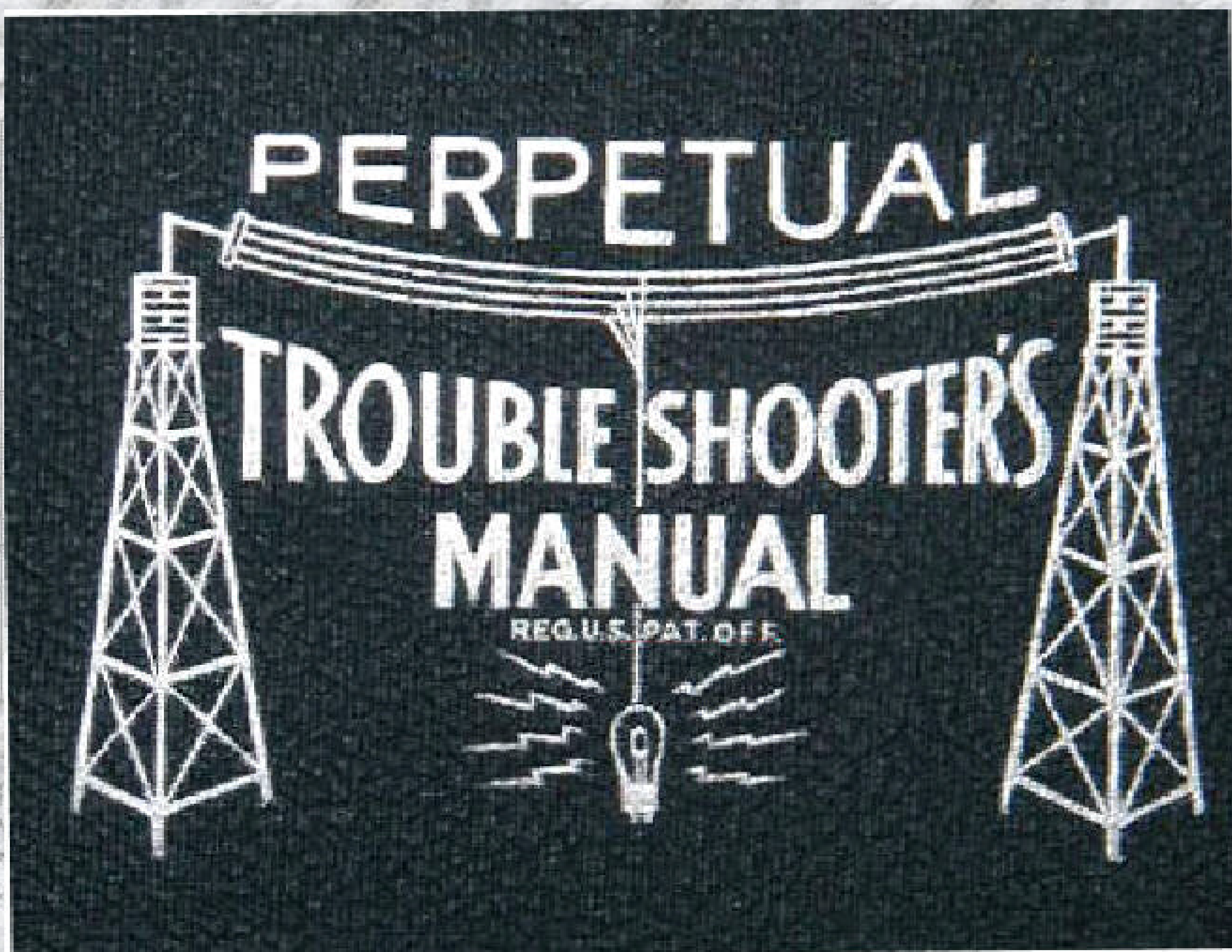
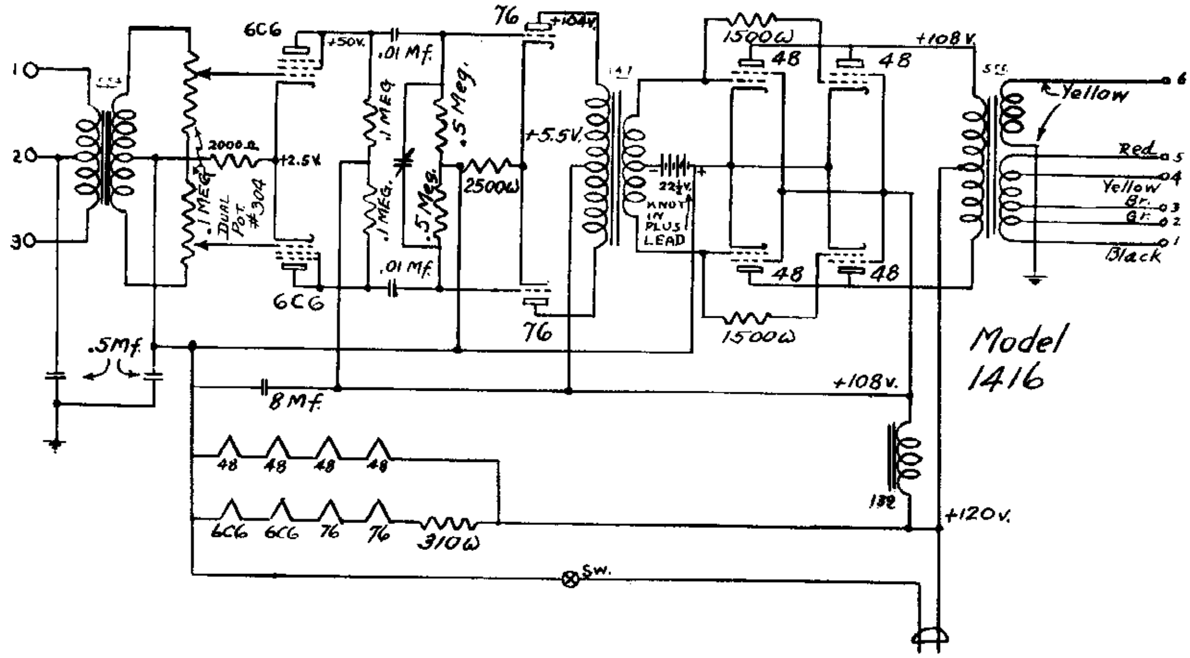
RIDER'S
VOLUME - VIII

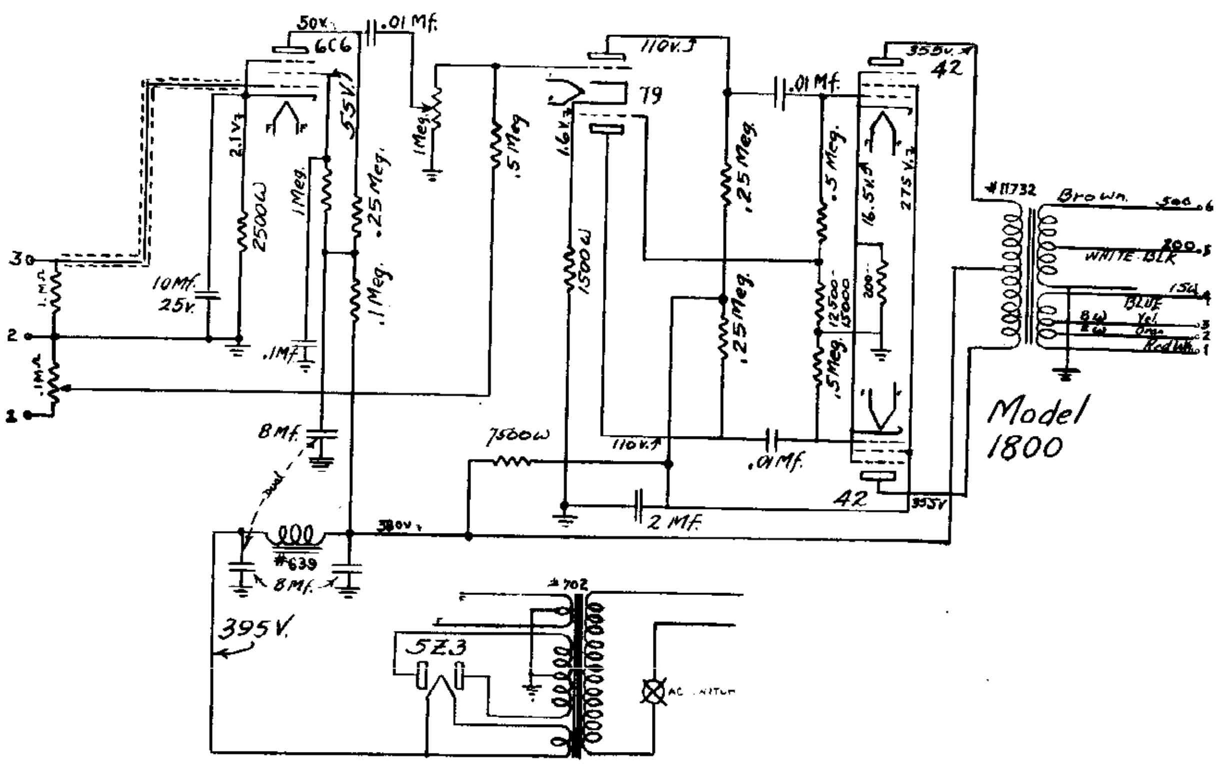


COVERING OCTOBER 1936
THROUGH
OCTOBER 1937

MODEL 14
MODEL 18
Schemati
Voltage

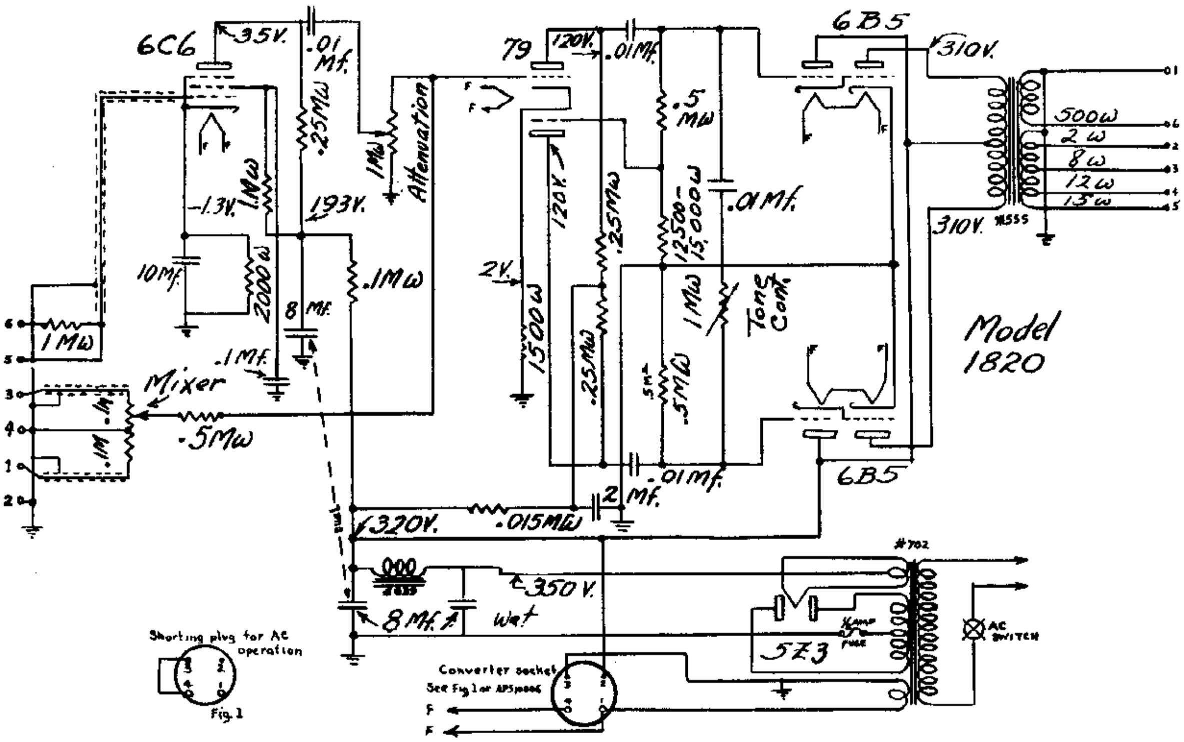
ACRATEST PRODUCTS

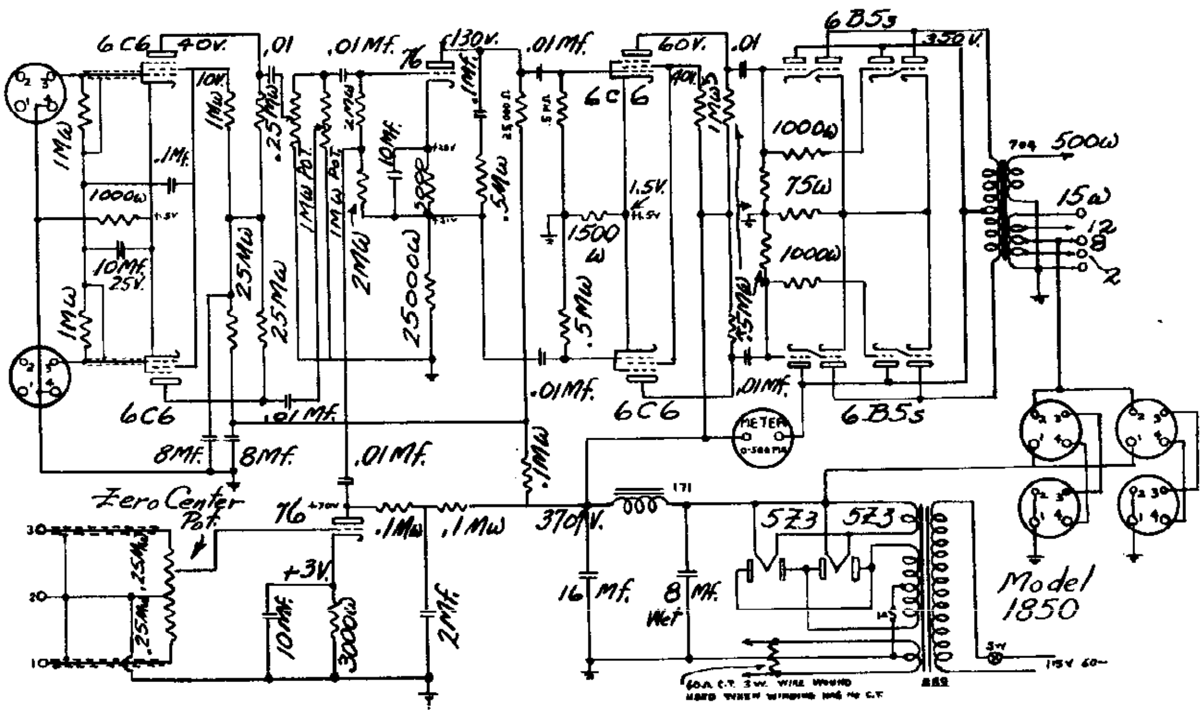




MODEL 1820
MODEL 1850
Schematics
Voltage

ACRATEST PRODUCTS

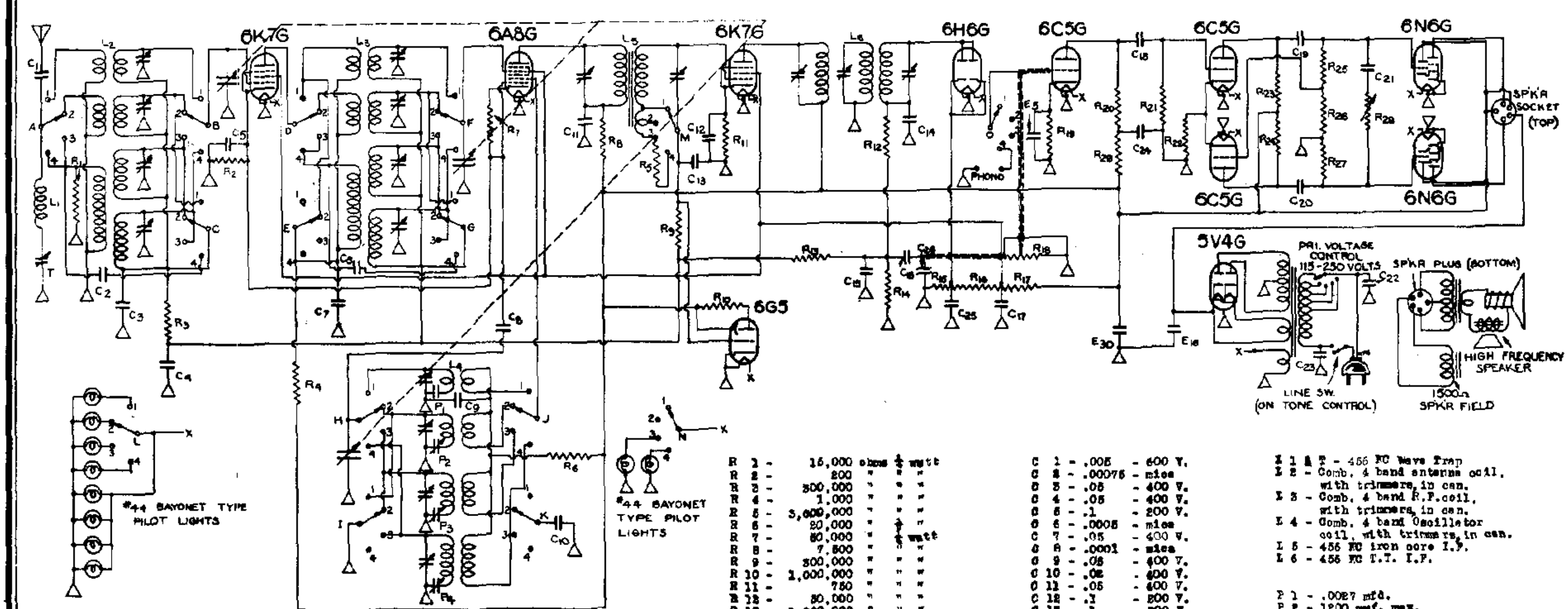




AIR KING PRODUCTS CORP.

MODEL 11F

4 BAND ALL-WAVE SUPERHETERODYNE



R 1 - 15,000 ohms ½ watt
R 2 - 200 " " "
R 3 - 500,000 " " "
R 4 - 1,000 " " "
R 5 - 3,000,000 " " "
R 6 - 20,000 " ½ "
R 7 - 50,000 " 1 watt
R 8 - 7,500 " " "
R 9 - 500,000 " " "
R 10 - 1,000,000 " " "
R 11 - 750 " " "
R 12 - 50,000 " " "
R 13 - 1,000,000 " " "
R 14 - 500,000 " " "
R 15 - 250 " } bleeder
R 16 - 15,000 "
R 17 - 10,000 "
R 18 - 500,000 " vol. control
R 19 - 9,000 " ½ watt
R 20 - 100,000 " " "
R 21 - 500,000 " " "
R 22 - 4,500 " " "
R 23 - 100,000 " " "
R 24 - 100,000 " " "
R 25 - 500,000 " " "
R 26 - 55,000 " " "
R 27 - 500,000 " " "
R 28 - 500,000 " tone control
R 29 - 50,000 " ½ watt

C 1 - .005 - 600 V.
C 2 - .00075 - mica
C 3 - .05 - 400 V.
C 4 - .05 - 400 V.
C 5 - .1 - 200 V.
C 6 - .0005 - mica
C 7 - .05 - 400 V.
C 8 - .0001 - mica
C 9 - .05 - 400 V.
C 10 - .02 - 400 V.
C 11 - .05 - 400 V.
C 12 - .1 - 200 V.
C 13 - .1 - 200 V.
C 14 - .0001 - mica
C 15 - .0001 - mica
C 16 - .02 - 400 V.
C 17 - .1 - 200 V.
C 18 - .05 - 400 V.
C 19 - .05 - 400 V.
C 20 - .05 - 400 V.
C 21 - .01 - 600 V.
C 22 - .05 - 400 V.
C 23 - .05 - 400 V.
C 24 - .1 - 200 V.
C 25 - .1 - 200 V.
C 26 - .0001 - mica

E 16 - 16 mfd - 450 V.
E 30 - 30 mfd - 550 V.

L 1 & T - 456 KC Wave Trap
L 2 - Comb. 4 band antenna coil, with trimmers, in can.
L 3 - Comb. 4 band R.F. coil, with trimmers, in can.
L 4 - Comb. 4 band Oscillator coil, with trimmers, in can.
L 5 - 456 KC iron core I.F.
L 6 - 456 KC T.T. I.F.

P 1 - .0027 mfd.
P 2 - 1200 mmf. max.
P 3 - 500 mmf. max.
P 4 - 200 mmf. max.

Wave Band Switch - 4 deck
3 section each deck,
1 to 4 position each section.
(Switches A,B,C,D,E,F,G,H,I,J,K,L)

Selectivity Switch - 1 deck,
3 section, 1 to 4 position
each section.
(Switches M, N, O)

NOTE: - WAVE BAND SWITCH SHOWN IN BAND 2 POSITION, (POLICE, AIRCRAFT, AMATEUR)
SELECTIVITY SWITCH SHOWN IN FIRST (SELECTIVE) POSITION.

ALIGNMENT FREQUENCIES

I.F. - 456 KC (Selectivity Switch in "Selectivity Position")

Trimmers	Padder
BAND 1 - 16 MC or 19 M	2 MC or 150 M
BAND 2 - 5 MC or 60 M	600 KC or 500 M
BAND 3 - 1500 KC or 200 M	150 KC or 2000 M
BAND 4 - 300 KC or 1000 M	150 KC or 2000 M

WAVE BAND SWITCH POSITIONS

1. Foreign Short Wave
2. Police, Aircraft, Amateur
3. Medium Wave
4. Long Wave

SELECTIVITY SWITCH POSITIONS

1. Selective
2. Medium Fidelity
3. High Fidelity
4. Phonograph

MODELS 21,22,522
81 Series
Schematic,Layout
Data

AIR KING PRODUCTS CORP.

INSTRUCTIONS FOR INSTALLATION AND OPERATION
Model Nos. 21-22-522 and 81 Series

This receiver employes a chassis of latest design. The frequency range covered is 540-1750 kilocycles.

TUBES (Model 21 series)
6D6, 6C6, 38, 76
(Model 81 & 22 and 522 series)
6D6, 6C6, 38, 76, K90F

ANTENNA The antenna built into the set will perform to give best results in most localities. However, in communities located more than 100 miles away from a broadcasting station, an outside antenna of 50 to 75 feet may be necessary for better performance. This antenna should be attached to the end of the built in antenna hank.

VOLUME CONTROL AND ON/OFF SWITCH This control is located on the lower right side of the receiver. To place set in operation, turn this knob to the right. This automatically turns the receiver on. To decrease volume to desired level, turn this control to the left. To turn set off, rotate the control to the extreme left until click is heard.

SELECTOR KNOB The selector knob is located on the upper right hand side of the receiver. It is used to tune in desired stations. The scale is calibrated in kilocycles.

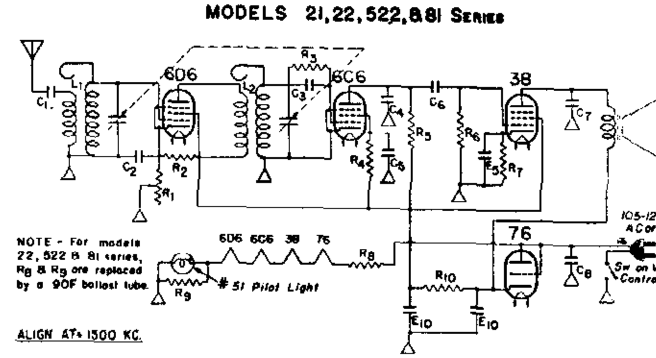
INSTALLATION a. Unhank the line cord and stretch it out to its full length before connecting to the 105-125 volts, 50-60 cycles AC or DC power lines. Under this condition, the cord will feel warm. THIS IS NORMAL. Operating with the cord hanked or rolled up may cause it to heat excessively and damage set. DO NOT CUT THIS CORD TO SHORTEN OR LENGTHEN IT.

b. When using DC current, allow the receiver to warm up for 60 seconds. IF AFTER THAT TIME RECEIVER DOES NOT FUNCTION, REVERSE THE PLUG IN THE ELECTRIC OUTLET.

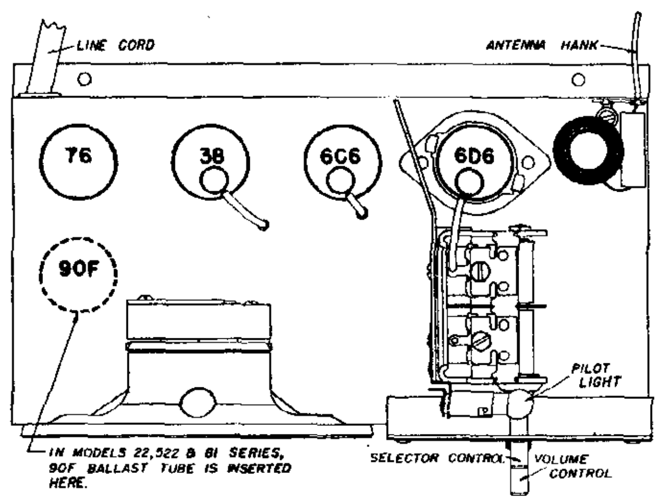
c. CAUTION — Do Not Connect Ground Wire to Chassis.

L1 - Antenna Coil
L2 - RF Coil

MODELS 21,22,522,&81 SERIES

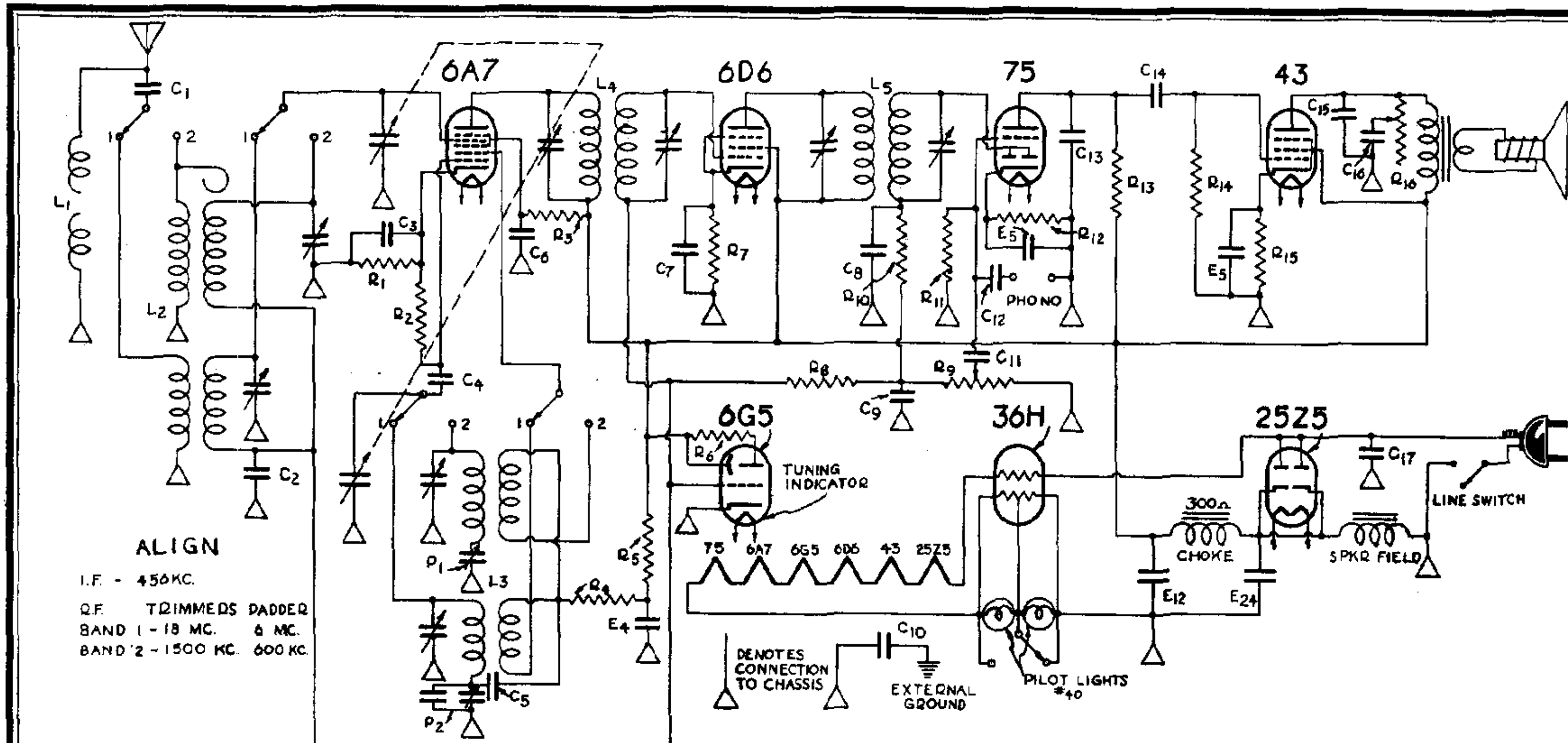


TUBE SOCKET LOCATIONS



E5	5 MF	25 VOLT
E10	10 MF	150 VOLT
C1	.005 MF	400 VOLT
C2	.02 MF	400 VOLT
C3	.005 MF	400 VOLT
C4	.0001 MF	mica
C5	.02 MF	400 VOLT
C6	.02 MF	400 VOLT
C7	.005 MF	400 VOLT
C8	.05 MF	400 VOLT
R1	25,000 ohm	VOL. CONTROL
R2	35,000 ohm	1/4 Watt
R3	3,000,000 ohm	1/4 Watt
R4	6,000,000 ohm	1/4 Watt
R5	1,000,000 ohm	1/4 Watt
R6	750,000 ohm	1/4 Watt
R7	1,000 ohm	1/4 Watt
R8	290 ohm	in line cord
R9	31 ohm	3 Watt
R10	2700 ohm	1/4 Watt

AIR KING PRODUCTS CORP.



R 1 -	250 ohms	1/4	watt
R 2 -	50,000 "	1/4	"
R 3 -	35,000 "	1/4	"
R 4 -	4,500 "	1/4	"
R 5 -	4,500 "	1/4	"
R 6 -	1,000,000 "	1/4	"
R 7 -	500 "	1/4	"
R 8 -	3,000,000 "	1/4	"
R 9 -	500,000 "	vol. cont.	
R10 -	50,000 "	1/4	watt
R11 -	750,000 "	1/4	"
R12 -	4,500 "	1/4	"
R13 -	500,000 "	1/4	"
R14 -	750,000 "	1/4	"
R15 -	650 "	1	"
R16 -	500,000 "	tone cont.	

L 1 - 456 KC Wave Trap
L 2 - Comb. B'dcast and Short Wave Ant. Coil
L 3 - Comb. B'dcast and Short Wave Osc. Coil
L 4 - 456 KC I.F.
L 5 - 456 KC I.F.

P 1 - .0005 mfd.
P 2 - .0053 mfd.

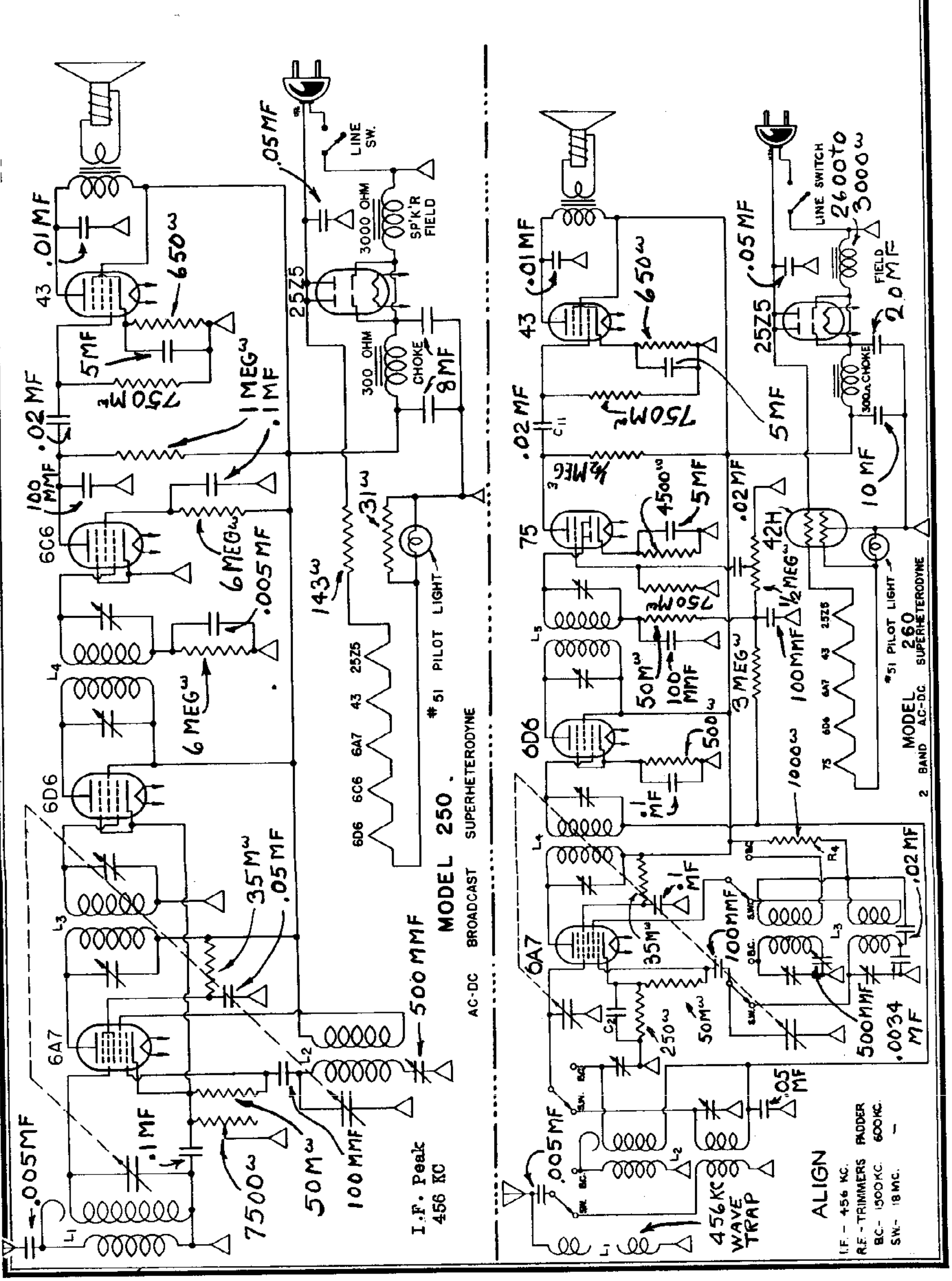
E 3 - 4 mfd. - 25 V.
E 5 - 5 mfd. - 25 V.
E 4 - 4 mfd. -150 V.
E12 - 12 mfd. -150 V.
E24 - 24 mfd. -150 V.

C 1 -	.005	- 600 V.
C 2 -	.05	- 400 V.
C 3 -	.1	- 200 V.
C 4 -	.0001	- Mica.
C 5 -	.02	- 400 V.
C 6 -	.05	- 400 V.
C 7 -	.1	- 200 V.
C 8 -	.0001	- Mica.
C 9 -	.0001	- Mica.
C10 -	.1	- 200 V.
C11 -	.02	- 400 V.
C12 -	.1	- 200 V.
C13 -	.0001	- Mica.
C14 -	.02	- 400 V.
C15 -	.005	- 600 V.
C16 -	.02	- 400 V.
C17 -	.05	- 400 V.

MODELS 72,73 2 BAND AC-DC SUPERHETERODYNE WITH VISION TUNING

MODEL 250
MODEL 260
Schematics

AIR KING PRODUCTS CORP.

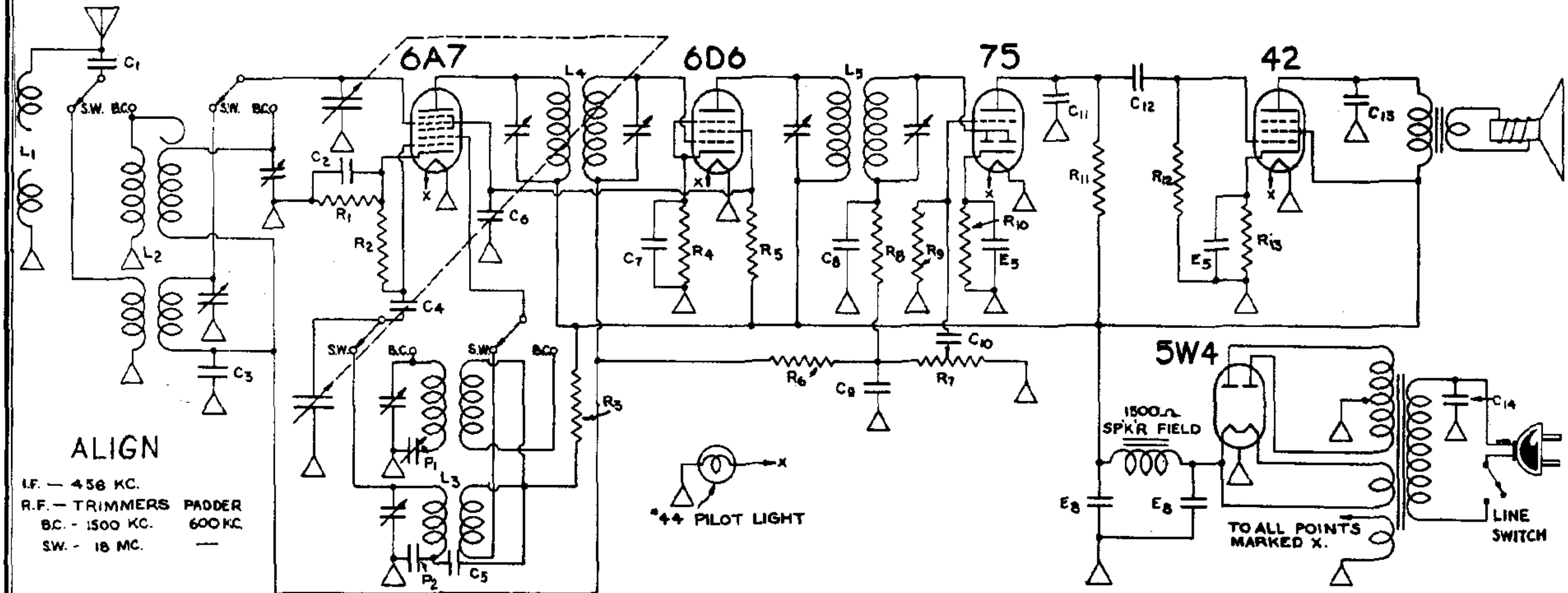


AIR KING PRODUCTS CORP.

MODEL 261
MODELS 730,731
Schematics,Alignm

MODEL 261

2 BAND A.C. SUPERHETERODYNE

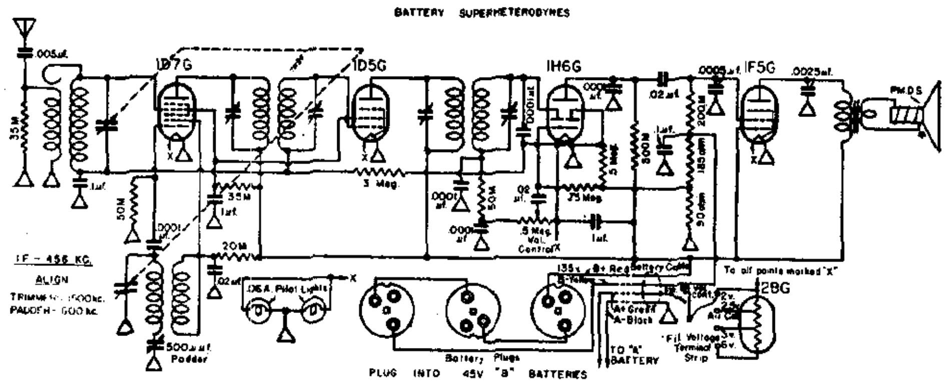


ALIGN

I.F. — 456 KC.
R.F. — TRIMMERS PADDER
B.C. - 1500 KC. 600 KC.
S.W. - 18 MC. —

MODELS 730,731

BATTERY SUPERHETERODYNES



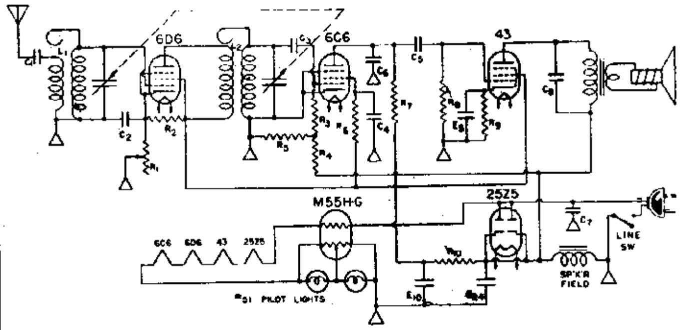
I.F. – 456 KC.
ALIGN
TRIMMERS 1500 KC.
PADDER - 600 KC.

R 1 - 250 ohm ½ watt	L 1 - 456 KC wave trap	C 1 - .005 - 600 V.
R 2 - 50,000 " ½ "	L 2 - 2 band Antenna coil	C 2 - .1 - 200 V.
R 3 - 20,000 " ½ "	L 3 - 2 band Oscillator coil	C 3 - .05 - 400 V.
R 4 - 500 " ½ "	L 4 - 456 KC Input I.F.	C 4 - .0001 - mica
R 5 - 20,000 " ½ "	L 5 - 456 KC Output I.F.	C 5 - .02 - 400 V.
R 6 - 5,000,000 " ½ "		C 6 - .1 - 200 V.
R 7 - 500,000 " Vol.Cont.	P 1 - 500 Mmf.	C 7 - .1 - 200 V.
R 8 - 50,000 " ½ watt	P 2 - .0054 mfd.	C 8 - .0001 - mica
R 9 - 750,000 " ½ "		C 9 - .0001 - mica
R 10 - 2,000 " ½ "	E 5 - 5 mfd. - 35 V.	C 10 - .02 - 400 V.
R 11 - 500,000 " ½ "	E 5 - 5 mfd. - 35 V.	C 11 - .0001 - mica
R 12 - 750,000 " ½ "	E 8 - 8 mfd. -250 V.	C 12 - .02 - 400 V.
R 13 - 400 " ½ "	E 8 - 8 mfd. -250 V.	C 13 - .005 - 600 V.
		C 14 - .05 - 200 V.

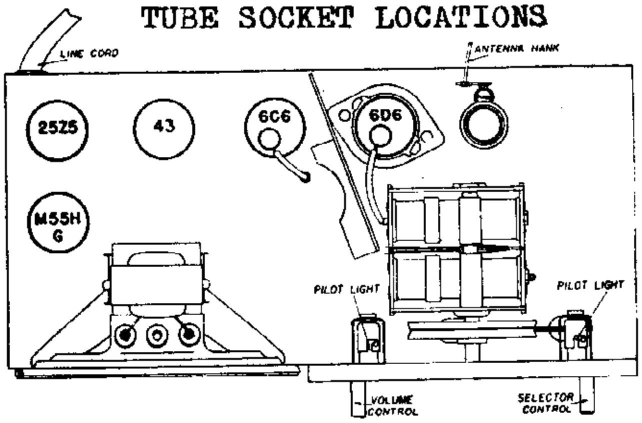
MODEL 700
MODEL 705

AIR KING PRODUCTS CORP.

Schematics
Socket



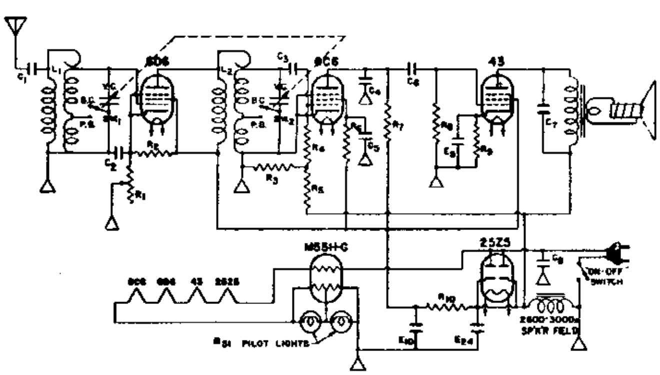
TUBE SOCKET LOCATIONS



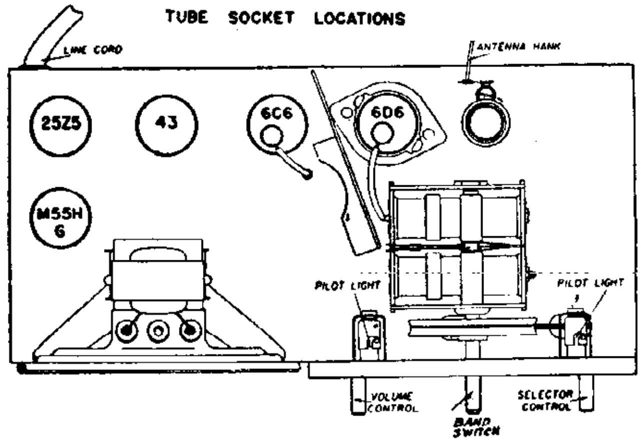
The frequency range covered is 540-1750 kilocycles.

MODEL No. 700

- R1 - 25,000 ohm Vol. Cont.
- R2 - 35,000 " 1/4 Watt
- R3 - 6,000,000 " " "
- R4 - 1,000,000 " " "
- R5 - 2,700 " " "
- R6 - 6,000,000 " " "
- R7 - 1,000,000 " " "
- R8 - 500,000 " " "
- R9 - 650 " 1/2 "
- R10 - 4,500 " " "
- C1 - .005 MF, 400 Volt DC
- C2 - .02 MF, 200 " "
- C3 - .005 MF, 400 " "
- C4 - .02 MF, 200 " "
- C5 - .02 MF, 200 " "
- C6 - .00025 MF, Mica
- C7 - 1 MF, 400 Volt DC
- C8 - .005 MF, 400 " "
- E5 - 5 MF, 25 VOLT Elec.
- E10 - 10 MF, 150 VOLT ELEC.
- E24 - 24 MF, 150 VOLT ELEC.
- L1 - Antenna Coil
- L2 - R.F. COIL



TUBE SOCKET LOCATIONS



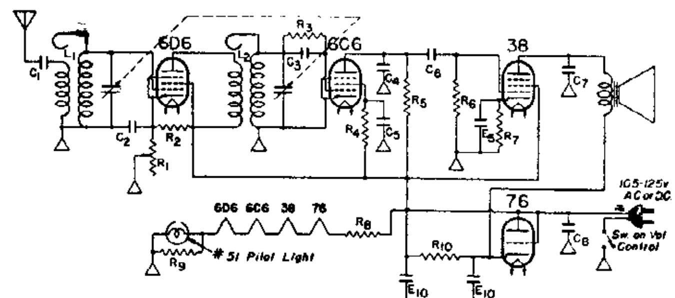
The frequency ranges covered are 540-1750, and 1725-4000 kilo-cycles.

MODEL No. 705

- R1 - 25,000 Ohm Vol. Cont.
- R2 - 35,000 " 1/4 Watt
- R3 - 27,000 " " "
- R4 - 6,000,000 " " "
- R5 - 1,000,000 " " "
- R6 - 6,000,000 " " "
- R7 - 1,000,000 " " "
- R8 - 500,000 " " "
- R9 - 650 " 1/2 "
- R10 - 4,500 " " "
- C1 - .005 MF, 400 Volt DC
- C2 - .02 MF, 200 " "
- C3 - .005 MF, 400 Volt DC
- C4 - .00025 MF - Mica
- C5 - .02 MF, 200 Volt DC
- C6 - .02 MF, 200 " "
- C7 - .005 MF, 400 " "
- C8 - .1 Mf , 400 " "
- E5 - 5 MF, 150 Volt Elec.
- E10 - 10 MF, 150 " "
- E24 - 24 MF, 150 " "
- L1 - Combination Ant. Coil
- L2 - Combination RF Coil
- VC - 410 MMF Max. Variable
- SW1, SW2 - 2 Pole, 2 position common rotor band switch

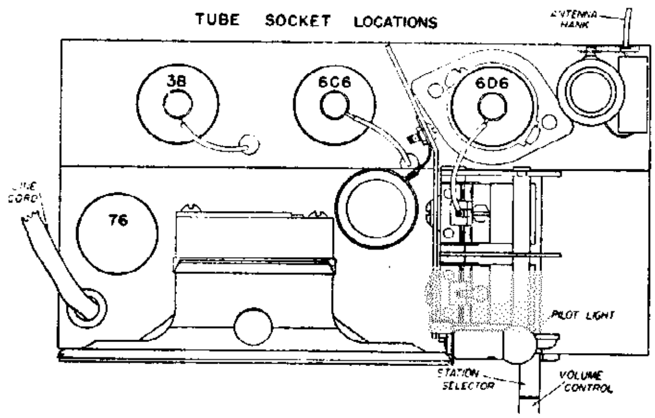
AIR KING PRODUCTS CORP.

MODELS 1000 and 2000



ALIGN AT 1500 KC.

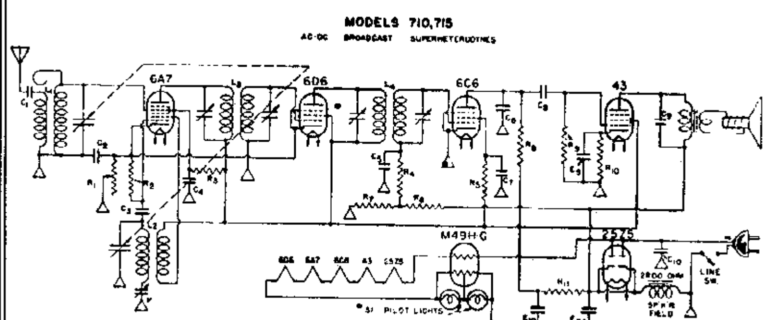
TUBE SOCKET LOCATIONS



The frequency range is 540-1750 kilocycles.

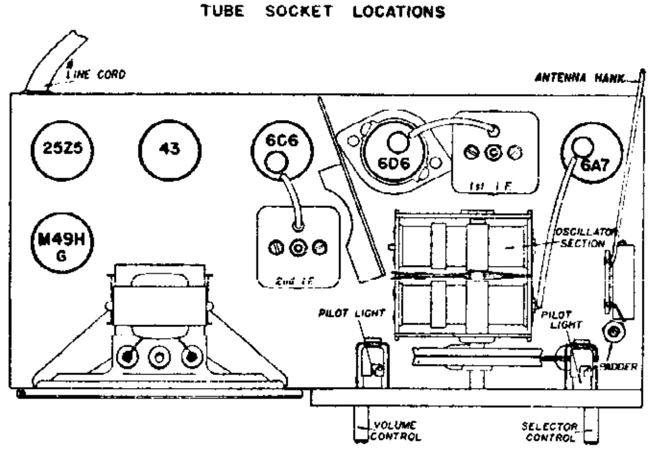
R1 -	25,000 Ohm Vol. Cont	
R2 -	35,000 " 1/4 Watt	
R3 -	3,000,000 " " "	
R4 -	6,000,000 " " "	
R5 -	1,000,000 " " "	
R6 -	750,000 " " "	
R7 -	1,000 " " "	
R8 -	290 Ohm in line cord	
R9 -	31 Ohm 3 Watt	
R10-	2,700 Ohm 1/4 Watt	
C1 -	.005 MF , 400 Volt DC	
C2 -	.02 " , 400 " "	
C3 -	.005 " , 400 " "	
C4 -	.0001 " , Mica	
C5 -	.02 " , 400 Volt DC	
C6 -	.02 " , 400 Volt DC	
C7 -	.005 " , " " "	
C8 -	.05 " , " " "	
E5 -	5 Mf , 25 Volt Elec.	
E10-	10 Mf ,150 " "	
L1 -	Antenna Coil	
L2 -	RF Coil	

MODELS 710 and 715



IF PEAK 456 KC

TUBE SOCKET LOCATIONS



The frequency range covered is 540-1750 kilocycles.

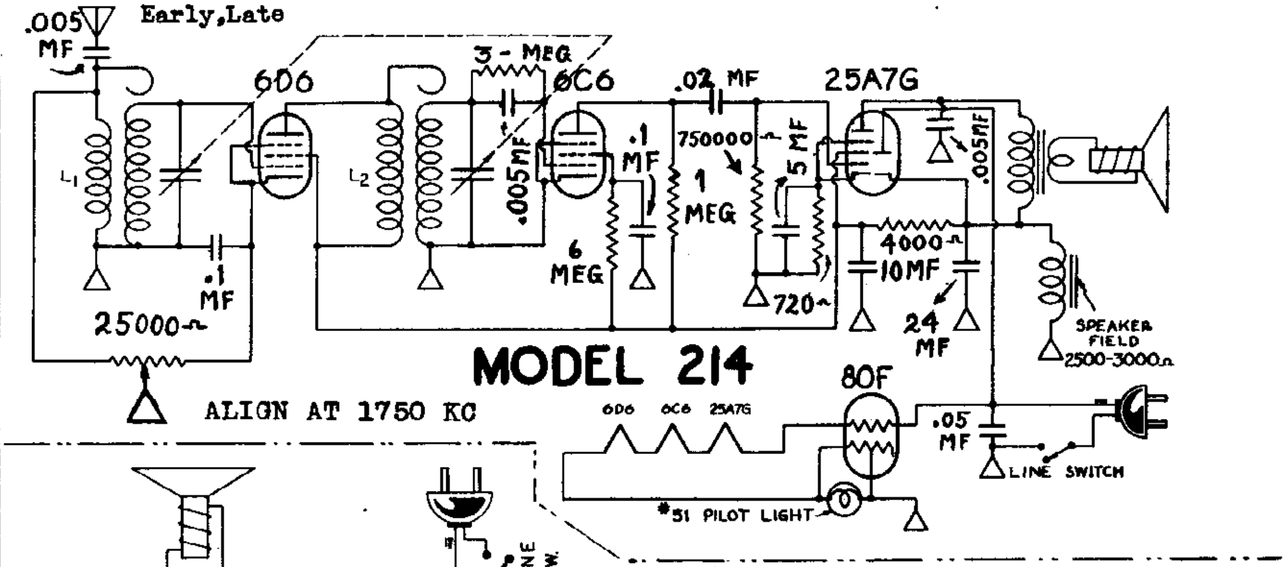
R1 -	7,500 Ohm Vol. Cont
R2 -	50,000 " 1/4 Watt
R3 -	35,000 " " "
R4 -	6,000,000 " " "
R5 -	6,000,000 " " "
R7 -	2,700 " " "
R8 -	1,000,000 " " "
R9 -	500,000 " " "
R10-	650 " 1/2 "
R11-	4,500 " " "
C1 -	.005 MF , 400 Volt DC
C2 -	.1 MF , 200 " "
C3 -	.0001 " , MICA
C4 -	.02 " , 400 Volt DC
C5 -	.005 " , 400 " "
C6 -	.00025 MF, Mica
C7 -	.02 MF , 400 Volt DC
C8 -	.02 " , 400 " "
C9 -	.005 " , 400 " "
C10-	.1 " , 200 " "

L1- Ant. Coil ; L2- Osc.Coil
L3- input IF ; L4-Output IF
E5- 5 MF, 25 Volt Electro.
E10-10 MF, 150 Volt "
E24-24 MF, 150 " "

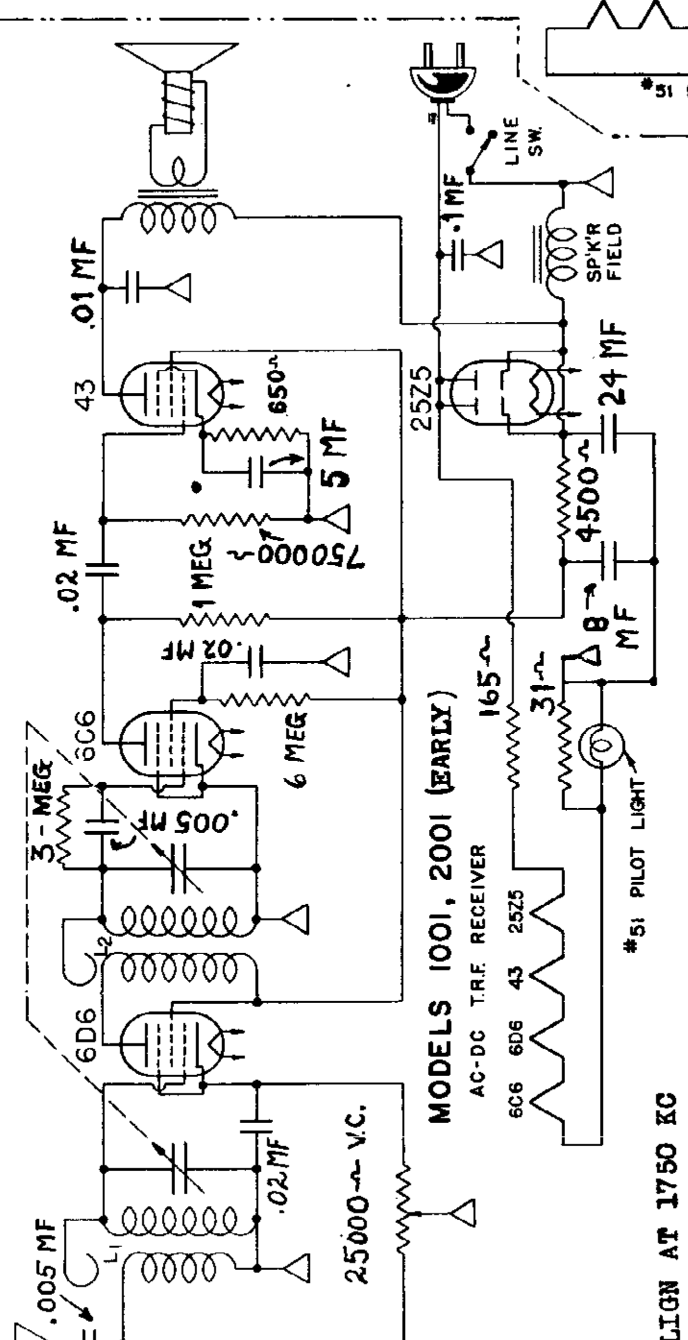
MODEL 214
MODELS 1001,2001 Early,Late

AIR KING PRODUCTS CORP.

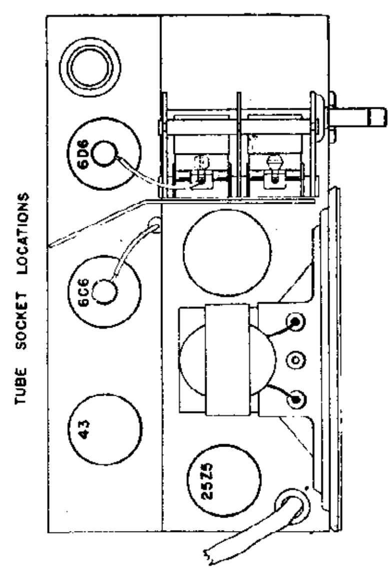
Schematics, Socket



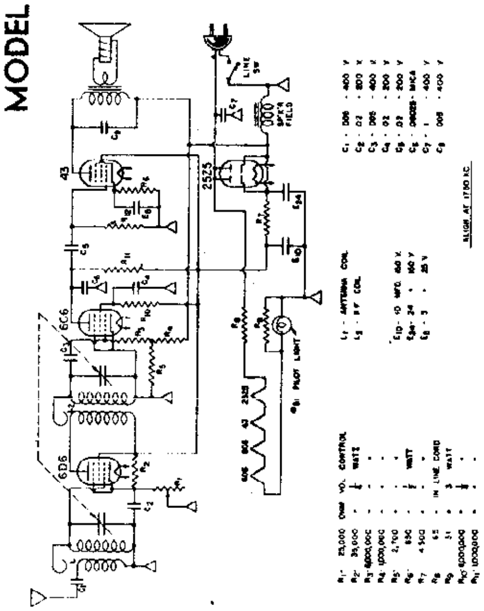
MODEL 214



MODELS 1001, 2001 (EARLY)
AC-DC T.R.F. RECEIVER



TUBE SOCKET LOCATIONS



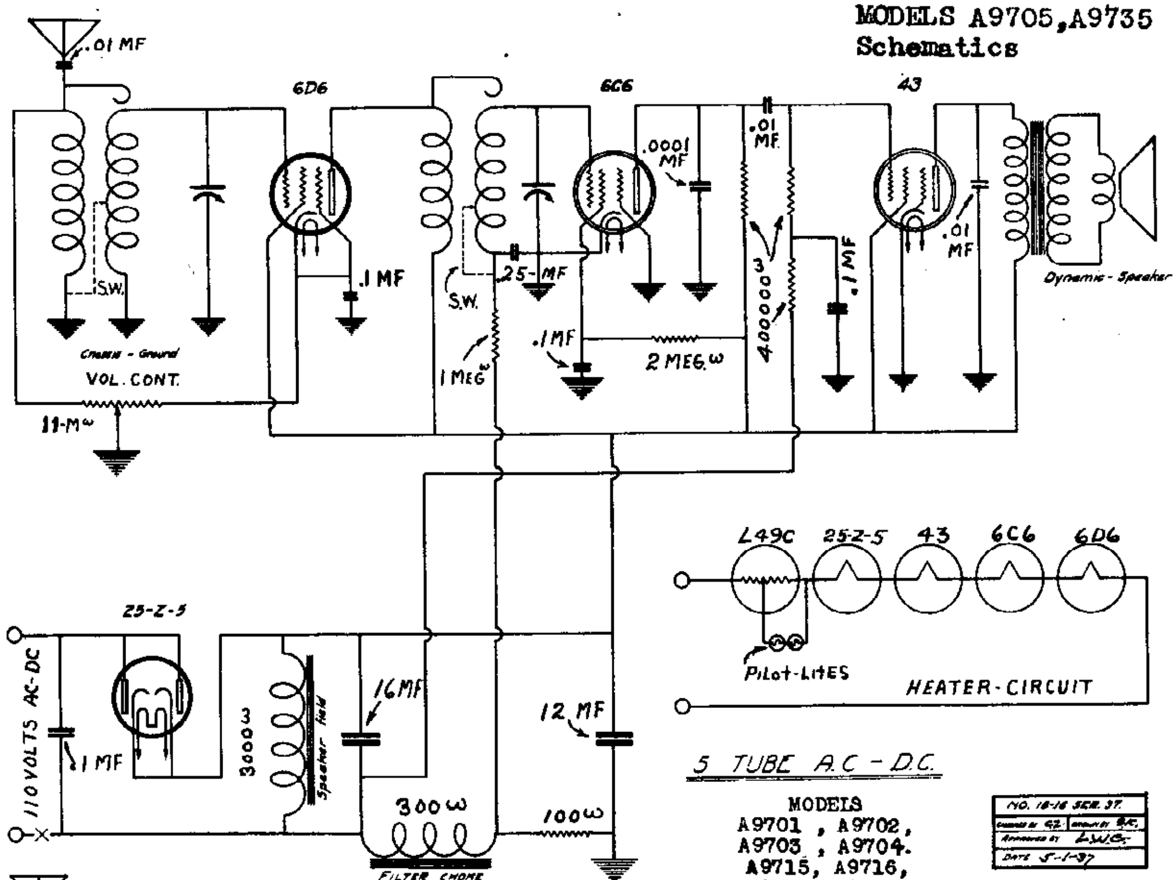
MODEL No. 1001, 2001 (REVISED)

ALLIED RADIO CORP.

MODELS A9701, A9702, A9703, A9704, A9715, A9716, A9717, A9718

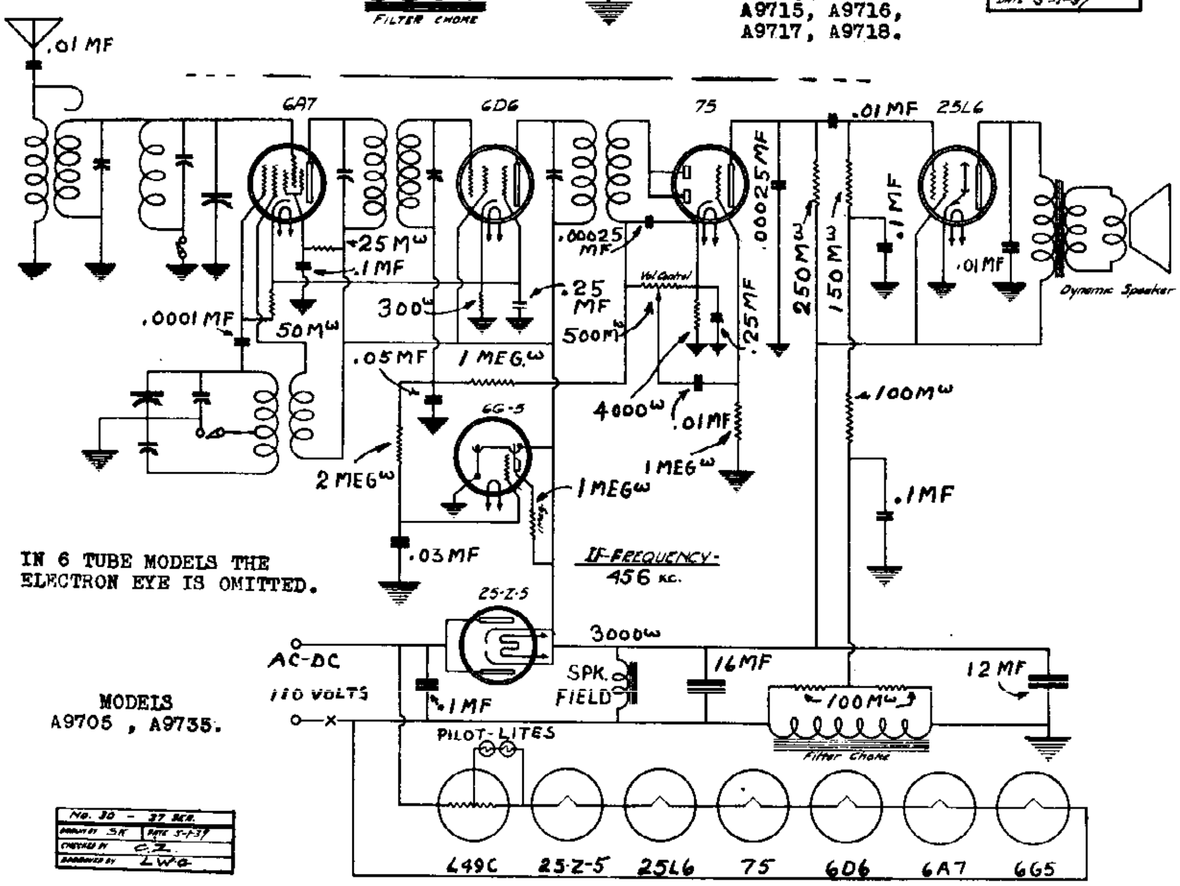
MODELS A9705, A9735

Schematics



5 TUBE A.C - D.C.

MODELS
A9701 , A9702,
A9703 , A9704.
A9715, A9716,
A9717, A9718.

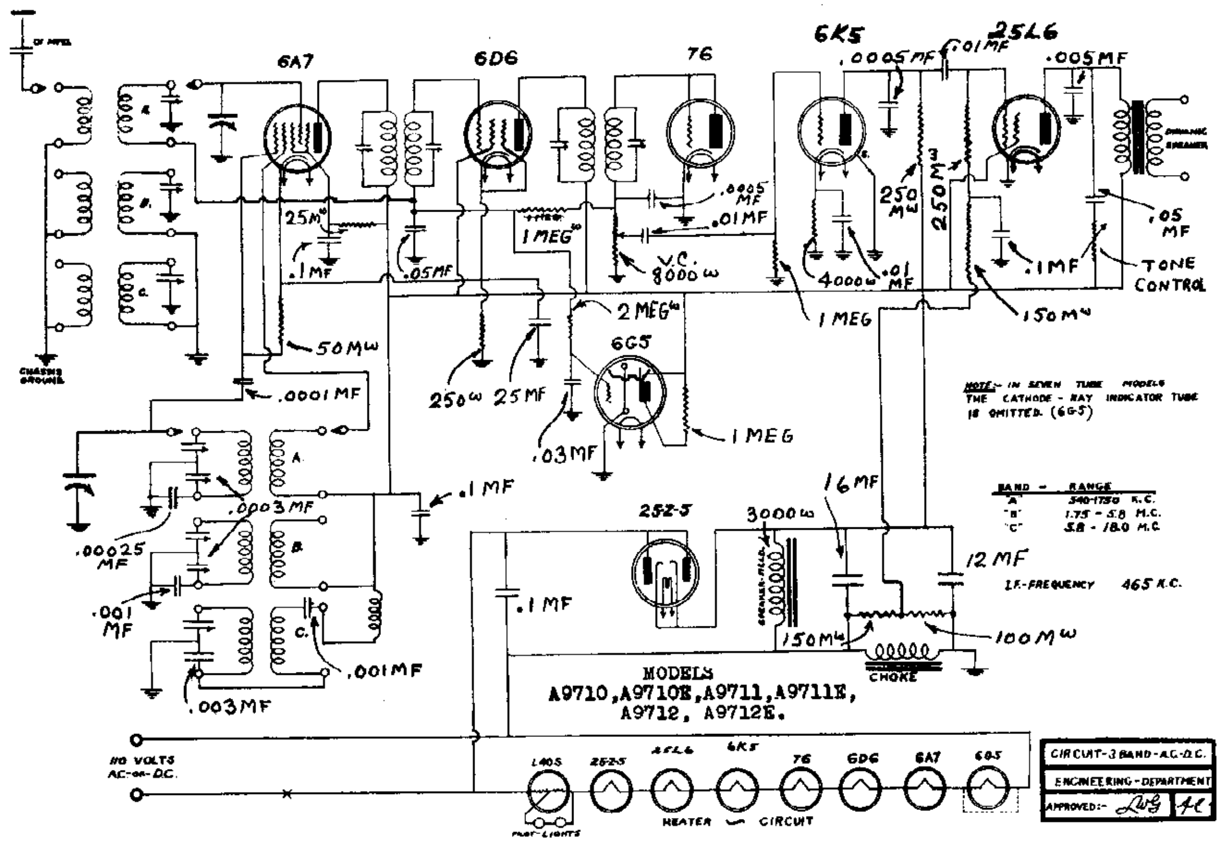


IN 6 TUBE MODELS THE ELECTRON EYE IS OMITTED.

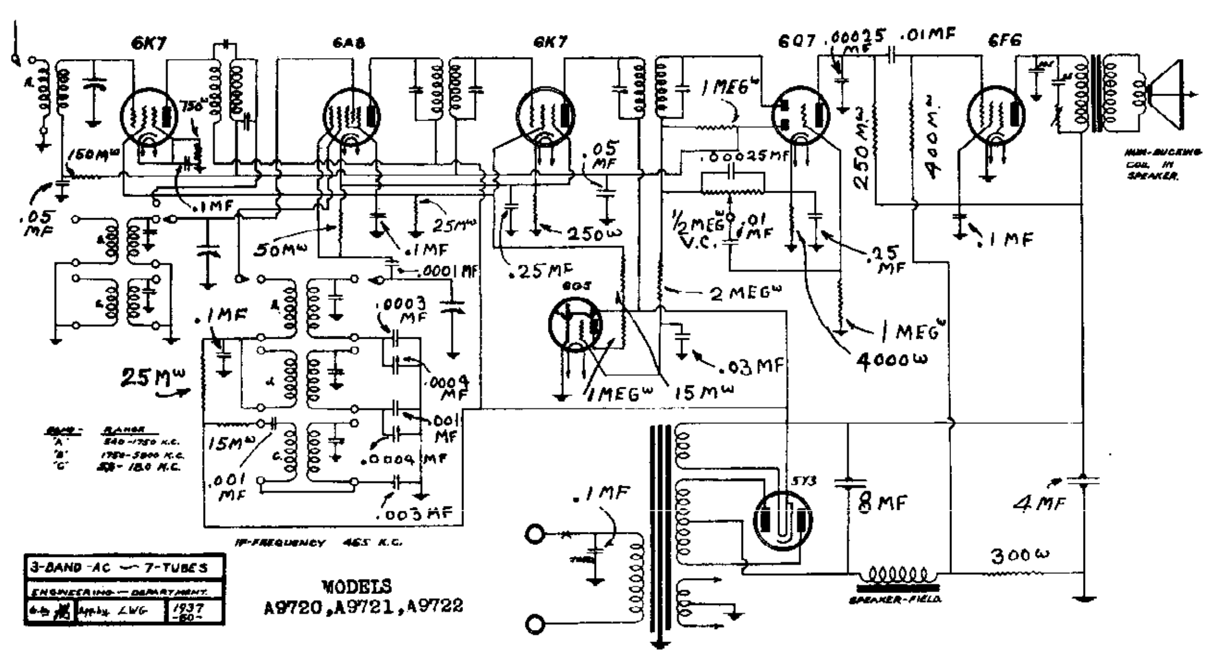
MODELS
A9705 , A9735.

MODELS A9710,A9711,A9711E
A9712,A9712E
MODELS A9720,A9721,A9722
Schematics

ALLIED RADIO CORP.



MODELS
A9710,A9710E,A9711,A9711E,
A9712, A9712E.



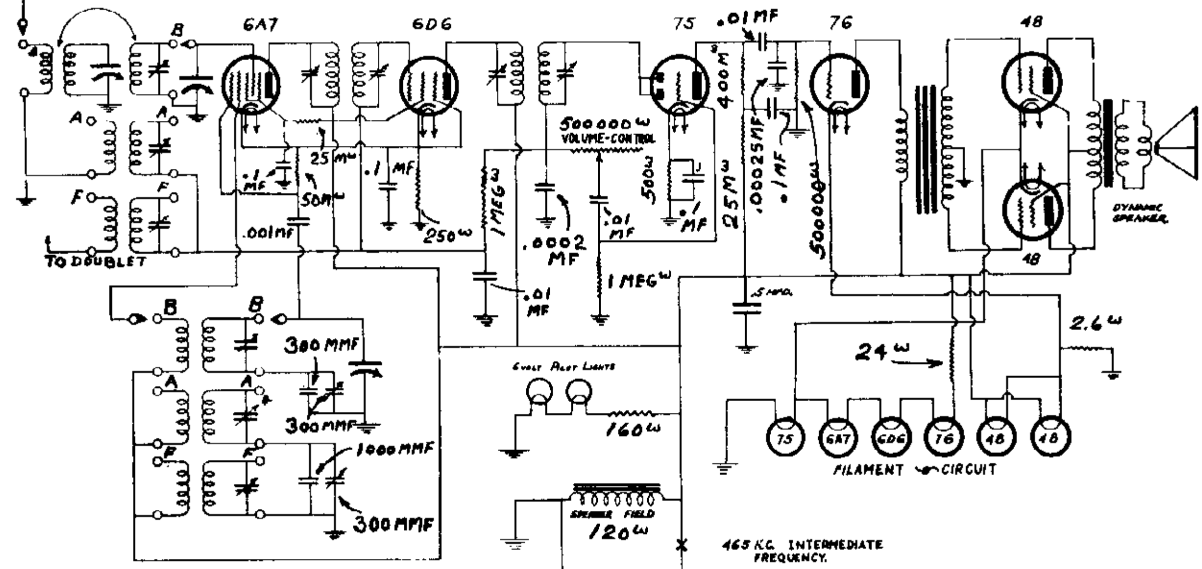
MODELS
A9720,A9721,A9722

ALLIED RADIO CORP.

MODELS A9724, A9725, A9726, A9813
MODELS A9728, A9729, A97
Schematics

ALL-WAVE THREE BAND

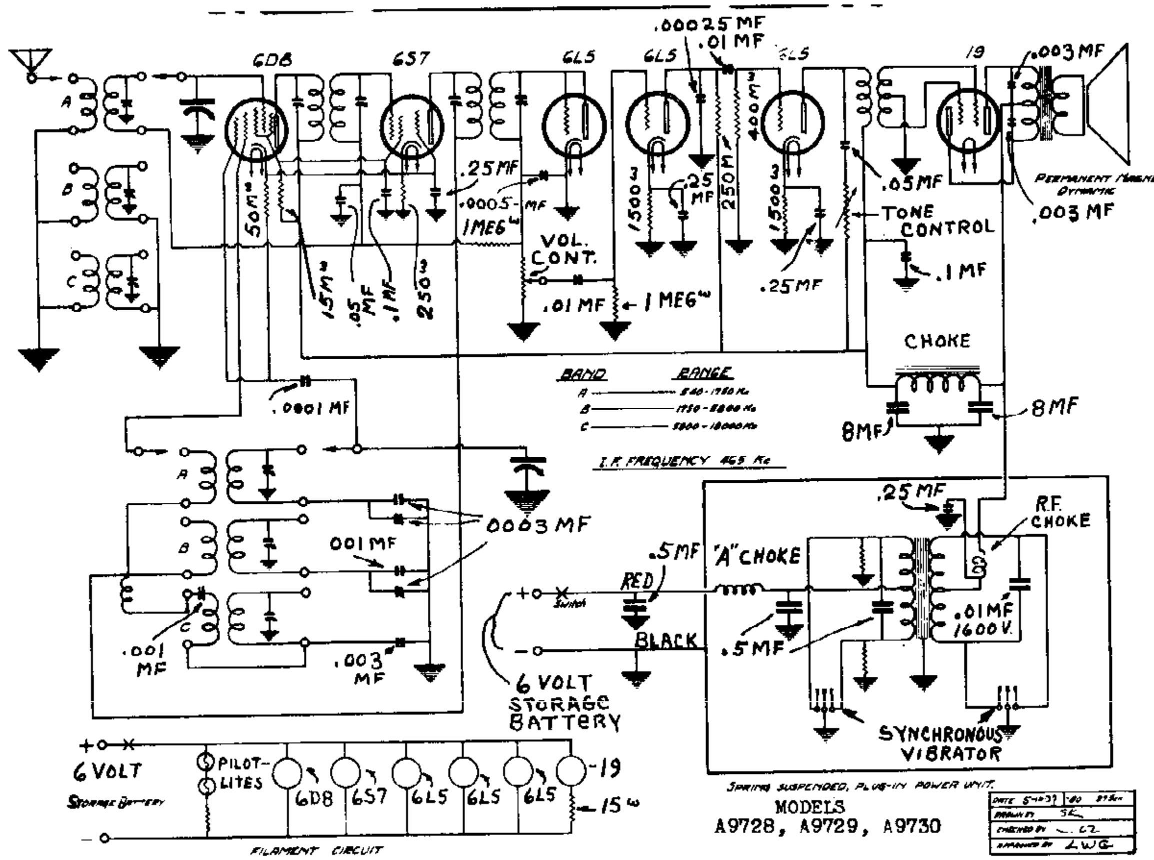
6 • TUBE • 32 • VOLT • SUPERHET



BAND	FREQUENCY RANGE
"B" BROADCAST	540 KC. – 1710 K.C.
"A" AMATEUR	1700 KC. – 5500 K.C.
"F" FOREIGN	5.5 MEG. – 16.5 MEGACYCLES

MODELS
A9724, A9725, A9726
MODEL A9813

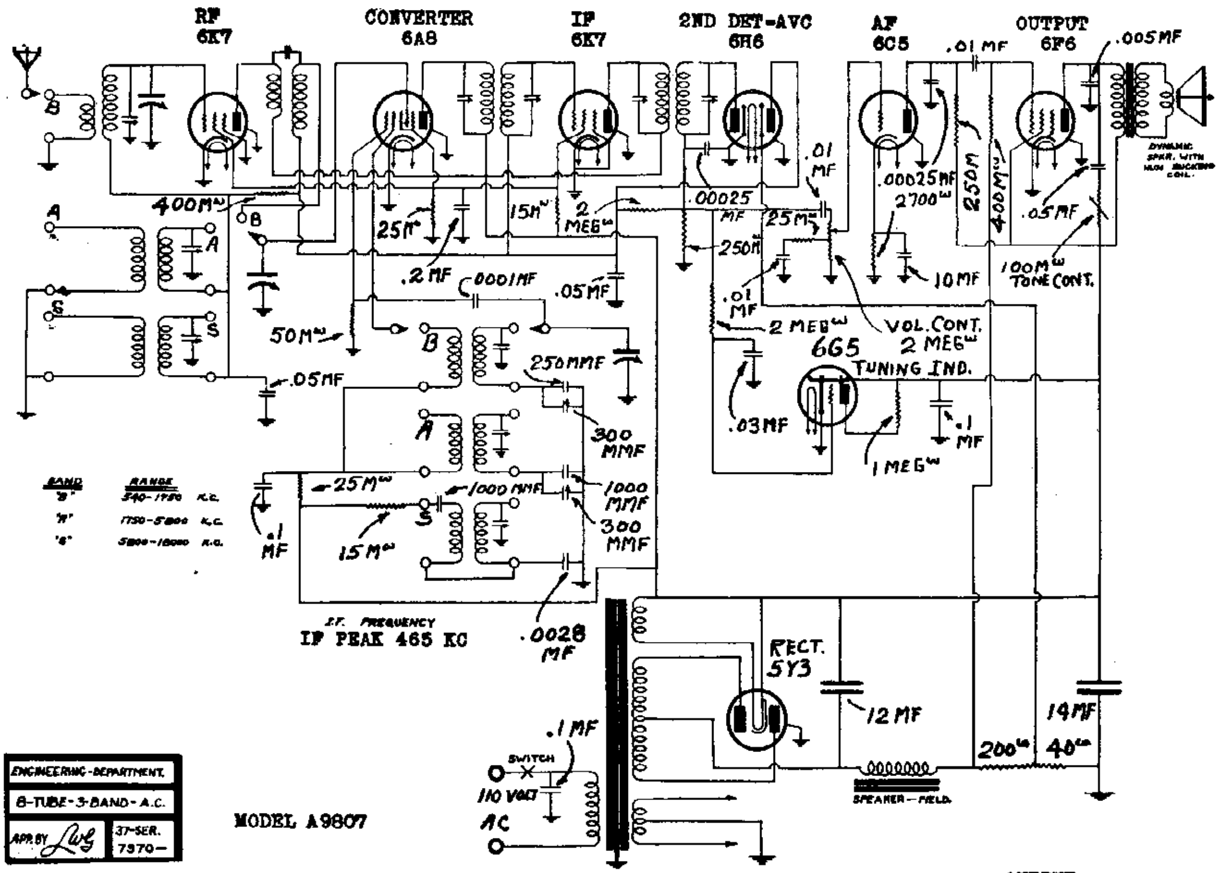
ENGINEERING DEPARTMENT



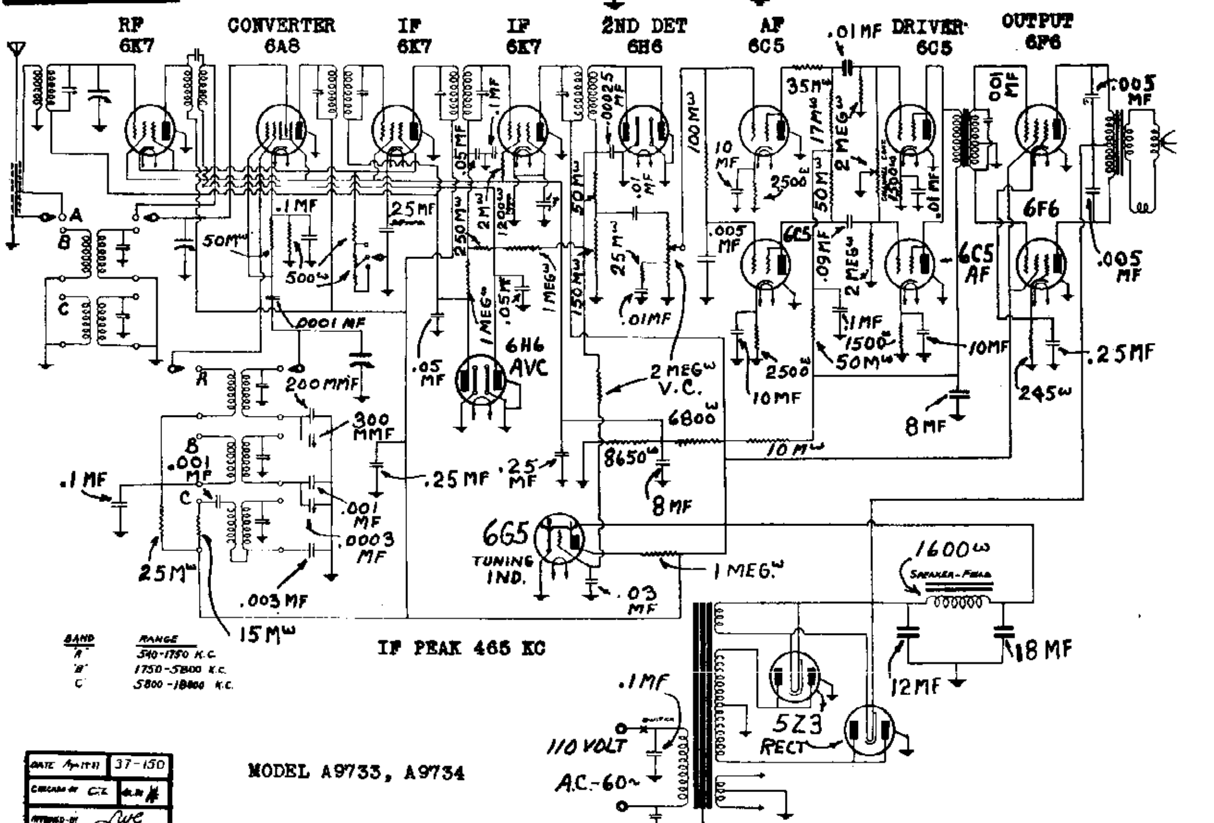
MODELS
A9728, A9729, A9730

MODELS A9733, A9734
MODEL A9807
Schematics

ALLIED RADIO CORP.

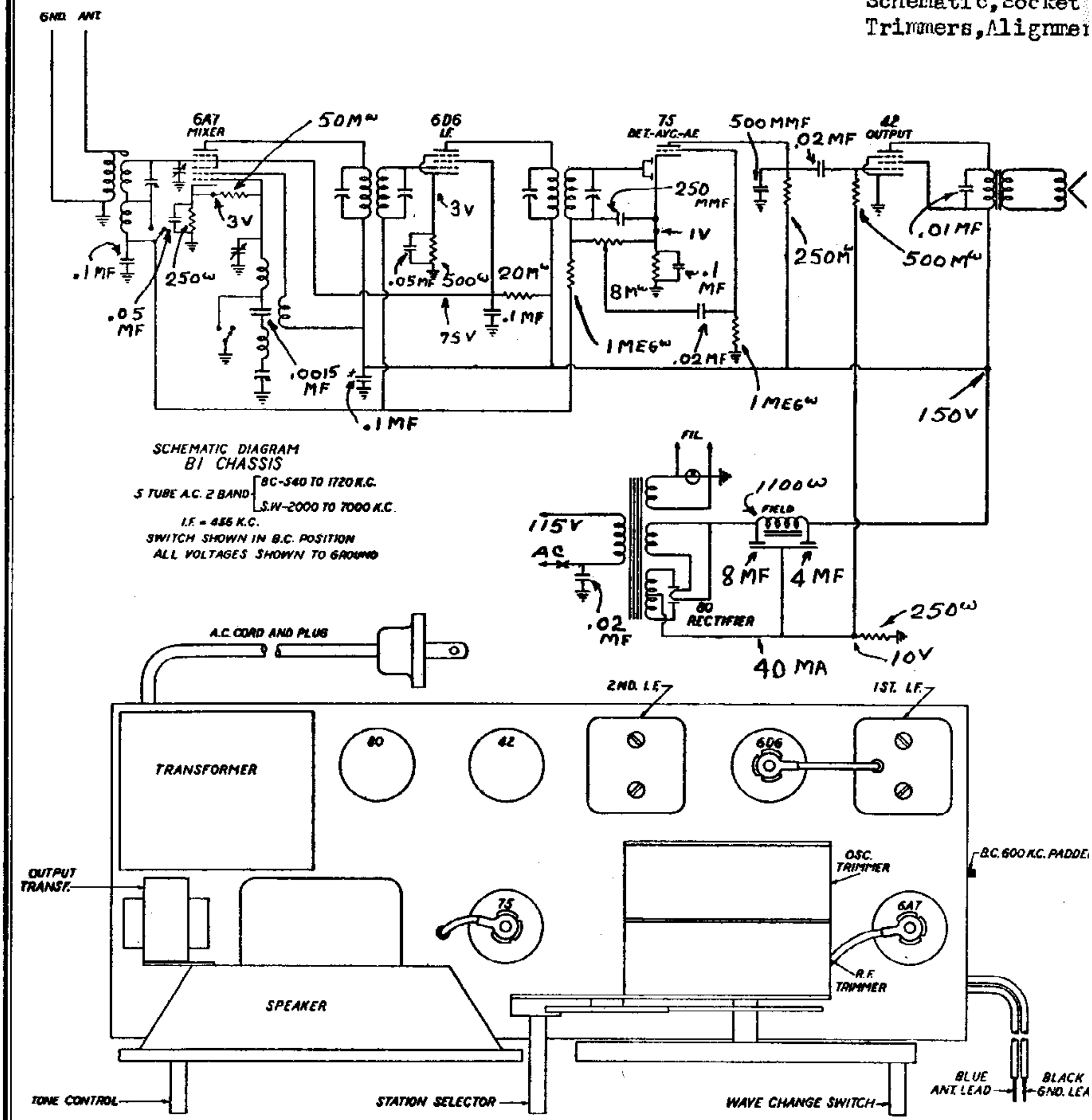


MODEL A9807



MODEL A9733, A9734

ALLIED RADIO CORP.



ALIGNMENT

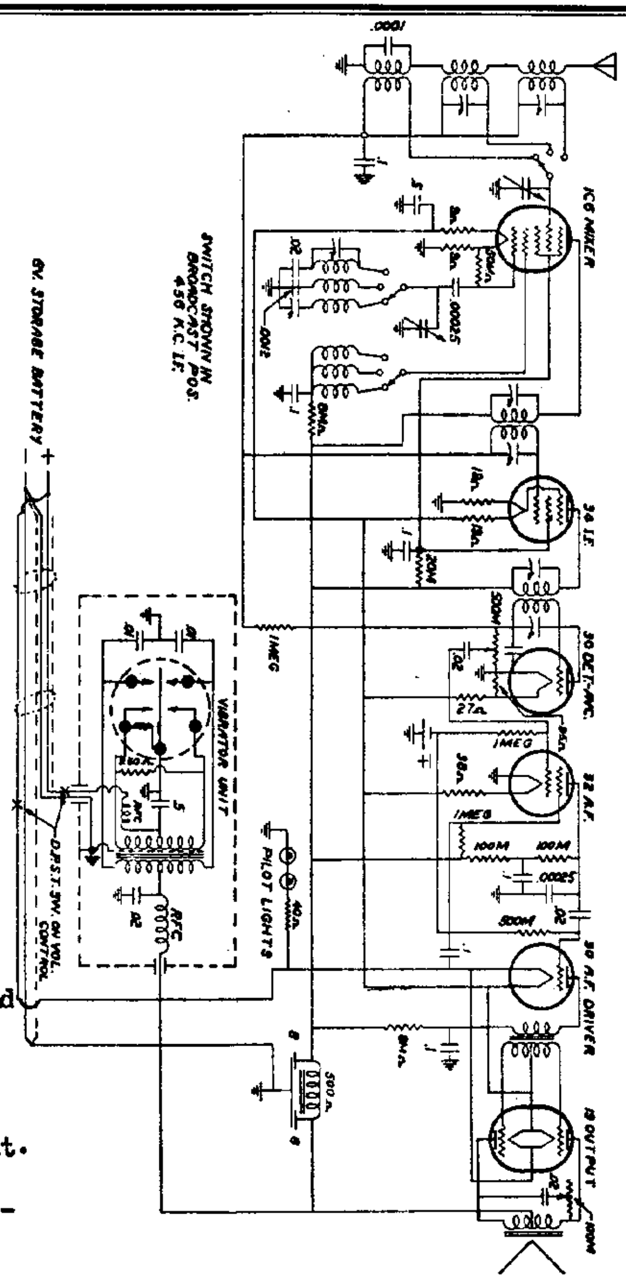
INTERMEDIATE FREQUENCY - Connect the Signal Generator to grid of 6A7 tube through a .05 MFD condenser. Ground Generator to Ground of chassis. Set Generator at 456 KC and adjust trimmers on IF transformers for Max. Peak.

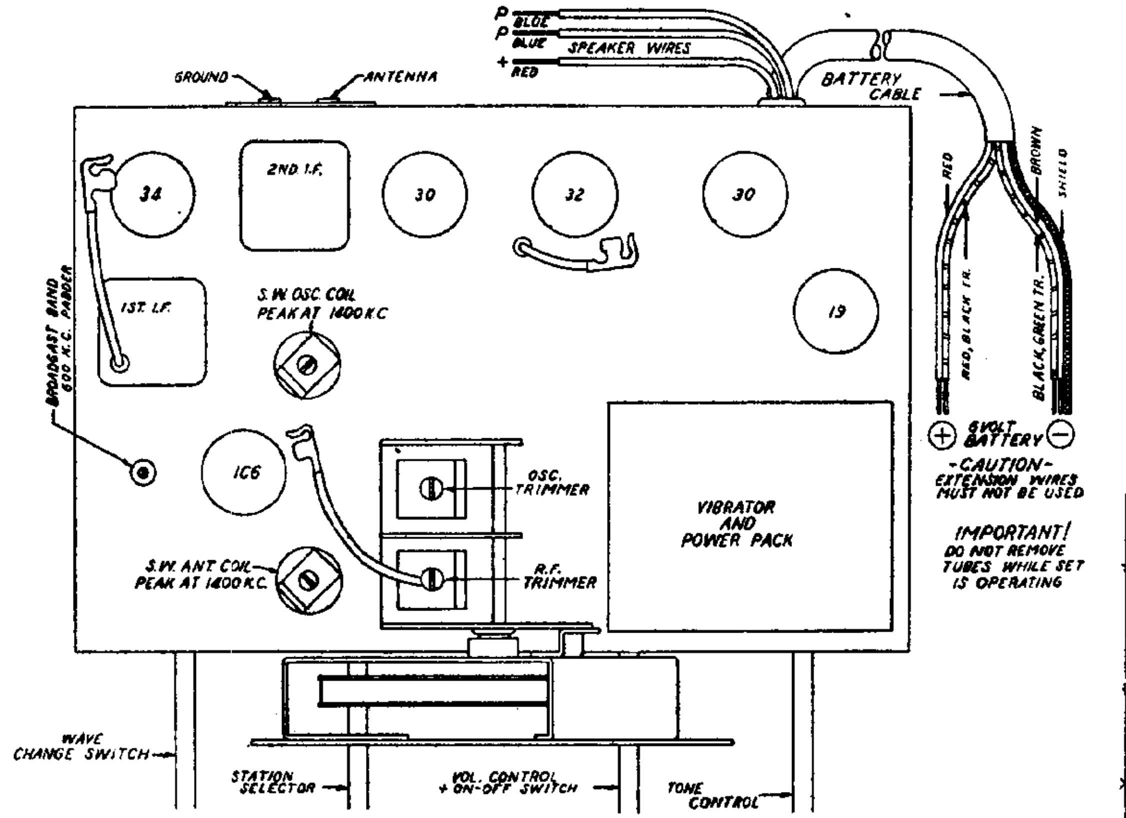
BROADCAST BAND - Connect the Generator to the antenna of receiver through a 1000MMFD condenser. Ground Generator to ground of chassis. Range switch in Broadcast position. Set Generator to 1400 KC and adjust Oscillator and RF trimmers to maximum peak. Dial of receiver set on 1400 KC. Pad the Broadcast band at 600 KC, rocking gang condenser during the adjustment.

SHORT WAVE BAND - Set Receiver and Generator to 6000 KC. Range switch in SW position. Adjust SW antenna trimmer for maximum peak. No padding adjustment is required on this band.

MODELS A9776,A9777,A9778
Chassis Z5
Schematic,Socket,Trimmers
Alignment

ALLIED RADIO CORP.





ALIGNMENT

IF ALIGNMENT - Wave change switch on B.C. position. Gen. connected to grid of 1C6 thru .05 MFD condenser. Align four trimmer condensers.

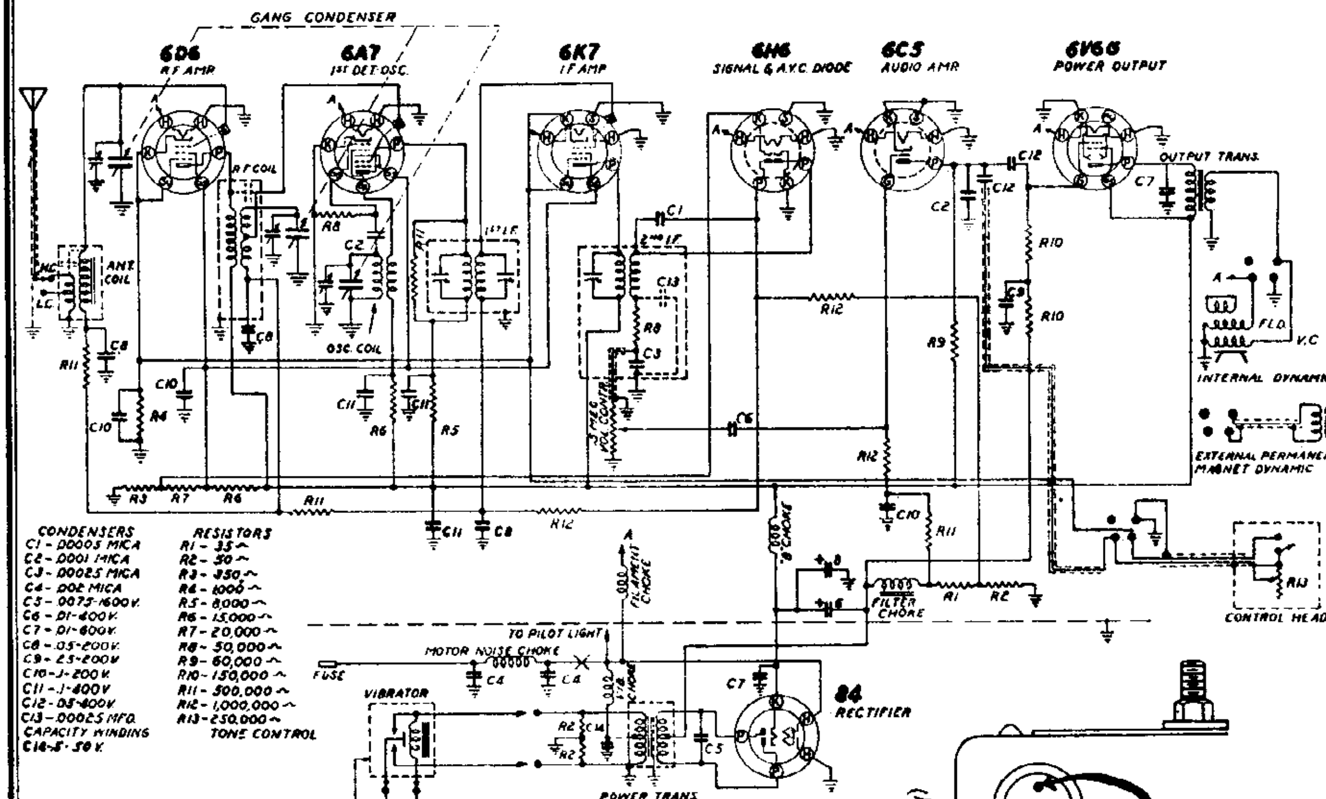
BROADCAST - Connect Gen. to Ant. lead thru 100 MMFD cond. Set Gen. and receiver dial to 1400 KC, adj. rear gang cond. trimmer to peak. Then adj. front trimmer to maximum peak. Generator and receiver set to 600 KC, rock variable condenser, and pad oscillator for maximum peak.

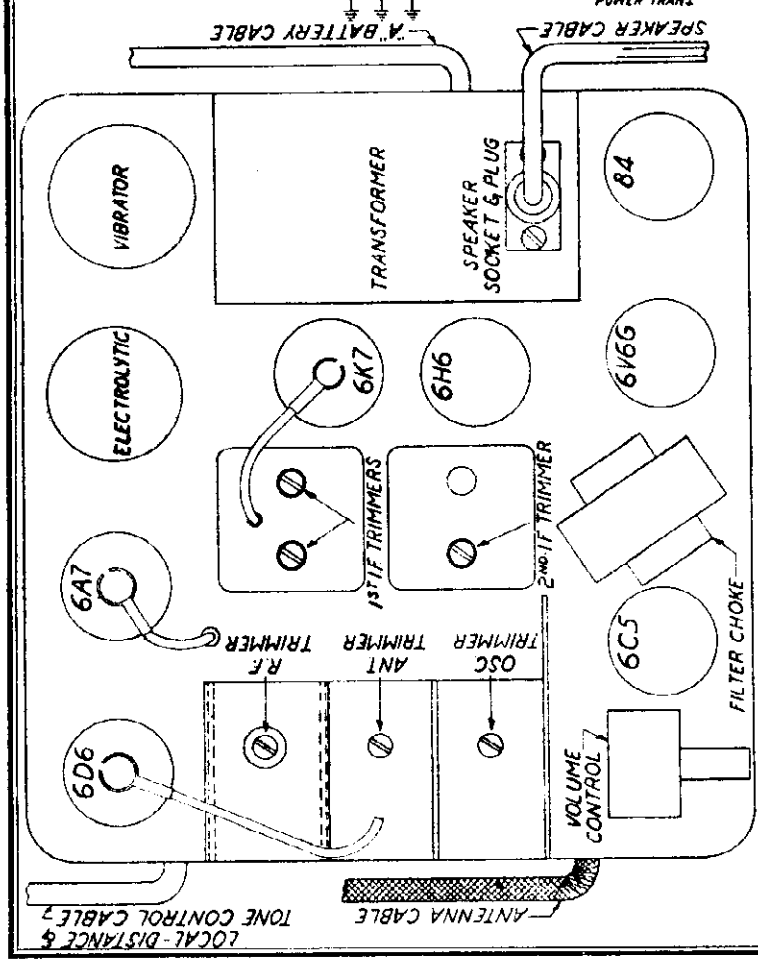
POLICE - Set dial to 4000 KC, also Gen., connect Gen. to Ant. of set thru 100 MMFD cond. and 400 ohms resistance in series. Adj. Police Ant. trimmer to maximum peak. No other adjustment provided on this band.

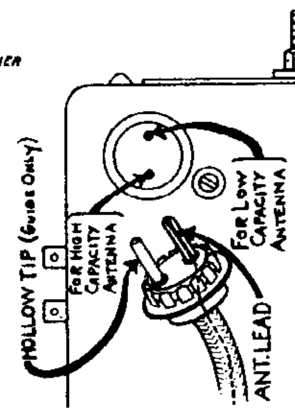
FOREIGN S.W. - Connect Gen. as in Police adjustment. Set Gen. and receiver to 14000 KC. Peak S.W. Oscillator and then S.W. RF trimmers to maximum signal. To make adjustments have Osc. trimmer loose (all way) and Ant. trimmer tight (all way in). Check- re-adjust dial to 13100 KC, for image, if properly aligned, image will be weaker.

MODELS A9782, A9783
Chassis B7
Schematic, Socket
Trimmers, Alignment

ALLIED RADIO CORP.







ALIGNMENT

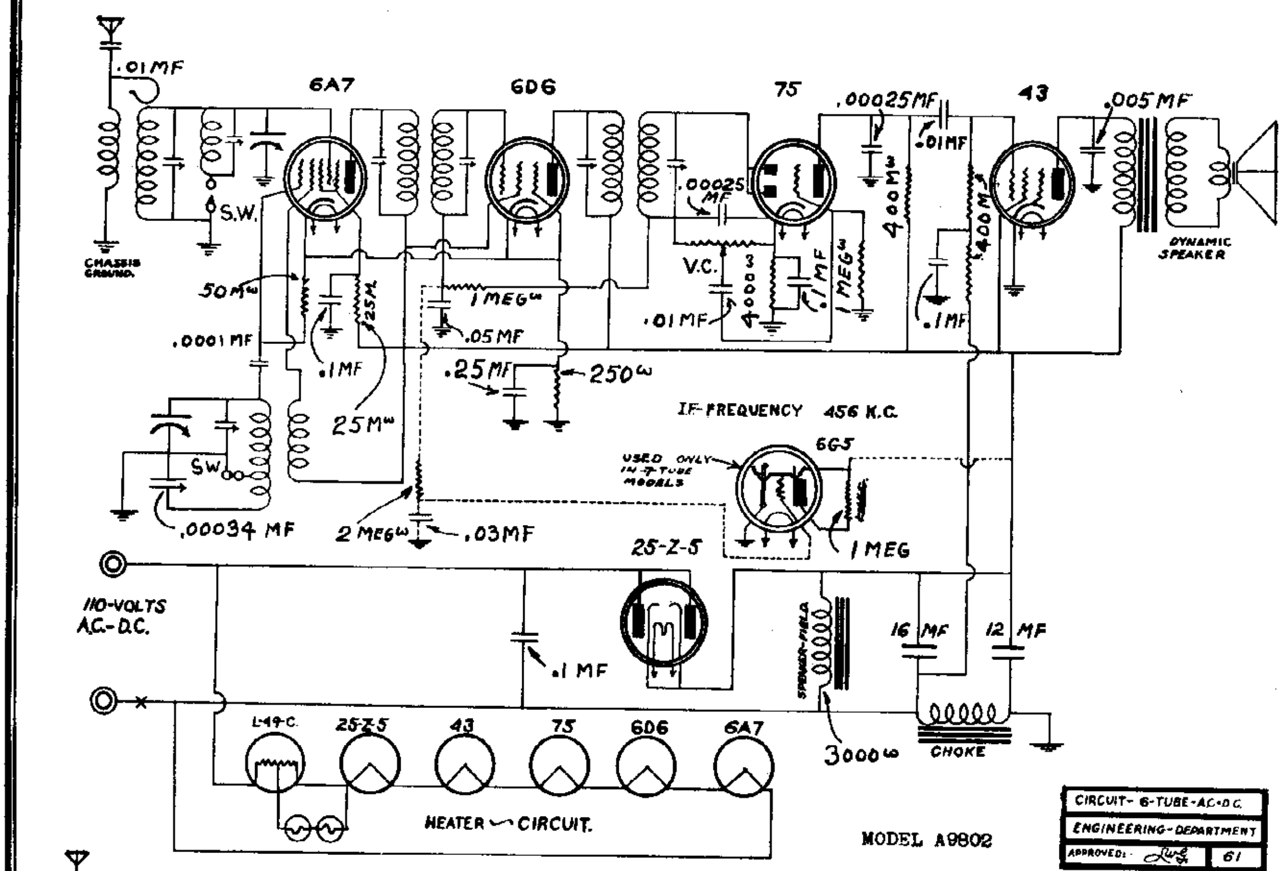
I.F. ALIGNMENT. Adjust the test oscillator to 175 K.C. and connect the output directly to the grid of the first detector tube (6A7), without the use of any series condenser or resistor; the omission of series condenser and resistor to block out the AVC action. The ground on the test oscillator can be connected to the chassis ground. Align the trimmers of the first and second I.F. transformers to peak or maximum reading on the output meter.

OSCILLATOR ALIGNMENT. Adjust the test oscillator to 1400 K.C. and connect the output to the antenna through a .0001 mfd. mica condenser to give the equivalent of a low capacity type average auto antenna. Set the dial pointer to 1400 K.C. and adjust the oscillator trimmer to peak. (Front section of gang condenser.)

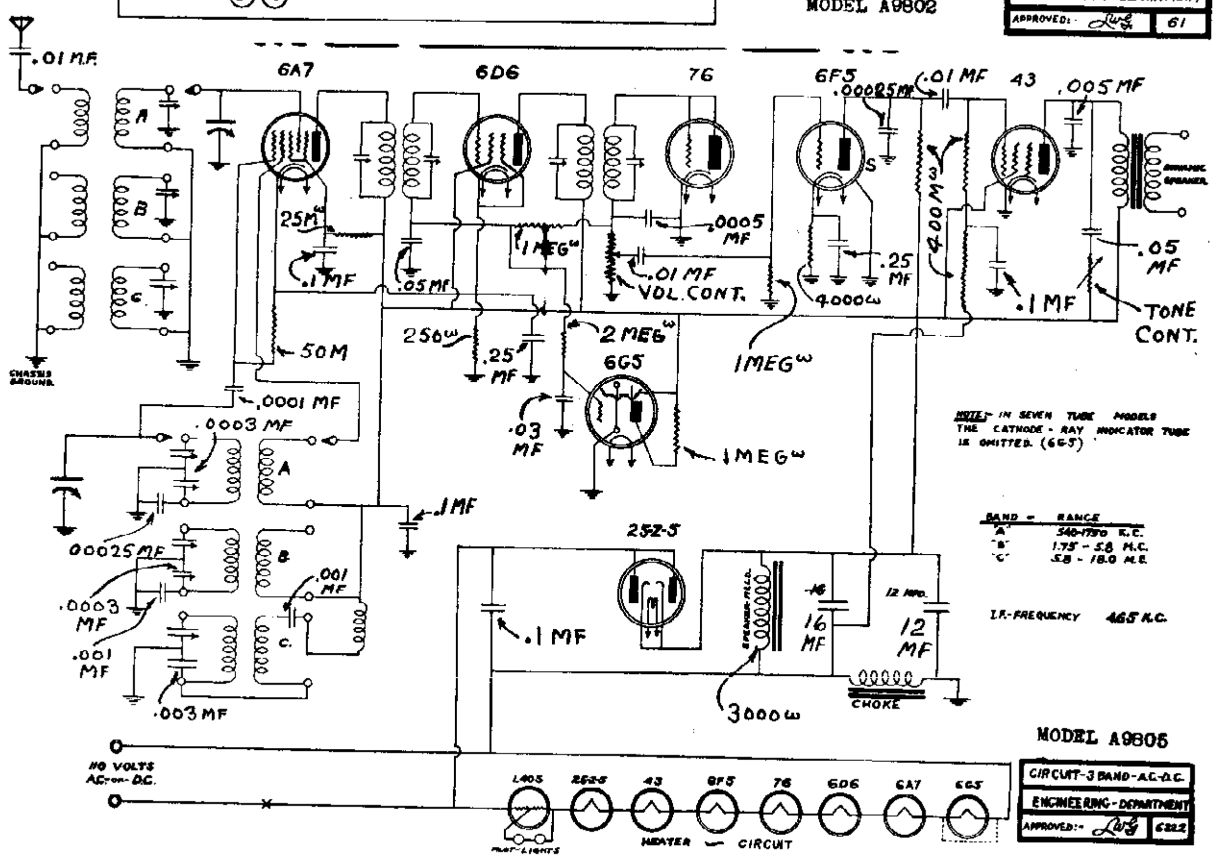
R.F. ALIGNMENT. The next step is to adjust the center and rear trimmers of the gang condenser to peak. The center section of the gang condenser tunes the antenna amplifier stage (6D6 tube), and the rear condenser section tunes the detector grid coil of the 6A7 tube.

MODEL A9802
MODEL A9805
Schematics

ALLIED RADIO CORP.



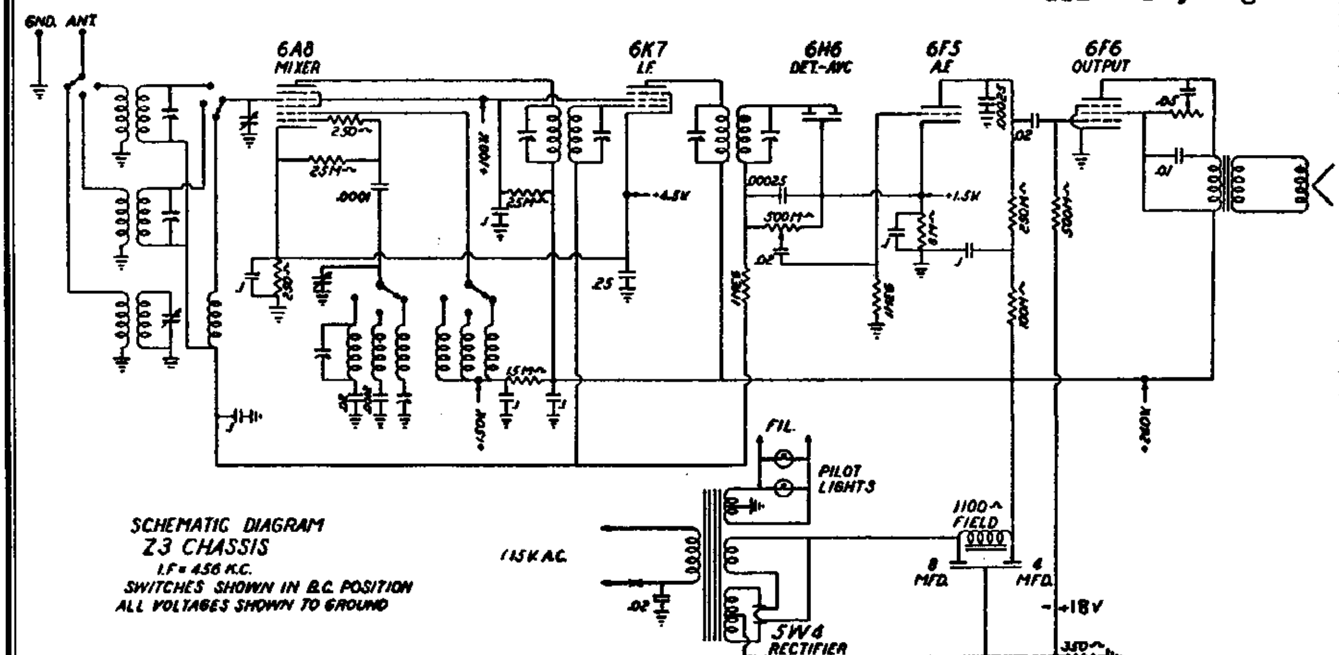
MODEL A9802

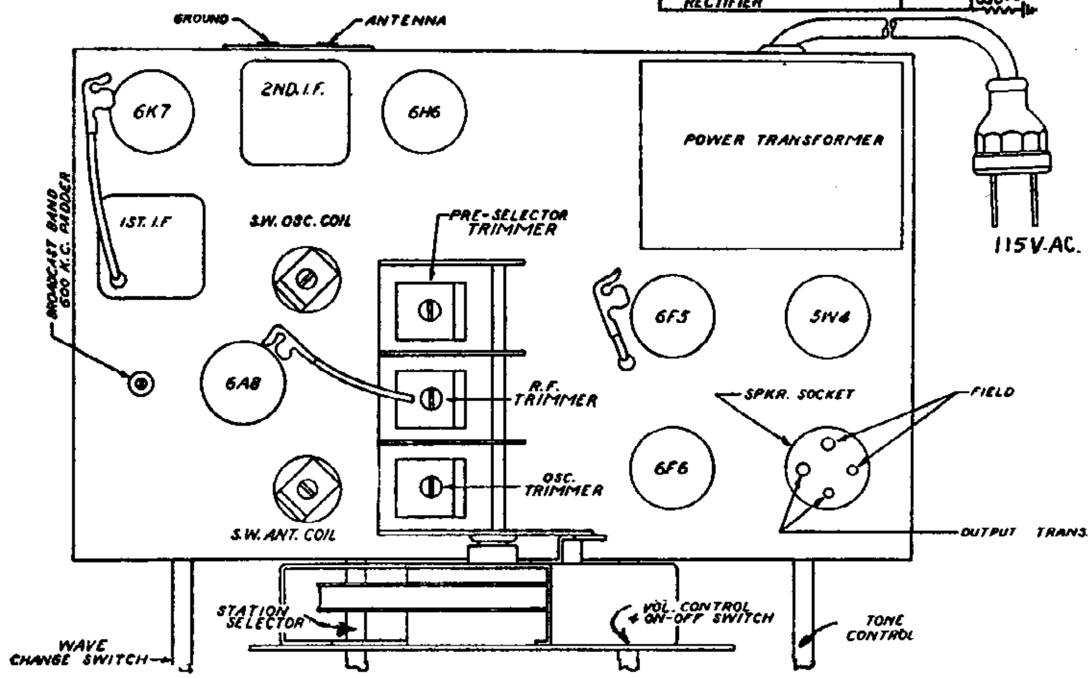


MODEL A9805

ALLIED RADIO CORP.

MODEL A9870
Chassis Z3
Schematic, Socket
Trimmers, Alignment





ALIGNMENT DATA

IF ALIGNMENT - Wave change switch in BC position. Generator connected to grid of 6A8 thru a .05 MFD condenser. trim IF trimmers to maximum peak.

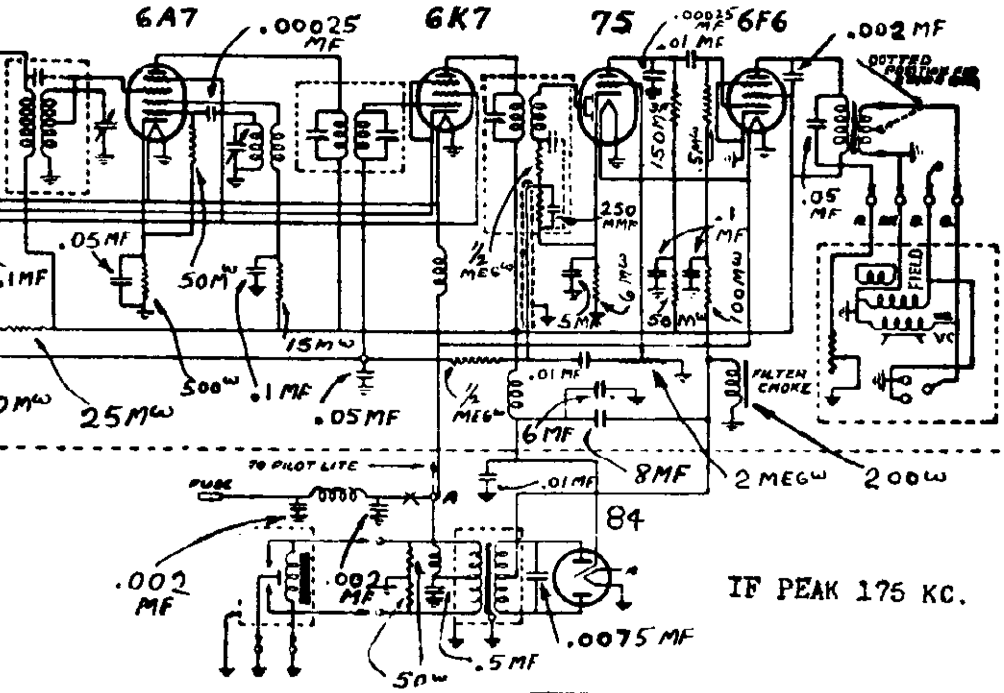
BROADCAST - Connect Generator to ANT lead thru 100 MMFD condenser. Receiver and Generator set to 1400 KC, adjust Oscillator trimmer to peak, then ANT trimmer. Pad the oscillator circuit at 600 KC while rocking variable condenser.

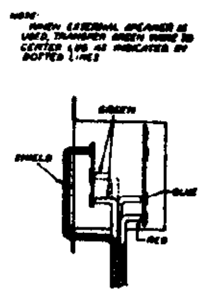
POLICE - Replace the 100 MMFD condenser with 100 MMFD condenser in series with a 400 ohm resistor and connect generator to ANT lead. Generator and receiver set at 4000 KC, adjust oscillator trimmer and then ANT trimmer (POLICE) to maximum peak. No padding adjustment provided in oscillator circuit.

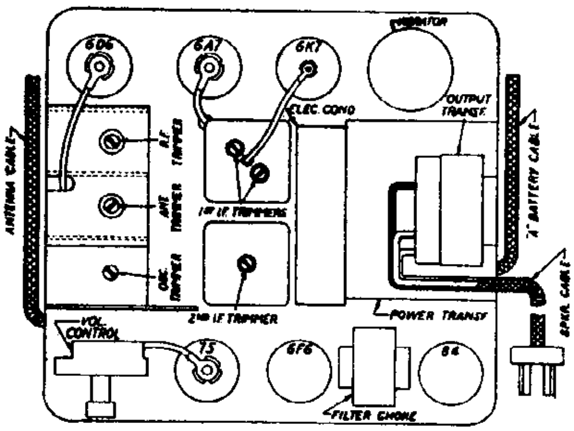
FOREIGN - Set generator and receiver to 14000 KC, adjust oscillator trimmer and Foreign ANT trimmer to peak. Readjust receiver to 13100 KC, generator still at 14000 KC, and check the image frequency response which should be weaker. Adjustments should be started with the oscillator trimmer loose and the Antenna tight.

MODEL A9880
Chassis U6
Schematic, Socket
Trimmers, Alignment

ALLIED RADIO CORP.







ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 175, 600 and 1400 K.C., and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignment should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) transformers should be aligned properly as the first step.

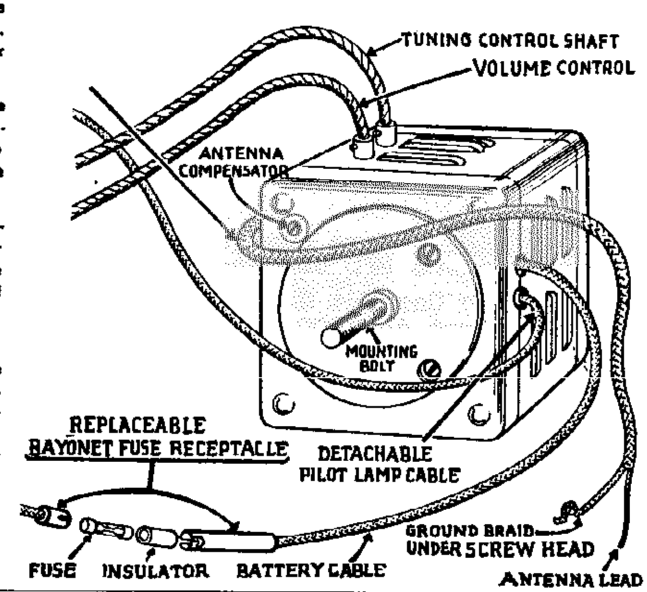
I.F. ALIGNMENT Adjust the test oscillator to 175 K.C. and connect the output directly to the grid of the first detector tube (6A7), without the use of any series condenser or resistor; the omission of series condenser and resistor to block out the AVC action. The ground on the test oscillator can be connected to the chassis ground. Align the trimmers of the first and second I.F. transformers to peak or maximum reading on the output meter.

OSCILLATOR ALIGNMENT Adjust the test oscillator to 1400 K.C. and connect the output to the antenna through a .0001 mfd. mica condenser to give the equivalent of a low capacity type average auto antenna. Set the dial pointer to 1400 K.C. and adjust the oscillator trimmer to peak. (Front section of gang condenser.)

R.F. ALIGNMENT The next step is to adjust the center and rear trimmers of the gang condenser to peak. The center section of the gang condenser tunes the R.F. antenna amplifier stage (6D6 tube), and the rear condenser section tunes the detector grid coil of the 6A7 tube.

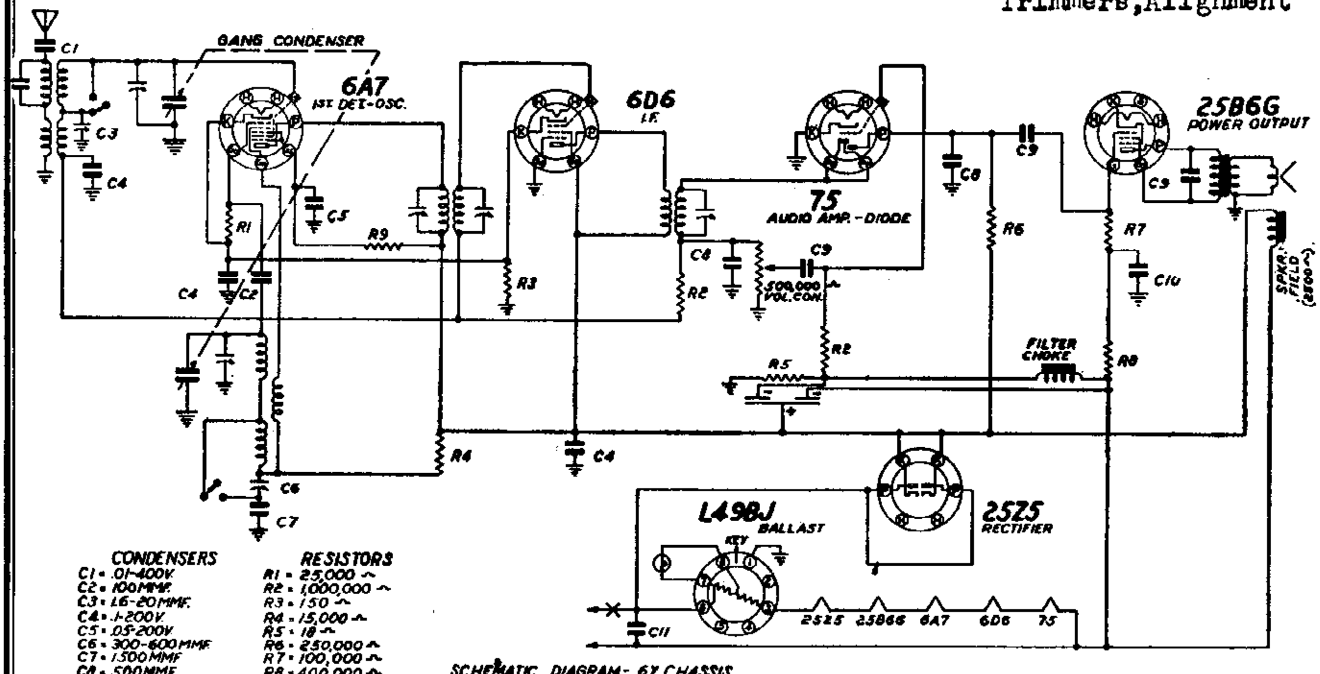
LOW FREQUENCY PADDING Next, reset the dial pointer on the control head and the test oscillator to 600 K.C., adjust the antenna compensator condenser to peak. This adjustment is best reached from the bottom of the chassis and the location of the condenser will be found near the volume control.

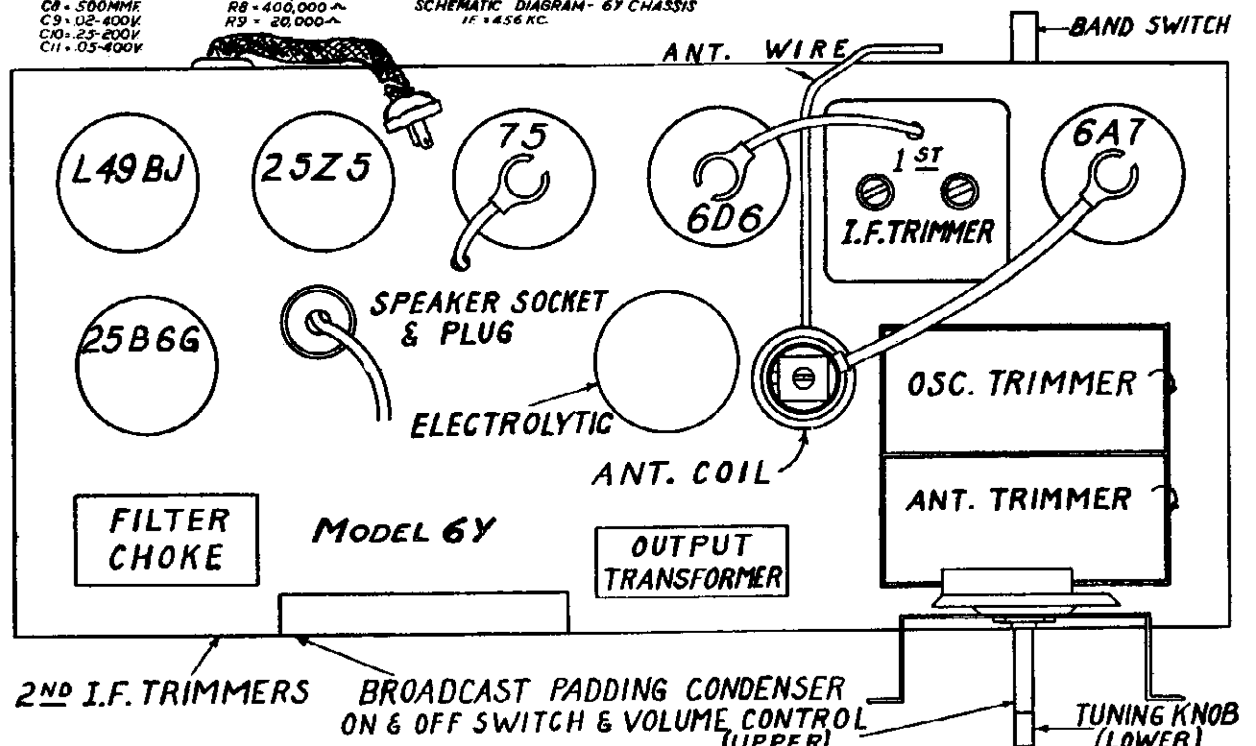
The adjustment of the antenna compensator should again be gone over after the auto set has been again installed in the car, to compensate for the difference that may exist in the capacity of the car antenna and the .0001 mfd. capacitor used with the test oscillator.



ALLIED RADIO CORP.

MODELS A10502, A10503
Chassis 6Y
Schematic, Socket
Trimmers, Alignment





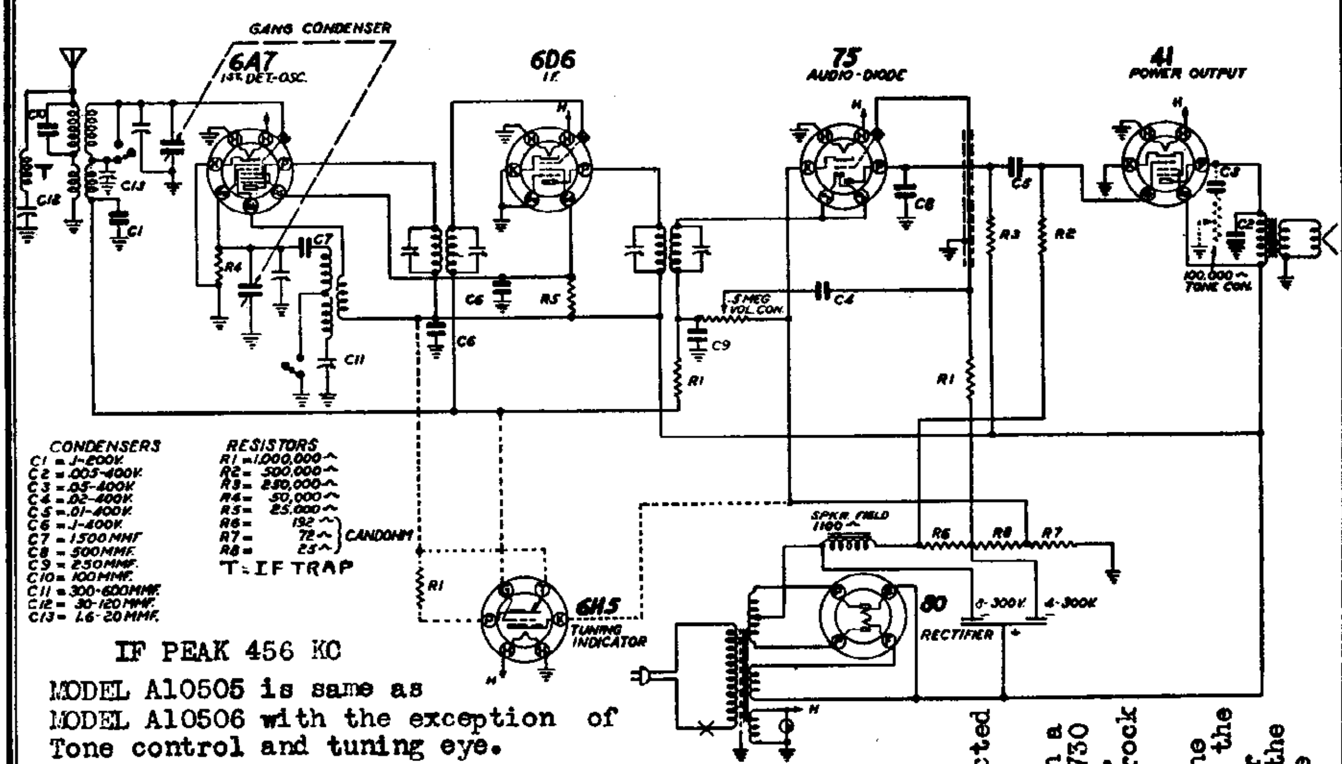
IF ALIGNMENT - Wave switch on B.C. position. Generator connected to grid of 6A7 through a .05 MFD condenser. Align four trimmers.

BROADCAST - Connect generator to antenna lead through a 100 MMFD condenser. Gang condenser at minimum. Generator set at 1730 KC and adjust oscillator trimmer to peak. Set generator at 1400 KC, adjust Antenna trimmer to peak. Generator and receiver set at 600 KC, rock gang condenser while padding oscillator to maximum peak.

SHORT WAVE - Generator set to 6000 KC, while rotating gang condenser from the high frequency end of dial until the generator signal is heard, adjust the S.W. antenna trimmer for maximum peak. Be sure to align this trimmer on the first signal heard while rotating gang condenser from high frequency end. Repeat adjustments for maximum performance of the receiver.

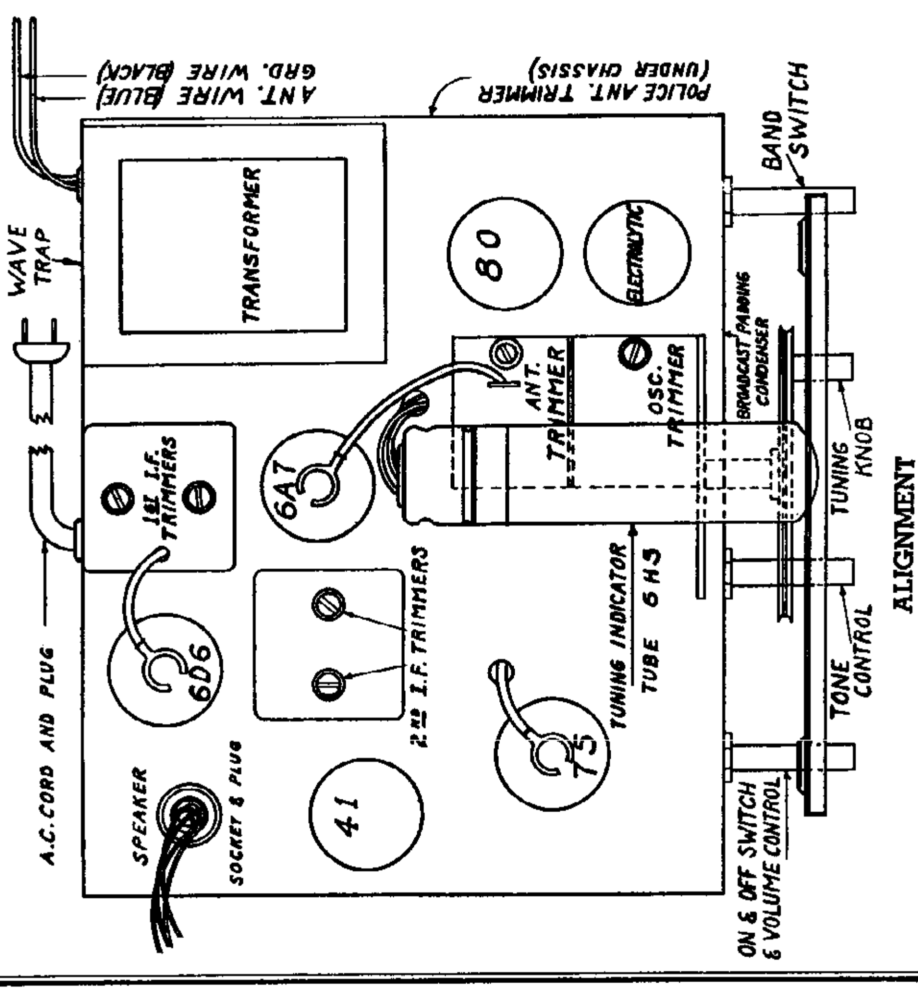
MODEL A10505, Chassis 5X
MODEL A10506, Chassis 6W
Schematic, Socket
Trimmers, Alignment

ALLIED RADIO CORP.



IF PEAK 456 KC

MODEL A10505 is same as MODEL A10506 with the exception of Tone control and tuning eye.



ALIGNMENT

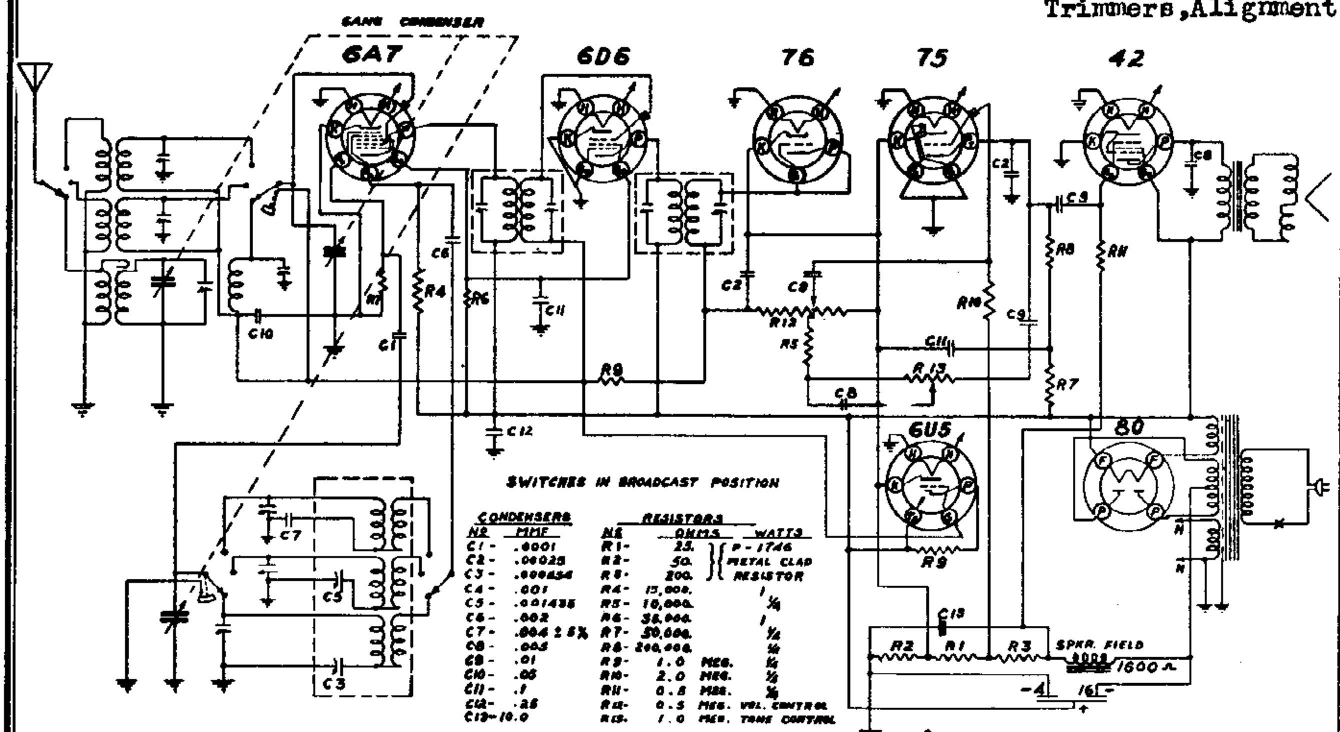
IF ALIGNMENT - Wave switch on B.C. position. Generator connected to grid of 6A7 through a .05 MFD Cond. Align four trimmers.

BROADCAST - Connect generator to the Ant. lead (blue) through a 200 MMFD cond. Gang condenser at minimum, generator set at 1730 KC, adj. OSC. trimmer to peak. Set generator to 1400 KC, adj. ANT. trimmer to peak. Generator and receiver set to 600 KC, rock gang condenser while padding Oscillator to maximum peak.

SHORT WAVE - Generator adjusted to 6000 KC, while rotating the gang condenser from the high frequency end of the dial until the Generator signal is heard, adjust the S.W. ANT. trimmer (under chassis) for maximum peak. Be sure to align this trimmer on the first signal heard while rotating the gang condenser from the high frequency end of the dial. REPEAT ADJUSTMENTS.

ALLIED RADIO CORP.

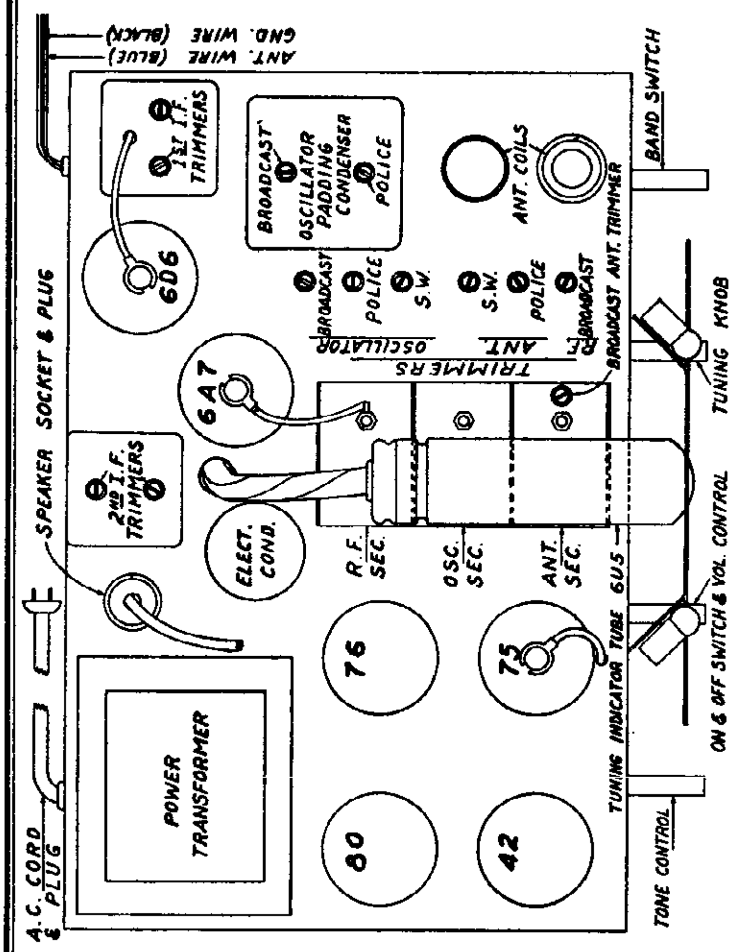
MODEL A10507
Chassis 7M
Schematic, Socket
Trimmers, Alignment



CONDENSERS NO.	MMF
C1 -	.0001
C2 -	.00025
C3 -	.000454
C4 -	.001
C5 -	.001435
C6 -	.002
C7 -	.004 ± 5%
C8 -	.005
C9 -	.01
C10 -	.05
C11 -	.1
C12 -	.25
C13 -	10.0

RESISTORS NO.	OHMS	WATTS
R1 -	25.	P-1746 METAL CLAD RESISTOR
R2 -	50.	
R3 -	200.	
R4 -	15,000.	1
R5 -	10,000.	¼
R6 -	38,000.	1
R7 -	50,000.	½
R8 -	200,000.	¼
R9 -	1.0 MEG.	¼
R10 -	2.0 MEG.	¼
R11 -	0.5 MEG.	¼
R12 -	0.5 MEG. VOL. CONTROL	
R13 -	1.0 MEG. TONE CONTROL	

IF PEAK 456 KC



ALIGNMENT DATA

IF ALIGNMENT - Wave Switch on BC position. Generator connected to grid of 6A7 through .05 MFD Cond. Align 4 Trimmers to Peak.

BROADCAST - Connect Generator to Ant. lead (BLUE) through 100 MFD condenser. Variable condenser to minimum, Generator at 1730 KC, adj. Osc. Trimmer to PEAK. Set Generator to 1400 KC, adj. ANT. Trimmer to PEAK. Generator and Receiver set to 600 KC, rock variable cond., PAD Osc. to maximum PEAK.

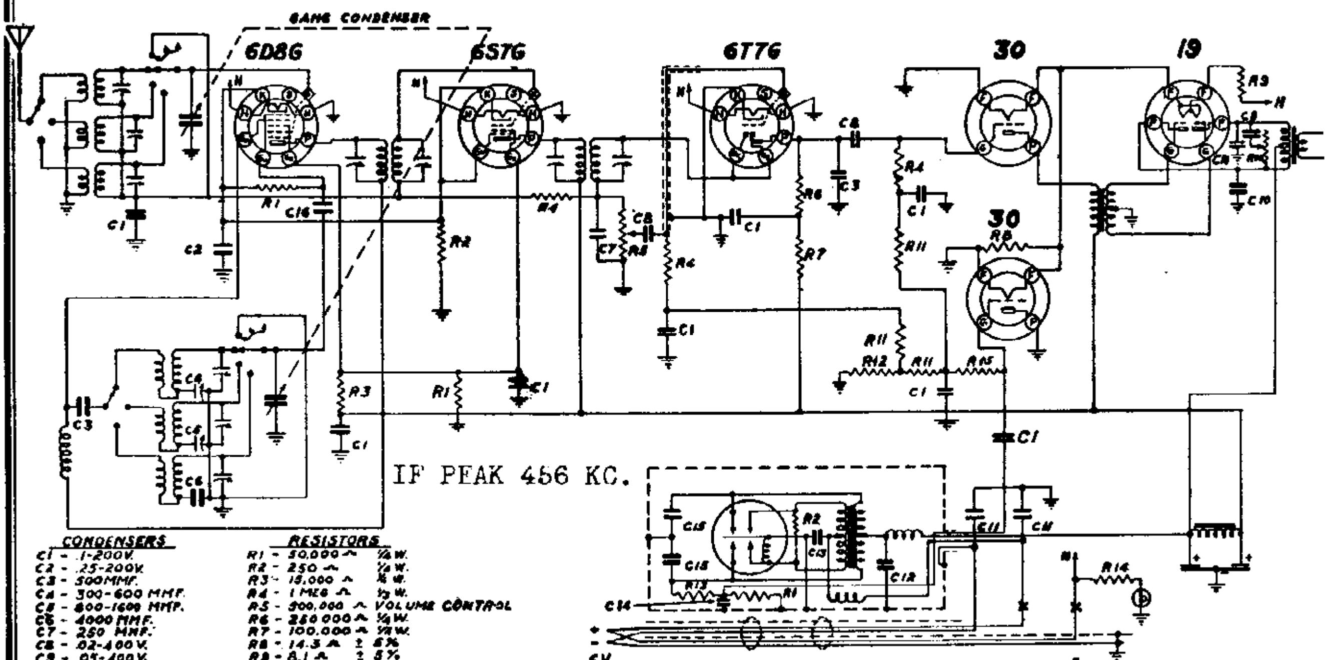
POLICE - Replace 200 MMFd Cond. with 400 ohm resistor, Variable Condenser at minimum, Generator at 5600 KC, adj. Police Osc. Trimmer to receive signal, then set Generator at 4000 KC, Adj. Police Trimmer to PEAK. Set Generator at 1800 KC, PAD Osc. with Police Padding Trimmer to peak. Rock Variable condenser.

SHORT WAVES - Variable condenser at minimum, Generator at 18100 KC, Adj. Osc. Short Wave Trimmer to PEAK. Generator to 16000 KC and adjust S.W. Ant. Trimmer to PEAK. No padding of Oscillator is provided in this range. Sensitivity should be checked at 6000 KC.

All adjustments should be repeated for maximum performance.

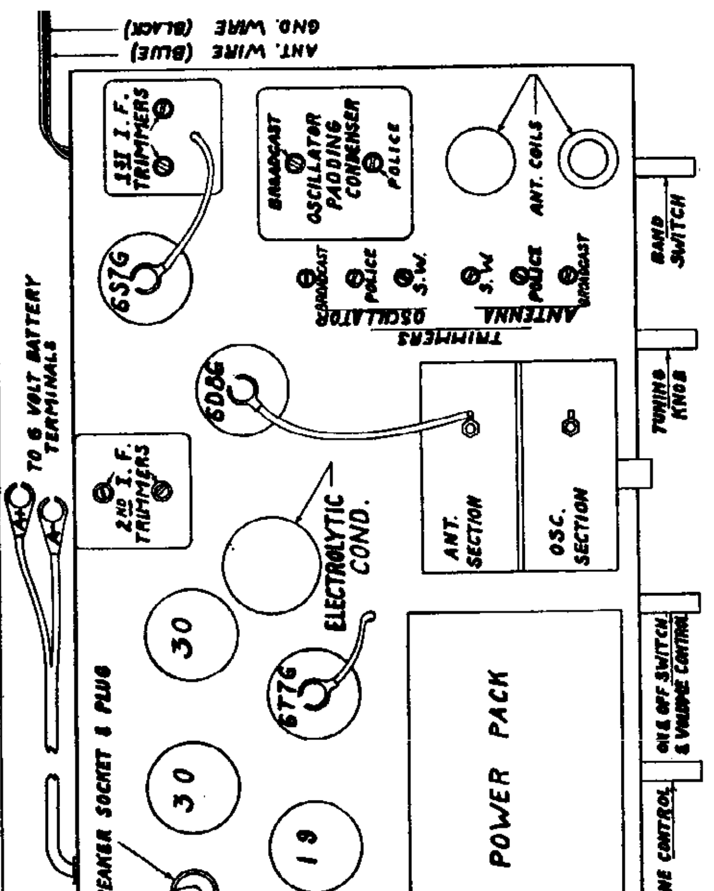
MODEL A10508
Chassis 6P
Schematic, Socket
Trimmers, Alignment

ALLIED RADIO CORP.



IF PEAK 456 KC.

CONDENSERS	RESISTORS
C1 - .1-200V.	R1 - 50,000 Ω 1/4 W.
C2 - .25-200V.	R2 - 250 Ω 1/4 W.
C3 - 500MMF.	R3 - 15,000 Ω 1/2 W.
C4 - 300-600 MMF.	R4 - 1 MEG Ω 1/2 W.
C5 - 800-1600 MMF.	R5 - 500,000 Ω VOLUME CONTROL
C6 - 4000 MMF.	R6 - 250,000 Ω 1/4 W.
C7 - 250 MMF.	R7 - 100,000 Ω 1/2 W.
C8 - .02-400V.	R8 - 14.3 Ω ± 5%
C9 - .05-400V.	R9 - 8.1 Ω ± 5%
C10 - .002-400 V.	R10 - 100,000 Ω TONE CONTROL
C11 - .005-400 V.	R11 - 500,000 Ω 1/2 W.
C12 - .01 - 600 V.	R12 - 70,000 Ω 1/2 W.
C13 - .5-10 V.	R13 - 200,000 Ω 1/2 W.
C14 - .05-200 V.	R14 - 70. Ω ± 10%
C15 - .01-1000 V.	R15 - 600,000 Ω 1/2 W.
C16 - 100 MMF.	



ALIGNMENT DATA

IF ALIGNMENT - Wave switch on B.C. position. Generator connected to grid of 6D8G through .05 MFD Cond. Align 4 trimmers to peak.

BROADCAST - Connect Generator to Ant. lead (BLUE) through 200 MMFD condenser. Variable condenser to minimum, Generator set at 1730 KC, adj. Osc. trimmer to PEAK. Set Generator to 1400 KC, adj. ANT. trimmer to PEAK. Generator and receiver to 600 KC, rock the variable cond., PAD Oscillator to maximum PEAK.

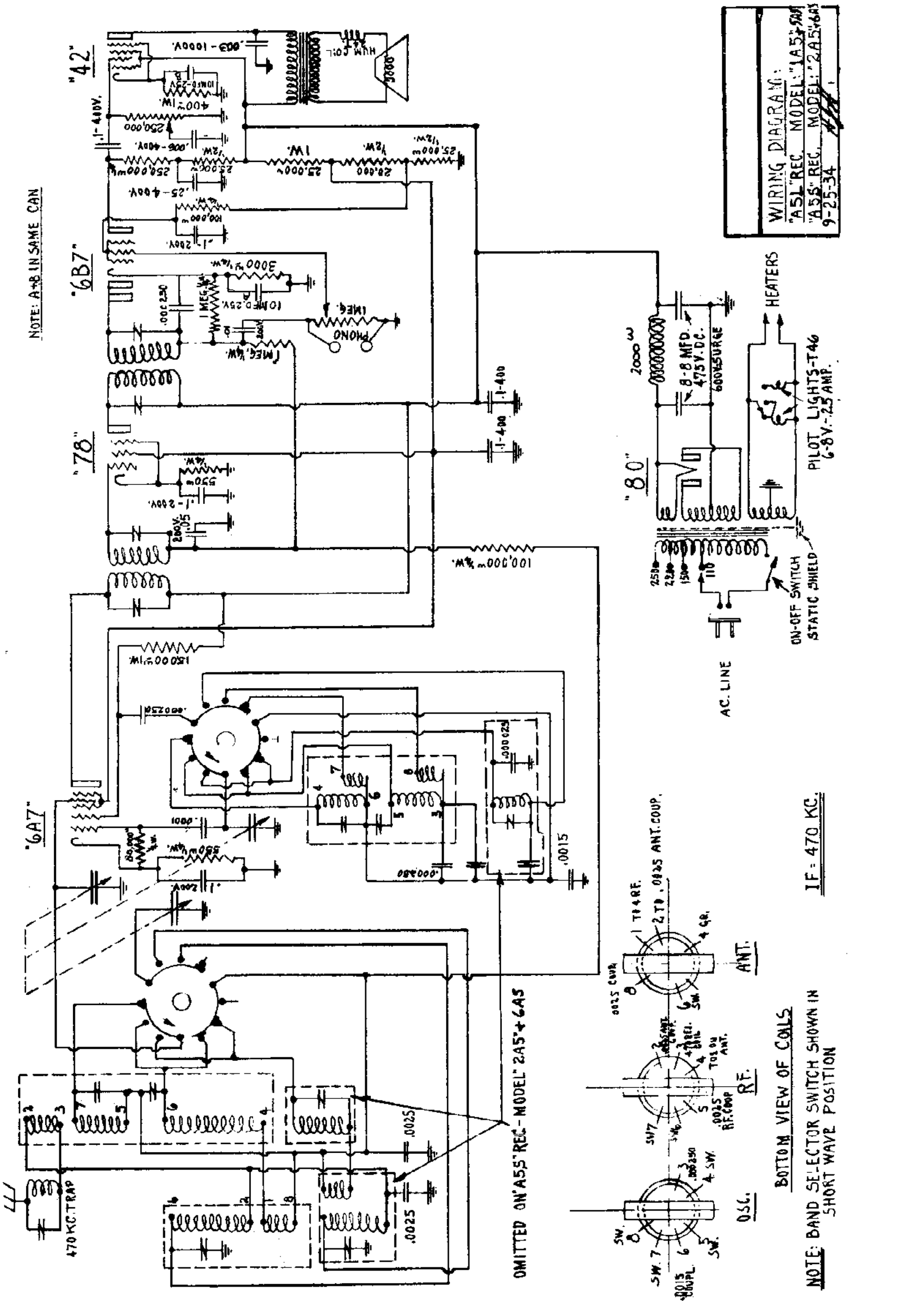
POLICE - Replace 200 MMFD cond. with 400 ohm resistor, variable condenser at minimum, Generator at 5600 KC, adj. Police Oscillator trimmer to receive signal. Then set Generator at 4000 KC, adj. Police Ant. trimmer to peak. Set Generator at 1800 KC, Pad Osc. with Police Padding trimmer to peak. Rock variable condenser.

SHORT WAVE - Variable condenser at minimum, Generator at 18100 KC, adj. Osc. Short Wave Trimmer to peak. Generator to 16000 KC and adjust ANT. Short Wave trimmer to peak. No padding of Oscillator is provided in this range. Sensitivity to be checked at 6000 KC.

All adjustments should be repeated to obtain maximum performance.

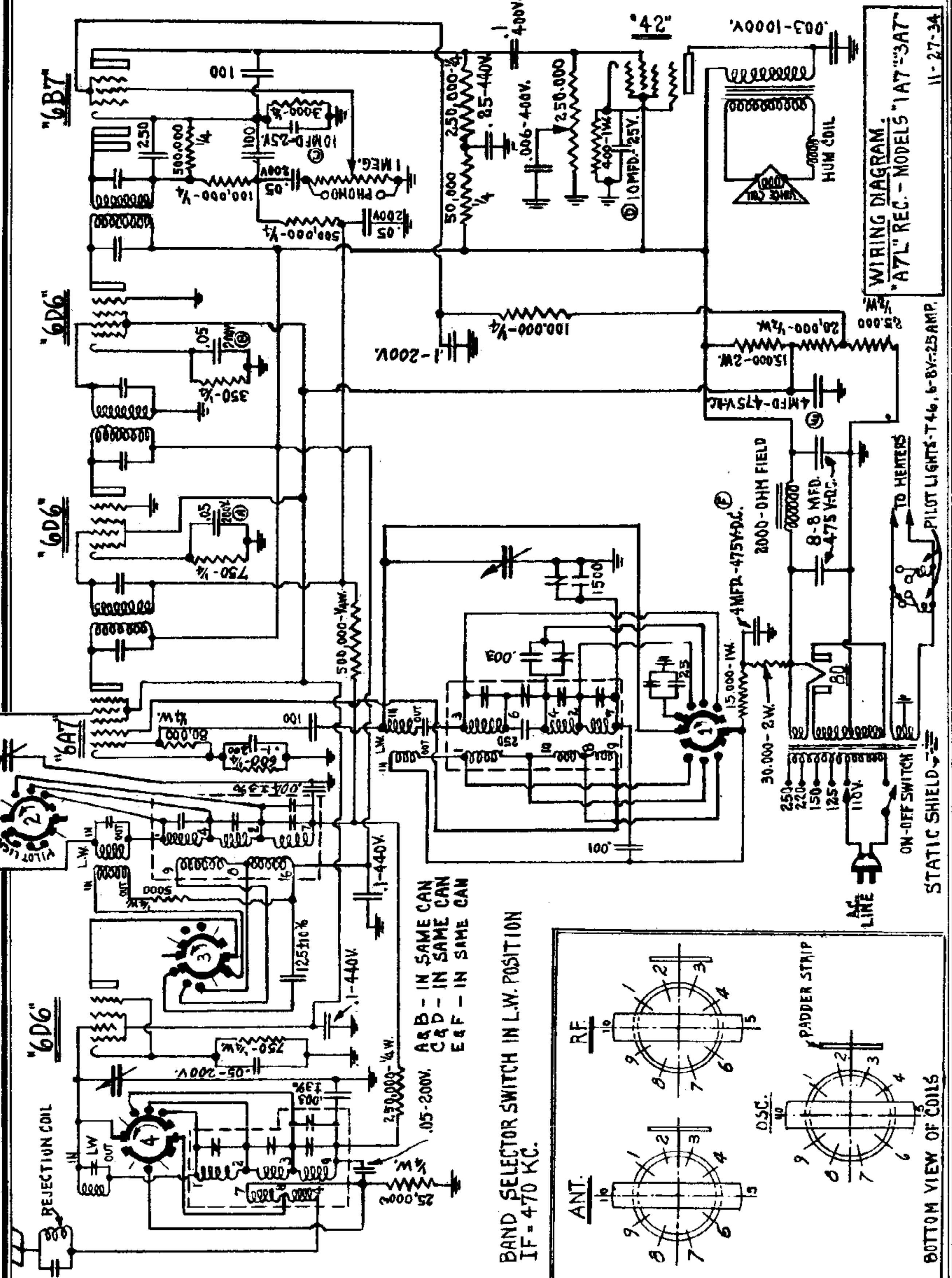
MODELS 1A5,5A5
Chassis A5L
MODELS 2A5,6A5
Chassis A5S
Schematic,Coils

ANDREA RADIO CORP.



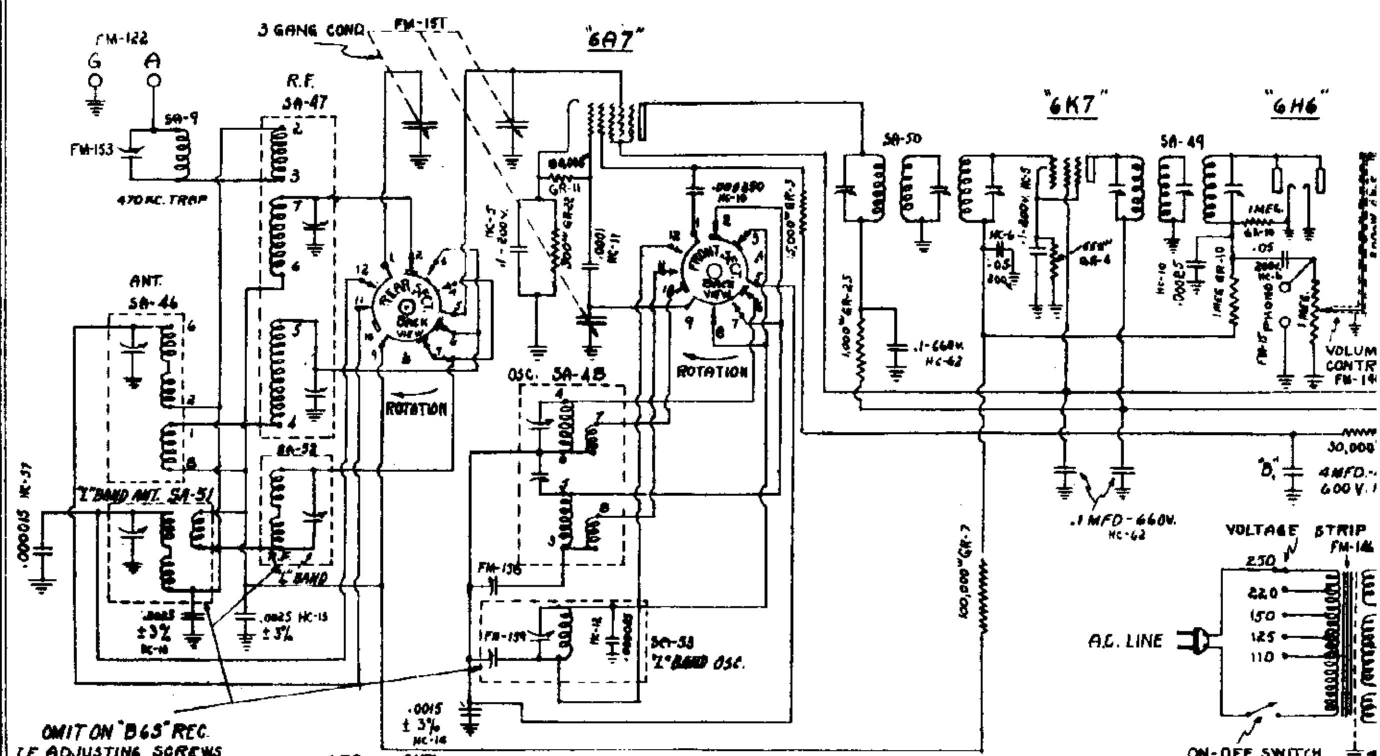
MODELS 1A7,3A7
Chassis A7L
Schematic,Coils

ANDREA RADIO CORP.



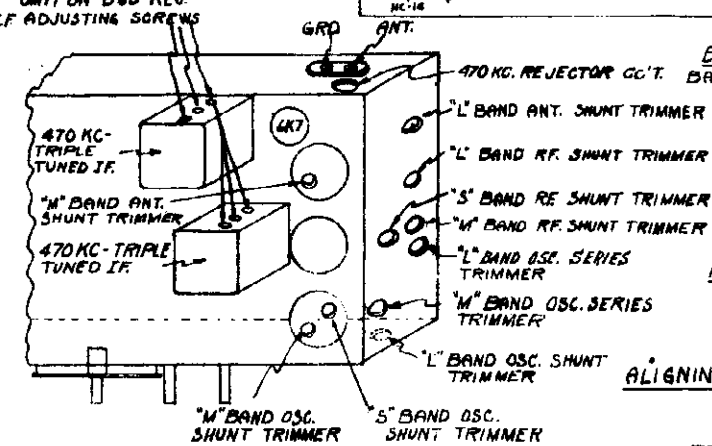
MODEL 55 Amplifier
Schematic

ANDREA F



OMIT ON "B63" REC.

BAND SELECTOR SWITCH SHOWN IN SHORT WAVE POSITION
BAND SELECTOR SWITCH DRAWN EXACTLY MECHANICALLY AND ELECTRIC
AS VIEWED FROM BOTTOM OF CHASSIS



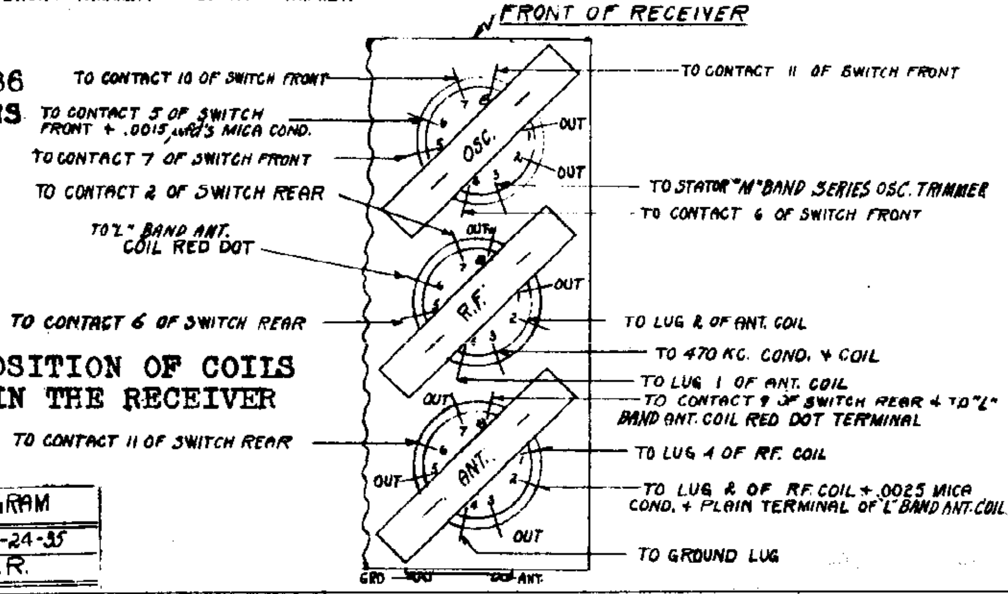
ALIGNING FREQ.
I.F. SYSTEM - 470 KC.
BAND "L" 335 + 150 KC.
BAND "M" 1400 + 600 KC.
BAND "S" 17000 KC.

NOTE:
"A" + "A" IN SAME CAN HC-2
"B" + "B" IN SAME CAN HC-59
"C" + "C" IN SAME CAN HC-58

ALIGNING CONDENSER LOCATIONS

AMPLIF

MODELS
1B6 and 2B6
RECEIVERS

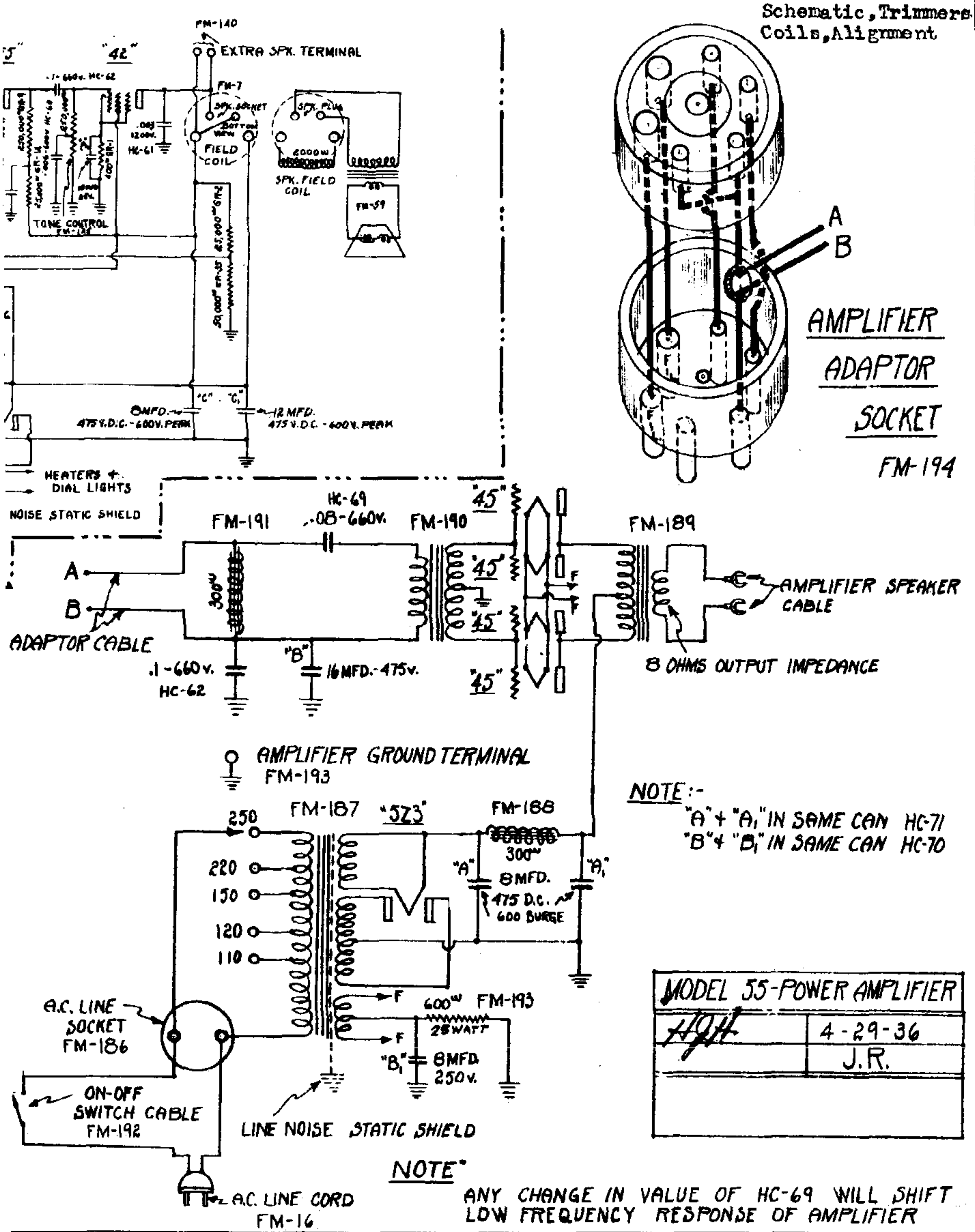


POSITION OF COILS IN THE RECEIVER

WIRING DIAGRAM	
"1B6" + "2B6" REC	12-24-35
HJH	J.R.

DIO CORP.

MODELS 1B6,3B6
Chassis B6L
MODELS 2B6,4B6
Chassis B6S
Schematic,Trimmers
Coils,Alignment



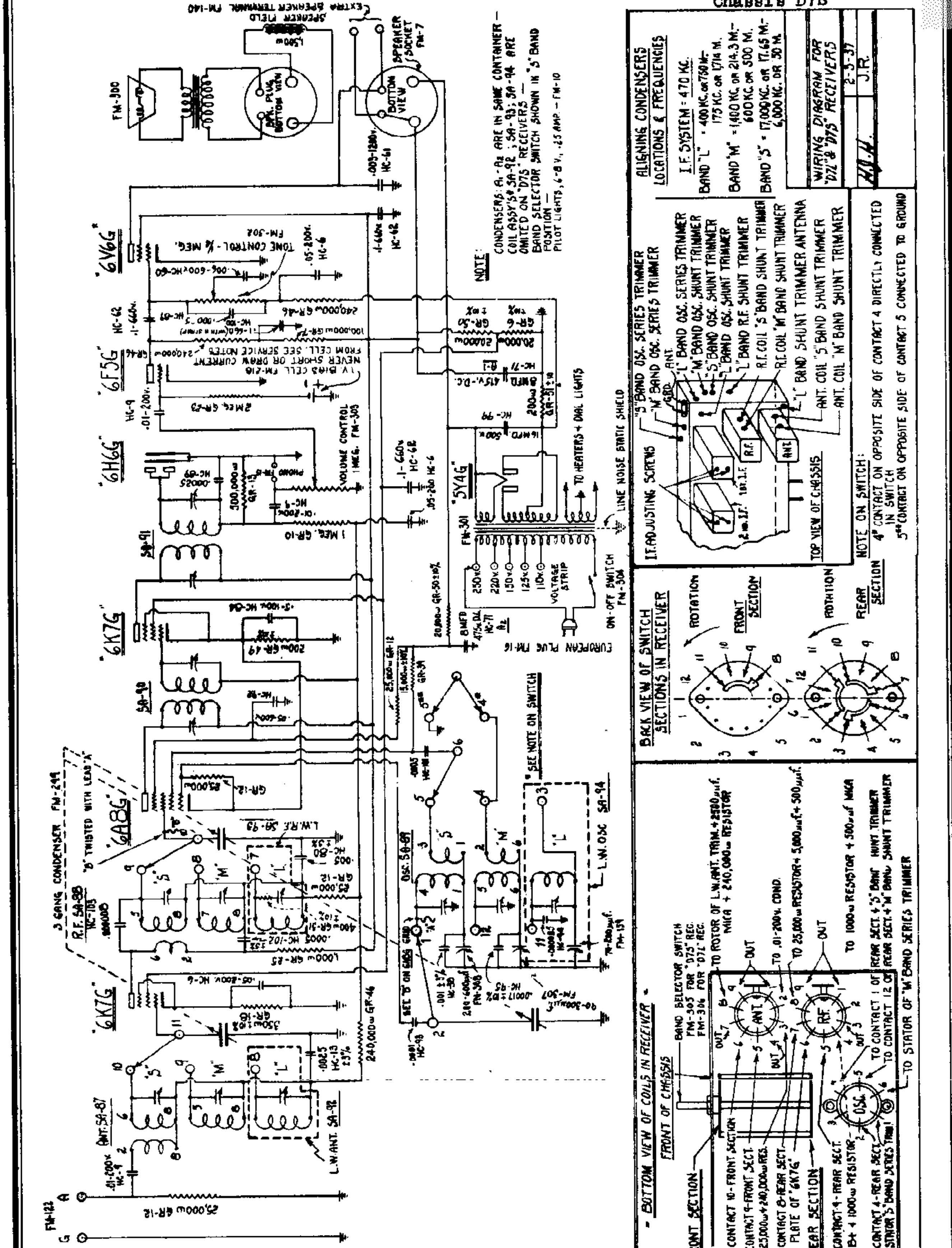
NOTE

ANY CHANGE IN VALUE OF HC-69 WILL SHIFT LOW FREQUENCY RESPONSE OF AMPLIFIER

Schematic, Trimmers
Alignment, Coils

ANDREA RADIO CORP.

MODELS 1D7, 3D7, 5D7, 7D7
Chassis D7L
MODELS 2D7, 4D7, 6D7, 8D7
Chassis D7S



MODELS 1D7, 3D7, 5D7, 7D7
Chassis D7L
MODELS 2D7, 4D7, 6D7, 8D7
Chassis D7S
Alignment, Notes

ANDREA RADIO CORP.

When aligning the "S" band at 17,000 K.C., any adjustment of the antenna shunt and R.F. shunt trimmer will affect the oscillator tuning. This must be compensated for during the alignment, but rotating the gang condenser slowly back and forth about the signal for each shunt trimmer adjustment, until maximum deflection on the output meter is obtained. If the gang condenser is not rocked, false alignment and poor receiver sensitivity will result.

These receivers incorporate a 1.0 volt bias cell in the grid circuit of the 75 tube (see circuit diagram). THIS CELL MUST NEVER BE SHORTED OR TESTED BY MEANS OF A LOW RESISTANCE 2000 OHM PER VOLT VOLTMETER. THE ONLY ACCURATE WAY TO MEASURE ITS POTENTIAL IS BY MEANS OF A VACUUM TUBE VOLTMETER. These cells can be expected to render at least three years service without replacement. If further data is required, write the manufacturer.

FUNDAMENTAL & IMAGE FREQUENCY NOTES

A simple method of checking to determine if the receiver and generator are tuned for correct alignment is as follows:

Set the signal generator to 17,000 K.C. Tune the receiver from 15,000 slowly up to 18,000 K.C. Two signals should be heard 940 K.C. apart on the receiver, namely, one lower in frequency than 17,000 K.C., the other higher. The correct point for alignment is the higher frequency on the receiver dial, the lower is the image. As a check, the receiver should be left tuned to the higher frequency. Increase the generator frequency which was set for 17,000 K.C. slowly to approximately 18,000 K.C. A signal should be heard near 18000 K.C. if the first setting was correct for alignment. No signal would indicate that the original setting was on the image frequency. If this occurs, make certain that you start from the beginning to be sure of your results.

After the correct setting has been found, and the alignment has been carried out, it will be noted that the image, or lower frequency response on the receiver dial will always sound weaker than the true signal if the tuned circuits have been correctly adjusted.

470 K.C. I.F. ADJUSTMENT

1. Connect high potential output lead from test generator in series with a .1 mfd. condenser to the grid of the 6A8G with selector switch in "M" band position and dial at 1000 K.C. NEVER REMOVE CONTROL GRID CAP FROM TUBE.
2. Connect output voltmeter (copper oxide rectifier type) accross voice coil of speaker.
3. Set generator to supply a modulated 470 K.C. signal. Adjust generator output attenuator until a small output reading is obtained on the output voltmeter.
4. Adjust both trimmers on top of the first and second I.F. transformers for maximum output.
5. Retrim slightly the first I.F. trimmer.

MEDIUM BAND "M" ALIGNMENT

Set test generator for 1400 K.C. Connect high potential lead of test generator in series with a .1 mfd. condenser to grid of 6A8G tube.

Tune receiver to 1400 K.C. (214.3 meters) on the tuning scale. If signal is not heard, leave scale pointer set to 1400 K.C., (214.3 meters), and adjust oscillator coil shunt trimmer slowly and carefully until signal is heard.

The oscillator coil of the receiver and dial are now set correctly, assuming the test generator calibration is correct.

Remove test generator hot lead from 6A8G grid. Replace .1 mfd. condenser with 250 mmf. (.00025 mfd.) and connect to antenna terminal of receiver "A", all other settings to remain the same.

Adjust "R.F." coil shunt trimmer and then "ANT" coil shunt trimmer for maximum output deflection.

Retune test generator to 600 K.C. (500 meters) and tune receiver to 600 K.C. (500 meters) until signal is heard.

Adjust oscillator coil series trimmer slowly while rotating the gang condenser slowly about the signal for each small adjustment of the series trimmer, until further adjustment of the series trimmer does not increase the output signal. During this adjustment, never touch the ANT., R.F. or OSC. shunt trimmers.

Reset test generator and receiver to 1400 K.C. Tune in signal on receiver. Adjust ANT. and R.F. shunt trimmers slightly for maximum output; never the OSC. shunt trimmer.

SHORT WAVE "S" BAND ALIGNMENT

1. Turn wave band selector switch to extreme right "S" band. Replace 250 mmf. (.00025 mfd.) condenser with 400 ohm resistor.
2. The following adjustment is necessary if the dial calibration is badly off, otherwise proceed with step 3 and 4.

Set the signal generator to 17,000 K.C. and the receiver dial pointer to 17 M.C. (17,000 K.C.). Adjust oscillator shunt trimmer slowly between maximum and minimum. A signal will be heard at two settings of this trimmer; one near the minimum capacity (plates open) of the trimmer, the other nearer to maximum capacity (plates closed). The trimmer should be left adjusted to the signal heard near its minimum (open plates). The adjustment nearer maximum is the image frequency setting, as can be determined from previous explanation on image frequency.

3. Align R.F. shunt trimmer for maximum output deflection. During this adjustment, be certain to rotate the station selector knob back and forth slowly for each small R.F. shunt trimmer change.
4. Align antenna shunt trimmer for maximum output deflection. During this adjustment, be certain to rotate the station selector knob back and forth slowly for each small antenna shunt trimmer change until maximum output is obtained. Retrim R.F. shunt trimmer for small change. Check to see that alignment has not been made on the image. (See notes).

Set test generator to 6000 K.C., retune receiver until signal is heard. Adjust oscillator series trimmer slowly while rotating the gang condenser around the signal for each small adjustment of the series trimmer until further adjustment of the series trimmer decreases the output signal.

Never touch the ANT., R.F. and OSC. shunt trimmer during this adjustment.

Reset test generator to 17,000 K.C.; tune receiver until correct signal is heard. Retune antenna and R.F. shunt trimmer for final critical setting. During this final adjustment, never touch the oscillator shunt trimmers.

Should the operator be inexperienced on "S" band alignment, the individual coilscan be checked very simply as follows:

Apply the test generator signal through a .1 mfd. coil to the 6A8G grid, and carry out the procedure outlined above. This will tell you if the oscillator shunt trimmer only is correctly adjusted or the right signal setting has been used on the test generator. In this case, ONLY, the image and fundamental will have the same intensity.

When you are sure the oscillator circuit is correct, place the signal on the grid of the 6K7G R.F. tube, and repeat the procedure on the R.F. coil. In this case when correctly aligned, the image will be lower in volume than the fundamental.

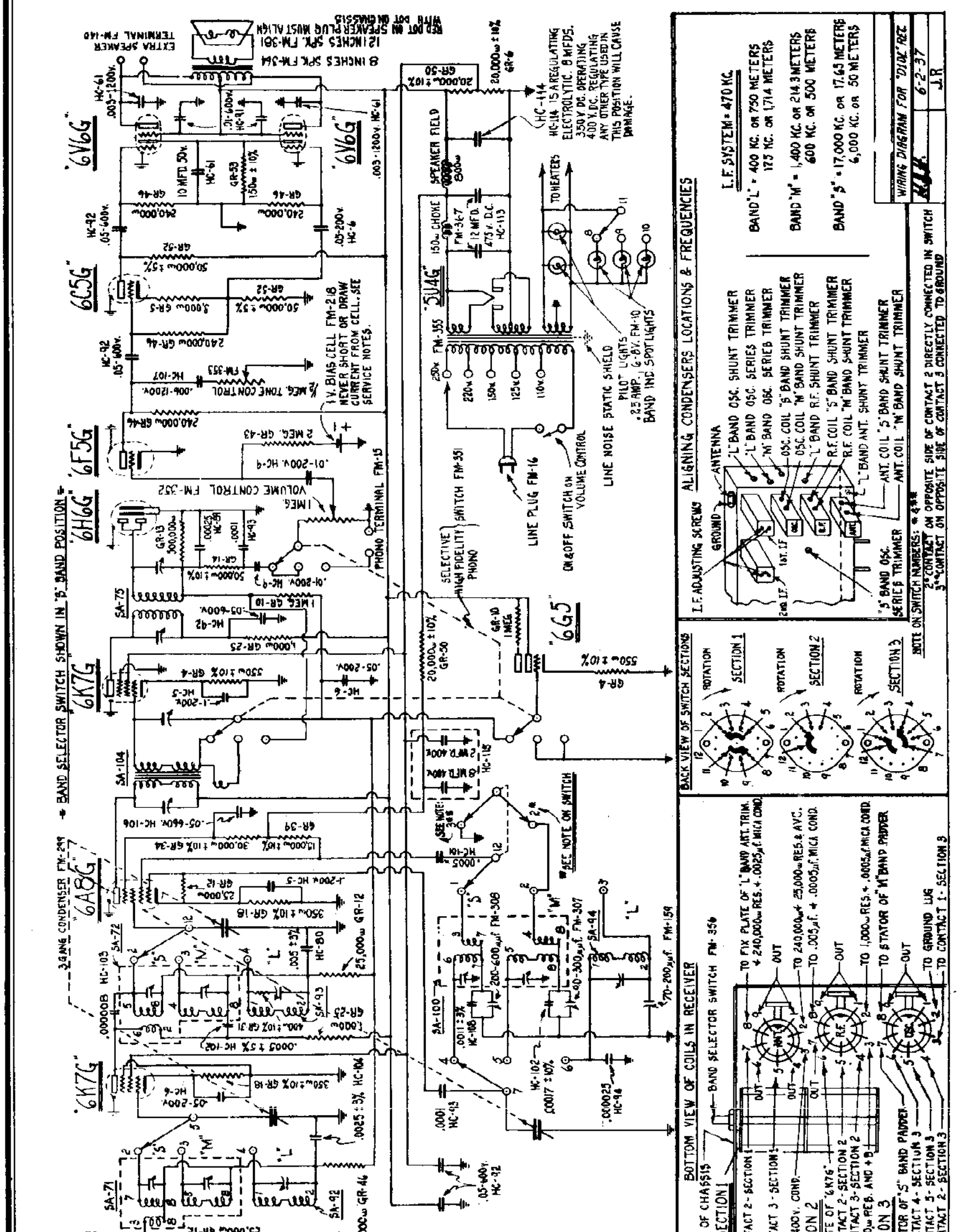
Replace the .1 mfd. condenser in the test generator lead with a 400 ohm resistor and repeat procedure on antenna.

This method now assures you of correct individual alignment on each coil. Then proceed to touch up each coil except the oscillator as outlined.

LONG WAVE BAND "L" ALIGNMENT (This band is included in the D7L chassis only.)

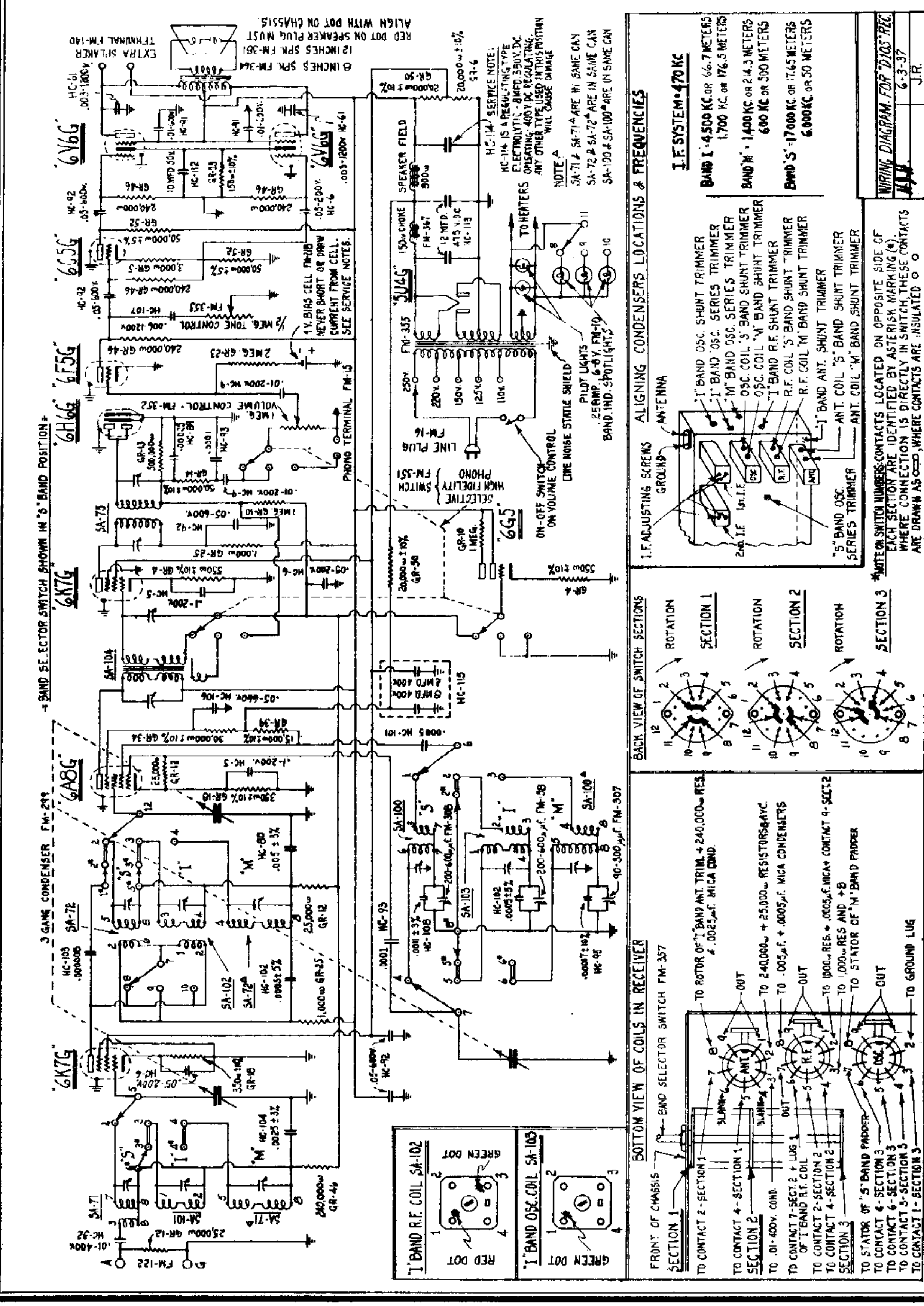
1. Set signal generator for 175 K.C. and connect generator high potential lead in series with .1 mfd. condenser to grid of 6A8G tube.
2. Set receiver dial to 175 K.C. (1714 meters).
3. Adjust L.W. series oscillator trimmer until the loudest signal is heard. This point is required because of the wide frequency range the L.W. series oscillator trimmer has on the oscillator frequency. Due to this wide change in frequency it is possible that several different adjustment points in the L.W. series oscillator trimmer will produce output signals, but only one of these is correct (the loudest).
4. Set the generator and receiver dial to 400 K.C. (750 meters) and adjust L.W. oscillator shunt trimmer until the signal is heard.
5. After readjusting the L.W. oscillator shunt trimmer it is very important that the generator and set dial be set for 175 K.C. (1714 meters) and the L.W. series oscillator trimmer readjusted as given in paragraph 3. Set the generator and receiver dials back to 400 K.C. (750 meters) and adjust L.W. oscillator shunt trimmer until the signal is heard.
6. Remove generator lead from grid of 6A8G. Replace .1 mfd. condenser with .00025 mfd. condenser and connect to antenna of receiver.
7. Set generator and receiver dial to 400 K.C. (750 meters).
8. Adjust antenna and R.F. shunt trimmer for maximum output deflection.
9. Change generator and dial to 175 K.C. (1714 meters). Adjust L.W. series oscillator trimmer for maximum deflection. (Be certain to rotate gang condenser for each adjustment of the series trimmer).
10. Repeat adjustments set forth in paragraph 8 or receiver will not be aligned correctly because of effect given in paragraph 3.
11. After carrying out 10 be sure to repeat 9.
12. Both 8 and 9 must be repeated until it is noticed that the trimmers no longer improve alignment. The receiver is then correctly aligned.

MODELS 1D10, 3D10, 5D10, 7D10, 9D1
ANDREA RADIO CORP. Chassis D10L
Schematic, Trimmers, Coils, Data



MODELS 2D10,4D10,6D10,8D10,10D10
Chassis D10S
Schematic,Trimmers,Coils,Data

ANDREA RADIO CORP.



MODELS 1D10,3D10,5D10, 7D10,9D10
Chassis D10L

ANDREA RADIO CORP.

MODELS 2D10,4D10,6D10 8D10,10D10
Chassis D10S
Alignment

FUNDAMENTAL & IMAGE FREQUENCY NOTES

A simple method of checking to determine if the receiver and generator are tuned for correct alignment is as follows:

Set the signal generator to 17,000 K.C. Tune the receiver from 15,000 slowly up to 18,000 K.C. Two signals should be heard 940 K.C. apart on the receiver, namely, one lower in frequency than 17,000 K.C., the other higher. The correct point for alignment is the higher frequency on the receiver dial, the lower is the image. As a check, the receiver should be left tuned to the higher frequency. Increase the generator frequency which was set for 17,000 K.C. slowly to approximately 18,000 K.C. A signal should be heard near 18,000 K.C. if the first setting was correct for alignment. No signal would indicate that the original setting was on the image frequency. If this occurs, make certain that you start from the beginning to be sure of your results.

After the correct setting has been found, and the alignment has been carried out, it will be noted that the image or lower frequency response on the receiver dial will always sound weaker than the true signal if the tuned circuits have been correctly adjusted.

470 K.C. I.F. ADJUSTMENT

CAUTION: The I.F. system must always be aligned with the SELECTIVE-HI-FI-PHONO in the SELECTIVE POSITION or insensitivity or poor selectivity will result.

1. Connect high potential output lead from test generator in series with a .1 mfd. condenser to the grid of the 6A8G with selector switch in "M" band position and dial at 1000 K.C. NEVER REMOVE CONTROL GRID CAP FROM TUBE.
2. Connect output voltmeter (copper oxide rectifier type) across voice coil of speaker.
3. Set generator to supply a modulated 470 K.C. signal. Adjust generator output attenuator until a small output reading is obtained on the output voltmeter.
4. Adjust both trimmers on top of the first and second I.F. transformers for maximum output. (BE CERTAIN THE SWITCH IS ON THE SELECTIVE POSITION).
5. Retrim slightly the first I.F. trimmer.

MEDIUM BAND "M" ALIGNMENT

TURN THE WAVE BAND SELECTOR SWITCH TO THE "M" POSITION.

Set test generator for 1400 K.C. Connect high potential lead of test generator in series with a .1 mfd. condenser to grid of 6A8G tube. Tune receiver to 1400 K.C. (214.3 meters) on the tuning scale. If signal is not heard, leave scale pointer set to 1400 K.C. (214.3 meters), and adjust oscillator coil shunt trimmer slowly and carefully until signal is heard.

The oscillator coil of the receiver and dial are now set correctly, assuming the test generator calibration is correct.

Remove test generator hot lead from 6A8G grid. Replace .1 mfd. condenser with 250 mmf.(.00025 mfd.) and connect to antenna terminal of receiver "A", all other settings to remain the same.

Adjust R.F. coil shunt trimmer and then "ANT" coil shunt trimmer for maximum output deflection.

Retune test generator to 600 K.C. (500 meters) and tune receiver to 600 K.C. (500 meters) until signal is heard.

Adjust oscillator coil series trimmer slowly while rotating the gang condenser slowly about the signal for each small adjustment of the series trimmer, until further adjustment of the series trimmer does not increase the output signal. During this adjustment, never touch the ANT.,RF., or Osc. shunt trimmers.

Reset test generator and receiver to 1400 K.C. Tune in signal on receiver. Adjust ANT. and R.F. shunt trimmers slightly for maximum output. NEVER THE OSC. SHUNT TRIMMER.

SHORT WAVE "S" BAND ALIGNMENT

1. Turn wave band selector switch to extreme right "S" band. Replace 250 mmf. (.00025 mfd.) condenser with 400 ohm resistor.
2. The following adjustment is necessary only if the dial calibration is badly off otherwise proceed with step 3 and 4.

Set the signal generator to 17,000 K.C. and the receiver dial pointer to 17 M.C. (17,000 K.C.). Adjust oscillator shunt trimmer slowly between maximum and minimum. A signal will be heard at two settings of this trimmer; one near the minimum capacity (plates open) of the trimmer, the other nearer to maximum capacity (plates closed). The trimmer should be left adjusted to the signal heard near its minimum (open plates). The adjustment nearer maximum is the image frequency setting, as can be determined from previous explanation on image frequency.

3. Align R.F. shunt trimmer for maximum output deflection. During this adjustment, be certain to rotate the station selector knob back and forth slowly for each small R.F. shunt trimmer change.
4. Align antenna shunt trimmer for maximum output deflection. During this adjustment, be certain to rotate the station knob back and forth slowly for each small antenna shunt trimmer change until maximum output is obtained. Retrim R.F. shunt trimmer for any small change. Check to see that alignment has not been made on the image. (See notes).

Set test generator to 6000 K.C., retune receiver until signal is heard. Adjust oscillator series trimmer slowly while rotating the gang condenser around the signal for each small adjustment of the series trimmer until no further adjustment of the series trimmer increases the output signal.

NEVER TOUCH THE ANT.,R.F. AND OSC. SHUNT TRIMMER DURING THIS ADJUSTMENT.

Reset test generator to 17,000 K.C.; tune receiver until correct signal is heard. Retune antenna and R.F. shunt trimmer for final critical setting. During this final adjustment, never touch the oscillator shunt trimmers.

THE "S" BAND IS NOW ALIGNED.

Should the operator be inexperienced on "S" band alignment, the individual coils can be checked very simply as follows:

Apply the test generator signal through a .1 mfd. coil to the 6A8G grid, and carry out the procedure outlined above. This will tell you if the oscillator shunt trimmer only is correctly adjusted or the right signal setting has been used on the test generator. In this case, ONLY, the image and fundamental will have the same intensity.

When you are sure the oscillator circuit is correct, place the signal on the grid of the 6K7G R.F. tube, and repeat the procedure on the R.F. coil. In this case when correctly aligned, the image will be lower in volume than the fundamental.

Replace the .1 mfd. condenser in the test generator lead with a 400 ohm resistor and connect to antenna terminal "A", and repeat procedure on antenna.

This method now assures you of correct individual alignment on each coil. Then proceed to touch up each coil except the oscillator as outlined in 3 and 4.

LONG WAVE BAND "L" ALIGNMENT

THIS BAND IS INCLUDED IN THE D10L CHASSIS ONLY.
TURN THE WAVE BAND SELECTOR SWITCH TO THE "L" POSITION.

1. Set signal generator for 175 K.C. and connect generator high potential lead in series with .1 mfd. condenser to grid of 6A8G tube.
2. Set receiver dial to 175 K.C. (1714 meters).
3. Adjust L.W. series oscillator trimmer until the loudest signal is heard. This point is required because of the wide frequency range the L.W. series oscillator trimmer has on the oscillator frequency. Due to this wide change in frequency it is possible that several different adjustment points in the L.W. oscillator series trimmer will produce output signals, but only one of these is correct (the loudest).
4. Set the generator and receiver dial to 400 K.C. (750 meters) and adjust L.W. oscillator shunt trimmer until the signal is heard.
5. After readjusting the L.W. oscillator shunt trimmer it is very important that the generator and the set dial be set for 175 K.C. (1714 meters) and the L.W. series oscillator trimmer readjusted as given in paragraph 3. Set the generator and receiver dials back to 400 K.C. (750 meters) and adjust L.W. oscillator shunt trimmer until the signal is heard.
6. Remove generator lead from grid of 6A8G. Replace .1 mfd. condenser with .00025 mfd. condenser and connect to antenna of receiver.
7. Set generator and receiver dial to 400 K.C. (750 meters).
8. Adjust antenna and R.F. shunt trimmer for maximum output deflection.
9. Change generator and dial to 175 K.C. (1714 meters). Adjust L.W. series oscillator trimmer for maximum deflection. (BE CERTAIN TO ROTATE GANG CONDENSER FOR EACH ADJUSTMENT OF THE SERIES TRIMMER).
10. Repeat adjustments set forth in paragraph 8 or receiver will not be aligned correctly because of effect given in paragraph 3.
11. After carrying out 10 be sure to repeat 9.
12. Both 8 and 9 must be repeated until it is noticed that the trimmers no longer improve alignment.

INTERMEDIATE WAVE BAND "I" ALIGNMENT

THIS BAND IS INCLUDED IN THE D10S CHASSIS ONLY.
TURN THE WAVE BAND SELECTOR SWITCH TO THE "I" BAND POSITION.

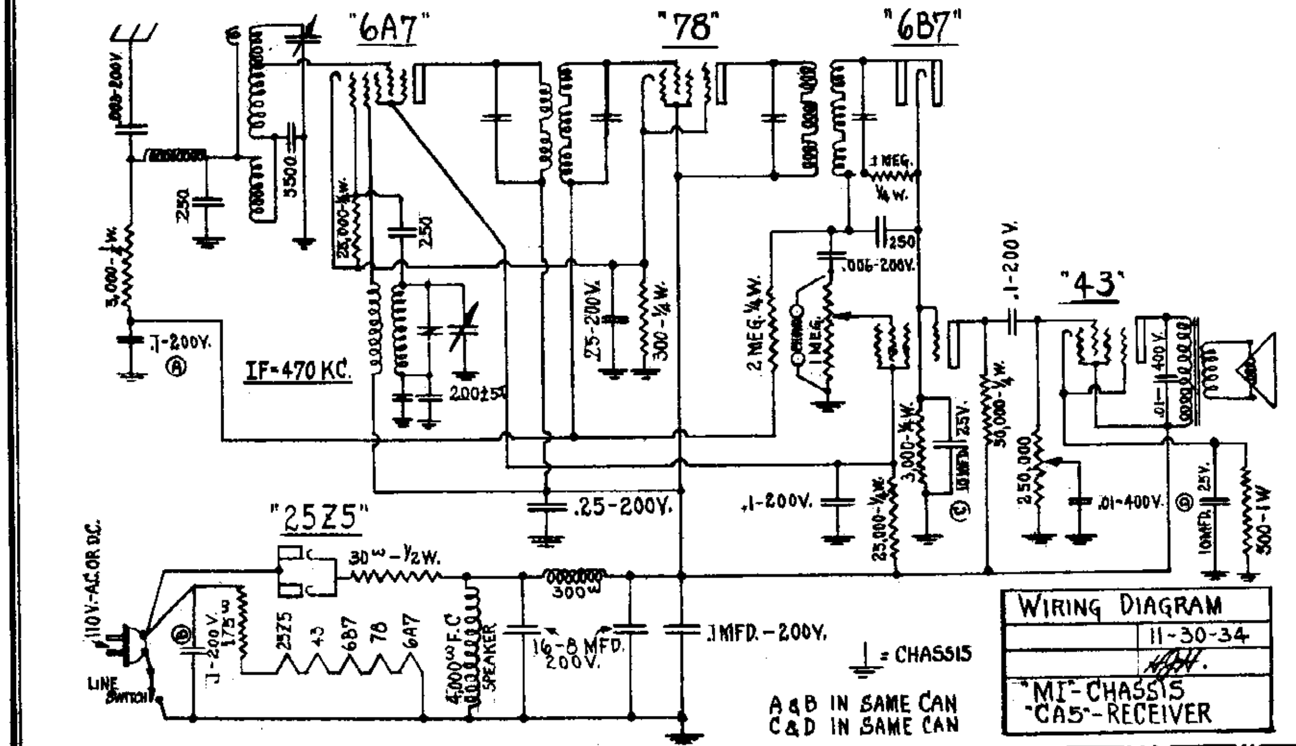
1. In series with the generator high potential output lead connect a .00025 mfd. (250 mmf.) condenser and connect to antenna "A" terminal of the chassis.
2. Tune generator and receiver to 4500 K.C. - 4.5 megacycles.
3. If signal is not heard leave scale pointer set to 4.5 megacycles and adjust oscillator "I" band shunt trimmer slowly and carefully until the signal is heard. The oscillator coil and dial are now correctly aligned and require no further adjustment.
4. Adjust R.F. coil shunt trimmer and then the ANT. for maximum output deflection.
5. Reset generator and receiver to 1700 K.C. (1.7 megacycles). Pick up signal by tuning receiver on either side of 1.7 megacycles.
6. Adjust "I" Band oscillator series trimmer only while turning the gang condenser tuning control slowly back and forth about the signal for each small adjustment of the series trimmer.

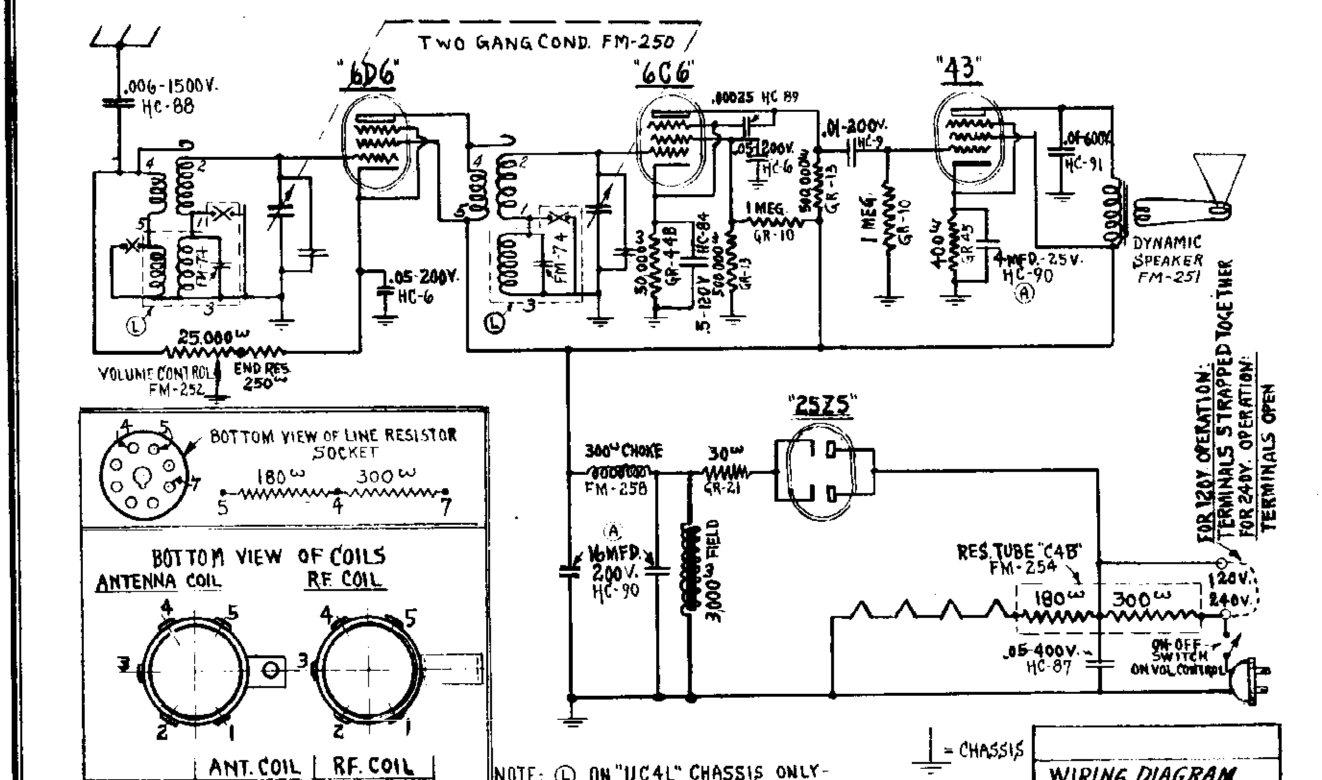
Continue this until no further adjustment of the series trimmer produces an increase in the output deflection.

Retune generator and receiver to 4500 K.C. (4.5 megacycles). Tune in signal on receiver. Readjust ANT. and R.F. shunt trimmers slightly for any small change.

MODEL CA5, Chassis MI
MODEL 410, Chassis UC4
MODEL 411, Chassis UC4L
Schematics

ANDREA RADIO CORP.





	ANT. COIL	RF. COIL
"UC4L" REC.	* SA-77	* SA-78
"UC4" REC.	* SA-79	* SA-80

ON MODEL 411. First Adjust Trimmers on Gang Cond. For B.C. range. THEN L.W. Must be Adjusted NEVER THE opposite

NOTE: Ⓛ ON "UC4L" CHASSIS ONLY - BAND SELECTOR SWITCH FM-253

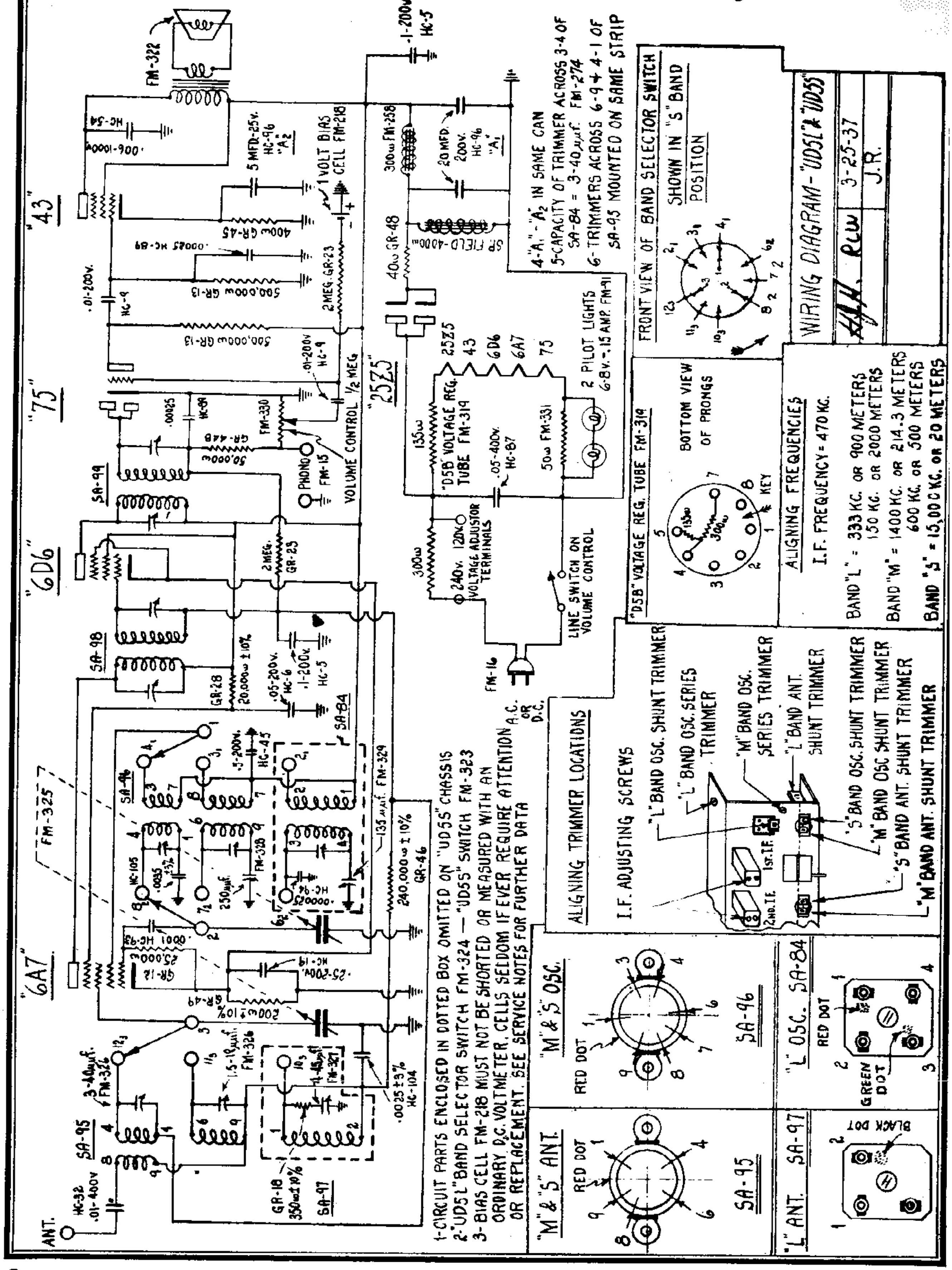
Ⓐ IN SAME CONTAINER

B.C. ALIGNMENT AT 1400 KC. - TRIMMERS ON GANG
*L.W. " AT 325 KC. " ON COILS ONLY

*NOTE. ALIGNMENT ON L.W. BY ADJUSTING TRIMMER ON ANT. COIL & ROCKING GANG

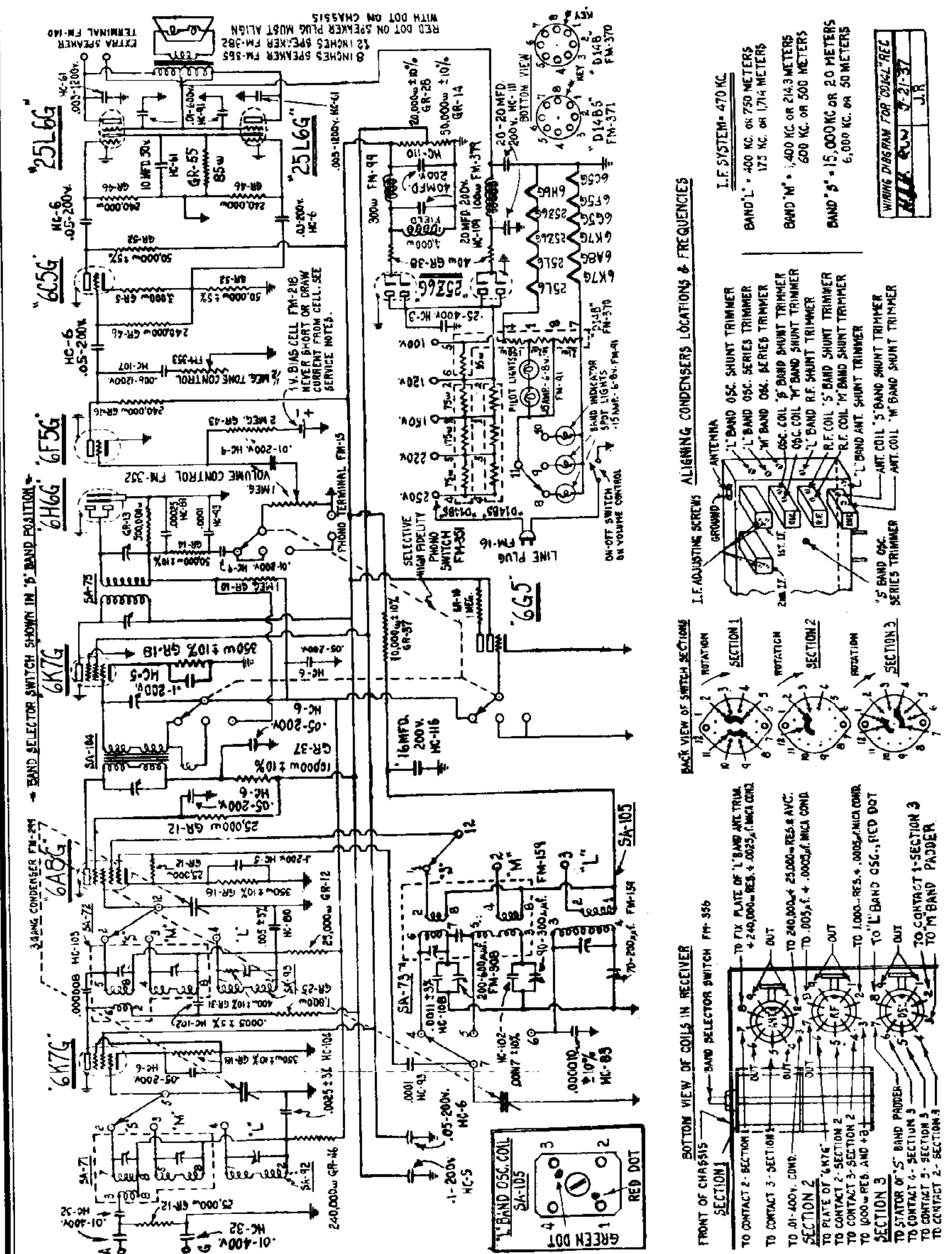
MODEL 520, Chassis UD5S
MODEL 521, Chassis UD5L
Schematic, Trimmers, Coils
Alignment

ANDREA RADIO CORP.



MODELS 1401,1403,1405,1407,1409
Chassis UD14L
Schematic, Trimmers, Coils
Alignment

ANDREA RADIO CORP.



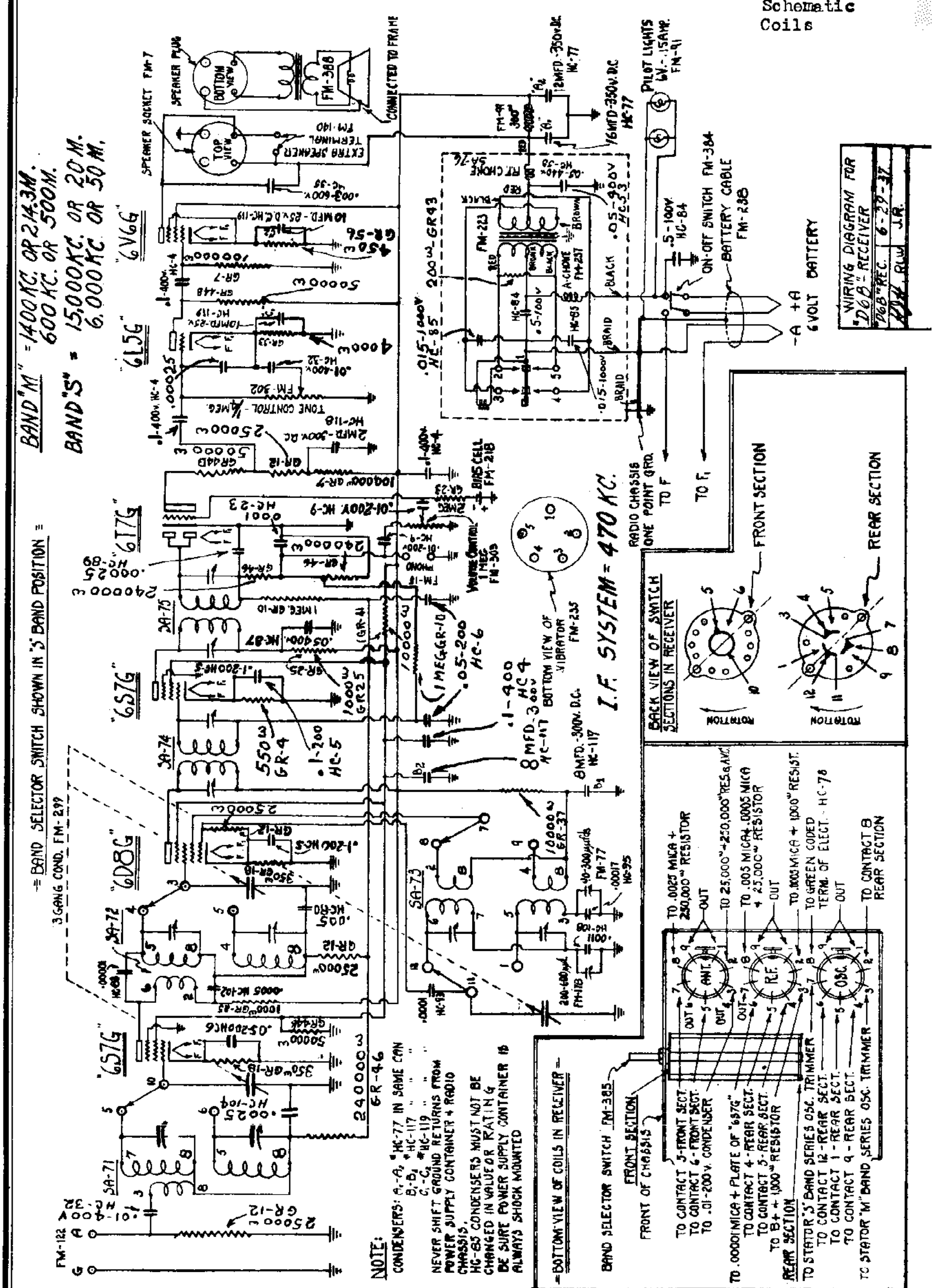
MODELS 616,617,6

Chassis D6B

Schematic

Coils

ANDREA RADIO CORP.



MODELS 616,617,618
Chassis D6B
Alignment,Trimmers

ANDREA RADIO CORP.

FUNDAMENTAL & IMAGE FREQUENCY NOTES

A simple method of checking to determine if the receiver and generator are tuned for correct alignment is as follows:

Set the signal generator to 15000 K.C. Tune the receiver from 13000 slowly up to 16000 K.C. Two signals should be heard 940 K. C. apart on the receiver, namely, one lower in frequency than 15000 KC, the other higher. The correct point for alignment is the higher frequency on the receiver dial, the lower is the image. As a check, the receiver should be left tuned to the higher frequency. Increase the generator frequency which was set for 15000 KC slowly to approximately 16000 K.C. A signal should be heard near 16000 K.C. if the first setting on the generator was correct for alignment. No signal would indicate that the original setting was on the image frequency. If this occurs, make certain that you start from the beginning to be sure of your results.

After the correct setting has been found, and the alignment has been carried out, it will be noted that the image or lower frequency response on the receiver dial will always sound weaker than the true signal, if the tuned circuits have been correctly adjusted.

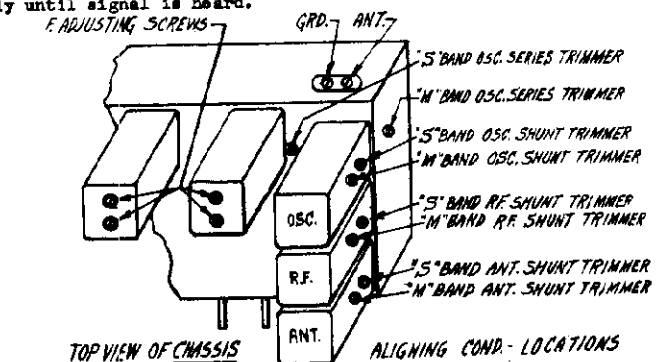
470 K.C. I.F. ADJUSTMENT.

1. Connect high potential output lead from test generator in series with a .1 mfd. condenser to the grid of the 6D8G tube.
2. Connect output voltmeter (copper oxide rectifier type) across voice coil of speaker.
3. Set generator to supply a modulated 470 K.C. signal. Adjust generator output attenuator until a small output reading is obtained on the output voltmeter.
4. Adjust both trimmers on top of the first and second I.F. transformers (see diagram) for maximum output.
5. Retrim slightly the first I.F. trimmer.

MEDIUM BAND "M" ALIGNMENT

TURN THE WAVE BAND SELECTOR SWITCH TO THE "M" POSITION.

Set test generator for 1400 K.C. Connect high potential lead of test generator in series with a .1 mfd. condenser to grid of 6D8G tube. Tune receiver to 1400 K.C. (214.3 meters) on the tuning scale. If signal is not heard, leave scale pointer set to 1400 K.C. (214.3 meters), and adjust oscillator coil shunt trimmer slowly and carefully until signal is heard.



TOP VIEW OF CHASSIS — ALIGNING COND. - LOCATIONS

The oscillator coil of the receiver and dial are now set correctly, assuming the test generator calibration is correct.

Remove test generator hot lead from 6D8G grid. Replace .1 mfd. condenser with 250 mmf. (.00025 mfd.) and connect to antenna terminal of receiver "A", all other settings to remain the same.

Adjust R.F. coil shunt trimmer and then "ANT." coil shunt trimmer for maximum deflection.

Retune test generator to 600 K.C. (500 meters), and tune receiver to 600 K.C. (500 meters) until signal is heard.

Adjust oscillator coil series trimmer slowly while rotating the gang condenser slowly about the signal for each small adjustment of the series trimmer, until further adjustment of the series trimmer does not increase the output signal. During this adjustment, never touch the ANT., R.F. or OSC. shunt trimmers.

Reset test generator and receiver to 1400 K.C. Tune in signal on receiver. Adjust Antenna and R.F. shunt trimmers slightly for maximum output - NEVER THE OSC. SHUNT TRIMMER.

SHORT WAVE "S" BAND ALIGNMENT

1. Turn wave band selector switch to extreme right "S" band. Replace 250 mmf. (.00025 mfd.) condenser with 400 ohm resistor.
2. The following adjustment is necessary only if the dial calibration is badly off, otherwise proceed with steps 3 and 4.

   Set the signal generator to 15,000 K.C. and the receiver dial pointer to 15 M.C. (15,000 K.C.). Adjust oscillator shunt trimmer slowly between maximum and minimum. A signal will be heard at two settings of this trimmer, one near the minimum capacity (plates open) of the trimmer, the other nearer to maximum capacity (plates closed). The trimmer should be left adjusted to the signal heard near its minimum (open plates). The adjustment nearer maximum is the image frequency setting, as can be determined from previous explanation on Image Frequency.

3. Align R.F. shunt trimmer for maximum output deflection. During this adjustment, be certain to rotate the station selector knob back and forth slowly for each small R.F. shunt trimmer change.
4. Align antenna shunt trimmer for maximum output deflection. During this adjustment, be certain to rotate the station knob back and forth slowly for each small antenna shunt trimmer change until maximum output is obtained. Retrim R.F. shunt trimmer for any small change. Check to see that alignment has not been made on the image. (See notes)

Set test generator to 6000 K.C. Retune receiver until signal is heard. Adjust oscillator series trimmer slowly while rotating the gang condenser around the signal for each small adjustment of the series trimmer until no further adjustment of the series trimmer increases the output signal.

NEVER TOUCH THE ANT., R.F. OR OSC. SHUNT TRIMMERS DURING THIS ADJUSTMENT.

Reset test generator to 15,000 K.C. Tune receiver until correct signal is heard. Retune antenna and R.F. shunt trimmer for final critical setting. During this final adjustment, never touch the oscillator shunt trimmer.

THE "S" BAND IS NOW ALIGNED.

Should the operator be inexperienced on "S" band alignment, the individual coils can be checked very simply as follows:

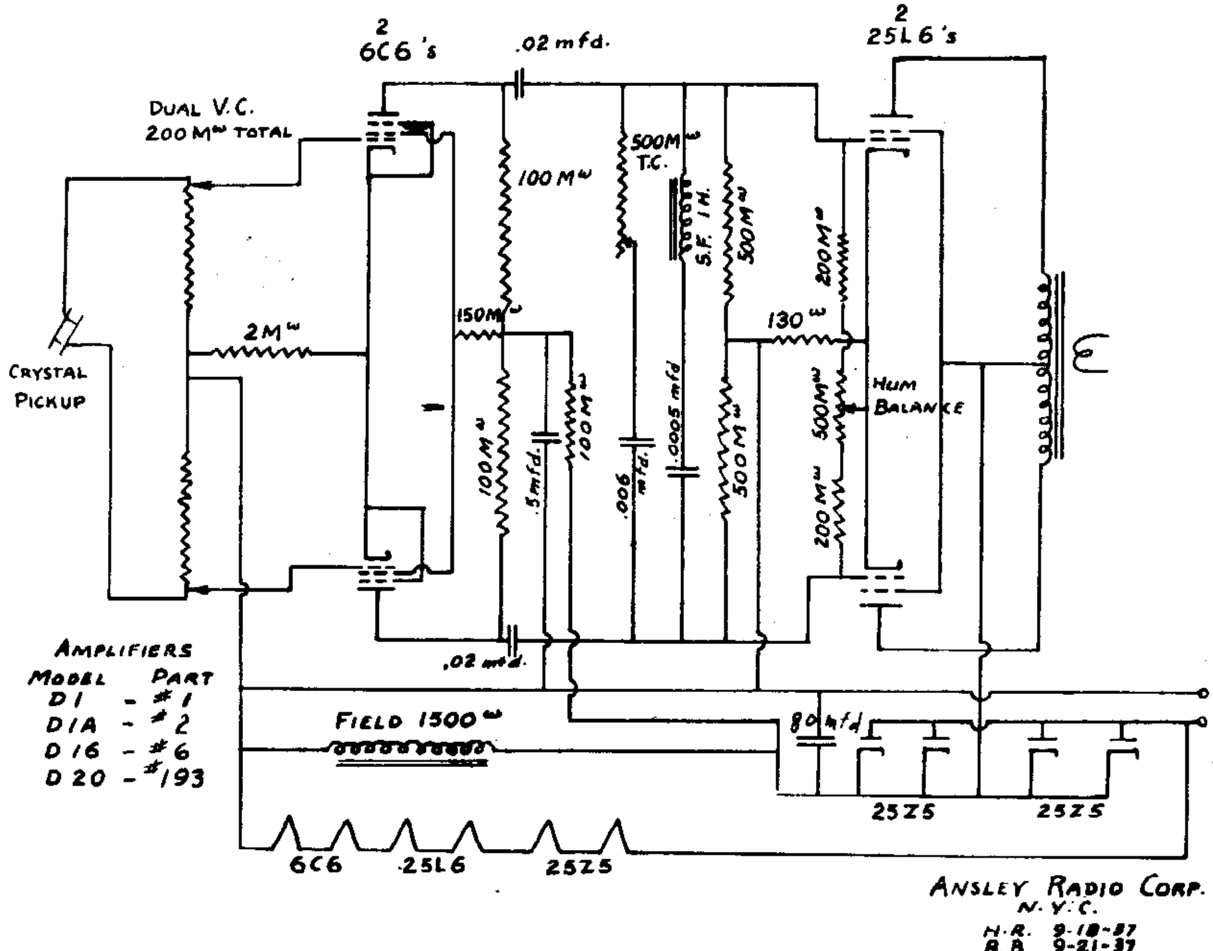
Apply the test generator signal through a .1 mfd. coil to the 6D8G grid, and carry out the procedure outlined above. This will tell you if the oscillator shunt trimmer only is correctly adjusted, or the right signal setting has been used on the test generator. In this case ONLY the image and fundamental will have the same intensity.

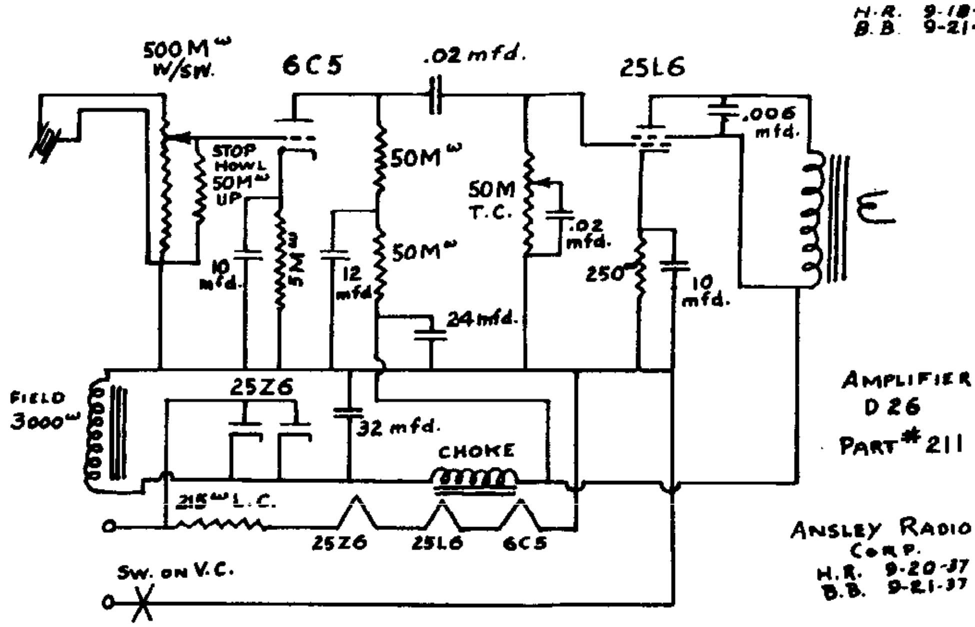
When you are sure the oscillator circuit is correct, place the signal on the grid of the 6S7G R.F. tube, and repeat the procedure on the R.F. coil. In this case when correct alignment has been made, the image will be lower in volume than the fundamental.

Replace the .1 mfd. condenser in the test generator lead with a 400 ohm resistor and connect to antenna terminal "A", and repeat procedure on antenna.

This method now assures you of correct individual alignment on each coil. Then proceed to touch up each coil except the oscillator, as outlined in 3 and 4.

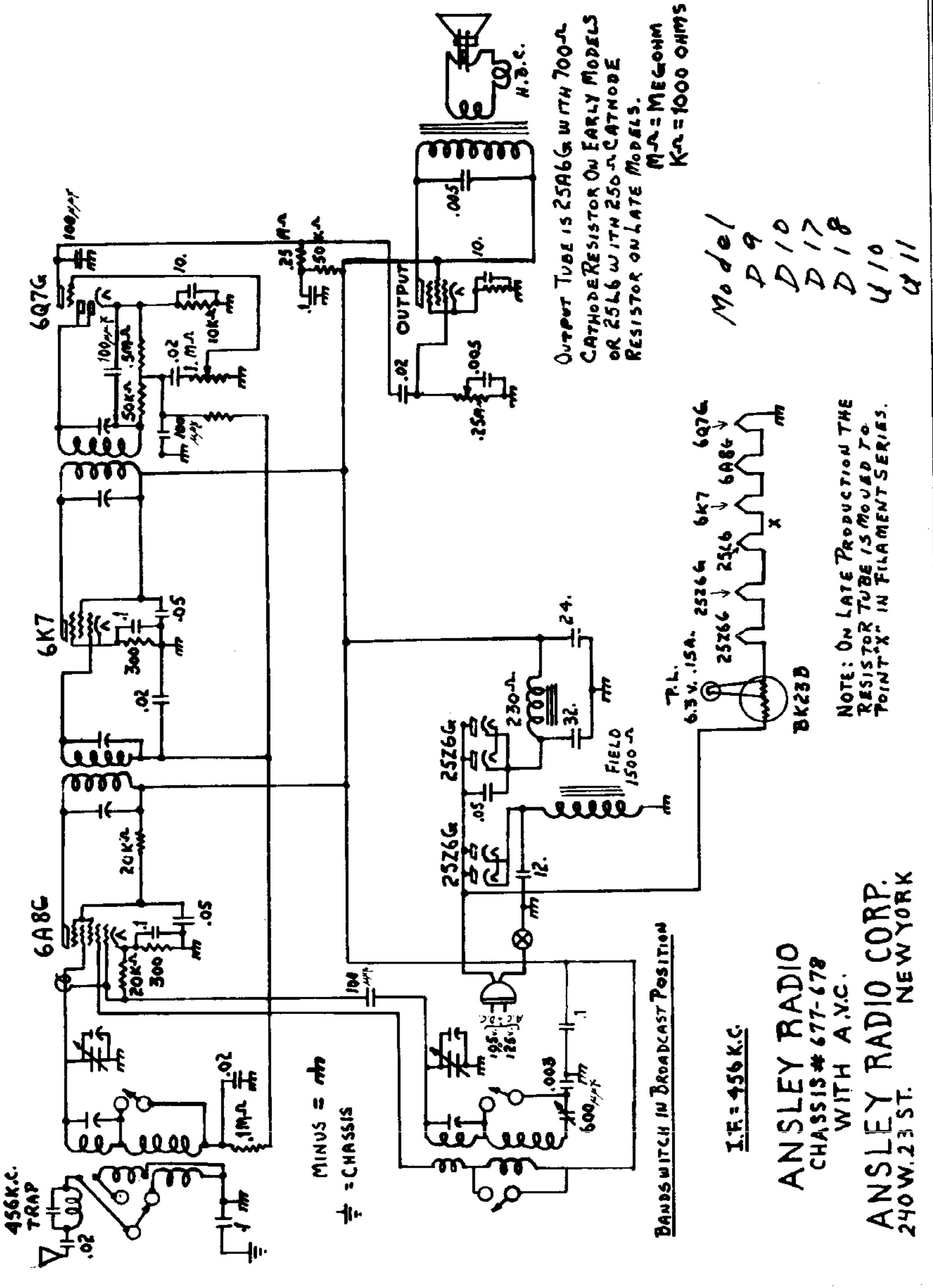
ANSLEY RADIO LABORATORIES



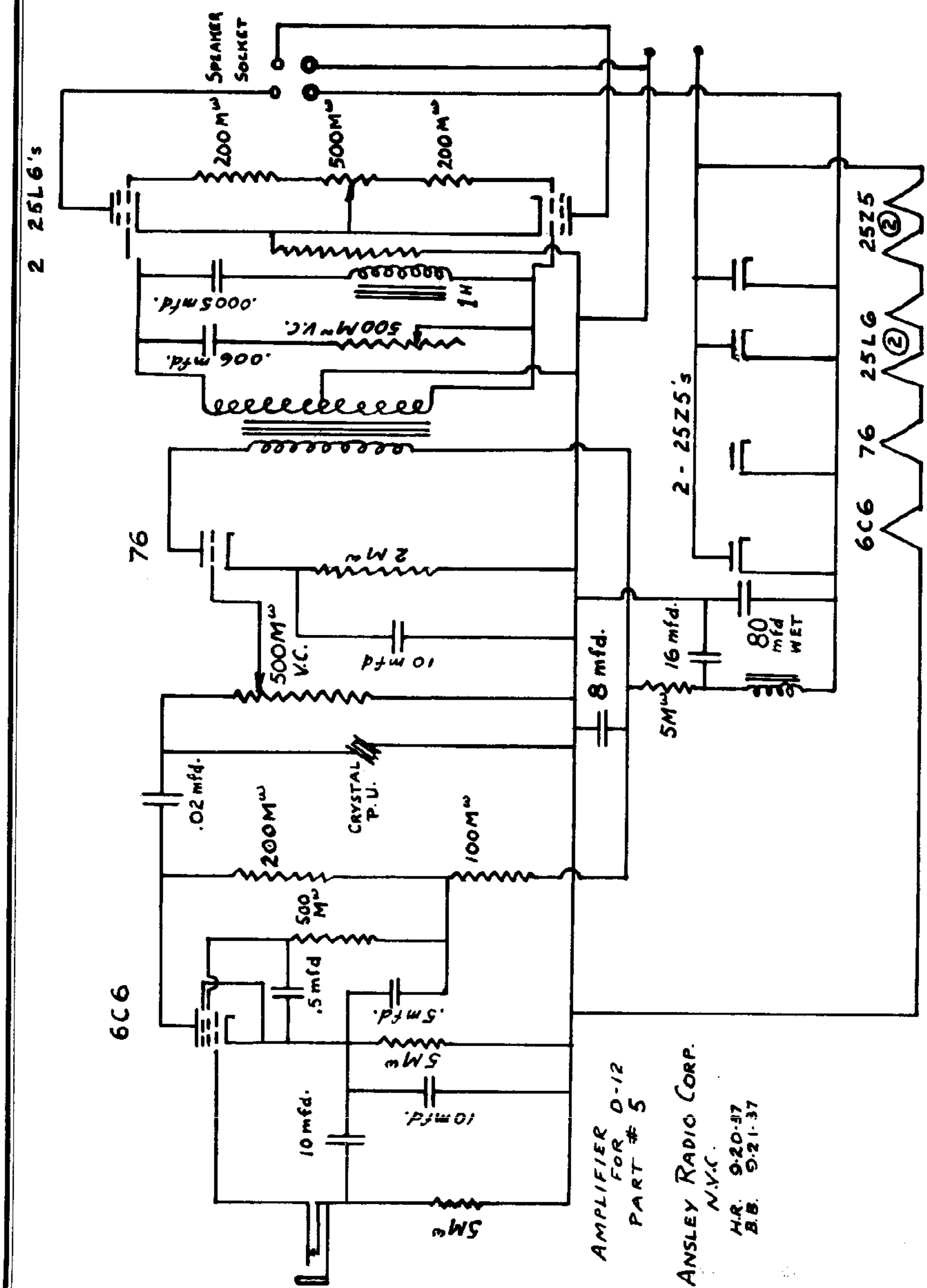


MODELS D9,D10,D17,D18
U10,U11
Schematic

ANSLEY RADIO LABORATORIES

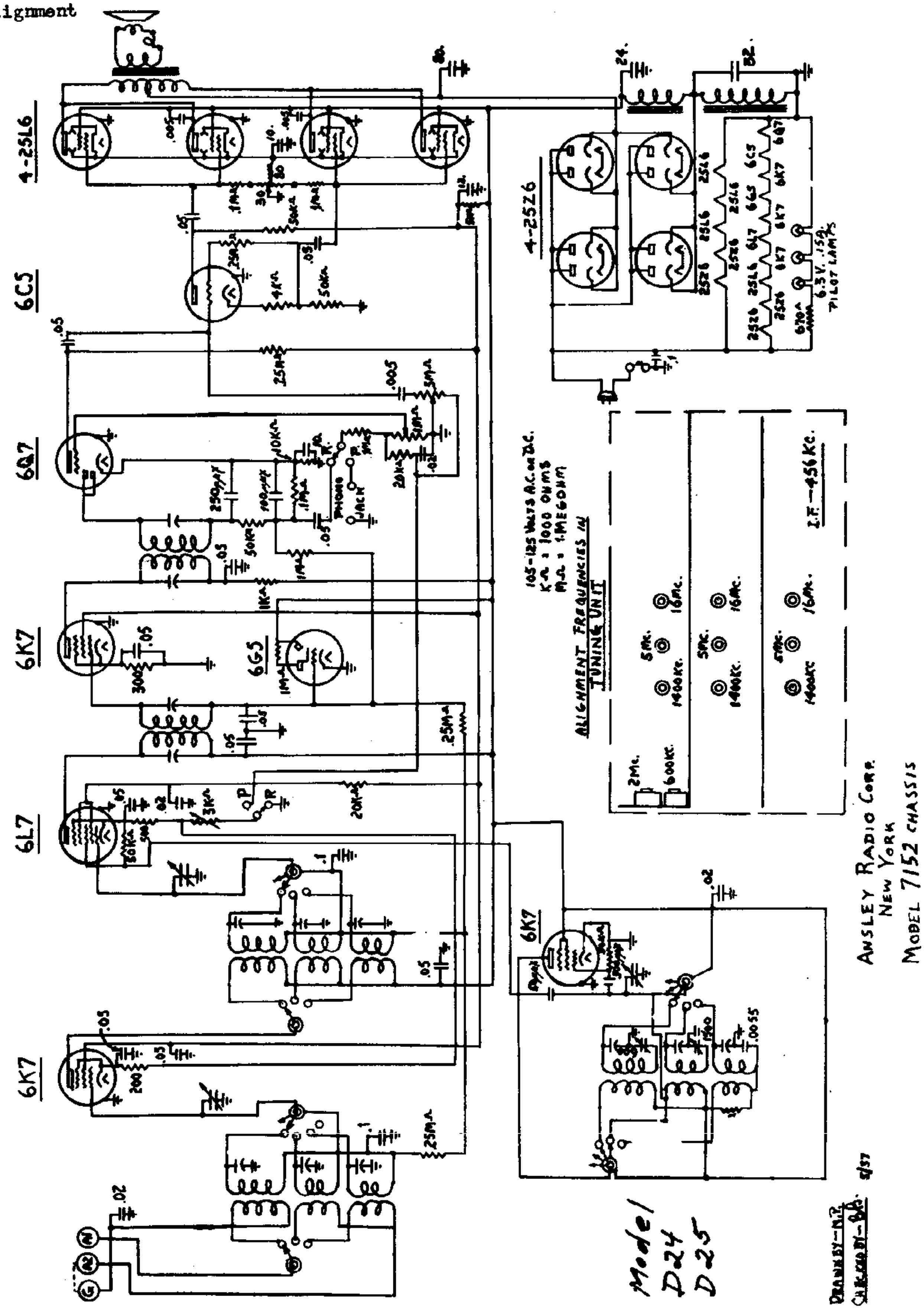


ANSLEY RADIO LABORATORIES

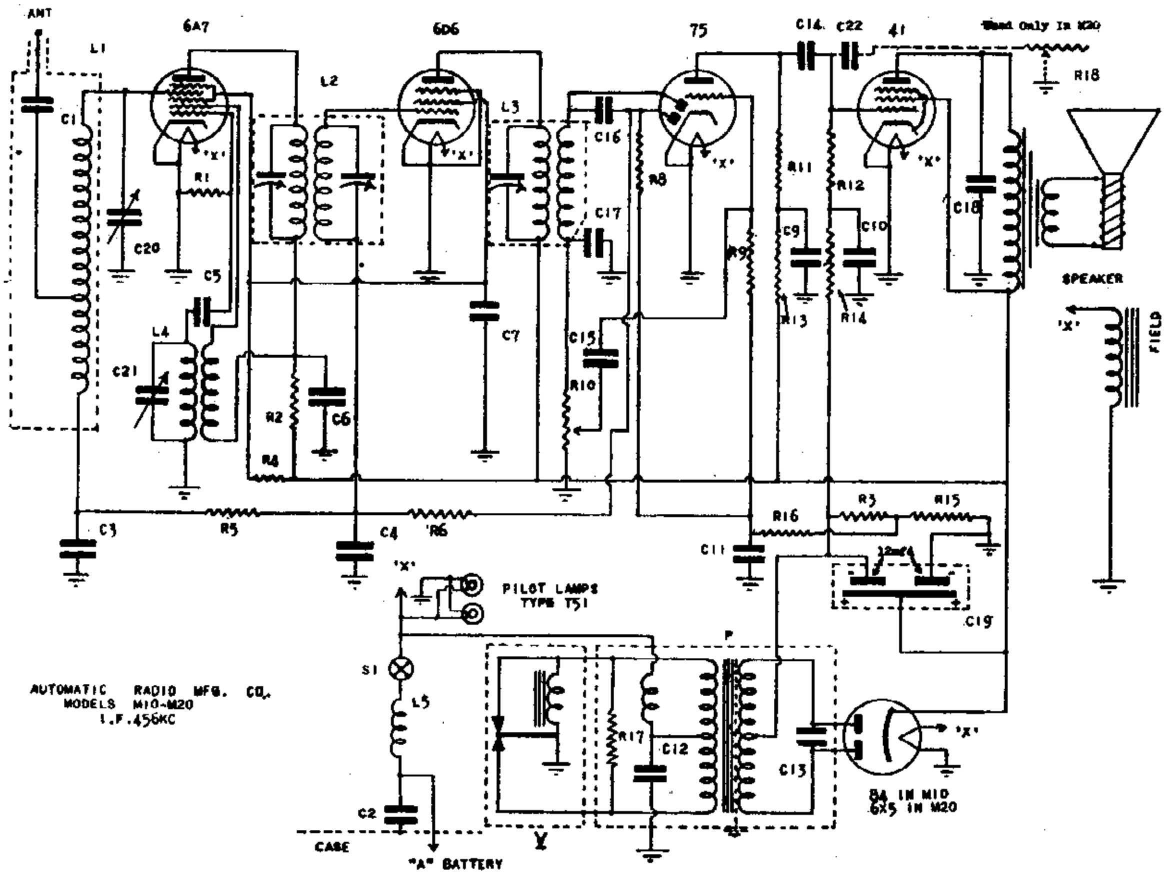


MODELS D24, D25
Chassis 7152
Schematic, Trimmers
Alignment

ANSLEY RADIO LABORATORIES



AUTOMATIC RADIO MFG. CO., INC.



ALIGNMENT PROCEDURE

I. F. Alignment. Connect a signal generator set at 456 kc to the 6A7 grid. Connect an output meter across the secondary terminals of the speaker output transformer. With the weakest signal from the generator necessary to obtain .5 volt deflection on the output meter, peak the two trimmers on the first I. F. transformer and the single trimmer on the second I. F. transformer. This second I. F. transformer is located on the under side of the chassis.

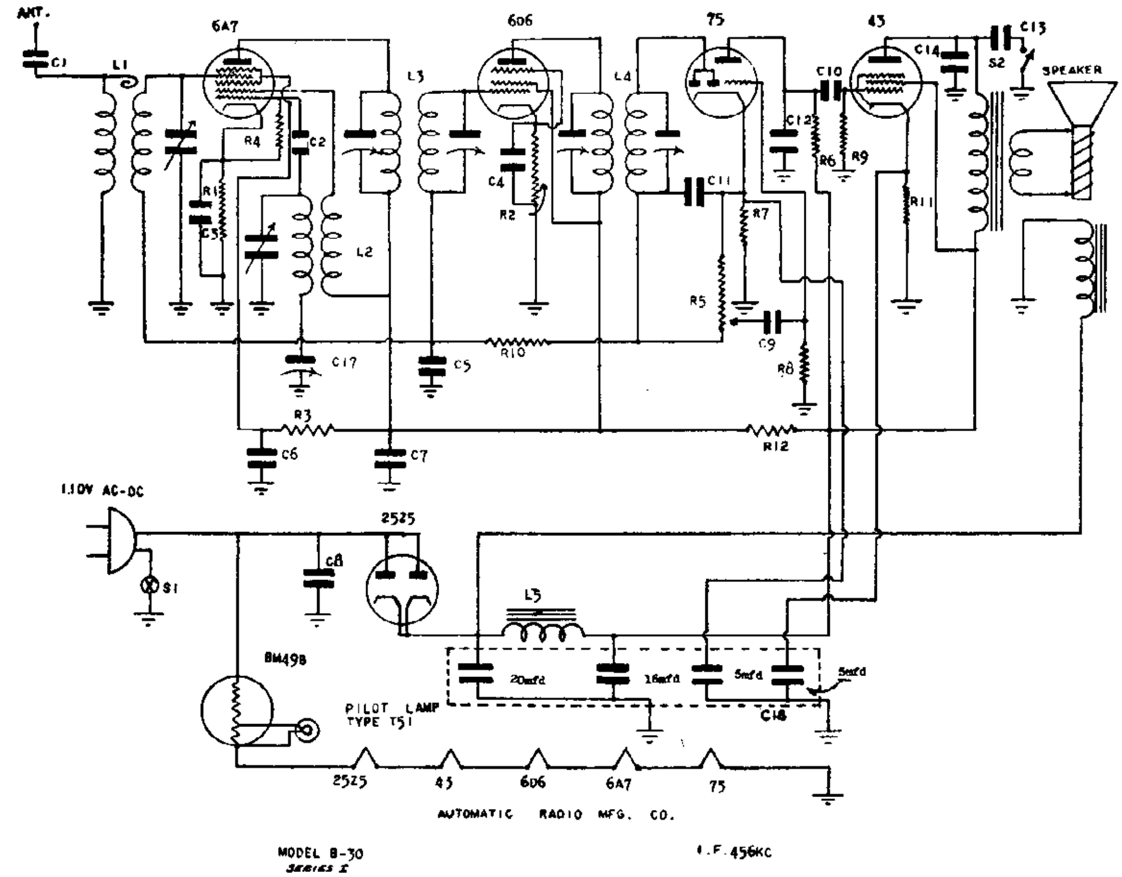
R. F. Alignment. Insert a 200mmfd condenser in series with the antenna lead of the receiver and the signal generator. Set the receiver dial to 1400kc and the signal generator to the same frequency. Again with the weakest signal necessary to obtain .5 volt deflection of the output meter, adjust the terminals on both sections of the variable condenser. It is the utmost importance in making these various adjustments that the signal level be attenuated as far as possible in order to overcome the AVC action which would otherwise introduce serious errors and prevent obtaining optimum results.

SCHEMATIC LOCATION	DESCRIPTION
L1	Antenna Coil
L2, L4	Composite I.F. Trans. and Osc.
L3	2nd I.F. Transformer
L5	"A" R.F. Choke
——	Speaker
P	Power Transformer
V	Vibrator
S1	Line Switch (On Vol. Control)
C1, C2	Mica Condenser .0005mfd
C3, C4	Fixed " .05mfd—200v
C5, C16	Mica " 100mmfd
C6, C7, C9, C10, C11	Fixed " .1mfd—200v
C12	Fixed " .5mfd—200v
C13	Fixed " .007mfd—1200v
C14, C15	Fixed " .01mfd—400v
C17	Mica " 200mmfd
C18	Fixed " .005mfd—600v

SCHEMATIC LOCATION	DESCRIPTION
C19	Electrolytic Condenser Block
C20, C21	2 sect. Tuning Condenser
C22	Fixed Condenser .002mfd—600v
R1	Resistor 50,000 ohms—1/4 Watt
R2	" 250 ohms—1/4 Watt
R3	" 250 ohms—1/2 Watt
R4	" 25,000 ohms—1/4 Watt
R5	" 250,000 ohms—1/4 Watt
R6, R8, R9	" 1 megohm—1/4 Watt
R10	Volume Control—1/2 megohm
R11, R12	Resistor 1/2 megohm—1/4 Watt
R13, R14	" 1/4 megohm—1/4 Watt
R15	" 30 ohms—1/4 Watt
R16	" 100,000 ohms—1/4 Watt
R17	" 150 ohms—1/4 Watt
R18	Tone Control—1/2 megohm

MODEL B30, Series I
Schematic, Parts
Alignment

AUTOMATIC RADIO MFG. CO., INC.



ALIGNMENT PROCEDURE

I. F. Alignment. Connect a signal generator set at 456kc to the 6A7 input and connect an output meter to the speaker output. Using a weak signal tune the two I. F. condensers on the first I. F. coil and the two I. F. condensers on the output I. F. coil for maximum response.

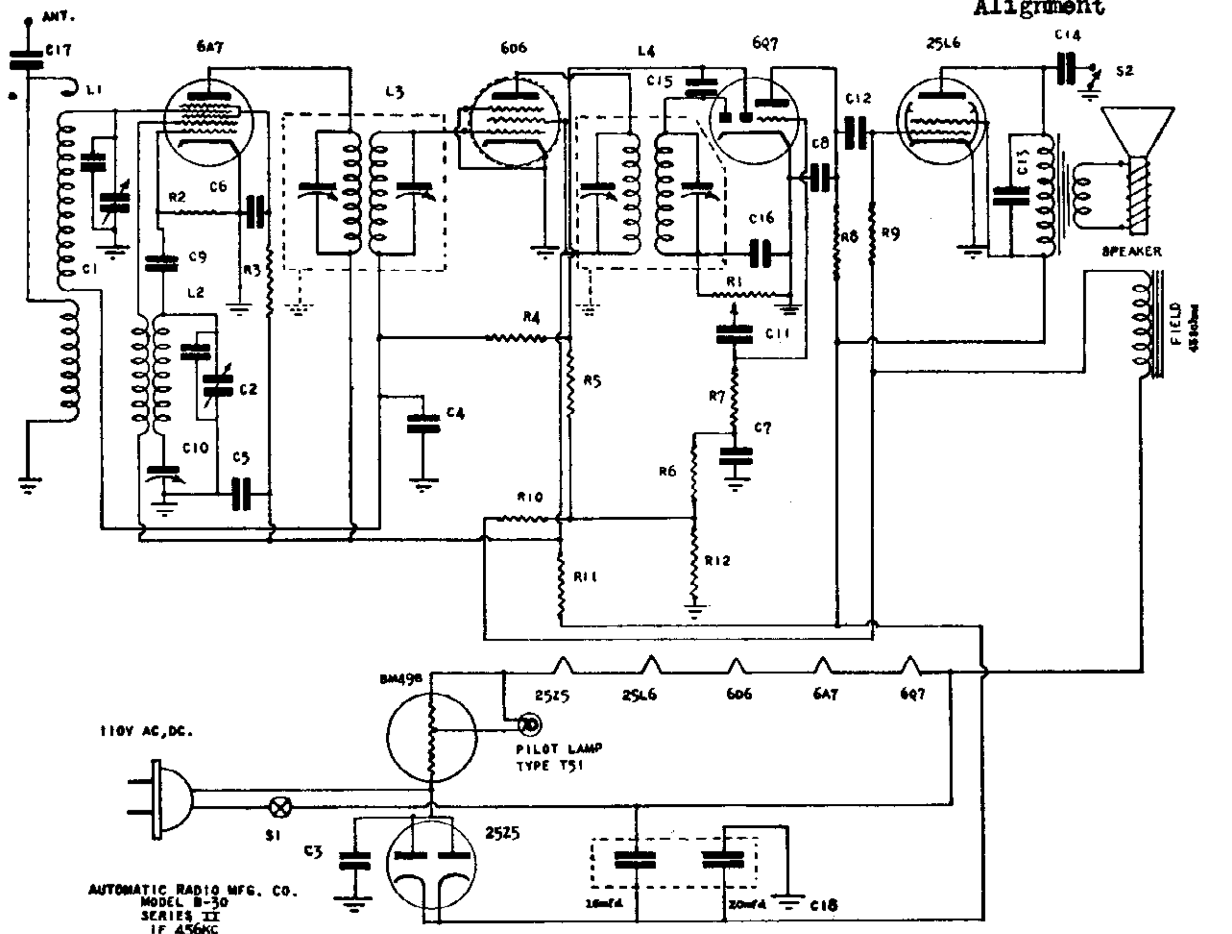
R. F. Alignment. Connect the signal generator set at 1400kc to the antenna lead using a dummy antenna of 200mmf. Tune the set by means of the dial to 1400kc position. Adjust oscillator trimmer for this frequency. Pad at 600kc. Recheck 1400 kc and trim antenna stage for maximum response. Repeating the alignment may result in improved sensitivity.

SCHEMATIC LOCATION	DESCRIPTION	PART NO.	LIST PRICE
L1	Antenna Coil	BA110	$ .50
L2	Oscillator Coil	BO110	.40
L3	1st IF Coil	LC110	.80
L4	2nd IF Coil	LC112	.80
L5	Filter Choke—300w	C1588	.80
——	Speaker	SD1	3.50
C1	Fixed Condensor — .002mfd—600v	——	.20
C2	Mica " — .0001mfd	——	.20
C3, C4, C5, C6, C7, C8	Fixed " — .1mfd—200v	——	.20
C9, C10	Fixed " — .01mfd—400v	——	.20
C11, C12	Mica " — .0002mfd	——	.20
C13	Fixed " — .02mfd—600v	——	.25
C14	Fixed " — .006mfd—600v	——	.20
C17	Variable Padder — 200-600mfd	——	.40
C18	Electrolytic Condensor Block	CE15	1.60
S1	Line Switch (On Volume Control)	——	——
S2	Tone Control Switch	S12	.40
R1, R2	Resistor — 250 ohms—¼ watt	——	.20
R3	Resistor — 25,000 ohms—¼ watt	——	.15
R4	Resistor — 50,000 ohms—¼ watt	——	.15
R5	Volume Control — 500,000 ohms	RV18	.80
R6	Resistor — 500,000 ohms—¼ watt	——	.15
R7	Resistor — 5,000 ohms—¼ watt	——	.15
R8, R9, R10	Resistor — 1 megohm—¼ watt	——	.15
R11	Resistor — 750 ohms ½ watt	——	.20
R12	Resistor — 30 ohms—¼ watt	——	.20

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL B30, Series II
Schematic, Parts
Alignment

AUTOMATIC RADIO MFG. CO., INC.



ALIGNMENT PROCEDURE

I. F. Alignment. Connect a signal generator set at 456kc to the 6A7 input and connect an output meter to the speaker output. Using a weak signal tune the two I. F. condensers on the first I. F. coil and the two I. F. condensers on the output I. F. coil for maximum response.

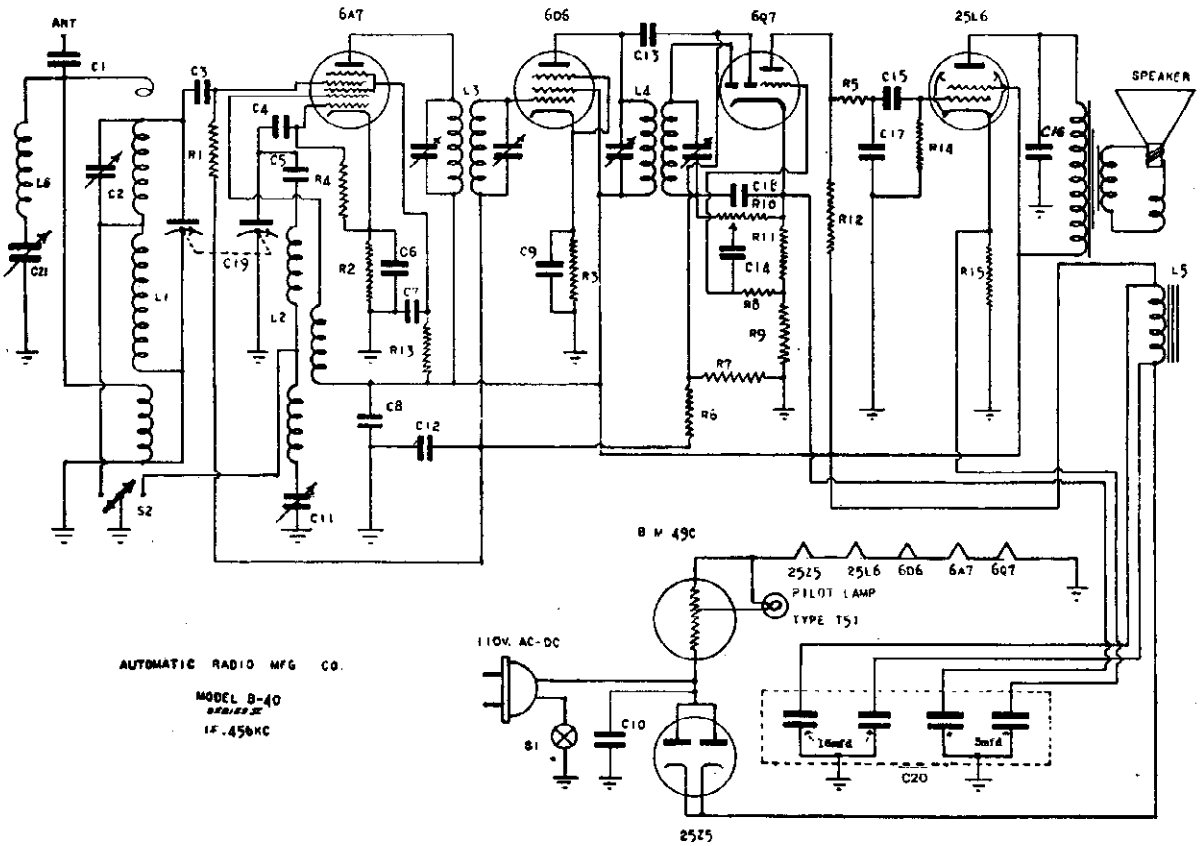
R. F. Alignment. Connect the signal generator set at 1400kc to the antenna lead using a dummy antenna of 200mmf. Tune the set by means of the dial to 1400kc position. Adjust oscillator trimmer for this frequency. Pad at 600kc. Recheck 1400kc and trim antenna stage for maximum response. Repeating the alignment may result in improved sensitivity.

SCHEMATIC LOCATION	DESCRIPTION	PART NO.	LIST PRICE
L1	Antenna Coil	BA110	$0.50
L2	Oscillator Coil	BO110	.40
L3	1st I.F. Coil	LC110	.80
L4	2nd I.F. Coil	LC112	.80
——	Speaker	SD23	3.50
C1, C2	Tuning Condenser	CV25	1.80
C3, C4, C5, C6, C7	Fixed " .1mfd—200v	——	.20
C8, C9, C16	Mica " 200mmfd	——	.20
C15	Mica " 100mmfd	——	.20
C10	Variable Padder 550mmfd	——	.40
C11, C12, C13	Fixed Condenser .01mfd—200v	——	.20
C14	Fixed " .02mfd—600v	——	.20
C17	Fixed " .002mfd—600v	——	.25
C18	Electrolytic Condenser Block	CE20	1.40
S1	Line Switch (On Vol. Control)	——	——
S2	Tone Control Switch	S12	.40
R1	Volume Control 1/4 megohm	RV18	.80
R2	Resistors 50,000 ohms—1/4 Watt	——	.15
R3	" 25,000 ohms—1/4 Watt	——	.20
R4, R5	" 2 megohms—1/4 Watt	——	.15
R6, R7	" 1 megohm—1/4 Watt	——	.15
R8,	" 1/4 megohm—1/4 Watt	——	.15
R9	" 1/2 megohm—1/4 Watt	——	.15
R10	" 100 ohms—1/2 Watt	——	.20
R11	" 30 ohms—1/4 Watt	——	.20
R12	" 25 ohms—1/4 Watt	——	.20

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL B40, Series II
Schematic, Parts
Alignment

AUTOMATIC RADIO MFG. CO., INC.



SCHEMATIC LOCATION	DESCRIPTION	LIST PRICE
L1	Antenna Coil	$0.80
L2	Oscillator Coil	.75
L3	1st I. F. Transformer	.80
L4	2nd I.F. Transformer	.80
L5	Speaker Field—450 ohms	——
L6	Wave Trap	.50
S1	Line Switch (On Volume Control)	——
S2	Band Switch	.40
C1	Fixed Condenser .002mfd—600v	.20
C2, C13, C21	Trimmer Condensers 3-30mmfd	.20
C3, C12	Fixed Condensers .005mfd—600v	.20
C4	Mica " 100mmfd	.20
C5 C10	Mica " 1900mmfd	.25
C6, C7, C8, C9,	Fixed " .1mfd—200v	.20
C11	Variable Padder Condensers 550mmfd	.40
C14, C15, C16	Fixed Condensers .01mfd—400v	.20

SCHEMATIC LOCATION	DESCRIPTION	LIST PRICE
C17, C18	Mica " 200mmfd	.20
C19	Tuning Condenser	1.80
C20	Electrolytic Condenser Block	1.40
R1	Resistors 1 megohm—¼ Watt	.15
R2, R3	" 250 ohms—¼ Watt	.20
R4, R5	" 50,000 ohms—¼ Watt	.15
R6, R7, R8	" 2 megohms—¼ Watt	.20
R9	" 35,000 ohms—¼ Watt	.20
R10	Volume Control 250,000 ohms	.80
R11	Resistors 7500 ohms—¼ Watt	.20
R12	" 250,000 ohms—¼ Watt	.15
R13	" 25,000 ohms—¼ Watt	.20
R14	" 500,000 ohms—¼ Watt	.15
R15	" 150 ohms—½ Watt	.25
——	Speaker	3.75

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

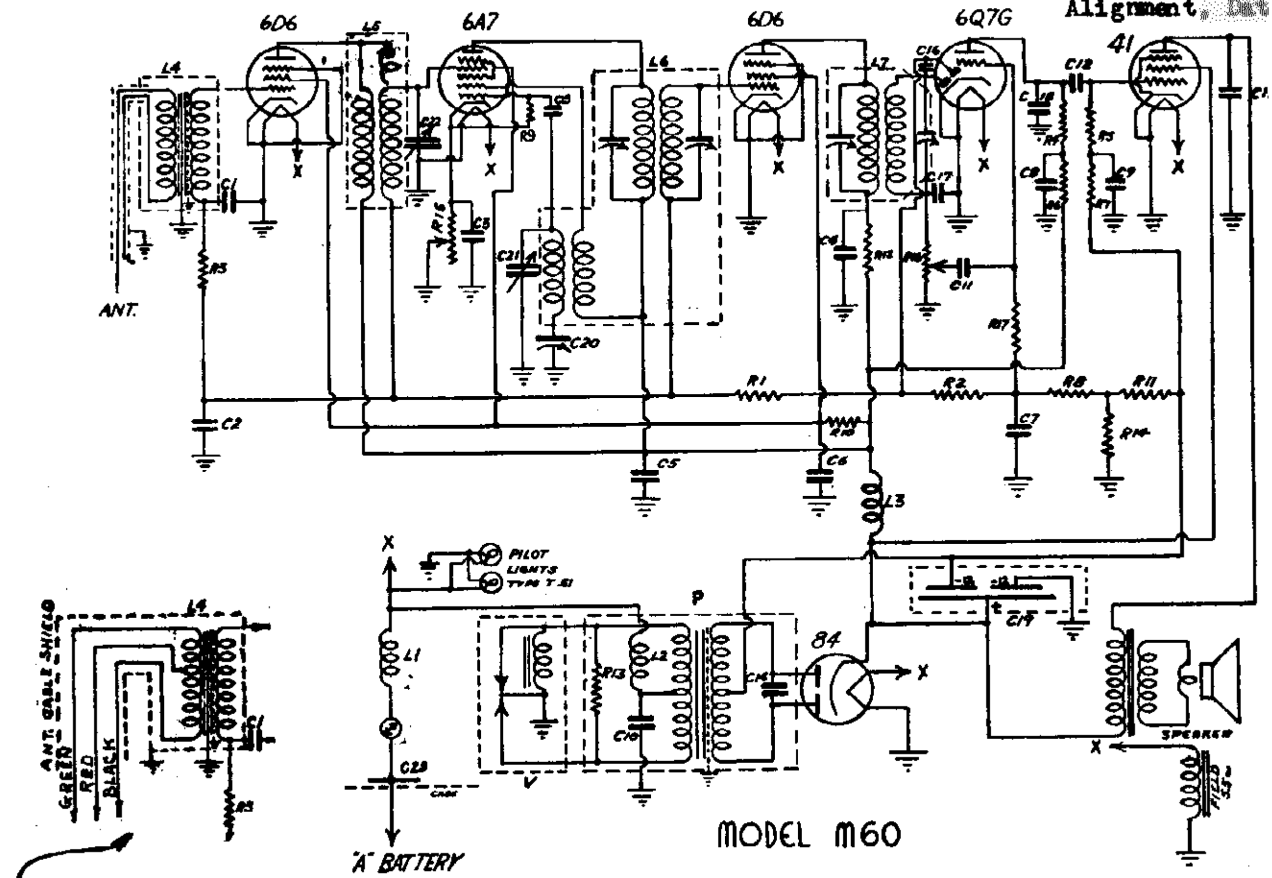
ALIGNMENT PROCEDURE

I. F. Alignment. Connect a signal generator set at 456kc to the 6A7 grid. Connect an output meter across the secondary terminals of the speaker output transformer. With the weakest signal from the generator necessary to obtain a .5 volt deflection on the output meter, peak the trimmers on both I. F. Transformers.

R. F. Alignment. Insert a 200mmfd condenser in series with the antenna lead of the receiver and the signal generator. Switch the receiver to the broadcast band and set the dial to 1400kc. Set the signal generator at the same frequency. With the weakest signal necessary to obtain .5 volt deflection on the output meter, adjust the trimmers on the variable condenser. Set the receiver to 600kc and with a signal of the same frequency adjust the oscillator padder condenser. Repeat the above procedure until certain that optimum adjustment has been secured. Now rotate the band switch to the short wave position. With the signal generator feeding a 6.0mc signal into the set, adjust the trimmer condenser on the antenna coil while "rocking" the variable condenser with the dial indicating a setting of approximately 6.0mc. It is imperative that all of the above adjustments be made with the signal level attenuated as far as possible in order to overcome the AVC action which would otherwise introduce serious errors and prevent obtaining best results.

Wave Trap Alignment. With a signal of a fairly high order and a frequency of 456kc being fed into the antenna input, adjust the trimmer on the trap coil to minimum response.

AUTOMATIC RADIO MFG. CO., INC.



REVISED ANTENNA CIRCUIT FOR MODEL M-60

For high capacity antenna (above 300 MMF), such as built in roof antenna or large running board antenna GREEN lead should be connected to antenna, RED lead connected to antenna cable shielding, and BLACK lead taped (not used).

For medium capacity antennas (150 to 300 MMF), such as rear vertical rod or overhead strip, RED lead is connected to antenna, BLACK lead should be grounded to cable shield, and GREEN wire taped (not used).

For low capacity antenna (below 150 MMF) such as a hinge mounted vertical rod or a cowl rod, the GREEN lead should be connected to the antenna, the BLACK lead should be grounded to the cable shield and the RED lead should be taped, and pushed back into the cable.

Schematic Location	Description	Part No.	List Price
L1	"A" R.F. Choke	RF100	$0.20
L2	"A" R.F. Choke	RF101	.20
L3	"B" R.F. Choke	RF102	.40
L4	Antenna Coil	BA200	.80
L5	Interstage Coil	BR200	.75
L6	Composite I.F. Trans. an Osc.	LC200	.90
L7	2nd I.F. Transformer	L200	.80
P	Power Transformer	P300	1.80
V	Vibrator	V100	2.40
——	Speaker	SD16	3.50
C1, C2	Fixed Condenser .05 mfd—200 volt	——	.20
C3, C4, C5, C6, C7, C8, C9	" " .1 mfd—200 volt	——	.20
C10	" " .5 mfd—150 volt	——	.30
C11, C12	" " .01 mfd—400 volt	——	.20
C13	" " .006 mfd—600 volt	——	.20
C14	" " .007 mfd—1200 volt	——	.30
C15, C16	Mica Condenser 100 mmfd	——	.20
C17, C18	" " 200 mmfd	——	.20
C19	Electrolytic Condenser Block	CE12	1.20
C20	Variable Padder Condenser 500 mmfd	——	.40
C21, C22	2 Sect. Tuning Condenser	CV21	1.80
C23	Spark Plate 250 mmfd	——	.30
R1, R2, R17	Resistor 1 megohm ¼ watt	——	.15
R3, R4, R5	" ½ megohm ¼ watt	——	.15
R6, R7	" ¼ megohm ¼ watt	——	.15
R8	" 100,000 ohms ¼ watt	——	.15
R9	" 50,000 ohms ¼ watt	——	.15
R10	" 25,000 ohms ½ watt	——	.20
R11	" 250 ohms ½ watt	——	.20
R12	" 250 ohms ¼ watt	——	.20
R13	" 150 ohms ¼ watt	——	.20
R14	" 35 ohms ¼ watt	——	.20
R15	Sensitivity Control 3,000 ohms	RV20	.80
R16	Volume Control 500,000 ohms	RV19	.80

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

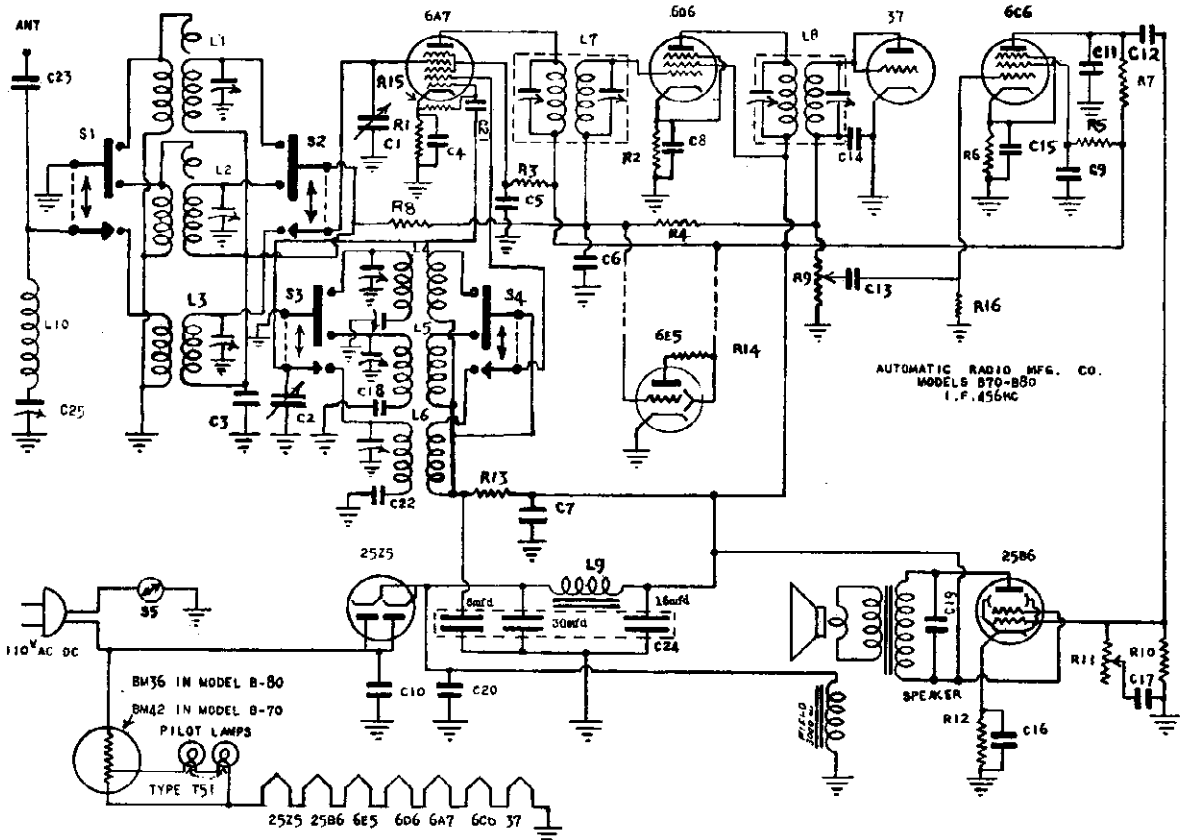
ALIGNMENT PROCEDURE

I. F. Alignment. Connect a signal generator set **at 456kc to the 6A7 input and connect an output meter** to the speaker output. Using a weak signal tune the two I. F. condensers on the **composite** coil and the two I. F. condensers on the output I. F. coil for **maximum response.**

Connect the signal generator set at 1400kc to the antenna lead using a dummy antenna of 200 mmf. Tune the set by means of the dial to 1400kc position. Adjust oscillator trimmer for this frequency. Pad at 600kc, Recheck 1400kc and trim antenna stage for maximum response. Repeating the alignment may result in improved sensitivity.

MODELS B70, B80
Schematic, Parts
Alignment

AUTOMATIC RADIO MFG. CO., INC.



ALIGNMENT PROCEDURE

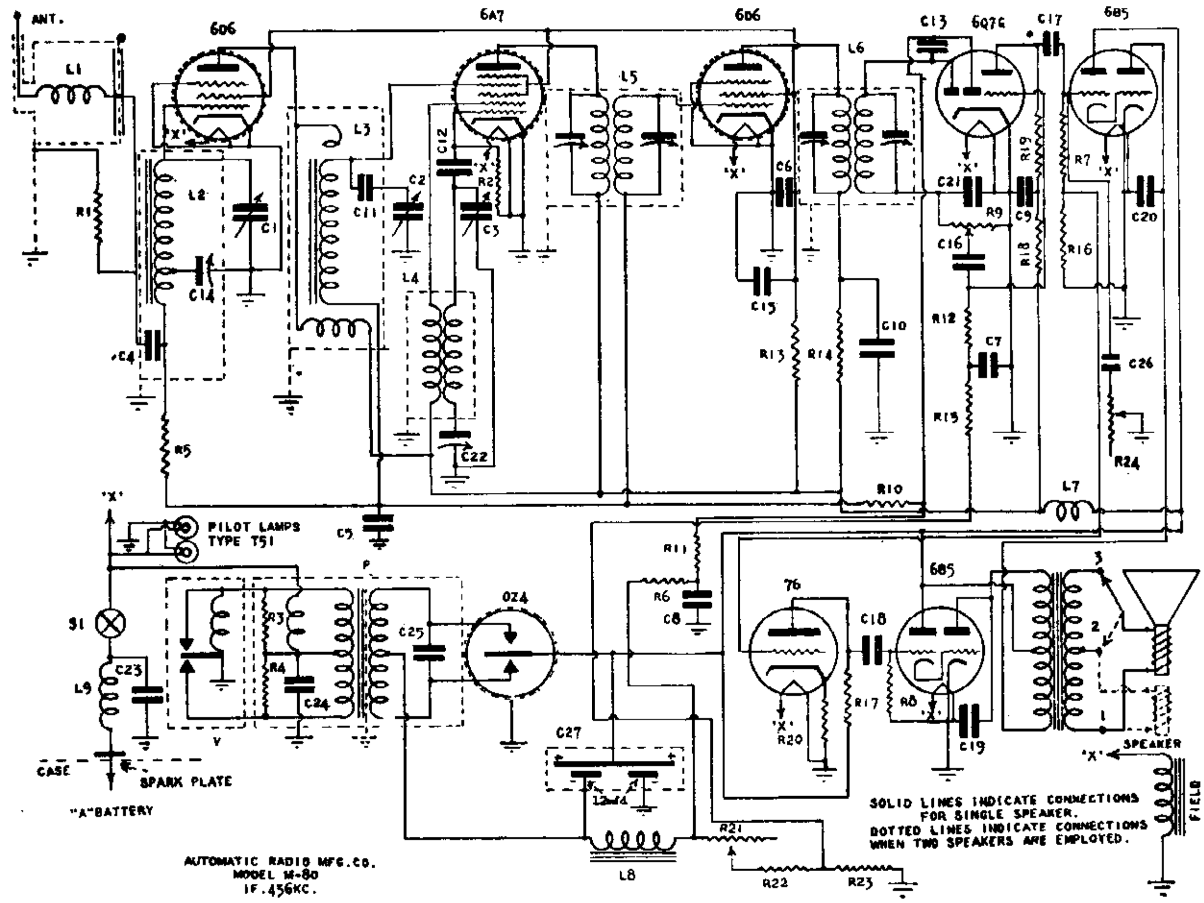
I. F. Alignment. Connect a signal generator set at 456kc to the 6A7 input and connect an output meter to the speaker output. Using a weak signal tune the two I. F. condensers on the composite coil and the two I. F. condensers on the output I. F. coil for maximum response.

R. F. Alignment. Connect the signal generator set at 1400kc to the antenna lead using a dummy antenna of 200mmf. Tune the set by means of the dial to 1400kc position. Adjust oscillator trimmer for this frequency. Pad at 600kc. Recheck 1400kc and trim antenna stage for maximum response. Repeating the alignment may result in improved sensitivity. Introduce a 456kc signal into the antenna lead and adjust Trap Condenser (C25) for minimum response.

SCHEMATIC LOCATION	DESCRIPTION	SCHEMATIC LOCATION	DESCRIPTION
L1	Antenna Coil Band A	C18	Mica " 1400mmfd
L2	" " " B	C19, C20	Fixed " .006mfd—600v
L3	" " " C	C21	Mica " 100mmfd
L4	Oscillator Coil Band A	C22	Fixed " 4500mmfd—200v
L5	" " " B	C23	Fixed " .002mfd—600v
L6	" " " C	C24	Electrolytic Condenser Block
L7	1st I.F. Coil	C25	Trimmer Condenser 3–30mmfd
L8	2nd I.F. Coil	R1, R2	Resistors 250 ohms—¼ Watt
L9	Filter Choke	R3	" 25,000 ohms—¼ Watt
L10	Antenna Wave Trap	R4	" 2 megohms—¼ Watt
——	Speaker	R5, R14	" 1 megohm—¼ Watt
S1, S2, S3, S4	Band Switch	R6	" 2,500 ohms—¼ Watt
S5	Line Switch (On Vol. Control)	R7, R8	" 250,000 ohms—¼ Watt
C1, C2	Tuning Condenser	R9	Volume Control 250,000 ohms
C3, C4, C5, C6,		R10	Resistors 500,000 ohms—¼ Watt
C7, C8, C9, C10	Fixed " .1mfd—200v	R11	Tone Control 500,000 ohms
C11, C14	Mica " 200mmfd	R12	Resistors 300 ohms—1 Watt
C12, C13	Fixed " .02mfd—600v	R13	" 7,500 ohms—¼ Watt
C15, C16	Fixed " 5mfd—35v	R15	" 50,000 ohms—¼ Watt
C17	Fixed " .0015mfd—600v	R16	" 2 megohms—¼ Watt

MODEL M80
Schematic, Parts,
Alignment

AUTOMATIC RADIO MFG. CO., INC.



ALIGNMENT PROCEDURE

I. F. Alignment. Connect a signal generator set at 456 kc to the 6A7 grid. Connect an output meter across the secondary terminals of the speaker output transformer. With the weakest signal from the generator necessary to obtain .5 volt deflection on the output meter, peak the trimmers on both I. F. transformers.

R. F. Alignment. Insert a 200mmfd condenser in series with the antenna lead of the receiver and the signal generator. Set the receiver dial to 1400kc and the signal generator to the same frequency. Again with the weakest signal necessary to obtain 1 volt deflection of the output meter, adjust the trimmers on the oscillator, antenna and interstage sections of the variable condenser. Tune the receiver to 600kc and set the signal generator to this frequency. Adjust the padder condenser for maximum signal response to minimum signal input. Repeat the high frequency alignment.

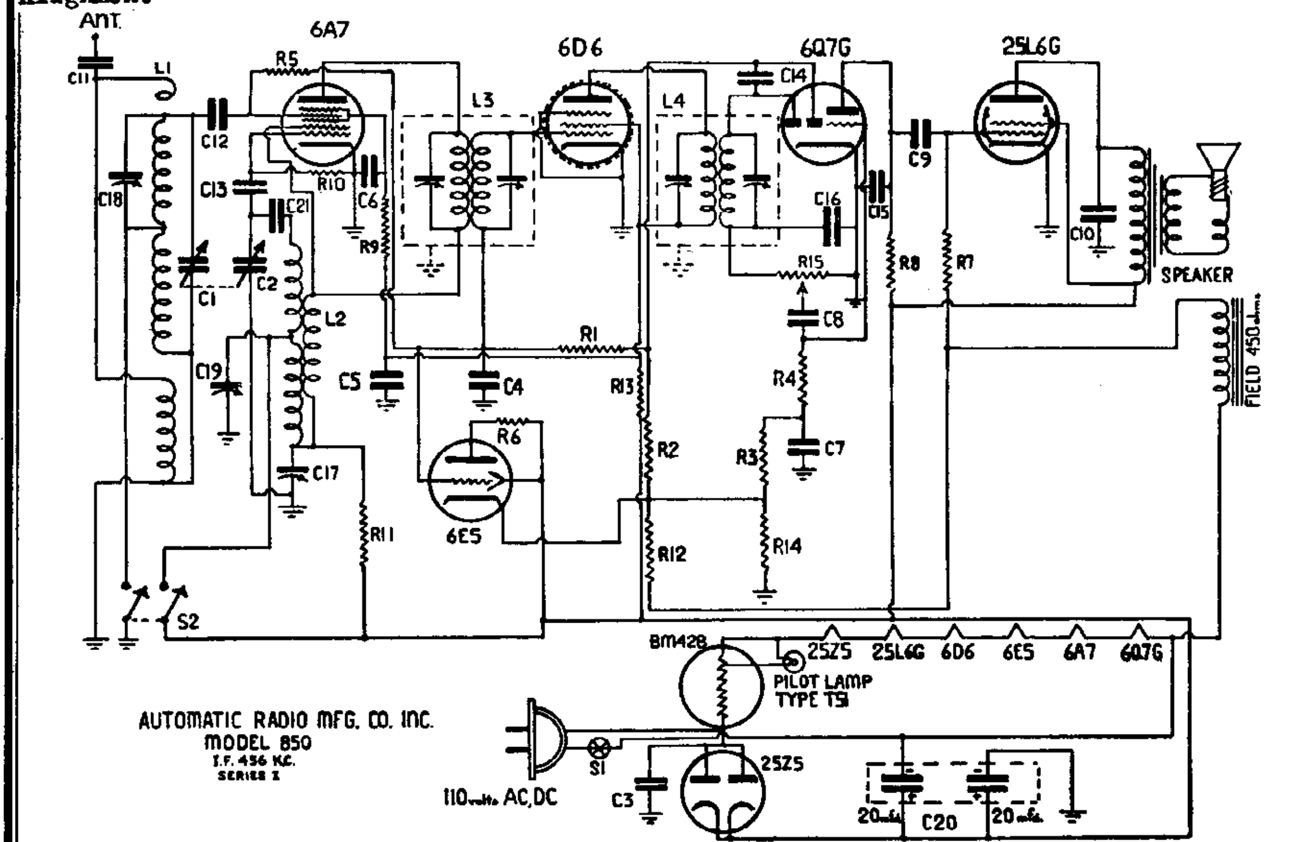
It is of the utmost importance in making these various adjustments that the signal level be attenuated as far as possible in order to overcome the AVC action which would otherwise introduce serious errors and prevent obtaining optimum results.

SCHEMATIC LOCATION	DESCRIPTION		
L1	Antenna Noise Filter		
L2	Antenna Coil		
L3	Interstage Coil		
L4	Oscillator Coil		
L5	1st I.F. Coil		
L6	2nd I.F. Coil		
L7	"B" R.F. Choke		
L8	Filter Choke—100 ohms		
L9	"A" R.F. Choke		
	Speaker		
S1	Line Switch (On Vol. Control)		
P	Power Transformer		
V	Vibrator		
C1, C2, C3	Tuning Condenser		
C4	Fixed	"	.01mfd—200v
C5, C6, C7, C8, C9, C10	Fixed	"	.1mfd—200v
C11	Padder	"	1477mfd
C14	Padder	"	1300mfd
C22	Padder	"	300mfd
C12, C13	Mica	"	100mmfd
C21	Mica	"	200mmfd

SCHEMATIC LOCATION	DESCRIPTION		
C15	Electrolytic	"	8mfd—175v
C16, C17, C18, C26	Fixed	"	.02mfd—200v
C19, C20	Fixed	"	.006mfd—600v
C23, C24	Fixed	"	.5mfd—200v
C25	Fixed	"	.008mfd—1200
C27	Electrolytic Condenser Block		
R1, R2	Resistors		50,000 ohms—1/3 Watt
R3, R4		"	50 ohms—1/3 Watt
R5, R6, R7, R8		"	½ megohm—1/3 Watt
R10, R11, R12		"	1 megohm—1/3 Watt
R13		"	10,000 ohms—½ Watt
R14		"	250 ohms—1/3 Watt
R15, R16, R17, R18		"	100,000 ohms—1/3 Wat
R19		"	¼ megohm—1/3 Watt
R20		"	5,000 ohms—1/3 Watt
R22		"	17 ohms—1 Watt
R23		"	13 ohms—1 Watt
R9	Volume Control—½ megohm		
R21	Sensitivity Control—115 ohms		
R24	Tone Control—50,000 ohms		

MODEL 850
Schematic, Parts
Alignment

AUTOMATIC RADIO MFG. CO., INC.



ALIGNMENT PROCEDURE

I. F. Alignment. The intermediate frequency to which this set should be adjusted is 456 K.C. To align the intermediate frequency transformers properly, a signal generator emitting a signal of 456 K.C. should be coupled to the signal control grid of the 6A7 tube through a 200 mmfd condenser. An output meter should be connected across the voice coil of the speaker. The four trimmers mounted internally in the top of the two I. F. cans should be adjusted to resonance. The output of the signal generator should be attentuated so as to provide the weakest possible signal necessary to produce a .5 volt deflection on the output meter.

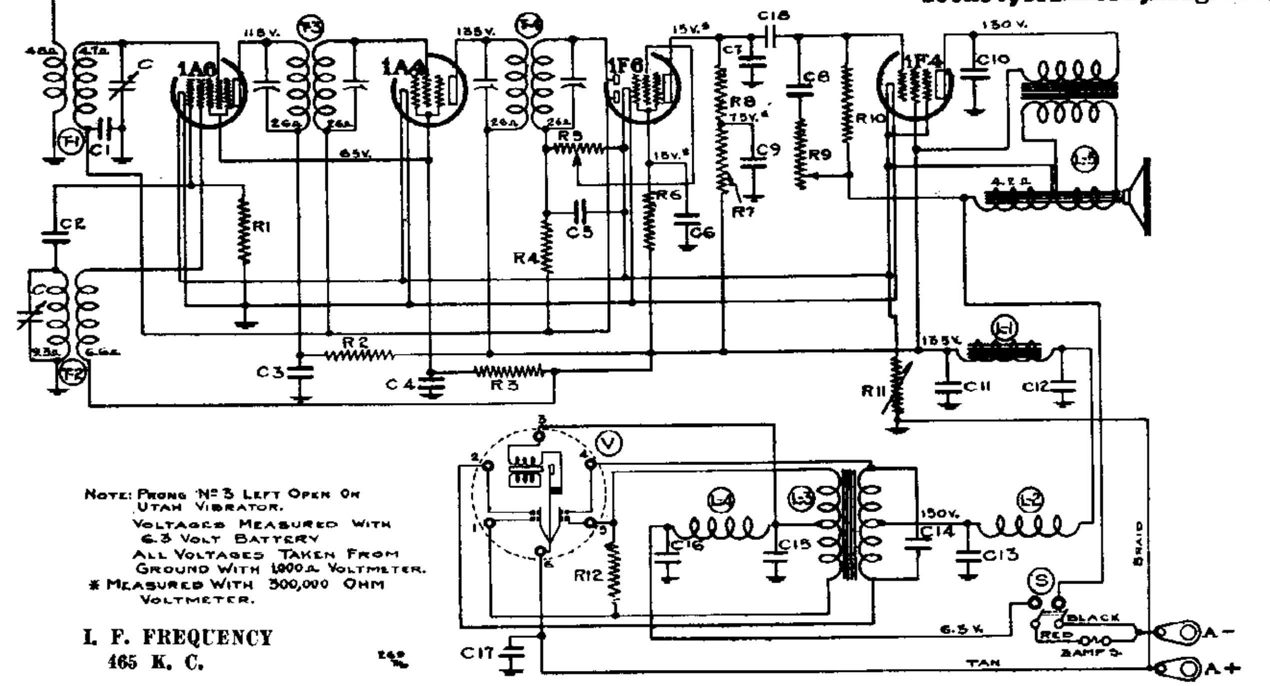
R. F. Alignment. Adjust the signal generator to 17.4 MC. Feed this signal into the antenna lead of the receiver through a 400 ohm resistor. Rotate the band switch on the receiver to the Short Wave position and set the tuning dial to 17.4 on the Short Wave Scale. Adjust the trimmer on the rear section for maximum signal output. Rotate the Band Switch to the broadcast position. Replace the 400 ohm resistor in the Oscillator lead with a 200 mmfd condenser. Set the signal generator to 1560 K.C. and tune the receiver to the same frequency. Adjust the small trimmer condenser which is located near the Oscillator coil underneath the Chassis, to maximum signal response. Attentuate the output of the signal generator to the extent necessary for maintaining a deflection of .5 volts on the output meter and adjust the trimmer mounted on the front section of the variable condenser to resonance. Set the signal generator and the receiver at 600 K.C. and adjust the padder condenser for optimum response. Repeat the last two adjustments to insure accuracy of alignment. Rotate the Band Switch to the Short Wave position and with the signal generator and receiver tuned to 15 MC, adjust the small trimmer condenser which is located near the Short Wave Antenna coil. This last operation should be made with the 400 ohm resistor in the antenna circuit.

It is imperative that all adjustments be made with the minimum signal necessary to obtain the designated deflection on the output meter. This will obviate any difficulty arising from the A.V.C. action of the receiver, and will permit adjustment to absolute resonance.

SCHEMATIC LOCATION	DESCRIPTION		
L1	Antenna Coil	C17	Padder " 550mmfd
L2	Oscillator Coil	C18, C19	Trimmer " 3-30mmfd
L3	1st I F Transformer	C20	Electrolytic Condenser
L4	2nd I F Transformer	R1, R2	Resistors 2 megohms—¼ Watt
———	Speaker	R3, R4, R5, R6	" 1 megohm—¼ Watt
S1	Line Switch (On Vol. Control)	R7	" ½ megohm—¼ Watt
S2	Band Selector Switch	R8	" ¼ megohm—¼ Watt
C1, C2	2 Sect. Variable Condenser	R9	" 25,000 ohms—¼ Watt
C3, C4, C5, C6, C7	Fixed Condensers .1mfd—200v	R10	" 50,000 ohms—¼ Watt
C8, C9, C10	Fixed " .01mfd—400v	R11	" 5,000 ohms—¼ Watt
C11	Fixed " .002mfd—600v	R12	" 100 ohms—1 Watt
C12	Fixed " .006mfd—600v	R13	" 30 ohms—¼ Watt
C13, 14	Mica " 100mmfd	R14	" 25 ohms—¼ Watt
C15, C16	Mica " 200mmfd	R15	Volume Control ¼ megohm
C21	Mica " 3660mmfd		

BELMONT RADIO CORP.

MODEL 415, Series A
Schematic, Voltage, Parts Socket, Trimmers, Alignment



I. F. FREQUENCY
465 K. C.

No.	Part No.	Description
		CONDENSERS
C1	100-10	.05 x 200 Volts
C2	129-12	.00025 Mica
C3	100-33	.1 x 200 Volts
C4	100-33	.1 x 200 Volts
C5	129-12	.00025 Mica
C6	100-33	.1 x 200 Volts
C7	129 5	.0001 Mica
C8	100-25	.002 x 600 Volts
C9	100-9	.05 x 200 Volts
C10	100-7	.005 x 600 Volts
C11	119-28	5 mfd. x 200 Working Voltage
C12	119-28	5 mfd. x 200 Working Voltage
C13	100-33	.1 x 200 Volts
C14	100-34	.005 x 1200 Volts
C15	100-40	.5 mfd. x 200 Working Voltage
C16	100-40	.5 mfd. x 200 Working Voltage
C17	100-35	.5 x 200 Volts
C18	100-11	.01 x 400 Volts

NOTE: C11 & C12 in one unit—No. 119-28

No.	Part No.	Description
		RESISTORS
R1	130-94	50M Ohm—1/3 Watt
R2	130-17	10M Ohm—1/3 Watt
R3	130-123	15M Ohm—1/2 Watt
R4	130-121	3.2 megohm—1/3 Watt
R5	101-56	1 meg ohm—Volume Control
R6	130-19	1 meg ohm—1/3 Watt
R7	130-20	100M Ohm—1/3 Watt
R8	130-11	250M Ohm—1/3 Watt
R9	101-59	1 meg ohm—Tone Control
R10	130-37	750M Ohm—1/3 Watt
R11	101-44	4.75 Ohm—Filament Rheostat
R12	130-124	200 Ohm—1/2 Watt

No.	Part No.	Description
		MISCELLANEOUS PARTS
C	102-38	One Section of Two Gang
T1	111-66	Antenna Coil
T2	110-45	Oscillator Coil
T3	108-84	Input I.F.—465 Kc.
T4	108-85	Output I.F.—465 Kc.
L1	105-30	Filter Choke
L2	123-3	R.F. Choke Coil
L3	104-62	Power Transformer
L4	105-19	"A" Choke
L5	114-50	6" Spkr. (Field Res. 4.2 Ohms)
S	101-56	On Volume Control
V	126-4	Vibrator Unit

NOTE: R11, Part No. 101-44 Variable Filament Rheostat is adjusted at the factory to keep the filament voltage of the tubes at 2 volts.

TUBES:

The tube complement of this chassis consists of the following tubes:

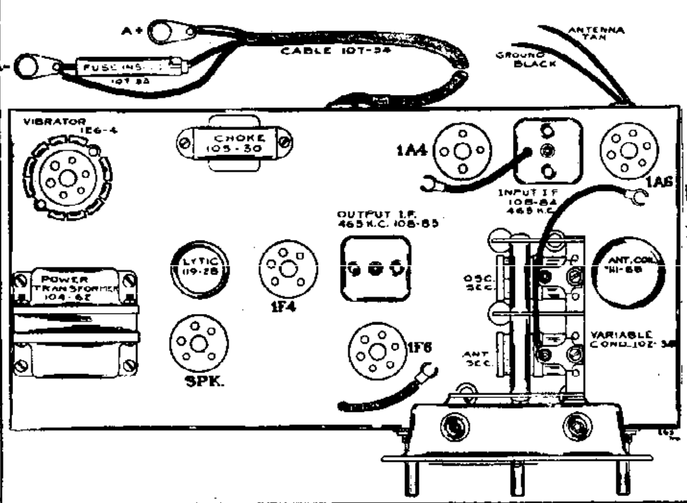
The type and function of each tube is as follows:

1—Type 1A6 Pentagrid Mixer, First Detector-oscillator.

1—Type 1A4 Super Control R. F. Tetrode I. F. Amplifier (465 K.C.)

1—Type 1F6 Duplex Diode Pentode, Second Detector, A.V.C. and First Audio.

1—Type 1F4 Pentode Output Amplifier.



ALIGNING I.F. TRANSFORMERS: (465 K. C.):

Part No. 108-85 Output I.F. Transformer.
Part No. 108-84 Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view)

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 1A4 tube, and adjust the output I.F. transformer (No. 108-85) to resonance.

   (b) Move oscillator output clip from grid of 1A4 to grid cap of 1A6 and adjust input I.F. transformer (No. 108-84) to resonance.

   (c) With oscillator still connected to 1A6, readjust output I.F. transformer (108-85) if necessary.

R.F. ALIGNMENT: (535-1720 K.C.)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmf. condenser to tan antenna and black ground leads and make the following adjustments:

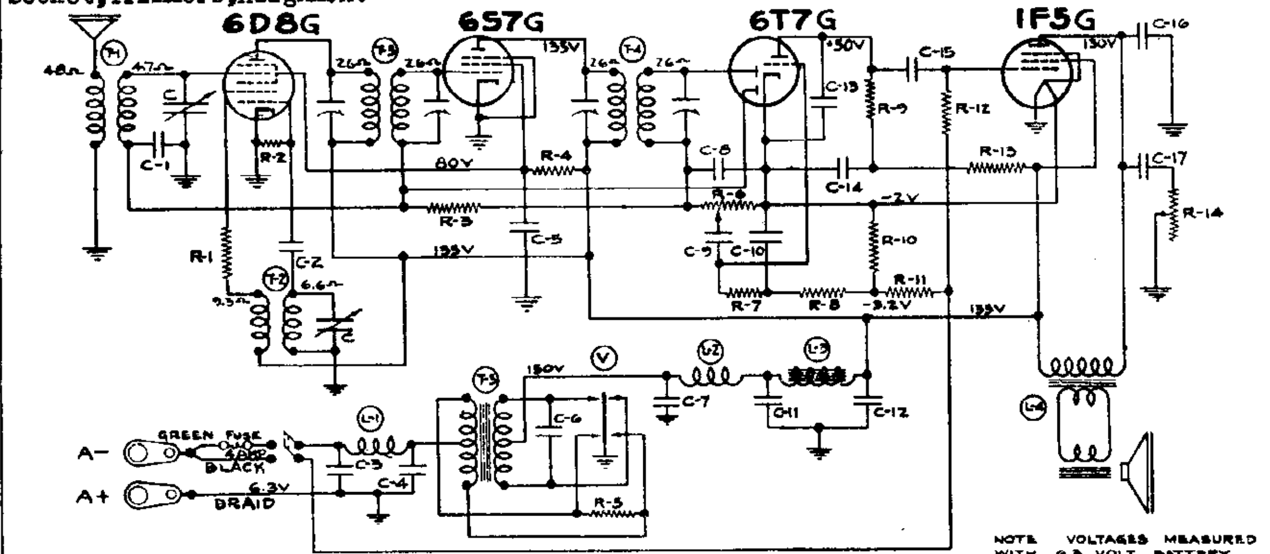
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer (rear of gang condenser).

   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance (front section of gang condenser).

   (c) Check sensitivity at 600 and 1000 kilocycles.

MODEL 415, Series B
Schematic, Voltage
Socket, Trimmers, Alignment

BELMONT RADIO CORP.

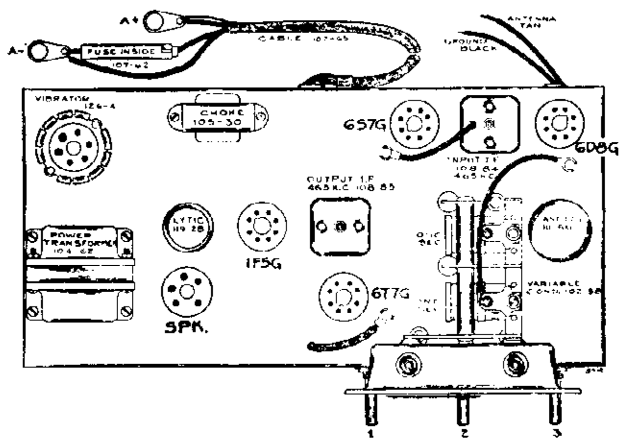


NOTE VOLTAGES MEASURED WITH 6.3 VOLT BATTERY. ALL VOLTAGES TAKEN FROM GROUND WITH 1000Ω PER VOLT METER. * MEASURED WITH 0-300V SCALE.

IF PEAK 465 KC

305

No.	Part No.	DESCRIPTION
		RESISTORS
R1	130-23	2M-1/3
R2	130-76	30M-1/3
R3	130-121	3.2 meg-1/3
R4	130-123	15M-1/2
R5	130-84	200-1/3
R6	101-56	1 meg-Volume Control
R7	130-19	1 meg-1/3
R8	130-19	1 meg-1/3
R9	130-100	150M-1/3
R10	106-36	10 Ohm Muter
R11	106-36	25 Ohm Muter
R12	130-19	1 meg-1/3
R13	130-20	100M-1/3
R14	101-72	300M-Tone control
		CONDENSERS
C1	100-9	.05-200 v.
C2	129-39	.00005-Mica
C3	100-40	.5-200 v.
C4	100-40	.5-200 v.
C5	100-33	.1-200 v.
C6	100-34	.005-1200 v.
C7	100-33	.1-200 v.
C8	129-5	.0001-Mica
C9	100-11	.01-400 v.
C10	100-11	.01-400 v.
C11	119-28	5. Electrolytic-200 wv.
C12	119-28	5. Electrolytic-200 wv.
C13	129-12	.00025-Mica
C14	100-33	.1-200 v.
C15	100-11	.01-400 v.
C16	100-37	.003-600 v.
C17	100-11	.01-400 v.
		PARTS
T1	111-66	Antenna Coil
T2	110-45	Oscillator Coil
T3	108-84	Input I. F. Coil
T4	108-85	Output I. F. Coil
T5	104-62	Power Transformer
L1	105-19	"A" Choke
L2	123-3	RF "B" Choke
L3	105-30	Filter Choke
L4	114-63	Speaker (P. M. Dynamic)
V	126-4	Vibrator
C	102-38	Variable Condenser



The type and function of each tube is as follows:

1—Type 6D8G Pentagrid Mixer, First Detector-oscillator.

1—Type 6S7G Remote Cut-off Pentode I. F. Amplifier (465 K.C.)

1—Type 6T7G Duplex Diode Triode, Second Detector, A.V.C. and First Audio.

1—Type 1F5G Pentode Output Amplifier.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 1F5G output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

ALIGNING I.F. TRANSFORMERS: (465 K. C.):

Part No. 108-85 Output I.F. Transformer.
Part No. 108-84 Input I.F. Transformer.

These I.F. Transformers have two adjustments, both of which are accessible from the top of chassis (see fig. 1, top view page 2).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments.

   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer (No. 108-85) to resonance.

   (b) Move oscillator output clip from grid of 6S7G to grid cap of 6D8G and adjust input I.F. transformer (No. 108-84) to resonance.

   (c) With oscillator still connected to 6D8G readjust output I.F. transformer (108-85) if necessary.

R. F. ALIGNMENT: (535-1720 K.C.)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmf. condenser to tan antenna and black ground leads and make the following adjustments:

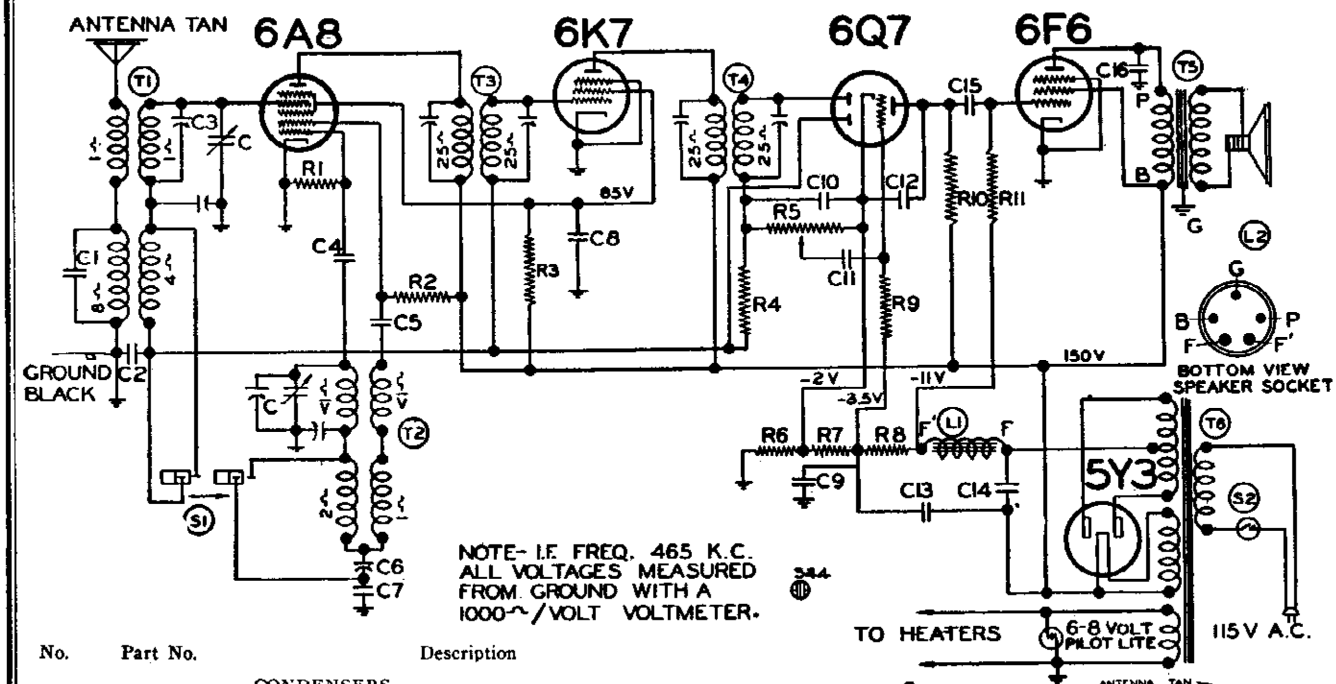
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer (rear of gang condenser).

   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick-up oscillator signal and adjust antenna trimmer to resonance (front section of gang condenser).

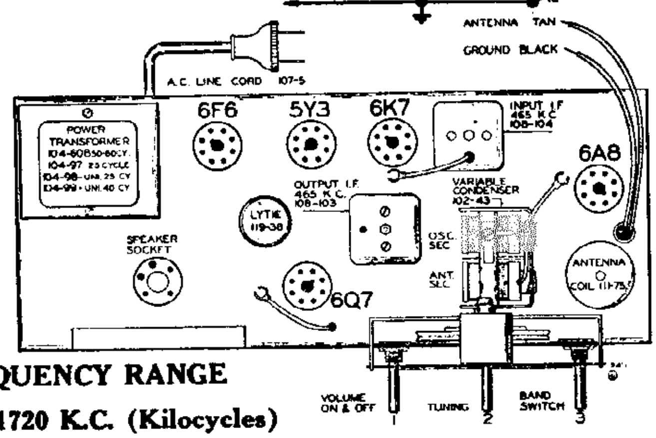
   (c) Check sensitivity at 600 and 1000 kilocycles.

BELMONT RADIO CORP.

MODEL 588, Series A
Schematic, Voltage
Socket, Trimmers, Parts



No.	Part No.	Description
		CONDENSERS
C1	129-13	.00025 - Mica 20%
C2	100-22	.05 x 200 25%
C3	124-39	Adjustable Condenser 2-20 mmf.
C4	129-5	.0001 - Mica 20%
C5	100-37	.003 x 600 v. 10%
C6	124-38	Series Pad - 600 mmf.
C7	129-74	.0015 Mica 2½%
C8	100-1	.1 x 400 v. 50% - 10%
C9	100-20	.1 x 200 v. 25%
C10	129-5	.0001 Mica 20%
C11	100-11	.01 x 400 v. 25%
C12	129-2	.0005 Mica 20%
C13	119-38	5 mfd. 200 w. v. Black
C14	119-38	5 mfd. 250 w. v. Brown
C15	100-11	.01 x 400 v. 25%
C16	100-19	.006 x 600 v. 25%
		C13 and C14 - in one unit.
		RESISTORS
R1	130-12	50M ohm - 1/3 w. 20%
R2	130-17	10M ohm - 1/3 w. 20%
R3	130-149	15M ohm - 1/3 w. 20%
R4	130-4	3 megohm - 1/3 w. 20%
R5	101-71	1 megohm - Volume control
R6	106-35	65 ohm - Muter
R7	106-35	45 ohm - Muter
R8	106-35	220 ohm - Muter
R9	130-4	3 megohm - 1/3 w. 20%
R10	130-9	200M ohm - 1/3 w. 20%
R11	130-3	500M ohm - 1/3 w. 20%
		R6, R7 and R8 in one unit
		PARTS
T1	111-75	Antenna coil complete
T2	110-60	Oscillator coil complete
T3	108-104	Input I.F. Assembly complete
T4	108-103	Output I.F. Assembly complete
T5		Output Transformer
T6	104-60B	Power Transformer
L1		2000 ohm - speaker field
L2	114-61	Dynamic speaker
S1	125-27	Wave change switch
S2		Switch on Volume Control



Vol. Control On-Off Switch — Tuning Control — Band Switch

FREQUENCY RANGE

535 to 1720 K.C. (Kilocycles)

2000 to 7000 K.C. (Kilocycles)

The tube complement of this chassis consists of the following octal base glass tubes which are interchangeable with metal tubes:

1—Type 6A8G Pentagrid mixer, first detector-oscillator.
1—Type 6K7G Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6Q7G duplex diode triode second detector, A.V.C. and audio.
1—Type 6F6G—pentode output amplifier.
1—Type 5Y3G or 5W4—high vacuum rectifier.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 108, 127, 150, 225, and 260 volts, (see instructions) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 115 volts on the primary of the power transformer.

MODEL 588, Series A
Trimmers, Alignment

BELMONT RADIO CORP.

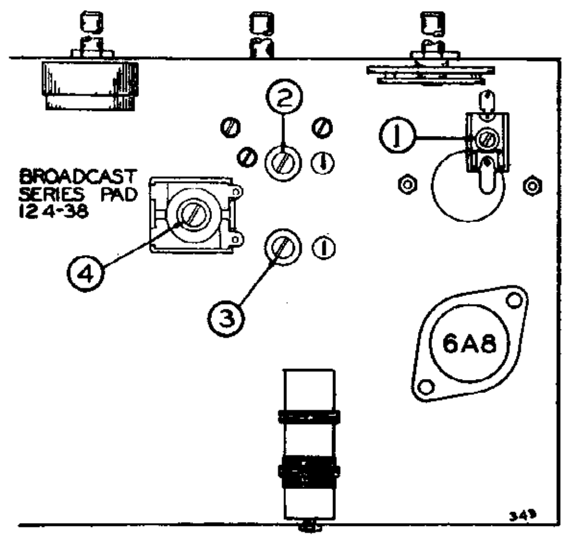


FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and screen terminals of the type 6F6G output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-103 Output I.F. Transformer
Part No. 108-104 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser in its minimum capacity position, plates entirely out of mesh, make the following adjustments:

(a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7G tube, and adjust the output I.F. transformer (No. 108-103) to resonance.

(b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7G to grid cap of 6A8G and adjust input I.F. transformer (No. 108-104) to resonance.

SHORT WAVE BAND ALIGNMENT:

2000 to 7000 Kilocycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 6 megacycles and connected in series with "Dummy 3" to the antenna and ground leads, make the following adjustments:

(a) Move dial pointer to 6 megacycles and adjust short wave oscillator trimmer to resonance.
This adjustment is the trimmer mounted on the top of rear section of the variable gang condenser (see Fig. 1, top view).

(b) Adjust short wave antenna trimmer (Adjustment Number 1), to resonance (see Fig. 3, bottom view).

BROADCAST BAND ALIGNMENT:

535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground leads make following adjustments:

(a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 3, see bottom view of chassis, Fig. 3).

(b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (adjustment number 2), to resonance.

(c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment number 4), to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).

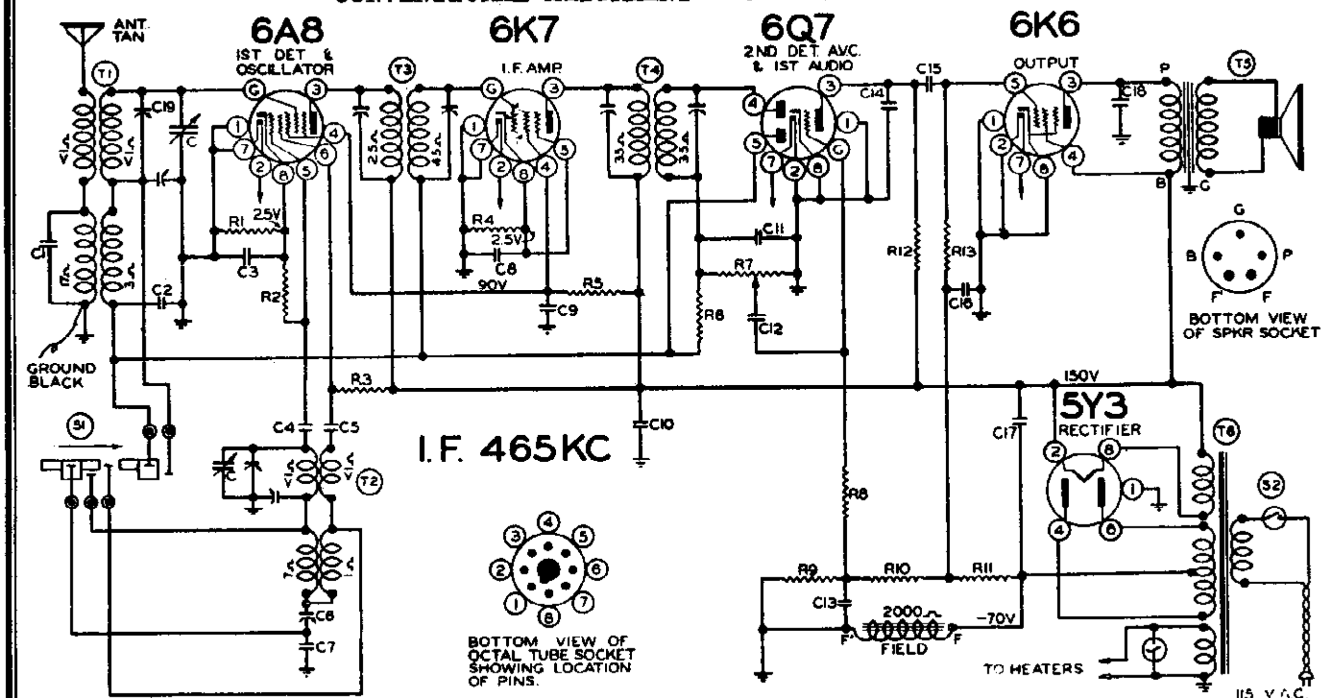
(d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

(e) Check for tracking and sensitivity at 1400, 1000, and 600 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

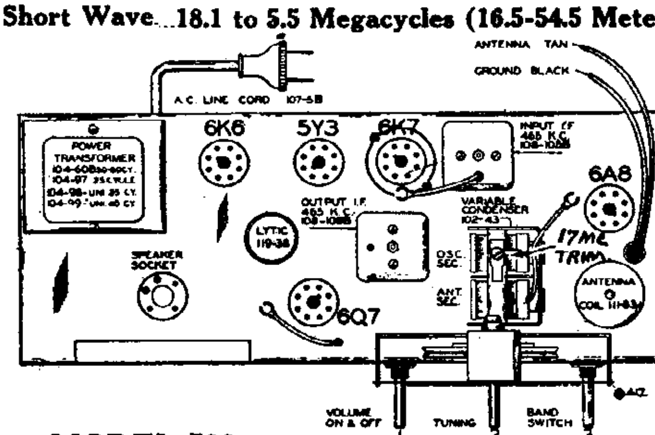
MODEL 589
Schematic, Socket
Trimmers, Alignment
Parts, Voltage

BELMONT RADIO CORP.

CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION



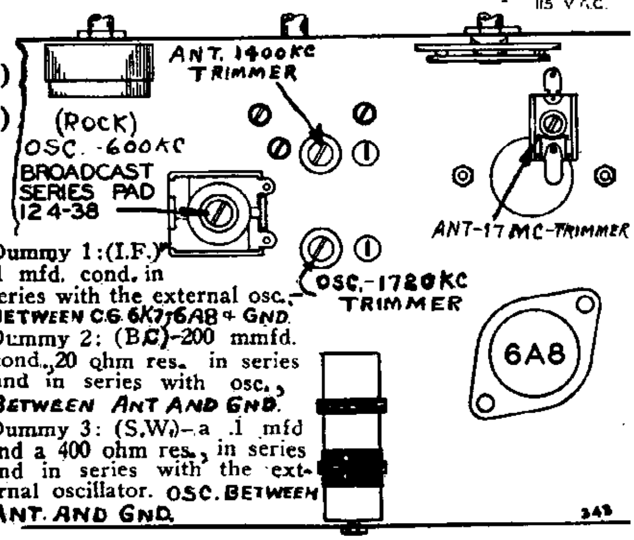
BAND	FREQUENCY RANGE
Broadcast	1720 to 535 Kilocycles (174-560 Meters)
Short Wave	18.1 to 5.5 Megacycles (16.5-54.5 Meters)



MODEL 589
SERIES "A"

Vol. Control On-Off Switch — Tuning Control — Band Switch

FIG. 1—TOP VIEW



Dummy 1: (I.F.) .1 mfd. cond. in series with the external osc. BETWEEN C.G. 6K7 & 6A8 & GND.
Dummy 2: (B.C.)-200 mmfd. cond., 20 ohm res. in series and in series with osc., BETWEEN ANT AND GND.
Dummy 3: (S.W.)-a .1 mfd and a 400 ohm res., in series and in series with the external oscillator. OSC. BETWEEN ANT. AND GND.

FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS

RESISTORS

R1	130-83	300 ohm - 1/3 w. 10%
R2	130-12	50M ohm - 1/3 w. 20%
R3	130-17	10M ohm - 1/3 w. 20%
R4	130-93	450 ohm - 1/3 w. 10%
R5	130-49	15M ohm - 1/3 w. 20%
R6	130-4	3 megohm - 1/3 w. 20%
R7	101-71	1 megohm Volume control
R8	130-4	3 megohm - 1/3 w. 20%
R9	130-176	20M ohm - 1/3 w. 10%
R10	130-80	150M ohm - 1/3 w. 10%
R11	130-46	800M ohm - 1/3 w. 10%
R12	130-9	200M ohm - 1/3 w. 20%
R13	130-3	500M ohm - 1/3 w. 20%

CONDENSERS

C	102-43	2 gang variable Condenser
C1	129-5	.0001 Mica
C2	100-22	.05 x 200 v. - 25%
C3	100-20	.1 x 200 v. - 25%
C4	129-39	.00005 - 20% - Mica
C5	100-25	.002 x 600 v. - 20%
C6	124-38	600 mmf. Series Pad. Adj.
C7	129-54	.003 - 2½% Mica
C8	100-20	.1 x 200 v. - 25%
C9	100-1	.1 x 400 v. - 50 - 10%
C10	119-38	5.0 mfd. - 250 w. v. 'Lytic
C11	129-5	.0001 - 20% Mica
C12	100-11	.01 x 400 v. - 25%
C13	100-20	.1 x 200 v. - 25%
C14	129-2	.0005 - 20% Mica
C15	100-26	.02 x 400 v. - 25%
C16	100-20	.1 x 200 v. - 25%
C17	119-38	5.0 mfd. - 250 w.v. 'Lytic
C18	100-37	.003 x 600 v. - 10%
C19	124-39B	2 - 25 mmf. Adj. Cond.

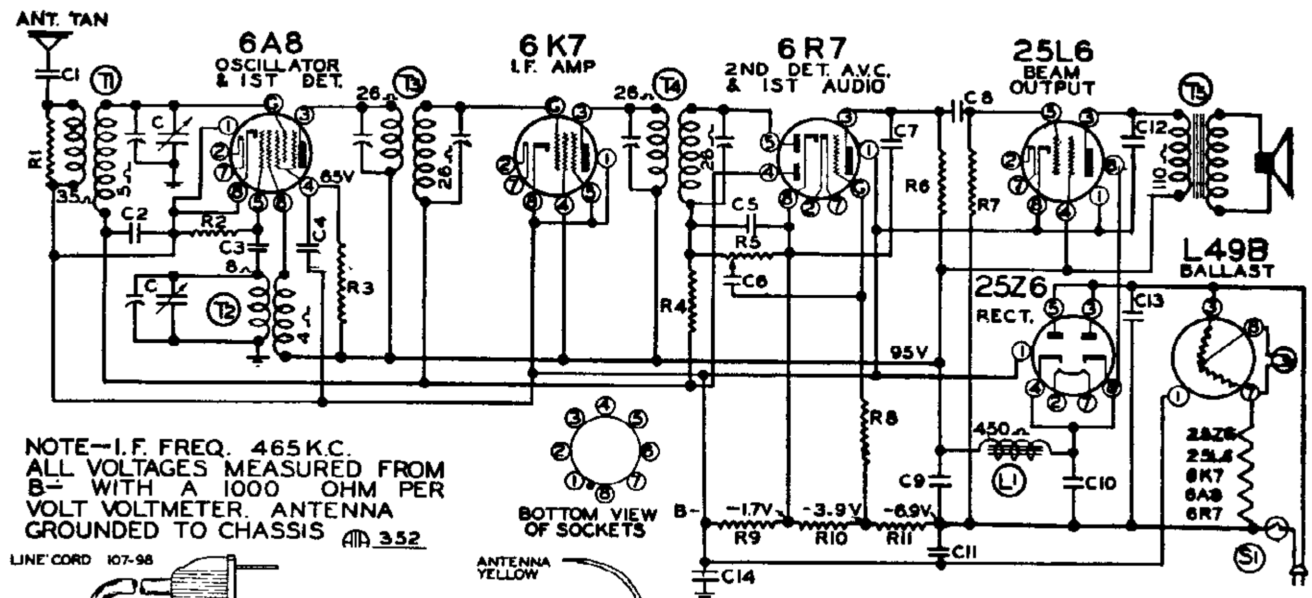
PARTS

T1	111-83	Ant. Coil
T2	110-66	Osc. Coil
T3	108-105B	Input I.F. - 465 kc.
T4	108-106B	Output I.F. - 465 kc.
T5	114-61	6" Dynamic speaker
T6	104-60B	Power Transformer
S1	125-37	Wave Band Switch
S2		On-off switch on volume control

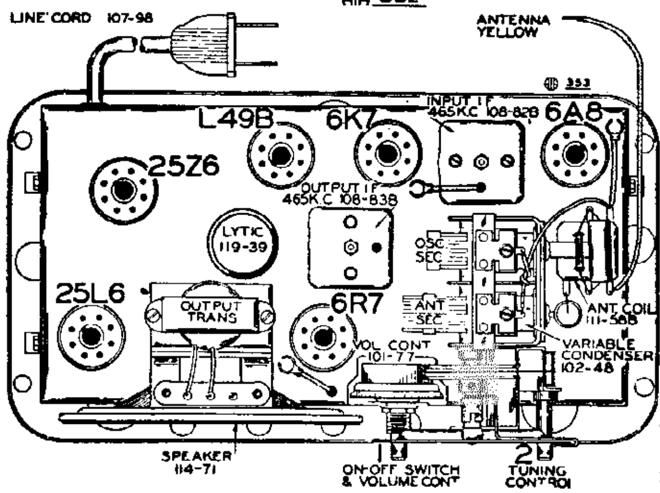
MODEL 602
Schematic, Socket

BELMONT RADIO CORP.

Voltage, Trimmers
Alignment, Parts



NOTE—I.F. FREQ. 465 K.C.
ALL VOLTAGES MEASURED FROM B— WITH A 1000 OHM PER VOLT VOLTMETER. ANTENNA GROUNDED TO CHASSIS



ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-83B Output I.F. Transformer

Part No. 108-82B Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6K7G tube, and adjust the output I.F. transformer (No. 108-83B) to resonance.

   (b) Move oscillator output clip from grid of 6K7G to grid of 6A8G and adjust input I.F. transformer (No. 108-82B) to resonance.

   (c) With oscillator still connected to 6A8G, readjust output I.F. transformer (108-83B) if necessary.

R.F. ALIGNMENT: (535-1720 K.C.)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmf. condenser to the antenna lead and chassis ground and make the following adjustments:

   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).

   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).

   (c) Check sensitivity at 600 and 1000 kilocycles.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram are measured with 119 volt A.C. or D.C. line.

RESISTORS

No.	Part No.	Description	
R1	130-17	10M ohm - 1/3 w.	20%
R2	130-12	50M ohm - 1/3 w.	20%
R3	130-149	15M ohm - 1/3 w.	20%
R4	130-4	3 meg ohm - 1/3 w.	20%
R5	101-77	Volume Control (1 Meg)	
R6	130-12	50M ohm - 1/3 w.	20%
R7	130-20	100M ohm - 1/3 w.	20%
R8	130-19	1 megohm - 1/3 w.	20%
R9	106-38	30 ohm	
R10	106-38	40 ohm	
R11	106-38	55 ohm	

R9, R10, and R11 in one unit

CONDENSERS

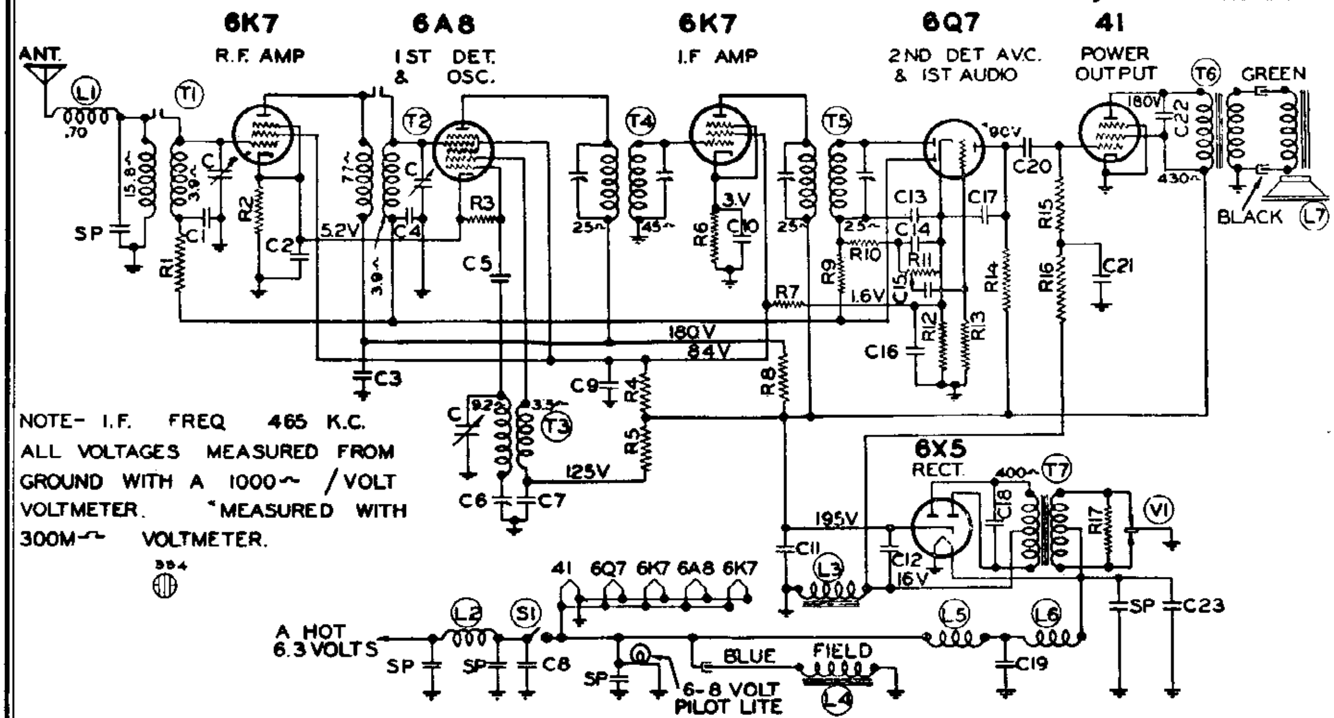
No.	Part No.	Description	
C	102-48	2 gang variable	
C1	100-25	.002 x 600	25%
C2	100-9	.05 x 200	25%
C3	129-12	.00025 Mica	20%
C4	100-22	.05 x 200	25%
C5	129-5	.0001 Mica	20%
C6	100-11	.01 x 400	25%
C7	129-2	.0005 Mica	20%
C8	100-22	.05 x 200	25%
C9	119-39	20 mfd. lytic - 100 w.v.	
C10	119-39	15 mfd. lytic - 100 w.v.	
C11	100-20	.1 x 200	25%
C12	100-13	.05 x 400	25%
C13	100-39	.1 x 400	20%
C14	100-53	.25x400	20%

PARTS

T1	111-58B	Antenna Coil Complete
T2	110-46	Oscillator Coil Complete
T3	108-82B	Input I. F. Complete
T4	108-83B	Output I. F. Complete
T5	114-71	Dynamic Speaker
L1		450 ohm speaker field
S1		Switch on Volume Control

BELMONT RADIO CORP.

MODEL 661
Schematic, Voltage
Socket, Trimmers, Parts



NOTE- I.F. FREQ 465 K.C.
ALL VOLTAGES MEASURED FROM GROUND WITH A 1000~ /VOLT VOLTMETER. *MEASURED WITH 300M~ VOLTMETER.

No.	Part No.	Description
		CONDENSERS
C	102-26	3 Gang Variable Condenser
C1	100-63	.05 x 200v. 50 - 10%
C2	100-63	.1 x 200v. 50 - 10%
C3	100-13	.05 x 400v. 25%
C4	100-22	.05 x 200v. 25%
C5	129-12	.00025 Mica - 20%
C6	124-37	Series Pad
C7	100-20	.1 x 200 v. 25%
C8	100-31	.5 x 120 v. 10 50%
C9	100-62	.25 x 200 v. 50 - 10%
C10	100-20	.1 x 200 v. 25%
C11	119-37	8 mfd. lytic 300 wv.
C12	119-37	4 mfd. lytic 300 wv.
C13	129-5	.0001 Mica 20%
C14	129-5	.0001 Mica 20%
C15	100-11	.01 x 400 v. 25%
C16	100-11	.01 x 400 v. 25%
C17	129-5	.0001 Mica 20%
C18	100-58	.005 x 1200 v. 20 - 10%
C19	100-31	.5 x 120 v. - 10 50%
C20	100-11	.01 x 400 v. 25%
C21	100-62	.25 x 200 v. 50 - 10%
C22	100-54	.006 x 600 v. 25%
C23	100-31	.5 x 120 v. - 10 50%
SP		Spark Plate

		RESISTORS
R1	130-20	100M - 1/3 w. - 20%
R2	130-54	500 ohm - 1/3 w. - 20%
R3	130-12A	50M ohm - 1/3 w. insulated 20%
R4	130-165	15M ohm - 1 w. - 20%
R5	130-131A	20M ohm - 1/2 w. - insulated - 10%
R6	130-24	400 ohm - 1/3 w. - 20%
R7	130-139A	40M ohm - 1/3 w. Insulated - 20%
R8	130-31A	1500 ohm - 1/3 w. insulated - 20%
R9	130-19	1 megohm - 1/3 w. - 20%
R10	130-52	50M ohm - 1/3 w. - 20%
R11	101-41	500M ohm - Volume Control
R12	130-153	700 ohm - 1/3 w. - 20%
R13	130-19	1 megohm - 1/3 w - 20%
R14	130-11A	250M - 1/3 w. Insulated - 20%
R15	130-5A	300M ohm - 1/3 w. insulated - 20%
R16	130-11A	250M ohm - 1/3 w. insulated - 20%
R17	130-84	200 ohm - 1/3 w. insulated - 20%

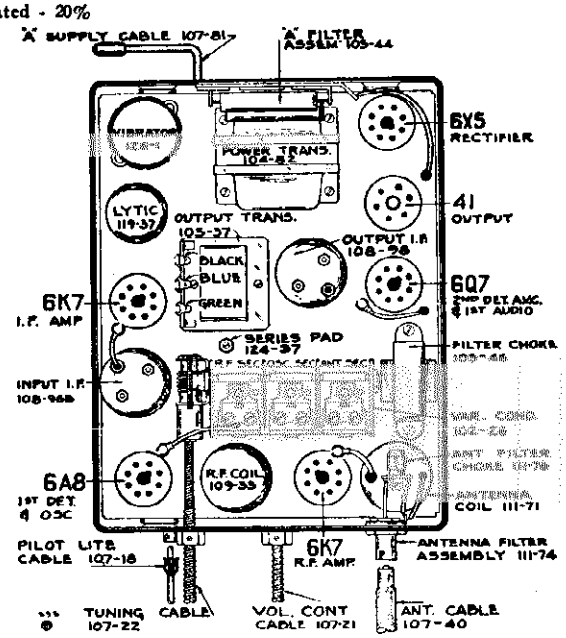
C1, C2 in same block
C11 and C12 in same block
C9 and C21 in same block

		PARTS
T1	111-71	Antenna Coil Complete
T2	109-35	R.F. Coil Complete
T3	110-57	Oscillator Coil Complete
T4	108-96B	Input I.F. Complete
T5	108-98	Output I. F. Complete
T6	105-37	Output Transformer
T7	104-82	Power Transformer
L1	111-76	Antenna Filter Choke
L2	105-26	"A" Choke
L3	105-46	"B" Filter Choke, 335 ohm
L4		Speaker Field, 4 ohm
L5	105-24	"A" Choke
L6	105-19	"A" Choke
L7	114-59	Dynamic Speaker
S1		Switch on Volume Control
V1	126-1	Vibrator

CONNECTIONS TO BATTERY

The battery cable, number 107-82, (red wire with fuse receptacle at one end and terminal lug at other end) must be connected to battery terminal of ammeter. At the same time connect ammeter capacitor, number 148-3, to battery terminal of ammeter, other end of condenser to any convenient grounded screw on back of instrument panel. Make certain that insulating sleeve is slipped over fuse when fuse is placed in receptacle, before connecting to short battery cable from receiver.

When connected properly, the discharge due to current drawn by the receiver should not indicate on the ammeter. This is important, since if improperly connected, as shown by the deflection of ammeter, additional motor interference may be encountered.



MODEL 661
Alignment, Assembly
Wiring Data

BELMONT RADIO CORP.

SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

DESCRIPTION

Model No. 661 is a six-tube superheterodyne receiver having a tuning range of 530 K.C. to 1550 K.C., operates from a 6.0 volt storage battery and uses the automotive type 6.3 volt tubes. The "B" supply is obtained from a vibrator with a tube rectifier.

The I.F. frequency used is 465 K.C., the R.F. end of the receiver consisting of a high gain iron core antenna coil which gives high signal to noise ratio and an R.F. stage especially designed to give high image rejection and high I.F. attenuation. The I.F. transformers are designed to give high gain and selectivity and yet to have a broad nose for ease of tuning and hi-fidelity response. They are of the air core type and wound with solid wire to give *minimum* drift and variation of gain due to climatic changes.

This receiver has been carefully designed to facilitate servicing, the top and bottom covers are both removable and are fastened in place by spring clips, self tapping screws and trimount buttons.

DUMMY ANTENNAS

The dummy antennas referred to in the following instructions are:

"I.F. Dummy" —A .5 mfd. condenser connected in series with the test oscillator output lead.

"Broadcast Dummy"—A 175 mmfd. condenser connected in series with the output lead of the test oscillator.

RESONANCE INDICATOR

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 41 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

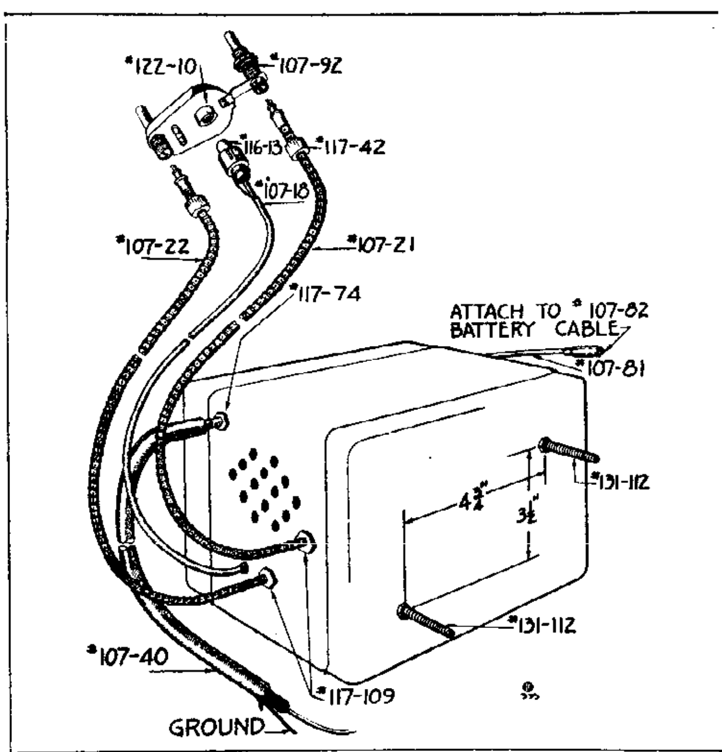
I.F. ALIGNMENT: (465 K.C.)

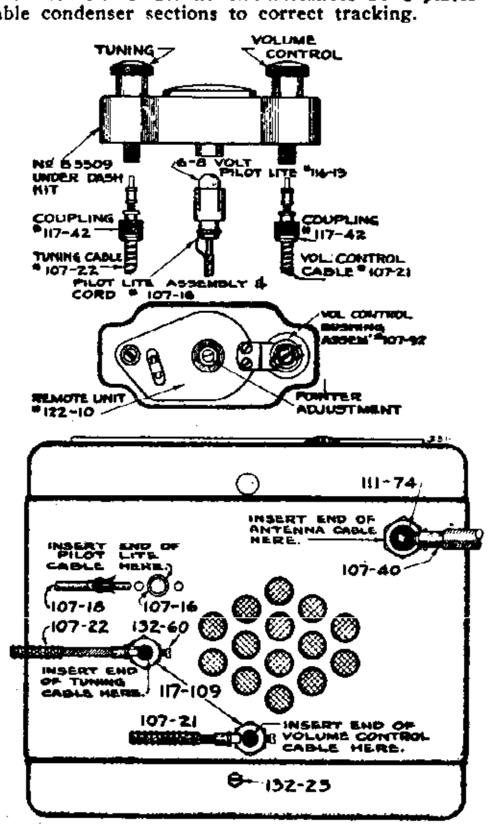
1. With variable condenser in its minimum capacity position (plates entirely out of mesh) and with volume control full on, connect test oscillator set at 465 K.C. in series with I.F. dummy antenna, to grid of 6K7 I.F. tube.
2. Adjust trimmer condensers of output I.F. transformer No. 108-98 to resonance with oscillator.
3. Move test oscillator connection to grid of 6A8 tube and adjust trimmer condensers of input I.F. transformer No. 108-96B to resonance with oscillator. See top view for location of these transformers. There are two adjustments on each and they are accessible from the top of the transformer shield and should be adjusted with an insulated screw driver.

BROADCAST ALIGNMENT

1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. in series with broadcast dummy to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance. (This adjustment is on the middle section of the three-gang condenser—see top view, Fig. 2).
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust R.F. and antenna trimmers to resonance (see top view, Fig. 2).
4. Re-set test oscillator to 600 K.C. and rotate variable condenser to 600 K.C. Adjust series pad, rocking gang condenser to and fro, at the same time adjusting series pad for maximum gain. This adjustment is accessible from the top of chassis—see top view.
5. Go back and check 1400 K.C. If adjustment is made here, check 600 K.C. again.
6. Check for sensitivity at 1000 K.C. by setting test oscillator to this frequency and picking up the signal by rotating variable condenser. Under no circumstances bend plates of variable condenser sections to correct tracking.

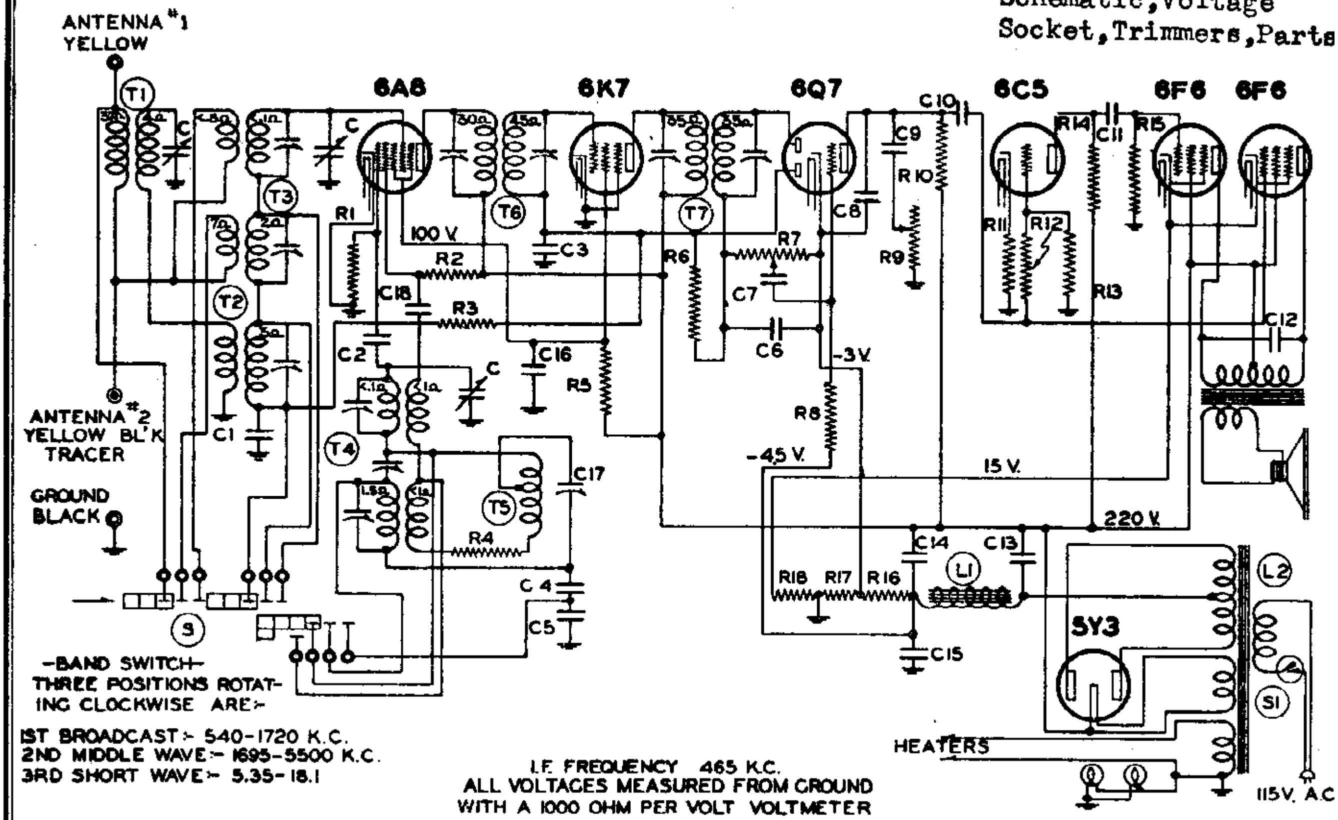
WIRING CONNECTIONS AND ASSEMBLY





BELMONT RADIO CORP.

MODEL 740
Schematic, Voltage
Socket, Trimmers, Parts



PARTS

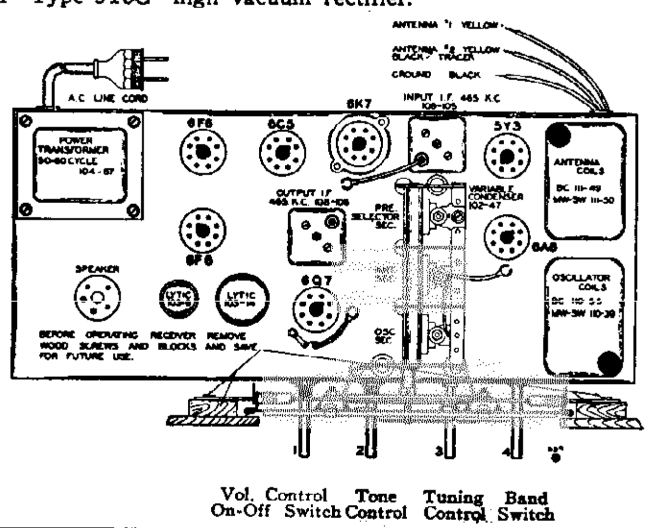
No.	Part No.	Description
		RESISTORS
R1	130-12	50M ohms - 1/3 w.
R2	130-48	15M ohms - 1/3 w.
R3	130-103	100M ohms - 1/3 w.
R4	130-27	50 ohms - 1/3 w.
R5	130-96	25M ohms - 1/2 w.
R6	130-4	3 megohm - 1/3 w.
R7	101-74	1 megohm - Volume Control
R8	130-4	3 megohm - 1/3 w.
R9	101-75	300M ohms - Tone Control
R10	130-100	150M ohms - 1/3 w.
R11	130-22	5M ohms - 1/3 w.
R12	130-163	400M ohms - 1/3 w.
R13	130-103	100M ohms - 1/3 w.
R14	130-12	50M ohms - 1/3 w.
R15	130-100	150M ohms - 1/3 w.
R16	106-37	20 ohms - Muter
R17	106-37	42 ohms - Muter
R18	106-37	250 ohms - Muter

NOTE: R16, R17 and R18 in one unit, No. 106-37

No.	Part No.	Description
		CONDENSERS
C1	100-22	.05 x 200 v.
C2	129-39	.00005 Mica
C3	100-22	.05 x 200 v.
C4	129-55	.0034 Mica
C5	129-54	.003 Mica
C6	129-5	.0001 Mica
C7	100-11	.01 x 400 v.
C8	129-2	.0005 Mica
C9	100-57	.006 x 600 v.
C10	100-26	.02 x 400 v.
C11	100-26	.02 x 400 v.
C12	100-12	.003 x 600 v.
C13	103-6	8 mfd. x 350 v.
C14	103-14	16 mfd. x 250 v.
C15	100-20	.1 x 200 v.
C16	100-39	.1 x 400 v.
C17	124-35	Adjustable Padder - Working Capacity 740 mmf.
C18	100-12	.003 x 600 v.

No.	Part No.	Description
C	102-47	One section of three gang condenser
T1	111-51	B.C. Pre-Selector
T2	111-49	B.C. Antenna Coil Assembly
T3	111-50	MW - SW Antenna Coil Assembly
T4	110-39	MW - SW Oscillator Coil Assembly
T5	110-55	B.C. Oscillator Coil Assembly
T6	108-105	Input I.F. - 465 kc.
T7	108-106	Output I.F. - 465 kc.
L1	114-66	6" Speaker (Field Resistance 900 ohms)
L2	104-87	Power Transformer (60 cycle) 115 volts
S	125-17	Band Switch
S1	101-74	On-off Switch on volume control.

1—Type 6A8G—Pentagrid mixer, first detector and oscillator.
1—Type 6K7 Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6Q7G duplex diode triode second detector, A.V.C. and audio.
1—Type 6C5 Inverter stage.
2—Type 6F6G—pentode push-pull output amplifier.
1—Type 5Y3G high vacuum rectifier.



MODEL 740
Alignment, Trimmers

BELMONT RADIO CORP.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to measured with 115 volts on the primary of the power transformer.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-106 Output I.F. Transformer
Part No. 108-105 Input I.F Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-106) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap of 6A8G and adjust input I.F. transformer (No. 108-105) to resonance.

BROADCAST BAND ALIGNMENT:
540 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly. Fig. 3.)
   (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

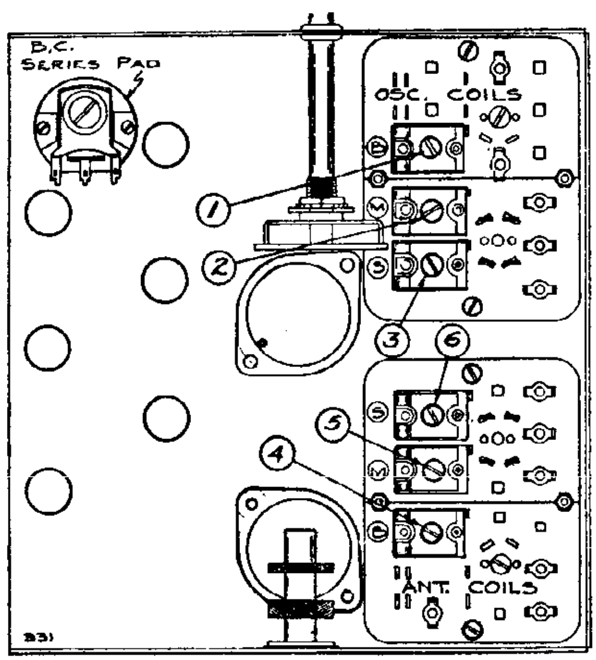
SHORT WAVE BAND ALIGNMENT:
5.35 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment number 3) and short wave antenna (Adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.3 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 18.3 megacycle signal appears near 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:
1690 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (Adjustment number 2) and middle wave antenna (Adjustment number 5) to resonance.
   (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 5400 kilocycles and 1700 kilocycles for band coverage.
   (d) Recheck broadcast band alignment.

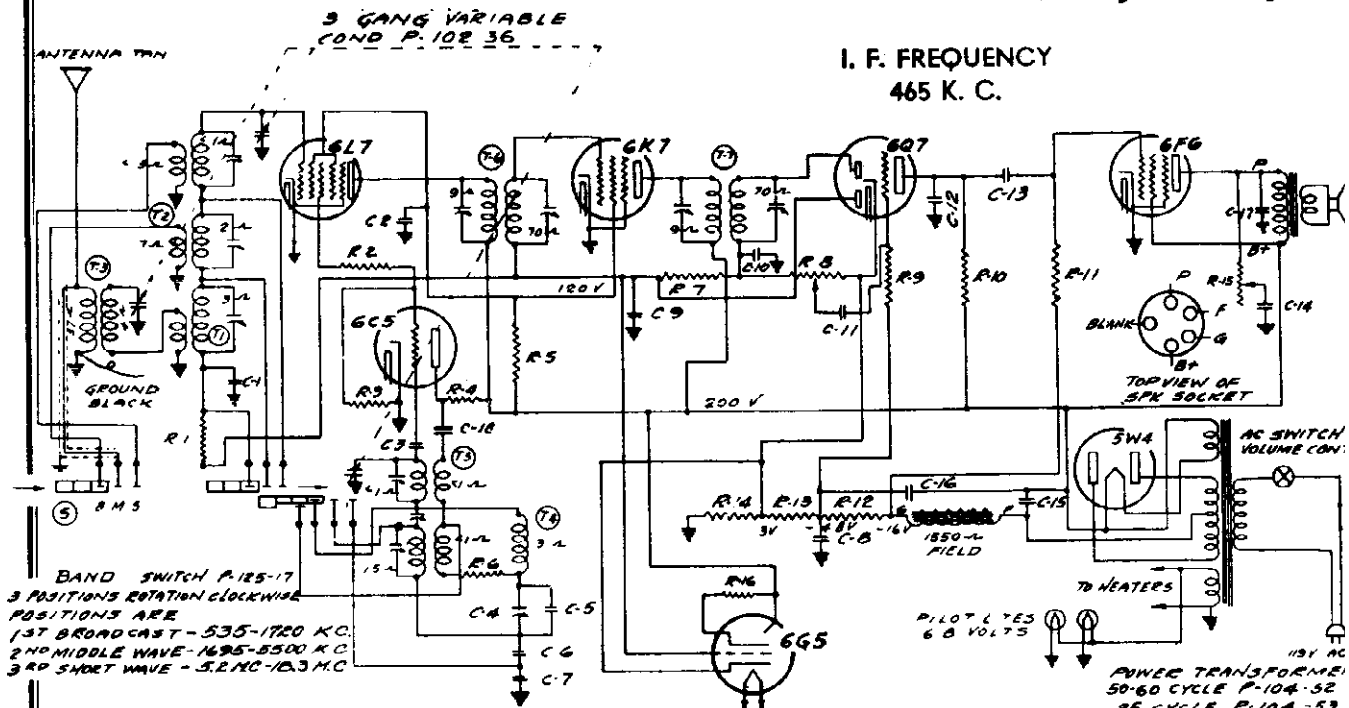


BOTTOM VIEW SHOWING TRIMMERS

MODEL 787, Series A
Schematic, Voltage
Socket, Trimmers, Part

BELMONT RADIO CORP.

I. F. FREQUENCY
465 K. C.



RESISTORS

No.	Part No.	Description
R1	130-20	100M Ohm—⅓ Watt—20%—50 Volt Carbon
R2	130-105	150 Ohm—⅓ Watt—20%—10 Volt Carbon
R3	130-12	50M Ohm—⅓ Watt—20%—10 Volt Carbon
R4	130-104	9M Ohm—1 Watt—20%—100 Volt Carbon
R5	130-34	19M Ohm—1 Watt—20%—100 Volt Carbon
R6	130-27	50 Ohm—⅓ Watt—20%—3 Volt Carbon
R7	130-19	1 Meg Ohm—⅓ Watt—20%—100 Volt Carbon
R8	101-46	1 Meg Ohm—Volume Control
R9	130-4	3 Meg Ohm—⅓ Watt—20%—100 Volt Carbon
R10	130-103	100M Ohm—⅓ Watt—20%—50 Volt Carbon
R11	130-102	500M Ohm—⅓ Watt—10%—50 Volt Carbon
R12	106-26	220 Ohm
R13	106-26	32 Ohm
R14	106-26	52 Ohm
R15	101-53	50M Ohm—Tone Control
R16	130-110	1 Meg Ohm—1/10 Watt—10%—100 Volt Carbon

CONDENSERS

No.	Part No.	Description
C1	100-22	.05x200 Volt—25%
C2	100-1	.1x400 Volt—+50%—10%
C3	129-39	.00005 Mica (MT-O)—20%
C4	124-28	Series Pad (80-225)
C5	129-65	.00055 Mica (MT-O)—5%
C6	129-55	.0034 Mica (MW-W)—2½%
C7	129-54	.003 Mica (MW-W)—2½%
C8	100-20	.1x200 Volt—25%
C9	100-22	.05x200 Volt—25%
C10	129-12	.00025 Mica (MT-0)—20%
C11	100-11	.01x400 Volt—25%
C12	129-2	.0005 Mica (MT-O)—20%
C13	100-11	.01x400 Volt—25%
C14	100-27	.025x600 Volt—25%
C15	103-6	8 Mfd. x 350 Volt Electrolytic
C16	103-7	8 Mfd. x 300 Volt Electrolytic
C17	100-25	.002x600 Volt—20%
C18	100-37	.003x600 Volt—10%

PARTS

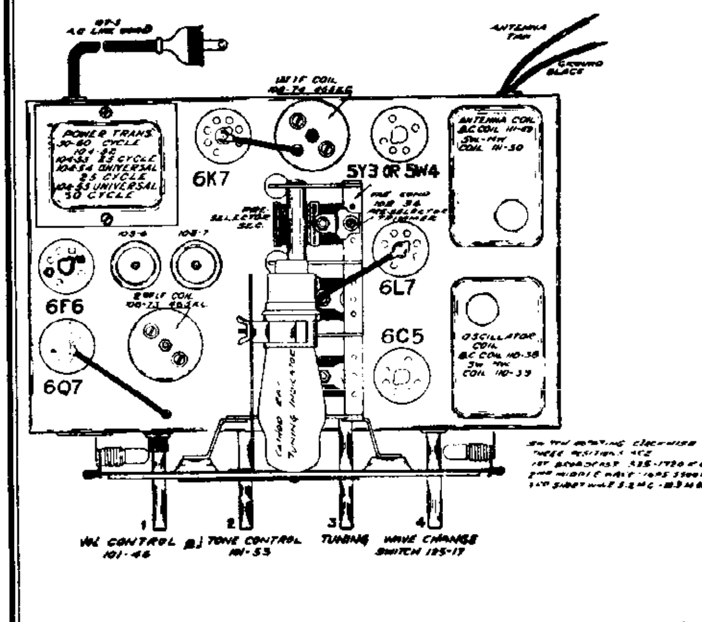
No.	Part No.	Description
T1	111-49	Broadcast Antenna Coil
T2	111-50	S.W.-M.W. Antenna Coil
T3	111-51	B.C.-Pre-Selector Coil Assem.
T4	110-38	B.C. Oscillator Coil
T5	110-39	S.W.-M.W. Oscillator Coil
T6	108-71	Input I.F. - 465 K.C.
T7	108-73	Output I.F. - 465 K.C.
S	125-17	Wave Change Switch

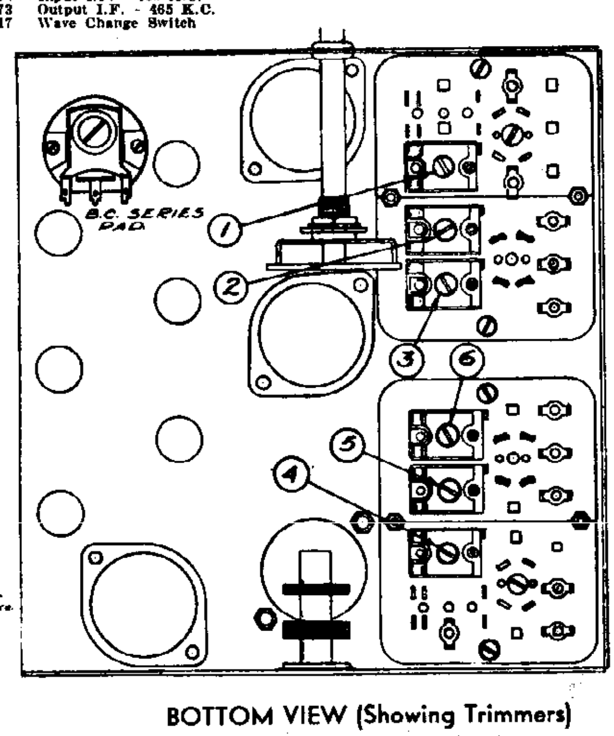
TUNING RANGE—

Standard Broadcast Band
535-1720 Kilocycles.

Middle Wave Band
1695-5500 Kilocycles.

Short Wave Band
5.2-18.3 Megacycles.





BOTTOM VIEW (Showing Trimmers)

MODEL 787, Series A
MODEL 879, Series A
Alignment

BELMONT RADIO CORP.

MODEL 787 - Series A

DESCRIPTION:

Model 787 is a seven tube A.C. all wave superheterodyne receiver. It has a tuning range of 535 K.C. to 18.3 megacycles in three bands, and is characterized by its exceptional stability, and by a sensitivity both high and uniform, with high signal to noise ratio on all bands. The I.F. frequency used is 465 K.C., which in conjunction with the pre-selector circuit, gives high image and I.F. attenuation (freedom from whistles and telegraphic interference).

A separate oscillator; effective automatic volume control; broad nose sharp skirt selectivity and new type oval airplane dial, are a few of the outstanding features of this model.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40, and 60 cycles and with primary taps for 108, 127, 150, 225 and 260 volts (see instructions), and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

TUBE COMPLEMENT:

The tube complement of the model 787 consists of the latest metal tubes. They are as follows:

1-Type 6L7 Pentagrid Mixer, First Detector.

1-Type 6C5 Oscillator.

1-Type 6K7 Remote Cut-off Pentode, I.F. Amplifier (465 K.C.).

1-Type 6Q7 Duplex Diode Triode Second Detector, A.V.C. and First Audio.

1-Type 6F6 Pentode Output Amplifier.

1-Type 5W4 High Vacuum Rectifier.

1-Type 6G5 Cathode-Ray Tuning Indicator. (Note: 6G5 available in all glass only.)

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram are measured with 119 volts on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS; (465 K.C.):

Part No. 108-73 Output I.F. Transformer.
Part No. 108-74 Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), the band changing switch in the broadcast position (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-73) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6L7 and adjust input I.F. transformer (No. 108-74) to resonance.
   (c) With oscillator still connected to 6L7, readjust output I.F. transformer (108-73) if necessary.

BROADCAST BAND ALIGNMENT:

535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly, Fig. 3).
   (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. Under no circumstances bend plates of variable condenser sections to correct tracking.

SHORT WAVE BAND ALIGNMENT:

5.2 to 18.3 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment number 3) and short wave antenna (Adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.1 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 18.3 megacycle signal appears near 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:

1695 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (Adjustment number 2) and middle wave antenna (Adjustment number 5) to resonance.
   (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 5400 kilocycles and 1700 kilocycles for band coverage.

MODEL 879 - Series A

DESCRIPTION

The tube complement of this chassis is as follows:

1—Type 6K7 Remote cut-off pentode R.F. amplifier
1—Type 6J7—pentode first detector.
1—Type 6C5 Oscillator
1—Type 6K7 Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6Q7 duplex diode pentode second detector, A.V.C. and audio.
1—Type 6F6—pentode output amplifier.
1—Type 5Y3 or 5W4—high vacuum rectifier.
1—Type 6G5 Cathode ray tuning indicator.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 108, 127, 150, 225, and 260 volts, (see instructions) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 119 volts on the primary of the power transformer.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS

Dummy Antennas

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3"

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Intermediate and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and screen terminals of the type 6F6 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

CAUTION:

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the four bolts by which it is fastened.

ALIGNING I.F. TRANSFORMERS (465 K.C.)

Part No. 108-63 Output I.F. Transformer
Part No. 108-64 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the underside of chassis (see bottom view, Fig. 1).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), the tone control on "Hi" part of the sharp position (as much right rotation as possible without operating the Hi Fidelity switch), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, located between the two I.F. transformers, and adjust the output I.F. transformer 108-63 to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6J7 and adjust input I.F. transformer (108-64) to resonance.
   (c) With oscillator still connected to 6J7, re-adjust output I.F. transformer if necessary.

ALIGNMENT PROCEDURE

The following adjustments to be made after the I.F.'s have been aligned as explained above.

BROADCAST BAND ALIGNMENT:

1. With band changing switch in the broadcast position, extreme left of its rotation, and with external oscillator set at 600 kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:
   (a) Adjust broadcast series pad (adjustment number 3) to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained. Note: This adjustment is accessible from the top of the chassis and is located between the variable condenser and the 108-63 output I.F. transformer. See top view, Fig. 3.
   (b) Re-set external oscillator to 1400 K.C., move dial pointer to 1400 K.C. and adjust oscillator (adjustment number 4), R.F. (adjustment number 6) and antenna (adjustment number 7) to resonance. See bottom view for location of these adjustments, Fig. 1.
   (c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

NOTE: IT IS EXTREMELY NECESSARY IN MAKING ALL OF THESE ADJUSTMENTS THAT THE FUNDAMENTAL OSCILLATOR SIGNAL BE TUNED IN AND NOT THE IMAGE FREQUENCY WHICH WILL FALL BELOW THE FUNDAMENTAL.

SHORT WAVE BAND ALIGNMENT:

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 1), short wave R.F. (adjustment number 8) and short wave antenna (adjustment number 9) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check for sensitivity.

MIDDLE WAVE BAND ALIGNMENT:

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5 M.C. and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

(a) Rotate condenser, pick signal and adjust middle wave R.F. (adjustment number 10), middle wave antenna (adjustment number 5) and middle wave oscillator (adjustment number 2) to resonance.

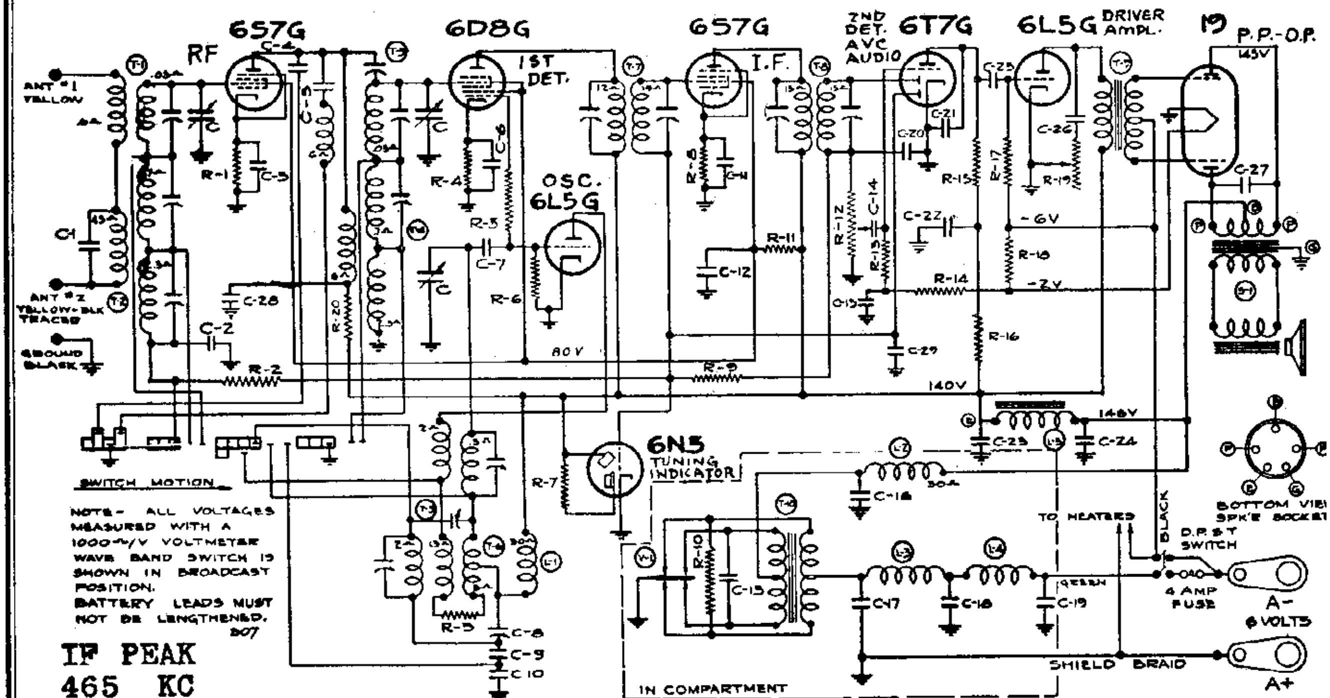
(b) Re-check broadcast alignment and if it is found necessary to re-adjust either R.F. or antenna trimmers, repeat the 17 M.C. short wave and 5 M.C. middle wave adjustments.

Voltage, Parts

MODEL 804

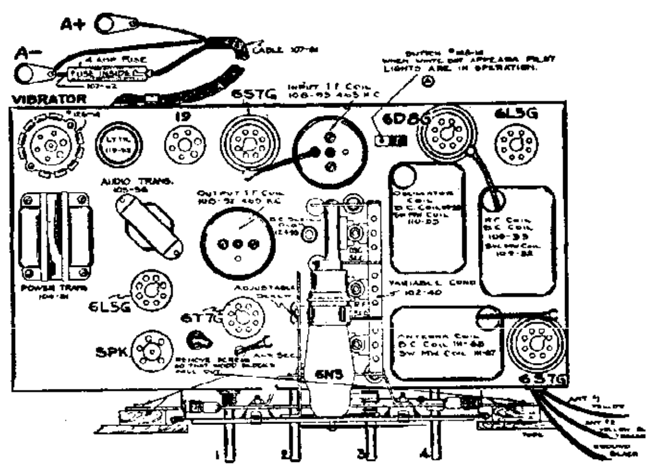
BELMONT RADIO CORP.

Schematic, Socket



IF PEAK
465 KC

No.	Part No.	Description	
		CONDENSERS	
C	102-40	Variable Condenser	
C1	129-5	.0001 Mica—MO—O—20%	
C2	100-9	.05 x 200 v.—25%	
C3	100-9	.05 x 200 v.—25%	
C4	129-72	.0004 Mica—MT—W—5%	
C5	129-38	.00005 Mica—MO—O—10%	
C6	100-9	.05 x 200 v.—25%	
C7	129-38	.00005 Mica—MO—O—10%	
C8	124-35	J.S. Series Pad	
C9	129-70	.004 Mica MW—J—2½%	
C10	129-71	.002—Mica MW—W—2½%	
C11	100-20	.1 x 200v.—25%	
C12	100-20	.1 x 200v.—25%	
C13	100-34	.005 x 1200 v.—10%	
C14	100-11	.01 x 400 v.—25%	
C15	100-11	.01 x 400 v.—25%	
C16	100-14	.1 x 200 v.—25%	
C17	100-56	.5 x 200 v.—50%—10%	
C18	100-56	.5 x 200 v.—50%—10%	
C19	100-25	.002 x 600 v.—25%	
C20	129-5	.0001 Mica MO—O—20%	
C21	129-2	.0005 Mica MT—O—20%	
C22	100-20	.1 x 200 v.—25%	
C23	119-32	4. mfd. 200 w. v. Lytic	
C24	119-32	8. mfd. 200 w. v. Lytic	
C25	100-11	.01 x 400 v.—25%	
C26	100-26	.02 x 400 v.—25%	
C27	100-25	.002 x 600 v.—25%	
C28	100-50	.25 x 200 v.—20%	
C29	100-22	.05 x 200 v.—25%	
		RESISTORS	
R1	130-140	1200 ohm	1/3 w.—20%
R2	130-20	100M	1/3 w.—20%
R3	130-27	50	1/3 w.—20%
R4	130-54	500 ohm	1/3 w.—20%
R5	130-27	50	1/3 w.—20%
R6	130-2	75 M	1/3 w.—20%
R7		½ meg	(in m. e. socket)
R8	130-140	1200 ohm	1/3 w.—20%
R9	130-38	2 meg	1/3 w.—20%
R10	130-84	200 ohm	1/3 w.—20%
R11	130-157	12M	½ w.—10%
R12	101-66	500M	Volume Control
R13	130-19	1 meg	1/3 w.—20%
R14	130-19	1 meg	1/3 w.—20%
R15	130-20	100M	1/3 w.—20%
R16	130-20	100M	1/3 w.—20%
R17	130-4	3 meg	1/3 w.—20%
R18	130-158	16 ohm	1 w.—Insulated
R19	101-67	100M	Tone Control
R20	130-85	3 M	1/3 w.—20%
		PARTS	
T1	111-67	S.W. M.W. Ant. Coil	
T2	111-68	B.C. Antenna Coil	
T3	109-32	S.W. M. W. R.F. Coil	
T4	109-33	B.C. R.F. Coil	
T5	110-53	S.W. M.W. Osc. Coil	
T6	110-55	B.C. Osc. Coil	
T7	108-93	Input I.F. Coil	
T8	108-92	Output I.F. Coil	
T9	105-36	Audio Input Transformer	
T10	104-81	Power Transformer	
S1	114	P.M. Dynamic Spkr. 8"	
L-1	123-3	Osc. "B" Choke	
L-2	123-3	R.F. "B" Choke	
L-3	105-19	"A" Choke	
L-4	105-19	"A" Choke	
L-5	105-30	"B" Filter Choke	
V-1	126-4	Vibrator	



Vol. Control On-Off Switch | Tone Control | Tuning Control | Band Switch

MODEL 804
Alignment, Trimmers

BELMONT RADIO CORP.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the two plate terminals of the type 19 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-92 Output I.F. Transformer
Part No. 108-93 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer (No. 108-92) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6S7G to grid cap to 6D8G and adjust input I.F. transformer (No. 108-93) to resonance.

SHORT WAVE BAND ALIGNMENT:

5.35 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 18 megacycles and connected in series with "Dummy 3" to the antenna and ground posts, make the following adjustments:
   (a) Move dial pointer to 18 megacycles and adjust short wave oscillator trimmer (adjustment number 1) to resonance.
   (b) Re-set external oscillator to 17 megacycles and pick up signal by rotating variable condenser and adjust short wave R.F. trimmer (adjustment number 8), and short wave antenna trimmer (adjustment number 9), to resonance.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 6 megacycles for band coverage and sensitivity.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental on the receiver dial. As an example of this a fundamental 18.3 megacycle signal can be tuned in not only at 18.3 on the dial but also at approximately 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:

1690 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5.5 megacycles and connected in series with "Dummy 3" to the antenna and ground posts make the following adjustments:
   (a) Move dial pointer to 5.5 megacycles and adjust middle wave oscillator trimmer (adjustment number 2) to resonance.
   (b) Re-set external oscillator to 5 megacycles and pick up signal by rotating variable condenser and adjust middle wave R.F. trimmer (adjustment number 10), and middle wave antenna trimmer (adjustment number 5), to resonance.
   (c) Re-set external oscillator and check sensitivity at 1700 kilocycles.

BROADCAST BAND ALIGNMENT:

540 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground posts, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 4; see bottom view of coil assembly. Fig. 3)
   (b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast R.F. trimmer (adjustment number 6) and broadcast antenna trimmer (adjustment number 7), to resonance.
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment number 3), to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1400, 1000, and 600 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

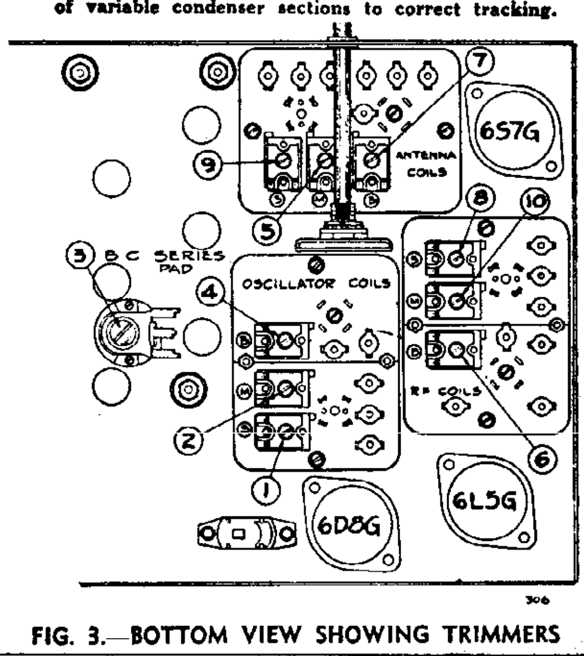
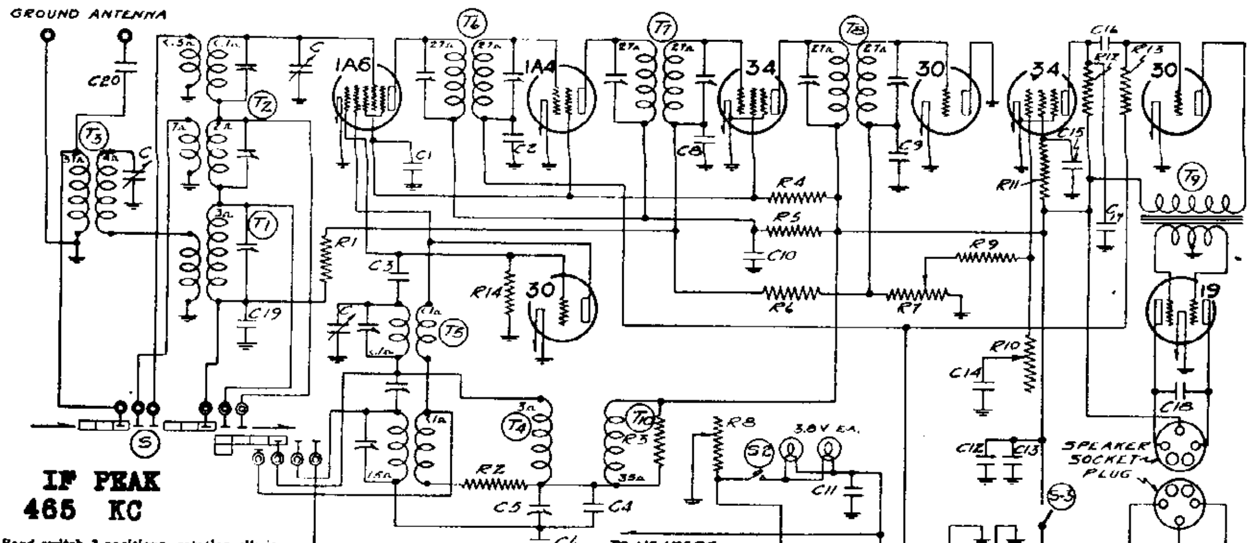


FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS

BELMONT RADIO CORP.



IF PEAK 465 KC

Band switch 3 positions, rotation cl'wise positions are:—
1st Broadcast:—535-1720 K. C.
2nd Middle Wave:—1695-5500 K. C.
3rd Short Wave:—5.2 M. C.—18.3 M. C.
Voltages taken from points indicated to chassis. Set not tuned to signal.

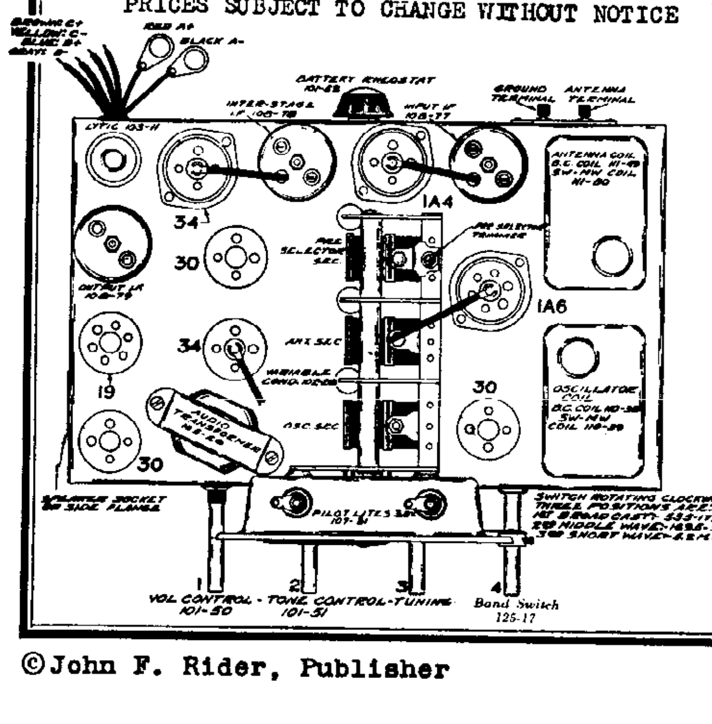
Switches S1, S2, S3 on diagram are located as follows:—
S1 On volume control 101-50
S2 On tuning Shaft
S3 On volume control 101-50

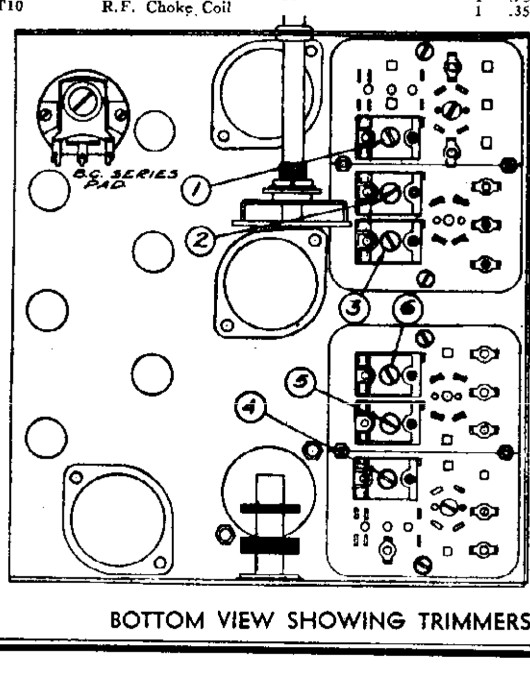
LIST OF REPAIR PARTS (Serial No. 6K 411500 and up)

Use Only Genuine Factory Replacement Parts

Part No.	Circuit Diagram Reference	Description	No. Used in Set	List Price Each
		CONDENSERS		
100-5B	C11	1.0 x 120 Volt Tubular with Bracket	1	.50
100-6	C1	.25 x 200 Volt Tubular less Bracket	1	.35
100-6B	C13	.25 x 200 Volt Tubular with Bracket	1	.35
100-11	C14, C16, C20	.01 x 400 Volt Tubular	3	.25
100-20	C10	.1 x 200 Volt Tubular	1	.25
100-22	C2, C8, C15, C19	.05 x 200 Volt Tubular	4	.25
100-25	C18	.002 x 600 Volt Tubular	1	.25
103-11	C12	8 Mfd. x 200 Volt Electrolytic	1	.75
129-5	C17	.0001 Mica—Type MT—20%	1	.25
129-12	C9	.00025 Mica—Type MT—20%	1	.25
129-50	C3	.00004 Mica—Type MT—30%	1	.25
129-54	C7	.003 Mica—Type MW—2½%	1	.35
129-55	C6	.0034 Mica—Type MW—2½%	1	.35
129-65	C4	.00055 Mica—Type MT—5%	1	.25
			1	6.00
		MISCELLANEOUS		
101-50	R7	Volume Control and Switch (250 M ohm)	1	1.25
101-51	R10	Tone Control (300 M ohm)	1	.70
101-52	R8	Filament Rheostat (2 ohm)	1	.50
102-28	C	Three Gang Variable Condenser	1	4.00
105-28	T9	Audio Input Transformer	1	1.75
125-17	S	Band Switch	1	.85
128-51		Wood Knob with Spring	3	.15
128-52		"Tuning" Knob with Set Screw—Wood	1	.15
131-12		Bakelite Knob with Arrow	1	.15
		RESISTORS		
130-11	R12	250M Ohm—⅓ Watt—20%—50 Volt Carbon	1	.20
130-12	R3, R9, R14	50M Ohm—⅓ Watt—20%—20 Volt Carbon	3	.20
130-19	R6, R11, R13	1 Meg Ohm—⅓ Watt—20%—100 Volt Car.	3	.20
130-20	R1	100M Ohm—⅓ Watt—20%—50 Volt Carbon	1	.20
130-27	R2	50 Ohm—⅓ Watt—20%—3 Volt Carbon	1	.20
130-31	R5	1500 Ohm—⅓ Watt—20%—10 Volt Carbon	1	.20
130-109	R4	7500 Ohm—⅓ Watt—20%—50 Volt Carbon	1	.20
		COILS		
108-77	T6	Input I.F. complete with Can	1	1.25
108-78	T7	Interstage I.F. complete with Can	1	1.25
108-79	T8	Output I.F. complete with Can	1	1.25
110-38	T4	Broadcast Oscillator Coil Complete	1	.50
110-39	T5	Mid-Wave & Short Wave Oscillator Coil Com.	1	1.50
111-49	T1	Broadcast Antenna Coil Assembly Complete	1	.75
111-50	T2	Mid-Wave & Short Wave Antenna Coil Assem. Complete	1	1.50
111-51	T3	Broadcast Preselector Coil	1	.75
123-3	T10	R.F. Choke Coil	1	.35

PRICES SUBJECT TO CHANGE WITHOUT NOTICE





BOTTOM VIEW SHOWING TRIMMERS

MODEL 822
Alignment

BELMONT RADIO CORP.

BATTERIES REQUIRED:

The following batteries are required:

2—45 Volt "B" Batteries.
1—4½ Volt "C" Battery.
1—3 Volt Dry "A" Battery or 2 Volt Storage Battery.

TUBES:

The tube complement of this chassis is as follows:

1—Type 1A6 Pentagrid Mixer, First Detector.
1—Type 1A4 Tetrode First I.F. Amplifier (465 K.C.)
1—Type 34 Remote Cut-Off Pentode, 2nd I.F. Amplifier (465 K.C.)
1—Type 30 Oscillator.
1—Type 30 Second Detector and A. V. C.
1—Type 34 A.F. Amplifier.
1—Type 30 Driver Amplifier.
1—Type 19 Class "B" Push-Pull Output Amplifier.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram, are measured with a new set of batteries.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

The approximate current consumption is as follows:
"A"—660 ma., "B"—18 to 24 ma.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the two plate terminals of the type 19 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-79 Output I.F. Transformer
Part No. 108-78 Interstage I.F. Transformer
Part No. 108-77 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 34 tube, and adjust the output I.F. transformer (No. 108-79) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 34 to grid cap to 1A4 and adjust interstage I.F. transformer (No. 108-78) to resonance.
   (c) Move oscillator to grid cap of 1A6 and adjust input I.F. transformer (No. 108-77).

BROADCAST BAND ALIGNMENT:

535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground posts, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 1; see bottom view of coil assembly, Fig. 3)
   (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment).
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. Under no circumstances bend plates of variable condenser sections to correct tracking.

SHORT WAVE BAND ALIGNMENT:

5.2 to 18.3 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the antenna and ground posts, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 3) and short wave antenna (adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.3 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental on the receiver dial. As an example of this a fundamental 18.3 megacycle signal can be tuned in not only at 18.3 on the dial but also at approximately 17.4 megacycles.

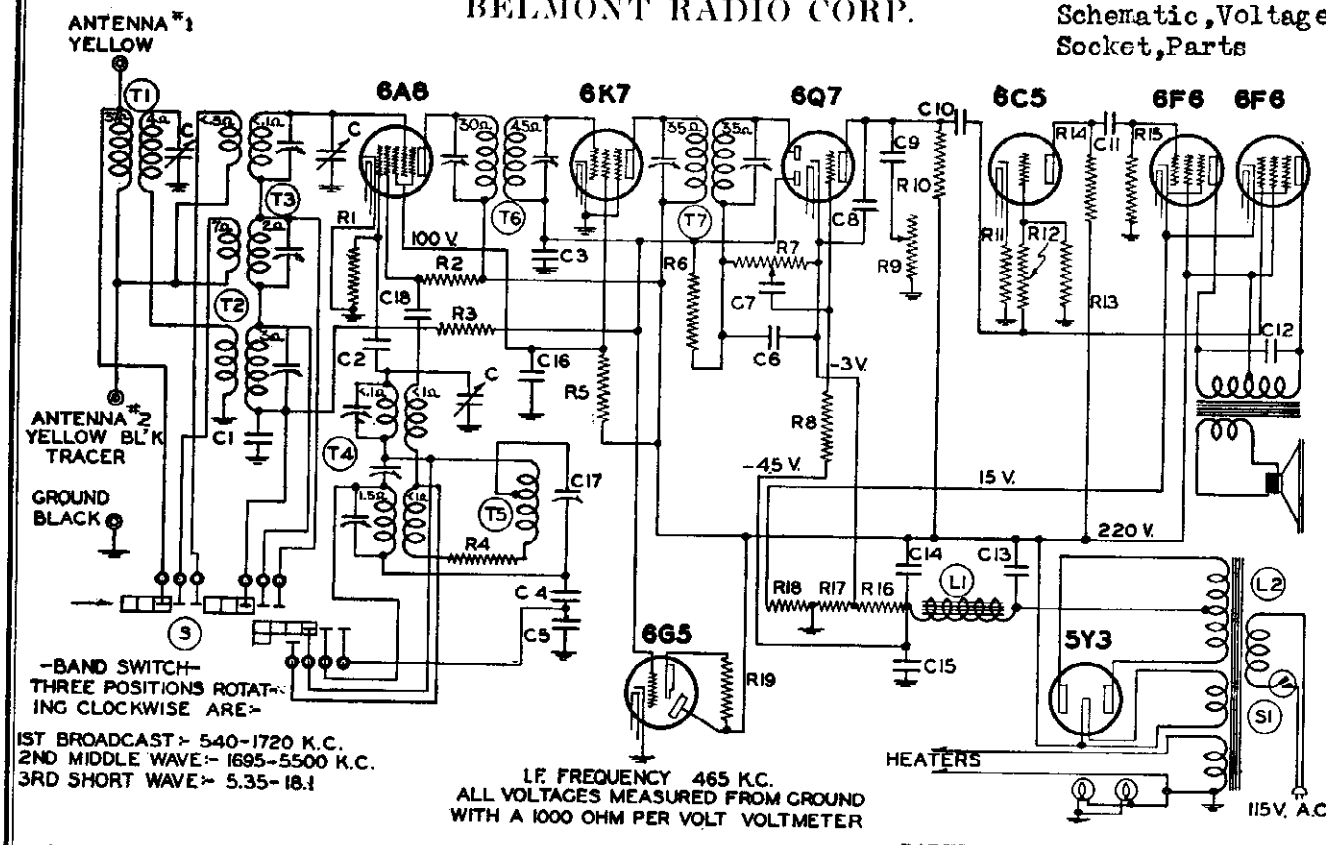
MIDDLE WAVE BAND ALIGNMENT:

1695 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the antenna and ground posts make the following adjustments:
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (adjustment number 2) and middle wave antenna (adjustment number 5) to resonance.
   (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 5400 kilocycles and 1700 kilocycles for band coverage.

BELMONT RADIO CORP.

MODEL 840
Schematic, Voltage
Socket, Parts



RESISTORS

No.	Part No.	Description
R1	130-12	50M ohms - 1/3 w.
R2	130-48	15M ohms - 1/3 w.
R3	130-103	100M ohms - 1/3 w.
R4	130-27	50 ohms - 1/3 w.
R5	130-96	25M ohms - 1/2 w.
R6	130-4	3 megohm - 1/3 w.
R7	101-74	1 megohm - Volume Control
R8	130-4	3 megohm - 1/3 w.
R9	101-75	300M ohms - Tone Control
R10	130-100	150M ohms - 1/3 w.
R11	130-22	5M ohms - 1/3 w.
R12	130-163	400M ohms - 1/3 w.
R13	130-103	100M ohms - 1/3 w.
R14	130-12	50M ohms - 1/3 w.
R15	130-100	150M ohms - 1/3 w.
R16	106-37	20 ohms - Muter
R17	106-37	42 ohms - Muter
R18	106-37	250 ohms - Muter
R19	130-110	1 megohm - 1/10 w.

NOTE: R16, R17 and R18 in one unit, No. 106-37

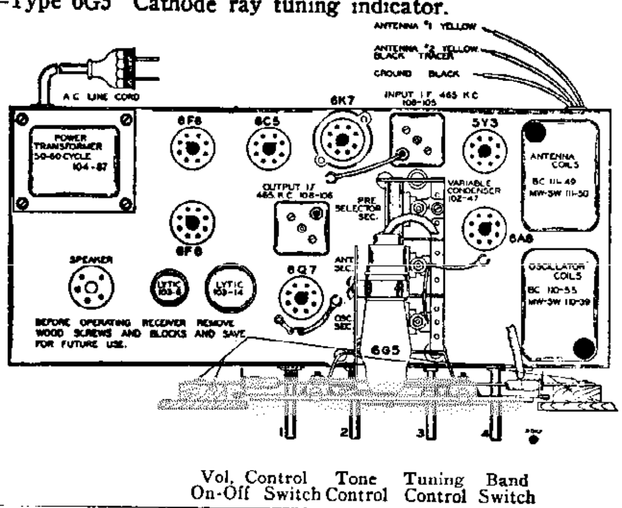
CONDENSERS

No.	Part No.	Description
C1	100-22	.05 x 200 v.
C2	129-39	.00005 Mica
C3	100-22	.05 x 200 v.
C4	129-55	.0034 Mica
C5	129-54	.003 Mica
C6	129-5	.0001 Mica
C7	100-11	.01 x 400 v.
C8	129-2	.0005 Mica
C9	100-57	.006 x 600 v.
C10	100-26	.02 x 400 v.
C11	100-26	.02 x 400 v.
C12	100-12	.003 x 600 v.
C13	103-6	8 mfd. x 350 v.
C14	103-14	16 mfd. x 250 v.
C15	100-20	.1 x 200 v.
C16	100-39	.1 x 400 v.
C17	124-35	Adjustable Padder - Working Capacity 740 mmf.
C18	100-12	.003 x 600 v.

PARTS

C	102-47	One section of three gang condenser
T1	111-51	B.C. Pre-Selector
T2	111-49	B.C. Antenna Coil Assembly
T3	111-50	MW - SW Antenna Coil Assembly
T4	110-39	MW - SW Oscillator Coil Assembly
T5	110-55	B.C. Oscillator Coil Assembly
T6	108-105	Input I.F. - 465 kc.
T7	108-106	Output I.F. - 465 kc.
L1	114-68	8" Speaker (Field Resistance 900 ohms)
L2	104-87	Power Transformer (60 cycle) 115 volts
S	125-17	Band Switch
S1	101-74	On-off Switch on volume control.

1—Type 6A8G—Pentagrid mixer, first detector and oscillator.
1—Type 6K7 Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6Q7G duplex diode triode second detector, A.V.C. and audio.
1—Type 6C5 Inverter stage.
2—Type 6F6G—pentode push-pull output amplifier.
1—Type 5Y3G high vacuum rectifier.
1—Type 6G5 Cathode ray tuning indicator.



MODEL 840
Alignment, Trimmers

BELMONT RADIO CORP.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to measured with 115 volts on the primary of the power transformer.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-106 Output I.F. Transformer
Part No. 108-105 Input I.F Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-106) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap of 6A8G and adjust input I.F. transformer (No. 108-105) to resonance.

BROADCAST BAND ALIGNMENT:
540 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly. Fig. 3.)
   (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

SHORT WAVE BAND ALIGNMENT:
5.35 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment number 3) and short wave antenna (Adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.3 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 18.3 megacycle signal appears near 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:
1690 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (Adjustment number 2) and middle wave antenna (Adjustment number 5) to resonance.
   (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 5400 kilocycles and 1700 kilocycles for band coverage.
   (d) Recheck broadcast band alignment.

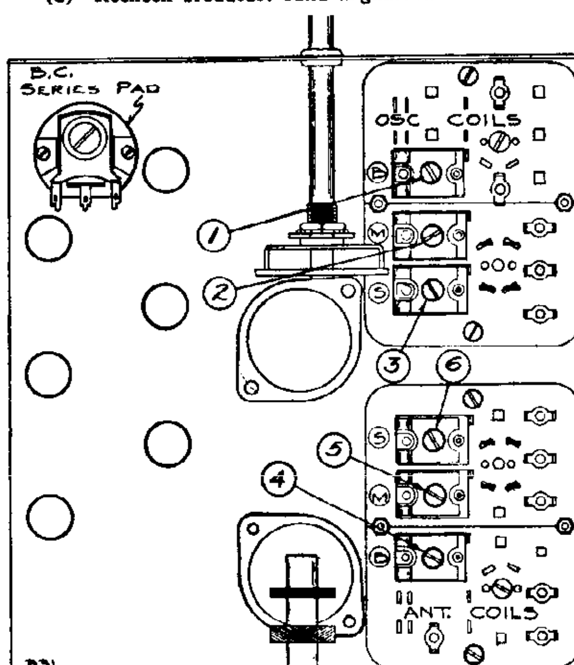
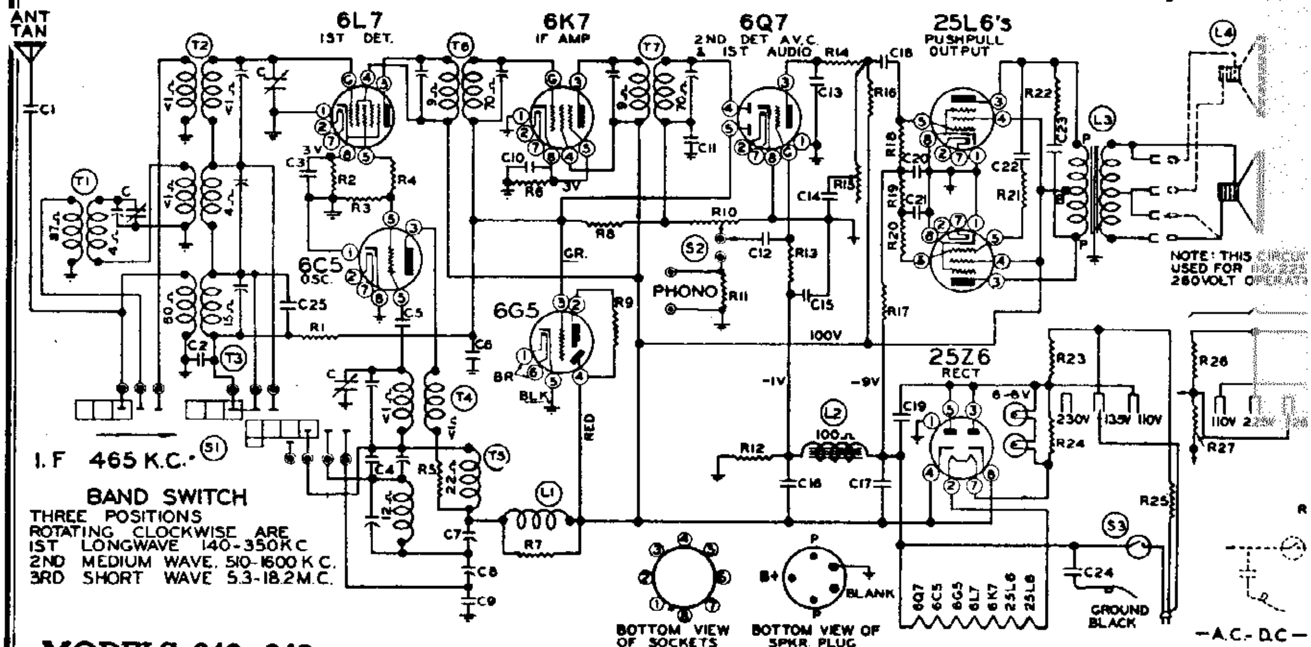


FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS

BELMONT RADIO CORP.



MODELS 848, 849

CONDENSERS

C	102-47	3 gang variable condenser	
C1	100-11	.01 x 400	25%
C2	100-22	.05 x 200	25%
C3	100-22	.05 x 200	25%
C4	129-67	.00004 Mica	10%
C5	129-39	.00005 Mica	20%
C6	100-26	.02 x 400	25%
C7	124-31	Adj. Cond.—300 mmf. W.C.	
C8	124-32	Adj. Cond.—565 mmf. W.C.	
C9	129-54	.003 Mica	2½%
C10	100-9	.05 x 200	25%
C11	129-21	.0002 Mica	20%
C12	100-9	.05 x 200	25%
C13	129-2	.0005 Mica	20%
C14	100-19	.006 x 600	25%
C15	100-6	.25 x 200	20%
C16	119-30	26 mfd.—100 w.v.	
C17	119-30	26 mfd.—100 w.v.	
C18	100-11	.01 x 400	25%
C19	100-39	.1 x 400	20%
C20	100-43	.25 x 200	25%
C21	100-20	.1 x 200	25%
C22	100-19	.006 x 600	25%
C23	100-19	.006 x 600	25%
C24	100-36	.01 x 1400	10%
C25	129-3	.00002 Mica	20%

C16 and C17 in same unit

RESISTORS

R1	130-20	100M ohm—1/3 w. 20%
R2	130-54	500 ohm—1/3 w. 20%
R3	130-12	50M ohm—1/3 w. 20%
R4	130-60	100 ohm—1/3 w. 20%
R5	130-27	50 ohm—1/3 w. 20%
R6	130-54	500 ohm—1/3 w. 20%
R7	130-12	50M ohm—1/3 w. 20%
R8	130-4	3 megohm—1/3 w. 20%
R9		250M—1/10 w. in Tuning indicator socket
R10	101-46	Volume Control (1 meg. ohm)
R11	130-20	100M ohm—1/3 w. 20%
R12	130-169	12 ohm—Wire wound
R13	130-19	1 megohm—1/3 w. 20%
R14	130-66	75M ohm—1/3 w. 10%
R15	101-51	Tone Control (300M ohm)
R16	130-100	150M—1/3 w. 20%
R17	130-102	500M ohm—1/3 w. 10%
R18	130-11	250M ohm—1/3 w. 20%
R19	130-11	250M ohm—1/3 w. 20%
R20	130-7	40M ohm—1/3 w. 10%
R21	130-102	500M ohm—1/3 w. 10%
R22	130-22	5M ohm—1/3 w. 20%
R23	106-41	65 ohm
R24	106-41	40 ohm
R25	107-48	250 ohm line cord
R26	106-30	100 ohm
R27	106-30	40 ohm

R26 and R27 in one unit (110-225-260 volt operation)
R23 and R24 in one unit (110-135-230 volt operation)

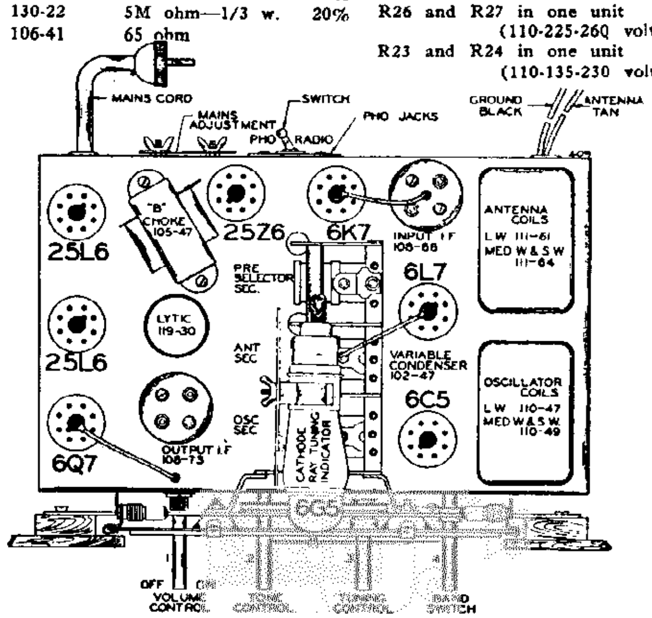


FIG. 1—TOP VIEW

T1	111-62	Pre-selector Coil Complete
T2	111-64	S.W. M.W. Antenna Coil Complete
T3	111-61	L.W. Antenna Coil Complete
T4	110-49	S.W. M.W. Oscillator Coil Complete
T5	110-47	L.W. Oscillator Coil Complete
T6	108-88	Input I.F. Coil Complete
T7	108-73	Output I.F. Coil Complete
L1	123-3	R.F. "B" Choke
L2	105-47	100 ohm Filter Choke
L3	114-83	8" P.M. Speaker
S1	125-17	Band Switch
S2	125-22	Phono Switch
S3		On-Off Switch on Volume Control
L4	114-84	Extension Speaker—6 ohm voice coil 8" P.M.

BAND	FREQUENCY RANGE	
Long Wave	350 to 140 K.C. (Kilocycles)	860-2150 Meters
Medium Wave	1600 to 510 K.C. (Kilocycles)	187- 588 Meters
Short Wave	18.2 to 5.3 M.C. (Megacycles)	16.5-56.5 Meters

BELMONT RADIO CORP.

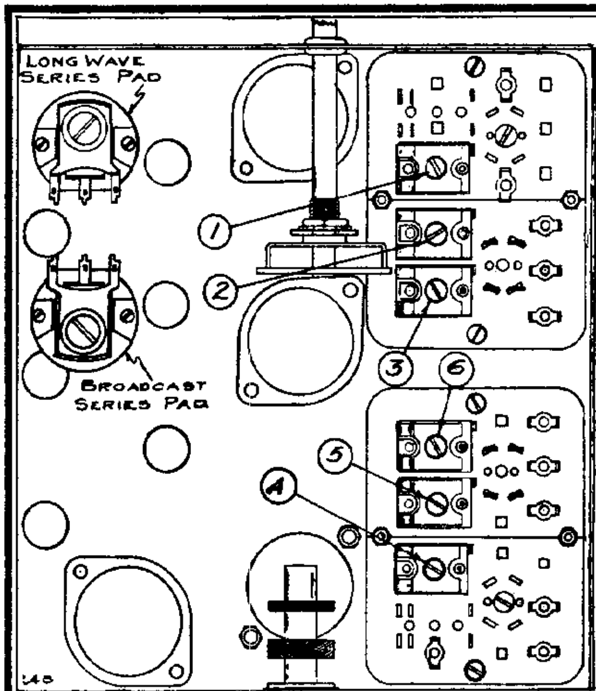


FIG. 3—BOTTOM VIEW (Showing Trimmers)

ALIGNING INSTRUCTIONS:

Dummy Antennas:

The following dummy antennas are used in aligning the receiver, and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Medium and long wave) — Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

TEST FREQUENCIES USED:

	Kilocycles	Meters
I. F.	465	645.1
Long Wave	150	2000
	350	860
	325	925
Medium Wave	600	500
	1400	214
	1600	187
Short Wave	6000	50.0
	17000	17.6
	18200	16.5

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

CAUTION:

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the four bolts by which it is fastened.

ALIGNING I.F. TRANSFORMERS:

(465 K.C.) (645.1 Meters)

Part No. 108-73 Output I. F. Transformer.
Part No. 108-88 Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view)

1. With volume control full on (the extreme right of its rotation), the band changing switch in the medium wave position, (center of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-73) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6L7 and adjust input I.F. transformer (No. 108-88) to resonance.
   (c) With oscillator still connected to 6L7, readjust output I.F. transformer (108-73) if necessary.

ALIGNMENT PROCEDURE:

The following adjustments to be made after the I.F.'s have been aligned as explained above.

SHORT WAVE BAND ALIGNMENT:

16.5 Meters (18.2 Mc.) to 56.5 Meters (5.3 Mc.)

1. With band changing switch in the short wave position, extreme right of its rotation, and with the gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Set external oscillator to 16.5 meters (18.2 Mc.) and adjust short wave oscillator trimmer (adjustment number 3, see Fig. 3) to resonance.
   (b) Re-set external oscillator to 17.6 meters (17.0 Mc.) and pick up signal by rotating gang condenser. Adjust short wave antenna trimmer (adjustment number 6) to resonance.
   (c) Re-set external oscillator to 50 meters (6.0 Mc.) and check for sensitivity.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 18.3 megacycle signal appears near 17.4 megacycles.

MEDIUM BAND ALIGNMENT:

588 Meters (510 K.C.) to 187 Meters (1600 K.C.)

1. With band changing switch in the medium wave position, center of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 187 meters (1600 K.C.) and adjust medium wave oscillator trimmer to resonance (adjustment number 2; see bottom view of coil assembly. Fig. 3.)
   (b) Re-set external oscillator to 214 meters (1400 K.C.), rotate variable gang condenser and pick up signal. Adjust medium wave antenna trimmer (Adjustment number 5) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 500 meters (600 K.C.), and adjust medium wave series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 300 meters (1000 K.C.) **Under no circumstances bend plates of variable condenser sections to correct tracking.**

IMPORTANT: This band must be completely rechecked after the long wave band has been adjusted.

LONG WAVE BAND ALIGNMENT:

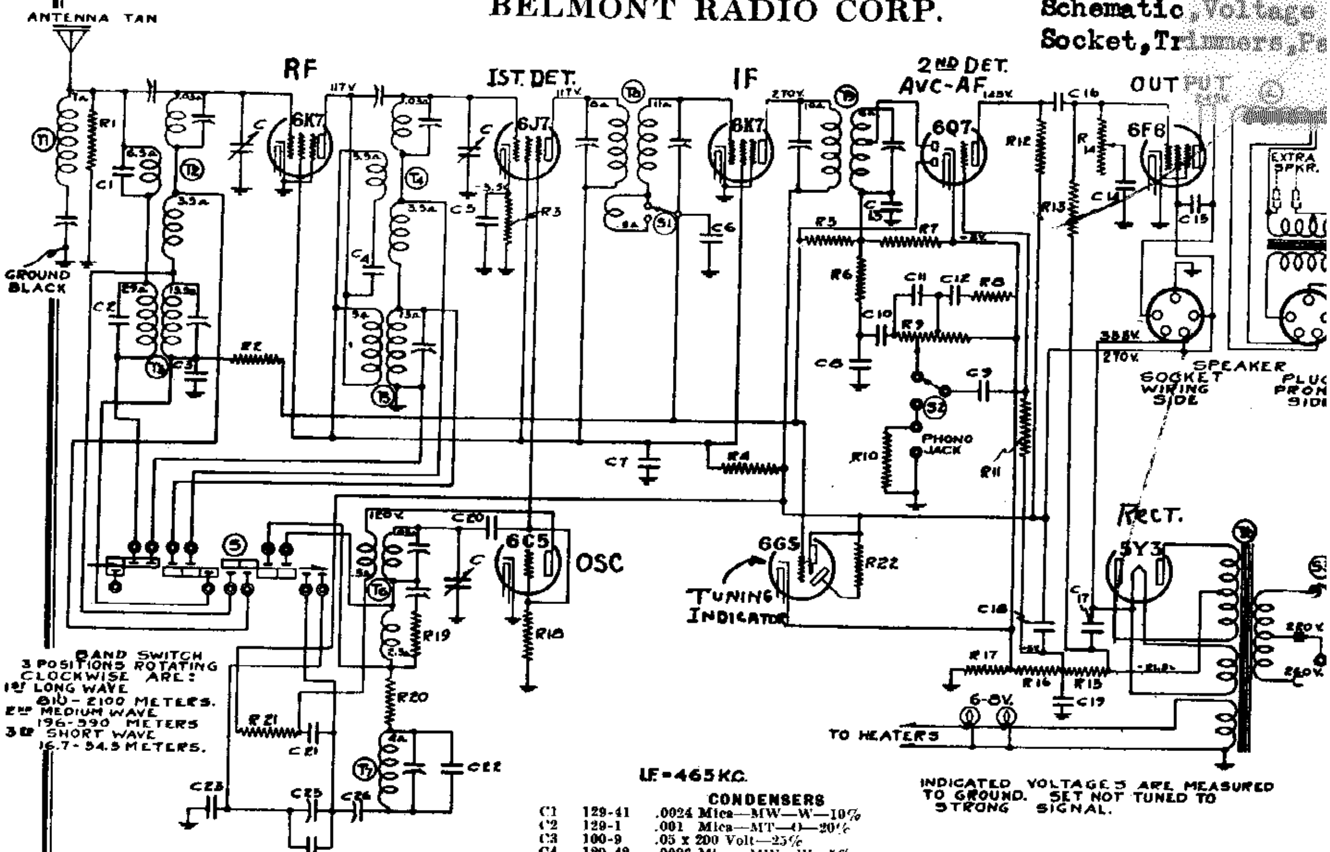
860 Meters (350 K.C.) to 2150 Meters (140 K.C.)

1. With band changing switch in the long wave position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 860 meters (350 K.C.), and adjust long wave oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly. Fig. 3.)
   (b) Re-set external oscillator to 925 meters (325 K.C.), rotate variable gang condenser and pick up signal. Adjust long wave antenna trimmer (Adjustment number 4) to resonance.
   (c) Re-set external oscillator to 2000 meters (150 K.C.), and adjust long wave series pad to resonance by rotating condenser to approximately 2000 meters, rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

IMPORTANT: This band must be completely rechecked after the medium wave band has been rechecked.

MODEL 856, Series A
Schematic, Voltage
Socket, Trimmers, P

BELMONT RADIO CORP.



I.F.=465 KC.

INDICATED VOLTAGES ARE MEASURED TO GROUND. SET NOT TUNED TO STRONG SIGNAL.

RESISTORS

No.	Part No.	Description
R1	130-36	10M Ohm 1/3 Watt—20%— 50 Volt Carbon
R2	130-20	100M Ohm 1/3 Watt—20%— 50 Volt Carbon
R3	130-43	2500 Ohm 1/3 Watt—20%— 20 Volt Carbon
R4	130-88	10M Ohm 2 Watt—20%—Wire Wound
R5	130-3	500M Ohm 1/3 Watt—20%—100 Volt Carbon
R6	130-20	100M Ohm 1/3 Watt—20%— 50 Volt Carbon
R7	130-11	250M Ohm 1/3 Watt—20%— 50 Volt Carbon
R8	130-22	5M Ohm 1/3 Watt—20%— 10 Volt Carbon
R9	101-47	1 Meg Ohm—Volume Control
R10	130-12	50M Ohm 1/3 Watt—20%— 20 Volt Carbon
R11	130-38	2 Meg Ohm 1/3 Watt—20%—100 Volt Carbon
R12	130-20	100M Ohm 1/3 Watt—20%— 50 Volt Carbon
R13	130-3	500M Ohm 1/3 Watt—20%—100 Volt Carbon
R14	101-38	100M Ohm—Tone Control
R15	106-27	220 Ohm—Muter Strip
R16	106-27	28 Ohm—Muter Strip
R17	106-27	33 Ohm—Muter Strip
R18	130-12	50M Ohm 1/3 Watt—20%— 20 Volt Carbon
R19	130-60	100 Ohm 1/3 Watt—20%— 10 Volt Carbon
R20	130-27	30 Ohm 1/3 Watt—20%— 3 Volt Carbon
R21	130-25	19M Ohm 1.2 Watt—20%—150 Volt Carbon
R22	130-110	1 Meg Ohm 1/10 Watt—10%—100 Volt Carbon

NOTE: R15, R16, and R17 are in one unit—No. 106-27

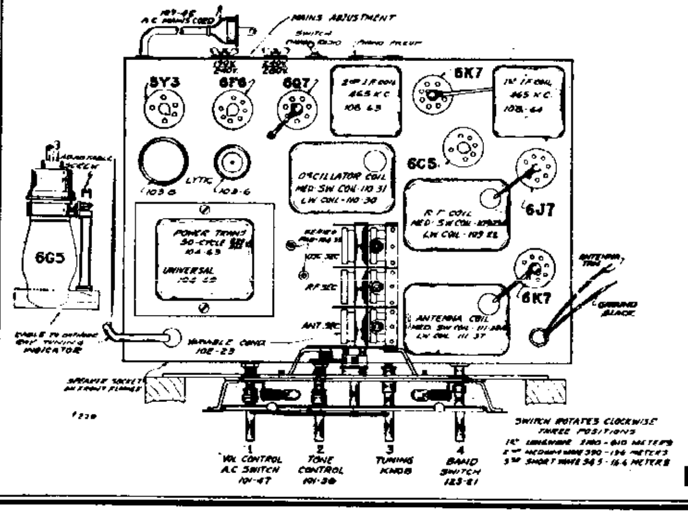
CONDENSERS

C1	129-41	.0024 Mica—MW—W—10%
C2	129-1	.001 Mica—MT—O—20%
C3	100-9	.05 x 200 Volt—25%
C4	129-42	.0036 Mica—MW—W—5%
C5	100-14	.1 x 200 Volt—20%
C6	100-9	.05 x 200 Volt—25%
C7	100-41	.25 x 400 Volt—20%
C8	129-60	.00015 Mica—MT—O—20%
C9	100-11	.01 x 400 Volt—25%
C10	100-9	.05 x 200 Volt—25%
C11	129-2	.0005 Mica—MT—O—20%
C12	100-9	.05 x 200 Volt—25%
C13	129-5	.0001 Mica—MT—O—20%
C14	100-26	.02 x 400 Volt—25%
C15	100-32	.0005 x 1000 Volt—20%
C16	100-11	.01 x 400 Volt—25%
C17	103-8	14 mfd. x 400 Volt Electrolytic
C18	103-6	8 mfd. x 350 Volt Electrolytic
C19	100-42	.25 x 200 Volt—20%
C20	129-68	.00003 Mica—MT—O—20%
C21	100-13	.05 x 400 Volt—25%
C22	129-40	.0001 Mica—MT—O—10%
C23	129-37	.0019 Mica—MW—W—2½%
C24	129-57	.0005 Mica—MT—O—5%
C25	124-33	Adjustable Condenser 200 mmf. Work. Cap.
C26	124-33	Adjustable Condenser 340 mmf. Work. Cap.

NOTE: C25 and C26 are in one unit—No. 124-33

MISCELLANEOUS PARTS

C	102-23	One Section of Three Gang Condenser
T1	108-50	Wave Trap Coil and Trimmer
T2	111-38A	M.W. and S.W. Antenna Coil
T3	111-37	L.W. Antenna Coil
T4	109-23A	M.W. and S.W. R.F. Coil
T5	109-22	L.W. R.F. Coil
T6	110-31	M.W. and S.W. Oscillator Coil
T7	110-30	L.W. Oscillator Coil
T8	108-64	Input I.F. 465 Kc.
T9	108-63	Output I.F. 465 Kc.
T10	104-63	Power Transformer 50 Cycle
L	114-46	8 In. Speaker (Field Resistance 1250 Oh
S	125-21	Band Switch
S1	101-38	High Fidelity Switch on Tone Control
S2	125-22	Phono-Radio Switch
S3	101-47	On and Off Switch on Volume Control



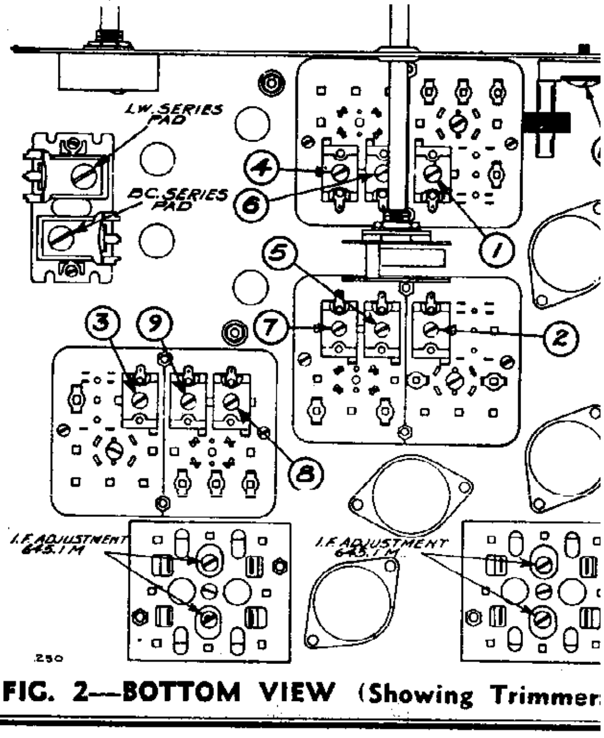


FIG. 2—BOTTOM VIEW (Showing Trimmer

BELMONT RADIO CORP.

POWER SUPPLY:

This receiver is normally supplied with a transformer for operation on 50 cycles (may be higher in frequency, not lower) and with a primary designed for operation on 190-280 volts.

Mains transformer is provided with two taps, one for voltages 190-240 volts another for voltages 240-280 volts. These taps are accessible upon removing plate fastened with two wing nuts to back of chassis.

ALIGNING INSTRUCTIONS

Dummy Antennas

The following dummy antennas are used in aligning the receiver, and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast and long wave)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

TEST FREQUENCIES USED

	Kilocycles	Meters
I. F.	465	645.1
Long Wave	150	2000
	370	810
	350	857
Broadcast	550	545
	1300	230
	1530	196
Short Wave	6000	50.0
	17000	17.6
	18100	16.6

ALIGNING I.F. TRANSFORMERS
(465 K.C.) (645.1 Meters)

Part No. 108-63 Output I.F. Transformer.
Part No. 108-64 Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the underside of chassis (see bottom view).

1. With volume control full on (the extreme right of its rotation), the band changing switch in the medium wave position (center of its rotation), the tone control on "Hi" part of the sharp position (as much right rotation as possible without operating the Hi Fidelity switch), and with the variable condenser set to approximately 230 meters (1300 K.C.), make the following adjustments:
   (a) Connect external oscillator set at 645.1 meters (465 K.C.), in series with "Dummy 1," to the control grid cap of the type 6K7 tube, located between the two I.F. transformers, and adjust the output I.F. transformer (108-63) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6J7 and adjust input I.F. transformer (108-64) to resonance.
   (c) With oscillator still connected to 6J7, readjust output I.F. transformer if necessary.

ALIGNMENT PROCEDURE

The following adjustments to be made after the I.F.'s have been aligned as explained above.

SHORT WAVE BAND ALIGNMENT:
16.6 Meters (18.1 Mc.) to 54.5 Meters (5.5 Mc.)

1. With band changing switch in the short wave position, extreme right of its rotation, and with the gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Set external oscillator to 16.6 meters (18.1 Mc.) and adjust short wave oscillator trimmer (adjustment number 8, see Fig. 2) to resonance.
   (b) Re-set external oscillator to 17.6 meters (17.0 Mc.) and pick up signal by rotating gang condenser. Adjust short wave R.F. trimmer (adjustment number 7) and short wave antenna trimmer (adjustment number 6) to resonance.
   (c) Re-set external oscillator to 50 meters (6.0 Mc.) and check for sensitivity.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 18.3 megacycle signal appears near 17.4 megacycles.

MEDIUM OR BROADCAST BAND ALIGNMENT:
590 Meters (508 K.C.) to 196 Meters (1530 K.C.)

1. With band changing switch in the medium wave position, center of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 196 meters (1530 K.C.) and adjust medium wave oscillator trimmer to resonance (adjustment number 9; see bottom view of coil assembly. Fig. 2.)
   (b) Re-set external oscillator to 230 meters (1300 K.C.), rotate variable gang condenser and pick up signal. Adjust medium wave R.F. trimmer (adjustment number 5) and medium wave antenna trimmer (adjustment number 4) to resonance.
   (c) Re-set external oscillator to 545 meters (550 K.C.). and adjust medium wave series pad to resonance by rotating condenser to approximately 550 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 2.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 300 meters (1000 K.C.) **Under no circumstances bend plates of variable condenser sections to correct tracking.**

IMPORTANT: This band must be completely rechecked after the long wave band has been adjusted.

LONG WAVE BAND ALIGNMENT:
810 Meters (370 K.C.) to 2100 Meters (143 K.C.)

1. With band changing switch in the long wave position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 810 meters (370 K.C.), and adjust long wave oscillator trimmer to resonance (adjustment number 3; see bottom view of coil assembly. Fig. 2.)
   (b) Re-set external oscillator to 857 meters (350 K.C.), rotate variable gang condenser and pick up signal. Adjust long wave R.F. trimmer (adjustment number 2) and long wave antenna trimmer (adjustment number 1) to resonance.
   (c) Re-set external oscillator to 2000 meters (150 K.C.), and adjust long wave series pad to resonance by rotating condenser to approximately 2000 meters, rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 2.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

IMPORTANT: This band must be completely rechecked after the medium wave band has been rechecked.

WAVE TRAP ADJUSTMENT:

The circuit diagram of this receiver shows a wave trap part number 108-50 (T1) in the antenna circuit.

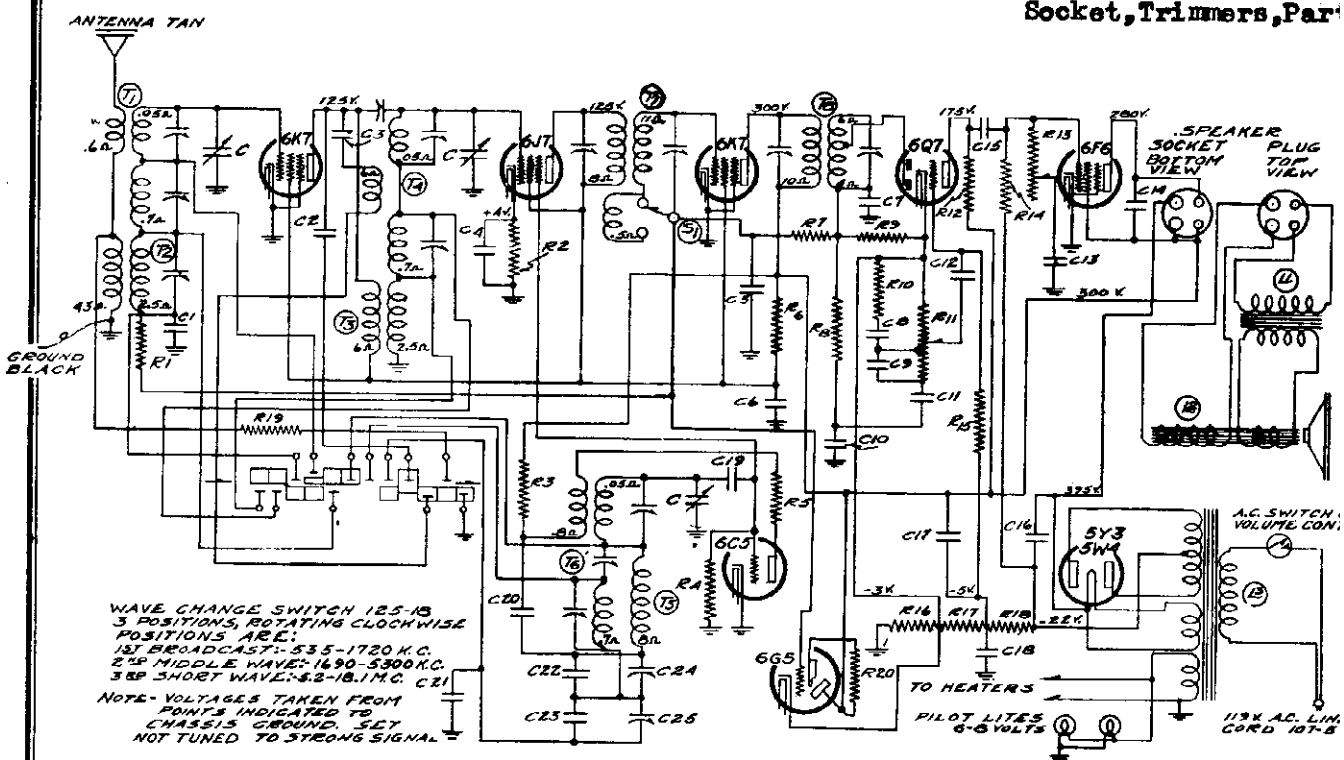
The purpose of this part is to trap out interfering frequencies close to the intermediate frequency (645.1 meters, 465 K.C.) used for the I.F. stage.

To properly adjust the trimmer for the wave trap (adjustment number 10, Fig. 2, page 2), proceed as follows:

1. With band changing switch in the medium wave position, center of its rotation and the dial pointer set at 545 meters, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make the following adjustment:

(a) Set external oscillator to 645.1 meters (465 K.C.) and adjust wave trap trimmer (adjustment number 10) for minimum response.

BELMONT RADIO CORP.



The tube complement of this chassis is as follows:

1—Type 6K7 Remote cut-off pentode R.F. amplifier
1—Type 6J7—pentode first detector.
1—Type 6C5 Oscillator
1—Type 6K7 Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6Q7 duplex diode pentode second detector, A.V.C. audio.
1—Type 6F6—pentode output amplifier.
1—Type 5Y3 or 5W4—high vacuum rectifier.
1—Type 6G5 Cathode Ray Tuning Indicator.

I. F. FREQUENCY 465 K. C.

No.	Part No.	Description
		RESISTORS
R1	130-20	100M Ohms—1/3 W.—20%—50 V.—Car.
R2	130-43	2500 Ohms—1/3 W.—20%—20 V.—Car.
R3	130-77	10M Ohms 1 W. -20%—100V.—Car.
R4	130-12	50M Ohms—1/3 W.—20%—20 V.—Car.
R5	130-60	100 Ohms—1/3 W.—20%—10 V.—Car.
R6	130-88	10M Ohms—2 W.—20%—Wire Wound
R7	130-3	500M Ohms—1/3 W.—20%—100 V.—Car.
R8	130-20	100M Ohms—1/3 W.—20%—50 V.—Car.
R9	130-11	250M Ohms—1/3 W.—20%—50 V.—Car.
R10	130-22	5000 Ohms—1/3 W.—20%—10 V.—Car.
R11	101-47	1 meg Ohm—Vol. Con. with AC Switch
R12	130-20	100M Ohms—1/3 W.—20%—50 V.—Car.
R13	101-38	100M Ohms—Tone Con with Fid. Switch.
R14	130-3	500M Ohms—1/3 W.—20%—100 V.—Car.
R15	130-38	2 meg Ohm—1/3W.—20%—100 V.—Car.
R16	106-27	38 Ohms—10% Muter Resistor
R17	106-27	28 Ohms—10% Muter Resistor
R18	106-27	220 Ohms—10% Muter Resistor
R19	130-27	50 Ohms—1/3 Watt—20% Car.
		Note: R16, R17, R18 in one unit—part No. 106-27
R20	130-110	1 Megohm—1/10 W.—10%—100V.—Car.
		CONDENSERS
C	102-35	One sec. of 3 gang var. condenser
C1	100-9	.05—200 Volt—25%
C2	129-59	.0003 Mica—MT—0—5%
C3	129-39	.00005 Mica—MT—0—20%
C4	100-9	.05—200 Volt—25%
C5	100-9	.05—200 Volt—25%
C6	100-41	.25—400 Volt—20%
C7	129-5	.0001 Mica—MT—0—20%
C8	100-9	.05—200 Volt—25%
C9	129-2	.0005 Mica—MT—0—20%
C10	129-60	.00015 Mica—MT—0—20%
C11	100-9	.05—200 Volt—25%
C12	100-11	.01—400 Volt—25%
C13	100-26	.02—400 Volt—25%
C14	100-32	.0005—1000 Volt—20%
C15	100-11	.01—400 Volt—25%
C16	103-8	14 mfd.—400 Volt Electrolytic
C17	103-6	8 mfd.—350 Volt Electrolytic
C18	100-46	.25—200 Volt—20%
C19	129-31	.000025 Mica—MT—0—15%
C20	100-13	.05—400 Volt—25%
C21	129-54	.003 Mica—MW—W—2½%
C22	129-57	.0005 Mica—MT—0—5%
C23	129-66	.0021 Mica—MW—W—2½%
C24	124-18	Padder, 175 mmf. working capacity
C25	124-18	Padder, 300 mmf. working capacity
		Note: C24, C25 in one unit—Part No. 124-18
		PARTS
T1	111-54	M.W. and S.W. Antenna Coil Asse
T2	111-55	Broadcast Antenna Coil Assem.
T3	109-30	Broadcast R.F. Coil Assem.
T4	109-29	M.W. and S.W. R.F. Coil Assem.
T5	110-43	Broadcast Osc Coil Assem.
T6	110-42	M.W. and S.W. Osc. Coil Assem.
T7	108-64	Input I.F. Coil—465 Kc.
T8	108-63	Output I.F. Coil—465 Kc.
L1		Output Transformer (on speaker)
L2	114-36	8" Speaker (Field Resist. 1250 Ohm
L3	104-27	Power Transformer (50-60 Cycle)
S	125-18	Band Switch
S1	101-38	Fidelity Switch on Tone Control

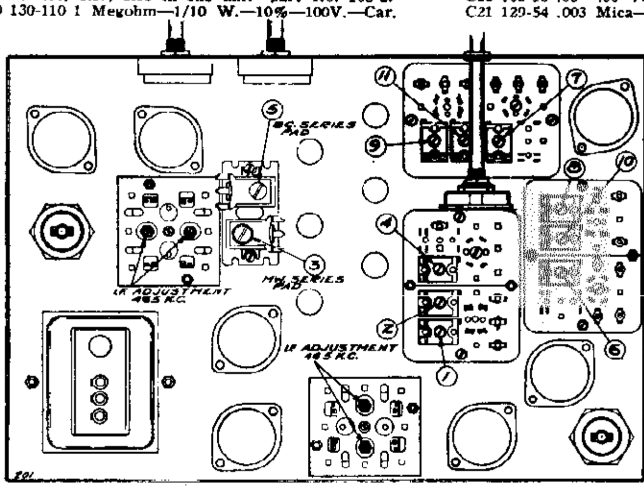
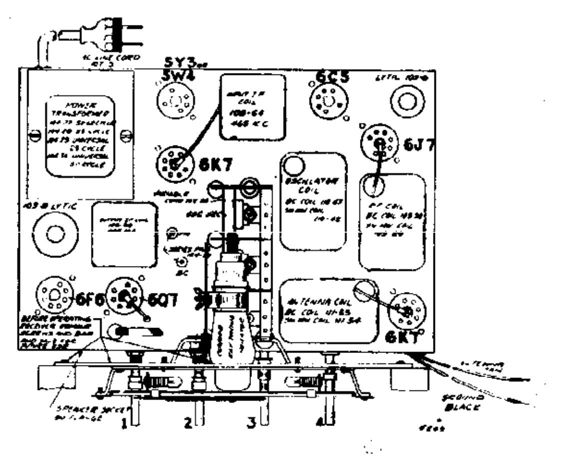


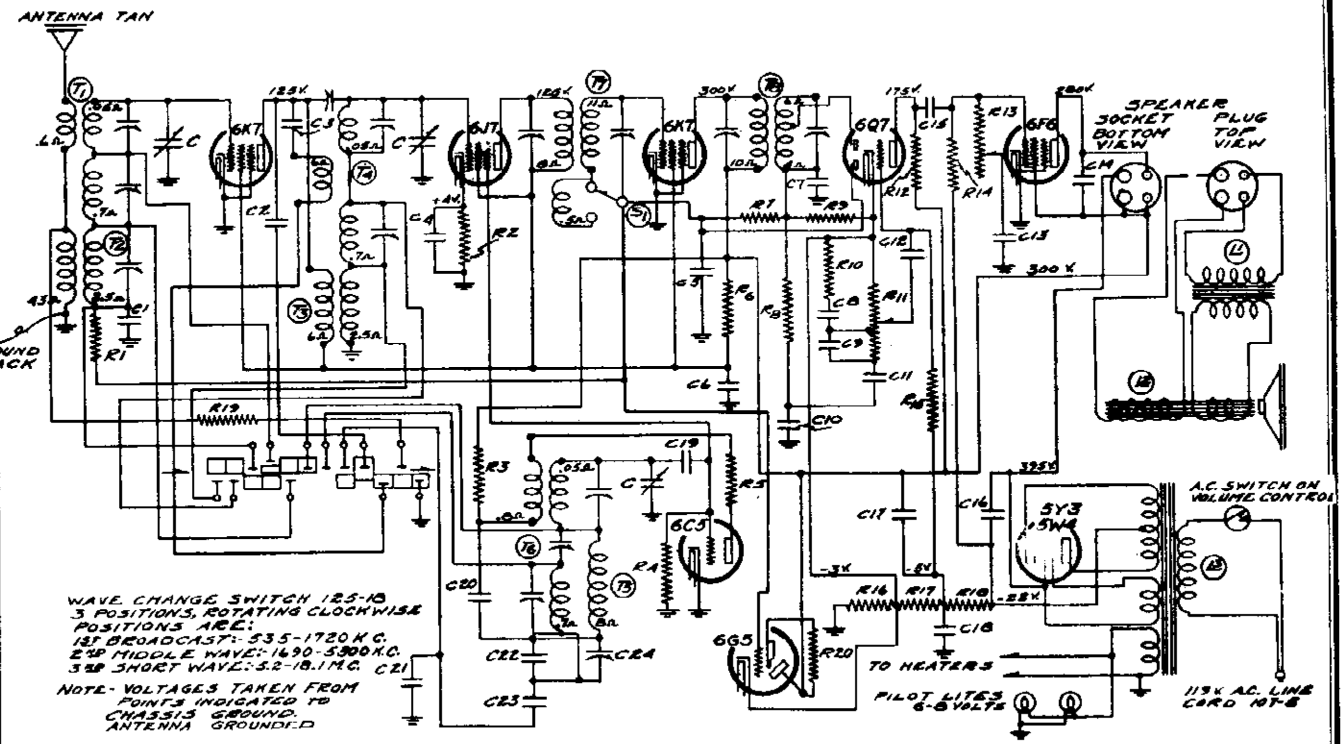
FIG. 1—BOTTOM VIEW SHOWING TRIMMERS



MODEL 878, Series B

BELMONT RADIO CORP.

Schematic, Voltage Socket, Trimmers, Parts



The tube complement of this chassis is as follows:

1—Type 6K7 Remote cut-off pentode R.F. amplifier
1—Type 6J7—pentode first detector.
1—Type 6C5 Oscillator
1—Type 6K7 Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6Q7 duplex diode pentode second detector, A.V.C. audio.
1—Type 6F6—pentode output amplifier.
1—Type 5Y3 or 5W4—high vacuum rectifier.
1—Type 6G5 Cathode Ray Tuning Indicator.

No.	Part No.	Description
		RESISTORS
R1	130-20	100M Ohms—1/3 W.—20%—50 V.—Car.
R2	130-43	2500 Ohms—1/3 W.—20%—20 V.—Car.
R3	130-77	10M Ohms—1 W.—20%—100V.—Car.
R4	130-12	50M Ohms—1/3 W.—20%—20 V.—Car.
R5	130-60	100 Ohms—1/3 W.—20%—10 V.—Car.
R6	130-88	10M Ohms—2 W.—20%—Wire Wound
R7	130-38	2 meg Ohms—1/3 W.—20%—100 V.—Car.
R8	130-20	100M Ohms—1/3 W.—20%—50 V.—Car.
R9	130-11	250M Ohms—1/3 W.—20%—50 V.—Car.
R10	130-22	5000 Ohms 1/3 W. 20%—10 V.—Car.
R11	101-47	1 meg Ohm—Vol. Con. with AC Switch
R12	130-20	100M Ohms—1/3 W.—20%—50 V.—Car.
R13	101-38	100M Ohms—Tone Con with Fid. Switch.
R14	130-3	500M Ohms—1/3 W.—20%—100 V.—Car.
R15	130-38	2 meg Ohm—1/3W.—20%—100 V.—Car.
R16	106-27	38 Ohms—10% Muter Resistor
R17	106-27	28 Ohms—10% Muter Resistor
R18	106-27	220 Ohms—10% Muter Resistor
R19	130-27	50 Ohms—1/3 Watt—20% Car.
		Note: R16, R17, R18 in one unit—part No. 106-27
R20	130-110	1 Megohm—1/10 W.—10%—100V.—Car.
		CONDENSERS
C	102-35	One sec. of 3 gang var. condenser
C1	100-9	.05—200 Volt—25%
C2	129-59	.0003 Mica—MT—0—5%
C3	129-39	.00005 Mica—MT—0—20%
C4	100-9	.05—200 Volt—25%
C5	100-9	.05—200 Volt—25%
C6	100-41	.25—400 Volt—20%
C7	129-5	.0001 Mica—MT—0—20%
C8	100-9	.05—200 Volt—25%
C9	129-2	.0005 Mica—MT—0—20%
C10	129-60	.00015 Mica—MT—0—20%
C11	100-22	.05—200 Volt—25%
C12	100-11	.01—400 Volt—25%
C13	100-26	.02—400 Volt—25%
C14	100-32	.0005—1000 Volt—20%
C15	100-11	.01—400 Volt—25%
C16	103-8	14 mfd.—400 Volt Electrolytic
C17	103-6	8 mfd.—350 Volt Electrolytic
C18	100-46	.25—200 Volt—20%
C19	129-31	.000025 Mica—MT—0—15%
C20	100-13	.05—400 Volt—25%
C21	129-69	.0023 Mica—MW—W—2½%
C22	129-57	.0005 Mica—MT—0—5%
C23	129-55	.0034 Mica—MW—W—2½%
C24	124-34	Padder, working capacity, 200 mmf.
		PARTS
T1	111-54	M.W. and S.W. Antenna Coil Assem.
T2	111-55	Broadcast Antenna Coil Assem.
T3	109-30	Broadcast R.F. Coil Assem.
T4	109-29	M.W. and S.W. R.F. Coil Assem.
T5	110-43	Broadcast Osc Coil Assem.
T6	110-42	M.W. and S.W. Osc. Coil Assem.
T7	108-64	Input I.F. Coil—465 Kc.
T8	108-63	Output I.F. Coil—465 Kc.
L1		Output Transformer (on speaker)
L2	114-36	8" Speaker (Field Resist. 1250 Ohms)
L3	104-27	Power Transformer (50-60 Cycle)
S	125-18	Band Switch
S1	101-38	Fidelity Switch on Tone Control

I. F. FREQUENCY 465 K. C.

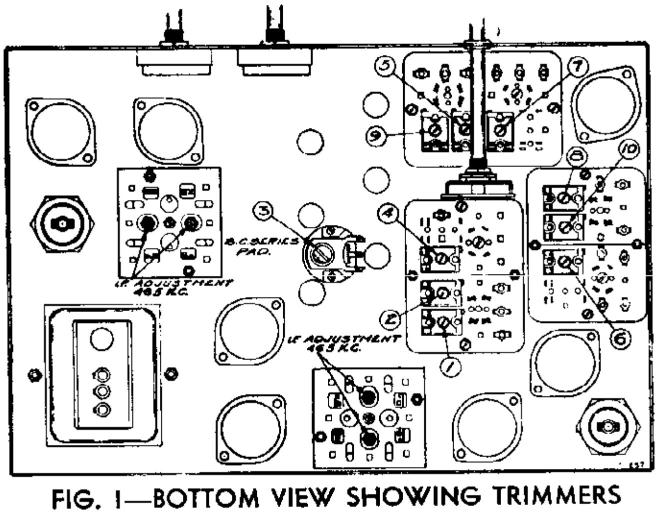
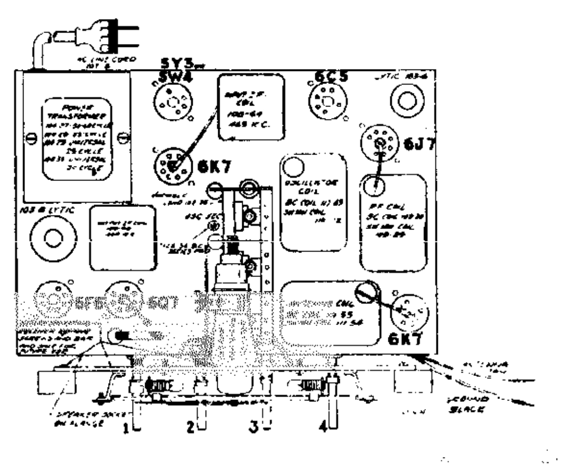


FIG. 1—BOTTOM VIEW SHOWING TRIMMERS



BELMONT RADIO CORP.

SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 119 volts on the primary of the power transformer.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS

Dummy Antennas

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Intermediate and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and screen terminals of the type 6F6 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

CAUTION:

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the four bolts by which it is fastened.

ALIGNING I.F. TRANSFORMERS (465 K.C.)

Part No. 108-63 Output I.F. Transformer
Part No. 108-64 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the underside of chassis (see bottom view, Fig. 1).

1. With volume control full on, (the extreme right of its rotation), the wave changing switch in the broadcast position, (extreme left of its rotation), the tone control on "Hi" part of the sharp position (as much right rotation as possible without operating the Hi Fidelity switch), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   - (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, located between the two I.F. transformers, and adjust the output I.F. transformer 108-63 to resonance.
   - (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6J7 and adjust input I.F. transformer (108-64) to resonance.
   - (c) With oscillator still connected to 6J7, re-adjust output I.F. transformer if necessary.

ALIGNMENT PROCEDURE

The following adjustments to be made after the I.F.'s have been aligned as explained above.

BROADCAST BAND ALIGNMENT:

1. With band changing switch in the broadcast position, extreme left of its rotation, and with external oscillator set at 600 kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:

FOR SERIES "A"

(a) Adjust broadcast series pad (adjustment number 5) to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained. Note: This adjustment is accessible from the top of the chassis and is located between the variable condenser and the 108-63 output I.F. transformer. See top view, Fig. 3.

FOR SERIES "B"

(a) Adjust broadcast series pad (adjustment number 3) to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained. Note: This adjustment is accessible from the top of the chassis and is located between the variable condenser and the 108-63 output I.F. transformer. See top view, Fig. 3.

(b) Re-set external oscillator to 1400 K.C., move dial pointer to 1400 K.C. and adjust oscillator (adjustment number 4), R.F. (adjustment number 6) and antenna (adjustment number 7) to resonance. See bottom view for location of these adjustments, Fig. 1.

(c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

NOTE: IT IS EXTREMELY NECESSARY IN MAKING ALL OF THESE ADJUSTMENTS THAT THE FUNDAMENTAL OSCILLATOR SIGNAL BE TUNED IN AND NOT THE IMAGE FREQUENCY WHICH WILL FALL BELOW THE FUNDAMENTAL.

SHORT WAVE BAND ALIGNMENT:

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   - (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 1), short wave R.F. (adjustment number 8) and short wave antenna (adjustment number 9) to resonance.
   - (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check for sensitivity.

MIDDLE WAVE BAND ALIGNMENT:

FOR SERIES "A"

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 1800 K.C. and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   - (a) Rotate variable condenser to approximately 1800 K.C., tune in oscillator signal and adjust M.W. series pad (adjustment number 3) (see top view) to resonance. Slowly rock condenser to and fro while making this adjustment to be sure maximum output is obtained.
   - (b) Set external oscillator at 5 M.C., rotate condenser, pick up signal and adjust intermediate wave R.F. (adjustment number 10), intermediate wave antenna (adjustment number 11) and intermediate wave oscillator (adjustment number 2) to resonance.

FOR SERIES "B"

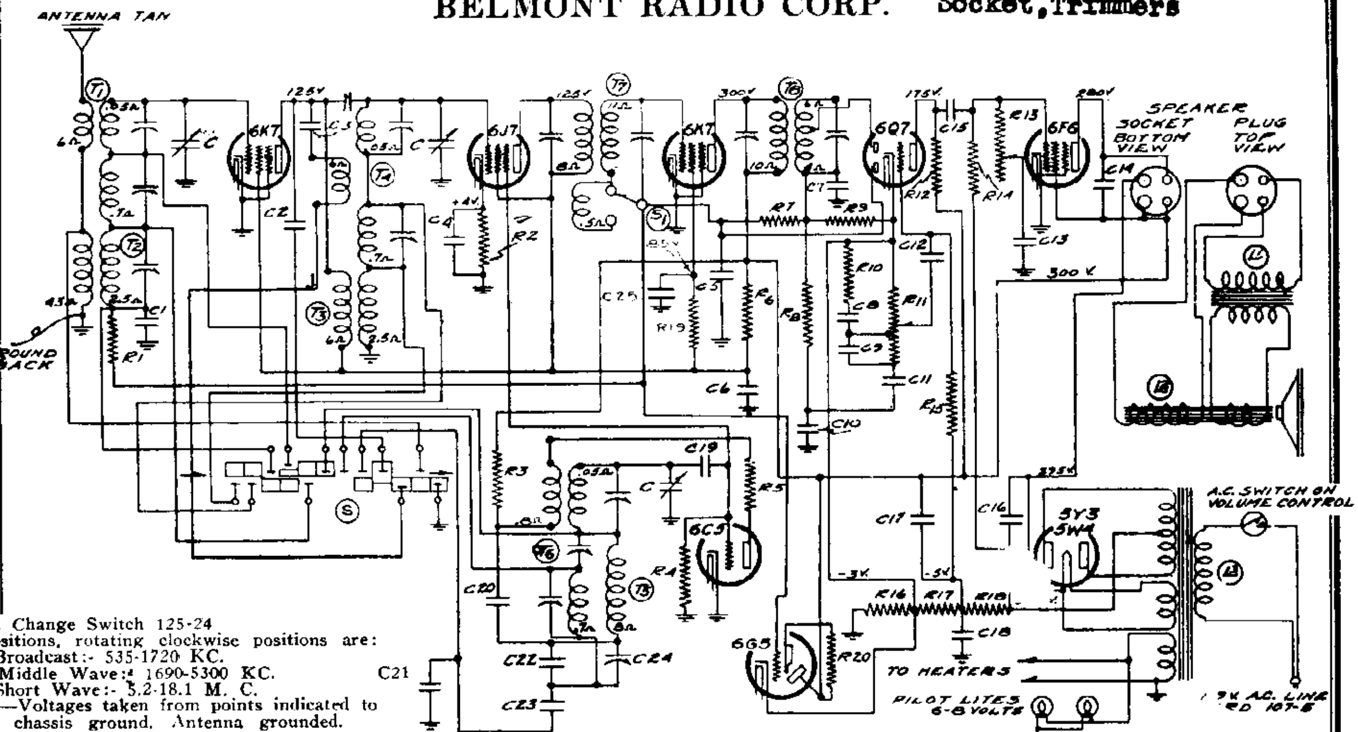
1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5 M.C. and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   - (a) Rotate condenser, pick up signal and adjust middle wave R.F. (adjustment number 10), middle wave antenna (adjustment number 5) and middle wave oscillator (adjustment number 2) to resonance.

NOTE— Re-check broadcast alignment and if it is found necessary to re-adjust either R.F. or antenna trimmers, repeat the 17 M.C. short wave and 5 M.C. middle wave adjustments.

MODEL 879, Series A

BELMONT RADIO CORP.

Schematic, Voltage, Parts Socket, Trimmers



Band Change Switch 125-24
3 positions, rotating clockwise positions are:
1st Broadcast:- 535-1720 KC.
2nd Middle Wave: 1690-5300 KC.
3rd Short Wave:- 5.2-18.1 M. C.
Note—Voltages taken from points indicated to chassis ground. Antenna grounded.

FOR ALIGNMENT, SEE INDEX

No.	Part No.	Description RESISTORS
R1	130-20	100M Ohms—1/3 W.—20%—50 V.—Car.
R2	130-43	2500 Ohms 1/3 W. 20%—20 V.—Car.
R3	130-77	10M Ohms—1 W.—20%—100V.—Car.
R4	130-12	50M Ohms—1/3 W.—20%—20 V.—Car.
R5	130-60	100 Ohms—1/3 W.—20% 10 V. Car.
R6	130-88	10M Ohms—2 W.—20%—Wire Wound
R7	130-38	2 meg Ohms—1/3 W.—20%—100 V.—Car.
R8	130-20	100M Ohms—1/3 W.—20%—50 V.—Car.
R9	130-11	250M Ohms—1/3 W.—20%—50 V.—Car.
R10	130-22	5000 Ohms—1/3 W.—20%—10 V.—Car.
R11	101-60	1 meg Ohm—Vol. Con. with AC Switch
R12	130-20	100M Ohms—1/3 W.—20%—50 V.—Car.
R13	101-61	100M Ohms Tone Con. with Fid. Switch
R14	130-3	500M Ohms—1/3 W.—20%—100 V.—Car.
R15	130-38	2 meg Ohm—1/3W.—20%—100 V.—Car.
R16	106-27	38 Ohms—10% Muter Resistor
R17	106-27	28 Ohms—10% Muter Resistor
R18	106-27	220 Ohms—10% Muter Resistor
R19	130-76	30M Ohms—⅓ W.—20%—10V.—Carbon
		Note: R16, R17, R18 in one unit—part No. 106-27
R20	130-110	1 Megohm—1/10 W.—10%—100V.—Car.

No.	Part No.	CONDENSERS
C	102-37	One sec. of 3 gang var. condenser
C1	100-9	.05—200 Volt—25%
C2	129-59	.0003 Mica—MT—0—5%
C3	129-39	.00005 Mica—MT—0—20%
C4	100-9	.05—200 Volt—25%
C5	100-9	.05—200 Volt—25%
C6	100-41	.25—400 Volt—20%
C7	129-5	.0001 Mica—MT—0—20%
C8	100-9	.05—200 Volt—25%
C9	129-2	.0005 Mica—MT—0—20%
C10	129-60	.00015 Mica—MT—0—20%
C11	100-22	.05—200 Volt—25%
C12	100-11	.01—400 Volt—25%
C13	100-26	.02—400 Volt—25%
C14	100-32	.0005—1000 Volt—20%
C15	100-11	.01—400 Volt—25%
C16	103-8	14 mfd.—400 Volt Electrolytic
C17	103-6	8 mfd.—350 Volt Electrolytic
C18	100-46	.25—200 Volt—20%
C19	129-31	.000025 Mica—MT—0—15%
C20	100-13	.05—400 Volt—25%
C21	129-69	.0023 Mica—MW—W—2½%
C22	129-57	.0005 Mica—MT—0—5%
C23	129-55	.0034 Mica—MW—W—2½%
C24	124-34	Padder, working capacity, 200 mm.
C25	100-11	.01 x 400 Volt—25%

No.	Part No.	PARTS
T1	111-54	M.W. and S.W. Antenna Coil Assem.
T2	111-55	Broadcast Antenna Coil Assem.
T3	109-30	Broadcast R.F. Coil Assem.
T4	109-29	M.W. and S.W. R.F. Coil Assem.
T5	110-43	Broadcast Osc Coil Assem.
T6	110-42	M.W. and S.W. Osc. Coil Assem.
T7	108-64	Input I.F. Coil—465 Kc.
T8	108-63	Output I.F. Coil—465 Kc.
L1		Output Transformer (on speaker)
L2	114-36	8" Speaker (Field Resist. 1250 Ohms)
L3	104-27	Power Transformer (50-60 Cycle)
S	125-24	Band Switch
S1	101-61	Fidelity Switch on Tone Control

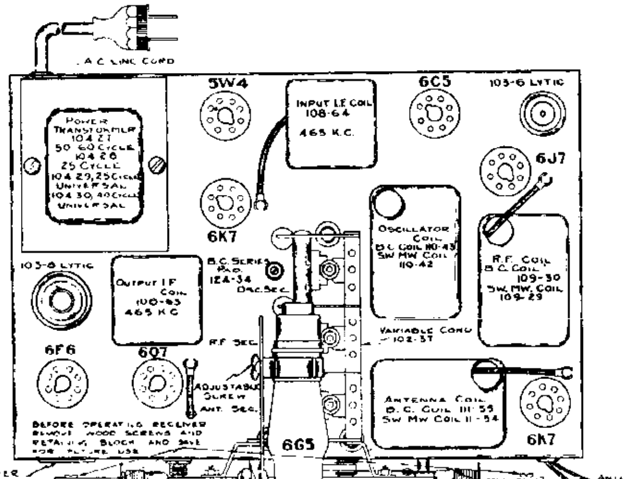
TUNING RANGE—

Standard Broadcast Band 535-1720 Kilocycles.

Middle Wave Band 1690-5300 Kilocycles

Short Wave Band 5.2-18.1 Megacycles.

I. F. FREQUENCY 465 K. C.



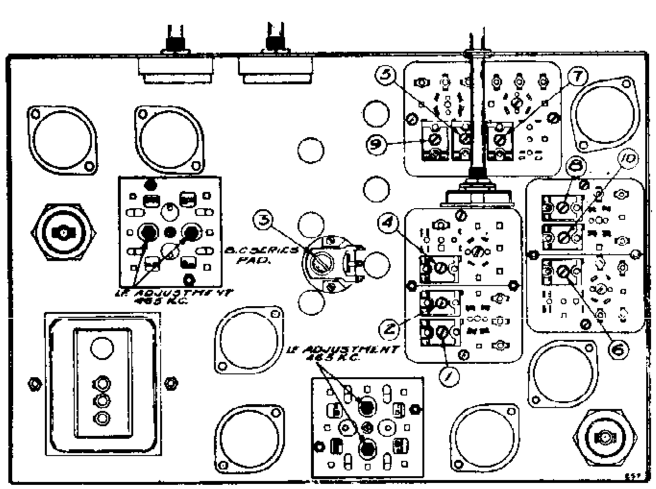
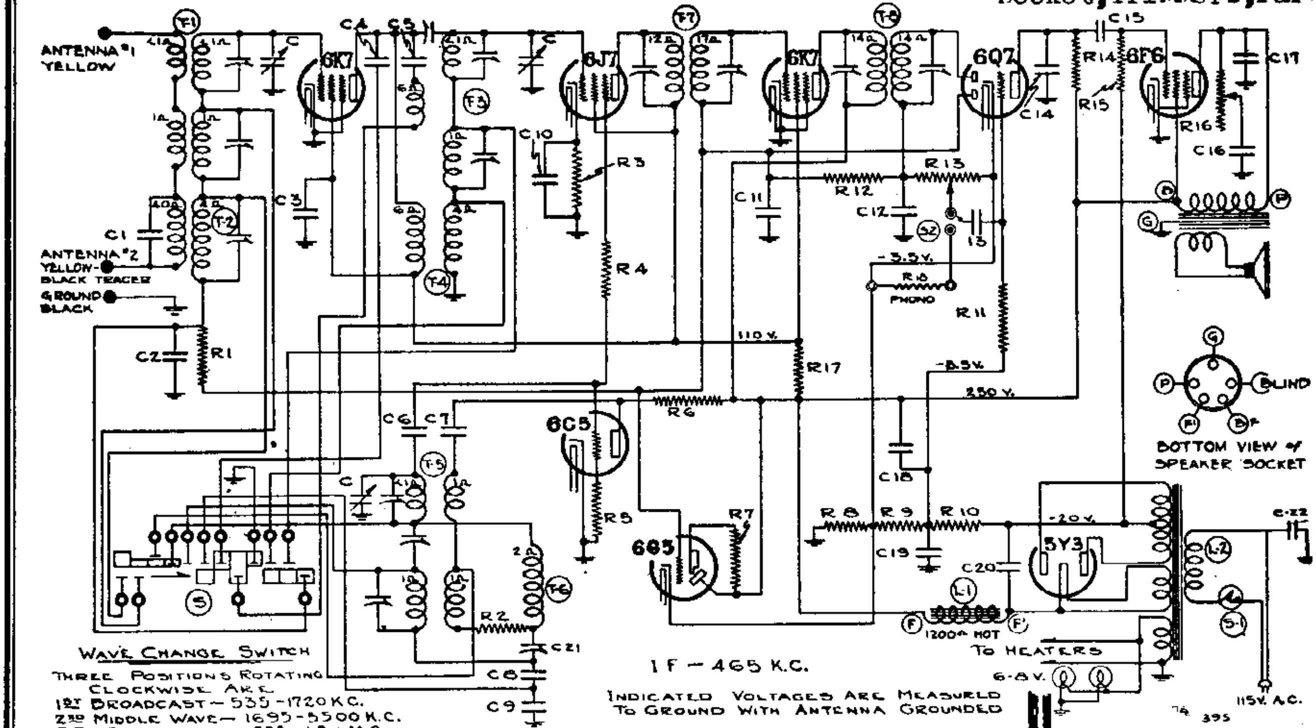


FIG. 1—BOTTOM VIEW SHOWING TRIMMERS

MODEL 890, Series A
Schematic, Voltage
Socket, Trimmers, Part

BELMONT RADIO CORP.



BAND	FREQUENCY RANGE
Broadcast	535 to 1720 K.C. (Kilocycles)
Middle Wave	1695 to 5500 K.C. (Kilocycles)
Short Wave	5.35 to 18.1 M.C. (Megacycles)

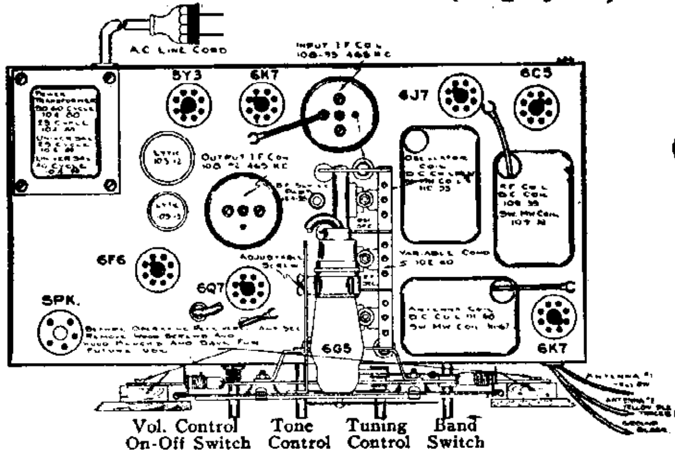


FIG. 1—TOP VIEW

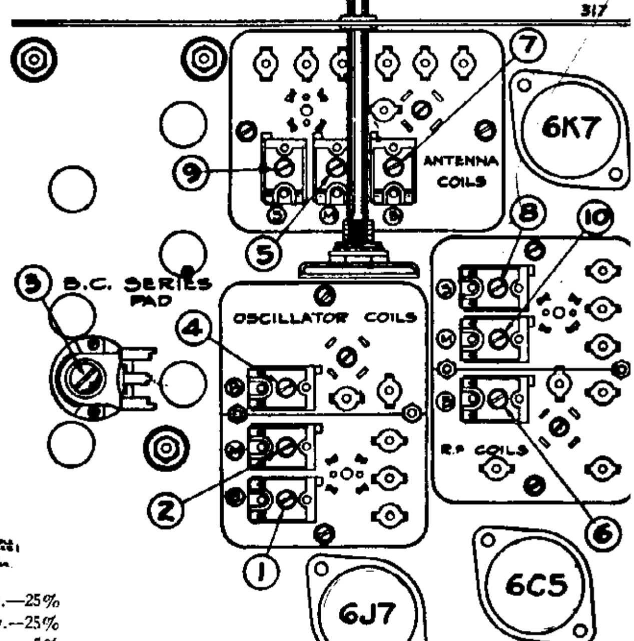


FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS.

RESISTORS

R1	130-103	100M ohm—1/3 w.—10%
R2	130-105	150 ohm—1/3 w.—20%
R3	130-159	2500 ohm—1/3 w.—10%
R4	130-60	150 ohm — 1/3 w. 20%
R5	130-52	50M ohm—1/3 w.—20%
R6	130-77	10M ohm—1 w.—20%
R7	130-110	1 megohm—1/10 w.—10%
R8	106-33	55 ohm—Muter (ONE UNIT)
R9	106-33	30 ohm—Muter (ONE UNIT)
R10	106-33	240 ohm—Muter (ONE UNIT)
R11	130-4	3 megohm—1/3 w.—20%
R12	130-38	2 megohm—1/3 w.—20%
R13	101-65	500M ohm—Volume Control
R14	130-103	100M ohm—1/3 w.—10%
R15	130-102	500M ohm—1/3 w.—10%
R16	101-53	50M ohm—Tone Control
R17	130-160	10M ohm—2 w.—Wire Wound
R18	130-103	100M ohm—1/3 w—10%
C1	129-40	.0001 Mica 10%
C2	100-9	.05x200 v.—25%
C3	100-53	.25x400 v.—25%
C4	129-59	.0003 Mica—5%
C5	129-38	.00005 Mica—10%
C6	129-67	.00004 Mica 10%
C7	100-25	.002x600 v.—25%
C8	129-70	.004 Mica—2½%
C9	129-71	.002 Mica—2½%
C10	100-20	.1x200 v.—25%
C11	100-26	.02x400 v.—25%
C12	129-40	.0001 Mica—10%
C13	100-11	.01x400 v.—25%
C14	129-2	.0005 Mica—20%
C15	100-11	.01x400 v.—25%
C16	100-27	.025x600 v.—25%
C17	100-25	.002x600 v.—25%
C18	103-13	8.0x400 v.—Lytic
C19	100-20	.1x200 v.—25%
C20	103-12	8.0x275 v.—Lytic
C21	124-35	Series Pad Regulating
C22	100-61	.02x600 ±20%
C	102-40	Section of three gang condenser
T1	111-67	MW-SW Antenna Coil Assembly
T2	111-68	Broadcast Antenna Coil Assembly
T3	109-32	MW-SW R. F. Coil Assembly
T4	109-33	B. C.-R. F. Coil Assembly
T5	110-53	M. W.-S. W. Oscillator Coil Assembl
T6	110-52	B. C. Osc. Coil Assembly
T7	108-93	Input I. F. Coil 465 kc.
T8	108-92	Output I. F. Coil 465 kc.
L1	114-57	Speaker 8"
L1	114-65	Speaker 10"—field Resistance—1200 o
L2	104-80	Power Transformer—50-60 cycles
S	125-25	Band Switch
S1	101-65	On-off switch on Volume Control
S2	125-22	Phono Switch

MODEL 890, Series A
Alignment

BELMONT RADIO CORP.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and screen terminals of the type 6F6 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-92 Output I.F. Transformer
Part No. 108-93 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-92) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap of 6J7 and adjust input I.F. transformer (No. 108-93) to resonance.

BROADCAST BAND ALIGNMENT:

535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground leads make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 4; see bottom view of coil assembly, Fig. 3)
   (b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast R.F. trimmer (adjustment number 6) and broadcast antenna trimmer (adjustment number 7), to resonance.
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment number 3), to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1400, 1000, and 600 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

SHORT WAVE BAND ALIGNMENT:

5.35 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the antenna and ground leads, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator trimmer (adjustment number 1) to resonance.
   (b) Adjust short wave R.F. trimmer (adjustment number 8), and short wave antenna trimmer (adjustment number 9), to resonance.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 6 megacycles for band coverage and sensitivity.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental on the receiver dial. As an example of this a fundamental 17 megacycle signal can be tuned in not only at 17 on the dial but also at approximately 16.1 megacycles.

MIDDLE WAVE BAND ALIGNMENT:

1695 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5 megacycles and connected in series with "Dummy 3" to the antenna and ground leads make the following adjustments:
   (a) Move dial pointer to 5 megacycles and adjust middle wave oscillator trimmer (adjustment number 2) to resonance.
   (b) Adjust middle wave R.F. trimmer (adjustment number 10), and middle wave antenna trimmer (adjustment number 5), to resonance.
   (c) Re-set external oscillator and check sensitivity at 1800 kilocycles.
   (d) Recheck broadcast band alignment.

ANTENNA AND GROUND LEADS:

You will notice three wires coming out of the back of the chassis, — the **yellow** wire and the **yellow with black tracer** wire are used for doublet antenna connections. The **black** wire is the ground connection.

For conventional types of antennas connect the **yellow** wire to the antenna lead and the **yellow with black tracer** and the **black** wire together to the ground lead.

When a doublet antenna is used connect the **yellow** wire and **the yellow with black tracer** wire to the doublet antenna and the solid **black** wire to the ground lead. (See Fig. 1—Top View, page 2).

ANTENNA:

For the best results an outside antenna approximately 75-100 feet long including the lead-in should be used. It should be erected as high as possible and as far from surrounding objects as practical. Both the antenna and lead-in should be placed at right angles to street car lines and incoming power lines and as far from any electrical apparatus which may be in the vicinity (such as elevator motors) as practical.

An inside antenna is not recommended, although it occasionally may serve as a temporary installation especially near powerful broadcasting stations. This type of antenna, however, will not be satisfactory in buildings of steel construction.

Reception on the short wave band can be sometimes improved by means of an approved doublet antenna.

DESCRIPTION:

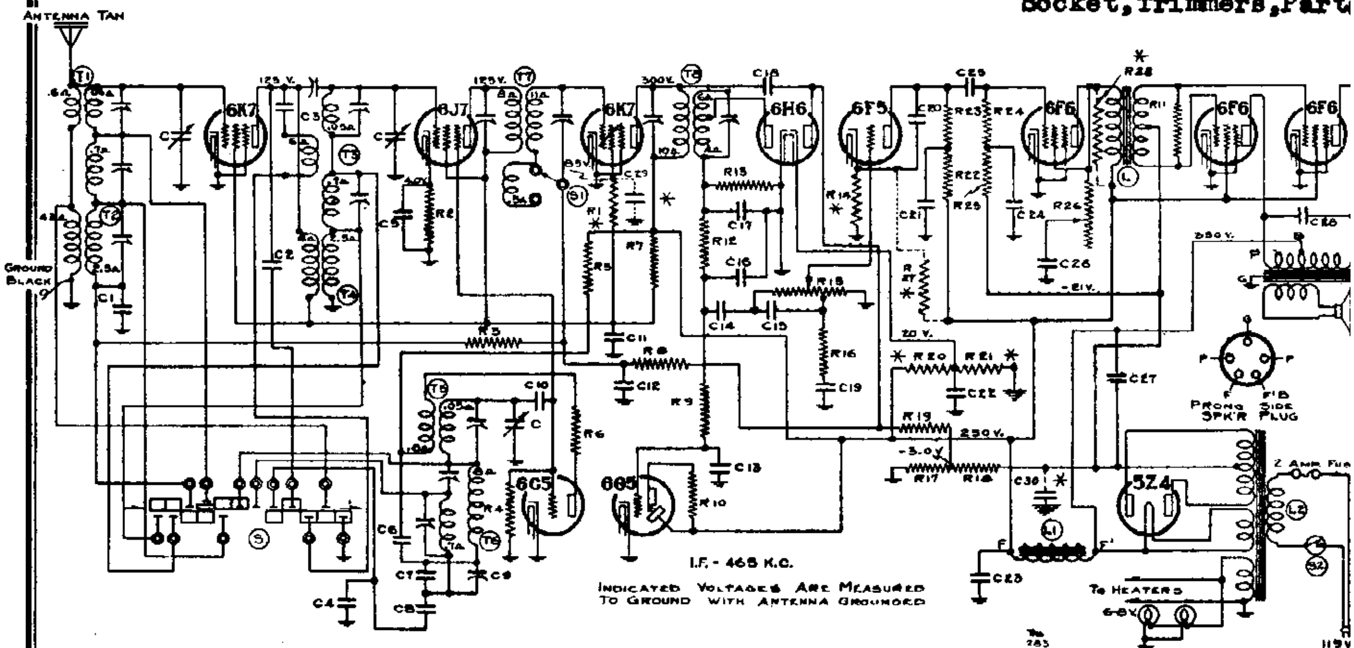
The tube complement of this chassis consists of the following metal and octal base glass tubes which are interchangeable with metal tubes:

1—Type 6K7 Remote cut-off pentode R.F. amplifier.
1—Type 6J7—pentode first detector.
1—Type 6C5 Oscillator.
1—Type 6K7 Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6Q7G duplex diode triode second detector, A.V.C. and audio.
1—Type 6F6G—pentode output amplifier.
1—Type 5Y3G or 5W4—high vacuum rectifier.
1—Type 6G5 Cathode ray tuning indicator.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 110, 130, and 230 volts.

MODELS 1170,1172
Schematic,Voltage
Socket,Trimmers,Part

BELMONT RADIO CORP.



BAND CHANGE SWITCH
THREE POSITIONS, ROTATING
CLOCKWISE ARE:
1st BROADCAST: 535-1720 K.C.
2nd MIDDLE WAVE: 1690-5300 K.C.
3rd SHORT WAVE: 5.2-18.1 M.C.

TUNING RANGE—

Standard Broadcast Band
535-1720 Kilocycles.

Middle Wave Band
1690-5300 Kilocycles
Short Wave Band
5.2-18.1 Megacycles.

No.	Part No.	Description
		RESISTORS
*R1	130-76	30M Ohm—⅓ Watt—20%—Carbon
R2	130-129	2500 Ohm—⅓ Watt—10%—Carbon
R3	130-20	100M Ohm—⅓ Watt—20%—Carbon
R4	130-12	50M Ohm—⅓ Watt—20%—Carbon
R5	130-77	10M Ohm—1 Watt 20%—Carbon
R6	130-60	100 Ohm—⅓ Watt—20%—Carbon
R7	130-88	10M Ohm—2 Watt—20%—Wire Wound
R8	130-19	1 meg Ohm—⅓ Watt—20%—Carbon
R9	130-4	3 meg Ohm—⅓ Watt—20%—Carbon
R10	130-110	1 meg Ohm—1/10 Watt—10%—Carbon
R11	130-21	20M Ohm—⅓ Watt—20%—Carbon
R12	130-20	100M Ohm—⅓ Watt—20%—Carbon
R13	130-20	100M Ohm—⅓ Watt—20%—Carbon
*R14	130-70	500 Ohm—⅓ Watt—10%—Carbon
R15	101-47	1 meg Ohm—Volume Control
R16	130-22	5M Ohm—⅓ Watt—20%—Carbon
R17	106-31	30 Ohm—Muter
R18	106-31	175 Ohm—Muter
R19	130-3	500M Ohm—⅓ Watt—20%—Carbon
*R20	130-130	100M Ohm—½ Watt—10%—Carbon
*R21	130-82	10M Ohm—⅓ Watt—10%—Carbon
R22	130-20	100M Ohm—⅓ Watt 20%—Carbon
R23	130-20	100M Ohm—⅓ Watt—20%—Carbon
R24	130-45	250M Ohm—⅓ Watt—20%—Carbon
R25	130-45	250M Ohm—⅓ Watt—20%—Carbon
R26	101-40	5000 Ohm Tone Control
*R27	130-130	100M Ohm—½ Watt—10%—Carbon
*R28	130-131	20M Ohm—½ Watt—10%—Carbon

NOTE: R17 and R18 in one Unit—No. 106-31.

CONDENSERS

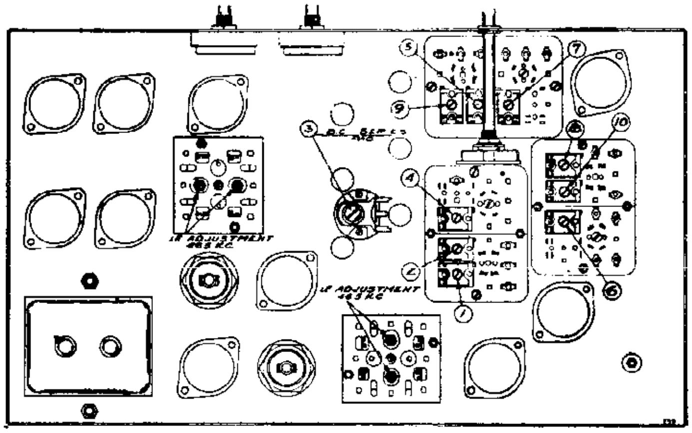
C1	100-9	.05 x 200 Volt—25%
C2	129-59	.0003 Mica—5%—MT—0
C3	129-39	.00005 Mica—20%—MT—0
C4	129-69	.0023 Mica—2½%—MT—0
C5	100-9	.05 x 200 Volt—25%
C6	100-13	.05 x 400 Volt—25%
C7	129-57	.0005 Mica—5%—MT—0
C8	129-55	.0034 Mica—2½%—MT—0
C9	124-34	200 mmf. Working cap. adjustable Pad
C10	129-31	.000025 Mica—15%—MT—0
C11	100-41	.25 x 400 Volt—20%
C12	100-9	.05 x 200 Volt—25%
C13	100-11	.01 x 400 Volt—25%
C14	100-22	.05 x 200 Volt—25%
C15	129-12	.00025 Mica—20%—MT—0
C16	129-60	.00015 Mica—20%—MT—0
C17	129-60	.00015 Mica—20%—MT—0
C18	129-3	.00002 Mica—20%—MT—0
C19	100-9	.05 x 200 Volt—25%
C20	129-5	.0001 Mica—20%—MT—0
C21	100-20	.1 x 200 Volt—25%
C22	100-19	.006 x 600 Volt—25%
C23	103-8	14 mfd.—400 Volt—Electrolytic
C24	100-20	.1 x 200 Volt—25%
C25	100-13	.05 x 400 Volt—25%
C26	100-45	.1 x 600 Volt—25%
C27	103-10	30 mfd. x 450 Volt—Electrolytic
C28	100-32	.0005 x 1000 Volts—20%
*C29	100-11	.01 x 400 Volts—25%
*C30	100-20	.1 x 200 Volt—25%

PARTS

C	102-35	One section of three gang condenser
T1	111-54	MW and SW Antenna Coil Assem.
T2	111-55	Broadcast Antenna Coil Assem.
T3	109-29	MW and SW R.F. Coil Assem.
T4	109-30	Broadcast R.F. Coil
T5	110-42	MW and SW Osc. Coil Assem.
T6	110-43	Broadcast Osc. Coil Assem.
T7	108-64	Input I.F. Coil—465 Kc.
T8	108-63	Output I.F. Coil—465 Kc.
L	105-33	Audio Transformer
L1	114-47C	Speaker (Field Resist. 1225 ohm) Ho
L2	104-72	Power Transformer (50-60 Cycle)
S	125-18	Band Switch
S1	101-40	Fidelity Switch on Tone Control
S2	101-47	On-Off Switch on Volume Control

NOTE: Resistors and Condensers which are pre fixed with an asterisk (*) on the circuit diagran and parts list were added or the values change during production to meet certain conditions.

Resistors R1, R27, R28, and Condensers C29, C3 were added to correct certain variances of tub characteristics. Resistors R14, R20, R21 the value were changed. In some chassis the values of thes resistors are as follows:
R14—2500 Ohm—⅓ Watt
R20—200M Ohm—⅓ Watt
R21—20M Ohm—⅓ Watt
Present values of these resistors are:
R14—500 Ohm—⅓ Watt
R20—100M Ohm—½ Watt
R21—10M Ohm—⅓ Watt



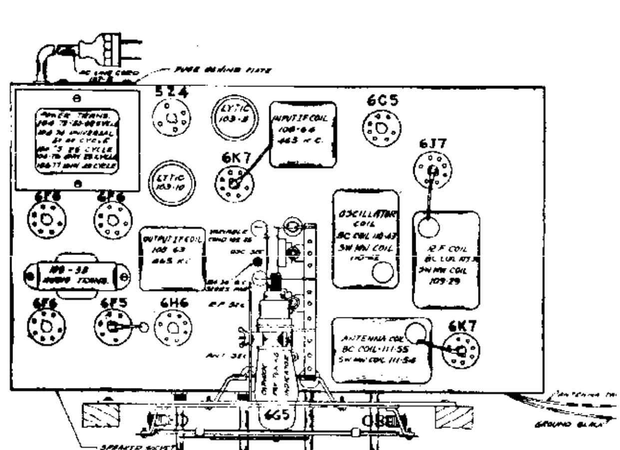


FIG. 1—BOTTOM VIEW SHOWING TRIMMERS

MODELS 1170,1172
Alignment

BELMONT RADIO CORP.

DESCRIPTION

The tube complement of this chassis is as follows:
1—Type 6K7 Remote cut-off pentode R.F. amplifier
1—Type 6J7 Pentode first detector
1—Type 6C5 Oscillator
1—Type 6K7 Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6H6 Duplex diode second detector and A.V.C.
1—Type 6F5 First audio amplifier
1—Type 6F6 Triode driver stage
2—Type 6F6 Class AB Output pentodes in push-pull
1—Type 5Z4 High vacuum rectifier
1—Type 6G5 Cathode Ray Tuning Indicator.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 108, 127, 150, 225, and 260 volts, (see instructions) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

SERVICE NOTES

NOTE: DeLuxe Model 1172 differs only from the Model 1170 in that dual speakers and a de luxe console cabinet are used. Both chasses are identical and the circuit diagram, the alignment procedure and the parts list contained in this manual apply to both models.

Attention is called to the circuit diagram contained in this manual. Several minor changes were made during production of these models to correct certain conditions. These changes are shown on the circuit diagram in dotted lines and explained in detail. Some of the chassis were equipped with 5Z3 rectifier tubes in place of the 5Z4 and do not have a fuse assembly in the power line.

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 115 volts on the primary of the power transformer.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

This chassis is protected against damage from faulty tubes or abnormal line conditions by a fuse in the primary circuit.

If when set is turned on pilot lights do not light, look for a blown fuse.

This fuse is made accessible for replacement by removing fuse cover located on back flange of chassis, replace only with a 2 ampere fuse. If replacement fuse blows out, check tubes, (particularly 5Z4 rectifier) circuit, repair or replace defective tubes or parts.

NEVER ATTEMPT TO REPLACE FUSE WITHOUT FIRST DISCONNECTING POWER.

NEVER REPLACE WITH FUSE OTHER THAN 2 AMPERE RATING.

ALIGNING INSTRUCTIONS

Dummy Antennas

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Intermediate and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

ALIGNING I.F. TRANSFORMERS (465 K.C.)

Part No. 108-63 Output I.F. Transformer
Part No. 108-64 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the underside of chassis (see bottom view Fig. 1).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), the tone control on "Hi" part of the sharp position (as much right rotation as possible without operating the Hi Fidelity switch), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, located between the two I.F. transformers, and adjust the output I.F. transformer 108-63 to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6J7 and adjust input I.F. transformer (108-64) to resonance.
   (c) With oscillator still connected to 6J7, re-adjust output I.F. transformer if necessary.

ALIGNMENT PROCEDURE

The following adjustments to be made after the I.F.'s have been aligned as explained above.

BROADCAST BAND ALIGNMENT:

1. With band changing switch in the broadcast position, extreme left of its rotation, and with external oscillator set at 600 kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:
   (a) Adjust broadcast series pad (adjustment number 3) to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained. Note: This adjustment is accessible from the top of the chassis and is located between the variable condenser and the 108-63 output I.F. transformer. See top view, Fig. 3.
   (b) Re-set external oscillator to 1400 K.C., move dial pointer to 1400 K.C. and adjust oscillator (adjustment number 4), R.F. (adjustment number 6) and antenna (adjustment number 7) to resonance. See bottom view for location of these adjustments, Fig. 1.
   (c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

NOTE: IT IS EXTREMELY NECESSARY IN MAKING ALL OF THESE ADJUSTMENTS THAT THE FUNDAMENTAL OSCILLATOR SIGNAL BE TUNED IN AND NOT THE IMAGE FREQUENCY WHICH WILL FALL BELOW THE FUNDAMENTAL.

SHORT WAVE BAND ALIGNMENT:

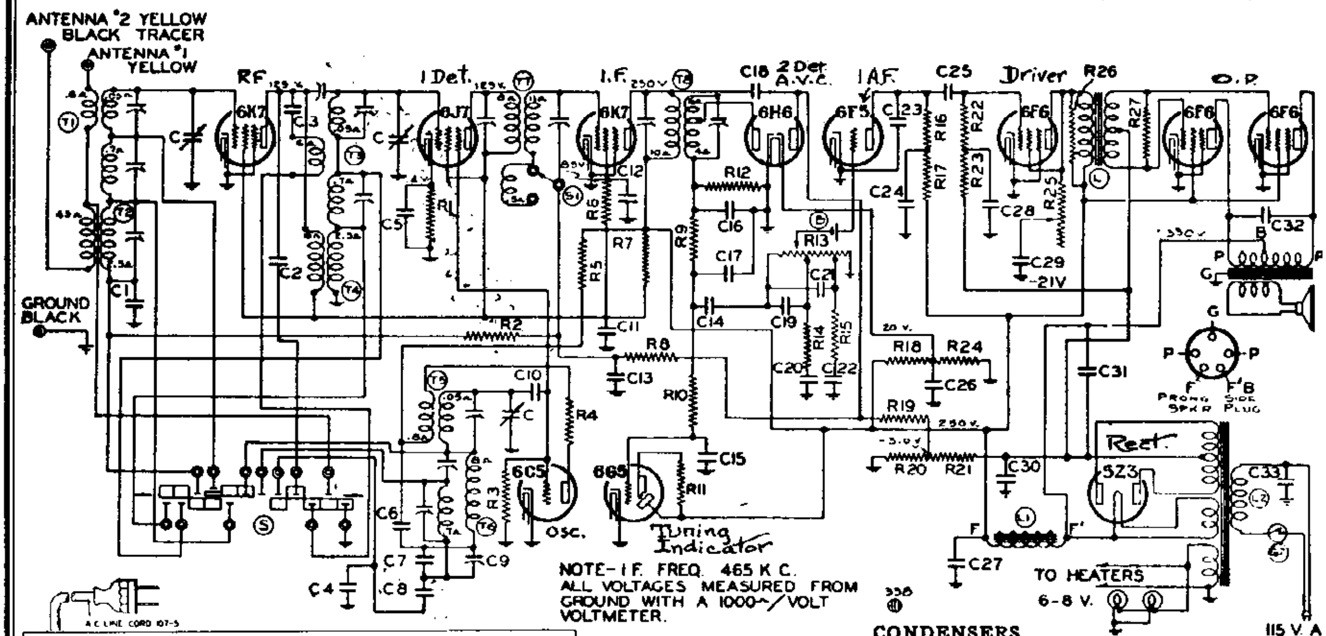
1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 1), short wave R.F. (adjustment number 8) and short wave antenna (adjustment number 9) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check for sensitivity.

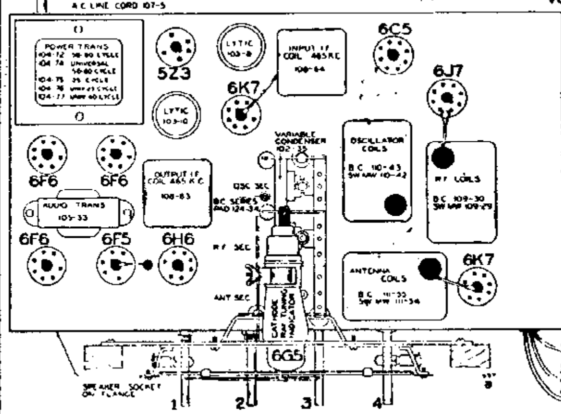
MIDDLE WAVE BAND ALIGNMENT:

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5 M.C. and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Rotate condenser, pick up signal and adjust middle wave R.F. (adjustment number 10), middle wave antenna (adjustment number 5) and middle wave oscillator (adjustment number 2) to resonance.
   (b) Re-check broadcast alignment and if it is found necessary to re-adjust either R.F. or antenna trimmers, repeat the 17 M.C. short wave and 5 M.C. middle wave adjustments.

BELMONT RADIO CORP.

MODEL 1170B
Schematic, Voltage
Socket, Trimmers, Part





Vol. Control On-Off Switch	Tone Control and High Fidelity Sw.	Tuning Control	Band Switch

No.	Part No.	Description
		RESISTORS
R1	130-129	2500 Ohm—1/3 Watt—10%—Carbon
R2	130-20	100M Ohm—1/3 Watt—20%—Carbon
R3	130-12	50M Ohm—1/3 Watt—20%—Carbon
R4	130-60	100 Ohm—1/3 Watt—20%—Carbon
R5	130-77	10M Ohm—1 Watt—20%—Carbon
R6	130-76	30M Ohm—1/3 Watt—20%—Carbon
R7	130-88	10M Ohm—2 Watt—20%—Wire Wound
R8	130-19	1 Megohm—1/3 Watt—20%—Carbon
R9	130-20	100M Ohm—1/3 Watt—20%—Carbon
R10	130-4	3 Megohm—1/3 Watt—20%—Carbon
R11	130-110	1 Megohm—1/10 Watt—10%—Carbon
R12	130-20	100M Ohm—1/3 Watt—20%—Carbon
R13	101-36	1 Megohm—Volume Control
R14	130-22	5M Ohm—1/3 Watt—20%—Carbon
R15	130-85	3M Ohm—1/3 Watt—20%—Carbon
R16	130-20	100M Ohm—1/3 Watt—20%—Carbon
R17	130-20	100M Ohm—1/3 Watt—20%—Carbon
R18	130-130	100M Ohm—½ Watt—10%—Carbon
R19	130-3	500M Ohm—1/3 Watt—20%—Carbon
R20	106-31	30 Ohm—Muter } One unit
R21	106-31	175 Ohm—Muter } One unit
R22	130-45	250M Ohm—1/3 Watt—20%—Carbon
R23	130-45	250M Ohm—1/3 Watt—20%—Carbon
R24	130-82	10M Ohm—1/3 Watt—10%—Carbon
R25	101-40	5000 Ohm—Tone Control
R26	130-131	20M Ohm—½ Watt—10%—Carbon
R27	130-21	20M Ohm—1/3 Watt—20%—Carbon

CONDENSERS

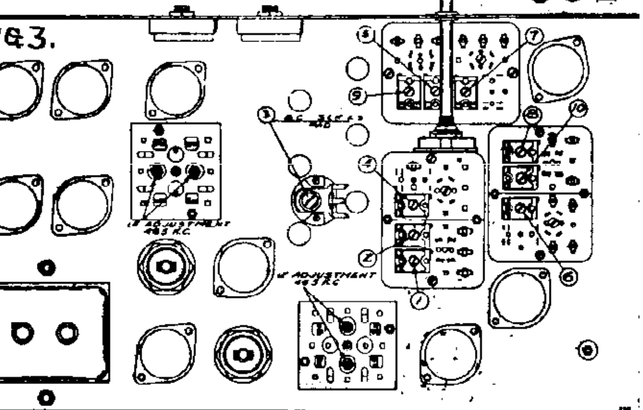
C1	100-9	.05x200 Volt—25%
C2	129-59	.0003 Mica—5%—MT-O
C3	129-39	.00005 Mica—20%—MT-O
C4	129-69	.0023 Mica—2½%—MT-O
C5	100-9	.05x200 Volt—25%
C6	100-13	.05x400 Volt—25%
C7	129-57	.0005 Mica—5%—MT-O
C8	129-55	.0034 Mica—2½%—MT-O
C9	124-34	200 Mmf. Working Cap. Adjustable Pad.
C10	129-31	.000025 Mica—15%—MT-O
C11	100-41	.25x400 Volt—20%
C12	100-11	.01x400 Volt—25%
C13	100-9	.05x200 Volt—25%
C14	100-22	.05x200 Volt—25%
C15	100-11	.01x400 Volt—25%
C16	129-60	.00015 Mica—20%—MT-O
C17	129-60	.00015 Mica—20%—MT-O
C18	129-3	.00002 Mica—20%—MT-O
C19	129-2	.0005 Mica—20%—MT-O
C20	100-22	.05x200 Volt—25%
C21	129-60	.00015 Mica—20%—MT-O
C22	100-22	.05x200 Volt—25%
C23	129-5	.0001 Mica—20%—MT-O
C24	100-20	.1x200 Volt—25%
C25	100-13	.05x400 Volt—25%
C26	100-19	.006x600 Volt—25%
C27	103-8	14 Mfd.—400 Volt—Elecrolytic
C28	100-20	.1x200 Volt—25%
C29	100-45	.1x600 Volt—25%
C30	100-20	.1x200 Volt—25%
C31	103-10	30 Mfd. — 450 Volt — Electrolytic
C32	100-32	.0005x1000 Volt—20%
C33	100-61	.02x600 Volt—Bakelite Micamold

FREQUENCY RANGE

DIAL SCALE

Dial Scale	Frequency Range
Outer Scale	535 to 1720 K.C. (Kilocycles)
Center Scale	1690 to 5300 K.C. (Kilocycles)
Inner Scale	5.3 to 18.1 M.C. (Megacycles)

FIG. 3.



MODEL 1170E
Alignment

BELMONT RADIO CORP.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 108, 127, 150, 225, and 260 volts, (see instructions) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a voltmeter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 115 volts on the primary of the power transformer.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of the multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS (465 K.C.)

Part No. 108-63 Output I.F. Transformer
Part No. 108-64 Input I. F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the underside of chassis (see bottom view Fig. 3).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), the tone control on "Hi" part of the sharp position (as much right rotation as possible without operating the Hi Fidelity switch), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, located between the two I.F. transformers, and adjust the output I.F. transformer 108-63 to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6J7 and adjust input I.F. transformer (108-64) to resonance.
   (c) With oscillator still connected to 6J7, re-adjust output I.F. transformer if necessary.

BROADCAST BAND ALIGNMENT:
535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with external oscillator set at 600 kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:
   (a) Adjust broadcast series pad (adjustment number 3) to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained. Note: This adjustment is accessible from the top of the chassis and is located between the variable condenser and the 108-63 output I.F. transformer. See top view, Fig. 1.
   (b) Re-set external oscillator to 1400 K.C., move dial pointer to 1400 K.C. and adjust oscillator (adjustment number 4), R.F. (adjustment number 6) and antenna (adjustment number 7) to resonance. See bottom view for location of these adjustments, Fig. 3.
   (c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (d) Check for tracking and sensitivity at 1000 kilocycles. **Under no circumstances bend plates of variable condenser to correct tracking.**

SHORT WAVE BAND ALIGNMENT:
5.3 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 1), short wave R.F. (adjustment number 8) and short wave antenna (adjustment number 9) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check for sensitivity.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental on the receiver dial. As an example of this a fundamental 18.3 megacycle can be tuned in not only at 18.3 on the dial, but also at approximately 17.4 megacycles.

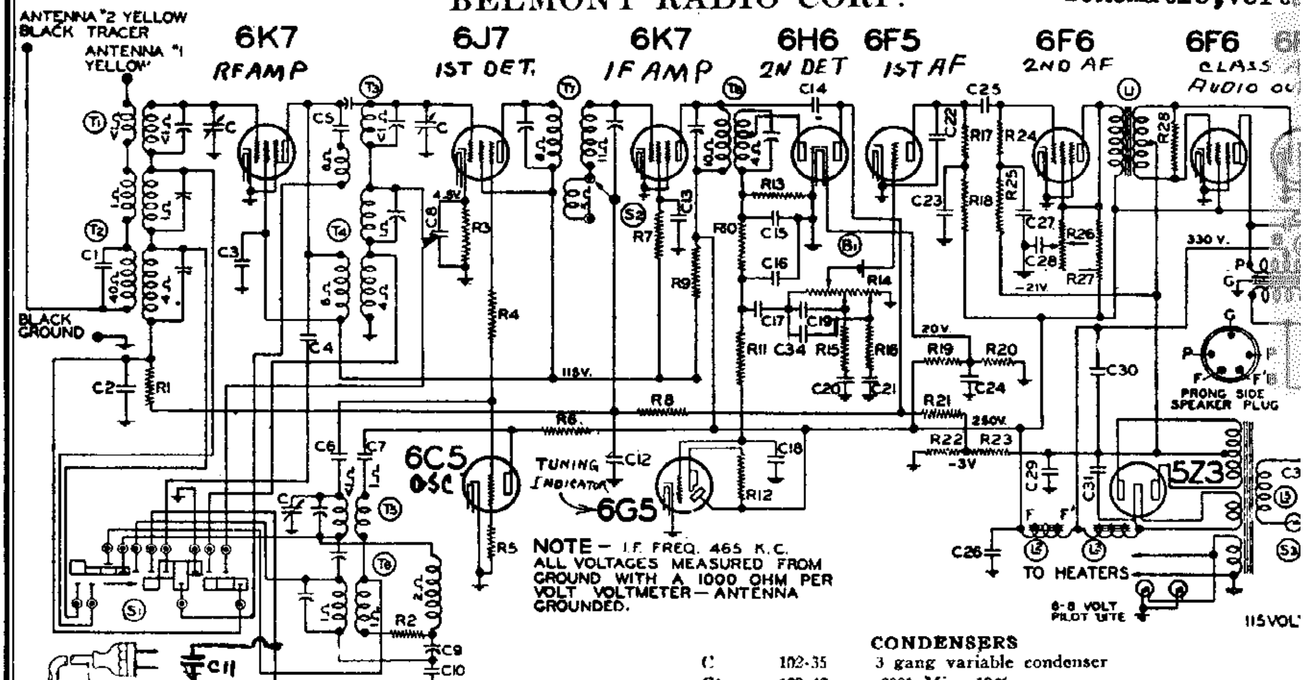
MIDDLE WAVE BAND ALIGNMENT:
1690 to 5300 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5 M.C. and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Rotate condenser, pick up signal and adjust middle wave R.F. (adjustment number 10), middle wave antenna (adjustment number 5) and middle wave oscillator (adjustment number 2) to resonance.
   (b) Re-check broadcast alignment and if it is found necessary to re-adjust either R.F. or antenna trimmers, repeat the 17 M.C. short wave and 5 M.C. middle wave adjustments.

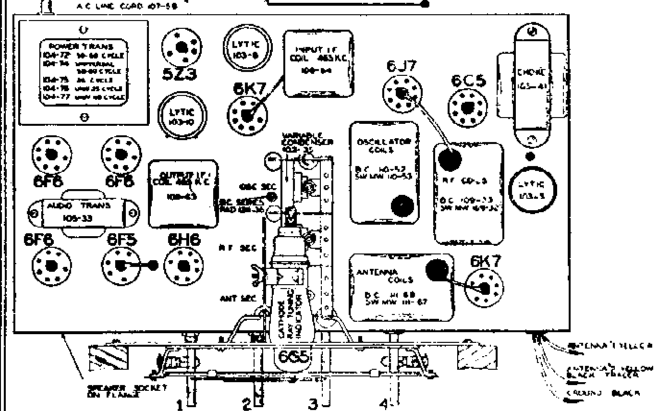
Socket, Trimmers, Parts

MODEL 1174
Schematic, Volt...

BELMONT RADIO CORP.



NOTE – I.F. FREQ. 465 K.C. ALL VOLTAGES MEASURED FROM GROUND WITH A 1000 OHM PER VOLT VOLTMETER—ANTENNA GROUNDED.



1 Vol. Control On-Off Switch
2 Tone Control and High Fidelity Sw.
3 Tuning Control
4 Band Switch

RESISTORS

R1	130-20	100M - 1/3 w. - 20%
R2	130-166	150 ohm - 1/3 w. - 10%
R3	130-129	2500 ohm - 1/3 w. - 10%
R4	130-60	100 ohm - 1/3 w. - 20%
R5	130-12	50M ohm - 1/3 w. - 20%
R6	130-133	15 M ohm - 1/2 w. - 20%
R7	130-76	30M ohm - 1/3 w. - 20%
R8	130-19	1 megohm - 1/3 w. - 20%
R9	130-88	10M ohm - 2 w. - 20% - wire wound
R10	130-20	100 M ohm - 1/3 w. - 20%
R11	130-4	3 megohm 1/3 w. - 20%
R12	130-110	1 megohm - 1/10 w. - 20%
R13	130-20	100M ohm - 1/3 w. - 20%
R14	101-36	1 megohm - Volume Control
R15	130-22	5M ohm - 1/3 w. - 20%
R16	130-85	3M ohm - 1/3 w. - 20%
R17	130-20	100M ohm - 1/3 w. - 20%
R18	130-20	100M ohm - 1/3 w. - 20%
R19	130-130	100M ohm - 1/2 w. - 10%
R20	130-82	10M - 1/3 w. - 10%
R21	130-3	500M ohm - 1/3 w. - 20%
R22	106-31	27 ohms
R23	106-31	175 ohms
R24	130-45	250M ohm - 1/3 w. - 20%
R25	130-45	250M ohm - 1/3 w. - 20%
R26	101-40	Tone Control
R27	130-131	20M ohm - 1/2 w. - 10%
R28	130-21	20M ohm - 1/3 w. - 20%

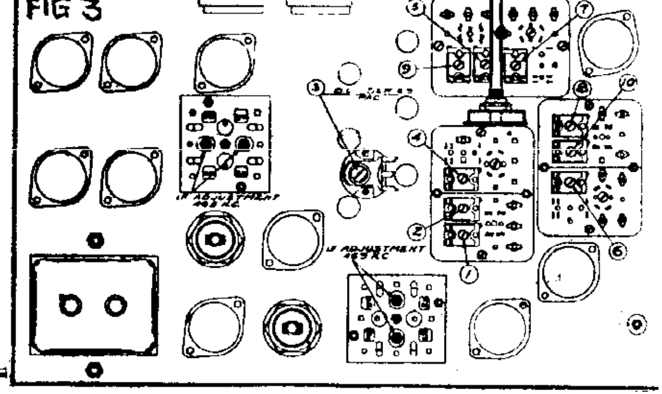
R22 and R23 in one unit

CONDENSERS

C	102-35	3 gang variable condenser
C1	129-40	.0001 Mica 10%
C2	100-9	.05 x 200 v. 25%
C3	100-53	.25 x 400 v. 20%
C4	129-59	.0003 Mica 5%
C5	129-38	.00005 Mica 10%
C6	129-38	.00005 Mica 10%
C7	100-25	.002 x 600 v. 25%
C8	100-20	.1 x 200 v. 25%
C9	124-35	.00074 Series Pad.
C10	129-70	.004 Mica 2½%
C11	129-71	.002 Mica 2½%
C12	100-9	.05 x 200 25%
C13	100-11	.01 x 400 25%
C14	129-3	.00002 Mica 20%
C15	129-60	.00015 Mica 20%
C16	129-60	.00015 Mica 20%
C17	100-22	.05 x 200 25%
C18	100-11	.01 x 400 25%
C19	129-2	.0005 Mica 20%
C20	100-22	.05 x 200 25%
C21	100-22	.05 x 200 25%
C22	129-40	.0001 Mica 10%
C23	100-20	.1 x 200 25%
C24	100-19	.006 x 600 v. 25%
C25	100-13	.05 x 400 25%
C26	103-8	14. mfd. x 400 w. v. lytic
C27	100-20	.1 x 200 25%
C28	100-45	.1 x 600 v. 25%
C29	100-20	.1 x 200 v. 25%
C30	103-10	30 mfd. x 450 w. v. lytic
C31	103-5	8 mfd. lytic 475 w. v.
C32	100-32	.0005 x 1000 v. 20%
C33	100-61	.02 x 600 v. Bakelite 20%
C34	129-60	.00015 Mica 20%

DIAL SCALE	FREQUENCY RANGE
Cream Colored........	535 to 1720 K.C. (Kilocycles)
Buff Colored........	1695 to 5500 K.C. (Kilocycles)
Green Colored........	5.35 to 18.1 M.C. (Megacycles)

FIG 3



MODEL 1174
Alignment

BELMONT RADIO CORP.

Service Data for Service Men

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 108, 127, 150, 225, and 260 volts, (see instructions) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a voltmeter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 115 volts on the primary of the power transformer.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

ALIGNING INSTRUCTIONS:

CAUTION:

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the four bolts by which it is fastened.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of the multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS (465 K.C.)

Part No. 108-63 Output I.F. Transformer
Part No. 108-64 Input I. F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the underside of chassis (see bottom view Fig. 3).

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), the tone control on "Hi" part of the sharp position (as much right rotation as possible without operating the Hi Fidelity switch), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   - (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, located between the two I.F. transformers, and adjust the output I.F. transformer 108-63 to resonance.
   - (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6J7 and adjust input I.F. transformer (108-64) to resonance.
   - (c) With oscillator still connected to 6J7, re-adjust output I.F. transformer if necessary.

SHORT WAVE BAND ALIGNMENT:
5.35 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the antenna and ground leads, make the following adjustments:
   - (a) Move dial pointer to 17 megacycles and adjust short wave oscillator trimmer (adjustment number 1) to resonance.
   - (b) Adjust short wave R.F. trimmer (adjustment number 8), and short wave antenna trimmer (adjustment number 9), to resonance.
   - (c) Re-set external oscillator and check set at 18.1 megacycles and 6 megacycles for band coverage and sensitivity.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental on the receiver dial. As an example of this a fundamental 17 megacycle signal can be tuned in not only at 17 on the dial but also at approximately 16.1 megacycles.

MIDDLE WAVE BAND ALIGNMENT:
1695 to 5500 Kilocycles

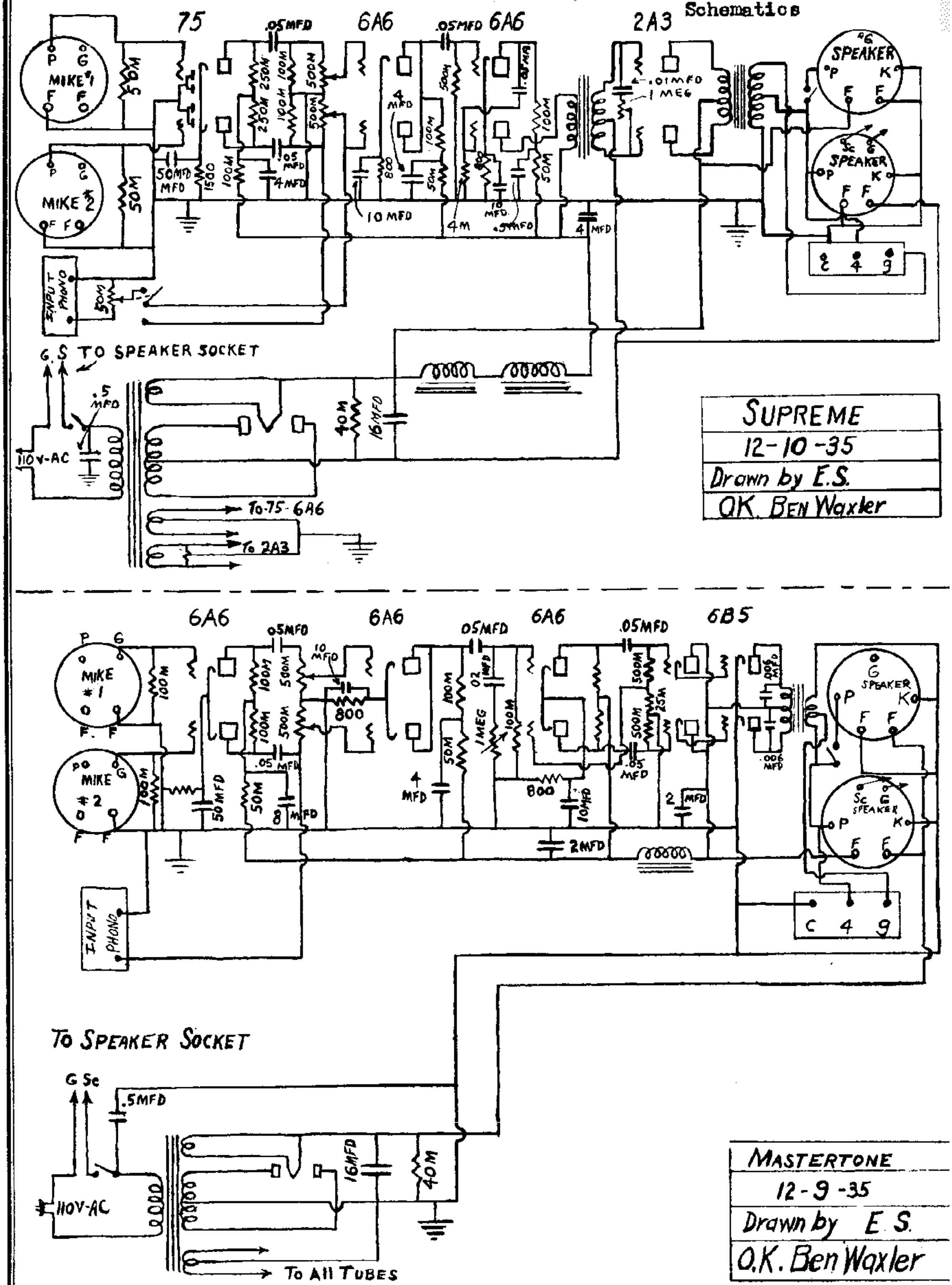
1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5 megacycles and connected in series with "Dummy 3" to the antenna and ground leads make the following adjustments:
   - (a) Move dial pointer to 5 megacycles and adjust middle wave oscillator trimmer (adjustment number 2) to resonance.
   - (b) Adjust middle wave R.F. trimmer (adjustment number 10), and middle wave antenna trimmer (adjustment number 5), to resonance.
   - (c) Re-set external oscillator and check sensitivity at 1800 kilocycles.

BROADCAST BAND ALIGNMENT:
535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground leads make following adjustments:
   - (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 4; see bottom view of coil assembly, Fig. 3)
   - (b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast R.F. trimmer (adjustment number 6) and broadcast antenna trimmer (adjustment number 7), to resonance
   - (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment number 3) to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).
   - (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   - (e) Check for tracking and sensitivity at 1400, 1000, and 600 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**
   - (f) Recheck short wave and middle wave band alignment

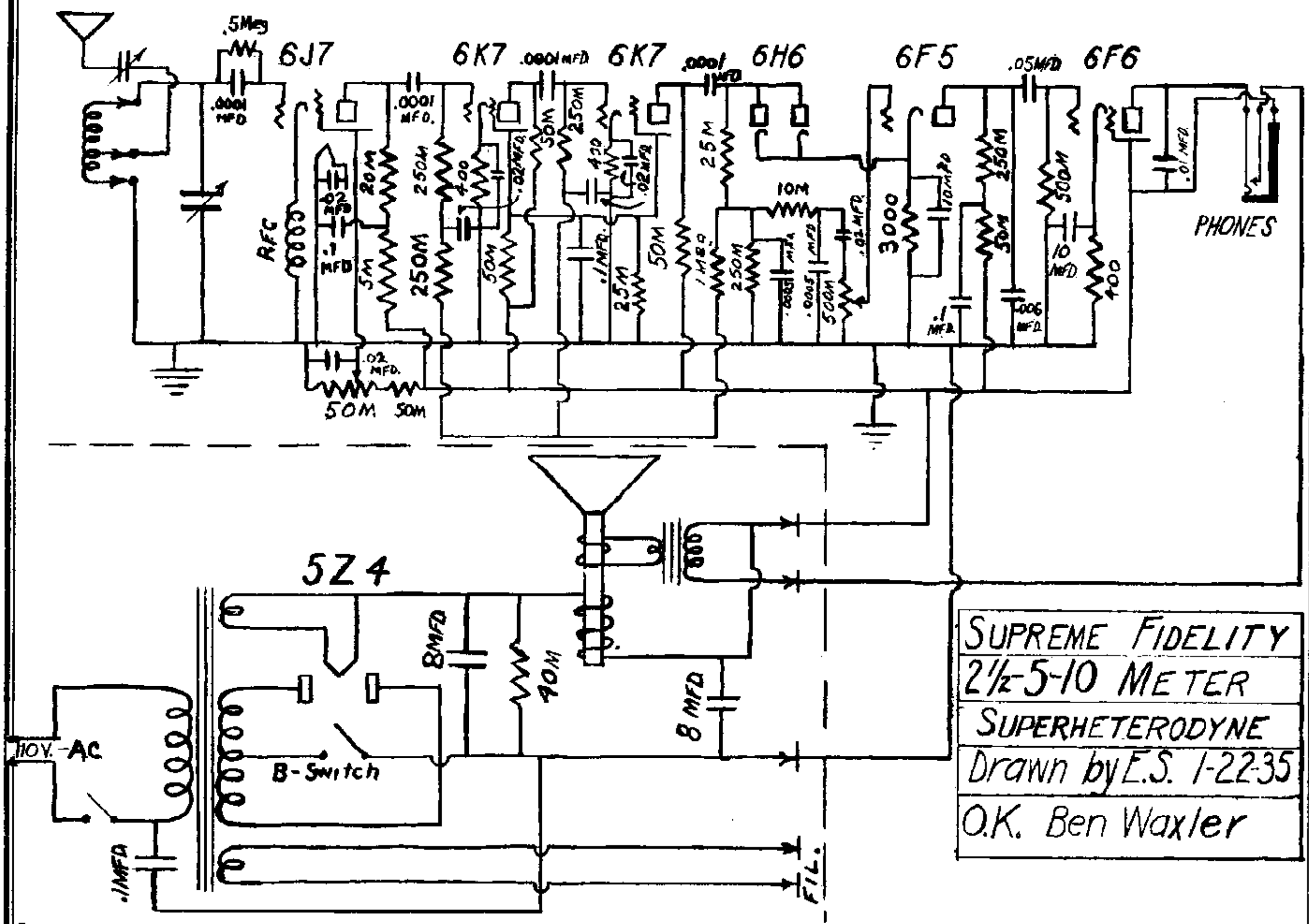
MODEL Supreme Amplifier
MODEL Mastertone "
Schematics

DAVID BOGEN CO., INC.



MODEL 2.5-5-10 Meter Super.
Schematic, Data

DAVID BOGEN CO., INC.



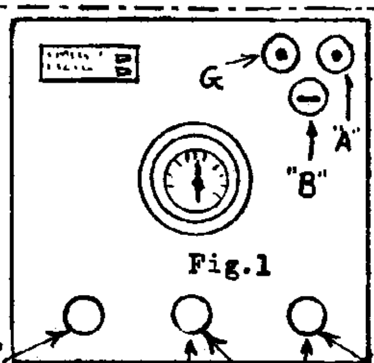


Fig.1

"C" BEAT "T" "R"

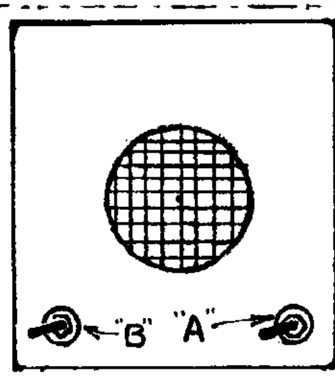
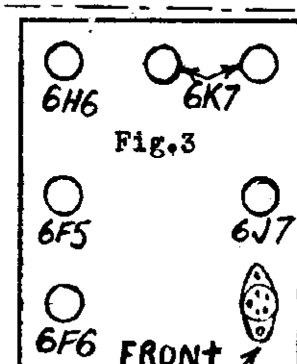
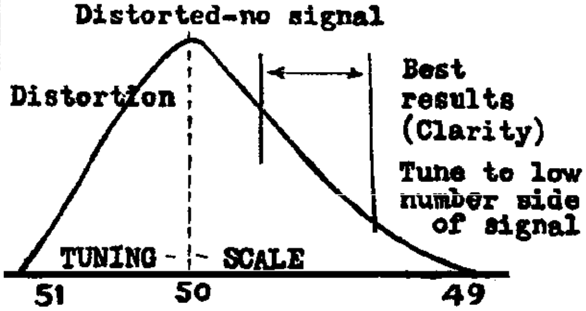


Fig.2



P

Distorted-no signal

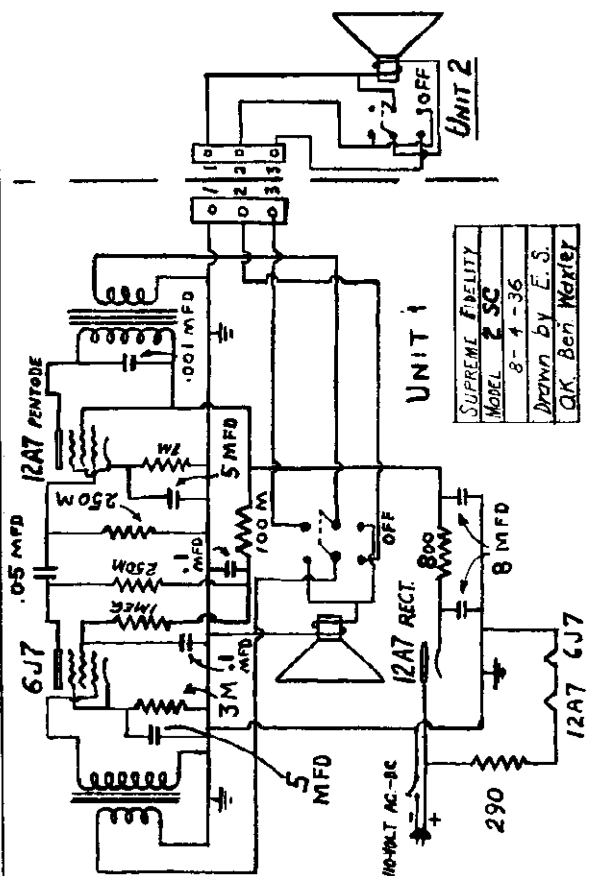


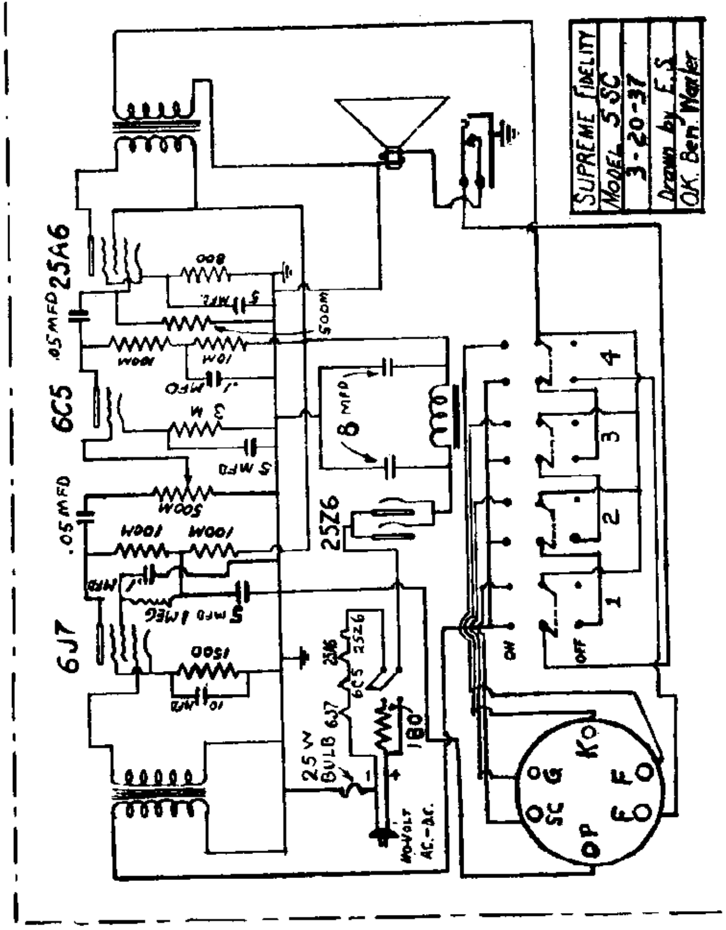
TUNING CURVE AS SHOWN ON CATHODE RAY OSCILLOGRAPH.
Fig. 4

SUPREME FIDELITY
2½-5-10 Meter
SUPERHETERODYNE
Drawn-by-E.S. 1-23-36
O.K. Ben. Waxler

DAVID BOGEN CO., INC.

MODEL 2SC Communicator
Schematic, Data
MODEL 5SC Communo-Phone
Schematic





INSTRUCTIONS FOR MODEL 2SC

The two station Supreme Communicator consists of two units. The master station is unit #1 and the extension station is unit #2. The master uses two tubes: 1-12A7 and 1-6J7. A three wire cable is used to inter-connect the units. The master unit is connected to the power line. The communicator works equally as well on A.C. or D.C., 110 volts.

CONNECTIONS:-
The three terminal strip located on the rear of each unit is used to inter-connect the units. The three wires are connected in numerical sequence, i.e. - 1 to 1, 2 to 2, 3 to 3. The line cord incorporates a self contained resistor, hence, must not be tampered with. The line plug is inserted in any source of 110 volts A.C. or D.C.. In D.C. operation, if the system fails to operate, reverse the polarity by removing the plug from the receptacle, giving it a half turn, and reinserting. On A.C., if a hum is noticed, reverse plug as explained above.

CONTROLS:-
Master Unit - The switch located on the front panel at the left, controls the power for both units, and is put on or off as denoted by the on-off plate. In the center of each unit there is a plate marked "RELEASE TO LISTEN" and "PRESS TO TALK". Conversation is started by pressing the switch down and is held down while talking. When through talking, release and the switch will automatically come back to "RELEASE TO LISTEN" position. Then, the second party will push the switch and talk. This operation is repeated.

REMARKS:-
This amplifier is licensed by agreement with Electrical Research Products, Inc., under patents owned or controlled by Western Electric Co., and American Telephone and Telegraph Co.

CAUTION:-
Do not use any ground or let any of the connecting wires touch any ground, such as water or gas pipes or metal ceilings, etc.

MODEL 5SC Communo-Phone
Instructions

DAVID BOGEN CO., INC.

INSTRUCTIONS FOR MODEL 5SC

The Supreme Communo-Phone is a self powered combination microphone loud speaker system. It operates on either A.C. or D.C. current, 105-125 volts. Each unit draws 35 watts and is designed for continuous service. The tubes used are:- 1-25Z6, 1-6J7, 1-6C5, 1-25A6, and 1-25 watt, 120 volt bulb.

The simplest inter-communication system consists of two of these units connecting one office to a second and permitting instantaneous communication. These units may be combined into a more elaborate inter-communication system by using any number of units up to five. The standard Supreme Communicator is equipped with all the switches and a socket so that a five way system may be connected with a minimum of time and difficulty and without the necessity of additional equipment other than the cable and connector box.

System units with a selection of more than five stations can be supplied in accordance with specified requirements.

CONNECTIONS:-

These units are connected together by means of the Supreme Communicator connector box. Cables are supplied in any length to meet requirements and come equipped with a six prong male plug on each end. The connector box is supplied with a five foot length of cable and a six prong male plug. The cable from the connector box is plugged into the socket marked "Pwr". ("A" Fig. #1) located on the rear of the first station. To connect the other stations insert one plug of the cable into the socket on the rear of the station, and insert the other plug into a socket on the connector box (see-Fig.#2). When less than five stations are used the cables should be plugged into consecutive sockets on the connector box.

Insert the plugs of the line cords into any source of 110 Volt A.C. or D.C. Snap the line switches on and observe the 25 watt lamp. If the lamp is brilliant, reverse the line plug which will give the correct operating polarity. With each unit at correct polarity, the system should be operating. As a check, the line cord should grow slightly warm in operation. Do not attempt to shorten this line cord since the operation of the set is dependent upon a self-contained resistor in it. If you desire to connect your own connector box and cables - refer to figure #3.

WHEN USING THESE UNITS ON D.C.:-

When all units are plugged in as outlined above, inter-communication may be started among the various stations, making sure that the volume control is turned up. If no sound is heard, the polarity of the units is incorrect and all the plugs must be reversed at the same time. This applied to D.C. only.

NOTE.- Do not under any circumstances connect a ground to the chassis.

CONTROLS:-

On the panel there are four momentary contact switches, two on each side of the power switch. Each switch is a selector calling another unit or station. All call switches are normally set in the up or listening position. To call another station, press the appropriate switch down and talk. To listen, release the switch. In setting up this system, it may be found that the volume of voice at the listening end is insufficient for efficient operation. To adjust the volume of the loudness use the screwdriver control adjustment on the rear ("B" Fig. #1).

A headset may be used if it is undesirable to have others, who may be standing near the station, hear the conversation. A magnetic headset should be used with an ordinary phone plug which can be inserted in the jack on the rear panel ("C" Fig.#1)

The names of the stations can be assigned to the respective switches by writing in the name. For new names remove the name plate, by taking off five nuts, and insert new paper.

The Supreme Communicator should be used at a distance of arm's length from the unit so as to prevent uncomfortable loud speech at the receiving end.

The person speaking should not raise his voice over that used in ordinary conversation since the Supreme communicator is designed to have enough sensitivity to pick space up low voices of moderate distances.

One of the useful features obtainable with the Supreme Communicator System is the possibility of instantaneous call to all stations by pressing all the switches down, whereupon, all other stations listen to the master station. Any unit can become a master to call any number of stations at once.

It is possible for any station to speak to the listening station, although the latter is listening to another station. The station breaking in cannot, however, eavesdrop on any conversation not being directed to him.

Another feature obtainable with the 5-Way Supreme Communicator System is that any two stations can talk to each other, while two other stations are talking without interfering with each other. In other words, each two units comprise a voice channel very much like a telephone switchboard.

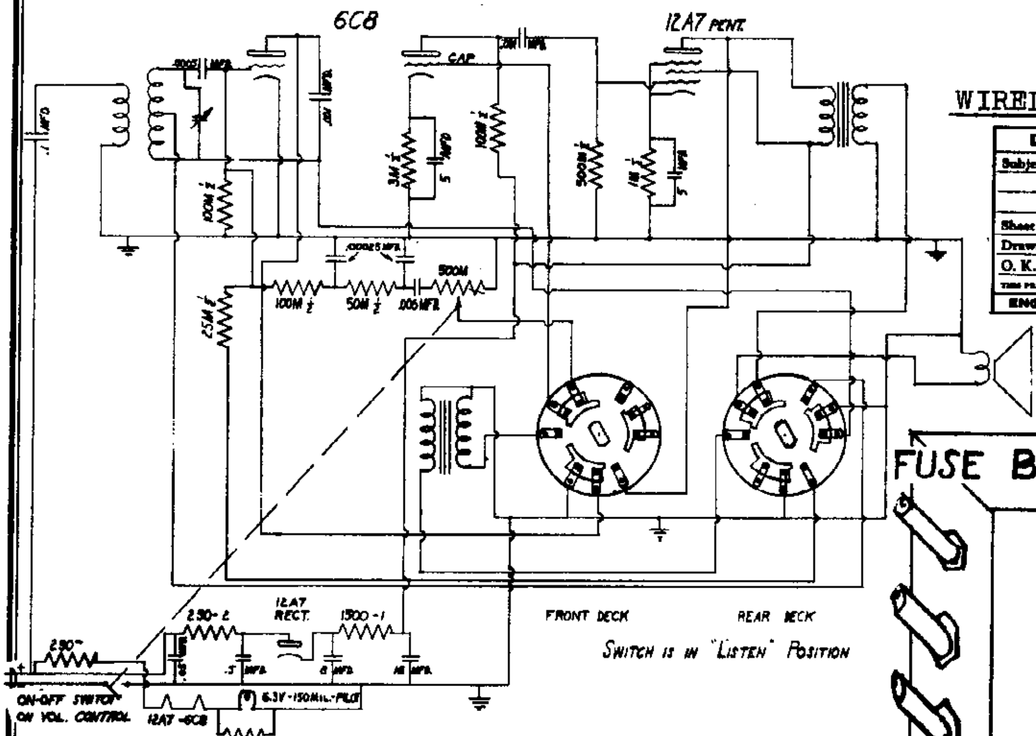
NOTE: CAUTION - DO NOT UNDER ANY CIRCUMSTANCE CONNECT A GROUND TO THIS CHASSIS.

REMARKS:

This amplifier is licensed by agreement with Electrical Research Products, Inc., under patents owned or controlled by Western Electric Co., and American Telephone and Telegraph Co. -

MODEL 2W CommunoPhone
Schematic, Data

DAVID BOGEN CO., INC.



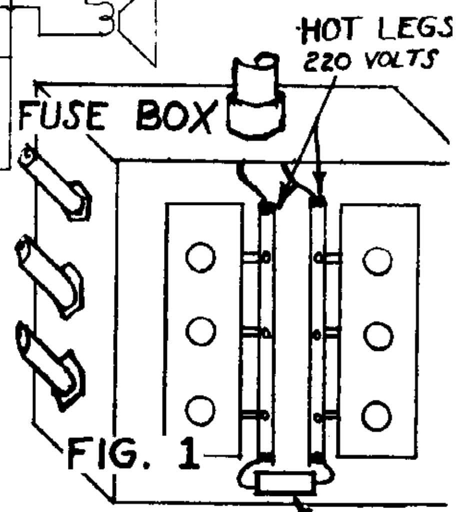


FIG. 1

1-MFD. 400V-PAPER CONDENSER

Power Rating:

105 to 125 volts, either A.C. or D.C.
Consumption 32 watts per unit.

The model 2W Bogen Wireless Communo-Phone is an intercommunicating telephone system using the usual power lines both for power and to carry the voice currents. Two or more stations may be operated, but since this model is not selective, all stations will hear all conversations.

Talk-Listen: The knob in the center of the front panel controls the direction of conversation. It normally holds itself in the "Listen" position. To call the other station, depress the knob and speak. Release knob to hear the response from the answering station. The person at the remote or called station must depress his own "Talk" knob before speaking.

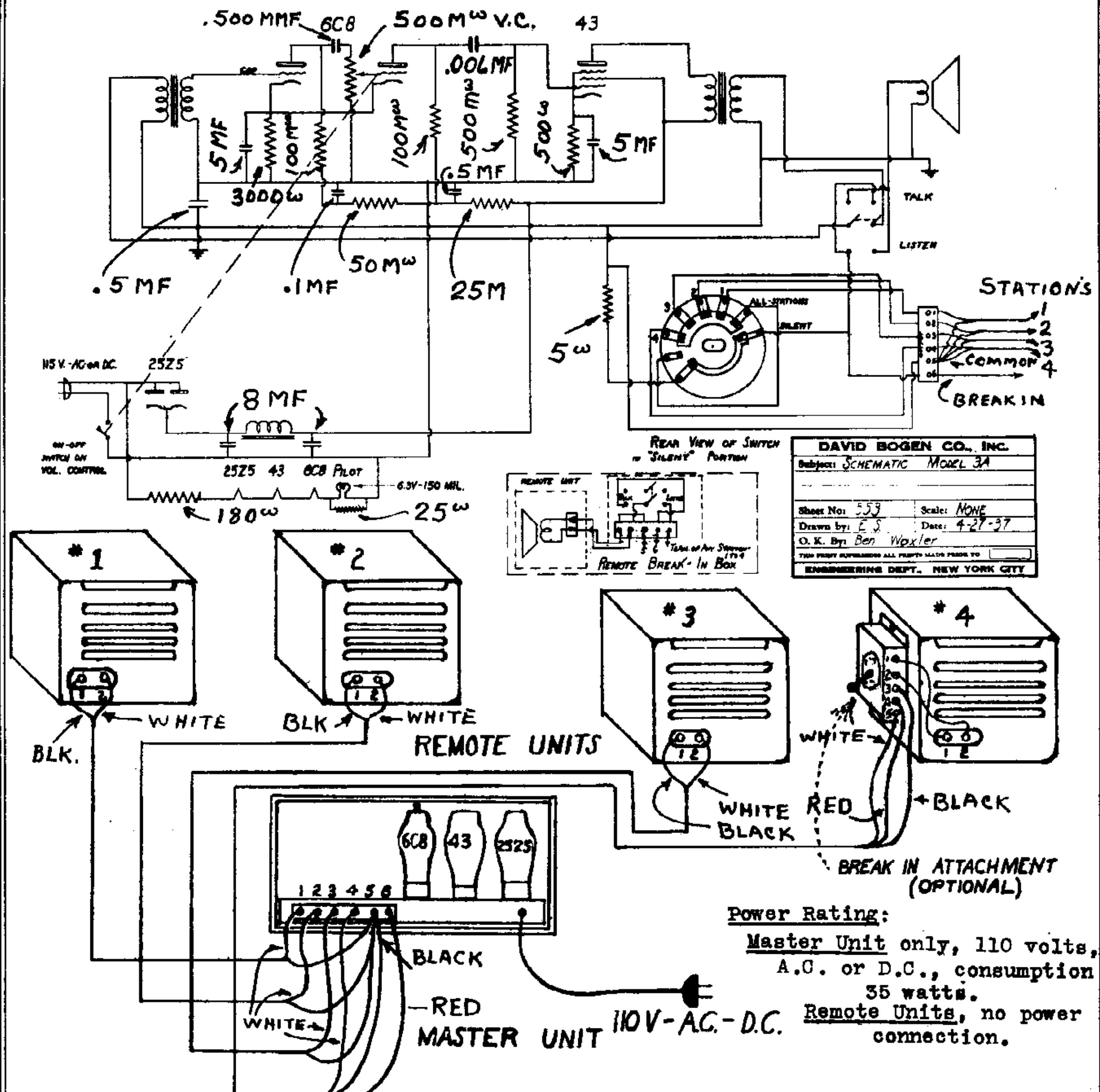
Connections: Insert the attachment cord plug from each unit into the nearest electrical outlet of proper voltage. There are no other connections to make unless the two electrical outlets used are wired on opposite sides of the common ground. In this case the two circuits should be bridged at the fuse box or meter with a paper condenser of a capacity of about 1 mfd. 400 volts. The two "hot" or ungrounded wires are joined thru the condenser as shown in figure 1.

Adjustments: These units are adjusted at the factory to match each other. However if there is reason to attempt to improve the match between the stations, the trimmer condenser screw located on the rear of the chassis may be adjusted. Turn the screw slightly left or right until the best results are observed as determined by the volume and quality of the received voice.

Noise: Some electrical devices such as small motors, flashing signs, oil burners, etc. radiate "man made static" which in some locations causes considerable annoyance to radio listeners and may cause a similar disturbance in the Wireless Communo-Phone. If the source of the noise can be determined, it can be reduced or entirely eliminated by the use of condensers or noise filters on the device creating the noise.

MODEL 3A CommunoPhone
Schematic, Data

DAVID BOGEN CO., INC.



Power Rating:

Master Unit only, 110 volts, A.C. or D.C., consumption 35 watts.
Remote Units, no power connection.

The model 3A Bogen Selective Communo-Phone provides selective communication between the Master Station and one to four Remote Stations.

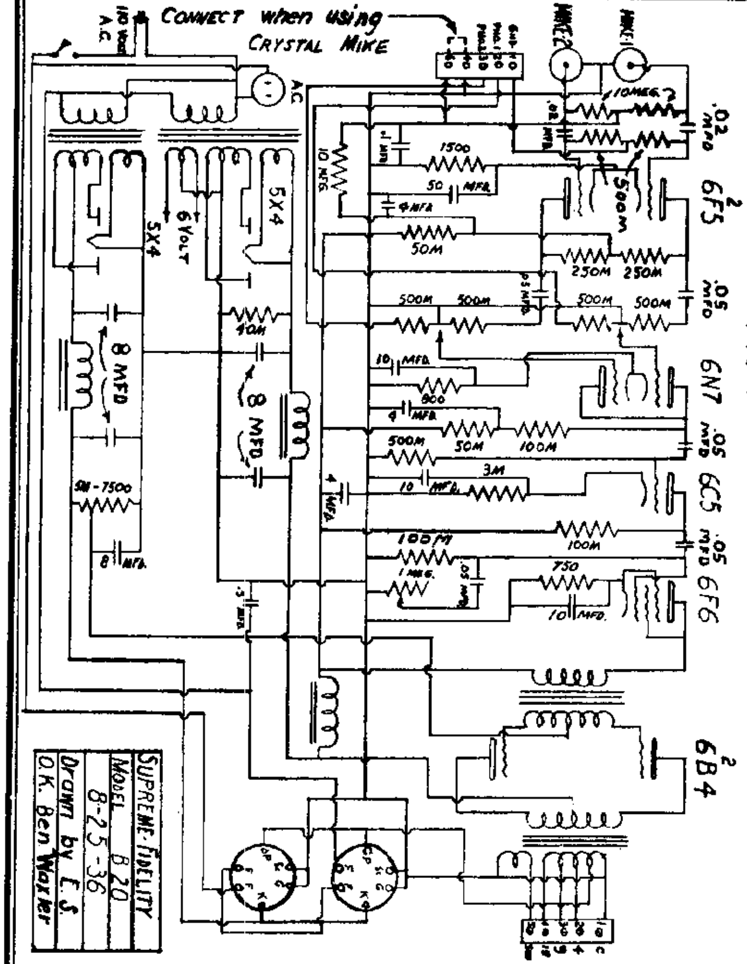
Connections: Using a two wire cable connect all the Remote Units so that their #1 terminals connect to #5 on the Master Unit. Then the remaining wire from each Remote Unit (Terminal #2) connects to its own selective terminal numbered 1, 2, 3 or 4 on the Master Unit. Plug line cord into the usual power outlet. If the device is silent when first connected to Direct Current the power line plug should be removed and rotated so that its prongs are reversed - this is done to correct the polarity.

Station Selector: The center knob is used to select the station called. It may be set to communicate with any single Remote Station or to call all at once. It is normally left in the "Silent" position. The Master Station can listen-in on any or all Remote Stations without warning.

Talk-Listen: The lower knob automatically remains in the "Listen" position. When it is desired to speak from the Master Station the knob is pressed down to the "Talk" position. It must be released to hear the reply from the station called. Because of the sensitivity of the Remote Units it is not necessary for the person called to approach the box closer than about 20 feet, thus saving steps and interruption of work. The Remote Stations can only "Talk" or "Listen" when the Master Switch is properly set.

MODEL B-20 Amplifier
Schematic, Notes

DAVID BOGEN CO., INC.



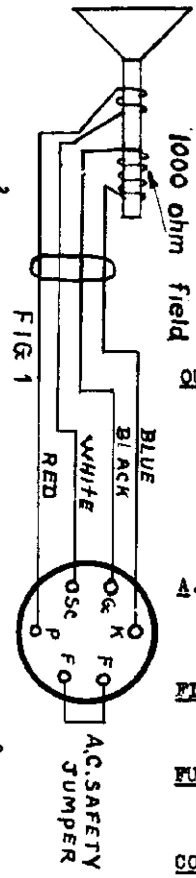


FIG 1

INSTRUCTIONS FOR MODEL B-20

The Supreme Fidelity Model B-20 is a nine tube amplifier operating on 110-125 volts, 50-60 cycles with a drain of 275 watts. The tubes used are: 2-6F5M, 1-6N7G, 1-6C5G, 1-6F6G, 2-6B4G, 2-5X4G.

INPUT CONNECTIONS:-
The five post input strip is used as follows: Terminals "1-2" are channel #2 for a phonograph or other low gain input. Terminal #1 is the ground sides; terminals "1-3" are channel #4, for another phonograph or low gain input. When using a Crystal microphone connect posts #4 and #5 by a wire. Do not jump these terminals when using a Velotron or Velocity microphone:

MICROPHONE CONNECTIONS:-
Above the five post strip are two screw cable connectors. These are the two channel inputs #1 and #3, for Velotron, Velocity or Crystal microphones. For each microphone, a single conductor shielded cable must be employed. The plug that is used on the microphone cable is supplied with each amplifier and is connected as follows:-

1. Skin outer rubber covering about 3/8" exposing the shield.
2. Remove all cotton sleeving which in some cable is present over the metal shield and insert over the shield the metal sleeve supplied with the connector.
3. Remove the exposed shielding up to the sleeve making sure to bend back over the sleeve all loose metal wires.
4. Skin second rubber covering about 1/8" from the sleeve exposing about 1/4" of the conductor.
5. Insert the cable thus prepared into one part of the connector, drop the spring washer in the recess, place bakelite washer over it allowing the conductor to pass through eyelet.
6. Clean and solder conductor to eyelet, cut excessive wire, and screw set screw over the sleeve.
7. Do not use soldering paste or acid on any connection on microphone or cable.

OUTPUT CONNECTIONS:-
Two, one thousand ohm speakers must be connected to the amplifier by means of sockets marked "SPK" located on the right side of the amplifier. As a safety measure, these sockets are so wired that the A.C. to the amplifier is cut off unless both speaker plugs are inserted. The speakers are wired as shown in Fig. 1. Additional speakers having their own source of field supply may be connected by using the taps on the strip marked "OUTPUT". The terminal connections are as follows: Terminal #1 is common; #2 is four ohms; #3 is nine ohms; #4 is fifteen ohms and #5 is five hundred ohms.

A.C. RECEPTACLE:-
An A.C. receptacle is located on the rear panel. This can be used to connect the A.C. for additional speaker exciters, phonographs, etc. The A.C. to this outlet is controlled by the master switch on the front panel.

FIELD SUPPLY:-
The built-in field supply will furnish 100 mils. at 125 volts to each of two 1000 ohm speakers. This field supply is not taken from the plate voltage supply but has its own source of power.

FUSE:-
If the amplifier fails to operate when turned on, examine the fuse clip. A five ampere fuse is used. If this fuse is burned out, examine the connections for a possible short circuit.

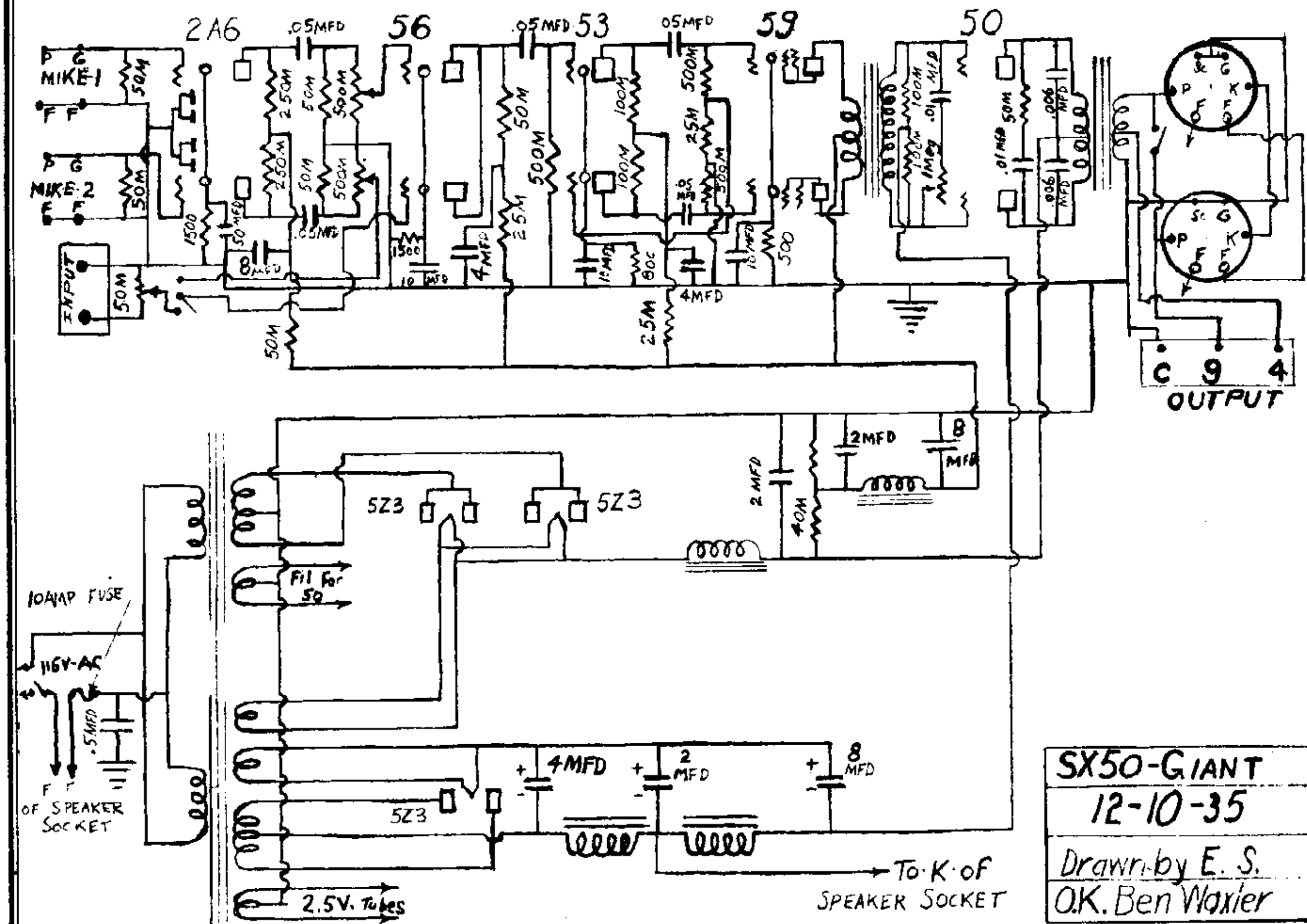
CONTROLS:-
Mixer Fader - The first control on the left governs the gain for either channel #1 or #2. With this control it is possible to fade from channel #1, a high gain input to channel #2, a low gain input. The second control from the left governs the gain for either channel #3 or #4 similiarly. By using both controls simultaneously it is possible to mix the inputs from channels #1 and #2 with those of channels #3 and #4.
Tone - The control marked "Tone" is used for tone correction effects.
Master Switch - The switch at the extreme right on the control panel controls all A.C. The pilot light indicates when the amplifier is operating.

REMARKS:-
If any hum is noticed, when using the microphone, reverse the line polarity, by pulling out the line plug, giving it a half turn and reinserting.

Hum can be caused by faulty tubes, particularly with a high gain amplifier of this design. Check all tubes carefully before looking elsewhere. In rare cases an external ground may be necessary.

MODEL SX-50 Amplifier
Schematic, Notes

DAVID BOGEN CO., INC.

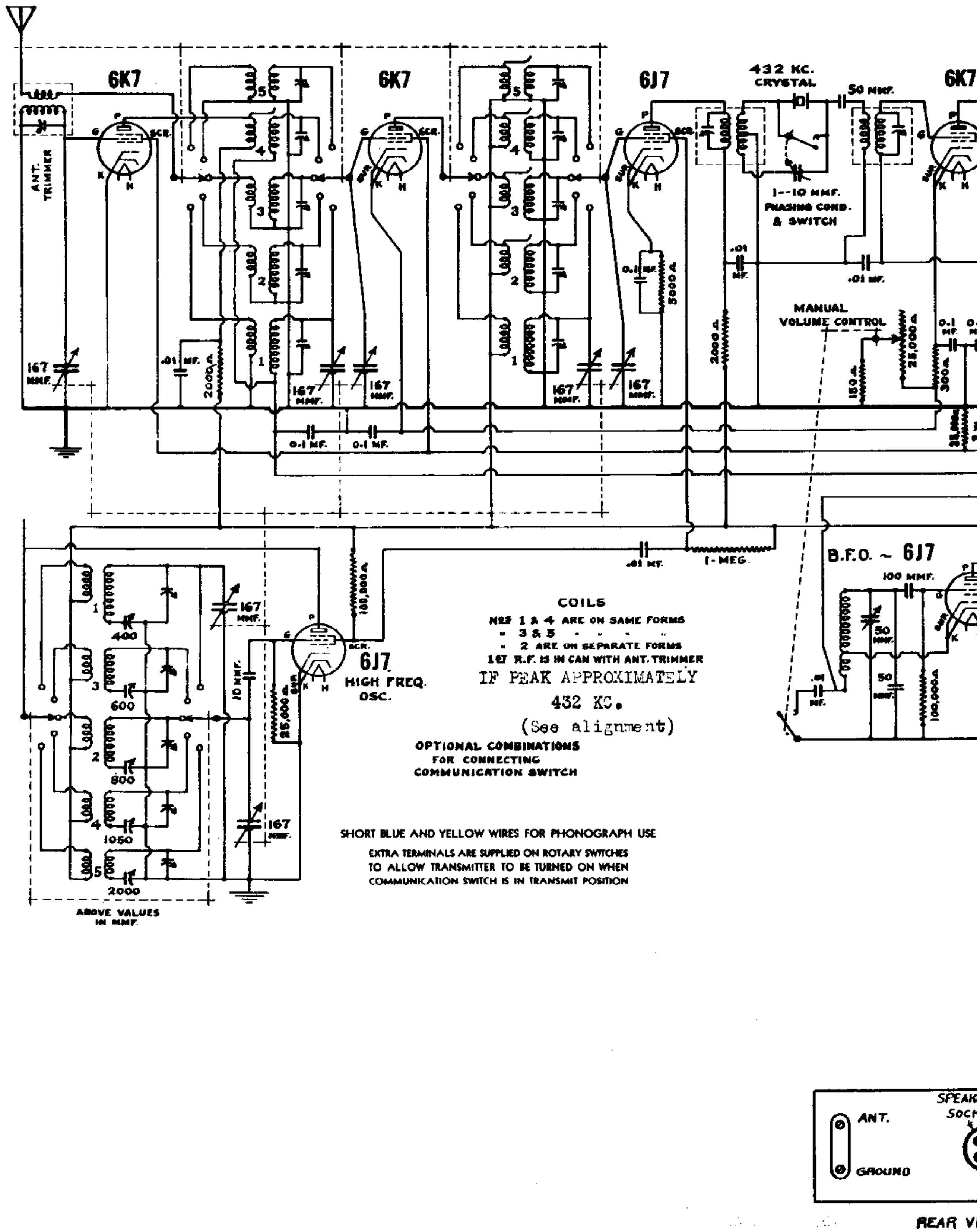


CONNECTIONS

On the left side of the amplifier, there are two sockets marked "MIKE #1" and "MIKE # 2". One or two microphones can be connected to the amplifier by plugging into these sockets. For microphone connections see Fig.1. Shielded cable and plug must be used between the amplifier and the microphone. The metal cover of the plug must be grounded to the shield as shown in Fig.1.

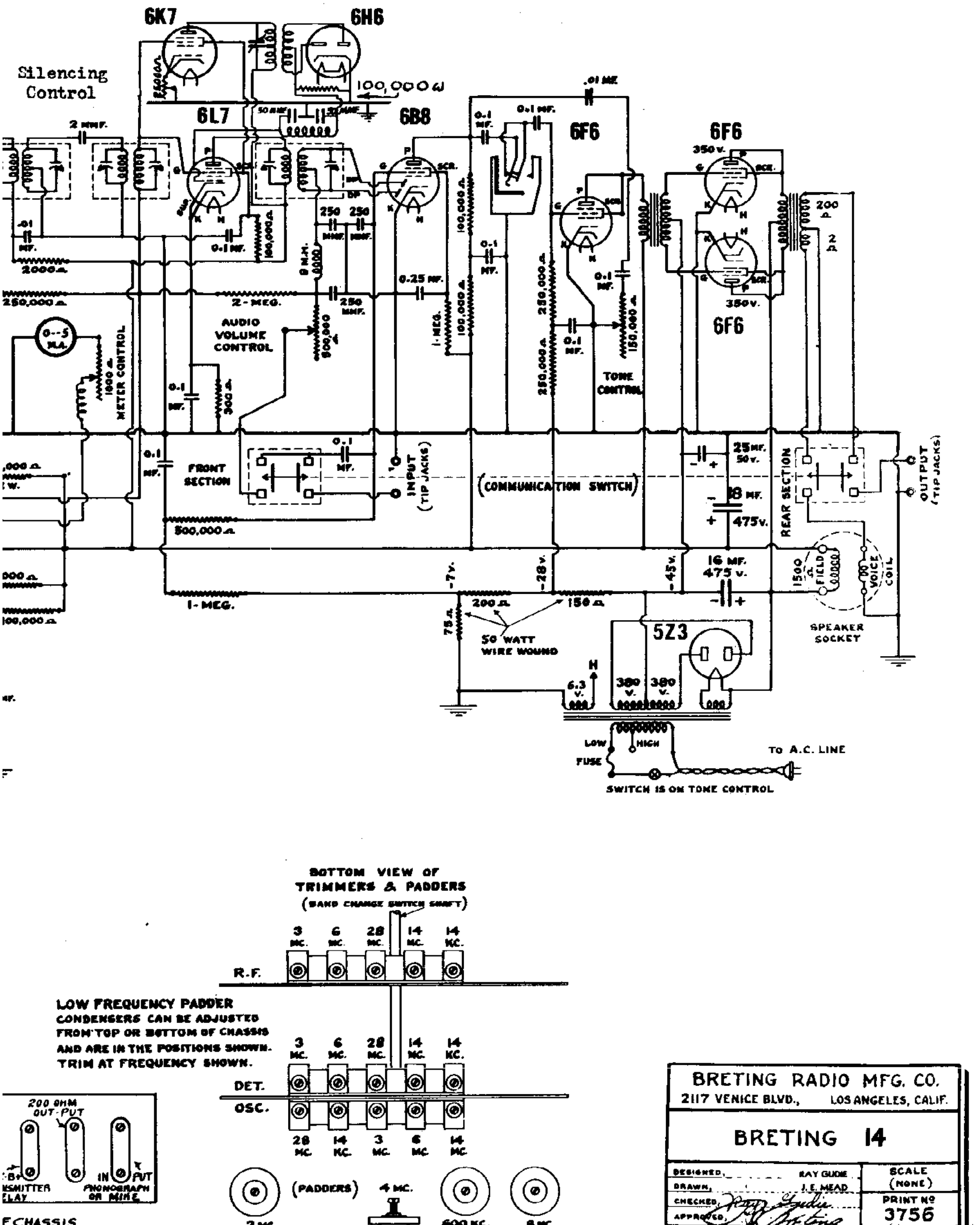
On this same side there is a tip jack marked "PHONO". This jack is used to connect phonographs having tip connectors. Above this jack is a two terminal strip marked "INPUT". These terminals can be used for various input connections such as any low gain input, phonograph,or microphone (dynamic),or radio. The jack and input strip are controlled by the # 3 control.

On the right side of the amplifier there are two six prong sockets marked "SPEAKER". These sockets are used to connect the two speakers required by the amplifier. For the speaker plug connections see Fig.2. The built-in field supply will furnish 100 mils, at 125 volts to each speaker. This field supply is not taken from the plate voltage supply, but has its own poer supply. A three terminal output strip marked C-4-9, is located at the right of the speaker sockets. These terminals can be used to match the voice coils of any additional speakers. Additional speakers must have their on source of field supply, either built in or external.


6K7
6K7
6J7
432 KC.
CRYSTAL
50 MMF.
6K7
ANT. TRIMMER
1--10 MMF.
PHASING COND.
& SWITCH
167 MMF.
.01 MF.
2000 Ω
167 MMF.
167 MMF.
167 MMF.
167 MMF.
0.1 MF.
0.1 MF.
0.1 MF.
5000 Ω
2000 Ω
.01 MF.
.01 MF.
MANUAL
VOLUME CONTROL
150 Ω
25,000 Ω
300 Ω
.01 MF.
1- MEG.
B.F.O. ~ 6J7
100 MMF.
50 MMF.
50 MMF.
100,000 Ω
.01 MF.
100,000 Ω
COILS
NOS 1 & 4 ARE ON SAME FORMS
" 3 & 5 " " " "
" 2 ARE ON SEPARATE FORMS
167 R.F. IS IN CAN WITH ANT. TRIMMER
IF PEAK APPROXIMATELY
432 KC.
(See alignment)
OPTIONAL COMBINATIONS
FOR CONNECTING
COMMUNICATION SWITCH
167 MMF.
400
600
800
1050
2000
10 MMF.
25,000 Ω
6J7
HIGH FREQ.
OSC.
167 MMF.
SHORT BLUE AND YELLOW WIRES FOR PHONOGRAPH USE
EXTRA TERMINALS ARE SUPPLIED ON ROTARY SWITCHES
TO ALLOW TRANSMITTER TO BE TURNED ON WHEN
COMMUNICATION SWITCH IS IN TRANSMIT POSITION
ABOVE VALUES
IN MMF.
ANT.
GROUND
REAR VI

IO MFG. CO

MODEL 14
Schematic, Trimmers



BRETING RADIO MFG. CO.
2117 VENICE BLVD., LOS ANGELES, CALIF.

BRETING 14

DESIGNED, RAY GUDE		SCALE (NONE)
DRAWN, J. E. MEAD		
CHECKED,		PRINT Nº 3756
APPROVED,		

MODEL 14

Alignment, Notes

BRETING RADIO MFG. CO.

ANTENNA: To insure best results it is absolutely essential that a first-class antenna be used. We recommend a single solid wire, 50-75 feet in length, including lead-in. Height over any obstruction in the immediate vicinity is, of course, highly desirable, and should be obtained whenever possible. An ideal situation with respect to antenna would be the use of two or three antennas running in different directions and using a switch mounted near the radio. This procedure would enable the operator to select the antenna giving the best results in any particular location.

On the higher frequencies a short antenna will usually give better results, and on the 10 meter band a 16 ft. vertical generally proves most efficient.

The only advantage obtained in using a doublet antenna would be to locate the antenna pick-up portion out of a noisy field, such as is usually found in a location near a street car line or much traveled highway. In locations of this kind the antenna proper can be located as far away as possible from the disturbing factor, and the long lead-in can be brought to the receiver without a great amount of loss. Almost all commercially made doublets are furnished with the matching transformer equipped with electro-static shields to eliminate any capacity pick-up in the lead-in. There are many coupling transformers on the market that may be obtained by anyone who desires to construct their own doublet, but when this is done a matching transformer should be used that is equipped with electro-static shield.

NOISE SILENCER CONTROL: The noise silencer is equipped with a filament switch that turns the two noise silencer tubes off when in the extreme left position. To operate the silencer the control should be turned to the right, and after the tubes have had sufficient time to heat advancing the control will cause the set to block when a station is tuned in. The point of operation is very critical and just below the blocking point. The weaker the signal the more effective becomes the noise silencer. It is worthless on a strong signal and on certain types of noise. The silencer cannot be used on local or extremely strong signals. The silencer is not a cure-all for static generally speaking, but it is very efficient in eliminating certain types of interference.

COMMUNICATION SWITCH: The communication switch disconnects the audio amplifier from the radio and connects it to the tip jacks on the rear of the chassis. The middle terminals on rear of chassis are connected to the 200 ohm line, the bottom one of which is grounded to the chassis. The terminals nearest the speaker plug when opened break the B+ to the RF portion of the receiver. Needless to say, these terminals are hot with respect to the chassis. The audio amplifier will drive any type of final amplifier, and if used as a modulator, will modulate approximately 100 watts. When using the receiver as a modulator, a modulation transformer with a 200 ohm primary and a secondary with a correct load to match the transmitter must be used. Numerous speaker transformers when reversed will operate satisfactorily for this purpose and several manufacturers have special transformers expressly made for this service, such as Inca Models N18 and N17.

A large number of amateurs are modulating at speech frequencies, 100W transmitters. In case feed back difficulties are encountered, try reversing connections on the external transformers and shielding all connecting wires. Sometimes a separate switch on the B+ terminals will be necessary while transmitting. A microphone transformer and volume control will be necessary for high level carbon microphones, and a high gain preamplifier is necessary for low level microphones. A single high gain stage is generally sufficient for the diaphram type crystal microphone.

The filament and plate power for the preamplifier stage can be supplied by the receiver. On rotary type communication switch extra terminals are supplied to turn transmitter on with the communication switch.

CRYSTAL PHASING CONDENSER: To obtain results with the crystal circuit, a complete understanding of crystal selectivity must be had by the operator.

Let us consider the ordinary C. W. signal as received by a super with the crystal in the off position. The band width of the carrier is about 10,000 cycles and is heard as a series of dot and dash hissing sounds as the receiver is tuned thru the range of the 10,000 cycles. If the beat oscillator is turned on and adjusted when the dial is set to the center of the carrier, you will notice that the C. W. signal becomes a howl and the pitch varies as the beat oscillator adjustment is turned from one side to the other. It starts as an extremely high pitch howl down to a zero beat point and then up the other side until the pitch becomes so high it is lost to the ears.

Now set the beat oscillator until a 1,000 cycle note is heard. Next adjust the crystal trimmer until the background noise is at minimum and a ringing sound is heard in the speaker. The C. W. signal will probably have been lost during this operation and the main dial will have to be readjusted until you find the narrow peak of the signal.

Remember that the peak of the crystal is only 50 cycles wide compared to 10,000 cycles without crystal. You can understand by comparing the above figures why the average amateur never finds the C. W. peak on the crystal and is ready to condemn its performance. The signal strength should not change as the trimmer is turned from the left hand off position to the right hand position.

Greatest selectivity of the crystal will be found as the trimmer is turned about two-thirds of the way to the right. If the signal strength changes as the trimmer is adjusted, the signal is not tuned in on the peak or else the beat oscillator is not adjusted 1,000 cycles to one side of zero beat. Different degrees of selectivity can be obtained on C. W. by not bringing the crystal trimmer in exact phase. The broad positions are on either side of where minimum noise is heard.

For phone reception leave beat oscillator off and keep crystal in either position. At best the reception will be poor.

On C. W. turn the volume control three-quarters on and use the manual control to bring up the signal level. Do not advance it too far on the crystal as it will overload the first detector and motor boating will result.

BEAT FREQUENCY OSCILLATOR SWITCH: The beat oscillator control turns the R meter off and converts the vacuum tube volt meter tube into a beat oscillator. It also shorts out the AVC circuit requiring the manual volume control to be turned to the left to keep from blocking the receiver.

To locate weak stations, turn beat oscillator switch to the right. This should produce a hissing sound in the speaker, and as the tuning dial is rotated, all stations will be heard with a definite squeal. After locating station, retune to greatest volume.

Adjust beat oscillator by turning the condenser shaft extending through the bottom front, left corner until the desired pitch is obtained. To make the beat oscillator adjustable from the front panel solder a heavy wire or handle to the shaft and allow it to extend out under the base pan.

RF GAIN CONTROL OR MANUAL VOLUME CONTROL: The RF gain control is used for code reception and should be rotated to the left when silent tuning is desired.

R METER ADJUSTMENT: To adjust the R meter, disconnect the antenna, and after the receiver has been on a few minutes, turn the control marked "R" METER ADJUSTMENT until the pointer swings to the maximum left hand position. The meter is at ground potential and cannot be damaged except through rough handling in a mechanical way.

ANTENNA TRIMMER ADJUSTMENT: Adjust the antenna trimmer on any station around 14 megacycles. Turn adjusting screw carefully until greatest signal strength is shown on the R meter. DO NOT ADJUST ANY OTHER TRIMMERS. The trimmer is adjusted correctly at the factory and should not require over ½ turn in either direction.

ALIGNMENT PROCEDURE

Tune the Intermediate Frequency transformers to resonant point of Crystal. This point may be 200 to 1000 cycles different from the oscillating point of the crystal (if crystal was used as oscillator control). Adjust IF transformers in following sequence :-

(1) Align the 2nd Detector stage.
(2) Band-pass IF stage located in center of chassis.
(3) Crystal grid coil.
(4) 1st Detector plate coil (On rear of chassis)

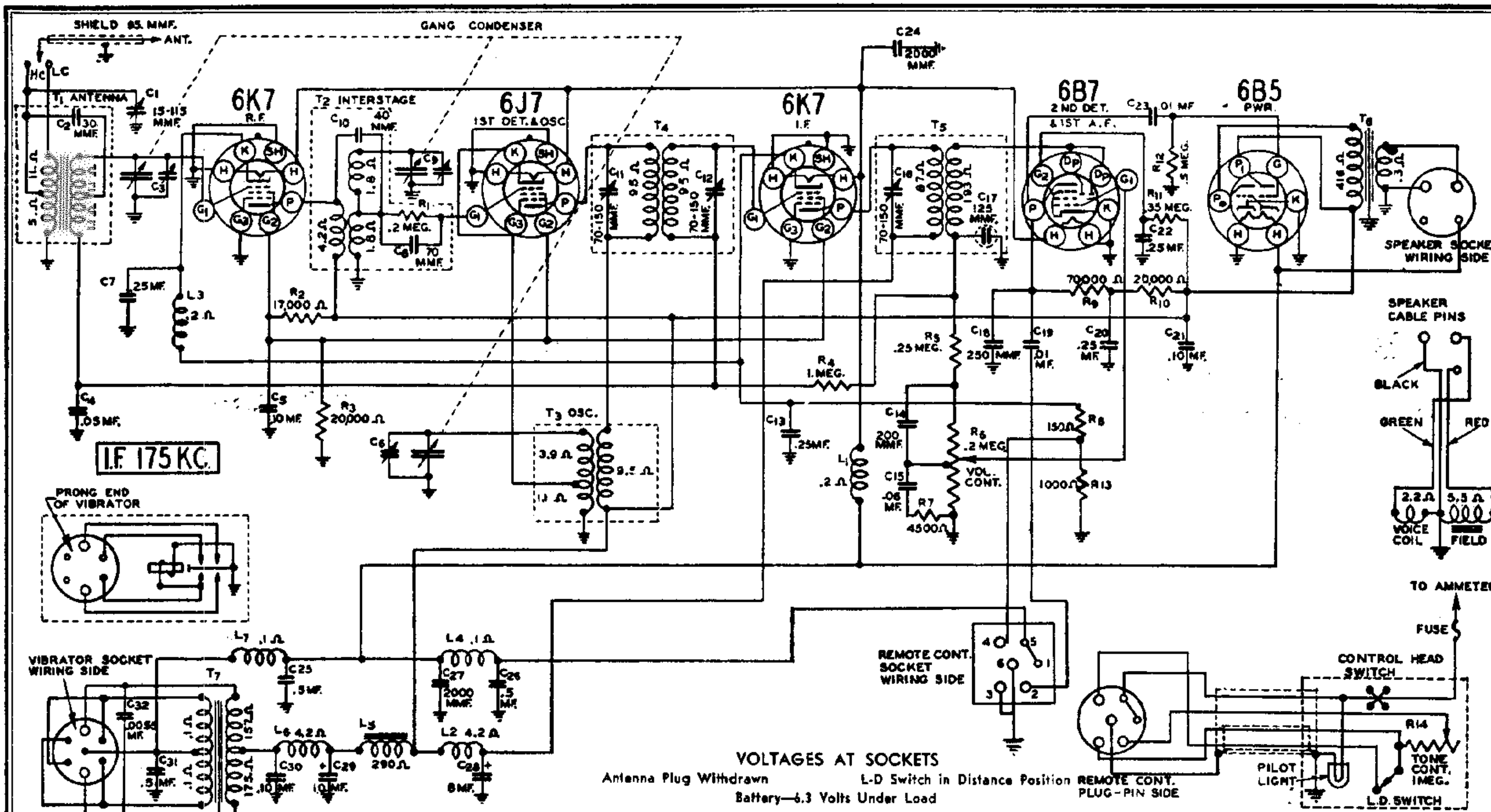
Place crystal in the filter circuit, tune in a low frequency broadcast station of 600 KC, adjust sensitivity control until "R" meter reads R6. Then phase crystal and retune dial to minimum modulation and maximum R strength location. Turn crystal off, without disturbing dial, retune IF trimmers as before to greatest "R" strength. Next align crystal resonant point with the IF. Crystal oscillator not necessary if IF adjustments have not been disturbed.

To adjust Low Frequency of each band. Trimmers are located on top of chassis, 75 meter trimmer located on the rear. High frequency trimmers are located on coil switch. At most trimmers should not require more than 1/8 turn for correction.

If variable condenser plates have become bent, realign rear unit of the three double sections of variable condenser, using 20 to 40 meter band as a standard. The broadcast portion of variable condenser is located in frontunit of the 3 double sections of variable condenser, and plates can be bent slightly for maximum gain and correct alignment when set is used on different antennas.

The oscillator section is located in rear double gang. In case the gear has slipped on condenser shaft or the belt damaged, set pointer at 580 KC when the condenser plates are even with front of condenser frame. This can be checked by laying knife along frame, opening the variable until rotor plates touch the knife. The pointer should be within 2 KC of 580 KC. For greater variations loosen gear on the condenser and slide rotors.

CADILLAC MOTOR CAR CO.



CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.

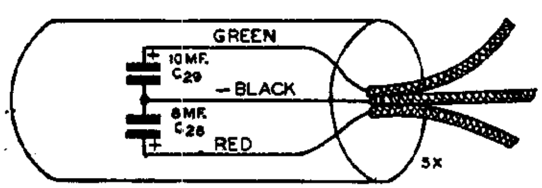


Fig. 5—Electrolytic Condenser Internal Connections

VOLTAGES AT SOCKETS

Antenna Plug Withdrawn — L-D Switch in Distance Position
Battery—6.3 Volts Under Load

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground
6K7	R.F.	6.1	240	105	2.0
6J7	1st Det. and Osc.	6.1	240	105	0
6K7	I.F.	6.1	240	105	2.0
6B7	2nd Det. and 1st A.F.	6.1	30(1)	40(1)	0
6B5	Power	6.2	230(2) 240(3)		0

(1) As read with 1000 ohms per volt meter—500 volt scale
(2) Measured at Output Plate (Po)

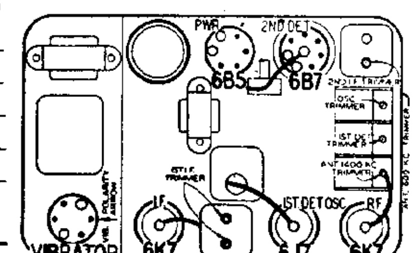


Fig. 2—Location of Tubes and Trimmers

MODEL 5X
MODEL 6KB
Alignment, Notes

CADILLAC MOTOR CAR CO.

I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the output of the signal generator through a .05 mf. condenser to the stator of the 1st det. section of the tuning condenser. (See Fig. 2. for location of this section.)

Connect the ground lead of the signal generator to the chassis. The chassis should be in the case.

Turn the Local-Distance switch to the "Distance" position and keep it in this position for all adjustments.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers is shown in Fig. 2.

1581 KC Adjustment

Set the signal generator for 1581 KC.

Turn the rotor of the tuning condenser to the full open position.

Insert the antenna plug for a high capacity antenna (mark on LC side). Connect the shielded antenna lead from the chassis through a 120 mmf. condenser to the antenna post of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—See Fig. 2 for location of this trimmer.

1400 KC Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st det. and antenna 1400 KC trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Adjust the antenna 600 KC trimmer to maximum. This trimmer is reached from the outside of the case See Fig. 3.

After the alignment procedure is completed, the antenna plug may be withdrawn and re-inserted for a low capacity antenna (mark on HC side) if a low capacity car antenna is used.

Adjusting Antenna 600 KC Trimmer

After the radio is installed and the car antenna is connected, it will be necessary to readjust the antenna 600 KC trimmer.

Tune in a weak signal at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained. See Fig. 3 for location of this trimmer.

Calibrating the Radio

Tune in a signal of known frequency at about the center of the dial. Choose a station with a frequency which corresponds to one of the numbers on the dial drum. For example, WLW, with a frequency of 700 KC, corresponds to 70 on the dial.

Hold the tuning knob. Using a clean eraser on the end of a lead pencil, turn the dial drum until the frequency of the station tuned in is at the center of the dial opening.

Inserting Antenna Plug

IMPORTANT—The antenna plug can be inserted in two ways depending on whether the antenna is of high or low capacity.

Referring to Fig. 3, it will be noted that the letters HC and LC are stamped on the case. There is a spot of paint on the antenna plug. When the plug is inserted with the spot of paint on the LC side, it is properly inserted for a high capacity antenna and when it is inserted with the spot of paint on the HC side, it is properly inserted for a low capacity antenna.

If the total capacity of the antenna and shielded lead is approximately 200 mmf., which would be the case in a running board or ordinary roof antenna (not metal roof), insert the antenna plug for a high capacity antenna or with the mark on the LC side.

If the total capacity of the antenna and shielded lead is approximately 70 mmf., such as may be the case if a "fish pole" antenna is used, insert the antenna plug for a low capacity antenna or with the mark on the HC side.

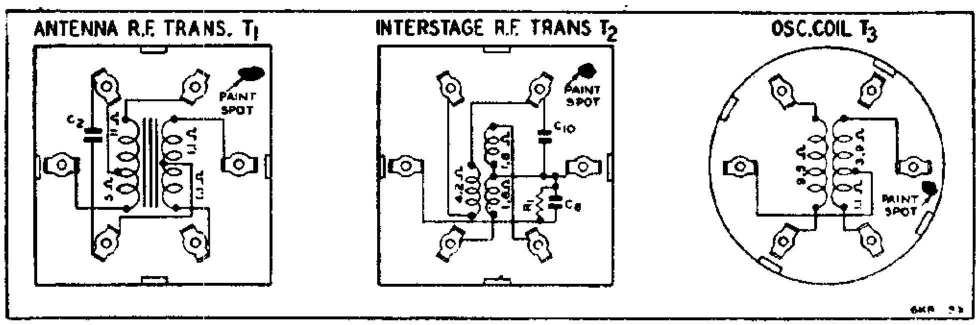


Fig. 4—R.F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

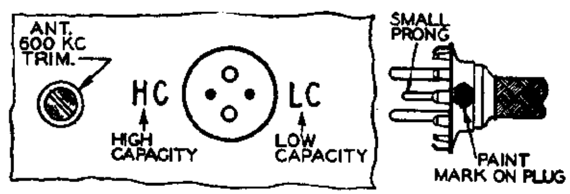
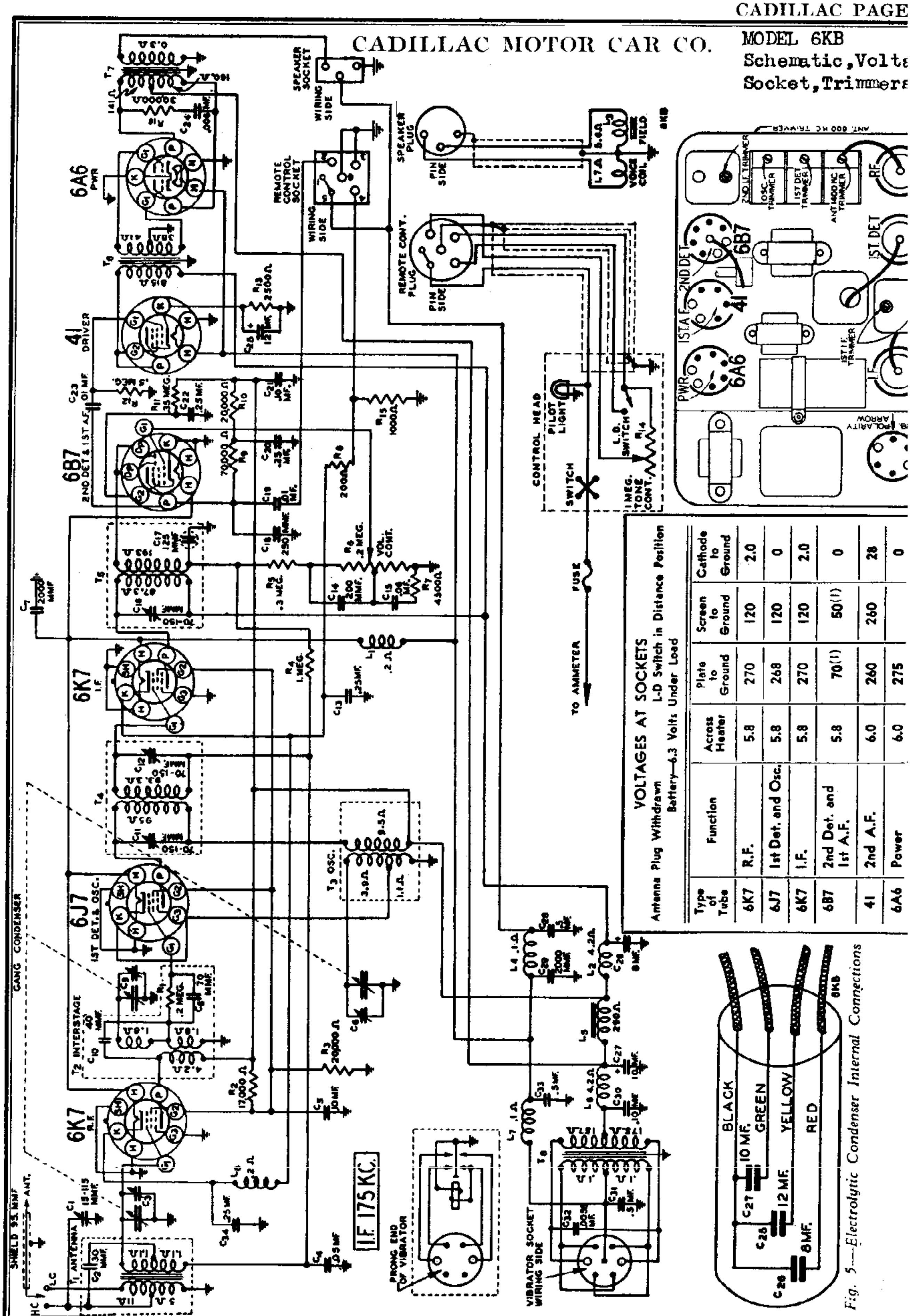


Fig. 3—Antenna Plug Insertion

MODEL 6KB
Schematic, Volta
Socket, Trimmers



VOLTAGES AT SOCKETS

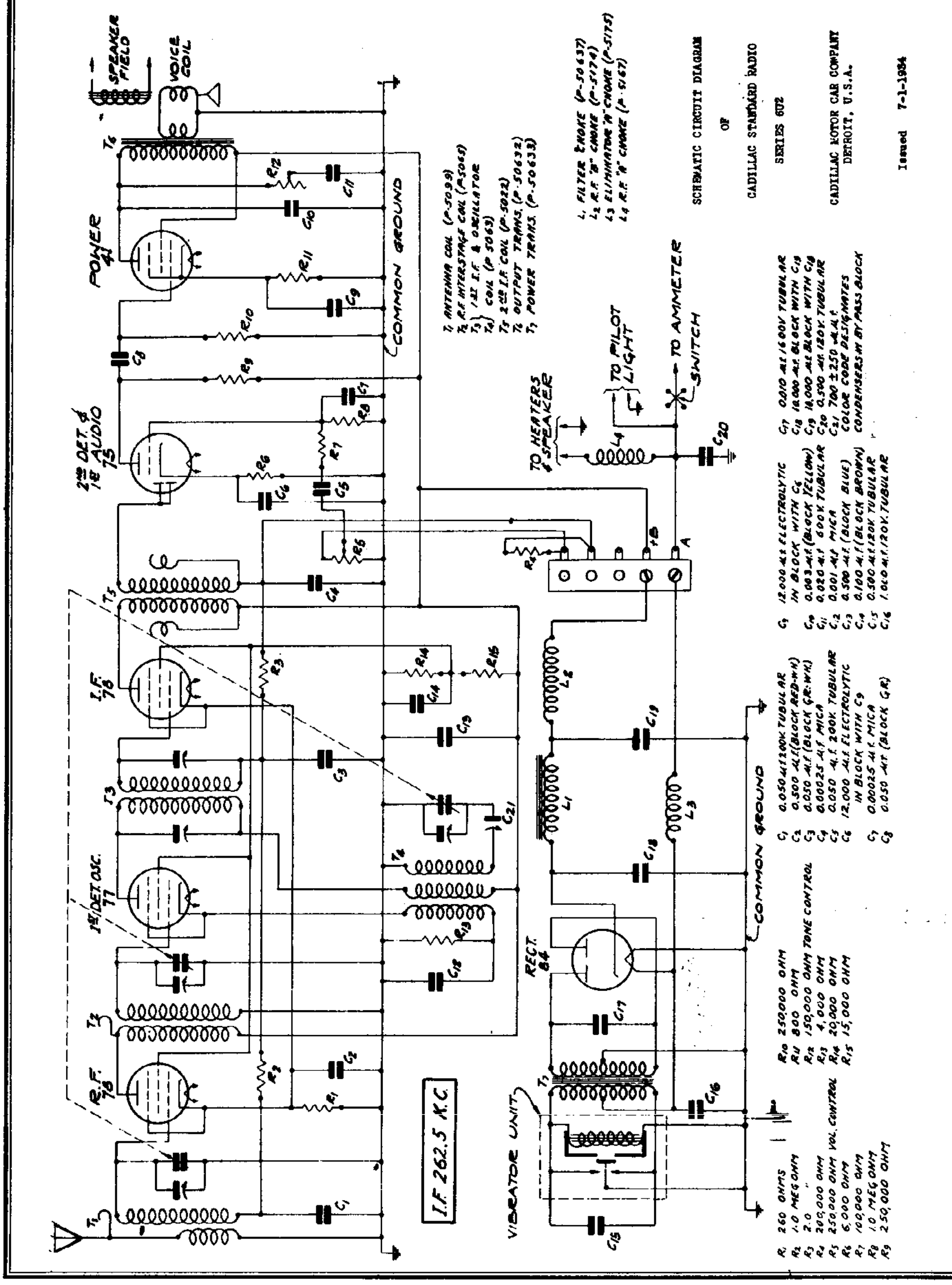
Antenna Plug Withdrawn — L-D Switch in Distance Position
Battery—6.3 Volts Under Load

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground
6K7	R.F.	5.8	270	120	2.0
6J7	1st Det. and Osc.	5.8	268	120	0
6K7	I.F.	5.8	270	120	2.0
6B7	2nd Det. and 1st A.F.	5.8	70(1)	50(1)	0
41	2nd A.F.	6.0	260	260	28
6A6	Power	6.0	275		0

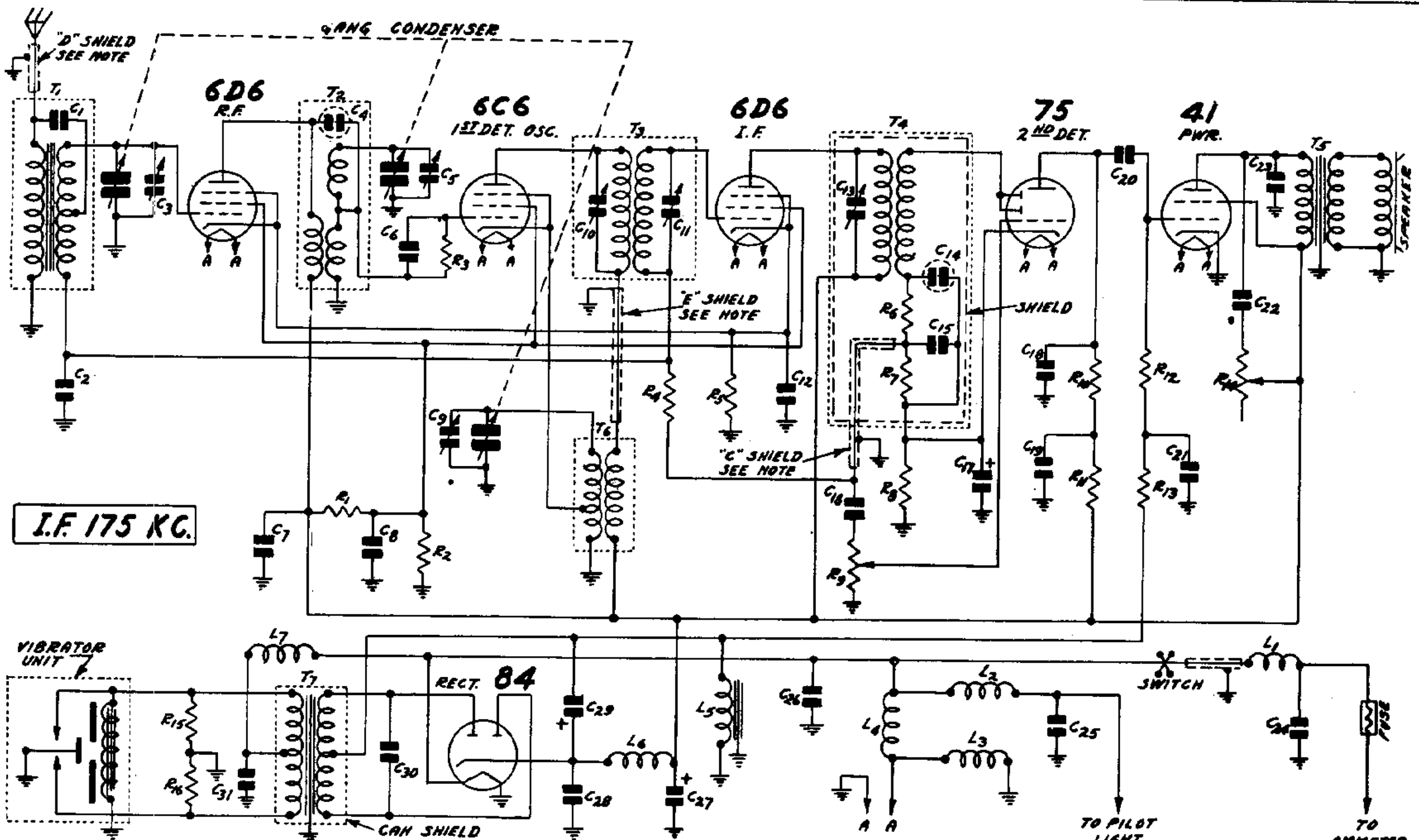
Fig. 5—Electrolytic Condenser Internal Connections

MODEL 6U2
Schematic

CADILLAC MOTOR CAR CO.



CADILLAC MOTOR CAR CO.



GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.
THE CAPACITY OF "C" SHIELD IS 37 MMF, THE CAPACITY OF "D" SHIELD IS 85 MMF AND THE CAPACITY OF "E" SHIELD IS 15 MMF.

C 1	21 mmf.
C 2	.05 mf. 180 V.
C 3	Gang Trimmer
C 4	40 mmf.
C 5	Gang Trimmer
C 6	35 mmf.
C 7	.10 mf. 360 V.
C 8	.10 mf. 180 V.
C 9	Gang Trimmer
C10	70-150 mmf. } One Unit
C11	70-150 mmf. } One Unit
C12	.10 mf. 180 V.
C13	70-150 mmf.
C14	250 mmf.
C15	250 mmf.
C16	.01 mf. 360 V.
C18	250 mmf.
C19	.10 mf. 360 V.
C20	.01 mf. 360 V.
C21	.25 mf. 180 V.
C22	.02 mf. 600 V.
C23	.002 mf. 600 V.
C24	.50 mf. 180 V.
C25	2000 mmf.
C26	2000 mmf.
C28	.01 mf. 360 V.
C30	.0075 mf. 1600 V.
C31	.50 mf. 180 V.
C17	4.0 mf. 25 V. } Electrolytic Block
C27	5.0 mf. 350 V } Electrolytic Block
C29	8.0 mf. 350 V } Electrolytic Block
R 1	17000 ohm 1.0 W.
R 2	20000 ohm .5 W.
R 3	.50 Megohm .2 W
R 4	1.0 Megohm .2 W.
R 5	350 ohm .2 W.
R 6	50000 ohm .2 W.
R 7	500000 ohm .2 W.
R 8	6000 ohm .2 W.
R 9	2.0 Megohm Volume Control
R10	150000 ohm .2 W.
R11	50000 ohm .2 W.
R12	.50 Megohm .2 W.
R13	100000 ohm .2 W.
R14	150000 ohm Tone Control
R15	50 ohm .5 W.
R16	50 ohm .5 W.
T 1	Antenna Trans.
T 2	R. F. Interstage Trans.
T 3	1st I. F. Trans.
T 4	2nd I. F. Trans.
T 5	Output Trans.
T 6	Osc. Inductor
T 7	Power Trans.
L 1	Motor Noise Reactor
L 2	Pilot Light Reactor
L 3	Speaker Field 5.3
L 4	Filament Reactor
L 5	Filter Choke
L 6	"B" Reactor
L 7	Vibrator Reactor

I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the antenna lead of the signal generator thru a .05 mf. condenser to the stator of the 1st detector section of the tuning condenser. (See Fig. 2 for location of this section.) This can be done by pushing a wire or conductor between the stator plates or by extending an insulated wire thru the hole in the shield over the stator and pushing the wire thru the hole in the lug which extends up from the insulated stator assembly.

Connect the ground lead of the signal generator to the chassis ground.

Short out the oscillator section of the tuning condenser.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers is shown in Fig. 2.

1650 KC. Adjustment

Set the signal generator for 1650 KC.

Turn the rotor of the tuning condenser to the full open position.

Connect the shielded antenna lead from the chassis through a 150 mmf. condenser to the antenna post of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—see Fig. 2 for location of this trimmer.

1400 KC. Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st detector and antenna trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 KC. with the volume control about three-fourths on. Remove the cover of the chassis case. **The antenna trimmer is on the center tuning condenser section—see Fig. 2.** Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

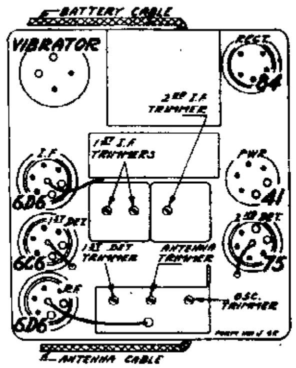


Fig. 2—Location of Tubes and Trimmers

VOLTAGES AT SOCKETS

Antenna Disconnected — Battery 6 Volts Under Load

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground	Cathode Current M. A.
6D6	R. F. Amp.	5.8	220	90	4.5	6.3
6C6	1st Det. Osc.	5.8	220	90	0	2.4
6D6	I. F. Amp.	5.8	220	90	4.5	6.3
75	2nd Det.	5.8	130(1)		1.2	0.3
41	Power	5.8	210	220	16(2)	25.5
84	Rectifier	5.8				50.0

(1) With 250,000 Ohm Meter
(2) As read across filter choke.

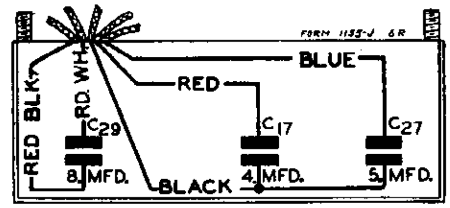


Fig. 4—Condenser Block—Internal Wiring

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Winding	Code	D. C. Resistance in Ohms
P-9A443	Antenna Transformer	T1	
	Primary Winding		8.7
	Secondary Winding—Either Portion		1.0
P-9A439	Interstage Transformer	T2	
	Primary Winding		44.4
	Secondary Winding—Either Portion		1.4
P-9A441	1st I. F. Transformer	T3	
	Primary Winding		93.5
	Secondary Winding		97.6
P-9A442	2nd I. F. Transformer	T4	
	Primary Winding		44.1
	Secondary Winding		49.6
P-12A227	Dynamic Speaker		
	Output Transformer Primary	T5	416.6
	Output Transformer Secondary	T5	Small
	Speaker Field	L3	5.3
	Speaker Voice Coil		Small
P-9A440	Oscillator Coils	T6	
	Grid Coil		
	Long Portion		3.0
	Short Portion		0.9
	Plate Coil		5.8
P-53X108	Power Transformer	T7	
	Primary Winding		
	Center Tap to Inside		Small
	Center Tap to Outside		Small
	Secondary Winding		
	Center Tap to Inside		200.
	Center Tap to Outside		200.
P-9A444	Motor Noise Reactor	L1	Small
P-9A448	Pilot Light Line Reactor	L2	Small
P-9A446	Filament Reactor	L4	Small
P-52X42	Filter Choke	L5	312.5
P-9A447	R. F. "B" Plate Reactor	L6	4.1
P-9A445	Vibrator Filter Reactor	L7	Small

Tuning Frequency Range . . . . . 530-1650 KC
Intermediate Frequency . . . . 175 KC
Speaker . . . . 6 Inch Dynamic
Power Consumption . . . 6.5 Amperes at 6.3 Volts
Power Output . . . . 3 Watts Undistorted
Sensitivity . . . . . 1.0 Microvolt Absolute
Selectivity . . 45 KC Broad at 1000 Times Signal

General Service Data

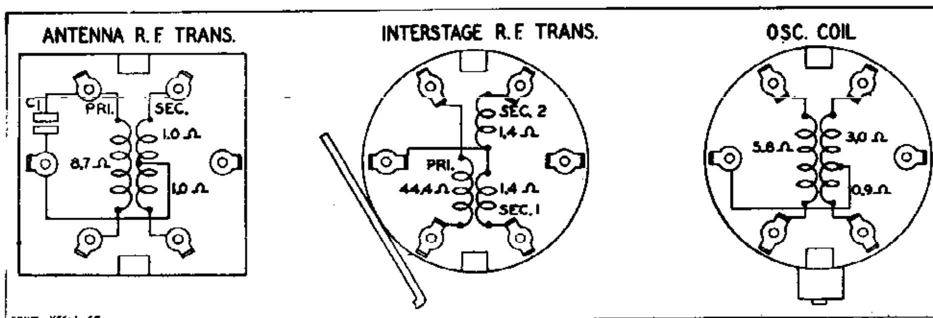
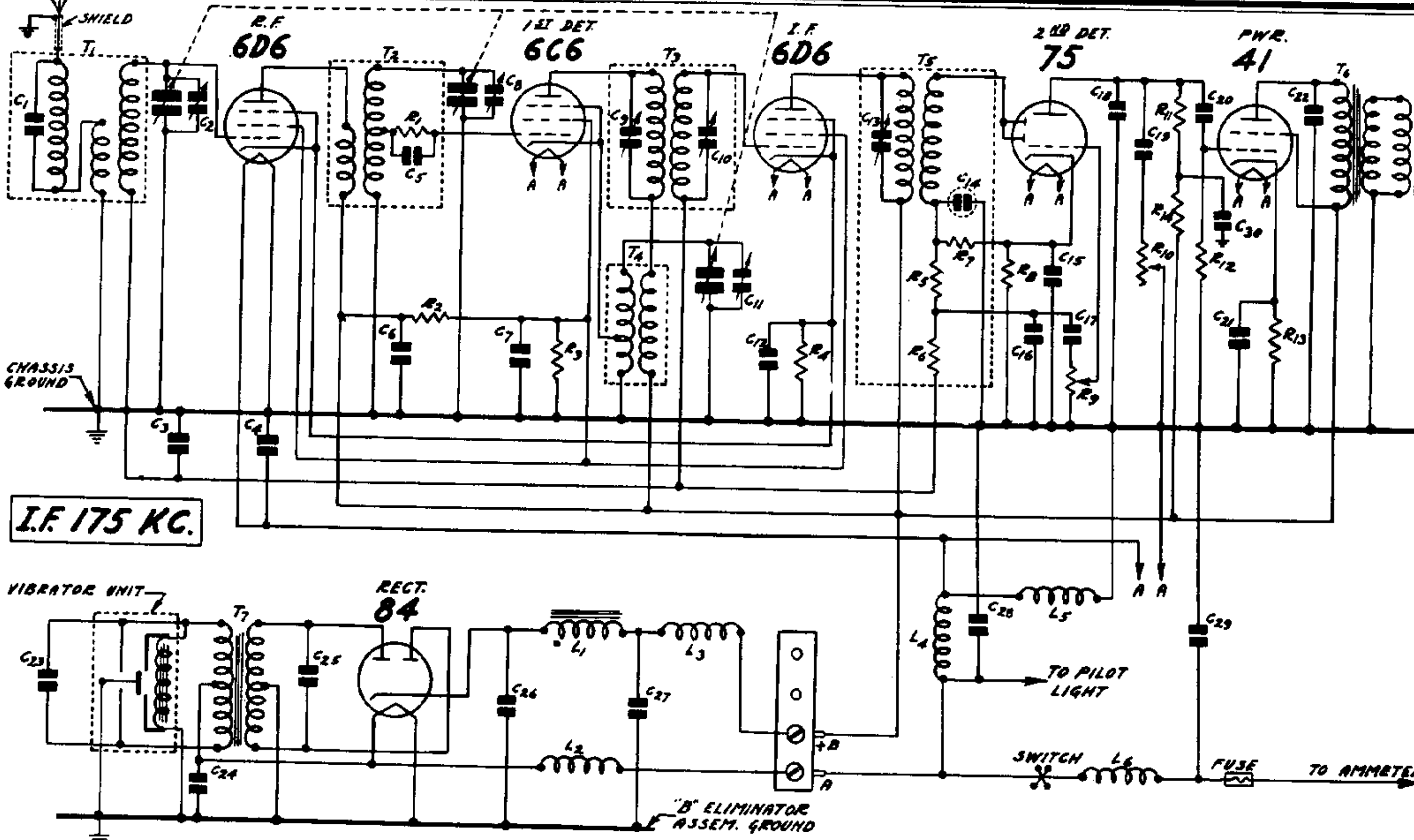


Fig. 3—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

CADILLAC MOTOR CAR CO.

MODEL 6S
Schematic, Parts



NOTE:
GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

RESISTORS

New Part No.	Code	Resistance	Wattage	Type	List Price
A95504	R1	500,000 Ohm	0.2	Carbon	.10
B94153	R2	15,000 Ohm	0.5	Carbon	.15
B94203	R3	20,000 Ohm	0.5	Carbon	.15
43X41	R4 / R13	450 Ohm / 800 Ohm	0.2 / 0.5	Armored Wire Wound	.30
A95503	R5	50,000 Ohm	0.2	Carbon	.10
A95105	R6	1.0 Megohm	0.2	Carbon	.10
A94504	R7	500,000 Ohm	0.2	Carbon	.10
A95752	R8	7,500 Ohm	0.2	Carbon	.10
36X200	R9	2.0 Megohm		Volume Control & Switch	1.15
40X201	R10	300,000 Ohm		Tone Control	.75
*A95204	R11	200,000 Ohm	0.2	Carbon	.10
†A95154	R11	150,000 Ohm	0.2	Carbon	.10
A95504	R12	500,000 Ohm	0.2	Carbon	.10
†A95503	R14	50,000 Ohm	0.2	Carbon	.10

CONDENSERS

New Part No.	Old Part No.	Code	Capacity	Voltage	Type	List Price
47X54		C1	.0005 mf.		Moulded	.15
		C2	Antenna Trimmer-Part of Gang Condenser			
46X30		C3	.05 mf.	180	Tubular	.15
47X50		C4	.003 mf.		Moulded	.25
47X53		C5	.000035 mf.		Moulded	.10
46X81		C6	.10 mf.	400	Tubular	.25
46X83		C7	.10 mf.	180	Tubular	.25
		C8	1st Detector Trimmer-Part of Gang Condenser			
*17A32		C9 / C10	130-300 mmf. / 130-300 mmf.		1st I. F. Trimmer Condensers	.50
†17A33		C9 / C10	70-150 mmf. / 70-150 mmf.		1st I. F. Trimmer Condensers	.50
		C11	Oscillator Trimmer-Part of Gang Condenser			
46X82		C12	.10 mf.	180	Tubular	.25
17A18	1965	C13	70-140 mmf. 2nd I.F. Trimmer Condenser			.35
		C14	.00025 mf. Part of 2nd I.F. Coil Assembly			
45X203		C15 / C21	12.00 mf. / 12.00 mf.	25 / 25	Dry Electrolytic Block	1.05
47X52		C16	.00025 mf.		Moulded	.15
46X84		C17	.01 mf.	180	Tubular	.15
47X52		C18	.00025 mf.		Moulded	.15
46X92		C19	.006 mf.	600	Tubular	.20
46X86		C20	.01 mf.	400	Tubular	.20
46X85		C22	.002 mf.	600	Tubular	.20
46X93		C23	.50 mf.	180	Tubular	.35
46X89		C24	1.65 mf.	180	Tubular	.80
46X88		C25	.01 mf.	1800	Tubular	.30
45X204		C26 / C27	6.00 mf. / 8.00 mf.	350 / 350	Dry Electrolytic Block	2.[illegible]
46X93		C28	.50 mf.	180	Tubular	[illegible]
46X94		C30	.25 mf.	[illegible]	Tubular	[illegible]
45X50		C29	.005 mf.		Moulded	[illegible]
14A39					3 Section Gang Condenser	[illegible]

TRANSFORMERS AND COILS

New Part No.	Old Part No.	Description	Code	List Price
51X17-6S	50632	Output Transformer	T6	1.65
9A368-6S		Antenna Coil Assembly (Less Can)	T1	.90
9A369-6S		R.F. Interstage Coil Assembly (Less Can)	T2	1.25
1A23-6S		Dual-Coil Can Assembly Only (for above two coils)		.30
9A371-6S		1st I.F. Coil & Can Assembly Complete	T3	1.70
9A370-6S		Oscillator Coil & Can Assembly Complete	T4	.60
9A372-6S		2nd I.F. Coil & Can Assembly Complete	T5	2.05
9A375-6S		Pilot Light Choke Assembly	L4	.15
9A373-6S		Motor Noise Choke	L6	.25
9A368-6S	5174	R.F. "B" Choke Coil Assembly	L3	.10
9A374-6S		Filament Reactor	L2	.50
53X72-6S	50633	Power Transformer	T7	3.20
52X27-6S	50637	Filter Choke	L1	.90
9A368	5174	R.F. "B" Choke Coil Assembly	L3	.10
9A374		Filament Reactor	L2	.50
53X72	50633	Power Transformer	T7	3.20
52X27	50637	Filter Choke	L1	1.00
19A14	2080	Vibrator—Mallory		4.00
19A16	2110	Vibrator—Radiart		4.00
3A127	2023	Vibrator Socket		.10

MODEL 68
Alignment, Voltage
Socket, Trimmers
Changes, Notes

CADILLAC MOTOR CAR CO.

Power Output - 3 Watts Maximum
Sensitivity - 1.5 Microvolts Absolute
Frequency Range - 530 to 1650 KC

Speaker - 6 Inch Dynamic
Power Consumption - 5.75 Amperes at 6 Volts
I. F. - 175 KC

I. F. Adjustment

Remove chassis from case.

Establish ground connection between chassis and power supply.

Reconnect A and B wires from power supply to chassis.

Set the signal generator for a signal of 175 KC.

Connect the antenna lead of the signal generator thru a .05 mf. condenser to the stator of the 1st detector (middle) section of the tuning condenser. This can be done by pushing a wire or conductor between the stator plates or by extending an insulated wire thru the hole in the shield over the stator and pushing the wire thru the hole in the lug which extends up from the insulated stator assembly.

Connect the ground lead of the signal generator to the chassis ground.

Short out the oscillator section of the tuning condenser.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the levelling off action of the A.V.C.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers are shown in Fig. 2.

1650 KC. Adjustment

Set the signal generator for 1650 KC.

Turn the rotor of the tuning condenser to the full open position.

Connect the shielded antenna lead from the chassis through a 250 mmf. condenser to the antenna post of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A. V. C. action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—see Fig. 2 for location of this trimmer.

1400 K C. Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st detector and antenna trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 KC. with the volume control about three-fourths on. Remove the cover of the chassis case. The antenna trimmer is the trimmer condenser closest to the terminal strip—see Fig. 2. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

Calibrating the Receiver

After installing the receiver in the car the control unit or flexible shaft will probably cause the setting of the dial pointer to change. The receiver may then be recalibrated as follows: Tune in a station of known frequency at about the center of the dial. Then loosen the set screw which secures the station selector knob to the shaft.

The station selector shaft is made up of two sections—an inner and an outer shaft. By loosening the set screw in the station selector knob one turn, the knob and the outer shaft are disengaged from the inner shaft. The inner shaft is directly connected to the tuning condenser in the chassis.

By turning the station selector knob it will be found that the dial scale can be adjusted without disturbing the tuning of the receiver. Turn the knob until the dial scale is exactly at the frequency of the station which has been tuned in.

Retighten the set screw in the station selector knob.

Circuit

The circuit consists of a 6D6 R.F. stage, a 6C6 1st detector-oscillator stage, a 6D6 I.F. stage, a 75 dual diode-triode tube, which functions as a diode 2nd-detector and a triode 1st audio stage, and a single 41 output stage. An 84 full wave rectifier is used in the power unit. The intermediate frequency is 175 KC. The diode current establishes a drop across a resistor which is used as additional bias voltage for the R.F. and I.F. tubes giving automatic volume control action. The manual volume control varies the audio voltage to the grid of the 75 tube.

Changes In Early Models

In the early models, resistor R14, and condenser C30, were not used. In these models resistor R11 was rated at 200,000 ohms.

The capacity range of the 1st I.F. Trimmer Condensers C9 and C10, was from 130 to 300 mmf. in the early models.

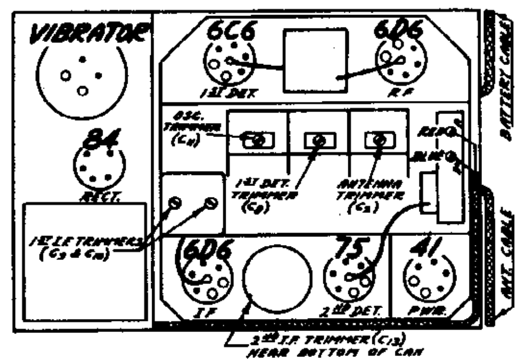


Fig. 2—Tube Arrangement and Trimmers

Voltages at Sockets
Antenna Disconnected - Voltage at Battery 6.1

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cath. to Ground	Normal Plate M.A.
6D6	R. F.	5.8	218	100	5.2	5.8
6C6	1st Det. and Osc.	5.8	218	100		2.0
6D6	I. F.	5.8	218	100	5.2	5.8
75	2nd Det. & 1st A. F.	5.8	160 (1)		1.4	2.8
41	Output	5.8	210	220	16.0	16.0
84	Rectifier	5.8				20.0 per plate

Speaker Field ..1.15 Amperes "B" Unit ......3.00 Amperes
Chassis .... 1.50 Amperes Pilot Lamp ....0.1 Amperes

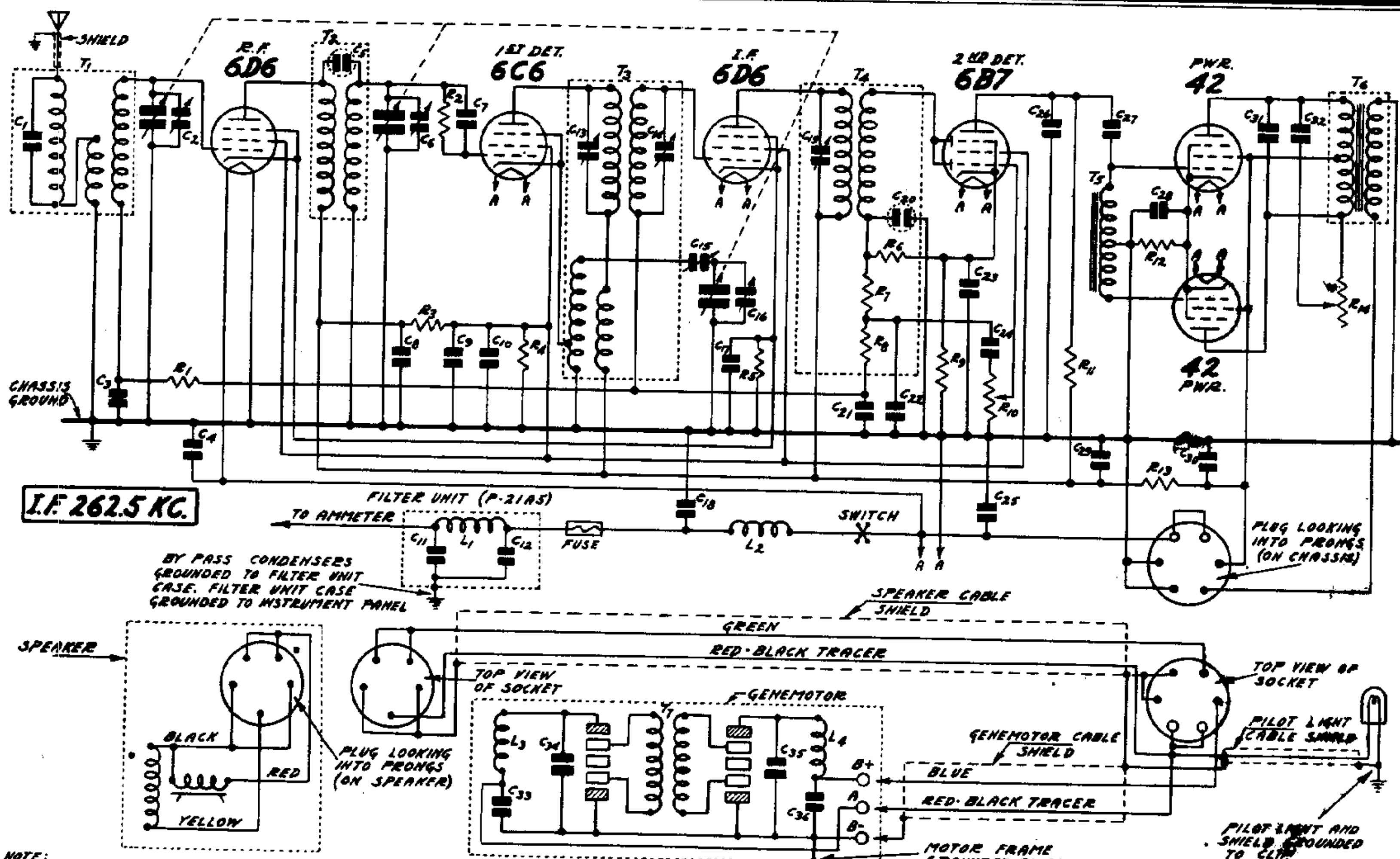
(1) Measured on 1000 V. Scale (1000 Ohms per volt)

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis.

New Part No.	ITEM	Code	D. C. Resistance in Ohms
9A368-6S	Antenna Trans. Primaries in Series	T1	6.3
	Antenna Trans. Secondary	T1	2.5
9A369-6S	R.F. Interstage Trans. Pri.	T2	4.5
	R.F. Interstage Trans. Sec.	T2	
	(Center Tap to inside)		1.8
	(Center Tap to ground)		1.3
9A371-6S	1st I.F. Trans. Primary	T3	58.
	1st I.F. Trans. Secondary	T3	58.
9A370-6S	Oscillator Cathode Coil (Total)	T4	3.
	Oscillator Plate Coil	T4	6.
9A372-6S	2nd I.F. Trans. Primary	T5	46.
	2nd I.F. Trans. Secondary	T5	46.
51X17-6S	Output Trans. Primary	T6	440.
	Output Trans. Sec. and Voice coil in parallel	T6	.4
53X72-6S	Power Trans. Primary	T7	.3
	Power Trans. Secondary	T7	500.
52X27-6S	Filter Choke	L1	300.
9A374-6S	Filament Reactor	L2	Small
9A268-6S	R.F. "B" Choke	L3	3.5
9A375-6S	Pilot Light Choke Assembly	L4	Small
12A62A	Speaker Field	L5	5.
9A373-6S	Motor Noise Choke	L6	Small

CADILLAC MOTOR CAR CO.



NOTE:
THE WIRE SHIELD, VOICE COIL AND FIELD RETURN SOLDERED TOGETHER. THE FRAME OF SPEAKER MUST BE ELECTRICALLY CONNECTED TO SHIELD.
GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.

Power Output - 8 Watts Maximum
Sensitivity - 1.5 Microvolts Absolute
Frequency Range - 530 to 1650 KC
Size of Speaker - 8" and 10"
Field Resistance - 5.4 Ohms (hot)

Power Consumption - at 6 Volts

Chassis - - - -	2.3 Amperes
Genemotor - - -	3.5 Amperes
Speaker Field - -	1.1 Amperes
Pilot Light - - -	0.1 Amperes
TOTAL	7.0 Amperes

Circuit

The circuit of this receiver consists of a 6D6 R. F. stage, a 6C6 1st detector-oscillator stage, a 6D6 I. F. stage, a 6B7 dual diode-pentode tube, which functions as a diode 2nd-detector and pentode 1st audio stage, and a 42 push pull output stage. A genemotor supplies the high voltage to the receiver. The intermediate frequency is 262.5 KC. The diode current establishes a drop across a resistor (R8) which is used as additional bias voltage for the R. F. and I. F. tubes giving automatic volume control action. The manual volume control varies the audio voltage applied to the grid of the 6B7 tube.

Current for the receiver is obtained from the car storage battery. In Fig. 3 is shown the condenser block internal wiring.

Genemotor Assembly

The genemotor assembly contains all of the parts shown within the dotted lines in Fig. _. We do not recommend that the genemotor itself be serviced in the field. The filter unit associated with the genemotor may be checked and any defective parts repaired or replaced. However, if the genemotor itself is at fault, it should be sent back to the factory for repair.

MODEL 6T
Alignment, Voltage
Trimmers, Socket
Data

CADILLAC MOTOR CAR CO.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the standard wave band and an accurately calibrated signal at 262.5 K. C., the intermediate frequency and an output indicating meter are necessary.

The chassis must be removed from the case.

I. F. Adjustment

Set the signal generator for a signal of 262.5 KC.

Connect the antenna lead of the signal generator thru a .05 mf. condenser to the coil end of the grid leak resistor R2. This connection can be made at either end of the lead between the stator of the 1st detector section of the gang condenser and the interstage R. F. coil.

Connect the ground lead of the signal generator to the chassis ground.

Short out the oscillator section of the tuning condenser.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the levelling off action of the A. V. C.

Then adjust the three I. F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the back of the chassis - see Fig. 1.

CAUTION:—Use an insulated screwdriver for adjusting these trimmers to prevent short circuiting to ground.

1650 KC. Adjustment

Set the signal generator for 1650 KC.

Turn the rotor of the tuning condenser to the full open position.

Connect the shielded antenna lead from the chassis through a 250 mmf. condenser to the antenna post of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A. V. C. action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—see Fig. 4 for location of this trimmer.

1400 KC. Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser until maximum output is obtained.

Adjust the antenna and 1st detector trimmers of the gang condenser for maximum output—see Fig. 4 for location of these trimmers. Do not change the setting of the oscillator section trimmer.

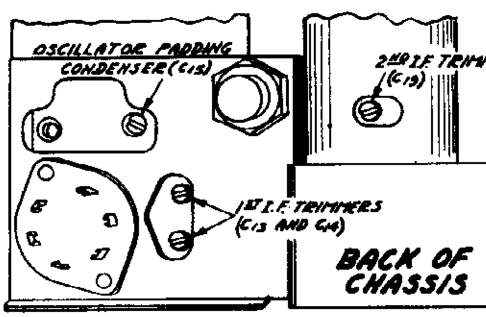


Fig. 1—Location of Trimmer Condensers

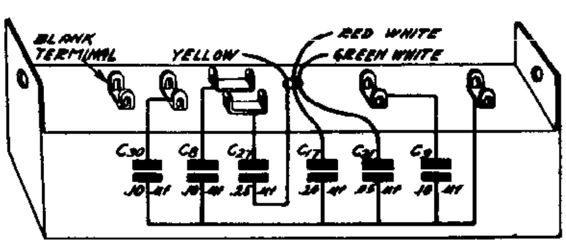


Fig. 3—Block Condenser

600 KC. Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Use a non-metallic screwdriver for this adjustment.

Turn the rotor slowly back and forth at the same time adjusting the oscillator padding condenser until the peak of greatest intensity is obtained. See Fig. 1 for location of this trimmer.

1400 KC. Adjustment Check

Set the signal generator for 1400 KC.

Check the setting of the antenna and 1st detector trimmers of the gang condenser for maximum output. Do not change the setting of the oscillator trimmer section.

Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 KC. with the volume control about three-fourths on. The location of the antenna trimmer is shown in Fig. 4. This trimmer may be reached by removing the small metal plate on the end of the chassis case. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

Calibrating the Receiver

After reinstalling the receiver in the car the control unit or flexible shaft will probably cause the setting of the dial pointer to change. The receiver may then be recalibrated as follows: Tune in a station of known frequency at about the center of the dial. Then loosen the set screw which secures the station selector knob to the shaft.

The station selector shaft is made up of two sections—an inner and an outer shaft. By loosening the set screw in the station selector knob one turn, the knob and the outer shaft are disengaged from the inner shaft. The inner shaft is directly connected to the tuning condenser in the chassis.

By turning the station selector knob it will be found that the dial scale can be adjusted without disturbing the tuning of the receiver. Turn the knob until the dial scale is exactly at the frequency of the station which has been tuned in.

Retighten the set screw in the station selector knob.

Voltages at Sockets

Antenna Disconnected - Battery 6 Volts Under Load

Type of Tube	Function	Across Fila. or Heater	Plate to Ground	Screen to Ground	Cath. to Ground	Normal Plate M. A.
6D6	R. F.	5.8	192	90	6.3	4.5
6C6	1st Det. & Osc.	5.8	192	90	—	4.0
6D6	I. F.	5.8	192	90	6.3	4.5
6B7	2nd Det.	5.8	90	90	3.5	2.7
42	Power	5.8	230	235	24.0	16.0

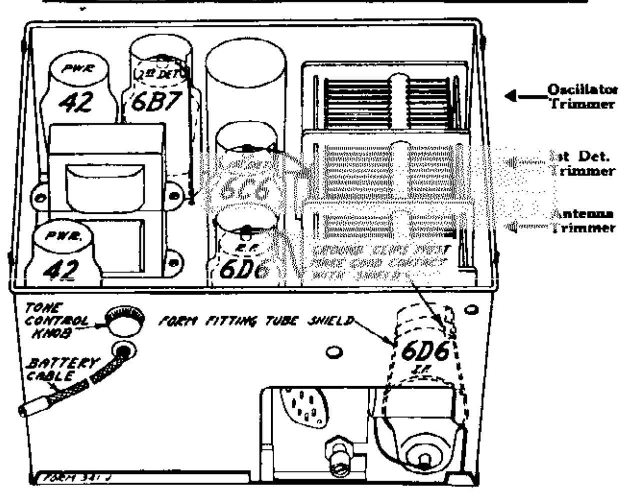
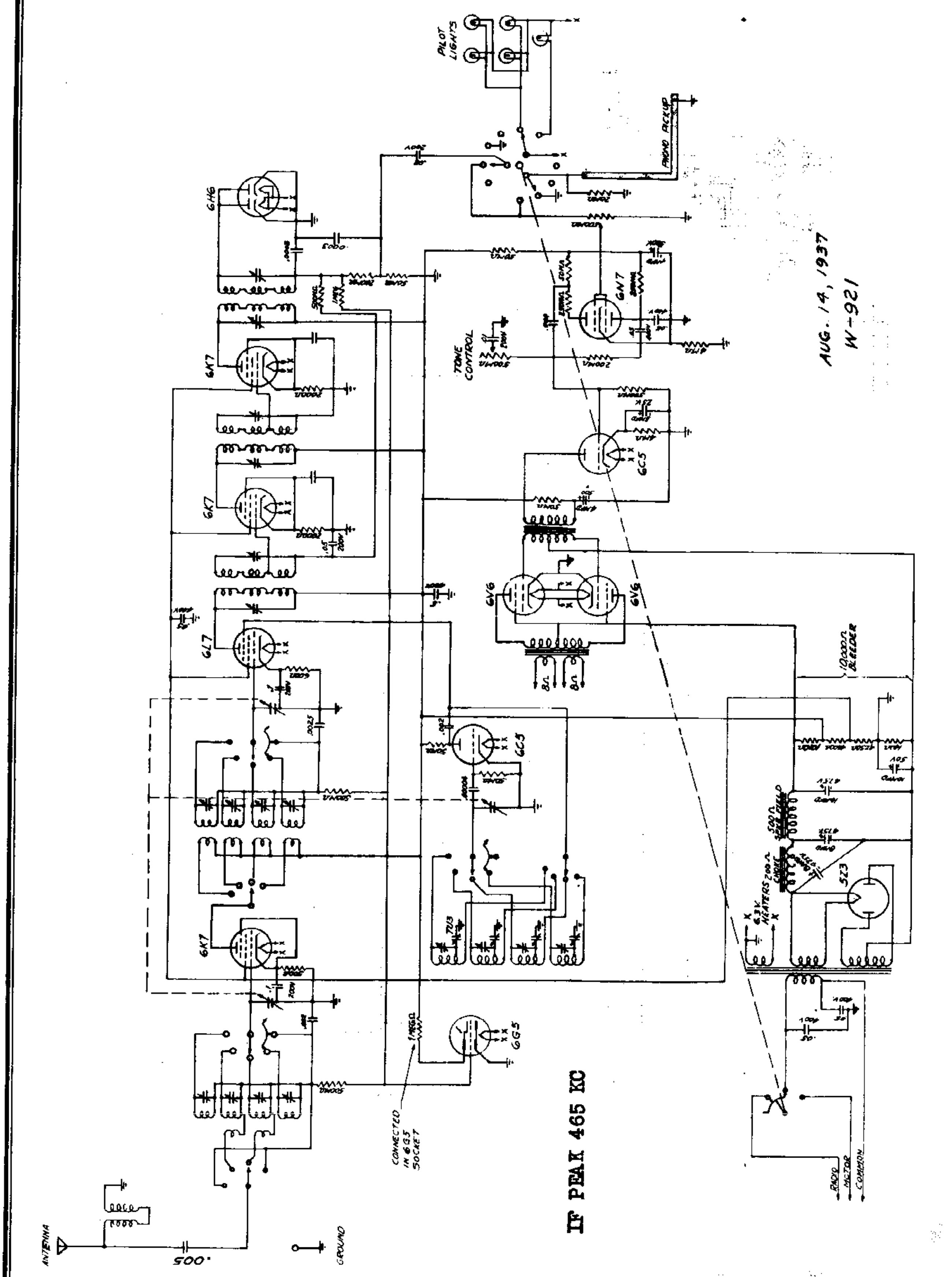


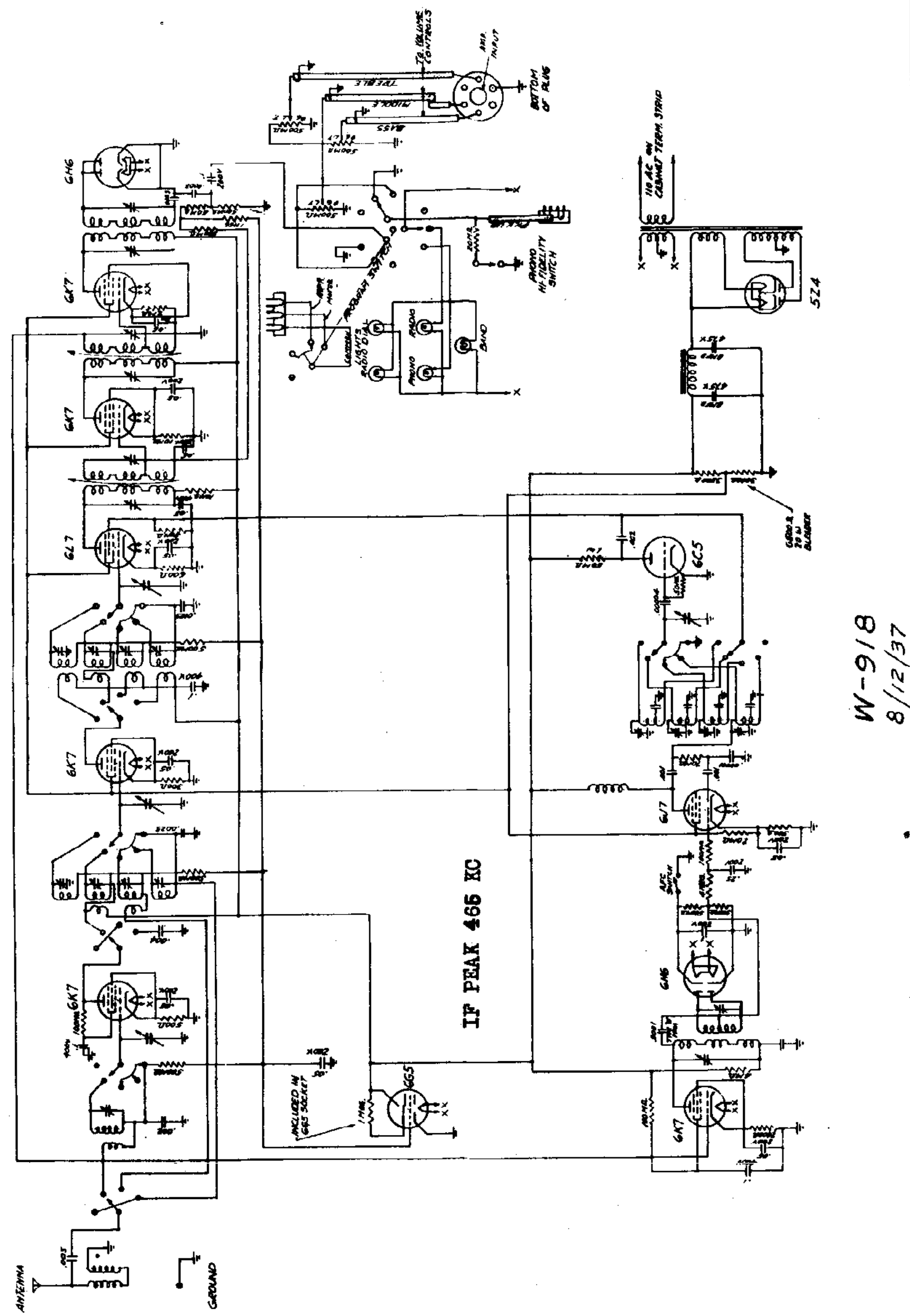
Fig. 4—Tube Arrangement

CAPEHART CORPORATION



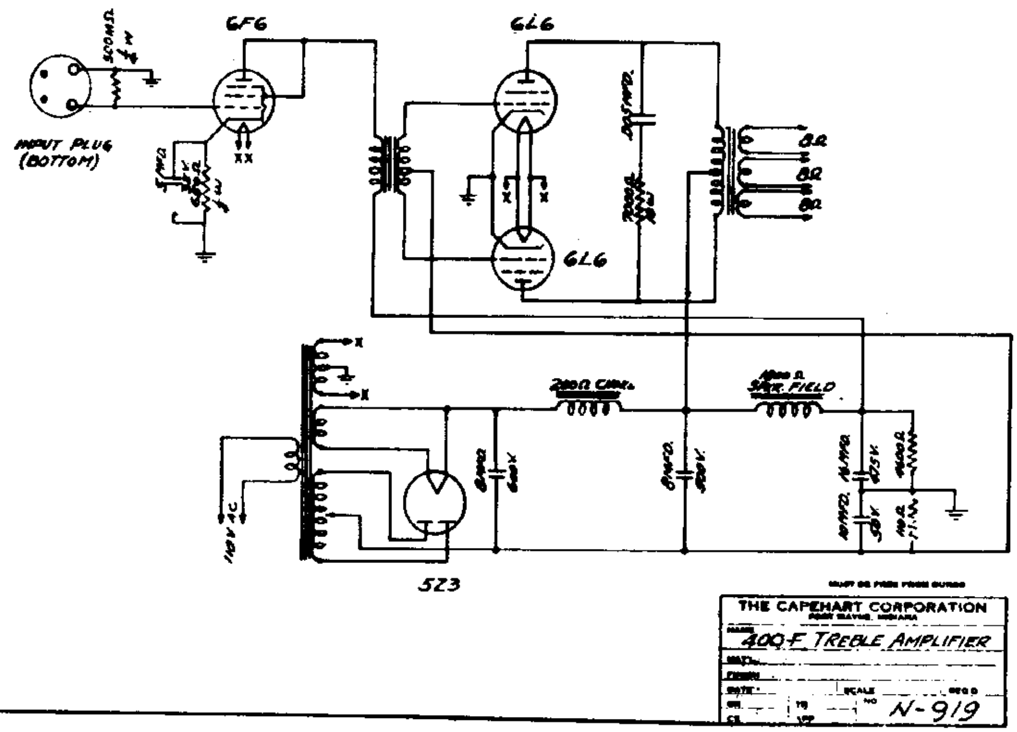
MODEL 400-F Tuner
Schematic

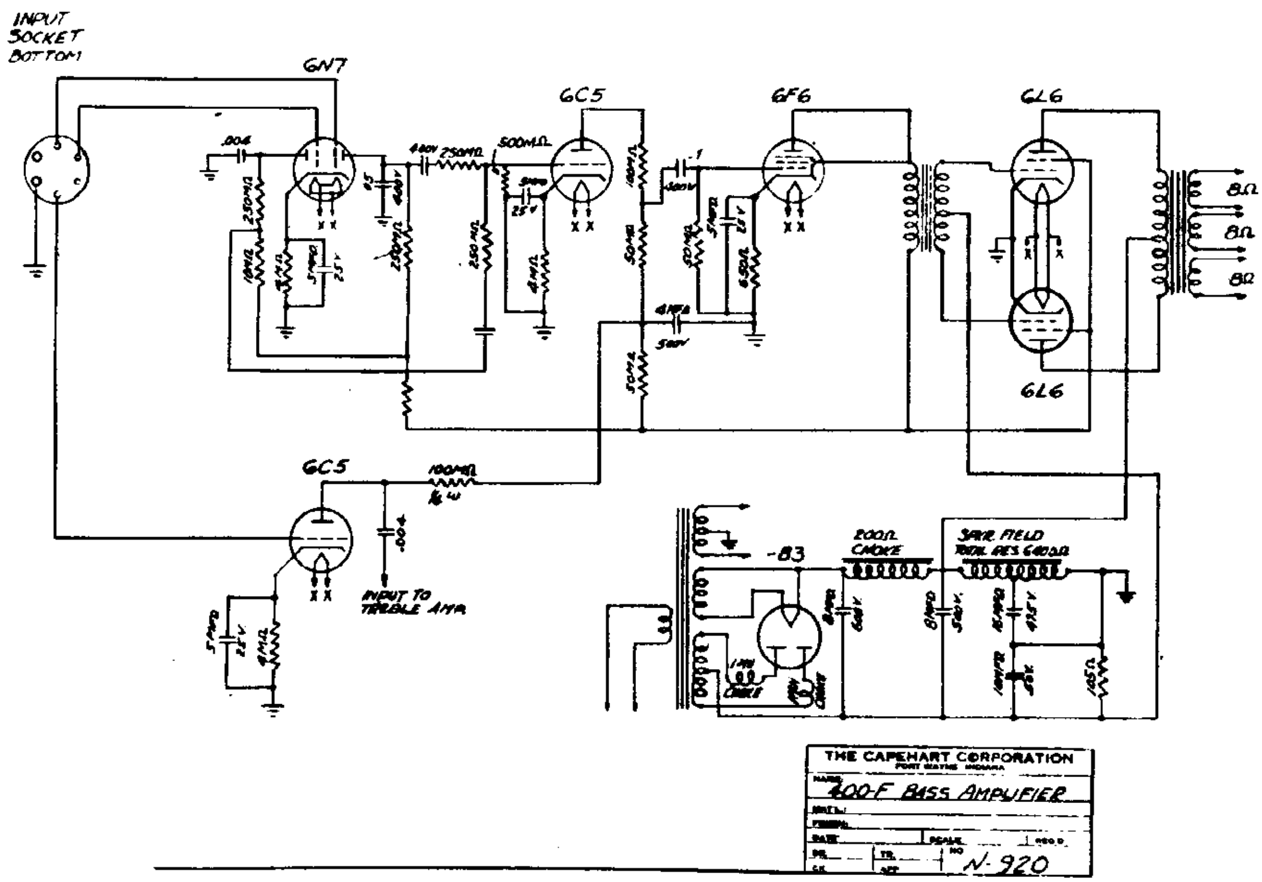
CAPEHART CORPORATION



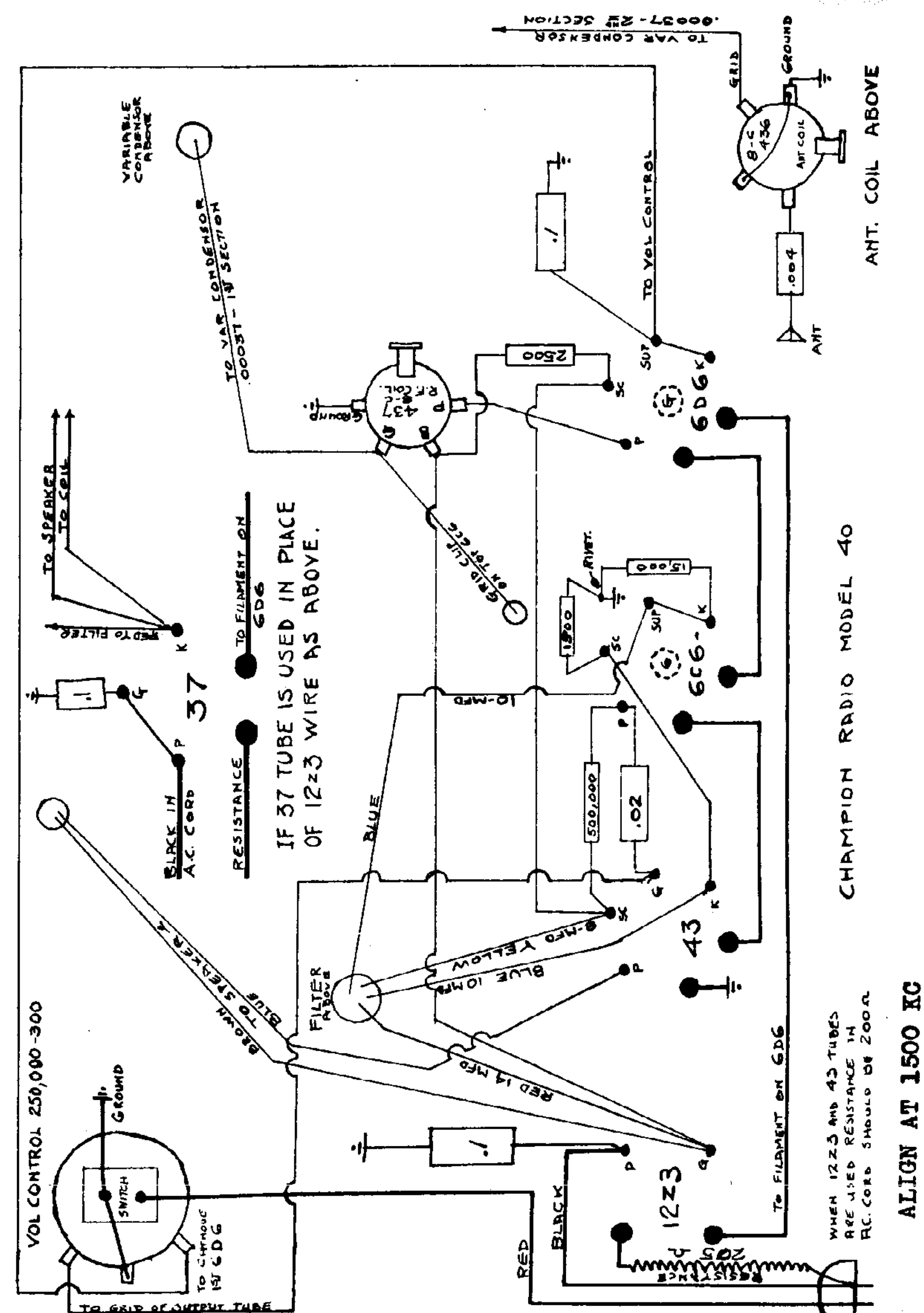
MODEL 400-F
Treble Amplifi
Bass Amplifier
Schematics

CAPEHART CORPORATION



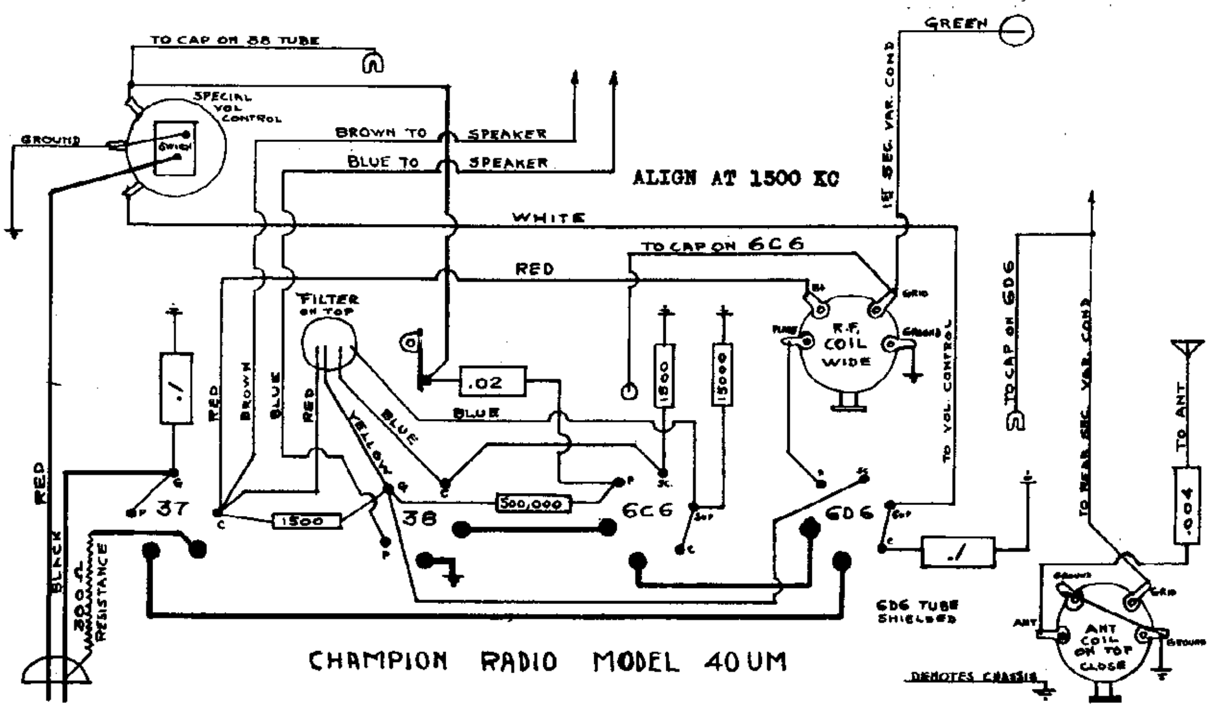


CHAMPION RADIO



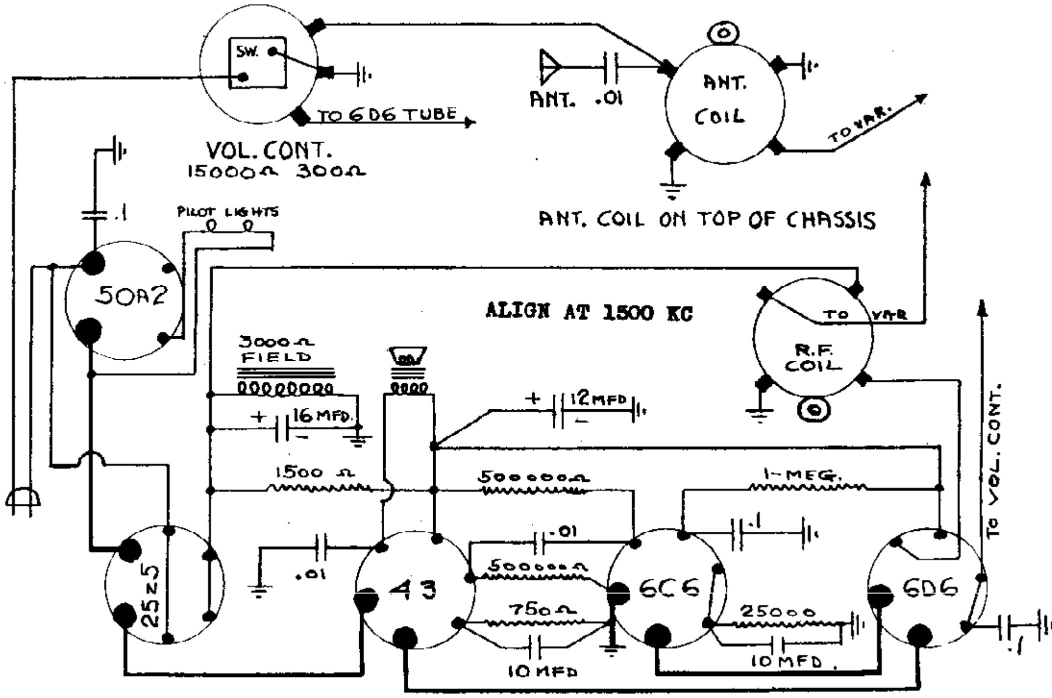
MODEL 40UM
MODEL 543 I.D.
Schematics

CHAMPION RADIO



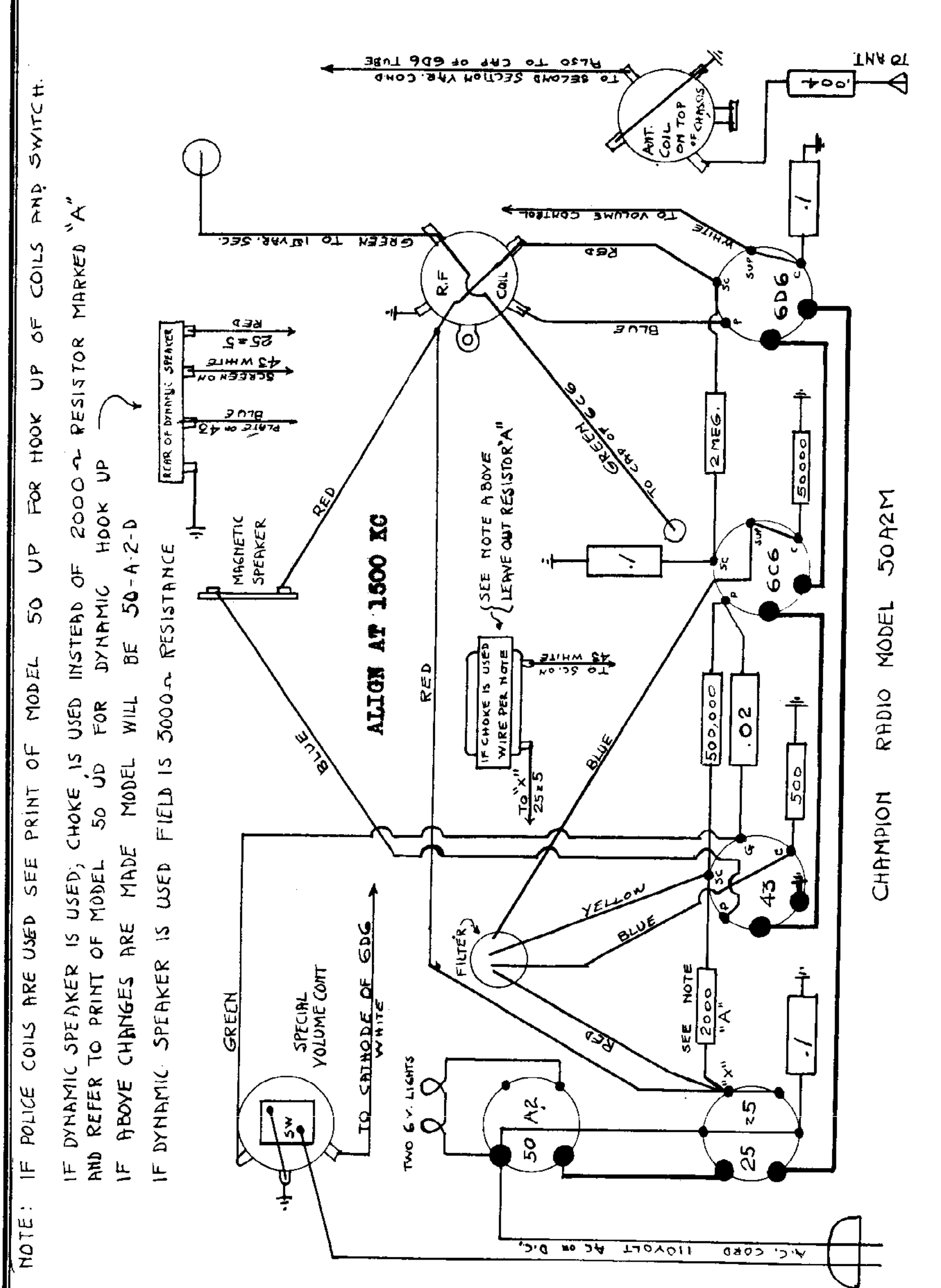
CHAMPION RADIO MODEL 40UM

5 TUBE A.C.-D.C. MODEL 543 I.D.



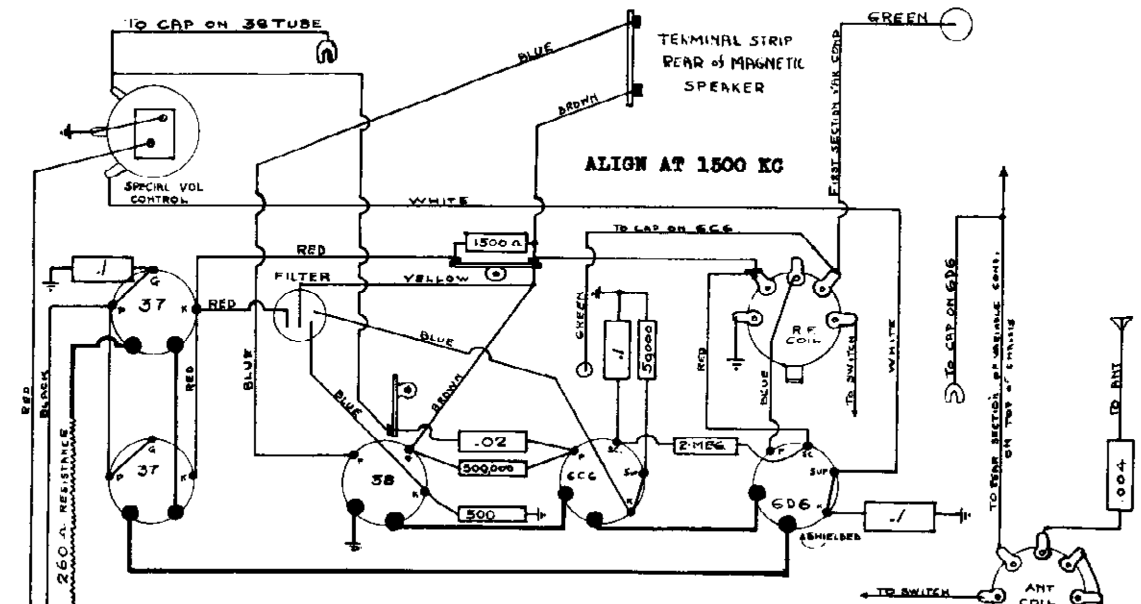
CHAMPION RADIO

CHAMPION RADIO



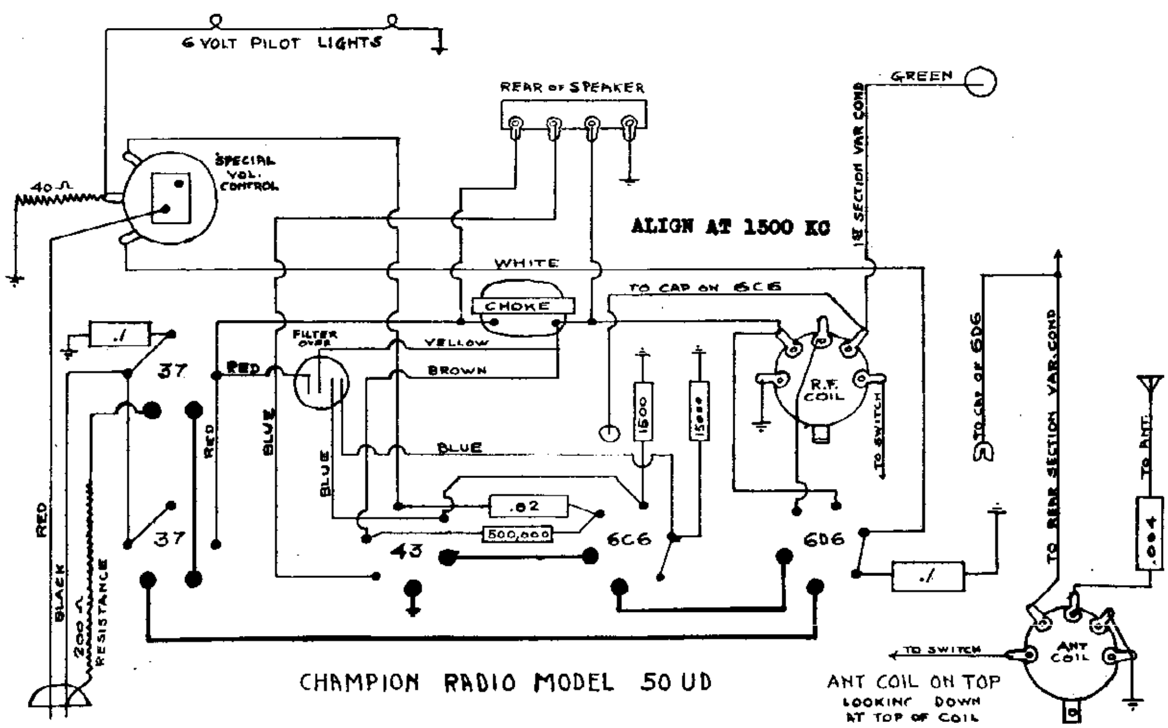
MODEL 50UD
MODEL 50UP
Schematics

CHAMPION RADIO



CHAMPION RADIO MODEL 50 U.P.

ANT. COIL ON TOP LOOKING DOWN AT TOP OF COIL.

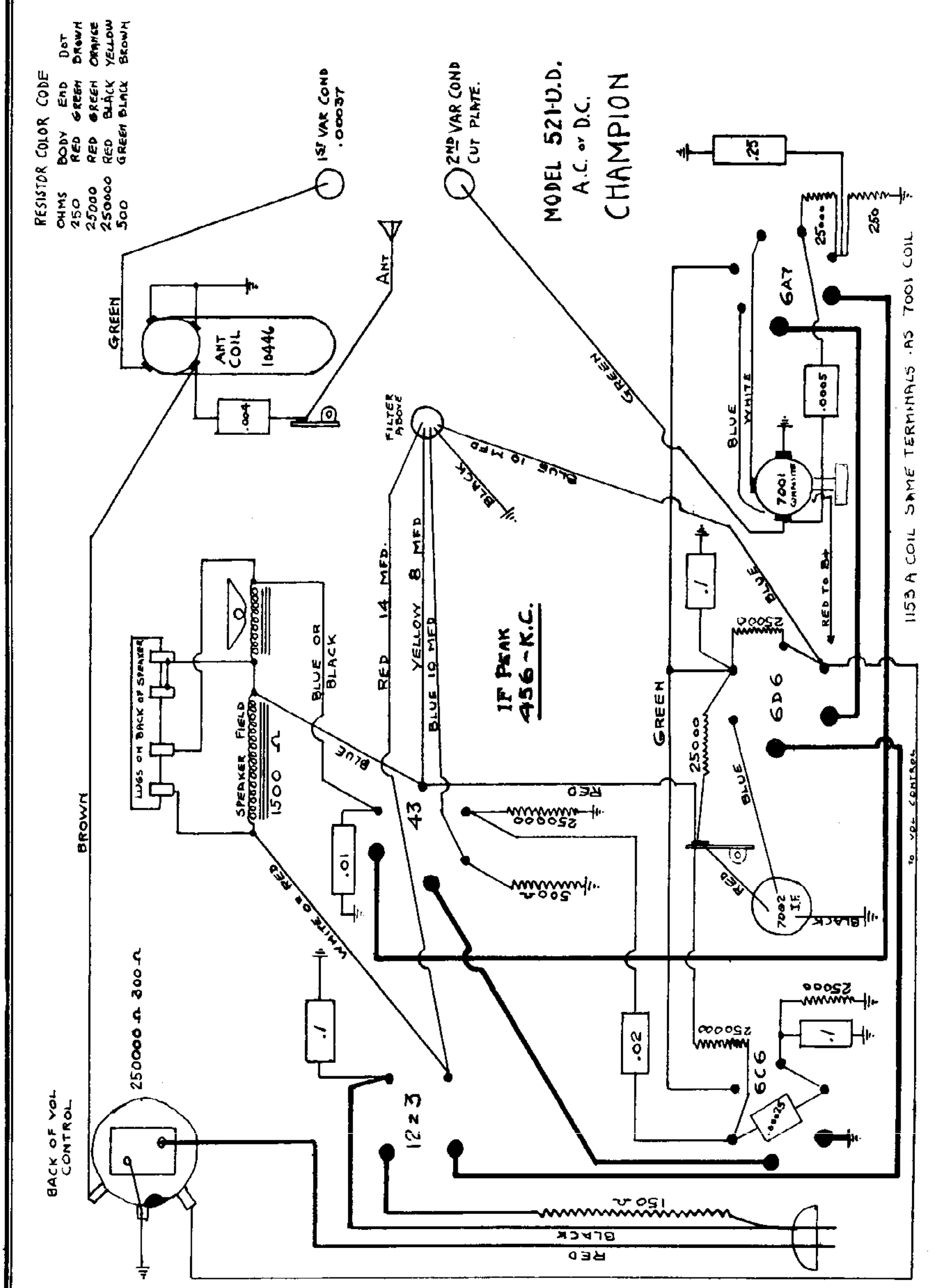


CHAMPION RADIO MODEL 50 UD

ANT COIL ON TOP LOOKING DOWN AT TOP OF COIL

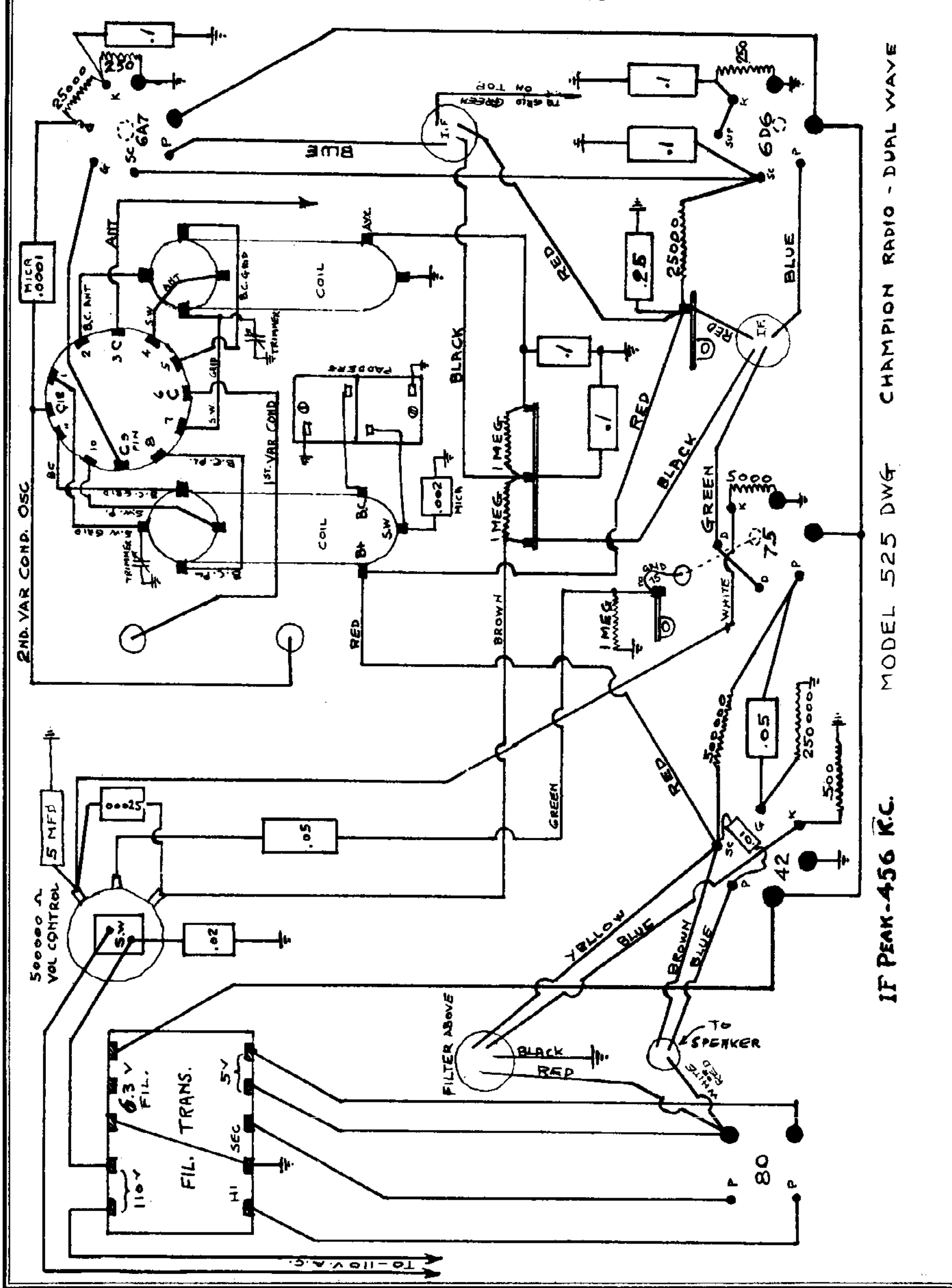
MODEL 521U
Schematic

CHAMPION RADIO

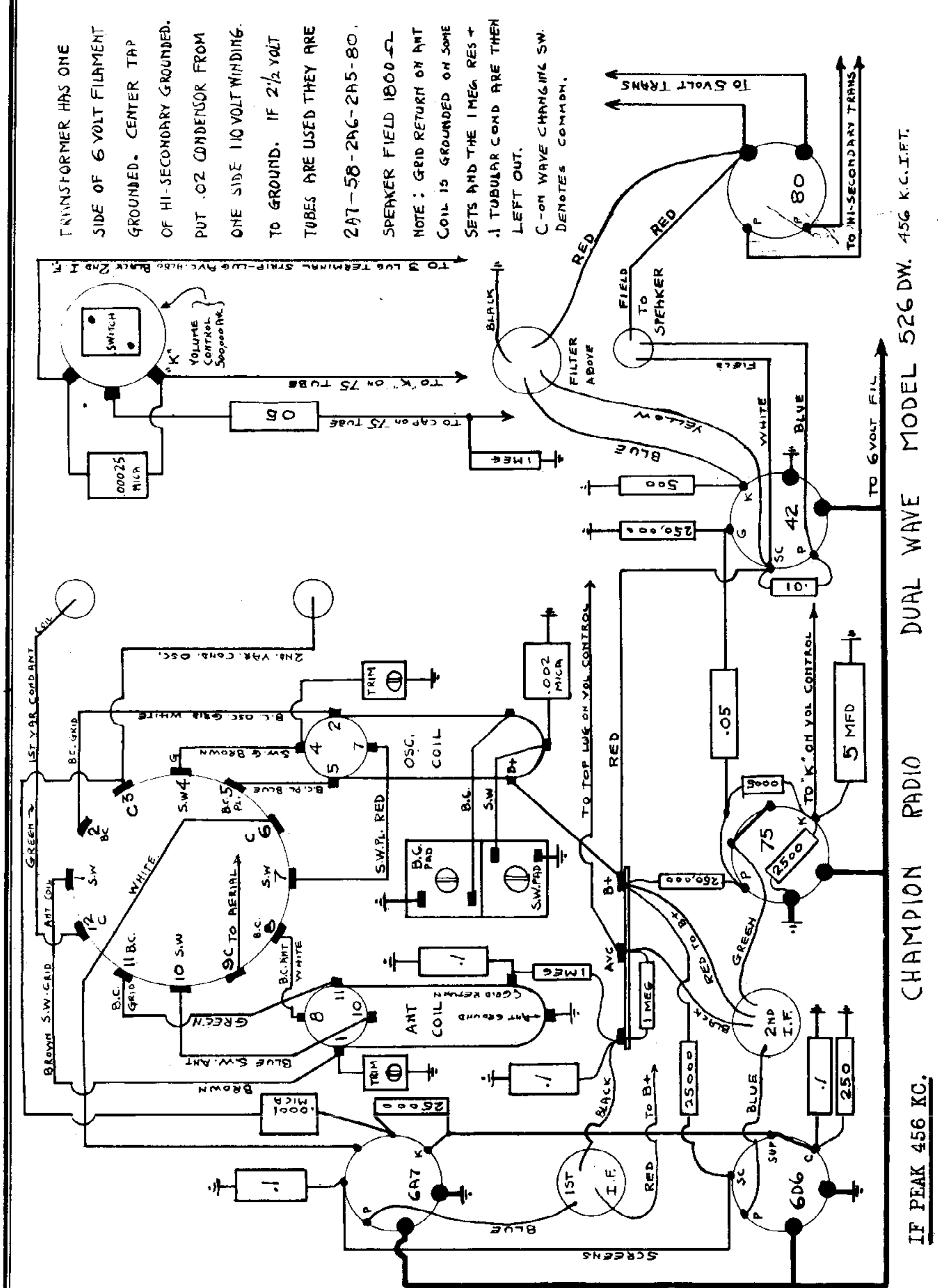


MODEL 525DWG
Schematic

CHAMPION RADIO

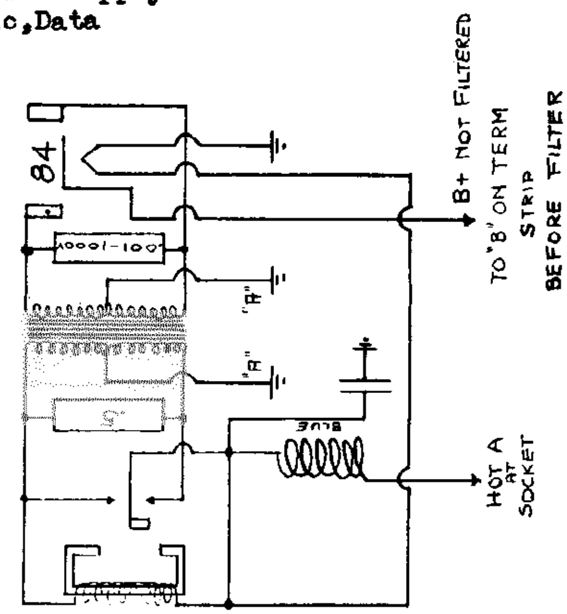


CHAMPION RADIO



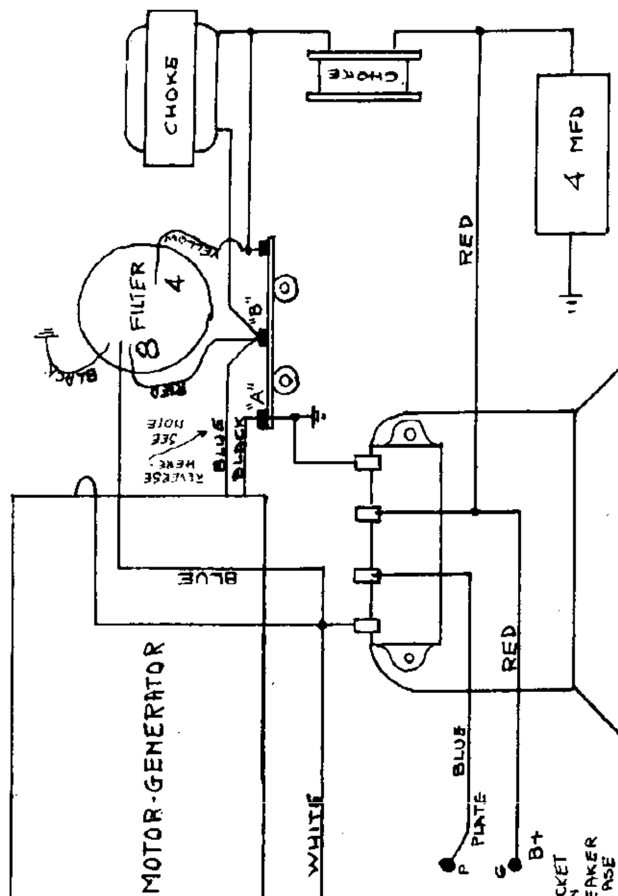
MODEL Auto Radio Power Supply
Schematic, Data

CHAMPION RADIO



IF VIBRATOR IS USED ABOVE DIAGRAM IS USED
THEN SPEAKER AND SUPPLY PLUG IS WIRED
SAME AS MOTOR GENERATOR DIAGRAM

CHAMPION RADIO
AUTO RADIO POWER SUPPLY AND
SPEAKER DIAGRAM

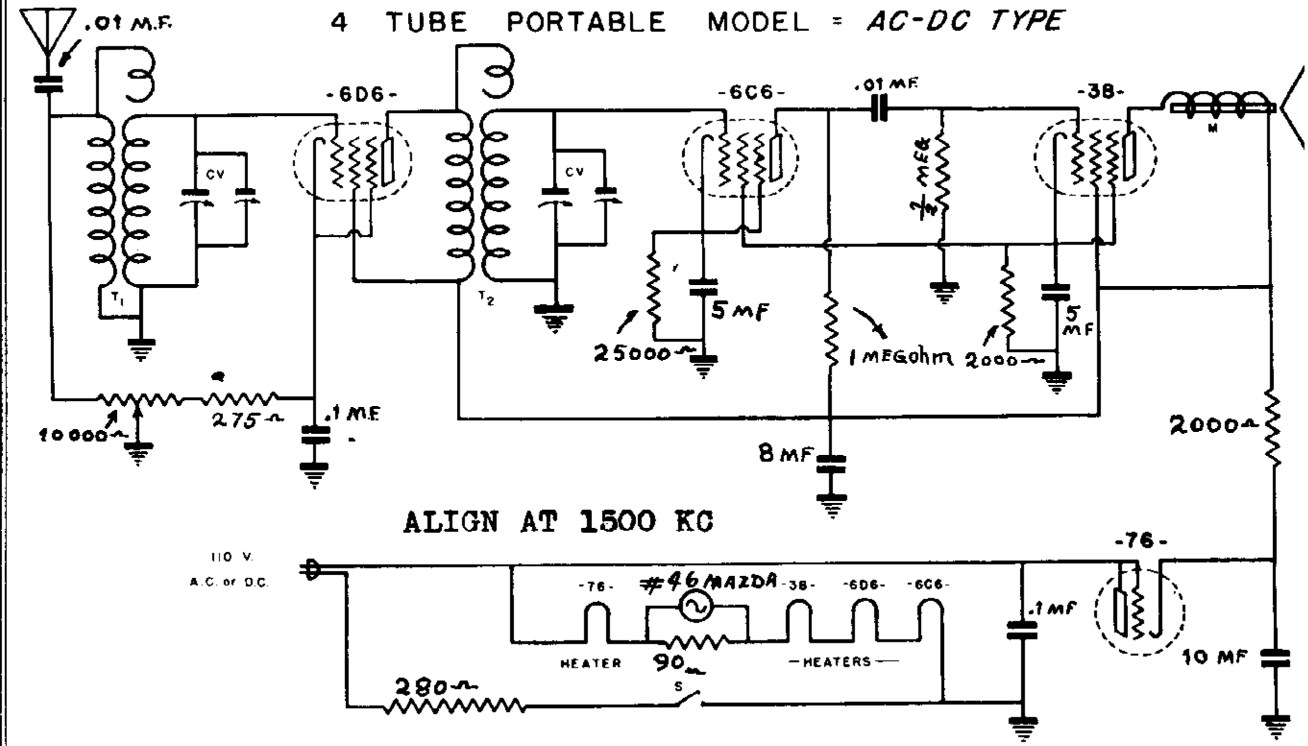


IF POSITIVE OF BATTERY IS GROUNDED BLUE "B" IS B POSITIVE
IF NEGATIVE OF BATTERY IS GROUNDED REVERSE WIRES AT "A"-"B"
IF CHANGE IS NECESSARY JUST REVERSE BLACK AND BLUE WIRES FROM MOTOR

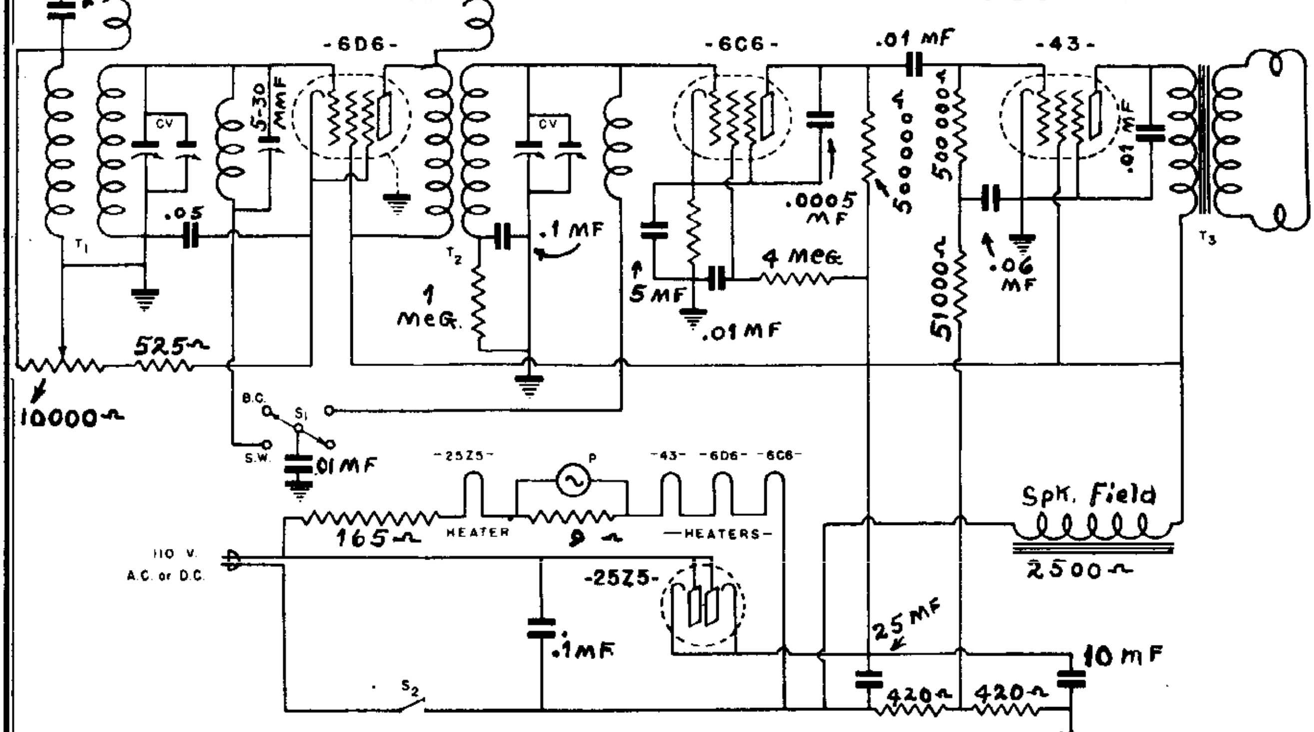
MODEL Opal
MODEL Diamond
Schematics

CLIMAX RADIO & TELEV. CO., INC.

OPAL
4 TUBE PORTABLE MODEL = AC-DC TYPE



DIAMOND
4 TUBE 2 BAND DESK MODEL = AC-DC TYPE

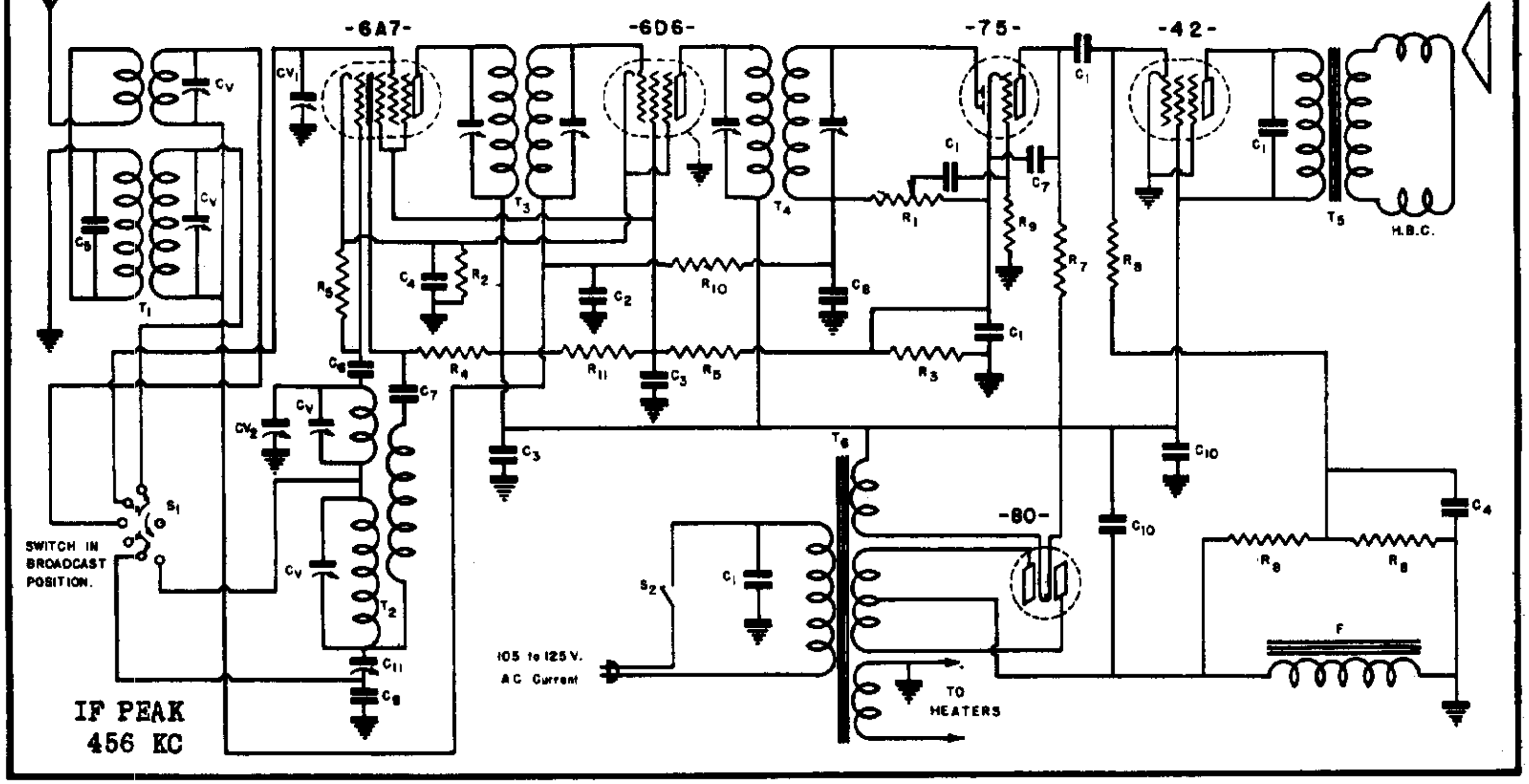


ALIGN AT 1500 KC

MODEL AD
Schematic
Parts

CLIMAX RADIO & TELEV. CO., INC.

MODEL AD
5 TUBE SKIP BAND SUPERHETERODYNE RECEIVER = *AC OPERATED*



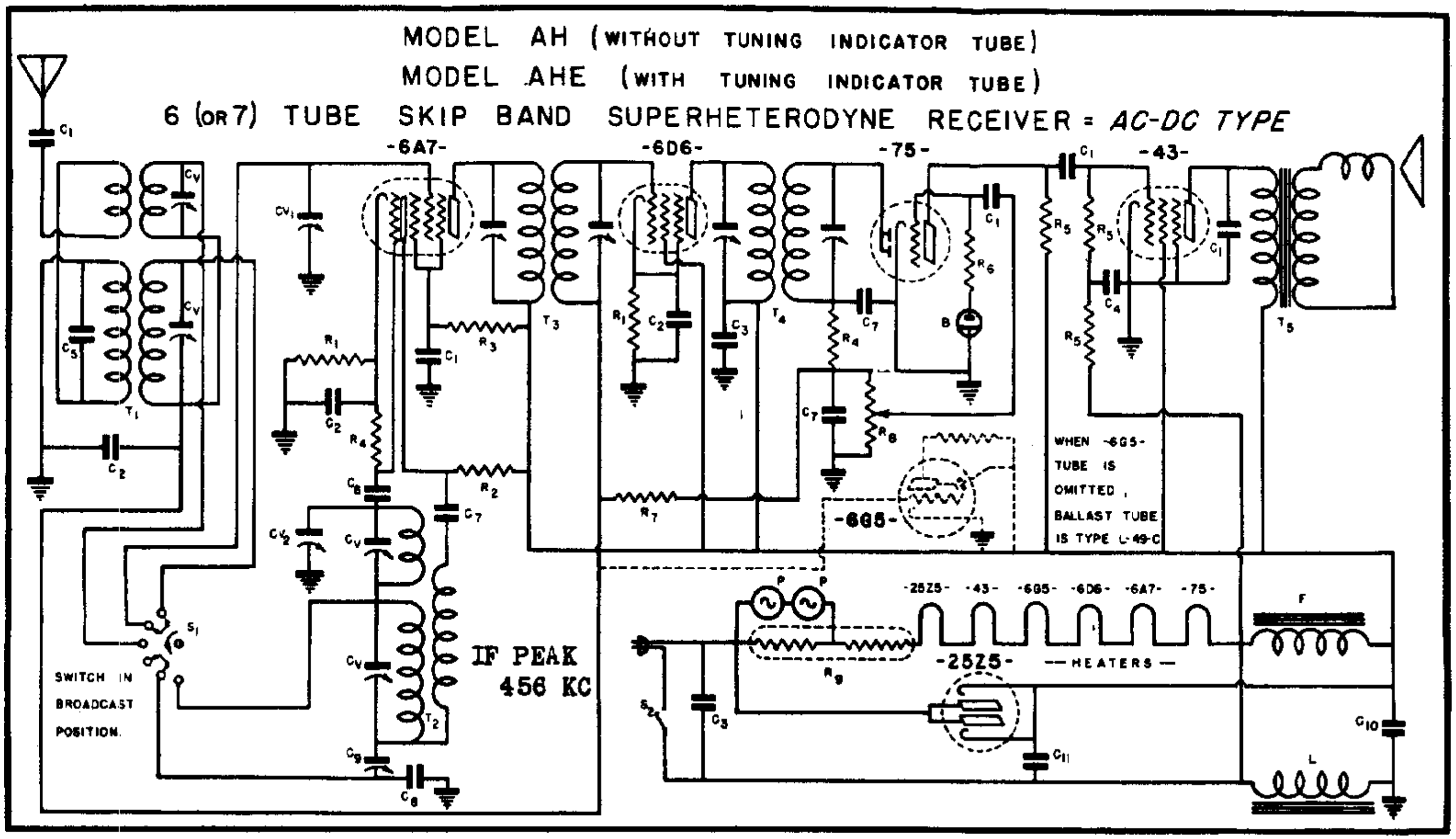
LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD.-400 V. TUBULAR CONDENSER
C_2	203	.1 MFD.-200 V. TUBULAR CONDENSER
C_3	210	.1 MFD.-400 V. TUBULAR CONDENSER
C_4	204	.25 MFD. 200 V. TUBULAR CONDENSER
C_5	412	.00005 MFD. MICA CONDENSER
C_6	400	.0001 MFD. MICA CONDENSER
C_7	401	.00025 MFD. MICA CONDENSER
C_8	402	.0005 MFD. MICA CONDENSER
C_9	410	.0018 MFD. MICA CONDENSER
C_{10}	317	.8 MFD. 450 W.V. WET ELECTROLYTIC COND.
C_{11}	507	5 PLATE PADDING CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
CV_{1-2}	612-A	2 GANG VARIABLE CONDENSER
C_V	500	5-30 MMFD. TRIMMER CONDENSER
T_1	1225	B.C. & SKIP BAND ANTENNA COIL
T_2	1412	B.C. & SKIP BAND OSCILLATOR COIL
T_3	1503	INPUT I.F. TRANSFORMER
T_4	1507	DIODE I.F. TRANSFORMER
T_5	811	SPEAKER TRANSFORMER
T_6	1014	POWER TRANSFORMER
F	811	SPEAKER FIELD (1600 OHMS)
S_1	1920	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL.

LEGEND	OUR PART NO.	DESCRIPTION
R_1	2009	500,000 OHM VOLUME CONTROL
R_2	103	250 OHM-½ WATT CARBON RESISTOR
R_3	139	400 OHM-½ WATT CARBON RESISTOR
R_4	109	10,000 OHM-½ WATT CARBON RESISTOR
R_5	113	50,000 OHM-½ WATT CARBON RESISTOR
R_6	115	100,000 OHM-½ WATT CARBON RESISTOR
R_7	116	250,000 OHM-½ WATT CARBON RESISTOR
R_8	145	400,000 OHM-½ WATT CARBON RESISTOR
R_9	117	500,000 OHM-¼ WATT CARBON RESISTOR
R_{10}	119	1 MEGOHM ½ WATT CARBON RESISTOR
R_{11}	146	25,000 OHM 1 WATT CARBON RESIST.

W.F.S.

CLIMAX RADIO & TELEV. CO., INC.



LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD. 400V. TUBULAR CONDENSER
C_2	203	.1 MFD 200V. TUBULAR CONDENSER
C_3	210	.1 MFD. 400V. TUBULAR CONDENSER
C_4	204	.25 MFD. 200 V. TUBULAR CONDENSER
C_5	412	.00005 MFD. MICA CONDENSER
C_6	400	.0001 MFD. MICA CONDENSER
C_7	401	.00025 MFD. MICA CONDENSER
C_8	410	.0018 MFD. MICA CONDENSER
C_9	507	5 PLATE PADDING CONDENSER
C_{10}	314	10 MFD. 150 W.V. WET ELECTROLYTIC COND.
C_{11}	311	20 MFD. 150 W.V. WET ELECTROLYTIC COND.

LEGEND	OUR PART NO.	DESCRIPTION
CV_{1-2}	612-A	2 GANG VARIABLE CONDENSER
C_V	50C	5-30 MMFD. TRIMMER CONDENSER
R_1	103	250 OHM ½ WATT CARBON RESISTOR
R_2	108	5000 OHM ½ WATT CARBON RESISTOR
R_3	111	25,000 OHM ½ WATT CARBON RESISTOR
R_4	113	50,000 OHM ½ WATT CARBON RESISTOR
R_5	116	250,000 OHM ½ WATT CARBON RESISTOR
R_6	117	500,000 OHM ½ WATT CARBON RESISTOR
R_7	119	1 MEGOHM ½ WATT CARBON RESISTOR
R_8	2009	500,000 OHM VOLUME CONTROL
R_9	2906	L-42-C BALLAST TUBE (with 6G5 tube)
R_9	2905	L-49-C BALLAST TUBE (without 6G5 tube)

LEGEND	OUR PART NO.	DESCRIPTION
T_1	1225	ANTENNA COIL
T_2	1412	OSCILLATOR COIL
T_3	1507	OUTPUT I.F. TRANSFORMER
T_4	1503	INPUT I.F. TRANSFORMER
T_5	IN 800	SPEAKER TRANSFORMER
L	1100	FILTER CHOKE
S_1	1920	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
P	2902	MAZDA NO. 46 PILOT LIGHT
B	3000	BIAS CELL
F	IN 800	SPEAKER FIELD

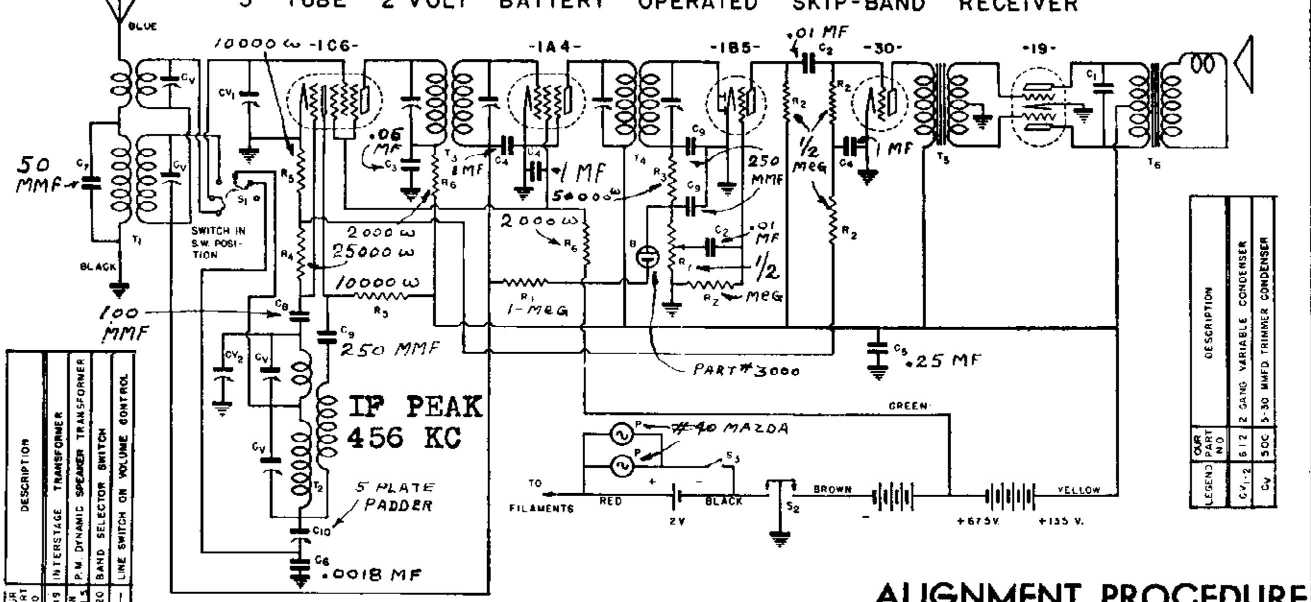
W.F.S.

MODEL AJ
Schematic, Socket
Trimmers, Alignment

CLIMAX RADIO & TELEV. CO., INC.

MODEL A. J.

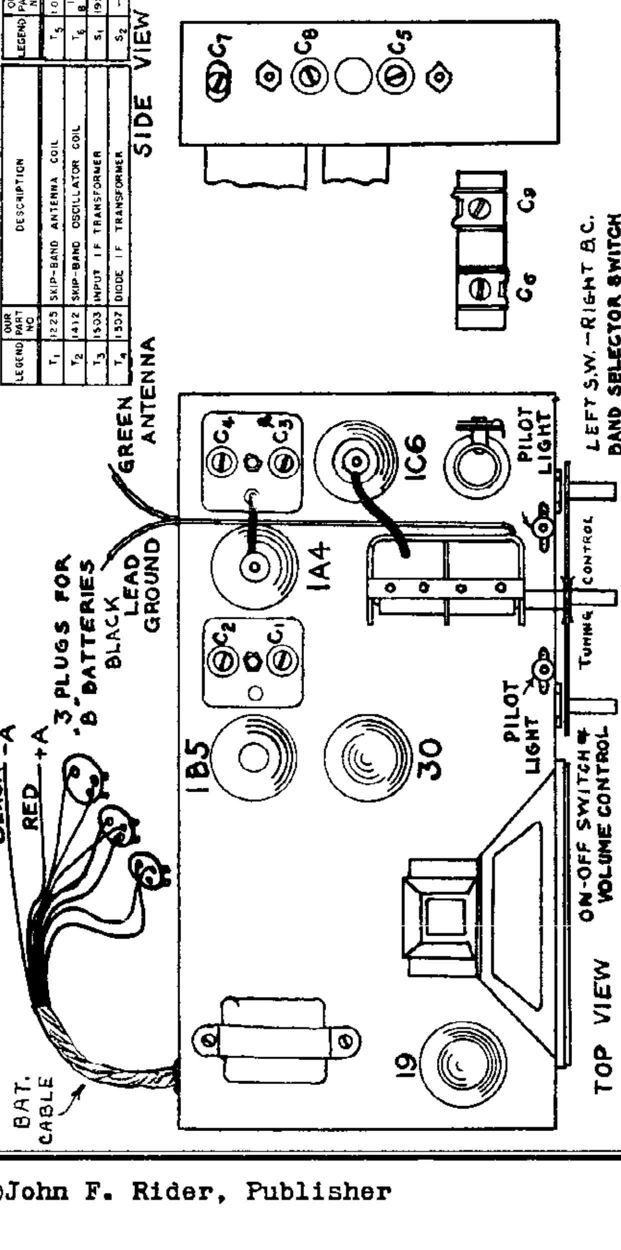
5 TUBE 2 VOLT BATTERY OPERATED SKIP-BAND RECEIVER



LEGEND	OUR PART NO	DESCRIPTION
T_5	1019	INTERSTAGE TRANSFORMER
T_6	IR 815	P.M. DYNAMIC SPEAKER TRANSFORMER
S_1	1920	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL

LEGEND	OUR PART NO	DESCRIPTION
T_1	1225	SKIP-BAND ANTENNA COIL
T_2	1412	SKIP-BAND OSCILLATOR COIL
T_3	1503	INPUT I F TRANSFORMER
T_4	1507	DIODE I F TRANSFORMER

LEGEND	OUR PART NO	DESCRIPTION
CV_{1-2}	612	2 GANG VARIABLE CONDENSER
CV	50C	5-30 MMFD TRIMMER CONDENSER



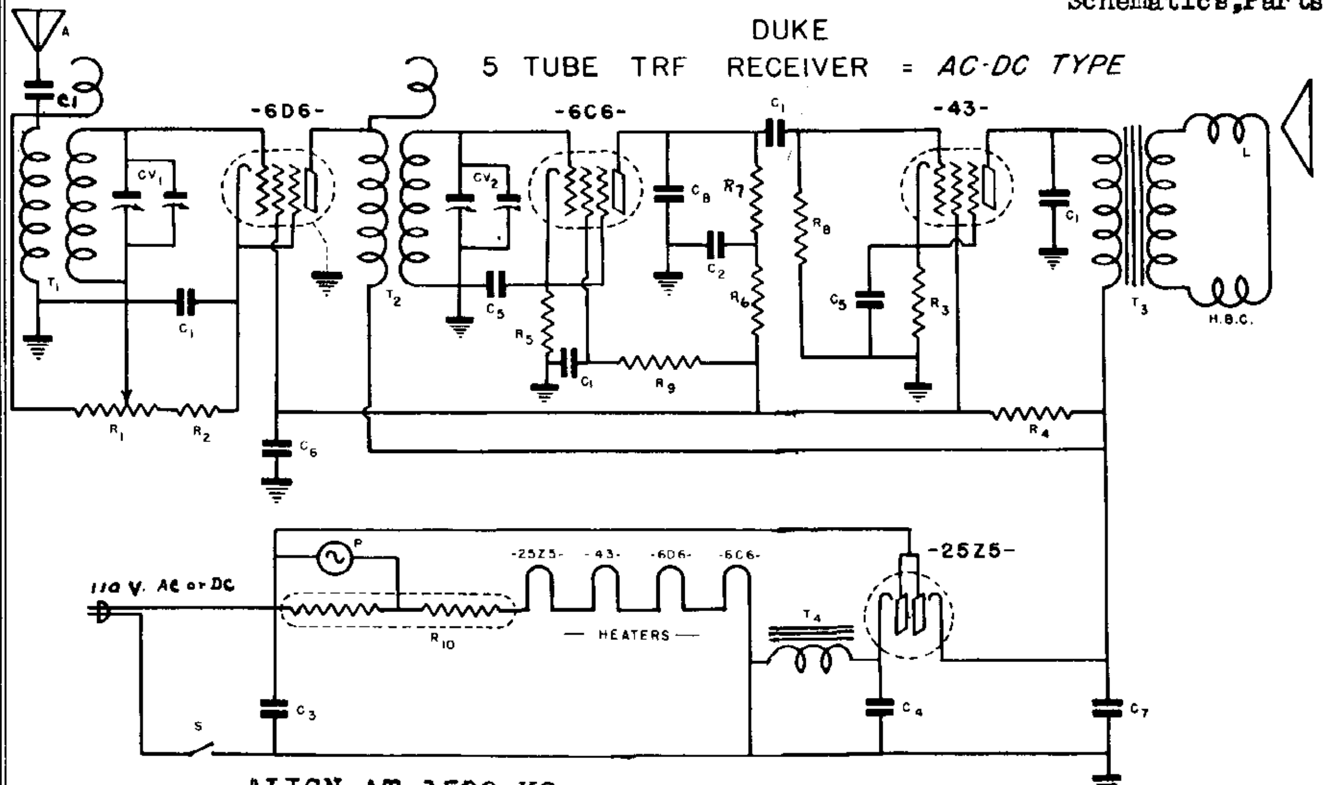
ALIGNMENT PROCEDURE

If at any tme it becomes necessary to realign this receiver, the following procedure should be employed: Set pointer so it is perfectly horizontal when the variable condenser is fully engaged. Connect the green antenna lead in series with a 200 mmfd. mica condenser to the output of the signal generator. Connect the black lead to the ground lead of the signal generator. Set the signal generator to 456 K.C. and turn the variable condenser on the receiver until the plates are completely intermeshed. Turn the selector switch to the Broadcast position and set the volume control knob to maximum. Connect an output meter between the plate and screen of the 42 output tube. Adjust trimmers C1, C2, C3 and C4 for maximum output as indicated by the meter. At all times keep the output control on the signal generator turned down as low as possible so as to obtain only a very small reading on the output meter. (At larger inputs the automatic volume control system may tend to obscure the correct adjustment.) Next set the signal generator to 1400 K.C., and turn the dial of the receiver to correspond to that frequency. Adjust trimmer C8 for maximum reading of the output meter and then adjust C6 to secure final adjustment. Next rotate the receiver dial to about 600 K.C. and set the signal generator at the same frequency. Adjust trimmer C7 while rocking the condenser back and forth until maximum output results. If it is necessary to turn that adjustment screw more than about one turn, it will be necessary to repeat the adjustment at 1400 K.C. again. This completes the alignment of the Broadcast band.

Next, substitute a 400 ohm carbon resistor for the series mica condenser between the receiver and the signal generator and set the switch to the short wave position. Rotate the receiver dial to 14M.C. and set the signal generator to the same frequency. Adjust trimmer C5 to resonance and then increase the generator frequency to 14.9M.C. and observe if the signal can be heard without changing the receiver dial setting. If it can be heard, then the image is properly placed and the signal generator should again be set to 14 M.C.. Adjust trimmer C9 for final adjustment.

CLIMAX RADIO & TELEV. CO., INC.

DUKE
5 TUBE TRF RECEIVER = AC-DC TYPE



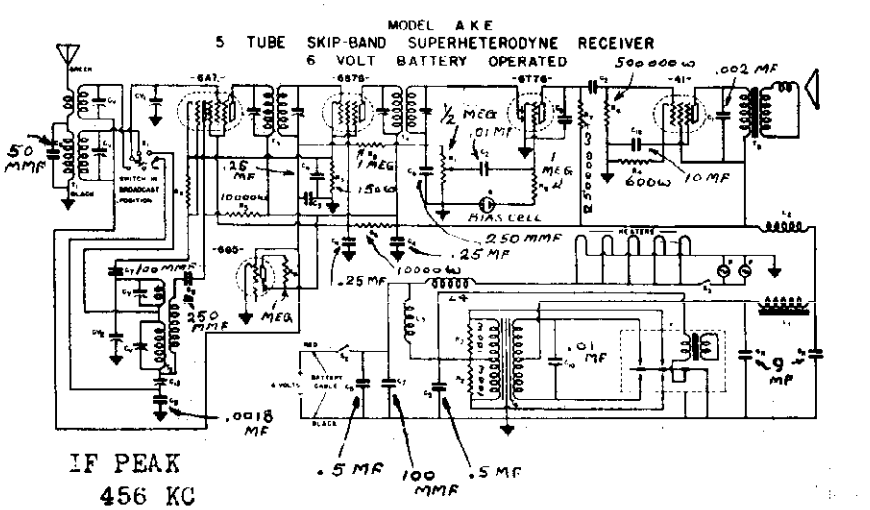
ALIGN AT 1500 KC

LEGEND	OUR PART NO	DESCRIPTION
C_1	211	.01 MFD 400 V. TUBULAR CONDENSER
C_2	216	.018 MFD 400 V. TUBULAR CONDENSER
C_3	210	.1 MFD 400 V. TUBULAR CONDENSER
C_4	IN 316	4 MFD 175 W.V. ELECTROLYTIC COND.
C_5	IN 316	5 MFD 25 W.V. ELECTROLYTIC COND.
C_6	IN 316	8 MFD 150 W.V. ELECTROLYTIC COND.
C_7	IN 316	14 MFD 175 W.V. ELECTROLYTIC COND.
C_8	401	.00025 MICA CONDENSER
CV_{1-2}	621	2 GANG VARIABLE CONDENSER

LEGEND	OUR PART NO	DESCRIPTION
R_1	2006	10,000 OHM VOLUME CONTROL
R_2	—	275 OHM (Minimum on Volume Control)
R_3	104	600 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	108	5,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_5	111	25,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_6	142	51,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_7	116	250,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_8	117	500,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_9	120	3 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR

LEGEND	OUR PART NO	DESCRIPTION
R_{10}	2903	L-55-B BALLAST TUBE
T_1	1213	ANTENNA COIL
T_2	1312	R F COIL
T_3	IN 809	SPEAKER OUTPUT TRANSFORMER
T_4	IN 809	SPEAKER FIELD (2500 ohms)
S	—	LINE SWITCH ON VOLUME CONTROL
P	2902	MAZDA #46 PILOT LIGHT
A	2400	INDOOR ANTENNA HANK
L	809	5" DYNAMIC SPEAKER

MODEL AKE
5 TUBE SKIP-BAND SUPERHETERODYNE RECEIVER
6 VOLT BATTERY OPERATED



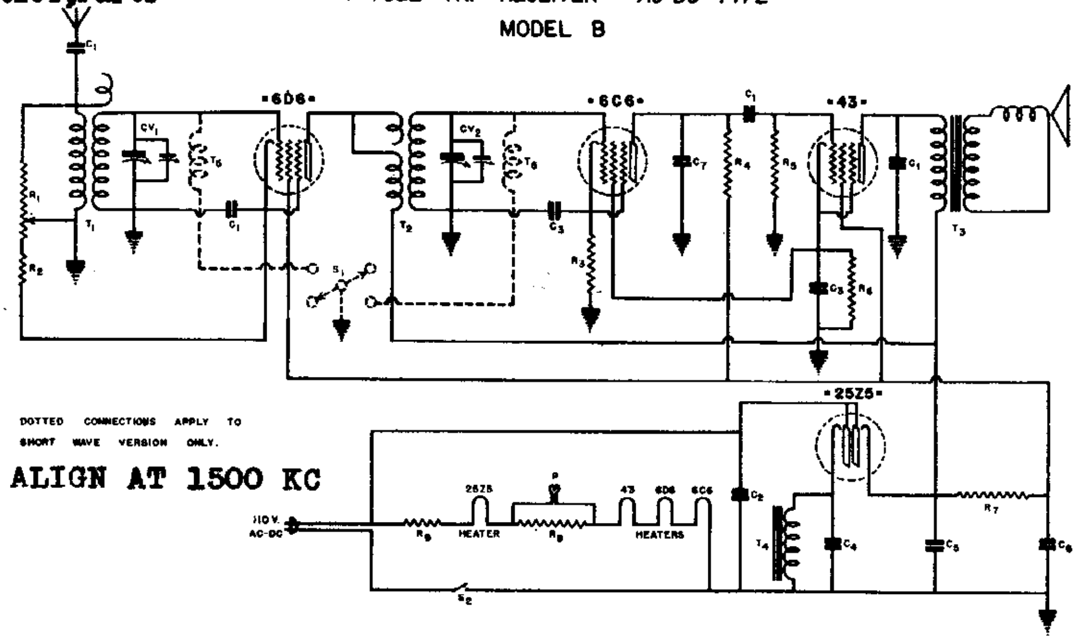
LEGEND	OUR PART NO	DESCRIPTION
C_1	[illegible]	.002 MFD 600 V TUBULAR CONDENSER
C_2	[illegible]	.01 MFD 400 V TUBULAR CONDENSER
C_3	[illegible]	.1 MFD [illegible] V TUBULAR CONDENSER
C_4	[illegible]	.25 MFD [illegible] V TUBULAR CONDENSER
[illegible]	[illegible]	[illegible] MFD 100 V TUBULAR CONDENSER
[illegible]	[illegible]	[illegible] MMFD MICA CONDENSER
[illegible]	[illegible]	100 MMFD MICA CONDENSER
[illegible]	401	250 MMFD MICA CONDENSER
[illegible]	[illegible]	.0018 MFD MICA CONDENSER

IF PEAK
456 KC

MODEL B
MODEL C,D
Schematics,Parts

CLIMAX RADIO & TELEV. CO., INC.

4 TUBE TRF RECEIVER — *AC-DC TYPE* —
MODEL B



DOTTED CONNECTIONS APPLY TO SHORT WAVE VERSION ONLY.

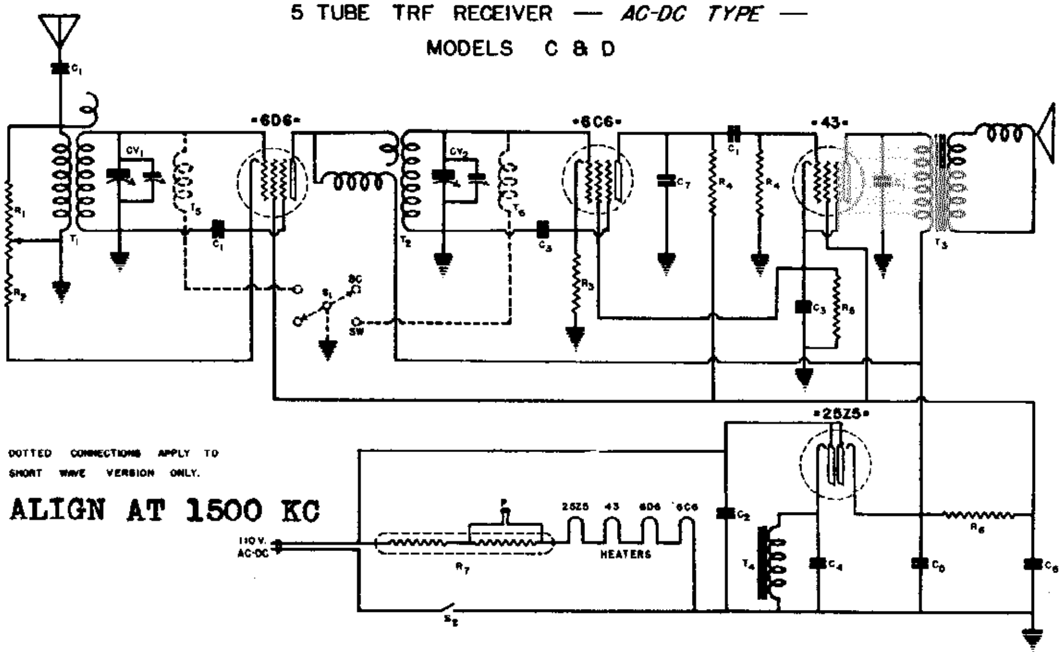
ALIGN AT 1500 KC

LEGEND	OUR PART NO.	DESCRIPTION
R_1	2006	10,000 OHM VOLUME CONTROL
R_2	—	275 OHM (Minim. on Volume Control)
R_3	111	25,000 OHM ¼ WATT CARBON RESISTOR
R_4	117	500,000 OHM ¼ WATT CARBON RESISTOR
R_5	141	350,000 OHM ¼ WATT CARBON RESISTOR
R_6	104	600 OHM ¼ WATT CARBON RESISTOR
R_7	108	5,000 OHM ¼ WATT CARBON RESISTOR
R_8	142	90 OHM 2 WATT WIRE WOUND RES.
R_9	1807	185 OHM RESISTOR CORD

LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	610	2 GANG VARIABLE CONDENSER
C_1	211	.01 MFD. 400V. TUBULAR CONDENSER
C_2	210	.1 MFD. 400V. TUBULAR CONDENSER
C_3	TR 316	5 MFD. 25V. ELECTROLYTIC CONDENSER
C_4	TR 316	4 MFD. 150V. ELECTROLYTIC CONDENSER
C_5	TR 316	14 MFD. 150V. ELECTROLYTIC CONDENSER
C_6	TR 316	8 MFD. 150V. ELECTROLYTIC CONDENSER
C_7	401	.00025 MFD. MICA CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
S_1	1914	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
T_1	1200	ANTENNA COIL
T_2	1300	R.F. COIL
T_3	TR 810	SPEAKER OUTPUT TRANSFORMER
T_4	TR 810	SPEAKER FIELD (2500 OHMS)
T_5	1612	SHORT WAVE ANTENNA SHUNT
T_6	1612	SHORT WAVE R.F. SHUNT
P	2902	MAZDA #44 PILOT LIGHT

5 TUBE TRF RECEIVER — *AC-DC TYPE* —
MODELS C & D



DOTTED CONNECTIONS APPLY TO SHORT WAVE VERSION ONLY.

ALIGN AT 1500 KC

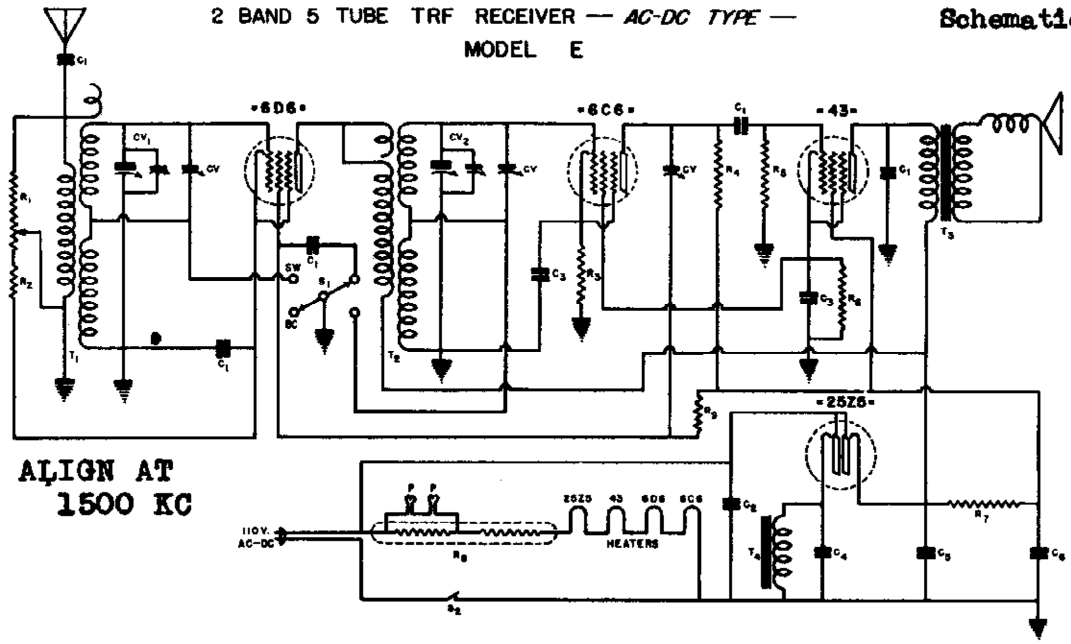
LEGEND	OUR PART NO.	DESCRIPTION
R_1	2006	10,000 OHM VOLUME CONTROL
R_2	—	275 OHM (Minimum on Volume Control)
R_3	111	25,000 OHM ¼ WATT CARBON RESISTOR
R_4	117	500,000 OHM ¼ WATT CARBON RESISTOR
R_5	104	600 OHM ¼ WATT CARBON RESISTOR
R_6	108	5000 OHM ¼ WATT CARBON RESISTOR
R_7	2903	L-55-5 BALLAST TUBE
P	2902	MAZDA #46 PILOT LIGHT

LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	607	2 GANG VARIABLE CONDENSER
C_1	211	.01 MFD. 400V. TUBULAR CONDENSER
C_2	210	.1 MFD. 400 V. TUBULAR CONDENSER
C_3	TR 318	5 MFD 25 W.V. ELECTROLYTIC CONDENSER
C_4	TR 318	4 MFD. 150 W.V. ELECTROLYTIC CONDENSER
C_5	TR 318	14 MFD. 150 W.V. ELECTROLYTIC CONDENSER
C_6	TR 318	8 MFD 150 W.V. ELECTROLYTIC CONDENSER
C_7	401	.00025 MFD MICA CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
S_1	1914	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
T_1	1204	ANTENNA COIL
T_2	1304	RF COIL
T_3	TR 810	SPEAKER OUTPUT TRANSFORMER
T_4	TR 810	SPEAKER FIELD (2500 OHMS)
T_5	1206	SHORT WAVE ANTENNA SHUNT
T_6	1306	SHORT WAVE RF SHUNT

CLIMAX RADIO & TELEV. CO., INC.

2 BAND 5 TUBE TRF RECEIVER — *AC-DC TYPE* —
MODEL E



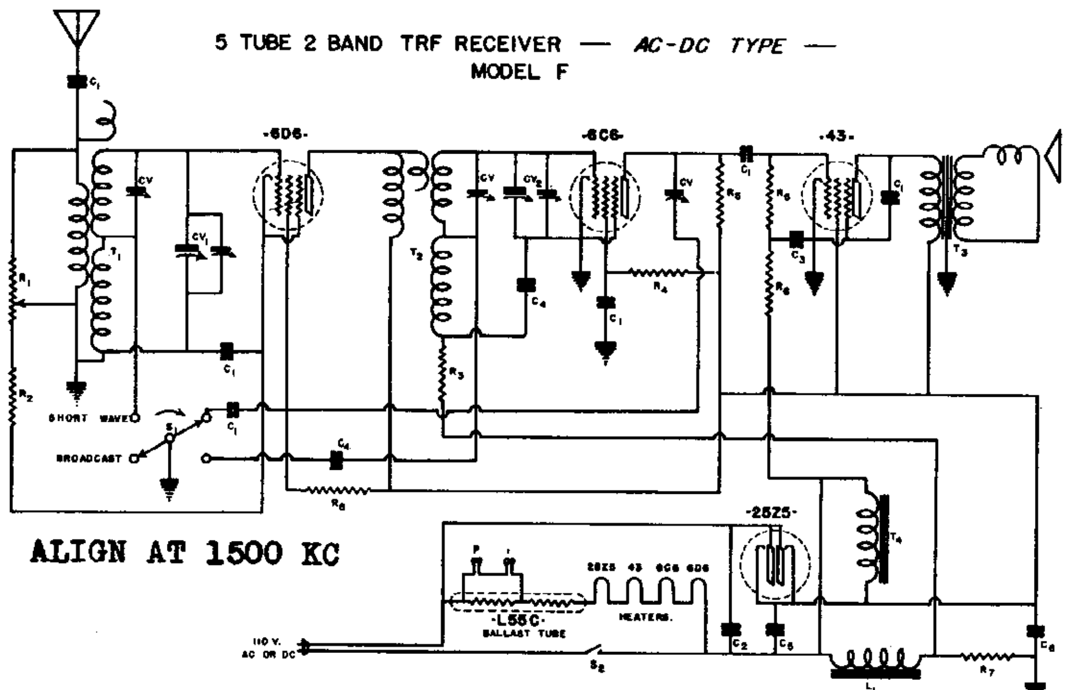
ALIGN AT 1500 KC

LEGEND	OUR PART NO.	DESCRIPTION
R_1	2006	10,000 OHM VOLUME CONTROL
R_2	—	275 OHM (Minimum on Volume Control)
R_3	111	26,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	117	500,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_5	141	350,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_6	104	600 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_7	108	5000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_8	2904	L-55-C BALLAST TUBE

LEGEND	OUR PART NO.	DESCRIPTION
R_9	110	15,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
CV_1 CV_2	615	2 GANG VARIABLE CONDENSER
CV	500	5-30MMFD. TRIMMER CONDENSER
C_1	211	.01 MFD. 400V. TUBULAR CONDENSER
C_2	210	.1 MFD. 400V. TUBULAR CONDENSER
C_3	IN 316	5 MFD. 25 W.V. ELECTROLYTIC CONDENSER
C_4	IN 316	4 MFD. 150 W.V. ELECTROLYTIC CONDENSER
C_5	IN 316	14 MFD. 150 W.V. ELECTROLYTIC CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
C_6	IN 316	8 MFD. 150 W.V. ELECTROLYTIC CONDENSER
S_1	1914	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
T_1	1216	2 BAND ANTENNA COIL
T_2	1511	2 BAND R F COIL
T_3	IN 810	SPEAKER OUTPUT TRANSFORMER
T_4	IN 810	SPEAKER FIELD (2500 OHMS)
P	2902	MAZDA # 46 PILOT LIGHT

5 TUBE 2 BAND TRF RECEIVER — *AC-DC TYPE* —
MODEL F



ALIGN AT 1500 KC

LEGEND	OUR PART NO.	DESCRIPTION
R_1	2006	10,000 OHM VOLUME CONTROL
R_2	—	275 OHM (Minimum on Volume Control)
R_3	119	1 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	120	3 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_5	117	$\frac{1}{2}$ MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_6	116	$\frac{1}{4}$ MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_7	139	65 OHM $\frac{1}{2}$ WATT WIRE WOUND RESIS.
R_8	110	15,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR

LEGEND	OUR PART NO.	DESCRIPTION
CV	500	5-30MMFD. TRIMMER CONDENSER
CV_1 CV_2	615	TWO GANG VARIABLE CONDENSER
C_1	211	.01 MFD 400V. TUBULAR CONDENSER
C_2	210	.1 MFD 400V. TUBULAR CONDENSER
C_3	204	.25 MFD 200V. TUBULAR CONDENSER
C_4	205	.1 MFD 200V. TUBULAR CONDENSER
C_5	311	20 MFD 150V. ELECTROLYTIC COND.
C_6	314	10 MFD 150V. ELECTROLYTIC COND.

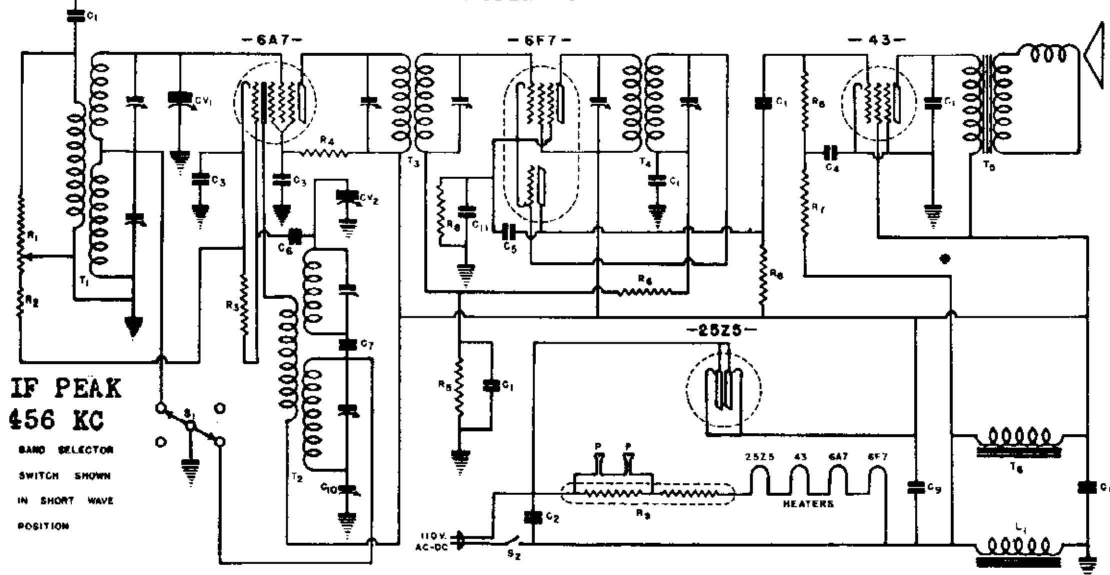
LEGEND	OUR PART NO.	DESCRIPTION
T_4	IN 800	SPEAKER FIELD (2500 OHM)
L_1	1100	IRON CORE FILTER CHOKE
S_1	1914	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
T_1	1212	BC & SW ANTENNA COIL
T_2	1303	BC & SW RF COIL
T_3	IN 800	SPEAKER OUTPUT TRANSFORMER
P	2902	MAZDA # 46 PILOT LIGHT

MODEL G
MODEL R
Schematics, Parts

CLIMAX RADIO & TELEV. CO., INC.

5 TUBE EXTENDED SKIP-BAND SUPERHETERODYNE RECEIVER — *AC-DC TYPE* —

MODEL G



IF PEAK
456 KC

BAND SELECTOR SWITCH SHOWN IN SHORT WAVE POSITION

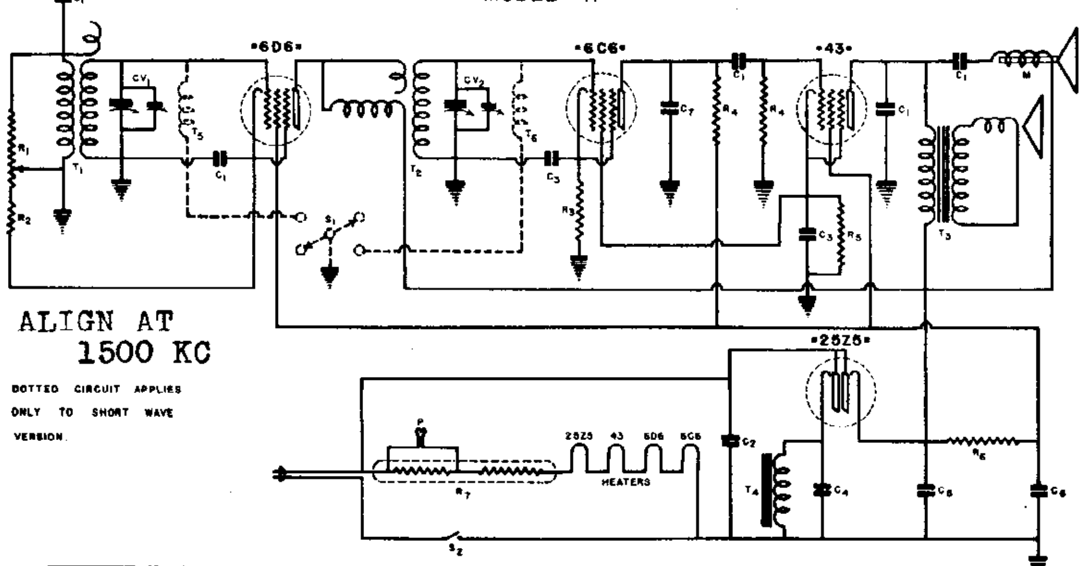
LEGEND	OUR PART NO.	DESCRIPTION
R_1	2013	10,000 OHM VOLUME CONTROL
R_2	—	275 OHM Minimum on Volume Control
R_3	113	50,000 OHM ½ WATT CARBON RESISTOR
R_4	109	10,000 OHM ½ WATT CARBON RESISTOR
R_5	126	2 MEGOHM ½ WATT CARBON RESISTOR
R_6	117	.5 MEGOHM ¼ WATT CARBON RESISTOR
R_7	116	.25 MEGOHM ¼ WATT CARBON RESISTOR
R_8	136	400 OHM ½ WATT CARBON RESISTOR
R_9	2904	L-55-C BALLAST TUBE
CV_1 CV_2	612	2 GANG VARIABLE CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD. 400V. TUBULAR CONDENSER
C_2	210	.1 MFD. 400V. TUBULAR CONDENSER
C_3	203	.1 MFD. 200V. TUBULAR CONDENSER
C_4	204	25MFD. 200V TUBULAR CONDENSER
C_5	401	.00025 MFD. MICA CONDENSER
C_6	400	.0001 MFD. MICA CONDENSER
C_7	411	.00125 MFD. MICA CONDENSER
C_8	314	10 MFD. 150V. ELECTROLYTIC CONDENSER
C_9	311	20 MFD. 150V ELECTROLYTIC CONDENSER
C_{10}	502	5 PLATE PADDING CONDENSER
C_{11}	212	.05 MFD. 200V. TUBULAR CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
T_1	1217	ANTENNA COIL
T_2	1406	OSCILLATOR COIL
T_3	1503	456 KC I.F. TRANSFORMER
T_4	1506	456 KC DIODE COUPLING TRANSFORMER
T_5	in 600	SPEAKER OUTPUT TRANSFORMER
T_6	in 600	2500 OHM SPEAKER FIELD
L_1	1100	IRON CORE FILTER CHOKE
S_1	1914	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
P	2902	MAZDA # 46 PILOT LIGHT

5 TUBE TRF TWIN SPEAKER RECEIVER — *AC-DC TYPE* —

MODEL R



ALIGN AT
1500 KC

DOTTED CIRCUIT APPLIES ONLY TO SHORT WAVE VERSION.

LEGEND	OUR PART NO.	DESCRIPTION
R_1	2006	10,000 . OHM VOLUME CONTROL
R_2	—	275 OHM (Minimum on Volume Control)
R_3	111	25,000 OHM ½ WATT CARBON RESISTOR
R_4	117	500,000 OHM ¼ WATT CARBON RESISTOR
R_5	104	500 OHM ½ WATT CARBON RESISTOR
R_6	108	5000 OHM ¼ WATT CARBON RESISTOR
R_7	2903	L-55-B BALLAST TUBE
P	2902	MAZDA # 46 PILOT LIGHT

LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	610	2 GANG VARIABLE CONDENSER
C_1	211	.01 MFD. 400V. TUBULAR CONDENSER
C_2	210	.1 MFD. 400V TUBULAR CONDENSER
C_3	in 316	5MFD. 25WV ELECTROLYTIC CONDENSER
C_4	in 316	4MFD. 150WV ELECTROLYTIC CONDENSER
C_5	in 316	14MFD 150WV ELECTROLYTIC CONDENSER
C_6	in 316	8MFD. 150WV ELECTROLYTIC CONDENSER
C_7	401	.00025 MFD. MICA CONDENSER
M	900	MAGNETIC SPEAKER

LEGEND	OUR PART NO.	DESCRIPTION
S_1	1914	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
T_1	1200	ANTENNA COIL
T_2	1300	RF COIL
T_3	in 810	SPEAKER OUTPUT TRANSFORMER
T_4	in 810	2500 OHM SPEAKER FIELD
T_5	1612	SHORT WAVE ANTENNA SHUNT
T_6	1612	SHORT WAVE RF SHUNT

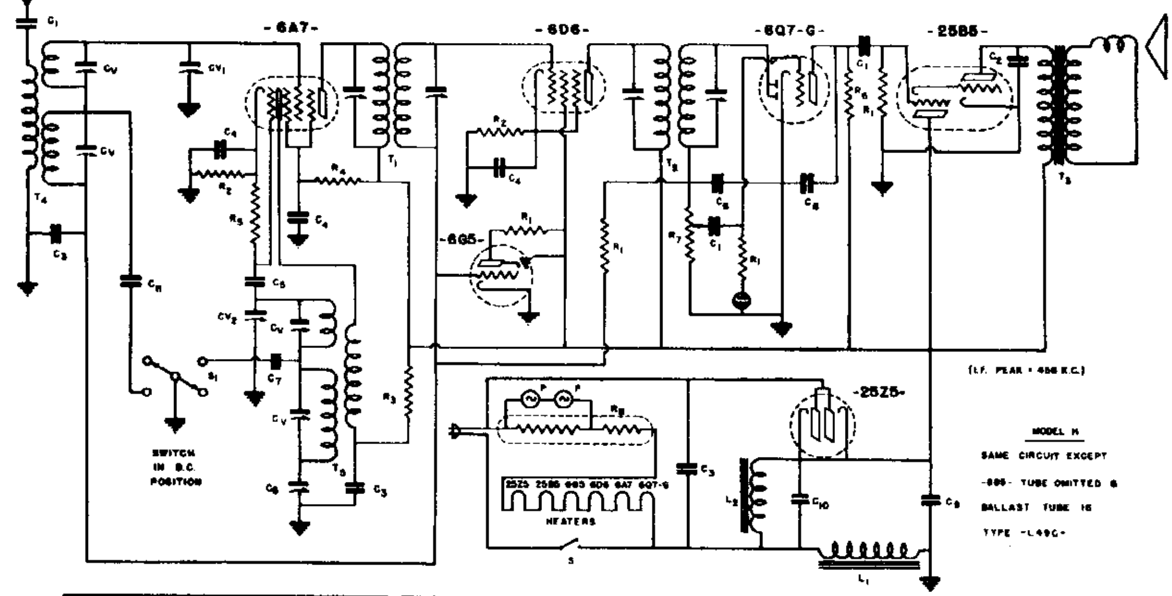
Schematics, Parts

MODEL HE
MODEL JE

CLIMAX RADIO & TELEV. CO., INC.

6 TUBE EXTENDED SKIP-BAND SUPERHETERODYNE RECEIVER = *AC-DC TYPE*

MODEL HE



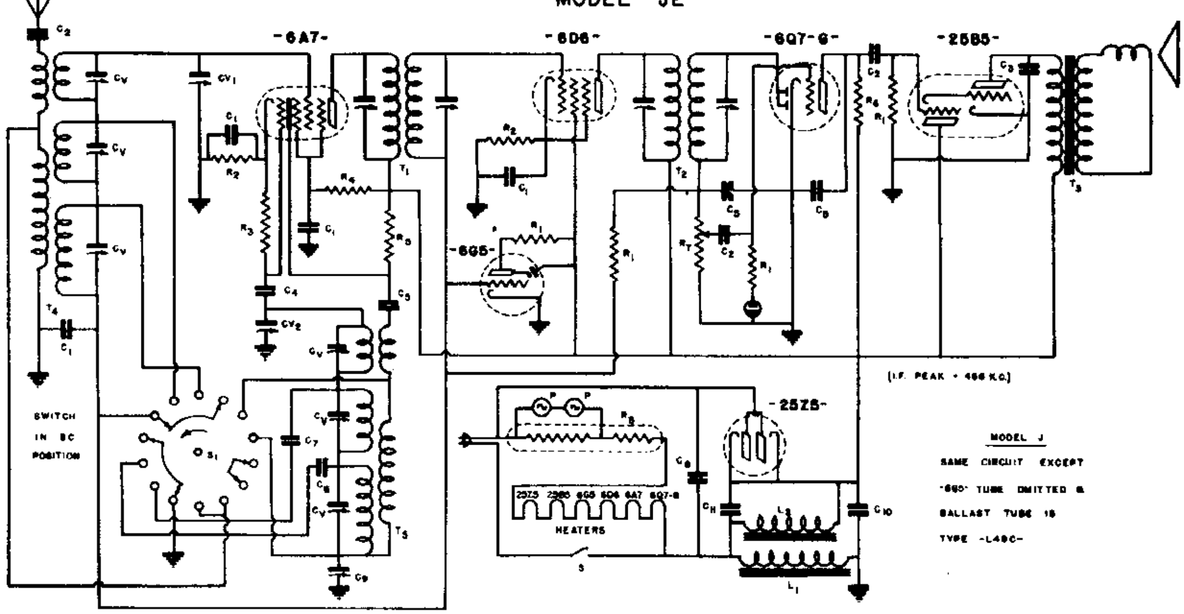
LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD-400V TUBULAR CONDENSER
C_2	206	.05 MFD-400V TUBULAR CONDENSER
C_3	210	.1 MFD-400V TUBULAR CONDENSER
C_4	203	.1 MFD-200V TUBULAR CONDENSER
C_5	400	.0001 MICA CONDENSER
C_6	401	.00025 MICA CONDENSER
C_7	411	.00125 MICA CONDENSER
C_8	507	5 PLATE PADDING CONDENSER
C_9	314	10 MFD 150 W.V ELECTROLYTIC COND.
C_{10}	311	20 MFD 150 W.V. ELECTROLYTIC COND.

LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	612	2 GANG VARIABLE CONDENSER
R_1	119	1 MEGOHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_2	103	250 OHMS $\frac{1}{2}$ WATT CARBON RESISTOR
R_3	109	10,000 OHMS $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	111	25,000 OHMS $\frac{1}{4}$ WATT CARBON RESISTOR
R_5	113	50,000 OHMS $\frac{1}{4}$ WATT CARBON RESISTOR
R_6	116	250,000 OHMS $\frac{1}{4}$ WATT CARBON RESISTOR
R_7	2009	50,000 OHMS VOLUME CONTROL & SWITCH
R_8	2905	L-49-C BALLAST TUBE (MODEL H)
R_8	2906	L-42-C BALLAST TUBE (MODEL HE)
C	212	.05 MFD - 200 V TUBULAR CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
T_1	1503	1st I.F. TRANSFORMER
T_2	1506	DIODE I.F. TRANSFORMER (2500 OHMS)
T_3	IN 805	SPEAKER OUTPUT TRANSFORMER
T_4	1210	ANTENNA COIL
T_5	1404	OSCILLATOR COIL
L_1	1101	CHOKE
L_2	IN 805	SPEAKER FIELD (2500 OHMS)
S_1	1914	BAND SELECTOR SWITCH
S	—	SWITCH ON TONE CONTROL
P	2902	MAZDA #46 PILOT LIGHT

7 TUBE 3 BAND ALL-WAVE SUPERHETERODYNE RECEIVER = *AC-DC TYPE*

MODEL JE



LEGEND	OUR PART NO.	DESCRIPTION
C_1	203	.1 MFD-200V TUBULAR CONDENSER
C_2	211	.01 MFD-400V TUBULAR CONDENSER
C_3	206	.05 MFD-400V TUBULAR CONDENSER
C_4	400	.0001 MICA CONDENSER
C_5	401	.00025 MICA CONDENSER
C_6	410	.0018 MICA CONDENSER
C_7	413	.0046 MICA CONDENSER
C_8	210	.1 MFD 400V. TUBULAR CONDENSER
C_V	IN 801	3-30 MMFD TRIMMER CONDENSER
C_9	507	5 PLATE PADDING CONDENSER
T_4	1214	3 BAND ANTENNA COIL

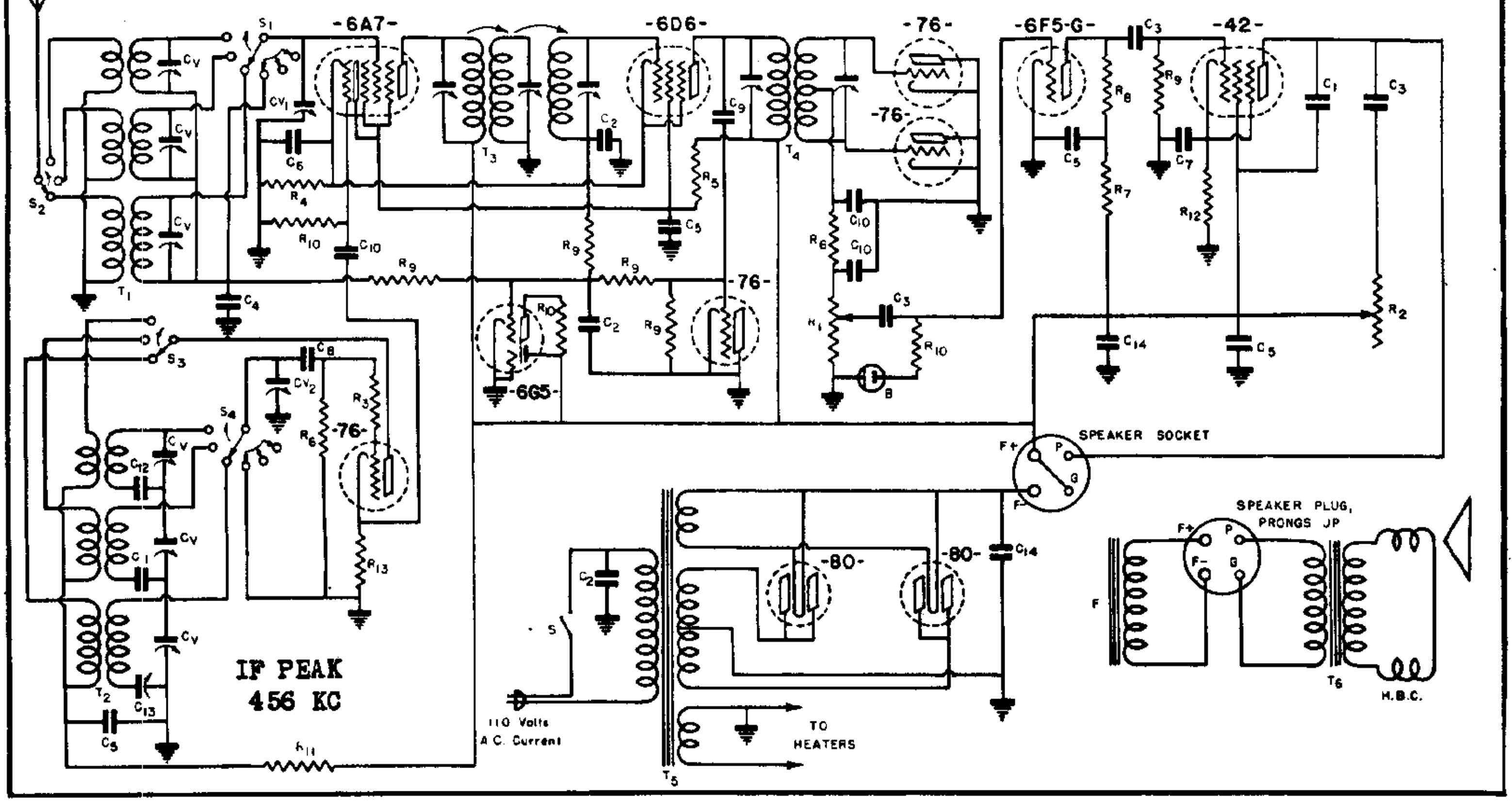
LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	612	2 GANG VARIABLE CONDENSER
C_{10}	314	10 MFD. 150 W.V. ELECTROLYTIC COND.
C_{11}	311	20 MFD 150 W.V. ELECTROLYTIC COND.
R_1	119	1 MEGOHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_2	103	250 OHMS $\frac{1}{2}$ WATT CARBON RESISTOR
R_3	113	50,000 OHMS $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	111	25,000 OHMS $\frac{1}{4}$ WATT CARBON RESISTOR
R_5	109	10,000 OHMS $\frac{1}{4}$ WATT CARRON RESISTOR
R_6	116	250,000 OHMS $\frac{1}{4}$ WATT CARBON RESISTOR
R_7	2008	500,000 OHM VOLUME CONTROL & SWITCH

LEGEND	OUR PART NO.	DESCRIPTION
R_8	2905	L-49-C BALLAST TUBE (MODEL J)
R_8	2906	L-42-C BALLAST TUBE (MODEL JE)
T_1	1503	1st I.F. TRANSFORMER
T_2	1506	DIODE I.F. TRANSFORMER
T_3	IN 805	SPEAKER FIELD (2500 OHMS)
L_1	1101	CHOKE
L_2	IN 805	SPEAKER FIELD (2500 OHMS)
S_1	1915	3 BAND SELECTOR SWITCH
S	—	SWITCH ON TONE CONTROL
P	2902	MAZDA #46 PILOT LIGHT
T_5	1405	3 BAND OSCILLATOR COIL

MODEL JL
Schematic
Parts

CLIMAX RADIO & TELEV. CO., INC.

MODEL JL
3 BAND ALL-WAVE SUPERHETERODYNE RECEIVER = AC OPERATED



LEGEND	OUR PART NO.	DESCRIPTION
C_1	213	.005 MFD.-600 V. TUBULAR CONDENSER
C_2	211	.01 MFD- 400 V. TUBULAR CONDENSER
C_3	212	.05 MFD.-400 V. TUBULAR CONDENSER
C_4	203	.1 MFD. 200 V. TUBULAR CONDENSER
C_5	210	.1 MFD.-400 V. TUBULAR CONDENSER
C_6	205	.25 MFD 200 V. TUBULAR CONDENSER
C_7	304	10 MFD. 35 V. DRY ELECTROLYTIC TUB. COND.
C_8	412	.00005 MFD MICA CONDENSER
C_9	400	.0001 MFD. MICA CONDENSER
C_{10}	401	.00025 MFD. MICA CONDENSER
C_{11}	410	.0018 MFD. MICA CONDENSER
C_{12}	413	.0038 MFD. MICA CONDENSER
C_{13}	1404	5 PLATE PADDING CONDENSER

LEGEND	OUR PART NO	DESCRIPTION
C_{14}	317	8 MFD. 450 W.V. WET ELECTROLYTIC COND.
CV_{1-2}	611	2 GANG VARIABLE CONDENSER
CV	560	5-30 MMFD TRIMMER CONDENSER
R_1	2011	500,000 OHM VOLUME CONTROL
R_2	2012	75,000 OHM TONE CONTROL & SWITCH
R_3	101	150 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_4	103	250 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_5	111	25,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_6	113	50,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_7	115	100,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_8	116	250,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_9	117	500,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_{13}	105	1,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR

LEGEND	OUR PART NO.	DESCRIPTION
R_{10}	119	1 MEGOHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_{11}	146	25,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_{12}	135	420 OHM 1 WATT W.W. RESISTOR
T_1	1215	SHIELDED 3 BAND ANTENNA COIL
T_2	1404	SHIELDED 3 BAND OSCILLATOR COIL
T_3	1508	TRIPLE TUNE I.F. TRANSFORMER
T_4	1510	DIODE I.F. TRANSFORMER
T_5	1015	POWER TRANSFORMER
T_6	IN 875	SPEAKER TRANSFORMER
$S_{1-2-3-4}$	1913	2 GANG BAND SWITCH
S	—	LINE SWITCH ON TONE CONTROL
F	IN 875	1600 OHM SPEAKER FIELD
B	3000	BIAS CELL

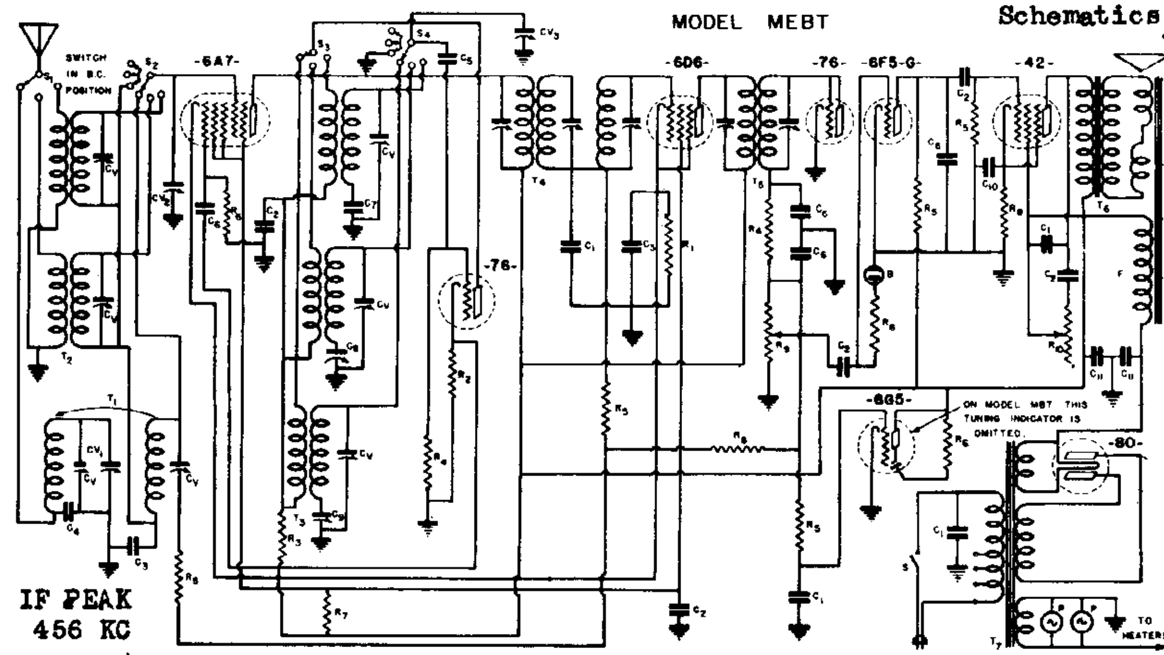
W.F.S.

CLIMAX RADIO & TELEV. CO., INC.

MODELS M,ME(Revised)
MODEL MEBT
Schematics,Parts

LONGWAVE 3 BAND SUPERHETERODYNE RECEIVER = AC OPERATED

MODEL MEBT



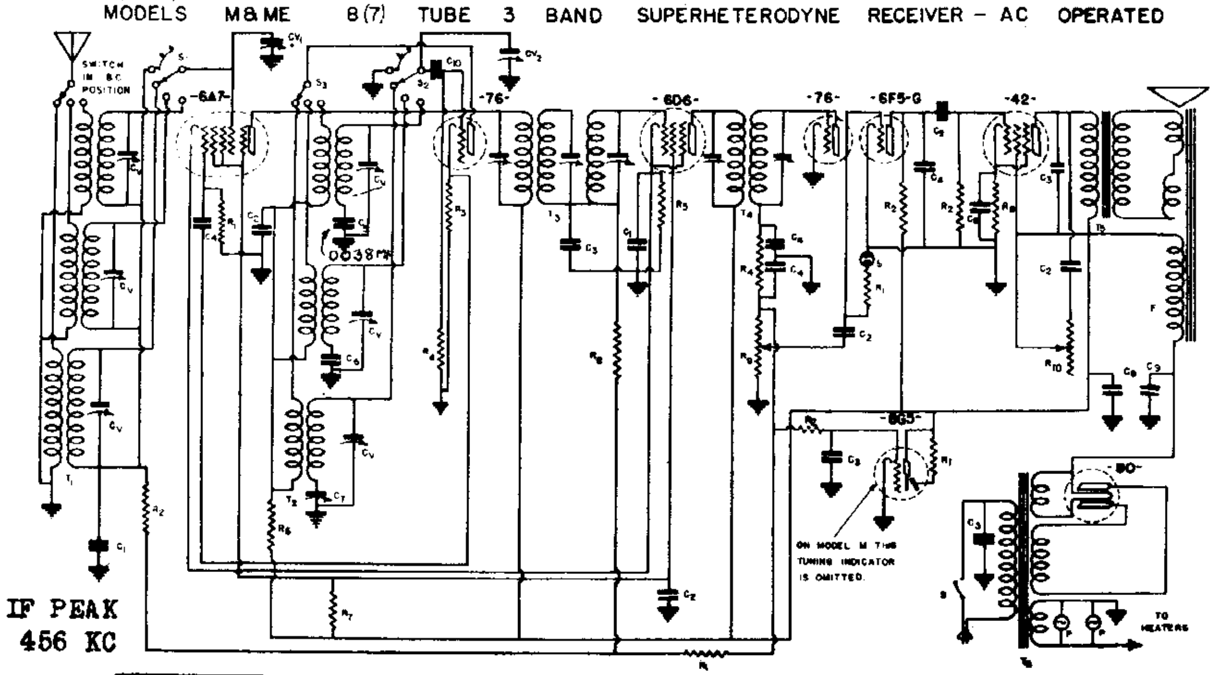
IF PEAK 456 KC

LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD-400V TUBULAR CONDENSER
C_2	206	.05 MFD-400V TUBULAR CONDENSER
C_3	203	.1 MFD-200V TUBULAR CONDENSER
C_4	214	.01 MFD-±5% TUBULAR CONDENSER
C_5	412	.00005 MICA CONDENSER
C_6	401	.00025 MICA CONDENSER
C_7	413	.0038 MICA CONDENSER
C_8	1411	5 PLATE PADDING CONDENSER
C_9	306	3 PLATE PADDING CONDENSER
C_{10}	304	10 MFD 25 W.V. ELECTROLYTIC COND.
C_{11}	317	8 MFD 450 W.V. ELECTROLYTIC COND
C_V	500	5-30 MFD TRIMMER CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
CV_{1-2-3}	613	3 GANG VARIABLE CONDENSER
R_1	103	250 OHM ¼ WATT CARBON RESISTOR
R_2	105	1000 OHM ¼ WATT CARBON RESISTOR
R_3	111	25,000 OHM ¼ WATT CARBON RESISTOR
R_4	113	50,000 OHM ¼ WATT CARBON RESISTOR
R_5	117	½ MEGOHM ¼ WATT CARBON RESISTOR
R_6	119	1 MEGOHM ¼ WATT CARBON RESISTOR
R_7	112	25,000 OHM ¼ WATT CARBON RESISTOR
R_8	122	420 OHM 2 WATT WIRE WOUND RESIST
R_9	2011	500,000 OHM VOLUME CONTROL
R_{10}	2012	75,000 OHM TONE CONTROL & SWITCH

LEGEND	OUR PART NO.	DESCRIPTION
T_1	1614	LONG-WAVE PRESELECTOR COIL
T_2	1221	B.C. & SKIP-BAND ANTENNA COIL
T_3	1411	LONG-WAVE 3 BAND OSCILLATOR COIL
T_4	1508	TRIPLE TUNE I.F. TRANSFORMER
T_5	1506	DIODE I.F. TRANSFORMER
T_6	851	SPEAKER TRANSFORMER
T_7	1013	POWER TRANSFORMER
F	851	1600 OHM SPEAKER FIELD
$S_{1-2-3-4}$	1913	2 GANG BAND SWITCH
B	3000	BIAS CELL
S	---	SWITCH ON VOLUME CONTROL
P	2902	MAZDA #46 PILOT LIGHT

MODELS M & ME 8(7) TUBE 3 BAND SUPERHETERODYNE RECEIVER - AC OPERATED



IF PEAK 456 KC

LEGEND	OUR PART NO.	DESCRIPTION
C_1	203	.1 MFD-200V TUBULAR CONDENSER
C_2	206	.05 MFD-400V TUBULAR CONDENSER
C_3	211	.01 MFD-400V TUBULAR CONDENSER
C_4	401	.00025 MICA CONDENSER
C_5	413	.0038 MICA CONDENSER
C_6	416	.0018 MICA CONDENSER
C_7	508	5 PLATE PADDING CONDENSER
C_V	500	5-30 MFD. TRIMMER CONDENSERS
C_8	304	10 MFD 25 W.V. TUBULAR ELECTROLYTIC COND.
C_9	317	8 MFD. 450 W.V. WET ELECTROLYTIC COND
C_{10}	412	.00005 MFD. MICA CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	611	2 GANG VARIABLE CONDENSER
R_1	119	1 MEGOHM ½ WATT CARBON RESISTOR
R_2	117	½ MEGOHM ¼ WATT CARBON RESISTOR
R_3	105	1,000 OHMS ¼ WATT CARBON RESISTOR
R_4	113	50,000 OHMS ¼ WATT CARBON RESISTOR
R_5	103	250 OHMS ¼ WATT CARBON RESISTOR
R_6	111	25,000 OHMS ¼ WATT CARBON RESISTOR
R_7	112	25,000 OHMS ¼ WATT CARBON RESISTOR
R_8	122	420 OHMS 2 WATT WIRE WOUND RESISTOR
R_9	2011	500,000 OHM VOLUME CONTROL
R_{10}	2012	75,000 OHM TONE CONTROL AND SWITCH

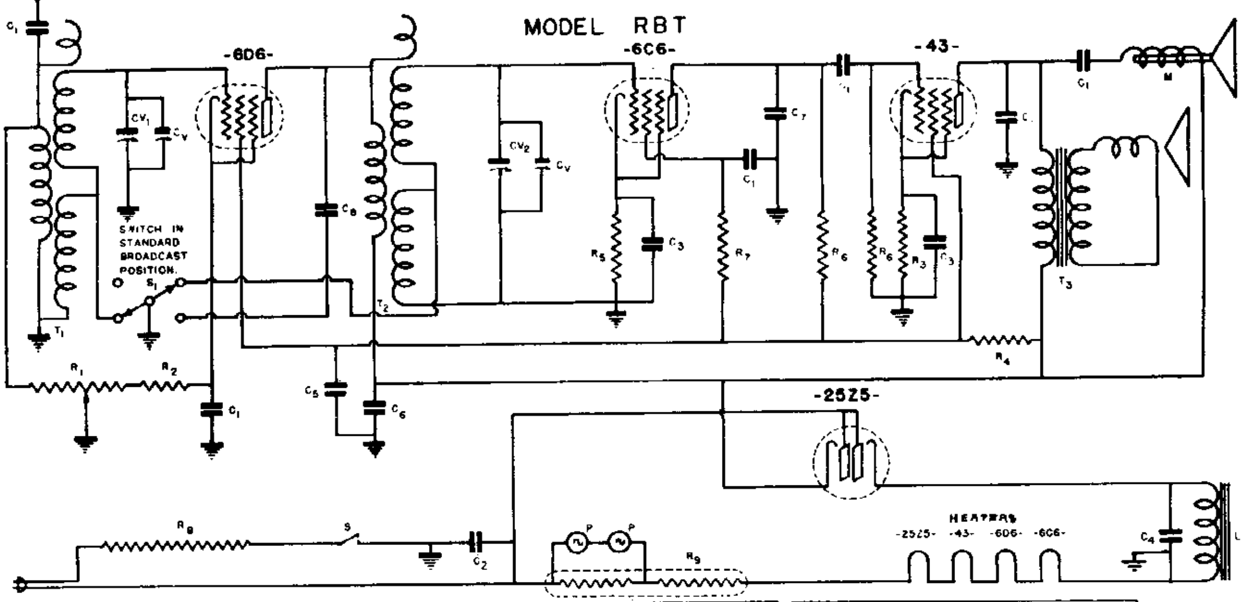
LEGEND	OUR PART NO.	DESCRIPTION
T_1	1215	SHIELDED 3 BAND ANTENNA COIL
T_2	1408	SHIELDED 3 BAND OSCILLATOR COIL
T_3	1508	TRIPLE TUNED I.F. TRANSFORMER
T_4	1506	DIODE I.F. TRANSFORMER
T_5	851	SPEAKER TRANSFORMER
T_6	1012	POWER TRANSFORMER
$S_1S_2S_3$	1913	2 GANG BAND SWITCH
P	2902	MAZDA #46 PILOT LIGHT
S	---	SWITCH ON TONE CONTROL
F	851	1600 OHM SPEAKER FIELD
B	3000	BIAS CELL

MODEL RBT
MODEL T
Schematics, Parts

CLIMAX RADIO & TELEV. CO., INC.

5 TUBE LONGWAVE 2 BAND TRF RECEIVER = *AC-DC TYPE*

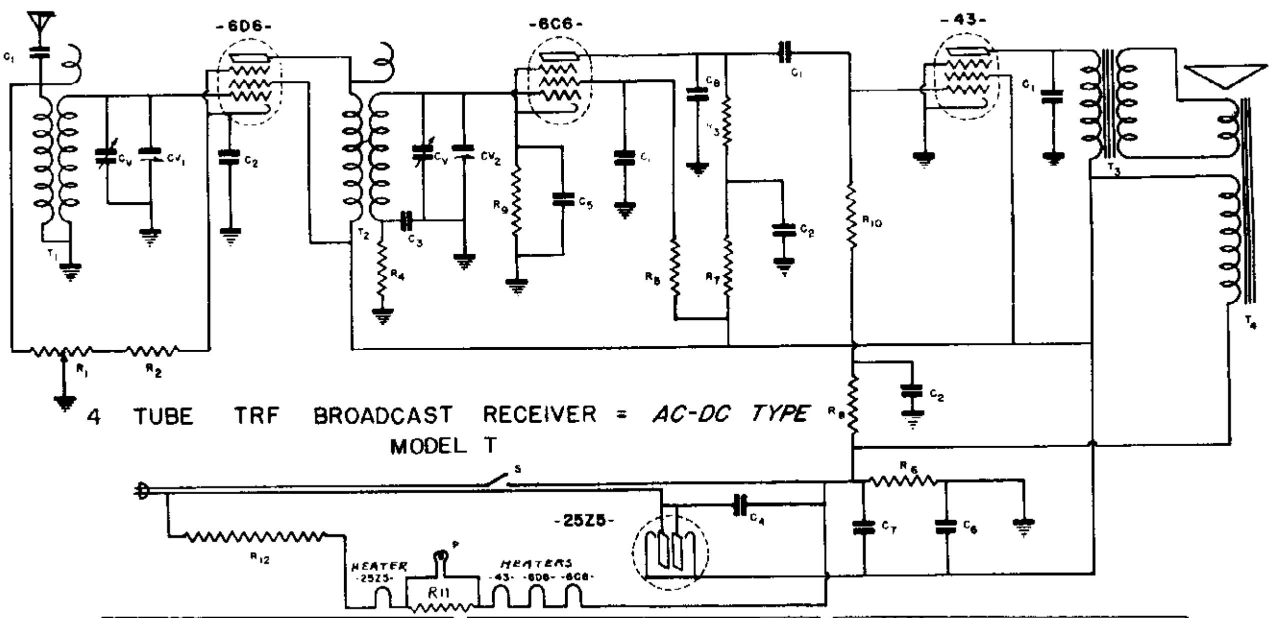
MODEL RBT



LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD 400 V TUBULAR CONDENSER
C_2	210	.1 MFD-400 V TUBULAR CONDENSER
C_3	IN 316	5 MFD 25 W.V. ELECTROLYTIC COND.
C_4	IN 316	4 MFD 150 W.V. ELECTROLYTIC COND.
C_5	IN 316	8 MFD 150 W.V. ELECTROLYTIC COND.
C_6	IN 316	14 MFD 150 W.V. ELECTROLYTIC COND.
C_7	401	.00025 MICA CONDENSER
C_8	405	.0004 MICA CONDENSER
C_V	ON 610	VARIABLE CONDENSER TRIMMER

LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	610	2 GANG VARIABLE CONDENSER
R_1	2006	10,000 OHM VOLUME CONTROL
R_2	—	250 OHM (Minimum on Volume Control)
R_3	104	600 OHM ¼ WATT CARBON RESISTOR
R_4	108	5,000 OHM ¼ WATT CARBON RESISTOR
R_5	111	25,000 OHM ¼ WATT CARBON RESISTOR
R_6	[illegible]	500,000 OHM ¼ WATT CARBON RESISTOR
R_7	120	3 MEGOHM ¼ WATT CARBON RESISTOR
R_8	1801	285 OHM RESISTOR CORD

LEGEND	OUR PART NO.	DESCRIPTION
R_9	2904	L-55-C BALLAST TUBE
T_1	1208	LONG WAVE ANTENNA COIL
T_2	1307	LONG WAVE R.F. COIL
T_3	IN 800	SPEAKER TRANSFORMER
L	IN 800	SPEAKER FIELD (2500 OHMS)
M	900	MAGNETIC SPEAKER
S_1	1914	BAND SELECTOR SWITCH
S	—	LINE SWITCH ON VOLUME CONTROL
P	2902	MAZDA #46 PILOT LIGHT



4 TUBE TRF BROADCAST RECEIVER = *AC-DC TYPE*

MODEL T

LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD - 400 V TUBULAR CONDENSER
C_2	212	.05 MFD. - 200 V. TUBULAR CONDENSER
C_3	203	.1 MFD. - 200 V TUBULAR CONDENSER
C_4	210	.1 MFD. - 400 V. TUBULAR CONDENSER
C_5	320	10 MFD - 25 W.V. ELECTROLYTIC CONDENSER
C_6	320	8 MFD - 150 W.V. ELECTROLYTIC CONDENSER
C_7	320	14 MFD - 150 W.V. ELECTROLYTIC CONDENSER
C_V	ON 617	VARIABLE CONDENSER TRIMMER
CV_1 CV_2	617	2 GANG VARIABLE CONDENSER
C_8	401	.00025 MICA CONDENSER

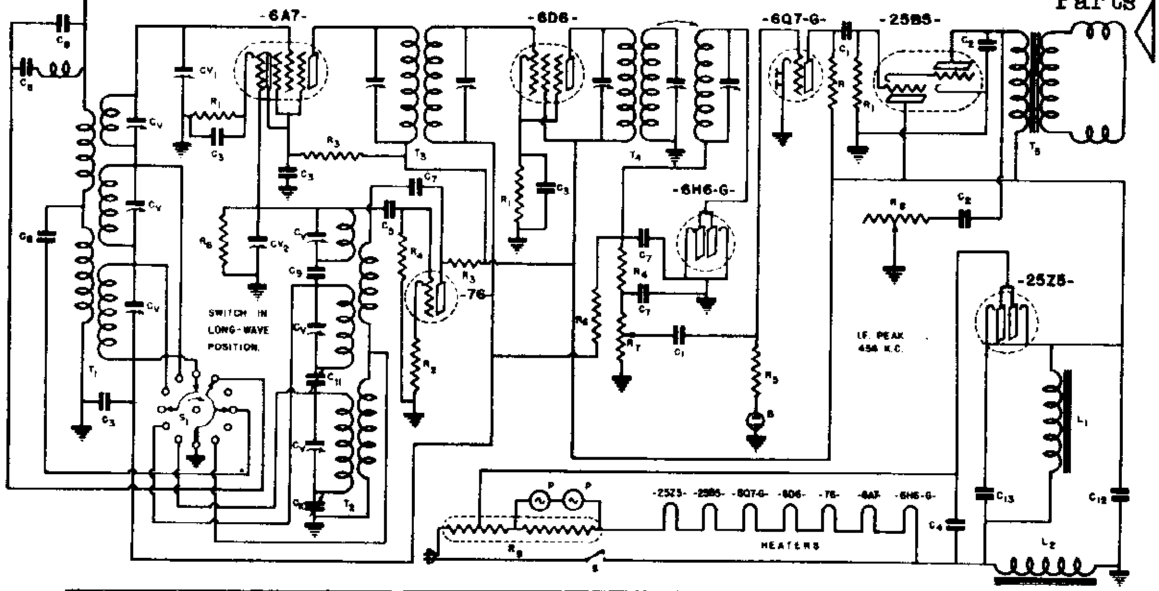
LEGEND	OUR PART NO.	DESCRIPTION
R_1	2006	10,000 OHM VOLUME CONTROL
R_2	—	275 OHM (Minim. on Volume Control)
R_3	117	5 MEGOHM ½ WATT CARBON RESISTOR
R_4	119	1 MEGOHM ½ WATT CARBON RESISTOR
R_5	120	3 MEGOHM ¼ WATT CARBON RESISTOR
R_6	135	420 OHM ½ WATT CARBON RESISTOR
R_7	115	100,000 OHM ¼ WATT CARBON RESISTOR
R_8	138	150,000 OHM ¼ WATT CARBON RESISTOR
R_9	111	25,000 OHM ¼ WATT CARBON RESISTOR

LEGEND	OUR PART NO.	DESCRIPTION
R_{10}	141	350,000 OHM ½ WATT CARBON RESISTOR
R_{11}	142	90 OHM 2 WATT WIRE WOUND RESISTOR
R_{12}	1807	165 OHM RESISTOR CORD
T_1	1200	HIGH IMPEDANCE PRIMARY ANTENNA COIL
T_2	1300	HIGH IMPEDANCE PRIMARY R.F. COIL
T_3	IN 803	SPEAKER OUTPUT TRANSFORMER
T_4	IN 803	SPEAKER FIELD (2500 OHMS)
S	—	SWITCH ON TONE CONTROL
P	2902	MAZDA #46 PILOT LIGHT

CLIMAX RADIO & TELEV. CO., INC.

8 TUBE LONGWAVE 3 BAND SUPERHETERODYNE RECEIVER = *AC-DC TYPE*

MODEL SBT



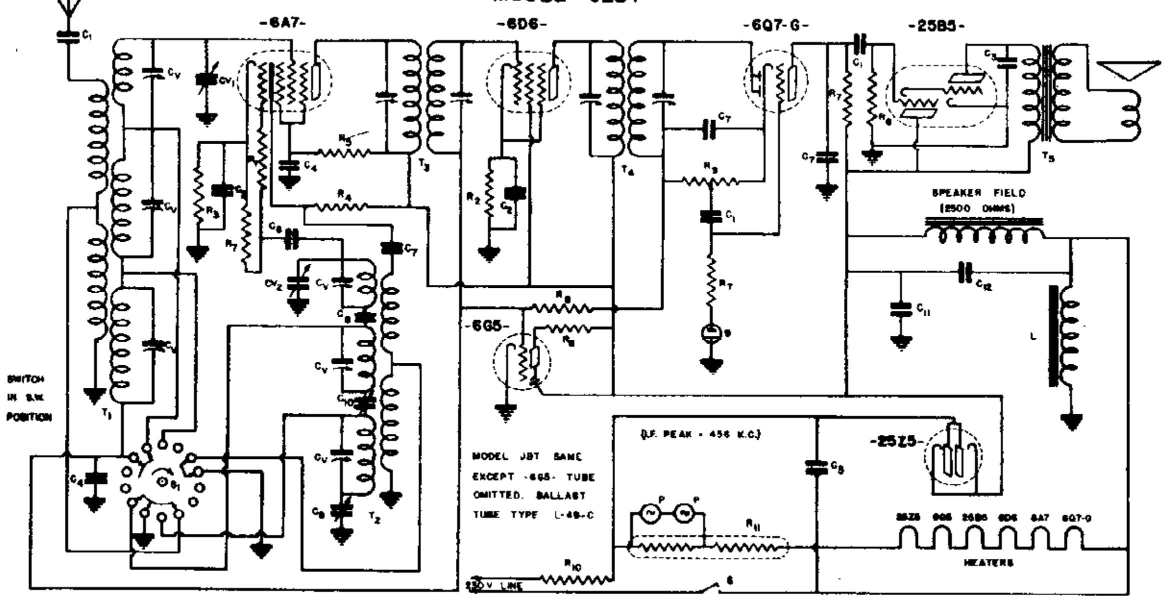
LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD-400 V TUBULAR CONDENSER
C_2	206	.05 MFD-400 V TUBULAR CONDENSER
C_3	203	.1 MFD-200 V TUBULAR CONDENSER
C_4	210	.1 MFD-400 V TUBULAR CONDENSER
C_5	412	.00005 MICA CONDENSER
C_6	400	.0001 MICA CONDENSER
C_7	401	.00025 MICA CONDENSER
C_8	406	.0005 MICA CONDENSER
C_9	407	.006 MICA CONDENSER
C_{10}	506	3 PLATE PADDING CONDENSER
C_{11}	507	5 PLATE PADDING CONDENSER
C_V	ON COIL	TRIMMER CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	606	2 GANG VARIABLE CONDENSER
C_{12}	314	10 MFD 150 W.V. ELECTROLYTIC COND.
C_{13}	311	20 MFD 150 W.V. ELECTROLYTIC COND.
R_1	103	250 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_2	105	1000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_3	119	10,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	113	50,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_5	117	500,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_6	119	1 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_7	2007A	500,000 OHM VOLUME CONTROL
R_8	2008A	75,000 OHM TONE CONTROL

LEGEND	OUR PART NO.	DESCRIPTION
R_9	2911	550 V. BALLAST TUBE
T_1	1207	LONG WAVE ANTENNA COIL
T_2	1401	LONG WAVE OSCILLATOR COIL
T_3	1509	INPUT I.F. TRANSFORMER
T_4	1505	TRIPLE TUNED DIODE I.F. TRANSFORMER
T_5	IN 654	SPEAKER TRANSFORMER
L_1	IN 654	SPEAKER FIELD (2500 OHMS)
L_2	1101	FILTER CHOKE
S_1	1908	3 BAND SELECTOR SWITCH
P	2902	MAZDA #46 PILOT LIGHT
S	—	SWITCH ON VOLUME CONTROL
B	3000	BIAS CELL

7 TUBE LONGWAVE 3 BAND SUPERHETERODYNE RECEIVER = *AC-DC TYPE*

MODEL JEBT



LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD-400 V TUBULAR CONDENSER
C_2	212	.05 MFD-200 V TUBULAR CONDENSER
C_3	206	.05 MFD-400 V TUBULAR CONDENSER
C_4	205	.1 MFD-200 V TUBULAR CONDENSER
C_5	210	.1 MFD-400 V TUBULAR CONDENSER
C_6	400	.0001 MICA CONDENSER
C_7	401	.00025 MICA CONDENSER
C_8	407	.006 MICA CONDENSER
C_9	506	3 PLATE PADDING CONDENSER
C_{10}	507	5 PLATE PADDING CONDENSER
C_{11}	314	10 MFD 150 W.V. ELECTROLYTIC COND.
C_{12}	311	20 MFD 150 W.V. ELECTROLYTIC COND.

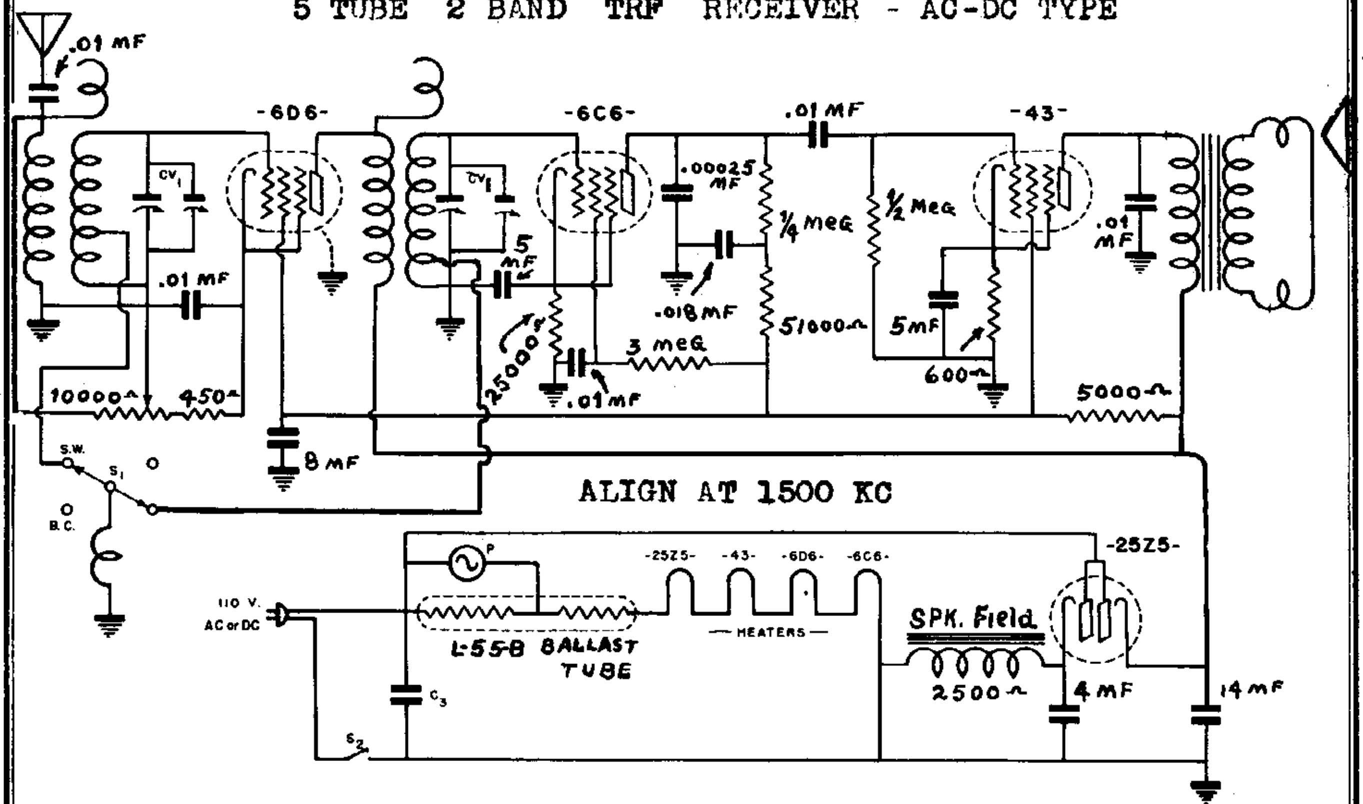
LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	612	2 GANG VARIABLE CONDENSER
C_V	ON COIL	TRIMMER CONDENSER
R_1	101	150 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_2	103	250 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_3	156	400 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	108	5,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_5	111	25,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_6	113	50,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_7	117	500,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_8	119	1 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_9	2009	500,000 OHM VOLUME CONTROL & Switch
R_{10}	1801	285 OHM RESISTOR CORD

LEGEND	OUR PART NO.	DESCRIPTION
R_{11}	2905	L-49-C BALLAST TUBE (MODEL JBT)
R_{11}	2906	L-42-C BALLAST TUBE (MODEL JEBT)
T_1	1220	LONG WAVE ANTENNA COIL
T_2	1410	LONG WAVE OSCILLATOR COIL
T_3	1503	I.F. TRANSFORMER
T_4	IN 1506	DIODE I.F. TRANSFORMER
T_5	IN 905	SPEAKER TRANSFORMER
L	1101	FILTER CHOKE
S_1	1915	3 BAND SELECTOR SWITCH
P	2902	MAZDA 46 PILOT LIGHT
S	—	LINE SWITCH ON VOLUME CONTROL
B	3000	BIAS CELL

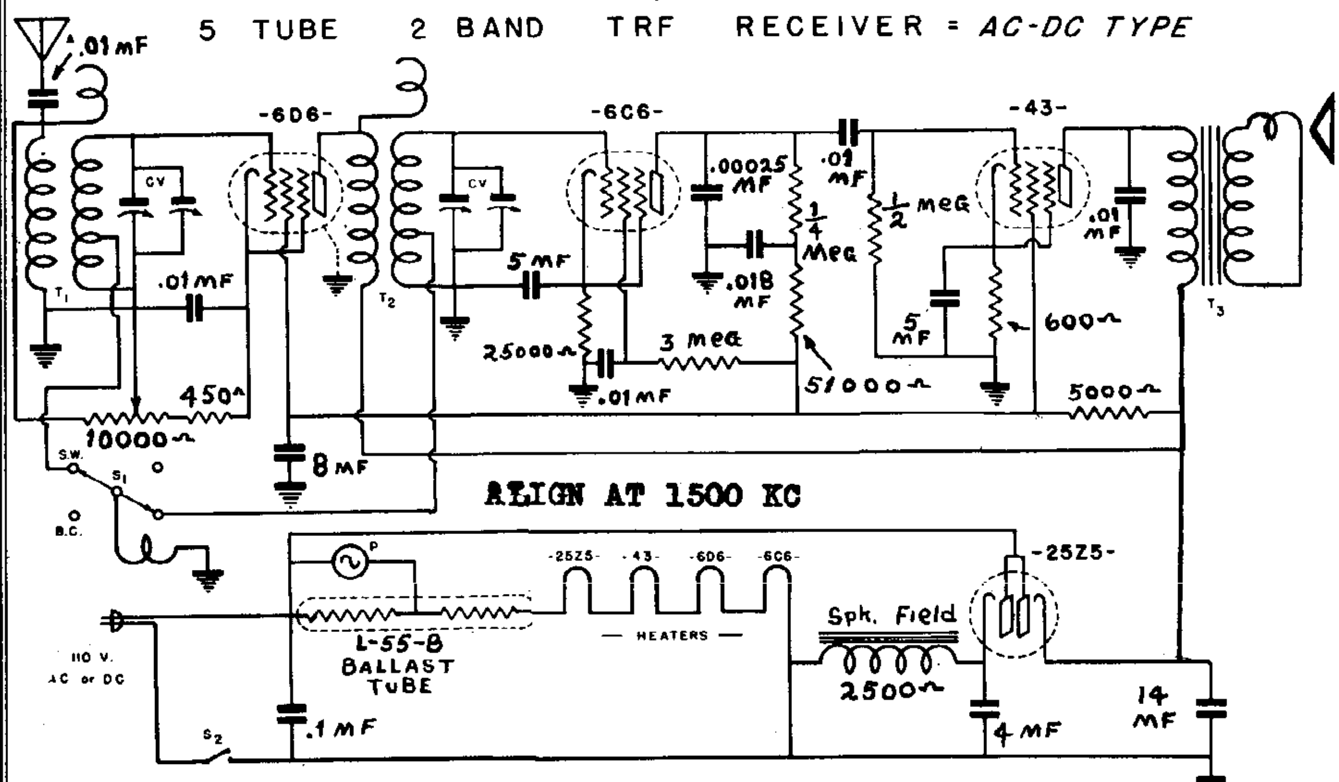
MODEL Q-69
MODEL Z-55
Schematics

CLIMAX RADIO & TELEV. CO., INC.

Z-55
5 TUBE 2 BAND TRF RECEIVER - AC-DC TYPE

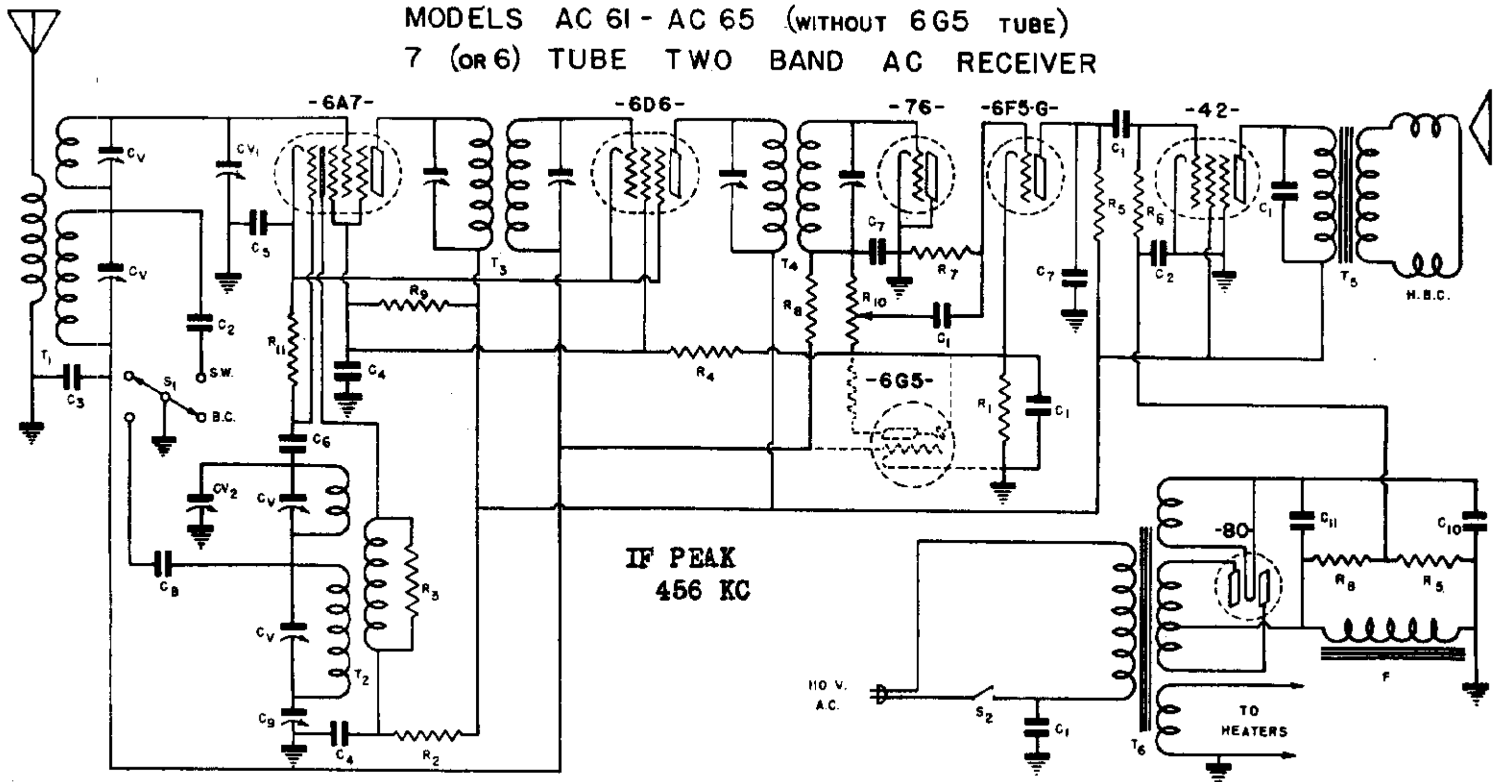


Q-69
5 TUBE 2 BAND TRF RECEIVER = AC-DC TYPE



CLIMAX RADIO & TELEV. CO., INC.

MODELS AC 60 - AC 64 - AC 64-B
MODELS AC 61 - AC 65 (WITHOUT 6G5 TUBE)
7 (OR 6) TUBE TWO BAND AC RECEIVER



LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD 400 V. TUBULAR CONDENSER
C_2	212	.05 MFD 200 V. TUBULAR CONDENSER
C_3	203	.1 MFD 200V. TUBULAR CONDENSER
C_4	210	.1 MFD 400 V. TUBULAR CONDENSER
C_5	204	25 MFD 200 V. TUBULAR CONDENSER
C_6	400	.0001 MICA CONDENSER
C_7	401	.00025 MICA CONDENSER
C_8	411	.00128 MICA CONDENSER
C_9	507	5 PLATE PADDING CONDENSER
C_V	500	5-30 MFD TRIMMER CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
CV_{1-2}	612-A	2 GANG VARIABLE CONDENSER
C_{10}	IN 323	4 MFD 600 P.V. ELECTROLYTIC COND.
C_{11}	IN 323	8 MFD 600 P.V. ELECTROLYTIC COND.
T_1	1210	ANTENNA COIL
T_2	1404	OSCILLATOR COIL
T_3	1507	OUTPUT I F TRANSFORMER
T_4	1503	INPUT I F TRANSFORMER
T_5	IN 811	SPEAKER TRANSFORMER
S_1	1914	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
F	IN 811	1600 OHM SPEAKER FIELD

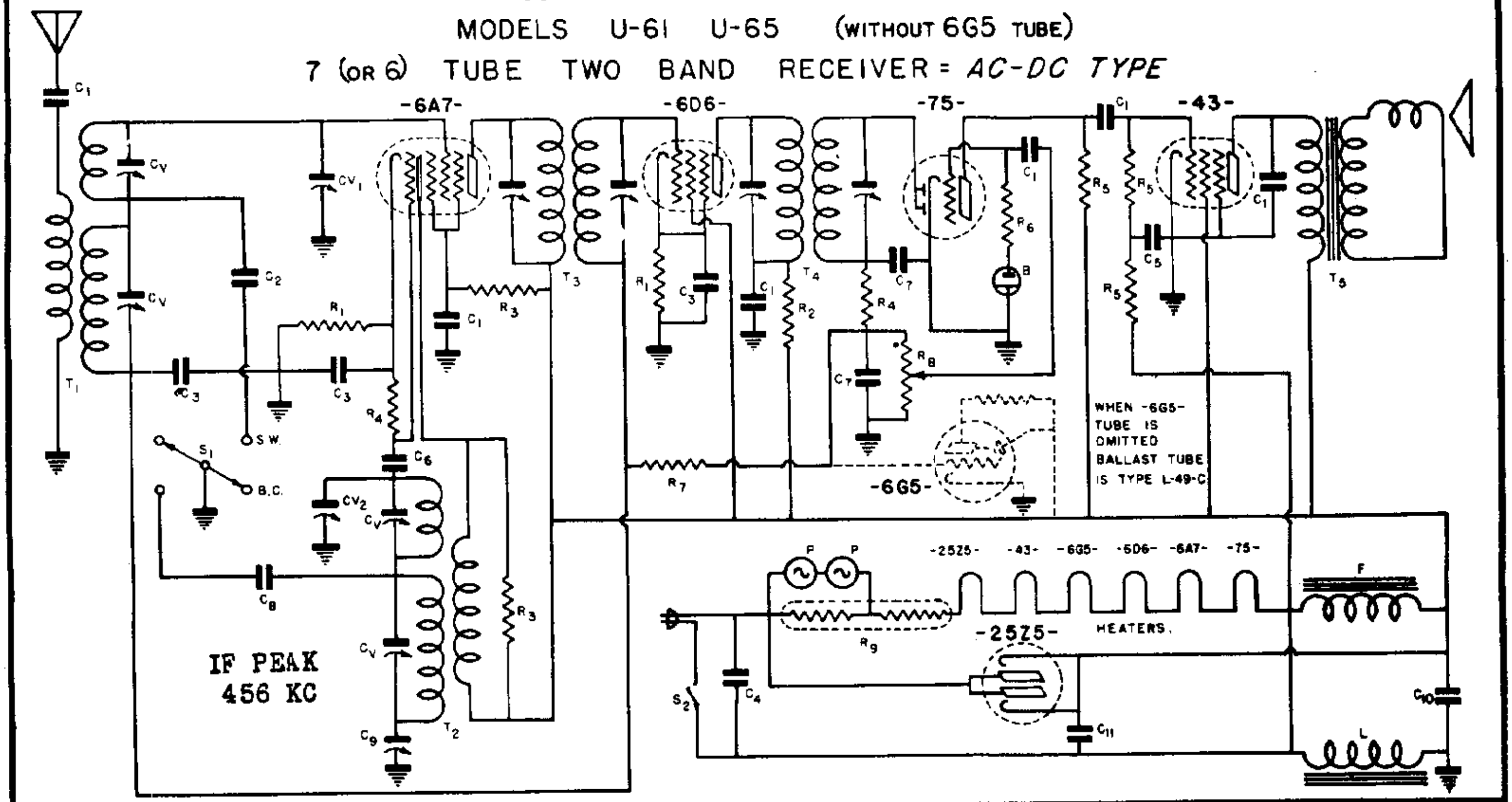
LEGEND	OUR PART NO.	DESCRIPTION
R_1	139	400 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_2	109	10,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_3	111	25,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	113	50,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_5	116	250,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_6	141	350,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_7	117	500,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_8	119	1 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_9	112	25,000 OHM 1 WATT CARBON RESISTOR
R_{10}	2009	500,000 OHM VOLUME CONTROL
R_{11}	103	250 OHM $\frac{1}{4}$ WATT CARBON RESISTOR

W.F.S.

**MODELS U60, U61, U64
U64B, U65
Schematic, Parts**

CLIMAX RADIO & TELEV. CO., INC.

MODELS U-60 U-64 U-64B
MODELS U-61 U-65 (WITHOUT 6G5 TUBE)
7 (OR 6) TUBE TWO BAND RECEIVER = AC-DC TYPE



LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD 400 V. TUBULAR CONDENSER
C_2	206	.05 MFD 200 V. TUBULAR CONDENSER
C_3	203	.1 MFD 200 V TUBULAR CONDENSER
C_4	210	.1 MFD 400 V. TUBULAR CONDENSER
C_5	204	.25 MFD 200 V. TUBULAR CONDENSER
C_6	400	.0001 MICA CONDENSER
C_7	401	.00025 MICA CONDENSER
C_8	411	.00128 MICA CONDENSER
C_9	507	5 PLATE PADDING CONDENSER
C_{10}	314	10 MFD 150 WV. WET ELECTROLYTIC COND
C_{11}	311	20 MFD 150 WV. WET ELECTROLYTIC COND

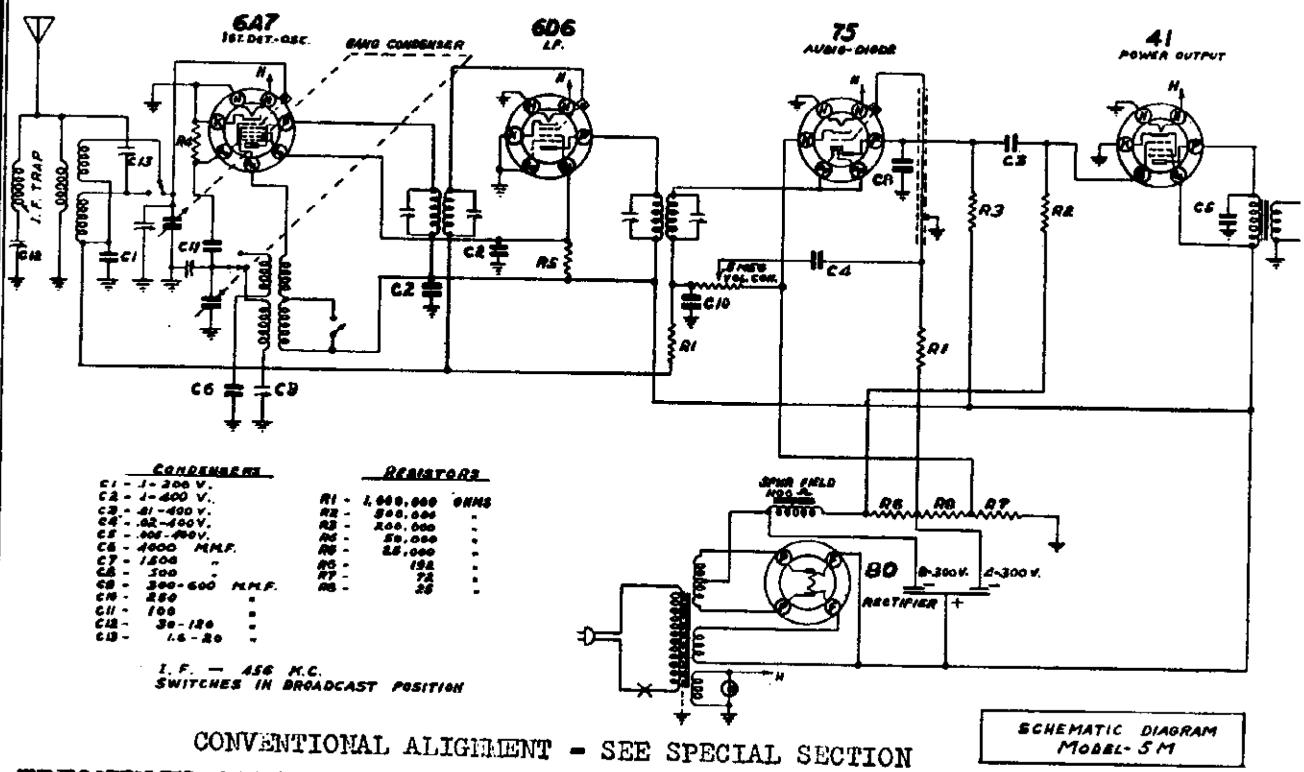
LEGEND	OUR PART NO.	DESCRIPTION
CV_{1-2}	612-A	2 GANG VARIABLE CONDENSER
C_V	500	5-30 MFD TRIMMER CONDENSER
R_1	103	250 OHM ¼ WATT CARBON RESISTOR
R_2	116	2000 OHM ½ WATT CARBON RESISTOR
R_3	111	25,000 OHM ½ WATT CARBON RESISTOR
R_4	113	50,000 OHM ½ WATT CARBON RESISTOR
R_5	116	250,000 OHM ½ WATT CARBON RESISTOR
R_6	117	500,000 OHM ½ WATT CARBON RESISTOR
R_7	119	1 MEGOHM ½ WATT CARBON RESISTOR
R_8	2009	500,000 OHM VOLUME CONTROL
R_9	2906	L-42-C BALLAST TUBE (with 6G5 tube)
R_9	2905	L-49-C BALLAST TUBE (without 6G5 tube)

LEGEND	OUR PART NO.	DESCRIPTION
T_1	1210	ANTENNA COIL
T_2	1404	OSCILLATOR COIL
T_3	1507	OUTPUT IF TRANSFORMER
T_4	1503	INPUT IF TRANSFORMER
T_5	IN 800	SPEAKER TRANSFORMER
L	1100	FILTER CHOKE
S_1	19.4	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
P	2902	MAZDA #46 PILOT LIGHT
B	3000	BIAS CELL
F	IN 800	SPEAKER FIELD (2500 OHMS)

W.F.S.

MODEL 5M Chass
Schematic, Sock
Trimmers,
Alignment

CONTINENTAL RADIO & TELEV. CORP.

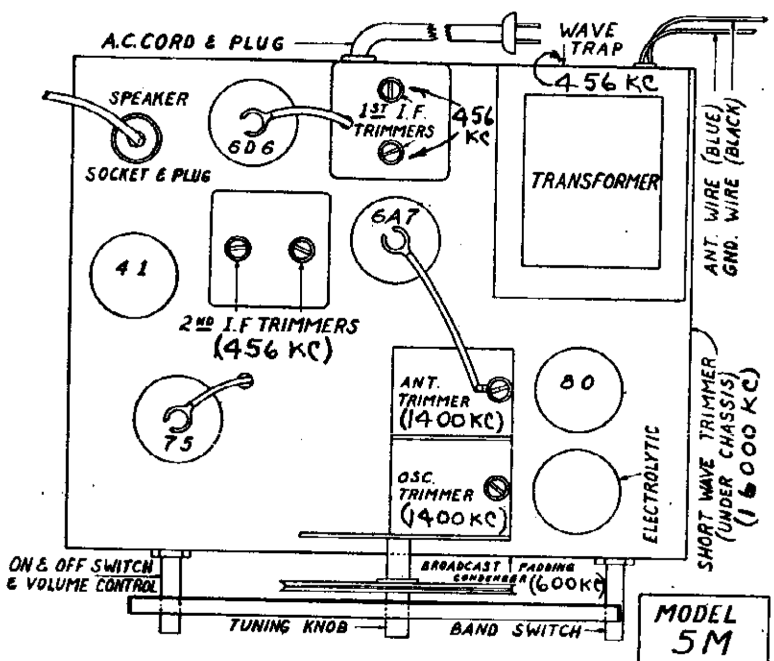


CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION

FREQUENCY RANGE -
535 to 1750 - KC
5600 to 18100 - KC

5 Tube AC Superheterodyne
5M Chassis

This receiver is designed to operate from a power supply main of 110-120 volt, 60 cycle alternating current AC). **Never plug into a DC outlet.**



MODEL
5M

ANTENNA

Use a standard outside antenna of at least 50 feet including lead-in. Connect the antenna to the "Blue" lead.

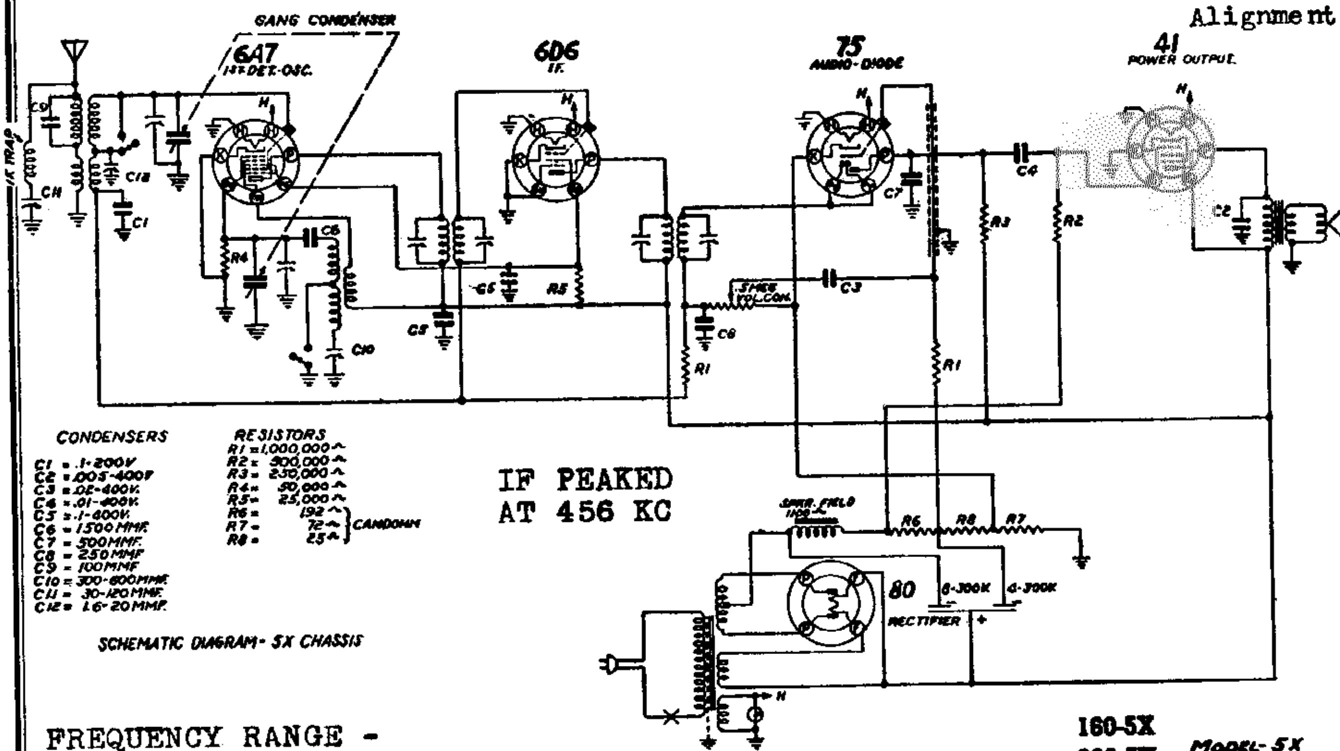
In remote locations that are far away from powerful broadcasting stations, a longer antenna may be used for increased receiving range. Antennas as long as 150 to 200 feet may be employed in "dead spots." (Longer antennas increase sensitivity and decrease selectivity slightly.)

The ground wire should be connected to the "Black" lead.

MODELS 160-5X, 980-5X
Chassis 5X

CONTINENTAL RADIO & TELEV. CORP.

Schematic
Trimmers
Socket
Alignment



CONDENSERS

C1 = .1-200V
C2 = .005-400V
C3 = .02-400V.
C4 = .01-400V.
C5 = .1-400V.
C6 = 1500 MMF.
C7 = 500 MMF.
C8 = 250 MMF
C9 = 100 MMF
C10 = 300-600 MMF.
C11 = 30-120 MMF.
C12 = 1.6-20 MMF.

RESISTORS

R1 = 1,000,000 ^
R2 = 300,000 ^
R3 = 230,000 ^
R4 = 50,000 ^
R5 = 25,000 ^
R6 = 192 ^
R7 = 72 ^
R8 = 25 ^
(R6–R8) CANDOHM

SCHEMATIC DIAGRAM - 5X CHASSIS

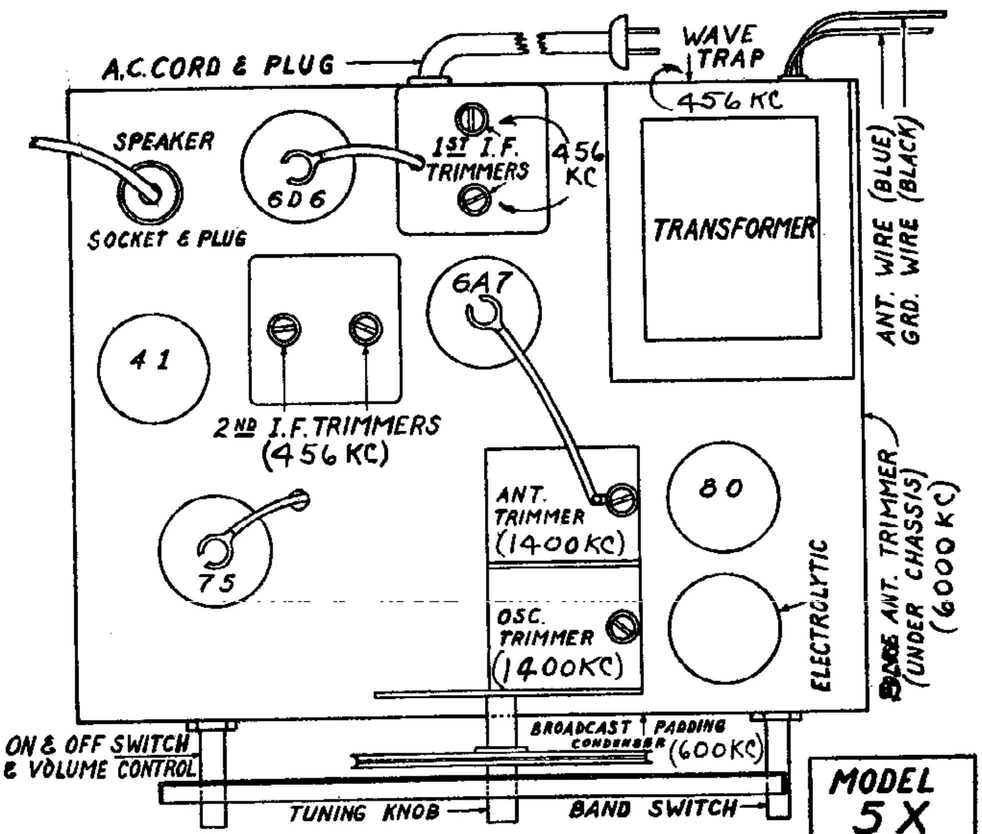
160-5X
980-5X
MODEL-5X

FREQUENCY RANGE -

535 to 1750 KC
5600 to 18100 KC

5 Tube AC Superheterodyne
5X Chassis

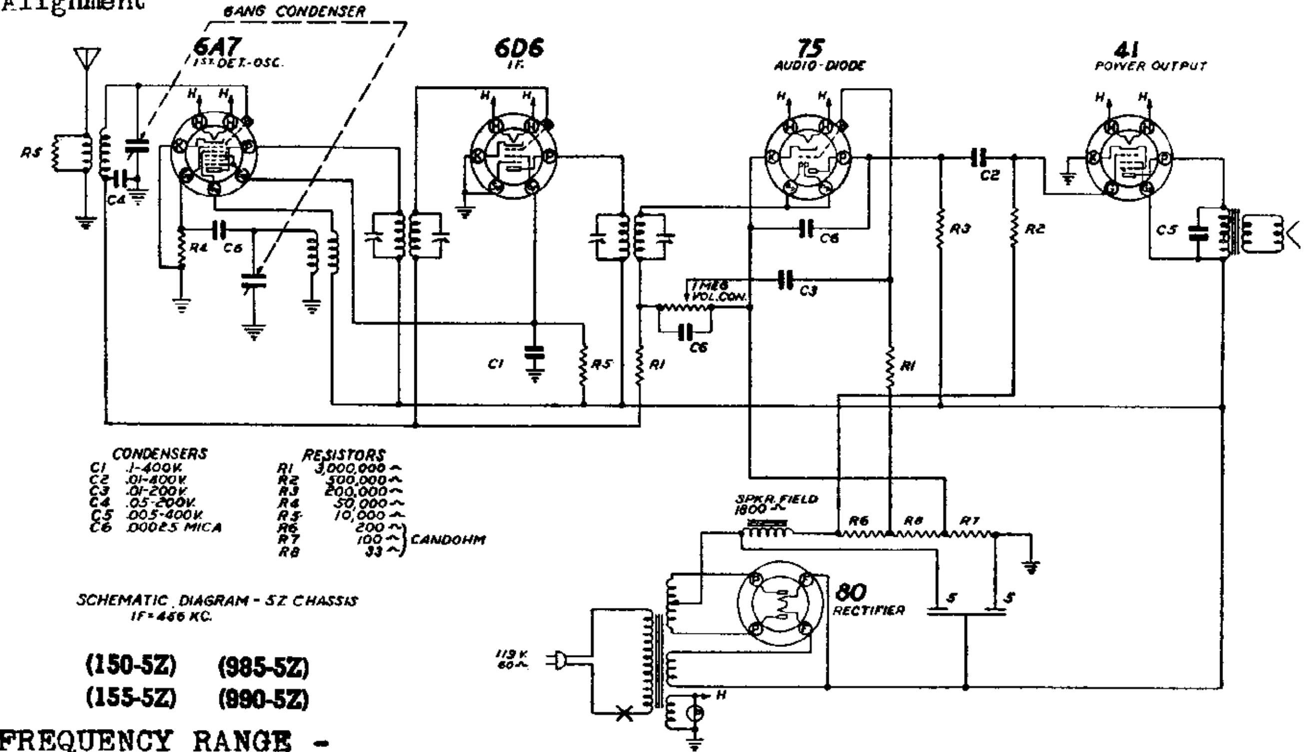
CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION



Schematic
Trimmers
Socket
Alignment

CONTINENTAL RADIO & TELEV CORP.

MODELS 150-5Z, 155-5Z
985-5Z, 990-5Z
Chassis 5Z



CONDENSERS	
C1	.1-400V.
C2	.01-400V.
C3	.01-200V.
C4	.05-200V.
C5	.005-400V.
C6	.00025 MICA

RESISTORS		
R1	3,000,000 ~	
R2	500,000 ~	
R3	200,000 ~	
R4	50,000 ~	
R5	10,000 ~	
R6	200 ~	CANDOHM
R7	100 ~	CANDOHM
R8	33 ~	CANDOHM

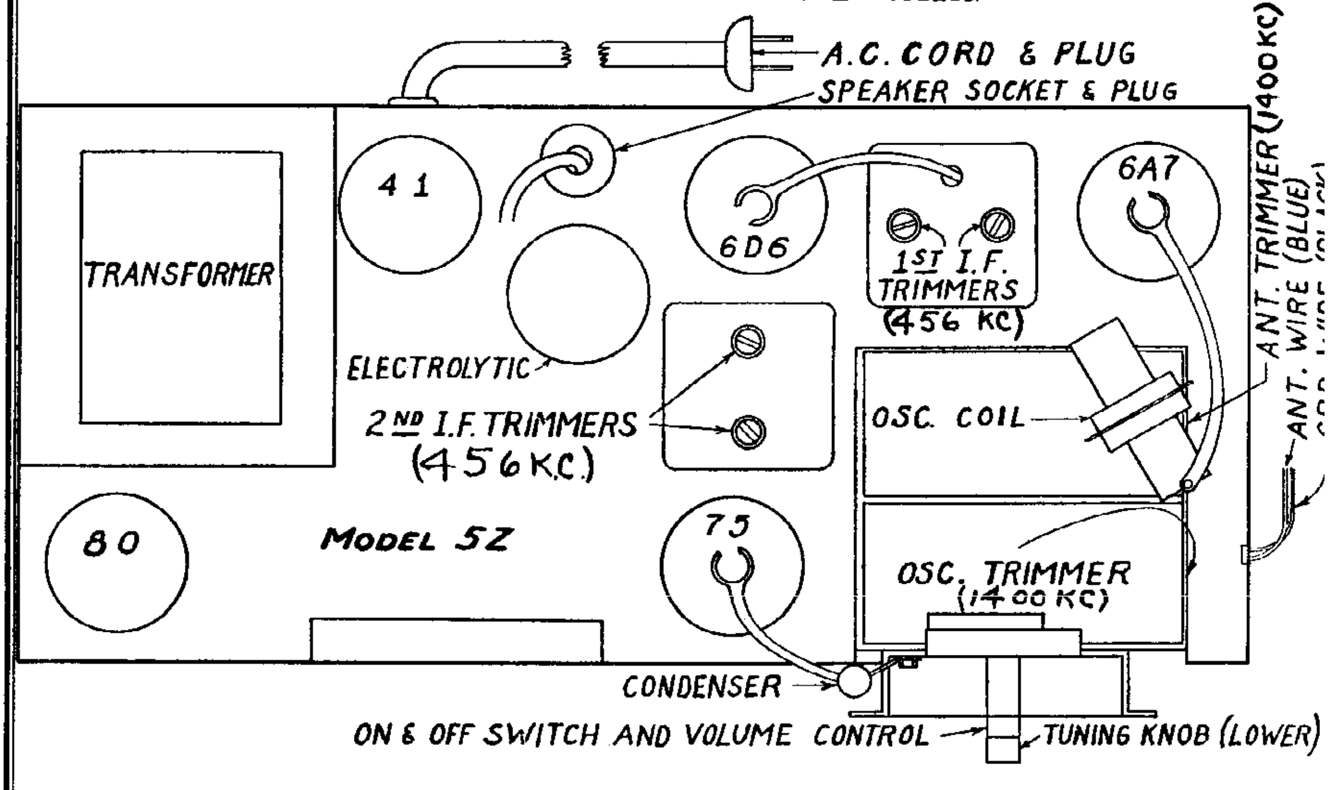
SCHEMATIC DIAGRAM - 5Z CHASSIS
IF = 456 KC.

(150-5Z) (985-5Z)
(155-5Z) (990-5Z)

FREQUENCY RANGE -
535 to 1720 KC

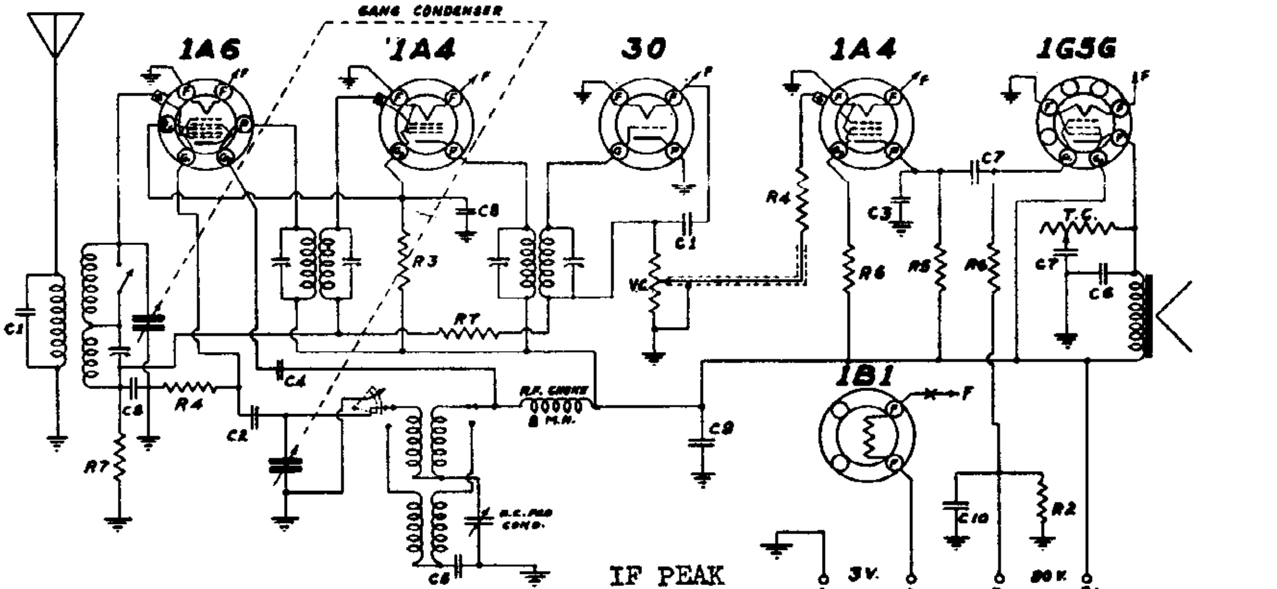
Five Tube A C Superheterodyne
5Z Chassis

CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION



MODEL 6Q Chassis
Schematic, Socket
Trimmers, Alignment
Battery Connections

CONTINENTAL RADIO & TELEV. CORP.



IF PEAK
456 KC

CONDENSERS

No.	MFD.	
1	.0001	MICA
2	.00025	"
3	.0005	"
4	.001	"
5	.0015.	"
6	.002	200 VOLTS
7	.01	200 "
8	.05	200 "
9	.25	
10	10.0 ELECT. 25 V.	

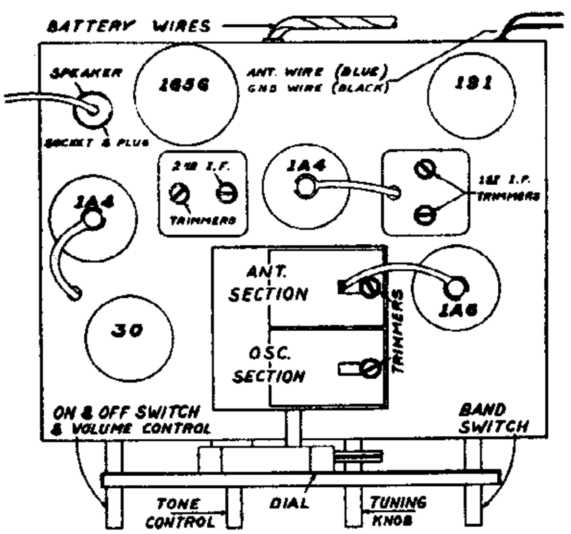
RESISTORS

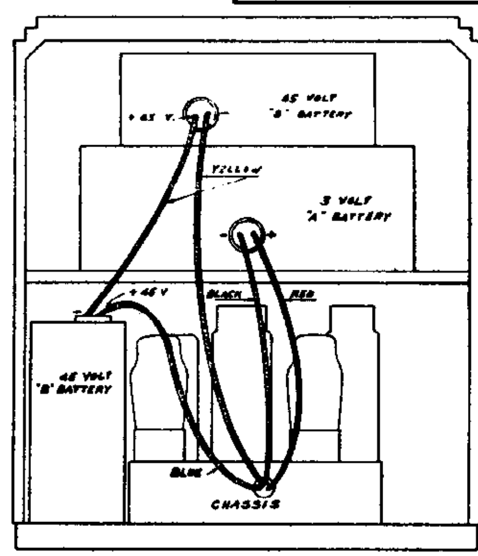
No.	OHMS	WATTS
1	50.	1/2
2	535. ± 5%	1/2
3	10,000.	1/3
4	50,000.	1/4
5	200,000.	1/4
6	1. MEG.	1/4
7	2. MEG.	1/2

V.C. - VOLUME CONTROL - 1 MEGOHM.
T.C. - TONE CONTROL - 100,000 OHMS.
SWITCHES IN BROADCAST POSITION.

FREQUENCY RANGE -
535 to 1730 KC
2.2 to 6.5 MC

SCHEMATIC DIAGRAM
MODEL 6Q





IF ALIGNMENT - Wave change Sw. in BC position. Gang condenser at minimum, generator at 456 KC, output to 1A6 CG thru .05 MFD condenser, Generator grounded to receiver, align four trimmers of IF transformers.

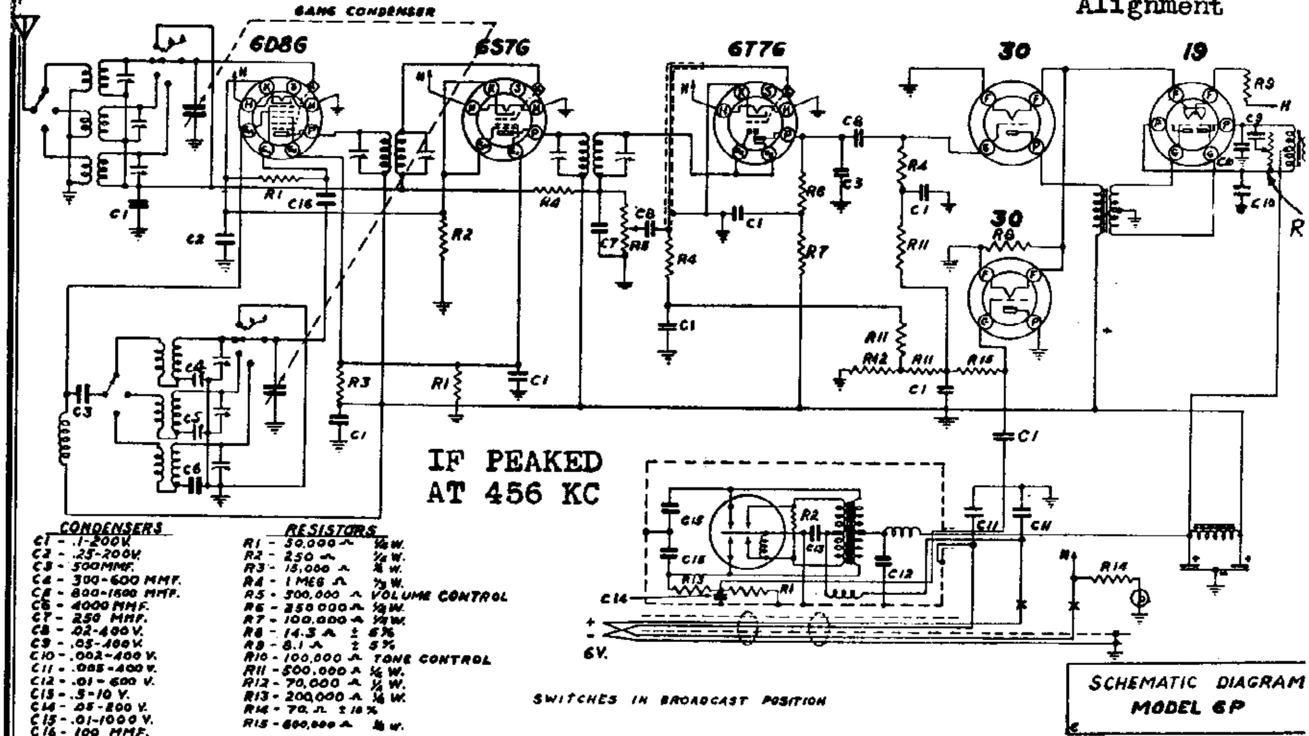
BROADCAST - Generator connected to antenna lead thru 200 MMFD condenser, and set at 1400 KC. Gang condenser at minimum. Trim oscillator then Antenna trimmers. Pad the oscillator circuit at 600 KC while rocking gang condenser.

SHORT WAVE - Generator at 6000 KC, start rotating gang condenser from HF end, when signal is heard, adjust antenna trimmer (SW) for maximum peak.

Repeat all adjustments for maximum performance.

MODEL 6P Chass
Schematic,
Alignment

CONTINENTAL RADIO & TELEV. CORP.



FREQUENCY RANGE-
550 to 1700 KC
1700 to 5400 KC
5600 to 18100 KC

Six Tube 6 Volt Battery Superheterodyn

6P Chassis

ALIGNMENT DATA AND SERVICING

GENERAL DATA

The alignment of this receiver requires the use of a test oscillator which will cover the frequencies of 456, 600, 1400, 1730, 1800, 4000, 5600, 6000, and 18,000 KC and an output meter which is to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE

The intermediate frequency (I.F. stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT

With the wave switch in the broadcast band and the gang condenser set at minimum, adjust the test ocillator to 456 KC and connect the output to the grid of the first detector tube (6D8G) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. **Note:** Approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the sig with the receiver until the maximum reading is obtained on output meter. This adjustment may seem a little complicated is the easiest way to adjust the oscillator to the antenna. Ret to 1400 KC and again go over the adjustments of this frequen to be certain that they were not put slightly out of alignment wh adjustment was made at 600 KC.

POLICE BAND ALIGNMENT

The police band is adjus by first replacing the .0C dummy with a 400 ohm sistor and setting the gene tor to 5600 KC. With the gang set at minimum, adjust the "pol oscillator trimmer" to receive this signal, then set the signal g erator to 4000 KC and adjust "police antenna trimmer" to g maximum output. Next, set the oscillator to 1800 KC and "pa the circuit at this frequency as described in the instructions padding the broadcast circuits.

SHORT WAVE BAND ALIGNMENT

The short wave band is justed by setting the gene tor to 18,100 KC and with gang at minimum, adjust "short wave oscillator trimmer" to receive the signal. Set the g erator at 16,000 KC and adjust the "short wave antenna" to g maximum output. As there is no variable low frequency padd condenser on this band, the sensitivity of the receiver should checked at 6000 KC to determine whether the circuits are in li at this frequency. Should the receiver lack sensitivity at 6000 K the antenna and oscillator coils, as well as the .004 mica paddi condenser, should be tested for defects as sometimes these co ponents become subject to mechanical or electrical injuries, desp their rugged construction and liberal ratings.

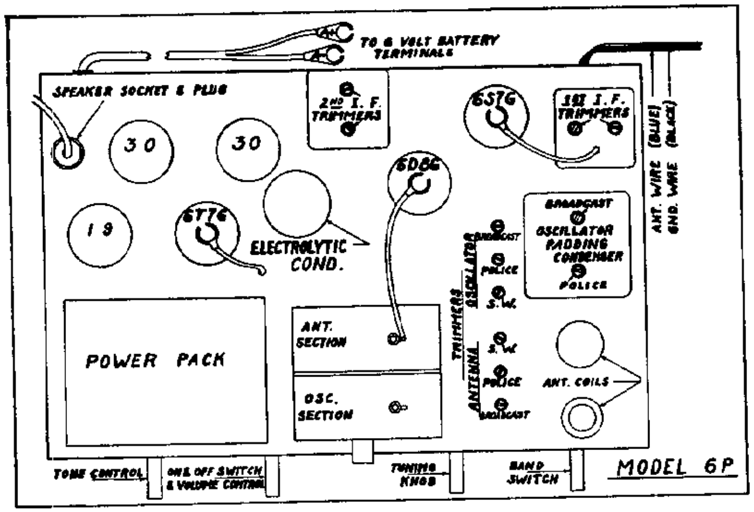
SERVICE DATA FOR ALL BANDS

If it is suspected that the oscillator has stopped but is doubtful d to the presence of the usual amount of noise level, it is suggest that the oscillator plate voltage be checked. To ascertain wheth the tube is oscillating, ground the oscillator grid of the 6D8G (sh stator and rotor plates of oscillator section on gang condenser). oscillating properly, grounding the grid will cause an apprecial drop in oscillator voltage.

MODEL 6P Chassis
Socket, Trimmers
Notes, Parts

CONTINENTAL RADIO & TELEV. CORP.

This receiver is designed to operate over three tuning **ranges**; the broadcast range which extends from 550 to 1700 Kilocycles (KC) (176 to 545 meters), Police and Aviation Band which extends from 1700 to 5400 Kilocycles (KC) (56 to 176 Meters) and the International Short Wave Band which extends from 5600 to 18,100 Kilocycles (KC) 16.5 to 53 Meters). This latter range is the one which includes the four internationally assigned bands —the 19, 25, 31 and 49 meter bands.



NOTICE — MICROPHONIC NOISE CORRECTION
If this radio instrument appears to be microphonic during operation, loosen the four (4) mounting screws that secure the chassis to the cabinet and remove the two (2) wooden strips that are underneath the chassis. This allows the chassis to float and rest on the four (4) rubber pads used for this purpose. After the strips have been removed, adjust the chassis in the cabinet so that the dial will be in the center of the front escutcheon plate. Do not retighten the mounting screws.
"Should this radio set be moved any great distance, it is best to put the wooden strips back under the chassis and have the mounting screws securely tightened. If this is not done, damage may be done to the instrument, cabinet or tubes."

INSTALLATION

BATTERY CONNECTIONS At the rear of the receiver there will be found extending from the right end of the chassis, the battery connecting cable. Observation will show that 5 wires are brought out from the braided cable. The **red** and **red with black tracer wires** are joined together and should **both** be securely fastened to the positive (+) terminal of the 6 volt storage battery. The other 3 wires which are **brown, black with green tracer** and **Metallic shield lead** are also joined together and should be securely connected to the negative (—) post of the battery.

Note: It is extremely important that only the **best** possible means of obtaining a secure connection to the **battery terminals** be employed. If a battery with automobile terminal posts is used, the **large** post is the positive (+) post; the **smaller post** is the **negative** (—) terminal. It is suggested, when using a battery with auto type posts that large heavy lead covered battery clips be used in making connections. Make sure that **all wires** are firmly connected to clips (solder if possible). Also see that the jaw teeth of the clips are clean, and firmly bite into the post. It is very important that the battery posts and battery clip teeth be cleaned at frequent intervals to assure maintaining good connections. Corrosion may be readily removed by cleaning with a solution of 3 tablespoons of bicarbonate of soda (baking soda) and one cup of water. This solution neutralizes the acid coating that causes the corrosion and leaves a protective condition that retards further corrosion. **It is important that this solution does not in any way enter the interior of the battery.**

ANTENNA

REGULAR ANTENNA Use a standard outside antenna of at least 50 feet including lead-in. Connect the antenna to the "Blue" lead.
In remote locations that are far away from powerful broadcasting stations, a longer antenna may be used for increased receiving range. Antennas as long as 150 to 200 feet may be employed in "dead spots." (Longer antennas increase sensitivity and decrease selectivity slightly.)

GROUND **This receiver requires a good ground.** Water pipes make a very desirable ground connection. Where the wire makes contact, the pipe must be clean and free of paint or corrosion. The ground wire should be connected to the "Black" lead.

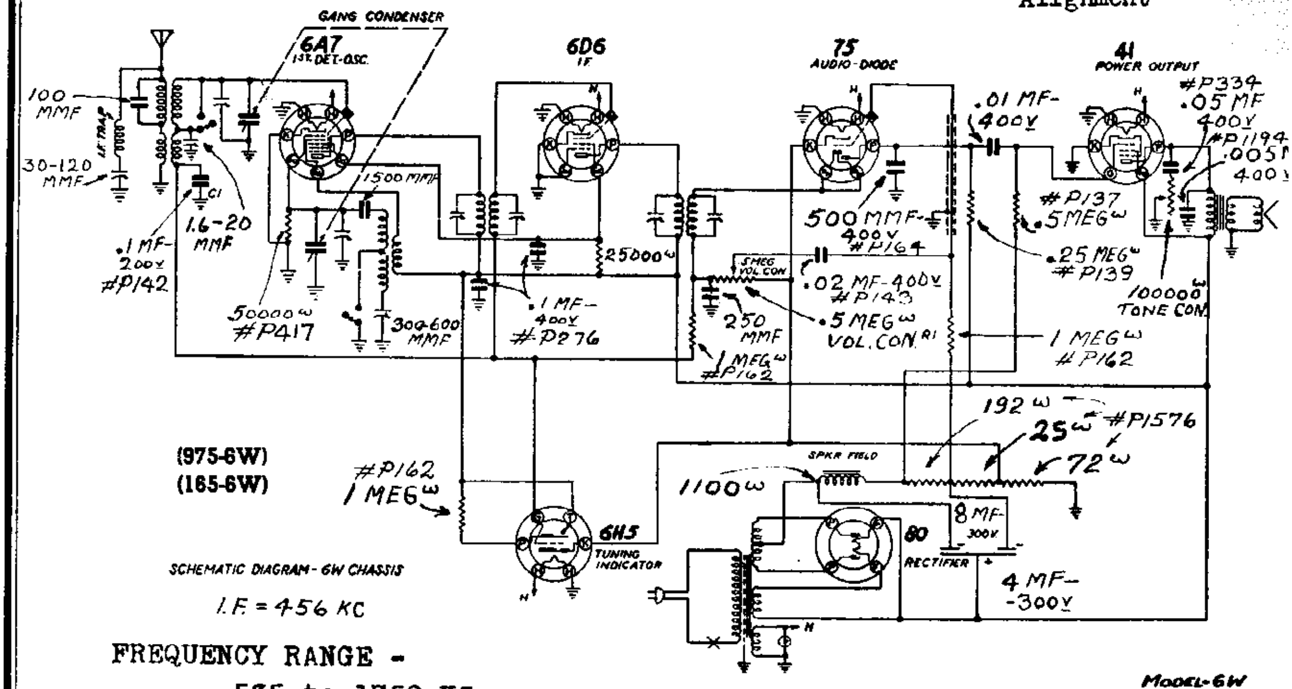
Where the above mentioned ground facilities are not available, a good outside ground may be had by sinking a metal pipe or ground rod about six feet into moist earth. An excellent bed can be prepared by digging a hole and filling with charcoal, in which the ground rod is placed. The charcoal bed surrounding the ground rod will maintain a desirable moist condition throughout the year.

IMPORTANT NOTE: The battery must never be charged while set is in operation. If a windcharger is used, it should always be disconnected from the battery when the receiver is being used. An inexpensive single pole switch can be used for disconnecting the windcharged from the battery. This will increase the life of the tubes and give additional economy to the use of the receiver.

P1727	Antenna Coil
P392	Battery Cable
P402	Vibrator Unit
P406	Vibrator Socket
P411	Filter Choke
P551	Type 30 Socket
P687	Type 19 Socket
P1666	Type 6T7G7 Socket
P1667	Type 6D8G Socket
P1668	Type 6S7G Socket
P1388	Speaker Socket
P1735	1st I.F. Transformer
P954	Power Transformer
P958	Electrolytic Condenser
P1160	6 Gang Trimmer
P1455	Tube Shield
P1540	Escutcheon
P1605	Knob (Volume)
P1606	Knob (Selector
P1607	Knob (Band Switch)
P1608	Knob (Tone)
P1764	Tone Control
P1220	200,000 Ohm ¼ Watt 20% Resistor
P1300	200,000 Ohm 1/3 Watt 20% Resistor
P1628	1 Megohm 1/3 Watt Resistor
P1715	14.3 Ohm ½ Watt 5% Wire Wound Resistor
P1716	8.1 Ohm ½ Watt 5% Wire Wound Resistor
P141	.25 Mfd. 200 Volt Condenser
P142	.1 Mfd. 200 Volt Condenser
P143	.02 Mfd. 400 Volt Condenser
P1653	Rubber Mounting Pads
P1676	Gang Condenser
P1677	Volume Control and Switch
P1682	Trimmer Condenser
P1663	Pointer
P1685	Band Switch
P1686	Pilot Light Socket
P1687	Pilot Light Bulb
P1688	Dial Scale
P1690	2nd I.F. Transformer
P719	Input Audio Transformer
P1696	6" P. M. Speaker
P1697	8" P. M. Speaker for Console
P675	20,000 ¼ Watt 20% Resistor
P139	250 Ohm ¼ Watt 20% Resistor
P1732	70 Ohm ½ Watt 10% Wire Wound Resistor
P138	250 Ohm ¼ Watt 20% Resistor
P137	500 Ohm ¼ Watt 20% Resistor
P258	15,000 Ohm ¼ Watt 20% Resistor
P280	100,000 Ohm ¼ Watt 20% Resistor
P417	50,000 Ohm ¼ Watt 20% Resistor
P148	.05 Mfd. 200 Volt Condenser
P334	.05 Mfd. 400 Volt Condenser
P335	.01 Mfd. 600 Volt Condenser
P395	.5 Mfd. 10 Volt Condenser
P1079	.01 Mfd. 1000 Volt Condenser
P1193	.002 Mfd. 400 Volt Condenser
P1194	.005 Mfd. 400 Volt Condenser
P336	.0005 Mfd. Mica Condenser
P480	.0001 Mfd. Mica Condenser
P1683	.004 Mfd. Mica Condenser
P147	.00025 Mfd. Mica Condenser

CONTINENTAL RADIO & TELEV. CORP.

MODELS 165-6W, 975-6W
Schematic, Socket
Trimmers, Parts
Alignment

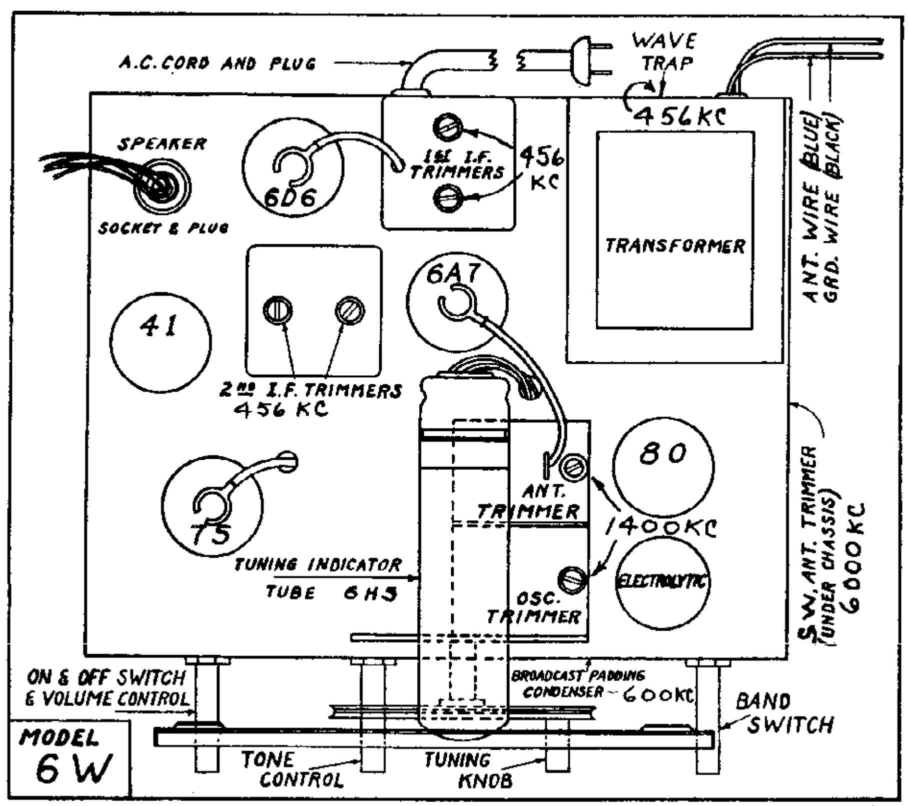


FREQUENCY RANGE -
535 to 1750 KC
5600 to 18100 KC

CONVENTIONAL ALIGNMENT -SEE SPECIAL SECTION

P1368	4 Prong Socket
P1277	Type 41 Socket
P521	Type 75 Socket
P492	Type 80 Socket
P506	Type 6A7 Socket
P536	Type 6D6 Socket
P617	Padding Condenser
P1576	Candohm Resistor
P1577	Trimmer Cond. with Bracket
P1578	Gang Condenser
P1663	Dial Pointer
P1641	Dial Scale
P1642	Tone Control
P334	.05 Mfd. 400V Condenser
P1643	Escutcheon
P1672	Selector Knob
P1673	Tone Knob
P1674	Volume Knob
P1675	Band Switch Knob
P166	25,000 Ohm ¼ Watt Resistor
P417	50,000 Ohm ¼ Watt Resistor
P162	1 Megohm ¼ Watt Resistor
P139	250,000 Ohm ¼ Watt Resistor
P137	500,000 Ohm ¼ Watt Resistor
P817	.00025 Mfd. Mica Condenser
P336	.005 Mfd. Mica Condenser
P1194	.005 Mfd. 400V Condenser
P142	.1 Mfd. 200V Condenser
P164	.01 Mfd. 400V Condenser
P276	.1 Mfd. 400V Condenser
P916	1st I.F. Transformer Coil
P1579	Volume Control and Switch
P143	.02 Mfd. 400V Condenser
P1580	Band Change Switch
P1581	Oscillator Coil
P1582	Antenna Coil
P1557	Riveted Mica Condenser
P1503	Pilot Light Socket
P1504	Pilot Light Bulb
P914n	Power Transformer
P929	AC Cord and Plug
P1591	Elec. Condenser
P917	2nd I.F. Transformer
P1455	Tube Shield
P1645	Magic Eye Socket & Cable Assembly
P1574	.0015 Mica Condenser

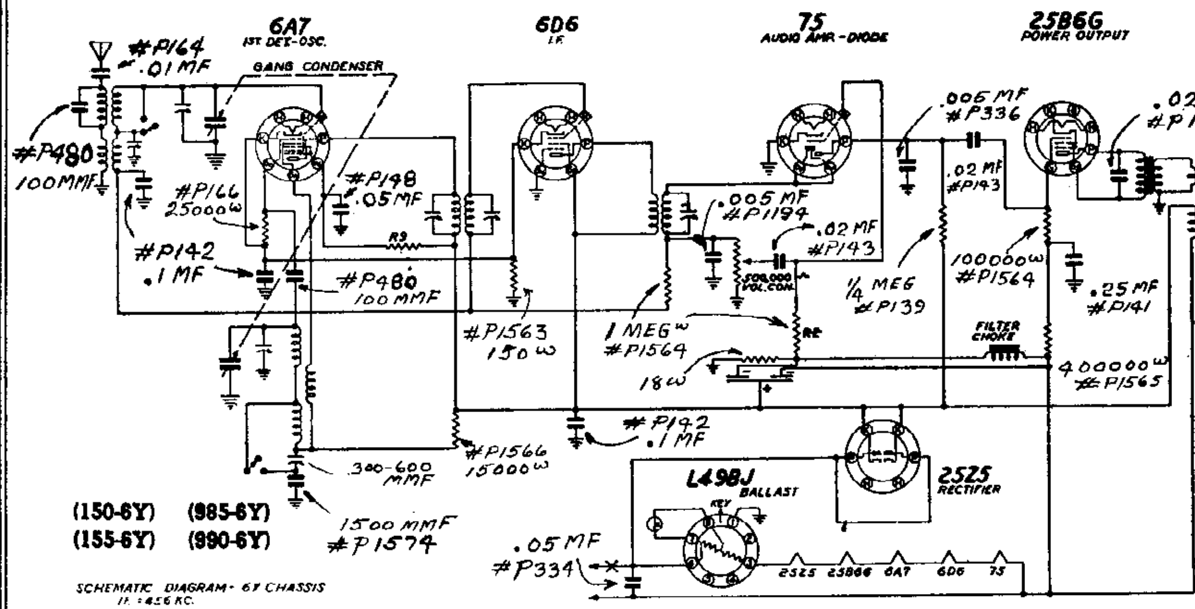
6 Tube AC Superheterodyne
6W Chassis



MODELS 150-6Y, 155-6Y
985-6Y, 990-6Y
Chassis 6Y

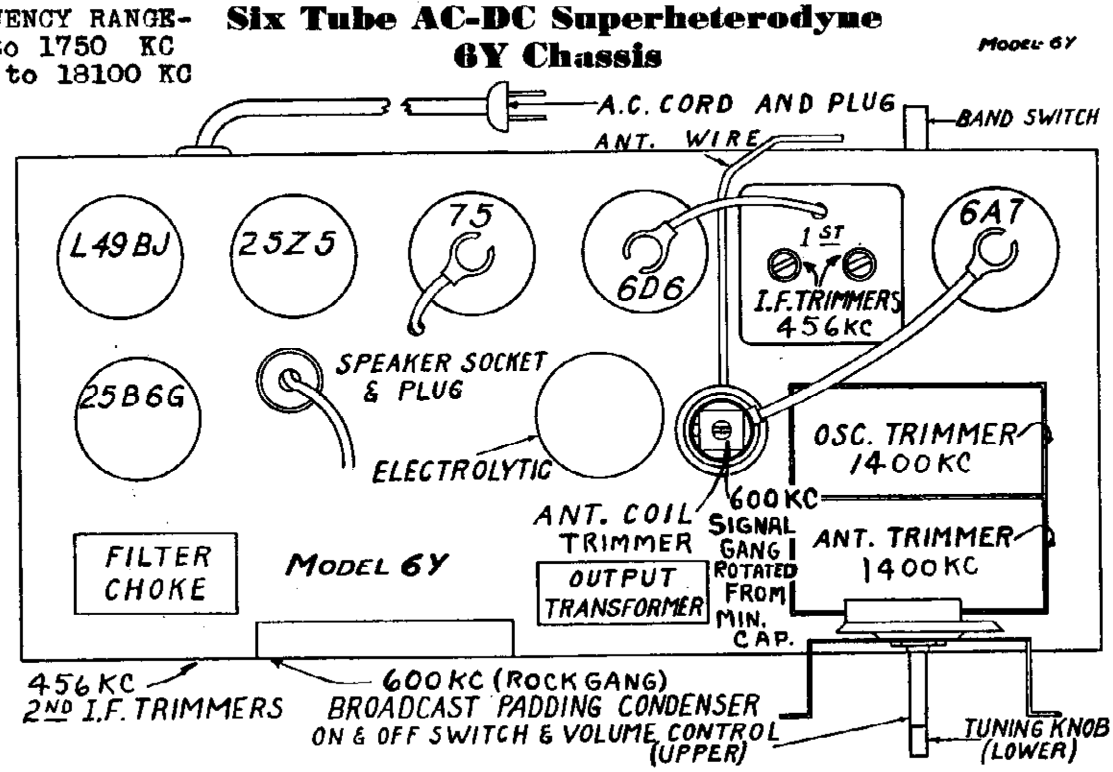
CONTINENTAL RADIO & TELEV. CORP.

Schematic, Socket
Trimmers, Alignment
Parts



FREQUENCY RANGE-
535 to 1750 KC
5600 to 18100 KC

Six Tube AC-DC Superheterodyne
6Y Chassis



CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION

Part No.	Description
P506	Socket, Type 6A7
P521	Socket, Type 75
P536	Socket, Type 6D6
P559	Socket, Type 25Z5
P1549	Socket, Type L49BJ
P1550	Socket, Type 25B6G
P530	Tube Shield
P1647	Trimmer
P916	1st I.F. Transformer
P929	AC Cord & Plug
P1489	Pointer
P1491	Dial Glass
P1496	Rubberized Belt
P1497	Takeup Spring
P1498	Drive Bushing
P1503	Pilot Light Socket
P1504	Pilot Light Bulb
P1508	Baffle Board
P1542	Gang Condenser
P1543	Dial Scale
P1551	Iron Core Filter Choke
P1552	Output Transformer
P1555	Volume Control & Switch
P1556	Antenna Coil
P1558	2nd I.F. Transformer
P1559	Oscillator Coil
P1560	Speaker
P1561	Electrolytic Condenser
P1562	Band Change Switch
P1568	Knob, (Specify Color)
P1656	20 Antenna Cord

CONDENSERS

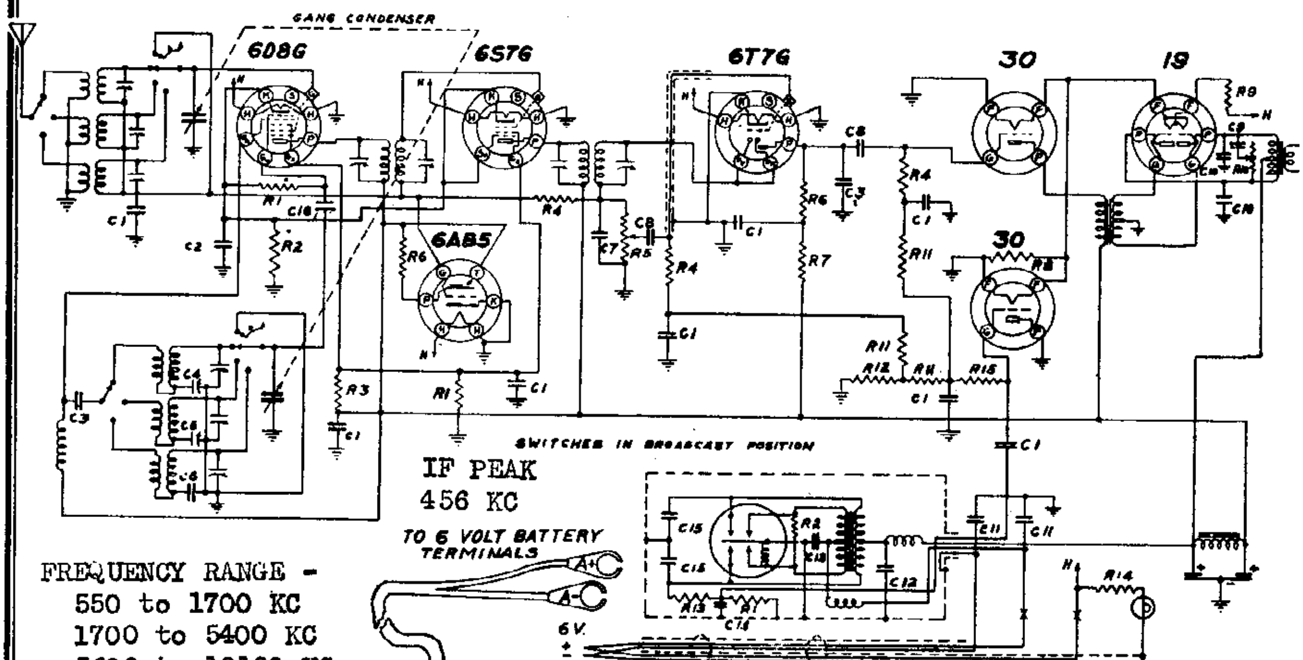
P141	.25 Mfd. 200 V
P142	.1 Mfd. 200 V
P143	.02 Mfd. 200 V
P148	.05 Mfd. 200 V
P164	.01 Mfd. 400 V
P334	.05 Mfd. 400 V
P336	.0005 Mica Condenser
P480	.0001 Mica Condenser
P1574	.0015 plus or 5% Mica
P1557	Riveted Mica Condenser

RESISTORS

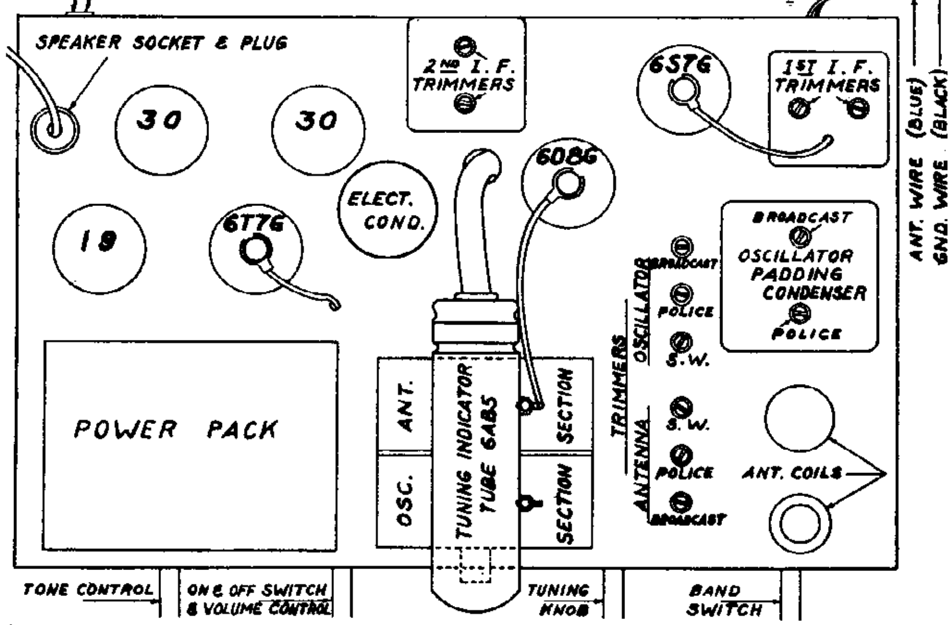
P1567	Candohm Resistor
P166	25,000 1/4 Watt
P419	20,000 1/4 Watt
P1563	150 1/3 Watt
P139	250,000 1/4 Watt
P162B	1 Megohm 1/3 Watt
P1564	100,000 Ohm 1/3 Watt
P1565	400,000 Ohm 1/3 Watt
P1566	15,000 Ohm 1/3 Watt

MODEL 7J Chassis
Schematic, Socket
Trimmers, Alignme
Parts

CONTINENTAL RADIO & TELEV. CORP.



FREQUENCY RANGE -
550 to 1700 KC
1700 to 5400 KC
5600 to 18100 KC



MODEL 7J 6-17-37

PARTS

CONDENSERS

C1 - .1-200V.
C2 - .25-200 V.
C3 - 500MMF.
C4 - 300-600 MMF.
C5 - 800-1850 MMF.
C6 - 4000 MMF.
C7 - 250 MMF.
C8 - .02-400 V.
C9 - .05-400 V.
C10 - .002-400 V.
C11 - .005-400 V.
C12 - .01-600 V.
C13 - .5-10 V.
C14 - .05-200 V.
C15 - .01-1000 V.
C16 - 100 MMF.

RESISTORS

R1 - 50,000 Ω ¼ W.
R2 - 250 Ω ¼ W.
R3 - 15,000 Ω ¼ W.
R4 - 1 MEG Ω ½ W.
R5 - 500,000 Ω VOLUME CONTROL
R6 - 250,000 Ω ½ W.
R7 - 100,000 Ω ¼ W.
R8 - 14.3 Ω 2 5%.
R9 - 8.1 Ω 2 5%.
R10 - 100,000 Ω TONE CONTROL
R11 - 500,000 Ω ¼ W.
R12 - 70,000 Ω ¼ W
R13 - 200,000 Ω ¼ W.
R14 - 70 Ω 1 10%
R15 - 600,000 Ω ¼ W.

<u>IF ALIGNMENT</u> - Wave change Sw. in BC position. Gang cond. set to minimum, test oscillator at 456 KC, to CG of 6D8G thru .05 MFD cond., GND to set, Align IF.

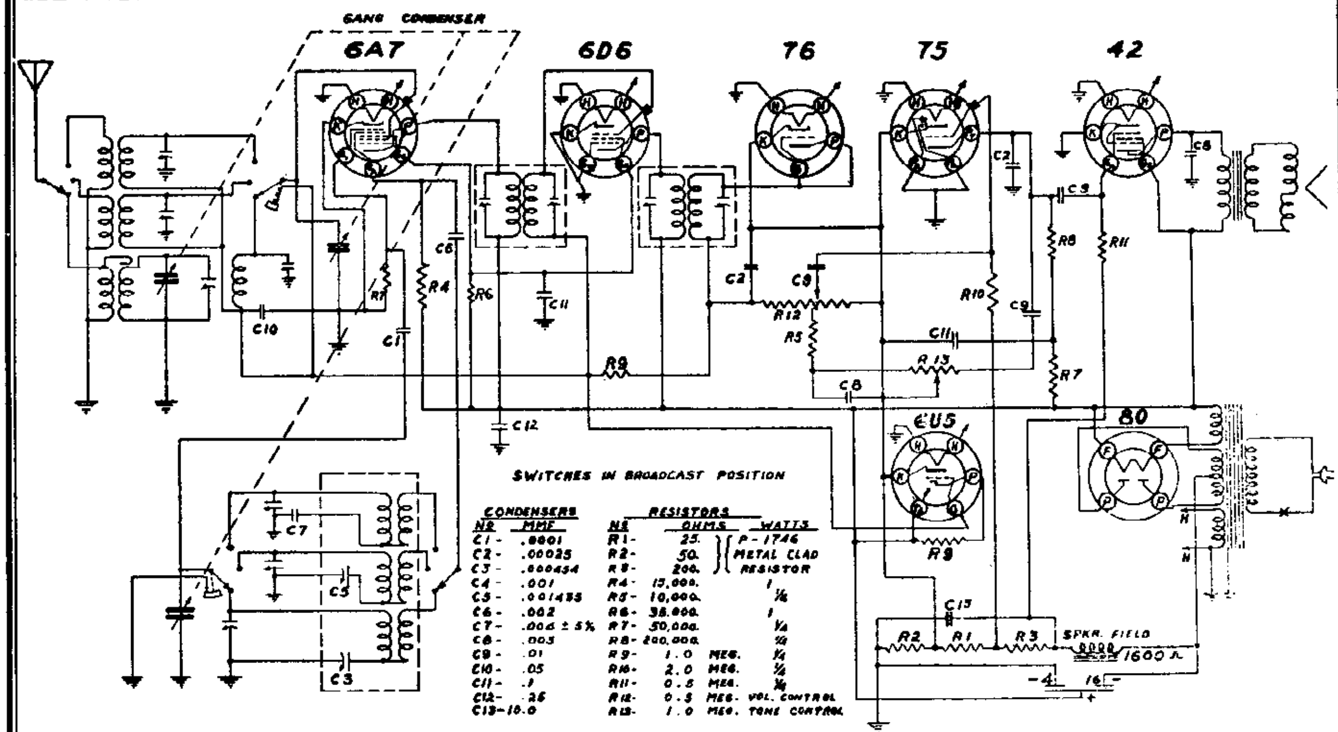
<u>BROADCAST</u> - Gen. connected to ANT lead thru 200 MMFD condenser, Gang at minimum Osc. to 1730 KC, and adjust OSC. trimmer of set. Shift Gen. and dial to 1400 K(and adjust ANT trimmer. Generator at 600 KC, pad oscillator to maximum peak.

<u>POLICE</u> - Replace 200 MMFD cond. with 400 ohm resistor, Generator at 5600 KC, Ga condenser at minimum, trim Osc. circuit, Gen. at 4000 KC, trim ANT trimmer. Ge at 1800 KC and pad Police Oscillator circuit to maximum peak.

<u>SHORT WAVE</u> - Generator at 18100 KC, gang condenser at minimum, adjust oscillat trimmer to peak, Generator at 16000 KC adjust SW ANT trimmer to peak.
No padding required on this band but check 6000 KC for alignment & sensitivity.
For maximum performance, all above adjustments should be repeated. Rock Gang condenser for padding adjustments.

MODEL 7M Chassis
Schematic, Socket
Trimmers

CONTINENTAL RADIO & TELEV. CORP.



CONDENSERS No.	MMF	RESISTORS No.	OHMS	WATTS
C1 -	.0001	R1 -	25.	P-1746 METAL CLAD RESISTOR
C2 -	.00025	R2 -	50.	P-1746 METAL CLAD RESISTOR
C3 -	.000454	R3 -	200.	P-1746 METAL CLAD RESISTOR
C4 -	.001	R4 -	15,000.	1
C5 -	.001435	R5 -	10,000.	1/2
C6 -	.002	R6 -	35,000.	1
C7 -	.006 ± 5%	R7 -	50,000.	1/4
C8 -	.005	R8 -	200,000.	1/2
C9 -	.01	R9 -	1.0 MEG.	1/4
C10 -	.05	R10 -	2.0 MEG.	1/4
C11 -	.1	R11 -	0.5 MEG.	1/4
C12 -	.25	R12 -	0.5 MEG. VOL. CONTROL	
C13 -	10.0	R13 -	1.0 MEG. TONE CONTROL	

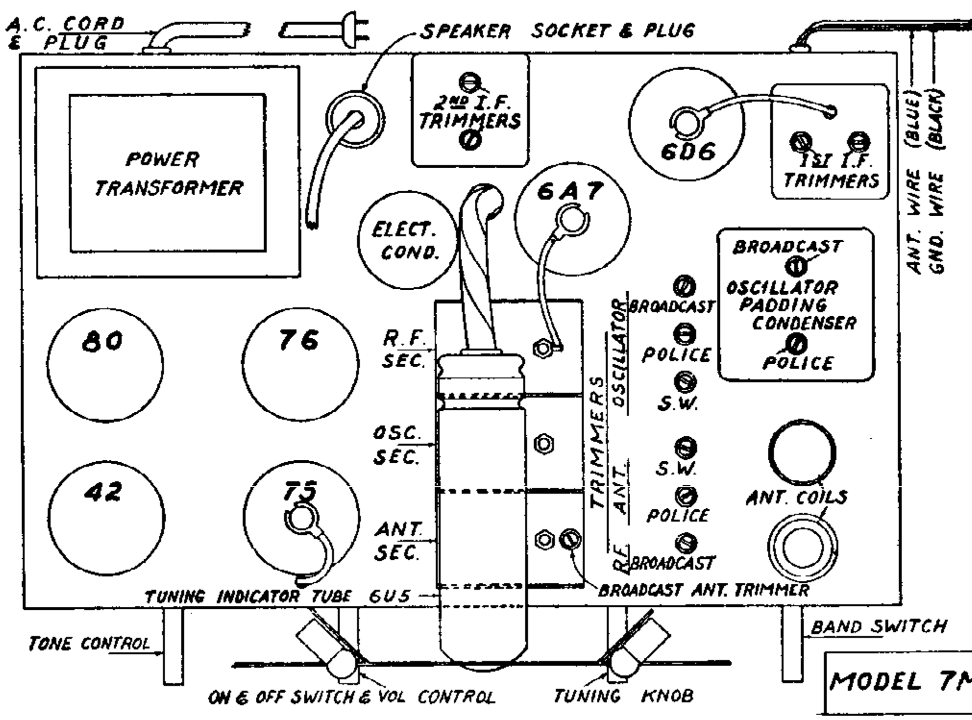
FREQUENCY RANGE -

550 to 1700 KC
1700 to 5400 KC
5600 to 18100 KC

IF PEAKED
AT 456 KC

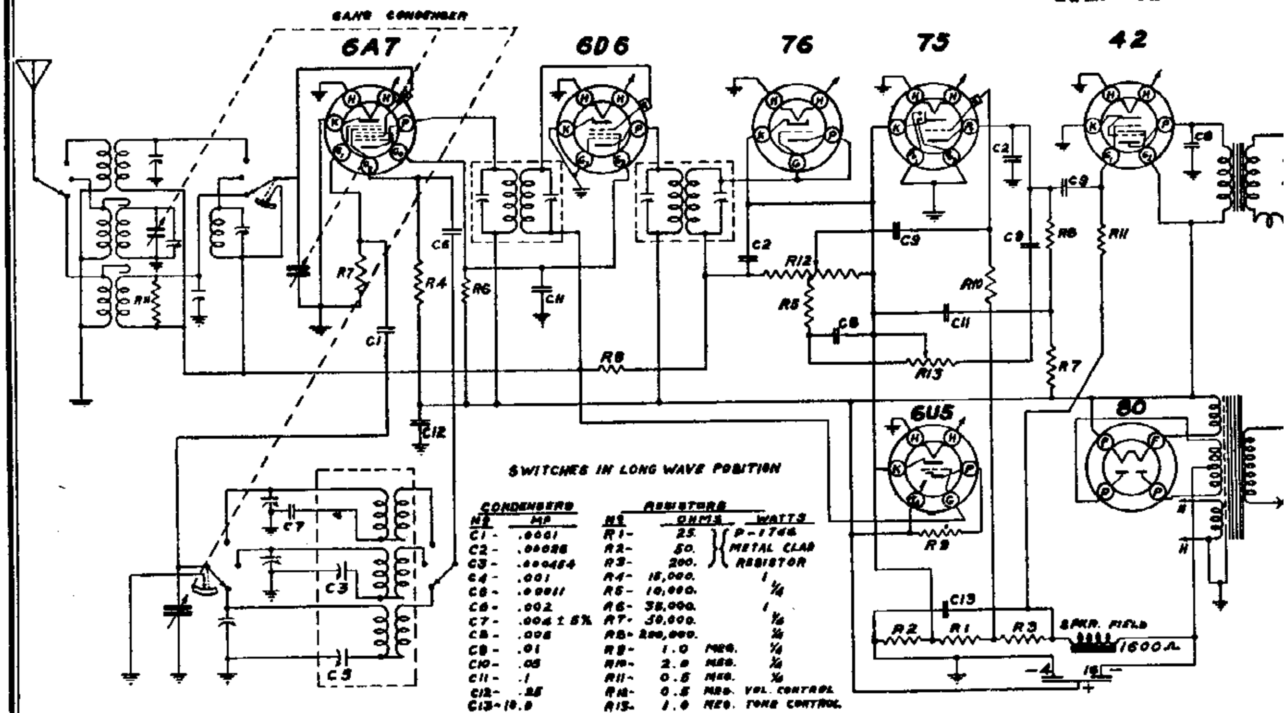
SCHEMATIC DIAGRAM
MODEL 7M

Seven Tube AC Superheterodyne
7M Chassis



MODEL 7M

CONTINENTAL RADIO & TELEV. CORP.



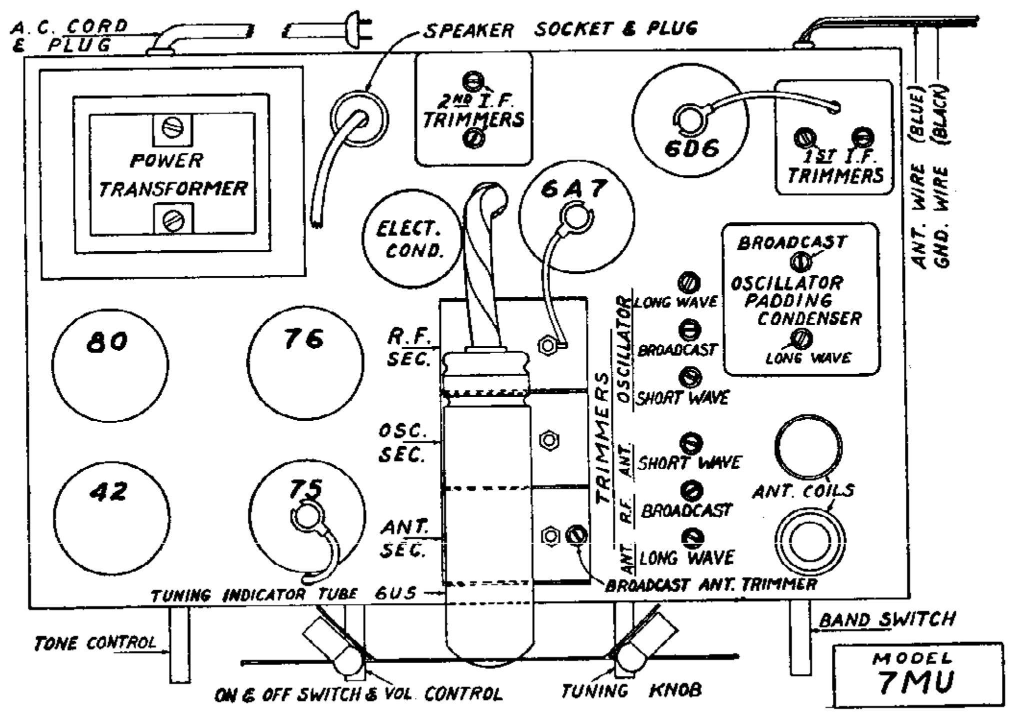
CONDENSERS NO	MF	RESISTORS NO	OHMS		WATTS
C1-	.0001	R1-	25.		P-1746 METAL CLAD RESISTOR
C2-	.00025	R2-	50.		
C3-	.000464	R3-	200.		
C4-	.001	R4-	15,000.		1
C5-	.00011	R5-	10,000.		¼
C6-	.002	R6-	35,000.		1
C7-	.004 ± 5%	R7-	50,000.		½
C8-	.005	R8-	250,000.		¼
C9-	.01	R9-	1.0	MEG.	¼
C10-	.05	R10-	2.0	MEG.	¼
C11-	.1	R11-	0.5	MEG.	¼
C12-	.25	R12-	0.5	MEG.	VOL. CONTROL
C13-	10.0	R13-	1.0	MEG.	TONE CONTROL

FREQUENCY RANGE
550 to 1700 KC
375 to 150 KC
5600 to 18100 KC

IF PEAKED
AT 456 KC

SCHEMATIC DIAGRAM
MODEL 7MU

Seven Tube AC Superheterodyne
7MU Chassis



MODEL 7MU

MODEL 7M Chassis
MODEL 7MU Chassis
Aligmment

CONTINENTAL RADIO & TELEV. CORP.

MODEL 7M CHASSIS

This receiver is designed to operate over three tuning ranges; the broadcast range which extends from 550 to 1700 Kilocycles (KC) (176 to 545 meters), Police and Aviation Band which extends from 1700 to 5400 Kilocycles (KC) (56 to 176 Meters) and International Short Wave Band which extends from 5600 to 18,100 Kilocycles (KC) 16.5 to 53 Meters). This latter range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.

ALIGNMENT DATA AND SERVICING

GENERAL DATA

The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1730, 1800, 4000, 5600, 6000, 16,000 and 18,100 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE

The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT

With the wave switch in the Broadcast Band and the gang condenser set at minimum. Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "preselector" and "antenna" trimmer to max imum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. Note: approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the preselector of the R.F. section. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 K.C.

POLICE BAND ALIGNMENT

The police band is adjusted by first replacing the .0002 dummy with a 400 ohm resistor and setting the generator to 5600 K.C. With the gang set at minimum, adjust the "police oscillator trimmer" to receive this signal, then set the signal generator to 4000 KC and adjust "police antenna trimmer" to give maximum output. Next, set the oscillator to 1800 KC and "pad" the circuit at this frequency as described in the instructions for padding the broadcast circuits.

SHORT WAVE BAND ALIGNMENT

The short wave band is adusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC, tune in the signal and adjust the "short wave antenna" trimmer to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

MODEL 7MU CHASSIS

This receiver is designed to operate over three tuning ranges; the broadcast range which extends from 550 to 1700 Kilocycles (KC) (173 to 562 meters), Longwave Band which extends from 375 to 150 Kilocycles (KC) (800 to 2000 Meters) and the International Short Wave Band which extends from 5600 to 18,100 Kilocycles (KC) (16.5 to 53 Meters). This latter range is the one which includes the four internationally assigned bands — the 19, 25, 31 and 49 meter bands.

ALIGNMENT DATA AND SERVICING

GENERAL DATA

The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 160, 325, 380, 456, 600, 1400, 1730, 6000, 16,000 and 18,100 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE

The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT

With the wave switch in the Broadcast Band and the gang condenser set at minimum. Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "preselector" and "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. Note: approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the preselector of the R.F. section. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 K.C.

SHORT WAVE BAND ALIGNMENT

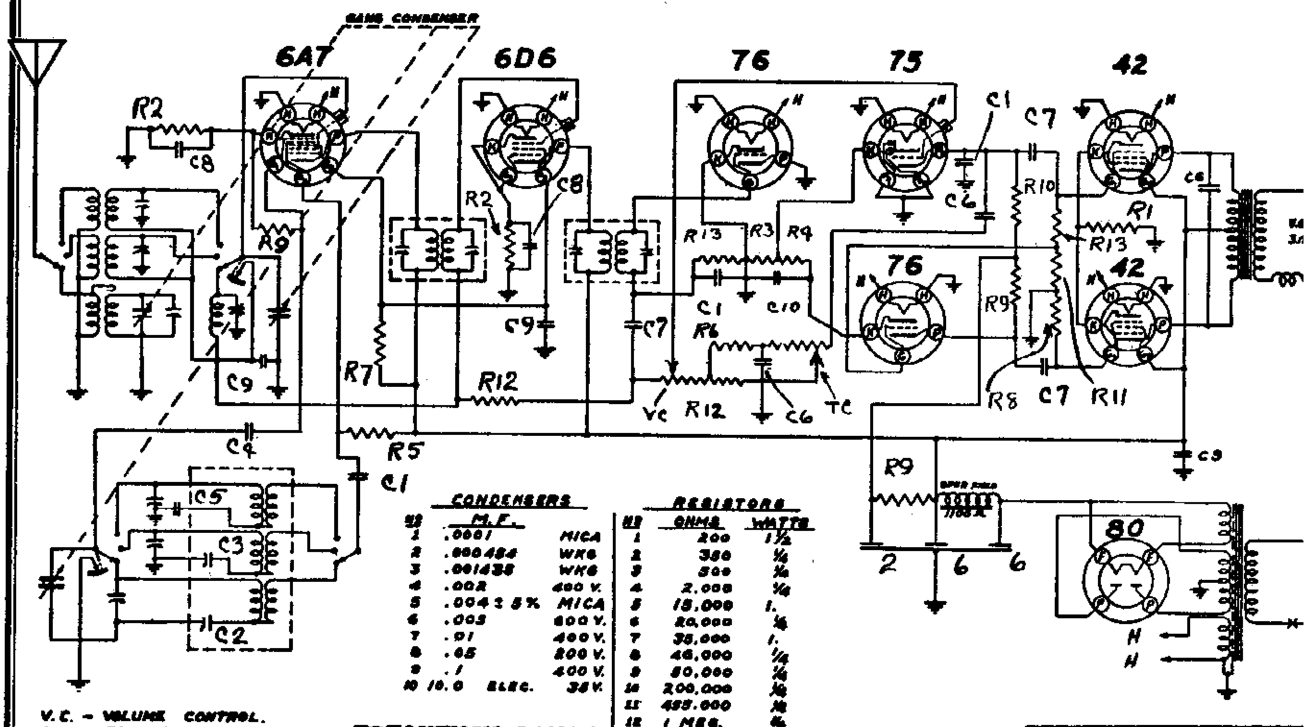
The short wave band is adusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC, tune in the signal and adjust the "short wave antenna" trimmer to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

LONG WAVE BAND ALIGNMENT

The long wave band is adjusted by connecting the output of the signal generator through a .0002 Mfd. mica condenser to the blue antenna lead. Then set the gang to minimum and the generator to 380 KC and adjust the long wave oscillator trimmer to receive this signal. Then set the generator to 325 KC and adjust the long wave antenna trimmer to give maximum output. Next set generator to 160 KC and pad the circuits to maximum output. Owing to the nature of the long wave band, the trimmer and padding condensers react upon each other to quite a degree; consequently, several re-adjustments at the trimming and padding positions are required before the circuits are adjusted properly.

MODEL 8K Chass
Schematic,
Alignment

CONTINENTAL RADIO & TELEV. CORP.



CONDENSERS No.	M.F.	
1	.0001	MICA
2	.000484	WKG
3	.001435	WKG
4	.002	400 V.
5	.004 ± 5%	MICA
6	.003	600 V.
7	.01	400 V.
8	.05	200 V.
9	.1	400 V.
10	10.0 ELEC.	35 V.

RESISTORS No.	OHMS	WATTS
1	200	1½
2	350	½
3	500	½
4	2,000	½
5	15,000	1.
6	20,000	½
7	35,000	1.
8	45,000	¼
9	50,000	½
10	200,000	½
11	455,000	½
12	1 MEG.	½
13	5 MEG.	½

IF PEAKED AT 456 KC

FREQUENCY RANGE
535 to 1730- KC
1.7 to 5.6 - MC
5.6 to 18.1- MC

SCHEMATIC DIAGRAM MODEL 8K

Eight Tube AC Superheterodyne

8K Chassis

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1730, 1800, 4000, 5600, 6000, 16,000 and 18,100 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT With the wave switch in the Broadcast Band and the gang condenser set at minimum. Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "preselector" and "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. **Note:** approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the cuits. This is done by slowly increasing or decreasing the oscilla padding condenser and, at the same time, continuously tun back and forth across the signal with the receiver until the mc mum reading is obtained on the output meter. This adjustment m seem a little complicated but is the easiest way to adjust the os lator to the preselector of the R.F. section. Return to 1400 KC c again go over the adjustments of this frequency to be certain tl they were not put slightly out of alignment when adjustment w made at 600 KC.

POLICE BAND ALIGNMENT The police band is adjus by first replacing the .0(dummy with a 400 ohm re tor and setting the generator to 5600 KC. With the gang set minimum, adjust the "police oscillator trimmer" to receive this s nal, then set the signal generator to 4000 KC and adjust "pol antenna trimmer" to give maximum output. Next, set the oscilla to 1800 KC and "pad" the circuit of this frequency as described the instructions for padding the broadcast circuits.

SHORT WAVE BAND ALIGNMENT The short wave band adjusted by setting the ge rator to 18,100 KC and w the gang at minimum, adjust the "short wave oscillator trimm to receive the signal. Set the generator at 16,000 KC, tune in signal and adjust the "short wave antenna" trimmer to give mc mum output. As there is no variable low frequency padding c denser on this band, the sensitivity of the receiver should checked at 6000 KC to determine whether the circuits are in l at this frequency. Should the receiver lack sensitivity at 6000 I the antenna and oscillator coils, as well as the .004 mica paddi condenser, should be tested for defects as sometimes these comp nents become subject to mechanical or electrical injuries, desp their rugged construction and liberal ratings.

MODEL 8K Chassis
Socket, Trimmers
Dial Adjustments

CONTINENTAL RADIO & TELEV CORP.

PROCEDURE FOR SETTING TELEPHONE DIAL STATIONS

CHOOSING THE STATIONS TO BE USED

The telephone dial has 10 buttons located in a ring within the dial scale. Make a list of 10 of your favorite stations, stations which are tuned in regularly. Shown in Fig. 1 is the approximate frequency range that each button will cover. **Note:** If 2 stations happen to fall within the range of one button, one station will necessarily have to be tuned in with the selector knob.

PROCEDURE FOR ADJUSTING THE TELEPHONE DIAL BUTTONS

(1) Choose one of the stations out of the list of stations selected and by means of the station selector very carefully tune in this station, noting at the same time the exact pointer location on the dial.

(2) Now select the proper button for the first station chosen by referring to Fig. 1 and noting the button into whose range the station falls. For example, station WGN with a frequency of 720 KC comes under the button whose frequency ranges from 670 to 755 KC. Usually the button nearest the tuning point or the bottom of the dial will be the proper button.

(3) Loosen the button by unscrewing it (not the dial) ½ turn to the left. Now press the button in all the way and rock the dial back and forth a trifle until a click is heard. Do not release the button now but set the pointer to its former location and with the dial in this position, being careful not to move it, proceed to tighten the button by turning it in the opposite direction (to the right). Make sure the button is very securely tightened as it may get out of adjustment.

(4) From the station call sheet supplied remove the proper station disc and insert into the push button so that the wording is horizontal when the button is at the bottom, and then insert a clear celluloid insert. Follow this same procedure for the remaining buttons.

(5) If for any reason it is necessary to remove a station call letter disc, the use of a pen knife or any sharp pointed instrument will facilitate the removal.

HOW TO TUNE IN STATIONS ON THE TELEPHONE DIAL

Press in the button of the station desired tuned and rotate the dial slowly until a click is heard and the dial will not turn in either direction until the button is released. The station is now tuned in and can be adjusted to the volume desired by means of the volume control. The proper direction of rotation of the dial can be determined by turning the dial in the direction which will not allow the wide space adjacent to the pointer to converge into the space at the bottom of the dial. See Fig. (1).

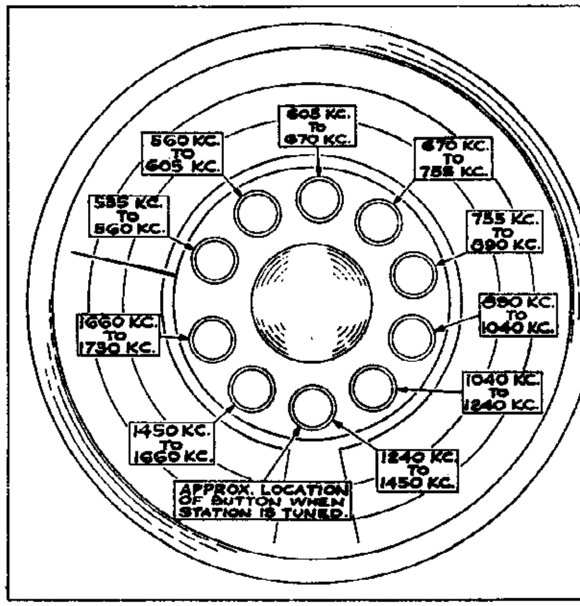
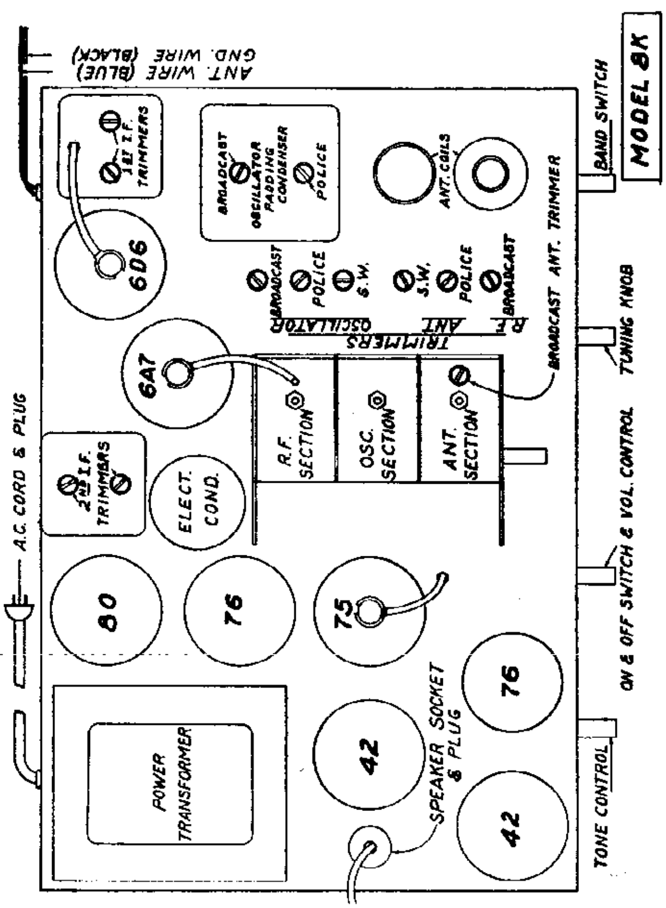


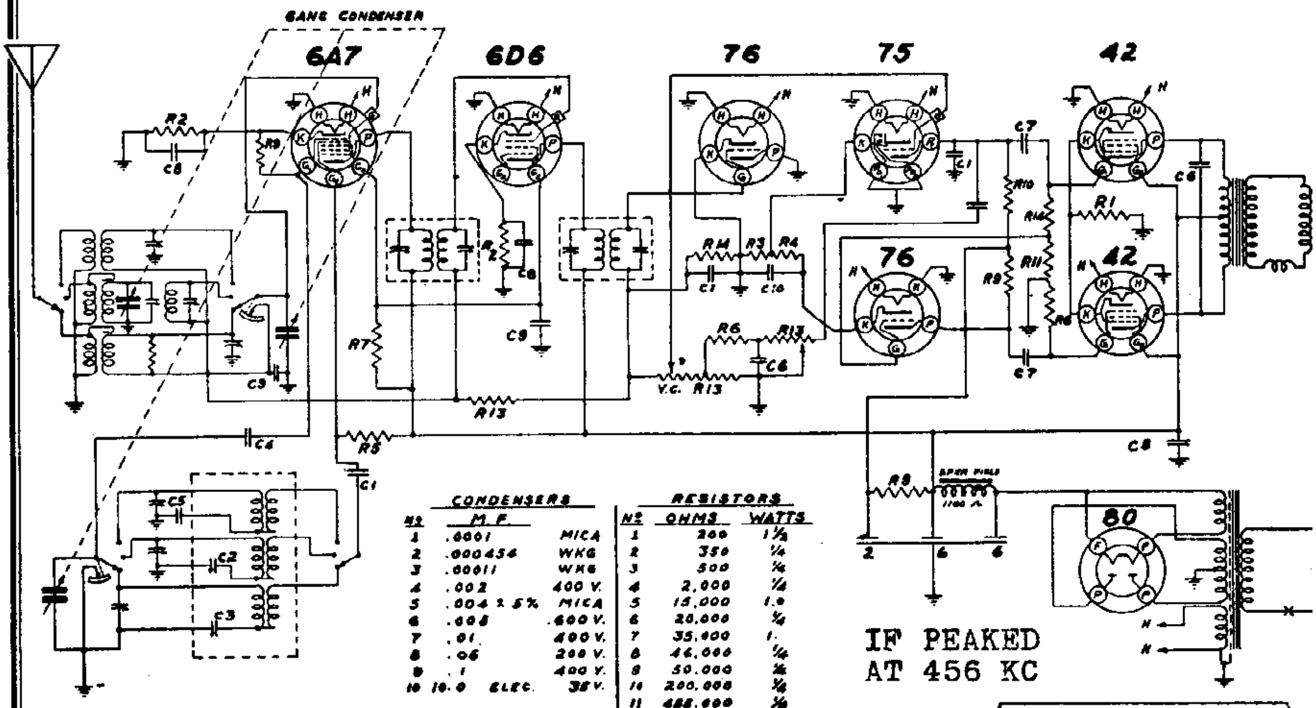
Figure 1



Reduce • 9⅝"

MODEL 8KU Chassis Schematic, Socket Trimmers

CONTINENTAL RADIO & TELEV. CORP.



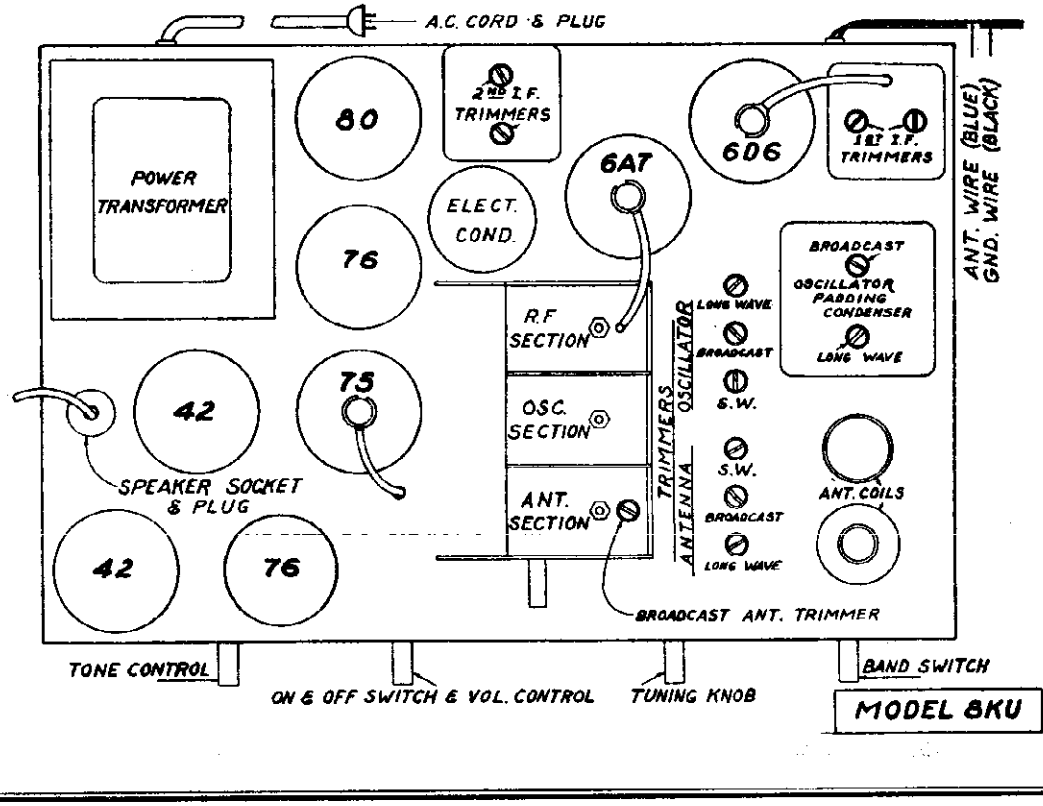
CONDENSERS No.	M.F.	
1	.0001	MICA
2	.000454	WKG
3	.00011	WKG
4	.002	400 V.
5	.004 ± 5%	MICA
6	.008	600 V.
7	.01	400 V.
8	.06	200 V.
9	.1	400 V.
10	10.0 ELEC.	35 V.

RESISTORS No.	OHMS	WATTS
1	200	1 1/2
2	350	1/4
3	500	1/4
4	2,000	1/4
5	15,000	1.0
6	20,000	1/4
7	35,000	1.
8	46,000	1/4
9	50,000	1/2
10	200,000	1/2
11	488,000	1/2
12	.5 MEG	1/2
13	1 MEG	1/2
14	5 MEG	1/4

SCHEMATIC DIAGRAM MODEL 8KU

FREQUENCY RANGE -
550 to 1700 KC
375 to 1500 KC
5600 to 18100 KC

Eight Tube AC Superheterodyne 8KU Chassis



MODEL 8KU

MODEL 8KU Chassis
Alignment
Dial Adjustments

CONTINENTAL RADIO & TELEV. CORP.

PROCEDURE FOR SETTING TELEPHONE DIAL STATIONS

CHOOSING THE STATIONS TO BE USED

The telephone dial has 10 buttons located in a ring within the dial scale. Make a list of 10 of your favorite stations, stations which are tuned in regularly. Shown in Fig. 1 is the approximate frequency range that each button will cover. **Note:** If 2 stations happen to fall within the range of one button, one station will necessarily have to be tuned in with the selector knob.

(3) Loosen the button by unscrewing it (not the dial) ½ turn to the left. Now press the button in all the way and rock the dial back and forth a trifle until a click is heard. Do not release the button now but set the pointer to its former location and with the dial in this position, being careful not to move it, proceed to tighten the button by turning it in the opposite direction (to the right). Make sure the button is very securely tightened as it may get out of adjustment.

(4) From the station call sheet supplied remove the proper station disc and insert into the push button so that the wording is horizontal when the button is at the bottom, and then insert a clear celluloid insert. Follow this same procedure for the remaining buttons.

(5) If for any reason it is necessary to remove a station call letter disc, the use of a pen knife or any sharp pointed instrument will facilitate the removal.

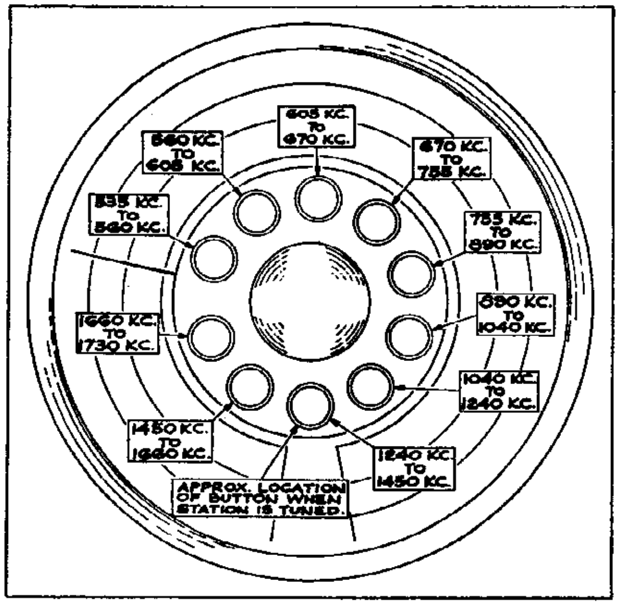


Figure 1

HOW TO TUNE IN STATIONS ON THE TELEPHONE DIAL

Press in the button of the station desired tuned and rotate the dial slowly until a click is heard and the dial will not turn in either direction until the button is released. The station is now tuned in and can be adjusted to the volume desired by means of the volume control. The proper direction of rotation of the dial can be determined by turning the dial in the direction which will not allow the wide space adjacent to the pointer to converge into the space at the bottom of the dial. See Fig. (1).

I.F. ALIGNMENT With the wave switch in the Broadcast Band and the gang condenser set at minimum. Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "preselector" and "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. **Note:** approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the preselector of the R.F. section. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 K.C.

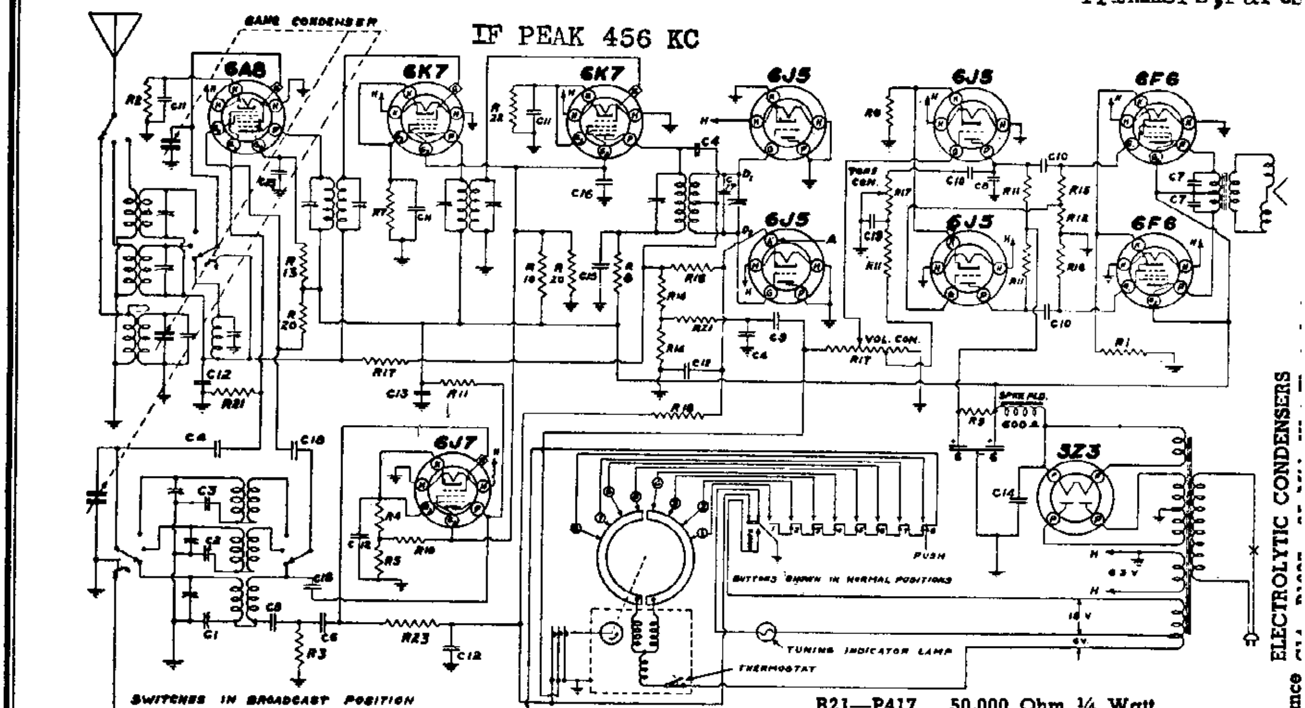
SHORT WAVE BAND ALIGNMENT The short wave band is adusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC, tune in the signal and adjust the "short wave antenna" trimmer to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

LONG WAVE BAND ALIGNMENT The long wave band is adjusted by connecting the output of the signal generator through a .0002 Mfd. mica condenser to the blue antenna lead. Then set the gang to minimum and the generator to 380 KC and adjust the long wave oscillator trimmer to receive this signal. Then set the generator to 325 KC and adjust the long wave antenna trimmer to give maximum output. Next set generator to 160 KC and pad the circuits to maximum output. Owing to the nature of tthe long wave band, the trimmer and padding condensers react upon each other to quite a degree; consequently, several re-adjustments at the trimming and padding positions are required before the circuits are adjusted properly.

CONTINENTAL RADIO & TELEV. CORP.

MODEL 11S
Schematic, Sock
Trimmers, Parts

IF PEAK 456 KC

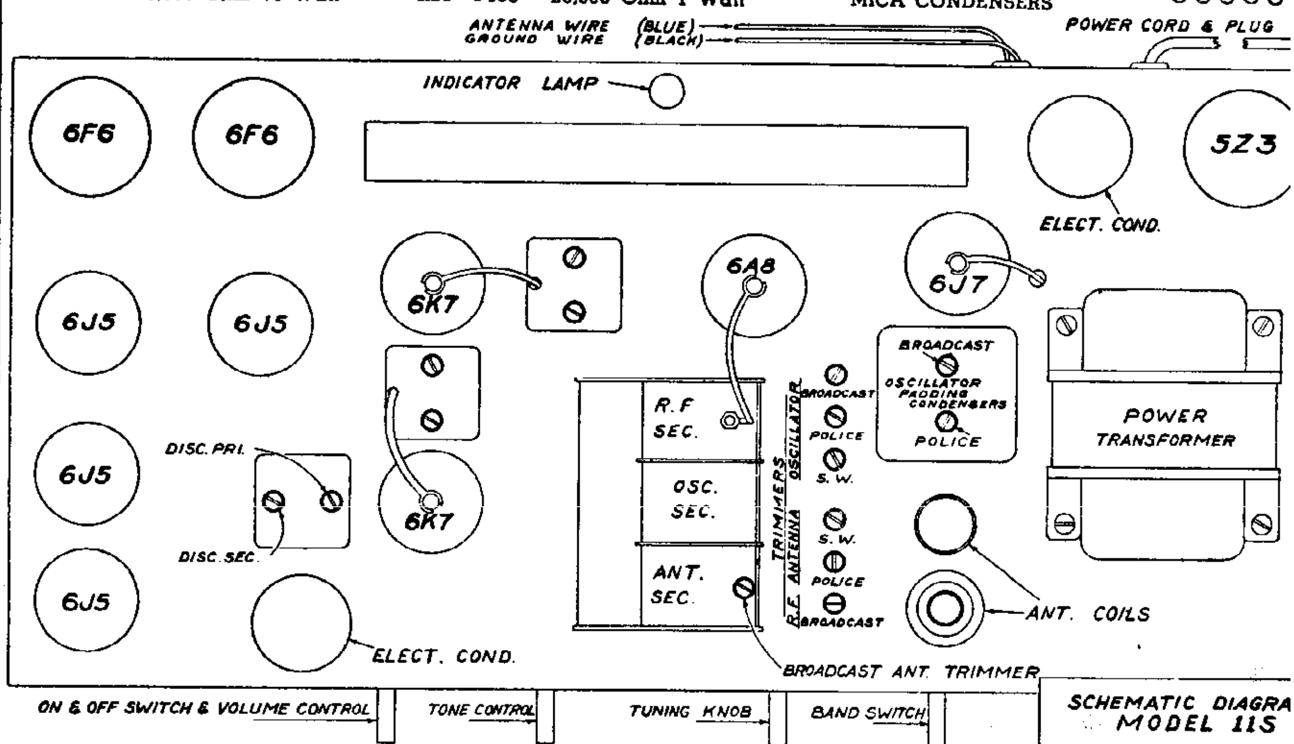


RESISTORS
R1 —P1318 210 Candohm Resistor 10% Tolerance
R2 —P1942 250 Ohm ¼ Watt 10% Tolerance
R3 —P1950 350 Ohm ¼ Watt 10% Tolerance
R4 —P279 500 Ohm ¼ Watt
R5 —P1951 650 Ohm ¼ Watt 5% Tolerance
R6 —P1729 750 Ohm ¼ Watt
R7 —P1973 1,000 Ohm ¼ Watt 10% Tolerance
R8 —P1216 5,000 Ohm ¼ Watt
R9 —P673 10,000 Ohm ½ Watt
R10—P1944 15,000 Ohm 2 Watt
R11—P166 25,000 Ohm ¼ Watt
R12—P1943 35,000 Ohm ¼ Watt 10% Tolerance
R13—P1952 50,000 Ohm ½ Watt
R14—P139 250,000 Ohm ¼ Watt
R15—P1843 455,000 Ohm ¼ Watt 10% Tolerance
R16—P137 500,000 Ohm ¼ Watt
R17—P162 1,000,000 Ohm ¼ Watt
R18—P310 4,000,000 Ohm ¼ Watt
R19—P1949 15,000 Ohm ½ Watt
R20—P165 25,000 Ohm 1 Watt
R21—P417 50,000 Ohm ¼ Watt
R22—P1972 2,000 Ohm ¼ Watt 10% Tolerance
R23—P280 100,000 Ohm ¼ Watt

PAPER CONDENSERS
C3 —P1947 .004 Mfd. 400 V.
C7 —P904 .002 Mfd. 600 V.
C9 —P164 .01 Mfd. 400 V.
C10—P334 .05 Mfd. 400 V.
C11—P148 .05 Mfd. 200 V.
C12—P142 .10 Mfd. 200 V.
C13—P1789 .25 Mfd. 400 V.
C15—P276 .10 Mfd. 400 V.
C16—P141 .25 Mfd. 200 V.
C18—P1193 .002 Mfd. 400 V.

MICA CONDENSERS
C4 —P480 .0001 Mfd.
C5 —P1044 .0002 Mfd.
C6 —P672 .001 Mfd.
C8 —P336 .0005 Mfd.
C17—P1044 .0002 Mfd. 5% Tolerance

ELECTROLYTIC CONDENSERS



MODEL 11S
Alignment
Notes

CONTINENTAL RADIO & TELEV. CORP.

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1730, 1800, 4000, 5600, 6000, 16,000 and 18,100 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure, after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT With the wave switch in the Broadcast Band and the gang condenser set at minimum push in the white button until it locks. Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align the first four I.F. trimmers to peak or maximum reading on the output meter.

After the first two I.F. transformers have been tuned, the discriminator transformer should be aligned. This is a critical adjustment and must be performed with care.

First — connect a 0-200 micro ammeter between the ungrounded cathode of the 6J5G tube serving as a diode rectifier, and ground. This cathode is indicated as point "A" in the circuit diagram. Then place a .0001 mfd. mica condenser across the secondary of the discriminator transformer. These terminals are indicated as points "D1" and "D2" on the circuit diagram. This condenser is used to detune completely the secondary circuit during the following primary adjustment.

The primary is tuned by impressing an I.F. signal on the convertor (6A8-G) grid and adjusting the trimmer marked "DISC. PRI." on the chassis layout diagram, to give maximum audio output. Signal strength should be the same as in an ordinary aligning operation. For this particular receiver about 30-micro volts of I.F. signal is required for standard output. (50 milliwatts). At this point it would be well to go over the adjustments of the two other I.F. transformers and bring the entire system to maximum sensitivity. Now without further adjustments of either the frequency setting of the signal generator or the I.F. transformer trimmers the "DISC. SEC." trimmer should be tuned.

After removing the .0001 mfd. mica condenser from the 6J5G grids "D1 and D2" increase the I.F. signal input to the maximum that the signal generator will supply (at least 100,000 micro volts). Then, with the volume control turned down to limit the audio output, slowly turn the "DISC. SEC." trimmer until a sudden, sharp drop in current as indicated by the micro ammeter is seen. The meter will now probably read in reverse and off scale. The trimmer should be reversed and the meter reading brought to zero. If a metallic screw driver is used it will be necessary, continually, to lift the screw driver away from the trimmer screw after each slight adjustment to observe the meter reading.

It is sometimes convenient to use an offset of "remote zero" setting of the micro ammeter in making this adjustment so that the zero current setting is higher on the scale than the conventional zero point.

After the current has been brought to zero by the above described method the I.F. alignment and discriminator tuning is completed and the R.F. tracking may be done.

BROADCAST BAND ALIGNMENT Connect the output of the signal generator to the antenna lead (blue) through at .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "preselector" and "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. **Note:** approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the preselector of the R.F. section. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

POLICE BAND ALIGNMENT The police band is adjusted by first replacing the .0002 dummy with a 400 ohm resistor and setting the generator to 5600 KC. With the gang set at minimum, adjust the "police oscillator trimmer" to receive this signal, then set the signal generator to 4000 KC and adjust "police antenna trimmer" to give maximum output. Next, set the oscillator to 1800 KC and "pad" the circuit of this frequency as described in the instructions for padding the broadcast circuits.

SHORT WAVE BAND ALIGNMENT The short wave band is adjusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC, tune in the signal and adjust the "short wave antenna" trimmer to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

CONTROLS AND OPERATION

RIGHT HAND KNOB **(Three Position Wave Band Selecting Switch)**—Turned to the right, it is set for Standard Broadcast Band; turned to the extreme left, it is set for Foreign and American Short Wave Reception; when in the center position, it is set for reception of Police, Aviation, Amateurs, and Ships at Sea.

SHORT WAVE TUNING

When tuning short wave stations, the selector knob must be turned more slowly and carefully, due to the sharp selectivity of the receiver in these bands. If you tune rapidly, many stations will be skipped entirely. When a response is heard, work the dial a little from left to right until you hit a point where the station comes in at maximum volume. This critical tuning is necessary if results are to be expected. It may require a little patient experimenting to become accustomed to short wave tuning. The use of a short wave "log" will be of great assistance in picking up short wave stations. Such logs are available from any of the leading radio magazines. They list the location, frequency and operating time schedules of short wave stations all over the world.

LEFT HAND KNOB **(Manual Volume Control and "On-Off" Switch**—Turn the left hand knob to the extreme right. The switch will click and the dial will become illuminated. Wait about one-half minute for the tubes to become heated.

LEFT CENTER KNOB **(Continuous Variable Tone Control**—The tone control permits tonal regulation to meet individual musical taste. When turned completely to the right the normal proportion of high to low notes is obtained. Upon turning the control from the extreme right position toward the center a gradually increasing emphasis of the low notes is noted. Further, increase in this direction serves to eliminate the more extreme "highs" which result in a greater apparent bass increase. A very useful application of this particular type of tone control is its ability to compensate for apparent lack of base at low volume levels. If when listening to a musical program at a low volume level the tone control is set at a position half way between its extreme settings a very pleasing effect is obtained.

CONTINENTAL RADIO & TELEV. CORP.

11S Chassis

INSTRUCTIONS FOR ADJUSTMENT AND OPERATION OF THE ELECTRIC TUNE

It is very important to read the following instructions carefully before attempting to adjust the electric tuner.
The electric tuner is made up of three integral units:

PUSH BUTTON SWITCH: The push button switch consists of one (1) white button (extreme left), and eight (8) brown buttons whose numerical sequence is reckoned from left to right. The white button is provided for converting the set from automatic electric push button tuning to manual knob tuning. The brown buttons are provided for automatic electric tuning.

SELECTOR MECHANISM: The selector mechanism is made up of the selector plate, eight (8) thumb screws, and the adjustment light bulb.

ELECTRIC MOTOR: The power for this tuner is provided by a small, efficient electric motor, of the brushless variety. It is fitted with an automatic clutch and a silent gear train. The bearings and the oil retainer hold sufficient oil to lubricate the motor for a lifetime.

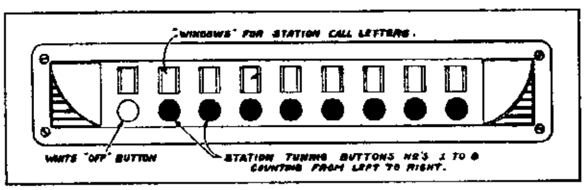


Fig. 1

The first step to take in adjusting the **electric push button de** incorporated into this receiver is to choose eight (8) of the **r** powerful local stations, stations which are free from excess fad Turn on the receiver (broadcast band) and press in the white ton; tune in the station of the **lowest frequency**, using the stc selector knob. Now hold the white button in and press in bu number one (1), next to the white button. (See Figure 1). Both tons are now locked into place; a small pilot lamp located at rear of the chassis will light up unless the thumb screw at the accidently happens to be correctly set. Loosen thumb screw r ber one (See Figure 2 for order of thumb screws) enough to a it to slide freely back and forth until the light goes out. I tighten the thumb screw; the adjustment for the first station is complete. Out of the station call letter sheet supplied remove proper station call block and insert into the window directly al button number one. Now release button number one by pres the white button in as far as it will go.

With the white button still in, tune in the station of the next hig frequency and holding the white button, press in button nur two. Both buttons are now locked into place. Loosen thumb sc number two (see Figure 2) and slide back and forth until a r is reached at which the pilot lamp in the rear goes out; tig the thumb screw. Insert the proper station call into the windo button number two.

Follow this same procedure for the remaining stations, alw choosing the station with the next highest frequency. After eight (8) stations have been adjusted, check each adjustmen tuning in each station. Note: In the window above the w button insert the word "OFF" found in the call letter sheet.

HOW TO TUNE IN STATIONS USING THE ELECTRIC PUSH BUTTON TUNER

In order to operate the receiver satisfactorily—using the electric push button tuner, the white button must be in released position, that is, all the way out. To tune in a station, merely press the selector button which designates the station desired. **Note:** Should the station fail to come in clearly, check the adjustment by following the adjustment procedure described in the paragraph above. If by chance all of the buttons are pressed in, they may be released by pressing any one button all the way in.

To change from electric tuning to manual selecting, simply press in the white button. When the white button is in, the set may be tuned as a conventional receiver. **Note:** If it is desired to tune Short Wave or Police while the set is being operated with push buttons, it is not necessary to change over from push button tuning to manual tuning. Simply turn the band switch and proceed to tune with the selector knob. When the band switch is returned to broadcast the station last selected by button will automatically tune in by itself.

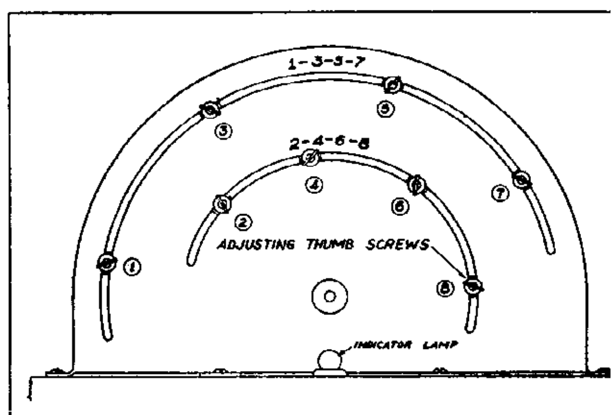


Fig. 2

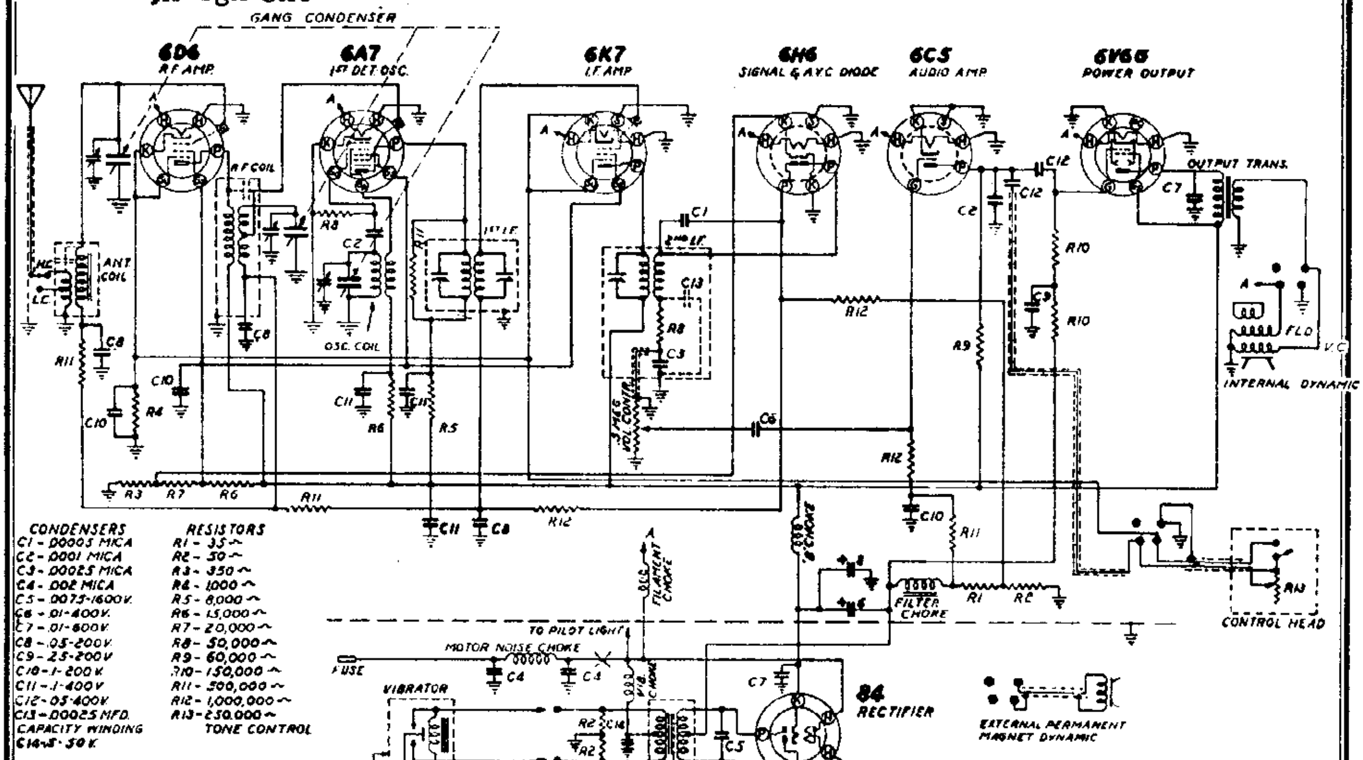
NOTE: The white push button must be pressed in, in order to tune the set manually.

RIGHT CENTER KNOB **(Station Selector)**—Rotate the indicator needle slowly over a narrow range of the dial at a point where the desired station is located, until the station is received with maximum volume; then re-adjust the volume control to the proper level. **Never** use the station selector to adjust volume as this practice results in distorted tone quality and deficient bass response. The Volume trol **only** is to be used for this purpose. For **maximum clarit** indicator needle should be adjusted to the center of the covered by the station being tuned.

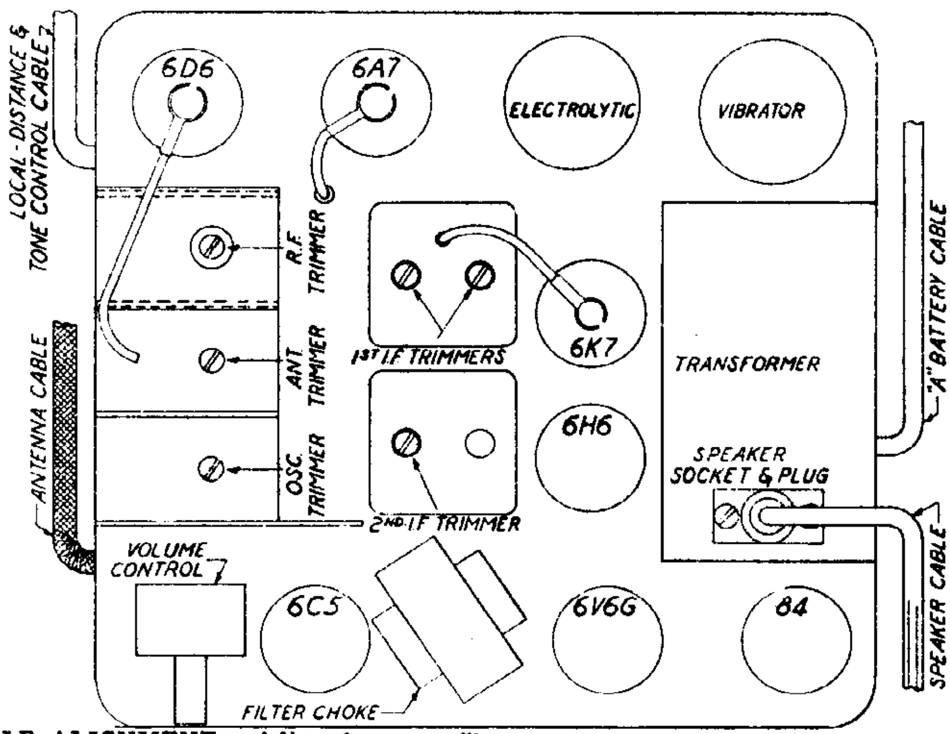
MODELS 77,770

Schematic, Socket CONTINENTAL RADIO & TELEV. CORP.

Trimmers, Alignment



IF PEAK 175 KC



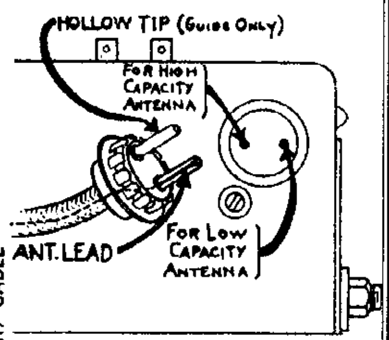
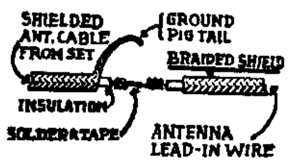


FIG. 17



7-Tube Auto Radio—Model 77 & 770 Chassis & Schematic

I.F. ALIGNMENT. Adjust the test oscillator to 175 K.C. and connect the output directly to the grid of the first detector tube (6A7), without the use of any series condenser or resistor; the omission of series condenser and resistor to block out the AVC action. The ground on the test oscillator can be connected to the chassis ground. Align the trimmers of the first and second I.F. transformers to peak or maximum reading on the output meter.

OSCILLATOR ALIGNMENT. Adjust the test oscillator to 1400 K.C. and connect the output to the antenna through a .0001 mfd. mica condenser to give the equivalent of a low capacity type average auto antenna. Set the dial pointer to 1400 K.C. and adjust the oscillator trimmer to peak. (Front section of gang condenser.)

R.F. ALIGNMENT. The next step is to adjust the center and rear trimmers of the gang condenser to peak. The center section of the gang condenser tunes the antenna amplifier stage (6D6 tube), and the rear condenser section tunes the detector grid coil of the 6A7 tube.

CONTINENTAL RADIO & TELEV. CORP.

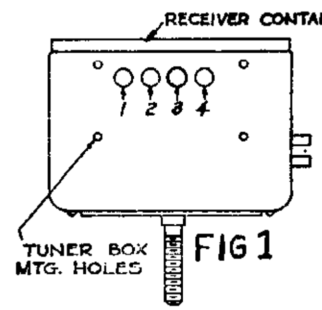


FIG 1

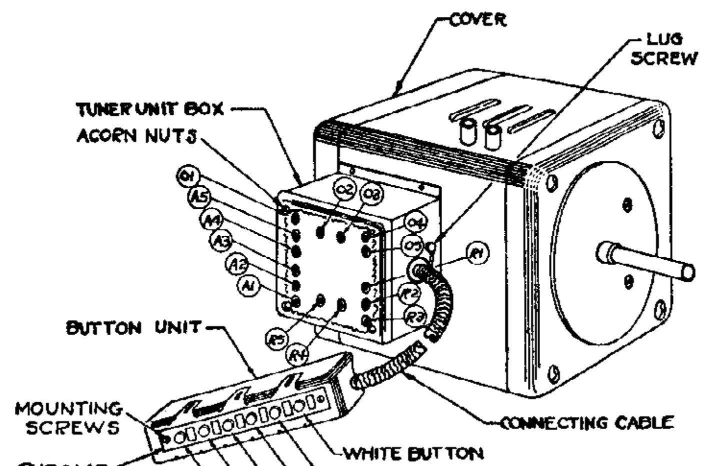
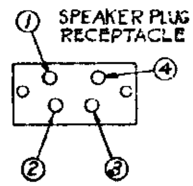
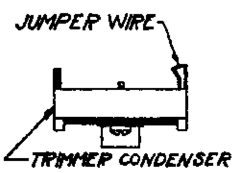


FIG. 2





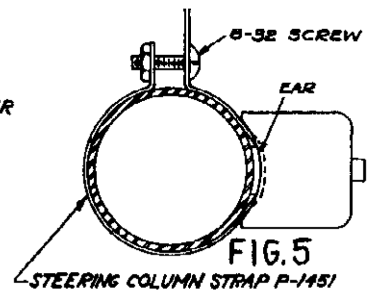


FIG. 5

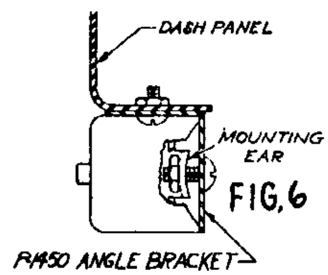
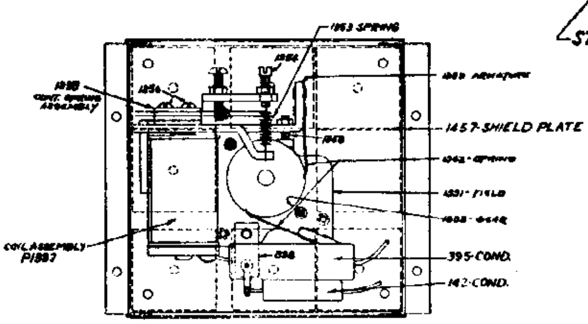


FIG. 6



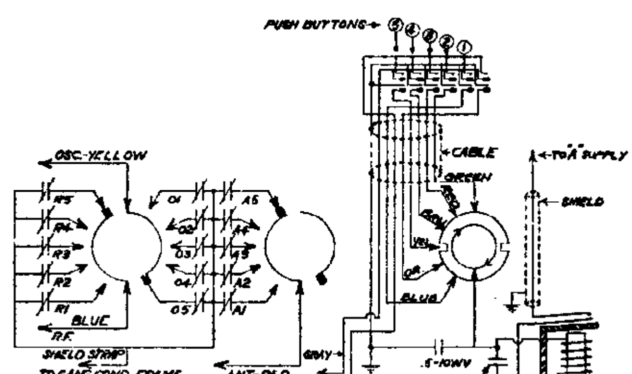


FIG. 7

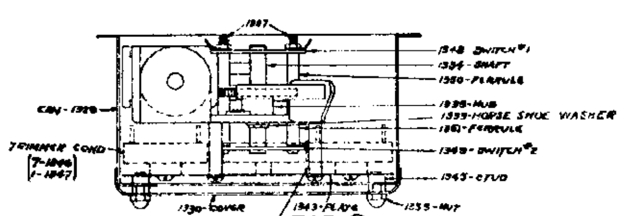
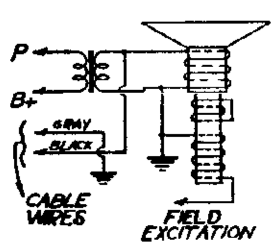
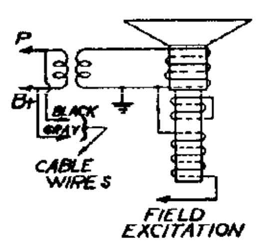


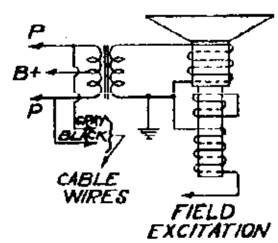
FIG. 8



TYPE 1.
FIG. 9



TYPE 2.
FIG. 9



TYPE 3.
FIG. 9

MODEL Touch-O-Matic
Type T-21

CONTINENTAL RADIO & TELEV. CORP.

Installation
Adjustments
Notes

GENERAL INFORMATION.

The ADMIRAL TOUCH-O-MATIC Tuner can be installed on any radio receiver which uses a six volt source of supply, where the mechanical layout of the set is of such nature that the tuner unit of the TOUCH-O-MATIC may be mounted near the tuning condenser. TOUCH-O-MATIC is not a booster unit and will not increase the volume or range of the set since it contains no tubes.

INSTALLATION OF ADMIRAL TOUCH-O-MATIC ON MODELS 66, 660; 77, 770; 78, 780; 88, 880.

Remove the cover of the radio and take the set out of the container. Now press out the four knock-out slugs located on the condenser side of the container (See Fig. 1) (For models 88-880 see Note 1 before replacing set in container). Replace and secure the set in the container. Scrape away the paint from around each one of the four mounting holes, shown in Fig. 1, to insure good electrical contact with the tuner box. Fig. 2 shows a complete assembly view.

The tuner box and the button unit are shipped from the factory, connected together by a heavy cable. The only connections to be made are projecting from the open end of the tuner box. These seven wires, are to be introduced into the four large holes in the side of the received container shown numbered in Fig. 1. Pull the gray, black, and shielded wire through hole No. 1. Through hole No. 2, pull the blue wire. Pull the red wire and the copper strap through hole No. 3, and the yellow wire through Hole No. 4. Now mount the tuner box in the position shown in Fig. 2. Use the four self-tapping screws supplied in bag of parts. After the tuner box has been securely fastened to the container, remove the single section shield located at the top of the R.F. section of the tuning condenser. This may be removed by loosening the two bolts at the rear plate of the tuning condenser. Now solder the blue wire to the lug left exposed by the removal of the shield, replace the shield and tighten bolts. Make the red, blue and yellow wires as short as possible without losing the floating properties of the tuning condenser. Solder the red wire to the stator lug of the middle section of the tuning condenser. Solder the copper strap to the frame of the tuning condenser; preferably one of the center partitions. Solder the yellow wire to the stator lug of the oscillator—front section of the tuning condenser. When the unit is being mounted on the models 66, 660; 77, 770; 78, 780: (For 88, 880 see Note 1 below) solder the gray wire to lug No. 2 of the speaker plug receptacle located in the set (See Fig. 3) Solder the wire of the shielded cable to lug No. 3 (Fig. 3). Solder the black wire to lug No. 1 (Fig. 3).

NOTE 1—When the unit is being mounted on the models 88, 880, solder the black wire to lug No. 4 (Fig. 3). Solder the shielded wire to the ungrounded side of the filament of any conveniently located tube, and the gray wire to lug No. 1 (Fig. 3). All the necessary connections are now made.

GENERAL INSTALLATION OF TOUCH-O-MATIC ON OTHER THAN ADMIRAL SETS

For receivers other than types listed above, proceed in the following manner, taking care to follow the instructions carefully. Determine the position for the location of the tuner unit of the TOUCH-O-MATIC, selecting a position for the unit so that the three Radio Frequency wires can be made as short as possible. These wires are the red, yellow and blue wires which connect directly to the switch segments of the TOUCH-O-MATIC (See Fig. 8). The success of the installation is dependent largely upon the shortness of these wires. Long leads may not allow the reception of the high frequency stations at the hig'. frequency end of the dial.

Drill four No. 33 holes for mounting tuner to side of the receiver container. Drill 3—⅝" holes close to the stator winding lugs of the tuning condenser. Locate these holes in such a manner as to provide the most direct path for the red, yellow, and blue leads. It is important that these wires do not cross each other and that they are not in close relation to one another. Should it be necessary for these wires to cross or come in close relation to one another, they should be provided with some form of low capacity shielding of the type found on the blue wire in the tuner box, as capacity between any of the wires on the gang or tuning condenser will cause excess oscillation and feed back. The importance of keeping these wires as short and as well separated as possible, cannot be overstressed. Any tendency for the tuner to cause oscillation may be directly attributed to capacity between these three wires. Proper shielding will stop the oscillation in all cases. If the installation will permit the choice of the yellow wire for the oscillator section, the red for the antenna section, and the blue wire for the Interstage or R.F. section, the group letters "O", "A", and "R" stamped into trimmer plate of the TOUCH-O-MATIC will have the following meaning: Oscillator, Antenna, and R.F., respectively.

If this selection of wires cannot be made, it may be necessary to add a small shield around the yellow wire in the TOUCH-O-MATIC unit. This shield should be of the low capacity variety, similar to that found on the blue wire, and not of the tight fitting variety. Under every condition, the red wire should be selected for the antenna section of the tuning condenser. A fourth ⅝" hole is necessary to allow the admittance of the shielded wire and the gray and black wire into the receiver container. The location of this hole is purely arbitrary as long as it is in the confines of the tuner box.

Fasten the tuner to the sides of the receiver by means of the four self tapping screws provided in the bag of parts.

After cutting to the proper size, solder the yellow, blue and red wires to the stator-section lugs of the tuning condenser, according to previous selection. Connect the copper strap to the frame of the tuning condenser. Connect the shielded wire to a convenient "A" source. This may be either at the tube socket, the ungrounded side of a tube filament, the dial light receptacle, or the ungrounded side of the speaker field. Proper choice of the location of this connection will insure a minimum amount of "Hash" (vibrator disturbance) and motor noise. Solder the shield of the shielded wire to the chassis of the receiver.

The wiring of the gray and black wire is determined as follows:

1. Determine whether or not the receiver in question has push-pull output.
2. Determine whether the output transformer is mounted in the set or on the speaker, (if an external speaker).
3. Determine whether or not the voice coil connections of the speaker are easily accessible.

After the above data is obtained, connect the grey and black wires according to the most suitable method suggested by one of the three diagrams, (Fig. 9, type 1-2-3). For sets with external or internal speaker with output transformer in chassis, use circuit Type 1. For sets with push-pull output, internal or external speaker, output transformer mounted in set or on speaker, use circuit suggested in Type 3. For all other sets, use circuit suggested in Type 2.

Connect the receiver to battery and turn the set "on". Press white button and hold down until clicking stops. If no clicking is heard, press any red button, (if still no clicking is heard, check wiring carefully. Be sure that the shielded wire is connected to some source of "A" supply). Press white button again and hold down until the clicking stops. This places tuner in minimum capacity position in which no trimmer condensers are connected to the receiver. Align the set in the conventional manner. Adjust TOUCH-O-MATIC adjustment screws according to information given under the heading: ADJUSTING TOUCH-O-MATIC FOR STATIONS CHOSEN.

ADJUSTING TOUCH-O-MATIC FOR STATIONS CHOSEN.

Connect the radio to a battery and turn the set "on"; press the white button and hold down until clicking stops. (If clicking is not heard, press any red button, then press white button. If a clicking is not heard now, check all the above connections for errors.

Turn the tuning condenser all the way out and by using a signal generator or a test oscillator, adjust the oscillator trimmer condenser located on tuning condenser to 1550 K.C. Having once made this adjustment it is important that this trimmer condenser remains untouched while making further adjustments. Now set the signal generator to 1400 K.C. and rotate the tuning condenser until the signal is received. Adjust the R.F. and Antenna trimmer condensers to the loudest signal or for the greatest deflection of an output meter. No further adjustments of trimmer condensers located in the set are necessary. Rotate the tuning condenser to the extreme high frequency end, that is, the position with the condenser plates all the way out. This is the position that the condenser plates must take when making adjustments on TOUCH-O-MATIC.

Select the five most desirable stations in your vicinity. The best selection will lie in the most powerful local stations having a frequency of less than 1430 K.C. For convenience, arrange the selected stations in order, according to their frequency—from the lowest to the highest. Press button No. 1, shown in Fig. 2. Select the station of lowest frequency; set the generator to this frequency. Remove the tuner box cover by removing the four acorn nuts, located in the corners of the cover, (Fig. 2). Now adjust trimmer screws "O1", "R1", and "A1" (Fig. 2) in the order named, for the loudest signal or greatest deflection of an output meter. If the frequency of the station cannot be reached with the trimmer screw completely open, cut jumper wire. (See Note No. 2 below). It will be necessary to cut jumper wire for all stations having a frequency greater than 1000 K.C. When all three trimmer screws "O1", "R1" and "A1", have been adjusted for button No. 1, proceed with station No. 2.

Press button No. 2 and set the signal generator to the frequency of this station and adjust trimmers screws "O2", "R2", and "A2".

Repeat this operation for the three remaining stations, using "O3", "R3", and "A3" for button No. 3; "O4", "R4", and "A4" for button No. 4, and "O5", "R5", and "A5" for button No. 5.

NOTE 2: If the frequency of the station selected cannot be reached when the trimmer screw is completely open, tighten the trimmer screw. Remove the lug screw, located on the cable side of the tuning unit, the four self-tapping screws (See Fig. 2) and the four nuts. Now the tuner box can be lifted off, leaving the inner mechanism exposed. Now cut jumper wire (Fig. 4) of trimmer which does not reach frequency. If any other trimmer condenser does not reach frequency when screw is completely opened, cut its jumper wire. Now replace the tuner box, the four self-tapping screws, the four nuts, and the lug screw. Adjust trimmers. Fasten tuner box cover in place, with the four acorn nuts. Replace the radio set cover.

MOUNTING BUTTON UNIT.

Included in the bag of parts:

1—Instructions
2—Drive screws
1—Under Dash Mounting Bracket
2—Steering Post Mounting Straps
4—8/32 x ½ R.H.M. screws
4—No. 8 lock washers
4—8/32 hex nuts
1—Celluloid strip
1—Station call letter sheet

Included with the TOUCH-O-MATIC is a printed sheet of station call letters, varying upward from 1000 watts and between 550 and 1430 K.C. These call letters are arranged in alphabetical order across the sheet. Each call letter can be removed individually since the sheet is cross-perforated. Select the call letters to be used. Remove the chromium plated strip by unscrewing the two small bolts (Fig. 2). Now place the call letters in the proper recess left exposed by the removal of the chromium strip. Over them place the celluloid strip supplied in the bag of parts, replace the chromium strip and secure with the small bolts. After the set has been mounted in the car, fasten the button tuner, either on the steering column or under the dash. To mount on the steering column, use the two steering post mounting straps. Bend straps to fit column. Slide bent straps under mounting ears located on the rear dust cover of the push button unit (Fig. 5), and fasten straps with two 8/32 bolts, furnished in bag of parts. This will hold the unit securely to column (See Fig. 5).

For under dash mounting, a special angle bracket is supplied. This necessitates the drilling of two holes on the bottom edge of the dash. Bolts are supplied for fastening. (See Fig. 6). After the unit has been mounted in the position selected, the set is ready for operation.

OPERATION OF TOUCH-O-MATIC

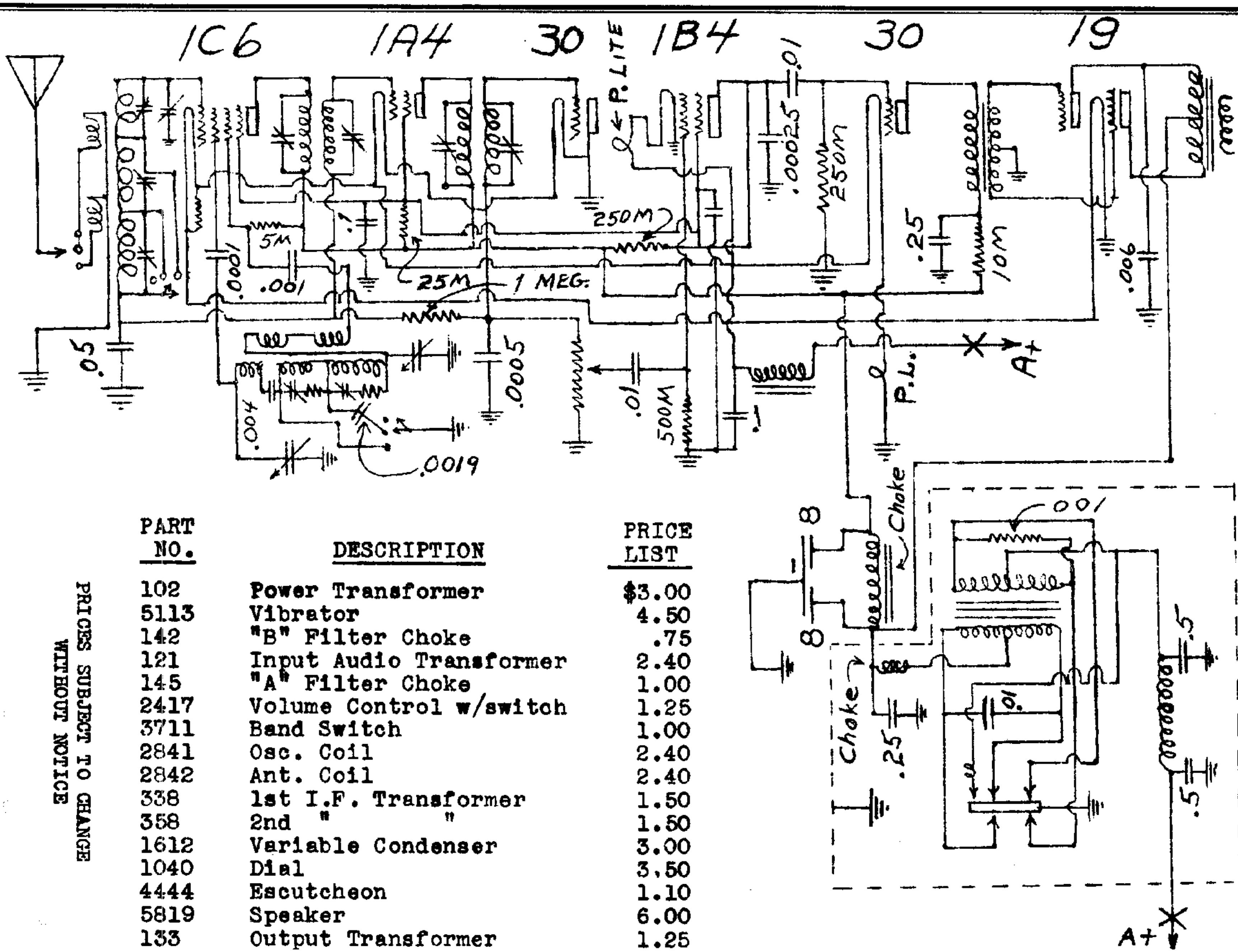
Switch on the radio. Turn the volume up about half-way and wait about 30 seconds for the tubes to heat, before attempting to operate the set. Now turn the dial pointer as far as it will go to the left—to the high frequency end of the dial. Press the button corresponding to the station wanted. If the above instructions have been followed, and the adjustments have been made accurately, your station will come in precisely tuned. For manual tuning, simply press the white button, and operate dial in conventional manner. For TOUCH-O-MATIC tuning, turn dial pointer to extreme high frequency end.

T-21 TOUCH-O-MATIC PARTS LIST

P1397	Magnet Coil	P1343	Trimmer Cond. plate
P838	Terminal Panel	P1346	Trimmer Cond.
P1320	Push Button control head	P1347	Trimmer Cond.
P1329	Automatic tuner can	P1348	Switch segment
P1330	Automatic tuner cover	P1349	Switch segment No 2
P1331	Field Piece	P1352	Control cable
P1332	Armature	P1353	Coil spring
P1333	Ratchet gear	P142	Condenser
P1334	Ratchet gear shaft	P395	Condenser
P1335	Gear shaft hub	P1399	Horseshoe washers
P1336	Electro-magnet core	P1450	Under dash mtg. bracket
P1337	Electro-magnet washer	P1451	Steering post mtg. bracket
P1338	Contact spring	P1452	Celluloid Shield
P1342	Springs	P1457	Shield Plate
		P1359	Acorn Nuts (cad.)

CORONA RADIO & TELEV. CORP.

MODEL 212
Schematic
Parts

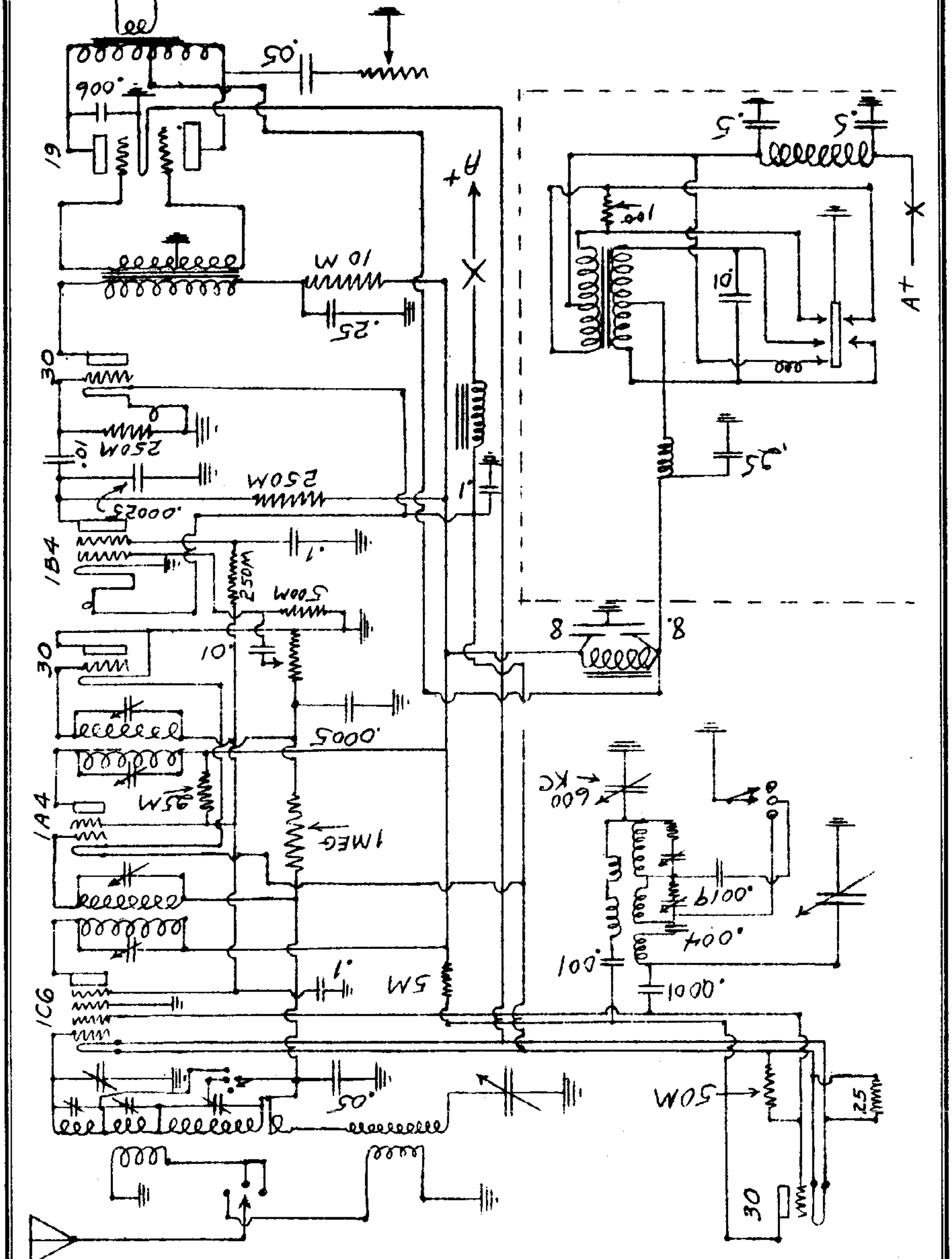


PART NO.	DESCRIPTION	PRICE LIST
102	Power Transformer	$3.00
5113	Vibrator	4.50
142	"B" Filter Choke	.75
121	Input Audio Transformer	2.40
145	"A" Filter Choke	1.00
2417	Volume Control w/switch	1.25
3711	Band Switch	1.00
2841	Osc. Coil	2.40
2842	Ant. Coil	2.40
338	1st I.F. Transformer	1.50
358	2nd " "	1.50
1612	Variable Condenser	3.00
1040	Dial	3.50
4444	Escutcheon	1.10
5819	Speaker	6.00
133	Output Transformer	1.25

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL 214
Schematic

CORONA RADIO & TELEV. CORP.



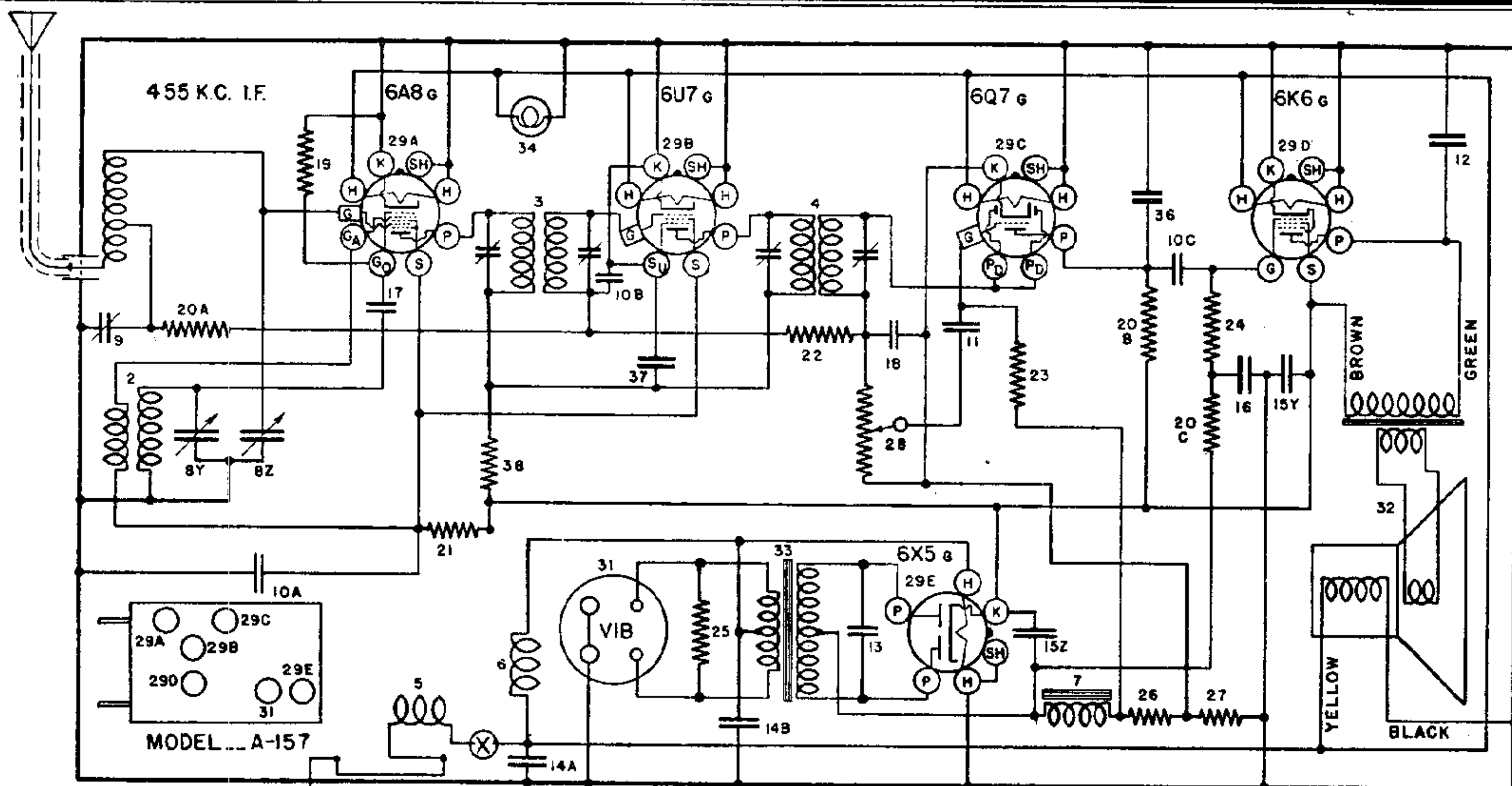
CROSLEY RADIO CORP.

MODEL A-157, Fiver Roamio
Schematic, Voltage, Parts

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	Su	K	Ga	Go
6A8-G	Oscillator-Modulator	6.0	220	90	—	0	90	0
6U7-G	I-F Amplifier	6.0	220	90	0	0	—	—
6Q7-G	Diode Detector & A-F Amp.	6.0	110	—	—	0	—	—
6K6-G	Output	6.0	200	220	—	0	—	—
6X5-G	Rectifier	6.0	—	—	—	220	—	—

Power Output approximately 4 Watts.
Battery Drain approximately 5.7 Amperes at 6 Volts.



April, 1937

MODEL A-157 (Fiver Roamio)

Item No.	Part No.	Description
1	G137—32000	Antenna Coil
2	G137—32002	Oscillator Coil
3	G149—32004	1st I-F Assembly, 455 Kc.
4	G148—32004	2nd I-F Assembly, 455 Kc.
5	G16—32977	Motor Noise Choke
6	G21—28067	"A" Filter Choke
7	G16—29535	"B" Filter Choke
8	G36—33001	Var. Tuning Cond., 2 Section
9	—38998A	Condenser Ant. Comp.
10ABC	W —32380	Condenser .05 Mf. 200 V.
11	W —37226	Condenser .02 Mf. 160 V.
12	W —23191A	Condenser .01 Mf. 400 V.
13	W —50170	Condenser .01 Mf. 1000 V.
14AB	W —50161	Condenser .5 Mf. 120 V.
15ZY	W —50160	Condenser 4 Mf. 350 V.
16	W —50105	Condenser .1 Mf. 160 V.
17	G1 —34002	Condenser .00025 Mf. 200 V.
18	G3 —34002	Condenser .0005 Mf. 200 V.
19	—35928	Resistor 60,000 Ohm ¼W.
20ABC	—35601	Resistor 300,000 Ohm ¼W.
21	—37377	Resistor 20,000 Ohm 1W.
22	—35602	Resistor 1 Megohm ¼W.
23	—35927	Resistor 2 Megohm ¼W.
24	—36322	Resistor 500,000 Ohm ¼W.
25	W —35467	Resistor 220 Ohm ½W.
26	W —23012A	Resistor 40 Ohm ¾W.
27	W —24537	Resistor 60 Ohm ½W.
28	—50042	Vol. Cont. 1 Meg. & Switch
29	G178—36400	Socket, Octal
	W —50142	Tube Shield, Plain Half } 6U7-G
	W —50143	Tube Shield, Cut-out Half } 6U7-G
	W —31210	Tube Shield Ring } 6U7-G
30		NONE
31	G105—28807	Socket (Vibrator)
	W —50123	Gnd. Clip (Vibrator)
32	263—BL7 "U"	Speaker, Spec. 5-S-21
	—44062	V. C. & Cone Assembly } Above Speaker
	—44063	Output Trans. } Above Speaker
33	G15 —32769	Power Transformer
	W —50130	P. T. Shield
34	W —43567	Dial Light Bulb
35	W —43568	Bracket—Dial Light
	G25 —32750	"A" Lead Assembly
	W —32757	Fuse, 12 Amp.
	W —32777	Fuse Cap (Female)
	W —32776	Fuse Insulator
	W —31393	Fuse Cap (Male)
36	G6 —34002	Condenser .000025 Mfd. 200 V.
37	W —32750	Condenser .05 Mfd. 400 V.
38	W —22514	Resistor 750 Ohm ½W.
38	W —35581	Resistor 1000 Ohm ¾W.
	W —38038D	Distr. Suppressor
	W —29754	Gen. Condenser
	W —50167	Mtg. Bracket (Set)
	—25846	Mtg. Screw (Set)
	—6213	Mtg. Nut
	—35065	Mtg. Bolt
	—35147B	Ant. Connecting Lead (Extra)
	W —50164	Knob
	C —50137	Dial Face (Glass)
	W —50135	Support Ring (Dial)
	B —50136	Support Bracket (Dial)
	W —50133	Dial Mask
	G2 —43564	Pulley and Hub Assembly
	—41582	Drive Cord
	W —50134	Shaft (Drive)
	W —50128	Mtg. Bracket (Shaft)

MODEL A-157, Fiver Roamio
Socket, Trimmers, Chassis
Alignment

CROSLEY RADIO CORP.

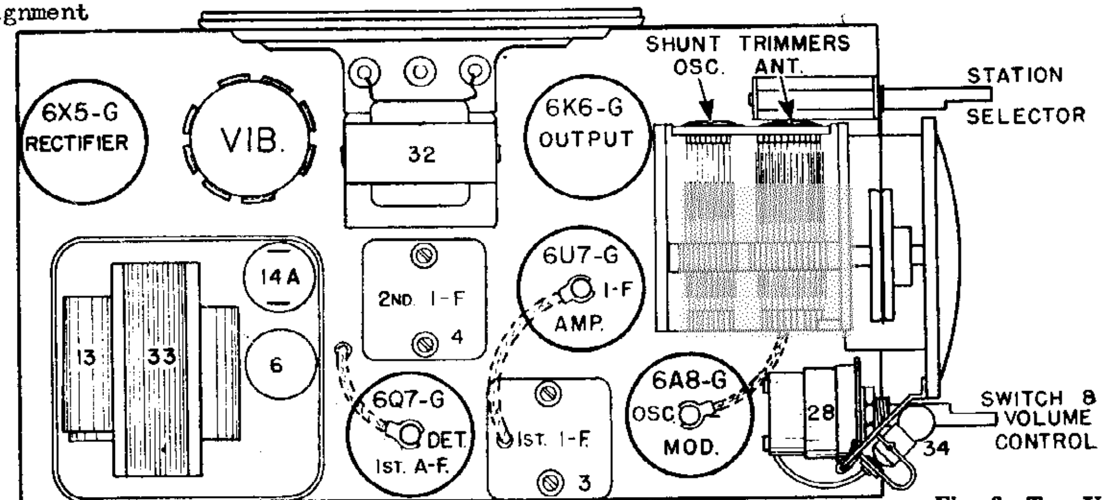


Fig. 2 Top View A-157

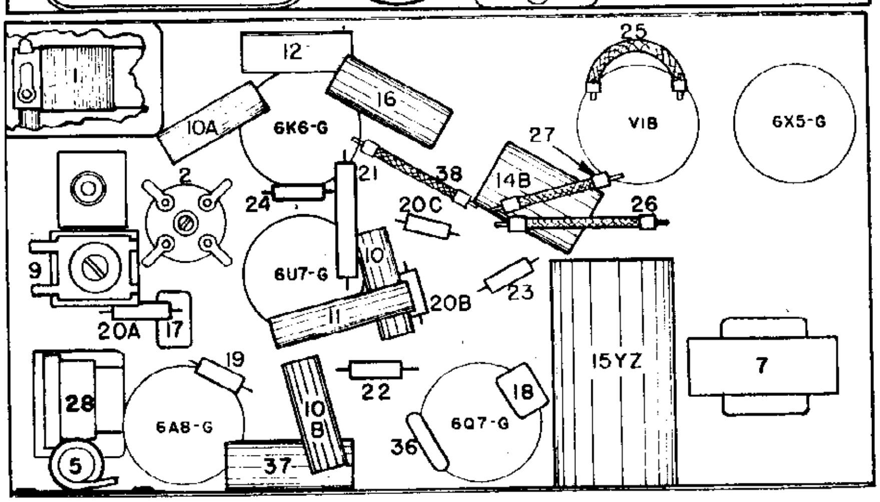


Fig. 3 Bottom View A-157

CONNECTING OUTPUT METER

Connect the output meter to P and S of the 6K6G Output tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd., or larger, condenser to the top cap of the 6A8G Osc-Mod. tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the receiver chassis frame. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Adjust the station selector so that the rotor plates of the tuning condenser are completely disengaged and turn Vol. Cont. to maximum position (RIGHT).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust both trimmers located on the 2nd I-F transformer for maximum output. Fig. 2.

(e) Adjust both trimmers located on the 1st I-F transformer for maximum output.

(f) Repeat operations (d) and (e) for more accurate adjustments.

IN ORDER TO PREVENT A. V. C. ACTION ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

(a) Connect the output lead from the signal generator through a .00025 mfd. condenser to the "ANT" connection of the receiver.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer on the "OSC" section of the tuning condenser for maximum output.

(e) Adjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

(f) Readjust the station selector for maximum output. DO NOT READJUST THE OSC. TRIMMER.

(g) Repeat operation (e) for more accurate adjustment.

3. Adjusting Antenna Compensating Condenser.

(a) Set the signal generator to 600 kilocycyes.

(b) Tune in the 600 kilocycle signal with the station selector for maximum output.

(c) Adjust the antenna compensating condenser, Illustration No. 9, Fig. 3, for maximum output.

(d) Repeat operations (b) and (c) alternately until no further improvement can be obtained.

(e) Set the signal generator to 1400 kilocycles again.

(f) Tune-in the 1400 kilocycle signal with the station selector for maximum output.

(g) Readjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

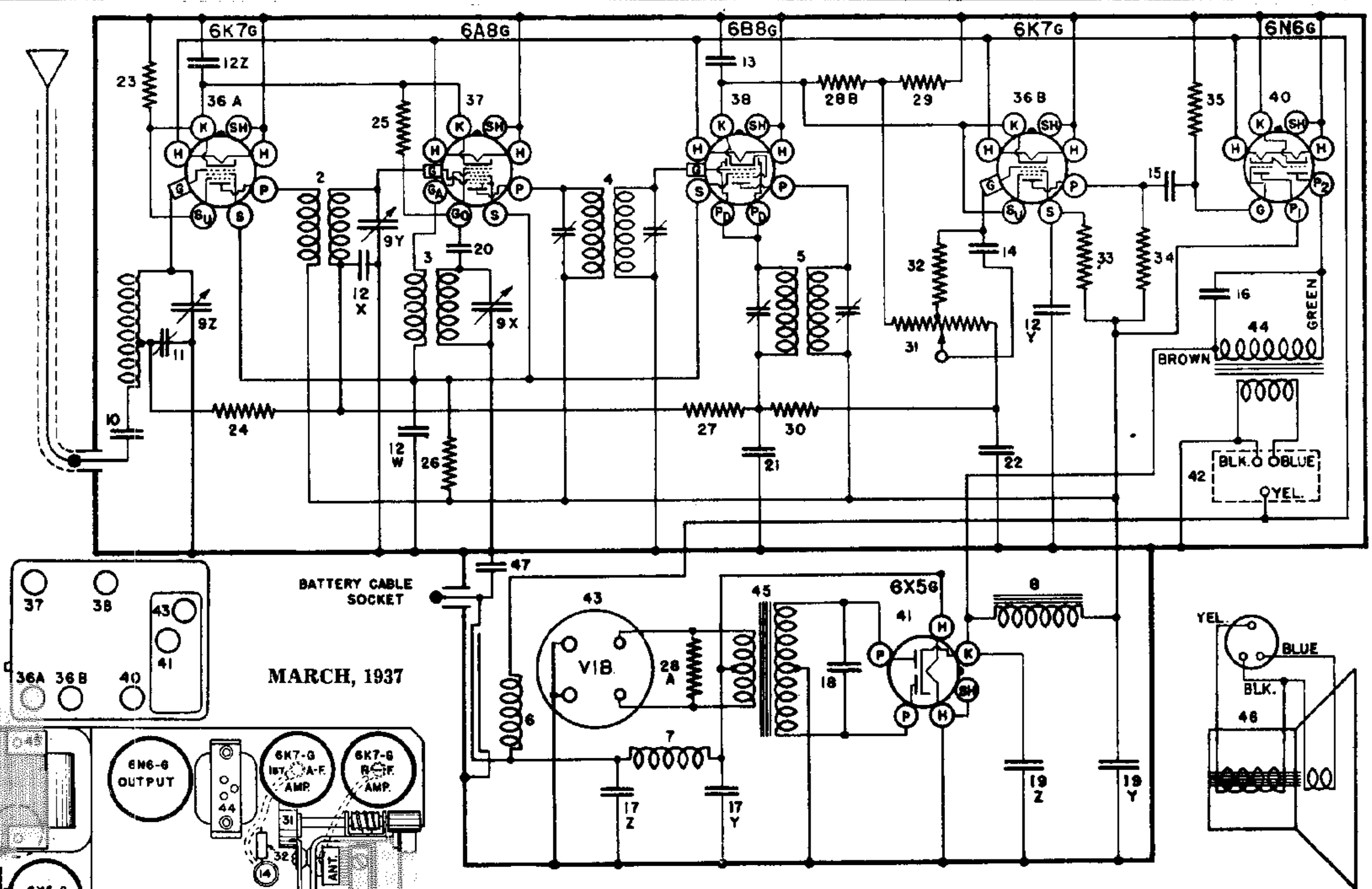
It will be necessary to adjust the antenna compensating condenser to the car antenna after the receiver has been installed in the car.

(a) After the installation is complete, tune-in a WEAK station between 55 and 65 on the dial.

(b) Adjust the antenna compensating condenser for maximum volume in the speaker.

MODEL A-167
Schematic, Voltage
Socket, Trimmers

CROSLEY RADIO CORP.



MARCH, 1937

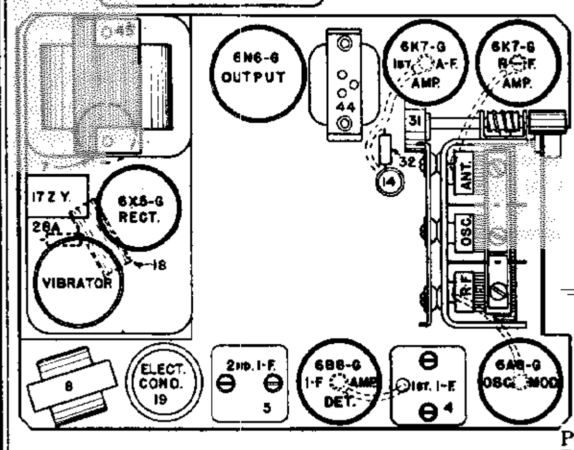


Fig. 2 Top View A-167

MODEL--A-167 262 K.C. I.F.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	P2	S	Su	K	Ga	Go
6K7G	R-F Amplifier	6.0	270	—	100	8.5	8.5	—	—
6A8G	Osc.-Modulator	6.0	270	—	100	—	8.5	100	0
6B8G	I-F Amplifier & Diode Detector	6.0	270	—	100	—	4.0	—	—
6K7G	A-F Amplifier	6.0	135	—	35	4.0	4.0	—	—
6N6G	Output	6.0	235	270	—	—	0	—	—
6X5G	Rectifier	6.0	—	—	—	—	285	—	—

Power output approximately 5 watts.
Battery drain approximately 8.0 amperes at 6.0 volts.

MODEL A-167
Chassis, Parts
Alignment

CROSLEY RADIO CORP.

CONNECTING OUTPUT METER

Connect the output meter to P1 and P2 of the 6N6G Output tube. Be sure the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

NOTE: The receiver chassis should be in its case and a speaker similar to one used with the receiver must be connected to the chassis before making adjustments. It is advisable to use a spare control unit for making adjustments of the volume control and tuning condenser. A standard control unit with short cables (6" to 8") makes a very convenient and useful tool. If it is desired to shorten a pair of long cables it will be absolutely necessary to heavily tin the cables before cutting them.

1. Tuning I-F Amplifier To 262 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd., or larger, condenser to the top cap of the 6A8G Osc-Mod. tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the receiver chassis frame. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Adjust the station selector so that the rotor plates of the tuning condenser are completely in mesh.

(c) Set the signal generator to 262 kilocycles.

(d) Adjust both trimmers located on the 2nd I-F transformer for maximum output. (Fig. 2).

(e) Adjust both trimmers located on the 1st I-F transformer for maximum output.

(f) Repeat operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier

(a) Connect the output lead from the signal generator through a .00025 mfd. condenser to the "ANT" connection of the receiver.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer on the "OSC" section of the tuning condenser for maximum output.

(e) Adjust the trimmer on the "R-F" section of the tuning condenser for maximum output.

(f) Adjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

(g) Readjust the station selector for maximum output. DO NOT READJUST THE OSC. TRIMMER.

(h) Repeat operations (e) and (f) for more accurate adjustments.

3. Adjusting Antenna Compensating Condenser.

(a) Set the signal generator to 600 kilocycles.

(b) Tune in the 600 kilocycle signal with the station selector for maximum output.

(c) Adjust the antenna compensating condenser, Illustration No. 11, Fig. 3, for maximum output.

(d) Repeat operations (b) and (c) alternately until no further improvement can be obtained.

(e) Set the signal generator to 1400 kilocycles again.

(f) Tune-in the 1400 kilocycle signal with the station selector for maximum output.

(g) Readjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

It will be necessary to adjust the antenna compensating condenser to the car antenna after the receiver has been installed in the car.

(a) After the installation is complete, tune-in a WEAK station between 55 and 65 on the dial.

(b) Adjust the antenna compensating condenser for maximum volume in the speaker.

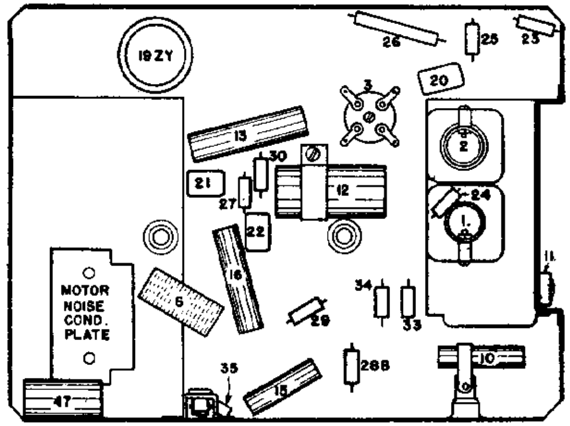
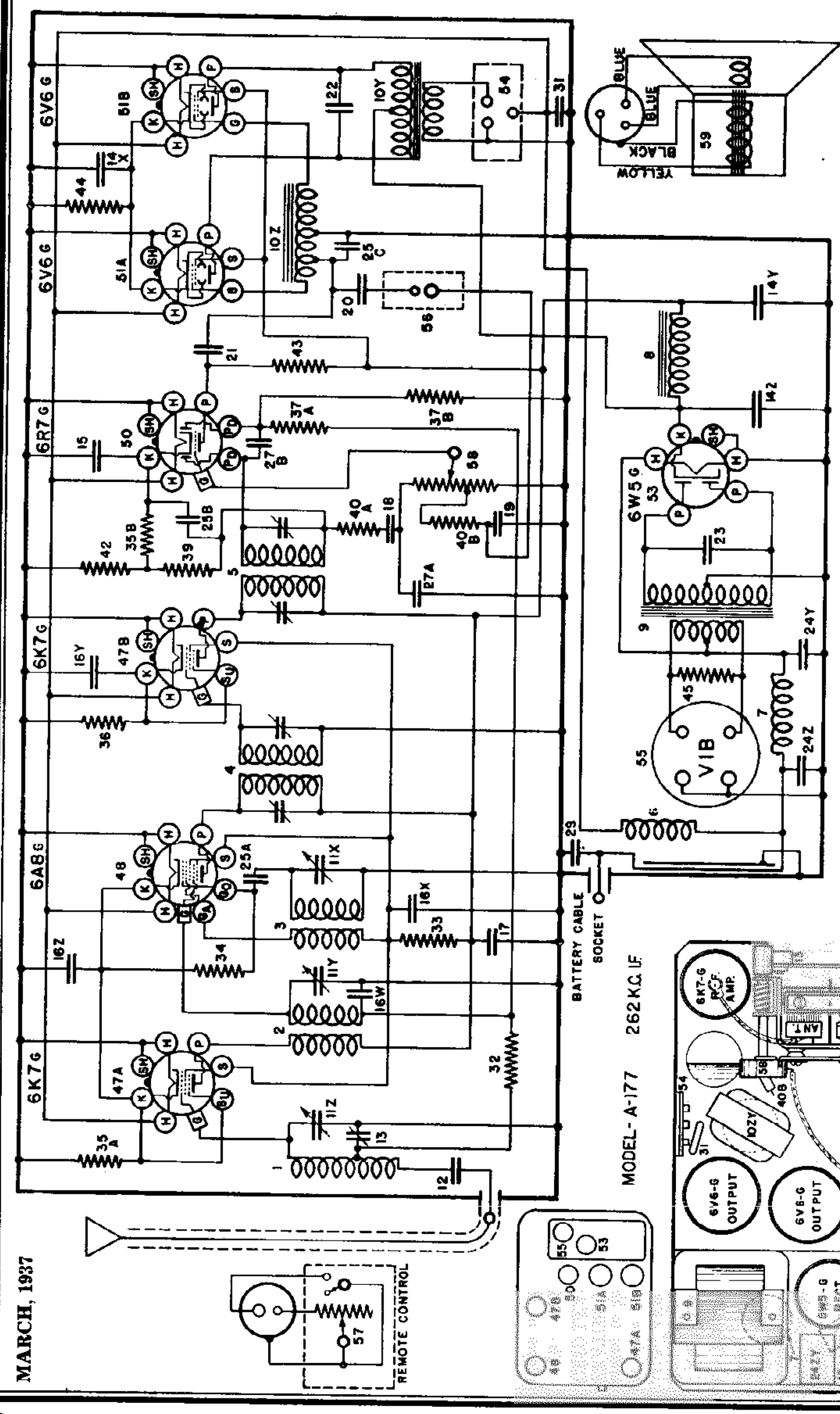


Fig. 3 Bottom View A-167

Item No.	Part No.	Description
1	G134—32000	Ant. Coil
2	G93 —32001	R-F Coil
	W —38995	Coil Shield only
	MG23—50000	Ant. and R-F Shield Assy. (Cans and Brackets)
	MG24 —50000	Ant. and R-F Coils and Shield Assy. Complete
	W —32912	Wood Coil Spacer
3	G134—32002	Osc. Coil
4	G38 —32005	1st I-F Assembly
5	G37 —32005	2nd I-F Assembly
6	G15 —32977	Choke—Motor Noise
7	G20 —28067	Choke "A" Filter
8	G75 —24628	Choke "B" Filter
9	G57 —33002	3 Section Var. Tuning Cond.
	W —38899A	Var. Cond. Connection
10	W —50039	Condenser .003 Mf. 160 V.
11	W —50054	Condenser Ant. Series Trimmer
	W —40698	Plug Ant. Trimmer Hole
12Z	W —50044A	Condenser .1 Mf. 160 V.
12Y		Condenser .1 Mf. 160 V.
12X		Condenser .05 Mf. 160 V.
12W		Condenser .05 Mf. 400 V.
13	W —24049C	Condenser .1 Mf. 200 V.
14	W —37226	Condenser .02 Mf. 160 V.
15	W —32380	Condenser .05 Mf. 200 V.
16	W —50043	Condenser .005 Mf. 600 V.
17ZY	W —38990	Condenser .5 Mf. 160 V.
18	W —38904	Condenser .005 Mf. 1000 V.
19ZY	W —50045A	Condenser 6 Mf. 350 V.
20	G1 —34002	Condenser .00025 Mf.
21	G3 —34002	Condenser .0005 Mf.
22	G2 —34002	Condenser .0001 Mf.
23	W —50046	Resistor 1000 Ohm ½W.
24	—35601	Resistor 300,000 Ohm ¼W.
25	—35928	Resistor 60,000 Ohm ¼W.
26	—36952	Resistor 30,000 Ohm 1W.
27	—35602	Resistor 1 Megohm ¼W.
28AB	W —38977	Resistor 220 Ohm ½W.
29	W —38918	Resistor 600 Ohm ½W.
30	—36760	Resistor 20,000 Ohm ¼W.
31	W —38989	Volume Control 300,000 Tap 150,000 Ohm
32	—35927	Resistor 2 Megohm ¼W.
33	—38623	Resistor 750,000 Ohm ¼W.
34	—35600	Resistor 100,000 Ohm ¼W.
35	—38976	Resistor 250,000 Ohm ¼W.
36AB	G151—36400	Socket Type 6K7
37	G156—36400	Socket Type 6A8
38	G175—36400	Socket Type 6B8
39	NONE	
40	G165—36400	Socket Type 6N6
41	G168—36400	Socket Type 6Y5
42	W —38991A	Socket Speaker
43	G105—28807	Socket Vibrator
	W —38873	Vibrator Ground Clip
	W —50002	Syncronode Mtg. Stud
	W —50020	Base—Tube Shield
	W —50021	Tube Shield—Half } 6K7G, 6B8G
	W —50022	Tube Shield—Half } 6K7G, 6B8G
	W —50023	Tube Shield—Half (2), 6x5
	W —31210	Ring—Tube Shield
44	G74 —24628	Output Transformer
	W —38991A	Speaker Socket, part of G1—43619 Brkt. Assy.
45	G13 —32769	Power Transformer
	G6 —38000	Vibrator
46	356BP9 "M"	Speaker Spec. 1-D-895
	—43818	Cone Assembly
	—43819	Field Coil
	MG2 —50000	Top Cover Assembly
	B —50028A	Escutcheon
	B —50029A	Screen—Speaker
	B —50030A	Grille Cloth
	W —50070	Clamp—Speaker Cable
	W —38935	Ground Clip (16 used)
	W —50002	Stud—Sync. Mtg.

MODEL A-177
Schematic, Voltage
Socket, Trimmers

CROSLEY RADIO CORP.



TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	Su	K	Ga	Go
6K7G	R-F Amplifier	6.0	225	90	4.0	4.0	—	—
6A8G	Osc.-Modulator	6.0	225	90	—	4.0	90	-18
6K7G	I-F Amplifier	6.0	225	90	3.2	3.2	—	—
6R7G	Diode Det. & 1st A-F Amplifier	6.0	170	—	—	7.0	—	—
6V6G	(2) Output	6.0	240	225	—	13.0	—	—
6W5G	Rectifier	6.0	—	—	—	250	—	—

Power output approximately 9 watts.
Battery drain approximately 10 amperes at 6.0 volts.

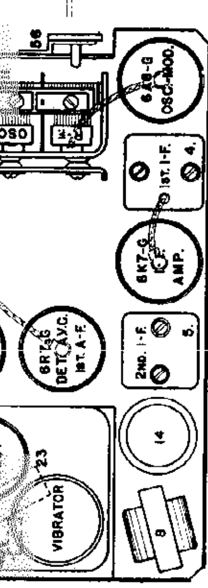


Fig. 2 Top View A-177

MARCH, 1937

MODEL A-177
Chassis, Parts
Alignment

Connect the output meter to the plate (P) terminals of the 6V6G output tubes. Be sure the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

NOTE: The receiver chassis should be in its case and a speaker similar to one used with the receiver should be connected to the chassis before making any adjustments. It is also advisable to use a spare control unit for making adjustments of the volume control and tuning condenser. A standard control unit with short cables (6" to 8") makes a very convenient and useful tool. If it is desired to shorten a pair of long cables it will be absolutely necessary to heavily tin the cables before cutting them.

1. Tuning I-F Amplifier To 262 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd., or larger, condenser to the top cap of the 6A8G Osc-Mod. tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the receiver chassis frame. **KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.**

(b) Adjust the station selector so that the rotor plates of the tuning condenser are completely in mesh.

(c) Turn the volume control full on.

(d) Leave the Fidelity Control cable disconnected from the chassis as this automatically sets the Fidelity Control in the TREBLE position and the Bass Compensation control in the OFF position.

(e) Set the signal generator to 262 kilocycles.

(f) Adjust both trimmers located on the 2nd I-F transformer for maximum output. (Fig. 2).

(g) Adjust both trimmers located on the 1st I-F transformer for maximum output.

(h) Repeat operations (f) and (g) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier

(a) Connect the output lead from the signal generator through a .00025 mfd. condenser to the "ANT" connection of the receiver.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer on the "OSC" section of the tuning condenser for maximum output.

(e) Adjust the trimmer on the "R-F" section of the tuning condenser for maximum output.

(f) Adjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

(g) Readjust the station selector for maximum output. DO NOT READJUST THE OSC. TRIMMER.

(h) Repeat operations (e) and (f) for more accurate adjustments.

3. Adjusting Antenna Compensating Condenser.

(a) Set the signal generator to 600 kilocycles.

(b) Tune in the 600 kilocycle signal with the station selector for maximum output.

(c) Adjust the antenna compensating condenser, Illustration No. 13, Fig. 3, for maximum output.

(d) Repeat operations (b) and (c) alternately until no further improvement can be obtained.

(e) Set the signal generator to 1400 kilocycles again.

(f) Tune-in the 1400 kilocycle signal with the station selector for maximum output.

(g) Readjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

It will be necessary to adjust the antenna compensating condenser to the car antenna after the receiver has beeen installed in the car.

(a) After the installation is complete, tune-in a WEAK station between 55 and 65 on the dial.

(b) Adjust the antenna compensating condenser for maximum volume in the speaker.

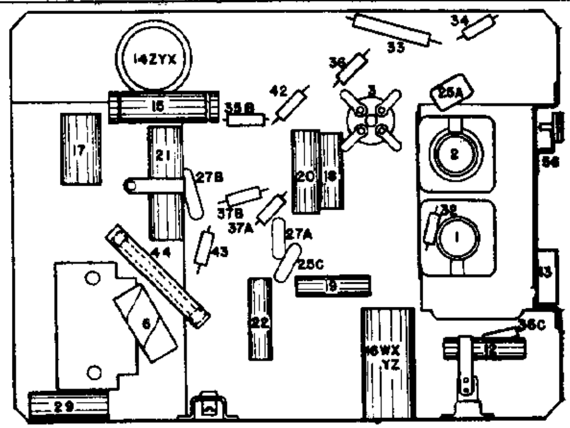


Fig. 3 Bottom View A-177

CROSLEY RADIO CORP.

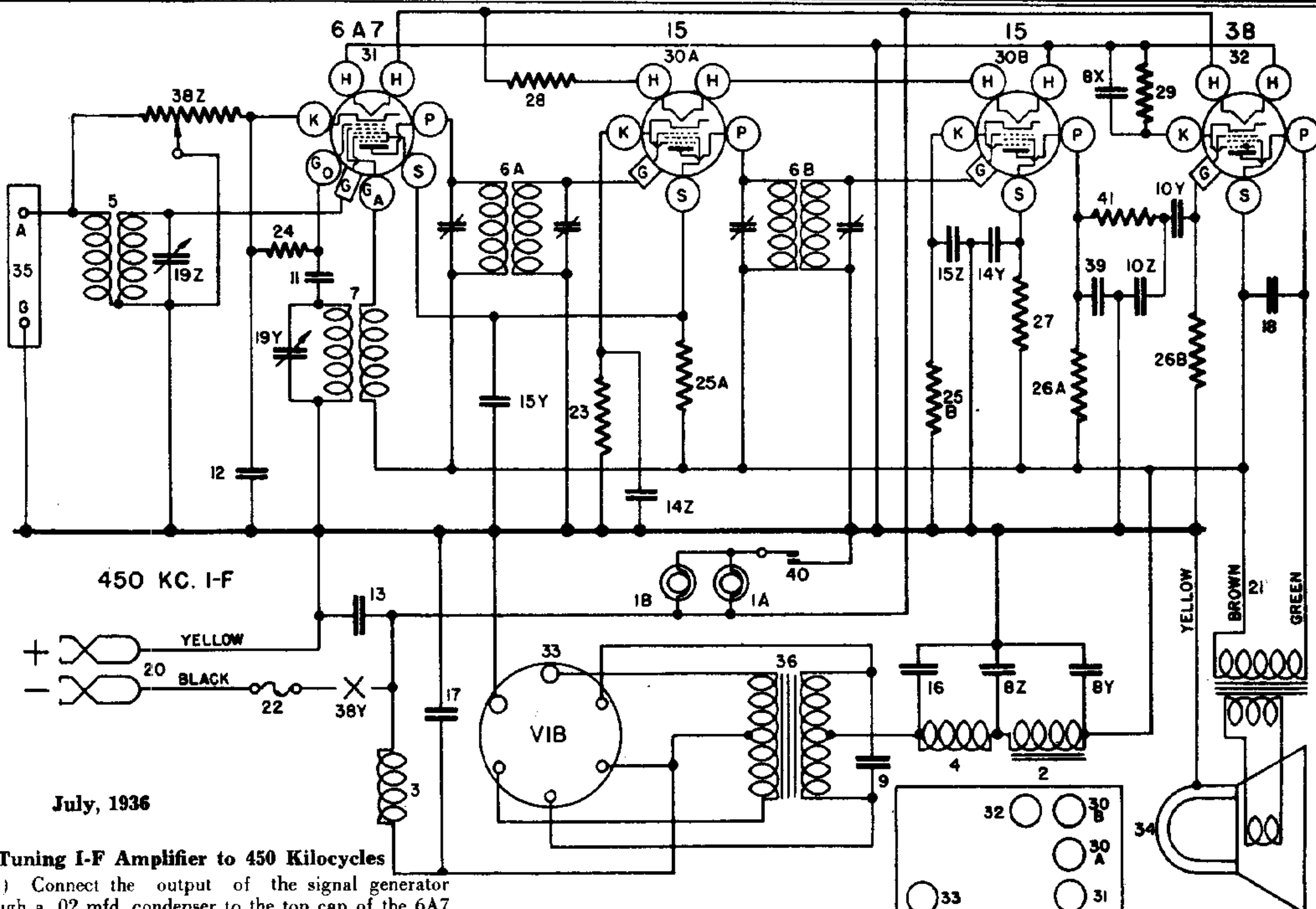
Item No.	Part No.	Description
1	G134—32000	Ant. Coil (only)
2	G93 —32001	R-F Coil (only)
	W —38995	Coil Shield
	W —32912	Wood Spacer (Coil)
3	G134—32002	Osc. Coil
4	G38 —32005	1st I-F Assembly
5	G39 —32005	2nd I-F Assembly
6	G15 —32977	Choke—Motor Noise
7	G20 —28067	Choke—"A" Filter
8	G75 —24628	Choke—"B" Filter
9	G14 —32769	Power Transformer
10	G1 —50063	Input and Output Unit Complete
10Z	G6 —38557	Input Transformer Coil
10Y	G3 —38884	Output Transformer Coil
	W —50062	Copper Shield Slug
11	G57 —33002	3 Section Var. Tuning Cond.
	W —38899A	Var. Cond. Connection
12	W —50039	Condenser .003 Mf. 160 V.
13	W —50054A	Ant. Series Trimmer Cond.
14Z		Condenser 8 Mf. 350 V.—Red
14Y	W —50076A	Condenser 8 Mf. 350 V.—Blue
14X		Condenser 12 Mf. 25 V.—Yellow
15	W —38430	Condenser 4 Mf. 10 V.
16Z		Condenser .05 Mf. 160 V.—Green
16Y		Condenser .05 Mf. 160 V.—Green
16X	W —50075	Condenser .05 Mf. 160 V.—Green
16W		Condenser .05 Mf. 160 V.—Green
17	W —32780B	Condenser .05 Mf. 400 V.—
18	W —50064	Condenser .01 Mf. 160 V.
19	W —50084	Condenser .003 Mf. 160 V.
20	W —50065	Condenser .03 Mf. 160 V.
21	W —50066	Condenser .15 Mf. 400 V.
22	W —25435	Condenser .003 Mf. 400 V.
23	W —50068A	Condenser .006 Mf. 1000V.
24Z	W —38990	Condenser .5 Mf. 160 V.
24Y		Condenser .5 Mf. 160 V.
25	G1 —34002	Condenser .00025 Mf. Molded
26	G1 —34002	Condenser .00025 Mf. Molded
27	G2 —34002	Condenser .0001 Mf. Molded
28	G1 —34002	Condenser .00025 Mf. Molded
29	W —50105	Condenser .1 Mf. 160 V.
30	G2 —34002	Condenser .0001 Mf. Molded
31	G3 —34002	Condenser .0005 Mf. Molded
32	—35601	Resistor 300,000 Ohm ¼W.
33	—37377	Resistor 20,000 Ohm 1W.
34	—35928	Resistor 60,000 Ohm ¼W.
35	—38916	Resistor 350 Ohm ½W.
36	—38918	Resistor 600 Ohm ½W.
37	—35602	Resistor 1 Megohm ¼W.
38	—35602	Resistor 1 Megohm ¼W.
39	—35929	Resistor 150,000 Ohm ¼W.
40	—35600	Resistor 100,000 Ohm ¼W.
41	—38916	Resistor 350 Ohm ½W.
42	—36316	Resistor 2700 Ohm ¼W.
43	—36760	Resistor 20,000 Ohm ¼W.
44	W —22172A	Resistor 220 Ohm 1½W. Flex.
45	—38977	Resistor 220 Ohm ⅛W.
46	—35600	Resistor 100,000 Ohm ¼W.
47AB	G151—36400	Socket Type 6K7
48	G156—36400	Socket Type 6A8
49	NONE	
50	G164—36400	Socket Type 6R7
51AB	G176—36400	Socket Type 6V6
52	NONE	
53	G177—36400	Socket Type 6W5
54	W —38993	Socket 3 Prong Speaker
55	G105—28807	Socket Vibrator
56	W —50083	Socket 2 Prong—T. C. & B. Comp.
	G6 —38000	Vibrator
57	See Remote	Control Head, etc.
58	—50056	Volume Control 2 Meg. Tap 1 Meg.
59	424G8 "M"	Speaker—Header Assembly

MODEL 416
Schematic, Voltage Socket, Alignment

CROSLEY RADIO CORP.

Tube	Where Used	S	G	S	G	K	Gs	Go
6A7	Osc.-Mod.	6.3	185	70	0	2.5	185	-10 to -20
15	I-F Amplifier	2.1	185	70	0	2.5	—	—
15	Detector	2.1	20	4	0	4.5	—	—
38	Output	6.3	170	185	0	11.0	—	—

POWER OUTPUT APPROXIMATELY 1 WATT.
"A" BATTERY DRAIN APPROXIMATELY 1.95 AMPERES AT 6 VOLTS.



July, 1936

1. **Tuning I-F Amplifier to 450 Kilocycles**

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A7 tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Adjust the station selector so that the plates of the condenser gang are completely out of mesh and turn the volume control to the right (ON).

(c) Set the signal generator to 450 kilocycles.

(d) Adjust both trimmers located on top of the 2nd I-F Transformer for maximum output. (Fig. 2).

(e) Adjust both trimmers located on top of the 1st. I-F Transformer for maximum output.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. **Aligning R-F Amplifier.**

(a) Connect the output lead from the signal generator through a .00025 mfd. condenser to the "ANT" terminal of the receiver.

(b) Set the signal generator to 1400 kilocycles.

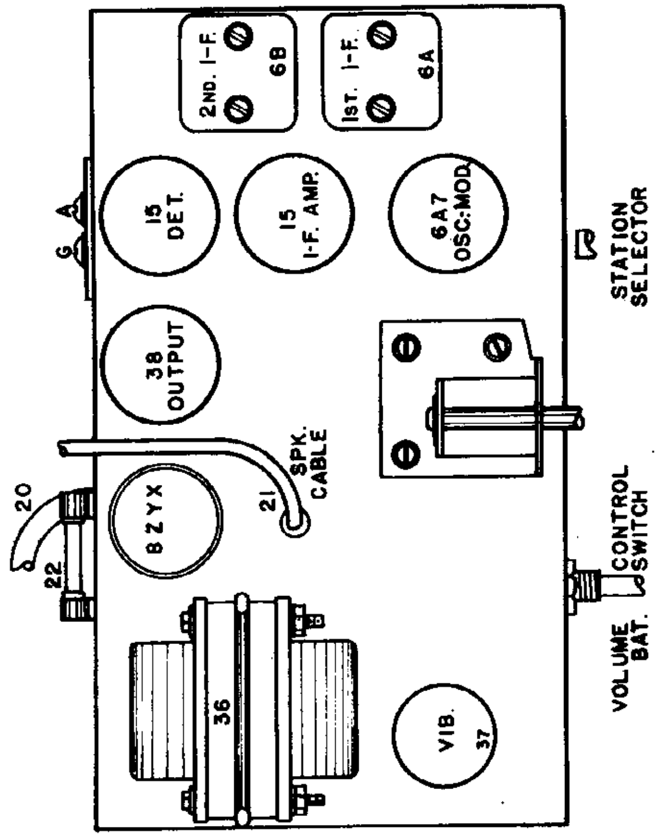
(c) Adjust the station selector to 140 on the dial.

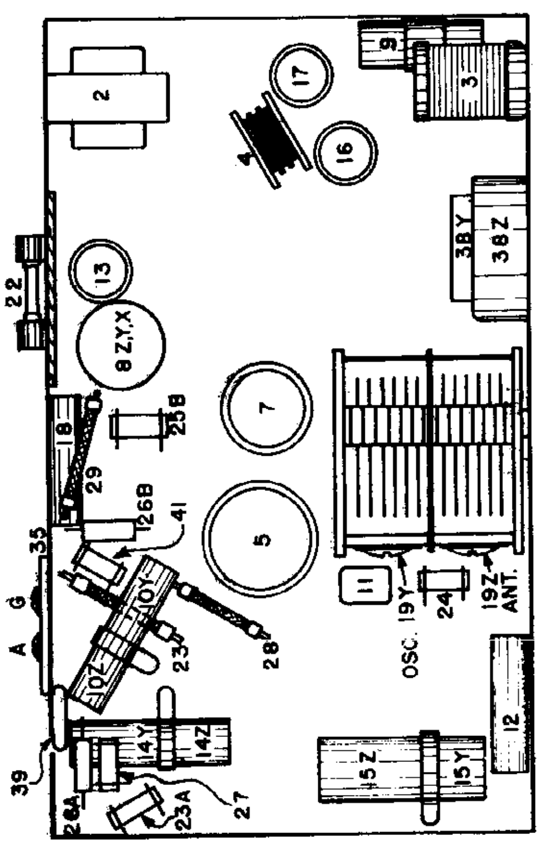
(d) Adjust the trimmer on the "OSC" section of the condenser gang for maximum output. (Fig. 3.)

(e) Adjust the trimmer on the "ANT" section of the condenser gang for maximum output.

MODEL 416
Chassis, Parts

CROSLEY RADIO CORP.





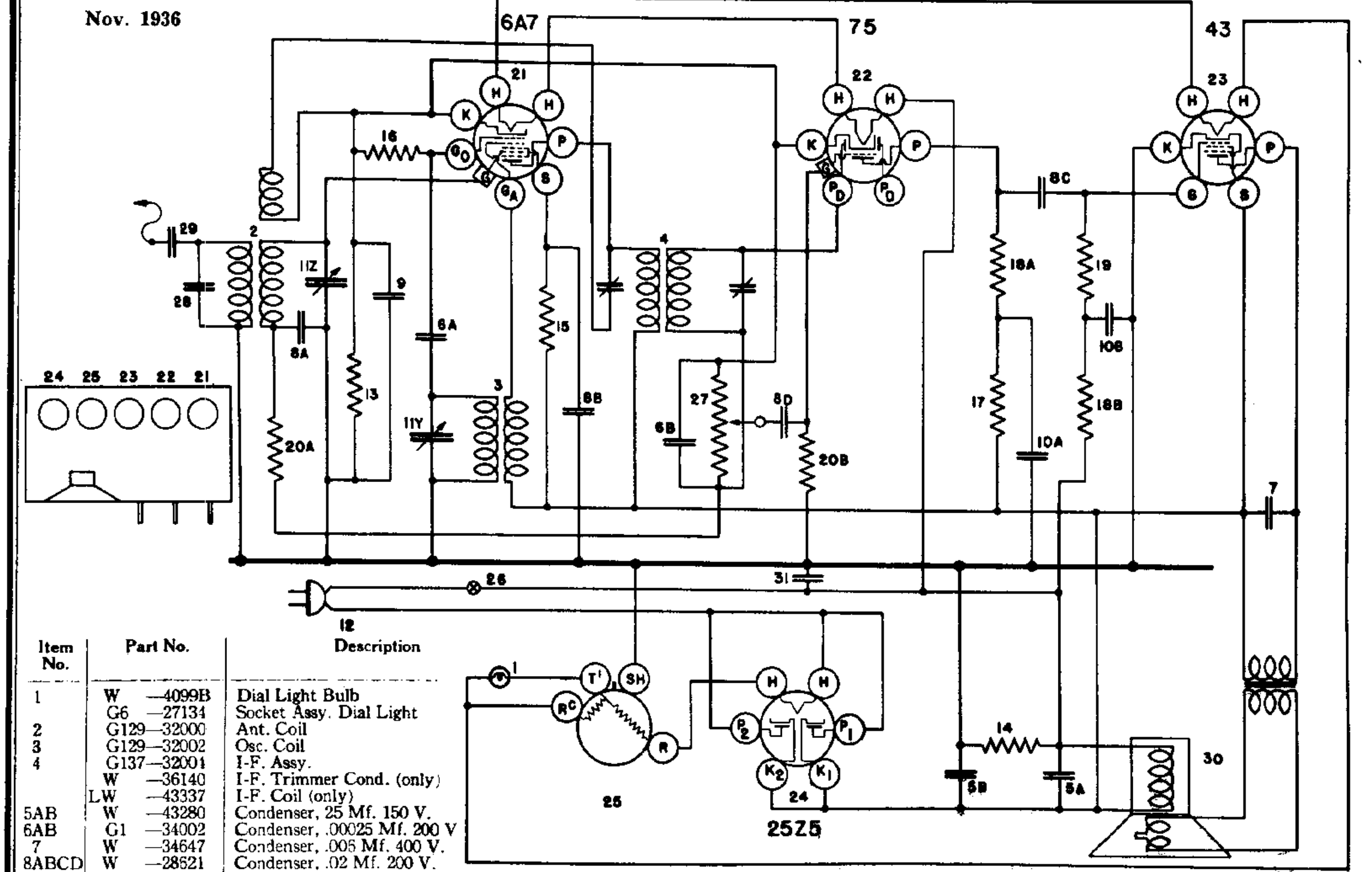
Item No.	Part No.	Description
1AB	W —37922	Bulb Dial Light
	G3 —37965	Socket Assembly Dial Light
2	G10 —29535	Choke 2.4H. Hum Filter
3	G13 —28067	Choke Vib. "A" Filter
4	G1 —24234	Choke R-F Filter
5	G55 —32000	Coil 540-1725 Kc. Antenna
6A	G119—32004	Coil 450 Kc. 1st I-F Assembly
6B	G119—32004	Coil 450 Kc. 2nd I-F Assembly
7	G9 —32002	Coil 540-1725 Kc. Oscillator
8Z		Cond. 12 MF. 250V. Filter Bypass
8Y	W —34896	Cond. 8 MF. 250V. Plate Bypass
8X		Cond. 8 MF. 25V. Output Bias Bypass
9	W —37214	Cond. .001 MF. 1000V. Synchronizing
10Z	W —30322A	Cond. .00017 MF. Det. Plate Bypass
10Y		Cond. .006 MF. A-F Coupling
11	G1 —34002	Cond. .00025 MF. Osc. Grid Coupling
12	W —28621	Cond. .02 MF. 200V. Osc.-Mod. Cathode Bypass
13	W —37190	Cond. .02 MF. 160V. Filament Bypass (Metal Clad H-F)
14Z	W —28623	Cond. .02MF. 200V. I-F Cathode Bypass
14Y		Cond. .02MF. 200V. Det. Screen Bypass
15Z	W —28622	Cond. .1MF. 200V. Det. Cath. Bypass
15Y		Cond. .1MF. 200V. Common Scr. Bypass
16	W —37173	Cond. .25 MF. 300V. V1B. "B" Bypass (Metal Clad H-F Type)
17	W —37174	Cond. .5MF. 160V. V1B. "A" Bypass (Metal Clad H-F Type)
18	W —34647	Cond. .006MF. 400V. Output Plate to Screen
19Z	G25 —33001	Cond. Var. Tuning Antenna Section
19Y		Osc. Section
	C —41755	Glass Dial—Calibrated
	W —41739	Dial Drive Unit
	W —41751	Dial Support Brkt. (R. H.)
	W —41752	Dial Support Brkt. (L. H.)
	W —41753	Dial Mtg. Brkt. (R. H.)
	W 40797	Dial Mtg. Brkt. (L. H.)
	W —40795B	Hand Shaft
	W —40907	Shaft Bearing Brkt.
	W —40909	Spring Washer (Shaft)
	W —41611	Shaft Retaining Ring
	B —40818C	Pointer Disc.
	W —40486	Disc. Mtg. Screw
	W —41578	Gear Spring
20	MG25—37103	Cable (Assembly) Battery Supply
21	G6 —35696	Cable 3 Lead Speaker
22	W — 7983A	Fuse 3 Amp. "A" Supply
	G2 —33339	Panel (Assembly) Fuse
23	W —22514	Resistor 750 Ohm. ½W. I-F Cathode
24	—21453	Resistor 40,000 Ohm. ¼W. Osc. Grid Leak
25A	—21237A	Resistor 60,000 Ohm. ¼W. Screen Series
25B	—21237A	Resistor 60,000 Ohm. Det. Cathode Bypass
26A	—35602	Resistor 1 Megohm ¼W. Det. Plate
26B	—35602	Resistor 1 Megohm ¼W. Output Grid
27	—33490	Resistor 10 Megohm ¼W. Det. Screen
28	W —41786	Resistor 9 Ohm. Filament Series
29	W —21452	Resistor 1100 Ohm. ¾W. Output Cathode
30A	G88 —28807	Type 15 I-F Amp.
30B	G88 —28807	Type 15 A-F Amp.
31	G47 —28807	Type 6A7 Osc.—Mod.
32	G15 —28807	Type 38 Output
33	G92 —28807	Type V1B Full Wave Vibrator
	W —35772	Tube Shield (Half) (6)
	W —35774	Tube Shield Base
	W —35773	Tube Shield Cap
34	—41316	Speaker Type 33PJ3, "A"
	—41434	Cone Assembly Used on 41316
	—41458	Mtg. Ring Used on 41316
	—41454	Output Trans. Used on 41316
35	G26 —26719	Terminal Board Assy. Ant. & Gnd.
36	G5 —31618	Transformer Power
37	W —37216	Vibrator
	W —37195	Vibrator Shield
	W —37217	Vibrator Side Packing
	W —37218	Vibrator Top Packing
	W —26973B	Shield Base
38Z	—41754	Volume Control 4800 Ohm.
38Y		Battery Switch
39	G2 —34002	Cond .0001 MF. Det. Plate Bypass
40	W —41068A	Switch Momentary Dial Light
41	—35600	Resistor 100,000 Ohm. ¼W. I-F Filte
		Misc. Parts
	B —37172A	Cover V1B. Compartment
	B —41886	Escutcheon
	D — 28	Escutcheon Mtg. Screw
	~~W —40840A~~	~~Crosley Shield~~
	W —41221	Knob (Upper) Volume Control
	W —41222	Knob (Lower) Dial Light Switch
	W —41605	Knob Station Selector

MODEL 506
Below Serial 1308741
Schematic, Socket, Parts

CROSLEY RADIO CORP.

SALES MODEL C-516 **CHASSIS MODEL 506**

Nov. 1936



MODEL 506 450 KC. I-F

Item No.	Part No.	Description
1	W —4099B	Dial Light Bulb
	G6 —27134	Socket Assy. Dial Light
2	G129—32000	Ant. Coil
3	G129—32002	Osc. Coil
4	G137—32001	I-F. Assy.
	W —36140	I-F. Trimmer Cond. (only)
	LW —43337	I-F. Coil (only)
5AB	W —43280	Condenser, 25 Mf. 150 V.
6AB	G1 —34002	Condenser, .00025 Mf. 200 V
7	W —34647	Condenser, .005 Mf. 400 V.
8ABCD	W —28621	Condenser, .02 Mf. 200 V.
9	W —37988	Condenser, .017 Mf. 200 V.
10AB	W —29910A	Condenser, .25 Mf. 200 V.
11	G28 —33001	2 Gang Var. Tuning Cond.
12	B —27885A	Power Cord and Plug
13	W —35467	Resistor, 275 Ohm ½W. Flex.
14	W —23907	Resistor, 750 Ohm 1½W. Flex.
15	—36761	Resistor, 40,000 Ohm ¼W.
16	—35928	Resistor, 60,000 Ohm ¼W.
17	—35600	Resistor, 100,000 Ohm ¼W.
18AB	—35601	Resistor, 300,000 Ohm ¼W.
19	—36322	Resistor, 500,000 Ohm ¼W.
20AB	—35927	Resistor, 2 Megohm ¼W.
21	G47 —28807	Socket Type 6A7
22	G41 —28807	Socket Type 75
23	G30 —28807	Socket Type 43
24	G51 —28807	Socket Type 25Z5
25	G170—34600	Socket Type W-43357
	W —28632	Tube Shield
26	—43339	Line Switch
27	—43340	Volume Control, 1 Meg.
28	G5 —34002	Condenser, .00005 Mf. 200 V.
29	W —30325A	Condenser, .003 Mf. 200 V.
30	255BL6Q	Speaker - Spec. 23393
	—43464	Cone Assy. (above Spk.)
	—43465	Output Trans. (above Spk.)
	—43466	Mtg. Ring, Cone (above Spk.)
	—6DD	Cabinet
	D —43302	Dial
	W —43321	Pointer Knob
	W —43320	Knob—V. C. & Sw.
31	W —23615	Condenser, .05 Mfd. 400 V.

MODEL 506
Below Serial 1308741
Trimmers, Chassis
Alignment, Voltage

CROSLEY RADIO CORP.

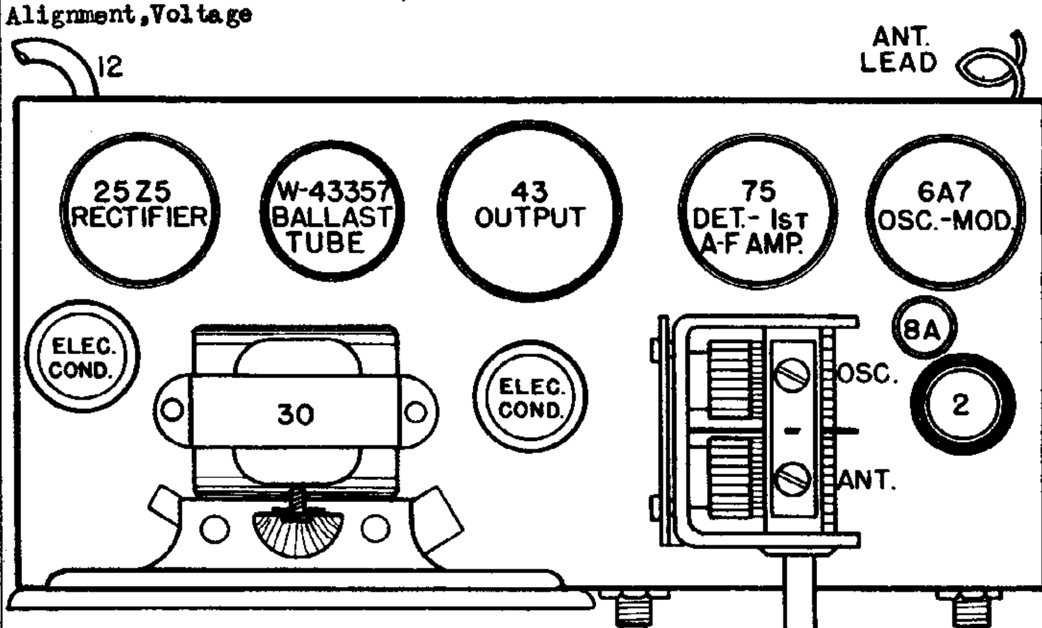


Fig. 2 Top View 506

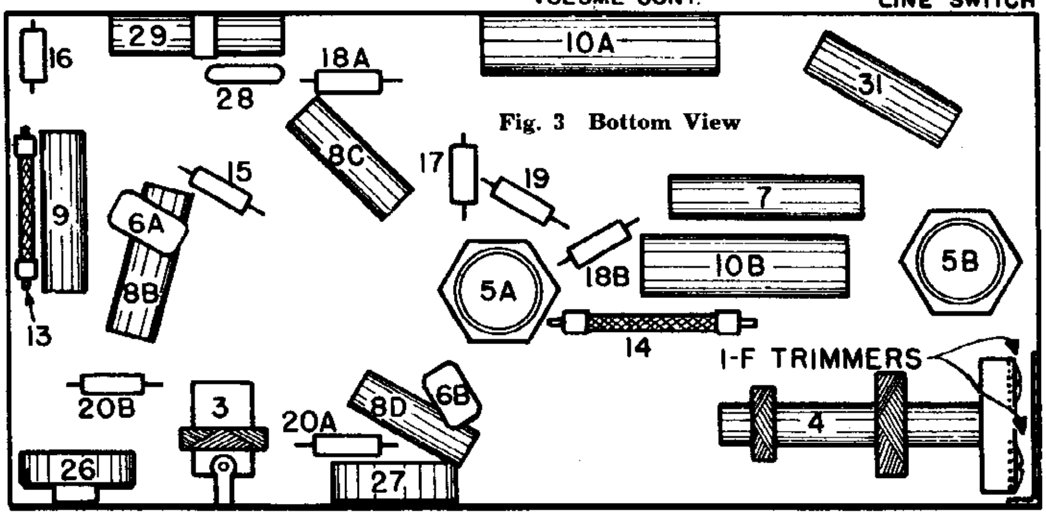


Fig. 3 Bottom View

Tube	Function	H	P	S	K	Ga	Go	G
6A7	Oscillator-Mod.	6.5	100	40	1	100	-20	—
75	Det. & A-F Amp.	6.5	11	—	1	—	—	—
43	Output	25.0	95	100	0	—	—	-20
25Z5	Rectifier	25.0	—	—	100	—	—	—
W—43357 Ballast Tube.								

Power output approximately 1 watt.
Power consumption approximately 50 watts.
Voltage drop across speaker field 120 volts.
All readings taken on 117.5 volt A. C. power supply.
All readings except filaments will be approximately 15% lower on 117.5 volts D. C.

ALIGNMENT PROCEDURE

The chassis of this receiver is connected through a resistor to one side of the power supply and for this reason all test equipment should be thoroughly isolated in order that the power supply will not be short circuited while attempting to align the receiver.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 93 Output tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 condenser to the top cap of the 6A7 Oscillator-Modulator tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator direct to the receiver chassis **but do not run a wire direct to ground.** KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the plates of the condenser gang are completely out of **mesh and turn** the volume control to the right (ON).

(c) Set the signal generator to **450 kilocycles.**

(d) Adjust the I-F trimmer condensers for maximum reading on the output meter.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

(a) Connect the output lead from the **signal generator** through a .00025 mfd. condenser to **the antenna** lead on the chassis.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on **the dial.**

(d) Adjust the trimmer located on the "OSC" section of the condenser gang for **maximum output.**

(e) Adjust the trimmer located on the "ANT" section of the condenser gang for maximum **output.**

(f) Readjust the station selector **slightly for** maximum output.

(g) Repeat operation (e) for more accurate adjustment.

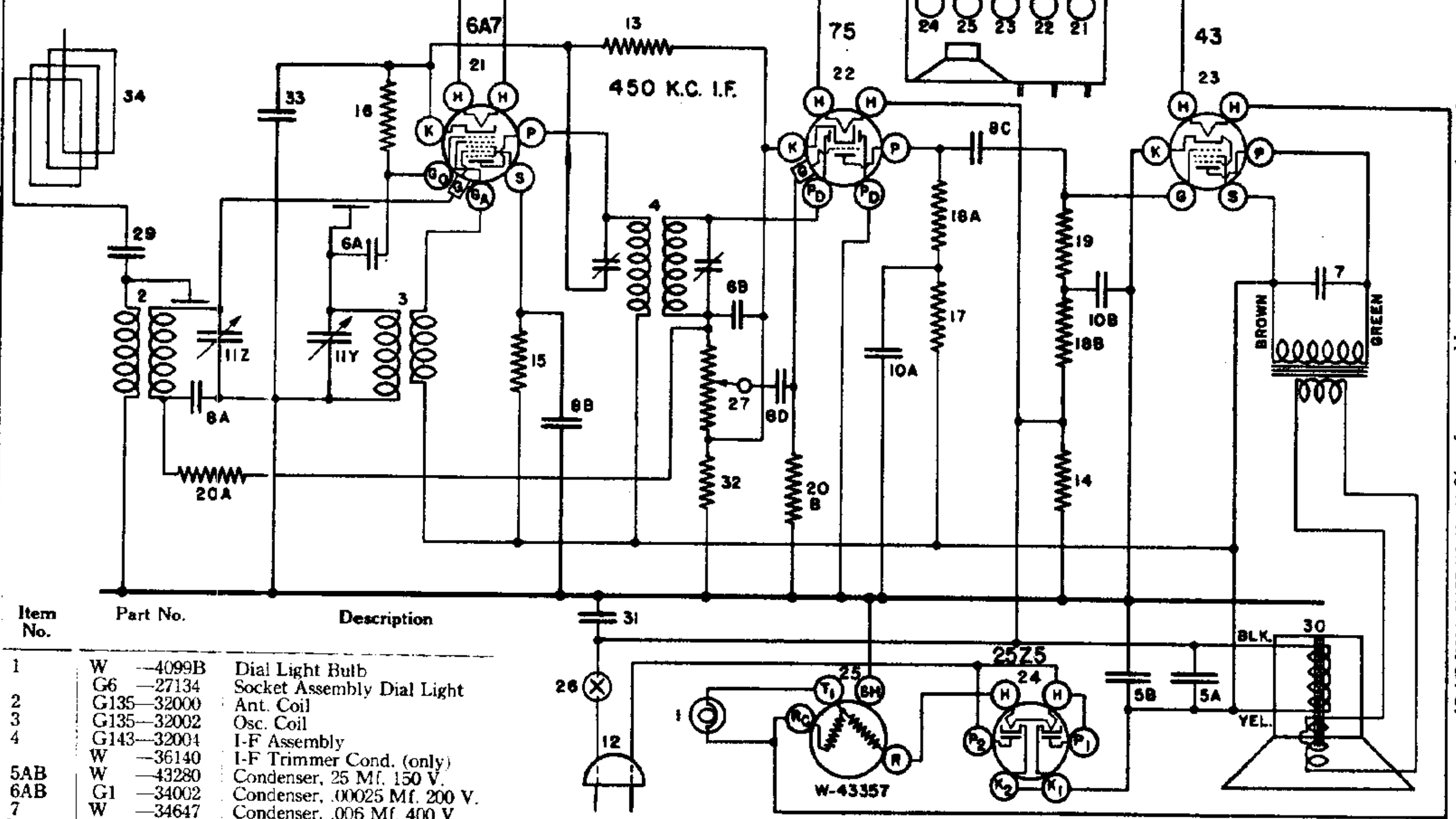
CROSLEY RADIO CORP.

MODEL 506
Above Serial 1308741
Schematic, Voltag
Socket, Parts

Tube	Function	H	P	S	K	Ga	Go	G
6A7	Oscillator-Mod.	6.5	100	40	1	100	-20	—
75	Det. & A-F Amp.	6.5	11	—	1	—	—	—
43	Output	25.0	95	100	0	—	—	-20
25Z5	Rectifier	25.0	—	—	100	—	—	—
W—43357 Ballast Tube.								

Power output approximately 1 watt.
Power consumption approximately 50 watts.
Voltage drop across speaker field 112 volts.
All readings taken on 117.5 volt A. C. power supply.
All readings except filaments will be approximately 15% lower on 117.5 volts D. C.

January, 1937



SALES MODEL C-516 CHASSIS MODEL 506
For Serial Numbers Above 1,308,741

Item No.	Part No.	Description
1	W —4099B	Dial Light Bulb
	G6 —27134	Socket Assembly Dial Light
2	G135—32000	Ant. Coil
3	G135—32002	Osc. Coil
4	G143—32004	I-F Assembly
	W —36140	I-F Trimmer Cond. (only)
5AB	W —43280	Condenser, 25 Mf. 150 V.
6AB	G1 —34002	Condenser, .00025 Mf. 200 V.
7	W —34647	Condenser, .006 Mf. 400 V.
8ABCD	W —28621	Condenser, .02 Mf. 200 V.
9		NONE
10AB	W —29910A	Condenser, 25 Mf. 200 V.
11	G32 —33001	2 Gang Var. Tuning Cond.
12	B —27885A	Power Cord and Plug
13	W —35467	Resistor, 275 Ohm ½W. Flex.
14	W —23907	Resistor, 750 Ohm 1½W. Flex.
15	—36761	Resistor, 40,000 Ohm ¼W.
16	—35928	Resistor, 60,000 Ohm ¼W.
17	—35600	Resistor, 100,000 Ohm ¼W.
18AB	—35601	Resistor, 300,000 Ohm ¼W.
19	—36322	Resistor, 500,000 Ohm ¼W.
20AB	—35927	Resistor, 2 Megohm ¼W.
21	G47 —28807	Socket Type 6A7
22	G41 —28807	Socket Type 75
23	G30 —28807	Socket Type 43
24	G51 —28807	Socket Type 25Z5
25	G170—34600	Socket Type W-43357
	W —28632	Tube Shield
26	—43339	Line Switch
27	—43340	Volume Control, 1 Meg.
28		NONE
29	W —30325A	Condenser, .003 Mf. 200 V.
30	255BL6Q	Speaker - Spec. 23393
	—43464	Cone Assembly (above Speaker)
	—43465	Output Trans. (above Speaker)
	—43466	Mtg. Ring, Cone (above Speaker)
	—6DD	Cabinet
	D —43302	Dial
	W —43321	Pointer Knob
	W —43320	Knob—V. C. and Sw.
31	W —23615	Condenser, .05 Mfd. 400 V.
32	W —21964	Resistor, 165 Ohm ½W. Flex.
33	W —43627	Condenser, .009 Mfd. 160 V.
34	W —31765	Antenna Wire Roll

MODEL 506
Above Serial 1308741
Trimmers, Chassis
Alignment

CROSLEY RADIO CORP.

ALIGNMENT PROCEDURE

The chassis of this receiver is connected through a resistor to one side of the power supply and for this reason all test equipment should be thoroughly isolated in order that the power supply will not be short circuited while attempting to align the receiver.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 43 Output tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 condenser to the top cap of the 6A7 Oscillator-Modulator tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator direct to the receiver chassis **but do not run a wire direct to ground.** KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the plates of the condenser gang are completely out of mesh and turn the volume control to the right (ON).

(c) Set the signal generator to 450 kilocycles.

(d) Adjust the I-F trimmer condensers for maximum reading on the output meter.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

(a) Connect the output lead of the signal generator through a .00005 mf. condenser to the **junction of the antenna and antenna blocking condenser** (Items 34 and 29).

(b) Set the signal generator to 1725 kilocycles.

(c) Open gang all the way (minimum capacity).

(d) Adjust the trimmer located on the "Osc" section of the gang for maximum output.

(e) Set signal generator to 1400 Kc.

(f) Tune station selector to 1400 kc. signal.

(g) Adjust the trimmer located on the "Ant" section of the gang for maximum output.

(h) Repeat e, f, and g for more accurate adjustment.

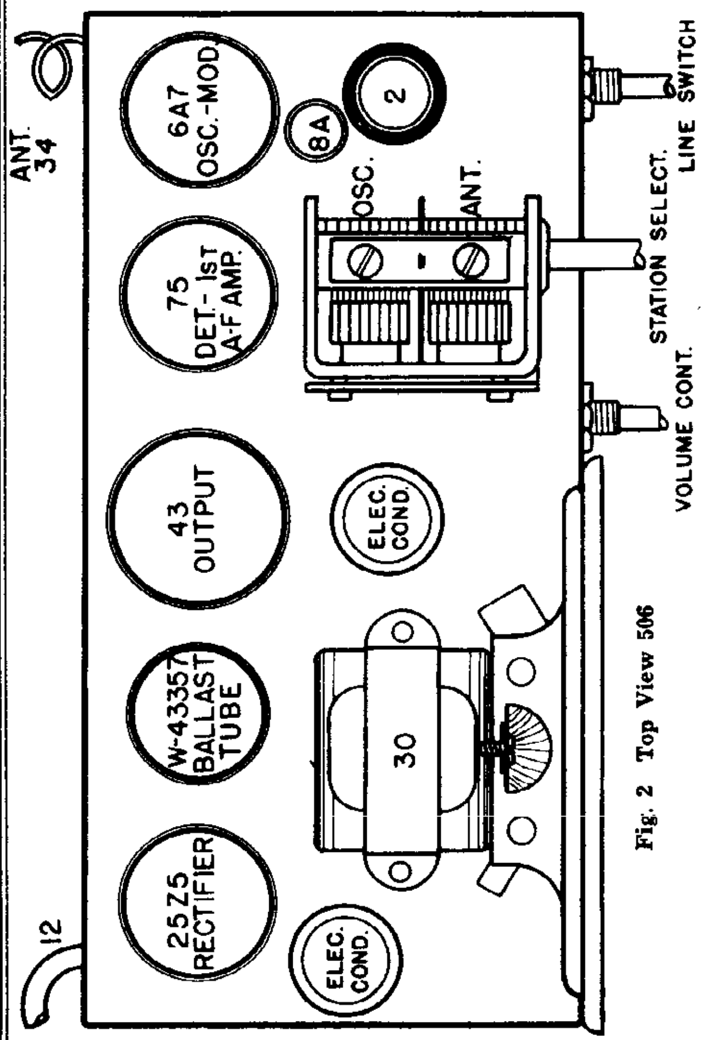


Fig. 2 Top View 506

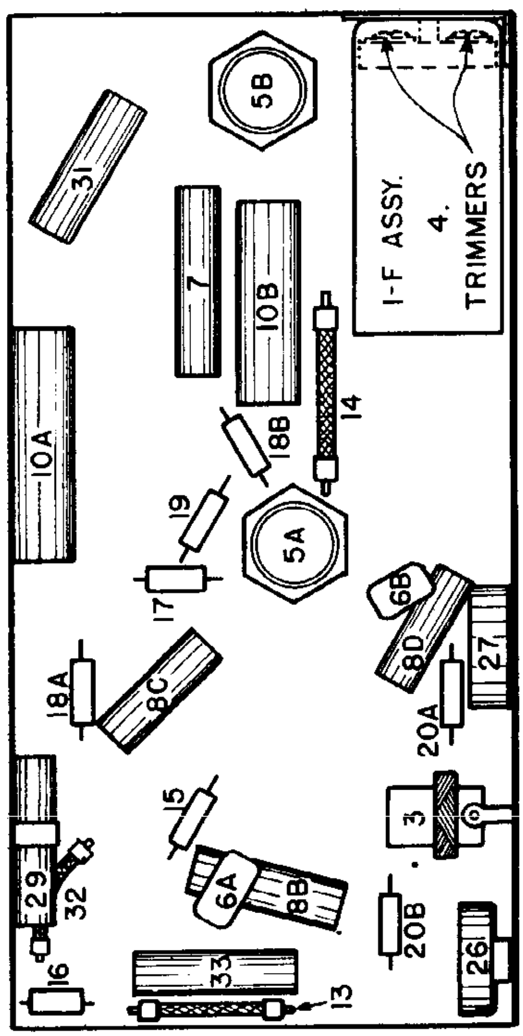
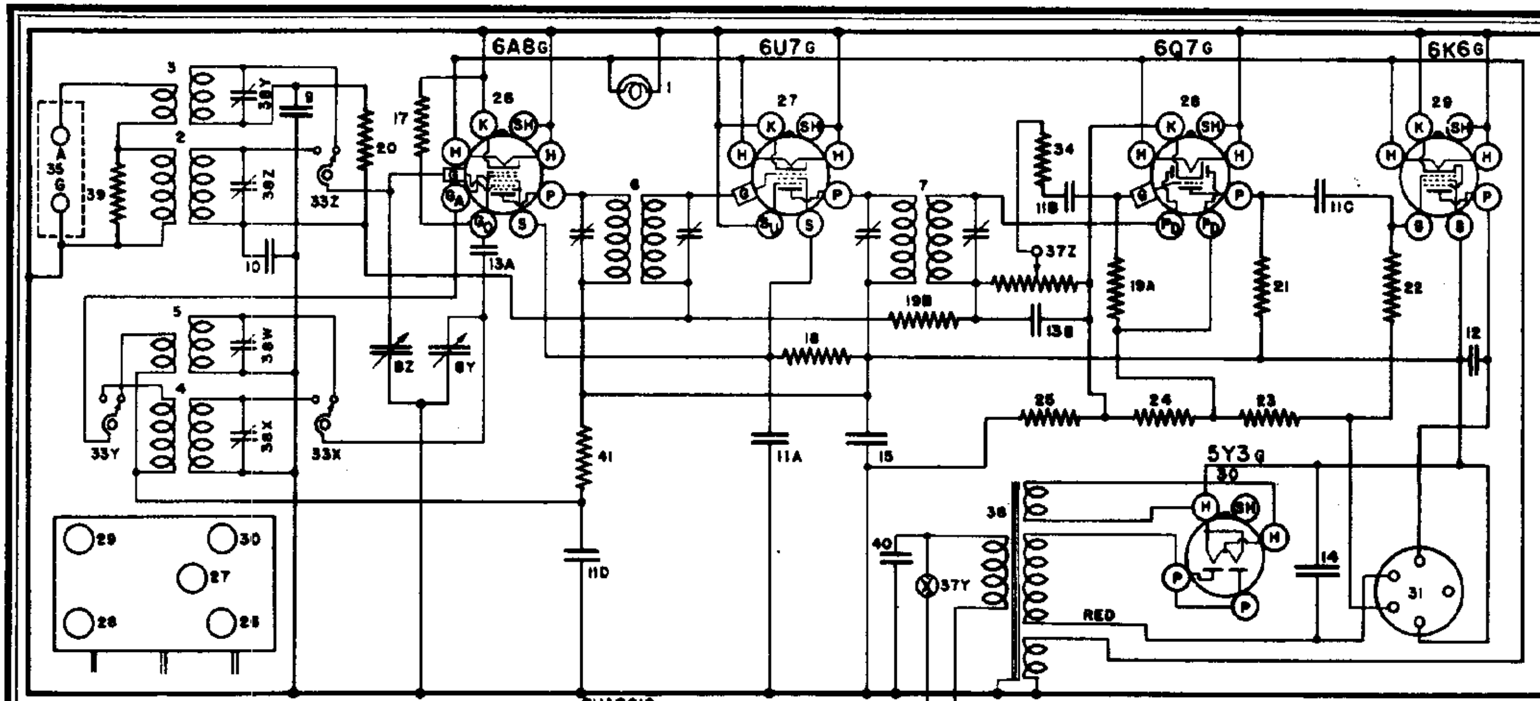


Fig. 3 Bottom View 506

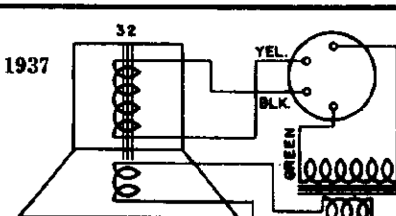
CROSLEY RADIO CORP.

SALES MODEL "FIVER" "TELETUNE FIVER" CHASSIS NO. 517 NO. 547

510—1725 kilocycles (American Broadcast Band)
6—15 megacycles (High Frequency Band)



MODELS. 517 & 547 455 K.C. I.F. MARCH, 1937



Item No.	Part No.	Description
1	W —43567	Bulb—Dial Light
	W —43568	Light Bracket
2	G132—32000	Ant. Coil, B. C.
3	G133—32000	Ant. Coil, H. F.
4	G132—32002	Osc. Coil, B. C.
5	G133—32002	Osc. Coil, H. F.
6	G136—32004	1st I-F Assembly
7	G137—32001	2nd I-F Assembly
8	G33 —33001	2 Sect. Var. Tuning Cond.(547 only)
8	G31 —33001	2 Sect. Var. Tuning Cond.(517 only)
9	G12 —34002	Condenser .0005 Mf. H.F. Osc. Ser.
10	—36541	Condenser .02 Mf. 160 V.
11ABCD	W —28621	Condenser .02 Mf. 200 V.
12	W —34647	Condenser .01 Mf. 400 V.
13AB	G1 —34002	Condenser .00025 Mf. Molded
14	W —41031	Condenser 16 Mf. 250 V.
15	W —43450	Condenser 16 Mf. 200 V.
16	B —33903A	Power Cord and Plug
17	—21237A	Resistor 60,000 Ohm ¼W.
18	—24814	Resistor 7,000 Ohm ¼W.
19AB	—36688	Resistor 3 Megohm ¼W.
20	—21455	Resistor 300,000 Ohm ¼W.
21	—35501	Resistor 300,000 Ohm ¼W.
22	—23785	Resistor 500,000 Ohm ¼W.
23	W —28589	Resistor 350 Ohm ½W. Flex.
24	W —33012A	Resistor 40 Ohm ½W. Flex.
25	W —24537	Resistor 60 Ohm ½W. Flex.
26	C155—36400	Socket Type 6A8
27	G171—36400	Socket Type 6U7
28	G160—36400	Socket Type 6Q7
29	G172—36400	Socket Type 6K6
30	G173—36400	Socket Type 5Y3
	W —40911	Tube Shield
31	G103—28807	Socket—Speaker
32	257BP11"B"	Speaker, Spec. No. 51-A-5 (Cab. 6K & 7KA)
	—42927	Cone for 257BP11 "B" Speaker
	—41473	O. P. Trans. for 257BP11 "B" Spkr.
	—43539	Cardb'd Ring for 257BP11 "B" Spk.
	257BP18 "B"	Speaker, Spec. No. 51-A-8 (Cab. 7H & 7HA)
	—42927	Cone for 257BP18 "B" Speaker
	—43986	O. P. Trans. for 257BP18 "B" Spkr.
	—43539	Cardb'd Ring for 257BP18 "B" Spk.
	462CP11 "M"	Spkr., Spec. No. 1-D-971 (Cab.6FF)
	—40405	Cone for 462CP11 "M" Speaker
	—43989	O. P. Trans. for 462CP11 "M" Spkr.
	—43988	Field Coil for 462CP11 "M" Spkr.
	464BP15 "M"	Spkr., Spec. No. 1-D-1017(Cab. 7M)
	—43993	Cone for 464BP15 "M" Speaker
	—43994	Field Coil for 464BP15 "M" Spkr.
	—43995	O. P. Trans. for 464BP15 "M" Spkr.
33	W —43448	Switch Band Selector
34	—36761	Resistor 40,000 Ohm ¼W.
35	G1 —26719	Ant. and Ground Terminal Board
36	—43479	Power Trans. 110 V. 60 Cy.
	—43480	Power Trans. 110 V. 25 Cy.
	—43481	Power Trans. 220 V. 25 Cy.
37Z	—43449	Volume Control, 1 Megohm
37Y		Line Switch
38Z	W —11247A	Trimmer Cond. B. C. Ant.
38Y		Trimmer Cond. H. F. Ant.
38X		Trimmer Cond. B. C. Osc.
38W		Trimmer Cond. H. F. Osc.
39	—22196	Resistor 20,000 Ohm ¼W.
40	W —30805	Condenser .01 Mf. 400 V.
41	—30137	Resistor 3,500 Ohm ¼W.
	G1 —43724	Tel. Tun. Escutcheon
	W —43769	Pointer—Cabinet (547 only)
	W —43551	Knob (1 required) Small
	W —43625	Knob (2 required) Large
	W —43553	Rubber Mtg. Foot
	W —43552	Clamp—Speaker Plug
	W —43726	Celluloid Disc (547 only)

MODELS 517, 547, Fiver
Teletune Fiver
Trimmers, Chassis
Voltage, Alignment

CROSLEY RADIO CORP.

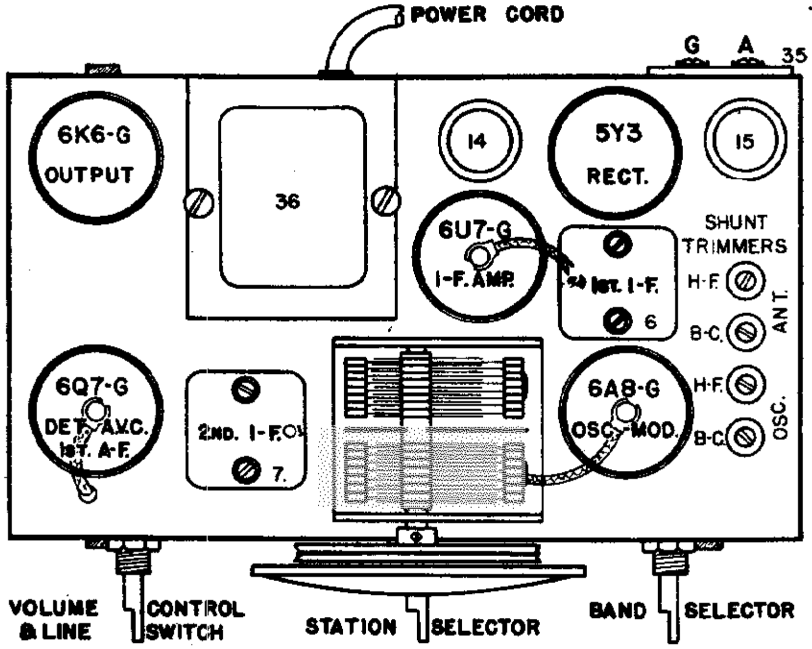


Fig. 2 Top View 517 and 547

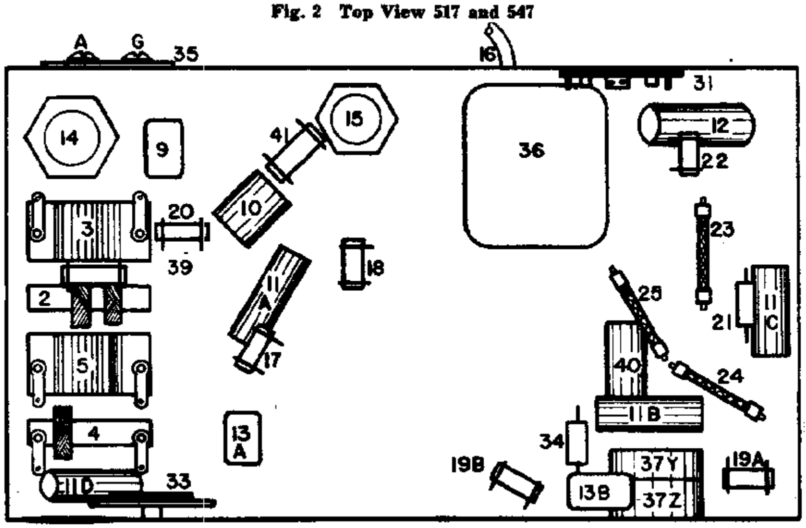


Fig. 3 Bottom View 517 and 547

Tube	Function	H	P	S	K	G	Gs
6A8G	Oscillator-Modulator	6.3	160	115	0	-1.2	160
6U7G	I-F Amplifier	6.3	160	115	0	-1.2	—
6Q7G	Diode Det & A-F Amplifier	6.3	80	—	2.5	-2.5	—
6K6G	Output	6.3	160	160	0	-5.0	—
5Y3	Rectifier	5.0		—	225	—	—

Power output approximately 2 watts.
Power consumption approximately 40 watts at 117.5 volts.
Voltage drop across speaker field 36 volts.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to P and S of the 6K6G Output Tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8G tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh and turn the volume control knob to the right (ON).

(c) Turn the band selector switch to the right (High Frequency).

(d) Set the signal generator to 455 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F Transformer for maximum output. (Fig. 2).

(f) Adjust both trimmers located on top of the 1st I-F Transformer for maximum output.

(g) Check operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier

When aligning the R-F Amplifier the output lead from the signal generator should be connected through a dummy antenna to the "ANT" terminal of the receiver. For the broadcast band the dummy antenna should be a .00025 mfd. condenser and for the high frequency band this condenser should be replaced by a 400 ohm (Non Inductive) carbon resistor.

(a) Set the band selector switch to the Broadcast Band.

(b) Set the signal generator to 1725 kilocycles.

(c) Open the condenser gang all the way.

(d) Adjust the "OSC" trimmer condenser for the B-C Band (38X) for maximum output.

(e) Set the signal generator to 1400 kilocycles.

(f) Tune the receiver to the generator signal for maximum output (appx. 140 on the dial).

(g) Adjust the "ANT" trimmer condenser for the B-C Band (38Z) for maximum output. DO NOT READJUST THE "OSC" TRIMMER AT 1400 KILOCYCLES.

(h) Repeat operations (f) and (g) alternately until no further improvement in output can be obtained.

(i) Set the band selector switch to the H-F Band.

(j) Set the signal generator to 15,400 kilocycles.

(k) Open the condenser gang all the way.

(l) Adjust the "OSC" trimmer condenser for the H-F Band (38W) for maximum output.

(m) Set the signal generator to 15,000 kilocycles.

(n) Tune the receiver to the generator signal for maximum output (appx. 15 on the dial).

(o) Adjust the "ANT" trimmer condenser for the H-F Band (38Y) for maximum output. DO NOT READJUST THE "OSC" TRIMMER AT 15,000 KILOCYCLES.

(p) Repeat operations (n) and (o) alternately until no further improvement in output can be obtained.

NOTE: If at any time the H-F coils in this receiver are replaced, it may be necessary to vary the inductance of the "OSC" coil by moving the cross-over turn of wire at the gap to make the set track at the 6 megacycle end. Moving the turn toward the short end of the coil will decrease the inductance and moving it toward the long end will increase the inductance. If the signal is weak at 6 megacycles, a similar slight change in the inductance of the "ANT" coil should bring up the signal strength. THIS IS A CRITICAL OPERATION AND SHOULD NOT BE DONE ON ANY SET UNLESS CHANGING COILS MAKES IT NECESSARY.

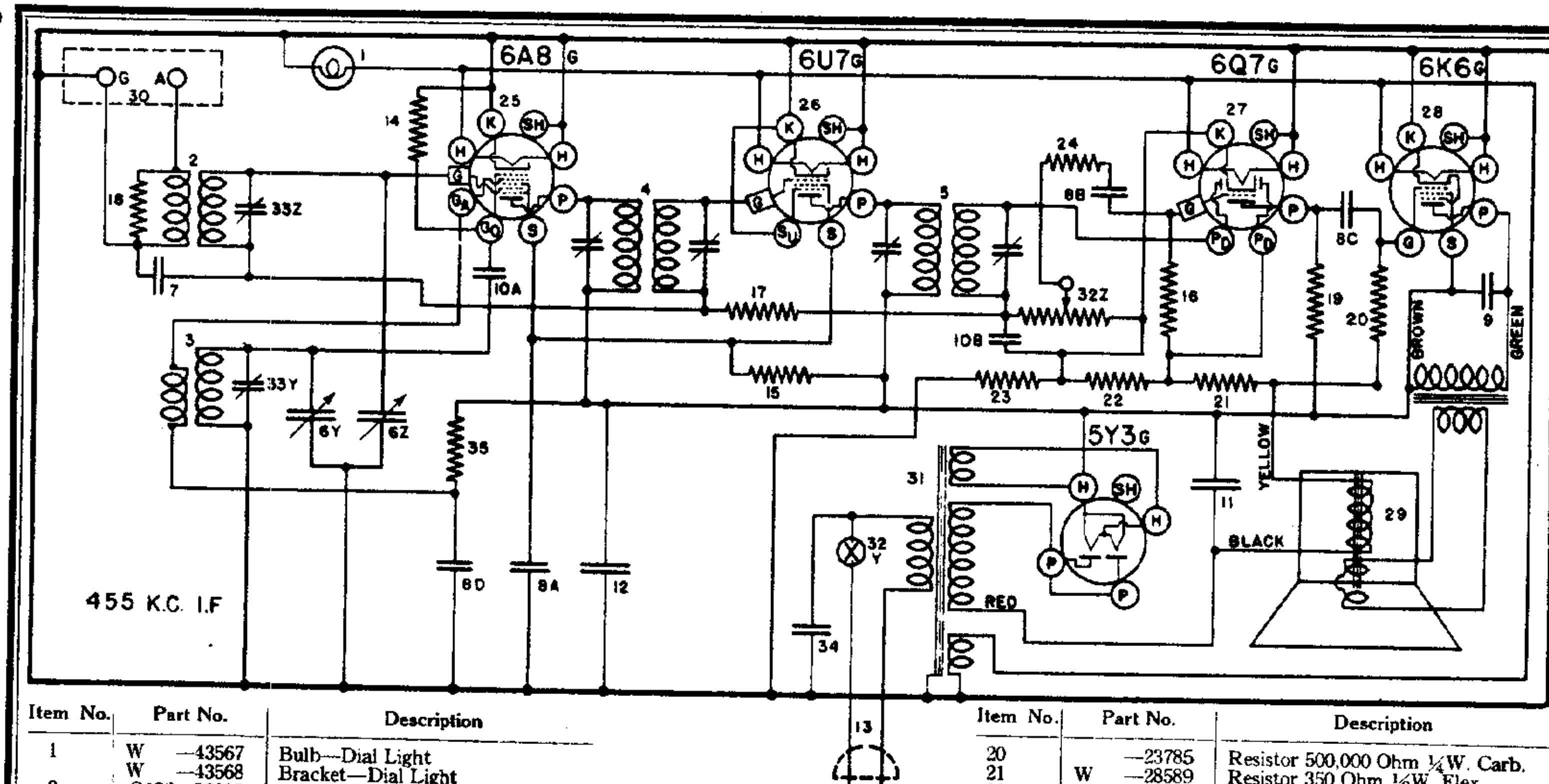
NOTE: When aligning the high frequency band care should be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this, increase the output of the signal generator approximately 10 times and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles below the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct dial setting.

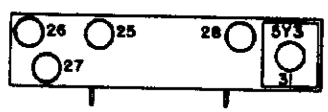
MODEL 537
Schematic, Voltage Socket, Parts

CROSLEY RADIO CORP.

Tube	Function	H	P	S	K	G	Ga
6A8G	Oscillator-Modulator	6.3	160	115	0	-1.2	160
6U7G	I-F Amplifier	6.3	160	115	0	-1.2	—
6Q7G	Diode Det & A-F Amplifier	6.3	80	—	2.5	-2.5	—
6K6G	Output	6.3	160	160	0	-5.0	—
5Y3	Rectifier	5.0	—	—	225	—	—

Power output approximately 2 watts.
Power consumption approximately 40 watts at 117.5 volts.
Voltage drop across speaker field 36 volts.





Item No.	Part No.	Description
1	W —43567	Bulb—Dial Light
	W —43568	Bracket—Dial Light
2	G132—32000	Ant. Coil
3	G132—32002	Osc. Coil
4	G144—32004	1st I-F Assembly
5	G145—32004	2nd I-F Assembly
6	G34 —33001	2 Section Var. Cond. Gang
	G2 —43564	Pulley Assembly
	C —43763	Dial Glass—Calibrated
	W —43779	Mask—Dial
	W —43739	Support—Dial
	—41582	Cable—Cond. Drive
	W —43561	Spring—Cable Tension
	W —43740	Shaft—Drive
	W —41611	Retaining Ring—Drive Shaft
	W —43770	Pointer
7	W —36541	Condenser .02 Mf. 160 V.
8A—D	W —28621	Condenser .02 Mf. 200 V.
9	W —34647	Condenser .006 Mf. 400 V.
10AB	G1 —34002	Condenser .00025 Mf. 200 V.
11	W —41081	Condenser 16 Mf. 250 V.
12	W —43450	Condenser 16 Mf. 200 V.
13	B —43742	Power Cord and Plug
14	—21237A	Resistor 60,000 Ohm ¼W. Carb.
15	—24814	Resistor 7,000 Ohm ¼W. Carb.
16	—26577	Resistor 3 Megohm ¼W. Carb.
17	—36688	Resistor 3 Megohm ¼W. Ins.
18	—22196	Resistor 20,000 Ohm ¼W. Carb.
19	—35601	Resistor 300,000 Ohm ¼W. Ins.

REFRIGERATOR RADIO, CHASSIS NO. 537

MARCH, 1937

Item No.	Part No.	Description
20	—23785	Resistor 500,000 Ohm ¼W. Carb.
21	W —28589	Resistor 350 Ohm ½W. Flex.
22	W —23012A	Resistor 40 Ohm ½W. Flex.
23	W —24537	Resistor 60 Ohm ½W. Flex.
24	—36761	Resistor 40,000 Ohm ¼W. Ins.
25	G156—36400	Socket Type 6A8
26	G171—36400	Socket Type 6U7
27	G160—36400	Socket Type 6Q7
28	G172—36400	Socket Type 6K6
	W —40911	Tube Shield
	W —27981	Base—Tube Shield
29	260BL9 "B"	Speaker Spec. No. 50-A-4
	—41472	Cone for 260BL9 "B" Speaker
	—13943	O. P. Trans. for 260BL9 "B" Spkr.
	—43540	Cardb'd Ring for 260BL9 "B" Spkr.
30	G1 —26719	Ant. and Ground Term. Assembly
31	—43748	Power Trans. 50-60 Cy. 110 V.
	—43747	Power Trans. 25 Cy. 110 V.
32Z } 32Y }	—43733	Vol. Cont. 1 Meg. / Line Switch
33	W —37986A	2 Sect. Shunt Trimmer
34	W —30805	Condenser .01 Mf. 400 V.
35	—30137	Resistor 3,500 Ohm ¼W.
	G2 —43788	Grille Cloth Assy.—HC9-Cab.
	G3 —43788	Grille Cloth Assy.—HE9-Cab.
	W —43789	Escutcheon—Cab-Mod. HC 50 & 60
	W —43790	Escut.—Cab.-Mod. HE 43, 50 & 61
	C —43782	Escut.—Cab.-Mod. HE 71 & HC 71
	W —43764	Knob

MODEL 537
Trimmers, Chassis
Alignment

CROSLEY RADIO CORP.

This model Crosley radio chassis is especially designed for installation in Crosley Shelvador electric refrigerators. It should be operated only from an ALTERNATING CURRENT power supply as specified on the Model Label which is fastened to the inside of the refrigerator top.

The tuning range of the receiver is from 540 to 1725 kilocycles or 555 to 173 metres.

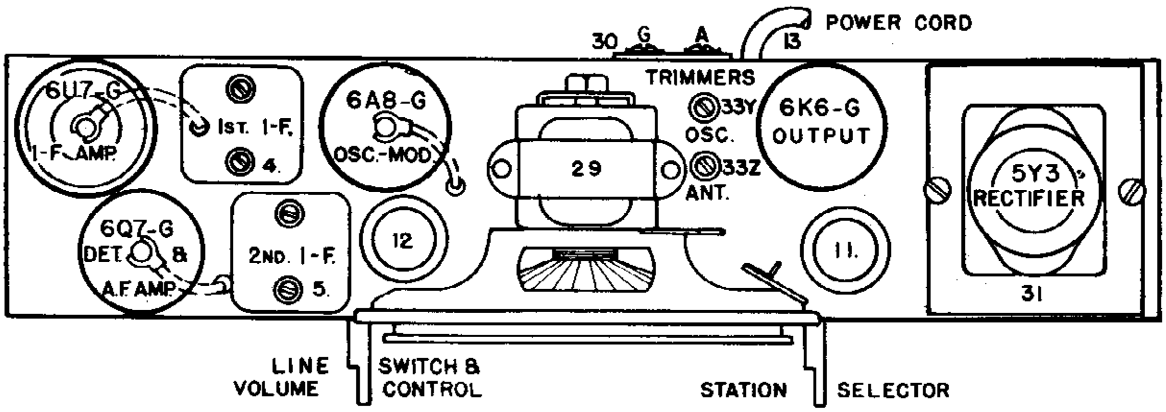


Fig. 2 Top View 537

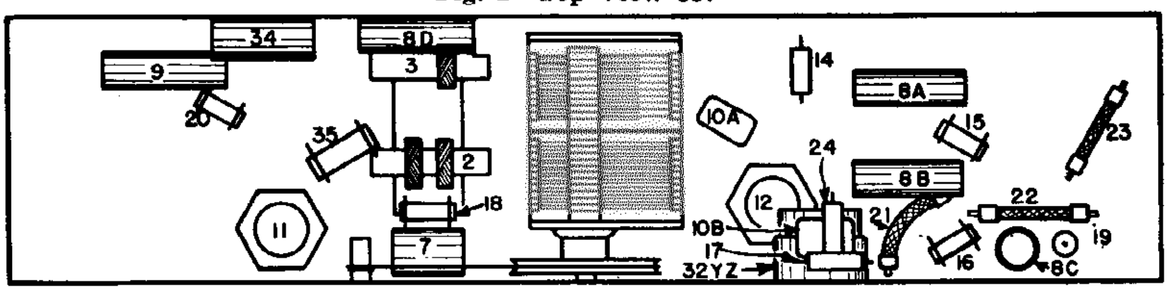


Fig. 3 Bottom View 537

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary, the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter across the "P" and "S" terminals of the 6K6G output tube. Be certain that the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through .02 mfd. condenser to the top cap of the 6A8G tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely in mesh and turn the volume control knob to the right (ON).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust both trimmers located on top of the 2nd I-F transformer for maximum reading on the output meter. (Fig. 2).

(e) Adjust both trimmers located on top of the 1st I-F transformer for maximum output.

(f) Check opeerations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier

When aligning the R-F amplifier the output lead from the signal generator should be connected through a .00025 mfd. condenser to the "ANT" terminal of the receiver.

(a) Set the signal generator to 1725 kilocycles.

(b) Open the condenser gang all the way.

(c) Adjust the "OSC" trimmer condenser (33Y) for maximum output.

(d) Set the signal generator to 1400 kilocycles.

(e) Tune the receiver to the generator signal for maximum output (appx. 140 on the dial).

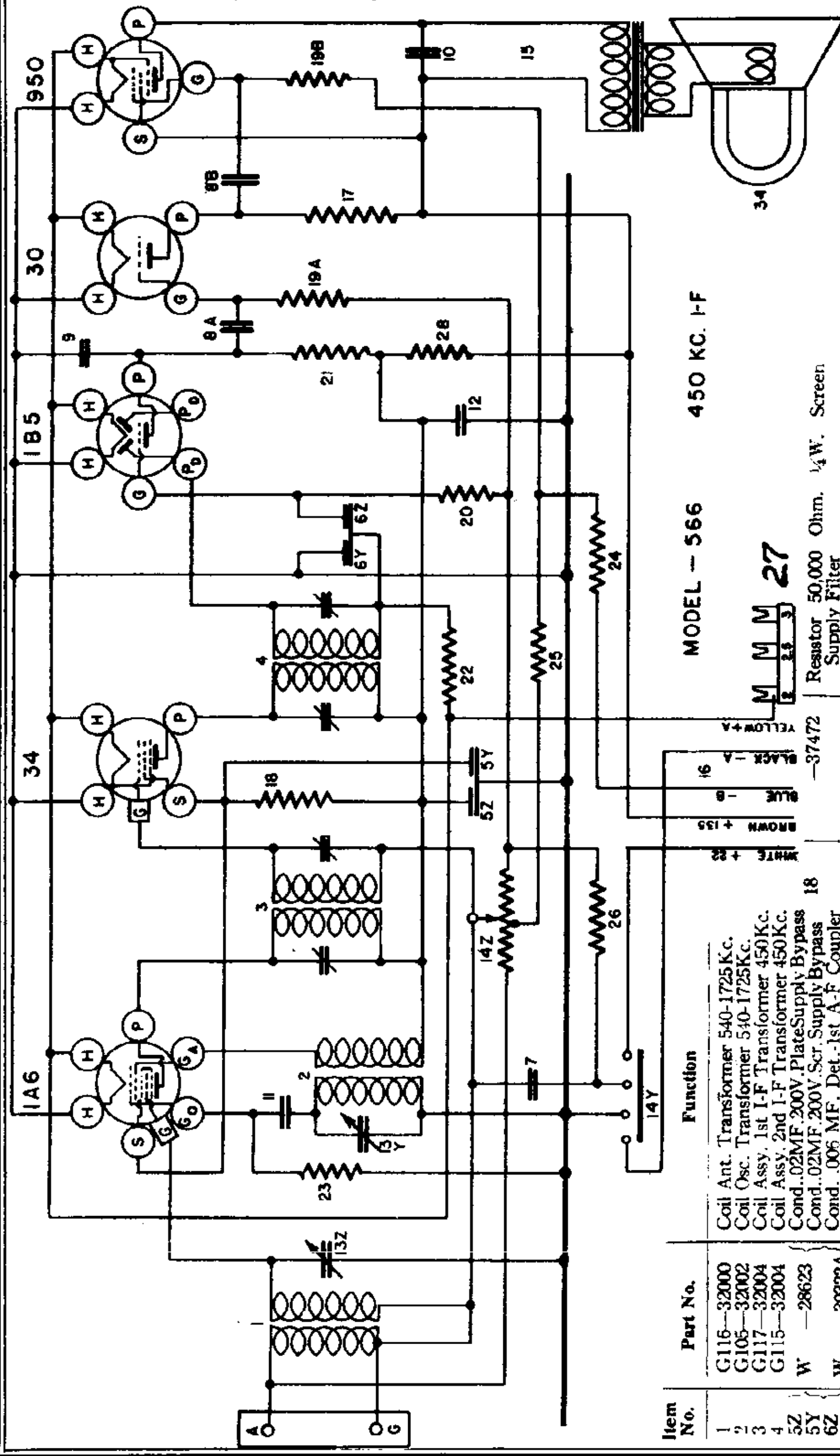
(f) Adjust the "ANT" trimmer condenser (33Z) for maximum output. DO NOT READJUST THE "OSC" TRIMMER AT 1400 KILOCYCLES.

(g) Repeat operations (e) and (f) alternately until no further improvement in output can be obtained.

CROSLEY RADIO CORP.

Tube	Where Used	H	P	S	G	Ga	Go
1C6	(*) Oscillator-Modulator	2.0	112	45	0	112	-5 to -20
34	I-F Amplifier	2.0	112	45	0	—	—
1B5	Detector & A-F Amplifier	2.0	60	—	0	—	—
30	2nd. A-F Amplifier	2.0	45	—	0		
950	Output	2.0	110	112	-4 (□)		

Power output approximately .5 watt.
"A" Battery drain approximately .36 ampere at 2 volts.
"B" Battery drain approximately 16 milliamperes at 135 volts.
*This model radio previous to Serial No. 1,196,783 employed a type 1A6 tube as an Oscillator-Modulator. Socket voltage readings as given.
□Measured at grid through 500,000 ohm grid resistor.



Item No.	Part No.	Function
1	G116—32000	Coil Ant. Transformer 540-1725Kc.
2	G105—32002	Coil Osc. Transformer 540-1725Kc.
3	G117—32004	Coil Assy. 1st I-F Transformer 450Kc.
4	G115—32004	Coil Assy. 2nd I-F Transformer 450Kc.
5Z, 5Y	W —28623	Cond..02MF.200V.PlateSupply Bypass; Cond..02MF.200V.Scr.Supply Bypass
6Z, 6Y	W —30322A	Cond. .006 MF. Det.-1st A-F Coupler; Cond. .00017 MF. Diode Load Bypass
7	W —37226	Cond. .02 MF. 160V. R-F&I-F Bias Filter
8A	W —36541	Cond. .02 MF. 160 V. 1st &2ndA-FCoup.
8B	W —36541	Cond. .02 MF. 160V. 2nd & Output A-F Coupler
9	W —30270	Cond. .001 MF. 400V. 1st A-F Plate Bypass
10	W —28904	Cond. .004 MF. 200V. Output Plate Bypass
11	G2 —34002	Cond. .0001 MF. Molded Osc. Grid Coupler
12	W —41081	Cond. 16 MF. 250V. Plate supply Filter (Electrolytic)
13Z, 13Y	G24 —33001	Cond. Var. Tuning Antenna Section; Osc. Section
14Z, 14Y	—41792	Volume Control 3410 Ohm. Tapped; 4 Contact Switch Battery A & B Supply
15	MG11—41760	Cable Speaker
16	B —41748	Cable 5 Lead Battery
17	—21237	Resistor 60,000 Ohm. ¼W. 2nd A-F (27)
18	—37472	Resistor 50,000 Ohm. ¼W. Screen Supply Filter
19A	—23785	Resistor 500,000 Ohm. ¼W. 2nd A-F Grid Return
19B	—23785	Resistor 500,000 Ohm. ¼W. Output Grid Return
20	—37583	Resistor 2.5 Megohm ¼W. 1st A-F Grid Return
21	—23403	Resistor 150,000 Ohm. ¼W. 1st A-F Plate Load
22	—35602	Resistor 1 Megohm Ins. ¼W. Diode Load
23	—21875	Resistor 100,000 Ohm. ¼W. Osc. Grid Return
24	W —29585	Resistor 600 Ohm. Flex. ½W. 1st Bias Divider
25	W —35467	Resistor 220 Ohm. Flex. ½W. 2nd Bias Divider
26	W —41759	Resistor 140 Ohm. Flex. ½W. Audio Bias Divider
27	W —41955A	Resistor on "A" Bat. Lead Used with 1C6 Tube
(27)	W —41955	Resistor on "A" Bat. Lead Used with
28	W —30960	Resistor 2600 Ohm. Flex. 1¼W.
29	G89 —28807	Socket 1C6 Osc.-Mod.
(29)	G55 —28807	Socket 1A6
30	G31 —28807	Socket 31 I-F.
31	G91 —28807	Socket 1B5 Det. 1st A-F.
32	G9 —28807	Socket 30 2nd A-F
33	G94 —28807	Socket 950 Output
34	—41056	Speaker Type 31PJ3. "A"
	—41434	Cone Assy. for 41056 Speaker
	—41453	Output Trans. for 41056 speaker
	—41458	Mtg. Ring for 41434 Cone Assembly
35	G1 —26719	Terminal Strip Ant. & Grd.
	W —41790	Tube Shield (Plain Half)
	W —41789	Tube Shield (Half with Slot)
	W —41784	Tube Shield Ring
	W —41785	Tube Shield Base
	W —12247	Metal Pointer for Dial
	W —42258	Escutcheon Pins
	W —41822	Dial & Drive Assembly

MODEL 566
Trimmers, Socket
Chassis, Alignment

CROSLEY RADIO CORP.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 950 Output tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger--not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02, or larger, mfd. condenser to the top cap of the 1C6 Osc-Mod tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON).

(c) Turn the band selector switch to the left (High Frequency).

(d) Set the signal generator to 450 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F transformer for maximum output. Fig. 2.

(f) Adjust both trimmers located on top of the Ist I-F transformer for maximum output.

(g) Check operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

() Connect the output lead from the signal generator through a .00025 mfd. condenser to the "ANT" terminal of the receiver.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer located on the "OSC" section of the condenser gang for maximum output. Fig. 3.

(e) Adjust the trimmer located on the "ANT" section of the condenser gang for maximum output.

(f) Tune the station selector to the generator signal for maximum output.

(g) Repeat operation (e) for more accurate adjustment.

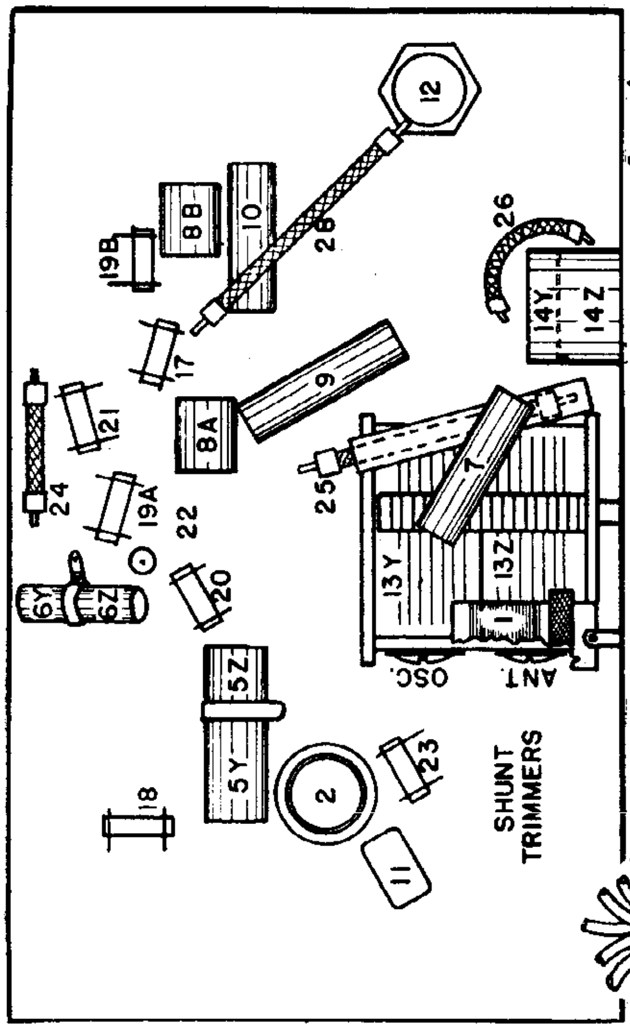


Fig. 3. Bottom View 566

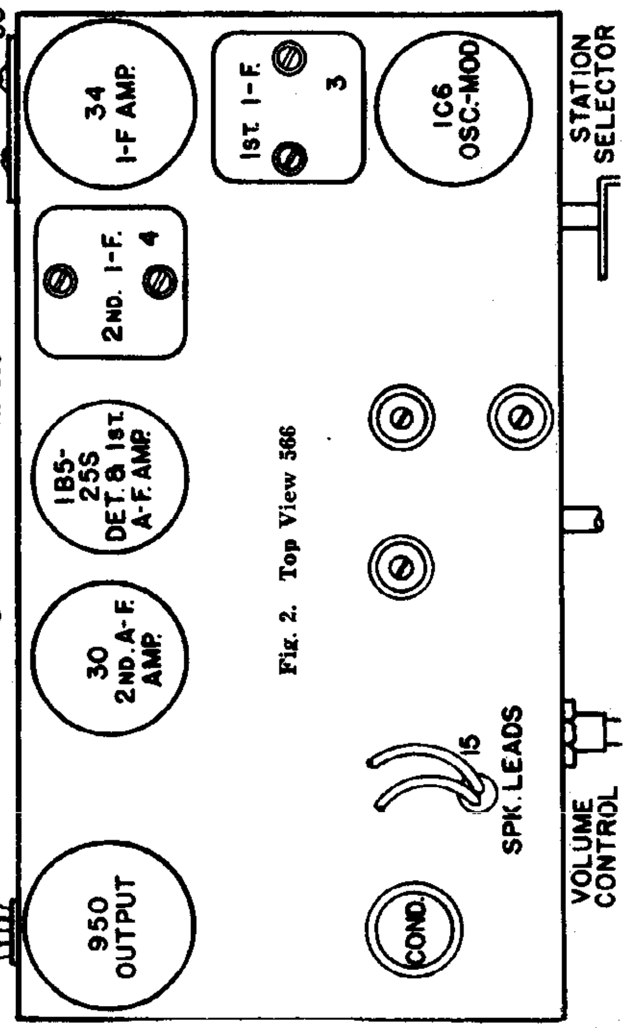
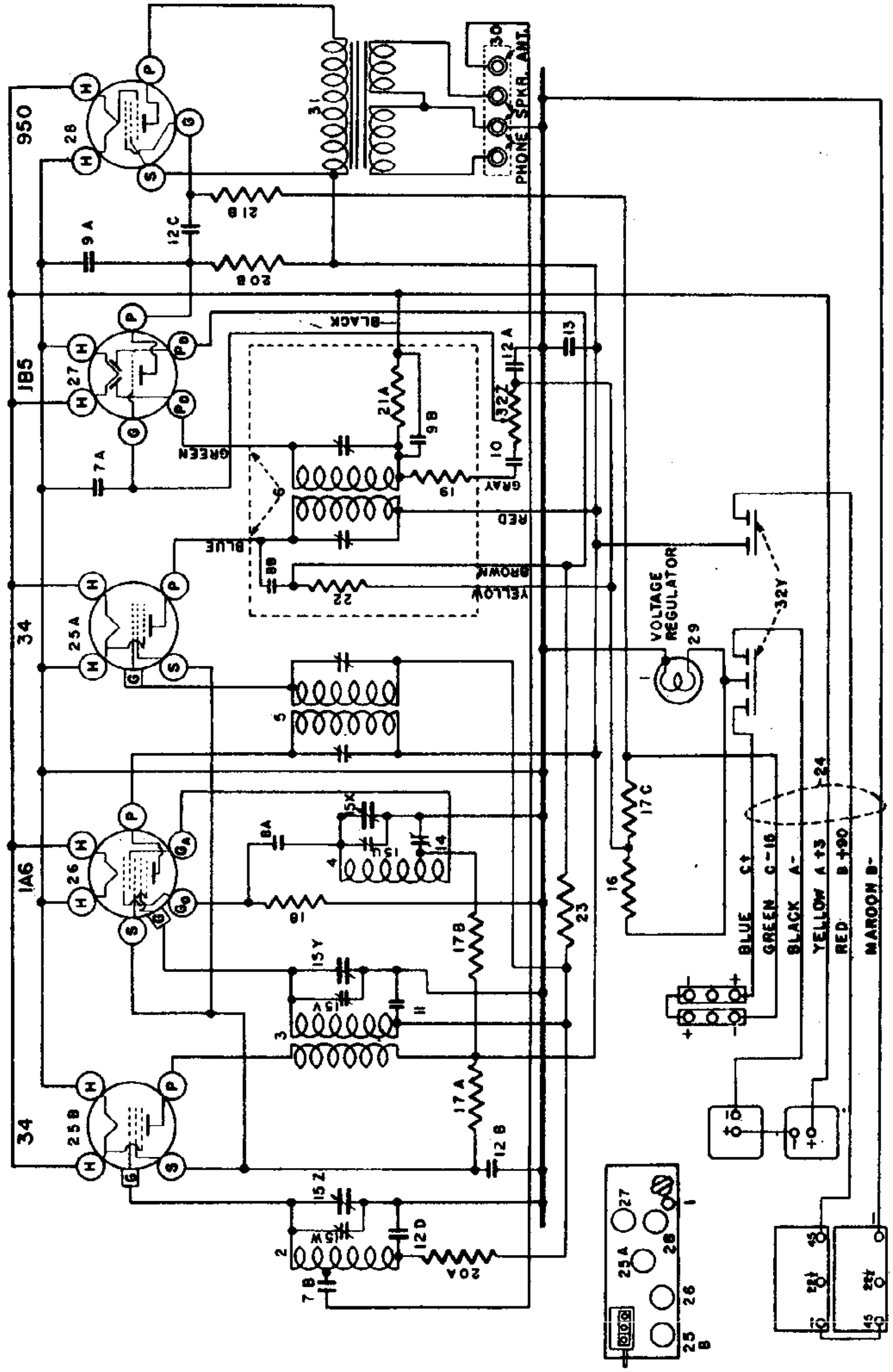


Fig. 2. Top View 566

CROSLEY RADIO CORP.

NOV. 1936 SALES MODEL B-637 (CARRIOR) CHASSIS MODEL 586



TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	G	Ga	Go
34	R-F Amplifier	2.0	90	45	-1.5	—	—
1A6	Oscillator-Modulator	2.0	90	45	-1.5	55	-2 to -5
34	I-F Amplifier	2.0	90	45	-1.5	—	—
1B5/25S	Detector and A-F Amplifier	2.0	90	—	-1.5	—	—
950	Output	2.0	90	90	-13.5	—	—

Power output approximately .2 watt.
"A" battery drain approximately .360 ampere.
"B" battery drain approximately .010 ampere.

SPECIFICATIONS

This model Crosley radio is a six-tube battery receiver designed for portable use. A detachable antenna approximately 18" long is supplied as standard equipment. Provision is made for operating the receiver either with headphones or a permanent-magnet dynamic speaker.

The tuning range is approximately from 540 to 1710 kilocycles.

MODEL 586, Carrior Trimmers, Chassis Alignment, Parts

CROSLEY RADIO CORP.

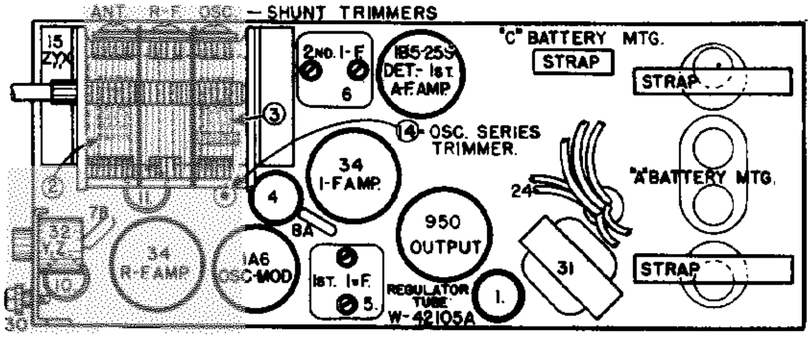


Fig. 2. Top View 586

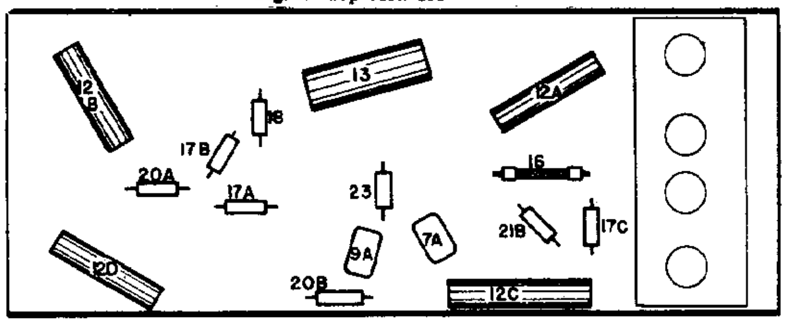


Fig. 3. Bottom View 586

Item No.	Part No.	Description
1	W —42105A	Voltage Regulator Tube
2	G117—32000	Ant. Coil
3	G85 —32001	R-F Coil
4	G106—32002	Osc. Coil
5	G35 —32005	1st I-F Assembly
6	G31 —32005	2nd I-F Assembly (contains Items 8B, 9B, 19, 21A, 22)
7AB	G5 —34002	Condenser .00005 Mf. 200 V.
8AB	G2 —34002	Condenser .0001 Mf. 200 V.
9AB	G1 —34002	Condenser .00025 Mf. 200 V.
10	W —36541	Condenser .02 Mf. 160 V.
11	W —35936	Condenser .05 Mf. 200 V.
12ABCD	W —27216	Condenser .05 Mf. 200 V.
13	W —29910A	Condenser .25 Mf. 200 V.
14	—40769	Condenser (Osc. Series Trimmer)
15	G55 —33002	3 Sect. Var. Tuning Cond. Gang
	W —42162	Dial (Calibrated Disc.)
	W —42122	Bearing Support Bracket
	W —42141	Sprocket Shaft Assembly
	B —41315A	Sprocket Hub Assembly
	W —42160	Drive Chain
	W —42120	Take Up Spring (Chain)
	W —40486	Dial Mtg. Screw
16	W —22514	Resistor 750 Ohm ¼W.
17ABC	—36318	Resistor 15,000 Ohm ¼W.
18	—36761	Resistor 40,000 Ohm ¼W.
19	—35600	Resistor 100,000 Ohm ¼W.
20AB	—35601	Resistor 300,000 Ohm ¼W.
21AB	—36322	Resistor 500,000 Ohm ¼W.
22	—35602	Resistor 1 Megohm ¼W.
23	—35927	Resistor 2 Megohm ¼W.
24	MG36—42101	Battery Cable Assembly
25AB	G31 —28807	Socket Type 34
26	G55 —28807	Socket Type 1A6
27	G91 —28807	Socket Type 1B5
28	G94 —28807	Socket Type 950
29	W —42105	Socket Volt. Regulator
	W —40911	Tube Shield (Small)
	W —26974B	Tube Shield (Large)
31	G58 —24628	Out-Put Transformer
32Z, 32Y	—41609	Vol. Cont. 1 Megohm; Battery Switch
30	MG3 —42101	Spk., Phone and Ant. Term. Assembly
	W —42119	Battery Clamp ("A" Batt.)
	W —42123	Battery Clamp ("C" Batt.)
	MG8 —42101	Case Assembly less End Covers
	MG4 —42101	Rear Cover
	MG9 —42101	Front Cover Assembly
	W —42195	Carrying Handle
	W —42178	Handle Fastener
	W — 5558	Phone Tip Jack (only)
	W —42179	Knob (Vol. Cont.)
	W —35252A	Knob (Sta. Sel.)
	W —42217	Head-Phones
	MG2 —42102	Antenna Assembly
	243PS2	Speaker
	MG22—42102	Speaker Case only
	B —42507	Speaker Grille
	W — 1500G	Speaker Cord

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator aand an output meter.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 950 Output tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 262 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd., or larger, condenser to the top cap of the 1A6 Osc-Mod. tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the receiver chassis frame. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Adjust the station selector so that the rotor plates of the tuning condenser are completely out of mesh.

(c) Turn the volume control of the receiver full on.

(d) Set the signal generator to 262 kilocycles.

(e) Adjust both trimmers located on the 2nd I-F transformer for maximum output.. (Fig. 2).

(f) Adjust both trimmers located on the 1st I-F transformer for maximum output.

(g) Repeat operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

(a) Connect the output lead from the signal generator through a .00025 mfd. condenser to the "ANT" connection of the receiver.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer on the "OSC" section of the tuning condenser for maximum output.

(e) Adjust the trimmer on the "R-F" section of the tuning condenser for maximum output.

(f) Adjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

(g) Readjust the station selector for maximum output. DO NOT READJUST THE OSC. TRIMMER.

(h) Repeat operations (e) and (f) for more accurate adjustments.

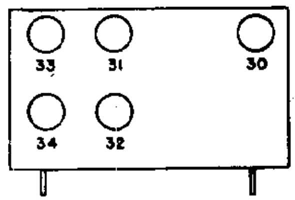
(i) Set the signal generator to 600 kilocycles.

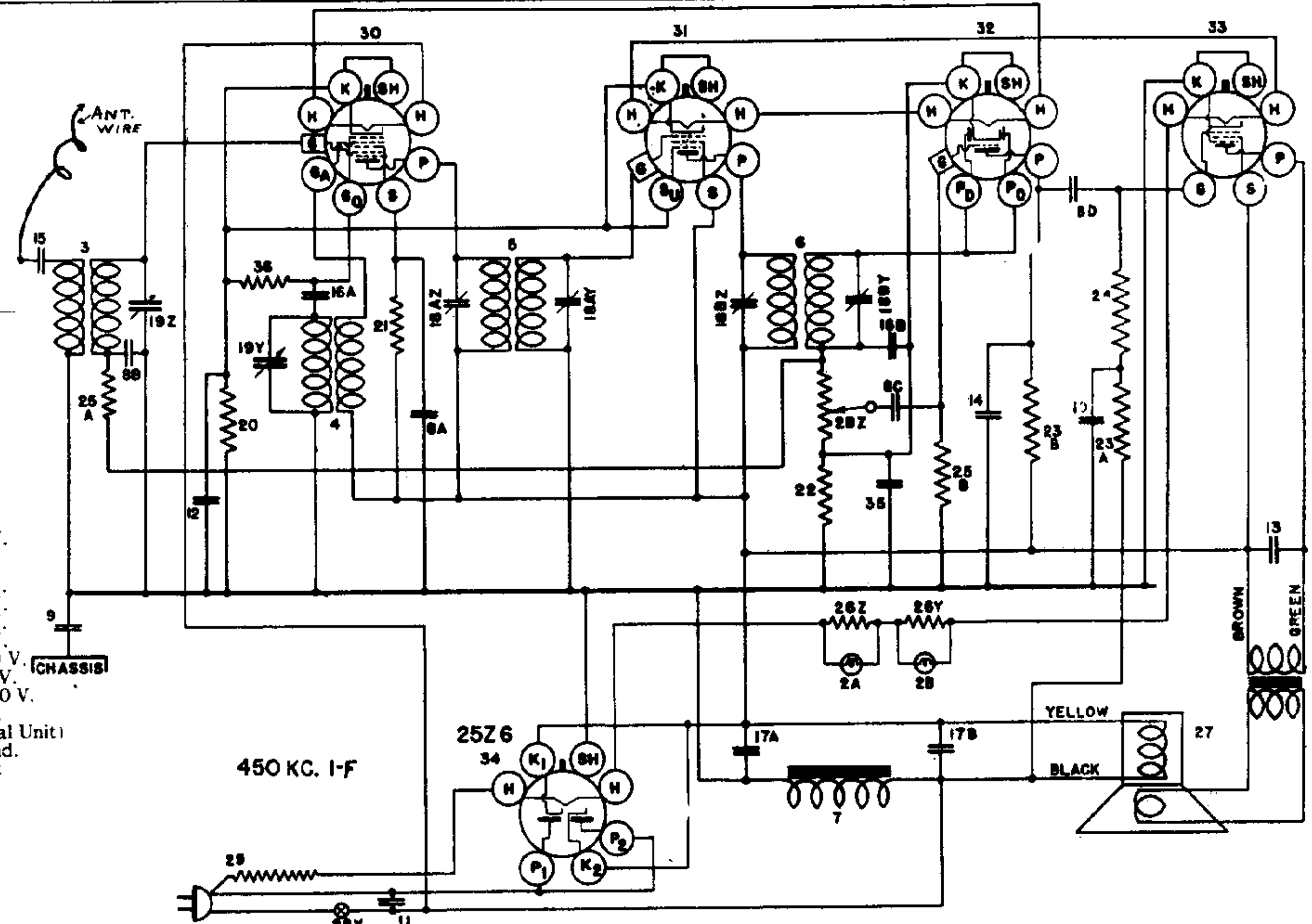
(j) Tune-in this signal with the station selector for maximum reading on the output meter.

(k) Adjust the series trimmer, item 14, Fig. 2, while rocking the tuning condenser back and forth slightly until no further improvement in output can be obtained.

(l) Return the signal generator to 1400 kilocycles and repeat operations (g) and (h).

MODEL 596
Schematic, Socket Parts





PARTS LIST—MODEL 596

Item No.		Part No.	Description
1	W	—29784B	Flexible Antenna
2AB	W	—4099B	Dial Light Bulb
	G6	—27134	Dial Light Socket
3	G116	—32000	Ant. Coil
4	G116	—32002	Osc. Coil
5	G104	—32004	1st I-F Coil (only)
	W	—21541C	Ring—Coil Retaining
	W	—26891	Insulating Washer (Coil)
	W	—25024.3	Shield—Coil
6			Same as Item No. 5
7	G4	—28859	Filter Choke
8AB CD	W	—36541	Condenser .02 Mf. 160 V.
9	W	—24049C	Condenser .1 Mf. 200 V.
10	W	—29910A	Condenser .25 Mf. 200 V.
11	W	—32780B	Condenser .05 Mf. 400 V.
12	W	—35936	Condenser .05 Mf. 200 V.
13	W	—23191A	Condenser .01 Mf. 200 V.
14	G3	—34002	Condenser .0005 Mf. 200 V.
15	W	—28620	Condenser .003 Mf. 200 V.
16AB	G1	—34002	Condenser .00025 Mf. 200 V.
17AB	W	—42439	Condenser 30 Mf. 150 V.
18AB	W	—37075	I-F Trimmer Cond. (Dual Unit)
19	G22	—33001	2 Gang Var. Tuning Cond.
	W	—40633B	Bearing Support Bracket
	W	—41112B	Sprocket (Small) Driver
	B	—41113	Sprocket (Large) Driver
	W	—41227	Chain—Drive
	W	—41610	Spring—Take Up
	W	—42608	Dial (Calibrated) Glass
	W	—40632C	Pointer Disc
	W	—41014B	Brkt. Dial Mtg., R. H.
	W	—41013B	Brkt. Dial Mtg., L. H.
	W	—40486	Screw—Pointer Disc Mtg.
20	W	—35467	Resistor 220 Ohm ½W. Flexible
21		—36760	Resistor 20,000 Ohm ¼W.
22		—36318	Resistor 15,000 Ohm ¼W.
23AB		—35601	Resistor 300,000 Ohm ¼W.
24		—36322	Resistor 500,000 Ohm ¼W.
25AB		—35602	Resistor 1 Megohm ¼W.
26	W	—41000	Resistor 44 Ohm C. T. Candohm
27	47BL9 "B"		Speaker
		—42928	V. C. and Cone Assembly above Spk.
		—42929	Output Trans. above Spk.
28Z 28Y		—42446	Vol. Cont. 500,000 Ohm / Line Switch
29	B	—40999	Power Cord and Plug, 100 Ohm 12W.

Item No.		Part No.	Description
30	G156	—36400	Socket—Type 6A8
31	G151	—36400	Socket—Type 6K7
32	G160	—36400	Socket—Type 6Q7
33	G161	—36400	Socket—Type 25A6
34	G162	—36400	Socket—Type 25Z6
	W	—27981A	Tube Shield
35	W	—41958	Condenser 50 Mf. 25 V.
36		—35928	Resistor 60,000 Ohm ¼W.
	B	—40590B	Escutcheon
		—42376	Screws, Escutcheon Mtg.
	W	—41019A	Knob
	W	—35863	Grille Cloth
		6AD	Cabinet

CHASSIS MODEL 596 SALES MODEL C-526

OCT. 1936

This model Crosley radio is a five-tube receiver designed for operation on a 110 to 120 volt power supply, either A. C. or D. C.

The tuning range of the receiver is approximately from 540 to 1710 kilocycles (555 to 175 meters).

MODEL 596
Trimmers, Chassis
Voltage, Alignment

CROSLEY RADIO CORP.

Fig. 3 Bottom View 596

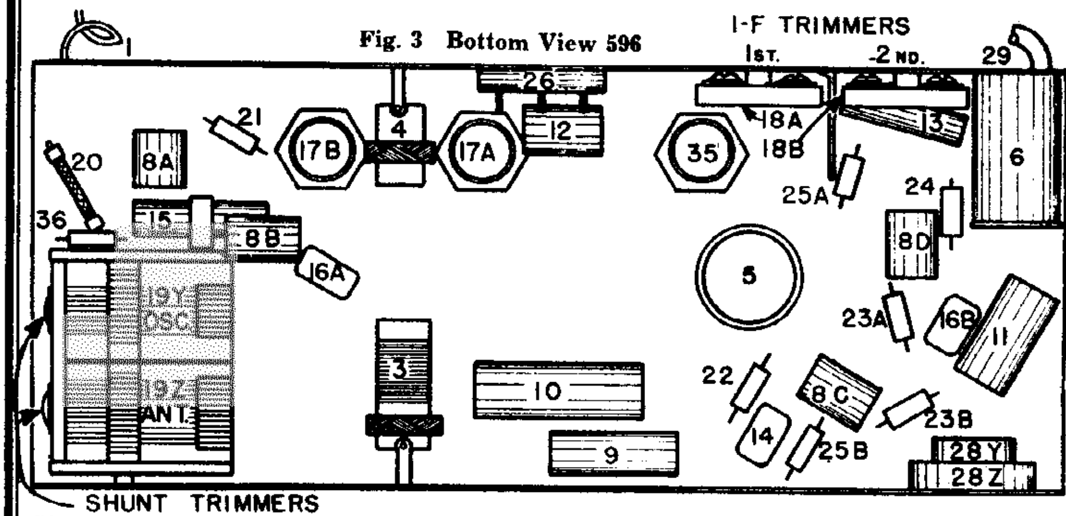
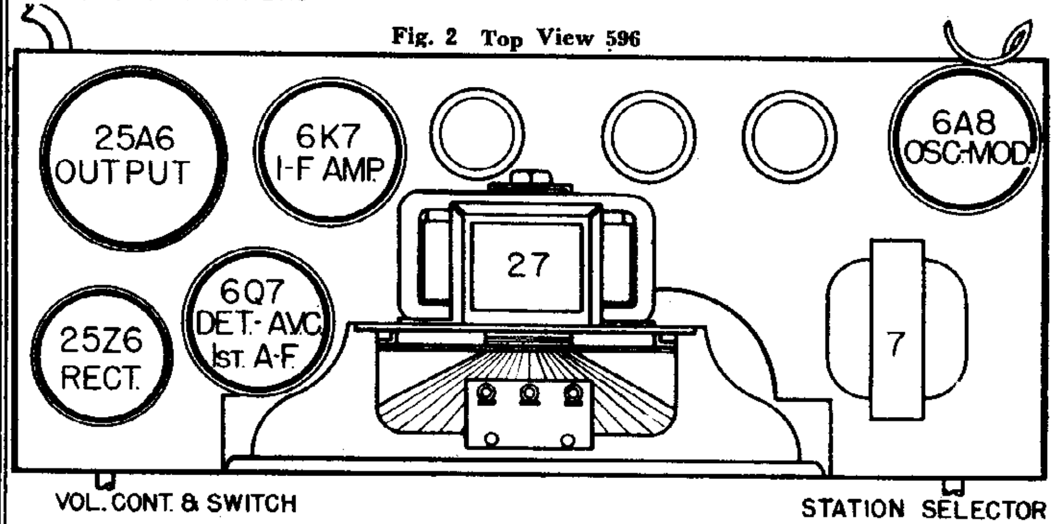


Fig. 2 Top View 596



Tube	Function	H	P	S	Su	K	Ga	Go
6A8G	Oscillator-Modulator	6.3	115	65	—	3.8	115	Neg.
6K7G	I-F Amplifier	6.3	115	115	3.8	3.8	—	—
6Q7G	Det and A-F Amplifier	6.3	25	—	—	1.2	—	—
25A6G	Output	25.0	115	115	—	0	—	—
25Z6G	Rectifier	25.0	—	—	—	115	—	—

TUBE SOCKET VOLTAGE READINGS

Power output approximately 1.8 watts.
Power consumption approximately 50 watts.
Voltage drop across speaker field 125 volts.
All readings taken on 117.5 volt A. C. power supply.
All readings except filaments will be approximately 10% lower on 117.5 volts D. C.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 25A6 Output tube. Be sure the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 condenser to the top cap of the 6A8 Oscillator-Modulator tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator through a .05 mfd., or larger, condenser to the receiver chassis. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the plates of the condenser gang are completely out of mesh and turn the volume control to the right (ON).

(c) Set the signal generator to 450 kilocycles.

(d) Adjust the 2nd I-F trimmer condensers (18B, Fig. 3) located on the rear of the receiver chassis for maximum reading on the output meter.

(e) Adjust the 1st I-F trimmer condensers (18A, Fig. 3) located on the rear of the receiver chassis for maximum reading on the output meter.

(f) Check operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

(a) Connect the output lead from the signal generator through a .00025 mfd. condenser to the antenna condenser at the point where the antenna wire is connected.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer located on the "OSC" section of the condenser gang for maximum output.

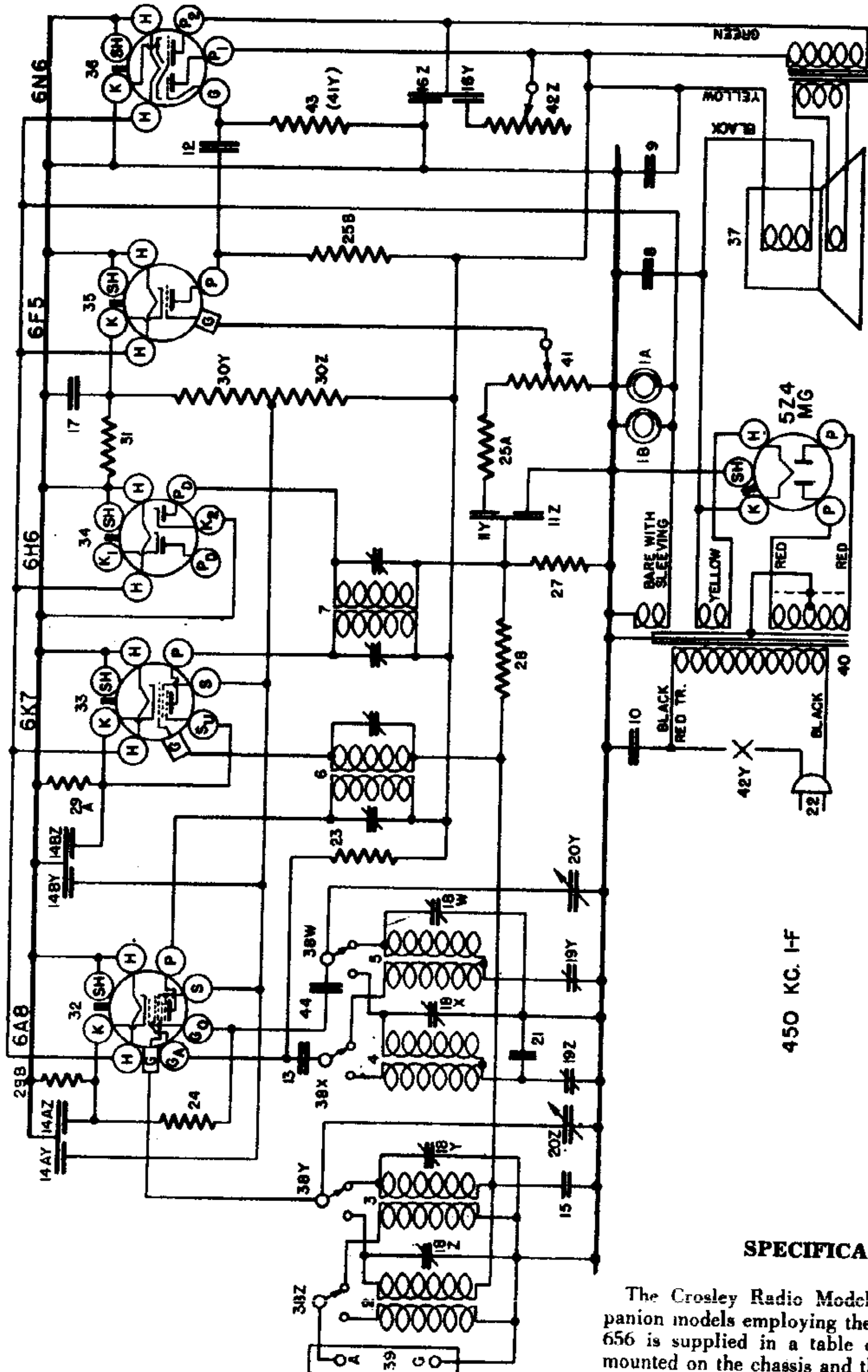
(e) Adjust the trimmer located on the "ANT" section of the condenser gang for maximum output.

(f) Readjust the station selector slightly for maximum output.

(g) Repeat operation (e) for more accurate adjustment.

CROSLEY RADIO CORP.

September, 1936 SALES MODELS 634 and 649 CHASSIS 656 and 5656



TUBE SOCKET VOLTAGE READINGS

Tube	Where Used	H	P	P2	S	Su	K	Ga	Go
6A8	Osc-Mod	6.3	275	—	120	—	5	170	—5 to —20
6K7	I. F. Amp.	6.3	275	—	120	4	4	—	—
6H6	Det. & AVC	6.3	0	—	—	—	0	—	—
6F5	A. F. Amp.	6.3	160	—	—	—	2	—	—
6N6	Output	6.3	275	260	—	—	0	—	—
5Z4MG	Rectifier	5.0	—	—	—	—	360	—	—

Power Output Approximately 4 Watts.
Power Consumption Approximately 85 Watts at 117.5 Volts.
Voltage Drop Across Speaker Field Approximately 78 Volts.

SPECIFICATIONS

The Crosley Radio Models 656 and 5656 are companion models employing the same circuit. The Model 656 is supplied in a table cabinet having the speaker mounted on the chassis and the Model 5656 is a console type having the speaker mounted in the cabinet.

The frequency ranges covered are from 540 to 1710 kilocycles in the broadcast band and from 6,000 to approximately 18,000 kilocycles in the high frequency band.

Signal Generator Frequencies.

	Shunt Alignment	Series Alignment
Broadcast Band	1400 Kc.	600 Kc.
High Frequency Band	18000 Kc.	6000 Kc.

MODELS 656,5656
Socket, Trimmers
Chassis, Alignment
Parts

CROSLEY RADIO CORP.

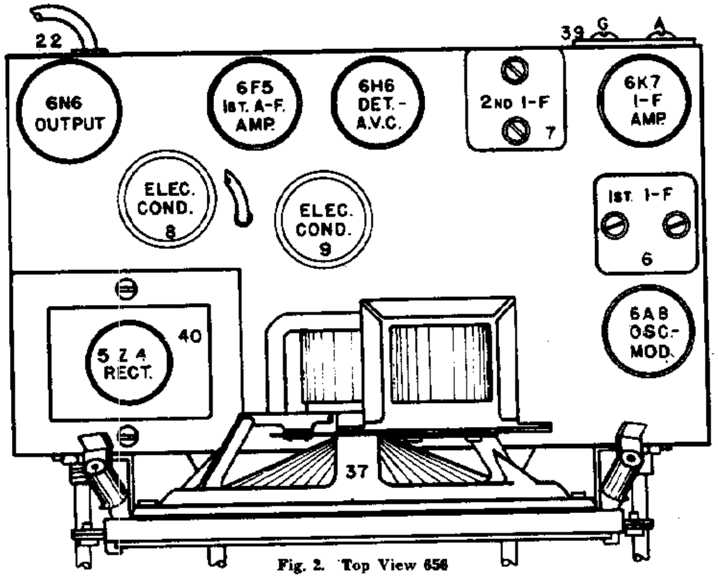


Fig. 2. Top View 656

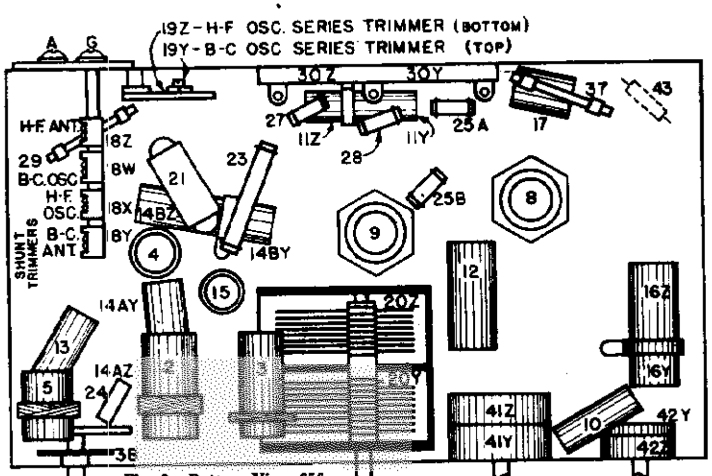


Fig. 3. Bottom View 656

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to P. and P2 of the 6N6 Output Tube. **Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.**

1. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8 tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Turn the band selector switch to the right (High Frequency).

(d) Set the signal generator to 450 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F Transformer for maximum output. (Fig. 2).

(f) Adjust both trimmers located on top of the 1st I-F Transformer for maximum output.

(g) Check operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

(a) When aligning the R-F Amplifier the output lead from the signal generator should be connected through a dummy antenna to the "ANT" terminal of the receiver. For the broadcast band the dummy antenna should be a .00025 mfd. condenser and for the high frequency band this condenser should be replaced by a 400 ohm (Non Inductive) carbon resistor.

Each band should be shunt aligned, series aligned and then shunt aligned again in the order given. The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated below for each adjustment.

Adjust the "OSC" and "ANT" shunt trimmers (Shunt alignment. See Fig. 3) in the order given for maximum output. Tune the station selector to the generator signal for maximum output and then check the adjustment of the "ANT" trimmer. NOTE: When aligning the high frequency band care should be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator approximately 10 times and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles below the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct dial setting.

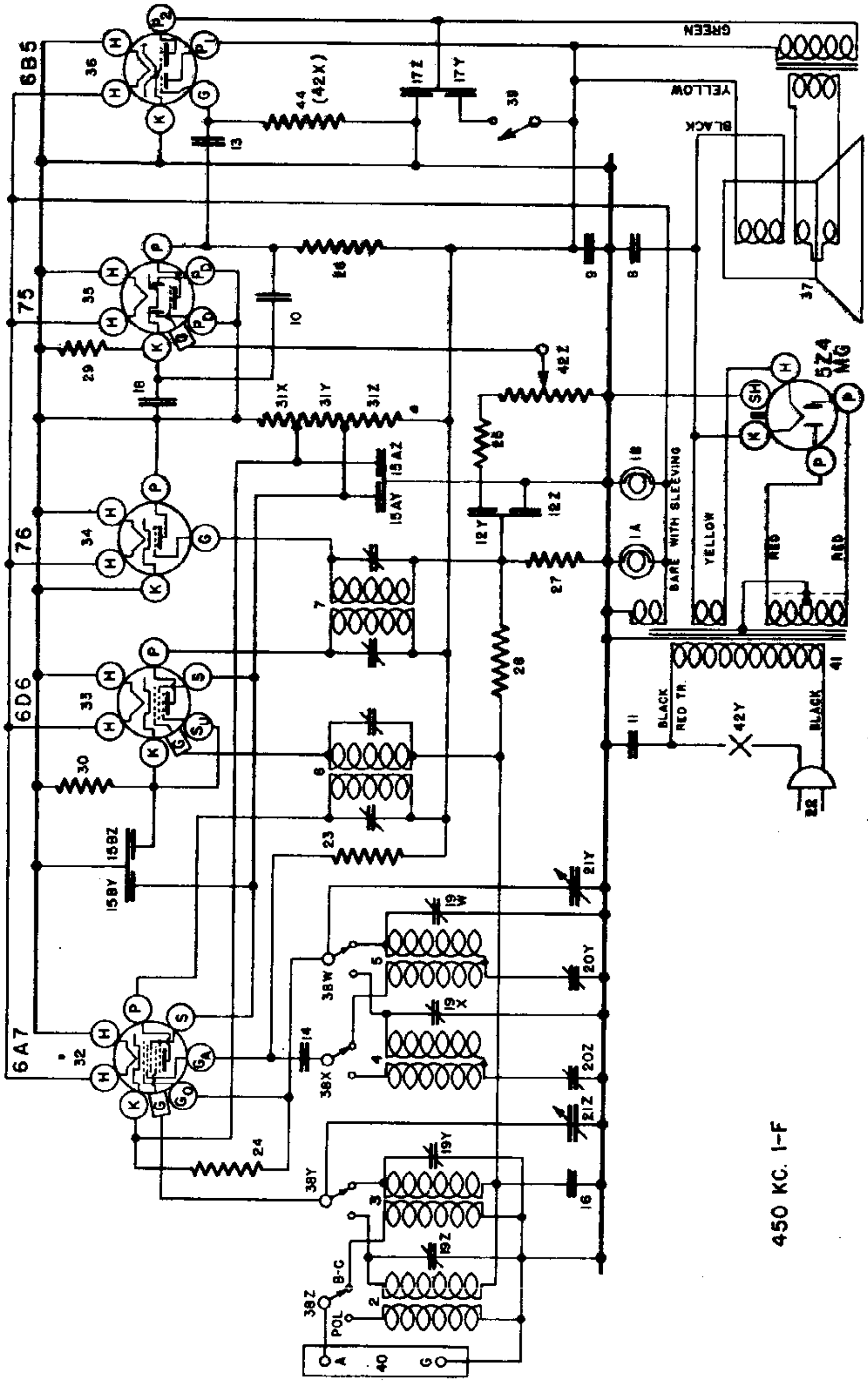
To adjust the "series" trimmers (Fig. 3) set the signal generator to the frequency indicated below and then tune-in this signal with the station selector for maximum output. Adjust the series trimmer while rocking the tuning condenser back and forth slightly, until no further improvement in output can be obtained.

Item No.	Part No.	Name
1-AB	W —37922	Bulb, Dial Light
	G3 —37965	Socket Assy., Dial Light
	W —40570	Shield, Dial Light
2	G118 —32000	Coil, Antenna (5800-18100 Kc.)
3	G81 —32000	Coil, Antenna (540-1725 Kc.)
4	G108 —32002	Coil, Osc. (5800-18100 Kc.)
5	G66 —32002	Coil, Osc. (540-1725 Kc.
6	G71 —32004	Coil Assy., 1st I-F. (450 Kc.)
7	G72 —32004	Coil Assy., 2nd I-F. (450 Kc.)
8	W —36055	Cond., 35 Mf. 400V.
9	W —36057	Cond., 40 Mf. 300V.
10	W —30605	Cond., .01 Mf. 400V.
11Z	W —30322-A	Cond., .00017 Mf. 200V.
11Y		Cond., .006 Mf. 200V.
12	W —32780-B	Cond., .05 Mf. 400V.
13	W —32191-A	Cond., .01 Mf. 400V.
14AZ	W —28623	Cond., .02 Mf. 200V.
14AY		Cond., .02 Mf. 200V.
14BZ	W —28623	Cond., .02 Mf. 200V.
14BY		Cond., .02 Mf. 200V.
15	W —27216	Cond., .05 Mf. 200V.
15B	W —36541	Cond., .02 Mf. 160V.
16Y	W —31052	Cond., .05 Mf. 400V.
16Z		Cond., .004 Mf. 400V.
17	See 15B	
18	W —37241	Cond., 4 Section Trimmer
19	G31 —33006	Condenser, 2 Section
20	G17 —33001	Condenser, Var. Tuning
	Mg35—40765	Bracket Assy., Dial Support & Spk. Mtg.-(656)
	W —40798	Bracket, L.H., Dial Sup.
	W —40799	Bracket, R.H., Dial Sup.
	W —40797	Bracket, (2 Req.), Dial Mtg.
	B —41979	Dial, Calibrated Glass
	W —41739	Drive Unit, Dial
	W —40795-B	Shaft, Hand
	W —40794	Bracket, Hand Shaft Bearing
	W —42629	Pointer (Hand), Dial
	W —40909	Washer (Spring), Hand Shaft
	W —41611	Ring, Shaft Retaining
	B —42374	Mask, Metal (Bronze)
	W —40486	Screw, Pointer Mtg.
21	G7 —34000	Condenser, 1750 Mmf.
22	B —33906-A	Cord and Plug, Power
23	— 5370-A	Resistor, 20,000 Ohm 1W.
24	—35928	Resistor, 60,000 Ohm ¼W.
25A	—23403	Resistor, 150,000 Ohm ¼W.
25B	—35928	Resistor, 150,000 Ohm ¼W.
27	—33344	Resistor, 400,000 Ohm ¼W.
28	—37245	Resistor, 1.5 Megohm ¼W.
29	W —28589	Resistor, 350 Ohm ½W. Flex.
30Z	W —32301	Resistor, 10,000 Ohm Candohm
30Y		Resistor, 15,000 Ohm Candohm
31		Resistor, 165 Ohm ½W. Flex.
32	G156 —36400	Socket, Type 6A8
33	G151 —36400	Socket, Type 6K7
34	G155 —36400	Socket, Type 6H6
35	G158 —36400	Socket, Type 6F5
36	G165 —36400	Socket, Type 6N6
37	331BL9	Speaker ("M"-1-D 116) (Model 656 only)
	—37039	Cone Assy. (For above Speaker)
	—40275	Field Coil (For above Speaker)
	—40276	Output Transformer (For above Speaker)
	632CJ3	Speaker ("M"-1-D-610) (Model 5656 only)
	—42879	Cone Assy. (For above Speaker)
	—42880	Field Coil (For above Speaker)
	—42881	Output Trans. (For above Speaker)
	G3 —35696	Speaker Cable, (Model 5656 only)
38	—37247	Switch, Band Selector
39	G1 —26719	Terminal Board, Antenna & Grd.
40	—41978-A	Transformer, 110V. 60 Cy. Power
41Z	—41027	Volume Control, (3 Meg.) See Note
41Y		Volume Control, (1 Meg.) See Note
42Z	—41028-A	Tone Control, (80,000 Ohm)
42Y		Line Switch
	W —42345	Escutcheon
	D — 28	Escutcheon Screws
	W —37339	Knob, V.C.&S.S.
	W —37341	Knob, T.C.&B. Sw.
	—42006	Volume Control, (3 Meg.)*
43	—21455	Resistor, 300,000 Ohm ¼W. *(See Note)
	BE	Cabinet, (Model 656)
	MA	Cabinet, (Model 5656)

*May be used in place of Dual Volume Control.

CROSLEY RADIO CORP.

September, 1936 SALES MODELS 629 and 644 CHASSIS 666 and 5666



TUBE SOCKET VOLTAGE READINGS

Tube	Where Used	H	P	P2	S	Su	K	Gs	Go
6A7	Osc-Mod	6.3	235	—	128	—	6.2	154	—5 to —20
6D6	I. F. Amp.	6.3	235	—	128	5.2	5.2	—	—
76	Dector	6.3	0	—	—	—	0	—	—
75	A.F. Amp.&AVC	6.3	110	—	—	—	2	—	—
6B5	Output	6.3	235	222	—	—	0	—	—
5Y3	Rectifier	5.0	—	—	—	—	335	—	—

Power Output Approximately 4 Watts.
Power Consumption Approximately 68 Watts at 117.5 Volts.
Voltage Drop Across Speaker Field Approximately 95 Volts.

Signal Generator Frequencies.

	Shunt Alignment	Series Alignment
Broadcast Band	1400 Kc.	600 Kc.
High Frequency Band	6000 Kc.	1500 Kc.

MODELS 666,5666
Socket, Trimmers
Alignment, Parts

CROSLEY RADIO CORP.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to P. and P2 of the 6B5 Output Tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 456 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A7 tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Turn the band selector switch to the right (High Frequency).

(d) Set the signal generator to 450 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F Transformer for maximum output. (Fig. 2).

(f) Adjust both trimmers located on top of the 1st I-F Transformer for maximum output.

(g) Check operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

(a) When aligning the R-F Amplifier the output lead from the signal generator should be connected through a dummy antenna to the "ANT" terminal of the receiver. For the broadcast band the dummy antenna should be a .00025 mfd. condenser and for the high frequency band this condenser should be replaced by a 400 ohm (Non Inductive) carbon resistor.

Each band should be shunt aligned, series aligned and then shunt aligned again in the order given. The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated below for each adjustment.

Adjust the "OSC" and "ANT" shunt trimmers (Shunt alignment. See Fig. 3) in the order given for maximum output. Tune the station selector to the generator signal for maximum output and then check the adjustment of the "ANT" trimmer. NOTE: When aligning the high frequency band care should be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator approximately 10 times and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles below the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct dial setting.

To adjust the "series" trimmers (Fig. 3) set the signal generator to the frequency indicated below and then tune-in this signal with the station selector for maximum output. Adjust the series trimmer while rocking the tuning condenser back and forth slightly, until no further improvement in output can be obtained.

PARTS LIST—MODELS 666 and 5666

Item No.	Part No.	Name
1	W —37922	6-8 V. Bulb, Dial Light
	G3 —37965	Socket Assy., Dial Light
2	G82 —32000	Coil Antenna—2350—7000 Kc.
3	C81 —32000	Coil Antenna—540—1725 Kc.
4	G 65—32002	Coil—2350—7000 Kc., Osc.
5	G 66—32002	Coil— 540—1725 Kc., Osc.
6	G118—32004	Coil—Assy., 1st I-F.
7	G 72—32004	Coil—Assy., 2nd I-F.
8	W —36055	Cond. 35 Mf. 400 V.
9	W —36057	Cond. 40 Mf. 300V.
10	W —30270	Cond. .001 Mf. 400V.
11	W —30805	Cond. .01 Mf. 400V.
12Z	W —30322-A	Cond. .00017 Mf.
12Y		Cond. .006 Mf.
13	W —23615	Cond. .05 Mf. 400V.
14	W —23191-A	Cond. .01 Mf. 400V.
15 AZ	W —28623	Cond. .02 Mf. 400V.
15 AY		Cond. .02 Mf. 400V.
15 BZ	W —28623	Cond. .02 Mf. 400V.
15 BY		Cond. .02 Mf. 400V.
16	W —27216	Cond. .05 Mf. 200V.
17 Z	W —31052	Cond. .004 Mf. 400V.
17 Y		Cond. .05 Mf. 400V.
18	W —37732	Cond. .3 Mf. 160V.
19	W —37241	Cond. 4 Section Trimmer
20	G 31—33006	Cond. Series Trimmers
21	G 17—33001	Cond. Var. Tuning
	W —41736	Drive Unit, 8Pt. Disc. Assy. } Model 666—Only
	W —41897	Dial-Calibrated Glass } Model 666—Only
	W —41737	Mtg. Brkt. Dial Glass R.H. } Model 666—Only
	W —41738	Mtg. Brkt.. Dial Glass, L.H. } Model 666—Only
	W —41739	Drive Unit } Model 5666 Only
	B —42617	Dial (Calibrated) } Model 5666 Only
	MG-14—41980	DialGlass, Mtg. Brkt. R.H. } Model 5666 Only
	W 40798	DialGlass, Mtg. Brkt., L.H. } Model 5666 Only
	W —40797-A	DialGlass Retaining Brkt. } Model 5666 Only
	W —42629	Pointer—Dial
	W —40795	Shaft—Pointer
	W —40909	Washer (Spring) Shaft
	W —41611	Ring-Shaft, Retaining
	B —42374-A	Mask (Metal) Dial
22	B —33906-A	Cord & Plug—Power
23	— 5370-A	Resistor, [illegible] Ohm 1W
24	—35928	Resistor, [illegible] Ohm ¼W
25	—21875	Resistor, 100,000 Ohm. ¼W
26	—35929-C	Resistor, 150,000 Ohm. ¼W
27	—33344	Resstor, 400,000 Ohm. ¼W
28	—37245-C	Resistor, 1.5 Megohm ¼W
29	—36316	Resistor, 2,700 Ohm. ¼W
30	W —28106	Resistor, 500 Ohm. ¼W. Flex.
31Z	W —37246	Resistor, 1,000 Ohm } Candohm
31Y		Resistor, 2,000 Ohm } Candohm
31X		Resistor, 185-185 Ohm } Candohm
32	G47 —28807	Socket— Type 6A7
33	G75 —28807	Socket— Type 6D6
34	G80 —28807	Socket—Type 76
35	G41 —28807	Socket—Type 75
36	G90 —28807	Socket Type 6B5
	W —27981	Base Tube Shield
	W —40911	Shield—Tube
37	244—BL—9	Speaker, "B" Spec. 50A-2
	—42928	Cone Assy, For above Speaker
	—41473	Output Trans., For above Speaker
	632—CJ—3	Speaker, "M" Spec. 1-D-610
	—42879	Cone Assy., For above Speaker
	—42880	Field Coil, For above Speaker
	—42881	Output Trans., For above Speaker
38	—37247	Switch, Band Sel.
39	W—36184-A	Switch, Tone Con.
40	G1 —26719	Terminal Board, Ant. & Grid
41	—41978	Transformer, 110V.—60 Cy. Power
42Z	—37395	Volume Control (3 Meg.) [illegible] A-F Grid
42Y		Line Switch
42X		Volume Control (3 Meg.) Output Grid
43	NONE	
44	—35601	Resistor, [illegible] Ohm ¼ W. Output Grid to Grid.*
	B —40590	Escutcheon, (666)
	W —42345	Escutcheon, (5666)
	D —28	Escutcheon Mtg. Screws
	W —37339	Knob, (2) V.C.&S.S.
	W —37341	Knob, (2) T. C. & B. S. W.
	—36297	Volume Control, 3 Meg.*
	AG	Cabinet Model 666
	MA	Cabinet Model 5666

*May be used in place of Dual Volume Control.

SPECIFICATIONS

The Crosley Radio Models 666 and 5666 are companion models employing the same circuit. The Model 666 is supplied in a table cabinet having the speaker mounted on the chassis and the Model 5666 is a console type having the speaker mounted in the cabinet.

The frequency ranges covered are from 540 to 1710 kilocycles in the broadcast band and from 2350 to approximately 7500 kilocycles in the high frequency band.

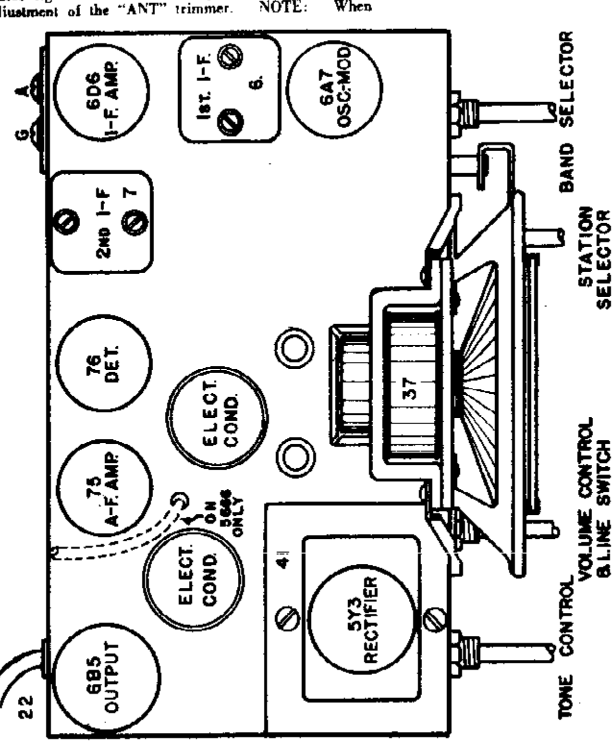


Fig. 2 Top View 666

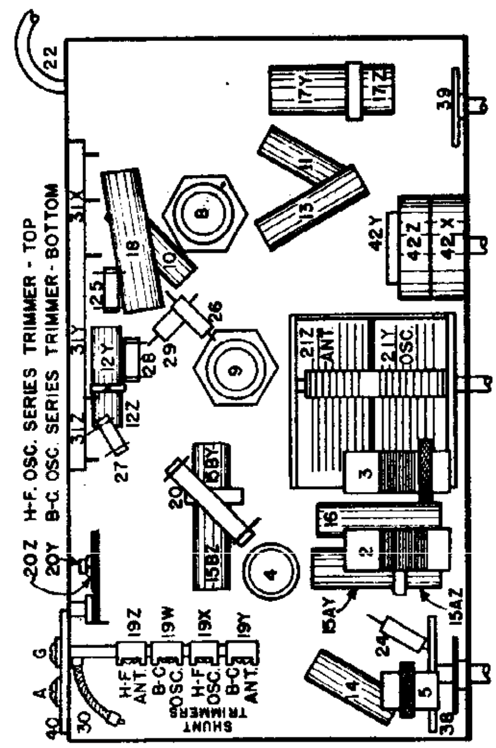
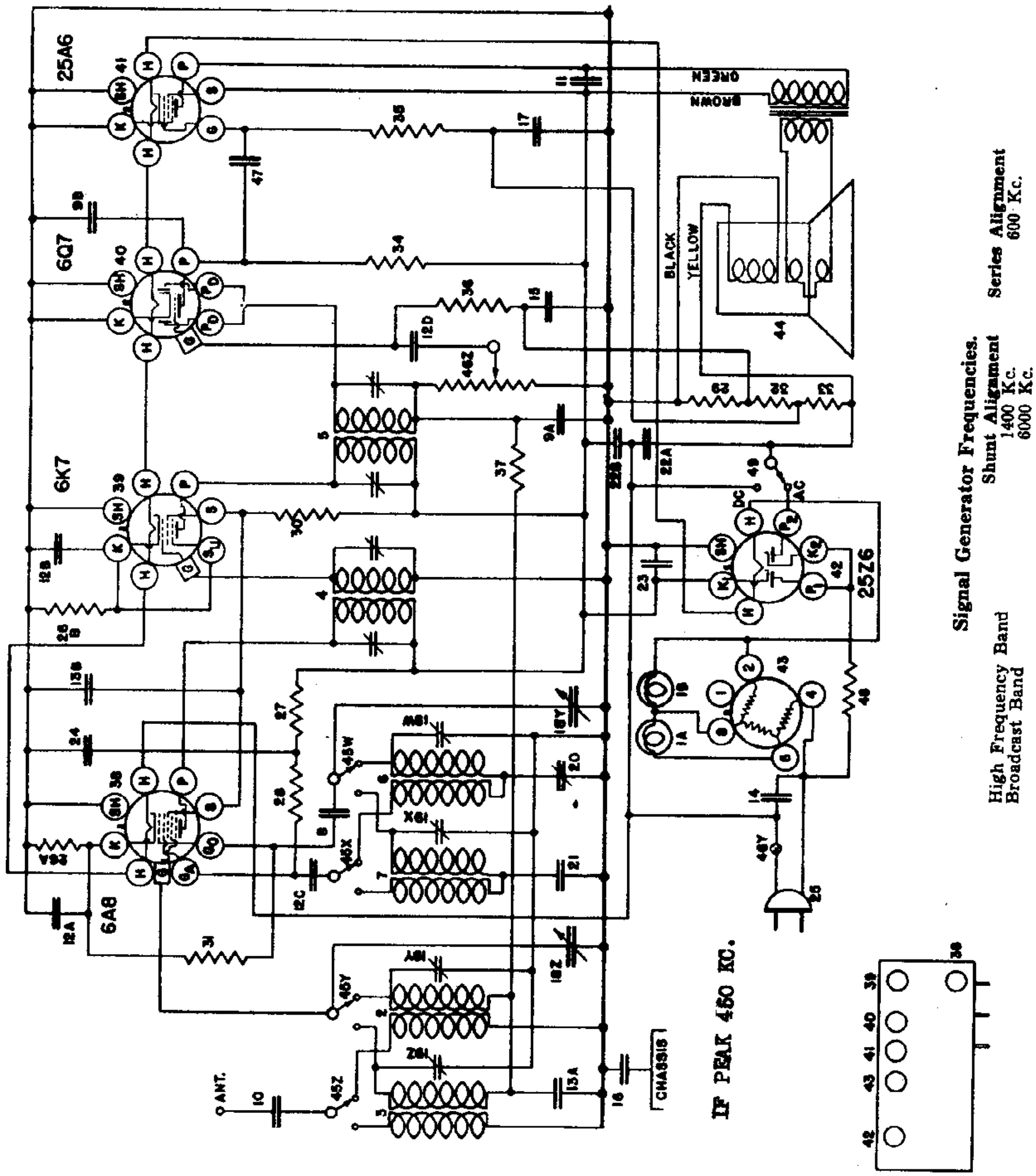


Fig. 3 Bottom View 666

CROSLEY RADIO CORP.

MODEL 676
Schematic, Socket Voltage



TUBE SOCKET VOLTAGE READINGS

Tube		H	P	S	G	Su	K	Ga	Go
6A8G	Oscillator-Modulator	6.3	150	90	—	—	3.0	115	Neg.
6K7G	I-F Amplifier	6.3	150	90		3.0	3.0	—	—
6Q7G	Det. & A-F Amp.	6.3	80	—	−3	—	0	—	—
25A6G	Output	25.0	125	150	−16	—	0	—	—
25Z6G	Rectifier	25.0							
W-42520	Ballast Tube		Variable						

Power output approximately 3 watts.
Power consumption approximately 75 watts.
Voltage drop across speaker field 80 volts.
All readings taken on 117.5 volt A.C. power supply.
All voltages except filaments will be approximately 40% lower if measured on 117.5 volt D.C. power supply.

MODEL 676
Socket, Trimmers
Alignment, Parts

CROSLEY RADIO CORP.

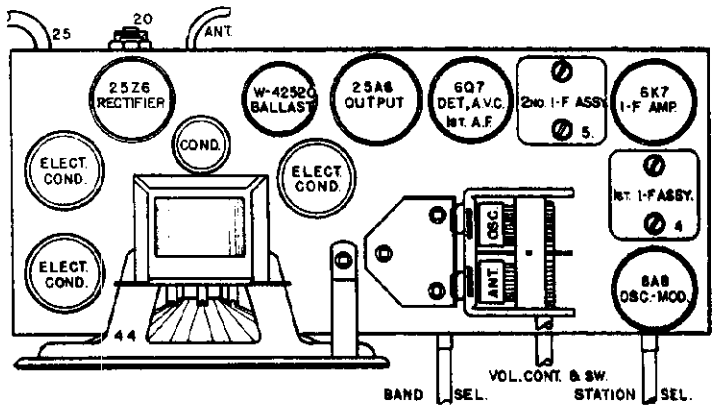


Fig. 2 Top View 676

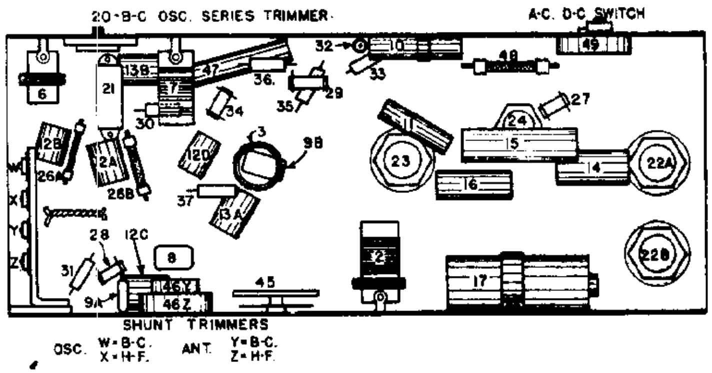


Fig. 3 Bottom View 676

A.C.-D.C. SWITCH

A switch is located on the rear of the receiver chassis for the purpose of adapting the receiver to either an A.C. or D.C. power supply. To change the position of the switch, remove the screw in the locking bracket and move the end of the bracket to the other position as marked on the chassis. Replace the screw so as to lock the switch in the new position.

The receiver will operate satisfactorily on either A.C. or D.C. with the switch in the D.C. position, but the performance of the receiver will be greatly improved with the switch in the A.C. position when being operated on A.C. DO NOT OPERATE THE RECEIVER ON A D.C. POWER SUPPLY WITH THE SWITCH IN THE A.C. POSITION AS IT WILL CAUSE DAMAGE TO THE RECEIVER PARTS.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 25A6 Output tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 condenser to the top cap of the 6A8 Oscillator-Modulator tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator through a .05 mfd., or larger, condenser to the receiver chassis. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the plates of the condenser gang are completely out of mesh, turn the band selector switch to the right (High Frequency Position) and turn the volume control to the right (ON).

(c) Set the signal generator to 450 kilocycles.

(d) Adjust both trimmer condensers located on top of the 2nd I-F transformer for maximum reading on the output meter.

(e) Adjust both trimmers located on top of the 1st I-F transformer for maximum reading on the output meter.

(f) Check operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

(a) When aligning the R-F Amplifier the output lead from the signal generator should be connected through a dummy antenna to the "ANT" terminal of the receiver. For the broadcast band the dummy antenna should be a .00025 mfd. condenser and for the high frequency band this condenser should be replaced by a 400 ohm (Non Inductive) carbon resistor.

Each band should be shunt aligned, series aligned (Broadcast Band) and then shunt aligned again in the order given. The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated below for each adjustment.

Adjust the "OSC" and "ANT" shunt trimmers. (See Fig. 3) in the order given for maximum output. Tune the station selector to the generator signal for maximum output and then check the adjustment of the "ANT" trimmer. NOTE: When aligning the high frequency band care should be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator approximately 10 times and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles below the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct dial setting.

To adjust the "series" trimmer (Fig. 3) set the signal generator to the frequency indicated below and then tune-in this signal with the station selector for maximum output. Adjust the series trimmer while rocking the tuning condenser back and forth slightly, until no further improvement in output can be obtained.

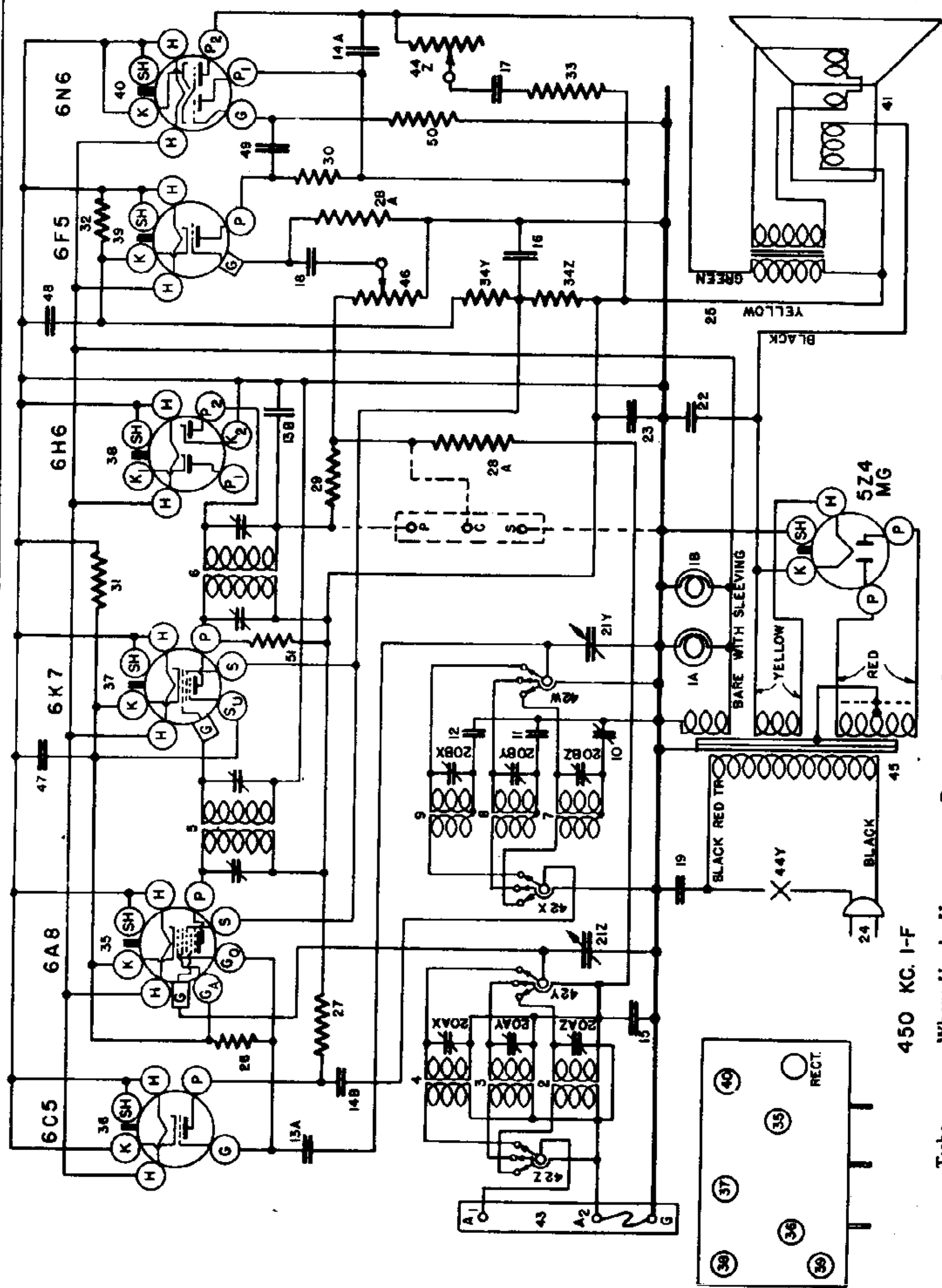
PARTS LIST—MODEL 676

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1AB	W —4099B	Dial Light Bulb
	G6 27130	Socket—Dial Light
2	G124—32000	Ant. Coil B-C-B
3	G123—32000	Ant. Coil H-F-B.
4	G128—32001	1st I-F Assembly
5	G129 32001	2nd I-F Assembly
6	G118—32002	Osc. Coil B-C-B
7	G117—32002	Osc. Coil H-F-B
8	G2 —34002	Condenser .0001 Mf.
9AB	G1 34002	Condenser .00025 Mf.
10	W —30325	Condenser .003 Mf.
11	W —32378	Condenser .01 Mf. 400V.
12ABCD	W —36541	Condenser .02 Mf. 160 V.
13AB	W —35936	Condenser .05 Mf. 200 V.
14	W —32780B	Condenser .05 Mf. 400 V.
15	W —31712	Condenser .25 Mf. 160 V.
16	W —24049C	Condenser .1 Mf. 200 V.
17	W —30321	Condenser 1. Mf. 160 V.
18ZY	G26 —33001	2 Section Var. Tuning Cond. Gang
	MG15—42502	Dial Assembly (Complete)
	C —42553A	Drive Unit—Dial
	B —42481	Dial (Calibrated)
	W —42494	Dial Hand
	W —40186	Screw (Hand Mtg.)
	—42713A	Band Indic. Dial Assembly
	—43412	Dial Vern.-Indic. Assembly
	—43413	Drive Chain
	—43414	Take-Up Spring
19	W —37241B	4 Section Shunt Trimmer
20	—40769	B-C Osc. Series Trimmer
21	G21 —34000	H-F Osc. Series Cond.
22AB	W —40325	Condenser 50 Mf. 150 V.
23	W —36067	Condenser 40 Mf. 300 V.
24	W —41081	Condenser 16 Mf. 250 V.
25	B —3390A	Power Cord and Plug
26AB	W —28589	Resistor 350 Ohm ¼W. Flexible
27	—31093	Resistor 2700 Ohm ¼W.
28	—24814	Resistor 7000 Ohm ¼W.
29	—27024	Resistor 8000 Ohm ¼W.
30	—36318	Resistor 15000 Ohm ¼W.
31	—35928	Resistor 60000 Ohm ¼W.
32	—35600	Resistor 100,000 Ohm ¼W.
33	—35930	Resistor 200,000 Ohm ¼W.
34	—34020	Resistor 250,000 Ohm ¼W.
35	—36321	Resistor 400,000 Ohm ¼W.
36	—35602	Resistor 1 Megohm ¼W.
37	—35927	Resistor 2 Megohm ¼W.
38	G156—36400	Socket Type 6A8
39	G151—36400	Socket Type 6K7
40	G160 36400	Socket Type 6Q7
41	G161—36400	Socket Type 25A6
42	G162—36400	Socket Type 25Z6
43	G169—36400	Socket Type Ballast
	W —35774	Tube Shield Base
	W —35772	Tube Shield (Half)
	W —35773	Tube Shield Cap
44	346BL9 "M"	Speaker Spec. 1-D-667
	—41638	Cone Assembly (For Above Speaker)
	40275	Field Coil (For Above Speaker)
	—42878	Output Trans. (For Above Speaker)
45	—42519	Band Selector Switch
46Z, 46Y	—42522	Volume Control, Line Switch — 500000 OHMS
47	W —27216	Condenser .05 Mf. 200 V.
48	W —42686	Resistor 50 Ohm 1¼W. Flexible
49	W —42701	A. C.—D. C. Switch
	G111—34403	Ant. Lead Assembly
	B —42543	Escutcheon and Lens
	W —37341	Knob—3 Req.
	—6AA	Cabinet

CROSLEY RADIO CORP.

September, 1936 SALES MODELS 744 and 745 CHASSIS 716



450 KC. I-F

Tube	Where Used	H	P	P2	S	G	K	Go
6C5	Oscillator	6.3	165	—	—	0	0	—
6A8	Modulator	6.3	270	—	120	0	2.85	—5 to —30
6K7	I. F. Amp.	6.3	270	—	120	0	2.85	—
6H6	Diode Detector	6.3	0	—	—	—	—	—
6F5	A. F. Amp.	6.3	170	—	—	0	1.75	—
6N6	Output	6.3	270	255	—	0	0	—
5Z4MG	Rectifier	5.0	—	—	—	—	330	—

Power Consumption Approximately 80 Watts at 117.5 Volts.
Power Output Approximately 6 Watts.
Voltage Drop Across Speaker Field Approximately 60 Volts.

SPECIFICATIONS

The Crosley Radio Model 716 is a seven-tube superheterodyne receiver designed to operate on an ALTERNATING CURRENT power supply.

It is a three band receiver and the dial is divided into three sections as follows:

BLUE	540-1800 Kilocycles	(American Broadcast Band)
RED	1.8- 6.0 Megacycles	(Police and Amateurs)
GREEN	6.0- 18.0 Megacycles	(High Frequency Bands)

MODEL 716
Trimmers, Chassis
Alignment, Parts

CROSLEY RADIO CORP.

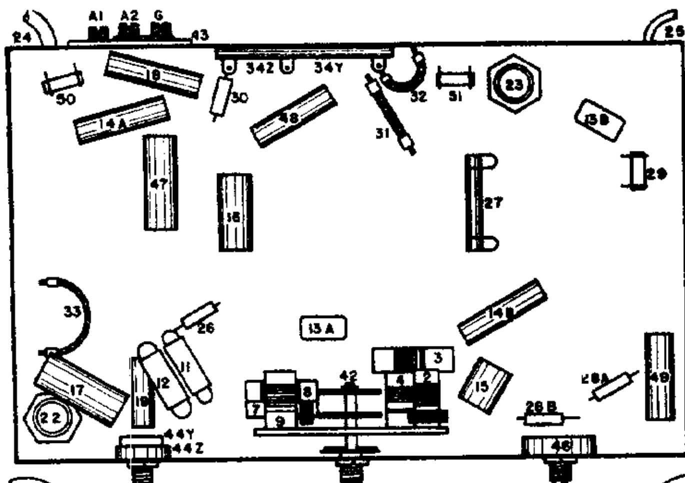


Fig. 3. Bottom View 716

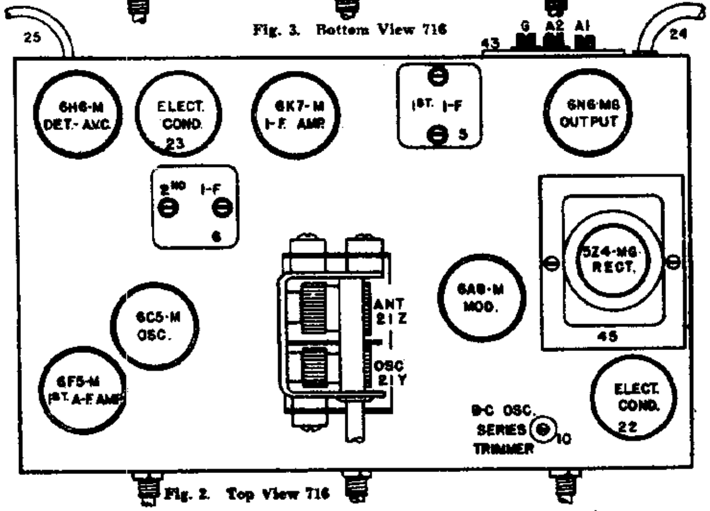


Fig. 2. Top View 716

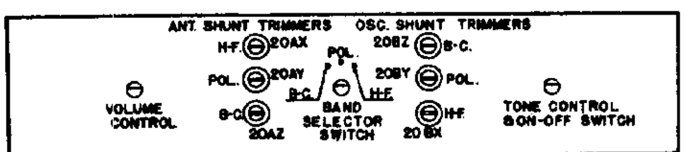


Fig. 4. Front View 716

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to the two plates of the 6N6 Output Tube. Be sure the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8 tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Turn the band selector switch to the High Frequency Band.

(d) Set the signal generator to 450 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F Transformer for maximum output.

(f) Adjust both trimmers located on top of the 1st I-F Transformer for maximum output.

(g) Check operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

Aligning R-F Amplifier.

When aligning the R-F Amplifier the output lead of the signal generator is connected to the "Ant" terminal of the receiver. For the BLUE and RED bands a .00025 mfd. condenser must be connected in series with the output lead of the signal generator and for the high-frequency band a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be shunt aligned and then series aligned, where provision is made for series alignment (BLUE band). The band selector switch should be set for the band being aligned and the station selector and signal generator should be set to the frequency indicated (c) for each adjustment.

(a) Adjust the "Osc" and "ANT" shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check the adjustments of the "ANT" trimmers. Do NOT READJUST the "OSC" TRIMMER.

NOTE: When shunt aligning the RED and GREEN bands care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times, or more, and try to tune-in the signal both at the station selector dial and at approximately 900 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct position.

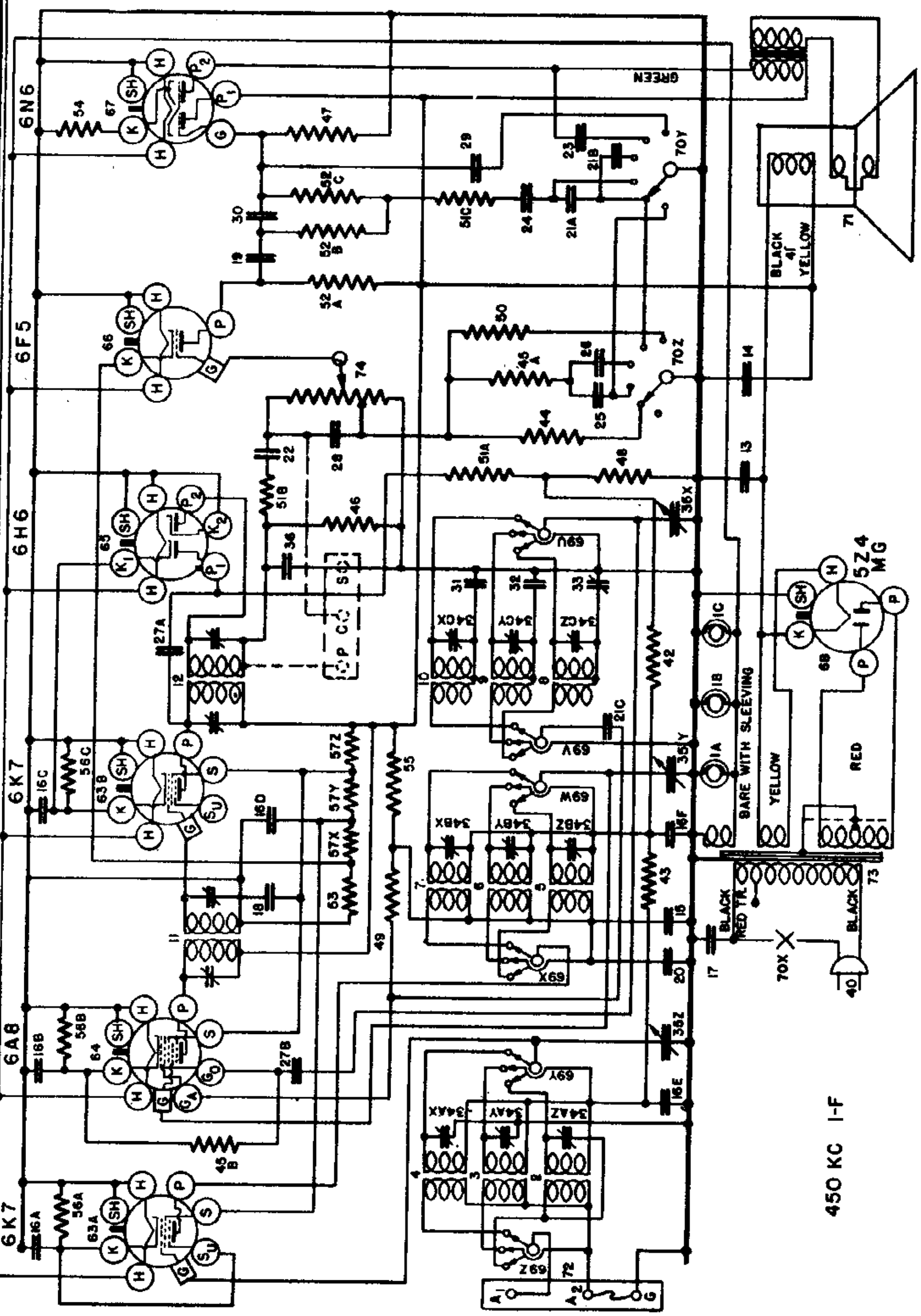
(b) To align the series trimmer (item 10, Fig. 2) set the signal generator to the frequency indicated (c) and then tune-in this signal with the station selector for maximum output. To obtain the best adjustment for the series trimmer it will be necessary to rotate the station selector back and forth slightly while adjusting the trimmer for maximum output.

(c) Signal Input Frequencies:

	Shunt Alignment	Series Alignment
American Broadcast Band (BLUE)	1700 Kilocycles	600 Kilocycles
Police Band (RED)	6000 Kilocycles	....
High-Frequency Band (GREEN)	18000 Kilocycles	....

Item No.	Part No.	Name
1-AB	W —37922	Bulb 6-8V, Dial Light
	G3 —37965	Socket Assy., Dial Light
2	G120 —32000	Coil, Ant. (540-1800 Kc.)
3	G119 —32000	Coil, Ant. (1800-6000 Kc.)
4	G121 —32000	Coil, Ant. (6000-18000 Kc.)
5	G122 —32004	Coil Assy. 1st I-F (450Kc.)
6	G123 —32004	Coil Assy. 2nd I-F (450Kc.)
7	G112 —33002	Coil, Osc. (540-1800 Kc.)
8	G111 —32002	Coil, Osc. (1800-6000 Kc.)
9	G123 —32002	Coil, Osc. (6000-18000 Kc.)
10	—40769	Cond. [illegible]
11	G7 —34007	Cond. [illegible]
12	G 8 —34007	Cond. [illegible]
13A	G 2 —34002	Cond., [illegible] (Molded)
13B	G 2 —34002	Cond., [illegible] (Molded)
14A	W —35139	Cond., [illegible] (Tub.)
14B	W —35139	Cond., [illegible] (Tub.)
15	W —35936	Cond., [illegible] (Tub.)
16	W —24049-B	Cond., [illegible] (Tub.)
17	W —37873	Cond., [illegible] (Tub.)
18	W —30488	Cond., [illegible] (Tub.)
19	W —30805	Cond., [illegible] (Tub.)
20	W —35951	Cond.-3 Section Trimmer
21	G21 —33001	Cond.-3 Section Tuning
	B —42142-A	Dial Calibrated Glass
	—42346	Drive Unit
	B —42338	Mask Metal
	—41145	Pointer Dial
	W —40486	Screw, Pointer Mtg.
	MG27—42151	Dial Drive Complete
	—41582	Cable, Drive
22	W —36055	Cond., [illegible] (Elect.)
23	W —36057	Cond., [illegible] (Elect.)
24	B —33906-A	Cord and Plug, Power
25	G4 —35696	Speaker Cable
26	—40757	Resistor, [illegible] Ohm ¼W. (Car.)
27	W —37987	Resistor, [illegible] Ohm [illegible] W (WireWound)
[illegible]	[illegible]	Resistor, 3 Megohm ¼W. (Car.)
[illegible]	[illegible]	Resistor, 3 Megohm ¼W. (Car.)
[illegible]	[illegible]	Resistor, 300,000 Ohm ¼W. (Car.)
[illegible]	[illegible]	Resistor, 200,000 Ohm ¼W. (Car.)
[illegible]	W [illegible]	Resistor, 165 Ohm ¾W. (Flex.)
32	W —35457	Resistor, 210 Ohm ¾W. (Flex.)
33	W —27503	Resistor, 1400 Ohm ¾W. (Flex.)
342	W —32301	Resistor, 10,000 Ohm Candohm
34Y		Resistor, 15,000 Ohm Candohm
35	G156 —36400	Socket Type 6A8
36	G152 —36400	Socket Type 6C5
37	G151 —36400	Socket Type 6K7
38	G155 —36400	Socket Type 6H6
39	G158 —36400	Socket Type 6F5
40	G165 —36400	Socket Type 6N6
41	332—BJ3	Speaker "M" Spec. 1-D-390
	—41638	Cone Assy. for "M" 332BJ3
	—40275	Field Coil for "M" 332BJ3
	—41639	Output Trans. for "M" 332BJ3
42	—40770-A	Switch, Band Selector
43	G27 —26719	Terminal Board, Antenna & Grd.
442	—37908	Tone Control, 100,000 Ohm
44Y		Switch, Line
45	—41978	Transformer, 110V. 60 Cy.
	—42119	Transformer, 110V. 25 Cy.
	—42150	Transformer, 220V. 25 Cy.
46	—37967	Volume Control 1Megohm
47	W —29910-A	Cond., .25Mf.200V. (Tub.)
48	W —28621	Cond., .02Mf.200V. (Tub.)
49	W —35758	Cond., .008, 400V. (Tub.)
50	—23785	Resistor, 500,000 Ohm ¼W. (Car.)
	W —42345	Escutcheon
	D —28	Screw Escutcheon Mtg.
	W —37339	Knob (3 Req.)
	W —40192-B	Knob (1 Req.)
	H	Cabinet, Model 744
	C	Cabinet, Model 745

CROSLEY RADIO CORP.



CHASSIS MODEL 726

SALES MODEL 769

Sept. 1936

SPECIFICATIONS

The Crosley Radio Model 726 is a seven tube super-heterodyne receiver designed to operate on an ALTERNATING CURRENT power supply. It is available with either 110 V., 60 Cy., or 110 V., 25 Cy., Transformers. It is a three band receiver and the dial is divided into three sections as follows:

BLUE 540-1800 Kilocycles (American Broadcast Band)
RED 1.8- 6.0 Megacycles (Police and Amateurs)
GREEN 6.0-18.0 Megacycles (High Frequency Band)

TUBE SOCKET VOLTAGE READINGS

Tube	Where Used	H	P	P_2	S	G	Su	K	Ga
6K7	R. F. Amplifier	6.3	235	—	73	0	3.0	3.0	—
6A8	Osc.-Mod.	6.3	270	—	96	0	—	3.5	145
6K7	I. F. Amplifier	6.3	270	—	96	0	2.7	2.7	—
6H6	Det. & AVC	6.3	0	—	—	—	—	0	—
6F5	A. F. Amplifier	6.3	135	—	—	0	—	2.5	—
6N6	Output	6.3	270	260	—	0	—	2.2	—
5Z4MG	Rectifier	5.0	—	—	—	—	—	350	—

Power Output Approximately 6 Watts.
Power Consumption Approximately 83 Watts at 117.5 Volts.
Voltage Drop Across Speaker Field 77 Volts

MODEL 726
Socket, Trimmers
Chassis, Alignment
Parts

CROSLEY RADIO CORP.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits may be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to the two plates of the 6N6 Output Tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8 tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the fidelity control knob to the left (NORMAL).

(c) Turn the band selector switch to the High Frequency Band.

(d) Set the signal generator to 450 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F transformer for maximum output.

(f) Adjust both trimmers located on top of the 1st I-F Transformer for maximum output.

(g) Check operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

Aligning R-F Amplifier.

When aligning the R-F Amplifier the output lead of the signal generator is connected to the "ANT" terminal of the receiver. For the BLUE and RED bands a .00025 mfd. condenser must be connected in series with the output lead of the signal generator and for the high-frequency band a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be shunt aligned and then series aligned, where provision is made for series alignment (BLUE band). The band selector switch should be set for the band being aligned and the station selector and signal generator should be set to the frequency indicated (c) for each adjustment.

(a) Adjust the "OSC.," "ANT" and "R-F" shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check the adjustments of the "ANT" and "R-F" trimmers. DO NOT READJUST the "OSC" TRIMMER.

NOTE: When shunt aligning the RED and GREEN bands care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times, or more, and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct position.

(b) To align the series trimmer (Item 33, Fig. 2) set the signal generator to the frequency indicated (c) and then tune-in this signal with the station selector for maximum output. To obtain the best adjustment for the series trimmer it will be necessary to rotate the station selector back and forth slightly while adjusting the trimmer for maximum output.

(c) Signal Input Frequencies:

	Shunt Alignment	Series Alignment
American Broadcast Band (BLUE)	1700 Kilocycles	600 Kilocycles
Police Band (RED)	6000 Kilocycles	....
High-Frequency Band (GREEN)	18000 Kilocycles	....

PARTS LIST

Item No.	Part No.	Description
1ABC	W —37922	Dial Light
	G3 —37965	Socket Assy. Dial Light
2	G110—32000	Coil Ant. 540–1800 Kc.
3	G111—32000	Coil Ant. 1800–6000 Kc.
4	G112—32000	Coil Ant. 6.–18 Mc.
5	G76 —32001	Coil R. F. 540–1800 Kc.
6	G89 —32001	Coil R. F. 1800–6000 Kc.
7	G90 —32001	Coil R. F. 6.–18 Mc.
8	G115—32002	Coil Osc. 590–1800 Kc.
9	G121—32002	CoilOsc. 1800–6000 Kc.
10	G122—32002	Coil Osc. 6.–18 Mc.
11	G121—32004	1st. IF. Assy.
12	G120—32004	2nd. IF. Assy.
13	W —36055	Condenser, 35Mf. 400V.
14	W 36057	Condenser, 40Mf. 300V
15	W —41081	Condenser 16Mf. 250V.
16A TO 16F	W —36541	Condenser, .02Mf. 160V.
	W —36541	Condenser, .02Mf. 160V.
17	W —30806	Condenser, .01Mf. 400V.
18	W —35936	Condenser, .05Mf. 200V.
19	W —32780B	Condenser, .05Mf. 400V.
20	W — 32378	Condenser, .01Mf. 400V.
21A	W —35139	Condenser, .004Mf. 400V.
21B	W —35139	Condenser, .004Mf. 400V.
21C	W —35139	Condenser, .004Mf. 400V.
22	W —28621	Condenser, [illegible]
23	W —23615	Condenser, [illegible]
24	W —30323	Condenser, [illegible]
25	W —28619	Condenser, [illegible]
26	W —25435	Condenser, [illegible]
27A	G2 —34002	Condenser, [illegible] (Mica)
27B	G2 —34002	Condenser, .0001Mf. (Mica)
28	G8 —34002	Condenser, .00001Mf. (Mica)
29	G3 — 34002	Condenser, .0005Mf. (Mica)
30	G6 —34002	Condenser, .000025Mf. (Mica)
31	G20 —34000	Condenser, 4910Mmf. (Mica)
32	G7 — 34000	Condenser, 1450Mmf. (Mica)
33	—40769	Condenser, B. C. Osc. Series Trim.
34	W —35951	Condenser, 3 Section Trimmer
35	G52 —33002	Condenser, 3 Gang Var. Tuning
	MG33—42255	Dial Drive Assy.
	C —42491	Dial Glass (Calibrated)
	—42300	Drive Unit
	—42597	Dial Mask (Cardboard)
	W —42180	Dial Hand, Pointer
	—41144	Dial Hand, Time Log
	W —40486	Pointer Mtg. Screw
36	G1 —34002	Condenser, .00025 Mf. (Mica)
37	W —30270	Condenser, .001 Mf. 400V.
40	B —33906A	Power Cord & Plug
41	G3 36696	Cable, Speaker
42	—37245	Resistor, Meg. Ohm. ¼ W.
43	—35600	Resistor, 100,000 Ohm. ¼ W.
44	—36319	Resistor, 75,000 Ohm. ¼ W.
45A	—35928	Resistor, 60,000 Ohm. ¼ W.
45B	35928	Resistor, 60,000 Ohm. ¼ W.
46	—36321	Resistor, 400,000 Ohm. ¼ W.
47	—38623	Resistor 750,000 Ohm. ¼ W.
48	—36322	Resistor, 500,000 Ohm. ¼ W.
49	—37377	Resistor, 20,000 Ohm. 1 W.
50	—35929	Resistor, 150,000 Ohm. ¼ W.
51A	—35601	Resistor, 300,000 Ohm. ¼ W.
51B	35601	Resistor, 300,000 Ohm. ¼ W.
51C	—35601	Resistor, 300,000 Ohm. ¼ W.
52A	—35930	Resistor, 200,000 Ohm. ¼ W.
52B	—35930	Resistor, 200,000 Ohm. ¼ W.
52C	—35930	Resistor, 200,000 Ohm. ¼ W.
53	W —30127	Resistor, 450 Ohm. ½ W. Flex.
54	W —23012A	Resistor, 40 Ohm ¼ W. Flex.
55	— 6705	Resistor, 3500 Ohm. 1 W.
56A	W —28589	Resistor, 350 Ohm. ½ W. Flex.
56B	W —28589	Resistor, 350 Ohm. ½ W. Flex.
56C	W 28589	Resistor, 350 Ohm. ½ W. Flex.
57Z	W —37781	Resistor, 16,500 Ohm. (Cand. Ohm.)
57Y		Resistor, 4,000 Ohm. (Cand. Ohm.)
57X		Resistor 18,500 Ohm. (Cand. Ohm.)
63A	G151 36400	Socket Type 6K7
63B	G151 —36400	Socket Type 6K7
64	G156—36400	Socket Type 6A8
65	G155 —36400	Socket Type 6H6
66	G158—36400	Socket Type 6F5
67	G165—36400	Socket Type 6N6
68	G154—36400	Socket Type 5Z4
69	C —40910A	Band Selector Switch
70Z	B —42387C	Fidelity Switch
70Y		Fidelity Switch
70X		Line Switch
71	—645CJ3	Speaker "M" Spec. 1D640
	—42883	Cone Assy. (For Above Speaker)
	—40406	Field Coil (For Above Speaker)
	—42885	Output Trans. (For Above Speaker)
72	G27 —26719	Ant. & Gnd. Terminal Assy.
73	—42260	Power Trans. 60 Cy. 110 V.
	42261	Power Trans. 25 Cy. 110 V.
74	—42501	Volume Control 3 Meg.
		Misc. Parts
	C —42045	Escutcheon
	B —42043	Escutcheon Rubber
	D — 30	Screws—Escutcheon Mtg.
	C —42044	Lens—Escutcheon
	W —40230B	Emblem
	W —33620	Nut—Emblem Mtg.
	W —36117	Rubber Mtg. Foot
	W —37339	Knob. (2 Req.)
	W —40192B	Knob, B. S. Sw. (1 Req.)
	W —42490	Knob, S. S. (1 Req.)
	6-NG	Cabinet

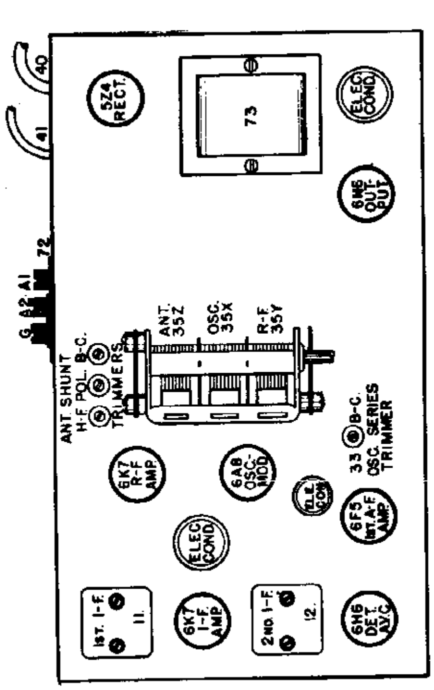


Fig. 2 Top View 726

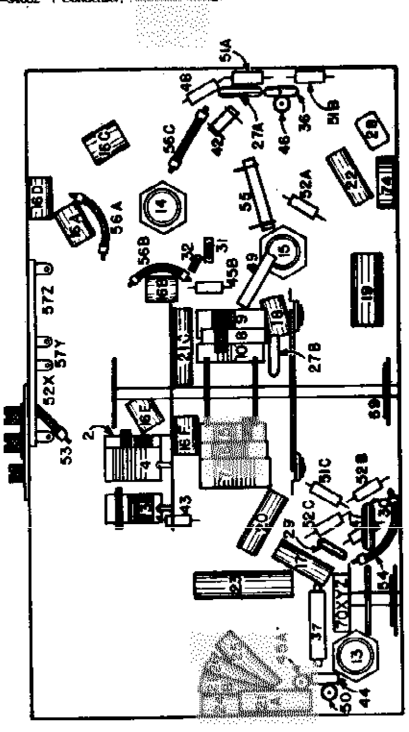


Fig. 3 Bottom View 726

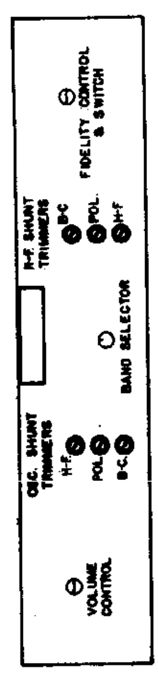
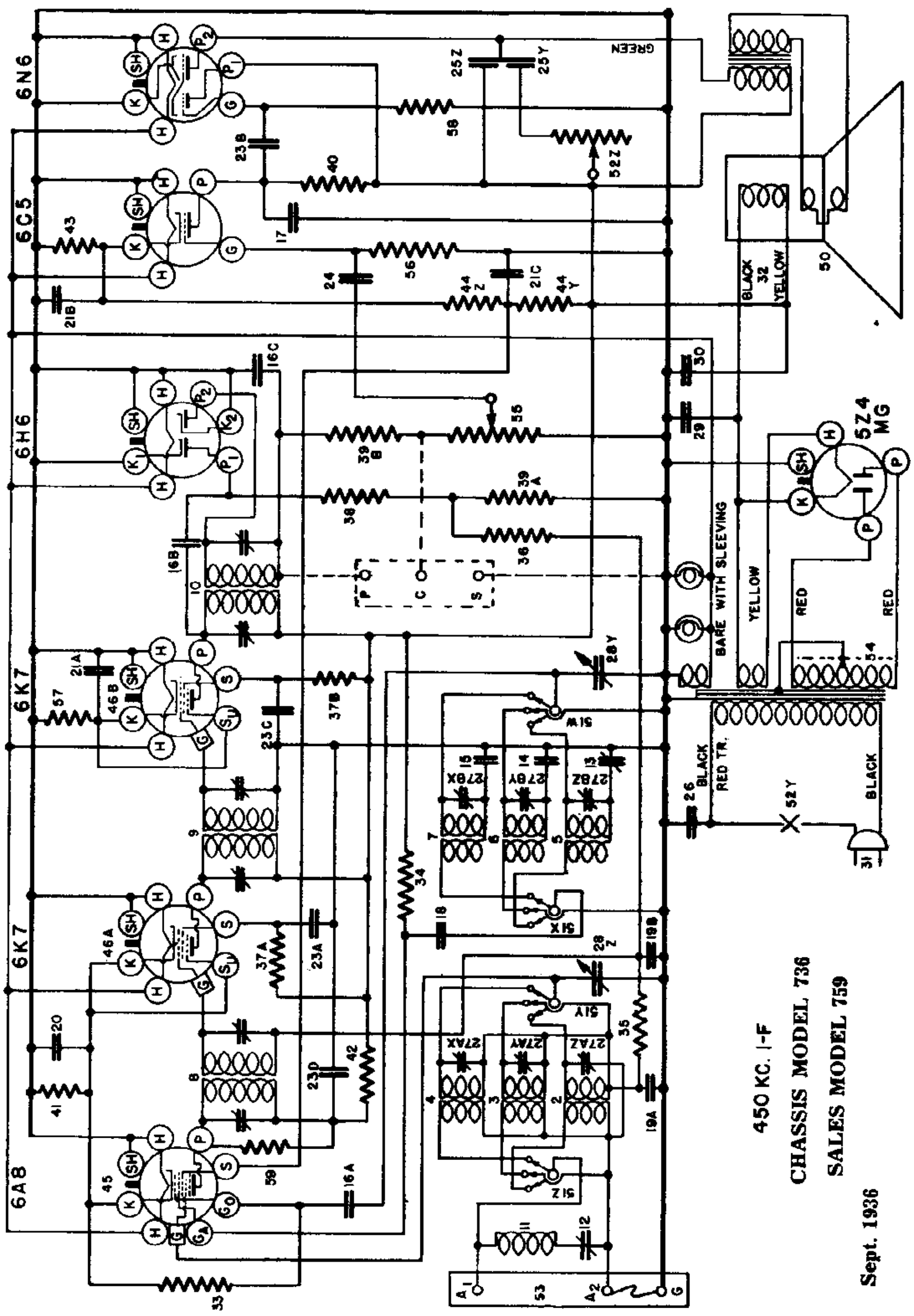


Fig. 4 Front View 726

MODEL 736
Schematic, Voltage

CROSLEY RADIO CORP.



450 KC. I-F

CHASSIS MODEL 736

SALES MODEL 759

Sept. 1936

SPECIFICATIONS

The Crosley Receiver Model 736 is a seven tube superheterodyne radio designed to operate on an ALTERNATING CURRENT power supply. It incorporates a WAVE-TRAP in its construction so that interfering signals between the frequencies of approximately 440 and 480 Kilocycles may be reduced so that they are not objectionable if not entirely eliminated from over riding station being received.

It is a three band receiver and the dial is divided into three sections as follows:

BLUE	540-1800 Kilocycles	(American Broadcast Band)
RED	1.8- 6.0 Megacycles	(Police and Amateurs)
GREEN	6.0-18.0 Megacycles	(High Frequency Band)

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	K	S	Go	Ga
6A8	Osc.-Mod.	6.3	280	3.2	130	-5 to -30	160
6K7	1st. I. F. Amp.	6.3	280	3.2	110	—	—
6K7	2nd. I. F. Amp.	6.3	280	8.0	130	—	—
6H6	Det. & AVC	6.3		—	—	—	—
6C5	1st. A. F. Amp.	6.3	155	6.5	—	—	—
6N6	Output	6.3	220	—	P_2 280	—	—
5Z4	Rectifier	5.0	—	330	—	—	—

Power Output Approximately 6 Watts.
Power Consumption Approximately 80 Watts at 117.5 Volts
Voltage Drop Across Speaker Field Approximately 50 Volts.

MODEL 736
Socket, Trimmers
Alignment, Chassis
Parts

CROSLEY RADIO CORP.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to the two plates of the 6N6 Output Tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger not electrolytic) in series with one of the leads.

I. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8 tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Turn the band selector switch to the High Frequency Band.

(d) Set the signal generator to 450 kilocycles.

(e) Adjust both trimmers located on the top of the 3rd I-F Transformer for maximum output.

(f) Adjust both trimmers located on top of the 2nd I-F Transformer for maximum output.

(g) Adjust both trimmers located on top of the 1st I-F Transformer for maximum output.

(h) Check operations (e), (f) and (g) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

Aligning R-F Amplifier.

When aligning the R-F Amplifier the output lead of the signal generator is connected to the "ANT" terminal of the receiver. For the BLUE and RED bands a .0002 mfd. condenser must be connected in series with the output lead of the signal generator and for the high-frequency band a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be shunt aligned and then series aligned, where provision is made for series alignment (BLUE band). The band selector switch should be set for the band being aligned and the station selector and signal generator should be set to the frequency indicated (c) for each adjustment.

(a) Adjust the "OSC" and "ANT" shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check the adjustments of the "ANT" trimmers. DO NOT READJUST the "OSC" TRIMMER.

NOTE: When shunt aligning the RED and GREEN bands care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times, or more, and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct position.

(b) To align the series trimmer (Item 13, Fig. 2) set the signal generator to the frequency indicated (c) and then tune-in this signal with the station selector for maximum output. To obtain the best adjustment for the series trimmer it will be necessary to rotate the station selector back and forth slightly while adjusting the trimmer for maximum output.

(c) Signal Input Frequencies:

	Shunt Alignment	Series Alignment
American Broadcast Band (BLUE)	1700 Kilocycles	800 Kilocycles
Police Band (RED)	6000 Kilocycles	....
High-Frequency Band (GREEN)	18000 Kilocycles	....

TO ADJUST WAVE TRAP

Connect the output of the signal generator through an .02 Mf. condenser to the ANT. terminal on the chassis and the other lead to GND. terminal.

(a) Adjust signal generator to frequency of interfering signal.

(b) Set station selector to approximately 650 Kilocycles with the band selector in the Broadcast position.

(c) Adjust Wave Trap trimmer (Item 12, Fig. 2) to minimum signal.

For simple adjustment tune-in station with maximum interference and adjust Wave Trap Trimmer for minimum interference.

PARTS LIST

Item No.	Part No	Name Value
1AB	W —37992	Bulb, Dial Light 6-8V.
	G3 —37965	Socket Assy. Dial Light
2	G120—32000	Coil, Ant. 540-1800 Kc.
3	G119—32000	Coil, Ant. 1800-6000 Kc.
4	G121—32000	Coil, Ant. 6000-18000 Kc.
5	G112—32002	Coil, Osc. 540-1800 Kc
6	G111—32002	Coil, Osc. 1800-6000 Kc.
7	G113—32002	Coil, Osc. 6000-18000 Kc.
8	G125—32004	Coil, Assy. 1st. I. F. 450 Kc.
9	G124—32004	Coil, Assy. 2nd I. F. 450 Kc.
10	G100—32004	Coil, Assy. 3rd. I. F. 450 Kc.
11	G1 —32006	Coil, Assy. Wave Trap
	LW —37235A	Coil, Only Wave Trap
12	W —37232	Condenser, Wave Trap Trimmer
	G5 —31927	Shield Assy. Wave Trap
13	—40769	Condenser 400 to 500 Mmf., B. C. Osc. Series Trimmer
14	G7 —34007	Condenser, 1750 Mmf., Pol. Osc. Series, Fixed
15	G8 —34007	Condenser, 4350 Mmf., H. F. Osc. Series, Fixed
16A	G2 —34002	Condenser, .0001 Mf. Molded
16B	G2 —34002	Condenser, .0001 Mf. Molded
16C	G2 —34002	Condenser, .0001 Mf. Molded
17	G1 —34002	Condenser, .00025 Mf. Molded
18	W —35139	Condenser, .001 Mf. 400 V. Tub.
19A	W —35936	Condenser, .05 Mf. 200 V. Tub.
19B	W —35936	Condenser, .05 Mf. 200 V. Tub.
20	W —29910A	Condenser, .25 Mf. 200 V. Tub.
21A	W —28621	Condenser, .02 Mf. 200 V. Tub.
21B	W —28621	Condenser, .02 Mf. 200 V. Tub.
21C	W —28621	Condenser, .02 Mf. 200 V. Tub.
23A	W —30488	Condenser, .02 Mf. 400 V. Tub.
23B	W —30188	Condenser, .02 Mf. 400 V. Tub.
23C	W —30188	Condenser, .02 Mf. 400 V. Tub.
23D	W —30488	Condenser, .02 Mf. 400 V. Tub.
24	W —35758	Condenser, .008 Mf. 400 V. Tub.
25Z	W —31062	Condenser, .004 Mf. 400 V. Tub.
25Y		Condenser, .05 Mf. 400 V.
26	W —30605	Condenser, .01 Mf. 400 V. Tub.
27A	W —35951	Condenser, 3 Sect. Trimmer, Ant. Shunt
27B	W —35951	Condenser, 3 Sect. Trimmer, Osc. Shunt
28	G21 —33001	Condenser, 2 Sect. Gang.
	MG27—42390	Dial Drive Assy.
	C —42420	Dial Glass (Calibrated)
	—41844	Drive Unit
	W —42684	Dial Hand
	W —40486	Screw, Hand Mtg.
	41582	Cable, Drive
29	W —36055	Condenser, 35 Mf. 400 V. Elect.
30	W —36057	Condenser, 40 Mf. 300 V. Elect.
31	B —33906A	Cord & Plug, Power
32	G3 —35696	Cable, Speaker
33	—40757	Resistor, 50,000 Ohm, ¼ W.
34	—23616	Resistor 15,000 Ohm, 1 W.
35	—21454	Resistor, 1. Megohm ¼ W.
36	—37245	Resistor, 1.5 Megohm ¼ W.
37A	—21875	Resistor, 100,000 Ohm ¼ W.
37B	—21875	Resistor, 100,000 Ohm, ¼ W.
38	—35930	Resistor, 200,000 Ohm, ¼ W.
39A	—21455	Resistor, 300,000 Ohm, ¼ W.
39B	—21455	Resistor, 300,000 Ohm, ¼ W.
40	—37768	Resistor, 6500 Ohm, ¼ W.
41	W —21964	Resistor, 165 Ohm, ½ W. Flex.
42	—23013	Resistor, 2000 Ohm, 1 W. Flex.
43	W —22514	Resistor, 750 Ohm, ½ W. Flex.
44Z	W —32301	Resistor, 10000 Ohm } Candohm
44Y		Resistor, 15000 Ohm } Candohm
45	G156—36400	Socket Type, 6A8
46A	G151—36400	Socket Type, 6K7
46B	G151—36400	Socket Type, 6K7
47	G155—36400	Socket Type, 6H6
48	G152—36400	Socket Type, 6C5
49	G165—36400	Socket Type, 6N6
50	—632CJ3	Speaker, "M", Spec. 1—D—610
	—42879	Cone Assy., For Above Spk.
	—42880	Field Coil, For Above Spk.
	—42881	Output Trans., For Above Spk.
51	—40770A	Switch, Band Selector
52Z	—37908	Tone Control 100,000 Ohm.
52Y		Line Switch
53	G27 —26719	Terminal Board, Ant. & Gnd.
54	—41978A	Transformer, Power 110 V. 60 Cy.
55	—37967	Volume Control 1 Megohm.
56	—36688	Resistor, 3 Megohm, ¼ W.
57	W —28106	Resistor, 500 Ohm, ½ W. Flex.
58	—36322	Resistor, 500,000 Ohm, ¼ W.
59	—35928	Resistor, 60,000 Ohm, ¼ W.
	W —42408	Escutcheon Ring Assy.
	—41880	Dial Lens
	—41881	Lens Retaining Ring
	—7670	Screws, (2 Req.) Escutcheon Mtg.
	W —37339	Knob, (3 Req.)
	W —40192B	Knob, (1 Req.)
	W 36117	Foot, (4 Req.) Rubber Mtg.
	6-T	Cabinet

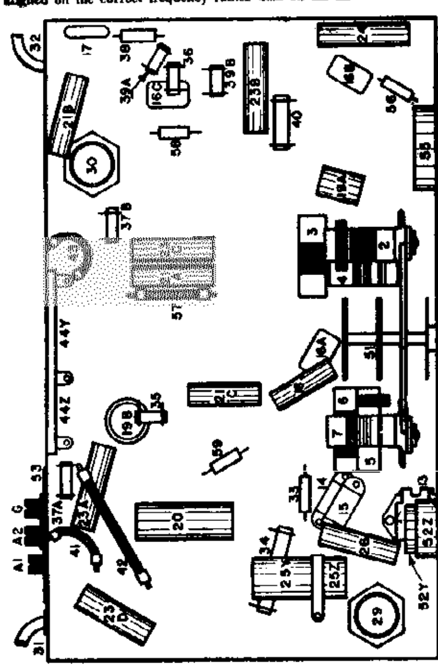


Fig. 3 Bottom View 736

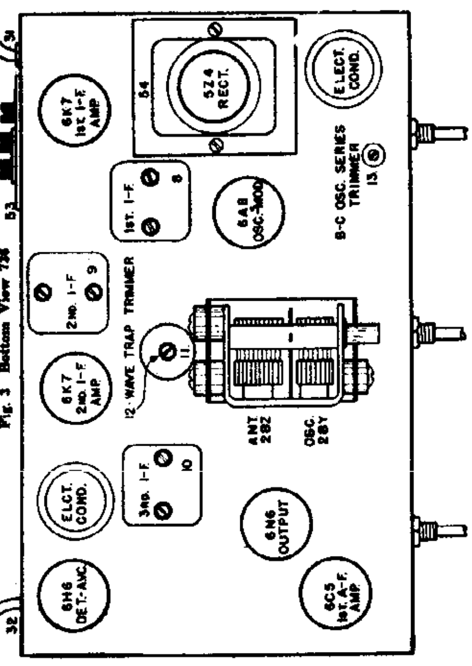


Fig. 2 Top View 736

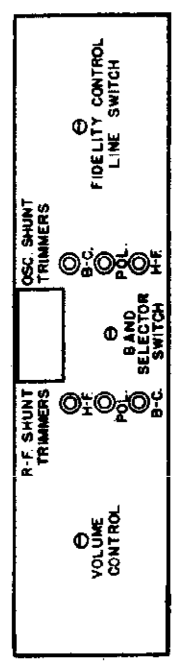
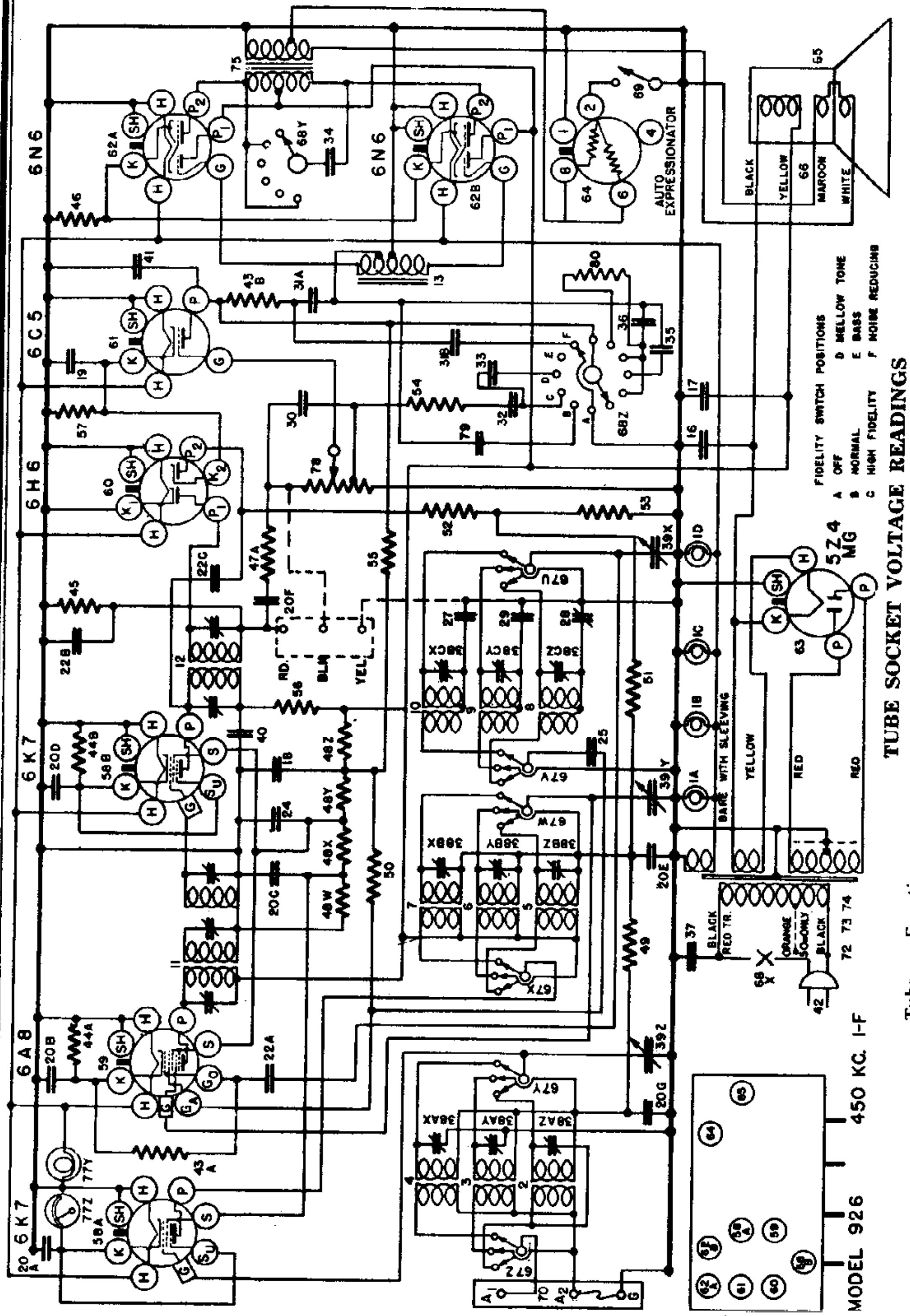


Fig. 4 Front View 736

MODEL 926
Schematic, Socket Voltage

CROSLEY RADIO CORP.



TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	P_2	S	Su	C	K	Ca	Go
6K7	R-F Amplifier	6.3	228	—	90	4.0	—	4.0	—	—
6A8	Osc.-Modulator	6.3	250	—	120	—	—	5.0	Var.	150
6K7	I-F Amplifier	6.3	235	—	120	4.0	—	4.0	—	—
6H6	Det. & A. V. C.	6.3	—	—	—	—	—	4.0	—	—
6C5	1st A-F Amp.	6.3	120	—	—	—	—	12.0	—	—
6N6	(2) Output	6.3	250	245	—	—	—	4.0	—	—
5Z4	Rectifier	5.0	—	—	—	—	—	350	—	—

W-41187 Expressionator—Variable.
Voltage drop across speaker field 100 Volts.
Power output approximately 8 watts.
Power consumption approximately 115 watts.
All readings taken on 117.5 line voltage.

CHASSIS MODEL 926

SALES MODEL 989

Sept. 1936

SPECIFICATIONS

The Crosley Model 926 radio is a nine-tube superheterodyne receiver and uses metal tubes, except the Auto Expressionator tube which is always glass and the 5Z4 rectifier which should always be the MG type. Chassis are available either with a standard 110 Volt—60 Cycle, or 110 Volt—25 Cycle Power Transformer.

The tuning range of the receiver is from 540 to 18100 Kilocycles and is divided into three bands as follows:

BLUE	540-1800 Kc.	or 555-170 Meters (Standard American Broadcast)
RED	1.8- 6.0 Mc.	or 158- 50 Meters (Police and Amateurs)
GREEN	6.0-18.0 Mc.	or 50- 17 Meters (High Frequency)

MODEL 926
Socket, Trimmers
Alignment, Parts

CROSLEY RADIO CORP.

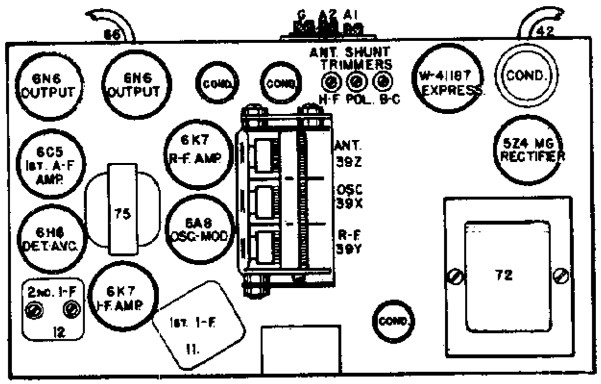


Fig. 2 Top View 926

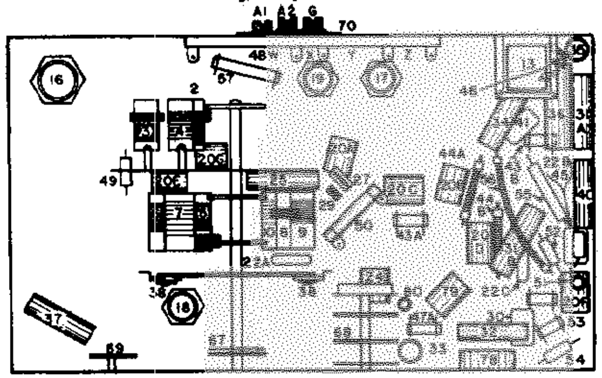
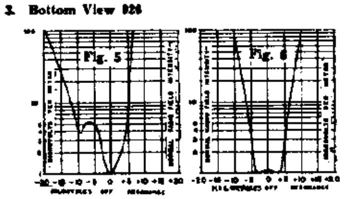


Fig. 3 Bottom View 926



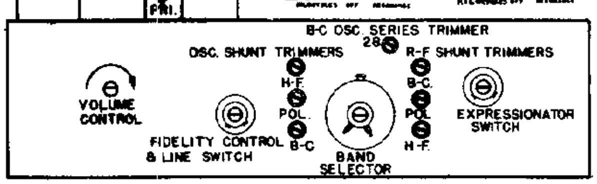


Fig. 4. Front View 926

ALIGNMENT PROCEDURE

This is a High Fidelity receiver and in order to secure maximum performance the alignment of its circuits should be done with precision instruments.

Tuning I-F Amplifier to 450 Kilocycles.

The I-F amplifier employes one triple-tuned and one double-tuned I-F transformers and under no condition should their trimmer condensers be readjusted just to determine if they are properly tuned. Fig. 5 shows the selectivity curve of a receiver whose I-F amplifier was slightly mis-tuned while Fig. 6 shows a curve made from actual measurements of a receiver which was properly aligned with the use of an oscilloscope. (See Note 3, next page).

1. Conventional Method—

(a) Connect one terminal of the output meter to P2 of one of the 6N6 Output tubes and the other terminal through a .1 mf., or larger, condenser—Not Electrolytic—to P2 of the other Output Tube.

(b) Connect the output of the signal generator through a .02 mf. condenser, to the top cap of the 6K7 I-F Amp. tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the GND. terminal of the receiver chassis. KEEP THE GENERATOR OUTPUT LEAD AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(c) Set the band selector switch to the Broadcast Band and rotate the station selector to approximately 60 on the dial. Turn the volume control knob to the right (ON), turn the fidelity control knob to (NORMAL), and turn the Auto-Expressionator Control Switch to the left (NORMAL).

(d) Set the signal generator to 450 Kilocycles.

(e) Adjust the trimmer condensers on the top of the 2nd. I-F transformer for maximum output. Fig. 2 (Item 12).

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

(f) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 Osc.-Mod. tube, leaving the tube's grid clip in place.

(g) Close the middle trimmer condenser on the 1st. I-F transformer (Tert. Fig. 4) so that it is moderately tight. (DO NOT FORCE ADJUSTING SCREW).

(h) Adjust the top (Sec) and then the bottom (Pri) trimmers of the 1st I-F transformer for maximum output.

(i) Transfer the lead of the signal generator from the 6A8 tube to the "ANT" terminal of the receiver and increase the output of the signal generator if necessary.

(j) Check the adjustment of the bottom (Pri) trimmer of the 1st. I-F transformer. Then adjust the middle trimmer by opening until maximum output is obtained. DO NOT READJUST TOP OR BOTTOM TRIMMERS AFTER THE MIDDLE TRIMMER HAS BEEN ADJUSTED.

2. Oscilloscope Method—

(a) Connect the output of the signal generator through a .02 mf. condenser to the top cap of the 6K7 I-F amplifier tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the receiver chassis. KEEP THE GENERATOR OUTPUT LEAD AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Connect the vertical plates of the cathode ray oscilloscope to the receiver as follows: The binding post marked "GND" should be connected to the receiver chassis and the other binding post should be connected to the plate terminal of the 6C5 tube, (Fig. 1). (Be sure the oscilloscope is protected from D. C. by connecting a condenser, 0.1 to .05 mf., in series with the lead to the plate of the 6C5 tube).

(c) Set the band selector switch to the Broadcast Band and rotate the station selector to approximately 60 on the dial. The exact setting should be at a position where no broadcast signal will be received. Turn the volume control to the right (ON), turn the fidelity control to the left (NORMAL) and turn the Auto-Expressionator switch to the left (NORMAL).

(d) Set the signal generator to 450 kilocycles. See Instructions supplied with signal generator and oscilloscope.

(e) Adjust the trimmer condensers located on top of the 2nd. I-F transformer for maximum amplitude and symmetry of the selectivity curve on the resonance line (R).

NOTE: Keep the signal generator output as low as possible in order to prevent AVC action in the receiver.

(f) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 oscillator-modulator tube, leaving the tube's grid clip in place.

(g) Close the middle trimmer (TERT) of the 1st. I-F transformer so that it is moderately tight. (Do not force adjustment screw).

(h) Increase the output of the signal generator and adjust the top trimmer (Sec) of the 1st. I-F transformer for maximum symmetry and amplitude.

(i) Adjust the bottom trimmer (Pri) of the 1st. I-F transformer for maximum amplitude.

(j) Reduce the output of the signal generator and adjust the middle trimmer of the 1st. I-F transformer for maximum symmetry and amplitude.

Aligning R-F Amplifier.

The R-F amplifier can best be aligned in the conventional manner, using a modulated signal generator and output meter.

When aligning the R-F amplifier the output lead of the signal generator is connected to the antenna terminal of the receiver. For the BLUE and RED bands a .0002 mf. condenser must be in series with the output lead of the signal generator and for the high-frequency band a 400 Ohm carbon resistor should be used in place of the condenser.

Each band should be shunt aligned and then series aligned, where provision is made for series alignment (BLUE band). The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated (c) for each adjustment.

(a) Adjust the "Osc.," "R-F" (Fig. 4) and "Ant." (Fig. 2) shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check the adjustments of the "R-F" and "Ant." trimmers in the order given. DO NOT READJUST THE "OSC" TRIMMER.

NOTE: When shunt aligning the RED and GREEN bands care must be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 900 Kilocycles less than the fundamental frequency. To check on this, increase the output of the signal generater ten times or more and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 Kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct position.

(b) To align the B-C "OSC" series trimmer, Item 28, Fig. 4, set the signal generator to 600 Kilocycles and then tune-in this signal with the station selector for maximum output. While the series trimmer is being adjusted rotate the station selector back and forth slightly until no further improvement in output can be obtained.

(C) SIGNAL INPUT FREQUNCIES

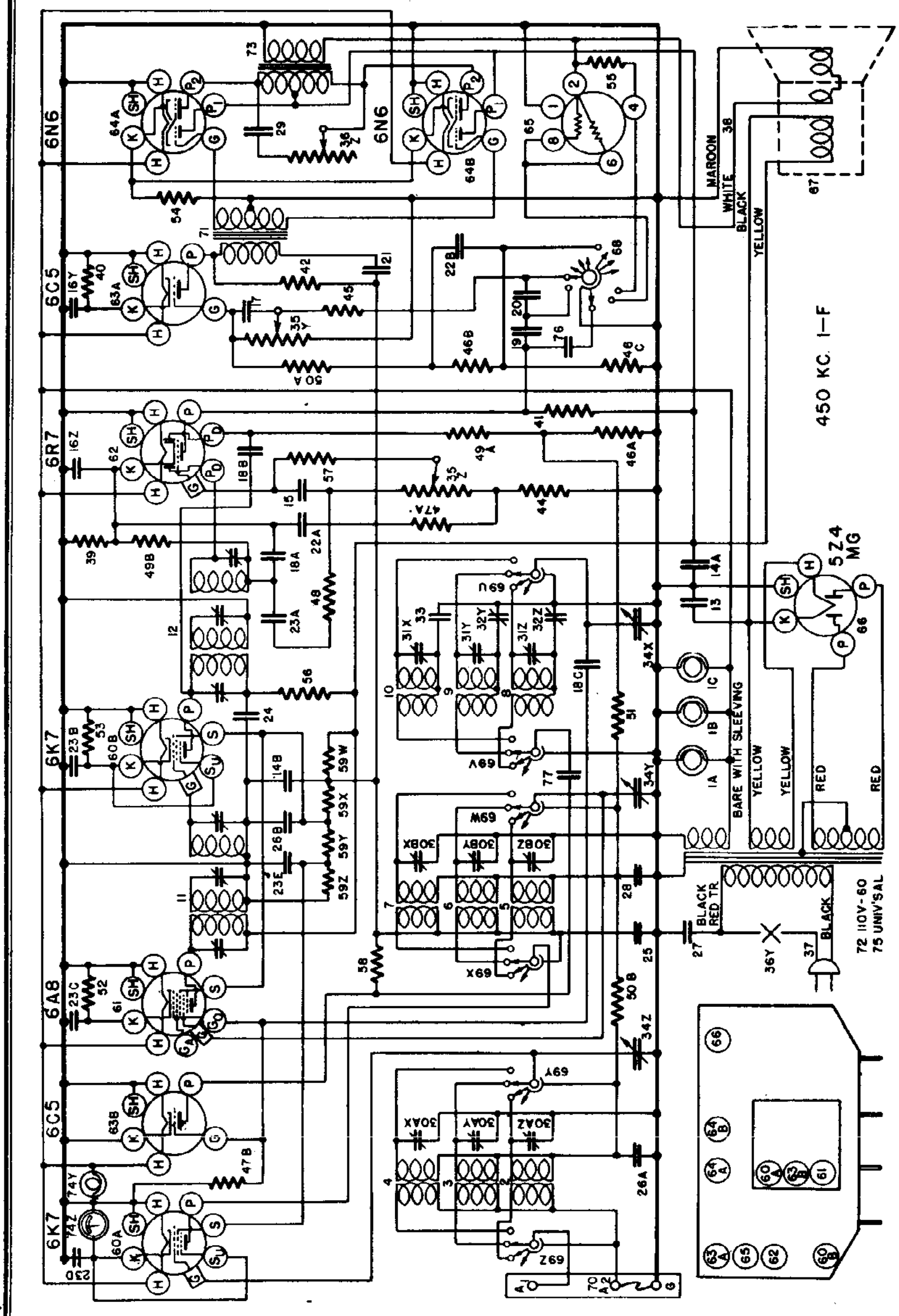
		Shunt Aligned	Series Aligned
American Broadcast	(BLUE)	1700 Kc.	600 Kc.
Pol. & Amateur	(RED)	6000 Kc.	
High-Frequency	(GREEN)	18000 Kc.	

NOTE 3: The high frequency oscillator on this receiver is neutralized by the addition of some small capacity coupling between the oscillator grid and the R-F grid of the 6A8 tube. This is accomplished by loosely wrapping a piece of insulated hook-up wire around the R-F grid lug and connecting it to the oscillator grid lug on the band selector switch.

It is necessary on some sets to adjust or even remove his coupling, in which case the wire should be unwrapped and threaded through the extra hole in the grid end of the R-F coil.

Item No.	Part No.	Description
1ABCD	W —37922	Dial Light (bulb)
	G3 —37965	Light Socket Assembly
	W —40570	Dial Light Shield
2	G110—32000	Ant. Coil - B-C-B
3	G111—32000	Ant. Coil - Pol-B
4	G112—32000	[illegible]-B.
5	G76 —32001	[illegible]-B.
6	G89 —32001	[illegible]-B.
7	G90 —32001	[illegible]-B.
8	G121—32002	[illegible]-B.
9	G115—32002	[illegible]-B.
10	G122—32002	[illegible]-B.
11	G112—32004	[illegible] Assembly
12	G114—32004	[illegible] Assembly
13	G63 24628	[illegible] Choke
14		[illegible]
15		[illegible]
16	W —36055	[illegible] Mfd. 400 V.
17	W —41080	[illegible] Mfd. 300 V.
18	W —41081	[illegible] Mfd. 250 V.
19	W —41598	[illegible] Mfd. 25 V.
20A To 20G	W —36541	[illegible] Mfd. 160 V.
	W —36541	[illegible] Mfd. 160 V.
21		[illegible]
22A	G2 —34002	[illegible] Mfd.
22B	G2 —34002	[illegible] Mfd.
22C	G2 —34002	[illegible] Mfd.
23		[illegible]
24	W 35936	[illegible] Mfd. 200 V.
25	W —35139	[illegible] Mfd. 400 V.
26		[illegible]
27	G20 34000	[illegible] Mmfd.
28	40769	[illegible] Osc. Series Trimmer
29	G7 —34000	[illegible] Mmfd.
30	G8 34002	[illegible]01 Mfd
31A	W 35758	[illegible] Mfd. 400 V
31B	W —35758	[illegible] Mfd. 400 V
32	W 37988	[illegible] Mfd. 200 V
33	W 28619	[illegible] Mfd. 200 V
34	W —23615	[illegible] Mfd. 400 V.
35	W 32380	[illegible] Mfd. 200 V.
36	W 29910A	[illegible] Mfd. 200 V.
37	W —30805	[illegible] Mfd. 400 V.
38	W 35951	[illegible]ection Shunt Trim. Assy
39	[illegible] 33002	[illegible]ection Var. Tuning
40	[illegible] —30488	[illegible] Mfd 400 V
41	[illegible] 34002	[illegible]025 Mfd.
42	[illegible] —33906	[illegible] Plug
43A	—21237A	[illegible] Ohm ¼W.
43B	21237A	[illegible] Ohm ¼W.
44A	[illegible]	[illegible] Ohm ½W. Flex.
44B	[illegible]	[illegible] Ohm ½W. Flex.
45	[illegible]	[illegible],000 Ohm ¼W.
46	[illegible]	[illegible] Ohm ½W. Flex.
47A	[illegible]	[illegible],000 Ohm ¼W.
47B		[illegible]
48Z	[illegible]	[illegible]r, 1000 Ohms (Candohm)
48Y		[illegible]r, 7000 Ohms (Candohm)
48X		[illegible]r, 3,500 Ohms (Candohm)
48W		[illegible]r, 15,000 Ohms (Candohm)
49	[illegible]	[illegible]r, 100,000 Ohm ¼W.
50	[illegible]	Resistor, 15,000 Ohm 1W.
51	[illegible]	Resistor, 1.5 Megohm ¼W.
52	[illegible]	Resistor, 200,000 Ohm ¼W.
53	[illegible]	Resistor, 500,000 Ohm ¼W.
54	[illegible]	Resistor, 75,000 Ohm ¼W.
55	—[illegible]	Resistor, 30,000 Ohm 1W.
56	W —23013	Resistor, 2,000 Ohm 1½W. Flex.
57	W — 6706	Resistor, 3,500 Ohm 1W.
58AB	G151—36400	Socket Type 6K7
59	G156—36400	Socket Type 6A8
60	G155—[illegible]	[illegible] 6H6
61	G152—[illegible]	[illegible] 6C5
62AB	G165—[illegible]	[illegible] 6N6
63	G154 [illegible]	[illegible] 5Z4
64	G167—[illegible]	[illegible] Plain
65	636CJ4 [illegible]	[illegible] Spec. No. 1-D-641
	[illegible]	[illegible] Spk. 636CJ4 "M"
	—[illegible]	[illegible]
66	G4 [illegible]	[illegible]
67	C [illegible]	[illegible] Switch
68	B —[illegible]	[illegible] Line Switch
69	W [illegible]	[illegible] Switch
70	G27 [illegible]	[illegible] Terminal Assembly
71		[illegible]
72	[illegible]	[illegible]rmer 110 V. 60 Cy.
	[illegible]	[illegible]rmer 110 V. 25 Cy.
75	G70 —[illegible]	[illegible]former
77Y	W [illegible]	[illegible]
77Z	W —41464	[illegible]
78	—41301	[illegible] Tap at 1 Meg.
79	W 41209	[illegible] 200 V.
80	—36317	[illegible] ¼W.
	C —42045	[illegible]
	—42043	[illegible]
	C —42044	Dial Lens (Escutcheon Glass)
	D —30	Mtg. Screws (Escutcheon)
	W —40192B	Knob (Fidelity & Band Sel.) (2)
	W —37339	Knob (V. C. & Station Sel.)
	W —42490	Knob (Expressionator)

CROSLEY RADIO CORP.



BLUE 540-1900 Kc. or 555-158 Meters (American Broadcast Band)
RED 1.9-6.5 Megacycles or 158-46 Meters (Police & Amateurs)
GREEN 6.0-19 Megacycles or 50-16 Meters (High Frequency Band)

MODEL 1026

July, 1936

MODEL 1026
Parts

CROSLEY RADIO CORP.

SPECIFICATIONS

The Crosley Model 1026 radio is a ten-tube superheterodyne receiver and is available either with a standard 110 volt—60 cycle power transformer or with a universal power transformer.

The tubes used are 6K7 R-F Amplifier, 6A8 Modulator, 6C5 Oscillator, 6K7 I-F Amplifier, 6R7 Detector and 1st Audio Amplifier, 6C5 2nd Audio Amplifier, two 6N6 Output, 5Z4 Rectifier and the newly developed Auto-Expressionator or Volume Expander tube.

The tuning range of the receiver is from 540 to 19000 Kilocycles and is divided into threee bands

PARTS LIST—MODEL 1026

Item No.	Part No.	Description
1ABC	W —37922	Dial Light
	G3 —37965	Dial Light Socket
2	G94 —32000	Ant. Coil, B. C. B.
3	G95 —32000	Ant. Coil, Pol. B.
4	G113—32000	Ant. Coil, H. F. B.
5	G68 —32001	R. F. Coil, B. C. B.
6	G80 —32001	R. F. Coil, Pol. B.
7	G79 —32001	R. F. Coil, H. F. B.
8	G101—32002	Osc. Coil, B. C. B.
9	G102—32002	Osc. Coil, Pol. B.
10	G103—32002	Osc. Coil, H. F. B.
11	G90 —32004	1st I. F. Assembly
12	G91 —32004	2nd I. F. Assembly
13	W —36055	Condenser 35 Mfd. 400 V. Electrolytic
14A	W —36057	Condenser 40 Mfd. 300 V. Electrolytic
14B	W —36057	Condenser 40 Mfd. 300 V. Electrolytic
15	G8 —34002	Condenser, .00001 Mfd. (Molded)
16Z 16Y	W —37778	Condenser, 12. Mfd. 25 V. Electrolytic
17	G6 —34002	Condenser, .000025 Mfd. (Molded)
18A	G2 —34002	Condenser, .0001 Mfd. (Molded)
18B	G2 —34002	Condenser, .0001 Mfd. (Molded)
18C	G2 —34002	Condenser, .0001 Mfd. (Molded)
19	W —32780B	Condenser, .05 Mfd. 400 V.
20	G3 —34002	Condenser, .0005 Mfd. (Molded)
21	W —37732	Condenser, .3 Mfd. 160 V.
22A	W —31219	Condenser, .023 Mfd. 200 V.
22B	W —31219	Condenser, .023 Mfd. 200 V.
23A	W —36541	Condenser, .02 Mfd. 160 V.
23A to 23E	W —36541	Condenser, .02 Mfd. 160 V.
24	W —30488	Condenser, .02 Mfd. 400 V.
25	W —32378	Condenser, .01 Mfd. 400 V.
26A	W —35936	Condenser, .05 Mfd. 200 V.
26B	W —35936	Condenser, .05 Mfd. 200 V.
27	W —30805	Condenser, .01 Mfd. 400 V.
28	W —32380	Condenser, .05 Mfd. 200 V.
29	W —23615	Condenser, .05 Mfd. 400 V.
30	W —37891	3 Section Shunt Trimmer Assembly
31	W —35951	3 Section Shunt Trimmer Assembly
32Z 32Y	W —37874	B. C. Osc. Series Trimmer Cond. / Pol. Osc. Series Trimmer Cond.
33	G18 —34000	H. F. Fixed Series Condenser
34	G47 —33002	3 Section Var. Tuning Cond.
	MG54—41214	Dial Drive Complete
	—41153	Drive Unit (only)
	C —41148	Dial—Calibrated Glass
	—41136	Dial Paper Mask
	—40485	Long Hand
	—41145	Short Hand
	W —40486	Hand Mtg. Screw
	—40537	Coupling Unit
	—41157	Belt (Drive)
	—40638	Indicator Cable
35Z 35Y	—41417	Volume Control 1st A. F. 3 Meg. / Volume Control 2nd A. F. 1 Meg.
36Z 36Y	—37966	Tone Control — 80000 OHMS / A. C. Switch
37	B —33906A	Power Cord & Plug
38	G3 —37918	Speaker Cable
39	—31093	Resistor, 2,700 Ohm ¼ W.
40	W —21452	Resistor, 1,100 Ohm ½ W. Flex.
41	—37768	Resistor, 65,000 Ohm ½ W.
42	— 5370A	Resistor, 20,000 Ohm 1 W.
43	None	
44	—21454	Resistor, 1 Megohm ¼ W.
45	—21455	Resistor, 300,000 Ohm ¼ W.
46A	—23785	Resistor, 500,000 Ohm ¼ W.
46B	—23785	Resistor, 500,000 Ohm ¼ W.
46C	—23785	Resistor, 500,000 Ohm ¼ W.
47A	—21453	Resistor, 40,000 Ohm ¼ W.
47B	—21453	Resistor, 40,000 Ohm ¼ W.
48	—23403	Resistor, 150,000 Ohm ¼ W.
49A	—33344	Resistor, 400,000 Ohm ¼ W.
49B	—33344	Resistor, 400,000 Ohm ¼ W.
50A	—35600	Resistor, 100,000 Ohm ¼ W.
50B	—35600	Resistor, 100,000 Ohm ¼ W.
51	—37245	Resistor, 1.5 Megohm ¼ W.
52	W —28589	Resistor, 350 Ohm ½ W. Flex.
53	W —28106	Resistor, 500 Ohm ½ W. Flex.
54	W —23012A	Resistor, 40 Ohm ¾ W. Flex.
55	W —41193	Resistor, 1. Ohm 2½ W. Flex.
56	W —23013	Resistor, 2,000 Ohm 1¼ W. Flex.
57	—21273A	Resistor, 60,000 Ohm ¼ W.
58	W —37987	Resistor, 15,000 Ohm I. W. Wire Wound
59	W —41225	4 Section Candohm
60A	G151—36400	Socket Type 6K7
60B	G151—36400	Socket Type 6K7
61	G156—36400	Socket Type 6A8
62	G164—36400	Socket Type 6R7
63A	G152—36400	Socket Type 6C5
63B	G152—36400	Socket Type 6C5
64A	G165—36400	Socket Type 6N6
64B	G165—36400	Socket Type 6N6
65	G167—36400	Socket Type 2C2
66	G154—36400	Socket Type 5Z4
67	—40193	Speaker, Type 633CJ4 "M"
	—40701	Cone Assembly for 40193
	—40702	Field Coil for 40193
68	W —41446	Switch Multivox Control
69	C —37958E	Switch Band Slector
70	G27 —26719	Ant. & Grd. Terminal Board Assembly
71	G1 —37995	Audio Input Transformer
72	G43 —25669	Power Supply Transformer(110V.60Cy.)
73	G48 —24628	Audio Output Transformer
74Z 74Y	W —41259	Tuning Meter / Tuning Meter Bulb
75	—37685A	Universal Power Tranxformer
76	W —41445	Condenser, .036 Mfd. 400 V.
77	W —34647	Condenser, .006 Mfd. 400 V.
	C —37894	Escutcheon
	B —37876A	Escutcheon Ret. Spring
	B —37898	Dial Lens (Escutcheon Glass)
	B —37897	Lens Retaining Spring
	W —40365	Escutcheon Felt
	W —37339	Knob (3 required)
	W —40192B	Knob (2 required)
	W —40230A	Emblem (Crosley Shield)

CROSLEY RADIO CORP.

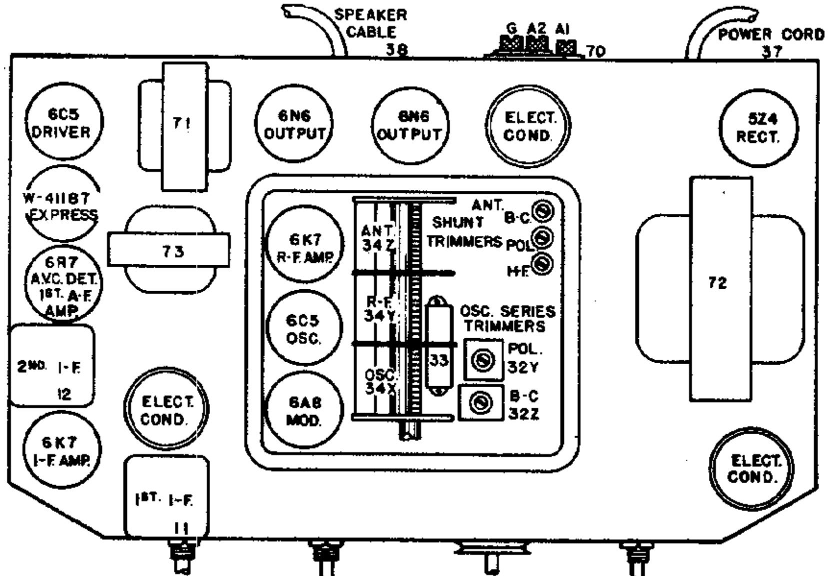


Fig. 2. Top View 1026

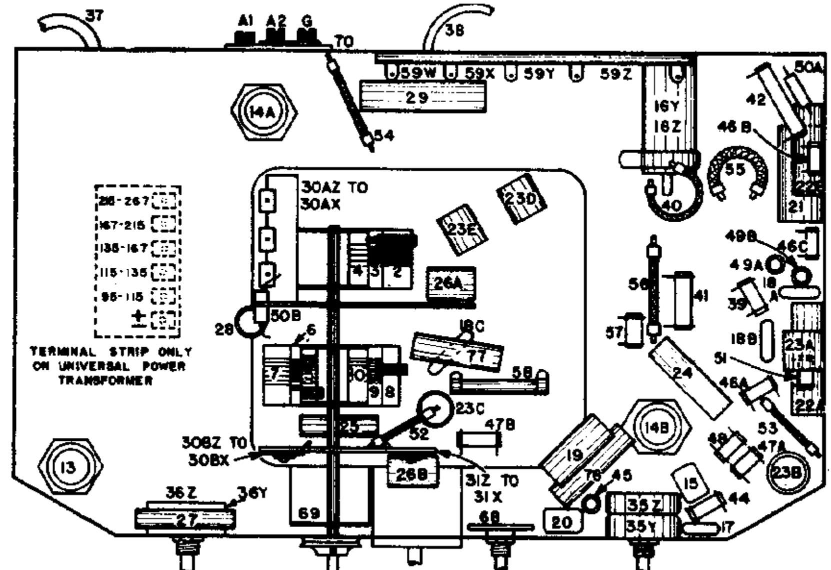


Fig. 3. Bottom View 1026

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	P_2	S	Sg	G	K	Go
6K7	R-F Amplifier	6.3	221	—	98	4	0	4	—
6A8	Modulator	6.3	221	—	138	—	0	4.5	4.5
6C5	Oscillator	6.3	140	—	—	—	—	0	—
6K7	I-F Amplifier	6.3	260	—	138	5	0	5	—
6R7	Detector & 1st A-F Amplifier	6.3	130	—	—	—	0	6.5	—
6C5	2nd A-F Amplifier	6.3	150	—	—	—	0	6.5	—
6N6	(2) Output	6.3	278	285	—	—	0	3.2	—
5Z4	Rectifier	4.5	357	—	—	—	—	—	—

Auto-Expressionator Tube (W41187) Varies with power output.

Voltage drop across speaker field 72 Volts.
Power Output approximately 9 Watts.

Power Consumption approximately 117 Watts.
All readings taken on 117.5 volt power supply.

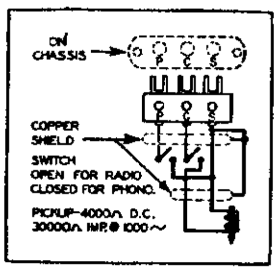


Fig. 7. Phonograph Pickup

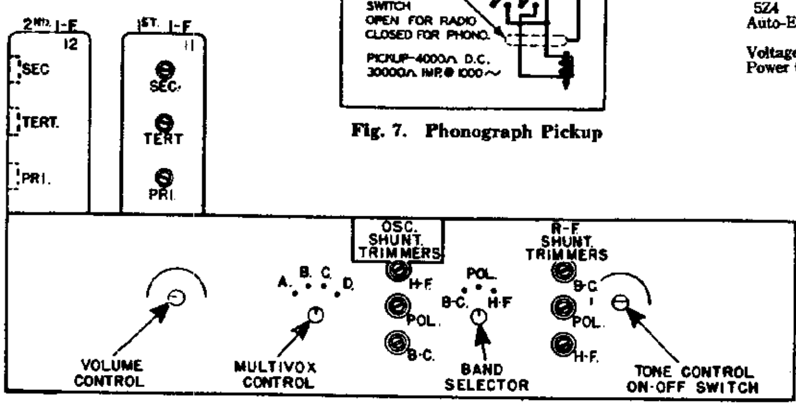


Fig. 4. Front View 1026

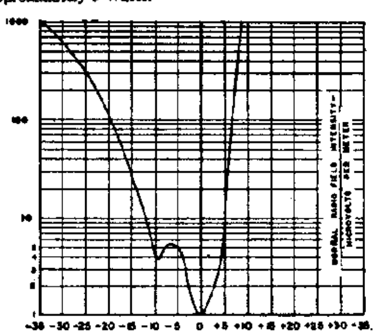


Fig. 5

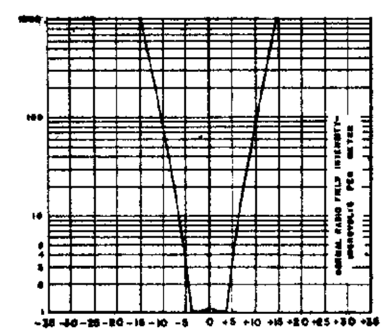


Fig. 6

MODEL 1026
Alignment
Notes

CROSLEY RADIO CORP.

ALIGNMENT PROCEDURE

This is a High Fidelity receiver and in order to secure maximum performance the alignment of its circuits should be done with precision instruments.

Tuning I-F Amplifier to 450 Kilocycles

The I-F amplifier employs two triple-tuned I-F transformers and under no condition should their trimmer condensers be readjusted just to determine if they are properly tuned. Fig. 5 shows the selectivity curve of a receiver whose I-F amplifier was slightly mis-tuned while Fig. 6 shows a curve made from actual measurements of a receiver which was properly aligned with the use of an oscilloscope.

I. Conventional Method—

(a) Connect one terminal of the output meter to P2 of one of the 6N6 Output tubes and the other terminal through a .1 mf., or larger, condenser—not electrolytic—to P2 of the other 6N6 Output tube.

(b) Connect the output of the signal generator through a .02 mf. condenser to the top cap of the 6K7 I-F Amplifier tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver chassis. KEEP THE GENERATOR OUTPUT LEAD AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(c) Set the band selector switch to the Broadcast Band and rotate the station selector to approximately 60 on the dial. Turn the volume control knob to the right (ON), turn the tone control knob to the left (TREBLE) and turn the Multivox control knob to the Auditorium Position (Third position in the clockwise direction).

(d) Set the signal generator to 450 kilocycles.

(e) Close the middle trimmer condenser on the 2nd. I-F transformer (Tert. Fig. 4) so that it is moderately tight. (Do not force the adjustment screw).

(f) Adjust the top trimmer and then the bottom trimmer (Sec. & Pri) of the 2nd. I-F transformer for maximum output. ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

(g) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 Modulator tube, leaving the tube's grid clip in place.

(h) Open the middle trimmer of the 1st I-F transformer three or four turns from the closed position. (Care should be taken that the adjustment screw does not become dislodged from the nut).

(i) Adjust the top trimmer and then the bottom trimmer of the 1st I-F transformer for maximum output.

(j) Transfer the output lead of the signal generator from the 6A8 tube to the "ANT" terminal of the receiver and increase the output of the signal generator, if necessary.

(k) Adjust the middle trimmer of the 2nd. I-F transformer by opening until maximum output is obtained. DO NOT READJUST THE TOP AND BOTTOM TRIMMERS.

(l) Adjust the middle trimmer of the 1st I-F transformer by closing until maximum output is obtained. DO NOT READJUST TOP AND BOTTOM TRIMMERS.

II. Oscilloscope Method.

(a) Connect the output of the signal generator through a .02 mf. condenser to the top cap of the 6K7 I-F amplifier tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the receiver chassis. KEEP THE GENERATOR OUTPUT LEAD AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Connect the vertical plates of the cathode ray oscilloscope to the receiver as follows: The binding post marked "GND" should be connected to the receiver chassis and the other binding post should be connected to the terminal marked "P" of the 6R7 tube. (Be sure the oscilloscope is protected from D. C. by connecting a condenser, .1 to .05 mf., in series with the lead connected to the plate of the 6R7 tube).

(c) Set the band selector switch to the Broadcast Band and rotate the station selector to approximately 60 on the dial. The exact setting should be at a position where no broadcast signal will be received. Turn the volume control knob to the right (ON), turn the tone control knob to the left (TREBLE) and turn the Multivox control knob to the Auditorium Position (Third position in the clockwise direction).

(d) Set the signal generator to 450 kilocycles. See Instructions supplied with signal generator and oscilloscope.

(e) Close the middle trimmer condenser on the 2nd. I-F transformer (Tert. Fig. 4) so that it is moderately tight. (Do not force adjustment screw).

(f) Adjust the top trimmer (Sec) of the 2nd. I-F transformer so that the nose of the selectivity curves is centered on the resonance axis (R) of the transparent scale supplied with the oscilloscope.

(g) Adjust the bottom trimmer (Pri) of the 2nd. I-F transformer for maximum amplitude of the selectivity curve on resonance line (R).

(h) Reduce the output of the signal generator and adjust the middle trimmer of the 2nd. I-F transformer for maximum amplitude and symmetry of the selectivity curve about the resonance line.

NOTE: Keep the base of the selectivity curve centered on the transparent scale from —15 to +15 and keep the signal generator output as low as possible in order to prevent AVC action in the receiver.

(i) Readjust the bottom trimmer of the 2nd. I-F transformer for maximum symmetry and amplitude.

(j) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 Modulator tube, leaving the tube's grid clip in place.

(k) Open the middle trimmer of the 1st. I-F transformer three or four turns from the closed position. (Care should be taken that the adjustment screw does not become dislodged from the nut).

(l) Increase the output of the signal generator and adjust the top trimmer (Sec) of the 1st. I-F transformer for maximum symmetry and amplitude.

(m) Adjust the bottom trimmer of the 1st I-F transformer for maximum amplitude.

(n) Reduce the output of the signal generator and adjust the middle trimmer of the 1st. I-F transformer for maximum symmetry and amplitude.

(o) Carefully repeat operations (h), (i) and (n) for more accurate adjustments.

Aligning R-F Amplifier.

The R-F amplifier can best be aligned in the conventional manner, using a modulated signal generator and output meter.

When aligning the R-F amplifier the output lead of the signal generator is connected to the antenna terminal of the receiver. For the BLUE and RED bands a .00025 mfd. condenser must be connected in series with the output lead of the signal generator and for the high-frequency band a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be shunt aligned and then series aligned, where provision is made for series alignment (BLUE and RED bands). The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated (c) for each adjustment.

(a) Adjust the "OSC", "R-F" and "ANT" shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check the adjustments of the "R-F" and "ANT" trimmers in the order given. DO NOT READJUST THE "OSC" TRIMMER.

NOTE: When shunt aligning the RED and GREEN bands care must be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times or more and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct position.

(b) To align the series trimmers, 32Y and 32Z Fig. 2, set the signal generator to the frequency indicated below and then tune-in this signal with the station selector for maximum output. At the time that any series trimmer is being adjusted rotate the station selector back and forth slightly until no further improvement in output can be obtained.

(c) Signal Input Frequencies:

American Broadcast Band (BLUE)
Police Band (RED)
High-Frequency Band (GREEN)

	Shunt Aligned	Series Aligned
(BLUE)	1700 Kc.	600 Kc.
(RED)	6000 Kc.	2000 Kc.
(GREEN)	18000 Kc.	....

UNIVERSAL POWER TRANSFORMER

The Model 1026 chassis for use on other than 110 volts—60 cycles, is supplied with a universal power transformer designed to operate on a power supply of from 95 to 267 volts and any commercial frequency of 25 cycles or above. To adapt the set to a different line voltage it is necessary to remove the chassis from the cabinet, remove the bottom from the chassis, locate the terminal strip on the bottom of the power transformer and locate the wire leading from the power switch to the terminal strip. After careful measurement of the maximum values of line voltage, unsolder the wire described above, from the lug on the terminal strip and solder it to the correct lug. The correct lug will be the one marked so as to cover or nearly cover the maximum line voltage. THE MAXIMUM LINE VOLTAGE SHOULD NOT EXCEED THE HIGHEST VOLTAGE STAMPED ON THE TERMINAL STRIP BESIDE THE LUG TO BE USED BY MORE THAN 3%.

AUTO-EXPRESSIONATOR

The Auto-Expressionator tube, Illustration No. 65, is connected across the voice coil of the speaker. When it is operating its resistance varies so as to increase the volume of loud tones, thus giving a wider volume range to reproduced music which tends to compensate for the electrical limitations of broadcasting equipment.

PHONOGRAPH PICKUP

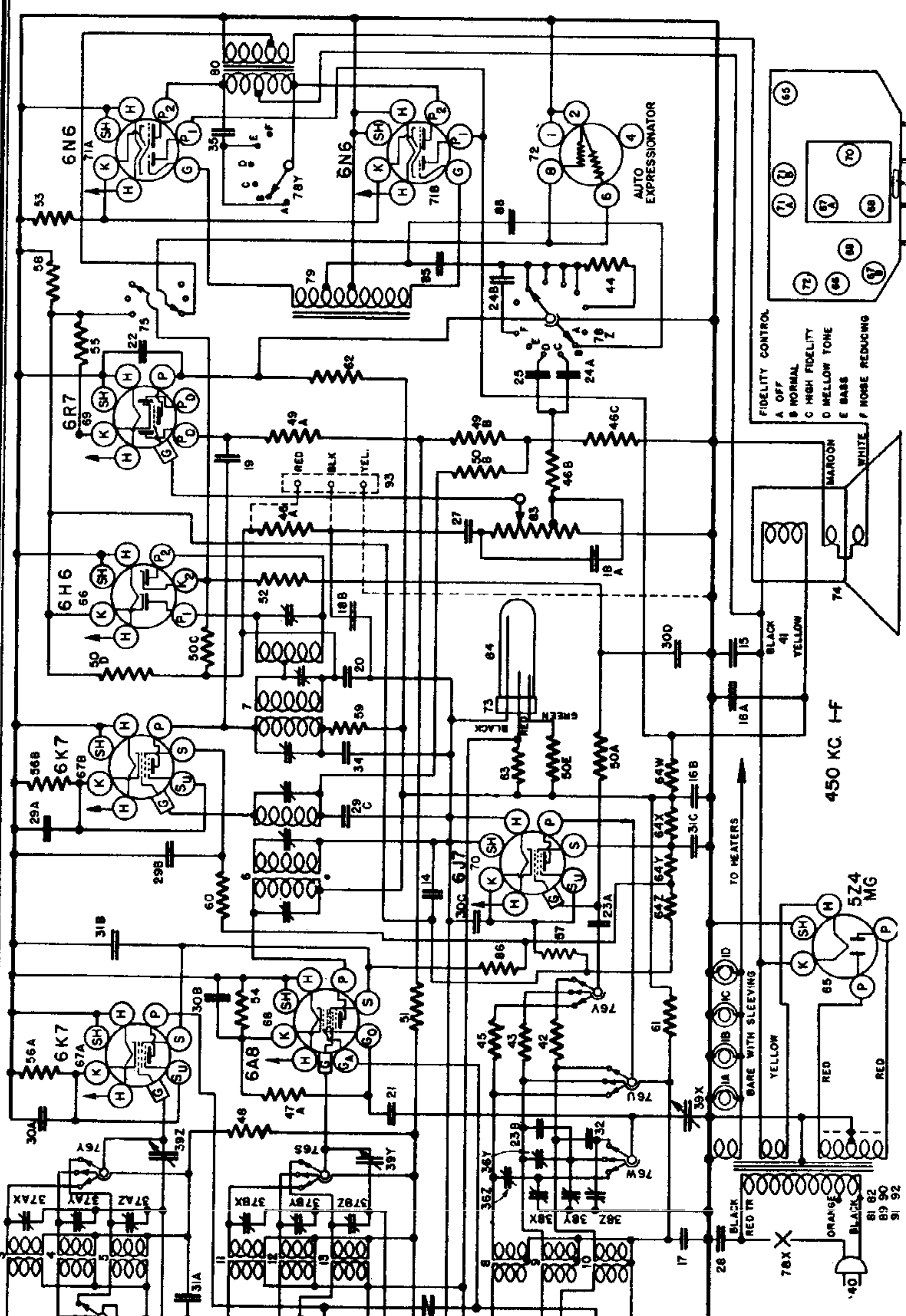
Chasses equipped with a universal power transformer also have three terminals on the back for connecting a phonograph pickup. These terminals are marked P C S and the pickup is connected through a double pole—single throw switch to these terminals as shown in Fig. 7.

SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt, 500 volt D.-C. voltmeter (except filaments) with the receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A.-C. voltmeter. Readings may vary plus or minus 10% of values given.

MODEL 1126
Schematic
Socket, Note

CROSLEY RADIO CORP.



CHASSIS MODEL 1126

SALES MODEL 1199

Oct., 1936

(c) SIGNAL INPUT FREQUENCIES

BLUE 540-1725 Kc. or 555-173 Meters (Amer American Broadcast Band (BLUE)
RED 1.8- 5.5 Megacycles or 170-55 Meters Police and Amateur Band (RED)
GREEN 5.6- 18.1 Megacycles or 54-16.5 Meters High Frequency Band (GREEN)

Shunt Alignment	Series Alignment
1,400 Kilocycles	600 Kilocycles
5,000 Kilocycles	2000 Kilocycles
18,000 Kilocycles	

MODEL 1126
Parts, Notes

CROSLEY RADIO CORP.

50 CYCLE POWER TRANSFORMER ADJUSTMENT

Receivers equipped with a 50 cycle power transformer have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 260 volts.

The accompanying illustration shows the connections for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.

NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

Item No.	Part No.	Description
1ABCD	W —37922	Dial Light Bulb, 6.3V.
	G3 —37965	Socket, Dial Light
	W —40570	Shield, Dial Light
2	W —41187	Expressionator Tube
3	G94 —32000	Antenna Coil—B. C. B.
4	G108—32000	Antenna Coil—Pol. B.
5	G107—32000	Antenna Coil—H. F. B.
6	G90 —32004	1st I-F Assembly
7	G126—32004	2nd I-F Assembly
8	G97 —32002	Osc. Coil—B. C. B.
9	G96 —32002	Osc. Coil—Pol. B.
10	G95 —32002	Osc. Coil—H. F. B.
11	G68 —32001	R-F Coil—B. C. B.
12	G75 —32001	R-F Coil—Pol. B.
13	G74 —32001	R-F Coil—H. F. B.
14	W —41598	Condenser, 50 Mf. 25V. (Elect.)
15	W —36055	Condenser, 35 Mf. 400V. (Elect.)
16A	W —42386	Condenser, 20 Mf. 300V. (Elect.)
16B	W —42386	Condenser, 20 Mf. 300V. (Elect.)
17	G18 —34000	Condenser, 5600 Mmf. H-F Osc. Series
18A	G5 —34002	Condenser, .00005 Mf. Mica 200V.
18B	G5 —34002	Condenser, .00005 Mf. Mica 200V.
19	G10 —34002	Condenser, .00005 Mf. Mica 300V.
20	G2 —34002	Condenser, .0001 Mf. Mica 200V.
21	G6 —34002	Condenser, .000025 Mf. Mica 200V.
22	G1 —34005	Condenser, .00025 Mf. Mica 300V.
23A	G3 —34002	Condenser, .0005 Mf. Mica 200V.
23B	G3 —34002	Condenser, .0005 Mf. Mica 200V.
24A	W —35758	Condenser, .008 Mf. 400V.
24B	W —35758	Condenser, .008 Mf. 400V.
25	W —41461	Condenser, .0014 Mf. 200V.
26		None
27	W —28621	Condenser, .02 Mf. 200V.
28	W —30805	Condenser, .01 Mf. 400V.
29A	W —27216	Condenser, .05 Mf. 200V.
29B	W —27216	Condenser, .05 Mf. 200V.
29C	W —27216	Condenser, .05 Mf. 200V.
30A	W —36541	Condenser, .02 Mf. 160V.
to		
30D	W —36541	Condenser, .02 Mf. 160V.
31A	W —35936	Condenser, .05 Mf. 200V.
to		
31D	W —35936	Condenser, .05 Mf. 200V.
32	W —41209	Condenser, .048 Mf. 200V.
33	W —32380	Condenser, .05 Mf. 200V.
34	W —32780B	Condenser, .05 Mf. 400V.
35	W —22688	Condenser, .1 Mf. 400V.
36	W —41218	Trimmer Cond. B.C. & Pol. Osc.Ser.
37A	W —37891	Trimmer Cond. 3 Sect. Shunt
37B	W —37891	Trimmer Cond. 3 Sect. Shunt
38	W —35951	Trimmer Cond. 3 Sect. Shunt
39	G47 —33002	Cond. Gang—3 Sect. Var. Tuning
	MG12 —42411	Dial Drive Assembly
	C —42421	Dial Glass (Calibrated)
	—42598A	Dial Mask (Paper Backing)
	—42325B	Dial Drive Unit (only)
	W —41144	Dial Hand—Long
	W —42180	Dial Hand—Short
	W —40486	Screw—Hand Mtg.
	E —13647	Mystic Hand, etc., Flipper (L. H.)
	E —13648	Fidelity, etc., Flipper (R. H.)
	W —42308	Flipper Pulley (2)
	W —37909A	Band Indi. Pulley
	—43081	L. H. Flipper Control Cable
	—43080	R. H. Flipper Control Cable
	—40638	Band Indicator Control Cable
	—41157	Drive Belt
	—40537	Drive Flexible Coupling
40	B —33906A	Power Cord & Plug
41	G2 —37918	Speaker Cable
42	—36760	Resistor, 20,000 Ohm. ¼W.
43	—33390	Resistor, 30,000 Ohm. ¼W.
44	—21453	Resistor, 40,000 Ohm. ¼W.

Item No.	Part No.	Description
45	—34019	Resistor, 75,000 Ohm. ¼W.
46ABC	—35600	Resistor, 100,000 Ohm. ¼W.
47A	—35930	Resistor, 200,000 Ohm. ¼W.
48	—35601	Resistor, 300,000 Ohm. ¼W.
49AB	—36321	Resistor, 400,000 Ohm. ¼W.
50A	—36322	Resistor, 500,000 Ohm. ¼W.
to		
50E	—36322	Resistor, 500,000 Ohm. ¼W.
51	—21454	Resistor, 1 Megohm. ¼W.
52	—36688	Resistor, 3 Megohm. ¼W.
53	W —32961	Resistor, 100 Ohm. 3W. Flex.
54	W —25937	Resistor, 275 Ohm. ½W. Flex.
55	W —34900	Resistor, 68 Ohm. ¾W. Flex.
56AB	W —28589	Resistor, 350 Ohm. ½W. Flex.
57	—24814	Resistor, 7,000 Ohm. ¼W. Carbon
58	W —42518	Resistor, 150 Ohm. ½W. Flex.
59	W —21452	Resistor, 1,100 Ohm. ¾W. Flex.
60	W —27503	Resistor, 1,400 Ohm. ¾W. Flex.
61	— 4921	Resistor, 10,000 Ohm. 1W. Carbon
62	—36952	Resistor, 30,000 Ohm. 1W. Carbon
63	W —42516	Resistor, 20,000 Ohm. 1W. W. W.
64Z	W —41966	4,000 Ohm. Candohm
64Y		1,000 Ohm.
64X		3,000 Ohm.
64W		200 Ohm.
65	G154—36400	Socket Type 5Z4
66	G155—36400	Socket Type 6H6
67AB	G151—36400	Socket Type 6K7
68	G156—36400	Socket Type 6A8
69	G164—36400	Socket Type 6R7
70	G157—36400	Socket Type 6J7
71AB	G165—36400	Socket Type 6N6
72	G167—36400	Socket Type Expressionator
73	G2 —42584	Socket Neon Tube
74	649CJ4 "M"	Speaker Spec. 1-D-668
	—40701	Cone Assy. for above Speaker
	—40699	Field Coil for above Speaker
	634CJ4 "M"	Speaker Spec. 1-D-244
	—40268	Cone Assy. for above Speaker
	—40272	Field Coil for above Speaker
75	W —41029B	Phantom Control Switch
76	C —41235A	Band Sel. Switch
77	G27 —26719	Ant. & Gnd. Terminal Assy.
78	B —42295A	Fidelity & Line Switch
79	G64 —24628	Choke, Audio Input
80	G60 —24628	Output Transformer
81	—42557	Power Trans. 60 Cy. 110V.
	—43088	Power Trans. 50 Cy. 110V.
	—43089	Power Trans. 50 Cy. 220V.
	—43008	Power Trans. 25 Cy. 110V.
	—43170	Power Trans. 25 Cy. 220V.
82		None
83	—41301	Vol. Cont. 3 Meg. Tap 1 Meg.
84	W —42419A	Neon Tube
	W —42589	Tube Cover
	—42592	Cover Gasket
85	W —42554	Condenser .12 Mf. 160V.
86	— 6705	Resistor, 3,500 Ohm. 1W.
87	G101—34403	R-F Neutralizer Assembly
88	W —43091	Condenser .07 Mf. 160V.
	G37 —26719	Phono Terminal Assembly
	C —43134	Escutcheon
	—42043	Escutcheon Rubber Strip
	C —42044	Escutcheon Lens
	D — 30	Mtg. Screws, Escutcheon
	W —37339	Knob, V. C. & Sta. Sel.
	W —40192	Knob, Bd. Sel. & Phantom Cont.
	W —42490	Knob, Fidelity Cont.
	W —36117	Rubber Mtg. Foot
	W —40230B	Emblem
	W —32620	Nut, Emblem Mtg.
	—6-W	Cabinet

MODEL 1126
Socket, Trimmers
Voltage, Data
Resonance Curves
Phono Pickup

CROSLEY RADIO CORP.

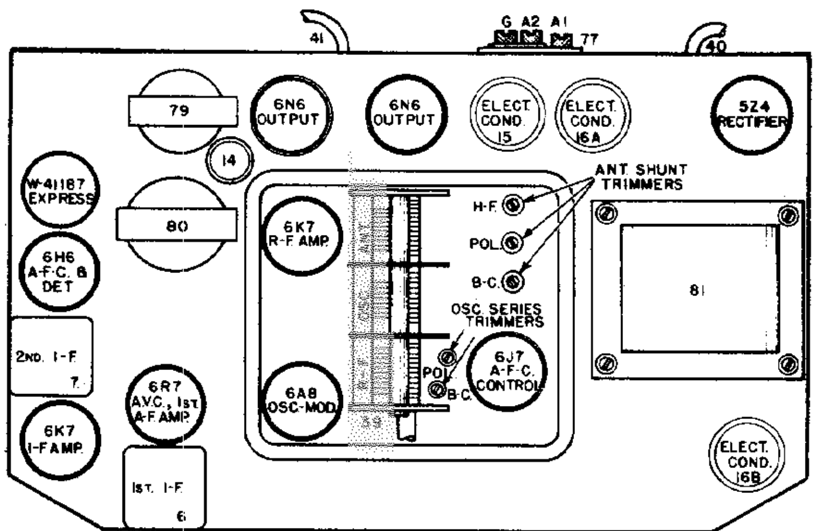


Fig. 2 Top View—1126

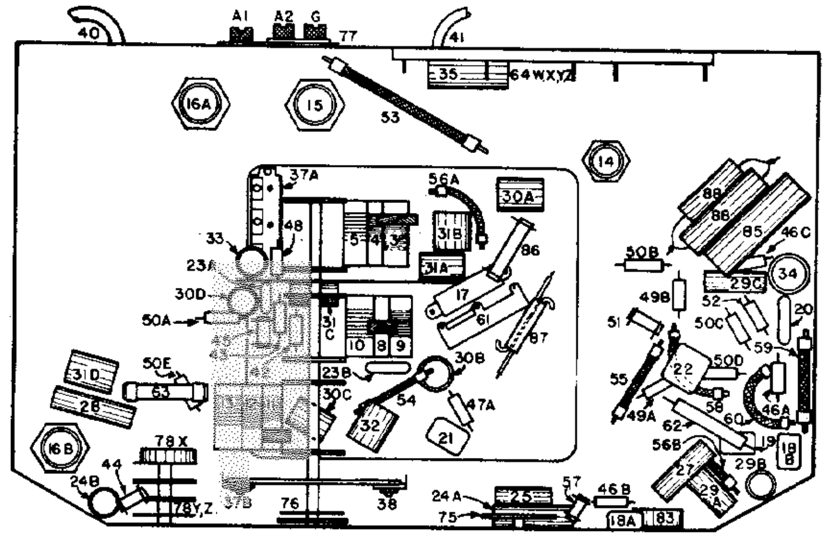


Fig. 3 Bottom View—1126

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P1	P2	S	Su	K	Ga	Go
6K7	R-F Amplifier	6.3	80	—	105	3.5	3.5	—	—
6A8	Oscillator-Modulator	6.3	235	—	105	—	3	150	-4 to -12
6J7	AFC Control	6.3	150	—	137	10.7	10.7	—	—
6K7	I-F Amplifier	6.3	228	—	104	3.4	3.4	—	—
6H6	AFC Diode	6.3	—	—	—	—	4.2	—	—
6R7	A-F Amplifier	6.3	150	—	—	—	6.0	—	—
6N6	(2) Output	6.3	235	345	—	—	5.2	—	—
5Z4	Rectifier	5.0	—	—	—	—	345	—	—
W42419A	Neon Tuning Tube	—	155	80	—	—	—	—	—
W41187	Auto-Expressionator Tube			Varies with power output					

Voltage drop across speaker field 110 volts.
Power output approximately 15 watts.

Power consumption approximately 123 watts.
All readings taken on 117.5 volt power supply.

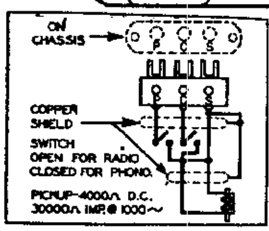
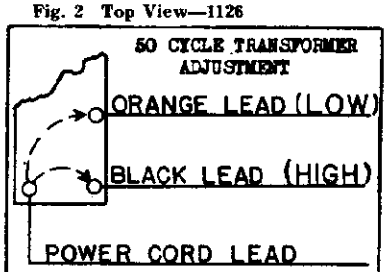
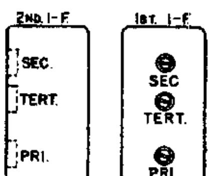


Fig. 7. Phonograph Pickup



AUTO-EXPRESIONATOR

The Auto-Expressionator tube, item No. 72, Fig. 1, is connected across the voice coil of the speaker. When it is operating its resistence varies so as to increase the volume of loud tones, thus giving a wider volume range to reproduced music, which tends to compensate for the electrical limitations of broadcasting equipment.



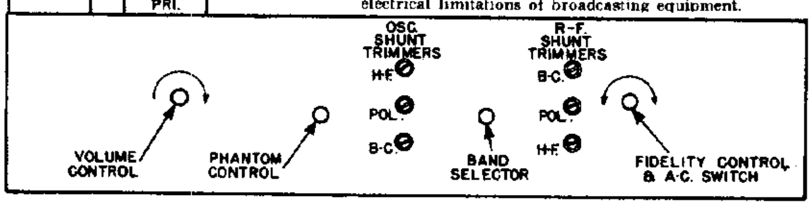


Fig. 4 Front View—1126

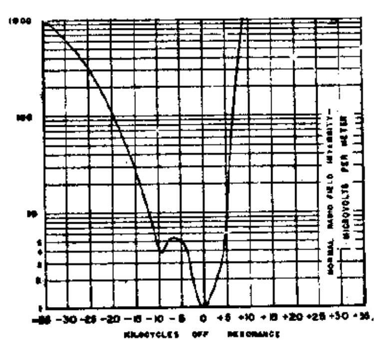


Fig. 5

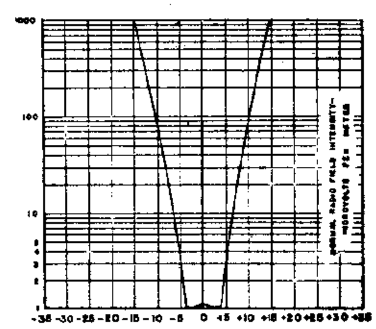


Fig. 6

MODEL 1126
Alignment, Notes

CROSLEY RADIO CORP.

ALIGNMENT PROCEDURE

This model receiver should be turned on and allowed to "warm-up" for about 15 minutes before aligning its circuits.

It is a High Fidelity receiver and in order to secure maximum performance the alignment should be done with precision instruments. The alignment condensers should not be readjusted just to determine if they are properly tuned. Fig. 5, shows the selectivity curve of a receiver whose I-F amplifier was slightly mistuned while Fig. 6, shows a curve made from actual measurements of a receiver employing a triple-tuned I-F amplifier which was properly aligned with the use of a FREQUENCY MODULATED R-F signal generator and an oscilloscope.

The alignment of the AFC circuit may be checked by means of a modulated signal generator and output meter as follows:

(a) Connect one terminal of the output meter to P2 of one of the 6N6 Output tubes and the other terminal through a .1 mf., or larger, condenser—not electrolytic—to P2 of the other 6N6 Output tube.

(b) Connect the output of the signal generator through a .00025 mf. condenser to the top cap of the 6A8 Oscillator-Modulator tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver chassis.

(c) Rotate the Phantom Control to the left-hand position (NORMAL).

(d) Adjust the frequency of the signal generator in the region of 450 kilocycles for maximum reading on the output meter.

(e) Without altering the connections or adjustments of the signal generator or output meter connect an antenna to the antenna terminal "A1" and tune-in a local broadcasting station. Turn off modulation of signal generator Adjust station selector slightly for zero beat.

(f) Rotate the Phantom Control to the Mystic Hand position and listen to the beat note. If the note is less than 200 cycles, or the equivalent of some tone below middle C on the piano, the AFC alignment is satisfactory.

(g) If the beat note is higher than middle C realignment is necessary.

(h) In cases where the beat note is not more than about two octaves above middle C or from 1000 to 1500 cycles the AFC circuit may be aligned for zero beat by making a slight adjustment of the top trimmer condenser on the 2nd I-F transformer. This circuit is very critical and a slight adjustment will produce a great change in the beat note.

(i) Where the AFC is considerably out of alignment as evidenced by a beat note of higher than 1500 cycles the standard alignment procedure outlined below should be followed.

TUNING I-F AMPLIFIER

I. Conventional Method.

(a) Connect the output meter as outlined above in (a)

(b) Check the 6J7 cathode bias which should be approximately 6.5 volts with no signal applied.

(c) Connect the output of the signal generator through a .02 mf. condenser to the top cap of the 6K7 I-F amplifier tube, leaving the tube's grid clip in place. Connect the ground lead of the signal generator to the "GND" terminal of the receiver chassis.

(d) Set the band selector switch to the Broadcast Band and rotate the station selector to approximately 60 on the dial. The exact setting should be at a position where no broadcast signal will be received. Turn the volume control all the way to the right (clockwise), turn the fidelity control to HIGH FIDELITY and the Phantom Control to NORMAL.

(e) Set the signal generator to 450 kilocycles.

(f) Adjust the middle trimmer and then the bottom trimmer of the 2nd I-F transformer for maximum reading on the output meter. Caution: do not attempt to adjust the top trimmer at this time. ALWAYS USE THE LOWEST GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

(g) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 oscillator-modulator tube, leaving the tube's grid clip in place.

(h) Open the middle trimmer of the 1st I-F transformer three or four turns of the adjustment screw. (Care should be taken that the adjustment screw does not become dislodged from the nut).

(i) Adjust the top trimmer and then the bottom trimmer of the 1st I-F transformer for maximum reading on the output meter.

(j) Adjust the middle trimmer of the 1st I-F transformer by closing until maximum reading is obtained on the output meter.

(k) Transfer the output lead of the signal generator from the 6A8 tube to the antenna terminal "A1" of the receiver and recheck the adjustment of the bottom trimmer of the 1st -IF transformer.

(l) To adjust the AFC system it will be necessary to transfer the output lead of the signal generator back to the top cap of the 6K7 I-F amplifier tube. The .02 mf. condenser should still be connected in series with this lead.

(m) Insert a 0-5 milliammeter in series with the cathode circuit of the 6J7 tube and with a strong 450 kilocycle signal from the signal generator, the reading of the cathode current should be recorded.

(n) Turn the Phantom Control to the MYSTIC HAND position and without changing the output of the signal generator, adjust the top trimmer condenser of the 2nd I-F transformer so that the reading of the 0-5 milliammeter is the same as was recorded with the Phantom Control in the NORMAL position. This value of current will be obtained with the trimmer closed, with the trimmer open and at some intermediate position. A very slight adjustment while in the intermediate position will cause the meter to read from 0 to 1.5 milliamperes. This is the setting that should be used. An insulated screw driver should be used in adjusting the AFC trimmer condenser.

(o) As a final check on the AFC adjustment, disconnect the test equipment and tune-in a fairly weak broadcast station in the region of 1500 kilocycles. Turn the AFC "ON" and "OFF." If reception is the same in both positions and will automaticaly tune-in strong stations within approximately plus or minus 10 kilocycles of the station selector setting with AFC "ON," the AFC is properly aligned. If distortion is noted and the receiver will not automatically tune-in stations as described, the AFC alignment should be rechecked.

II. Oscilloscope Method.

(a) Connect the output of a FREQUENCY MODULATED R-F signal generator through a .02 mf. condenser to the top cap of the 6K7 I-F amplifier tube, leaving the tube's grid clip in place. KEEP THE GENERATOR LEAD AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Connect the vertical plates of the cathode ray oscilloscope to the receiver as follows: The "High" side should be connected to the plate of the 6R7 tube and the "low" side should be connected to the receiver chassis. (Be sure the oscilloscope is protected from D.C. by connecting a condenser, .1 mf. to .05 mf., in series with the lead of the 6R7 tube).

(c) Set the band selector switch to the Broadcast Band and rotate the station selector to approximately 60 on the dial. The exact setting should be at a position where no broadcast signal will be received. Turn the volume control to the right (clockwise), turn the fidelity control to HIGH FIDELITY and the Phantom Control to NORMAL.

(d) Set the signal generator to 450 kilocycles. See instructions supplied with signal generator and oscilloscope.

(e) Adjust the middle trimmer of the 2nd I-F transformer so that the nose of the selectivity curve is centered on the resonance axis (R) of the transparent scale supplied with the oscilloscope.

(f) Adjust the bottom trimmer of the 2nd I-F transformer for maximum amplitude of the selectivity curve on resonance axis (R).

(g) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 oscillator-modulator tube, leaving the tube's grid clip in place.

(h) Open the middle trimmer of the 1st I-F transformer three or four turns of the adjustment screw. (Care should be taken that the adjustment screw does not become dislodged from the nut).

(i) Increase the output of the signal generator and adjust the top trimmer of the 1st I-F transformer for maximum symmetry and amplitude.

(j) Adjust the bottom trimmer of the 1st I-F transformer for maximum amplitude.

(k) Reduce the output of the signal generator and adjust the middle trimmer of the 1st I-F transformer for maximum symmetry and amplitude.

(l) Carefully repeat operations (f) and (k) for more accurate adjustments.

Aligning R-F Amplifier.

The R-F amplifier can best be aligned in the conventional manner, using a modulated signal generator and output meter.

When aligning the R-F amplifier the output lead of the signal generator is connected to the antenna terminal "A1" of the receiver. For the BLUE and RED bands a .00025 mf. condenser must be connected in series with the output lead of the signal generator and for the high frequency band a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be shunt aligned and then series aligned, where provision is made for series alignment (BLUE and RED bands). The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated in "C" below for each adjustment.

(a) Adjust the "OSC", "R-F" and "ANT" shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check in the order given. DO NOT READJUST THE "OSC" TRIMMER.

NOTE: When shunt aligning the RED and GREEN bands care must be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times or more and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct position.

(b) To align the series trimmers, 39Z and 39Y—Fig. 2, set the signal generator to the frequency indicated below and then tune-in this signal with the station selector for maximum output. At the time that any series trimmer is being adjusted rotate the station selector back and forth slightly until no further improvement in output is obtained.

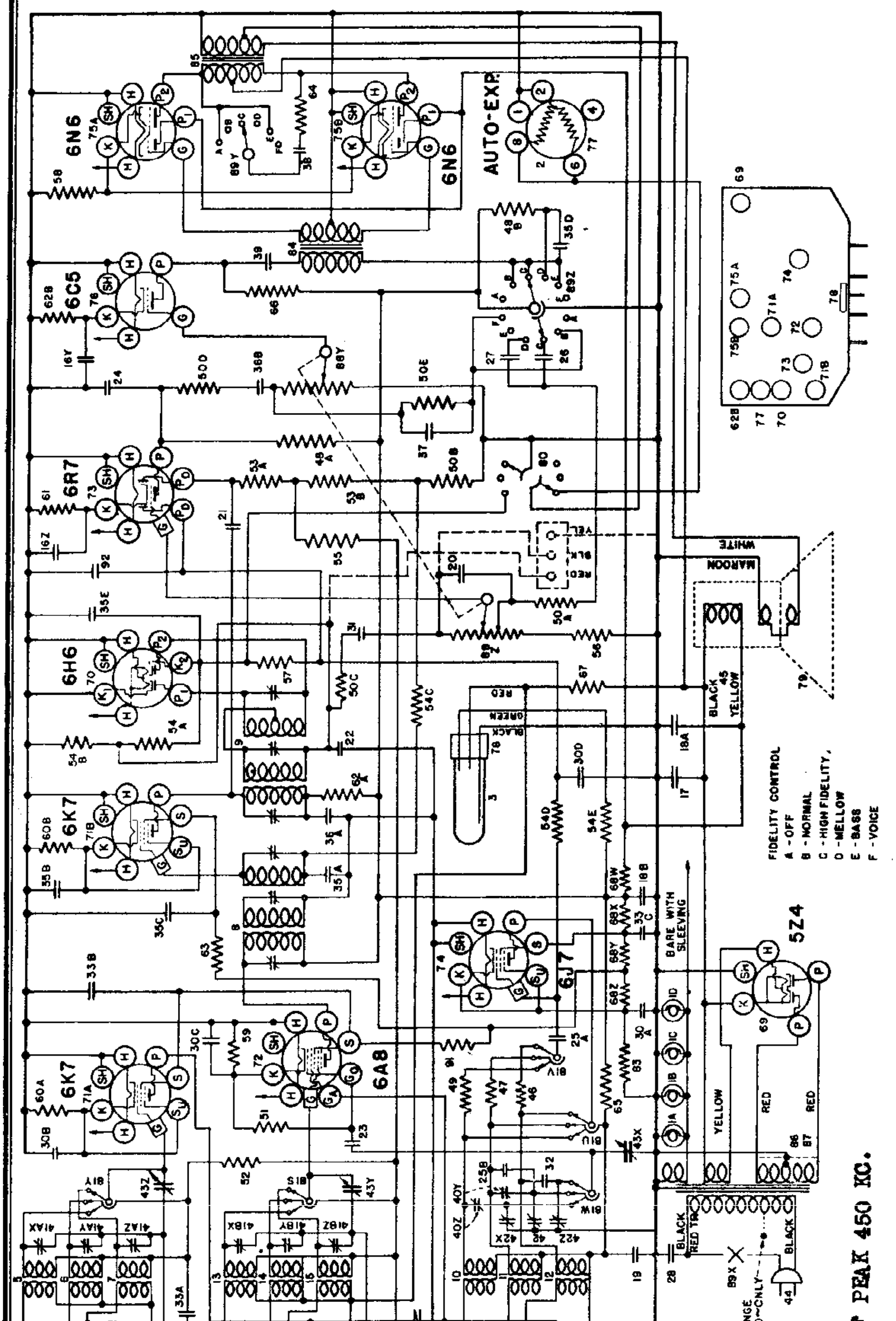
PHANTOM CONTROL

The Phantom Control permits the listener to use the Mystic Hand (Automatic Frequency Control) and the Auto-Expressionator as desired. The various positions of the control are shown on an illuminated indicator on the dial.

The receiver may be operated with normal power output and fidelity, such as would ordinarily be desired in the average home, with the control in the NORMAL position.

The Mystic Hand automatically tunes the receiver accurately to the strongest signal within a frequency range of approximately 10 kilocycles of the station selector setting.

CROSLEY RADIO CORP.



IF PEAK 450 KC.

Oct., 1936

SALES MODEL 1211

CHASSIS MODEL 1216

(c) SIGNAL INPUT FREQUENCIES

		Shunt Alignment	Series Alignment
BLUE	540-1725 Kc. or 555-173 Meters (American Broadcast Band)	1,400 Kilocycles	600 Kilocycles
RED	1.8- 5.5 Megacycles or 170-55 Meters (Police and Amateurs)	5,000 Kilocycles	2000 Kilocycles
GREEN	5.6- 18.1 Megacycles or 54-16.5 Meters (High Frequency Band)	18,000 Kilocycles	

MODEL 1216
Parts

CROSLEY RADIO CORP.

SPECIFICATIONS

The Crosley Model 1216 radio is a Twelve-tube receiver featuring High Fidelity, Volume Expansion which is accomplished by the Auto-Expressionator tube and Automatic Frequency Control which is known as the Mystic Hand.

The tubes used are 6K7 R-F Amplifier, 6A8 Oscillator-Modulator, 6J7 AFC Control, 6K7 I-F Amplifier, 6H6 AFC Detector, 6R7 AVC Diode and A-F Amplifier 6C5 A-F Driver, two 6N6 Output, 5Z4 Rectifier, W41187 Auto-Expressionator and W42419A Neon Tuning Tube.

Item No.	Part No.	Description
1ABCD	W —37922	Dial Light Bulb
	G 3—37965	D. L. Socket
	W — 4057	D. L. Shield
2	W —41187	Auto Express. Tube
3	W —42419A	Neon Tuning Indi. Tube
	G 2—42584	Neon Socket Assembly
	W —42589	Neon Tube Cover
	—42592	Cover Gasket, (N. T.)
4		None
5	G 94—32000	Antenna Coil, B. C. B.
6	G108—32000	Antenna Coil, Pol. B.
7	G107—32000	Antenna Coil, H. F. B.
8	G 90—32004	1st I-F Assembly
9	G126—32004	2nd I-F Assembly
10	G 97—32002	Osc. Coil, B. C. B.
11	G 96—32002	Osc. Coil, Pol. B
12	G 95—32002	Osc. Coil, H. F. B.
13	G 68—32001	R-F. Coil, B. C. B.
14	G 75—32001	R-F. Coil, Pol. B.
15	G 74—32001	R-F. Coil, H. F. B.
16Z 16Y	W —37778	Condenser, 12 Mf. 25V. Condenser, 12 Mf. 25V.
17	W —36055	Condenser, 35 Mf. 400V.
18AB	W —42386	Condenser, 20 Mf. 300V.
19	G 18—34000	Condenser, 5600 Mmf.
20	G 5—34002	Condenser, .00005 Mf. 200V.
	G 10—34002	Condenser, .00005 Mf. 300V.
22	G 2—34002	Condenser, .0001 Mf. 200V.
23	G 6—34002	Condenser, .000025 Mf. 200V.
24	G 1—34005	Condenser, .00025 Mf. 300V.
25AB	G 3—34002	Condenser, .0005 Mf. 200V.
26	W —35758	Condenser, .008 Mf. 400V.
27	W —41461	Condenser, .0014 Mf. 200V.
28	W —30805	Condenser, .01 Mf. 400V.
29		NONE
30AB CD	W —36541	Condenser, .02 Mf. 160V.
31	W —28621	Condenser, .02 Mf. 200V.
32	W —41209	Condenser, .048 Mf. 200V.
33AB CD	W —35936	Condenser, .05 Mf. 200V.
34	W —32380	Condenser, .05 Mf. 200V.
35AB CDE	W —27216	Condenser, .05 Mf. 200V.
36AB	W —32780B	Condenser, .05 Mf. 400V.
37	W —43094	Condenser, .011 Mf. 160V.
38	W —22688	Condenser, .1 Mf. 200V.
39	W —42554	Condenser, .12 Mf. 160V.
40Z 40Y	—41218	B. C. Osc. Series Trimmer Pol. Osc. Series Trimmer
41	W —37891	3 Section Trimmer (Shunt)
42	W —35951	3 Section Trimmer (Shunt)
43	G 47—33002	3 Section Var. Tuning Cond. Gang
	MG12 —42411	Dial Drive Assembly
	C —42421	Dial Glass (Calibrated)
	—42325A	Drive Unit
	W —41144	Dial Hand (Long)
	W —42180	Dial Hand (Short)
	W —40486	Hand Mtg. Screw
	E —13648	R. H. Indic. Flipper
	E —13647	L. H. Indic. Flipper
	W —42308	Flipper Pulley
	—43081	L. H. Flipper Cont. Cable
	—43080	R. H. Flipper Cont. Cable
	—40638	Indi. Cont. Cable
	—41157	Drive Belt
	W —23877	Flex. Coupling
	W —37909A	Band Sel. Pulley
44	B —33906A	Power Cord and Plug
45	G 2—37918	Speaker Cable
46	—35760	Resistor, 20,000 Ohm ¼W.
47	—33390	Resistor, 30,000 Ohm ¼W.
48AB	—35928	Resistor, 60,000 Ohm ¼W.
49	—34019	Resistor, 75,000 Ohm ¼W.
50ABC	—35600	Resistor, 100,000 Ohm ¼W.
51	—35930	Resistor, 200,000 Ohm ¼W.
52	—35601	Resistor, 300,000 Ohm ¼W.
53AB	—36321	Resistor, 400,000 Ohm ¼W.
54AB CDE	—36322	Resistor, 500,000 Ohm ¼W.
55	—36176	Resistor, 1.3 Megohm ¼W.
56	—21454	Resistor, 1. Megohm ¼W.
57	—36688	Resistor, 3. Megohm ¼W.
58	W —32961	Resistor, 100 Ohm 3W. Flex.
59	W —25937	Resistor, 275 Ohm ½W. Flex.
60AB	W —28589	Resistor, 350 Ohm ½W. Flex.
61	W —22514	Resistor, 750 Ohm ½W. Flex.
62AB	W —21452	Resistor, 1100 Ohm ¾W. Flex.
63	W —23013	Resistor, 2000 Ohm 1½W. Flex.
64	W —23907	Resistor, 750 Ohm 1½W. Flex.
65	— 4921C	Resistor, 10,000 Ohm 1W.
66	—36952	Resistor, 30,000 Ohm 1W.
67	W —42516	Resistor, 20,000 Ohm 1W.
68Z 68Y 68X 68W	W —41966	Resistor, 4,000 Ohm Resistor, 1,000 Ohm Candohm Resistor, 3,000 Ohm Resistor, 200 Ohm
69	G154—36400	Socket Type, 5Z4
70	G155—36400	Socket Type, 6H6
71AB	G151—36400	Socket Type, 6K7
72	G156—36400	Socket Type, 6A8
73	G164—36400	Socket Type, 6R7
74	G157—36400	Socket Type, 6J7
75AB	G165—36400	Socket Type, 6N6
76AB	G152—36400	Socket Type, 6C5
77	G167—36400	Socket Type, Auto Expressionator
78		See Item 3
79	649CJ4 "M"	Speaker, Spec. 1-D-668
	—40701	Cone Assembly for above Spk.
	—40699	Field Coil for above Spk.
80	W —41029A	Phantom Control Switch
81	C —41235A	Band Selector Switch
82	G 27—26719	Ant. and Gnd. Terminal Assembly
83	W —42679	Resistor, 245 Ohm ½W. Flex.
84	G 1—37995	A-F Driver Transformer
85	G 60—24628	Out-Put Transformer
86	—42557	Pwr. Trans., 60 Cy. 110V.
	—43088	Pwr. Trans., 50 Cy. 110V.
	—43089	Pwr. Trans., 50 Cy. 220V.
	—43008	Pwr. Trans., 25 Cy. 110V.
	—43170	Pwr. Trans., 25 Cy. 220V.
87		See Item 86
88Z 88Y	—41375	Vol. Cont., 3 Meg. Vol. Cont., 1 Meg.
89	B —42295A	Fidelity Cont. and Line Switch
90	G101—34403	Neutralizing Cond. Assembly
91	W — 6705	Resistor, 3500 Ohm 1W.
92	W —24049A	Condenser, .1 Mf. 200V.
	C —43134	Escutcheon
	—42043	Escutcheon Gasket
	C —42044	Escutcheon Lens
	D — 30	Screws Escut. Mtg.
	W —37339	Knob, V. C. and Station Selector
	W —40192B	Knob, Bd. Sel. and Phantom Cont.
	W —42490	Knob, Fid. Cont.
	W —36117	Rubber Mtg. Feet
	— 6-P	Cabinet

MODEL 1216
Socket, Trimmers
Voltage, Notes
Resonance Curve
Pickup Data

CROSLEY RADIO CORP.

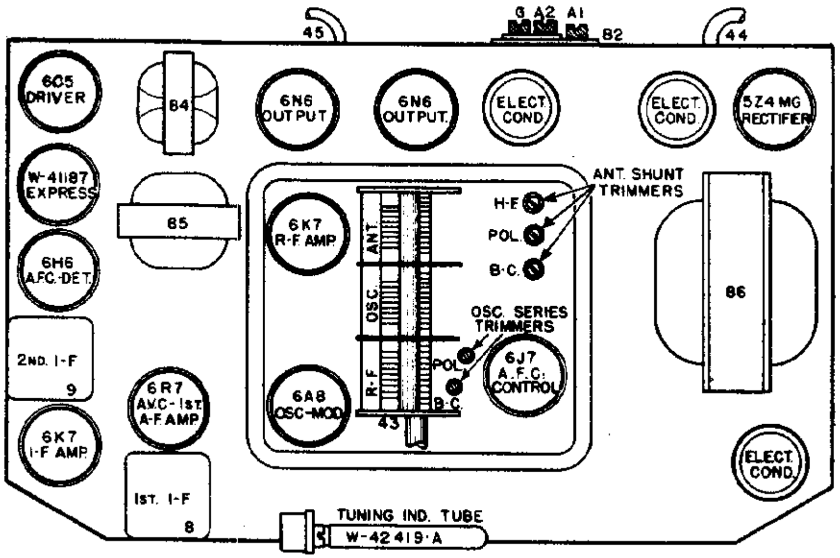


Fig. 2 Top View—1216

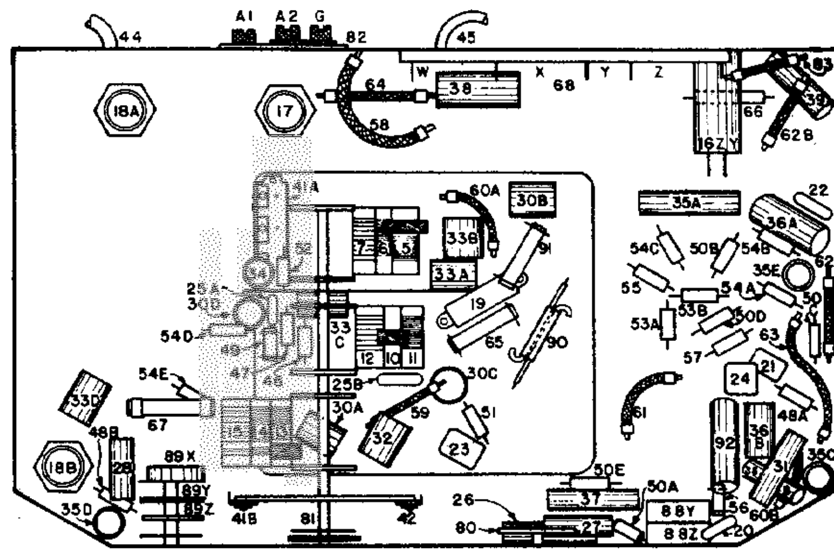


Fig. 3 Bottom View—1216

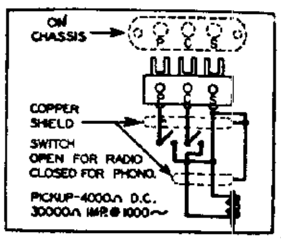
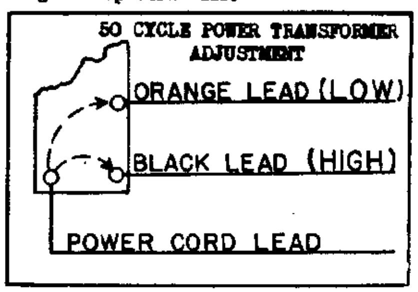


Fig. 7 Phonograph Pickup



TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P_1	P_2	S	Su	K	Ga	Go
6K7	R-F Amplifier	6.3	100	—	110	3.3	3.3	—	—
6A8	Oscillator-Modulator	6.3	250	—	110	—	3.8	175	-4 to -12
6J7	AFC Control	6.3	160	—	140	6.3	6.3	—	—
6K7	I-F Amplifier	6.3	240	—	108	3.0	3.0	—	—
6H6	AFC Detector	6.3	—	—	—	—	—	—	—
6R7	Diode and 1st A-F Amplifier	6.3	75	—	—	—	2.3	—	—
6C5	A-F Driver	6.3	170	—	—	—	5.2	—	—
6N6	(2) Output	6.3	250	370	—	—	6.0	—	—
5Z4	Rectifier	5.0	—	—	—	—	370	—	—
W42419A	Tuning Tube	—	100–170	170	—	—	—	—	—
W41187	Auto-Expressionator Tube	Varies with power output.							

Voltage drop across speaker field 120 volts.
Power output approximately 20 watts.

Power consumption approximately 123 watts.
All readings taken on 117.5 volt power supply.

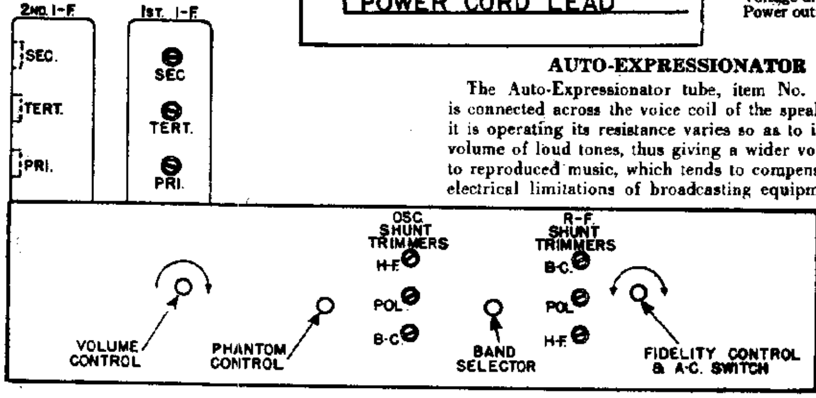


Fig. 4 Front View—1216

AUTO-EXPRESSIONATOR

The Auto-Expressionator tube, item No. 77, Fig. 1, is connected across the voice coil of the speaker. When it is operating its resistance varies so as to increase the volume of loud tones, thus giving a wider volume range to reproduced music, which tends to compensate for the electrical limitations of broadcasting equipment.

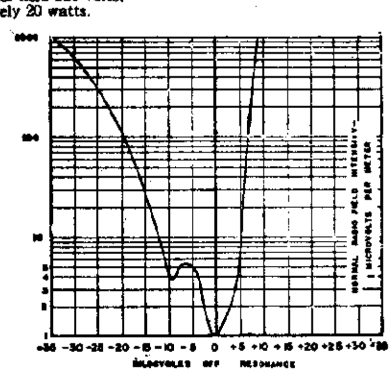


Fig. 5

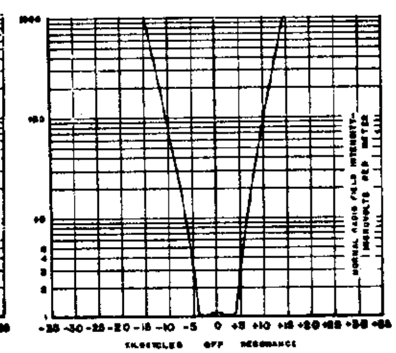


Fig. 6

MODEL 1216
Alignment
Notes

CROSLEY RADIO CORP.

ALIGNMENT PROCEDURE

This model receiver should be turned-on and allowed to "warm-up" for about 15 minutes before aligning its circuits.

It is a High Fidelity receiver and in order to secure maximum performance the alignment should be done with precision instruments. The alignment condensers should not be readjusted just to determine if they are properly tuned. Fig. 5, shows the selectivity curve of a receiver whose I-F amplifier was slightly mistuned while Fig. 6, shows a curve made from actual measurements of a receiver employing a triple-tuned I-F amplifier which was properly aligned with the use of a FREQUENCY MODULATED R-F signal generator and an oscilloscope.

The alignment of the AFC circuit may be checked by means of a modulated signal generator and output meter as follows:

(a) Connect one terminal of the output meter to P2 of one of the 6N6 Output tubes and the other terminal through a .1 mf., or larger, condenser—not electrolytic to P2 of the other 6N6 Output tube.

(b) Connect the output of the signal generator through a .00025 mf. condenser to the top cap of the 6A8 Oscillator-Modulator tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver chassis.

(c) Rotate the Phantom Control to the left-hand position (NORMAL).

(d) Adjust the frequency of the signal generator in the region of 450 kilocycles for maximum reading on the output meter.

(e) Without altering the connections or adjustments of the signal generator or output meter connect an antenna to the antenna terminal "A1" and tune-in a local broadcasting station. Turn off modulation of signal generator. Adjust station selector slightly for zero beat.

(f) Rotate the Phantom Control to the Mystic Hand position and listen to the beat note. If the note is less than 200 cycles, or the equivalent of some tone below middle C on the piano, the AFC alignment is satisfactory.

(g) If the beat note is higher than middle C realignment is necessary.

(h) In cases where the beat note is not more than about two octaves above middle C or from 1000 to 1500 cycles the AFC circuit may be aligned for zero beat by making a slight adjustment of the top trimmer condenser on the 2nd I-F transformer. This circuit is very critical and a slight adjustment will produce a great change in the beat note.

(i) Where the AFC is considerably out of alignment as evidenced by a beat note of higher than 1500 cycles the standard alignment procedure outlined below should be followed.

TUNING I-F AMPLIFIER

I. Conventional Method.

(a) Connect the output meter as outlined above in (a).

(b) Check the 6J7 cathode bias which should be approximately 6.5 volts with no signal applied.

(c) Connect the output of the signal generator through a .02 mf. condenser to the top cap of the 6K7 I-F amplifier tube, leaving the tube's grid clip in place. Connect the ground lead of the signal generator to the "G" terminal of the receiver chassis.

(d) Set the band selector switch to the Broadcast **Band and rotate the station selector** to approximately 60 on the dial. **The exact setting should** be at a position where no broadcast signal will be received. Turn the volume control all the way to the right (clockwise), turn the fidelity control to HIGH FIDELITY and the Phantom Control to NORMAL.

(e) Set the signal generator to 450 kilocycles.

(f) Adjust the middle trimmer and then the bottom trimmer of the 2nd I-F transformer for maximum reading on the output meter. Caution: do not attempt to adjust the top trimmer at this time. ALWAYS USE THE LOWEST GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

(g) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 oscillator-modulator tube, leaving the tube's grid clip in place.

(h) Open the middle trimmer of the 1st I-F transformer three or four turns of the adjustment screw. (Care should be taken that the adjustment screw does not become dislodged from the nut).

(i) Adjust the top trimmer and then the bottom trimmer of the 1st I-F transformer for maximum reading on the output meter.

(j) Adjust the middle trimmer of the 1st I-F transformer by closing until maximum reading is obtained on the output meter.

(k) Transfer the output lead of the signal generator from the 6A8 tube to the antenna terminal "A1" of the receiver and recheck the adjustment of the bottom trimmer of the 1st I-F transformer.

(l) To adjust the AFC system it will be necessary to transfer the output lead of the signal generator back to the top cap of the 6K7 I-F amplifier tube. The .02 mf. condenser should still be connected in series with this lead.

(m) Insert a 0-5 milliammeter in series with the cathode circuit of the 6J7 tube and with a strong 450 kilocycle signal from the signal generator, the reading of the cathode current should be recorded.

(n) Turn the Phantom Control to the MYSTIC HAND position and without changing the output of the signal generator, adjust the top trimmer condenser of the 2nd I-F transformer so that the reading of the 0-5 milliammeter is the same as was recorded with the Phantom Control in the NORMAL position. This value of current will be obtained with the trimmer closed, with the trimmer open and at some intermediate position. A very slight adjustment while in the intermediate position will cause the meter to read from 0 to 1.5 milliamperes. This is the setting that should be used. An insulated screw driver should be used in adjusting the AFC trimmer condenser.

(o) As a final check on the AFC adjustment, disconnect the test equipment and tune-in a fairly weak broadcast station in the region of 1500 kilocycles. Turn the AFC "ON" and "OFF". If reception is the same in both positions and will automatically tune-in strong stations within approximately plus or minus 10 kilocycles of the station selector setting with AFC "ON", the AFC is properly aligned. If distortion is noted and the receiver will not automatically tune-in stations as described, the AFC alignment should be rechecked.

II. Oscilloscope Method.

(a) Connect the output of a FREQUENCY MODULATED R-F signal generator through a .02 mf. condenser to the top cap of the 6K7 I-F amplifier tube, leaving the tube's grid clip in place. KEEP THE GENERATOR LEAD AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Connect the vertical plates of the cathode ray oscilloscope to the receiver as follows: The "High" side should be connected to the plate of the 6R7 tube and the "Low" side should be connected to the receiver chassis. (B sure the oscilloscope is protected from D.C. by connecting a condenser, .1 mf. to .05 mf., in series with the lead of the 6R7 tube).

(c) Set the band selector switch to the Broadcast Band and rotate the station selector to approximately 60 on the dial. The exact setting should be at a position where no broadcast signal will be received. Turn the volume control to the right (clockwise), turn the fidelity control to HIGH FIDELITY and the Phantom Control to NORMAL.

(d) Set the signal generator to 450 kilocycles. See instructions supplied with signal generator and oscilloscope.

(e) Adjust the middle trimmer of the 2nd I-F transformer so that the nose of the selectivity curve is centered on the resonance axis (R) of the transparent scale supplied with the oscilloscope.

(f) Adjust the bottom trimmer of the 2nd I-F transformer for maximum amplitude of the selectivity curve on resonance axis (R).

(g) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 oscillator-modulator tube, leaving the tube's grid clip in place.

(h) Open the middle trimmer of the 1st I-F transformer three or four turns of the adjustment screw. (Care should be taken that the adjustment screw does not become dislodged from the nut).

(i) Increase the output of the signal generator and adjust the top trimmer of the 1st I-F transformer for maximum symmetry and amplitude.

(j) Adjust the bottom trimmer of the 1st I-F transformer for maximum amplitude.

(k) Reduce the output of the signal generator and adjust the middle trimmer of the 1st I-F transformer for maximum symmetry and amplitude.

(l) Carefully repeat operations (f) and (k) for more accurate adjustments.

Aligning R-F Amplifier.

The R-F amplifier can best be aligned in the conventional manner, using a modulated signal generator and output meter.

When aligning the R-F amplifier the output lead of the signal generator is connected to the antenna terminal "A1" of the receiver. For the BLUE and RED bands a .00025 mf. condenser must be connected in series with the output lead of the signal generator and for the high frequency band a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be shunt aligned and then series aligned, where provision is made for series alignment (BLUE and RED bands). The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated in "C" below for each adjustment.

(a) Adjust the "OSC", "R-F" and "ANT" shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check in the order given. DO NOT READJUST THE "OSC" TRIMMER.

NOTE: When shunt aligning the RED and GREEN bands care must be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times or more and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct position.

(b) To align the series trimmers, "Osc. Series"—Fig. 2, set the signal generator to the frequency indicated below and then tune-in this signal with the station selector for maximum output. At the time that any series trimmer is being adjusted rotate the station selector back and forth slightly until no further improvement in output is obtained.

PHANTOM CONTROL

The Phantom Control permits the listener to use the Mystic Hand (Automatic Frequency Control) and the Auto-Expressionator as desired. The various positions of the control are shown on an illuminated indicator on the dial.

The receiver may be operated with normal power output and fidelity, such as would ordinarily be desired in the average home, with the control in the NORMAL position.

The Mystic Hand automatically tunes the receiver accurately to the strongest signal within a frequency range of approximately 10 kilocycles of the station selector setting.

50 CYCLE POWER TRANSFORMER ADJUSTMENT

Receivers equipped with a 50 cycle power transformer have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 260 volts.

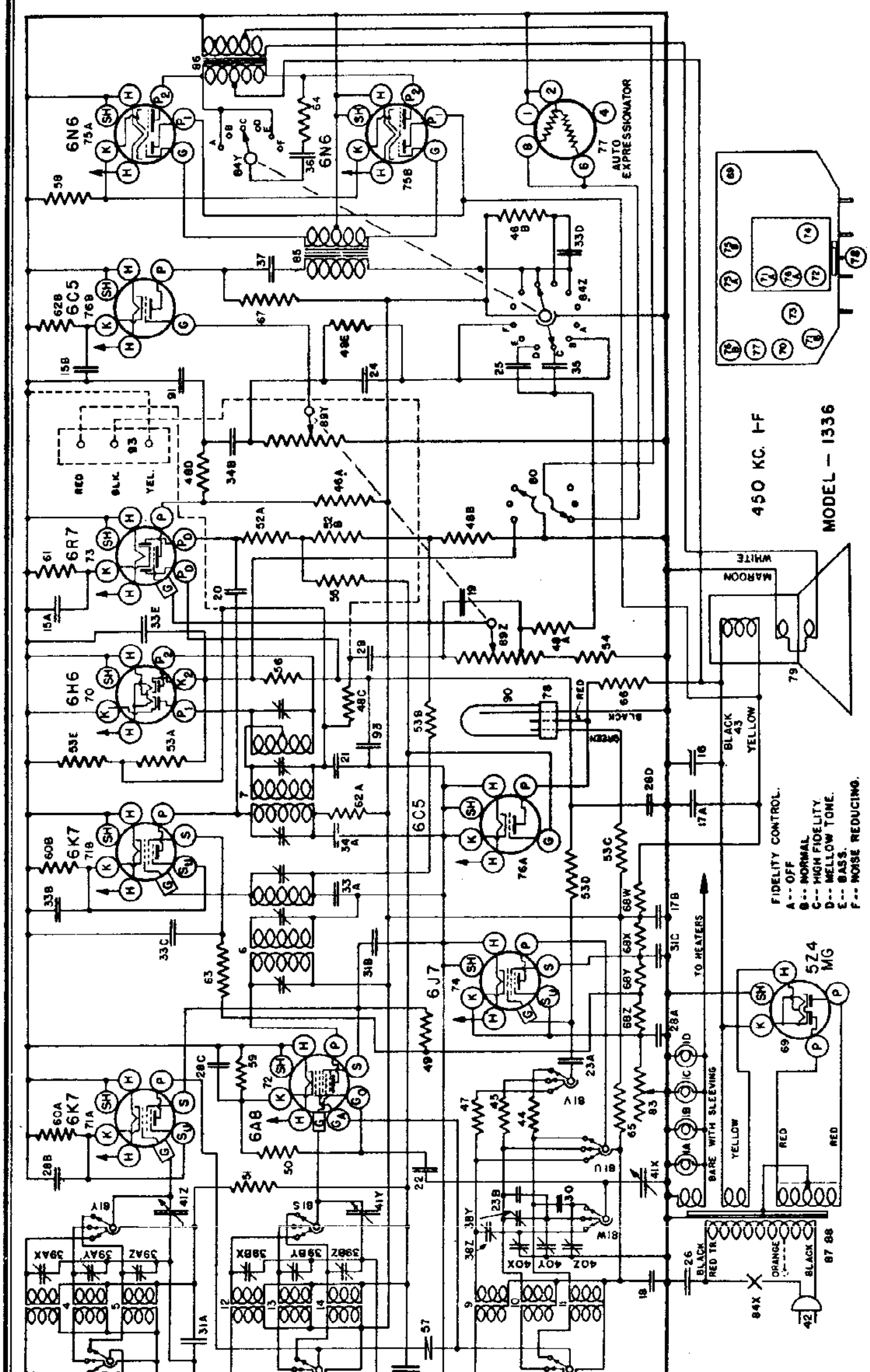
The accompanying illustration shows the connections for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.

NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt, 500 volt D.C. meter (except filaments) with the receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A.C. voltmeter. Readings may vary plus or minus 10% of values given.

CROSLEY RADIO CORP.



Oct., 1936 SALES MODEL 1313 CHASSIS MODEL 1336

(c) SIGNAL INPUT FREQUENCIES

		Series Alignment	Shunt Alignment
BLUE	540-1725 Kc. or 555-173 Meters (American Broadcast Band)	600 Kilocycles	1,400 Kilocycles
RED	1.8- 5.5 Megacycles or 170-55 Meters (Police and Amateurs)	2000 Kilocycles	5,000 Kilocycles
GREEN	[illegible]		

MODEL 1336
Parts

CROSLEY RADIO CORP.

SPECIFICATIONS

The Crosley Model 1336 radio is a Thirteen-tube receiver featuring High Fidelity, Volume Expansion which is accomplished by the Auto-Expressionator tube and Automatic Frequency Control which is known as the Mystic Hand.

The tubes used are 6K7 R-F Amplifier, 6A8 Oscillator-Modulator, 6J7 AFC Control, 6K7 I-F Amplifier, 6H6 AFC Detector, 6R7 AVC Diode and A-F Amplifier 6C5 A-F Driver, two 6N6 Output, 6C5 Tuning Indicator Amplifier, 5Z4 Rectifier, W41187 Auto-Expressionator, and W42419A Neon Tuning Indicator Tube.

Item No.	Part No.	Description
1ABCD	W —37922	Dial Light Bulb
	G 3—37965	Dial Light Socket
	W —40570	Dial Light Shield
2	W —41187	Auto Expressionator Tube
3	G 94—32000	Antenna Coil, B. C. B.
4	G108—32000	Antenna Coil, Pol. B.
5	G107—32000	Antenna Coil, H. F. B.
6	G 90 —32004	1st I-F Assembly
7	G126—32004	2nd I-F Assembly
9	G 97—32002	Osc. Coil. B. C. B.
10	G 96—32002	Osc. Coil, Pol. B.
11	G 95—32002	Osc. Coil, H. F. B.
12	G 68—32001	R. F. Coil, B.C.B.
13	G 75—32001	R. F. Coil, Pol. B.
14	G 74—32001	R. F. Coil, H. F. B.
15AB	W —41598	Condenser, 50 Mf. 25V.
16	W —36055	Condenser, 35 Mf. 400V.
17AB	W —36057	Condenser, 40 Mf. 300V.
18	G 18—34000	Condenser, 5600 Mmf. 300V.
19	G 5—34002	Condenser, .000050 Mf. 200V.
20	G 10—34002	Condenser, .000050 Mf. 300V.
21	G 2—34002	Condenser, .0001 Mf. 200V.
22	G 6—34002	Condenser, .000025 Mf. 200V.
23AB	G 3—34002	Condenser, .0005 Mf. 200V.
24	W —34713	Condenser, .006 Mf. 160V.
25	W —41461	Condenser, .0014 Mf. 200V.
26	W —30805	Condenser, .01 Mf. 400V.
27		NONE
28AB CD	W —36541	Condenser, .02 Mf. 160V.
29	W —28621	Condenser, .02 Mf. 200V.
30	W —41209	Condenser, .048 Mf. 200V.
31ABC	W —35936	Condenser, .05 Mf. 200V.
32	W —32380	Condenser, .05 Mf. 200V.
33AB CDE	W —27216	Condenser, .05 Mf. 200V.
34AB	W —32780B	Condenser, .05 Mf. 400V.
35	W —35758	Condenser, .008 Mf. 400V.
36	W —22688	Condenser, .1 Mf. 400V.
37	W —42554	Condenser, .12 Mf. 160V.
38	—41218	B. C. and Pol. Osc. Series Trimmer
39AB	W —37891A	3 Section Shunt Trimmer
40	W —35951A	3 Section Shunt Trimmer
41	G 47—33002	3 Gang Var. Tuning Cond.
	MG12—42411	Dial Drive Assembly, Complete
	C —42421	Dial Glass (Calibrated)
	—42325	Dial Drive Unit only
	W —41144	Dial Hand (Long)
	W —42180	Dial Hand (Short)
	W —40486	Screw, Hand Mtg.
	E —13648	R.H. Indicator Flipper (Phan. Cont.)
	E —13647	L.H. Indicator Flipper (Fidelity Cont.)
	W —42308	Indicator Control Pulley (2)
	—43080	R.H. Indicator Cont. Cable Assy.
	—43081	L.H. Indicator Cont. Cable Assy.
	—40638	Band Indic. Cont. Cable
	—41157	Drive Belt
	—40537	Flexible Coupling
42	B —33906A	Power Cord and Plug
43	G 2—37918	Speaker Cable
44	—36760	Resistor, 20,000 Ohm ¼W.
45	—33390	Resistor, 30,000 Ohm ¼W.
46AB	—35928	Resistor, 60,000 Ohm ¼W.
47	—34019	Resistor, 75,000 Ohm ¼W.
48AB CDE	—35600	Resistor, 100,000 Ohm ¼W.
49	— 6705	Resistor, 3,500 Ohm 1W.
50	—35930	Resistor, 200,000 Ohm ¼W.
51	—35601	Resistor, 300,000 Ohm ¼W.

Item No.	Part No.	Description
52AB	—36321	Resistor, 400,000 Ohm ¼W.
53AB CDE	—36322	Resistor, 500,000 Ohm ¼W.
54	—21454	Resistor, 1 Megohm ¼W.
55	—36176	Resistor, 1.3 Megohm ¼W.
56	—36688	Resistor, 3. Megohm ¼W.
57	G101—34403	R. F. Neutralizing Condenser
58	W —32926	Resistor, 100 Ohm 3W. Flex.
59	W —25937	Resistor, 275 Ohm ½W. Flex.
60AB	W —28589	Resistor, 350 Ohm ½W. Flex.
61	W —22514	Resistor, 750 Ohm ½W. Flex.
62AB	W —21452	Resistor, 1100 Ohm ¾W. Flex.
63	W —23013	Resistor, 2000 Ohm 1¼W. Flex.
64	W —23907	Resistor, 750 Ohm 1½W. Flex.
65	— 4921C	Resistor, 10,000 Ohm 1W.
66	W —42418A	Resistor, 30,000 Ohm 4W.
67	—36952	Resistor, 30,000 Ohm 1W.
68Z	W —41966	Resistor, 4,000 Ohm Candohm
68Y		Resistor, 1,000 Ohm
68X		Resistor, 3,000 Ohm
68W		Resistor, 200 Ohm
69	G154—36400	Socket Type, 5Z4
70	G155—36400	Socket Type, 6H6
71AB	G151—36400	Socket Type, 6K7
72	G156—36400	Socket Type, 6A8
73	G164—36400	Socket Type, 6R7
74	G157—36400	Socket Type, 6J7
75AB	G165—36400	Socket Type, 6N6
76AB	G152—36400	Socket Type, 6C5
77	G167—36400	Auto Expressionator
78	G 1—42584	Neon Tube Socket Assembly
	W —42589	Neon Tube Cover
	—42592	Cover Rubber Gasket
79	734CJ4 "M"	Speaker Spec. 1-D-437
	—41603	Cone Assembly For above Spk.
	—41601	Field Coil
80	W —41029	Phantom Cont. Switch
81	C —41235	Band Select. Switch
82	G 27—26719	Ant. and Gnd. Terminal Assembly
83	W —11287	300 Ohm ½W. A-F-C Bias Resistor
84	B —42295A	Fidelity and Line Switch
85	G 2—37995	A-F Transformer
86	G 60—24628	Out-Put Transformer
87	—42557	Power Trans. 60 Cy. 110V.
	—43008	Power Trans. 25 Cy. 110V.
	—43088	Power Trans. 50 Cy. 110V.
	—43089	Power Trans. 50 Cy. 220V.
89Z	—41375B	Vol. Cont. 3 Meg. Tap 1 Meg.
89Y		Vol. Cont. 1 Meg.
90	W —42419A	Neon Tuning Indic. Tube
91	G 5—34005	Condenser, .00005 Mf. 300V.
92	G 37—26719	Phono Terminal
93	W —24049	Condenser, .1 Mf. 200V.
Type A	C —41219	Escutcheon
	B —41232	Escutcheon Lens
	B —41233	Escutcheon Retaining Spring
	B —41234	Lens Retaining Spring
	—43134A	Escutcheon
Type B	C —42044	Escutcheon Lens
	C —42043	Escutcheon Rubber Ring
	— 7570	Escutcheon Mtg. Screw
	W —37339	Knob, V. C. and Station Sel.
	W —40192B	Knob, Band Sel. and Phantom
	W —42490	Knob, Fidelity Control Cont.
	W —36117	Rubber Mtg. Foot
	W —40230B	Emblem
	W —32620	Nut, Emblem Mtg.
	— 6-Q	Cabinet

CROSLEY RADIO CORP.

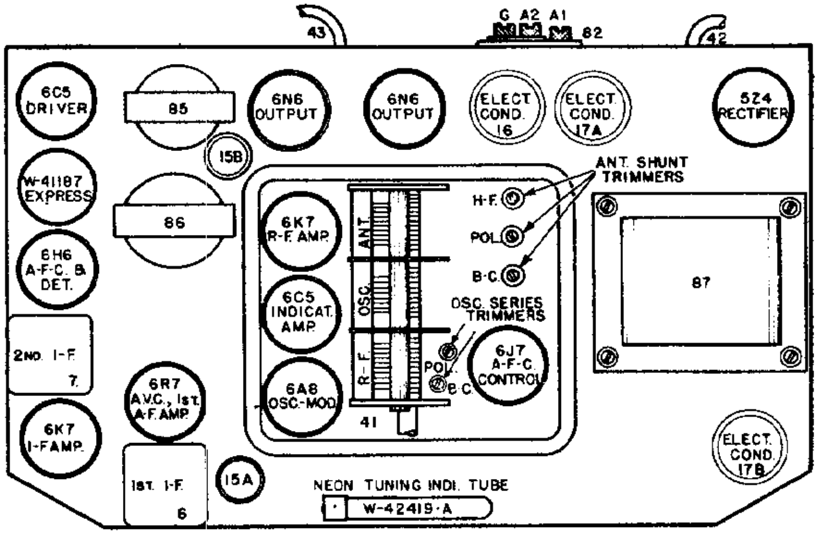


Fig. 2. Top View—1336

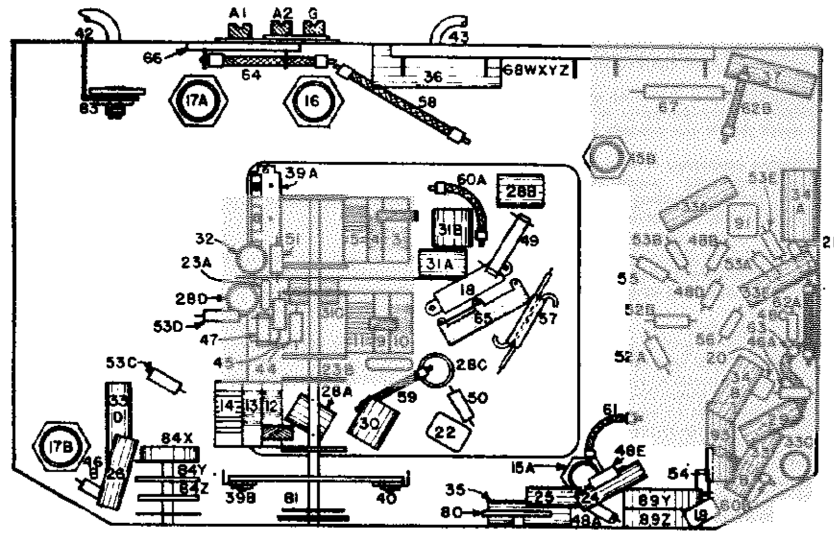


Fig. 3 Bottom View—1336

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P_1	P_2	S	Su	K	Ga	Go
6K7	R-F Amplifier	6.3	235	—	106	2.2	2.2	—	—
6A8	Oscillator-Modulator	6.3	235	—	106	—	3.1	140	-6 to -12
6J7	AFC Control	6.3	140	—	137	6.5	6.5	—	—
6K7	I-F Amplifier	6.3	225	—	100	2.7	2.7	—	—
6H6	AFC Detector	6.3	0	—	—	—	0	—	—
6R7	Diode and 1st A-F Amplifier	6.3	85	—	—	—	2.1	—	—
6C5	A-F Driver	6.3	150	—	—	—	5.0	—	—
6N6	(2) Output	6.3	235	340	—	—	5.2	—	—
6C5	Tuning Indicator Amplifier	6.3	100-200	—	—	—	0	—	—
5Z4	Rectifier	5.0	—	—	—	—	350	—	—
W42419A	Tuning Indicator Tube	—	100-200	150	—	—	0	—	—
W41187	Expander Tube	Varies with power output.							

Voltage drop across speaker field 105 volts.
Power output approximately 25 watts.

Power consumption approximately 135 watts.
All readings taken on 117.5 volt power supply.

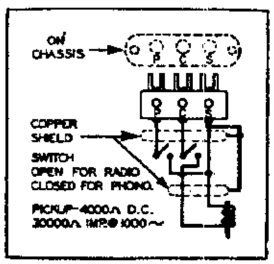
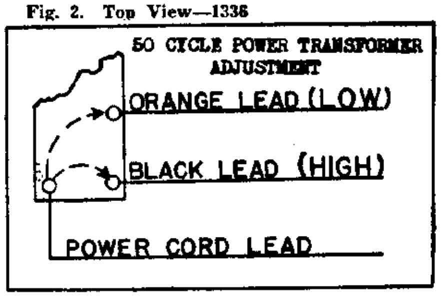


Fig. 7 Phonograph Pickup



AUTO-EXPRESSIONATOR

The Auto-Expressionator tube, item No. 77, Fig. 1, is connected across the voice coil of the speaker. When it is operating its resistance varies so as to increase the volume of loud tones, thus giving a wider volume range to reproduced music, which tends to compensate for the electrical limitations of broadcasting equipment.

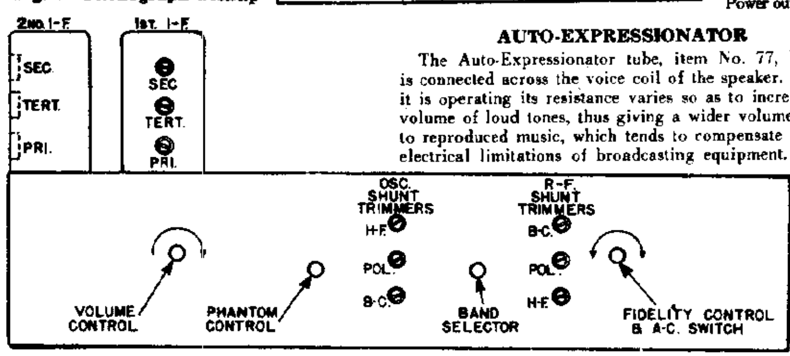


Fig. 4 Front View—1336

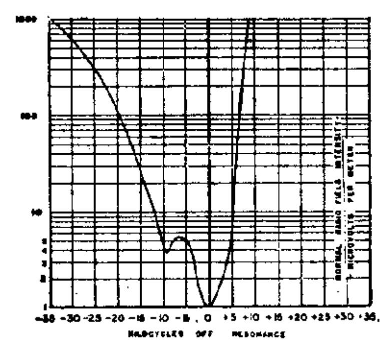


Fig. 5

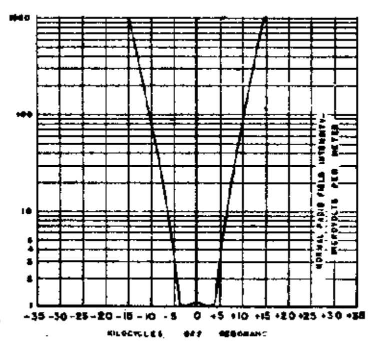


Fig. 6

MODEL 1336
Alignment, Notes

CROSLEY RADIO CORP.

TUNING I-F AMPLIFIER

This model receiver should be turned-on and allowed to "warm-up" for about 15 minutes before aligning its circuits.

It is a High Fidelity receiver and in order to secure maximum performance the alignment should be done with precision instruments. The alignment condensers should not be readjusted just to determine if they are properly tuned. Fig. 5, shows the selectivity curve of a receiver whose I-F amplifier was slightly mistuned while Fig. 6, shows a curve made from actual measurements of a receiver employing a triple-tuned I-F amplifier which was properly aligned with the use of a FREQUENCY MODULATED R-F signal generator and an oscilloscope.

The alignment of the AFC circuit may be checked by means of a modulated signal generator and output meter as follows:

(a) Connect one terminal of the output meter to P2 of one of the 6N6 Output tubes and the other terminal through a .1 mf., or larger, condenser—not electrolytic to P2 of the other 6N6 Output tube.

(b) Connect the output of the signal generator through a .00025 mf. condenser to the top cap of the 6A8 Oscillator-Modulator tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver chassis.

(c) Rotate the Phantom Control to the left-hand position (NORMAL).

(d) Adjust the frequency of the signal generator in the region of 450 kilocycles for maximum reading on the output meter.

(e) Without altering the connections or adjustments of the signal generator or output meter connect an antenna to the antenna terminal "A1" and tune-in a local broadcasting station. Turn off modulation of signal generator. Adjust station selector slightly for zero beat.

(f) Rotate the Phantom Control to the Mystic Hand position and listen to the beat note. If the note is less than 200 cycles, or the equivalent of some tone below middle C on the piano, the AFC alignment is satisfactory.

(g) If the beat note is higher than middle C re-alignment is necessary.

(h) In cases where the beat note is not more than about two octaves above middle C or from 1000 to 1500 cycles the AFC circuit may be aligned for zero beat by making a slight adjustment of the top trimmer condenser on the 2nd I-F transformer. This circuit is very critical and a slight adjustment will produce a great change in the beat note.

(i) Where the AFC is considerably out of alignment as evidenced by a beat note of higher than 1500 cycles the standard alignment procedure outlined below should be followed.

TUNING I-F AMPLIFIER

I. Conventional Method.

(a) Connect the output meter as outlined above in (a).

(b) Adjust the 6J7 cathode bias to 6.5 volts with no signal applied, by means of the variable control item, No. 83, Fig. 3.

(c) Connect the output of the signal generator through a .02 mf. condenser to the top cap of the 6K7 I-F amplifier tube, leaving the tube's grid clip in place. Connect the ground lead of the signal generator to the "G" terminal of the receiver chassis.

(d) Set the band selector switch to the Broadcast Band and rotate the station selector to approximately 60 on the dial. The exact setting should be at a position where no broadcast signal will be received. Turn the volume control all the way to the right (clockwise), turn the fidelity control to HIGH FIDELITY and the Phantom Control to NORMAL.

(e) Set the signal generator to 450 kilocycles.

(f) Adjust the middle trimmer and then the bottom trimmer of the 2nd I-F transformer for maximum reading on the output meter. Caution: do not attempt to adjust the top trimmer at this time. ALWAYS USE THE LOWEST GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

(g) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 oscillator-modulator tube, leaving the tube's grid clip in place.

(h) Open the middle trimmer of the 1st I-F transformer three or four turns of the adjustment screw. (Care should be taken that the adjustment screw does not become dislodged from the nut).

(i) Adjust the top trimmer and then the bottom trimmer of the 1st I-F transformer for maximum reading on the output meter.

(j) Adjust the middle trimmer of the 1st I-F transformer by closing until maximum reading is obtained on the output meter.

(k) Transfer the output lead of the signal generator from the 6A8 tube to the antenna terminal "A1" of the receiver and recheck the adjustment of the bottom trimmer of the 1st I-F transformer.

(l) To adjust the AFC system it will be necessary to transfer the output lead of the signal generator back to the top cap of the 6K7 I-F amplifier tube. The .02 mf. condenser should still be connected in series with this lead.

(m) Insert a 0-5 milliammeter in series with the cathode circuit of the 6J7 tube and with a strong 450 kilocycle signal from the signal generator, the reading of the cathode current should be recorded.

(n) Turn the Phantom Control to the MYSTIC HAND position and without changing the output of the signal generator, adjust the top trimmer condenser of the 2nd I-F transformer so that the reading of the 0-5 milliammeter is the same as was recorded with the Phantom Control in the NORMAL position. This value of current will be obtained with the trimmer closed, with the trimmer open and at some intermediate position. A very slight adjustment while in the intermediate position will cause the meter to read from 0 to 1.5 milliamperes. This is the setting that should be used. An insulated screw driver should be used in adjusting the AFC trimmer condenser.

(o) As a final check on the AFC adjustment, disconnect the test equipment and tune-in a fairly weak broadcast station in the region of 1500 kilocycles. Turn the AFC "ON" and "OFF". If reception is the same in both positions and will automatically tune-in strong stations within approximately plus or minus 10 kilocycles of the station selector setting with AFC "ON", the AFC is properly aligned. If distortion is noted and the receiver will not automatically tune-in stations as described, the AFC alignment should be rechecked.

II. Oscilloscope Method.

(a) Connect the output of a FREQUENCY MODULATED R-F signal generator through a .02 mf. condenser to the top cap of the 6K7 I-F amplifier tube, leaving the tube's grid clip in place. KEEP THE GENERATOR LEAD AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Connect the vertical plates of the cathode ray oscilloscope to the receiver as follows: The "High" side should be connected to the plate of the 6R7 tube and the "Low" side should be connected to the receiver chassis. (B sure the oscilloscope is protected from D.C. by connecting a condenser, .1 mf. to .05 mf., in series with the lead of the 6R7 tube).

(c) Set the band selector switch to the Broadcast Band and rotate the station selector to approximately 60 on the dial. The exact setting should be at a position where no broadcast signal will be received. Turn the volume control to the right (clockwise), turn the fidelity control to HIGH FIDELITY and the Phantom Control to NORMAL.

(d) Set the signal generator to 450 kilocycles. See instructions supplied with signal generator and oscilloscope.

(e) Adjust the middle trimmer of the 2nd I-F transformer so that the nose of the selectivity curve is centered on the resonance axis (R) of the transparent scale supplied with the oscilloscope.

(f) Adjust the bottom trimmer of the 2nd I-F transformer for maximum amplitude of the selectivity curve on resonance axis (R).

(g) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 oscillator-modulator tube, leaving the tube's grid clip in place.

(h) Open the middle trimmer of the 1st I-F transformer three or four turns of the adjustment screw. (Care should be taken that the adjustment screw does not become dislodged from the nut).

(i) Increase the output of the signal generator and adjust the top trimmer of the 1st I-F transformer for maximum symmetry and amplitude.

(j) Adjust the bottom trimmer of the 1st I-F transformer for maximum amplitude.

(k) Reduce the output of the signal generator and adjust the middle trimmer of the 1st I-F transformer for maximum symmetry and amplitude.

(l) Carefully repeat operations (f) and (k) for more accurate adjustments.

Aligning R-F Amplifier.

The R-F amplifier can best be aligned in the conventional manner, using a modulated signal generator and output meter.

When aligning the R-F amplifier the output lead of the signal generator is connected to the antenna terminal "A1" of the receiver. For the BLUE and RED bands a .00025 mf. condenser must be connected in series with the output lead of the signal generator and for the high frequency band a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be shunt aligned and then series aligned, where provision is made for series alignment (BLUE and RED bands). The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated in "C" below for each adjustment.

(a) Adjust the "OSC", "R-F" and "ANT" shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check in the order given. DO NOT READJUST THE "OSC" TRIMMER.

NOTE: When shunt aligning the RED and GREEN bands care must be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times or more and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct position.

(b) To align the series trimmers, "osc. series" Fig. 2, set the signal generator to the frequency indicated below and then tune-in this signal with the station selector for maximum output. At the time that any series trimmer is being adjusted rotate the station selector back and forth slightly until no further improvement in output is obtained.

50 CYCLE POWER TRANSFORMER ADJUSTMENT

Receivers equipped with a 50 cycle power transformer have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 260 volts.

The accompanying illustration shows the connections for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.

NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

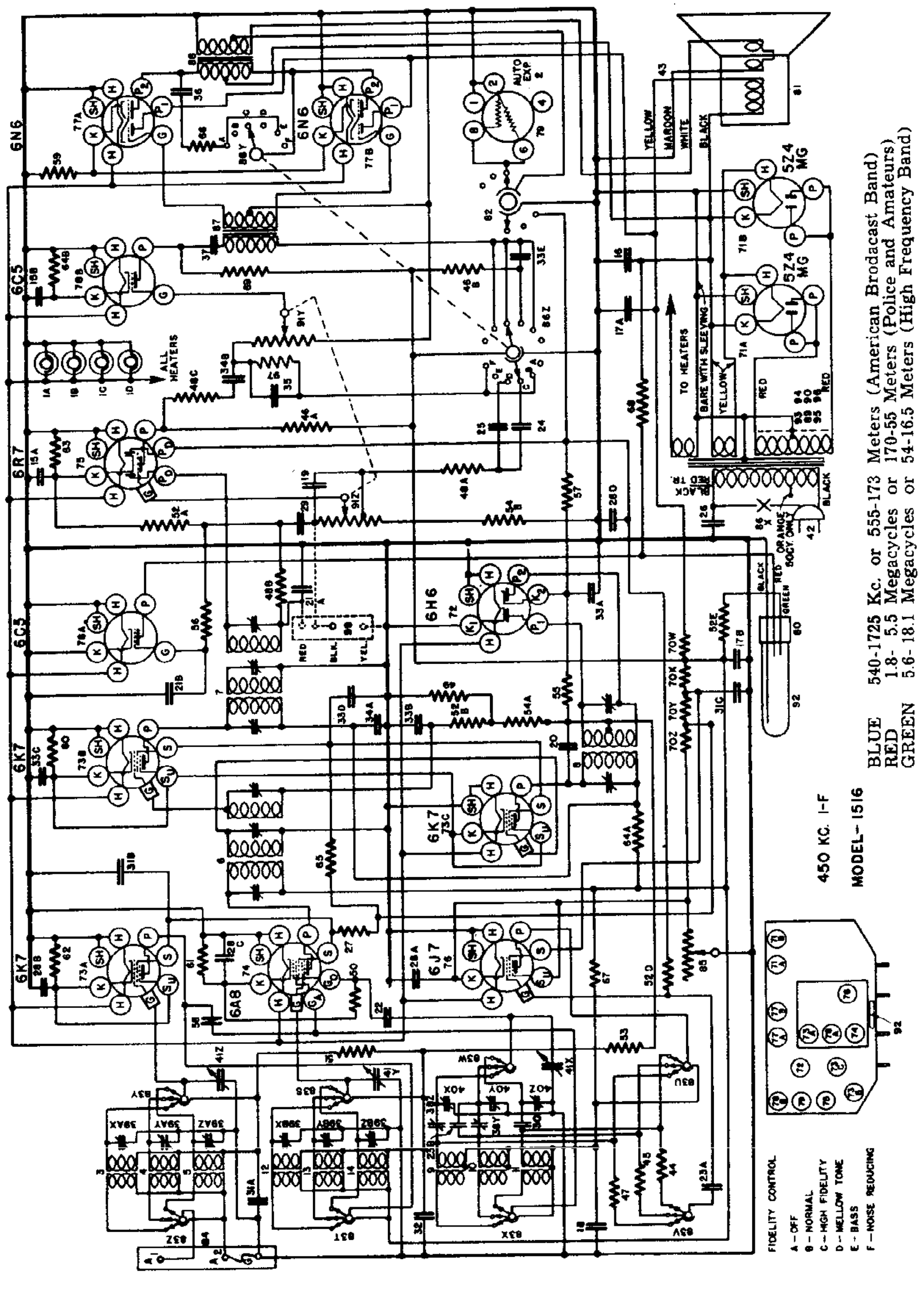
PHANTOM CONTROL

The Phantom Control permits the listener to use the Mystic Hand (Automatic Frequency Control) and the Auto-Expressionator as desired. The various positions of the control are shown on an illuminated indicator on the dial.

The receiver may be operated with normal power output and fidelity, such as would ordinarily be desired in the average home, with the control in the NORMAL position.

The Mystic Hand automatically tunes the receiver accurately to the strongest signal within a frequency range of approximately 10 kilocycles of the station selector setting.

CROSLEY RADIO CORP.



MODEL 1516
Parts, Notes

CROSLEY RADIO CORP.

SPECIFICATIONS

The Crosley Model 1516 radio is a fifteen-tube receiver featuring High Fidelity, Volume Expansion which is accomplished by the Auto-Expressionator tube and Automatic Frequency Control which is known as the Mystic Hand.

The tubes used are 6K7 R-F Amplifier, 6A8 Oscillator-Modulator, 6J7 AFC Control, 6K7 Signal I-F Amplifier, 6K7 AFC Diode and I-F Amplifier, 6H6 AFC Detector, 6R7 Diode and 1st A-F Amplifier, 6C5 A-F Driver, (2) 6N6 Output, (2) 5Z4 Rectifiers, 6C5 Tuning Indicator Amplifier, W42419A Neon Tuning Indicator Tube and W-41187 Auto-Expressionator Tube.

AUTO-EXPRESSIONATOR

The Auto-Expressionator tube, item No. 79, Fig. 1, is connected across the voice coil of the speaker. When it is operating its resistance varies so as to increase the volume of loud tones, thus giving a wider volume range to reproduced music, which tends to compensate for the electrical limitations of broadcasting equipment.

PART LIST—MODEL 1516

Item No.	Part No.	Description
1ABCD	W —37922	Dial Light Bulb
	W —40570	Dial Light Shield
2	W —41187	Auto-Expressionator Tube
3	G 94—32000	Antenna Coil B. C. B.
4	G108—32000	Antenna Coil Pol. B.
5	G107—32000	Antenna Coil H. F. B.
6	G107—32004	1st I-F Assembly
7	G 91—32001	2nd I-F Assembly
8	G108—32004	A-F-C I-F Assembly
9	G 97—32002	Oscillator Coil B. C. B.
10	G 96—32002	Oscillator Coil Pol. B.
11	G 95—32002	Oscillator Coil H. F. B.
12	G 68—32001	R-F Coil B. C. B.
13	G 75—32001	R-F Coil Pol. B.
14	G 74—32001	R-F Coil H. F. B.
15AB	W —41598	Condenser, 50 Mf. 25V.
16	W —36055	Condenser, 35 Mf. 400V.
17AB	W —36057	Condenser, 40 Mf. 300V.
18	G 18—34000	Condenser, 5600 Mmf.
19	G 5—34002	Condenser, .00005 Mf. 200V.
20		NONE
21AB	G2 —34002	Condenser, .0001 Mf. 200V.
22	G6 —34002	Condenser, .000025 Mf. 200V.
23AB	G3 —34002	Condenser, .0005 Mf. 200V.
24	W —35758	Condenser, .008 Mf. 400V.
25	W —41461	Condenser, .0014 Mf. 200V.
26	W —30805	Condenser, .01 Mf. 400V.
27	— 6705	Resistor, 3500 Ohm. 1W.
28AB CD	W —36541	Condenser, .02 Mf. 160V.
29	W —28621	Condenser, .02 Mf. 200V.
30	W —41209	Condenser, .048 Mf. 200V.
31ABC	W —35936	Condenser, .05 Mf. 200V.
32	W —32380	Condenser, .05 Mf. 200V.
33AB CDE	W —27216	Condenser, .05 Mf. 200V.
34AB	W —32780B	Condenser, .05 Mf. 400V.
35	W —28904	Condenser, .004 Mf. 200V.
36	W —22688	Condenser, .1 Mf. 400V.
37	W —42554	Condenser, .12 Mf. 160V.
38Z	—41218	B. C. Osc. Series Trimmer
38Y		Pol. Osc. Series Trimmer
38AB	W —37891	3 Section Shunt Trimmer
40	W —35951	3 Section Shunt Trimmer
41	G47 —33002	3 Gang Var. Tuning Cond.
	MG12 —42425	Dial Drive Assembly
	—42421	Dial Glass (Calibrated)
	—42325B	Drive Unit only
	—42598A	Dial Mask (Paper Backing)
	—41144	Hand—Long Dial
	—42180	Hand—Short Dial
	W —40486	Screw—Hand Mounting
	E —13648	R. H. (Mystic Hand) Flipper
	E —13647	L. H. (Fidelity) Flipper
	W —43080	Flipper Control Cable
	W —42308A	Flipper Cont. Cable Pulley
	—40638	Band Indic. Cont. Cable
	—40537	Flexible Coupling Unit
	—41157	Drive Belt
42	B —33906A	Power Cord and Plug
43	G2 —37918	Speaker Cable
44	—36760	Resistor, 20,000 Ohm. ¼W.
45	—33390	Resistor, 30,000 Ohm. ¼W.
46AB	—36761	Resistor, 40,000 Ohm. ¼W.
47	—34019	Resistor, 75,000 Ohm. ¼W.
48ABC	—35600	Resistor, 100,000 Ohm. ¼W
49	—35929	Resistor, 150,000 Ohm. ¼W.
50	—35930	Resistor, 200,000 Ohm. ¼W.
51	—35601	Resistor; 300,000 Ohm. ¼W.
52AB CDE	—36322	Resistor, 500,000 Ohm. ¼W.
53	—38623	Resistor, 750,000 Ohm. ¼W.
54AB	—35602	Resistor, 1 Megohm. ¼W.
55	—36176	Resistor, 1.3 Megohm. ¼W.
56		NONE
57	—36688	Resistor, 3 Megohm. ¼W.
58	G101—34403	R-F Neutralizing Cond.
59	W —23012A	Resistor, 40 Ohm. ¾W. Flex.
60	W —35467	Resistor, 220 Ohm. ½W. Flex.
61	W —25937	Resistor, 275 Ohm. ½ W. Flex.
62	W —28589	Resistor, 350 Ohm. ½W. Flex.
63	W —28106	Resistor, 500 Ohm. ½W. Flex.
64AB	W —21452	Resistor, 1100 Ohm. ¾W. Flex.
65	W —23013	Resistor, 2000 Ohm. 1¼W. Flex.
66	W —23907	Resistor, 750 Ohm. 1½W. Flex.
67	— 4921C	Resistor, 10000 Ohm. 1W.
68	W —42418	Resistor, 30000 Ohm. 4W.
69	—36952	Resistor, 30000 Ohm. 1W.
70Z	W — 41966	Resistor, 4000 Ohm. Candohm
70Y		Resistor, 1000 Ohm.
70X		Resistor, 3000 Ohm.
70W		Resistor, 200 Ohm.
71AB	G154—36400	Socket Type 5Z4
72	G155—36400	Socket Type 6H6
73ABC	G151—36400	Socket Type 6K7
74	G156—36400	Socket Type 6A8
75	G164—36400	Socket Type 6R7
76	G157—36400	Socket Type 6J7
77AB	G165—36400	Socket Type 6N6
78AB	G152—36400	Socket Type 6C5
79	G167—36400	Auto-Expressionator Socket
80	G2 —42584	Tuning Indic. Socket
81	734CJ4 "M"	Speaker Spec. 1-D-437
	—41603	Cone Assembly for above Speaker
	—41601	Field Coil for above Speaker
82	W —41029B	Phantom Control Switch
83	—41235A	Band Selector Switch
84	G27 —26719	Ant. and Gnd. Terminal Assembly
85	W —41287	A-F-C Bias Control, 300 Ohm. ½W
86	B —42295A	Fidelity and Line Switch
87	G2 —37995	A-F Driver Transformer
88	G62 —24628	Out-Put Transformer
89	G1 —37900	Power Transformer, 60 Cy. 110V.
(93)	G5 —37900	Power Transformer, 25 Cy. 110V.
(94)	G6 —37900	Power Transformer, 50 Cy. 220V.
(95)	G7 —37900	Power Transformer, 50 Cy. 110V.
(96)	G8 —37900	Power Transformer, 25 Cy. 220V.
90	G2 —37900	Power Transformer, Universal
91Z	41375	Vol. Control, 3 Meg., Tap. .3 Meg.
91Y		Vol. Control, 1 Meg.
92	W —42419	Neon Tuning Indic. Tube
97	—21237A	Resistor, 60,000 Ohm. ¼W.
98	G37 —26719	Phono. Terminal Assembly
	C —43134A	Escutcheon
	C —42044	Lens, Escutcheon
	—42043	Escutcheon Rubber Mounting
	W —36117	Rubber Mounting Foot
	W —42490	Knob (Fidelity)
	W —37339	Knob (Station and Volume)
	W —40192	Knob (Band Sel. and A-F-C)
	W —40230B	Emblem
	W —32620	Nut, Emblem Mounting
	W —35922	Grille Clothe
	— 6-R	Cabinet

MODEL 1516
Socket, Trimmers
Chassis, Voltage
Resonance Curves
Phono Pickup

CROSLEY RADIO CORP.

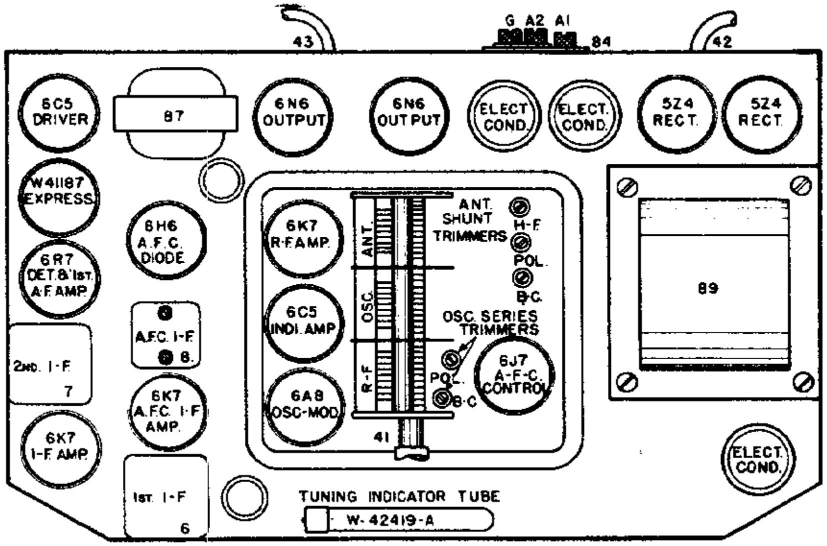


Fig. 2. Top View—1516

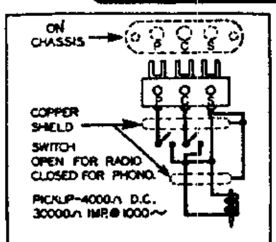
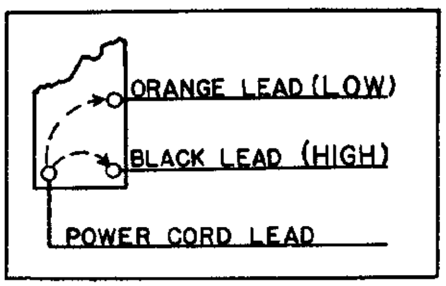


Fig. 7 Phonograph Pickup



50 CYCLE POWER TRANSFORMER ADJUSTMENT

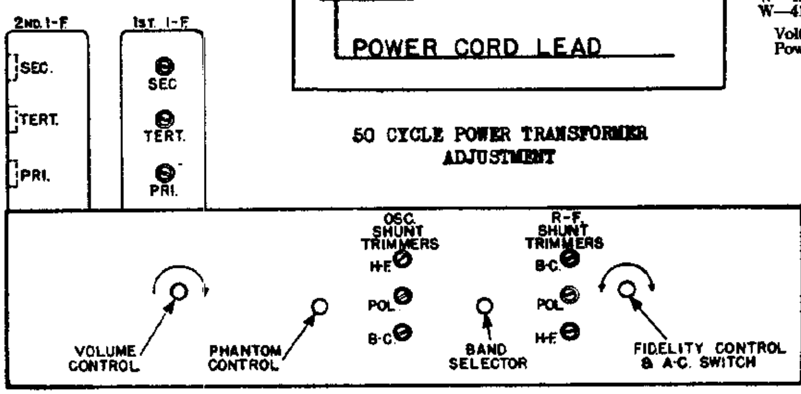


Fig. 4 Front View—1516

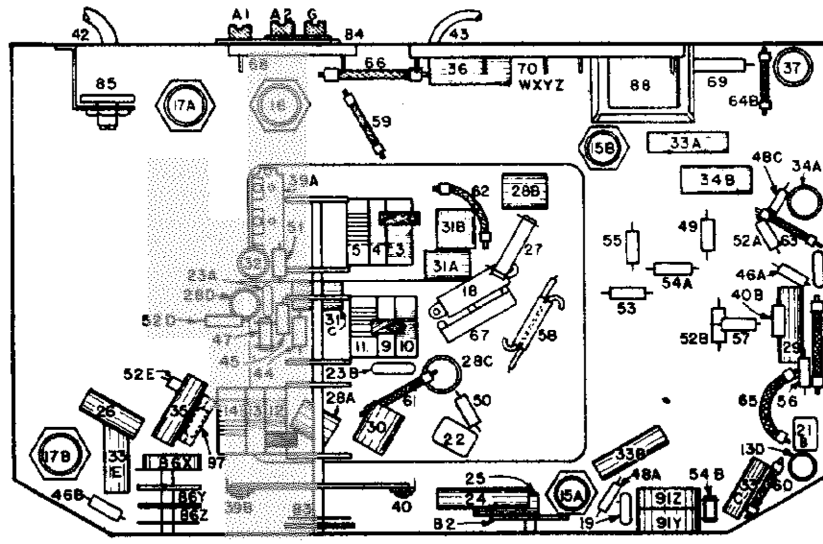


Fig. 3. Bottom View—1516

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P_1	P_2	S	Su	K	Ga	Go
6K7	R-F Amplifier	6.3	238	—	105	2.5	2.5	—	—
6A8	Oscillator-Modulator	6.3	238	—	105	—	2.5	170	-5 to -12
6J7	AFC Control	6.3	170	—	130	—	5.8	—	—
6K7	I-F Amplifier	6.3	220	—	105	3.0	3.0	—	—
6K7	AFC Diode and I-F Amplifier	6.3	220	—	100	3.0	3.0	—	—
6H6	AFC Detector	6.3	—	—	—	—	—	—	—
6R7	Diode and 1st A-F Amplifier	6.3	80	—	—	—	2.0	—	—
6C5	A-F Driver	6.3	220	—	—	—	6.8	—	—
6N6	(2) Output	6.3	238	350	—	—	2.6	—	—
5Z4	(2) Rectifiers	5.0	—	—	—	—	350	—	—
6C5	Tuning Indicator Amplifier	6.3	150	—	—	—	0	—	—
W—42419A	Neon Tuning Tube	—	150	—	—	—	0	—	—

W—41187 Auto-Expressionator Tube. Varies with power output.

Voltage drop across speaker field 112 volts.
Power output approximately 25 watts.

Power consumption approximately 142 watts.
All readings taken on 117.5 volt power supply

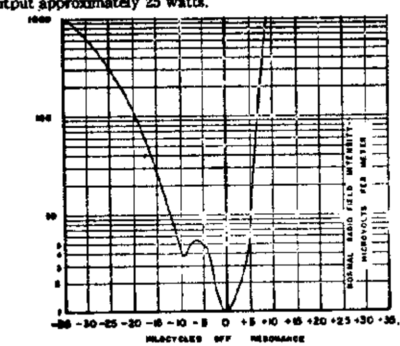


Fig. 5

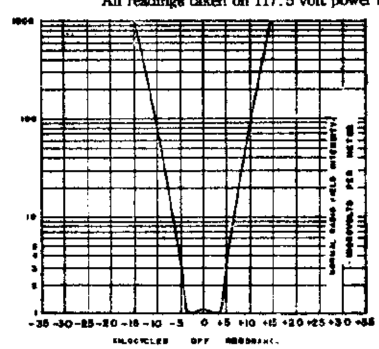


Fig. 6

MODEL 1516
Alignment
Notes

CROSLEY RADIO CORP.

ALIGNMENT PROCEDURE

This model receiver should be turned on and allowed to "warm-up" for about 15 minutes before aligning its circuits.

It is a High Fidelity receiver and in order to secure maximum performance the alignment should be done with precision instruments. The alignment condensers should not be readjusted just to determine if they are properly tuned. Fig. 5, shows the selectivity curve of a receiver whose I-F amplifier was slightly mistuned while Fig. 6, shows a curve made from actual measurements of a receiver employing a triple-tuned I-F amplifier which was properly aligned with the use of a FREQUENCY MODULATED R-F signal generator and an oscilloscope.

The alignment of the AFC circuit may be checked by means of a modulated signal generator and output meter as follows:

(a) Connect one terminal of the output meter to P2 of one of the 6N6 Output tubes and the other terminal through a .1 mf., or larger, condenser—not electrolytic to P2 of the other 6N6 Output tube.

(b) Connect the output of the signal generator through a .00025 mf. condenser to the top cap of the 6A8 Oscillator-Modulator tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver chassis.

(c) Rotate the Phantom Control to the left-hand position (NORMAL).

(d) Adjust the frequency of the signal generator in the region of 450 kilocycles for maximum reading on the output meter.

(e) Without altering the connections or adjustments of the signal generator or output meter connect an antenna to the antenna terminal "A1" and tune-in a local broadcasting station. Turn off modulation of signal generator. Adjust station selector slightly for zero beat.

(f) Rotate the Phantom Control to the Mystic Hand position and listen to the beat note. If the note is less than 200 cycles, or the equivalent of some tone below middle C on the piano, the AFC alignment is satisfactory.

(g) If the beat note is higher than middle C re-alignment is necessary.

(h) In cases where the beat note is not more than about two octaves above middle C or from 1000 to 1500 cycles the AFC circuit may be aligned for zero beat by making a slight adjustment of the rear trimmer condenser on the AFC I-F transformer (Fig. 2, item No. 8). This circuit is very critical and a slight adjustment will produce a great change in the beat note.

(i) Where the AFC is considerably out of alignment as evidenced by a beat note of higher than 1500 cycles the standard alignment procedure outlined below should be followed.

TUNING I-F AMPLIFIER

The I-F amplifier employs two triple-tuned signal I-F transformers and one double-tuned AFC I-F transformer.

I. Conventional Method.

(a) Connect the output meter and signal generator as outlined above in (a) and (b) except that the signal generator should be connected through a .02 mf. condenser to the top cap of the 6K7 I-F amplifier tube, leaving the tube's grid clip in place.

(b) Set the band selector switch to the Broadcast Band and rotate the station selector to approximately 60 on the dial. Turn the volume control knob to the right (ON), turn the fidelity control to its middle position and turn the phantom control to the left (NORMAL).

(c) Set the signal generator to 450 kilocycles.

(d) Open the middle trimmer condenser of the 2nd I-F transformer (Fig. 4) three or four turns of the adjustment screw. (Care should be taken that the adjustment screw does not become dislodged from the nut).

(e) Adjust the top trimmer and then the bottom trimmer (Sec. & Pri.) of the 2nd I-F transformer for maximum output. Do not readjust the middle trimmer. ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

(f) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 Osc.-Mod. tube, leaving the tube's grid clip in place.

(g) Open the middle trimmer of the 1st I-F transformer three or four turns of the adjustment screw, from the closed position. (Care should be taken that the adjustment screw does not become dislodged from the nut).

(h) Adjust the top trimmer and then the bottom trimmer of the 1st I-F transformer for maximum output.

(i) Transfer the output lead of the signal generator from the 6A8 tube to the antenna terminal "A1" of the receiver and increase the output of the signal generator if necessary.

(j) Adjust the middle trimmer of the 2nd I-F transformer, by closing, until maximum output is obtained. DO NOT READJUST THE TOP AND BOTTOM TRIMMERS.

(k) Adjust the middle trimmer of the 1st I-F transformer, by closing, until maximum output is obtained. DO NOT READJUST THE TOP AND BOTTOM TRIMMERS.

(l) To adjust the AFC system it will be necessary to remove the signal generator lead from the receiver and adjust the 6J7 cathode bias to 6.5 volts by means of the variable control (Illustration No. 85—Fig. 3) in this cathode circuit. The cathode voltage is measured between the cathode terminal and chassis.

(m) Turn the phantom control to the left (NORMAL) and connect the signal output lead through a .02 mf. condenser to the top cap of the 6A8 oscillator-modulator tube, leaving the tube's grid clip in place.

(n) Adjust the signal generator to 450 kilocycles.

(o) Adjust the front trimmer (plate winding) of the AFC I-F transformer for minimum reading on the output meter. It will be necessary to retard the volume control of the receiver in order to prevent AVC action. A fairly strong I-F signal will be required. (An insulated screw driver should be used for aligning the AFC I-F amplifier system).

(p) Insert an 0-5 milliammeter in series with the lead to the cathode terminal of the 6J7 socket and note the current reading.

(q) Turn the phantom control to its middle position and increase the output of the signal generator to approximately 100,000 microvolts.

(r) Transfer the output lead of the signal generator from the 6A8 tube to the top cap of the 6K7 AFC I-F amplifier tube, leaving the tube's grid clip in place.

(s) Adjust the rear trimmer of the AFC I-F transformer for the same value of cathode current as obtained in (p) above. This value of current will be obtained with the trimmer closed, with it open and at some intermediate position. A very slight adjustment while in the intermediate position will cause the meter to read from 0 to 1.5 milliamperes. This is the setting that should be used.

(t) To check on the AFC adjustment, disconnect the equipment and tune-in a fairly weak broadcast station in the region of 1500 kilocycles. Turn the AFC ON and OFF. If reception is the same in both positions and will automatically tune-in strong stations within approximately plus or minus 15 kilocycles of the station selector setting with the AFC ON, the AFC is properly aligned. If distortion is noted and the set will not automatically tune-in stations as described, the AFC alignment should be rechecked.

II. Oscilloscope Method.

(a) Connect the output of a FREQUENCY MODULATED R-F signal generator through a .02 mf. condenser to the top cap of the 6K7 I-F amplifier tube, leaving the tube's grid clip in place. Connect the ground lead of the signal generator to the receiver chassis. KEEP THE GENERATOR LEAD AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Connect the vertical plates of the cathode ray oscilloscope to the receiver as follows: The binding post marked "GND" should be connected to the receiver chassis and the other binding post should be connected to the plate of the 6R7 tube. (Be sure the oscilloscope is protected from D.C. by connecting a condenser, .1 mf. to .05 mf., in series with the lead connected to the plate of the 6R7 tube).

(c) Set the band selector switch to the Broadcast Band and rotate the station selector to approximately 60 on the dial. The exact setting should be at a position where no broadcast signal will be received. Turn the volume control knob to the right (ON), turn the fidelity control to NORMAL and turn the phantom control to NORMAL.

(d) Set the signal generator to 450 kilocycles. See instructions supplied with signal generator and oscilloscope.

(e) Open the middle trimmer condenser on the 2nd I-F transformer three or four turns of the adjustment screw. (Care should be taken that the adjustment screw does not become dislodged from the nut).

(f) Adjust the top trimmer of the 2nd I-F transformer so that the nose of the selectivity curve is centered on the resonance axis (R) of the transparent scale supplied with the oscilloscope.

(g) Adjust the bottom trimmer of the 2nd I-F transformer for maximum amplitude of the selectivity curve on resonance line (R).

(h) Reduce the output of the signal generator and adjust the middle trimmer of the 2nd I-F transformer for maximum amplitude and summetry of the selectivity curve about the resonance line.

NOTE: Keep the base of the selectivity curve centered on the transparent scale from —15 to +15 and keep the signal generator output as low as possible in order to prevent AVC action in the receiver.

(i) Readjust the bottom trimmer of the 2nd I-F transformer for maximum symmetry and amplitude.

(j) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 oscillator-modulator tube, leaving the tube's grid clip in place.

(k) Open the middle trimmer of the 1st I-F transformer three or four turns of the adjustment screw from the closed position. (Care should be taken that the adjustment screw does not become dislodged from the nut)

(l) Increase the output of the signal generator and adjust the top trimmer of the 1st I-F transformer for maximum symmetry and amplitude.

(m) Adjust the bottom trimmer of the 1st I-F transformer for maximum amplitude

(n) Reduce the output of the signal generator and adjust the middle trimmer of the 1st I-F transformer for maximum symmetry and amplitude.

(o) Carefully repeat operations (h), (i) and (n) for more accurate adjustments. (See Fig. 6).

Al'gning R-F Amplifier.

The R-F amplifier can best be aligned in the conventional manner, using a modulated signal generator and output meter.

When aligning the R-F amplifier the output lead of the signal generator is connected to the antenna terminal "A1" of the receiver. For the BLUE and RED bands a .00025 mf. condenser must be connected in series with the output lead of the signal generator and for the high frequency band a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be shunt aligned and then series aligned, where provision is made for series alignment (BLUE and RED bands). The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated in "C" below for each adjustment.

(a) Adjust the "OSC", "R-F" and "ANT" shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check in the order given. DO NOT READJUST THE "OSC" TRIMMER.

NOTE: When shunt aligning the RED and GREEN bands care must be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times or more and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct position.

(b) To align the series trimmers, "osc. series" Fig. 2, set the signal generator to the frequency indicated below and then tune-in this signal with the station selector for maximum output. At the time that any series trimmer is being adjusted rotate the station selector back and forth slightly until no further improvement in output is obtained.

(c) SIGNAL INPUT FREQUENCIES

	Shunt Alignment	Series Alignment
American Broadcast Band (BLUE)	1,400 Kilocycles	600 Kilocycles
Police and Amateur Band (RED)	5,000 Kilocycles	2000 Kilocycles
High Frequency Band (GREEN)	18,000 Kilocycles	———

PHANTOM CONTROL

The Phantom Control permits the listener to use the Mystic Hand (Automatic Frequency Control) and the Auto-Expressionator as desired. The various positions of the control are shown on an illuminated indicator on the dial.

The receiver may be operated with normal power output and fidelity, such as would ordinarily be desired in the average home, with the control in the NORMAL position.

The Mystic Hand automatically tunes the receiver accurately to the strongest signal within a frequency range of approximately 15 kilocycles of the station selector setting.

50 CYCLE POWER TRANSFORMER ADJUSTMENT

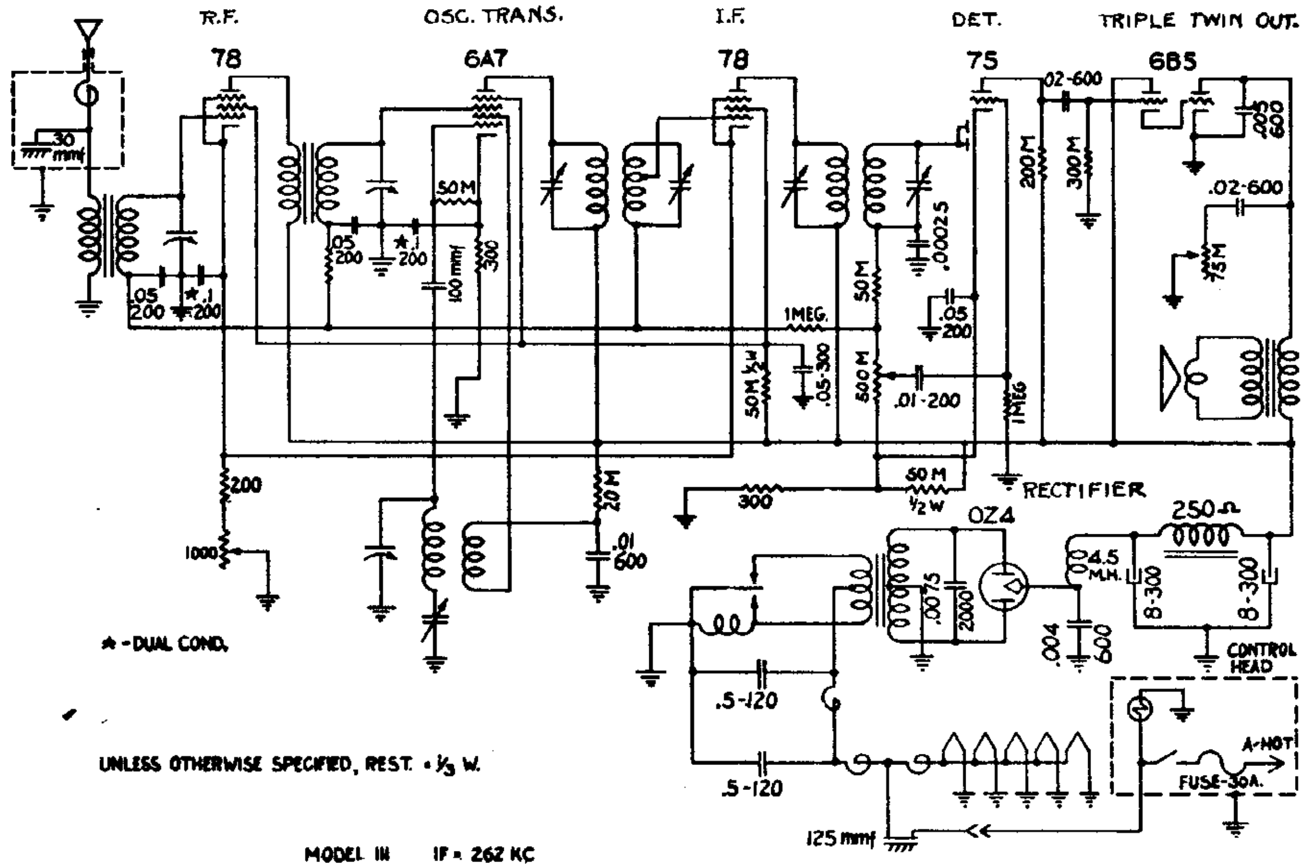
Receivers equipped with a 50 cycle power transformer have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

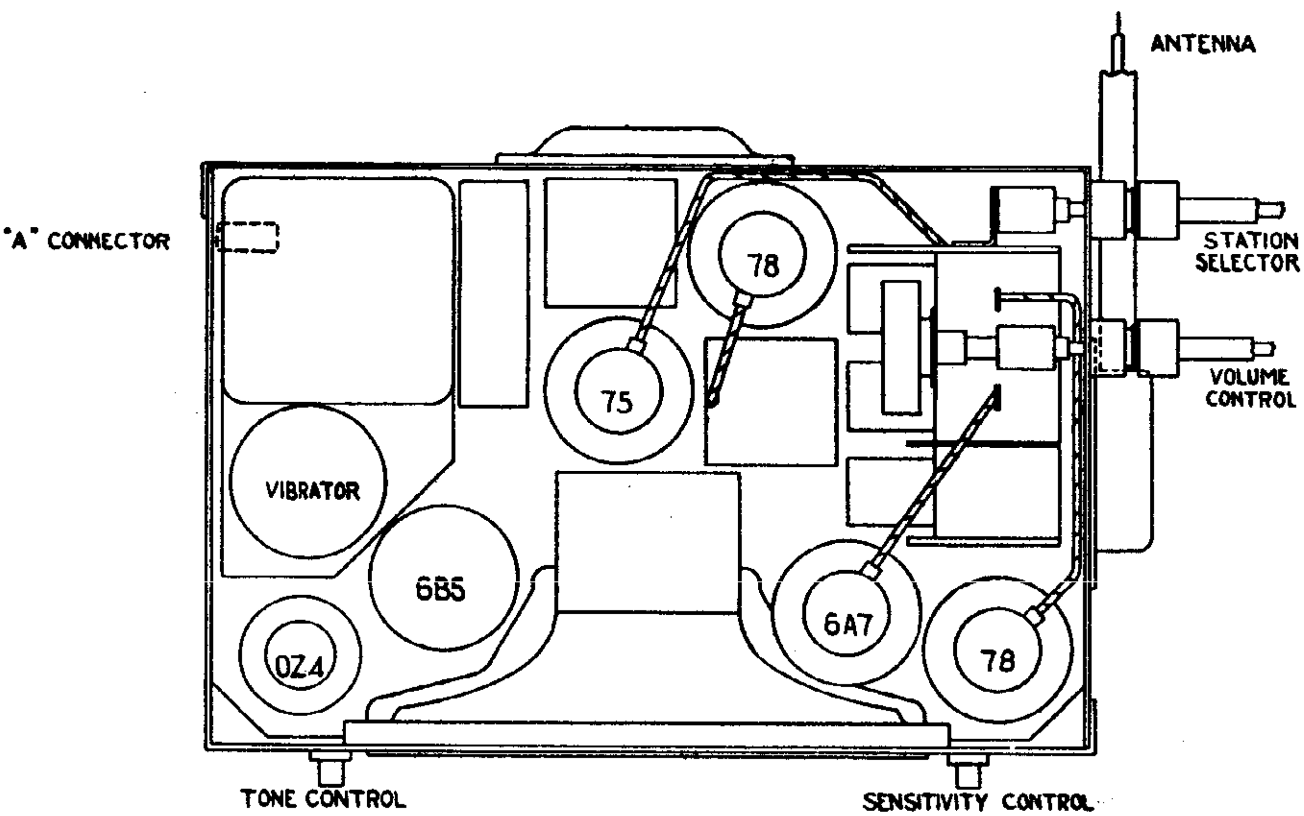
The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 260 volts.

The accompanying illustration shows the connections for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.

NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

DETROLA RADIO CORP.

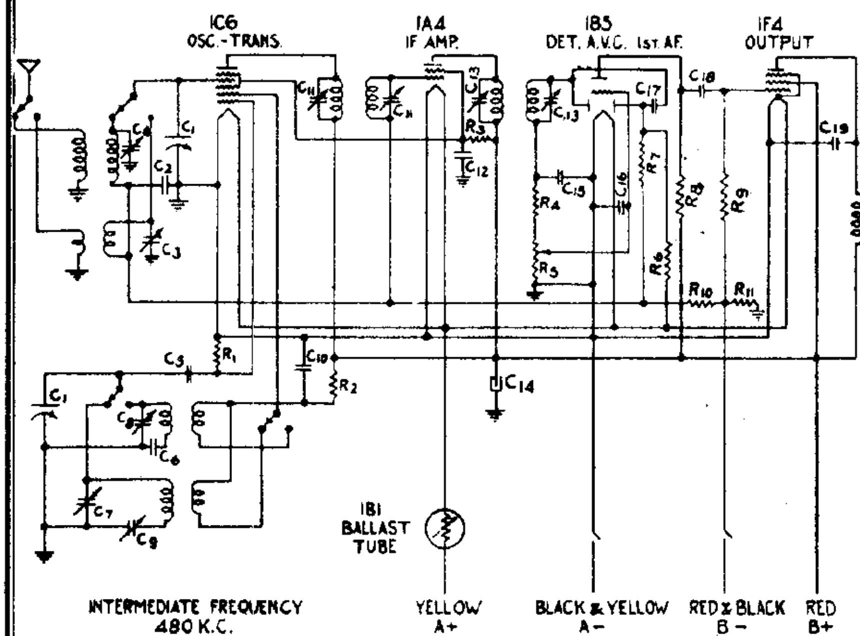


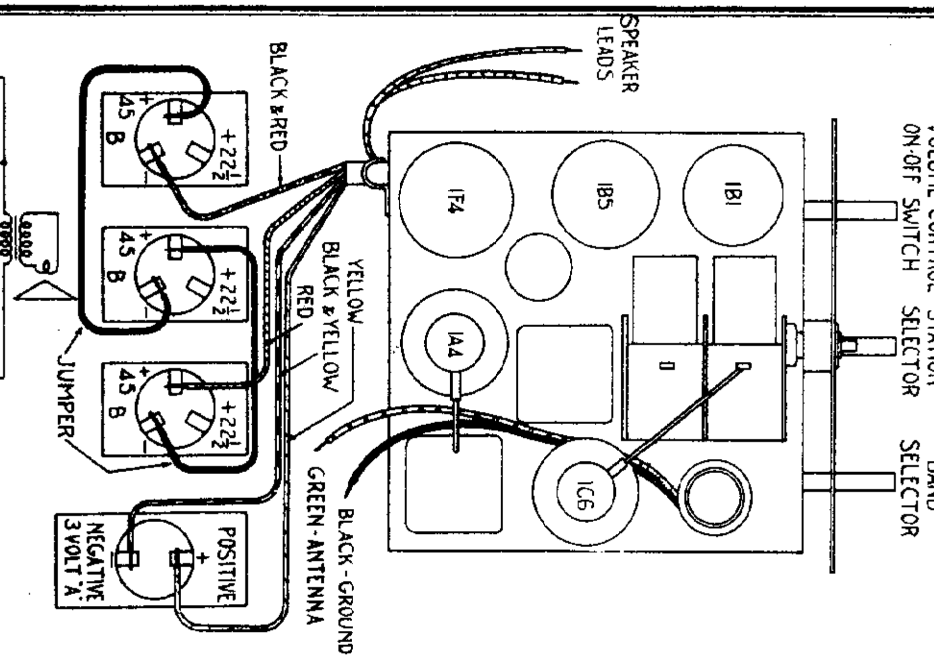


MODEL 117B
Schematic, Socket

DETROLA RADIO CORP.

Alignment, Parts





Symbol	Part No.	Description
R1, R4	631	50M 1/3 watt
R2	617	20M 1/3 watt
R3	621	25M 1/3 watt
R5	2699	500M volume control with DPST switch
R6, R7	2599	1 meg $\pm$ 10% 1/3 watt
R8	602	250M 1/3 watt
R9	624	1 meg 1/3 watt
R10	2693	2 meg $\pm$ 10% 1/3 watt
R11	2946	400 ohms $\pm$ 10% ½ watt
C1	2664	350 mmf variable
C2, C12	572	.1 200V
C3, C7	1611	3-35 Trimmer
C4, C8	2597	1-10 Trimmer
C5	2780	50 mmf Mica
C6	2694	.005 $\pm$ 5%
C9	2560	Variable padder
C10	2385	.02 200V
C11, C13		IF trimmers
C14	2698	16 MF electrolytic
C15, C16,		
C17	1286	250 mmf Mica
C18	581	.005 600V
C19	2695	.003 600V

Part No.	Description
1408	Pointer screw
2364	Dial glass
2365	Dial glass retainer
1151	Escutcheon screw
2707	First IF transformer
2942	Second IF transformer
2685	Broadcast antenna coil
2686	Broadcast oscillator coil
2761	Short wave oscillator coil
2762	Short wave antenna coil
2696	Band selector switch
833	4-prong socket
789	6-prong socket
1489	5-prong socket
2949	PM dynamic speaker
2378	Pointer

Batteries required for operation of this receiver are:

1— 3 Volt dry "A" pack.
3—45 Volt Standard "B" batteries.

No "C" batteries are necessary.

DO NOT USE A 6 VOLT BATTERY.

Connect a high impedance AC voltmeter across loud-speaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from generator, strong signals tend to cause improper adjustments.

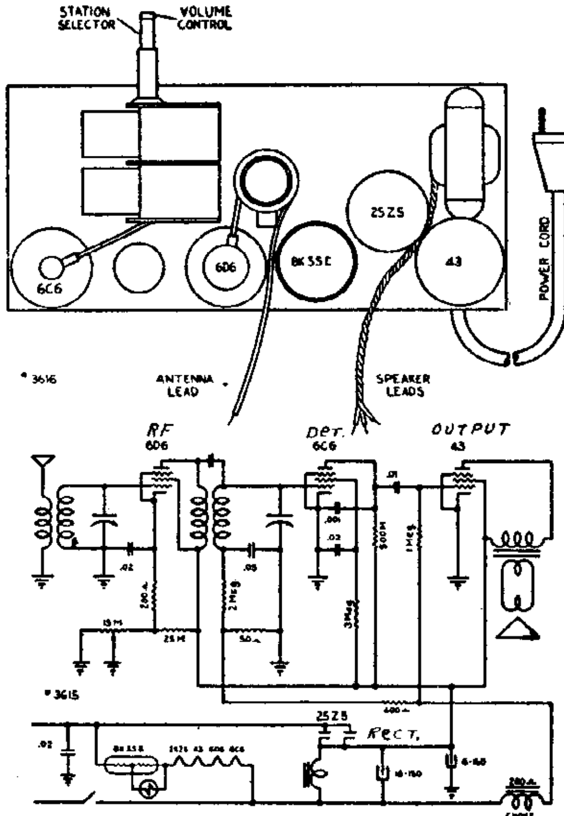
IF. Connect signal generator ground to receiver ground. Using .1 mfd condenser in series with "high" side of generator, apply 480 KC signal to grid of 1A4 and adjust second IF transformer; same for first IF transformer, applying signal to grid of 1C6.

RF. Using 200 mmf condenser in series with generator, feed 1725 KC signal to antenna lead and adjust BC oscillator trimmer (located center under base). Set generator to 1400 KC, tune receiver and adjust BC antenna trimmer (located on coil on top of base). Set generator to 600 KC, tune receiver and adjust BC oscillator padder (located between variable and 1B1 tube). The tuning condenser should be rocked back and forth through the signal while padder is being adjusted to obtain perfect alinement.

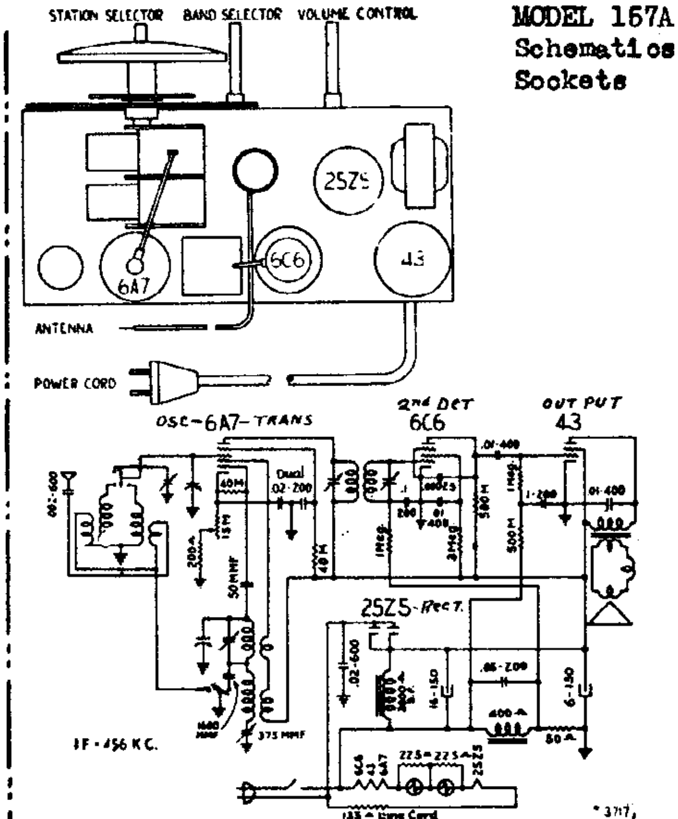
Using 400 ohm resistor in series with generator, set band selector in SW (right) position, and feed 15600 KC signal to antenna lead and adjust SW oscillator trimmer (on coil back of band selector switch); screw trimmer down tight and unscrew to SECOND peak. Set generator to 15000 KC and adjust SW antenna trimmer (on coil back of tuning control); screw trimmer down tight and unscrew to FIRST peak, rocking tuning control back and forth through signal while adjusting screw. Above procedure for alinement at 15000 KC should be followed exactly to insure proper tracking. A "dead spot" at about 12000 KC will result if oscillator and antenna circuits are not set in proper relation to each other.

DETROLA RADIO CORP.

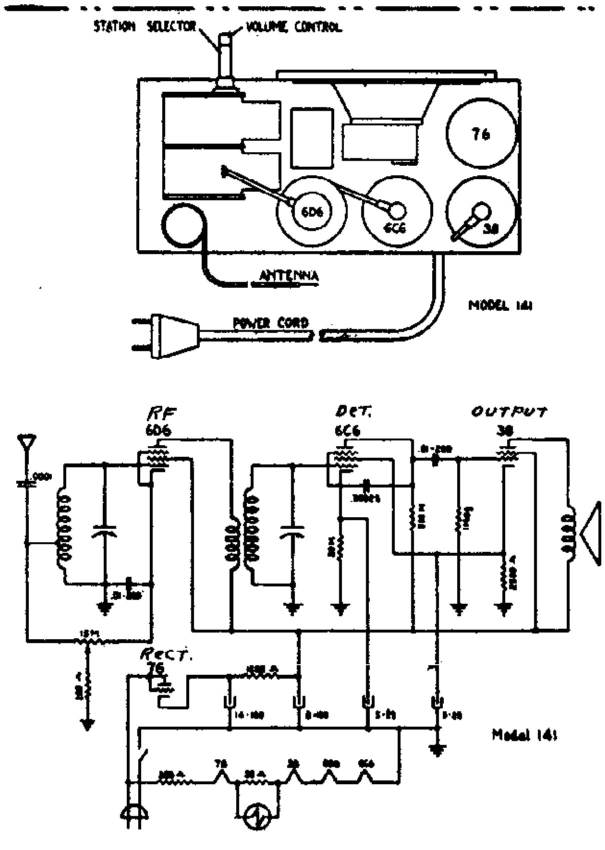
MODEL 130
MODEL 134X
MODEL 141A
MODEL 157A
Schematics
Sockets



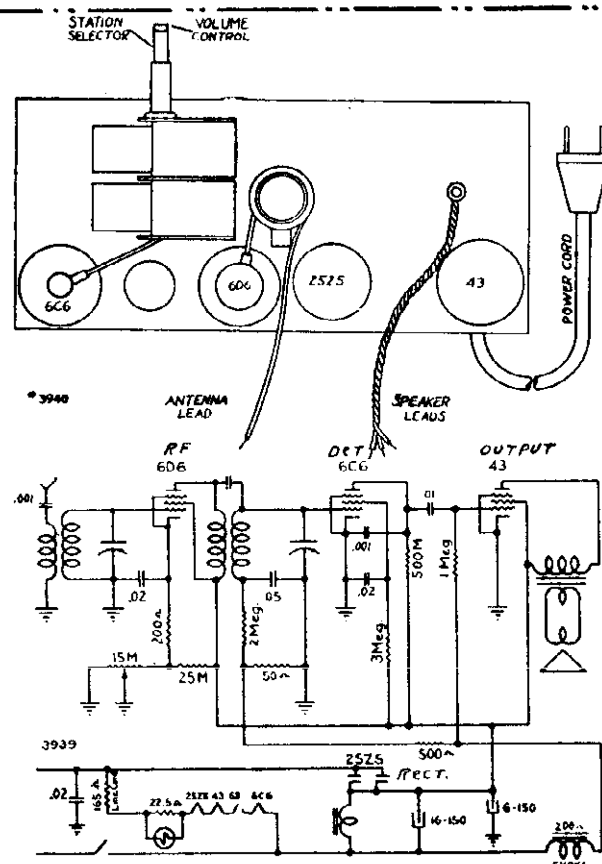
MODEL 130



MODEL 134-X



MODEL 141-A

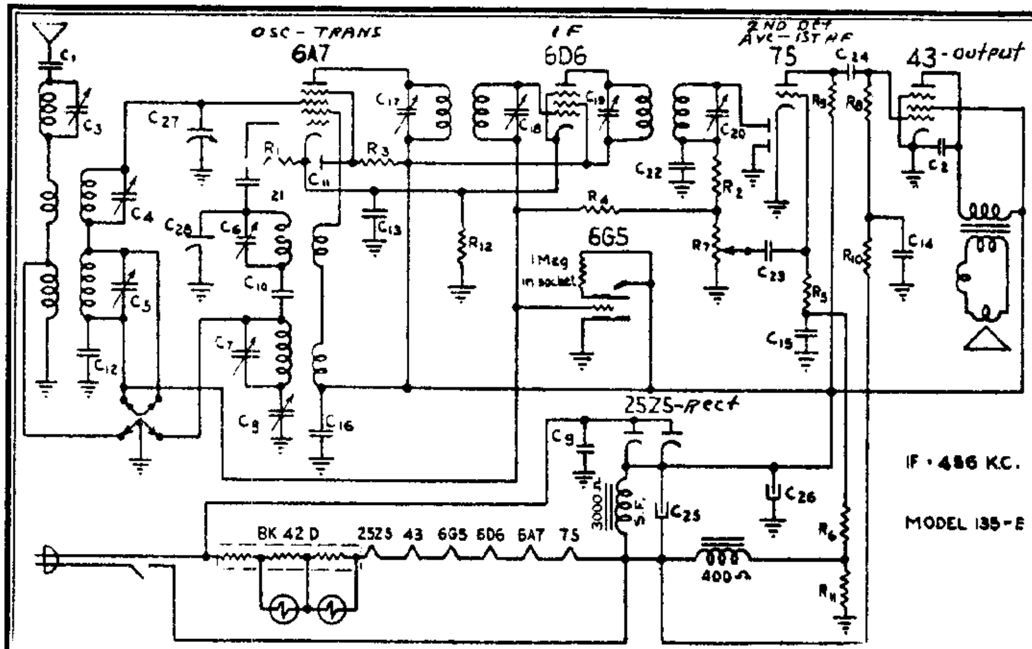


MODEL 157-A

MODELS 134A,134AZ,134AB
MODELS 135, 135E

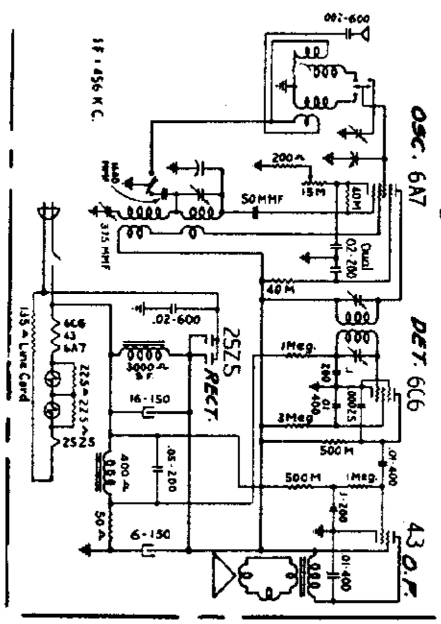
DETROLA RADIO CORP.

Schematics, Sockets

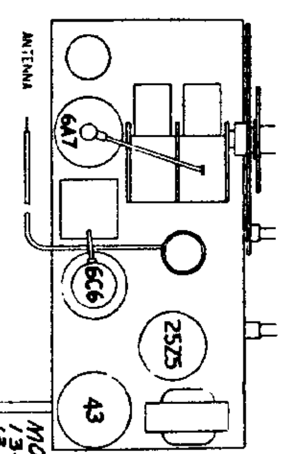


IF = 456 KC.

MODEL 135-E



IF = 456 K.C.

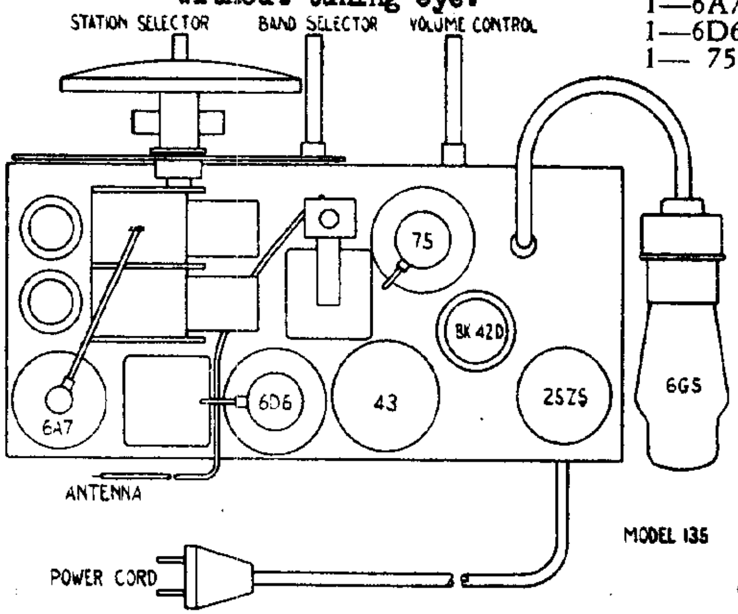


MODELS
134 A
134 AZ
134 AB

MODEL 135 same as MODEL 135-E but without tuning eye.

Tubes required are:

1—6A7 Oscillator-Translator
1—6D6 Intermediate Frequency Amplifier
1— 75 Detector-Automatic Volume Control First Audio
1— 43 Power Output
1—25Z5 Rectifier
1—6G5 Tuning Indicator
1—BK-42-D Voltage Regulator



MODEL 135

PARTS LIST — MODEL 135

C1, C2 .005 - 600 v.
C3 180 mmf. trimmer
C4, C5, C6, C7, 1 - 10 mmf. trimmer
C8 350 mmf. padder
C9 .02 - 600
C10 1150 mmf. mica
C11, C12 .05 - 200
C13, C14, C15, C16 .1 - 200 v.
C17, C18, C19, C20 100 - 125 trimmer
C21 50 mmf. mica
C22 250 mmf. mica
C23, C24 .01 - 600 v.
C25 16 mfd. 150 v.
C26 24 mfd. 150 v.
C27, C28 variable air
R1, R2, 50M 1/3 w.
R3 20M 1/3 w.
R4, R5, R6 1 meg. 1/3 w.
R7 500M volume control and switch
R8 500M 1/3 w.
R9 200M 1/3 w.
R10 300M 1/3 w.
R11 20 ohms. 1/2 w.
R12 100 ohms. 1/3 w.

DETROLA RADIO CORP.

MODELS 136,149,149E
Schematic, Socket
Trimmers, Alignment

I. F. Alignment

The I.F. frequency of this receiver is 456 K.C. For realignment, use the following procedure.

It is necessary to use an accurately calibrated signal generator. Couple the signal generator to the grid of the 6A7 tube with a tenth microfarad condenser in series with the "high" lead of the signal generator. Connect the ground side of the signal generator to the chassis. Set the signal generator to 456 K.C. Be sure the wave switch of the set is in the broadcast position and the volume control set at maximum. Attenuate the signal generator so that the signal is just audible in the speaker. If an output meter is used, it should be connected across the voice coil terminals of the speaker. Use ½ volt as standard output.

Adjust the 2nd I.F. transformer first. Each screw should be adjusted for maximum output. After number two I.F. has been adjusted, number one I.F. should be adjusted for maximum output. After both transformers have been adjusted, it is necessary to re-check No. 2 transformer and then recheck No. 1.

See TUBE LAYOUT for location of I.F. and R.F. trimmers and padder.

R. F. Alignment

To align the broadcast band, proceed as follows:

First, connect the ground side of the signal generator to the chassis. Connect the high side of the signal generator with a .00025 condenser, in series, to the antenna lead of the set. Make sure the band switch of the set is in the broadcast position. Set the volume control to maximum. Turn the station selector to the highest frequency (as far as it will go). Set the signal generator to 1720 K.C. Adjust the oscillator trimmer until the signal is heard. After the oscillator has been set at 1720 K.C., turn the station selector to 1400 K.C. Set the signal generator to 1400 K.C. When the signal is heard, adjust the first detector trimmer for maximum output.

When the set has been adjusted at 1400 K.C., turn the station selector dial to 600 K.C. Set the signal generator to 600 K.C. When the signal is heard, adjust the padder condenser by rocking the selector back and forth. While adjusting the padder screw, it is necessary to move the selector so that the signal may be kept in tune while adjusting the padder screw. This procedure should be followed until maximum output is obtained.

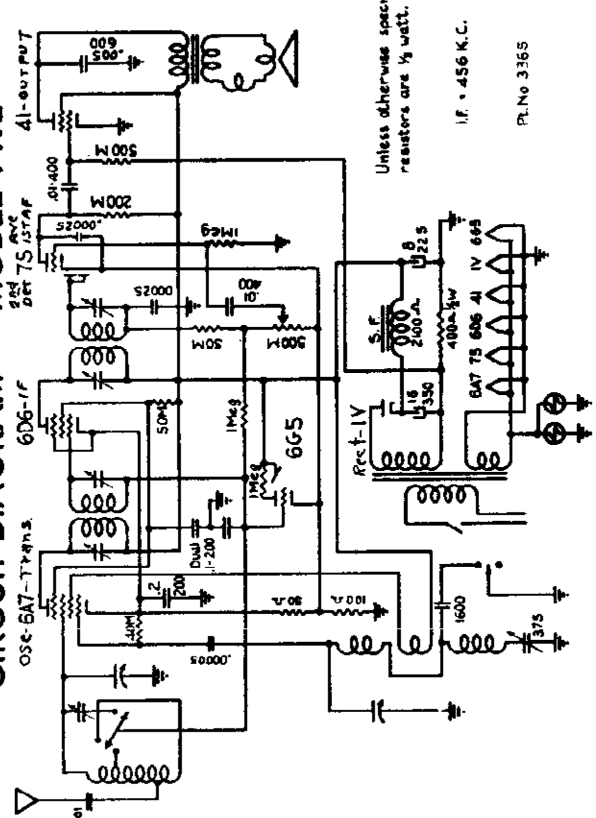
The foregoing procedure should be repeated. That is, the set is to be rechecked at 1720, 1400 and 600 K.C.

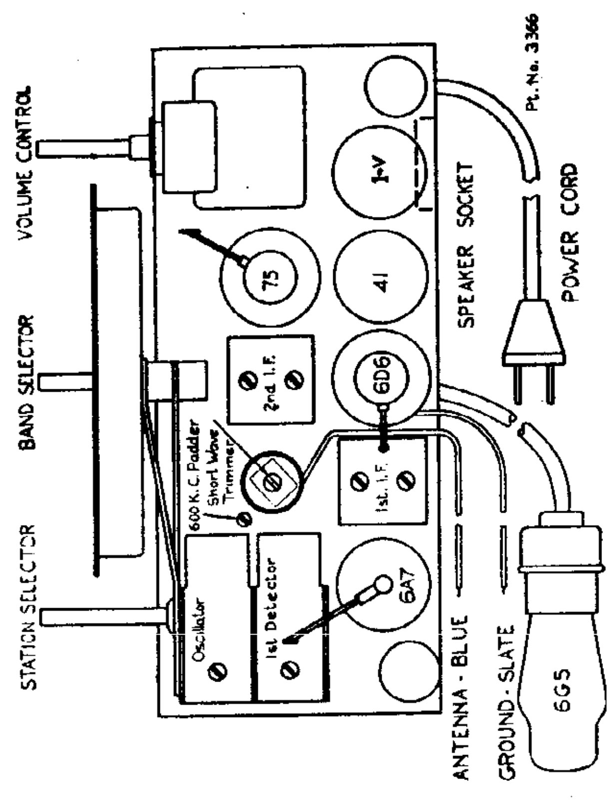
When aligning the R.F., use the same output standard as was used on the I.F. alignment.

Short Wave Alignment

Turn the band selector switch of the set to short wave. Set the signal generator to 6000 K.C. Connect a 400 ohm resistor in series with the .00025 condenser. Tune the set until the signal is heard. If two signals are heard, always align to the highest frequency heard on the receiver. Adjust the small trimmer on the antenna coil for maximum output.

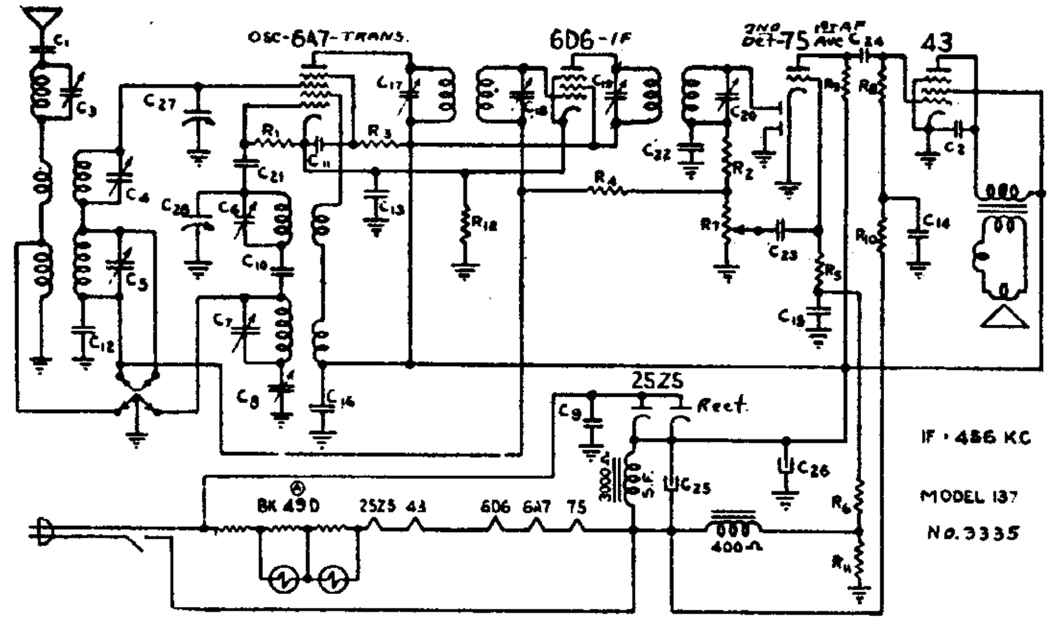
MODELS 136 & 149 are the same except that the 6G5 Tuning Tube is not used.
CIRCUIT DIAGRAM — MODEL 149E





MODEL 137
Schematic, Socket
Parts

DETROLA RADIO CORP.

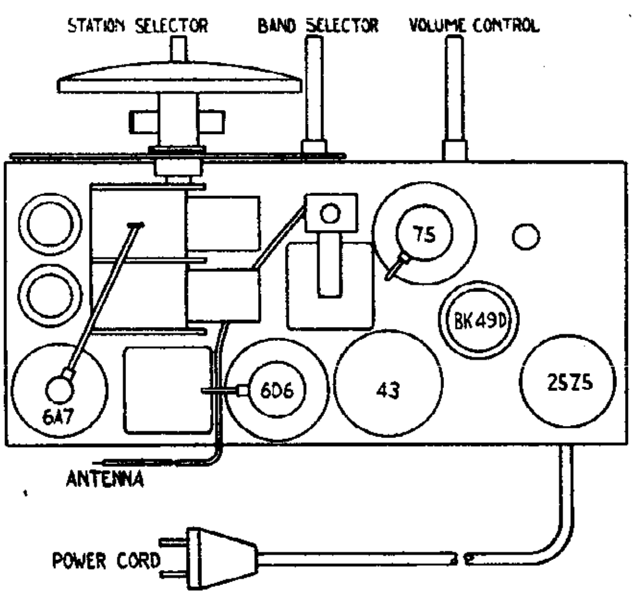


PARTS LIST — MODEL 137

C1, C2 .005 - 600 v.
C3 180 mmf. trimmer
C4, C5, C6, C7, 1 - 10 mmf. trimmer
C8 350 mmf. padder
C9 .02 - 600
C10 1150 mmf. mica
C11, C12 .05 - 200
C13, C14, C15, C16 .1 - 200 v.

C17, C18, C19, C20 100 - 125 trimmer
C21 50 mmf. mica
C22 250 mmf. mica
C23, C24 .01 - 600 v.
C25 16 mfd. 150 v.
C26 24 mfd. 150 v.
C27, C28 variable air
R1, R2, 50M 1/3 w.
R3 20M 1/3 w.

R4, R5, R6 1 meg. 1/3 w.
R7 500M volume control and switch
R8 500M 1/3 w.
R9 200M 1/3 w.
R10 300M 1/3 w.
R11 20 ohms. 1/2 w.
R12 100 ohms. 1/3 w.



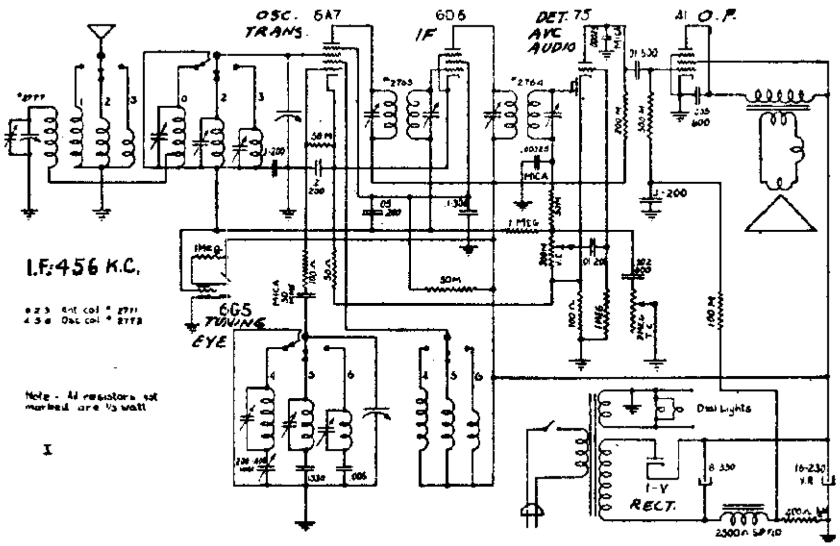
Tubes required are:
1—6A7 Oscillator-Translator
1—6D6 Intermediate Frequency Amplifier
1— 75 Detector-Automatic Volume Control First Audio
1— 43 Power Output
1—25Z5 Rectifier
1—BK-42-D Voltage Regulator

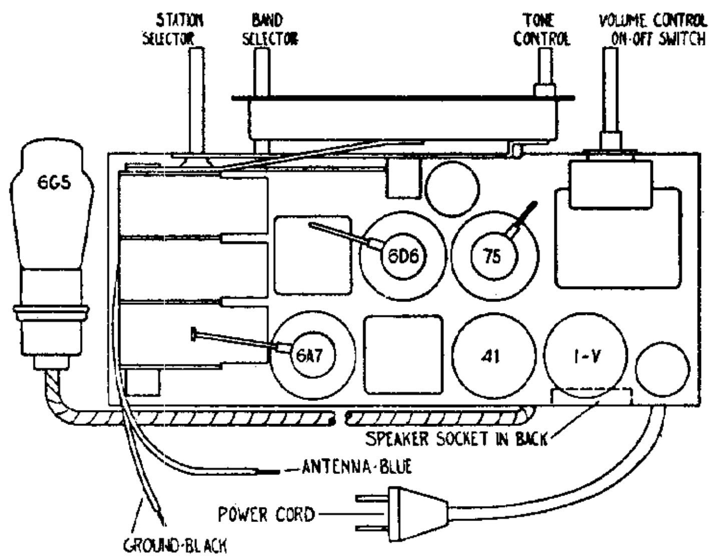
NO GROUND IS NECESSARY—Under no condition should a ground wire be attached to this receiver.

DETROLA RADIO CORP.

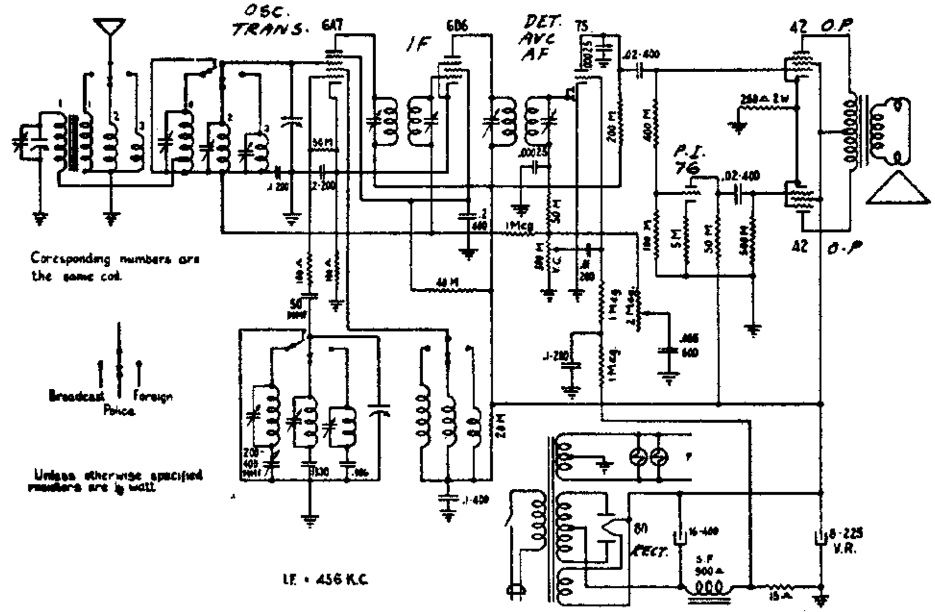
CIRCUIT DIAGRAM—MODEL 139E

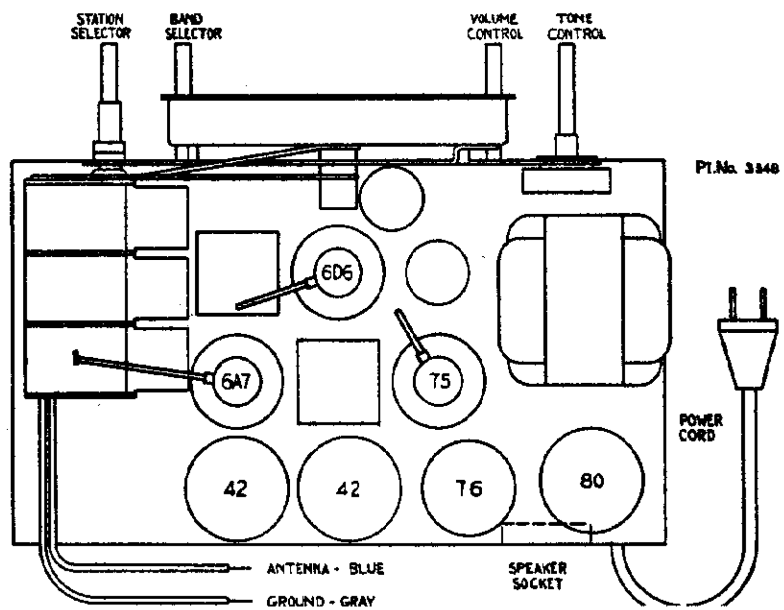
MODEL 139 is the same except that 6G5 Tuning Indicator is not used.





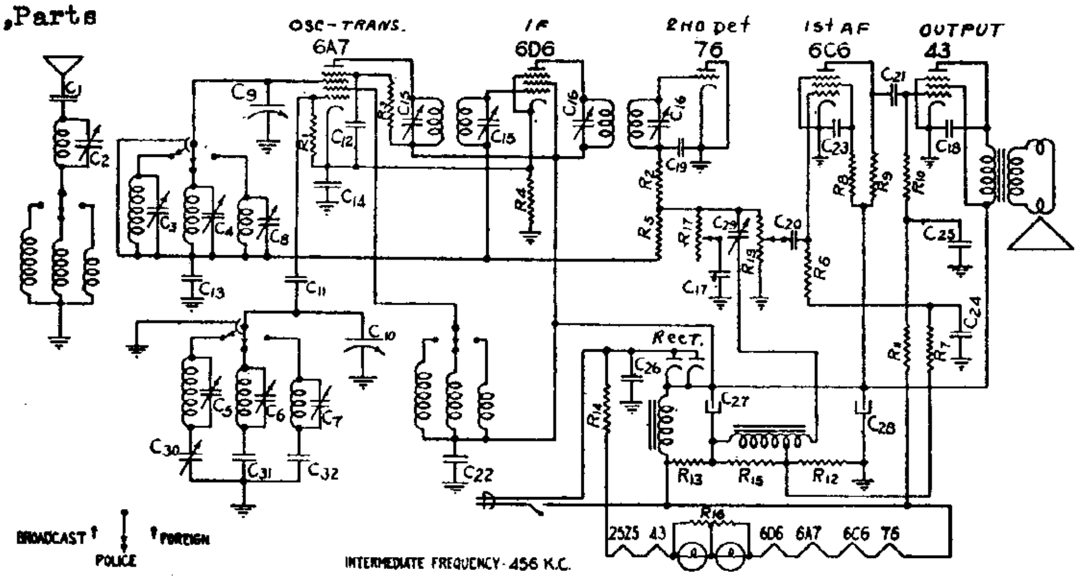
CIRCUIT DIAGRAM MODEL 147 A-B-CR





MODEL 140
Schematic
Socket, Parts

DETROLA RADIO CORP.

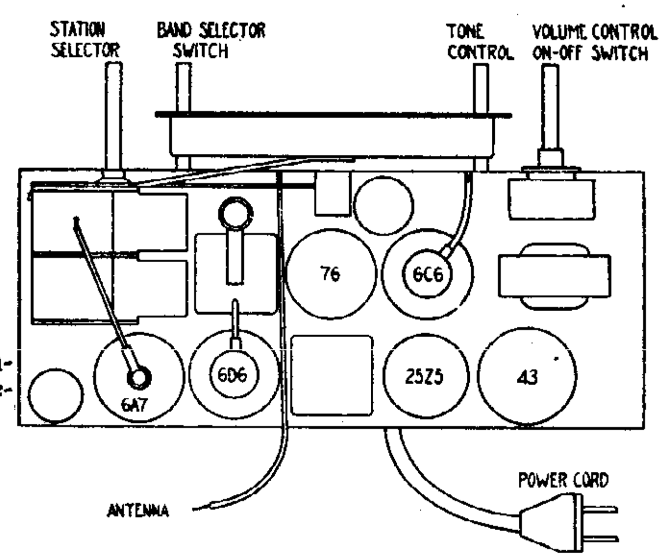


PARTS LIST — MODEL 140

C1 .005 600 v.
C2 180 mmf. trimmer
C3, C4, C5, C6, C7, 1 to 10 mmf. trimmer
C8 3 to 35 mmf. trimmer
C9, C-10 350 mmf. air variable
C11 50 mmf. mica
C12, C13, .05-200 v.
C14 .2 200
C15, C16 120 mmf. trimmer
C17, C18 .003 600 v.
C19 250 mmf. mica
C20 .01 200 v.
C21 .01 400 v.
C22, C23, C24 .1 200 v.
C25 .2 200 v.
C26 .02 600 v.
C27 16 mfd. 150 v. wet electrolytic
C28 24 mfd. 150 v. wet electrolytic
C29 3 to 35 mmf. trimmer
C30 220 to 550 mmf. padder
C31 1330 mmf. padder
C32 3850 mmf. padder
R1, R2 50M ohms
R3 20M ohms
R4 200 ohms
R5, R6, R7, R8 I megohm
R9 250M ohms
R10 500M ohms
R11 300M ohms
R12, R13 35 ohms
R14 100 ohms line cord
R15 10M ohms
R16 45 ohms center tapped
R17 2 megohms tone control
R18 500M ohms vol. control

Tubes required are:

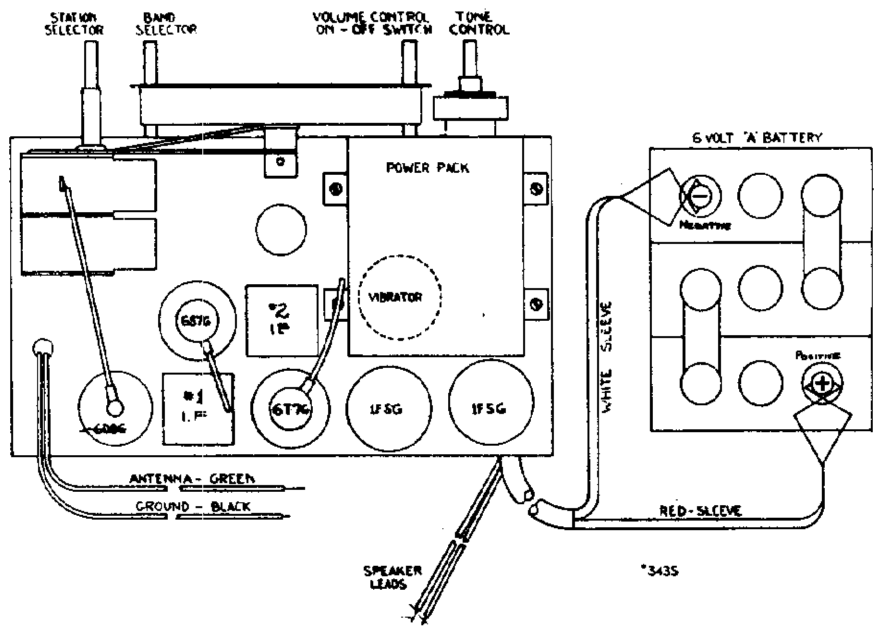
1—6A7 Oscillator-Translator
1—6D6 Intermediate Frequency Amplifier
1— 76 Detector-Automatic Volume Control
1—6C6 First Audio
1— 43 Power Output
1—25Z5 Rectifier



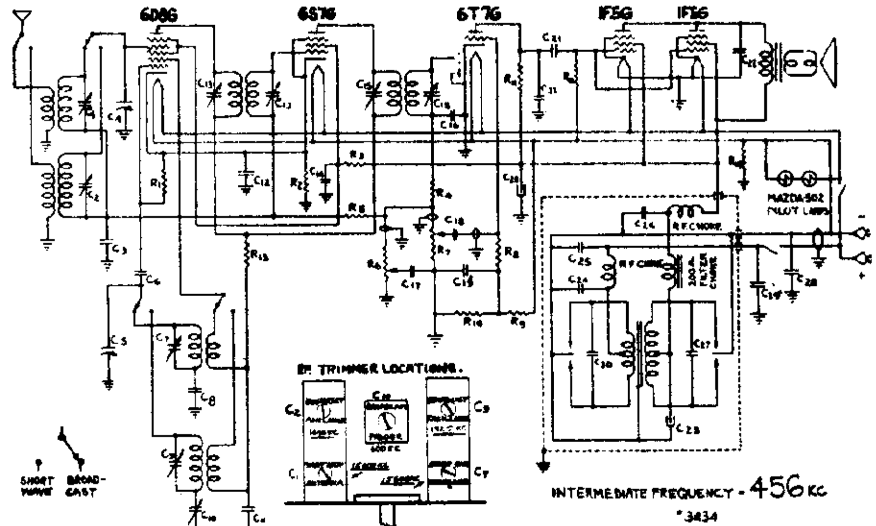
NO GROUND IS NECESSARY—Under no condition should a ground wire be attached to this receiver.

DETROLA RADIO CORP.

TUBE LAYOUT *and* CONNECTION DIAGRAM



Tubes required are:
1—6D8G Oscillator-Translator.
1—6S7G Intermediate frequency amplifier.
1—6T7G Detector—automatic volume control—first audio amplifier.
2—1F5G Power output.



ALINEMENT PROCEDURE

Connect a high impedance AC voltmeter across loud-speaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from generator, strong signals tend to cause improper adjustments.

IF. Connect generator ground to receiver ground. Using .1 mfd condenser in series with "high" side of generator, apply 456 kc signal to grid of 6S7G and adjust second IF transformer; same for first IF, applying signal to grid of 6D8G. (See above diagram for location of tubes and transformers.)

RF. (See circuit diagram for location of trimmers.) Using 200 mmf condenser in series with generator, feed 1725 kc signal to antenna lead and adjust oscillator top frequency. Set generator at 1400 kc, tune receiver to signal and adjust broadcast antenna trimmer. Set generator to 600 kc, tune receiver and adjust padder. The tuning condenser should be rocked back and forth through the signal while the padder is being adjusted in order to obtain perfect alinement.

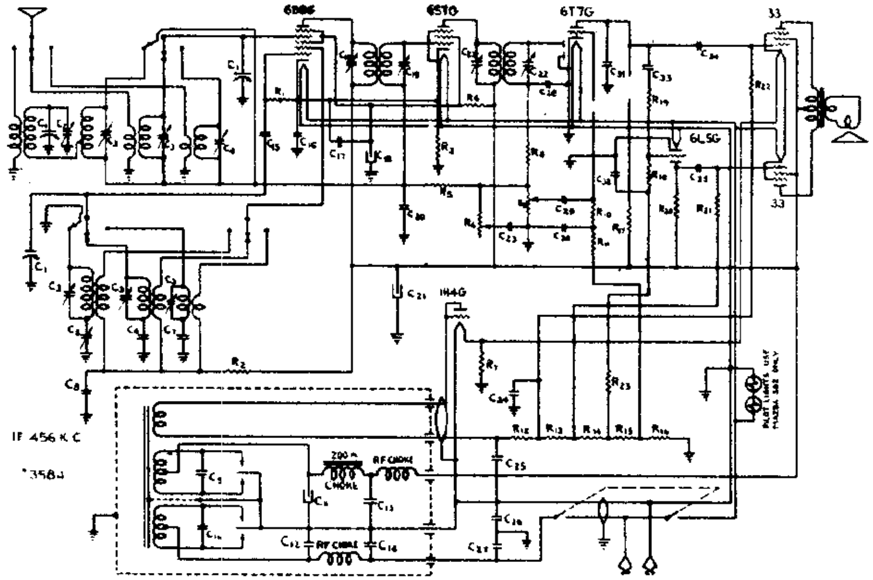
Using 400 ohm resistor in series with generator, set band selector in short wave (right) position, feed 15,600 kc signal to antenna and adjust oscillator trimmer—screw trimmer down tight and unscrew to SECOND peak. Set generator to 15,000 kc, tune receiver and adjust antenna trimmer—screw trimmer down tight and unscrew to FIRST peak, rocking the condenser back and forth through the signal while the adjustment is being made. **Above procedure for alinement at 15,000 kc must be followed exactly to insure proper tracking. A 'dead spot" at about 12,000 kc will result if antenna and oscillator are not set in proper relation to each other.**

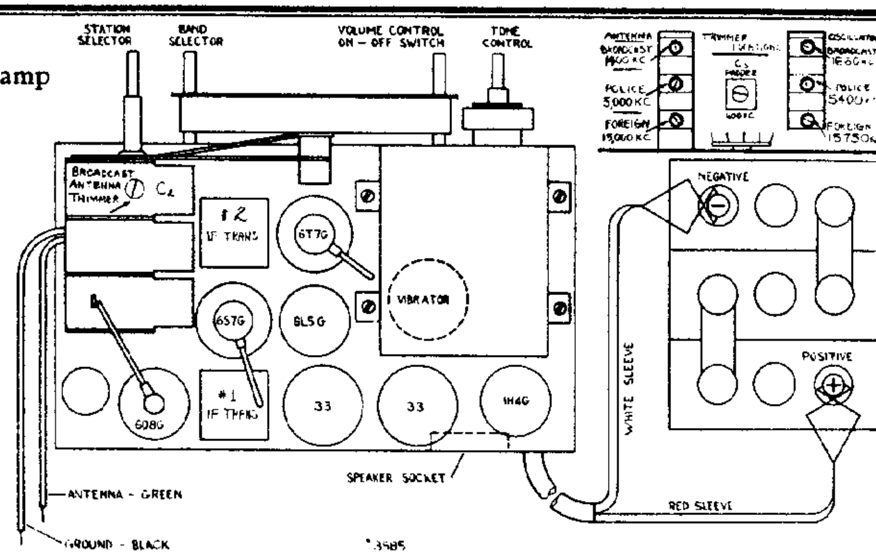
Symbol	Part No.	Description	Symbol	Part No.	Description
C1	1611	3-35 Trimmer	R7	3418	500 M VC with DPST Switch
C2, 7, 9	2597	1-10 Trimmer			
C3, 12, 19	572	.1 200V	R9	2693	2 Meg 1/3 W
C4, 5	2871	350 mmf Variable	R11	599	150 M 1/3 W
C6	2780	50 mmf Mica	R12	615	500 M 1/3 W
C8	2694	.005 ± 5%	R13	614	5 M 1/3 W
C10	2560	350 mmf Padder	R14	3433	15 Ohms ± 5% 1w
C11, 18	568	.01 400V		3412	No. 1 IF Trans.
C13, 15		IF Trimmers		3413	No. 2 IF Trans.
C14, 28, 29	580	.05 200V		3415	Power Transformer
C16, 31	1286	250 mmf Mica		3416	Filter Choke
C17	581	.005 400V		3570	Band Selector Switch
C20	2594	24 mf 150V		3419	Antenna Coil
C21	576	.02 400V		3420	Oscillator Coil
C22	3190	.001 Mica		3421	Vibrator
C23	3417	8 mf 200V		2378	Pointer
C24, 25, 30	3003	.5 160V		1408	Pointer Screw
C26	824	.002 600V		2163	Drive Cable
C27	3432	.015 1200V		3268	8 Prong Socket
R1, 4	631	50 M 1/3 W		2165	7 Prong Socket
R2	3004	150 Ohms		1489	5 Prong Socket
R3	609	15 M 1/3 W		3426	Pilot Lamp
R5, 8, 10	624	1 Meg 1/3 W		3431	Battery Connector
R6	3571	2 Meg TC		3436	PM Dynamic Speaker

MODELS 145B, 145CR
Schematic, Socket
Trimmers, Alignment, Parts

DETROLA RADIO CORP.

6T7G	Detector—automatic volume cont first audio amplifier	6D8G	Oscillator-translator
6L5G	Phase inverter	6S7G	Intermediate frequency amp
1H4G	Bias rectifier	33	Power output





ALINEMENT PROCEDURE

Connect a high impedance AC voltmeter across loud-speaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from generator, strong signals tend to cause improper adjustments.

IF. Connect generator ground to received ground. Using .1 mfd condenser in series with "high" side of generator, apply 456 kc signal to grid of 6S7G and adjust second IF transformer; same for first IF, applying signal to grid of 6D8G. **(See above diagram for location of tubes and transformers.)**

RF. (See above diagram for location of trimmers.) Using 200 mmf condenser in series with the generator, feed 1660 kc to antenna lead and adjust broadcast oscillator trimmer for top frequency. Set generator to 1400 kc, tune receiver and adjust the *two* antenna trimmers. Set generator to 600 kc, tune receiver to signal and adjust padder. The tuning condenser should be rocked back and forth through the signal while the padder is being set in order to secure perfect alinement.

Using 400 ohm resistor in series with generator, set band selector in center position, set generator to 5400 kc and adjust oscillator trimmer for top frequency. Set generator to 5000 kc, tune receiver to signal and adjust antenna trimmer.

Turn band selector to extreme clockwise position. Using 400 ohm resistor in series with generator, set oscillator top frequency for 15,750 kc—screw trimmer down tight, then unscrew to *second* peak. Set generator to 15,000 kc, tune receiver to signal and adjust antenna trimmer—Screw trimmer down tight, then unscrew to *first* peak, rocking the tuning condenser back and forth through the signal while the adjustment is being made. **Above procedure for alinement at 15,000 kc must be followed exactly to insure proper tracking. A dead spot at about 12,000 kc will result if antenna and oscillator circuits are not set in proper relation to each other.**

Symbol	Part No.	Description
C1	2872	350 MMF Variable
C2,3	2597	1-10 trimmer
C4	1611	3-35 trimmer
C5	2560	360 MMF padder
C6	2741	1330 MMF padder
C7	2793	.006+5%
C8,17	565	.01 200V
C9	3579	.01 1600V
C10,12,14	3003	.5 160V
C11	3575	8 MF 250WV
C13	563	.05 400V
C15	2780	50 MMF mica
C16	2792	.2 200V
C18	3574	8 MF 150WV
C19,22		IF trimmers
C20,30,32	572	.1 200V
C21	3574	16 MF 200 WV
C23	581	.005 600V
C24	566	.5 200V
C25	579	.25 200V
C26,27	680	.05 200V
C28	1286	250 MMF mica
C29,33,34,35	576	.02 400V
C31	1285	100 MMF mica
R1	631	50M 1/3 w
R2	617	20M 1/3 w
R3	2689	100 ohms+10%
R4	609	15M 1/3 w
R5,10,11,23	624	1 Meg.
R6	3571	2 Meg. TC
R7	3580	10 ohms+5%
R8	631	50M 1/3 w

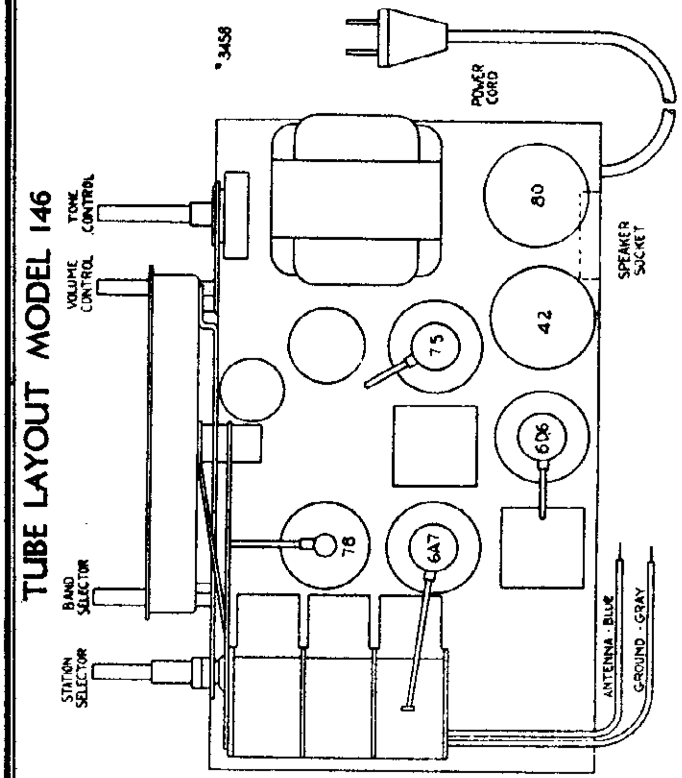
Symbol	Part No.	Description
R9	3418	500M VC with DPST Switch
R12	2688	60M 1/3 w ± 10%
R13,16	3581	3M 1/3 w ± 10%
R17	602	250M 1/3 w
R18	3582	75M 1/3 w ± 10%
R19	2599	1 Meg. ± 10%
R20	603	100M 1/3 w
R21,22	615	500M 1/3 w
	3412	#1 IF transformer
	3465-1	#2 IF transformer
	3573	Power transformer
	3416	Filter choke
	2724	Band switch
	2771	Antenna coil
	2772	Oscillator coil
	L-1020	Choke coil
	2845	B.C. Antenna coil
	3421	Vibrator
	2378	Pointer
	1408	Pointer screw
	2163	Drive cable
	3268	8 Prong socket
	2165	7 Prong socket
	2221	6 Prong socket
	1489	5 Prong socket
	833	4 Prong socket
	3426	Pilot lamp
	3431	Battery connector
	3586	8" PM Dynamic speaker
	3660	6" PM Dynamic speaker

Schematics, Sockets

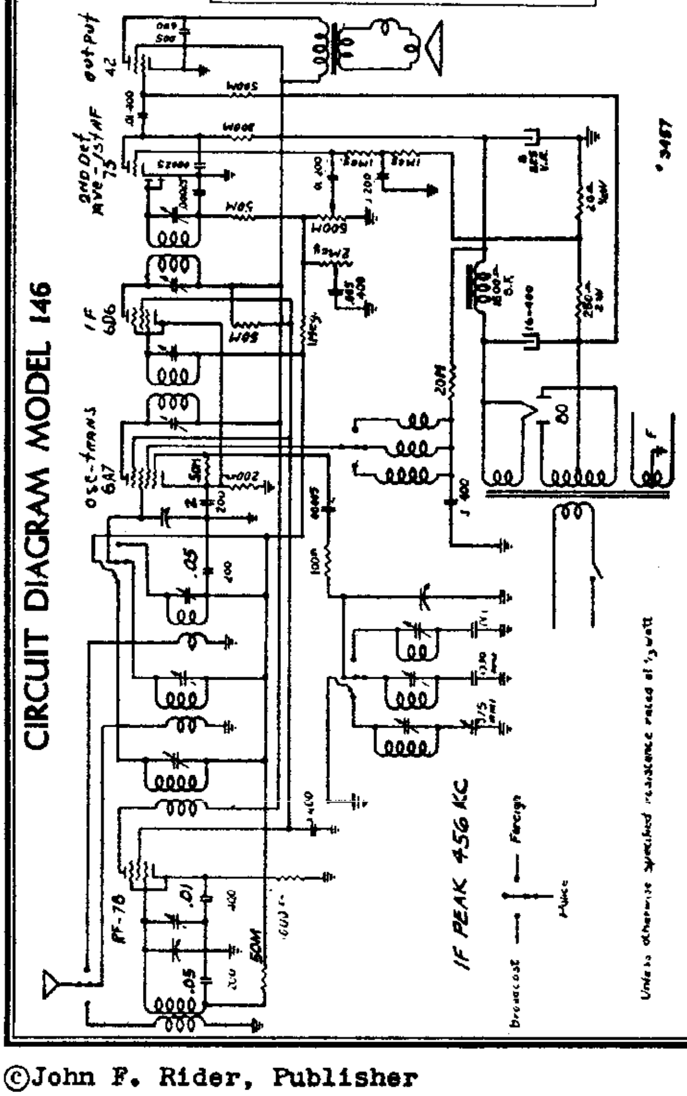
DETROLA RADIO CORP.

MODEL 146
MODEL 158A
MODEL 162

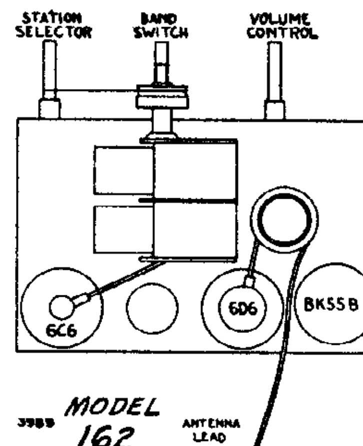
TUBE LAYOUT MODEL 146



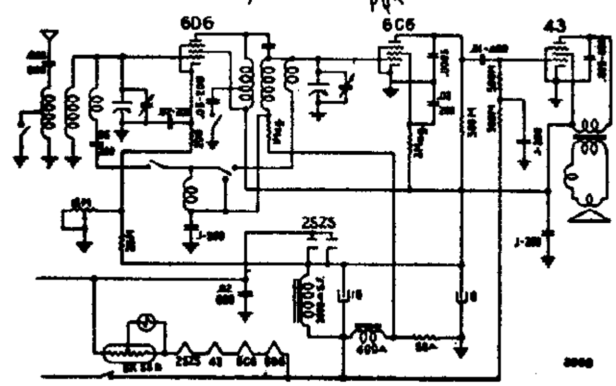
CIRCUIT DIAGRAM MODEL 146



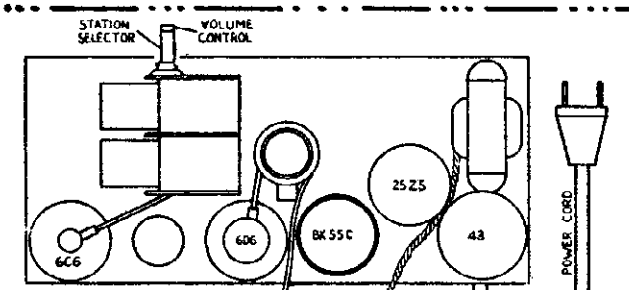
1—6D6 R. F. Amplifier
1—6C6 Detector
1—43 Power Output
1—25Z5 Rectifier
1—BK55B Regulator



MODEL 162

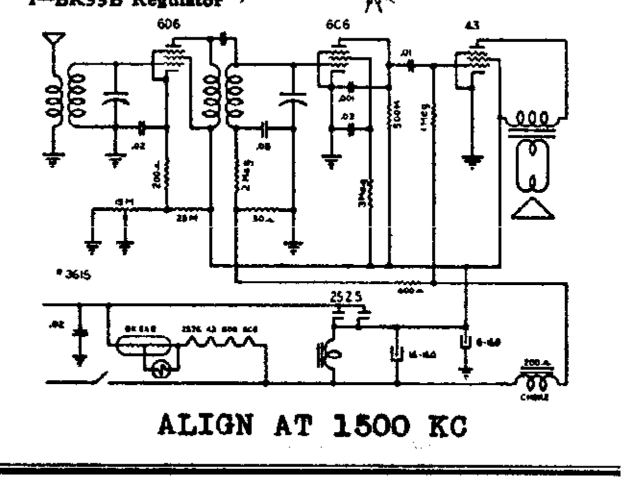


ALIGN AT 1500 KC



1—6D6 R. F. Amplifier
1—6C6 Detector
1—43 Power Output
1—25Z5 Rectifier
1—BK55B Regulator

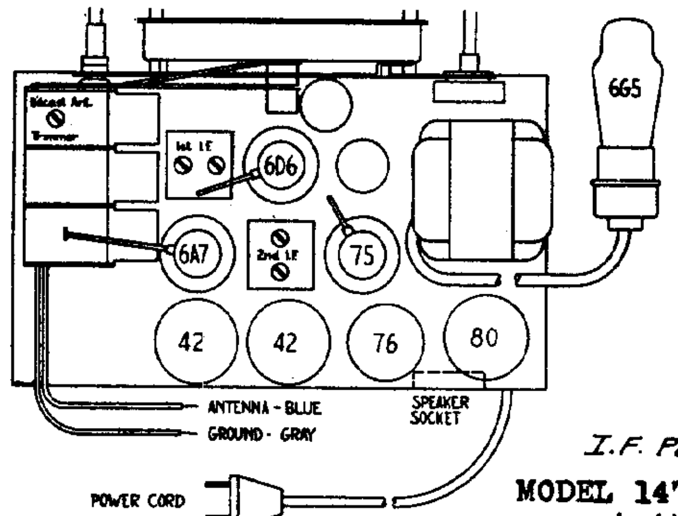
MODEL 158A

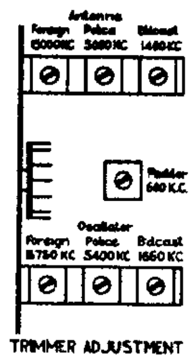


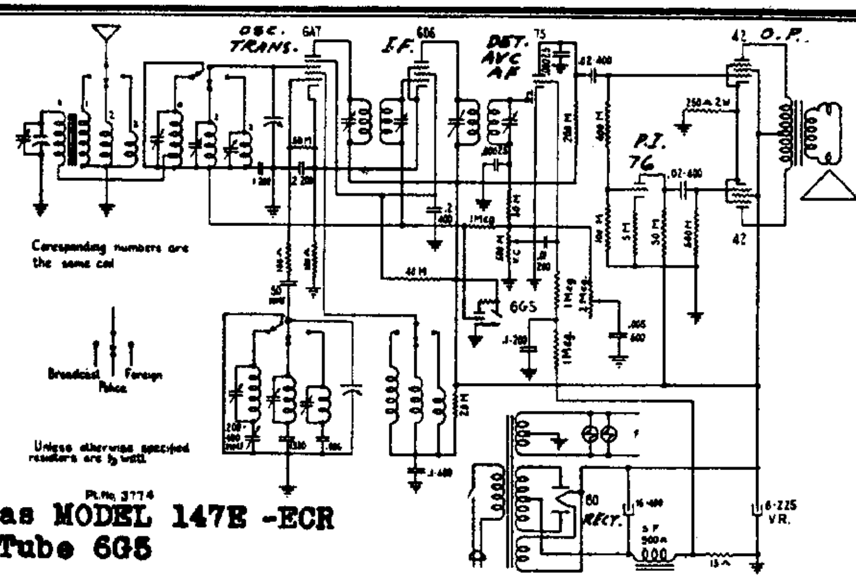
ALIGN AT 1500 KC

MODELS 147,147E,147ECR
Schematic, Socket, Parts
Alignment, Trimmers

DETROLA RADIO CORP.







I.F. PEAK 456KC

MODEL 147-the same as MODEL 147E -ECR except that Tuning Tube 6G5 is not used.

I. F. Alignment

The I.F. frequency of this receiver is 456 K.C. For realignment, use the following procedure.

It is necessary to use an accurately calibrated signal generator. Couple the signal generator to the grid of the 6A7 tube with a tenth microfarad condenser in series with the "high" lead of the signal generator. Connect the ground side of the signal generator to the chassis. Set the signal generator to 456 K.C. Be sure the wave switch of the set is in the broadcast position and the volume control set at maximum. Attenuate the signal generator so that the signal is just audible in the speaker. If an ouput meter is used, it should be connected across the voice coil terminals of the speaker. Use ½ volt as standard output.

Adjust the 2nd I.F. transformer first. Each screw should be adjusted for maximum output. After number two I.F. has been adjusted, number one I.F. should be adjusted for maximum output. After both transformers have been adjusted, it is necessary to recheck No. 2 transformer and then recheck No. 1.

See TUBE LAYOUT for location of I.F. and R.F. trimmers and padder.

RF. (See above diagram for location of trimmers.) Using 200 mmf condenser in series with the generator, feed 1660 kc to antenna lead and adjust broadcast oscillator trimmer for top frequency. Set generator to 1400 kc, tune receiver and adjust the *two* antenna trimmers. Set generator to 600 kc, tune receiver to signal and adjust padder. The tuning condenser should be rocked back and forth through the signal while the padder is being set in order to secure perfect alinement.

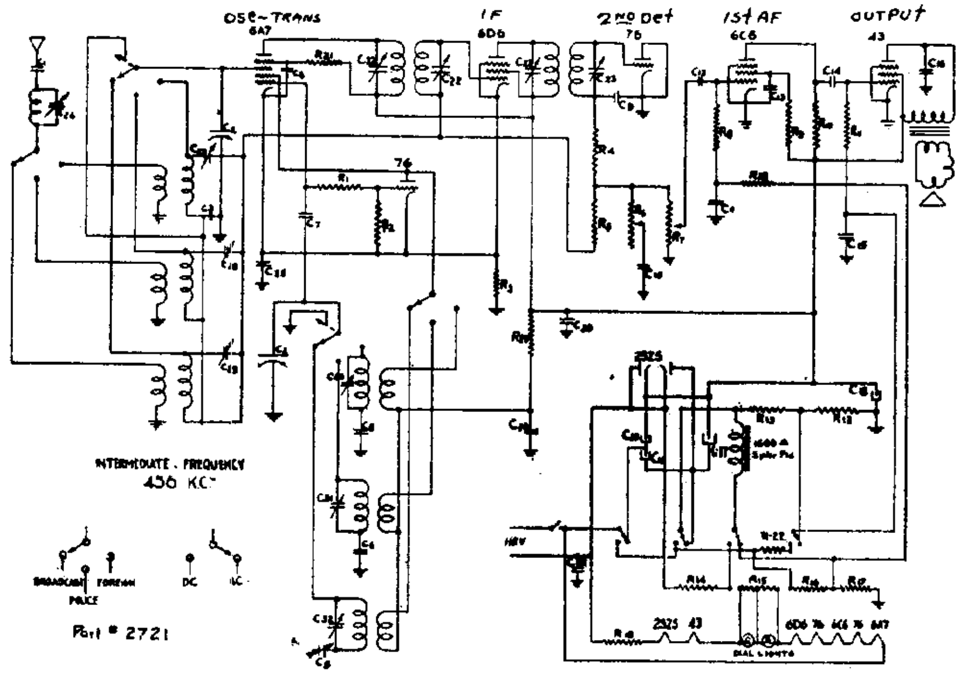
Using 400 ohm resistor in series with generator, set band selector in center position, set generator to 5400 kc and adjust oscillator trimmer for top frequency. Set generator to 5000 kc, tune receiver to signal and adjust antenna trimmer.

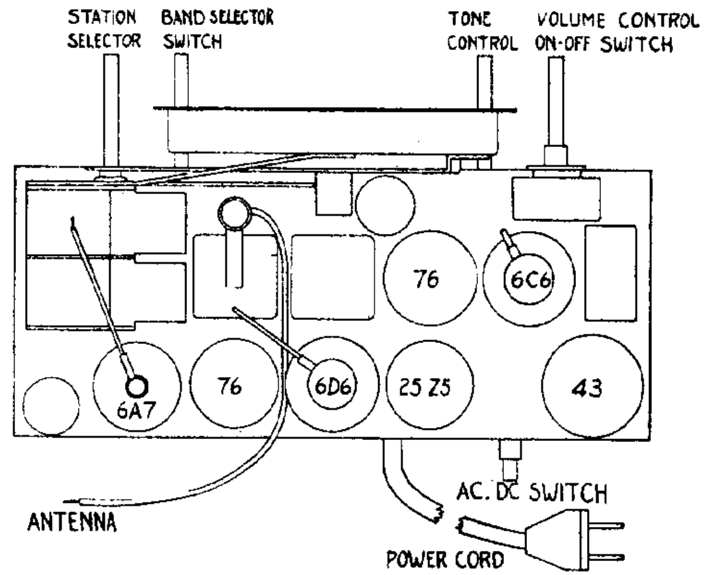
Turn band selector to extreme clockwise position. Using 400 ohm resistor in series with generator, set oscillator top frequency for 15,750 kc—screw trimmer down tight, then unscrew to *second* peak. Set generator to 15,000 kc, tune receiver to signal and adjust antenna trimmer—Screw trimmer down tight, then unscrew to *first* peak, rocking the tuning condenser back and forth through the signal while the adjustment is being made. **Above procedure for alinement at 15,000 kc must be followed exactly to insure proper tracking. A dead spot at about 12,000 kc will result if antenna and oscillator circuits are not set in proper relation to each other.**

Part No.	Req.	Description
2163		Cable, Drive, Approx. 20"
3351	1	Cond. 8 MF. 225 V. Reg. Wet El.
3774		Schematic Diagram
3775		Tube Sticker
2560	1	Condenser, Padder
2597	4	Condenser, Trimmer, 1-10
1611	1	Condenser, Trimmer, 5-35
3157	1	Condenser, Trimmer
1286	1	Condenser, Mica, .00025
2780	1	Condenser, Mica, .00005
2741	1	1 Condenser, Mica, 1330
2872	1	Variable Condenser
576	2	Condenser, .02, 400 V., Paper
572	2	Condenser, .1, 200 V., Paper
565	1	Condenser, .01, 200 V., Paper
581	1	Cond., .005, 600 V., Paper
2792	1	Condenser, .2, 200 V., Paper
2793	1	1 Cond., .006, 600 V., Paper
3352	1	Condenser, .2, 400 V., Paper
575	1	Condenser, .1, 400 V., Paper
624	2	Resistor, 1/3 W., 1 Meg.
2731	1	Resistor, 1/3 W., 500 M.
2730	1	Resistor, 1/3 W., 200 M.
631	2	Resistor, 1/3 W., 50 M.
617	1	Resistor, 1/3 W., 20 M.

Part No.	Req.	Description
3353	1	Resistor, 2 W., 250 Ohm
2689	2	Resistor, 1/3 W., 100 Ohm
2883	1	Resistor, 1/3 W., 5 M.
2882	1	Resistor, 1/3 W., 15 Ohm
2881	1	Resistor, 1/3 W., 400 M.
2880	1	Resistor, 1/3 W., 100 M.
636	1	Resistor, 1/3 W., 40 M.
2724	1	Switch, Band
2837	1	Coil, Antenna
2772	1	Coil, Oscillator
2845	1	Coil, B. C. Antenna
3343	1	Transformer, Power
3344	1	Transformer, 1st I. F.
3345	1	Transformer, 2nd I. F.
3375	1	Cond. Elec. 16 MF., 400 V
2908	1	Spring, Drive Cable
3374	1	Indicator
2378	1	Pointer
2726	1	Control, Vol. & Switch
2737	1	Control, Tone
1732	1	A. C. Cord
3778	1	Book, Instruction
2897	1	Escutcheon Tuning Tube
2981	1	Tuning Tube Cable
3710	1	Speaker, 8"
3377	1	Escutcheon

DETROLA RADIO CORP.





TUBE LAYOUT CHART

PARTS LIST - - MODEL 148

C1	.005 600 v.	C18	24 mfd. 150 w.v. wet el.	R6	2 meg. tone control
C2	.00035 variable air	C19	8/8 mfd. 175 p.v. dry	R7	500M ohms, vol. con. and line switch
C3	.05 200 v.	C20	.1 200 v.	R8	1 meg., 1/3 watt
C4	.05 200 v.	C21	.02 600 v.	R9	1 meg., 1/3 watt
C5	350 mmf. variable mica	C22	120 mmf. trimmer	R10	250M ohms, 1/3 watt
C6	1330 mmf.	C23	120 mmf. trimmer	R11	500M ohms, 1/3 watt
C7	50 mmf. mica	C24	.02 200 v.	R12	200M ohms, 1/3 watt
C8	3850 mmf.	C25	.05 200 v.	R13	500M ohms, 1/3 watt
C9	250 mmf. mica	C26	180 mmf. trimmer	R14	1200 ohms, 3 watt
C10	.01 200 v.	C27	5 to 35 mmf. trimmer	R15	45 ohms, center tapped
C11	.1 200 v.	C28, C29, C30, C31, C32,	1 to 10 mmf. trimmer	R16	370 ohms, 1 watt
C12	.01 400 v.			R17	35 ohms, 1/3 watt
C13	.1 200 v.	R1	200 ohms, 1/3 watt	R18	82 ohms, line cord
C14	.01 400 v.	R2	50M ohms, 1/3 watt	R19	1 meg., 1/3 watt
C15	.25 200 v.	R3	200 ohms, 1/3 watt	R20	5M ohms, 1/3 watt
C16	.005 600 v.	R4	50M ohms, 1/3 watt	R21	20M ohms, 1/3 watt
C17	8 mfd. 250 w.v. wet el.	R5	1 meg., 1/3 watt	R22	500M ohms, 1/3 watt

NO GROUND IS NECESSARY—Under no condition should a ground wire be attached to this receiver.

Tubes and Connections

Tubes required are:

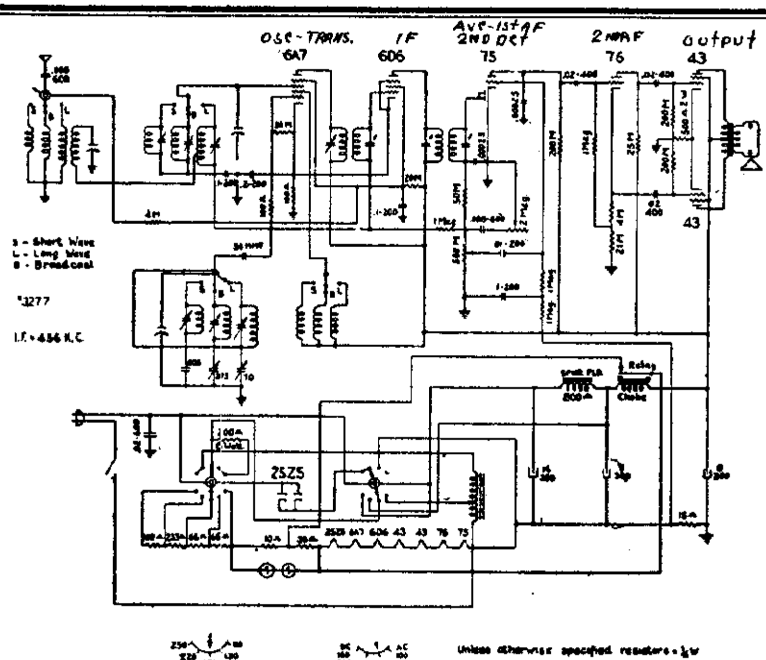
1—6A7 Translator.
1—76 Oscillator.
1—6D6 Intermediate frequency amplifier.
1—76 Detector-Automatic volume control.
1—6C6 First audio.
1—43 Power output.
1—25Z5 Rectifier. Voltage Doubler.

MODEL 150
Schematic, Socket
Notes

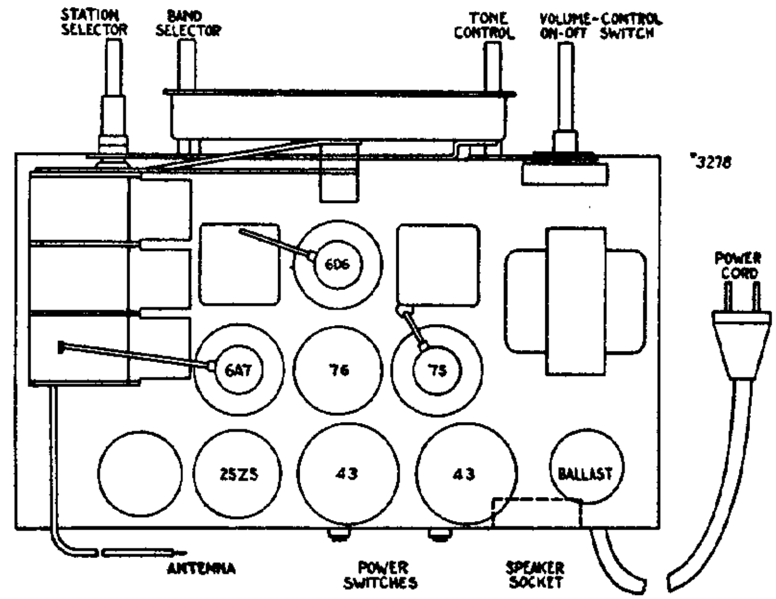
DETROLA RADIO CORP.

Tubes required are:

1—6A7 Oscillator Translator
1—6D6 I. F. Amplifier
1— 75 Detector A. V. C. Audio Amplifier
1— 76 Phase Inverter
2— 43 Output
1—25Z5 Rectifier



TUBE LAYOUT



Do not attach a ground to this receiver.

WARNING: READ THESE INSTRUCTIONS BEFORE CONNECTING THIS RECEIVER TO THE ELECTRIC MAINS

This receiver may be adjusted to operate on any current, either direct or alternating of any frequency from 25 cycles to 150 cycles, and at any voltage from 100 volts to 260 volts. The adjustments of the receiver to any voltage or current is accomplished by means of two switches located on the rear panel of the receiver.

Before connecting the receiver to the electric mains, ascertain from your power company the voltage of the mains in your home, and whether it is alternating current or direct current.

When this information has been obtained, the following procedure should be used to set the electrical circuits of the receiver to the line voltage in your home:

Below is a table of main voltage, for both direct and alternating currents. Opposite each main voltage in the table, is a designation of the proper setting for each switch. There is a plate on the rear of the chassis that is graduated in the main voltage settings. The switches are adjustable by means of a screw driver. The slot in the switches is also used as an indicator which should point to graduation to be used.

Each switch must be set according to the table. They must not be changed on the set while it is connected to the mains.

Unless these instructions are properly carried out serious harm to the electrical parts in the receiver will result.

FOR DIRECT CURRENT ONLY

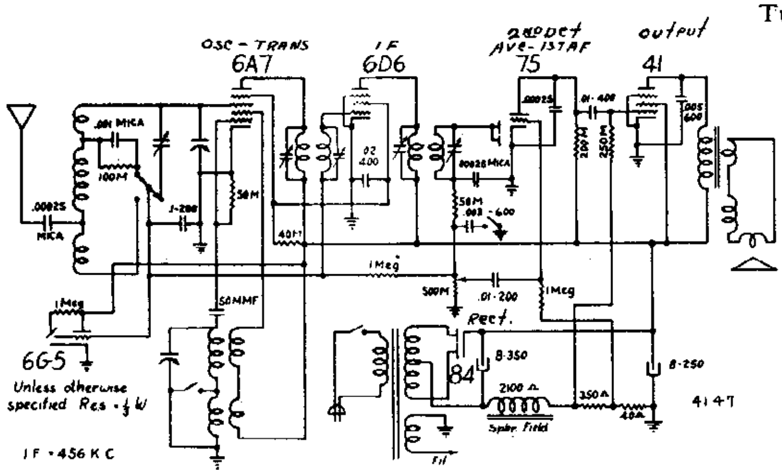
Voltage of Mains	Set Switch B to position marked	Set Swith A to position marked
100 to 120	110	DC 100 to 150
120 to 140	130	DC 100 to 150
140 to 160	150	DC 150 to 250
210 to 230	220	DC 150 to 250
240 to 260	250	DC 150 to 250

FOR ALTERNATING CURRENT ONLY

Voltage of Mains	Set Switch B to position marked	Set Swith A to position marked
100 to 120	110	AC 100 to 130
120 to 130	130	AC 100 to 130
140 to 160	150	AC 130 to 250
210 to 230	220	AC 130 to 250
240 to 260	250	AC 130 to 250

MODEL 154E
Schematic, Socket Trimmers, Alignment Parts

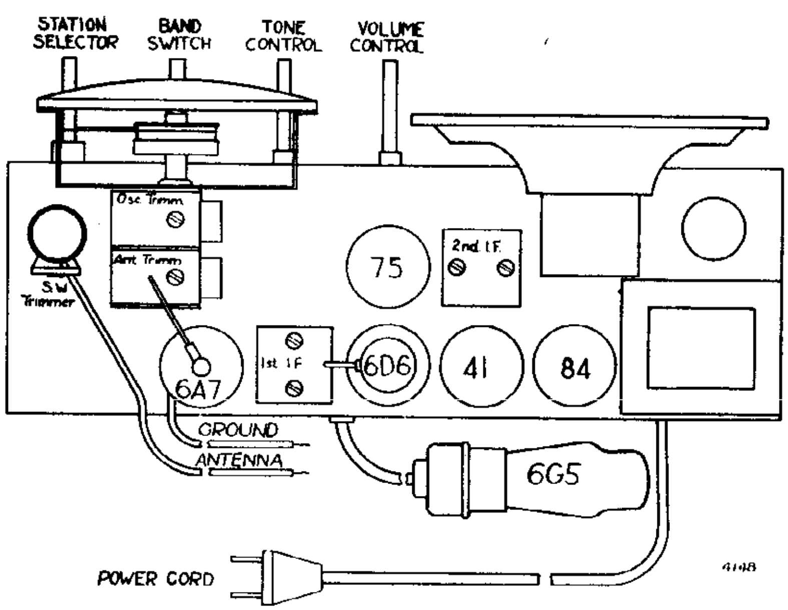
DETROLA RADIO CORP.



Tubes required are:

1—6A7 Oscillator-Translator
1—6D6 I. F. Amplifier
1— 75 Detector-A.V.C., Audio Amplifier
1— 41 Output
1— 84 Rectifier
1—6G5 Tuning Eye

Part No.	Req.	Description	Part No.	Req.	Description
3873	1	Transformer—Power	624	1	Resistor—⅓W—1 Meg.
3356	1	Transformer—1st I.F.	602	1	Resistor—⅓W—250M
3465-2	1	Transformer—2nd I.F.	2730	1	Resistor—⅓W—200M
3874	1	Coil—Antenna	603	1	Resistor—⅓W—100M
3875	1	Coil—Oscillator	631	1	Resistor—⅓W—50M
3876	1	Condenser—Variable	636	1	Resistor—⅓W—40M
3877	1	Condenser Dry Elec.	3893	1	Resistor—⅓W—350 oms
3878	1	Speaker	3402	1	Resistor—1W—40 ohms Flexohm
4147		Schematic Diagram			
4148		Tube Sticker	4145	1	Indicator
530	2	Bulbs—Pilot Light	3889	1	Gasket—Glass
2163	1	Drive Cable	3890	1	Glass
2908	1	Spring—Drive Cable	3891	1	Pointer
2597	1	Condenser—Trimmer	565	1	Condenser—Paper .01-200V
1286	2	Condenser—Mica .00025	568	1	Condenser—Paper .01-400V
3190	1	Condenser—Mica .001	576	1	Condenser—Paper .02-400V
3066	1	Switch—Band	572	1	Condenser—Paper .1-200V
3883	1	Control—Tone—Switch	581	1	Condenser—Paper .005-600V
3361	1	Control—Volume and Switch	2695	1	Condenser—Paper .003-600V



R. F. Alignment

First, connect the ground side of the signal generator to the chassis. Connect the high side of the signal generator with a .00025 condenser, in series, to the antenna lead of the set. Make sure the band switch of the set is in the broadcast position. Set the volume control to maximum. Turn the station selector to the highest frequency (as far as it will go). Set the signal generator to 1720 K.C. Adjust the oscillator trimmer until the signal is heard. After the oscillator has been set at 1720 K.C., turn the station selector to 1400 K.C. Set the signal generator to 1400 K.C. When the signal is heard, adjust the first detector trimmer for maximum output.

When aligning the R.F., use the same output standard as was used on the I.F. alignment.

Short Wave Alignment

Turn the band selector switch of the set to short wave. Set the signal generator to 6000 K.C. Connect a 400 ohm resistor in series with the .00025 condenser. Tune the set until the signal is heard. If two signals are heard, always align to the highest frequency heard on the receiver. Adjust the small trimmer on the antenna coil for maximum output.

I. F. Alignment

The I.F. frequency of this receiver is 456 K.C. For realignment, use the following procedure.

It is necessary to use an accurately calibrated signal generator. Couple the signal generator to the grid of the 6A7 tube with a tenth microfarad condenser in series with the "high" lead of the signal generator. Connect the ground side of the signal generator to the chassis. Set the signal generator to 456 K.C. Be sure the wave switch of the set is in the broadcast position and the volume control set at maximum. Attenuate the signal generator so that the signal is just audible in the speaker. If an output meter is used, it should be connected across the voice coil terminals of the speaker. Use ½ volt as standard output.

Adjust the 2nd I.F. transformer first. Each screw should be adjusted for maximum output. After number two I.F. has been adjusted, number one I.F. should be adjusted for maximum output. After both transformers have been adjusted, it is necessary to recheck No. 2 transformer and then recheck No. 1.

See TUBE LAYOUT for location of I.F. and R.F. trimmers and padder.

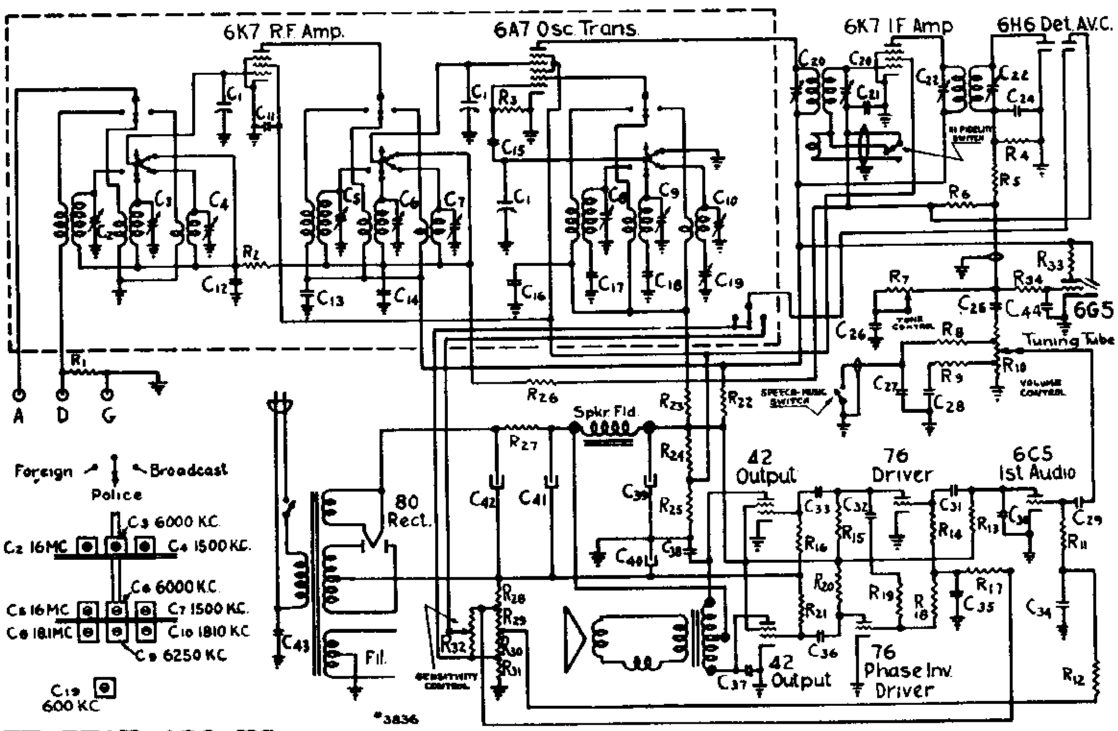
MODEL 155X
Schematic, Parts

DETROLA RADIO CORP.

Tubes

Tubes required are:

1—6K7 Radio frequency amplifier
1—6A7 Oscillator—translator
1—6K7 Intermediate frequency amplifier
1—6H6 Detector—automatic volume control
1—6C5 First audio amplifier
1—6G5 Cathode ray tuning tube (on models equipped with "eye" tuning indicator)
1—76 Driver
1—76 Driver-phase inverter
2—42 Power output
1—80 Rectifier



IF PEAK 456 KC

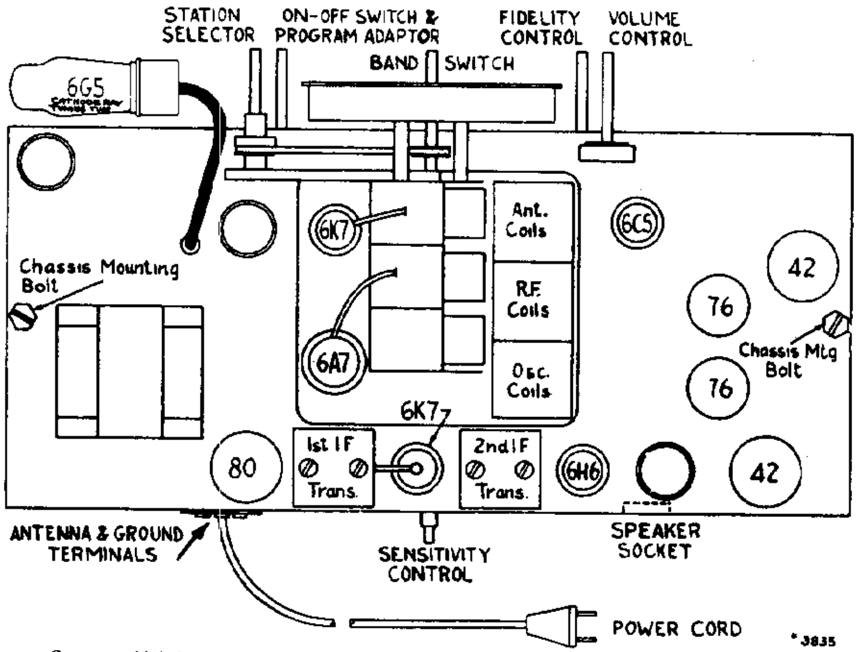
Symbol	Part No.	Description
C1	3814	9-400 mmf Variable
C2,3,4	3822	2-35 triple trimmer
C5,6,7	3822	2-35 triple trimmer
C8,9,10	3822	2-35 triple trimmer
C11,21,34	572	.1—200 V.
C12,14	580	.05 200 V.
C13	575	.1 400 V.
C15,24	2780	50 mmf mica
C16	568	.01 400 V.
C17	2694	.005 5% tolerance
C18	2741	1330 mmf 5% tolerance
C19	2560	350 mmf variable padder
C20,22		IF Trimmers
C25,28	2385	.02 200 V.
C26	2695	.003 600 V.
C27	824	.002 600 V.
C29	576	.02 400 V.
C30	1286	250 mmf mica
C31,33,36	2600	.02 600 V.
C32	563	.05 400 V.
C35	579	.25 200 V.
C37,38	3138	.001 800 V.
C39	3113	16 MF regulating
C40	3136	20 MF 25 V.
C41	3112	16 MF 450 V.
C42	3111	16 MF 500 V.
C43	3135	.003 800 V.
R1,5,15,20,26	603	100 M 1/3 W.
R2,3,13	631	50 M 1/3 W.
R4,14,16,21	615	500 M 1/3 W.
R6	2693	2 meg 1/3 W.
R7	3799	2 meg tone control
R8,17	2568	300 M 1/3 W.

Symbol	Part No.	Description
R9,23	617	20 M 1/3 W.
R10	3800	3 meg volume control
R11,12	624	1 meg 1/3 W.
R18	2688	60 M 1/3 W. 10%
R19	2731	500 M 1/3 W. 10%
R22	2421	1 M 1/3 W.
R24	3805	7 M 3.5 W.
R25	3805	8 M 1.5 W.
R27	3809	100 ohms 2 W. 10%
R28	3806	120 ohms 1.5 W. 10%
R29	3808	50 ohms .75 W. 10%
R30	3807	35 ohms .5 W. 10%
R31	3870	15 ohms .5 W. 10%
R32	3801	2 M Variable
	3796	Power transformer
	3797	No. 1 IF transformer
	3798	No. 2 IF transformer
	2981	Tuning tube cable
	3838	12" Speaker
	2898	Tuning tube clamp
	3815	RF coil
	3943	Oscillator coil
	3817	Antenna coil
	3825	Planetary drive
	3826	Drive belt
	3198	Idler pulley
	3199	Idler spring
	3831	Minute pointer
	3832	Tuning pointer
	3802	On-off switch
	3818	RF and Antenna switch
	3819	Oscillator switch

DETROLA RADIO CORP.

MODEL 155X

TUBE LAYOUT *and* CONNECTION DIAGRAM



Connect a high impedance AC voltmeter across the loudspeaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from the generator, strong signals tend to cause improper adjustments.

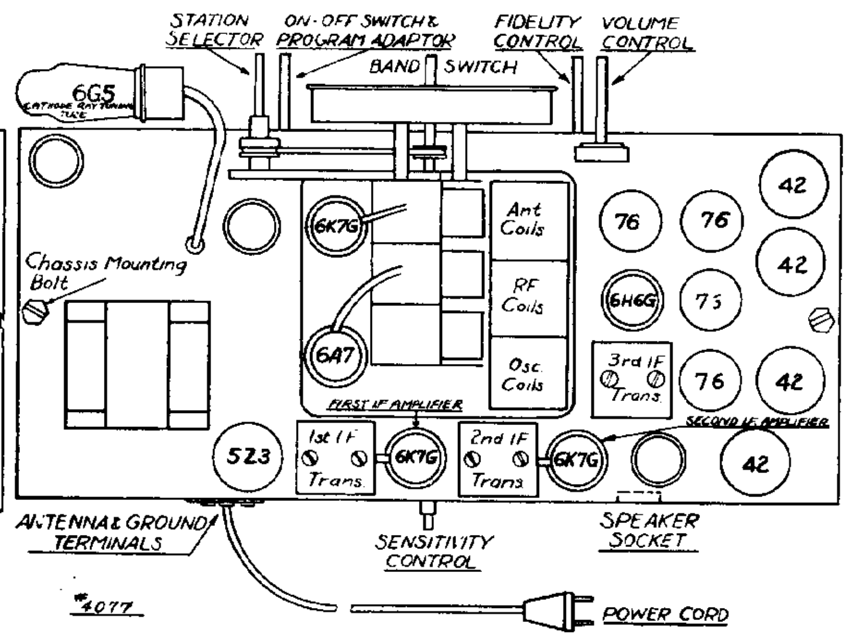
Be sure that the fidelity control is NOT in the HIGH FIDELITY position. It will not be possible to properly aline the receiver unless this control is turned part way toward its "bass" position."

IF. Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of the generator, apply 456 kc. signal to the grid of the 6K7 IF amplifier tube and aline second IF transformer trimmers. Repeat for first IF transformer, applying signal to grid of the 6A7 tube. (See above diagram for location of tubes and transformers.)

RF. (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1810 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1500-1600 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alinement of the two short wave bands. Set the band selector switch in the center position, adjust the oscillator top frequency for 6250 kc., then aline the antenna and RF trimmers at about 6000 kc. With the band selector in the extreme right position, adjust the top frequency of the high frequency to 18,100 kc., and aline the antenna and RF trimmers at about 16,000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmer down tight, then unscrew to the second peak. The antenna and RF trimmers should be screwed down tight, then unscrewed to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be set in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

MODEL 163



Connect a high impedance AC voltmeter across the loudspeaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from the generator, strong signals tend to cause improper adjustments.

Be sure that the fidelity control is NOT in the HIGH FIDELITY position. It will not be possible to properly aline the receiver unless this control is turned part way toward its "bass" position.

IF. Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of generator, apply 456 kc. signal to grid of 6K7G second IF amplifier and aline transformer No. 3. Repeat for transformer No. 2, applying signal to grid of 6K7G first IF amplifier. Repeat for transformer No. 1, applying signal to grid of 6A7 translator. (See above diagram for location of tubes and transformers.)

RF. (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1810 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1500-1600 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

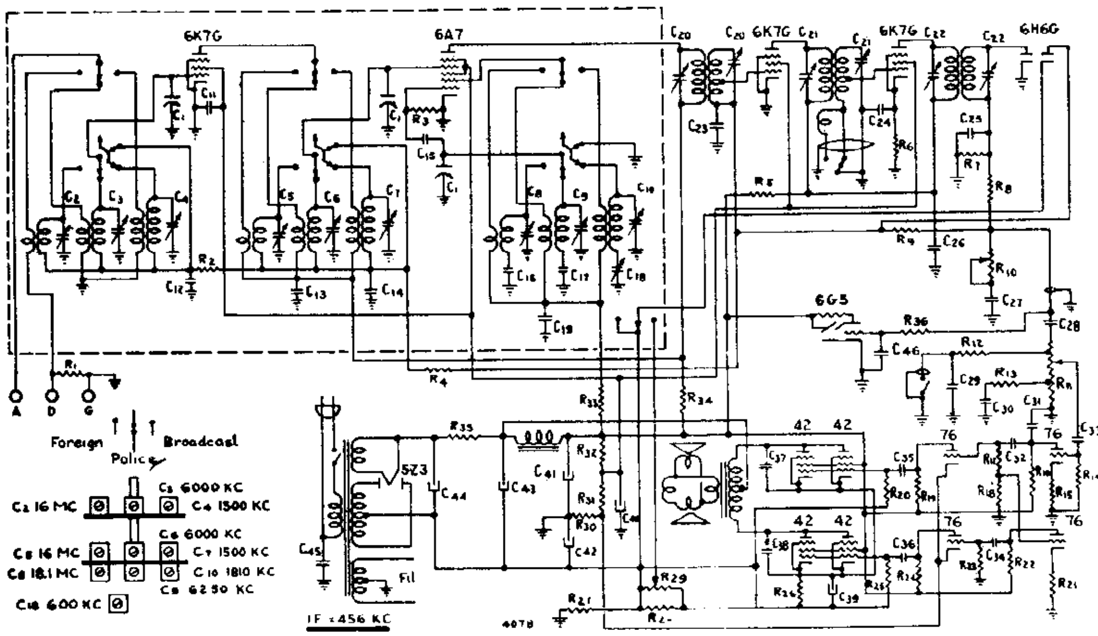
A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alinement of the two short wave bands. Set the band selector switch in the center position, adjust the oscillator top frequency for 6250 kc., then aline the antenna and RF trimmers at about 6000 kc. With the band selector in the extreme right position, adjust the top frequency of the high frequency to 18 100 kc., and aline the antenna and RF trimmers at about 16,000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmer down tight, then unscrew to the second peak. The antenna and RF trimmers should be screwed down tight, then unscrewed to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be set in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

MODEL 163
Schematic
Parts

DETROLA RADIO CORP.

Tubes

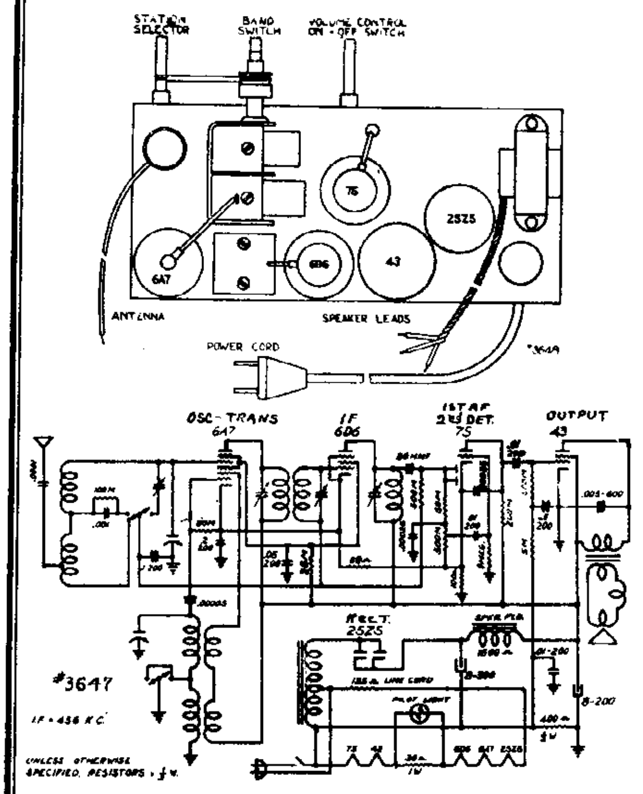
Tubes required are:
1—6K7G Radio frequency Amplifier
1—6A7 Oscillator—Translator
2—6K7G Intermediate frequency Amplifiers
1—6H6G Detector—AVC—Bias control
1—6G5 Cathode ray tuning tube (on models equipped with "eye" tuning indicator)
1—76 First Audio Amplifier
1—76 Phase Inverter
2—76 Drivers
4—42 Power Output
1—5Z3 Rectifier



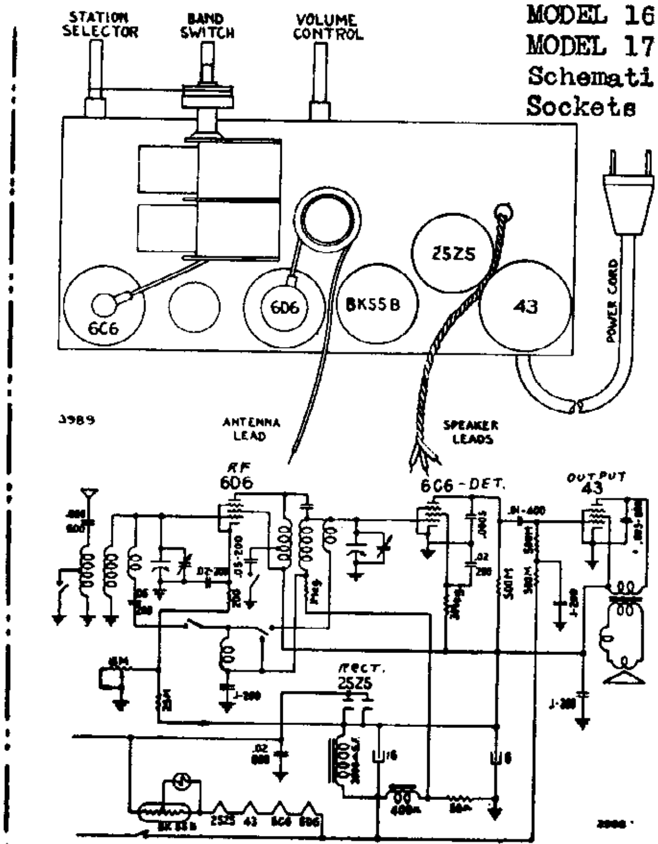
Symbol	Part No.	Description
C1	3814	9-400 mmf variable
C2,3,4	3822	2-35 triple trimmer
C5,6,7	3822	2-35 triple trimmer
C8,9,10	3822	2-35 triple trimmer
C11,23	572	.1 200V.
C12,14,46	580	.05 200V.
C13	575	.1 400V.
C15,25	2780	50 mmf mica
C16	2694	.005 5% tolerance
C17	2741	1330 mmf 5% tolerance
C18	2560	350 mmf variable padder
C19,24	568	.01 400V.
C20,21,22		IF trimmers
C26	563	.05 400V.
C27	2695	.003 600V.
C28,33	576	.02 200V.
C29	824	.002 600V.
C30	4072	.03 200V.
C31	1286	250 mmf mica
C32,34,35,36	2600	.02 600V.
C37,38	3138	.001 800V.
C39,42	4071	20 MF 35 WV.
C40	3079	8 MF 150V.
C41	4062	30 MF 275V. Reg.
C43	3112	16 MF 450V.
C44	3111	16 MF 500V.
C45	3135	.003 800V.
R1,4,8,16,19,22,24	603	100 M 1/3 W.
R2,3	631	50 M 1/3 W.
R5,6,34	2421	1 M 1/3 W.
R7,23	615	500 M 1/3 W.
R9	2693	2 meg 1/3 W.
R10	3799	2 meg tone control
R11	3800	3 meg volume control
R12,20,25	2568	300 M 1/3 W.
R13,33	617	20 M 1/3 W.
R14	624	1 meg 1/3 W.
R15,21	614	5 M 1/3 W.
R17	2731	500 M 10% 1/3 W.
R18	2880	100 M 10% 1/3 W.
R26	4068	300 ohm 10% 3 W. flex.
R27	3808	50 ohm 10% ¾ W. flex.
R28	4069	200 ohm 10% 2 W. flex.
R29	3801	2 M variable
R30	639	750 ohm 1/3 W.
R31	3805	8 M 1.5 W.
R32	3805	7 M 3.5 W.
R35	4070	100 ohm 10% 3 W. flex
	4058	Power transformer
	4061	No. 1 IF transformer
	4060	No. 2 IF transformer
	3968	No. 3 IF transformer
	2981	Tuning tube cable
	4082	12" Dynamic speaker
	4079	12" P.M. speaker
	2898	Tuning tube clamp
	3815	RF coil
	3943	Oscillator coil
	3817	Antenna coil
	3825	Planetary drive
	3826	Drive belt
	3198	Idler pulley
	3199	Idler spring
	3831	Minute pointer
	3832	Tuning pointer
	3802	On-off switch
	3818	RF and antenna switch
	3819	Oscillator switch

MODEL 15
MODEL 16
MODEL 16
MODEL 17
Schemati
Sockets

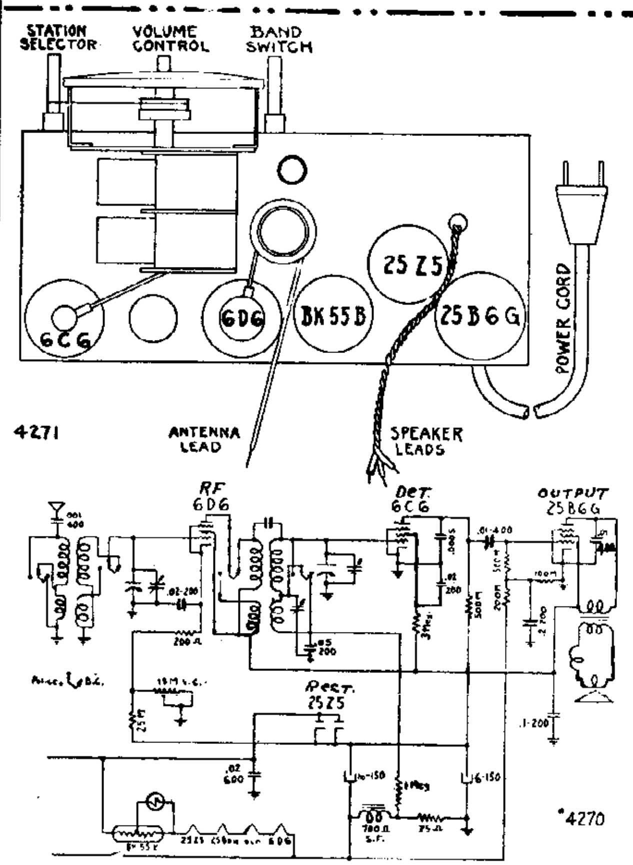
DETROLA RADIO CORP.



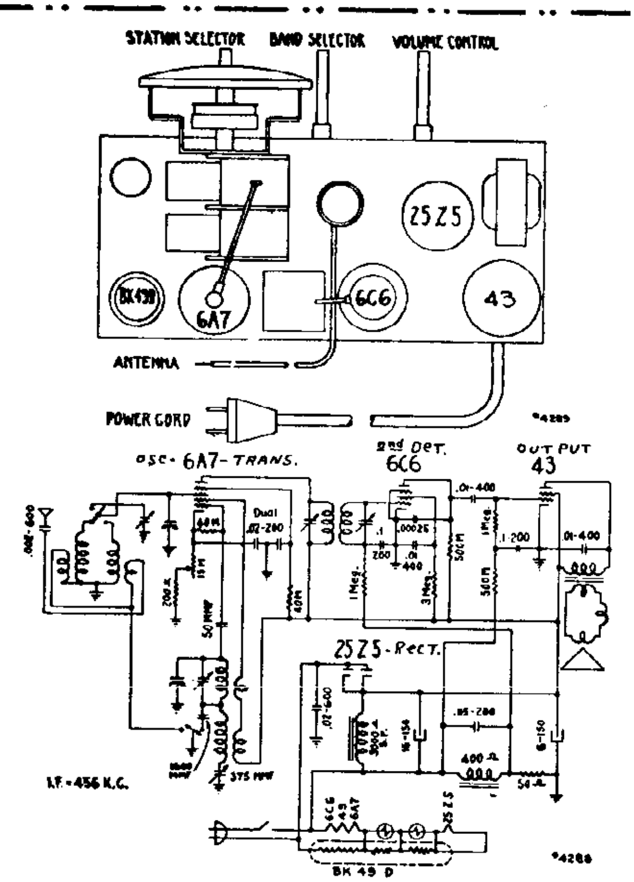
MODEL 169



MODEL 162-A



MODEL 168



MODEL 172

MODEL 166
Schematic, Socket
Trimmers, Alignment, Parts

DETROLA RADIO CORP.

I. F. Alignment

The I.F. frequency of this receiver is 456 K.C. For realignment, use the following procedure.

It is necessary to use an accurately calibrated signal generator. Couple the signal generator to the grid of the 6A7 tube with a tenth microfarad condenser in series with the "high" lead of the signal generator. Connect the ground side of the signal generator to the chassis. Set the signal generator to 456 K.C. Be sure the volume control is set at maximum. Attenuate the signal generator so that the signal is just audible in the speaker. If an output meter is used, it should be connected across the voice coil terminals of the speaker. Use ½ volt as standard output.

Adjust the 2nd I.F. transformer first. Each screw should be adjusted for maximum output. After number two I.F. has been adjusted, number one I.F. should be adjusted for maximum output. After both transformers have been adjusted, it is necessary to recheck No. 2 transformer and then recheck No. 1.

R. F. Alignment

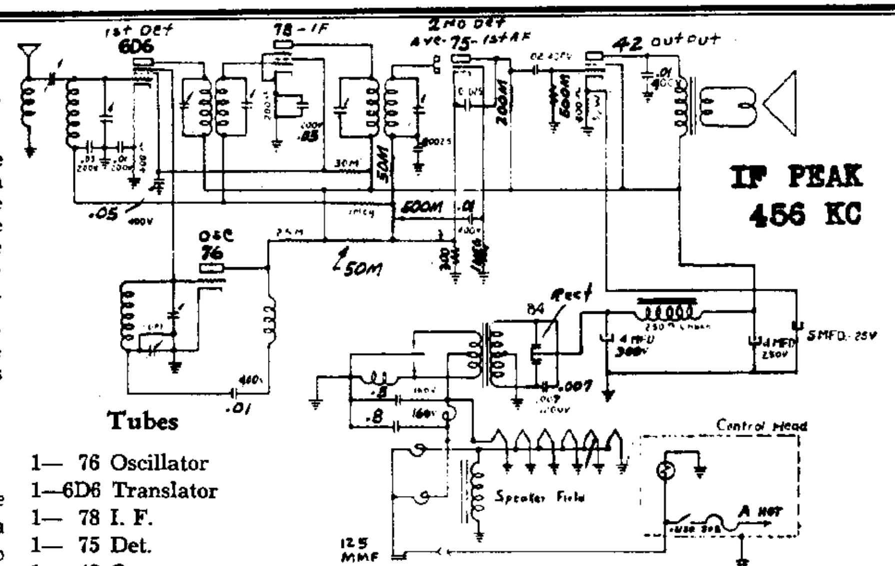
To align the broadcast band, proceed as follows:

First, connect the ground side of the signal generator to the chassis. Connect the high side of the signal generator with a .00025 condenser, in series, to the antenna lead of the set. Set the volume control to maximum. Turn the station selector to the highest frequency (as far as it will go). Set the signal generator to 1570 K.C. Adjust the oscillator trimmer until the signal is heard. After the oscillator has been set at 1570 K.C., turn the station selector to 1400 K.C. Set the signal generator to 1400 K.C. When the signal is heard, adjust the antenna trimmer for maximum output.

When the set has been adjusted at 1400 K.C., turn the station selector dial to 600 K.C. Set the signal generator to 600 K.C. When the signal is heard, adjust the padder condenser by rocking the selector back and forth. While adjusting the padder screw, it is necessary to move the selector so that the signal may be kept in tune while adjusting the padder screw. This procedure should be followed until maximum output is obtained.

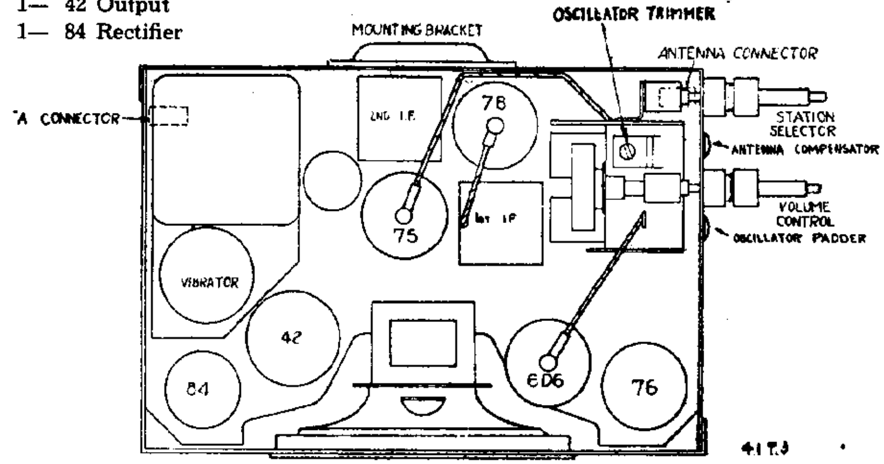
The foregoing procedure should be repeated. That is, the set is to be rechecked at 1570, 1400 and 600 K.C.

When aligning the R.F., use the same output standard as was used on the I.F. alignment.



Tubes

1— 76 Oscillator
1—6D6 Translator
1— 78 I. F.
1— 75 Det.
1— 42 Output
1— 84 Rectifier



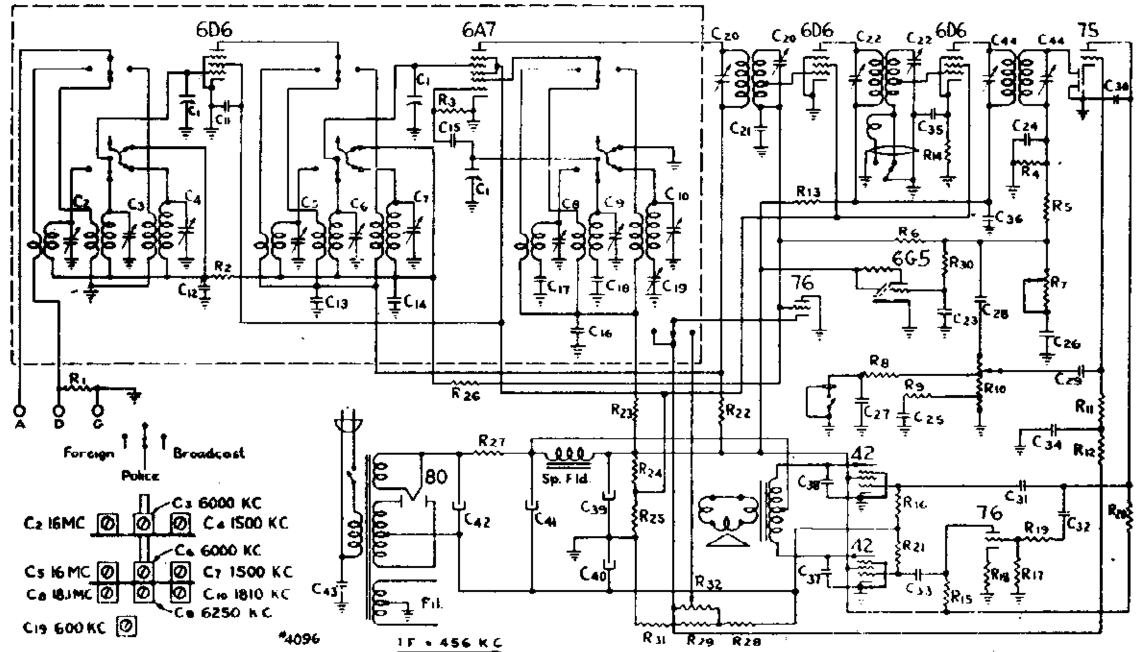
No.	Req.	Description	No.	Req.	Description
624	1	Resistor—1 Meg.—⅓ W.	3298	1	Speaker
615	1	Resistor—500 M.—⅓ W.	3299	1	Grille Screen
2730	1	Resistor—200 M.—⅓ W.	4156	1	Grille Cloth
631	1	Resistor—50 M.—⅓ W.	4157	1	Condenser—Variable
621	1	Resistor—25 M.—⅓ W.	4169	1	Condenser—Ant. Trimmer
2692	1	Resistor—300 ohm—⅓ W.	4170	1	Condenser—Osc. Padder
2268	1	Resistor—200 ohm—⅓ W.	4167	1	Antenna Cable
2572	1	Resistor—400 ohm—⅓ W.	4187	1	Steering Post Control Head
629	1	Resistor—50 M.—½ W.	1286	1	Condenser—.00025 Mica
2784	1	Resistor—400 ohm—½ W.	3002	1	Condenser—.0075-1200 V.

No.	Req.	Description	No.	Req.	Description
3583	-	Resistor—30 M.—⅓ W.			Buffer
3012	1	Transformer—Vibrator	3061	2	Cables Control. Includes Casing Tips and Flex. Shafts
3052	1	Cover—Transformer			
3042	1	Adapter—Variable Condenser	580	3	Condenser—.05—200 V. Paper
2293	1	Choke—Iron Core	565	2	Condenser—.01—200 V. Paper
4158	1	Coil—Antenna	2601	2	Condenser—.01—600 V. Paper
4159	1	Coil—Oscillator	2600	1	Condenser—.02—600 V. Paper
3000	1	Vibrator—With Ground Ring	4171	1	Condenser—.2—160 V. N.I.—Paper
2860	1	Transformer—1st I.F.			
2916	1	Transformer—2nd I.F.	3003	1	Condenser—.5—160 V. N.I.—Paper
4165	1	Condenser—Dry Elec.			

DETROLA RADIO CORP.

Tubes

Tubes required are:
1—6D6 Radio Frequency Amplifier
1—6A7 Oscillator-translator
2—6D6 Intermediate Frequency Amplifiers
1—76 Automatic Bias Control
1—75 Detector AVC—First Audio Amplifier
1—76 Driver—Phase Inverter
2—42 Power Output
1—80 Rectifier
1—6G5 Cathode Ray Tuning Tube (on models equipped with "eye" tuning indicator)

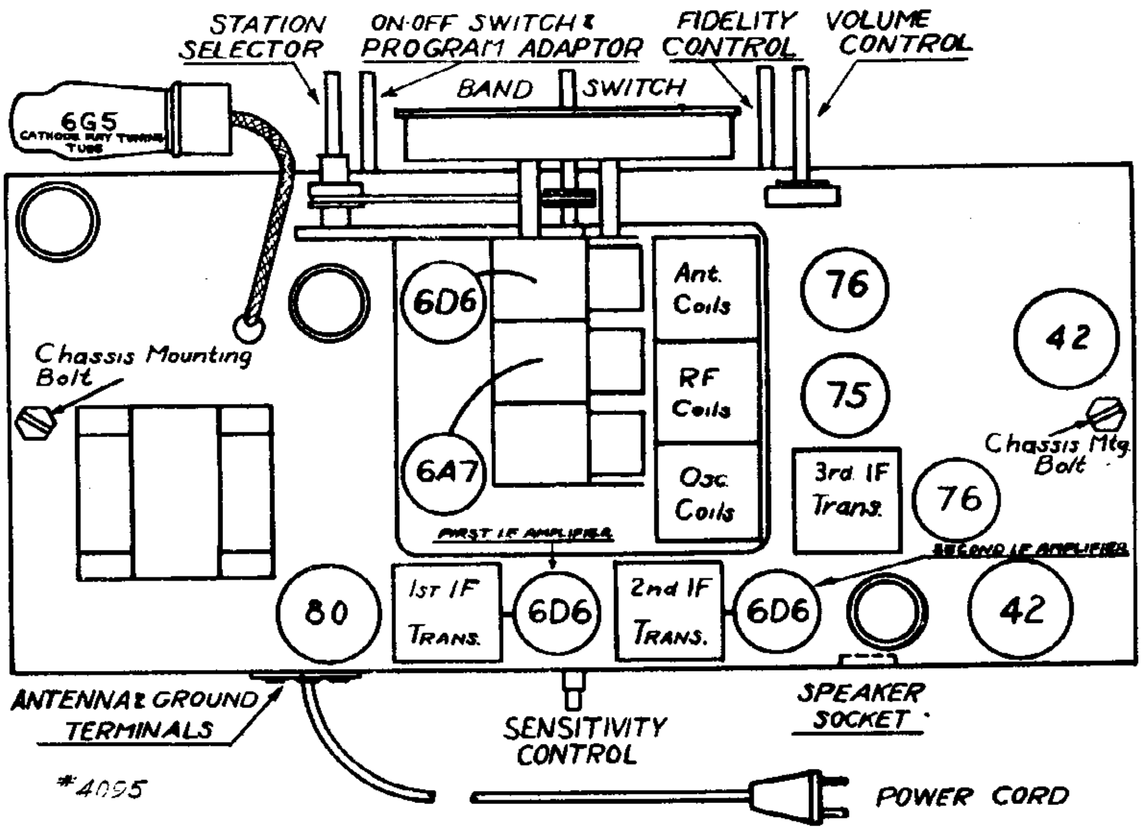


Symbol	Part No.	Description
C1	3814	9-400 mmf variable
C2,3,4	3822	2-35 triple trimmer
C5,6,7	3822	2-35 triple trimmer
C8,9,10	3822	2-35 triple trimmer
C11,21,34	572	.1-200 V.
C12,14,23	580	.05-200 V.
C13	575	.1-400 V.
C15,24	2780	50 mmf mica
C16,35	568	.01-400 V.
C17	2694	.005 5% tolerance
C18	2741	1330 mmf 5% tolerance
C19	2560	350 mmf variable padder
C20,22,44.		IF Trimmer
C25	4072	.03-200 V.
C26	2695	.003-600 V.
C27	824	.002-600 V.
C28,29	576	.02-400 V.
C30	1286	250 mmf mica
C31,33	2600	.02-600 V.
C32,36	563	.05-400 V.
C37,38	3138	.001-800 V.
C39	3113	16 MF regulating
C40	3136	20 MF 25 V.
C41	3112	16 MF 450 V.
C42	3111	16 MF 500 V.
C43	3135	.003-800 V.
R1,5,15,26	603	100 M 1/3 W.
R2,3	631	50 M 1/3 W.
R4,16,21	615	500 M 1/3 W.
R6	2693	2 meg 1/3 W.
R7	3799	2 meg tone control
R8	2558	300 M 1/3 W.
R9,23	617	20 M 1/3 W.
R10	3800	3 meg volume control

Symbol	Part No.	Description
R11,12	624	1 meg 1/3 W.
R13,14,22	2421	1 M 1/3 W.
R17	2880	100 M 1/3 W. 10%
R18	614	5 M 1/3 W.
R19	2731	500 M 1/3 W. 10%
R20	598	200 M 1/3 W.
R24	3805	7 M 3.5 W.
R25	3805	8 M 1.5 W.
R27	3809	100 ohms 2 W. 10%
R28	3806	120 ohms 1.5 W. 10%
R29	4111	85 ohms 1.0 W. 10%
R30	2106	3 meg 1/3 W.
R31	3870	15 ohms .5 W. 10%
R32	3801	2 M variable
	3796	Power transformer
	4061	No. 1 IF transformer
	4060	No. 2 IF transformer
	3968	No. 3 IF transformer
	2981	Tuning tube cable
	3838	12" Speaker
	2898	Tuning tube clamp
	3815	RF coil
	3943	Oscillator coil
	3817	Antenna coil
	3826	Drive belt
	3198	Idler pulley
	3199	Idler spring
	3831	Minute pointer
	4113	Tuning pointer
	3802	On-off, switch
	3818	RF and Antenna switch
	3819	Oscillator switch
	3825	Planetary drive

MODEL 165
Socket
Alignment

DETROLA RADIO CORP.



Tubes must be in proper position and connected as shown.

ALINEMENT PROCEDURE

***Warning!* This information is to be used by a *Competent Service Man only* and not by an untrained person.**

Connect a high impedance AC voltmeter across the loudspeaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from the generator, strong signals tend to cause improper adjustments.

Be sure that the fidelity control is NOT in the HIGH FIDELITY position. It will not be possible to properly aline the receiver unless this control is turned part way toward its "bass" position.

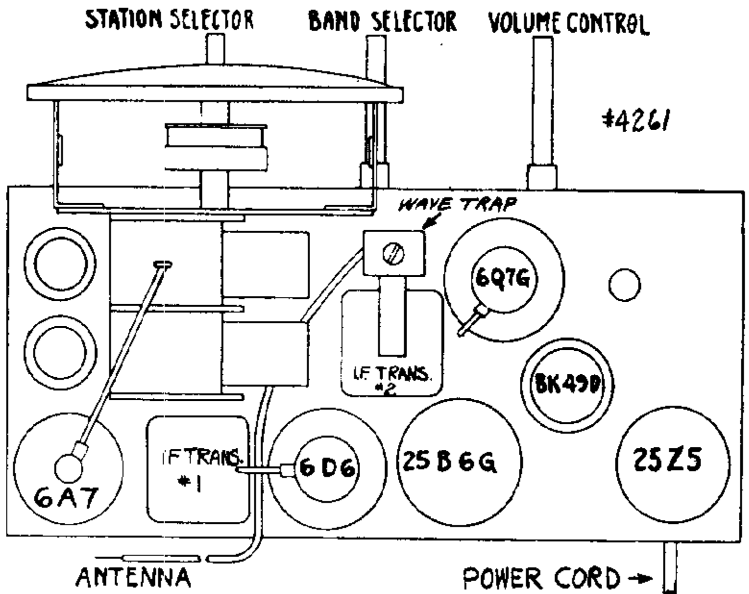
IF. Connect the generator ground to receiver chassis. Using .1 mfd condenser in series with high side of generator, apply 456 kc signal to grid of 6D6 second IF amplifier and aline transformer No. 3. Repeat for transformer No. 2, applying signal to grid of 6D6 first IF amplifier. Repeat for transformer No. 1, applying signal to grid of 6A7 translator. (See above diagram for location of tubes and transformers.)

RF. (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1810 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1500-1600 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

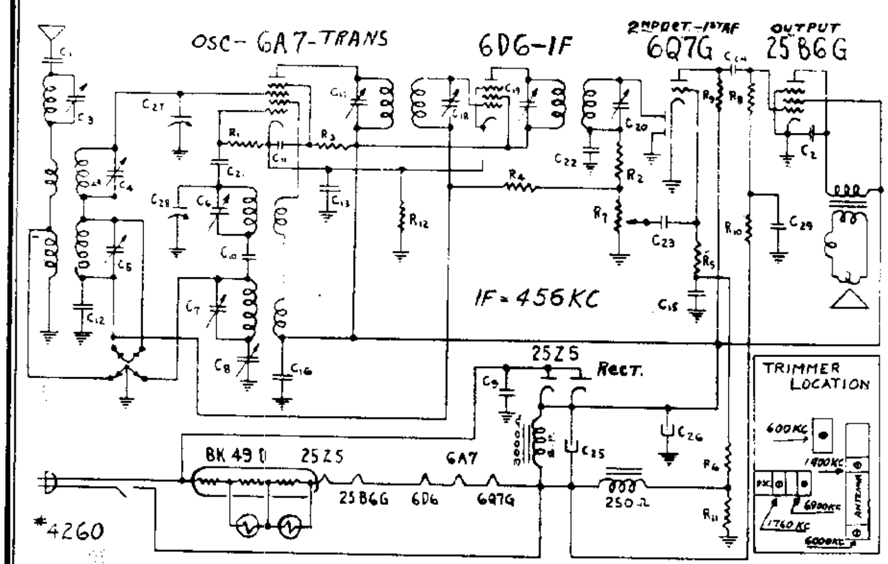
A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alinement of the two short wave bands. Set the band selector switch in the center position, adjust the oscillator top frequency for 6250 kc., then aline the antenna and RF trimmers at about 6000 kc. With the band selector in the extreme right position, adjust the top frequency of the high frequency to 18,100 kc., and aline the antenna and RF trimmers at about 16,000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmer down tight, then unscrew to the second peak. The antenna and RF trimmers should be screwed down tight, then unscrewed to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be set in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

MODEL 167
Schematic, Socket
Trimmers, Alignment, Par

DETROLA RADIO CORP.



Tubes must be in proper sockets and connected as shown.



ALINEMENT PROCEDURE—WARNING! This information is to be used by a COMPETENT SERVICE MAN ONLY and not by an untrained person.

Connect a high impedance A.C. voltmeter across the loud-speaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from the generator, strong signals tend to cause improper adjustments.

I.F.: Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of generator, apply 456 kc. signal to grid of 6D6 I.F. amplifier tube, and aline transformer No. 2. Connect generator to grid of 6A7 tube and aline transformer No. 1.

SHORT WAVE: A 400 ohm resistor must be used in a series with the generator as a "dummy" antenna for proper alinement of the short wave band. Set the band selector switch in the right hand position, adjust the oscillator top frequency to 6900 kc. then aline antenna trimmer at about 6000 kc.

BROADCAST: Using a 100 mmf. condenser in series with the high side of the generator turn band selector switch to left hand position and the tuning condenser to about 600 kc. Feed a 456 kc. signal to the antenna and adjust wave trap trimmer for minimum response. With the tuning condenser at minimum capacity feed 1760 kc. signal to the antenna and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at about 1400 kc. Adjust broadcast antenna trimmer. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

Antenna: This receiver requires very little antenna for proper operation, provided the installation is made correctly. The average length of antenna, including lead-in should be about fifty feet. In locations near powerful broadcast stations, this length should be shortened to thirty-five feet. In more favorable locations, seventy-five feet may be used.

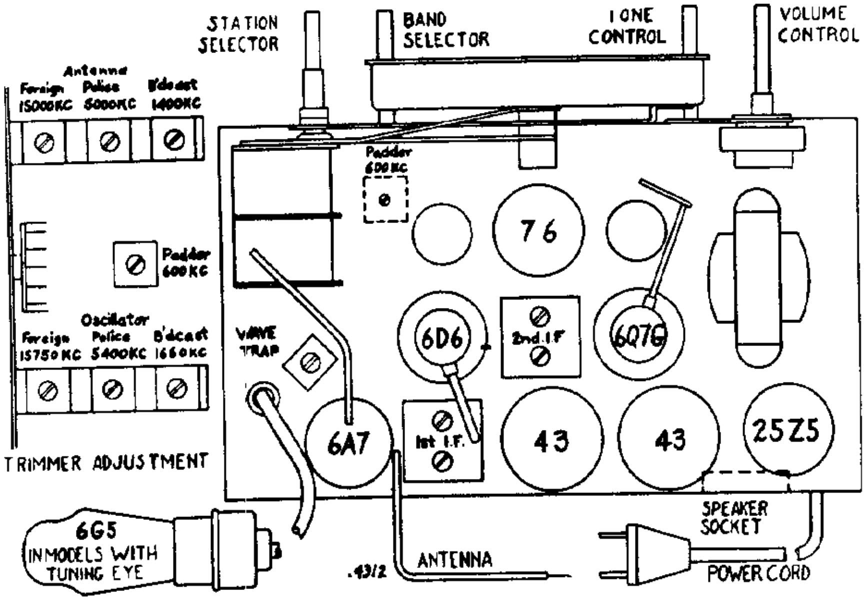
Regardless of length, the antenna and lead-in should be spaced well away from the roof, sides of building, trees, power lines, etc. Indoor antennae will give good broadcast reception except in steel frame buildings. However, foreign reception will not be satisfactory unless a good, well insulated, outdoor antenna is used.

NO GROUND IS NECESSARY—UNDER NO CONDITION SHOULD A GROUND WIRE BE ATTACHED TO THIS RECEIVER.

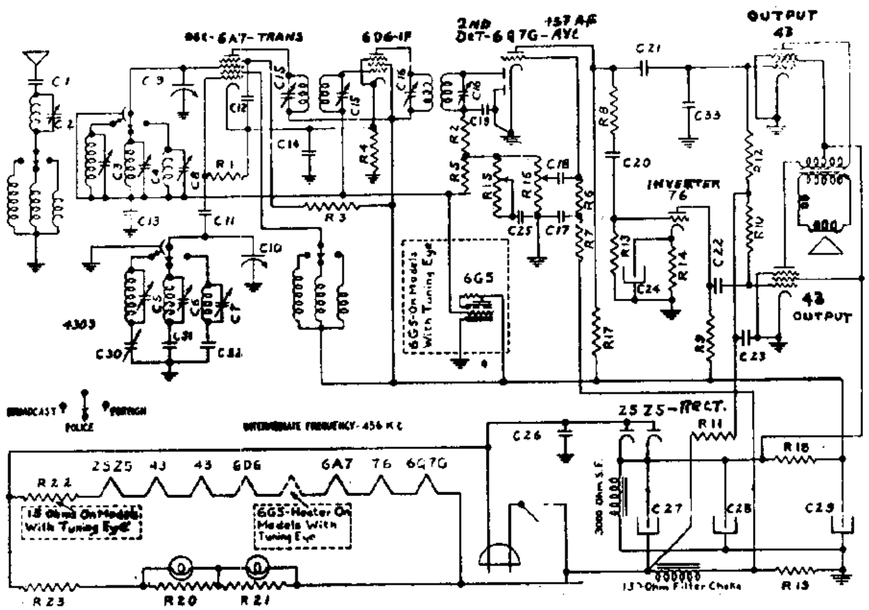
Symbol	Part. No.	Description	Symbol	Part. No.	Description
C1. C2	DR581	.005-600 V.	C29	DR579	.25-200 V.
C3	DR2559	180 mmf. Tr.	R1-2	DR631	50M ⅓ W.
C4-5-6-7	DR2597	1-10 mmf. Tr.	R3	DR617	20M ⅓ W.
C8	DR2560	350 mmf. Pad.	R4-5-6	DR624	1 Meg. ⅓ W.
C9	DR2600	.02-600 V.	R7	DR4255	500M V. C.
C10	DR2469	1150 mmf. 5%	R8	DR615	500M ⅓ W.
C11-12	DR580	.05-200 V.	R9	DR2730	200M ⅓ W.
C13-15-16	DR572	.1-200 V.	R10	DR602	250M ⅓ W.
C17 to 20		I.F. Trimmers	R11	DR2965	20 Ohms ⅓ W.
C21	DR2780	50 mmf. Mica	R12	DR2689	100 Ohms ⅓ W.
C22	DR1286	250 mmf. Mica		DR4254	Band Switch
C23-24	DR2601	.01-600 V.		DR2976	Antenna Coil
C25	DR2698	16 mfd.×150 V.		DR2977	Oscillator Coil
C26	DR2594	24 mfd.×150 V.		DR2972	1st I.F. Trans.
C27-28	DR4251	410 mmf. Var.		DR2969	2nd I.F. Trans.

MODEL 169
Schematic, Socket
Trimmers, Alignment, Parts

DETROLA RADIO CORP.



Tubes must be in proper position and connected as shown.



ALINEMENT PROCEDURE

Connect a high impedance AC voltmeter across loud-speaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from generator, strong signals tend to cause improper adjustments.

I.F.: Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of generator, apply 456 kc. signal to grid of 6D6 I.F. amplifier tube, and aline transformer No. 2. Connect generator to grid of 6A7 tube and aline transformer No. 1.

RF. (See above diagram for location of trimmers.)

Using a 200 MMF. condenser in series with the high side of the generator, turn band selector switch to left hand position and the tuning condenser to about 600 kc. Feed a 456 kc. signal to the antenna and adjust wave trap trimmer for minimum response. With the tuning condenser at minimum capacity feed 1660 kc. signal to the antenna and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at about 1400 kc. Adjust broadcast antenna trimmer. Set generator for 600 kc. tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

Using 400 ohm resistor in series with generator, set band selector in center position, set generator to 5400 kc and adjust oscillator trimmer for top frenquency. Set generator to 5000 kc, tune receiver to signal and adjust antenna trimmer

Turn band selector to extreme clockwise position. Using 400 ohm resistor in series with generator, set oscillator top frequency for 15,750 kc—screw trimmer down tight, then unscrew to *second* peak. Set generator to 15,000 kc, tune receiver to signal and adjust antenna trimmer—Screw trimmer down tight, then unscrew to *first* peak, rocking the tuning condenser back and forth through the signal while the adjustment is being made. **Above procedure for alinement at 15,000 kc must be followed exactly to insure proper tracking. A dead spot at about 12,000 kc will result if antenna and oscillator circuits are not set in proper relation to each other.**

Symbol	Part No.	Description
Symbol	Part No.	Description
C-1	3137	.001-400 V.
C-2	2559	180 MMF Trimmer
C-3, 4, 5, 6, 7	2597	1-10 MMF Trimmer
C-8	1611	3-35 MMF Trimmer
C-9, 10	2871	350 MMF Variable
C-11, 33	2780	50 MMF Mica
C-12, 13	580	.05-200 V.
C-14, 17	572	.1-200 V.
C-15, 16	2445	IF Trimmer
C-18, 20, 21, 22	576	.02-400 V.
C-19	1286	250 MMF Mica
C-23	566	.5-200 V.
C-25	581	.005-600 V.
C-26	2600	.02-600 V.
C-27	4297	20 MF-150 V.
C-24	4298	4 MF-18 V.
C-28	4298	30 MF-150 V.
C-29	4298	10 MF-150 V.
C-30	2560	220-550 MMF Padder
C-31	2741	1330 MMF 5%
C-32	2740	3850 MMF 5%
R-1, 2	631	50 M-1/3 W.
R-3, 14	4302	20 M-1/3 W. 10%
R-4	2689	100 OHM-1/3 W.
R-5, 6, 7	624	1 Meg.-1/3 W.
R-8	2599	1 Meg.-1/3 W.-10%
R-9	4300	250 M-1/3 W.-10%
R-10, 12	2731	500 M-1/3 W.-10%
R-11	2568	300 M-1/3 W.-10%
R-13	2880	100 M-1/3 W.-10%
R-15	2737	2 Meg. Tone Control
R-16	2726	500M Volume Control
R-17	2730	200 M-1/3 W.-10%
R-18	2886	500 OHM-1 W.-10%
R-19	3580	100 OHM-.5 W.
R-20, 21	4296	32 OHM 3 W.
R-22	4304	15 OHM—On Eye Models
R-22	4301	35 OHM—4W—Wire Wound
R-23	802	300 OHM Line Cord
	2755	Antenna Coil
	2724	Band Switch
	2857	Oscillator Coil
	2860	1st IF Transformer
	2859	2nd IF Transformer
	4295	Filter Choke
	1489	5 Prong Socket
	789	6 Prong Socket
	2165	7 Prong Socket
	2557	7 Prong Octal Socket
	530	Pilot Lamp
	2378	Pointer
	1408	Pointer Screw
	2981	Tuning Eye Cable
	4307	Speaker—10"
	4306	Speaker—8"

MODELS 200,202M
Electroca[l]
Connections, Dat[a]

DeWALD RADIO

SERVICE NOTES

MODEL 200 ELECTROCALL.

Failure to Function:

A. Defective tube (loose screen grid cap.)
B. Open resistor line cord.
C. Defective filter condenser:-

   If unit does not operate and voltages check O.K., suggest adding 8 mfd. 200 V condenser in parallel with filter in unit. If unit operates, replace filter condenser.

D. Defective "Talk-Listen" switch:-

   Remove set from cabinet - loosen set screws and remove lever arm - open retainer washer on shaft - remove rotor of switch - clean contacts with Carbona - bend rotor arms to increase tension - assemble switch making certain lever arm is in original position.

E. Open 1700 ohm resistor or discolored:

   Replace both resistor and seven prong tube (seven prong tube has developed internal short).

F. Reverse Line plug if connected to Direct Current.

Failure of Pilot Light:

A. Pilot lamp burned out or making poor contact.
B. Defective tube or open line cord.
C. Pilot lamp socket opened, shorted, or grounded.
D. Open 25 ohm wire wound resistor.

Excess Hum:

A. Defective 6 prong tube.
B. Defective Filter Condenser:-

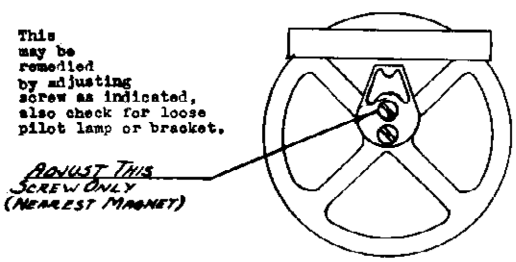
   To check -- connect 8 mfd. 200 volt condenser in parallel with filter in unit. If hum ceases, replace filter condenser.

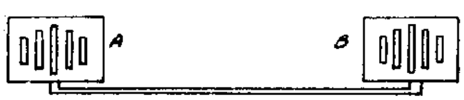
Weak Response:

A. Check second section of filter cond.
B. Check speaker adjustment.
C. Check tubes.

Speaker Rattles or Poor Quality:

This may be remedied by adjusting screw as indicated, also check for loose pilot lamp or bracket.

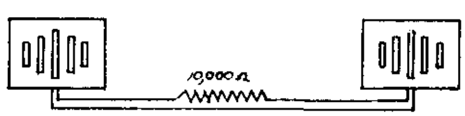




If Unit "A" rattles when speaking into Unit "B" - recheck adjustments on both speakers as it may be either the microphone unit or speaker.

If voice is audible through "A" when speaking into "B" but not vice-versa, then "A's" unit is defective.

If units howl or squeal due to close proximity, insert 10,000 ohm resistor in series with one side of the cable, as illustrated.



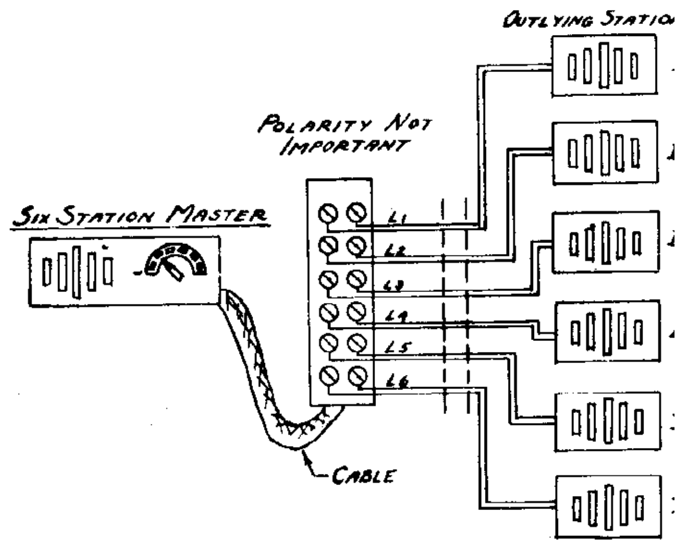
Voltages - taken with 1000 ohm per Volt meter:

Across 1700 ohm resistor 12 to 16 Volts
Across 3500 ohm resistor ½ to 1 Volt
Across B plus to B minus 125 to 150 Volts.

DO NOT SHORTEN LINE CORD UNDER ANY CONDITIONS.

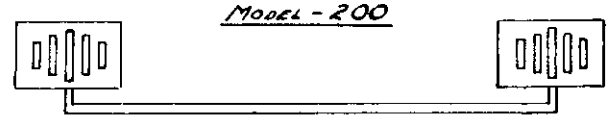
Connect conventional extension cord, should it be necessary to extend length of line cord furnished with units.

MODEL - 202 M

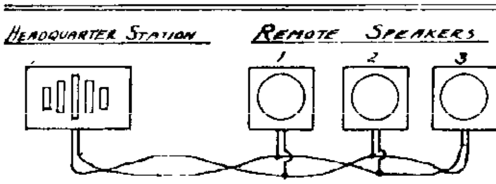


METHOD OF CONNECTING 6 STATIONS

MODEL - 200



METHOD OF CONNECTING TWO SINGLE UNITS



METHOD OF CONNECTING REMOTE SPEAKERS
MODEL - 203 - 206

F-109

MODELS 200A,202A,202M,203A
Schematic,Installation,Notes

DEWALD RADIO

GENERAL INSTRUCTIONS

202-M MASTER UNIT

This device is of a multiple system type, designed to operate on 25-60 cycles A.C. or D.C. 110-120 volts.

The master station may select and hold two way conversation with any one remote station and yet may not be overheard by any other station. Any remote station may also call the master and not be overheard by other stations.

INSTALLATION:

After locating the units the cables should be run in the most convenient manner. These cables carry no power, but care should be taken that they do not come in contact with electrical or telephone lines. It is also advisable not to run them parallel. (If they have to be run parallel, keep them as far apart as possible.)

TO OPERATE:

Snap middle switch to "ON" position and wait from ten to twenty seconds for tubes to heat. When operating instrument from direct supply line, it may be necessary to reverse the current plug at the calling stations if instrument at other end of line fails to respond and vice versa.

CALLING SIGNAL:

Turn Station Selector Switch to station desired, press "Call Listen" lever down and pull out.

TO TALK:

Press "Talk-Listen" switch down. This switch must be held down all the while when talking. Each instrument is normally in a position to receive calls regardless of whether the switch is turned on or off. It is only necessary to turn on the instrument when calling.

TO RECEIVE CALLS:

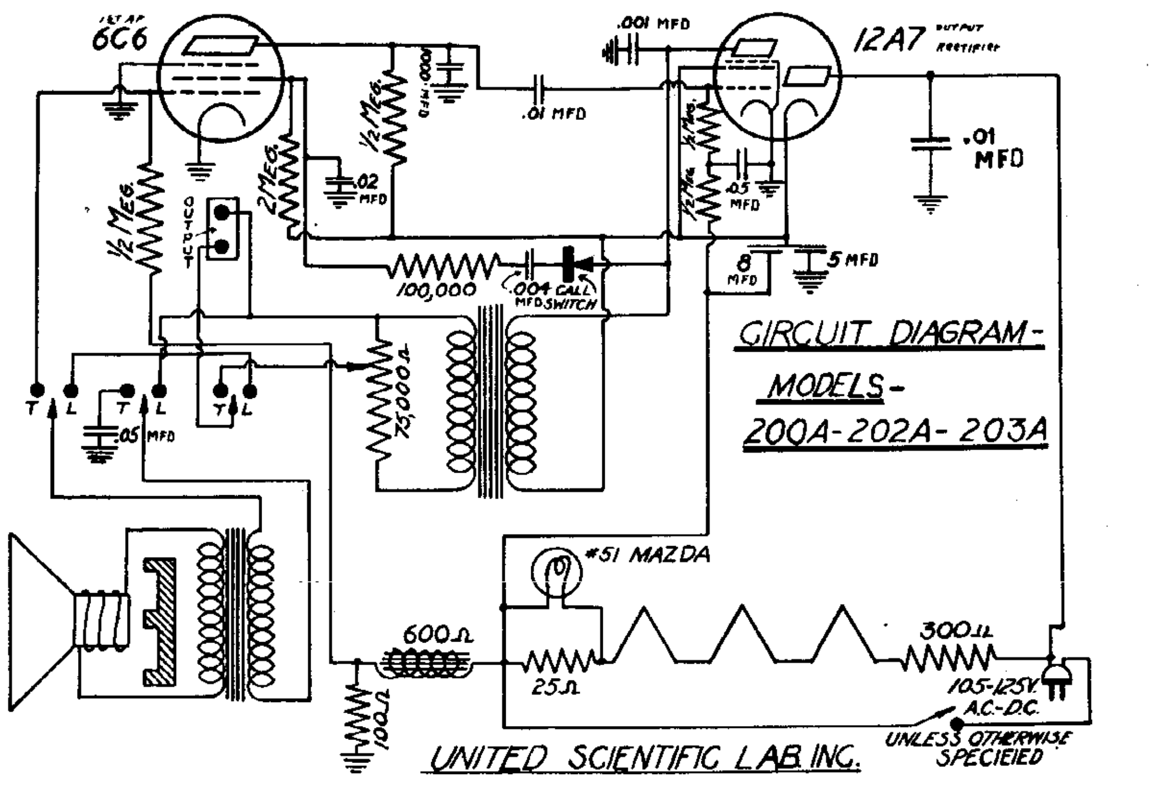
To signal master station from individual outlying station, most convenient practice is to adapt a call system corresponding with the numerals on the master terminal board. That is, if the outlying station is attached to #5 on terminal board, then this station should depress the "Talk-Listen" key five times, when desiring to converse through the master unit.

It is advisable to set station selector switch to a neutral position, which is indicated by the small arrow head between station numerals, when master instrument is not in use.

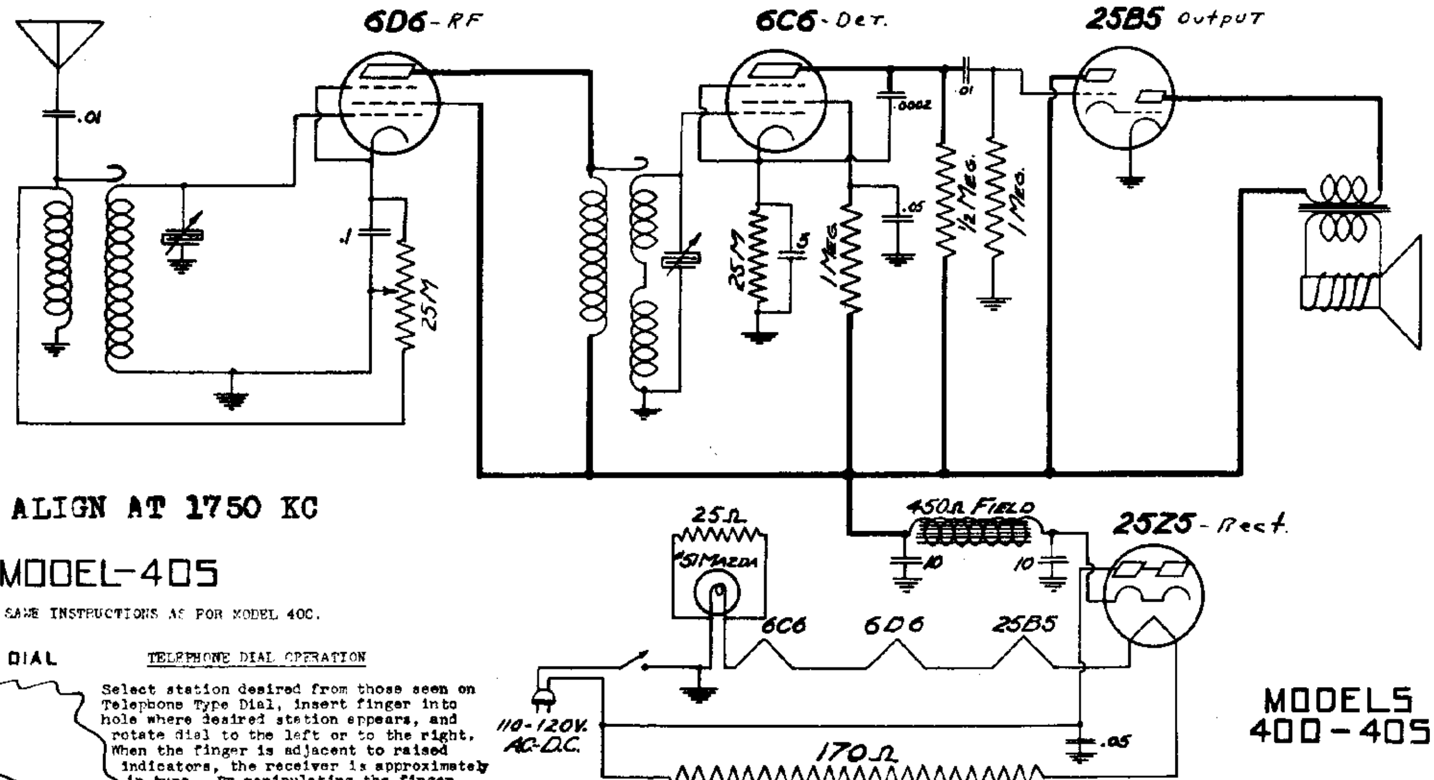
When operating Electrocall, the user should talk about an arm's length away from the grill and in an ordinary conversational tone. Talking loudly into the grill will result in greater amplification at the receiving end.

Both units must be turned "ON" when holding two way conversation. When continuous service is desired, it is necessary to keep all units turned "ON"

The tubes used for the Electrocall are especially designed for this system and can only be obtained directly from the manufacturer or through any Electrocall distributor. These tubes carry our regular ninety day guarantee.



DeWALD RADIO



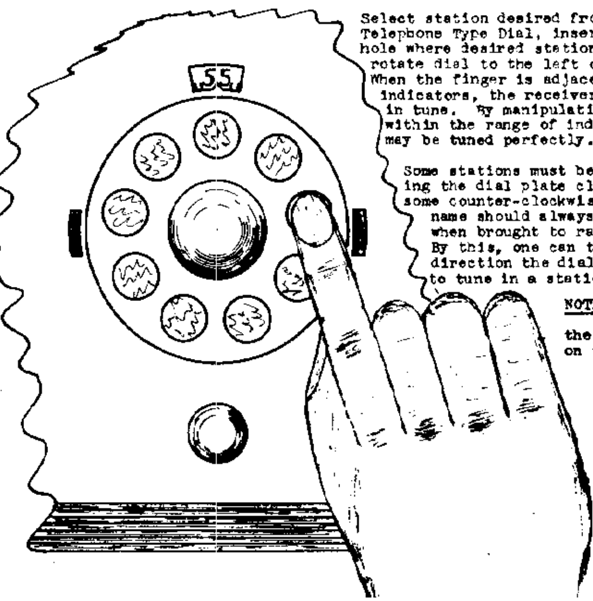
MODELS 400 - 405

ALIGN AT 1750 KC

MODEL-405

FOLLOW THE SAME INSTRUCTIONS AS FOR MODEL 40C.

TELEPHONE DIAL



TELEPHONE DIAL OPERATION

Select station desired from those seen on Telephone Type Dial, insert finger into hole where desired station appears, and rotate dial to the left or to the right. When the finger is adjacent to raised indicators, the receiver is approximately in tune. By manipulating the finger within the range of indicator, station may be tuned perfectly.

Some stations must be tuned by turning the dial plate clockwise, and some counter-clockwise. The station name should always appear upright when brought to raised indicators. By this, one can tell which direction the dial should be turned to tune in a station.

NOTE: If one prefers to use the knob the kilocycle scale on top is used.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

This receiver is a 4 tube T.R.F. and designed to operate on 110-120 Volts - 40-60 cycles, alternating current or direct current unless otherwise specified on rear of chassis.

RANGE: The tuning range of this receiver is from 540 to 1750 Kilocycles. This range covers all of the standard American broadcast stations and some Police Calls.

ANTENNA: Unwind reel of brown wire and place same along the baseboard. In shielded buildings, it is advisable to hang the wire out of the window or connect it to an outside antenna. No ground is necessary with this receiver.

TUBES: 1-6D6, 1-6C6, 1-25Z5, 1-25B5.

CONTROLS: The upper control is the station selector knob. The lower one is the On-Off Switch and the volume control.

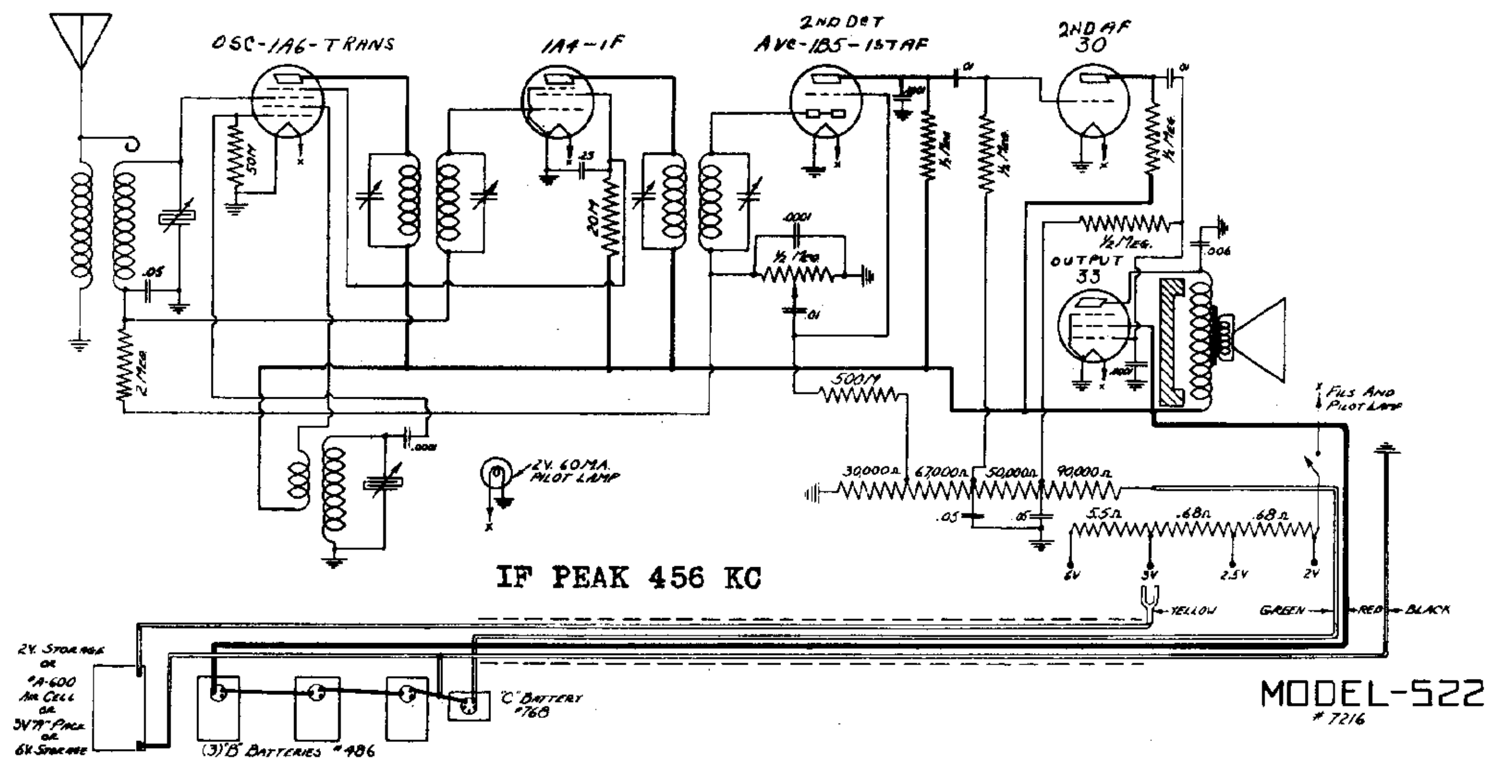
IMPORTANT: DO NOT CONNECT A GROUND WIRE TO THE CHASSIS. DO NOT CHANGE THE LENGTH OF THE LINE CORD.

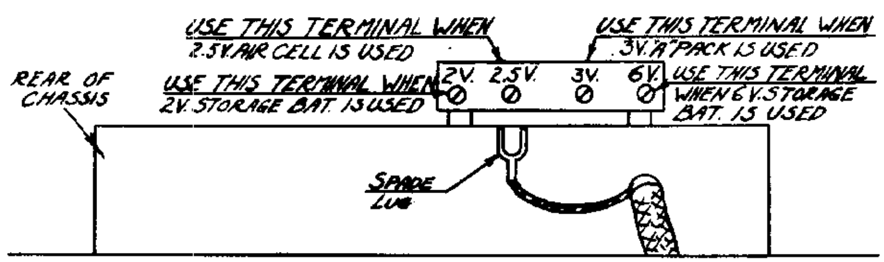
DEWALD LIST PRICES OF REPLACEMENT PARTS.

Part No.	Part	PRICE	Part No.	Part	PRICE
1443	- Antenna Coil	$ .50	8785	- Selector Knob	$ .20
1444	- Detector Coil	.50	8777	- Volume Control Knob	.10
2374	- Variable Cond.	2.00	8837	Telephone Dial	.25
2375	- Electrolytic Cond.	1.15	8051	Scale	.35
3398	- Volume Control	1.00	8787	Knob	.15

MODEL 522
Schematic
Notes
Alignment

DEWALD RADIO





FOR SERVICING TO CALIBRATE: Set service oscillator to 456 K.C. and connect "HOT" lead to grid of 1A6 tube ground stator of rear (oscillator) section of variable condenser. Turn volume control for maximum output and peak intermediate frequency trimmers for maximum gain.

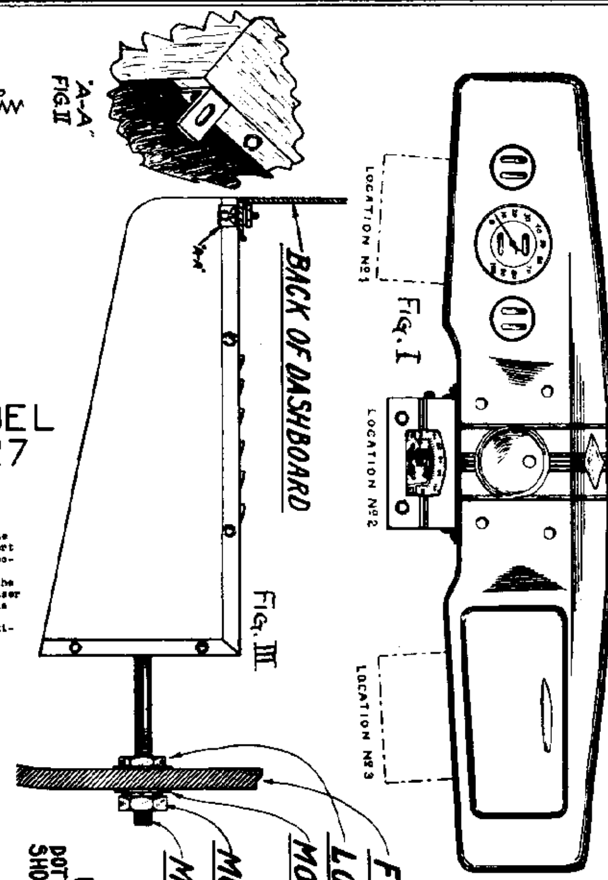
Remove short from variable condenser. Remove service oscillator lead from grid of 1A6 tube and connect same to red lead on rear of set. Adjust service oscillator and the receiver to 1500 K.C. and peak trimmers on variable condenser for maximum gain. All the other frequencies are automatically calibrated when receiver is peaked at 1500 K.C. due to the construction of the cut section of variable condenser.

BATTERY SUPPLY: This receiver is designed to operate from a 2-volt storage battery, 2.5 volt "air cell" battery, 3-volt "A" pack or a 6-volt storage battery.

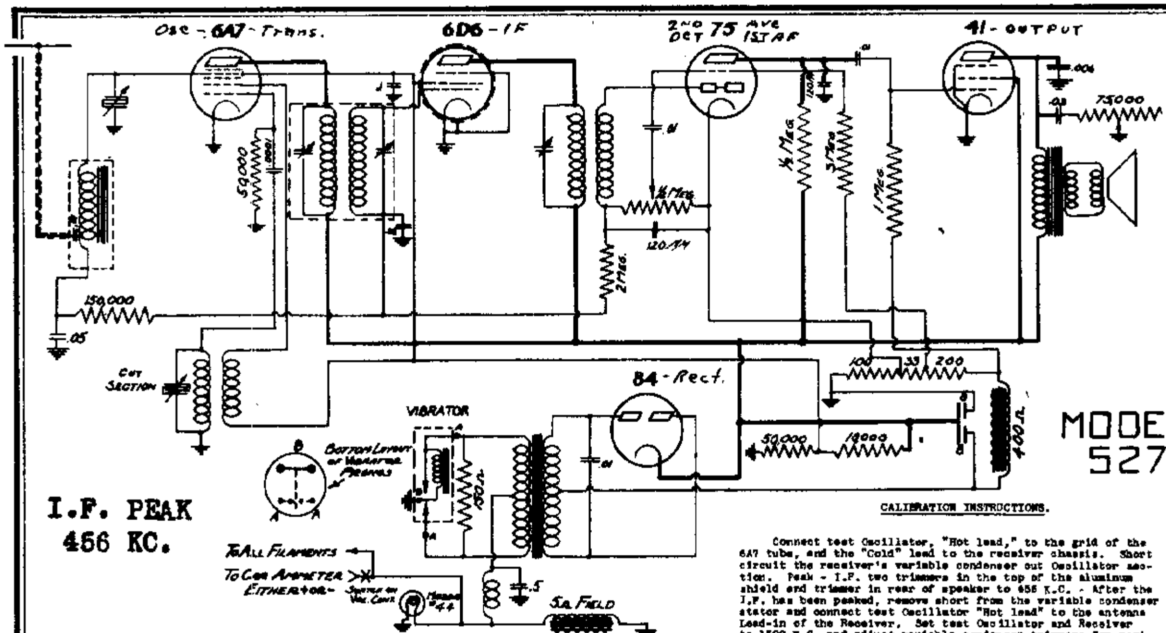
IMPORTANT:
1. Before operating this receiver, make certain that the spade lug which is attached to the yellow lead extending through rear of chassis is fastened to the proper terminal on the battery terminal strip. See Sketch.
2. See circuit drawing for battery connections.
3. Be certain all battery wires and plugs are properly connected.

MODEL 527
Schematic
Socket, Chassis
Installation, Note

DEWALD RADIO



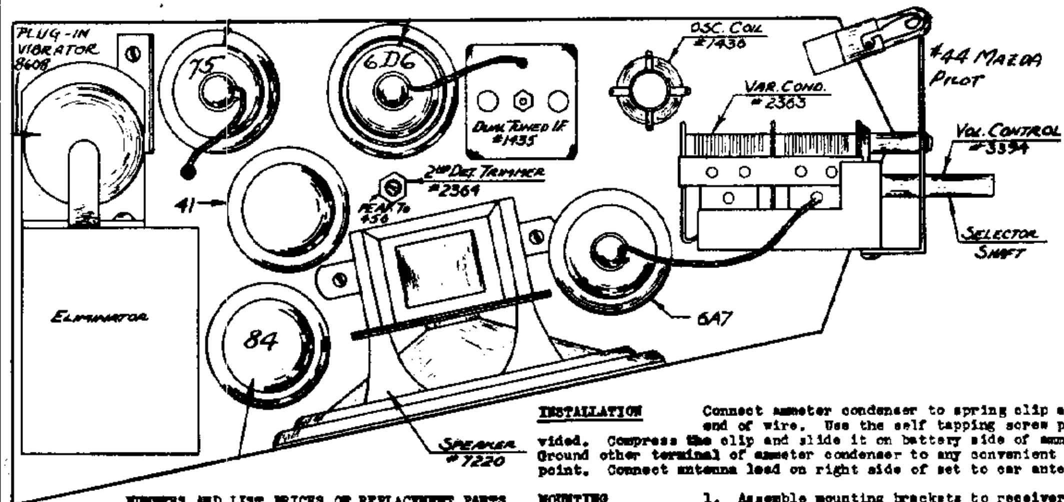
METHOD OF MOUNTING
MODEL Nº 527
UNDER THE DASHBOARD OF CAR
DOTTED LINE OF RECEIVER ON DASH
SHOWS OTHER LOCATIONS THAN CENTER



I.F. PEAK
456 KC.

CALIBRATION INSTRUCTIONS.

Connect test Oscillator, "Hot lead," to the grid of the 6A7 tube, and the "Cold" lead to the receiver chassis. Short circuit the receiver's variable condenser out Oscillator section. Peak - I.F. two trimmers in the top of the aluminum shield and trimmer in rear of speaker to 456 K.C. - After the I.F. has been peaked, remove short from the variable condenser stator and connect test Oscillator "Hot lead" to the antenna Lead-in of the Receiver. Set test Oscillator and Receiver to 1500 K.C. and adjust variable condenser trimmers for maximum signal.



INSTALLATION

Connect ammeter condenser to spring clip at end of wire. Use the self tapping screw provided. Compress the clip and slide it on battery side of ammeter. Ground other terminal of ammeter condenser to any convenient point. Connect antenna lead on right side of set to car antenna.

MOUNTING

1. Assemble mounting brackets to receiver.
2. Determine Location of receiver as in Figure I.
3. Spot and drill two ½" holes in the lower section of the dash-board to correspond with the two holes in the mounting brackets.
4. Drill a ½" hole in fire board to line up with tapped hole in rear of receiver. (See Figure III
5. Screw the short threaded section of mounting bolt into mounting hole in rear of receiver and the long threaded section through the fire board. Note the arrangement of nuts and washers. (Fig. III)
6. Fasten mounting brackets with the two 10-32 screws supplied (See Fig. III).
7. Install distributor suppressor in Distributor

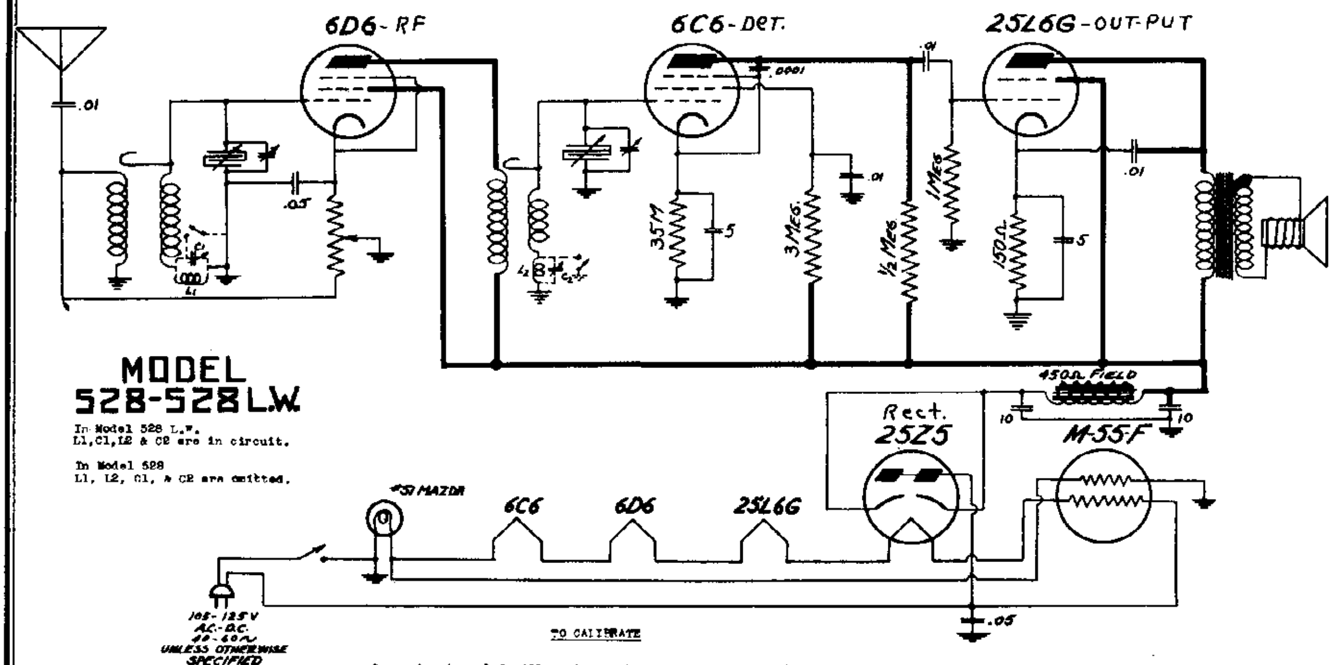
NUMBERS AND LIST PRICES OF REPLACEMENT PARTS

Part No.	PART	LIST	Part No.	Part	LIST
1379	2nd Det. I.F.	$ .55	2362	Electrolytic Cond.	$1.25
1434	Antenna Coil	.90	3394	Volume Control	.85
1435	Dual tuned I.F.	1.25	3390	Tone Control	.75
1436	Oscillator coil	.45	5107	Antenna Cable	.50
1432	"A" Choke	.25	5108	Battery Cable	.25
1433	"B" Choke	.75	7220	Speaker	4.50
1431	Power Transformer	3.00	8508	Vibrator	3.50

PRICES SUBJECT TO CHANGE
WITHOUT NOTICE

MODELS 528, 528LW
MODEL 1200
Schematics

DEWALD RADIO



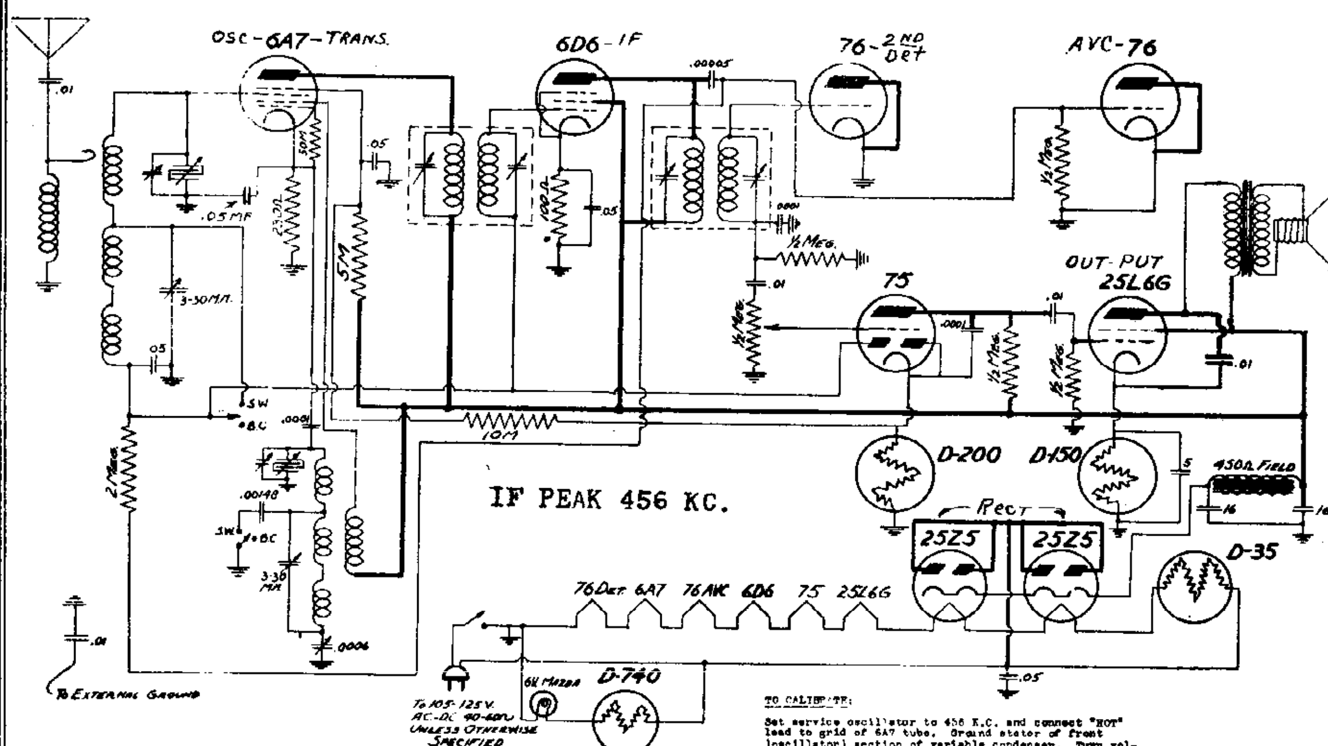
MODEL 528-528L.W.

In Model 528 L.W.
L1, C1, L2 & C2 are in circuit.

In Model 528
L1, L2, C1, & C2 are omitted.

TO CALIBRATE

Connect external Oscillator's hot lead to real antenna of receiver. Connect oscillator cold lead in series with a ¼ or .1 MFD condenser to receiver chassis. Set oscillator at 1500KC and peak Variable Condenser trimmers for Maximum signal with condenser set approximately where 1500 comes in on scale.



IF PEAK 456 KC.

MODEL 1200

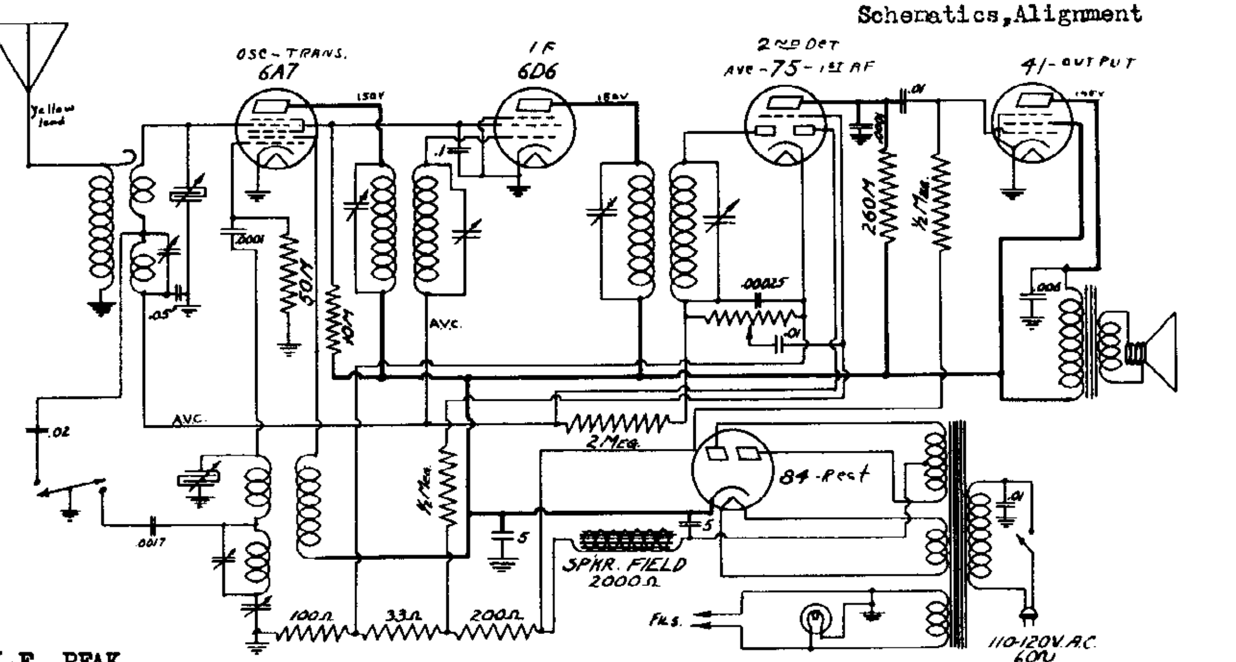
TO CALIBRATE:

Set service oscillator to 456 K.C. and connect "HOT" lead to grid of 6A7 tube. Ground stator of front (oscillator) section of variable condenser. Turn volume control for maximum output and peak intermediate frequency trimmers for maximum gain. Turn wave band switch knob toward right. Adjust service oscillator and receiver to 7 megacycles and peak variable condenser trimmers for maximum gain. Turn wave band switch toward left and adjust oscillator (service) and receiver to 1500 K.C. Peak both trimmers underneath chassis for maximum gain. Then adjust service oscillator and receiver to 600 K.C. and "rock" the variable condenser and adjust the padder (near front of chassis on top) at the same time for maximum gain.

DeWALD RADIO

MODELS 529, 529LW
MODELS 629, 629LW, 703, 703LW
Schematics, Alignment

PRICES SUBJECT TO CHANGE WITHOUT NOTICE



I.F. PEAK 456 KC.

MODEL-529
529 L.W.

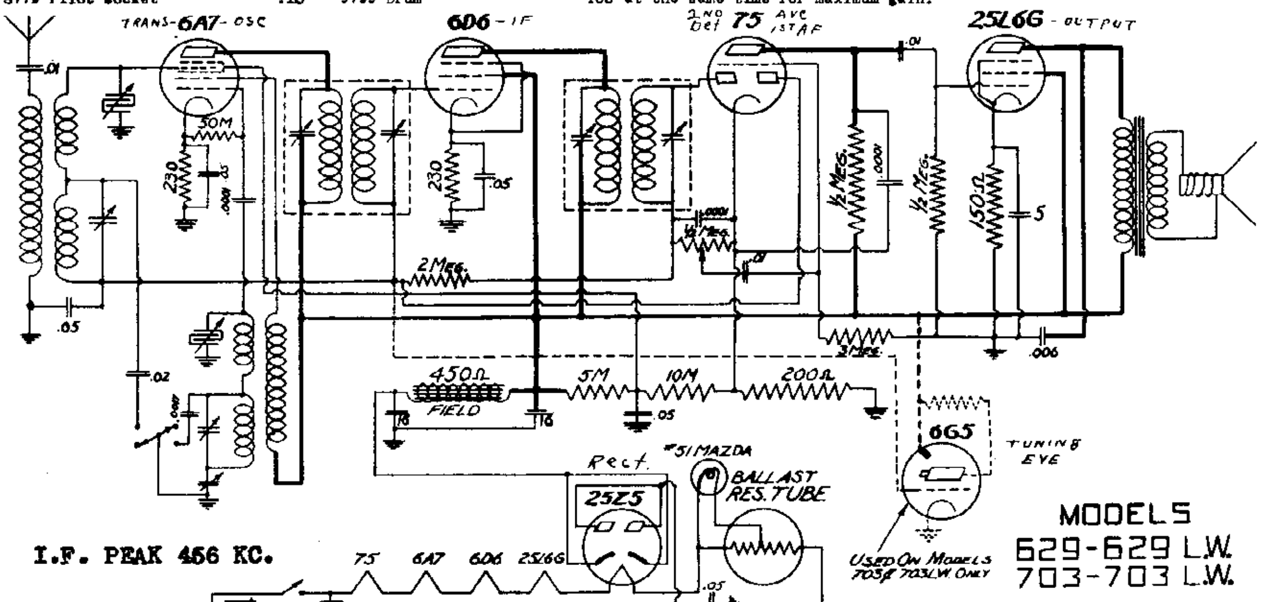
These receivers are dual wave superheterodynes with automatic volume control. The 529 covers the following ranges: 1650-550 K.C. and 7-2.4 M.C. The 529-LW covers the following ranges: 1650-550 K.C. and 340-150 K.C.

LONG WAVE OPERATION — The Model 529-LW has a long-wave band in place of the Sh.Wave band. Follow same instructions for tuning as for the Sh.Wave band operation.

LIST PRICES OF REPLACEMENT PARTS.

1440	Power Transformer	$2.50	3382	comb. bias resistor	.35
1423A	1st dual I.F.	1.25	7212	Speaker	4.00
1424A	2nd " "	1.25	8660	Comb. vol. control	1.00
1438	Ant. coil	.70	8662	knobs	.10
1439	Osc. coil	.65	6041	Scale	1.10
2369	2 Gang var. cond.	2.00	9823	Pointer	.10
2372	Electrolytic cond.	1.10	9818	Shaft	.10
8779	Pilot socket	.10	9799	Drum	.05

TO CALIBRATE: Set service oscillator to 456 K.C. and connect "HOT" lead to grid of 6A7 tube. Ground stator of front (oscillator) section of variable condenser. Turn volume control for maximum output and peak intermediate frequency trimmers for maximum gain. Turn wave band switch knob toward left. Adjust service oscillator and receiver to 7 megacycles and peak variable condenser trimmers for maximum gain. Turn wave band switch toward right and adjust service oscillator and receiver to 1500 K. C. Peak the trimmer next to the variable condenser and the one underneath chassis for maximum gain. Then adjust service oscillator and receiver to 600 K.C. and "rock" the variable condenser and adjust the padder (near front of chassis at the same time for maximum gain.



I.F. PEAK 456 KC.

MODELS
629-629 L.W.
703-703 L.W.

Models 629 and 629-LW: 1-6A7, 1-6D6, 1-75, 1-25L6, 1-25Z5, and 1-M-49-B.
Models 703 and 703-LW: 1-6A7, 1-6D6, 1-75, 1-25L6, 1-25Z5, 1-M-42-B, and 1-6G5

LIST PRICES OF REPLACEMENT PARTS

1438	Antenna coil	$ .70	8662	knobs	$ .10
1439	Oscillator Coil	.65	8627A	Wave Band Switch	.35
1423A	Dual tuned I.F.	1.25	8660	Comb. volume control	1.00
1424A	2nd det. coil	1.25	6041	Scale	1.10
2369	Variable condenser	2.00	9823	Pointer	.10
2376	Comb. electrolytic	1.00	9818	Shaft	.10
7222	Speaker	4.00	9799	Drum	.05

These receivers are dual wave superheterodynes with the automatic volume control feature. The frequency ranges are as follows:

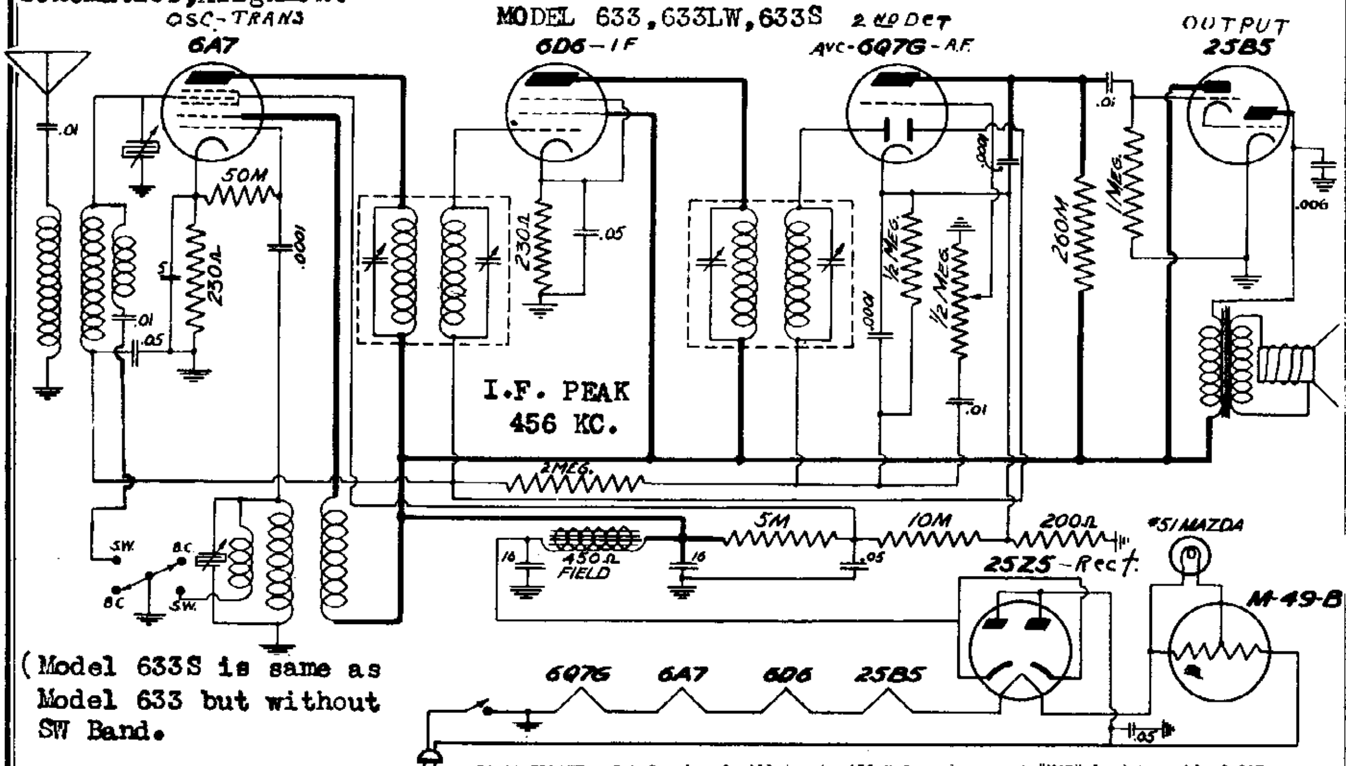
Models 629 and 703 - 1650-550 K.C. and 7-2.4 M.C.
Models 629-LW and 703-LW - 1650-550 K.C. and 340-150 K.C.

TO CALIBRATE: Set service oscillator to 456 K.C. and connect "HOT" lead to grid of 6A7 tube. Ground stator of front (oscillator) section of variable condenser. Turn volume control for maximum output and peak intermediate frequency trimmers for maximum gain. Turn wave band switch knob toward left. Adjust service oscillator and receiver to 7 megacycles and peak variable condenser trimmers for maximum gain. Turn wave band switch toward right and adjust oscillator (service) and receiver to 1500 K.C. Peak both trimmers underneath chassis for maximum gain. Then adjust service oscillator and receiver to 600 K.C. and "rock" the variable condenser and adjust the padder (near front of chassis) at the same time for maximum gain.

MODELS 633,633LW,633S
MODELS 635,635LW
Schematics,Alignment

DEWALD RADIO

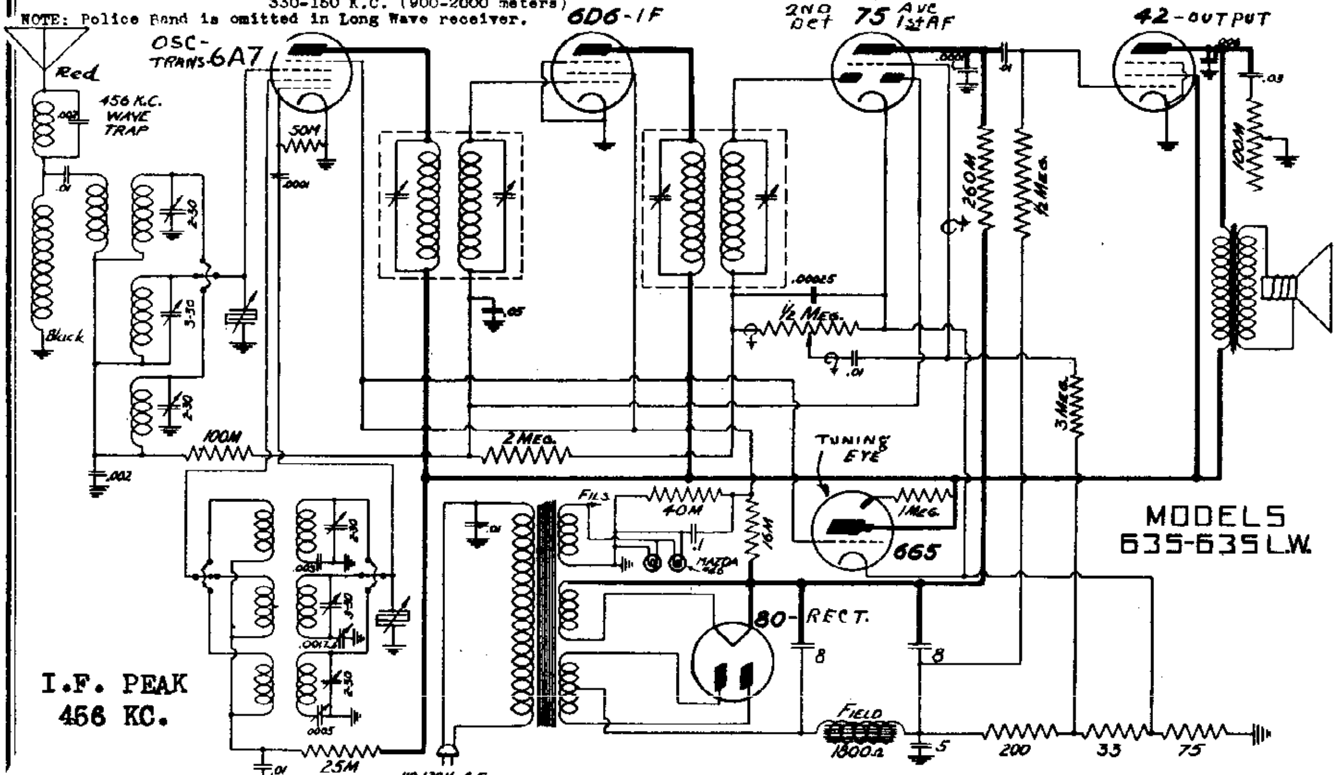
MODEL 633,633LW,633S



(Model 633S is same as Model 633 but without SW Band.

The Model 635 has the following ranges:
550-1700 K.C. (550-175 meters)
1700-4800 K.C. (175-62 meters)
5.7-16 M.C. (18-52 meters)
The Model 635LW has the following additional range:
330-150 K.C. (900-2000 meters)
NOTE: Police Band is omitted in Long Wave receiver.

TO CALIBRATE: Set Service Oscillator to 456 K.C. and connect "HOT" lead to grid of 6A7. Ground stator of rear (oscillator) section of variable condenser. Turn Volume Control for maximum output and peak intermediate frequency trimmers for maximum gain. Remove Variable Condenser short.
Adjust service oscillator and receiver to1500 K.C. and peak variable condenser trimmers for maximum gain.



I. F. ALIGNMENT: Intermediate frequency peaked at 456 K.C. Connect test oscillator to grid of 6A7 and chassis. Short circuit stator of front section of variable condenser during this operation. Then peak I.F. trimmers for maximum signal.

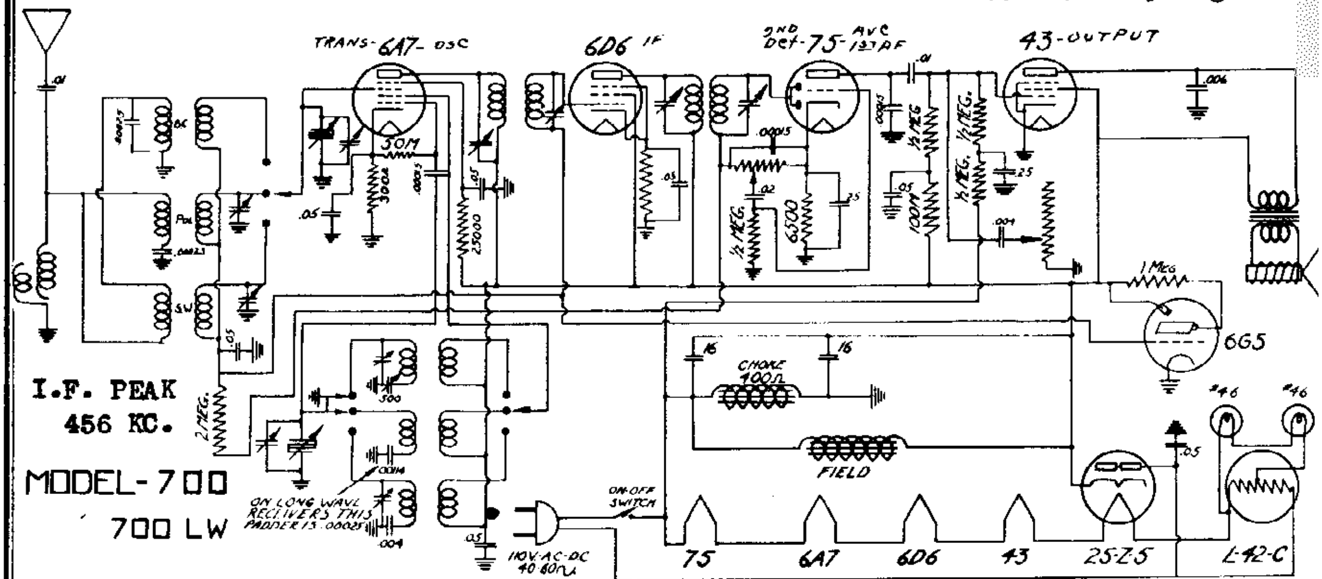
B. C. ALIGNMENT: Remove short from stator of variable condenser. Turn Wave Band Switch to Broadcast. Connect test oscillator to antenna and chassis. Set test oscillator and radio dial to 1500 K.C. and peak two trimmers underneath chassis, (toward rear) for maximum signal. Set test oscillator at 600 K.C. and adjust padder condenser (nut side) in front of chassis for maximum signal. During this operation, the variable condenser must be rocked. Readjust 1500 K.C.

POLICE BAND ALIGNMENT: Turn Wave Band Switch to Police Band. Set test oscillator and radio dial to 4000 K.C. and peak two trimmers on coil on top of chassis. Set test oscillator and radio to 1700 K.C. and adjust padder (screw side) for maximum signal. The variable condenser must be rocked during the operation. If receiver has long waves instead of police band, calibrate same trimming condenser as on Police Band, but set oscillator and receiver at 300 K.C. for alignment.

SHORT WAVE ALIGNMENT: Turn Wave band switch to short wave. Set test oscillator and radio dial to 15 Megacycles and peak trimmers on bottom of chassis (toward front) for maximum signal. Low frequency setting is automatically taken care of by short wave coils which are carefully matched for this setting by a fixed calibrated padder.

MODELS 700,700LW
MODELS 700A,700A-LW
Schematics,Alignment

DEWALD RADIO



I.F. PEAK
456 KC.

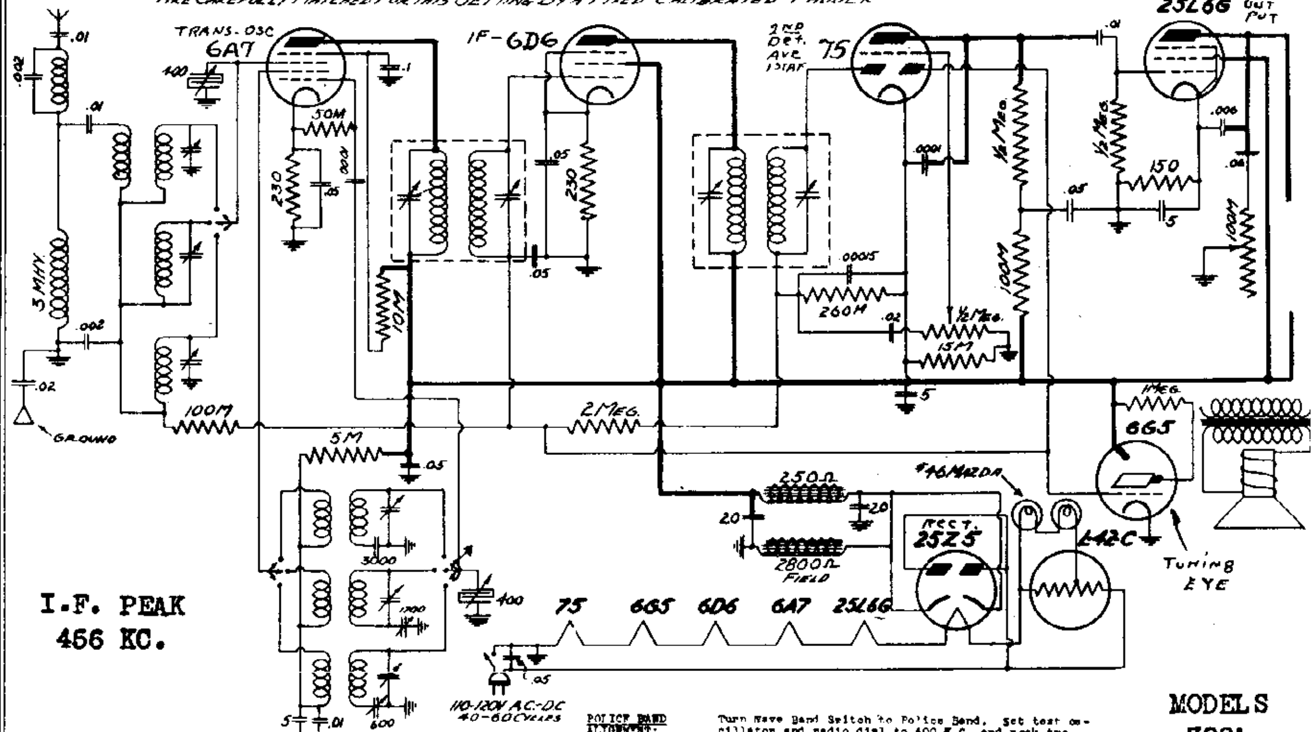
MODEL-700
700 LW

I.F. ALIGNMENT- Intermediate Frequency Peaked At 456 K.C. Connect Test Oscillator To Grid of 6A7 And Chassis. Short Circuit Stator of Front Section of Variable Condenser During This Operation. Then Peak I.F. Trimmers For Maximum Signal.

R.F. ALIGNMENT- Remove Short From Stator of Variable Condenser. Turn Wave Band Switch To Broadcast. Connect Test Oscillator To Antenna And Chassis. Set Test Oscillator And Radio Dial To 1500KC. And Peak Var. Cond. Trimmers For Maximum Signal. Set Test Oscil. At 600KC. And Adjust Padder Condenser in Front of Chassis For Max. Signal. During This Operation The Var. Cond. Must Be Rocked. Readjust 1500 K.C.

POLICE BAND ALIGNMENT- Turn Wave Band Switch To Police Band Set Test Osc. And Radio Dial To 4000 K.C. And Peak 2 Trimmers Near Front Of Chassis For Max. Sig. The Low Freq. Setting is Automatically Adjusted By A Fixed Calibrated Padder. If Receiver Has Long Waves Instead of Police Band Calibrate Same Trimming Cond. As on Police Band But Set Oscillator And Receiver At 300 K.C. For Alignment.

SHORT WAVE ALIGNMENT- Turn W.B. Switch To Short Wave. Set Test Osc. And Radio Dial To 15 Megacycles And Peak Trimmers Near Center of Chassis For Max. Sig. Low Freq. Setting is Automatically Taken Care Of By Short Wave Coils Which Are Carefully Matched For This Setting By a Fixed Calibrated Padder.



I.F. PEAK
456 KC.

MODELS
700A
700A-LW

I. F. ALIGNMENT: Intermediate frequency peaked at 456 K. C. Connect test oscillator to grid of 6A7 and chassis. Short circuit stator of front section of variable condenser during this operation. Then peak I.F. trimmers for maximum signal.

R. F. ALIGNMENT: Remove short from stator of variable condenser. Turn Wave Band Switch to Broadcast. Connect test oscillator to antenna and chassis. Set test oscillator and radio dial to 1500 K.C. and peak two trimmers underneath chassis, (toward rear) for maximum signal. Set test oscillator at 600 K.C. and adjust padder condenser (nut side) in front of chassis for maximum signal. During this operation, the variable condenser must be rocked. Readjust 1500 K. C.

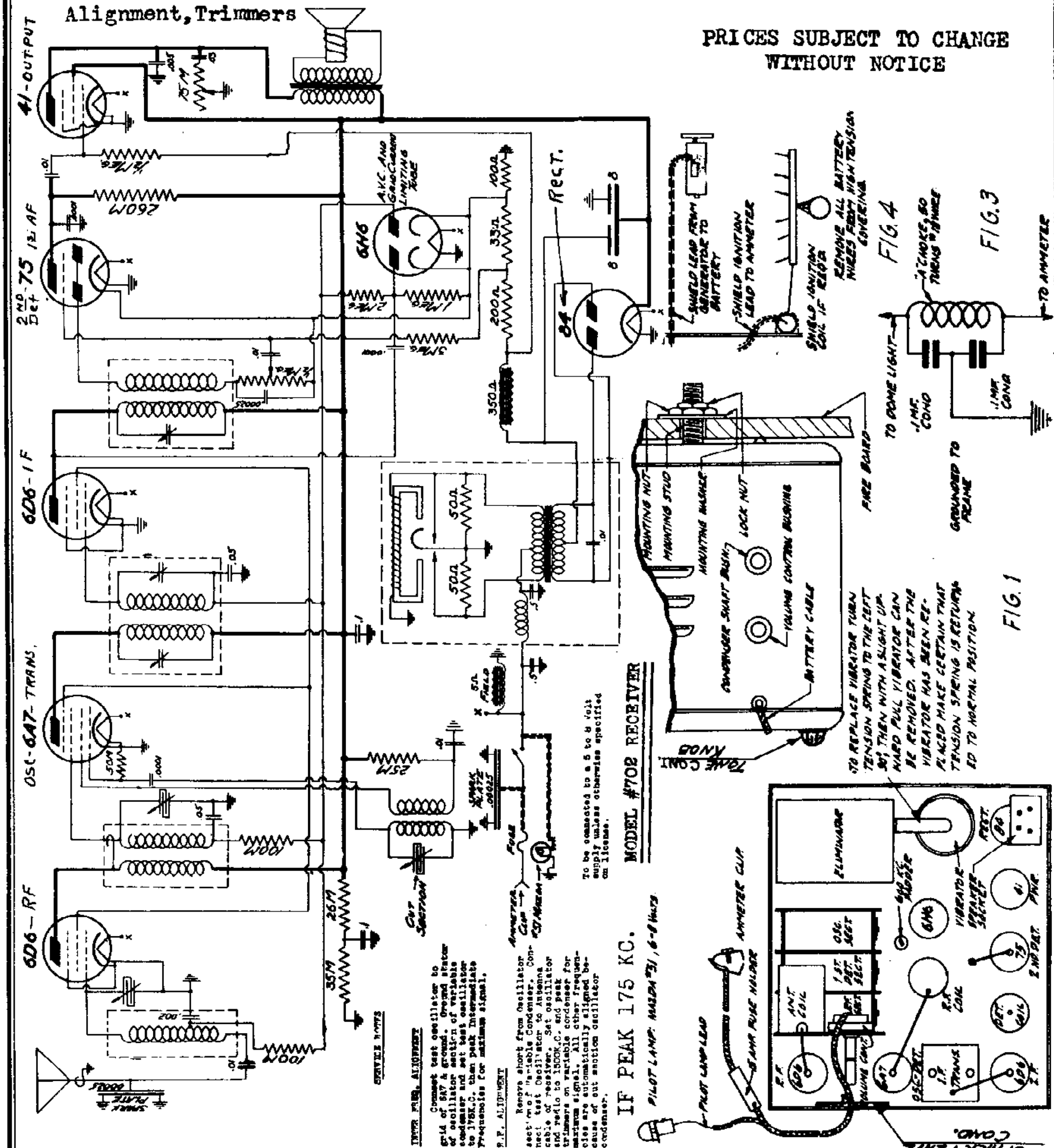
POLICE BAND ALIGNMENT: Turn Wave Band Switch to Police Band. Set test oscillator and radio dial to 400 K.C. and peak two trimmers on coil on top of chassis. Set test oscillator and radio to 1700 K.C. and adjust padder (screw side) for maximum signal. The variable condenser must be rocked during the operation. If receiver has long waves instead of police band, calibrate same trimming condenser as on Police Band, but set oscillator and receiver at 300 K.C. for alignment.

SHORT WAVE ALIGNMENT: Turn Wave band switch to short wave. Set test oscillator and radio dial to 15 Megacycles and peak trimmers on bottom of chassis (toward front) for maximum signal. Low frequency setting is automatically taken care of by short wave coils which are carefully matched for this setting by a fixed calibrated padder.

MODEL 702
Schematic, Socket, Parts
Alignment, Trimmers

DeWALD RADIO

PRICES SUBJECT TO CHANGE
WITHOUT NOTICE

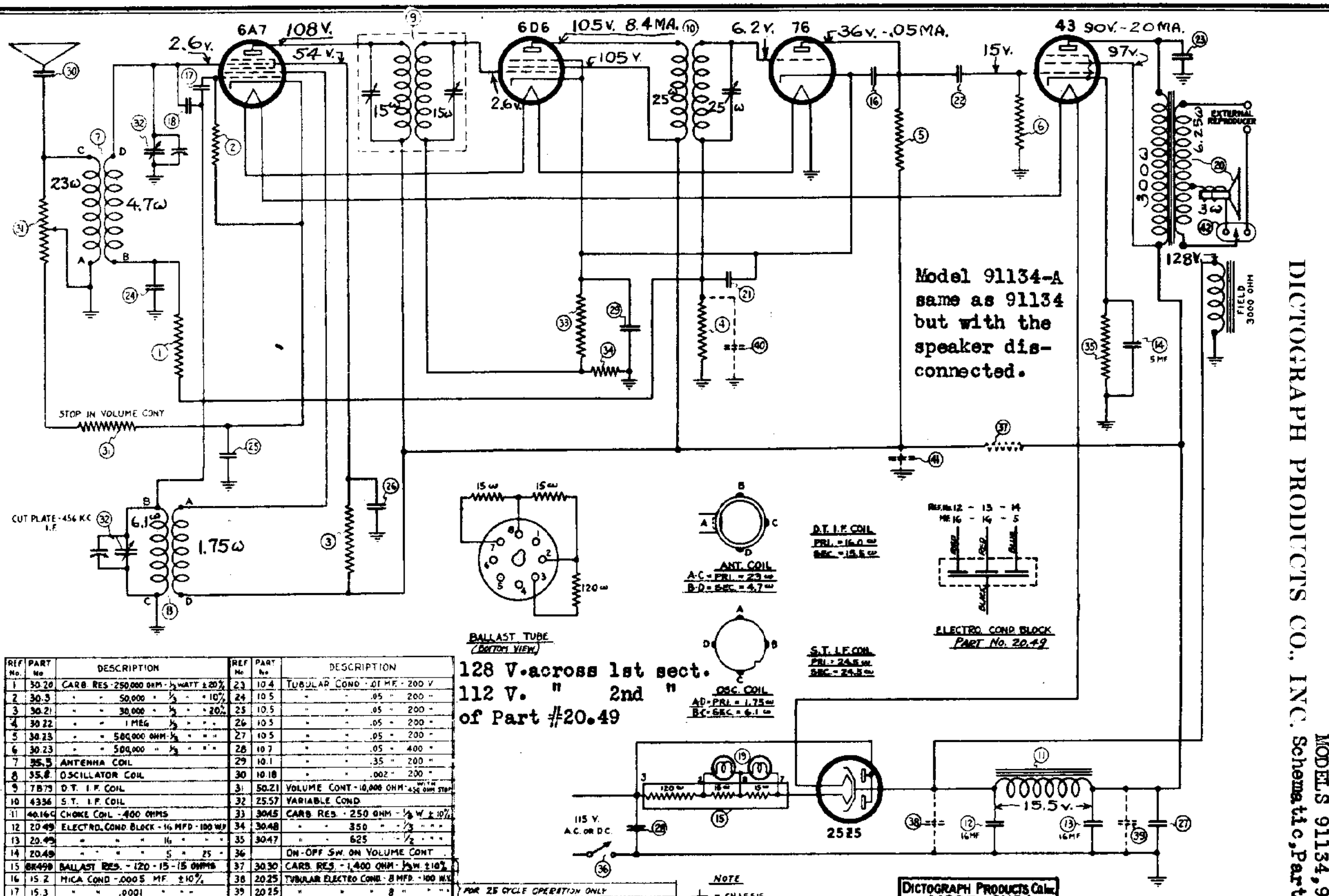


NUMBERS AND LIST PRICES OF REPLACEMENT PARTS

1431A	Power Transformer	$ 3.00	3407	Volume Control	1.10
1432A	A Choke	.30	5077B	Antenna Cable	.85
			5094	Combination A Cable	.50
1433	B Choke	.95	7194	Speaker	5.50
1488	Antenna Coil	.90	3608	Vibrator	5.00
1308D	1st Detector Coil	.95	8399	Fuse Retainer	.20
1309A	Dual I.F. Transformer	1.50	8400	15 Ampere Fuse	.05
1310	2nd Detector Coil	1.30	8777	Knob	.20
1454	Oscillator Coil	.75	8792	Remote Control	5.75
2317	3 Gang Variable Condenser	4.50	9850	Cable and Sheath	1.50
2362	Dual 8 Electrolytic Condenser	2.05	9517	Mounting Stud	.05
2390	Spark Plate Condenser (Chassis)	.25		7/16 Hexagon Nut	.05
2391	Spark Plate Condenser (Can)	.25		Pilot Lamps	.10
3390A	Tone Control	.80			

MODELS 91134,91134A

DICTOGRAPH PRODUCTS CO., INC. Schematic,Parts



Model 91134-A same as 91134 but with the speaker dis-connected.

128 V. across 1st sect.
112 V. " 2nd "
of Part #20.49

REF No.	PART No	DESCRIPTION	REF No	PART No	DESCRIPTION
1	30.20	CARB. RES - 250,000 OHM - ⅓ WATT ±20%	23	10.4	TUBULAR COND - .01 MF - 200 V
2	30.3	" " 50,000 " ⅓ " ±10%	24	10.5	" " .05 " 200 "
3	30.21	" " 30,000 " ⅓ " ±20%	25	10.5	" " .05 " 200 "
4	30.22	" " 1 MEG ⅓ " " "	26	10.5	" " .05 " 200 "
5	30.23	" " 500,000 OHM - ⅓ " " "	27	10.5	" " .05 " 200 "
6	30.23	" " 500,000 " ⅓ " " "	28	10.7	" " .05 " 400 "
7	35.5	ANTENNA COIL	29	10.1	" " .35 " 200 "
8	35.8	OSCILLATOR COIL	30	10.18	" " .002 " 200 "
9	7B73	D.T. I.F. COIL	31	50.21	VOLUME CONT. - 10,000 OHM - WITH 450 OHM STOP
10	4336	S.T. I.F. COIL	32	25.57	VARIABLE COND
11	40.16C	CHOKE COIL - 400 OHMS	33	3045	CARB. RES. - 250 OHM - ⅓ W ±10%
12	20.49	ELECTRO. COND. BLOCK - 16 MFD - 100 W.V.	34	30.48	" " 350 " - ⅓ " " "
13	20.49	" " " 16 " " "	35	30.47	" " 625 " - ½ " " "
14	20.49	" " " " 5 " 25 "	36		ON-OFF SW. ON VOLUME CONT.
15	8K490	BALLAST RES. - 120 - 15 - 15 OHMS	37	30.30	CARB. RES. - 1,400 OHM - ⅓ W. ±10%
16	15.2	MICA COND - .0005 MF. ±10%	38	20.25	TUBULAR ELECTRO COND. - 8 MFD. - 100 W.V.
17	15.3	" " .0001 " " "	39	20.25	" " " 8 " " "
18	15.16	" " 3. MMF - ± ½ MMF	40	10.2	" COND. - .1 MF. - 200 V.
19	120.3	PILOT LIGHTS - 6-8 V. .15 A	41	10.8	" " .25 " " "
20	105.64	SPEAKER - 3000 OHMS	42	45.38	SNAP SW.
21	10.4	TUBULAR COND - .01 MF 200 V.	43		
22	10.4	" " .01 " 200 "	44		

FOR 25 CYCLE OPERATION ONLY

NOTE

⏚ = CHASSIS

I.F. = 456 K.C.

PARTS SHOWN IN DOTTED LINES ARE FOR 25 CYCLE OPERATION ONLY

DICTOGRAPH PRODUCTS Co. Inc. MODEL 91134	
DRAWN BY J	DATE 10-15-36
CHECKED RFS	APP. TFS

MODELS 91134,91134A
MODELS 91168,91175

DICTOGRAPH PRODUCTS CO., INC.

Socket, Trimmers
Alignment

This receiver is equipped with an automatic overload control which necessitates setting the manual volume control of the receiver to its maximum position to insure accuracy in alignment. To control the signal output of the receiver it will be necessary to use the attenuator control of the signal generator. Connect the low potential side of the signal generator to the metal chassis through a .1 mfd. (400 volt) condenser for the following adjustments.

ADJUSTMENT OF I.F. CONDENSERS

(a) - Remove the control grid lead of the 6A7 tube and insert a 50,000 ohm (carbon type 1/3 watt) resistor in series with same. Then connect the high potential lead of the signal generator through a .001 mfd. condenser (paper tubular 400 volt type), directly to the control grid of the 6A7 tube.

(b) - Turn the rotor plates of the ganged variable condenser where no broadcast station carrier is heard (approximately 1000 KC). If this is not possible connect a .1 mfd. condenser (paper tubular) from the oscillator stator section (see sketch) of the ganged variable condenser to chassis.

(c) - Place an output meter (copper oxide type) across the mystic ear terminals with the speaker control switch in a clockwise position so that variations in signal output can be noted.

(d) - Place the signal generator in operation, adjust the carrier frequency to 456 KC and regulate the attenuator control of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condenser.

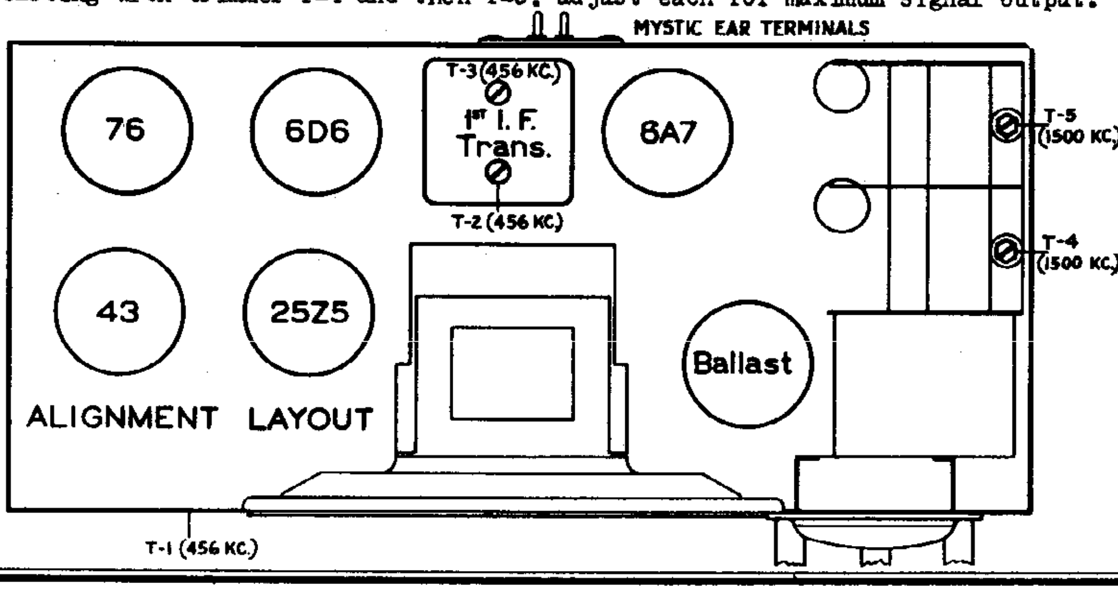
(e) - Adjust trimmers T-1, T-2 and T-3 (see alignment layout) to resonance as indicated by the greatest swing on the output meter.

ADJUSTMENT OF THE GANGED VARIABLE CONDENSERS

(a) - Remove the signal generator connection from the control grid of the 6A7 tube and replace the control grid lead. Then connect the antenna wire of the receiver to the high potential lead of the signal generator through a 200 mmfd. condenser (mica type).

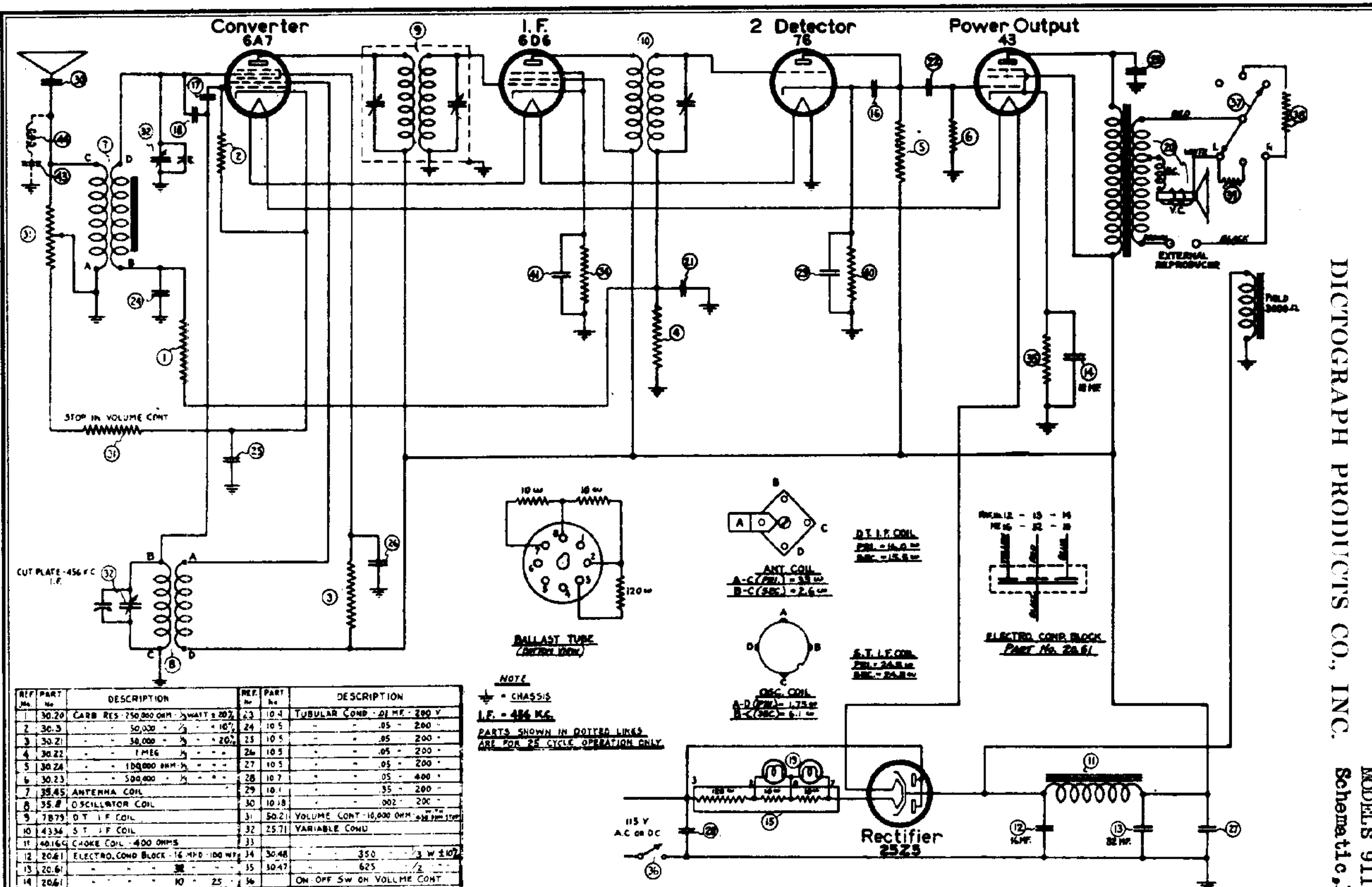
(b) - Set the dial pointer directly at the last long line at the right hand side of the dial with the ganged variable condenser fully meshed. Then rotate the receiver dial to 1,500 KC.

(c) - Adjust the carrier frequency of the signal generator to 1,500 KC and, starting with trimmer T-4 and then T-5, adjust each for maximum signal output.



MODELS 91168, 91175
Schematic, Parts

DICTOGRAPH PRODUCTS CO., INC.



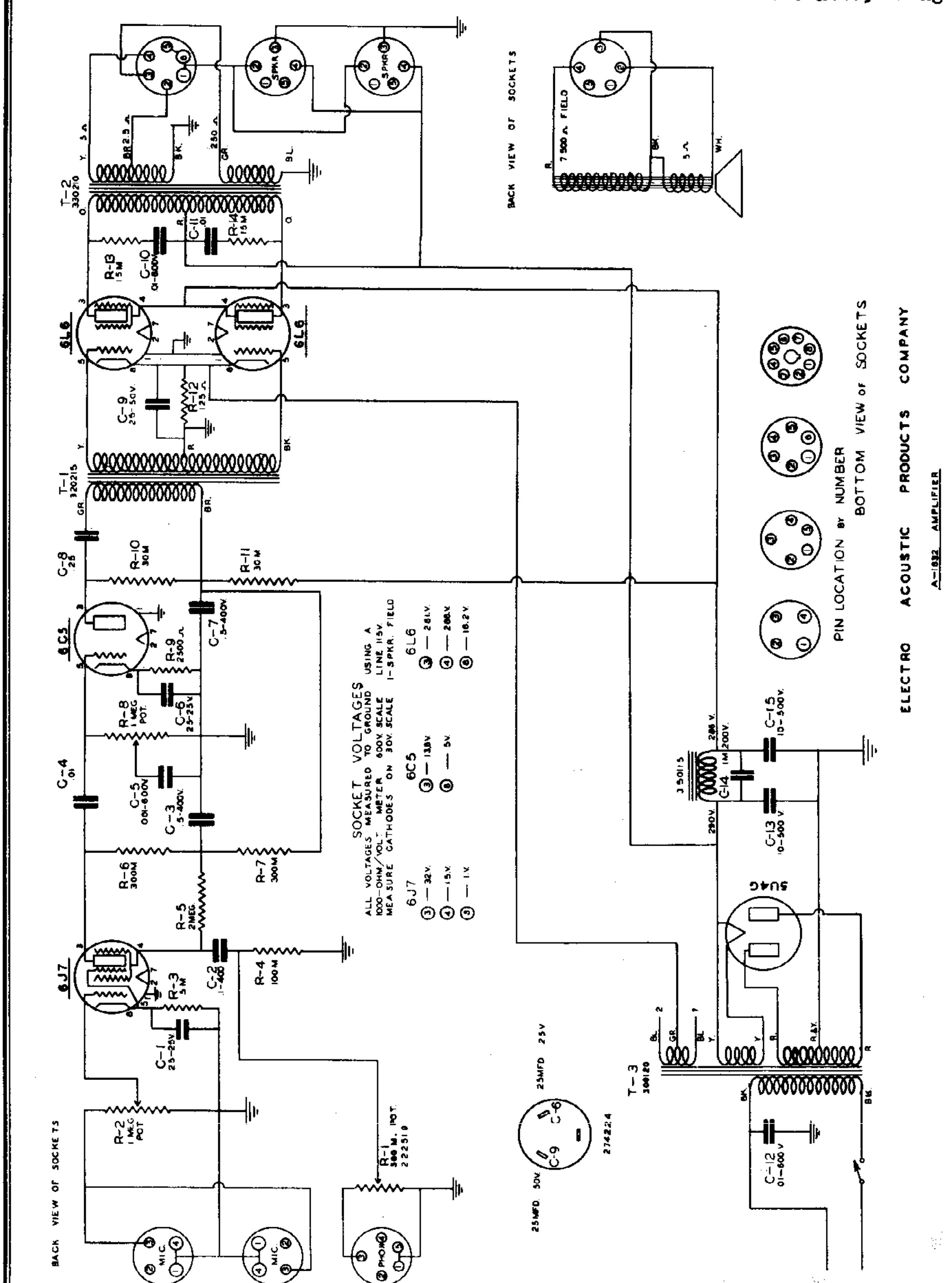
REF No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	30.20	CARB RES - 250,000 OHM - ⅓ WATT ± 20%	23	10.4	TUBULAR COND - .01 MF - 200 V
2	30.3	" " 50,000 - ⅓ - ± 10%	24	10.5	" " .05 - 200 "
3	30.21	" " 30,000 - ⅓ - ± 20%	25	10.5	" " .05 200 "
4	30.22	" " 1 MEG ⅓ " " "	26	10.5	" " .05 - 200 "
5	30.24	" " 100,000 OHM - ⅓ " " "	27	10.5	" " .05 - 200 "
6	30.23	" " 500,000 - ⅓ " " "	28	10.7	" " .05 - 400 "
7	35.45	ANTENNA COIL	29	10.1	" " .35 - 200 "
8	35.8	OSCILLATOR COIL	30	10.18	" " .002 - 200 "
9	7879	D T I F COIL	31	50.21	VOLUME CONT - 10,000 OHM - with 450 ohm stop
10	4336	S T I F COIL	32	25.71	VARIABLE COND
11	40.166	CHOKE COIL - 400 OHMS	33		
12	20.61	ELECTRO. COND BLOCK - 16 MFD - 100 WV	34	30.48	" " 350 " ⅓ W ± 10%
13	20.61	" " " 32 " " "	35	30.47	" " 625 " ½ " "
14	20.61	" " " 10 " 25 "	36		ON-OFF SW ON VOLUME CONT
15	115.28	BALLAST RES. - 120 - 10 - 10 OHMS	37	46.39	OUTPUT SW.
16	15.2	MICA COND - .0005 MF ± 10%	38	130.18	WIRE WD. RES. - 20 OHM ± 10%
17	15.3	" " .0001 " " "	39	130.19	" " " 1 " "
18	15.16	" " 3 MMF ± ½ MMF	40	30.3	CARB. RES. - 50,000 - ⅓ W. ± 10%
19	123.3	PILOT LIGHTS - 6-8 V. .15 A	41	10.5	TUBULAR COND. - .05 MF - 200 V.
20	105.84	SPEAKER - 3000 OHMS	42		
21	0.4	TUBULAR COND - .01 MF - 200 V.	43	25.50	TRIMMING COND. - 150 MMF.

OPTIONAL EQUIPMENT

DICTOGRAPH PRODUCTS Co. Inc. MODELS 91168 & 91175	
DRAWN BY	DATE 7-21-37
CHECKED F.M.S.	APP.

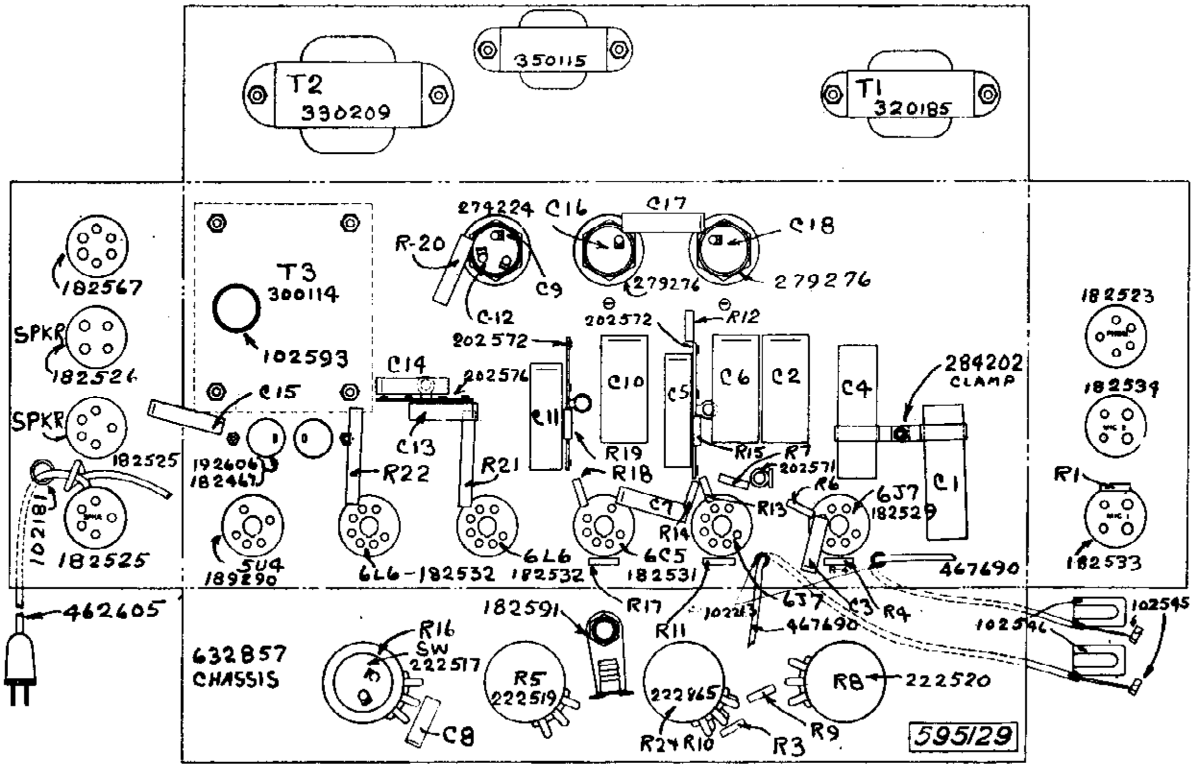
MODEL A1832 Amplifier

ELECTRO-ACOUSTIC PRODUCTS CO. Schematic, Voltage

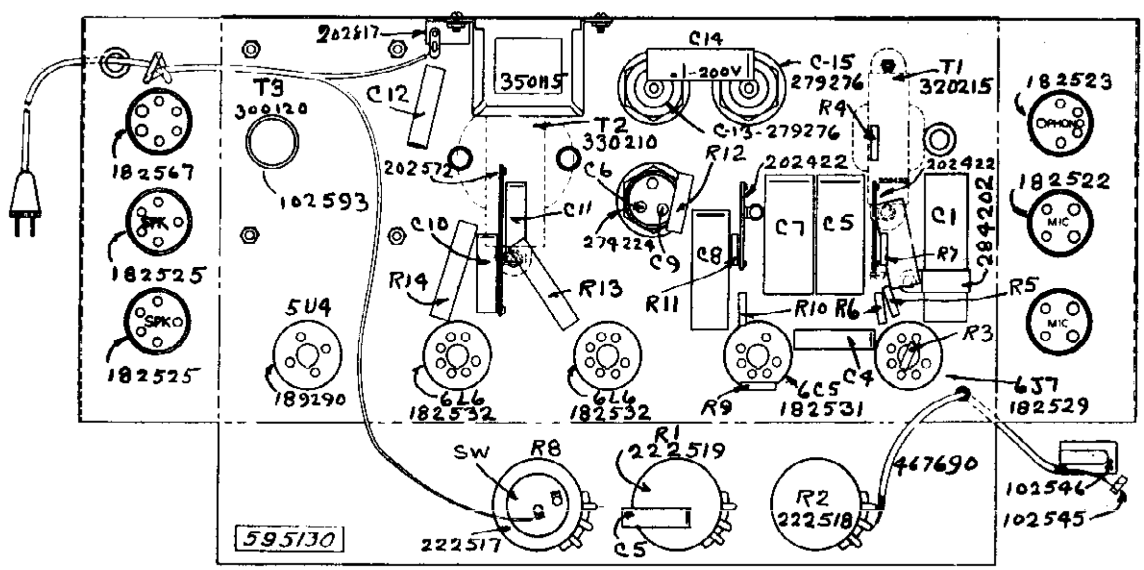


MODEL A1832 Amplifier
MODEL A2023 Amplifier
Chassis Layouts

ELECTRO-ACOUSTIC PRODUCTS CO.



CHASSIS LAYOUT - MODEL A2023



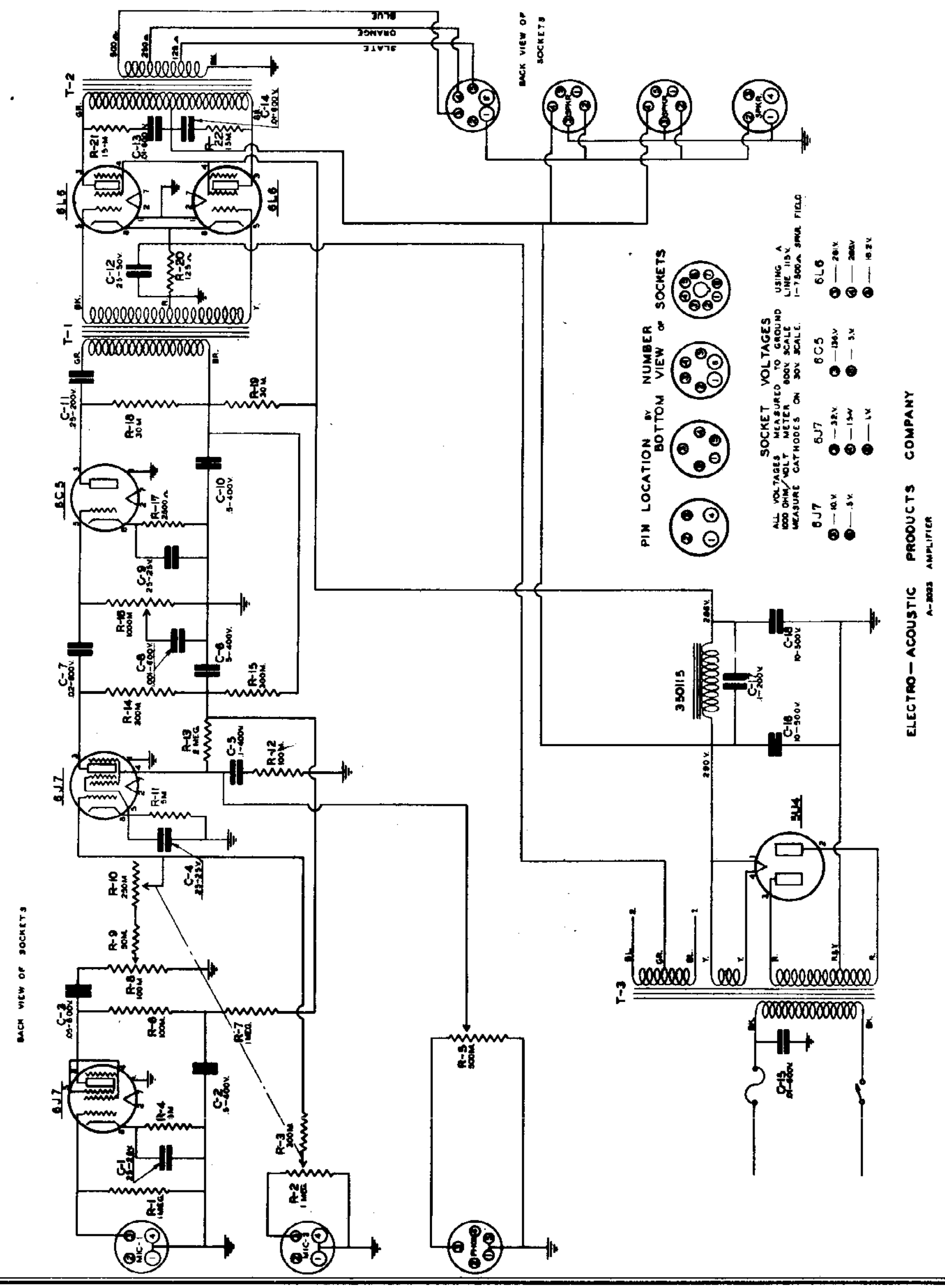
CHASSIS LAYOUT - MODEL 1832

MODEL A2023

ELECTRO-ACOUSTIC PRODUCTS CO.

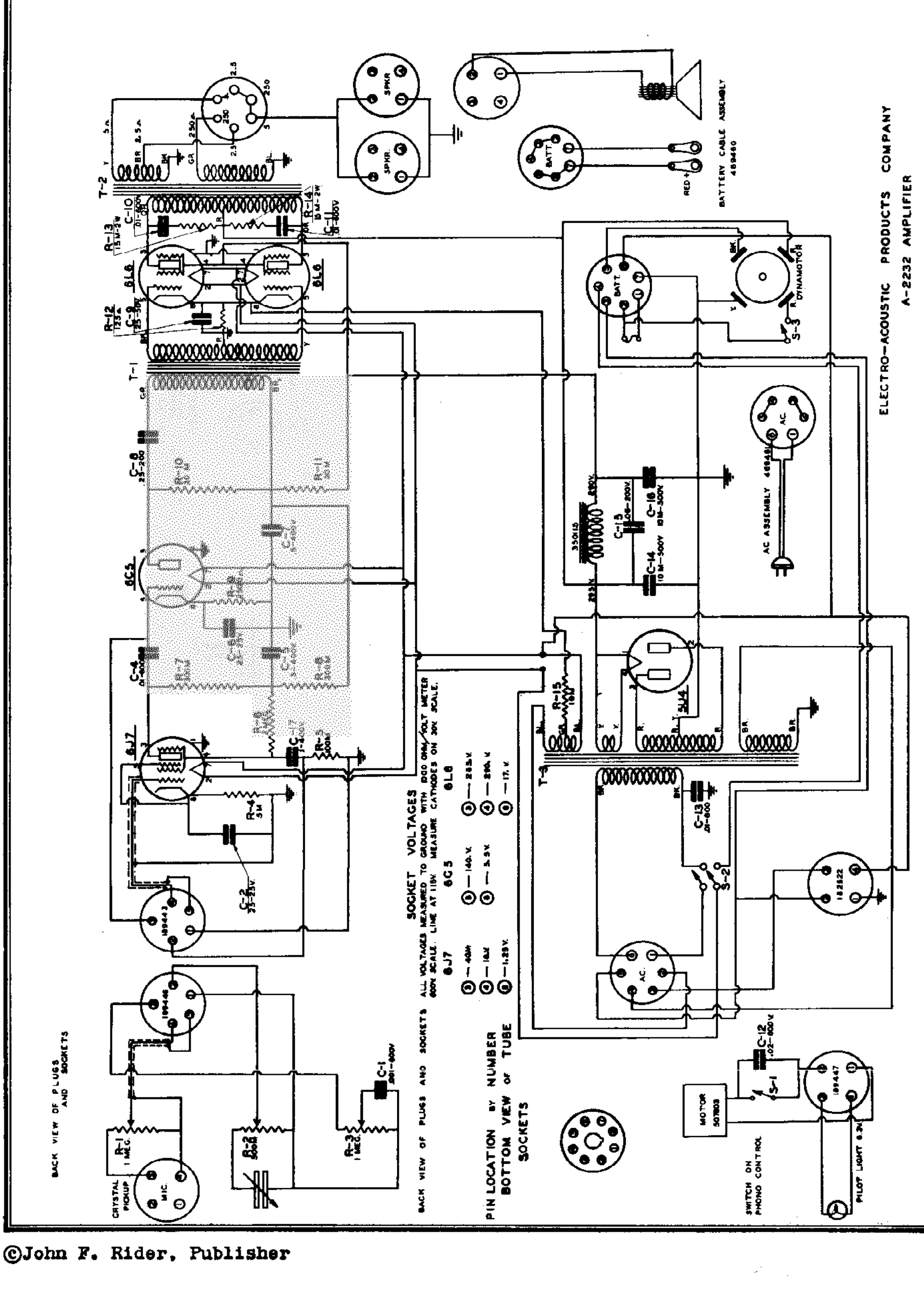
Amplifier

Schematic, Voltages



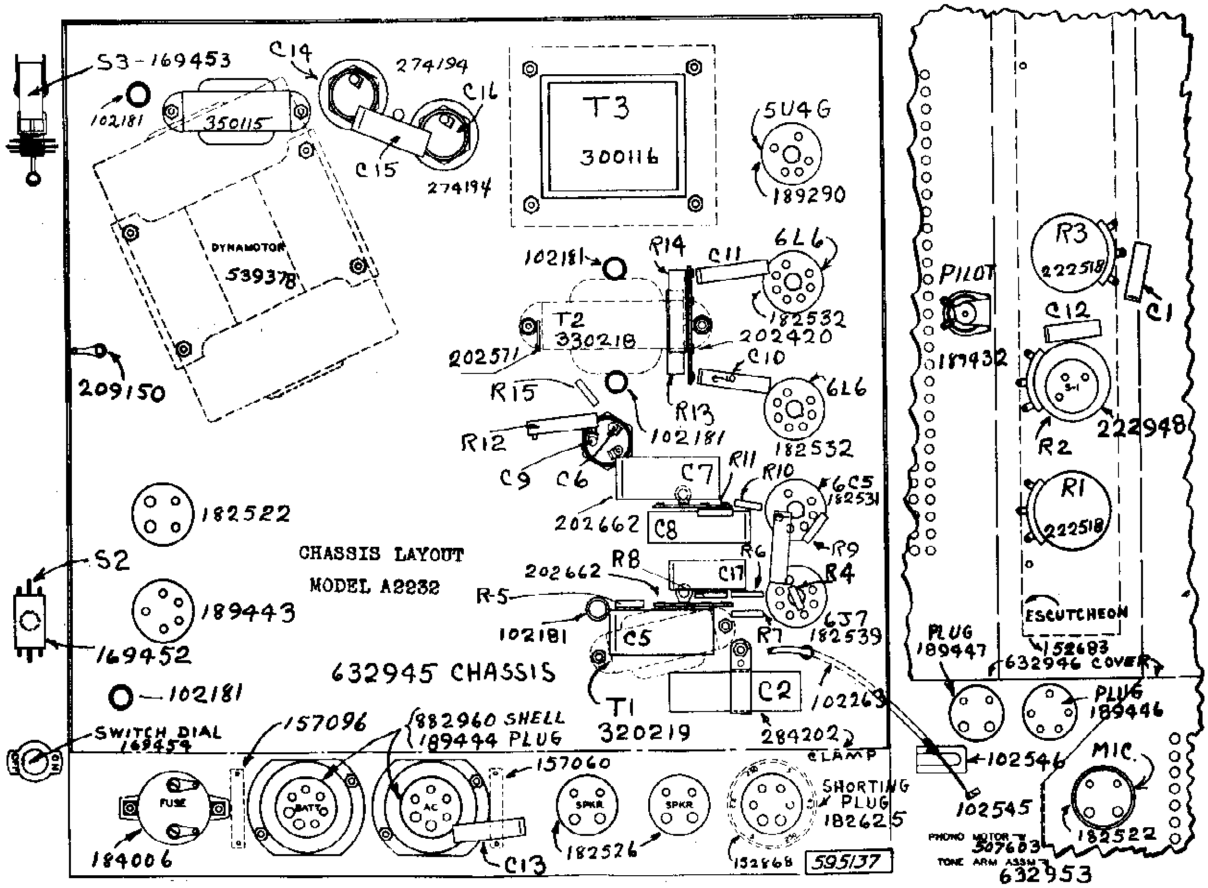
MODEL A2232 Amplifier
Schematic, Voltage

ELECTRO-ACOUSTIC PRODUCTS CO.

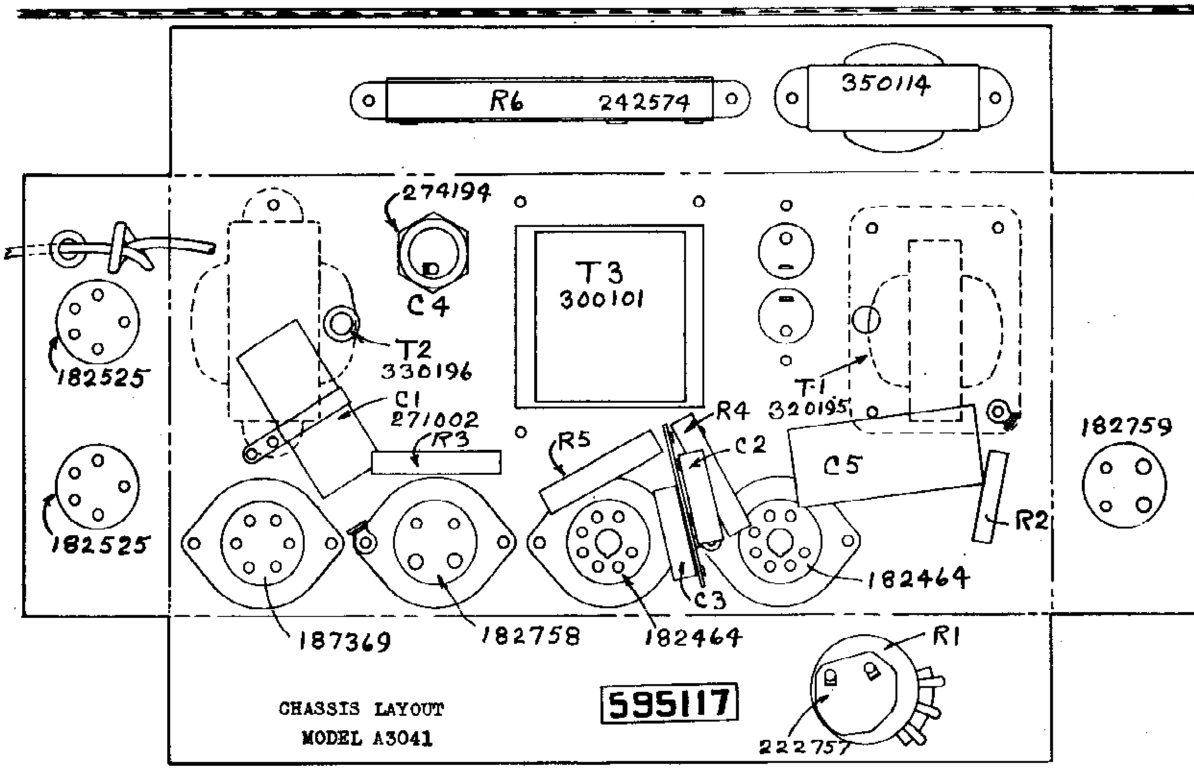


ELECTRO-ACOUSTIC PRODUCTS

MODEL A2232 Amplifier
MODEL A3041 Amplifier
Chassis Layouts



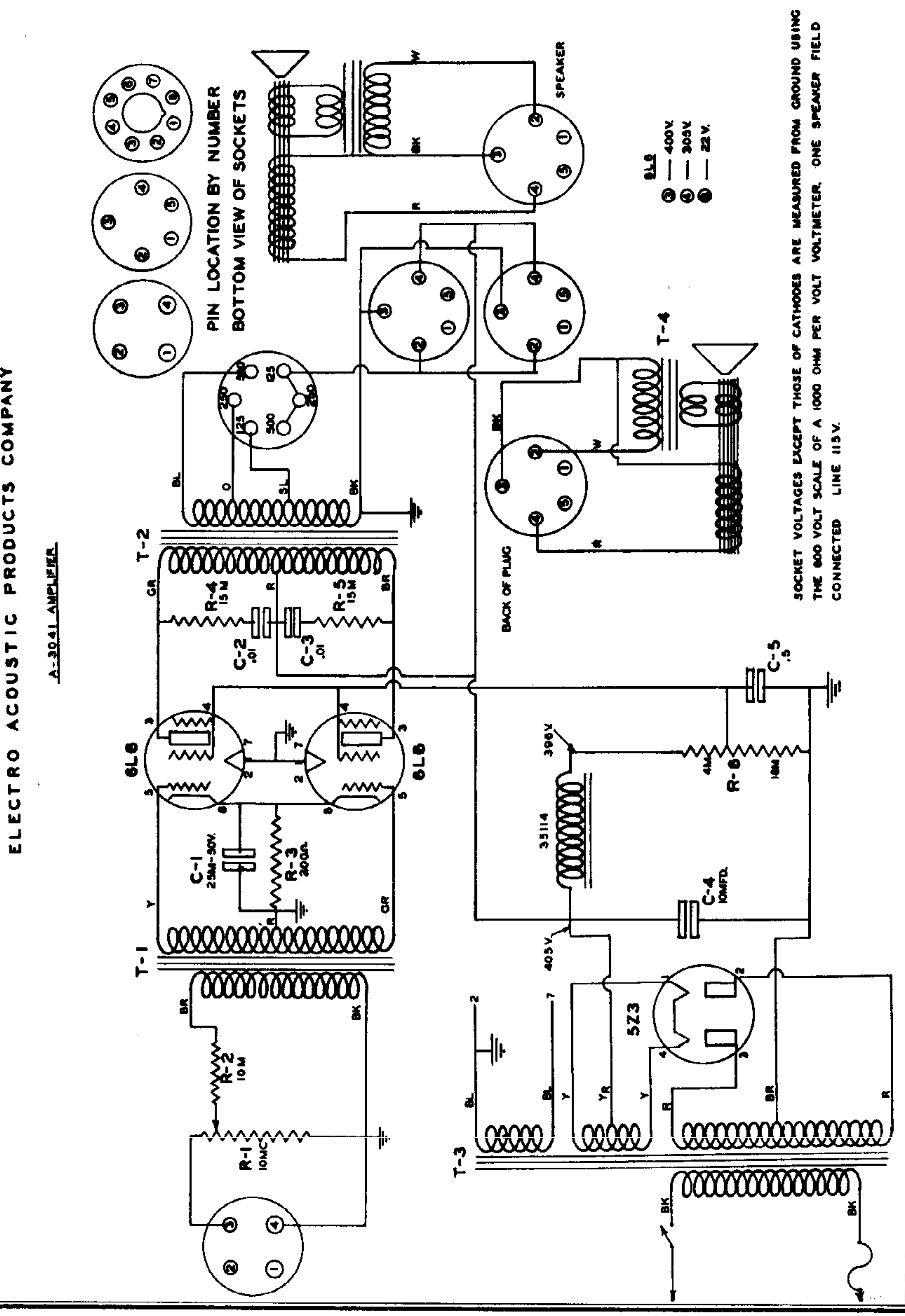
CHASSIS LAYOUT
MODEL A2232



CHASSIS LAYOUT
MODEL A3041

MODEL A3041 Amplifier
Schematic, Voltage

ELECTRO-ACOUSTIC PRODUCTS CO.



EMERSON RADIO & PHONO. CORP. MODELS AD108, AD110 AD125

Chassis AD

Schematic, Voltage

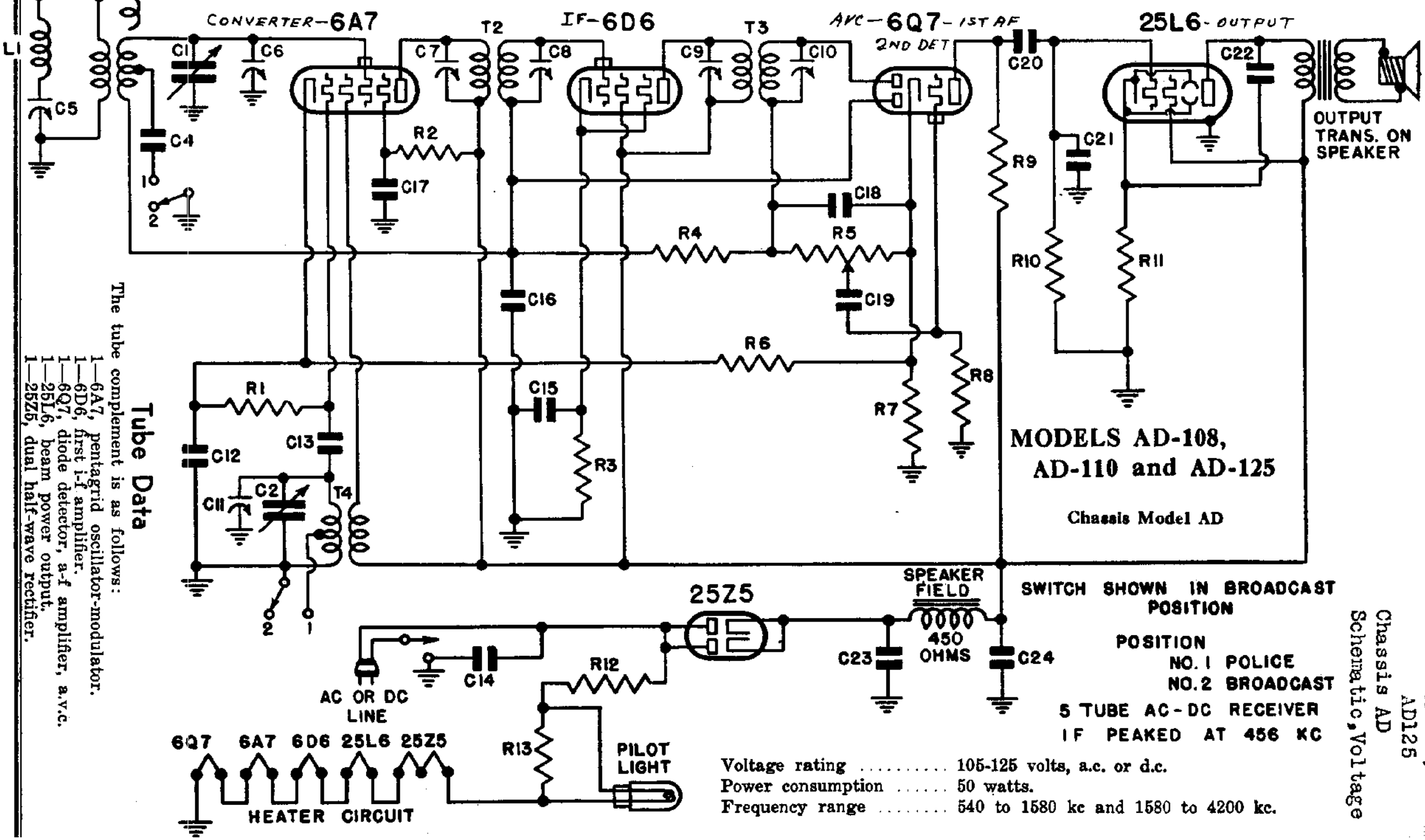
VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	100	50	2.3	100	6.3
6D6	100	100	3.5	—	6.3
6Q7	43	—	1.2	—	6.3
25L6	92	100	6.5	—	25.0

Voltage at 25Z5 cathode—128 volts.

Voltage across speaker field—28 volts.



MODELS AD-108, AD-110 and AD-125

Chassis Model AD

SWITCH SHOWN IN BROADCAST POSITION

POSITION
NO. 1 POLICE
NO. 2 BROADCAST

5 TUBE AC-DC RECEIVER
IF PEAKED AT 456 KC

Voltage rating .... 105-125 volts, a.c. or d.c.
Power consumption ...... 50 watts.
Frequency range .... 540 to 1580 kc and 1580 to 4200 kc.

Tube Data

The tube complement is as follows:

1—6A7, pentagrid oscillator-modulator.
1—6D6, first i-f amplifier.
1—6Q7, diode detector, a-f amplifier, a.v.c.
1—25L6, beam power output.
1—25Z5, dual half-wave rectifier.

MODELS AD108, AD110
AD125
Chassis AD
Alignment, Notes, Parts

EMERSON RADIO & PHONO. CORP.

ADJUSTMENTS

An oscillator with frequencies of 456 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck beside the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis in the right hand front corner. The trimmers are accessible through holes in the top of the chassis directly in front of the first i-f transformer.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 456 kc wave-trap is mounted on the metal strip at the rear of the chassis directly behind the variable condenser. The trimmer for the 456 kc wave-trap is mounted on the coil and is accessible from the bottom of the chassis.

I-f and Wave-trap Alignment

Rotate the wave-band switch (located at the rear of the chassis) to the broadcast position, clockwise, and swing the variable condenser to the minimum capacity position. Feed 456 kc to the grid-cap of the 6A7 tube and adjust the four i-f trimmers for maximum response. Feed 456 kc through a dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead and adjust the wave-trap trimmer for *minimum* response. (See General Notes, paragraph No. 7.)

R-f Alignment

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 140. Feed 1400 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response. The police band is self-tracking and does not require any adjustment.

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. The filament dropping resistor (R-12—see schematic) is a resistance wire in the special line cord. The cord will, therefore, become warm under normal operating conditions. To insure good heat radiation stretch out the line cord to its full length. Do not attempt to shorten it by cutting.
4. In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
5. The color coding of the i-f transformer leads is as follows:
   Grid—green — Plate—blue
   Grid return—black — B plus—red.
6. In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.
   Where the Flexible Mast is installed permanently, it is urgently recommended that the receiver antenna wire be cut. Leave just enough of this wire to reach from the receiver to the window strip connector.
7. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

REPLACEMENT PARTS

List Price as Effective as of Aug. 1st, 1937 (Subject to change without notice)

*Item	Part No.	DESCRIPTION	PRICE
L1	4DT-343	456 kc adjustable wave-trap	$ .60
T1	3RT-318	Two-band antenna coil	.85
T2	3RT-320B	456 kc first i-f transformer	1.10
T3	4DT-362	456 kc second i-f transformer	1.10
T4	3RT-319A	Two-band oscillator coil	.80
C1, C2	4DC-344	Two-gang variable condenser	2.95
C3	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C4	AAC-114	0.001 mf, mica condenser	.20
‡C5		Trimmer, part of 456 kc wave-trap.	
†C6, C11		Trimmer, part of variable condenser.	
‡C7, C8, C9, C10		Trimmer, part of i-f coil assembly.	
C12, C15, C17	AC-6	0.1 mf, 200 volt tubular condenser	.20
C13	AAC-106A	0.00005 mf mica condenser	.20
C14	2VC-242A	0.1 mf, 400 volt molded paper condenser	.20
C16	BC-12	0.05 mf, 200 volt tubular condenser	.20
C18, C21	NC-70A	0.0002 mf mica condenser	.20
C19	CCC-127	0.01 mf, 200 volt tubular condenser	.20
C20	LC-65	0.02 mf, 400 volt tubular condenser	.20
C22	4DC-349	0.04 mf, 400 volt tubular condenser	.20
C23, C24	4DC-345	Dual 16 mf, 150 volt tubular dry electrolytic condenser	1.50
R1	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R2	ZZR-196	30,000 ohm 1/4 watt carbon resistor	.16
R3	3CR-295	410 ohm 1/2 watt wire-wound resistor	.16
R4, R8	HR-42	2 megohm 1/4 watt carbon resistor	.16
R5	2DR-169A	Volume control with line switch—500,000 ohm	1.20
R6, R7	3CR-294	240 ohm 1/2 watt wire-wound resistor	.16
R9	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R10	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R11	3FR-293	140 ohm, 1/2 watt wire-wound resistor	.16
R12		145 ohm, 15 watt resistor wire in line cord.	
R13	2DR-218	40 ohm wire-wound metal clad resistor	.30
	3QS-257B	5" dynamic speaker	4.85
	4DS-264	Wave-band switch	.85
	XL-9	Pilot light 6.3 volt, .25 amp., Mazda No. 46	.20
	2DW-62	Line cord with built-in resistor wire—R12	.90

DIAL ASSEMBLY CONSISTS OF:

	Part No.	DESCRIPTION	PRICE
	2DD-43A	Dial scale and bracket	.90
	2DD-21B	Pyralin drive disc	.30
	2DD-21D	Dial crystal	.15
	2DD-21E	Dial pointer	.10
	2DD-21F	Vernier friction drive	.50

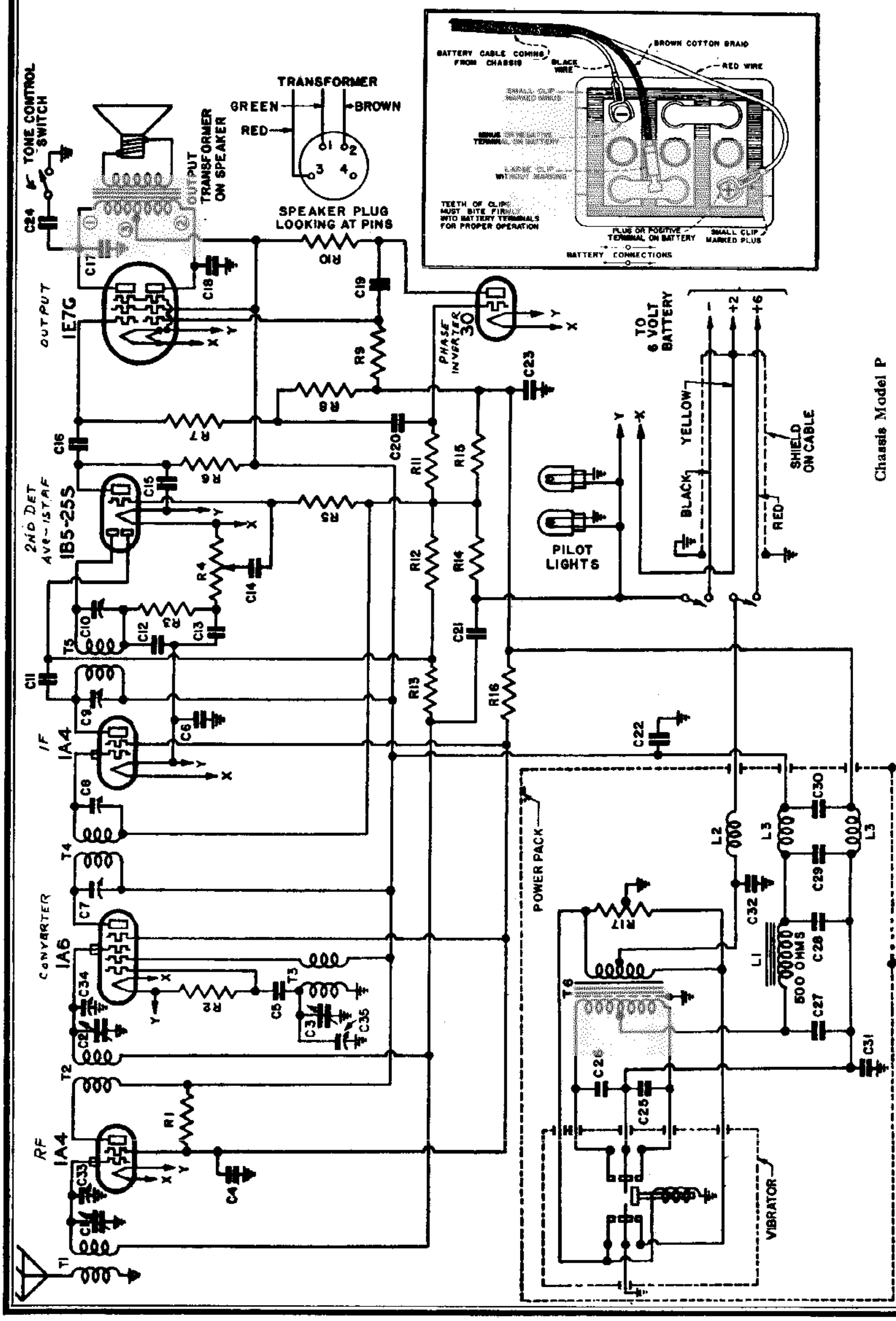
*Item number locates the article on the schematic diagram.

†These trimmer condensers are part of the variable condenser and can not be supplied separately.

‡These trimmer condensers are part of the coil assemblies and can not be supplied separately.

EMERSON RADIO & PHONO. CORP.

MODELS P117, P135
Chassis P
Schematic, Connections



Chassis Model P

Voltage rating	4 volts for power pack.
	2 volts for filaments.
Current drain	1.7 amps.
Frequency range	540 kc to 1,700 kc.

IF PEAK 456 KC

MODELS P117, P135
Chassis P
Voltage, Alignment
Notes, Parts

EMERSON RADIO & PHONO. CORP.

Six-Tube Battery-Operated Superheterodyne

MODELS P117 and P135
ADJUSTMENTS

An oscillator with frequencies of 456 kc and 1500 kc should be used.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Location of I-f Transformers and Trimmers

The first i-f transformer, part number 3HT-287A is in an oblong coil can located on the top of the chassis to the right of the variable condenser. The two trimmers for this i-f are accessible through holes in the top of the coil can.

The second i-f transformer, part number 3HT-288A, is in an oblong coil can located on the top of the chassis directly behind the first i-f tube. The two trimmers for this i-f are accessible through holes in the top of the coil can.

The oscillator, antenna, and r-f trimmers are located on the top of the variable condenser. The oscillator trimmer is on the rear section of the variable condenser, the antenna trimmer is on the front section of the variable condenser and the r-f trimmer is on the center section of the variable condenser.

Alignment Procedure

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 456 kc to the grid cap of the 1A6 tube.
3. Adjust the four i-f trimmers, repeating for maximum response.
4. Set dial pointer to 1500 and feed 1500 kc to the antenna lead through a standard broadcast dummy antenna (a .0002 mf mica condenser may be used as a substitute).
5. Adjust the oscillator trimmer (on rear section of variable condenser) for maximum response.
6. Adjust the r-f trimmer (on center section of variable condenser) for maximum response.
7. Adjust the antenna trimmer (on front section of variable condenser) for maximum response.

GENERAL NOTES

1. The large, oblong metal box on the top of the chassis deck contains the power pack. The function of this power pack is to convert the 4 volt direct current from the storage battery into 145 volt direct current. The vibrator used is of the synchronous type.
2. The illustration on the right indicates the correct battery connections. Three battery clips are attached to the ends of the leads emerging from the battery cable. One of the two small clips is marked plus and should be attached to the positive terminal of the battery. The small clip without marking should be attached to the negative side of the battery.

   Note that the battery is made up of three cells. The large battery clip should be attached to the positive side of the same cell to which the negative clip is attached.

   It is important that these battery connections be made correctly. Before turning the receiver on check the connections with the illustration.
3. The color coding of the leads of the i-f transformers is as follows:

   Grid—green
   Grid return—black
   Plate—blue
   B plus—red
4. With few exceptions the color coding of the general wiring is as follows:

   Plate—blue
   B plus—red
   Screen—brown
   Cathode—white or yellow
   Grid—green
   Filament and ground—black
5. The color coding of the leads of the power pack is as follows:

   A plus—yellow
   B plus—red
   Common neg.—black.
6. An efficient antenna system (aerial) is necessary to enable a full realization of the merits of the receiver. The Emerson All-Wave Antenna is especially designed for high efficiency and reduction of noise on all frequency ranges. Complete instructions for the installation of this antenna are supplied with each kit.

Tube Data

The tube complement is as follows:

1—1A4, r-f amplifier
1—1A6, oscillator-modulator
1—1A4, 1st i-f amplifier
1—1B5/25S 2nd detector, a.v.c., a-f amplifier
1—30, phase inverter
1—1E7G, push-pull pentode output.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to chassis with volume control turned on full and no signal. Battery voltage for these readings was 6.1 volts.

Tube	Plate	Screen	Osc. Plate
1A4 r-f	137	53	—
1A6	137	53	137
1A4 i-f	137	53	—
1B5/25S	95	—	—
30	55	—	—
1E7G	135	137	—

Voltage across filaments—2 volts.

To check the bias of the 1E7G tube, measure the voltage from the filament terminal, *closest to the screen*, of the 30 tube to the negative side of the 20 mf tubular electrolytic condenser. This reading should be 7.5 volts.

To check the bias of the other tubes, measure the voltage from the filament terminal, *closest to the screen*, of the 30 tube to the grid cap of the 1A4 i-f tube. This reading should be 3 volts.

REPLACEMENT PARTS LIST

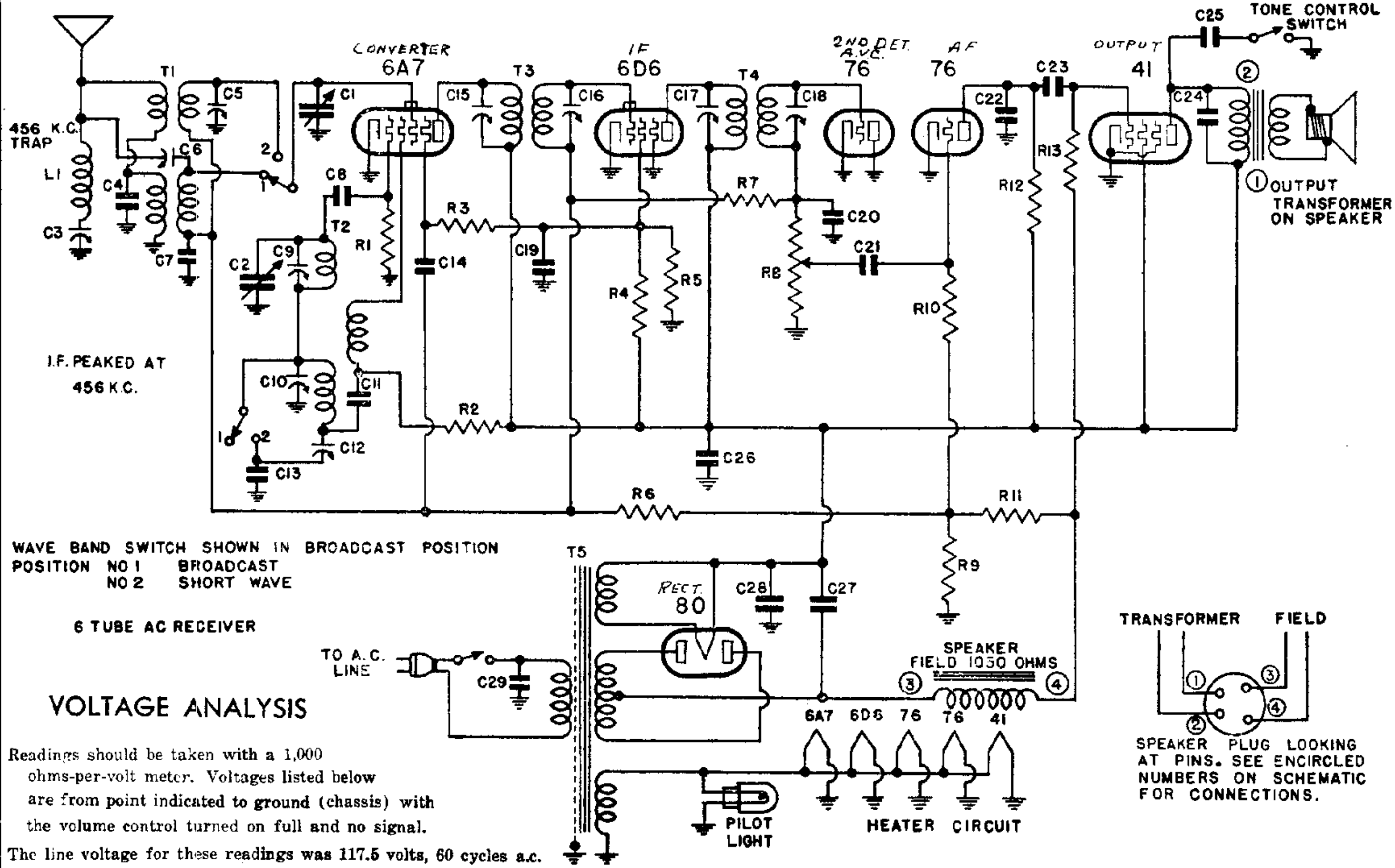
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

*ITEM	PART NO.	DESCRIPTION	PRICE (List Price ea. Effective as of Aug. 15, 1936)
T1	3PT-309	Antenna coil	$ .85
T2	3HT-285	R-f interstage coil	.75
T3	3HT-286	Oscillator coil	.50
T4	3HT-287A	456 kc first i-f transformer	1.35
T5	3HT-288A	456 kc second i-f transformer	1.35
T6	3PT-310	Power transformer	2.00
L1	2KT-239	Iron-core filter choke (500 ohms)	1.20
L2	2KT-240	Layer-wound "A" choke	.65
L3	3PT-311	Dual r-f choke assembly (170 microhenries each section)	1.50
R1	LR-60	20,000 ohm, 1/4 watt carbon resistor	.16
R2, R3	KR-53	50,000 ohm, 1/4 watt carbon resistor	.16
R4	3PR-258	Volume control (250,000 ohms)	.75
R5, R12	KR-56	500,000 ohm, 1/4 watt carbon resistor	.16
R6, R10	KR-54	100,000 ohm, 1/4 watt carbon resistor	.16
R7	LR-61	200,000 ohm, 1/4 watt carbon resistor	.16
R8	ZZR-196	30,000 ohm, 1/4 watt carbon resistor	.16
R9, R11	KR-55	250,000 ohm, 1/4 watt carbon resistor	.16
R13	KR-57	1 megohm, 1/4 watt carbon resistor	.16
R14	IIR-130	150 ohm, 1/2 watt wire-wound resistor	.16
R15	3PR-260	200 ohm, 1/2 watt wire-wound resistor	.16
R16	3BR-247	40,000 ohm, 1/4 watt carbon resistor	.16
R17	ZR-105	200 ohm wire-wound center-tapped resistor	.16
C1, C2, C3	3PC-304	Three-gang variable condenser	4.15
C4, C21	AC-6	0.1 mf, 200 volt tubular condenser	.20
C5, C11	EC-24A	0.0001 mf mica condenser	.20
C6,	BBC-131	0.9 mf, 200 volt tubular condenser	.50
C7, C8		Trimmers. part of 3HT-287A, first i-f transformer assembly. (Trimmers can not be supplied separately.)	
C9, C10		Trimmers, part of 3HT-228A, second i-f transformer assembly. (Trimmers can not be supplied separately.)	
C12, C13, C15	AC-7A	0.00025 mf mica condenser	.20
C14, C20	FC-29	0.02 mf, 200 volt tubular condenser	.20
C16, C19, C30	LC-65	0.02 mf, 400 volt tubular condenser	.20
C17, C18	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C23	3PC-310	20 mf, 25 volt tubular dry electrolytic condenser	.80
C22	BC-13	0.25 mf, 200 volt tubular condenser	.20
C24	TTC-177	0.01 mf, 600 volt tubular condenser	.20
C25, C26	3PC-308	0.0125 mf, 800 volt tubular condenser	.60
C27, C28	3PC-307	Dual 8 mf, 300 volt dry electrolytic condenser	3.00
C29	EEC-132	0.1 mf, 400 volt tubular condenser	.20
C31, C32	2KC-236	0.5 mf, 120 volt tubular condenser	.60
C33, C34, C35		Trimmers on three-gang variable condenser. (Trimmers can not be supplied separately.)	
	3PS-214	6½" permanent magnet dynamic speaker (for Model P-117)	8.25
	3PS-222	10" permanent magnet dynamic speaker (for Model P-135)	11.00
	2TS-145E	Tone control switch	.35
	3PS-215	Power switch	.75
	3PW-81	Battery cable	1.85
	AL-2	Pilot light 2.5 volt, 0.5 amp Mazda No. 41	.20
	3PZ-452	Dial face	.75
	3PZ-456	Dial drive belt	.20
	3CZ-337	Dial drive shaft and pulley	.10
	3CZ-339	Idler pulley	.05
	3CZ-340	Idler spring	.05
	3CZ-341	Condenser shaft pulley	.10
	3FZ-353	Dial pointer	.10
	3CZ-350	Escutcheon with crystal	1.05

*Item number locates the article on the schematic diagram.

MODELS Z117, Z122, Z133
Z141, Z150, Z159
Z160 Z135
Chassis Z
Schematic, Voltage

EMERSON RADIO & PHONO. CORP.



VOLTAGE ANALYSIS

Readings should be taken with a 1,000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal.

The line voltage for these readings was 117.5 volts, 60 cycles a.c.

Tube	Plate	Screen	Osc. Plate	Cathode	Fil.
6A7 osc.-mod.	244	62	118	0	6.3 a.c.
6D6 i-f amp.	244	85	—	0	6.3 a.c.
76 detector a.v.c.	0	—	—	0	6.3 a.c.
76 a-f amp.	85	—	—	0	6.3 a.c.
41 output	226	244	—	0	6.3 a.c.

Voltage across speaker field—65.

Voltage at 80 filament to B minus (center-tap of high-voltage winding on power transformer)—325.

The grid bias for all the tubes is developed across the resistors R9 and R11 (see schematic). The total voltage measured across R9 and R11 should be 15 volts, and is the bias for the 41 tube. The voltage measured across R9 should be 5 volts. To check the bias on the 6A7 and 6D6 tubes, measure the values of resistors R6, R7 and R8 (see schematic).

Chassis Model Z

Listed by Underwriters' Laboratories

Voltage rating ...... 105-125 volts, 60 cycle a.c.
Power consumption .. 55 watts
Frequency ranges ... 540 to 1730 kc and 5.6 to 18 megacycles

MODELS Z117, Z122, Z133
Z141, Z150, Z159
Z160 Z135

EMERSON RADIO & PHONO. CORP.

Chassis Z
Alignment, Changes, Notes
Parts

Six-Tube, A.C., Dual-Wave Superheterodyne

MODELS Z117, Z122, Z133, Z135, Z141, Z150, Z159, and Z160

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600 and 16,000 kc should be used.

An output meter should be used across the voice coil or output transformer for observing maximum response.

If the circuit is at all disturbed, both the broadcast and short-wave bands must be realigned.

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Always use as weak a test signal as possible during alignment.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The second i-f is the one directly behind the variable condenser. The four trimmers, two for each transformer, are accessible through holes in the tops of the cans.

The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the 6A7 tube) with the screw adjustment accessible through a hole in the front of the chassis.

The antenna coils for the broadcast and short-wave bands and the 456 kc wave trap are wound on one form and mounted underneath the chassis deck directly behind the adjustable padding condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the short-wave antenna trimmer. The central trimmer is the broadcast antenna trimmer. The trimmer nearest the rear of the chassis is the 456 kc wave trap.

The oscillator coils for the broadcast and short-wave bands are wound on one form and mounted underneath the chassis deck near the variable condenser. The trimmer for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is for the short-wave oscillator coil and the trimmer farthest from the front is for the broadcast oscillator coil.

I-f and Wave-trap Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 456 kc, through a 0.02 mf paper condenser, to the grid cap of the 6A7 tube (do not remove the grid clip from the tube). Adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna through a standard dummy antenna (a 0.0002 mica condenser may be substituted) and adjust the wave-trap trimmer (farthest from front on left side of the chassis) for *minimum* response. (See General Notes.)

Short-Wave Alignment (Alignment of the short-wave band should precede broadcast alignment)

Use a 400 ohm dummy antenna (a 400 ohm non-inductive resistor in series with the test oscillator antenna lead) when aligning the short-wave coils. Rotate the wave-band switch to the short-wave (counter-clockwise) position, and set the dial pointer exactly at 16 megacycles. Feed 16,000 kc to the antenna and adjust the short-wave oscillator trimmer (nearest the front beside variable condenser) for maximum response, and then adjust the short-wave antenna trimmer (nearest the front on the left side of the chassis) for maximum response. Be very careful to choose the minimum capacity peak on the oscillator trimmer.

Broadcast Alignment

Use a standard dummy antenna in aligning the broadcast coils. (A .0002 condenser may be substituted.) Rotate the wave-band switch to the broadcast (clockwise) position. Set the dial pointer at 60 and feed 600 kc. Adjust the broadcast series padder (in corner near 6A7 tube) for maximum response. Move the dial pointer to 160 and feed 1600 kc. Adjust the broadcast oscillator trimmer (farthest from front beside the variable condenser) for maximum response and then readjust the broadcast antenna trimmer (central trimmer at left side of chassis). Return pointer to 60, feed 600 kc and readjust the broadcast series padder, rocking the variable condenser (rotate the variable condenser shaft back and forth through a small arc) for maximum response.

GENERAL NOTES

1. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.
2. The receiver should never be turned on with either the speaker plug or the 41 tube out of their sockets, since the rapid rise in rectifier voltage would damage the electrolytic condensers.
3. The pilot light may be replaced by slipping the push-on socket off the dial and unscrewing the bulb. It is not necessary to remove either the dial or chassis from cabinet.
4. In replacing chassis in cabinet do not tighten mounting screws so much that chassis will not float freely, and do not allow any part of the dial assembly to touch the cabinet. Do not push control knobs on so far that they touch the cabinet front panel. If these precautions are not observed the receiver may become microphonic.
5. The color coding of the 3ZT-345 power transformer leads is as follows: (See production changes for color coding of power transformer previously used.)
   Primary—two black leads
   High voltage sec.—two red leads
   High voltage sec. center tap—red and yellow
   6.3 v. sec.—two green leads
   5 v. sec.—two yellow leads
6. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. The Emerson All-Wave Antenna is especially designed for high efficiency and reduction of noise on all frequency ranges. Complete instructions for the installation of this antenna are supplied with each kit.

Tube Data

The tube complement is as follows:

1—6A7, pentagrid oscillator-modulator.
1—6D6, i-f amplifier.
1—76, diode detector and a.v.c. (behind second i-f transformer).
1—76, audio amplifier.
1—41, pentode power output.
1—80, full-wave rectifier.

REPLACEMENT PARTS

List Price Effective as of Feb. 1st., 1937 (Subject to change without notice)

*Item	Part No.	DESCRIPTION	PRICE
T1, L1	3CT-289A	Two-band antenna coil and 456 kc wave trap	$1.80
T2	3CT-290A	Two-band oscillator coil	1.85
T3	3ZT-342	456 kc first i-f transformer	1.50
T4	2NT-231	456 kc second i-f transformer	1.85
†T5	3ZT-345	Power transformer	4.45
R1	KR-53	50,000 ohm, 1/4 watt carbon resistor	.16
R2	3BR-247	40,000 ohm, 1/4 watt carbon resistor	.16
R3	LR-65	10,000 ohm, 1/4 watt carbon resistor	.16
R4	BR-12	25,000 ohm, 1 watt carbon resistor	.16
R5	3LR-265	40,000 ohm, 1/2 watt carbon resistor	.16
R6	NNR-220	3 megohm, 1/4 watt carbon resistor	.16
R7	HR-42	2 megohm, 1/4 watt carbon resistor	.16
R8	3ZR-288	Volume control with line switch—500,000 ohms	1.05
R9	3VR-270	90 ohm, 1/2 watt wire-wound resistor	.16
R10	3RR-274	5 megohm, 1/4 watt carbon resistor	.16
R11	3ZR-289	210 ohm, 1/2 watt wire-wound resistor	.16
R12	KR-54	100,000 ohm, 1/4 watt carbon resistor	.16
R13	KR-56	500,000 ohm, 1/4 watt carbon resistor	.16
C1, C2	3EC-264	Two-gang variable condenser	6.65
‡C3, C5, C6		Trimmer, part of antenna coil.	
C4, C8	AAC-106A	0.00005 mf mica condenser	.20
C7, C19	BC-12	0.05 mf, 200 volt tubular condenser	.20
‡C9, C10		Trimmer, part of oscillator coil.	
C11, C14	KC-58	0.01 mf, 400 volt tubular condenser	.20
C12	2NC-231	Single adjustable padding condenser. Range: 300 to 600 mmf	.50
C13	3EC-267	0.0042 mf mica condenser	.40
‡C15, C16		Trimmer part of first i-f transformer.	
‡C17, C18		Trimmer part of second i-f transformer.	
C20	AC-7A	0.00025 mf mica condenser	.20
C21	HC-34	0.006 mf, 600 volt tubular condenser	.20
C22	IC-47	0.0005 mf mica condenser	.20
C23	LC-65	0.02 mf, 400 volt tubular condenser	.20
C24	ZC-115	0.008 mf, 1000 volt tubular condenser	.20
C25	2TC-189	0.015 mf, 1000 volt tubular condenser	.20
C26	EEC-182	0.1 mf, 400 volt tubular condenser	.20
†C27	2NC-246	16 mf, 450 volt wet electrolytic condenser	1.20
†C28	2NC-247	16 mf, 405 volt wet electrolytic condenser	1.20
C29	3LC-297A	0.01 mf, 400 volt molded type paper condenser	.20
	3TS-145E	Tone control switch	.35
	3TS-111K	Wave-band switch	.60
	3NS-122	6" dynamic speaker	5.00
	3BS-191	8" dynamic speaker	8.90
	[illegible]	8" dynamic speaker	8.90
	[illegible]	10" dynamic speaker	8.35
	XL-9	Pilot light 6.8 volt, .25 amp., Mazda No. 44	.20
	3ZZ-320	Dial face	.75
	3CZ-336A	Dial drive belt	.10
	3CZ-337	Dial drive shaft and pulley	.10
	3CZ-339	Idler pulley	.05
	3CZ-340	Idler pulley spring	.05
	3CZ-341	Condenser shaft pulley	.10
	3FZ-353	Dial pointer	.10
	3CZ-350	Escutcheon with crystal	1.05

PRODUCTION CHANGES

Early Model Z-150 receivers differed from the schematic diagram as follows:

a. C27 is a 12 mf, 450 volt dry electrolytic condenser.
b. C28 is a 8 mf, 450 volt dry electrolytic condenser.
c. A 50,000 ohm 1/4 watt carbon resistor, by-passed to chassis with a .1 mf, 400 volt condenser, is used as an R-C filter between B plus and the plate resistor (R12) of the 76 a-f amplifier.
d. A 8 mf, 150 volt dry electrolytic condenser is connected from the screen-grid of the 6D6 i-f amplifier to ground.

Later Model Z-150 receivers differ from the schematic diagram as follows:

a. C27 is a 12 mf, 450 volt dry electrolytic condenser.
b. C28 is a 24 mf, 400 volt dry electrolytic condenser.
c. A .25 mf, 200 volt condenser is connected from the screen-grid of the 6D6 i-f amplifier to ground.

In receivers bearing serial numbers below 1,072,650:

a. The power transformer is part No. 2NT-233. The color coding of this transformer is as follows:
   Primary—two green leads
   High voltage secondary—two black leads
   High voltage secondary center tap—yellow lead.
   6.3 volt secondary—two blue leads
   5 volt secondary—two red leads.

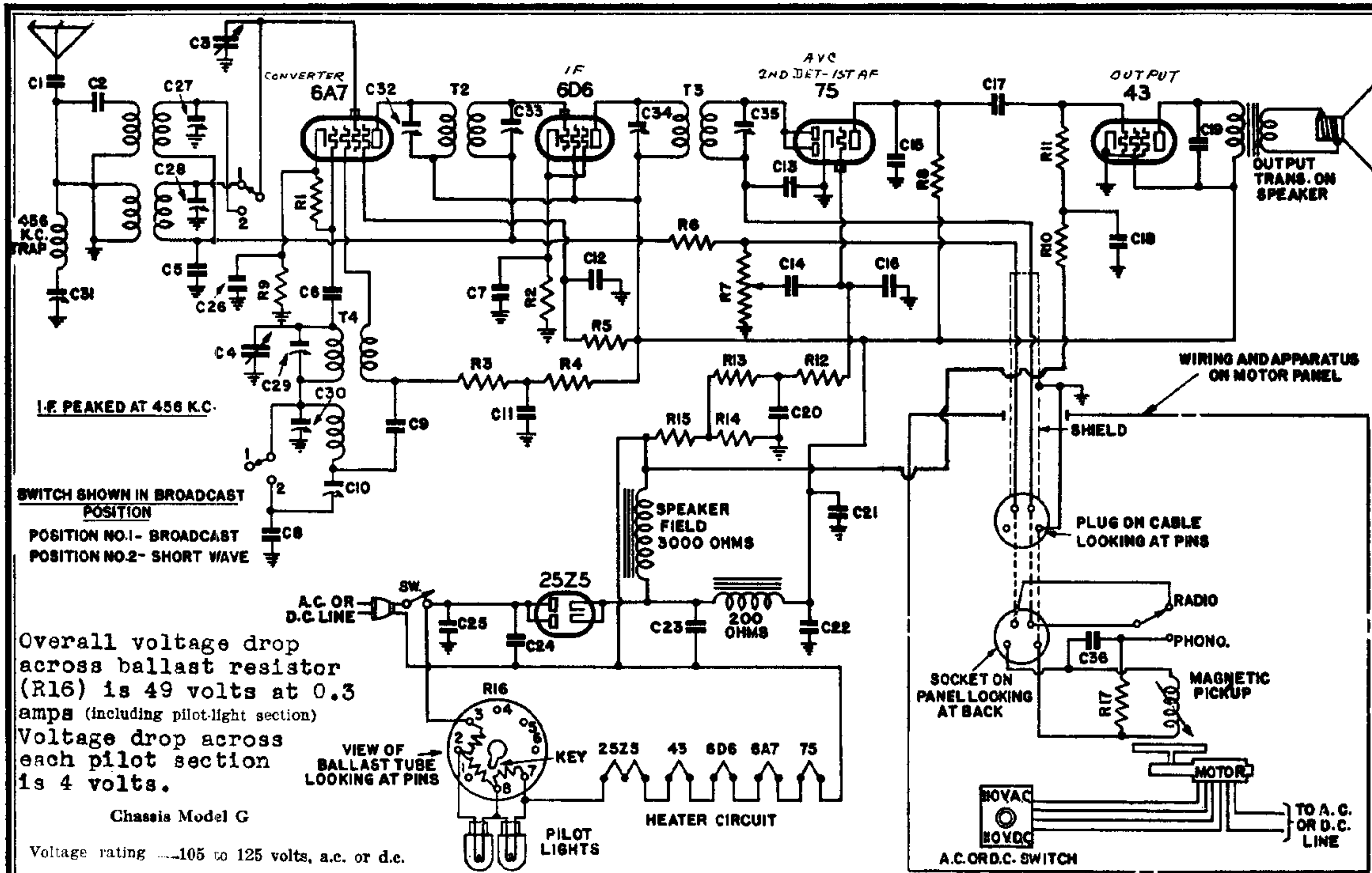
*Item number locates the article on the schematic diagram.

†See production changes.

‡These trimmer condensers are part of the coil assemblies and can not be supplied separately.

MODEL G127
Chassis G
Schematic,Voltage

EMERSON RADIO & PHONO. CORP.



SWITCH SHOWN IN BROADCAST POSITION
POSITION NO.1- BROADCAST
POSITION NO.2- SHORT WAVE

Overall voltage drop across ballast resistor (R16) is 49 volts at 0.3 amps (including pilot-light section)
Voltage drop across each pilot section is 4 volts.

Chassis Model G

Voltage rating ......105 to 125 volts, a.c. or d.c.

Current drain ......0.42 amperes for receiver and 0.2 amperes for motor.

Frequency ranges ......540 to 1625 kc,
...... 5.6 to 18.0 megacycles.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	100.0	42	2.0	60	6.3 a.c.
6D6	100.0	100	2.0	—	6.3 a.c.
75	39.5	0	0	—	6.3 a.c.
43	87.0	100	0	—	25 a.c.

Voltage at 25Z5 cathode—110 volts.

MODEL G127
Chassis G
Alignment, Notes
Changes, Parts

EMERSON RADIO & PHONO. CORP.

Combination Phonograph and A.C.-D.C. Dual-Wave Superheterodyne

SIX TUBES, INCLUDING BALLAST TUBE

Model G-127

RECEIVER ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1425 and 15,000 kc should be used.

In addition an output meter should be used across the voice coil or output transformer for observing maximum response.

Location of Coils and Trimmer Adjustments

The broadcast antenna coil, the short-wave antenna coil and the 456 kc wave trap are one assembly mounted underneath the chassis deck to the right of the variable condenser. The trimmers for these coils are accessible through three holes in the top of the chassis. The trimmer closest to the front of the chassis is for the short-wave antenna coil. The central trimmer is for the broadcast antenna coil and the trimmer farthest from the chassis front is for the 456 kc wave trap.

The broadcast oscillator and short-wave oscillator coils are wound on one tubing and mounted on the inside of the rear chassis wall. The trimmers for these coils are accessible through two holes in the rear chassis wall. The left-hand trimmer (looking at the rear wall) is for the short-wave oscillator coil and the right-hand trimmer is for the broadcast oscillator coil.

The two i-f transformers are in oblong coil cans located on the top of the chassis. The first i-f transformer is the one behind the variable condenser. The trimmers for these transformers are accessible through holes in the tops of the cans.

The broadcast series padding condenser is located on the rear wall of the chassis below the 6A7 tube.

I-f Transformer and Wave-Trap Alignment

Turn the switch clockwise to the broadcast position and rotate the variable condenser to the minimum capacity position. Feed 456 kc to the grid cap of the 6A7 tube and adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna and adjust the wave-trap trimmer (rear screw beside variable condenser) for minimum response.

Short-Wave Alignment

Use a dummy antenna (400 ohm resistor) when aligning the short-wave coils.

Rotate the wave-band switch counter-clockwise to the short-wave position and set the dial pointer to 15 megacycles. Feed 15 megacycles through the dummy antenna and adjust the short-wave oscillator trimmer (left-hand screw on rear chassis wall) for maximum response and then adjust the short-wave antenna trimmer (front screw beside variable condenser) for maximum response. The variable condenser should be rocked while adjusting the antenna trimmer. (Rotate variable condenser rotor shaft back and forth through a small arc).

Broadcast Alignment

Rotate the wave-band switch to the broadcast position, clockwise, and set the dial pointer at 60. Feed 600 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute).

Adjust the broadcast series padding condenser (on rear chassis wall, below 6A7 tube) for maximum response. Move pointer to 142.5, feed 1425 kc and adjust the broadcast oscillator trimmer (right-hand screw on rear chassis wall) for maximum response and then adjust the broadcast antenna trimmer (central screw beside variable condenser) for maximum response. Return pointer to 60, feed 600 kc and readjust the series padding condenser rocking the variable condenser for maximum response.

GENERAL INSTRUCTIONS

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Always use as weak a test signal as possible during alignment.

Never leave a trimmer with the outside plate so loose t'ut there is no tension on the screw. Either bend the plate up or remove the screw entirely.

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f portion of the circuit, the receiver should be carefully re-aligned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. The filament dropping resistor (R16 on schematic) is in a special metal tube at the rear of the chassis. This tube will become quite hot under normal operating conditions. For voltage drop specifications, see below.
4. When operating the receiver on d.c. it may be necessary to reverse the line plug to obtain the correct polarity.
5. The two i-f transformers are held to the chassis by snap-on fasteners. To remove an i-f, unsolder all the leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.
6. The color coding of the i-f transformer leads is as follows:

Grid—green	Plate—blue
Grid return—black	B plus—red

7. The phonograph motor has been adjusted at the factory, to turn at a speed of 78 r.p.m. The speed may be checked by counting the turns per minute or by using a stroboscope disc and a neon light (the stroboscope method will only work when the neon bulb is lighted from a 60 cycle a.c. supply).
8. An a.c.-d.c. switch is provided to switch the motor for a.c. or d.c. power supply. It is important that this switch be in the proper position for the power supply available.

Tube Data

The tube complement is as follows:

1-6A7, pentagrid oscillator-modulator
1-6D6, first i-f amplifier
1-75, diode detector, a-f amplifier, automatic volume control
1-43, pentode power output
1-25Z5, dual half-wave rectifier
1-8CR-241, ballast tube (R-16 on schematic).

REPLACEMENT PARTS

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

*Item	Part No.	DESCRIPTION	PRICE (List Price ea. Effective as of Aug. 1st, 1936)
T1	8CT-289	Two-band antenna coil	$2.40
T2	8CT-274	456 kc first i-f transformer	1.50
T3	8CT-275	456 kc second i-f transformer	1.35
T4	8CT-290	Two-band oscillator coil	1.10
L1	2CT-207	Iron-core filter choke	.90
R1	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R2, R9	AAR-119	300 ohm ½ watt wire-wound resistor	.16
R3, R4	LR-65	10,000 ohm ¼ watt carbon resistor	.16
R5	ZZR-196	30,000 ohm ¼ watt carbon resistor	.16
R6	KR-57	1 megohm ¼ watt carbon resistor	.16
R7	2NR-214C	Volume control with line switch—250,000 ohms	1.20
R8, R13	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R10	OR-73	25,000 ohm ¼ watt carbon resistor	.16
R11, R12	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R14	8CR-242	20 ohm ½ watt wire-wound resistor	.16
R15	8CR-261	230 ohm 1 watt metallized resistor	.16
R16	8CR-241	Plug-in type ballast resistor	.80
R17	KR-54	100,000 ohm ¼ watt carbon resistor	.16
C1	AAC-114	.001 mf mica condenser	.20
C2		0.00005 mica condenser (part of 8CT-289 antenna coil assembly)	
C3, C4	8CC-275	Two-gang variable condenser	3.65
C5	BC-12	0.05 mf, 200 volt tubular condenser	.20
C6	AAC-106A	0.00005 mica condenser	.20
C7, C12, C18, C20, C21, C26	AC-6	0.1 mf, 200 volt tubular condenser	.20
C3	3EC-267	0.0042 mf mica condenser	.20
C9, C36	CCC-127	0.01 mf, 200 volt tubular condenser	.20
C10	2NC-231	Single adjustable padding condenser, range: 300 to 400 mmf	.50
C11	YC-98A	4 mf, 150 volt tubular electrolytic condenser	1.05
C13, C15	AC-7A	0.00025 mf mica condenser	.20
C14, C17	LC-65	0.02 mf, 400 volt tubular condenser	.20
C19	TTC-177	0.01 mf, 800 volt tubular condenser	.20
C22, C23	8CC-261	20 mf, 150 volt wet electrolytic condenser	.90
C25	8LC-297A	0.01 mf, 400 volt molded type condenser	.20
C24	EEC-132	0.1 mf, 400 volt tubular condenser	.20
C27, C28, C31		Trimmer, part of 3CT-289 antenna coil assembly. (Trimmers can not be supplied separately.)	
C29, C30		Trimmer, part of 8CT-290 oscillator coil assembly. (Trimmers can not be supplied separately.)	
C32, C33		Trimmer, part of 8CT-274 first i-f transformer. (Trimmers can not be supplied separately.)	
C34, C35		Trimmer, part of 3CT-275 second i-f transformer. (Trimmers can not be supplied separately.)	
	TTS-111J	Wave-band switch	.60
	8CS-171	6½" dynamic speaker	5.25
	XL-9	Pilot light, 6.8 volt, .25 amp. Mazda No. 46	.20
	8CZ-356	Dial face	.75
	8CZ-336A	Dial drive belt	.10
	8CZ-337	Dial drive shaft and pulley	.10
	8CZ-339	Idler pulley	.05
	8CZ-340	Idler pulley spring	.05
	8CZ-341	Condenser shaft pulley	.10
	8FZ-358	Dial pointer	.10
	8CZ-350	Escutcheon with crystal	1.05
	8GM-251	Phonograph needle cup	.75
	8GZ-429	Magnetic pickup (high impedance type)	19.50
	8GZ-429A	Magnetic pickup (high impedance type) with pickup rest, part no. 8GZ-442	14.95
	8GS-202	Phono-radio switch	.50
	8GS-203	On-off switch for phonograph motor (with escutcheon)	.95
	8GPM-1	A.c.-d.c. phonograph motor complete with accessories	45.00

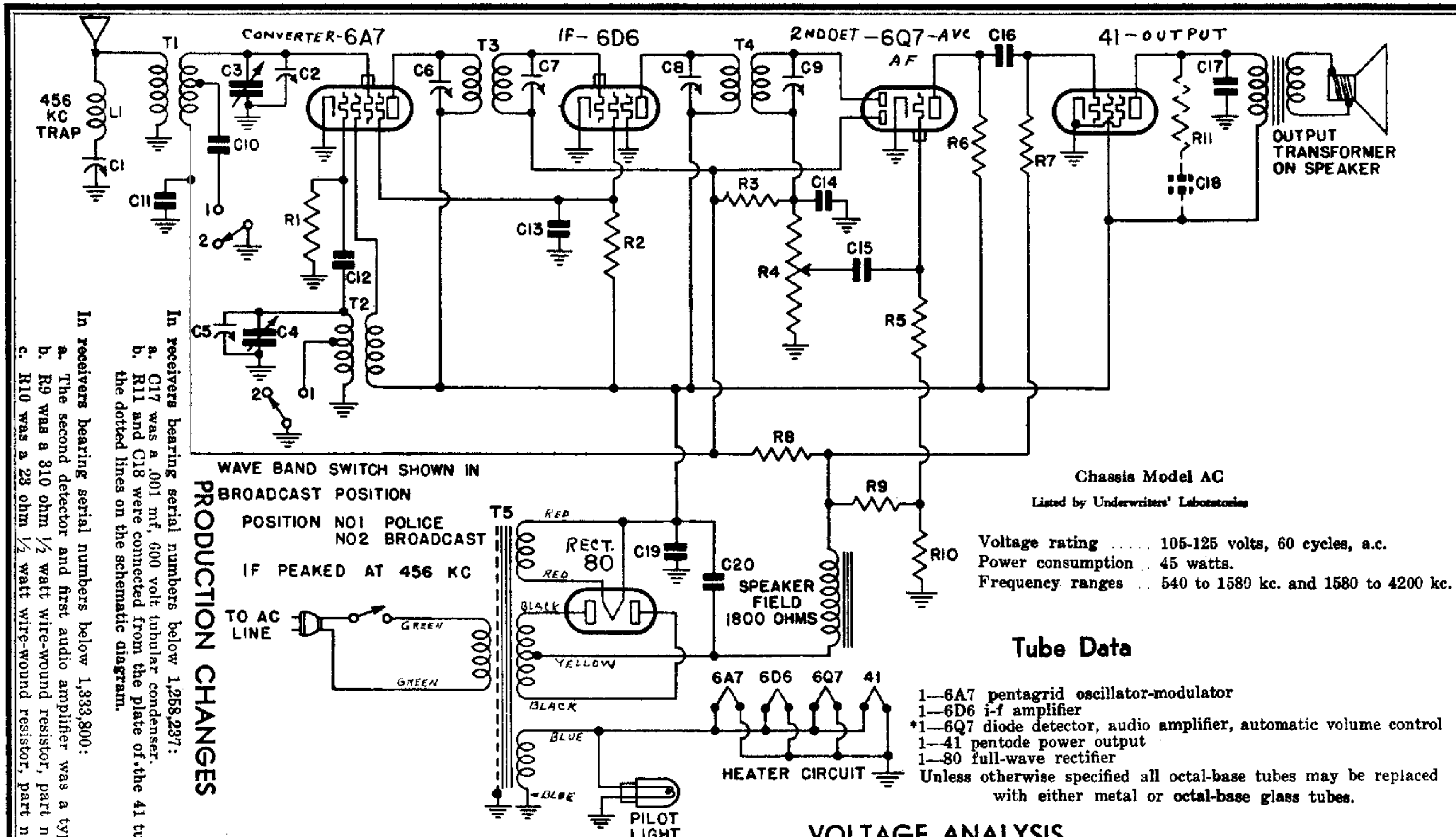
*Item number locates the article on the schematic diagram.

PRODUCTION CHANGES

Early receivers differed from the schematic diagram as follows:

a. A 50,000 ohm resistor, by-passed with a 0.1 mf, 200 volt condenser, was used in the plate circuit of the 75 tube as an R-C filter.
b. The rotor of C28 was returned to ground instead of the coil, as shown on the schematic.
c. R11 and R12 were 250,000 ohm carbon resistors.
d. The 6A7 and 6D6 cathodes were connected together. R2 was a 150 ohm, ½ watt wire-wound resistor, and C7 was 0.15 mf, 200 volt condenser. R9 and C26 were not in the circuit.
e. C1 was an 0.01 mf, 200 volt condenser.

EMERSON RADIO & PHONO. CORP



Chassis Model AC

Listed by Underwriters' Laboratories

Voltage rating	105-125 volts, 60 cycles, a.c.
Power consumption	45 watts.
Frequency ranges	540 to 1580 kc. and 1580 to 4200 kc.

Tube Data

1—6A7 pentagrid oscillator-modulator
1—6D6 i-f amplifier
*1—6Q7 diode detector, audio amplifier, automatic volume control
1—41 pentode power output
1—80 full-wave rectifier

Unless otherwise specified all octal-base tubes may be replaced with either metal or octal-base glass tubes.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	182	70	0	182	6.3
6D6	182	70	0	—	6.3
6Q7	87	—	0	—	6.3
41	165	182	0	—	6.3

Voltage across speaker field—70.
Voltage from B minus to chassis—80.
B plus at 80 tube filament—262.

*See production changes on next page.

5 TUBE AC RECEIVER

MODELS AC-130, AC-149, AC-168

PRODUCTION CHANGES

In receivers bearing serial numbers below 1,258,237:

a. C17 was a .001 mf, 600 volt tubular condenser.
b. R11 and C18 were connected from the plate of the 41 tube to B plus as shown by the dotted lines on the schematic diagram.

In receivers bearing serial numbers below 1,333,800:

a. The second detector and first audio amplifier was a type 75.
b. R9 was a 310 ohm ½ watt wire-wound resistor, part number 3RR-276.
c. R10 was a 23 ohm ½ watt wire-wound resistor, part number 3RR-266.

MODELS AC130,AC149,AC168
Chassis AC
Alignment,Notes,Parts

EMERSON RADIO & PHONO. CORP.

GENERAL NOTES

1. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

2. The receiver should never be turned on with the 41 tube out of its socket since the rapid rise in rectifier voltage would damage the electrolytic condensers.

3. The two i-f transformers are held to the chassis by snap-on fasteners. To remove an i-f, unsolder all the leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.

4. The color coding of the leads of the i-f transformers, is as follows:
   Grid—green | Plate—blue
   Grid return—black | B plus—red

5. The color coding of the power transformer leads is as follows:
   Primary—two green leads | 6.3 v. sec.—two heavy blue leads
   High voltage sec.—two black leads | 5 v. sec.—two heavy red leads
   High voltage sec. center tap—yellow

6. With a few exceptions, the color coding of the general wiring is as follows:
   Plate—blue | A.v.c. and cathode—white or yellow
   B plus—red | Grid—green
   Screen—brown | Filament and ground—black

7. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. For reduction of noise and achievement of high efficiency on all frequency ranges the Emerson All-Wave High-Fidelity Antenna, Model W-78, and the Emerson All-Wave Antenna System, Model W-89, are recommended. Instructions for the installation of these antennas are supplied with each kit.

   In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.

ADJUSTMENTS

An oscillator with frequencies of 456 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The first i-f transformer is the one directly behind the variable condenser. The trimmers for the two i-f transformers are available through holes in the tops of the cans.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 456 kc wave-trap is mounted on the front chassis wall beneath the variable condenser. The trimmer for the 456 kc wave-trap is mounted on the coil and is accessible from the bottom of the chassis.

I-f and Wave-Trap Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 456 kc, through a 0.02 mf paper condenser, to the grid cap of the 6A7 tube (do not remove the grid clip from the tube). Adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) and adjust the wave-trap trimmer for *minimum* response. (See General Notes.)

R-f Alignment

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 140. Feed 1400 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response. The police band is self-tracking and does not require any adjustment.

NOTE: The Model AC-149 should be aligned with the chassis bottom plate in place.

REPLACEMENT PARTS LIST

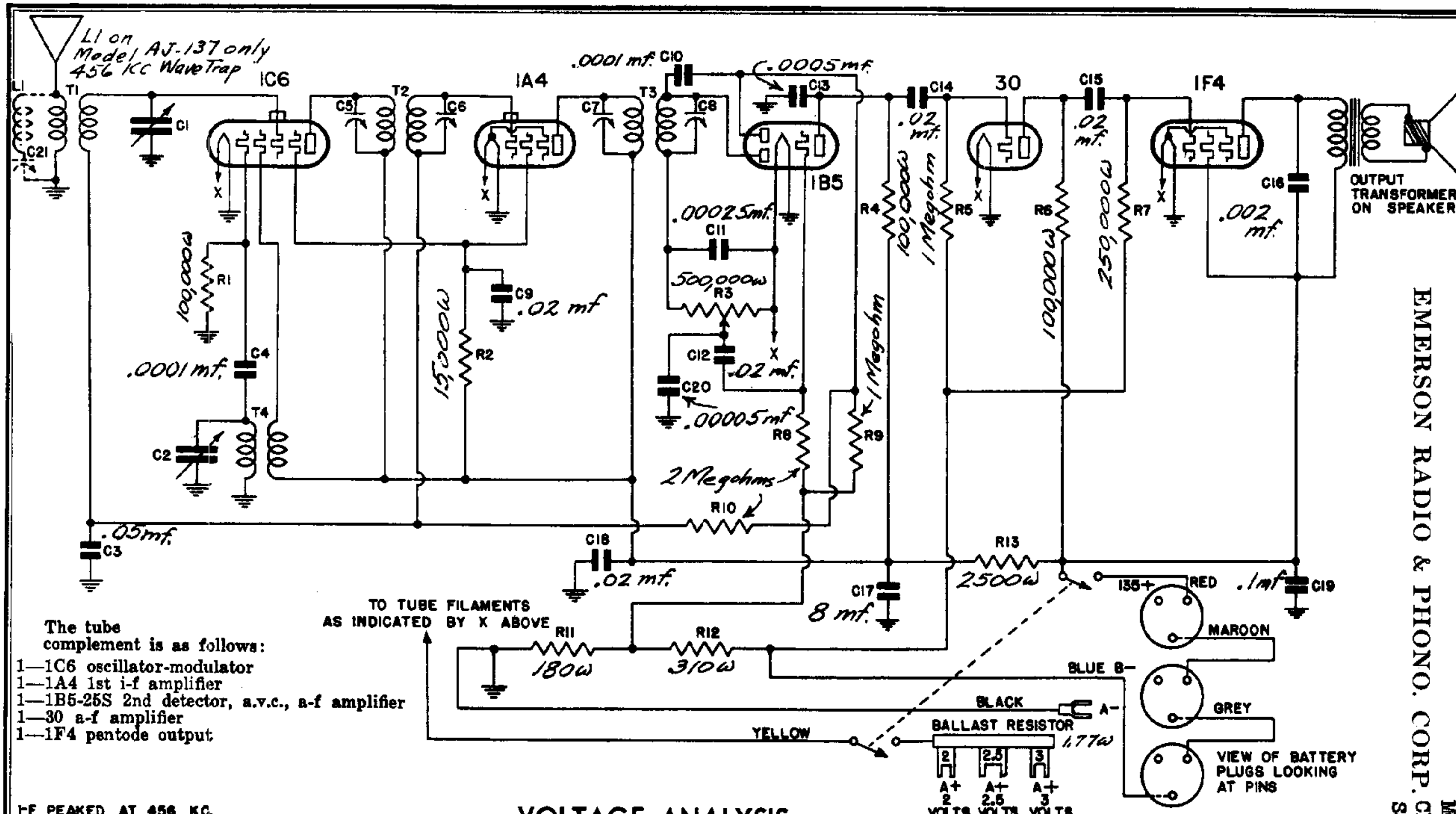
List Prices as Effective as of Aug. 16, 1937 (Subject to change without notice)

*Item	Part No.	DESCRIPTION	PRICE
L1	MMT-149A	456 kc wave-trap	$ .60
T1	3RT-334	Two-band antenna coil	.85
T2	3RT-319A	Two-band oscillator coil	.80
T3	3RT-320B	456 kc first i-f transformer	1.10
T4	3RT-321B	456 kc second i-f transformer	1.10
T5	3RT-322A	Power transformer	3.30
R1	KR-53U	50,000 ohm ¼ watt carbon resistor	.16
R2	3LR-265U	40,000 ohm ½ watt carbon resistor	.16
R3	HR-42U	2 megohm ¼ watt carbon resistor	.16
R4	3FR-265B	Volume control with switch—250,000 ohms	1.00
R5	3RR-274U	5 megohm ¼ watt carbon resistor	.16
R6	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R7	KR-56U	500,000 ohm ¼ watt carbon resistor	.16
R8	3RR-275U	10 megohm ¼ watt carbon resistor	.16
R9	4CR-321	290 ohm ½ watt wire-wound resistor	.16
R10	4CR-320	35 ohm ½ watt wire-wound resistor	.16
R11	LR-65U	10,000 ohm ¼ watt carbon resistor	.16
†C1		Trimmer, part of 456 kc wave-trap assembly.	
‡C2, C5		Trimmer, part of variable condenser.	
C3, C4	4CC-350A	Two-gang variable condenser	2.60
†C6, C7		Trimmer, part of first i-f transformer.	
†C8, C9		Trimmer, part of second i-f transformer.	
C10	AAC-114	0.001 mf mica condenser	.20
C11, C13			
C18	BC-12	0.05 mf, 200 volt tubular condenser	.20
C12	AAC-106A	0.00005 mf mica condenser	.20
C14	IC-47A	0.0005 mf mica condenser	.20
C15, C17	HC-34	0.006 mf, 600 volt tubular condenser	.20
C16	KC-58	0.01 mf, 400 volt tubular condenser	.20
C19, C20	3RC-318A	Dual 5 mf, 300 volt dry electrolytic condenser	1.00
	3RS-231	Wave-band switch	.35
	4CS-269	5½" dynamic speaker	4.75
	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
	4LZ-582	Dial face	.70
	3CZ-336	Drive belt for dial assembly	.10
	3CZ-337B	Drive shaft and pulley for dial assembly	.10
	3CZ-339	Idler pulley for dial assembly	.05
	3CZ-340	Idler spring for dial assembly	.05
	3CZ-341	Condenser shaft pulley	.10
	4MZ-588	Dial pointer	.25
	3FZ-351	Escutcheon with crystal (for Models AC-130 and AC-168)	1.05
	3FZ-398A	Dial crystal (for Model AC-149)	.50
	3FZ-399	Clip for dial crystal (for Model AC-149)	.01

†These trimmers are part of coil assemblies and can not be supplied separately.
‡These trimmers are part of variable condenser and can not be supplied separately.

When ordering replacement parts specify part numbers.
*Item number locates the article on the schematic diagram.

EMERSON RADIO & PHONO. CORP.



The tube complement is as follows:

1—1C6 oscillator-modulator
1—1A4 1st i-f amplifier
1—1B5-25S 2nd detector, a.v.c., a-f amplifier
1—30 a-f amplifier
1—1F4 pentode output

I-F PEAKED AT 456 KC.

VOLTAGE ANALYSIS

Readings should be taken with a 1,000 ohms-per-volt meter. The voltages listed below are from point indicated to A minus with volume control turned on full and no signal. The battery voltages for these readings were as follows: "A" battery 3 volts, "B" battery 135 volts.

Tube	Plate	Screen	Osc. Plate	Fil.
1C6	105	105	57	2.0
1A4	105	57	—	2.0
1B5-25S	75	—	—	2.0
30	90	—	—	2.0
1F4	127	135		2.0

5 TUBE BATTERY RECEIVER

MODELS AJ130,AJ137,AJ149
Chassis AJ
Alignment,Notes

EMERSON RADIO & PHONO. CORP.

MODELS AJ-130, AJ-137, and AJ-149

CHASSIS MODEL AJ

Current drain .... "A" battery—.42 amps.
"B" battery—.016 amps. with no signal

Frequency range .... 540 to 1730 kc.

GENERAL NOTES

1. The battery complement should be as follows:

Portable (Small Batteries)

Type	No. Req.	Eveready Part No.	Burgess Part No.	Ray-o-vac Part No.
1½ volt "A"	2	7111	4FA	6 Railroad
45 volt "B"	3	762 (plug-in type)	5308 (plug-in type)	5303 (plug-in type)

Home (Heavy Duty Batteries)

Type	No. Req.	Eveready Part No.	Burgess Part No.	Ray-o-vac Part No.
3 volt "A"	1	X-125	20F2	P9403
45 volt "B"	3	385 (plug-in type)	22308 (plug-in type)	P9303 (plug-in type)

The batteries indicated above for portable use are chosen for size so that the entire complement can be housed by the portable cabinet. In general, it will be found that the "B" batteries will last somewhat longer than the "A" batteries.

2. The receiver is designed for an "A" supply of 2 to 3 volts. If a 2 volt storage battery is used, its positive terminal should be connected to the terminal marked "2" on the metal clad ballast resistor. If a 2½ volt air-cell battery is used, it should be connected to the terminal marked "2.5". A 3 volt supply should be connected to the terminal marked "3".

3. The i-f transformers are of the snap-on type. To remove, unsolder all leads under the chassis, pinch together the prongs of the snap-on fastener and lift out.

4. The color coding of the i-f transformer leads is as follows:
   Grid—green
   Grid return—black
   Plate—blue
   B plus—red

5. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. For reduction of noise and achievement of high efficiency on all frequency ranges the Emerson All-Wave High-Fidelity Antenna, Model W-78, and the Emerson All-Wave Antenna System, Model W-89, are recommended. Instructions for the installation of these antennas are supplied with each kit.

ADJUSTMENTS

An oscillator with frequencies of 456 and 1600 kc should be used.
An output meter should be used across the voice coil or output transformer for observing maximum response.
If the circuit is at all disturbed, the receivers must be realigned.
The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.
Always choose the minimum capacity peak on the oscillator trimmer and the maximum capacity peak on the antenna trimmer. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.
Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.
Always use as weak a test signal as possible during alignment.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The first i-f is the one directly behind the variable condenser. The four trimmers, two for each transformer, are accessible through holes in the tops of the cans.

The antenna and oscillator trimmers are located on the right hand side of the variable condenser. The rear trimmer is the oscillator trimmer.

On portable model AJ-137, the 456 kc wave-trap is located below the chassis deck, directly underneath the variable condenser. Its trimmer is accessible through a hole in the bottom plate.

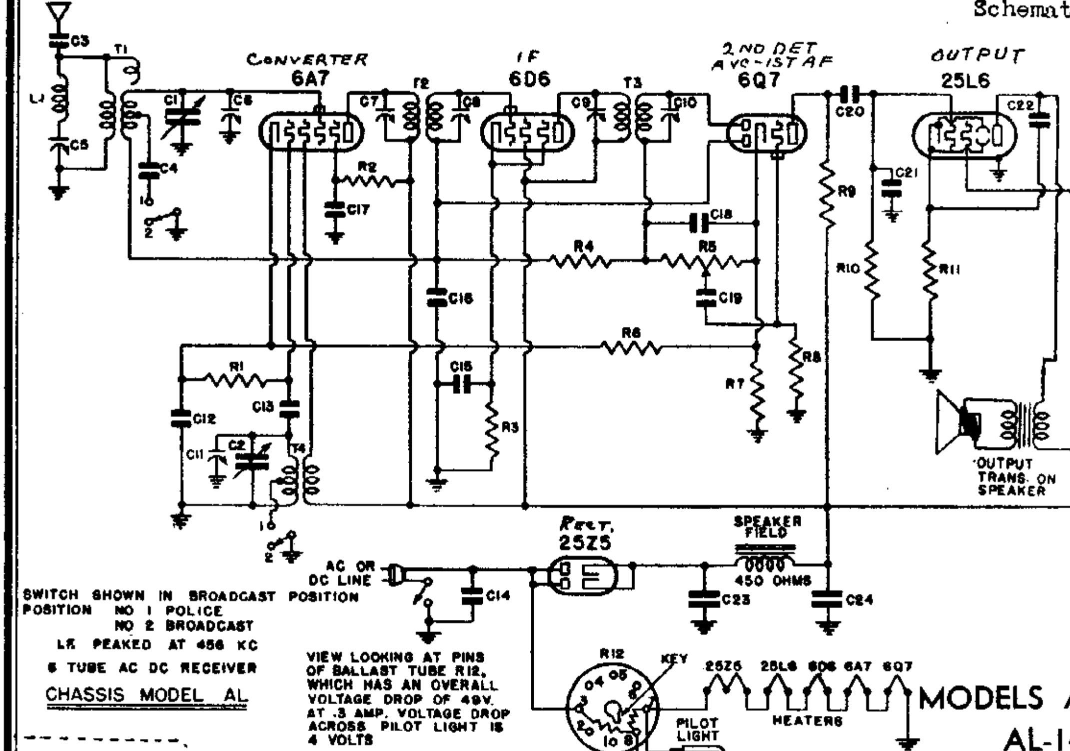
Alignment Procedure

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 456 kc to the grid cap of the 1C6 tube.
3. Adjust the four i-f trimmers, repeating for maximum response.
4. If the receiver is portable model AJ-137, feed 456 kc to the antenna through a standard dummy antenna (a .0002 mf mica condenser may be substituted) and adjust the wave-trap trimmer for minimum response.
5. Set dial pointer to 1600 and feed 1600 kc to the antenna lead through a standard broadcast dummy antenna (a .0002 mf mica condenser may be used as a substitute).
6. Adjust the oscillator trimmer (on rear section of variable condenser) for maximum response.
7. Adjust the r-f trimmer (on front section of variable condenser) for maximum response.

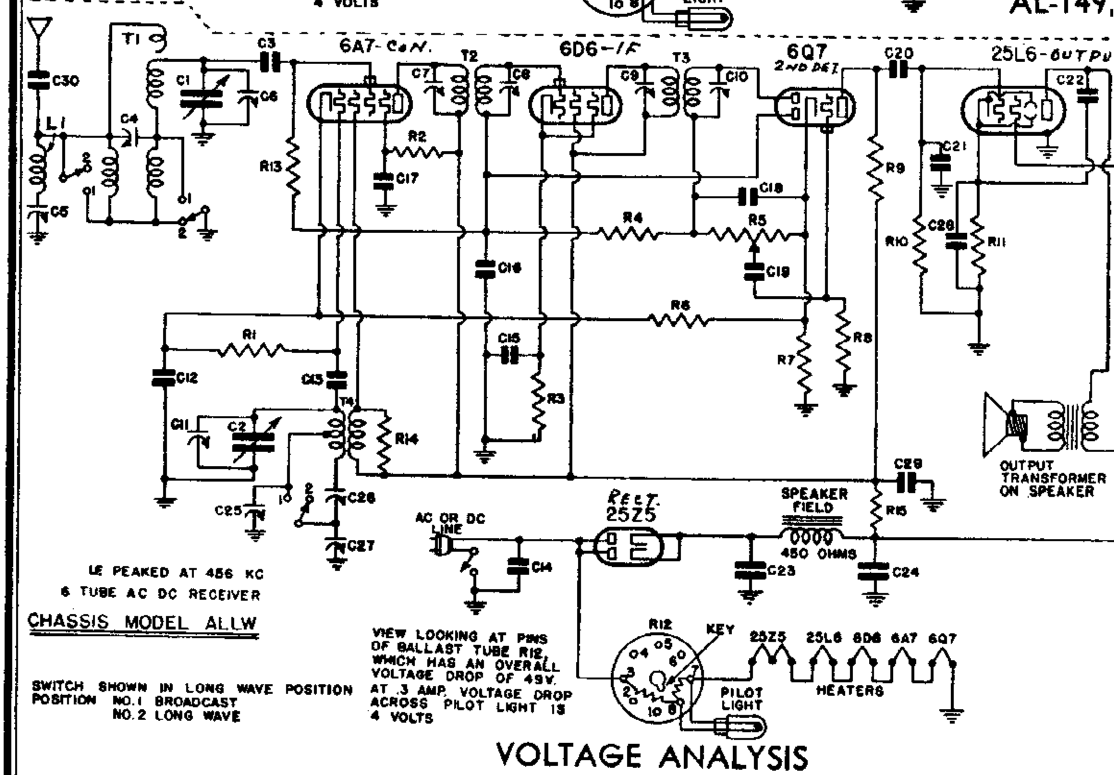
MODELS AL130,AL132
AL149,AL168
Chassis AL

EMERSON RADIO & PHONO. CORP.

MODELS ALLW130,ALLW13
ALLW149,ALLW16
Chassis ALLW
Schematics,Voltage



MODELS AL-130, AL-13
AL-149, AL-168



Tube Data

The tube complement is as follows:
1—6A7 pentagrid oscillator-modulator.
1—6D6 first i-f amplifier.
1—6Q7 diode detector, a-f amplifier, a.v.c.
1—25L6 beam power output.
1—25Z5 dual half-wave rectifier.
1—2UR-224 ballast tube (R12 on schematic).

Chassis Model AL and Chassis Model ALLW

Voltage rating .... 105 to 125 volts, a.c. or d.c.
Power consumption .... 43 watts.
Frequency ranges .... Model AL: 540 to 1580 kc and 1580 to 4200 kc.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	100	50	2.3	100	6.3
6D6	100	100	3.5	—	6.3
6Q7	43	0	1.2	—	6.3
25L6	92	100	6.5	—	25.0

Voltage at 25Z5 cathode—130 volts.
Voltage across speaker field—28 volts.
Voltage drop across ballast tube (pins Nos. 3, 7)—49 volts.
Voltage drop across pilot light section (pins Nos. 8 and 7)—4 volts.

MODELS ALLW-130, ALLW-13
ALLW-149, ALLW-168

MODELS AL130, AL132, AL149, AL168 — Chassis AL

EMERSON RADIO & PHONO. CORP.

MODELS ALLW130, ALLW132, ALLW149, ALLW168 — Alignment, Parts, Notes

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f portion of the circuit, the receiver should be carefully re-aligned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. The filament dropping resistor (R12 on schematic) is in a special metal tube at the rear of the chassis. This tube will become quite hot under normal operating conditions. For voltage drop specifications, see below.
4. When operating the receiver on d.c. it may be necessary to reverse the line plug to obtain the correct polarity.
5. The two i-f transformers are held to the chassis by snap-on fasteners. To remove an i-f, unsolder all the leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.
6. The color coding of the i-f transformer leads is as follows:

   Grid—green　　Plate—blue
   Grid return—black　　B plus—red
7. The receiver is shipped with an attached antenna wire. In some locations near powerful local stations the addition of a very large antenna may be detrimental to reception, because of the resulting interference. The Emerson Flexible Mast Antenna, Model W-82, has been especially designed for Emerson receivers, featuring compactness and portability while at the same time retaining a nigh efficiency from the standpoint of performance. Since it functions as an outside antenna the Flexible Mast will substantially improve the receiver performance. Where the Flexible Mast is installed permanently, it is urgently recommended that the receiver antenna wire be cut. Leave just enough of this wire to reach from the receiver to the window strip connector. Instructions for the installation of this compact and efficient outside antenna are supplied with each kit.
8. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

ADJUSTMENTS

An oscillator with frequencies of 172, 345, 456, 600 and 1400 kc should be used.

An output meter should be used across the voice coil or output transformer for observing maximum response.

If the circuit is at all disturbed, both the broadcast and long-wave bands must be realigned .

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Always use as weak a test signal as possible during alignment.

Use a standard dummy antenna for aligning either of the bands. A .0001 mf condenser may be used for either the broadcast or long-wave band dummy antennas.

CHASSIS MODEL AL

Location of Coil and Trimmer Adjustments on the Model AL

The two i-f transformers are in oblong coil cans located on top of the chassis deck. The first i-f transformer is the one behind the variable condenser. The trimmers for these transformers are accessible through holes in the tops of the cans.

The 456 kc wave-trap is mounted on the right side of the front chassis wall. Its trimmer is accessible through a hole in the bottom plate.

The antenna coils for the broadcast and police bands are wound on one form and are mounted underneath the chassis deck below the variable condenser.

The oscillator coils for the broadcast and police bands are wound on one form and are mounted on the rear wall of the chassis deck near the variable condenser.

The trimmers for the broadcast antenna and oscillator coils are located on the variable condenser. The trimmer on the front sections is for the antenna coil.

I-f Transformer and Wave-Trap Alignment for Model AL

Turn the switch clockwise to the broadcast position and rotate the variable condenser to the minimum capacity position. Feed 456 kc to the grid cap of the 6A7 tube and adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna and adjust the wave-trap trimmer for minimum response.

R-f Alignment for Model AL

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 140. Feed 1400 kc through a standard dummy antenna (a .0001 mf condenser may be used as a substitute) to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response. The police band is self-tracking and does not require any adjustment.

CHASSIS MODEL ALLW

Location of Coils and Trimmer Adjustments on the Model ALLW

The two i-f transformers are in oblong coil cans located on top of the chassis deck. The first i-f transformer is the one behind the variable condenser. The trimmers for these transformers are accessible through holes in the tops of the cans.

The broadcast antenna coil, the long-wave antenna coil and the 456 kc wave-trap are one assembly mounted underneath the chassis deck to the right of the variable condenser. The trimmers for these coils are accessible through three holes in the top of chassis. The trimmer closest to the front of the chassis is for the 456 kc wave-trap, the central trimmer is for the long-wave oscillator coil and the rear trimmer is for the long-wave antenna coil.

The oscillator coils for the broadcast and long-wave bands are wound on one form and are mounted underneath the chassis below the variable condenser.

The trimmers for the broadcast antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The dual adjustable padding condenser is mounted on the left side of the rear chassis wall. The hexagon nut is the adjustment for the long-wave band and the screw in the center of this nut is for the broadcast band.

I-f Transformer and Wave-Trap Alignment for ALLW

Turn the switch clockwise to the broadcast position and rotate the variable condenser to the minimum capacity position. Feed 456 kc to the grid cap of the 6A7 tube and adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna and adjust the wave-trap trimmer for minimum response.

Broadcast Alignment for Model ALLW

Rotate the wave-band switch clockwise to the broadcast position and set dial pointer to 60. Feed 600 kc through a .0001 mf condenser. Adjust padding condenser (slotted screw on dual unit) for maximum response. Move pointer to 140. Feed 1400 kc and adjust broadcast oscillator trimmer (on front section of gang) and broadcast antenna trimmer (on rear section of gang) for maximum response. Return pointer to 60, feed 600 kc and readjust padding condenser while rocking variable condenser.

Long-Wave Alignment for Model ALLW

Rotate the wave-band switch to the long-wave position, counter-clockwise, and set the dial pointer to 345. Feed 345 kc through the dummy antenna and adjust the long-wave oscillator trimmer for maximum response and then adjust the long-wave antenna trimmer. Move the pointer to 172.5 kc and feed 172.5 kc. Adjust the long-wave series padder (hexagon nut on dual unit) for maximum response. Return the pointer to 345 kc and adjust the long-wave oscillator and antenna trimmers. Check at 600 kc on broadcast band and readjust if necessary.

REPLACEMENT PARTS LIST

List Price as. Effective as of Aug. 15th, 1937 (Subject to change without notice.)

*Item Chassis AL	*Item Chassis ALLW	Part No.	DESCRIPTION	PRICE
T1	——	3RT-384	Two-band antenna coil	$ .85
——	T1	4LT-389	Two-band antenna coil	2.25
T2	T2	3RT-320B	456 kc first i-f transformer	1.10
T3	T3	3RT-321B	456 kc second i-f transformer	1.10
T4	——	3RT-319A	Two-band oscillator coil	.80
——	T4	4LT-390	Two-band oscillator coil	.85
L1	——	4DT-343	456 kc adjustable wave-trap	.60
——	L1	——	456 kc wave trap, part of antenna coil assembly	
R1	R1	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R2	R2	ZZR-196	30,000 ohm ¼ watt carbon resistor	.16
R3	R3, R15	3CR-295	410 ohm ½ watt wire wound resistor	.16
R4, R8	R4, R8	HR-42	2 megohm ¼ watt carbon resistor	.16
R5	R5	3FR-255	Volume control with line switch—500,000 ohms	1.05
R6, R7	R6, R7	3CR-294	240 ohm ½ watt wire-wound resistor	.16
R9	R9	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R10	R10	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R11	R11	3FR-298	140 ohm ½ watt wire-wound resistor	.16
R12	R12	2UR-224	Plug-in type ballast resistor	.80
——	R13	KR-57	1 megohm ¼ watt carbon resistor	.16
——	R14	LR-65	10,000 ohm ¼ watt carbon resistor	.16
C1, C2	——	4CC-350A	Two-gang variable condenser	2.60
——	C1, C2	4LC-360	Two-gang variable condenser	2.60
C3	C30	3HC-274	0.002 mf, 600 volt tubular condenser	.20
——	C3	IC-47A	0.0005 mf mica condenser	.20
C4	——	AAC-114	0.001 mf mica condenser	.20
——	†C4, C5, C25	——	Trimmer, part of antenna coil assembly.	
†C5	——	——	Trimmer, part of wave-trap assembly.	
‡C6, C11	‡C6, C11	——	Trimmer, part of variable condenser.	
†C7, C8	†C7, C8	——	Trimmer, part of first i-f transformer assembly.	
†C9, C10	†C9, C10	——	Trimmer, part of second i-f transformer assembly.	
C12, C17	C12, C17, C29	AC-6	0.1 mf, 200 volt tubular condenser	.20
C13	——	AAC-106A	0.00005 mf mica condenser	.20
——	C13	EC-24A	0.0001 mf mica condenser	.20
C14	C14	2VC-242A	0.1 mf, 400 volt molded condenser	.20
C15	C15	FC-29	0.02 mf, 200 volt tubular condenser	.20
C16	C16	BC-12	0.05 mf, 200 volt tubular condenser	.20
C18, C21	C18, C21	NC-70A	0.0002 mf mica condenser	.20
C19	C19	CCC-127	0.01 mf, 200 volt tubular condenser	.20
C20	C20	LC-65	0.02 mf, 400 volt tubular condenser	.20
C22	C22	3FC-386	0.025 mf, 400 volt tubular condenser	.20
C23, C24	C23, C24	3CC-261	20 mf, 150 volt wet electrolytic condenser	.90
	C26, C27	2ZC-257	Dual padding condenser C26—100 to 200 mmf C27—250 to 500 mmf	.65
	C28	1C-48A	5 mf, 25 volt dry electrolytic condenser	.90
		3HS-251	Wave-band switch for AL chassis	.85
		4JS-268	Wave-band switch for ALLW chassis	.80
		3FS-251	5½" dynamic speaker	4.90
		4LZ-582	Dial face (for AL chassis)	.70
		4LZ-655	Dial face (for ALLW chassis)	.70
		XL-9	Pilot light, 6.3 volt, .25 amp. Mazda No. 44	.30
		3CZ-336	Dial drive belt	.10
		3CZ-337	Dial drive shaft and pulley	.10
		3CZ-339	Idler pulley	.05
		3CZ-340	Idler pulley spring	.05
		3CZ-341	Condenser shaft pulley	.10
		4MZ-538	Dial pointer	.25
		3FZ-351	Escutcheon with crystal (for Models AL-130, AL-168, ALLW-130 and ALLW-168)	1.05
		3FZ-398	Dial crystal (for Models AL-132, AL-169, ALLW-132 and ALLW-169)	.50
		3FZ-399	Clip for dial crystal (for Models AL-132, AL-169, ALLW-132 and ALLW-169)	.01

When ordering replacement parts specify part numbers.

*Item number locates the article on the schematic diagram.

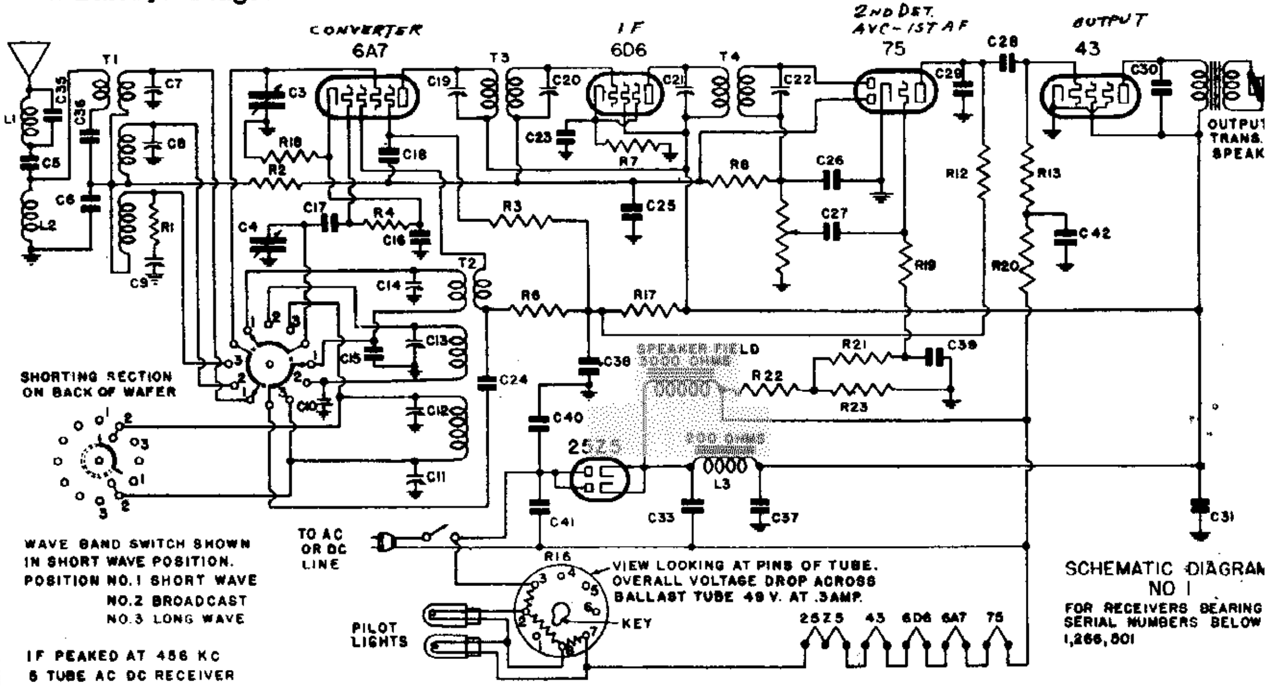
†These trimmers are part of coil assemblies and can not be supplied separately.

‡These trimmers are part of variable condenser and can not be supplied separately.

Below and Above
Serial 1266501
Schematics, Voltages

EMERSON RADIO & PHONO. CORP.

MODEL AA1
Chassis AA

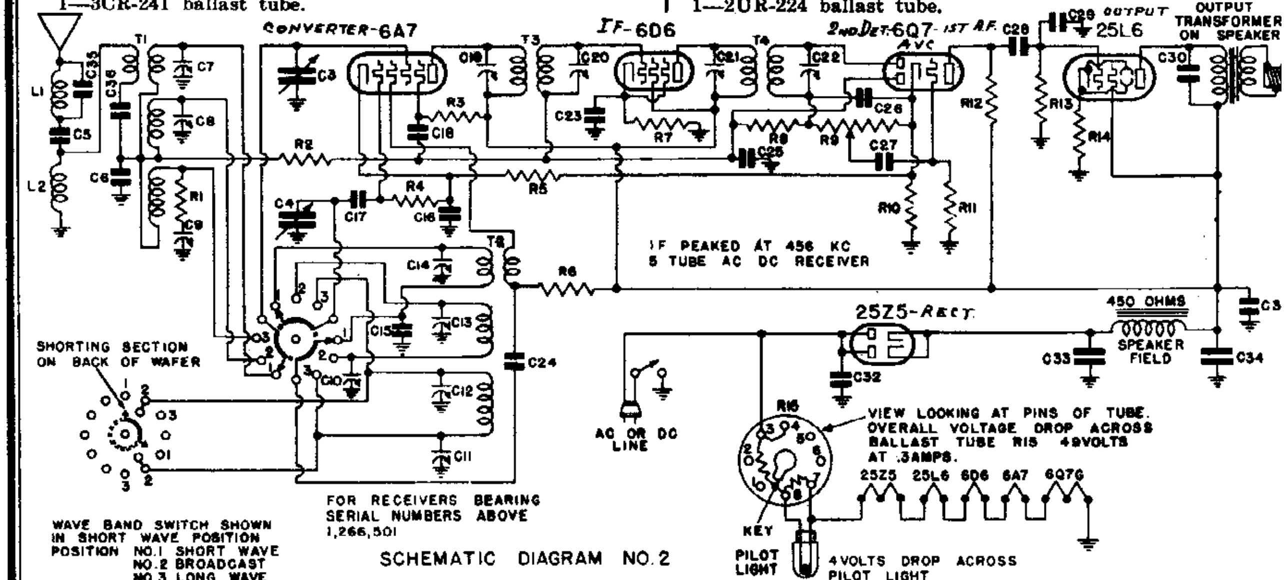


The tube complement for receivers bearing serial numbers below 1,266,501 is as follows:

1—6A7 pentagrid oscillator-modulator
1—6D6 first i-f amplifier
1—75 diode detector, a.v.c., audio amplifier
1—43 pentode power output
1—25Z5 dual half-wave rectifier
1—3CR-241 ballast tube.

The tube complement for receivers bearing serial numbers above 1,266,501 is as follows:

1—6A7 pentagrid oscillator-modulator
1—6D6 first i-f amplifier
1—6Q7 diode detector, a.v.c., audio amplifier
1—25L6 beam power output
1—25Z5 dual half-wave rectifier
1—2UR-224 ballast tube.



SCHEMATIC DIAGRAM NO. 2

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

The following are voltages for receivers bearing serial numbers *below* 1,266,501:

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	96	35	0.6	57	6.3
6D6	96	78	2	—	6.3
75	35	—	0	—	6.3
43	85	96	0	—	24

Voltage across speaker field—125
Voltage across filter choke—11.1
The bias for the 75 and 43 is developed across resistors R22 and R23 (see schematic diagram). The voltage across R22 is 11 volts and the voltage across R23 is 1 volt.
The voltage drop across the ballast resistor (R16—see schematic) is 49 volts between pins 3 and 7.

The following are voltages for receivers bearing serial numbers *above* 1,266,501:

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	100	42	1.6	75	6.3
6D6	100	100	3.6	—	6.3
6Q7	36	—	0.8	—	6.3
25L6	95	100	6.7	—	24

Voltage across speaker field—27.5
The voltage drop across the ballast resistor (R15—see schematic) is 49 volts between pins 3 and 7.

MODEL AA131
Chassis AA
Below and Above
Serial 1266501
Alignment, Notes, Parts

EMERSON RADIO & PHONO. CORP.

MODEL AA-131

Chassis Model AA

Voltage rating .... 105-125 volts, a.c. or d.c.
Power consumption .... 50 watts
Frequency range .... 150 to 375 kc, 540 to 1600 kc, 5.7 to 17.5 mc.

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f portion of the circuit, the receiver should be carefully re-aligned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. The filament dropping resistor is in a special metal tube at the rear of the chassis. This tube will become quite hot under normal operating conditions. For voltage drop specifications, see below.
4. The power supply for this receiver may be either a.c. or d.c. The standard line voltage rating is 105 to 125 volts. With special external line ballast resistors this receiver may be operated on higher voltages.
5. When operating the receiver on d.c. it may be necessary to reverse the line plug to obtain the correct polarity.
6. The two i-f transformers are held to the chassis by snap-on fasteners. To remove an i-f, unsolder all the leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.
7. The color coding of the i-f transformer leads is as follows:
   Grid—green; Plate—blue
   Grid return—black; B plus—red
8. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. For reductions of noise and achievement of high efficiency on all frequency ranges the Emerson All-Wave High-Fidelity Antenna, Model W-78, and the Emerson All-Wave Antenna System, Model W-89, are recommended. Instructions for the installation of these antennas are supplied with each kit.
   In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.

ADJUSTMENTS

An oscillator with frequencies of 150, 350, 456, 600, 1500 and 15,000 kc should be used.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Use a standard dummy antenna when aligning either the long-wave or medium-wave bands. A .0002 mf condenser may be used as a substitute. When aligning the short-wave band use a 400 ohm dummy antenna (a 400 ohm resistor in series with antenna lead).

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion is adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Always use as weak a test signal as possible during alignment.

Location of Coils and Trimmers

The antenna coils for the three bands are wound on one form and mounted underneath the chassis deck to the right of the variable condenser. The trimmers for these coils are accessible through three holes in the top of the chassis. The trimmer farthest from the front of the chassis is for the long-wave antenna coil. The trimmer closest to the front of the chassis is for the medium-wave antenna coil, and the central trimmer is for the short-wave antenna coil.

The oscillator coils for the three bands are wound on one form and mounted on the inside of the rear chassis wall. The trimmers for these coils are accessible through holes in the rear chassis wall. The trimmer farthest from the end of the chassis is for the long-wave oscillator coil. The trimmer nearest the end of the chassis is for the medium-wave oscillator coil, and the central trimmer is for the short-wave oscillator coil.

The two i-f transformers are in oblong coil cans located on the top of the chassis. The first i-f transformer is the one behind the variable condenser. The trimmers for these transformers are accessible through holes in the tops of the cans.

The series padding condensers for the long-wave and medium-wave bands are located on the rear chassis wall below the 6A7 tube.

I-f Alignment

Rotate the wave-band switch to the medium-wave (central) position and set the variable condenser to minimum. Feed 456 kc to the grid cap of the 6A7 tube through a .02 mf paper condenser, (do not remove the grid clip from the tube). Adjust the four i-f trimmers for maximum response.

Long-Wave Alignment

With the wave-band switch at long-wave (clockwise) position set the dial pointer at 15 and feed 150 kc to antenna. Adjust the long-wave series padder (hex nut on dual padder) for maximum response. Move pointer to 35 and feed 350 kc to antenna. Adjust the long-wave oscillator trimmer then the long-wave antenna trimmer for maximum response. Reset pointer to 15, feed 150 kc and rock (rotate back and forth through a small arc) the variable condenser while adjusting long-wave series padder for maximum response. Reset pointer to 35, feed 350 kc and check alignment. If readjustment is necessary return to 150 kc and repeat entire procedure.

Medium-Wave Alignment

Set switch at medium-wave (central) position and dial pointer at 60. Feed 600 kc to antenna and adjust medium-wave series padder (slotted screw on dual padder) for maximum response. Move pointer to 150, feed 1500 kc and adjust medium-wave oscillator trimmer and then the medium-wave antenna trimmer for maximum response. Reset pointer to 60, feed 600 kc and rock variable condenser while readjusting medium-wave series padder for maximum response. Reset pointer to 150, feed 1500 kc and check alignment. If readjustment is necessary return to 600 and repeat entire procedure.

Short-Wave Alignment

Set wave-band switch at short-wave (counter-clockwise) position. Set pointer at 15, feed 15 megacycles to antenna and adjust short-wave oscillator trimmer and then short-wave antenna trimmer for maximum response.

REPLACEMENT PARTS LIST

NOTE: Schematic No. 1 applies to receivers bearing serial numbers below 1,266,501. Schematic No. 2 applies to receivers bearing serial numbers above 1,266,501.

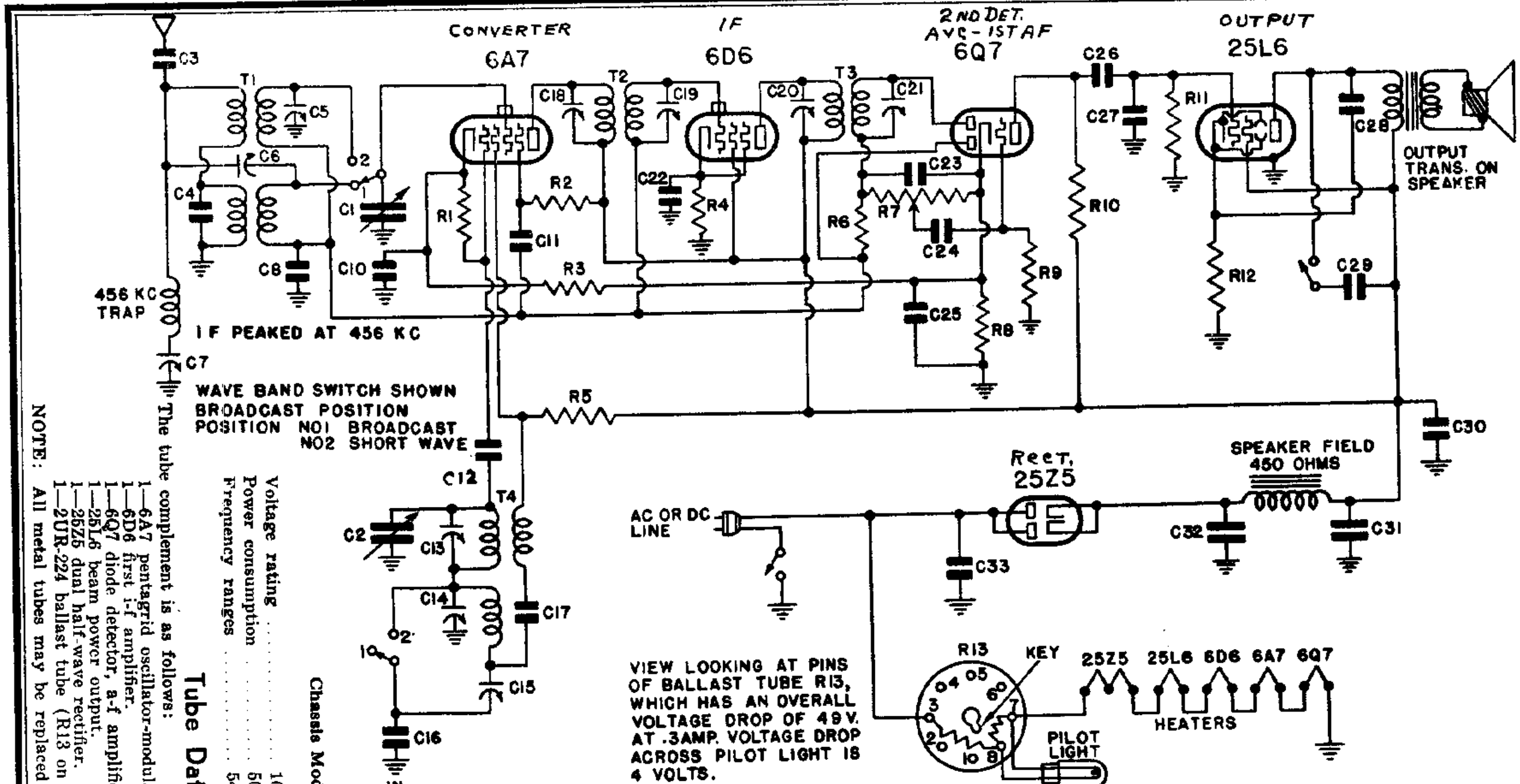
*Item Schematic No. 1	Schematic No. 2	Part No.	DESCRIPTION	PRICE (List Price ea., Effective as of July 15, 1937 (Subject to change without notice))
L1	L1	2ZT-268A	456 kc wave-trap	$.75
L2	L2	8ET-299	R-f choke	.55
L3	—	2CT-207	Iron-core filter choke	.90
T1	T1	8ET-297	Three-band antenna coil	2.05
T2	T2	8ET-298	Three-band oscillator coil	1.90
T3	T3	8CT-274	Double-tuned 456 kc first i-f transformer	1.50
T4	T4	8CT-275	Double-tuned 456 kc second i-f transformer	1.35
R1	R1	TTR-201	3,000 ohm 1/4 watt carbon resistor	.16
R2, R12, R21	R2, R12	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R3	R3	8ER-283	60,000 ohm 1/4 watt carbon resistor	.16
R4	R4	KR-54	100,000 ohm 1/4 watt carbon resistor	.16
—	R5	8RR-276	310 ohm 1/2 watt wire-wound resistor	.16
R6	R6	LR-60	20,000 ohm 1/4 watt carbon resistor	.16
—	R7	3CR-295	410 ohm 1/2 watt wire-wound resistor	.16
R8	R8, R11	KR-57	1 megohm 1/4 watt carbon resistor	.16
R9	R9	2NR-214C	Volume control with on-off switch—250,000 ohms	1.20
—	R10	3CR-294	240 ohm 1/2 watt wire-wound resistor	.16
R18, R19	R13	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
—	R14	8FR-293	140 ohm 1/2 watt wire-wound resistor	.16
—	R15	2UR-224	Plug-in type ballast resistor	.80
R16	—	3CR-241	Plug-in type ballast resistor	.80
R17	—	LR-64	5,000 ohm 1/4 watt carbon resistor	.16
R18	—	AAR-119	300 ohm 1/2 watt wire-wound resistor	.16
R20	—	OR-73	25,000 ohm 1/4 watt carbon resistor	.16
R22	—	3CR-261	230 ohm 1 watt wire-wound resistor	.16
R23	—	3CR-242	20 ohm 1/2 watt wire-wound resistor	.16
C1, C2	—	3CC-275	Two-gang variable condenser	3.55
—	C3, C4	3CC-275A	Two-gang variable condenser	3.90
C5, C24, C27, C36	C5, C24, C27, C36	FC-29	0.02 mf, 200 volt tubular condenser	.20
C6	C6	2ZC-253	0.0025 mf mica condenser	.30
†C7, C8, C9	†C7, C8, C9	—	Trimmer, part of antenna coil assembly.	
C10, C11	C10, C11	2ZC-257	Dual adjustable padding condenser: C10-250 to 500 mmf, C11-100 to 200 mmf.	.65
†C12, C13, C14	†C12, C13, C14	—	Trimmer, part of oscillator coil assembly.	
C15	C15	3EC-286	0.0024 mf mica condenser	.30
C16, C23, C31, C39	C16, C23, C31	AC-6	0.1 mf, 200 volt tubular condenser	.20
C17	C17	AAC-105A	0.00005 mf mica condenser	.20
C18, C40	C18	KC-58	0.01 mf, 400 volt tubular condenser	.20
†C19, C20, C21, C22	†C19, C20, C21, C22		Trimmer, part of i-f coil assembly.	
C25	C25	BC-12	0.05 mf, 200 volt tubular condenser	.20
C26, C29	C26, C29	AC-7A	0.00025 mf mica condenser	.20
C28, C42	C28	LC-65	0.02 mf, 400 volt tubular condenser	.20
C30	C30	QQC-173	0.016 mf, 600 volt tubular condenser	.20
—	C32	3EC-326A	0.05 mf, 400 volt molded paper condenser	.20
C33, C37	C33	3CC-261	20 mf, 150 volt wet electrolytic condenser	.90
—	C34	3CC-337	40 mf, 150 volt wet electrolytic condenser	.90
C35	C35	—	.0015 mf mica condenser, part of wave-trap assembly.	
C38	—	YC-98A	4 mf, 150 volt tubular dry electrolytic condenser	1.05
C41	—	EEC-132	0.1 mf, 400 volt tubular condenser	.20
		8ES-218	Wave-band switch	1.10
		8CS-254	6 1/2" dynamic speaker for receivers using 25L6 output tube	5.25
		8CS-171	6 1/2" dynamic speaker for receivers using 43 output tube	5.25
		XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
		4AZ-533	Dial face	.75
		3CZ-336A	Dial drive belt	.10
		3CZ-337	Dial drive shaft and pulley	.10
		3CZ-339	Idler pulley	.05
		3CZ-340	Idler pulley spring	.05
		3CZ-341	Condenser shaft pulley	.10
		‡3FZ-353	Dial pointer (screw-on type)	.10
		‡4MZ-538	Dial pointer (push-on type)	.25
		3CZ-350	Escutcheon with crystal	1.05

When ordering replacement parts specify part numbers.

*Item number locates the article on the schematic diagram.
†These trimmers are part of the coil assembly and can not be supplied separately.
‡When ordering pointer specify if screw-on or push-on type.

MODELS AM131,AM169,AM187
Chassis AM
Schemntic,Voltage,Changes

EMERSON RADIO & PHONO. CORP



VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	96	45	2.3	74	6.3
6D6	96	96	4.5	—	6.3
6Q7	40	—	1.0	—	6.3
25L6	92	100	6.2	—	25.0

Voltage at 25Z5 cathode—125 volts.
Voltage across speaker field—29 volts.
Voltage drop across ballast tube (pins Nos. 3, 7)—49 volts.
Voltage drop across pilot light section (pins Nos. 8, 7)—4 volts.

PRODUCTION CHANGES

In receivers bearing serial numbers below 1,184,290:

The variable condenser was part number 3CC-275. The dial pointer was part number 4MZ-590.

SIX TUBES, INCLUDING BALLAST TUBE **MODELS AM-131, AM-169 and AM-187**

Chassis Model AM

Voltage rating	105-125 volts, a.c. or d.c.
Power consumption	50 watts.
Frequency ranges	540 to 1,730 kc, and 5.6 to 18.0 megacycles.

Tube Data

The tube complement is as follows:
1—6A7 pentagrid oscillator-modulator.
1—6D6 first i-f amplifier.
1—6Q7 diode detector, a-f amplifier, a.v.c.
1—25L6 beam power output.
1—25Z5 dual half-wave rectifier.
1—2UR-224 ballast tube (R13 on schematic).

NOTE: All metal tubes may be replaced with equivalent octal base glass tubes.

MODELS AM131, AM169, AM187
Chassis AM
Alignment, Notes, Parts

EMERSON RADIO & PHONO. CORP.

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f portion of the circuit, the receiver should be carefully re-aligned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. The filament dropping resistor (R13 on schematic) is in a special metal tube at the rear of the chassis. This tube will become quite hot under normal operating conditions. For voltage drop specifications, see below.
4. When operating the receiver on d.c. it may be necessary to reverse the line plug to obtain the correct polarity.
5. The two i-f transformers are held to the chassis by snap-on fasteners. To remove an i-f, unsolder all the leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.
6. The color coding of the i-f transformer leads is as follows:
   Grid—green　　Plate—blue
   Grid return—black　　B plus—red
7. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. For reduction of noise and achievement of high efficiency on all frequency ranges the Emerson All-Wave High Fidelity Antenna, Model W-78, and the Emerson All-Wave Antenna System, Model W-89, are recommended. Instructions for the installation of these antennas are supplied with each kit.
   In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.
8. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1425 and 15,000 kc should be used.

In addition an output meter should be used across the voice coil or output transformer for observing maximum response.

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Always use as weak a test signal as possible during alignment.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Location of Coils and Trimmer Adjustments

The broadcast antenna coil, the short-wave antenna coil and the 456 kc wave trap are one assembly mounted underneath the chassis deck to the right of the variable condenser. The trimmers for these coils are accessible through three holes in the top of the chassis. The trimmer closest to the front of the chassis is for the short-wave antenna coil. The central trimmer is for the broadcast antenna coil and the trimmer farthest from the chassis front is for the 456 kc wave trap.

The broadcast oscillator and short-wave oscillator coils are wound on one form and mounted on the inside of the rear chassis wall. The trimmers for these coils are accessible through two holes in the rear chassis wall. The left hand trimmer (looking at the rear wall) is for the short-wave oscillator coil and the right-hand trimmer is for the broadcast oscillator coil.

The two i-f transformers are in oblong coil cans located on the top of the chassis. The first i-f transformer is the one behind the variable condenser. The trimmers for these transformers are accessible through holes in the tops of the cans.

The broadcast series padding condenser is located on the rear wall of the chassis below the 6A7 tube.

I-f Transformer and Wave-Trap Alignment

Turn the switch clockwise to the broadcast position and rotate the variable condenser to the minimum capacity position. Feed 456 kc to the grid cap of the 6A7 tube and adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna and adjust the wave-trap trimmer (rear screw beside variable condenser) for minimum response.

Short-Wave Alignment

Use a dummy antenna (400 ohm resistor) when aligning the short-wave coils.

Rotate the wave-band switch counter-clockwise to the short-wave position and set the dial pointer to 15 megacycles. Feed 15 megacycles through the dummy antenna and adjust the short-wave oscillator trimmer (left-hand screw on rear chassis wall) for maximum response and then adjust the short-wave antenna trimmer (front screw beside variable condenser) for maximum response. The variable condenser should be rocked while adjusting the antenna trimmer. (Rotate variable condenser rotor shaft back and forth through a small arc).

Broadcast Alignment

Rotate the wave-band switch to the broadcast position, clockwise, and set the dial pointer at 60. Feed 600 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute).

Adjust the broadcast series padding condenser (on rear chassis wall, below 6A7 tube) for maximum response. Move pointer to 142.5, feed 1425 kc and adjust the broadcast oscillator trimmer (right-hand screw on rear chassis wall) for maximum response and then adjust the broadcast antenna trimmer (central screw beside variable condenser) for maximum response. Return pointer to 60, feed 600 kc and readjust the series padding condenser rocking the variable condenser for maximum response.

REPLACEMENT PARTS LIST

List Prices as Effective as of Aug. 15, 1937
(Subject to change without notice)

*Item	Part No.	DESCRIPTION	PRICE
T1	3CT-289A	Two-band antenna coil	$1.80
T2	3CT-274	456 kc first i-f transformer	1.50
T3	3CT-275	456 kc second i-f transformer	1.35
T4	3CT-290A	Two-band oscillator coil	1.55
R1	KR-63	50,000 ohm 1/4 watt carbon resistor	.16
R2	ZZR-196	80,000 ohm 1/4 watt carbon resistor	.16
R3	AAR-119	300 ohm 1/2 watt wire-wound resistor	.16
R4	3CR-295	410 ohm 1/2 watt wire-wound resistor	.16
R5	LR-65	10,000 ohm 1/4 watt carbon resistor	.16
R6, R9	KR-57	1 megohm 1/4 watt carbon resistor	.16
R7	2NR-214C	Volume control with line switch—250,000 ohms	1.20
R8	3CR-294	240 ohm 1/2 watt wire-wound resistor	.16
R10	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R11	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R12	3FR-298	140 ohm 1/2 watt wire-wound resistor	.16
R13	2UR-224	Plug-in type ballast resistor	.80
C1, C2	3CC-275A	Two-gang variable condenser (see production changes)	2.95
C3	AAC-114	0.001 mf mica condenser	.20
C4, C12	AAC-106A	0.00005 mf mica condenser	.20
†C5, C6, C7		Trimmer, part of antenna coil assembly.	
C8, C29	BC-12	0.05 mf, 200 volt tubular condenser	.20
C10, C22, C25, C30	AC-6	0.1 mf, 200 volt tubular condenser	.20
C11	KC-59	0.006 mf, 400 volt tubular condenser	.20
†C13, C14		Trimmer, part of oscillator coil assembly.	
C15	2NC-231	Single adjustable padding condenser. Range: 300 to 800 mmf	.50
C16	3EC-267	0.0042 mf mica condenser	.40
C17	CCC-127	0.01 mf, 200 volt tubular condenser	.20
†C18, C19		Trimmer, part of first i-f transformer.	
†C20, C21		Trimmer, part of second i-f transformer.	
C23, C27	AC-7A	0.00025 mf mica condenser	.20
C24	FC-29	0.02 mf, 200 volt tubular condenser	.20
C26, C28	LC-65	0.02 mf, 400 volt tubular condenser	.20
C31	3CC-337	40 mf, 150 volt wet electrolytic condenser	.90
C32	3CC-261	20 mf, 150 volt wet electrolytic condenser	.90
C33	EEC-132	0.1 mf, 400 volt tubular condenser	.20
	3ES-256	Tone control switch	.50
	TTS-111G	Wave-band switch	.60
	3CS-254	6½" dynamic speaker	5.25
	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
	3CZ-514	Dial face	.70
	3CZ-336A	Dial drive belt	.10
	3CZ-337	Drive shaft and pulley	.10
	3CZ-339	Idler pulley	.05
	3CZ-340	Idler spring	.05
	3CZ-341	Condenser shaft pulley	.10
	4MZ-336	Dial pointer (see production changes)	.25
	3CZ-350	Escutcheon with crystal (for Models AM-131 and AM-169)	1.05
	4MZ-644	Dial crystal (for Model AM-187)	.60

When ordering replacement parts specify part numbers.

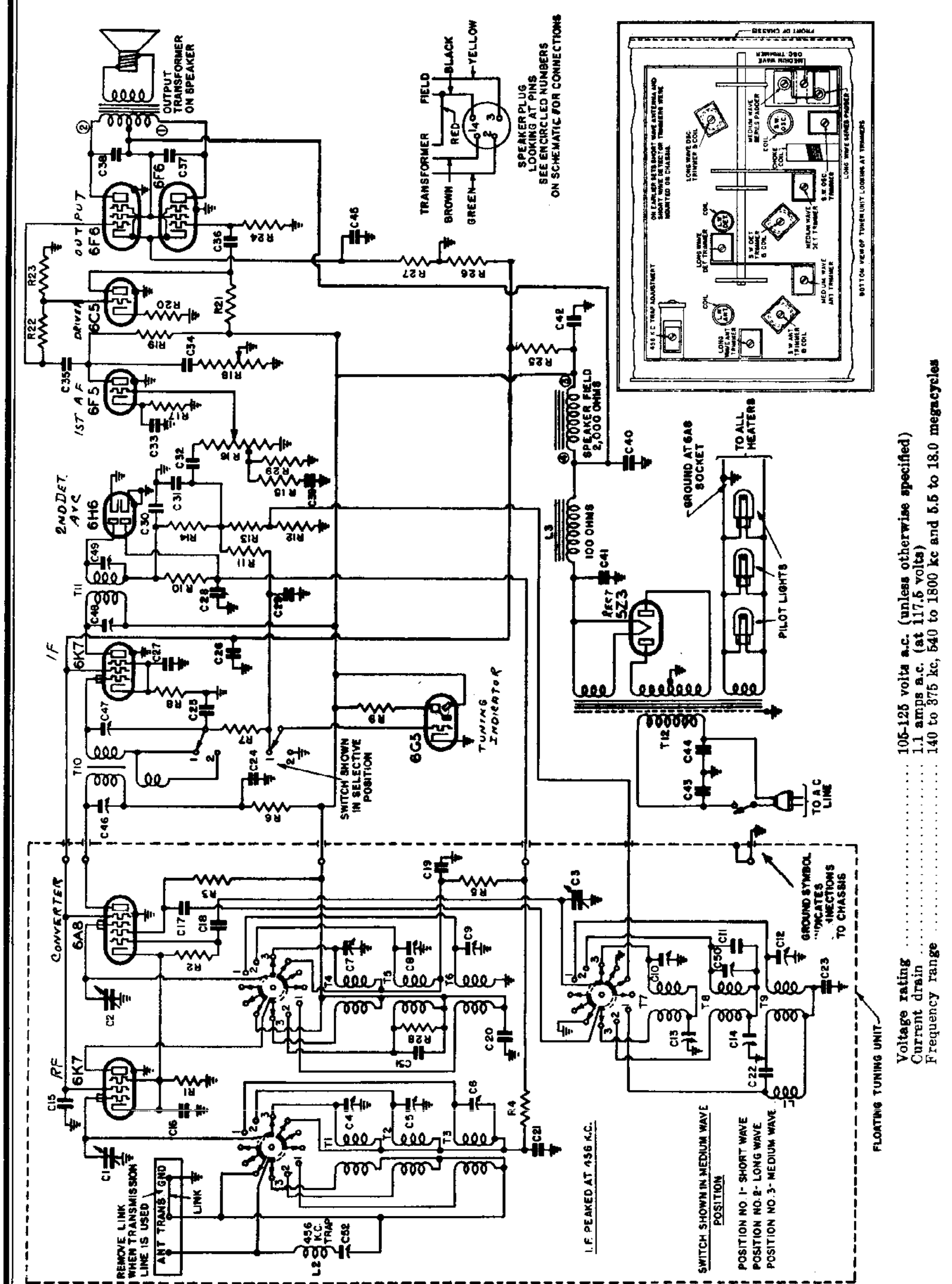
*Item number locates the article on the schematic diagram.

†These trimmers cannot be supplied separately.

Chassis DLW
Schematic, Trimmers

EMERSON RADIO & PHONO. CORP.

MODELS D134LW, D136LW, D138LW
D139LW, D140LW, D142LW
D146LW



MODELS D134LW, D136LW, D138LW, D139LW, D140LW, D142LW, D146LW — EMERSON RADIO & PHONO. CORP. — Chassis DLW — Alignment, Voltage Notes, Changes, Parts

Ten-Tube, A.C., Long, Medium and Short-Wave Superheterodyne

MODELS D134LW, D136LW, D138LW, D139LW, D140LW, D142LW and D146LW

Chassis Model DLW

ADJUSTMENTS

The receiver was carefully aligned and checked at the factory by means of an oscillograph, and it is strongly recommended that servicemen use one for realignment.

An oscillator with frequencies of 150, 345, 456, 600, 1600 and 16000 kc should be used.

An output meter should be used across the voice coil or speaker output transformer for observing maximum response.

Use a standard dummy antenna for aligning any of the three bands. A .0002 mf condenser may be used for the medium-wave and long-wave dummy antenna, and a 400 ohm resistor for the short-wave dummy antenna.

The i-f transformers are located on the extreme left side of the chassis. The transformer nearest the front of the chassis is the first i-f transformer. The four trimmers for the i-f adjustment are available through holes in the tops of the cans.

The medium-wave, long-wave and short-wave coils are all located on the tuner unit. The tuner unit is the separate chassis section floated on rubber and mounted in center of chassis. The location of the trimmers for the coils is shown in the illustration at the right. The three coils for the medium-wave band are in separate cans on top of the tuner unit.

Checking High-Fidelity Operation

On the oscillograph screen the peak of the selectivity curve (i-f response curve with fidelity-selectivity switch in selective position, clockwise) should appear in a position midway between the two peaks of the high-fidelity curve (i-f response curve with fidelity-selectivity switch in fidelity position, counter clockwise). In other words the central vertical axis of the selectivity curve should be coincident on the screen with the central vertical axis of the high-fidelity curve.

An approximate check of the high-fidelity operation can be made with the use of the oscillator and output meter. First, the i-f's should be very carefully peaked at 456 kc *with the fidelity-selectivity switch in the selective position.* Turn the switch to the fidelity position, counter-clockwise, and vary the frequency of the oscillator. Two peaks should be observed on the output meter, approximately 7 kc on each side of the selectivity peak.

Alignment

Set the wave-band switch at the medium-wave (clockwise) position and the variable condenser at the minimum capacity position. Feed 456 kc to the grid cap of the 6A8 tube. Adjust the four i-f trimmers carefully for maximum response. Feed 456 kc through a dummy antenna into the antenna terminal and adjust the 456 kc wave-trap for *minimum response.* (See General Notes.)

Both pointers on the dial should coincide vertically at [illegible]m. For adjustment, the gold pointer may be slipped around its shaft. With the wave-band switch at the medium-wave (clockwise) position, set the pointer at 60, feed 600 kc through the antenna (using a standard dummy antenna) and adjust the medium-wave series padder for maximum response. Move pointer to 160, feed 1600 kc to the antenna and adjust the oscillator trimmer for maximum response, then adjust detector and antenna trimmers. Reset the pointer to 60, feed 600 kc to antenna and rock the variable condenser (rotate the condenser back and forth through a small arc) while resetting the oscillator padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary, return to 600 and repeat entire procedure.

Set the wave-band switch at the long-wave (central) position and the pointer to 150. Feed 150 kc through a standard dummy antenna to the antenna terminal and adjust the long-wave series padder for maximum response. Move the pointer to 345, feed 345 kc and adjust the long-wave oscillator trimmer, then the r-f trimmer and then the antenna trimmer for maximum response. Return to 150 kc and re-adjust the long-wave series padder for maximum response. Return to 345 kc and re-adjust all three trimmers. Return again to 150 and check the alignment. Repeat the entire procedure until no appreciable readjustment is required.

Set the wave-band switch at the short-wave (counter-clockwise) position. Move pointer to 16, feed 16000 kc to antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator for maximum response. If two peaks are obtained choose minimum capacity peak. Then adjust the detector and antenna trimmers for maximum response. If two peaks are obtained choose the maximum capacity peak.

Tube Data

The tube complement is as follows:

1—6K7—R-f amplifier (on tuner unit)
1—6A8—Pentagrid modulator-oscillator (on tuner unit)
1—6K7—I-f amplifier
1—6H6—Diode detector and automatic volume control
1—6F5—First a-f amplifier
1—6C5—Phase inverter (audio)
2—6F6—Push-pull pentode output
1—6G5—Electron ray tuning indicator
1—5Z3—Full-wave rectifier.

GENERAL INSTRUCTIONS

Use as weak a test signal as possible during alignment.

The set's oscillator is higher in frequency than the signal on all three bands. Images, therefore, should be observed on the low-frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmer and maximum capacity peaks on antenna and r-f trimmers. The last motion in adjusting trimmers should always be a tightening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a source of noise, frequency drift and microphonism.

In aligning antenna trimmers on the high-frequency signals there is usually a tendency for the oscillator to drift, due to interlocking. To compensate for this always keep re-tuning the variable condenser as you align.

GENERAL NOTES

1. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraph station the wave-trap trimmer may be readjusted until the response from the interfering station is at a minimum.
2. A jack is provided at the rear of the chassis for a phonograph attachment. The pickup to be used should be of the high impedance type. A separate potentiometer type volume control is required, the overall resistance to be determined by the type of pickup chosen. The pickup leads should be connected to the two outside terminals of the volume control with the ground lead of the pickup on the right-hand terminal (looking at front with terminals at top) of the control. A lead from this terminal should be plugged into the hole in the phono jack nearest the center of the chassis. A lead from the center terminal of the volume control should be plugged into the other hole in the jack (grid side of jack). Ends of leads to be plugged in jack should be fitted with tips. The volume control in the receiver should be turned to the extreme counter-clockwise (low) position when operating phonograph. Since the phono jack is of the shorting type signals cannot be received by the set when the leads are plugged into the jack. The leads should be removed before attempting to receive broadcast stations.
3. The receiver should never be turned on with either the speaker plug or the 6F6 tubes out of their sockets, since the rapid rise in rectifier voltage would damage the electrolytic condensers.
4. Pilot lights may be replaced by slipping the push-on sockets off the dial and unscrewing the bulbs. It is not necessary to remove either the dial or chassis from cabinet.
5. In replacing chassis in cabinet do not tighten mounting screws so much that chassis will not float freely, and do not allow any part of the dial assembly to touch the cabinet. Do not push control knobs on so far that they touch the cabinet front panel. If these precautions are not observed the receiver may become microphonic.
6. The color coding of the power transformer leads is as follows:
   - Primary—two black leads
   - High voltage sec.—two red leads
   - High voltage secondary center tap—red and yellow lead
   - 6.3v sec.—two heavy green leads
   - 5v sec.—two heavy yellow leads
7. The tuning indicator (6G5 tube) is mounted in the cabinet above the dial on all the console type receivers, and in the speaker compartment on the table type receivers. On the table type receivers it is necessary to remove the speaker from the baffle, in order to remove the tuning indicator tube assembly. The color coding of the tuning indicator tube cable is as follows:
   - Shield—cathode
   - Blue—plate
   - Red—target
   - Black—filament
   - Green—grid
8. An efficient antenna system (aerial) is necessary to enable a full realization of the merits of the receiver. The Emerson All-Wave Antenna is especially designed for high efficiency and reduction of noise on all three frequency ranges. Complete instructions for the installation of this antenna are supplied with each kit.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground, with no signal. Line voltage for these readings was 117.5 volts, 60 cycles.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A8 osc.-mod.	210	100	3.2	160	6.3 a.c.
6K7 r-f amp.	215	100	3.2	—	6.3 a.c.
6K7 i-f amp.	215	100	2.6	—	6.3 a.c.
6H6 diode det.	—	—	0	—	6.3 a.c.
6F5 1st audio	75	—	1.1	—	6.3 a.c.
6C5 phase inverter	98	—	4	—	6.3 a.c.
6F6 output	330	335	22	—	6.3 a.c.
6F6 output	330	335	22	—	6.3 a.c.

Voltage at 5Z3 filament—350.
Voltage across speaker field—110.
Voltage across choke—15.
Voltages in chassis measured along voltage divider, starting at end nearest rear of chassis.
Tap 1 (nearest rear of chassis)—215
Tap 2—[illegible]
Tap 3—0
Tap 4—22

REPLACEMENT PARTS LIST

*Item	Part No.	DESCRIPTION	List Price as effective as of Aug. 1st, 1936 PRICE
L1	8AT-261	Oscillator choke	$ .20
L2	[illegible]	456 kc wave trap	.60
L3	8AT-264	Iron core filter choke	.90
T1	8AT-251	Medium-wave antenna coil	.95
T4	8AT-252	Medium-wave detector coil	.95
T7	8AT-253	Medium-wave oscillator coil	.75
T2	[illegible]	Long-wave antenna coil	1.05
T5	[illegible]	Long-wave detector coil	1.05
T8	[illegible]	Long-wave oscillator coil	.95
T3	8AT-257	Short-wave antenna coil	.80
T6	8AT-258	Short-wave detector coil	.70
T9	8AT-259	Short-wave oscillator coil	.50
T10	8AT-260	Band-spread, iron core, 456 kc first i-f transformer	2.90
T11	8AT-261	456 kc second i-f transformer	1.90
T12	8AT-262	Power transformer	6.65
R1	8AR-245	220 ohm ½ watt wire-wound resistor	.18
R2	KR-53	50,000 ohm ¼ watt carbon resistor	.18
R3	YR-97	15,000 ohm ½ watt carbon resistor	.16
R4, R5, R7, R13, R14, R121	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R6, R28	GR-35	2,000 ohm ¼ watt carbon resistor	.16
R8	CCR-140	350 ohm ½ watt wire-wound resistor	.16
R9, R10, R11	KR-57	1 megohm ¼ watt carbon resistor	.16
R12, R22, R24	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R15, R30	LR-65	10,000 ohm ¼ watt carbon resistor	.16
R16	8AR-228	Volume control with line switch—500,000 ohms tapped at 100,000 ohms	1.20
R17	8AR-250	2,500 ohm ¼ watt carbon resistor	.16
R18	NNR-157B	Tone control—500,000 ohms	.90
R19	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R20	KR-68	15,000 ohm ¼ watt carbon resistor	.16
R23	8AR-244	80,000 ohm ¼ watt carbon resistor	.16
R25, R26, R27	8AR-280	Wire-wound voltage divider: R25—3000 ohms, 4.8 watts; R26—8000 ohms, 3.35 watts; R27—240 ohms, 2.4 watts	.95
C1, C2, C3	8AC-275	Three-gang variable condenser	7.40
C4, C5, C7, C8, C10, C12	8AC-278	1.5 to 12 mmf trimmer condensers. (See Production Changes.)	.15
†C6		Trimmer—part of short-wave coil assembly.	
†C9		Trimmer—part of short-wave detector coil assembly.	
C13, C14	8MC-295	Dual padding condenser: C13—250 to 550 mmf; C14—100 to 200 mmf	.60
C15, C35, C36	LC-65	0.02 mf 400 volt tubular condenser	.20
C16, C27	AC-6	0.1 mf 200 volt tubular condenser	.20
C17	AAC-114	0.001 mf mica condenser	.20
C11, C18	AAC-168A	0.00025 mf mica condenser	.20
C19	[illegible]	0.05 mf 200 volt tubular condenser (with mounting strap)	.20
C20, C24	[illegible]	0.1 mf 400 volt tubular condenser	.20
C21	[illegible]	0.25 mf 200 volt tubular condenser	.20
C22	[illegible]	0.000025 mf mica condenser	.20
C23	[illegible]	0.0005 mf mica condenser	.25
C25, C32	[illegible]	0.05 mf 200 volt tubular condenser	.20
C33	[illegible]	5 mf 25 volt dry electrolytic condenser	.90
C28, C29	[illegible]	0.02 mf 200 volt tubular condenser	.20
C26	AAC-112	0.25 mf 400 volt tubular condenser	.20
C30, C31	AC-7A	0.00025 mf mica condenser	.20
C45	[illegible]	5 mf 50 volt dry electrolytic condenser	.60
C34	[illegible]	0.005 mf 400 volt tubular condenser	.20
C37, C38	[illegible]	0.002 mf 1000 volt tubular condenser	.20
C39	[illegible]	0.05 mf 200 volt tubular condenser	.20
C40, C41	[illegible]	8 mf 400 volt wet electrolytic condenser	1.20
C42	[illegible]	10 mf 250 volt wet electrolytic condenser	1.20
C43, C44	[illegible]	Dual 0.01 mf, 400 volt tubular condenser in metal container	.20
†C46, C47		Trimmers—part of first i-f assembly.	
†C48, C49		Trimmers—part of second i-f assembly.	
†C50		Trimmer—part of long-wave oscillator coil assembly.	
†C51	EC-24A	0.0001 mf mica condenser	
†C52		Trimmer—part of wave-trap.	

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

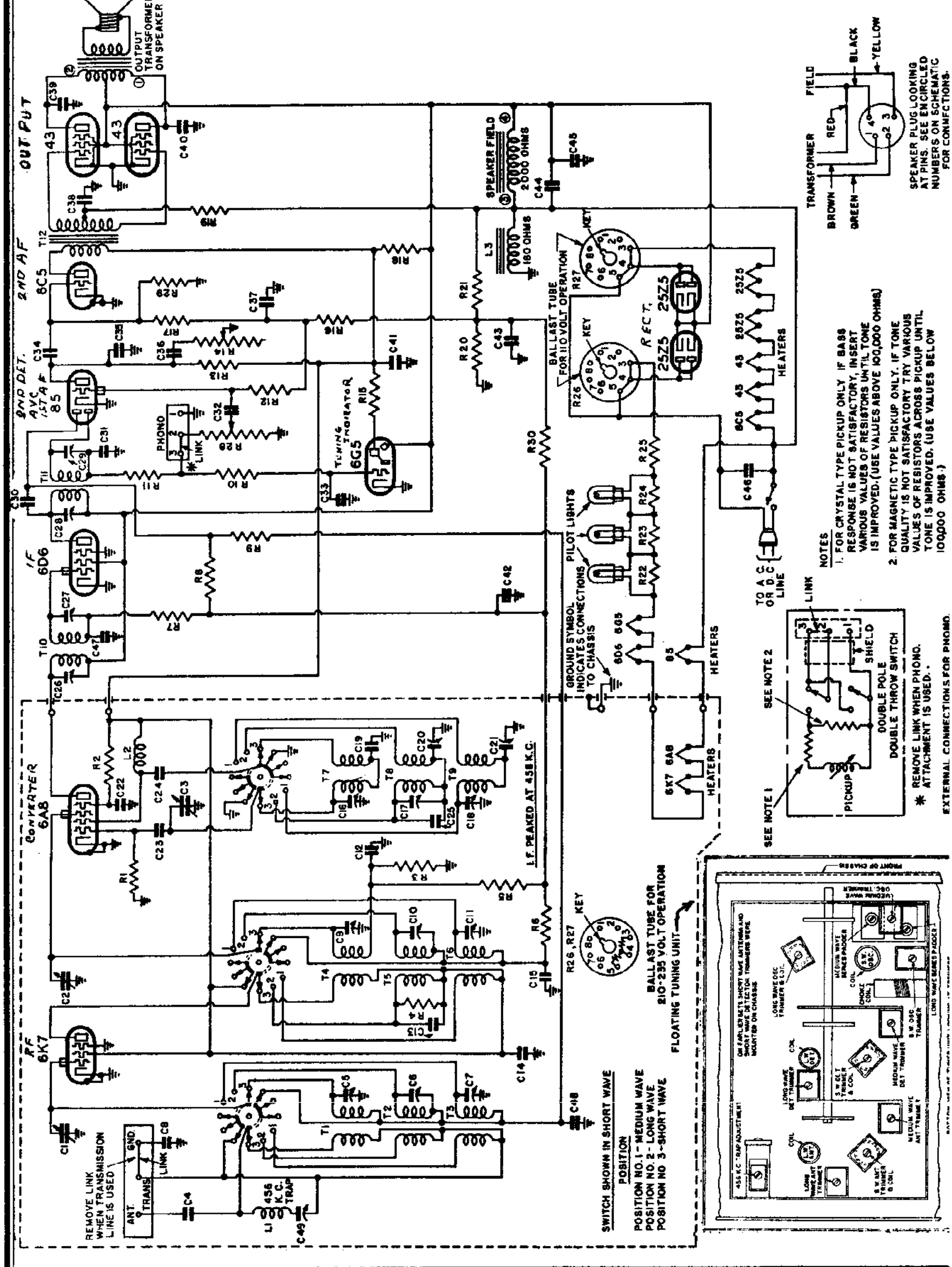
*Item number locates the article on the schematic diagram.
† These condensers are part of coil assemblies and can not be supplied separately.

PRODUCTION CHANGES

a. C6 and C9 trimmers were supplied separately and later incorporated as part of the short-wave antenna and detector coil assemblies.
b. R30 in early receivers was a 5,000 ohm ¼ watt resistor.
c. R29 was not used in early receivers.

EMERSON RADIO & PHONO. CORP

MODELS M134,M136,M13
M140,M142,M14
Chassis M M13
Schematic
Trimmers,Phono Notes



MODELS M134, M136, M138, M139, M140, M142, M146

EMERSON RADIO & PHONO. CORP.

Chassis M
Alignment, Voltage Changes, Notes, Parts

A.C.-D.C., Long, Medium and Short-Wave Superheterodyne

12 Tubes Including Ballast Tubes

MODELS M-134, M-136, M-138, M-139, M-140, M-142, and M-146

Chassis Model M

ADJUSTMENTS

An oscillator with frequencies of 150, 345, 456, 600, 1600 and 16000 kc should be used.

An output meter should be used across the voice coil or speaker output transformer for observing maximum response.

Use a standard dummy antenna for aligning any of the three bands. A .0002 mf condenser may be used for the medium-wave band and the long-wave band dummy antenna and a 400 ohm resistor for the short-wave dummy antenna.

The i-f transformers are located on the extreme left side of the chassis. The transformer nearest the front of the chassis is the first i-f transformer. The four trimmers for the i-f adjustment are available through holes in the tops of the cans.

The medium-wave, long-wave and short-wave coils are all located on the tuner unit. The tuner unit is the separate chassis section floated on rubber and mounted in center of chassis. The location of the trimmers for the coils is shown in the illustration at the right. The three coils for the medium-wave band are in separate cans on top of the tuner unit.

I-f Alignment

Set the wave-band switch at the medium-wave (clockwise) position and the variable condenser at the minimum capacity position. Feed 456 kc to the grid cap of the 6A8 tube. Adjust the four i-f trimmers carefully for maximum response. Feed 456 kc through a dummy antenna into the antenna terminal and adjust the 456 kc wave-trap for minimum response. (See General Notes.)

TUBE DATA

The tube complement is as follows:

1—6K7—R-f amplifier (on tuner unit)
1—6A8—Pentagrid modulator-oscillator (on tuner unit)
1—6D6—I-f amplifier
1—85—Second detector, a.v.c., and a-f amplifier
1—6C5—A-f amplifier
2—43—Push-pull pentode output
1—6G5—Electron Ray tuning indicator
2—25Z5—Half-wave rectifiers
2—3MZ-419—Ballast tubes for 105-125 volt operation
2—3MR-253—Ballast tubes for 210-250 volt operation

Medium-Wave Alignment

Both pointers on the dial should coincide vertically at 890 kc. For adjustment, the gold pointer may be slipped around its shaft. With the wave-band switch at the medium-wave (clockwise) position, set the pointer at 60, feed 600 kc through the antenna (using a standard dummy antenna) and adjust the medium-wave series padder for maximum response. Move pointer to 160, feed 1600 kc to the antenna and adjust the oscillator trimmer for maximum response, then adjust detector and antenna trimmers. Reset the pointer to 60, feed 600 kc to antenna and rock the variable condenser (rotate the condenser back and forth through a small arc) while resetting the oscillator padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary, return to 600 and repeat entire procedure.

Long-Wave Alignment

Set the wave-band switch at the long-wave (central) position and the pointer to 150. Feed 150 kc through a standard dummy antenna to the antenna terminal and adjust the long-wave series padder for maximum response. Move the pointer to 345, feed 345 kc and adjust the long-wave oscillator trimmer, then the r-f trimmer and then the antenna trimmer for maximum response. Return to 150 kc and re-adjust the long-wave series padder for maximum response. Return to 345 kc and re-adjust all three trimmers. Return again to 150 and check the alignment. Repeat the entire procedure until no appreciable re-adjustment is required.

Short-Wave Alignment

Set the wave-band switch at the short-wave (counter-clockwise) position. Move pointer to 16, feed 16000 kc to antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator for maximum response. If two peaks are obtained choose minimum capacity peak. Then adjust the detector and antenna trimmers for maximum response. If two peaks are obtained choose the maximum capacity peak.

GENERAL INSTRUCTIONS

The set's oscillator is higher in frequency than the signal on all three bands. Images, therefore, should be observed on the low-frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmer and maximum capacity peaks on antenna and r-f trimmers. The last motion in adjusting trimmers should always be a tightening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a source of noise, frequency drift and microphonism.

In aligning antenna trimmers on the high-frequency signals there is usually a tendency for the oscillator to drift, due to interlocking. To compensate for this always keep re-tuning the variable condenser as you align.

GENERAL NOTES

1. An electrical phonograph pick-up may be connected to this receiver for playing records. Connections to the receiver may be made at the "phono" terminal strip which is located on the rear wall of the receiver chassis. A double-pole, double throw-switch is necessary in addition to the phonograph pick-up and motor. The receiver volume control may be used to control the phonograph volume. Remove the link connecting two of the terminals on the phono strip. The switch should be wired to the pick-up and terminal strip so that in the phonograph position the switch should short terminals 1 and 3 and at the same time connect the high side of the pick-up to a lead from terminal 2. (The ground side of the pick-up may be permanently wired to terminal 1.) When the switch is in the radio position terminals 2 and 3 should be shorted together and the pick-up disconnected from terminal 2. A matching input transformer must be used if the pick-up is of the low impedance type. If the phonograph be permanently disconnected, the small connecting link must be replaced across terminals 2 and 3. (See schematic diagram.)
2. The receiver should never be turned on with the speaker plug out of its socket, since the rapid rise in rectifier voltage would damage the electrolytic condenser.
3. Pilot lights may be replaced by slipping the push-on sockets off the dial and unscrewing the bulbs. It is not necessary to remove either the dial or chassis from cabinet.
4. In replacing chassis in cabinet do not tighten mounting screws so much that chassis will not float freely, and do not allow any part of the dial assembly to touch the cabinet. Do not push control knobs on so far that they touch the cabinet front panel. If these precautions are not observed the receiver may become microphonic.
5. One side of the power line is connected to the chassis through the filter choke L3 (see schematic). Under no condition, therefore, should a ground wire be allowed to come in contact with any metal part of the receiver.
6. The tuning indicator (6G5 tube) is mounted in the cabinet above the dial on all the console type receivers, and in the speaker compartment on the table type receivers. On the table type receivers it is necessary to remove the speaker from the baffle, in order to remove the tuning indicator tube assembly. The color coding of the tuning indicator tube cable is as follows:

   Shield—cathode | Black—filament
   Blue—plate | Green—grid.
   Red—target

7. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. The Emerson All-Wave Antenna is especially designed for high efficiency and reduction of noise on all three frequency ranges. Complete instructions for the installation of this antenna are supplied with each kit.
8. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraph station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.
9. The receivers for 105-125 volt operation may be easily converted for 210-250 volt operation by substituting ballast tubes part no. 3MR-253 for ballast tubes part no. 3MZ-419.

Voltage rating	105-125 volts, a.c. or d.c. (with ballast tubes part no. 3MZ-419). 210-250 volts, a.c. or d.c. (with ballast tubes part no. 3MR-253).
Current drain	0.7 amps.
Frequency ranges	140 to 375 kc, 540 to 1800 kc, 5.5 to 18.0 megacycles.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground, with no signal, volume control turned on full, and variable condenser at maximum capacity position. The line voltage for these readings was as indicated in the headings below.

Line voltage—117.5 volts, 60 cycles, a.c. Using ballast tubes part no. 3MZ-419

Tube	Plate	Screen	Osc. Plate	Fil.
6K7	85	85	—	7.5
6A8	100	40	85	7.5
6D6	100	100	—	7.5
85	25	—	—	7.5
6C5	85	—	—	7.5
43	90	100	—	23.0
43	90	100	—	23.0

Voltage from 25Z5 cathode to chassis—100 volts.
Voltage across choke (soldering lug on electrolytic in corner to chassis)—16 volts.
Filament of 6G5 (black lead to black lead)—7 volts.
Target voltage of 6G5 (red lead to chassis)—100 volts.

Line voltage—235 volts, 60 cycles, a.c. Using ballast tubes part no. 3MR-253

Tube	Plate	Screen	Osc. Plate	Fil.
6K7	100	100	—	7
6A8	125	60	100	7
6D6	125	125	—	7
85	30	—	—	7
6C5	100	—	—	7
43	115	125	—	28
43	115	125	—	28

Voltage from 25Z5 cathode to chassis—125 volts.
Voltage across choke (soldering lug on electrolytic in corner to chassis)—20 volts.
Filament of 6G5 (black lead to black lead—7 volts.
Target voltage of 6G5 (red lead to chassis)—125 volts.

REPLACEMENT PARTS

*Item	Part No.	DESCRIPTION	List Price as Effective as of Aug. 1st, 1934 PRICE
L1	2PT-288	456 kc wave-trap	$ .60
L2	3KT-299	R-f choke—5 millihenries	.55
L3	3MT-300	[illegible] filter choke	2.00
T1	3AT-257	Short-wave antenna coil	.60
T4	3AT-258	Short-wave detector coil	.70
T7	3AT-259	Short-wave oscillator coil	.50
T2	3MT-301	Long-wave antenna coil	1.05
T5	3MT-302	Long-wave detector coil	1.05
T8	3MT-303	Long-wave oscillator coil	.95
T3	3AT-261	Medium-wave antenna coil	.95
T6	3AT-262	Medium-wave detector coil	.95
T9	3AT-263	Medium-wave oscillator coil	.75
T10	3BT-259A	456 kc first i-f transformer	2.00
T11	3AT-261	456 kc second i-f transformer	1.90
T12	3AT-266	Audio input transformer	2.55
R1, R11	KR-58	[illegible] ohm ½ watt carbon resistor	.16
R2	LR-60	[illegible] ohm ½ watt carbon resistor	.16
R3, R5, R9, R10	KR-57	1 megohm ¼ watt carbon resistor	.16
R4	GR-85	[illegible] ohm ¼ watt carbon resistor	.15
R6, R7, R15, R29	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R8, R12, R17, R30	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R13, R16, R21	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R14	3MR-252	Tone control—250,000 ohms	.75
R18	IIR-131	1,000 ohm ½ watt wire-wound resistor	.16
R19	OR-73	25,000 ohm ¼ watt carbon resistor	.16
R20	ZZR-196	30,000 ohm ¼ watt carbon resistor	.16
R22, R23, R24, R25	3MR-254	Wire-wound metal clad filament resistor. R22—40 ohms; R23—40 ohms; R24—40 ohms; R25—195 ohms.	.40
R26, R27	3MZ-419	Ballast tube for 105-125 volt operation	.40
	3MR-255	Ballast tube for 210-250 volt operation	1.10
R28	3MR-251	Volume control—100,000 ohms	.80
C1, C2, C3	3AC-276	Three-gang variable condenser	7.40
C4, C24	AAC-114	0.001 mf mica condenser	.20
C5, C6, C7, C9, C10, C11, C16, C18	3AC-278	1.5 to 12 mmf trimmer condenser (see Production Changes)	.15
C8	KC-58	0.01 mf, 400 volt tubular condenser	.20
C12, C38, C42, C47	BC-12	0.05 mf, 200 volt tubular condenser	.20
C13, C23	EC-24A	0.0001 mf mica condenser	.20
C14, C22	AC-6	0.1 mf, 200 volt tubular condenser	.20
C15, C48	NNC-158	0.05 mf, 200 volt tubular condenser with mounting strap	.20
†C17		Trimmer, part of long-wave oscillator coil.	
C19	XXC-197	0.0038 mf mica condenser	.25
C20, C21	3MC-296	Dual adjustable padding condenser. C20—100 to 200 mmf C21—250 to 550 mmf.	.60
C25	AAC-106A	0.00005 mf mica condenser	.20
†C26, C27		Trimmer, part of first i-f transformer.	
†C28, C29		Trimmer, part of second i-f transformer.	
C30	IIC-133A	0.000025 mf mica condenser	.20
C31, C35	AC-7A	0.00025 mf mica condenser	.20
C32, C34	LC-64	0.05 mf, 400 volt tubular condenser	.20
C36	QQC-173	0.015 mf, 600 volt tubular condenser	.20
C37, C43	BBC-131	0.9 mf, 200 volt tubular condenser	.50
C38	3AC-256	5 mf, 50 volt tubular dry electrolytic condenser	.30
C39, C40	TTC-177	0.01 mf, 600 volt tubular condenser	.20
C41	3MC-292	8 mf, 150 volt wet electrolytic condenser	.85
C44	3MC-290	50 mf, 200 volt wet electrolytic condenser	1.45
C45	3MC-291	50 mf, 150 volt wet electrolytic condenser	1.30
C46	3MC-293	0.1 mf, 400 volt a.c. tubular condenser	.30
†C49		Trimmer, part of wave-trap assembly.	

*Item number locates the article on the schematic diagram.
†These trimmers are part of coil assemblies and can not be supplied separately.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

PRODUCTION CHANGES

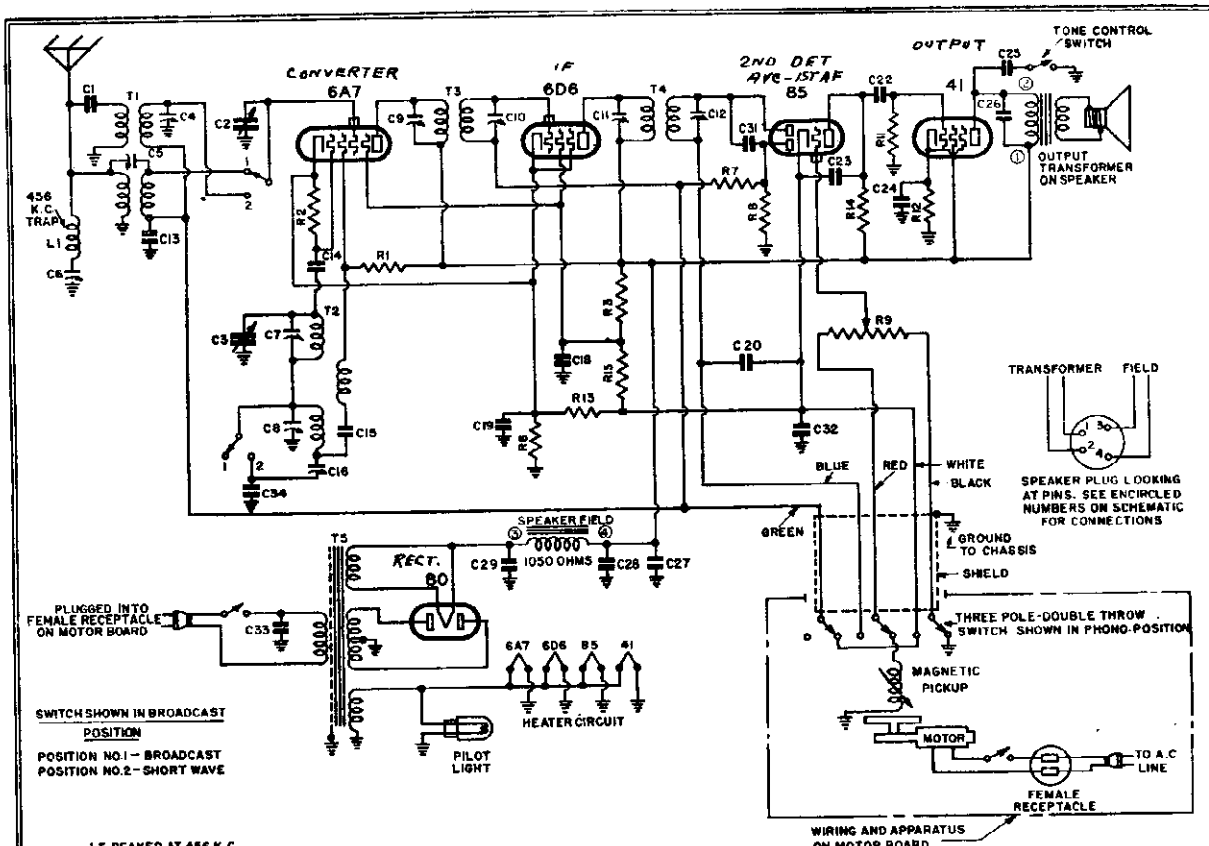
C5 and C9 trimmers were supplied separately and later incorporated as part of the short-wave antenna and detector coil assemblies.

In later receivers trimmers C6 and C10 have their rotors returned to ground and not to a.v.c., as shown on the schematic.

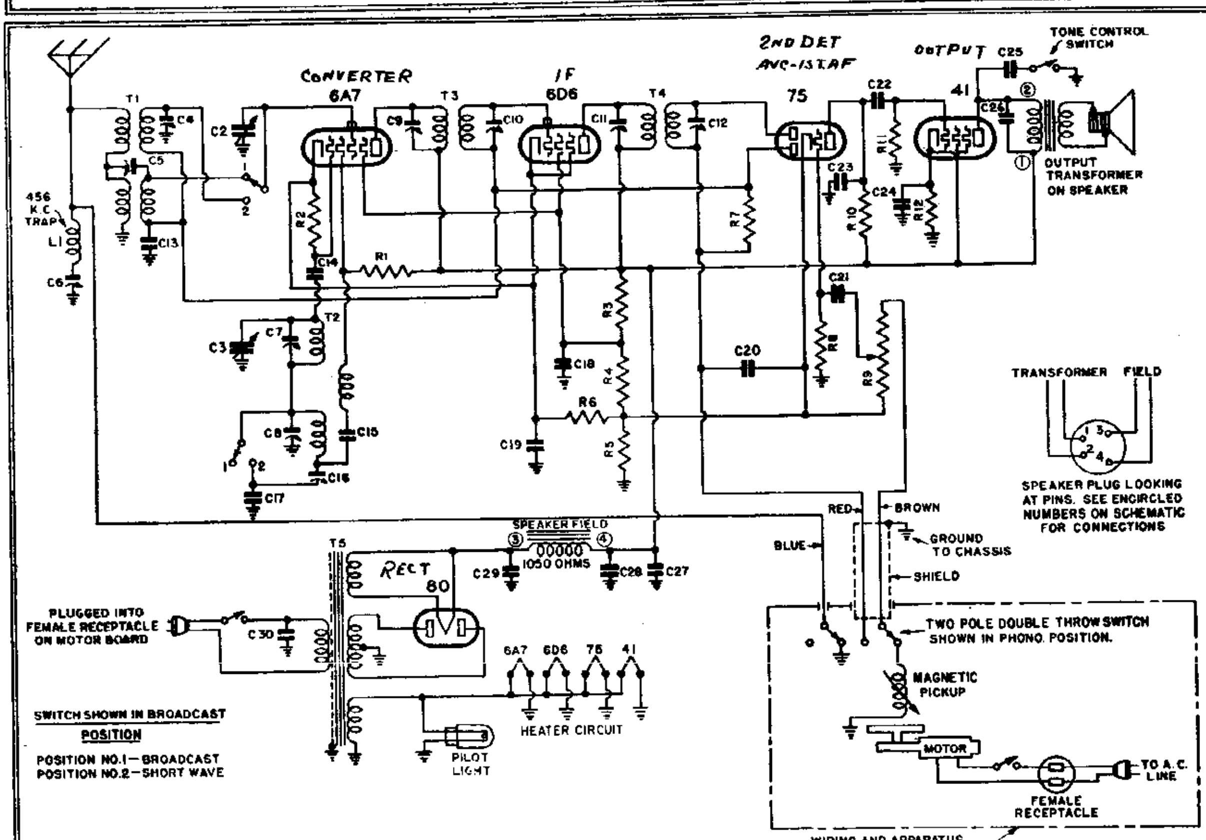
Below and Above Ser.895962
Schematics,

EMERSON RADIO & PHONO. CORP.

MODEL L143
Chassis L



SCHEMATIC DIAGRAM NO.1



SCHEMATIC DIAGRAM NO.2

MODEL L143
Chassis L
Below and Above #895962
Alignment, Voltage, Parts
Notes, Changes

EMERSON RADIO & PHONO. CORP.

Combination Phonograph and Five-Tube, A.C., Dual-Wave Superheterodyne

MODEL L143

Chassis Model L

Voltage rating	105 to 125 volts, a.c.
Current drain	0.5 amps. for receiver.
Frequency range	540 to 1750 kc, 2300 to 7500 kc.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600 and 6000 kc should be used.
An output meter should be used across the voice coil or output transformer for observing maximum response.
If the circuit is at all disturbed, both the broadcast and short-wave bands must be realigned.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The second i-f is the one directly behind the variable condenser. The four trimmers, two for each transformer, are accessible through holes in the tops of the cans.

The 456 kc wave trap is located on top of the chassis deck between the 6A7 tube and the first i-f transformer.

The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the 6A7 tube) with the screw adjustment accessible through a hole in the top of the chassis.

The antenna coils for the broadcast and short-wave bands are wound on one form and mounted underneath the chassis deck directly behind the adjustable padding condenser. The trimmers for these coils are also accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the short-wave antenna trimmer. The trimmer farthest from the front of the chassis is the broadcast antenna trimmer.

The oscillator coils for the broadcast and short-wave bands are wound on one form and mounted underneath the chassis deck near the variable condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is for the short-wave oscillator coil and the trimmer farthest from the front is for the broadcast oscillator coil.

I-f and Wave-trap Alignment

Rotate the wave-band switch to the broadcast position, clockwise. Set the variable condenser at the minimum capacity position and feed 456 kc to the grid cap of the 6A7 tube. Adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna lead and adjust the wave-trap trimmer (mounted on wave-trap) for minimum response. (See paragraph 7 under General Notes.)

Short-wave Alignment (Alignment of the short-wave band should precede broadcast alignment)

Use a 400 ohm dummy antenna (a 400 ohm resistor in series with the test oscillator antenna lead) in aligning the short-wave coils. Rotate the wave-band switch to the short-wave position (counter-clockwise) and set the dial pointer exactly at 6 megacycles. Feed 6000 kc and adjust the short-wave oscillator trimmer (closest to front beside the variable condenser) for maximum response and then adjust the antenna trimmer (left side of top of chassis, closest to front). Be very careful to choose the minimum capacity peak on the oscillator trimmer. (See General Instructions below.)

Broadcast Alignment

Use a standard dummy antenna in aligning the broadcast coils. (A .0002 condenser may be used as a substitute.) Rotate the wave-band switch to the broadcast position, clockwise. Set the dial pointer at 600 and feed 600 kc. Adjust the broadcast series padder (in corner near 6A7 tube) for maximum response. Move the dial pointer to 1600 and feed 1600 kc. Adjust the broadcast oscillator trimmer (farthest from front beside the variable condenser) for maximum response and then adjust the broadcast antenna trimmer (farthest from front at left side of chassis). Return pointer to 600, feed 600 kc and readjust the broadcast series padder, rocking the variable condenser (rotate the variable condenser shaft back and forth through a small arc) for maximum response.

GENERAL INSTRUCTIONS

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Always use as weak a test signal as possible during alignment.

GENERAL NOTES

1. The receiver should never be turned on with either the speaker plug or the 41 tube out of its respective socket, since the rapid rise in rectifier voltage will damage the electrolytic condenser.
2. When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonism will result.
3. The color coding of the i-f transformers is as follows:
   Grid—green   Grid return—black
   B plus—red   Plate—blue.
4. The color coding of the power transformer is as follows:
   Primary—two black leads
   High-voltage secondary—two red leads
   High-voltage secondary center tap—red and yellow lead
   6.3 volt secondary—two green leads
   5 volt secondary—two yellow leads.
5. The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the wave-band switch) with the screw adjustment accessible through a hole in the top of the chassis. The short-wave band has a fixed padder, C17 on schematic. When replacing this fixed padder be careful to use a condenser which has a capacity within 2% of the specified value, otherwise the short-wave coils may not track.
6. With a few exceptions, the color coding of the general wiring is as follows:
   Plate—blue   Cathode—white or yellow
   B plus—red   Grid—green
   Screen—brown   Fil. and ground—black.
7. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraph station the wave-trap trimmer may be readjusted until the response from the interfering station is at a minimum.
8. An efficient antenna system (aerial) is necessary to enable a full realization of the merits of the receiver. The Emerson All-Wave Antenna is especially designed for high efficiency and reduction of noise on both frequency ranges. Complete instructions for the installation of this antenna are supplied with each kit.
9. The phonograph motor has been adjusted at the factory to turn at a speed of 78 r.p.m. The speed may be checked by counting the turns per minute or by using a stroboscope disc and a neon light. (The stroboscope method will only work when neon bulb is lighted from a 60 cycle a.c. supply.) To readjust the speed of the motor, part No. 3LPM-3, remove the turn-table and turn the speed adjusting screw (located near the turn-table shaft). A clockwise rotation of the screw decreases the speed. The speed should be checked with the pick-up and record in playing position. Phonograph motors, part No. 3LPM-2, have the speed adjustment brought out to an indicator arm and escutcheon. The speed of this motor is adjusted by shifting the indicator arm to the right or left.

Tube Data

The tube complement is as follows:
1—6A7, oscillator-modulator
1—6D6, i-f amplifier
†1—75, diode detector, a.v.c., a-f amplifier
1—41, power output pentode
1—80, full-wave rectifier.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis). Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	255	90	3.5	170	6.3 a.c.
6D6	255	90	3.5	—	6.3 a.c.
†75	120	—	1.8	—	6.3 a.c.
41	240	255	18.0	—	6.3 a.c.

B plus at filament of 80 tube—325 volts.
Voltage across speaker field—70 volts.

†Receivers bearing serial numbers below 895,962 used a type 85 second detector. The voltage readings at the 85 socket are as follows: Plate 87, Cathode 5.5, Fil. 6.3 a.c.

REPLACEMENT PARTS LIST

*Item Schematic No. 1	Schematic No. 2	Part No.	DESCRIPTION	List Price as Effective as of Aug. 1st, 1936 PRICE
L1	L1	MMT-149	456 kc adjustable wave-trap	$ .50
T1	‡T1	2NT-226	Two-band antenna coil	1.65
T2	T2	2NT-227	Two-band oscillator coil	1.35
T3	T3	2NT-230	456 first i-f transformer	1.35
T4	T4	2NT-231	456 kc second i-f transformer	1.35
T5	T5	*2NT-233	Power transformer	4.05
R1	R1	LR-40	20,000 ohm 1/4 watt carbon resistor	.16
R2	R2	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R3	R3	BR-12	25,000 ohm 1 watt carbon resistor	.16
—	R4	3LR-265	40,000 ohm 1/2 watt carbon resistor	.16
—	R5	3ER-262	75 ohm 1/2 watt wire-wound resistor	.16
R6	R6	IIR-130	150 ohm 1/2 watt wire-wound resistor	.16
R7, R8	R7, R8	KR-57	1 megohm 1/4 watt carbon resistor	.16
R9	R9	2NR-214D	Volume control with line switch—250,000 ohm	1.20
—	R10	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R11	R11	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R12	R12	CCR-113	450 ohm 1 watt wire-wound resistor	.16
R13	—	FFR-126	500 ohm 1/2 watt wire-wound resistor	.16
R14	—	KR-54	100,000 ohm 1/4 watt carbon resistor	.16
R15	—	2NR-217	40,000 ohm 1 watt carbon resistor	.16
C1	‡—	AAC-106A	0.00005 mf mica condenser	.20
C2, C3	C2, C3	3EC-284	Two-gang variable condenser	3.65
†C4, C5	†C4, C5	—	Trimmer, part of 2NT-226 coil assembly.	
†C6	†C6	—	Trimmer, part of MMT-149 wave-trap assembly.	
†C7, C8	†C7, C8	—	Trimmer, part of 2NT-227 oscillator coil assembly.	
†C9, C10	†C9, C10	—	Trimmer, part of 2NT-230, first i-f transformer assembly.	
†C11, C12	†C11, C12	—	Trimmer, part of 2NT-231 second i-f transformer assembly.	
C13, C14	C13, C14	BC-12	0.05 mf, 200 volt tubular condenser	.20
C15	C15	KC-53	0.01 mf, 400 volt tubular condenser	.20
C16	C16	2NC-231	Single adjustable padding condenser—Range 300 to 600 mmf	.50
—	‡C17	3LC-327	0.0018 mf mica condenser	.30
C19	C19	BC-18	0.25 mf, 200 volt tubular condenser	.30
C20, C31	C20	AC-7A	0.00025 mf mica condenser	.20
—	C21	CCC-127	0.01 mf, 200 volt tubular condenser	.20
C22	C22	LC-55	0.02 mf, 400 volt tubular condenser	.20
C23	C23	IC-47	0.0005 mf mica condenser	.20
C24	C24	IC-43A	5 mf, 25 volt tubular dry electrolytic condenser	.90
C25	C25	2TC-189	0.015 mf, 1000 volt tubular condenser	.30
C26	C26	ZC-115	0.006 mf, 1000 volt tubular condenser	.20
C27	C27	EEC-132	0.1 mf, 400 volt tubular condenser	.20
C28	C28	2NC-247	16 mf, 405 volt wet electrolytic condenser	1.20
C29	C29	2NC-246	16 mf, 450 volt wet electrolytic condenser	1.20
—	C30	3LC-297A	0.01 mf, 400 volt molded type paper condenser	.20
C32	—	AC-6	0.1 mf, 200 volt tubular condenser	.20
C33	—	3LC-297	0.01 mf, 250 volt a.c. tubular condenser in metal container	.30
C34	—	2NC-230	0.00135 mf mica condenser	.50

*Item number locates the article on the schematic diagram.
†These condensers are part of coil assemblies and will not be supplied separately.
‡See Production Changes, paragraph 3.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

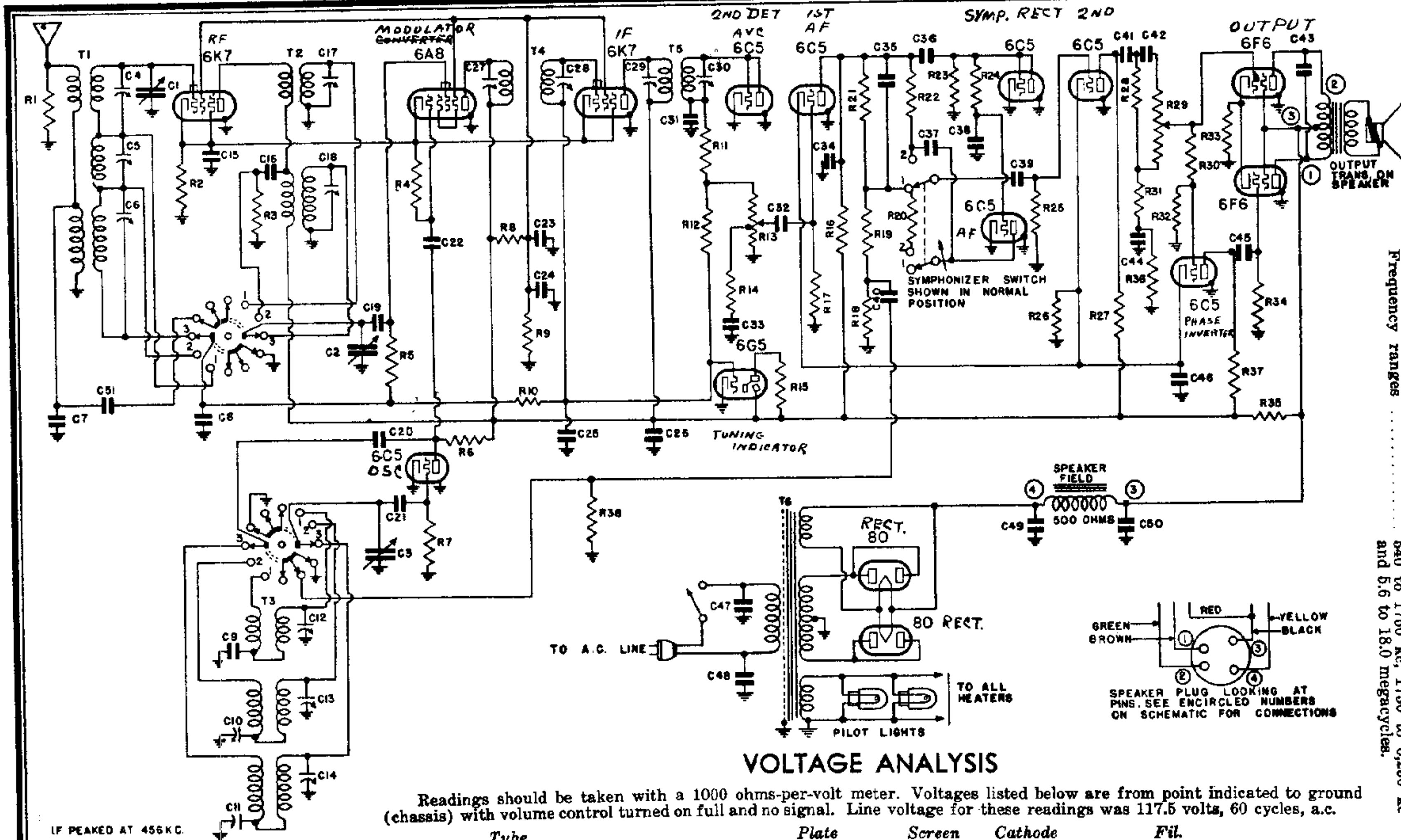
PRODUCTION CHANGES

1. Schematic No. 1 applies to receivers bearing serial numbers below 895,962.
2. Schematic No. 2 applies to receivers bearing serial numbers above 895,962.
3. In receivers bearing serial numbers below 961,900:
   a. The two primaries of the antenna coil, T1, were in parallel from antenna to ground and a 0.00005 mf mica condenser was in series with the antenna lead and the short-wave primary.
   b. C17 was an 0.00135 mf mica condenser.

MODEL X146
Chassis X
Schematic,Voltage

EMERSON RADIO & PHONO. CORP.

Voltage rating .... 105-125 volts, 60 cycles, a.c.
Power consumption .... 130 watts at 117.5 volts.
Frequency ranges .... 540 to 1750 kc, 1750 to 6,250 kc and 5.6 to 18.0 megacycles.



VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	Plate	Screen	Cathode	Fil.
6K7 r-f amplifier	240	90	2	6.3 a.c.
6A8 modulator	240	90	2	6.3 a.c.
6C5 oscillator	80	—	—	6.3 a.c.
6K7 i-f amplifier	240	90	2	6.3 a.c.
6C5 diode detector	—	—	—	6.3 a.c.
6C5 1st a-f amplifier	125	—	5.6	6.3 a.c.
6C5 2nd a-f amplifier	140	—	5.6	6.3 a.c.
6C5 phase inverter	140	—	5.6	6.3 a.c.
6F6 output	280	300	18	6.3 a.c.
6F6 output	280	300	18	6.3 a.c.
6C5 symphonizer rectifier	—	—	—	6.3 a.c.
6C5 symphonizer amplifier	40	—	—	6.3 a.c.

Voltage across speaker field—75   Voltage at 80 filament—375

Chassis Model X

WAVE BAND SWITCH SHOWN IN BROADCAST POSITION
POSITION NO. 1 SHORT WAVE
NO. 2 POLICE
NO. 3 BROADCAST

MODEL X146
Chassis X
Alignment, Notes
Parts

EMERSON RADIO & PHONO. CORP.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1800, 1600, 6000 and 18,000 kc should be used.

An output meter should be used across the voice coil or speaker output transformer for observing maximum response.

Use a standard dummy antenna for aligning any of the three bands. A .0002 mf condenser may be used for broadcast band dummy antenna, a .0001 mf condenser for the police band dummy antenna and a 400 ohm non-inductive resistor for the short-wave band dummy antenna.

Always use as weak a test signal as possible during alignment.

The set's oscillator is higher in frequency than the signal on *all three bands*, so images should be observed on the low frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a sure source of noise, drifting, and microphonism.

In aligning antenna trimmers on the high-frequency signals there is always a tendency for the oscillator to drift, due to interlocking. To compensate for this always keep tuning the variable condenser as the trimmers are being adjusted.

Location of Coils and Trimmer Adjustments

The i-f transformers are located on the left-hand side of the top of the chassis. The first i-f transformer is the one nearest the rear of the chassis. The four trimmers for the i-f adjustment are available through holes in the tops of the cans.

The antenna coils for the three bands are wound on one form located on the front wall of the chassis with the trimmers accessible through holes in the chassis. The left-hand trimmer is for the broadcast band, the right-hand trimmer is for the short-wave band and the central trimmer is for the police band.

The r-f interstage coils are also wound on one form and mounted underneath the chassis on the right-hand side of the variable condenser. The trimmers are accessible through holes in the top of the chassis. The trimmer closer to the variable is for the short-wave band and the other trimmer is for the broadcast band.

The oscillator coils are wound on one form and mounted underneath the chassis directly behind the r-f interstage coil. The trimmers are accessible through holes in the top of the chassis. The trimmer closest to the variable condenser is for the broadcast band, the trimmer farthest from the variable is for the short-wave band and the central trimmer is for the police band.

The oscillator series padder for the broadcast and police bands are mounted underneath the chassis near the oscillator coils. The adjusting screws are available through holes in the top of the chassis. The padder nearest the front of chassis is for the broadcast band. The padder for the short-wave band is a .0088 fixed mica condenser. If this condenser is to be replaced use a condenser with a value within 2% of that specified.

Set the wave-band switch at the broadcast (clockwise) position and the variable condenser at the minimum capacity position. Feed 456 kc to the grid cap of the 6A8 tube through a .02 mf condenser and adjust the four i-f trimmers for maximum response. (Do not remove the grid clip from the tube.)

The three bands should be aligned in the following order: Short-wave band first, police-band second, and broadcast-band last.

Short-Wave Alignment

Both pointers on the dial should coincide vertically at 890 kc. (For adjustment the gold pointer may be slipped around on its shaft.)

Set the wave-band switch at the short-wave (counter-clockwise) position. Move the dial pointer to 18 and feed 18,000 kc to the antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator trimmer for maximum response. If two peaks are obtained choose the minimum capacity peak. Then adjust the interstage and antenna coil trimmers for maximum response. If two peaks are obtained choose the maximum capacity peak.

Police Alignment

Set the wave-band switch at the police-band (central) position and the dial pointer at 1.8. Feed 1,800 kc to the antenna (using a standard dummy antenna) and adjust the police-band series padder for maximum response. Move the dial pointer to 6.0, feed 6,000 kc and adjust the oscillator trimmer for maximum response. Then adjust the antenna trimmer for maximum response. Note the interstage coil on this band has no trimmer adjustment. Return the dial pointer to 1.8, feed 1,800 kc to the antenna and rock the variable condenser while readjusting the series padder for maximum response. Return to 6,000 kc and check alignment. If readjustment is necessary return to 1,800 kc and repeat entire procedure.

Broadcast Alignment

Set the wave-band switch at the broadcast (clockwise) position, and the dial pointer at 60. Feed 600 kc to the antenna (using a standard dummy antenna) and adjust the broadcast-band series padder for maximum response. Move the pointer to 160, feed 1600 kc and adjust the oscillator coil trimmer for maximum response, then adjust the interstage and antenna coil trimmers for maximum response. Reset the pointer at 60, feed 600 kc and rock the variable condenser while adjusting the series padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary return to 600 and repeat entire procedure.

GENERAL NOTES

1. The receiver should never be turned on with either the speaker plug or the 6F6 tubes out of their sockets, since the rapid rise in rectifier voltage would damage the electrolytic condensers.
2. Pilot lights may be replaced by slipping the push-on sockets off the dial and unscrewing the bulbs. It is not necessary to remove either the dial or chassis from cabinet.
3. In replacing chassis in cabinet do not tighten mounting screws so much that chassis will not float freely, and do not allow any part of the dial assembly to touch the cabinet. Do not push control knobs on so far that they touch the cabinet front panel. If these precautions are not observed the receiver may become microphonic.
4. The color coding of the power transformer leads is as follows:
   - Primary—two black leads
   - High voltage sec.—two red leads
   - High voltage secondary center tap—red and yellow lead
   - 6.3v sec.—two heavy green leads
   - 5v sec.—two heavy yellow leads
5. The tuning indicator (6G5 tube) is mounted in the cabinet above the dial. The color coding of the tuning indicator tube cable is as follows:
   - Shield—cathode
   - Blue—plate
   - Red—target
   - Black—filament
   - Green—grid
6. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. The Emerson All-Wave Antenna is especially designed for high efficiency and reduction of noise on all frequency ranges. Complete instructions for the installation of this antenna are supplied with each kit.

TUBE DATA

The tube complement is as follows:

1—6K7—R-f amplifier (opposite front section of variable condenser)
1—6A8—Modulator (opposite rear section of variable condenser)
1—6C5—Oscillator (behind variable condenser)
1—6K7—I-f amplifier (between i-f transformers)
1—6C5—Diode detector, a.v.c. (left side of chassis nearest front)
1—6C5—First a-f amplifier (left side of chassis second from front)
1—6C5—Symphonizer rectifier (left side of chassis third from front)
1—6C5—Symphonizer amplifier (left side of chassis fourth from front)
2—6F6—Pentode power output (two large tubes at rear)
1—6C5—Phase inverter (rear between 6F6 tubes)
1—6C5—Second a-f amplifier (behind 6A8 tube)
2—80—Rectifiers (beside power transformer).

REPLACEMENT PARTS

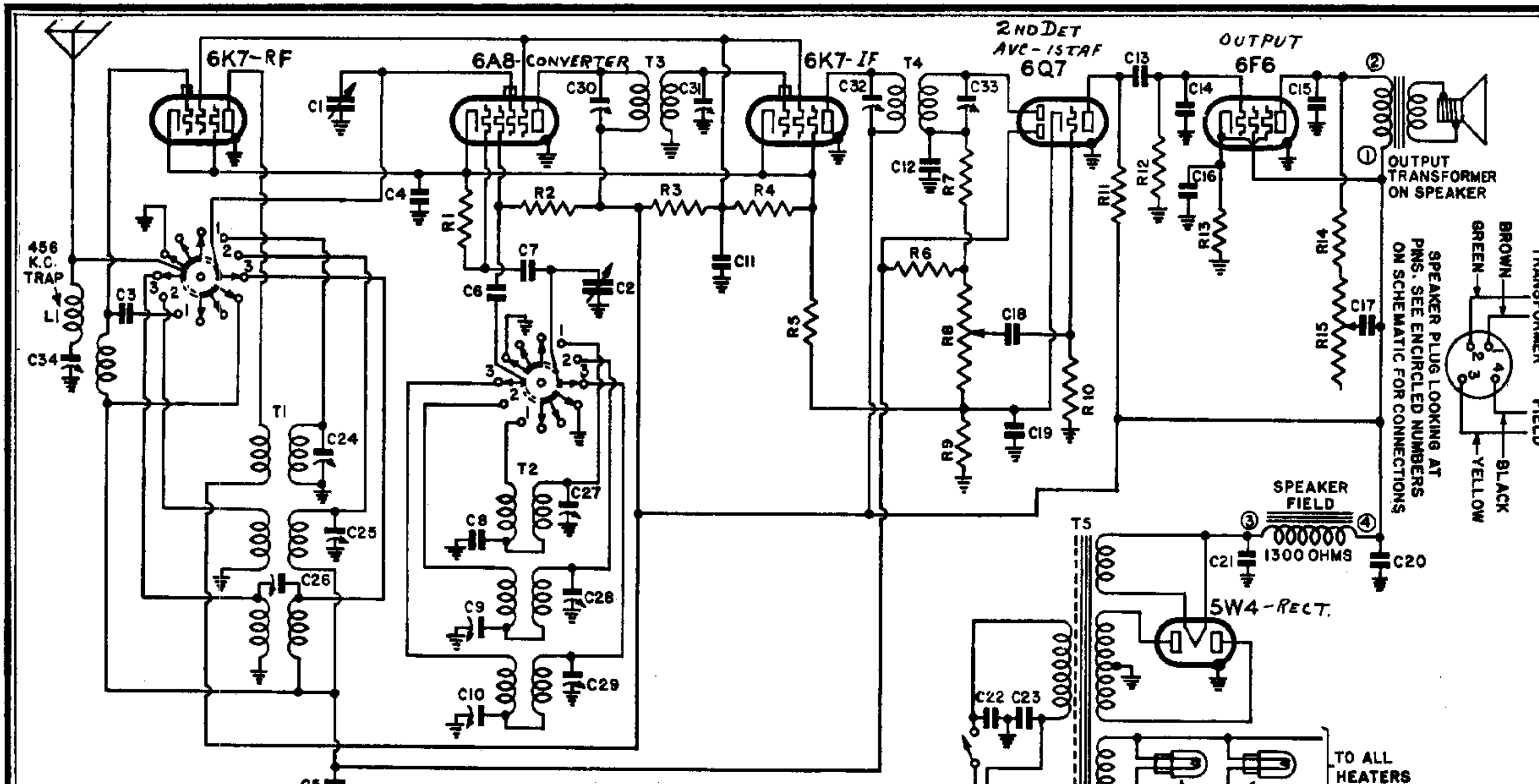
*Item	Part No.	DESCRIPTION	List Price as of Feb. 15, 1937 (Subject to change without notice) PRICE
T1	3XT-335	Three-band antenna coil	$2.00
T2	3XT-336	Three-band interstage coil	1.50
T3	3XT-337	Three-band oscillator coil	1.95
T4	3BT-269	456 kc first i-f transformer	2.00
T5	3AT-261	456 kc second i-f transformer	1.90
T6	3XT-338	Power transformer	6.90
R1, R14, R31	LR-64	5,000 ohm, ¼ watt carbon resistor	.16
R2	3VR-270	90 ohm, ½ watt wire-wound resistor	.16
R3	LR-60	20,000 ohm, ¼ watt carbon resistor	.16
R4, R20, R36	LR-61	200,000 ohm, ¼ watt carbon resistor	.16
R5, R15, R23, R28	KR-57	1 megohm, ¼ watt carbon resistor	.16
R6	2NR-217	40,000 ohm, 1 watt carbon resistor	.16
R7, R10, R11, R16, R18, R27, R25, R37	KR-56	50,000 ohm, ¼ watt carbon resistor	.16
R8	3BR-246	10,000 ohm, 2 watt carbon resistor	.28
R9	2TR-225	12,000 ohm, 2 watt carbon resistor	.28
R12, R17, R22	HR-42	2 megohm, ¼ watt carbon resistor	.16
R13	3XR-287	Volume control—500,000 ohms	.90
R19	KR-63	15,000 ohm, ¼ watt carbon resistor	.16
R21	LLR-154	75,000 ohm, ¼ watt carbon resistor	.16
R24	NNR-230	8 megohm, ¼ watt carbon resistor	.16
R26	YR-96	1,500 ohm, ¼ watt carbon resistor	.16
R29	3XR-277	Tone control with line switch—500,000 ohms	1.00
R30, R34	KR-66	500,000 ohm, ¼ watt carbon resistor	.16
R32	NR-66	35,000 ohm, ¼ watt carbon resistor	.16
R33	3XR-278	220 ohm, 2 watt wire-wound resistor	.16
R35	3XR-283	1,500 ohm, 2 watt carbon resistor	.28
R38	OR-73	25,000 ohm, ¼ watt carbon resistor	.16
C1, C2, C3	3XC-328	Three-gang variable condenser with gear train for dial	7.00
†C4, C5, C6		Trimmer part of antenna coil.	
C7, C21, C22	AAC-106A	0.00005 mf mica condenser	.20
C8	BC-12	0.05 mf, 200 volt tubular condenser	.20
C9	XXC-197	0.0088 mf mica condenser	.25
C10, C11	3SC-309	Dual adjustable padding condenser C10—1,200 to 2,000 mmf C11—300 to 600 mmf	.95
†C12, C13, C14		Trimmer part of oscillator coil.	
C15, C28	BC-13	0.25 mf, 200 volt tubular condenser	.20
C16, C20, C32, C27, C42, C51	KC-53	0.01 mf, 400 volt tubular condenser	.20
†C17, C18		Trimmer part of interstage coil.	
C19, C31	EC-24A	0.0001 mf mica condenser	.20
C23	YC-96A	4 mf, 150 volt tubular dry electrolytic condenser	1.05
C24, C33	AC-4	0.1 mf, 200 volt tubular condenser	.20
C25	FC-29	0.02 mf, 200 volt tubular condenser	.20
C26, C36, C41	EEC-182	0.1 mf, 400 volt tubular condenser	.20
†C37, C38		Trimmer part of first i-f transformer.	
†C29, C30		Trimmer part of second i-f transformer	
C34, C35	IC-47A	0.0005 mf mica condenser	.20
C39	LC-65	0.02 mf, 400 volt tubular condenser	.20
C40	EC-19	0.5 mf, 200 volt tubular condenser	.35
C43	NNC-214	0.002 mf, 1000 volt tubular condenser	.20
C44	3XC-331	0.015 mf, 400 volt tubular condenser	.20
C45	LC-64	0.05 mf, 400 volt tubular condenser	.20
C46	IC-43A	5 mf, 25 volt tubular dry electrolytic condenser	.90
C47, C48	3LC-297A	0.01 mf, 400 volt molded type paper condenser	.20
C49, C50	3XC-329	30 mf, 400 volt wet electrolytic condenser	1.45

*Item number locates the article on the schematic diagram.

†These trimmer condensers are part of the coil assemblies and can not be supplied separately.

MODELS S147, S151
Chassis S
Schematic, Voltage
Changes

EMERSON RADIO & PHONO. CORP.



PRODUCTION CHANGES

On later receivers the rectifier tube was changed from a 5W4 (metal) to a 5Z3 (glass).

SWITCH SHOWN IN BROADCAST POSITION

POSITION NO. 1 – SHORT WAVE
POSITION NO. 2 – POLICE
POSITION NO. 3 – BROADCAST

I.F. PEAKED AT 456 K.C.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground with no signal. Line voltage for these readings was 117.5 volts, 60 cycles.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6K7—R-f amp.	230	90	2.8	—	6.3 a.c.
6A8—Osc.-mod.	230	90	2.8	140	6.3 a.c.
6K7—I-f amp.	230	90	2.8	—	6.3 a.c.
6Q7—2nd det.	118	—	1.4	—	6.3 a.c.
6F6—Output	215	230	14	—	6.3 a.c.

Voltage across speaker field—80 volts.
Voltage from 5W4 filament to ground—310 volts.

Chassis Model S

Voltage rating .... 105-125 volts a.c.
Current drain ..... 0.55 amps.
Frequency ranges .. 550 to 1750 kc., 1750 to 5500 kc., 5.7 to 18.0 megacycles.

MODELS S147, S151
Chassis S
Alignment, Notes
Parts

EMERSON RADIO & PHONO. CORP.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600, 1800, 5000 and 15000 kc should be used.

An output meter should be used across the voice coil or speaker output transformer for observing maximum response.

Use a standard dummy antenna for aligning any of the three bands. A .0002 mf condenser may be used for the broadcast band dummy antenna, a .0001 mf condenser for police-band antenna and a 400 ohm non-inductive resistor for the short-wave antenna.

Location of Coils and Trimmers

The i-f transformers are in oblong coil cans located on the top of the chassis. The four trimmers, two for each transformer, are available through holes in the tops of the cans. The trimmer for the wave-trap is available through a hole in the top of the chassis deck at the rear, near the rectifier tube.

The antenna coils for the three bands are wound on one form and mounted underneath the chassis on the front wall, directly under the variable condenser. The trimmers for the three coils are available through holes in front of the chassis. The trimmer farthest to the right is the broadcast antenna trimmer. The central trimmer is the police-band antenna trimmer, and the trimmer to the left is the short-wave antenna trimmer.

The oscillator coils for the three bands are wound on one form and mounted underneath the chassis, directly behind the wave-band switch. The trimmers for the three coils are available through holes in the top of the chassis. The trimmer farthest to the right is the broadcast oscillator trimmer. The central trimmer is the police-band oscillator trimmer, and the trimmer farthest to the left is the short-wave oscillator trimmer.

The adjusting screws for the dual padder are available through holes in the top of the chassis to the right of the electrolytic condenser. The screw nearest the front of the chassis is for the broadcast band padder and the screw farthest from the front is for the police-band padder.

I-f and Wave-trap Alignment

Set the wave-band switch at the broadcast (clockwise) position and the variable condenser at the minimum capacity position. Feed 456 kc to the grid cap of the 6A8 tube. Adjust the four i-f trimmers carefully for maximum response. Feed 456 kc through a dummy antenna into the antenna terminal and adjust the 456 kc wave-trap for *minimum response.*

If a particular telegraphic station causes interference, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

Broadcast Alignment

With the wave-band switch at the broadcast (clockwise) position, set the pointer at 60, feed 600 kc through the antenna (using a standard dummy antenna), and adjust the broadcast series padder for maximum response. Move pointer to 160, feed 1600 kc to the antenna and adjust the oscillator trimmer for maximum response, then adjust the antenna trimmer. Reset the pointer to 60, feed 600 kc to antenna and rock the variable condenser (rotate the condenser back and forth through a small arc) while resetting the oscillator padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary, return to 600 and repeat entire procedure.

Police Alignment

Set the switch at police (central) position and the pointer at 1.8. Feed 1800 kc to antenna (using a 0.0001 mf condenser for a dummy antenna), and adjust the police-band series padder for maximum response. Move the pointer to 5.0, feed 5000 kc to the antenna and adjust the police-band oscillator for maximum response. If two peaks are obtained select the minimum capacity peak. (See General Instructions below.) Then adjust the antenna trimmer for maximum response. If two peaks are obtained select the maximum capacity peak. Return the pointer to 1.8, feed 1800 kc to the antenna and rock the variable condenser while adjusting the police-band series padder for maximum response. Return to 5000 and check alignment. If readjustment is necessary return to 1800 and repeat entire procedure.

Short-Wave Alignment

Set the wave-band switch at the short-wave (counter-clockwise) position. Move pointer to 15, feed 15000 kc to antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator for maximum response. If two peaks are obtained choose minimum capacity peak. Then adjust the antenna trimmer for maximum response. If two peaks are obtained choose the maximum capacity peak.

GENERAL INSTRUCTIONS

Always use as weak a test signal as possible during alignment.

The set's oscillator is higher in frequency than the signal on all three bands. Images, therefore, should be observed on the low-frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmer and maximum capacity peaks on antenna trimmers.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a source of noise, frequency drift and microphonism.

In aligning antenna trimmers on the high-frequency signals there is usually a tendency for the oscillator to drift, due to interlocking. To compensate for this always keep re-tuning the variable condenser as you align.

GENERAL NOTES

1. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.
2. The receiver should never be turned on with either the speaker plug or the 6F6 tube out of their sockets, since the rapid rise in rectifier voltage would damage the electrolytic condensers.
3. Pilot lights may be replaced by slipping the push-on sockets off the dial and unscrewing the bulbs. It is not necessary to remove either the dial or chassis from cabinet.
4. In replacing chassis in cabinet do not tighten mounting screws so much that chassis will not float freely, and do not allow any part of the dial assembly to touch the cabinet. Do not push control knobs on so far that they touch the cabinet front panel. If these precautions are not observed the receiver may become microphonic.
5. The color coding of the power transformer leads is as follows:

   Primary—two green leads
   High voltage sec.—two black leads
   High voltage sec. center tap—yellow
   6.3 v. sec.—two heavy blue leads
   5 v. sec.—two heavy red leads

6. An efficient antenna system (aerial) is necessary to enable a full realization of the merits of the receiver. The Emerson All-Wave Antenna is especially designed for high efficiency and reduction of noise on all three frequency ranges. Complete instructions for the installation of this antenna are supplied with each kit.

Tube Data

The tube complement is as follows:
1—6K7—R-f amplifier (Right-hand front corner)
1—6A8—Pentagrid modulator-oscillator
1—6K7—I-f amplifier (Between i-f transformers)
1—6Q7—Second detector, a.v.c., a-f amplifier
1—6F6—Pentode output
*1—5W4—Full-wave rectifier

REPLACEMENT PARTS LIST

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

*Item	Part No.	DESCRIPTION	List Price Effective as of Aug. 1st, 1936 Price
L1	2PT-288	456 kc wave-trap	$ .60
L2	3ST-306	Antenna choke coil	.20
T1	3ST-304	Three-band antenna coil	2.75
T2	3ST-305	Three-band oscillator coil	2.85
T3	3ST-312	456 kc first i-f transformer	1.45
T4	3ST-313	456 kc second i-f transformer	1.45
T5	3ST-314	Power transformer	4.40
R1	KR-58	50,000 ohm, 1/4 watt carbon resistor	.16
R2	AR-8	25,000 ohm, 1/2 watt carbon resistor	.16
R3	3BR-246	10,000 ohm, 2 watt carbon resistor	.28
R4	2TR-225	12,000 ohm, 2 watt carbon resistor	.28
R5, R9	3SR-257	50 ohm, 1/2 watt wire-wound resistor	.16
R6, R10	HR-42	2 megohm, 1/4 watt carbon resistor	.16
R7, R11	KR-54	100,000 ohm, 1/4 watt carbon resistor	.16
R8	NNR-157B	Volume control—500,000 ohms	.90
R12	KR-56	250,000 ohm, 1/4 watt carbon resistor	.16
R13	FFR-126	500 ohm 1/2 watt wire-wound resistor	.16
R14	LR-64	5,000 ohm, 1/4 watt carbon resistor	.16
R15	3MR-251	Tone control—100,000 ohms	.80
C1, C2	3SC-298	Two-gang variable condenser	3.50
C3, C7	AAC-106A	0.00005 mf mica condenser	.20
C4	HC-13	0.25 mf, 200 volt tubular condenser	.28
C5	BC-12	0.05 mf, 200 volt tubular condenser	.20
C6, C18	KC-58	0.01 mf, 400 volt tubular condenser	.20
C8	XXC-197	0.0033 mf, mica condenser	.35
C9, C10	3SC-309	Dual adjustable padding condenser C9—1200 to 2000 mmf; C10—300 to 600 mmf	.95
C11, C17	EEC-182	0.1 mf, 400 volt tubular condenser	.20
C12	EC-24A	0.0001 mf, mica condenser	.20
C13	LC-64	0.05 mf, 400 volt tubular condenser	.20
C14	IC-47A	0.0005 mf, mica condenser	.20
C15	ZC-115	0.006 mf, 1,000 volt tubular condenser	.20
C16	IC-43A	5 mf, 25 volt tubular electrolytic condenser	.90
C19	AC-6	0.1 mf, 200 volt tubular condenser	.20
C20	3BC-289	8 mf, 300 volt wet electrolytic condenser	1.30
C21	3SC-303	8 mf, 375 volt wet electrolytic condenser	1.70
C22, C23	XXC-220	Dual 0.01 mf, 250 volt a.c. metal clad tubular condenser	.45
†C24, C25, C26		Trimmers, part of 3ST-304 antenna coil assembly.	
†C27, C28, C29		Trimmers, part of 3ST-305 oscillator coil assembly.	
†C30, C31		Trimmers, part of 3ST-312 first i-f coil assembly.	
†C32, C33		Trimmers, part of 3ST-313 second i-f coil assembly.	
†C34		Trimmer, part of 2PT-288 wave-trap assembly.	
	3BS-178	12" dynamic speaker	10.60
	3BS-191	8" dynamic speaker	8.80
	3SS-206	Wave-band switch	1.80
	3BS-226	Power switch	.55
	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
	3SZ-437	Dial face	1.30
	3SD-42	Dial plate	1.25
	3SZ-443	Dial drive belt	.20
	3SZ-444	Drive shaft and pulley	.20
	3CZ-339	Idler pulley	.05
	3SZ-457	Idler pulley spring	.05
	3CZ-341	Condenser pulley	.10
	3JZ-375	Dial drive-shaft bushing	.10
	3SZ-436	Dial pointer	.10
	3SZ-438	Escutcheon with crystal	1.55

WHEN ORDERING REPLACEMENT PARTS SPECIFY PART NUMBERS.

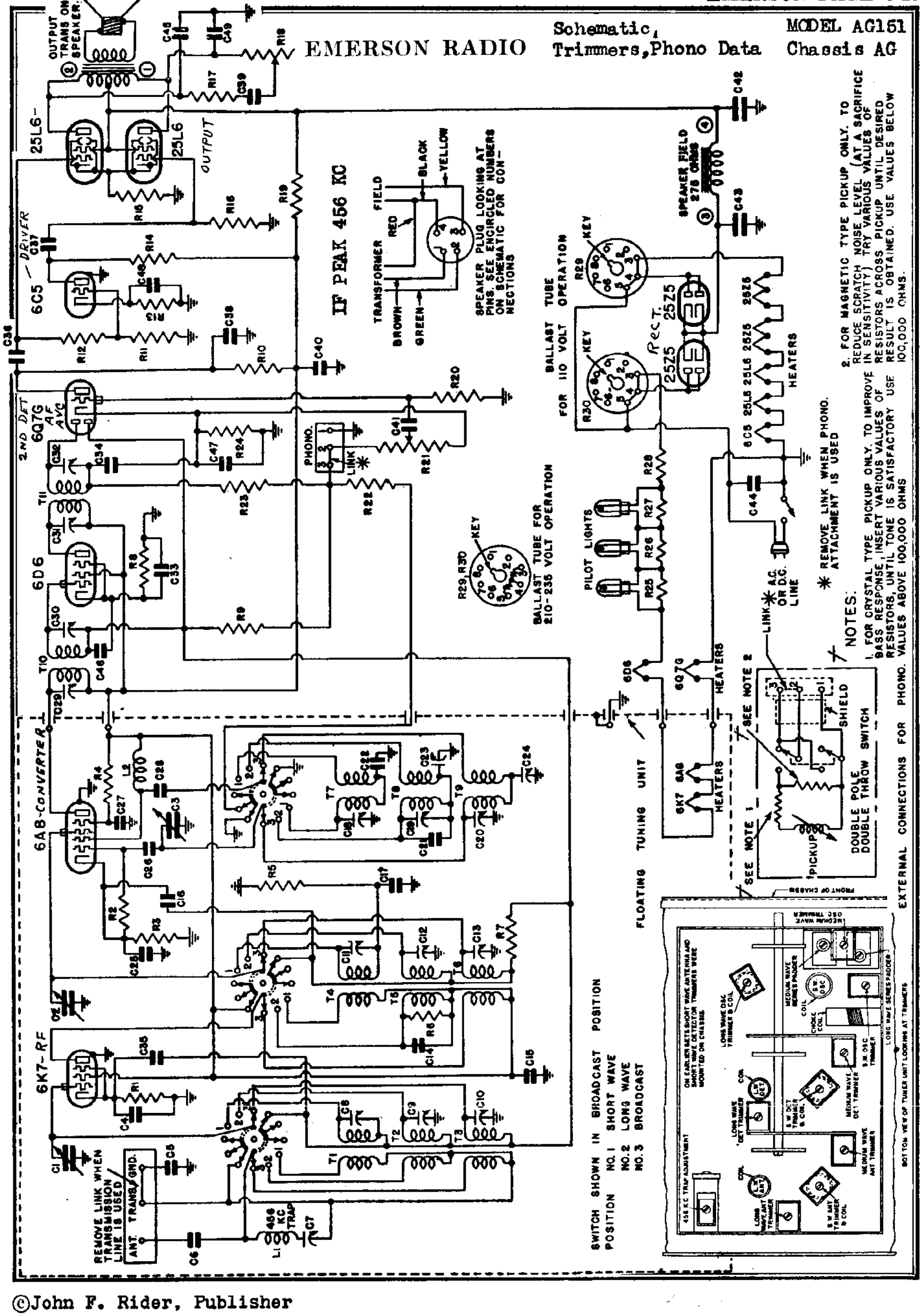
*Item number locates the article on the schematic diagram.

†These trimmers are part of the coil assemblies and can not be supplied separately.

EMERSON RADIO

Schematic, Trimmers, Phono Data

MODEL AG151 Chassis AG



MODEL AG151
Chassis AG
Alignment, Notes
Parts

EMERSON RADIO & PHONO. CORP.

GENERAL NOTES

1. An electrical phonograph pick-up may be connected to this receiver for playing records. Connections to the receiver may be made at the "phono" terminal strip which is located on the rear wall of the receiver chassis. A double-pole, double throw-switch is necessary in addition to the phonograph pick-up and motor. The receiver volume control may be used to control the phonograph volume. Remove the link connecting two of the terminals on the phono strip. The switch should be wired to the pick-up and terminal strip so that in the phonograph position the switch should short terminals 1 and 3 and at the same time connect the high side of the pick-up to a lead from terminal 2. (The ground side of the pick-up may be permanently wired to terminal 1.) When the switch is in the radio position terminals 2 and 3 should be shorted together and the pick-up disconnected from terminal 2. A matching input transformer must be used if the pick-up is of the low impedance type. If the phonograph be permanently disconnected, the small connecting link must be replaced across terminals 2 and 3. (See schematic diagram.)
2. The receiver should never be turned on with the speaker plug out of its socket, since the rapid rise in rectifier voltage would damage the electrolytic condenser.
3. Pilot lights may be replaced by slipping the push-on sockets off the dial and unscrewing the bulbs. It is not necessary to remove either the dial or chassis from cabinet.
4. In replacing chassis in cabinet do not tighten mounting screws so much that chassis will not float freely, and do not allow any part of the dial assembly to touch the cabinet. Do not push control knobs on so far that they touch the cabinet front panel. If these precautions are not observed the receiver may become microphonic.
5. One side of the power line is connected to the chassis. Under no condition, therefore, should a ground wire be allowed to come in contact with any metal part of the receiver.
6. An efficient antenna system is necessary to enable a full realisation of the merits of the receiver. For reduction of noise and achievement of high efficiency on all frequency ranges the Emerson All-Wave High Fidelity Antenna, Model W-78, or the Emerson All-Wave Antenna System, Model W-89, are recommended. Complete instructions for the installation of these antennas are supplied with each kit.
7. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.
8. The receiver for 105-125 volt operation may be easily converted for 210-250 volt operation by substituting ballast tubes part no 3MR-253 for ballast tubes part no. 3MZ-419.

ADJUSTMENTS

An oscillator with frequencies of 150, 345, 456, 600, 1600 and 16000 kc should be used.

An output meter should be used across the voice coil or speaker output transformer for observing maximum response.

Use a standard dummy antenna for aligning any of the three bands. A .0002 mf condenser may be used for the medium-wave band and the long-wave band dummy antenna and a 400 ohm non-inductive resistor for the short-wave dummy antenna.

Always use as weak a test signal as possible when aligning the receiver.

The set's oscillator is higher in frequency than the signal on all three bands. Images, therefore, should be observed on the low-frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmer and maximum capacity peaks on antenna and r-f trimmers. The last motion in adjusting trimmers should always be a tightening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a source of noise, frequency drift and microphonism.

In aligning antenna trimmers on the high-frequency signals there is usually a tendency for the oscillator to drift, due to interlocking. To compensate for this always keep re-tuning the variable condenser as you align.

Location of Coils and Trimmer Adjustments

The i-f transformers are located on the extreme left side of the chassis. The transformer nearest the front of the chassis is the first i-f transformer. The four trimmers for the i-f adjustment are available through holes in the tops of the cans.

The medium-wave, long-wave and short-wave coils are all located on the tuner unit. The tuner unit is the separate chassis section floated on rubber and mounted in center of chassis. The location of the trimmers for the coils is shown in the illustration at the right. The three coils for the medium-wave band are in separate cans on top of the tuner unit.

MODEL AG-151

Chassis Model AG

Voltage rating .... 105-125 volts, a.c. or d.c. (with ballast tubes part no. 3MZ-419).
210-250 volts, a.c. or d.c. (with ballast tubes part no. 3MR-253).

Current drain .... 0.7 amps.

Frequency ranges 140 to 375 kc, 540 to 1800 kc, 5.5 to 18.0 megacycles.

TUBE DATA

1—6K7—R-f amplifier (on tuner unit)
1—6A8—Pentagrid modulator-oscillator (on tuner unit)
1—6D6—I-f amplifier
1—6Q7G—Second detector, a.v.c., and a-f amplifier
1—6C5—A-f amplifier
2—25L6—Push-pull pentode output
2—25Z5—Half-wave rectifiers
2—3MZ-419—Ballast tubes for 105-125 volt operation
2—3MR-253—Ballast tubes for 210-250 volt operation

I-f Alignment

Set the wave-band switch at the medium-wave (clockwise) position and the variable condenser at the minimum capacity position. Feed 456 kc to the grid cap of the 6A8 tube. Adjust the four i-f trimmers carefully for maximum response. Feed 456 kc through a dummy antenna into the antenna terminal and adjust the 456 kc wave-trap for *minimum response*. (See General Notes.)

Medium-Wave Alignment

Both pointers on the dial should coincide vertically at 890 kc. For adjustment, the gold pointer may be slipped around its shaft. With the wave-band switch at the medium-wave (clockwise) position, set the pointer at 60, feed 600 kc through the antenna (using a standard dummy antenna), and adjust the medium-wave series padder for maximum response. Move pointer to 160, feed 1600 kc to the antenna and adjust the oscillator trimmer for maximum response, then adjust detector and antenna trimmers. Reset the pointer to 60, feed 600 kc to antenna and rock the variable condenser (rotate the condenser back and forth through a small arc) while resetting the oscillator padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary, return to 600 and repeat entire procedure.

Long-Wave Alignment

Set the wave-band switch at the long-wave (central) position and the pointer to 150. Feed 150 kc through a standard dummy antenna to the antenna terminal and adjust the long-wave series padder for maximum response. Move the pointer to 345, feed 345 kc and adjust the long-wave oscillator trimmer, then the r-f trimmer and then the antenna trimmer for maximum response. Return to 150 kc and re-adjust the long-wave series padder for maximum response. Return to 345 kc and re-adjust all three trimmers. Return again to 150 and check the alignment. Repeat the entire procedure until no appreciable re-adjustment is required.

Short-Wave Alignment

Set the wave-band switch at the short-wave (counter-clockwise) position. Move pointer to 16, feed 16000 kc to antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator for maximum response. If two peaks are obtained choose minimum capacity peak. Then adjust the detector and antenna trimmers for maximum response. If two peaks are obtained choose the maximum capacity peak.

REPLACEMENT PARTS

List Prices as effective as of JULY 1st, 1937 (Subject to change without notice)

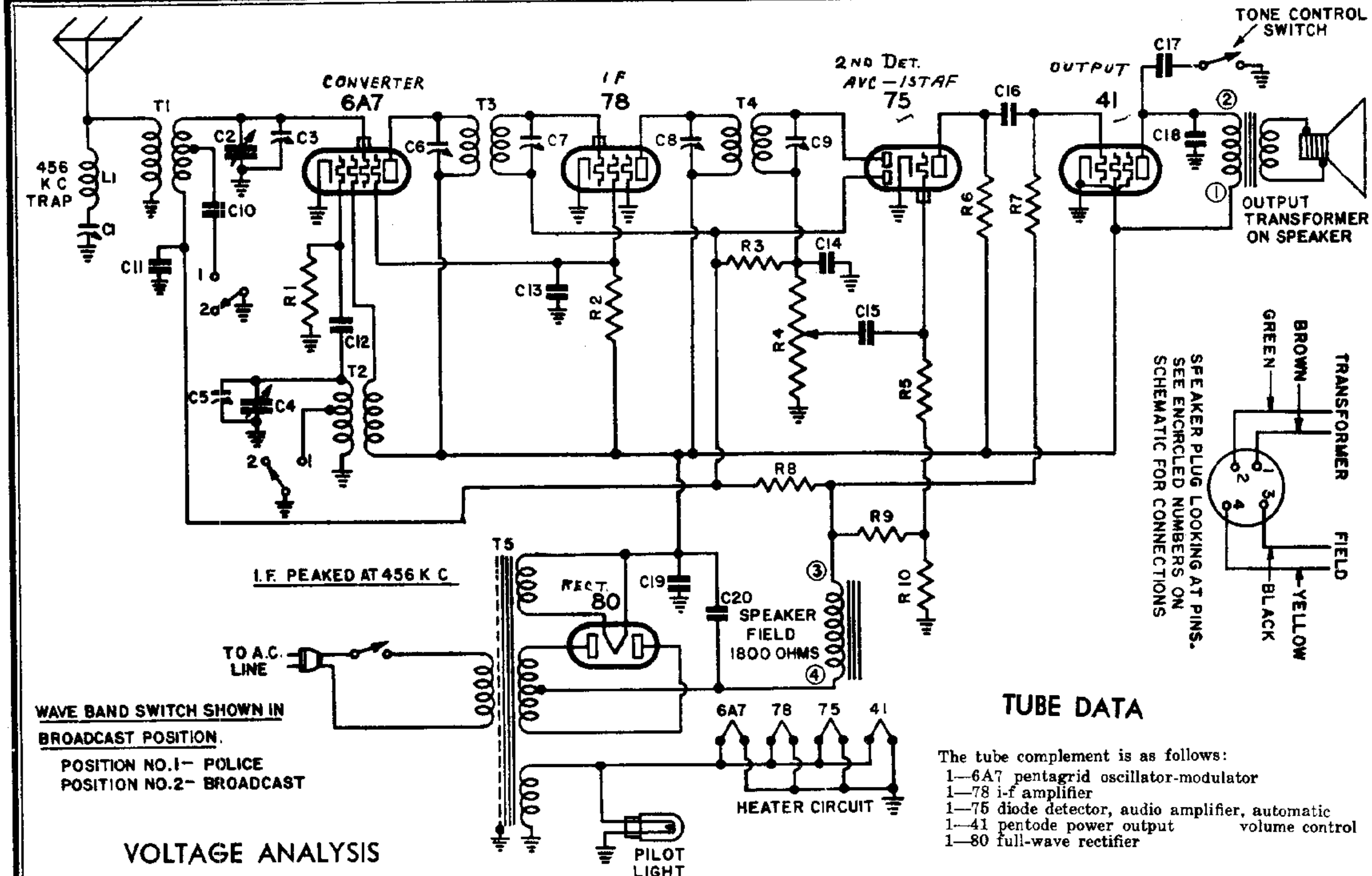
*Item	Part No.	DESCRIPTION	PRICE
L1	2PT-283	Adjustable 456 kc wave-trap	$ .60
L2	3ET-299	R-f choke wound on wooden dowel	.55
T1	3AT-257	Short-wave antenna coil	.60
T2	3MT-301	Long-wave antenna coil	1.05
T3	3AT-251	Broadcast antenna coil	.95
T4	3AT-258	Short-wave detector coil	.70
T5	3MT-302	Long-wave detector coil	1.05
T6	3AT-252	Broadcast detector coil	.95
T7	3AT-259	Short-wave oscillator coil	.50
T8	3MT-303	Long-wave oscillator coil	.95
T9	3AT-253	Broadcast oscillator coil	.75
T10	3BT-269A	Double-tuned 456 kc first i-f transformer	2.00
T11	3AT-261	Double-tuned 456 kc second i-f transformer	1.90
R1, R8	3CR-295	410 ohm ½ watt wire-wound molded resistor	.16
R2, R14	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R3	4ER-284	510 ohm ½ watt wire-wound molded resistor	.16
R4, R23	LR-60	20,000 ohm ¼ watt carbon resistor	.16
R5	KR-57	1 megohm ¼ watt carbon resistor	.16
R6	GR-55	2,000 ohm ¼ watt carbon resistor	.16
R7, R9, R20	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R10	LLR-152	150,000 ohm ¼ watt carbon resistor	.16
R11	OR-78	25,000 ohm ¼ watt carbon resistor	.16
R12, R16	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R13	LR-64	5,000 ohm ¼ watt carbon resistor	.16
R15	4GR-300	75 ohm ½ watt wire-wound molded resistor	.16
R17	PR-79	1,000 ohm ¼ watt carbon resistor	.16
R18	3MR-251	Tone control—100,000 ohms	.80
R19	IIR-131	1,000 ohm ½ watt wire-wound molded resistor	.16
R21	3MR-252	Volume control—250,000 ohms	.75
R22	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R24	LR-64	5,000 ohm ¼ watt carbon resistor	.16
R25, R26, R27, R28	3MR-254	315 ohm wire-wound tapped resistor R25—40 ohms; R26—40 ohms; R27—40 ohms; R28—195 ohms	.60
R29, R30	3MZ-419	Ballast tube for 105-125 volt operation	.40
	or 3MR-253	Ballast tube for 210-250 volt operation	1.10
C1, C2, C3	3AC-276	Three-gang variable condenser	7.40
C4, C17, C41, C46	BC-12	0.05 mf, 200 volt roll type condenser	.20
C5	KC-58	0.01 mf, 400 volt roll type condenser	.20
C6, C28	AAC-114	0.001 mf mica condenser	.20
†C7		Trimmer, part of 456 kc wave-trap.	
C8, C9, C10, C11, C12, C13, C14, C26	3AC-278	Mica trimmer, range—1½ to 12 mmf	.15
C38	EC-24A	0.0001 mf mica condenser	.20
C15, C25, C27, C33, C35	AC-6	0.1 mf, 200 volt roll type condenser	.20
C16	NNC-158	0.05 mf, 200 volt roll type condenser	.20
†C18, C19, C20		Trimmer, part of oscillator coil.	
C21	AAC-106A	0.00005 mf mica condenser	.20
C22	XXC-197	0.0038 mf mica condenser	.35
C23, C24	3MC-295	Dual adjustable padding condenser C23—100 to 200 mmf C24—250 to 550 mmf	.60
†C29, C30		Trimmer, part of 456 kc first i-f transformer.	
†C31, C32		Trimmer, part of 456 kc second i-f transformer.	
C34	AC-7A	0.00025 mf mica condenser	.20
C36, C37, C39	LC-64	0.05 mf, 400 volt roll type condenser	.20
C40	3MC-292	8 mf, 150 volt wet electrolytic condenser	.85
C42	3MC-291	50 mf, 150 volt wet electrolytic condenser	1.30
C43	3MC-290	50 mf, 200 volt wet electrolytic condenser	1.45
C44	3MC-293	0.1 mf, 400 volt a.c. roll type condenser	.30
C45, C49	HC-84	0.006 mf, 600 volt roll type condenser	.20
C47, C48	KKC-145	Dual 5 mf, 25 volt electrolytic condenser	1.85
	4GS-260	8" dynamic speaker	7.85
	3AS-166	Wave-band switch	2.25
	3BS-226	On-off switch	.55
	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
	3AD-41	Dial assembly with band-indicator mechanism	2.20
	3MZ-422	Dial face	1.30
	3AZ-369	Idler pulley	.05
	3AZ-370	Idler pulley spring	.05

*Item number locates the article on the schematic diagram.

†These trimmers cannot be supplied separately.

EMERSON RADIO & PHONO. CORP.

MODELS R152, R153, R156
R158
Chassis R
Schematic, Voltage



I.F. PEAKED AT 456 K C

WAVE BAND SWITCH SHOWN IN BROADCAST POSITION.

POSITION NO.1– POLICE
POSITION NO.2– BROADCAST

TUBE DATA

The tube complement is as follows:

1—6A7 pentagrid oscillator-modulator
1—78 i-f amplifier
1—75 diode detector, audio amplifier, automatic volume control
1—41 pentode power output
1—80 full-wave rectifier

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	182	70	0	182	6.3
78	182	70	0	—	6.3
75	87	—	0	—	6.3
41	165	182	0	—	6.3

Voltage across speaker field—70.
Voltage from B minus to chassis—80.

B plus at 80 filament—262.

Chassis Model R

Listed by Underwriters Laboratories

Voltage rating .... 105-125 volts a.c.
Power consumption 45 watts
Frequency ranges 540 to 1580 kc. and 1580 to 4200 kc.

MODELS R152,R153
R156,R158
Chassis R
Alignment,Changes
Notes,Parts

EMERSON RADIO & PHONO. CORP.

ADJUSTMENTS

An oscillator with frequencies of 456 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. **The first i-f transformer is the one directly behind** the 6A7 tube. The trimmers for the two i-f transformers are available through holes in the tops of the cans.

The trimmers for the antenna and oscillator coils are located on the variable condenser. **The trimmer on the front section** is for the antenna coil.

The 456 kc wave-trap is mounted on the rear chassis wall directly beneath the wave-band switch. **The trimmers for the 456 kc wave-trap is mounted on the coil and is accessible from the bottom of the chassis.**

I-f and Wave-Trap Alignment

Rotate the wave-band switch (located on the rear wall of the chassis) to the broadcast position, clockwise, and swing the variable condenser to the maximum capacity position. Feed 456 kc to the grid-cap of the 6A7 tube and adjust the four i-f trimmers for maximum response. Feed 456 kc through a dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead and adjust the wave-trap trimmer for minimum response. (See General Notes, paragraph No. 1.)

Broadcast Alignment

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 140. Feed 1400 kc. through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) **for maximum response. The police band is self-tracking and does not require any adjustment.**

GENERAL NOTES

1. **The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.**
2. **The receiver should never be turned on with either the speaker plug or the 41 tube out of their sockets, since the rapid rise in rectifier voltage would damage the electrolytic condensers.**
3. **The pilot light may be replaced by removing the snap-on socket from the dial and unscrewing the bulb. It is not necessary to remove either the dial or chassis from the cabinet.**
4. **The color coding of the leads of the i-f transformers, is as follows:**
   Grid—green | Plate—blue
   Grid return—black | B plus—red
5. The color coding of the power transformer leads is as follows:
   Primary—two green leads | 6.3 v. sec.—two heavy blue leads
   High voltage sec.—two black leads | 5 v. sec.—two heavy red leads
   High voltage sec. center tap—yellow
6. **With a few exceptions, the color coding of the general wiring is as follows:**
   Plate—blue | A.v.c. and cathode—white or yellow
   B plus—red | Grid—green
   Screen—brown | Filament and ground—black
7. **An efficient antenna system (aerial) is necessary to enable a full realization of the merits of the receiver. The Emerson All-Wave Antenna is especially designed for high efficiency and reduction of noise on all three frequency ranges. Complete instructions for the installation of this antenna are supplied with each kit.**

PRODUCTION CHANGES

On early receivers the oscillator coil was part number 3RT-319. When replacing this coil with the new coil, part number 3RT-319A, it will be necessary to remove the short length of shielding over the white lead (lead from wave-band switch to tap on coil).

REPLACEMENT PARTS

List Price as Effective as of Dec. 3rd, 1936 (Subject to change without notice)

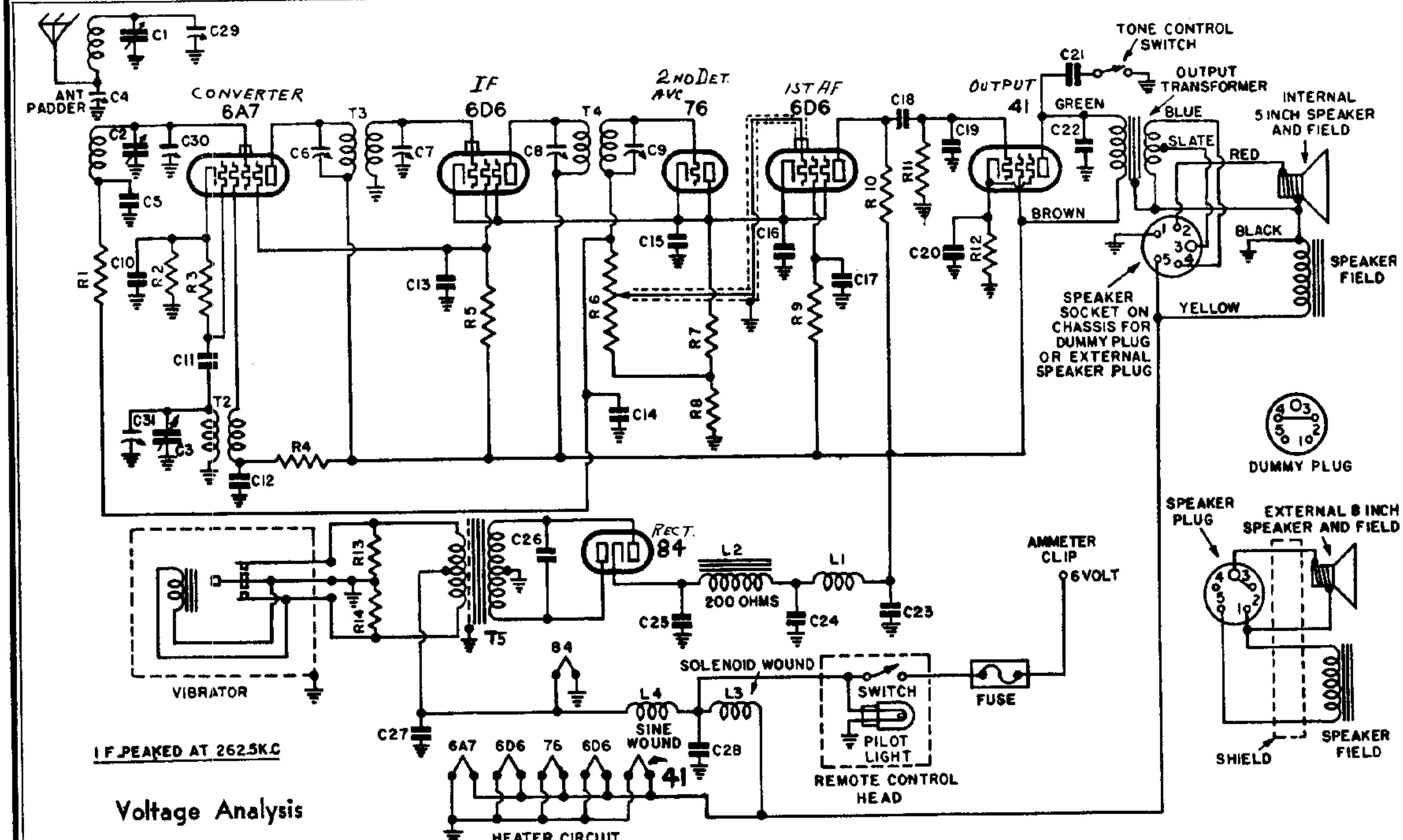
*Item	Part No.	DESCRIPTION	PRICE
L1	MMT-149A	456 kc wave-trap	$ .60
T1	3RT-318	Two-band antenna coil	.85
T2	3RT-319A	Two-band oscillator coil	.80
T3	3RT-320	456 kc first i-f transformer	1.10
T4	3RT-321	456 kc second i-f transformer	1.10
T6	3RT-322	Power transformer	3.20
R1	KR-53U	50,000 ohm ¼ watt carbon resistor	.16
R2	3LR-265U	40,000 ohm ½ watt carbon resistor	.16
R3	NNR-220U	3 megohm ¼ watt carbon resistor	.16
R4	3FR-256A	Volume control with switch—500,000 ohms	1.00
R5	3RR-274U	5 megohm ¼ watt carbon resistor	.16
R6	KR-55U	250,000 ohm ¼ watt carbon resistor	.16
R7	KR-56U	500,000 ohm ¼ watt carbon resistor	.16
R8	3RR-275U	10 megohm ¼ watt carbon resistor	.16
R9	3RR-276	310 ohm ½ watt wire-wound resistor	.16
R10	3RR-266	23 ohm ½ watt wire-wound resistor	.16
†C1		Trimmer, part of 456 kc wave-trap assembly.	
C2, C5	3RC-317	Two-gang variable condenser	2.40
‡C3, C4		Trimmers, part of variable condenser.	
†C6, C7		Trimmers, part of first i-f transformer assembly.	
†C8, C9		Trimmers, part of second i-f transformer assembly.	
C10	AAC-114	0.001 mf mica condenser	.20
C11, C13	BC-12	0.05 mf, 200 volt tubular condenser	.20
C12	AAC-106A	0.00005 mf mica condenser	.20
C14	IC-47A	0.0005 mf mica condenser	.20
C15, C18	HC-34	0.006 mf, 600 volt tubular condenser	.20
C16	KC-58	0.01 mf, 400 volt tubular condenser	.20
C17	QQC-173	0.015 mf, 600 volt tubular condenser	.20
C19, C20	3RC-318	Dual 5 mf, 300 volt dry electrolytic condenser	1.00
	3RS-230	5" dynamic speaker	4.55
	3RS-248A	6" dynamic speaker	4.85
	3RS-231	Wave-band switch	.35
	2TS-145F	Tone control switch	.35
	3RM-270	Pointer shaft bearing plate	.05
	3RM-269	Dial plate	.20
	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
	3RB-38	Pilot light socket	.10
	3RZ-477	Dial face	.75
	3RZ-478	Condenser pulley	.15
	3RZ-479	Pointer pulley	.15
	3RZ-480	Drive cord spring	.02
	3FZ-353	Dial pointer	.10
	3CZ-350	Bronze escutcheon with crystal	1.05
	3CZ-350A	Brass escutcheon with crystal	1.05

When ordering replacement parts specify part numbers.

*Item number locates the article on the schematic diagram.
†These trimmers are part of coil assemblies and can not be supplied separately.
‡These trimmers are part of variable condenser and can not be supplied separately.

EMERSON RADIO & PHONO. CORP.

MODEL U154
Chassis U
Schematic, Voltage



I F PEAKED AT 262.5 K.C

Voltage Analysis

All voltages should be measured with a 1000 ohms-per-volt meter. Voltages measured from the point indicated to ground (chassis) with no signal and volume control turned on full. Readings taken with battery voltage of 6.3 volts. Voltage across heaters—6.0. Voltage across speaker field—6.0.

Tube	Plate	Screen	Cathode	Osc. Plate
6A7	230	60	5.1	155
6D6 i-f (in corner)	230	60	3.4	—
76	3.4	—	3.4	—
6D6 a-f	20	20	3.4	—
41	235	230	14.5	—

Voltage rating .. 6.3 volts
(6 volt storage battery).
Current drain .. 6.1 amps.
Frequency range 540 to 1530 kc.

MODEL U154
Chassis U
Alignment, Notes
Parts

EMERSON RADIO & PHONO. CORP.

ALIGNMENT PROCEDURE

The receiver was carefully adjusted and tested at the factory, and should reach the customer in perfect condition. Under no circumstances should these adjustments be disturbed unless it is absolutely necessary, as in the repairing of a damaged set. This should be done by an experienced auto radio service man only.

I-f Alignment

To align the intermediate frequency transformers, use a good modulated oscillator set for 262.5 kc. Rotate the variable condenser to the minimum capacity position, turn the volume control on full and ground the antenna to the chassis.

Connect the test oscillator lead, through a paper condenser (.02 mf or larger), to the grid cap of the 6A7 tube. Do not remove the grid clip from the tube. Connect an output meter across the primary of the speaker transformer or across the voice coil. Using the *smallest output* from the test oscillator that will give a definite reading on the meter, adjust the two i-f transformers for maximum response. Use a non-metallic screw driver if possible.

Radio Frequency and Oscillator Alignment

Connect the test oscillator lead through a standard dummy antenna (a .0002 mf condenser may be substituted) to the antenna connector of the receiver. Rotate the variable condenser to the *minimum capacity* position. Feed 1530 kc and adjust the oscillator trimmer (center) on the variable condenser for maximum response. Set the test oscillator to some frequency near 1400 kc and swing the variable until this signal is heard. Adjust the two r-f trimmers (front and rear) on the variable condenser for maximum response. Set the test oscillator for 600 kc and swing the variable until this signal is heard. Adjust the antenna padder (on chassis wall below the variable condenser) for maximum response. Reset the test oscillator to some frequency near 1400 kc and readjust the two r-f trimmers for maximum response. Reduce the output of the test oscillator and repeat this adjustment.

NOTE: The antenna padder should be readjusted when the receiver is installed in the car. (See paragraph (g) under installation instructions.)

Suppression of Ignition Interference

If, when the receiver is in operation, and the motor is running, the ignition interference is excessive the following suggestions should help to reduce it to a satisfactory level.

By-pass dome light wire at instrument panel with a ½ mf condenser.

By-pass the low tension lead to the ignition coil with a ½ mf condenser.

Shield high tension lead from coil and ground to fire wall.

Shield low tension leads to ignition coil.

Try grounding antenna shield at various points, and also try leaving shield ungrounded, except at point where it is automatically grounded at receiver by means of the metal connector. Move all adjacent wiring slightly, and note if it may be coupling to the battery lead to receiver.

Bond steering column to fire wall.

Try bonding exhaust pipe, particularly if interference is increased with passengers in car.

Bond metal cables or pipes coming through fire wall, connecting them to the fire wall. If car has wooden floor boards, place a screen underneath floor mat and note if interference is decreased, particularly with passengers in car.

Check antenna wiring, making sure it is shielded completely.

Try bonding windshield wiper pipe.

Check ignition system for defects.

When condensers are used for by-passing ignition interference, their leads should be as short as possible, since often a condenser with leads a fraction of an inch long will be very effective in places where the same condenser with longer leads would be useless.

NOTE: It is recommended that the charging rate of the car generator be increased slightly to compensate for the added drain of the receiver.

General Notes

1. To remove the chassis from the case it will be necessary to unsolder the speaker leads.
2. It should be noted that one side of the speaker field is grounded to the speaker frame.
3. A 10 ampere fuse is located in a small tubular holder in the battery lead. The fuse is intended to protect the receiver and in no case should one larger than 10 amperes be used.

Tube Data

The tube complement is as follows:

1—6A7 pentagrid oscillator-modulator
1—6D6 i-f amplifier (in corner of chassis)
1—76 diode detector, a.v.c.
1—6D6 a-f amplifier
1—41 power output pentode
1—84 full-wave thermionic rectifier
1 primary type vibrator.

The function of the vibrator is to convert the direct current from the battery into alternating current to actuate the power transformer. The stepped-up voltage is then rectified into direct current by the 84 tube for use as plate supply.

REPLACEMENT PARTS

*ITEM	PART NO.	DESCRIPTION
T1	3UT-331	Preselector coil
T2	3UT-325	Oscillator coil
T3	3UT-332	262 kc first i-f transformer
T4	3UT-333	262 kc second i-f transformer
T5	3UT-334	Power transformer
L1	0OT-166	1 millihenry r-f choke
L2	3VT-229	Iron-core filter choke
L3	0OT-167B	"A" choke solenoid
L4	3VT-328	"A" choke sine wound
R1	HR-42	2 megohm ¼ watt carbon resistor
R2	3UR-282	860 ohm ½ watt wire-wound resistor
R3	3VR-272	60,000 ohm ¼ watt carbon resistor
R4	LR-60	20,000 ohm ¼ watt carbon resistor
R5	LLR-154	75,000 ohm ¼ watt carbon resistor
R6	3VR-267	Volume control—1 megohm
R7	3DR-289	250 ohm ½ watt wire-wound resistor
R8	3UR-278	750 ohm ½ watt wire-wound resistor
R9	KR-57	1 megohm ¼ watt carbon resistor
R10	LLR-152	150,000 ohm ¼ watt carbon resistor
R11	KR-56	500,000 ohm ¼ watt carbon resistor
R12	3VR-271	510 ohm 1 watt wire-wound resistor
R13, R14	3VR-270	90 ohm ½ watt wire-wound resistor
C1, C2, C3	3VC-319	Three-gang variable condenser
†C4		Padder condenser part of 3UT-331 preselector coil assembly.
C5, C10	FC-29	0.02 mf, 200 volt tubular condenser
†C6, C7		Trimmer part of 3UT-332 first i-f coil assembly.
†C8, C9		Trimmer part of 3UT-333 second i-f transformer assembly.
C11, C12		
C14, C19, C28	AC-7A	0.00025 mf mica condenser
C13, C15, C17	BC-12	0.05 mf, 200 volt tubular condenser
C16	IC-43A	5 mf, 25 volt dry electrolytic condenser
C18	LC-65	0.02 mf, 400 volt tubular condenser
C20, C24, C25	3VC-320A	Dry electrolytic condenser block. C20, 20 mf—35 volt. C24, 8 mf—350 volt. C25, 8 mf—350 volt.
C21	3DC-272	0.015 mf, 600 volt tubular condenser with mounting strap
C22	3VC-324	0.003 mf, 600 volt tubular condenser
C23	EEC-132	0.1 mf, 400 volt tubular condenser
C26	3UC-225	0.0075 mf, 2000 volt condenser
C27	3VC-222	0.5, mf, 50 volt tubular condenser
	0OC-164	Special 0.5 mf ammeter condenser
	0OC-165	Special 0.5 mf generator condenser
	3US-235	5" dynamic speaker
	3VS-247	8" dynamic speaker
	0OS-108A	Tone control switch
	0OW-53A	Shielded antenna lead
	0OZ-165	Distributor suppressor
	3VV-10	Non-synchronous vibrator
	3VZ-540	Tuning control cable
	3VZ-541	Volume control cable
‡C29, C30, C31		Trimmer, part of variable condenser

*Item number locates the article on the schematic diagram.
†These trimmer condensers are part of coil assemblies and cannot be supplied separately.
‡These trimmer condensers cannot be supplied separately.

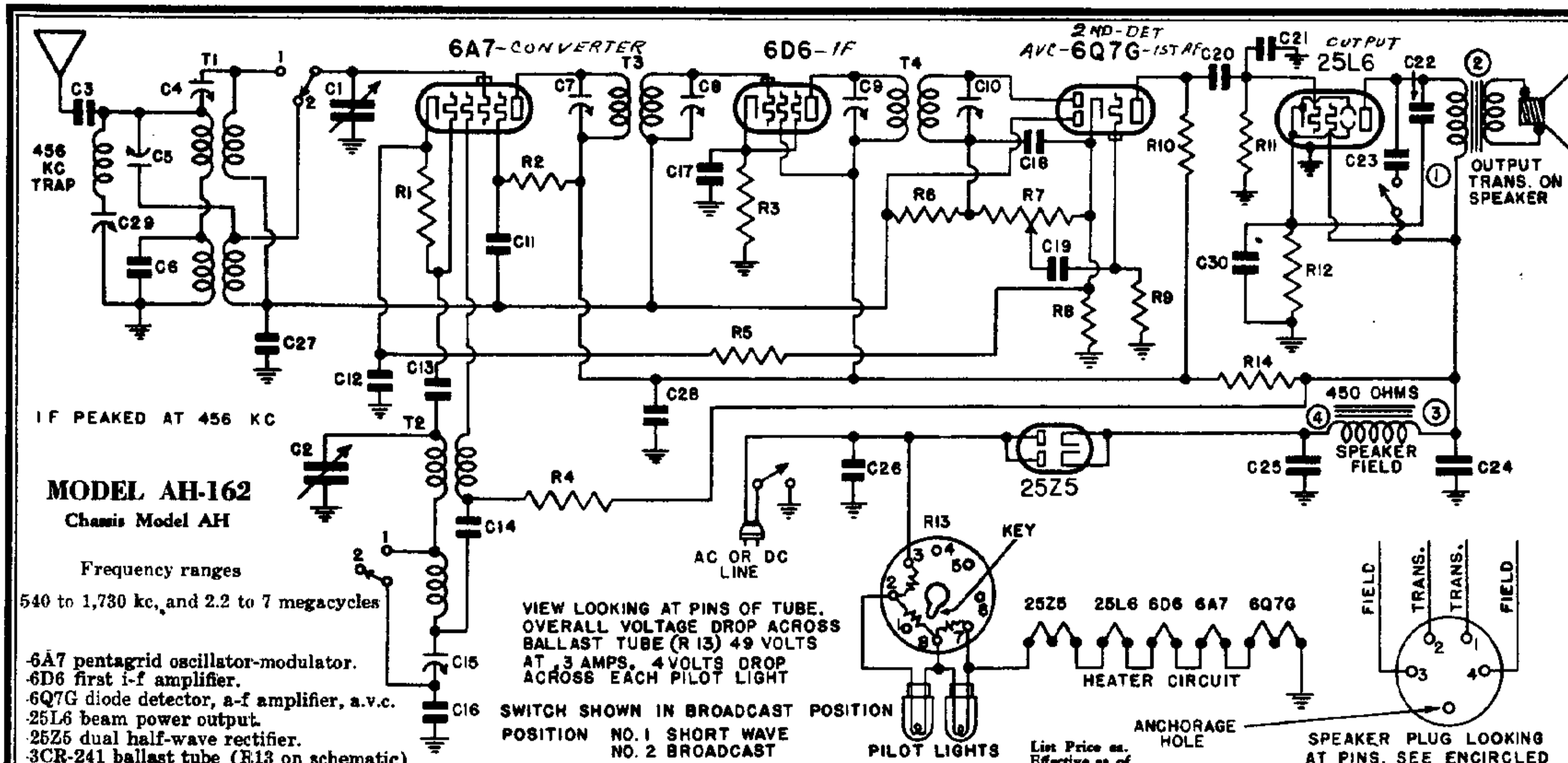
EMERSON RADIO & PHONO. CORP.

MODEL AH162
Chassis AH
Schematic, Changes
Parts

PRODUCTION CHANGES

In receivers bearing serial numbers below 1, 102, 142, C11 was an .01 mf, 400 volt tubular condenser.

In receivers bearing serial numbers below 1, 149, 148, C22 was connected from plate to B plus.



MODEL AH-162
Chassis Model AH

Frequency ranges
540 to 1,730 kc, and 2.2 to 7 megacycles

- 6A7 pentagrid oscillator-modulator.
- 6D6 first i-f amplifier.
- 6Q7G diode detector, a-f amplifier, a.v.c.
- 25L6 beam power output.
- 25Z5 dual half-wave rectifier.
- 3CR-241 ballast tube (R13 on schematic)

List Price as Effective as of April 15th, 1937 (Subject to change without notice)

*ITEM	PART No.		PRICE
T1	4HT-360	Two-band antenna coil with 456 kc wave trap	$1.70
T2	4HT-361	Two-band oscillator coil	1.10
T3	4ET-350A	Double-tuned 456 kc first i-f transformer	1.15
T4	4ET-351A	Double-tuned 456 kc second i-f transformer	1.15
R1	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R2	ZZR-196	30,000 ohm ¼ watt carbon resistor	.16
R3	3CR-295	410 ohm ½ watt wire-wound molded resistor	.16
R4	LR-65	10,000 ohm ¼ watt carbon resistor	.16
R5	3RR-276	310 ohm ½ watt wire-wound molded resistor	.16
R6	HR-42	2 megohm ¼ watt carbon resistor	.16
R7	3ZR-288	Volume control with line switch—500,000 ohms	1.05
R8, R14	3CR-294	240 ohm ½ watt wire-wound molded resistor	.16
R9	KR-57	1 megohm ¼ watt carbon resistor	.16
R10	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R11	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R12	3FR-293	140 ohm ½ watt wire-wound molded resistor	.16
R13	3CR-241	Plug-in ballast resistor	.80
C1, C2	4HC-343	Two-gang variable condenser	3.35
C3, C11	3HC-274	0.002 mf, 600 volt tubular condenser	.20
†C4, C5, C29	——	Trimmer, part of antenna coil assembly.	
C6	HC-133A	0.000025 mf mica condenser	.20
†C7, C8	——	Trimmer, part of first i-f transformer.	
†C9, C10	——	Trimmer, part of second i-f transformer.	
C14	KC-58	0.01 mf, 400 volt tubular condenser	.20
C12, C28	AC-6	0.1 mf, 200 volt tubular condenser	.20
C13	AAC-106A	0.00005 mf mica condenser	.20
C15	2NC-231	Single adjustable padding condenser range—300 to 600 mmf	.50
C16	3LC-327	0.0018 mf mica condenser	.30
C17, C19	FC-29	0.02 mf, 200 volt tubular condenser	.20
C20	LC-65	0.02 mf, 400 volt tubular condenser	.20
C18, C21	AC-7A	0.00025 mf mica condenser	.20
C22	QQC-173	0.015 mf, 600 volt tubular condenser	.20
C23	EC-23	0.03 mf, 400 volt tubular condenser	.20
C24, C25	4HC-348	Dual 20 mf, 150 volt, dry electrolytic condenser in cardboard	1.50
C26	3EC-326A	0.05 mf, 400 volt molded type paper condenser	.20
C27	BC-12	0.05 mf, 200 volt tubular condenser	.20
C30	IC-43A	5 mf, 25 volt tubular dry electrolytic condenser	.90
——	TTS-111K	Wave-band switch	.60
——	4HS-262	5½" dynamic speaker	5.15
——	3ES-256	Tone control switch	.50
——	XL-9	Pilot light, 6.3 volt, 25 amp., Mazda No. 46	.20
——	4HZ-561	Dial face	1.15
——	3LZ-403	Drive belt for dial assembly	.15
——	3CZ-337	Drive shaft and pulley for dial assembly	.10
——	3CZ-339	Idler pulley for dial assembly	.05
——	4HZ-562	Idler spring for dial assembly	.05
——	3CZ-341	Condenser shaft pulley	.10
——	3SZ-436	Dial pointer	.10
——	3SZ-438A	Escutcheon with crystal	1.85

MODEL AH162
Chassis AH
Voltage, Alignment
Notes

EMERSON RADIO & PHONO. CORP.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	100	55	2.0	77	6.3
6D6	100	100	3.3	—	6.3
6Q7G	38	—	1.0	—	6.3
25L6	96	103	6.7	—	25.0

Voltage at 25Z5 cathode—130 volts.
Voltage across speaker field—28 volts.
Voltage drop across ballast tube (pins Nos. 3, 7)—49 volts.
Voltage drop across each pilot light section (pins Nos. 2, 8 and Nos. 8, 7)—4 volts

1. If replacements are made or the wiring disturbed in the r-f portion of the circuit, the receiver should be carefully re-aligned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. The filament dropping resistor (R13 on schematic) is in a special metal tube at the rear of the chassis. This tube will become quite hot under normal operating conditions. For voltage drop specifications, see below.
4. When operating the receiver on d.c. it may be necessary to reverse the line plug to obtain the correct polarity.
5. The color coding of the i-f transformer leads is as follows:

   Grid—green — Plate—blue
   Grid return—black — B plus—red
6. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. For reduction of noise and achievement of high efficiency on all frequency ranges the Emerson All-Wave High-Fidelity Antenna, Model W-78, and the Emerson All-Wave Antenna System, Model W-89, are recommended. Instructions for the installation of these antennas are supplied with each kit.

   In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.
7. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

An oscillator with frequencies of 456, 600, 1600 and 6,000 kc should be used.

An output meter should be used across the voice coil or output transformer for observing maximum response.

If the circuit is at all disturbed, both the broadcast and short-wave bands must be realigned.

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Always use as weak a test signal as possible during alignment.

Use a standard dummy antenna for aligning either of the bands. A .0002 mf condenser may be used for the broadcast band dummy antenna and a 400 ohm non-inductive resistor for the short-wave dummy antenna.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The second i-f is the one directly behind the variable condenser. The four trimmers, two for each transformer, are accessible through holes in the tops of the cans.

The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the 6A7 tube) with the screw adjustment accessible through a hole in the top of the chassis.

The antenna coils for the broadcast and short-wave bands and the 456 kc wave trap are wound on one form and mounted underneath the chassis deck directly behind the adjustable padding condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the short-wave antenna trimmer. The central trimmer is the broadcast antenna trimmer. The trimmer nearest the rear of the chassis is the 456 kc wave trap.

The oscillator coils for the broadcast and short-wave bands are wound on one form and mounted underneath the chassis deck near the variable condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is for the short-wave oscillator coil and the trimmer farthest from the front is for the broadcast oscillator coil.

I-f and Wave-trap Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 456 kc, through a 0.02 mf paper condenser, to the grid cap of the 6A7 tube (do not remove the grid clip from the tube). Adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna through a standard dummy antenna and adjust the wave-trap trimmer for *minimum* response. (See General Notes.)

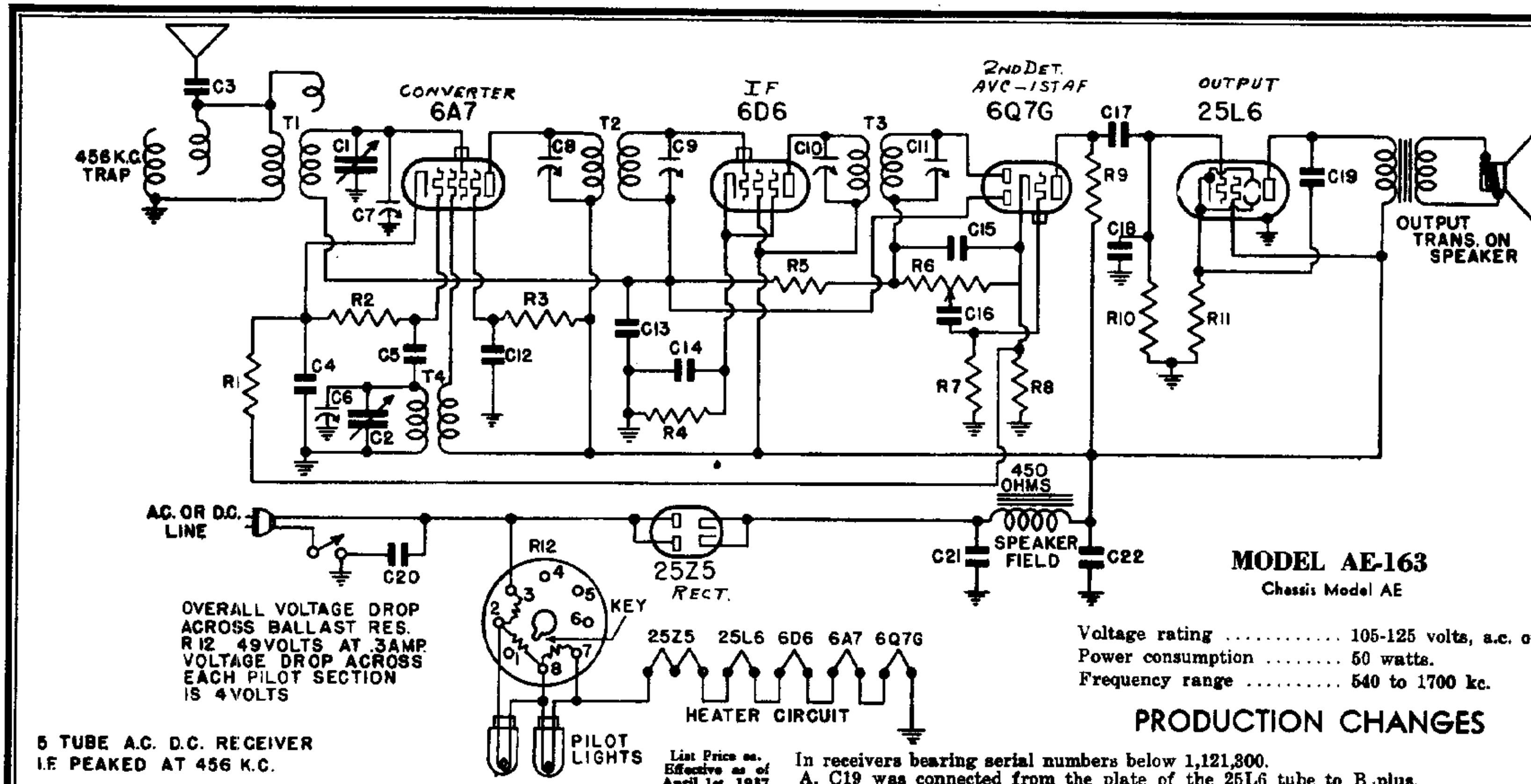
Short-Wave Alignment (Alignment of the short-wave band should precede broadcast alignment)

Rotate the wave-band switch to the short-wave (counter-clockwise) position, and set the dial pointer exactly at 6 megacycles. Feed 6,000 kc to the antenna and adjust the short-wave oscillator trimmer for maximum response, and then adjust the short-wave antenna trimmer for maximum response. Be very careful to choose the minimum capacity peak on the oscillator trimmer.

Broadcast Alignment

Rotate the wave-band switch to the broadcast position (clockwise) and set the dial pointer at 60. Feed 600 kc through a standard dummy antenna. Adjust the broadcast series padding condenser for maximum response. Move pointer to 160, feed 1600 kc and adjust the broadcast oscillator trimmer for maximum response and then adjust the broadcast antenna trimmer for maximum response. Return pointer to 60, feed 600 kc and readjust the series padding condenser rocking the variable condenser for maximum response.

EMERSON RADIO & PHONO. CORP.



5 TUBE A.C. D.C. RECEIVER
I.F. PEAKED AT 456 K.C.

MODEL AE-163

Chassis Model AE

Voltage rating .... 105-125 volts, a.c. or d.c.
Power consumption .... 50 watts.
Frequency range .... 540 to 1700 kc.

PRODUCTION CHANGES

In receivers bearing serial numbers below 1,121,300.
A. C19 was connected from the plate of the 25L6 tube to B plus.

List Price as. Effective as of April 1st, 1937 (Subject to change without notice)

*ITEM	PART No.	DESCRIPTION	PRICE
T1	3FT-280	Antenna coil with 456 kc wave trap	$1.10
T2	4ET-350	456 kc first i-f transformer	1.15
T3	4ET-351	456 kc second i-f transformer	1.15
T4	3FT-281	Oscillator coil	.50
R1	3RR-276	310 ohm ½ watt wire-wound molded resistor	.16
R2	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R3	ZZR-196	30,000 ohm ¼ watt carbon resistor	.16
R4	3CR-295	410 ohm ½ watt wire-wound molded resistor	.16
R5, R7	HR-42	2 megohm ¼ watt carbon resistor	.16
R6	ZZR-190A	Volume control—500,000 ohms	1.10
R8	3CR-294	240 ohm ½ watt wire-wound molded resistor	.16
R9	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R10	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R11	3FR-293	140 ohm ½ watt wire-wound molded resistor	.16
R12	3CR-241	Plug-in type ballast resistor	.80
C1, C2	4EC-340	Two-gang variable condenser	3.05
C3	3HC-274	0.002 mf 600 volt tubular condenser	.20
C4, C12	AC-6	0.1 mf 200 volt tubular condenser	.20
C5, C15, C18	NC-70A	0.0002 mf mica condenser	.20
†C6, C7	——	Trimmer, part of variable condenser	
†C8, C9	——	Trimmer, part of first i-f transformer	
†C10, C11	——	Trimmer, part of second i-f transformer	
C13	BC-12	0.05 mf 200 volt tubular condenser	.20
C14	FC-29	0.02 mf 200 volt tubular condenser	.20
C16	CCC-127	0.01 mf 200 volt tubular condenser	.20
C17, C19	LC-65	0.02 mf 400 volt tubular condenser	.20
C20	2VC-242A	0.1 mf 400 volt molded type paper condenser	.20
C21, C22	3CC-261	20 mf 150 volt wet electrolytic condenser	.90
——	4ES-258	5½" dynamic speaker	5.00
——	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
——	4EZ-551	Dial face	.80
——	4EZ-531	Dial drive belt	.15
——	4EZ-553	Dial drive shaft	.10
——	3JZ-375	Dial drive shaft bushing	.10
——	3JZ-376	Dial drive shaft pulley	.10
——	3CZ-339	Idler pulley	.05
——	3SZ-457	Idler pulley spring	.05
——	3CZ-341	Condenser shaft pulley	.10
——	3FZ-353	Dial pointer	.10
——	3CZ-350B	Escutcheon with crystal	1.05

MODEL AE163
Chassis AE
Voltage, Alignment
Notes

EMERSON RADIO & PHONO. CORP.

GENERAL NOTES

1. If replacements are made or the wiring distributed in the r-f section of the circuit, the receiver should be carefully re-aligned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. The filament dropping resistor (R12—see schematic) is in a special metal tube at back of the chassis. This tube will, therefore, become quite hot under normal operating conditions. For voltage drop see below.
4. When operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
5. The color coding of the i-f transformer leads is as follows:

Grid—green
Grid return—black
Plate—blue
B plus—red

Tube Data

The tube complement is as follows:

1—6A7 pentagrid oscillator-modulator.
1—6D6 first i-f amplifier.
1—6Q7G diode detector, audio amplifier, automatic volume control.
1—25L6 pentode power output.
1—25Z5 dual half-wave rectifier.
1—3CR-241 ballast tube.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Osc. Plate*	*Cathode*	*Fil.*
6A7	100	50	100	2.4	6.3
6D6	100	100	—	3.8	6.3
6Q7G	45	—	—	1.1	6.3
25L6	95	100	—	6.4	25.0

Voltage across speaker field—30 volts.
Overall voltage drop across ballast tube, (See R12, schematic)—49 volts at .3 amps.
Voltage drop across the pilot light section of ballast tube—4 volts, a.c.

ADJUSTMENTS

An oscillator with frequencies of 456 kc and 1500 kc should be used.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible.

Location of I-f Transformers and Trimmers

The first i-f transformer, part number 4ET-350, is in an oblong coil can located on the top of the chassis directly behind the 6A7 tube. The two trimmers for this i-f are accessible through holes in the top of the coil can.

The second i-f transformer, part number 4ET-351 is in an oblong coil can located on top of the chassis directly behind the speaker. The two trimmers for this i-f are accessible through holes in the top of the coil can.

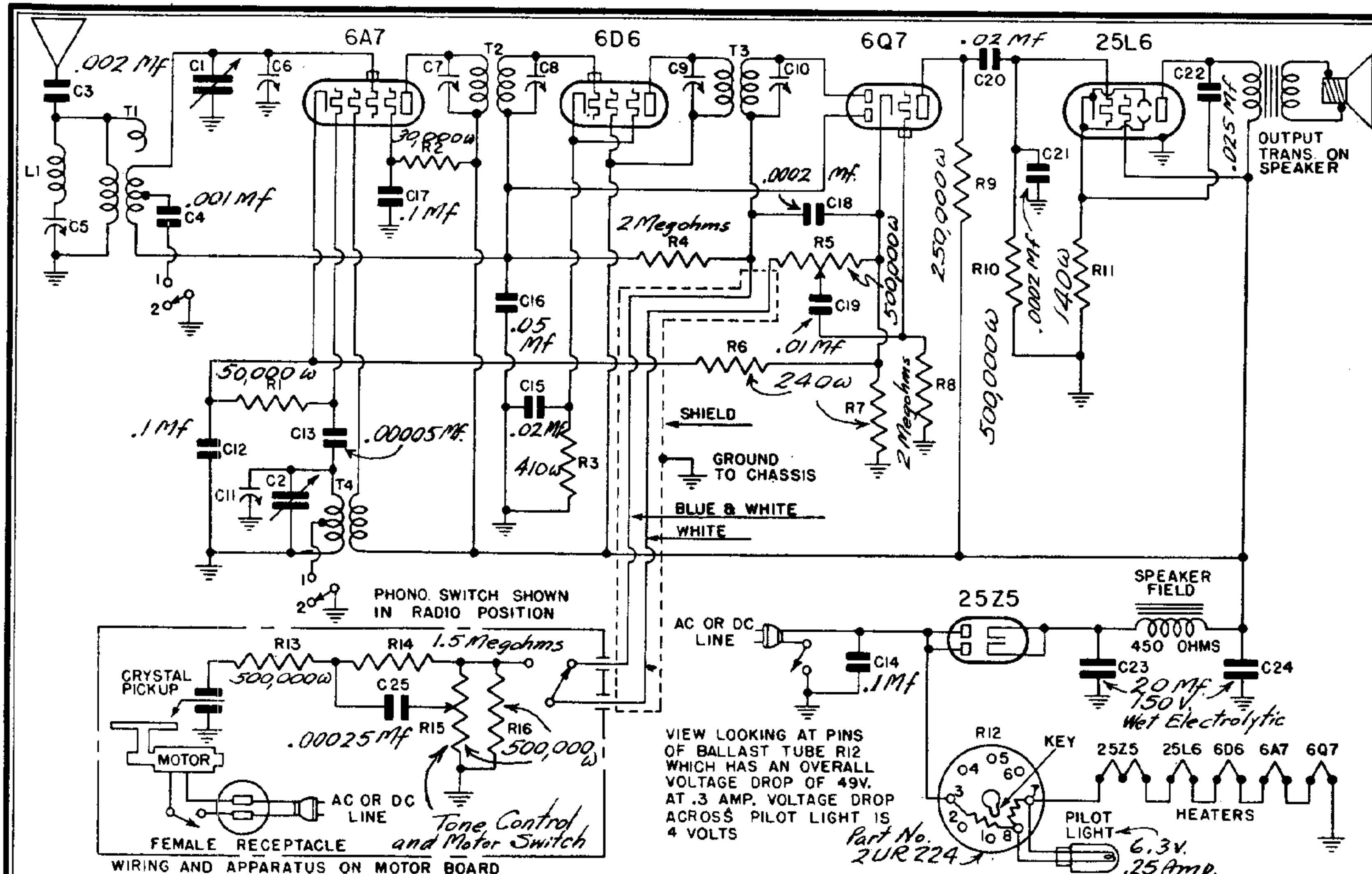
The oscillator and antenna trimmers are located on the variable condenser. The oscillator trimmer is on the rear section of the variable condenser and the antenna trimmer is on the front section of the variable condenser.

Alignment Procedure

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 456 kc to the grid cap of the 6A7 tube, through a .02 mf paper condenser.
3. Adjust the i-f trimmers, repeating for maximum response.
4. Set the dial pointer to 1500 and feed 1500 kc to the antenna lead through a standard dummy antenna. (A .0001 mf mica condenser may be used as a substitute.)
5. Adjust the oscillator trimmer (on rear section of variable condenser) for maximum response.
6. Adjust the antenna trimmer (on front section of variable condenser) for maximum response.

MODEL AL164
Chassis AL
Schematic, Voltag

EMERSON RADIO & PHONO. CORP.



I.F. PEAKED AT 456 KC

WAVE BAND SWITCH SHOWN IN BROADCAST POSITION

POSITION NO. 1 POLICE
NO. 2 BROADCAST

1—6A7 pentagrid oscillator-modulator.
1—6D6 first i-f amplifier.
1—6Q7 diode detector, a-f amplifier, a.v.c.
1—25L6 beam power output.
1—25Z5 dual half-wave rectifier.
1—2UR-224 ballast tube (R12 on schematic)

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	100	50	2.3	100	6.3
6D6	100	100	3.5	—	6.3
6Q7	43	—	1.2	—	6.3
25L6	92	100	6.5	—	25.0

Voltage at 25Z5 cathode—130 volts.
Voltage across speaker field—28 volts.
Voltage drop across ballast tube (pins Nos. 3, 7)—49 volts.
Voltage drop across pilot light section (pins Nos. 8 and 7)—4 volts.

MODEL AL164
Chassis AL
Notes,Alignment

EMERSON RADIO & PHONO. CORP.

Model AL-164

CHASSIS MODEL AL

Voltage rating	105 to 125 volts a.c. or d.c.
Power consumption	43 watts for receiver and 26 watts for motor
Frequency range	540 to 1580 kc (See paragraph 11 in General Notes below).

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f portion of the circuit, the receiver should be carefully re-aligned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. The filament dropping resistor (R12 on schematic) is in a special metal tube at the rear of the chassis. This tube will become quite hot under normal operating conditions. For voltage drop specifications, see below.
4. When operating the receiver on d.c. it may be necessary to reverse the line plug to obtain the correct polarity.
5. The two i-f transformers are held to the chassis by snap-on fasteners. To remove an i-f, unsolder its leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.
6. The color coding of the i-f transformer leads is as follows:
   Grid—green Plate—blue
   Grid return—black B plus—red
7. The receiver is shipped with an attached antenna wire. In some locations near powerful local stations the addition of a very large antenna may be detrimental to reception, because of the resulting interference. The Emerson Flexible Mast Antenna, Model W-82, has been especially designed for Emerson receivers, featuring compactness and portability while at the same time retaining a high efficiency from the standpoint of performance. Since it functions as an outside antenna the Flexible Mast will substantially improve the receiver performance. Where the Flexible Mast is installed permanently, it is urgently recommended that the receiver antenna wire be cut. Leave just enough of this wire to reach from the receiver to the window strip connector. Instructions for the installation of this compact and efficient outside antenna are supplied with each kit.
8. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.
9. The phonograph motor has been adjusted at the factory, to turn at a speed of 78 r.p.m. The speed may be checked by counting the turns per minute or by using a stroboscope disc and a neon light (the stroboscope method will only work when the neon bulb is lighted from a 60 cycle a.c. supply).
10. An a.c.-d.c. switch is provided to switch the motor for a.c. or d.c. power supply. It is important that this switch be in the proper position for the power supply available.
11. The receiver in this combination is designed to cover two frequency ranges, but since it is represented as a single band receiver only, the short-wave band, although available, may be ignored.

ADJUSTMENTS

An oscillator with frequencies of 456, 600 and 1400 kc should be used.

An output meter should be used across the voice coil or output transformer for observing maximum response.

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Always use as weak a test signal as possible during alignment.

Use a .0001 mf mica condenser as a dummy antenna during alignment.

Location of Coils and Trimmer Adjustments

The two i-f transformers are in oblong coil cans located on top of the chassis deck. The first i-f transformer is the one behind the variable condenser. The trimmers for these transformers are accessible through holes in the tops of the cans.

The 456 kc wave-trap is mounted on the right side of the front chassis wall. Its trimmer is accessible at the bottom of the chassis.

The antenna coils for the broadcast and police bands are wound on one form and are mounted underneath the chassis deck below the variable condenser.

The oscillator coils for the broadcast and police bands are wound on one form and are mounted on the rear wall of the chassis deck near the variable condenser.

The trimmers for the broadcast antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

I-f Transformer and Wave-Trap Alignment

Turn the switch clockwise to the broadcast position and rotate the variable condenser to the minimum capacity position. Feed 456 kc to the grid cap of the 6A7 tube and adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna and adjust the wave-trap trimmer for *minimum* response.

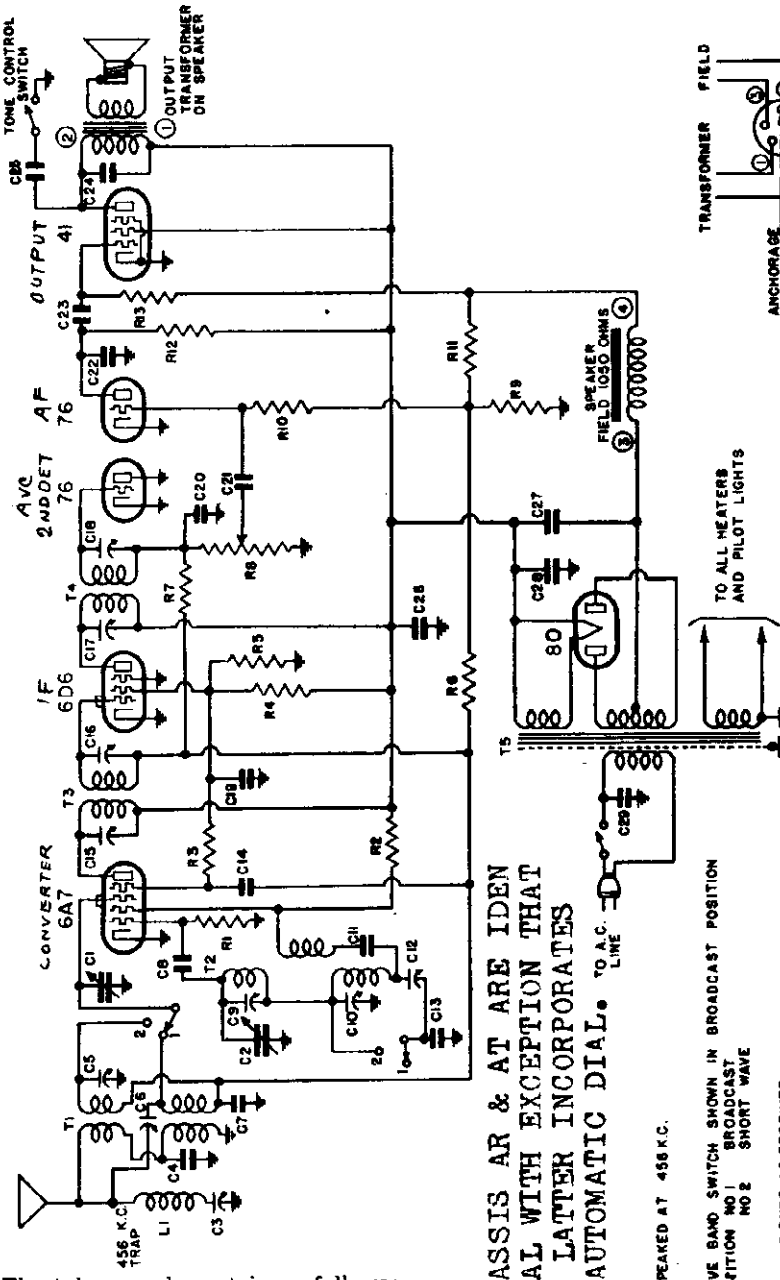
R-f Alignment

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response. The police band is self-tracking and does not require any adjustment.

MODELS AT170, AT172, AT181
Chassis AT

EMERSON RADIO & PHONO. CORP.

MODELS AR171, AR173, AR174, AR176, AR180, AR185
Chassis AR
Schematic, Changes
Voltage



CHASSIS AR & AT ARE IDENTICAL WITH EXCEPTION THAT THE LATTER INCORPORATES AN AUTOMATIC DIAL.

MODELS AR171, AR173, AR174, AR176, AR180 and AR185
Chassis Model AR
AT-170, AT-172 and AT-181

VOLTAGE ANALYSIS

Readings should be taken with a 1,000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal.

The line voltage for these readings was 117.5 volts, 60 cycles a.c.

Tube	*Plate*	*Screen*	*Osc. Plate*	*Cathode*	*Fil.*
6A7 osc.-mod.	244	62	118	0	6.3 a.c.
6D6 i-f amp.	244	85	—	0	6.3 a.c.
76 detector a.v.c.	0	—	—	0	6.3 a.c.
76 a-f amp.	85	—	—	0	6.3 a.c.
41 output	226	244	—	0	6.3 a.c.

Voltage across speaker field—65.

Voltage at 80 filament to B minus (center-tap of high-voltage winding on power transformer)—325.

The grid bias for all the tubes is developed across the resistors R9 and R11 (see schematic). The total voltage measured across R9 and R11 should be 15 volts, and is the bias for the 41 tube. The voltage measured across R9 should be 5 volts. To check the bias on the 6A7 and 6D6 tubes, measure the values of resistors R6, R7 and R8 (see schematic).

The tube complement is as follows:

1—6A7, pentagrid oscillator-modulator.
1—6D6, i-f amplifier.
1—76, diode detector and a.v.c. (behind second i-f transformer).
1—76, audio amplifier.
1—41, pentode power output.
1—80, full-wave rectifier.

Voltage rating .... 105-125 volts, 60 cycle a.c.
Power consumption .... 55 watts
Frequency ranges .... 540 to 1730 kc and 5.6 to 18 megacycles

PRODUCTION CHANGES

Model AR-174 receivers differ from the schematic diagram as follows:

a. C27 is a 12 mf, 450 volt dry electrolytic condenser, part no. 3LC-314.
b. C28 is a 24 mf, 400 volt dry electrolytic condenser, part no. 3ZC-341.
c. A .25 mf, 200 volt condenser is connected from the screen-grid of the 6D6 i-f amplifier to ground.

In receivers bearing serial numbers below 1,200,100:

a. C1 and C2 was a two-gang variable condenser, part no. 4HC-343B and the dial face used with this condense was part no. 4RZ-580.

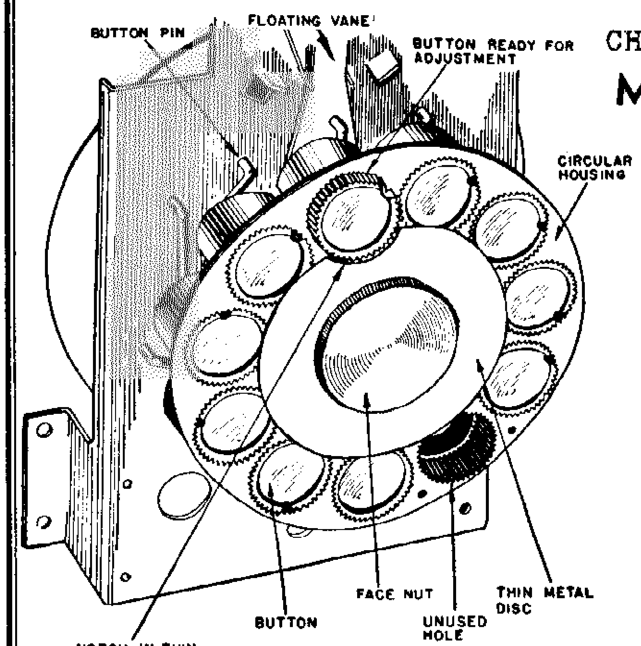
MODELS AT170, AT172 AT181

EMERSON RADIO & PHONO. CORP

Chassis AT
Automatic Dial Details

CHASSIS AR - SEE INDEX FOR SCHEMATIC

Models AT-170, AT-172 and AT-181



AUTOMATIC DIAL MECHANISM

FIGURE 2

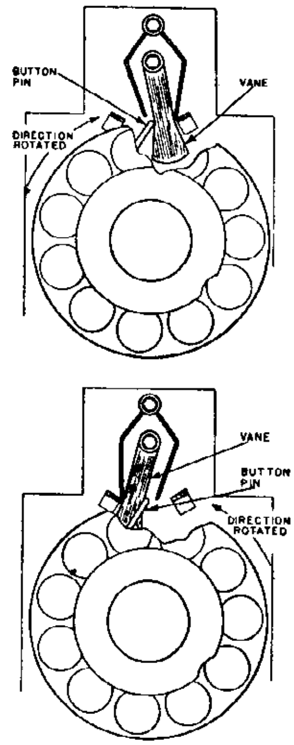
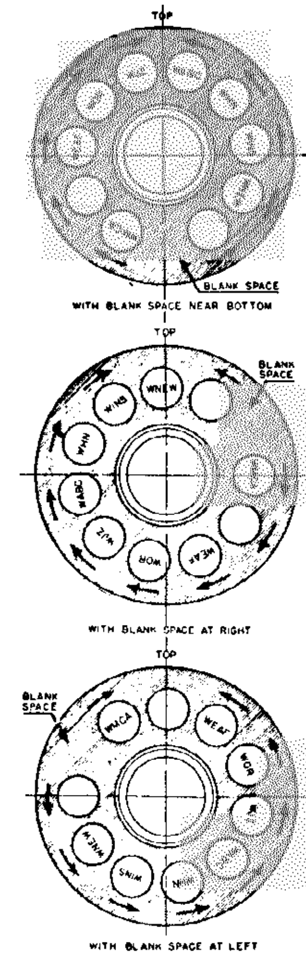


FIGURE 5

SHOWING TIP OF PIN HITTING VANE FROM EITHER SIDE WHEN STATION IS TUNED IN



ARROWS INDICATE DIRECTION DIAL IS TO BE TURNED FOR ANY PARTICULAR BUTTON

FIGURE 1

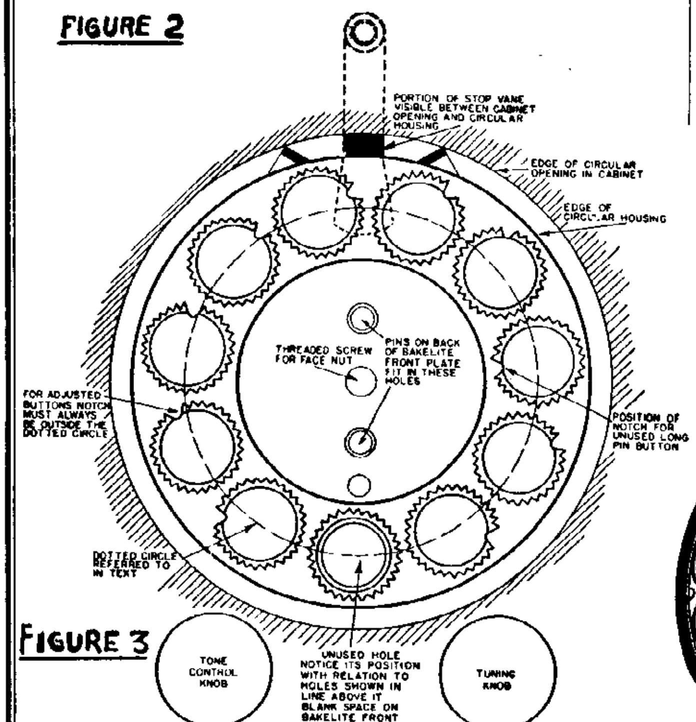
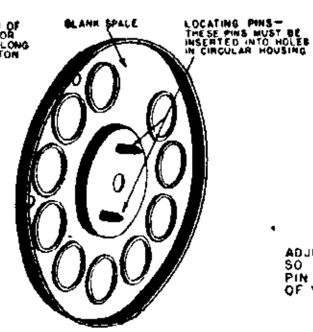


FIGURE 3

FRONT OF DIAL WITH METAL DISC REMOVED



REAR VIEW OF BAKELITE FRONT PLATE

FIGURE 7

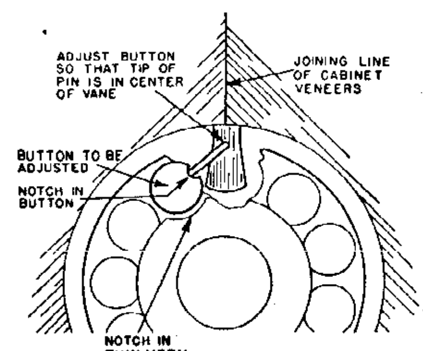
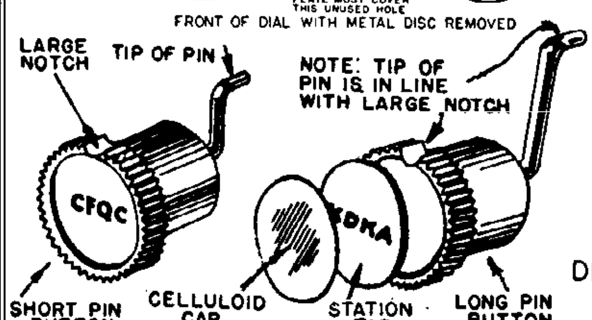


FIGURE 6



DETAILS OF BUTTONS

FIGURE 4

EMERSON RADIO & PHONO. CORP.

AUTOMATIC DIAL Models AT-170, AT-172 and AT-181

CHASSIS AR - SEE INDEX FOR SCHEMATIC

Automatic Dial Tuning

Insert the line plug into the electric outlet. Turn the receiver on by rotating the volume control knob clockwise until the switch is heard to click. Wait about a minute for the tubes to warm up.

Be sure the wave-band switch is in the broadcast position, clockwise.

(Complete information relative to the pre-setting of the Automatic Dial appears on pages 6 to 7 inclusive in this booklet.)

Tuning with the Automatic Dial is very similar to dialing a telephone except that only one turn of the dial is necessary. Merely push in the button bearing the call letters of the desired station, and, keeping the button pressed in firmly, rotate the dial until it stops with the button near the top. The button may then be released. This procedure automatically tunes in the desired station.

The illustrations, Fig. 1, indicate the proper rotation of the dial for a particular button. Note that the button must always stop near the top of the disc. If the button for the desired station is already at the top, rotate the dial in either direction about a quarter turn and then push the button in and rotate the dial back again until it stops with this button near the top.

Broadcast Reception

Broadcast stations may be tuned in the regular manner by means of the station selector knob on the front of the cabinet

STATION PRE-SETTING OF AUTOMATIC DIAL

The bakelite front plate for the dial will be found in the knob envelope. This plate is to be assembled after following the procedure described below. Eight cards of station call letter tabs for the buttons are in a separate envelope packed with the receiver.

The illustrations at the right, Fig. 2 and Fig. 3, show the major parts of the automatic dial. Ten buttons are supplied with each dial. Note that there are eleven button holes in the circular housing. One of these button holes is not to be used. (See Fig. 3). Each of the buttons may be set for a particular station. The stations chosen should be the popular local broadcast stations. The dial cannot be used for automatic tuning of short-wave stations. Each button is adjustable in that it can be rotated in its hole in the housing. This rotation is the means of adjustment for any particular station.

First turn the receiver on. The adjustments should be made with the receiver warmed up. Of the possible ten selected local stations choose five of the more desirable and determine their frequencies. Station frequencies will usually be found listed in newspapers. The station with the lowest frequency of the first five chosen should be adjusted first. Compare the frequency of this station with the frequency markings on the tab inserts in the buttons. The station frequency will be between the frequency limits marked on one of the buttons and that button should be adjusted for that particular station.

The following procedure should be observed in adjusting the buttons:

1. *Do not remove* the thin metal disc which holds the buttons in the housing until this entire procedure is completely finished. Merely loosen the face nut slightly and rotate the disc until its semi-circular notch falls below the first button to be adjusted. See Fig. 2. (When rotating this disc it is necessary to successively hold each button in place with a finger as the notch in the disc moves past these buttons.) Tighten the face nut again to prevent the disc from falling off. Take out this button and remove the celluloid cap and tab insert by prying with a sharp instrument at the large notch on the side of the button.

   Tune in the desired station by means of the selector knob on the front of the cabinet.

3. The large notch on the side of the button will indicate the position of the stop pin on the back of the button, see Fig. 4. The tip portion of the stop pin in this drawing is the part that stops against the floating vane. This tip portion in stopping against the vane is the action that locates the station once the button is adjusted, see Fig. 5. The vane is visible between the edge of the button housing and the edge of the hole in the cabinet, see Fig. 3.
4. With the station tuned in and without moving the circular housing partially insert the button, lining up the tip portion of the stop pin by eye with the center of the floating vane, and then push the button in, engaging the teeth. See Fig. 6. The center joint of the veneer on the cabinet may be used to assist in this lining up since the joint is approximately at the center of the floating vane.

   Hold the button in and rotate the thin metal disc a small fraction of a turn, just enough so that it holds the button in place.

   It is important that when the stop pin is lined up it is either horizontal or pointing at some angle away from the hub of the housing. This precaution may be observed by locating the large notch of the button (which is in line with the tip of the stop pin) outside the dotted circle through the buttons as shown in Fig. 3.
5. To check if the button has been properly adjusted rotate the entire housing first in clockwise direction so that the button stop pin is clear of the floating vane. Push the button all the way in with a finger and rotate the housing so that the pin travels toward and stops against the floating vane. The desired station should then be heard. Repeat this procedure on the counter-clockwise side of the vane. The station should again be heard.
6. If the station tunes in perfectly on each side of the vane no further adjustment is necessary. If it does not tune in perfectly, further adjustment should be made by carefully pulling out the button and rotating it one notch in the housing in the direction which will bring in the station more accurately. Check the tuning again by following the procedure outlined in paragraph No. 5. Find the station call letters for this button on one of the cards supplied. Remove the tab from the card and insert in the button by pressing in firmly. Replace the clear celluloid cap over the call letter tab, snapping it firmly in place.
7. Adjust four buttons for the other four selected stations following the procedure outlined above. In adjusting these buttons care should be taken, when rotating the thin metal disc, to keep the other buttons from falling
8. The remaining buttons, five in number, may be adjusted for any other local stations easily obtainable, or left in reserve for future settings.
9. After the buttons are all adjusted the thin metal disc should be removed carefully by unscrewing the face nut and replaced by the bakelite front plate. *Be very careful in removing the thin metal disc that the buttons do not spring out from the housing.*

   The cabinet should be tilted or placed on its back, when placing the bakelite plate on the dial, to make sure that the buttons do not fall out.

   Check carefully the drawings in Fig. 3 and Fig. 7 for aligning the bakelite front plate with the circular housing.

   The plate must fit in easily and snugly. Care should be taken not to damage the locating pins on the back of the front plate.

   The following additional precautions must be observed when adjusting the buttons:

The long pin buttons, when adjusted, should have the long length of the pin nearly horizontal. If these long pins, after the button is adjusted, interefere with any other part of the mechanism when the housing is rotated the buttons cannot be used in these holes.

If no special use is found for the two long pin buttons it is preferable to insert these in unused holes with the pins pointing directly toward the hub of the housing.

When loosening the thin metal disc be sure the face nut is unscrewed only enough to allow the disc to turn. During adjustments check this nut frequently to make sure it is in no danger of falling off. It cannot be emphasized too strongly that the utmost care must be taken to prevent this metal disc or the bakelite front plate from falling off and allowing the adjusted buttons to spring out from the housing. When making adjustments, rotate the thin metal disc very carefully to be sure that the adjusted buttons do not fall out of the housing past the notch in the disc.

After replacing the thin metal disc with the bakelite plate, the disc should not be discarded but should be reserved for future use in resetting buttons or in the event the receiver is reshipped. The receiver should never be transported with the bakelite plate assembled.

Note:—Two of the ten buttons supplied with the dial have long pins. In rare cases a particular station cannot be reached with a short pin button. The two long pin buttons are available for this purpose.

MODELS AR171, AR173
AR174, AR176
AR180, AR185
Chassis AR
Alignment, Notes, Parts

EMERSON RADIO & PHONO. CORP.

MODELS AT170, AT172
AT181
Chassis AT

GENERAL NOTES

1. The receiver should never be turned on with either the speaker plug or the 41 tube out of its respective socket, since the rapid rise in rectifier voltage will damage the electrolytic condenser.
2. When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonism will result.
3. The color coding of the i-f transformers is as follows:
   Grid—green — Grid return—black
   B plus—red — Plate—blue.
4. The color coding of the power transformer is as follows:
   Primary—two black leads
   High-voltage secondary—two red leads
   High-voltage secondary center tap—red and yellow lead
   6.3 volt secondary—two green leads
   5 volt secondary—two yellow leads.
5. The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the wave-band switch) with the screw adjustment accessible through a hole in the top of the chassis. The short-wave band has a fixed padder, C13 on schematic. When replacing this fixed padder be careful to use a condenser which has a capacity within 2% of the specified value, otherwise the short-wave coils may not track.
6. With a few exceptions, the color coding of the general wiring is as follows:
   Plate—blue — Cathode—white or yellow
   B plus—red — Grid—green
   Screen—brown — Fil. and ground—black.
7. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraph station the wave-trap trimmer may be readjusted until the response from the interfering station is at a minimum.
8. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. For reduction of noise and achievement of high efficiency on all frequency ranges the Emerson All-Wave High-Fidelity Antenna, Model W-78, and the Emerson All-Wave Antenna System, Model W-89, are recommended. Instructions for the installation of these antennas are supplied with each kit.
   In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600 and 16,000 kc should be used.

An output meter should be used across the voice coil or output transformer for observing maximum response.

If the circuit is at all disturbed, both the broadcast and short-wave bands must be realigned.

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Always use as weak a test signal as possible during alignment.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The second i-f is the one directly behind the variable condenser. The four trimmers, two for each transformer, are accessible through holes in the tops of the cans.

The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the 6A7 tube) with the screw adjustment accessible through a hole in the front of the chassis.

The antenna coils for the broadcast and short-wave bands and the 456 kc wave trap are wound on one form and mounted underneath the chassis deck directly behind the adjustable padding condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the short-wave antenna trimmer. The central trimmer is the broadcast antenna trimmer. The trimmer nearest the rear of the chassis is the 456 kc wave trap.

The oscillator coils for the broadcast and short-wave bands are wound on one form and mounted underneath the chassis deck near the variable condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is for the short-wave oscillator coil and the trimmer farthest from the front is for the broadcast oscillator coil.

I-f and Wave-trap Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 456 kc, through a 0.02 mf paper condenser, to the grid cap of the 6A7 tube (do not remove the grid clip from the tube). Adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna through a standard dummy antenna (a 0.0002 mica condenser may be substituted) and adjust the wave-trap trimmer (farthest from front on left side of the chassis) for *minimum* response. (See General Notes.)

Short-Wave Alignment (Alignment of the short-wave band should precede broadcast alignment)

Use a 400 ohm dummy antenna (a 400 ohm non-inductive resistor in series with the test oscillator antenna lead) when aligning the short-wave coils. Rotate the wave-band switch to the short-wave (counter-clockwise) position, and set the dial pointer exactly at 16 megacycles. Feed 16,000 kc to the antenna and adjust the short-wave oscillator trimmer (nearest the front beside variable condenser) for maximum response, and then adjust the short-wave antenna trimmer (nearest the front on the left side of the chassis) for maximum response. Be very careful to choose the minimum capacity peak on the oscillator trimmer.

Broadcast Alignment

Use a standard dummy antenna in aligning the broadcast coils. (A .0002 condenser may be substituted.) Rotate the wave-band switch to the broadcast (clockwise) position. Set the dial pointer at 60 and feed 600 kc. Adjust the broadcast series padder (in corner near 6A7 tube) for maximum response. Move the dial pointer to 160 and feed 1600 kc. Adjust the broadcast oscillator trimmer (farthest from front beside the variable condenser) for maximum response and then adjust the broadcast antenna trimmer (central trimmer at left side of chassis). Return pointer to 60, feed 600 kc and re-adjust the broadcast series padder, rocking the variable condenser (rotate the variable condenser shaft back and forth through a small arc) for maximum response.

REPLACEMENT PARTS

List Prices as Effective as of July 15th, 193[illegible]
(Subject to change without notice)

*Item	Part No.	DESCRIPTION	PRICE
T1, L1	8CT-289A	Two-band antenna coil and 456 kc wave-trap	$1.80
T2	8CT-290A	Two-band oscillator coil	1.25
T3	8ZT-342	456 kc first i-f transformer	1.80
T4	2NT-281	456 kc second i-f transformer	1.25
T5	3ZT-345	Power transformer	4.45
R1	KR-53	50,000 ohm, ¼ watt carbon resistor	.16
R2	8BR-247	40,000 ohm, ¼ watt carbon resistor	.16
R3	LR-65	10,000 ohm, ¼ watt carbon resistor	.16
R4	BR-12	25,000 ohm, 1 watt carbon resistor	.16
R5	3LR-265	40,000 ohm, ½ watt carbon resistor	.16
R6	NNR-220	3 megohm, ¼ watt carbon resistor	.16
R7	HR-42	2 megohm, ¼ watt carbon resistor	.16
R8	3ZR-288	Volume control with line switch—500,000 ohms	1.08
R9	3VR-270	90 ohm, ½ watt wire-wound resistor	.16
R10	3RR-274	5 megohm, ¼ watt carbon resistor	.16
R11	4RR-316	210 ohm, 1 watt wire-wound resistor	.16
R12	KR-54	100,000 ohm, ¼ watt carbon resistor	.16
R13	KR-56	500,000 ohm, ¼ watt carbon resistor	.16
†C1, C2	4HC-343A	Two-gang variable condenser	3.65
‡C3, C5, C6		Trimmer, part of antenna coil.	
C4, C8	AAC-106A	0.00005 mf mica condenser	.20
C7, C19	BC-12	0.05 mf, 200 volt tubular condenser	.20
‡C9, C10		Trimmer, part of oscillator coil.	
C11, C14	KC-58	0.01 mf, 400 volt tubular condenser	.20
C12	2NC-231	Single adjustable padding condenser. Range: 300 to 600 mmf	.50
C13	3EC-267	0.0042 mf mica condenser	.40
‡C15, C16		Trimmer, part of first i-f transformer.	
‡C17, C18		Trimmer, part of second i-f transformer.	
C20	AC-7A	0.00025 mf mica condenser	.20
C21	HC-34	0.006 mf, 600 volt tubular condenser	.20
C22	IC-47	0.0005 mf mica condenser	.20
C23	LC-65	0.02 mf, 400 volt tubular condenser	.20
C24	ZC-115	0.006 mf, 1000 volt tubular condenser	.20
C25	2TC-189	0.015 mf, 1000 volt tubular condenser	.20
C26	EEC-182	0.1 mf, 400 volt tubular condenser	.20
†C27	2NC-246	16 mf, 450 volt wet electrolytic condenser	1.20
†C28	2NC-247	16 mf, 405 volt wet electrolytic condenser	1.20
C29	3LC-297A	0.01 mf, 400 volt molded type paper condenser	.20
	2TS-145E	Tone control switch	.35
	TTS-111K	Wave-band switch	.60
	4RS-270	6½" dynamic speaker	5.25
	4TS-281	10" dynamic speaker	8.60
	XL-9	Pilot light 6.3 volt, .25 amp., Mazda No. 46	.20
	†4FZ-596	Dial face	1.20
	3LZ-403	Dial drive belt	.15
	3CZ-337	Dial drive shaft and pulley	.10
	3CZ-339	Idler pulley	.05
	4HZ-562	Idler pulley spring	.05
	3CZ-341	Condenser shaft pulley	.10
	4RZ-592	Dial pointer	.25
	4RZ-595	Escutcheon with crystal	1.95

When ordering replacement parts specify part numbers.

*Item number locates the article on the schematic diagram.

†See production changes.

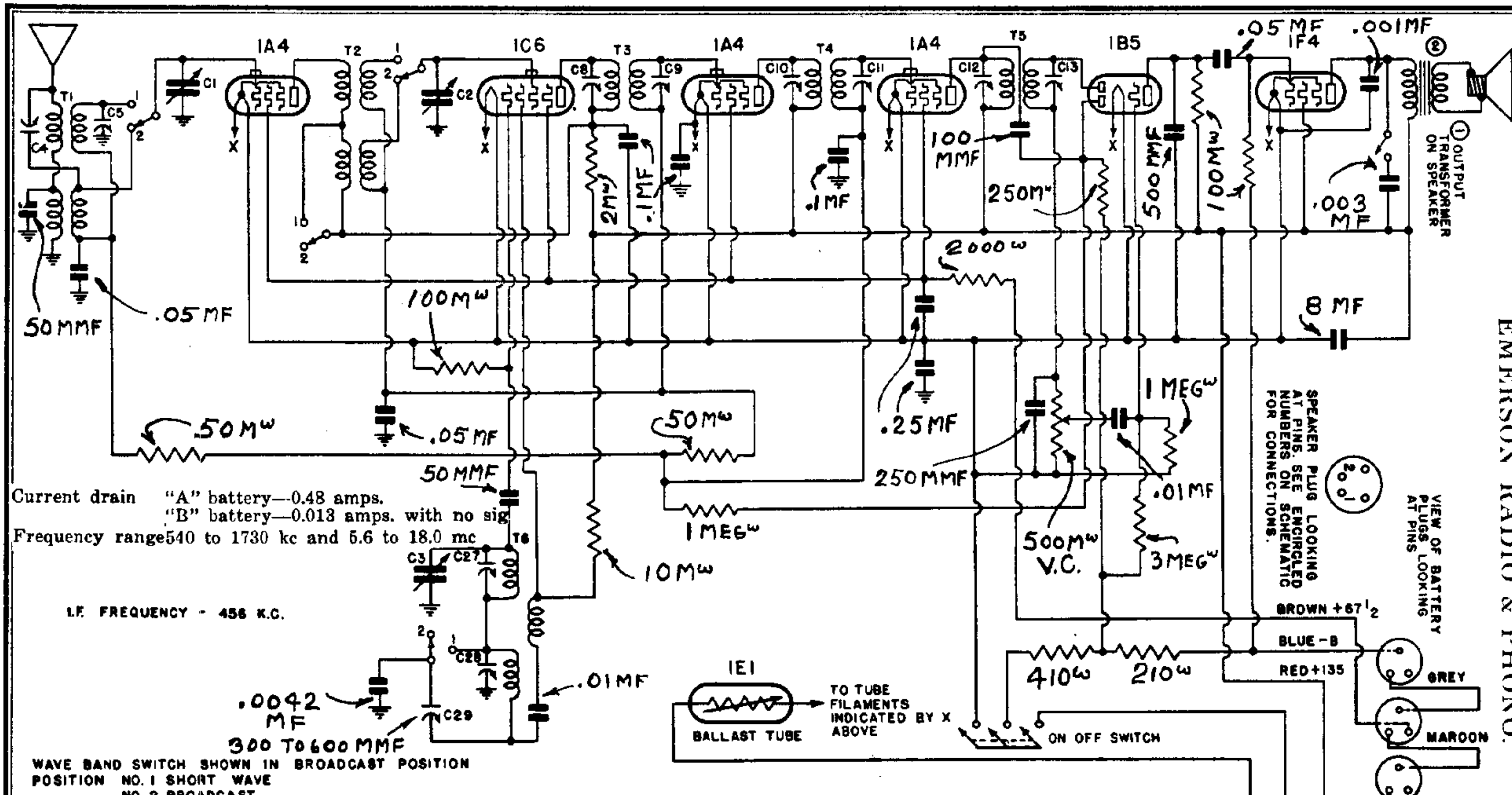
‡These trimmer condensers are part of the coil assemblies and can not be supplied separately.

MODELS AF171, AF173, AF1
AF179, AF180, AF1

Chassis AF Schematic

Voltage

EMERSON RADIO & PHONO.



Current drain "A" battery—0.48 amps.
"B" battery—0.013 amps. with no sig

Frequency range 540 to 1730 kc and 5.6 to 18.0 mc

I.F. FREQUENCY - 456 K.C.

WAVE BAND SWITCH SHOWN IN BROADCAST POSITION
POSITION NO. 1 SHORT WAVE
NO. 2 BROADCAST

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to A neg. with volume control turned on full and no signal. The battery voltages for these readings were: "A" 3 volts, "B" 135 volts.

Tube	Plate	Screen	Osc. Plate	Fil.
1A4 r-f	130	57	—	2.0
1C6	130	57	100	2.0
1A4 1st i-f	130	57	—	2.0
1A4 2nd i-f	130	57	—	2.0
1B5-25S	65	—	—	2.0
1F4	130	130	—	2.0

Bias for the three 1A4 and the 1C6 tubes is obtained across the resistor R10. The voltage drop across this resistor should be 5 volts. Bias for the output tube (1F4) is obtained across resistors R10 and R14 in series. Voltage drop across

Tube Data

1A4, r-f amplifier (to right of variable cond
1C6, oscillator-modulator
1A4, 1st i-f amplifier (to left of variable cond
1A4, 2nd i-f amplifier (behind variable cond
1B5-25S, 2nd detector, a.v.c., a-f amplifier
1F4, pentode output
1E1, ballast tube.

MODELS AF171,AF173,AF176
AF179,AF180,AF185 EMERSON RADIO & PHONO. CORP.
Chassis AF
Alignment, Notes

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600 and 15,000 kc should be used.

An output meter should be used across the voice coil or output transformer for observing maximum response.

If the circuit is at all disturbed, both the broadcast and short-wave bands must be realigned.

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Always use as weak a test signal as possible during alignment.

Use a standard dummy antenna for aligning either of the bands. A .0002 mf condenser may be used for the broadcast band dummy antenna and a 400 ohm non-inductive resistor for the short-wave dummy antenna.

Location of Coils and Trimmer Adjustments

The three i-f transformers are in oblong coil cans located on top of the chassis deck.

The first i-f transformer, part number 4ET-350B, is located to the left of the variable condenser.

The second i-f transformer, part number 4ET-350B, is located behind the variable condenser.

The third i-f transformer, part number 4FT-382, is located to the right of the variable condenser. The trimmers, two for each transformer, are accessible through holes in the top of the cans.

The broadcast series padder is located underneath the chassis (in the corner near the 1C6 tube). The screw adjustment is accessible through a hole in the top of the chassis.

The antenna coil for the two bands is wound on one coil form and mounted underneath the chassis to the right of the variable condenser. The trimmers are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is for the short-wave antenna coil.

The r-f interstage coils for the two bands are wound on one form and mounted underneath the chassis to the left of the first i-f transformer. The trimmers are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is for the short-wave interstage coil.

The oscillator coils for the two bands are wound on one coil form and mounted underneath the chassis to the left of the variable condenser. The trimmers are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is for the short-wave oscillator coil.

I-f Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 456 kc through a 0.02 mf paper condenser, to the grid cap of the 1C6 tube (do not remove the grid clip from the tube). Adjust the six i-f trimmers for maximum response.

Short-Wave Alignment (Short-wave alignment should precede broadcast alignment.)

Set the wave-band switch at the short-wave (counter-clockwise) position. Move pointer to 15, feed 15,000 kc to antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator for maximum response. If two peaks are obtained choose minimum capacity peak. Then adjust the interstage and antenna trimmers for maximum response. If two peaks are obtained choose the maximum capacity peak.

Broadcast Alignment

With the wave-band switch at the broadcast (clockwise) position, set the pointer at 600, feed 600 kc through the antenna (using a standard dummy antenna), and adjust the broadcast series padder for maximum response. Move pointer to 1600, feed 1600 kc to the antenna and adjust the oscillator trimmer for maximum response, then adjust interstage and antenna trimmers. Reset the pointer to 600, feed 600 kc to antenna and rock the variable condenser (rotate the condenser back and forth through a small arc) while resetting the oscillator padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary, return to 600 and repeat entire procedure.

1. The battery complement should be as follows:

		Battery Manufacturer		
Type	*No. Required*	*Eveready Part No.*	*Burgess Part No.*	*Ray-o-vac Part No.*
3 volt "A"	1	X-125 or A-600	20F2	P9403
45 volt "B"	3	385 (plug-in type)	22308 (plug-in type)	P9303 (plug-in type)

2. The receiver is designed for an "A" supply of 2 to 3 volts. A 2 volt storage battery may be used, in which case the 1E1 (ballast) tube, in the chassis becomes unnecessary and may be eliminated as follows:
   If it is definitely known that a 2 volt storage battery will always be used it is permissable and advisable to short-circuit the two heavy prongs on the 1E1 tube by connecting them with a short piece of bare wire. *Be sure that the two small prongs on the tube are free of this bare wire.*

3. The color coding of the i-f transformer leads is as follows:
   Grid—green   Plate—blue
   Grid return—black   B plus—red

4. Note that all leads in the battery cable are color coded. The two "A" leads are tagged with small metal markers giving the polarity. The battery cable is equipped with three plugs for "B" battery connections. These plugs are all alike and may be inserted in any order in the sockets of the three "B" batteries. The color coding of the battery cable is as follows:

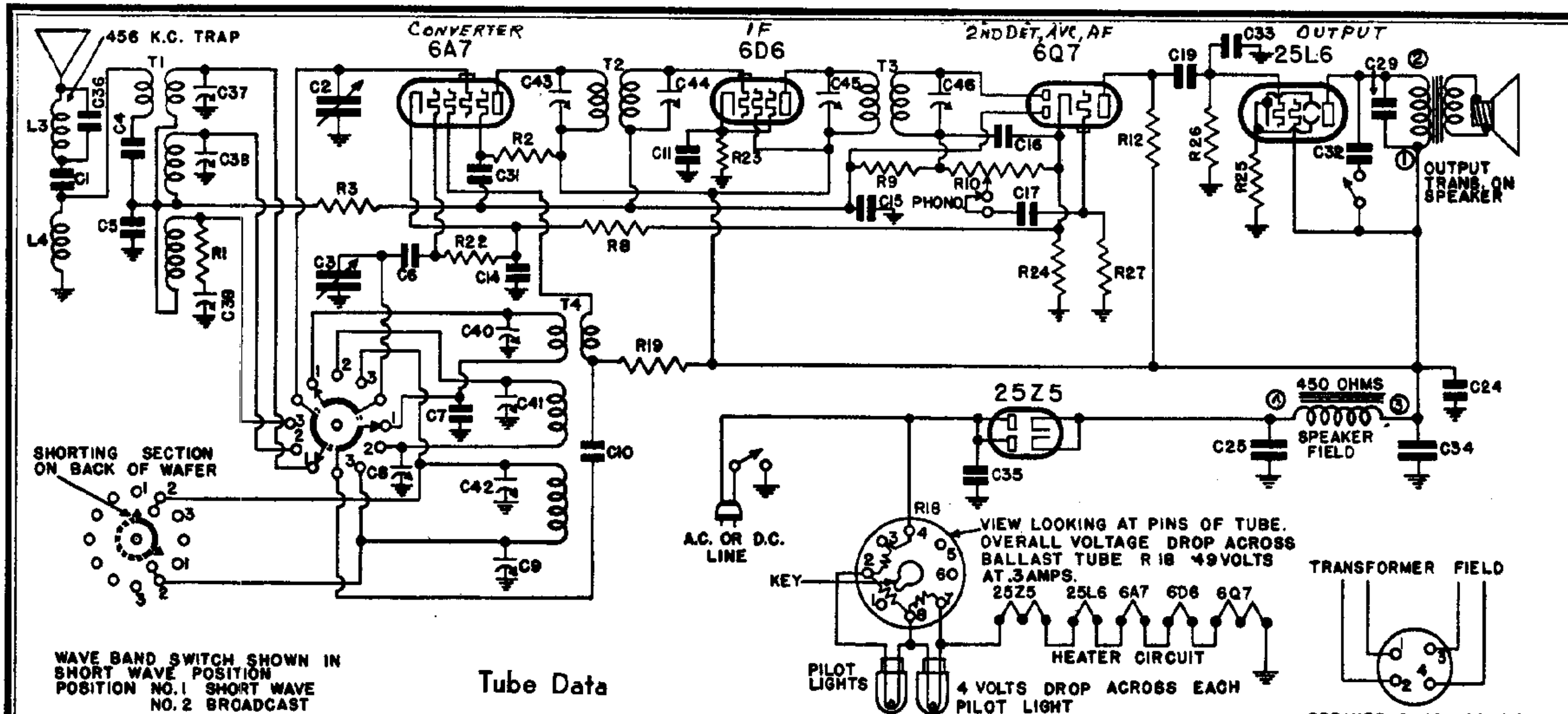
Red	B plus 135
Brown	B plus 67.5
Blue	B neg.
Yellow	A plus 3
Black	A neg.

5. If replacements are made in the r-f section of the circuit, the receiver should be carefully re-aligned.

6. Be very careful not to remove any of the tubes from their sockets with the power switch turned on, as the rapid rise in filament voltage will damage the remainder of the tubes.

EMERSON RADIO & PHONO. CORP

MODELS AP171,AP173,AP17
AP176,AP180,AP18
Chassis AP
Schematic,Voltage



WAVE BAND SWITCH SHOWN IN SHORT WAVE POSITION
POSITION NO. 1 SHORT WAVE
NO. 2 BROADCAST
NO. 3 LONG WAVE

I.F. PEAKED AT 456 KC.
5 TUBE A.C. D.C. RECEIVER

Tube Data

The tube complement is as follows:

1—6A7 pentagrid oscillator-modulator
1—6D6 first i-f amplifier
1—6Q7 diode detector, a.v.c., audio amplifier
1—25L6 beam power output
1—25Z5 dual half-wave rectifier
1—3CR-241 ballast tube.

NOTE: Octal-base tubes may be replaced with either metal or octal-base glass tubes.

CHASSIS MODEL AP

Voltage rating	105-125 volts, a.c. or d.c.
Current drain	0.4 amp.
Frequency range	150 to 375 kc, 540 to 1600 kc, 5.7 to 17.5 mc.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	110	34	2.4	67	6.3
6D6	110	110	4.2	—	6.3
6Q7	45	—	1.2	—	6.3
25L6	100	110	7.0	—	25
25Z5	—	—	135.0	—	25

Voltage across speaker field—25 volts.
The overall voltage drop across the resistors in the ballast tube is 49 volts.
The voltage drop across each pilot light section in the ballast tube is 4 volts.

MODELS AP-171, AP-173, AP-174, AP-176, AP-180 and AP-185

MODELS AP171, AP173
AP174, AP176
AP180, AP185

EMERSON RADIO & PHONO. CORP.

Chassis AP
Alignment, Notes, Parts

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully re-aligned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. When operating the receiver on d.c., it may be necessary to reverse the line plug for correct polarity.
4. When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonism will result.
5. The color coding of the i-f transformers is as follows:
   Grid—green Grid return—black
   B plus—red Plate—blue
5. An electrical phonograph pick-up may be connected to this receiver for playing records. Connections to this receiver may be made at the "phono" jack which is located on the rear wall of the receiver chassis. A separate volume control of the potentiometer type is necessary in addition to the phonograph pick-up. The two pick-up lead wires should be connected to the two outside terminals of this volume control. A lead from the center terminal should be plugged into the right-hand hole in the phono jack. A lead from one of the outside terminals of the volume control should be plugged into the other hole in the phono jack. The leads to be plugged in the jack should be fitted with tips. The volume control in the receiver should be turned down to the zero volume position when operating the phonograph. The required over-all resistance of the separate volume control will, of course, depend on the type of phonograph pick-up to be used. A matching input transformer must be used if the pick-up is of the low impedance type. In this case the volume control is connected to the secondary of the transformer. It is important that the phonograph leads be removed from the jack when it is desired to operate the receiver for ordinary radio reception.
7. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. For reduction of noise and achievement of high efficiency on all frequency ranges the Emerson All-Wave High-Fidelity Antenna, Model W-78, and the Emerson All-Wave Antenna System, Model W-89, are recommended. Instructions for the installation of these antennas are supplied with each kit.
   In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.

ADJUSTMENTS

An oscillator with frequencies of 150, 350, 456, 600, 1500 and 15,000 kc should be used.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Use a standard dummy antenna when aligning either the long-wave or medium-wave bands. A .0002 mf condenser may be used as a substitute. When aligning the short-wave band use a 400 ohm dummy antenna (a 400 ohm resistor in series with antenna lead).

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Always use as weak a test signal as possible during alignment.

Never leave a trimmer with its outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Location of Coils and Trimmers

The two i-f transformers are located on top of the chassis deck. The second i-f transformer is the one directly behind the variable condenser. The four trimmers, two for each transformer, are accessible through holes in the tops of the cans.

The dual adjustable padding condenser is mounted on the left side of the front chassis wall.

The antenna coils for the three bands are wound on one form and mounted underneath the chassis deck directly behind the adjustable padding condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the medium-wave antenna trimmer. The central trimmer is the short-wave antenna trimmer. The trimmer farthest from the front of the chassis is the long-wave antenna trimmer.

The oscillator coils for the three bands are wound on one form and mounted underneath the chassis deck near the variable condenser. The trimmers for these coils are also accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the medium-wave oscillator trimmer. The central trimmer is the short-wave oscillator trimmer. The trimmer farthest from the front of the chassis is the long-wave oscillator trimmer.

I-f Alignment

Rotate the wave-band switch to the medium-wave (central) position and set the variable condenser to minimum. Feed 456 kc to the grid cap of the 6A7 tube. Adjust the four i-f trimmers for maximum response.

Long-Wave Alignment

With the wave-band switch at long-wave (clockwise) position set the dial pointer at 150 and feed 150 kc to antenna. Adjust the long-wave series padder (hex nut on dual padder) for maximum response. Move pointer to 350 and feed 350 kc to antenna. Adjust the long-wave oscillator trimmer then the long-wave antenna trimmer for maximum response. Reset pointer to 150, feed 150 kc and rock (rotate back and forth through a small arc) the variable condenser while adjusting long-wave series padder for maximum response. Reset pointer to 350, feed 350 kc and check alignment. If readjustment is necessary return to 150 kc and repeat entire procedure.

Medium-Wave Alignment

Set switch at medium-wave (central) position and dial pointer at 600. Feed 600 kc to antenna and adjust medium-wave series padder (slotted screw on dual padder) for maximum response. Move pointer to 1500, feed 1500 kc and adjust medium-wave oscillator trimmer and then the medium-wave antenna trimmer for maximum response. Reset pointer to 600 feed 600 kc and rock variable condenser while readjusting medium-wave series padder for maximum response. Reset pointer to 1500, feed 1500 kc and check alignment. If readjustment is necessary return to 600 and repeat entire procedure.

Short-Wave Alignment

Set wave-band switch at short-wave (counter-clockwise) position. Set pointer at 15, feed 15 megacycles to antenna and adjust short-wave oscillator trimmer and then short-wave antenna trimmer for maximum response.

REPLACEMENT PARTS LIST

List Prices as Effective as of Aug. 15th, 1937 (Subject to change without notice)

*Item	Part No.	DESCRIPTION	PRICE
L3	2ZT-268	456 kc wave-trap	.75
L4	3ET-299	R-f choke—5 millihenries	.55
T1	3ET-297	Three-band antenna coil	2.05
T2	2NT-230	456 kc first i-f transformer	1.35
T3	2NT-231	456 kc second i-f transformer	1.35
T4	3ET-298	Three-band oscillator coil	1.90
R1	TTR-201	3,000 ohm ¼ watt carbon resistor	.16
R2	3ER-263	60,000 ohm ¼ watt carbon resistor	.16
R3, R12	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R8	AAR-119	300 ohm ½ watt wire-wound resistor	.16
R9, R27	KR-57	1 megohm ¼ watt carbon resistor	.16
R10	2NR-214D	Volume control with switch—250,000 ohms	1.20
R18	3CR-241	Plug-in type ballast resistor	.80
R19	LR-60	20,000 ohm ¼ watt carbon resistor	.16
R22	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R23	3CR-295	410 ohm ½ watt wire-wound resistor	.16
R24	3CR-294	240 ohm ½ watt wire-wound resistor	.16
R25	3FR-293	140 ohm ½ watt wire-wound resistor	.16
R26	KR-56	500,000 ohm ¼ watt carbon resistor	.16
C1, C4, C10, C17	FC-29	0.02 mf, 200 volt tubular condenser	.20
C2, C3	4HC-343A	Two-gang variable condenser	3.65
C5	2ZC-252	0.0025 mf mica condenser	.30
C6	AAC-106A	0.00005 mf mica condenser	.20
C7	3EC-236	0.0024 mf mica condenser	.30
C8, C9	2ZC-257	Dual adjustable padding condenser C8—250 to 500 mmf. C9—100 to 200 mmf.	.65
C11, C14, C24	AC-6	0.1 mf, 200 volt tubular condenser	.20
C15	BC-12	0.05 mf, 200 volt tubular condenser	.20
C16, C33	AC-7A	0.00025 mf mica condenser	.20
C19	LC-65	0.02 mf, 400 volt tubular condenser	.20
C25	3CC-261	20 mf, 150 volt wet electrolytic condenser	.90
C29	QQC-173	0.015 mf, 600 volt tubular condenser	.20
C31	KC-53	0.01 mf, 400 volt tubular condenser	.20
C32	EC-23	0.03 mf, 400 volt tubular condenser	.20
C34	3CC-337	40 mf, 150 volt wet electrolytic condenser	.90
C35	3EC-326A	0.05 mf, 400 volt molded type paper condenser	.20
†C36		0.0015 mf mica condenser, part of wave trap assembly.	
†C37, C38, C39		Trimmer, part of antenna coil assembly.	
†C40, C41, C42		Trimmer, part of oscillator assembly.	
†C43, C44		Trimmer, part of first i-f transformer assembly.	
†C45, C46		Trimmer, part of second i-f transformer assembly.	
	4PS-271	8½" dynamic speaker	5.50
	4PS-299	10" dynamic speaker	9.50
	3ES-218	Wave-band switch	1.10
	3ES-256	Tone-control switch	.50
	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
	4PZ-615	Dial face	1.20
	3LZ-403	Dial drive belt	.15
	3CZ-337B	Dial drive shaft and pulley	.10
	3CZ-339	Idler pulley	.05
	4HZ-562	Idler pulley spring	.05
	3CZ-341	Condenser shaft pulley	.10
	4RZ-592	Dial pointer	.25
	4RZ-595	Escutcheon with crystal	1.95

When ordering replacement parts specify part numbers.

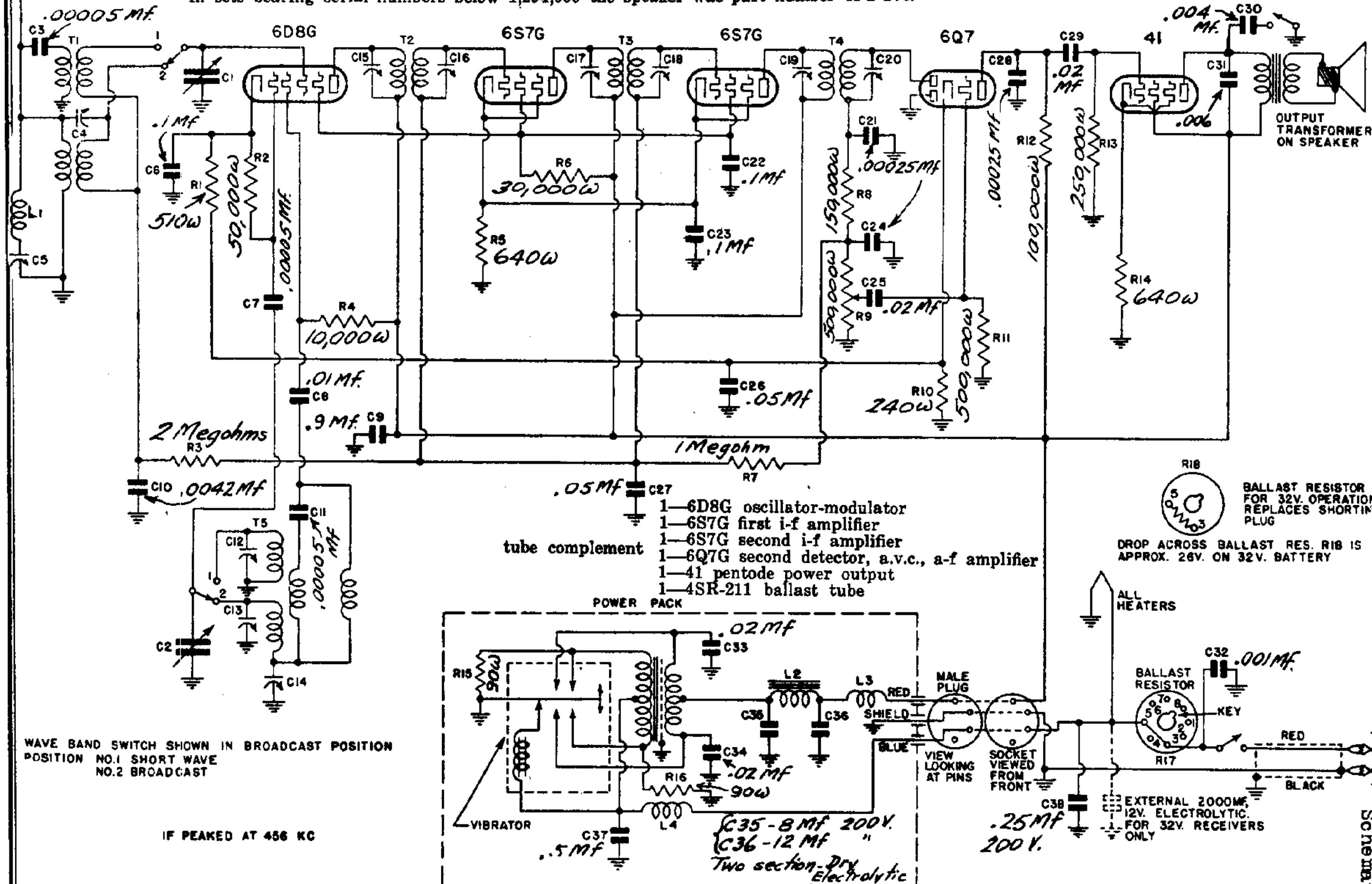
*Item number locates the article on the schematic diagram.

†These condensers are part of coil assemblies and cannot be supplied separately.

EMERSON RADIO & PHONO. CORP.

MODEL AS1
Chassis A
Schematic

‡Production changes: In sets bearing serial numbers below 1,294,700, C31 was a .002 mf, 600 volt condenser.
In sets bearing serial numbers below 1,294,000 the speaker was part number 4FS-274.



tube complement
1—6D8G oscillator-modulator
1—6S7G first i-f amplifier
1—6S7G second i-f amplifier
1—6Q7G second detector, a.v.c., a-f amplifier
1—41 pentode power output
1—4SR-211 ballast tube

WAVE BAND SWITCH SHOWN IN BROADCAST POSITION
POSITION NO.1 SHORT WAVE
NO.2 BROADCAST

IF PEAKED AT 456 KC

6 TUBE BATTERY RECEIVER

Voltage rating .... 6 volts d.c. (6 volt storage battery)

MODEL AS179
Chassis AS
Alignment, Notes, Voltage

EMERSON RADIO & PHONO. CORP.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600 and 15,000 kc should be used.
An output meter should be used across the voice coil or output transformer for observing maximum response.
If the circuit is at all disturbed, both the broadcast and short-wave bands must be realigned.
Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.
Always use as weak a test signal as possible during alignment.
Use a standard dummy antenna for aligning either of the bands. A .0002 mf condenser may be used for the broadcast band dummy antenna and a 400 ohm non-inductive resistor for the short-wave dummy antenna.

Location of Coils and Trimmer Adjustments

The first i-f transformer, part number 4ET-350C, is located on top of the chassis to the left of the variable condenser.
The second i-f transformer, part number 4ET-350A is located on top of the chassis behind the variable condenser.
The third i-f transformer, part number 4FT-382B, is located on top of the chassis to the right of the variable condenser.
The trimmer condensers, two for each transformer, are accessible through holes in the top of the cans.
The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the 6D8G tube) with the screw adjustment accessible through a hole in the front of the chassis.
The antenna coils for the broadcast and short-wave bands and the 456 kc wave-trap are wound on one form and mounted underneath the chassis deck directly behind the adjustable padding condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the broadcast antenna trimmer. The central trimmer is the short-wave antenna trimmer. The trimmer nearest the rear of the chassis is the 456 kc wave-trap.
The oscillator coils for the broadcast and short-wave bands are wound on one form and mounted underneath the chassis deck near the variable condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is for the short-wave oscillator coil and the trimmer farthest from the front is for the broadcast oscillator coil.

I-f and Wave-trap Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 456 kc through a 0.02 mf paper condenser to the grid cap of the 6D8G tube (do not remove the grid clip from the tube). Adjust the six i-f trimmers for maximum response. Feed 456 kc to the antenna through a standard dummy antenna and adjust the wave-trap trimmer for *minimum* response. (See General Notes.)

Broadcast Alignment

Rotate the wave-band switch to the broadcast position (clockwise) and set the dial pointer at 600. Feed 600 kc through a standard dummy antenna. Adjust the broadcast series padding condenser for maximum response. Move pointer to 1600, feed 1600 kc and adjust the broadcast oscillator trimmer for maximum response and then adjust the broadcast antenna trimmer for maximum response. Return pointer to 600, feed 600 kc and readjust the series padding condenser, rocking the variable condenser for maximum response.
The set's oscillator is higher in frequency than the signal on the broadcast band, so images should be observed on the low-frequency side of the signals.

Short-Wave Alignment

Rotate the wave-band switch to the short-wave (counter-clockwise) position, and set the dial pointer exactly at 15 megacycles. Feed 15,000 kc to the antenna through a 400 ohm non-inductive resistor and adjust the short-wave oscillator trimmer for maximum response, and then adjust the short-wave antenna trimmer for maximum response. Be very careful to choose the maximum capacity peak on the oscillator trimmer.
The set's oscillator is lower in frequency than the signal (on the short-wave band only), so images should be observed on the high frequency side of the signal.

1. The large, oblong metal box behind the speaker contains the power pack. The function of this power pack is to convert the 6 volt direct current from the storage battery into 150 volt direct current. The vibrator used is of the synchronous type.
2. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.
3. Particular care should be taken in connecting the battery to the receiver. The heavy battery cable emerging from the rear of the receiver terminates in two separate leads with clips attached. Note that the clip at the end of the red rubber covered lead is marked with a plus sign (+). This clip should be attached to the *positive* terminal of the six-volt storage battery. The other clip, on the braid covered lead should be attached to the *negative* terminal of the storage battery. It is important to observe the proper polarity in connecting the battery. Reversed connections with the receiver turned on will result in serious damage to the receiver.
4. Make certain that all battery connections make good contact, otherwise the receiver may be noisy. The positive terminal of an unmarked battery may be distinguished by a deposit of green corrosion, which usually collects on this terminal. On most batteries the positive terminal is larger than the negative terminal.
5. The color coding of the leads of the i-f transformers is as follows:
   Grid—green Plate—blue
   Grid return—black B plus—red
6. With few exceptions the color coding of the general wiring is as follows:
   Plate—blue Cathode—white or yellow
   B plus—red Grid—green
   Screen—brown Filament and ground—black
7. The color coding of the leads of the power pack is as follows:
   A plus—blue B plus—red Common neg.—shield

The receiver may be quickly and easily adapted for operation from a 32 volt power supply. A complete kit, Model W-95, containing the additional parts required for this conversion may be purchased through Emerson dealers. Complete instructions for attaching these additional parts are supplied with each kit.

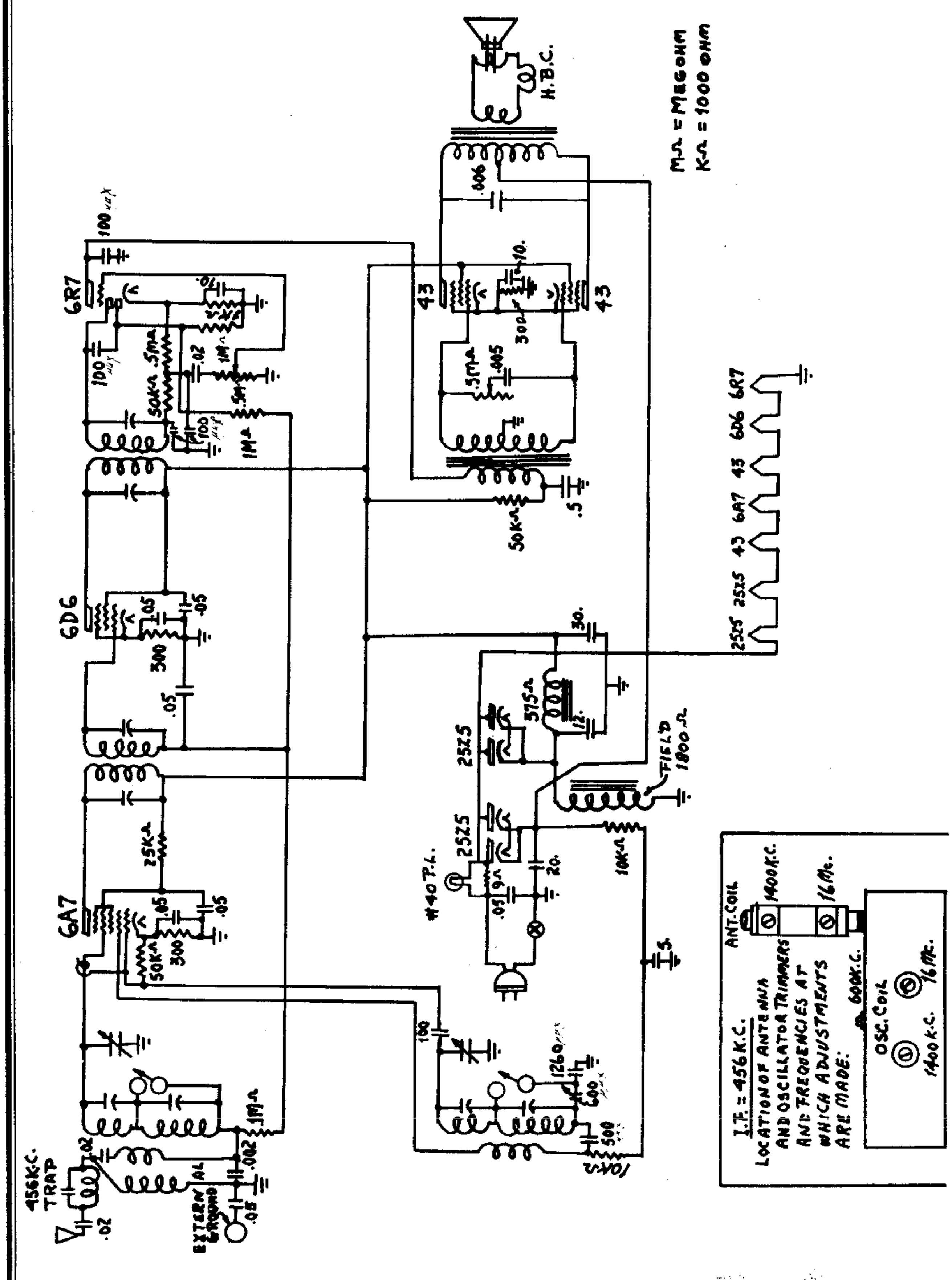
Readings should be taken with a 1,000 ohms-per-volt meter. Voltages listed below are from point indicated to chassis with volume control turned on full and no signal. Battery voltage for these readings was 6.1 volts.

VOLTAGE ANALYSIS

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*
6D8G osc.-mod.	150	60	4	120
6S7G 1st i-f	150	60	4	—
6S7G 2nd i-f	150	60	4	—
6Q7G 2nd detector	95	—	1.4	—
41 output	145	150	10.5	—

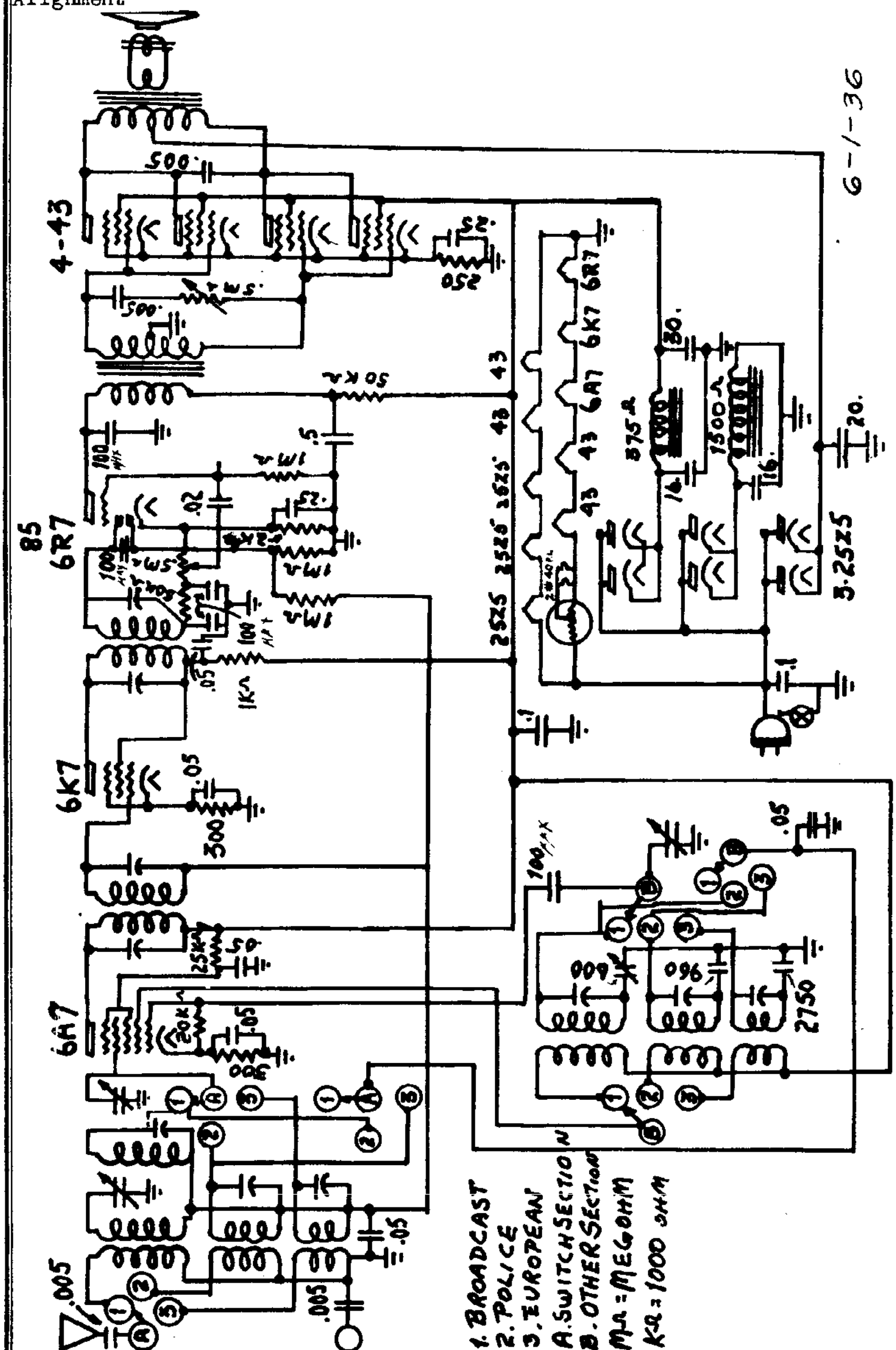
MODEL 675
Schematic, Trimmers
Alignment

ESPEY MFG. CO., INC.



MODEL 5111
Schematic
Alignment

ESPEY MFG. CO., INC.



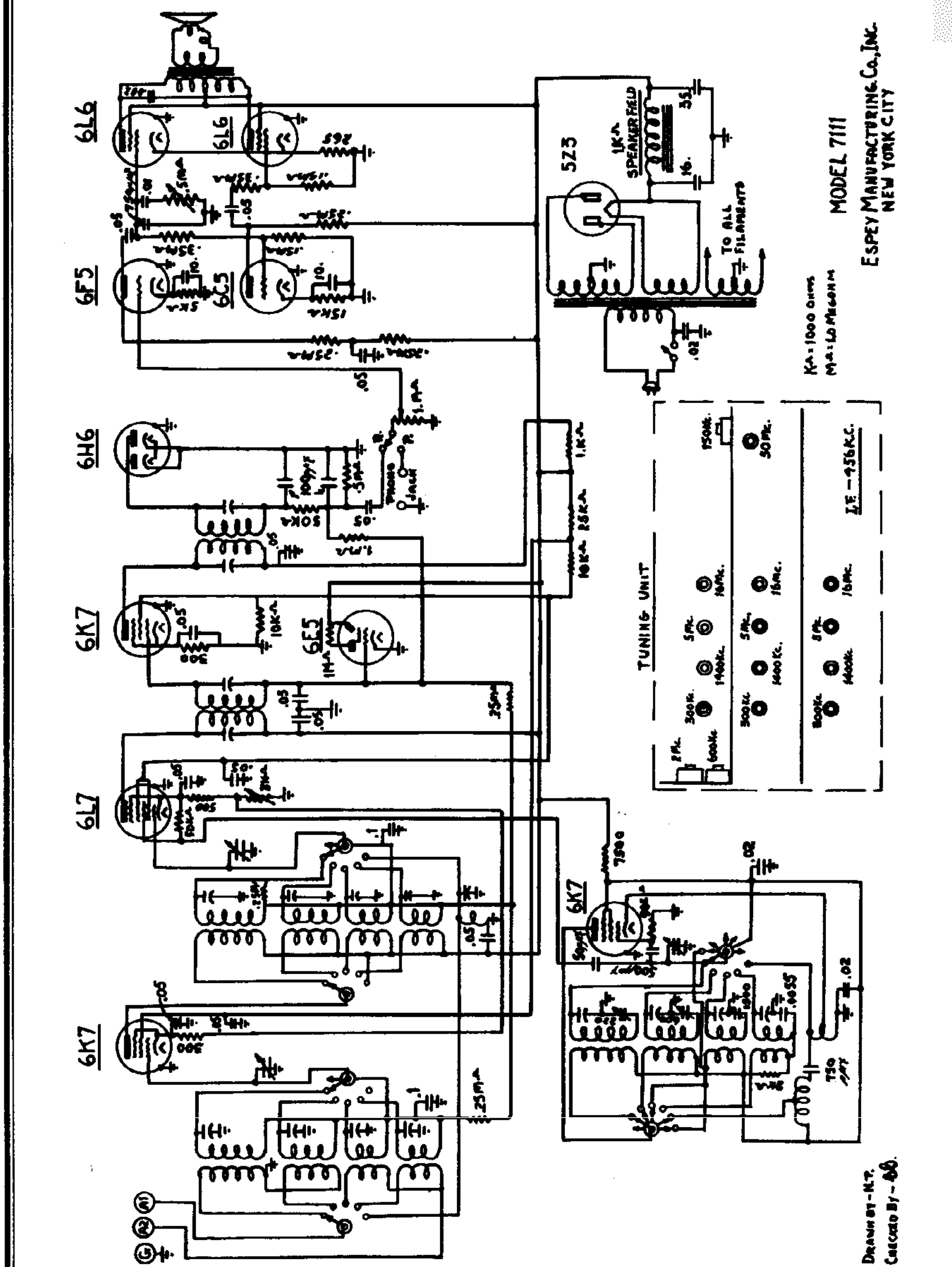
6-1-36

ALIGNMENT FREQS:-
I.F. = 456 K.C.

	PRESELECTOR	R.F.	OSCILLATOR	PADDER
BAND I	1400 K.C.	1400 K.C.	1400 K.C.	600 K.C.
" 2	NONE	4 Mc.	4 Mc.	FIXED
" 3	NONE	15 Mc.	15 Mc.	FIXED

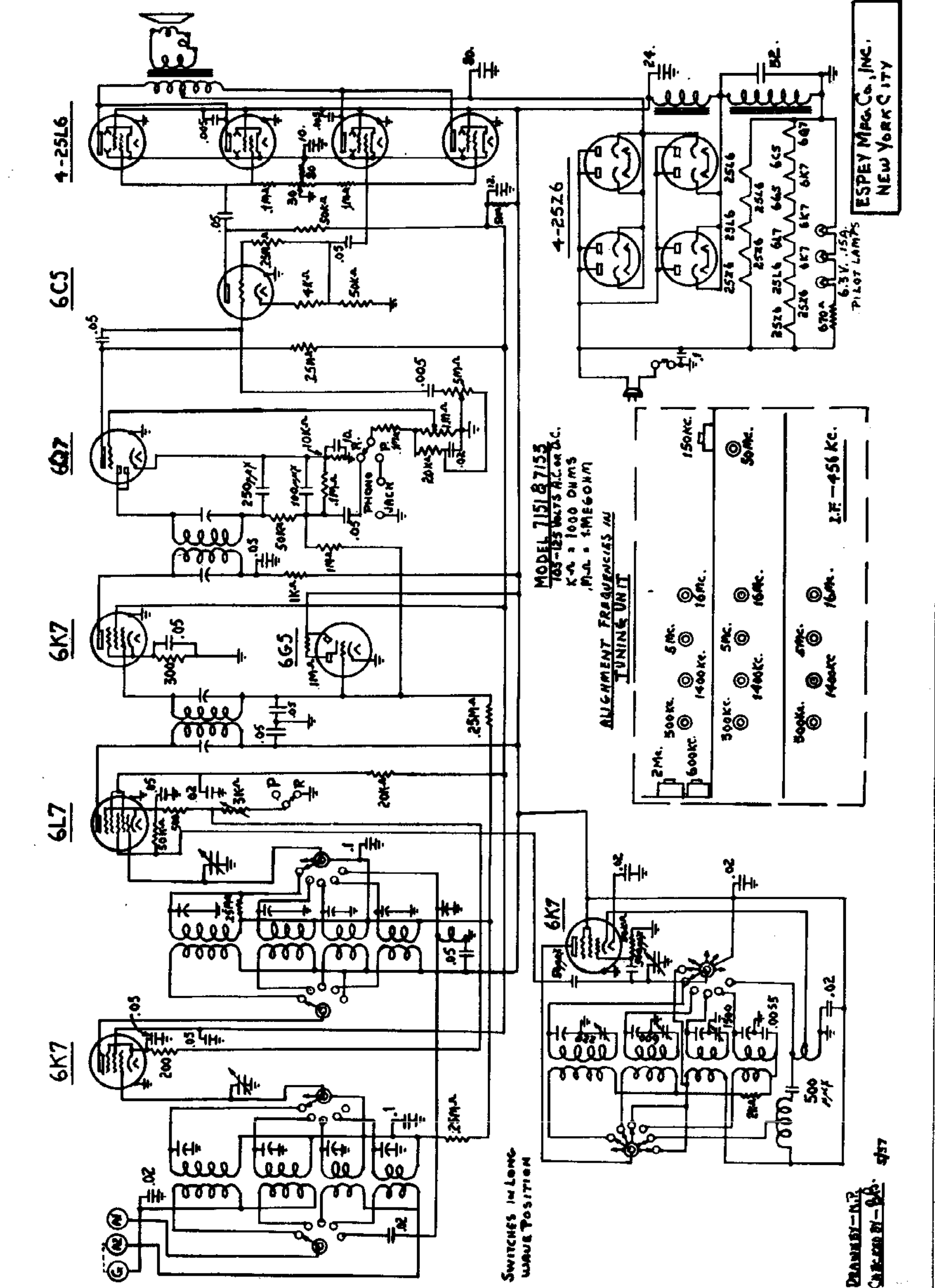
MODEL 7111
Schematic
Trimmers, Alignment

ESPEY MFG. CO., INC.



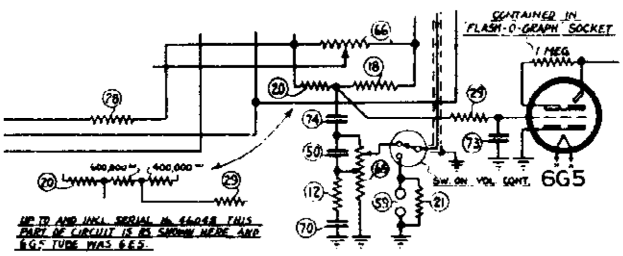
MODELS 7151,7153
Schematic,Trimmers
Alignment

ESPEY MFG. CO., INC.



FADA RADIO & ELECTRIC CO

MODEL 211(Late)
Alignment,Changes
Socket,Trimmers



FLASH-O-GRAPH CIRCUIT CHANGES

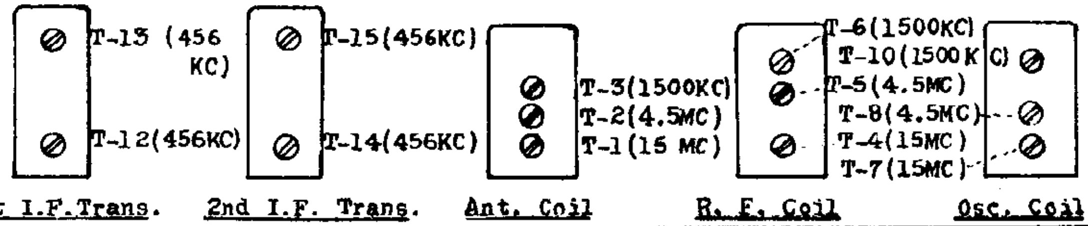
The Schematic of the EARLY model on page 7-3 is the same as the latest model with the exception,Ref.No.54 was.00093 Mf, changed to .0007 MF, MICA , the latter value shunted by Ref.No. 89, Padding Condenser of 110 to 250 MMF.

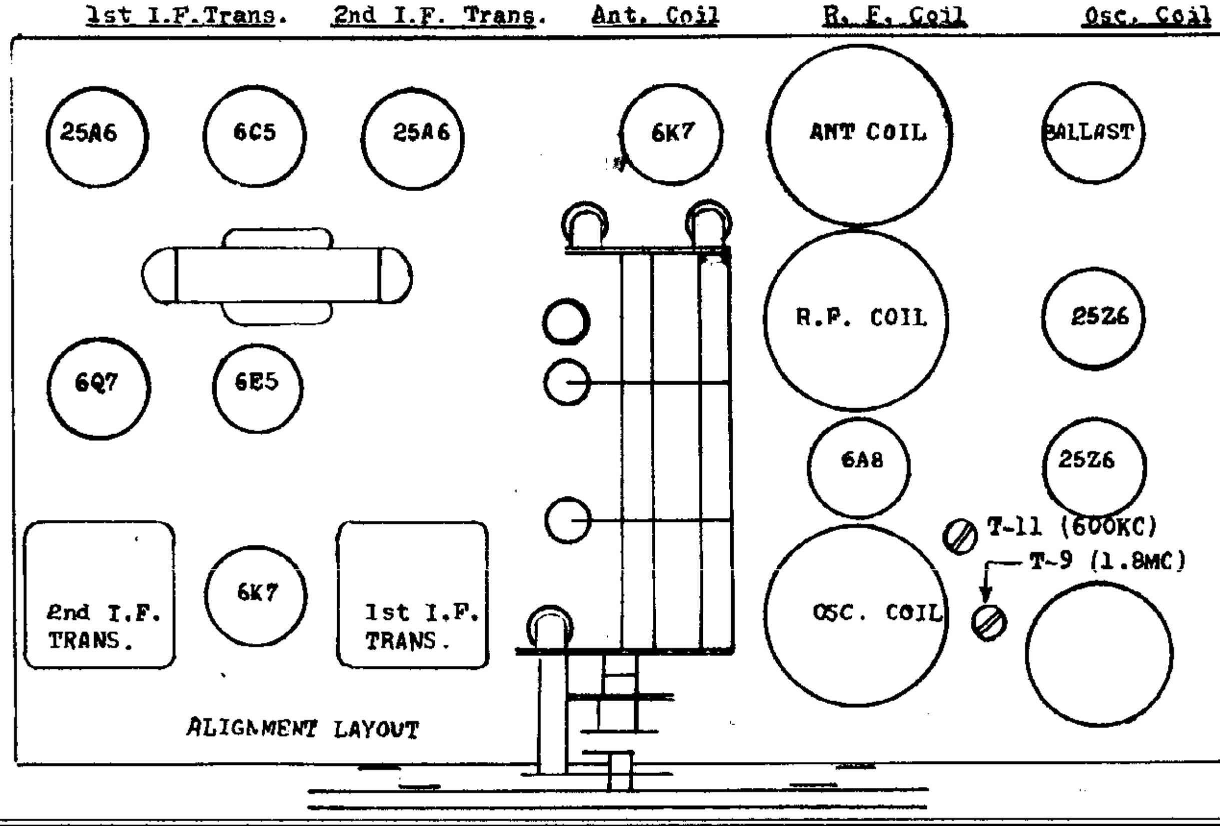
The changes in the Flash-o-graph circuit is given in the insert to the left.

ALIGNMENT TABLE

WAVE BAND	DIAL FRE.	GEN. FRE.	IMAGE FRE.	DUMMY ANTENNA	GENERATOR CON. TO	ADJUST TRIMMER
BC	---	456KC	- -	.001 MF 50 M	CG of IF	T15,T14
BC	- -	456KC	- -	Same	CG of 6A8	T13,T12
A	15 MC	15 MC	15.9MC	400	"Y" Ant.	T7,T4,T1
A	6 MC	6 MC	- -	Same	Same	Chk.Sen.
B	4.5MC	4.5MC	- -	Same	Same	T8,T5,T2
B	1.8MC	1.8MC	- -	Same	Same	T9(Rock V.C.
C	1500KC	1500KC	- -	200 MMF	Same	T10,T6,T3
C	600KC	600KC	- -	Same	Same	T11(Rock VC)

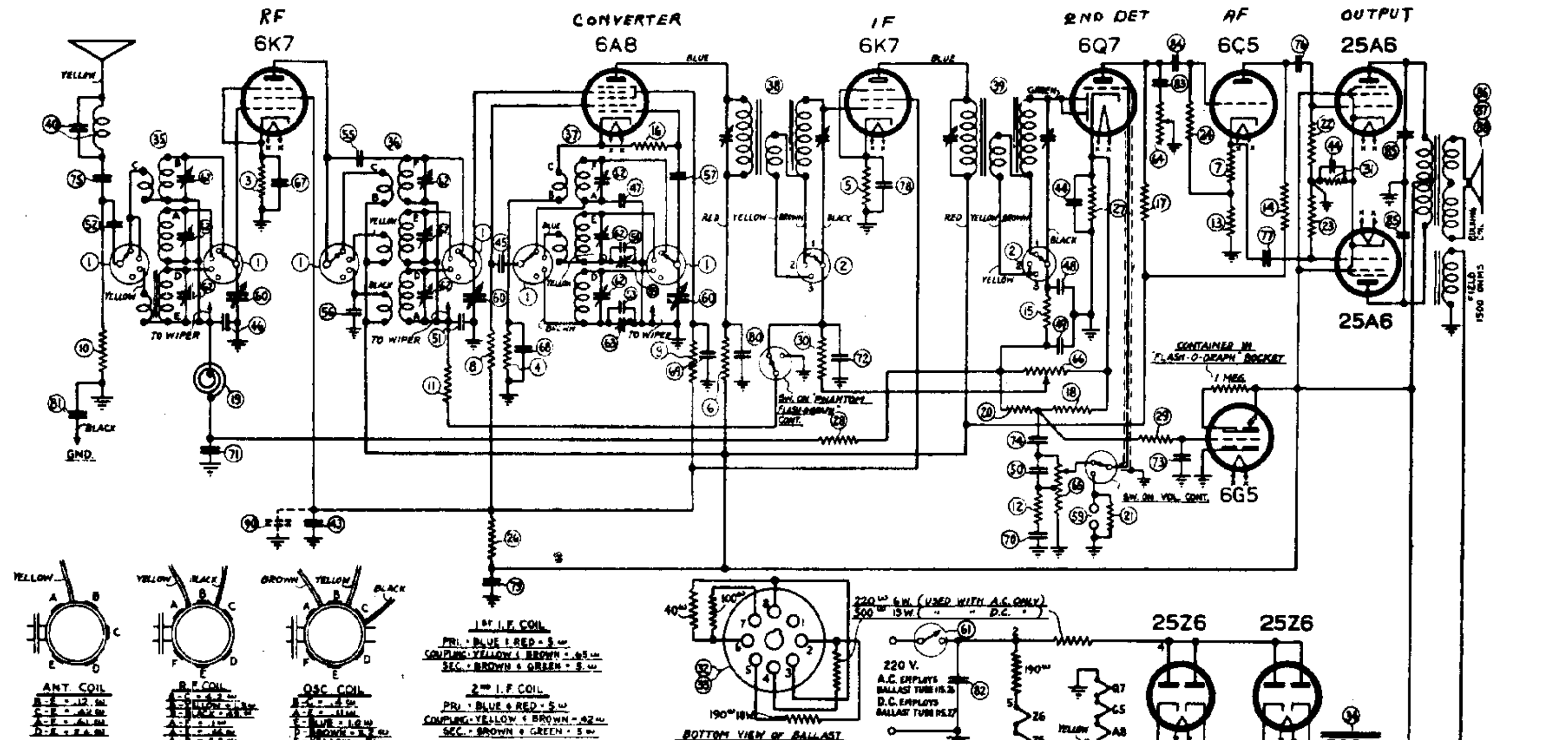
All adjustments made with selectivity control in the "S" Position





MODEL 211(220V)
Schematic,Parts

FADA RADIO & ELECTRIC CO.



REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION
1	45.34	BAND SWITCH	23	30.23	CARB. RES. - 500,000 OHMS 1/3 W ± 20%
2	45.32	SELECTIVITY SWITCH	24	30.23	" " 250,000
3	30.45	CARB. RES. - 250 OHMS 1/3 W ± 10%	25		
4	30.45	" " 250	26	30.12	" " 4,000
5	30.63	" " 300	27	30.42	" " 4,500
6	30.36	" " 1000	28	30.18	" " 2,000,000
7	30.15	" " 2000	29	30.24	" " 2,000,000
8	30.1	" " [illegible]	30	30.28	" " 2,000,000
9	30.2	" " [illegible]	31	30.43	" " 31.5 1 W
10	30.31	" " [illegible]	32	115.26	BALLAST RES. [illegible]
11	30.31	" " [illegible]	33	115.27	" " [illegible]
12	30.58	" " [illegible]	34	40.34	CHOKE COIL - 200 OHMS
13	30.59	" " [illegible]	35	35.13	ANTENNA
14	30.10	" " [illegible]	36	35.16	R.F.
15	30.26	" " [illegible]	37	35.17	OSCILLATOR
16	30.8	" " [illegible]	38	35.18	1ST I.F.
17	30.44	" " [illegible]	39	35.19	2ND I.F.
18	30.6	" " [illegible]	40	35.8	WAVE TRAP
19	32.16	CHOKE COIL - 2.3 MH	41	20.43	ELECTRO. COND. - 32 MF 100 WV
20	30.20	CARB. RES. - [illegible]	42	20.47	" " 16 100
21	30.23	" " [illegible]	43	[illegible]	" " 8 100
22	30.23	" " [illegible]	44	20.64	" DUAL 10-15 25

REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION
45	15.7	MICA COND. - .002 MF ± 10%	67	10.5	TUBULAR COND. .05 MF 200 V
46	15.5	" " .002 " 3	68	10.5	" " .05 " 200 "
47	15.62	" " .004 " 5	69	10.5	" " .05 " 200 "
48	15.3	" " .0001 " 10	70	10.5	" " .05 " 200 "
49	15.3	" " .0001 "	71	10.26	" " .02 " 200 "
50	15.3	" " .0001 "	72	10.26	" " .02 " 200 "
51	15.6	" " .0025 " 3	73	10.26	" " .02 " 200 "
52	15.2	" " .0005 " 10	74	10.4	" " .01 " 200 "
53	15.52	" " .00026 " 5	75	10.4	" " .01 " 200 "
54	15.68	" " .0007 " 5	76	10.2	" " .1 " 200 "
55	15.16	" " 3 MMF 10	77	10.2	" " .1 " 200 "
56	15.61	" " 35 " 3	78	10.2	" " .1 " 200 "
57	15.10	" " 50 10	79	10.2	" " .1 " 200 "
58	120.3	PILOT LT'S. - 6-8 V. .15 A.	80	10.2	" " .1 200
59	125.1	PHONO JACK	81	10.23	" " .006 " 200 "
60	[illegible]	VARIABLE COND.	82	10.9	" " .1 " 400 "
61		ON-OFF SW. ON TONE CONT.	83	10.10	" " .01 " 400 "
62		MIN. ADJ. SW. COILS	84	10.10	" " .01 " 400 "
63	25.43	PADDING COND. - 70 MMF	85	10.17	DUAL " .001 " 600 "
64	55.11	TONE CONTROL - 1/2 MEG.	96	105.44	SPEAKER - 1500 Ω (MODEL 211 T)
65	[illegible]	VOLUME CONT. TAPPED [illegible]	97	105.45	" " (" 211 C)
66	55.24	PHANTOM FLASH-O-GRAPH CONT.	98	105.46	" " (" 211 CK)
			99	25.64	PADDING COND. - 110-250 MMF.

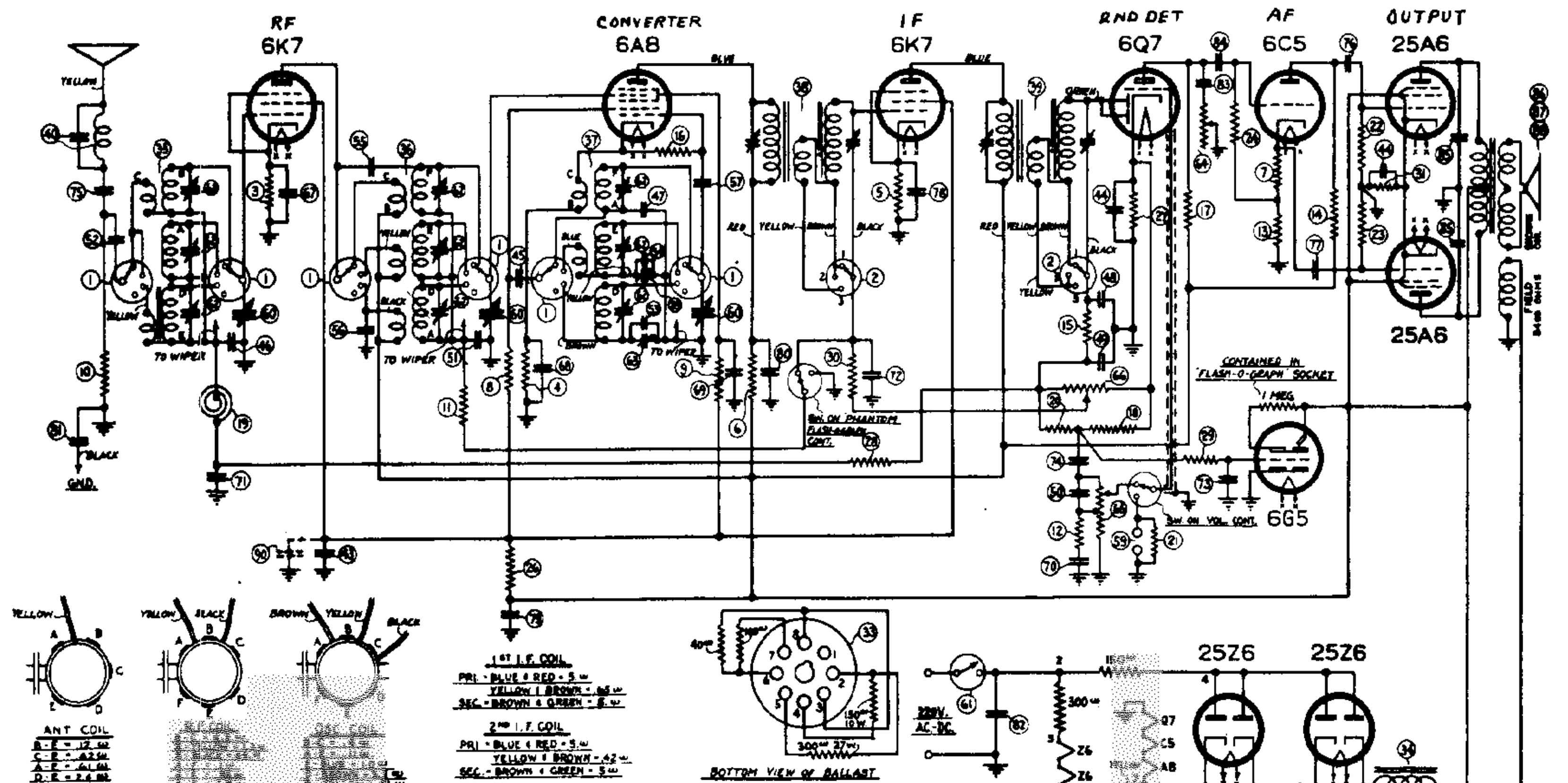
NOTE:
BAND SW. SHOWN IN B.W. POSITION
SELECTIVITY SW. - SHARP
I.F. TO BE ALIGNED POS. #1 (SHARP), POS. #2 (BROAD), POS. #3 (HI-FIDELITY)
⏚ = CHASSIS
(90)(91)(92) ELECTRO. COND. 8 MF 100 W.V. (FOR 25 CYCLE OPERATION ONLY) (PART No 20.23)

I.F. = 456 KC.

FADA RADIO & ELECTRIC CO
LONG ISLAND CITY, N.Y.
220V-MODEL 211
DRAWN BY: JD | DATE: 11-12-36
CHECKED BY: JB | APPROVED BY: PFS

MODEL 211B(220V)
Schematic,Parts

FADA RADIO & ELECTRIC CO.



ANT COIL
B-E = .12 Ω
C-E = .425 Ω
A-E = .61 Ω
D-E = 2.4 Ω

1ST I.F. COIL
PRI - BLUE & RED - 5 Ω
YELLOW & BROWN - .65 Ω
SEC. - BROWN & GREEN - 5 Ω

2ND I.F. COIL
PRI - BLUE & RED - 5 Ω
YELLOW & BROWN - .42 Ω
SEC. - BROWN & GREEN - 5 Ω

REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION
1	45.34	BAND SWITCH	23	30.73	CARB. RES. - 500,000 OHMS ½W ±20	45	15.7	MICA COND - .002 MF. ± 10%	67	10.5	TUBULAR COND .05 MF 200 V
2	45.32	SELECTIVITY SWITCH	24	30.23	" " 500,000 " " "	46	15.5	" " .002 " 5	68	10.5	" " .05 " 200
3	30.45	CARB. RES. - 250 OHMS ½W ±10	25			47	15.62	" " .004 " 5	69	10.5	" " .05 " 200 "
4	30.45	" " 250 " " " "	26	30.12	" " 4,000 " " "	48	15.3	" " .0001 " 10	70	10.5	" " .05 " 200 "
5	30.63	" " 300 " " "	27	30.65	" " 4,400 " "	49	15.3	" " .0001 " "	71	10.26	" " .02 " 200 "
6	30.35	" " 1000 " " " 20	28	30.28	" " 2,000,000 " "	50	15.3	" " .0001 "	72	10.26	" " .02 " 200 "
7	30.15	" " 2,000 " " " 10	29	30.28	" " 2,000,000 " " "	51	15.6	" " .0025 3	73	10.26	" " .02 " 200 "
8	30.1	" " 5000 " " " "	30	30.28	" " 2,000,000 " " "	52	15.2	" " .0005 " 10	74	10.4	" " .01 " 200 "
9	30.2	" " 10000 " " " "	31	30.43	" " 315 " 1W 10	53	15.52	" " .00026 5	75	10.4	" " .01 " 200 "
10	30.31	" " 10,000 " " " 20	32	10.30	TUBULAR COND. - 75 MF. 200 V.	54	15.63	" .00093 " 3	76	10.2	" " .1 " 200 "
11	30.31	" " 10,000 " " "	33	115.18	BALLAST RES. 40-180 [illegible]	55	15.16	" " 3 MMF 10	77	10.2	" " .1 " 200 "
12	30.58	" " 20,000 " " 10	34	40.3A	CHOKE COIL - 200 OHMS	56	15.6	" " 35 " 5	78	10.2	" " .1 " 200 "
13	30.59	" " 27,000 " "	35	35.15	ANTENNA "	57	15.10	" " 50 " 10	79	10.2	" " .1 " 200
14	30.10	" " 30,000 " " " "	36	35.16	R.F. "	58	120.3	PILOT LTS. - 6-8 V .15 A.	80	10.2	" " .1 " 200 "
15	[illegible]	[illegible]	37	[illegible]	OSCILLATOR "	59	[illegible]	PHONO JACK	81	10.23	" " .006 " 200 "
16	[illegible]	[illegible]	38	[illegible]	[illegible]	60	[illegible]	VARIABLE COND	82	10.9	" " .1 " 400 "
17	[illegible]	[illegible]	39	[illegible]	[illegible]	61	[illegible]	[illegible]	83	10.10	" " .01 " 400 "
18	[illegible]	[illegible]	40	[illegible]	WAVE TRAP	62	[illegible]	[illegible]	84	10.10	" " .01 " 400 "
19	[illegible]	CHOKE COIL [illegible]	41	[illegible]	[illegible]	63	[illegible]	PADDING COND [illegible]	85	10.17	" DUAL " .001 600
20	[illegible]	CARB. RES. [illegible]	42	[illegible]	[illegible]	64	[illegible]	[illegible]	86	105.55	SPEAKER - 3400 Ω (MODEL 211 T)
21	[illegible]	[illegible]	43	[illegible]	[illegible]	65	[illegible]	[illegible]	87	105.56	" " (" 21-C)
22	[illegible]	[illegible]	44	[illegible]	DUAL [illegible]	66	[illegible]	[illegible]	88	105.57	" " (" 21-CK)
									89	25.64	PADDING COND. - 110 - 250 MMF.

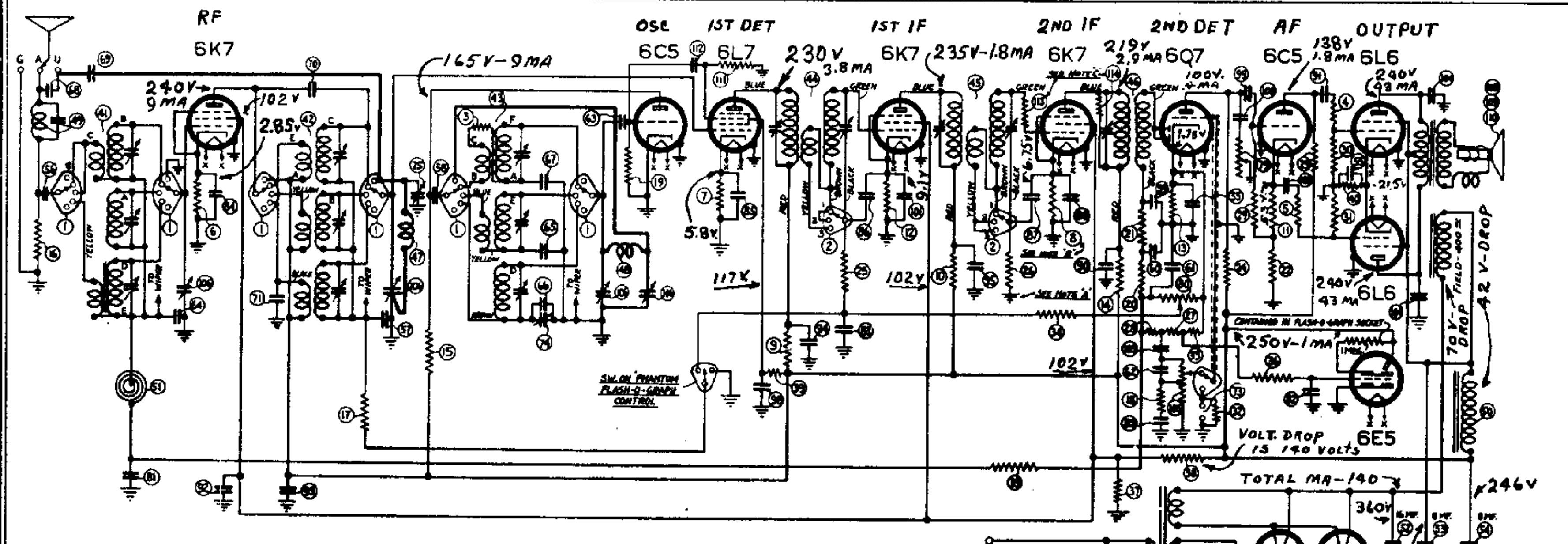
NOTE:
BAND SW. SHOWN IN S.W. POSITION.
SELECTIVITY SW. - SHARP
I.F. TO BE ALIGNED
POS. #1 (SHARP) POS. #2 (BROAD) POS. #3 (HI-FIDELITY)
⏚ = CHASSIS
90 91 92 ELECTRO. COND. - 8 MF. 175 W.V. (FOR 25 CYCLE OPERATION ONLY) (PART No. 20.52)

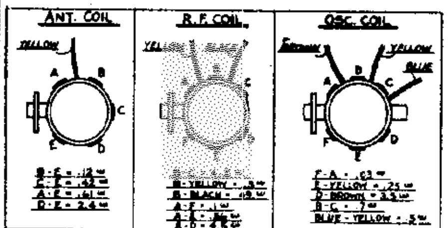
I. F. = 456 KC.

FADA RADIO & ELECTRIC CO
LONG ISLAND CITY, N.Y.
220 V. MODEL 211 B
DRAWN BY JD — DATE 10-15-36
CHECKED BY JB — APPROVED BY PFS

MODEL 212
Schematic
Voltage, Parts

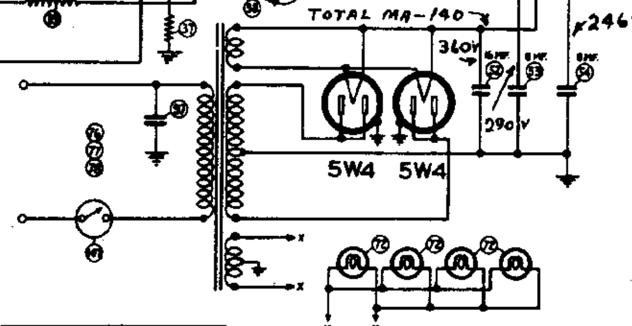
FADA RADIO & ELECTRIC CO





I.F. COILS	PRI.	COUPLING	SEC.
1ST	BLUE & RED - .8 ω	YELLOW & BROWN - .09 ω	BROWN & GREEN - .8 ω
2ND	" " - .8 ω	" " - .10 ω	" " - .8 ω
3RD	" " - .8 ω	———	" " - .8 ω

NOTE:
BAND SW. SHOWN IN BAND "A" POSITION.
I.F. SELECTIVE SW. - SHARP
I.F. TO BE ALIGNED " " "
POS. #1 (SHARP). POS. #2 (BROAD) POS. #3 (HI-FIDELITY).
⏚ = CHASSIS.



FOR ALIGNMENT, SEE INDEX

I.F. - 456 KC.

REF No.	PART No.	DESCRIPTION
1	45.36	BAND SW.
2	45.324	SELECTIVITY SW.
3	30.78	CARB. RES. - 25 OHMS 1/3 W. ± 10%
4	30.70	" " 130 " " " " 20
5	30.70	" " 130 " " " " "
6	30.45	" " 250 " " " " 10
7	30.71	" " 450 " " " " "
8	30.88	" " 800 " " " " "
9	30.64	" " 2,000 " " " " 20
10	30.64	" " 2,000 " " " " "
11	30.57	" " 3,000 " " " " 10
12	30.1	" " 5,000 " " " " "
13	30.1	" " 5,000 " " " " "
14	30.36	" " 5,000 " " " " 20
15	30.2	" " 10,000 " " " " 10
16	30.31	" " 10,000 " " " " 20
17	30.31	" " 10,000 " " " " "
18	30.58	" " 20,000 " " " " 10
19	30.11	" " 25,000 " " " " "
20	30.32	" " 25,000 " " " " 20
21	30.32	" " 25,000 " " " " "
22	30.59	" " 27,000 " " " " 10
23	30.10	" " 30,000 " " " " "
24	30.53	" " 200,000 " " " " 20

REF No.	PART No.	DESCRIPTION
25	30.20	CARB. RES. - 250,000 OHMS 1/3 W. ± 20%
26	30.20	" " 250,000 " " " " "
27	30.62	" " 400,000 " " " " 10
28	30.5	" " 500,000 " " " " "
29	30.23	" " 500,000 " " " " 20
30	30.23	" " 500,000 " " " " "
31	30.23	" " 500,000 " " " " "
32	30.23	" " 500,000 " " " " "
33	30.67	" " 600,000 " " " " 10
34	30.28	" " 2,000,000 " " " " 20
35	30.28	" " 2,000,000 " " " " "
36	30.28	" " 2,000,000 " " " " "
37	30.14	" " 50,000 " 1/2 " " 10
38	30.33	" " 25,000 " 1 " " "
39	30.73	" " 12,500 " 2 " " "
40	30.72	" " 210 " 2 " " "
41	35.15	COIL - ANT.
42	35.16	" R.F.
43	35.31	" OSC
44	35.25	" 1ST I.F.
45	35.26	" 2ND I.F.
46	35.27	" 3RD I.F.
47	35.28	" U.H.F. ANT
48	35.29	" " OSC.

REF No.	PART No.	DESCRIPTION
49	35.6	COIL - WA[illegible]
50	40.53	" CH[illegible]
51	32.16	" R.F. [illegible]
52	20.50	ELECTRO. C[illegible]
53	20.4	" [illegible]
54	20.4	" [illegible]
55	20.44	" DUAL [illegible]
56	15.2	MICA COND. [illegible]
57	15.6	" " [illegible]
58	15.7	" " [illegible]
59	15.3	" " [illegible]
60	15.3	" " [illegible]
61	15.3	" " [illegible]
62	15.1	" " [illegible]
63	15.10	" " [illegible]
64	15.5	" " [illegible]
65	15.69	" " [illegible]
66	15.66	" " [illegible]
67	15.32	" [illegible]
68	15.9	" " 10 [illegible]
69	15.9	" " 10 [illegible]
70	15.16	" " 3 [illegible]
71	15.61	" " 35 [illegible]
72	120.3	PILOT LTS - 6-8 V. [illegible]

REF No.	PART No.	DESCRIPTION
[illegible]	125.1	PHONO. JACK
[illegible]	25.40	PADDING COND. - 140 MMF.
[illegible]	25.49	" " 70 "
[illegible]	40.49	POWER TRANS - 115 V. 50-60 ~
[illegible]	40.50	" " - 115 V. 25 ~
[illegible]	40.51	" " TAP. 110, 130, 150, 220, 250 V.
[illegible]	55.13	TONE CONTROL - 1/2 MEG
[illegible]	50.24	FLASH O GRAPH CONTROL - 1 MEG.
[illegible]	10.26	TUBULAR COND. - .02 MF. 200 V.
[illegible]	10.26	" " .02 " 200 "
[illegible]	10.26	" " .02 " 200 "
[illegible]	10.5	" " .05 " 200 "
[illegible]	10.5	" " .05 " 200 "
[illegible]	10.5	" " .05 " 200 "
[illegible]	10.5	" " .05 " 200 "
[illegible]	10.5	" " .05 " 200 "
[illegible]	10.5	" " .05 " 200 "
[illegible]	10.9	" " .1 " 400 "
[illegible]	10.9	" " .1 " 400 "
[illegible]	10.9	" " .1 " 400 "
[illegible]	10.9	" " .1 " 400 "
[illegible]	10.7	" " .05 " 400 "
[illegible]	10.7	" " .05 " 400 "
[illegible]		

REF No.	PART No.	DESCRIPTION
97	10.7	TUBULAR COND. - .05 MF. 400 V.
98	10.10	" " .01 " 400 "
99	10.10	" " .01 " 400 "
100	[illegible]	[illegible] .01 " 400 "
101	[illegible]	[illegible] .1 " 200 "
102	[illegible]	[illegible] .1 " 200 "
103	[illegible]	[illegible] .01 " 200 "
104	[illegible]	[illegible] .001 " 600 "
105	[illegible]	[illegible] -1 MEG. [illegible]
106	[illegible]	[illegible]
107	[illegible]	[illegible] LINE)
108	[illegible]	[illegible] (MODEL 212T)
109	[illegible]	[illegible] (" 212C)
110	[illegible]	[illegible] (" 212CK)
111	[illegible]	[illegible] 00 OHMS 1/2 W. ± 10%
112	15.10	MICA COND. - 50 MMF. ± 10%
113	30.20	CARB. RES. - 250,000 OHMS 1/3 W. ± 20%
114	30.20	" " 250,000 " " " "
115		
116		
117		
118		
119		
120		

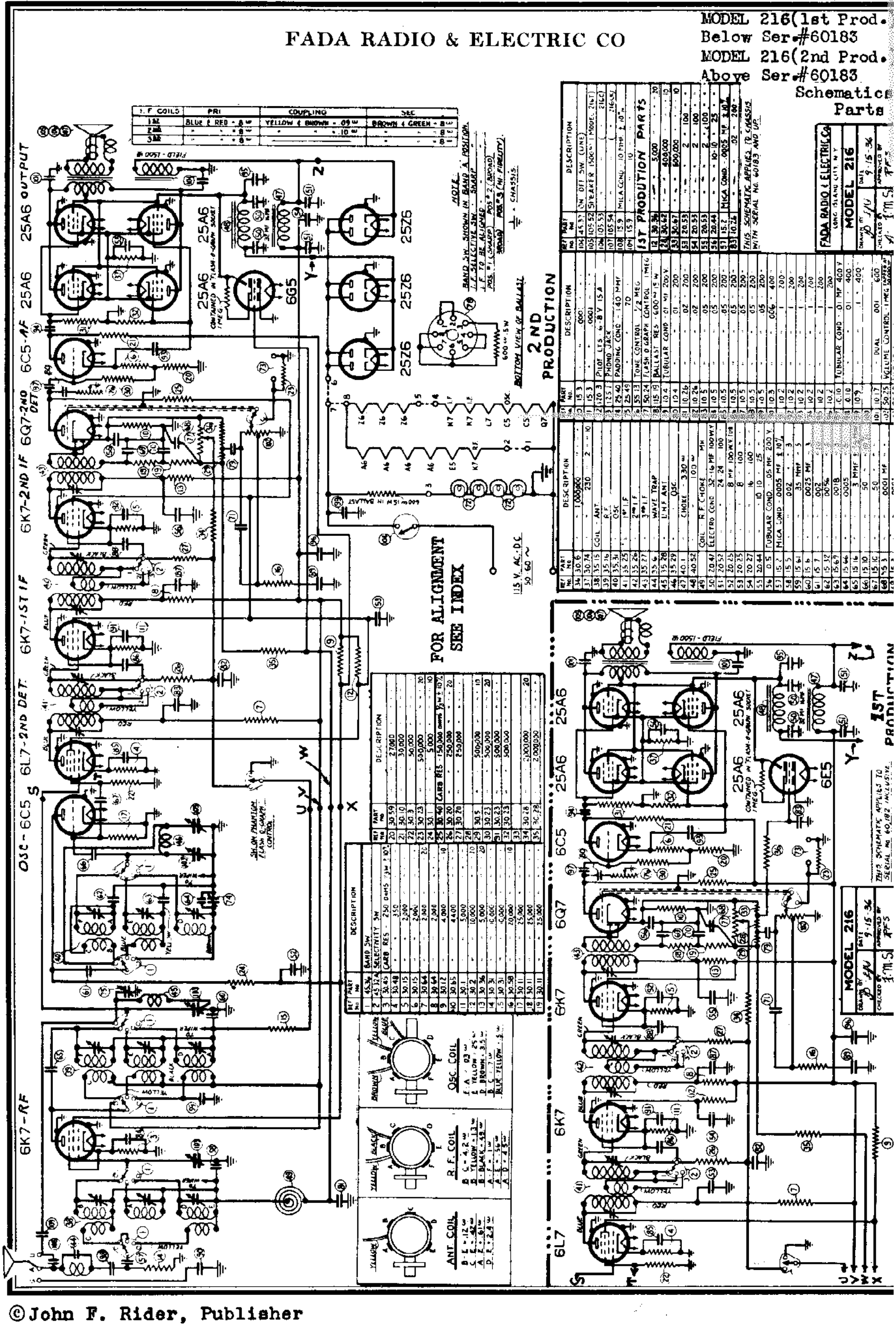
NOTE A. - A.V.C. TAKEN OFF 2ND I.F. ON LATER MODELS.
NOTE B. - REF. No. 8 WAS 2000 Ω ON SOME EARLY MODELS
NOTE C. - REF. No. 113 & 114 ADDED ON LATER MODELS

FIELD COIL	OUTPUT TRANS P — S
400 ω	800 ω .25 ω
400 ω	500 ω .8 ω
400 ω	400 ω 1.2

FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.
MODEL 212
DRAWN BY: [illegible] DATE: 9-15-36
CHECKED BY: JMS. APPROVED BY: PFS.

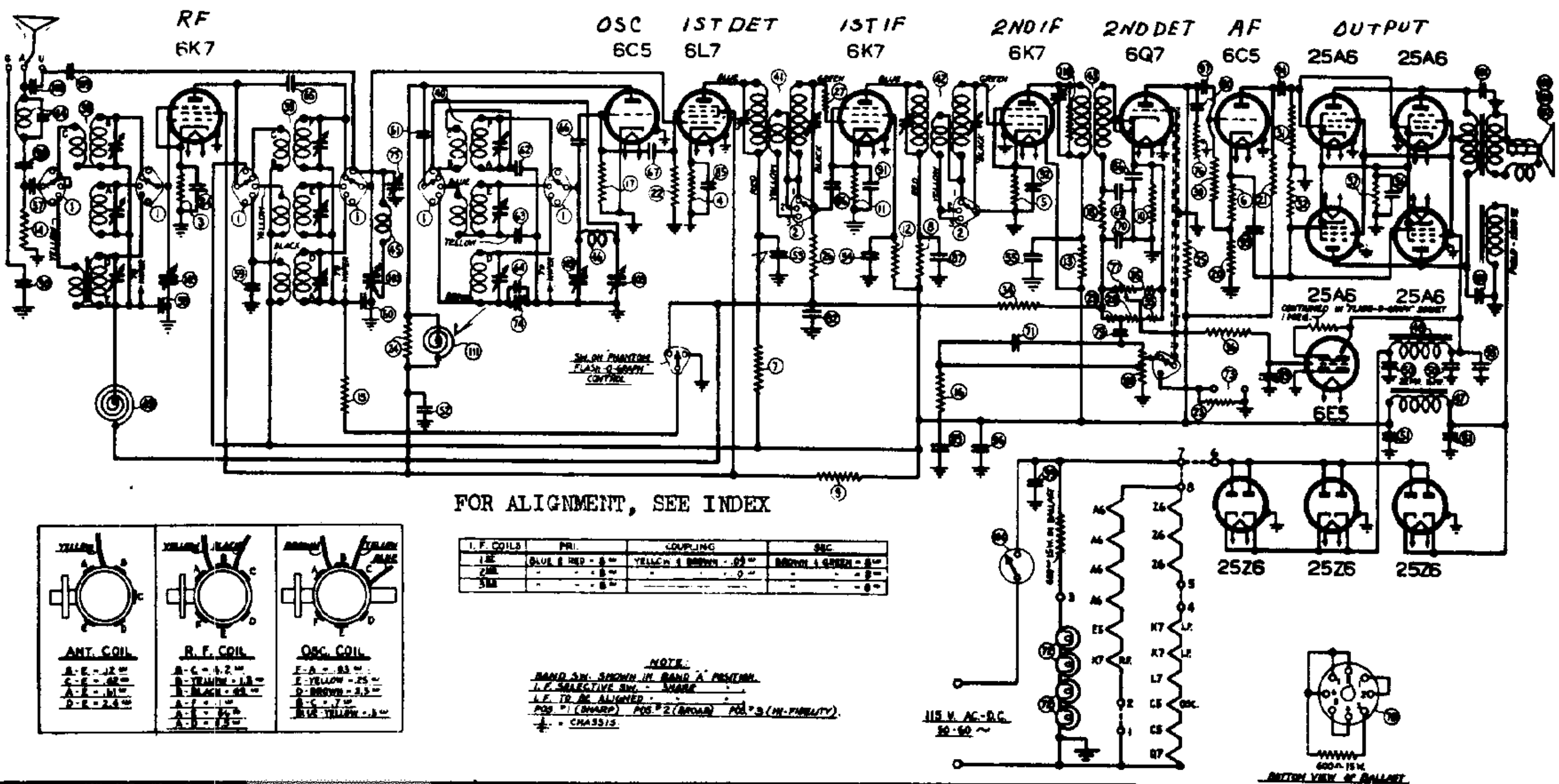
FADA RADIO & ELECTRIC CO

MODEL 216(1st Prod.
Below Ser.#60183
MODEL 216(2nd Prod.
Above Ser.#60183
Schematic
Parts



MODEL 216(3rd Prod.)
Schematic,Parts

FADA RADIO & ELECTRIC CO.



FOR ALIGNMENT, SEE INDEX

I.F. COILS	PRI.	COUPLING	SEC.
1ST	BLUE & RED - 8 Ω	YELLOW & BROWN - .03 Ω	BROWN & GREEN - 8 Ω
2ND	" " - 8 Ω	" " - .0 Ω	" " - 8 Ω
3RD	" " - 8 Ω		" " - 8 Ω

NOTE:
BAND SW. SHOWN IN BAND 'A' POSITION.
I.F. SELECTIVE SW. - SHARP
I.F. TO BE ALIGNED
POS. #1 (SHARP) POS. #2 (BROAD) POS. #3 (HI-FIDELITY).
⏚ - CHASSIS.

REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION
1	[illegible]	BAND SW.	25	[illegible]	CARB. RES. - [illegible] 10%	49	3216	COIL - R.F. CHOKE - 2.5 MH	73	125.1	PHONE [illegible]	97	10.10	TUBULAR COND. - .01 MF 400 V
2	[illegible]	SELECTIVITY SW.	26	[illegible]	[illegible] 20	50	20.47	ELECTRO. COND. - 32-16 MF 100 W.V.	74	25.40	PADDING [illegible]	98	10.10	" " .01 - 400 "
3	30.45	CARB. RES. - 250 OHMS 1/3W ±10%	27	[illegible]	[illegible]	51	20.52	" " 24-24 - 100 "	75	25.49	[illegible]	99	10.9	" " .1 - 400 "
4	30.48	" " 350 "	28	[illegible]	[illegible] 10	52	20.25	" " 8 MF 100 W.V. TUB.	76	[illegible]	TONE [illegible]	100		
5	30.40	" " 550 "	29	[illegible]	[illegible]	53	20.53	" " 2 - 100 "	77	[illegible]	FLASH-O-GRAPH [illegible]	10·	10.17	" DUAL " .001 - 600 "
6	30.15	" " 2,000 "	30	[illegible]	[illegible] 20	54	20.53	" " 2 - 100 "	78	[illegible]	BALLAST [illegible]	102	50.25	VOLUME CONTROL - 1 MEG. [illegible]
7	30.64	" " 2,000 " 20	31	[illegible]	[illegible]	55	20.53	" " 2 - 100 "	79	[illegible]	[illegible]	103	25.63	VARIABLE COND.
8	30.64	" " 2,000 "	32	[illegible]	[illegible]	56	20.44	" " 10-10 - 25 "	80	[illegible]	[illegible]	104	45.57	ON-OFF SW. (LINE)
9	30.12	" " 4,000 " 10	33	30.67	" " 600,000 " 10	57	15.2	MICA COND. - .0005 MF ±10%	91			105	105.52	SPEAKER - 1500 Ω (MODEL 216T)
10	30.65	" " 4,400 "	34	30.28	" " 2,000,000 " 20	58	15.5	" " .002 " 3	82	10.26	" " .02 - 200 "	106	105.53	" " (" 216C)
11	30.42	" " 800 "	35	30.63	" " 400,000 " 10	59	15.61	" " 35 MMF - 5	83	10.26	" " .02 - 200 "	107	105.54	" " (" 216CX)
12	30.36	" " 5,000 " 10	36	30.28	" " 2,000,000 " 20	60	15.6	" " .0075 MF 3	84	10.5	" " .05 - 200 "	108	15.9	MICA COND. - 10 MMF. ±10%
13	30.16	" " 8,000 " 10	37	30.74	" " 250 - 2 - 10	61	15.7	" " .002 " 10	85	10.5	" " .05 - 200 "	109	15.9	" " 10 " "
14	30.31	" " 10,000 " 20	38	35.15	COIL - ANT.	62	15.32	" " .0056 " 5	86	10.5	" " .05 - 200 "	110	30.20	CARB. RES. - 250,000 OHMS - 1/3W ±20
15	30.31	" " 10,000 "	39	35.16	" R.F.	63	15.69	" " .0018 " 3	87	10.5	" " .05 - 200 "	111	3216	COIL - R.F. CHOKE - 2.5 MH
16	30.58	" " 20,000 " 10	40	35.31	" OSC.	64	15.66	" " .0005 " 5	88			112		
17	30.11	" " 25,000 "	41	35.25	" 1ST I.F.	65	15.16	" " 3 MMF ± 1/2 MMF	89	10.5	" " .05 - 200 "	113		
18		50,000 OHMS CONTAINED IN 3RD I.F. CAN ASSY.	42	35.26	" 2ND I.F.	66	15.10	" " 50 " 10%	90	10.3	" " .006 - 400 "	114		
19			43	35.59	" 3RD I.F.	67	15.10	" " 50 " "	91	10.2	" " .1 - 200 "	115		
20	30.59	CARB. RES. 27,000 OHMS 1/3W ± [illegible]	44	35.6	" WAVE TRAP	68			92	10.2	" " .1 - 200 "	116		
21	30.10	" " 30,000 "	45	35.28	" U.H.F. ANT.	69		CONTAINED IN 2ND I.F. CAN ASSY.	93	10.2	" " .1 - 200 "	117		
22	30.3	" " 50,000 "	46	35.29	" " OSC.	70		" " " " "	94	10.2	" " .1 - 200 "	118		
23	30.23	" " 500,000 " 20	47	40.1	" CHOKE 350 Ω	71	15.3	MICA COND. - .0001 MMF ±10%	95	10.2	" " .1 - 200 "	119		
24	30.1	" " 5,000 " 10	48	40.53	" " 100 Ω	72	120.3	PILOT LTS. - 6-8 V .15 A	96	10.2	" " .1 - 200 "	120		

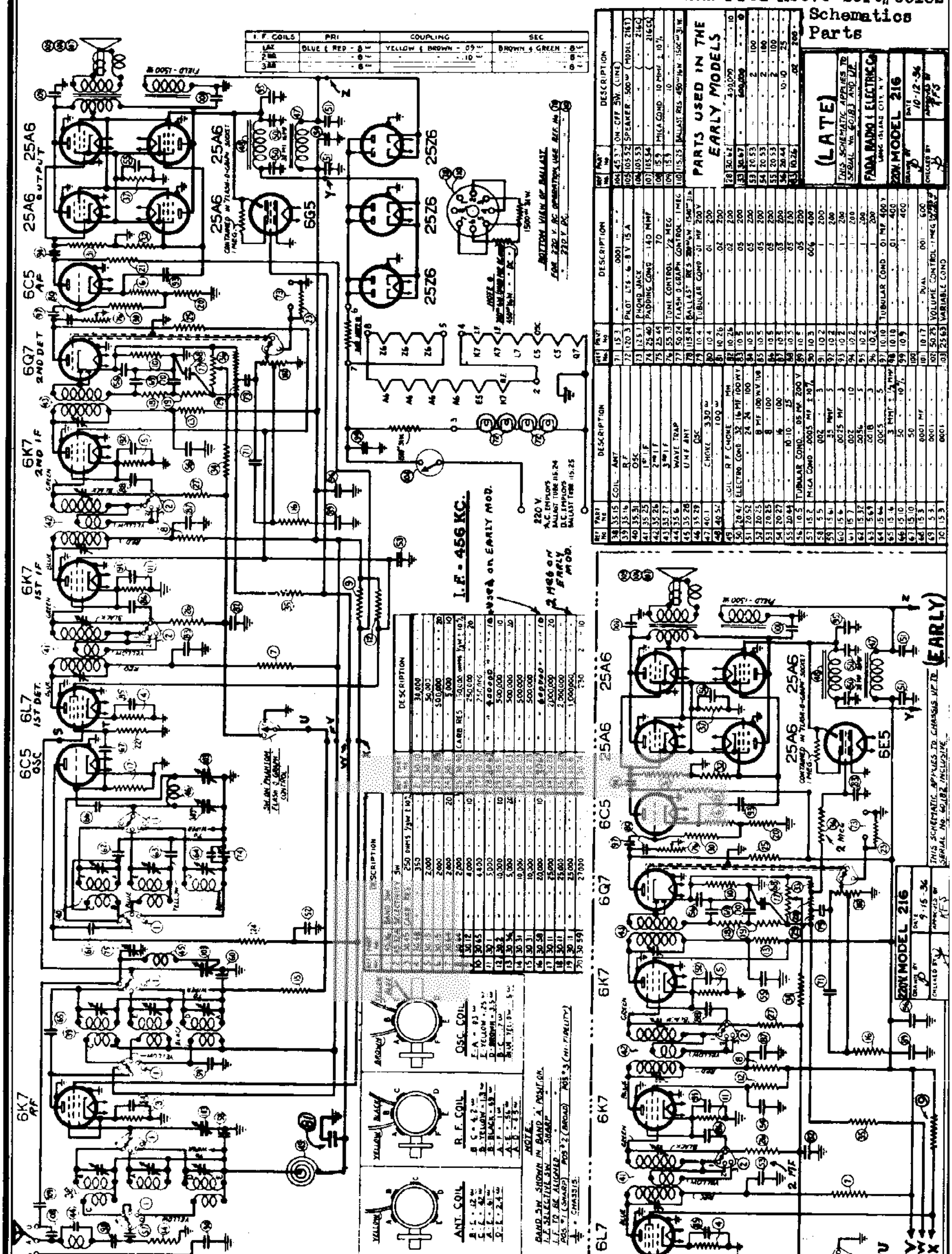
SEE OTHER SIDE FOR EARLY MODELS

I.F. - 456 KC.
3RD PRODUCTION

FADA RADIO & ELECTRIC Co.
LONG ISLAND CITY, N.Y.
MODEL 216
DATE 2-9-37

FADA RADIO & ELECTRIC CO.

MODEL 216(220V.)
1st Prod.Below Ser.#60182
MODEL 216(220V.)
2nd Prod.Above Ser.#60182
Schematics
Parts



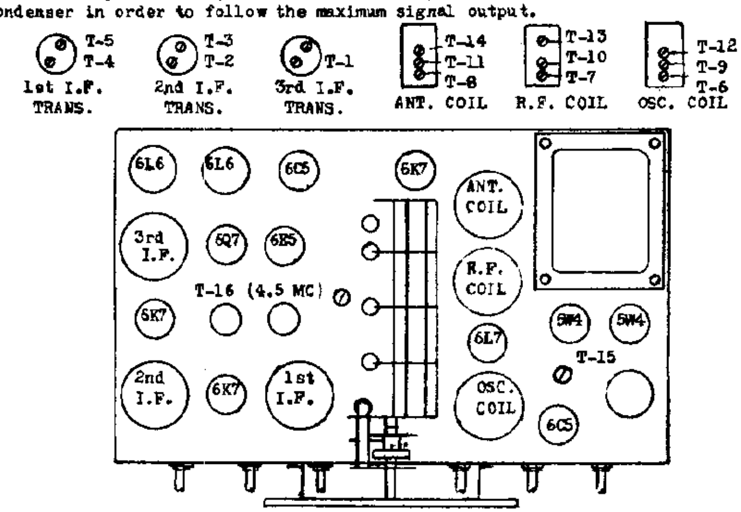
MODEL 212
MODEL 216,All Prod.
MODEL 216(220V)
Alignment,Socket
Trimmers

FADA RADIO & ELECTRIC CO

MODEL 212 ALIGNMENT TABLE

WAVE BAND	DIAL FREQUENCY	GENERATOR FREQUENCY	IMAGE FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER
C	1000 KC	456 KC	---	.001 mfd. 50,000 ohms	1st I.F. tube control grid	T-1, T-2, T-3
C	1000 KC	456 KC	---	.001 mfd. 50,000 ohms	6L7 tube control grid	T-4, T-5
A	15 MC	15 MC	15.9 MC	400 ohm resistor	"A" antenna post	T-6, T-7, T-8
A	6 MC	6 MC	---	400 ohm resistor	"A" antenna post	Check Sensitivity
B	4.5 MC	4.5 MC	3.6 MC	400 ohm resistor	"A" antenna post	T-9, T-10 T-11
B	1.8 MC	1.8 MC	---	400 ohm resistor	"A" antenna post	Check Sensitivity
C	1500 KC	1500 KC	---	200 mmfd. condenser	"A" antenna post	T-12T-13 T-14
C	600 KC	600 KC	---	200 mmfd. condenser	"A" antenna post	T-15*
U	45 MC	45 MC	45.9 MC	400 ohm resistor	"U" antenna post	T-16
U	20 MC	20 MC	---	400 ohm resistor	"U" antenna post	Check Sensitivity

* To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

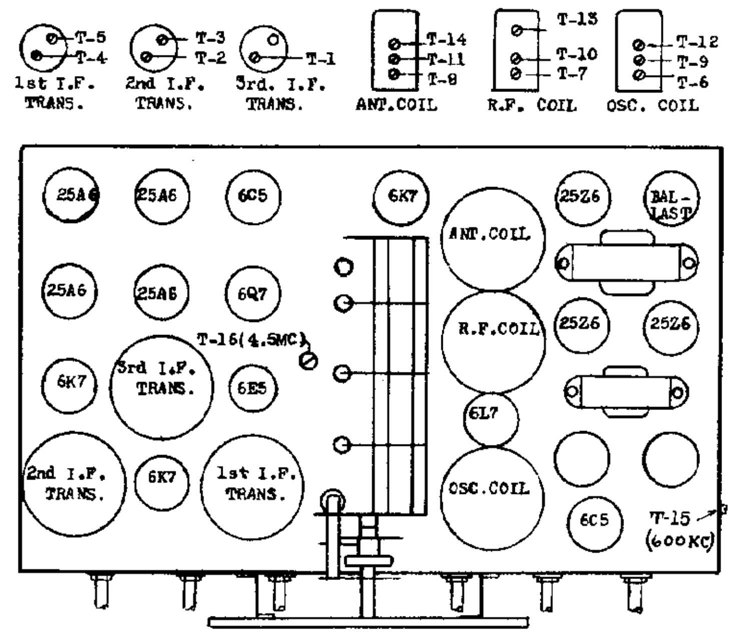


ALIGNMENT LAYOUT

MODELS 216 and 216 (220 Volt) ALIGNMENT TABLE

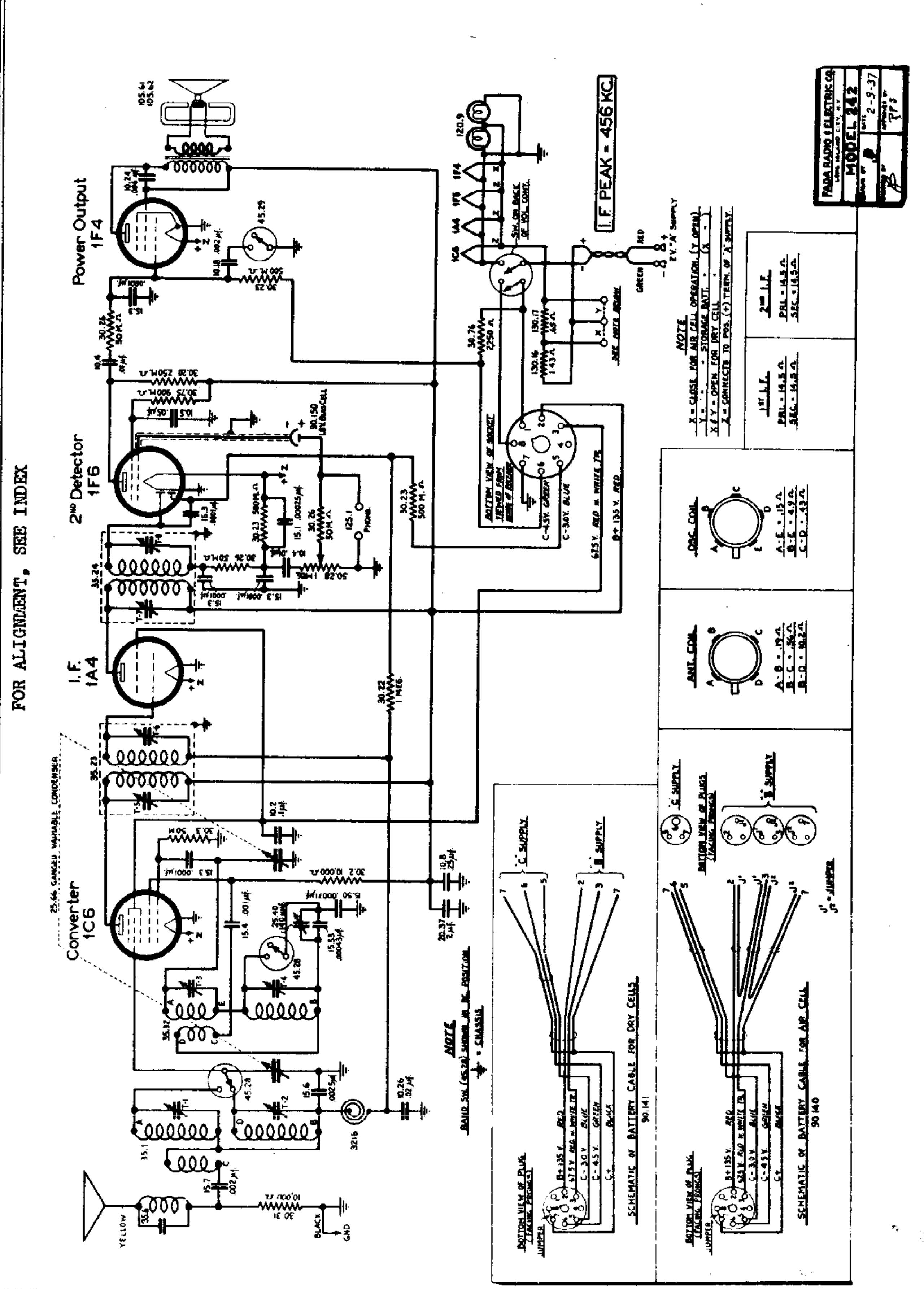
Wave Band	Dial Frequency	Generator Frequency	Image Frequency	Dummy Antenna	Generator connected to	Adjust Trimmer No.
C	1000 KC	456 KC	- - -	.001 MF & 50M	1st IF Tube control grid	T1, T2, T3
C	1000 KC	456 KC	- - -	.001 MF & 50M	6L7 Tube control grid	T4 and T5
A	15 MC	15 MC	15.9 MC	400 Ohm Res.	"A" Antenna Post	T6,T7,T8
A	6 MC	6 MC	- - -	400 Ohm Res.	"A" Antenna Post	Check Sensitivity
B	4.5 MC	4.5 MC	3.6 MC	400 Ohm Res.	"A" Antenna Post	T9, T10, T11
B	1.8 MC	1.8 MC	- - -	400 Ohm Res.	"A" Antenna Post	Check Sensitivity
C	1500 KC	1500 KC	- - -	200 MMF Cond.	"A" Ant. Post	T12,T13,T14
C	600 KC	600 KC	- - -	200 MMF Cond.	"A" Ant. Post	T15 (Rock)
U	45 MC	45 MC	45.9 MC	400 Ohm Res.	"U" Ant. Post	T16
U	20 MC	20 MC	- - -	400 Ohm Res.	"U" Ant. Post	Check

* To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.



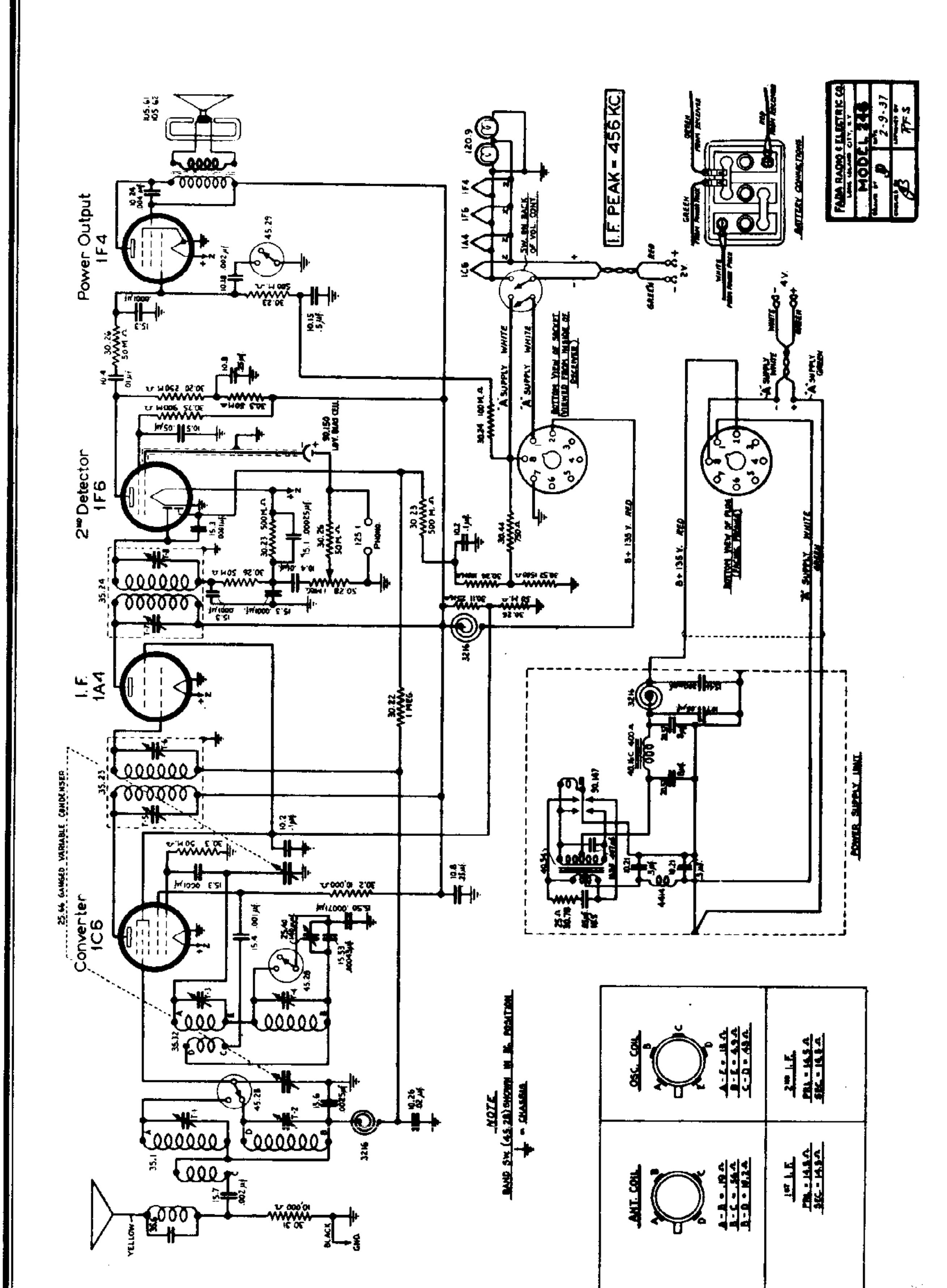
ALIGNMENT LAYOUT

FADA RADIO & ELECTRIC CO



MODEL 246
Schematic

FADA RADIO & ELECTRIC CO.



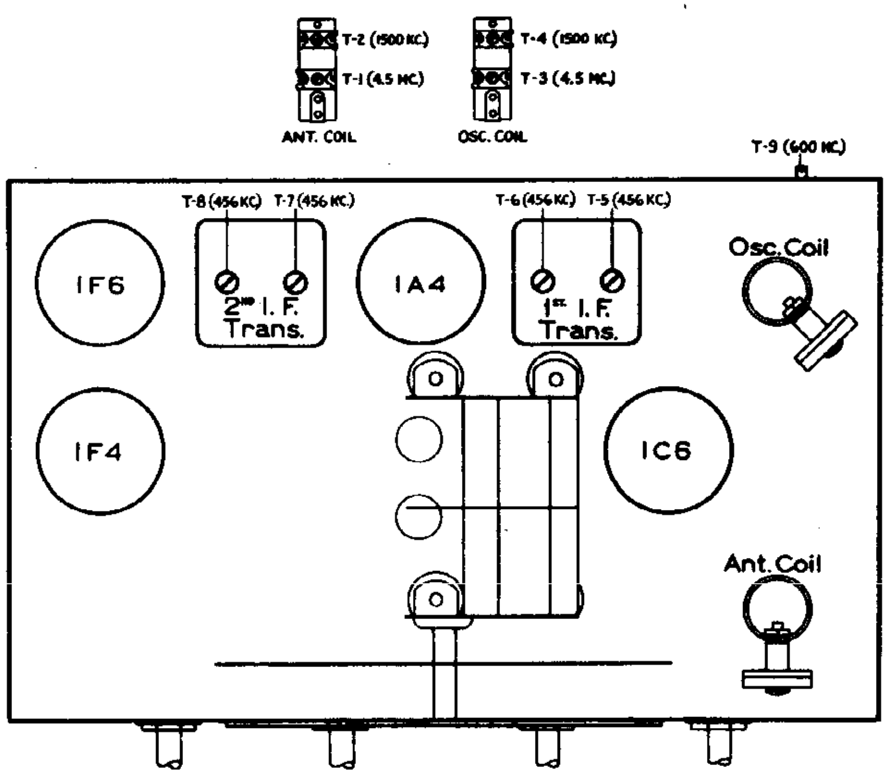
MODEL 242
MODEL 246
Alignment
Socket, Trimmers

FADA RADIO & ELECTRIC CO.

ALIGNMENT TABLE

WAVE BAND	DIAL FREQUENCY	GENERATOR FREQUENCY	IMAGE FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER
B.C.	1000 KC	456 KC	---	.001 mfd. 50,000 ohms	Control grid of 1A4 tube	T-8,T-7
B.C.	1000 KC	456 KC	---	.001 mfd. 50,000 ohms	Control grid of 1C6 tube	T-6,T-5
S.W.	4.5 MC	4.5 MC	3.6 MC	400 ohm resistor	Yellow antenna lead	T-3,T-1
S.W.	1.8 MC	1.8 MC	---	400 ohm resistor	Yellow antenna lead	Check Sensitivity
B.C.	1500 KC	1500 KC	---	200 mmfd. condenser	Yellow antenna lead	T-4,T-2
B.C.	600 KC	600 KC	---	200 mmfd. condenser	Yellow antenna lead	T-9*

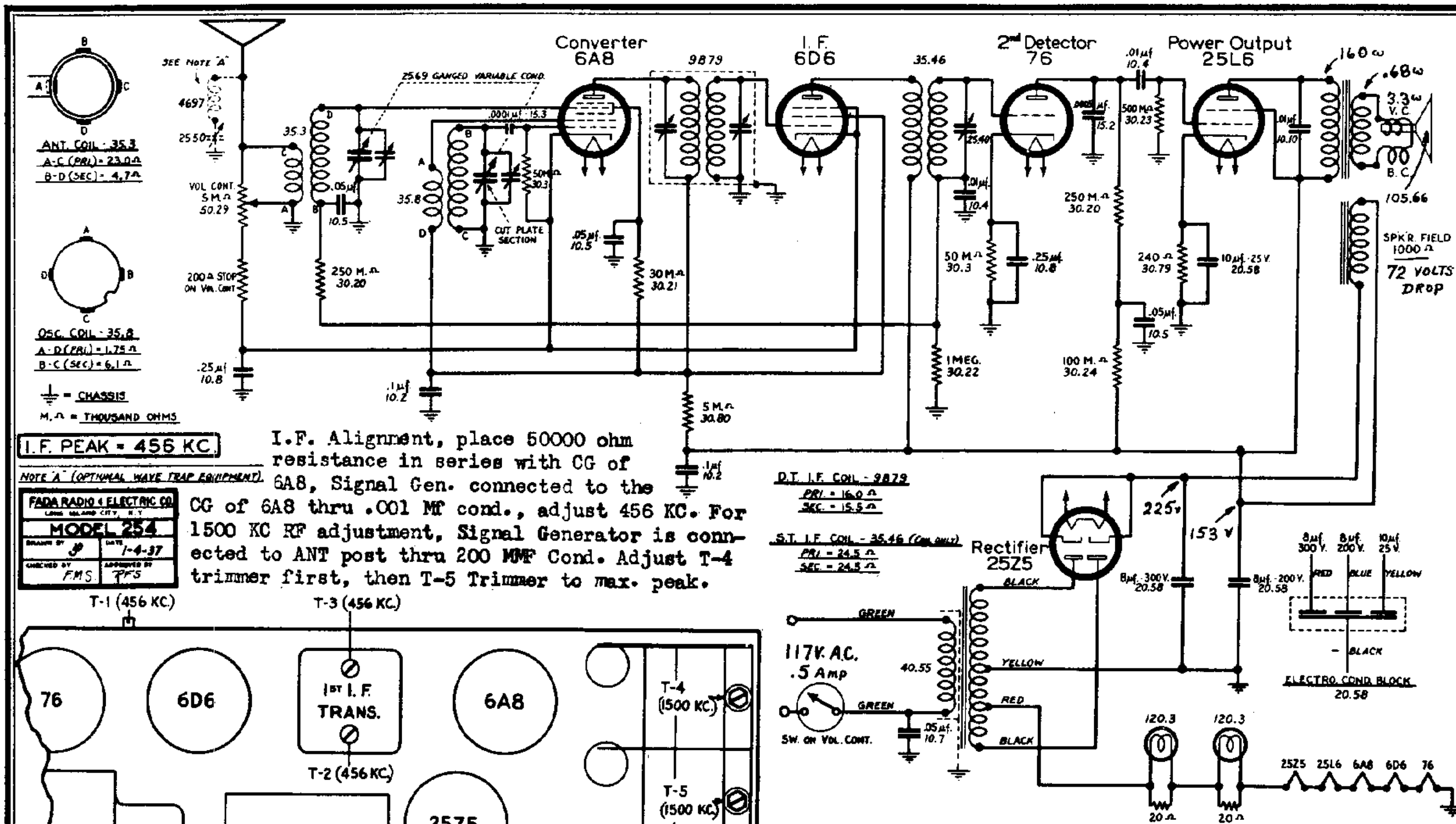
*To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.



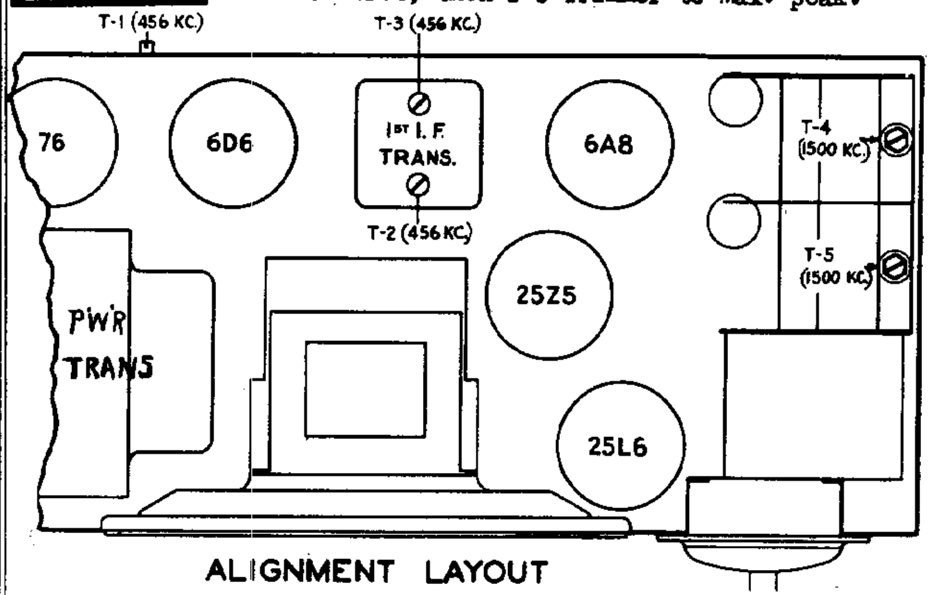
ALIGNMENT LAYOUT

MODEL 254
Schematic, Voltage
Socket, Trimmers, Alignment

FADA RADIO & ELECTRIC CO



I.F. Alignment, place 50000 ohm resistance in series with CG of 6A8, Signal Gen. connected to the CG of 6A8 thru .001 MF cond., adjust 456 KC. For 1500 KC RF adjustment, Signal Generator is connected to ANT post thru 200 MMF Cond. Adjust T-4 trimmer first, then T-5 Trimmer to max. peak.

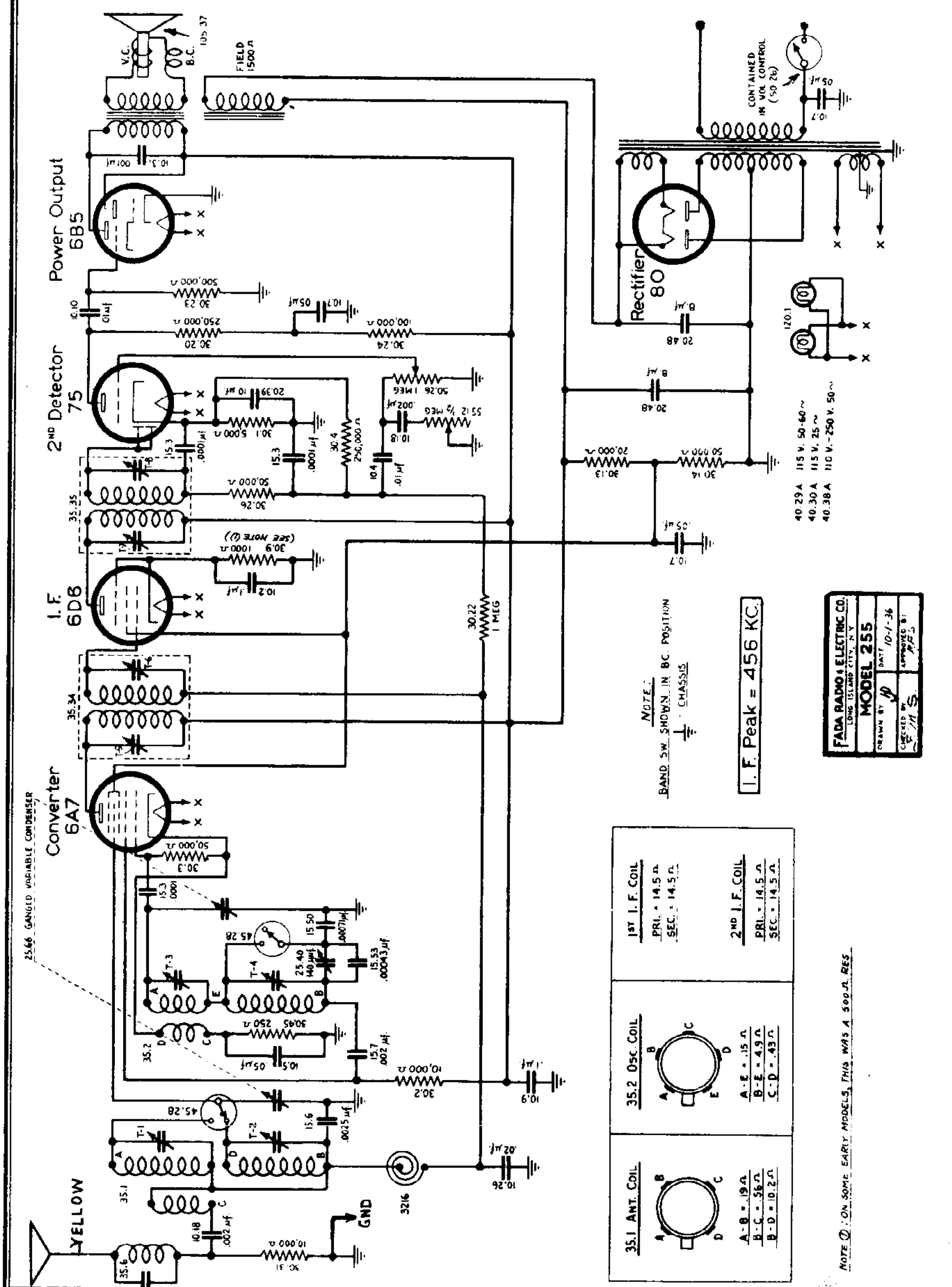


ALIGNMENT LAYOUT

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CATHODE VOLTS	SCREEN GRID VOLTS
6A8	1st Detector	110	2.7	---	---
6A8	Oscillator	110	.8	3.4	55
6D6	Int. Freq.	150	9.4	3.4	110
76	2nd Detector	50	.1	6.1	---
25L6	Power output	132	43.0	13.0	140
25Z5	Rectifier	---	63.0 TOTAL	---	---

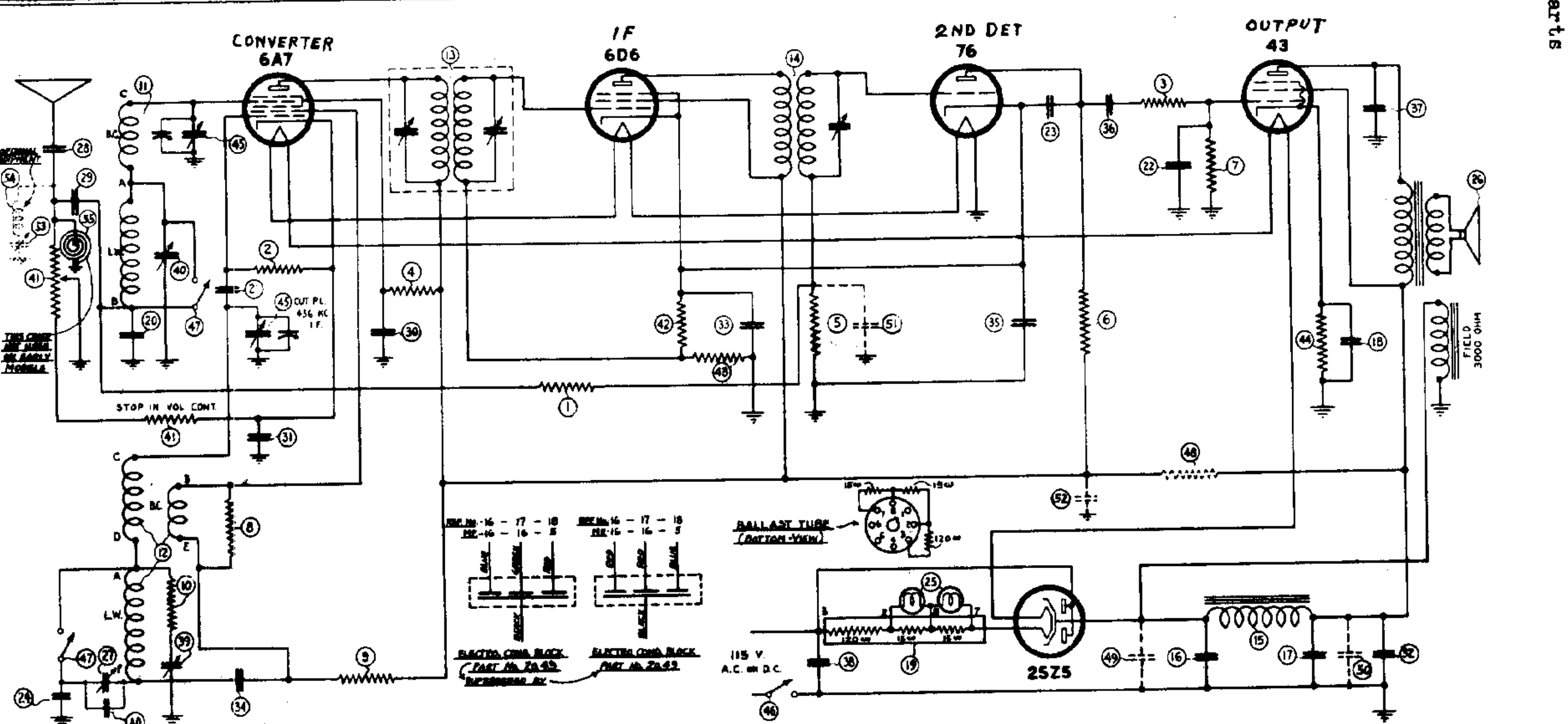
FADA RADIO & ELECTRIC CO

MODEL 255
Schematic



MODEL 261
Schematic
Parts

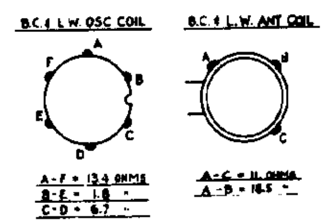
FADA RADIO & ELECTRIC CO



REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION
1	30.20	CARB. RES. - 250,000 OHM ½W ±20%	23	15.2	MICA COND. .0005 MFD ±10%	45	25.57	VARIABLE COND
2	30.5	" " 50,000 " " " 10%	24	15.36	" " .0008 " " 3%	46		ON-OFF SW. ON VOLUME CONT.
3	30.3	" " 50,000 " " " "	25	120.3	PILOT LIGHTS 6-8 V. .15 A	47	45.31	BAND SWITCH
4	30.21	" " 30,000 " " " 20%	26	10521	SPEAKER - 3000 OHMS	48	30.30	CARB. RES. - 1400 OHM - ½W ±10%
5	30.22	" " 1 MEG " " " "	27	25.49	PADDING COND. - 70 MMF.	49	20.25	TUBULAR ELECTRO. COND. - 8 MF. - 100 W.V.
6	30.23	" " 500,000 " " " "	28	10.18	TUBULAR COND. - .002 MFD. 200 V	50	20.25	" " " 8 " " "
7	30.23	" " 500,000 " " " "	29	10.18	" " .002 " "	51	10.2	" COND. - .1 MF. - 200 V.
8	30.1	" " 5,000 " " " 10%	30	10.5	" " .05 " "	52	10.8	" " .25 " " "
9	30.1	" " 5,000 " " " "	31	10.5	" " .05 " "	53	25.50	TRIMMING COND. - 150 MMF
10	[illegible]	" " 500 " " " "	32	10.5	" " .05 " "	54	4697	WAVE TRAP COIL
11	[illegible]	B.C. & L.W. ANTENNA COIL	33	10.1	" " .35 " "	55	3216	CHOKE COIL - 2.3 MH.
12	[illegible]	B.C. & L.W. OSCILLATOR "	34	10.4	" " .01 " "			
13	[illegible]	D.T. I.F. COIL	35	10.4	" " .01 " "			
14	[illegible]	S.T. I.F. "	36	10.4	" " .01 " "			
15	[illegible]	CHOKE COIL - 400 OHM	37	10.4	" " .01 " "			
16	[illegible]	ELECTRO. COND. BLOCK - 16 MFD. 100 W.V.	38	10.7	" " .05 " 400 "			
17	[illegible]	" " " 16 " " "	39	25.59	TRIMMER 30 - 80 MMF			
18	[illegible]	" " " 5 " 25 "	40	15.41	MICA COND. .0002 MFD ±5%			
19	[illegible]	BALLAST RESISTOR - 120-15-15 OHM	41	50.22	VOLUME CONT. - 10,000 OHM with sw. [illegible]			
20	[illegible]	MICA COND. - .002 MFD. ±3%	42	3046	CARB. RES. - 250 OHM - ½ 10%			
21	[illegible]	" " .0001 " " 10%	43	3048	" " 350 " "			
22	[illegible]	" " .0001 " " "	44	3047	" " 625 " ½			

FOR 25 CYCLE OPERATION ONLY (Ref. 48–52)

OPTIONAL EQUIPMENT (Ref. 53–54)



I.F. = 456 K.C.

D.T. I.F. COIL
PRI. = 16 OHMS
SEC. = 15.5 "

S.T. I.F. COIL
PRI. = 24.5 OHMS
SEC. = 24.5 "

NOTE:
BAND SW. SHOWN IN L.W. POS.
PARTS SHOWN IN DOTTED LINES ARE FOR 25 ~ OPERATION ONLY.
⏚ = CHASSIS

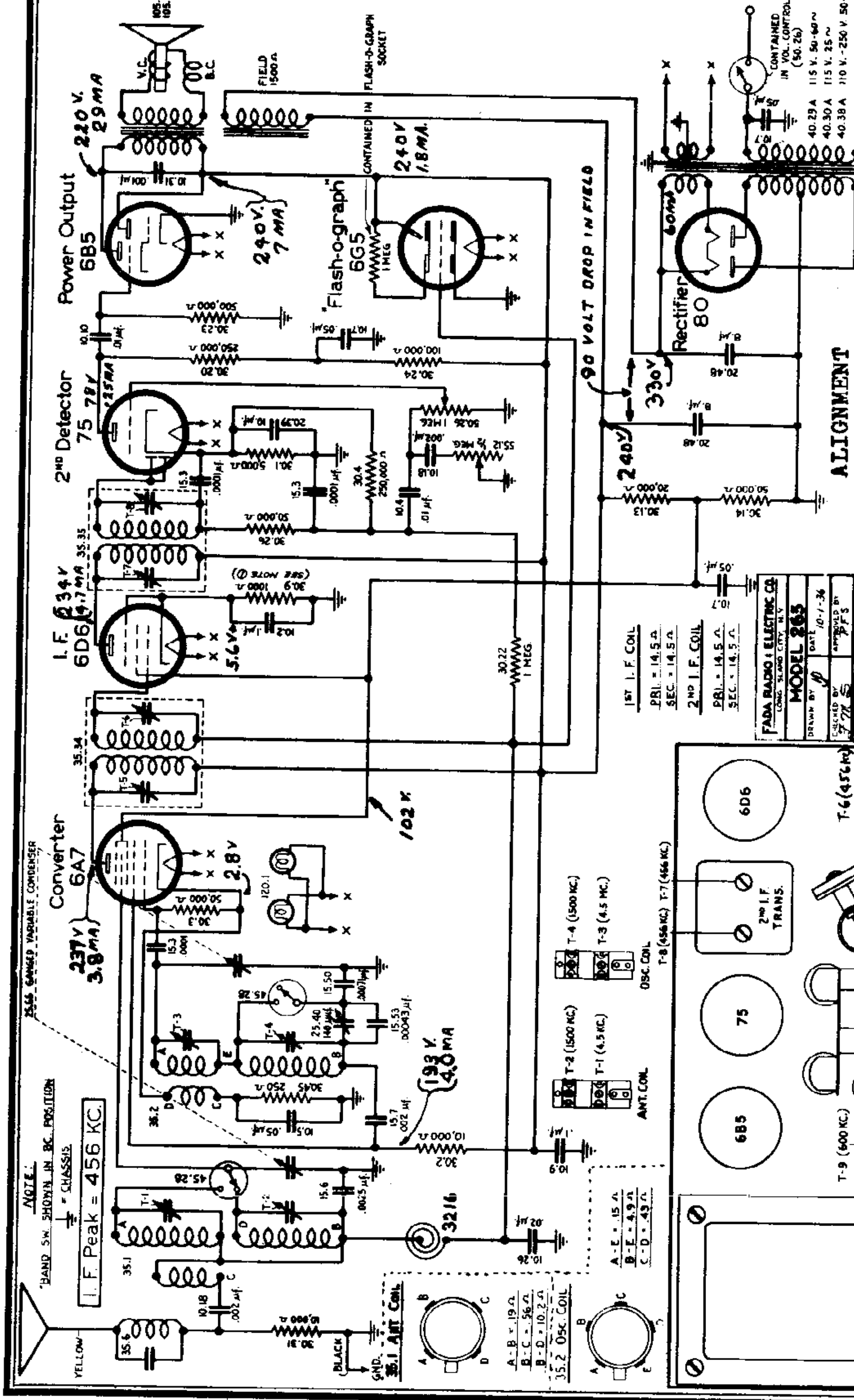
FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.
MODEL 261
DRAWN BY JD | DATE 8-7-36
CHECKED BY [illegible] | APP. PFS

FADA RADIO & ELECTRIC CO

MODEL 265
Schematic, Socket
Trimmers, Alignment
Voltage

SPEAKER D.C. RESISTANCE VALUES

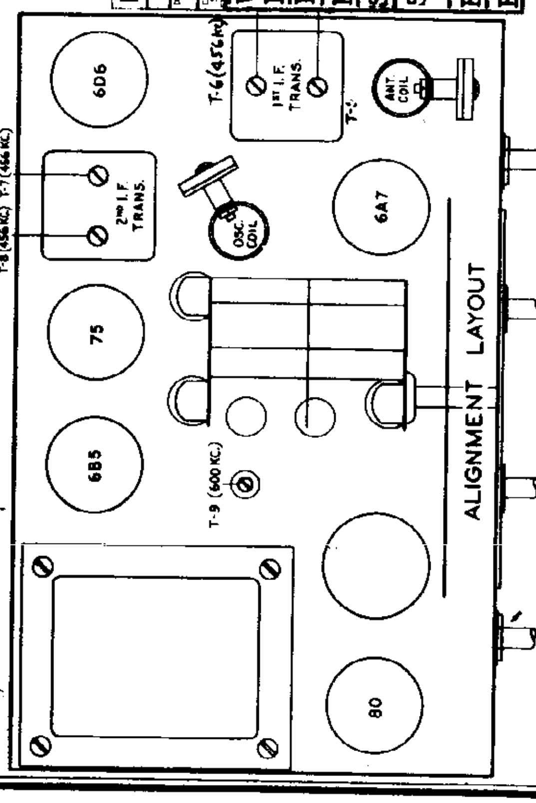
PART NO.	FIELD COIL	AUDIO TRANS. PRI.	AUDIO TRANS. SEC.	V.C.
105.27	1500 *(COLD)	650 ohms *	.4 ohms **	1.8
105.37	1500 * "	400 ohms *	.58 ohms **	2.2



ALIGNMENT

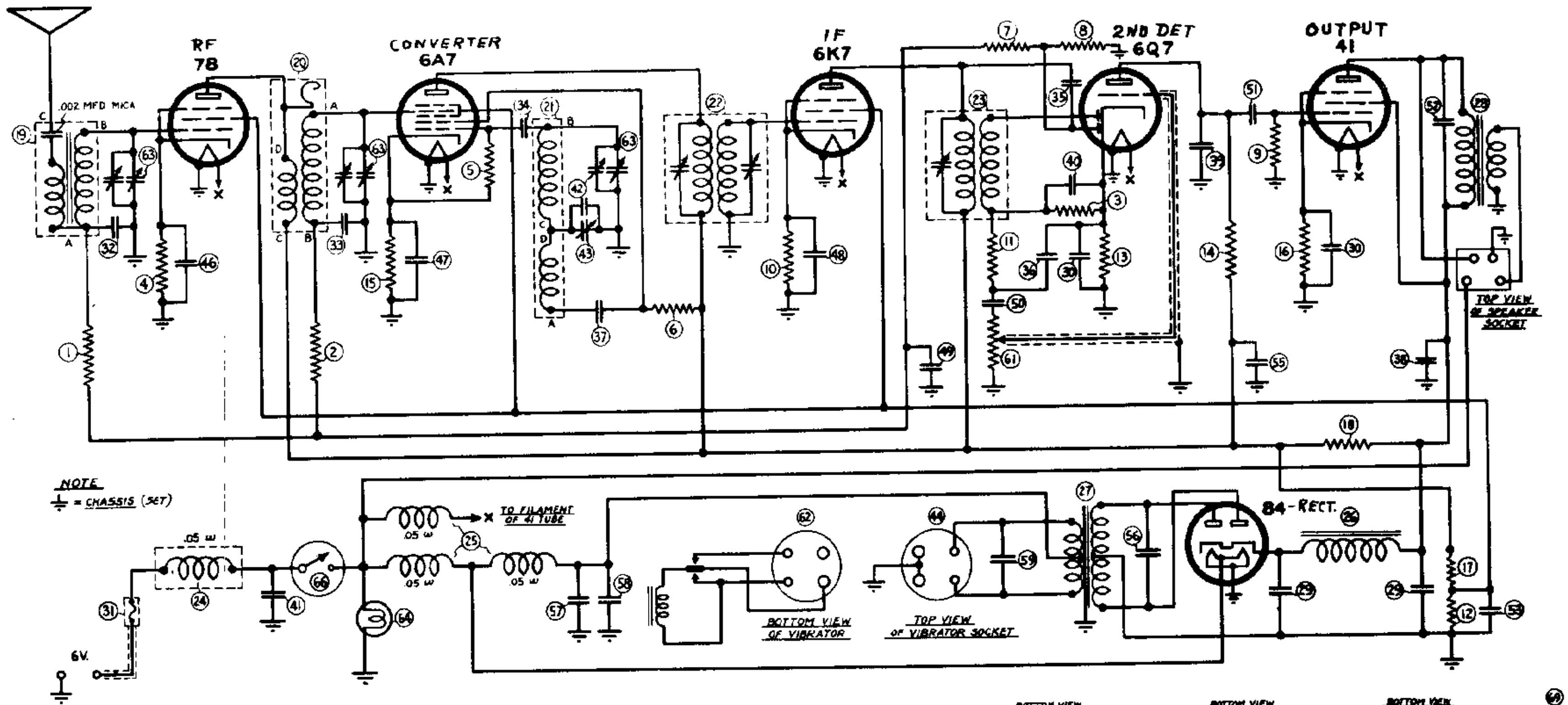
Wave Band	Dial Fre.	Gen. Fre.	Image Fre	Dummy Ant.	Connect Gen. To-	Adj. Trim.
BC	1000 KC	456 KC	-	.001 & 50M	CG of 6D6	T8,T7
BC	1000 KC	456 KC	-	same	CG of 6A7	T6,T5
SW	4.5 MC	4.5 MC	3.6 MC	400 Ohm	Yel. Ant.	T3,T1
SW	1.8 MC	1.8 MC	-	same	Same	Check Sensi.
BC	1500 KC	1500KC	-	200 MFD	Same	T4,T2
BC	600 KC	600 KC	-	Same	Same	T9*

* Rock variable gang condenser for padder adjustment



MODEL 266
Schematic
Parts

FADA RADIO & ELECTRIC CO

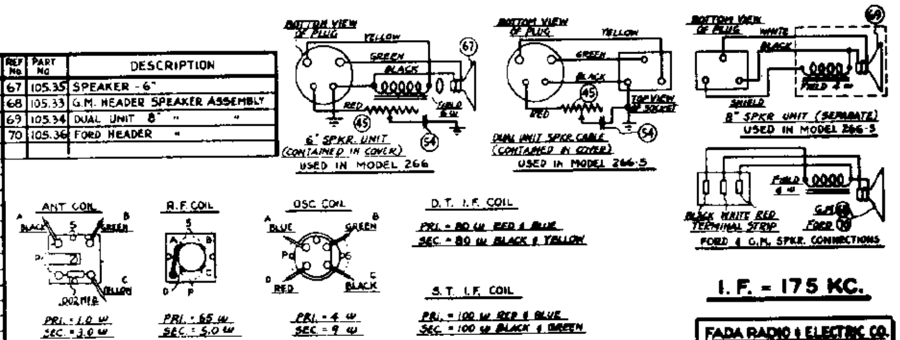


REF No	PART No.	DESCRIPTION
1	30.20	CARB. RES. - 250,000 OHMS 1/3 W. ± 20%
2	30.20	" " 250,000 " " "
3	30.20	" " 250,000 " " "
4	30.15	" " 2,000 " " 10
5	30.3	" " 50,000 " " "
6	30.11	" " 25,000 " " "
7	30.23	" " 500,000 " " 20
8	30.23	" " 500,000 " " "
9	30.23	" " 500,000 " " "
10	30.52	" " 1,500 " " 10
11	30.26	" " 50,000 " " 20
12	30.26	" " 50,000 " " "
13	30.12	" " 4,000 " " 10
14	30.53	" " 200,000 " " 20
15	30.9	" " 1,000 " " 10
16	30.47	" " 625 " 1/2 "
17	30.13	" " 20,000 " 1 "
18	30.25	" " 5,000 " 2 20
19	35.4	ANT. COIL (IRON CORE)
20	35.5	R.F. "
21	4422	OSC. "
22	717	D.T. I.F. "

REF No	PART No	DESCRIPTION
23	4423	S.T. I.F. COIL
24	4424A	SHIELDED CHOKE COIL (SPARK FILTER)
25	4414	R.F. CHOKE COIL
26	40.1	AUDIO " " - 300 OHMS
27	40.45	POWER TRANS. - 6 V
28	40.22	OUTPUT "
29	20.42	ELECTRO. COND. (DUAL) 8 MFD. 350 WV.
30	20.30	" TUB. " " 5 " 25 "
31	90.13	FUSE - 10 A.
32	15.5	MICA COND. - .002 MFD ± 3%
33	15.20	" " .00275 " "
34	15.3	" " .0001 " 10
35	15.3	" " .0001 " "
36	15.3	" " .0001 " "
37	15.4	" " .001 " "
38	15.4	" " .001 " "
39	15.54	" " .0002 " "
40	15.2	" " .0005 " "
41	15.10	" " 50 MMF. "
42	15.37	" " .0005 " " 5
43	25.40	PADDING COND. - 140 MMF.
44	65.20	VIBRATOR SOCKET

REF No	PART No.	DESCRIPTION
45	55.4	TONE CONT. - 100,000 OHMS
46	10.5	TUBULAR COND. - .05 MFD 200 V.
47	10.5	" " .05 " 200 "
48	10.5	" " .05 " 200 "
49	10.5	" " .05 " 200 "
50	10.4	" " .01 " 200 "
51	10.10	" " .01 " 400 "
52	10.3	" " .006 " 400 "
53	10.7	" " .05 " 400 "
54	10.7	" " .05 " 400 "
55	10.14	" " .25 " 400 "
56	0.29	" " .007 " 2000 "
57	10.21	" " .5 " 120 "
58	10.21	" " .5 " 120 "
59	10.21	" " .5 " 120 "
60		
61	50.8	VOL. CONT. - 1 MEG
62	90.63	VIBRATOR
63	25.56	VARIABLE COND.
64	90.31	PILOT LIGHT - MAZDA #51
65		
66		ON-OFF SW. ON VOL. CONT.

REF No	PART No	DESCRIPTION
67	105.35	SPEAKER - 6"
68	105.33	G.M. HEADER SPEAKER ASSEMBLY
69	105.34	DUAL UNIT 8" " "
70	105.36	FORD HEADER "



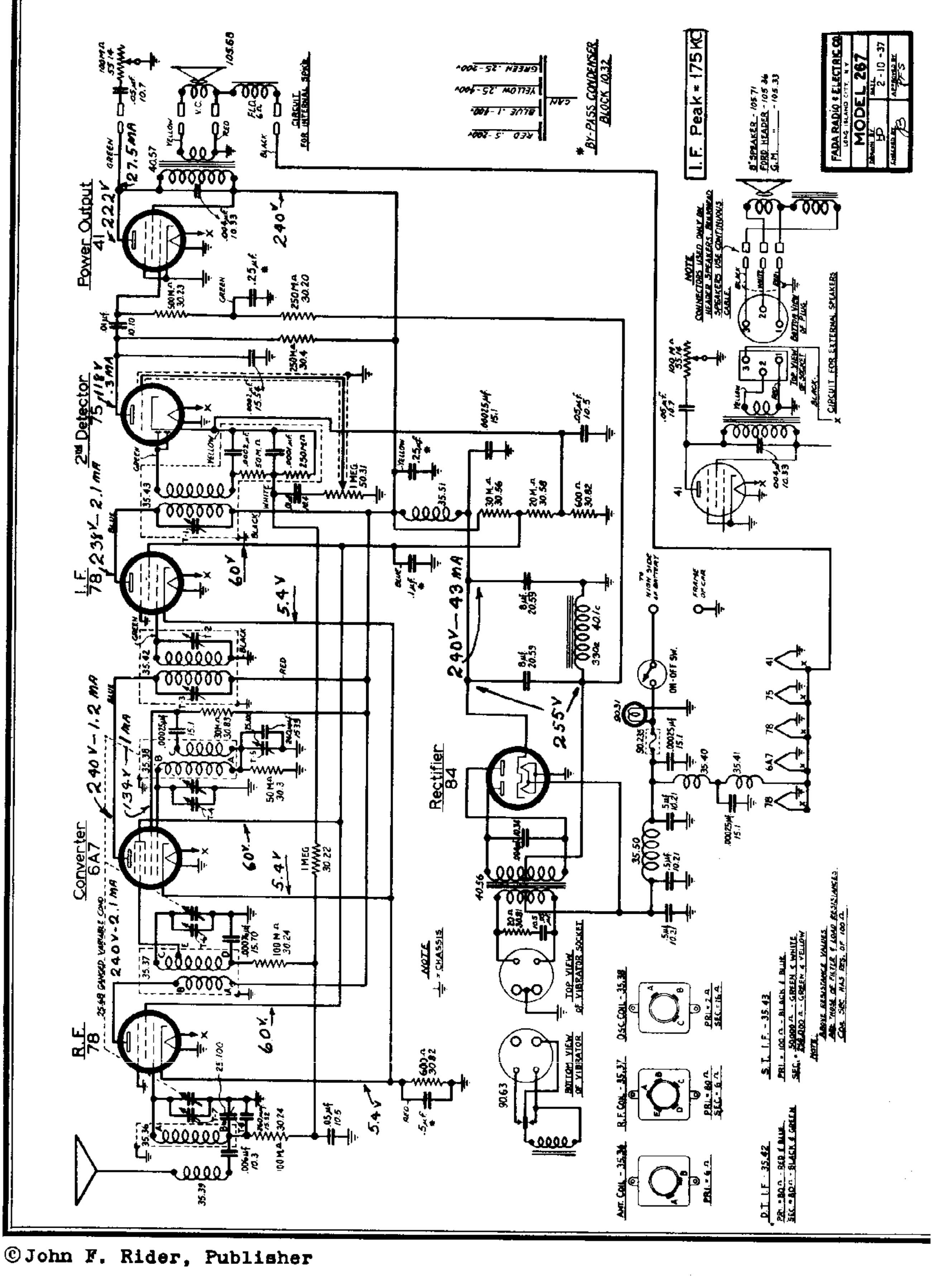
I.F. = 175 KC.

FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.
MODEL 266
DRAWN BY JD — DATE 3-23-36
CHECKED BY — APPROVED BY

FADA RADIO & ELECTRIC CO

**MODELS 267, 267SD, 267SC
267SF Motoset**

**Schematic
Voltage**



MODELS 267, 267SD
267SG, 267SF
Motoset
Socket, Trimmers
Alignment, Parts

FADA RADIO & ELECTRIC CO

PRICES SUBJECT TO CHANGE
WITHOUT NOTICE

SEPARATE SPEAKERS: Model 267 MOTOSET is also available for use with separate speakers instead of the standard 6½ inch speaker supplied with the standard set. These combinations are available as follows:

MODEL 267 SD is a two unit receiver in which the speaker is an 8 inch dynamic in a large housing of its own. This housing mounts on the bulkhead by a single large bolt, and plugs into the receptacle provided for this purpose on the side of the case, near the front.

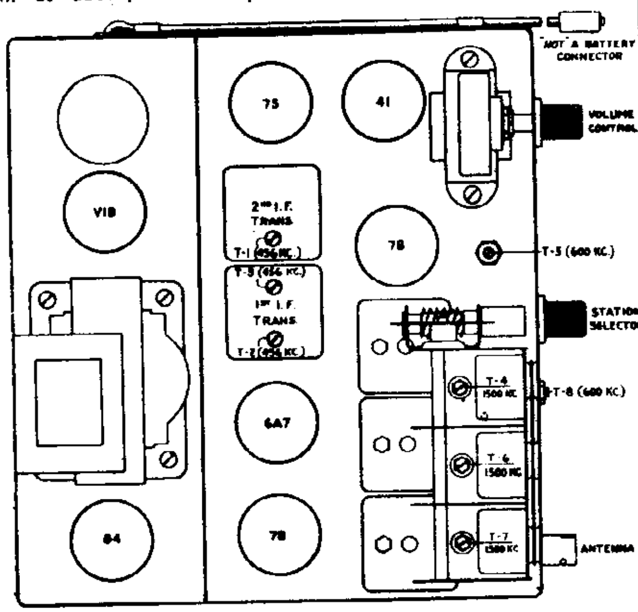
MODEL 267 SG is a two unit receiver similar to 267 SF, with header speaker for installation in 1936 General Motor Cars.

MODEL 267 SF is a two unit radio employing the same receiver unit as above, but a separate speaker for installation behind the header panel in 1936-37 Ford Cars.

ALIGNMENT TABLE

Dial Frequency	Generator Frequency	Dummy Antenna	Generator Connected To	Adjust Trimmer
1,000 KC	175 KC	.001 mfd. 50,000 ohms	Control grid of 6A7 tube	T-1, T-2 T-3
1,500 KC	1,500 KC	200 mmfd. condenser	Antenna lead socket	T-4, T-6, T-8
600 KC	600 KC	200 mmfd. condenser	Antenna lead socket	T-5* T-8

*To insure perfect alignment, it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.



ALIGNMENT LAYOUT

PARTS PRICE LIST

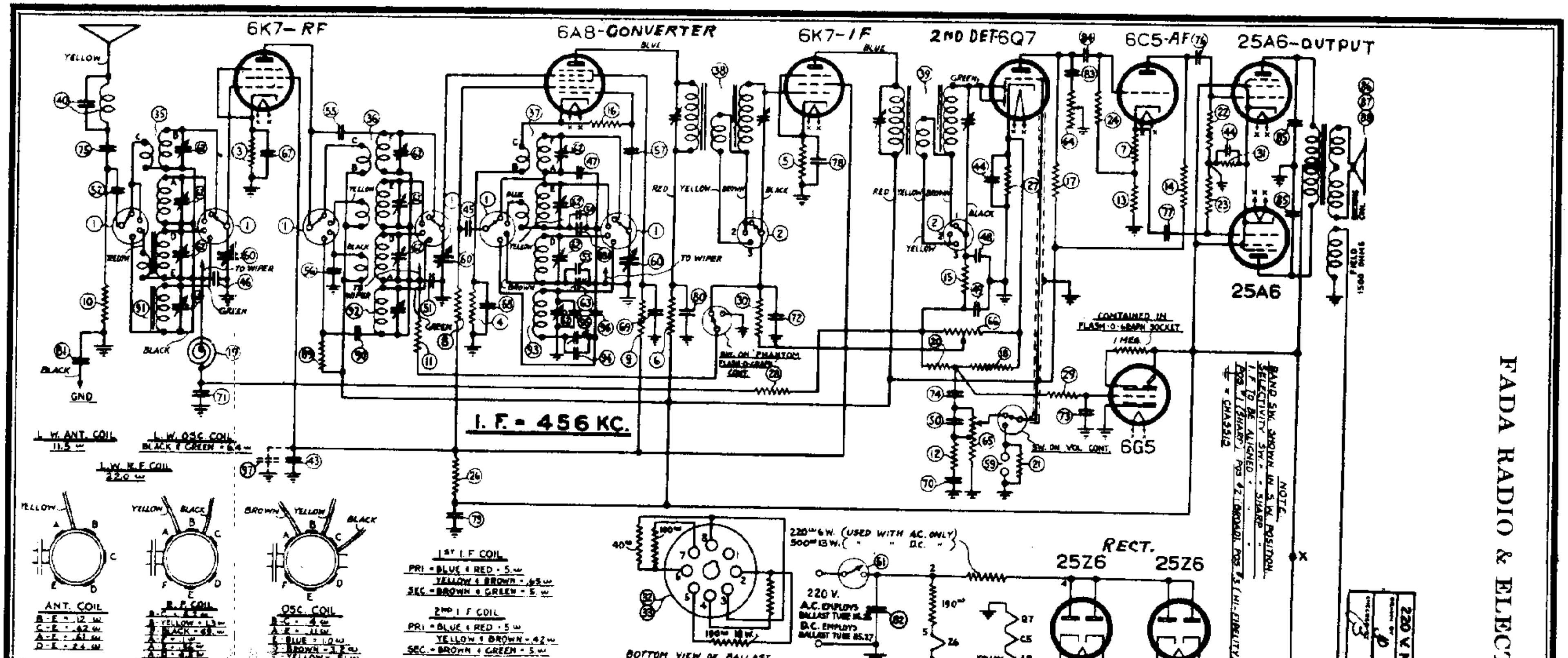
PART NO.	DESCRIPTION	LIST PRICE
10.3	Capacitor - tubular - (.006 mfd. - 400 Volts)	.20
10.4	Capacitor - tubular - (.01 mfd. - 200 Volts)	.20
10.5	Capacitor - tubular - (.05 mfd. - 200 Volts)	.20
10.7	Capacitor - tubular - (.05 mfd. - 400 Volts)	.20
10.10	Capacitor - tubular - (.01 mfd. - 400 Volts)	.20
10.21	Capacitor - tubular - (.5 mfd. - 120 Volts)	.40
10.22	Capacitor - generator - (.5 mfd. - 120 Volts)	.50
10.32	Capacitor - block - (.25 mfd. 400 V., 1 mfd. 400 V.) (.5 mfd. 200 V., .25 mfd. 200 V.)	1.05
10.33	Capacitor - tubular - (.004 mfd. - 400 Volts)	.20
10.34	Capacitor - tubular - (.004 mfd. - 1,600 Volts)	.25
15.1	Capacitor - mica - (.00025 mfd. - 10%)	.25
15.33	Capacitor - mica - (.00024 mfd. - 5%)	.25
15.52	Capacitor - mica - (.00026 mfd. - 5%)	.25
15.54	Capacitor - mica - (.0002 mfd. - 10%)	.25
15.70	Capacitor - mica - (.00076 mfd. - 3%)	.25
20.59	Capacitor - electrolytic (Dual 8 mfd. 350 W.V.)	1.55
25.63	Capacitor - variable gang	4.10
25.100	Capacitor - padder	.30
30.3	Resistor - carbon - (50,000 ohms 1/3 W 10%)	.20
30.4	Resistor - carbon - (250,000 ohms 1/3 W 10%)	.20
30.20	Resistor - carbon - (250,000) ohms 1/3 W 20%)	.20
30.22	Resistor - carbon - (1,000,000 ohms 1/3 W 20%)	.20
30.23	Resistor - carbon - (500,000 ohms 1/3 W 20%)	.20
30.24	Resistor - carbon - (100,000 ohms 1/3 W 20%)	.20
30.27	Resistor - distributor suppressor - (15,000 ohms)	.35
30.56	Resistor - carbon - (30,000 ohms 1 W 10%)	.25
30.58	Resistor - carbon - (20,000 ohms 1/3 W 10%)	.20
30.81	Resistor - carbon - (20 ohms 1/3 W 10%)	.20
30.82	Resistor - carbon - (600 ohms 1/3 W 10%)	.20
30.83	Resistor - carbon - (30,000 ohms 1/3 W 20%)	.20
30.87	Resistor - carbon - (650 ohms 1/3 W 10%)	.20
35.36	Coil - antenna	.80
35.37	Coil R. F.	1.15
35.38	Coil - oscillator	.75
35.39	Spark filter choke	.25
35.40	R. F. Choke Coil	.50
35.41	R. F. Choke Coil	.25
35.42	1st I. F. Transformer	1.30

PARTS PRICE LIST

PART NO.	DESCRIPTION	LIST PRICE
35.43	2nd I. F. Transformer	1.50
35.50	"A" Choke	.50
35.51	R. F. Choke	.50
40.1C	Choke coil - filter (330 ohm)	.75
40.56	Power transformer	3.50
40.57	Output transformer	1.30
50.31	Volume control - (1 meg.)	.85
55.14	Tone control - (100,000 ohm)	.65
65.2	Socket - (6A7)	.15
65.4	Socket - (75)	.15
65.17	Socket - (78)	.15
65.18	Socket - (41)	.15
65.19	Socket - (84)	.10
65.46	Socket - (vibrator)	.10
65.61	Socket - (external speaker)	.12
75.119	Remote control cable - (station selector)	1.25
75.120	Remote control cable - (volume control)	1.25
75.122	Volume control unit - (with switch)	2.75
75.123	Tuning control unit	2.60
80.11	Tube shield - (two sections)	.09
80.13	Tube shield base	.04
80.14	Tube shield retaining ring	.02
80.16	Tube shield cap	.04
90.2	Cup washer	.05
90.3	Rubber grommet - (Dia. 11/16" Hole 13/32")	.05
90.15	Antenna cable	.60
90.18	Mounting bolt - (5/16" - 18 Thd. x 3½" L.)	.04
90.31	Pilot light - (6 volt)	.20
90.54	Grid cap	.07
90.63	Vibrator	3.50
90.107	Washer - (7/8" x 1/16" x 11/32" Hole) Net	.01
90.108	Lockwasher - (11/16" O. D. x 3/32") Net	.01
90.110	Hex nut - (5/16" - 18 Thd.) Net	.02
90.153	Speaker cable	.35
90.160	Grounding clips - (per doz.)	.10
90.159	Vibrator grounding cup	.15
90.235	Fuse - 15 Amp.	.10
105.68	Speaker - (Model 267)	5.95
140.14	Knob - (tone control)	.10

MODELS 311(220V),311B(22[illegible]
Schematics,Parts

FADA RADIO & ELECTRIC CO

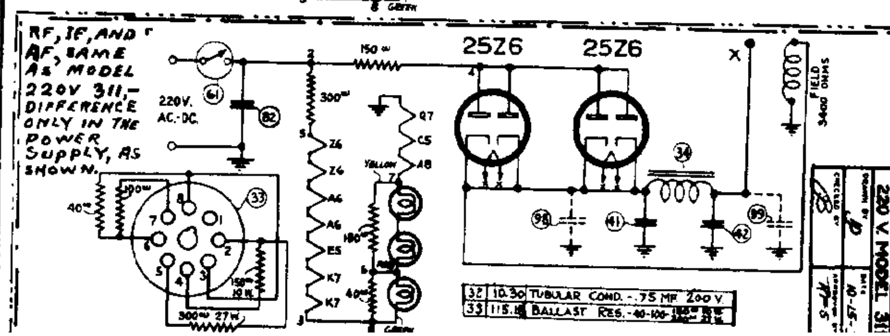


REF. No.	PART No.	DESCRIPTION
1	45.34	BAND SWITCH
2	45.32	SELECTIVITY SWITCH
3	30.45	CARB. RES. - 250 OHMS 1/3 W ± 10
4	30.45	" " 250 " " " "
5	30.63	" " 300 " " " "
6	30.35	" " 1000 " " " 20
7	30.15	" " 2000 " " " 10
8	30.1	" " 5000 " " " "
9	30.2	" " 10000 " " " "
10	30.31	" " 10000 " " " 20
11	30.31	" " 10000 " " "
12	30.58	" " 20000 " " " 10
13	30.59	" " 27000 " " " "
14	30.10	" " 30000 " " " "
15	30.26	" " 50000 " " " 20
16	30.8	" " 100,000 " " " 10
17	30.66	" " 150,000 " " " 20
18	30.6	" " 1000,000 " " " 10
19	5409	CHOKE COIL - 20. MH.
20	30.20	CARB. RES. 250,000 OHMS 1/3 W ± 20
21	30.23	" " 500,000 " " "
22	30.23	" " 500,000 " " " "
23	30.23	CARB. RES - 500,000 OHMS 1/3 W ± 20
24	30.23	" " 500,000 " " "
25		
26	30.17	" " 4,000 " "
27	30.65	" " 4,400 " "
28	30.28	" 2,000,000
29	30.28	" 2,000,000 " "
30	[illegible]	" " 2,000,000 " "

REF. No.	PART No.	DESCRIPTION
[illegible]	15.26	BALLAST RES - 40 ω - 100 ω - 190 ω - 18K - 220 ω 6W.
[illegible]	15.27	" " " " " " 500 ω 13 W.
[illegible]	40.3A	CHOKE COIL - 200 OHMS
35	35.15	ANTENNA
36	35.16	R.F.
37	35.17	OSCILLATOR
38	35.18	1ST I.F.
39	35.19	2ND I.F.
40	35.6	WAVE TRAP
41	20.34	ELECTRO COND. 32 MF 175 WV
42	20.56	" " 16 175
43	20.55	" " 8 175 tub.
44	20.44	" DUAL " 10 10 25
45	15.7	MICA COND. - .002 MF. ± 10%
46	15.5	" " .002 " 3
47	15.62	" " .004 " 5
48	15.3	" " .0001 " 10
49	15.3	" " .0001 " "
50	15.3	" " .0001 " "
51	15.6	" " .0025 " 3
52	15.2	" " .0005 " 10
53	15.52	" " .00026 " 5
54	15.63	" " .00093 " 3
55	15.16	" " 3. MMF 10
56	15.61	" " 35. " 5
57	15.10	" " 50. " 10
58	20.3	PILOT LTS. - 6-8 V .15 A
59	25.1	PHONO JACK
60	25.61	VARIABLE COND.
61		ON-OFF SW. ON TONE CONT.

REF. No.	PART No.	DESCRIPTION
63	25.49	PADDING COND. - 70 MMF
64	[illegible]	[illegible]
65	[illegible]	[illegible]
66	[illegible]	[illegible]
67	[illegible]	TUBULAR COND. .05 MF 200 V.
68	[illegible]	" " .05 " [illegible]
69	[illegible]	" " .05 " [illegible]
70	[illegible]	" " .05 " [illegible]
71	[illegible]	" " .02 " [illegible]
72	10.26	" " .02 " 200 "
73	10.26	" " .02 " 200 "
74	10.4	" " .01 " 200 "
75	10.4	" " .01 " 200 "
76	10.2	" " .1 " 200 "
77	10.2	" " .1 " 200 "
78	10.2	" " .1 " 200 "
79	10.2	" " .1 " 200 "
80	10.2	" " .1 " 200 "
81	10.23	" " .006 200
82	10.9	" " .1 400
83	10.10	" " .01 " 400
84	10.10	" " .01 " 400 "
85	10.17	DUAL .001 600 "
86	105.55	SPEAKER 3400 ω (MODEL 21 T)
87	105.56	" " (" 21 C)
88	105.57	" " (" 21 CK)
88A	25.64	PADDING COND. - 110 - 250 MMF.
89	30.2	CARB RES. - 10,000 OHMS 1/3 W ± 10%
90	15.3	MICA COND. - .0001 MF. ± 10%

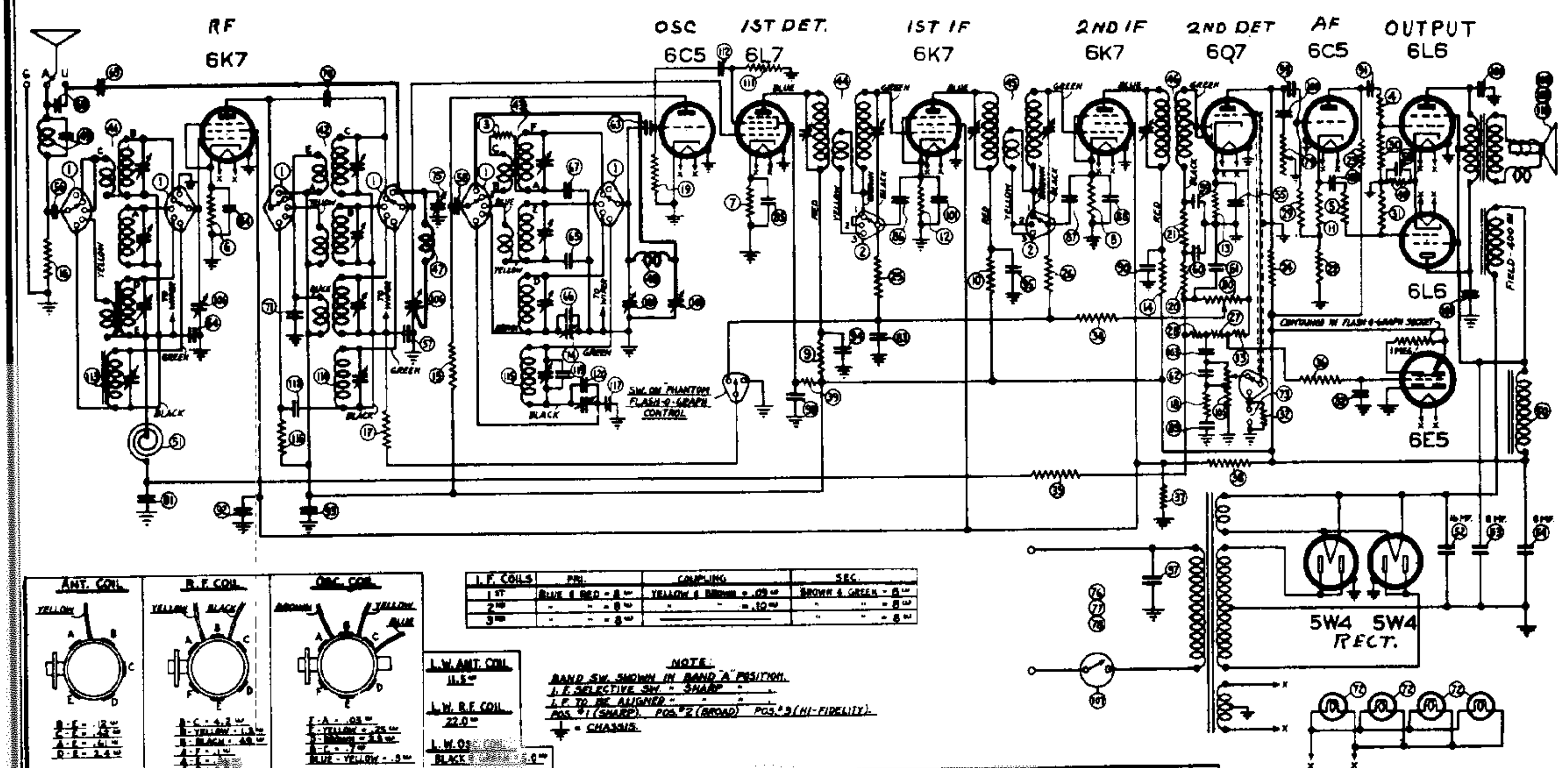
REF. No.	PART No.	DESCRIPTION
92	35.21	L.W. R.F. "
93	35.22	L.W. OSC. "
94	15.58	MICA COND. .00018 MF. ± 5%
95	15.10	" " 50 MMF
96	15.2	" " .0005 MF. ± 5%



32	10.30	TUBULAR COND. - .75 MF 200 V.
33	115.18	BALLAST RES. - 40-100-[illegible]

MODEL 312
Schematic
Parts

FADA RADIO & ELECTRIC CO



I.F. COILS	PRI.	COUPLING	SEC.
1ST	BLUE & RED - 8 Ω	YELLOW & BROWN - .09 Ω	BROWN & GREEN - 8 Ω
2ND	" " - 8 Ω	" " - .10 Ω	" " - 8 Ω
3RD	" " - 8 Ω		" " - 8 Ω

NOTE:
BAND SW. SHOWN IN BAND "A" POSITION.
I.F. SELECTIVE SW. - SHARP
I.F. TO BE ALIGNED - " "
POS. #1 (SHARP). POS. #2 (BROAD) POS. #3 (HI-FIDELITY).
⏚ = CHASSIS.

I.F. - 456 KC.

FADA RADIO & ELECTRIC Co. LONG ISLAND CITY, N.Y.
MODEL 312
DRAWN BY: JD — DATE: 9-15-36
CHECKED BY: J.M.S. — APPROVED BY: RFS

REF No.	PART No.	DESCRIPTION
1	45.36	BAND SW.
2	45.32A	SELECTIVITY SW.
3	30.78	CARB. RES. - 25 OHMS [illegible] 10%
4	30.70	" " 130 " [illegible] 20
5	30.70	" " 130 " [illegible]
6	30.45	" " 250 " [illegible] 10
7	30.71	" " 454 " [illegible]
8	30.15	" " 2,000 " [illegible]
9	30.64	" " 2,000 " [illegible] 20
10	30.64	" " 2,000 " [illegible]
11	30.57	" " 3,000 " [illegible] 10
12	30.1	" " 5,000 " [illegible]
13	30.1	" " 5,000 " [illegible]
14	30.36	" " 5,000 " [illegible] 20
15	30.2	" " 10,000 " [illegible] 10
16	30.31	" " 10,000 " [illegible] 20
17	30.31	" " 10,000 " [illegible]
18	30.38	" " 20,000 " [illegible] 10
19	30.11	" " 25,000 " [illegible]
20	30.32	" " 25,000 " [illegible] 10
21	30.32	" " 25,000 " [illegible]
22	30.59	" " 27,000 " [illegible] 10
23	30.10	" " 30,000 " [illegible]
24	30.53	" " 200,000 " [illegible] 20

REF No.	PART No.	DESCRIPTION
25	30.20	CARB. RES. - 250,000 OHMS ½W ± 20%
26	30.20	" " 250,000 " " " " "
27	30.62	" " 400,000 " " " " 10
28	30.5	" " 500,000 " " " " "
29	30.23	" " 500,000 " " " " 20
30	30.23	" " 500,000 " " " " "
31	30.23	" " 500,000 " " " " "
32	30.23	" " 500,000 " " " " "
33	30.67	" " 600,000 " " " " 10
34	30.28	" " 2,000,000 " " " " 20
35	30.28	" " 2,000,000 " " " " "
36	30.28	" " 2,000,000 " " " " "
37	30.14	" " 50,000 " ½ " " 10
38	30.33	" " 25,000 " 1 " " "
39	30.73	" " 12,500 " 2 " " "
40	30.72	" " 210 " 2 " " "
41	35.15	COIL - ANT.
42	35.16	" R.F.
43	35.31	" OSC.
44	35.25	" 1ST I.F.
45	35.26	" 2ND I.F.
46	35.27	" 3RD I.F.
47	35.28	" U.H.F. ANT.
48	35.29	" " OSC.

REF No.	PART No.	DESCRIPTION
49	[illegible]	COIL - WAVE TRAP
50	[illegible]	" CHOKE [illegible]
51	5409	" R.F. CHOKE - 20 MH.
52	20.50	ELECTRO. COND. 16 MF. 475 W.V.
53	20.4	[illegible]
54	20.4	" " [illegible]
55	20.44	" DUAL - [illegible]
56	15.2	MICA COND. - [illegible]
57	15.6	" " [illegible]
58	15.7	" " [illegible]
59	15.3	" " .0001 " " "
60	15.3	" " .0001 " " "
61	15.3	" " .0001 " " "
62	15.3	" " .0001 " " "
63	15.10	" " 50 MMF " "
64	15.5	" " .002 MF " 3
65	15.63	" " .0018 " " "
66	15.66	" " .0005 " " 5
67	15.32	" " .0056 " " "
68	15.9	" " 10 MMF - 10
69	15.9	" " 10 " " "
70	15.16	" " 3 " " ½ MMF
71	15.61	" " 35 " " 5%
72	120.3	PILOT LTS - 6-8 V. .15 A.

REF No.	PART No.	DESCRIPTION
[illegible]	[illegible]	PHONO. JACK
[illegible]	[illegible]	PADDING COND. - 140 MMF
[illegible]	[illegible]	" " 70 "
[illegible]	[illegible]	POWER TRANS. - 115 V. 50-60 ~
[illegible]	[illegible]	" " - 115 V. 25 ~
[illegible]	[illegible]	" " TAP. 110,130,150 [illegible]
[illegible]	[illegible]	TONE CONTROL - ½ MEG
[illegible]	[illegible]	FLASH-O-GRAPH CONTROL [illegible]
[illegible]	[illegible]	TUBULAR COND. - .02 MF [illegible]
[illegible]	[illegible]	" " .02 " [illegible]
[illegible]	[illegible]	" " .02 " [illegible]
[illegible]	[illegible]	" " .05 " [illegible]
[illegible]	[illegible]	" " .05 " [illegible]
[illegible]	[illegible]	" " .05 " [illegible]
[illegible]	[illegible]	" " .05 " [illegible]
[illegible]	[illegible]	" " .05 " [illegible]
[illegible]	[illegible]	" " .05 " [illegible]
[illegible]	[illegible]	" " .1 " [illegible]
[illegible]	[illegible]	" " .1 " [illegible]
[illegible]	[illegible]	" " .1 " [illegible]
[illegible]	[illegible]	" " .1 " [illegible]
[illegible]	[illegible]	" " .05 " [illegible]
[illegible]	[illegible]	" " .05 " [illegible]
[illegible]	[illegible]	

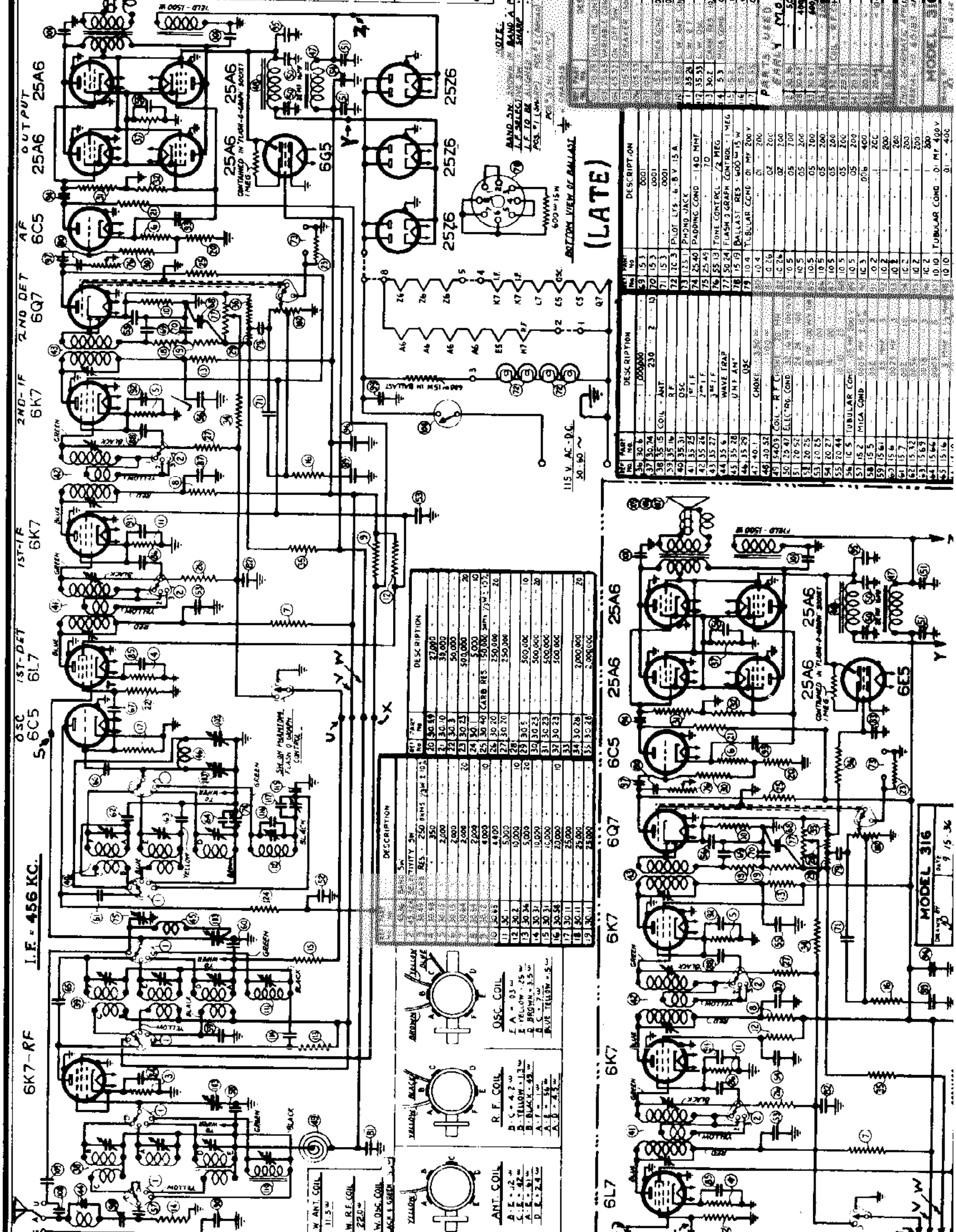
REF No.	PART No.	DESCRIPTION
[illegible]	[illegible]	TUBULAR COND. - .05 MF. 400 V.
[illegible]	[illegible]	" " .01 " 400 "
[illegible]	[illegible]	" " .01 " 400 "
[illegible]	[illegible]	" " .01 " 400 "
[illegible]	[illegible]	" " .1 " 200 "
[illegible]	[illegible]	" " .1 " 200 "
[illegible]	[illegible]	" " .01 " 200 "
[illegible]	[illegible]	" DUAL - .001 " 600 "
[illegible]	[illegible]	VOLUME CONTROL - 1 MEG [illegible]
[illegible]	[illegible]	VARIABLE COND.
[illegible]	[illegible]	ON-OFF SW. (LINE)
[illegible]	[illegible]	SPEAKER - 400 Ω (MODEL 212T)
[illegible]	[illegible]	" " (" 212C)
[illegible]	[illegible]	" " (" 212CK)
[illegible]	[illegible]	CARB. RES. - 50,000 OHMS ½W ± 10%
[illegible]	[illegible]	MICA COND. - 50 MMF. ± 10%
[illegible]	[illegible]	L.W. ANT. COIL
[illegible]	[illegible]	L.W. R.F. "
[illegible]	[illegible]	L.W. OSC. "
[illegible]	[illegible]	CARB. RES. - 10,000 OHMS ½W ± 10%
[illegible]	[illegible]	MICA COND. - .0005 MF. ± 10%
[illegible]	[illegible]	" " .0001 " " "
[illegible]	[illegible]	" " .00007 " " 5
[illegible]	[illegible]	" " .00043 " " "

MODEL 316 Late
Above Ser.#60183
Schematics,Parts

FADA RADIO & ELECTRIC CO

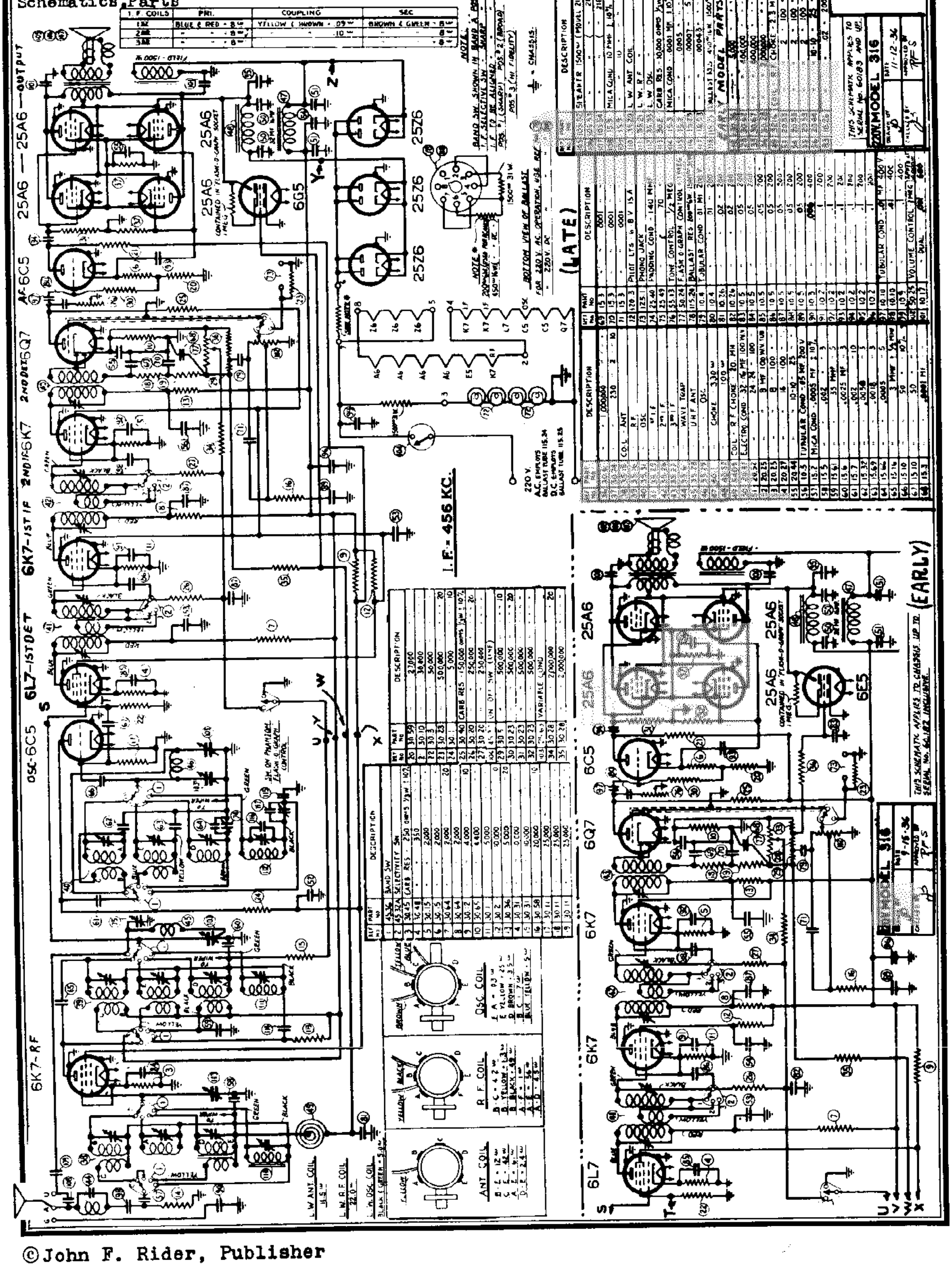
MODEL 316 Earl
Below Ser.#601

I. F. COILS	PRI	COUPLING	SEC
1st	BLUE & RED - 8 ω	YELLOW & BROWN - .09 ω	BROWN & GREEN - 8 ω
2nd	" " - 8 ω	" " - 10 ω	" " - 8 ω
3rd	" " - 8 ω		" " - 8 ω



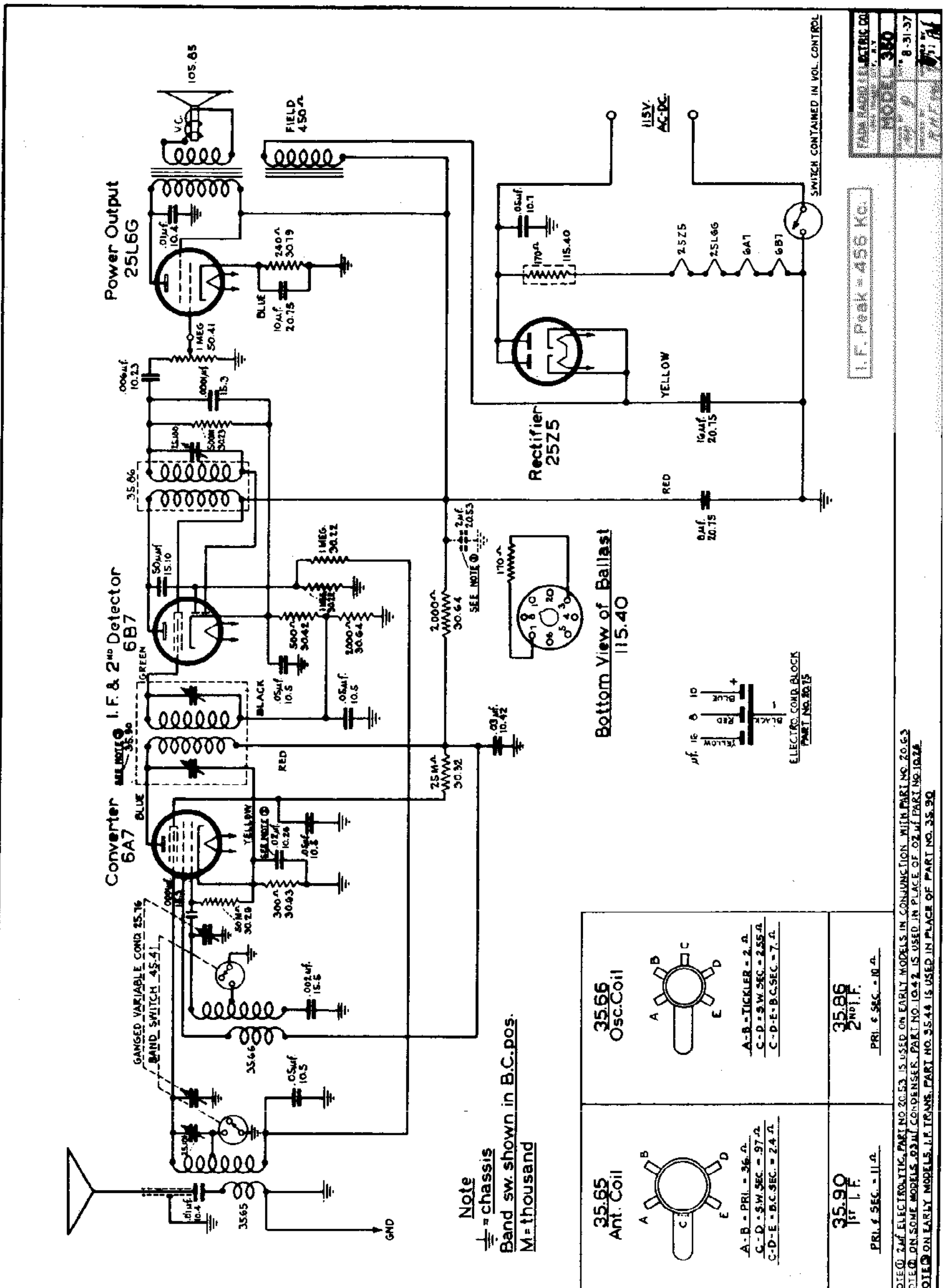
MODEL 316(220V)
Early, Below Ser. #60183
MODEL 316(220V)
Late, Above Ser. #60183
Schematics, Parts

FADA RADIO & ELECTRIC CO



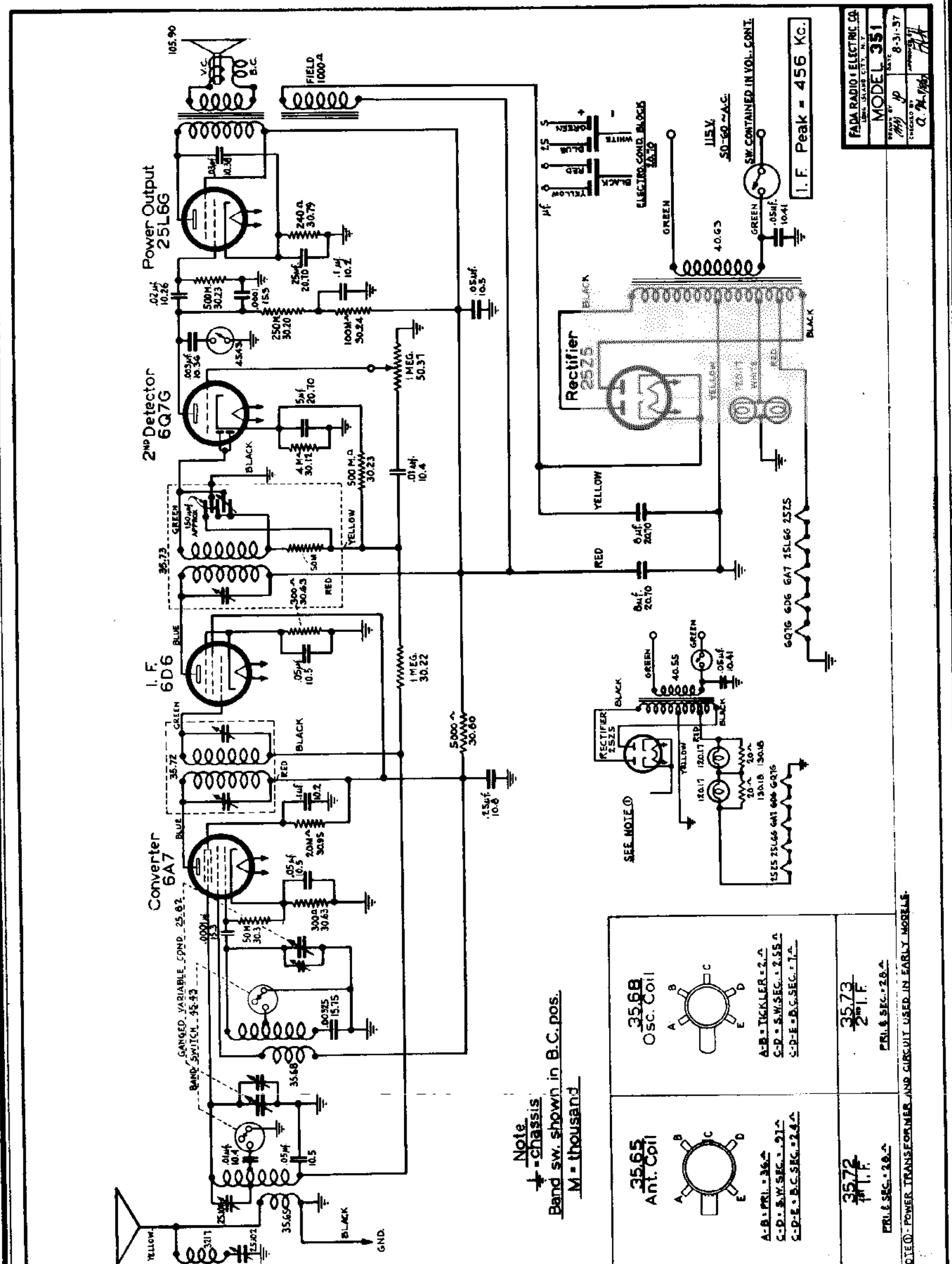
FADA RADIO & ELECTRIC CO

MODEL 350
Schematic, Changes



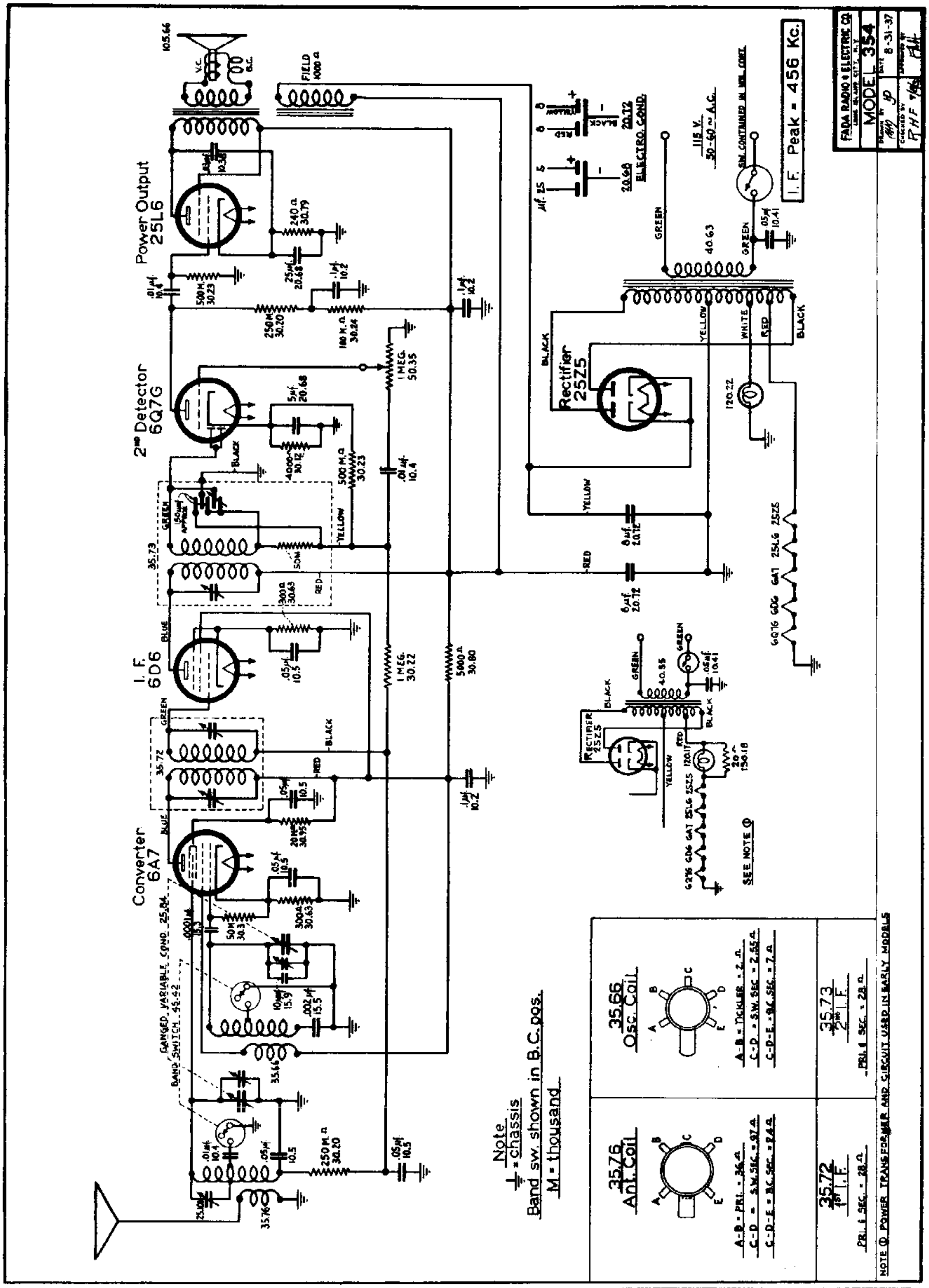
MODEL 351
Schematic

FADA RADIO & ELECTRIC CO



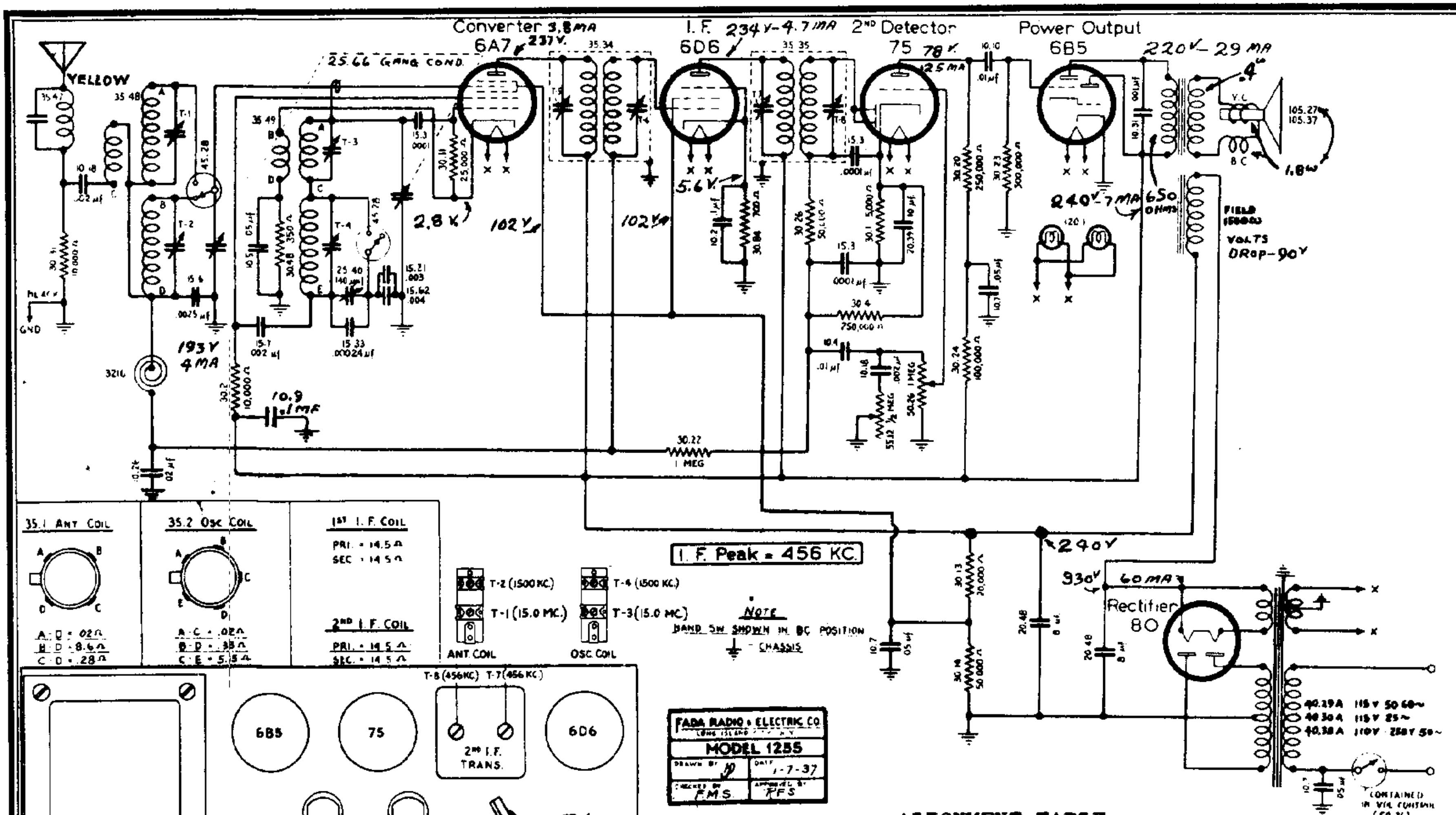
FADA RADIO & ELECTRIC CORP.

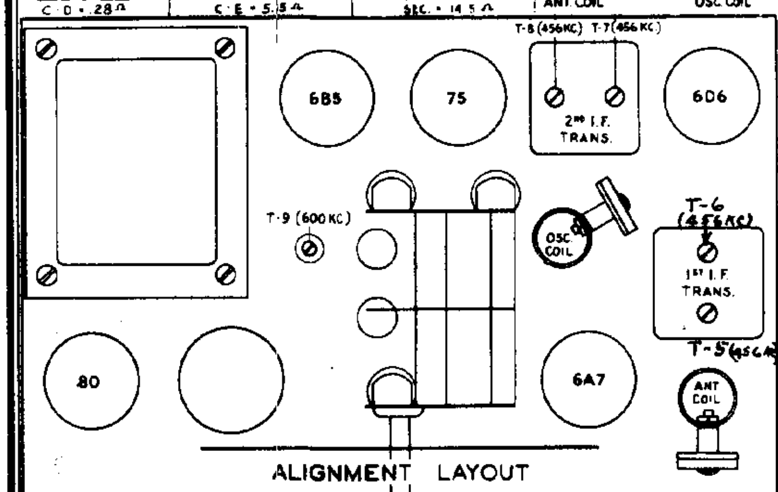
MODEL 354
Schematic



MODEL 1255
Schematic, Socket
Alignment, Trimmers

FADA RADIO & ELECTRIC CO





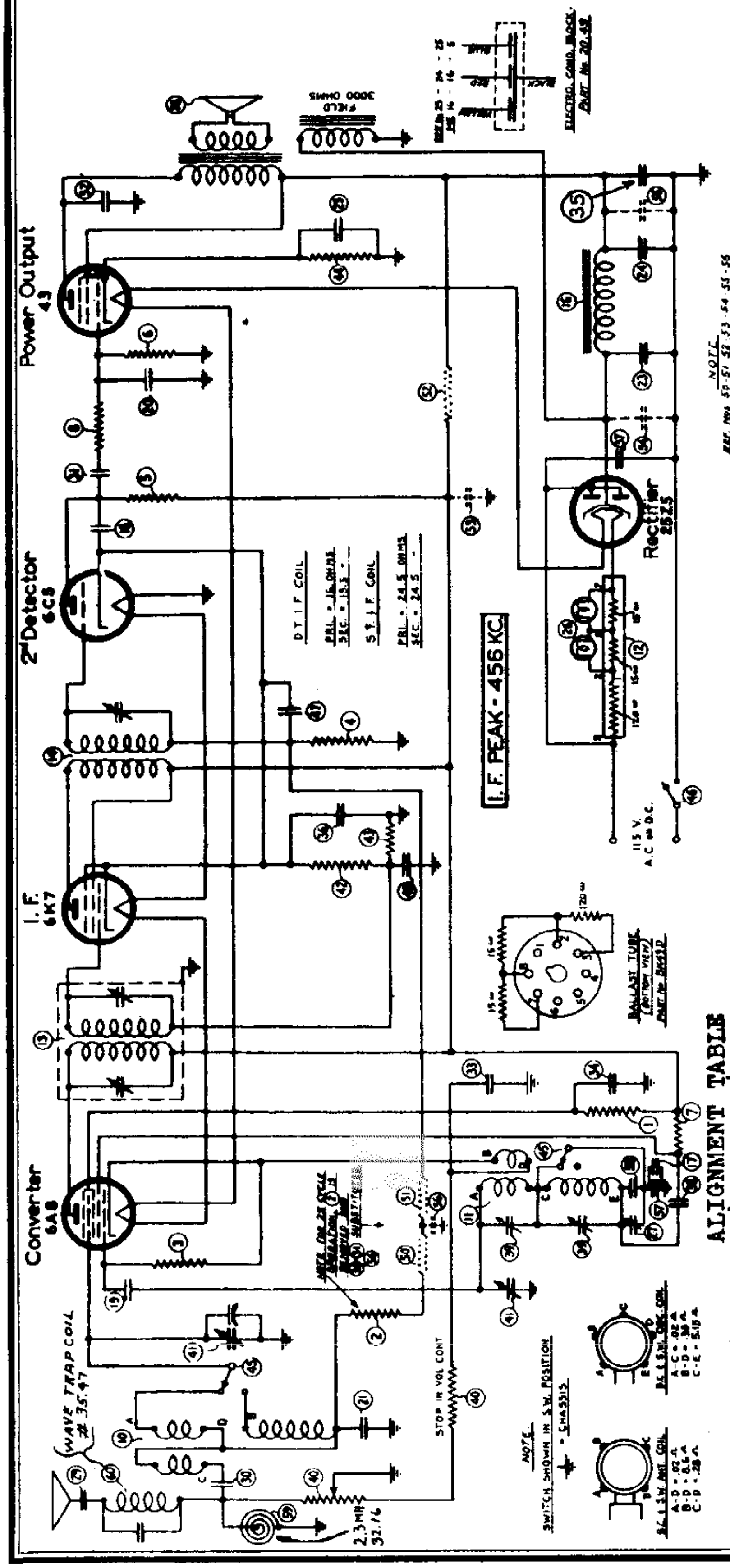
ALIGNMENT TABLE

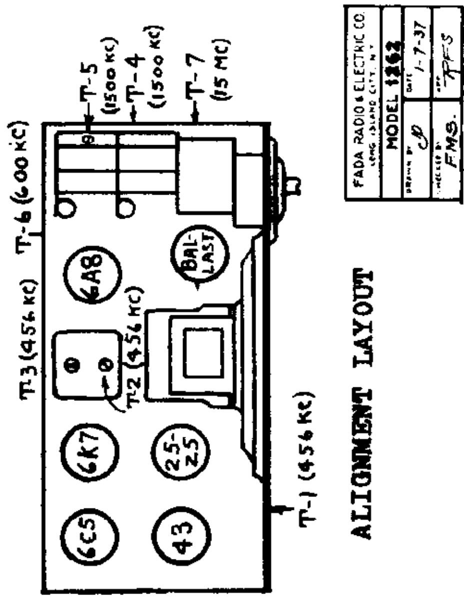
Wave BAND	Dial Fre.	Gen. Fre.	Image Fre.	Dum. ANT	Gen. Con. to	Adj. Trim.
BC	1000 KC	456 KC	- - -	.001 MF & 50MΩ	CG of 6D6	T8, T7
BC	1000 KC	456 KC	- - -	Same	CG of 6A7	T6, T5
SW	15.0 MC	15.0MC	15.9MC	400 Ω	"Y" Ant.	T3, T1
SW	6.0 MC	6.0 MC	- - -	Same	Same	Chk. Sen.
BC	1500 KC	1500KC	- - -	200MMF	Same	T4, T2
BC	600 KC	600 KC	- - -	Same	Same	T9 *

* Rock during adjustment. (Check sensitivity at 6 MC)

FADA RADIO & ELECTRIC CO

MODEL 1262
Schematic, Socket
Trimmers, Alignment
Parts





ALIGNMENT LAYOUT

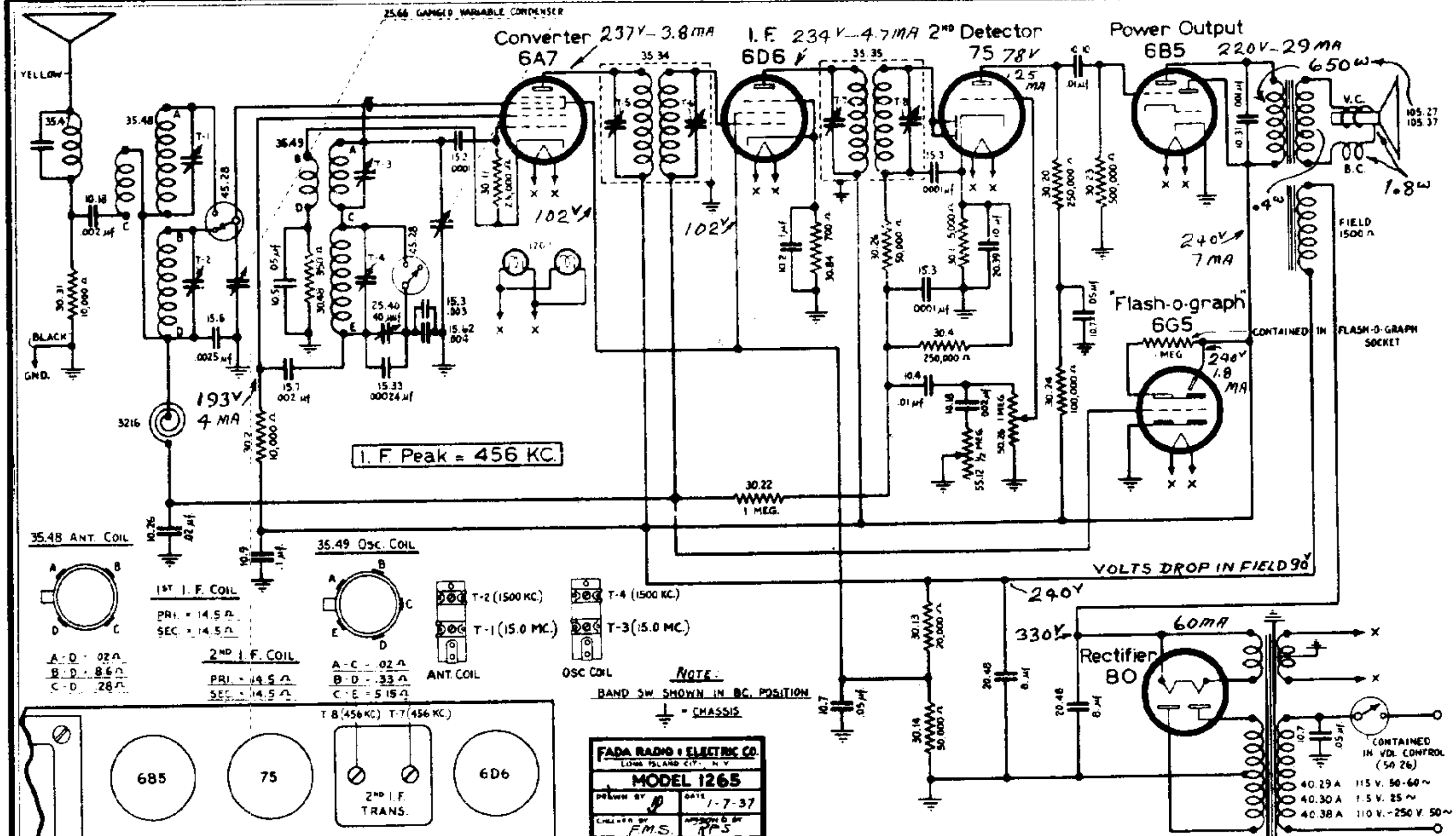
ALIGNMENT TABLE

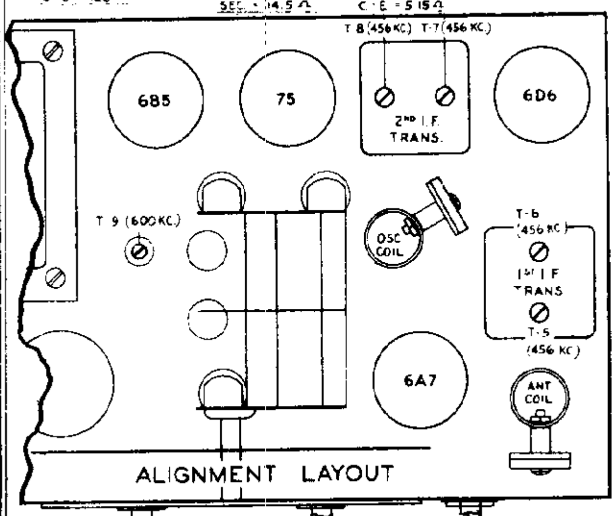
WAVE BAND	Dial Fre.	Gen. Fre.	Image Fre.	Dum. Ant.	Gen. Con. to	Adj. Trim.
BC	1000KC	456 KC	- - -	.001 MF & 50M ω	CG of 6A8	T1,T2,T3
BC	1500KC	1500KC	- - -	200 MMF	Ant. lead	T4, T5
BC	600KC	600KC	- - -	Same	Same	T6*
SW	15 MC	15MC	15.9MC	400 ω	Same	T7

* Rock variable condenser during alignment.

MODEL 1265
Schematic, Socket
Trimmers, Alignment
Voltage

FADA RADIO & ELECTRIC CO





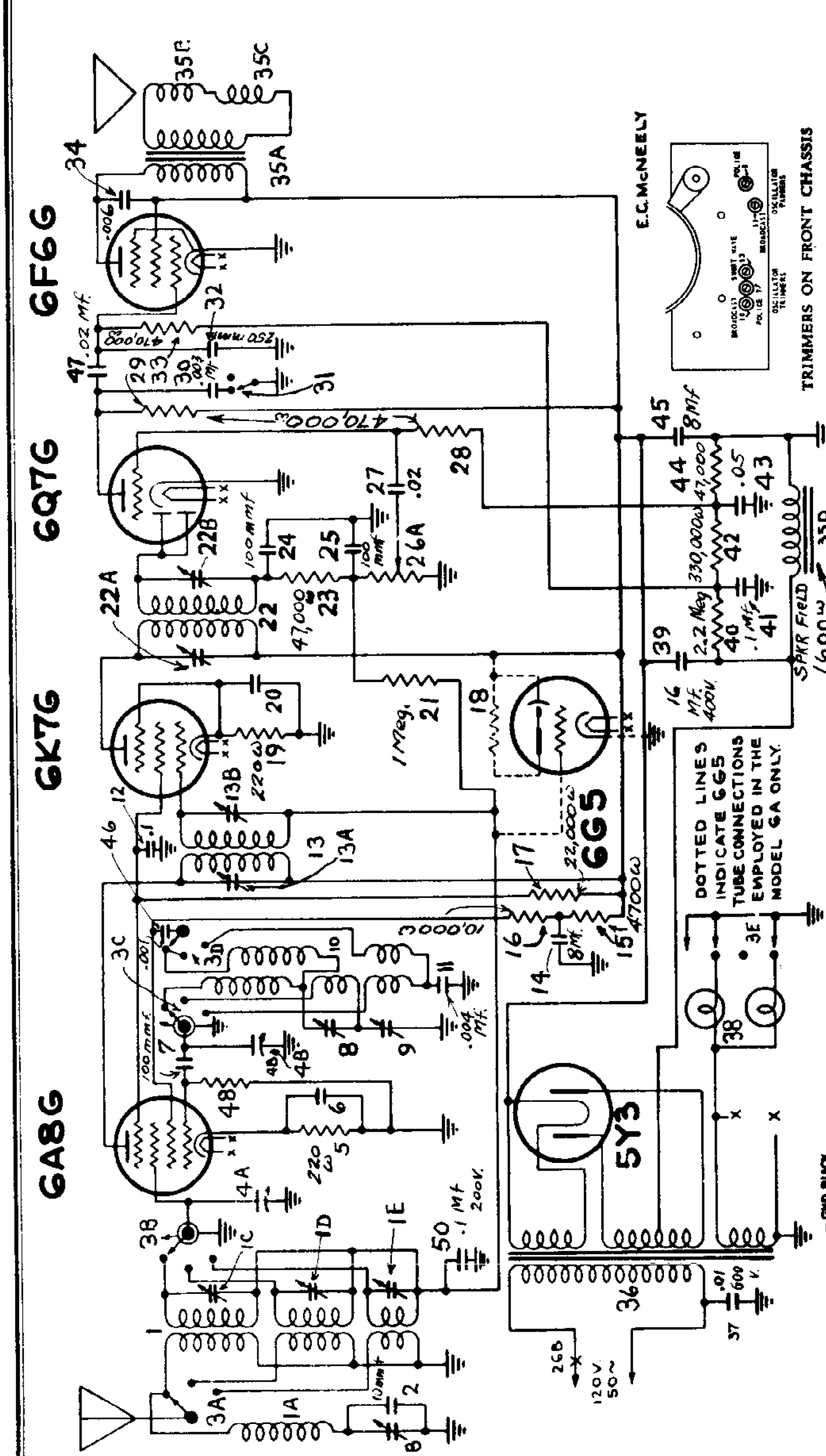
ALIGNMENT TABLE

WAVE BAND	DIAL Fre.	Gen. Fre.	Image Fre.	Dummy Antenna	Generator Con. to-	Adjust Trimmer
BC	1000KC	456KC	-	.001 MF & 50M~	CG of 6D6	T8, T7
BC	1000KC	456KC	-	Same	CG of 6A7	T6, T5
SW	15.0MC	15 MC	15.9MC	400 ω	"Y"Ant.Ld.	T3, T1
SW	6 MC	6 MC	-	Same	Same	Chk.Sen.
BC	1500KC	1500KC	-	.002 MF	Same	T4, T2
BC	600KC	600KC	-	Same	Same	*T9(Rock)

* Rock variable condenser during adjustment.

MODELS 5C, 6A
Schematic, Socket
Trimmers, Color Co

FAIRBANKS, MORSE & CO.



ELECTROLYTIC CONDENSER COLOR CODE

With the positive (+) or center solder lug toward you, read the colored markings as follows from left to right:

LEFT HAND OR CAPACITY COLOR

Black	0 to 9 mfd.
Brown	9 to 19 mfd.
Red	19 to 29 mfd.
Orange	29 to 39 mfd.
Yellow	39 to 49 mfd.

SECOND FROM LEFT OR MAXIMUM VOLTAGE COLOR

Black	0 to 99 volts
Brown	99 to 199 volts
Red	199 to 299 volts
Orange	299 to 399 volts
Yellow	399 to 499 volts
Green	499 to 599 volts

MODELS 5C, 6A
Alignment, Voltage
Resistance

FAIRBANKS, MORSE & CO.

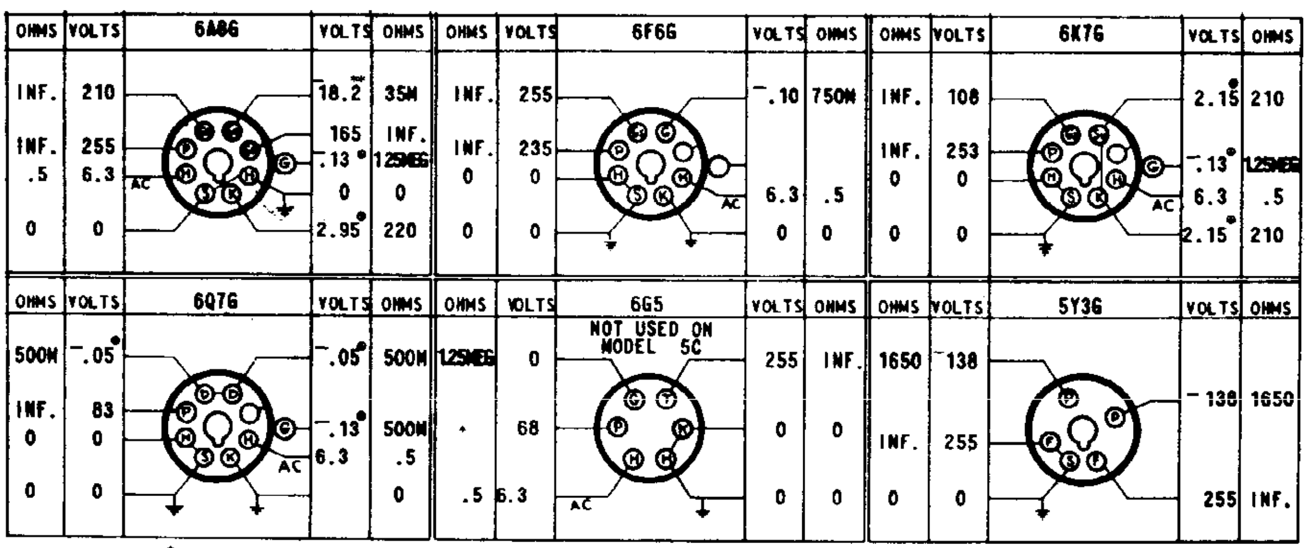
ALIGNMENT

The models 5C and 6A are AC operated, superheterodyne chassis with automatic volume control. These receivers operate on three bands—broadcast, police-amateur, and short wave, Figure 4. The 6A has the tuning eye, Figures 3 and 4; the 5C does not. Otherwise, the two chassis are identical.

Alignment procedure is given below in chart form, Figures 1 and 2. Make adjustments in the order given. The output meter may be any low range AC voltmeter, preferably about 0-15 volts. It should be connected from the plate of the 6F6G tube to ground with a .1 mfd. condenser in series with one of the leads. When the hand tends to go off scale, reduce the input from the signal generator and keep the volume control at maximum. If too strong a signal is fed to the receiver and the volume control is used to keep the output meter hand on scale, the A. V. C. will operate and inaccurate alignment will result.

No.	Connect Generator To	Signal Generator Frequency	Dummy	Range Switch	Dial Setting	Stage	Trimmer No.	AFC Switch	Peak For	Special Instructions
1	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	2nd IF	1		Max.	
2	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	2nd IF	2		Max.	
3	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	1st IF	3		Max.	
4	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	1st IF	4		Max.	
5	Antenna	456 KC*	400 ohm Resistor	Broadcast	530 KC	Wave Trap	5		Min.	*Raise input until signal is heard.
6	Antenna	5.4 MC	400 ohm Resistor	Police Amateur	5.4 MC	Police Osc.	6		Max.	
7	Antenna	5.4 MC	400 ohm Resistor	Police Amateur	5.4 MC	Police Det.	7		Max.	
8	Antenna	1.8 MC	400 ohm Resistor	Police Amateur	1.8 MC	Police Osc.	8		*Max.	*While rocking — Repeat 6, 7 and 8 until no change is noted.
9	Antenna	1500 KC	200 mmfd. Condenser	Broadcast	1500 KC	B. C. Osc.	9		Max.	
10	Antenna	1500 KC	200 mmfd. Condenser	Broadcast	1500 KC	B. C. Det.	10		Max.	
11	Antenna	600 KC	200 mmfd. Condenser	Broadcast	600 KC	B. C. Osc.	11		*Max.	*While rocking — Repeat 9, 10 and 11 until no change is noted.
12	Antenna	18 MC	400 ohm Resistor	Short Wave	18 MC	S. W. Osc.	12		Max.	
13	Antenna	18 MC	400 ohm Resistor	Short Wave	18 MC	S. W. Det.	13		Max.	
14	Antenna	6 MC	400 ohm Resistor	Short Wave	6 MC		*			*Check calibration at 6 MC—Padder is fixed.

FIGURE 2
ALIGNMENT CHART

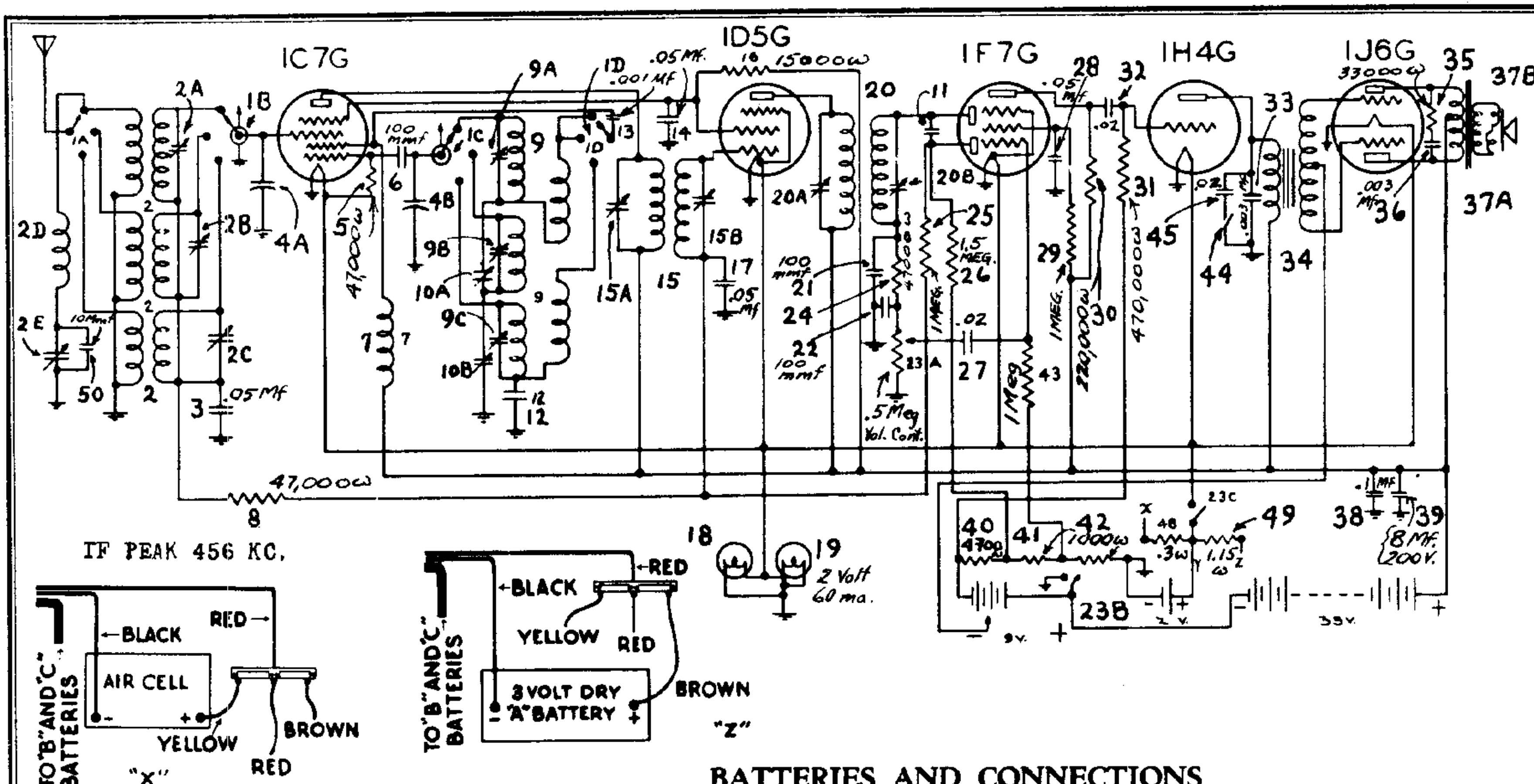


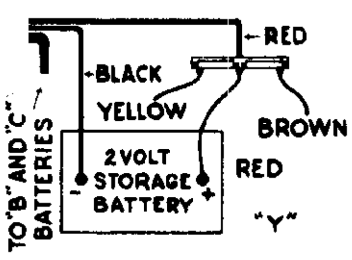
*CONNECTED TO TARGET THRU 1 MEGOHM RESISTOR ** 30 VOLT SCALE • 3 VOLT SCALE

VOLTAGE AND RESISTANCE ANALYSIS CHART

MODEL 5D
Schematic
Batt.Connections

FAIRBANKS, MORSE & CO.





BATTERIES AND CONNECTIONS

AIR CELL "A" BATTERY. If the receiver is to be operated on an Air Cell Battery, only one section of the "resistance link" circuit should be connected. (See "X," Figure 2.) The remaining two leads from the positive (+) "A" lead should be taped or otherwise insulated so they will not come in contact with any of the battery terminals.

TWO-VOLT STORAGE "A" BATTERY. If the receiver is to operate on a Two-Volt Storage "A" Battery, none of the "resistance link" circuit is to be used. The positive (+) "A" connection is to be made as shown under "Y" of Figure 2. The unused leads should be taped so they will not come in contact with the other battery terminals.

THREE-VOLT "A" BATTERY (DRY). If the receiver is to be operated on a Three-Volt "A" Battery, the "resistance link" circuit should be connected as shown under "Z" of Figure 2. The unused leads should be taped so they will not come in contact with any of the battery terminals.

When the Three-Volt "A" Battery becomes so low or weak that the receiver will no longer operate satisfactorily, the connections may then be changed to conform with "X" under Figure 2, thus obtaining a little more operating time from the battery.

When the Three-Volt "A" Battery again becomes so low that the receiver will not operate satisfactorily, the connections may once again be changed to conform with "Y," Figure 2, thus obtaining more operating time from the battery.

the receiver does not operate properly, and then the change must be made one step at a time as described above, otherwise the tubes in the receiver may be damaged.

"A" battery current consumption may be reduced approximately 18 per cent. by removing both dial light bulbs.

"B" BATTERIES. Three 45-volt "B" Batteries, with standard plug receptacles, are required with the receiver. Good quality, HEAVY DUTY batteries are recommended.

"C" BATTERIES. Two 4½-volt "C" Batteries, with standard plug receptacles are required with the receiver.

"A" BATTERY (2-VOLT). The Black battery lead is to be connected to "A" minus (—). The Red battery lead is to be connected to "A" plus (+).

"B" AND "C" BATTERIES. Five standard battery plugs will be found on the battery cable. While each has three prongs, it will be noted that three of the plugs have prongs which are all the same size. These are the "B" battery plugs and are to be plugged into the standard receptacles on the three 45-volt "B" batteries. The remaining plugs, each having one large prong and two small ones are to be plugged into the standard receptacles on the 4½-volt "C" batteries.

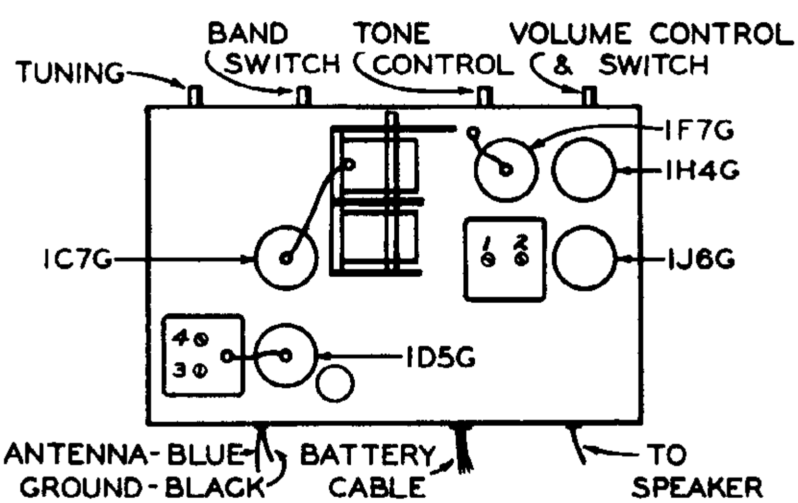
WARNING—DO NOT ALLOW THE "A" BATTERY LEADS TO COME IN CONTACT WITH ANY OF THE "B" BATTERY TERMINALS. IF THIS HAPPENS THE TUBES, RECEIVER, AND BATTERIES MAY BE

MODEL 5D
Alignment, Socket
Trimmers

FAIRBANKS, MORSE & CO.

The model 5D is a battery operated superhetrodyne with automatic volume control. It receives signals on three bands—broadcast, police-amateur, and short wave.

Alignment procedure is given below in chart form, figures 1 and 2. Make adjustments in the order given. The output meter may be any low range AC voltmeter, preferably about 0-15 volts. It should be connected across the two plates of the 1J6G tube with a .1 mfd. condenser in series with one of the leads. Set the volume at maximum during the alignment and as the meter hand tends to go off scale, decrease the output from the signal generator. If too strong a signal is fed to the receiver and the volume control is used to keep the output meter hand on scale, the AVC will operate and inaccurate alignment will result.



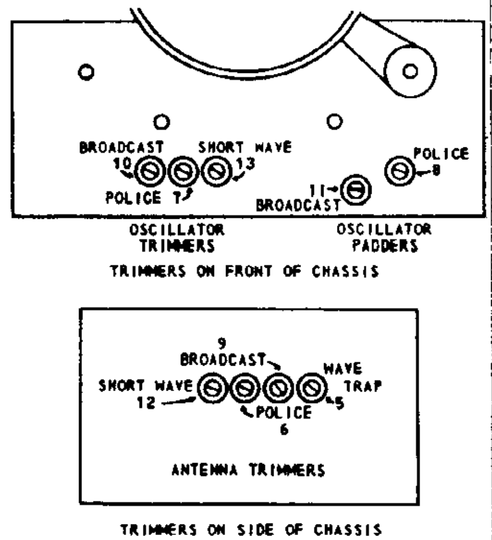


Figure 4

TOP, FRONT AND END VIEWS OF THE 5D CHASSIS SHOWING LOCATION OF TRIMMERS, CONTROLS AND COMPONENT PARTS

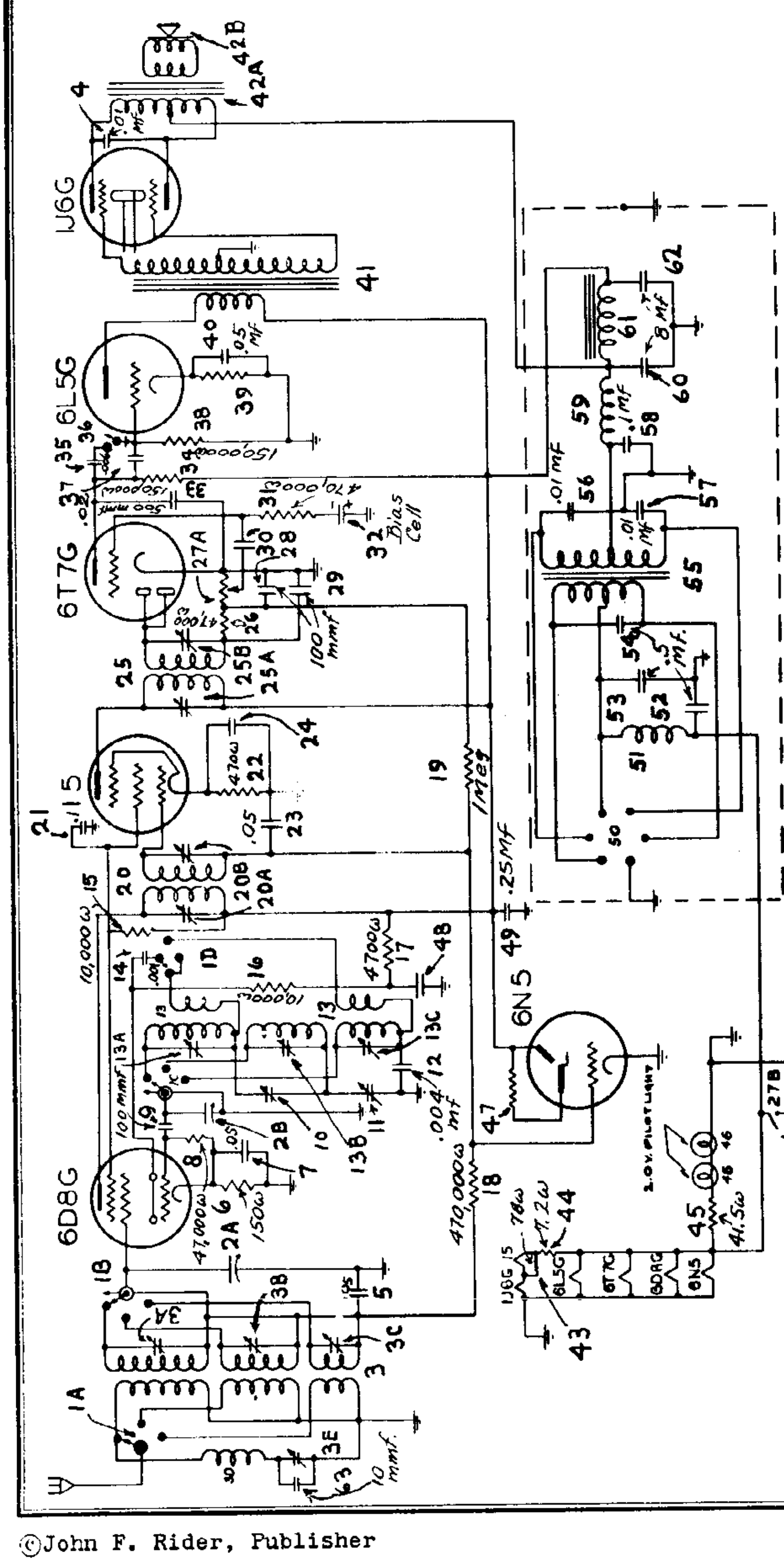
No.	Connect Generator To	Signal Generator Frequency	Dummy	Range Switch	Dial Setting	Stage	Trimmer No.	AFC Switch	Peak For	Special Instructions
1	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	2nd IF	1		Max.	
2	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	2nd IF	2		Max.	
3	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	1st IF	3		Max.	
4	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	1st IF	4		Max.	
5	Antenna	456 KC*	400 ohm Resistor	Broadcast	530 KC	Wave Trap	5		Min.	*Raise input until signal is heard.
6	Antenna	5.4 MC	400 ohm Resistor	Police Amateur	5.4 MC	Police Osc.	6		Max.	
7	Antenna	5.4 MC	400 ohm Resistor	Police Amateur	5.4 MC	Police Det.	7		Max.	
8	Antenna	1.8 MC	400 ohm Resistor	Police Amateur	1.8 MC	Police Osc.	8		*Max.	*While rocking — Repeat 6, 7 and 8 until no change is noted.
9	Antenna	1500 KC	200 mmf. Condenser	Broadcast	1500 KC	B. C. Osc.	9		Max.	
10	Antenna	1500 KC	200 mmf. Condenser	Broadcast	1500 KC	B. C. Det.	10		Max.	
11	Antenna	600 KC	200 mmf. Condenser	Broadcast	600 KC	B. C. Osc.	11		*Max.	*While rocking — Repeat 9, 10 and 11 until no change is noted.
12	Antenna	18 MC	400 ohm Resistor	Short Wave	18 MC	S. W. Osc.	12		Max.	
13	Antenna	18 MC	400 ohm Resistor	Short Wave	18 MC	S. W. Det.	13		Max.	
14	Antenna	6 MC	400 ohm Resistor	Short Wave	6 MC	S.W. Pad.	*			*Check calibration at 6 MC—Padder is fixed.

Figure 5

ALIGNMENT PROCEDURE CHART

FAIRBANKS, MORSE & CO.

MODEL 6C
Schematic, Socket
Trimmers



IF PEAK 456 KC.

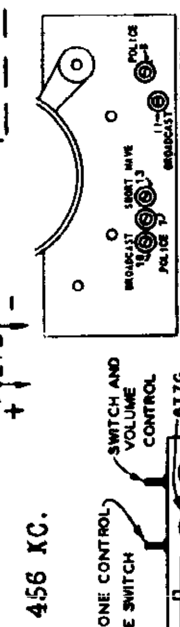
ELECTROLYTIC CONDENSER COLOR CODE

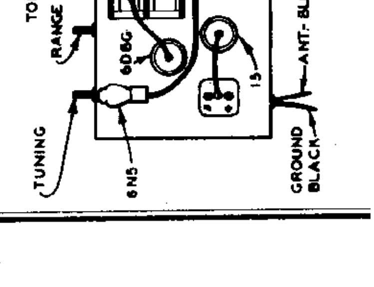
(All Other Color Codes Standard R. M. A.)

With the positive (+) or center solder lug toward you, read the colored markings as follows from left to right.

LEFT HAND OR CAPACITY COLOR		SECOND FROM LEFT OR MAXIMUM VOLTAGE COLOR	
Black	0 to 9 mfd.	Black	0 to 99 volts
Brown	9 to 19 mfd.	Brown	99 to 199 volts
Red	19 to 29 mfd.	Red	199 to 299 volts
Orange	29 to 39 mfd.	Orange	299 to 399 volts
Yellow	39 to 49 mfd.	Yellow	399 to 499 volts
		Green	499 to 599 volts

If a third (blue) stripe is shown, the condenser is a regulator and should be in the position farthest from the rectifier tube in the filter circuit.





MODEL 6C
Alignment, Voltage
Resistance

FAIRBANKS, MORSE & CO.

The model 6C is a six-volt battery operated superhetrodyne with automatic volume control and tuning eye. It receives signals on three bands—broadcast, police-amateur, and short wave.

Alignment procedure is given below in chart form, figures 1 and 2. Make adjustments in the order given. The output meter may be any low range AC voltmeter, preferably about 0-15 volts. It should be connected across the two plates of the 1J6G tube with a .1 mfd. condenser in series with one of the leads. Set the volume at maximum during the alignment and as the meter hand tends to go off scale, decrease the output from the signal generator. If too strong a signal is fed to the receiver and the volume control is used to keep the output meter hand on scale, the AVC will operate and inaccurate alignment will result.

Figure 1

TOP VIEW, FRONT VIEW AND END VIEW OF THE CHASSIS SHOWING THE LOCATION OF TRIMMERS, CONTROLS, TUBES AND COMPONENT PARTS

No.	Connect Generator To	Signal Generator Frequency	Dummy	Range Switch	Dial Setting	Stage	Trimmer No.	AFC Switch	Peak For	Special Instructions
1	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	2nd IF	1		Max.	
2	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	2nd IF	2		Max.	
3	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	1st IF	3		Max.	
4	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	1st IF	4		Max.	
5	Antenna	456 KC*	400 ohm Resistor	Broadcast	530 KC	Wave Trap	5		Min.	*Raise input until signal is heard.
6	Antenna	5.4 MC	400 ohm Resistor	Police Amateur	5.4 MC	Police Osc.	6		Max.	
7	Antenna	5.4 MC	400 ohm Resistor	Police Amateur	5.4 MC	Police Det.	7		Max.	
8	Antenna	1.8 MC	400 ohm Resistor	Police Amateur	1.8 MC	Police Osc.	8		*Max.	*While rocking. Repeat 6, 7 and 8 until no change is noted.
9	Antenna	1500 KC	200 mmf. Condenser	Broadcast	1500 KC	B. C. Osc.	9		Max.	
10	Antenna	1500 KC	200 mmf. Condenser	Broadcast	1500 KC	B. C. Det.	10		Max.	
11	Antenna	600 KC	200 mmf. Condenser	Broadcast	600 KC	B. C. Osc.	11		*Max.	*While rocking. Repeat 9, 10 and 11 until no change is noted.
12	Antenna	18 MC	400 ohm Resistor	Short Wave	18 MC	S. W. Osc.	12		Max.	
13	Antenna	18 MC	400 ohm Resistor	Short Wave	18 MC	S. W. Det.	13		Max.	
14	Antenna	6 MC	400 ohm Resistor	Short Wave	6 MC		*			*Check calibration at 6 MC. Padder is fixed.

Figure 2

ALIGNMENT PROCEDURE CHART

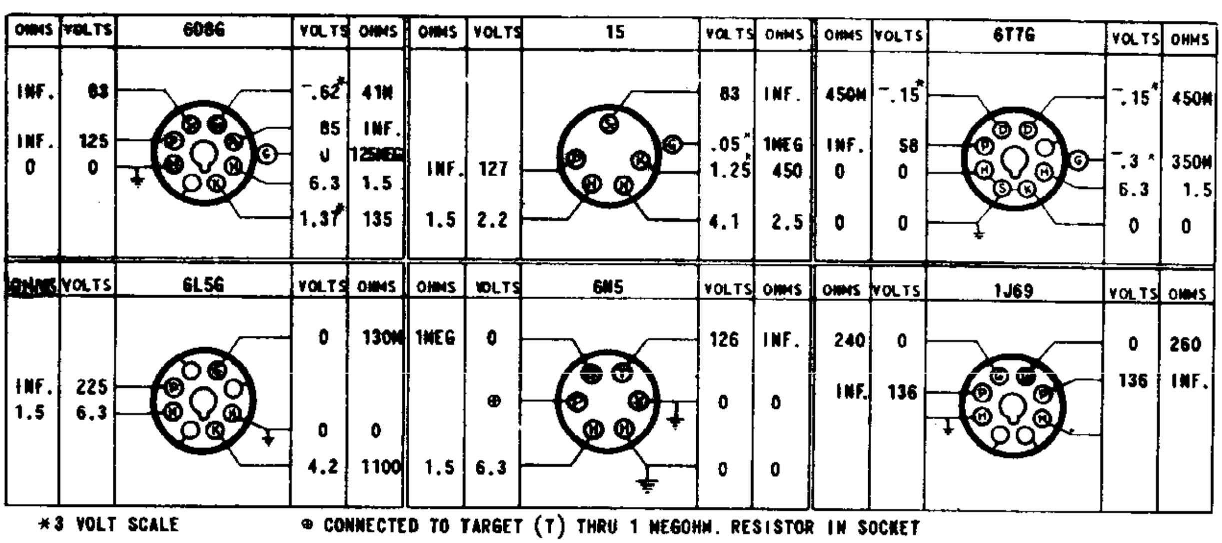
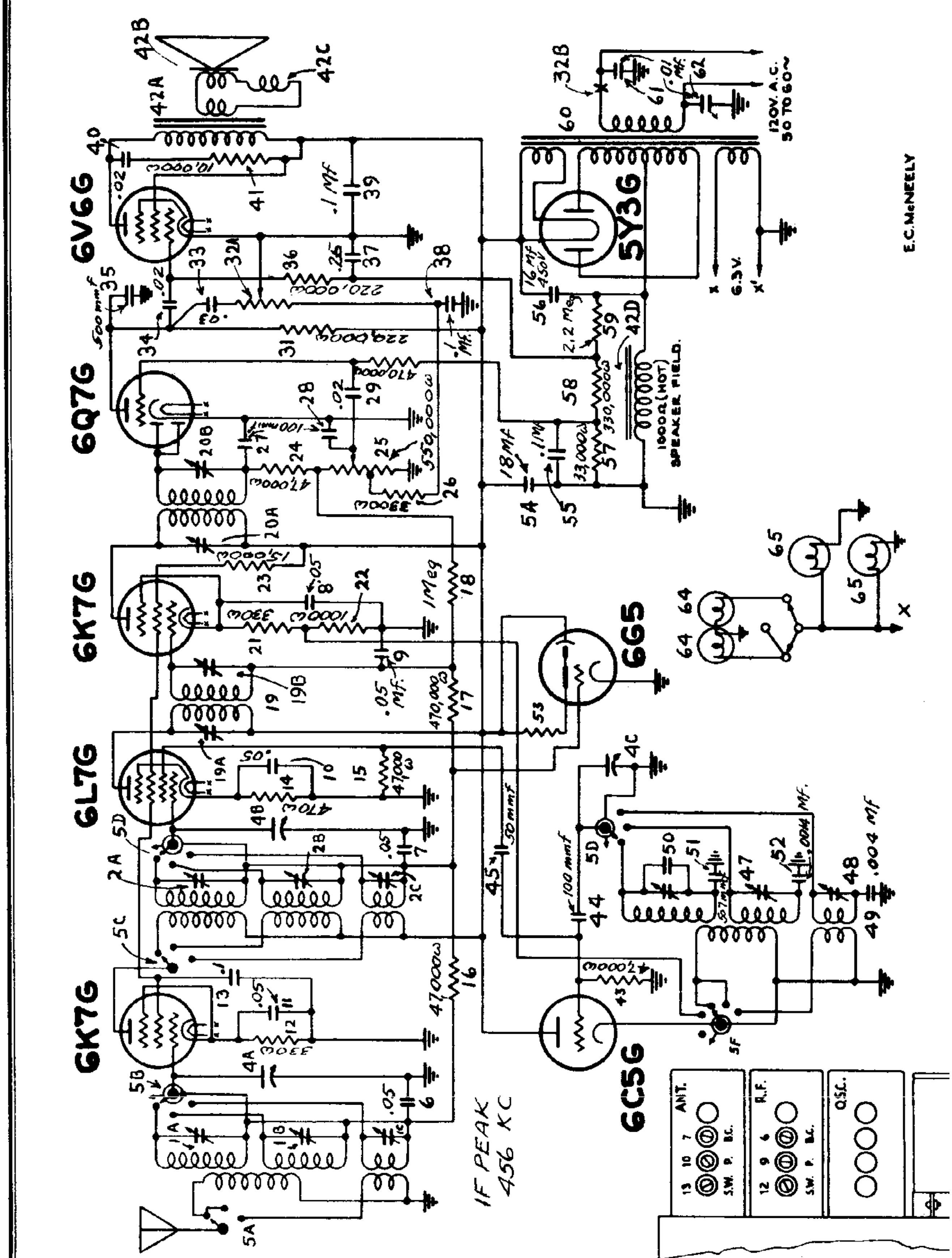


Figure 5

VOLTAGE AND RESISTANCE ANALYSIS CHART

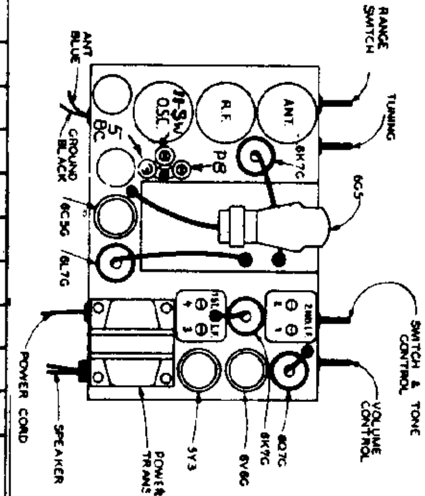
MODEL 8A
Schematic
Trimmers

FAIRBANKS, MORSE & CO.

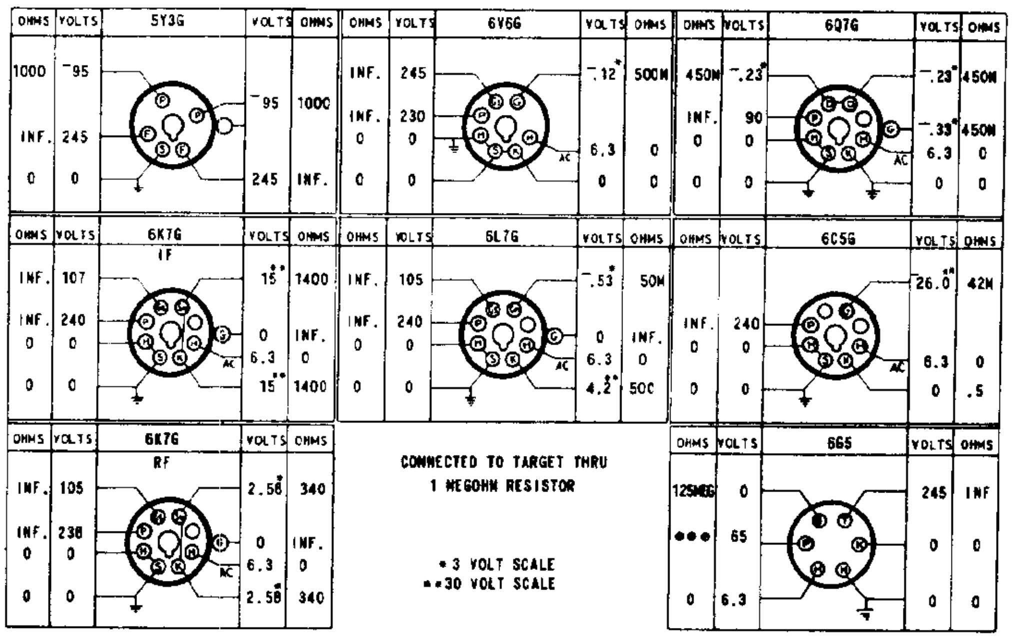


MODEL 8A
Alignment, Voltage
Resistance, Socket
Trimmers

FAIRBANKS, MORSE & CO.



No.	Connect Generator To	Signal Generator Frequency	Dummy	Range Switch	Dial Setting	Stage	Trimmer No.	AFC Switch	Peak For	Special Instructions
1	6L7G Grid	456 KC	.1 mfd. Condenser	Broadcast	550 KC	2nd IF	1		Max.	
2	6L7G Grid	456 KC	.1 mfd. Condenser	Broadcast	550 KC	2nd IF	2		Max.	
3	6L7G Grid	456 KC	.1 mfd. Condenser	Broadcast	550 KC	1st IF	3		Max.	
4	6L7G Grid	456 KC	.1 mfd. Condenser	Broadcast	550 KC	1st IF	4		Max.	
5	Antenna Lead	1500 KC	200 mmf. Condenser	Broadcast	1500 KC	BC Osc.	5		Max.	
6	Antenna Lead	1500 KC	200 mmf. Condenser	Broadcast	1500 KC	BC Det.	6		Max.	
7	Antenna Lead	1500 KC	200 mmf. Condenser	Broadcast	1500 KC	BC Ant.	7		Max.	Check calibration at 600 KC
8	Antenna Lead	5.4 MC	400 ohm Resistor	Police	5.4 MC	Police Osc.	8		Max.	
9	Antenna Lead	5.4 MC	400 ohm Resistor	Police	5.4 MC	Police Det.	9		Max.	
10	Antenna Lead	5.4 MC	400 ohm Resistor	Police	5.4 MC	Police Ant.	10		Max.	Check calibration at 1.8 MC
11	Antenna Lead	18 MC	400 ohm Resistor	Short Wave	18 MC	S.W. Osc.	11		Max.	Check for image at 17.1 MC. It should not be as strong as the signal at 18 MC
12	Antenna Lead	18 MC	400 ohm Resistor	Short Wave	18 MC	S.W. Det.	12		Max.	
13	Antenna Lead	18 MC	400 ohm Resistor	Short Wave	18 MC	S.W. Ant.	13		Max.	Check calibration at 6 MC



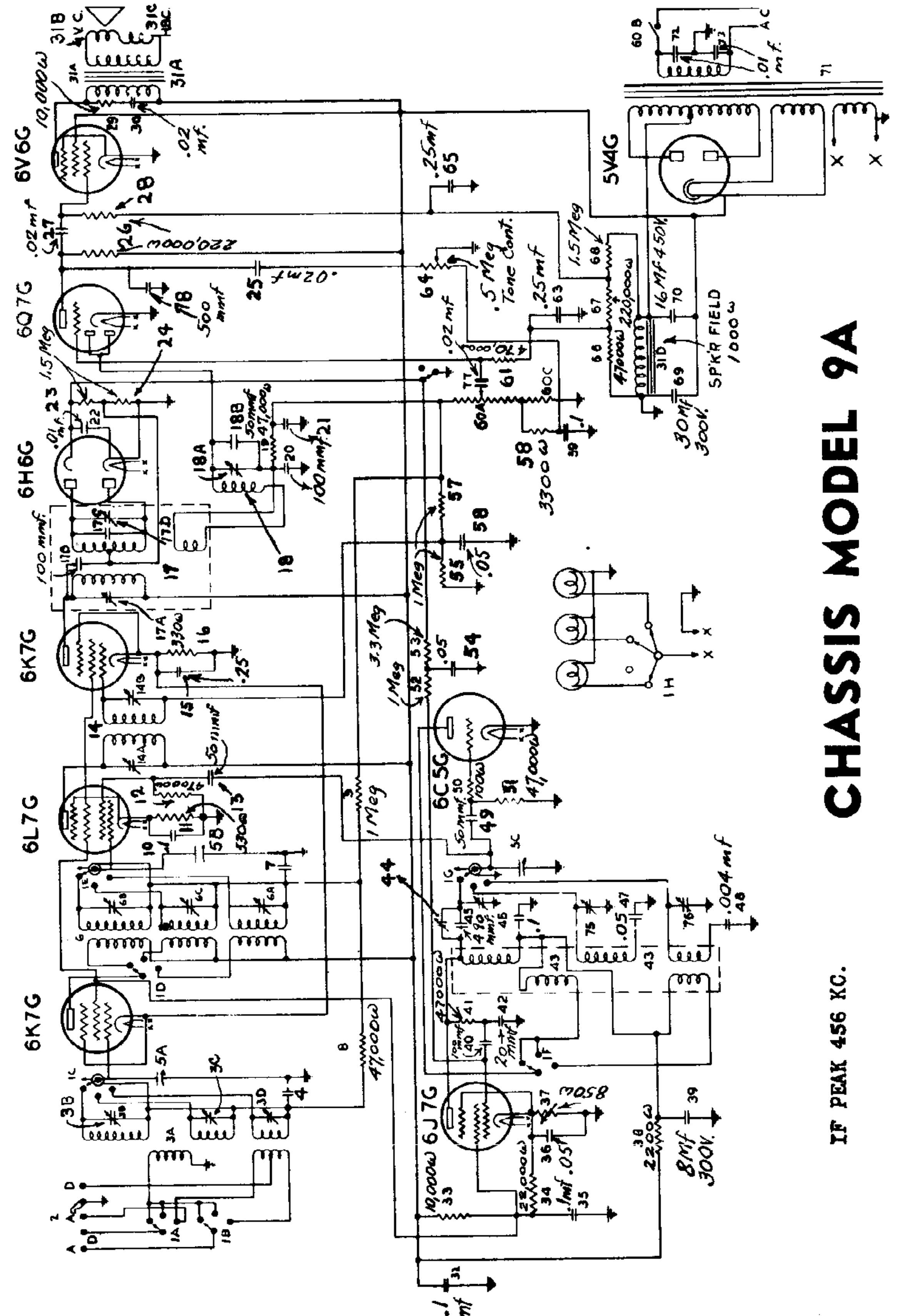
When aligning the police and short wave bands, care must be taken to see that the trimmers are set on the proper frequency and not on the image. The signal from the oscillator beating with the incoming signal in the mixer tube produces two 456 kilocycle hetrodynes, one equal to the oscillator frequency minus the frequency of the incoming signal, and the other equal to the incoming signal minus the oscillator. The former is the one to which the RF and antenna trimmers must be tuned if the receiver is to work correctly over the entire band. The image falls 912 kilocycles below the fundamental signal, so at 18 megacycles the image should be heard at 18 megacycles minus .912 megacycle or 17.1 megacycles aprpoximately.

After setting the oscillator trimmer, increase the input from the signal generator and make sure that the image comes in at the proper point. When you can hear one signal at the frequency to which your generator is set, and one at about 1 megacycle below it, you are ready to finish the alignment. Go back to the fundamental frequency and start peaking the RF trimmer, rocking the tuning condenser slightly as you do so. When you reach a peak, compare the strength of the fundamental signal and the image. If the image is the stronger, you have the wrong peak on the RF trimmer. Find the other peak and again compare the two signals. You will probably find it necessary to increase the generator input greatly in order even to hear the image when you have found the right peak. The antenna trimmer may be peaked in the same manner.

Extreme howling or motorboating on the short wave bands or dead spots near the high frequency end of the dial are good indications that the RF trimmer is improperly aligned and may easily be corrected by resetting it as described above.

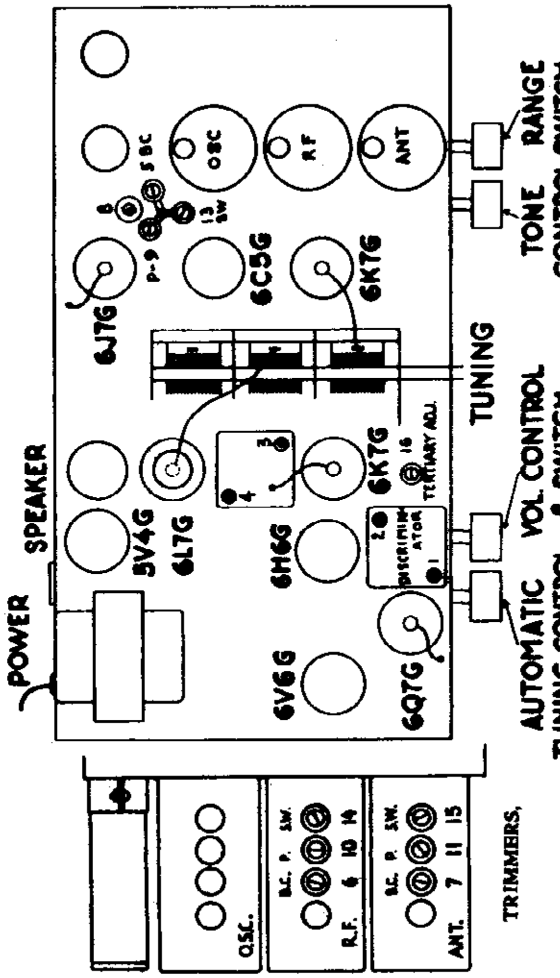
MODEL 9A
Schematic

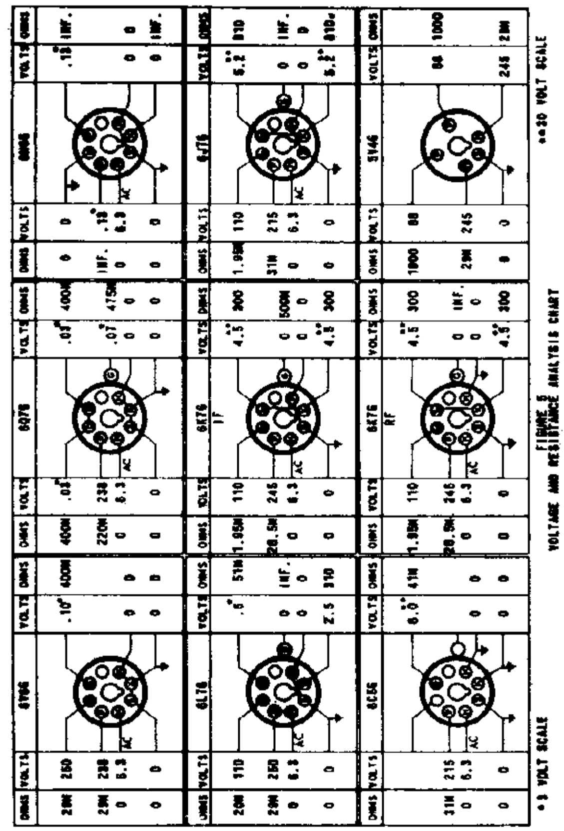
FAIRBANKS, MORSE & CO.



MODEL 9A
Socket, Trimmers
Alignment, Voltage
Resistance

FAIRBANKS, MORSE & CO.





AUTOMATIC DIAL ADJUSTMENT SAME AS GIVEN FOR THE MODEL 12A (see index). ALIGNMENT NOTES OF MODEL 12A ALSO APPLY TO THIS MODEL.

ALIGNMENT PROCEDURE CHART

No.	Connect Generator To	Signal Generator Frequency	Dummy Antenna	Range Switch	Dial Setting	Stage	Trimmer No.	AFC Switch	Peak For	Special Instructions
1	6L7G Grid	456 KC	.1 Mfd. Condenser	Broadcast	550 KC	Disc.	1	Out	Max.	
2	6L7G Grid	456 KC	.1 Mfd. Condenser	Broadcast	550 KC	Disc.	2	Out	Max.	
3	6L7G Grid	456 KC	.1 Mfd. Condenser	Broadcast	550 KC	Disc.	16	Out	Max.	
4	6L7G Grid	456 KC	.1 Mfd. Condenser	Broadcast	550 KC	1st IF	3	Out	Max.	
5	6L7G Grid	456 KC	.1 Mfd. Condenser	Broadcast	550 KC	1st IF	4	Out	Max.	
6	Antenna	1500 KC	200 Mmf. Condenser	Broadcast	1500 KC	B.C. Osc.	5	Out	Max.	
7	Antenna	1500 KC	200 Mmf. Condenser	Broadcast	1500 KC	B.C. R.F.	6	Out	Max.	
8	Antenna	1500 KC	200 Mmf. Condenser	Broadcast	1500 KC	B.C. Ant.	7	Out	Max.	
9	Antenna	600 KC	200 Mmf. Condenser	Broadcast	600 KC	B.C. Pad.	8	Out	*Max.	*While rocking. Repeat 6, 7, 8, and 9 until no change is noted.
10	Antenna	1500 KC	200 Mmf. Condenser	Broadcast	1500 KC	Disc.	1	In	Max.	
11	Antenna	5.4 MC	400 Ohm Resistor	Police Amateur	5.4 MC	Police Osc.	9	Out	Max.	
12	Antenna	5.4 MC	400 Ohm Resistor	Police Amateur	5.4 MC	Police R.F.	10	Out	Max.	
13	Antenna	5.4 MC	400 Ohm Resistor	Police Amateur	5.4 MC	Police Ant.	11	Out	Max.	
14	Antenna	1.8 MC	400 Ohm Resistor	Police Amateur	1.8 MC	Police Pad.	*	Out		*Check calibration at 1.8 MC. Padder is fixed.
15	Antenna	18 MC	400 Ohm Resistor	Short Wave	18 MC	S.W. Osc.	13	Out	Max.	
16	Antenna	18 MC	400 Ohm Resistor	Short Wave	18 MC	S.W. R.F.	14	Out	Max.	
17	Antenna	18 MC	400 Ohm Resistor	Short Wave	18 MC	S.W. Ant.	15	Out	Max.	
18	Antenna	6.0 MC	400 Ohm Resistor	Short Wave	6.0 MC	S.W. Pad.	*	Out	Max.	*Check calibration at 6.0 MC. Padder is fixed.

FAIRBANKS, MORSE & CO.

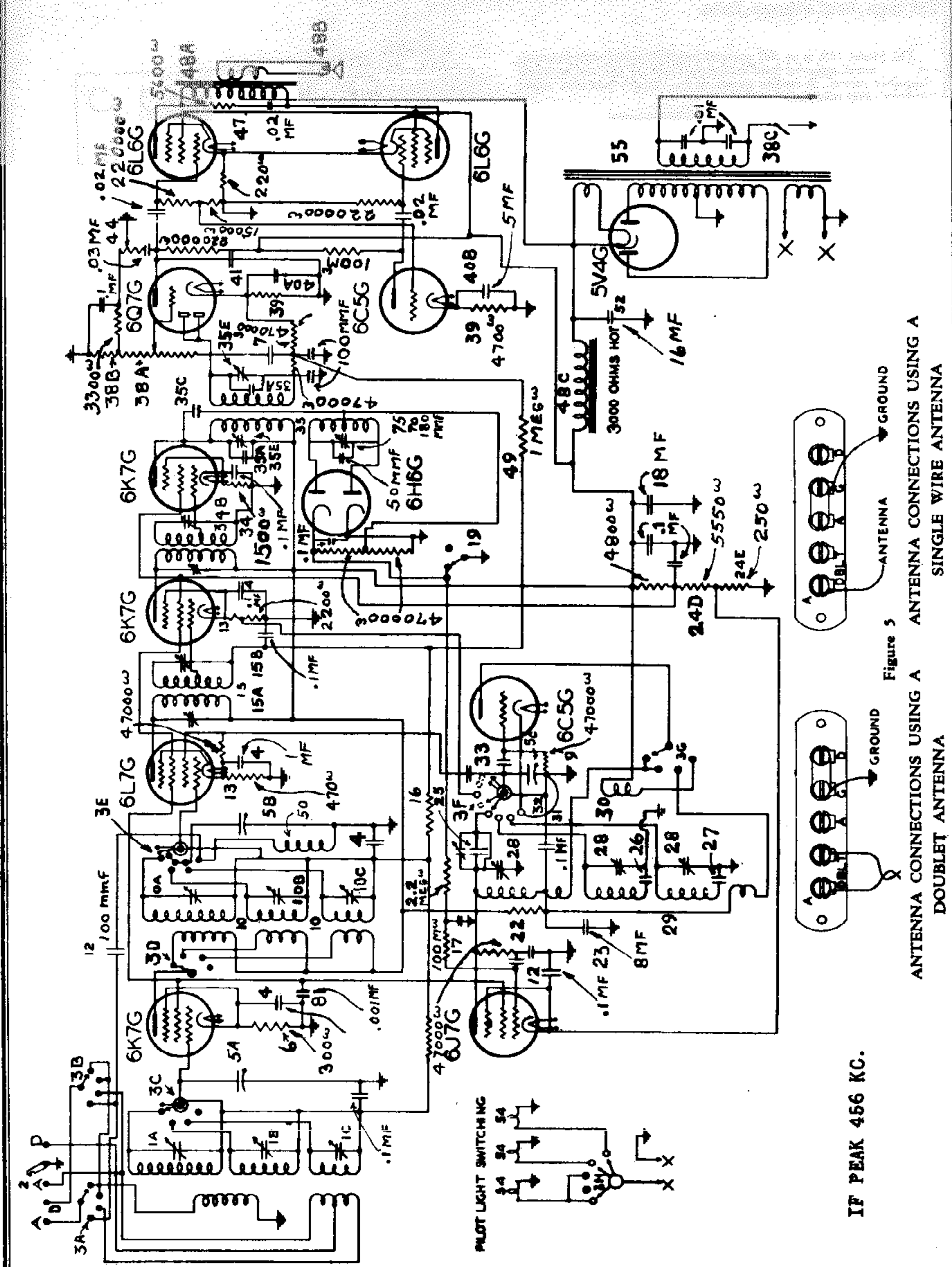


Figure 5

MODEL 12A
Socket, Trimmers
Voltage, Resistance, Data

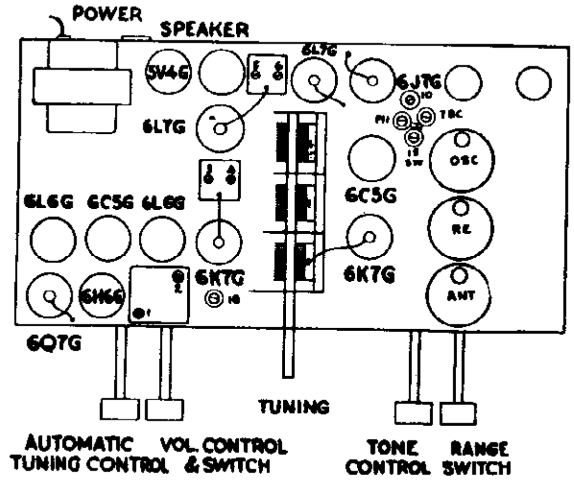
FAIRBANKS, MORSE & CO.

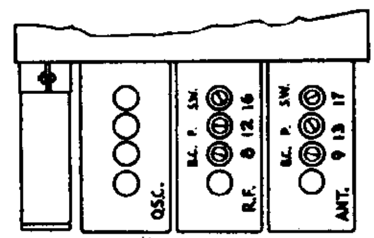
The Model 12A is an AC operated superheterodyne with automatic volume control, signa-lite band indication, automatic dial and automatic frequency control. It receives signals on four bands—broadcast, police-amateur, short wave and ultra-short wave.

Alignment procedure is given in the following pages in chart form. Make adjustments in the order given. The output meter may be any low range AC voltmeter, preferably about 0-15 volts. It should be connected across the plates of the 6L6G tubes with a .1 mfd. condenser in series with one of the leads. The volume control should be set at maximum during the alignment, and as the meter hand tends to go off scale, the output from the signal generator should be decreased. If too strong a signal is fed to the receiver and the volume control is used to keep the hand on scale, the A.V.C. will operate and inaccurate alignment will result.

When aligning the police and short wave bands, care must be taken to see that the trimmers are set on the proper frequency and not on the image. The signal from the oscillator beating with the incoming signal in the mixer tube produces two 456 kilocycle heterodynes, one equal to the osciilator frequency minus the frequency of the incoming signal and the other equal to the incoming signal minus the oscillator. The former is the one to which the RF and antenna trimmers must be tuned if the receiver is to work correctly over the entire band. The image falls 912 kilocycles below the fundamental signal, so at 18 megacycles the signal should be heard at 18 minus .912 or 17.1 megacycles approximately.

After setting the oscillator trimmer, increase the input from the signal generator and make sure that the image comes in at the proper point. When one signal can be heard at the frequency to which the generator is set and one at about one megacycle below it the alignment is ready to be finished. Go back to the fundamental frequency and start peaking the RF trimmer, rocking the tuning condenser slightly at the same time. When a peak has been reached, compare the strength of the fundamental signal and the image. If the image is the stronger, the RF trimmer is at the wrong peak. Find the other peak and again compare the two signals. It will porbably be necessary to increase the generator input greatly in order even to hear the image when the right peak has been found.





VOLTAGE AND RESISTANCE ANALYSIS CHART

OHMS	VOLTS	6K7G RF	VOLTS	OHMS
5,700	100		3.7*	320
10,500	235		0	INF.
0	6.3	AC	0	0
0	0		3.7*	320

OHMS	VOLTS	6L7G	VOLTS	OHMS
5,700	100		.35**	42,500
10,000	232		0	INF.
0	0	AC	6.3	0
0	0		5.2*	500

OHMS	VOLTS	6J7G	VOLTS	OHMS
5,700	100		4.8*	250
13,500	192		0	INF.
0	6.3	AC	0	0
0	0		4.8*	250

OHMS	VOLTS	6C5G OSC	VOLTS	OHMS
			-.05**	41,500
13,500	200			
0	6.3	AC	0	0
0	0		0	0

OHMS	VOLTS	6K7G 1ST IF	VOLTS	OHMS
5,700	100		8.3*	2,900
10,500	232		0	INF.
0	6.3	AC	0	0
0	0		8.3*	2,900

OHMS	VOLTS	6K7G 2ND IF	VOLTS	OHMS
5,700	100		3.2*	1,500
10,500	232		0	7.50
0	0	AC	6.3	0
0	0		3.2*	1,500

OHMS	VOLTS	6H6G	VOLTS	OHMS
0	0		-.13**	230M
230M	-.13**			
0	6.3	AC	0	0
0	0		0	0

OHMS	VOLTS	6C5G PHASE INVERTER	VOLTS	OHMS
			0	190M
13,000	108			
0	6.3	AC	0	0
			4.8*	225

OHMS	VOLTS	6Q7G	VOLTS	OHMS
500M	0		0	500M
190M	110		0	500M
0	6.3	AC	0	0
0	0		1.15**	4,500

OHMS	VOLTS	6L6G	VOLTS	OHMS
10,500	215		0	190M
13,000	395			
0	6.3	AC	0	0
0	0		18.7*	205

OHMS	VOLTS	6L6G	VOLTS	OHMS
10,500	215		0.	190M
13,000	395			
0	0	AC	6.3	0
0	0		18.7*	225

OHMS	VOLTS	5V4G	VOLTS	OHMS
55	AC			
			AC	58
13,500	405			
			405	13,000

*3 VOLT SCALE **30 VOLT SCALE

MODEL 9A,12A
Automatic Dial Notes
MODEL 12A
Alignment

FAIRBANKS, MORSE & CO.

THE AUTOMATIC DIAL

Since the Model 12AC6 is to be delivered to the customer with the dial set up for the locality in which he lives, it is important that the serviceman be thoroughly familiar with the proper set-up procedure so that he can perform the operation accurately and in a small amount of time.

It would be practically impossible to design a mechanical tuning device for a receiver as selective as the 12A which would automatically tune stations to the exact point of resonance every time without the operator's having to watch some sort of resonance indicator. For that reason automatic frequency control (true AFC tuning) has been incorporated into this model. The automatic frequency control makes up for the slight mechanical tolerances necessary in a device such as the automatic dial by shifting the oscillator to the exact frequency of the station to which the dial is tuned. It will be noted that stations can be "pulled" into resonance with the dial as much as 10 kilocycles away from the point where they would come in with the automatic tuning switch in the "out" position, and for that reason accurate setting of the dial might seem unimportant. It must be remembered, however, that the sensitivity of the receiver is best at the point where the stations come in without A.F.C. and that A.F.C. shifts only the oscillator frequency, not the RF and detector stages. Therefore, accurate setting of the dial is important if good reception is to be obtained on all the stations.

First, throw the automatic tuning switch to the "OUT" position. Then, by means of the outer tuning knob, tune in a station to which a button is to be assigned. Now, place a finger on the button nearest the "click" point (the mid-point at the bottom) and move it over to the "click" point until the dial locks. Care must be taken at this point that in depressing the button without its pyralin covering the metal plunger in the center is not pushed to a point where the dial will not lock. If this difficulty is experienced, try depressing the button with the nail of the forefinger against its outer edge.

After the dial has clicked into place and seems to be locking properly, release the button taking care not to move the dial. Now, with a pencil or screw driver held in the left hand push the metal plunger at the center of the button in as far as it will go. With the right hand retune the station carefully and then release the metal plunger. It may not come all the way out at first and a slight back and forth motion of the vernier knob may be necessary before it snaps out to its original position. Be sure that the plunger is back into place before the station tab is placed in the button.

To check the setting before putting in the station tab, rotate the dial until the button which was just set is somewhere near the top of the dial. Throw the automatic tuning switch to the "IN" position and use the button to tune in the station just as is described under "Automatic Tuning" in the Operating Instructions. Observe the same precautions as were mentioned before in regard to the metal plunger or the setting will have to be made all over again. With the station still tuned in, throw the automatic tuning switch to the "OUT" position and note the amount of detuning which occurs. If the station is detuned more than 3 or 4 kilocycles or to a point where the side bands are just barely audible, there is a closer setting possible and the button should be reset. When the dial seems to be tuning in the station properly, put in the proper station tab and place one of the pyralin discs over it. The tab should be placed so as to read right side up when the button is at the "click" point. This gives a uniform appearance to the dial when the buttons have all been set. In case any of the buttons are not used, put in one of the blank tabs supplied and a pyralin disc.

Set the remainder of the buttons in exactly the same manner, making sure each time that the switch is in the "OUT" position before an adjustment is started.

When the dial setting has been completed, replace the sheets of station tabs in their envelope and put the envelope, together with the one containing the pyralin discs, into the back of the cabinet beside the chassis so that they will be available later should the customer desire to have the dial set for other stations.

ALIGNMENT PROCEDURE CHART

No.	Connect Generator To	Signal Generator Frequency	Dummy Antenna	Range Switch	Dial Setting	Stage	Trimmer No.	AFC Switch	Peak For	Special Instructions
1	6L7G Grid	456 KC	.1 Mfd. Condenser	Broadcast	550 KC	Disc.	1	Out	Max.	***See foot note below.
2	6L7G Grid	456 KC	.1 Mfd. Condenser	Broadcast	550 KC	Disc.	2	Out	Max.	***See foot note below.
3	6L7G Grid	456 KC	.1 Mfd. Condenser	Broadcast	550 KC	Disc.	18	Out	Min.	***See foot note below.
4	6L7G Grid	456 KC	.1 Mfd. Condenser	Broadcast	550 KC	2nd IF	3	Out	Max.	
5	6L7GGrid	456 KC	.1 Mfd. Condenser	Broadcast	550 KC	2nd IF	4	Out	Max.	
6	6L7G Grid	456 KC	.1 Mfd. Condenser	Broadcast	550 KC	1st IF	5	Out	Max.	
7	6L7G Grid	456 KC	.1 Mfd. Condenser	Broadcast	550 KC	1st IF	6	Out	Max.	
8	Antenna	1500 KC	200 Mmf. Condenser	Broadcast	1500 KC	B.C. Osc.	7	Out	Max.	
9	Antenna	1500 KC	200 Mmf. Condenser	Broadcast	1500 KC	B.C. R.F.	8	Out	Max.	
10	Antenna	1500 KC	200 Mmf. Condenser	Broadcast	1500 KC	B.C. Ant.	9	Out	Max.	
11	Antenna	600 KC	200 Mmf. Condenser	Broadcast	600 KC	B.C. Pad.	10	Out	*Max.	*While rocking. Repeat 8, 9, 10, and 11 until no change is noted.
12	Antenna	5.4 MC	400 Ohm Resistor	Police Amateur	5.4 MC	Police Osc.	11	Out	Max.	
13	Antenna	5.4 MC	400 Ohm Resistor	Police Amateur	5.4 MC	Police R.F.	12	Out	Max.	
14	Antenna	5.4 MC	400 Ohm Resistor	Police Amateur	5.4 MC	Police Ant.	13	Out	Max.	
15	Antenna	1.8 MC	400 Ohm Resistor	Police Amateur	1.8 MC	Police Pad.	*	Out		*Check calibration at 1.8 MC. Padder is fixed.
16	Antenna	18 MC	400 Ohm Resistor	Short Wave	18 MC	S.W. Osc.	15	Out	Max.	
17	Antenna	18 MC	400 Ohm Resistor	Short Wave	18 MC	S.W. R.F.	16	Out	Max.	
18	Antenna	18 MC	400 Ohm Resistor	Short Wave	18 MC	S.W. Ant.	17	Out	Max.	
19	Antenna	6 MC	400 Ohm Resistor	Short Wave	6 MC	S.W. Pad.	*	Out		*Check calibration at 6.0 MC. Padder is fixed.
20	Antenna	60 MC	400 Ohm Resistor	Ultra S.W.	60 MC		**	Out		**See foot note below.
21	Antenna	30 MC	400 Ohm Resistor	Ultra S.W.	30 MC		**	Out		**See foot note below.

**No adjustment is required on this band. If signal is not received on or near dial setting, check the oscillator tube, switch contacts, the fixed padding condenser and the coils.

***To check the setting of the discriminator, tune in a fairly weak station near 1000 kilocycles with the automatic tuning switch in the "OUT" position. Peak the station carefully and then throw the switch to the "IN" position. If throwing the switch detunes the station, repeak it carefully using trimmer number 18. A further check may be made by tuning to either side of the station with the switch out until only the side bands are audible and then throwing the switch in. The station should come into resonance as the switch is thrown in. Failure to do so indicates that the adjustment just described has not been careful enough and that it should be made over again.

MODEL 12C6
Chassis 12C
Socket, Trimmers
Voltage, Resistance

FAIRBANKS. MORSE & CO.

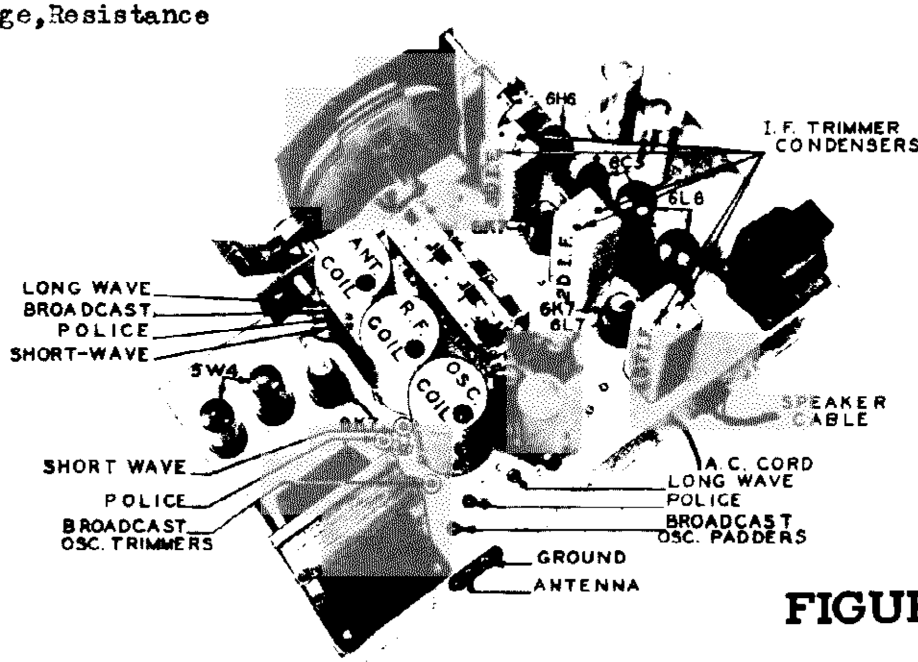


FIGURE 4

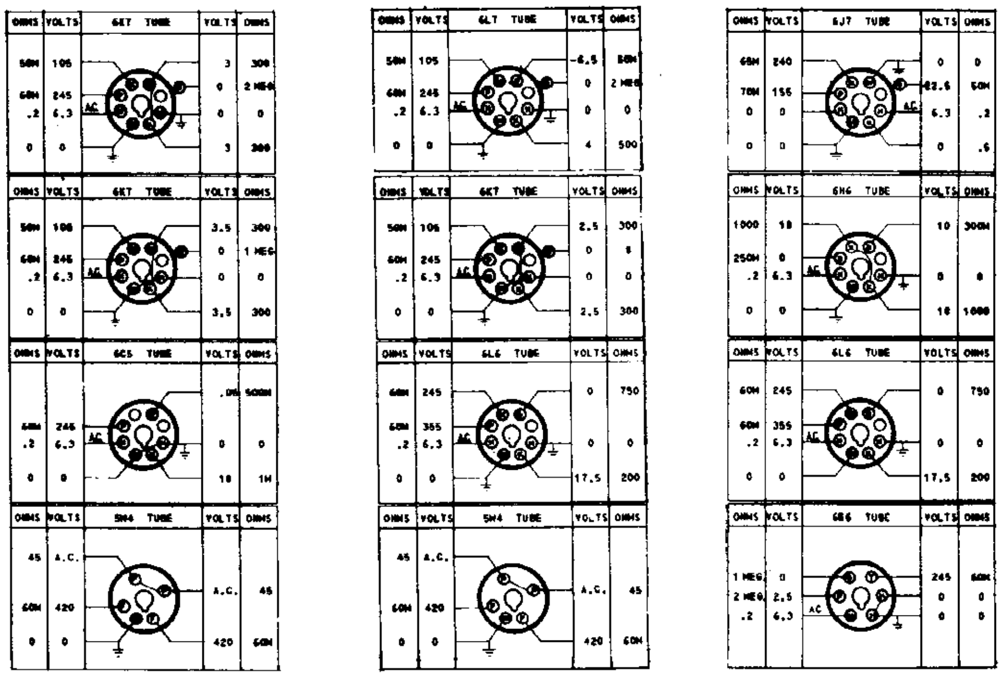
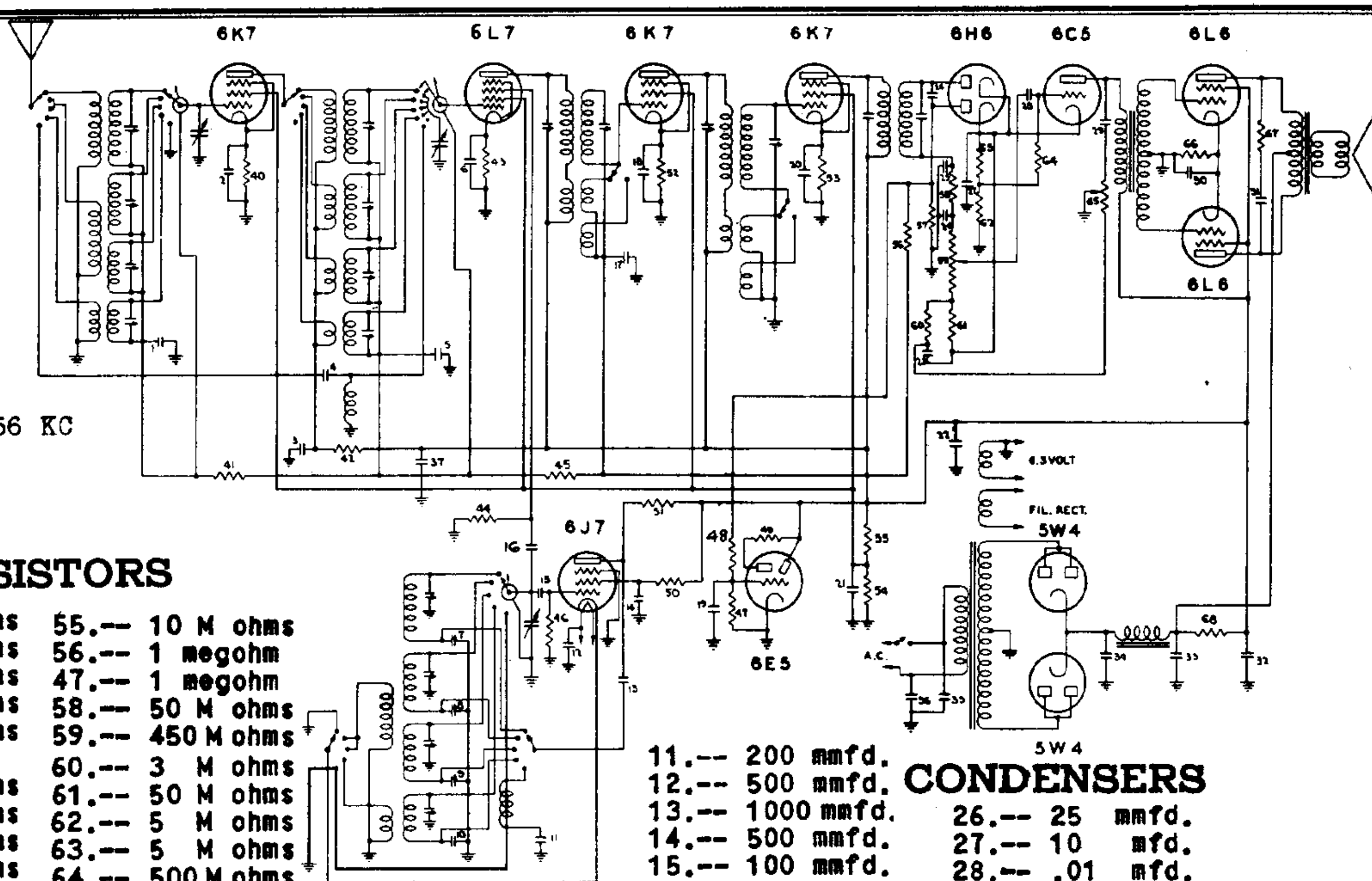


FIGURE 6
VOLTAGE AND RESISTANCE TABLE

The voltage and resistance charts in this manual give detailed information regarding the resistance from various points to various other points in the chassis. The measured voltage from the various tube socket contacts to ground is also given. When these charts are followed faithfully, little difficulty should be experienced in finding almost any fault that may develop.

MODEL 12C6
Chassis 12C
Schematic

FAIRBANKS, MORSE & CO.



IF PEAK 456 KC

RESISTORS

40.-- 300 ohms
41.-- 50 M ohms
42.-- 200 ohms
43.-- 500 ohms
44.-- 50 M ohms

45.-- 50 M ohms
46.-- 50 M ohms
47.-- 2 megohms
48.-- 2 megohms
49.-- 1 megohm

50.-- 2 M ohms
51.-- 10 M ohms
52.-- 300 ohms
53.-- 300 ohms
54.-- 50 M ohms

55.-- 10 M ohms
56.-- 1 megohm
47.-- 1 megohm
58.-- 50 M ohms
59.-- 450 M ohms

60.-- 3 M ohms
61.-- 50 M ohms
62.-- 5 M ohms
63.-- 5 M ohms
64.-- 500 M ohms

65.-- 500 M ohms
66.-- 200 ohms
67.-- 10 M ohms
68.-- 2 M ohms

CONDENSERS

1.-- .05 mfd.
2.-- .05 mfd.
3.-- .1 mfd.
4.-- 100 mmfd.
5.-- .05 mfd.

6.-- .05 mfd.
7.-- 220 mmfd.
8.-- 750 mmfd.
9.-- 1800 mmfd.

11.-- 200 mmfd.
12.-- 500 mmfd.
13.-- 1000 mmfd.
14.-- 500 mmfd.
15.-- 100 mmfd.

16.-- 50 mmfd.
17.-- .05 mfd.
18.-- .05 mfd.
19.-- .1 mfd.
20.-- .05 mfd.

21.-- .1 mfd.
22.-- .1 mfd.
23.-- .1 mfd.
24.-- 100 mmfd.
25.-- 100 mmfd.

26.-- 25 mmfd.
27.-- 10 mfd.
28.-- .01 mfd.
29.-- .03 mfd.
30.-- .1 mfd.

31.-- .02 mfd.
32.-- 30 mfd.
33.-- 8 mfd.
34.-- 16 mfd.
35.-- .01 mfd.

36.-- .01 mfd.

MODEL 12C6
Chassis 120
Alignment

FAIRBANKS, MORSE & CO.

THE OSCILLATOR CIRCUIT

The oscillator circuit is unconventional in that the tickler coils are in the cathode circuit of the 6J7 oscillator tube, this is done to obtain sufficient band coverage with the additional capacity of the 6L7 tube injector grid across the tune circuits and also to accommodate the receiver to operation up to 70 megacycles. One tickler serves for Both the Broadcast and Police-Amateur bands and the second tickler serves the short wave band, being switched in and out by the range switch.

The tuned circuit coil for the Ultra Short Wave band consists of three pieces of heavy bus wire. The cathode taps into this circuit and causes oscillation at the high frequency end of the band. In addition, on this band, a small coil which is inductively coupled to the bus wire coil is switched into the plate circuit and causes the tube to oscillate at the low frequency end of the band.

On the other bands, the plate of the oscillator tube is by-passed to ground through the padding condensers of the oscillator tuned circuits and assists the oscillator at the low frequency end of each band. The patent on this circuit was issued to MacNabb.

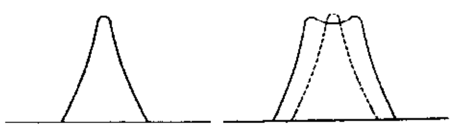
INTERMEDIATE FREQUENCY ALIGNMENT

With the range switch on the broadcast position, the fidelity switch on "Sharp" (clockwise) and the gang condenser closed (maximum capacity), supply a 456 kilocycle signal, stage by stage, to the intermediate frequency amplifier, beginning with the grid of the second intermediate frequency tube. To accomplish this, a .1 Mfd. condenser should be connected between the signal generator supply lead and the second intermediate frequency tube.

The trimmers of the third intermediate frequency transformer should be adjusted for maximum output with minimum input from the signal generator. Then the signal generator lead should be moved to the first intermediate frequency tube and the trimmers of the second intermediate transformer should be adjusted. The next step is to supply the signal to the grid of the first detector tube and adjust the trimmers of the first intermediate frequency transformer. This method of procedure is essential because of the extreme selectivity of the receiver. After each stage has been aligned, it is well to go back over all adjustments to make sure they are accurate.

The next step in the intermediate frequency alignment is to supply a very strong (about 1000 microvolt) signal to the grid of the first detector tube through the .1 Mfd. condenser. CAUTION: Before the signal is applied to the receiver, the volume control should be retarded to zero. After the signal is applied to the receiver, the volume control should be advanced slowly and carefully until a suitable indication appears on the output meter.

The fidelity switch should be turned to the high fidelity or Third Dimension position. Symetrical double humps should appear, one on each side of where the sharp resonance point appeared on the "Sharp" position (see Figure 5), when the signal generator is tuned approximately 8 kilocycles on each side of the resonance point. The two humps must be of equal amplitude. If this is not the case, the trimmers of the third intermediate frequency transformer must be adjusted until a condition of equal amplitude is obtained. This may be found to be a very difficult adjustment unless an oscillograph is used.



A B

FIGURE 5

USE OF THE OSCILLOGRAPH

A signal generator with a sweep circuit must be employed in making this check. The output of the signal generator should be fed to the grid of the first detector tube in the receiver. The grid clip must be removed from the tube, but, since the first detector is one of the A.V.C. controlled tubes, it is necessary to complete the grid circuit. To accomplish this, connect a large resistor (about 50,000 or 100,000 ohms) between the grid clip and the grid cap of the tube. The low side of the signal generator should be connected to the chassis ground.

The "vertical" binding posts of the oscillograph should be connected to the audio output of the second detector. The high side connection from the "vertical" plates should be made to the point of juncture between resistors 58 and 59. The low side connection may be made to ground. Thus, the audio voltage is applied to the "vertical" plates of the oscillograph.

With the receiver operating on the "Sharp" position, the intermediate frequency amplifier resonance curve will appear on the screen. When the receiver is switched to the "3RD DIMENSION" position, symetrical double humps, approaching a wide flat top resonance curve, should appear in place of the "Sharp" resonance curve (see Figure 5). Each side of the curve should be of equal amplitude. If this is not the case, the trimmers of the third intermediate frequency transformer should be adjusted until the proper curve is obtained. The adjustment of one trimmer, in addition to effecting its own side of the curve, will reflect in the other side and, for this reason, great care must be exercised in making these adjustments.

RADIO FREQUENCY ALIGNMENT

The parallel or high frequency trimmer condensers for each coil are housed in the same can with the coil, with the exception of the oscillator trimmers, these are air dielectric condensers and are mounted on the chassis. These trimmers are used for aligning the high frequency end of each band. The location of the various trimmers is shown on Figure 4. It is essential that the bands be aligned in the order they appear in the following instructions. In other words, the police band alignment must be completed before the broadcast band alignment is started because of the interlocking effect of the padding condensers on these bands.

Adjustable series padding condensers are used for tracking the oscillator at the low frequency end of each band. The padding condensers may be adjusted from the top of the chassis, through the holes indicated in Figure 4. Since a fixed mica padding condenser is employed on the short wave band, no adjustment is necessary. While making padding condenser adjustments, the gang condenser should be rotated back and forth across the signal to insure adjustment to the peak of greatest intensity.

POLICE BAND

With the band selector switch on the police position and the fidelity switch on the "Sharp" position, supply a 5 megacycle signal from the signal generator to the antenna of the receiver, using a 400 ohm carbon resistor in series with the signal generator lead. Tune the receiver to 5 megacycles and then adjust the oscillator, radio frequency and antenna stage police band trimmers for maximum output with minimum input from the signal generator. WARNING: Care must be exercised to avoid aligning the receiver to the image frequency as outlined under "Short Wave Band".

Supply a 1.8 megacycle signal to the receiver and tune the receiver to 1.8 megacycles. Adjust the police band oscillator padding condenser (see Figure 4.), for the signal of greatest intensity, rocking the gang condenser back and forth across the signal while making adjustment. Check at 5 megacycles and then at 1.8 megacycles to correct for any frequency change.

BROADCAST BAND

With the band selector switch on the broadcast position, supply a 1500 kilocycle signal from the signal generator to the receiver, using a standard dummy antenna or a 200 Mmfd. condenser in series between the signal generator and the antenna post of the receiver to serve as the dummy antenna. Make certain that the fidelity switch is on the "Sharp" position.

Tune the receiver to 1500 kilocycles and adjust the radio frequency, antenna and oscillator stage broadcast band trimmers for maximum output with minimum input from the signal generator.

Supply a 600 kilocycle signal to the receiver through the same connections. Tune the receiver to 600 kilocycles. Adjust the broadcast band oscillator padding condenser (see Figure 4), for the peak of greatest intensity while rocking the tuning condenser back and forth across the signal. Recheck at 1500 kilocycles and then at 600 kilocycles and make any frequency corrections that appear necessary.

LONG WAVE BAND

With the band selector switch on the long wave position, supply a 350 kilocycle signal from the signal generator to the antenna of the receiver, using a standard dummy antenna or a 200 Mmfd. condenser in series with the lead. Make sure the fidelity switch is on the "Sharp" position. Tune the receiver to 350 kilocycles and adjust the oscillator, radio frequency and antenna stage trimmer condensers for maximum output with minimum input from the signal generator.

NOTE - The Long Wave oscillator trimmer is accessable through a hole in the chassis bottom shield plate.

Supply a 175 kilocycle signal to the receiver through the same connections used in the previous adjustment. Tune the receiver to 175 kilocycles. Adjust the long wave oscillator padding condenser for the peak of greatest intensity while rocking the tuning condenser back and forth across the signal. Readjust at 350 kilocycles and then at 175 kilocycles as many times as may be necessary to obtain satisfactory tracking.

SHORT WAVE BAND

Turn the band selector switch to the short wave position. Supply an 18 megacycle signal from the signal generator through a 400 ohm carbon resistor (dummy antenna) to the antenna post of the receiver. Tune the receiver to 18 megacycles on the dial. Adjust the short wave band oscillator trimmer condenser for maximum output with minimum input from the signal generator, then adjust the short wave band antenna and Radio Frequency stage trimmer condensers for maximum output, at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity. The 6 megacycle signal should be received near 6 megacycles on the dial. If the signal is not received check the oscillator tube, switch connections, the fixed padding condenser and the coils. No adjustment is required at this point. Check the calibration and, if necessary, readjust all three stages.

WARNING: The image signal should be received at approximately 17 megacycles after the above adjustments have been made. If it cannot be located, the oscillator has probably been aligned to the image frequency and the oscillator trimmer must be backed out until the proper signal comes in at 18 megacycles and the somewhat weaker image is received at approximately 17 megacycles. If this readjustment is necessary, it will also be necessary to again align all three trimmers for maximum output.

ULTRA SHORT WAVE BAND

No adjustment is required on this band. If signals are not properly received check the oscillator tube, switch contacts, fixed condenser and the coils.

POWER TRANSFORMERS

Lead Color	Voltage
Black	115 Volts Primary
Green	6.3 Volt Filament
Yellow	5.0 Volt Filament
Red	High Voltage Sec.
Red & White	High Voltage C.T.

COLOR CODES

I. F. TRANSFORMERS

FIRST

Plate	Blue
"B" Plus	Red
Grid (Top)	Green
Grid Return (A.V.C.)	Black-White
Switch Lead	Brown-White
Switch Lead (Sharp)	Brown
Switch Lead (3rd.Dim)	Black

SECOND

Plate	Blue
"B" Plus	Red
Grid (Top)	Green
Grid Return (Ground)	Black-White
Switch Lead	Brown-White
Switch Lead (Sharp)	Brown
Switch Lead (3rd Dim)	Black

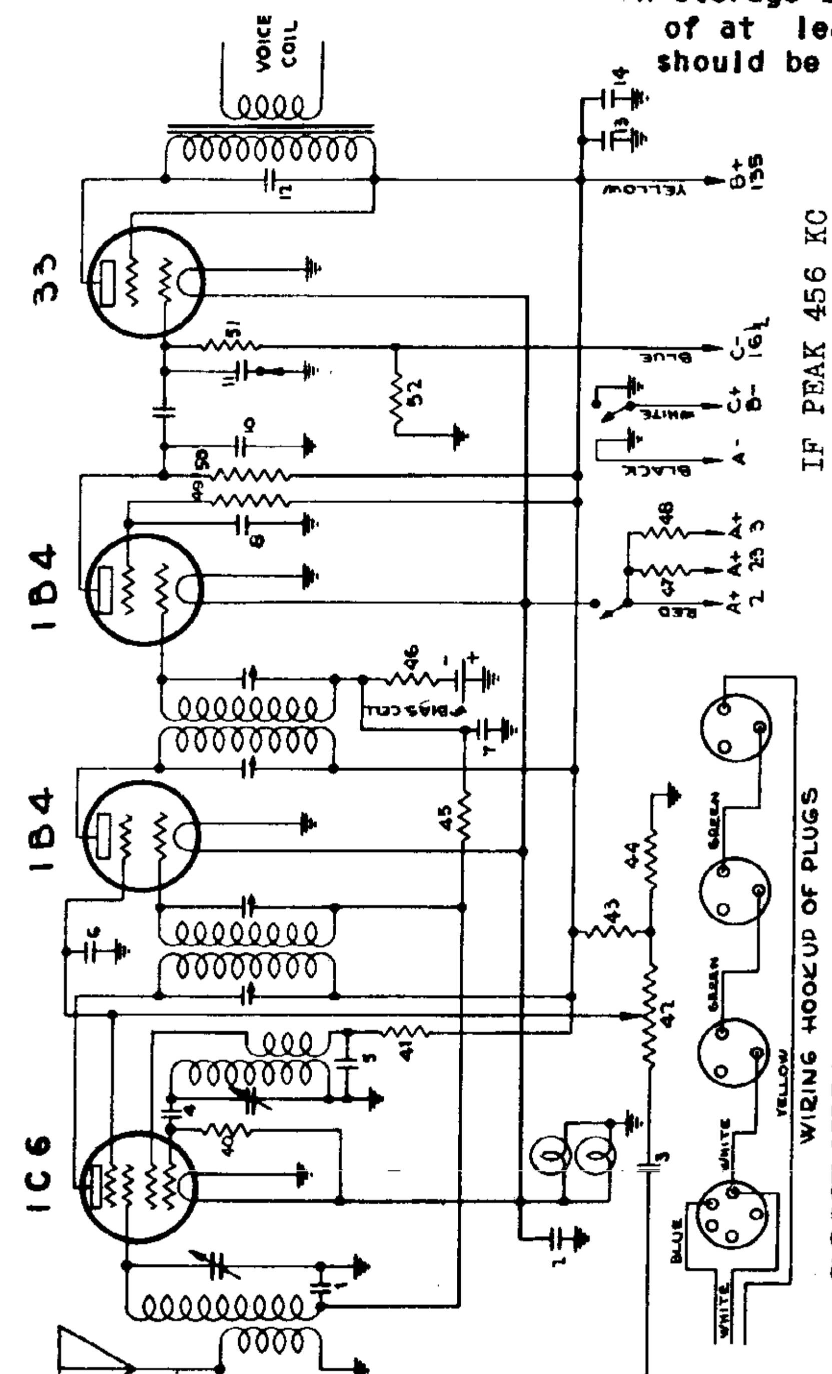
THIRD

Plate	Blue
"B" Plus	Red
Grid	Green
Grid Return	Black-White

FAIRBANKS, MORSE & CO.

MODELS 42CIB,42TOB
Chassis 42
Schematic,Notes

The model 42 chassis employs a type 1C6 pentagrid converter. The incoming signal is supplied to this tube through a preselector coil arrangement. This tube serves the dual function of first detector and oscillator. A type 1B4 is employed as the intermediate frequency amplifier. This tube and the two intermediate frequency transformers are responsible for most of the selectivity and gain in the receiver. A type 1B4 tube performs the dual function of detector and first audio amplifier. The output of the second type 1B4 tube is resistance coupled to a type 33 tube in the power output stage. A storage battery having a capacity of at least 135 ampere hours should be used with the receiver.



IF PEAK 456 KC

RESISTORS

40 - 50M Ohms	47 - .4 Ohms
41 - 25M Ohms	48 - 1.2 Ohms
42 - 400M Ohms	49 - 2 Meg.
43 - 25M Ohms	50 - 250M Ohms
44 - 50M Ohms	51 - 500M Ohms
45 - 100M Ohms	52 - 20M Ohms
46 - 250M Ohms	

CONDENSERS

1 - .1 MFD	8 - .05 MFD
2 - .5 MFD	9 - .02 MFD
3 - .05 MFD	10 - .0005 MFD
4 - .001 MFD	11 - .006 MFD
5 - .1 MFD	12 - .006 MFD
6 - .1 MFD	13 - .25 MFD
7 - .1 MFD	14 - 8. MFD

MODELS 42CIB, 42TOB
Chassis 42
Socket, Trimmers, Notes
Alignment, Batt. Conn.

FAIRBANKS, MORSE & CO.

BATTERIES

This receiver has been designed to operate equally well on an Air Cell "A" Battery or a Two Volt Storage Battery as the "A" supply.

A three volt dry battery may be used with the receiver but the life of such a battery is usually not as long as that of the other types.

AIR CELL "A" BATTERY

If the receiver is to be operated on an air cell battery only one section of the "resistance link" circuit should be connected (See "X" Figure 3). The remaining two leads from the positive (+) "A" lead should be taped or otherwise insulated so they will not come in contact with any of the other battery terminals.

TWO VOLT STORAGE "A" BATTERY

If the receiver is to be operated on a Two Volt Storage "A" Battery, none of the "resistance link" circuit is to be used. The Positive (+) "A" connections are to be made as shown under "Y" of Figure 3. The unused leads should be taped so they will not come in contact with the other battery terminals.

THREE VOLT "A" BATTERY

If the receiver is to be operated on a Three Volt "A" Battery the "resistance link" circuit should be connected as shown under "Z" of Figure 3. The unused leads should be taped so they will not come in contact with any of the battery terminals.

When the Three Volt "A" Battery becomes so low or weak that the receiver will no longer operate satisfactorily, the connections may then be changed to conform with "X" under Figure 3, thus obtaining a little more operating time from the battery.

When the Three Volt "A" Battery again becomes so low that the receiver will not operate satisfactorily, the connections may once more be changed, to conform with "Y" of Figure 3, thus again obtaining more operating time from the battery.

NOTE - These changes must not be made until the battery becomes so low that the receiver does not operate properly, and then the change must be made one step at a time as described above otherwise the tubes in the receiver may be damaged.

"B" BATTERIES

Three 45 volt "B" batteries, with standard plug receptacles, are required with the receiver. Good quality, HEAVY DUTY batteries are recommended.

"C" BATTERIES

16½ volts of "C" battery are required on the receiver. This voltage may be obtained from a standard 22½ volt battery, with a standard plug receptacle, with a 16½ volt tap.

BATTERY CABLE CONNECTIONS

"A" BATTERY

The Black battery lead is to be connected to "A" minus (-). The Red battery lead is to be connected to "A" plus (+). See Figure 3.

"B" AND "C" BATTERIES

Four Standard Battery Plugs will be found on the battery cable, three of these are identical to each other and are to be plugged into the Standard Receptacles on the three "B" batteries. The remaining plug, the one with the different terminal arrangement, should be plugged into the "C" battery.

WARNING - DO NOT ALLOW THE "A" BATTERY LEADS TO COME IN CONTACT WITH ANY OF THE "B" BATTERY TERMINALS. IF THIS HAPPENS, THE TUBES, RECEIVER AND BATTERIES MAY BE SERIOUSLY DAMAGED.

SUGGESTED SERVICE PROCEDURE

If the receiver does not operate properly, first test all batteries and then test all tubes in a reliable tube tester or, better still, replace the tubes in the receiver, one by one, with tubes known to be good. Most difficulties will be found in or centered around defective tubes, or batteries. If, after replacing any defective tubes, or batteries, the receiver is still inoperative, remove the chassis from the cabinet and conduct a careful resistance analysis using the resistance values shown on the schematic diagram as a guide. This will usually reveal the source of the difficulty.

ALIGNMENT PROCEDURE

To insure obtaining the performance the model 42 chassis is capable of delivering, it is essential that it be aligned perfectly. For this reason, it is urged that the following instructions be studied carefully before any alignment adjustments are attempted.

Proper adjustment of the various tuned circuits will be possible only through the use of an accurate and reliable signal generator employed in conjunction with an output meter, which may be connected from plate to ground on the output tube. A fixed condenser (.1 Mfd.) should be connected in series with the output meter.

NOTE - All adjustments should be made with the volume control "full on". Any desired variation in signal strength should be obtained by adjusting the output of the signal generator.

INTERMEDIATE FREQUENCY

1.- Turn the gang condenser to maximum capacity (fully meshed).

2.- Set the dial pointer at 530 kilocycles and then tighten the set screw.

3.- Supply a 456 kilocycle signal from the signal generator to the grid of the type 1C6 first detector tube through a .1 Mfd. condenser connected in series with the signal generator lead.

4.- Adjust the radio frequency trimmer ("B" Figure 1) for maximum output with minimum input from the signal generator.

4.- Adjust the four trimmers of the two intermediate frequency transformers (see Figure 1) for maximum output with minimum input from the service oscillator.

RADIO FREQUENCY ALIGNMENT

The parallel or high frequency trimmer condensers for each stage located on the gang condenser (see Figure 1)

1.- Tune the receiver to 1500 kilocycles.

2.- Supply a 1500 kilocycle signal from the signal generator to the antenna lead of the receiver through a standard dummy antenna or a 200 Mmfd. (.0002 Mfd.) condenser, connected in series with the signal generator lead.

3.- Adjust the oscillator stage trimmer condenser ("A" Figure 1) for maximum output with minimum input from the signal generator.

COLOR CODES

FIRST I. F. TRANSFORMER

Plate	Blue
"B" Plus	Red
Grid Return	Black
Grid (Top)	Green

SECOND I. F. TRANSFORMER

Plate	Blue
"B" Plus	Red
Diode Return	Black
Diodes	Green

STANDARD RMA RESISTOR AND CONDENSER COLOR CODE

0	Black	5	Green
1	Brown	6	Blue
2	Red	7	Purple
3	Orange	8	Grey
4	Yellow	9	White

POWER TRANSFORMERS

Lead Color	Voltage
Black	115V. Primary
Green	6.3V. Filament
Yellow	5.0V. Filament
Red	High Voltage Sec.
Red and White	High Voltage C.T.

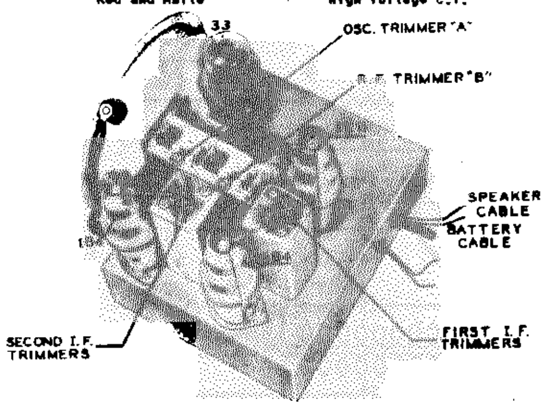


FIGURE 1
TOP VIEW

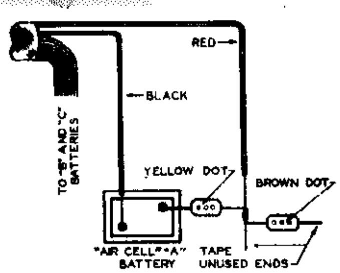


DIAGRAM X

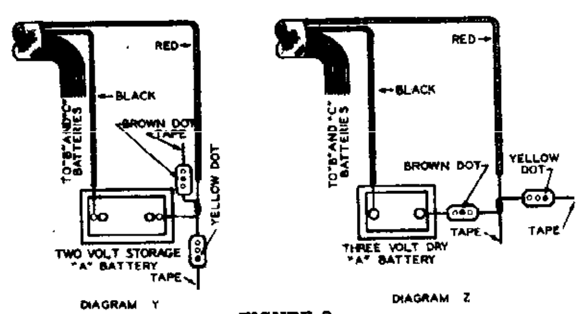
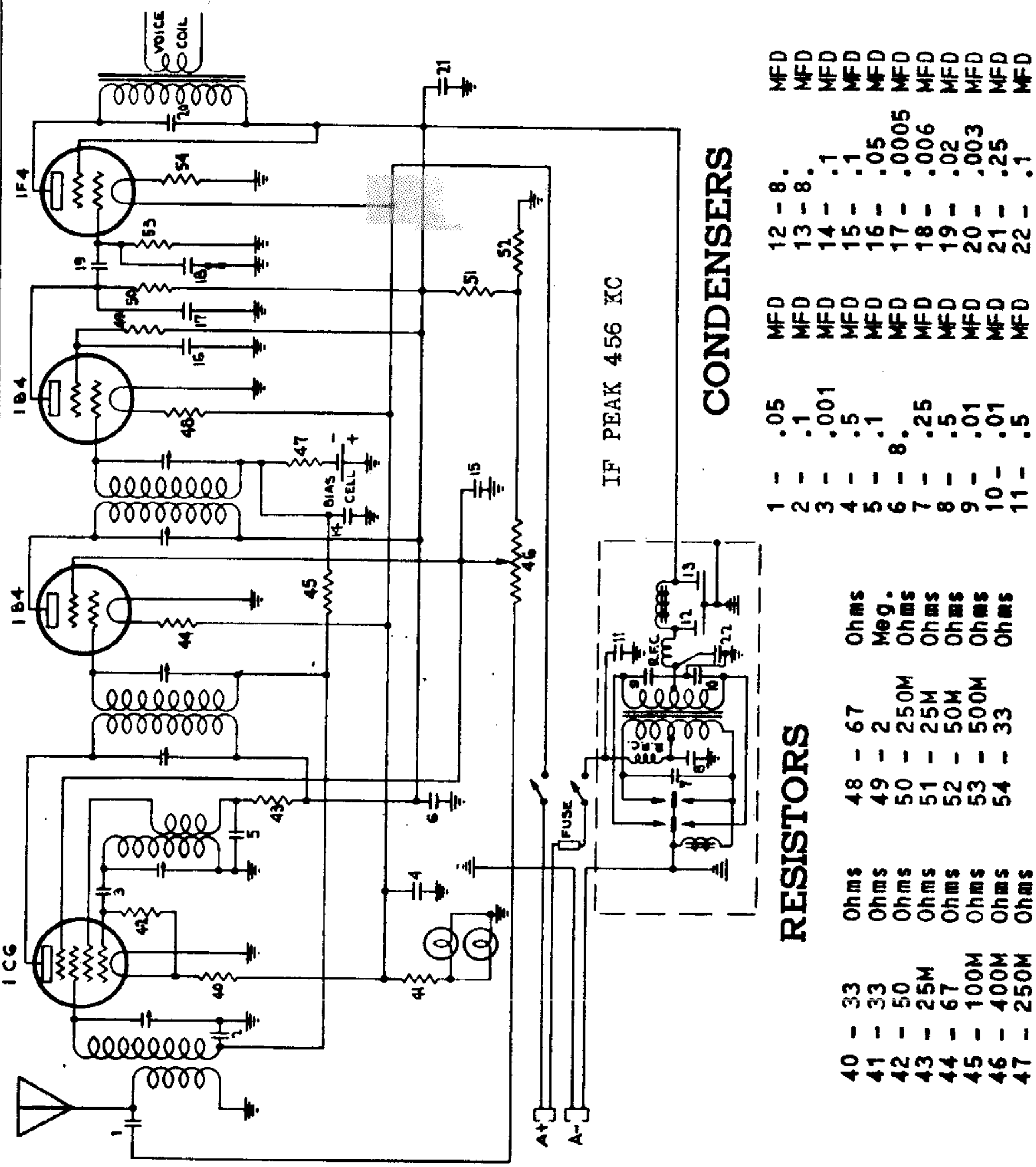


DIAGRAM Y DIAGRAM Z

FIGURE 3
BATTERY CABLE CONNECTIONS

FAIRBANKS, MORSE & CO.

The model 43 chassis employs a type 1C6 pentagrid converter. The incoming signal is supplied to this tube through a preselector coil arrangement. This tube serves the dual function of first detector and oscillator. A type 1B4 tube is employed as the intermediate frequency amplifier. This tube and the two intermediate frequency transformers are responsible for most of the selectivity and gain in the receiver. A type 1B4 tube performs the dual function of detector and first audio amplifier. The output of the second type 1B4 tube is resistance coupled to a type 1F4 tube in the power output stage.



MODELS 43CIB, 43TIB
Chassis 43

FAIRBANKS, MORSE & CO.

Alignment, Voltage
Socket, Trimmers
Resistance

ALIGNMENT PROCEDURE

To insure obtaining the performance the model 43 chassis is capable of delivering, it is essential that it be aligned perfectly. For this reason, it is urged that the following instructions be studied carefully before any alignment adjustments are attempted.

Proper adjustment of the various tuned circuits will be possible only through the use of an accurate and reliable signal generator employed in conjunction with an output meter, which may be connected from plate to ground on the output tube. A fixed condenser (.1 Mfd.) should be connected in series with the output meter.

NOTE - All Adjustments should be made with the volume control "full on". Any desired variation in signal strength should be obtained by adjusting the output of the signal generator.

INTERMEDIATE FREQUENCY ALIGNMENT

1. Turn the gang condenser to maximum capacity (fully meshed).
2. Set the dial pointer at 530 kilocycles and then tighten the set screw.
3. Supply a 456 kilocycle signal from the signal generator to the grid of the type 1C6 first detector tube through a .1 Mfd. condenser connected in series with the signal generator lead.
4. Adjust the four trimmers of the two intermediate frequency transformers (see Figure 1) for maximum output with minimum input from the service oscillator.

RADIO FREQUENCY ALIGNMENT

The parallel or high frequency trimmer condensers for each stage are located on the gang condenser (see Figure 1).

1. Tune the receiver to 1500 kilocycles.
2. Supply a 1500 kilocycle signal from the signal generator to the antenna lead of the receiver through a standard dummy antenna or a 200 Mmfd. (.0002 Mfd.) condenser, connected in series with the signal generator lead.
3. Adjust the oscillator stage trimmer condenser ("A" Figure 1) for maximum output with minimum input from the signal generator.
4. Adjust the radio frequency trimmer ("B" Figure 1) for maximum output with minimum input from the signal generator.

OHMS	VOLTS	1B4 TUBE (I.F.)	VOLTS	OHMS	OHMS	VOLTS	1B4 TUBE (2 DET. I.A.F.)	VOLTS	OHMS
75M	137		50	50M	300M	55		15	2MEG.
			0	300M				0	200M
72	2		0	0	72	2		0	0

OHMS	VOLTS	1C6 TUBE (1DET. OSC.)	VOLTS	OHMS	OHMS	VOLTS	1F4 TUBE (OUT PUT)	VOLTS	OHMS
100M	65		-.6	40M				0	500M
			0	300M					
80M	140		50	55M	75M	135		140	75M
40	2		0	0	8	6		4	34

FIGURE 5
VOLTAGE AND RESISTANCE TABLE

COLOR CODES

FIRST I. F. TRANSFORMER

Plate	Blue
"B" Plus	Red
Grid Return	Black
Grid (Top)	Green

SECOND I. F. TRANSFORMER

Plate	Blue
"B" Plus	Red
Diode Return	Black
Diodes	Green

POWER TRANSFORMERS

Lead Color	Voltage
Black	115 Volts Primary
Green	6.3 Volts Filament
Yellow	5.0 Volts Filament
Red	High Voltage Sec.
Red and White	High Voltage C.T.

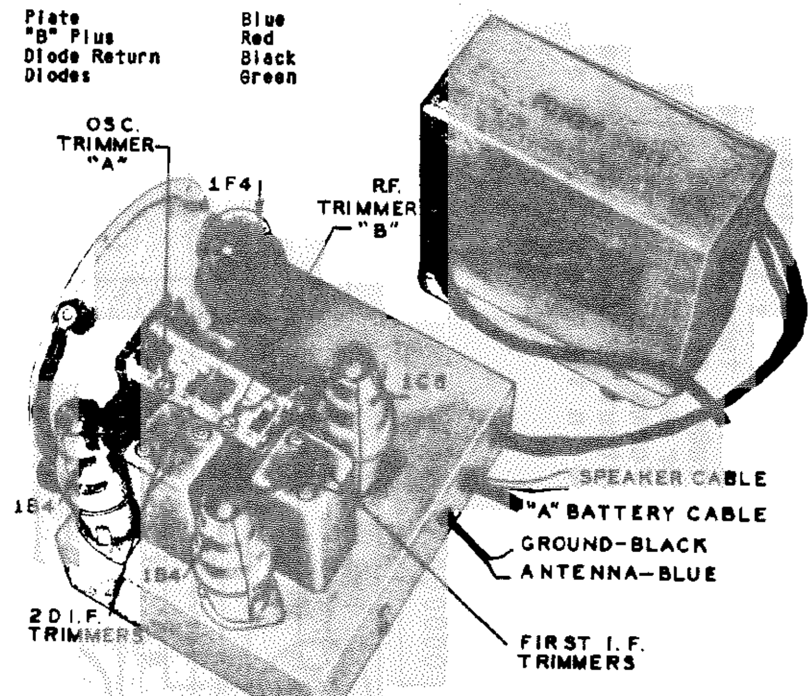
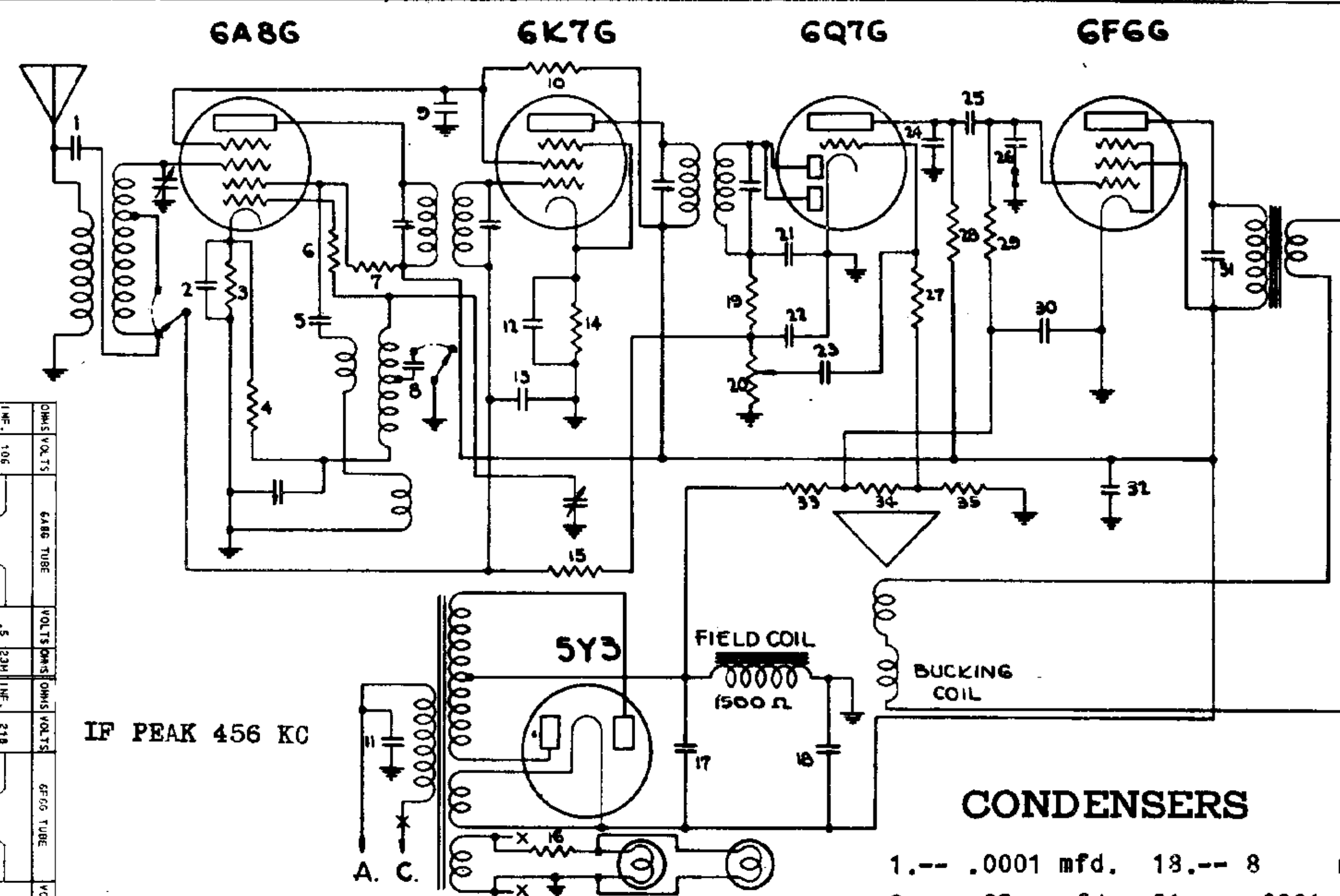


FIGURE 1
TOP VIEW OF THE MODEL 43 CHASSIS

FAIRBANKS, MORSE & CO.



IF PEAK 456 KC

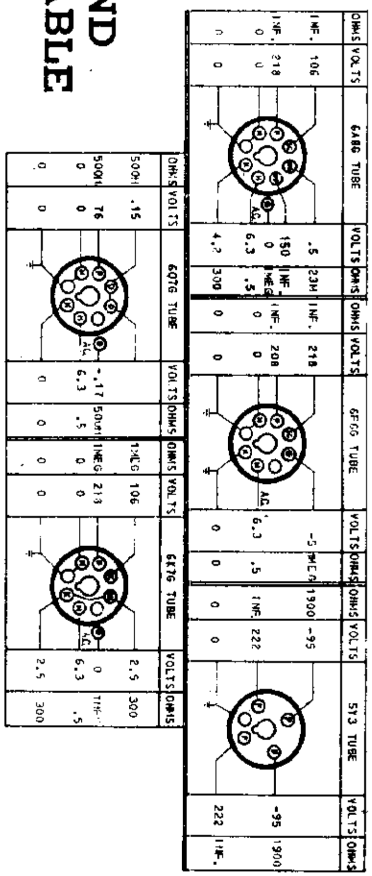


FIGURE 5
VOLTAGE AND
RESISTANCE TABLE

CONDENSERS

1.-- .0001 mfd.
2.-- .05 mfd.
5.-- .001 mfd.
8.-- .003 mfd.
9.-- .1 mfd.
11.-- .01 mfd.
12.-- .1 mfd.
13.-- .1 mfd.
16.-- .6 mfd.
17.-- 8 mfd.
18.-- 8 mf
21.-- .0001 mf
22.-- .0001 mf
23.-- .02 mf
24.-- .0001 mf
25.-- .02 mf
26.-- .006 mf
30.-- .25 mf
31.-- .006 mf
32.-- .1 mf

RESISTORS

3.-- 300 ohms
4.-- 20 M ohms
6.-- 150 ohms
7.-- 10 M ohms
10.-- 20 M ohms
14.-- 300 ohms
15.-- 1 megohm
19.-- 50 M ohms
20.-- 500 M ohms
27.-- 500 M ohms
28.-- 500 M ohms
29.-- 500 M ohms
33.-- 2 megohms
34.-- 400 M ohms
35.-- 50 M ohms

MODEL 57TO
Alignment, Trimmers
Socket, Notes

FAIRBANKS, MORSE & CO.

Chassis 57

COLOR CODES

FIRST I. F. TRANSFORMER

Plate	Blue
"B" Plus	Red
Grid Return	Black
Grid (Top)	Green

SECOND I. F. TRANSFORMER

Plate	Blue
"B" Plus	Red
Diode Return	Black
Diodes	Green

RESISTOR AND CONDENSER COLOR CODE

0	Black	2	Red	4	Yellow	6	Blue	8	Grey
1	Brown	3	Orange	5	Green	7	Purple	9	White

RESISTORS

The BODY COLOR represents the FIRST FIGURE of the resistance value
The END COLOR represents the SECOND FIGURE of the resistance value
The DOT COLOR represents the NUMBER OF CIPHERS following the First two figures

INTERMEDIATE FREQUENCY ALIGNMENT

1.- Turn the gang condenser to maximum capacity (fully meshed.)

2.- Set the band selector switch on the "Broadcast" position.

3.- Supply a 456 kilocycle signal from the signal generator to the antenna lead of the receiver through a .1 Mfd. condenser connected in series with the signal generator lead.

4.- Adjust the four trimmers of the two intermediate frequency transformers (see Figure 1) for maximum output with minimum input from the service oscillator.

RADIO FREQUENCY ALIGNMENT

The parallel or high frequency trimmer condensers for the broadcast band are on the gang condenser. These trimmers are used for aligning the high frequency end of the broadcast band. The location of the trimmers is shown in Figure

The oscillator adjustable series padding condenser is used for tracking the oscillator at the low frequency end of the broadcast band. The padding condenser may be adjusted from the side of the chassis through the hole indicated in Figure 1. While making padding condenser adjustments, the gang condenser should be rotated back and forth across the signal to insure adjustment to the peak of greatest intensity.

DIAL ADJUSTMENT

Before making any radio frequency alignment adjustments, close the variable tuning condenser (Maximum capacity), place the dial pointer at 540 kilocycles (gang condenser still closed) and then proceed with the following adjustments.

BROADCAST BAND

1.- Turn the band selector switch to the broadcast (Counter-Clockwise) position.

2.- Tune the receiver to 1500 kilocycles.

3.- Supply a 1500 kilocycle signal from the signal generator to the antenna lead of the receiver through a standard dummy antenna or a 200 Mmfd. (.0002 Mfd.) condenser, connected in series with the signal generator lead.

4.- Adjust the trimmer condensers on the gang condenser (Figure 1) for maximum output with minimum input from the signal generator.

5.- Tune the receiver to 600 kilocycles.

6.- Supply a 600 kilocycle signal to the antenna of the receiver through the same connections as previously used.

7.- Adjust the broadcast band oscillator padding condenser "B" (side of chassis, see Figure 1) for maximum output with minimum input from the signal generator, at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity.

8.- Check at 1500 kilocycles and then at 600 kilocycles. Make any adjustments that are necessary to obtain satisfactory calibration.

SHORT WAVE BAND

1.- Turn the band selector switch to the short wave position (clockwise).

2.- Tune the receiver to 6 megacycles.

3.- Supply a 6 megacycle signal from the signal generator to the antenna lead of the receiver through a 400 ohm carbon resistor (dummy antenna), connected in series with the signal generator lead.

4.- The 6 megacycle signal should be received near 6 megacycles on the dial. If this is not the case, check the oscillator tube, switch connections, the fixed padding condenser (C-4) and coils. No adjustment is necessary on this band.

5.- Repeat 1, 2, 3 and 4 at 3.6 megacycles.

THE ANTENNA

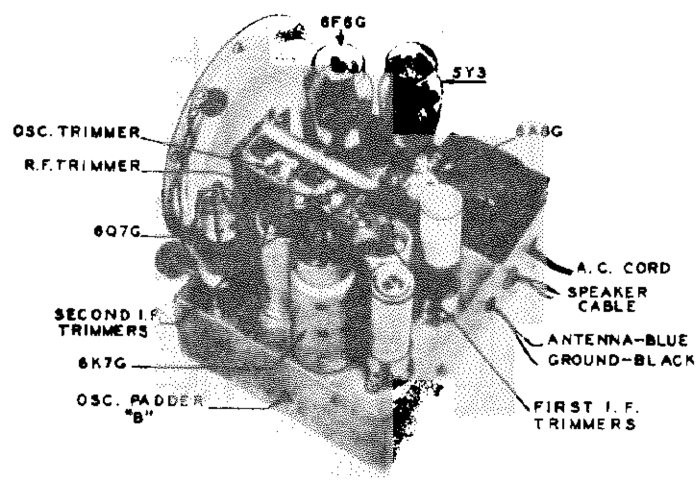
A good outside antenna is recommended for best results. An inside antenna will usually give satisfactory results on local broadcast stations, but it cannot be relied upon for distant and short wave reception.

The most satisfactory antenna for any installation will vary, depending largely upon local structural details and sources of interference. It should be kept as far as possible from buildings, trees and other obstructions. The antenna should not run parallel to nearby power lines and should not run near a tin roof or any metallic structure. The length of the antenna has much to do with the volume of the receiver. As the length of the antenna is increased, the volume on distant stations will be increased.

The most suitable antenna for use in large cities or congested radio districts, where interference is a serious problem, is the doublet. In small centers of population, where interference is not serious, a single wire antenna having a total length of from 75 to 100 feet, erected as high as possible, with a good insulator at each end, will prove satisfactory. The lead-in should go to the receiver by the most direct route and should be kept away, as far as possible, from obstructions. Such an antenna will have less directional properties and less tendency to pick up power line interference than a low antenna with a long horizontal lead.

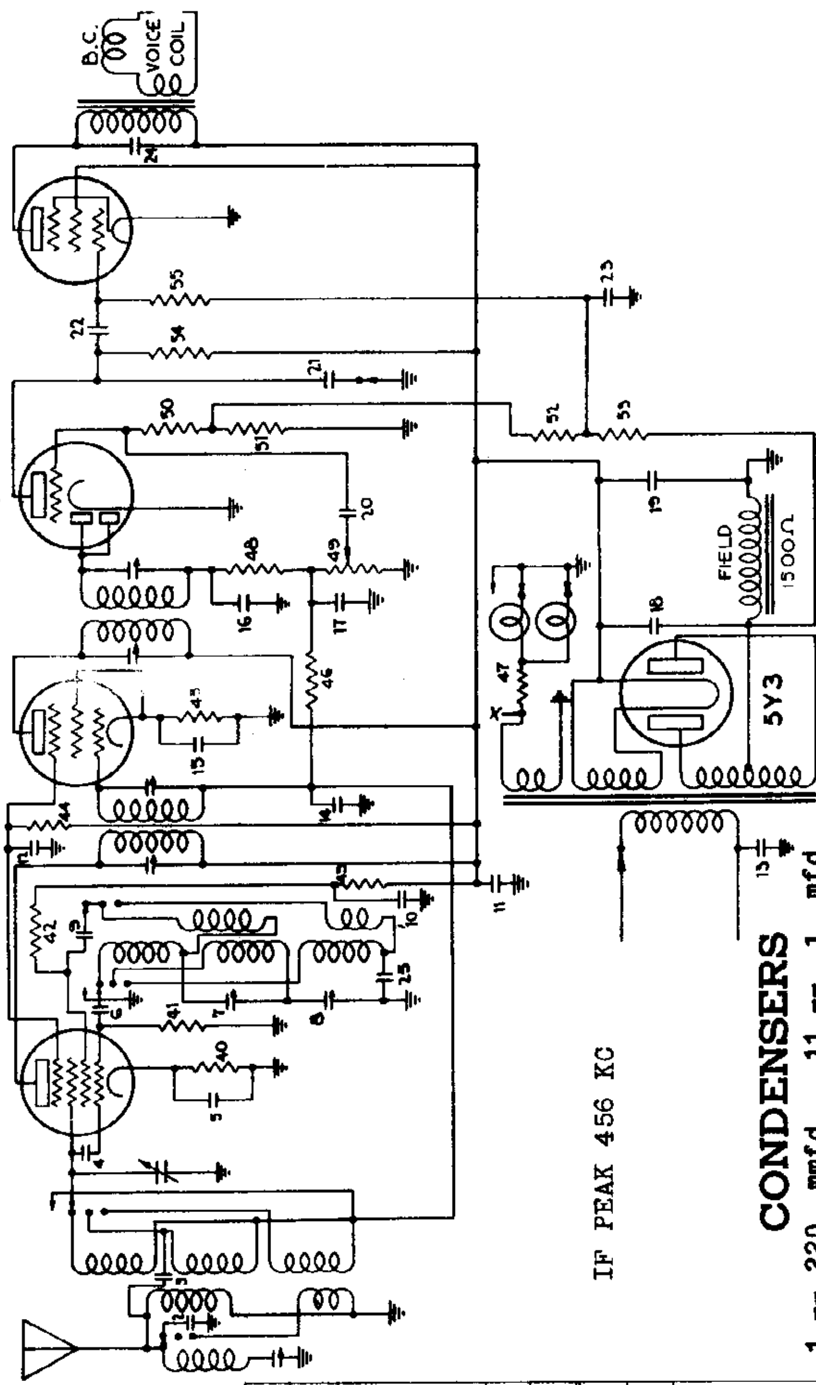
POWER TRANSFORMER

Lead Color	Voltage
Black	115 Volt Primary
Green	6.3 Volt Filament
Yellow	5.0 Volt Filament
Red	High Voltage Sec.
Red & White	High Voltage C.T.



FAIRBANKS, MORSE & CO.

MODELS 58T1, 58T2
Chassis 58
Schematic, Voltage
Resistance



RESISTORS

40.-- 300 ohms
41.-- 35 M ohms
42.-- 10 M ohms
43.-- 5 M ohms
44.-- 25 M ohms
45.-- 300 ohms
46.-- 1 megohm
47.-- .4 ohms
48.-- 50 M ohms
49.-- 500 M ohms
50.-- 500 M ohms
51.-- 50 M ohms
52.-- 400 M ohms
53.-- 2 megohms
54.-- 500 M ohms
55.-- 500 M ohms

CONDENSERS

1.-- 220 mmfd.
2.-- .0001 mfd.
3.-- 6.5 mmfd.
4.-- 1.2 mmfd.
5.-- .05 mfd.
6.-- .0001 mfd.
7.-- 800 mmfd.
8.-- 1600 mmfd.
9.-- .001 mfd.
10.-- 8 mfd.
11.-- .1 mfd.
12.-- .1 mfd.
13.-- .01 mfd.
14.-- .1 mfd.
15.-- .25 mfd.
16.-- .0001 mfd.
17.-- .0001 mfd.
18.-- 8 mfd.
19.-- 8 mfd.
20.-- .02 mfd.
21.-- .006 mfd.
22.-- .02 mfd.
23.-- .25 mfd.
24.-- .006 mfd.
25.-- .004 mfd.

OHMS	VOLTS	6A8G TUBE	VOLTS	OHMS
INF.	100		-11	40M
INF.	242		155	INF.
0	0	AC	0	1 MEG.
			6.3	.5
0	0		3.6	300

OHMS	VOLTS	6F6G TUBE	VOLTS	OHMS
INF.	248		-.3	1 MEG
INF.	235	AC		
0	0		6.3	.5
0	0		0	0

OHMS	VOLTS	5Y3 TUBE	VOLTS	OHMS
1800	-100			
			-100	1800
INF.	248			
0	0		248	INF.

OHMS	VOLTS	6Q7G TUBE	VOLTS	OHMS
500M	-.1			
INF.	90	AC	-.1	500M
0	0		6.3	.5
0	0		0	0

OHMS	VOLTS	6K7G TUBE	VOLTS	OHMS
INF.	100		2.2	300
INF.	245	AC	0	1 MEG.
0	0		6.3	.5
0	0		2.2	300

FIGURE 5
VOLTAGE AND RESISTANCE TABLE

MODELS 58T1, 58T2
Chassis 58
Alignment, Trimmers
Socket, Notes

FAIRBANKS, MORSE & CO.

INTERMEDIATE FREQUENCY ALIGNMENT

1.- Turn the gang condenser to maximum capacity (full meshed). With the Range Switch on the Broadcast position.

2.- Supply a 456 kilocycle signal from the signal generator to the grid of the first detector tube (6A8G) through a .1 Mfd. condenser connected in series with the signal generator lead.

3.- Adjust the four trimmers of the two intermediate frequency transformers (see Figure 1) for maximum output with minimum input from the service oscillator.

RADIO FREQUENCY ALIGNMENT

The parallel or high frequency trimmer condensers for each coil are housed in the same shield can with the coil. These trimmers are used for aligning the high frequency end of each band. The location of the various trimmers is shown in Figure 1.

The oscillator, adjustable, series padding condensers are used for tracking the oscillator at the low frequency end of each band. The padding condenser may be adjusted from the top of the chassis through the holes indicated in Figure 1. Since a fixed mica padding condenser is employed on the short wave band, no adjustment is necessary. While making padding condenser adjustments, the gang condenser should be rotated back and forth across the signal to insure adjustment to the peak of greatest intensity.

DIAL ADJUSTMENT

Before making any radio frequency alignment adjustments, close the variable tuning condenser (maximum capacity), loosen the screw that secures the dial pointer, place the pointer in a horizontal position (gang condenser still closed) and then tighten the screw.

NOTE - The three bands must be aligned in the following order: First, police; second, broadcast; third, short wave.

POLICE BAND

1.- Turn the band selector switch to the police band (center) position.

2.- Tune the receiver to 6 megacycles.

3.- Supply a 6 megacycle signal from the signal generator to the antenna lead of the receiver through a 400 ohm carbon resistor (dummy antenna), connected in series with the signal generator lead.

4.- Adjust the police band oscillator trimmer condenser (Figure 1) for maximum output with minimum input from the signal generator, then adjust the police band antenna stage trimmer for maximum output, at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity.

5.- Tune the receiver to 2.4 megacycles.

6.- Supply a 2.4 megacycle signal to the receiver through the same connections used on the previous adjustment.

7.- Adjust the police band oscillator padding condenser (top of chassis, see Figure 1) for maximum output with minimum input from the signal generator, at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity.

8.- Check at 6 megacycles and then at 2.4 megacycles and make any adjustments that are necessary to obtain satisfactory calibration.

BROADCAST BAND

1.- Turn the band selector switch to the broadcast (counter-clockwise) position.

2.- Tune the receiver to 1500 kilocycles.

3.- Supply a 1500 kilocycle signal from the signal generator to the antenna lead of the receiver through a standard dummy antenna or a 200 Mmfd. (.0002 Mfd.) condenser, connected in series with the signal generator lead.

4.- Adjust the broadcast band oscillator trimmer condenser (Figure 1) for maximum output with minimum input from the signal generator. Then adjust the broadcast band antenna stage trimmer for maximum output.

5.- Tune the receiver to 600 kilocycles.

6.- Supply a 600 kilocycle signal to the antenna of the receiver through the same connections as previously used.

7.- Adjust the broadcast band oscillator padding condenser (top of chassis, see Figure 1) for maximum output with minimum input from the signal generator, at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity.

8.- Check at 1500 kilocycles and then at 600 kilocycles. Make any adjustments that are necessary to obtain satisfactory calibration.

9.- Supply a 456 kilocycle signal to the antenna of the receiver through the dummy antenna with the gang condenser at 600 kilocycles.

10.- Adjust the wave trap trimmer "A" (see Figure 1) for minimum output.

SHORT WAVE BAND

1.- Turn the band selector switch to the short wave (clockwise) position.

2.- Tune the receiver to 20 megacycles.

3.- Supply a 20 megacycle signal from the signal generator to the antenna lead of the receiver through a 400 ohm carbon resistor (dummy antenna), connected in series with the signal generator lead.

4.- Adjust the short wave band oscillator trimmer condenser (Figure 1) for maximum output with minimum input from the signal generator. Then adjust the short wave band antenna stage trimmer for maximum output, at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity.

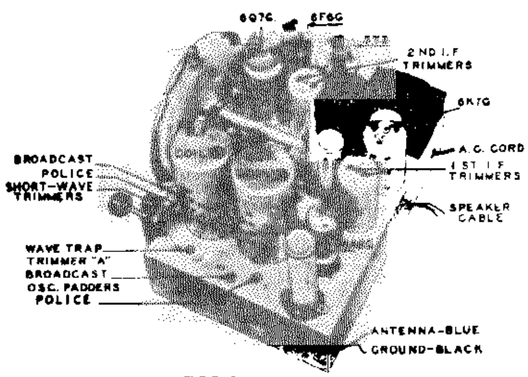
5.- The 8 megacycle signal should be received near 8 megacycles on the dial. If this is not the case, check the oscillator tube, switch connections, the fixed padding condenser and the coils. No adjustment is necessary at this point.

WARNING - The image signal should be received at approximately 19 megacycles on the dial. If not, the oscillator has been aligned to the image frequency and the oscillator trimmer condenser must be backed out until the correct signal is received at 20 megacycles and the image at approximately 19 megacycles. If readjustment is found necessary, the antenna stage trimmer should also be checked again.

ANTENNA AND GROUND CONNECTIONS

The BLUE wire on the receiver is to be connected to the antenna. The BLACK wire on the receiver is to be connected to the ground. When a FAIRBANKS-MORSE ANTENNA is used, the BLUE wire from the receiver is to be connected to the red wire on the antenna set coupler and the BLACK wire from the receiver is to be connected to the black wire on the antenna set coupler and to a good ground.

The most suitable antenna for use in large cities or congested radio districts, where interference is a serious problem, is the doublet. In small centers of population, where interference is not serious, a single wire antenna having a total length of from 75 to 100 feet, erected as high as possible, with a good insulator at each end, will prove satisfactory. The lead-in should go to the receiver by the most direct route and should be kept away, as far as possible, from obstructions. Such an antenna will have less directional properties and less tendency to pick up power line interference than a low antenna with a long horizontal lead.



COLOR CODES

FIRST I. F. TRANSFORMER

Plate	Blue
"B" Plus	Red
Grid Return	Black
Grid (Top)	Green

SECOND I. F. TRANSFORMER

Plate	Blue
"B" Plus	Red
Diode Return	Black
Diodes	Green

RESISTOR AND CONDENSER COLOR CODE

0	Black	2	Red	4	Yellow	6	Blue	8	Grey
1	Brown	3	Orange	5	Green	7	Purple	9	White

POWER TRANSFORMER

Lead Color	Voltage
Black	115 Volt Primary
Green	6.3 Volt Filament
Yellow	5.0 Volt Filament
Red	High Voltage Sec.
Red & White	High Voltage C.T.

RESISTORS

The BODY COLOR represents the FIRST FIGURE of the resistance value
The END COLOR represents the SECOND FIGURE of the resistance value
The DOT COLOR represents the NUMBER OF CIPHERS following the First two figures

MICA CONDENSERS

(Capacity in Micro-Microfarads)

The FIRST DOT on the condenser represents the FIRST FIGURE of the capacity
The SECOND DOT on the condenser represents the SECOND FIGURE of the capacity
The THIRD DOT on the condenser represents the NUMBER OF CIPHERS following the first two figures.
The colors on the condensers should be read from left to right with the condenser in an upright position.

FAIRBANKS, MORSE & CO.

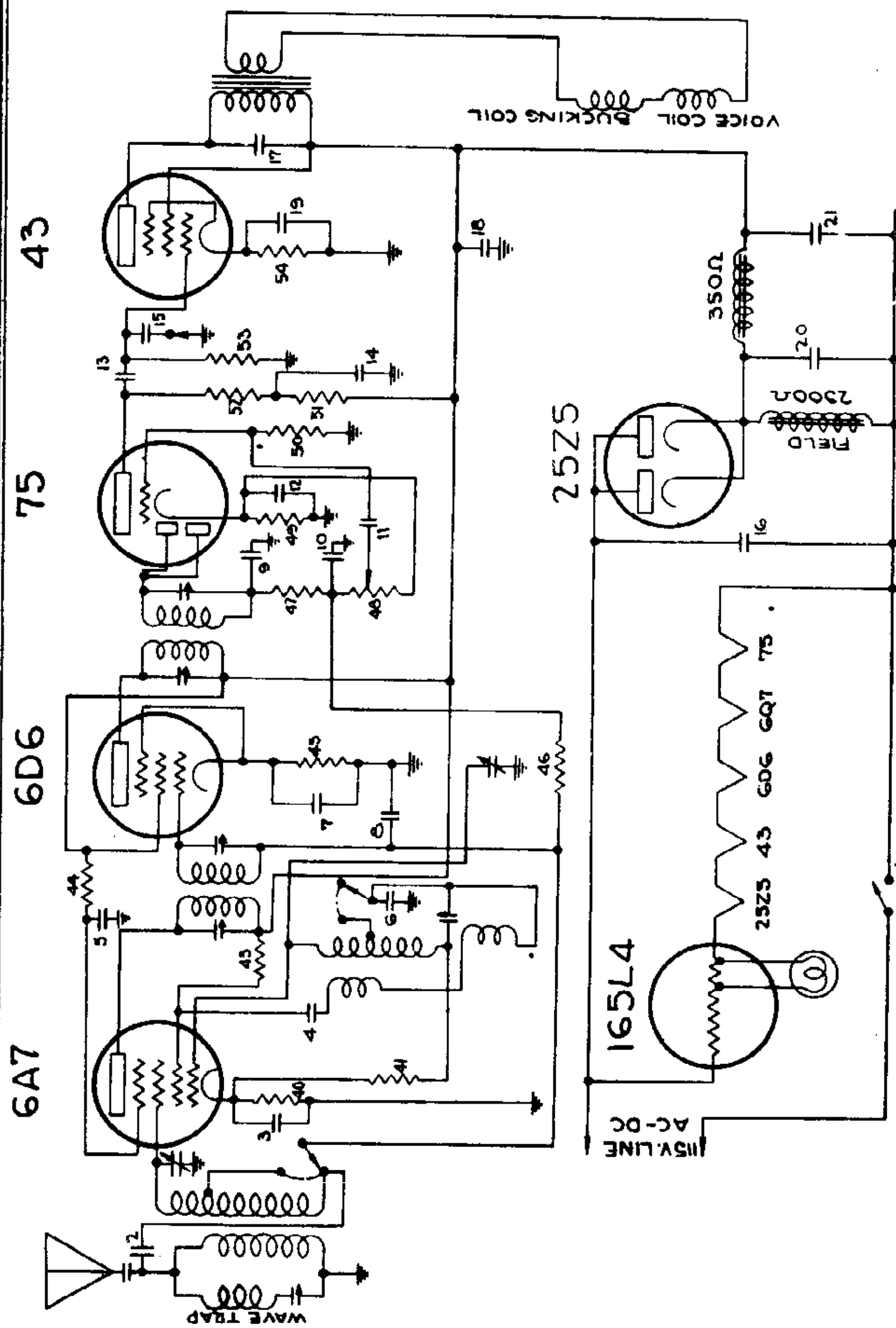
COLOR CODES

FIRST I. F. TRANSFORMER

Plate. . . . . Blue
"B" Plus . . . . Red
Grid Return. . . . . Black
Grid (Top) . . . . Green

SECOND I. F. TRANSFORMER

Plate. . . . . Blue
"B" Plus . . . . Red
Diode Return . . . . Black
Diodes . . . . Green



IF PEAK 456 KC

RESISTORS

40 -	300 OHMS
41 -	20M OHMS
42 -	
43 -	10M OHMS
44 -	35M OHMS
45 -	300 OHMS
46 -	1 MEGOHM
47 -	50M OHMS
48 -	500M OHMS
49 -	10M OHMS
50 -	500M OHMS
51 -	100M OHMS
52 -	250M OHMS
53 -	500M OHMS
54 -	600 OHMS

CONDENSERS

1 -	.01 MFD.
2 -	.0001 MFD.
3 -	.05 MFD.
4 -	.001 MFD.
5 -	.1 MFD.
6 -	.003 MFD.
7 -	.1 MFD.
8 -	.1 MFD.
9 -	.0001 MFD.
10 -	.0001 MFD.
11 -	.01 MFD.
12 -	.5 MFD.
13 -	.01 MFD.
14 -	.1 MFD.
15 -	.006 MFD.
16 -	.01 MFD.
17 -	.01 MFD.
18 -	.1 MFD.
19 -	5 MFD.
20 -	16 MFD.
21 -	16 MFD.

MODEL 68T6
Chassis 68
Socket, Trimmers
Alignment

FAIRBANKS, MORSE & CO.

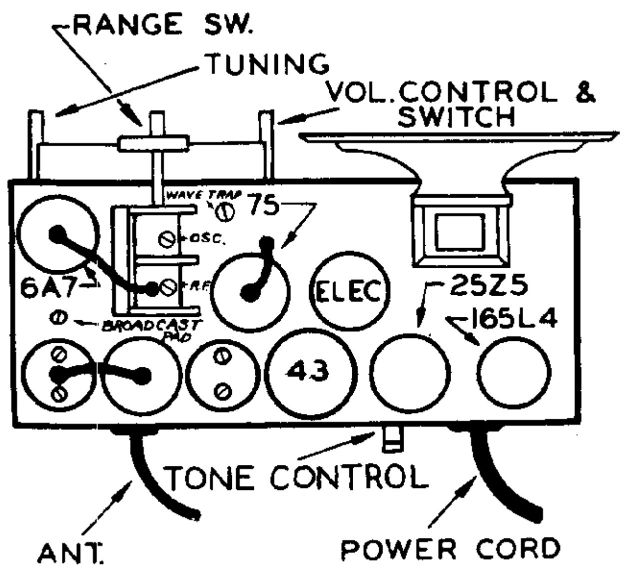


FIGURE 1

TOP VIEW OF THE MODEL 68 CHASSIS

INTERMEDIATE FREQUENCY ALIGNMENT

1. Turn the gang condenser to maximum capacity (fully meshed.)
2. Set the band selector switch on the "Broadcast" position.
3. Supply a 456 kilocycle signal from the signal generator to the antenna lead of the receiver through a .1 Mfd. condenser connected in series with the signal generator lead.
4. Adjust the four trimmers of the two intermediate frequency transformers (see Figure 1) for maximum output with minimum input from the service oscillator.

RADIO FREQUENCY ALIGNMENT

The parallel or high frequency trimmer condensers for the broadcast band are on the gang condenser. These trimmers are used for aligning the high frequency end of the broadcast band. The location of the trimmers is shown in Figure 1.

The oscillator adjustable series padding condenser is used for tracking the oscillator at the low frequency end of the broadcast band. The padding condenser may be adjusted from the top of the chassis through the hole indicated in Figure 1. While making padding condenser adjustments, the gang condenser should be rotated back and forth across the signal to insure adjustment to the peak of greatest intensity.

DIAL ADJUSTMENT

Before making any radio frequency alignment adjustments, close the variable tuning condenser (Maximum capacity), place the dial pointer at 540 kilocycles (gang condenser still closed) and then proceed with the following adjustments.

BROADCAST BAND

1. Turn the band selector switch to the broadcast (Counter-Clockwise) position.
2. Tune the receiver to 1500 kilocycles.
3. Supply a 1500 kilocycle signal from the signal generator to the antenna lead of the receiver through a standard dummy antenna or a 200 Mmfd. (.0002 Mfd.) condenser, connected in series with the signal generator lead.
4. Adjust the trimmer condensers on the gang condenser (Figure 1) for maximum output with minimum input from the signal generator.
5. Tune the receiver to 600 kilocycles.
6. Supply a 600 kilocycle signal to the antenna of the receiver through the same connections as previously used.
7. Adjust the broadcast band oscillator padding condenser (top of chassis, see Figure 1) for maximum output with minimum input from the signal generator, at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity.
8. Check at 1500 kilocycles and then at 600 kilocycles. Make any adjustments that are necessary to obtain satisfactory calibration.
9. Supply a 456 kilocycle signal to the antenna of the receiver through the dummy antenna with the gang condenser at 600 kilocycles.
10. Adjust the wave trap trimmer (see Figure 1) for minimum output.

SHORT WAVE BAND

1. Turn the band selector switch to the short wave position (clockwise).
2. Tune the receiver to 6 megacycles.
3. Supply a 6 Megacycle signal from the signal generator to the antenna lead of the receiver through a 400 ohm carbon resistor (dummy antenna), connected in series with the signal generator lead.
4. The 6 megacycle signal should be received near 6 megacycles on the dial. If this is not the case, check the oscillator tube, switch connections, the fixed padding condenser (C-6) and coils. No adjustment is necessary on this band.
5. Repeat 1, 2, 3, and 4 at 3.6 megacycles.

MODEL 68T6
Chassis 68
Model 69T7
Chassis 69
Voltage,
Resistance

FAIRBANKS, MORSE & CO.

Upper Voltage Readings A. C.

Lower Voltage Readings D. C.

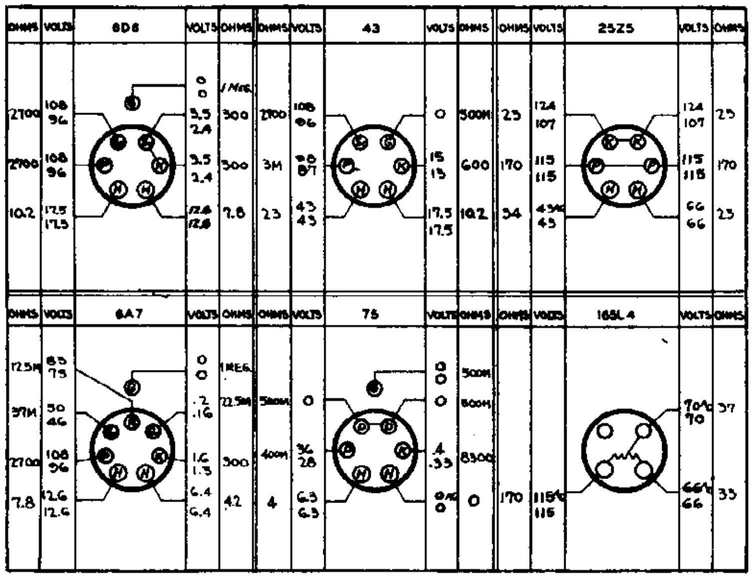


FIGURE 5
VOLTAGE AND RESISTANCE TABLE MODEL 68

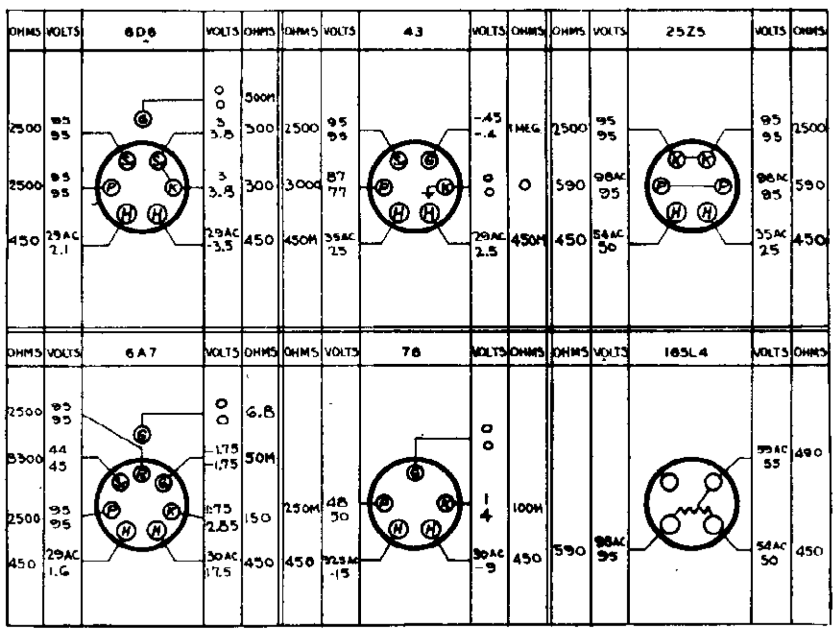


FIGURE 5
VOLTAGE AND RESISTANCE TABLE
MODEL 69

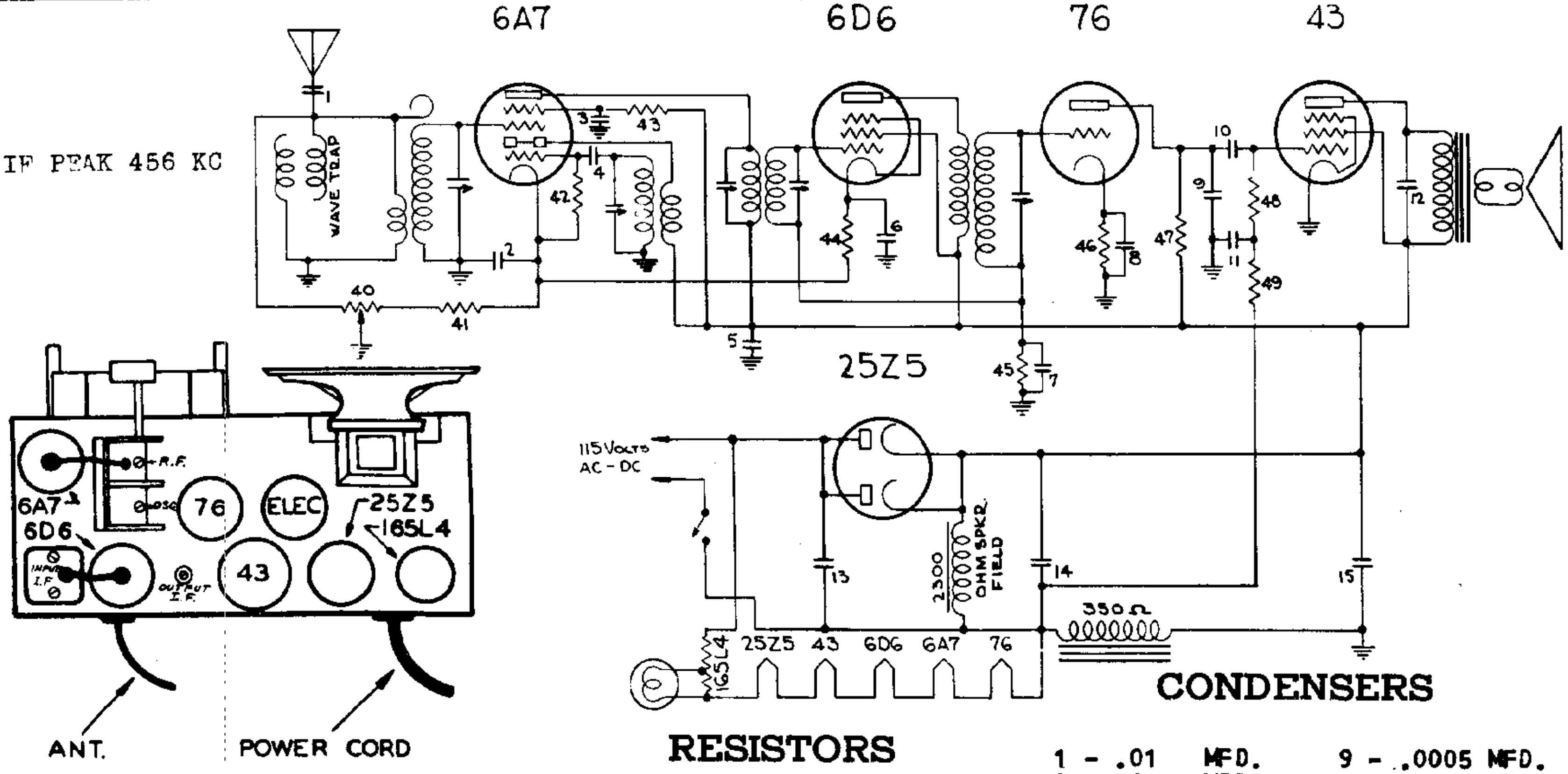
NOTE - The upper voltage readings shown indicate the voltage from eac respective prong to ground with the receiver connected to an A.C. (Alternating Current) power line.

The lower voltage readings were taken with the receiver connected to D.C. (Direct Current) power line.

These Voltage readings may vary with the fluctuation in line voltage.

MODEL 69T7
Chassis 69
Schematic, Socket
Trimmers, Alignment

FAIRBANKS, MORSE & CO.



RESISTORS

40 - 5M OHMS	45 - 500M OHMS
41 - 150 OHMS	46 - 100M OHMS
42 - 50M OHMS	47 - 250M OHMS
43 - 35M OHMS	48 - 500M OHMS
44 - 150 OHMS	49 - 500M OHMS

CONDENSERS

1 - .01 MFD.	9 - .0005 MFD.
2 - .05 MFD.	10 - .01 MFD.
3 - .05 MFD.	11 - .25 MFD.
4 - .0001 MFD.	12 - .006 MFD.
5 - .25 MFD.	13 - .01 MFD.
6 - .05 MFD.	14 - 16 MFD.
7 - .1 MFD.	15 - 8 MFD.
8 - .1 MFD.	

COLOR CODES
FIRST
I. F. TRANSFORMER

Plate. . . . . Blue
"B" Plus . . . . Red
Grid Return. . . . . . . Black
Grid (Top) . . . . Green

SECOND
I. F. TRANSFORMER

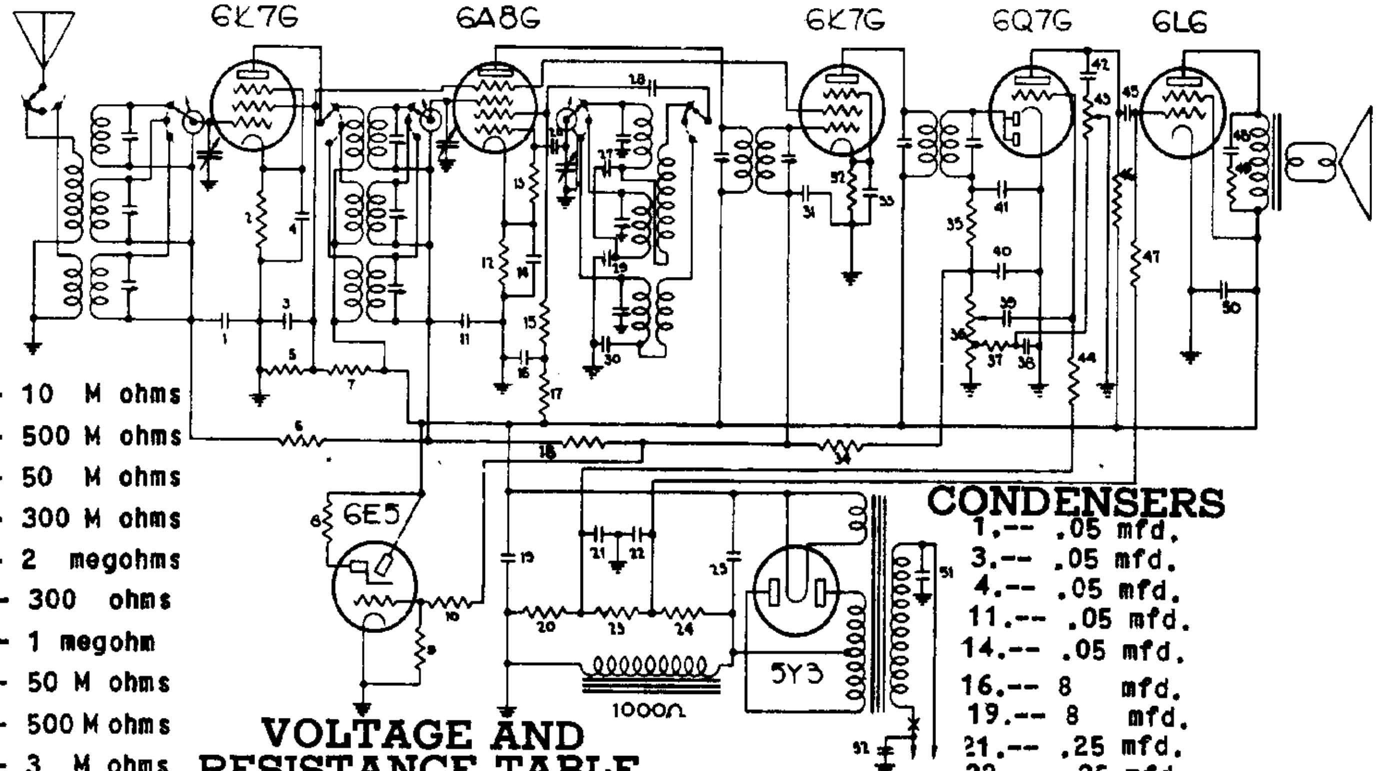
Plate. . . . . Blue
"B" Plus . . . . Red
Grid Return. . . . . . . Black
Grid . . . . Green

INTERMEDIATE FREQUENCY ALIGNMENT:-Supply a 456 KC signal from the sig. gen. to the antenna lead thru a .1 mfd. cond. in series with the signal gen.
Adjust the three trimmers for maximum ouput with minimum input from the osc.
RADIO FREQUENCY ALIGNMENT: With min. cap. of var. cond. set dial at 540 KC.
Tune the receiver at 1500 KC. - Supply a 1500 signal from sig. gen. to antenna thru 200 mmfd. cond., connected in series with sig. gen. lead. Adj. trimmers for max. OP.
Tune receiver to 600 KC - Supply 600 KC to ant. thru the same connection as above.
Low freq. of band does not employ an osc. padding cond. but is tracked by means of a split section of gang cond. The wave trap requires no adjustment.

MODELS 72C2, 72C3, 72T3
Chassis 72
Schematic, Voltage
Resistance

FAIRBANKS, MORSE & CO.

IF PEAK 456 KC



RESISTORS

43.-- 500 M ohms
44.-- 500 M ohms
46.-- 250 M ohms
47.-- 250 M ohms
49.-- 5 M ohms

2.-- 300 ohms
5.-- 50 M ohms
6.-- 50 M ohms
7.-- 15 M ohms
8.-- 1 megohm
9.-- 2 megohms
10.-- 1 megohm
12.-- 300 ohms
13.-- 50 M ohms
15.-- 10 M ohms

17.-- 10 M ohms
18.-- 500 M ohms
20.-- 50 M ohms
23.-- 300 M ohms
24.-- 2 megohms
32.-- 300 ohms
34.-- 1 megohm
35.-- 50 M ohms
36.-- 500 M ohms
37.-- 3 M ohms

CONDENSERS

1.-- .05 mfd.
3.-- .05 mfd.
4.-- .05 mfd.
11.-- .05 mfd.
14.-- .05 mfd.
16.-- 8 mfd.
19.-- 8 mfd.
21.-- .25 mfd.
22.-- .25 mfd.
25.-- 16 mfd.
26.-- 100 mfd.
27.-- 750 M mfd.
28.-- 1000 M mfd.
29.-- 1800 M mfd.
30.-- 4000 M mfd.
31.-- .05 mfd.
33.-- .05 mfd.
38.-- .1 mfd.
39.-- .01 mfd.
40.-- 100 M mfd.
41.-- 100 M mfd.
42.-- .03 mfd.
48.-- .02 mfd.
45.-- .01 mfd.
50.-- .1 mfd.
51.-- .01 mfd.
52.-- .01 mfd.

VOLTAGE AND RESISTANCE TABLE

OHMS	VOLTS	6A8G TUBE	VOLTS	OHMS
50M	85		-2	55M
65M	195	AC	125	85M
.5	6.3		0	1 MEG.
			0	0
0	0		2	300

OHMS	VOLTS	6K7G TUBE	VOLTS	OHMS
50M	85		1.75	300
65M	195,	AC	0	1 MEG.
.5	6.3		0	0
0	0		1.75	300

OHMS	VOLTS	6K7G TUBE	VOLTS	OHMS
50M	85		1.75	300
55M	195	AC	0	1 MEG.
0	0		6.3	.5
0	0		1.75	300

OHMS	VOLT	6Q7G TUBE	VOLTS	OHMS
500M	-.2		-2	500 M
300M	95	AC	-.25	500 M
.5	6.3		0	0
0	0		0	0

OHMS	VOLTS	6L6 TUBE	VOLTS	OHMS
65M	195		-.25	500M
65M	185	AC		
.5	6.3		0	0
0	0		0	0

OHMS	VOLTS	5Y3 TUBE	VOLTS	OHMS
1150	-95			
			-95	1150
65M	195			
0	0		195	65M

OHMS	VOLTS	6E5 TUBE	VOLT	OHMS
1 MEG	-.1		195	65M
2 MEG	5		0	0
.5	6.3	AC	0	0

MODELS 72C2,72C3,72T3
Chassis 72

FAIRBANKS, MORSE & CO.

Alignment,Socket
Trimmers,Data

INTERMEDIATE FREQUENCY ALIGNMENT

1.- Turn the gang condenser to maximum capacity (fully meshed). With the range switch on the broadcast position.

2.- Supply a 456 kilocycle signal from the signal generator to the grid of the first detector tube (6A8G) through a .1 Mfd.condenser connected in series with the signal generator lead.

3.- Adjust the four trimmers of the two intermediate frequency transformers (see Figure 1) for maximum output with minimum input from the service oscillator.

RADIO FREQUENCY ALIGNMENT

The parallel or high frequency trimmer condensers for each coil are housed in the same shield can with the coil except the oscillator trimmers, these are air dielectric condensers and are mounted on the chassis. These trimmers are used for aligning the high frequency end of each band. The location of the various trimmers is shown in Figure 1.

The oscillator, adjustable, series padding condensers are used for tracking the oscillator at the low frequency end of each band. The padding condensers may be adjusted from the top of the chassis through the holes indicated in Figure 1. Since a fixed mica padding condenser is employed on the short wave band, no adjustment is necessary. While making padding condenser adjustments, the gang condenser should be rotated back and forth across the signal to insure adjustment to the peak of greatest intensity.

DIAL ADJUSTMENT

Before making any radio frequency alignment adjustments, close the variable tuning condenser (maximum capacity), loosen the screw that secures the dial pointer, place the pointer in a horizontal position (gang condenser still closed) and then tighten the screw.

POLICE BAND

1.- Turn the band selector switch to the police band (center)position.

2.- Tune the receiver to 6 megacycles.

3.- Supply a 6 megacycle signal from the signal generator to the antenna lead of the receiver through a 400 ohm carbon resistor (dummy antenna), connected in series with the signal generator lead.

4.- Adjust the police band oscillator trimmer condenser (Figure 1)for maximum output with minimum input from the signal generator, then adjust the police band radio frequency and antenna stage trimmers for maximum output.

5.- Tune the receiver to 2.5 megacycles.

6.- Supply a 2.5 megacycle signal to the receiver through the same connections used on the previous adjustment.

7.- Adjust the police band oscillator padding condenser (top of chassis, see Figure 1) for maximum output with minimum input from the signal generator, at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity.

8.- Check at 6 megacycles and then at 2.5 megacycles and make any adjustments that are necessary to obtain satisfactory calibration.

BROADCAST BAND

1.- Turn the band selector switch to the broadcast (counter-clockwise) position.

2.- Tune the receiver to 1500 kilocycles.

3.- Supply a 1500 kilocycle signal from the signal generator to the antenna lead of the receiver through a standard dummy antenna or a 200 Mmfd. (.0002 Mfd.) condenser, connected in series with the signal generator lead.

4.- Adjust the broadcast band oscillator trimmer condenser (Figure 1) for maximum output with minimum input from the signal generator. Then adjust the broadcast band radio frequency and antenna stage trimmers for maximum output.

5.- Tune the receiver to 600 kilocycles.

6.- Supply a 600 kilocycle signal to the antenna of the receiver through the same connections as previously used.

7.- Adjust the broadcast band oscillator padding condenser (top of the chassis, see Figure 1) for ~~maximum output with minimum input from~~ the signal generator, at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity.

8.- Check at 1500 kilocycles and then at 600 kilocycles. Make any adjustments that are necessary to obtain satisfactory calibration.

SHORT WAVE BAND

1.- Turn the band selector switch to the short wave (clockwise) position.

2.- Tune the receiver to 20 megacycles.

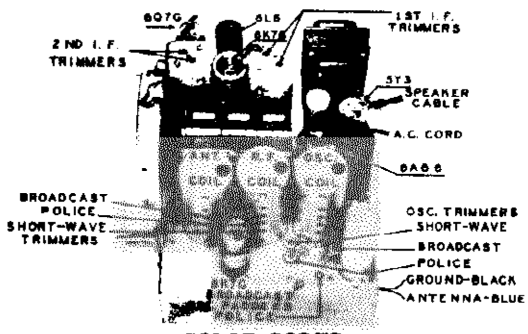
3.- Supply a 20 megacycle signal from the signal generator to the antenna lead of the receiver through a 400 ohm carbon resistor (dummy antenna), connected in series with the signal generator lead.

4.- Adjust the short wave band oscillator trimmer condenser (Figure 1) for maximum output with minimum input from the signal generator. Then adjust the short wave band antenna and radio frequency stage trimmers for maximum output, at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity.

5.- The 8 megacycle signal should be received near 8 megacycles on the dial. If this is not the case check the oscillator tube, switch connections, the fixed padding condenser and the coils. No adjustment is required at this point.

WARNING

The image signal should be received at approximately 19 megacycles on the dial. If not, the oscillator has been aligned to the image frequency and the oscillator trimmer condenser must be backed out until the correct signal is received at 20 megacycles and the image at approximately 19 megacycles. If readjustment is found necessary, the antenna and radio frequency stage trimmers should also be checked again.



COLOR CODES

FIRST I. F. TRANSFORMER	
Plate	Blue
"B" Plus	Red
Grid Return	Black
Grid (Top)	Green

SECOND I. F. TRANSFORMER	
Plate	Blue
"B" Plus	Red
Diode Return	Black
Diodes	Green

STANDARD RMA

RESISTOR AND CONDENSER COLOR CODE

0 Black	2 Red	4 Yellow	6 Blue	8 Grey
1 Brown	3 Orange	5 Green	7 Purple	9 White

RESISTORS

The BODY COLOR represents the FIRST FIGURE of the resistance value
The END COLOR represents the SECOND FIGURE of the resistance value
The DOT COLOR represents the NUMBER OF CIPHERS following the First two figures

MICA CONDENSERS

(Capacity in Micro-Microfarads)

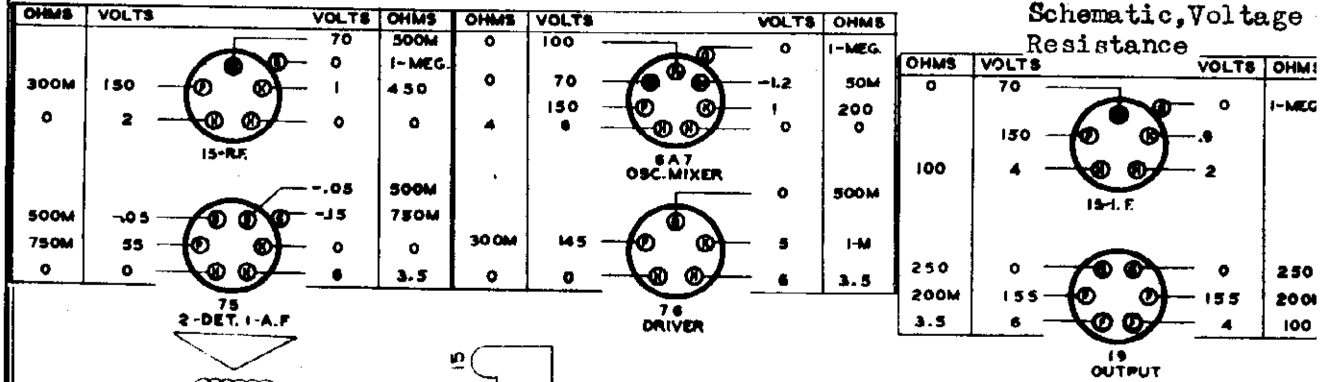
The FIRST DOT on the condenser represents the FIRST FIGURE of the capacity
The SECOND DOT on the condenser represents the SECOND FIGURE of the capacity
The THIRD DOT on the condenser represents the NUMBER OF CIPHERS following the first two figures.
The colors on the condensers should be read from left to right with the condenser in an upright position.

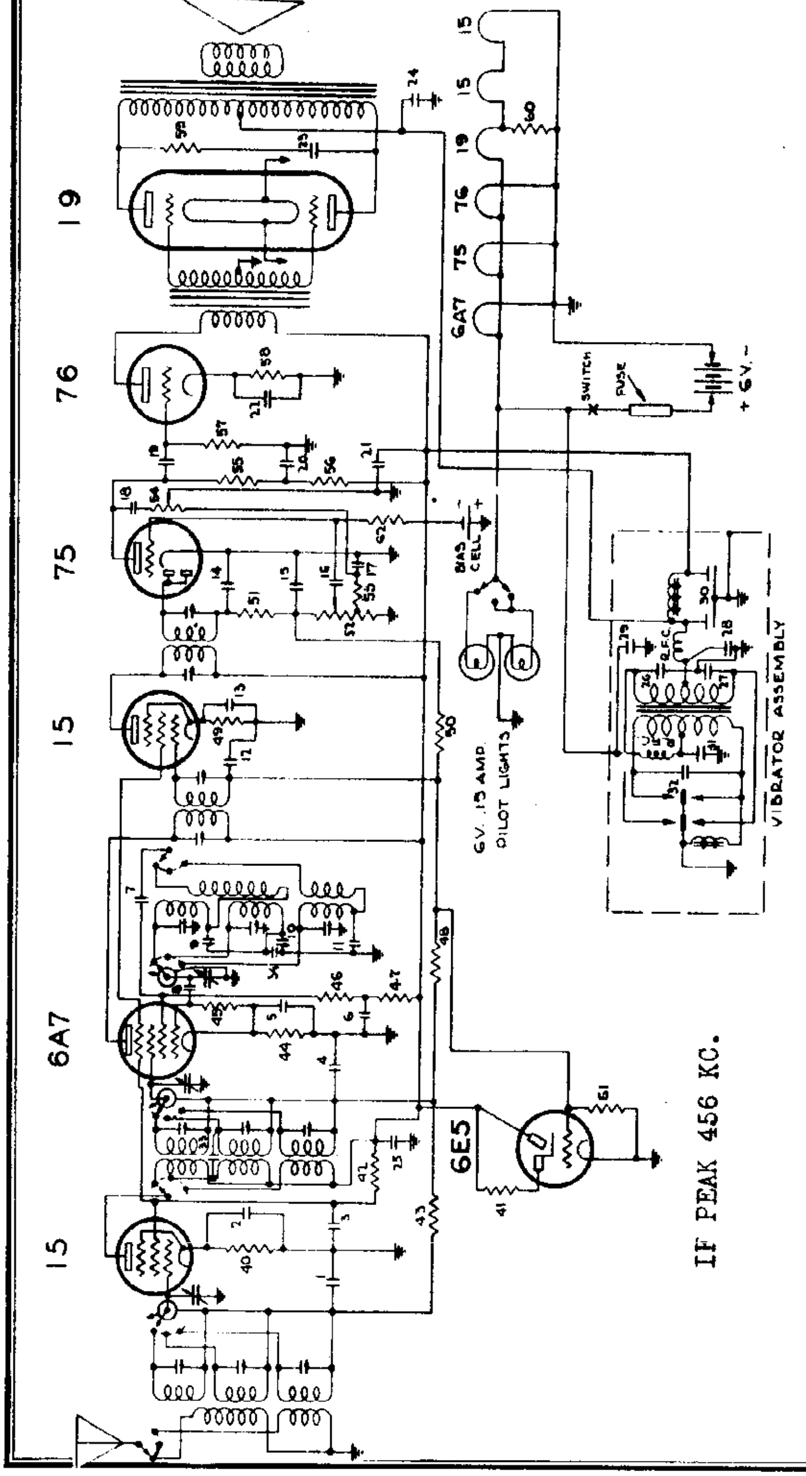
POWER TRANSFORMER

Lead Color	Voltage
Black	115 Volt Primary
Green	6.3 Volt Filament
Yellow	5.0 Volt Filament
Red	High Voltage Sec.
Red & White	High Voltage C.T.

MODELS 73C3B, 73T3B
Chassis 73
Schematic, Voltage
Resistance

FAIRBANKS, MORSE & CO.





RESISTORS

40 - 500 ohms
41 - 1 megohm
42 - 25M ohms
43 - 50 ohms
44 - 150 ohms
45 - 50M ohms
46 - 10M ohms
47 - 10M ohms
48 - 500M ohms
49 - 500 ohms
50 - 1 megohm
51 - 50M ohms
52 - 500M ohms
53 - 3M ohms
54 - 500M ohms
55 - 250M ohms
56 - 250M ohms
57 - 500M ohms
58 - 1M ohms
59 - 10M ohms
60 - 100 ohms
61 - 2 megohms
62 - 500M ohms

CONDENSERS

1 - .05 mfd
2 - .05 mfd
3 - .1 mfd
4 - .05 mfd
5 - .05 mfd
6 - 8 mfd
7 - .001 mfd
8 - 100 mmfd
9 - .0005 mfd
10 - .00175 mfd
11 - .004 mfd
12 - .05 mfd
13 - .05 mfd
14 - .0001 mfd
15 - .0001 mfd
16 - .01 mfd
17 - .1 mfd
18 - .03 mfd
19 - .01 mfd
20 - .1 mfd
21 - .25 mfd
22 - 10 mfd
23 - .01 mfd
24 - .25 mfd
25 - .1 mfd
26 - .01 mfd
27 - .01 mfd
28 - .1 mfd
29 - .05 mfd
30 - Dual 8 mfd
31 - .5 mfd
32 - .25 mfd
33 - 10 mfd
34 - 300 mmfd

MODELS 73C3B, 73T3B
Chassis 73
Socket, Trimmers
Alignment, Data

FAIRBANKS, MORSE & CO.

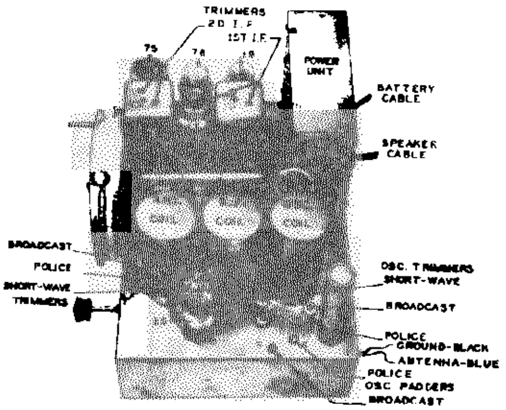


FIGURE 3
TOP VIEW OF THE MODEL 73 CHASSIS

INTERMEDIATE FREQUENCY ALIGNMENT

1.- Turn the gang condenser to maximum capacity (fully meshed). Set the band selector switch on the broadcast position.

2.- Supply a 456 kilocycle signal from the signal generator to the grid of the first detector tube (6A7) through a .1 Mfd. condenser connected in series with the signal generator lead.

3.- Adjust the four trimmers of the two intermediate frequency transformers (see Figure 3) for maximum output with minimum input from the service oscillator.

RADIO FREQUENCY ALIGNMENT

The parallel or high frequency trimmer condensers for each coil are housed in the same shield can with the coil except the oscillator trimmers, these are air dielectric condensers and are mounted on the chassis. These trimmers are used for aligning the high frequency end of each band. The location of the various trimmers is shown in Figure 3.

The oscillator, adjustable, series padding condensers are used for tracking the oscillator at the low frequency end of each band. The padding condensers may be adjusted from the top of the chassis through the holes indicated in Figure 3. Since a fixed mica padding condenser is employed on the short wave band, no adjustment is necessary. While making padding condenser adjustments, the gang condenser should be rotated back and forth across the signal to insure adjustment to the peak of greatest intensity.

DIAL ADJUSTMENT

Before making any radio frequency alignment adjustments, close the variable tuning condenser (maximum capacity), loosen the screw that secures the dial pointer, place the pointer in a horizontal position (gang condenser still closed) and then tighten the screw.

POLICE BAND

1.- Turn the band selector switch to the police band (center) position.

2.- Tune the receiver to 6 megacycles.

3.- Supply a 6 megacycle signal from the signal generator to the antenna lead of the receiver through a 400 ohm carbon resistor (dummy antenna), connected in series with the signal generator lead.

4.- Adjust the police band oscillator trimmer condenser (Figure 3) for maximum output with minimum input from the signal generator, then adjust the police band radio frequency and antenna stage trimmers for maximum output.

5.- Tune the receiver to 2.5 megacycles.

6.- Supply a 2.5 megacycle signal to the receiver through the same connections used on the previous adjustment.

7.- Adjust the police band oscillator padding condenser (top of chassis, see Figure 3) for maximum output with minimum input from the signal generator, at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity.

8.- Check at 6 megacycles and then at 2.5 megacycles and make any adjustments that are necessary to obtain satisfactory calibration.

BROADCAST BAND

1.- Turn the band selector switch to the broadcast (counter-clockwise) position.

2.- Tune the receiver to 1500 kilocycles.

3.- Supply a 1500 kilocycle signal from the signal generator to the antenna lead of the receiver through a standard dummy antenna or a 200 Mmfd. (.0002 Mfd.) condenser, connected in series with the signal generator lead.

4.- Adjust the broadcast band oscillator trimmer condenser (Figure 3) for maximum output with minimum input from the signal generator. Then adjust the broadcast band radio frequency and antenna stage trimmers for maximum output.

5.- Tune the receiver to 600 kilocycles.

6.- Supply a 600 kilocycle signal to the antenna of the receiver through the same connections as previously used.

7.- Adjust the broadcast band oscillator padding condenser (top of chassis, see Figure 3) for maximum output with minimum input from the signal generator, at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity.

8.- Check at 1500 kilocycles and then at 600 kilocycles. Make any adjustments that are necessary to obtain satisfactory calibration.

SHORT WAVE BAND

1.- Turn the band selector switch to the short wave (clockwise) position.

2.- Tune the receiver to 20 megacycles.

3.- Supply a 20 megacycle signal from the signal generator to the antenna lead of the receiver through a 400 ohm carbon resistor (dummy antenna), connected in series with the signal generator lead.

4.- Adjust the short wave band oscillator trimmer condenser (Figure 3) for maximum output with minimum input from the signal generator. Then adjust the short wave band antenna and radio frequency stage trimmers for maximum output, at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity.

5.- The 8 megacycle signal should be received near 8 megacycles on the dial. If this is not the case check the oscillator tube, switch connections, and fixed padding condenser and the coils. No adjustment is required at this point.

WARNING

The image signal should be received at approximately 19 megacycles on the dial. If not, the oscillator has been aligned to the image frequency and the oscillator trimmer condenser must be backed out until the correct signal is received at 20 megacycles and the image at approximately 19 megacycles. If readjustment is found necessary, the antenna and radio frequency stage trimmers should also be checked again.

SUGGESTED SERVICE PROCEDURE

If the receiver does not operate properly, test all tubes in a reliable tube tester or, better still, replace the tubes in the receiver, one by one, with tubes known to be good. Care must be exercised to see that the switch is turned off before any tubes are removed from the receiver, since some of them are two volt tubes, while others are six volt tubes, their filaments being connected in a series parallel arrangement. If, after replacing any defective tubes, the receiver is still inoperative, remove the chassis from the cabinet and conduct a careful resistance and voltage analysis.

The voltage and resistance charts in this manual give detailed information regarding the resistance from various points to various other points in the chassis. The measured voltage from the various tube socket contacts to ground is also given. When these charts are followed faithfully, little difficulty should be experienced in finding almost any fault that may develop.

NOTE - All adjustments should be made with the volume control "full on". Any desired variation in signal strength should be obtained by adjusting the output of the signal generator.

FUSE

In case of difficulty, the fuse located in a metal cartridge near the end of the positive (red) battery lead should be checked. A 15 ampere fuse, FAIRBANKS-MORSE part number 5605, should be used for replacement purposes.

BATTERY

A storage battery having a capacity of at least 135 ampere hours should be used with the receiver. The storage battery should be located as far from the chassis of the receiver as the battery cables will permit. Attach the long, red lead from the receiver to the positive (+) side of the storage battery. Attach the long, black lead from the receiver to the negative (-) side of the battery.

POWER TRANSFORMERS

Lead Color	Voltage
Black	115V. Primary
Green	6.3V. Filament
Yellow	5.0V. Filament
Red	High Voltage Sec.
Red and White	High Voltage C.T.

COLOR CODES

FIRST I. F. TRANSFORMER

Plate	Blue
"B" Plus	Red
Grid Return	Black
Grid (Top)	Green

SECOND I. F. TRANSFORMER

Plate	Blue
"B" Plus	Red
Diode Return	Black
Diodes	Green

Schematic, Voltage
Resistance

FAIRBANKS, MORSE & CO.

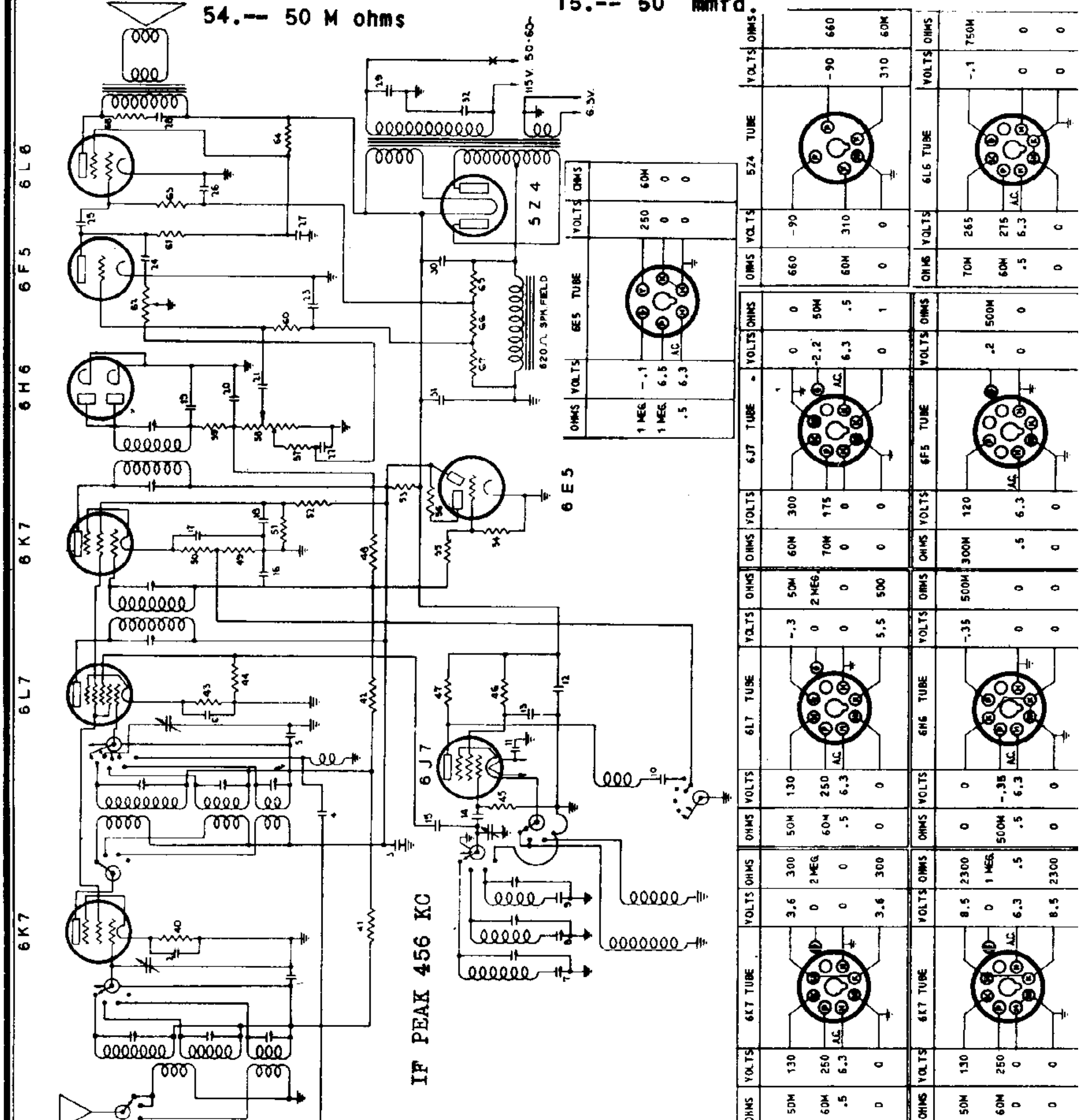
MODELS 91C4, 91C5, 91T4
Chassis 91

RESISTORS

40.-- 300 M ohms	55.-- 1 megohm
41.-- 50 M ohms	56.-- 1 megohm
42.-- 500 M ohms	57.-- 3 M ohms
43.-- 500 ohms	58.-- 500 M ohms
44.-- 50 M ohms	59.-- 50 M ohms
45.-- 50 M ohms	60.-- 500 M ohms
46.-- 2 M ohms	61.-- 250 M ohms
47.-- 10 M ohms	62.-- 500 M ohms
48.-- 1 megohm	63.-- 250 M ohms
49.-- 2 M ohms	64.-- 10 M ohms
50.-- 300 ohms	65.-- 2 megohms
51.-- 50 M ohms	66.-- 400 M ohms
52.-- 500 M ohms	67.-- 40 M ohms
53.-- 500 ohms	68.-- 5 M ohms
54.-- 50 M ohms	

CONDENSERS

1.-- .05 mfd.	16.-- .05 mfd.
2.-- .05 mfd.	17.-- .05 mfd.
3.-- .1 mfd.	18.-- .1 mfd.
4.-- 100 mfd.	19.-- 100 mmfd.
5.-- .05 mfd.	20.-- 100 mmfd.
6.-- .05 mfd.	21.-- .01 mfd.
7.-- 750 mmfd.	22.-- .1 mfd.
8.-- 1800 mmfd.	23.-- .25 mfd.
9.-- .004 mfd.	24.-- .03 mfd.
10.-- 200 mmfd.	25.-- .01 mfd.
11.-- 500 mmfd.	26.-- .25 mfd.
12.-- .1 mfd.	27.-- 4 mfd.
13.-- 500 mmfd.	28.-- .02 mfd.
14.-- 100 mmfd.	29.-- .01 mfd.
15.-- 50 mmfd.	30.-- 16 mfd.
	31.-- 30 mfd.
	32.-- .01 mfd.



MODELS 91C4, 91C5, 91T4
Chassis 91
Socket, Trimmers
Alignment, Data

FAIRBANKS, MORSE & CO.

NOTE - All adjustments should be made with the volume control "full on". Any desired variation in signal strength should be obtained by adjusting the output of the signal generator.

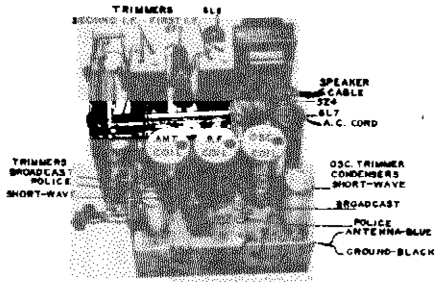


FIGURE 4
TOP VIEW OF THE MODEL 91 CHASSIS

INTERMEDIATE FREQUENCY ALIGNMENT

1.- Turn the gang condenser to maximum capacity (fully meshed). Band switch on broadcast position.

2.- Supply a 456 kilocycle signal from the signal generator to the grid of the first detector tube through a .1 Mfd. condenser connected in series with the signal generator lead.

3.- Adjust the four trimmers of the two intermediate frequency transformers (see Figure 4) for maximum output with minimum input from the service oscillator.

RADIO FREQUENCY ALIGNMENT

The parallel or high frequency trimmer condensers for each coil are housed in the same shield can with the coil, with the exception of the oscillator trimmers, these are air dielectric condensers and are mounted on the chassis. These trimmers are used for aligning the high frequency end of each band. The location of the various trimmers is shown in Figure 4.

The oscillator, adjustable, series padding condensers are used for tracking the oscillator at the low frequency end of each band. The padding condensers may be adjusted from the top of the chassis through the holes indicated in Figure 4. Since a fixed mica padding condenser is employed on the short wave band, no adjustment is necessary. While making padding condenser adjustments, the gang condenser should be rotated back and forth across the signal to insure adjustment to the peak of greatest intensity.

BROADCAST BAND

1.- Turn the band selector switch to the broadcast (clockwise) position.

2.- Tune the receiver to 1500 kilocycles.

3.- Supply a 1500 kilocycle signal from the signal generator to the antenna lead of the receiver through a standard dummy antenna or a 200 Mmfd. (.0002 Mfd.) condenser, connected in series with the signal generator lead.

4.- Adjust the broadcast band oscillator trimmer condenser (Figure 4) for maximum output with minimum input from the signal generator. Then adjust the broadcast band radio frequency and antenna stage trimmers for maximum output.

5.- Tune the receiver to 600 kilocycles.

6.- Supply a 600 kilocycle signal to the antenna of the receiver through the same connections as previously used.

7.- Adjust the broadcast band oscillator padding condenser (top of chassis, see Figure 4) for maximum output with minimum input from the signal generator, at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity.

8.- Check at 1500 kilocycles and then at 600 kilocycles. Make any adjustments that are necessary to obtain satisfactory calibration.

POLICE BAND

1.- Turn the band selector switch to the police band (center) position.

2.- Tune the receiver to 5.4 megacycles.

3.- Supply a 5.4 megacycle signal from the signal generator to the antenna lead of the receiver through a 400 ohm carbon resistor (dummy antenna), connected in series with the signal generator lead.

4.- Adjust the police band oscillator trimmer condenser (Figure 4) for maximum output with minimum input from the signal generator, then adjust the police band radio frequency and antenna stage trimmers for maximum output.

5.- Tune the receiver to 1.8 megacycles.

6.- Supply a 1.8 megacycle signal to the receiver through the same connections used on the previous adjustment.

7.- Adjust the police band oscillator padding condenser (top of chassis, see Figure 4) for maximum output with minimum input from the signal generator, at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity.

8.- Check at 5.4 megacycles and then at 1.8 megacycles and make any adjustments that are necessary to obtain satisfactory calibration.

SHORT WAVE BAND

1.- Turn the band selector switch to the short wave (clockwise) position.

2.- Tune the receiver to 18 megacycles.

3.- Supply an 18 megacycle signal from the signal generator to the antenna lead of the receiver through a 400 ohm carbon resistor (dummy antenna), connected in series with the signal generator lead.

4.- Adjust the short wave band oscillator trimmer condenser (in Figure 4) for maximum output with minimum input from the signal generator. Then adjust the short wave band antenna and radio frequency stage trimmers for maximum output, at the same time rocking the tuning condenser back and forth across the signal to insure the peak of greatest intensity.

5.- The 6 megacycle signal should be received near 6 megacycles on the dial. If the signal is not received check the oscillator tube, switch connections, the fixed padding condenser and the coils. No adjustment is required at this point.

6.- Check and, if necessary, readjust all three stages for maximum output with minimum input from the signal generator.

WARNING

The image signal should be received at approximately 17 megacycles on the dial. If not, the oscillator has been aligned to the image frequency and the oscillator trimmer condenser must be backed out until the correct signal is received at 18 megacycles and the image at approximately 17 megacycles. If readjustment is found necessary, the antenna and radio frequency stage trimmers should also be checked again.

ULTRA SHORT WAVE BAND

No adjustment is required on this band. If signals are not properly received check the oscillator tube, switch contacts, the fixed padding condenser, and the coils.

COLOR CODES

FIRST I. F. TRANSFORMER

Plate	Blue
"B" Plus	Red
Grid Return	Black
Grid (Top)	Green

SECOND I. F. TRANSFORMER

Plate	Blue
"B" Plus	Red
Diode Return	Black
Diodes	Green

STANDARD RMA
RESISTOR AND CONDENSER COLOR CODE

0	Black	2	Red	4	Yellow	6	Blue	8	Grey
1	Brown	3	Orange	5	Green	7	Purple	9	White

RESISTORS

The BODY COLOR represents the FIRST FIGURE of the resistance value
The END COLOR represents the SECOND FIGURE of the resistance value
The DOT COLOR represents the NUMBER OF CIPHERS following the First two figures

MICA CONDENSERS

(Capacity in Micro-Microfarads)

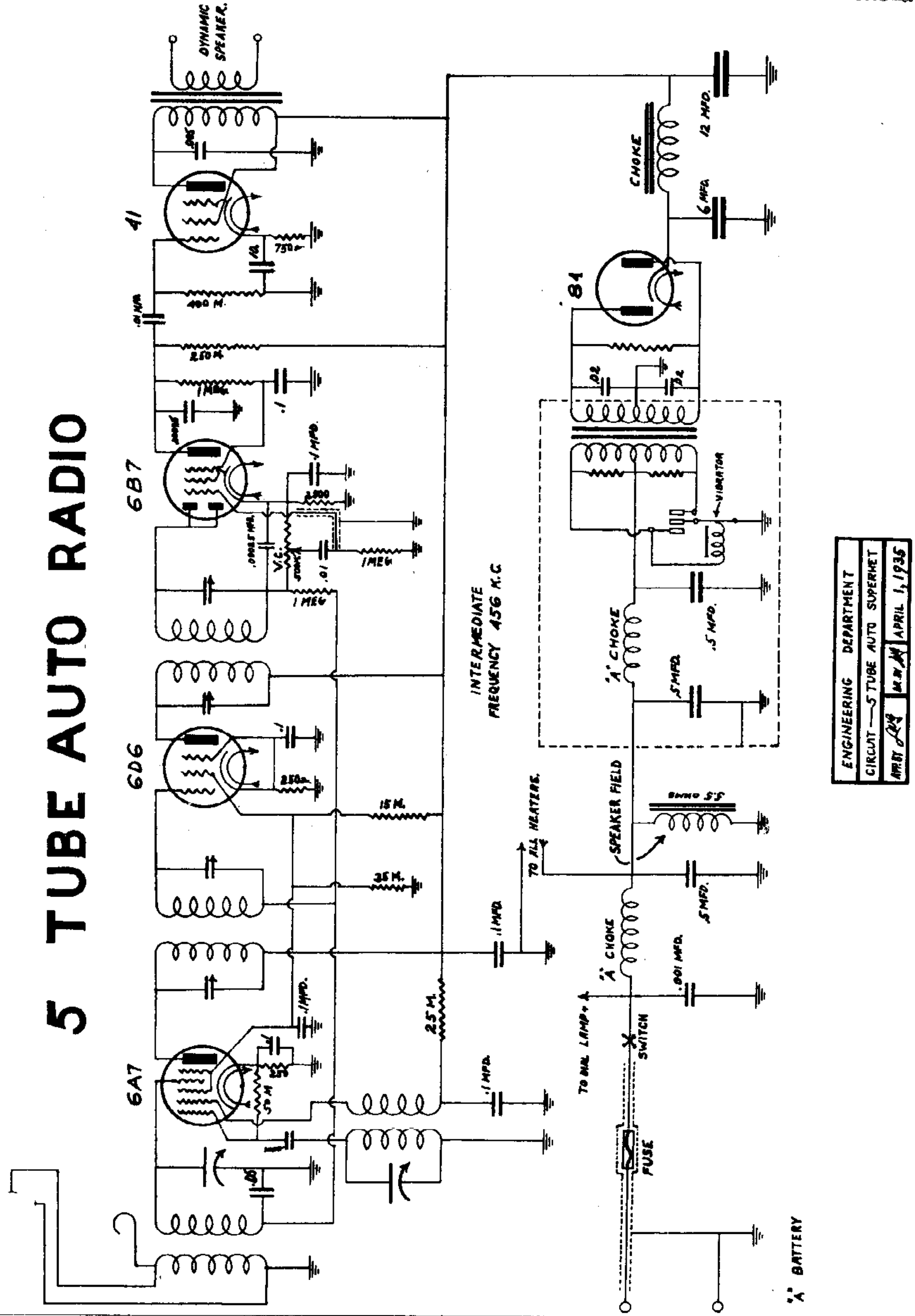
The FIRST DOT on the condenser represents the FIRST FIGURE of the capacity
The SECOND DOT on the condenser represents the SECOND FIGURE of the capacity
The THIRD DOT on the condenser represents the NUMBER OF CIPHERS following the first two figures.
The colors on the condensers should be read from left to right with the condenser in an upright position.

POWER TRANSFORMER

Lead Color	Voltage
Black	115 Volt Primary
Green	6.3 Volt Filament
Yellow	5.0 Volt Filament
Red	High Voltage Sec.
Red & White	High Voltage C.T.

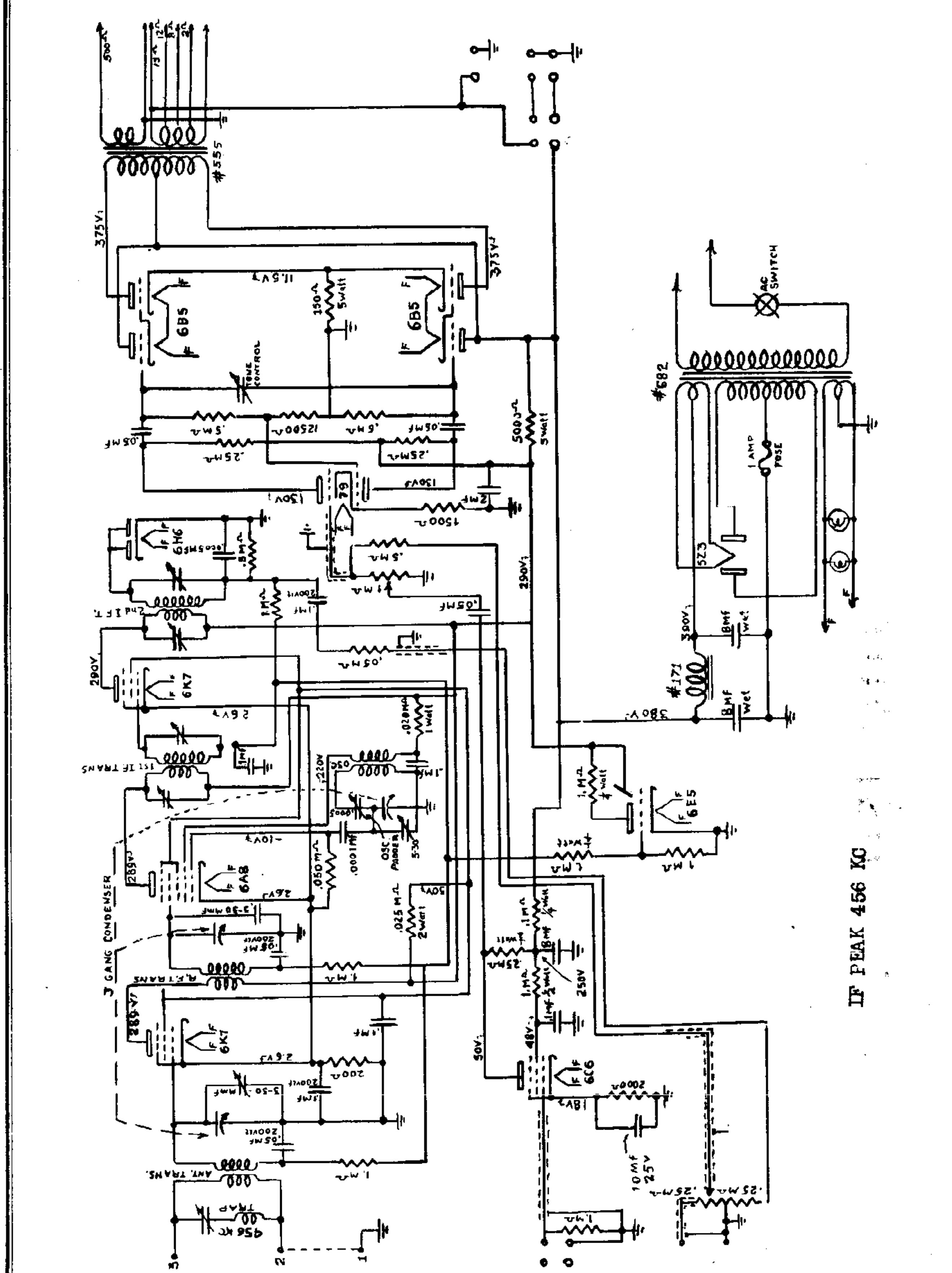
MODEL 4
Schemat

FEDERATED PURCHASER



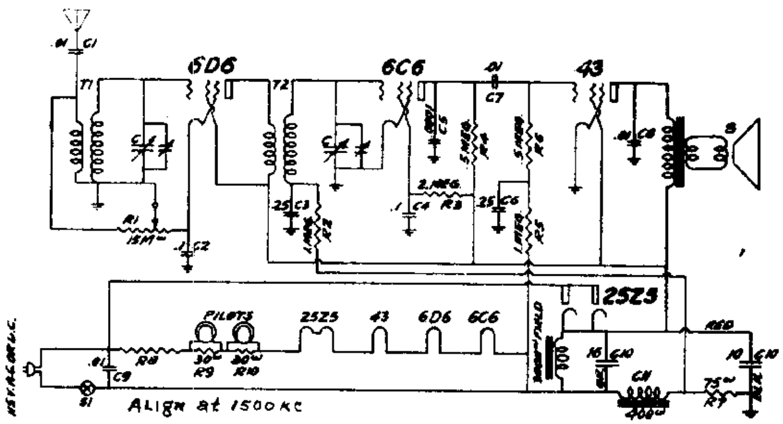
MODEL 1940
Schematic

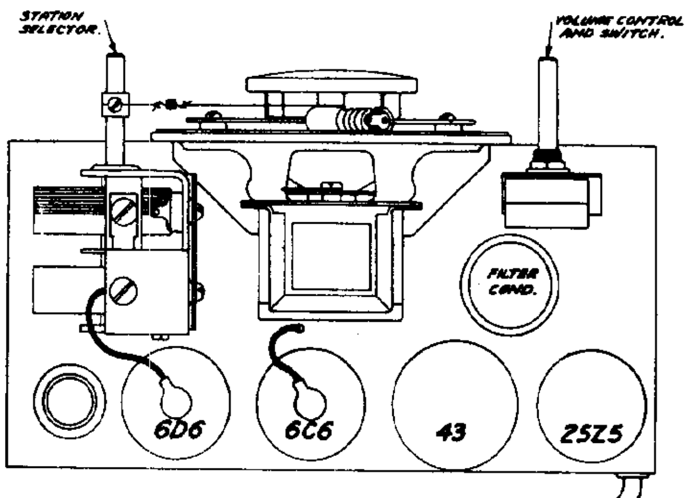
FEDERATED PURCHASER



FIRESTONE

MODEL 7405-1
4 Tube - AC-DC - Receiver
(Airchief)





TUBE LAYOUT.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

4-Tube AC-DC Receiver
For Use on 110-115 Volts AC or DC Current Only

This receiver is a four-tube tuned-radio-frequency type which operates on either AC or DC current. It will provide very satisfactory entertainment for those who desire a small set.

First, carefully remove all packing material from the set and around the tubes. See that all tubes are pushed down tightly in the sockets, all grid caps on top of tubes properly connected, and tube shields in place. Test by means of a lamp that there is power at the receptacle you have chosen for your radio, and be sure that the voltage is 110 volts. Connect attachment cord to outlet.

SUPPLY VOLTAGE

This receiver operates from any 110 volt light socket of any frequency AC or straight DC. When operating on a DC socket, the plug may have to be reversed in the socket to obtain the correct polarity, as it will work only in one position on DC current, but in either position on AC current.

ANTENNA

A 20-foot coil of antenna wire is supplied connected to the receiver. This is usually sufficient for most locations if it is unrolled and laid on the floor or thrown out of window. However, in some buildings of steel construction it may be necessary to use an outside antenna to obtain satisfactory results. Connect it to end of the antenna supplied.

GROUND

No ground connection is necessary. There is no provision made for its use on this set.

REPLACEMENT PARTS LIST

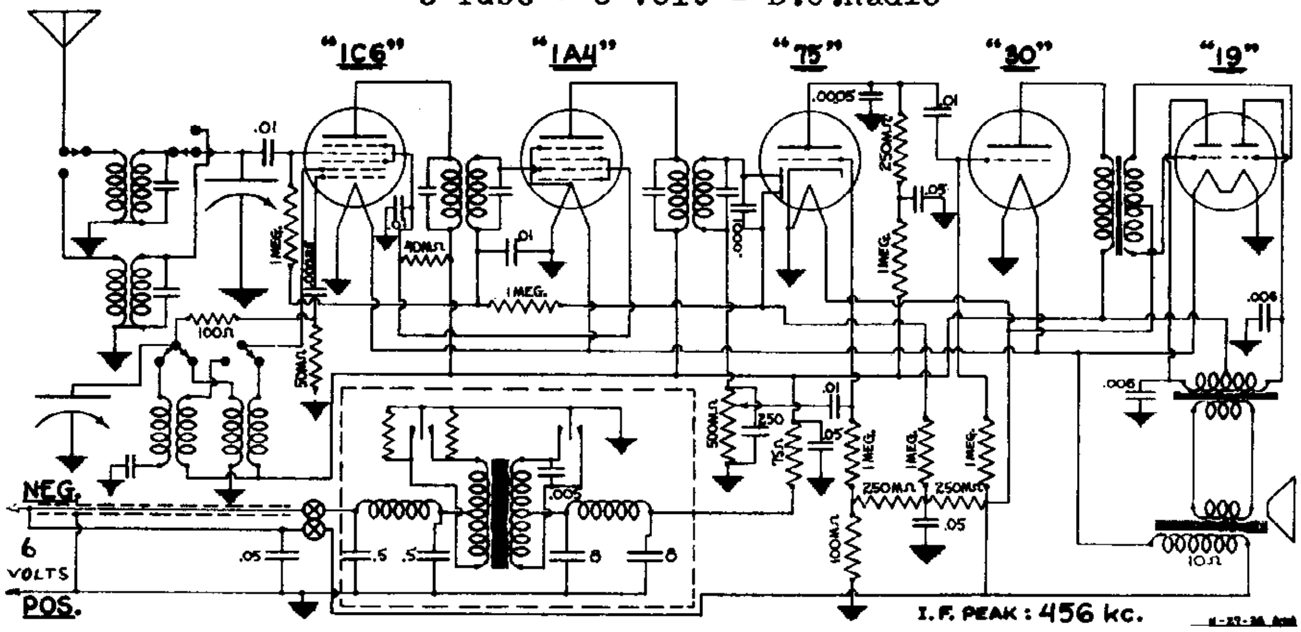
In Ordering Always State Model, Description & Part No.

Part #	Description	Letter	List Price
3508-A	Antenna Coil	T1	.65
3804-A	R.F. Coil	T2	.65
50005-A	Loud Speaker	S	4.25
5201-C	Choke	CH	.75
3206-A	Tuning Condenser	C	2.05
	Mica Condenser .0001 Mf.	C5	.15
	Tubular Condenser .01 Mf. 200 V.	C1,C7,C8,C9	.10
	" " .1 Mf. 200 V.	C2,C4	.10
	" " .25 Mf. 200 V.	C3,C6	.10
4806-A	Filter Condenser 15 & 10 Mf.	C10	1.50
4108-A	Volume Control & Switch	E1,S1	1.05
	Carbon Resistor 1. meg., ½ watt	R2,R5	.10
	" " 2 meg., ½ watt	R3	.10
	" " .5 meg., ½ watt	R4,R6	.10
	" " 75 Ω ½ watt	R7	.10
6652-A	Armored Resistor 30 Ω, 30 Ω	R9,R10	.25
4554-A	Resistance Cord	R8	.75
4461-F	Pilot Bulb		.15
4501-D	Antenna Cord		

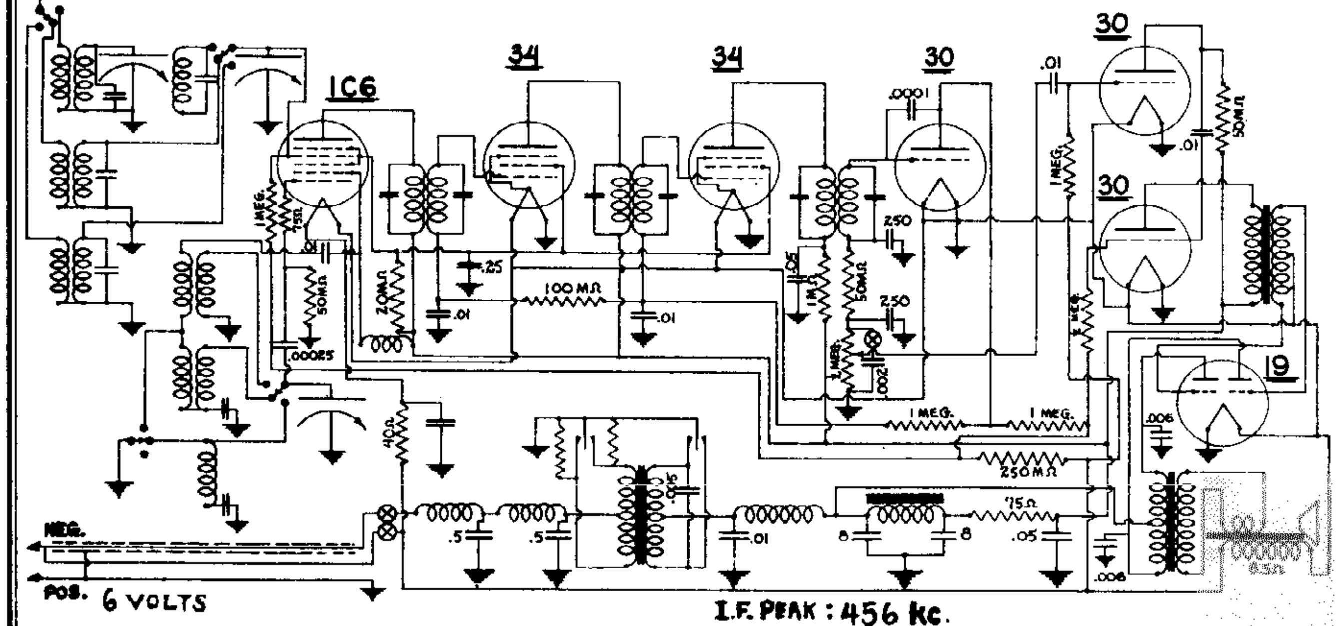
MODEL 7406-1
MODEL 7407-1
Schematics

FIRESTONE

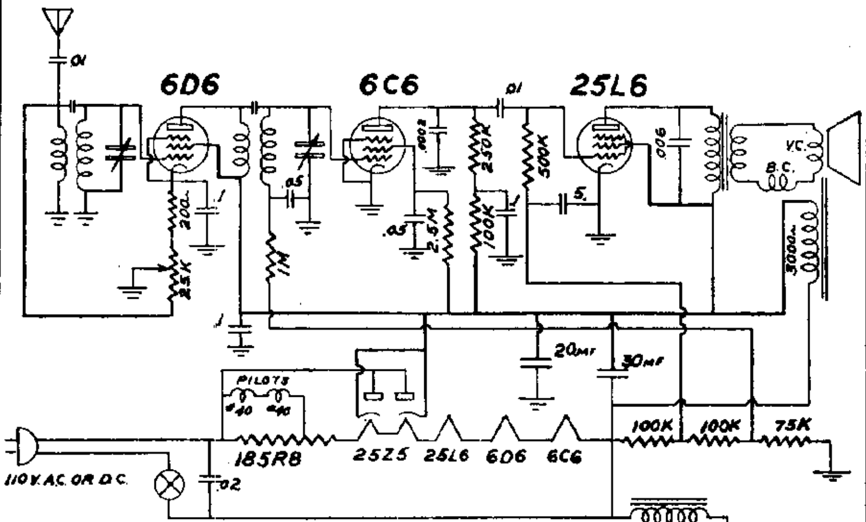
MODEL 7406-1
5 Tube - 6 Volt - D.C.Radio

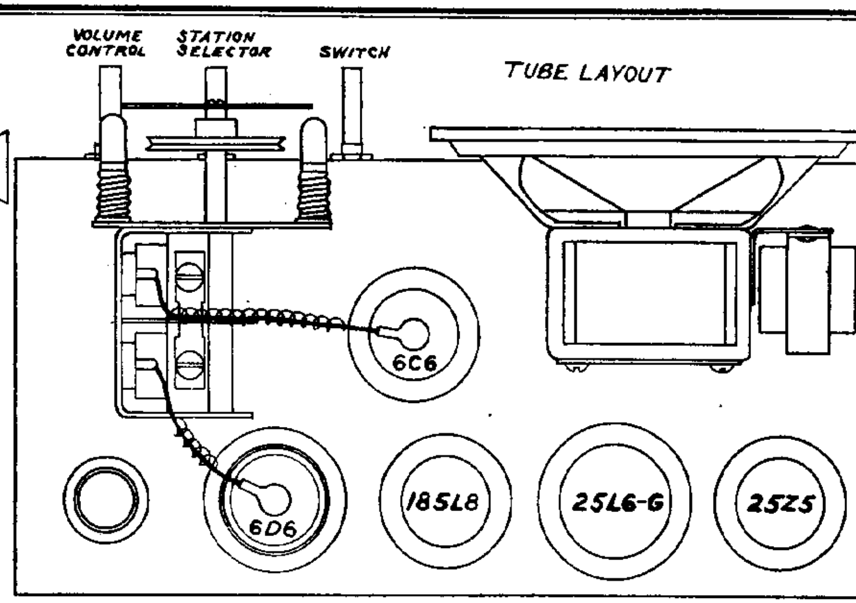


MODEL 7407-1
7 Tube - 6 Volt - D.C.Radio



FIRESTONE





ALIGN AT
1500 KC

Model 7422-3

"AIR CHIEF"

GENERAL INFORMATION This is a 5-tube tuned radio frequency receiver and operates from either an alternating or a direct current lighting circuit having the usual 110-115 volt terminal potential.

After taking the set out of its carton, be sure that all packing material has been removed. The line cord is unwound and later inserted in the nearest receptacle. First, however, be sure that the line voltage is of the value mentioned above.

ANTENNA A 20-foot coil of antenna wire is supplied attached to the receiver. This is usually sufficient for most locations if it is unrolled and laid on the floor or dropped out the window. Inside a steel constructed building it may be necessary to erect an outside antenna either up to the roof or on top of it. In localities where signal strengths are low as in rural districts, an outside antenna is always advisable with any radio receiver.

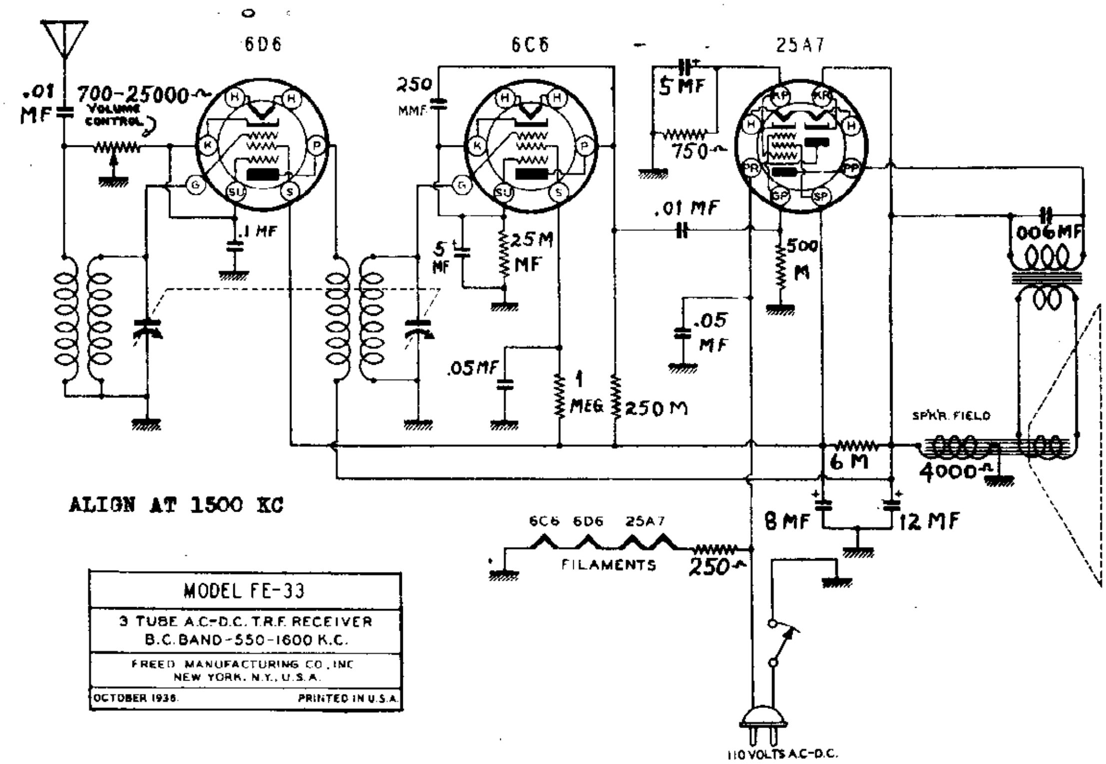
GROUND No ground is needed as set is grounded to the supply circuit internally.

PRICES SUBJECT TO CHANGE
WITHOUT NOTICE

REPLACEMENT PARTS LIST

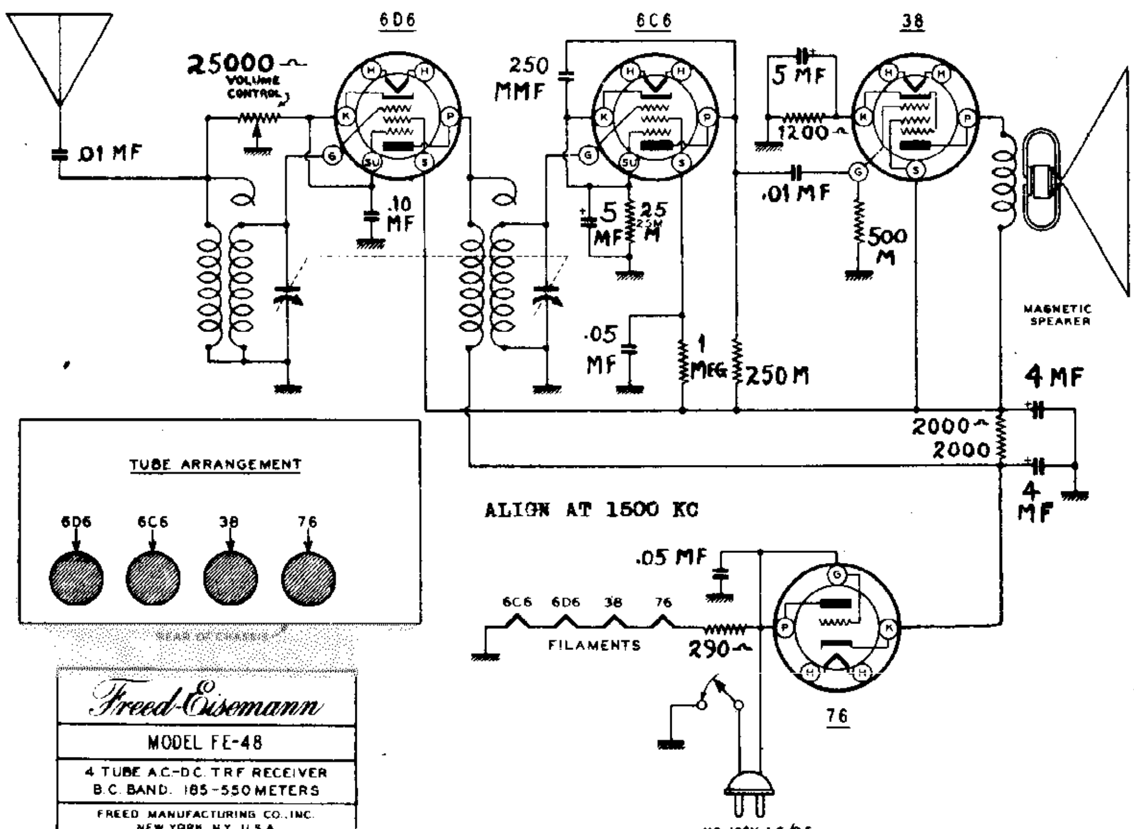
Part No.	Description	Price
5-39	Volume Control	.75
6-3	.01 mfd. 400V condenser	.15
6-7	.02 mfd. 400V condenser	.15
6-12	.05 mfd. 200V condenser	.15
6-21	.006 mfd. 400V condenser	.15
6-24	.1 mfd. 200V condenser	.15
7-27	Electrolytic condenser	1.50
8-29-B	.0002 mfd. mica condenser	.10
10-39	Variable Tuning Condenser	2.15
13-9	Filter Choke	.85
14-18	Switch	.40
15-76	Antenna coil	.65
15-77	R. F. coil	.65
19-F-5	Dial Scale	.50
19-G-13	Dial indicator	.15
34-2	Antenna cord	.20
43-60	Speaker	3.90
46-36	Control Knobs	.10
44-52	Cabinet	6.50
	Resistors 1/4 watt	.10

FREED MFG. CO., INC.



ALIGN AT 1500 KC

MODEL FE-33
3 TUBE A.C.-D.C. T.R.F. RECEIVER B.C. BAND - 550-1600 K.C.
FREED MANUFACTURING CO., INC NEW YORK, N.Y., U.S.A.
OCTOBER 1936   PRINTED IN U.S.A.



ALIGN AT 1500 KC

TUBE ARRANGEMENT

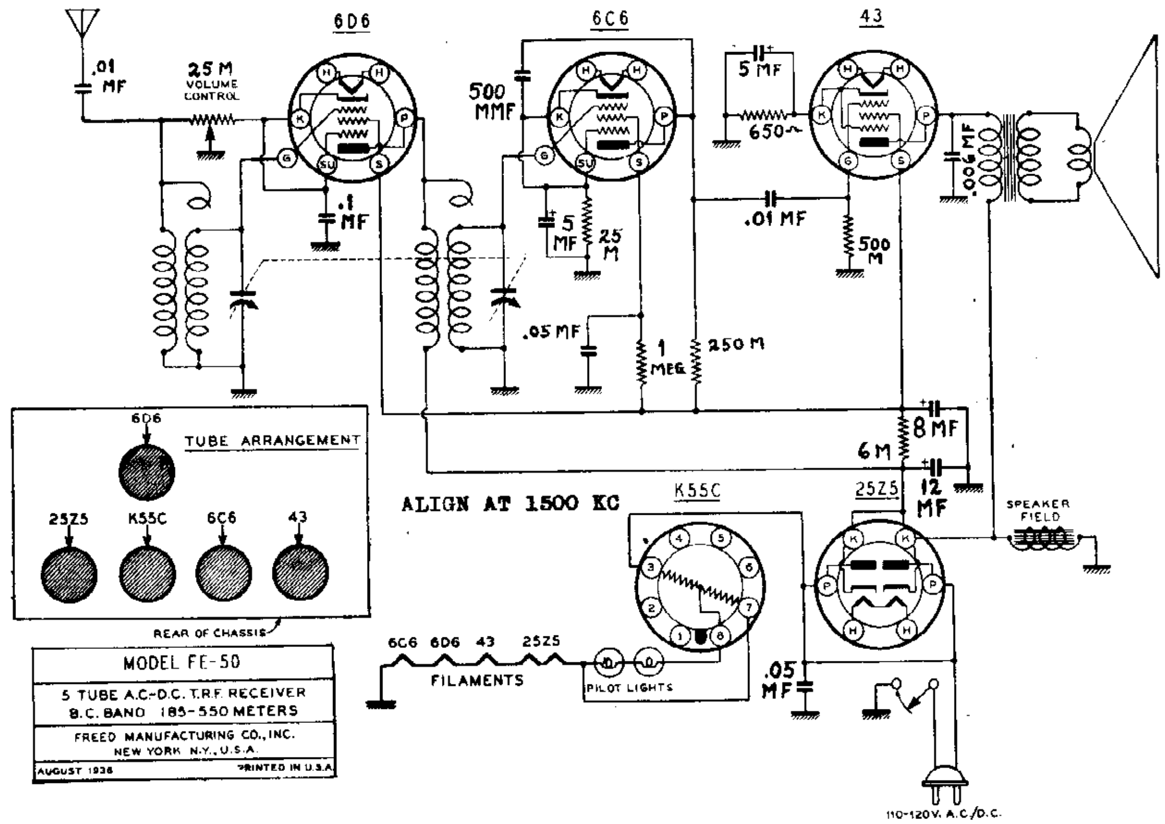
6D6 6C6 38 76

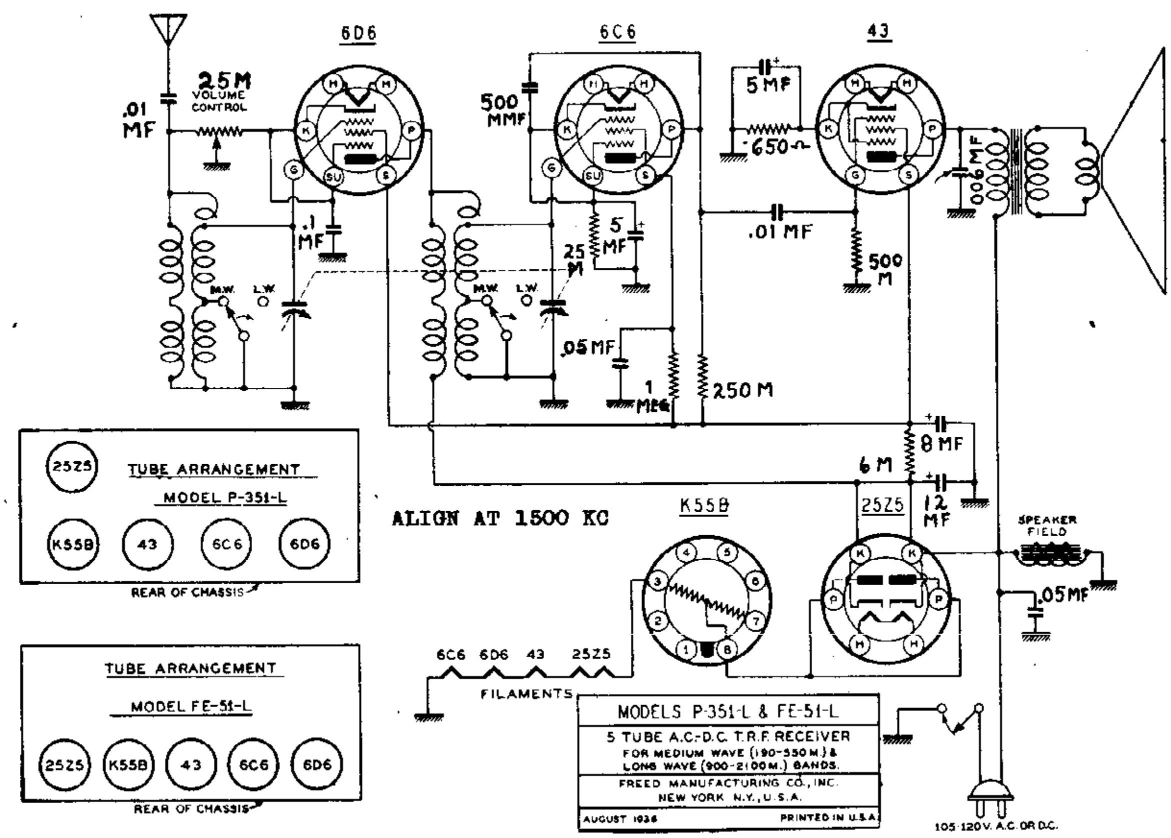
REAR OF CHASSIS

Freed-Eisemann
MODEL FE-48
4 TUBE A.C.-D.C. T.R.F. RECEIVER B.C. BAND. 185-550 METERS
FREED MANUFACTURING CO., INC. NEW YORK, N.Y., U.S.A.
AUGUST 1936   PRINTED IN U.S.A.

MODEL FE50
MODELS FE51L,P351L
Schematics,Sockets

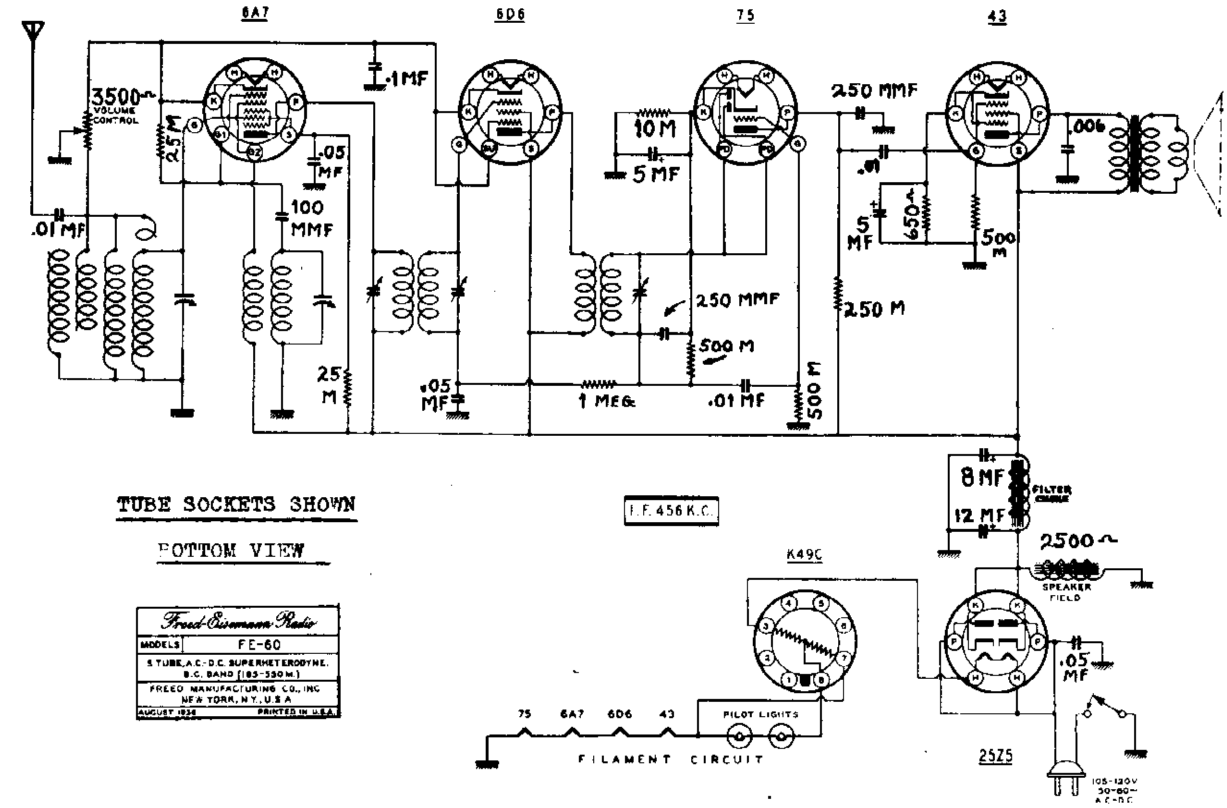
FREED MFG. CO., INC.

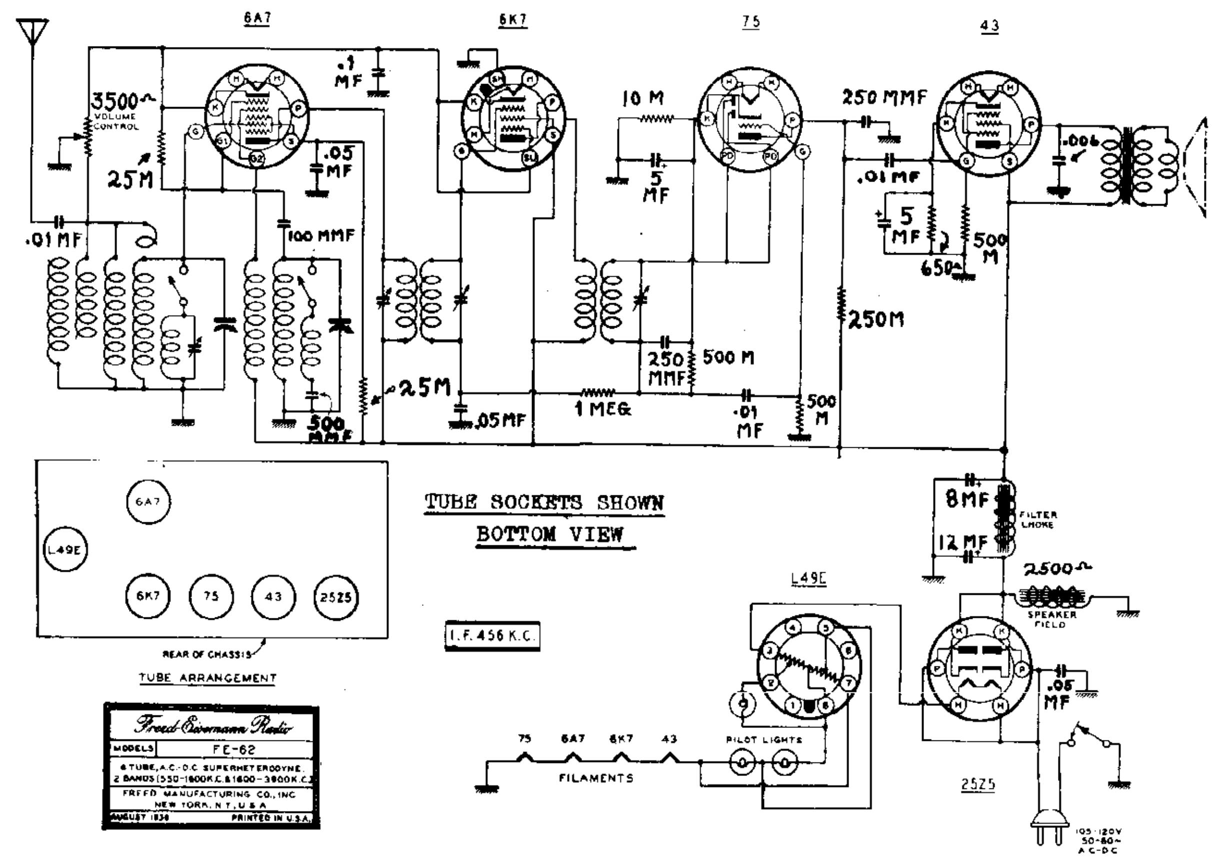




MODEL FE60
MODEL FE62
Schematics
Socket

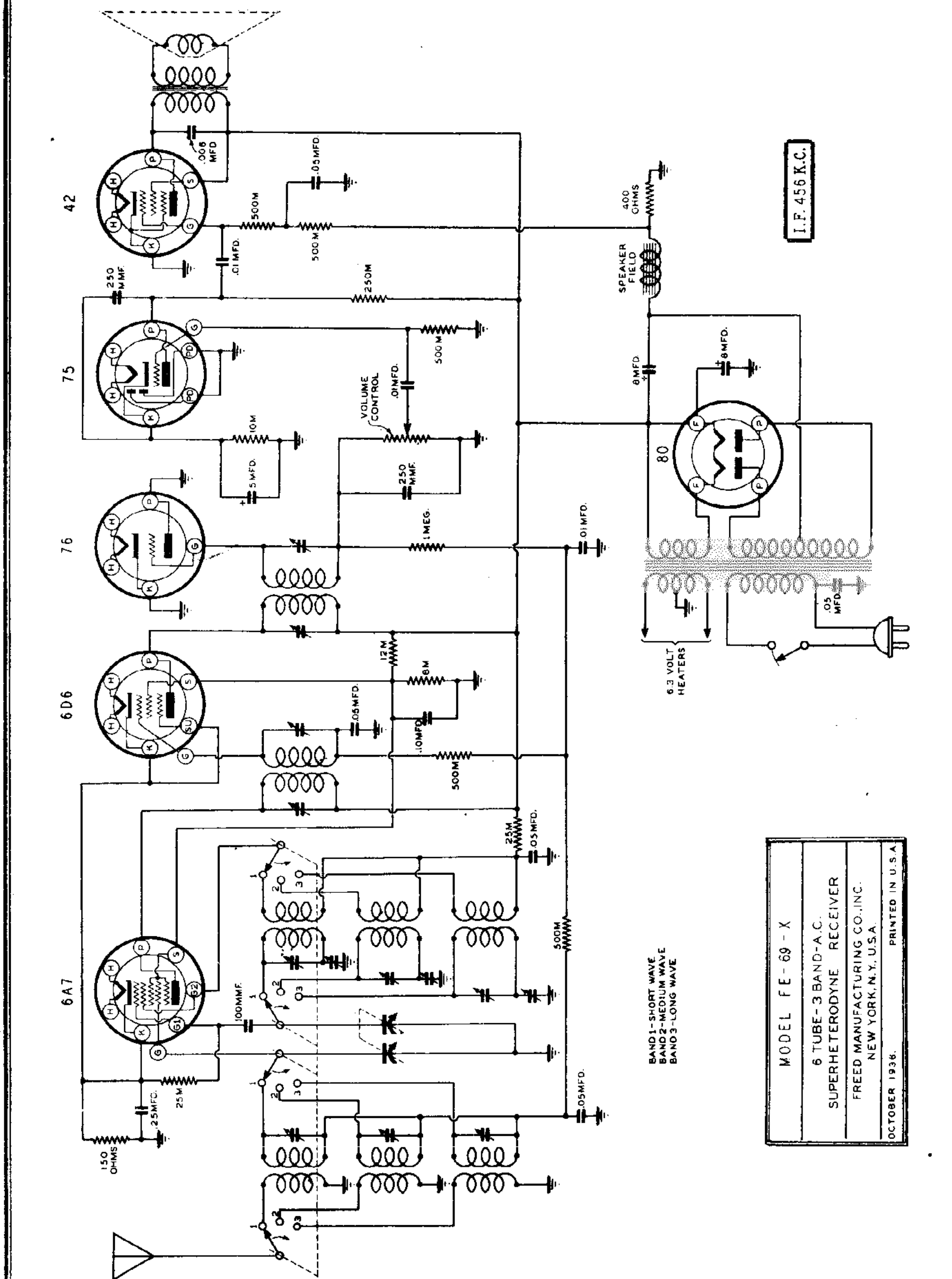
FREED MFG. CO., INC.





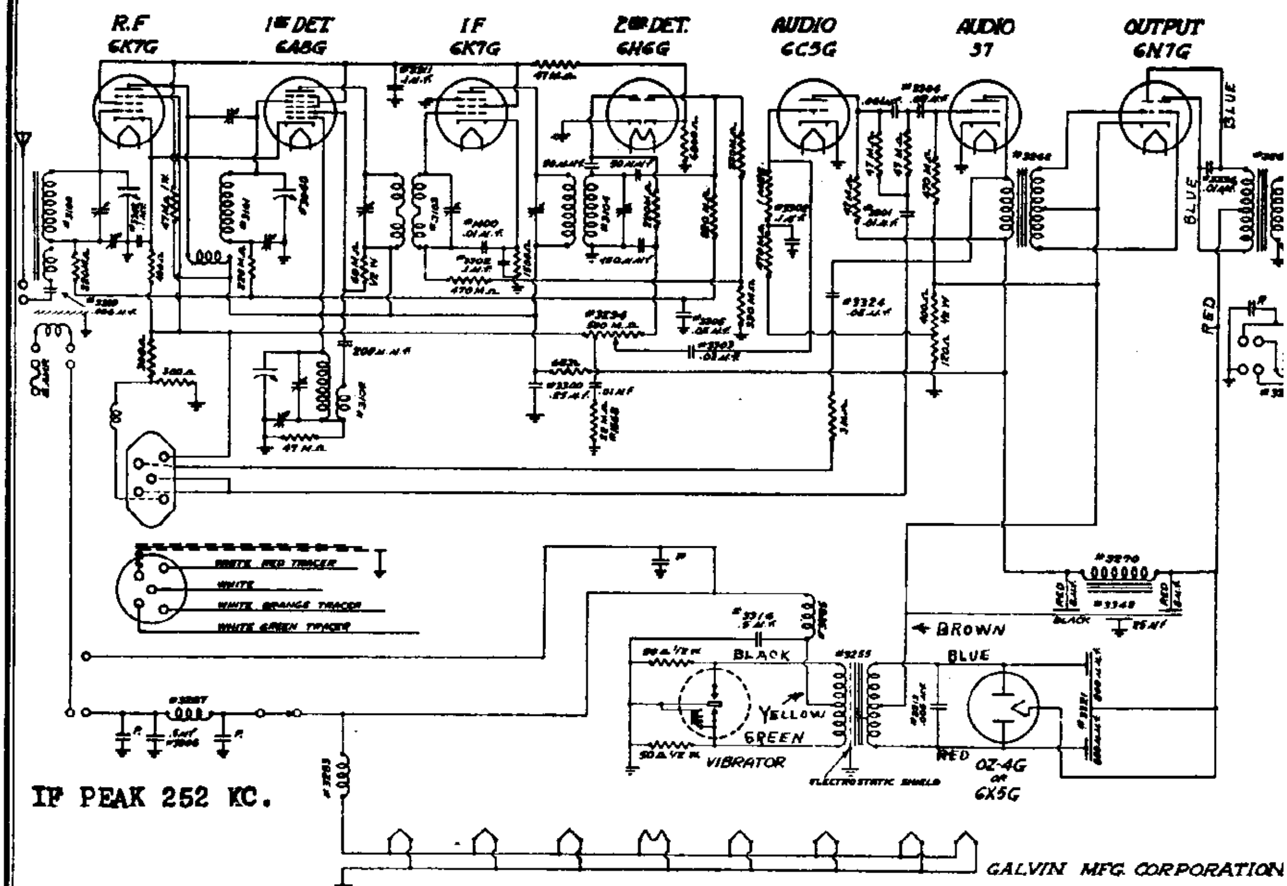
MODEL FE69-X
Schematic

FREED MFG. CO., INC.



GALVIN MFG. CO.

MODEL Golden Voice
1937 Early
Schematic, Alignment
Sensitivity, Voltage
Chassis



IF PEAK 252 KC.

GALVIN MFG. CORPORATION
CHICAGO, ILL.
CIRCUIT DIAGRAM OF MODEL
GOLDEN VOICE

DUMMY ANTENNA - 200 MMF Condenser in series & 500000 Ohms in shunt with the Generator output.

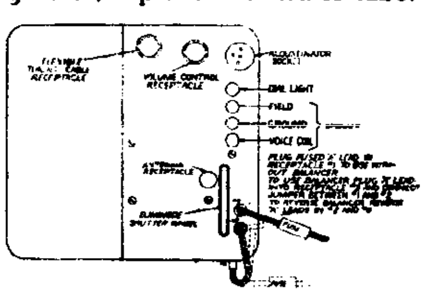
Average Microvolt Input	Generator Feeder Connected to Grid of	Generator Set At	Output meter Across Voice Coil
50,000	6K7G	262 K.C.	Voice coil resistance is 3 ohms—
1,000	6A8G	262 K.C.	
1,200	6A8G*	600 K.C.	
50	6K7G*	600 K.C.	1.73 Volts equals 1 Watt output
1.5	Ant.	600 K.C.	

Microvolt input may be 10 to 20% more at 600 K.C. than at 262 K.C. This is due to normal conversion loss in the Translator tube. If greater, replace Translator tube. CURRENT DRAIN — 7 AMPS

ALIGNMENT

Peak the oscillat at 1600 kc and pa the oscillator at 600 kc. Peak the r-f circuits at 1400 kc.

SEE INDEX FOR TH DATA ON MAGIC EI MINODE ADJUSTMEN AND ACOUSTINATOR



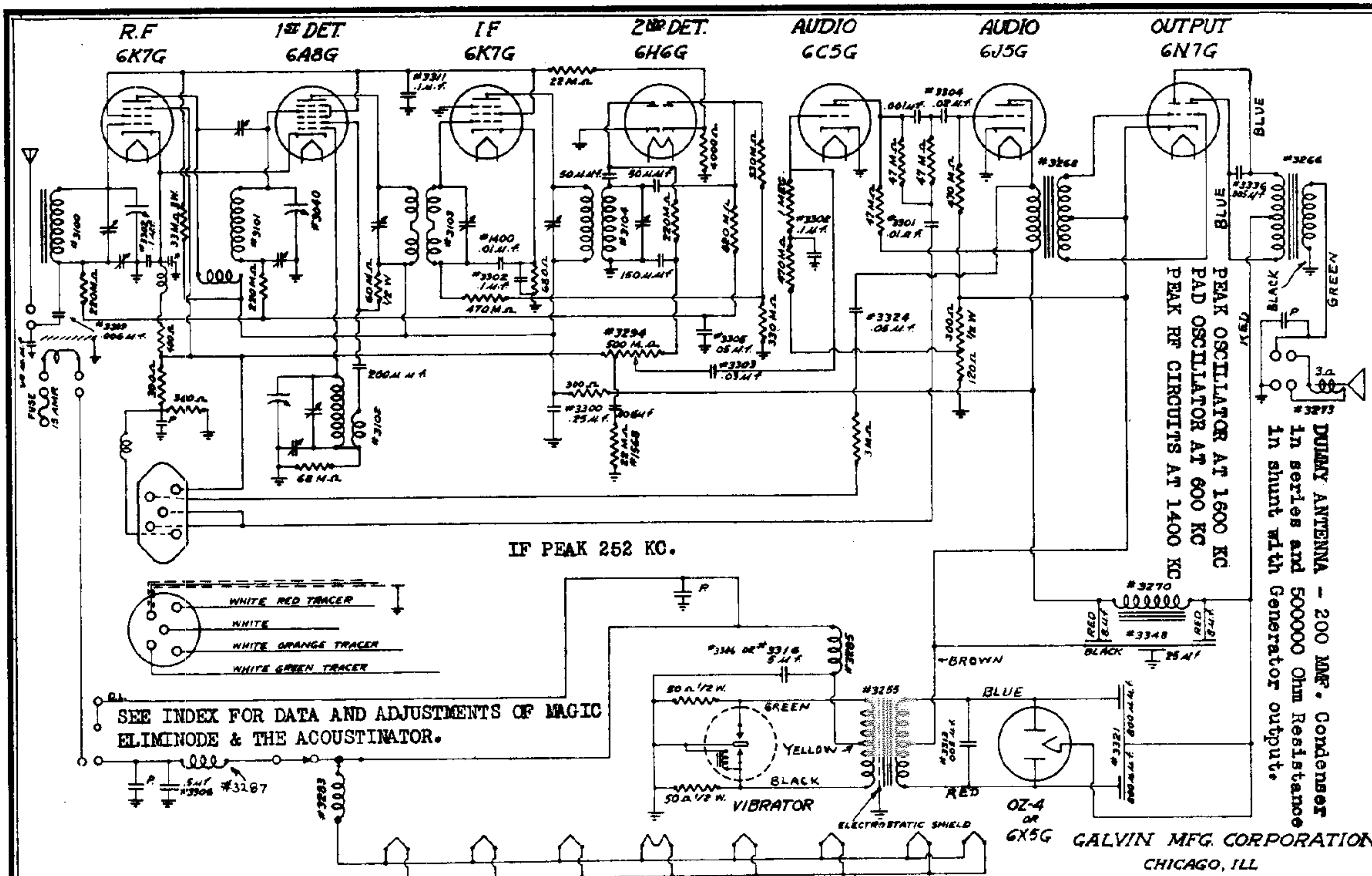
(FIG. 2)

Plate voltage	260
Plate to cathode voltage (output tube)	250
Plate voltage for 37 tube	250
Plate voltage for 6C5 tube	180
Screen voltage	65
Bias voltage for 37 tube	15
Bias voltage for 6C5 tube	3.5
Bias voltage for R.F. tubes	3.5
AVC Delay voltage (total)	9.0

The above readings all made with Battery Voltage of 6.3

MODEL Golden Voice
1937 Late
Schematic, Voltage
Sensitivity, Alignment

GALVIN MFG. CO.



Average Microvolt Input	Generator Feeder Connected to Grid of	Generator Set At
50,000	6K7G	262 K.C.
1,000	6A8G	262 K.C.
1,200	6A8G*	600 K.C.
50	6K7G*	600 K.C.
1.5	Ant.	600 K.C.

Current drain ....7.00 amps.

Output meter Across Voice Coil

Voice coil resistance 3 ohms—
1.73 Volts equals 1 Watt output

GOLDEN VOICE
ACOUSTINATOR SET AT "COUNTRY" AND "VOICE"

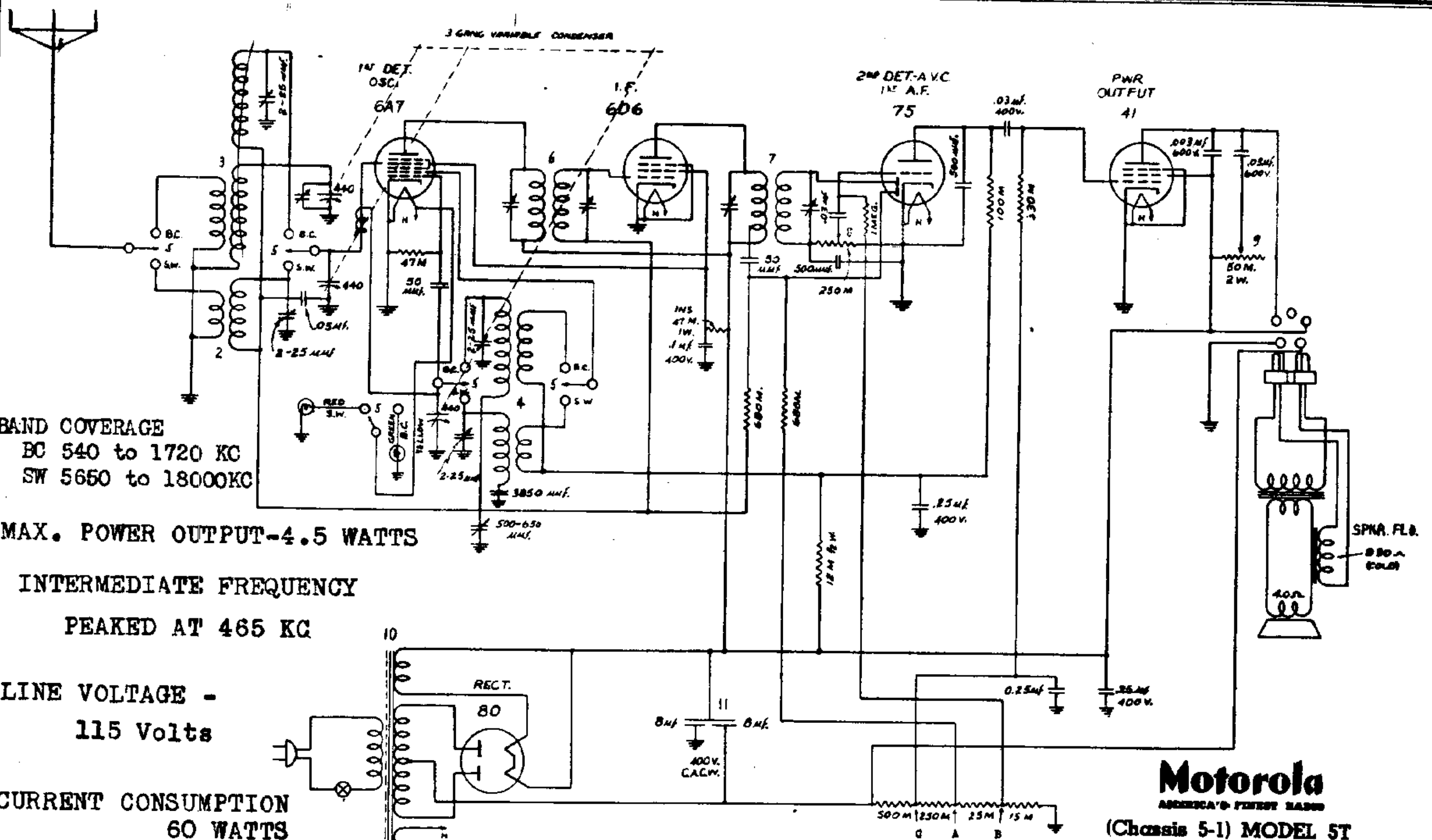
Plate voltage	260
Plate to cathode voltage (output tube)	250
Plate voltage for 6J5G tube	250
Plate voltage for 6C5 tube	160
Screen voltage	65
Bias voltage for 6J5G tube	15
Bias voltage for 6C5 tube	3.5
Bias voltage for R.F. tubes	3.5
AVC Delay voltage (total)	9.0

The above readings all made with Battery Voltage of 6.3

3-5-37

MODEL 5T
Chassis 5-1
Schematic, Volt...
Parts

GALVIN MFG. CO.



BAND COVERAGE
BC 540 to 1720 KC
SW 5650 to 18000KC

MAX. POWER OUTPUT-4.5 WATTS

INTERMEDIATE FREQUENCY
PEAKED AT 465 KC

LINE VOLTAGE -
115 Volts

CURRENT CONSUMPTION
60 WATTS

Motorola
AMERICA'S FINEST RADIO
(Chassis 5-1) MODEL 5T

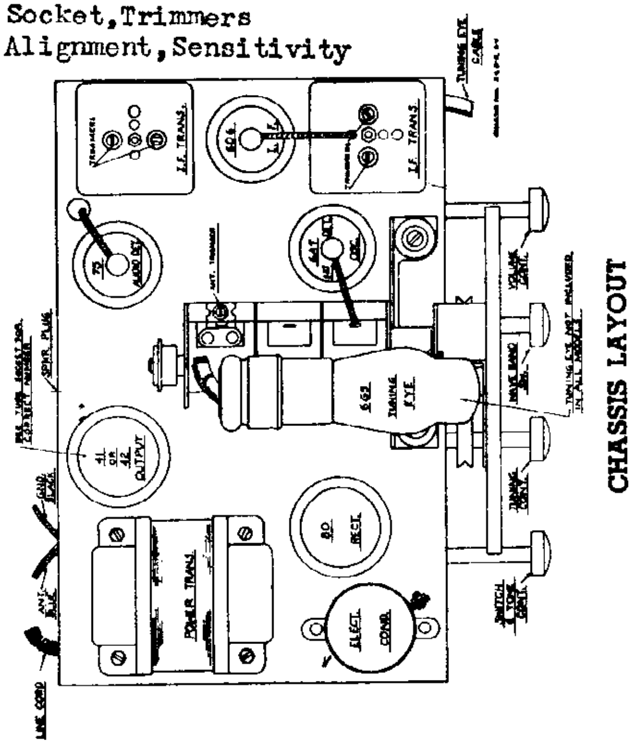
DRWG. NO.	PART NO.	DESCRIPTION
1	14-H-37263	3 Gang Condenser
2	13-H-37234	Ant.Coil (S.W.)
3	13-H-37233A	Ant.Coil (B.C.)
4	13-H-37244	Osc. Coil
5	54-H-37762	Band Switch
6	47-H-37684A	1st. I.F. Coil assem.
7	47-H-37686A	2nd. I.F. Coil assem.
8	60-H-37838	Volume Control
9	60-H-37835	Tone Control & switch
10	56-H-37781	Power Transformer
11	[illegible]	[illegible]

SOCKET VOLTAGES (CHASSIS 5-1)

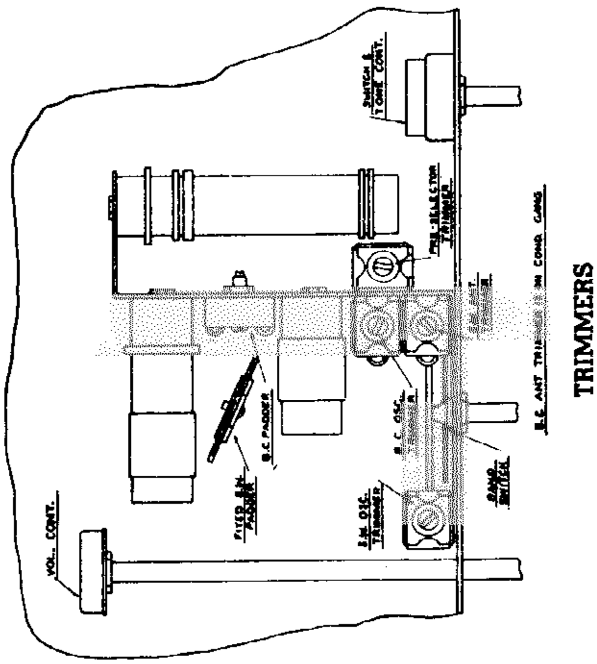
Tube	Position	Fil.	Cath.	Cont. Grid	Osc. Grid	Osc. Plate	Screen	Plate
6A7	1st. det.-osc.	6.0 AC	0	Note A	-9.3	170	75	250
6D6	I. F.	6.0 AC	0	Note A	.....	.....	75	250
75	2nd det.-AVC	6.0 AC	0	Note B	.....	.....	.....	50
41	Output	6.0 AC	0	Note C	.....	.....	250	235
80	[illegible]	[illegible]						

MODEL 5T
Chassis 5-1
MODELS 5T-1,5T-2,5Y
Chassis 5-2
MODEL 6A
Chassis 6-1
Socket,Trimmers
Alignment,Sensitivity

GALVIN MFG. CO.



CHASSIS LAYOUT



TRIMMERS

BAND COVERAGE
American Programs 540-1720 KC
Foreign Programs 5650-18,000 KC

ALIGNMENT PROCEDURE

CHASSIS 5-1, 5-2 and 6-1

Connect signal generator to control grid of first detector tube (6A7) through a .05 MF condenser, and to chassis. Do not remove grid cap. Also connect output meter across speaker voice coil. Turn band switch to "American Programs" position. Turn condenser gang completely out of mesh.

Set signal generator at 465 K.C. and carefully adjust the four I.F. trimmers (located in top of I.F. coil cans) to point showing highest reading on output meter.

Leave band switch in "American Programs" position. Connect signal generator to antenna and ground leads using a .0002 MF condenser in antenna lead.

Set signal generator and receiver dial both at 1700 K.C. Adjust B.C. OSC. trimmer until 1700 K.C. signal is heard.

Set signal generator at 1400 K.C. and turn condenser gang to the signal at 1400 K.C. Adjust antenna section and second section of preselector to point showing highest reading on output meter.

Set signal generator at 600 K.C. and rock pointer at 600 K.C. position on dial scale, while adjusting B.C. padder, until combination is found which gives highest output reading. (Note: If there is noise level at 600 K.C., padder can be adjusted to maximum noise without rocking gang and without use of signal generator. Use short wire for pick-up if necessary.)

Turn band switch to "Foreign Programs" position. Replace .0002 MF condenser in signal generator antenna lead with a 400 ohm carbon resistor.

Set signal generator and receiver dial both at 18.0 MC. Adjust SW OSC. trimmer until 18.0 MC signal is heard.

Set signal generator at 16.0 MC and turn condenser gang to the signal at 16.0 M.C. Adjust SW ANT. trimmer to point giving greatest output reading, while slightly rocking condenser gang.

SW padder is fixed (no adjustment necessary.)

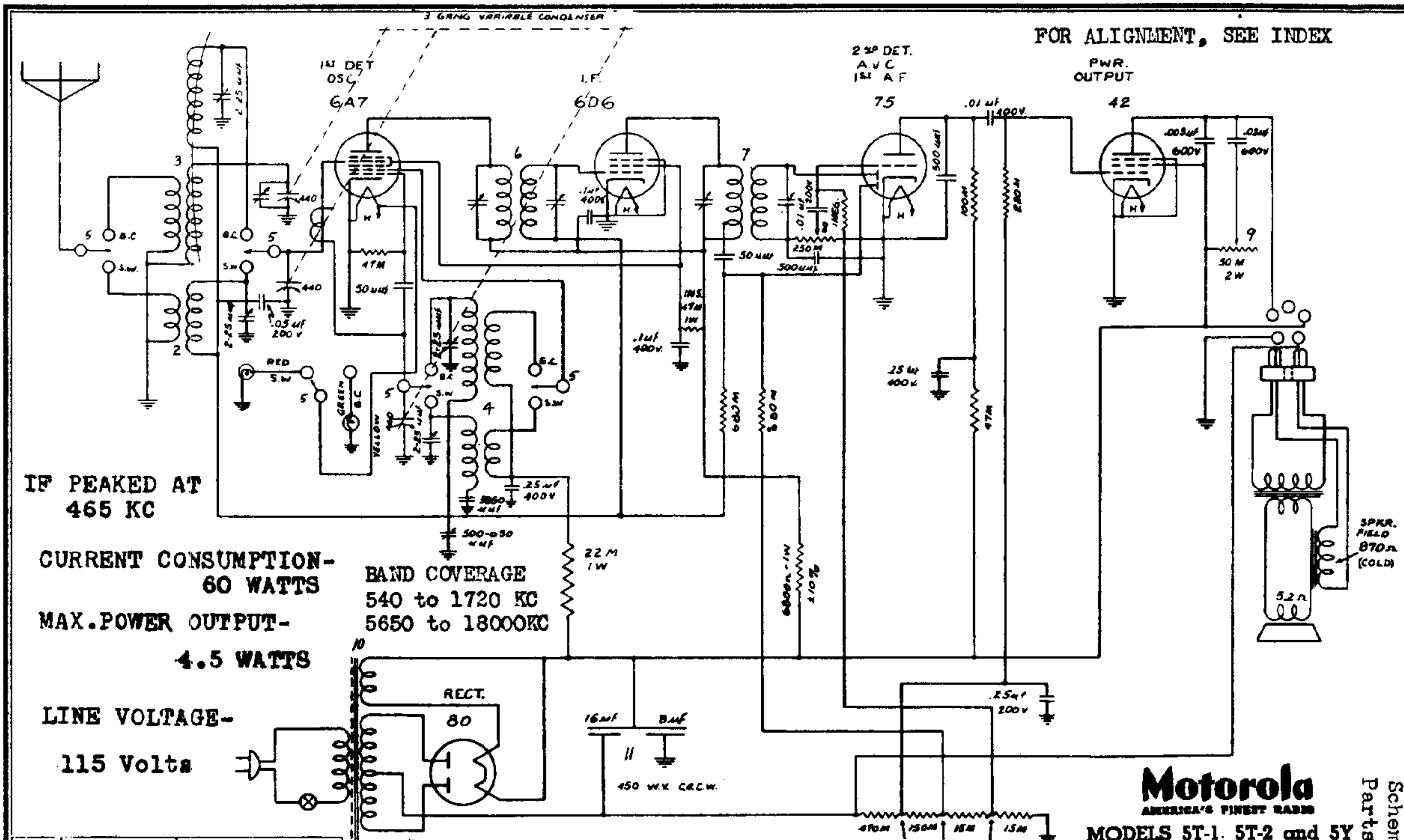
NOTE: I.F. Sensitivity at 465 K.C. is 50 microvolts for 50 milliwatts output
Ant. Sensitivity at 600 K.C. is 30 microvolts for 50 milliwatts output (Chassis 5-1)
Ant. Sensitivity at 600 K.C. is 25 microvolts for 50 milliwatts output (Chassis 5-2 and 6-1)

Note A: .3 V measured point A to ground on 10 V scale (see circuit diagram).
Note B:— .2 V measured point B to ground on 10 V scale (see circuit diagram).
Note C:—1.3 V measured point C to ground on 10 V scale (see circuit diagram).
All voltages, except rectifier filaments, measured from socket terminal indicated to chassis ground, using 1000 ohms per volt meter.
Line voltage 115. — Current consumption 60 watts. — Maximum power output 4.5 watts.

MODELS 5T-1, 5T-2, 5Y
Chassis 5-2
Schematic, Voltage
Parts

GALVIN MFG. CO.

FOR ALIGNMENT, SEE INDEX



IF PEAKED AT
465 KC

CURRENT CONSUMPTION-
60 WATTS

MAX. POWER OUTPUT-
4.5 WATTS

LINE VOLTAGE-
115 Volts

BAND COVERAGE
540 to 1720 KC
5650 to 18000KC

Motorola
AMERICA'S FINEST RADIO
MODELS 5T-1, 5T-2 and 5Y
CHASSIS 5-2

DRWG. NO.	PART NO.	DESCRIPTION
1	14-H-37263	3 Gang Condenser
2	13-H-37234	Ant. Coil (S.W.)
3	13-H-37230	Ant. Coil (B.C.)
4	13-H-37244	Osc. Coil
5	54-H-37763	Band Switch
6	47-H-37684A	1st I.F. Coil Assem.
7	47-H-37686A	2nd I.F. Coil Assem.
8	60-H-37838	Volume Control
9	60-H-37835	Tone Cont. & Switch
10	56-H-37783	Power Transformer
11	14-H-37281	Electrolytic Cond.

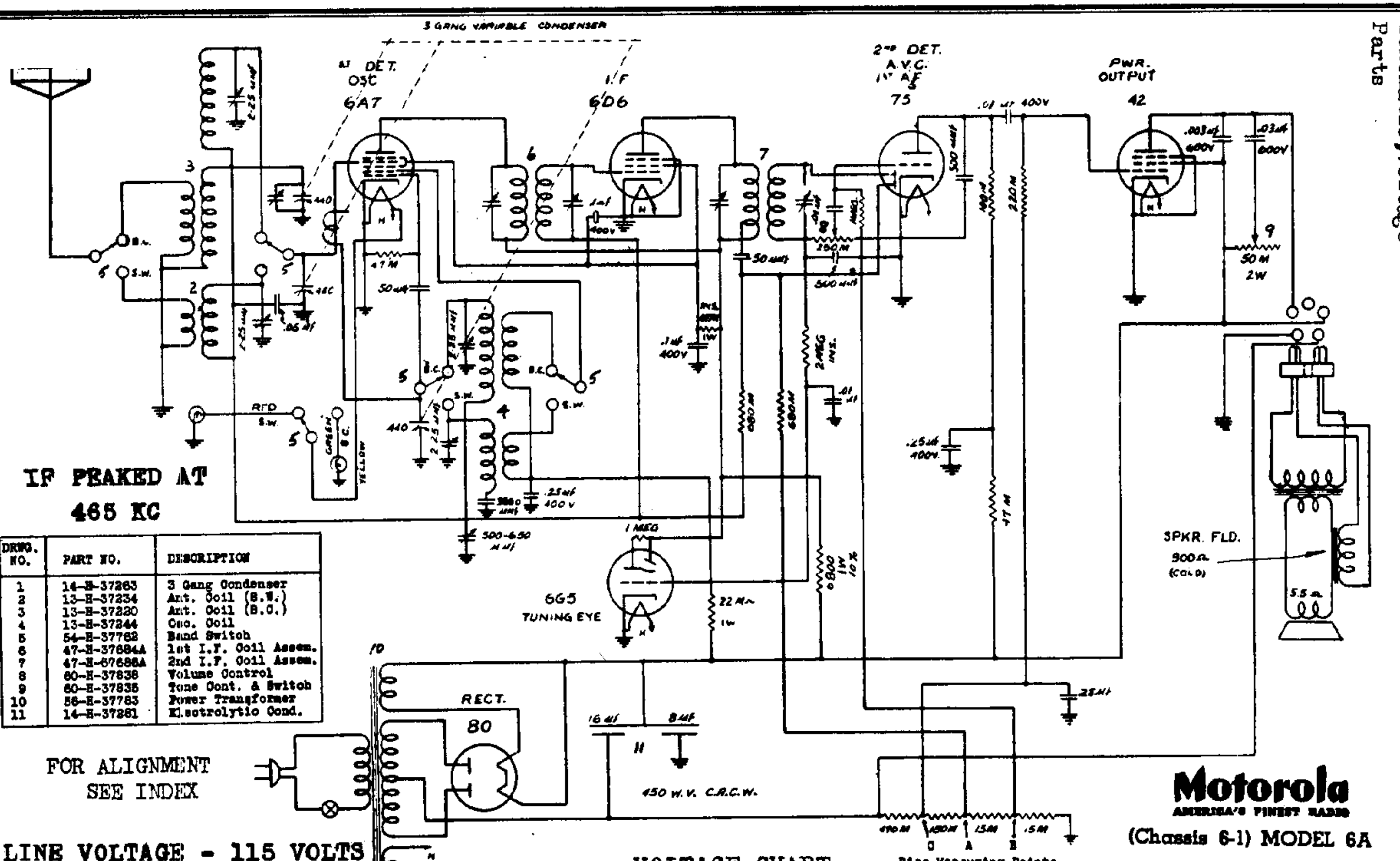
VOLTAGE CHART

(CHASSIS 5-2)

6A7	1st det.-osc.	6.0 AC	0	Note A	−14.0	130	70	200
6D6	I. F.	6.0 AC	0	Note A	.....	....	70	200
75	2nd det.-AVC	6.0 AC	0	Note B	.....	....	....	125
42	Output	6.0 AC	0	Note C	.....	....	260	255
80	Rectifier	4.75 AC	...	......	......	....	....	No.1 315 AC No.2 315 AC

MODEL 6A
Chassis 6-1
Schematic, Voltage
Parts

GALVIN MFG. CO.



IF PEAKED AT
465 KC

DRWG. NO.	PART NO.	DESCRIPTION
1	14-B-37263	3 Gang Condenser
2	13-B-37234	Ant. Coil (S.W.)
3	13-B-37220	Ant. Coil (B.C.)
4	13-B-37244	Osc. Coil
5	54-B-37762	Band Switch
6	47-B-37684A	1st I.F. Coil Assem.
7	47-B-67686A	2nd I.F. Coil Assem.
8	60-B-37838	Volume Control
9	60-B-37835	Tone Cont. & Switch
10	56-B-37783	Power Transformer
11	14-B-37261	Electrolytic Cond.

FOR ALIGNMENT
SEE INDEX

LINE VOLTAGE - 115 VOLTS
CURRENT CONSUMPTION - 60 WATTS
MAX. POWER OUTPUT - 4.5 Watts

BAND COVERAGE
BC - 540 to 1720 KC
SW - 5650 to 18000 KC

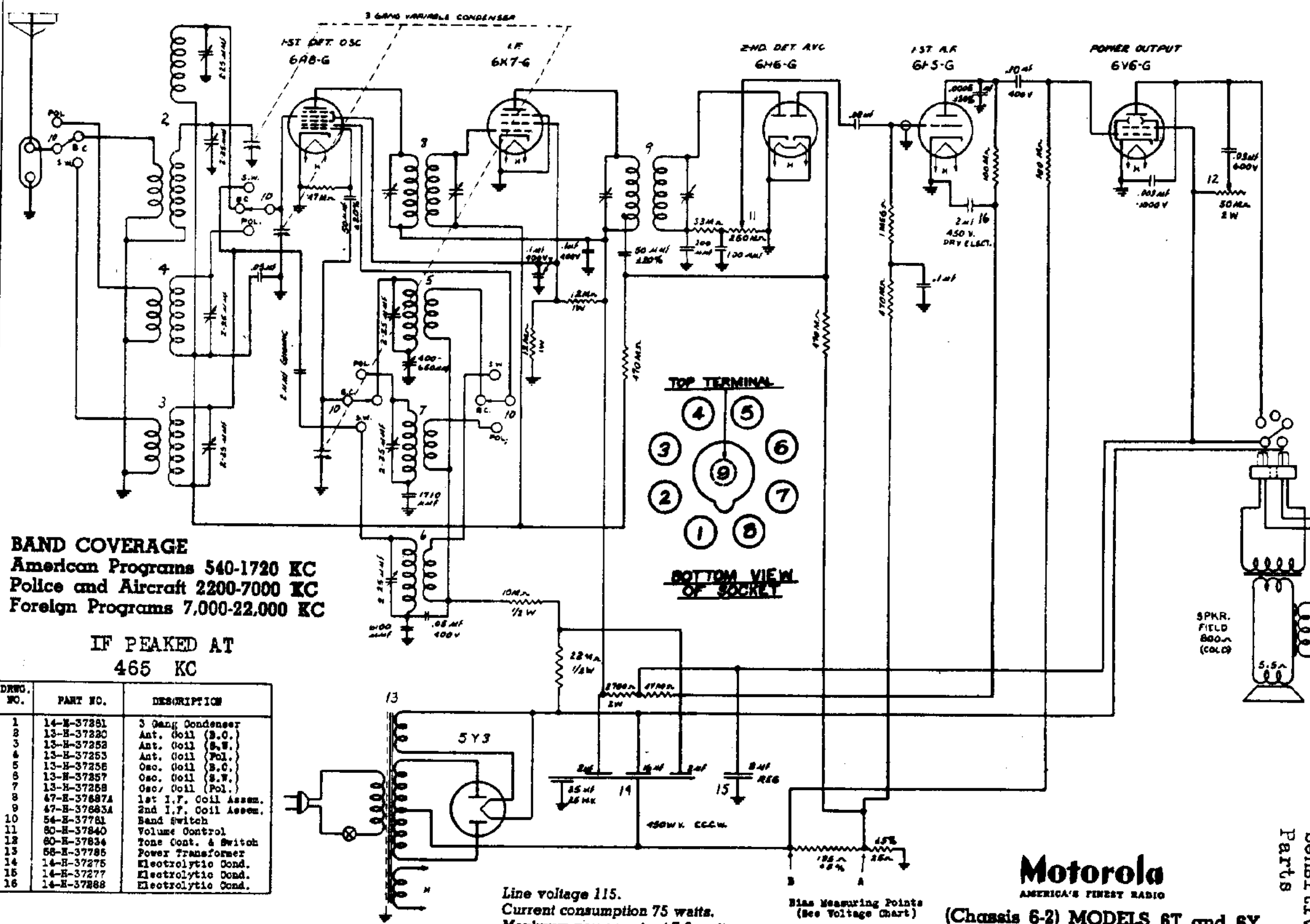
Motorola
AMERICA'S FINEST RADIO
(Chassis 6-1) MODEL 6A

Bias Measuring Points (See Voltage Chart)

(CHASSIS 6-1) VOLTAGE CHART

6A7	1st det.-osc.	6.0 AC	0	Note A	-5.0	180	65	180
6D6	I. F.	6.0 AC	0	Note A	.....	....	65	180
75	2nd det.-AVC	6.0 AC	0	Note B	.....	....	....	125
42	Output	6.0 AC	0	Note C	.....	....	260	255
80	Rectifier	4.75 AC	...	......	.....	....	....	No.1 305 AC No.2 305 AC
6U5	Eye	6.0 AC	0	0	.....	....	....	180

GALVIN MFG. CO.



BAND COVERAGE
American Programs 540-1720 KC
Police and Aircraft 2200-7000 KC
Foreign Programs 7,000-22,000 KC

IF PEAKED AT
465 KC

DRWG. NO.	PART NO.	DESCRIPTION
1	14-H-37281	3 Gang Condenser
2	13-H-37220	Ant. Coil (B.C.)
3	13-H-37252	Ant. Coil (S.W.)
4	13-H-37253	Ant. Coil (Pol.)
5	13-H-37256	Osc. Coil (B.C.)
6	13-H-37257	Osc. Coil (S.W.)
7	13-H-37258	Osc/ Coil (Pol.)
8	47-H-37687A	1st I.F. Coil Assem.
9	47-H-37683A	2nd I.F. Coil Assem.
10	54-H-37781	Band Switch
11	60-H-37840	Volume Control
12	60-H-37834	Tone Cont. & Switch
13	58-H-37785	Power Transformer
14	14-H-37275	Electrolytic Cond.
15	14-H-37277	Electrolytic Cond.
16	14-H-37288	Electrolytic Cond.

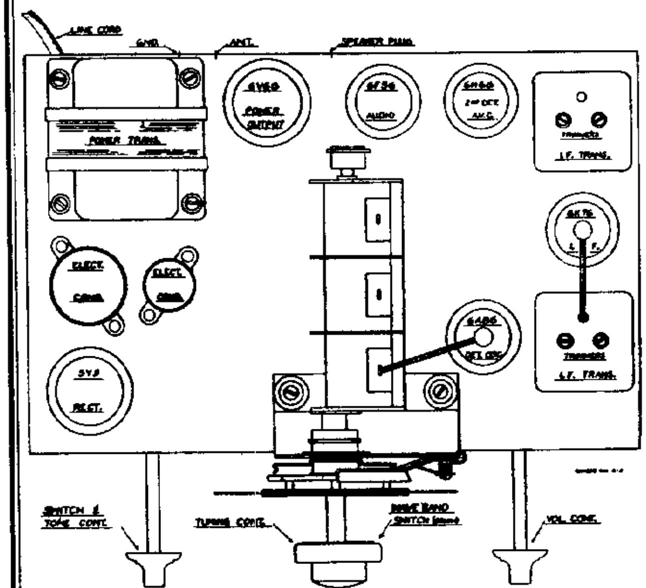
Line voltage 115.
Current consumption 75 watts.
Maximum power output 7.5 watts.

Motorola
AMERICA'S FINEST RADIO
(Chassis 6-2) MODELS 6T and 6Y

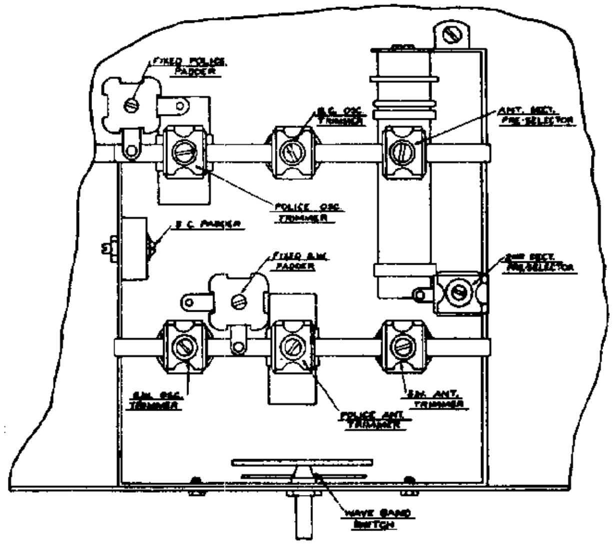
NOTE: I.F. Sensitivity at 465 K.C. is 35 microvolts for 50 milliwatts output
Ant. Sensitivity at 600 K.C. is 18 microvolts for 50 milliwatts output

MODELS 6T, 6Y
Chassis 6-2
Voltage, Socket
Trimmers, Alignment

GALVIN MFG. CO.



CHASSIS LAYOUT



TRIMMERS

ALIGNMENT PROCEDURE

CHASSIS 6-2

Connect signal generator to control grid of first detector tube (6A8G) through a .05 MF condenser, and to chassis. Do not remove grid cap. Also connect output meter across speaker voice coil. Turn band switch to "American Programs" position. Turn condenser gang completely out of mesh.

Set signal generator at 465 K.C. and carefully adust the four I.F. trimmers (located in top of I.F. coil cans) to point showing highest reading on output meter.

Leave band switch in "American Programs" position. Connect signal generator to antenna and ground terminals using a .0002 MF condenser in antenna lead.

Set signal generator and receiver dial both at 1700 K.C. Adjust B.C. OSC. trimmer until 1700 K.C. signal is heard.

Set signal generator at 1400 K.C. and turn condenser gang to the signal at 1400 K.C. Adjust antenna section and second section of preselector trimmers to point showing highest reading on output meter.

Set signal generator at 600 K.C. and rock pointer at 600 K.C. position on dial scale, while adjusting B.C. padder, until combination is found which gives highest output reading. (Note: If there is noise level at 600 K.C., padder can be adjusted to maximum noise without rocking gang and without use of signal generator. (Use short wire for pick-up if necessary.)

Turn band switch to "Police and Aircraft" position. Replace .0002 MF condenser in signal generator antenna lead with a 400 ohm carbon resistor.

Set signal generator and receiver dial both at 7.0 MC. Adjust POLICE OSC. trimmer until 7.0 MC signal is heard.

Set signal generator at 5.8 MC and turn condenser gang to signal at 5.8 MC. Adjust POLICE ANT. trimmer to point giving greatest output reading, while slightly rocking condenser gang.

Turn band switch to "Foreign Programs" position, still using 400 ohm carbon resistor in antenna lead to signal generator.

Set signal generator and receiver dial both at 22.0 MC. Adjust SW OSC. trimmer until 22.0 MC signal is heard.

Set signal generator at 18.7 MC. and turn condenser gang to signal at 18.7 MC. Adjust SW ANT. trimmer to point giving greatest output reading, while slightly rocking condenser gang.

Padders on "Police" and "Foreign" bands are fixed (no adjustment necessary).

SOCKET VOLTAGES (CHASSIS 6-2)

Tube	Position	1	2	3	4	5	6	7	8	9—Top Grid
6A8G	1st det.-osc.	0	0	225	80	−7.0	175	6.3 AC	0	Note A
6K7G	I. F.	0	0	225	80	0	X	6.3 AC	0	Note A
6H6G	2nd det.-AVC	0	6.3 AC	0	0	Note A	X	0	0	....
6F5G	A. F.	0	6.3 AC	X	120	X	X	0	0	Note A
6V6G	Output	0	6.3 AC	255	260	Note B	X	0	0	....
5Y3	Rectifier	0	5.0 AC	......	350 AC	...	350 AC	X	5.0 AC	....

"X" indicates socket terminals used as dummy tie points.
Note A:— 2.8 V measured point A to ground on 10 V scale (see circuit diagram).
Note B:—13.0 V measured point B to ground on 50 V scale (see circuit diagram).
All voltages except rectifier filaments measured from socket terminal indicated to chassis ground, using 1000 ohms per volt meter.

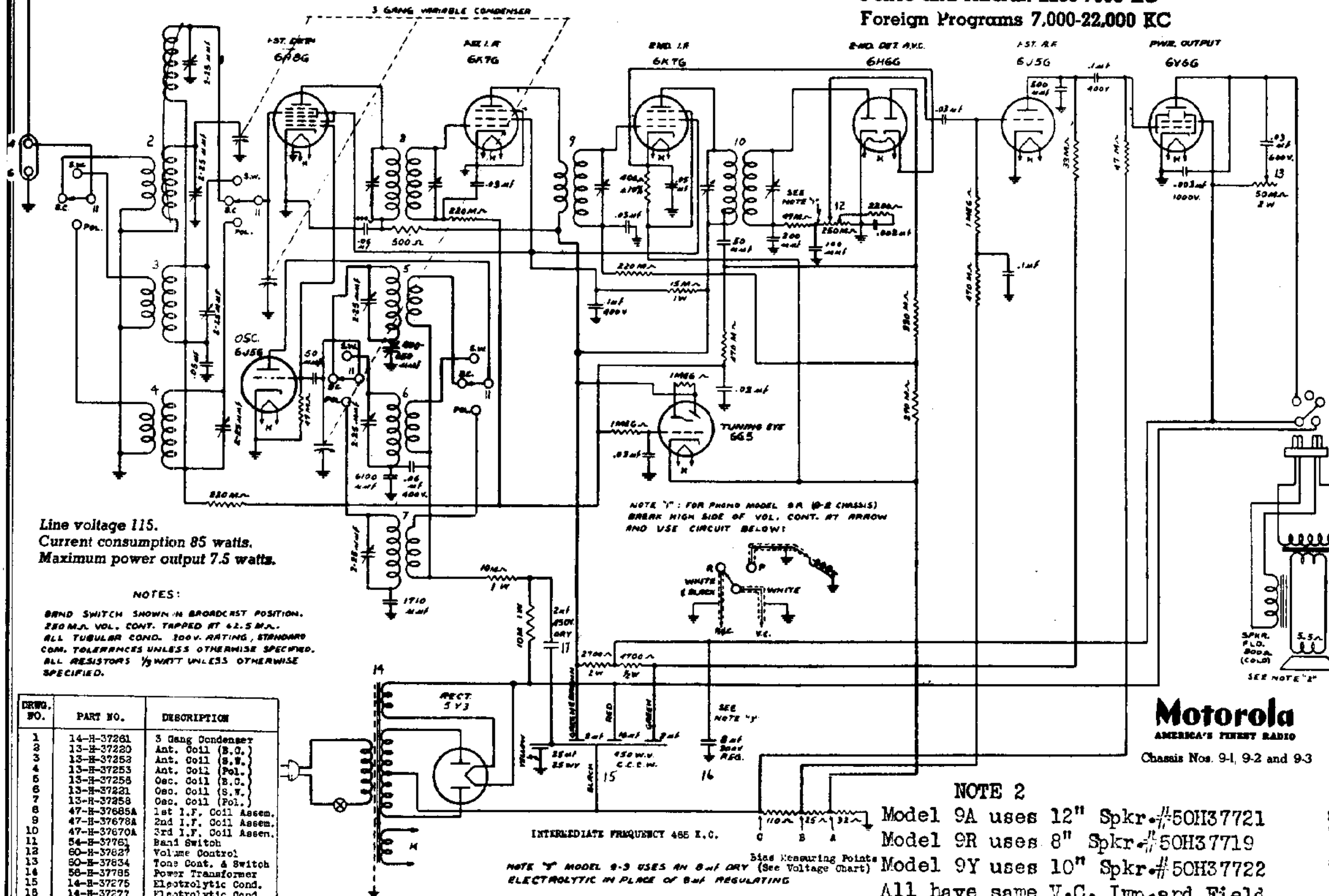
MODEL 9A
Chassis 9-3
Schematic, Notes
Parts

GALVIN MFG. CO.

MODEL 9Y
Chassis 9-1
MODEL 9R
Chassis 9-2

NOTE: I.F. Sensitivity at 465 K.C. is 20 microvolts for 50 milliwatts output
Ant. Sensitivity at 600 K.C. is 7 microvolts for 50 milliwatts output

BAND COVERAGE
American Programs 540-1720 KC
Police and Aircraft 2200-7000 KC
Foreign Programs 7,000-22,000 KC



Line voltage 115.
Current consumption 85 watts.
Maximum power output 7.5 watts.

NOTES:
BAND SWITCH SHOWN IN BROADCAST POSITION.
250 M.Ω. VOL. CONT. TAPPED AT 62.5 M.Ω.
ALL TUBULAR COND. 200V. RATING, STANDARD COM. TOLERANCES UNLESS OTHERWISE SPECIFIED.
ALL RESISTORS ⅓ WATT UNLESS OTHERWISE SPECIFIED.

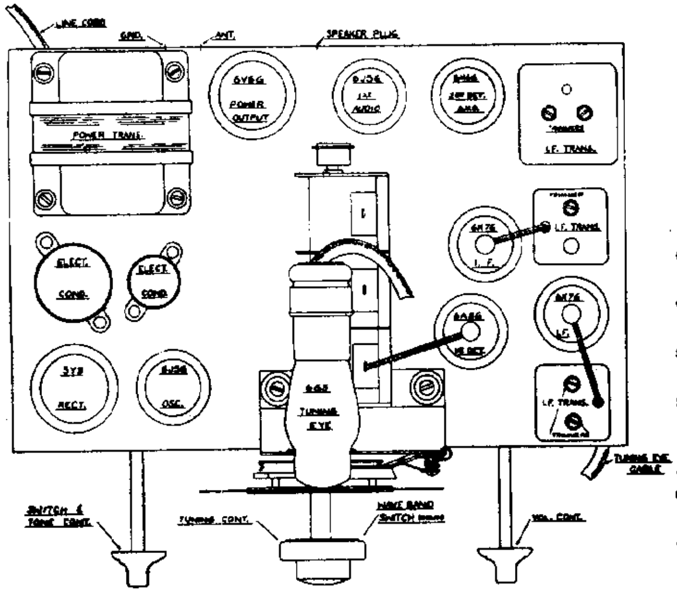
DRWG. NO.	PART NO.	DESCRIPTION
1	14-H-37261	3 Gang Condenser
2	13-H-37220	Ant. Coil (B.C.)
3	13-H-37252	Ant. Coil (S.W.)
4	13-H-37253	Ant. Coil (Pol.)
5	13-H-37256	Osc. Coil (B.C.)
6	13-H-37221	Osc. Coil (S.W.)
7	13-H-37258	Osc. Coil (Pol.)
8	47-H-37685A	1st I.F. Coil Assem.
9	47-H-37678A	2nd I.F. Coil Assem.
10	47-H-37670A	3rd I.F. Coil Assem.
11	54-H-37761	Band Switch
12	60-H-37827	Volume Control
13	60-H-37834	Tone Cont. & Switch
14	56-H-37785	Power Transformer
15	14-H-37275	Electrolytic Cond.
16	14-H-37277	Electrolytic Cond.
16a	14-H-37279	Electrolytic Cond.
17	14-H-37288	Electrolytic Cond.

Motorola
AMERICA'S FINEST RADIO
Chassis Nos. 9-1, 9-2 and 9-3

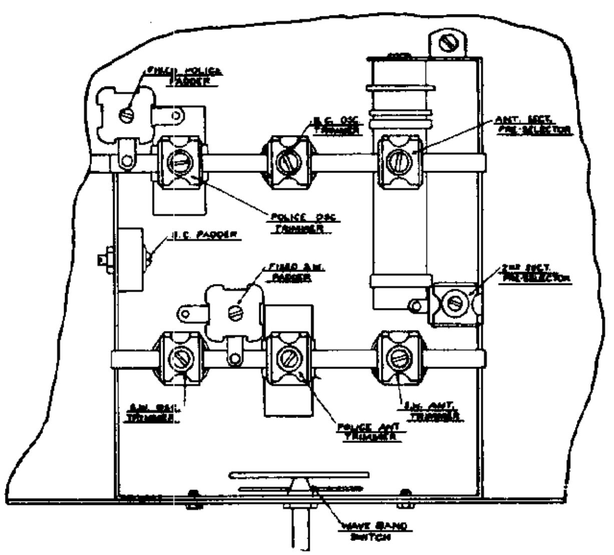
NOTE 2
Model 9A uses 12" Spkr-#50H37721
Model 9R uses 8" Spkr-#50H37719
Model 9Y uses 10" Spkr-#50H37722
All have same V.C. Imp. and Field resistance

MODELS 9Y, 9R, 9A
Chassis 9-1, 9-2, 9-3
Socket, Trimmers
Voltage, Alignment

GALVIN MFG. CO.



CHASSIS LAYOUT



TRIMMERS

CHASSIS 9-1, 9-2 and 9-3

ALIGNMENT PROCEDURE

Connect signal generator to control grid of first detector tube (6A8G) through a .05 MF. condenser, and to chassis. Do not remove grid cap. Also connect output meter across speaker voice coil. Turn band switch to "American Programs" position. Turn condenser gang completely out of mesh.

Set signal generator at 465 K.C. and carefully adjust the five I.F. trimmers (located in top of I.F. coil cans) to point showing highest reading on output meter.

Leave band switch in "American Programs" position. Connect signal generator to antenna and ground terminals using a .0002 MF condenser in antenna lead.

Set signal generator and receiver dial both at 1700 K.C. Adjust BC OSC. trimmer until 1700 K.C. signal is heard.

Set signal generator at 1400 K.C. and turn condenser gang to the signal at 1400 K.C. Adjust antenna section and second section of preselector trimmers to point showing highest reading on output meter.

Set signal generator at 600 K.C. and rock pointer at 600 K.C. position on dial scale, while adjusting BC padder, until combination is found which gives highest output reading. (Note: If there is noise level at 600 K.C., padder can be adjusted to maximum noise without rocking gang and without use of signal generator. Use short wire for pick-up if necessary.)

Turn band switch to "Police and Aircraft" position. Replace .0002 MF condenser in signal generator antenna lead with a 400 ohm carbon resistor.

Set signal generator and receiver dial both at 7.0 MC. Adjust POLICE OSC. trimmer until 7.0 MC signal is heard.

Set signal generator at 5.8 MC and turn condenser gang to the signal at 5.8 MC. Adjust POLICE ANT. trimmer to point giving greatest output reading, while slightly rocking condenser gang.

Turn band switch to "Foreign Programs" position still using 400 ohm carbon resistor in antenna lead to signal generator.

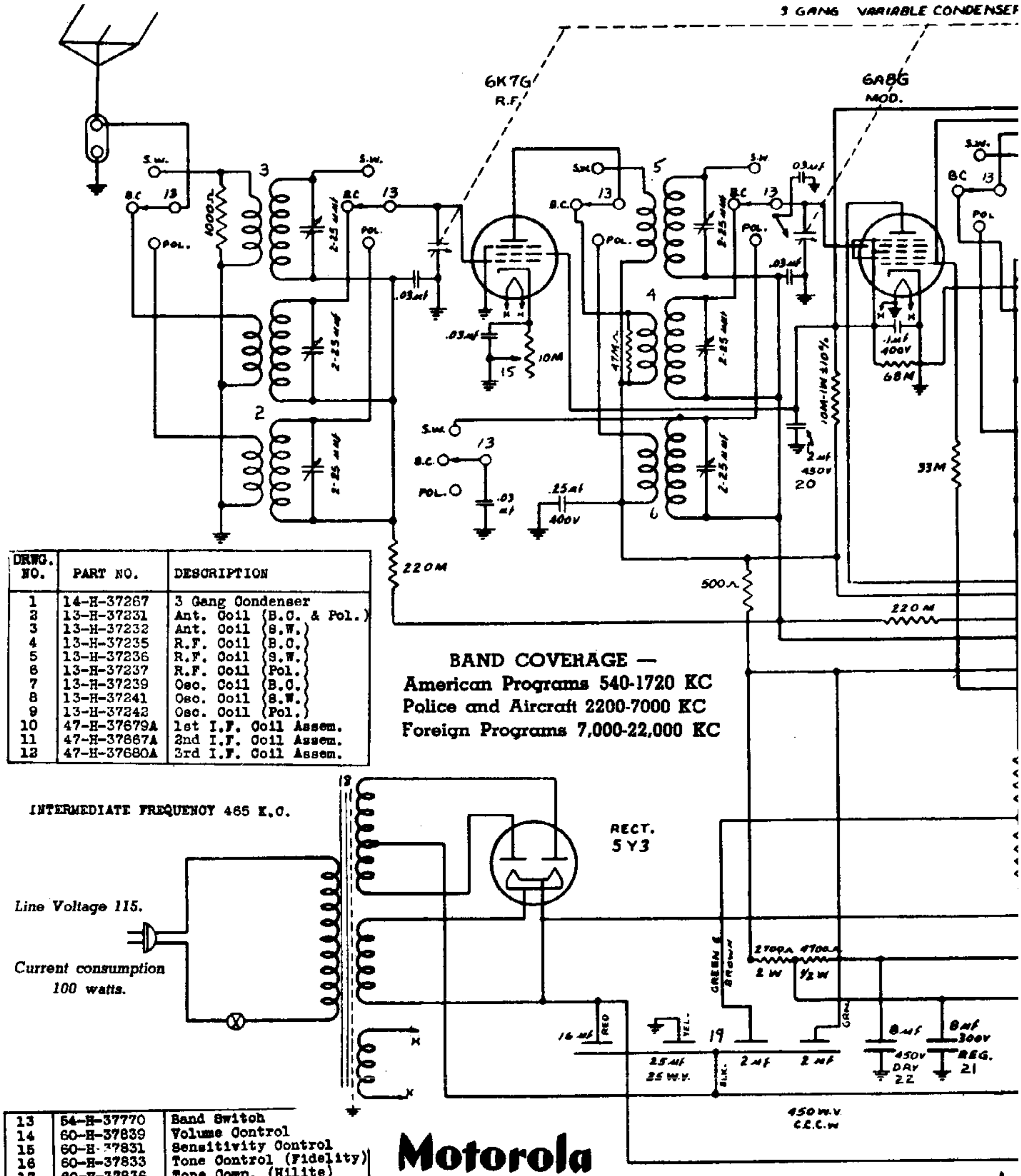
Set signal generator and receiver dial both at 22.0 MC. Adjust SW OSC. trimmer until 22.0 MC signal is heard.

Set signal generator at 18.7 MC and turn condenser gang to the signal at 18.7 MC. Adjust SW ANT. trimmer to point giving greatest output reading, while slightly rocking condenser gang.

Padders on "Police" and "Foreign" bands are fixed (no adjustment necessary).

SOCKET VOLTAGES (CHASSIS 9-1, 9-2, AND 9-3)

Tube	Position	1	2	3	4	5	6	7	8	9
6A8G	1st det.	0	6.3 AC	195	80	−6.0	80	0	0	Note A
6J5G	Osc.	0	0	160	−6.0	−16.0	....	6.3 AC	0	...
6K7G	1st I. F.	0	0	200	80	0	X	6.3 AC	0	Note A
6K7G	2nd I. F.	0	6.3 AC	200	80	−3.0	X	0	1.2	Note A
6H6G	2nd det.-AVC	0	6.3 AC	0	0	Note A	X	0	1.2	...
6J5G	A. F.	0	6.3 AC	125	240	Note B	X	0	0	...
6V6G	Output	0	6.3 AC	250	260	Note C	X	0	0	...
5Y3	Rectifier	0	5.0 AC	..	350 AC	....	350 AC	X	5.0 AC	...
6G5	Eye	Fil. (Brown wire) 6.3 AC Plate (Red wire) 200 Cathode (Black wire) Note A Grid (Green Wire) Note A								



DRWG. NO.	PART NO.	DESCRIPTION
1	14-H-37267	3 Gang Condenser
2	13-H-37231	Ant. Coil (B.C. & Pol.)
3	13-H-37232	Ant. Coil (S.W.)
4	13-H-37235	R.F. Coil (B.C.)
5	13-H-37236	R.F. Coil (S.W.)
6	13-H-37237	R.F. Coil (Pol.)
7	13-H-37239	Osc. Coil (B.C.)
8	13-H-37241	Osc. Coil (S.W.)
9	13-H-37242	Osc. Coil (Pol.)
10	47-H-37679A	1st I.F. Coil Assem.
11	47-H-37667A	2nd I.F. Coil Assem.
12	47-H-37680A	3rd I.F. Coil Assem.

BAND COVERAGE —
American Programs 540-1720 KC
Police and Aircraft 2200-7000 KC
Foreign Programs 7,000-22,000 KC

INTERMEDIATE FREQUENCY 465 K.C.

Line Voltage 115.

Current consumption 100 watts.

13	54-H-37770	Band Switch
14	60-H-37639	Volume Control
15	60-H-37831	Sensitivity Control
16	60-H-37833	Tone Control (Fidelity)
17	60-H-37836	Tone Comp. (Hilite)
18	56-H-37788	Power Transformer
19	14-H-37275	Electrolytic Cond.
20	14-H-37288	Electrolytic Cond.
21	14-H-37277	Electrolytic Cond.
22	14-H-37279	Electrolytic Cond.

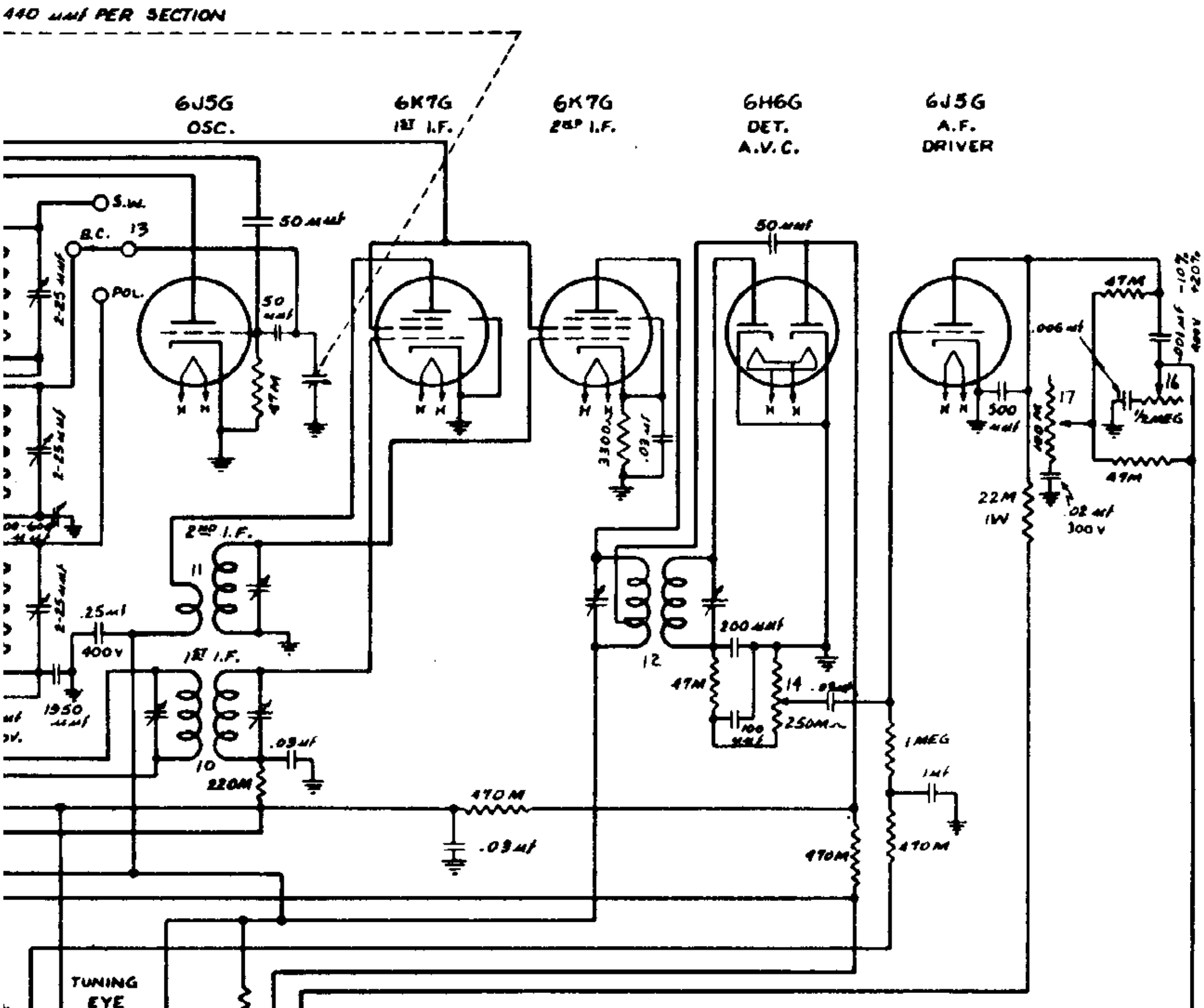
Motorola

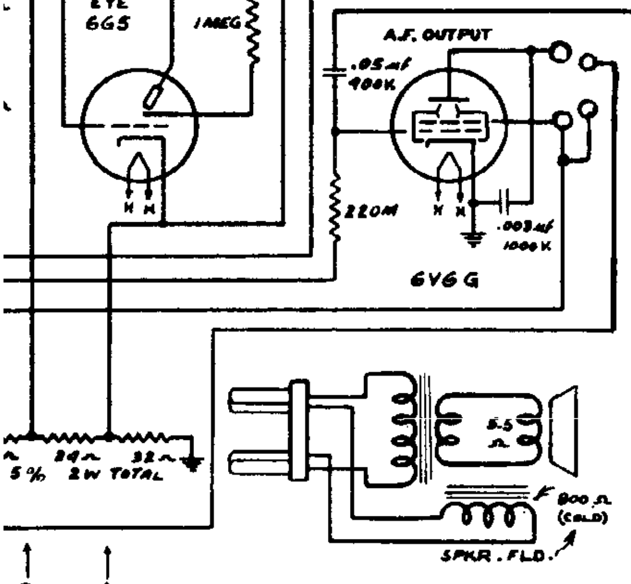
Chassis No. 10-1

MODEL 10Y

MFG. CO.

MODEL 10Y
Chassis 10-1
Schematic, Parts
Trimmers

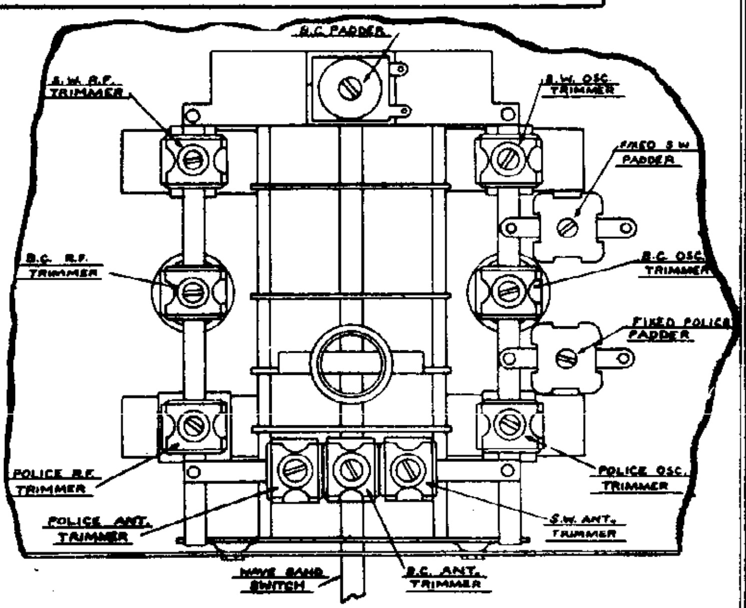




Maximum power output 7.5 watts.

B
A

...uring Points
...ltage Chart)



TRIMMERS 10-1

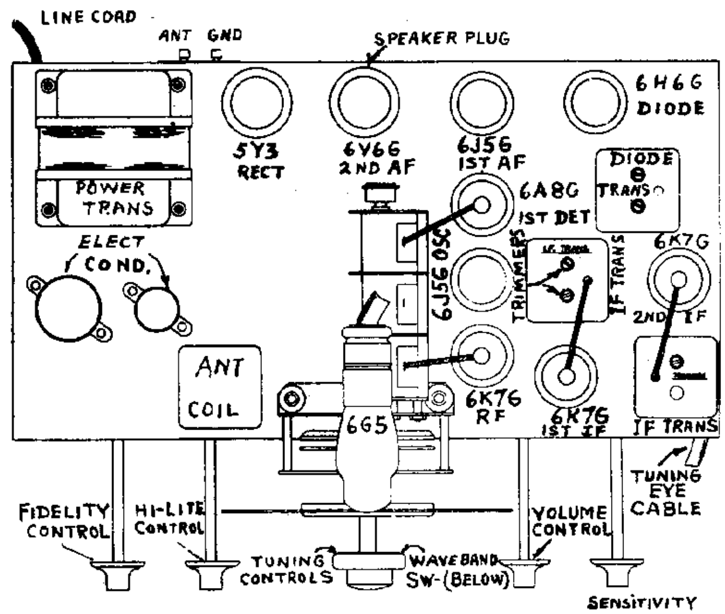
GALVIN MFG. CO.

ALIGNMENT PROCEDURE

CHASSIS 10-1

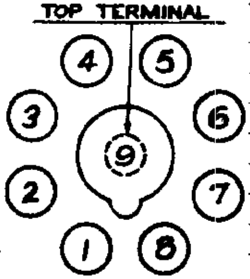
1. Read alignment notes on Page 14 .
2. Connect signal generator to control grid of first detector tube (6A8G) through a .05 MF. condenser and to chassis. Do not remove grid cap. Also connect output meter across speaker voice coil. Turn band switch to "American Programs" position. Turn condenser gang completely out of mesh.
3. Set signal generator at 465 K.C. and carefully adjust the five I.F. trimmers (located in top of I.F. coil cans) to point showing highest reading on output meter.
4. Leave band Switch in "American Programs" position. Connect signal generator to antenna and ground terminals, using a .0002 MF condenser in antenna lead.
5. Set signal generator and receiver dial both at 1700 K.C. Adjust BC OSC. trimmer until 1700 K.C. signal is heard.
6. Set signal generator at 1400 K.C. and turn condenser gang to the signal at 1400 K.C. Adjust BC ANT. and BC RF. trimmers to point showing highest reading on output meter.
7. Set signal generator at 600 K.C. and rock pointer at 600 K.C. position on dial scale, while adjusting BC padder, until combination is found which gives highest output reading. (Note: If there is noise level at 600 K.C., padder can be adjusted to maximum noise without rocking gang and without use of signal generator. (Use short wire for pick-up if necessary.)
8. Turn band switch to "Police and Aircraft" position. Replace .0002 M.F. condenser in signal generator lead with a 400 ohm carbon resistor.
9. Set signal generator and receiver dial both at 7.0 MC. Adjust POLICE OSC. trimmer until 7.0 MC signal is heard.
10. Set signal generator at 5.8 MC and turn condenser gang to signal at 5.8 MC. Adjust POLICE ANT. and POLICE RF. trimmers to point giving greatest output reading, while slightly rocking condenser gang.
11. Turn band switch to "Foreign Programs" position, still using 400 ohm carbon resistor in antenna lead to signal generator.
12. Set signal generator and receiver dial both at 22.0 MC. Adjust SW OSC. trimmer until 22.0 MC signal is heard.
13. Set signal generator at 18.7 MC and turn condenser gang to the signal at 18.7 MC. Adjust SW ANT. and SW RF. trimmers to point giving greatest output reading, while slightly rocking condenser gang.
14. Padders on "Police" and "Foreign" bands are fixed. (No adjustment necessary.)

NOTE: I.F. Sensitivity at 465 K.C. is 90 microvolts for 50 milliwatts output
Ant. Sensitivity at 600 K.C. is 1 microvolt for 50 milliwatts output



CHASSIS LAYOUT 10-1

TOP TERMINAL



BOTTOM VIEW OF SOCKET

SOCKET VOLTAGE (CHASSIS 10-1)

Tube	Position	1	2	3	4	5	6	7	8	9
6K7G	R. F.	0	6.3 AC	215	85	0	X	0	7.0	Note A
6A8G	1st det.	0	6.3 AC	225	90	−25	90	0	0	Note A
6J5G	Osc.	0	6.3 AC	160	0	−23	....	0	0	...
6K7G	1st I. F.	0	6.3 AC	220	100	0	X	0	0	Note A
6K7G	2nd I. F.	0	6.3 AC	220	100	8	....	0	8	0
6H6G	2nd det.-AVC	0	6.3 AC	0	0	Note A	X	0	0	...
6J5G	A. F.	0	6.3 AC	150	0	Note B	X	0	0	...
6V6G	Output	0	6.3 AC	260	285	Note C	....	0	0	...
5Y3	Rectifier	0	5.0 AC	X	350 AC	X	350 AC	X	5.0 AC	...
6G5	Eye	Filament (Brown wire) 6.3 AC Cathode (Black wire) Note A				Plate (Red wire) 210 Grid (Green wire) Note A				

"X" indicates socket terminals used as dummy tie points.
Note A:— 3.0 V measured point A to ground on 10 V scale (see circuit diagram).
Note B:— 5.0 V measured point B to ground on 10 V scale (see circuit diagram).
Note C:—15.0 V measured point C to ground on 50 V scale (see circuit diagram).
All voltages, except rectifier filaments, measured from socket terminal indicated to chassis ground, using 1000 ohms per volt meter.

GALVIN MFG. CO.

THE 1937 IMPROVED MAGIC ELIMINODE

The 1937 Magic Eliminode consists of filters in the various supply leads to the radio set to prevent the introduction of "motor noise" at these points and an improved bucking or balancing circuit in Models 65, 70, and Golden Voice which may be adjusted to prevent the development of "motor noise" in the antenna circuit.

The manner in which the cancellation of "motor noise" in the antenna circuit is accomplished is as follows:

Developed on the antenna coil, from the antenna system we have both "motor noise" and "broadcast signal." Developed on the "A" lead of the radio set which is connected into the electrical system we have "motor noise" alone. We introduce "motor noise" into the antenna circuit from the "A" lead in opposite phase to that picked up by the antenna.

We then vary the intensity introduced from the "A" circuit into the antenna coil by means of the metal shutter between the two circuits, until the intensity from both antenna system and "A" circuit is the same. When this is accomplished there is cancellation of "motor noise" in the antenna system and the broadcast signal comes through without being affected in any way.

For those cases in which the motor noise developed in the "A" circuit is *in phase* with that of the antenna system, provision is made to reverse the phase at the coupling coil to the antenna circuit so that bucking action may occur. Refer to Fig. (2).

MAGIC ELIMINODE BALANCING PROCEDURE

After the set is completely installed, if any ignition noise is present with the shutter in a closed position and with the "A" lead plugged into the bottom of the set it will be necessary to use the balancer.

To use the balancer, pull the end of the fused "A" lead out of the bottom of the set No. 1 (Fig. 2) and plug it into the balancer terminal receptacle No. 3 (Fig. 2). Take the short heavy jumper with pin prongs on either end and plug one end into receptacle No. 1 (Fig. 2) on the bottom of the set and plug the other end into balancer terminal receptacle No. 2 (Fig. 2). Tune the set then to the point on the dial where the noise appears with greatest intensity.

Adjust the eliminode shutter wheel by revolving it with the thumb as shown in (Fig. 2) until the motor noise disappears.

If it is found when turning the shutter toward an open position that the noise gradually becomes louder without any sign of decrease at any point, it will be necessary to reverse the connections in receptacles No. 2 and No. 3 (Fig. 2). Then readjust the shutter wheel with the thumb as described above.

When this adjustment is once made, it will not change unless some change is later made in the car wiring or the radio set is installed in another car.

CHASSIS PICKUP

In extreme cases of "motor noise" in the Models No. 65, 70 and Golden Voice, a preliminary test for chassis pickup should be made before attempting to balance out antenna interference.

When making this test, it is necessary to use a well shielded dummy antenna plugged into the set in place of the regular antenna lead-in. The dummy antenna can be made by using a standard Motorola antenna series condenser, part M-94, and short circuiting the inside connection to the shell.

Balance the antenna trimmer very carefully to this dummy antenna so that the set is at maximum sensitivity and then run the car motor.

Should "motor noise" occur after this test, it will be entering the radio set through some other source than the antenna.

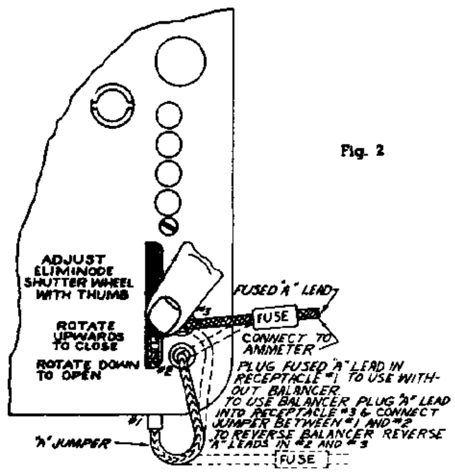


Fig. 2

ACOUSTINATOR

The Acoustinator used on the 1937 MOTOROLAS must be mounted always at a point most convenient to the customer since its operation is just as essential as the tuning dial or the volume control in giving complete enjoyment and maximum performance from the radio set.

The Acoustinator performs the function of varying the sensitivity of the radio set in three logical predetermined steps from the extreme sensitivity necessary in isolated communities to the noise free smooth reception desired in Metropolitan areas, and changes the tone characteristics in three distinctly different positions to correct for the acoustic differences in the various makes of cars give a pleasing effect to any type of program that anyone might prefer.

The three steps of the sensitivity switch controlled by the left hand knob are:
Country: average sensitivity 1.5 Microvolt for 1 Watt.
City: average sensitivity 5 Microvolts for 1 Watt.
Street Car: average sensitivity 15 Microvolts for 1 Watt.

"High Fidelity" is a term applied to an audio system that reproduces all frequencies of the audible spectrum at the same level of output.

The human ear however is most sensitive to frequencies in the middle register occupied by the human voice. The acoustics of the average automobile tend to accentuate this effect. The actual effect to the ear then of "High Fidelity" is that the pleasing higher and lower frequencies of music are dropped into the background and tends to spotlight the human voice as shown on the chart in Fig. (1).

This is the condition that occurs when the right hand knob of the acoustinator is set at "Voice" position.

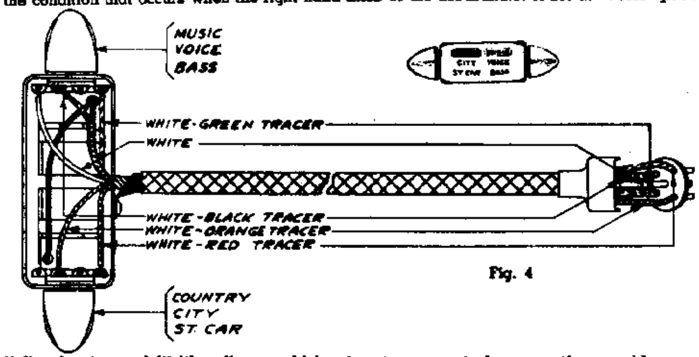
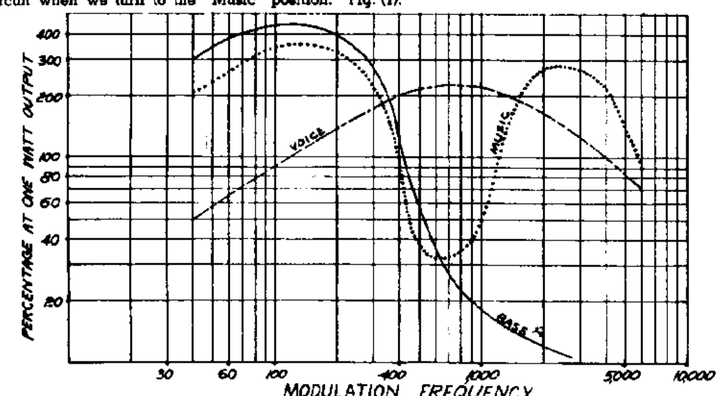


Fig. 4

A beautifully pleasing and lifelike effect would be given to any musical program if we would compensate for the limitations of the ear and in some manner drop the center portion of the audio register slightly below the level of the two ends. The deep bass notes and high notes that give expression to music would then stand out in a very natural manner. This has been done by means of an electrical filter network that is switched into the circuit when we turn to the "Music" position. Fig. (1).

Fig. 1



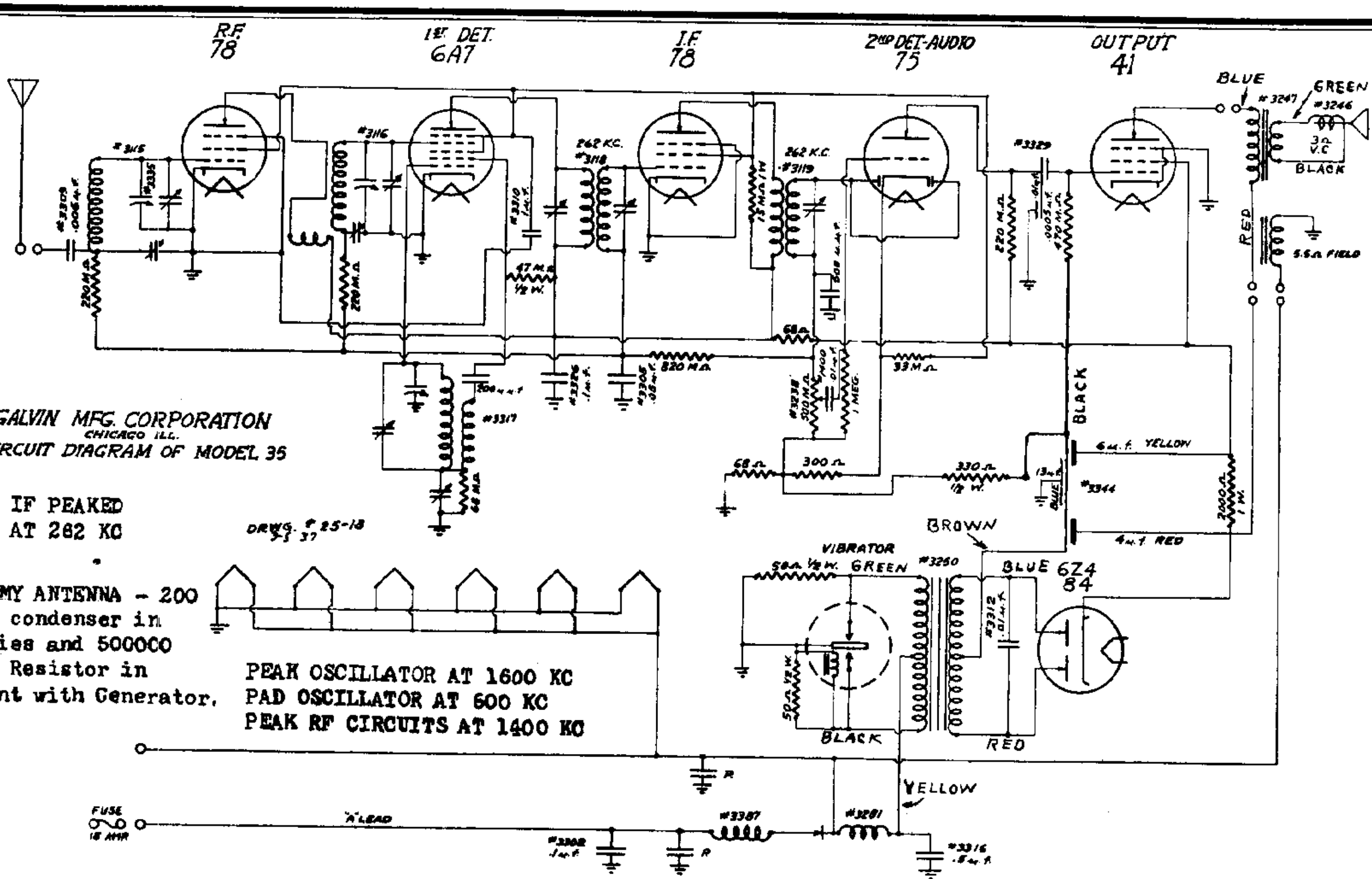
RELATIVE AFFECT TO THE EAR EXPRESSED IN PERCENTAGE OF THREE ACOUSTINATOR POSITIONS IN AVERAGE AUTOMOBILE

Many people prefer the deep bass instruments that mark the rhythm of music to be accentuated above all others. A soft mellowness is given music when this is done and the sound of static and man-made electrical interference which is reproduced at a very high audio frequency is reduced to a minimum when the acoustinator is set to the bass position.

Many combinations of positions then of right and left knobs are available to give us the finest reception, regardless of the demands of the region through which we are driving and regardless of the tonal balance required of the program to which we may be listening.

GALVIN MFG. CO.

ALL VOLTAGE ANALYSIS READINGS MADE WITH A BATTERY VOLTAGE OF 6.3 VOLTS.



GALVIN MFG. CORPORATION
CHICAGO ILL.
CIRCUIT DIAGRAM OF MODEL 35

IF PEAKED
AT 262 KC

DUMMY ANTENNA - 200 MMF condenser in Series and 500000 Ohm Resistor in Shunt with Generator.

PEAK OSCILLATOR AT 1600 KC
PAD OSCILLATOR AT 600 KC
PEAK RF CIRCUITS AT 1400 KC

MODEL 35

Plate voltage	210
Screen voltage	65
Bias voltage for R.F. tubes	3.5
Bias voltage for 75 tube	1.0
Bias voltage for 41 tube	16
Delay voltage	1.0

Current drain ....5.75 amps.

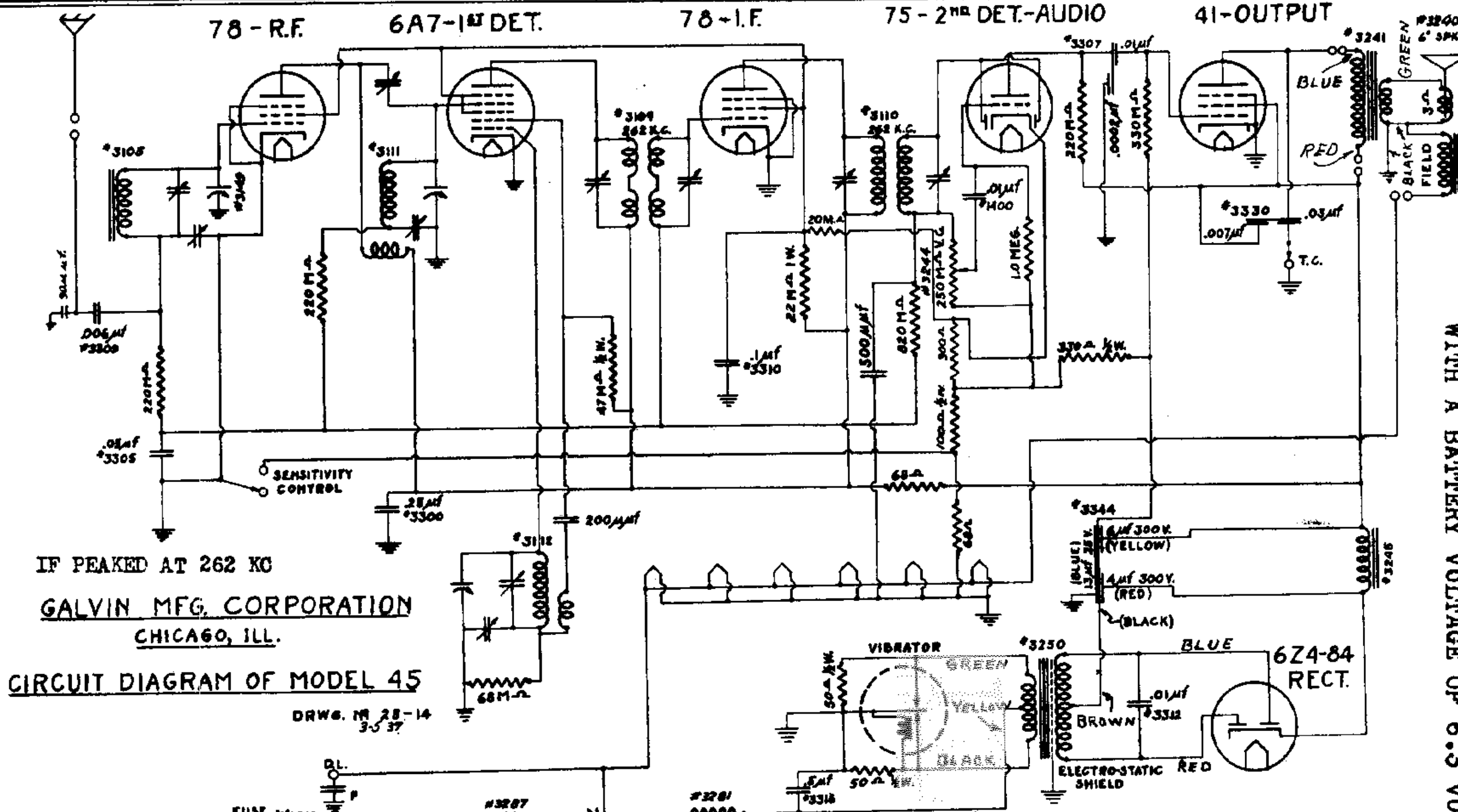
AVERAGE MICROVOLT INPUT	GEN. FEEDER CONNECTED TO GRID OF -	GENERATOR SET AT	OUTPUT METER ACROSS VOICE COIL
30,000	- 78	262 K.C.	Voice coil resistance is 3 ohms—
2,000	- 6A7	262 K.C.	
2,000	- 6A7*	600 K.C.	1.73 Volts equals
70	- 78*	600 K.C.	1 Watt output
3.5	- Ant.	600 K.C.	

*Microvolt input may be 10 to 20% more at 600 K.C. than at 262 K.C. This is due to normal conversion loss in the Translator tube. If greater, replace Translator tube.

MODEL 45
Schematic, Voltage
Sensitivity, Alignment

GALVIN MFG. CO.

ALL VOLTAGE ANALYSIS READINGS MADE
WITH A BATTERY VOLTAGE OF 6.3 VOLTS



IF PEAKED AT 262 KC

GALVIN MFG. CORPORATION
CHICAGO, ILL.

CIRCUIT DIAGRAM OF MODEL 45

DRWG. Nº 28-14
3-5-37

DUMMY ANTENNA - 200 MMF. Condenser in series and 500000 Ohm Resistor in shunt with Generator.
PEAK OSCILLATOR AT 1600 KC
PAD OSCILLATOR AT 600 KC
PEAK RF CIRCUITS AT 1400 KC

MODEL 45

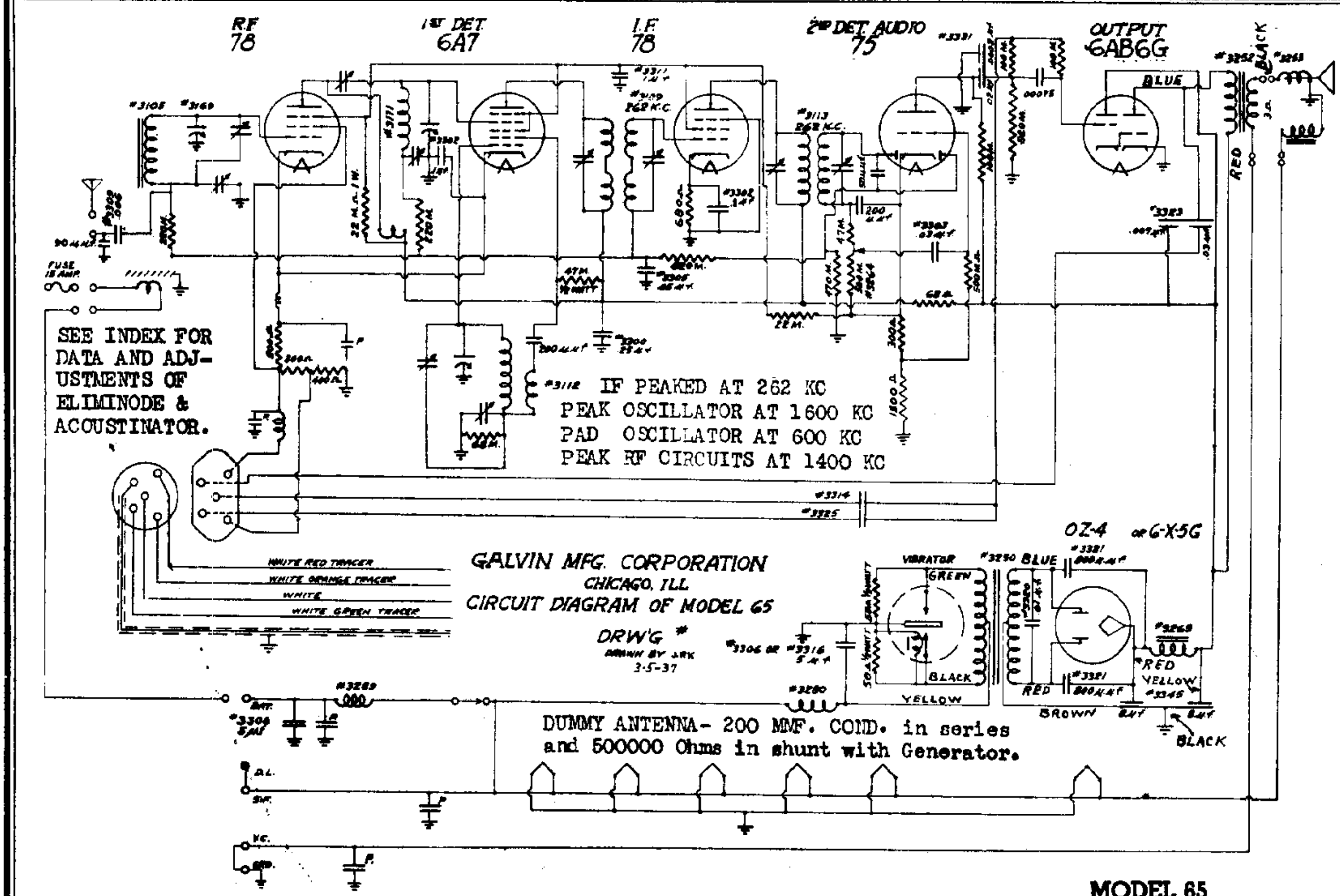
Plate voltage	210
Plate on output tube	210
Screen voltage	65
Bias voltage for R.F. tubes	3.5
Bias voltage for 75 tube	1.0
Bias voltage for 41 tube	16
Delay voltage	1.0
Current Drain	6.00 amps.

AVERAGE MICROVOLT INPUT	GEN. FEEDER CONNECTED TO GRID OF	GENERATOR SET AT	OUTPUT METER ACROSS VOICE COIL
15,000	- 78	262 K.C.	Voice coil resistance is 3 ohms—
500	- 6A7	262 K.C.	
500	- 6A7*	600 K.C.	1.73 Volts equals
50	- 78*	600 K.C.	1 Watt output
1.5	- Ant.	600 K.C.	

GALVIN MFG. CO.

MODEL 65
Schematic, Voltage
Sensitivity, Alignment

ALL VOLTAGE ANALYSIS READINGS MADE WITH A BATTERY VOLTAGE OF 6.3 VOLTS.



AVERAGE MICROVOLT INPUT	GEN. FEEDER CONNECTED TO GRID OF	GEN. SET AT	OUTPUT METER ACROSS VOICE COIL
15,000	78	262 K.C.	Voice coil resistance is 3 ohms—
500	6A7	262 K.C.	
500	6A7*	600 K.C.	1.73 Volts equals 1 Watt output
50	78*	600 K.C.	
1.5	Ant.	600 K.C.	

MODEL 65

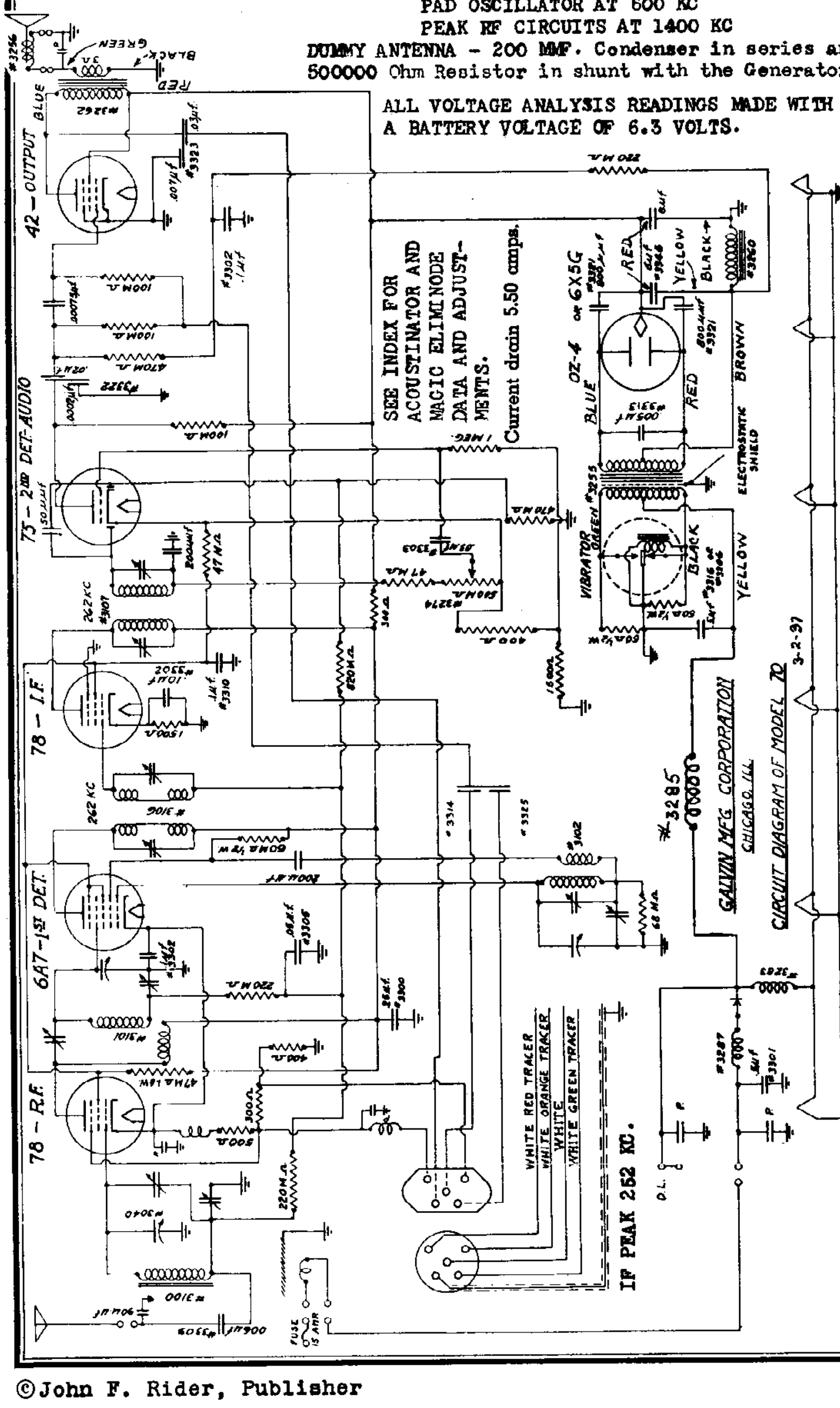
MODEL 65	
Plate voltage	220
Plate on output tube	210
Screen voltage	65
Bias voltage for R.F. tubes	3.5
Bias voltage for 75 tube	1.0
Bias voltage for 6AB6G tube	0.0
Delay voltage	1.0
Current drain	6.40 amps.

MODEL 70
Schematic, Voltage
Sensitivity, Alignment

GALVIN MFG. CO.

PEAK OSCILLATOR AT 1600 KC
PAD OSCILLATOR AT 600 KC
PEAK RF CIRCUITS AT 1400 KC
DUMMY ANTENNA - 200 MMF. Condenser in series and 500000 Ohm Resistor in shunt with the Generator.

ALL VOLTAGE ANALYSIS READINGS MADE WITH A BATTERY VOLTAGE OF 6.3 VOLTS.



MODEL 70

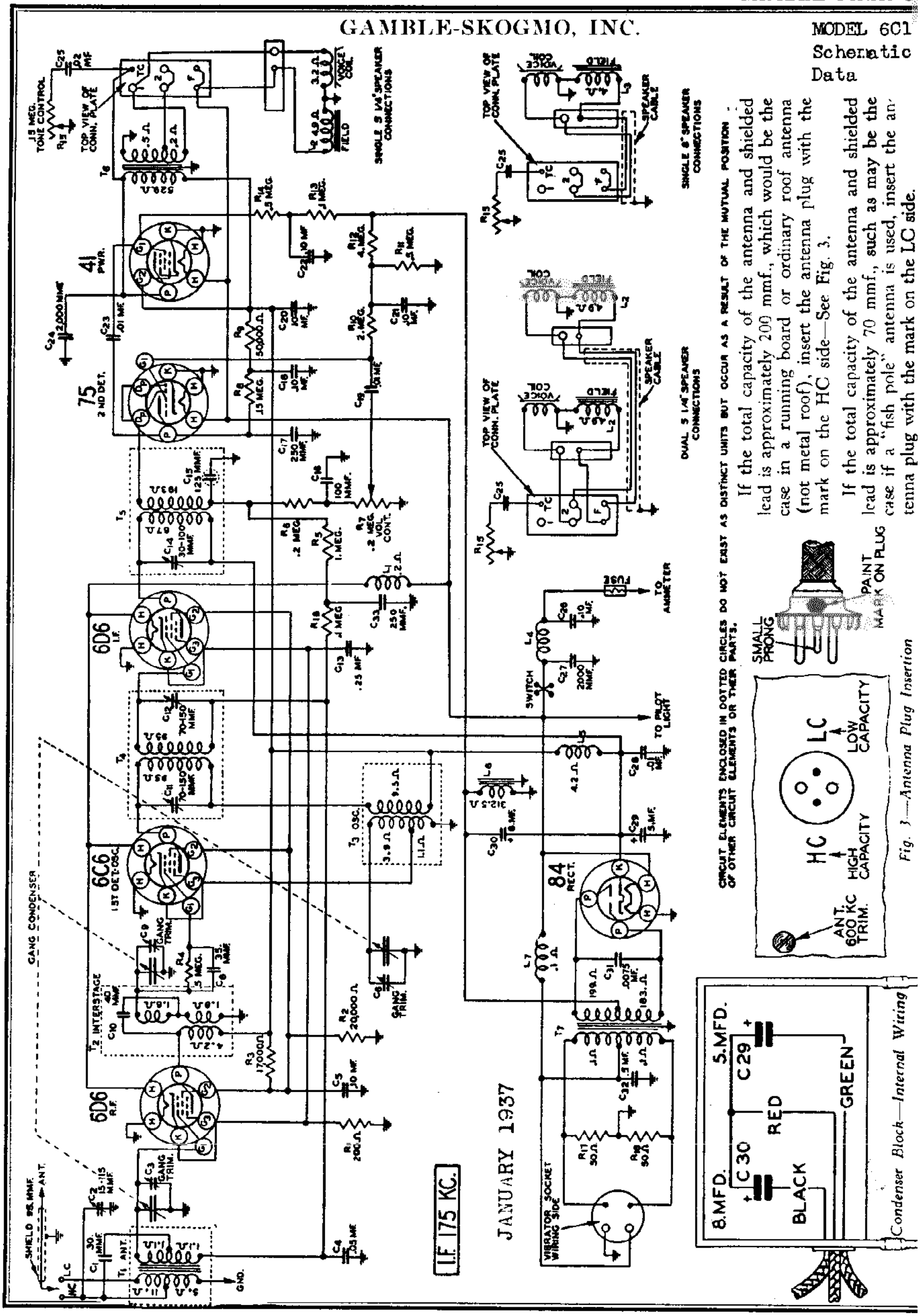
Plate voltage	260
Plate on output tube	250
Screen voltage	65
Bias voltage for R.F. tubes	3.5
Bias voltage for 75 tube	1.5
Vias voltage for 42 tube	18
AVC Delay voltage	3

AVERAGE MICROVOLT INPUT	GEN. FEEDER CONNECTED TO GRID OF -	GENERATOR SET AT	OUTPUT METER ACROSS VOICE COIL
15,000	78	262 K.C.	Voice coil resistance is 3 ohms—
500	6A7	262 K.C.	
500	6A7*	600 K.C.	1.73 Volts equals 1 Watt output
50	78*	600 K.C.	
1.5	Ant.	600 K.C.	

*Microvolt input may be 10 to 20% more at 600 K.C. than at 262 K.C. This is due to normal conversion loss in the Translator tube. If greater, replace Translator tube.

GAMBLE-SKOGMO, INC.

MODEL 601
Schematic
Data



JANUARY 1937

I.F. 175 KC.

CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.

If the total capacity of the antenna and shielded lead is approximately 200 mmf., which would be the case in a running board or ordinary roof antenna (not metal roof), insert the antenna plug with the mark on the HC side—See Fig. 3.

If the total capacity of the antenna and shielded lead is approximately 70 mmf., such as may be the case if a "fish pole" antenna is used, insert the antenna plug with the mark on the LC side.

Fig. 3—Antenna Plug Insertion

Condenser Block—Internal Wiring

MODEL 6C1
Alignment, Coils

GAMBLE-SKOGMO, INC.

Voltage, Socket
Trimmers

I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the output of the signal generator through a .05 mf. condenser to the stator of the R.F. interstage section of the tuning condenser. (See Fig. 2 for location of this section.)

Connect the ground lead of the signal generator to the chassis. The chassis should be in the case.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers is shown in Fig. 2.

1581 KC Adjustment

Set the signal generator for 1581 KC.

Turn the rotor of the tuning condenser to the full open position.

Insert the antenna plug with the mark on the high capacity (HC) side. Connect the shielded antenna lead from the chassis through a 120 mmf. condenser to the antenna post of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—see Fig. 2 for location of this trimmer.

1400 KC Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the R.F. interstage and antenna 1400 KC trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Tune in this signal and adjust the 600 KC antenna trimmer to maximum (See Fig. 3 for location of this trimmer).

After the alignment procedure is completed, the antenna plug may be withdrawn and reinserted on the LC side if a low capacity (70 mmf.) car antenna is used.

Adjusting Antenna 600 KC Trimmer

After the radio is installed and the car antenna is connected, it will be necessary to readjust the antenna trimmer. Tune in a weak signal at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained. See Fig. 3 for location of this trimmer.

Calibrating the Radio

To calibrate the radio, tune in a station of known frequency. At the back of the control head is the calibration screw. Remove the pilot lamp assembly. Hold the tuning knob. Insert a fine blade screwdriver and turn this screw until the pointer on the dial scale is at the frequency of the station being received.

A very short insulated screwdriver will be helpful.

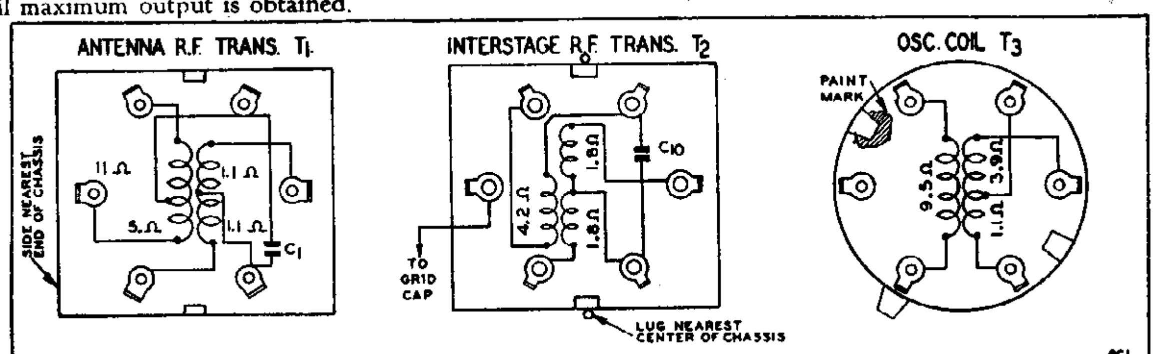


Fig. 4—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

VOLTAGES AT SOCKETS

Battery—6.3 Volts Under Load

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground
6D6	R.F.	6.0	245	105	3.2
6C6	1st Det. and Osc.	6.0	243	105	
6D6	I.F.	6.0	245	105	3.2
75	2nd Det.	6.1	127		
41	Power	6.1	230	245	17(1)
84	Rectifier	6.1	600(2)		

(1) Grid bias read across filter choke L6
(2) A.C. voltage across plates

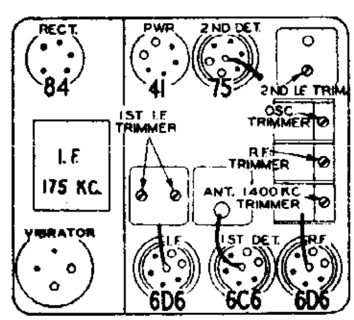
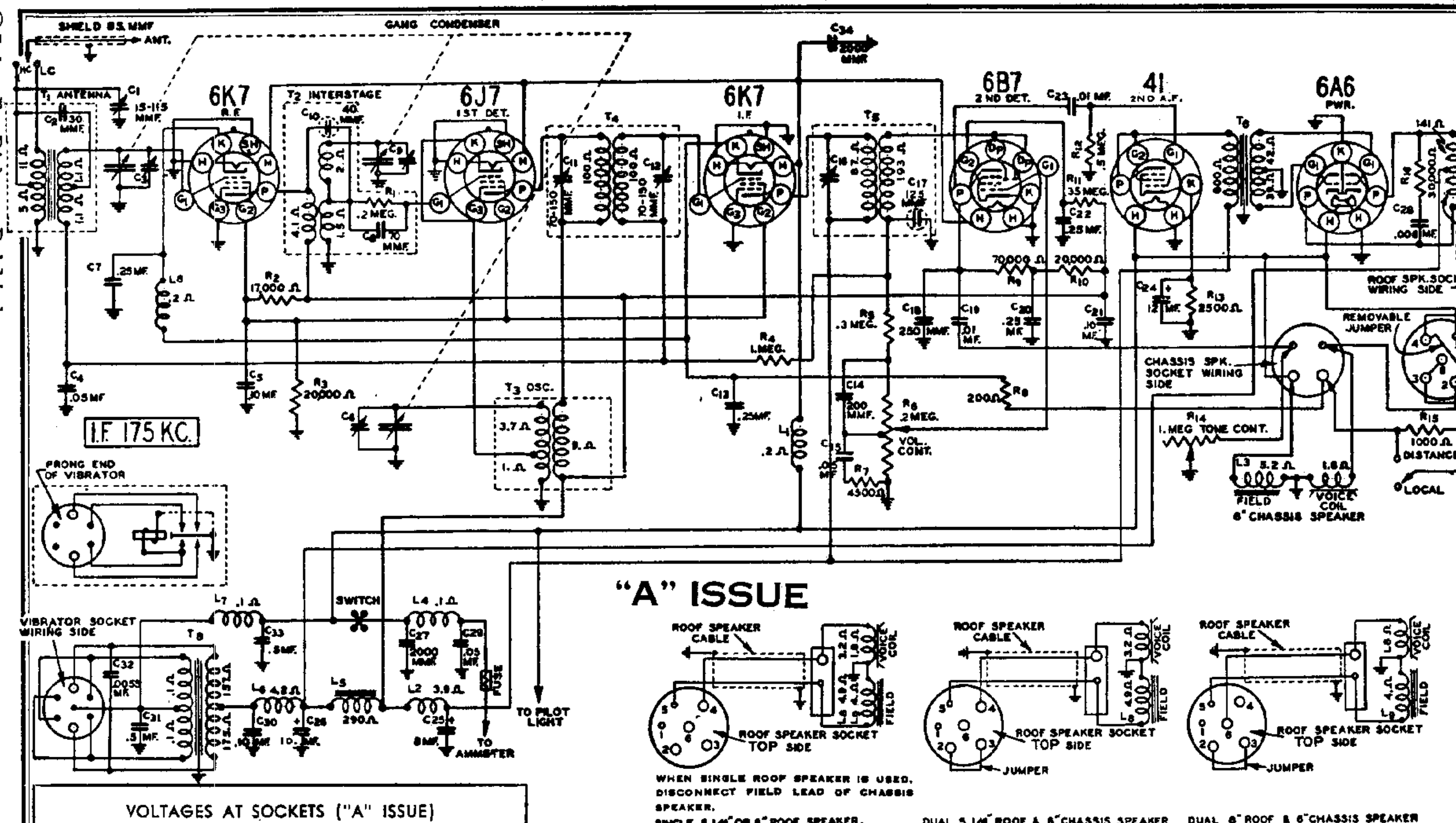


Fig. 2—Location of Tubes and Vibrator

MODEL 6J Series
"A" Issue
Schematic,Volta
Sensitivity,Dat

GAMBLE-SKOGMO, INC.



VOLTAGES AT SOCKETS ("A" ISSUE)

Battery—6.3 Volts Under Load   L-D Switch in Distance Position

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground
6K7	R.F.	5.8	270	120	2.0
6J7	1st Det. and Osc.	5.8	268	120	0
6K7	I.F.	5.8	270	120	2.0
6B7	2nd Det. & 1st A.F.	5.8	70(1)	50(1)	0
41	2nd A.F.	6.0	260	260	28
6A6	Power	6.0	275		0

POWER CONSUMPTION - 8.25 Amperes at 6.3 Volts
7 Amperes with P.M.Speaker

POWER OUTPUT ------- 6 Watt Undistorted at 6.3 Volts

Sensitivity ------- 0.8 Microvolts at 1 Watt Output (LD Switch in Distance Position.)

Selectivity ------- 43 KC Broad at 1000 times

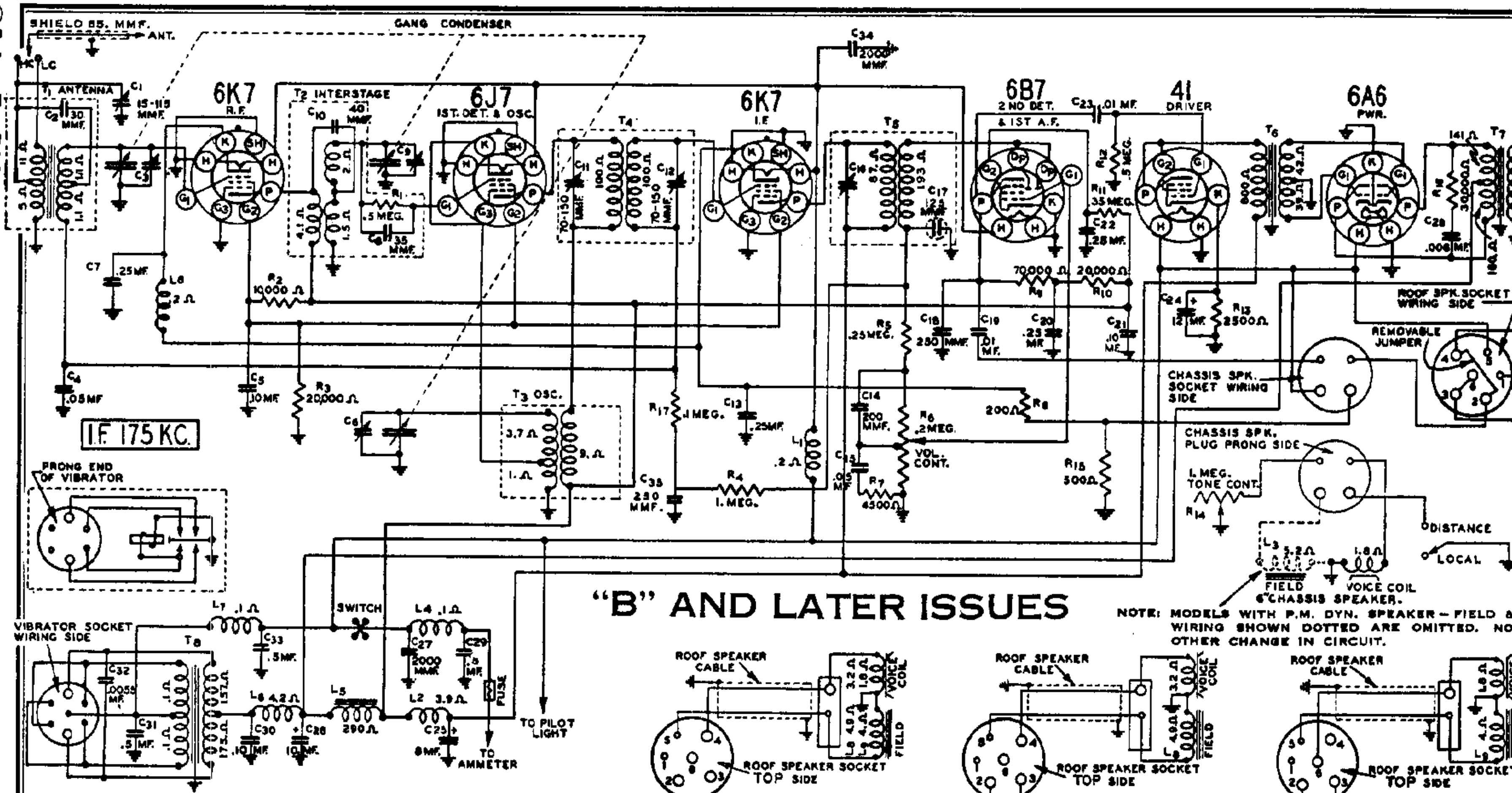
Series 6J

JAN.,1937

MODEL 6J Series
"B" & Later Issues

GAMBLE-SKOGMO, INC.

Schematic, Voltage
Sensitivity, Data



VOLTAGES AT SOCKETS ("B" AND LATER ISSUES)

Battery—6.3 Volts Under Load   L-D Switch in Distance Position

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground
6K7	R.F.	5.8	250	132	3.6
6J7	1st Det. and Osc.	5.8	250	132	0
6K7	I.F.	5.8	250	132	3.6
6B7	2nd Det. & 1st A.F.	5.8	45(1)	45(1)	0
41	2nd A.F.	6.0	240	240	26
6A6	Power	6.0	262		0

(1) As read with 1000 ohm per volt meter—500 volt scale.

POWER CONSUMPTION - 8.25 Amperes at 6.3 Volts
7 Amperes with P.M. Speaker

POWER OUTPUT ------ 6 Watt Undistorted at 6.3 Volts

Sensitivity ------- 0.8 Microvolts at 1 Watt Output (LD Switch in distance position.)

Selectivity ------- 43 KC Broad at 1000 times Signal

Series 6J

Jan., 1937

Coils, Socket
Trimmers, Data

GAMBLE-SKOGMO, INC.

MODEL 6J Series
All Issues

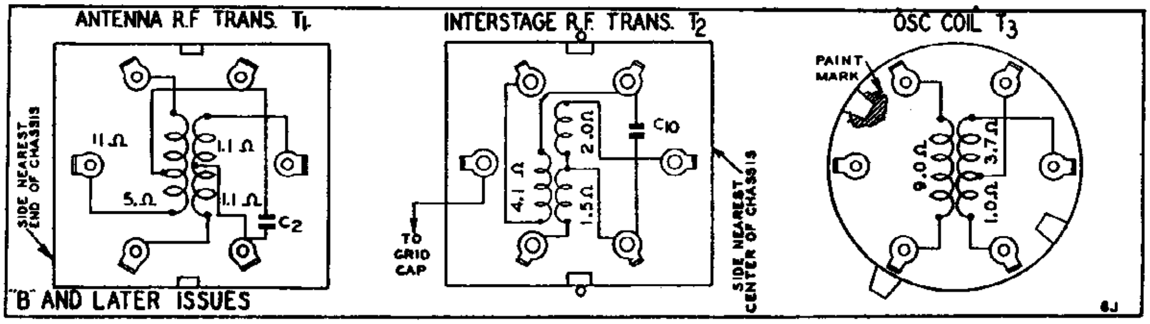


Fig. 4—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

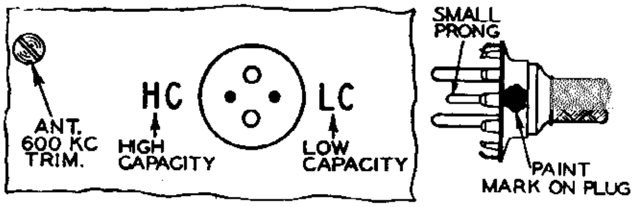


Fig. 5—Antenna Plug Insertion

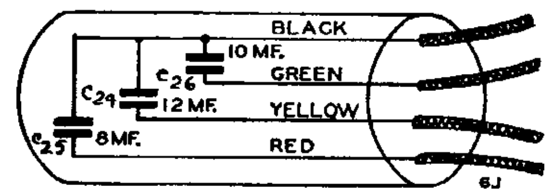


Fig. 6—Electrolytic Condenser Internal Connections

Instrument Panel Mounting Kits

Car	Year & Model	Kit No.
Buick	1937 40-60 Series	21A68
	1937 80-90 Series	21A69
	1936	21A16
Cadillac	1937	21A70
	1936	21A39
Chevrolet	1937 All Models	21A58
	1936-35 Standard & Master	21A11
Chrysler	1937 Royal	21A59
	1937 Imperial	21A71
	1937 Airflow	21A72
	1936 Six	21A19
	1936 Eight	21A30
	1936 Airflow	21A31
	1935-34 Except Imperial	21A47
DeSoto	1937	21A60
	1936 Airflow & Airstream Custom	21A22
	1936 Airstream DeLuxe	21A26
	1935 DeLuxe	21A46
	1934	21A47
Dodge	1937	21A61
	1936 DeLuxe	21A13
	1935	21A45
	1934	21A49

Car	Year & Model	Kit No.
Ford	1937 DeLuxe	21A74
	1937 Standard	21A73
	1936 Std. & DeLuxe	21A10
	1935 DeLuxe	
	1935 Standard	21A32
	1934	21A38
Graham	1937 Cavalier & Supercharger	21A87
	1937 Crusader	21A86
Hudson	1937	21A75
	1936	21A17
	1935	21A48
	1934	21A35
LaFayette	1936-35	21A50
LaSalle	1937	21A89
	1936	21A40
Lincoln	Zephyr 1937	21A76
	Zephyr 1936	21A10
Nash	1937 Ambassador	21A63
	1936-35	21A36
Nash Laf. 400	1937	21A62
Oldsmobile	1937	21A88
	1936	21A14
	1935	21A34

Car	Year & Model	Kit No.
Packard	1937 Six	21A56
	1937 120-C	21A57
	1937 Super 8 & 12	21A77
	1936 120-B	21A21
	1935 120	21A41
Plymouth	1937 DeLuxe	21A78
	1937 Standard	21A64
	1936 DeLuxe	21A12
	1936-35 Standard	21A37
	1935 DeLuxe	21A33
	1934	21A49
Pontiac	1937	21A79
	1936-35 Standard-DeLuxe 6 & 8	21A15
Studebaker	1937 Dictator Coupe	21A65
	1937 Dictator	21A54
	1937 President	21A55
	1936 Dictator	21A20
	1936 President	21A24
Terraplane	1937	21A80
	1936	21A18
	1935	21A48
	1934	21A35
Steering column and under panel kit.	Chromium	21A66
	Black	21A67

1934, 1935, 1936 and No. 21A67 Steering Column Kits..................... Net Price.... Ea. $0.60
1937 and No. 21A66 Steering Column Kits..................... Net Price.... Ea. .75

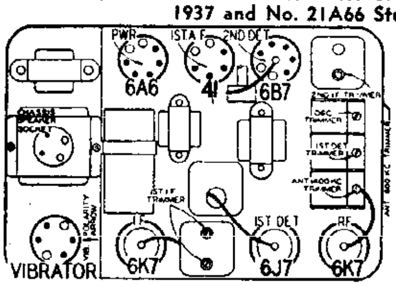


Fig. 3—Location of Tubes and Vibrator

Polarity in inserting the vibrator must be observed. It can be inserted in two ways, and the correct method depends on which terminal of the car storage battery is grounded. Full instructions are on the vibrator.

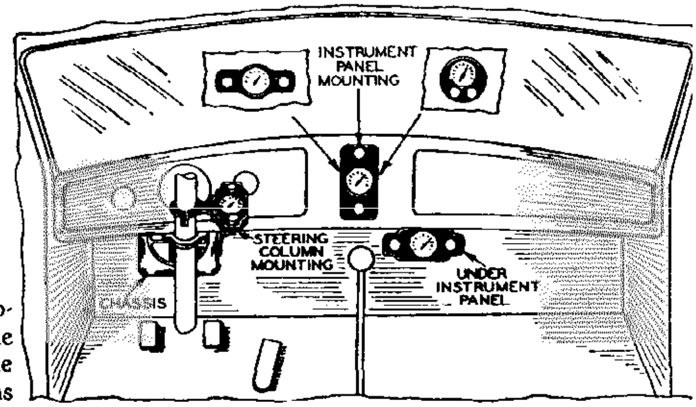


Fig. 7—Various Control Head Mountings

I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the output of the signal generator through a .05 mf. condenser to the stator of the 1st detector section of the tuning condenser. (See Fig. 3 for location of this section.)

Connect the ground lead of the signal generator to the chassis. The chassis should be in the case.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers is shown in Fig. 3.

1581 KC Adjustment

Set the signal generator for 1581 KC.

Turn the rotor of the tuning condenser to the full open position.

Insert the antenna plug with the mark on the high capacity (HC) side. Connect the shielded antenna lead from the chassis through a 120 mmf. condenser to the antenna post of the signal generator.

For this and all subsequent adjustments, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—see Fig. 3 for location of this trimmer.

1400 KC Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st detector and antenna 1400 KC trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Tune in this signal and adjust the 600 KC antenna trimmer to maximum. (See Fig. 5 for location of this trimmer).

After the alignment procedure is completed, the antenna plug may be withdrawn and reinserted on the LC side if a low capacity (70 mmf.) car antenna is used.

Adjusting Antenna 600 KC Trimmer

After the radio is installed and the car antenna is connected, it will be necessary to readjust the antenna trimmer. Tune in a weak signal at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained. See Fig. 5 for location of this trimmer.

Calibrating the Radio

To calibrate the radio, tune in a station of known frequency. At the back of the control head is the calibration screw. Remove the pilot lamp assembly. Hold the tuning knob. Insert a fine blade screwdriver and turn this screw until the pointer on the dial scale is at the frequency of the station being received

Inserting Antenna Plug

IMPORTANT—The antenna plug can be inserted in two ways depending on whether the antenna is of high or low capacity.

If the total capacity of the antenna and shielded lead is approximately 200 mmf., which would be the case in a running board or ordinary roof antenna (not metal roof), insert the antenna plug with the mark on the HC side—See Fig. 5.

If the total capacity of the antenna and shielded lead is approximately 70 mmf., such as may be the case if a "fish pole" antenna is used, insert the antenna plug with the mark on the LC side.

The 1936 Chrysler Motors cars (except Plymouth—but including Chrysler, Dodge and DeSoto) have a steel roof, separated from the body proper, which is used as an antenna. The capacity of these antennas is about 1500 mmf. If this radio is installed in these cars, it will be necessary to use a running board or "fish pole" antenna.

Most 1937 General Motors cars are equipped with an antenna built into the running board which is insulated from the body proper.

If a running board or under-car antenna is used, it must be one which is covered with a suitable insulation, to prevent short circuiting in wet weather.

Changes in Later Models

The "B" and later issues of this series have changes incorporated in them as explained in this article. The issue letter is a large letter stamped on the chassis base.

The "B" and later issue models are different from the "A" issue models in the following respects: The antenna, interstage and oscillator assemblies have been redesigned; condensers C13, 21, 22, and 32 have been changed to a different type with a new part number; the value of condenser C8 has been changed from 70 mmf. to 35 mmf.; condenser C35, 250 mmf., has been added to the circuit. On radios with the

Roof Speaker and Dual Speakers

(1936 Cars)

The Ford and General Motors 1936 automobiles have provision for mounting a speaker in the car roof (Ford 5¼ inch speaker, General Motors 5¼ or 8 inch speaker). This radio is so designed that roof speaker installations in these cars can readily be made.

Five types of speaker installations can be made as follows:

Single 6 inch Speaker on Chassis Case Cover
Single 5¼ inch Roof Speaker
Single 8 inch Roof Speaker
Dual 5¼ inch Roof and 6 inch Chassis Speakers
Dual 8 inch Roof and 6 inch Chassis Speakers.

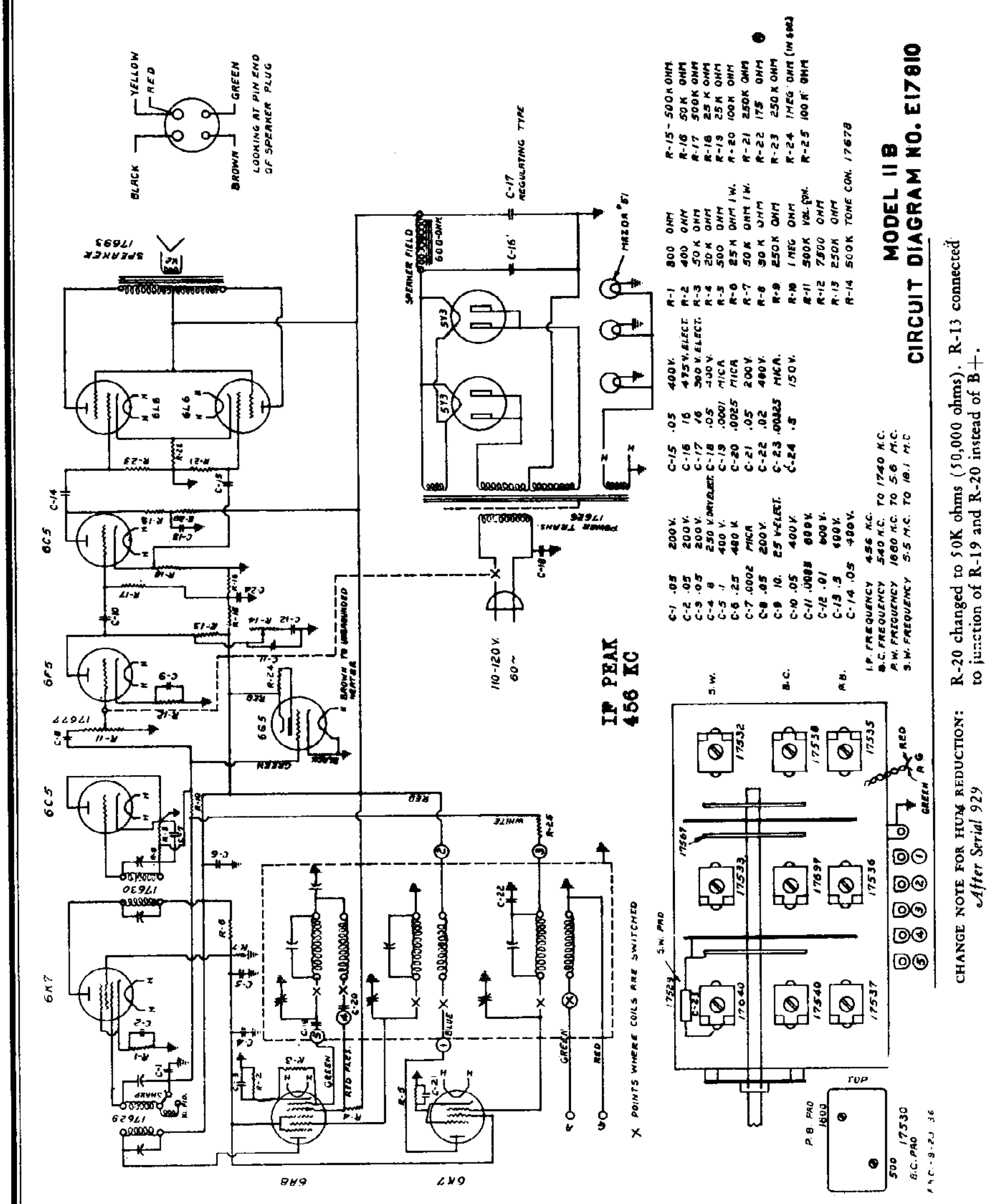
The electrical connections of the different speaker installations are shown in the schematics—Figs. 1 and 2.

Complete information regarding the method of making the installations is in the installation manual packed with each radio. The kits of parts required are listed in the installation manual and in the parts list at the back of this manual.

MODEL 11B
Schematic
Trimmers, Change

GAMBLE-SKOGMO, INC.

TUBE FUNCTIONS: 6-K-7 RF Stage on all bands, 6-A-8 Oscillator-First detector, 6-K-7 Intermediate amplifier, 6-C-5 Diode second detector, 6-F-5 first audio, 6-C-5 Phase inverter, 2 6-L-6 in push-pull class A Beam power amplifiers, 2 5-Y-3 as rectifiers, 6-G-5 Tuning indicator.



MODEL 11B
Alignment
Voltage, Data

GAMBLE-SKOGMO, INC.

II ALIGNMENT. If all parts and tubes check OK and sensitivity is low on all bands it is probably due to IF being out of adjustment. It is necessary to use a test oscillator or signal generator having accurate calibration and positive attenuation. Proceed as follows:

IF ALIGNMENT. Put wave switch in B. C. position, tone control in normal (not high fidelity), open tuning condenser, connect signal generator to Grid of 6-A-8 tube leaving present cap in place. A small condenser .002-.01 should be used in series with the signal generator lead. Set the signal generator at exactly 456 K. C. and adjust the trimmers in the top of the IF cans, going over them several times and reducing the output of the signal generator as the sensitivity increases, do not reduce by the volume control on the set. The 6-G-5 "Eye" may be watched to indicate "peak" or an output meter may be used, connected across the speaker.

HIGH FREQUENCY ALIGNMENT. This should not be changed unless all other possible defects are eliminated and the set still does not perform properly.

BROADCAST: Connect signal generator to Ant. post thru .0002 condenser. Trim oscillator at 1750 K. C. and pad at 535 K. C. See drawing on circuit diagram for location of trimmer and padding condensers. Trim B. C. Ant. and R. F. coils at 1400 K. C.

POLICE BAND. Trim oscillator at 5.6 M. C. and pad at 1.7 M. C. Trim Ant. and R. F. coils at 4.5 M. C.

SHORT WAVE. Use 400 ohms in series with the signal generator. Trim oscillator at 18 M. C. The pad is fixed so that the low frequency end point is approximately 5.5 M. C. Care should be taken to be sure that the oscillator is trimmed for reception of the fundamental frequency. With the tuning condenser set at the high frequency end, and the signal generator set at 18 M. C., two settings of the oscillator trimmer will be found to give response—one fairly tight and the other, loose—the loose one is the correct setting.

Trim the ant. and R. F. coils on 15 M. C., retuning the tuning condenser to compensate for reaction on the oscillator.

TUNING BELT SLIPPING: Usually due to:

1. Idler spring too loose.
2. Belt worn or stretched.
3. Condenser thrust bearing too tight or not lubricated.
4. Defective gear on condenser.

If the belt only slips slightly it can usually be remedied by applying a small amount of "belt dressing" such as used in machine shops, to the belt while the knob is turned through the entire range. Care should be used to not get too heavy a coating which will build up the pulleys. Idler spring tension may be increased by cutting off about one quarter inch of the spring and forming a new loop on the end. A worn or badly stretched belt should of course be replaced. A tight thrust bearing should be very carefully adjusted, usually one eighth turn to the left on the adjusting screw will be sufficient. A gear may stick due to dirt in the teeth, but if a tooth is damaged, the gear should be replaced, making sure that the floating gear is turned about two "teeth" against the spring to eliminate back lash.

REPLACING DIAL SCALE. Should the dial scale be broken in shipment, or for any reason need to be replaced, care should be taken to see that: the plate that holds the glass is not bent, that the glass lays "flat" on the plate, that there is clearance around the pointer shaft, and that rubber bands are in place on the hold down clamps.

Voltage Readings at 115 volt A. C. Line

ANTENNA OFF — NO SIGNAL

		Plate	*Screen*	*Cathode*	*Other*
6K7 RF		250	80	2	Fil. 6.1
6A8 OSC		250	80	2.2	Anode 170
6K7 IF		250	80	2	
6C5 Diode		0		0	
6F5 1st AF	250V. Scale	65		1	
6C5 Inverter	250V. Scale	110		30	
6L6 Power		245	250	16	
5Y3 Rect.		330AC			Fil. 4.9

Input to Speaker Field 340V.

All voltages read from ground except rect. fil. and taken with a 1000 ohm per volt meter. Voltages may vary plus or minus 10 due to tolerances in tubes, resistors, etc., without affecting performance.

GAMBLE-SKOGMO, INC.

Power Consumption - 170 Watts (At 115 volts 60 cycles)

Power Output - - - - - - 20 Watts Undistorted

Selectivity - 19 KC Broad at 1000 times Signal (Sharp)

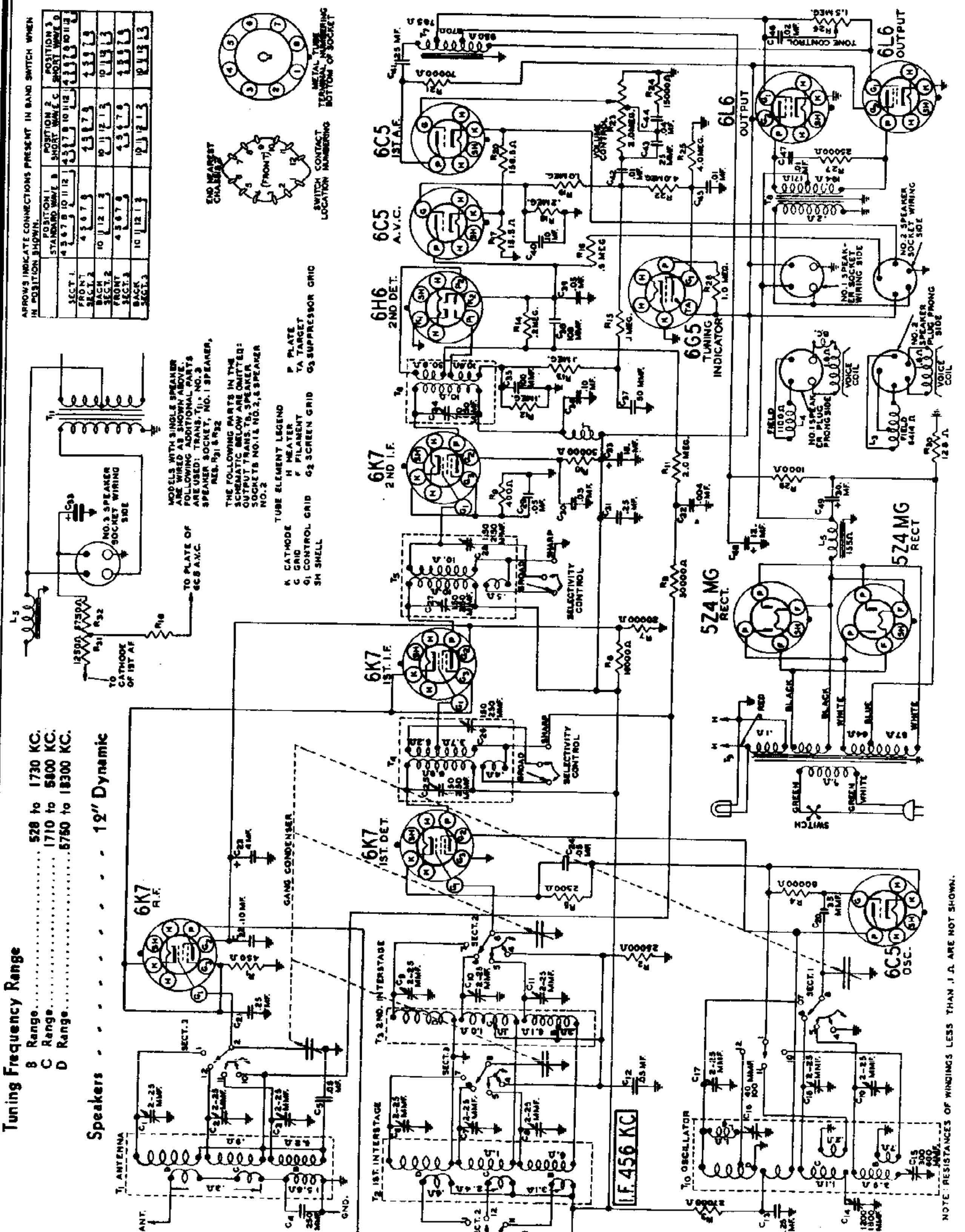
Intermediate Frequency - - - - - - - 456 KC.

Sensitivity

B Range....................1.0 Microvolt Absolute

C Range..............0.5 to 3 Microvolts Absolute

D Range..............1.0 to 5 Microvolts Absolute



MODEL 42DL670
Socket, Trimmers
Coils, Phono Data

GAMBLE-SKOGMO, INC.

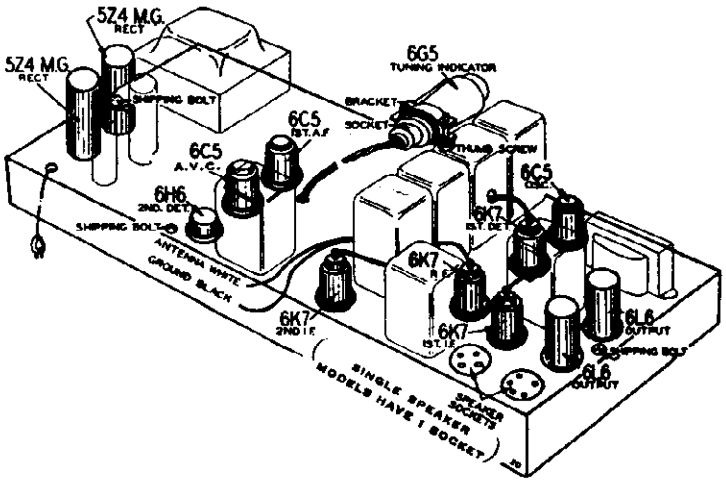


Fig. 5—Location of Tubes

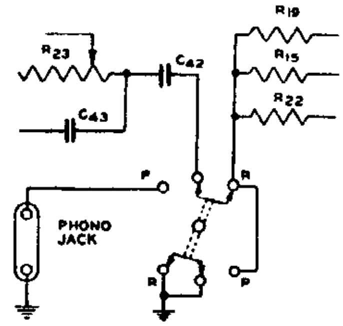


Fig. 7—Phonograph Connections

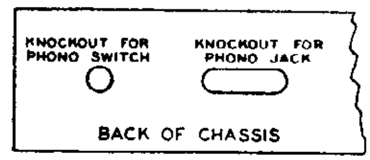
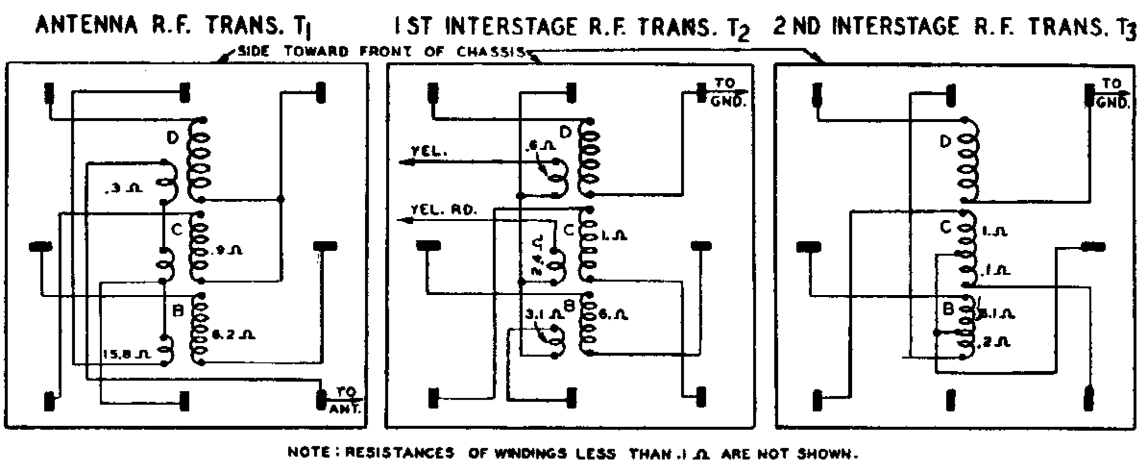


Fig. 8—Location of Phono Knockouts



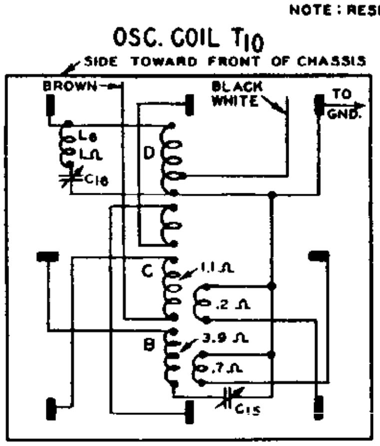


Fig. 6—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

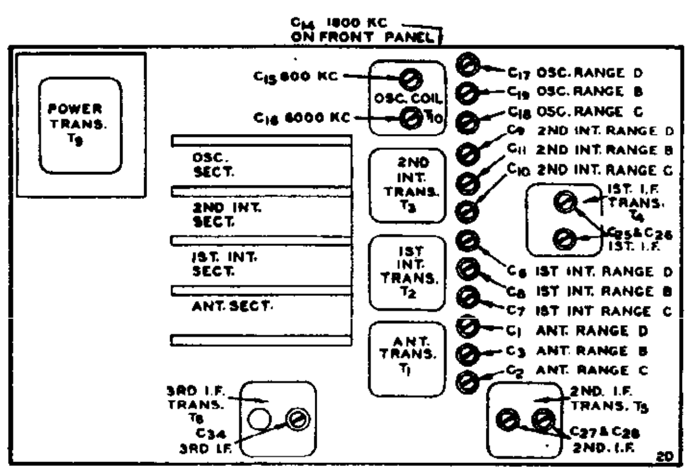


Fig. 3—Location of Trimmers

GAMBLE-SKOGMO, INC.

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C19) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

In sets using pointers, loosen the screw of the large pointer and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

In sets using the moving beam of light, there is moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until it is at the 1500 KC mark on the dial. Retighten the screw.

Adjust the 1st and 2nd interstage Range B trimmers (C8 and C11) and antenna Range B trimmer (C3) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C18) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range C trimmers (C7 and C10) and antenna Range C trimmer (C2) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 1800 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C17) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range D trimmers (C6 and C9) and antenna Range D trimmer (C1) to maximum.

When adjusting the 2nd interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Planetary Drive Assembly

The planetary assembly is the unit that is integral with the tuning shaft.

If the nut on the back end of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect.

If this nut is too loose, the drive will slip in slow speed. The remedy in this case, of course, is to tighten the nut.

Should the condenser drive cord slip when the planetary pulley is turning, inspect the tuning condenser, drive drum and gears to see if they are turning properly or if they are being obstructed in some way.

If the drive turns unevenly (rough in spots), this may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required as shown in the parts list. Knockouts are provided in the back of the chassis for mounting the phono jack and phono switch—See Fig. 8.

The phono switch should be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. This is done by removing the wire connecting condenser C42 to resistors R15, R19 and R22, at the terminal strip located near the back of the planetary drive. Cut this wire to correct length and solder it to the proper terminal on the phono switch—See Fig. 7, keeping the wire close to the back of the chassis base.

A wire is then connected from the lug on the above mentioned terminal strip to which C42 was connected, to the correct terminal on the phono switch—See Fig. 7. This wire should be brought directly to the back of the chassis at a point close to the phono jack pin tip nearest the channel provided for a chassis mounting bolt, and then routed over to the switch.

Complete the other connections as illustrated in Fig. 7.

It will be necessary to re-route the AC line cord away from the 6C5 1st audio grid lead by running it between the volume control and the filter choke and then straight back to the hole provided for it in the chassis base.

If a hum is heard when the phono pickup is touched, reverse the two pickup leads.

Twenty-five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Line Voltage: 115 — Volume Control: Maximum
Antenna Shorted to Ground — Position of Band Switch: Standard Wave

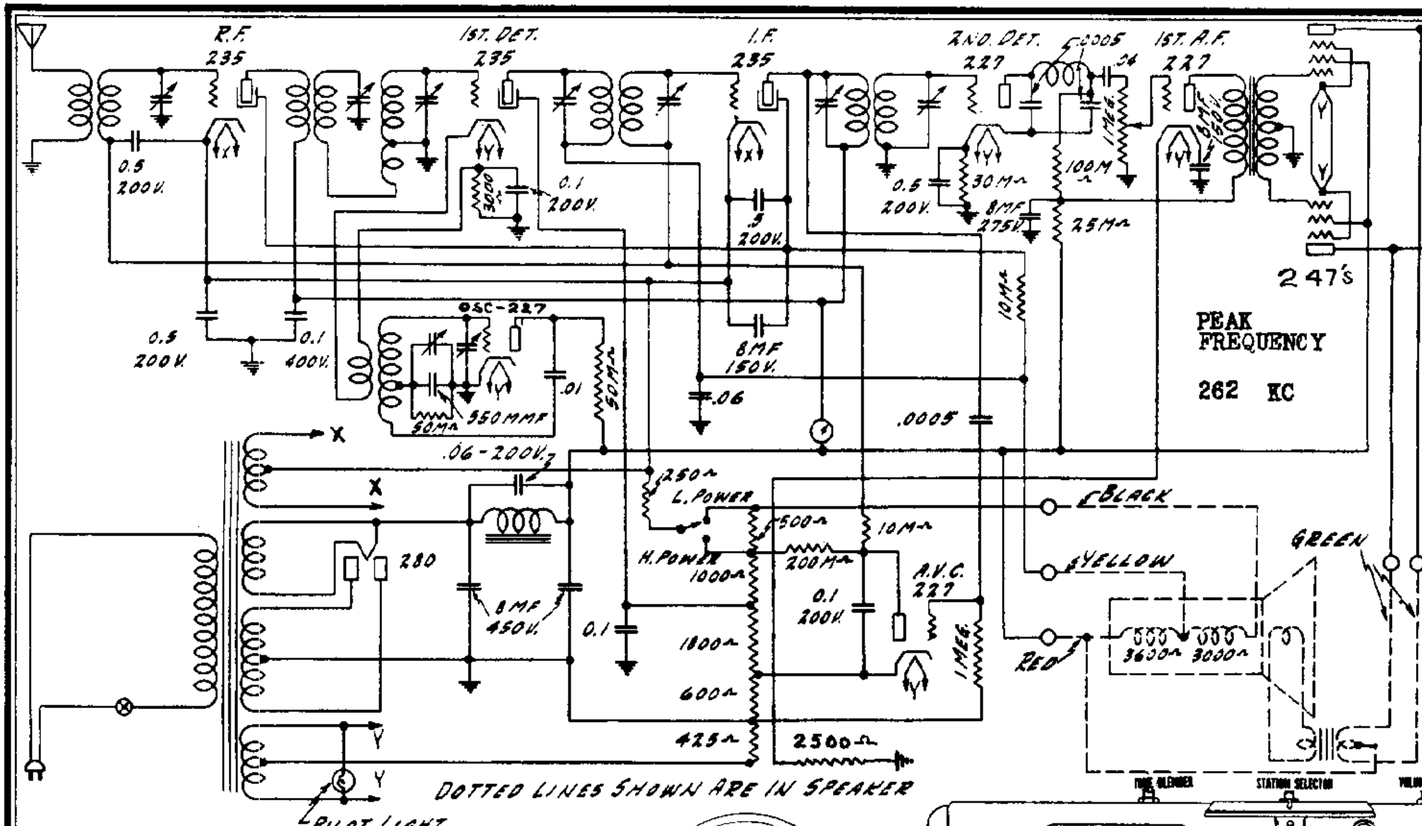
TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	R.F.	0	6.2(1)	250	110	7.5(2)		6.2(1)	7.5(2)
6K7	1st Det.	0	6.2(1)	250	110			6.2(1)	9.0
6C5	Osc.	0	6.2(1)	110				6.2(1)	
6K7	1st I.F.	0	6.2(1)	250	110	7.5		6.2(1)	7.5(2)
6K7	2nd I.F.	0	6.2(1)	250	145	5(2)		6.2(1)	5.0
6H6	2nd Det.	0	6.2(1)					6.2(1)	
6C5	A.V.C.	0	6.2(1)	5(3)	-			6.2(1)	6.5
6C5	1st A.F.	0	6.2(1)	130				6.2(1)	6.0
6L6	Power	0	6.2(1)	250	250	20(4)		6.2(1)	
5Z4MG	Rectifier	0	5.0(5)		1020(6)		1020(6)		5.0(5)
6G5	Tuning Indicator	Plate to Ground 25(3)		Target to Ground 250		Cathode to Ground 0		Across Heater 6.3 A.C.	

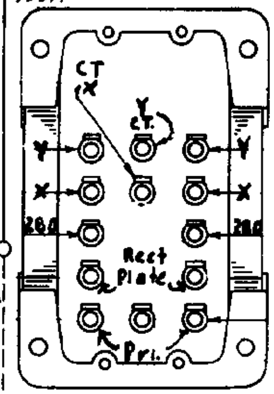
(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Subject to variation.
(3) As read with 500,000 ohm meter.
(4) As read across R-30.
(5) A.C. voltage as read across heater terminals 2 and 8.
(6) A.C. voltage as read across terminals 4 and 6.

MODEL 70
Schematic, Voltage
Socket, Alignment
Chassis

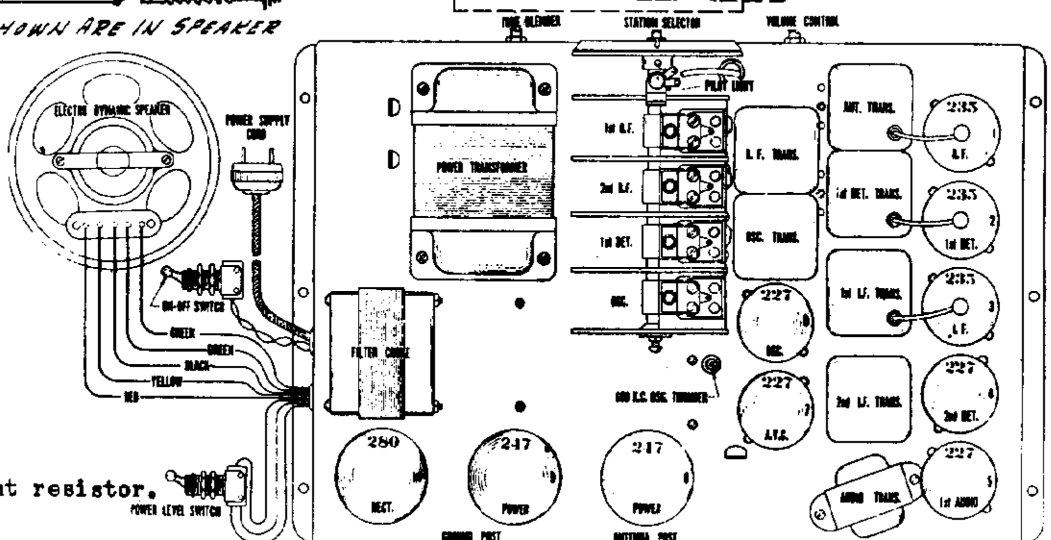
GAMBLE-SKOGMO, INC.

CONVENTIONAL ALIGNMENT- SEE SPECIAL SECTION.





Power Transformer
Terminals



Tube	A Volts	B Volts	C Volts	Scr. Volts	Plt. Crnt.
RF	2.3	175.	2.3[1]	65	4.0
1st Det	2.3	185.	7.0	69	2.0
IF	2.3	175	2.3[1]	65	4.0
2nd Det	2.3	115	12.		.4
1st AF	2.3	145	11.[2]		4.6
Osc.	2.3	83	15-35[3]		4.2
AVC	2.3	89[4]	20.[5]		0.
Power	2.35	255	18.5	265	21.
Power	2.35	255	18.5	265	21.
Rect.	4.9				45.[6]

1 Across 250 ohm series resistor
2 Across 2500 ohm series resistor
3 Governed by setting of tuning condenser
4 Across 1000 and 1800 ohm sections of shunt resistor.
5 Across 600 ohm section of shunt resistor
6 Per Anode.

MODEL 46L
Schematic
Coils, Data

GAMBLE-SKOGMO, INC.

Power Consumption - - 7.0 Amperes at 6.0 Volts
Power Output - - - - - - 3 Watts Undistorted
Sensitivity - - - - - 1.0 Microvolt Absolute
Selectivity - - 45 KC Broad at 1000 Times Signal

Tuning Frequency Range - - - 530 to 1575 KC
Intermediate Frequency - - - - - - - 175 KC
Speaker - - - - - - - 5¼ inch Dynamic

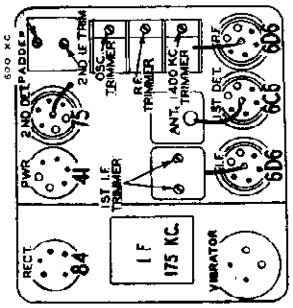


Fig. 2—Location of Tubes and Vibrator

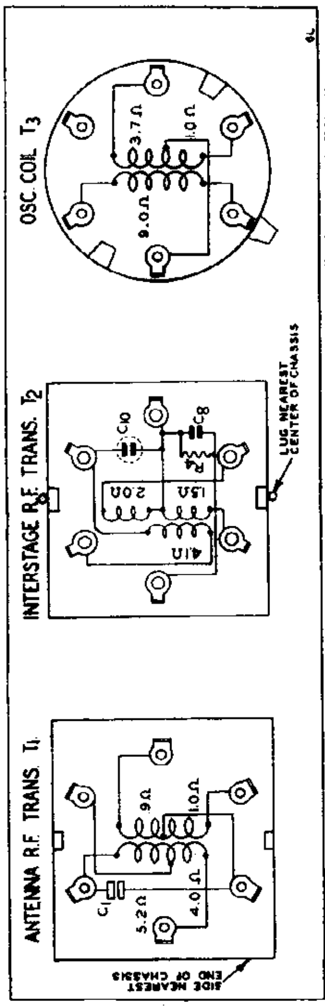


Fig. 4—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

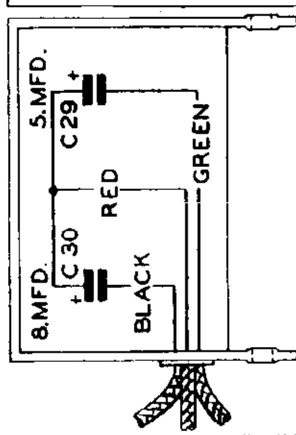
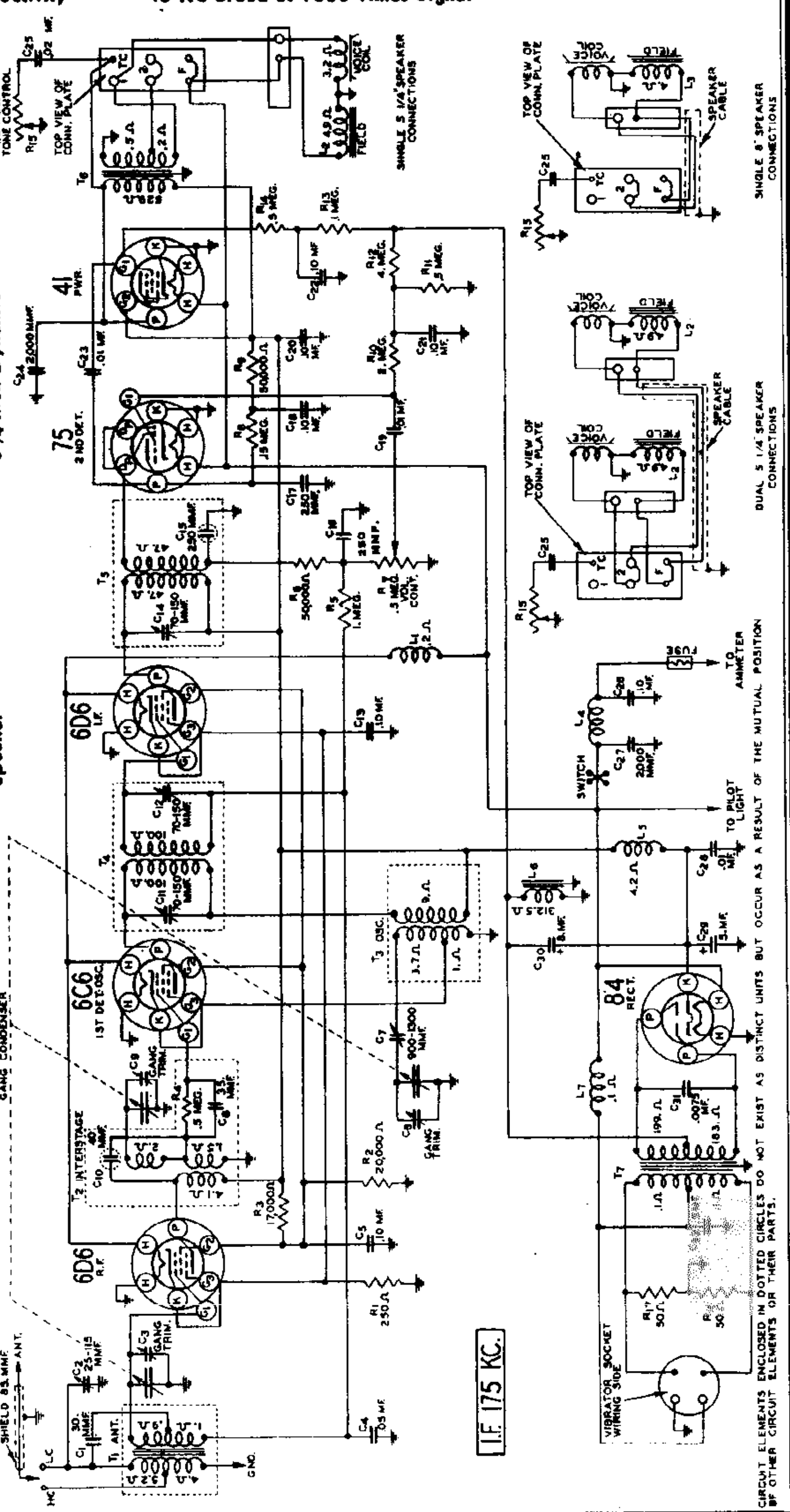


Fig. 5—Condenser Block—Internal Wiring



MODEL 46L
Alignment
Voltage, Parts

GAMBLE-SKOGMO, INC.

6 Tube Automobile Radio

June 1936

I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the output of the signal generator through a .05 mf. condenser to the stator of the R. F. interstage section of the tuning condenser. (See Fig. 2 for location of this section.)

Connect the ground lead of the signal generator to the chassis ground.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers is shown in Fig. 2.

1575 KC Adjustment

Set the signal generator for 1575 KC.

Turn the rotor of the tuning condenser to the full open position.

If a low capacity antenna is used, connect the shielded antenna lead from the chassis through a 150 mmf. condenser to the antenna post of the signal generator. (If high capacity, use 1500 mmf.)

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—see Fig. 2 for location of this trimmer.

1400 KC Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the R.F. interstage and antenna 1400 KC trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Connect the output of the signal generator through a .05 mf. condenser to the control grid of the 6D6 R.F. tube.

Turn the tuning condenser rotor until maximum output is obtained. Then turn the tuning condenser rotor back and forth, at the same time adjusting the 600 KC padder (see Fig. 2) until the peak of greatest intensity is obtained.

Re-connect the output of the signal generator to the shielded antenna lead.

Adjust the 600 KC antenna trimmer to maximum. This trimmer is reached from the outside of the case—see Fig. 3.

Adjusting Antenna 600 KC Trimmer

After the receiver is installed and the car antenna is connected, it will be necessary to adjust the antenna trimmer. Tune in a weak signal at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained. See Fig. 3 for location of this trimmer.

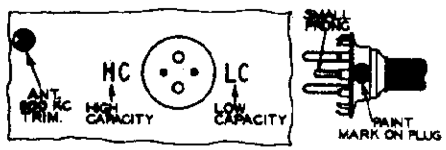


Fig. 3—Antenna Plug Insertion

Antenna Disconnected	Battery 6 Volts Under Load				
Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground
6D6	R.F.	6	233	103	4.0
6C6	1st Det. & Osc.	6	233	103	
6D6	I.F.	6	233	103	4.0
75	2nd Det.	6	130		
41	Power	6	215	233	16.0(1)
84	Rectifier	6	560(2)		

(1) Grid bias read across filter choke L6
(2) Plate to Plate A.C. voltage

Calibrating the Receiver

To calibrate the receiver, tune in a station of known frequency. At the back of the control head is the calibration screw. Remove the pilot lamp assembly. Insert a fine blade screwdriver and turn this screw until the pointer on the dial scale is at the frequency of the station being received. The knob must be held during this adjustment.

If the control head is inaccessible it may be calibrated by setting the pointer from the front. Remove the crystal by inserting a knife blade under the lower edge. Loosen the pointer screw, set the pointer and retighten.

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
P-A94251	R1	250 Ohms	0.2	$0.15
P-B94203	R2	20,000 Ohms	0.5	.15
P-C94173	R3	17,000 Ohms	1.0	.15
P-A94504	R4	500,000 Ohms	0.2	.15
P-A95105	R5	1 Megohm	0.2	.10
P-A95503	R6	50,000 Ohms	0.2	.10
P-A95154	R8	150,000 Ohms	0.2	.10
P-A95503	R9	50,000 Ohms	0.2	.10
P-A95205	R10	2 Megohms	0.2	.10
P-A94504	R11	500,000 Ohms	0.2	.15
P-A94405	R12	4 Megohms	0.2	.15
P-A94104	R13	100,000 Ohms	0.2	.15
P-A95504	R14	500,000 Ohms	0.2	.10
P-B94500	R16	50 Ohms	0.5	.15
P-B94500	R17	50 Ohms	0.5	.15

VARIABLE

Part No.	Code	Description	List Price
P-36X216	R7	.5 Megohm Vol. Control and Switch	$0.95
P-40X207	R15	.15 Megohm Tone Control	.70

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
P-46X80	C4	.05 mf.	180	$0.15
P-46X98	C5	.10 mf.	180	.20
P-46X98	C13	.10 mf.	180	.20
P-46X105	C18	.10 mf.	360	.20
P-46X130	C19	.01 mf.	360	.15
P-46X105	C20	.10 mf.	360	.20
P-49X4	C21	.10 mf.	180	.35
	C22	.10 mf.	180	.35
P-46X130	C23	.01 mf.	360	.15
P-46X190	C25	.02 mf.	600	.15
P-46X98	C26	.10 mf.	180	.20
P-46X130	C28	.01 mf.	360	.15
P-46X177	C31	.0075 mf.	1600	.20
P-46X185	C32	.50 mf.	180	.40

ELECTROLYTIC

Part No.	Code	Description	List Price
P-45X210	C29 / C30	5.0 mf. / 8.0 mf. Electrolytic Block	$1.70

MOULDED

Part No.	Code	Capacitance	List Price
P-47X66	C1	30 mmf.	$0.15
P-47X53	C8	35 mmf.	.10
P-47X52	C16	250 mmf.	.15
P-47X52	C17	250 mmf.	.15
P-47X41	C24	2000 mmf.	.20
P-47X41	C27	2000 mmf.	.20

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
P-9A561	T1	Antenna Transformer and Can Assembly	$1.65
P-9A562	T2	Interstage Transformer and Can Assembly	1.55
P-9A563	T3	Oscillator Coil and Can Assembly	.80
P-9A564	T4	1st I.F. Transformer and Can Assembly	1.45
P-9A565	T5	2nd I.F. Transformer and Can Assembly	1.80
P-51X42	T6	Output Transformer	1.10
P-53X123	T7	Power Transformer	2.95
P-9A568	L1 / L5	Filament Reactor / R.F. "B" Plate Reactor — One Assembly	.35
P-9A566	L4	Motor Noise Reactor	.25
P-52X42	L6	Filter Choke	.90
P-9A567	L7	Vibrator Reactor	.50

TRIMMER

Part No.	Code	Description	List Price
P-17A48	C2	25-115 mmf. Antenna 600 KC Trimmer	$0.20
	C3	Antenna Trimmer—Part of Gang Condenser	
	C6	Oscillator Trimmer—Part of Gang Condenser	
	C9	Interstage Trimmer—Part of Gang Condenser	
P-17A33	C11 / C12	70-150 mmf. / 70-150 mmf. 1st I.F. Trimmers	.40
P-17A46	C14 / C7	70-150 mmf. 2nd I.F. Primary Trimmer / 900-1700 mmf. 600 KC Oscil. Pad. Cond.	.55

MISCELLANEOUS

Part No.	Code	Description	List Price
	C10	40 mmf. Integral Part of Interstage Transformer Assembly	
	C15	250 mmf. Integral Part of 2nd I.F. Transformer	
P-14A51		Three Section Gang Condenser Assembly Complete with Drive Gears	4.50

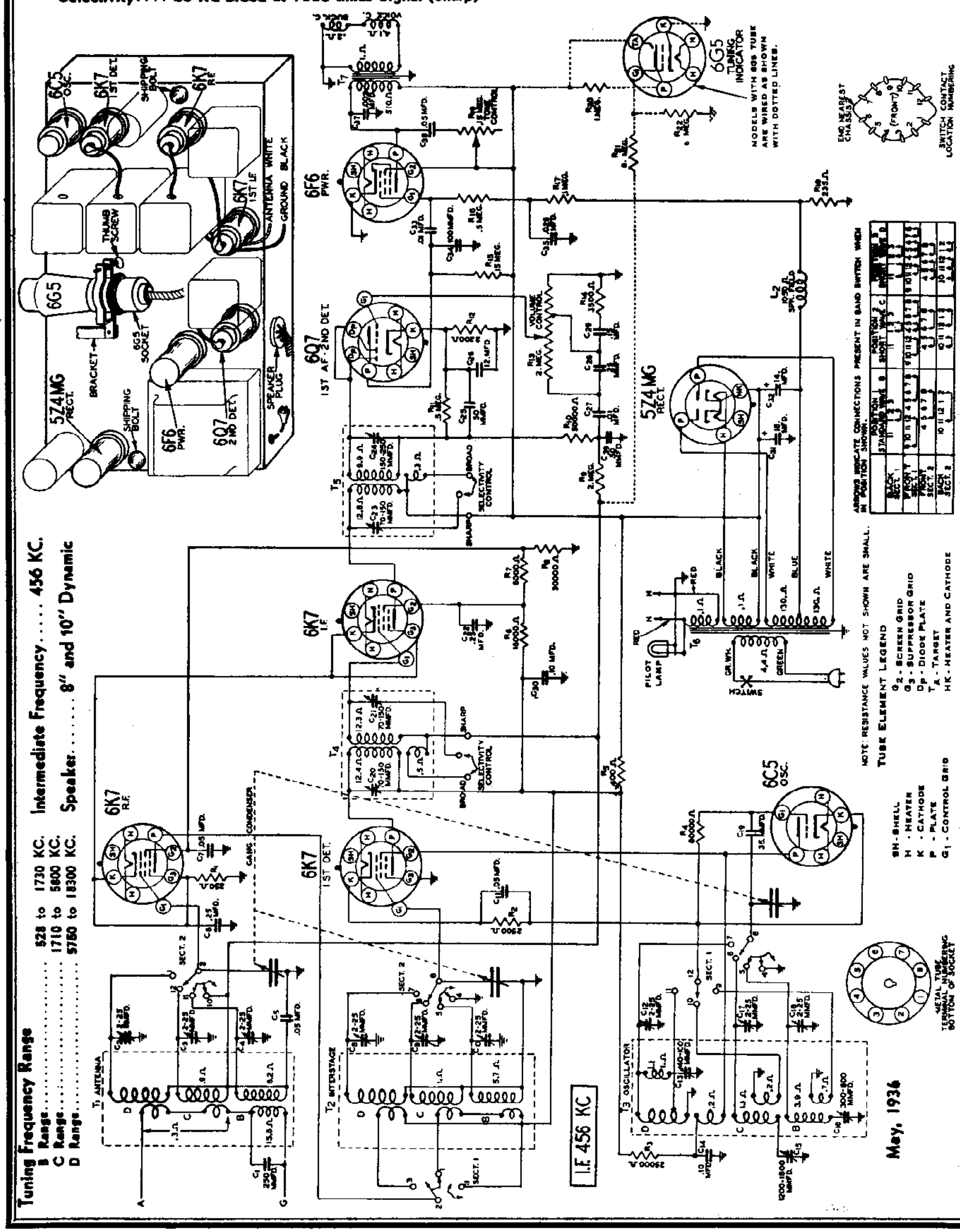
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL 47LL
Schematic, Socket
Data

GAMBLE-SKOGMO, INC.

Power Consumption . . 85 Watts (At 115 volts 60 cycles)
Power Output . . . . 3 Watts Undistorted
Selectivity . . . . 28 KC Broad at 1000 times Signal (Sharp)

Sensitivity
B Range . . . . 0.5 to 2 Microvolts Absolute
C Range . . . . 0.5 to 2 Microvolts Absolute
D Range . . . . 1.0 to 4 Microvolts Absolute



MODEL 47LL
Alignment, Trimmers
Voltage, Coils
Phono Connections

GAMBLE-SKOGMO, INC.

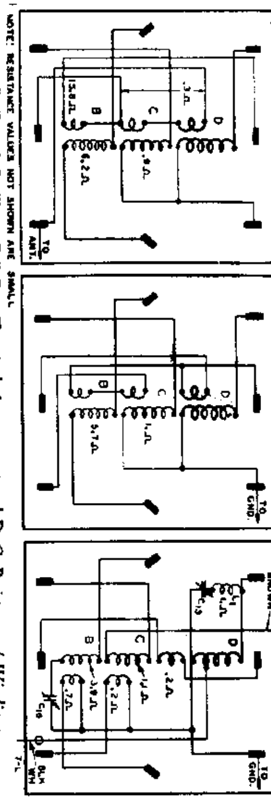


Fig. 4—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Twenty-five Cycle Receivers

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and *all* subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C18) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C10) and antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 600 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band).

Adjust the oscillator Range C trimmer (C17) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C9) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 1800 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band).

Adjust the oscillator Range D trimmer (C12) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C8) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

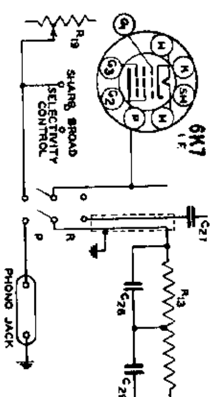


Fig. 7—Phonograph Connections

Voltage Chart

Line Voltage: 115
Volume Control: Maximum

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
		VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
6K7	RF	0	6.1(1)	260	100	4.0	....	6.1(1)	4.0
6K7	1st Det.	0	6.1(1)	260	118	0	....	6.1(1)	9.0
6C5	Osc.	0	6.1(1)	120	...	0	....	6.1(1)	0
6K7	I F.	0	6.1(1)	260	138	4.0	....	6.1(1)	4.0
6Q7	1st A.F.—2nd Det.	0	6.1(1)	105	0	0	....	6.1(1)	1.4
6F6	Power Amp.	0	6.1(1)	238	260	18	....	6.1(1)	0
5Z4MG	Rect.	0	4.9(2)	...	680(3)	...	680(3)	....	4.9(2)
6E5	Tuning Indicator	Plate to Ground 30(4)		Target to Ground 270		Cathode to Ground 0		Across Heater 6.1 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) A.C. voltage as read across heater terminals 2 and 8.
(3) A.C. voltage as read across terminals 4 and 6.
(4) As read with 500,000 ohm meter.

TOP VIEW OF CHASSIS

Alignment parts locations

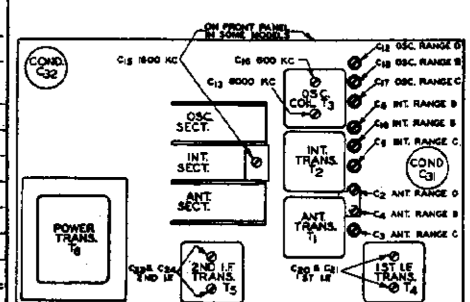
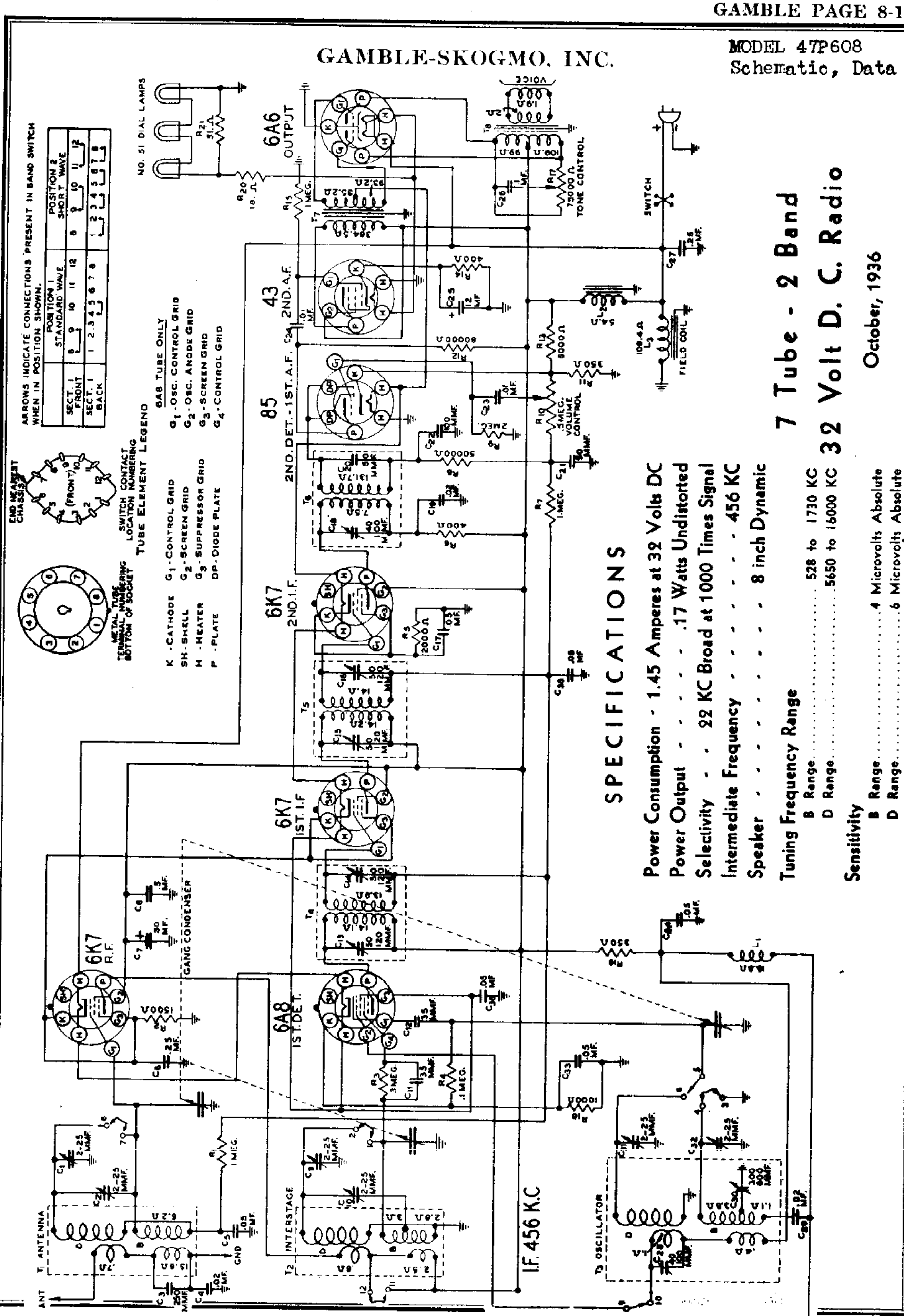


Fig. 3—Location of Trimmers

GAMBLE-SKOGMO, INC.

MODEL 47P608
Schematic, Data



SPECIFICATIONS

Power Consumption - 1.45 Amperes at 32 Volts DC
Power Output - - - - .17 Watts Undistorted
Selectivity - - 22 KC Broad at 1000 Times Signal
Intermediate Frequency - - - - 456 KC
Speaker - - - - - - 8 inch Dynamic

Tuning Frequency Range
B Range .... 528 to 1730 KC
D Range .... 5650 to 16000 KC

Sensitivity
B Range .... 4 Microvolts Absolute
D Range .... 6 Microvolts Absolute

7 Tube - 2 Band
32 Volt D. C. Radio

October, 1936

MODEL 47P608
Voltage,Trimmers
Socket,Coils
Data

GAMBLE-SKOGMO, INC.

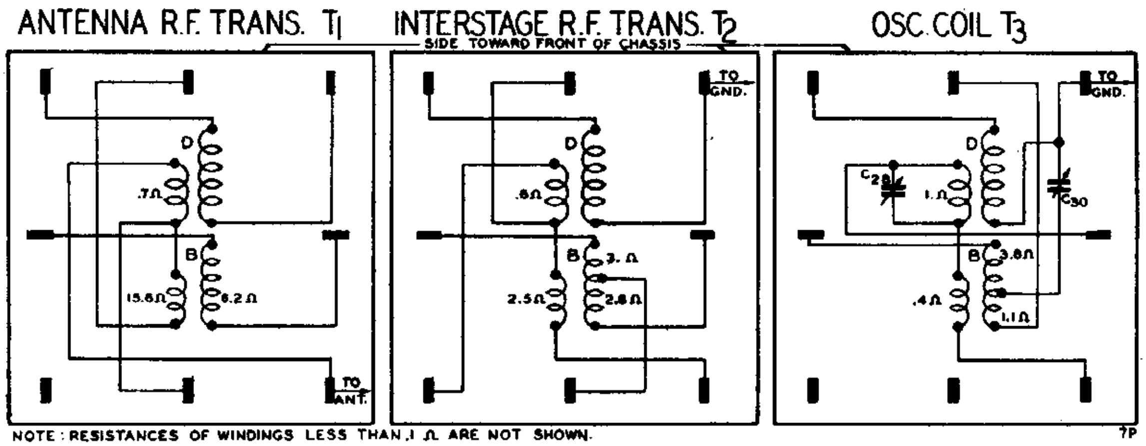


Fig. 4—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

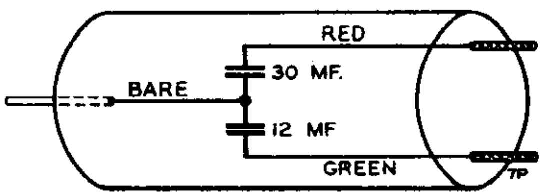


Fig. 5—Electrolytic Condenser Internal Connections

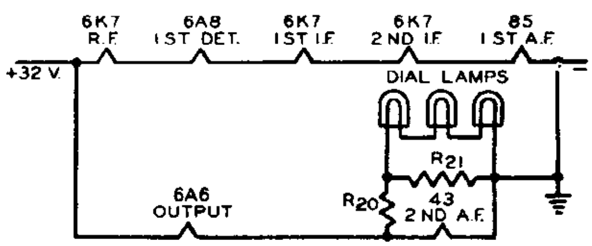


Fig. 7—Abridged Wiring Diagram Showing Tube Heater and Dial Lamp Wiring System

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground

Line Voltage: 32

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Cathode to Ground
6K7	R.F.	6.3 (1)	31	31	3.2
6A8	1st Det. and Osc.	6.3 (1)	31 31 (2)	20	1.25
6K7	1st I.F.	6.3 (1)	31	31	3.2
6K7	2nd I.F.	6.3 (1)	31	31	3.0
85	2nd Det. and 1st A.F.	6.3 (1)	10		1.5
43	2nd A.F.	26.0 (1)	28.2	31	3.2
6A6	Output	6.0 (1)	31		6.4 (3)

(1) Subject to Variation
(2) Anode Grid to Ground
(3) Center Tap of Output Transformer to Ground

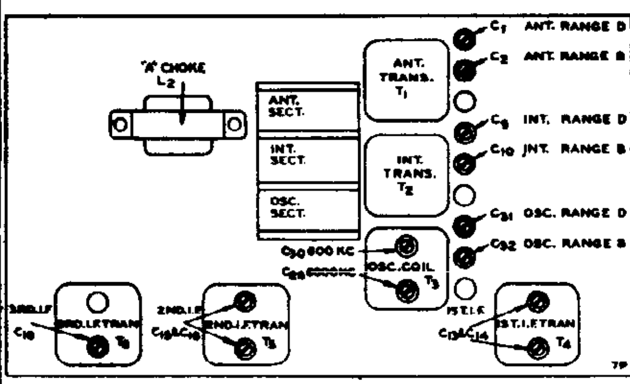


Fig. 3—Location of Trimmers

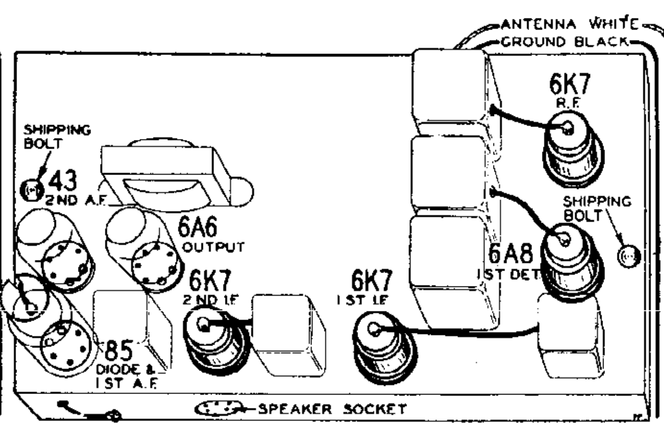


Fig. 6—Tube Arrangement

GAMBLE-SKOGMO, INC.

MODEL 47P608
Alignment
Power Supply Notes
Notes

7 TUBE - 2 BAND   32 VOLT D.C. RADIO   OCTOBER 1936

ALIGMENT & NOTES

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector (G_4).

Connect the ground lead of the radio to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the radio through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C32) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

Adjust the interstage Range B trimmer (C10) and antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer (C30) until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC or 14,088 KC. It may be necessary to increase the input signal to hear the image.

16,000 KC Adjustment

Set the signal generator for 16,000 KC.

Connect the antenna lead of the radio through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (short wave band).

Adjust the oscillator Range D trimmer (C31) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C1) to maximum. When adjusting these trimmers, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC (C28) trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Antenna and Ground

Run the antenna at right angles to any 32 volt lines and keep it as far away from these lines as possible, in order to avoid line noise being carried into the radio via the antenna.

A ground connection may be obtained by connecting to a water pipe, a pipe driven in the ground, or the metal jacket of a water pump. *Do not ground the receiver to the 32 volt system conduit or fittings at any point.*

CAUTION—Read the Following

To avoid the danger of damage to the radio and accidental short circuit, the following facts should be understood.

The metal chassis is connected to one side of the line—See Fig. 2. 32 volt lines are generally grounded on one side — either side may be used. If the side of the line, not connected to the metal chassis, is grounded and the metal chassis comes in contact with the external ground, the line will be short circuited and an excessive current may result.

In any service work, therefore, on this chassis keep it on a wood or other insulated surface. Disconnect the antenna and ground leads to avoid the possibility of any external ground contacts with the chassis. The person working on the set should avoid coming in contact with any ground.

32 Volt Power Supply

Polarity of Power Supply

There is a red mark on the plug at the end of the power supply cord of the radio. The prong of the plug at which the red mark is placed must be plugged into the positive side of the line.

Use a receptacle on the 32 volt line from which the plug will not have to be removed after it has once been inserted correctly.

If the polarity of the line is not known, that is, if it is not known which side of the line is positive, a meter may be used to indicate the polarity. A voltmeter of 50 volt range or up is used. Connect the meter across the line. If the pointer deflects correctly, then the positive post of the meter is connected to the positive side of the line.

If the polarity of the line is not known and there is no way of determining it, insert the power supply plug, turn on the set, advance the volume control and proceed to tune the radio. If no sounds are heard from the speaker after the plug has been in two minutes, withdraw the plug, turn it around and re-insert it. This time sounds should be heard after the tubes have been heated.

Caution

If used on any other type of power supply than 32 volt DC, severe damage may be done to the receiver.

Do not turn the radio on unless all of the tubes and the dial lamps are in the proper sockets. Use only No. 51 bayonet pin base lamps.

Do not leave the plug inserted for more than five minutes if it is found that the radio does not operate.

Line Voltage Range

The radio will operate satisfactorily within a line voltage range of 25 to 42 volts.

Series Resistor

If the line voltage is higher than 42, it will be necessary to use a series resistor to cut it down. If the voltage varies, a variable resistor may be required.

Starting Current

When first turned on, the drain for a few seconds is slightly higher than normal until the tubes heat up. Some automatic plants are adjusted to start under a load of 200 to 300 watts. If a number of devices such as lights or motors are being used and the radio set is turned on the total drain may be sufficient to start the plant.

Eliminating Ignition and Generator Noise

After the radio is in working order, the following procedure must be followed in practically all cases to eliminate ignition and generator noise caused by the charging plant. If the charging plant causes no noise, then of course, these steps do not have to be taken.

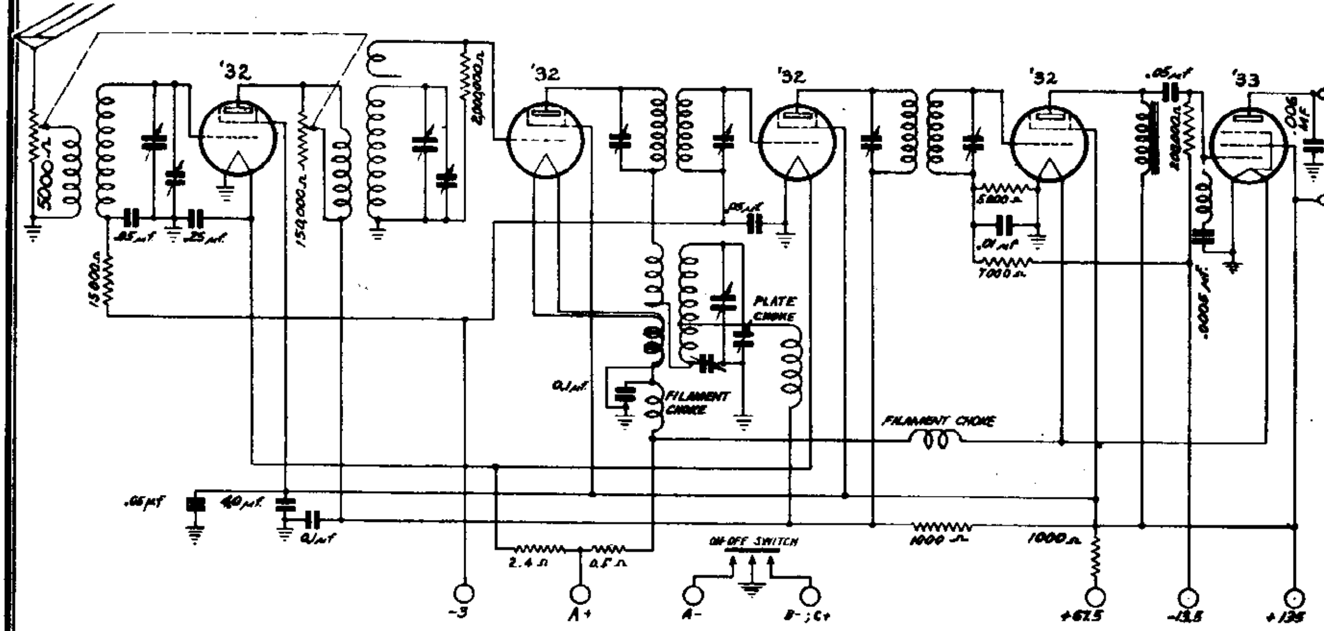
One spark plug suppressor must be placed on each spark plug of the engine. One spark plug for example would be required on a one-cylinder engine and four must be used on a four-cylinder engine. To connect the spark plug suppressor, remove the wire from the top of the plug, put the suppressor on and attach the wire to the other end of the suppressor.

A generator condenser must be used. This consists of two .5 mf. sections in one unit. The two sections have one side grounded to the metal case of the condenser. Mount the condenser on the frame of the charging plant. This will ground it. Then connect the two leads to the charging switch, one on each side of the line.

In some large installations, where the charging unit is on only two or three times a week, the above steps do not have to be taken as interference is caused only when the generating plant is in operation.

MODEL 90
Schematic
Socket, Notes

GAMBLE-SKOGMO, INC.



CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION

IF PEAK 175 KC

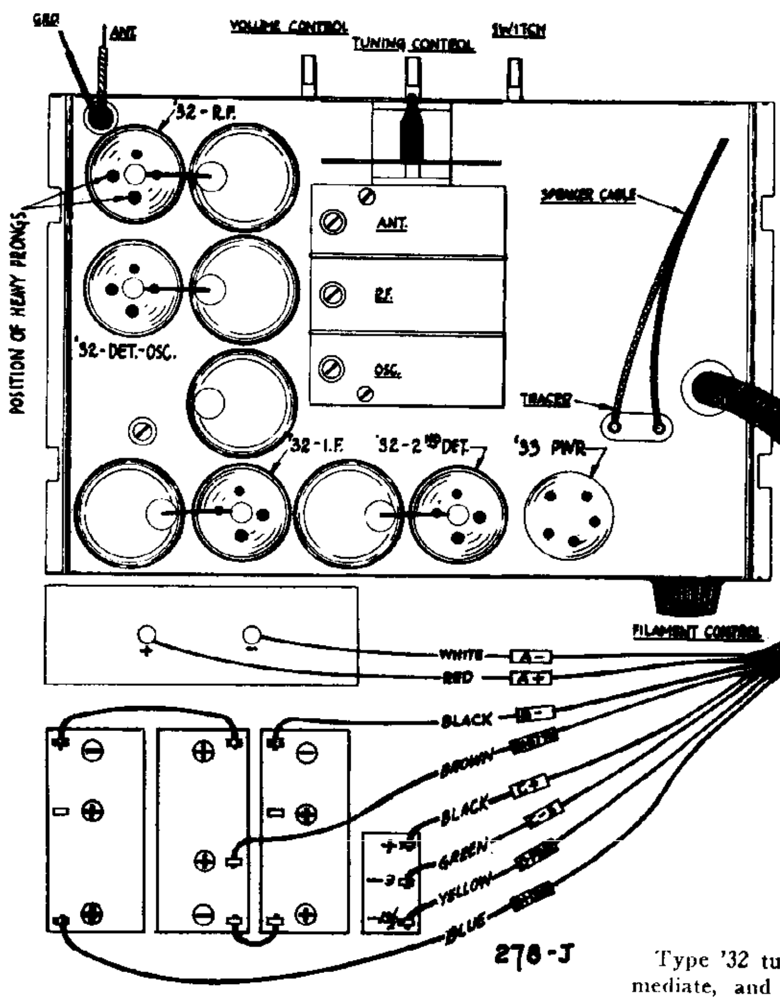


Figure 2. Top View of. Chassis

Circuit

This chassis has one stage of radio frequency amplification, a combined detector and oscillator, one stage of intermediate frequency amplification, a second detector, and one stage of audio frequency amplification. The intermediate stage operates at a frequency of 175 K.C. All stages are transformer coupled with the exception of the audio stage which is coupled to the detector by a choke, condenser and resistor network.

The plate choke in the oscillator circuit has been substituted for the 15,000 ohm resistor to allow wider limits on the tube used in this circuit.

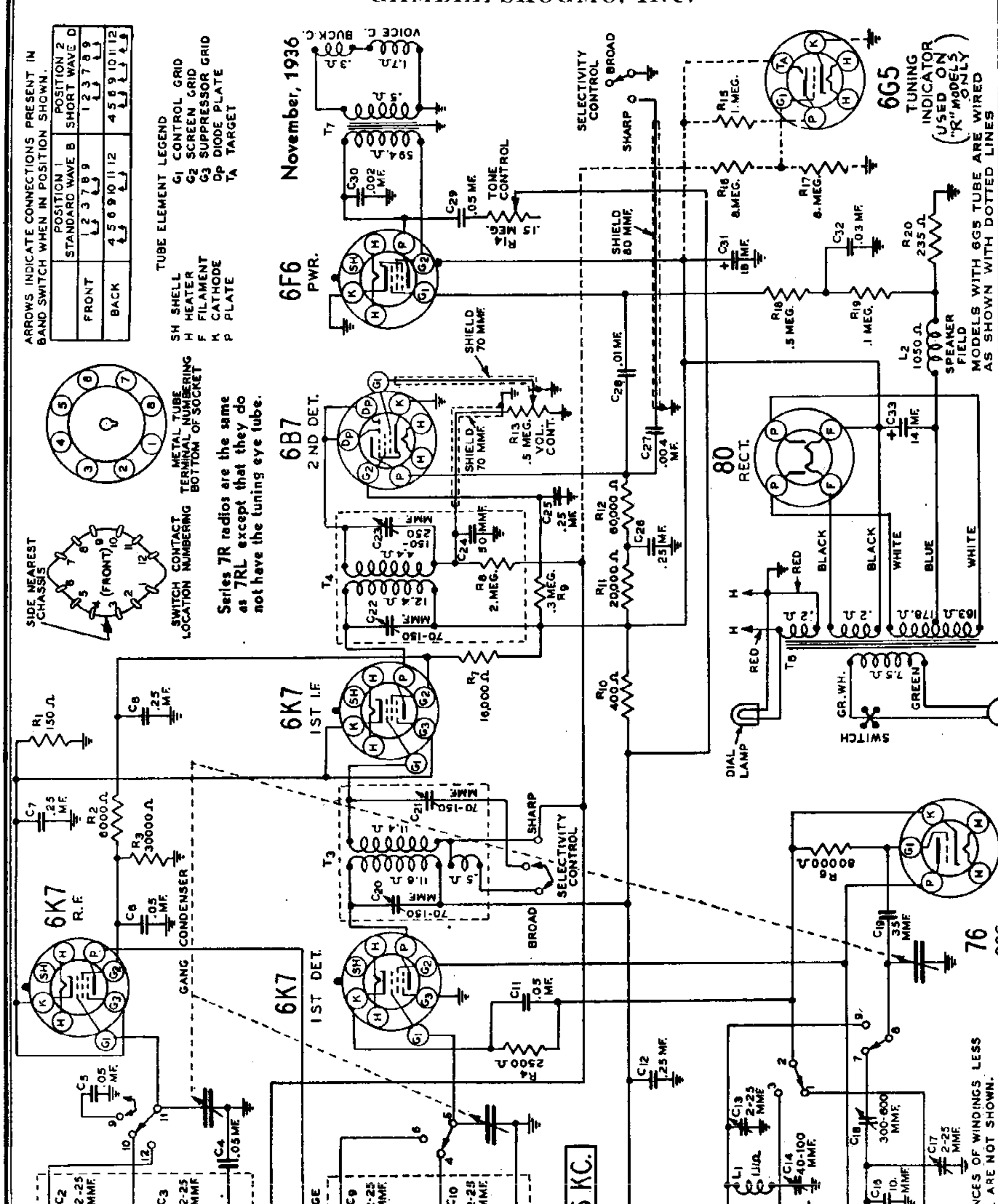
The complete chassis is mounted on rubber to prevent any vibration being transmitted to the tubes.

Tubes

Type '32 tubes are used in the R.F., 1st detector, intermediate, and second detector stages. The audio output tube is a type '33 pentode.

GAMBLE-SKOGMO, INC.

MODELS 47R, 47RL
Schematic



MODELS 47R, 47RL
Voltage, Socket
Trimmers, Coils
Sensitivity

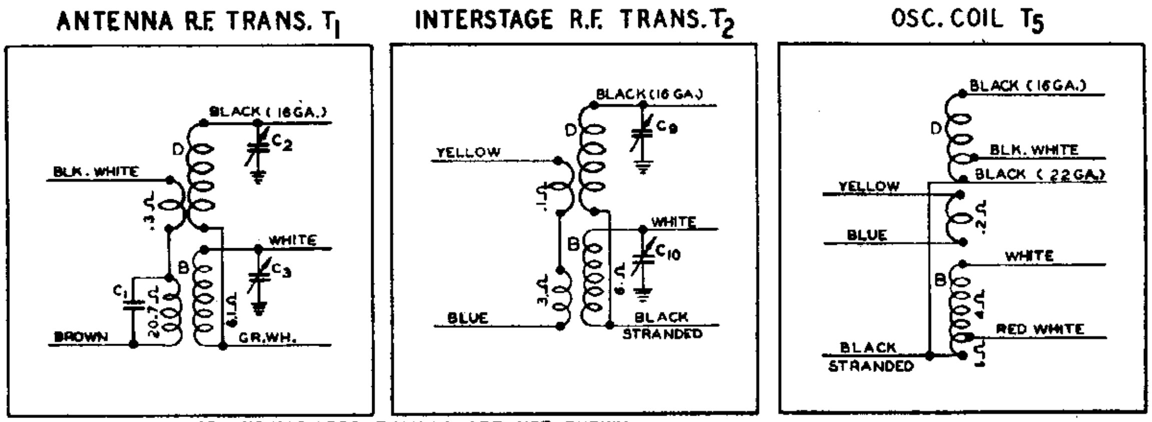
GAMBLE-SKOGMO, INC.

SPECIFICATIONS

Power Consumption - 71 Watts (At 115 volts 60 cycles)
Power Output - - - - - - 3 Watts Undistorted
Selectivity - 28 KC Broad at 1000 times Signal (Sharp)
Intermediate Frequency - - - - - - - 456 KC.
Speaker - - - - - - - - - - - - 8" Dynamic

Tuning Frequency Range
B Range.......................... 535 to 1730 KC.
D Range.......................... 5.75 to 18.3 MC.

Sensitivity
B Range Average.............. .5 Microvolts Absolute
D Range Average..............2.0 Microvolts Absolute



NOTE: RESISTANCES OF WINDINGS LESS THAN .1 Ω ARE NOT SHOWN

Fig. 4—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

VOLTAGES AT SOCKETS

Line Voltage: 115 — Antenna Shorted to Ground
Volume Control: Maximum — Band Switch: Standard Wave

Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Cathode to Ground
6K7	R.F.	6.2	245	105	2.8
6K7	1st Det.	6.2	245	105	9.0
76	Osc.	6.2	105		
6K7	1st I.F.	6.2	250	130	2.8
6B7	2nd Det.	6.2	50	35	
6F6	Output	6.2	230	250	17(1)
80	Rectifier	5.0			
				Target to Ground	
6G5	Tuning Eye	6.2	25	250	

(1) As read across resistor, R20.

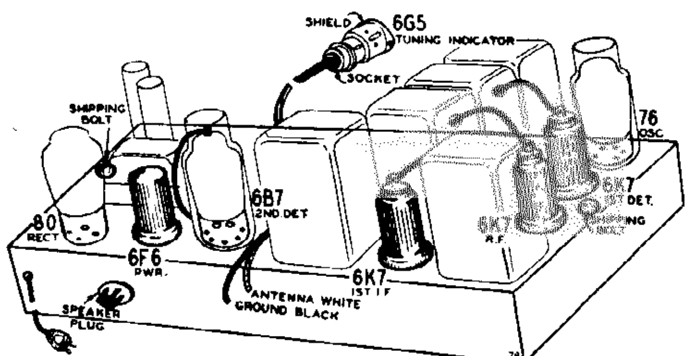


Fig. 5—Location of Tubes

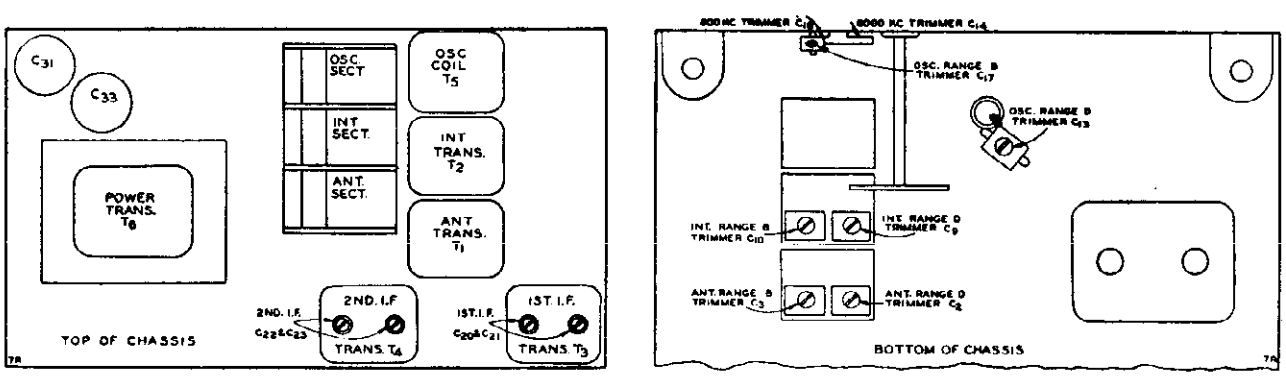


Fig. 3—Location of Trimmers

GAMBLE-SKOGMO, INC.

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C17) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C10) and antenna Range B trimmer (C3) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (short wave band).

Adjust the oscillator Range D trimmer (C13) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage and antenna Range D trimmers it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator short wave trimmer, the 15,000 KC adjustment must be repeated.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Twenty-five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

General Data

The models with the tuning indicator tube are wired as shown in the schematic. This tube contains a triode and cathode ray section in one envelope.

The cathode ray is produced by the attraction of electrons from the upper end of the cathode to the coated target or anode which is operated at a high positive potential. When this electron stream strikes the target, the coating glows. The electron stream is controlled by an additional element, or control electrode, in the tube.

As a signal is tuned in, the control grid of the triode section of the 6G5 cathode ray tube becomes increasingly negative, the negative bias voltage being taken from the AVC line. The AVC voltage is reduced to a suitable value by the voltage divider arrangement of the 8 megohm resistors. The increased bias voltage reduces the triode plate current. This reduces the voltage drop across the 1 megohm plate resistor and raises the triode plate voltage. The triode plate is connected to the control electrode of the cathode ray section of the tube.

The shape and size of the area on the target struck by the cathode ray is governed by the voltage of the control electrode. When the signal is tuned to resonance, practically no plate current flows and the voltage of the control electrode is the same as that of the target. There is no opposition to the flow of electrons to the target. Tuning off resonance decreases the control electrode voltage and causes the darkened sector of the target to widen, because of the opposition to the flow of electrons in the direction of the control electrode.

Referring to the 1st I.F. transformer T3 in Fig. 2, it will be noted that there is a coupling winding shown below the primary.

When the selectivity control is in the sharp position, the coupling winding is open circuited and the loose coupling which exists between the primary and secondary of this transformer results in high selectivity; also, the plate of the audio section of the 6B7 tube is bypassed by condenser C27.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary is connected in series with the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained. Condenser C27 is open circuited in this position to avoid bypassing the higher audio frequencies.

Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
P-3A126	76 Tube Socket	$0.10
P-3A201	6K7 Tube Socket	.15
P-3A129	6B7 Tube Socket	.15
P-3A230	6F6 Tube Socket	.15
P-3A129	80 Tube Socket	.10
P-3A[illegible]	Speaker Socket	.10
P-12X[illegible]	Tuning Indicator Tube Socket and Cable Assembly (Used on models with tuning eye)	.85

SPEAKER

Part No.	Description	List Price
P-12A211	8" Dynamic Speaker Complete with Output Trans. (T7)	5.95

KNOBS

Part No.	Description	List Price
Specify Name of knob and Model of Radio	Tuning Control Knob	.20
	Band Switch Knob	.20
	Volume Control Knob	.20
	Tone Control Knob	.20

GENERAL

Part No.	Description		List Price
P-2X[illegible]	Felt Washers (Used behind knobs)	doz.	.10
P-4A38	Single Lug Terminal Strip		.10
P-4A39	Two Lug Terminal Strip		.10
P-4A41	Four Lug Terminal Strip		.10
P-2A43	1 Section, 2 Position, Band Change Switch		.95
P-30X14	Grid Clip Only (Glass Tube)	doz.	.10
P-30X[illegible]	Grid Clip Only (Metal Tube)	doz.	.10
P-12X[illegible]	Line Cord and Plug		.50
P-12X214	Antenna and Ground Lead Assembly		.30
P-32X[illegible]	Tube Shield (Used on models with tuning eye)		.15
P-32X[illegible]	Tube Shield Base (Used on models with tuning eye)		.10
P-32X[illegible]	Tube Shield Bases	ea.	.10
P-32X[illegible]	Tube Shields	ea.	.15
P-8X27	Rubber Cushions for Gang Condensers	ea.	.10
P-8X[illegible]	Rubber Chassis Mounting Cushions	ea.	.10
P-28X[illegible]	Mounting Feet for Chassis (Rear)	ea.	.10
P-28X[illegible]	Mounting Feet for Chassis (Front)	ea.	.10
P-17X[illegible]	Glass Crystal (Mounted in Escutcheon Plate)		.15
P-28X[illegible]	Retaining Ring (for above Crystal)		.10

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
P-9A448	T1	Antenna Transformer and Can Assembly	$2.30
P-9A449	T2	R.F. Interstage Transformer and Can Assembly	1.85
P-9A451	T3	1st I.F. Transformer and Can Assembly	1.85
P-9A452	T4	2nd I.F. Transformer and Can Assembly	2.10
P-9A450	T5	Oscillator Coil and Can Assembly	1.75
P-53X91	T6	115 Volt, 60 Cycle, Power Transformer	3.60
P-53X92	T6	115 Volt, 25 Cycle, Power Transformer	5.95
P-53X[illegible]	T6	115-230 Volt, 40-60 Cycle Power Transformer	4.95
P-53X99	T6	230 Volt, 60 Cycle, Power Transformer	4.10
P-51X31	T7	Output Transformer (Part of Speaker Assembly)	2.45
P-9A453	L1	Oscillator Tracking Coil	.35

DIAL AND DRIVE ASSEMBLY

Part No.	Description		List Price
Specify Name and Model of Radio	Dial and Drive Assembly Complete with Pointer		$2.60
	Dial Face Only (Included in above Assembly)		.60
P-11X69	Double End Pointer (Included in above Assembly)		.10
P-28X232	Mounting Bracket for Dial and Drive Assembly		.10
P-7A37	Dial Lamp Sockets and Clips	ea.	.10
P-7A32	Dial Lamps, No. 51 Bayonet Type	ea.	.20

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
P-46X[illegible]	C4	.05 mf.	100	$0.15
P-46X[illegible]	C5	.05 mf.	100	.15
P-46X103	C6	.05 mf.	200	.15
P-46X117	C7	.25 mf.	100	.25
P-46X104	C8	.25 mf.	200	.25
P-46X[illegible]	C11	.05 mf.	100	.15
P-46X121	C12	.25 mf.	200	.20
P-46X105	C15	.10 mf.	200	.20
P-46X197	C25	.25 mf.	200	.20
P-46X107	C26	.25 mf.	200	.20
P-46X114	C27	.006 mf.	600	.15
P-46X109	C28	.01 mf.	400	.15
P-46X[illegible]	C29	.05 mf.	400	.20
P-46X100	C30	.002 mf.	600	.15
P-46X110	C32	.02 mf.	100	.15

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage	List Price
P-40X11	C31	16 mf.	300 Wet	1.30
P-40X10	C33	14 mf.	400 Wet	1.25

MOLDED

Part No.	Code	Capacitance	List Price
P-47X99	C1	250 mmf.	.10
P-47X52	C16	10 mmf.	.15
P-47X53	C19	35 mmf.	.10
P-47X56	C24	50 mmf.	.10

TRIMMER

Part No.	Code	Capacitance	Description	List Price
P-17A36	C2	2-25 mmf.	Antenna Range "D" Trimmer	.10
P-17A36	C3	2-25 mmf.	Antenna Range "B" Trimmer	.10
P-17A36	C9	2-25 mmf.	Interstage Range "D" Trimmer	.10
P-17A36	C10	2-25 mmf.	Interstage Range "B" Trimmer	.10
P-17A41	C13	2-25 mmf.	Oscillator Range "D" Trimmer	.10
P-17A41	C17	2-25 mmf.	Oscillator Range "B" Trimmer	.10
P-7A35	C14	40-100 mmf.	6000 KC Trimmer	.45
	C18	300-600 mmf.	600 KC Trimmer	
P-17A33	C20	70-100 mmf.	1st I.F. Trimmers	.40
	C21	70-100 mmf.		
P-17A34	C22	70-100 mmf.	2nd I.F. Trimmers	.40
	C23	100-200 mmf.		

MISCELLANEOUS

Part No.	Description	List Price
P-14A42	3 Gang Condenser less Dial and Drive Assembly	3.85

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	Remarks	List Price
P-A94151	R1	150 Ohm	0.2		$0.15
P-B94402	R2	4000 Ohm	0.5		.15
P-B95303	R3	30,000 Ohm	0.5		.20
P-A94252	R4	2500 Ohm	0.2		.15
P-C95253	R5	25,000 Ohm	1.0		.20
P-A94603	R6	60,000 Ohm	0.2		.15
P-D95163	R7	15,000 Ohm	2.0		.40
P-A95205	R8	2 Megohm	0.2		.15
P-B95304	R9	.3 Megohm	0.5		.15
P-A95401	R10	400 Ohm	0.2		.15
P-A95203	R11	20,000 Ohm	0.2		.15
P-B94603	R12	60,000 Ohm	0.5		.15
P-A95105	R15	1 Megohm	0.2	Used on models with tuning eye	.10
P-A94805	R16	8 Megohm	0.2	Used on models with tuning eye	.15
P-A94805	R17	8 Megohm	0.2	Used on models with tuning eye	.15
P-A95504	R18	.5 Megohm	0.2		.10
P-A94104	R19	.1 Megohm	0.2		.15

WIRE WOUND

Part No.	Code	Resistance	Wattage	List Price
P-43X42	R20	250 Ohm	2.5	.25

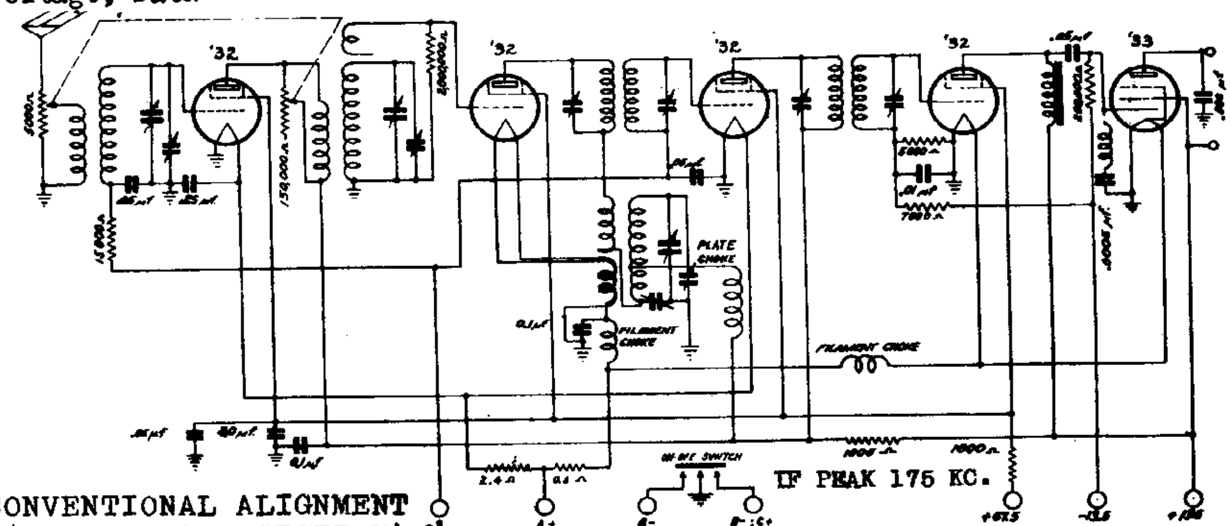
VARIABLE

Part No.	Code	Resistance	Description	List Price
P-36X265	R13	.5 Megohm	Volume Control and On-Off Switch	1.00
P-40X217	R14	.15 Megohm	Tone Control and Selectivity Switch	1.25

Prices subject to change without notice

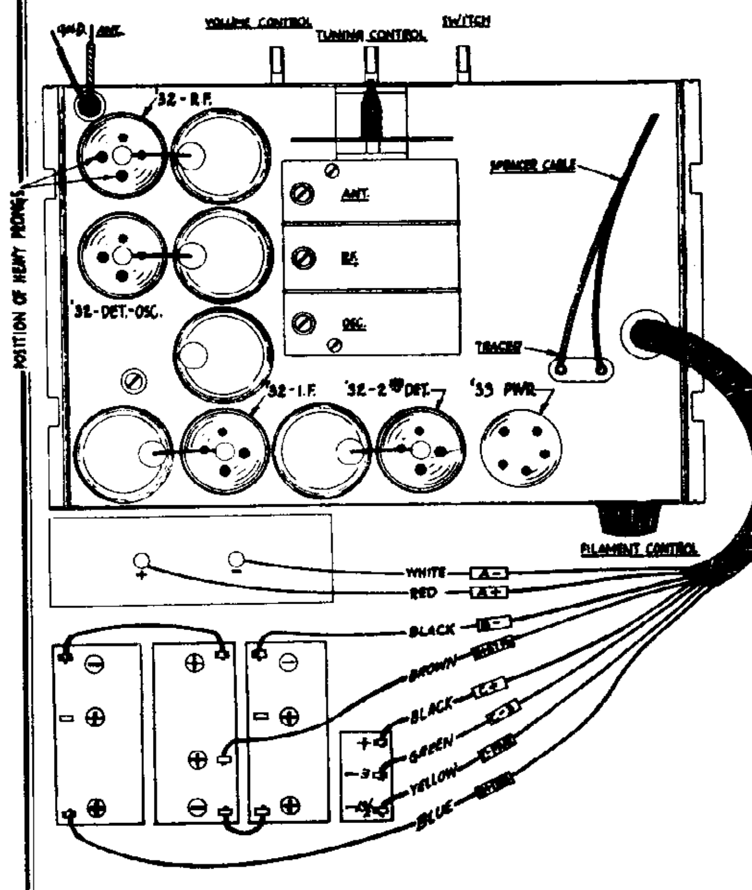
MODELS 92D, 92M
Schematic, Socket
Voltage, Data

GAMBLE-SKOGMO, INC.



CONVENTIONAL ALIGNMENT
(SEE SPECIAL SECTION)

TURN THE VOLUME CONTROL ALL THE WAY ON, CONNECT THE ANTENNA AND GROUND LEADS TOGETHER AND TURN THE GANG CONDENSER PLATES ALL THE WAY OUT. CHECK BATTERY VOLTAGES.



TUBE	CIRCUIT	VOLTAGE
R.F. '32	Filament	2.
	Screen Grid	65.
	Plate	127.
	Control Grid	1.4
1st Det. & Oscillator '32	Filament	2.
	Screen Grid	65.
	Plate	85.
	Control Grid	No Reading
I.F. '32	Filament	2.
	Screen Grid	65.
	Plate	125.
	Control Grid	5. *
2nd Det '32	Filament	2.
	Screen Grid	67.
	Plate	127.5
	Control Grid	3.2
Audio '33	Filament	2.
	Screen Grid	132.5
	Plate	117.5
	Control Grid	7.5 **

*This includes filament voltage.
**250 v. Scale.

The measurement of grid bias voltages is not recommended as this causes an abnormal rise in plate current which is injurious to the tube. When the receiver does not function properly and the trouble is apparently due to incorrect grid bias on any tube or tubes, the cause of the incorrect bias may be determined by applying the proper continuity test.

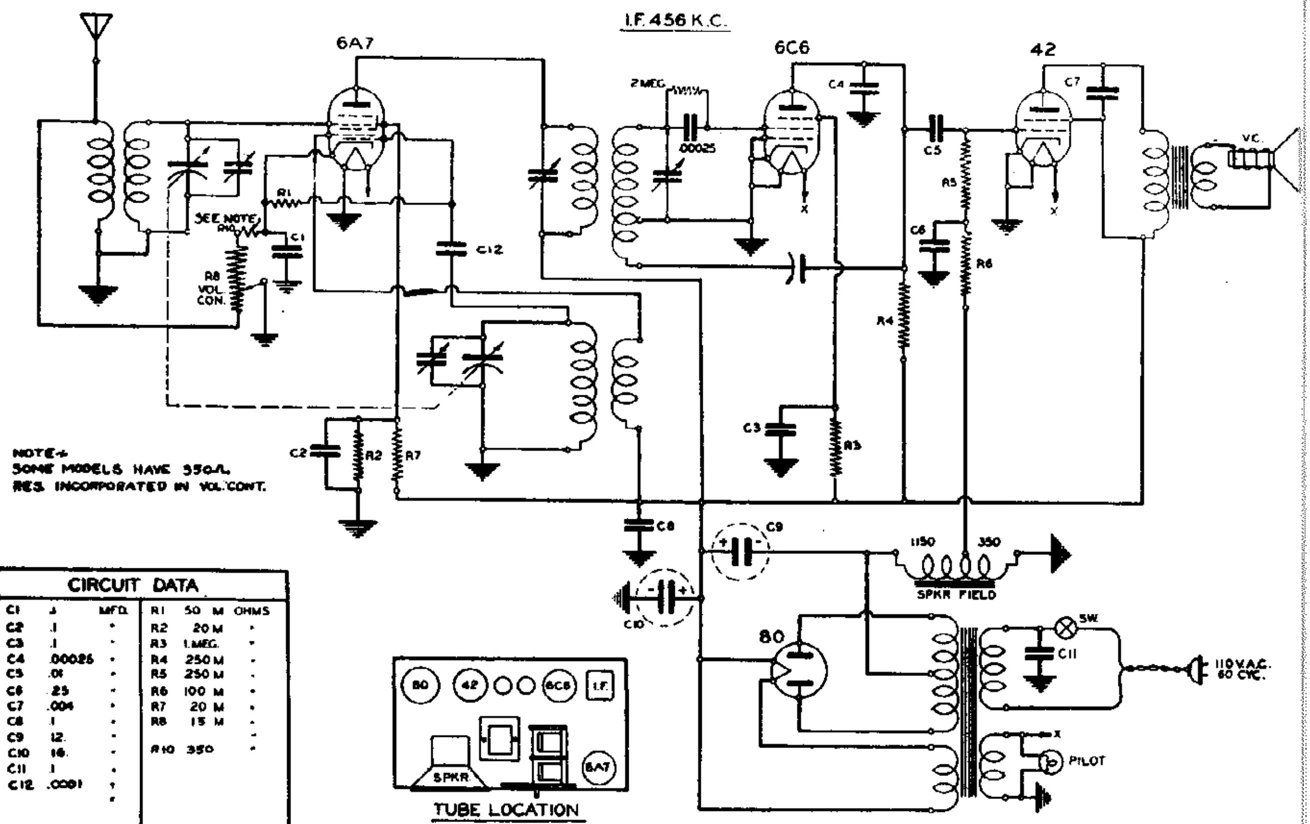
CAUTION: Do not attempt to take voltage measurements or test the '33 pentode tube with a set analyzer which is not designed to test that type of tube. A special adaptor is necessary. The latest type analyzers only are designed to test pentode tubes. The UY socket in an analyzer which is used to test '24, '35, and '27 tubes cannot be used to test '33 pentode tubes. A break-in adaptor and the external binding posts of the set analyzer may be used to take voltage measurements when an adaptor is not available.

Comparison of the voltage measurements taken and those shown in the chart below will show any irregularities. The cause of any variation may be determined by applying the proper continuity test. REMEMBER—Voltage measurements will vary slightly with different sets of tubes, and also with different chassis. Unless the voltages are radically different than normal, they may be considered satisfactory.

The voltages shown in the chart were taken with a 1000 ohm per volt voltmeter; voltage measurements taken with a voltmeter having a different resistance will, of course, differ from those shown.

The .006 mfd. condenser connected from the plate of the pentode tube to ground is there for two reasons,—one, to prevent any I.F. or harmonic of the intermediate frequency from getting into the speaker and possibly coupling back into the antenna to cause a squeal; two, to put the proper amount of capacity across the speaker winding to produce a pleasing tone quality. This condenser may be varied to any value from .002 mfd. to .006 mfd. without losing its effectiveness in preventing the I.F from getting into the speaker.

GAMBLE-SKOGMO, INC.



CIRCUIT DATA					
C1	.1	MFD.	R1	50 M	OHMS
C2	.1	"	R2	20 M	"
C3	.1	"	R3	1. MEG.	"
C4	.00025	"	R4	250 M	"
C5	.01	"	R5	250 M	"
C6	.25	"	R6	100 M	"
C7	.004	"	R7	20 M	"
C8	.1	"	R8	15 M	"
C9	12.	"			"
C10	16.	"	R10	350	"
C11	.1	"			
C12	.0001	"			

PARTS LIST—460 A. C. Superheterodyne

1925	2 Gang Condenser	1.65
8030	Power Trans	1.73
2441	Volume Control	.73
1841	Wet Electrolytic 16 mfd	.60
1840	Wet Electrolytic 12 mfd	.60
1142	Ant. Coil	.32
1143	Osc. Coil	.10
1126	I. F. Trans.	.85
2054	Trimmer	.10
1600	.1—200 V. Bypass Condenser	.12
1601	.1—400 V. Bypass Condenser	.13
1604	.01—600 V. Bypass Condenser	.10
1614	.25—200 V. Bypass Condenser	.16
1651	.004—600 V. Bypass Condenser	.12
6017	1 Meg. 1/3 W 20% Resistor	.06
6020	2 Meg. 1/3 W 20% Resistor	.06
6024	¼ Meg. 1/3 W 20% Resistor	.06
6025	50 M. 1/3 W 20% Resistor	.06
6026	100 M. 1/3 W. 20% Resistor	.06
6120	20 M. ½ W. 20% Resistor	.08
1501	.0001—20% Mica. Cond.	.10
1504	.00025—20% Mica Cond.	.12
8901	No. 40 Pilot Light Bulb	.18
242	Pilot Light Bracket	.06
6850	4 Prong Socket	.10
6852	6 Prong Socket	.10
6853	7 Prong Socket	.10
7933	Speaker	3.00
	Dial—(order by name and description)	.75
5218	Knobs, Plain	.12

TUBES
6A7
6C6
42
80

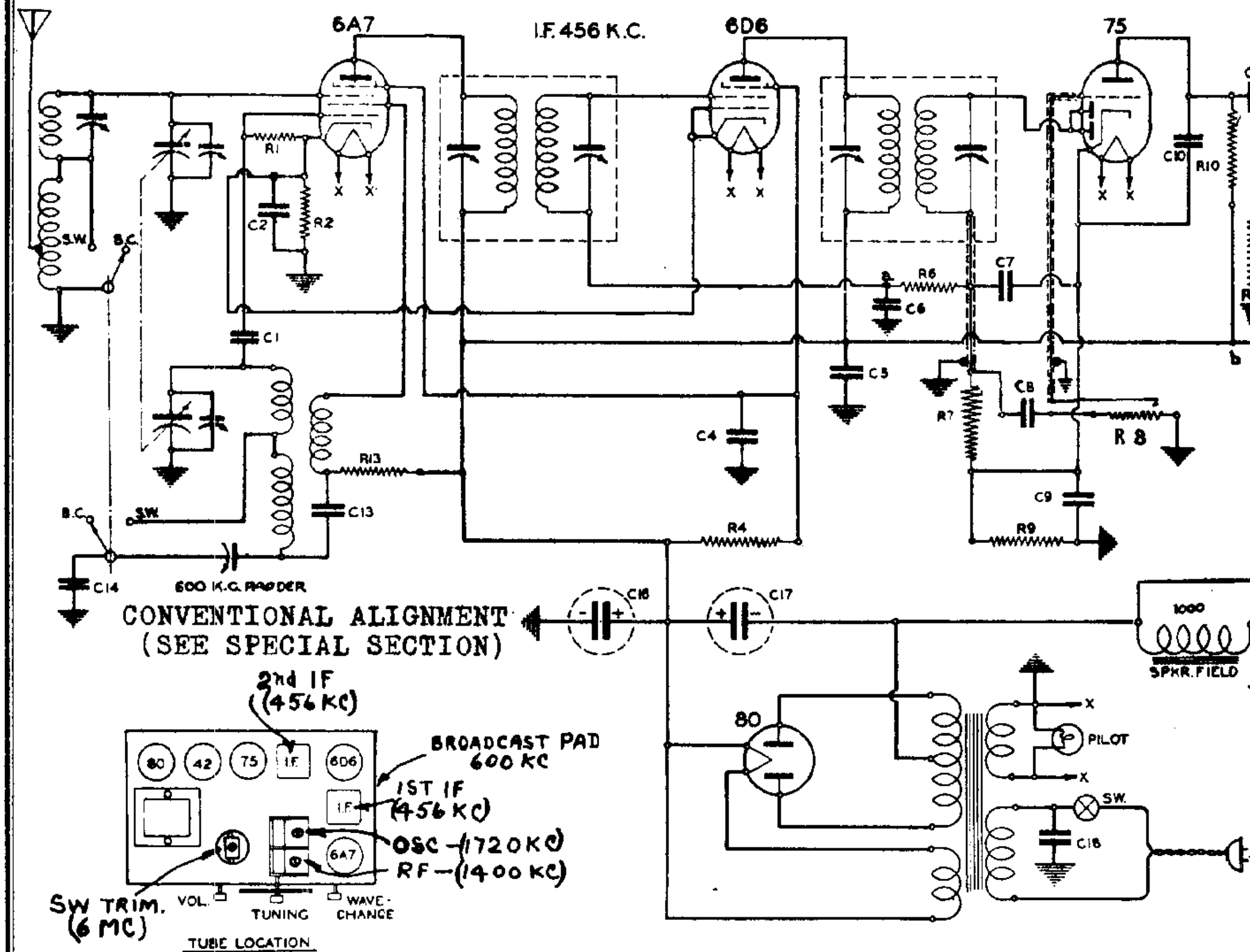
PRICES SUBJECT TO CHANGE
WITHOUT NOTICE

This receiver should be connected ONLY to an electric light outlet supplying current of 110 to 120 volts, 50 to 60 cycle A.C. If connected to any other type of current or voltage, the set may be seriously damaged. If you are in doubt as to the type of current available, your electric power company will be glad to furnish the needed information.

MODELS 510,511

GAMBLE-SKOGMO, INC.

Schematic, Socket Trimmers, Alignment



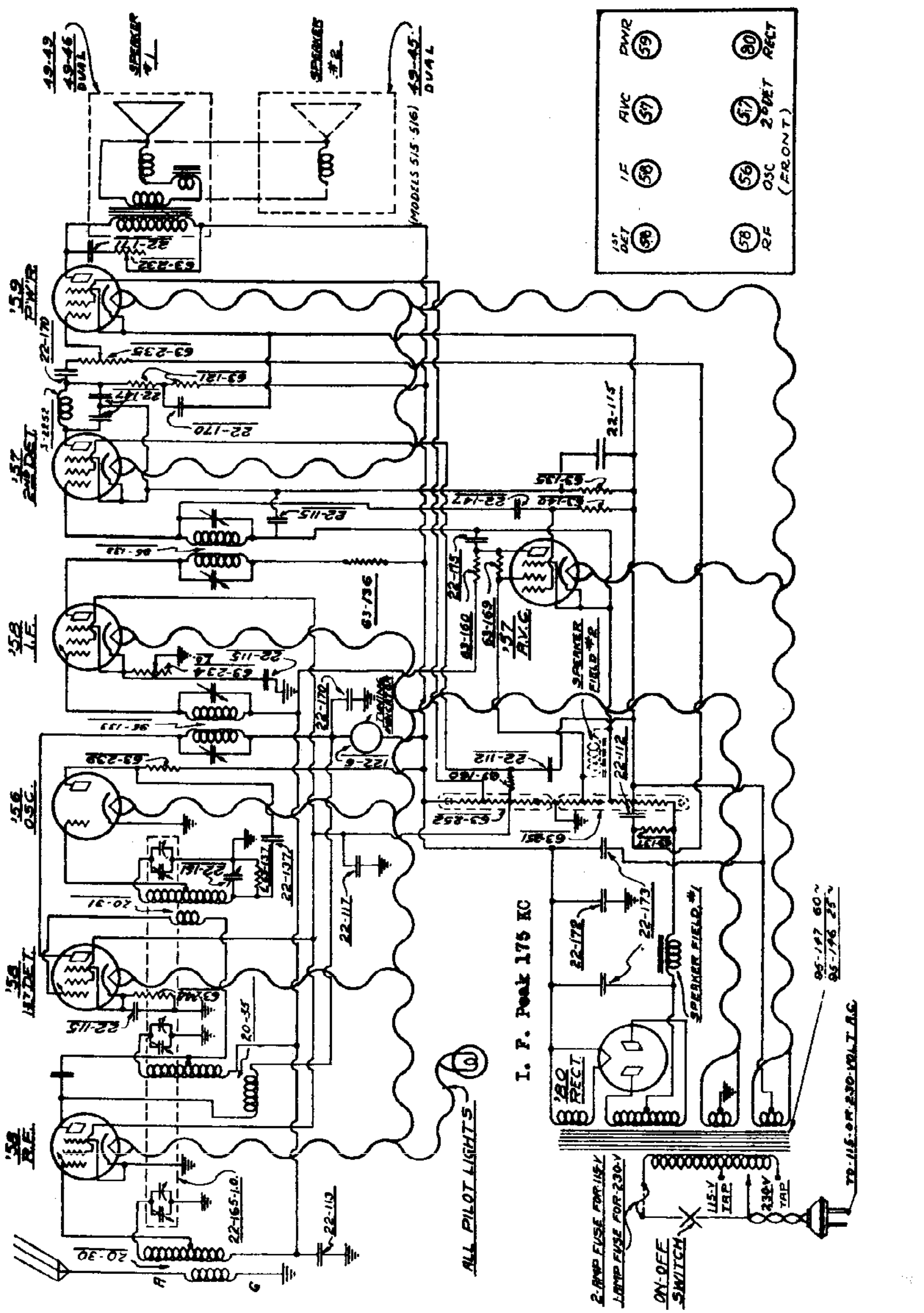
LEGEND

C1	.0001	MFD	Mica	R1	50M	Ohms	1/3W
C2	.25	"	200V	R2	330	"	"
C4	.1	"	400V	R4	25M	"	1W
C5	.1	"	600V	R5	190M	"	1/3W
C6	.05	"	200V	R6	1 Meg.	"	"
C7	.00025	"	Mica	R7	250M	"	"
C8	.01	"	600V	R8	500M	"	"
C9	10	"	25V	R9	4500	"	"
C10	.00025	"	Mica	R10	250M	"	"
C11	.01	"	600V	R11	500M	"	"
C12	.1	"	200V	R12	600M	"	"
C13	.001	"	Mica	R13	10M	"	1/2W
C14	.002	"	Mica				
C15	.004	"	600V				
C16	8	"	450V				
C17	8	"	450V				
C18	.1	"	400V				

WARNING—This receiver can be operated only on 105-120 volt, A. C., 50-60 cycle. This is the current commonly supplied, although a few communities or neighborhoods are supplied with 25-30 cycle or with D.C. The receiver may be badly damaged if it is connected to incorrect supply.
If there is any doubt whether your supply is proper for this receiver, your local electric company can advise you.

GAMBLE-SKOGMO, INC.

MODEL Z516
Schematic
Socket



MODEL Z516
Voltage, Parts
Alignment

GAMBLE-SKOGMO, INC.

Resistors

63-121 100M ohm, 1 Watt (2nd Detector Plate).......
63-135 25M " ½ " (2nd Detector Cathode).....
63-137 250M " ½ " (Oscillator & Power Grid)..
63-140 1 meg" ½ " (A.V.C. Screen)...........
63-160 100M " ½ " (A.V.C. Plate).............
63-169 400M " ½ " (A.V.C. Grid).............
63-239 24M ohm 1 Watt (Oscillator Plate).....
63-244 500 " ¼ " (1st Detector Cathode).
63-251 Voltage Divider (six tap).............
63-252 Voltage Divider (five tap)............

Coils and Chokes

20-30 Antenna Coil..........................
20-31 Oscillator Coil.......................
20-35 Detector Coil.........................
95-133 1st & 2nd I. F. Transformer...........

Condensers

22-112 .1 mfd 300 volt (2nd Detector Screen & Power Grid).............
22-113 .5 " ....(R.F. 1st Detector & I.F. Grid Return)...........
*22-115 .1 " 200 volt (Four used, see below).......................
22-117 .5 " ....(R.F. 1st Detector, & I.F. Screen)............
22-137 .05 " 400 volt (Oscillator Plate).............................
22-147 .0005 600 volt (2nd Detector Plate & A.V.C. Screen)............
22-170 .1 mfd 400 volt (R.F. & 1st Detector Plate, 2nd Detector Plate)..
22-171 .05 " 600 volt (Tone Control)...............................
22-172 2. " 450 volt (Filter)......................................
22-173 8. " 500 volt (Filter)......................................

Socket Voltages

Tube Type	Position	Fil. Volt.	Plate Volt.	Cath. Volt.	Screen Volt.	Supp. Volt.	Plate Current
Z-58	R.F.	2.4	190	0	95	0	7.
Z-58	1st Det.	2.4	190	2.3	95	2.3	4.
Z-56	Osc.	2.4	100	0	-	-	4.
Z-58	I.F.	2.4	190	0	90	0	2.
Z-57	2nd Det.	2.4	90	-60	70	-60	.2
Z-57	A.V.C.	2.4	-10	-65	-2	-65	0
Z-59	Power	2.4	175	-70	165	-70	25
Z-80	Rect.	5.	*350	-	-	-	*36

Line 115 Volts — All Controls Maximum

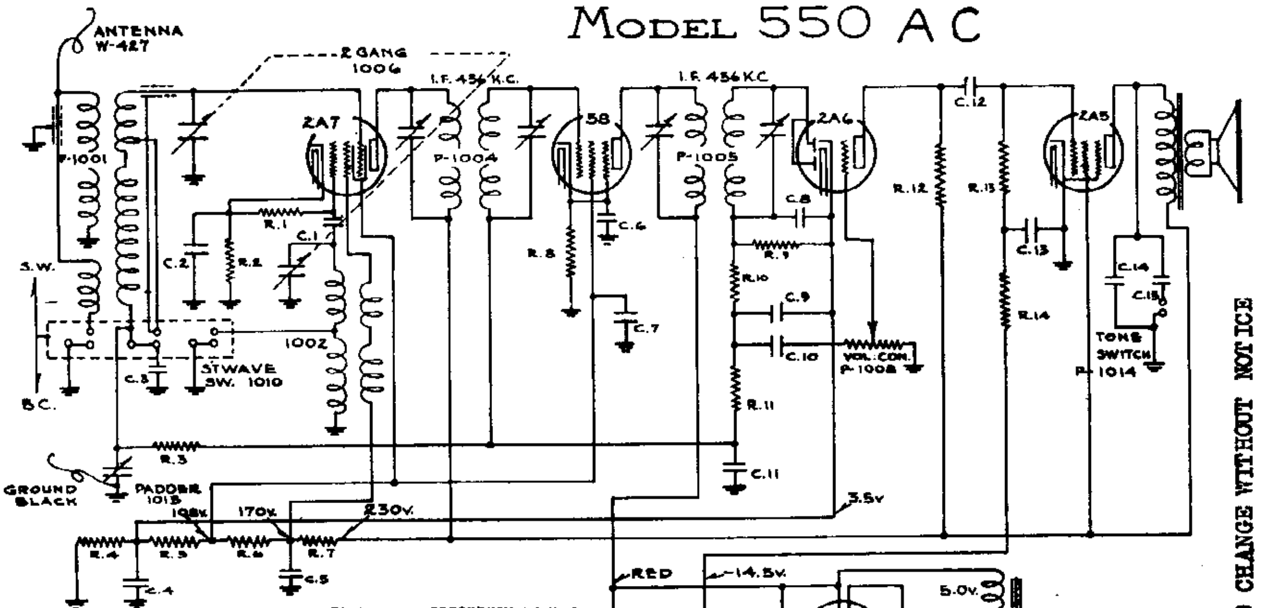
All readings, with exception of heaters, taken from socket connections to ground. Use 1,000 ohm per volt D. C. meter.)

BALANCE I.F. frequency at 175 K.C. Condenser gang at 1500 K.C. and oscillator padder at 600 K.C.

MODEL 550 AC
Schematic, Voltage
Parts, Alignment

GAMBLE-SKOGMO, INC.

MODEL 550 AC



*R.2, R.4, R.5, R.6, R.7 & R.8 IN ONE UNIT P-1012

*C.16 & C.17 IN ONE UNIT P-1003

X R.9, R.10, R.11, C.8, C.9 & C.10 IN I.F. CAN P-1005

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

SERVICE MANUAL FIVE TUBE TWO BAND SUPERHETERODYNE

WITH A. V. C.

105-115 volts alternating current 50-60 cycles - 60 watts.
GREEN (Broadcast band) 530 - 1550 Kilocycles
RED (Short wave band) 1550 - 14,000 Kilocycles

SERVICE NOTES

Should it be at any time necessary to rebalance this set, the correct procedure is as follows:

To peak I.F. transformers connect oscillator (set at 456 KC) to grid of 2A7 tube and (Black) ground wire. With variable condenser set at minimum capacity, (extreme left of its rotation) adjust four trimmers (one nut and one screw on each transformer trimmer) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer).

To align Broadcast band, set wave changing switch to Green (right turn) and with variable condenser at minimum capacity disconnect antenna wire and connect 1550 KC oscillator to antenna coil in series with a 75 MMFD condenser. Adjust oscillator (front) section trimmer to resonance. Set oscillator to 1400 KC, rotate variable condenser until signal is tuned in, then adjust R.F. (rear) section trimmer to resonance. Check output at 1200, 1000, 800, and 600 Kilocycles if necessary bend plates (of rear R.F. section of variable only).

To align Short wave band, set wave changing switch to RED (left turn) and with input oscillator connected as above and set at 1720 KC, tune in signal, adjust padding condenser on rear of chassis to resonance. Check for output at 1550 KC and at harmonics of 1000 KC (2000 KC), of 1200 KC (2400 KC), of 1400 KC (2800 KC), and of 1720 KC (3440 KC). DO NOT BEND PLATES.

For failure to operate over both bands check 2A7 tube and connections to and contacts of wave changing switch.

Part No.	Description	List Price
1001	Antenna Coil	$ 2.50 ea.
1002	Oscillator Coil & Bracket	1.20 ea.
1003	8-8 MFD electrolytic filter condenser.	2.50 ea.
1004	Input I.F. Transformer and can	1.60 ea.
1005	Output I.F. Transformer with can and including parts as indicated on schematic circuit diagram.	2.60 ea.
1006	Two gang gear drive variable condenser.	2.75 ea.
1008	500M Ohm volume control with switch	1.35 ea.
1010	Wave changing switch	.75 ea.
1011	105-115 volt 50-60 cycle power transformer	3.50 ea.
1012	31,050 Ohm metal clad resistor.	1.00 ea.
1014	Tone control switch	.30 ea.
1015	400-000M-MFD Padding condenser	.60 ea.
1017	Special light socket	.10 ea.
1019	Rubber line cord & plug	.60 ea.
1039	Celluloid selector scale	.15 ea.
1040	Celluloid volume scale	.15 ea.
1041	Escutcheon for parts 1039 and 1040	.35 ea.
1044	Color indicating strip assembly.	.25 ea.
5031	Small knobs for wave changing switch & tone control.	.15 ea.
5032	2.5 volt pilot lights	.20 ea.
K214	Knob (selector and volume controls)	.15 ea.
	All molded mica condensers	.25 ea.
	All single section tubular paper bypass condensers.	.25 ea.
	All dual section tubular paper bypass condensers.	.50 ea.

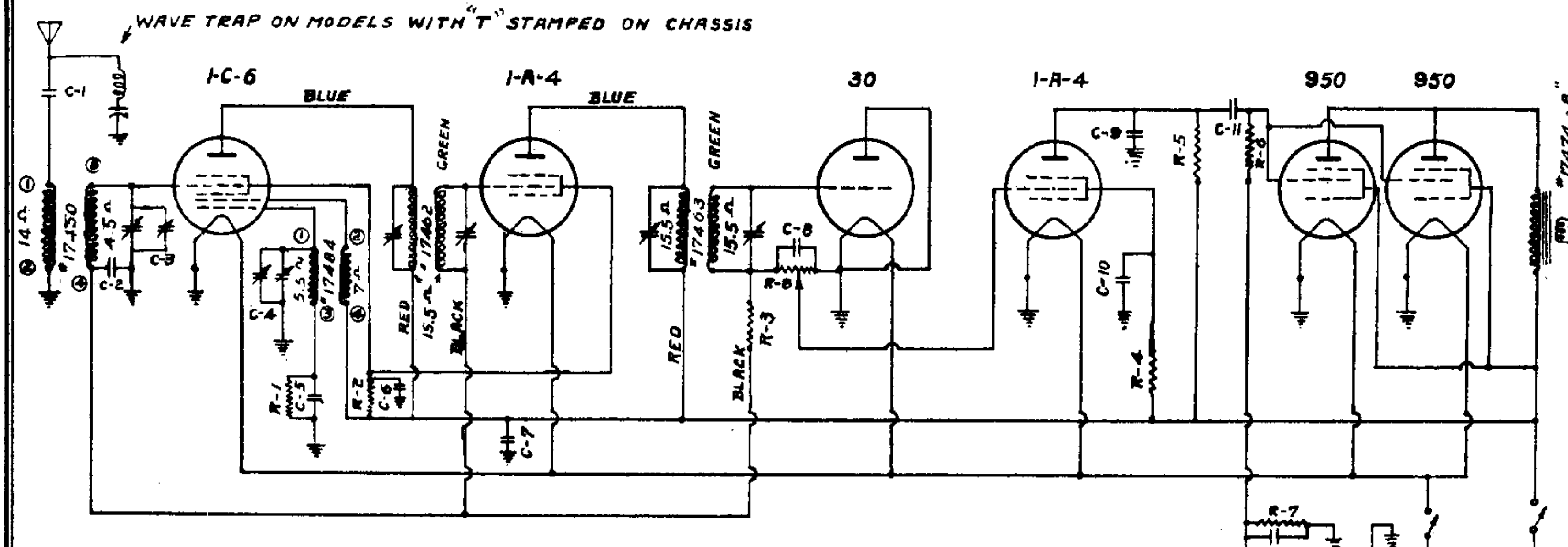
LEGEND

R.1	50M	
R.2	500	*
R.3	250M	
R.4	250	*
R.5	20M	*
R.6	6M	*
R.7	4M	*
R.8	300	*
R.9	250M	X
R.10	50M	X
R.11	250M	X
R.12	250M	
R.13	300M	
R.14	250M.	
C.1	250MMF.	
C.2	.05	
C.3	.05	
C.4	.05	
C.5	.05	
C.6	.05	
C.7	.1	
C.8	500MMF.	X
C.9	500MMF.	X
C.10	.01	X
C.11	.1	
C.12	.01	
C.13	.05	
C.14	.01	
C.15	.02	
C.16	8MF.	*
C.17	8MF.	*

MODEL 650 A-B-C

GAMBLE-SKOGMO, INC.

Schematic, Alignment

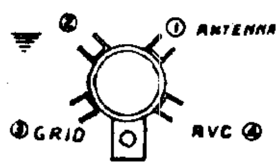


Tube Functions. 1-C-6 First detector oscillator, 1-A-4 Intermediate amplifier, "30" diode detector, 1-A-4 first audio, two "950" tubes in parallel in the power stage. Early production used 1-A-6 instead of 1-C-6.

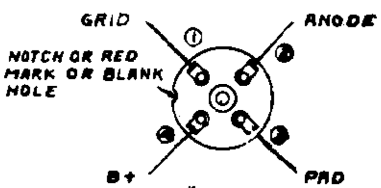
I.F. FREQUENCY 456 K.C.
B.C. FREQUENCY 540 K.C TO 1725 K.C.

C-1	.01	200 V.
C-2	.05	200 V.
C-3 } C-4	.00037 TUNING COND.	
C-5	.0005	PAD
C-6	.05	200 V
C-7	.25	200 V.
C-8	.0005	600 V.
C-9	.0005	600 V.
C-10	.05	200V.
C-11	.01	200V.
C-12	10 MFD. 25 V. ELECT.	

R-1	50,000	
R-2	15,000	
R-3	2-MEG.	
R-4	500,000	
R-5	100,000	
R-6	1 MEG.	
R-7	450	
R-8	500,000	VOL. CONTROL #17451



#17450
LOOKING AT PLAIN END OF COIL



#17484

BATTERY RADIO

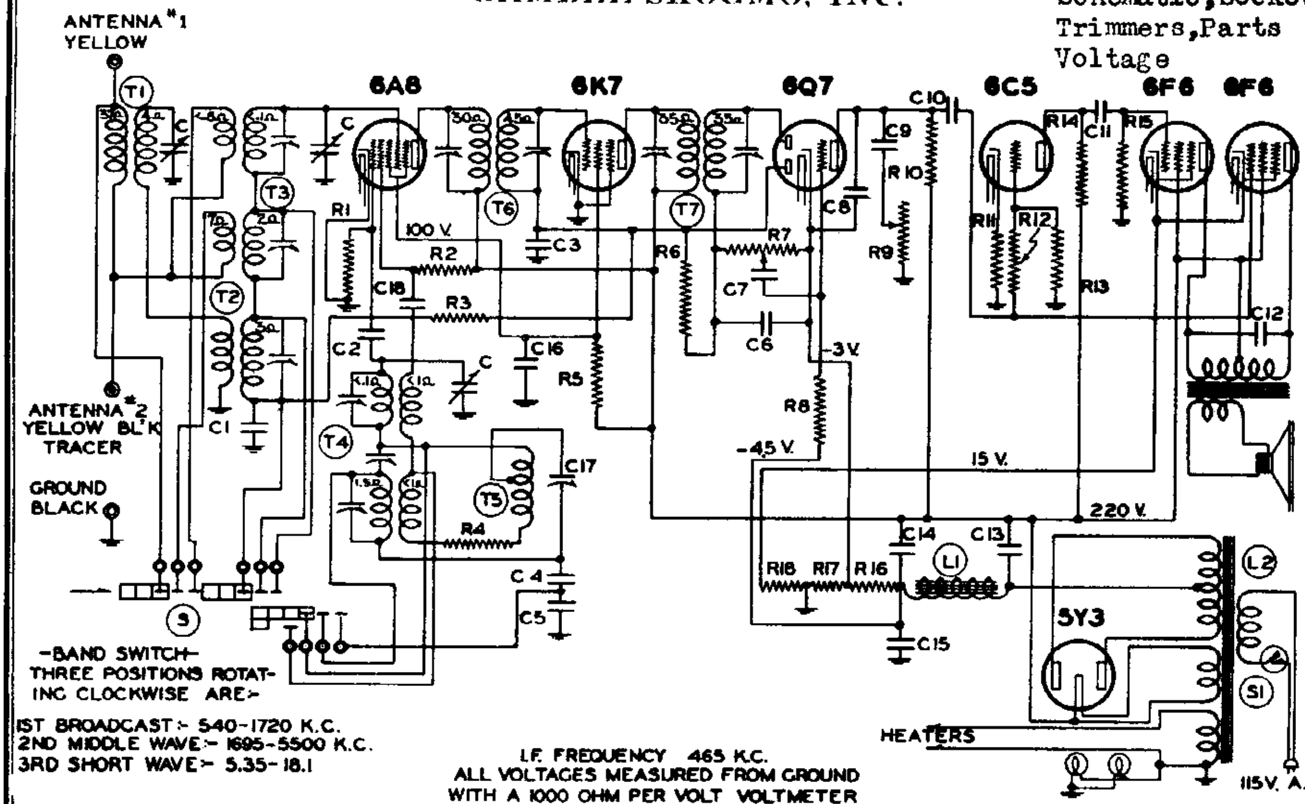
Alignment. IF and Broadcast alignment same as Model 11-B. For IF, connect signal generator to grid of 1-C-6 tube, be sure tuning condenser is open.

K.R.C. 5-6-36

Code Interference. This may be noticeable in regions close to the Great Lakes and is due to ship to shore radio-telegraph service being received directly on the IF amplifier and usually comes in regardless of tuning. All late production of this model going into Great Lakes territory were equipped with a wave trap which greatly reduces such interference. Such sets had the letter "T" marked on back of chassis and on carton. This wave trap No. 17736 may be added to any other production sets as shown in the circuit diagram. *After installation it must be tuned* to minimum response to a 456 signal applied to the antenna lead or to minimum reception of the code interference.

GAMBLE-SKOGMO, INC.

MODEL 740
Schematic, Socket
Trimmers, Parts
Voltage



No.	Part No.	Description
		RESISTORS
R1	130-12	50M ohms - 1/3 w.
R2	130-48	15M ohms - 1/3 w.
R3	130-103	100M ohms - 1/3 w.
R4	130-27	50 ohms - 1/3 w.
R5	130-96	25M ohms - 1/2 w.
R6	130-4	3 megohm - 1/3 w.
R7	101-74	1 megohm - Volume Control
R8	130-4	3 megohm - 1/3 w.
R9	101-75	300M ohm - Tone Control
R10	130-100	150M ohms - 1/3 w.
R11	130-22	5M ohms - 1/3 w.
R12	130-163	400M ohms - 1/3 w.
R13	130-103	100M ohms - 1/3 w.
R14	130-12	50M ohms - 1/3 w.
R15	130-100	150M ohms - 1/3 w.
R16	106-37	20 ohms - Muter
R17	106-37	42 ohms - Muter
R18	106-37	250 ohms - Muter

NOTE: R16, R17 and R18 in one unit, No. 106-37

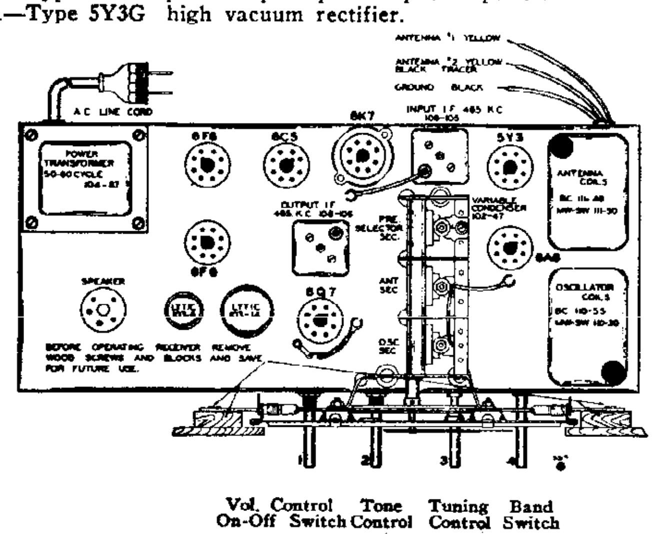
CONDENSERS

C1	100-22	.05 x 200 v.
C2	129-39	.00005 Mica
C3	100-22	.05 x 200 v.
C4	129-55	.0034 Mica
C5	129-54	.003 Mica
C6	129-5	.0001 Mica
C7	100-11	.01 x 400 v.
C8	129-2	.0005 Mica
C9	100-57	.006 x 600 v.
C10	100-26	.02 x 400 v.
C11	100-26	.02 x 400 v.
C12	100-12	.003 x 600 v.
C13	103-6	8 mfd. x 350 v.
C14	103-14	16 mfd. x 250 v.
C15	100-20	.1 x 200 v.
C16	100-39	.1 x 400 v.
C17	124-35	Adjustable Padder - Working Capacity 740 mmf.
C18	100-12	.003 x 600 v.

PARTS

C	102-47	One section of three gang condenser
T1	111-51	B.C. Pre-Selector
T2	111-49	B.C. Antenna Coil Assembly
T3	111-50	MW - SW Antenna Coil Assembly
T4	110-39	MW - SW Oscillator Coil Assembly
T5	110-55	B.C. Oscillator Coil Assembly
T6	108-105	Input I.F. - 465 kc.
T7	108-106	Output I.F. - 465 kc.
L1	114-66	6" Speaker (Field Resistance 900 ohms)
L2	104-87	Power Transformer (60 cycle) 115 volts
S	125-17	Band Switch
S1	101-74	On-off Switch on volume control.

1—Type 6A8G—Pentagrid mixer, first detector and oscillator.
1—Type 6K7 Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6Q7G duplex diode triode second detector, A.V.C. and audio.
1—Type 6C5 Inverter stage.
2—Type 6F6G—pentode push-pull output amplifier.
1—Type 5Y3G high vacuum rectifier.



MODEL 740

GAMBLE-SKOGMO, INC.

Alignment Trimmers

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to measured with 115 volts on the primary of the power transformer.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-106 Output I.F. Transformer
Part No. 108-105 Input I.F Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-106) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap of 6A8G and adjust input I.F. transformer (No. 108-105) to resonance.

BROADCAST BAND ALIGNMENT:
540 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly, Fig. 3.)
   (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 600 K.C. and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

SHORT WAVE BAND ALIGNMENT:
5.35 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment number 3) and short wave antenna (Adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.3 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 18.3 megacycle signal appears near 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:
1690 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (Adjustment number 2) and middle wave antenna (Adjustment number 5) to resonance.
   (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 5400 kilocycles and 1700 kilocycles for band coverage.
   (d) Recheck broadcast band alignment.

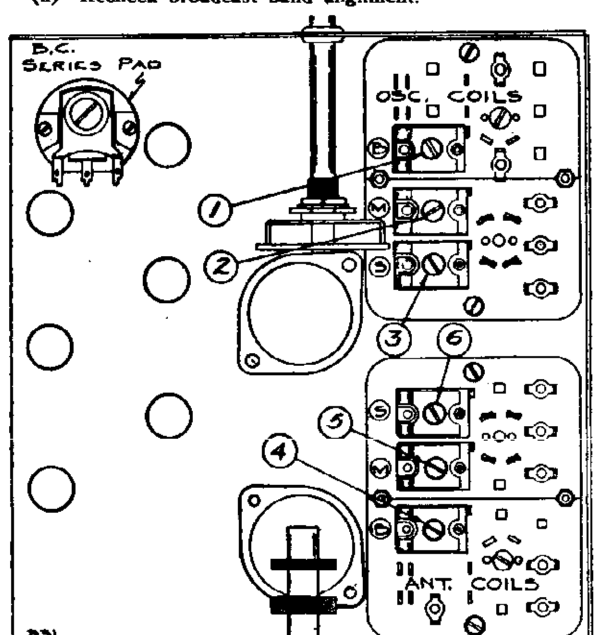


FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS

MODEL 762
Schematic
Data

GAMBLE-SKOGMO, INC.

Power Consumption - 67 Watts (At 117 volts 60 cycles)

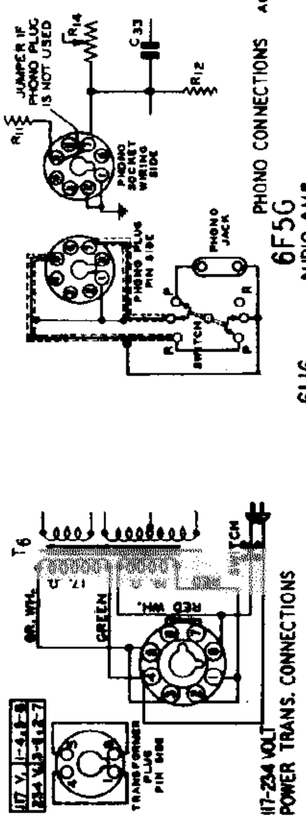
Power Output - - - - 2.5 Watts Undistorted
4.5 Watts Maximum

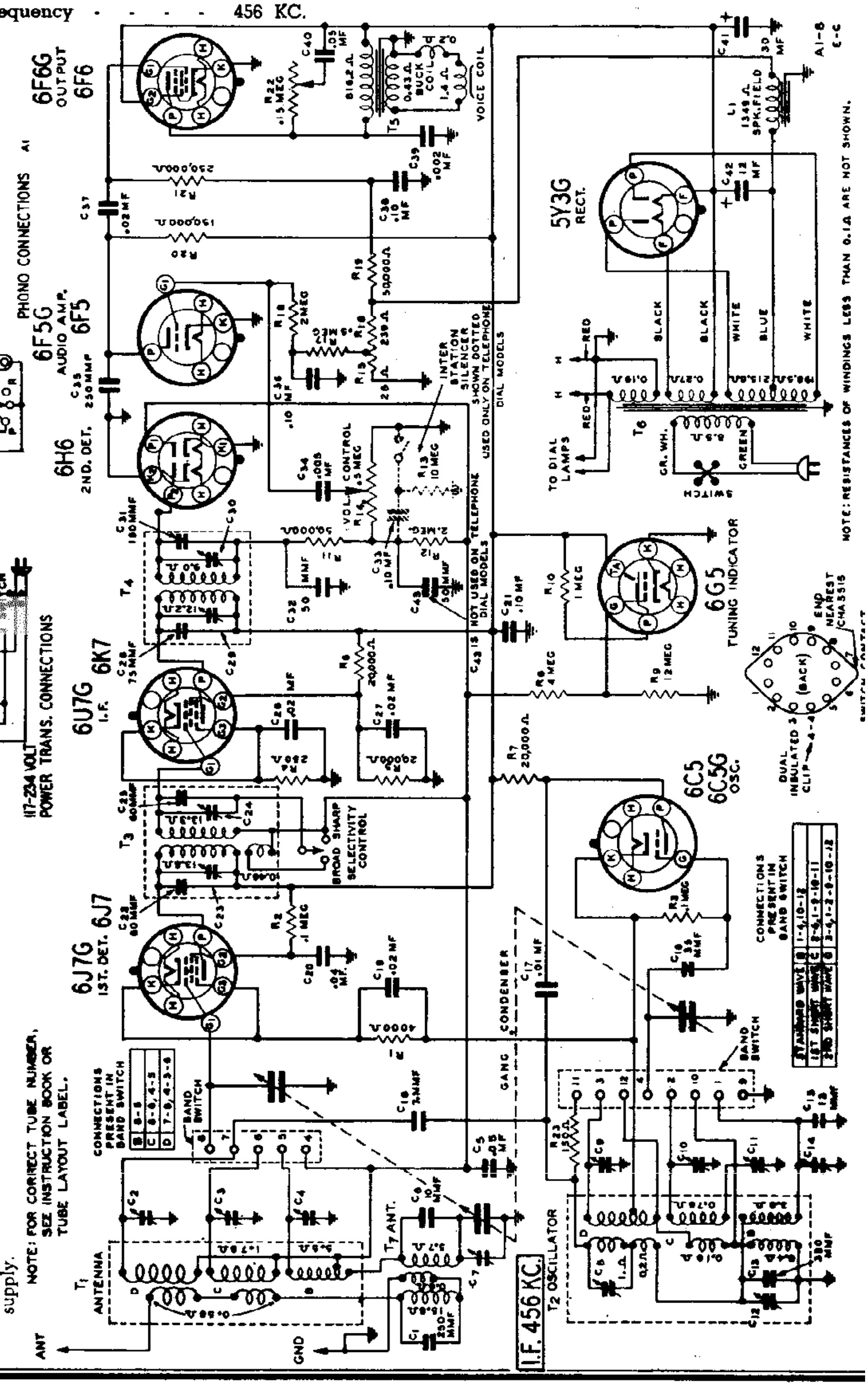
Selectivity - 30 KC Broad at 1000 times Signal
(Sharp)

Intermediate Frequency - - - - 456 KC.

Sensitivity

B Range.................. 8 Microvolts Average
C Range..................13 Microvolts Average
D Range.................. 9 Microvolts Average





Twenty-five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

MODEL 762
Socket, Chassis
Voltage, Coils

GAMBLE-SKOGMO, INC.

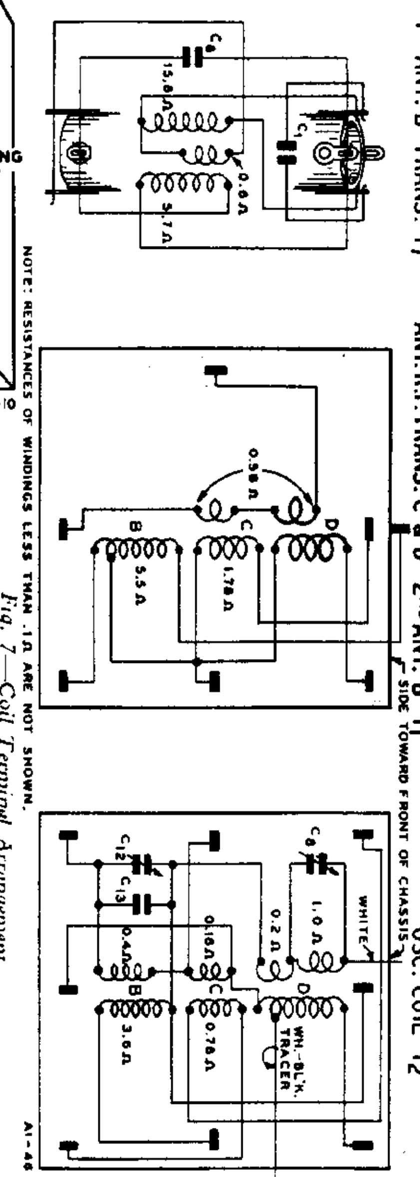


Fig. 7—Coil Terminal Arrangement and D.C. Resistance of Windings

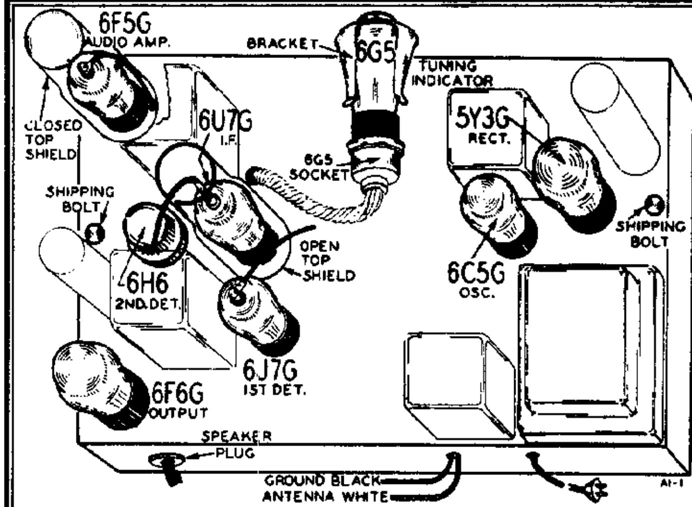


Fig. 4—Location of Tubes—Glass Tube Chassis

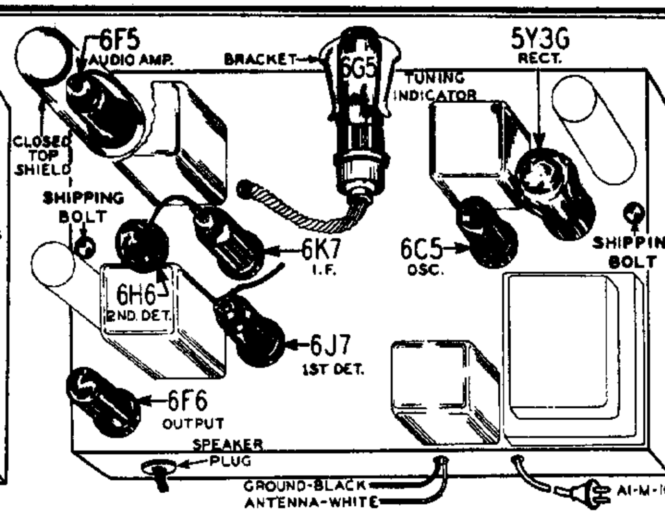


Fig. 6—Location of Tubes—Metal Tube Chassis

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum
Readings taken with 1000 Ohm-per-volt meter.

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6J7 6J7G	1st Det.	0	6.1(1)	220	100	7.9		6.1(1)	7.9
6C5 6C5G	Osc.	0	6.1(1)	140				6.1(1)	0
6K7 6U7G	I.F.	0	6.1(1)	220	100	2		6.1(1)	2
6H6	2nd Det.	0	6.1(1)		0			6.1(1)	0
6F5 6F5G	Audio Amp.	0	6.1(1)		75			6.1(1)	0(2)
6F6 6F6G	Power	0	6.1(1)	215	220			6.1(1)	0(3)
5Y3G	Rectifier	0	4.9(4)		610(5)		610(5)		4.9(4)
6G5	Tuning Indicator	Plate to Ground 20		Target to Ground 220		Cathode to Ground 0		Across Heater 6.1 A. C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Bias (1.5 volts) as read across resistor R15.
(3) Bias (14 volts) as read across resistors R15 and R16.
(4) A.C. voltage as read across filament terminals 2 and 8.
(5) A.C. voltage as read across terminals 4 and 6.

MODEL 762
Alignment
Trimmers, Data

GAMBLE-SKOGMO, INC.

APRIL, 1937

Speakers - - - - 8", 10" or 12" Dynamic

Tuning Frequency Range

B Range........................ 528 to 1930 KC.
C Range........................ 1810 to 6350 KC.
D Range........................ 6300 to 22000 KC.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter — Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR		TRIMMERS ADJUSTED See Illustration	PROCEDURE	
			FREQUENCY SETTING	CONNECTION AT RADIO		INITIAL STEPS	ADJUSTMENT
I. F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C29) & (C30)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C23) & (C24)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C14)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st Ant. Range B (C7) 2nd Ant. Range B (C4)	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C12)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C10)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3)	Turn Rotor to Max. Output	Adjust to Maximum Output
2000 KC	Range C	400 Ohm	2000 KC	Antenna Lead	2000 KC (C11)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C9)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Antenna Range D (C2)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
7000 KC	Range D	400 Ohm	7000 KC	Antenna Lead	7000 KC (C8)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

In sets using the moving beam of light indicator, there is a moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until the beam is at the 1500 KC mark on the dial. Retighten the screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

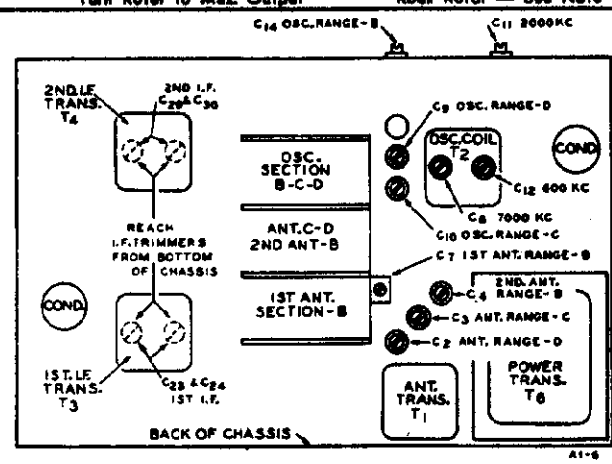


Fig. 3—Location of Trimmers

MODEL 762
Circuit Data
Notes, Parts

GAMBLE-SKOGMO, INC.

Circuit

This model is a three band AC operated radio with a tuning range as shown in the specifications above.

Referring to the schematic circuit diagram, Fig. 2, T1 and T7 are the antenna coil assemblies and T2 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively.

The band switch completes connections to the coils in use. When it is in the Range B position, a double tuned antenna R.F. stage is used while for the C and D Ranges, a single tuned secondary is used.

A type 6J7 tube functions as the 1st detector.

A separate type 6C5 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

One stage of I.F. amplification is employed using a 6K7 tube. The primaries and secondaries of the 1st and 2nd I.F. transformers are tuned by small trimmer condensers.

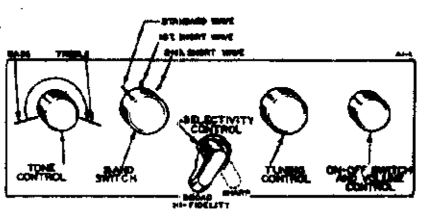


Fig. 1—Arrangement of Controls

Referring to Fig. 2, it will be noted that there is a coupling winding connected in series with the secondary of I.F. transformer T3. When the selectivity control is in the sharp position, the coupling winding is open circuited and the loose coupling which exists between the primary and secondary of this transformer results in high selectivity.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary is connected in series with the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

A 6H6 tube functions as a diode 2nd detector. AVC voltage is applied to the control grid circuits of the 1st detector and I.F. tubes.

A 6F5 triode tube functions as the first audio amplifier while the output stage uses a 6F6 output pentode tube. A dynamic reproducer is employed.

The power unit uses a 5Y3G full wave rectifier. A 6G5 tuning indicator tube is employed.

Glass and Metal Tubes

All sets of this series use a 6H6 metal tube and 5Y3G and 6G5 glass tubes.

It will be noted in the schematic that there are two tube type numbers shown at the other sockets. The "metal" tube sets use the upper tube type numbers which are for metal tubes while the "glass" tube sets use the lower tube type numbers which are for glass tubes.

Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram Fig. 2. On the side panel of the chassis base is a round knockout 1⅝ inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

Some models are shipped from the factory equipped with the phono socket. A jumper is inserted in this socket which must be removed, if the phonograph installation is made—See Fig. 2.

Early Models—A few of the early models did not have the circular knockout for the phonograph socket as mentioned above. If a phonograph installation is to be made in connection with one of these early models, write the factory for detailed instructions.

117-234 Volt Power Transformers

Some models are equipped with a 117-234 volt 40-to 60 cycle power transformer. Connections as shown in Fig. 2 are completed to a special octal socket mounted on the back panel of the chassis. A plug which goes with this socket may then be inserted for either the 117 volt or 234 volt connection.

If one of these transformers is to be installed in a chassis equipped with a regular transformer, there is a 1⅛ inch round knockout on the back panel which may be removed to permit installation of the octal socket mentioned above.

Dial and Drive Assembly

Complete information regarding the dial and drive assemblies will be found in the Dial and Drive Service Manual issued for this chassis.

Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter. With the exception of the parts otherwise indicated, the following parts are common to Series A1 chassis using either the Telephone Dial or the Phantom Light Dial.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A256	Tube Socket—Octal (7 Prong)	$0.15
3A261	Tube Socket—Octal (5 Prong)	.10
3A260	Tube Socket—Octal (8 Prong)	.15
3A262	Speaker Socket—(6 Prong)	.15
13X295	6G5 Tube Socket and Cable Assembly	.55
3A266	Phono Socket—Octal (4 Prong)	.10
3A252	Dual Keyway Socket—Octal (8 Prong)—Universal Power Transformer Connections	.15
6A214	Plug (4 Prong)—Used with above socket	.25

SPEAKERS

When ordering parts for speakers, specify part number of speaker and letter preceding part number stamped on the speaker.

Part No.	Description	List Price
12A290	8" Dynamic Speaker compl. with Output Transformer (T5)	4.30
	Cone and Voice Coil Assy. for above Spkr.	2.75
	Output Transformer only (T5)	2.45
12A260	10" Dynamic Speaker compl. with Output Transformer (T5)	4.66
	Cone and Voice Coil Assy. for above Spkr.	3.00
	Output Transformer only (T5)	2.45
12A291	12" Dynamic Speaker compl. with Output Transformer (T5)	7.55
	Cone and Voice Coil Assy. for above Spkr.	4.60
	Output Transformer only (T5)	2.45

KNOBS

Specify name of knob & name & model of radio	Description	List Price
	Volume Control	.15
	Tone Control	.15
	Tuning Control	.15
	Band Switch	.20
	Selectivity Control	.25

GENERAL

Part No.	Description	List Price
12X81	Tube Shield Base	.10
12X82	Tube Shield—Open Top (Used only on models having glass tubes)	.15
12X80	Tube Shield—Closed Top (Used on glass & metal tube chassis)	.15
8X23	Rubber Cushions (Chassis Mounting)	.10
7X30	Felt Washers (Used behind Knobs) doz.	.10
13X90	Line Cord and Plug	.80
13X314	Antenna and Ground Lead Assembly	.30
2A87	Band Change Switch (1 section, 3 position)—Used on Phantom Light Dial Radios only	1.05
2A85	Dial Lamp Switch—Used with above Switch on Phantom Light Dial only	.30
2A77	Band Change Switch (1 section, 3 position)—Used on Telephone Dial Radios only	1.00
28X375	Chassis Mounting Foot	.10
30X44	Grid Clip Only doz.	.10
2A78	Selectivity Switch	.40
4A46	Terminal Strip (3 Lugs Insulated)	.10
28X378	Clamp Bracket for Tuning Eye Tube	.10

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A774	T1	Antenna Transformer and Can Assembly "B" Range Secondary; C & D Range	$2.00
9A778	T7	1st Antenna Coil Assembly "B" Range	1.20
9A775	T2	Oscillator Coil and Can Assembly	2.35
9A776	T3	1st I.F. Transformer and Can Assembly	2.40
9A777	T4	2nd I.F. Transformer and Can Assembly	2.30
	T5	Output Transformer only (See "Speakers")	
53X144	T6	117 Volt, 60 Cycle, Standard Power Transformer	3.10
53X145	T6	117 Volt, 25 Cycle, Standard Power Transformer	5.20
53X146	T6	117-234 Volt, 40-60 Cycle, Universal Power Transformer	4.35

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
40X80	C5	.05 mf.	100	$0.15
40X128	C17	.01 mf.	340	.15
40X107	C19	.02 mf.	100	.15
40X212	C20	.04 mf.	340	.15
40X105	C21	.1 mf.	340	.20
40X107	C26	.02 mf.	100	.15
40X202	C27	.02 mf.	340	.15
*40X98	C33	.1 mf.	100	.20
40X147	C34	.005 mf.	340	.15

CONDENSERS (Cont.)

TUBULAR (Cont.)

Part No.	Code	Capacitance	Voltage	List Price
46X98	C36	.1 mf.	100	$0.20
46X202	C37	.02 mf.	340	.15
46X98	C38	.1 mf.	100	.20
46X180	C39	.002 mf.	600	.15
46X190	C40	.05 mf.	400	.20

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage	List Price
44X35	C41	30 mf.	250	.75
44X31	C42	12 mf.	340	.60

MOLDED

Part No.	Code	Capacitance	List Price
47X69	C1	250 mmf.	.15
47X63	C4	10 mmf.	.15
47X59	C18	7 mmf.	.10
47X36	C32	50 mmf.	.10
47X65	C35	250 mmf.	.15
*47X56	C43	50 mmf.	.10

TRIMMER

Part No.	Code	Capacitance	Description	List Price
17A73	C2, C3, C6	2-25 mmf.	Antenna Range—"D"; Antenna Range—"C"; 2nd Antenna Range—"B"	.35
17A74	C7	2-25 mmf.	1st Antenna Range—"B"	.10
17A69	C8 / C12	40-100 mmf. / 40-120 mmf.	Oscillator 7000 KC / Oscillator 600 KC	.40
17A76	C9 / C10	2-25 mmf.	Oscillator Range "D" / Oscillator Range "C"	.25
17A75	C11	1200-1700 mmf.	Range "C"—Series Padding	.30
17A68	C14	1-12 mmf.	Oscillator Range "B"	.20
17A70	C23 / C24	15-50 mmf.	1st I.F. Trimmers	.40
17A70	C29 / C30	15-50 mmf.	2nd I.F. Trimmers	.40

MISCELLANEOUS

Part No.	Code	Description	List Price
47X82	C13	300 mmf. Iron Clad	.30
47X81	C16	35 mmf. Iron Clad	.25
47X85	C22	60 mmf. Iron Clad	.30
47X85	C25	60 mmf. Iron Clad	.30
47X84	C28	75 mmf. Iron Clad	.35
47X87	C31	160 mmf. Iron Clad	.30
47X80	C15	13 mmf. Compensating Capacitor	.50
16A78		3 Section Gang Condenser less Gears and Dial Assy.	4.20

* Used only on Telephone Dial Models.
† Used only on Phantom Light Dial Models.

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A95402	R1	4000 Ohm	0.2	$0.10
A94104	R2	100,000 Ohm	0.2	.15
A94104	R3	100,000 Ohm	0.2	.15
A95251	R4	250 Ohm	0.2	.15
C96203	R5	20,000 Ohm	1.0	.18
C96203	R6	20,000 Ohm	1.0	.18
B96203	R7	20,000 Ohm	0.5	.15
A94405	R8	4 Megohm	0.2	.15
A94126	R9	12 Megohm	0.2	.15
A95105	R10	1 Megohm	0.2	.10
A95503	R11	50,000 Ohm	0.2	.10
A95205	R12	2 Megohm	0.2	.10
*A95106	R13	10 Megohm	0.2	.10
A95504	R17	500,000 Ohm	0.2	.10
A95205	R18	2 Megohm	0.2	.10
A95503	R19	50,000 Ohm	0.2	.10
A95154	R20	150,000 Ohm	0.2	.10
A95254	R21	250,000 Ohm	0.2	.10
A95181	R23	180 Ohm	0.2	.10

WIRE WOUND

Part No.	Code	Resistance	Wattage	List Price
43X76	R15	24 Ohm	.25	.35
	R16	219 Ohm	2.0	

VARIABLE

Part No.	Code	Description	List Price
34X236	R14	.5 Megohm Volume Control and On-Off Switch	.90
40X223	R22	.15 Megohm Tone Control	.45

* Used only on Telephone Dial Models.

PHONO ATTACHMENT PARTS

Part No.	Description	List Price
13X298	30" Phono Cable Assembly Complete (Includes Plug, Double-tip Phono Jack, Switch, and Knob)	$2.55
3A266	Phono Socket—Octal (4 Prong)—Must be ordered for Chassis not equipped with this socket	.10
6A218	Plug (8 Prong) Only of Phono Cable	.15
3A12	Phono Jack Only of Phono Cable	.10
2A80	Phono Switch Only of Phono Cable	.70
10A90	Knob Only of Phono Cable	.20

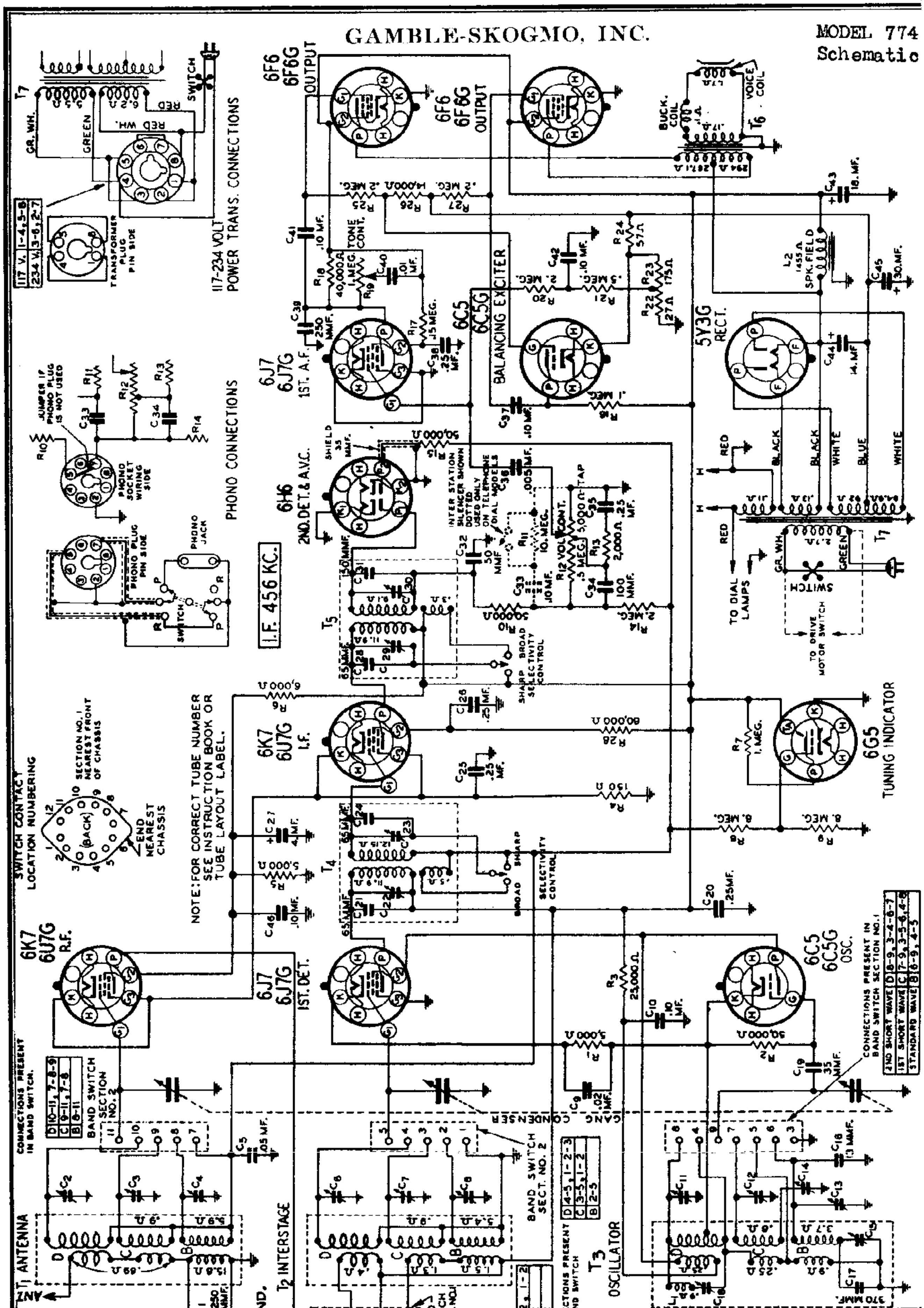
DIAL AND DRIVE ASSEMBLY

DIAL AND DRIVE PARTS WILL BE FOUND IN SPECIAL DIAL AND DRIVE MANUAL.

Prices Subject to Change Without Notice.

GAMBLE-SKOGMO, INC.

MODEL 774
Schematic



MODEL 774
Alignment
Trimmers

GAMBLE-SKOGMO, INC.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter — Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I. F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C29) & (C30)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C22) & (C23)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C13)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	Ant. Range B (C4) Int. Range B (C8)	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C15)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C12)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3) Int. Range C (C7)	Turn Rotor to Max. Output	Adjust to Maximum Output
2000 KC	Range C	400 Ohm	2000 KC	Antenna Lead	2000 KC (C14)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C11)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Ant. Range D (C2) Int. Range D (C6)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
7000 KC	Range D	400 Ohm	7000 KC	Antenna Lead	7000 KC (C18)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

In sets using the moving beam of light indicator, there is a moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until the beam is at the 1500 KC mark on the dial. Retighten the screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

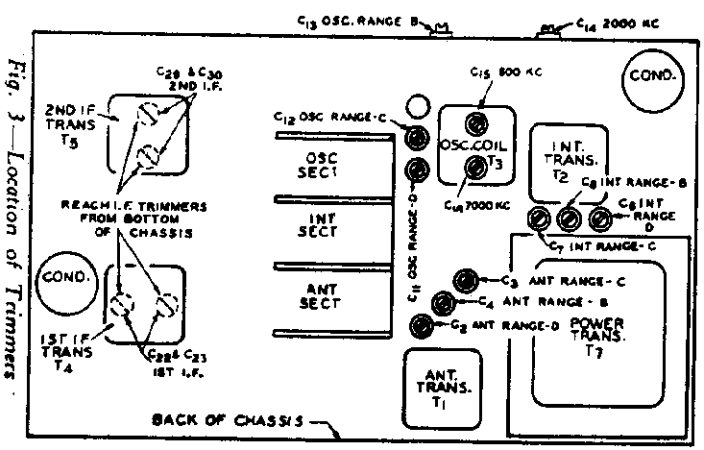


Fig. 3—Location of Trimmers

MODEL 774
Voltage, Socket
Chassis, Coils

GAMBLE-SKOGMO, INC.

Power Consumption - 100 Watts (At 117 volts 60 cycles)

Power Output - - - - - - 9.8 Watts Undistorted, 12 Watts Maximum

Selectivity - - 27 KC Broad at 1000 times Signal (Sharp)

Intermediate Frequency - - - - - - - - 456 KC.

Speaker - - - - - - - - - - 12" Dynamic

Tuning Frequency Range

B Range .... 528 to 1830 KC.
C Range .... 1810 to 6350 KC.
D Range .... 6300 to 22000 KC.

Sensitivity

B Range .... 1.0 Microvolts Average
C Range .... 1.0 Microvolts Average
D Range .... 2.0 Microvolts Average

MAY, 1937

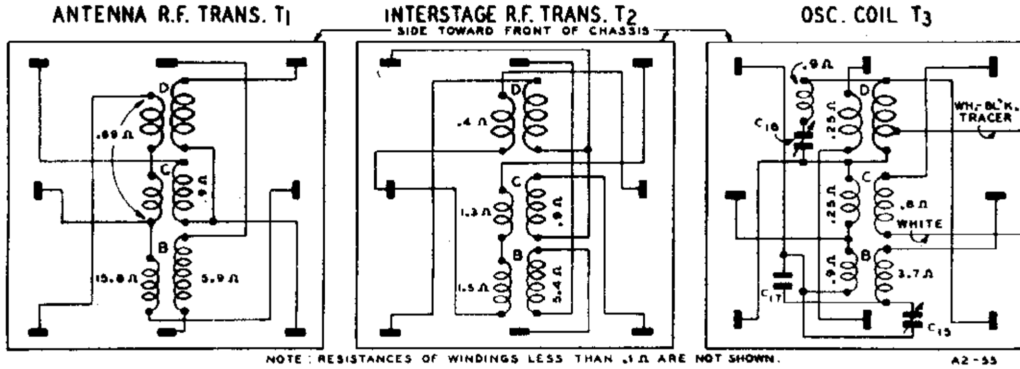


Fig. 6—Coil Terminal Arrangement and DC Resistance of Windings

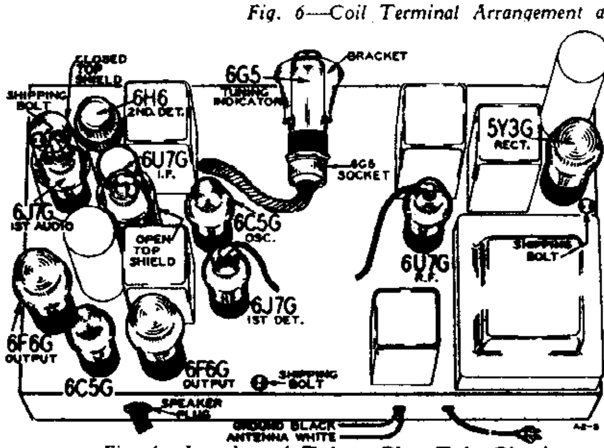


Fig. 4—Location of Tubes—Glass Tube Chassis

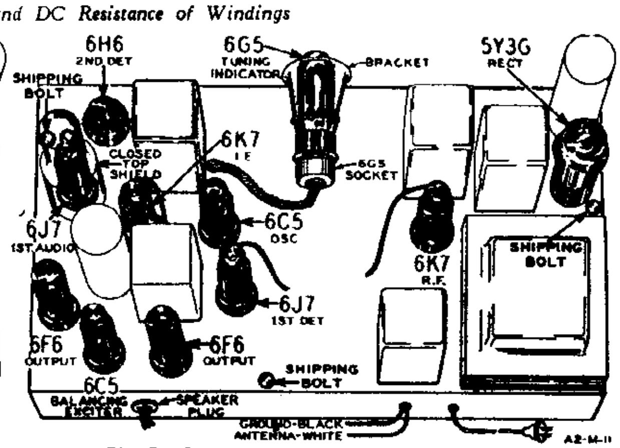


Fig. 5—Location of Tubes—Metal Tube Chassis

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum — Antenna Shorted to Ground
Readings taken with 1000 Ohm-per-volt meter. — Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7 6U7G	R.F.	0	6.1(1)	250	106	2.5		6.1(1)	2.6
6J7 6J7G	1st Det.	0	6.1(1)	250	125	0		6.1(1)	5.8
6C5 6C5G	Osc.	0	6.1(1)	125(2)				6.1(1)	0
6K7 6U7G	I.F.	0	6.1(1)	250	100	2.5		6.1(1)	2.5
6H6	2nd Det.—A.V.C.	0	6.1(1)					6.1(1)	0
6J7 6J7G	1st A.F.	0	6.1(1)	110	120	0(3)		6.1(1)	0(3)
6C5 6C5G	Balancing Exciter	0	6.1(1)	100				6.1(1)	18.5
6F6 6F6G	Output	0	6.1(1)	330	250			6.1(1)	0(4)
5Y3G	Rectifier	0	4.8(5)		730(6)		730(6)		4.8(5)

TUBE	FUNCTION	Plate to Ground	Target to Ground	Cathode to Ground	Across Heater
6G5	Tuning Indicator	20	250	0	6.1 A.C.

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Subject to variation.
(3) Bias (2.5 volts) as read across resistor R22.
(4) Bias (24 volts) as read across resistors R22, R23, & R24.
(5) A.C. voltage as read across filament terminals 2 and 8.
(6) A.C. voltage as read across terminals 4 and 6.

GAMBLE-SKOGMO, INC.

Twenty-Five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true—the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram Fig. 2. On the front panel of the chassis base is a round knockout 1⅛ inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

Some models are shipped from the factory equipped with the phono socket. A jumper is inserted in this socket which must be removed if the phonograph installation is made—see Fig. 2.

117-234 Volt Power Transformers

Some models are equipped with a 117-234 volt 40 to 60 cycle power transformer. Connections as shown in Fig. 2 are completed to a special octal socket mounted on the back panel of the chassis. A plug which goes with this socket may then be inserted for either the 117 volt or 234 volt connection.

If one of these transformers is to be installed in a chassis equipped with a regular transformer, there is a 1⅛ inch round knockout on the back panel which may be removed to permit installation of the octal socket mentioned above.

Dial and Drive Assembly

Complete information regarding the dial and drive assemblies will be found in the Dial and Drive Service Manual issued for this chassis.

Changes in Later Models

Later models of this series have the following changes incorporated in them.

On the first models, the 2nd I.F. Coil was not expanded. In other words, the extra selectivity coupling winding was not incorporated in the early type coil. Models with the letter "C" or any later issue stamped on the chassis use the new type coil with the selectivity coupling winding. Because of the change in coil connections, the selectivity switch used on the late model is not interchangeable with that on the early model.

When ordering parts, therefore, it is important that the issue letter on the chassis be noted and the correct part number as shown in the parts list be specified.

The R.F. circuit of early models was slightly different from that used in later models. The screen grids of the R.F. and I.F. tubes now supplied by separate voltage sources were formerly connected together and supplied from a single source. On the latter models, resistor R 28 and condenser C 46 were not used.

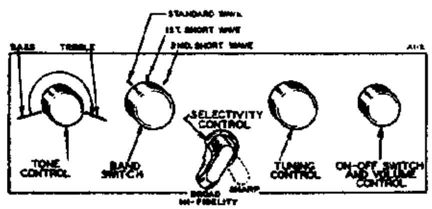


Fig. 1—Arrangement of Controls

Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

Prices Subject to Change Without Notice.

Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A254	Tube Socket—Octal (7 Prong)	$0.15
3A253	Tube Socket—Octal (8 Prong)	.16
3A251	Tube Socket—Octal (6 Prong)	.14
3A252	Speaker Socket (6 Prong)	.15
12X295	Tuning Eye Tube Socket and Cable Assembly	.85
3A266	Phono Socket—Octal (4 Prong)	.10
3A282	Dual Keyway Socket—Octal (8 Prong)—Universal Power Transformer Connections	.15
6A214	Plug (4 Prong)—Used with above Socket	.25

SPEAKERS

When ordering parts for speakers, specify part number of speaker and letter preceding part number stamped on the speaker.

Part No.	Description	List Price
12A269	12" Dynamic Speaker, complete with Output Trans. (T6)	7.70
	Cone and Voice Coil Assembly for above speaker	4.40
	Output Transformer only (T6)	2.46

KNOBS

Part No.	Description	List Price
Specify Name of Knob & Name & Model of Radio	Volume Control Knob	.15
	Tone Control Knob	.15
	Tuning Control Knob	.15
	Band Switch Knob	.20
	Selectivity Control Knob	.25

GENERAL

Part No.	Description	List Price
25X378	Clamp Bracket for Tuning Eye Tube	.10
32X50	Tube Shield—Closed Top (Used on glass and metal tube chassis)	.15
32X32	Tube Shield—Open Top (Used only on models having glass tubes)	.15
32X51	Tube Shield Base	.10
2X38	Felt Washers (Used Behind Knobs) doz.	.10
8X23	Rubber Cushions (Chassis Mounting)	.10
30X44	Grid Clip only doz.	.10
2A78	Selectivity Switch (Early Type—Used when 2nd I.F. is not expanded)	.40
2A83	Selectivity Switch (Late Type—Used when 2nd I.F. is expanded)	.45
4A38	Terminal Strip (1 lug insulated, one lug used for mtg.)	.10
4A83	Terminal Strip (3 lugs insulated, mounting hole used)	.16
4A48	Terminal Strip (3 lugs insulated)	.18
12X214	Antenna and Ground Lead Assembly	.30
13X80	Line Cord and Plug	.50
2A79	Band Switch (2 section, 3 position)	1.65

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A779	T1	Antenna Transformer and Can Assembly	$2.15
9A780	T2	R.F. Interstage Transformer and Can Assembly	2.30
9A781	T3	Oscillator Coil and Can Assembly	3.40
9A782	T4	1st I.F. Transformer and Can Assembly	2.40
9A783	T5	2nd I.F. Transformer and Can Assembly (Early Type—Without selectivity coupling winding)	2.25
9A857	T5	2nd I.F. Transformer and Can Assembly (Late Type—With selectivity coupling winding)	2.25
	T6	Output Transformer (See "Speakers")	
53X148	T7	117 Volt, 60 Cycle, Standard Power Transformer	4.45
53X149	T7	117 Volt, 25 Cycle, Standard Power Transformer	7.15
53X150	T7	117-234 Volt, 40-60 Cycle, Universal Power Transformer	5.75

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X80	C5	.05 mf.	180	$0.15
46X187	C9	.02 mf.	180	.15
46X105	C10	.10 mf.	340	.20
46X121	C20	.25 mf.	340	.30
46X117	C25	.25 mf.	180	.25
46X121	C26	.25 mf.	340	.30
46X98	C33	.10 mf.	180	.20
46X197	C35	.25 mf.	180	.25
46X147	C36	.005 mf.	340	.15
46X105	C37	.10 mf.	340	.20
46X121	C38	.25 mf.	340	.30
46X161	C40	.01 mf.	400	.15
46X105	C41	.10 mf.	340	.20
46X98	C42	.10 mf.	180	.20
*46X161	C46	.10 mf.	340	.15

CONDENSERS (Cont.)

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage	List Price
45X223	C27	4 mf.	150 Dry	$0.75
44X11	C43	18 mf.	290 Wet	1.10
44X30	C44	14 mf.	460 Wet	1.00
45X222	C45	30 mf.	25 Dry	.95

MOLDED

Part No.	Code	Capacitance	List Price
47X69	C1	250 mmf.	.15
47X81	C19	35 mmf.	.25
47X56	C32	50 mmf.	.10
47X57	C34	100 mmf.	.10
47X65	C39	250 mmf.	.15

TRIMMER

Part No.	Code	Capacitance	Description	List Price
17A73	C2	2-25 mmf.	Range "D" Antenna Trimmer	.35
	C3	2-25 mmf.	Range "C" Antenna Trimmer	
	C4	2-25 mmf.	Range "B" Antenna Trimmer	
17A73	C6	2-25 mmf.	Range "D" Interstage Trimmer	.35
	C7	2-25 mmf.	Range "C" Interstage Trimmer	
	C8	2-25 mmf.	Range "B" Interstage Trimmer	
17A74	C11	2-25 mmf.	Range "D" Oscillator Trimmer	.25
	C12	2-25 mmf.	Range "C" Oscillator Trimmer	
17A68	C13	1-12 mmf.	Range "B" Oscillator Trimmer	.20
17A75	C14	1300-1700 mmf.	2000 KC Adjustment	.50
17A69	C15	40-120 mmf.	Oscillator 600 KC Adjustment	.40
	C18	40-100 mmf.	Oscillator 7000 KC Adjustment	
17A70	C22	15-55 mmf.	1st I.F. Trimmer	.40
	C23	15-55 mmf.		
17A70	C29	15-55 mmf.	2nd I.F. Trimmer	.40
	C30	15-55 mmf.		

MISCELLANEOUS

Part No.	Code	Capacitance	Description	List Price
47X80	C16	13 mmf.	Compensating Capacitor	.50
47X89	C17	370 mmf.	Iron Clad	.30
47X91	C21	65 mmf.	Iron Clad	.25
47X91	C24	65 mmf.	Iron Clad	.25
47X91	C28	65 mmf.	Iron Clad	.25
47X83	C31	150 mmf.	Iron Clad	.35
14A70			3 Section Gang Condenser (less dial and drive assembly)	4.20

* Used on late models only.

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A94502	R1	5,000 Ohm	0.2	$0.15
A94503	R2	50,000 Ohm	0.2	.15
C94253	R3	25,000 Ohm	1.0	.15
A94151	R4	150 Ohm	0.2	.15
E94502	R5	5,000 Ohm	3.0	.30
G94602	R6	6,000 Ohm	5.0	.40
A95105	R7	1 Megohm	0.2	.10
A94805	R8	8 Megohm	0.2	.15
A94805	R9	8 Megohm	0.2	.15
A95503	R10	50,000 Ohm	0.2	.10
A95106	R11	10 Megohm	0.2	.10
A94202	R13	2,000 Ohm	0.2	.15
A95205	R14	2 Megohm	0.2	.10
A95503	R15	50,000 Ohm	0.2	.10
A94104	R16	100,000 Ohm	0.2	.15
A94154	R17	150,000 Ohm	0.2	.15
B94403	R18	40,000 Ohm	0.5	.15
A95205	R20	2 Megohm	0.2	.10
A95504	R21	500,000 Ohm	0.2	.10
B93570	R24	57 Ohm	0.5	.20
A93204	R25	200,000 Ohm	0.2	.20
A93143	R26	14,000 Ohm	0.2	.20
A95204	R27	200,000 Ohm	0.2	.10
*B94803	R28	80,000 Ohm	0.5	.15

WIRE WOUND

Part No.	Code	Resistance	Wattage	List Price
43X77	R22	27 Ohm	0.25	.35
	R23	175 Ohm	2.0	

VARIABLE

Part No.	Code	Resistance	Description	List Price
36X236	R12	500,000 Ohm	Volume Control and On-Off Switch	1.00
40X224	R19	1 Megohm	Tone Control	.65

* Used on late models only.

PHONO ATTACHMENT PARTS

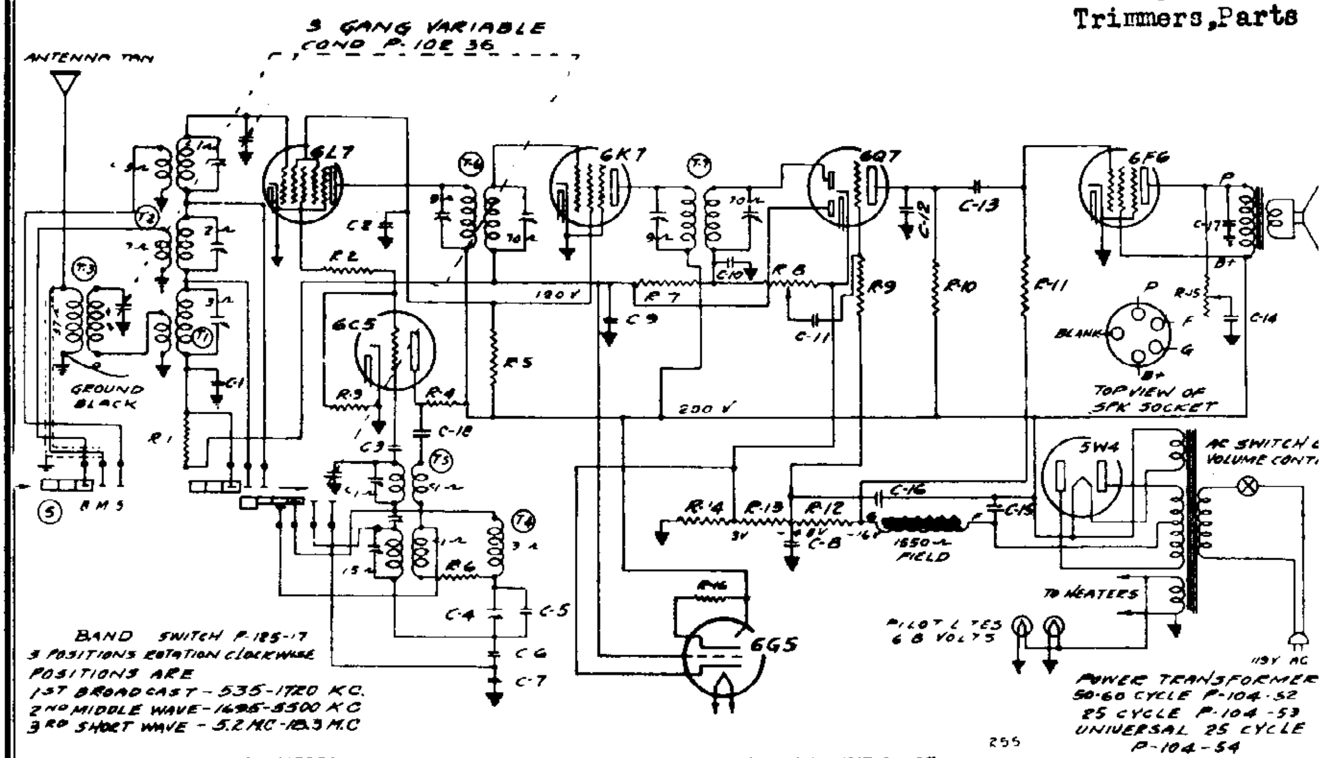
Part No.	Description	List Price
12X298	30" Phono Cable Assembly Complete (Includes Plug, Double-tip Phono Jack, Switch, and Knob)	$2.55
3A266	Phono Socket—Octal (4 Prong)—Must be ordered for Chassis not equipped with this socket	.10
6A218	Plug (8 Prong) Only of Phono Cable	.15
2A12	Phono Jack Only of Phono Cable	.10
2A50	Phono Switch Only of Phono Cable	.70
10A90	Knob Only of Phono Cable	.20

DIAL AND DRIVE ASSEMBLY

DIAL AND DRIVE PARTS WILL BE FOUND IN SPECIAL DIAL AND DRIVE MANUAL.

MODEL 787
Schematic
Voltage, Socket
Trimmers, Parts

GAMBLE-SKOGMO, INC.



255

RESISTORS

No.	Part No.	Description
R1	130-20	100M Ohm—½ Watt—20%— 50 Volt Carbon
R2,	130-105	150 Ohm—½ Watt—20%— 10 Volt Carbon
R3	130-12	50M Ohm—½ Watt—20%— 10 Volt Carbon
R4	130-104	9M Ohm— 1 Watt—20%—100 Volt Carbon
R5	130-34	19M Ohm— 1 Watt—20%—100 Volt Carbon
R6	130-27	50 Ohm—½ Watt—20%— 3 Volt Carbon
R7	130-19	1 Meg Ohm—½ Watt—20%—100 Volt Carbon
R8	101-46	1 Meg Ohm—Volume Control
R9	130-4	3 Meg Ohm—½ Watt—20%—100 Volt Carbon
R10	130-103	100M Ohm—½ Watt—20%— 50 Volt Carbon
R11	130-102	500M Ohm—½ Watt—10%— 50 Volt Carbon
R12	106-26	220 Ohm
R13	106-26	32 Ohm
R14	106-26	52 Ohm
R15	101-53	50M Ohm—Tone Control
R16	130-110	1 Meg Ohm—1/10 Watt—10%—100 Volt Carbon

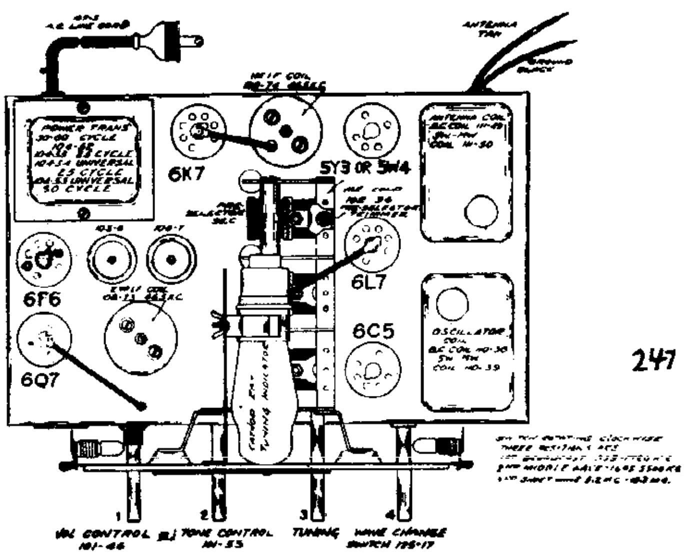
CONDENSERS

C1	100-22	.05x200 Volt—25%
C2	100-1	.1x400 Volt— + 50%—10%
C3	129-39	.00005 Mica (MT-O)—20%
C4	124-28	Series Pad (80-225)
C5	129-65	.00055 Mica (MT-O)—5%
C6	129-55	.0034 Mica (MW-W)—2½%
C7	129-54	.003 Mica (MW-W)—2½%
C8	100-20	.1x200 Volt—25%
C9	100-22	.05x200 Volt—25%
C10	129-12	.00025 Mica (MT-0)—20%
C11	100-11	.01x400 Volt—25%
C12	129-2	.0005 Mica (MT-O)—20%
C13	100-11	.01x400 Volt —25%
C14	100-27	.025x600 Volt—25%
C15	103-6	8 Mfd. x 350 Volt Electrolytic
C16	103-7	8 Mfd. x 300 Volt Electrolytic
C17	100-25	.002x600 Volt—20%
C18	100-37	.003x600 Volt—10%

PARTS

T1	111-49	Broadcast Antenna Coil
T2	111-50	S.W.-M.W. Antenna Coil
T3	111-51	B.C.-Pre-Selector Coil Assem.
T4	110-38	B.C. Oscillator Coil
T5	110-39	S.W.-M.W. Oscillator Coil
T6	108-74	Input I.F. - 465 K.C.
T7	108-73	Output I.F. - 465 K.C.
S	125-17	Wave Change Switch

I. F. FREQUENCY 465 K. C.



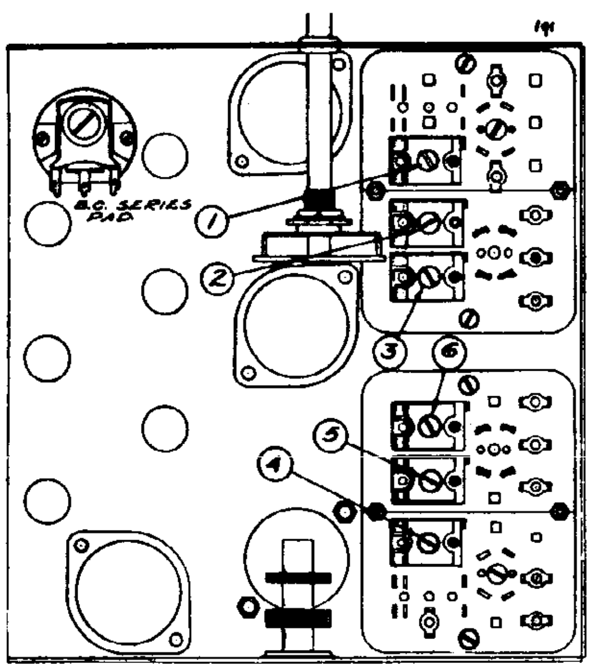
60 Cycle, 55 Watt, 105-115 Volt
BRC-787 (Model 787), Series A

FIG. 1—TOP VIEW

247

FIG. 3—BOTTOM VIEW

(Showing Trimmers)



MODEL 787
Alignment
Notes

GAMBLE-SKOGMO, INC.

Including Cathode-Ray Tuning Indicator
3-Band A. C. Superheterodyne Receiver

TUNING RANGE—
Standard Broadcast Band 535-1720 Kilocycles.
Middle Wave Band 1695-5500 Kilocycles.
Short Wave Band 5.2-18.3 Megacycles.

DESCRIPTION:

Model 787 is a seven tube A.C. all wave superheterodyne receiver. It has a tuning range of 535 K.C. to 18.3 megacycles in three bands, and is characterized by its exceptional stability, and by a sensitivity both high and uniform, with high signal to noise ratio on all bands. The I.F. frequency used is 465 K.C., which in conjunction with the pre-selector circuit, gives high image and I.F. attenuation (freedom from whistles and telegraphic interference).

A separate oscillator; effective automatic volume control; broad nose sharp skirt selectivity and new type oval airplane dial, are a few of the outstanding features of this model.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40, and 60 cycles and with primary taps for 108, 127, 150, 225 and 260 volts (see instructions), and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

TUBE COMPLEMENT:

The tube complement of the model 787 consists of the latest metal tubes. They are as follows:

1-Type 6L7 Pentagrid Mixer, First Detector.

1-Type 6C5 Oscillator.

1-Type 6K7 Remote Cut-off Pentode, I.F. Amplifier (465 K.C.).

1-Type 6Q7 Duplex Diode Triode Second Detector, A.V.C. and First Audio.

1-Type 6F6 Pentode Output Amplifier.

1-Type 5W4 High Vacuum Rectifier.

1-Type 6G5 Cathode-Ray Tuning Indicator. (Note: 6G5 available in all glass only.)

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram are measured with 119 volts on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. Remove the knobs and the four bolts which are used to fasten the chassis.

All adjustments should be made, with a non-metallic screw driver.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 6F6 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

ALIGNING I.F. TRANSFORMERS; (465 K.C.):

Part No. 108-73 Output I.F. Transformer.
Part No. 108-74 Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), the band changing switch in the broadcast position (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   - (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-73) to resonance.
   - (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6L7 and adjust input I.F. transformer (No. 108-74) to resonance.
   - (c) With oscillator still connected to 6L7, readjust output I.F. transformer (108-73) if necessary.

ALIGNMENT PROCEDURE:

The following adjustments to be made after the I.F.'s have been aligned as explained above.

BROADCAST BAND ALIGNMENT:

535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   - (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly, Fig. 3).
   - (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   - (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)
   - (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   - (e) Check for tracking and sensitivity at 1000 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

SHORT WAVE BAND ALIGNMENT:

5.2 to 18.3 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   - (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment number 3) and short wave antenna (Adjustment number 6) to resonance.
   - (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   - (c) Re-set external oscillator and check set at 18.1 megacycles and 5.3 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 18.3 megacycle signal appears near 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:

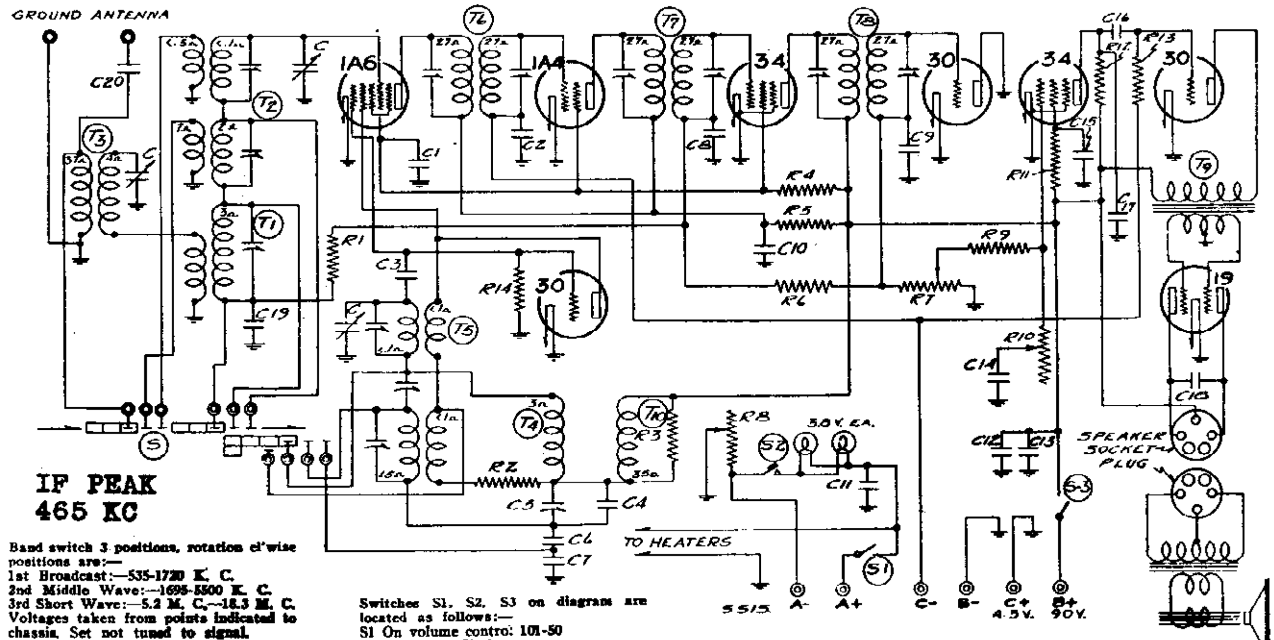
1695 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   - (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (Adjustment number 2) and middle wave antenna (Adjustment number 5) to resonance.
   - (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   - (c) Re-set external oscillator and check set at 5400 kilocycles and 1700 kilocycles for band coverage.

Schematic, Socket
Trimmers, Parts

GAMBLE-SKOGMO, INC.

MODEL 822



IF PEAK 465 KC

Band switch 3 positions, rotation cl'wise positions are:—
1st Broadcast:—535-1720 K. C.
2nd Middle Wave:—1695-5500 K. C.
3rd Short Wave:—5.2 M. C.—18.3 M. C.
Voltages taken from points indicated to chassis. Set not tuned to signal.

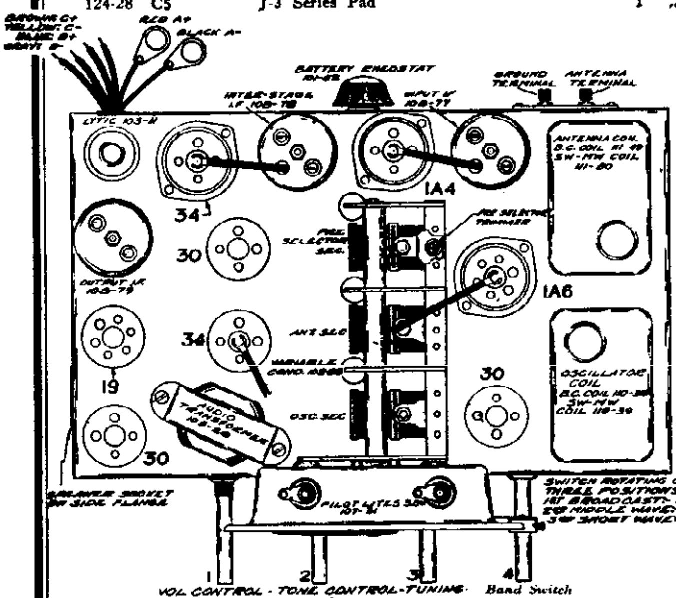
Switches S1, S2, S3 on diagram are located as follows:—
S1 On volume control 101-50
S2 On tuning Shaft
S3 On volume control 101-50

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

LIST OF REPAIR PARTS (Serial No. 6K 411500 and up)

Use Only Genuine Factory Replacement Parts

Part No.	Circuit Diagram Reference	Description	No. Used in Set	List Price Each
		CONDENSERS		
100-5B	C11	1.0 x 120 Volt Tubular with Bracket	1	.50
100-6	C1	.25 x 200 Volt Tubular less Bracket	1	.35
100-6B	C13	.25 x 200 Volt Tubular with Bracket	1	.35
100-11	C14, C16, C20	.01 x 400 Volt Tubular	3	.25
100-20	C10	.1 x 200 Volt Tubular	1	.25
100-22	C2, C8, C15, C19	.05 x 200 Volt Tubular	4	.25
100-25	C18	.002 x 600 Volt Tubular	1	.25
103-11	C12	8 Mfd. x 200 Volt Electrolytic	1	.75
129-5	C17	.0001 Mica—Type MT—20%	1	.25
129-12	C9	.00025 Mica—Type MT—20%	1	.25
129-50	C3	.00004 Mica—Type MT—30%	1	.25
129-54	C7	.003 Mica—Type MW—2½%	1	.35
129-55	C6	.0034 Mica—Type MW—2½%	1	.35
129-65	C4	.00055 Mica—Type MT—5%	1	.25
		MISCELLANEOUS		
101-50	R7	Volume Control and Switch (250 M ohm)	1	1.25
101-51	R10	Tone Control (300 M ohm)	1	.70
101-52	R8	Filament Rheostat (2 ohm)	1	.50
102-28	C	Three Gang Variable Condenser	1	4.00
105-28	T9	Audio Input Transformer	1	1.75
113-34		Ant.-Gnd. Strip	1	.15
115-35		Antenna-Oscillator Shield	2	.15
115-46		Shield Cap for Part 115-49	2	.05
115-49		Tube Shield for Types 1A4—1A6 Tubes	2	.15
115-55		Tube Shield for Type 34 Tube	1	.10
124-28	C5	J-3 Series Pad	1	.35
125-17	S	Band Switch	1	.85
128-51		Wood Knob with Spring	3	.15
128-52		"Tuning" Knob with Set Screw—Wood	1	.15
131-12		Bakelite Knob with Arrow	1	.15
		RESISTORS		
130-11	R12	250M Ohm—⅓ Watt—20%—50 Volt Carbon	1	.20
130-12	R3, R9, R14	50M Ohm—⅓ Watt—20%—20 Volt Carbon	3	.20
130-19	R6, R11, R13	1 Meg Ohm—⅓ Watt—20%—100 Volt Car.	3	.20
130-20	R1	100M Ohm—⅓ Watt—20%—50 Volt Carbon	1	.20
130-27	R2	50 Ohm—⅓ Watt—20%—3 Volt Carbon	1	.20
130-31	R5	1500 Ohm—⅓ Watt—20%—10 Volt Carbon	1	.20
130-109	R4	7500 Ohm—⅓ Watt—20%—50 Volt Carbon	1	.20
		COILS		
108-77	T6	Input I.F. complete with Can	1	1.25
108-78	T7	Interstage I.F. complete with Can	1	1.25
108-79	T8	Output I.F. complete with Can	1	1.25
110-38	T4	Broadcast Oscillator Coil Complete	1	.50
110-39	T5	Mid-Wave & Short Wave Oscillator Coil Com.	1	1.50
111-49	T1	Broadcast Antenna Coil Assembly Complete	1	.75
111-50	T2	Mid-Wave & Short Wave Antenna Coil Assem. Complete	1	1.50
111-51	T3	Broadcast Preselector Coil	1	.75
123-3	T10	R.F. Choke Coil	1	.35



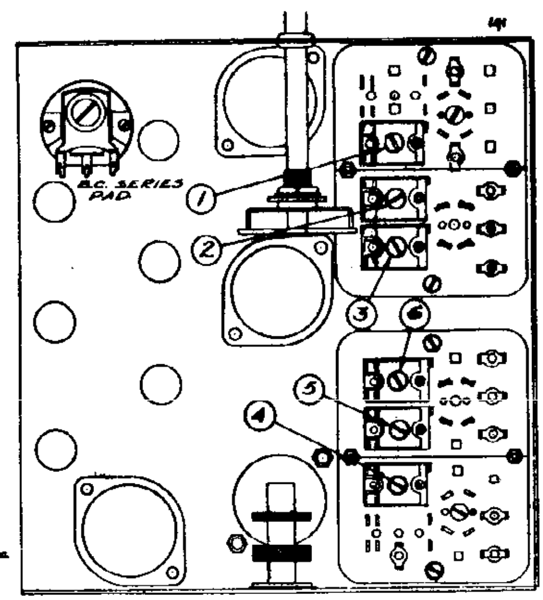


FIG. 3 — BOTTOM VIEW SHOWING TRIMMERS

MODEL 822
Alignment
Notes

GAMBLE-SKOGMO, INC.

BAND	DIAL SCALE	FREQUENCY RANGE
Broadcast	Outer Scale	535 to 1720 K.C. (Kilocycles)
Middle Wave	Center Scale	1695 to 5500 K.C. (Kilocycles)
Short Wave	Inner Scale	5.2 to 18.3 M.C. (Megacycles)

BATTERIES REQUIRED:

The following batteries are required:

2—45 Volt "B" Batteries.
1—4½ Volt "C" Battery.
1—3 Volt Dry "A" Battery or 2 Volt Storage Battery.

TUBES:

The tube complement of this chassis is as follows:

1—Type 1A6 Pentagrid Mixer, First Detector.
1—Type 1A4 Tetrode First I.F. Amplifier (465 K.C.)
1—Type 34 Remote Cut-Off Pentode, 2nd I.F. Amplifier (465 K.C.)
1—Type 30 Oscillator.
1—Type 30 Second Detector and A. V. C.
1—Type 34 A.F. Amplifier.
1—Type 30 Driver Amplifier.
1—Type 19 Class "B" Push-Pull Output Amplifier.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram, are measured with a new set of batteries.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

The approximate current consumption is as follows:
"A"—660 ma., "B"—18 to 24 ma.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the two plate terminals of the type 19 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-79 Output I.F. Transformer
Part No. 108-78 Interstage I.F. Transformer
Part No. 108-77 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 34 tube, and adjust the output I.F. transformer (No. 108-79) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 34 to grid cap to 1A4 and adjust interstage I.F. transformer (No. 108-78) to resonance.
   (c) Move oscillator to grid cap of 1A6 and adjust input I.F. transformer (No. 108-77).

BROADCAST BAND ALIGNMENT:

535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground posts, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 1; see bottom view of coil assembly, Fig. 3)
   (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment).
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. Under no circumstances bend plates of variable condenser sections to correct tracking.

SHORT WAVE BAND ALIGNMENT:

5.2 to 18.3 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the antenna and ground posts, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 3) and short wave antenna (adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.3 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental on the receiver dial. As an example of this a fundamental 18.3 megacycle signal can be tuned in not only at 18.3 on the dial but also at approximately 17.4 megacycles.

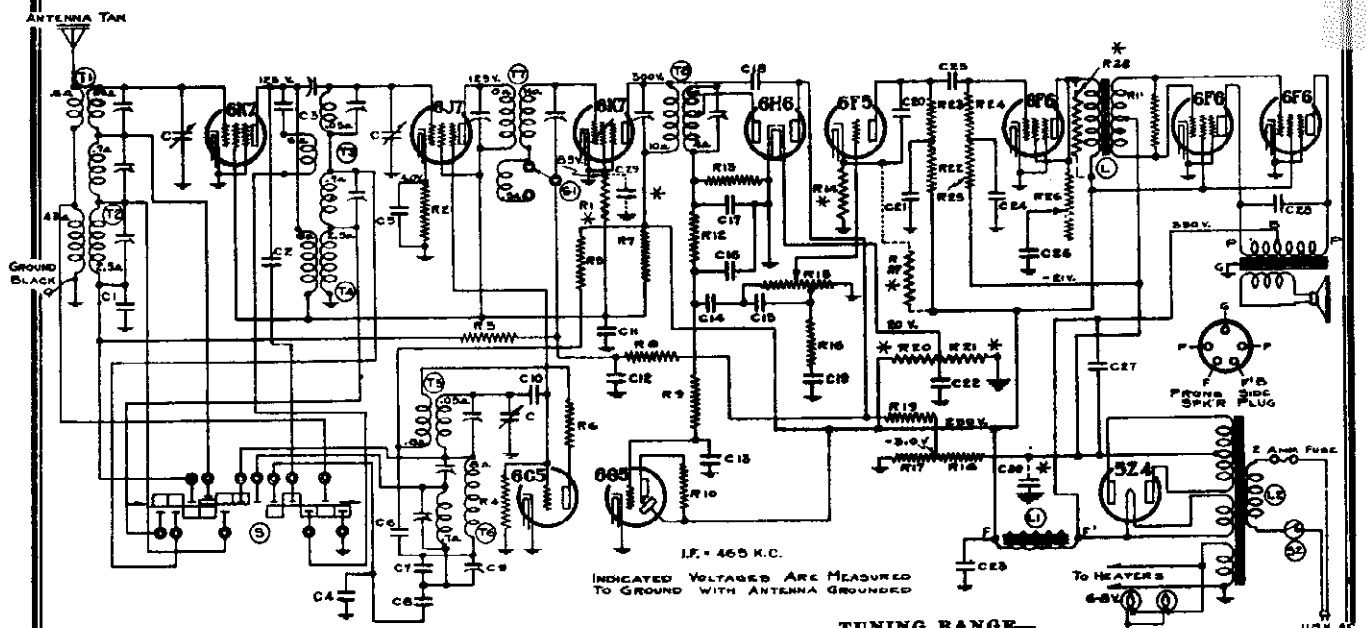
MIDDLE WAVE BAND ALIGNMENT:

1695 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the antenna and ground posts make the following adjustments:
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (adjustment number 2) and middle wave antenna (adjustment number 5) to resonance.
   (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 5400 kilocycles and 1700 kilocycles for band coverage.

MODEL 1170
Schematic, Voltage
Socket, Trimmers, Parts

GAMBLE-SKOGMO, INC.



BAND CHANGE SWITCH
THREE POSITIONS, ROTATING
CLOCKWISE ARE:
1st BROADCAST: 535-1720 K.C.
2nd MIDDLE WAVE: 1690-5300 K.C.
3rd SHORT WAVE: 5.2-18.1 M.C.

I. F. FREQUENCY 465 K. C.

TUNING RANGE—

Standard Broadcast Band
535-1720 Kilocycles.

Middle Wave Band
1690-5300 Kilocycles

Short Wave Band
5.2-18.1 Megacycles.

RESISTORS

No.	Part No.	Description
*R1	130-76	30M Ohm—⅓ Watt—20%—Carbon
R2	130-129	2500 Ohm—⅓ Watt—10%—Carbon
R3	130-20	100M Ohm—⅓ Watt—20%—Carbon
R4	130-12	50M Ohm—⅓ Watt—20%—Carbon
R5	130-77	10M Ohm—1 Watt—20%—Carbon
R6	130-60	100 Ohm—⅓ Watt—20%—Carbon
R7	130-88	10M Ohm—2 Watt 20%—Wire Wound
R8	130-19	1 meg Ohm—⅓ Watt—20%—Carbon
R9	130-4	3 meg Ohm—⅓ Watt—20%—Carbon
R10	130-110	1 meg Ohm—1/10 Watt—10%—Carbon
R11	130-21	20M Ohm—⅓ Watt—20%—Carbon
R12	130-20	100M Ohm—⅓ Watt—20%—Carbon
R13	130-20	100M Ohm—⅓ Watt—20%—Carbon
*R14	130-70	500 Ohm—⅓ Watt—10%—Carbon
R15	101-47	1 meg Ohm—Volume Control
R16	130-22	5M Ohm—⅓ Watt—20% Carbon
R17	106-31	30 Ohm—Muter
R18	106-31	175 Ohm—Muter
R19	130-3	500M Ohm—⅓ Watt—20%—Carbon
*R20	130-130	100M Ohm—½ Watt—10%—Carbon
*R21	130-82	10M Ohm—⅓ Watt—10%—Carbon
R22	130-20	100M Ohm—⅓ Watt—20%—Carbon
R23	130-20	100M Ohm—⅓ Watt—20%—Carbon
R24	130-45	250M Ohm—⅓ Watt—20%—Carbon
R25	130-45	250M Ohm—⅓ Watt—20%—Carbon
R26	101-40	5000 Ohm Tone Control
*R27	130-130	100M Ohm—½ Watt—10%—Carbon
*R28	130-131	20M Ohm—½ Watt—10%—Carbon

NOTE: R17 and R18 in one Unit—No. 106-31.

CONDENSERS

C1	100-9	.05 x 200 Volt—25%
C2	129-59	.0003 Mica—5%—MT—0
C3	129-39	.00005 Mica—20%—MT—0
C4	129-69	.0023 Mica—2½%—MT—0
C5	100-9	.05 x 200 Volt—25%
C6	100-13	.05 x 400 Volt—25%
C7	129-57	.0005 Mica—5%—MT—0
C8	129-55	.0034 Mica—2½%—MT—0
C9	124-34	200 mmf. Working cap. adjustable Pad
C10	129-31	.000025 Mica—15%—MT—0
C11	100-41	.25 x 400 Volt—20%
C12	100-9	.05 x 200 Volt—25%
C13	100-11	.01 x 400 Volt—25%
C14	100-22	.05 x 200 Volt—25%
C15	129-12	.00025 Mica—20%—MT—0
C16	129-60	.00015 Mica—20%—MT—0
C17	129-60	.00015 Mica—20%—MT—0
C18	129-3	.00002 Mica—20%—MT—0
C19	100-9	.05 x 200 Volt—25%
C20	129-5	.0001 Mica—20% MT—0
C21	100-20	.1 x 200 Volt—25%
C22	100-19	.006 x 600 Volt—25%
C23	103-8	14 mfd.—400 Volt—Electrolytic
C24	100-20	.1 x 200 Volt—25%
C25	100-13	.05 x 400 Volt—25%
C26	100-45	.1 x 600 Volt—25%
C27	103-10	30 mfd. x 450 Volt—Electrolytic
C28	100-32	.0005 x 1000 Volts—20%
*C29	100-11	.01 x 400 Volts—25%
*C30	100-20	.1 x 200 Volt—25%

PARTS

C	102-35	One section of three gang condenser
T1	111-54	MW and SW Antenna Coil Assem.
T2	111-55	Broadcast Antenna Coil Assem.
T3	109-29	MW and SW R.F. Coil Assem.
T4	109-30	Broadcast R.F. Coil
T5	110-42	MW and SW Osc. Coil Assem.
T6	110-43	Broadcast Osc. Coil Assem.
T7	108-64	Input I.F. Coil—465 Kc.
T8	108-63	Output I.F. Coil—465 Kc.
L	105-33	Audio Transformer
L1	114-47C	Speaker (Field Resist. 1225 ohm) Hot
L2	104-72	Power Transformer (50-60 Cycle)
S	125-18	Band Switch
S1	101-40	Fidelity Switch on Tone Control
S2	101-47	On-Off Switch on Volume Control

NOTE: Resistors and Condensers which are prefixed with an asterisk (*) on the circuit diagram and parts list were added or the values changed during production to meet certain conditions.

Resistors R1, R27, R28, and Condensers C29, C30 were added to correct certain variances of tube characteristics. Resistors R14, R20, R21 the values were changed. In some chassis the values of these resistors are as follows:
R14—2500 Ohm—⅓ Watt
R20—200M Ohm—⅓ Watt
R21—20M Ohm—⅓ Watt
Present values of these resistors are:
R14—500 Ohm—⅓ Watt
R20—100M Ohm—½ Watt
R21—10M Ohm—⅓ Watt

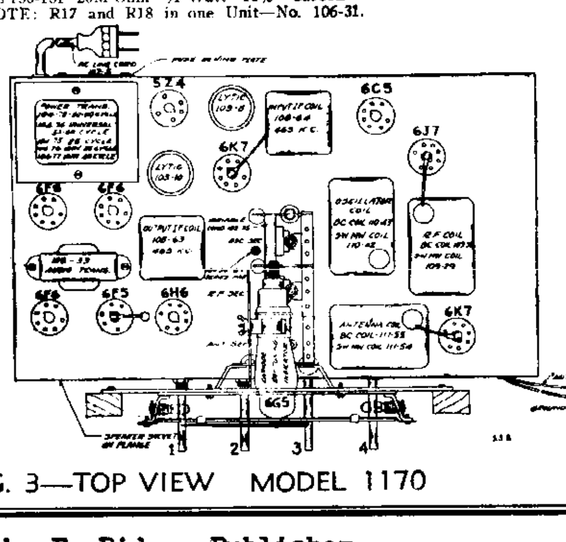


FIG. 3—TOP VIEW MODEL 1170

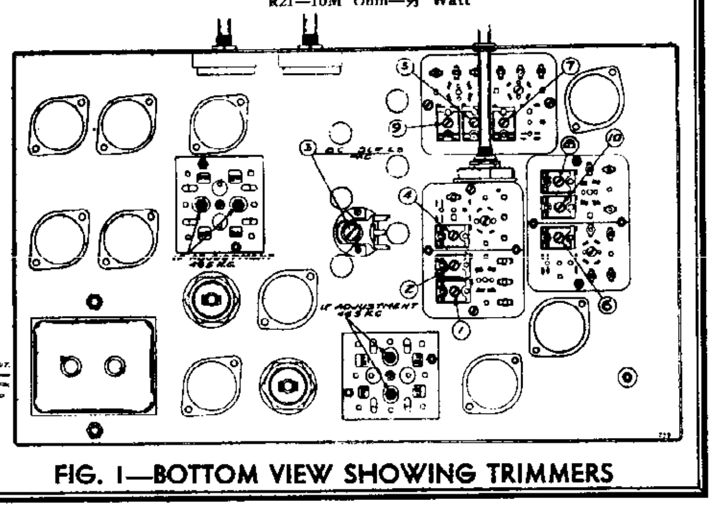


FIG. 1—BOTTOM VIEW SHOWING TRIMMERS

MODEL 1170
Alignment, Notes

GAMBLE-SKOGMO, INC.

DESCRIPTION

The tube complement of this chassis is as follows:

1—Type 6K7 Remote cut-off pentode R.F. amplifier
1—Type 6J7 Pentode first detector
1—Type 6C5 Oscillator
1—Type 6K7 Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6H6 Duplex diode second detector and A.V.C.
1—Type 6F5 First audio amplifier
1—Type 6F6 Triode driver stage
2—Type 6F6 Class AB Output pentodes in push-pull
1—Type 5Z4 High vacuum rectifier
1—Type 6G5 Cathode Ray Tuning Indicator.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 108, 127, 150, 225, and 260 volts, (see instructions) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

SERVICE NOTES

NOTE: DeLuxe Model 1172 differs only from the Model 1170 in that dual speakers and a de luxe console cabinet are used. Both chasses are identical and the circuit diagram, the alignment procedure and the parts list contained in this manual apply to both models.

Attention is called to the circuit diagram contained in this manual. Several minor changes were made during production of these models to correct certain conditions. These changes are shown on the circuit diagram in dotted lines and explained in detail. Some of the chassis were equipped with 5Z3 rectifier tubes in place of the 5Z4 and do not have a fuse assembly in the power line.

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 115 volts on the primary of the power transformer.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

This chassis is protected against damage from faulty tubes or abnormal line conditions by a fuse in the primary circuit.

If when set is turned on pilot lights do not light, look for a blown fuse.

This fuse is made accessible for replacement by removing fuse cover located on back flange of chassis, replace only with a 2 ampere fuse. If replacement fuse blows out, check tubes, (particularly 5Z4 rectifier) circuit, repair or replace defective tubes or parts.

NEVER ATTEMPT TO REPLACE FUSE WITHOUT FIRST DISCONNECTING POWER.

NEVER REPLACE WITH FUSE OTHER THAN 2 AMPERE RATING.

ALIGNING INSTRUCTIONS

Dummy Antennas

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Intermediate and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

CAUTION:

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the four bolts by which it is fastened.

ALIGNING I.F. TRANSFORMERS (465 K.C.)

Part No. 108-63 Output I.F. Transformer
Part No. 108-64 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the underside of chassis (see bottom view Fig. 1).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), the tone control on "Hi" part of the sharp position (as much right rotation as possible without operating the Hi Fidelity switch), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, located between the two I.F. transformers, and adjust the output I.F. transformer 108-63 to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6J7 and adjust input I.F. transformer (108-64) to resonance.
   (c) With oscillator still connected to 6J7, re-adjust output I.F. transformer if necessary.

ALIGNMENT PROCEDURE

The following adjustments to be made after the I.F.'s have been aligned as explained above.

BROADCAST BAND ALIGNMENT:

1. With band changing switch in the broadcast position, extreme left of its rotation, and with external oscillator set at 600 kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:
   (a) Adjust broadcast series pad (adjustment number 3) to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained. Note: This adjustment is accessible from the top of the chassis and is located between the variable condenser and the 108-63 output I.F. transformer. See top view, Fig. 3.
   (b) Re-set external oscillator to 1400 K.C., move dial pointer to 1400 K.C. and adjust oscillator (adjustment number 4), R.F. (adjustment number 6) and antenna (adjustment number 7) to resonance. See bottom view for location of these adjustments, Fig. 1.
   (c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

NOTE: IT IS EXTREMELY NECESSARY IN MAKING ALL OF THESE ADJUSTMENTS THAT THE FUNDAMENTAL OSCILLATOR SIGNAL BE TUNED IN AND NOT THE IMAGE FREQUENCY WHICH WILL FALL BELOW THE FUNDAMENTAL.

SHORT WAVE BAND ALIGNMENT:

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 1), short wave R.F. (adjustment number 8) and short wave antenna (adjustment number 9) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check for sensitivity.

MIDDLE WAVE BAND ALIGNMENT:

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5 M.C. and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Rotate condenser, pick up signal and adjust middle wave R.F. (adjustment number 10), middle wave antenna (adjustment number 5) and middle wave oscillator (adjustment number 2) to resonance.
   (b) Re-check broadcast alignment and if it is found necessary to re-adjust either R.F. or antenna trimmers, repeat the 17 M.C. short wave and 5 M.C. middle wave adjustments.

GAMBLE-SKOGMO, INC.

MODEL 1170
Parts

11-Tube Including Cathode-Ray Tuning Indicator

3-Band A. C. High Fidelity Superheterodyne Receiver

Serial No. 6J391150 to 6J391649 and from 6J408950 and up

Use only genuine factory replacement parts

Part No.	DESCRIPTION	Circuit Diagram Reference	List Price Each
	CONDENSERS		
100-9	.05 x 200 Volt Tubular	C1, C5, C12, C19	$0.25
100-11	.01 x 400 Volt Tubular	C13, C29	.25
100-13	.05 x 400 Volt Tubular	C6, C25	.25
100-19	.006 x 600 Volt Tubular	C22	.25
100-20	.1 x 200 Volt Tubular	C21, C24, C30	.25
100-22	.05 x 200 Volt Tubular	C14	.25
100-32	.0005 x 1000 Volt Condenser	C28	.25
100-41	.25 x 400 Volt Tubular (with Bracket)	C11	.35
100-45	.1 x 600 Volt Tubular	C26	.35
103-8	14 mfd. x 400 Volt Electrolytic	C23	1.35
103-10	30 mfd. x 450 Volt Electrolytic	C27	1.35
129-3	.00002 Mica—Type MT—20%	C18	.25
129-5	.0001 Mica Type MT—20%	C20	.25
129-12	.00025 Mica—Type MT—20%	C15	.25
129-31	.000025 Mica—Type MT—15%	C10	.25
129-39	.00005 Mica—Type MT—20%	C3	.25
129-55	.0034 Mica—Type MT—2½%	C8	.35
129-57	.0005 Mica—Type MT—5%	C7	.25
129-59	.0003 Mica—Type MT—5%	C2	.25
129-60	.00015 Mica—Type MT—20%	C16, C17	.25
129-69	.0023 Mica—Type MT—2½%	C4	.35
	RESISTORS		
130-3	500M Ohm—1/3 Watt—20%—100 V. Carbon	R19	.20
130-4	3 meg Ohm—1/3 Watt—20%—20 V. Carbon	R9	.20
130-12	50M Ohm—1/3 Watt—20%—20 V. Carbon	R4	.20
130-19	1 meg Ohm—1/3 Watt—20%—20 V. Carbon	R8	.20
130-20	100M Ohm—1/3 Watt—20%—50 V. Carbon	R3, R12, R13, R22, R23	.20
130-21	20M Ohm—1/3 Watt—20%—20 V. Carbon	R11	.20
130-22	5M Ohm—1/3 Watt—20%—10 V. Carbon	R16	.20
130-76	30M Ohm—1/3 Watt—20%—Carbon	R1	.20
130-45	250M Ohm—1/3 Watt—20%—20 V. Carbon	R24, R25	.20
130-60	100 Ohm—1/3 Watt—20%—10 V. Carbon	R6	.20
130-70	500 Ohm—1/3 Watt—10%—Carbon	R14	.20
130-77	10M Ohm—1 Watt—20%—100 V. Carbon	R5	.20
130-82	10M Ohm—1/3 Watt—10%—Carbon	R21	.20
130-88	10M Ohm—2 Watt—20%—Wire Wound	R7	.40
130-129	2500 Ohm—1/3 Watt—10%—10 V. Carbon	R2	.20
130-130	100M Ohm—½ Watt—10%—Carbon	R20, R27	.20
130-131	20M Ohm—½ Watt—10%—Carbon	R28	.20
130-110	1 meg Ohm—1/10 Watt—10%—Carbon	R10	.30
106-31	(30 Ohm, R17) (175 Ohm, R18) Metal Clad Resistor	R17, R18	.40
	COILS		
108-63	Output I.F. Coil Assembly Complete, Less Can	T8	1.50
108-64	Input I.F. Coil Assembly Complete, Less Can	T7	1.65
109-29	Mid-Wave and Short-Wave R.F. Coil Assembly Complete, Less Can	T3	1.50
109-30	Broadcast R.F. Coil Assembly Complete, Less Can	T4	1.00
110-42	Mid-Wave and Short-Wave Oscillator Coil Assembly Complete, Less Can	T5	1.25
110-43	Broadcast Oscillator Coil Assembly Complete, Less Can	T6	.50
111-54	Mid-Wave and Short-Wave Antenna Coil Assembly Complete, Less Can	T1	1.50
111-55	Broadcast Antenna Coil Assembly Complete, Less Can	T2	1.00
	TRANSFORMERS		
104-72	50/60 Cycle Power Transformer	L2	4.00
104-74	Universal—50/60 Cycle Primary		6.00
104-75	25 Cycle Power Transformer		7.00
104-76	Universal—25 Cycle Primary		7.50
104-77	Universal—40 Cycle Primary		6.00
	SOCKETS		
121-8	Five-Prong Socket Marked "Spkr"		.10
121-12	Seven-Prong Socket Marked "6K7"		.15
121-13	Seven-Prong Socket Marked "6J7"		.15
121-14	Seven-Prong Socket Marked "6F6"		.15
121-16	Five-Prong Socket Marked "5Z4"		.10
121-17	Six-Prong Socket Marked "6C5"		.15
121-19	Seven-Prong Socket Marked "6H6"		.15
121-33	Five-Prong Socket Marked "6F5"		.10
121-34	Four-Prong Socket Marked "5Z3"		.10
	SPEAKER FOR MODEL 1170		
114-47C	Twelve Inch Dynamic (Field 1225 Ohms)	L1	8.50
	SPEAKERS FOR MODEL 1172		
114-53	Twelve Inch Dynamic, with Special Voice Coil for Dual Speaker Operation		8.50
114-54	Ten Inch Permanent Magnet Dynamic		10.00
	MISCELLANEOUS		
101-40	Tone Control and Fidelity Switch (5M Ohm)	R26, S1	1.35
101-47	Volume Control and Switch (1 Meg Ohm)	R15, S2	1.25
102-35	Three-Gang Variable Condenser	C	5.00
107-5	Line Cord and Plug		.50
115-35	Antenna, Oscillator and R.F. Shield Can		.15
115-36	I.F. Shield Can		.15
105-33	Input Audio Transformer	L	1.35
115-54	Fuse Cover		.05
113-47	Fuse Clip Assembly		.15
125-18	Band Switch	S	.90
124-34	Single J Padder 200 mmf	C9	.35
131-34	2 Amp. Fuse Type 3AG		.10
128-51	Wood Knob with Spring		.15

All resistors and mica condensers are RMA color coded—specify value and/or resistor or condenser (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None.

When ordering condensers, specify part number, model and/or capacitor (per schematic diagram) and model number.

When ordering parts, always specify part and model number as well as serial number of chassis.

All prices quoted are list and are subject to the usual trade discounts.

Prices subject to change without notice.

Shipments are F.O.B. our Factory. When remitting in advance, please include postage.

WE CANNOT SUPPLY SPEAKER PARTS, CONES, TRANSFORMERS, OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $2.50 NET, IF IT IS RETURNED TO OUR FACTORY, TRANSPORTATION CHARGES PREPAID.

DIAL PARTS LIST—MODEL 1170A

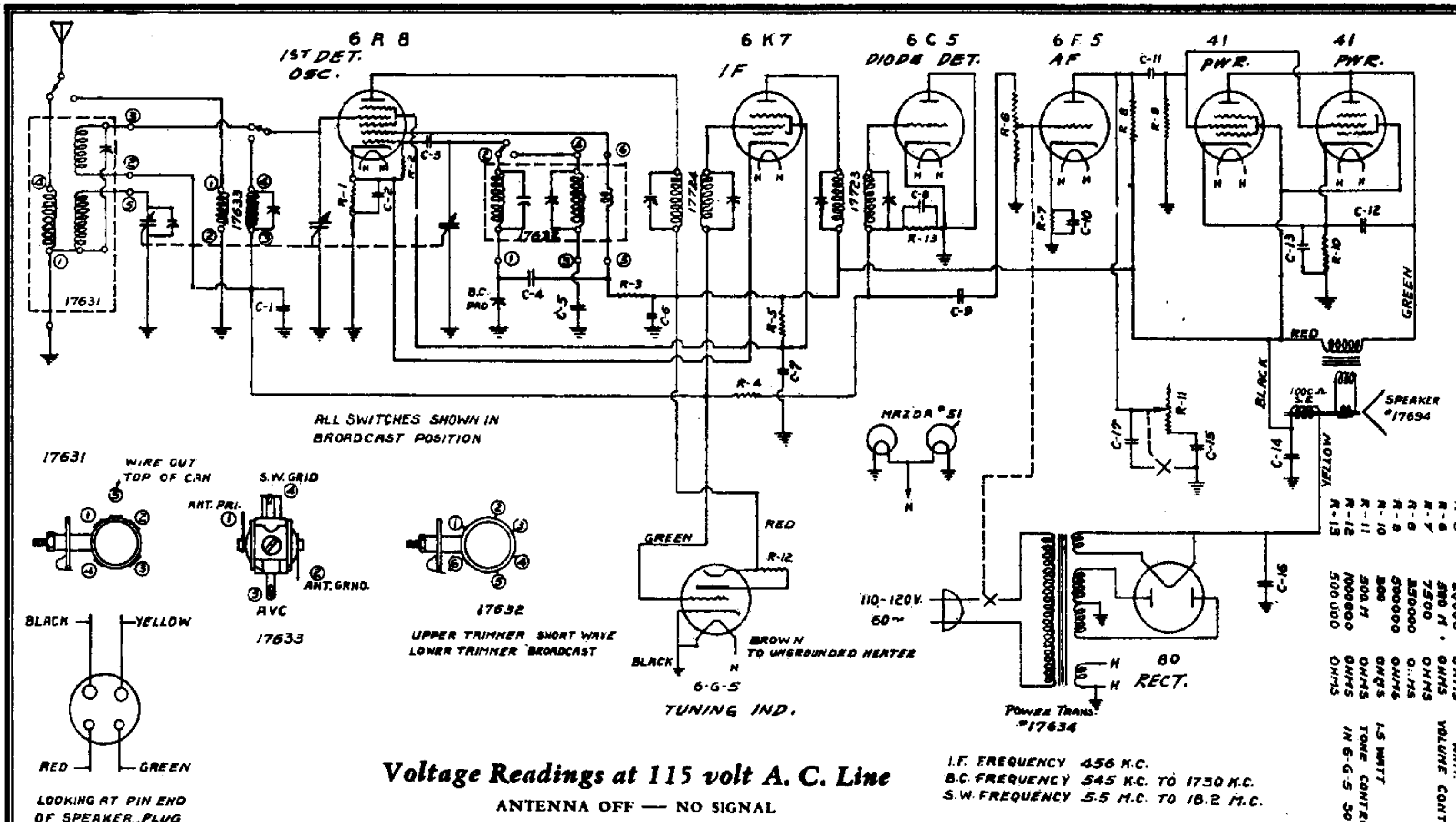
Part No.	DESCRIPTION	List Price Each
	ASSEMBLIES	
112-188	Dial Plate Assembly—Including: 1—No. 117-17A Dial Plate 2—No. 117-11 Dial Bracket 1—No. 117-73A Bushing 4—No. 162-4 Rivets	.75
112-189	Switch Assembly—Including: 2—No. 117-16 Band Indicator Arm 1—No. 117-15 Link (small) 1—No. 117-14 Elbow 1—No. 117-13 Link (large) 1—No. 131-26 Washer 3—No. 162-5 Rivets 1—No. 117-22A Stud for link 1—No. 134-9 Horseshoe Spring Washer 1—No. 131-30 Spring Washer Red Cellulose	.35
112-190	Switch Arm Assembly—Including: 1—No. 117-12 Switch Arm 1—No. 117-35 Switch Arm Bushing 2—No. 132-13 Set Screws	.10
112-191	Tone Indicator Assembly—Including: 1—No. 112-178 Celluloid Disc 1—No. 117-75 Disc Bushing 1—No. 120-54R Coil Spring Fish Line	.60
112-192	Volume Indicator Assembly—Including: 1—No. 112-178 Celluloid Disc 1—No. 117-75 Disc Bushing 1—No. 120-54L Coil Spring Fish Line	.60
	DIAL PARTS ONLY	
112-117A	Tuning Shaft	.05
112-118	Metal Oval Escutcheon Only	1.25
112-119	Dial Pointer with 132-8 Screw	.20
112-123	Oval Glass Crystal Only	.35
112-139	Oval Glass Retaining Ring	.10
112-175	Background Plate Gasket	.10
112-176	Drive Belt	.20
112-179	Band Spread Pointer	.10
112-180	Glass Dial Scale	.90
107-46	Right Pilot Light Bracket and Socket	.10
107-47	Left Pilot Light Bracket and Socket	.10
115-65	Tuning Indicator Paper Tube Shield	.01
107-14	6-8 Volt, T-46 Pilot Light	.10
117-20A	Drive Belt Pulley	.05
117-25A	Tone and Volume Shaft	.05
117-33A	Stud for Switch	.03
117-39	Drive Belt Take-up Pulley	.03
117-57	Tuning Indicator Holder	.25
117-64	Background Plate	.25
117-72	Reflector Plate	.10
117-74	Bushing	.10
120-53	Drive Belt Take-up Coil Spring	.05
131-30	Spring Washer for Switch Link Assembly	.03
131-31	Spring Washer for Switch Arm	.01
131-33	Glass Dial Retaining Clips	.03
154-2	Set Screw	.02

CATHODE-RAY TUNING INDICATOR PARTS

Part No.	DESCRIPTION	List Price Each
107-53	Cable and Socket Assembly (With 130-110 Resistor)	$0.75
117-57	Holder and Clamp	.25

MODEL 810
Schematic, Voltage

GAMBLE-SKOGMO, INC.



R-1	200	OHMS	
R-2	50000	OHMS	
R-3	10000	OHMS	WATT
R-4	1000000	OHMS	
R-5	20000	OHMS	WATT
R-6	500 M	OHMS	VOLUME CONTROL #17637
R-7	7500	OHMS	
R-8	250000	OHMS	
R-9	500000	OHMS	
R-10	300	OHMS	1.5 WATT
R-11	500 M	OHMS	TONE CONTROL #17638
R-12	1000000	OHMS	IN 6-G-5 SOCKET
R-13	500000	OHMS	

C-1	.05	200 V.
C-2	.25	200 V.
C-3	.0001	MICA
C-4	.0025	MICA
C-5	.00325	MICA S.W. PAD
C-6	.1	400 V.
C-7	.1	400 V.
C-8	.0005	600 V.
C-9	.05	200 V.
C-10	10 MFD.	25
C-11	.01	400 V.
C-12	.002	800 V.
C-13	10 MFD	25
C-14	16 MFD	300 V. REG.
C-15	.01	400 V.
C-16	16 MFD	475 V.
C-17	.005	400 V.

I.F. FREQUENCY 456 K.C.
B.C. FREQUENCY 545 K.C. TO 1730 K.C.
S.W. FREQUENCY 5.5 M.C. TO 18.2 M.C.

Voltage Readings at 115 volt A. C. Line

ANTENNA OFF — NO SIGNAL

	Plate	Screen	Cathode	Other
6-A-8 OSC	240	125	4	Anode 190
6-K-7 IF	240	125	4	Fil. 6
6-C-5 Diode	0		0	
6-F-5 1st AF	75		1.7	
41 (2) Power	225	240	18	
80 Rect.	320 AC			Fil. 4.9

Input to Speaker Field 320V.

DIAGNOSIS OF TROUBLES. Consult table given in 11-B Notes.

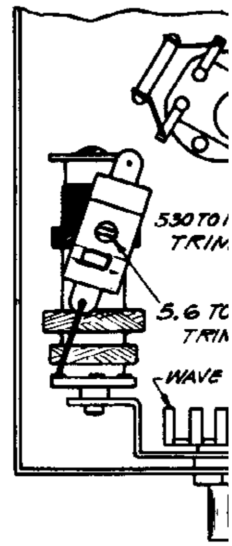
K.R.C. 9-21-36

ALIGNMENT. General procedure is the same as given in 11-B notes except that there is no "Police band". Refer to Model 810 Circuit Diagram for location of trimmers.

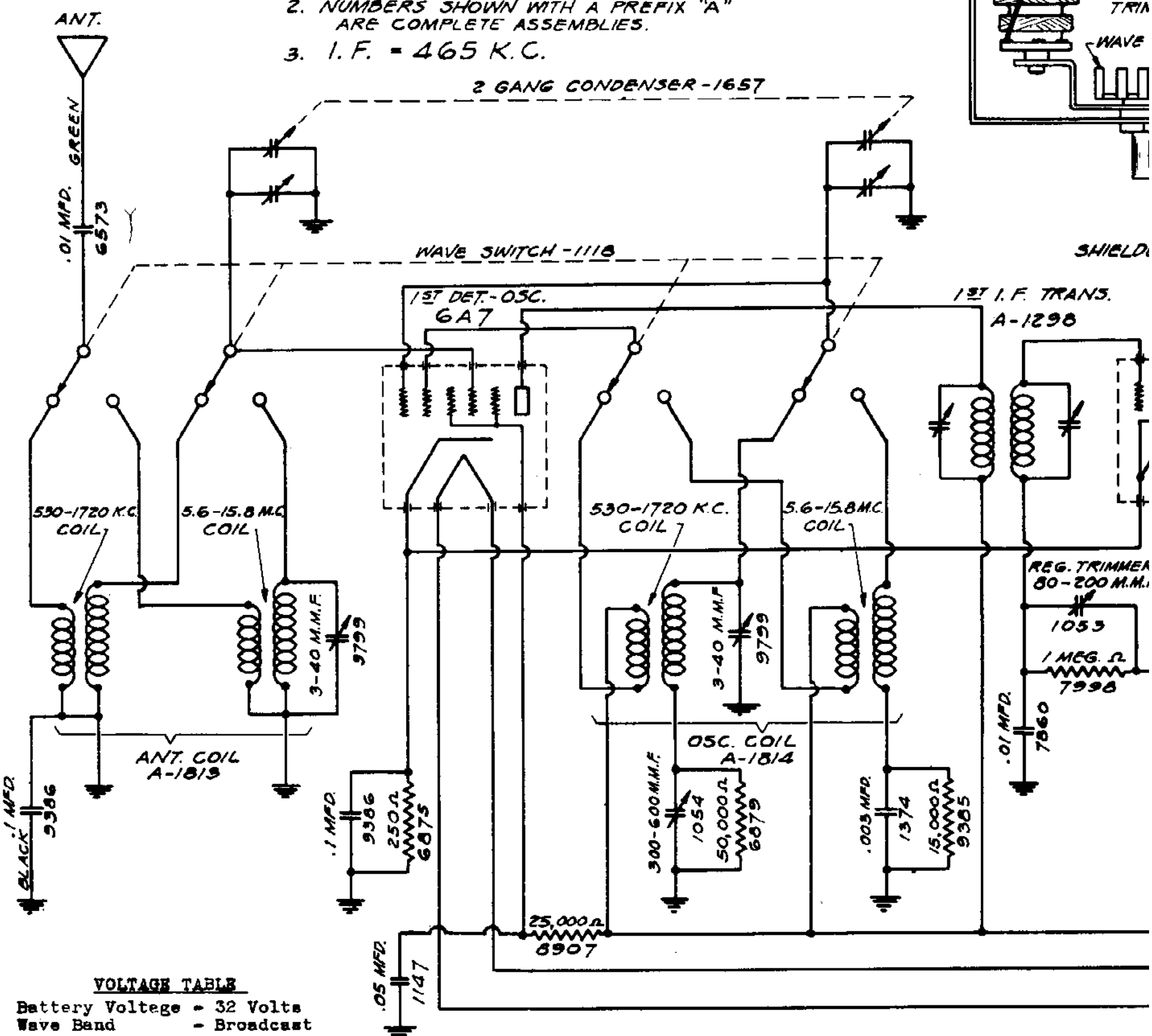
GAMBLE-

SIX TUBE SUPERHETERODYNE
TWO BAND
1720 to 530 KC
15.8 to 5.6 MC
32 Volt

This receiver is designed for operation on 32 volt battery plants only; and must not be used on battery plants of a higher rated voltage than 32 volts without a voltage regulator.



NOTE:
1. ALL NOS. SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
2. NUMBERS SHOWN WITH A PREFIX "A" ARE COMPLETE ASSEMBLIES.
3. I.F. = 465 K.C.



VOLTAGE TABLE

Battery Voltage - 32 Volts
Wave Band - Broadcast

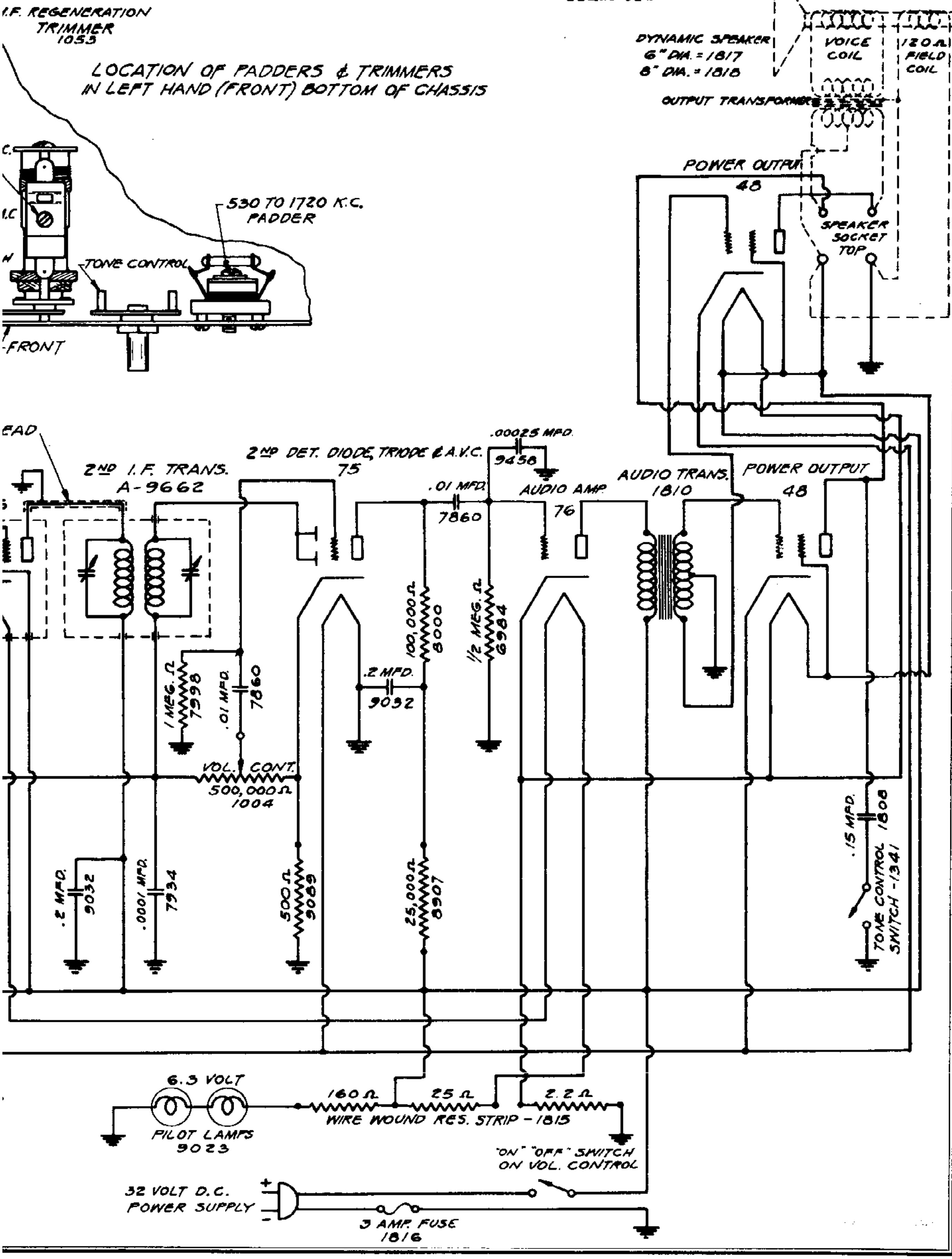
TUBE		FILAMENT	PLATE	SCREEN	CATHODE	GRID NO.2	GRID NO. 1
6A7	1st Detector & Oscillator	6	32		.5	32	15
6D6	I. F. Amplifier	6	32	32	.6		
75	2nd Detector & A.V.C	6	5*				
76	1st Audio	6	30				
48	Output	6	30	32	5		
48	Output	6	30	32	5		

* Triode plate comparative voltage only
Read all voltages from socket to chassis.

GMO, INC.

Schematic, Voltage
Trimmers

MODEL 5953A



MODEL 5953A
Alignment, Parts

GAMBLE-SKOGMO, INC.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube. Leave the grid cap disconnected and connect a 1 meg ohm resistor from the modulator grid to the chassis base. Connect the ground side of the oscillator to the receiver ground lead.

2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).

3. Align the first intermediate transformer by turning one of the trimmer screws up and down (increasing and decreasing capacity) until maximum reading is obtained on the output meter, after which adjust the other trimmer screw of the same transformer for maximum sensitivity.

4. Adjust the other intermediate transformers in the same manner.

NOTE: Two types of intermediate transformer trimmers have been used in this receiver. One type has two parallel holes in the top of the shield, one for each trimmer. The other type has a brass hex nut for adjusting one trimmer, the other intermediate trimmer being adjusted with the trimmer screw located inside of the brass hex nut. Regardless of which type trimmer is used the procedure is the same.

5. Adjust the IF regeneration trimmer located underneath the chassis for maximum 465 kilocycle signal sensitivity. If adjustment of this trimmer causes the receiver to oscillate always adjust to a point where oscillation just stops, and then back off 1/8 turn.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning the gang condenser and padding and trimmer condensers to follow the procedure given carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The two coils located on the underside of the chassis which have trimmer condensers mounted on them will be referred to by their function as indicated on the circuit diagram.

1. Connect the high output side of the test oscillator through a .00025 Mfd. condenser to the set antenna lead and the ground to the set ground.

2. Place the band selector switch for operation on the 15.8 to 5.6 megacycle band, tune the receiver to EXACTLY 14 MEGACYCLES on the dial, and set the test oscillator frequency to EXACTLY 14 MEGACYCLES. THEN BRING IN THE 14 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER CONDENSER LOCATED ON TOP OF THE OSCILLATOR SECTION OF THE GANG CONDENSER. Looking at the front of the receiver the oscillator section is the rear section of the gang condenser. When adjusting this trimmer two peaks, the fundamental and the image peak, will be noticed. CARE MUST BE TAKEN SO THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 14 MEGACYCLES. First back off the trimmer to minimum capacity, next screw down the trimmer (add capacity) until the first peak, which is the fundamental and the one you are to use, is tuned in. If the trimmer is screwed down beyond the point where this first peak is received the incorrect image peak will be tuned in. When the first peak has been located adjust the trimmer to bring in the 14 megacycle signal to maximum output. After completing this adjustment always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 14 megacycles, increase the output of the test oscillator and then tune the receiver dial to approximately 13 megacycles. Vary the receiver dial slightly to the right and left of 13 megacycles and if the fundamental peak was used in aligning at 14 megacycles the test oscillator signal will be heard at approximately 13 megacycles on the receiver dial. If it is not possible to receive the signal then the fundamental peak was not used and the 14 megacycle adjustment of the trimmer on top of the oscillator section of the gang condenser must be gone over and properly adjusted.

3. Set the band selector switch for operation on the broadcast band (1720-530 K.C.) adjust the test oscillator frequency to EXACTLY 1400 KILOCYCLES and the receiver dial to EXACTLY 1400 KILOCYCLES. THEN BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 1720-530 KILOCYCLE TRIMMER (see circuit diagram) mounted on one of the coils located underneath the chassis. Next adjust the trimmer located on the front section of the gang condenser for maxim m 1400 kilocycle signal sensitivity.

4. Leave the band selector switch for operation on the broadcast band (1720-530 K.C.), tune the receiver dial and set the test oscillator frequency to approximately 600 kilocycles. While rocking the gang condenser slightly to the right and left adjust the 1720-530 kilocycle padder condenser which is located on and accessible through the small hole in the front of the chassis, for maximum sensitivity.

5. Recheck the 1400 kilocycle signal adjustment.

6. Place the band selector switch for operation on the short wave 15.8 to 5.6 megacycle band, set the test oscillator frequency to EXACTLY 14 MEGACYCLES and tune the receiver to EXACTLY 14 MEGACYCLES. While rocking the gang condenser slightly to the right and left adjust the 5.6 to15.8 megacycle trimmer (see circuit diagram) mounted on one of the coils underneath the chassis.

This completes the alignment and it is recommended that all the adjustments be gone over again, as generally it will be found that improved results can be obtained if this is done. Assuming that all tubes and component parts of the set are okeh, then extreme inaccuracies in the dial calibration, low sensitivity, and poor selectivity are indications that the alignment procedure has not been followed.

PART NUMBER		LIST PRICE
1813	Antenna Coil	$1.63
1814	Oscillator Coil	1.63
1298	First I.F. Transformer	2.05
9662	Second I. F. Transformer	2.05
1810	Audio Transformer	1.75
1657	Two Gang Variable Condenser	4.00
1106	Drive Disc with Hub	.30
1641	Calibrated Dial (Calibration No. 1653) with Frame and Gasket	.50
	Glass for above Dial	.35
1744	Calibrated Dial (Calibration No. 1745) with Frame and Gasket	.48
	Glass for above Dial	.35
9023	6.3 Volt .15 Ampere Pilot Light	.19
1118	Wave Switch	.75
9799	Trimmer Condenser	.15
1053	Padding Condenser	.50
1054	Padding Condenser	.55
1004	Volume Control and Off and On Switch	1.24
1816	3 Ampere Fuse	.12
7934	.0001 Mfd. Moulded Condenser	.21
9456	.00025 Mfd. Moulded Condenser	.21
1374	.003 Mfd. Moulded Condenser	.21

PART NUMBER		LIST PRICE
1148	.5 Mfd. 200 Volt Condenser	$ .55
9032	.2 Mfd. 200 Volt Condenser	.23
9386	.1 Mfd. 200 Volt Condenser	.19
1147	.05 Mfd. 200 Volt Condenser	.17
6573	.01 Mfd. 200 Volt Condenser	.17
1808	.15 Mfd. 200 Volt Condenser	.17
7860	.01 Mfd. 400 Volt Condenser	.17
1815	Resistor Strip	.95
1333	18,000 Ohm 1/2 Watt Resistor	.19
~~7998~~	~~1 Meg Ohm 1/3 Watt Resistor~~	.19
6984	500,000 Ohm 1/3 Watt Resistor	.19
8967	25,000 Ohm 1/3 Watt Resistor	.19
6879	50,000 Ohm 1/3 Watt Resistor	.19
9385	15,000 Ohm 1/3 Watt Resistor	.19
8000	100,000 Ohm 1/3 Watt Resistor	.19
9089	500 Ohm 1/3 Watt Resistor	.19
6875	250 Ohm 1/3 Watt Resistor	.19
1817	6" Dynamic Speaker	7.25
1818	8" Dynamic Speaker	9.00
1341	Tone Control Switch	.39
1548	Fuse Block Receptacle	.25

Prices are subject to change without notice.

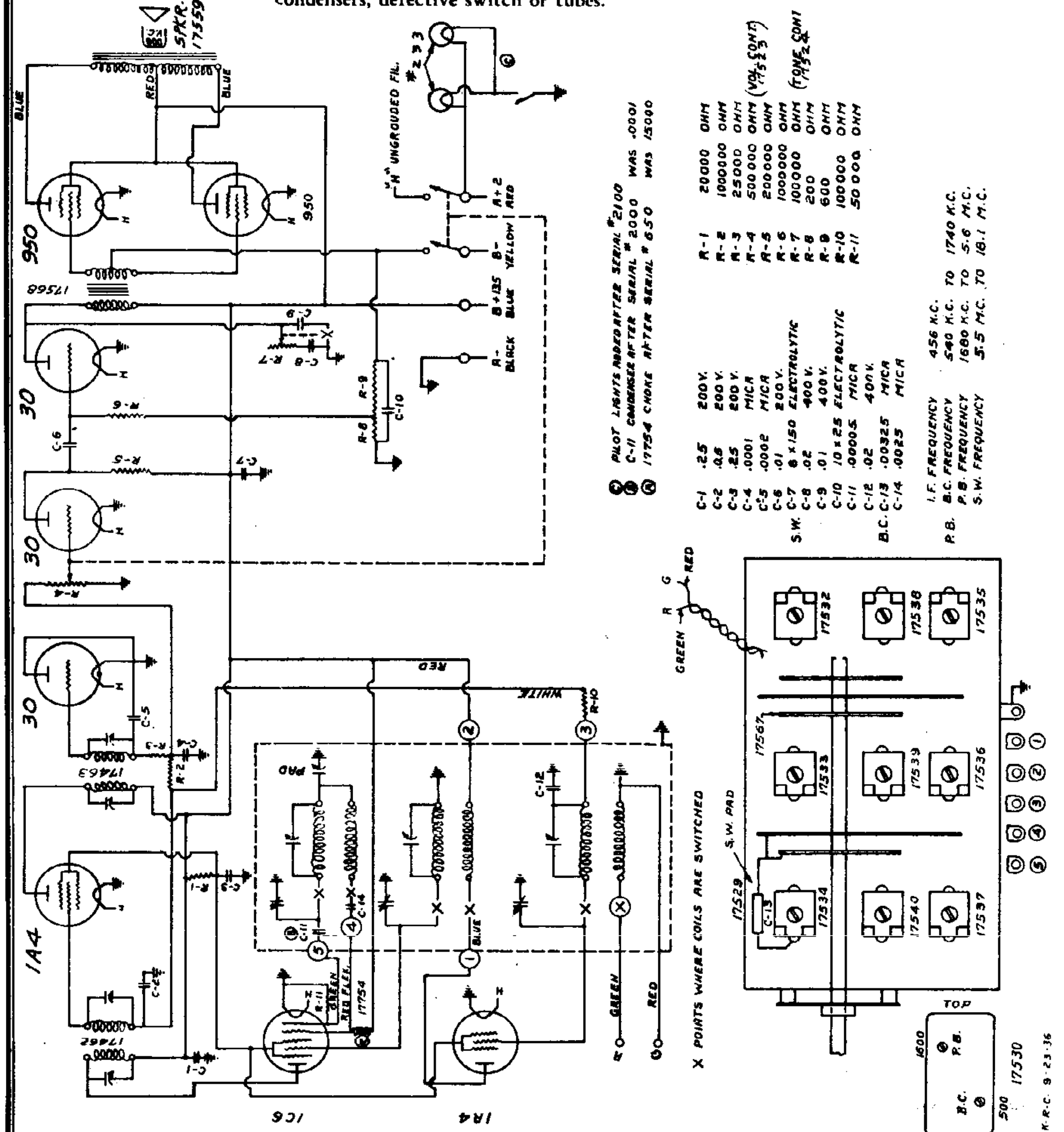
MODEL 850B GAMBLE-SKOGMO, INC. **Schematic, Trimmers Alignment**

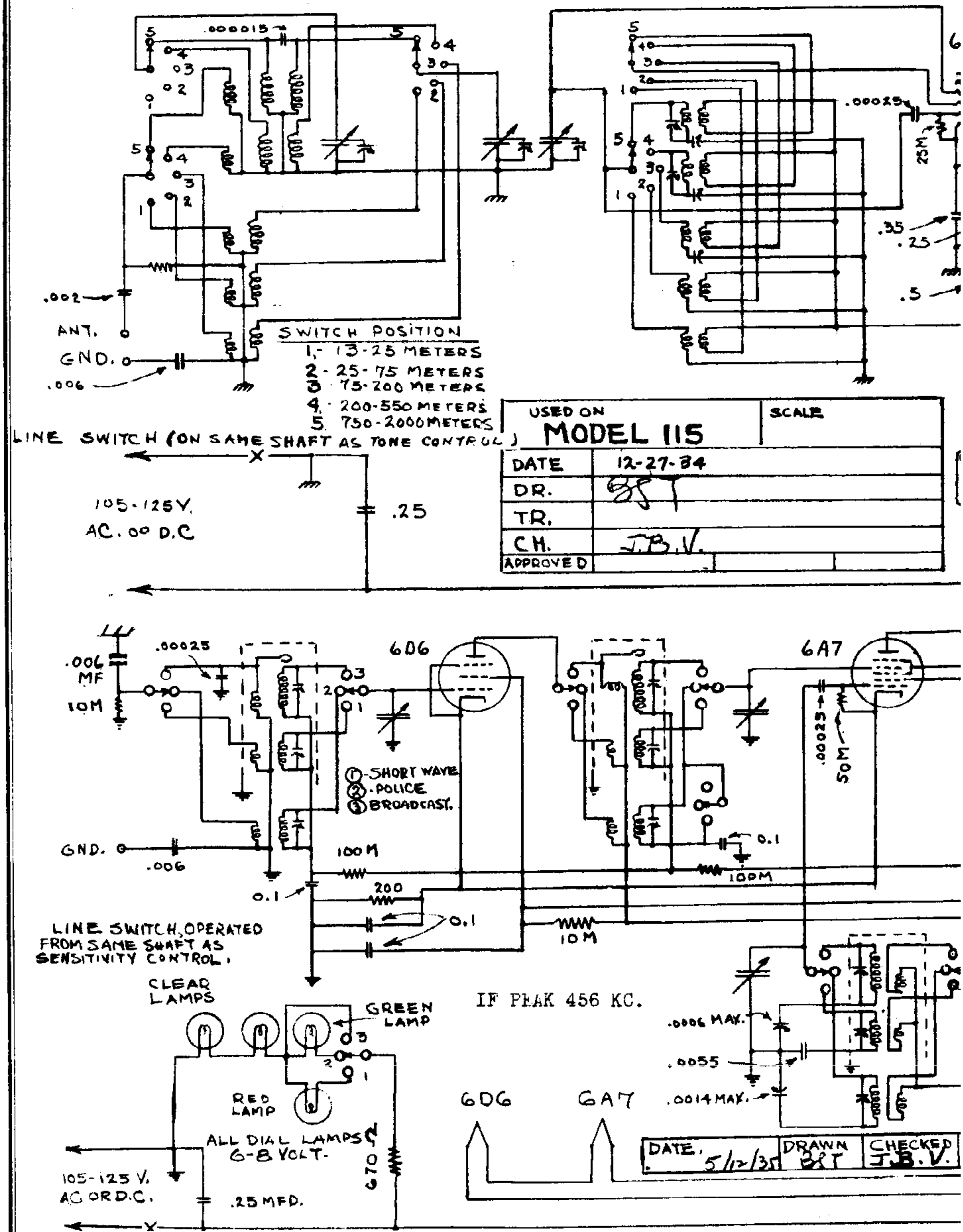
ALIGNMENT. Refer to "Alignment" in 11-B notes. Connect signal generator to grid cap of 1-C-6 tube for IF alignment .

BELT AND DIAL REPLACEMENT. Belt may be replaced without removing any parts on this model. Also see notes on 11-B dial and belt.

TUBE FUNCTIONS. 1-A-4 R. F. Stage on all wave bands, 1-C-6 first detector-oscillator, 1-A-4 intermediate amplifier, "30" as diode detector, "30" as first audio, "30" as second audio, two type 950 Pentodes operating in push-pull class A prime as power tubes.

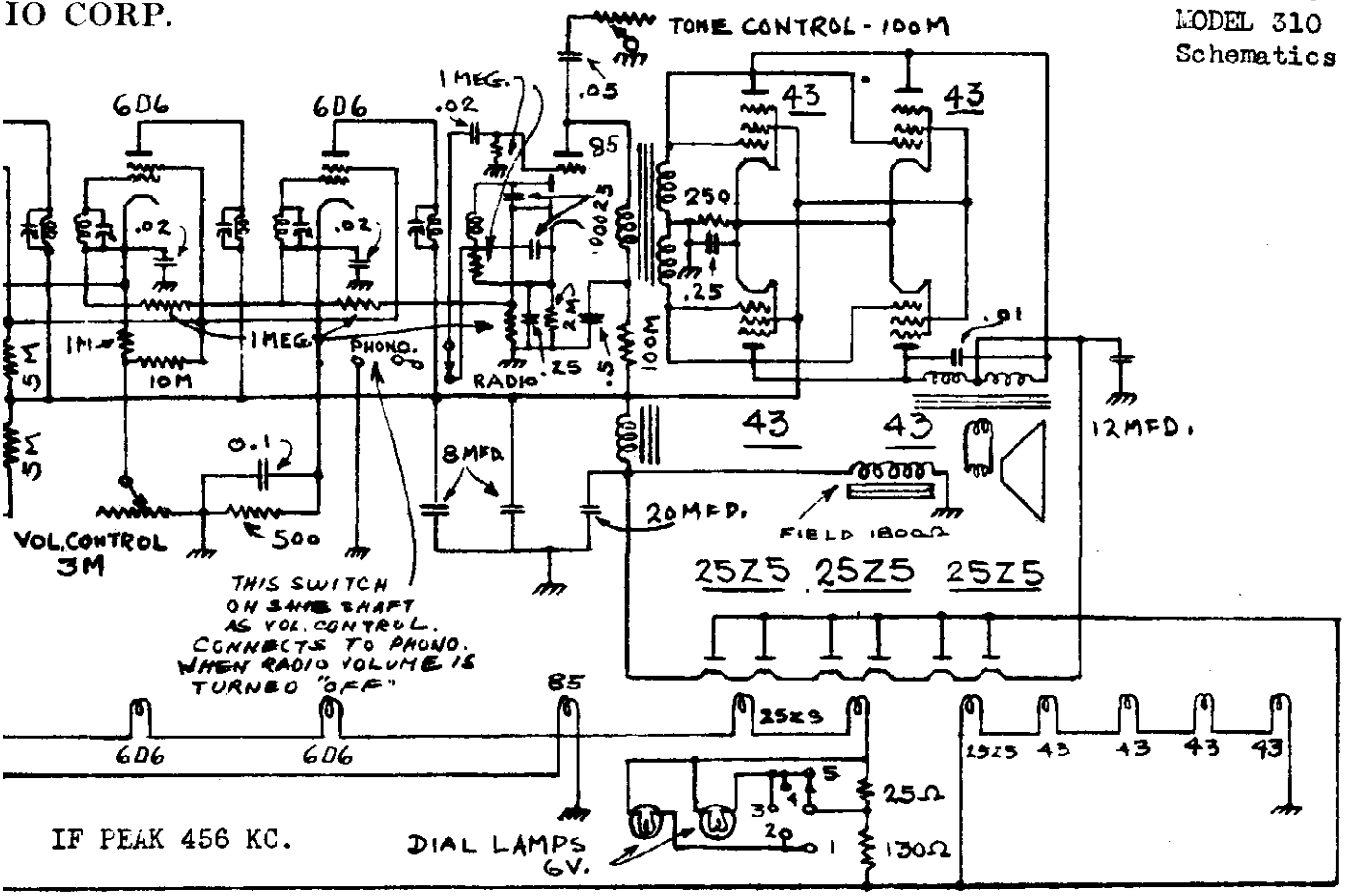
Excessive Battery Drain ....This should always be checked with a meter, since some people use a set more than they realize or may leave it "on" over night. The "A" drain should measure not over .68 amp. and the "B" 20 to 22 Milliamperes on low volume—increasing some when tuned in on high volume. Causes of excessive drain can usually be traced to shorted or leaky condensers, defective switch or tubes.



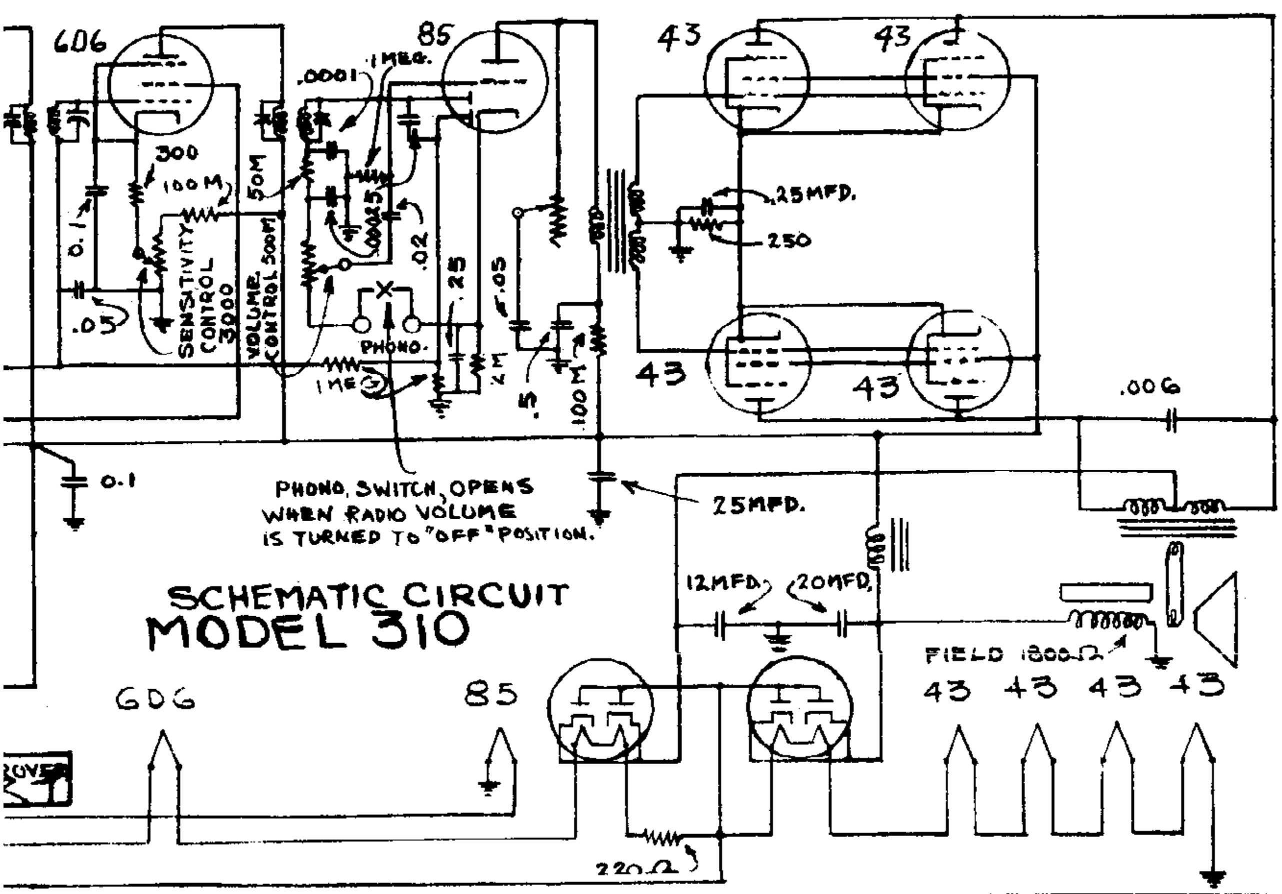

.000015
.00025
25M
.35
.25
.5
.002
ANT.
GND.
.006
SWITCH POSITION
1. 13-25 METERS
2. 25-75 METERS
3. 75-200 METERS
4. 200-550 METERS
5. 750-2000 METERS
LINE SWITCH (ON SAME SHAFT AS TONE CONTROL)
105-125V.
AC. OR D.C
.25
USED ON
MODEL 115
SCALE
DATE 12-27-34
DR.
TR.
CH. J.B.V.
APPROVED
.006 MF
10M
6D6
6A7
.00025
50M
1-SHORT WAVE
2-POLICE
3-BROADCAST.
0.1
GND.
.006
100M
200
0.1
10M
LINE SWITCH, OPERATED FROM SAME SHAFT AS SENSITIVITY CONTROL.
CLEAR LAMPS
GREEN LAMP
RED LAMP
IF PEAK 456 KC.
.0006 MAX.
.0055
.0014 MAX.
ALL DIAL LAMPS 6-8 VOLT.
670
105-125 V.
AC OR D.C.
.25 MFD.
6D6
6A7
DATE. 5/12/35
DRAWN
CHECKED J.B.V.

IO CORP.

MODEL 115
MODEL 310
Schematics



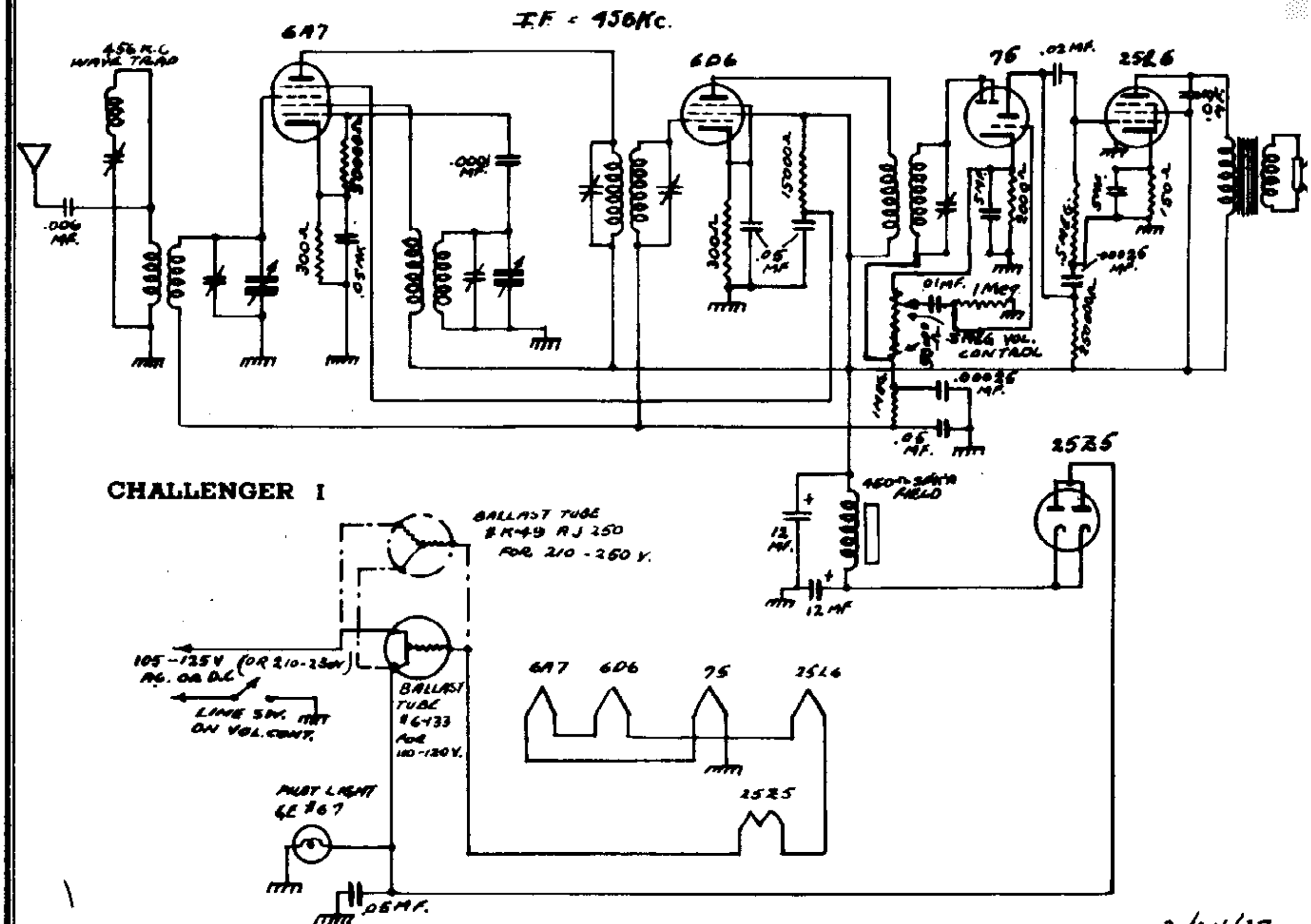
IF PEAK 456 KC.



SCHEMATIC CIRCUIT
MODEL 310

GAROD RADIO CORP.

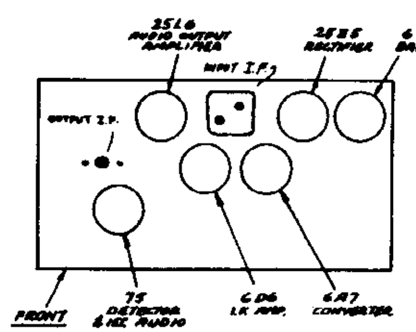
MODEL Challenger I
Schematic, Socket
Alignment, Voltage



CHALLENGER I

2/24/37

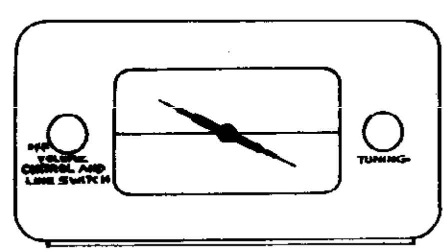
This receiver operates on either direct current or alternating current of any frequency on voltage between 105 and 130. If voltages in excess of this value are to be applied to the receiver, a special Ballast Tube must be used. When operating from direct current, if after the receiver has been turned on for about three quarters of a minute, no reception is obtained, the plug must be reversed in the socket. On alternating current, there is generally no difference, though sometimes quieter operation results.



I.F. ADJUSTMENT - The signal generator is set at 456 kc. The "hot" lead from the signal generator is connected to the grid cap on the 1st detector (6A7) tube, the clip having first been removed from the tube cap. The ground lead is connected to the receiver chassis. The oscillator section (front) of the gang tuning condenser is short-circuited and the volume control turned on full. The i.f. trimmers are then adjusted for maximum gain in the receiver. These trimmers are located on top of the i.f. transformer shield can and on the chassis to the left of the 6D6 tube. The one towards the right is the 1st i.f. transformer and the left one is the 2nd i.f. transformer. The oscillator section of the variable condenser is the one nearest the front of the chassis. The antenna trimmer is then adjusted for maximum output.

1500 KILOCYCLE ADJUSTMENT - The short-circuit is removed from the oscillator condenser and the grid clip replaced in its normal position on the cap of the 6A7 tube. The "hot" lead from the signal generator is connected to the antenna lead of the receiver and the ground lead to the ground of the receiver. With the volume control set at maximum and a minimum input signal from the signal generator, the band switch is turned to the left and the receiver dial set at 1500 K.C. The oscillator trimmer is adjusted so as to bring the signal in at this setting.

456 K.C. WAVE TRAP ADJUSTMENT: The signal generator is again set to 456 kc. The output of the signal generator is increased so as to obtain a good reading (about half scale) on the output meter connected to the receiver. The wave trap is then adjusted for a MINIMUM reading by rotating the trimmer on top of the antenna coil. This is located directly behind the dial scale.



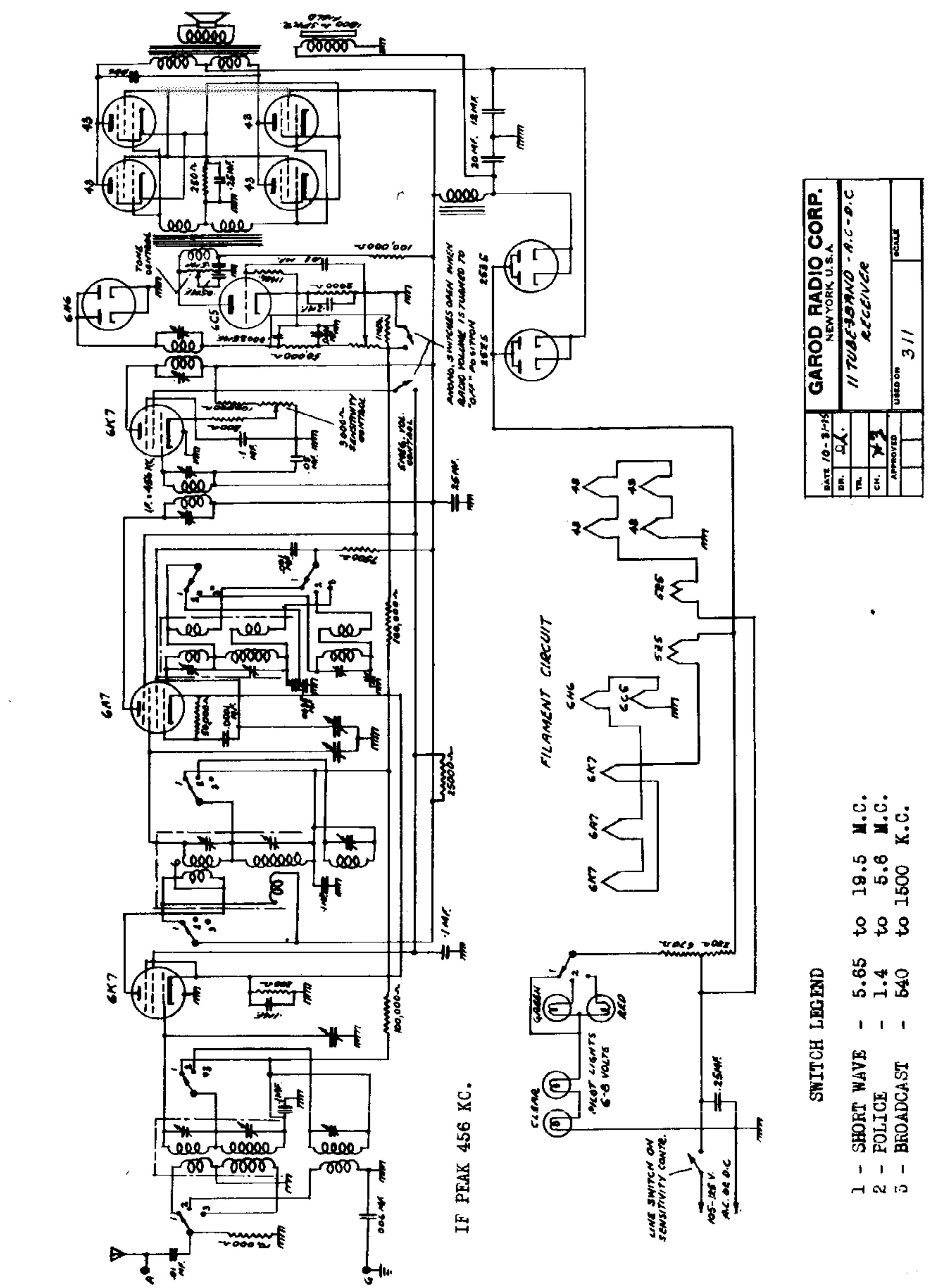
VOLTAGE TABLE

TUBE	FUNCTION	H'T'R	PLATE	SC.GR.	CATH	OSC.PL.
6A7	det.-osc.	6.3	92	65.0	2.5	92
6D6	i.f. ampl.	6.3	92	92	2.0	----
75	diode det. and 1st audio	6.3	40.0	----	----	----
25L6	audio oupt.	25.	90	92	7.5	----
25Z5	rectifier	25.	92	----	120.	----

NOTE: Fil. voltages measured with a high impedance A.C. voltmeter, other potentials with a high resistance (1000 OHMS per volt) voltmeter.

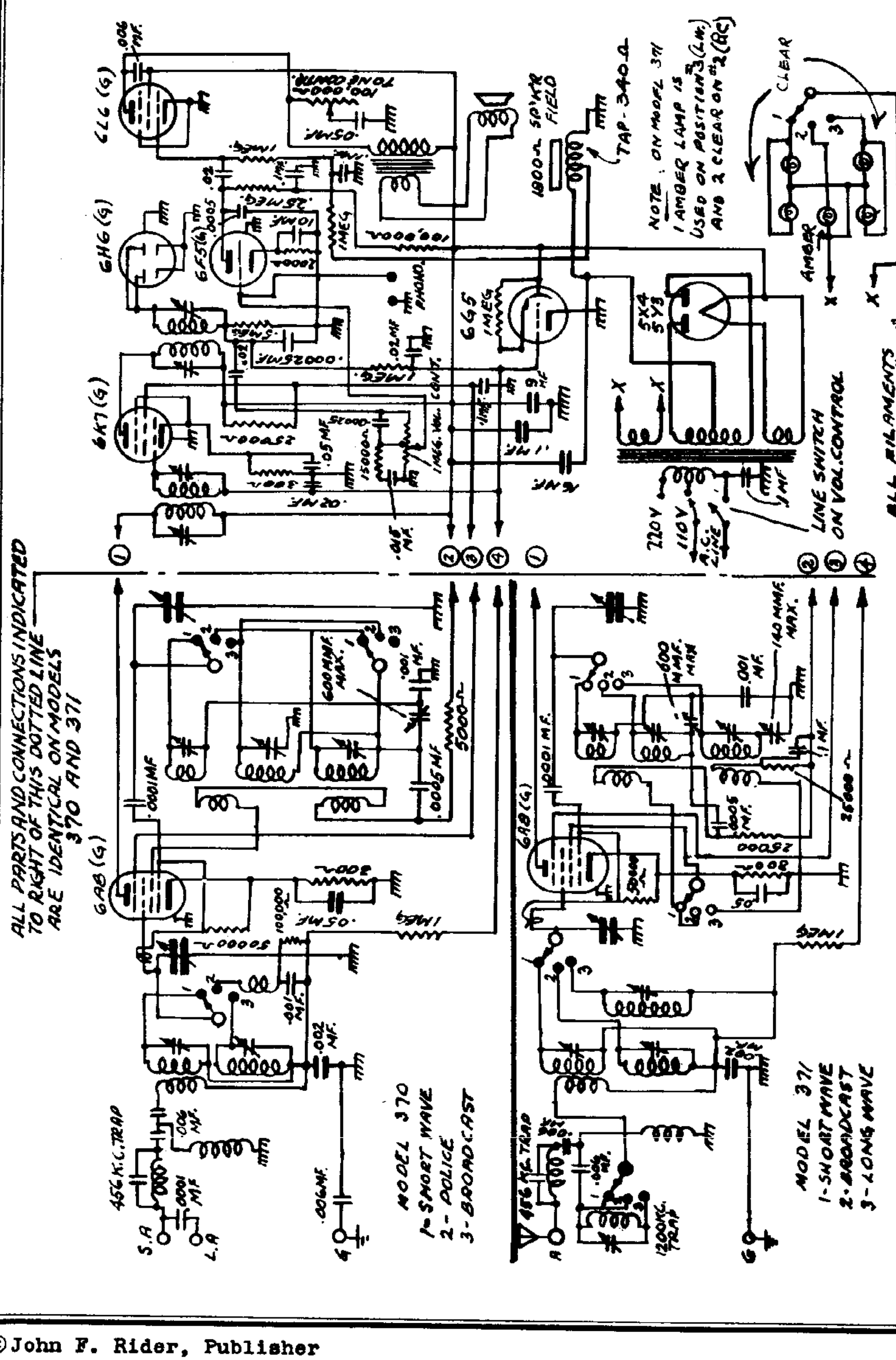
MODEL 311
Schematic

GAROD RADIO CORP.



GAROD RADIO CORP.

MODELS 370,370C,370D,370KC
MODELS 371,371C,371D,371KC
Schematics



IF PEAK 456 KC.

WAVE BANDS For Model 370

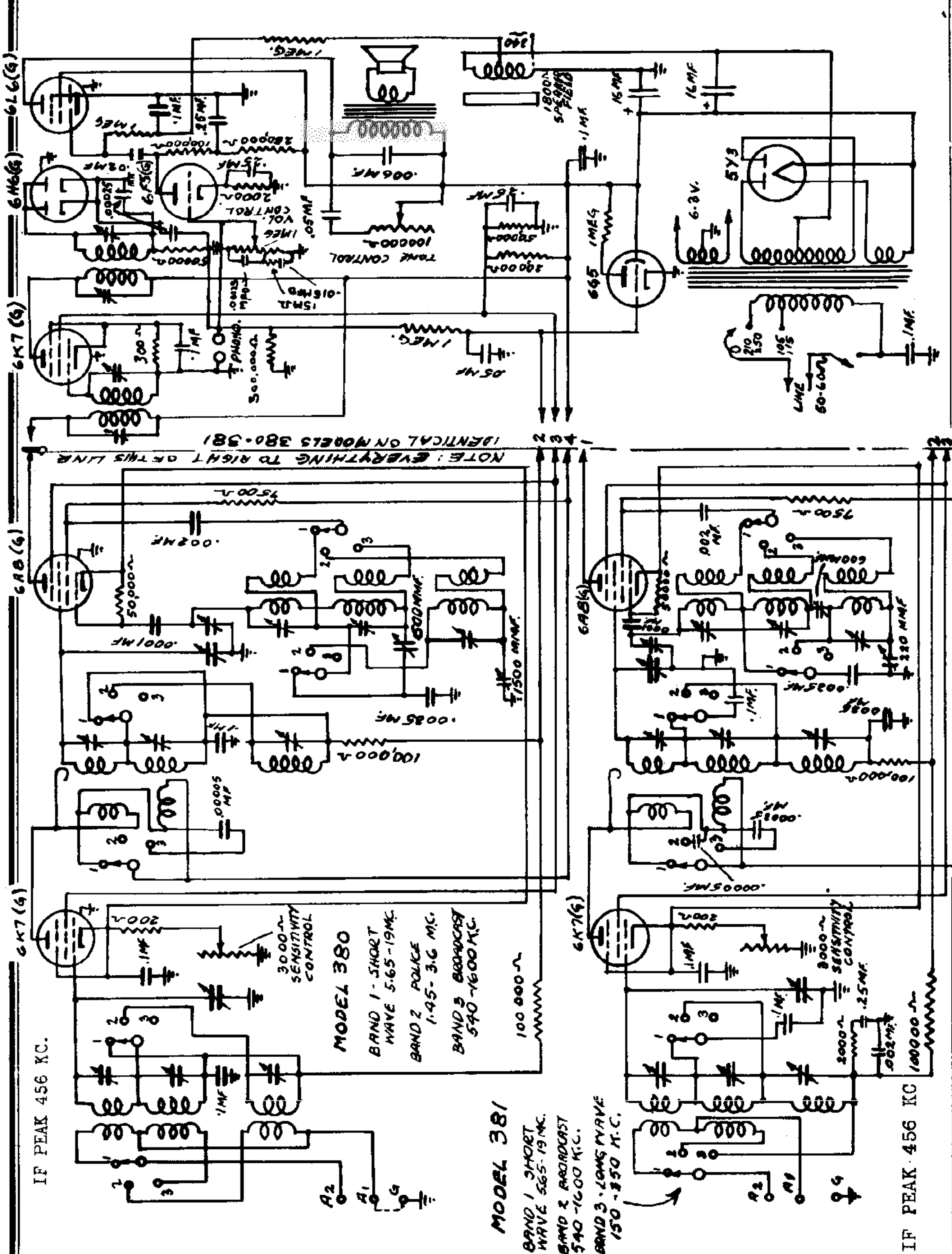
POSITION	WAVE BAND	
1	15 to 52 meters	- Foreign & American Short Waves.
2	75 " 200 "	- Aircraft, Police, Amateur, etc.
3	200 " 560 "	- Regular Broadcast

WAVE BANDS For Model 371

POSITION	WAVE BAND	
1	16 to 52 meters	- Foreign & American Short Waves
2	200 " 560 "	- Regular Broadcast
3	750 " 2000 "	- Weather reports in the U.S.A.

MODELS 380,380D,380KC
MODELS 381,381D,381KC
Schematics

GAROD RADIO CORP.



Alignment,Voltage
Socket,Trimmers

GAROD RADIO CORP.

MODELS 380,380D,380KC
MODELS 381,381D,381KC

I.F. ADJUSTMENT - The signal generator is set at 456 kc. and is connected to the grid of the first detector (6A8). With the oscillator section of the tuning condenser short-circuited and the receiver volume control at its maximum position, the i.f. trimmers are adjusted for maximum output. These trimmers may be found on tops of the i.f. transformer shield cans.

MODEL 380

18 MEGACYCLE ADJUSTMENT - The high side of the signal generator is connected to the antenna lead of the receiver and the low side to the ground lead. The receiver and the signal are both tuned to a frequency of 18 mc. with the selector switch in position for band no. 1. The oscillator trimmer condenser is adjusted so that the 18 mc signal is tuned in exactly at the 18 mc calibration point, with the volume control on full and the signal generator adjusted for minimum input. The antenna preselector and first detector trimmers are then adjusted in the order named for maximum output. These trimmers are located on the sides of the shield cans and are opposite the lower openings. This is the only adjustment on Band #1.

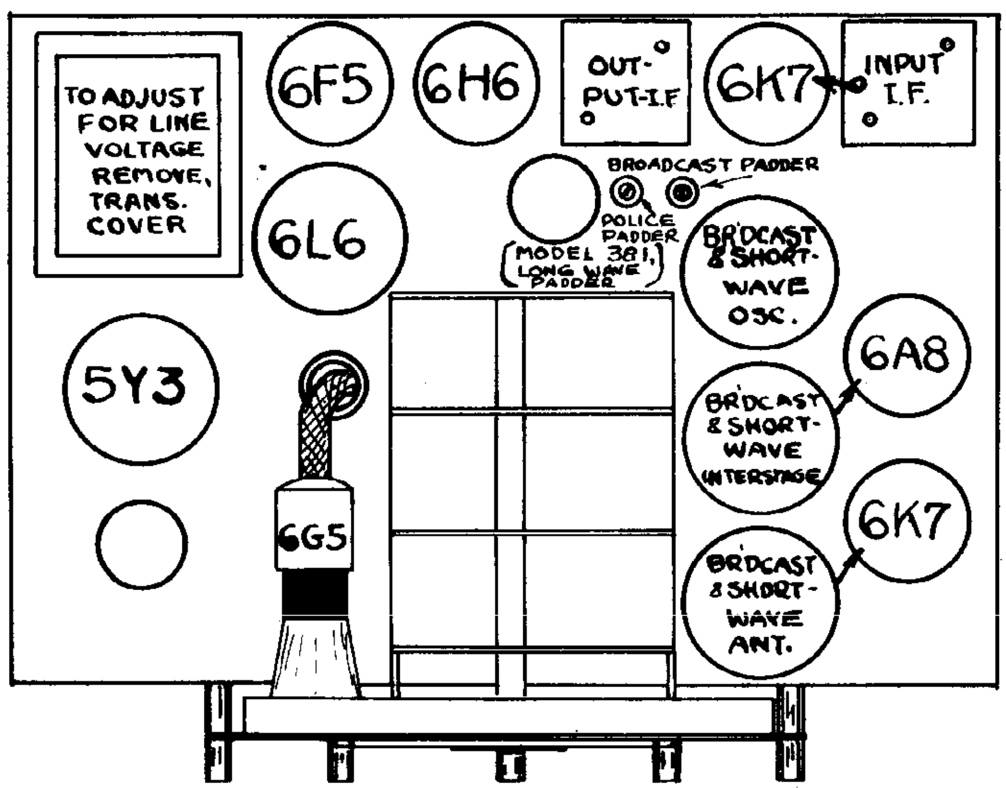
1500 K.C. ADJUSTMENT - With the band selector switch in position for operation on band no. 3. and the receiver and signal generator both set at 1500 K.C. the procedure outlined above is repeated. The oscillator trimmer is found on the rear coil can, and is opposite the upper opening. The antenna preselector and interstage coil trimmers are located in the same positions on the corresponding shield cans.
The signal generator is set at 600 K.C. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left. The 1500 K.C. adjustment should then be rechecked. The 600 K.C. Padder is located as indicated in the sketch.

3 MC. ADJUSTMENT - The band selector switch is set in position for operation on the No. 2. band. The receiver and signal generator are both set at 3 M.C. and the procedure outlined above is repeated. The oscillator trimmer is found on the Police Band Coil located under the chassis and is towards the rear. The other trimmers for this band are located in similar positions on the corresponding coils.
The signal generator is set at 1.7 M.C. and the signal tuned in on the dial. The padder condenser for the police band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 3 M.C. adjustment should then be rechecked. The 1.7 MC. padder is located as indicated.

MODEL 381

Model 381 is the same as Model 380 except that the Long Wave band is substituted for the Police Band. Alignment procedure is identical for the Short Wave and Broadcast Bands. The Long Wave Band is aligned as follows:
300 KC. ADJUSTMENT - The band selector switch is set in position for operation on band no. 3. The receiver and generator are both tuned to 340 kc. and the procedure outlined above is repeated. The oscillator trimmer is located under the chassis and is mounted on the rear coil.
The signal generator is set at 150 kc. and the signal is tuned in on the dial. The padder condenser for this band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 300 kc. adjustment should then be rechecked. The 150 kc. padder is located as indicated.

All voltages except filament, are measured from socket terminals to chassis and with a 1000 Ohms per volt voltmeter. The set must be in operation and the sensitivity control in its maximum clockwise position. Wave Band switch in broadcast position.
Filament voltages are taken from filament prong to filament prong at tube socket and measured with a low impedance AC voltmeter.



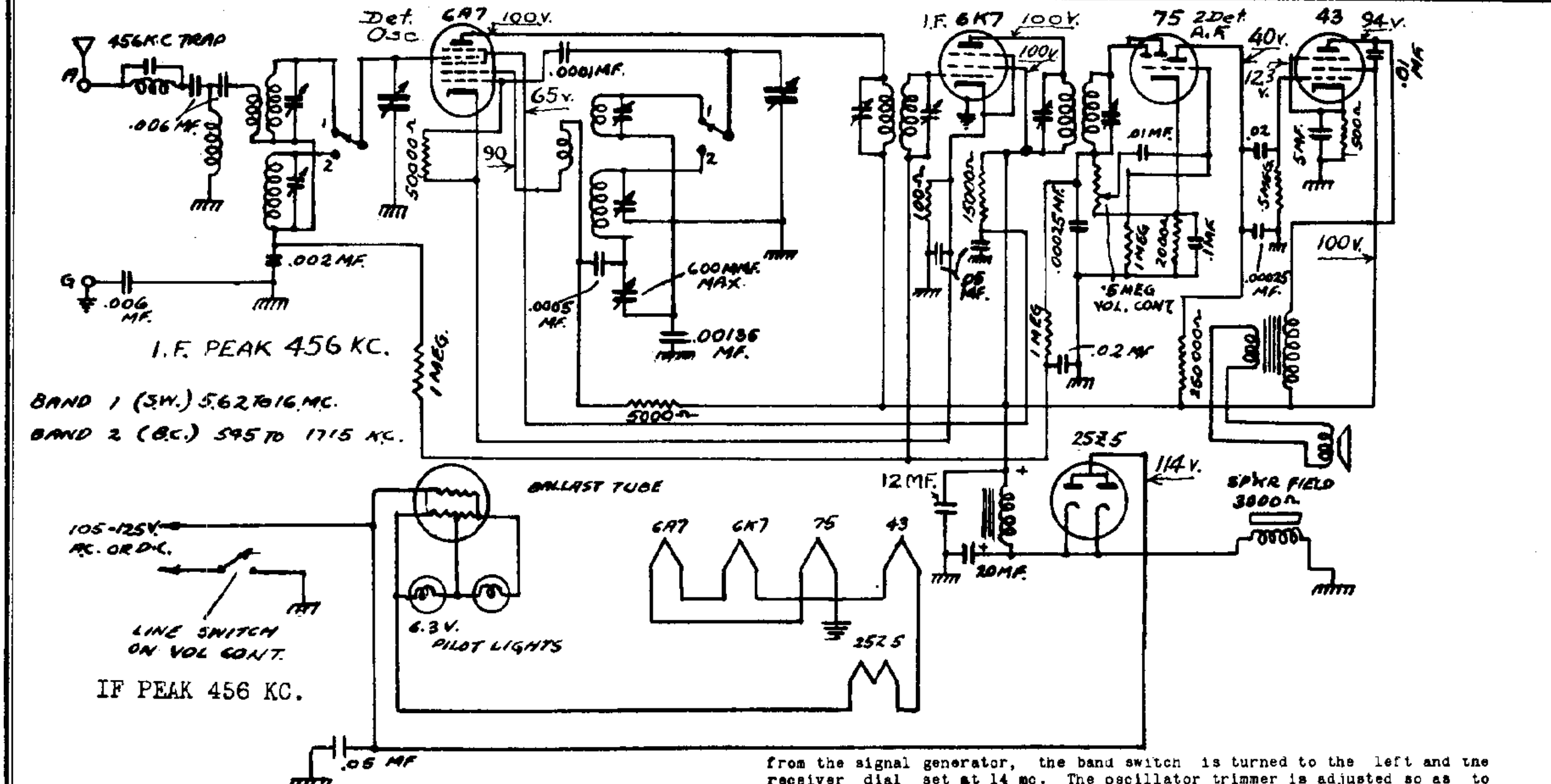
CHASSIS AND TUBE LAYOUT

MODEL 380 - 381

TUBE	FUNCTION	HEATER	PLATE	SC. GR.	CATH Volts	CATH Curr.	OSC. PL.
6K7(G)	R.F. Amp.	6.3	265	110	3	7	
6A8(G)	Det. Osc.	6.3	265	110	3	8	220
6K7(G)	I.F. Amp.	6.3	265	110	3.5	7	
6H6(G)	Diode Det.	6.3	0				
6F5(G)	1st Audio Amp.	6.3	80		1	.5	
6L6(G)	Audio Output	6.3	255	265	0	45	
5Y3	Rectifier	5.0			380	68	

MODEL 620
Schematic
Alignment

GAROD RADIO CORP.



IF PEAK 456 KC.

ALIGNMENT PROCEDURE

Realignment of this receiver should not be attempted unless all other possible causes of faulty operation have first been thoroughly investigated. An accurately calibrated signal generator which will cover the various wavebands, and an output meter for indicating the effects of adjustments, are required.

I.F. ADJUSTMENT - The signal generator is set at 456 kc. The "hot" lead from the signal generator is connected to the grid cap on the 1st detector (6A7) tube, the clip having first been removed from the tube cap. The ground lead is connected to the receiver chassis. The oscillator section (front) of the gang tuning condenser is short-circuited and the volume control turned on full. The i.f. trimmers are then adjusted for maximum gain in the receiver. These trimmers are located on top of the i.f. transformer shield cans, which are situated in the rear of the chassis. The one towards the right is the 1st i.f. transformer and the left one is the 2nd i.f. transformer.

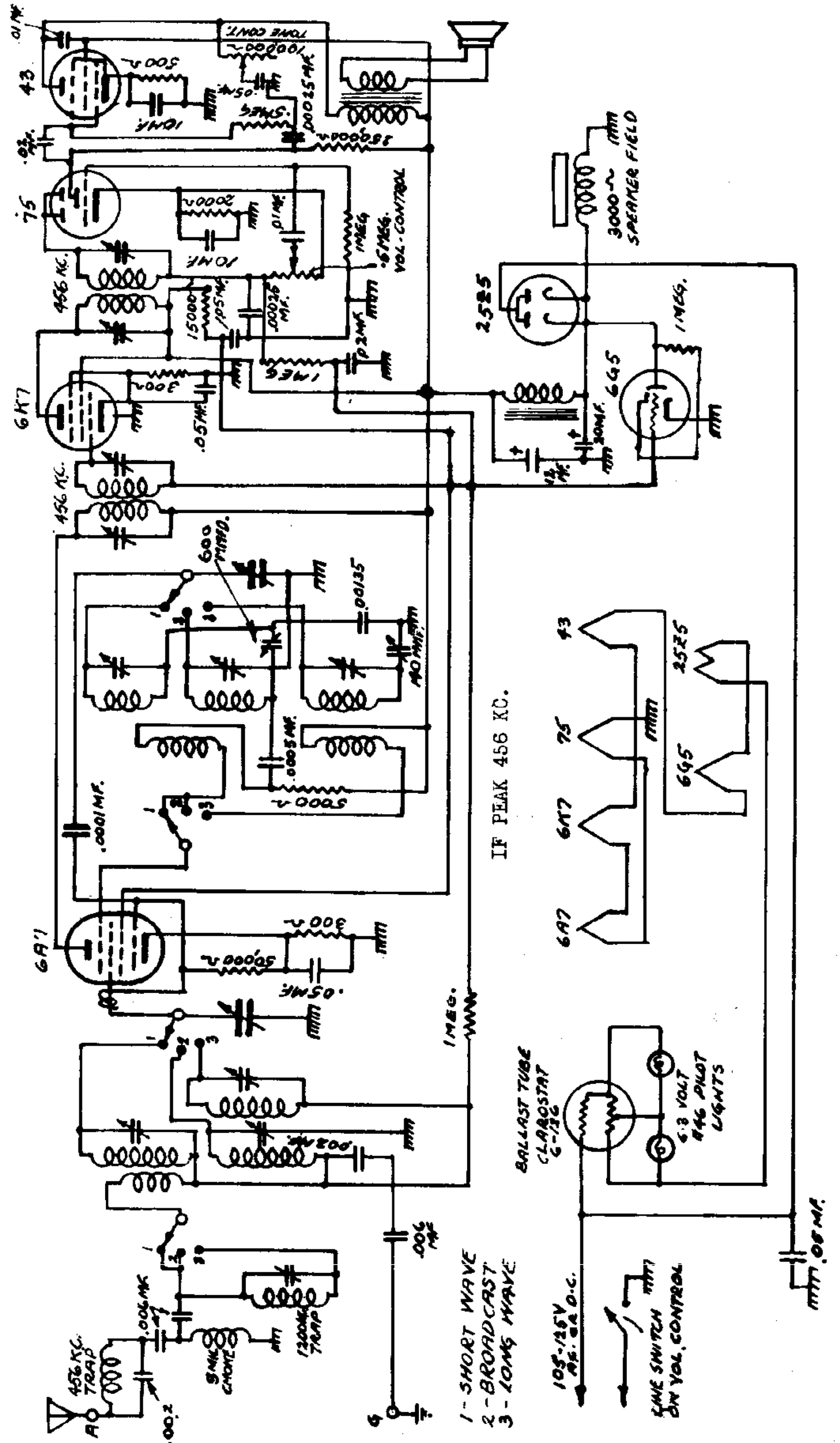
14 MEGACYCLE ADJUSTMENT - The short-circuit is removed from the oscillator condenser and the grid clip replaced in its normal position on the cap of the 6A7 tube. The "hot" lead from the signal generator is connected to the antenna lead of the receiver and the ground lead to the ground of the receiver. With the volume control set at maximum and a minimum input signal from the signal generator, the band switch is turned to the left and the receiver dial set at 14 mc. The oscillator trimmer is adjusted so as to bring the signal in at this setting. The oscillator coil is underneath the chassis and is located directly under the variable gang condenser. The short wave trimmer is over the short wave winding (Heavy spaced wire.) After the oscillator is set, the antenna trimmer is adjusted for maximum output as indicated by the output meter. (Again the S. W. antenna trimmer is located over the heavy spaced winding on the antenna coil, and is accessible from the top of the chassis.) There are no other adjustments on this band.

1500 KC KILOCYCLE ADJUSTMENT - Turn the Wave Band Switch to the right. Set the signal generator to 1500 kc. and turn the dial pointer to correspond to this frequency. Adjust the oscillator trimmer for this band so that the signal is received exactly at this setting. (This trimmer is located over the close-wound fine winding on the oscillator coil.) Adjust the Broadcast antenna trimmer for maximum output as described previously, (this trimmer is over the small 5 section winding and is accessible from the top.)

600 KC PADDER ADJUSTMENT - With all connections as above, the signal generator is set at 600 KC and the signal tuned in on the dial. The padder for this frequency is found on the front sub-panel of the receiver, directly under the dial. This padder should be adjusted for maximum response of the receiver, while the tuning condenser is rocked slightly back and forth. The 1500 kc adjustment should then be rechecked.

GAROD RADIO CORP.

MODEL 731
Schematic
Notes



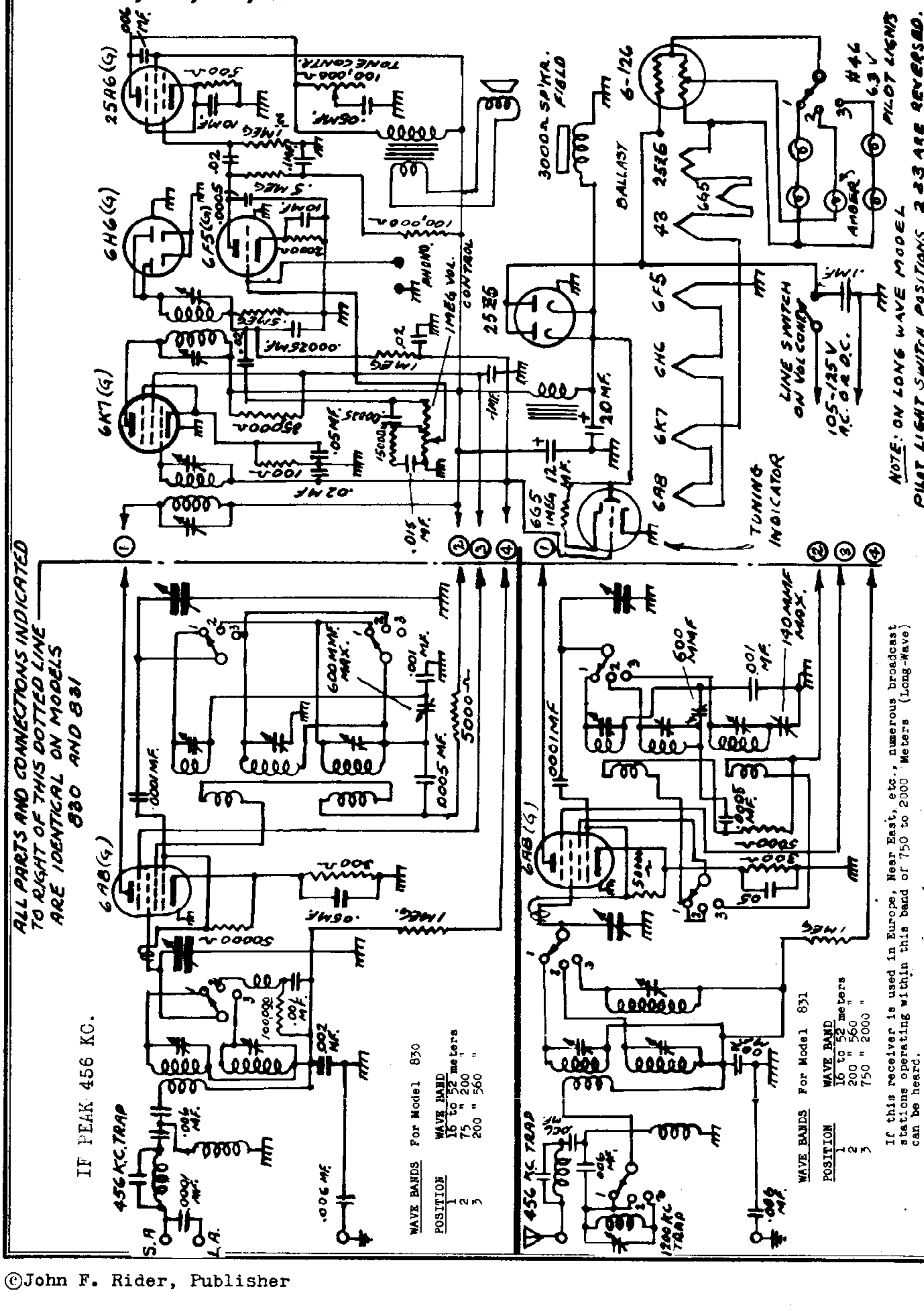
This receiver operates on either direct current or alternating current of any frequency on voltage between 105 and 130. If voltages in excess of this value are to be applied to the receiver, a special voltage reducing resistor must be used. When operating from direct current, if after the receiver has been turned on for about three quarters of a minute, no reception is obtained, the plug must be reversed in the socket. On alternating current, there is generally no difference, though sometimes, quieter operation results.

POSITION	WAVE BAND	
1	17 to 53 meters	- Foreign & American Short Waves
2	200 " 560 "	- Regular Broadcast
3	750 " 2000 "	- Weather reports in the U.S.A.

MODELS 830,830C,830D,830KC
MODELS 831,831C,831D,831KC

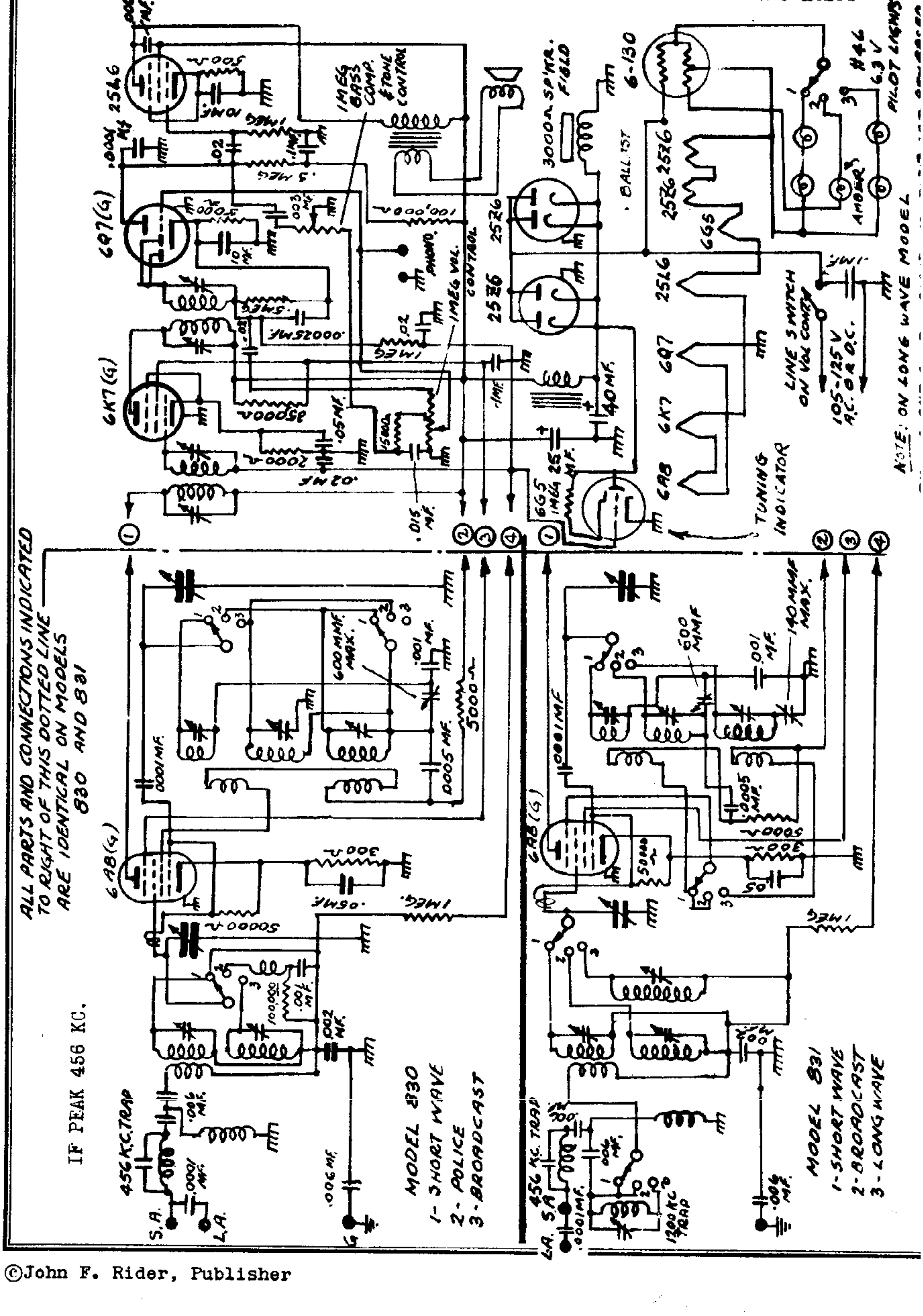
GAROD RADIO CORP.

Schematics



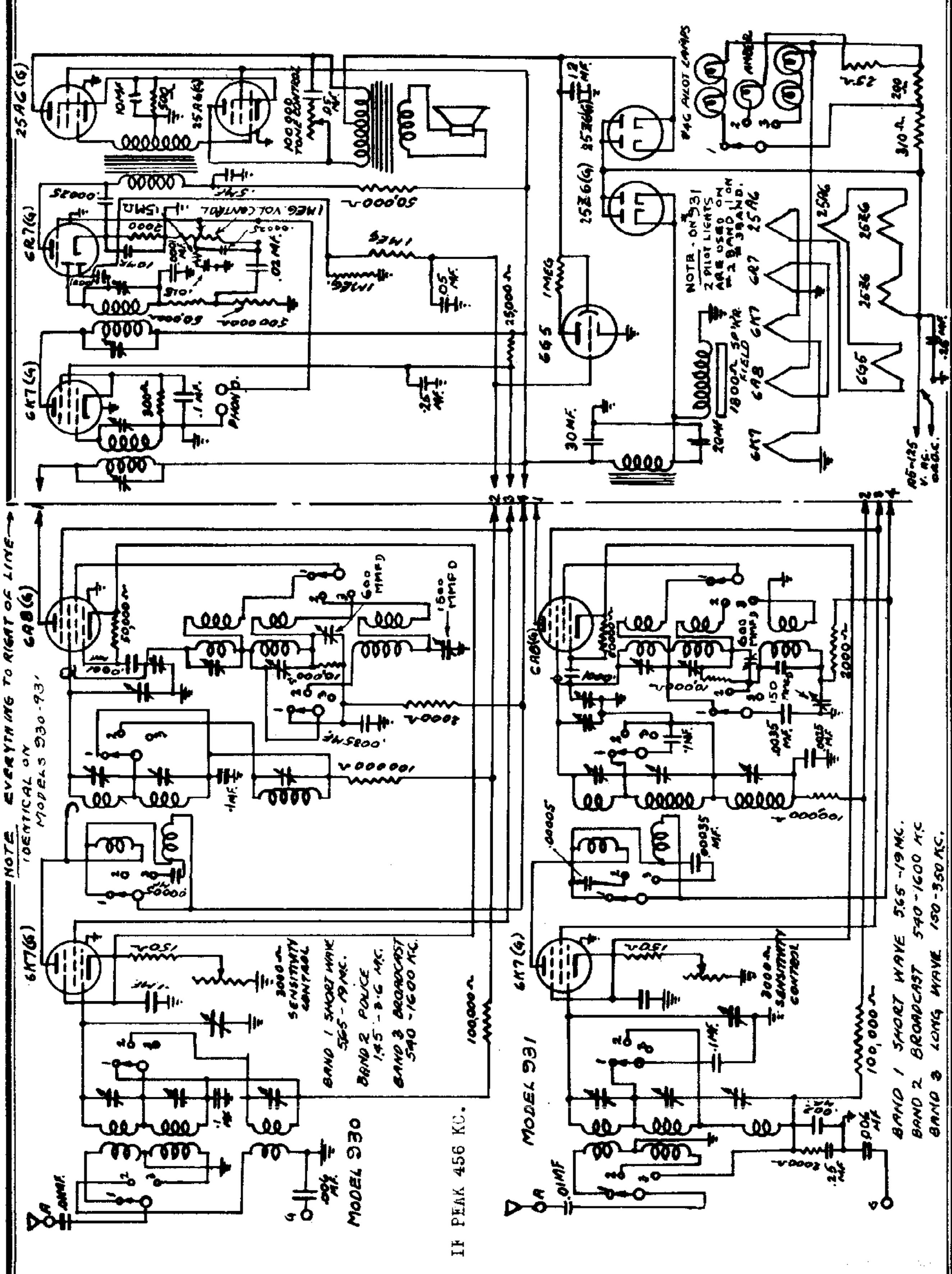
GAROD RADIO CORP.

MODELS 830A, 831A
Schematics



MODELS 930,930D,930KC
MODELS 931,931D,931KC
Schematics

GAROD RADIO CORP.



Alignment, Socket, Trimmers
Voltage

GAROD RADIO CORP.

MODELS 930, 930A, 930D, 930F
MODELS 931, 931A, 931D, 931F

I.F. ADJUSTMENT - The signal generator is set at 456 kc. and is connected to the grid of the first detector (6A8). With the oscillator section of the tuning condenser short-circuited and the receiver volume control at its maximum position, the i.f. trimmers are adjusted for maximum output. These trimmers may be found on tops of the i.f. transformer shield cans.

MODEL 930

18 MEGACYCLE ADJUSTMENT - The high side of the signal generator is connected to the antenna lead of the receiver and the low side to the ground lead. The receiver and the signal are both tuned to a frequency of 18 mc. with the selector switch in position for band no. 1. The oscillator trimmer condenser is adjusted so that the 18 mc signal is tuned in exactly at the 18 mc calibration point, with the volume control on full and the signal generator adjusted for minimum input. The antenna preselector and first detector trimmers are than adjusted in the order named for maximum output. These trimmers are located on the sides of the shield cans and are opposite the lower openings. This is the only adjustment on band #1.

1500 K.C. ADJUSTMENT - With the band selector switch in position for operation on band no. 3. and the receiver and signal generator both set at 1500 K.C. the procedure outlined above is repeated. The oscillator trimmer is found on the rear coil can, and is opposite the lower opening. The antenna preselector and interstage coil trimmers are located in the same positions on the corresponding shield cans.

The signal generator is set at 600 K.C. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left. The 1500 K.C. adjustment should then be rechecked. The 600 K.C. Padder is located as indicated in the sketch.

3 MC ADJUSTMENT - The band selector switch is set in position for operation on the no. 2. band. The receiver and signal generator are both set at 3 M.C. and the procedure outlined above is repeated. The oscillator trimmer is found on the police band coil located under the chassis and is towards the rear. The other trimmers for this band are located in similar positions on the corresponding coils.

The signal generator is set at 1.7 M.C. and the signal tuned in on the dial. The padder condenser for the police band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 3 M.C. adjustment should then be rechecked. The 1.7 M.C. padder is located as indicated.

MODEL 931

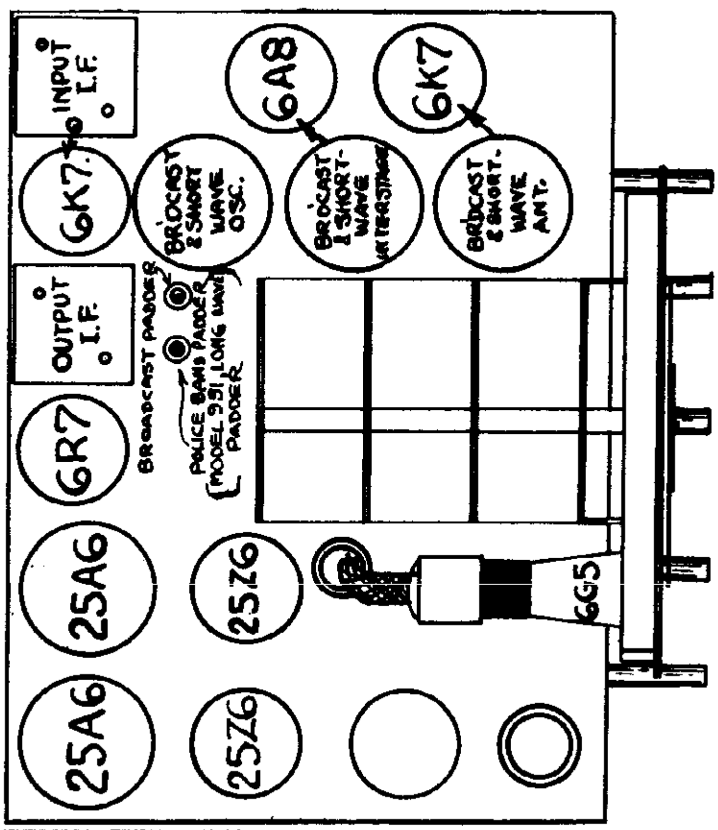
Model 931 is the same as Model 930 except that the Long Wave band is substituted for the Police Band. Alignment procedure is identical for the Short Wave and Broadcast Bands. The Long Wave Band is aligned as follows:

300 KC. ADJUSTMENT - The band selector switch is set in position for operation on band no. 3. The receiver and generator are both tuned to 340 kc. and the procedure outlined above is repeated. The oscillator trimmer is located under the chassis and is mounted on the rear coil.

The signal generator is set at 150 kc. and the signal is tuned in on the dial. The padder condenser for this band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 300 kc. adjustment should then be rechecked. The 150 kc. padder is located as indicated.

All voltages except filament, are measured from socket terminals to chassis and with a 1000 Ohms per volt voltmeter. The set must be in operation and the sensitivity control in its maximum clockwise position. Wave band switch in the broadcast position.

Filament voltages are taken from filament prong to filament prong at tube socket and measured with a high impedance AC voltmeter. (Rectifier Type)



TUBE AND CHASSIS LAYOUT

MODEL 930 - 931

TUBE	FUNCTION	HEATER	PLATE	SC. GR.	CATH Volts	CATH Curr.	OSC. PL.
6K7 (G)	R.F. Amp.	6.3	120	50	1.3	3.5	
6A8 (G)	Det. Osc.	6.3	120	50	1.3	5.5	100
6K7 (G)	I.F. Amp.	6.3	120	50	1.2	4	
6R7 (G)	Diode Det. & 1st Audio Amp	6.3	60		2.	1.6	
25A6 (G)(2)	Audio Output	25.	125	120	19.	20.	
25Z6(G)	Rectifier (B+ for RF Amp)	25.			125.	80.	
·25Z6	Rectifier (B+ for output tube plates)	25.			128.	35.	

MODELS 930A, 931A
Schematics, Voltage
Socket

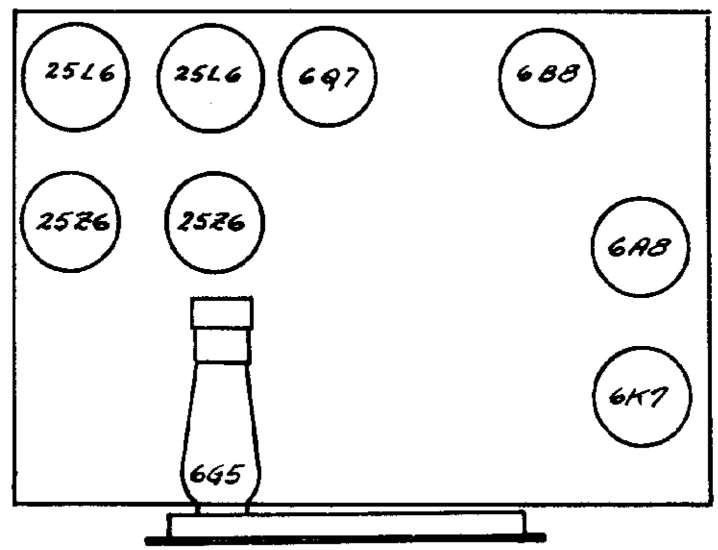
GAROD RADIO CORP.

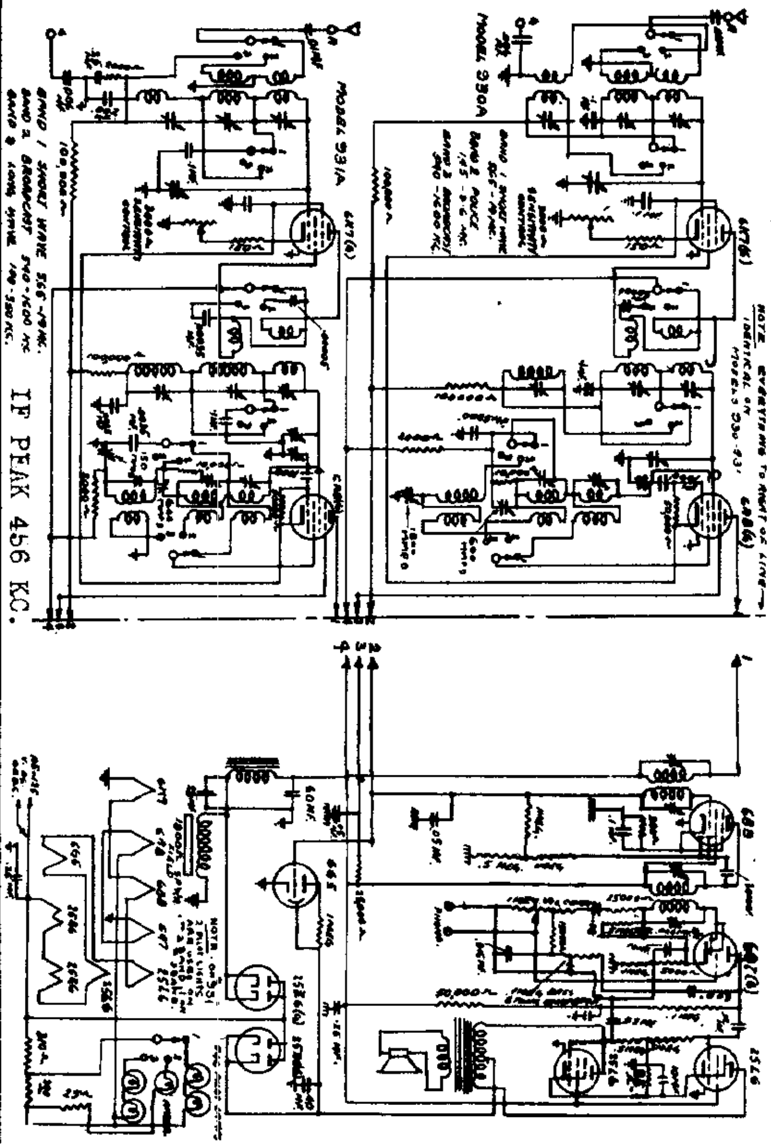
MODEL 930A- 931A

TUBE	FUNCTION	HEATER	PLATE	SC.GR.	CATH Volts	CATH Curr.	OSC.PL.
6K7 (G)	R.F. Amp.	6.3	120	120	2.0	7.0	
6A8 (G)	Det. Osc.	6.3	120	50	2.0	5.5	100
6B8	I.F. Amp& AVC	6.3	120	120	1.2	4	
6Q7 (G)	Diode Det. & 1st Audio Amp.	6.3	80		2.0	.2	
25L6(G)(2)	Audio Output	25.	125	120	8.5	52.	
25Z6(G)	Rectifier (B+ for RF Amp)	25.			125.	80.	
25Z6(G)	Rectifier (B+for output tube plates)	25.			128.	90.	

All voltages except filament, are measured from socket terminals to chassis and with a 1000 Ohms per volt voltmeter. The set must be in operation and the sensitivity control in its maximum clockwise position. Wave band switch in the broadcast position.

Filament voltages are taken from filament prong to filament prong at tube socket and measured with a high impedance AC voltmeter. (Rectifier Type)

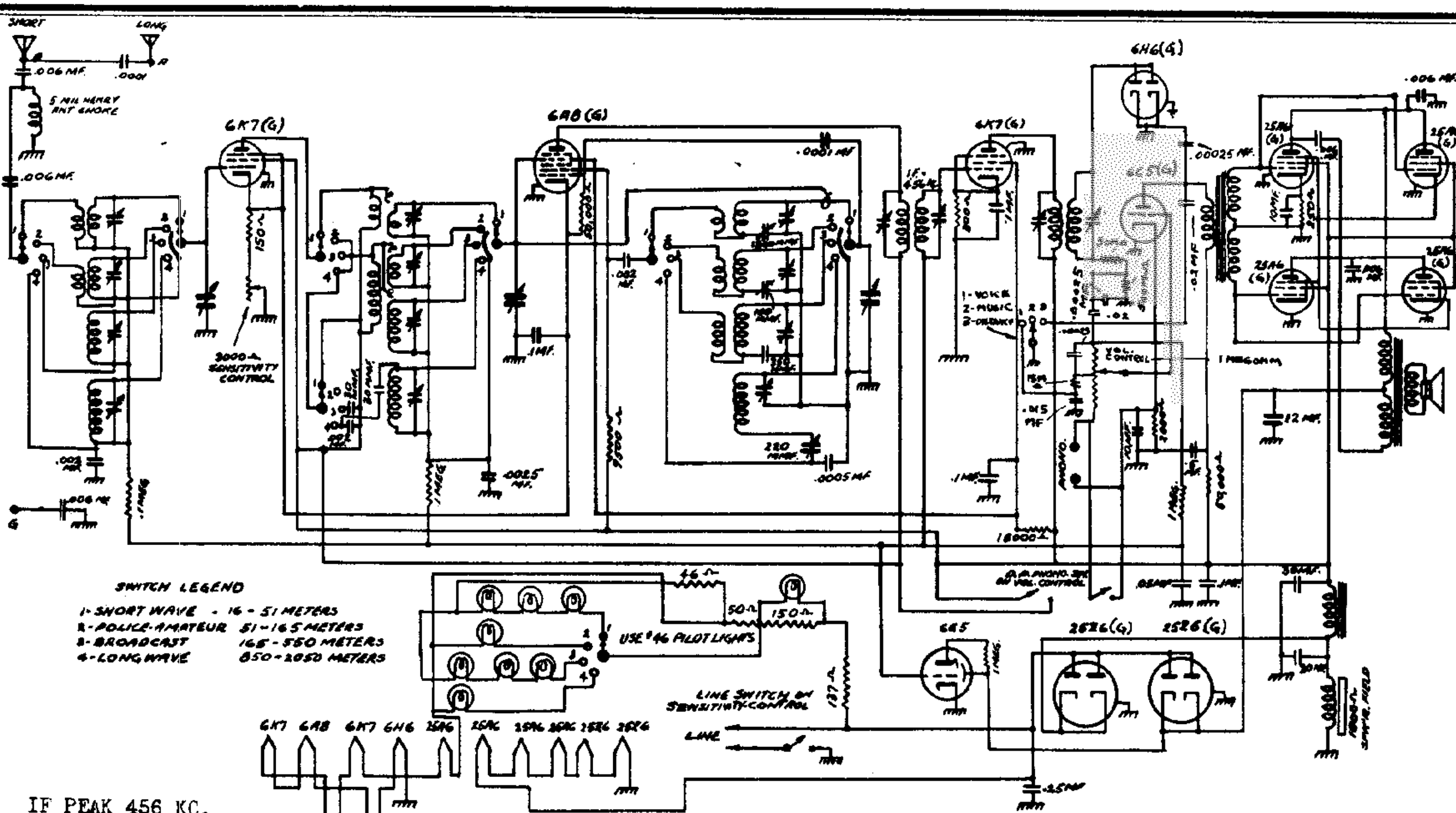




IF PEAK 456 KC.

GAROD RADIO CORP.

MODELS 1240,1240E,1240LC
Schematic,Voltage



SWITCH LEGEND

1-SHORT WAVE - 16 - 51 METERS
2-POLICE-AMATEUR 51-165 METERS
3-BROADCAST 165-550 METERS
4-LONG WAVE 850-2050 METERS

IF PEAK 456 KC.

NOTE :- WAVE BAND SWITCH EQUIPPED WITH EXTRA CONTACTS INDICATED THUS- SHORT CIRCUITS ALL COILS OF LOWER FREQUENCY THAN THE ONE IN USE.

TUBE	FUNCTION	HEATER	PLATE	SC. GR	CATH V	CATH I	OSC. PL
6K7 (G)	RF Amp.	6.3	100	100	1.75	8.0	
6A8 (G)	1st Det. & Osc.	6.3	100	55	1.75	5.5	80
6K7 (G)	IF Amp.	6.3	100	55	1.25	4.0	
6H6 (G)	Diode detector	6.3	0		0		
6C5 (G)	1st Audio Amp.	6.3	60		1.5	.75	
25A6 (G)	(4) Audio Output	25	120	100	20	15.	
25Z6	Rectifier for Set	25			107	87.	
25Z6	Rectifier for Output Plates	25			125	60.	

All voltages except filament, are measured from socket terminals to chassis and with a 1000 Ohms per volt voltmeter. The set must be in operation and the sensitivity control in its maximum clockwise position.

Filament voltages are taken from filament prong to filament prong at tube socket and measured with a low impedance AC voltmeter.

MODELS 1240,1240E,1240LC
Socket,Trimmers,Alignment

GAROD RADIO CORP.

MODEL 1240A
Alignment

I.F. ADJUSTMENT - The signal generator is set at 456 kc. and is connected to the grid of the first detector (6A8). With the oscillator section of the tuning condenser short-circuited and the receiver volume control at its maximum position, the i.f. trimmers are adjusted for maximum output. These trimmers may be found on the tops of the I.F. Transformers.

18 MEGACYCLE ADJUSTMENT - The high side of the signal generator is connected to the antenna lead of the receiver and the low side to the ground lead. The receiver and the signal are both tuned to a frequency of 18 mc. with the selector switch in position for band no. 1. The oscillator trimmer condenser is adjusted so that the 18 mc. signal is tuned in exactly at the 18 mc. calibration point, with the volume control on full and the signal generator adjusted for minimum input. The antenna preselector and interstage trimmers are then adjusted in the order named for maximum output. These trimmers are located as indicated in the bottom view of the chassis.

6 MEGACYCLE ADJUSTMENT - The signal generator is set at 6 megacycle and the signal tuned in on the dial. The short wave padding condenser is adjusted for maximum output, while the gang condenser is rocked slightly to the right and left. The 18 megacycle adjustment should then be rechecked.

5 MC. ADJUSTMENT - With the band selector switch in position for operation on band no. 2. and the receiver and signal generator both set at 5 mc. the procedure outlined above is repeated.

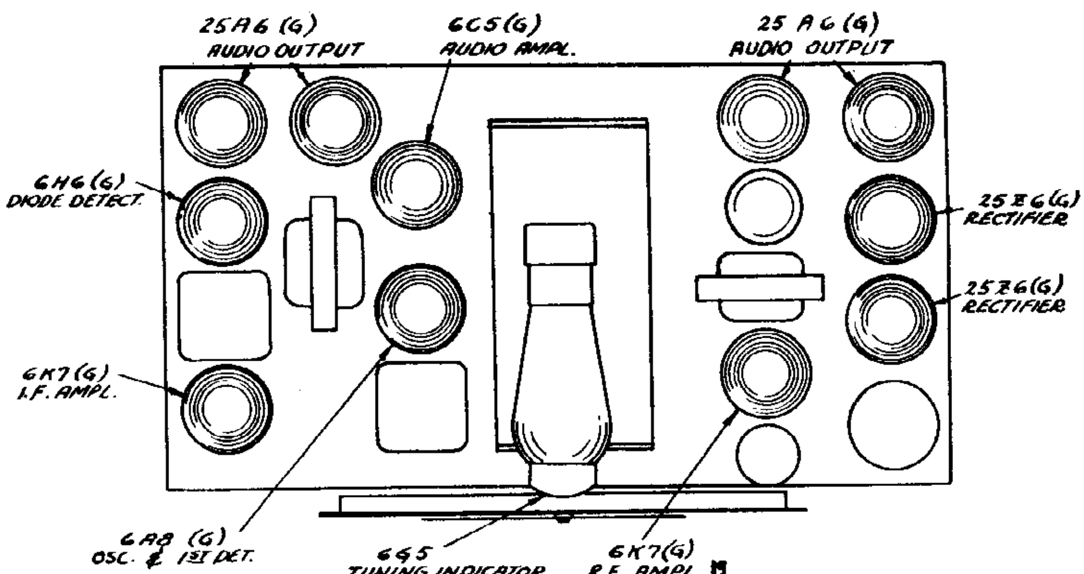
The signal generator is set at 1.8 mc. and the signal tuned in on the dial. The police band padder condenser is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left. The 5 mc. adjustment should then be rechecked.

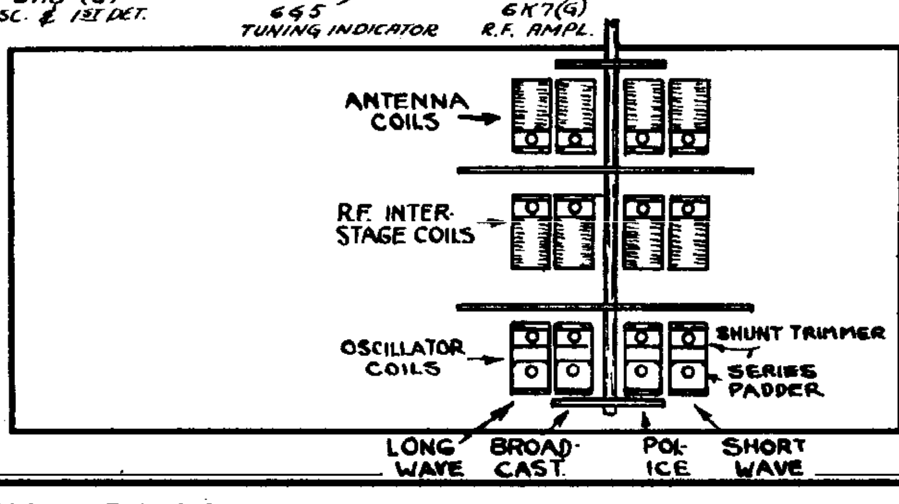
1500 KC. ADJUSTMENT - The band selector switch is set in position for operation on the no. 3. band. The receiver and signal generator are both set at 1500 kc. and the procedure outlined above is repeated.

The signal generator is set at 600 kc. and the signal tuned in on the dial. The broadcast padder condenser is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 1500 kc. adjustment should then be rechecked.

300 KC. ADJUSTMENT - The band selector switch is set in position for operation on band no. 4. The receiver and generator are both tuned to 300 kc. and the procedure outlined above is repeated.

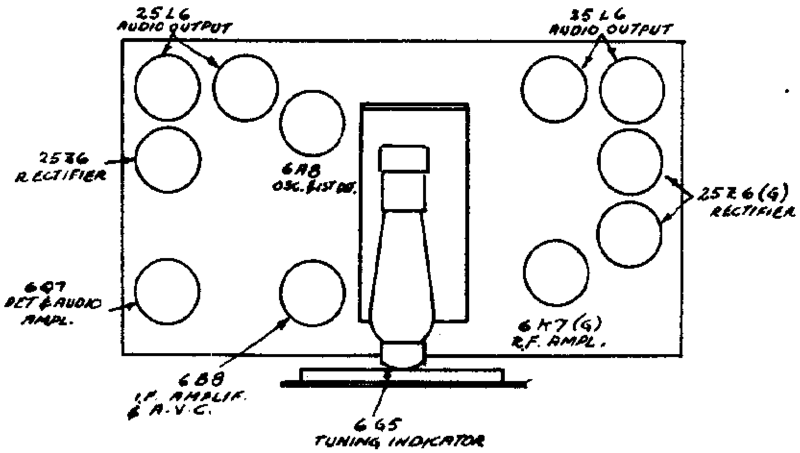
The signal generator is set at 150 kc. and the signal is tuned in on the dial. The long wave padder condenser is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 300 kc. adjustment should then be rechecked.





MODEL 1240A
Schematic, Socket Voltage

GAROD RADIO CORP.



MODEL 1240A

TUBE	FUNCTION	HEATER	PLATE	SC.GR.	CATH V	CATH I	OCS.PL
6K7 (G)	RF Amp.	6.3	100	100	1.75	8.0	
6A8 (G)	1st Det. & Osc.	6.3	100	55	1.75	5.5	80
6B8 (G)	IF Amp.	6.3	100	100	2.00	6.0	
25L6	(4) Audio Output	25	120	100	8.5	.50	
25Z6 (G)	Rectifier for Set	25			107	87.	
25Z6(G)(2)	Rectifier for Output Plates	25			125	85.	
6Q7 G	Det. & 1st Audio	6.3	80		20	.2	

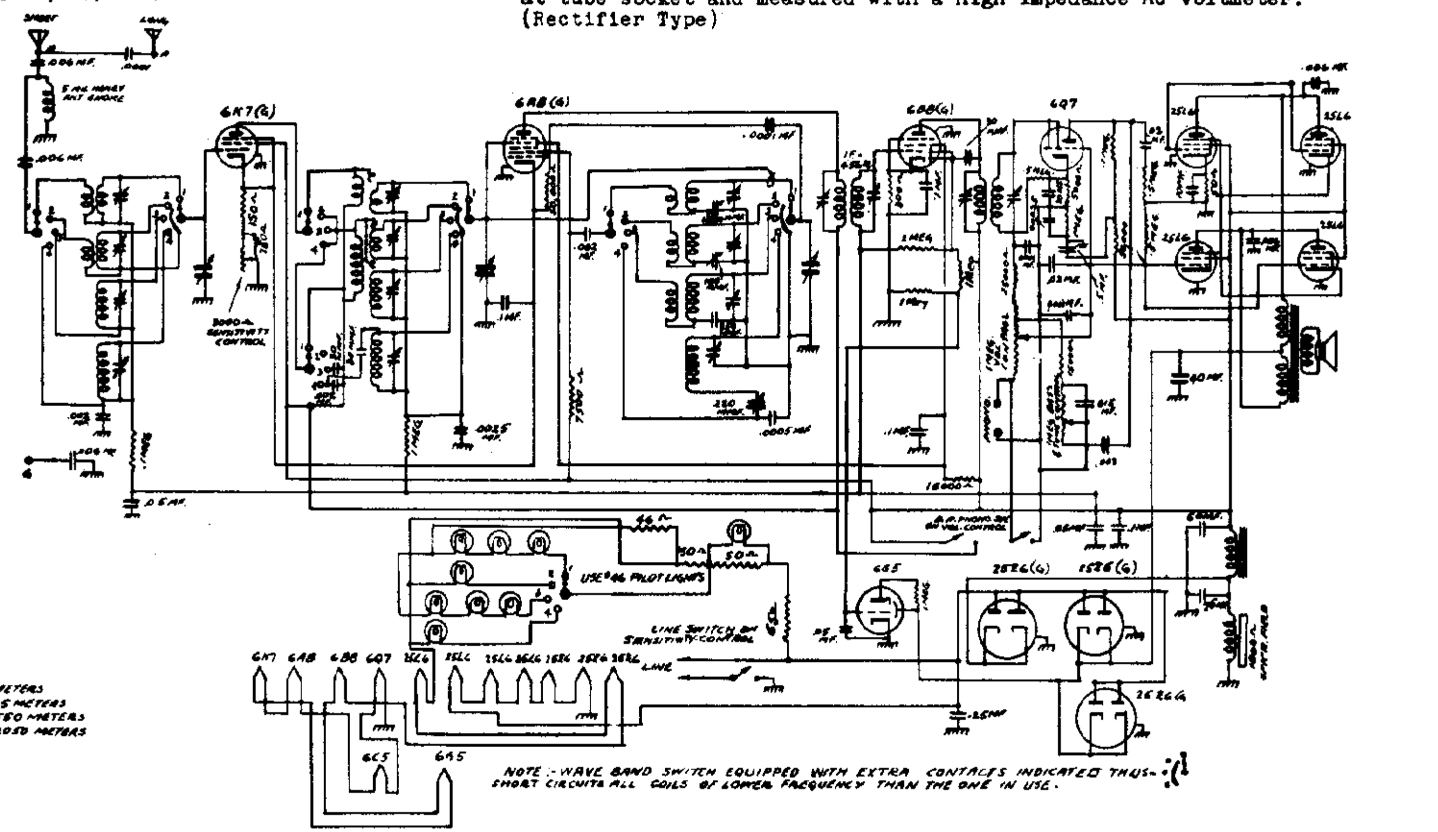
All voltages except filament, are measured from socket terminals to chassis and with a 1000 Ohms per volt voltmeter. The set must be in operation and the sensitivity control in its maximum clockwise position.

Filament voltages are taken from filament prong to filament prong at tube socket and measured with a high impedance AC voltmeter. (Rectifier Type)

IF PEAK 456 KC.

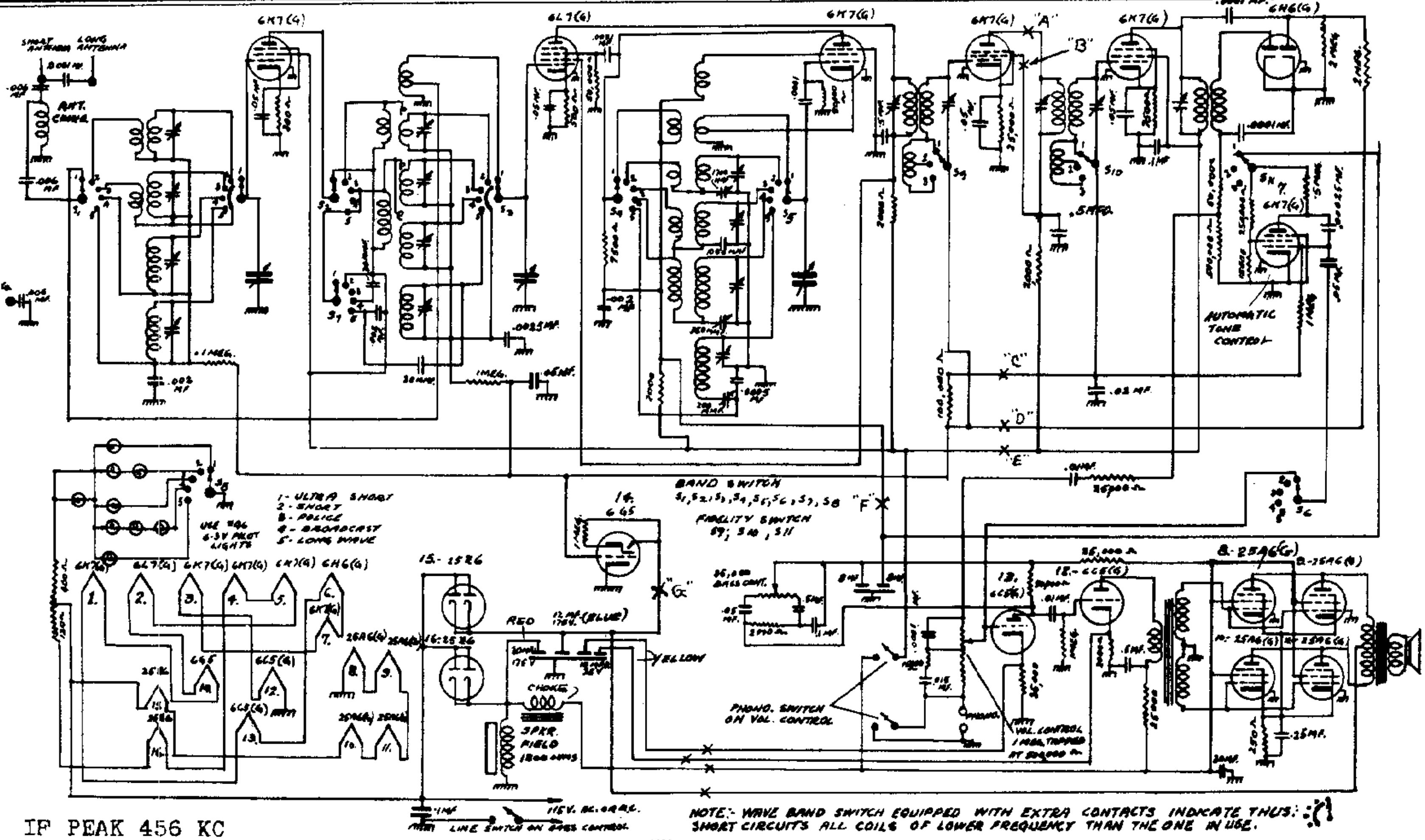
NOTE: On Model 1240A

The tone control is continuously variable, instead of 3 points as in earlier sets of this model (1240). To obtain maximum treble turn tone control all the way to the right (clockwise), and to increase bass or low frequencies, turn to the left.



MODELS 1650,1650H,1650LC
Schematic,Voltage

GAROD RADIO CORP.



IF PEAK 456 KC

MODEL 1650

TUBE	FUNCTION	HEATER	PLATE	SC. GRID.	CATH. V.	CATH. I.MA.
6K7(G)	R.F. Amp.	6.3	100	100	2	6.7
6L7(G)	Converter	6.3	95	95	2.5	5.0
6K7(G)	Oscillator	6.3	80	100	0	4
6K7(G)	Ist I.F. Amp.	6.3	95	95	12	5
6K7(G)	2nd I.F. Amp.	6.3	100	100	6	1
6H6(G)	Diode Det. & A.V.C.	6.3	0		0	
6C5(G)	1st Audio Amp.	6.3	30		1.5	0.3

TUBE	FUNCTION	HEATER	PLATE	SC. GR.	CATH	
6C5(G)	2nd Audio Amp.	6.3	60		1.5	0.75
25A6(G)(4)	Audio Output	25.	120	100	20	15
25Z6(G)	Rectifier For Set	25.			107	87
25Z6(G)	Rectifier For Output Plates	25.			125	60
6K7(G)	Automatic Tone Control	6.3	50	5	0	1

All voltages except filament, are measured from socket terminals to chassis and with a 1000 Ohms per volt voltmeter. The set must be in operation and the sensitivity control in its maximum clockwise position.

Filament voltages are taken from filament prong to filament prong at tube socket and measured with a low impedance AC voltmeter.

MODELS 1650,1650H,1650LC
Socket,Trimmers,Alignment
MODEL 1650A
Alignment

GAROD RADIO CORP

I.F. ADJUSTMENT: The signal generator is set at 456 kc. and is connected to the grid of the first detector (6L7). With the oscillator section of the tuning condenser short-circuited and the receiver volume control at its maximum position, the i.f. trimmers are adjusted for maximum output. These trimmers may be found on the tops of the I.F. transformers.

18 MEGACYCLE ADJUSTMENT: The high side of the signal generator is connected to the antenna lead of the receiver and the low side to the ground lead. The receiver and the signal are both tuned to a frequency of 18 mc. with the selector switch in position for band no. 2 (Short Wave). The oscillator trimmer condenser is adjusted so that the 18 mc. signal is tuned in exactly at the 18 mc. calibration point, with the volume control on full and the signal generator adjusted for minimum input. The antenna preselector and interstage trimmers are then adjusted in the order named for maximum output. These trimmers are located as indicated in the bottom view of the chassis.

6 MEGACYCLE ADJUSTMENT: The signal generator is set at 6 megacycles and the signal tuned in on the dial. The Short Wave padding condenser is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left.

5 MC. ADJUSTMENT: With the band selector switch in position for operation on band no. 3 (Police) and the receiver and signal generator both set at 5 mc. the procedure outlined above is repeated.

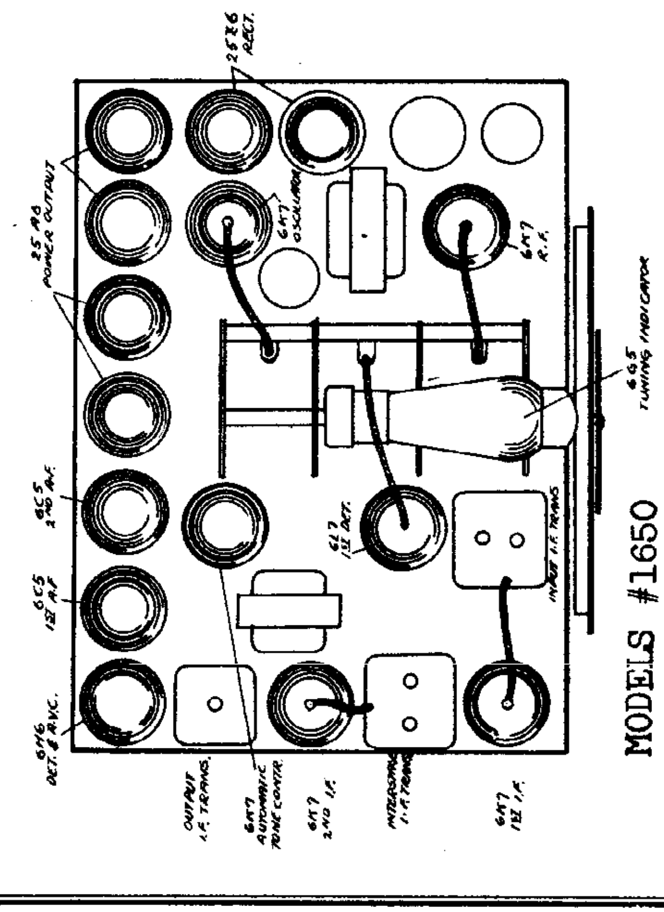
The signal generator is set at 1.8 mc. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left. The 5 mc. adjustment should then be rechecked.

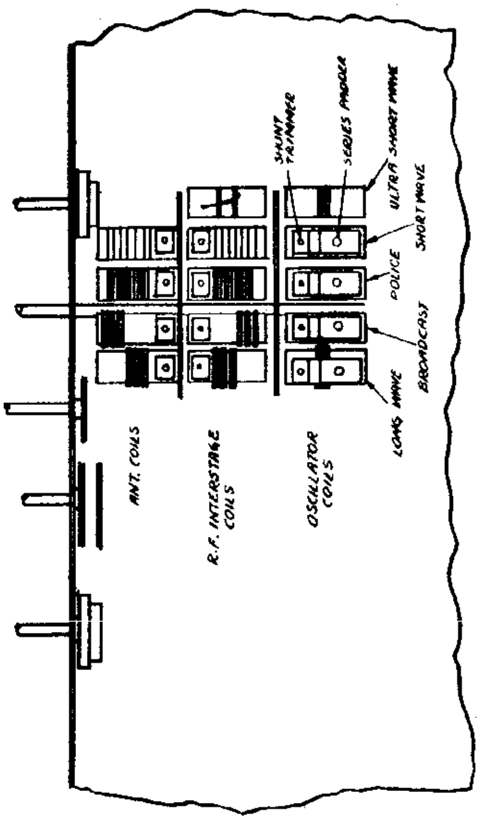
1500 KC. ADJUSTMENT: The band selector switch is set in position for operation on the no. 4 band. (Broadcast). The receiver and signal generator are both set at 1500 kc. and the procedure outlined above is repeated.

The signal generator is set at 600 kc. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 1500 kc. adjustment should then be rechecked.

300 KC. ADJUSTMENT: The band selector switch is set in position for operation on band no. 5. The receiver and generator are both tuned to 300 kc. and the procedure outlined above is repeated.

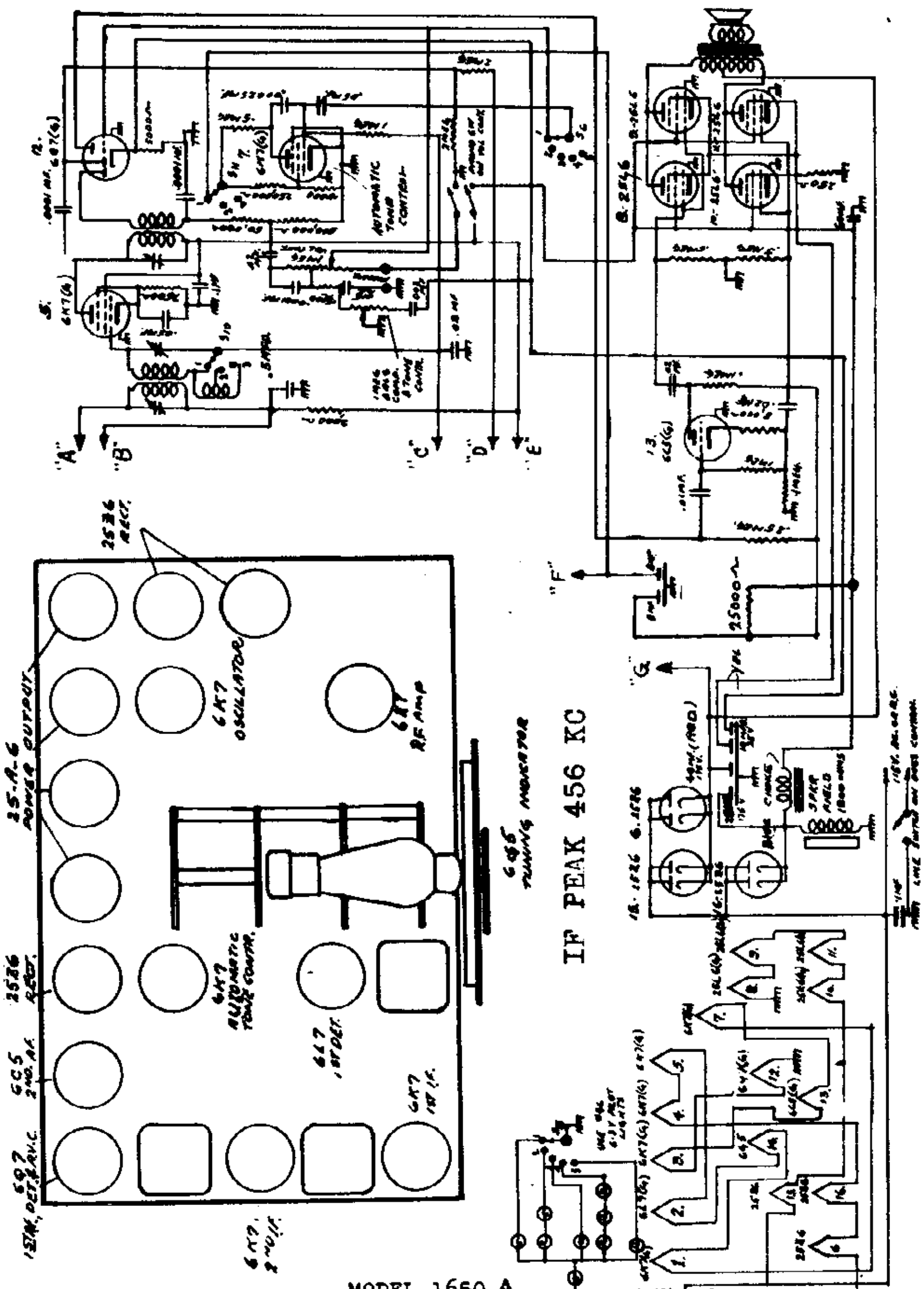
The signal generator is set at 150 kc. and the signal is tuned in on the dial. The Long Wave padder condenser is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 300 kc. adjustment should then be rechecked.





MODEL 1650A
Schematic, Notes
Voltage, Socket

GAROD RADIO CORP.



The RF and Oscillator circuits with their corresponding band switching arrangements for the MODEL 1650A, are the same as those of the MODEL 1650.

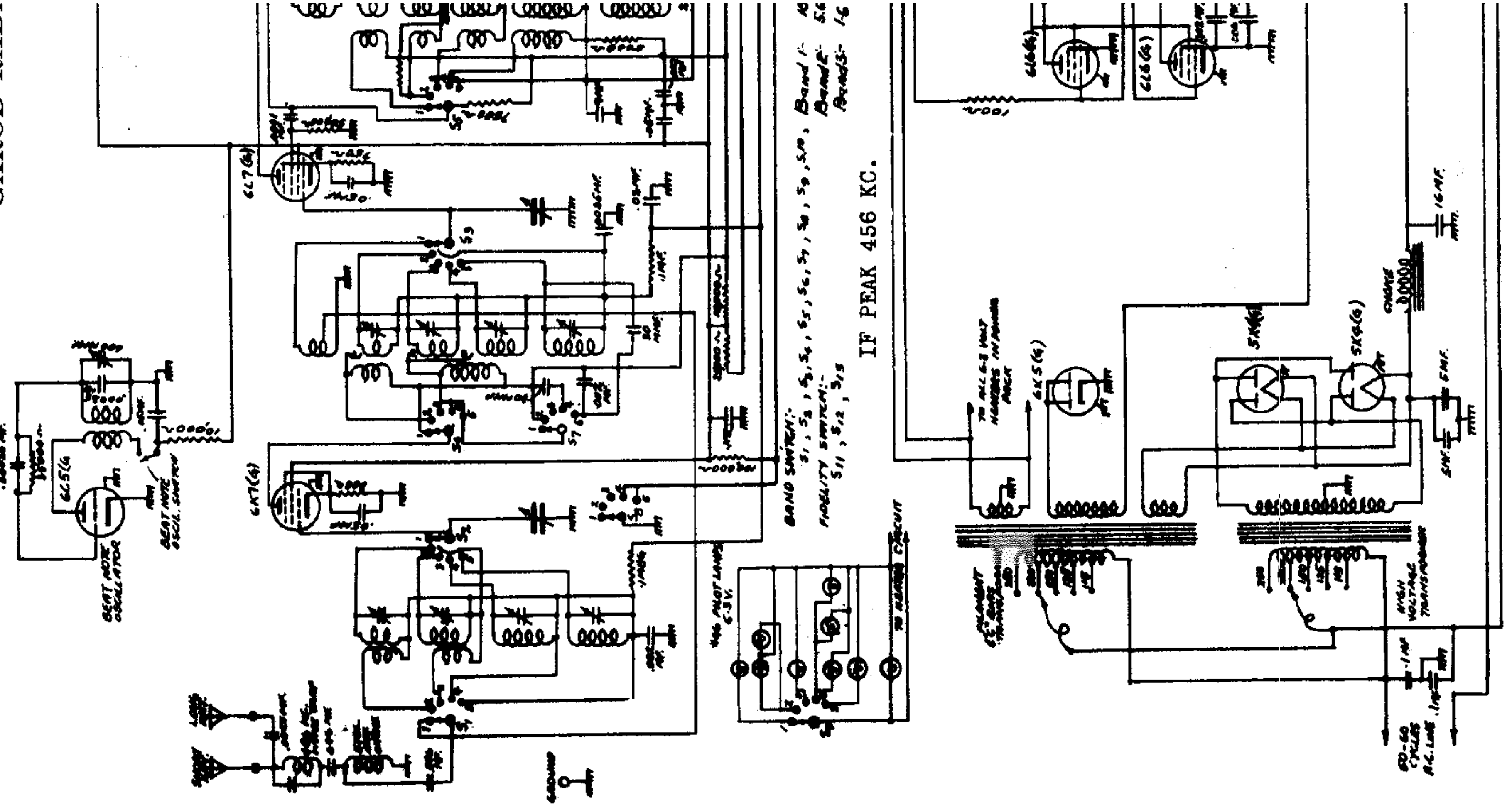
The schematic of the MODEL 1650 is shown broken at the various points marked with "X", lettered "A","B","C","D","E","F", and "G", which are connected to the corresponding points marked in the same manner on the schematic above.

MODEL 1650 A

TUBE	FUNCTION	HEATER	PLATE	SC.GR.	CATH. V	CATH. I.MA.
6K7(G)	R.F. Amp.	6.3	100	100	2	6.7
6L7(G)	Converter	6.3	95	95	2.5	5.0
6K7(G)	Oscillator	6.3	80	100	0	4
6K7(G)	1st I.F. Amp.	6.3	95	95	12	5
6K7(G)	2nd I.F. Amp.	6.3	100	100	6	1
6Q7(G)	Diode Det. & AVC & 1st Audio	6.3	60		1.5	.3
6C5(G)	2nd Audio Amp.	6.3	80		20.	2.
25L6(G)(4)	Audio Output	25.	120	100	8.5	50
25Z6(G)	Rectifier for Set	25.			107	87
25Z6(G)(2)	Rectifier for Output Plates	25.			125	85
6K7(G)	Automatic Tone Control	6.3	50	5	0	1

1650A

GAROD RADI

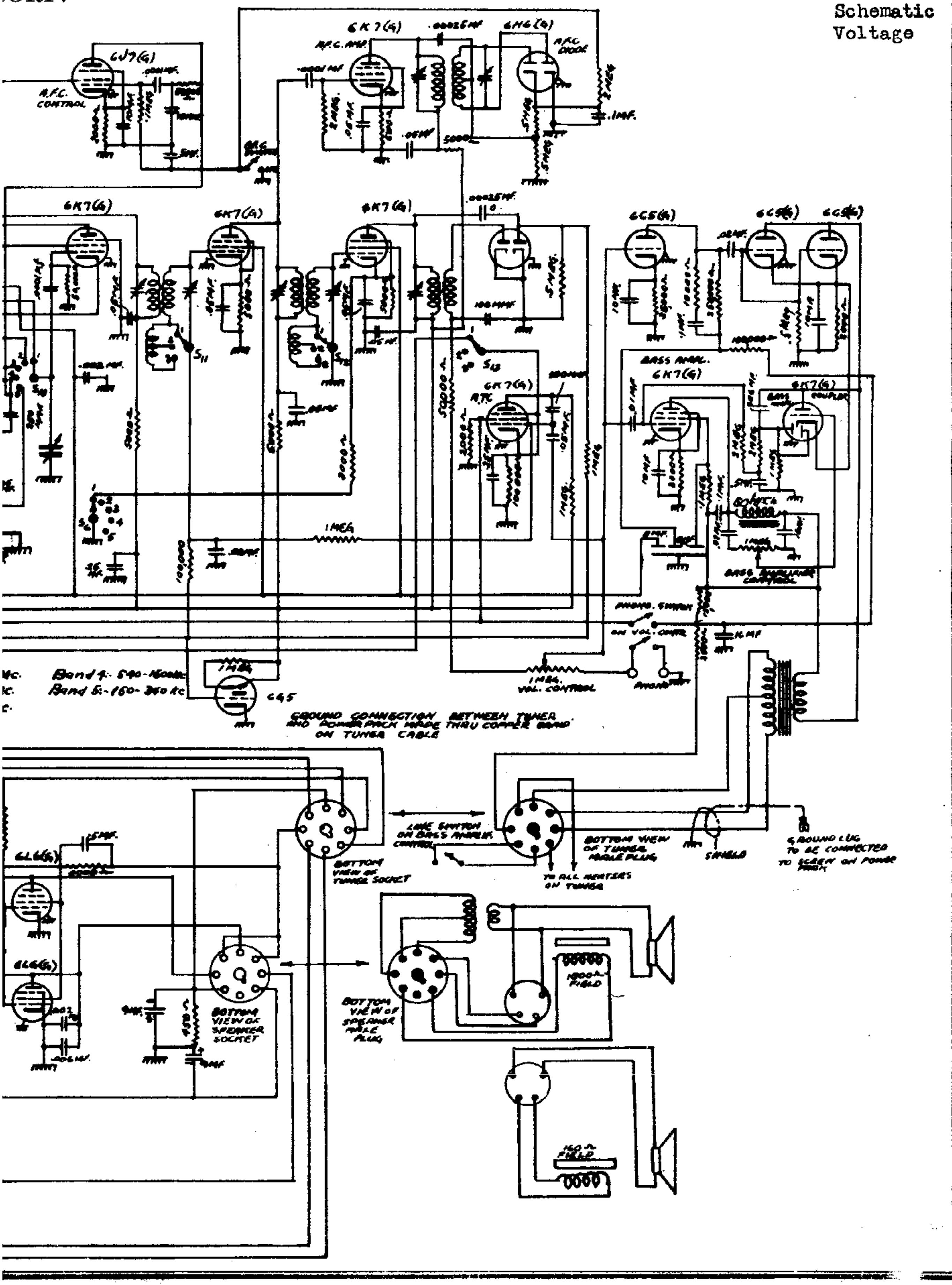


TUBE	FUNCTION	HTR.	PLATE	SCREEN	CATHODE
6K7	R.F. Amp.	6.3	250	100	4
6L7	Converter	"	245	100	6
6K7	Oscillator	"	220	100	0
6K7	1st I.F.	"	250	100	13
6K7	2nd I.F.	"	250	100	9
6H6	Audio det.	"	0		0
6K7	A.F.C. Amp.	"	240	100	4
6H6	A.F.C. Diodes	"	0		0
6C5	1st Audio	"	125		9
6C5)					
6C5)	driver	"	150		8
6K7	Bass Amp.	"	150	90	11
6R7	Bass Amp. Coupler	"	150		8

TUBE	FUNCTION	HTR	PLATE	SCREEN	CATHODE	GRID
6C5	Beat note USC.	"	with switch on 100V.		0	
6V7	AFC Control tube	"	220	100		
6K7	ATC	"	25	7	0	
6L6) 6L6) 6L6) 6L6)	Audio Output	"	325	300	0	25
6X5	Bias Rectifier	"	140		0	
5X4G) 5X4G)	Rectifier	5.0			410	

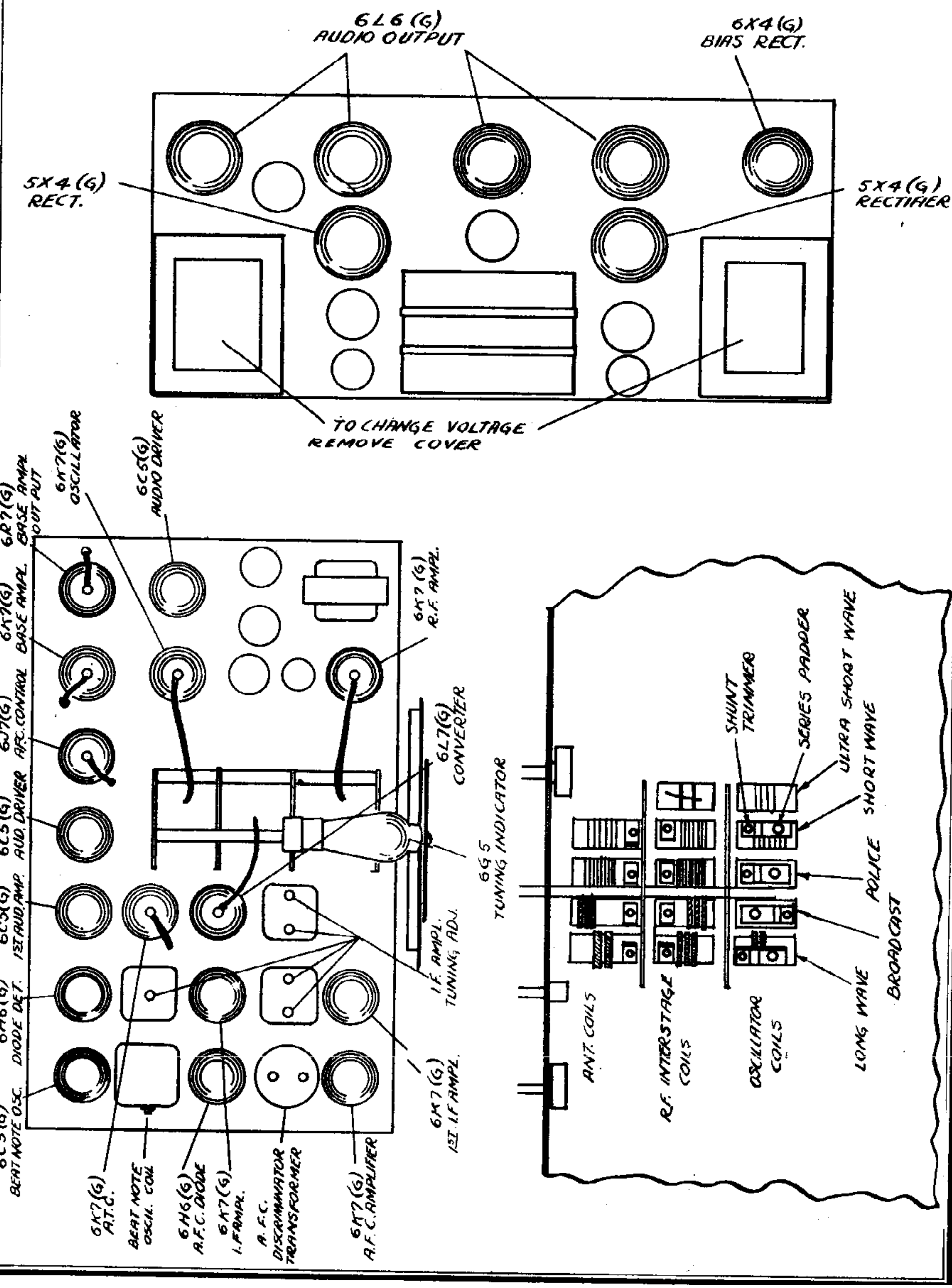
CORP.

MODEL 5240
Schematic
Voltage



MODEL 5240
Socket, Trimmers

GAROD RADIO CORP.



MODEL 5240
Alignment

GAROD RADIO CORP.

SERVICE NOTES FOR THE MODEL 5240
24 TUBE 5 BAND A.C. SUPERHETERODYNE RECEIVER
ALIGNMENT PROCEDURE

I.F. ADJUSTMENT - The signal generator is set at 456 kc. and is connected to the grid of the first detector (6L7). With the oscillator section of the tuning condenser short-circuited and the receiver volume control at its maximum position, the i.f. trimmers are adjusted for maximum output. These trimmers may be found on the tops of the I.F. transformers.

18 MEGACYCLE ADJUSTMENT - The high side of the signal generator is connected to the antenna lead of the receiver and the low side to the ground lead. The receiver and the signal are both tuned to a frequency of 18 mc. with the selector switch in position for band no. 2 (short wave). The oscillator trimmer condenser is adjusted so that the 18 mc. signal is tuned in exactly at the 18 mc. calibration point, with the volume control on full and the signal generator adjusted for minimum input. The antenna preselector and inter-stage trimmers are then adjusted in the order named for maximum output. These trimmers are located as indicated in the bottom view of the chassis.

5 MC. ADJUSTMENT - With the band selector switch in position for operation on band no. 3. (Police) and the receiver and signal generator both set at 5 mc. the procedure outlined above is repeated.

6 MEGACYCLE ADJUSTMENT - The signal generator is set at 6 megacycles and the signal tuned in on the dial. The Short Wave padding condenser is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left.

The signal generator is set at 1.8 mc. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left. The 5 mc. adjustment should then be rechecked.

1500 KC. ADJUSTMENT - The band selector switch is set in position for operation on the no. 4 band (Broadcast). The receiver and signal generator are both set at 1500 kc. and the procedure outlined above is repeated.

The signal generator is set at 600 kc. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 1500 kc. adjustment should then be rechecked.

300 KC. ADJUSTMENT - The band selector switch is set in position for operation on band no. 5. The receiver and generator are both tuned to 300 kc. and the procedure outlined above is repeated.

The signal generator is set at 150 kc. and the signal is tuned in on the dial. The Long Wave padder condenser is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 300 kc. adjustment should then be rechecked.

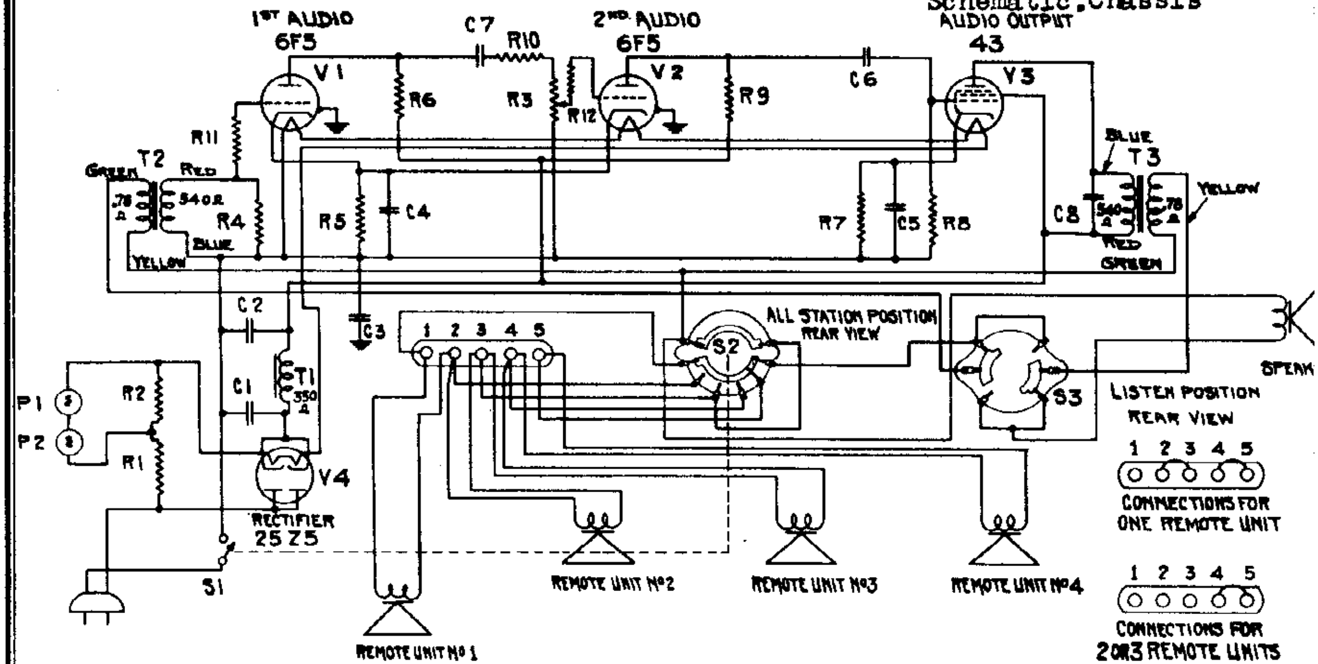
BEAT OSCILLATOR ADJUSTMENT - The signal generator, set at 456 K.C. is connected to the mixer tube (6L7) as described for the I.F. adjustment. The modulation switch is set to the "OFF" position and only a hiss or slight hum should be heard. Turn the Beat Oscillator "ON". If this is in exact adjustment (zero beat) no signal should be heard. If it has drifted however, a whistle will be heard the pitch of which can be varied by rotating the screw protruding from the side of square can on the left side of the chassis. As this is turned the pitch will change from high to low, then pass through a zero point, and then it will rise again in frequency. The "Zero Beat" position, where no signal is heard is the correct setting.

AUTOMATIC FREQUENCY CONTROL - Should it be found that after a station is tuned in accurately (in the selective position) as indicated by the cathode ray tube, that when the A.F.C. switch is turned "ON", the signal is detuned or a change observed in the tone of the receiver, it will be necessary to readjust the "Discriminator" transformer which controls this action. A low range (0-5 or 0-10V.) high resistance volt meter or preferably a microammeter is inserted in series with the diode load resistor at the grounded end, which will indicate a maximum when a signal is tuned to exact resonance. This 500,000 Ohms load resistor is located directly under the discriminator transformer. A 0-10 milliammeter is inserted in the cathode circuit of the A.F.C. control tube. An R.F. signal (any frequency in the Broadcast Band) is fed into the antenna and the receiver is tuned as accurately as possible to resonance (with the switch turned OFF). Now throw the secondary trimmer of the discriminator off resonance. Tune the primary for maximum output as indicated by the diode load meter. Turn the AFC switch "ON". Now tune the secondary trimmer, identified by a red paint mark, so that when the A.F.C. switch is turned from the ON to the OFF position and vice-versa, no change takes place in the cathode, current of the A.F.C. control tube, as indicated by the milliammeter. Be sure that the receiver has been accurately tuned first without the A.F.C., or improper adjustment may result, whereby the frequency is automatically detuned instead of tuned. When this condition of no change in cathode current is obtained, it is indicated that no control voltage is being generated at exact resonance, which is the desired condition. If now the receiver is slightly detuned either above or below resonance, the cathode current will either increase or decrease above its normal value with the A.F.C. OFF, or no signal fed into the antenna. The voltage thus generated as indicated by this change in current serves to shift the frequency of the oscillator in the proper direction so as to automatically retune the oscillator to the exact frequency required to bring in the desired station with maximum clarity and a minimum of noise.

NOTE - IN ALLIGNING THE BROADCAST BAND (1500 KC AND 600 KC) THE A.F.C. MUST BE OFF

All voltages except filament measured with 1,000 Ohms per volt meter from socket to chassis with band switch in broadcast position, and fidelity switch in selective position. Filament voltages are taken across filament prongs at tube socket and measured with a low impedance AC Voltmeter.

MODEL FM-41, Handy Phone
GENERAL ELECTRIC CO. MODEL FS-5, Remote Statio
Schematic, Chassis



SYMBOL	DESCRIPTION		
C1	DRY ELECTROLYTIC CAP.	16 MFD	150 V
C2	DRY ELECTROLYTIC CAP.	16 MFD	150 V
C3	LINE CAPACITOR	.1 MFD	400 V A.C.
C4	DRY ELECTROLYTIC CAP.	20 MFD	6 V
C5	DRY ELECTROLYTIC CAP.	10 MFD.	25 V
C6	PAPER CAPACITOR	.01 MFD.	200 V
C7	MICA CAPACITOR	500 MMF.	
C8	PAPER CAPACITOR	.005 MFD.	200 V
P1	PILOT LAMP	6.3 V .25 AMP.	
P2	PILOT LAMP	6.3 V .25 AMP.	
R1	BLEEDER RESISTOR	20 W 140 OHMS	
R2	BLEEDER RESISTOR	5 W 40 OHMS	
R3	VOLUME CONTROL	30,000 OHMS	
R4	CARBON RESISTOR	10,000 OHMS ½ W	
R5	CARBON RESISTOR	1000 OHMS ½ W	
R6	CARBON RESISTOR	47000 OHMS ½ W	

SYMBOL	DESCRIPTION	
R7	CARBON RESISTOR	680 OHMS ½ W
R8	CARBON RESISTOR	470 000 OHMS ½ W
R9	CARBON RESISTOR	120 000 OHMS ½ W
R10	CARBON RESISTOR	100 000 OHMS ½ W
R11	CARBON RESISTOR	36000 OHMS ½ W
R12	CARBON RESISTOR	36000 OHMS ½ W
S1	POWER SWITCH	
S2	SELECTOR SWITCH	
S3	SPEAK. LISTEN SWITCH	
T1	FILTER REACTOR	
T2	INPUT TRANSFORMER	
T3	OUTPUT TRANSFORMER	
V1	6F5 TUBE	
V2	6F5 TUBE	
V3	43 TUBE	
V4	25Z5 TUBE	

Fig. 1. Schematic Circuit Diagram

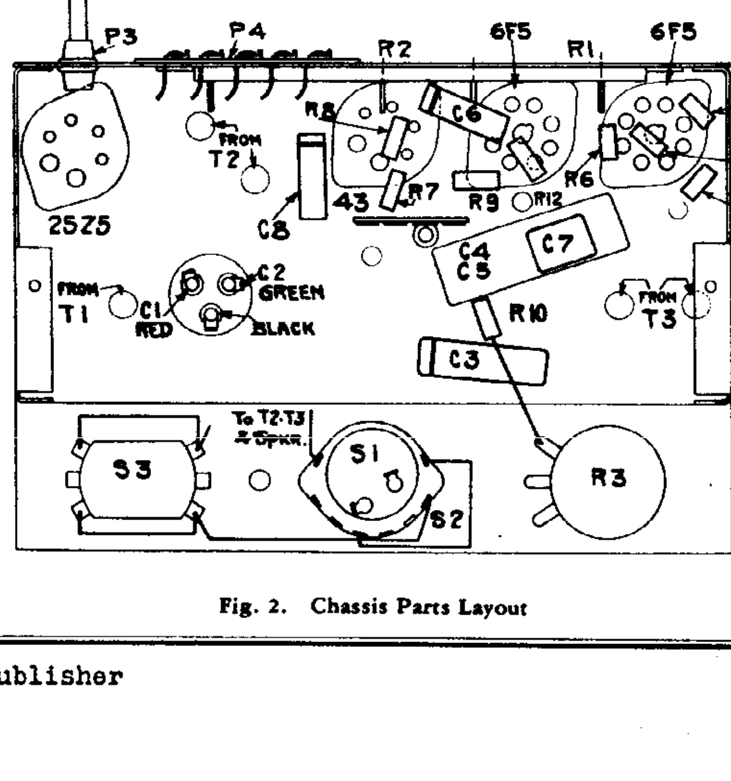


Fig. 2. Chassis Parts Layout

MODEL FM-41, Handy Phone
MODEL FS-5, Remote Station GENERAL ELECTRIC CO.
Circuit Data, Operation
Notes

Tubes

1st Audio Amplifier . . . . 6F5 High-gain Triode
2nd Audio Amplifier . . . 6F5 High-gain Triode
Audio Power Amplifier . 43 Power Amplifier Pentode
Rectifier . . . . 25Z5 Rectifier
Dial Lamps . . . . MAZDA No. 46

Permanent-Magnet "Speaker-Phone"

Over-all diameter . . . . . 5¼ inches
Cone diameter . . . . 5 inches
Voice Coil Impedance . . 5.0 ohms at 400 cycles

GENERAL INFORMATION

The Handy-Phone is an efficient loudspeaker phone system for use in offices, homes, hospitals or other places where voice communication between a central station and one or more remote stations is desirable. The system consists of one Model FM-41 Master Station and from one to four Model FS-5 remote "speaker-phone" stations.

The Master Station Model FM-41, employs four General Electric tubes in a three stage audio amplifier circuit with power supply. Volume is controlled by a variable potentiometer R-3 in the grid circuit of the 2nd audio amplifier. The "speaker-phone" used in this unit is of the permanent magnet type and is connected either as a microphone to the input circuit of the amplifier or as a loudspeaker to the output circuit of the amplifier by means of the talk-listen switch (S-3).

The heaters of all tubes and the dial lights with their shunt ballast resistor (R-2) are all in series and are furnished current from the power line through a dropping resistor (R-1). The two 6F5 tubes use the common self-biasing resistor R-5 for obtaining grid bias. The 43 output tube is self-biased by the voltage drop in R-7.

Note that the chassis is not the "B-" lead of the power supply. This "B-" lead is by-passed to the chassis through the capacitor C-3.

The Remote Station FS-5 uses a similar "speaker-phone" of the permanent magnet type but does not incorporate an amplifier or power supply; all operating power being supplied from the Master Station unit. The Remote Station speaker is also connected either to the input or output circuits of the amplifier in the Master Unit by means of the talk-listen switch (S-3).

As an example of the operation of the system: When the talk-listen switch (S-3) is in the normal "listen" position, the Remote Station functions as a microphone and is connected to the input of the amplifier while the Master Station speaker is connected across the output of the amplifier. When S-3 is placed in the "talk" position, the Master Station speaker then functions as a microphone and is connected to the input of the amplifier, while the Remote Station is connected to the output of the amplifier and functions as a speaker. The selector switch (S-2) connects either any *one* individual Remote Station or *all* Remote Stations to the Master unit. When the selector switch (S-2) is turned to the *all* position, the Remote Station units are connected in a series-parallel combination across the output of the amplifier.

DC Operation

When operating from a D.C. source, it is necessary to insert the plug with proper polarity. If the unit fails to function, after allowing time for the tubes to reach their operating temperature, reverse the power plug in the receptacle.

When the system is used on a D.C. supply, the 25Z5 rectifier tube and the filter remain in the circuit and serve two purposes. If the power cord should be plugged in with incorrect polarity, the 25Z5 tube protects the filter condensers from damage. On correct D.C. polarity the 25Z5 tube passes the D.C. and the filter circuit aids in smoothing the supply voltage, thus minimizing line noise.

AC Operation

When the system is used on alternating current, all D.C. potentials are supplied by a 25Z5 rectifier tube and its associated filter circuit. The tube is connected as a half-wave rectifier.

If any hum is noticed when the system is used on A.C., reverse the power plug in the receptacle. When the system has not been used for some time, a slight hum may be audible when the system is first turned on. This hum may not immediately clear up upon reversal of the power plug. However, it will probably be eliminated after approximately five minutes operation by which time the anode plates of the electrolytic capacitors will have re-formed.

Operating Distance

The following table gives the size of the twisted wire and additional equipment necessary to wire a remote station to the master station for various distances:

Distance of Remote from Master Station	Wire Size	Additional Equipment
1—500 Feet	No. 19—No. 22 B & S Gauge	None
500—2000 Feet	No. 16—No. 19 B & S Gauge	None
2000 Feet and Over	No. 19 B & S Telephone Wire	*Line Transformers

* Standard line transformers may be used. The transformers should be designed to operate from a five-ohm source into a line of 200, 500 or 600 ohms impedance. A similar transformer should be used on the remote station end to match the line impedance to the five-ohm load. These transformers may be procured from any radio supply house.

GENERAL ELECTRIC CO.

MODEL FM-41, Handy Phone
MODEL FS-5, Remote Station
Voltage, Parts

SOCKET VOLTAGES

Tube No.	Plate to -B (*) Volts D.C.		Screen to -B (*) Volts D.C.		Cathode to -B (*) Volts D.C.		Cathode Current M.A. -D.C.		Heater Volts	
	A.C.	D.C.	A.C.	D.C.	A.C.	D.C.	A.C.	D.C.	A.C.	D.C.
6F5 1st Audio	105	81	...	...	0.9	0.9	combined	combined	6.3	6.3
6F5 2nd Audio	85	63	...	...	0.9	0.9	0.9	0.9	6.3	6.3
43 Power Amplifier	121	94	133	103	18.0	14.0	27.0	20.0	25.0	25.0
25Z5 Rectifier	115	115	...	...	142	113	29.0	22.0	23.0	23.0

Measured at 115 volts, 60 cycles or 115 volts DC supply—Voltmeter 1000 ohms per volt—Measurements on highest reading scale.

* NOTE: The chassis is not the "B-" lead of the power supply. For voltage measurements, the "B-" may be taken at black terminal of the electrolytic capacitor.

Physical Specifications

Model	FM-41	FS-5
Height	8⅜ in.	7⅝ in.
Width	11⅛ in.	7¼ in.
Depth	7 1/16 in.	4⅛ in.
Wt. Packed	13 pounds	5 pounds

Electrical Power Output

	A.C.	D.C.
Undistorted	0.7 watt	0.45 watt
Maximum	1.0 watt	0.65 watt

Electrical Specifications

Power Supply Volts	Frequency Cycles on A.C.	Power Consumption Watts (At 120 V. Line)
100–125 A.C.	25–100	46
100–125 D.C.	....	38

REPLACEMENT PARTS LIST

HANDY-PHONE MODEL FM-41

INSIST ON GENUINE FACTORY-TESTED PARTS WHICH MAY BE PURCHASED FROM AUTHORIZED DEALERS

Stock No.	Description	List Price
*RB-040	BOARD—Terminal Board (near 43 socket)	$0.10
RB-067	BOARD—Remote Station Terminal Board (5 terminals)	.25
RC-005	CAPACITOR—.001 mfd., 400 volt, Paper (C-6)	.25
*RC-023	CAPACITOR—.005 mfd., 600 volt, Paper (C-8)	.25
*RC-123	CAPACITOR—.1 mfd., 400 volt, Paper (C-3)	.35
*RC-296	CAPACITOR—500 mmf., Mica (C-7)	.25
RC-577	CAPACITOR—Dry Electrolytic 16-16 mfd., 150 volt (C-1, C-2)	1.75
RC-578	CAPACITOR—Dry Electrolytic 20 mfd., 6 volt; 10 mfd., 25 volt (C-4, C-5)	1.25
RC-865	CORD—Power Cord with Plug	.45
RC-926	CONE—5-inch Cone and Voice Coil	.90
RE-020	ESCUTCHEON—Volume Control Escutcheon	.20
RG-009	GRID CAP—Insulated Grid Cap and Lead	.25
RI-007	INDICATOR—Selector Switch Indicator Plate	.55
RK-019	KNOB—Speech Control Knob	.20
RK-020	KNOB—Station Selector Knob (Pkg. of 5)	.40
RK-022	KNOB—Volume Control Knob (Pkg. of 5)	.60
RL-333	REACTOR—Filter Reactor (T-1)	1.30
RL-920	LAMP—Dial Lamp 6.3 volt, .25 amp. (Pkg. of 10)	1.50
RQ-1255	RESISTOR—680 ohm, ½ watt, Carbon (R-7) (Pkg. of 5)	.70
RQ-1259	RESISTOR—1000 ohm, ½ watt, Carbon (R-5) (Pkg. of 5)	$0.70
RQ-1283	RESISTOR—10,000 ohm, ½ watt, Carbon (R-4) (Pkg. of 5)	.70
RQ-1296	RESISTOR—36,000 ohm, ½ watt, Carbon (R-11, R-12) (Pkg. of 5)	.70
RQ-1299	RESISTOR—47,000 ohm, ½ watt, Carbon (R-6) (Pkg. of 5)	.70
RQ-1307	RESISTOR—100,000 ohm, ½ watt, Carbon (R-10) (Pkg. of 5)	.70
RQ-1309	RESISTOR—120,000 ohm, ½ watt, Carbon (R-9) (Pkg. of 5)	.70
RQ-1323	RESISTOR—470,000 ohm, ½ watt, Carbon (R-8) (Pkg. of 5)	.70
RR-729	RESISTOR—Bleeder Resistor, 140 ohm, 20 watt, 60 ohm, 5 watt (R-1, R-2)	.60
RS-059	SPEAKER—5-inch Permanent Magnet Type Speaker (Complete) (FM-41 and FS-5)	5.10
RS-220	SOCKET—Lamp Socket Assembly	.25
RS-354	SWITCH—Talk-listen Switch (S-3)	.75
RS-355	SWITCH—Power and Selector Switch (S-1, S-2)	.40
RT-429	TRANSFORMER—Input or Output Transformer (T-2, T-3)	1.40
RV-032	VOLUME CONTROL—50,000 ohm, Volume Control (R-3)	.70
*RW-101	WASHER—Felt Washer (Pkg. of 10)	.45
RX-026	ASSEMBLY—Chassis Mounting Screws and Washers	.10

* Used on previous receivers.

(Prices subject to change without notice)

MODELS E-50, E-52
Chassis Wiring

GENERAL ELECTRIC CO.

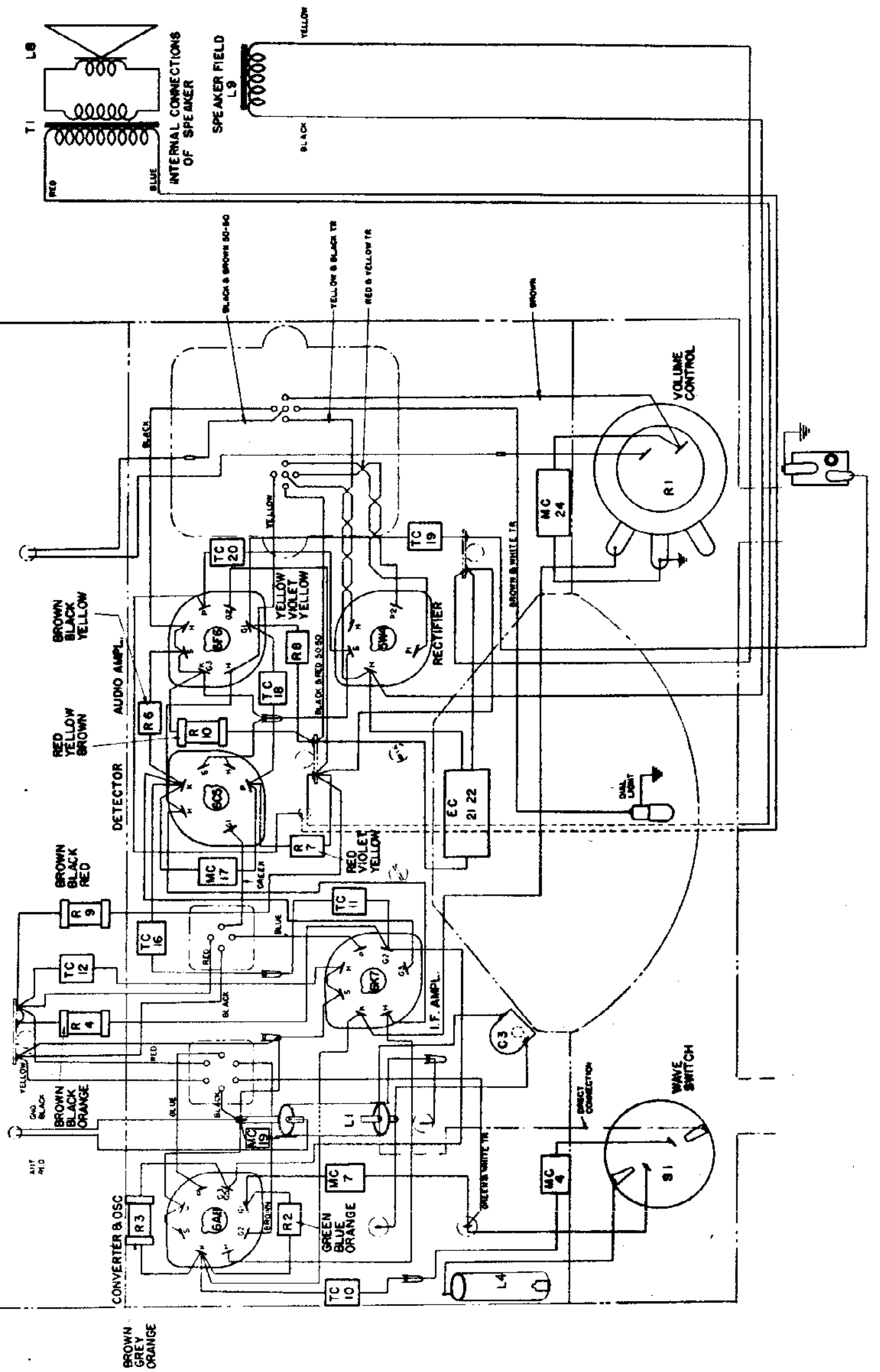
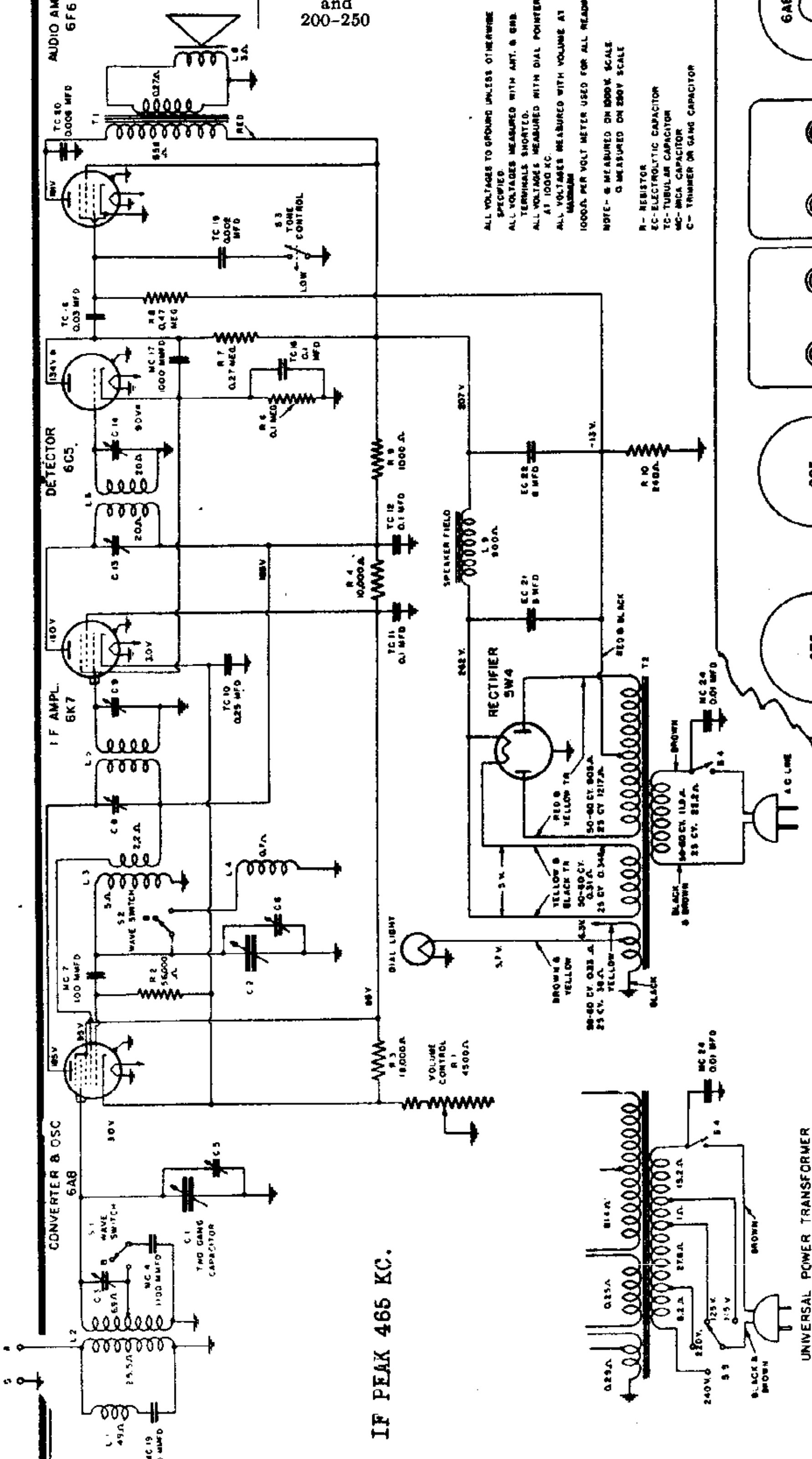


Fig. 2. Chassis Wiring Diagram

GENERAL ELECTRIC CO.

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	115	50-60	50
C	115	25-60	55
V	105-130 and 200-250	40-60	55



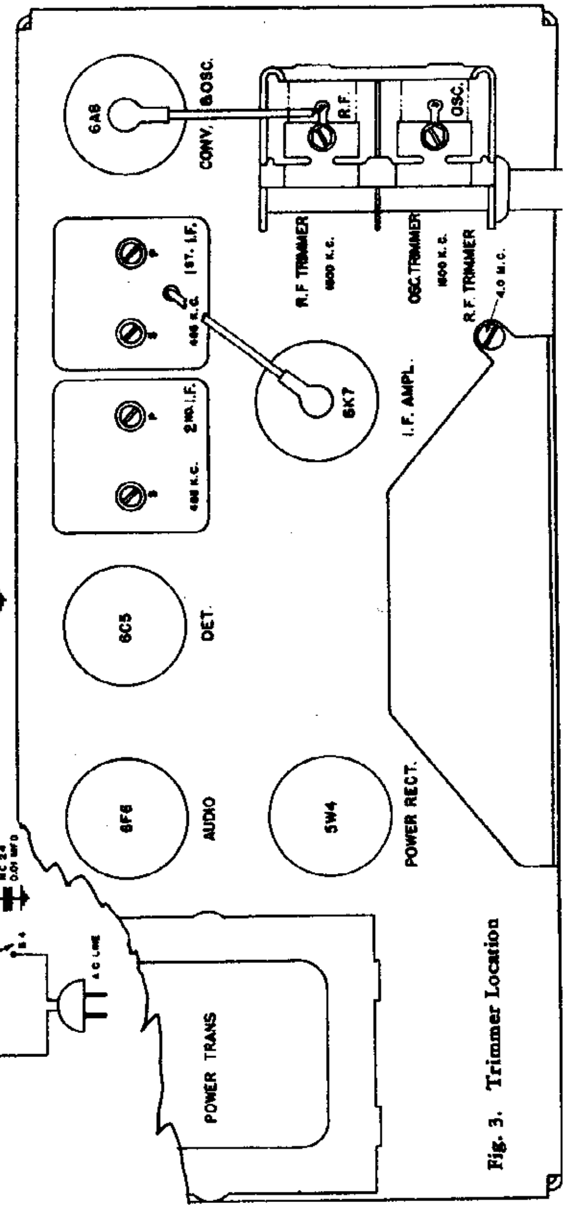


Fig. 3. Trimmer Location

Tuning Frequency Range
Band "B" .... 540–1800 kc.
Band "C" .... 1800–4000 kc.

Tuning Control Drive Ratio
Single Speed 1:1

Electrical Power Output
Undistorted 1.0
Maximum 3.0

Loud-speaker—Electrodynamic
Cone Diameter: 6½ in.
Cone Coil Impedance: 3 ohms at 400 cycles

MODELS E-50,E-52
Alignment,Parts

GENERAL ELECTRIC CO

DESCRIPTION OF ELECTRICAL CIRCUIT

The signal from the antenna is applied to the control grid of the 6A8 tube through the R.F. transformer, the secondary of which is tuned to the incoming signal by the rear section of the main tuning condenser. In the 6A8 tube the incoming signal is combined with the local oscillator signal which is 465 kc higher in frequency. The local signal is generated by the oscillator section of this tube, and the proper frequency difference is maintained throughout the tuning range by the front section of the tuning condenser in conjunction with the oscillator coils. The special-cut rotor of the front condenser section permits dispensing with the usual padding capacitor.

The combination of the two signals produces the intermediate frequency of 465 kc. This particular frequency is chosen to reduce image response and improve short-wave performance. The intermediate frequency amplifier consists of a 6K7 tube and two transformers, both of which have tuned primaries and secondaries. Volume is controlled by the 4500-ohm variable resistor, R-1, which varies the bias applied to the control grids of the 6A8 and 6K7 tubes.

The output of the I.F. amplifier is applied to the grid of the 6C5 detector which is properly biased for this service by the .1 megohm cathode resistor, R-6.

The output of the 6C5 detector is resistance coupled to the grid of the 6F6 power amplifier pentode. The plate circuit of the 6F6 is suitably matched to the loud-speaker by means of a step-down output transformer.

The tone control circuit consists of a .002 mfd. capacitor, connected in series with a two-point grounding switch, S-3, in the grid circuit of the 6F6 power pentode. When it is desired to reduce the high frequency output of the receiver, the switch, S-3, is turned to its counterclockwise grounding position.

Plate and grid voltages for all tubes are supplied by the power supply system employing a 5W4 full-wave rectifier tube which, together with a suitable network of resistors and capacitors, supplies the required voltages and filtering action.

ALIGNMENT PROCEDURE

Before making any adjustments to the R.F. circuits, it is wise to determine the correctness of the existing alignment. This may be done by supplying a signal from the test oscillator to the receiver and inserting a "tuning wand" into the antenna coil. The "tuning wand" consists of a bakelite rod having a brass cylinder attached to one end, and a small core of finely divided iron compacted into the opposite end. By inserting the brass cylinder end into the antenna coil, the inductance is lowered, increasing its resonant frequency. Inserting the iron-filled end into the coil raises its inductance, lowering its resonant frequency. If the circuits are in exact alignment, inserting either end of the tuning wand in the coil will result in a decrease in output. When an increase in signal is obtained with the iron-filled end of the wand at the 1500-kc. point or the 4.0-mc. point, a decrease in resonant frequency of that circuit by increasing the antenna trimmer capacity is indicated. When an increase in signal is obtained with the brass cylinder, a decrease in antenna trimmer capacity is indicated.

Changes Indicated by Wand

Wand	Signal	Trimmer Adjustment Required
Brass cylinder Iron filings	Decrease Decrease	None
Brass cylinder Iron filings	Increase Decrease	Decrease capacity
Brass cylinder Iron filings	Decrease Increase	Increase capacity

ALIGNMENT FREQUENCIES

I.F.	Broadcast	Short-wave
465 Kc.	1500 Kc.	4000 Kc.

In order to align these receivers properly it is necessary to have available:

1. A modulated test oscillator capable of producing the above alignment frequencies.
2. An output indicator, such as a high-resistance a-c voltmeter with a maximum scale reading of 3 to 5 volts, or a neon lamp indicator.
3. An alignment tool consisting of an insulating shaft with a small screwdriver blade.

The location of all alignment trimmer capacitors are illustrated in Fig. 3.

(1) *I.F. Alignment*

Set the frequency band switch of the receiver to the broadcast position and turn the volume control to maximum (extreme clockwise position). Tune the receiver to a point where no signal comes in and short-circuit the antenna and ground leads.

Connect the test oscillator output between the chassis and the control grid of the 6A8 tube. Connect the output meter across the cone coil of the speaker. Set the test oscillator to 465 kc. and adjust the output until a small deflection is observed in the output meter.

The four I.F. trimmers, see Fig. 3, are adjusted in the following sequence:

1. Secondary trimmer on second I.F. transformer.
2. Primary trimmer on second I.F. transformer.
3. Secondary trimmer on first I.F. transformer.
4. Primary trimmer on first I.F. transformer.

Throughout all adjustments the output should be maintained at a low level by decreasing the test oscillator output as the various stages are brought in line. After these adjustments have been made, the same procedure should be repeated as a final check. The I.F. alignment will then be complete.

(2) *I.F. Wave Trap*

No adjustable trimmer is provided for the I.F. trap adjustment in this receiver. The capacitor MC-19, in conjunction with the inductance, L-1, automatically provides rejection of incoming I.F. signals.

(3) *R.F. Alignment*

The R.F. and oscillator trimmers are aligned at 1500 kc. First of all, check the position of the dial pointer. To do this, rotate the gang condenser to the maximum capacity position, i.e., plates fully meshed. While in this position, align the pointer with the last black line on the scale by loosening the dial drum set screws and rotating the drum on the gang shaft. Remove the short-circuit from the antenna and ground terminals and connect the test oscillator to same through a dummy antenna consisting of a 400-ohm resistor in series with a 250-mmf. capacitor. Connect the output indicator across the speaker cone coil.

(a) *Broadcast Band—(540-1800 Kc.)*

With the band switch in the clockwise position, set the tuning indicator to 1500 kc. Set the test oscillator at 1500 kc. and adjust the broadcast band oscillator trimmer, C-6, for maximum output. Next, set the R.F. trimmer, C-5, for maximum output, taking care that the output from the test oscillator is not high enough to overload any part of the set. No padding adjustment is required.

To complete the broadcast band line-up, repeat the R.F. trimmer adjustment after aligning the short-wave band.

(b) *Short-wave Band (1800-4000 Kc.)*

Turn the band switch to its counterclockwise position. Set the test oscillator at 4000 kc. and tune the receiver to resonate at this frequency. No trimmer is provided for short-wave oscillator alignment. To perform the R.F. short-wave adjustment, rock the tuning condenser back and forth through resonance while adjusting the short-wave R.F. trimmer, C-3, for maximum output indication on the tuning meter. It may now be necessary to readjust the broadcast band R.F. trimmer as indicated above.

Alignment of the receiver is now complete.

Physical Specifications

Dimensions	Model E-50	Model E-52
Height	8⅝ in.	8⅝ in.
Length	12⅝ in.	12⅝ in.
Depth	6⅞ in.	6⅞ in.
Weight Packed	14 lb.	14 lb.

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLY	
RA-308	ASSEMBLY—Dial Scale and Lamp Housing Assembly (Complete)	$1.00
*RB-008	BOARD—Terminal Board Double-lug (Adjacent to Power Transformer)	.10
RB-041	BOARD—Terminal Board (Center of Chassis deck)	.10
RB-058	BOARD—Terminal Board—3 Lug (Mounted on rear chassis wall)	.10
*RC-013	CAPACITOR—.002 Mfd., 200 V. Paper (TC-19)	.25
RC-026	CAPACITOR—.006 Mfd., 1000 V. Paper (TC-20)	.30
*RC-083	CAPACITOR—.03 Mfd., 400 V. Paper (TC-18)	.25
*RC-096	CAPACITOR—.1 Mfd., 200 V. Paper (TC-16, TC-11)	.30
*RC-123	CAPACITOR—.1 Mfd., 400 V. Paper (TC-12)	.35
*RC-136	CAPACITOR—.25 Mfd., 200 V. Paper (TC-10)	.30
RC-235	CAPACITOR—100 Mmfd., Mica (MC-7)	.25
RC-333	CAPACITOR—1000 Mmfd., Mica (MC-17)	.30
RC-338	CAPACITOR—1100 Mmfd., Mica (MC-4)	.35
RC-564	CAPACITOR—8 Mfd., 350 V.; 8 Mfd., 350 V.; Dry Electrolytic Capacitor (EC-21, EC-22)	1.25
RC-631	CAPACITOR—Trimmer Capacitor (C-3)	.30
RC-714	CONDENSER—Two Gang Tuning Condenser (C1, C-2) Including (C-5, C-6)	3.00
RC-756	CAPACITOR—.01 Mfd., 200 V. Paper (Bakelite Case) (C-24)	.25
RC-823	CABLE—Dial Cable Assembly (Complete)	.15
RC-860	CORD—Power Cord	.65
RC-944	CUSHION—Gang Mounting Cushion	.10
RC-945	CLAMP-Electrolytic Capacitor Mounting Clamp	.05
RD-043	DIAL—Dial Scale	.15
RD-044	DRUM—Gang Drive Drum	.30
*RG-001	GRID CAP—Control Grid Clip (Pkg. of 5)	.10
RK-010	KNOB—Control Knob (Walnut or Gum Cabinet) (Pkg. of 5)	.40
RK-011	KNOB—Control Knob (Black or White Cabinet) (Pkg. of 5)	.50
RK-012	KNOB—Control Knob (Red Cabinet) (Pkg. of 5)	.50
RL-024	COIL—Antenna Coil (Complete) (L-1, L-2, MC-19)	1.00

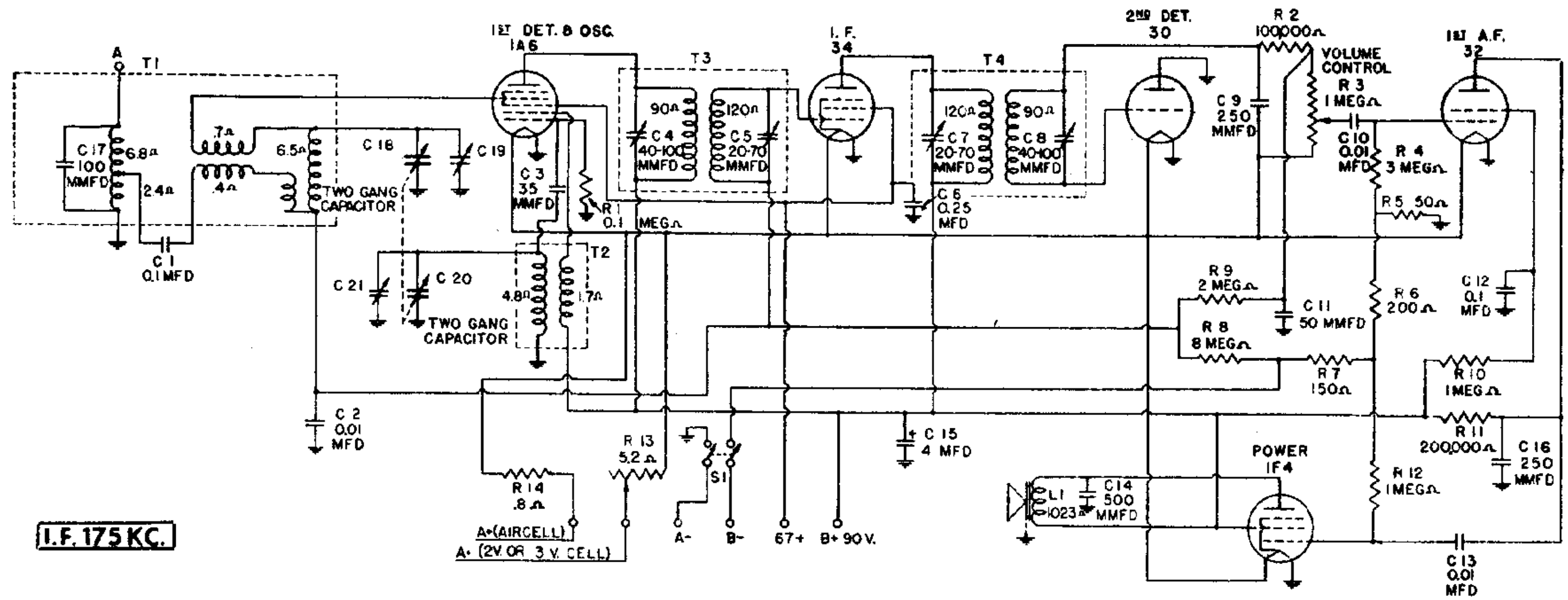
Stock No.	Description	List Price
RL-234	COIL—Oscillator Coil (C Band) (L-4)	$0.40
RP-062	POINTER—Dial Scale Pointer	.10
RQ-101	RESISTOR—56,000 Ohm, ¼ Watt Carbon (R-2) (Pkg. of 5)	.80
*RQ-107 (RR-050)	RESISTOR—100,000 Ohm, ¼ Watt Carbon (R-6) (Pkg. of 5)	.70
RQ-117	RESISTOR—270,000 Ohm, ¼ Watt Carbon (R-7) (Pkg. of 5)	.70
RQ-123	RESISTOR—470,000 Ohm, ¼ Watt Carbon (R-8) (Pkg. of 5)	.70
RQ-444	RESISTOR—240 Ohm, 1 Watt Carbon (R-10)	.15
RQ-459	RESISTOR—1000 Ohm, 1 Watt Carbon (R-9)	.15
RQ-483	RESISTOR—10,000 Ohm, 1 Watt Carbon (R-4)	.15
RQ-489	RESISTOR—18,000 Ohm, 1 Watt Carbon (R-3)	.15
*RS-200	SOCKET—8 Pin Tube Socket (Pkg. of 5)	.75
*RS-204	SOCKET—5 Pin Tube Socket (Pkg. of 5)	.75
RS-211	SOCKET—Pilot Lamp Socket	.05
RS-332	SWITCH—Band Change Switch (S-1, S-2)	.60
RS-333	SWITCH—Tone Control Switch (S-3)	.40
RT-057	TRANSFORMER—115 V. 50-60 Cycle Transformer (T-2)	3.85
RT-058	TRANSFORMER—115 V. 25-60 Cycle Transformer (T-2)	7.50
RT-059	TRANSFORMER—Universal Transformer (T-2)	8.00
RT-229	TRANSFORMER—1st I.F. Transformer (Complete) and B Band Oscillator Coil (L-3, L-5, C-8, C-9)	1.90
RT-230	TRANSFORMER—2nd I.F. Transformer (Complete) (L-6, C-13, C-14)	1.60
RV-019	VOLUME CONTROL—4500-ohm Volume Control and Power Switch (R-1, S-4)	.95
*RW-101	WASHER—Felt Washer for Knobs (Pkg. of 10)	.45
RX-019	WASHER—For mounting chassis in cabinet (Pkg. of 4)	.10
	SPEAKER ASSEMBLY	
RC-915	CONE—Speaker Cone	$0.90
RS-040	SPEAKER—6½ in. Type Speaker (Complete with Output Trans.) (L-7, L-8, L-9, T-1)	6.00
RT-420	TRANSFORMER—Output Transformer (T-1)	1.00

*Indicates part also used on 1936 "A" line of receivers.

(Prices subject to change without notice)

GENERAL ELECTRIC CO.

MODEL U-50
Schematic, Socket
Trimmers, Voltage



I. F. 175 KC.

Voltages

Check the voltages at the sockets to see if correct values are being delivered to the tubes. The antenna and ground should be disconnected and the antenna

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground — "A" Battery—2 Volts

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Grid to Ground
1A6	1st Det.-Osc.	2	85 85(1)	62	
34	I.F.	2	85	62	
30	2nd Det.	2			
32	1st A.F.	2	25	13	2(2)
1F4	Power	2	80	85	4(3)

(1) Anode Grid to ground.
(2) As read across resistor, R5, with 100,000 ohm meter.
(3) As read across resistors, R5 and R6, with 250,000 ohm meter.

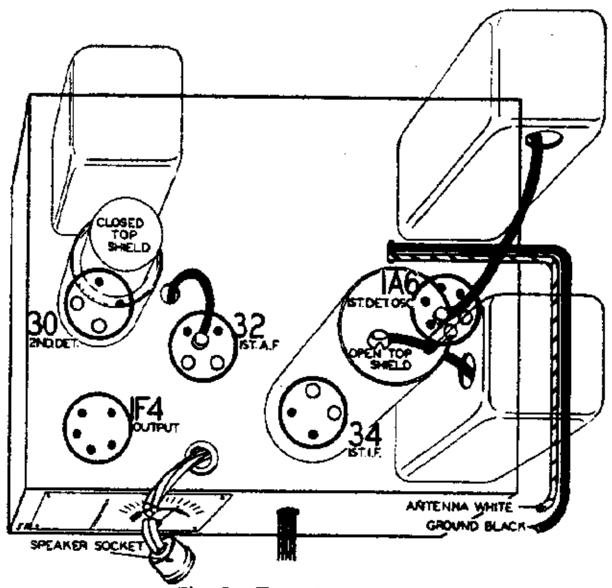


Fig. 7—Tube Arrangement

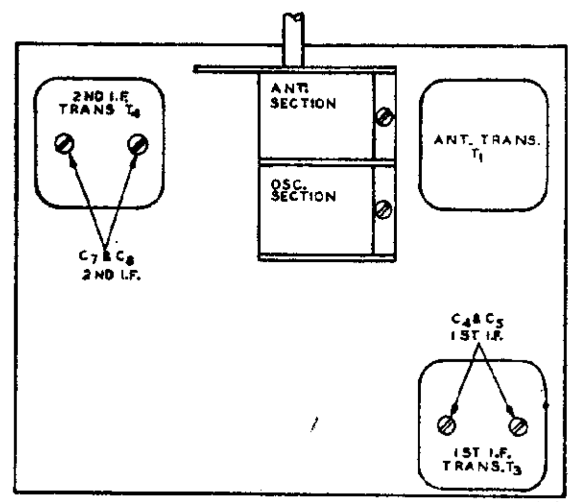


Fig. 6—Location of Trimmers

Alignment and Calibration

I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 6.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

Keep the volume control at the maximum position.

Adjust the trimmer of the oscillator section of the two gang condenser until maximum output is obtained. The location of this trimmer is shown in Fig. 6.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

The dial indicator should be near the 1500 KC mark on the dial scale. If it is a considerable distance from this mark, the position of the indicator on the drive cord must be changed. This procedure, however, should not be followed unless it is absolutely necessary as there is danger of breaking the clamps (See Fig. 8) which hold the indicator in place, and of fraying the drive cord. If the indicator must be moved, loosen the clamps at the back which hold it in place, and then retighten as explained in the article "Replacing Drive Cord."

Adjust the antenna trimmer for maximum output.

Do not change the setting of the oscillator trimmer.

Grid Lead of 32 1st A. F. Tube

Keep the grid lead of the 32 1st A.F. tube in its normal position as shown in the tube arrangement, Fig. 7. If this lead is swung around so that it is close to the 1F4 output tube, an audio feedback may result which will manifest itself as a squeal.

Replacing Drive Cord

Remove the chassis from the cabinet.

Remove the old drive cord, pulleys, washer and indicator.

Turn the drive drum until the slot in the rim is in the position shown in Fig. 8.

Insert one end of the drive cord in the slot and wind the cord around the drum in a clockwise direction for about two-thirds of a turn, or until it reaches the top of the drum.

Now, before putting the right pulley (from front) in place, bring the cord around the pulley from back to front so that the cord is adjacent to the celluloid dial scale; then place the pulley in position.

Extend the cord over to the left and bring it around the other pulley from front to back before placing this pulley. Put the small brass washer on the upper shaft of the pulley and place the pulley in position as shown in Fig. 8.

Bring the cord over to the drive drum and wind it around the drum in a clockwise direction, keeping it behind the cord already on the drum.

Push the pulley tension spring in toward the drive drum so as to provide slack in the cord while the free end is being inserted into the slot in the rim.

Now mesh the condenser plates completely. Replace the celluloid indicator on the dial strip and attach it to the drive cord as shown in Fig. 8. The line on the indicator should cover the 530 KC mark on the dial scale.

CAUTION—When attaching the indicator to the drive cord, do not pinch the center clamp too tightly on the cord or the cord will be cut. After the clamp is pinched slightly a small amount of shellac on it will hold the cord securely.

Input Voltages and Currents

"A" Battery	2 Volts—.36 Amperes
"B" Batteries	90 Volts—10 to 15 Ma.

Power Output	**.1 Watt Undistorted**
Speaker	**6" Magnetic**
Intermediate Frequency	**175 KC**
Tuning Frequency Range	**528 to 1730 KC**

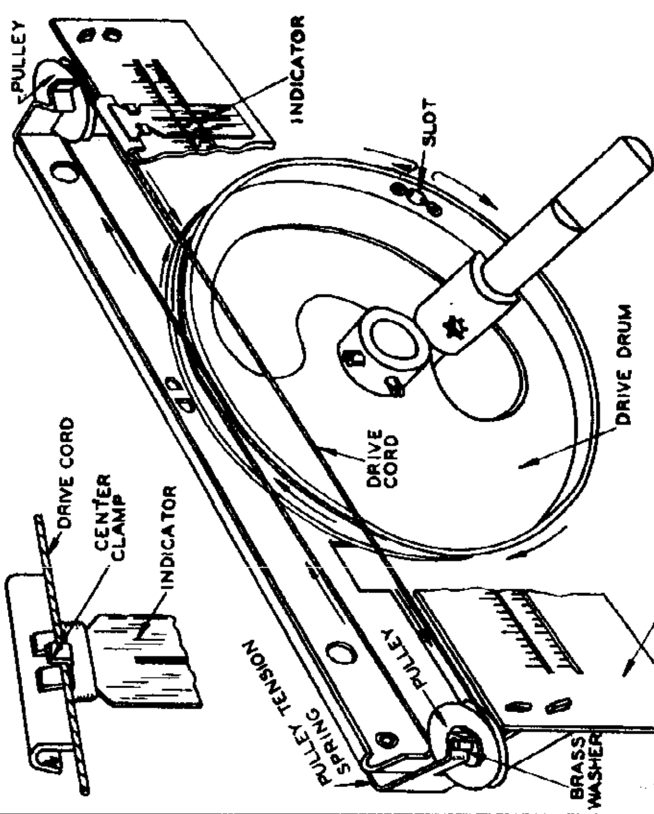


Fig. 8—Dial and Drive Assembly

GENERAL ELECTRIC CO.

MODEL E-51
Schematic, Voltage
Socket, Trimmers

Physical Specifications

Model.......................................E-51
Height.......................................$9\frac{1}{16}$ in.
Width.......................................$14\frac{3}{4}$ in.
Depth.......................................$7\frac{1}{16}$ in.
Weight Packed...............................17 lb.

Electrical Specifications

Power Supply—Volts	Frequency Cycles on A.C.	Power Watts
115 A.C. or D.C.	50–60	45

Tuning Frequency Range

Broadcast...............................540–1720 kc.
Short-wave...............................2.2–7.0 mc.

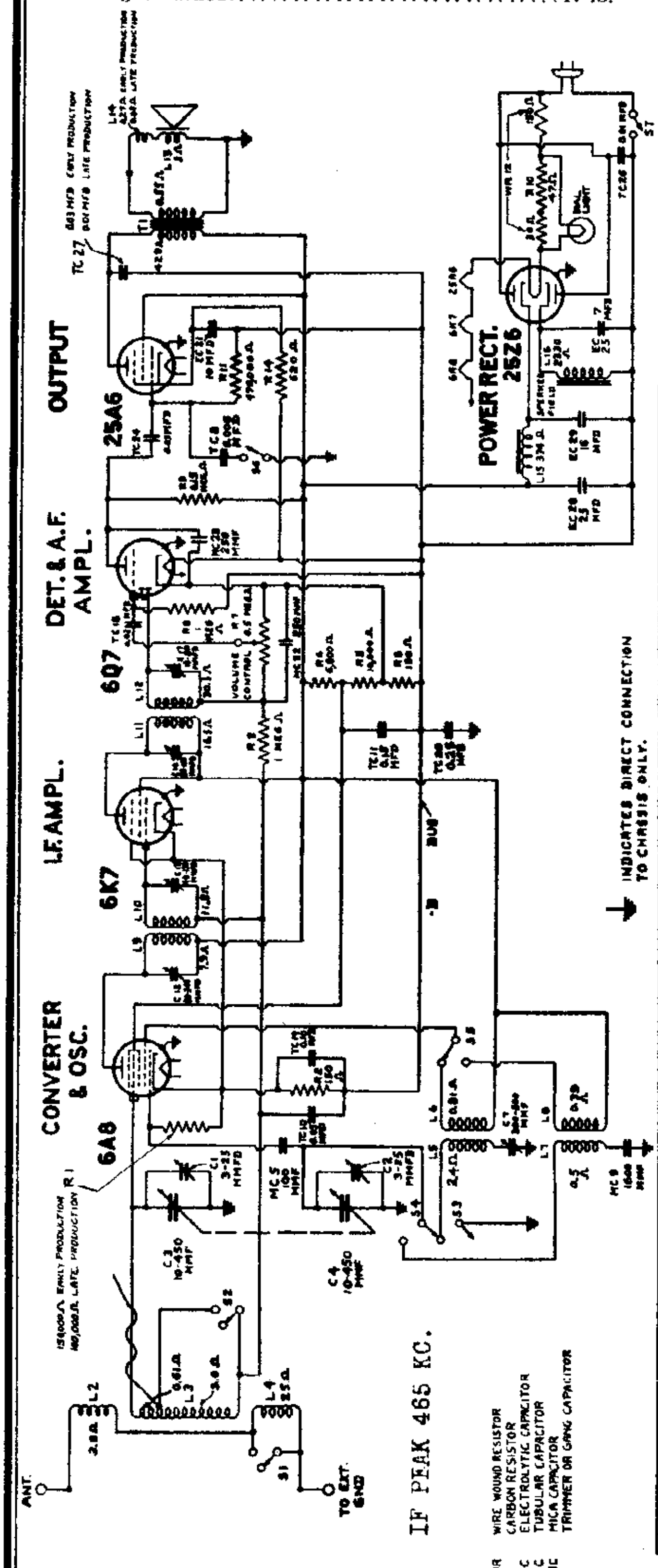
Tuning Control Drive Ratio:...................8:1

Electrical Power Output

Undistorted...............................0.3 watts
Maximum...............................0.7 watts

Loud-speaker—Electrodynamic

Cone: $6\frac{1}{2}$-in. type.
Cone Coil Impedance 3.3 ohms at 400 cycles.



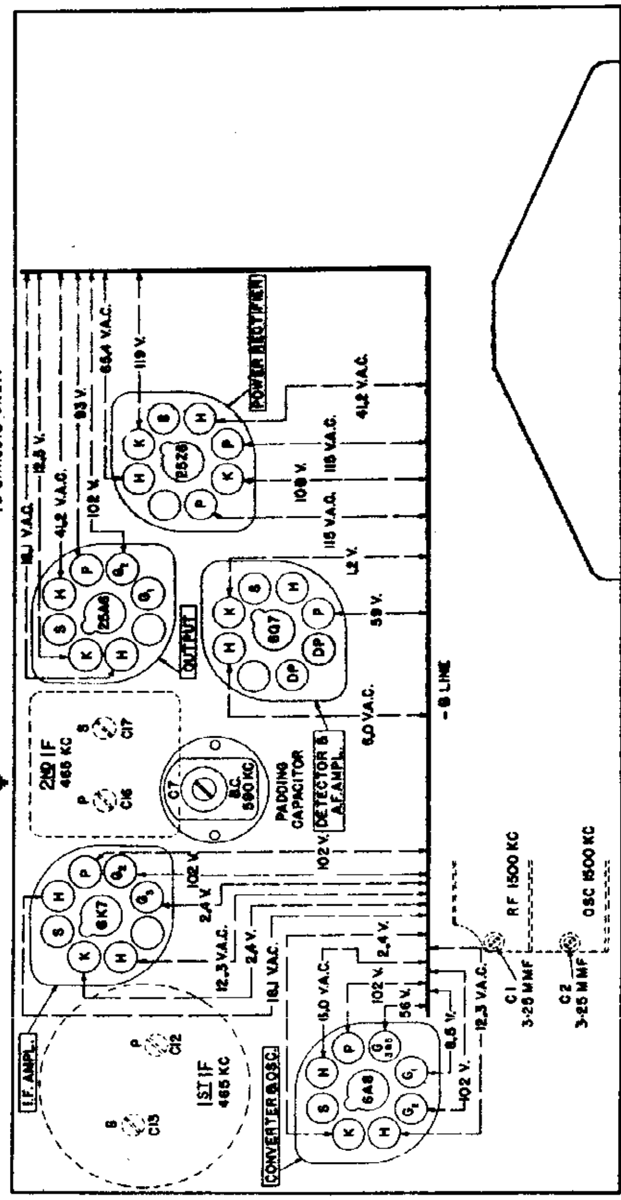


Fig. 3. Trimmer Locations and Socket Voltages

MODEL E-51
Chassis Wiring

GENERAL ELECTRIC CO.

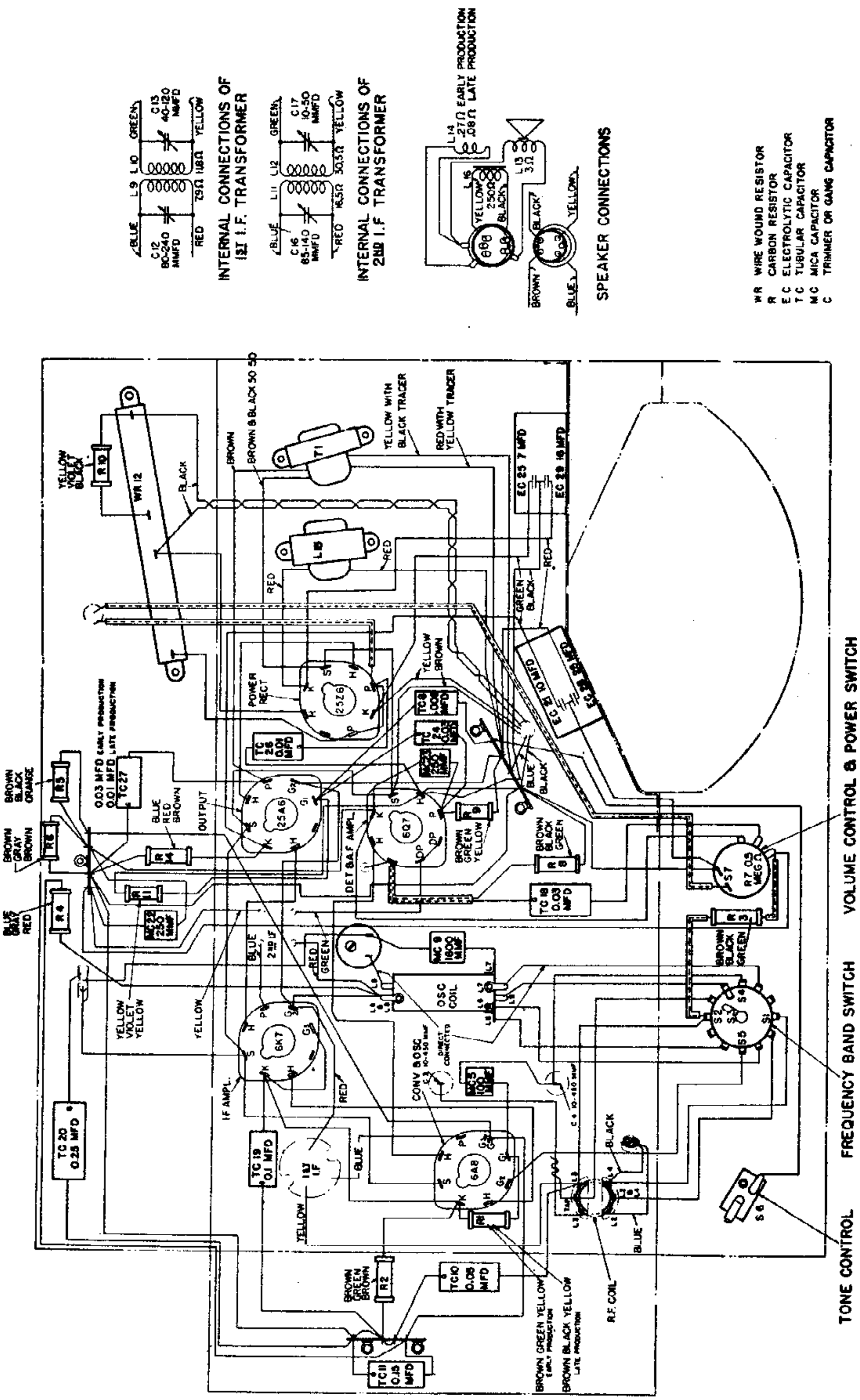


Fig. 2. Chassis Wiring Diagram

GENERAL ELECTRIC CO.

DESCRIPTION OF ELECTRICAL CIRCUIT

The signal from the antenna is applied to the control grid of the 6A8 tube through the R.F. transformer, the secondary of which is tuned to the incoming signal by the rear section of the main tuning condenser. In the 6A8 tube the incoming signal is combined with the local oscillator signal which is 465 kc. higher in frequency. The local signal is generated by the oscillator section of this tube, and the proper frequency difference is maintained throughout the tuning range by the front section of the tuning condenser in conjunction with the oscillator coils and padding capacitors.

The combination of the two signals produces the intermediate frequency of 465 kc. This particular frequency is chosen to reduce image response and improve short-wave performance. The intermediate frequency amplifier consists of a 6K7 tube and two transformers, both of which have tuned primaries and secondaries.

The output of the I.F amplifier is rectified by the diode section of the 6Q7 tube, providing automatic volume control bias as well as detection. The audio frequency voltage developed across R-7 is applied through TC-18 to the grid of the triode section of this tube from the variable arm of R-7, which constitutes the volume control of the receiver. The D.C. voltage developed across R-7 is applied to the control grids of the 6A8 and 6K7 tubes for automatic volume control.

The output of the 6Q7 amplifier section is resistance coupled to the grid of the 25A6 power amplifier pentode. The plate circuit of the 25A6 is suitably matched to the loud-speaker by means of a step-down output transformer.

The tone control circuit consists of a .006-mfd. capacitor which is connected from the grid of the 25A6 tube to ground through the tone control switch. When it is desired to reduce the high frequency output of the receiver the tone control switch is closed by turning the tone control knob to the eft.

When the receiver is used on alternating current, plate and grid voltages and loud-speaker field current are supplied by a 25Z6 rectifier tube and its associated filter circuits. Each section of the 25Z6 tube acts as a separate half-wave rectifier, one for speaker field current, and the other for plate and grid voltages, each section having its own filter circuit.

When the receiver is used on a D.C. supply the 25Z6 rectifier tube remains in the circuit and serves two purposes. If the power cord should be plugged in with incorrect polarity, the 25Z6 tube protects the filter condensers from damage. On correct D.C. polarity the 25Z6 tube aids the filter circuits in smoothing the supply, thus minimising line noise.

The heaters of all tubes and the dial light with its shunt ballast resistor (the 30-ohm section of WR-12 and R-10) are all in series and are furnished current from the power line through a dropping resistor (the 150-ohm section of WR-12).

Note that the chassis is not connected directly to either the ground lead or to the power supply, but is by-passed to the "B-" lead capacitor TC-20.

ALIGNMENT PROCEDURE

Before making any adjustments to the R.F. circuits, it is wise to determine the correctness of the existing alignment. This may be done by supplying a signal from the test oscillator to the receiver and inserting a "tuning wand" into the antenna coil. The "tuning wand" consists of a bakelite rod having a brass cylinder attached to one end, and a small core of finely divided iron compacted into the opposite end. By inserting the brass cylinder end into the antenna coil, the inductance is lowered, increasing its resonant frequency.

Inserting the iron-filled end into the coil raises its inductance, lowering its resonant frequency. If the circuits are in exact alignment, inserting either end of the tuning wand in the coil will result in a decrease in output. When an increase in signal is obtained with the iron-filled end of the wand at the 1500-kc. point, a decrease in resonant frequency of that circuit by increasing the antenna trimmer capacity is indicated. When an increase in signal is obtained with the brass cylinder, a decrease in antenna trimmer capacity is indicated. In the event that the brass cylinder end causes an increase in output at the 580-kc. point when inserted in the antenna coil, it is necessary to increase the oscillator padder capacity, meanwhile rocking the tuning dial. An increase in output, resulting from inserting the iron-filled end, indicates a decrease in oscillator padder capacity.

ALIGNMENT FREQUENCIES

I.F.	Broadcast	Short-wave
465 kc.	580 kc.	None
	1500 kc.	

In order to properly align this receiver, it will be necessary to have the following service tools

1. Test Oscillator capable of producing the above alignment frequencies.
2. Non-metallic alignment screwdriver.
3. Output meter.

Trimmer locations as well as socket voltages are illustrated in Fig. 3.

(1) *I.F. Alignment*

The I.F. amplifier should be tuned to 465 kc.; set the test oscillator dial at this frequency. Turn the volume control to maximum and short-circuit the antenna and ground leads. Tune the receiver to a point where no signal comes in.

Connect the test oscillator output between the 6A8 converter tube grid (with the grid cap on) and the chassis. Connect the output meter across the cone coil of the speaker and adjust the oscillator output until a small deflection is observed in the output meter.

The four I.F. trimmers are adjusted in the following sequence:

1. Secondary trimmer on second I.F. transformer.
2. Primary trimmer on second I.F. transformer.
3. Secondary trimmer on first I.F. transformer.
4. Primary trimmer on first I.F. transformer.

Throughout all adjustments the output should be maintained at a low level by decreasing the test oscillator output as the various stages are brought in line. After these adjustments have been made, the same procedure should be repeated as a final check. The I.F. alignment will then be complete.

(2) *R.F. Alignment*

The R.F. and oscillator transformers are aligned at 580 and 1500 kc. With the tuning condenser plates fully meshed, line up the pointer and dial by adjusting the dial drive drum set screws so that the line at the extreme right-hand end of the dial is indicated.

(a) *Broadcast Band*

With the band switch in the clockwise position, set the tuning dial to 1500 kc. Set the test oscillator at 1500 kc. and adjust the oscillator trimmer for maximum output. Next, adjust the R.F. trimmer for maximum output, taking care that the output from the test oscillator is not high enough to overload any part of the set. After these adjustments, tune the set and the test oscillator to 580 kc. Adjust the broadcast padding capacitor for maximum output while rocking the tuning condenser back and forth until maximum output is obtained. The dial setting after this adjustment may not agree exactly with the frequency, but this is not important.

To complete the broadcast band line-up, repeat the adjustment at 1500 kc. as before.

(b) *Short-wave—22-7.0 M.C. (2200-7000 kc)*

No separate short-wave trimmers are provided on this receiver. The correct adjustment of the broadcast band automatically aligns the short-wave band.

SOCKET VOLTAGES

Power Supply	Cathode to "-B" Volts D.C.		Screen Grid to "-B" Volts D.C.		Plate to "-B" Volts D.C.		Plate Current M.A.-D.C.		Heater Volts	
	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC
6A8 Converter	2.4	2.2	56	51	102	92	1.1	.9	6.3	6.3
Oscillator					102	92	.9	.8		
6K7 I.F. Amplifier	2.4	2.2	102	92	102	92	9.1	7.8	5.8	5.8
6Q7 Detector and A.F. Amplifier	1.2	1.1			59	51	.2	.19	6.0	6.0
25A6 Pwr. Amp.	12.5	10.5	102	92	98	84	17.2	15.6	23.1	23.1
25Z6 Rectifier "+B"	119	108			(15 A.C.)	115	42.8	37.2	24.2	24.2
Spkr. Field	108	106				115	45.5	45.5		

Measured at 115 volts 60 cycles or 115 volts D.C. supply. Dial 1000 kc. No signal input. Voltmeter 1000 ohms per volt; measurements taken on highest scale giving accurate readable deflection.

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLY	
*RB-002	BOARD—Terminal Board (Chassis Deck)	$0.15
*RB-021	BOARD—Terminal Board (Chassis side wall)	.10
*RB-023	BOARD—Terminal Board (Rear Chassis Wall)	.10
RB-150	BRACKET—Dial Light Bracket and Scale Support	.25
*RC-030	CAPACITOR—.006 mfd., 400 V Paper (TC-8)	.25
*RC-037	CAPACITOR—.01 mfd., 250 V A.C. (TC-26) (Pkg. of 5)	.75
*RC-040	CAPACITOR—.01 mfd., 400 V Paper (TC-27)	.25
*RC-068	CAPACITOR—.03 mfd., 200 V Paper (TC-18, TC-24)	.25
*RC-072	CAPACITOR—.05 mfd., 200 V Paper (TC-10)	.25
*RC-096	CAPACITOR—.1 mfd., 200 V Paper (TC-19)	.30
*RC-110	CAPACITOR—.15 mfd., 200 V Paper (TC-11)	.30
*RC-150	CAPACITOR—.25 mfd., 200 V Paper (TC-20)	.30
RC-236	CAPACITOR—100 mmfd., Mica (MC-5)	.25
*RC-258	CAPACITOR—250 mmfd., Mica (MC-22, MC-23)	.25
*RC-348	CAPACITOR—1600 mmfd., Mica (MC-9)	.35
RC-565	CAPACITOR—25 mfd., 150 V; 10 mfd., 25 V. Dry Electrolytic (EC-28, EC-21)	1.30
RC-566	CAPACITOR—16 mfd., 150 V; 7 mfd., 150 V Dry Electrolytic (EC-29, EC-25)	1.20
RC-608	CAPACITOR—Oscillator Padder, 300-500 mmfd. (C-7)	.45
RC-713	CONDENSER—Two-gang Tuning Condenser (C-3, C-4)	3.00
RC-815	CABLE—Dial Cable (Pkg. of 5)	.50
RC-822	CABLE—Speaker Cable and Female Plug	.50
RC-860	CORD—Power Cord and Plug	.65
RD-030	DRUM—Dial Drive Drum	.40
RD-041	DIAL—Dial Scale	.25
RD-042	DRIVE—Condenser Drive Shaft	.50
*RG-001	GRID CAP—Control Grid Cap (Pkg. of 5)	.10
*RK-004	KNOB—Control Knob (Push-on) (Pkg. of 5)	.40
RK-008	KNOB—Knob for use with Red Cabinet	.10
RK-009	KNOB—Knob for use with Black or Ivory Cabinet	.10
RL-023	COIL—Antenna Coil (L-2, L-3, L-4)	1.10
*RL-221	COIL—Oscillator Coil (L-5, L-6, L-7, L-8)	.90
RL-302	REACTOR—Filter Reactor (L-15)	1.85
RP-041	POINTER—Dial Pointer and Guide	.10
RP-042	PULLEY—Dial Pulley (Pkg. of 2)	.25
RP-061	PLATE—Asbestos Plate (Under Chassis)	$0.15
*RQ-039 (RR-005)	RESISTOR—150 ohm, ¼ watt Carbon (R-2) (Pkg. of 5)	.60
RQ-041	RESISTOR—180 ohm, ¼ watt Carbon (R-6) (Pkg. of 5)	.60
*RQ-083 (RR-021)	RESISTOR—10,000 ohm, ¼ watt Carbon (R-5) (Pkg. of 5)	.60
*RQ-107 (RR-049)	RESISTOR—100,000 ohm, ¼ watt Carbon (R-1) Late Production (Pkg. of 5)	.70
*RQ-111 (RR-054)	RESISTOR—150,000 ohm, ¼ watt Carbon (R-9) [(R-1) Early Production] (Pkg. of 5)	.70
RQ-123	RESISTOR—470,000 ohm, ¼ watt Carbon (R-11) (Pkg. of 5)	.70
*RQ-131 (RR-067)	RESISTOR—1 meg., ¼ watt Carbon (R-3, R-8) (Pkg. of 5)	.70
RQ-254	RESISTOR—620 ohm, ½ watt Carbon (R-14) (Pkg. of 5)	.70
RQ-279	RESISTOR—6800 ohm, ½ watt Carbon (R-4) (Pkg. of 5)	.70
RQ-427	RESISTOR—47 ohm, 1 watt Carbon (R-10) (Pkg. of 5)	.70
RR-714	RESISTOR—Candohm Tapped Bleeder Resistor (WR-12)	.65
RR-904	REFLECTOR—Dial Light Reflector	.15
*RS-200	SOCKET—8 Pin Tube Socket (Pkg. of 5)	.75
RS-210	SOCKET—Dial Light Socket	.30
*RS-314	SWITCH—Band Switch (S-1, S-2, S-3, S-4, S-5)	.80
RS-331	SWITCH—Tone Control Switch (S-6)	.30
RS-415	SPRING—Spring Bracket Supporting Cable Pulley (Pkg. of 2)	.10
RT-214	TRANSFORMER—2nd I.F. Transformer Assembled (L-11, L-12)	1.50
RT-219	TRANSFORMER—1st I.F. Transformer Assembled (L-9, L-10)	1.50
RT-419	TRANSFORMER—Output Transformer (T-1)	1.45
RV-018	VOLUME CONTROL—Volume Control and Power Switch (R-7, S-7)	.90
RW-004	WINDOW—Dial Window	.15
*RW-101	WASHER—Felt Washers for Control Shafts (Pkg. of 10)	.45
RX-018	SCREW ASSEMBLY—Chassis Mounting Screw Assembly	.15
	SPEAKER ASSEMBLY	
RC-914	CONE—6½-in. Cone and Voice Coil (L-13)	$0.85
RP-059	PLUG—Male Speaker Plug	.20
RP-060	PLUG—Female Speaker Plug	.20
RS-089	SPEAKER—6½-in. Type Speaker (L-13, L-14, L-16)	5.50

*Indicates part also used on 1936 "A" line of receivers.

Sept. 1936 (3M)

(Prices subject to change without notice)

MODELS U-51, U-65
Parts, Notes

GENERAL ELECTRIC CO.

Replacement Parts

Stock No.	Description	List Price
RBB-001	BOARD—Terminal board, 2 lugs	$ .10
RBB-002	BOARD—Terminal board, 3 lugs	.10
RBB-003	BOARD—Terminal board, 5 lugs	.10
RBB-004	BOARD—Fuse board	.10
RBB-100	BRACKET—Dial support bracket with drive cord spring	.10
RBB-101	BRACKET—Dial mounting bracket	.20
RBC-001	CAPACITOR—.1 Mfd., 180 volt paper (C-7, C-10, C-11, C-23, C-25, C-37, C-33, C-42)	.20
RBC-003	CAPACITOR—.25 Mfd., 180 volt paper (C-21, C-31)	.25
RBC-004	CAPACITOR—.01 Mfd., 180 volt paper (C-16, C-18)	.15
RBC-005	CAPACITOR—.05 Mfd., 180 volt paper (C-4)	.15
RBC-006	CAPACITOR—.5 Mfd., 180 volt paper (C-19, C-20, C-39)	.40
RBC-007	CAPACITOR—.5 Mfd., 180 volt paper (C-22)	.30
RBC-008	CAPACITOR—.01 Mfd., 1000 volt paper (C-24)	.15
RBC-009	CAPACITOR—.02 Mfd., 180 volt paper (C-36, C-40, C-44)	.20
RBC-010	CAPACITOR—.5 Mfd., 180 volt paper (C-43)	.30
RBC-014	CAPACITOR—.01 Mfd., 240 volt paper (C-38)	.15
RBC-203	CAPACITOR—50 Mmfd., Mica (C-13, C-15, C-17)	.10
RBC-205	CAPACITOR—250 Mmfd., Mica (C-1)	.15
RBC-206	CAPACITOR—35 Mmfd., Mica (C-28)	.10
RBC-207	CAPACITOR—100 Mmfd., Mica (C-14, C-41)	.10
RBC-502	CAPACITOR—4 Mfd., 18 Mfd., 18 Mfd., 150 volt dry electrolytic (C-32, C-26, C-27)	1.55
RBC-602	CAPACITOR—Quadruple trimmers, antenna and oscillator bands B and D (C-2, C-3, C-29, C-30)	.45
RBC-603	CAPACITOR—Double trimmers 1st IF (C-5, C-6)	.45
RBC-604	CAPACITOR—Double trimmers, 2nd IF (C-8, C-9)	.40
RBC-605	CAPACITOR—Double padder, bands B and D (C-34, C-35)	.45
RBC-606	CAPACITOR—Trimmer, 3rd IF (C-12)	.25
RBC-609	CAPACITOR—Replacement trimmer for any one section of trimmer strip RBC-602	.10
RBC-701	CONDENSER—Two gang tuning condenser and reduction drive	3.65
RBC-800	CABLE—Drive cable	.10
RBC-801	CABLE—Speaker cable and socket assembly	.40
RBC-803	CABLE—Shielded battery cable	1.00
RBC-901	CONE—6" Speaker cone (U51)	2.50
RBC-904	CONE—8" Speaker cone (U55)	3.00
RBC-950	CUSHION—Rubber chassis mounting cushions	.10
RBC-952	CLIP—Vibrator spring clip	.10
RBD-001	DRUM—Dial drive drum	.30
RBD-003	DIAL—Dial scale	.35
RBD-004	DRIVE—Tuning cord reduction drive assembly	.90
RBF-002	FOOT—Chassis mounting foot ea.	.10
RBF-300	FUSE—5 Ampere fuse	.10
RBG-001	GRID CAP—Control grid cap ea.	.10
RBK-001	KNOB—Control knob	.10
RBL-002	COIL—Antenna coil and shield assembly (T-1)	.55
RBL-201	COIL—Oscillator coil and shield assembly (T-2)	2.45
RBL-300	REACTOR—{"B" Reactor (L-1) / "A" Reactor (L-8)}	.60
RBL-301	REACTOR—"B" Reactor (L-2)	.25
RBL-302	REACTOR—Vibrator reactor (L-3)	$ .35
RBL-303	REACTOR—"A" line reactor (L-4, L-5)	.35
RBL-304	REACTOR—"B" reactor (L-6)	.80
RBL-305	REACTOR—Transformer (L-7)	1.25
RBL-900	LEADS—Antenna and ground lead assembly	.30
RBP-001	PULLEY—Dial pulley ea.	.10
RBP-002	POINTER—Dial pointer	.10
RBQ-001	RESISTOR—100,000 ohm, .2 Watt Carbon (R-2, R-6, R-12, R-13)	.15
RBQ-002	RESISTOR—3 megohm, .2 Watt Carbon (R-9, R-10)	.10
RBQ-008	RESISTOR—2 megohm, .2 Watt Carbon (R-17)	.10
RBQ-010	RESISTOR—30,000 ohm, .2 Watt Carbon (R-1)	.15
RBQ-011	RESISTOR—80,000 ohm, .2 Watt Carbon (R-3)	.15
RBQ-012	RESISTOR—10,000 ohm, .2 Watt Carbon (R-4)	.15
RBQ-013	RESISTOR—4 megohm, .2 Watt Carbon (R-5)	.10
RBQ-014	RESISTOR—50,000 ohm, .2 Watt Carbon (R-7, R-8)	.15
RBQ-015	RESISTOR—15,000 ohm, .2 Watt Carbon (R-15)	.15
RBQ-016	RESISTOR—1,000 ohm, .2 Watt Carbon (R-16)	.10
RBR-702	RESISTOR—16.8 ohm, wire wound (R-14)	.25
RBS-002	SPEAKER—6" type speaker complete with output transformer (T-6)	5.70
RBS-003	SPEAKER—8" type speaker complete with output transformer (T-6)	6.00
RBS-100	SHIELD—Large tube shield	.20
RBS-101	SHIELD—Small tube shield (closed top)	.10
RBS-102	SHIELD BASE—Large tube shield base and vibrator shield base	.10
RBS-103	SHIELD BASE—Small tube shield base	.10
RBS-104	SHIELD—Small tube shield (open top)	.15
RBS-105	SHIELD—Vibrator shield	.20
RBS-106	SHIELD—Shield can for filter assembly (under vibrator and transformer assembly)	.50
RBS-201	SOCKET—4 prong tube socket	.10
RBS-202	SOCKET—5 prong tube socket	.10
RBS-203	SOCKET—6 prong tube socket	.10
RBS-204	SOCKET—6 prong vibrator socket	.10
RBS-300	SWITCH—Band change switch (S-1)	.80
RBS-301	SWITCH—Tone control switch (S-3)	.20
RBT-050	TRANSFORMER—Power transformer (T-7)	2.45
RBT-202	TRANSFORMER—1st IF transformer and shield assembly (T-3)	1.45
RBT-203	TRANSFORMER—2nd IF transformer and shield assembly (T-4)	1.50
RBT-204	TRANSFORMER—3rd IF transformer and shield assembly (T-5)	1.60
RBT-400	TRANSFORMER—Output transformer (T-6)	1.50
RBV-001	VOLUME CONTROL—1 megohm volume control and on-off switch (R-11) (S-2)	1.00
RBV-200	VIBRATOR—Vibrator unit	3.90
RBW-002	WINDOW—Dial window	.15
RBW-101	WASHERS—Felt washers used behind knobs ea.	.10
RX-751	ASSEMBLY—Gang condenser mounting assembly (complete)	.15
RBT-051	TRANSFORMER—Power transformer assembly, includes RBT-050, RBS-204, RBS-102, RBC-952, RBC-009	3.85

Prices subject to change without notice.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer RBC-609, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Tubes

The tubes used in this receiver are of the 2 volt series. All of them are of the filament or directly heated types. The filaments are connected in the series-parallel arrangement shown in Fig. 6.

Synchronous Vibrator—The action of the synchronous vibrator used in the power unit is shown in the abridged wiring diagram Fig. 7. When the switch is closed, the armature is drawn up (from the standpoint of diagram) as a result of the current through the vibrator coil. When this occurs, the upper contacts are closed and the vibrator coil is short circuited. The spring action then causes the armature to spring back and the upper contacts are opened. The vibrator coil is again energized, but the inertia of the armature causes it to continue in motion until the two bottom contacts are closed.

The spring action then brings the armature up, opening the bottom contacts. The vibrator coil is again energized and the armature is drawn up to start the next cycle.

The "A" current (heavy lines, Fig. 7) flows first through one side of the power transformer primary and then through the other side in the opposite direction. An AC voltage is induced in the secondary as a result. That portion of the armature shown in light lines rectifies the current in the secondary circuit.

GENERAL ELECTRIC CO.

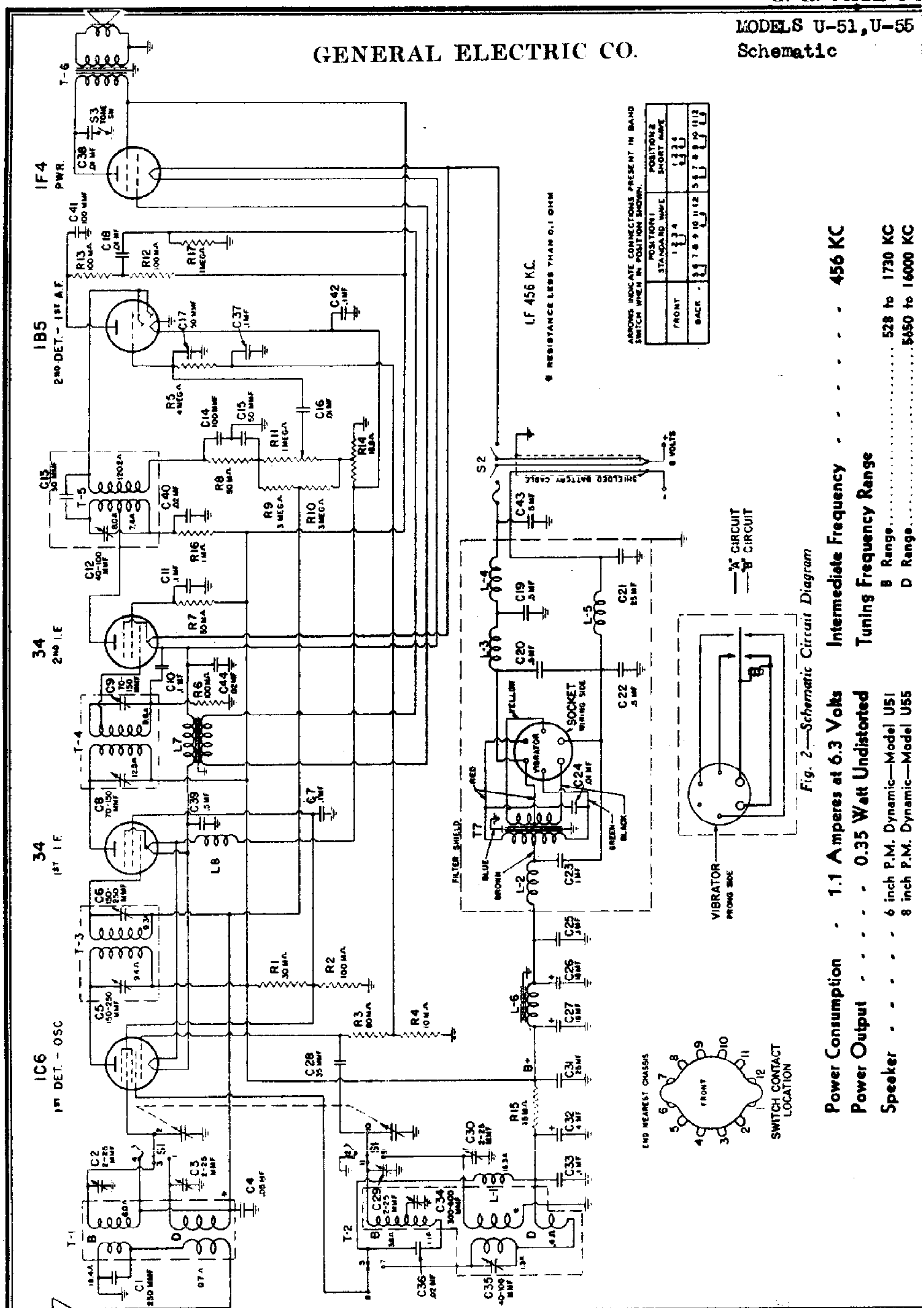


Fig. 2—Schematic Circuit Diagram

MODELS U-51, U-55
Coils, Resistance
Vibrator, Notes

GENERAL ELECTRIC CO.

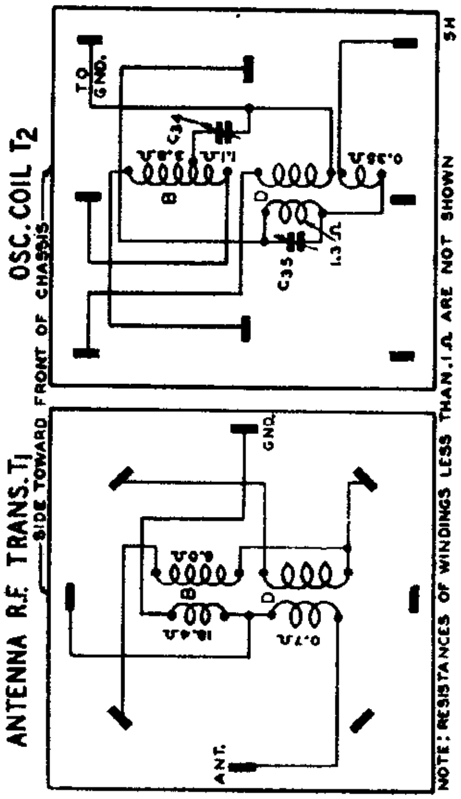


Fig. 8—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

D. C. Resistances of Audio and Filter Circuit Windings — Other Resistances are Shown in Fig. 2

The values given below will vary slightly in different sets.

Part No.	Winding	Code	D. C. Resistance in Ohms
RBT-400	Output Transformer	T6	
	Primary Winding		713.
	Secondary Winding		0.4
RBS-002 & 003	Dynamic Speaker 6" and 8"		
	Speaker Voice Coil		5.4
RBT-050	Power Transformer	T7	
	Primary Winding		
	Center Tap to Inside		0.3
	Center Tap to Outside		0.3
	Secondary Winding		
	Center Tap to Inside		166.
	Center Tap to Outside		185.
RBL-300	"B" Reactor	L1	18.3
RBL-301	"B" Reactor	L2	17.7
RBL-302	Vibrator Reactor	L3	0.1
RBL-303	"A" Line Reactor	L4	0.1
RBL-303	"A" Line Reactor	L5	0.1
RBL-304	"B" Reactor	L6	305.
RBL-305	Transformer	L7	
	Audio Choke (Primary)		1.3
	Hum Bucking Winding (Secondary)		22.7
RBL-300	"A" Reactor	L8	0.3

Caution

Do not turn the receiver on unless ALL the tubes are in the sockets. Removal of any of them will result in abnormal voltages on the remaining tubes.

Be sure that the battery clips are connected to the battery with the correct polarity. Reversed connections may damage the receiver.

Do not use any power source other than a 6 volt storage battery.

If the receiver does not operate after being turned on, turn the switch off immediately, examine the battery connections and the fuse and see if all tubes are properly inserted.

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 2. In contact locations not used, the number applying to that particular location is not employed.

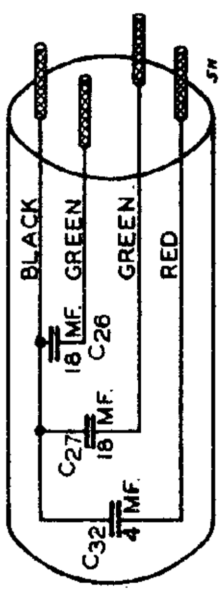


Fig. 4—Electrolytic Condenser Internal Connections

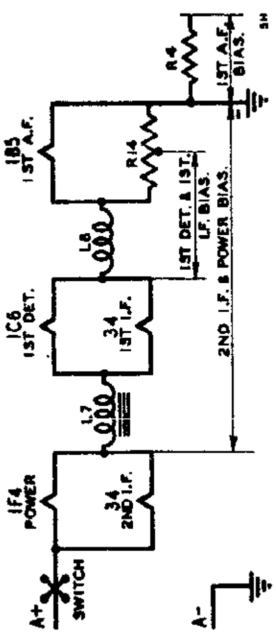


Fig. 6—Abridged wiring diagram showing filament wiring system and points at which no-signal bias voltages are obtained.

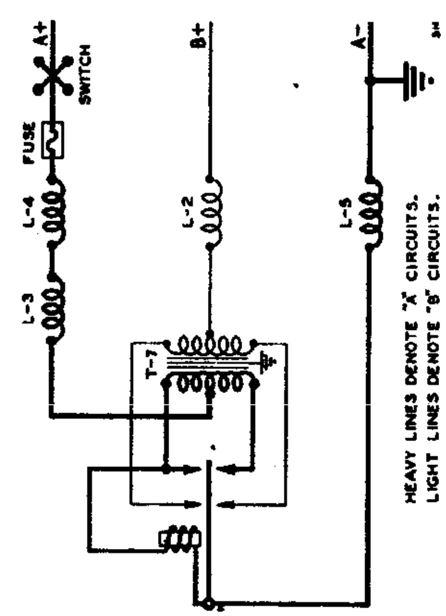


Fig. 7—Abridged wiring diagram showing action of synchronous vibrator

GENERAL ELECTRIC CO.

MODELS U-51, U-55
Socket, Trimmers
Voltage, Dial Assembly

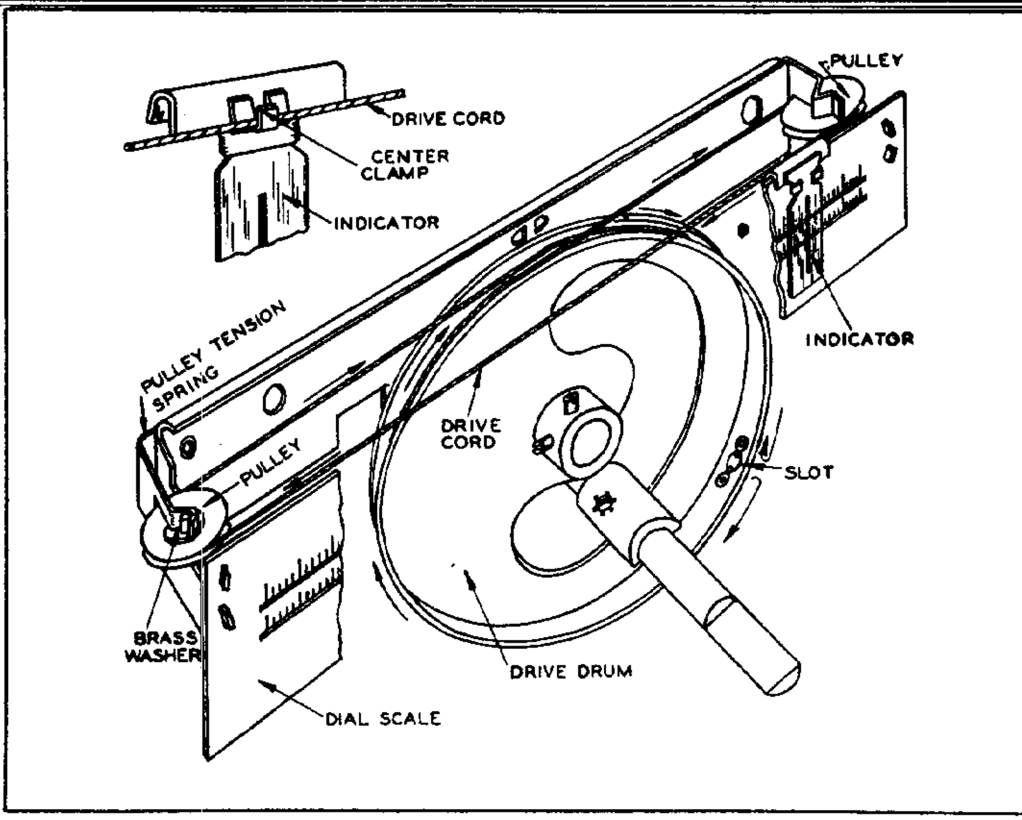


Fig. 9—Dial and Drive Assembly

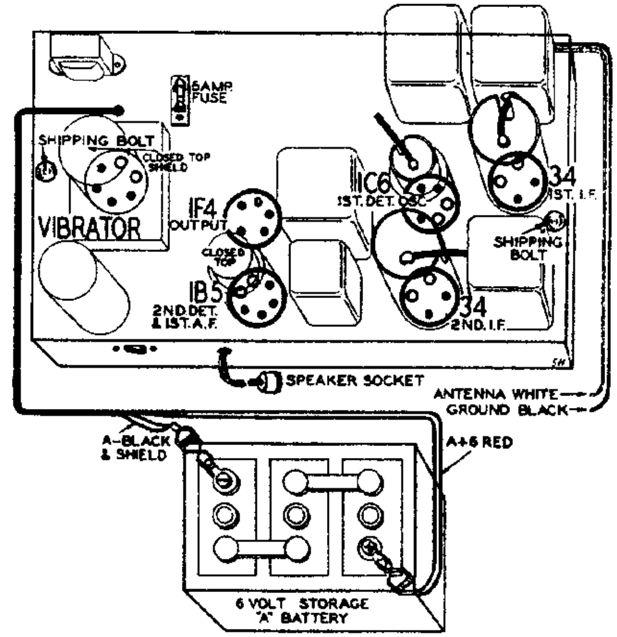


Fig. 5—Tube Arrangement and Battery Connections

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground
Battery—6 Volts — Band Switch in Standard Wave Position

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Bias Voltage
1C6	1st Det.-Osc.	2.0	140 110(1)	55	1.1(2)
34	1st I.F.	2.0	140	55	1.1(2)
34	2nd I.F.	2.0	140	75	4.0
1B5	2nd Det. 1st A.F.	2.0	75		3.0(3)
1F4	Power	2.0	135	140	4.0

(1) Anode Grid to ground.
(2) As read from negative filament leg to center tap of R14.
(3) As read across Resistor R4 (using 100,000 ohm meter). This voltage is subject to considerable variation depending on band and frequency setting.

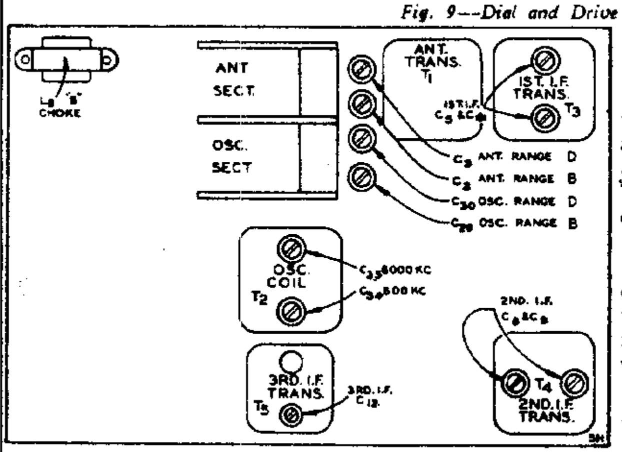


Fig. 3—Location of Trimmers

Voltages

Check the voltages at the sockets to see if correct values are being delivered to the tubes. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together. The volume control should be turned to the right or maximum position.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condition. These voltages are typical of the sets but will vary slightly with variations in individual receivers, tubes, test equipment used and battery voltage.

The voltage readings are taken with a voltmeter having a resistance of 1000 ohms per volt.

MODELS U-51, U-55
Alignment, Notes
Drive Cord Data

GENERAL ELECTRIC CO.

The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 16,000, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the control grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C29) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

The dial indicator should be near the 1500 KC mark on the dial scale. If it is a considerable distance from this mark, the position of the indicator on the drive cord must be changed. This procedure, however, should not be followed unless it is absolutely necessary as there is danger of breaking the clamps (See Fig. 9) which hold the indicator in place, and of fraying the drive cord. If the indicator must be moved, loosen the clamps at the back which hold it in place, and then retighten as explained in the article "Replacing Drive Cord."

Adjust the antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC padder (C34) until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC. It may be necessary to increase the input signal to hear the image.

16,000 KC Adjustment

Set the signal generator for 16,000 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (short wave band).

Adjust the oscillator Range D trimmer (C30) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the antenna Range D trimmer (C3) to maximum. When adjusting this trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC (C35) padder until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Servicing Power Unit

The power unit is that portion of the chassis assembly contained within the large rectangular shield can and the circuit for which is shown within the dotted lines at the lower center of the schematic diagram, Fig. 2.

Continuity Resistance Check—The power transformer, choke coil circuits and condenser shorts may be checked by utilizing the vibrator socket terminals and various points on the "A" or "B" lines, or ground without removal of the shield can. For example: when checking the continuity or resistance of the upper half of the transformer secondary, contact may be made with the test prods at the proper vibrator socket terminal, as shown on the circuit diagram, and at the terminal strip lug to which the 18 mf. electrolytic condenser, C26 is connected.

Removing Transformer and Vibrator Socket Assembly—Take off the filter unit shield can by removing the four self tapping screws at the right side (from front) of the chassis base and the five hex nuts from the bolts at the top of the chassis.

Unsolder the ground connections from the two lugs on the inside of the chassis base (right side from front).

Now unsolder the mounting lug holding the terminal strip to the transformer cover.

Remove the four nuts from the bolts holding the transformer assembly to the chassis. Do not remove these bolts from the transformer core. Then lift the assembly to free it from the chassis so that all parts of the assembly are readily accessible.

Proceed with replacement of the power transformer or with any other necessary service or replacements and then reassemble.

Replacement of Buffer Condenser C24—This condenser is located in the top of the transformer and vibrator assembly just underneath the vibrator socket. To replace, remove the assembly as explained in the preceding article.

In addition, the two screws holding the vibrator socket to the transformer cover assembly should be taken out. The condenser is then easily replaced.

Replacing Drive Cord

Remove the chassis from the cabinet.

Remove the old drive cord, pulleys, washer and indicator.

Turn the drive drum until the slot in the rim is in the position shown in Fig. 9.

Insert one end of the drive cord in the slot and wind the cord around the drum in a clockwise direction for about two-thirds of a turn, or until it reaches the top of the drum.

Now, before putting the right pulley (from front) in place, bring the cord around the pulley from back to front so that the cord is adjacent to the celluloid dial scale; then place the pulley in position.

Extend the cord over to the left and bring it around the other pulley from front to back before placing this pulley. Put the small brass washer on the upper shaft of the pulley and place the pulley in position as shown in Fig. 9.

Bring the cord over to the drive drum and wind it around the drum in a clockwise direction, keeping it behind the cord already on the drum.

Push the pulley tension spring in toward the drive drum so as to provide slack in the cord while the free end is being inserted into the slot in the rim.

Now mesh the condenser plates completely. Replace the celluloid indicator on the dial strip and attach it to the drive cord as shown in Fig. 9. The line on the indicator should cover the 530 KC mark on the dial scale.

Caution—When attaching the indicator to the drive cord, do not pinch the center clamp too tightly on the cord or the cord will be cut. After the clamp is pinched slightly a small amount of shellac on it will hold the cord securely.

This receiver is designed to operate from a 6 volt storage battery and uses a synchronous vibrator and a transformer to provide the required high voltage. The tubes used are of the 2 volt type. They are connected in a series-parallel arrangement across the 6 volt battery.

Two bands are covered with a tuning range in each band as shown in the specifications above. Two band coverage is accomplished by means of two sets of antenna and oscillator coils and a single section double throw switch.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna transformer and oscillator coil assemblies. The standard wave and short wave coils are indicated by the letters B and D respectively.

The band switch completes connections to the antenna transformer secondary and oscillator grid and plate coils in use. It also short circuits the antenna

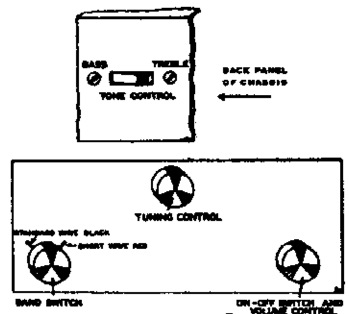


Fig. 1—Location of Controls

transformer B Range secondary and oscillator B Range grid coil when it is in the D Range position.

The antenna transformer with tuned secondary feeds into a type 1C6 pentagrid converter tube which functions as the oscillator and 1st detector.

The oscillator potential on the oscillator control grid of this tube modulates the electron stream from the cathode in such a manner as to impress on it the oscillator frequency which is always 456 KC above the frequency to which the R.F. amplifier is tuned. The electron stream is also modulated at the signal frequency by the detector control grid. As a result of the beating of the two frequencies, the intermediate or beat frequency of 456 KC is present in the plate circuit of this tube.

Two stages of I.F. amplification are employed using type 34 tubes. The primaries and secondaries of the first and second I.F. transformers and the primary of the 3rd I.F. transformer are tuned by small trimmer condensers.

A type 1B5 duo-diode triode tube functions as the second detector and a one stage audio amplifier. AVC voltage is applied through isolating resistors to the control grid circuits of the 1st detector and 1st I.F. tubes. The audio voltage developed across volume control resistor R11 is applied through the movable arm to the control grid of the 1B5 tube.

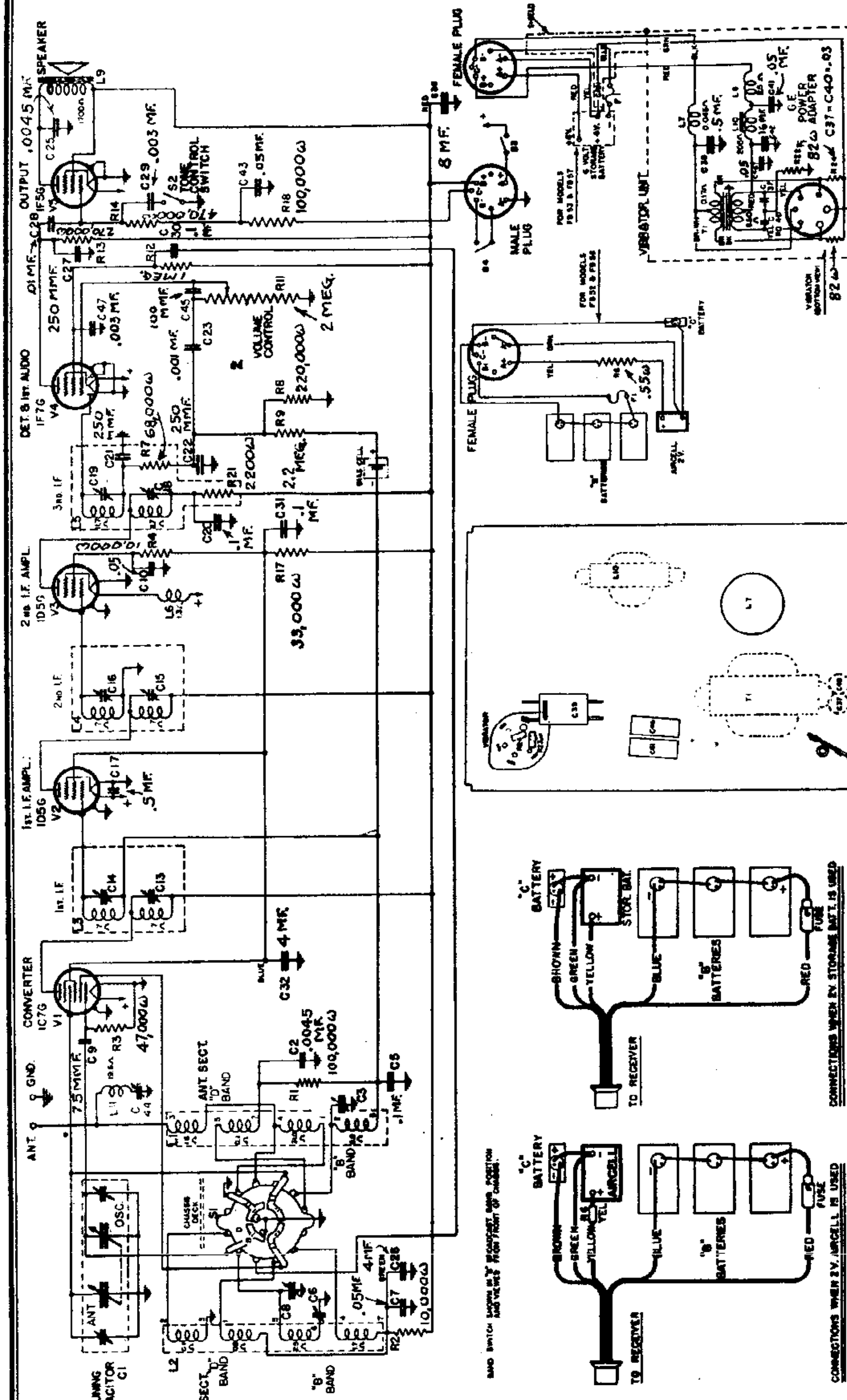
Resistance coupling is used between the 1st audio stage and the output stage which employs a 1F4 output pentode tube. A P.M. dynamic reproducer is employed.

The primary of transformer L7 serves as an audio choke in the filament circuit. The secondary of this transformer is in the control grid circuit of the 1F4, and acts as a hum bucking winding.

Filament Wiring—Fig. 6 is an abridged wiring diagram which shows the tube filament wiring system and also indicates the points at which the no-signal bias voltages are obtained.

GENERAL ELECTRIC CO.

MODELS FB-52, FB-53 FB-56, FB-57 Schematic, Batt. Conn. Power Adapter



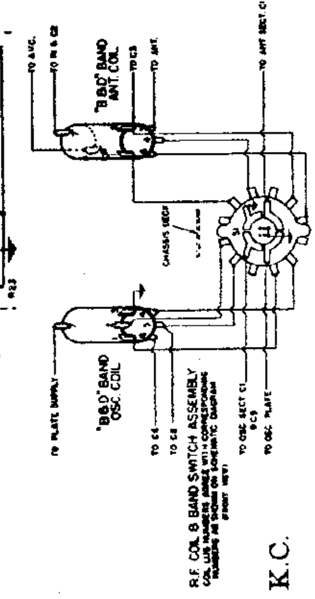


Fig 5. Battery Connections Models FB-52, FB-56

Loudspeaker—Magnetic Type

Cone diameter—
Models FB-52, FB-53 ..... 6½ in.
Models FB-56, FB-57 ..... 8 in.

Speaker Impedance .... 16,000 ohms at 400 cycles.

Intermediate Frequency .... 465 K.C.

Tuning Frequency Range

Band "B" .... 540- 1600 K.C.
Band "D" .... 5600-18000 K.C.

GENERAL ELECTRIC CO.

AVERAGE SOCKET VOLTAGES

Tube	Plate to Ground Volts D.C.	Screen Grid to Ground Volts D.C.	Filament Volts D.C.	D.C. Plate Current M.A.
1C7G Oscillator	134	...	2.0	2.8
1C7G Converter	136	46	2.0	1.3
1D5G 1st I.F. Amp.	136	46	2.0	2.3
1D5G 2nd I.F. Amp.	128	46	2.0	3.5
1F7G Det., AVC, Audio Amp.	40	15	2.0	0.4
1F5G Output	121	135	2.0	7.6

Measured with normal battery voltages using a 1000 ohm per volt meter—dial pointer at 540 K.C. with no signal input-volume control at minimum.

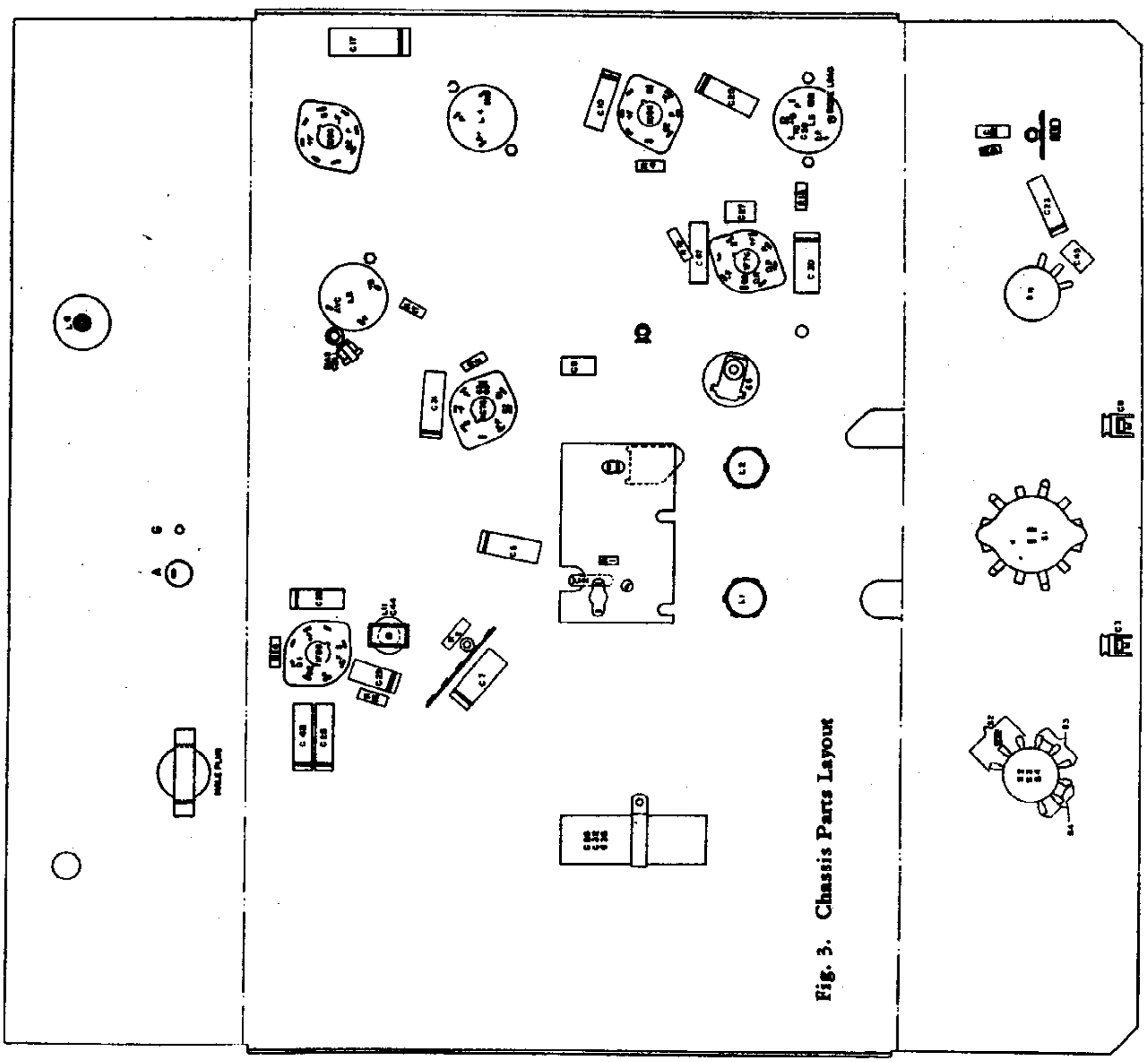


Fig. 3. Chassis Parts Layout

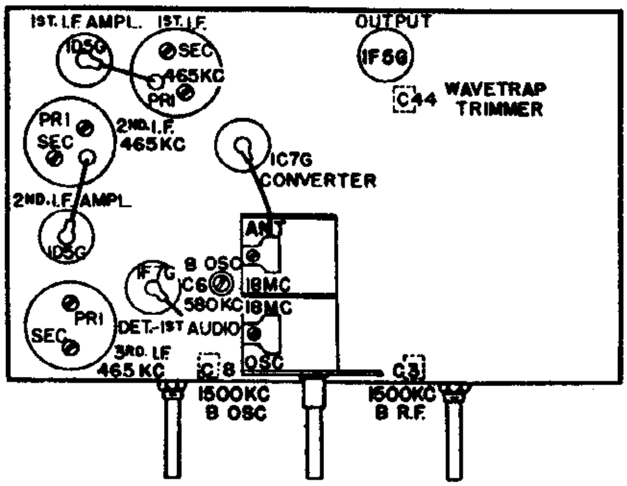


Fig. 1. Chassis Layout and Trimmer Locations

A 1-volt bias cell is used to supply initial bias for the 1C7G converter and the 1D5G 1st I.F. tubes which are controlled by the AVC. Do not attempt to measure the voltage of the cell with any device which draws current. The cell will last indefinitely under normal conditions. If the receiver oscillator stops functioning on the low frequency end of the "D" band, try substituting a new bias cell.

ALIGNMENT PROCEDURE

On the "D" Band (5600 to 18,000 K.C.) the oscillator operates on the *low* frequency side of the incoming signal; therefore, adjust the trimmer until the second oscillator peak is reached as the trimmer is *increased* in capacity. When the correct adjustment is made, it will be possible to tune the image of any signal on the "D" band 970 K.C. *higher* than the signal if the input is sufficiently high. Example: The image of 15 M.C. should be heard at 15,970 K.C.

The alignment procedure is given in table form on page 3. The "Dummy Antenna" is the capacitor or capacitor and resistor used in series with the signal generator antenna lead.

I.F. ALIGNMENT WITH OSCILLOSCOPE

Band Switch Setting	Input Frequency	Point of Input	Dummy Ant.	Trimmer	Remarks
1 Band "B"	465 K.C. Sweep	1st I.F. Grid	.05 MFD or Larger	3rd I.F. Sec. (C-19) 3rd I.F. Pri. (C-18)	Gang condenser plates closed—connect audio input of oscilloscope to ground and to the diode load terminal of the 3rd I.F. transformer—Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude.
2 Band "B"	465 K.C. Sweep	1st I.F. Grid	.05 MFD or Larger	2nd I.F. Sec. (C-16) 2nd I.F. Pri. (C-15)	
3 Band "B"	465 K.C. Sweep	Converter Grid	.05 MFD or Larger	1st I.F. Sec. (C-14) 1st I.F. Pri. (C-13)	
4 Band "B"	465 K.C. Sweep	Antenna Post	250 MMF 400 ohms	Wave Trap Trimmer	Adjust trimmer for minimum amplitude.

I.F. ALIGNMENT WITH OUTPUT METER

1 Band "B"	465 K.C. with modulation	1st I.F. Grid	.05 MFD or Larger	3rd I.F. Sec. (C-19) 3rd I.F. Pri. (C-18)	Adjust trimmer for maximum output
2 Band "B"	465 K.C. with modulation	1st I.F. Grid	.05 MFD or Larger	2nd I.F. Sec. (C-16) 2nd I.F. Pri. (C-15)	
3 Band "B"	465 K.C. with modulation	Converter Grid	.05 MFD or Larger	1st I.F. Sec. (C-14) 1st I.F. Pri. (C-13)	
4 Band "B"	465 with modulation	Antenna Post	250 MMF 400 ohms	Wave Trap Trimmer	Adjust trimmer for minimum output.

R.F. ALIGNMENT WITH OUTPUT METER

1 Band "B"					Close gang plates—adjust pointer to first line at left end of tuning scale (530 K.C.).
2 Band "D"	18 MC with modulation	Antenna Post	250 MMF 400 ohms	Oscillator (18 MC) Antenna (18 MC) See Trimmer Location View	Connect output meter across Loudspeaker—tone control on "Bass" position—set osc. trimmer. While rocking the gang cond., adjust the antenna trimmer for maximum output.
3 Band "B"	1500 K.C. with modulation	Antenna Post	250 MMF 400 ohms	Osc. (C-8) Ant. (C-3)	Peak trimmers for maximum output with a low input signal.
4 Band "B"	580 K.C. with modulation	Antenna Post	250 MMF 400 ohms	Osc. Padder (C-6)	Adjust padder for a maximum output meter indication in vicinity of 580 K.C. while rocking the gang condenser.
5 Band "B"	1500 K.C. with modulation.	Antenna Post	250 MMF 400 ohms	Osc. (C-8)	As in operation No. 3.

MODELS FB-52, FB-53
FB-56, FB-57
Drive Cord Data
Notes, Parts

GENERAL ELECTRIC CO.

ELECTRICAL SPECIFICATIONS

Tuning Frequency Range

Band "B" .... 540– 1800 K.C.
Band "D" .... 5600–18000 K.C.

Intermediate Frequency .... 465 K.C.

Electrical Power Output

Undistorted .... 0.35 Watts
Maximum .... 0.65 Watts

Tone Control .... 2-point control

Batteries Required

Models FB-52, FB-56
1—2-volt Aircell Battery (Eveready A-600)
or
1—2-volt Storage Battery
3—45-volt "B" Batteries (Eveready No. 386, No. 485, No. 486 or equivalent)
1—4½-volt "C" Battery (Eveready No. 771 or equivalent)

Models FB-53, FB-57
1—6-volt storage battery.

Current Consumption

Models FB-52, FB-56
"A" Battery .... 0.42 Amps at 2 Volts
"B" Battery .... 26 M.A. at 135 Volts

Models FB-53, FB-57
"A" Battery .... 6 Volts
Filament (2 volts) .... 0.42 Amps.
G.E. Power Adapter .... 1.7 Amps. (4 volts)

Loudspeaker—Magnetic Type

Cone diameter—
Models FB-52, FB-53 .... 6½ in.
Models FB-56, FB-57 .... 8 in.
Speaker Impedance .... 16,000 ohms at 400 cycles.

Tubes

Converter and Oscillator .... 1C7G Pentagrid Converter
1st I.F. Amplifier .... 1D5G Super Control Amplifier
2nd I.F. Amplifier .... 1D5G Super Control Amplifier
Detector, AVC and Audio Amplifier .... 1F7G Duplex Diode Pentode
Output .... 1F5G Power Amplifier Pentode

REPLACING DRIVE CORD

Remove the old drive cord, pulleys, washer and indicator.

Turn the drive drum until the slot in the rim is in the position shown in Fig. 4.

Insert one end of the drive cord in the slot and wind the cord around the drum in a clockwise direction for about two-thirds of a turn, or until it reaches the top of the drum.

Now, before putting the right pulley (from front) in place, bring the cord around the pulley from back to front so that the cord is adjacent to the celluloid dial scale; then place the pulley in position.

Extend the cord over to the left and bring it around the other pulley from front to back before placing this pulley. Put the small brass washer on the upper shaft of the pulley and place the pulley in position as shown in Fig. 4.

Bring the cord over to the drive drum and wind it around the drum in a clockwise direction, keeping it behind the cord already on the drum.

Push the pulley tension spring in toward the drive drum so as to provide slack in the cord while the free end is being inserted into the slot in the rim.

Now mesh the condenser plates completely. Replace the celluloid indicator on the dial strip and attach it to the drive cord as shown in Fig. 4. The line on the indicator should cover the 530 K.C. mark on the dial scale.

CAUTION—When attaching the indicator to the drive cord, do not pinch the center clamp too tightly on the cord or the cord will be cut. After the clamp is pinched slightly, a small amount of shellac on it will hold the cord securely.

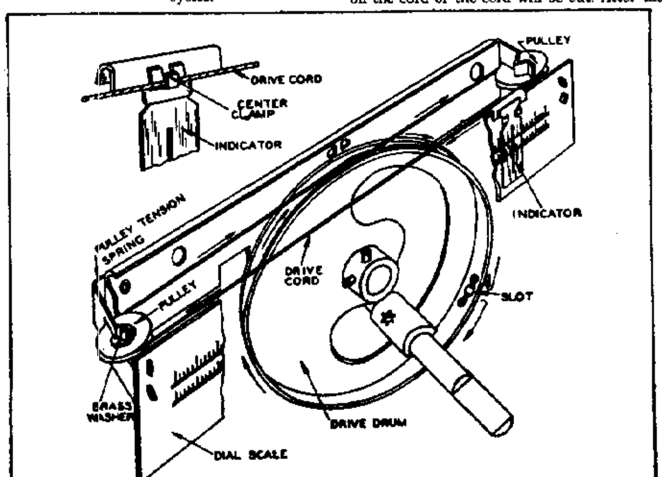


Fig. 4. Dial and Drive Assembly

Power Supply

The chassis used in these receivers are identical except for the type of power supply employed. The 2-volt Models FB-52 and FB-56 are operated by "A," "B" and "C" batteries which are connected to the receiver by a battery cable, Stock No. BK-327.

Models FB-53 and FB-57 are operated entirely by a 6-volt storage battery. 1 cell (2 volts) of which supplies filament current. The remaining two cells (4-volts) supply the G.E. Power Adapter which, in turn, provides "B" and "C" voltages.

If desired, the 2-volt receivers may be converted to 6-volt operation at any time by the addition of a G.E. Power Adapter, Model BA-407.

In connecting a 6-volt receiver to the storage battery, first clip the yellow and green leads on the battery to avoid applying excessive voltage to the filaments, accidentally. Also, be sure to separate the two clips by connecting them to opposite ends of the battery connector strap, as shown on the Power Adapter label. This avoids establishing a common path for the filament and Power Adapter supply which would result in objectionable vibrator noise.

If it is difficult to snap the Power Adapter into position on the chassis, apply a little vaseline to the rubber mounting feet.

REPLACEMENT PARTS LIST

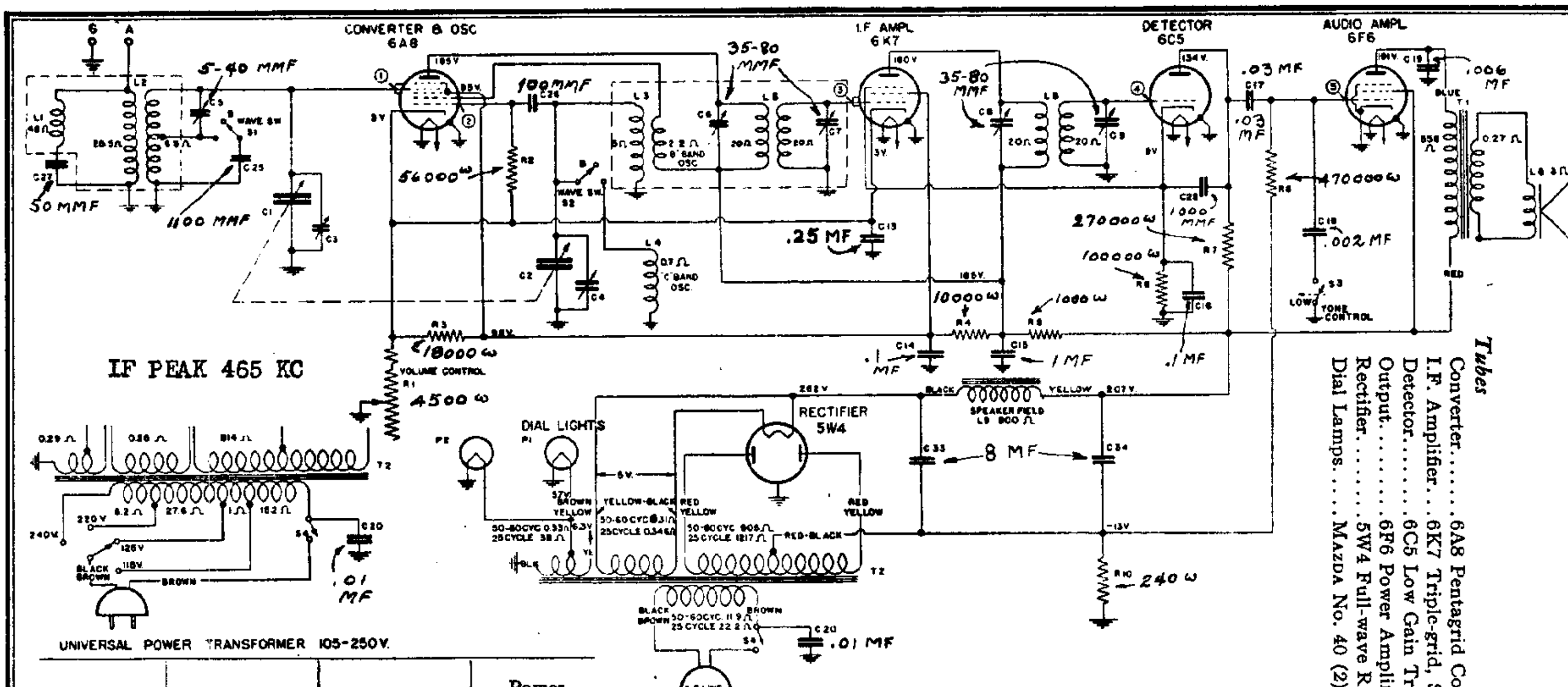
Stock No.	Description	List Price
*R[illegible]	BOARD—Terminal Board (on front wall of chassis)	$0.10
*R[illegible]	BOARD—Terminal Board (single terminal)	.15
*R[illegible]	BOARD—Terminal Board (3 terminals)	.10
*R[illegible]	BOARD—Antenna ground terminal board	.10
R[illegible]	BRACKET—Bias cell bracket	.15
RC-008	CAPACITOR—.001 Mfd., 200 V. paper (C-23)	.25
*RC-014	CAPACITOR—.003 Mfd., 200 V. Paper (C-29, C-47)	.25
*RC-017	CAPACITOR—.0045 Mfd. 200 V. paper (C-2, C-25)	.25
RC-032	CAPACITOR—.01 Mfd., 200 V. paper (C-28)	.25
*RC-072	CAPACITOR—.05 Mfd., 200 V. paper (C-7, C-10, C-43)	.25
*RC-096	CAPACITOR—.1 Mfd., 200 V paper (C-5, C-20, C-30, C-31)	.30
RC-178A	CAPACITOR—.5 Mfd., 200 V. paper (C-17)	.40
RC-223	CAPACITOR—75 Mmf. Mica (C-9)	.25
*RC-235	CAPACITOR—100 Mmf. Mica (C-45)	.25
*RC-261	CAPACITOR—250 Mmf. Mica (C-22, C-27)	.25
RC-572	CAPACITOR—4 Mfd., 4 Mfd, 8 Mfd., 150 V. dry electrolytic (C-26, C-32, C-36)	1.10
*RC-608	CAPACITOR—300–500 Mmf. osc. padder (C-6)	.45
*RC-618	CAPACITOR—5-45 Mmf. trimmer ant. and osc. (C-3, C-8)	.25
RC-637	CAPACITOR—190 Mmf. double trimmer 3rd IF (C-18, C-19, C-21)	.60
RC-642	CAPACITOR—200–350 Mmf. double trimmers 1st or 2nd IF (C-13, C-14, C-15, C-16)	.45
RC-717	CONDENSER—2 gang tuning condenser (C-1)	3.20
*RC-815	CABLE—Drive Cable (Pkg. of 5)	.50
RC-833	CABLE—Speaker cable	2.25
RC-834	CABLE—Battery Cable (For models FB-52 and FB-56 only)	1.60
RC-1958	CLIP—Battery clip marked (+)	.30
RC-1959	CLIP—Battery clip (plain)	.30
RC-1960	CLIP—Shield grounding clip	.10
RC-1961	CELL—1.0 volt Bias cell	.25
*RR-905	REFLECTOR—Dial scale reflector	$0.15
RS-050	SPEAKER—6½-inch armature type speaker (Models FB-52, FB-53)	3.70
RS-051	SPEAKER—8-inch armature type speaker (Models FB-56, FB-57)	4.10
RS-173	SHIELD—Tube shield	.15
*RS-200	SOCKET—Tube socket (Pkg. of 5)	.75
RS-345	SWITCH—Tone control and power switch (S-2)	.70
RS-346	SWITCH—Band change switch	1.25
RT-237	TRANSFORMER—1st or 2nd IF transformer (complete)	1.60
RT-238	TRANSFORMER—3rd IF transformer (Complete)	1.90
RV-028	VOLUME CONTROL—2 meg. volume control (R-11)	.80
*RW-101	WASHER—Felt washer for control shaft (Pkg. of 10)	.45
*RW-400	WAVE TRAP—Wave trap (complete) (C-44, L-11)	.80
*RX-016	ASSEMBLY—Condenser mounting assembly	.30
*RD-030	DRUM—Condenser drive drum	$0.40
RD-043	DIAL—Dial scale	.25
*RD-033-22	DRIVE—Condenser reduction drive	1.00
*RF-010	FOOT—Mounting foot assembly	.30
RF-303	FUSE—½ Amp fuse (Used on FB-52 and FB-56 only) (Pkg. of 10)	1.20
RF-304	FUSE—5 Amp. 25 V. fuse (Used on models FB-53 and FB-57 only) (Pkg. of 10)	1.00
*RG-001	GRID CAP—Control grid cap (Pkg. of 5)	.10
*RK-004	KNOB—Control knob (Pkg. of 5)	.40
*RK-005	KNOB—Control knob with dot (Pkg. of 5)	.50
RL-041	COIL—Ant. coil Band B-D (L-1)	1.25
‡RL-243	COIL—Osc. coil Band B-D (L-2)	1.30
RL-328	REACTOR—RF filament reactor (L-8)	.40
RP-042	PULLEY—Dial pulley (Pkg. of 2)	.15
*RP-045	POINTER—Dial pointer and guide	.10
RP-070	PLUG—Battery plug (male)	.25
*RQ-067	RESISTOR—2200 ohm, ¼ W. Carbon (R-21) (Pkg. of 5)	.60
*RQ-083	RESISTOR—10,000 ohm, ¼ W. Carbon (R-2, R-4) (Pkg. of 5)	.60
*RQ-095	RESISTOR—33,000 ohm, ¼ W. Carbon (R-17) (Pkg. of 5)	.60
*RQ-099	RESISTOR—47,000 ohm, ¼ W. Carbon (R-3) (Pkg. of 5)	.60
*RQ-103	RESISTOR—68,000 ohm, ¼ W. Carbon (R-7) (Pkg. of 5)	.60
*RQ-107	RESISTOR—100,000 ohm, ¼ W. Carbon (R-1, R-18) (Pkg. of 5)	.70
*RQ-115	RESISTOR—220,000 ohm, ¼ W. Carbon (R-8) (Pkg. of 5)	.70
*RQ-117	RESISTOR—270,000 ohm, ¼ W. Carbon (R-13) (Pkg. of 5)	.70
*RQ-123	RESISTOR—470,000 ohm, ¼ W. Carbon (R-14) (Pkg. of 5)	.70
*RQ-131 (RR-067)	RESISTOR—1 meg., ¼ W. Carbon (R-12) (Pkg. of 5)	.70
*RQ-139	RESISTOR—2.2 meg., ¼ W. Carbon (R-9) (Pkg. of 5)	.70
RR-306	RESISTOR—.55 ohm, 1 W. flexible (R-6) (Used on models FB-52, FB-56) (Pkg. of 5)	.60
	POWER ADAPTER (Models FB-53 and FB-57)	
*RB-053	BOARD—Terminal board (3 terminals)	$0.10
RB-603	BASE—Vibrator grounding base	.15
RC-064	CAPACITOR—.03 Mfd., 1600 V. paper (C-37, C-40)	.35
*RC-072	CAPACITOR—.05 Mfd., 200 V. paper (C-41, C-46)	.25
RC-156B	CAPACITOR—.5 Mfd., 120 V. paper (C-39)	.40
RC-573	CAPACITOR—16 Mfd., 150 V. dry electrolytic (C-42)	.90
RC-833	CABLE—Battery Cable	2.20
RL-322	REACTOR—RF B+ reactor (L-6)	.30
RL-323	REACTOR—Vibrator reactor (L-7)	.70
RL-329	REACTOR—Filter reactor (L-10)	.90
RQ-033	RESISTOR—80 ohm, ¼ W. Carbon (R-22, R-23, R-24,) (Pkg. of 5)	.60
RS-216	SOCKET—Vibrator tube socket (Pkg. of 5)	.75
RT-077	TRANSFORMER—Vibrator transformer (T-3)	2.50
RV-201	VIBRATOR—4-volt vibrator	4.00

* Used on previous receivers.

(Prices subject to change without notice)

GENERAL ELECTRIC CO.

MODEL F-53
Schematic, Resistance
Transformer Data



IF PEAK 465 KC

Tubes

Converter.......6A8 Pentagrid Converter
I.F. Amplifier...6K7 Triple-grid, Super-control Amplifier
Detector........6C5 Low Gain Triode
Output.........6F6 Power Amplifier Pentode
Rectifier........5W4 Full-wave Rectifier
Dial Lamps.....Mazda No. 40 (2)

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	115	60	50
C	115	25–60	55
V	105–130 and 200–250	40–60	55

Tuning Frequency Range
Band "B"..........540–1800 kc.
Band "C"..........1800–4000 kc.

Electrical Power Output
Undistorted..........1.0
Maximum..........3.0

Loud-speaker—Electrodynamic
Cone Diameter: 6½ in.
Cone Coil Impedance: 3 ohms at 400 cycles

Conditions of Test:
Wave switch on "B" band -- Power switch Off

APPROXIMATE RESISTANCE MEASUREMENTS:

RESIST. TO GND.	TUBE	SOCKET
1. 7 ohms	Conv.Grid	Cap
2. 60,000 "	Osc. Grid	Prong 5
3. 20 "	I-f Grid	Cap
4. 20 "	Det. Grid	Prong 5
5. 470,000 "	O.P. Grid	Prong 5

PRONG NUMBERS BOTTOM VIEW

All voltages to ground unless otherwise specified
" " measured with Ant. and Gnd. Terminals shorted
" " " " Dial Pointer at 1000 kc
" " " " volume at maximum

MODEL F-53
Socket, Trimmers
Alignment, Parts

GENERAL ELECTRIC CO.

ALIGNMENT PROCEDURE

Before making any adjustments to the R.F. circuits, it is wise to determine the correctness of the existing alignment. This may be done by supplying a signal from the test oscillator to the receiver and inserting a "tuning wand" into the antenna coil. The "tuning wand" consists of a bakelite rod having a brass cylinder attached to one end, and a small core of finely divided iron compacted into the opposite end. By inserting the brass cylinder end into the antenna coil, the inductance is lowered, increasing its resonant frequency. Inserting the iron-filled end into the coil raises its inductance, lowering its resonant frequency. If the circuits are in exact alignment, inserting either end of the tuning wand in the coil will result in a decrease in output. When an increase in signal is obtained with the iron-filled end of the wand at the 1500-kc. point or the 4.0-mc. point, a decrease in resonant frequency of that circuit by increasing the antenna trimmer capacity is indicated. When an increase in signal is obtained with the brass cylinder, a decrease in antenna trimmer capacity is indicated.

Changes Indicated by Wand

Wand	Signal	Trimmer Adjustment Required
Brass cylinder	Decrease	None
Iron filings	Decrease	
Brass cylinder	Increase	Decrease capacity
Iron filings	Decrease	
Brass cylinder	Decrease	Increase capacity
Iron filings	Increase	

ALIGNMENT FREQUENCIES

I.F.	Broadcast	Short-wave
465 Kc.	1500 Kc.	4000 Kc.

In order to align these receivers properly it is necessary to have available:

1. A modulated test oscillator capable of producing the above alignment frequencies.
2. An output indicator, such as a high-resistance a-c voltmeter with a maximum scale reading of 3 to 5 volts, or a neon lamp indicator.
3. An alignment tool consisting of an insulating shaft with a small screwdriver blade.

The location of all alignment trimmer capacitors are illustrated in Fig. 2.

(1) *I.F. Alignment*

Set the frequency band switch of the receiver to the broadcast position and turn the volume control to maximum (extreme clockwise position). Tune the receiver to a point where no signal comes in and short-circuit the antenna and ground leads.

Connect the test oscillator output between the chassis and the control grid of the 6A8 tube. Connect the output meter across the cone coil of the speaker. Set the test oscillator to 465 kc. and adjust the output until a small deflection is observed in the output meter.

The four I.F. trimmers, see Fig. 2, are adjusted in the following sequence:

1. Secondary trimmer on second I.F. transformer.
2. Primary trimmer on second I.F. transformer.
3. Secondary trimmer on first I.F. transformer.
4. Primary trimmer on first I.F. transformer.

Throughout all adjustments the output should be maintained at a low level by decreasing the test oscillator output as the various stages are brought in line. After these adjustments have been made, the same procedure should be repeated as a final check. The I.F. alignment will then be complete.

(2) *I.F. Wave Trap*

No adjustable trimmer is provided for the I.F. trap adjustment in this receiver. The capacitor C-27, in conjunction with the inductance, L-1, automatically provides rejection of incoming I.F. signals.

(3) *R.F. Alignment*

The Ant. and oscillator trimmers are aligned at 1500 kc. First of all, check the position of the dial pointer. To do this, rotate the gang condenser to the maximum capacity position, i.e., plates fully meshed. While in this position, align the pointer with the last black line on the scale by loosening the dial drum set screws and rotating the drum on the gang shaft. Remove the short-circuit from the antenna and ground terminals and connect the test oscillator to same through a dummy antenna consisting of a 400-ohm resistor in series with a 250-mmf. capacitor. Connect the output indicator across the speaker cone coil.

(a) *Broadcast Band—(540-1800 Kc.)*

With the band switch in the clockwise position, set the tuning indicator to 1500 kc. Set the test oscillator at 1500 kc. and adjust the broadcast band oscillator trimmer, C-4 for maximum output. Next, set the Ant. trimmer, C-3, for maximum output, taking care that the output from the test oscillator is not high enough to overload any part of the set. No padding adjustment is required.

To complete the broadcast band line-up, repeat the Ant. trimmer adjustment after aligning the short-wave band.

(b) *Short-wave Band (1800-4000 Kc.)*

Turn the band switch to its counterclockwise position. Set the test oscillator at 4000 kc. and tune the receiver to resonate at this frequency. No trimmer is provided for short-wave oscillator alignment. To perform the Ant. short-wave adjustment, rock the tuning condenser back and forth through resonance while adjusting the short-wave Ant. trimmer, C-5, for maximum output indication on the tuning meter. It may now be necessary to readjust the broadcast band Ant. trimmer as indicated above.

Alignment of the receiver is now complete.

DESCRIPTION OF ELECTRICAL CIRCUIT

The signal from the antenna is applied to the control grid of the 6A8 tube through the R.F. transformer, the secondary of which is tuned to the incoming signal by the rear section of the main tuning condenser. In the 6A8 tube the incoming signal is combined with the local oscillator signal which is 465 kc. higher in frequency. The local signal is generated by the oscillator section of this tube, and the proper frequency difference is maintained throughout the tuning range by the front section of the tuning condenser in conjunction with the oscillator coils. The special-cut rotor of the front condenser section permits dispensing with the usual padding capacitor.

The combination of the two signals produces the intermediate frequency of 465 kc. This particular frequency is chosen to reduce image response and improve short-wave performance. The intermediate frequency amplifier consists of a 6K7 tube and two transformers, both of which have tuned primaries and secondaries. Volume is controlled by the 4500-ohm variable resistor, R-1, which varies the bias applied to the control grids of the 6A8 and 6K7 tubes.

The output of the I.F. amplifier is applied to the grid of the 6C5 detector which is properly biased for this service by the .1 megohm cathode resistor, R-6.

The output of the 6C5 detector is resistance coupled to the grid of the 6F6 power amplifier pentode. The plate circuit of the 6F6 is suitably matched to the loud-speaker by means of a step-down output transformer.

The tone control circuit consists of a .002 mfd. capacitor, connected in series with a two-point grounding switch, S-3, in the grid circuit of the 6F6 power pentode. When it is desired to reduce the high frequency output of the receiver, the switch, S-3, is turned to its counterclockwise grounding position.

Plate and grid voltages for all tubes are supplied by the power supply system employing a 5W4 full-wave rectifier tube which, together with a suitable network of resistors and capacitors, supplied the required voltages and filtering action.

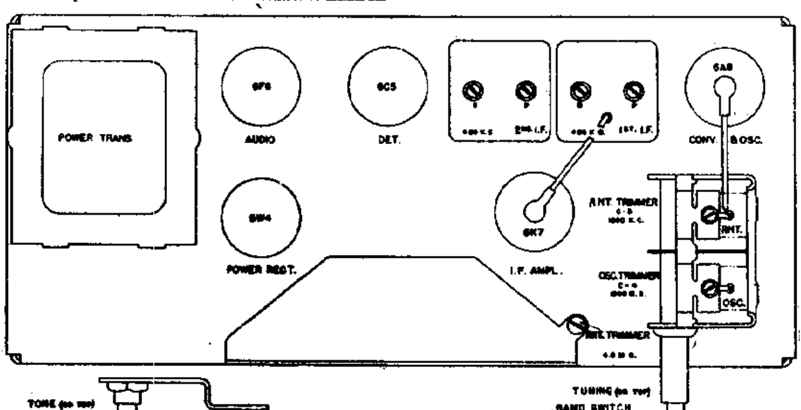


Fig. 2. Trimmer Location.

REPLACEMENT PARTS MODEL F-53

(Insist on genuine factory-tested parts which may be purchased from authorized dealers)

Stock No.	Description	List Price
	RECEIVER ASSEMBLY	
*RB-006	BOARD—Terminal Board (two lugs)	$0.10
*RB-053	BOARD—Terminal Board (3 lugs)	.10
*RC-013	CAPACITOR—.002 Mfd., 200 V. paper (C-18)	.25
*RC-027	CAPACITOR—.006 Mfd., 1000 V. paper (C-19)	.30
RC-039	CAPACITOR—.01 Mfd., 600 V. paper (C-20)	.25
*RC-083	CAPACITOR—.03 Mfd., 400 V. paper (C-17)	.25
*RC-096	CAPACITOR—.1 Mfd., 200 V. paper (C-14, C-16)	.30
*RC-123	CAPACITOR—.1 Mfd., 400 V. paper	.35
*RC-136	CAPACITOR—.25 Mfd., 200 V. paper (C-13)	.30
*RC-210	CAPACITOR—50 Mmf., Mica (C-27)	.25
*RC-235	CAPACITOR—100 Mmf., Mica (C-26)	.25
*RC-333	CAPACITOR—1000 Mmf., Mica (C-28)	.20
*RC-338	CAPACITOR—1100 Mmf., Mica (C-25)	.25
*RC-564	CAPACITOR—8 Mfd., 350 V.; 8 Mfd., 350 V. dry electrolytic (C-33, C-34)	1.25
*RC-631	CAPACITOR—5-40 Mmf., Mica trimmers (C-5)	.30
*RC-714	CONDENSER—2 section tuning condenser with trimmers (C-1, C-2, C-3, C-4)	3.00
RC-835	CABLE—Dial cable assembly (complete) (pkg. of 5)	.15
*RC-860	CORD—Power Cord	.65
*RC-944	CUSHION—Gang mtg. cushion	.10
*RC-945	CLAMP—Electrolytic mounting clamp	.05
RD-049	DIAL—Dial scale	.60
RD-050	DRUM—Gang drive drum	.30
RE-015	ESCUTCHEON—Escutcheon plate	1.25
*RG-001	GRID CLIP—Control grid clip (Pkg. of 5)	.10
RK-016	KNOB—Control knob (Pkg. of 5)	.40
*RL-024	COIL—Antenna coil (L-1, L-2)	1.00
*RL-234	COIL—Osc. coil Band "C" (L-4)	.40
RL-919	LAMP—6.3 volt dial lamp (P-1, P-2) (pkg. of 10)	1.20
RP-071	POINTER—Dial scale pointer (Pkg. of 5)	.25

Stock No.	Description	List Price
*RQ-101	RESISTOR—56,000 ohms, ¼ W. Carbon (R-2) (Pkg. of 5)	$0.60
*RQ-107 (RR-050)	RESISTOR—100,000 ohms, ¼ W. Carbon (R-6) (Pkg. of 5)	.70
*RQ-117	RESISTOR—270,000 ohms, ¼ W. Carbon (R-7) (Pkg. of 5)	.70
*RQ-123	RESISTOR—470,000 ohms, ¼ W. Carbon (R-3) (Pkg. of 5)	.70
*RQ-444	RESISTOR—240 ohms, 1 W. Carbon (R-10)	.15
*RQ-459	RESISTOR—1000 ohms, 1 W. Carbon (R-9)	.15
*RQ-483	RESISTOR—10,000 ohms, 1 W. Carbon (R-4)	.15
*RQ-489	RESISTOR—18,000 ohms, 1 W. Carbon (R-8)	.15
*RS-200	SOCKET—8-pin tube socket (Pkg. of 5)	.75
*RS-204	SOCKET—5-pin tube socket (Pkg. of 5)	.75
RS-216	SOCKET—Pilot lamp socket	.05
*RS-332	SWITCH—Band change switch (S-1)	.60
*RS-333	SWITCH—Tone control switch (S-3)	.40
*RT-329	TRANSFORMER—1st I.F. transformer (complete) (L-3, L-5, C-6, C-7)	1.90
*RT-330	TRANSFORMER—2nd I.F. transformer (complete) (L-6, C-8, C-9)	1.50
*RT-057	TRANSFORMER—Power transformer, 60 cycles, 115-120 volt (T-2)	3.85
*RT-058	TRANSFORMER—Power transformer, 25-60 cycles, 115-120 volts (T-2)	7.50
*RT-059	TRANSFORMER—Universal power transformer	8.00
*RW-101	WASHER—Felt washer for knobs (Pkg. of 10)	.45
*RX-019	WASHER—Mounting washers and screws	.10
*RV-019	VOLUME CONTROL—4500 ohm volume control and power switch (R-1, S-4)	.95
	SPEAKER ASSEMBLY	
*RC-915	CONE—Speaker cone	.90
*RS-040	SPEAKER—6½-inch type speaker (Complete with output transformer)	6.00
*RT-420	TRANSFORMER—Output transformer (T-1)	1.00

* Used on previous receivers.

(Prices subject to change without notice)

GENERAL ELECTRIC CO.

MODELS FA-60, FA-61
Schematic, Socket
Trimmers, Resistance

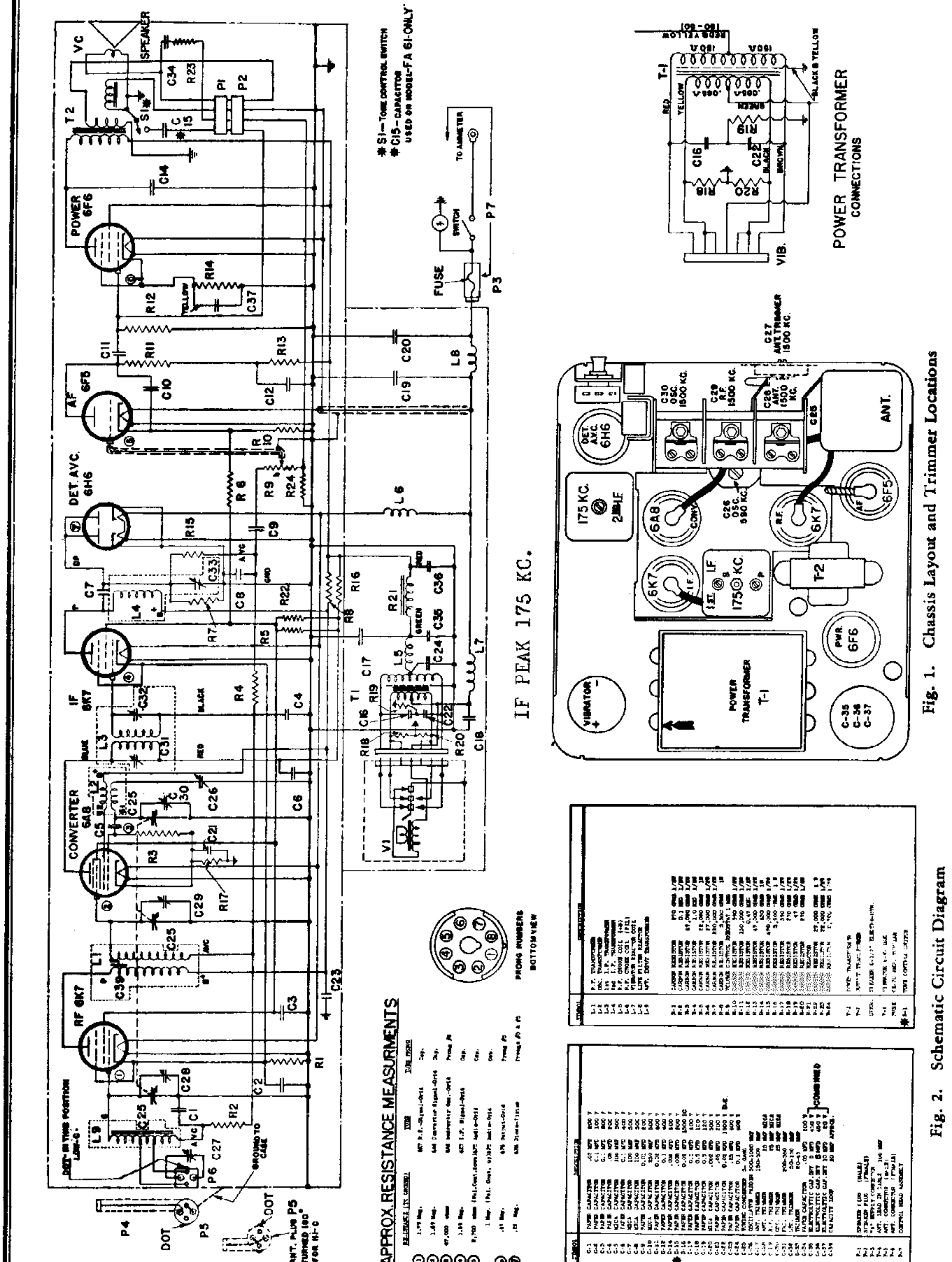


Fig. 1. Chassis Layout and Trimmer Locations

Fig. 2. Schematic Circuit Diagram

MODELS FA-60, FA-61
Chassis and Spkr.
Layouts

GENERAL ELECTRIC CO.

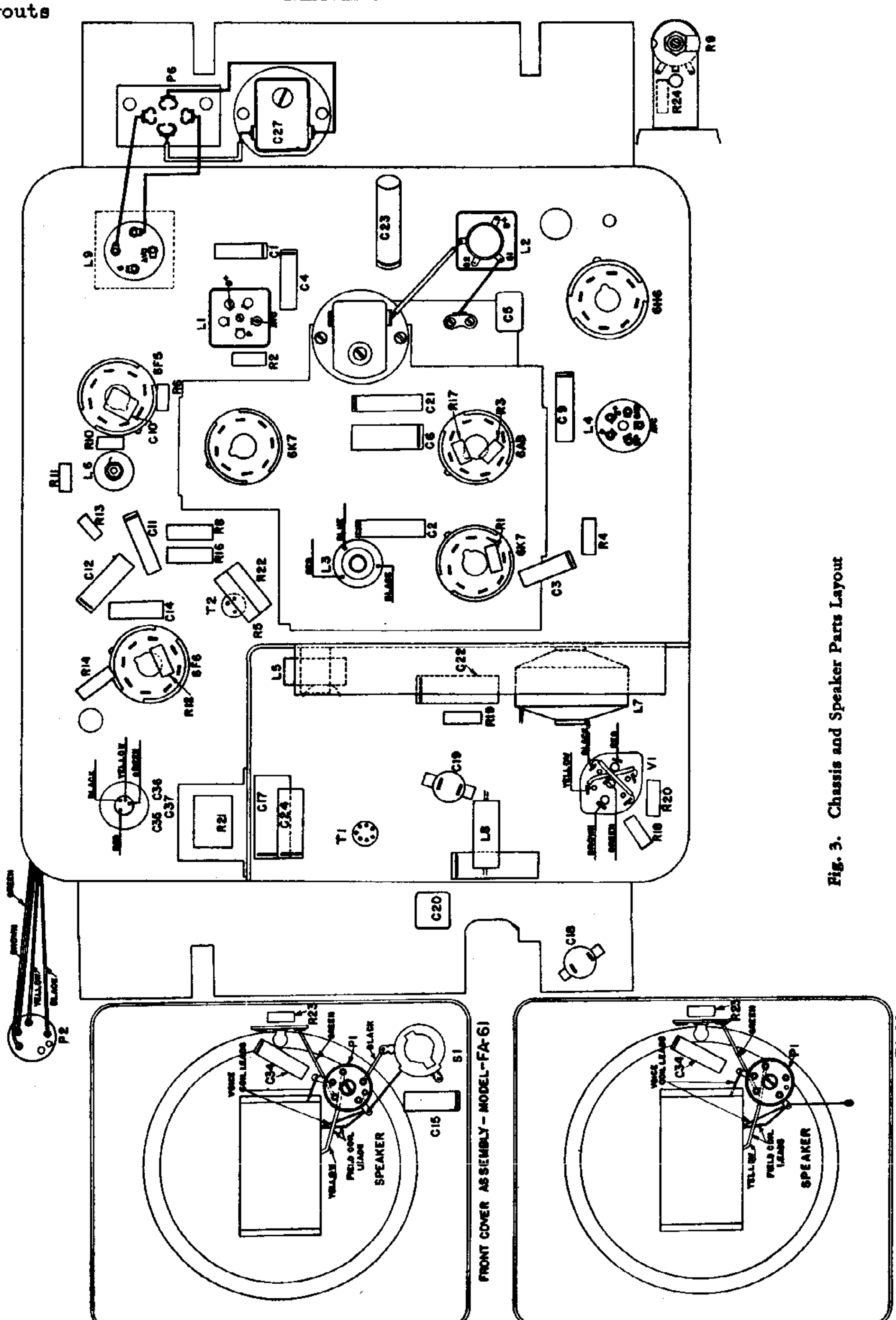


Fig. 3. Chassis and Speaker Parts Layout

GENERAL ELECTRIC CO.

ELECTRICAL SPECIFICATIONS

Tuning Frequency Range.......540–1600 kc

Intermediate Frequency........175 kc

Electrical Power Output

Undistorted..................3 watts
Maximum....................4 watts

Tone Control

Model FA-61................2-point control

Current Consumption

Storage Battery.............6.3 volts—7.0 amps.

Loudspeaker—Electrodynamic

Speaker Diameter...........$6\frac{1}{2}$ inches
Cone Coil Impedance........5.5 ohms at 400 cycles

AVERAGE SOCKET VOLTAGES

Tube	Plate to Ground Volts DC	Screen Grid to Ground Volts DC	Cathode to Ground Volts DC	Heater Volts DC	Cathode Current M.A.
6K7 R.F.	200	97	3.4	6.3	5.8
6A8 Oscillator	200	..	..	6.3	9.5
6A8 Converter	210	97	4		
6K7 I.F.	200	97	3.4	6.3	5.8
6F5 1st A.F.	147	..	1.5	6.3	0.3
6F6 Output	231	251	15.6	6.3	37

Filter Input Voltage—265
Filter Output Voltage—251

Total Plate Current 63 M.A.

Storage Battery 6.4 volts—no signal input—1000 ohms per volt meter—dial pointer at 54.

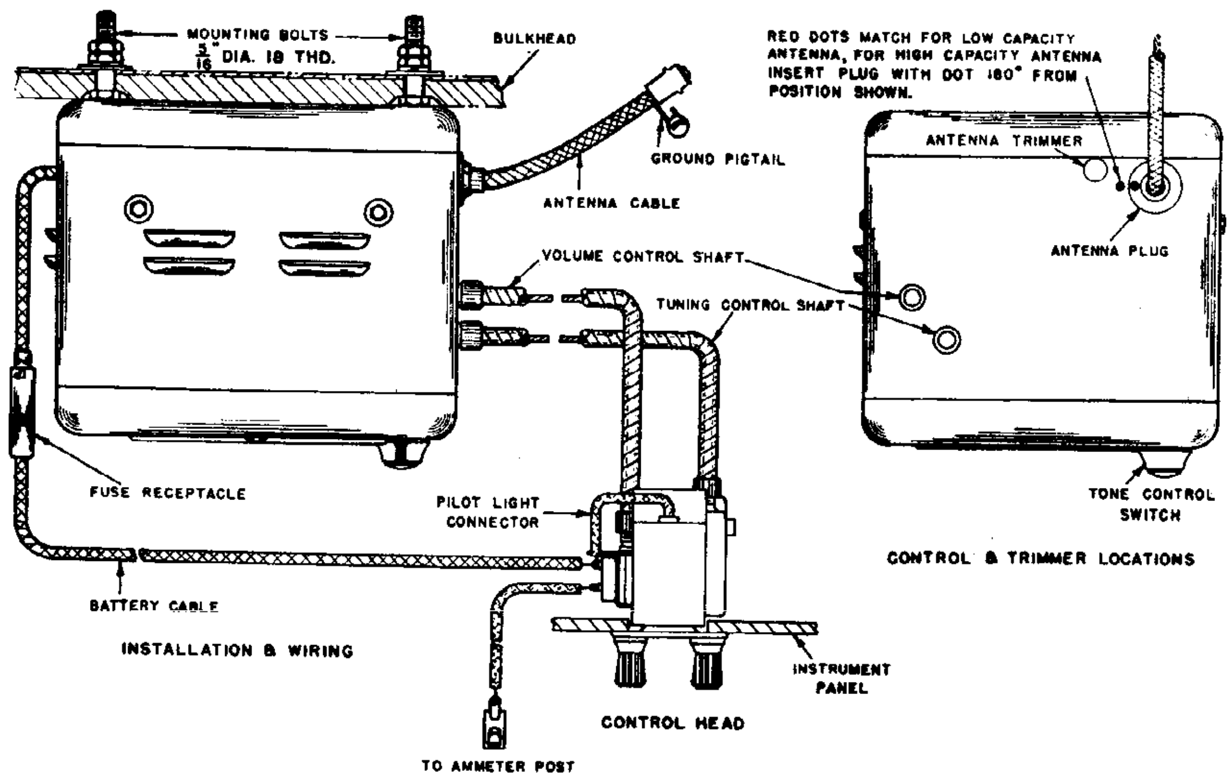


Fig. 1A. Installation Diagram

MODELS FA-60, FA-61
Alignment, Parts
Installation Notes

GENERAL ELECTRIC CO.

GENERAL INFORMATION

Models FA-60 and FA-61 are compact, single-unit super heterodyne receivers employing six General Electric Metal Tubes and a synchronous type vibrator power supply. A 6F6 pentode output tube provides ample power for the 6½-in. electrodynamic speaker. The use of an iron core antenna coil and an antenna matching trimmer, results in maximum transfer of energy from the antenna to the control grid of the 6K7 R.F. tube, providing a high signal-to-noise ratio.

The receiver chassis are housed in sturdy metal cases. To change tubes or align the receiver it is only necessary to remove the speaker cover which is secured by four snap fasteners. The chassis can be taken out of the case for servicing by removing seven self-tapping screws.

ANTENNA MATCHING SYSTEM

The design of the antenna input system makes it possible to use these receivers with either low or high capacity antennas with maximum efficiency. In general, the fish-pole under-car, built-in top, and over-top antennas are of the low-capacity type. Insulated metal top or insulated running board antennas, used in some cars, are of the high-capacity type.

The antenna male plug can be inserted into the female receptacle on the receiver in either of two positions. If the car antenna is of the low-capacity type, the plug should be inserted so that the red dots on the male plug and the receiver case are on the same side. If a high-capacity antenna is used, the red dots should be opposite each other.

The antenna coupling trimmer (C-27) should be adjusted on a weak signal between 1200 and 1600 K.C. with volume control nearly full on.

It may not be possible to "peak" the trimmer if an extremely low-capacity antenna is used. In such cases, turn the trimmer (C-27) to its maximum capacity (counter-clockwise) position, and "peak" the trimmer (C-28) on the antenna section of the gang condenser. (Antenna plug in low-capacity position).

If the antenna coupling trimmer (C-27) can be peaked with the antenna plug inserted in either position, it is recommended that the low-capacity position (red dots adjacent) be used.

In some installations, where there is not much room to work, it is advisable to adjust the antenna coupling trimmer before bolting the receiver in place.

The wiring of the antenna plugs is such that, in the low capacity position, C-27 is in series with the antenna to the high tap on the antenna coil. In the high capacity position, C-27 is in series with the antenna to the low tap on the antenna coil. These connections may be traced on the schematic diagram.

Degeneration

Audio degeneration is provided by returning a portion of the voice coil voltage of the proper phase to a section of the volume control. This is accomplished by grounding one side of the voice coil and connecting the high side of the voice coil through the capacitor (C-34) and resistor (R-23) to the resistor (R-24) which is in series with the volume control to ground.

The use of degeneration improves the frequency response and reduces non-linear distortion introduced by the audio amplifier.

ALIGNMENT PROCEDURE

In order to align these receivers properly, it is necessary to have the following test equipment:

1. A modulated test oscillator.
2. An output indicator such as a 2 to 5 volt a c voltmeter.
3. An alignment tool with a small screw driver blade.

All trimmers for aligning the receiver can be reached by removing the speaker cover. When the speaker cover is removed from the case, the field return should be made by a jumper lead between the speaker cover and case. The alignment adjustments should be made with the test oscillator output at the lowest level which will give a readable output indication.

I. F. Alignment

1. Connect an output meter across the voice coil of the loud speaker. Place a modulated 175 K.C. signal on the grid of the converter (6A8) tube through a .05 Mfd. condenser. Set the volume control at maximum and adjust the 2nd I.F. trimmer and the 1st I.F. secondary and primary trimmers in the order mentioned for maximum output. Readjust all the trimmers to insure accurate alignment.

R. F. Alignment

Attach the flexible cables to the control head and to the proper bushings on the receiver. Make sure that the control head is rigidly fastened and that its relative position in respect to the receiver will not change.

1. Adjust the scale calibration by rotating the station selector knob in a counterclockwise direction until the low frequency end of the dial has reached its stop and the gang plates are completely meshed.

2. Set the test oscillator to 1500 K.C. with the modulation "on." Connect its output through a 250 Mmf. condenser to the prong nearest the red dot on the receiver antenna receptacle. Set the receiver dial to 150 and peak the oscillator (C-30), R.F. (C-29) and antenna (C-28) trimmers respectively (see trimmer location drawing) to give maximum deflection on the output meter.

3. Set the test oscillator to 580 K.C. and tune the receiver to this signal. Peak the 580 K.C. capacitor (C-26) while rocking the tuning condenser back and forth through resonance. Leave the padder at the setting which gives the greatest deflection.

4. Realign the oscillator trimmer (C-30) at 1500 K.C. as in operation No. 2.

Tubes

R.F. Amplifier	6K7 Super-control triple-grid amplifier
Converter and Oscillator	6A8 Pentagrid converter
First I.F. Amplifier	6K7 Super-control triple grid amplifier
Detector and A.V.C.	6H6 Twin diode
Audio Amplifier	6F5 High gain triode
Output	6F6 Power amplifier pentode
Dial Lamp	6.3 Volt, Mazda No. 44

PHYSICAL SPECIFICATIONS

Height	8¾ in.
Width	9 in.
Depth	7¾ in.
Weight Packed	22 lbs.

Tuning Control Drive Ratio....12 to 1

INSTALLATION NOTES

BATTERY POLARITY

If the receiver is being used in a car with the positive battery terminal grounded, the vibrator should be inserted so that the arrow on the label points to (+) on the vibrator top. For use with cars having the negative terminal grounded the arrow must point to (−). The receiver will not operate if the vibrator is inserted in the wrong position.

ATTACHING VOLUME CONTROL CABLE

1. Rotate the volume control fully clockwise with a screwdriver.

2. Turn the volume control knob to its extreme counter-clockwise position, then insert the flexible cable into the receiver bushing.

3. Rotate the knob fully clockwise against the slip-clutch built in the volume control. If the cable tip does not engage the slot in the volume control during the first half of its rotation, reset the volume control with a screwdriver, so that this will occur.

4. Tape both the volume and tuning control cables securely in place to prevent them from changing position.

If these instructions are followed, there will be no tendency for the switch to snap "on" due to tension in the flexible cable.

SETTING THE DIAL

The gang condenser drive is equipped with a friction clutch. After the flexible drive cables have been connected and taped securely in position, rotate the tuning knob in a counter-clockwise direction until the dial reaches its stop at the low frequency end. Continue to rotate the knob for several turns against the friction clutch and the dial will be set correctly.

SUPPRESSION OF IGNITION NOISE

Included with each receiver is a distributor suppressor, a generator condenser, and an ammeter condenser. When these are properly installed, the receiver should be free of ignition noise but if the interference persists, try one or more of the following suggestions:

See that the distributor contacts and spark plug points do not have too wide a gap. They should be set as recommended by the car manufacturer.

If a built-in roof antenna is used, shield the lead-in from the set up to the antenna and place an R.F. filter, consisting of a choke and condenser, in the lead to the dome light as close as possible to the point where the lead enters the corner post.

When grounding the antenna cable shield, or making any other grounds, select a point which is most effective in reducing the noise pick-up. In some cases quieter operation may be obtained by omitting the antenna-shield ground connection entirely.

Ground the motor block to the frame by means of ½-inch copper braid. Also ground the steering post, speedometer cable, oil gauge line, etc., to the bulkhead. It is possible that interference may be carried from the motor compartment to the receiver by these cables.

In cars with composite wood and steel bodies, it may be necessary to bend various parts together such as the instrument panel and the corner posts.

If the ignition coil is mounted on the inside of the bulkhead, it may be helpful to move it to the motor side.

Wheel static interference may be overcome by installing static collector springs under the hub caps.

REPLACEMENT PARTS LIST

MODELS FA-60 AND FA-61

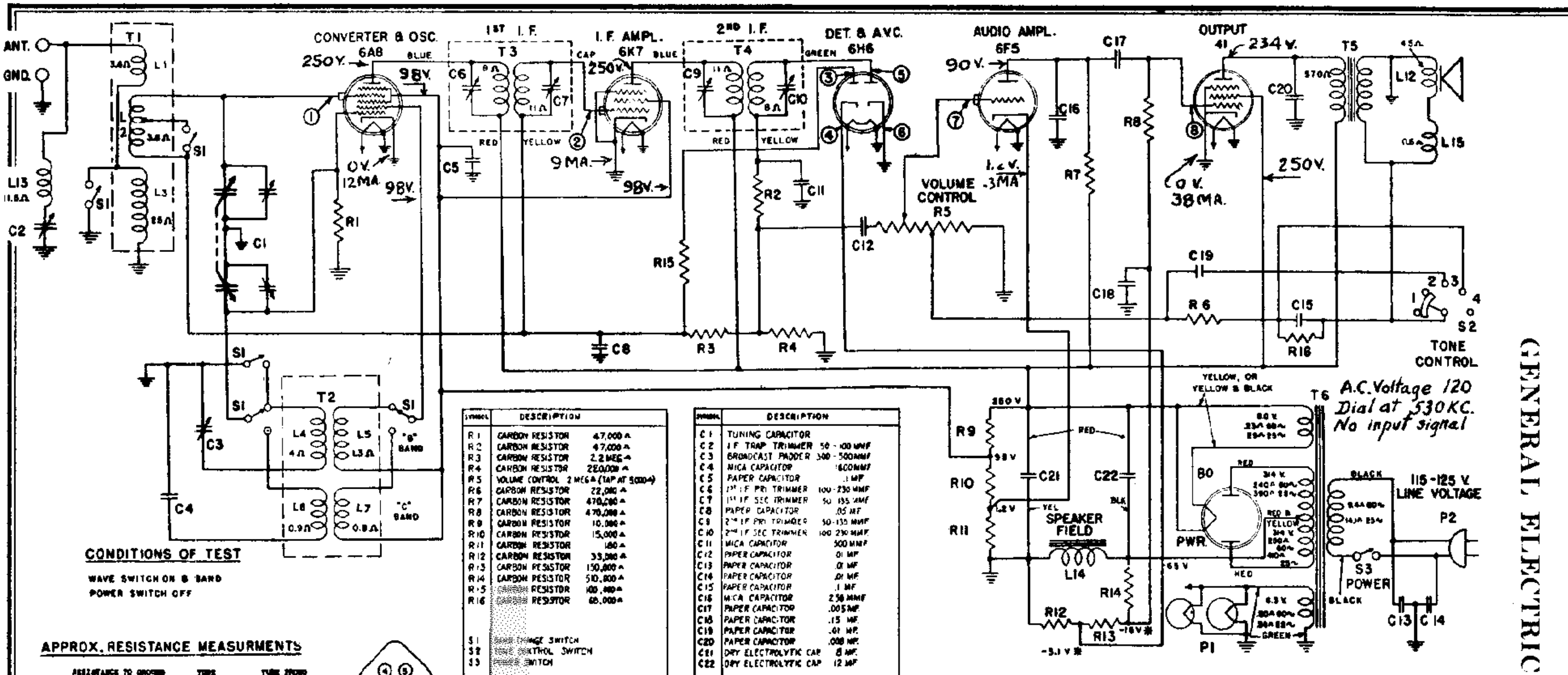
Insist on genuine factory-tested parts which may be purchased from authorized dealers.

Stock No.	Description	List Price
RA-309	ASSEMBLY—Receiver mounting studs, nuts, and washers	$0.20
*RB-008	BOARD—Terminal Board (2 lugs)	.10
*RB-013	BOARD—Terminal Board (2 lugs)	.10
*RB-017	BOARD—Terminal Board (1 lug)	.10
*RB-019	BOARD—Terminal Board (3 lugs)	.10
RB-603	BASE—Vibrator grounding base	.15
*RC-011	CAPACITOR—.002 mfd., 600 volt paper (C-14)	.25
RC-032	CAPACITOR—.01 mfd., 200 volt paper (C-9)	.25
*RC-036	CAPACITOR—.008 mfd., 200 volt paper (C-15) (Model FA 61 only)	.30
RC-051	CAPACITOR—.02 mfd., 1500 volt paper (C-16) (C-22)	.30
*RC-072	CAPACITOR—.05 mfd., 200 volt paper (C-1, C-4, C-21, C-34)	.25
*RC-080	CAPACITOR—.02 mfd., 400 volt paper (C-11)	.25
*RC-096	CAPACITOR—.1 mfd., 200 volt paper (C-3)	.30
RC-102	CAPACITOR—.1 mfd., 100 volt paper (C-2)	.30
*RC-123	CAPACITOR—.1 mfd., 400 volt paper (C-6, C-12, C-24)	.35
RC-149	CAPACITOR—.25 mfd., 400 volt (C-23)	.35
RC-156A	CAPACITOR—.5 mfd., 120 volt paper (C-18, C-19)	.45
RC-157A	CAPACITOR—.5 mfd., 200 volt interference filter capacitor	.46
RC-182	CAPACITOR—.5 mfd., 400 volt paper (C-17)	.40
*RC-235	CAPACITOR—100 mmf. Mica (C-5, C-7, C-8)	.25
*RC-238	CAPACITOR—250 mmf. Mica (C-10)	.25
*RC-340	CAPACITOR—.002 mfd., Mica (C-20)	.30
RC-570	CAPACITOR—5 mfd., 450 volt (C-35); 8 mfd., 450 volt (C-36); 10 mfd., 20 volt (C-37); Dry Electrolytic	1.40
RC-639	CAPACITOR—Antenna padder capacitor (C-27) 150-500 mmf.	.40
RC-640	CAPACITOR—Oscillator padder capacitor (C-26), 600-1000 mmf.	.40
RC-716-22	CONDENSER—3 gang condenser and trimmers (C-25, C-28, C-29, C-30)	4.80
RC-825	CABLE—Antenna lead-in cable complete with plugs (P-4)	1.60
RC-820	CABLE—Battery cable from set to fuse including connector	.20
RC-1955	CUSHION—Gang condenser rubber mounting cushion assembly	.20
RD-200-22	DRIVE—Gang drive assembly complete	.60
RF-202	FASTENER—Case cover snap fastener (pkg. of 4)	.10
RF-302	FUSE—20 amp fuse (pkg. of 10)	1.00
*RG-001	GRID CAP—(Pkg. of 5)	.10
RK-014	KNOB—Tone control knob	.10
RL-037	COIL—Antenna coil (L-9)	1.30
RL-132	COIL—RF coil assembly (L-1)	1.30
RL-239	COIL—Oscillator [illegible]	.70
RL-321	[illegible]	.20
RL-322	[illegible]	.25
RL-323	[illegible]	.55
RL-324	[illegible]	.35
RL-325	[illegible]	.95
RP-007	PLUG—Female antenna pl[illegible]	.15
RP-066	PLUG—Male antenna plug	.15
RQ-1227	RESISTOR—47 ohm, ½ W. Carbon (R-19) (Pkg. of 5)	.70
RQ-1245	RESISTOR—270 ohm, ½ W. Carbon (R-1, R-18, R-20) (Pkg. of 5)	.70
RQ-1249	RESISTOR—390 ohm, ½ W. Carbon (R-10, R-17) (Pkg. of 5)	.70

Stock No.	Description	List Price
RQ-1269	RESISTOR—2700 ohm, ½ W. Carbon (R-24) (Pkg. of 5)	$0.70
RQ-1291	RESISTOR—22,000 ohm, ½ W. Carbon (R-23) (Pkg. of 5)	.70
RQ-1293	RESISTOR—27,000 ohm, ½ W. Carbon (R-6) (Pkg. of 5)	.70
RQ-1299	RESISTOR—47,000 ohm, ½ W. Carbon (R-3, R-13) (Pkg. of 5)	.70
RQ-1307	RESISTOR—.1 meg ½ W. Carbon (R-2) (Pkg. of 5)	.70
RQ-1311	RESISTOR—150,000 ohm, ½ W. Carbon (R-11) (Pkg. of 5)	.70
RQ-1316	RESISTOR—220,000 ohm, ½ W. Carbon (R-7) (Pkg. of 5)	.70
RQ-1322	RESISTOR—.47 meg. ½ W. Carbon (R-12, R-15) (Pkg. of 5)	.70
RQ-1331	RESISTOR—1.0 meg. ½ W. Carbon (R-4) (Pkg. of 5)	.70
RQ-1450	RESISTOR—430 ohm, 1 W. Carbon (R-14)	.20
RQ-1471	RESISTOR—3300 ohm, 1 W. Carbon (R-8)	.20
RQ-1473	RESISTOR—3900 ohm, 1 W. Carbon (R-16)	.20
RQ-1491	RESISTOR—22,000 ohm, 1 W. Carbon (R-5)	.20
RQ-1493	RESISTOR—27,000 ohm, 1 W. Carbon (R-22)	.20
RS-170	SHIELD—Antenna coil shield	.20
RS-213	SOCKET—Vibrator socket (Pkg. of 5)	.75
RS-214	SOCKET—8 pin tube socket (Pkg. of 5)	.60
RS-339	SWITCH—Tone control switch (S-1) (Model FA-61 only)	.40
RS-503	SLEEVE—Fuse insulating sleeve	.05
RS-504	SUPPRESSOR—Ignition suppressor resistor	.35
RT-234	TRANSFORMER—1st I.F. transformer (complete) (L-3)	1.75
RT-235	TRANSFORMER—2nd I.F. transformer (complete) (L-4)	1.85
RT-424	TRANSFORMER—Output transformer (T-2)	1.15
RT-0610	TRANSFORMER—Power transformer (T-1)	3.80
RV-022	VOLUME CONTROL—1 meg. volume control (R-9)	.90
RV-200	VIBRATOR—Rectifier type vibrator (V-1)	4.00
	CONTROL HEAD ASSEMBLY	
RH-700	HEAD—Control head assembly (not including drive cables)	4.25
RC-827	CABLE—Battery cable from switch to fuse including connector	.25
RC-828	CABLE—20-inch drive cable	1.25
RC-829	CABLE—18-inch drive cable	1.25
RC-830	CABLE—24-inch drive cable	1.25
RK-015	KNOB—Control knobs and skirts (4 pieces). Specify Instrument Panel Control Kit Number	.45
RL-916	LAMP—Pilot lamp (Pkg. of 10)	1.50
RS-342	SWITCH—Power switch (mounted on control head)	.30
	SPEAKER ASSEMBLY	
*RC-916	CONE—Speaker cone and voice coil including gaskets	.90
*RC-1950	CLAMP—Cone spider clamp	.05
*RP-012	PLUG—Female speaker plug (P-2)	.20
RP-069	PLUG—Male speaker plug (P-1)	.20
RS-045	SPEAKER—6½-in. type speaker (Model FA-61)	4.00
RS-047	SPEAKER—6½-in. type speaker (Model FA-60)	4.60

* Used on previous receivers. (Prices subject to change without notice.)

GENERAL ELECTRIC CO.

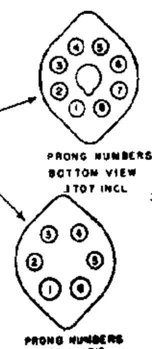


SYMBOL	DESCRIPTION
R1	CARBON RESISTOR 47,000 Ω
R2	CARBON RESISTOR 47,000 Ω
R3	CARBON RESISTOR 2.2 MEG Ω
R4	CARBON RESISTOR 220,000 Ω
R5	VOLUME CONTROL 2 MEG Ω (TAP AT 500,000 Ω)
R6	CARBON RESISTOR 22,000 Ω
R7	CARBON RESISTOR 470,000 Ω
R8	CARBON RESISTOR 470,000 Ω
R9	CARBON RESISTOR 10,000 Ω
R10	CARBON RESISTOR 15,000 Ω
R11	CARBON RESISTOR 180 Ω
R12	CARBON RESISTOR 33,000 Ω
R13	CARBON RESISTOR 150,000 Ω
R14	CARBON RESISTOR 510,000 Ω
R15	CARBON RESISTOR 100,000 Ω
R16	CARBON RESISTOR 68,000 Ω
S1	RANGE CHANGE SWITCH
S2	TONE CONTROL SWITCH
S3	POWER SWITCH
T1	ANT. TRANSFORMER
T2	OSC. TRANSFORMER
T3	1ST I.F. TRANSFORMER
T4	2ND I.F. TRANSFORMER
T5	OUTPUT TRANSFORMER
T6	POWER TRANSFORMER

SYMBOL	DESCRIPTION
C1	TUNING CAPACITOR
C2	I.F. TRAP TRIMMER 50-100 MMF
C3	BROADCAST PADDER 300-500 MMF
C4	MICA CAPACITOR 1600 MMF
C5	PAPER CAPACITOR .1 MF
C6	1ST I.F. PRI. TRIMMER 100-230 MMF
C7	1ST I.F. SEC. TRIMMER 50-135 MMF
C8	PAPER CAPACITOR .05 MF
C9	2ND I.F. PRI. TRIMMER 50-135 MMF
C10	2ND I.F. SEC. TRIMMER 100-230 MMF
C11	MICA CAPACITOR 500 MMF
C12	PAPER CAPACITOR .01 MF
C13	PAPER CAPACITOR .01 MF
C14	PAPER CAPACITOR .01 MF
C15	PAPER CAPACITOR .1 MF
C16	MICA CAPACITOR 250 MMF
C17	PAPER CAPACITOR .005 MF
C18	PAPER CAPACITOR .15 MF
C19	PAPER CAPACITOR .01 MF
C20	PAPER CAPACITOR .008 MF
C21	DRY ELECTROLYTIC CAP 8 MF
C22	DRY ELECTROLYTIC CAP 12 MF
L12	VOICE COIL
L13	WAVE TRAP COIL
L14	LOUDSPEAKER FIELD
L15	HUM BUCKING COIL

APPROX. RESISTANCE MEASURMENTS

	RESISTANCE TO GROUND	TUBE	TUBE PRONG
1	0.48 MEG OHM	CONV. GRID	CAP
2	0.48 MEG OHM	I.F. GRID	CAP
3	0.18 MEG OHM	DIODE PLATE	PRONG 3
4	31,000 OHM	DIODE CATHODE	PRONG 4
5	[illegible] OHM	DIODE PLATE	PRONG 5
6	GROUNDED	DIODE CATHODE	PRONG 6
7	0-2 MEG OHM VOL. CONT.	A.F. GRID	CAP
8	400,000 OHM	OUTPUT GRID	PRONG 4



* MEASURED WITH VOLTMETER OF AT LEAST 500,000 OHMS RESISTANCE

May, 1937

Tuning Frequency Range

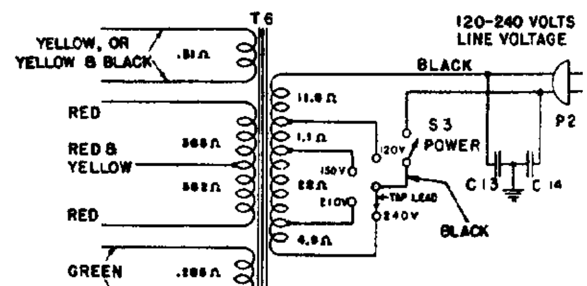
Band "B" . . . . 540-1750 KC
Band "C" . . . . 2.2-7.0 MC

Intermediate Frequency . . . . . . 465 KC

Electrical Power Output

Undistorted . . . . 2.5 Watts

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	115-125	50-60	70
C	115-125	25-60	70
V	115-155 and 190-250	50-60	75



NOTE: Rating "V" receivers may be used on 40-cycle circuits provided the voltage does not exceed 110 volts on the 115-125-volt tap or 200 volts on the 190-220-volt tap.

Loud-speaker—Electrodynamic

Cone: Model F-63 . . . . 6½ in.
Model F-65 . . . . 8 in.
Model F-66 . . . . 12 in.

MODELS F-63, F-65, F-66
Socket, Trimmers, Chassis Alignment

GENERAL ELECTRIC CO.

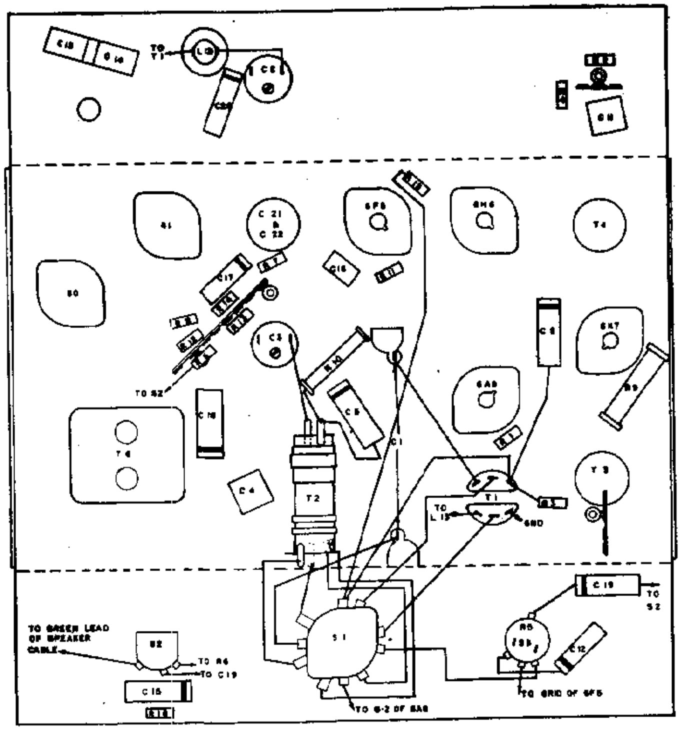


Fig. 2. Chassis Parts Layout

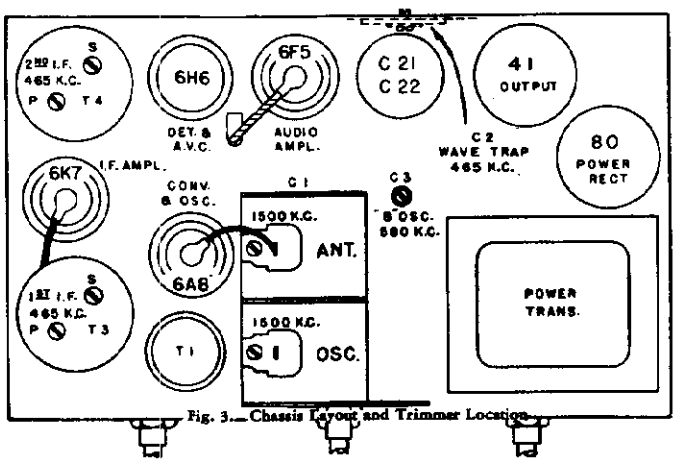


Fig. 3.—Chassis Layout and Trimmer Location

I. F. ALIGNMENT WITH OSCILLOSCOPE

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"	465 K.C. Sweep	I.F. Grid	.05 Mfd. or Larger	2nd I.F. Sec. (C-10) 2nd I.F. Pri. (C-9)	Gang condenser plates wide open—connect audio input of oscilloscope to ground and to the junction of R-3 and R-4 of the 2nd I.F. transformer—Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude.
2. Band "B"	465 K.C. Sweep	Converter Grid	.05 Mfd. or Larger	1st I.F. Sec. (C-7) 1st I.F. Pri. (C-6)	
3. Band "B"	465 K.C. Sweep	Antenna Post	250 Mmf. 400 ohms	Wave Trap Trimmer (C-2)	Adjust trimmer for minimum amplitude.

I. F. ALIGNMENT WITH OUTPUT METER

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"	465 K.C. with Modulation	I.F. Grid	.05 Mfd. or Larger	2nd I.F. Sec. (C-10) 2nd I.F. Pri. (C-9)	Gang condenser plates wide open—connect output meter across voice coil—keep input signal low and volume control on as far as possible. Adjust all trimmers for maximum output
2. Band "B"	465 K.C. with Modulation	Converter Grid	.05 Mfd. or Larger	1st I.F. Sec. (C-7) 1st I.F. Pri. (C-6)	
3. Band "B"	465 K.C. with Modulation	Antenna Post	250 Mmf. 400 ohms	Wave Trap Trimmer (C-2)	Adjust trimmer for minimum output.

R. F. ALIGNMENT

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"					Close gang plates—Adjust pointer to first line at left end of tuning scale.
2. Band "C"	No adjustments necessary				
3. Band "B"	1500 K.C. with Modulation	Antenna Post	250 Mmf. 400 ohms	Osc. trimmer (Front sect. of gang cond.) Ant. trimmer (Rear sect. of gang cond.)	Connect output meter across voice coil—tone control on "bass" position—peak trimmers for maximum output with a low input signal.
4. Band "B"	580 K.C. with Modulation	Antenna Post	250 Mmf. 400 ohms	Osc. padder (C-3)	Adjust padder for a maximum output meter indication in vicinity of 580 K.C. while rocking the gang condenser.
5. Band "B"	Repeat operation No. 3				

L1, L2 and L3 are the components of the "B" band antenna coil and are wound on the same coil form. When operating in the "C" band, L3 and a part of L2 are shorted out by the wave change switch. L4–L5 and L6–L7 are the "B" and "C" band oscillator coils respectively and are wound on the same coil form. The "B" band oscillator grid coil is shorted out by a contact of S-1 when the set is operating on the "C" band.

The intermediate frequency amplifier consists of a 6K7 tube and two transformers, both of which have tuned primaries and secondaries. The output of this amplifier is applied to one plate of the 6H6 diode which is a combined detector, initial bias and automatic volume control tube.

Volume is controlled by the variable potentiometer R-5 in the grid circuit of the 6F5 1st audio amplifier tube. The output of the 6F5 tube is resistance coupled to the grid of the type 41 power amplifier pentode. The plate circuit of the 41 tube is suitably matched to the loud-speaker by means of a step-down output transformer.

Proper bias voltages for the various tubes are obtained by the use of a tapped bleeder circuit across the speaker field L14. One of the cathodes of the 6H6 diode is returned to −3.1 volts on this bleeder circuit in order to provide initial bias to all the tubes controlled by the A.V.C.

Tone Control

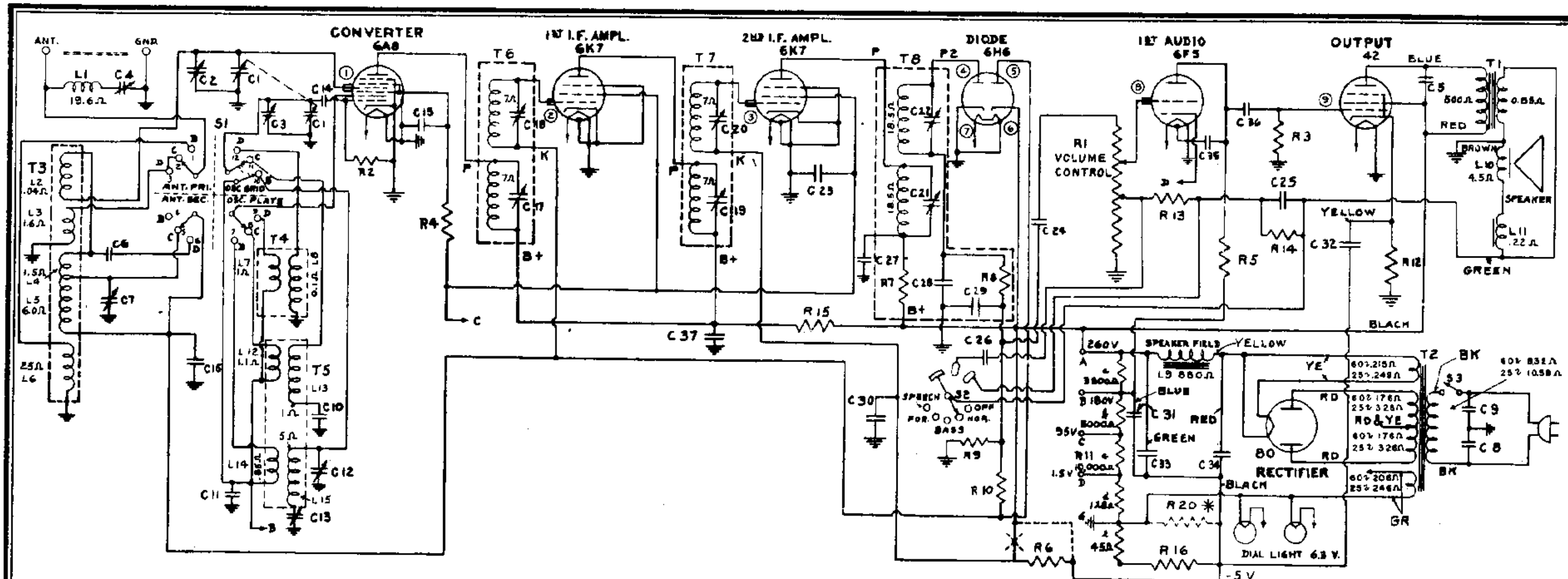
When the tone control switch is in the "normal" position, a portion of the output voltage of the receiver is fed back through a resistor-capacitor network consisting of C-15, R-16 and R-6 to a tap on the volume control. This feed back voltage is out of phase with the input and the resulting degeneration improves the frequency characteristic and reduces distortion. In the "bass" position, the tone control switch connects C-19 in parallel with the above network. The value of C-19 is such that more degeneration of the high than the low frequency notes occurs, thereby increasing the bass response. The "foreign" position of the switch shorts out C-15 and R-16 and places C-19 and R-6 in parallel which gives a frequency response best suited for short-wave reception. In the "speech" position, C-15 and R-16 are shorted out, C-19 is removed from the circuit, leaving R-6, thereby providing flat degeneration at all frequencies which is the most desirable condition for the reception of programs predominating in speech. The tone control switching described can be traced on the schematic diagram shown in Fig. 1.

Tubes

Oscillator and Converter	6A8 Pentagrid converter
IF Amplifier	6K7 Triple-grid Super-control Amplifier
Detector and AVC	6H6 Twin Diode
First Audio Amplifier	6F5 High-gain Triode
Audio Power Amplifier	41 Power Amplifier Pentode
Rectifier	80 Full-wave Rectifier
Dial Lamp	Mazda No. 46

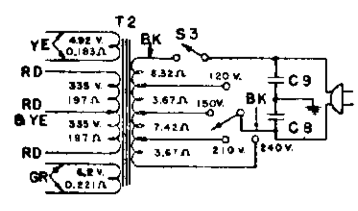
GENERAL ELECTRIC CO.

MODELS F-70, F-75
Schematic, Resista



SYMBOL	DESCRIPTION		
C1	TUNING	CAPACITOR	10-450 MMF
C2	D ANT. TRIM.		2-20 MMF
C3	D OSC. TRIM.		2-20 MMF
C4	WAVE TRAP TRIM.		75 MMF
C5	PAPER		.01 MF
C6	PAPER		.0045 MF
C7	B ANT. TRIM.		5-45 MMF
C8	PAPER		.01 MF
C9	PAPER		.01 MF
C10	MICA		1300 MMF
C11	PAPER		.05 MF
C12	B OSC. TRIM.		5-45 MMF
C13	B PADDER TRIM.		350-550 MMF
C14	MICA		50 MMF
C15	PAPER		.05 MF
C16	PAPER		.1 MF
C17	1ST I.F. PRI. TRIM.		335 MMF
C18	1ST I.F. SEC. TRIM.		335 MMF
C19	2ND I.F. PRI. TRIM.		335 MMF
C20	2ND I.F. SEC. TRIM.		335 MMF
C21	3RD I.F. PRI. TRIM.		190 MMF
C22	3RD I.F. SEC. TRIM.		190 MMF
C23	PAPER		.05 MF
C24			.005 MF
C25			.1 MF
C26			.01 MF
C27	PAPER		.02 MF
C28	MICA		250 MMF
C29	MICA		250 MMF
C30	PAPER		.1 MF
C31	DRY ELECT.		8 MF
C32			10 MF
C33			8 MF
C34	DRY ELECT.		42 MF
C35	MICA		250 MMF
C36	PAPER		.01 MF
C37	PAPER		.1 MF

SYMBOL	DESCRIPTION	
R1	VOLUME CONTROL 2 MEGΩ TAP AT	5000Ω
R2	CARBON RESISTOR	47000Ω
R3		470000Ω
R4		2200Ω
R5		220000Ω
R6		100000Ω
R7		4700Ω
R8		68000Ω
R9		220000Ω
R10	CARBON	1 MEGΩ
R11	CANDOHM	
R12	MOULDED	410Ω
R13	CARBON	22000Ω
R14		68000Ω
R15		3900Ω
R16	CARBON RESISTOR	38Ω
T1	OUTPUT TRANSFORMER	
T2	POWER	
T3	B C D ANT.	
T4	D OSC.	
T5	B,C OSC.	
T6	1ST I.F.	
T7	2ND I.F.	
T8	3RD I.F. TRANSFORMER	
L1	WAVE TRAP COIL	
L9	SPEAKER FIELD	
L10	VOICE	
L11	HUM COIL	
S1	BAND CHANGE SWITCH	
S2	TONE CONTROL SWITCH	
S3	POWER SWITCH	



UNIVERSAL TRANSFORMER
120-240 VOLTS

CONDITIONS OF TEST

WAVE SWITCH ON B BAND
POWER SWITCH OFF

APPROXIMATE RESISTANCE MEASUREMENTS

	RESISTANCE	GROUND	TUBE	SOCKET PRONG
1	1.2 MEG. Ω		CONV. GRID	CAP
2	1.2 MEG. Ω		1ST I.F. GRID	CAP
3	100,000 Ω		2ND I.F. GRID	CAP
4	280,000 Ω		DIODE PLATE	PRONG 3
5	1.2 MEG. Ω		DIODE PLATE	PRONG 5
6	100,000 Ω		DIODE CATH.	PRONG 4
7	GROUNDED		DIODE CATH.	PRONG 8
8	0-2 MEG. Ω VOL. CONT.		1ST AUDIO GRID	CAP
9	470,000 Ω		OUTPUT GRID	PRONG 4

PRONG NUMBERS BOTTOM VIEW 1 TO 8 INCL.

PRONG NUMBERS BOTTOM VIEW FOR 9

ALL VOLTAGES TO GROUND UNLESS OTHERWISE SPECIFIED.
ALL VOLTAGES MEASURED WITH ANT. & GND. TERMINALS SHORTED & 120V ON PRI.

Tone Control ....4-point control

Loud-speaker—Electrodynamic

Cone: Model F-70 .... 8 in.
Model F-75 .... 12 in.

Electrical Power Output

Undistorted ....2.5 watts
Maximum ....5.0 watts

Intermediate Frequency .....465 K.C.

MODELS F-70, F-75
Alignment, Socket
Trimmers

GENERAL ELECTRIC CO.

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
					I. F. ALIGNMENT WITH OSCILLOSCOPE
1. Band "B"	465 K.C. Sweep	2nd I.F. Grid	.05 Mfd.	3rd I.F. Sec. (C-22) 3rd I.F. Pri. (C-21)	Gang condenser plates wide open—connect vertical input of oscilloscope to ground and the junction of C-24 and R-9 on 3rd I.F. transformer. Adjust trimmers for a single symmetrical curve of maximum amplitude. The resulting curve with input at converter grid is shown in Figure 3.
2. Band "B"	465 K.C. Sweep	1st I.F. Grid	.05 Mfd.	2nd I.F. Sec. (C-20) 2nd I.F. Pri. (C-19)	
3. Band "B"	465 K.C. Sweep	Converter Grid	.05 Mfd.	1st I.F. Sec. (C-18) 1st I.F. Pri. (C-17)	
4. Band "B'	465 K.C. Sweep	Antenna Post	250 Mmf. 400 ohms	Wave Trap Trimmer (C-4)	Adjust for minimum amplitude.
I. F. ALIGNMENT WITH OUTPUT METER					
1. Band "B"	465 K.C. with Modulation	2nd I.F. Grid	.05 Mfd.	3rd I.F. Sec. (C-22) 3rd I.F. Pri. (C-21)	Gang condenser plates wide open—connect output meter across voice coil—keep input signal low and volume control at maximum. Adjust all trimmers in order mentioned for maximum output. Do not attempt an overall realignment after stage by stage alignment has been accomplished.
2. Band "B"	465 K.C. with Modulation	1st I.F. Grid	.05 Mfd.	2nd I.F. Sec. (C-20) 2nd I.F. Pri. (C-19)	
3. Band "B"	465 K.C. with Modulation	Converter	.05 Mfd.	1st I.F. Sec. (C-18) 1st I.F. Pri. (C-17)	
4. Band "B"	465 K.C. with Modulation	Antenna Post	250 Mmf. 400 ohms	Wave Trap Trimmer (C-4)	Adjust for minimum output.
R. F. ALIGNMENT					
1. Band "B"					Close gang plates—adjust pointer to first line at left end of tuning scale.
2. Band "D"	18 M.C. with Modulation	Antenna Post	250 Mmf. 400 ohms	Osc. (C-3) Ant. (C-2)	Connect output meter across voice coil—tone control on "Bass" position. The image of any "D" band signal should be heard 930 K.C. above input signal when (C-3) is on proper peak. Example: 15 M.C. image—15,930 K.C. Peak (C-2) while rocking the gang condenser.
3. Band "C"	No adjustments necessary.				
4. Band "B"	1500 K.C. with Modulation	Antenna Post	250 Mmf. 400 ohms	Osc. (C-12) Ant. (C-7)	Peak trimmers for maximum output with a low input signal.
5. Band "B"	580 K.C. with Modulation	Antenna Post	250 Mmf. 400 ohms	Osc. Padder (C-13)	Adjust padder for maximum output in vicinity of 580 K.C. while rocking the gang condenser.
6. Band "B"	1500 K.C. with Modulation	Antenna Post	250 Mmf. 400 ohms	Osc. (C-12) Ant. (C-7)	Peak trimmers for maximum output with a low input signal.

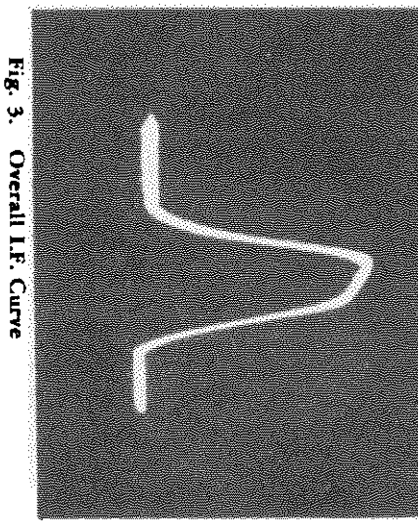
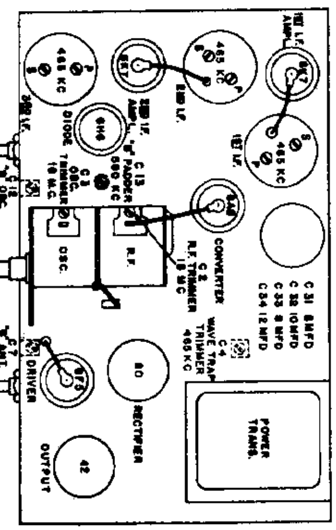


Fig. 3. Overall I.F. Curve

ALIGNMENT INFORMATION

A "dummy antenna" should be used in all alignments and is the capacitor or capacitor and resistor used in series with the signal generator. The grid lead should not be removed from the tube to which the input signal is applied when aligning the I.F. as this would remove the grid bias from the tube.



CHASSIS LAYOUT AND TRIMMER LOCATIONS

GENERAL ELECTRIC CO.

SOCKET VOLTAGES

Tube No.	Plate to Ground Volts D-C	Screen Grid to Ground Volts D-C	Cathode to Ground Volts D-C	Cathode Current M.A.	Heater Volts A-C
6A8 Oscillator	190	....	....	....	....
6A8 Converter	235	100	0	11	6.3
6K7 1st I.F. Amplifier	235	105	0	5	6.3
6K7 2nd I.F. Amplifier	235	105	0	7	6.3
6H6 Detector and A.V.C.	0 sig. −6 delay	....	0 sig. −6 delay	0 0	6.3
6F5 Audio Amplifier	120*	....	1.2	0.2	6.3
42 Output	250	265	16	39	6.3
80 Power Rectifier	640/320 RMS	....	335 D-C	70	5.0

A-C line voltage 120—No signal input—1000 ohms per volt-meter—dial pointer at 530 K.C.
* Measured on 500-volt scale.

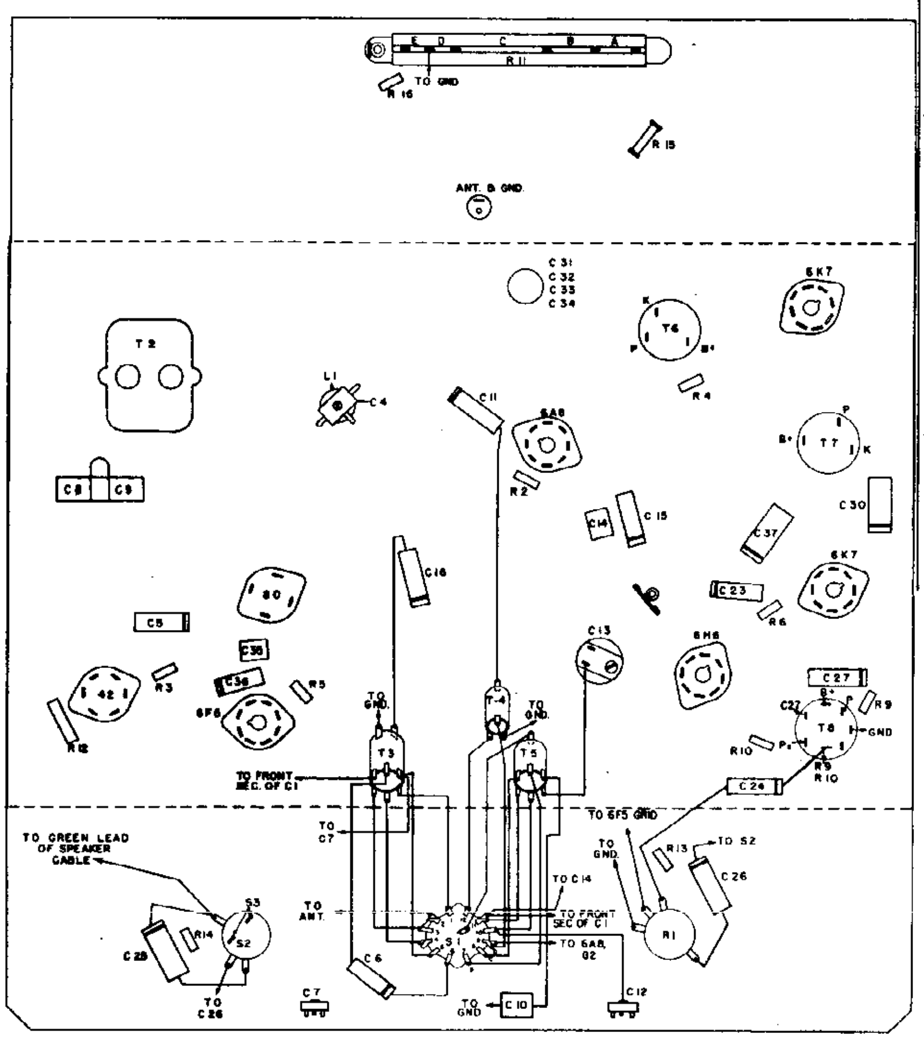


Fig. 2. Chassis Parts Layout

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	115–125	50–60	80
C	115–125	25–60	85
V	115–155 and 190–250	50–60	85

NOTE: Rating "V" receivers may be used on 40-cycle

Tuning Frequency Range

Band "B" .... 540- 1600 K.C.
Band "C" .... 1550- 5800 K.C.
Band "D" .... 5400-18000 K.C.

Tuning Control Drive Ratio

Fast Tuning .... 8 to 1
Vernier Tuning .... 40 to 1

MODELS U-70, U-75
Socket, Vibrator
Dial Assembly, Data

GENERAL ELECTRIC CO.

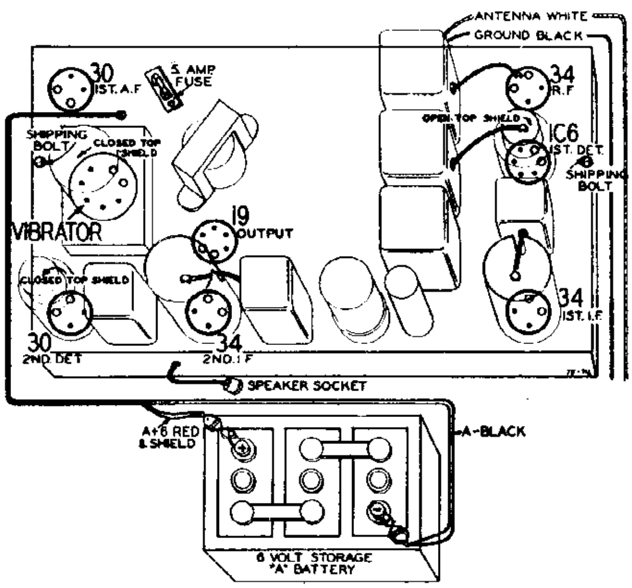


Fig. 4—Tube Arrangement and Battery Connections

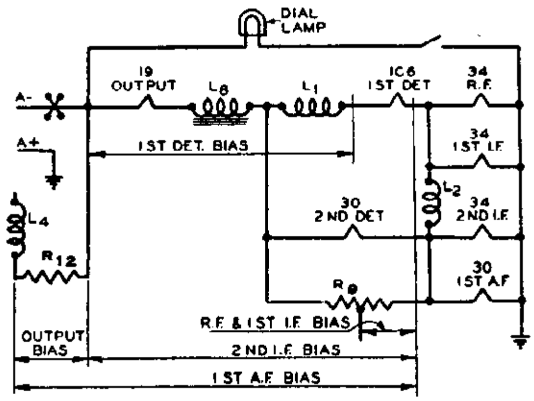


Fig. 5—Abridged wiring diagram showing filament wiring system and points at which no-signal bias voltages are obtained.

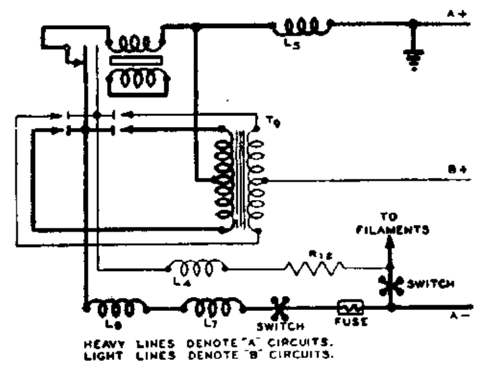


Fig. 6—Abridged wiring diagram showing action of synchronous vibrator

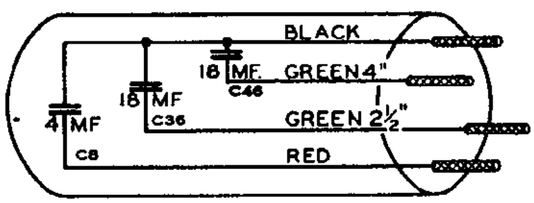


Fig. 8—Electrolytic Condenser Internal Connections

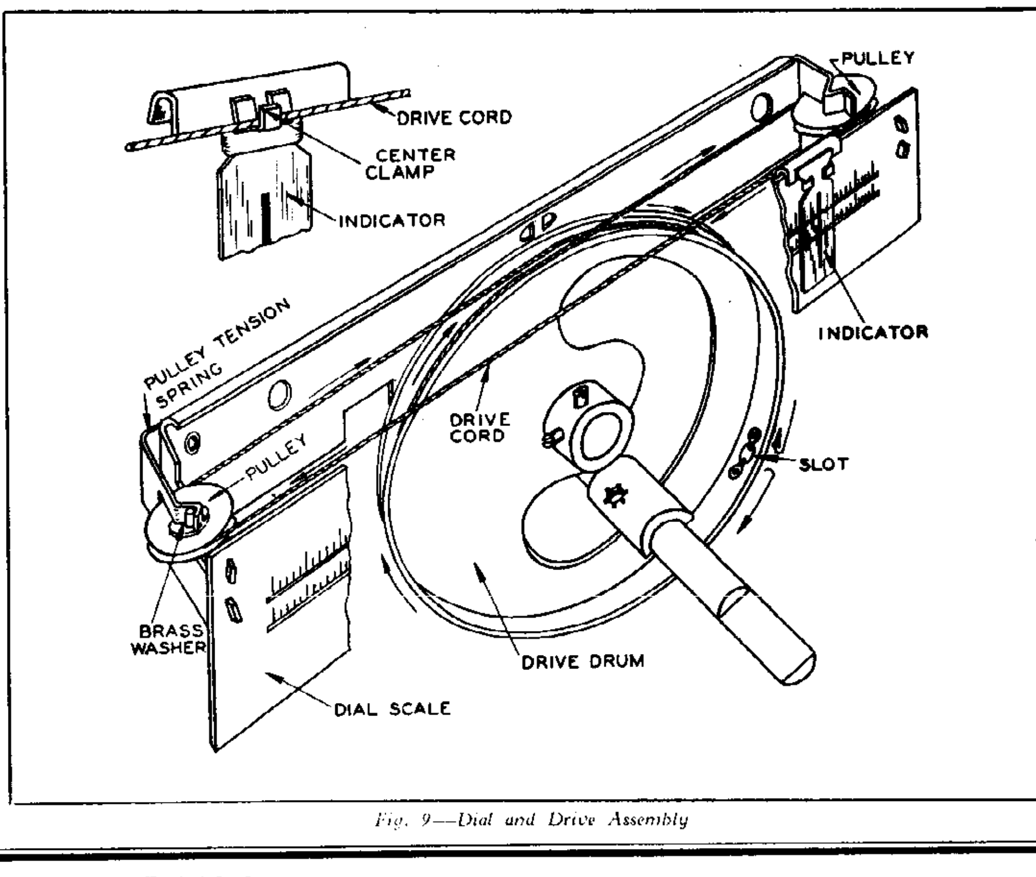
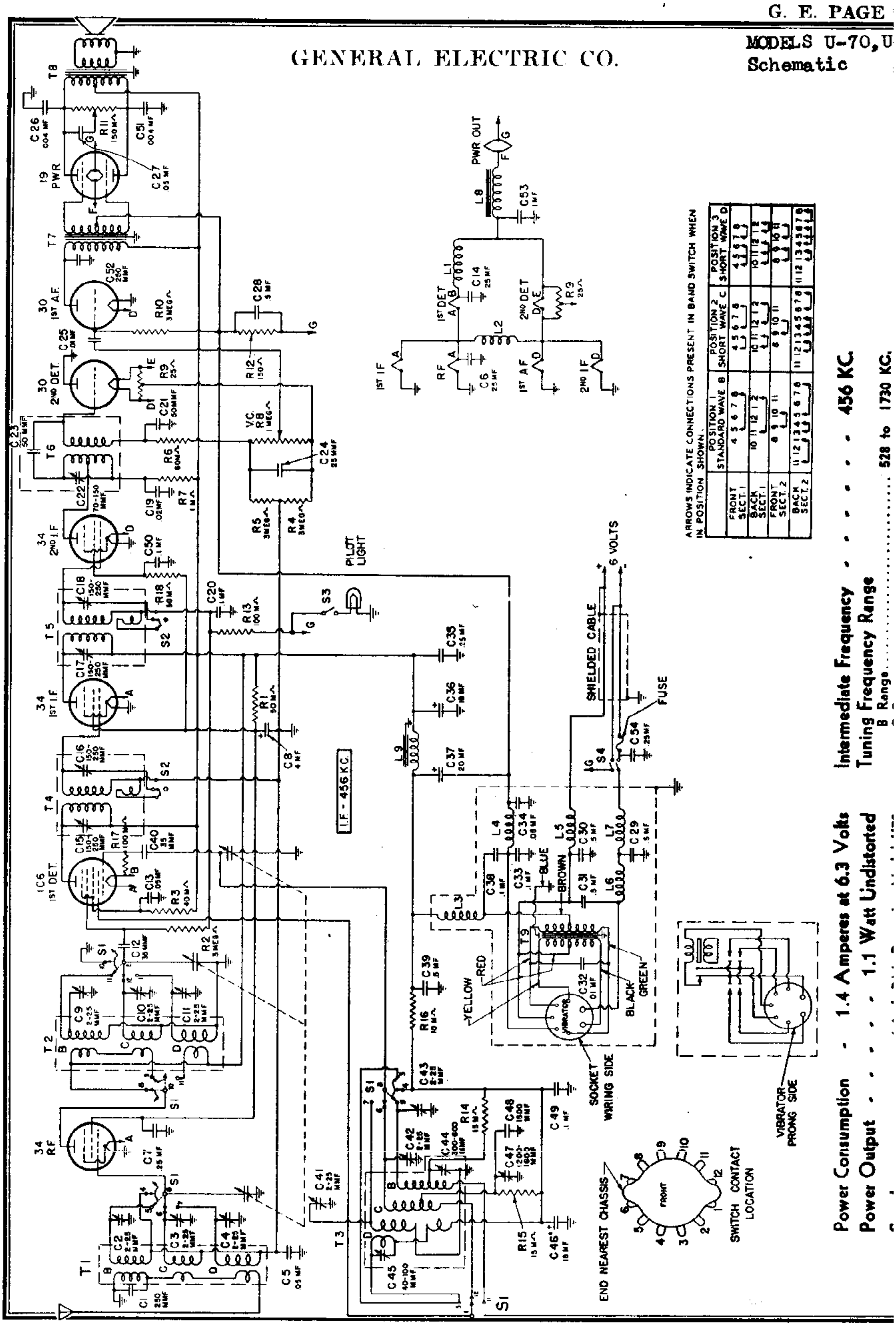


Fig. 9—Dial and Drive Assembly

MODELS U-70,U
Schematic

GENERAL ELECTRIC CO.



MODELS U-70, U-75
Trimmers, Voltage
Resistance, Coils

GENERAL ELECTRIC CO.

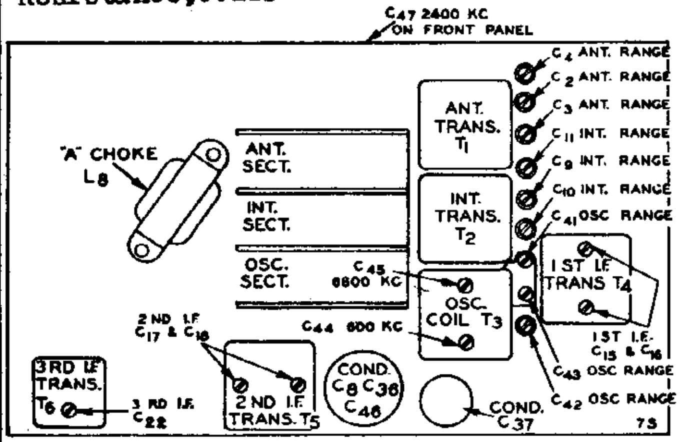


Fig. 3—Location of Trimmers

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground
Battery - 6 Volts — Band Switch in Standard Wave Position

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Bias Voltage See Notes
34	R.F.	2.0	145	55	1.0(1)
1C6	1st Det.-Osc.	2.0	145 90(2)	60	2 (3)
34	1st I.F.	2.0	145	55	1.0(1)
34	2nd I.F.	2.0	140	90	4.0(3)
30	2nd Det.	2.0			
30	1st A.F.	2.0	140		9 (4)
19	Power	2.0	140		5 (5)

(1) As read from negative filament leg to tap of resistor R9.
(2) Anode grid to ground.
(3) As read from negative filament leg to A—.
(4) Total voltage drop from negative filament leg to low potential end of resistor R12.
(5) As read across resistor R12.

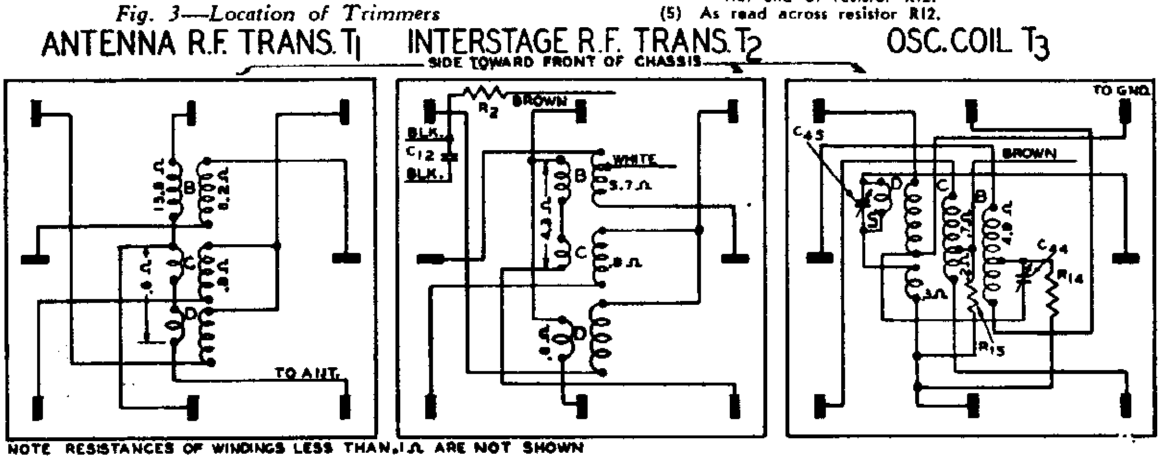


Fig. 7—R.F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 2. In contact locations not used, the number applying to that particular location is not employed.

D. C. Resistance of Windings

Refer to Figs. 2 & 7

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Winding	Code	D. C. Resistance in Ohms
RBL-003	Antenna R.F. Transformer	T1	
	Range B Primary Winding		15.8
	Range C Primary Winding } Range D Primary Winding }		0.6
	Range B Secondary Winding		6.2
	Range C Secondary Winding		0.8
	Range D Secondary Winding		Small
RBL-100	Interstage R.F. Transformer	T2	
	Range B Primary Winding } Range C Primary Winding }		4.3
	Range D Primary Winding		0.6
	Range B Secondary Winding		6.3
	Range C Secondary Winding		0.8
	Range D Secondary Winding		Small
RBL-202	Oscillator Coils	T3	
	Range B Oscillator Grid Coil		3.9
	Range C Oscillator Grid Coil		0.7
	Range D Oscillator Grid Coil		Small
	Range B Oscillator Plate Coil		1.0
	Range C Oscillator Plate Coil		0.2
	Range D Oscillator Plate Coil		0.3
	Range D Oscillator Tracking Reactor		1.0

Part No.	Winding	Code	D. C. Resistance in Ohms
RBT-205	1st I.F. Tranformer	T4	
	Primary Winding		12.9
	Secondary Winding		12.8
	Coupling Winding		0.5
RBT-206	2nd I.F. Transformer	T5	
	Primary Winding		12.9
	Secondary Winding		12.9
	Coupling Winding		0.5
RBT-207	3rd I.F. Transformer	T6	
	Primary Winding (Upper Winding)		8.5
	Primary Winding (Lower Winding)		7.7
	Secondary Winding		126.5
RBT-500	Input Transformer	T7	
	Primary Winding		1035.
	Secondary Winding		
	Center Tap to Inside		610.
	Center Tap to Outside		660.
RBT-401	Output Transformer	T8	
	Primary Winding		
	Center Tap to Inside		118.
	Center Tap to Outside		135.
	Secondary Winding		0.7
RBS-004 & 005	Dynamic Speaker 6" and 8"		
	Speaker Voice Coil		0.5
RBT-070	Power Transformer	T9	
	Primary Winding		
	Center Tap to Inside		0.3
	Center Tap to Outside		0.3
	Secondary Winding		
	Center Tap to Inside		166.
	Center Tap to Outside		194.
RBL-313	1st Det. Filament Reactor	L1	0.5
RBL-312	1st I.F. Filament Reactor	L2	0.6
RBL-311	"B" Reactor	L3	17.
RBL-310	"B" Reactor	L4	0.3
RBL-308	"A" Line Reactor	L5	0.1
RBL-309	"A" Line Reactor	L6	0.1
RBL-308	"A" Line Reactor	L7	0.1
RBL-307	"A" Reactor (Iron Core)	L8	0.7
RBL-306	"B" Reactor (Iron Core)	L9	350.

GENERAL ELECTRIC CO.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 6700, 6000, 2400, 18,400, 15,000 and 6800 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the control grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the volume control to the maximum position.

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Range C Alignment

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

6700 KC Adjustment

Set the signal generator for 6700 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C42) until maximum output is obtained. See Fig. 3 for location of this trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C10) and antenna Range C trimmer (C3) to maximum.

6700 KC Adjustment

Set the signal generator for 6700 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C42) until maximum output is obtained. See Fig. 3 for location of this trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C10) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

2400 KC Adjustment

Set the signal generator for 2400 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 2400 KC padder (C47) until the peak of greatest intensity is obtained. See Fig. 3 for location of this padder.

Range D Alignment

18,400 KC Adjustment

Set the signal generator for 18,400 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C41) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C11) and antenna Range D trimmer (C4) to maximum.

When adjusting the interstage and antenna Range D trimmers, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6800 KC Adjustment

Set the signal generator for 6800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6800 KC padder (C45) until the peak of greatest intensity is obtained. See Fig. 3 for location of this padder.

Continuity Resistance Check—The power transformer, choke coil circuits and condenser shorts may be checked by utilizing the vibrator socket terminals and various points on the "A" or "B" lines, without removal of the shield can. For example: when checking the continuity or resistance of the upper half of the transformer secondary, contact may be made with the test prods at the proper vibrator socket terminal, as shown on the circuit diagram, and at the positive terminal of the 20 mf. electrolytic condenser, C37.

Removing Transformer and Vibrator Socket Assembly—Take off the filter unit shield can by removing the four self tapping screws at the right side (from front) of the chassis base and the five hex nuts from the bolts at the top of the chassis.

Unsolder the ground connections from the two lugs on the inside of the chassis base (right side from front). Unsolder the black and white coded wire from the terminal strip lug nearest the front of the chassis. This terminal strip is mounted on the transformer cover. Now unsolder the bracket holding the terminal strip to the transformer cover.

Proceed with replacement of the power transformer or with any other necessary service or replacements and then reassemble.

Replacement of Buffer Condenser C32—This condenser is located in the top of the transformer and vibrator assembly just underneath the vibrator socket. To replace, remove the assembly as explained in the preceding article.

In addition, the two screws holding the vibrator socket to the transformer cover assembly should be taken out. The condenser is then easily replaced.

Replacing Drive Cord

Remove the chassis from the cabinet.

Lift off the dial lamp assembly and remove the old drive cord, pulleys, washer and indicator.

Turn the drive drum until the slot in the rim is in the position shown in Fig. 9.

Insert one end of the drive cord in the slot and wind the cord around the drum in a clockwise direction for about two-thirds of a turn, or until it reaches the top of the drum.

Now, before putting the right pulley (from front) in place, bring the cord around the pulley from back to front so that the cord is adjacent to the celluloid dial scale; then place the pulley in position.

Extend the cord over to the left and bring it around the other pulley from front to back before placing this pulley. Put the small brass washer on the upper shaft of the pulley and place the pulley in position as shown in Fig. 9.

Bring the cord over to the drive drum and wind it around the drum in a clockwise direction, keeping it behind the cord already on the drum.

Push the pulley tension spring in toward the drive drum so as to provide slack in the cord while the free end is being inserted into the slot in the rim.

Now mesh the condenser plates completely. Replace the celluloid indicator on the dial strip and attach it to the drive cord as shown in Fig. 9. The line on the indicator should cover the 530 KC mark on the dial scale.

Caution—When attaching the indicator to the drive cord, do not pinch the center clamp too tightly on the cord or the cord will be cut. After the clamp is pinched slightly a small amount of shellac on it will hold the cord securely.

Replace the dial lamp assembly.

Caution

Do not turn the receiver on unless ALL the tubes are in the sockets. Removal of any of them will result in abnormal voltages on the remaining tubes.

Be sure that the battery clips are connected to the battery with the correct polarity. Reversed connections may damage the receiver.

Do not use any power source other than a 6 volt storage battery.

If the receiver does not operate after being turned on, turn the switch off immediately, examine the battery connections and the fuse and see if all tubes are properly inserted.

Servicing Power Unit

The power unit is that portion of the chassis assembly contained within the large rectangular shield can and the circuit for which is shown within the dotted lines at the lower left side of the schematic diagram, Fig. 2.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer RBC-609, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

MODELS U-70, U-75
Parts

GENERAL ELECTRIC CO.

Replacement Parts – Models U70 and U75

Insist on genuine factory-tested parts which may be purchased from authorized dealers.

Stock No.	Description	List Price
RBB-004	BOARD—Fuse Board	$ .10
RBB-005	BOARD—Terminal board, single lug (Mtg. Foot left of lug)	.10
RBB-006	BOARD—Terminal board single lug (Mtg. Hole at one end)	.10
RBB-007	BOARD—Terminal board, 2 lugs (Mtg. Hole in center)	.10
RBB-008	BOARD—Terminal board, single lug (Mtg. Foot to right of lug)	.10
RBB-100	BRACKET—Dial support bracket	.10
RBB-102	BRACKET—Dial mtg. bracket and reflector	.15
RBB-103	BRACKET—Gang support bracket	.20
RBB-104	BRACKET—Dial extension bracket	.10
RBB-105	BRACKET—Dial lamp bracket and socket	.20
RBC-001	CAPACITOR—.1 Mfd., 180 V. paper (C-20, C-33, C-38, C-49, C-50, C-53)	.20
RBC-003	CAPACITOR—.25 Mfd., 180 V. paper (C-6, C-7, C-14, C-35, C-54)	.25
RBC-004	CAPACITOR—.01 Mfd., 180 V. paper (C-25)	.15
RBC-005	CAPACITOR—.05 Mfd., 180 V. paper (C-5, C-13, C-34)	.15
RBC-006	CAPACITOR—.05 Mfd., 180 V. paper (C-28, C-29, C-39)	.40
RBC-008	CAPACITOR—.01 Mfd., 1000 V. paper (C-32)	.15
RBC-009	CAPACITOR—.02 Mfd., 180 V. paper (C-19)	.15
RBC-010	CAPACITOR—.5 Mfd., 180 V. paper (C-31)	.30
RBC-011	CAPACITOR—.5 Mfd., 180 V. paper (C-30)	.30
RBC-012	CAPACITOR—.05 Mfd., 240 V. paper (C-27)	.15
RBC-013	CAPACITOR—.004 Mfd., 600 V. paper (C-26, C-51)	.15
RBC-201	CAPACITOR—35 Mmfd., Mica (C-12, C-40)	.10
RBC-203	CAPACITOR—50 Mmfd., Mica (C-21, C-23)	.10
RBC-208	CAPACITOR—250 Mmfd., Mica (C-1, C-52)	.15
RBC-209	CAPACITOR—1500 Mmfd., Mica (C-48)	.20
RBC-210	CAPACITOR—25 Mmfd., Mica (C-24)	.10
RBC-503	CAPACITOR—4 Mfd., 18 Mfd., 18 Mfd., 150 V. dry electrolytic (C-8, C-36, C-46)	1.50
RBC-504	CAPACITOR—20 Mfd., 150 V. wet electrolytic (C-37)	.95
RBC-604	CAPACITOR—70-150 Mmfd., double trimmers 1st and 2nd IF transformer (C-15, C-16, C-17, C-18)	.40
RBC-605	CAPACITOR—300-600, 40-100 Mmfd., double padder Band "B" and "D" (C-44, C-45)	.45
RBC-606	CAPACITOR—40-100 Mmfd. trimmer 3rd IF transformer (C-22)	.25
RBC-607	CAPACITOR—2-25 Mmfd. Ant., R.F., and osc. trimmers, Bands "B", "C" and "D" (C-2, C-3, C-4, C-9, C-10, C-11, C-41, C-42, C-43) (See RBC-609 for replacement of any one section)	.95
RBC-608	CAPACITOR—1200-1600 Mmfd., padding capacitor (C-47)	.50
RBC-609	CAPACITOR—2-25 Mmfd., Mica Replacement trimmer for any section of trimmer strip RBC-607	.10
RBC-702	CONDENSER—3 gang condenser and reduction drive	4.85
RBC-800	CABLE—Drive Cable	.10
RBC-804	CABLE—Spkr. cable and socket assembly	.45
RBC-805	CABLE—Shielded battery cable	1.00
RBC-902	CONE—Spkr. Cone for U-70	2.50
RBC-903	CONE—Spkr. Cone for U-75	3.00
RBC-950	CUSHIONS—Rubber chassis mtg. cushions ea.	.10
RBC-951	CLIP—25 Amp. Batt. clip ea.	.15
RBC-952	CLIP—Vibrator spring clip	.10
RBC-954	CUSHION—Gang condenser rubber mounting cushion assembly	.40
RBD-001	DRUM—Dial drive drum	.30
RBD-005	DIAL—Dial scale	.35
RBD-006	DRIVE—Tuning cord reduction drive assembly	1.10
RBF-002	FOOT—Chassis mtg. foot	.10
RBF-003	FOOT—Rear mounting foot for gang condenser	.10
RBF-300	FUSE—5 Amp. fuse	.10
RBG-001	GRID CAP—Control grid cap	.10
RBK-001	KNOB—Control knob (except band switch)	$ .10
RBK-003	KNOB—Band switch knob	.15
RBL-003	COIL—Ant. coil and shield assembly (T-1)	1.90
RBL-100	COIL—R.F. coil and shield assembly (T-2)	2.35
RBL-202	COIL—Oscillator coil and shield assembly (T-3)	3.20
RBL-306	REACTOR—"B" reactor (iron core) (L-9)	1.00
RBL-307	REACTOR—"A" reactor (iron core) (L-8)	.85
RBL-308	REACTOR—"A" line reactor (L-5, L-7)	.35
RBL-309	REACTOR—"A" line reactor (L-6)	.35
RBL-310	REACTOR—"B" reactor (L-4)	.30
RBL-311	REACTOR—"B" reactor (L-3)	.30
RBL-312	REACTOR—1st IF filament reactor (L-2)	.35
RBL-313	REACTOR—1st Det. filament reactor (L-1)	.40
RBL-900	LEADS—Ant. and gnd. lead assembly	.30
RBL-902	LAMP—Dial lamp	.15
RBP-001	PULLEY—Dial pulley	.10
RBP-003	POINTER—Dial pointer	.10
RBQ-002	RESISTOR—3 megohm, .2 Watt Carbon (R-2, R-4, R-5, R-10)	.15
RBQ-012	RESISTOR—10,000 ohm, .2 Watt Carbon (R-16)	.15
RBQ-016	RESISTOR—1,000 ohm, .2 Watt Carbon (R-7)	.10
RBQ-017	RESISTOR—50,000 ohm, .2 Watt Carbon (R-1, R-18)	.15
RBQ-018	RESISTOR—40,000 ohm, .2 Watt Carbon (R-3)	.10
RBQ-019	RESISTOR—60,000 ohm, .2 Watt Carbon (R-6)	.10
RBQ-020	RESISTOR—15,000 ohm, .2 Watt Carbon (R-14, R-15)	.10
RBQ-021	RESISTOR—100,000 ohm, .2 Watt Carbon (R-13, R-17)	.15
RBR-703	RESISTOR—25 ohm, 3.0 Watt; 150 ohm, 2.0 Watt wire wound resistor (R-9, R-12)	.45
RBS-004	SPEAKER—6" speaker complete with output transformer T8	5.70
RBS-005	SPEAKER—8" speaker complete with output transformer T8	6.00
RBS-100	SHIELD—Large tube shield	.20
RBS-101	SHIELD—Small tube shield (closed top)	.10
RBS-102	SHIELD BASE—Large tube shield base and vibrator shield base	.10
RBS-103	SHIELD BASE—Small tube shield base	.10
RBS-104	SHIELD—Small tube shield (open top)	.15
RBS-105	SHIELD—Vibrator shield	.20
RBS-106	SHIELD—Shield can for filter assembly (under vibrator and transformer assembly)	.50
RBS-201	SOCKET—4 prong tube socket	.10
RBS-203	SOCKET—6 prong tube socket	.10
RBS-205	SOCKET—7 prong Vibrator socket	.20
RBS-302	SWITCH—Band change switch (S1)	1.55
RBS-303	SWITCH—Selectivity Switch (S2)	.45
RBS-304	SWITCH—Dial lamp push button switch assembly (S3)	.50
RBS-400	SPRING—Pulley tension spring	.10
RBT-070	TRANSFORMER—Power transformer (T-9)	2.45
RBT-071	TRANSFORMER—Power Transformer Assembly (Includes RBC-008, RBC-952, RBS-102, RBS-205, RBT-070)	3.85
RBT-205	TRANSFORMER—1st IF transformer and shield assembly (T-4)	1.55
RBT-206	TRANSFORMER—2nd IF transformer and shield assembly (T-5)	1.55
RBT-207	TRANSFORMER—3rd IF transformer and shield assembly (T-6)	1.65
RBT-401	TRANSFORMER—Output transformer (T-8)	1.30
RBT-500	TRANSFORMER—Input transformer (T-7)	1.95
RBT-700	TONE CONTROL—150,000 ohm tone control (R-11)	.65
RBV-002	VOLUME CONTROL—1 megohm Volume Control and on-off switch (R-8) (S-4)	1.00
RBV-201	VIBRATOR—Vibrator unit	4.55
RBW-002	WINDOW—Dial window	.15
RBW-101	WASHER—Felt washer used behind knob ea.	.10

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Schematic, Batt. Conn.
Switch Assembly
Adapter

GENERAL ELECTRIC CO.

MODELS FB-72, FB-7
FB-76, FB-7

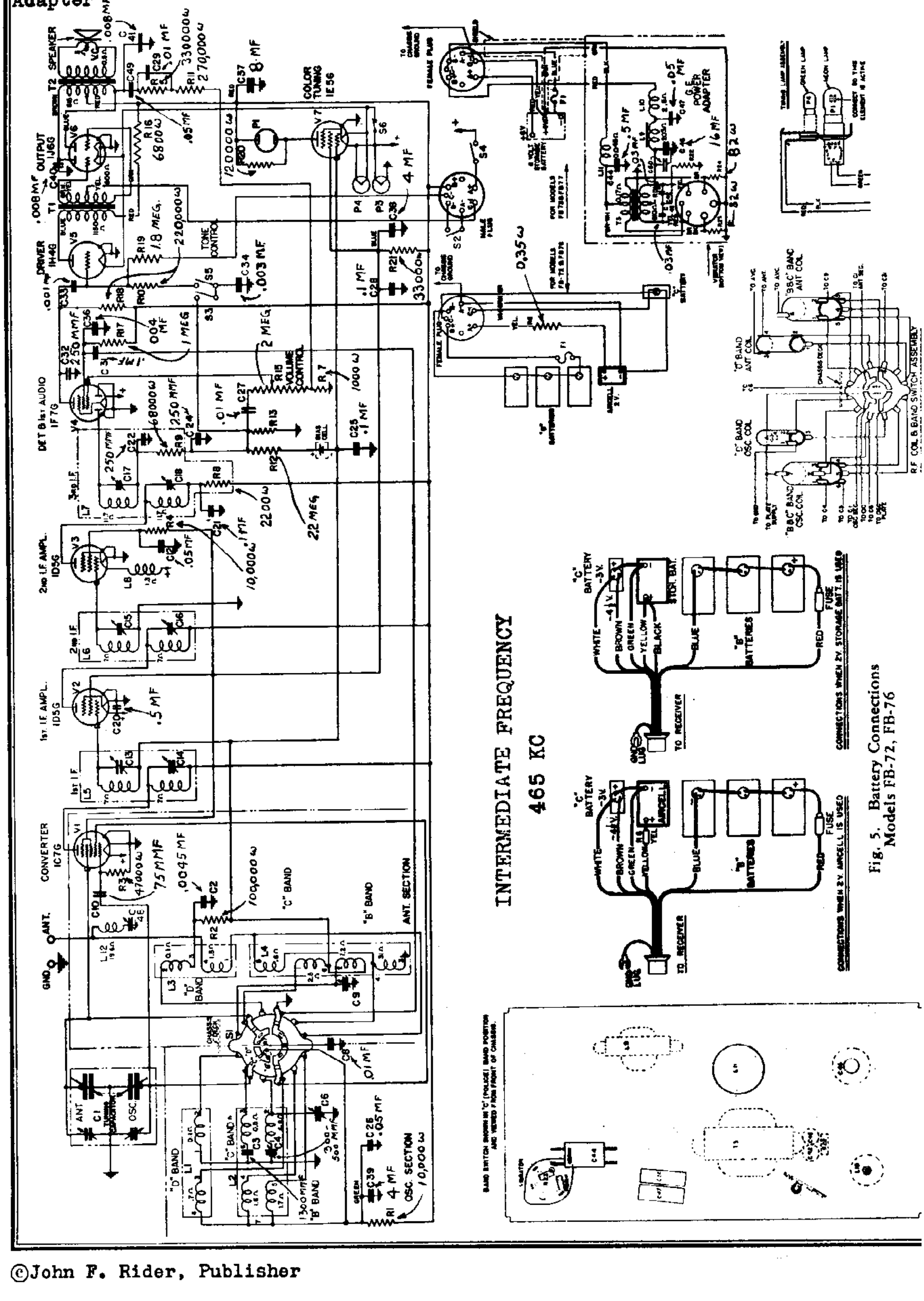


Fig. 5. Battery Connections
Models FB-72, FB-76

MODELS FB-72,FB-73
FB-76,FB-77
Socket,Trimmers
Alignment,Notes

GENERAL ELECTRIC CO.

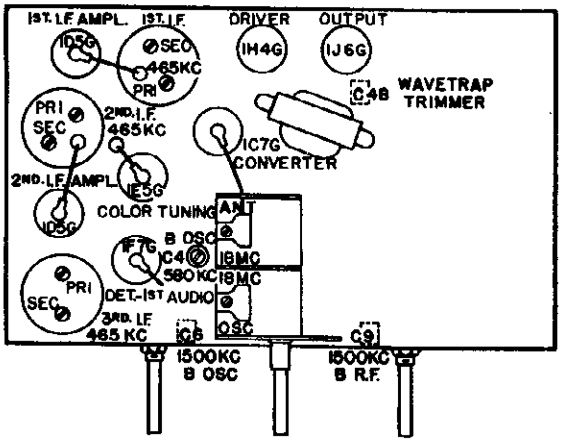


Fig. 1. Chassis Layout and Trimmer Locations

Power Supply

The chassis used in these receivers are identical except for the type of power supply employed. The 2-volt Models FB-72 and FB-76 are operated by "A," "B" and "C" batteries which are connected to the receiver by a battery cable, Stock No. BK-727.

Models FB-73 and FB-77 are operated entirely by a 6-volt storage battery, 1 cell (2 volts) of which supplies filament current. The remaining two cells (4 volts) supply the G.E. Power Adapter which, in turn, provides "B" and "C" voltages.

If desired, the 2-volt receivers may be converted to 6-volt operation at any time by the addition of a G.E. Power Adapter, Model BA-407.

In connecting a 6-volt receiver to the storage battery, first clip the yellow and green leads on the battery to avoid applying excessive voltage to the filaments, accidentally. Also, be sure to separate the two clips by connecting them to opposite ends of the battery connector strap, as shown on the Power Adapter label. This avoids establishing a common path for the filament and Power Adapter supply which would result in objectionable vibrator noise.

If it is difficult to snap the Power Adapter into position on the chassis, apply a little vaseline to the rubber mounting feet.

On the "D" Band (5600 to 18,000 K.C.) the oscillator operates on the *low* frequency side of the incoming signal; therefore, adjust the trimmer until the second oscillator peak is reached as the trimmer is *increased* in capacity. When the correct adjustment is made, it will be possible to tune the image of any signal on the "D" band 970 K.C. *higher* than the signal if the input is sufficiently high. Example: The image of 15 M.C. should be heard at 15,970 K.C.

The alignment procedure is given in table form on page 3. The "Dummy Antenna" is the capacitor or capacitor and resistor used in series with the signal generator antenna lead.

ALIGNMENT PROCEDURE

I.F. ALIGNMENT WITH OSCILLOSCOPE

	Band Switch Setting	Input Freq.	Point of Input	Dummy Ant.	Trimmer	Remarks
1	Band "B"	465 K.C. Sweep	1st I.F. Grid	.05 Mfd. or Larger	3rd I.F. Sec. (C-17) 3rd I.F. Pri. (C-18)	Gang condenser plates closed—connect audio input of oscilloscope to ground and to the diode load terminal of the 3rd I.F. transformer. Adjust the trimmers in order mentioned for a single symmetrical curve of maximum amplitude.
2	Band "B"	465 K.C. Sweep	1st I.F. Grid	.05 Mfd. or Larger	2nd I.F. Sec. (C-15) 2nd I.F. Pri. (C-16)	
3	Band "B"	465 K.C. Sweep	Converter Grid	.05 Mfd. or Larger	1st I.F. Sec. (C-13) 1st I.F. Pri. (C-14)	
4	Band "B"	465 K.C. Sweep	Antenna Post	250 Mmf. 400 ohms	Wave Trap (C-48)	Adjust trimmer for minimum amplitude.

I.F. ALIGNMENT WITH OUTPUT METER

	Band Switch Setting	Input Freq.	Point of Input	Dummy Ant.	Trimmer	Remarks
1	Band "B"	465 K.C. with Modulation	1st I.F. Grid	.05 Mfd. or Larger	3rd I.F. Sec. (C-17) 3rd I.F. Pri. (C-18)	Gang condenser plates closed—Connect output meter across Voice Coil—Keep input signal low and Volume Control on as far as possible. Adjust all trimmers in order mentioned for maximum output reading on the meter.
2	Band "B"	465 K.C. with Modulation	1st I.F. Grid	.05 Mfd. or Larger	2nd I.F. Sec. (C-15) 2nd I.F. Pri. (C-16)	
3	Band "B"	465 K.C. with Modulation	Converter Grid	.05 Mfd. or Larger	1st I.F. Sec. (C-13) 1st I.F. Pri. (C-14)	
4	Band "B"	465 K.C. with Modulation	Antenna Post	250 Mmf. 400 ohms	Wave Trap (C-48)	Adjust trimmer for minimum output.

R.F. ALIGNMENT WITH OUTPUT METER

	Band Switch Setting	Input Freq.	Point of Input	Dummy Ant.	Trimmer	Remarks
1	Band "B"					Close gang plates—adjust pointer to first line at left end of tuning scale (530 KC).
2	Band "D"	18 M.C. with Modulation	Antenna Post	250 Mmf. 400 ohms	Oscillator (18 M.C.) Antenna (18 M.C.) See Trimmer Location View	Connect output meter across Voice Coil—tone control on "Bass" position—set osc. trimmer. While rocking the gang cond. adjust the antenna trimmer for maximum output.
3	Band "C"	No adjustments necessary				
4	Band "B"	1500 K.C. with Modulation	Antenna Post	250 Mmf. 400 ohms	Osc. (C-6) Ant. (C-9)	Peak trimmers for maximum output with a low input signal.
5	Band "B"	580 K.C. with Modulation	Antenna Post	250 Mmf. 400 ohms	Osc. Padder (C-4)	Adjust padder for maximum output meter indication in vicinity of 580 K.C. while rocking the gang condenser.
6	Band "B"	1500 K.C. with Modulation	Antenna Post	250 Mmf. 400 Ohms	Osc. (C-6)	As in Operation No. 4.

GENERAL ELECTRIC CO.

AVERAGE SOCKET VOLTAGES

Tube		Plate to Ground Volts D.C.	Screen Grid to Ground Volts D.C.	Filament Volts D.C.	D.C. Plat Current M.A.
1C7G	Oscillator	134	..	2.0	2.8
	Converter	136	46	2.0	1.3
1D5G 1st I.F. Amp.		136	46	2.0	2.3
1D5G 2nd I.F. Amp.		128	46	2.0	3.5
1F7G Det. A.V.C. Audio Amp.		40	15	2.0	0.4
1H4G Driver		100	..	2.0	4.1
1J6G Output		136	..	2.0	3.9
*1E5G Color Tuning		58	43	2.0	1.5

Measured with normal battery voltages using a 1000 ohm-per-volt meter dial pointer at 540 K.C. with no signal inpu
volume control at minimum.

* Silent tuning switch pressed.

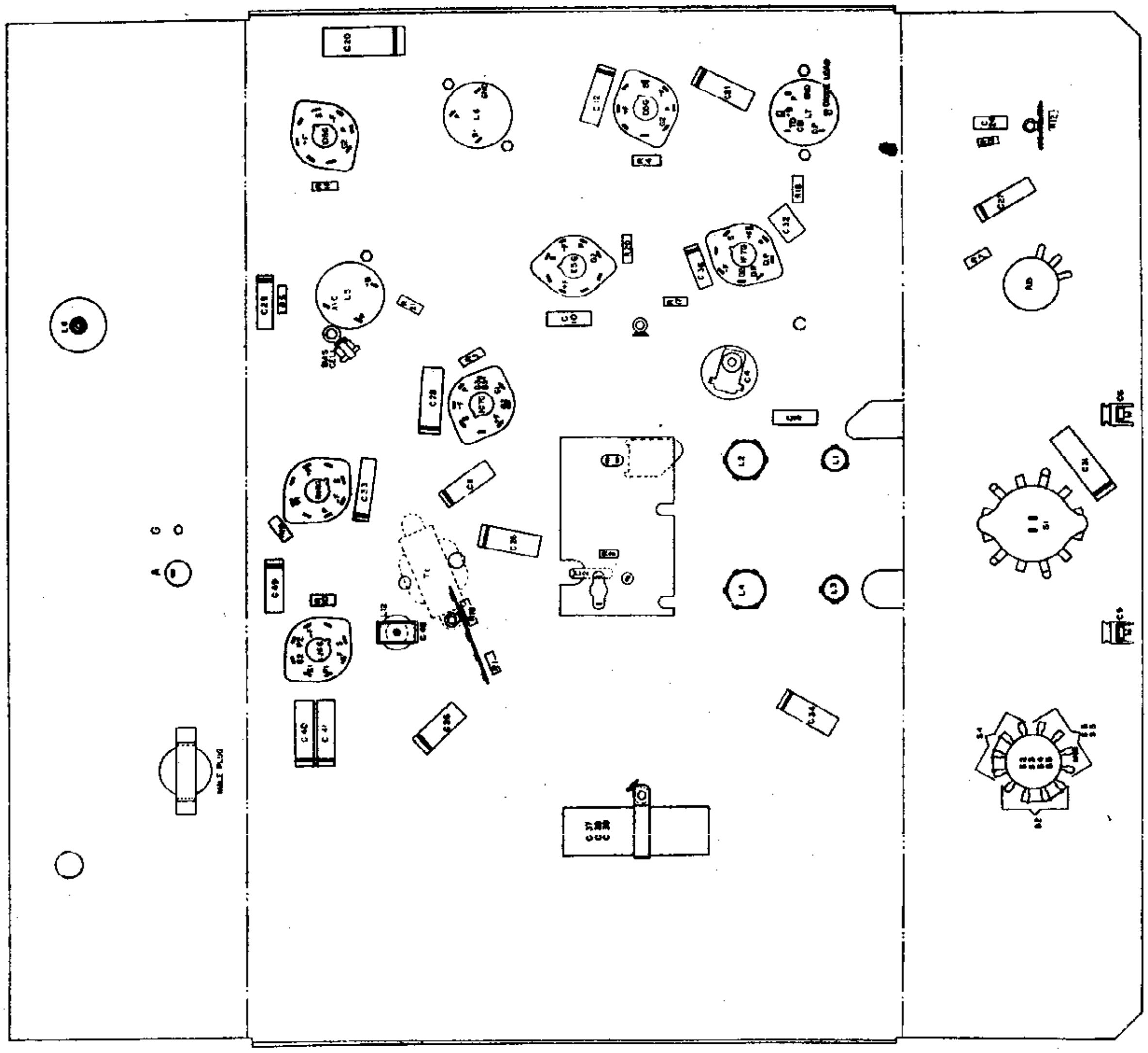


Fig. 3. Chassis Parts Layout

MODELS FB-72, FB-73 FB-76, FB-77

GENERAL ELECTRIC CO.

Notes, Parts Dial Assembly

ELECTRICAL SPECIFICATIONS

Tuning Frequency Range
Band "B" .... 540-1600 K.C.
Band "C" .... 1600-5800 K.C.
Band "D" .... 5600-18,000 K.C.

Intermediate Frequency .... 455 K.C.

Electrical Power Output
Models FB-72—FB-76
Undistorted .... 1.3 Watts
Maximum .... 2.2 Watts
Models FB-73—FB-77
Undistorted .... 1.0 Watts
Maximum .... 1.6 Watts

Tone Control 3-point

Batteries Required
Models FB-72, FB-76
1—2-volt Aircell Battery (Eveready A-600)
or
1—2-volt Storage Battery
3—45-volt "B" Batteries (Eveready No. 386, No. 485, No. 486 or equivalent)
1—4½-volt "C" Battery (Eveready No. 771 or equivalent)
Models FB-73, FB-77
1—6-volt Storage Battery

Current Consumption
Models FB-72, FB-76
"A" Battery (2 volts)—0.66 Amps.—0.49 Amps.*
"B" Battery (135 volts)—22 M.A.—18 M.A.*
Models FB-73, FB-77
6-Volt Storage Battery
Filament (2 volts)—0.66 Amps.—0.49 Amps.*
G-E Power Adapter (4 volts)—1.7 Amps.

*Silent tuning switch pressed.

Loud-speaker—Permanent Magnet Dynamic
Cone diameter:
Models FB-72 and FB-73 .... 8 inches
Models FB-76 and FB-77 .... 12 inches
Voice Coil Impedance .... 5.5 ohms at 400 cycles

Tubes
Converter and Oscillator .. 1C7G Pentagrid converter
1st IF Amplifier .... 1D5G Super-control Amplifier
2nd IF Amplifier .... 1D5G Super-control Amplifier
Detector, AVC and Audio Amplifier .... 1F7G Duplex Diode Pentode
Audio Driver .... 1H4G Detector Amplifier Triode
Output .... 1J6G Class "B" Twin Amplifier
Color Tuning Control .... 1E5G Screen Grid Amplifier Pentode

Colorama Tuning Indicator

These receivers are equipped with a novel resonance indicator located directly above the dial, and operated by pressing the silent tuning switch (S-6) on the side of the cabinet. When no signal is tuned in, the indicator will be amber in color, but as the receiver is tuned, it will change to green. Although this device is very sensitive, some signals may be too weak to cause a change to green. In such cases, the point of exact resonance is indicated by the greatest color change obtainable.

The Colorama Tuning Indicator consists of a Neon lamp and a green bulb mounted on a metal bracket which fits in the reflector housing mounted behind the bull's-eye. The brilliance of the Neon lamp is varied by the plate current of the 1E5G tube. The control grid of the 1E5G is connected to the AVC circuit. At a condition of no signal, the grid bias is at minimum and the resulting high plate current causes a voltage drop across R-20 (Fig. 2) which illuminates the Neon lamp brightly. When a signal is tuned in the AVC increases the 1E5G bias, lowers the plate current and the voltage drop across R-20, which partially or entirely extinguishes the Neon lamp. The brilliance of the green lamp does not vary.

During listening periods, the silent tuning switch S-6) shorts out the filaments of the green colorama bulb (P-4) and the 1E5G tube and full voltage is applied to the 1H4G and 1J6G filaments. When the switch is depressed, while tuning the receiver, the parallel connected filaments of the green bulb and the 1E5G are placed in series with the filaments of the audio tubes. Due to the low resistance of the latter, most of the voltage is applied to the green bulb and the 1E5G filaments. Thus the Colorama Indicator is illuminated and the audio system becomes inoperative during the tuning period. It should be noted that the battery drain is lessened during the time the switch is depressed.

Only one plate of a Neon lamp is illuminated when operated on D.C. It is important, therefore, to turn the lamp so that the illuminated plate is toward the front when making a replacement. The Neon lamp is encased in an insulating jacket and is free to turn in the bracket.

Degeneration

A portion of the 1J6G output voltage is fed back to the audio input circuit through the resistor condenser network, C-49, C-29, R-5, R-11 and R-7. This feedback voltage is out of phase with the input and the resulting degeneration improves the frequency response and reduces distortion.

Greatest degeneration occurs at the lower settings of the volume control. As the volume is increased, the degeneration is reduced, making it possible to realize the full gain of the audio amplifier.

Bias Cell

A 1-volt bias cell is used to supply initial bias for the 1C7G converter and the 1D5G 1st IF tubes which are controlled by the AVC. Do not attempt to measure the voltage of the cell with any device which draws current. The cell will last indefinitely under normal conditions. If the receiver oscillator stops functioning on the low frequency end of the "D" band, try substituting a new bias cell.

REPLACING DRIVE CORD

Remove the old drive cord, pulleys, washer and indicator.

Turn the drive drum until the slot in the rim is in the position shown in Fig. 4.

Insert one end of the drive cord in the slot and wind the cord around the drum in a clockwise direction for about two-thirds of a turn, or until it reaches the top of the drum.

Now, before putting the right pulley (from front) in place, bring the cord around the pulley from back to front so that the cord is adjacent to the celluloid dial scale; then place the pulley in position.

Extend the cord over to the left and bring it around the other pulley from front to back before placing this pulley. Put the small brass washer on the upper shaft of the pulley and place the pulley in position as shown in Fig. 4.

Bring the cord over to the drive drum and wind it around the drum in a clockwise direction, keeping it behind the cord already on the drum.

Push the pulley tension spring in toward the drive drum so as to provide slack in the cord while the free end is being inserted into the slot in the rim.

Now mesh the condenser plates completely. Replace the celluloid indicator on the dial strip and attach it to the drive cord as shown in Fig. 4. The line on the indicator should cover the 530 K.C. mark on the dial scale.

CAUTION - When attaching the indicator to the drive cord, do not pinch the center clamp too tightly on the cord or the cord will be cut. After the clamp is pinched slightly, a small amount of shellac on it will hold the cord securely.

Replace the dial lamp assembly.

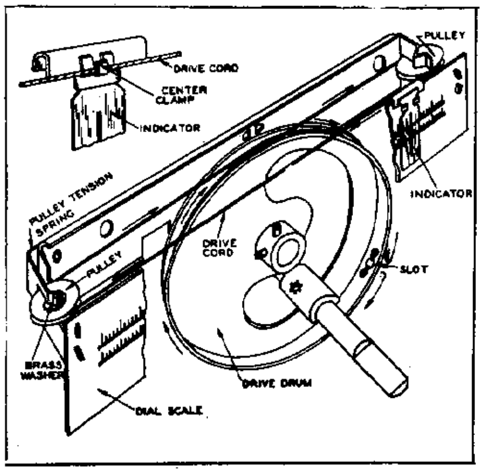


Fig. 4. Dial and Drive Assembly

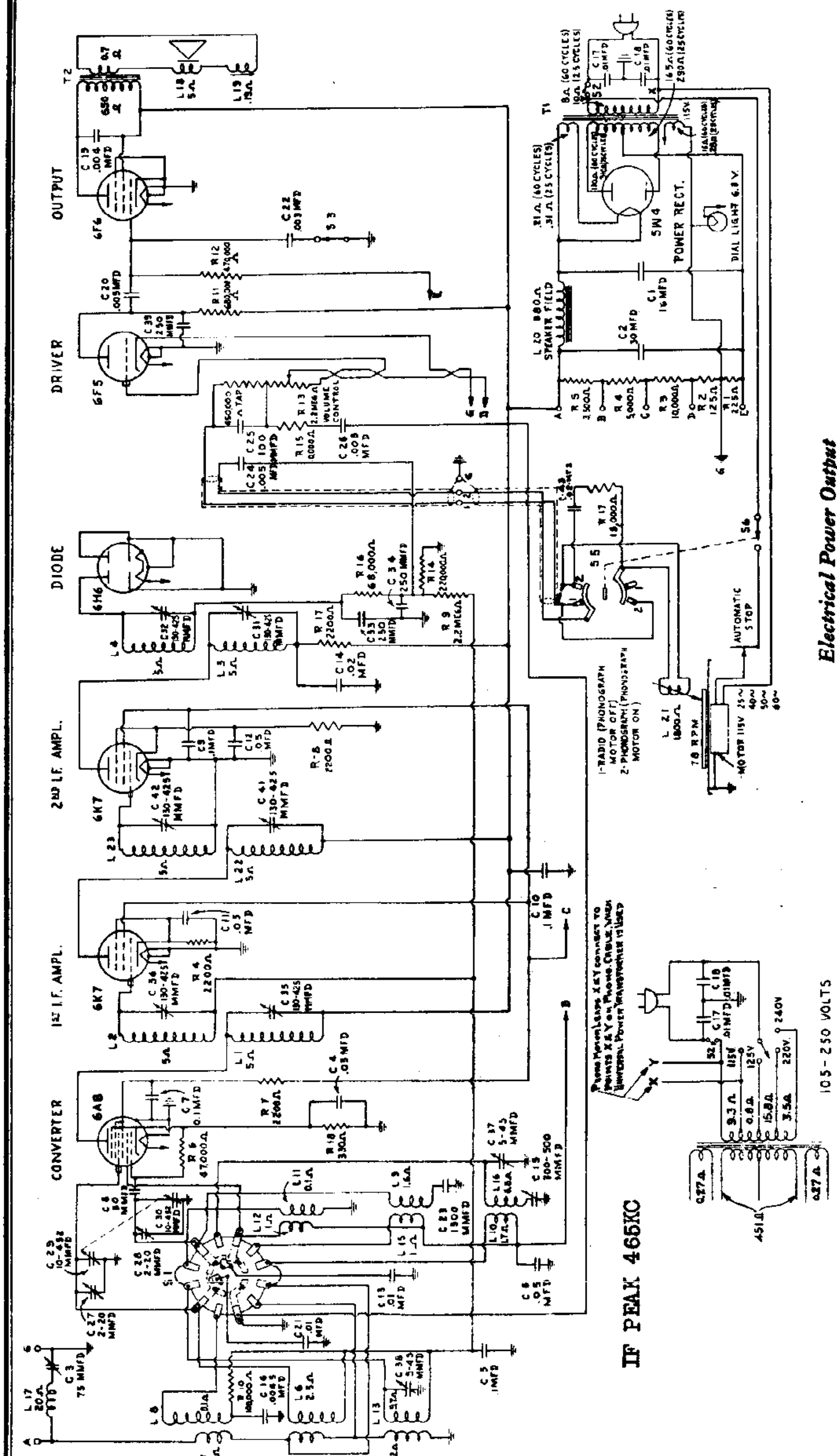
Stock No.	Description	List Price
*RB-008	BOARD—Terminal Board (on front wall of chassis)	$0.10
*RB-009	BOARD—Terminal Board (1 lug)	.15
[illegible]	BOARD—Terminal Board (near interstage transformer)	.10
[illegible]	BOARD—Ant. Terminal Board	.10
[illegible]	BRACKET—Band change bracket	.05
[illegible]	BRACKET—Bias cell bracket	.15
[illegible]	CAPACITOR—.001 Mfd., 200 V. paper (C-33)	.25
[illegible]	CAPACITOR—.003 Mfd., 200 V. paper (C-34)	.25
[illegible]	CAPACITOR—.0045 Mfd., 200 V. paper (C-2)	.25
[illegible]	CAPACITOR—.004 Mfd., 200 V. paper (C-36)	.25
[illegible]	CAPACITOR—.01 Mfd., 200 V. paper (C-8, C-27)	.25
[illegible]	CAPACITOR—.01 Mfd., 200 V. paper (C-29)	.25
[illegible]	CAPACITOR—.008 Mfd., 400 V. paper (C-40, C-41)	.25
[illegible]	CAPACITOR—.05 Mfd., 200 V. paper (C-12, C-26, C-49)	$0.25
[illegible]	CAPACITOR—.1 Mfd., 200 V. paper (C-21, C-25, C-28, C-31)	.30
[illegible]	CAPACITOR—.5 Mfd., 200 V. paper (C-20)	.40
RC-223	CAPACITOR—75 Mmf. Mica (C-10)	.25
*RC-261	CAPACITOR—250 Mmf. Mica (C-24, C-32)	.25
RC-339	CAPACITOR—1300 Mmf. Mica (C-3)	.35
RC-572	CAPACITOR—Dry Electrolytic 8 Mfd., 150 V; 4 Mfd. 150 V; 4 Mfd., 150 V. (C-37, C-38, C-39)	1.10
*RC-608	CAPACITOR—300-500 Mmf. osc. padder (C-4)	.45
*RC-618	CAPACITOR—5-45 Mmf. trimmer (C-6, C-9)	.25
RC-637	CAPACITOR—3rd I.F. double trimmer (C-17, C-18, C-22)	.60
RC-642	CAPACITOR—1st or 2nd I.F. double trimmer (C-14, C-13, C-15, C-16)	.45
*RC-710	CONDENSER—2 gang tuning condenser (C-1)	$8.60
*RC-816	CABLE—Speaker cable	.50
RC-831	CABLE—Battery Cable	1.80
RC-1958	CLIP—Battery clip (marked +)	.80
RC-1959	CLIP—Battery clip (plain)	.80
RC-1960	CLIP—Shield grounding clip	.10
RC-1961	CELL—1.0-volt bias cell	.25
*RD-034 Code 22	DRIVE—Condenser drive	1.10
*RF-010	FOOT—Mounting foot assembly	.20
RF-303	FUSE—½ Amp. fuse (Pkg. of 10) Models FB-72, FB-76	1.20
*RG-001	GRID CAP—Control grid cap (Pkg. of 5)	.10
*RK-004	KNOB—Control knob (Pkg. of 5)	.40
*RK-005	KNOB—Control knob with dot (Pkg. of 5)	.60
RL-039	COIL—Ant. coil band B-C (L-4)	1.20
RL-040	COIL—Ant. coil, Band "D" (L-3)	.70
RL-241	COIL—Oscillator coil band "D" (L-1)	.70
RL-242	COIL—Oscillator coil, Band B-C (L-2)	1.20
RL-328	REACTOR—RF filament reactor (L-8)	.40
RL-018	LAMP—Neon tuning indicator lamp, ¼ Watt, 115 Volt	.96
RL-014	LAMP—Green tuning indicator lamp (pkg. of 10)	2.10
RP-070	PLUG—Male battery plug	.25
*RQ-059 (RR-014)	RESISTOR—1000 ohm, ¼ W. Carbon (Pkg. of 5) (R-7)	.70
*RQ-067	RESISTOR—2200 ohm, ¼ W. Carbon (R-8) (Pkg. of 5)	.60
RQ-079	RESISTOR—6800 ohm, ¼ W. Carbon (R-16) (Pkg. of 5)	.60
RQ-083	RESISTOR—10,000 ohm, ¼ W. Carbon (R-1, R-4) (Pkg. of 5)	.60
*RQ-095	RESISTOR—33,000 ohm, ¼ W. Carbon (R-21) (Pkg. of 5)	.60
*RQ-099	RESISTOR—47,000 ohm, ¼ W. Carbon (R-3) (Pkg. of 5)	.60
*RQ-103	RESISTOR—68,000 ohm, ¼ W. Carbon (R-9) (Pkg. of 5)	.60
*RQ-107 (RR-050)	RESISTOR—.1 meg. ¼ W. Carbon (R-2) (Pkg. of 5)	.70
*RQ-109	RESISTOR—120,000 ohm, ¼ W. Carbon (R-20) (Pkg. of 5)	.70
*RQ-115	RESISTOR—220,000 ohm, ¼ W. Carbon (R-10, R-13, R-18) (Pkg. of 5)	.70
*RQ-117	RESISTOR—270,000 ohm, ¼ W. Carbon (R-11) (Pkg. of 5)	.70
*RQ-119	RESISTOR—330,000 ohm, ¼ W. Carbon (R-5) (Pkg. of 5)	.70
*RQ-131 (RR-067)	RESISTOR—1 meg. ¼ W. Carbon (R-17) (Pkg. of 5)	.70
*RQ-137	RESISTOR—1.8 meg. ¼ W. Carbon (R-19) (Pkg. of 5)	.70
*RQ-139	RESISTOR—2.2 meg. ¼ W. Carbon (R-12) (Pkg. of 5)	.70
RR-302	RESISTOR—35 ohm, 1 W. flexible (R-6) (Pkg. of 5)	.70
RS-172	SHIELD—1st, 2nd or 3rd IF transformer shield	.25
RS-173	SHIELD—Tube shield	.15
*RS-204	SOCKET—Tube socket (Pkg. of 5)	.75
*RS-323	SWITCH—Band-change switch (S-1)	1.25
RS-343	SWITCH—Color tuning switch (S-6)	.50
RS-344	SWITCH—Tone control and power switch (S-2, S-3, S-4)	.75
RT-237	TRANSFORMER—1st or 2nd IF transformer (complete)	1.60
RT-238	TRANSFORMER—3rd I.F. transformer (complete)	1.90
RT-507	TRANSFORMER—Audio input transformer (T-1)	1.50
RV-028	VOLUME CONTROL—2.0 meg. volume control (R-15)	.80
*RW-101	WASHER—Felt washer (Pkg. of 10)	.45
*RW-400	WAVE TRAP—Wave trap (complete) (C-48, L-12)	$0.80
*RX-016	ASSEMBLY—Tuning Condenser mounting assembly	.30
RX-030	LAMP ASSEMBLY—Tuning indicator lamp assembly (including lamps)	1.40
	DIAL MECHANISM	
RB-153	BRACKET—Lamp bracket	.30
*RC-815	CABLE—Dial cable (Pkg. of 5)	.60
*RD-030	DRUM—Condenser drive drum (includes set screws)	.40
RD-047	DIAL—Dial scale	.30
RI-005	INDICATOR—Band indicator assembly	.10
RL-015	LAMP—Dial lamp—2 volt 60 M.A. (pkg. of 10)	3.10
RP-042	PULLEY—Pulley assembly (Pkg. of 2)	.15
*RP-045	POINTER—Dial pointer and guide	.10
RR-909	REFLECTOR—Dial lamp reflector	.15
RS-203	SOCKET—Lamp socket assembly	.10
RS-856	SCREWS—Set screws for dial drive drum (Pkg. of 10)	.10
	VIBRATOR POWER SUPPLY MODELS FB-73, FB-77	
*RB-053	BOARD—Terminal Board (3 terminals)	.10
RB-603	BASE—Vibrator grounding base	.15
RC-054	CAPACITOR—.03 Mfd., 1600 V. paper (C-42, C-45)	.35
RC-072	CAPACITOR—.05 Mfd., 200 V. paper (C-47, C-50)	.25
RC-156B	CAPACITOR—.5 Mfd., 120 V. paper (C-44)	.40
RC-573	CAPACITOR—16 Mfd., 150 V. dry electrolytic (C-46)	.90
RC-832	CABLE—Battery Cable	2.30
RF-304	FUSE—5 amp. 25 V. fuse (Pkg. of 10)	1.00
RL-322	REACTOR—R.F. B+ reactor (L-10)	.30
RL-323	REACTOR—Vibrator reactor (L-11)	.70
RL-329	REACTOR—Filter reactor (L-9)	.90
RQ-033	RESISTOR—82 ohm, ¼ W. Carbon (Pkg. of 5) (R-22, R-23, R-24)	.60
RS-215	SOCKET—Vibrator tube socket (Pkg. of 5)	.75
RT-077	TRANSFORMER—Vibrator transformer (T-3)	3.50
RV-201	VIBRATOR—4-volt vibrator	4.00

*Used on previous receivers.

(Prices subject to change without notice)

GENERAL ELECTRIC CO.

MODEL E-79
Schematic



Electrical Power Output
Undistorted .... 2.5 watts
Maximum .... 5.0 watts

Loud-speaker—Electrodynamic
Cone diameter .... 12 in.
Cone Coil Impedance .... 5.5 ohms at 400 cycles

Phonograph Pickup
Type—Magnetic
Impedance—18,000 ohms at 1000 cycles

Tuning Frequency Range
Band "B" .... 540-1600 kc.
Band "C" .... 1560-5800 kc.
Band "D" .... 5.6-18.0 mc. (5,600-18,000 kc.)

Tuning Control Drive Ratio
Fast Tuning .... 8 to 1
Vernier Tuning .... 40 to 1

MODEL E-79
Chassis Wiring

GENERAL ELECTRIC CO.

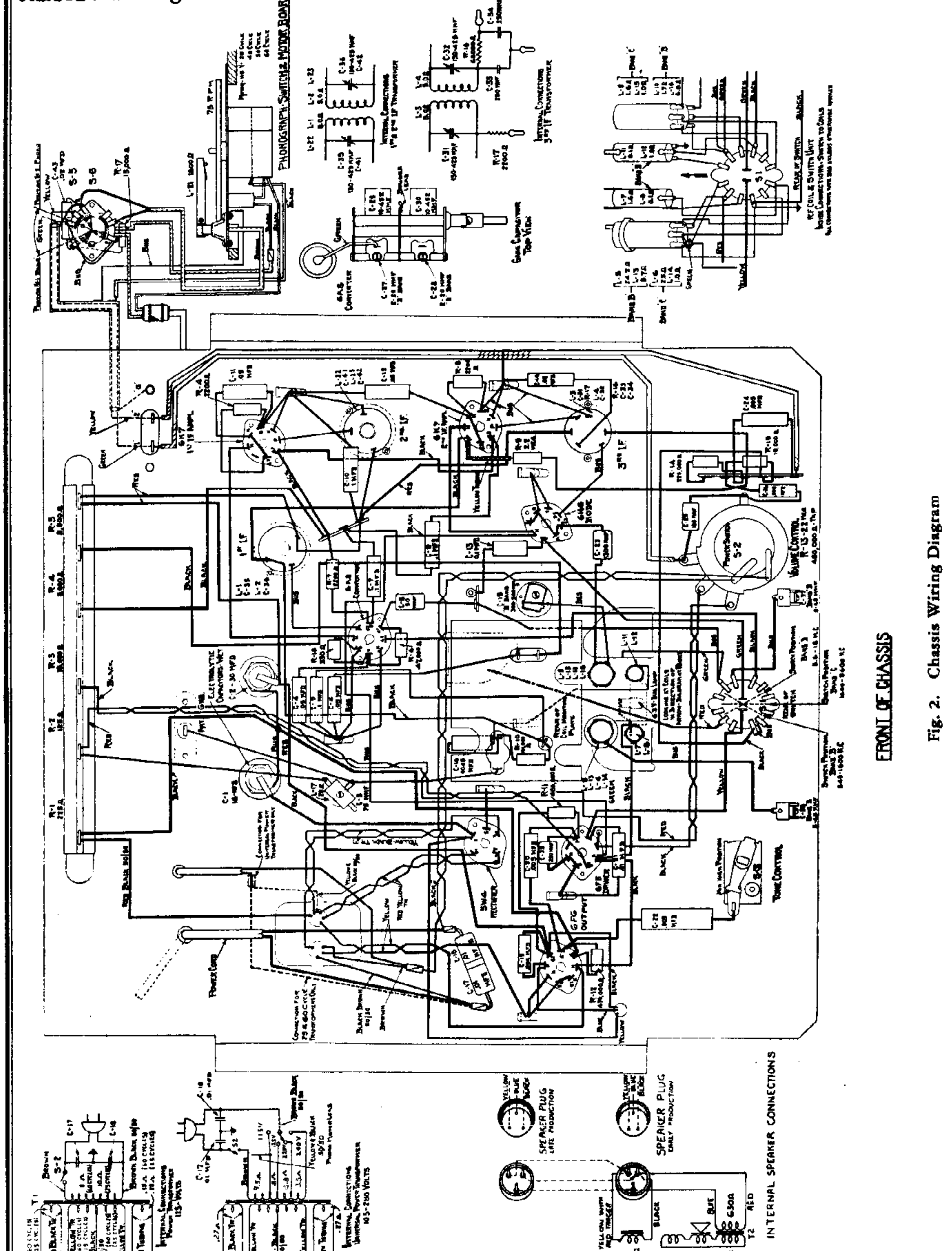


Fig. 2. Chassis Wiring Diagram

GENERAL ELECTRIC CO.

MODEL E-79
Voltage, Socket
Trimmers

SOCKET VOLTAGES

Tube No.		Cathode to Ground Volts D.C.	Screen Grid to Ground Volts D.C.	Plate to Ground Volts D.C.	Cathode Current M.A.	Heater Volts A.C.
6A8	Oscillator	2.5	...	180	12.0	6.3
	Converter	...	100	255		
6K7 1st I. F. Amp.		7.0	105	255	9.0	6.3
6K7 2nd I. F. Amp.		7.0	105	245	9.0	6.3
6H6 Detector & AVC.		...	...	...	...	6.3
6F5 Audio Amplifier		1.5	...	*60	0.3	6.3
6F6 Output		...	255	235	36.0	6.3
5W4 Power Rectifier		300 D.C.	...	650/325 R.M.S.	70.0	5.0

Measured at 115 volts supply. No signal input. Volume control maximum. Voltmeter 1000 ohms per volt; measuren taken on highest scale giving accurate readable deflection.
*Supply voltage minus drop in load resistor.

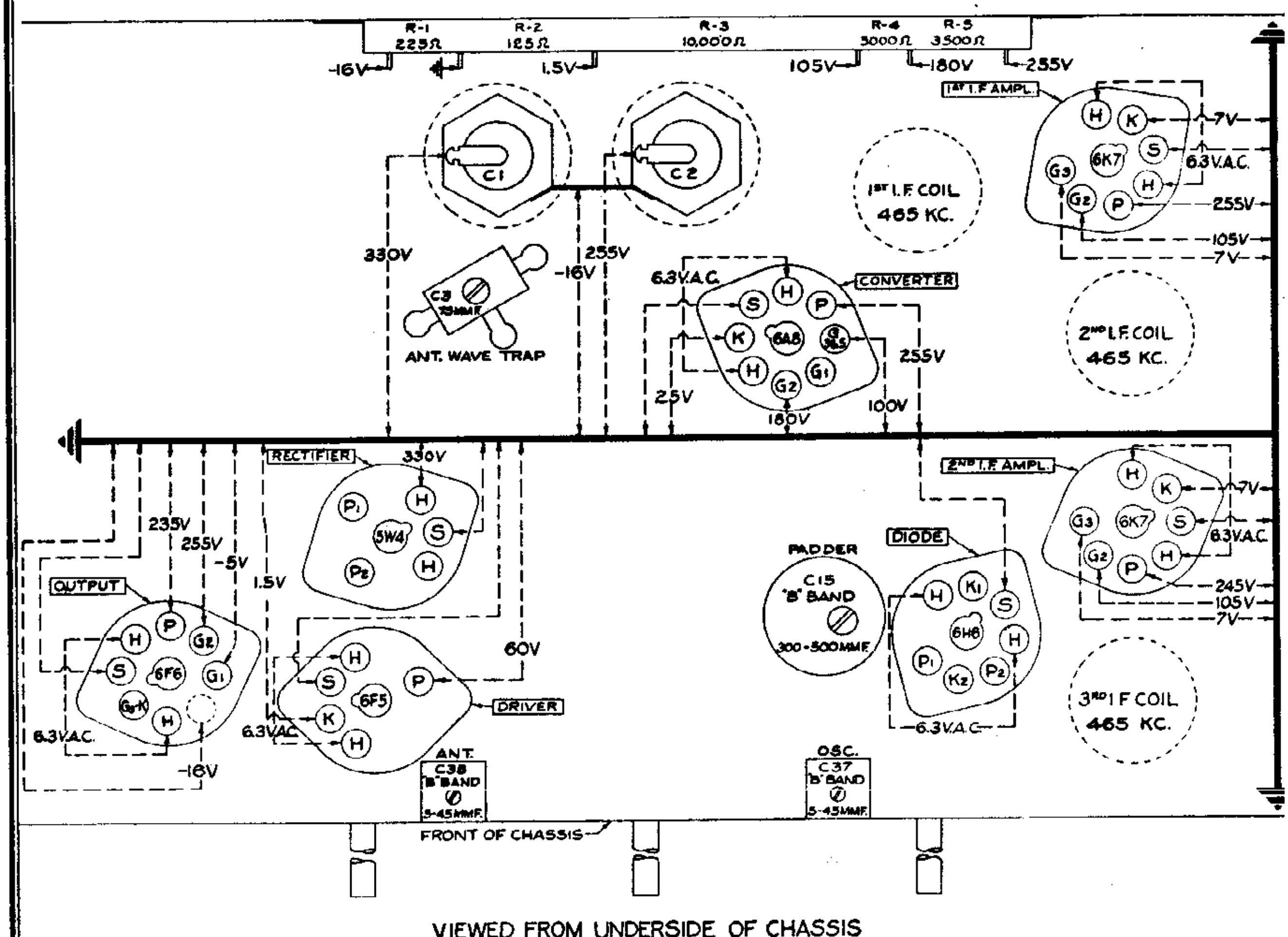


Fig. 3. Trimmer Location & Socket Voltages

MODEL E-79
Circuit Data
Alignment
Dial Data

GENERAL ELECTRIC CO.

DESCRIPTION OF ELECTRICAL CIRCUIT—RADIO

Model E-79 employs seven metal envelope tubes to perform the above functions in a superheterodyne circuit, giving the excellent selectivity and sensitivity inherent in this type circuit. The "B" and "C" band coils are wound on a common form, while the "D" band coils have individual forms. Ample undistorted output is obtained through diode detection and two audio amplifier stages.

The signal from the antenna is applied to the control grid of the 6A8 converter tube through the antenna coil, the secondary of which is tuned to the incoming signal by the rear section of the main tuning condenser. The secondary of the coil for the band next lower in frequency to the one in use is short-circuited through a capacitor to prevent absorption of energy at its resonant frequency which falls in the next higher band. (NOTE.—On the schematic diagram, Fig. 1, the center portion of the wave band switch supporting the two shorting lugs rotates simultaneously with the four contact pins.) In the 6A8 tube the incoming signal is combined with the local oscillator signal which is 465 kc. different in frequency. The local signal is generated by the oscillator elements of this tube and the proper frequency difference is maintained throughout the tuning range by the front section of the main tuning condenser in conjunction with the oscillator coil and padding capacitors.

The combination of the signal frequency with the local oscillator frequency in the converter tube produces the intermediate frequency of 465 kilocycles. This particular intermediate frequency is chosen to reduce image response and improve short-wave performance. The intermediate frequency amplifier consists of two 6K7 tubes and three transformers, each with two tuned circuits.

The output of the I. F. amplifier is applied to the 6H6 diode rectifier which is a combined detector and automatic volume control tube. The direct current component of the rectified signal produces a voltage drop across R-14. This voltage drop provides automatic bias for the R. F. and I. F. amplifier and converter tubes and so gives automatic volume control action. Full automatic bias voltage is applied to the pentagrid converter tube and to the first I. F. amplifier tube. The second I. F. tube is operated on self bias, obtained by the drop through R-8. This enables the second I. F. tube to provide maximum power to the 6H6 diode rectifier.

The manual volume control, R-13, selects the amount of audio signal applied to the grid of the 6F5 audio amplifier tube and this regulates the output of the receiver. The output of the 6F5 tube is resistance coupled to the grid of the 6F6 power amplifier pentode. The plate circuit of the 6F6 is suitably matched to the loud-speaker by means of a step-down output transformer.

The tone control circuit consists of a .003-mfd. capacitor connected in series with a grounding switch S-3 in the grid circuit of the 6F6 output tube. When it is desired to reduce the high frequency output of this receiver the switch S-3 is closed to ground.

Plate and grid voltages for all tubes are supplied by the power supply system employing a 5W4 full-wave rectifier tube which, together with a suitable network of resistors and capacitors, supplies the required voltages and filtering action.

PHONOGRAPH

The record reproducing facilities consist of a high impedance magnetic pickup with its associated balanced tone-arm, a compensated volume control, audio amplifier and loud-speaker of the receiver. In changing from radio reception to phonograph reproduction the phono-radio switch simultaneously disconnects the 6H6 diode from the volume control, connects the phono-pickup across this control, and shorts the 6H6 diode output, rendering the R. F. and I. F. sections inoperative.

The turntable assembly consists of a combination line switch which is simultaneously turned on when the phono-radio switch is turned on the phonograph position. A separate motor switch is provided to permit starting and an adjustable automatic stop.

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A 5	115	60	105
A 5	115	60	105
C 2	115	25	105
V 6	105-130/200-250	60	105
V 5	105-130/200-250	50	105
V 4	105-130/200-250	40	110

NOTE.—Taps on universal transformers (Rating "V") are accessible by removing the cap cover on the top of the transformer.

Tubes

Converter and Oscillator .... 6A8 Pentagrid Converter
1st I. F. Amplifier ..... 6K7 Super-control Amplifier
2nd I. F. Amplifier .... 6K7 Super-control Amplifier
Detector and AVC ...... 6H6 Twin Diode
Audio Amplifier .... 6F5 High Gain Triode
Output .... 6F6 Power Amplifier Pentode
Power Rectifier .... 5W4 Full-wave Rectifier
Dial Lamp .... MAZDA No. 46

ALIGNMENT PROCEDURE

The receiver should first be allowed to run for fifteen minutes in order to reach its approximate normal operating temperature. Before making any adjustments, it is wise to determine the correctness of the existing alignment. This may be done by supplying a signal at the alignment frequency from the test oscillator to the receiver and inserting a "Tuning Wand" into the coil involved. The "Tuning Wand" consists of a bakelite rod having a brass cylinder attached to one end, and a small core of finely divided iron compacted into the opposite end. For use on this receiver, it is recommended that a "Tuning Wand" having a flexible center portion be employed. The standard "Tuning Wand" may be adapted by cutting the bakelite rod in half and joining the two resulting pieces with a short length of rubber tubing. By inserting the brass cylinder end into the center of a particular coil, the inductance of the coil is lowered, increasing its resonant frequency. Inserting the iron-filled end into the coil raises its inductance, lowering its resonant frequency. If the circuits are in exact alignment, inserting either end of the tuning wand in any coil will result in a decrease in output. When an increase in signal is obtained with the iron-filled end of the wand, a decrease in resonant frequency of that circuit by increasing its trimmer capacity is indicated. When an increase in signal is obtained with the brass cylinder, a decrease in trimmer capacity is indicated.

Changes Indicated by Wand

Wand	Signal	Trimmer Adjustment Required
Brass cylinder	Decrease	None
Iron filings	Decrease	
Brass cylinder	Increase	Decrease capacity
Iron filings	Decrease	
Brass cylinder	Decrease	Increase capacity
Iron filings	Increase	

ALIGNMENT FREQUENCIES

I. F.	Band "B"	Band "D"	Wave Trap
465 kc.	580 kc. 1500 kc.	18,000 kc.	465 kc.

In order to align these receivers properly, it is necessary to have available the following test equipment:

1. A modulated test oscillator with frequencies available of 465, 580, 1500, and 18,000 kc.
2. An output indicator, such as a high resistance a-c. voltmeter with a maximum scale reading of 3 to 5 volts, or a neon lamp output indicator.
3. An alignment tool consisting of an insulating shaft with a small screwdriver blade.
4. A tuning wand.

The location of all trimmer capacitors, as well as socket voltages to chassis, is shown in Figs. 2 and 3.

1. I. F. Alignment

Set the frequency band switch of the receiver to Band "B," short-circuit the antenna and ground terminals and tune the receiver to some point where no signal is heard. Set the volume control at its maximum position and ground the chassis.

The I. F. amplifier is tuned to 465 kc.; set the test oscillator dial at this frequency. Connect the test oscillator output between the converter tube (6A8) control grid and chassis. Connect the output meter across the cone coil of the speaker and adjust the test oscillator output control so that, with the receiver volume control at maximum, a small deflection is observed on the output meter. During both I. F. and R. F. alignment, the test oscillator signal should be maintained at the lowest level that will give a good readable output indication.

Adjust the secondary trimmer of the third I. F. transformer until a maximum output reading is obtained. Maintain a small deflection on the output meter throughout alignment by adjusting the test oscillator output. Next, adjust the primary trimmer of the third I. F. transformer for maximum output. Continue this procedure, adjusting the secondary and primary trimmers, respectively, of the second I. F. transformer. The secondary trimmer of the first I. F. transformer may then be adjusted and, lastly, the primary trimmer of the first I. F. transformer. After completing this procedure, repeat it a second time for final alignment. The I. F. alignment will then be complete.

I. F. Wave Trap Alignment

After completion of the I. F. alignment, with the test oscillator still set on 465 kc., apply this frequency to the antenna post of the receiver through a dummy antenna. This dummy antenna consists of a 400-ohm resistor in series with a 250-mmfd. capacitor and should be connected in series between the test oscillator output and the receiver antenna post. With the 465-kc. signal applied to the receiver antenna post, adjust the I. F. Wave Trap trimmer for *minimum* output indication.

2. R. F. Alignment

First of all, check the position of the dial pointer. To do this, rotate the gang condenser to the maximum capacity position, i.e., plates fully meshed. While in this position, align the pointer with the last black line on the scale by loosening the dial drum set screws and rotating the drum on the gang shaft. Make sure the antenna and ground terminals of the receiver are not short-circuited and connect to them the output of the test oscillator, preferably using the dummy antenna described above between the test oscillator and the receiver antenna terminal. Connect the output indicator across the speaker cone coil.

"D" Band (5.6-18.0 mc.)

Because of the R. F. circuit used in this receiver, the "D" band must be aligned first. Set the frequency band switch to the "D" band position by rotating it to its most clockwise position. Tune the test oscillator to 18,000 kc. (18 mc.) and set the dial pointer on the receiver at this frequency. Adjust the "D" band oscillator trimmer, located on the front section of the gang condenser, for maximum output. (NOTE. The oscillator operates on the *low* frequency side of the incoming signal; therefore adjust the trimmer until the second oscillator peak is reached as the trimmer is *increased* in capacity. A check for the correctness of this adjustment may be made by rotating the gang to the 17,070 kc. calibration mark. If, with increased input from the test oscillator, no signal is detected, the correct oscillator peak has been used.) Keep the receiver volume control at its extreme clockwise position and adjust the test oscillator output to maintain a small reading on the output indicator. When the optimum adjustment on the oscillator trimmer has been obtained, adjust the "D" band antenna trimmer on the rear section of the gang for maximum output while rocking the tuning condenser through the signal.

"C" Band (1.56-5.80 mc.)

No separate trimmers are provided for adjustment of this band. The correct adjustment of the "D" band and "B" band automatically aligns the "C" band. The adjustment procedure for the "B" band follows immediately.

"B" Band (540-1600 kc.)

Set the frequency band switch to the broadcast position. Rotate the gang condenser until the dial pointer indicates the 1500 kc. calibration point, and adjust the test oscillator to this frequency. The "B" band trimmers are located underneath the chassis. (See Fig. 2.) Adjust the broadcast oscillator trimmer for maximum output. This trimmer is the one nearest the volume control. When the oscillator has been peaked, adjust the antenna trimmer for maximum output. Here again, as pointed out previously, it is necessary to maintain a small R. F. input from the test oscillator to avoid erratic action of the output indicator due to automatic volume control action.

Now set the test oscillator at 580 kc. and tune the receiver to that frequency. Slowly, rocking the tuning condenser back and forth through the signal, adjust the 580-kc. padding capacitor for maximum output. When this has been done, return to 1500 kc. on the receiver and test oscillator and recheck the alignment at that frequency for maximum output. The broadcast band should now be in alignment.

ADJUSTMENT OF DIAL MECHANISM

The dial mechanism is rigidly mounted to the frame of the tuning condenser by means of two removable, self-tapping screws. The complete assembly is rubber-mounted on rubber cushions at the points of support.

The dial mechanism consists of the following parts:

1. Dial Scale.
2. Reflector.
3. Mounting Bracket.
4. Dial Pointer.
5. Dial Pointer Drive Cable.
6. Drive Cable Tension Spring.
7. Two Idler Pulleys.
8. Cable Drum (mounted on condenser shaft).
9. Vernier Drive.

To Replace Dial Scale or Reflector

Twist the supporting tabs at either end of the scale into alignment with the slots and remove the scale and reflector. Disengage the old scale from the reflector and insert the new scale in its place with the mounting slots in alignment. Replace scale and reflector on the bracket and twist the inner corner of each tab over the outer edge of the slot with which it is engaged.

To Replace Dial Pointer

Disengage the clamping tabs at the rear of the slider from the cable by bending down the center one of the three tabs. Place the new pointer on the scale in a position to agree with the calibration. Secure the pointer to the cable by pinching together the clamping tabs with enough pressure to hold firmly without damaging the cable.

To Replace Dial Pointer Drive Cable

Remove the dial pointer as explained above and set the tuning condenser gang for maximum capacity (plates all meshed). Remove the old cable from the cable drum and engage one end of the new cable with the upper end of the keyhole slot in the drum circumference. Draw the cable clockwise over the top of the drum and through the notch in the right-hand end of the bracket, then around the idler pulley and to the left, close to the scale, passing around the idler pulley mounted in the tension spring and clockwise over the top of the drum. Note that the pulleys are held in place by the tension on the cable. Release the spring tension on the drive cable by pressing inwardly on the tension idler pulley, then insert the free end of the cable in the keyhole slot.

To Replace Cable Drum

Remove the dial scale and reflector bracket as explained elsewhere. The cable drum can then be removed by loosening the two set screws in the hub. When replacing the cable drum, set the condenser so that all plates are fully meshed. The right-hand end of the radial slot in the drum web should then be approximately $\frac{1}{16}$ of an inch clear of the tuning knob shaft bearing bushing. Locate the cable drum axially on the condenser shaft so as to clear the heads of the two mounting bracket screws.

To Replace Mounting Bracket

Remove the dial scale and reflector bracket, also the cable drum. Access may be had to the mounting bracket self-tapping screws when this is done. In replacing the mounting bracket it is necessary to insure that the lower edge of the bracket is parallel to and at height above the top of the cabinet chassis support panel of $5\frac{3}{4}$ inches.

To Adjust the "Automatic Vernier" Drive

The vernier drive used on this receiver includes a planetary reduction unit equipped with a clutch which automatically changes the reduction ratio. This clutch consists of a sleeve mounted on the knob shaft. To adjust, loosen the locking screw and move the sleeve axially along the shaft until the cam surface in the end of the sleeve engages with the pin in the knob shaft. This engagement should take place at a point on the cam surface as near to the stop as possible and still allow complete release of the clutch.

REPLACING COILS

In case of an open or shorted pickup coil, the method of replacement is obvious upon inspection of the pickup assembly and by study of Fig. 6. It is important to adjust the armature as previously explained after reassembly of the mechanism. Only rosin core solder should be used in soldering the coil leads to the lugs.

GENERAL ELECTRIC CO.

PHONOGRAPH

The phonograph mechanism in this receiver has been designed to be simple and foolproof. Under normal operating conditions, service difficulties should be negligible. Occasionally, however, certain adjustments may be required. These adjustments are explained in the following paragraphs.

MOTOR ADJUSTMENTS

The speed of the turntable motor is controlled by a governor which allows correct adjustment of the turntable rotation to 78 revolutions per minute. A pointer is provided under the turntable and the base plate is marked "F" and "S" to indicate direction to move pointer for faster or slower operation. A check of the turntable rotational speed may be made by placing a piece of paper under a record on the turntable and counting the number of times it rotates past a fixed point in one minute.

There is another type motor used in some sets of this model that does not have a speed control on the base plate. The speed of this motor is regulated by an adjustable collar on the governor. This is adjusted to 78 RPM at the factory and should not require attention.

The motor bearings and gears are properly lubricated for long operation under normal weather conditions. If the motor chatters or runs uneven, place a few drops of light machine oil on the governor felt.

TRIP MECHANISM

The trip mechanism is of simple design and consists of a latch bar connected to the motor switch and a trip lever. The latch is held closed by means of a spring between the latch bar and the trip lever. Be sure the parts work freely without binding.

The trip is actuated by an adjustable arm on the trip lever. When the eccentric groove in the record swings the tonearm back and forth, it pushes the latch out of engagement.

MAGNETIC PICKUP

The pickup used in the phonograph is of an improved design. It is horizontally mounted in the tonearm and is held by a single set screw. The horseshoe magnet is fastened to the pole pieces by means of a set screw and clamp. The armature is centered by means of a split rubber block, which also provides a damping effect on the armature movement. The frequency response is uniform over a wide range.

Service operations which may be necessary on the pickup are as follows:

CENTERING ARMATURE

Refer to Fig. 6 showing the pickup inner structure. The armature (11) is shown in its proper relation to the magnet pole pieces, i.e., exactly centered. Whenever this centering adjustment has been disturbed, the screws (5) and (10) should be loosened and the armature rubber cushion (12) adjusted so the vertical axis of the armature is at right angles to the horizontal axis of the pole piece (8). Adjust the tension on the armature until there is a slight rocking motion. The spacing between the pole pieces and armature should be .0125 inch on each side.

DAMPING BLOCK

The top projection of the armature is imbedded in a rubber block (6) attached to the top of the pole pieces. This damping block acts as a mechanical filter to eliminate undesirable resonances and to cause the frequency reponse to be uniform. Should it be necessary to replace this damping block, it may be done by removing the yoke (7).

MAGNETIZING

The loss of magnetization will not occur when the pickup has received normal care, due to the fact that the magnet and pole pieces are one unit and the magnetic circuit remains closed at all times. When the pickup has been mishandled, subjected to a strong AC field, jolted or dropped, there may be an appreciable loss of magnetic strength, in which case it will be necessary to remagnetize the entire structure. This should be done by placing the pickup assembly on the poles of a standard pickup magnetizer and changing the pickup in accordance with the instructions accompanying the magnetizer. It is preferable to check the polarity of the pickup magnet and to remagnetize it so that the same polarity is maintained.

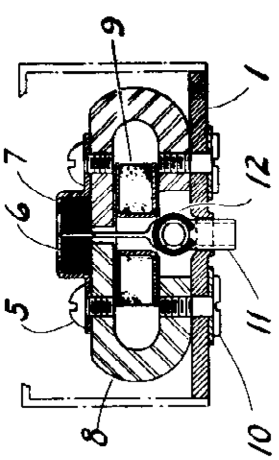


Fig. 6. Front View of Pickup

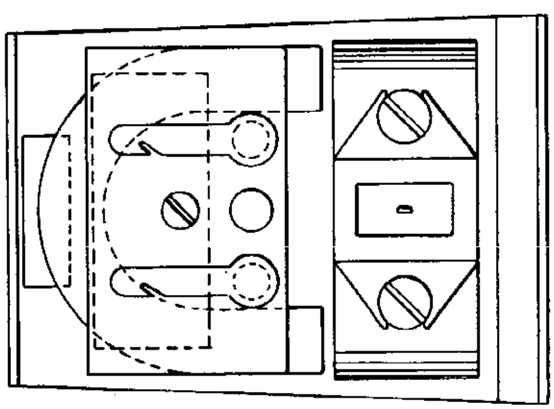


Fig. 5. Top View of Pickup

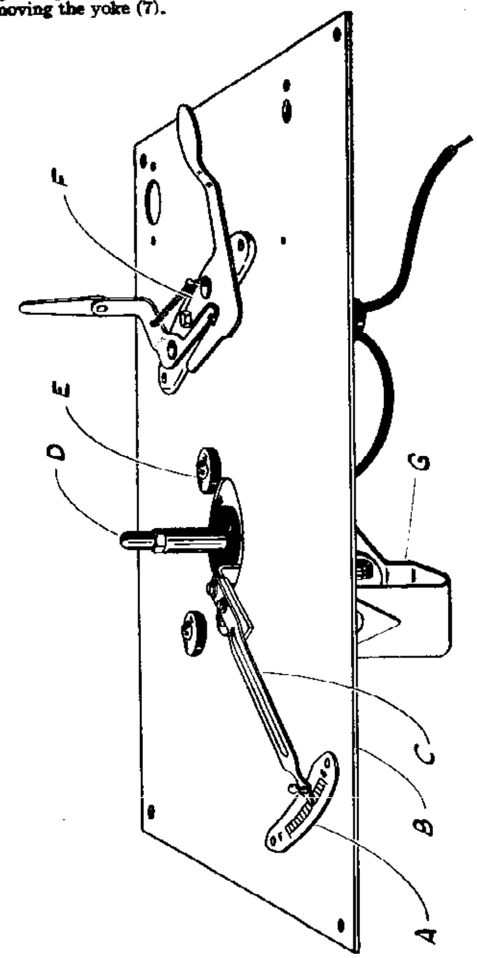


Fig. 4. Phonograph Motor Board

MODEL E-79
Parts

GENERAL ELECTRIC CO.

REPLACEMENT PARTS

INSIST ON GENUINE FACTORY-TESTED PARTS, WHICH MAY BE PURCHASED FROM AUTHORIZED DEALERS

Stock No.	Description	List Price
*RB-026	BOARD—Antenna & Ground Terminal Board	$0.10
RB-040	BOARD—Terminal Board Near Oscill. Padder	.10
RB-054	BOARD—Terminal Board on Front Wall near Volume Control	.10
RB-134	BRACKET—Dial Light Bracket	.15
RB-135	BRACKET—Dial Support Bracket	.15
RC-014	CAPACITOR—.003 mfd., 200 volt, Paper (C-22)	.25
RC-017	CAPACITOR—.0045 mfd., 200 volt, Paper (C-16)	.25
RC-018	CAPACITOR—.004 mfd., 600 volt, Paper (C-19)	.30
*RC-024	CAPACITOR—.005 mfd., 200 volt, Paper (C-24)	.25
*RC-029	CAPACITOR—.005 mfd., 400 volt, Paper (C-20)	.30
*RC-034	CAPACITOR—.01 mfd., 200 volt, Paper (C-21)	.25
RC-036	CAPACITOR—.008 mfd., 200 volt, Paper (C-26)	.25
*RC-072	CAPACITOR—.05 mfd. 200 volt, Paper (C-4, C-11, C-12)	.25
*RC-080	CAPACITOR—.02 mfd., 400 volt, Paper (C-14)	.25
*RC-091	CAPACITOR—.05 mfd., 400 volt, Paper (C-6)	.30
*RC-096	CAPACITOR—.1 mfd., 200 volt, Paper (C-5, C-13)	$0.30
*RC-123	CAPACITOR—.1 mfd., 400 volt, Paper (C-7, C-9, C-10)	.35
RC-218	CAPACITOR—50 mmfd., Mica (C-8)	.25
RC-235	CAPACITOR—100 mmfd., Mica (C-25)	.25
RC-261	CAPACITOR—250 mmfd., Mica (C-33, C-34, C-39)	.25
*RC-344	CAPACITOR—1300 mmfd., Mica (C-23)	.35
*RC-412	CAPACITOR—30 mfd., 280 volt, Wet Electrolytic (C-2)	1.20
RC-413	CAPACITOR—16 mfd., 340 volt, Wet Electrolytic (C-1)	1.25
*RC-608	CAPACITOR—Oscillator Padder, 300-500 mmfd. (C-15)	.40
RC-618	CAPACITOR—Trimmer Capacitor (On Lower Front Wall) (C-37, C-38)	.25
RC-710	CONDENSER—Two-gang Tuning Condenser, 10-452 mmfd. (C-29, C-30)	3.60
RC-754	CAPACITOR—Line Capacitor, .01-.01 mfd., 250 volt A.C. (C-17, C-18)	.40
RC-815	CABLE—Dial Cable (Pkg. of 5)	.50
*RC-854	CORD—Power Cord and Plug	.60
RD-030	DRUM—Condenser Drive Drum	.40
RD-032	DIAL—Dial Scale	.30
RD-034	DRIVE—Condenser Drive	1.10
RF-010	FOOT—Chassis Mounting Foot	.30
*RG-001	GRID CAP—Control Grid Cap, Pkg. of 5	.10
*RK-004	KNOB—Control Knob (Without Dot) (Pkg. of 5)	$0.40
*RK-005	KNOB—Control Knob (With Dot) (Pkg. of 5)	.50
RL-121	COIL—R.F. Coil Band D (L-7, L-8)	.75
RL-122	COIL—R.F. Coil Band B and C (L-5, L-13; L-6, L-14)	1.10
RL-223	COIL—Osc. Coil Band D (L-11, L-12)	.70
RL-224	COIL—Osc. Coil Band B and C (L-9, L-15; L-10, L-16)	1.00
RP-042	PULLEY—Dial Pulley (Pkg. of 2)	.15
RP-045	POINTER—Dial Pointer and Guide	.10
RP-046	PLATE—R.F. Coil Unit End Plate with Shield	.25
RQ-047	RESISTOR—330 ohms, ¼ watt, Carbon (R-18) (Pkg. of 5)	.60
RQ-067	RESISTOR—2200 ohms, ¼ watt, Carbon (R-4, R-7, R-8) (Pkg. of 5)	.60
*RQ-083 (RR-021)	RESISTOR—10,000 ohms, ¼ watt, Carbon (R-15) (Pkg. of 5)	.60
RQ-099	RESISTOR—47,000 ohms, ¼ watt, Carbon (R-6) (Pkg. of 5)	.60
RQ-103	RESISTOR—68,000 ohms, ¼ watt, Carbon (R-16) (Pkg. of 5)	.60
*RQ-107 (RR-050)	RESISTOR—100,000 ohms, ¼ watt, Carbon (R-10) (Pkg. of 5)	.70
RQ-115	RESISTOR—220,000 ohms, ¼ watt, Carbon (R-14) (Pkg. of 5)	.70
RQ-123	RESISTOR—470,000 ohms, ¼ watt, Carbon (R-12) (Pkg. of 5)	.70
RQ-127	RESISTOR—680,000 ohms, ¼ watt, Carbon (R-11) (Pkg. of 5)	.70
RQ-139	RESISTOR—2.2 megohms, ¼ watt, Carbon (R-9) (Pkg. of 5)	.70
RR-716	RESISTOR—Tapped Bleeder Resistor (R-1, R-2, R-3, R-4, R-5)	.90
RR-905	REFLECTOR—Dial Light Reflector	.15
RS-136	SHIELD—1st or 2nd I.F. Shield Can	.20
RS-137	SHIELD—3rd I.F. Shield Can	.20
RS-164	SHIELD—Chassis End Shield	.30
*RS-200	SOCKET—8 Pin Tube Socket (Pkg. of 5)	.75
*RS-204	SOCKET—5 Pin Tube Socket (Pkg. of 5)	.75
RS-321	SWITCH—Tone Control Switch (S-3)	.30
RS-323	SWITCH—Band Change Switch (S-1)	1.25
RS-415	SPRING—Spring Bracket Supporting Cable Pulley (Pkg. of 2)	.10
RS-423	SPRING—Knob Spring (Push-on type) (Pkg. of 10)	.25
RS-858	SCREWS—Set Screws for Dial Drive Drum (Pkg. of 10)	.10
RT-074	TRANSFORMER—Power Transformer, 115 volts, 50-60 cycles (T-1)	4.50
RT-075	TRANSFORMER—Power Transformer, 115 volts, 25-60 cycles (T-1)	8.35
RT-076	TRANSFORMER — Universal Power Transformer, 105-130 volts and 200-250 volts, 40-60 cycles (T-1)	8.50
RT-223	TRANSFORMER—1st or 2nd I.F. Transformer (Complete) (L-1, L-2; C-35, C-36) (L-22, L-23; C-41, C-42)	1.50
RT-224	TRANSFORMER—3rd I.F. Transformer (Complete) (L-3, L-4; C-31, C-32)	1.75
RV-014	VOLUME CONTROL—Volume Control and Power Switch, 2.2 meg. Total Res. (R-13, S-2)	1.15
RW-005	WINDOW—Dial Window	.15
*RW-101	WASHER—Felt Washers for Control Shafts (Pkg. of 10)	.45
*RW-102	WASHER—Insulating Washer for Mounting Electrolytic (Pkg. of 10)	.20
RW-400	WAVE TRAP COMPLETE—(L-17, C-3)	.80
RX-016	MOUNTING ASSEMBLY—Screws and Cushions for Mounting Tuning Condenser	.30
	SPEAKER ASSEMBLY	
RC-910	CONE—12-in. Cone and Voice Coil and Gasket (L-18)	$1.45
RC-991	CLAMP—Cone Spider Clamp	.05
*RP-012	PLUG—Female Speaker Plug	.20
RP-044	PLUG—Male Speaker Plug	.20
RS-031	SPEAKER—12-in. Reproducer Unit Complete with Transformer (L-18, L-19, L-20, T-2)	9.80
RS-416	SPRING—V.C. Leads Spring (Pkg. of 2)	.10
RT-413	TRANSFORMER—Output Transformer (T-2)	1.30
	PHONOGRAPH MOTOR BOARD ASSEMBLY	
RPB-007	BASE PLATE—13 in. by 13 in. Base plate (Brown enamel finish) (B)	2.50
RPB-008	BASE PLATE—13 in. by 13 in. Base plate Brown enamel finish (for motor with fixed speed regulator) (B)	2.50
RPL-004	LEVER—Motor speed regulator lever (C)	.25
RPP-010	PLATE—Speed Regulator Plate (A)	.35
RPR 004	RIVET—Rivet for Holding Automatic Stop to Base Plate (Pkg. of 5)	.05
RPS-025	SCREW—Turntable shaft thumb screw (D)	.20
RPS-026	SCREW—Screw for attaching speed regulator lever to bracket (Pkg. of 5)	.10
RPS 027	STOP—Automatic stop and switch (complete) (F)	1.50
RPT-002	TURNTABLE—10-in. turntable (Brown velveteen)	1.75
RPW 005	WASHER—Turntable drive washer (rubber)	.05
RPW-019	WASHER—Turntable drive washer (metal)	.05
	MOTOR ASSEMBLIES	
RPM-005	MOTOR—Motor complete—78 RPM 115 V. AC 60 cycles (G)	13.75
RPM-006	MOTOR—Motor complete (with fixed speed reg. mech.) 78 RPM 115 V. AC 60 cycles (G)	12.00
RPM-007	MOTOR—Motor complete—78 RPM 115 V. 50 cycles (G)	13.75
RPM-008	MOTOR—Motor complete—78 RPM 115 V. 40 cycles (G)	15.25
RPM-009	MOTOR—Motor complete—78 RPM 115 V. 25 cycles (G)	15.25
RPX-003	MOUNTING ASSEMBLY—Six steel washers, six rubber washers, three mounting screws and hex. mtg. screw nuts (E)	.20

REPLACEMENT PARTS

INSIST ON GENUINE FACTORY-TESTED PARTS, WHICH MAY BE PURCHASED FROM AUTHORIZED DEALERS

Stock No.	Description	List Price
	PICKUP AND TONEARM ASSEMBLY	
RPA-007	ARM—Pickup arm complete (including base and tonearm mtg. bracket)	2.30
RPA-008	ARMATURE—Pick-up armature (11)	.80
RPB-009	BASE—Pickup base plate (1)	.30
RPC-009	CABLE—Shielded pickup cable	1.50
RPC-010	CUSHION—Armature Rubber damping cushion (6) (Pkg. of 5)	.25
RPL-800	COIL—Pick-up coil assembly (9)	1.50
RPP-011	PICKUP—Pickup unit complete (L-21) (Less tone arm)	5.40
RPS-028	SCREW—Needle clamp screw	.30

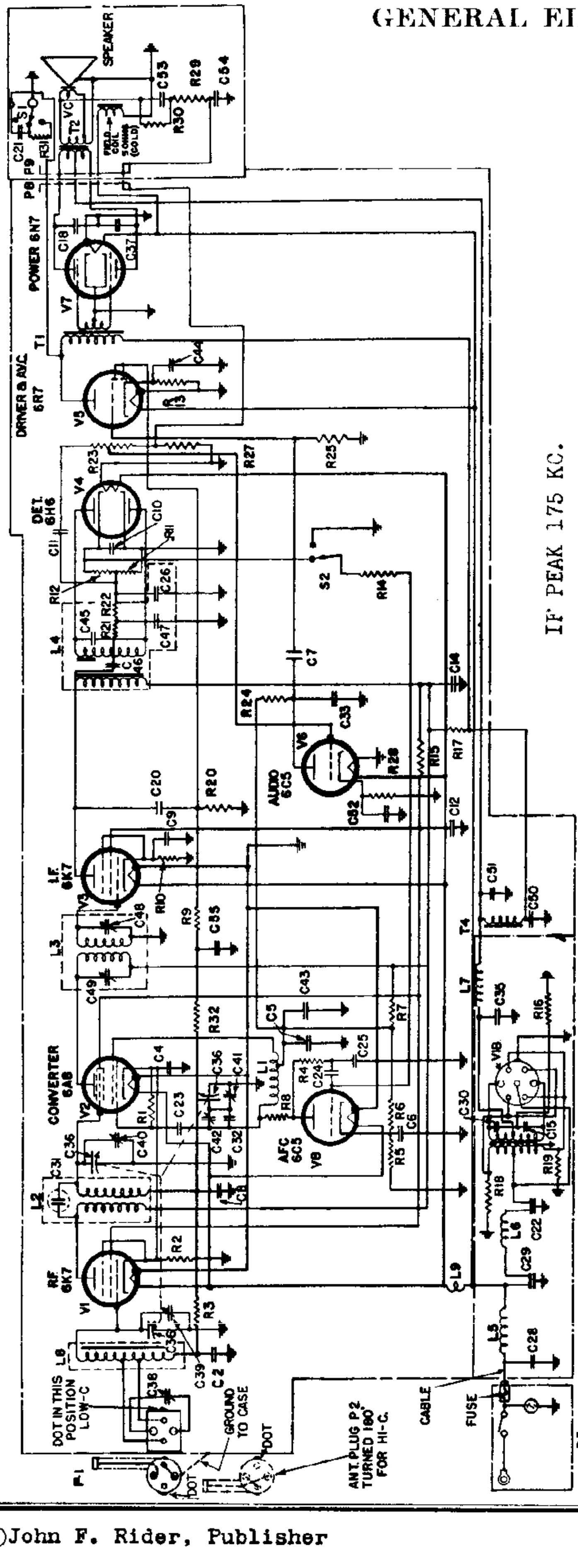
Stock No.	Description	List Price
	MISCELLANEOUS ASSEMBLIES	
RPB-005	BOARD—Terminal board for phono leads (Rear of chassis)	.15
RPC-011	CABLE—Phono radio switch cable with 3 lugs	.35
RPC-013	CORD—Phonograph power cord with female connector	.80
*RC-046	CAPACITOR—Phono radio switch capacitor (.02 mfd. 200 V.) (C-43)	.25
RK-002	KNOB—Phono radio switch knob (Pkg. of 5)	.50
RQ-087	RESISTOR—Phono radio switch resistor 15,000 ohm ¼ watt carbon (R-17) (Pkg. of 5)	.60
RPS-302	SWITCH—Phono radio switch with hex. nut ⅜"-32 (S5, S6)	1.10

* Indicates part also used on 1936 "A" line receivers.

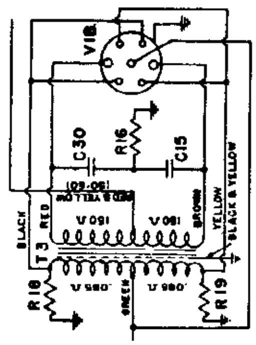
(Prices subject to change without notice)

MODEL FA-80
Schematic
Resistance

GENERAL ELECTRIC CO.



IF PEAK 175 KC.



APPROX. RESISTANCE MEASUREMENTS

Fig. 2. Schematic Circuit Diagram

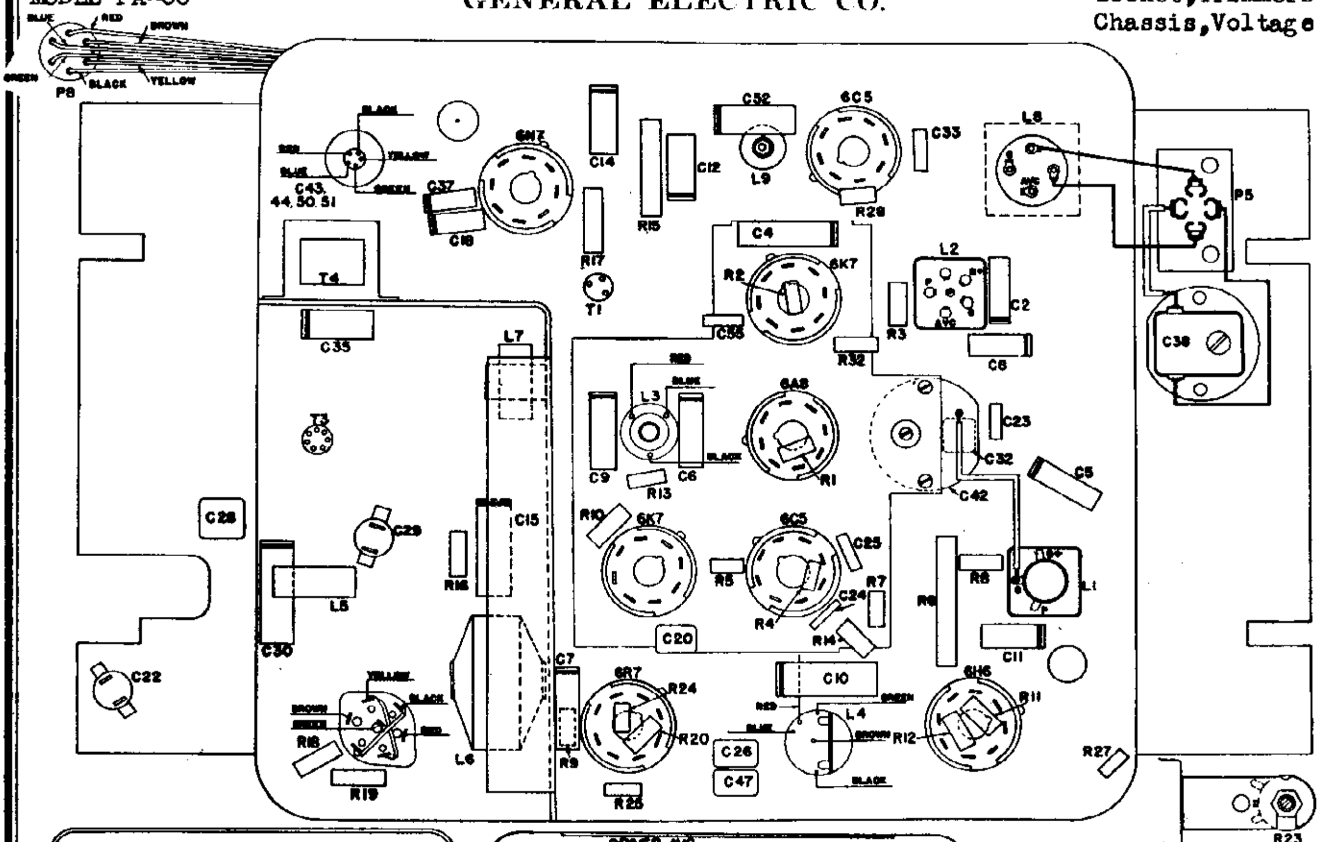
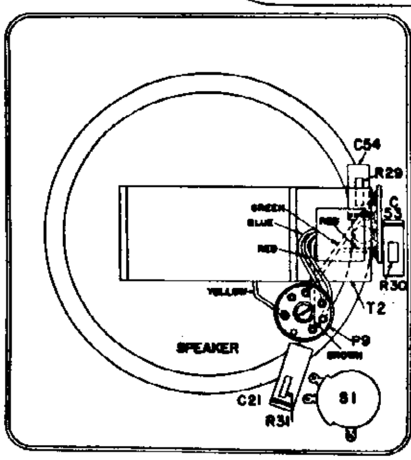


Fig. 3. Chassis and Speaker Parts Layout



FRONT COVER ASSEMBLY-MODEL-FA-80

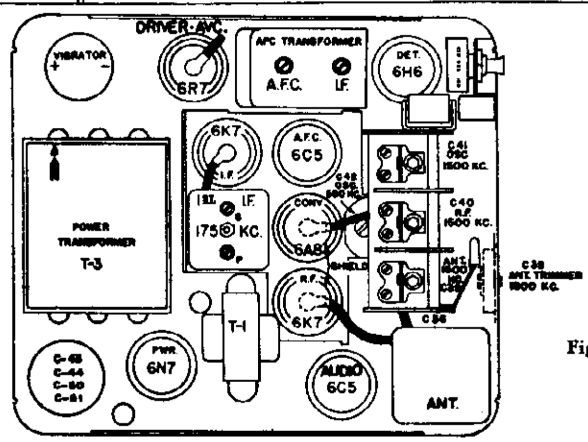


Fig. 1. Chassis Layout and Trimmer Locations

AVERAGE SOCKET VOLTAGES

Tube		Plate to Ground Volts DC	Screen Grid to Ground Volts DC	Cathode to Ground Volts DC	Heater Volts DC	Cathode Current M.A.
6K7 R.F.		200	102	3.9	6.3	7.3
6A8	Oscillator	180			6.3	11.2
	Converter	200	102	3.9		
6K7 I.F.		200	102	3.9	6.3	7.3
6C5 A.F.C.		172		8.3	6.3	0.6
6C5 1st Audio		115		3.9	6.3	2.8
6R7 Driver		235		7.4		7.7
6N7 Output		250		0	6.3	30.0

Filter Input Voltage—258 Volts
Filter Output Voltage—246 Volts Storage Battery—6.4 volts—no signal input—1000 ohms per volt meter—dial pointer at 54.
Total Plate Current—72 M.A.

MODEL FA-80
Circuit Data
Alignment, Installation

GENERAL ELECTRIC CO.

GENERAL INFORMATION

Model FA-80 is a compact, single-unit superheterodyne receiver employing eight General Electric Metal Tubes and a synchronous type vibrator power supply. High power output is provided by the use of a 6N7 tube in push-pull class "B" output and an efficient 6½-inch electrodynamic speaker. The use of an iron-core antenna coil and an antenna matching trimmer, results in maximum transfer of energy from the antenna to the control grid of the 6K7 R.F. tube, providing a high signal-to-noise ratio.

The receiver chassis is housed in a sturdy metal case. To change tubes or align the receiver, it is only necessary to remove the speaker cover which is secured by four snap fasteners. The chassis can be taken out of the case for servicing by removing seven self-tapping screws.

ANTENNA MATCHING SYSTEM

The design of the antenna input system makes it possible to use these receivers with either low- or high-capacity antennas with maximum efficiency. In general, the fish-pole, under-car, built-in top, and over-top antennas are of the low-capacity type. Insulated metal top or insulated running board antennas used in some cars, are of the high-capacity type.

The antenna male plug can be inserted into the female receptacle on the receiver in either of two positions. If the car antenna is of the low-capacity type, the plug should be inserted so that the red dots on the male plug and the receiver case are on the same side. If a high-capacity antenna is used, the red dots should be opposite each other.

The antenna coupling trimmer (C-38) should be adjusted on a weak signal between 1200 and 1500 kc with volume control nearly full on. It may not be possible to "peak" the trimmer if an extremely low-capacity antenna is used. In such cases, turn the trimmer (C-38) to its maximum capacity (counterclockwise) position, and "peak" the trimmer (C-39) on the antenna section of the gang condenser. (Antenna plug in low-capacity position.)

If the antenna coupling trimmer (C-38) can be peaked with the antenna plug inserted in either position, it is recommended that the low-capacity position (red dots adjacent) be used. In some installations where there is not much room to work, it is advisable to adjust the antenna coupling trimmer before bolting the receiver in place.

The wiring of the antenna plugs is such that, in the low-capacity position, C-38 is in series with the antenna to the high tap on the antenna coil. In the high-capacity position, C-38 is in series with the antenna to the low tap on the antenna coil. These connections may be traced on the schematic diagram.

DEGENERATION

Audio degeneration is provided by returning a portion of the voice coil voltage of the proper phase to a section of the volume control circuit. This is accomplished by grounding one side of the output transformer secondary and connecting the high side through the resistor and capacitor filter, consisting of R-30, C-53, R-29, and C-54, back to the 5000-ohm resistor (R-27) which is in series with the volume control (R-23) to ground. Further degeneration of the low-frequency notes is accomplished in the cathode circuit of the 5C5 1st audio tube by limiting the value of the by-pass condenser (C-52) to .5 mfd.

The use of degeneration improves the frequency response and reduces non-linear distortion introduced by the audio amplifier.

AUTOMATIC FREQUENCY CONTROL

Through a special circuit arrangement, the frequency of the heterodyne oscillator in this receiver is varied up or down so that the resultant IF signal is held closely to 175 kc (the frequency to which the IF channel is peaked) even though the receiver is mistuned.

When the IF signal reaching the AFC transformer is of a frequency higher or lower than 175 kc the d-c voltages developed across the 6H6 diode load resistors R-11 and R-12 are unequal. Since these voltages are bucking, the AFC voltage taken from the top end of R-12, will be either positive or negative in respect to ground depending on which side of resonance the receiver is tuned. When the receiver is detuned to the low-frequency side of the desired station the control voltage will be positive; when detuned to the high side it will be negative.

The AFC 6C5 is connected in parallel with the oscillator tank coil and, because of the excitation on its control grid, acts like a shunt inductance, capable of varying the oscillator frequency in the required direction to correct mistuning. Positive control voltage applied to the 6C5 control grid raises the oscillator frequency; negative voltage lowers the frequency. Because of the bias placed on the 6C5 cathode, its control grid never actually goes positive; positive control voltage merely lowering the normal negative grid bias.

The AFC may be made inoperative by switching S-2 to the position wherein the 6C5 grid resistor R-14 is returned to ground. The receiver will then operate in the conventional manner.

The AFC transformer is tuned to resonance by changing the position of the primary and secondary iron cores by means of adjustment screws. These cores fit very tightly into the coils so that vibration will not vary their position. Permanence of adjustment is further assured by the use of special fixed capacitors which are made of a single strip of mica, silver plated on each side. The silver plating constitutes the two plates and the mica, the dielectric of the capacitors.

ALIGNMENT PROCEDURE

In order to align these receivers properly, it is necessary to have the following test equipment:

1. A modulated test oscillator.

2. An output indicator such as a 3- to 5-volt a-c voltmeter.

3. An alignment tool with a small screwdriver blade.

The R.F., oscillator and 1st I.F. transformer trimmers are available by removing the speaker cover. The variable iron-core plugs of the 2nd I.F. transformer can be reached from the control side of the receiver case by removing the snap button on each side of the volume control. When the speaker cover is removed from the case, the field return should be made by a jumper lead between the speaker cover and case. The alignment adjustments should be made with the test oscillator output at the lowest level which will give a readable output indication.

I.F. Alignment

1. Connect a low-range a-c voltmeter across the voice coil of the loud-speaker. Place a modulated 175 kc signal on the grid of the converter (6A8) tube through a .05 mfd. condenser. With the AFC switch turned "off" and the volume set at maximum, adjust the 1st I.F. transformer secondary and primary trimmers and the AFC transformer I.F. trimmer for maximum output in the order mentioned. A readjustment of all trimmers should be made.

2. Next adjust the secondary AFC trimmer of the AFC transformer as follows: *Without disturbing the 175-kc setting of* the signal generator, place the input lead on the rubber insulation of the converter (6A8) grid lead. This will provide a small signal input through the capacity between the leads. Increase the attenuator setting if necessary to make the output audible. If the signal generator is provided with a switch for removing the modulation, switch if "off." However, the adjustment may be carried out satisfactorily even with a modulated signal.

3. Tune in a weak broadcast station at about 1000 kc and with the AFC switch "off" tune the receiver carefully for zero beat between this carrier and the 175-kc generator signal. Throw the AFC switch "on" and adjust the AFC secondary trimmer to give a zero beat note. This adjustment is very critical and must be made with great care. When the alignment is properly made, there will be no appreciable difference in the beat note when the AFC switch is thrown "on" or "off."

R.F. Alignment

Attach the flexible cables to the control head and to the proper bushings on the receiver. Make sure that the control head is rigidly fastened and that its relative position in respect to the receiver will not change. The AFC switch must be in the "off" position.

1. Adjust the scale calibration by rotating the station selector knob in a counterclockwise direction until the low-frequency end of the dial has reached its stop and the gang plates are completely meshed.

2. Set the test oscillator to 1500 kc with the modulation "on." Connect its output through a 250-mmf. condenser to the prong nearest the red dot on the receiver antenna receptacle. Turn the tone control to the middle—"bass"—position and set the receiver dial to 150. Peak the oscillator (C-41), R.F. (C-40), and antenna (C-39) trimmers respectively (see trimmer location drawing) to give maximum deflection on the output meter.

3. Set the test oscillator to 580 kc and tune the receiver to this signal. Peak the 580-kc capacitor (C-42) while rocking the tuning condenser back and forth through resonance. Leave the padder at the setting which gives the greatest deflection.

4. Realign the oscillator trimmer (C-41) at 1500 kc as in operation No. 2.

INSTALLATION NOTES

BATTERY POLARITY

If the receiver is being used in a car with the positive battery terminal grounded, the vibrator should be inserted so that the arrow on the label points to (+) on the vibrator top. For use with cars having the negative terminal grounded the arrow must point to (−). The receiver will not operate if the vibrator is inserted in the wrong position.

G-E MONOGRAM

If the receiver is mounted in a position in which the G-E monogram is inverted, the cover should be reversed. To do this, it is necessary to turn the speaker 180 degrees to obtain clearance for the output transformer. The speaker can be turned when the two connections to the tone-control switch are lengthened.

ATTACHING VOLUME-CONTROL CABLE

1. Rotate the volume control fully clockwise with a screwdriver.

2. Turn the volume-control knob to its extreme counter-clockwise position, then insert the flexible cable into the receiver bushing.

3. Rotate the knob fully clockwise against the slip-clutch built in the volume control. If the cable tip does not engage the slot in the volume control during the first half of its rotation, reset the volume control with a screwdriver, so that this will occur.

4. Tape both the volume and tuning control cables securely in place to prevent them from changing position.

If these instructions are followed, there will be no tendency for the switch to snap "on" due to tension in the flexible cable.

SETTING THE DIAL

The gang condenser drive is equipped with a friction clutch. After the flexible drive cables have been connected and taped securely in position, rotate the tuning knob in a counterclockwise direction until the dial reaches its stop at the low-frequency end. Continue to rotate the knob for several turns against the friction clutch and the dial will be set correctly.

SUPPRESSION OF IGNITION NOISE

Included with each receiver is a distributor suppressor, a generator condenser, and an ammeter condenser. When these are properly installed, the receiver should be free of ignition noise but if the interference persists, try one or more of the following suggestions:

See that the distributor contacts and spark-plug points do not have too wide a gap. They should be set as recommended by the car manufacturer.

If a built-in roof antenna is used, shield the lead-in from the set up to the antenna and place an R.F. filter, consisting of a choke and condenser, in the lead to the dome light as close as possible to the point where the lead enters the corner post.

When grounding the antenna cable shield, or making any other grounds, select a point which is most effective in reducing the noise pick-up. In some cases quieter operation may be obtained by omitting the antenna-shield ground connection entirely.

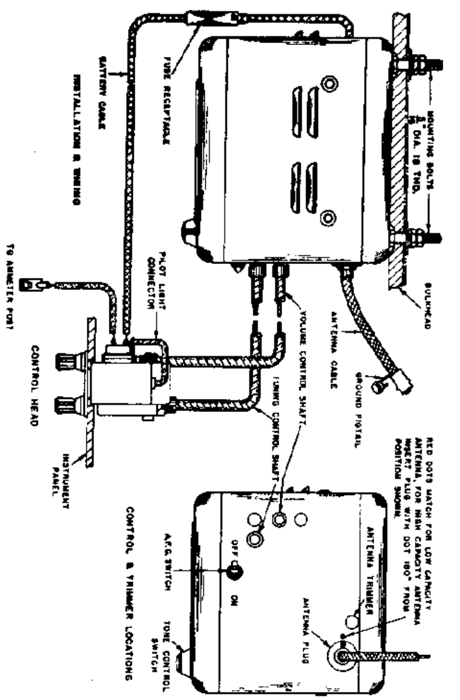


Fig. 4. Installation Diagram

Ground the motor block to the frame by means of ½-inch copper braid. Also ground the steering post, speedometer cable, oil gauge line, etc., to the bulkhead. It is possible that interference may be carried from the motor compartment to the receiver by these cables.

In cars with composite wood and steel bodies, it may be necessary to bond various parts together such as the instrument panel and the corner posts.

If the ignition coil is mounted on the inside of the bulkhead, it may be helpful to move it to the motor side.

Wheel static interference may be overcome by installing static collector springs under the hub caps.

ELECTRICAL SPECIFICATIONS

Tuning Frequency Range........540-1600 kc

Intermediate Frequency........175 kc

Electrical Power Output
Undistorted..............6 watts
Maximum..................9 watts

Tone Control................3-point control

Current Consumption
Storage Battery..........6.3 volts—6.5 amps.

Loudspeaker—Electrodynamic
Speaker Diameter..........6½ inches
Cone Coil Impedance......5.5 ohms at 400 cycles

MODEL FA-80
Parts

GENERAL ELECTRIC CO.

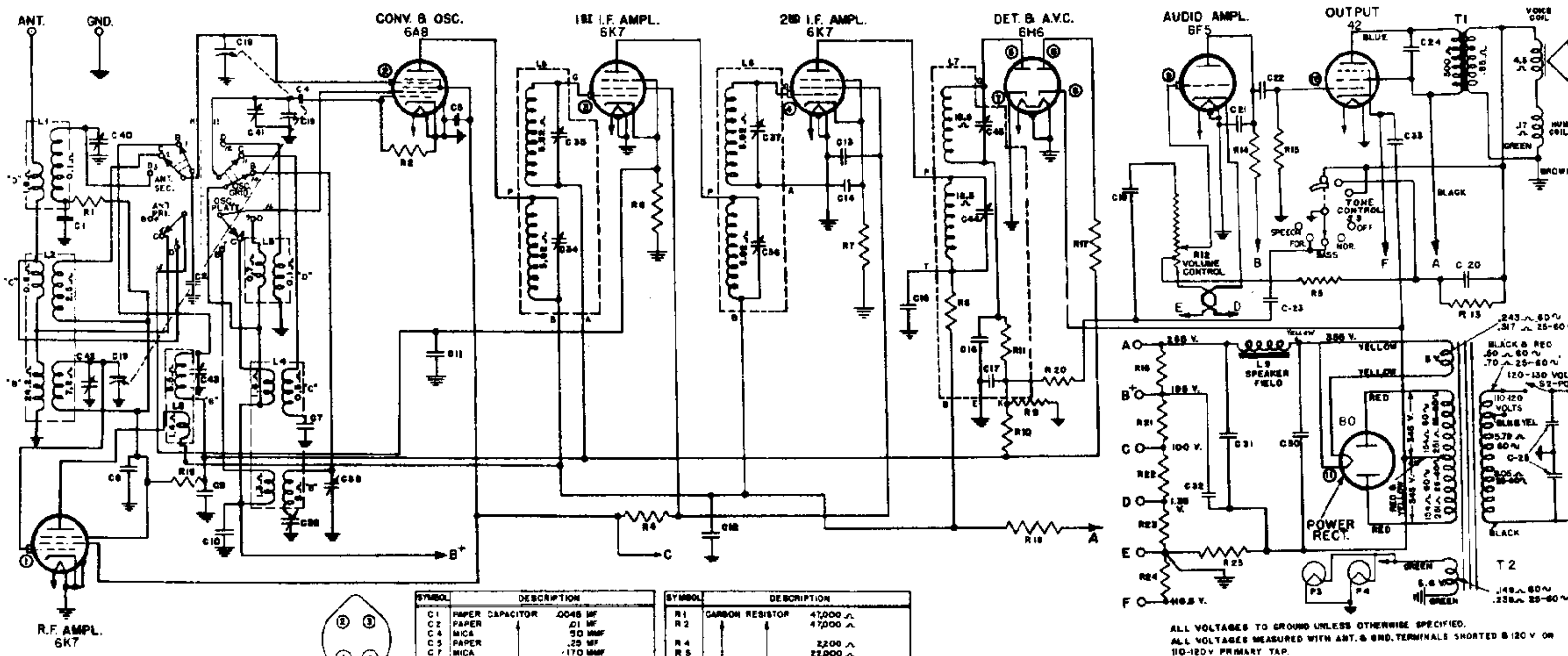
Stock No.	Description	List Price
RF-202	FASTENER—Case cover snap fastener (Pkg. of 4)	$0.10
*RF-302	FUSE—20 amp fuse (Pkg. of 10)	1.00
*RG-001	GRID CAP—Control grid cap (Pkg. of 5)	.10
RK-014	KNOB—Tone control knob	.10
RL-037	COIL—Antenna coil (L-8)	1.30
RL-133	COIL—R.F. coil assembly (L-2)	1.30
RL-240	COIL—Osc. coil assembly (L-1)	.70
RL-321	REACTOR—Line filter reactor (L-5)	.20
RL-322	REACTOR—B+ reactor (L-7)	.25
RL-323	REACTOR—Vibrator reactor (L-6)	.65
RL-324	REACTOR—Filament reactor (L-9)	.35
RL-325	REACTOR—Iron core reactor (T-4)	.95
RP-067	PLUG—Female antenna plug	.15
RP-068	PLUG—Male antenna plug	.15
RQ-497	RESISTOR—39,000 ohm, 1 W. Carbon (R-6)	.15
RQ-687	RESISTOR—15,000 ohm, 2 W. Carbon (R-15)	.35
RQ-1016	RESISTOR—1200 ohm, 5 W. Vitreous (R-17)	.35
RQ-1227	RESISTOR—47 ohm, ½ W. Carbon (R-16) (Pkg. of 5)	.70
RQ-1243	RESISTOR—220 ohm, ½ W. Carbon (R-2) (Pkg. of 5)	.70
RQ-1253	RESISTOR—560 ohm, ½ W. Carbon (R-10) (Pkg. of 5)	.70
RQ-1259	RESISTOR—1000 ohm, ½ W. Carbon (R-13) (Pkg. of 5)	.70
RQ-1263	RESISTOR—1500 ohm, ½ W. Carbon (R-28) (Pkg. of 5)	.70
RQ-1265	RESISTOR—1800 ohm, ½ W. Carbon (R-5, R-7) (Pkg. of 5)	.70
RQ-1277	RESISTOR—5600 ohm, ½ W. Carbon (R-27, R-29) (Pkg. of 5)	.70
RQ-1281	RESISTOR—8200 ohm, ½ W. Carbon (R-31) (Pkg. of 5)	.70
RQ-1282	RESISTOR—9100 ohm, ½ W. Carbon (R-8) (Pkg. of 5)	.70
RQ-1291	RESISTOR—22,000 ohm, ½ W. Carbon (R-24) (Pkg. of 5)	.70
RQ-1297	RESISTOR—39,000 ohm, ½ W. Carbon (R-4) (Pkg. of 5)	.70
RQ-1299	RESISTOR—47,000 ohm, ½ W. Carbon (R-1, R-22) (Pkg. of 5)	.70
RQ-1307	RESISTOR—100,000 ohm, ½ W. Carbon (R-21, R-25, R-30) (Pkg. of 5)	.70
RQ-1315	RESISTOR—220,000 ohm, ½ W. Carbon (R-3, R-32) (Pkg. of 5)	.70
RQ-1323	RESISTOR—470,000 ohm, ½ W. Carbon (R-14) (Pkg. of 5)	.70
RQ-1324	RESISTOR—510,000 ohm, ½ W. Carbon (R-11, R-12) (Pkg. of 5)	.70
RQ-1327	RESISTOR—680,000 ohm, ½ W. Carbon (R-9) (Pkg. of 5)	$0.70
RQ-1331	RESISTOR—1 meg. ½ W. Carbon (R-20) (Pkg. of 5)	.70
RR-1003	RESISTOR—100 ohm, 1½ Watt W.W. (R-18, R-19) (Pkg. of 5)	.70
RS-170	SHIELD—Antenna coil shield	.20
RS-171	SHIELD—R.F. or oscillator coil shield	.15
RS-213	SOCKET—Vibrator socket (Pkg. of 5)	.75
RS-214	SOCKET—8 pin tube socket (Pkg. of 5)	.60
RS-340	SWITCH—Tone control switch (S-1)	.50
RS-341	SWITCH—A.F.C. switch (S-2)	.70
RS-503	SLEEVE—Fuse insulating sleeve	.05
RS-504	SUPPRESSOR—Ignition suppressor resistor	.35
RT-234	TRANSFORMER—1st I.F. transformer (Complete) (L-3)	1.75
RT-236	TRANSFORMER—2nd (A.F.C.) I.F. transformer (Complete) (L-4)	3.20
RT-506	TRANSFORMER—Audio input transformer (T-1)	1.40
RT-0610	TRANSFORMER—Power transformer (T-3)	3.80
RV-022	VOLUME CONTROL—1.0 megohm volume control (R-23)	.90
RV-200	VIBRATOR—Rectifier type vibrator	4.00
	CONTROL HEAD ASSEMBLY	
RH-700	HEAD—Control head assembly (Not including drive cables)	4.25
RC-827	CABLE—Battery cable from switch to fuse including connector	.25

Stock No.	Description	List Price
RC-828	CABLE—20-inch drive cable	1.25
RC-829	CABLE—18-inch drive cable	1.25
RC-830	CABLE—24-inch drive cable	1.25
RK-015	KNOB—Control knobs and skirts (4 pieces) Specify Instrument Panel Control Kit Number	.45
RL-916	LAMP—Pilot Lamp (Pkg. of 10)	1.50
RS-342	SWITCH—Power switch (Mounted on control head)	.30
	SPEAKER ASSEMBLY	
RC-922	CONE—Speaker cone and voice coil (Including gaskets)	.90
*RC-1950	CLAMP—Cone spider clamp and screw	.05
*RP-012	PLUG—Female speaker plug	.20
*RP-015	PLUG—Male speaker plug	.20
RS-046	SPEAKER—6½-in. type speaker (Complete with output transformer)	5.80
RT-425	TRANSFORMER—Output transformer (T-2)	1.30
RA-309	ASSEMBLY—Receiver mtg. studs, nuts and washers	$0.20
*RB-008	BOARD—Terminal Board (2 lugs)	.10
*RB-013	BOARD—Terminal Board (under power transformer)	.10
*RB-023	BOARD—Terminal Board (under gang condenser)	.10
RB-057	BOARD—Terminal Board (under interstage transformer)	.10
RB-603	BASE—Vibrator grounding base	.15
RC-039	CAPACITOR—.01 mfd., 600 volt paper (C-18, C-37)	.25
*RC-046	CAPACITOR—.02 mfd., 200 volt paper (C-11)	.25
RC-051	CAPACITOR—.02 mfd., 1500 volt paper (C-15, C-30)	.30
*RC-072	CAPACITOR—.05 mfd., 200 volt paper (C-2, C-8, C-53)	.25
*RC-091	CAPACITOR—.05 mfd., 400 volt paper (C-7)	.30
RC-100	CAPACITOR—.1 mfd., 100 volt paper (C-6, C-9, C-54)	.30
RC-101	CAPACITOR—.1 mfd., 400 volt paper (C-21, C-35)	.35
*RC-123	CAPACITOR—.1 mfd., 400 volt paper (C-5, C-12, C-14)	.35
RC-156A	CAPACITOR—.5 mfd., 120 volt paper (C-22, C-29)	.45
RC-157A	CAPACITOR—.5 mfd., 200 volt interference filter capacitor	.45
RC-160	CAPACITOR—.25 mfd., 100 volt paper (C-4)	.30
RC-161	CAPACITOR—.5 mfd., 100 volt paper (C-10, C-52)	$0.40
*RC-204	CAPACITOR—15 mmf., Mica, (C-25)	.25
*RC-235	CAPACITOR—100 mmf., Mica (C-23)	.25
*RC-261	CAPACITOR—250 mmf., Mica (C-20, C-26, C-47, C-55)	.25
*RC-296	CAPACITOR—500 mmf., Mica (C-24, C-32, C-33)	.25
*RC-349	CAPACITOR—2000 mmf., Mica (C-28)	.30
RC-571	CAPACITOR—Dry Electrolytic condenser 10 mfd., 300 volt (C-43) 10 mfd., 25 volt (C-44) 5 mfd., 450 volt (C-50) 8 mfd., 450 volt (C-51)	1.75
RC-639	CAPACITOR—Antenna padder (C-38) 150-500 mmf	.40
RC-641	CAPACITOR—Oscillator padder 300-850 mmf. (C-42)	.40
RC-646	CAPACITOR—1st I.F. Double Trimmers (C-48, C-49)	.40
RC-716-14	CONDENSER—3-gang tuning condenser and trimmers (C-36, C-39, C-40, C-41)	4.60
RC-825	CABLE—Antenna lead-in cable complete with plugs (P-1)	1.60
RC-826	CABLE—Battery cable from set to fuse including connector	.20
RC-1955	CUSHION—Gang condenser rubber mounting cushion assembly	.20
RD-200-14	DRIVE—Gang drive assembly gears, complete	.60

.* Used on previous receivers. (Prices subject to change without notice.)

GENERAL ELECTRIC CO.

MODELS F-81, F-86
Schematic
Resistance



ALL VOLTAGES TO GROUND UNLESS OTHERWISE SPECIFIED.
ALL VOLTAGES MEASURED WITH ANT. & GND. TERMINALS SHORTED & 120 V OR 110-120V PRIMARY TAP.

CONDITIONS OF TEST

WAVE SWITCH ON BAND "B"
POWER SWITCH OFF

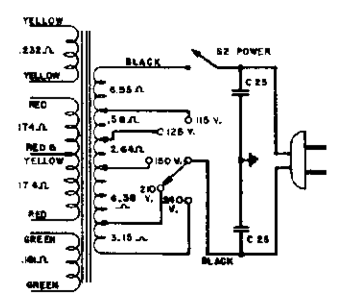
APPROXIMATE RESISTANCE MEASUREMENTS

	RESISTANCE TO GROUND	TUBE	SOCKET PRONG
1	1.3 MEG. Ω	R F GRID	CAP
2	1.25 MEG. Ω	CONV. GRID	CAP
3	1.25 MEG. Ω	1ST I.F. GRID	CAP
4	5.0 Ω	2ND I.F. GRID	CAP
5	256,000 Ω	DIODE PLATE	PRONG 3
6	1.2 MEG Ω	DIODE PLATE	PRONG 5
7	GROUNDED	DIODE CATH.	PRONG 4
8	100,000 Ω	DIODE CATH.	PRONG 8
9	0-2 MEG. Ω VOL. CONT.	A.F. GRID	CAP
10	.5 MEG. Ω	OUTPUT GRID	PRONG 5
11	10,600 Ω	80 FILAMENT	PRONG 1 OR 4

SYMBOL	DESCRIPTION
C1	PAPER CAPACITOR .0048 MF
C2	PAPER .01 MF
C4	MICA 50 MMF
C5	PAPER .25 MF
C7	MICA 170 MMF
C8	PAPER .05 MF
C9	PAPER .05 MF
C10	PAPER .05 MF
C11	PAPER .05 MF
C12	PAPER .1 MF
C13	PAPER .25 MF
C14	PAPER .05 MF
C15	PAPER .02 MF
C16	MICA 250 MMF
C17	MICA 75 MMF
C18	PAPER .005 MF
C19	TUNING 10-450 MMF
C20	PAPER .1 MF
C21	MICA 250 MMF
C22	PAPER .01 MF
C23	PAPER .001 MF
C24	PAPER .01 MF
C25	PAPER .01-.01 MF
C30	DRY ELECT. 12 MF
C31	DRY ELECT. 8 MF
C32	DRY ELECT. 8 MF
C33	DRY ELECT. CAPACITOR 10 MF
C34	1ST I.F. PRI. TRIMMER (OPERATE 335 MMF)
C35	1ST I.F. SEC. TRIMMER (OPERATE 335 MMF)
C36	2ND I.F. PRI. TRIMMER (OPERATE 335 MMF)
C37	2ND I.F. SEC. TRIMMER (OPERATE 335 MMF)
C38	"B" OSC. TRIMMER 5-45 MMF
C39	"B" PADDER TRIMMER 350-560 MMF
C40	"C" ANT. TRIMMER 5-40 MMF
C41	"D" OSC. TRIMMER 2-20 MMF
C42	"B" ANT. TRIMMER 5-35 MMF
C43	"B" R.F. TRIMMER 5-40 MMF
C44	3RD I.F. PRI. TRIMMER (OPERATE 190 MMF)
C45	3RD I.F. SEC. TRIMMER (OPERATE 190 MMF)
S1	BAND CHANGE SWITCH
S2	POWER SWITCH
S3	TONE CONTROL SWITCH

SYMBOL	DESCRIPTION
R1	CARBON RESISTOR 47,000 Ω
R2	CARBON RESISTOR 47,000 Ω
R4	CARBON RESISTOR 2,200 Ω
R5	CARBON RESISTOR 22,000 Ω
R6	CARBON RESISTOR 2,700 Ω
R7	CARBON RESISTOR 680 Ω
R8	CARBON RESISTOR 4,700 Ω
R9	CARBON RESISTOR 220,000 Ω
R10	CARBON RESISTOR 1 MEG
R11	CARBON RESISTOR 68,000 Ω
R12	VOLUME CONTROL 2 MEG - TAP AT 5000Ω
R13	CARBON RESISTOR 68,000 Ω
R14	CARBON 220,000 Ω
R15	CARBON 470,000 Ω
R16	CANDOHM 3,500 Ω
R17	CARBON 100,000 Ω
R18	CARBON 2,200 Ω
R19	CARBON 47,000 Ω
R20	CARBON 220,000 Ω
R21	CANDOHM 5000 Ω
R22	CANDOHM 10,000 Ω
R23	CANDOHM 125 Ω
R24	CANDOHM 410 Ω
R25	CARBON RESISTOR 68 Ω
L1	"D" ANTENNA COIL
L2	"B" & "C" ANTENNA COIL
L3	"D" OSCILLATOR COIL
L4	"B" & "C" OSCILLATOR COIL
L5	1ST I.F. TRANSFORMER ASSEMBLY
L6	2ND I.F. TRANSFORMER ASSEMBLY
L7	3RD I.F. TRANSFORMER ASSEMBLY
L8	"B" R.F. INTERSTAGE COIL
L9	FIELD COIL 872 Ω (COLD) 62 MA
T1	OUTPUT TRANSFORMER (ON SPEAKER)
T2	POWER TRANSFORMER {50-60, 25-60, 50-60 (UNIV.)}
P3	PILOT LIGHT, CLEAR .25A., 6.3V.
P4	PILOT LIGHT, CLEAR .25A., 6.3V.

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	110-120 120-130	50-60	90
C	110-120 120-130	25-60	90
V	110-155 and 190-250	50-60	85



NOTE: Rating "V" receivers may be used on 40-cycle circuits provided the voltage does not exceed 105 volts on the 110-120-volt tap or 200 volts on the 190-220-volt tap.

Intermediate Frequency...465 kc.

Electrical Power Output

Undistorted..............................2.5 watts
Maximum..................................5.0 watts

MODELS F-81, F-86
Voltage, Chassis

GENERAL ELECTRIC CO.

SOCKET VOLTAGES

Tube No.		Plate to Ground Volts D-c	Screen Grid to Ground Volts D-c	Cathode to Ground Volts D-c	Cathode Current M.A.	Heater Volts A-c
6K7	R.F. Amplifier	225	100	0	6.8	6.3
6A8	Oscillator	180	100	0	11.0	6.3
	Converter	225	100	0		
6K7	1st I.F. Amplifier	225	92	4.6	1.8	6.3
6K7	2nd I.F. Amplifier	200	92	4.0	5.6	6.3
6H6 Det. and AVC	Sig. Plate	0	....	....	....	6.3
	Delay Plate	—4.5	....	....	....	
6F5	Audio Amplifier	137*	....	1.3	0.4	6.3
42	Output	237	250	14.5	34	6.3
80	Power Rectifier	....	....	Filament to ground 330	70	5.2

A-C line voltage—120 volts with transformer connected for 120-130-volt operation—no signal input—1000 ohms per volt meter-dial pointer at 530 K.C. on "B" band.

* Measured on 1000-volt scale.

Loud-speaker—Electrodynamic
Cone: Model F-81 .... 8-inch
Model F-86 .... 12-inch
Speaker Impedance .... 5.5 ohms at 400 cycles

Tuning Frequency Range
Band "B" .... 540-1620 kc.
Band "C" .... 1600-6000 kc.
Band "D" .... 5400-18,000 kc.

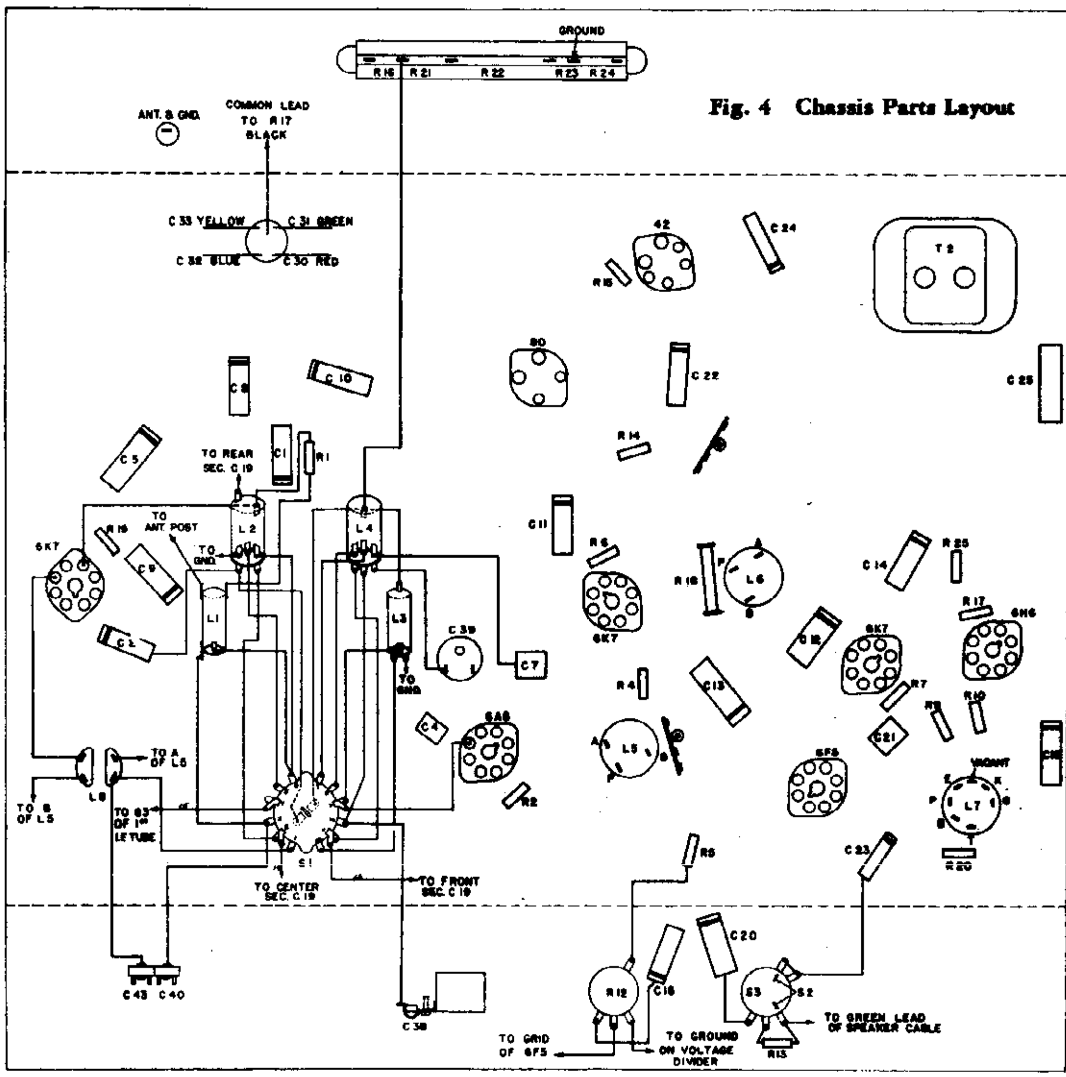


Fig. 4 Chassis Parts Layout

Tuning Control Drive Ratio
Fast Tuning .... 10 to 1
Vernier Tuning .... 55 to 1

MODELS F-81, F-86
Alignment, Trimmers
Socket

GENERAL ELECTRIC CO.

The alignment procedure is given in table form along with the trimmer location drawing, Fig. 2. A "dummy antenna" should be used in all alignments and is the capacitor or capacitor and resistor used in series with the signal generator. The grid lead should not be removed from the tube to which the input signal is applied when aligning the IF as this would remove the grid bias from the tube.

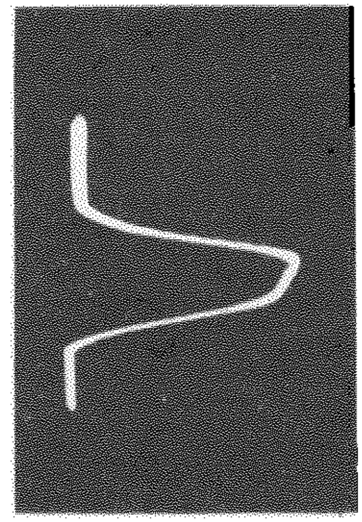


Fig. 1. Overall I.F. Curve

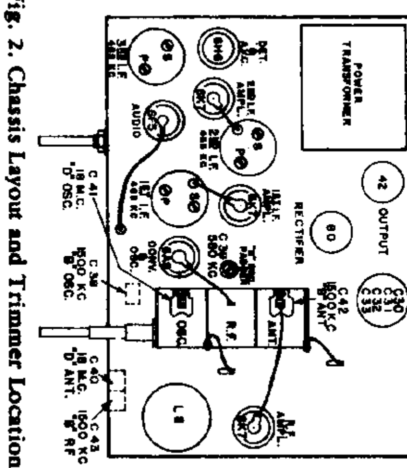


Fig. 2. Chassis Layout and Trimmer Location

I.F. Alignment with Oscilloscope

Band Switch Setting	Input Frequency	Point of Input	Dummy Ant.	Trimmer	Remarks
1. Band "B"	465 K.C. Sweep	2nd I.F. Grid	.05 Mfd.	3rd I.F. Sec. (C-45) Pri. (C-44)	Gang condenser plates wide open—connect vertical input of oscilloscope to ground and the junction of R-9 and R-10 on 3rd I.F. transformer. Adjust trimmers for a single symmetrical curve of maximum amplitude. The resulting curve with input at converter grid is shown in Fig. 1.
2. Band "B"	465 K.C. Sweep	1st I.F. Grid	.05 Mfd.	2nd I.F. Sec. (C-37) Pri. (C-36)	
3. Band "B"	465 K.C. Sweep	Converter Grid	.05 Mfd.	1st I.F. Sec. (C-35) Pri. (C-34)	

I.F. Alignment with Output Meter

Band Switch Setting	Input Frequency	Point of Input	Dummy Ant.	Trimmer	Remarks
1. Band "B"	465 K.C. with Modulation	2nd I.F. Grid	.05 Mfd.	3rd I.F. Sec. (C-45) Pri. (C-44)	Gang condenser plates wide open—connect output meter across voice coil—keep input signal low and volume control at maximum. Adjust all trimmers in order mentioned for maximum output. Do not attempt an overall realignment after stage by stage alignment has been accomplished.
2. Band "B"	465 K.C. with Modulation	1st I.F. Grid	.05 Mfd.	2nd I.F. Sec. (C-37) Pri. (C-36)	
3. Band "B"	465 K.C. with Modulation	Converter Grid	.05 Mfd.	1st I.F. Sec. (C-35) Pri. (C-34)	

R.F. Alignment

Band Switch Setting	Input Frequency	Point of Input	Dummy Ant.	Trimmer	Remarks
1. Band "B"					Close gang plates—adjust pointer to first line at left end of tuning scale.
2. Band "D"	18 M.C. with Modulation	Antenna Post	250 Mmf. 400 Ohms	Osc. (C-41) Ant. (C-40)	Connect output meter across voice coil—tone control on "Bass" position. The image of any "D" band signal should be heard 930 K.C. above input signal when (C-41) is on proper peak. Example: 15 M.C. image—15,930 K.C. Peak (C-40) while rocking the gang condenser.
3. Band "C"	No adjustment necessary				
4. Band "B"	1500 K.C. with Modulation	Antenna Post	250 Mmf. 400 Ohms	Osc. (C-38) R.F. (C-43) Ant. (C-42)	Peak trimmers for maximum output with a low input signal.
5. Band "B"	580 K.C. with Modulation	Antenna Post	250 Mmf. 400 Ohms	Osc. padder (C-39)	Adjust padder for maximum output in vicinity of 580 K.C. while rocking the gang condenser.
6. Band "B"	Repeat operation 4				

MODELS F-81,F-86
Dial Data,Notes

GENERAL ELECTRIC CO.

Power Supply

The power supply consists of an 80-type rectifier, power transformer, and the associated filter system; the speaker field acting as the filter choke.

The transformers on the "A" and "C" rating receivers have two primary taps so as to accommodate a range of voltages from 110–130 volts. As shipped from the factory the receivers have the power cord connected to the 120–130-volt tap of the transformer (black and red lead). If the normal voltage of the power supply is always below 115 volts, the connection of the power cord should be removed from the lead and soldered to the 110–120-volt tap (black and yellow lead). After changing the connection, tape the soldered joint as well as the exposed end of the unused lead. This change requires removal of the chassis from the cabinet.

Speaker

Two different types of voice coil suspensions are used in both the 8- and 12-in. speakers.

The 8-in. cone assemblies are designated as early and late production and are not interchangeable. The early production voice coil suspension is 4⅝ inches between points of clamping, while the later production voice coil suspension is 2⅜ inches between points of clamping.

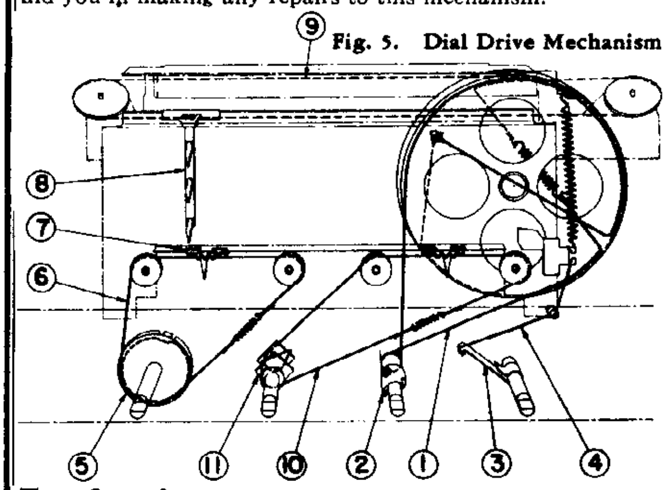
The 12-in. cone assemblies which were changed in design during production are interchangeable.

DIAL MECHANISM

The dial mechanism (Fig. 5) is rigidly mounted to the chassis by means of two brackets and four self-tapping screws. The dial pointer is operated by means of an "automatic vernier" reduction drive unit, mounted on the receiver chassis, and connected to the gang drive drum by a drive cord.

Motion imparted to the gang condenser rotor is transmitted through a series of pulleys and an interconnecting cable to the dial pointer slider which is supported on a rail in the rear of the dial scale. The following instructions should aid you in making any repairs to this mechanism.

Fig. 5. Dial Drive Mechanism



Tone Control

When the tone control is in the "normal position," a portion of the output voltage of the receiver is fed back through a resistor-capacitor network consisting of C-20, R-13, and R-5 to a tap on the volume control. This feedback voltage is out of phase with the input and the resulting degeneration reduces the speaker resonance boom due to pentode output, gives an extended and relatively flat response to a wide range of low frequencies, and reduces distortion arising in the audio amplifier. In the "bass" position, the tone control switch connects C-23 in series with R-20 across the diode load resistance (R-9), reducing the high frequency response. The "foreign" position of the switch shorts out capacitor C-20 and resistor R-13 from the above network and gives a frequency response best suited for short-wave reception. In the speech position, C-20 and R-13 are shorted out; C-23 is removed from the circuit, leaving R-5; thereby providing flat degeneration at all frequencies. This is the most desirable condition for the reception of programs predominating in speech. The tone control switching described can be traced on the schematic diagram shown in Fig. 3.

To Replace Pointer Cable and Drive Cable

Remove the dial scale, allowing ready access to the dial scale mechanism.

To replace the drive cord (1), set the drive drum to the relative position as shown in Fig. 5, loop the cord through the tab on the drum, then thread it down through the hole in the chassis and around the vernier drive as indicated. The other end of the cord is looped through one end of the tension spring in back of the drive drum.

To replace the wire pointer drive cord (9), set the drive drum to the relative position as shown in Fig. 5. Loop the cord through the tab on the drum, and thread it around the drive pulley and idler pulleys and back to the tension spring on the drive drum. With the gang condenser plates fully meshed, adjust the pointer (8) along the drive cord until it coincides with the end mark at the left-hand end of the scale. The scale may be slid into place to ascertain this correct position. After final adjustment is made, solder the pointer to the wire cable (9).

To Replace Tone Control Cable

Thread the cable (6) as shown in Fig. 5 around the drive pulley (5) and around the idler pulleys, fastening the ends to the tension spring. For adjustment: turn the pulley (5) to the extreme counterclockwise, setting the pointer (7) so it extends about 1/16 in. over the left-hand edge of the rail. Crimp the pointer tab on the drive cable. A final adjustment of the pointer may be made by means of the drive pulley (5) with the dial scale in place.

To Replace Volume Control Cable

Thread the cable (10) around the drive pulley (11) as shown in Fig. 5. Fasten the loops of the cable into the tension spring. To adjust, turn the control to the extreme clockwise direction and set the pointer so that the right-hand side of the pointer rider coincides with the right-hand edge of the rail. Crimp the pointer tab on the drive cable. A final adjustment of this pointer may be made by adjusting the pulley (11) on the volume control shaft after the scale has been replaced.

Band and Indicator Control

The threading and assembly of the band indicator is self-explanatory from an inspection of **Fig. 5.**

To "Adjust Automatic Vernier" Drive

The vernier drive used on this receiver includes a planetary reduction unit equipped with a clutch which automatically changes the reduction ratio. This clutch consists of a sleeve mounted on the knob shaft. To adjust, loosen the locking screw and move the sleeve (2) axially along the shaft until the cam surface in the end of the sleeve engages with the pin in the knob shaft. This engagement should take place at a point on the cam surface as near to the stop as possible and still allow complete release of the clutch.

To Change Dial Lamps

Dial lamps are located at either end of the dial scale assembly. Remove the dial lamp bracket from the projection at the top of the dial mechanism and replace bulb. This may be accomplished without removing the chassis from the cabinet.

Coil System

L1 is the "D" band antenna coil. The "B" and "C" band antenna coils are wound on a single coil form designated as L2 in Fig. 3. The coil L8, tuned by the center section of the gang condenser C-19 and coupled to a 6K7 tube are the essential elements of an R.F. stage, used only on the "B" band. L3 and L4 are the oscillator coils for the "D," "C," and "B" bands respectively. The antenna secondary and oscillator plate coils on the next lower frequency band to the one in use are shunted out by the wave switch contacts which are connected to C-2 and the B+ lead respectively.

The various contact terminals of the wave-change switch are numbered from 1 to 16 to facilitate the tracing of the circuit to the switch.

GENERAL ELECTRIC CO.

Stock No.	Description	List Price
*RB-026	BOARD—Ant. and gnd. terminal board	$0.10
*RB-040	BOARD—Terminal Board (3 lugs)	.10
*RB-139	BRACKET—Gang condenser mtg. brackets	.15
RC-003	CAPACITOR—.001 Mfd., 200 V. Paper (C-23) (Close Tolerance)	.25
*RC-017	CAPACITOR—.0045 Mfd., 200 V. Paper (C-1)	.25
*RC-023	CAPACITOR—.005 Mfd., 600 V. Paper (C-18)	.25
*RC-042	CAPACITOR—.01 Mfd., 1000 V. Paper (C-2, C-22, C-24)	.30
*RC-080	CAPACITOR—.02 Mfd., 400 V. Paper (C-15)	.25
*RC-091	CAPACITOR—.05 Mfd., 400 V. Paper (C-8, C-9, C-10, C-11, C-14)	.30
*RC-123	CAPACITOR—0.1 Mfd., 400 V. Paper (C-12, C-20)	.35
*RC-150	CAPACITOR—.25 Mfd., 400 V. Paper (C-5, C-13)	.35
*RC-213	CAPACITOR—50 Mmf., Mica (C-4)	.25
*RC-223	CAPACITOR—75 Mmf., Mica (C-17)	.25
*RC-259	CAPACITOR—250 Mmf., Mica (C-21)	.30
*RC-336	CAPACITOR—1170 Mmf., Mica (C-7)	.30
RC-569	CAPACITOR—12 Mfd., 450 V.; 8 Mfd., 400 V.; 8 Mfd., 350 V.; 10 Mfd., 25 V. dry electrolytic (C-30, C-31, C-32, C-33)	2.20
*RC-618	CAPACITOR—"B" band oscillator trimmer (5-45 Mmfd.) (C-38)	.25
*RC-632	CAPACITOR—Double trimmer (3-40 Mmfd.) (C-40, C-43)	.25
*RC-634	CAPACITOR—"B" band padder (350-550 Mmfd.) (C-39)	.35
RC-635	CAPACITOR—Double trimmers, 1st or 2nd I.F. transformer (C-34, C-35, C-36, C-37)	.45
*RC-637	CAPACITOR—Double trimmer, 3rd I.F. (C-44, C-45, C-16)	.60
RC-718	CONDENSER—3-gang tuning condenser (C-19) (Includes trimmers C-41, C-42)	4.20
*RC-755	CAPACITOR—Line capacitor, .01-.01 Mfd. 250 V. A-C (C-25)	.40
RC-849	CABLE—Speaker cable and plug	.55
*RC-863	CORD—Power cord and plug	.65
RC-992	CUSHION—Gang condenser mtg. cushions (Pkg. of 3)	.10
RD-201	DRIVE—Vernier drive mechanism	1.55
RE-016	ESCUTCHEON—Escutcheon plate	2.05
*RF-002	FOOT—Chassis mtg. foot	.20
*RF-008	FOOT—Chassis mtg. foot (red rubber)	.20
*RG-001	GRID CAP—Control grid clip (Pkg. of 5)	.10
RK-017	KNOB—Control knob (plain) (Pkg. of 5)	.40
RK-018	KNOB—Control knob (band selector and tone control (Pkg. of 5)	.40
*RL-035	COIL—Ant. coil band "D" (L-1)	.70
*RL-036	COIL—Ant. coil "B" and "C" band (L-2)	1.10
*RL-131	COIL—RF coil "B" band (L-8)	.75
*RL-237	COIL—Osc. coil band "D" (L-3)	.70
*RL-238	COIL—Osc. coil "B" and "C" band (L-4)	1.00
RQ-1231	RESISTOR—68 ohms, ½ W. Carbon (R-25) (Pkg. of 5)	.70
RQ-1255	RESISTOR—680 ohm, ½ W. Carbon (R-7) (Pkg. of 5)	.70
RQ-1267	RESISTOR—2200 ohm, ½ W. Carbon (R-4) (Pkg. of 5)	.70
RQ-1269	RESISTOR—2700 ohm, ½ W. Carbon (R-6) (Pkg. of 5)	.70
RQ-1275	RESISTOR—4700 ohm, ½ W. Carbon (R-8) (Pkg. of 5)	.70
RQ-1291	RESISTOR—22,000 ohm, ½ W. Carbon (R-5) (Pkg. of 5)	$0.70
RQ-1299	RESISTOR—47,000 ohm, ½ W. Carbon (R-1, R-2, R-19) (Pkg. of 5)	.70
RQ-1303	RESISTOR—68,000 ohm, ½ W. Carbon (R-11, R-13) (Pkg. of 5)	.70
RQ-1307	RESISTOR—100,000 ohm, ½ W. Carbon (R-17) (Pkg. of 5)	.70
RQ-1315	RESISTOR—220,000 ohm, ½ W. Carbon (R-9, R-14, R-20) (Pkg. of 5)	.70
RQ-1323	RESISTOR—470,000 ohm, ½ W. Carbon (R-15) (Pkg. of 5)	.70
RQ-1331	RESISTOR—1.0 Megohm, ½ W. Carbon (R-10) (Pkg. of 5)	.70
RQ-1467	RESISTOR—2200 ohms, 1 W. Carbon (R-18)	.20
RR-725	RESISTOR—Tapped bleeder resistor (R-16, R-21, R-22, R-23, R-24)	1.00
RS-140	SHIELD—"B" Band RF Transformer Shield Can	.20
RS-172	SHIELD—1st, 2nd, or 3rd I.F. Transformer Shield	.25

Stock No.	Description	List Price
*RS-200	SOCKET—8-pin Tube Socket (Pkg. of 5)	.75
RS-215	SOCKET—6-prong Tube Socket (Pkg. of 5)	.60
RS-217	SOCKET—4-prong Glass Tube Socket (Pkg. of 5)	.50
RS-350	SWITCH—Tone control and Power Switch (S-2, S-3)	1.10
RS-351	SWITCH—Band Change Switch (S-1)	1.30
RT-0810	TRANSFORMER—Power Transformer, 110-130 volts, 50/60 cycles (T-2)	4.75
RT-0811	TRANSFORMER—Power Transformer Universal 50/60 cycles (T-2)	8.50
RT-0812	TRANSFORMER—Power Transformer 110-130 V., 25/60 cycles (T-2)	8.00
RT-233	TRANSFORMER—1st or 2nd IF Transformer	1.50
RT-243	TRANSFORMER—3rd IF Transformer	1.60
RV-030	VOLUME CONTROL—2 megohm control tapped at 5,000 ohms	.80
RW-014	WINDOW—Escutcheon Window and Rubber Mounting	.45
*RW-101	WASHER—Felt Washer for Control Shafts (Pkg. of 10)	.45
RX-021	ASSEMBLY—Chassis Mounting Assembly	.10
	SPEAKER ASSEMBLY F-81	
RC-924	CONE—8-in. Cone and Voice Coil Assembly (early production) — See text under Speaker	.90
RC-927	CONE—8-in. Cone and Voice Coil Assembly (late production) — See text under Speaker	.90
*RC-990	CLAMP—Voice Coil Spider Clamp (early production) — See text under Speaker	.05
RC-1967	CLAMP—Voice Coil Spider Clamp (late production) — See text under Speaker	.05
*RP-015	PLUG—Male speaker plug	.20
RS-058	SPEAKER—8-in. Speaker (complete)	6.00
*RS-416	SPRING—Voice Coil Leads Spring (Pkg. of 2)	.10
RT-421	TRANSFORMER—Output Transformer	1.30
	SPEAKER ASSEMBLY F-86	
RC-925	CONE—12-in. Cone and Voice Coil Assembly	1.25
*RC-991	CLAMP—12-in. Cone Spider Clamp and Screw	.05
*RP-015	PLUG—Male Speaker Plug	$0.20
RS-057	SPEAKER—12-in. Speaker (complete)	6.80
*RS-416	SPRING—Voice Coil Leads Spring (Pkg. of 2)	.10
RT-421	TRANSFORMER—Output Transformer (T-1)	1.30
	DIAL SCALE MECHANISM	
RB-155	BRACKET—Band Change Indicator Bracket	.05
RB-604	BUSHING—Volume Control Cable Drive Bushing	.10
RC-846	CABLE—Volume Control Cable (Pkg. of 5)	.40
RC-847	CABLE—Tone Control Cable (Pkg. of 5)	.40
RC-848	CABLE—Condenser Drum Drive Cable and Pointer Cable (Pkg. of 5)	.90
*RD-013	DRUM—Condenser Drive Drum	.35
RD-053	DIAL—Dial Scale	$1.40
RL-920	LAMP—Dial Lamp, .25 amp., 6.3 V. (Pkg. of 10)	1.50
*RP-049	PULLEY—Idler Pulley for Cond. Drive Cable	.15
RP-073	POINTER—Volume or Tone Control Pointers (Pkg. of 5)	.10
RP-075	PULLEY—Idler Pulley for Tone and Volume Control Cords (Pkg. of 6)	.20
RP-076	PULLEY—Tone Control Drive Pulley	.15
RP-077	POINTER—Dial Scale Pointer Assembly (Pkg. of 5)	.90
RS-218	SOCKET—Lamp Socket Assembly	.10
RS-401	SPRING—Tuning Drive Cord Tension Spring (Pkg. of 5)	.10
RS-426	SPRING—Volume or Tone Control Drive Cord Tension Spring	.10
RX-023	ASSEMBLY—Band Indicator Assembly (Includes cord, pointer, and spring)	.20

* Used on previous receivers.

(Prices subject to change without notice)

MODEL E-115
Colorama Data
Dial Data, Voltage

GENERAL ELECTRIC CO.

GENERAL INFORMATION

The model B-115 is a three-band superheterodyne employing eleven G.E. Metal Tubes described above. It incorporates two stages of I.F., push-pull output, three-point tone control, and a high and low note compensated volume control. Full wave rectification is obtained from two 5W4's connected as half-wave rectifiers. L1 is the "D" band antenna coil. L2 is the "B" and "C" band antenna coil. The rear section of the gang condenser, L3, and a 6K7 tube are the essential elements of an R.F. stage, used only on the "B" band. L4 and L5 are the oscillator coils for the "D," "B" and "C" bands respectively. The antenna secondary and oscillator plate coils on the next lower frequency band to the one in use are shunted out by the wave switch contacts which are connected to C3 and B+.

Colorama Tuning

This receiver is equipped with a novel tuning device which indicates the point of exact resonance by the color of the dial illumination. When no signal is tuned-in, the dial illumination is red, but as the receiver is tuned, a smooth change to green occurs. Powerful stations will produce the darkest green color. Weak stations may only change the dial illumination to pink. The point at which any station is exactly in tune is indicated by the greatest color change obtainable.

The colored light is produced by a red and a green pilot bulb mounted behind the dial scale. These are controlled by a saturable reactor in a circuit which is shown in the schematic diagram, Fig. 2. The two bulbs are placed in series across one of the secondaries on the power transformer. In shunt with the green bulb is a reactor whose impedance is varied by a d-c coil wound on the same core. The plate current of the AVC controlled tubes flows through the d-c coil. At a condition of no-signal, the bias on the AVC controlled tubes is at minimum and their plate current is at maximum causing saturation of the reactor, which in turn shunts out and nearly extinguishes the green bulb. This causes most of the a-c supply voltage to be impressed across the RED bulb and its parallel resistor. At no signal, then, the dial is deepest red. When a station is tuned-in, the above conditions are reversed and the GREEN bulb is illuminated brightly. The impedance of the reactor changes in exact relationship with the incoming signal resulting in a smooth change from red to green or from green to red.

Phase Inverter

A 6C5, used as a phase-inverter, makes it possible to use push-pull output without the use of an inter-stage transformer. The audio signal from the volume control is impressed on the grid of the 6C5 audio amplifier. A portion of the 6C5 output is taken from a tap on one of the 6F6 grid resistors, and impressed on the grid of the phase inverter. (The ratio of R-19 and R-20 is chosen so that the excitation on the grid of the phase inverter is equal to that applied to the grid of the 6C5 audio amplifier.) Thus, the input signal to one of the 6F6's passes through two tubes while the input to the other 6F6 passes through one tube. As a result, the excitation on the 6F6 grids is 180 degrees out of phase, which is the requirement for push-pull operation.

ADJUSTMENT OF DIAL MECHANISM

The dial mechanism (Fig. 4) is mounted to the chassis by means of two brackets and four self-tapping screws. Motion is imparted to the gang condenser rotor through a series of pulleys and an interconnecting cable to the dial pointer slider which is supported on a rail above the dial scale.

To Replace Drive Cable

Rotate the drive drum (14) counter-clockwise until the gang condenser plates are fully open. Place the end of the cable having an eyelet in slot (A). Thread the cable as shown in Fig. 4, making certain that the cable passes *over* the pin (B) and runs along the *correct* grooves, the looped end hooking over the tension spring (16). Check the position of the drive wheel (14) on the condenser shaft to make sure that the cable coming off the right-hand idler pulley lines up with the groove in the drive pulley. Also, as the condenser plates become fully meshed, the drive wheel (14) should just meet the bushing (D) of the reduction drive unit (13). With the drive wheel in this position, place the pointer on the rail (E) and, with the tip of the pointer (11) on the extreme left-hand dial scale division of Broadcast band, crimp the pointer tab on the drive cable.

To Adjust Pointer or Scale Calibration

Three positions of the dial pointer cable are provided on the drive drum (14) to adjust the dial pointer up or down scale. The position shown in Fig. 4 with the cable over pin (B) is the medium position. Changing the cable to the position between pins (B) and (C) moves the pointer *down* scale. The position below the pin (C) moves the pointer *up* scale from the medium position. With the gang plates closed, set the pointer at the extreme left-hand dial scale marking on the Broadcast band.

To Replace Scale

Remove the band change cable (12) by unhooking it from the fork (F) on bracket (3). Remove the end support bracket (8) held by a single self-tapping screw and withdraw the scale assembly from its housing. Replace the end caps (5) and (6) on the new scale and reassemble. Before reattaching the band change cable to the fork (F) the tension spring (7) should be given two full turns to provide proper tension for the cable.

To Adjust Rotation of Scale

The bracket arm (3) may be moved up or down by means of the set screw to give the correct position of the scale divisions with respect to the dial pointer. The pointer tip should slightly overlap the scale divisions.

To Change Dial Lamps

Lift the lamp bracket (17) from the housing (20) to which it is clipped. With the lamp bracket laid back horizontally, the lamps may be replaced.

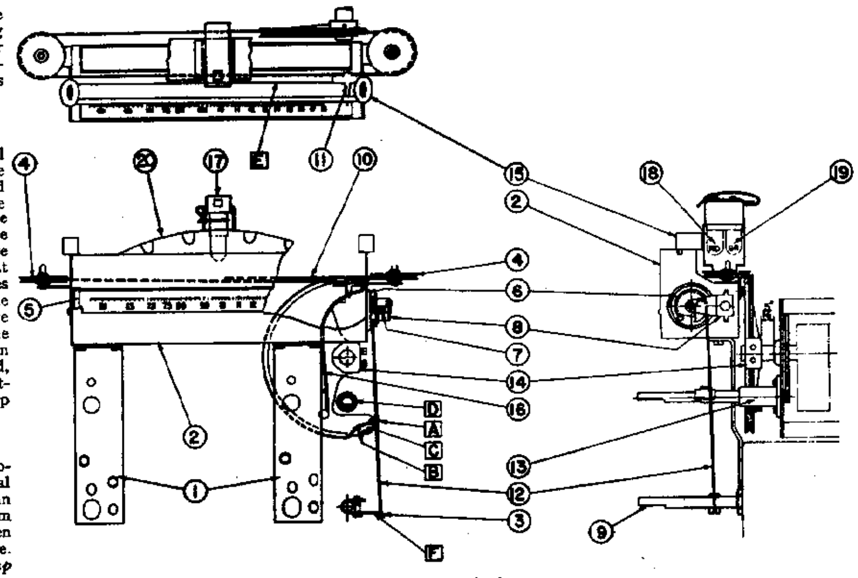


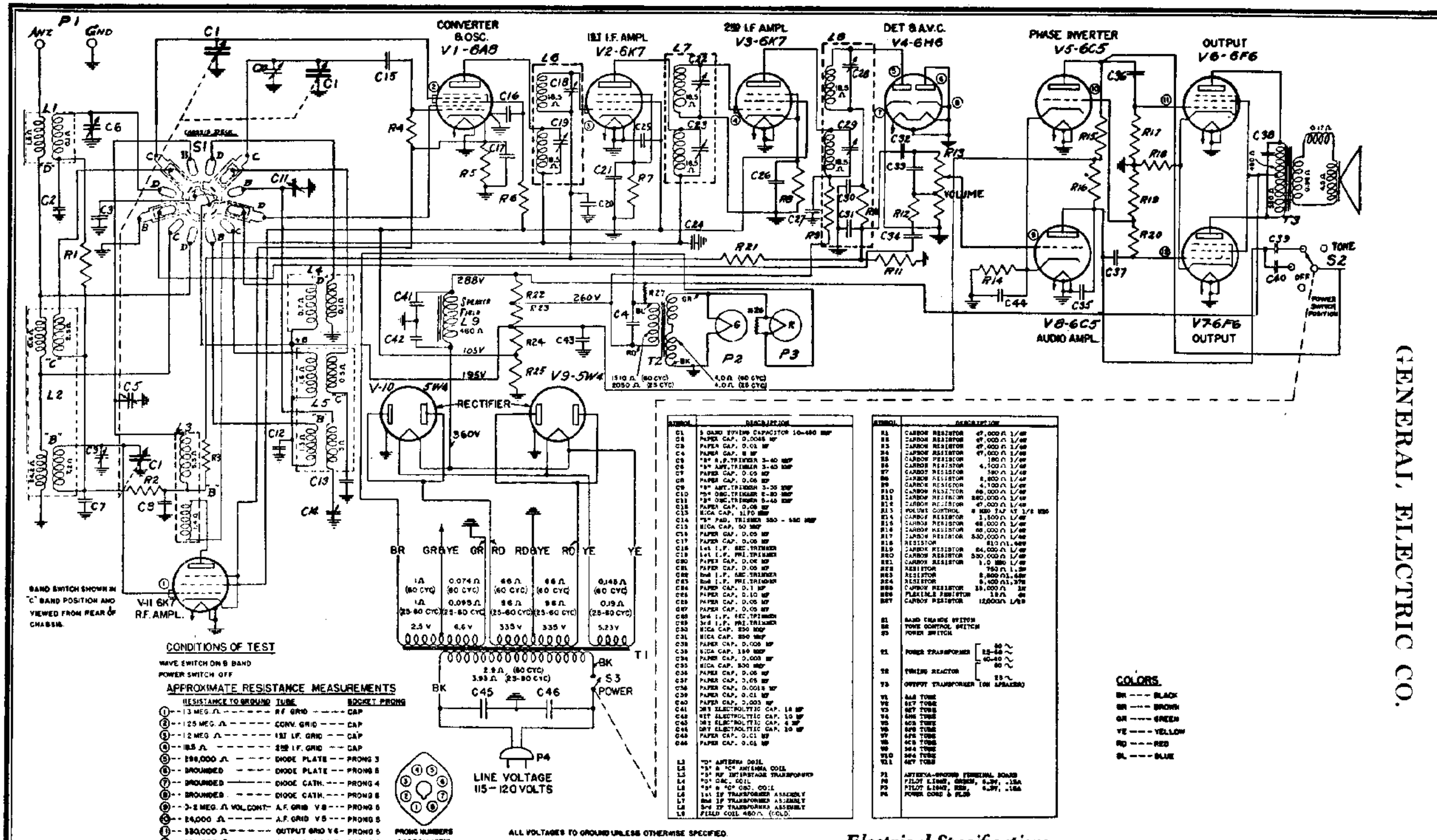
Fig. 4. Dial Mechanism

SOCKET VOLTAGES

Tube		Cathode to Ground Volts DC	Screen Grid to Ground Volts DC	Plate to Ground Volts DC	Cathode Current M.A.	Heater Volts A.C.
6A8	Oscillator	....	......	190	10.0	6.3
	Converter	3.3	93	235		
6K7 1st I.F.		3.0	103	235	8.5	6.3
6K7 2nd I.F.		6.3	103	235	3.1	6.3
6H6 Det. AVC		....	....	....	....	6.3
6C5 1st A.F.		6.4	....	95	1.3	6.3
6F6's Output		18	230	250	42	6.3
6C5 Inverter		6.4	....	95	1.3	6.3
5W4's Rectifiers		Fil. to gnd. 340	....	235 A-c EACH	65 EACH	5.0
6K7 R.F.		3.0	103	235	8.5	6.3

AC line voltage 117—no signal input—1000 ohms per volt meter—dial pointer at 580 K.C.

GENERAL ELECTRIC CO.



SYMBOL	DESCRIPTION
C1	3 GANG TUNING CAPACITOR 10-480 MMF
C2	PAPER CAP. 0.0045 MF
C3	PAPER CAP. 0.01 MF
C4	PAPER CAP. 8 MF
C5	"B" R.F. TRIMMER 3-40 MMF
C6	"B" ANT. TRIMMER 3-45 MMF
C7	PAPER CAP. 0.05 MF
C8	PAPER CAP. 0.05 MF
C9	"B" ANT. TRIMMER 3-35 MMF
C10	"D" OSC. TRIMMER 8-80 MMF
C11	"B" OSC. TRIMMER 5-45 MMF
C12	PAPER CAP. 0.05 MF
C13	MICA CAP. 1170 MMF
C14	"B" PAD. TRIMMER 350 - 550 MMF
C15	MICA CAP. 50 MMF
C16	PAPER CAP. 0.05 MF
C17	PAPER CAP. 0.05 MF
C18	1st I.F. SEC. TRIMMER
C19	1st I.F. PRI. TRIMMER
C20	PAPER CAP. 0.05 MF
C21	PAPER CAP. 0.05 MF
C22	2nd I.F. SEC. TRIMMER
C23	2nd I.F. PRI. TRIMMER
C24	PAPER CAP. 0.1 MF
C25	PAPER CAP. 0.10 MF
C26	PAPER CAP. 0.05 MF
C27	PAPER CAP. 0.05 MF
C28	3rd I.F. SEC. TRIMMER
C29	3rd I.F. PRI. TRIMMER
C30	MICA CAP. 250 MMF
C31	MICA CAP. 250 MMF
C32	PAPER CAP. 0.005 MF
C33	MICA CAP. 150 MMF
C34	PAPER CAP. 0.003 MF
C35	MICA CAP. 500 MMF
C36	PAPER CAP. 0.05 MF
C37	PAPER CAP. 0.05 MF
C38	PAPER CAP. 0.0015 MF
C39	PAPER CAP. 0.01 MF
C40	PAPER CAP. 0.003 MF
C41	DRY ELECTROLYTIC CAP. 16 MF
C42	WET ELECTROLYTIC CAP. 10 MF
C43	DRY ELECTROLYTIC CAP. 4 MF
C44	DRY ELECTROLYTIC CAP. 10 MF
C45	PAPER CAP. 0.01 MF
C46	PAPER CAP. 0.01 MF
L1	"D" ANTENNA COIL
L2	"B" & "C" ANTENNA COIL
L3	"B" RF INTERSTAGE TRANSFORMER
L4	"D" OSC. COIL
L5	"B" & "C" OSC. COIL
L6	1st IF TRANSFORMER ASSEMBLY
L7	2nd IF TRANSFORMER ASSEMBLY
L8	3rd IF TRANSFORMER ASSEMBLY
L9	FIELD COIL 460 Ω (COLD)

SYMBOL	DESCRIPTION
R1	CARBON RESISTOR 47,000 Ω 1/4W
R2	CARBON RESISTOR 47,000 Ω 1/4W
R3	CARBON RESISTOR 47,000 Ω 1/4W
R4	CARBON RESISTOR 47,000 Ω 1/4W
R5	CARBON RESISTOR 180 Ω 1/4W
R6	CARBON RESISTOR 4,700 Ω 1/4W
R7	CARBON RESISTOR 390 Ω 1/4W
R8	CARBON RESISTOR 2,000 Ω 1/4W
R9	CARBON RESISTOR 4,700 Ω 1/4W
R10	CARBON RESISTOR 68,000 Ω 1/4W
R11	CARBON RESISTOR 220,000 Ω 1/4W
R12	CARBON RESISTOR 47,000 Ω 1/4W
R13	VOLUME CONTROL 2 MEG TAP AT 1/2 MEG
R14	CARBON RESISTOR 1,500 Ω 1/4W
R15	CARBON RESISTOR 68,000 Ω 1/4W
R16	CARBON RESISTOR 68,000 Ω 1/4W
R17	CARBON RESISTOR 330,000 Ω 1/4W
R18	RESISTOR 810 Ω 1.6W
R19	CARBON RESISTOR 24,000 Ω 1/4W
R20	CARBON RESISTOR 330,000 Ω 1/4W
R21	CARBON RESISTOR 1.0 MEG 1/4W
R22	RESISTOR 750 Ω 1.3W
R23	RESISTOR 2,800 Ω 1.6W
R24	RESISTOR 6,400 Ω 1.37W
R25	CARBON RESISTOR 15,000 Ω 1W
R26	FLEXIBLE RESISTOR 18 Ω 4W
R27	CARBON RESISTOR 12,000 Ω 1/2W
S1	BAND CHANGE SWITCH
S2	TONE CONTROL SWITCH
S3	POWER SWITCH
T1	POWER TRANSFORMER 60~, 25-60~, 40-60~
T2	TUNING REACTOR 60~, 25~
T3	OUTPUT TRANSFORMER (ON SPEAKER)
V1	6A8 TUBE
V2	6K7 TUBE
V3	6K7 TUBE
V4	6H6 TUBE
V5	6C5 TUBE
V6	6F6 TUBE
V7	6F6 TUBE
V8	6C5 TUBE
V9	5W4 TUBE
V10	5W4 TUBE
V11	6K7 TUBE
P1	ANTENNA-GROUND TERMINAL BOARD
P2	PILOT LIGHT, GREEN, 6.3V, .15A
P3	PILOT LIGHT, RED, 6.3V, .15A
P4	POWER CORD & PLUG

CONDITIONS OF TEST
WAVE SWITCH ON B BAND
POWER SWITCH OFF

APPROXIMATE RESISTANCE MEASUREMENTS

	RESISTANCE TO GROUND	TUBE	SOCKET PRONG
1	13 MEG. Ω	RF GRID	CAP
2	125 MEG. Ω	CONV. GRID	CAP
3	12 MEG. Ω	1st I.F. GRID	CAP
4	18.5 Ω	2nd I.F. GRID	CAP
5	298,000 Ω	DIODE PLATE	PRONG 3
6	GROUNDED	DIODE PLATE	PRONG 5
7	GROUNDED	DIODE CATH.	PRONG 4
8	GROUNDED	DIODE CATH.	PRONG 8
9	2-2 MEG. Ω VOL.CONT.	A.F. GRID V8	PRONG 5
10	24,000 Ω	A.F. GRID V5	PRONG 5
11	330,000 Ω	OUTPUT GRID V6	PRONG 5
12	354,000 Ω	OUTPUT GRID V7	PRONG 5

Fig. 2. Schematic Circuit Diagram

Tuning Frequency Range

Band "B" . . . . 540- 1660 K.C.
Band "C" . . . . 1600- 6000 K.C.
Band "D" . . . . 5400-18000 K.C.

Intermediate Frequency . . . . 465 K.C.

Tuning Control Drive Ratio

Fast tuning . . . . 8 to 1
Vernier tuning . . . . 40 to 1

Cone diameter . . . . 12 inches
Voice coil impedance—5.5 ohms at 400 cycles

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	115-120	60	120
C	115-120	25-60	120

MODEL E-115
Chassis Wiring

GENERAL ELECTRIC CO.

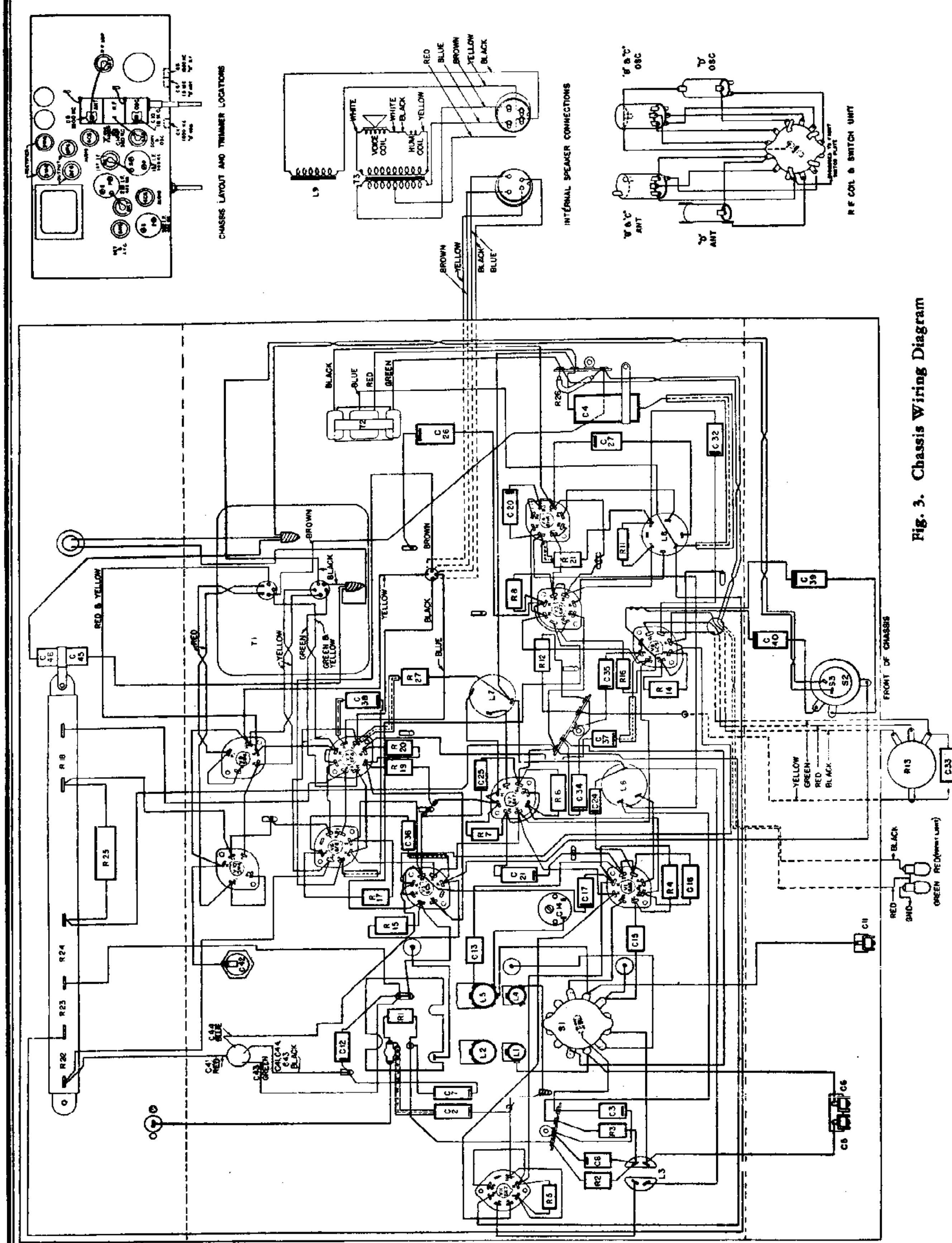


Fig. 3. Chassis Wiring Diagram

GENERAL ELECTRIC CO.

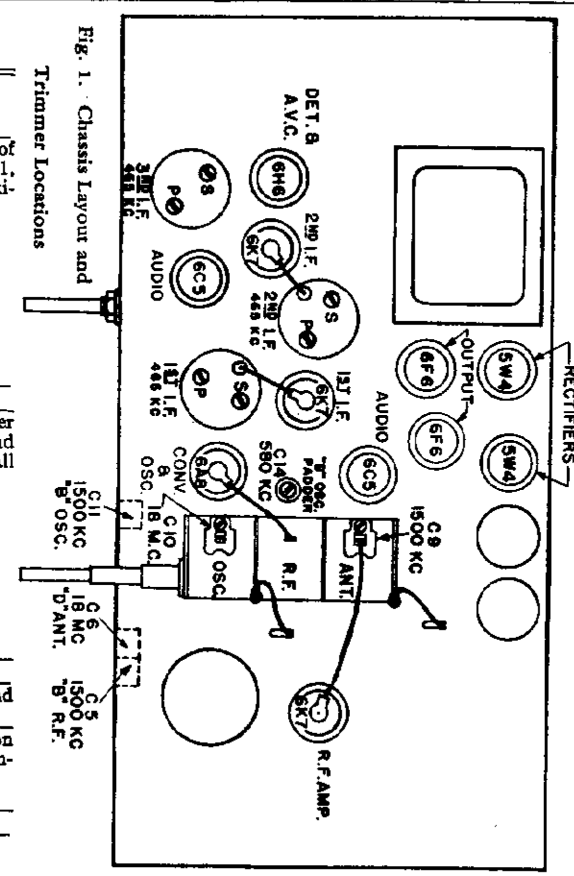


Fig. 1. Chassis Layout and Trimmer Locations

ALIGNMENT PROCEDURE

IF ALIGNMENT WITH OSCILLOSCOPE

	Band Switch Setting	Input Frequency	Point of Input	Dummy Ant.	Trimmer	Remarks
1	Band "B"	465 K.C. Sweep	1st IF Grid	.05 MFD or Larger	3rd IF Sec. (C-28) 3rd IF Pri. (C-29)	Gang condenser plates closed—connect audio input of oscilloscope to ground and to the junction of R-21, R-11—adjust for a single symmetrical curve of maximum amplitude.
2	Band "B"	465 K.C. Sweep	1st IF Grid	.05 MFD or Larger	2nd IF Sec. (C-22) 2nd IF Pri. (C-23)	
3	Band "B"	465 K.C. Sweep	Converter Grid	.05 MFD or Larger	1st IF Sec. (C-18) 1st IF Pri. (C-19)	

IF ALIGNMENT WITH OUTPUT METER

	Band Switch Setting	Input Frequency	Point of Input	Dummy Ant.	Trimmer	Remarks
1	Band "B"	465 K.C. with 400-cycle modulation	1st IF Grid	.05 MFD or Larger	3rd IF Sec. (C-28) 3rd IF Pri. (C-29)	Gang condenser plates closed—connect output meter across Voice Coil—keep input signal low and volume control on as far as possible. Adjust all trimmers for maximum output.
2	Band "B"	465 K.C. with 400-cycle modulation	1st IF Grid	.05 MFD or Larger	2nd IF Sec. (C-22) 2nd IF Sec. (C-23)	
3	Band "B"	465 K.C. with 400-cycle modulation	Converter Grid	.05 MFD or Larger	1st IF Sec. (C-18) 1st IF Pri. (C-19)	

RF ALIGNMENT

	Band Switch Setting	Input Frequency	Point of Input	Dummy Ant.	Trimmer	Remarks
1	Band "B"					Close gang plates—adjust pointer to first line at left end of tuning scale.
2	Band "D"	18 M.C. with 400-cycle modulation	Antenna Post	250 MMF 400 ohms in Series	Oscillator (C-10) Antenna (C-6)	Connect output meter across voice coil—tone control on "Bass" position—set osc. trimmer. Rock gang condenser when adjusting the antenna trimmer.
3	Band "C"	No adjustments necessary				
4	Band "B"	1500 K.C. with 400-cycle modulation	Antenna Post	250 MMF 400 ohms in Series	Oscillator (C-11) RF (C-5) Ant. (C-9)	Peak trimmers for max. output with a low input signal.
5	Band "B"	580 K.C. with 400-cycle modulation	Antenna Post	250 MMF 400 ohms in Series	Osc. Padder (C-14)	Adjust for maximum output in vicinity of 580 KC while rocking the gang.
6	Band "B"	1500 K.C. with 400-cycle modulation	Antenna Post	250 MMF 400 ohms in series	Oscillator (C-11)	

To realize all the performance built into these receivers at the factory, alignment using cathode ray equipment is to be preferred.

On the "D" band (5400 to 18,000 K.C.), the oscillator operates on the *LOW* frequency side of the incoming signal; therefore, adjust the oscillator trimmer until the second peak is reached as the trimmer is *INCREASED* in capacity. When the correct adjustment is made, it will be possible to tune the image of any signal on the "D" band 930 K.C. *HIGHER* than the signal if the input is sufficiently high. Example: The image of 15 M.C. should be heard at 15,970 K.C.

The alignment procedure is given in table form on page 3. The "Dummy Antenna" is the capacitor or capacitor and resistor used in series with the signal generator antenna lead.

MODEL E-115
Parts

GENERAL ELECTRIC CO.

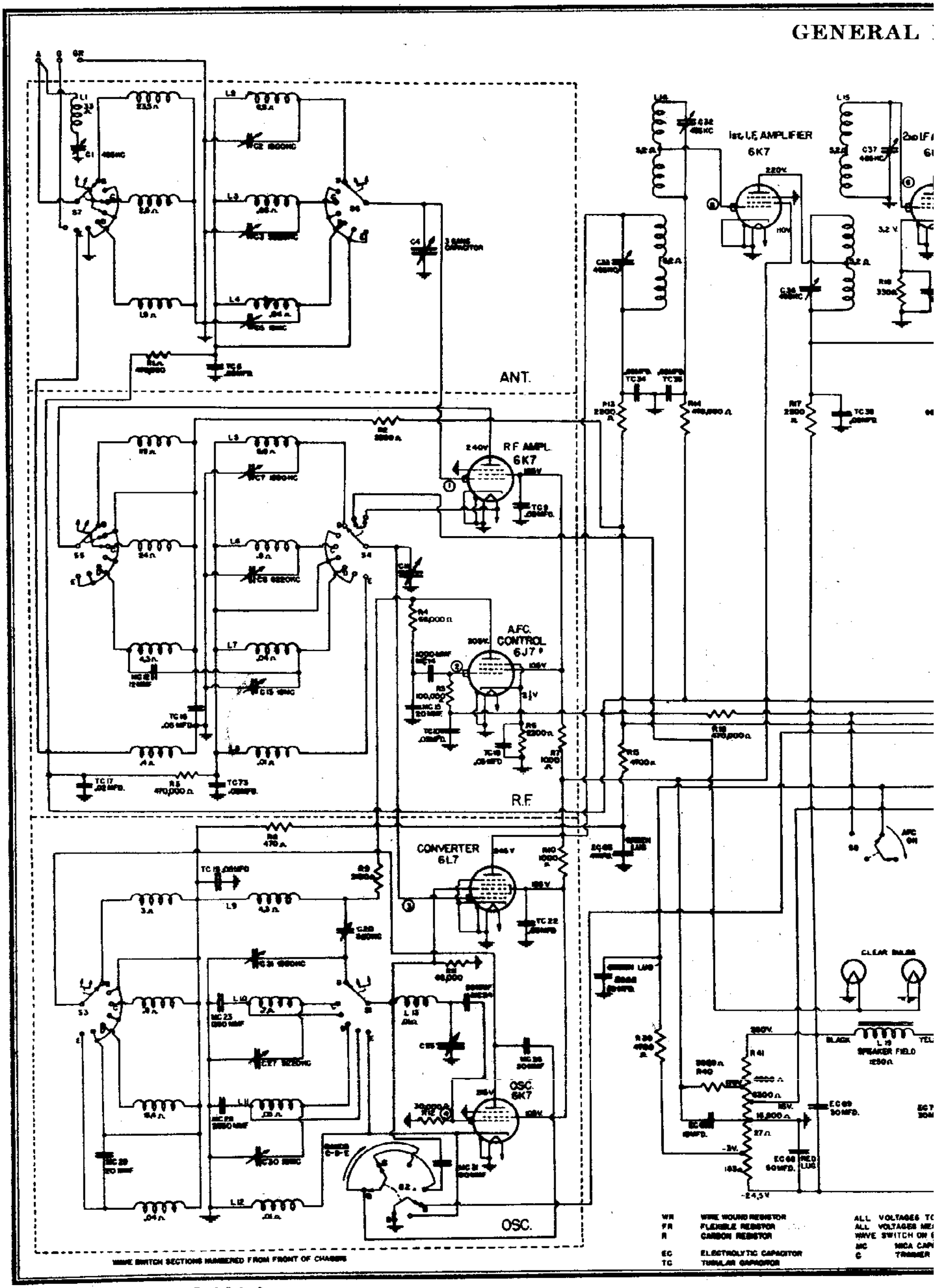
REPLACEMENT PARTS

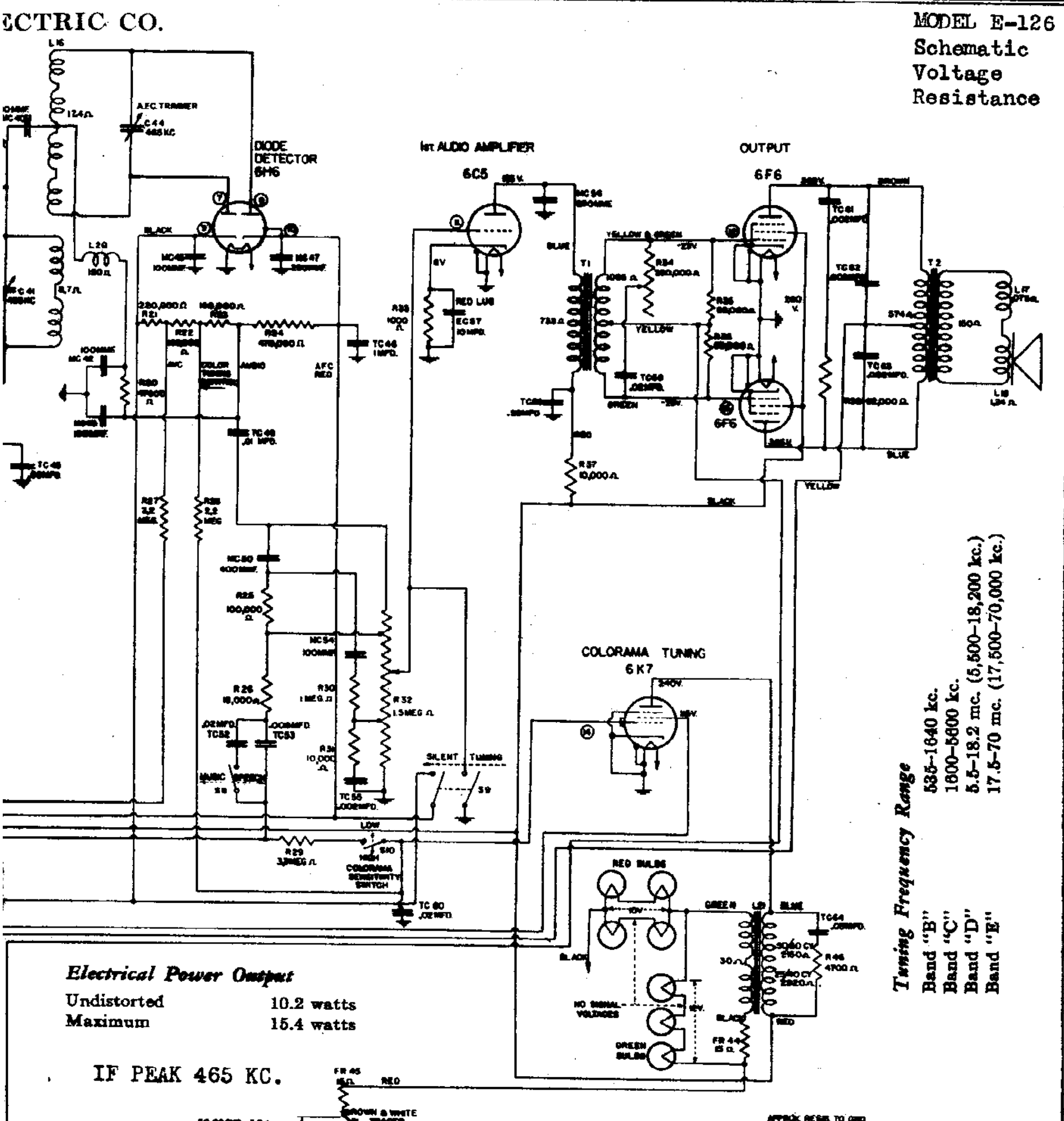
INSIST ON GENUINE FACTORY-TESTED PARTS, WHICH MAY BE PURCHASED FROM AUTHORIZED DEALERS

Stock No.	Description	List Price
*RB-023	BOARD—Terminal Board (Near Electrolytic Cond.)	$0.10
*RB-026	BOARD—Ant. Ground Terminal Board	.10
*RB-040	BOARD—Terminal Board (4 Lugs)	.10
*RB-053	BOARD—Terminal Board (3 Lugs) Between 1st and 2nd IF Transformer	.10
*RB-139	BRACKET—Gang Condenser Mtg. Brackets	.15
*RC-014	CAPACITOR—.003 Mfd. 200 V. Paper (C-34)	.25
RC-015	CAPACITOR—.003 Mfd. 400 V. Paper (C-40)	.25
*RC-017	CAPACITOR—.0045 Mfd. 200 V. Paper (C-2)	.25
RC-032	CAPACITOR—.01 Mfd. 200 V. Paper (C-3)	.25
*RC-040	CAPACITOR—.01 Mfd. 400 V. Paper (C-39)	.25
*RC-046	CAPACITOR—.02 Mfd. 200 V. Paper (C-20)	.25
*RC-072	CAPACITOR—.05 Mfd. 200 V. Paper (C-7, C-8, C-17, C-21, C-26)	.25
RC-091	CAPACITOR—.05 Mfd. 400 V. Paper (C-12, C-16, C-27, C-36, C-37)	.30
*RC-096	CAPACITOR—.1 Mfd. 200 V. Paper (C-25)	.30
*RC-123	CAPACITOR—.1 Mfd. 400 V. Paper (C-24)	.35
RC-715	CONDENSER—3 Gang Tuning Condenser (10-450 Mmf.) (Trimmers C-9, C-10) (C-1)	$5.25
*RC-755	CAPACITOR—Line Capacitors .01-.01 Mfd. 250 V. AC (C-45, C-46)	.40
RC-824	CABLE—Speaker Cable Complete with Plug	.55
*RC-860	CORD—Power Cord	.65
RC-977	CUSHION—Gang Cond. Mtg. Cushions (Pkg. of 3)	.15
*RE-011	ESCUTCHEON—Escutcheon Plate (with Mtg. Screws)	1.25
*RF-006	FOOT—Chassis Mtg. Foot (white rubber)	.30
*RF-008	FOOT—Chassis Mtg. Foot (red rubber)	.20
*RG-001	GRID CAP—Control Grid Clip (Pkg. of 5)	.10
*RK-004	KNOB—Control Knob (push-on) (Pkg. of 5)	.40
*RK-005	KNOB—Tone Control Knob (Pkg. of 5)	.50
RL-035	COIL—Antenna Coil Band "D" (L-1)	.70
RL-036	COIL—Antenna Coil "B" and "C" (L-2)	1.10
RL-131	COIL—RF Coil "B" Band (L-3)	.75
RL-237	COIL—Osc. Coil Band "D" (L-4)	.70
RL-238	COIL—Osc. Coil "B" and "C" Band (L-5)	1.00
RL-315	REACTOR—Colorama Tuning Reactor 25 Cycle (T-2)	2.75
RL-316	REACTOR—Colorama Tuning Reactor 60 Cycle (T-2)	2.25
RQ-041	RESISTOR—180 ohm ¼ watt Carbon (R-5) (Pkg. of 5)	.60
RQ-049	RESISTOR—390 ohm ¼ watt Carbon (R-7) (Pkg. of 5)	.60
*RQ-063	RESISTOR—1,500 ohm ¼ watt Carbon (R-14) (Pkg. of 5)	.60
*RQ-067	RESISTOR—2,200 ohm ¼ watt Carbon (R-8) (Pkg. of 5)	.60
*RQ-075	RESISTOR—4,700 ohm ¼ watt Carbon (R-6, R-9) (Pkg. of 5)	.60
RQ-092	RESISTOR—24,000 ohm ¼ watt Carbon (R-19) (Pkg. of 5)	.60
*RQ-099	RESISTOR—47,000 ohm ¼ watt Carbon (R-1, R-2, R-3, R-4, R-12) (Pkg. of 5)	.60
*RQ-103	RESISTOR—68,000 ohm ¼ watt Carbon (R-10, R-15, R-16) (Pkg. of 5)	.60
*RQ-115	RESISTOR—220,000 ohm ¼ watt Carbon (R-11) (Pkg. of 5)	.70
*RQ-119	RESISTOR—330,000 ohm ¼ watt Carbon (R-17, R-20) (Pkg. of 5)	.70
*RQ-131	RESISTOR—1.0 megohm ¼ watt Carbon (R-21) (Pkg. of 5)	.70
RQ-285	RESISTOR—12,000 ohm ½ watt Carbon (R-27) (Pkg. of 5)	.60
*RQ-487	RESISTOR—15,000 ohm 1 watt Carbon (R-25) (Pkg. of 5)	1.00
RR-317	RESISTOR—19 ohm 4 watt Flexible Resistor (R-26)	.20
RR-724	RESISTOR—Tapped Bleeder Resistance (R-18, R-22, R-23, R-24)	1.00
RS-140	SHIELD—"B" Band RF Transformer Shield Can	.20
RS-167	SHIELD—Shield Can for 1st or 2nd IF Transformer	.20
RS-168	SHIELD—Shield Can for 3rd IF Transformer	.20
*RS-200	SOCKET—8 Pin Tube Socket (Pkg. of 5)	.75
RC-195	CAPACITOR—.0015 Mfd. 1000 V. Paper (C-38)	$0.25
RC-197	CAPACITOR—.005 Mfd. 200 V. Paper (C-32)	.25
*RC-199	CAPACITOR—2 Mfd. 100 V. Paper (C-4)	.75
*RC-218	CAPACITOR—50 Mmfd. Mica Capacitor (C-15)	.25
*RC-242	CAPACITOR—150 Mmf. Mica (C-33)	.25
*RC-261	CAPACITOR—250 Mmfd. Mica (C-30, C-31)	.25
*RC-298	CAPACITOR—500 Mmf. Mica (C-35)	.30
RC-336	CAPACITOR—Mica "C" Band Padder 1170 Mmf. (C-13)	.30
*RC-405	CAPACITOR—10 Mfd. 480 V. Wet Electrolytic (C-42)	1.15
RC-568	CAPACITOR—Dry Electrolytic 18 Mmfd. 4 Mfd., 10 Mfd. (C-41, C-43, C-44)	2.25
*RC-618	CAPACITOR—"B" Band Osc. Trimmer (5-45 Mmf.) (C-11)	.25
RC-632	CAPACITOR—Double "B" and "D" Band Trimmer Capacitors 3-40 Mfd. (C-5, C-6)	.25
RC-634	CAPACITOR—"B" Band Padding Capacitor 350-550 Mmf. (C-14)	.35
RC-637	CAPACITOR—Double Trimmers 3rd IF Transformer (C-28, C-29)	.60
RC-638	CAPACITOR—Double Trimmers 1st or 2nd IF Transformer (C-18, C-19, C-22, C-23)	.50
*RS-204	SOCKET—5 Pin Socket (Pkg. of 5)	$0.75
RS-334	SWITCH—Band Change Switch (S-1)	1.25
RS-335	SWITCH—Tone Control and Power Switch (S-2, S-3)	1.00
*RS-423	SPRING—Knob Spring "Push-on" Type (Pkg. of 10)	.25
RT-093	TRANSFORMER—Power Transformer 115-120 V. 60 Cycles (T-1)	5.95
RT-095	TRANSFORMER—Power Transformer 115-120 V., 25/60 Cycles (T-1)	10.95
RT-231	TRANSFORMER—1st or 2nd IF Transformer (complete) (L-6, C-18, C-19) or (L-7, C-22, C-23)	1.50
RT-232	TRANSFORMER—3rd IF Transformer (L-8, C-28, C-29)	1.75
RV-020	VOLUME CONTROL—2 Megohm Volume Control (R-13)	.80
RW-012	WINDOW—Escutcheon Window	.50
*RW-101	WASHER—Felt washer for Control Shafts (Pkg. of 10)	.45
	SPEAKER ASSEMBLY	
*RC-910	CONE—12-in. Type Cone and Voice Coil.	1.45
*RC-991	CLAMP—12-in. Cone Spider Clamp and Screw	.05
*RP-040	PLUG—Male Speaker Plug	.20
RP-063	PLUG—Female Speaker Plug (includes 1 plug, 4 contacts, 1 eyelet, 1 washer)	.20
RS-041	SPEAKER—12-in. Type Speaker (complete with output transformer)	10.00
*RS-416	SPRING—Voice Coil Leads Spring (Pkg. of 2)	.10
*RT-401	TRANSFORMER—Output Transformer (T-3)	1.90
	DIAL MECHANISM	
*RB-137	BRACKET—Dial Mask and Reflector Box Support Bracket (1)	.20
RB-151	BRACKET—Lamp Bracket Assembly (17)	.05
RB-152	BRACKET—Band Change Bracket (3)	.05
RB-514	BOX—Scale Housing Box (2)	.70
*RC-817	CABLE—Drive Cable (10) (Pkg. of 5)	.40
*RC-818	CABLE—Band Change Cable (12) (Pkg. of 5)	.40
*RC-993	CUSHION—Rubber Buffer Cushion (Dial) (15) (Pkg. of 2)	.10
*RC-994	CAP—Scale Cap (Free end) (5)	.10
*RC-995	CAP—Scale Cap (pulley end) (6)	.10
*RD-035	DRIVE—Tuning Condenser Reduction Drive Assembly (13)	1.10
RD-046	DIAL—Slide Rule Dial Scale	.65
RL-908	LAMP—Colorama Tuning Green Lamp (19) (P-2) (Pkg. of 10)	1.50
RL-909	LAMP—Colorama Tuning Red Lamp (18) (P-3) (Pkg. of 10)	1.50
*RP-047	POINTER—Dial Pointer (Pkg. of 5) (11)	.25
*RP-048	PULLEY—Gang Drive Pulley (14)	.35
*RP-049	PULLEY—Drive Cord Idler Pulley (4)	.15
RR-906	REFLECTOR—Lamp Reflector (20)	.50
*RS-418	SPRING—Gang Drive Pulley Spring (16)	.05
RS-424	SPRING—Dial Scale Spring (7)	.05
RS-608	SUPPORT—Dial Scale Spring Support (8)	.05

* Indicates parts used on previous receivers.

(Prices subject to change without notice)


GENERAL
1st. I.F. AMPLIFIER
6K7
ANT.
R.F. AMPL.
6K7
A.F.C.
CONTROL
6J7
R.F.
CONVERTER
6L7
OSC.
6K7
OSC.
CLEAR BULBS
SPEAKER FIELD
WAVE SWITCH SECTIONS NUMBERED FROM FRONT OF CHASSIS
WR WIRE WOUND RESISTOR
FR FLEXIBLE RESISTOR
R CARBON RESISTOR
EC ELECTROLYTIC CAPACITOR
TC TUBULAR CAPACITOR



APPROX. RESIS. TO GND.

①	2.8 MEG Ω	RF GRID	CAP
②	340,000 Ω AFC OFF 94,000 Ω AFC ON	AFC GRID	CAP
③	2.8 MEG Ω	CONV. GRID	CAP
④	47,000 Ω	OSC. GRID	CAP
⑤	2.8 MEG Ω	1st I.F. GRID	CAP
⑥	52 Ω	2nd I.F. GRID	CAP
⑦	280,000 Ω AFC OFF 380,000 Ω AFC ON	DIODE PLATE	PRONG 3
⑧	280,000 Ω AFC OFF 380,000 Ω AFC ON	DIODE PLATE	PRONG 5
⑨	4700 Ω	DIODE CATHODE	PRONG 4
⑩	4700 Ω AFC OFF 940,000 Ω AFC ON	DIODE CATHODE	PRONG 8
⑪	0-1.5 MEG Ω GNDED. S.T. SW CLOSED	1st A.F. GRID	PRONG 5
⑫	700 Ω	OUTPUT GRID	PRONG 5
⑬	700 Ω	OUTPUT GRID	PRONG 5
⑭	2.4 MEG Ω 1.4 MEG Ω *	COLOR TUNING & CAP	

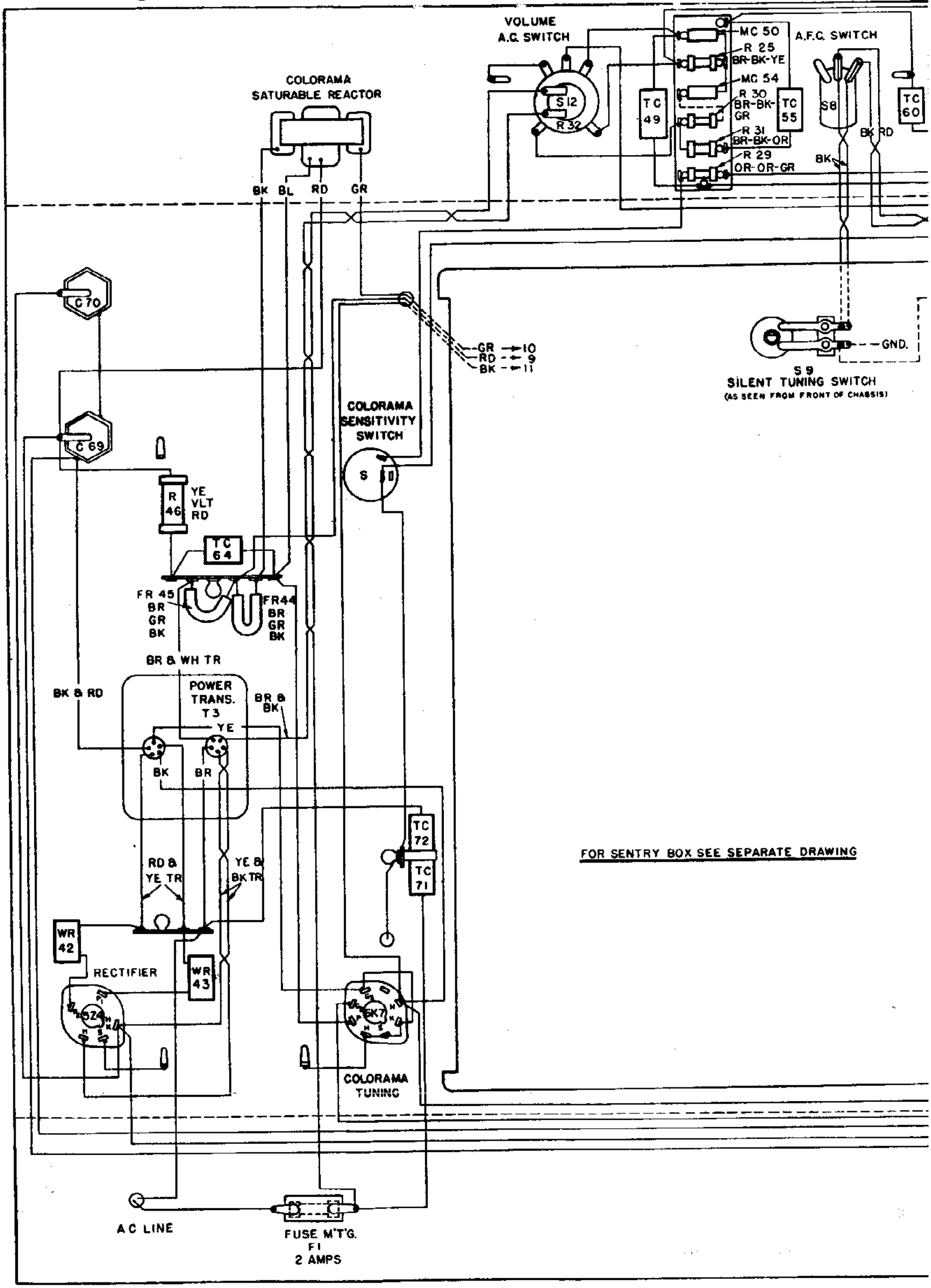
* LOW COLOR SENSITIVITY

CONDITIONS FOR TESTING RESISTANCE
WAVE SWITCH ON B BAND
AFC SWITCH OFF (COUNTERCLOCKWISE)
SILENT TUNING SWITCH OPEN (IN)
COLORAMA SWITCH IN SENSITIVE POSITION (COUNTERCLOCKWISE)
POWER SWITCH OFF

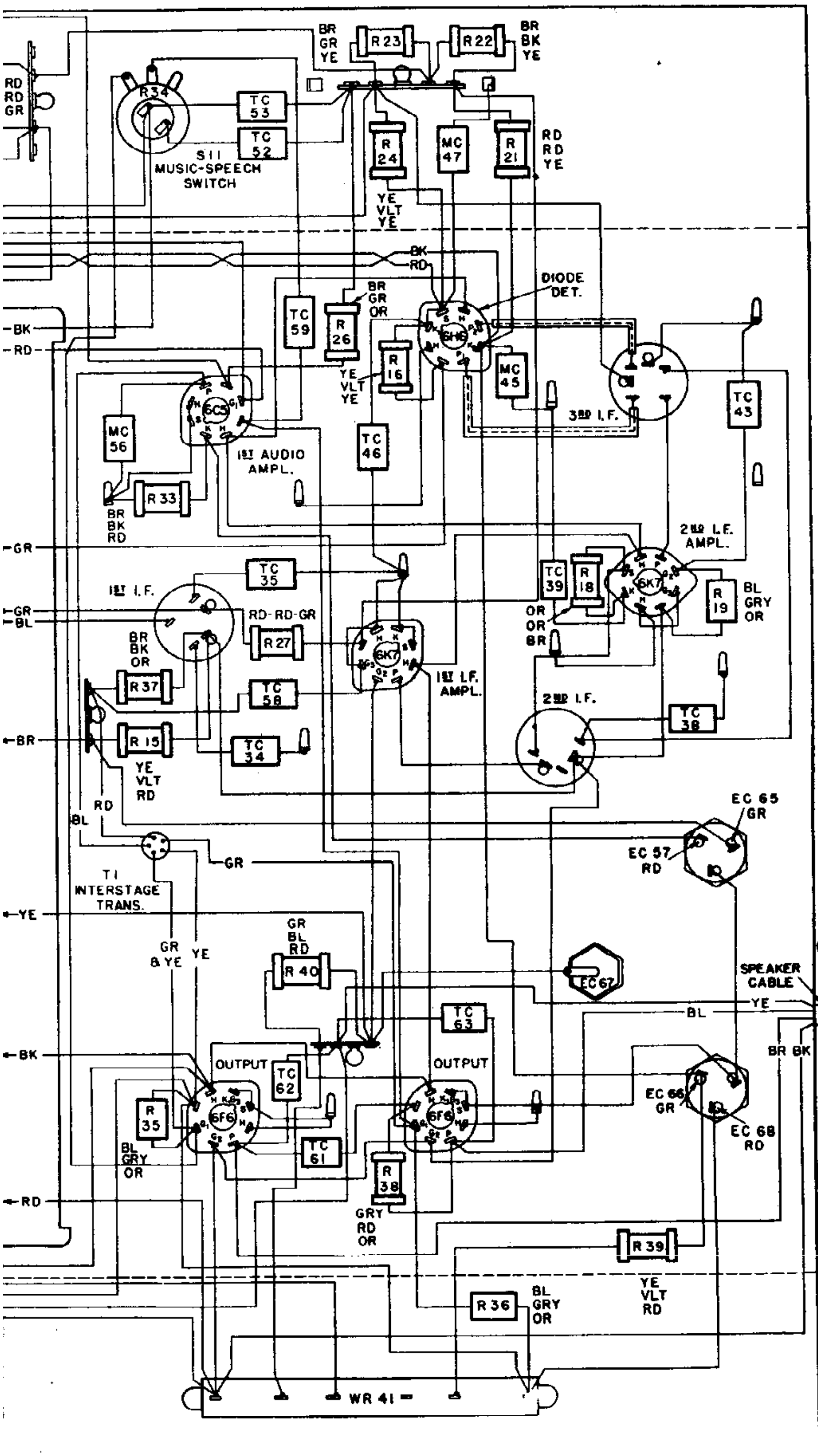
LESS OTHERWISE SPECIFIED.
MIT & GND. TERMINALS SHORTED.

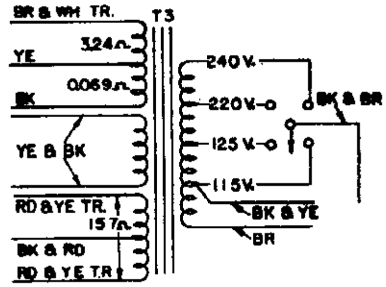
MODEL E-126
Chassis Wiring

GENERA



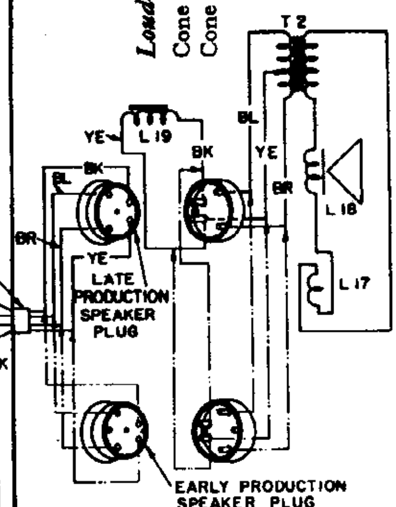
ELECTRIC CO.





INTERNAL CONNECTIONS OF UNIVERSAL TRANSFORMER FOR 105-250 VOLTS

Loud-speaker—Electrodynamic
Cone Diameter..........12 in.
Cone Coil Impedance..........1.4 ohms at 400 volts



INTERNAL CONNECTIONS OF SPEAKER

COLOR CODE

BLACK	BK
BROWN	BR
RED	RD
ORANGE	OR
YELLOW	YE
GREEN	GR
BLUE	BL
VIOLET	VLT
GRAY	GRY
WHITE	WH

GENERAL ELECTRIC CO.

To Change the Dial Lamps

Make certain that the copper-plated hex head shipping screw (which secures the dial lamp bracket during shipment) has been removed before attempting to remove the dial lamp bracket (No. 17). Lift the lamp bracket from the tabs under which it is clipped. Care should be taken that the lamp leads do not put an undue strain upon the drive cable. With the lamp bracket lead laid back horizontally the lamps may be placed. When the lamp bracket is reinserted care should be exercised to avoid having the lamp leads foul the gang mechanism.

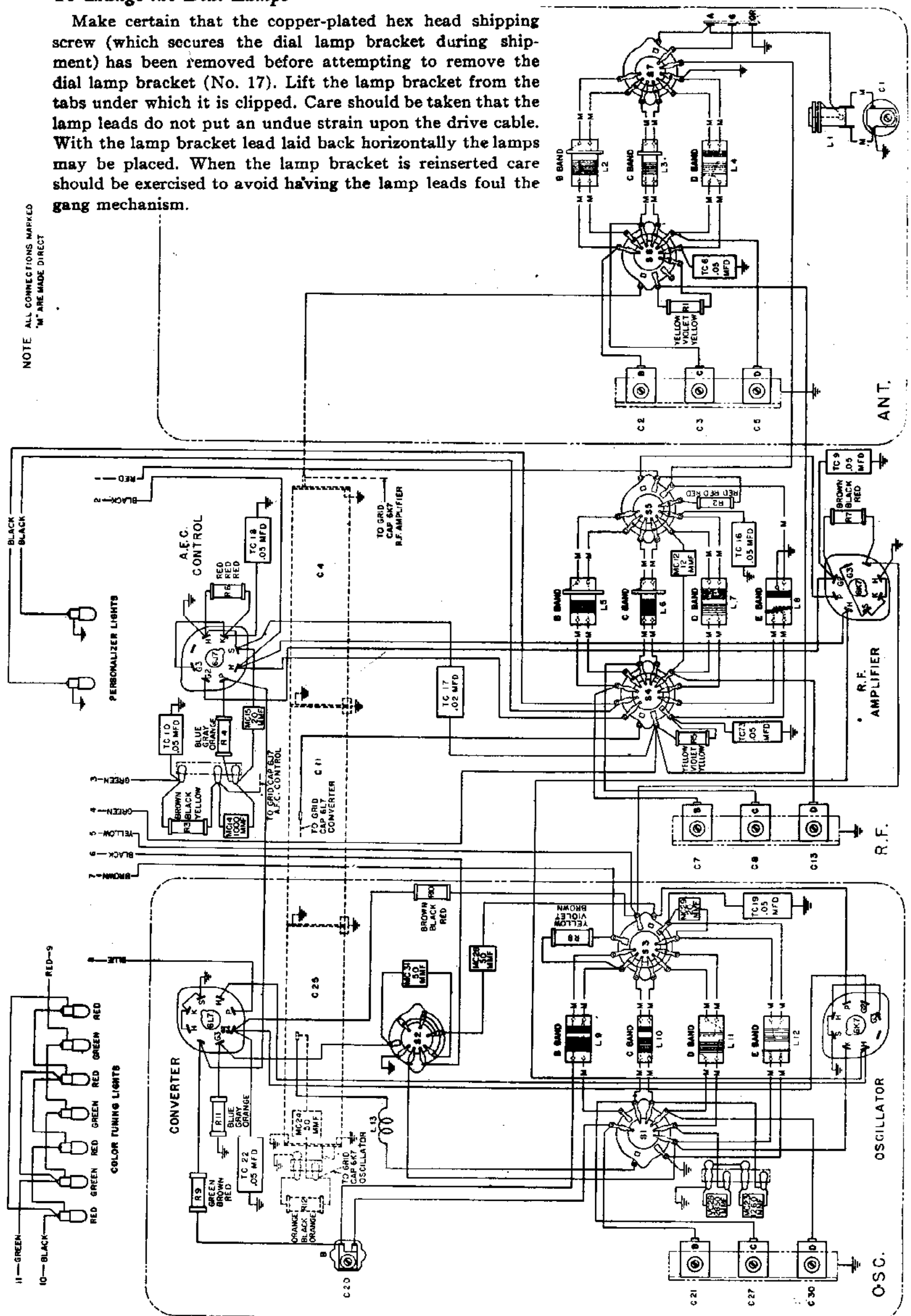


Fig. 1. "Sentry Box" Wiring Diagram

MODEL E-126
Socket, Trimmers
Voltage

GENERAL ELECTRIC CO.

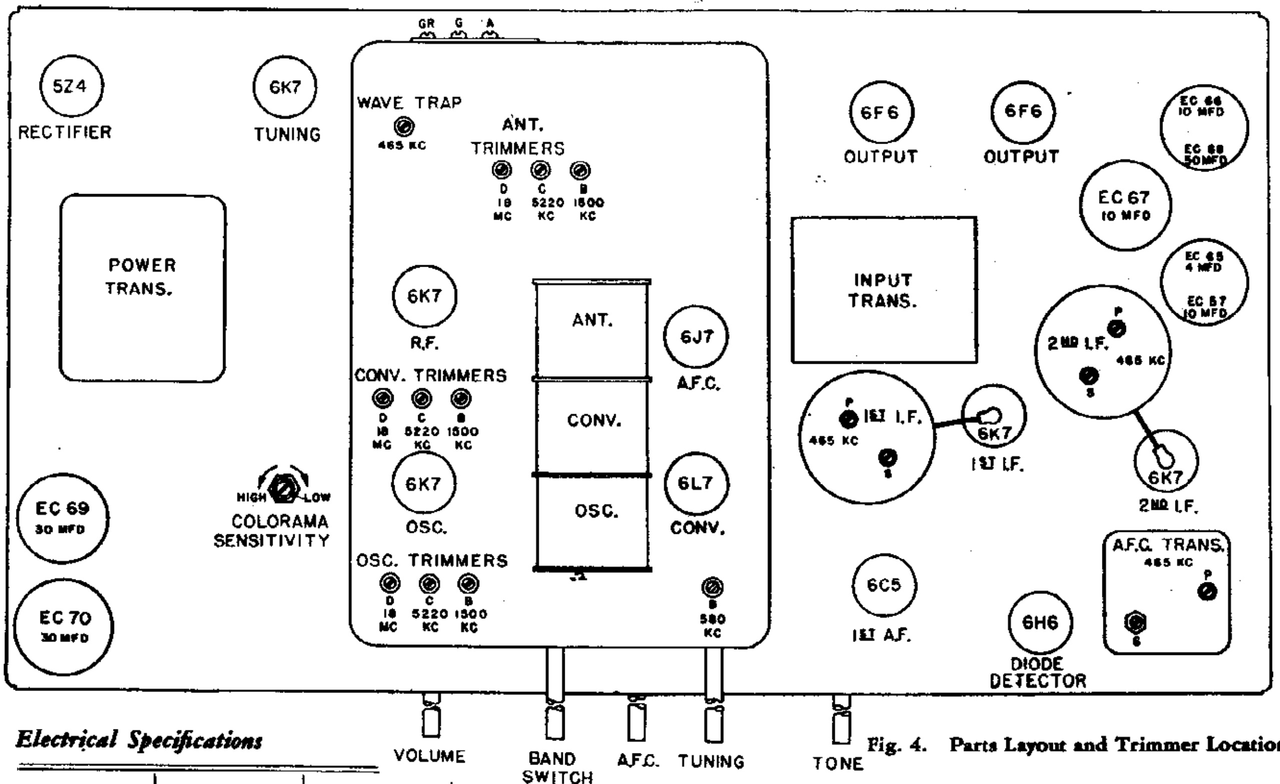
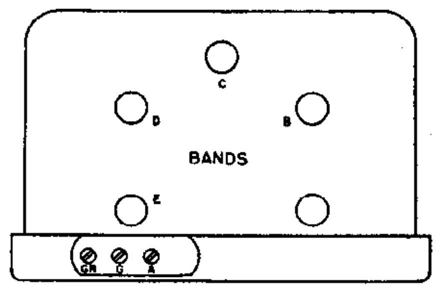


Fig. 4. Parts Layout and Trimmer Location



Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	115	50–60	120
C	115	25–60	120
V	105–130 and 200–250	40–60	125

NOTE.—Taps on universal transformers (Rating "V") are accessible by removing the cap cover on the top of the transformer.

SOCKET VOLTAGES

Tube No.	Cathode to Ground Volts D.C.	Screen Grid to Ground Volts D.C.	Plate to Ground Volts D.C.	Cathode Current M.A.	Heater Volts A.C.
6K7 R.F. Amp.	†	105	240	8.5	6.3
6L7 Converter	†	105	245	10.0	6.3
6K7 Oscillator	...	105	215	7.5	6.3
6K7 1st I. F. Amp.	†	110	220	9.5	6.3
6K7 2nd I. F. Amp.	3.0	105	220	10.0	6.3
6H6 Detector & AVC.	...	...	...	...	6.3
6C5 Audio Amplifier	6.0	...	185	5.6	6.3
6F6 Output	*	260	365	21.0	6.3
6F6 Output	*	260	365	21.0	6.3
6K7 Colorama Control	...	115	240	9.0	6.3
6J7 AFC.	2.5	105	205	1.0	6.3
5Z4 Rectifier	370 D.C.	...	700/350 R.M.S.	114.0	5.0

Measured at 115 volts supply. No signal input. Volume control maximum. Voltmeter 1000 ohms per volt. Measurements taken on highest scale giving accurate readable deflection.
† Grid bias at source −3 volts.
* Grid bias at source −23 volts.

Tuning Control Drive Ratio

Fast Tuning	8 to 1
Vernier Tuning	50 to 1

Physical Specifications

Model	E-126
Height	41 in.
Width	27¼ in.
Depth	14 5/16 in.
Weight packed	124 lb.

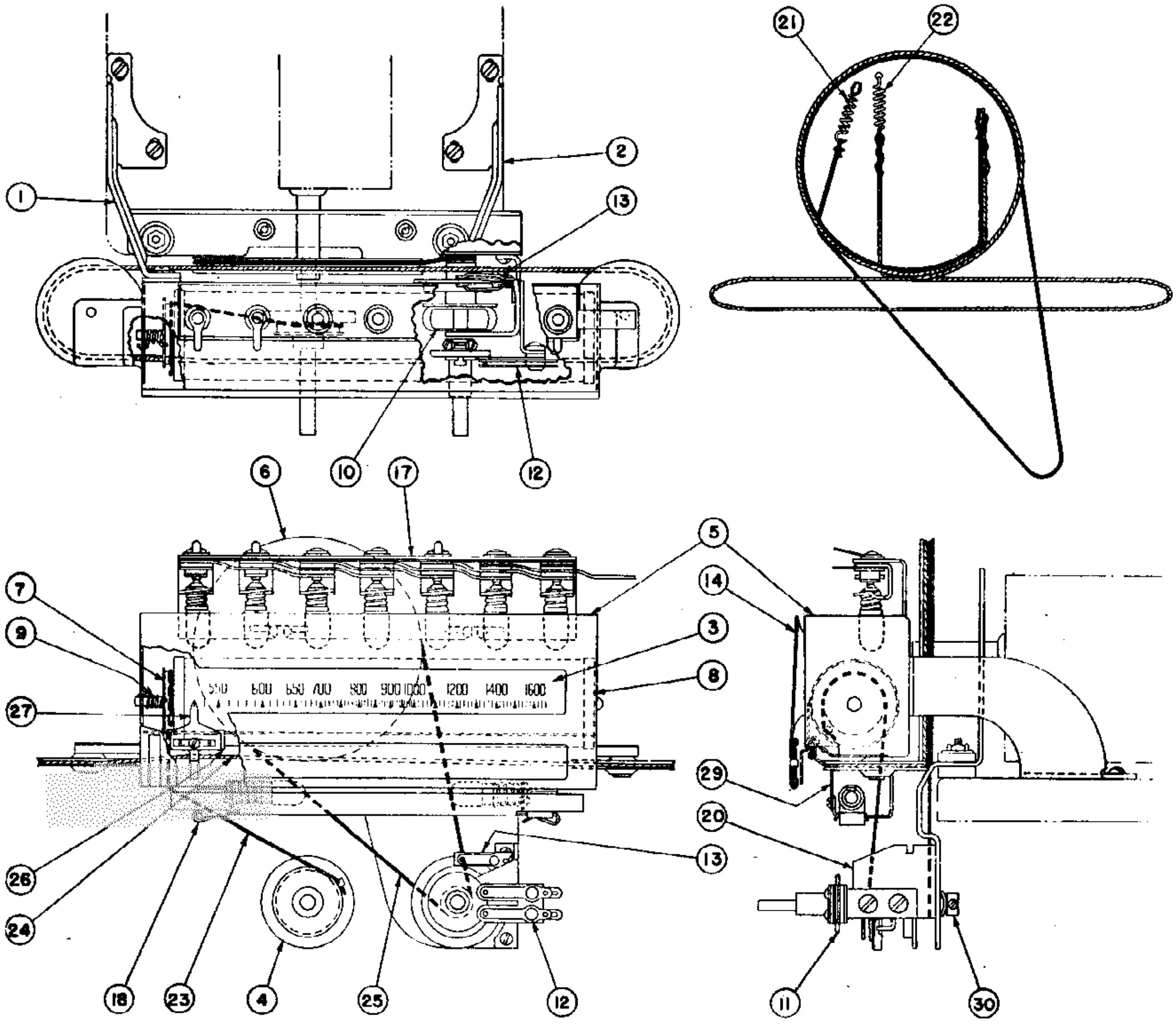


Fig. 7. Dial Drive Mechanism

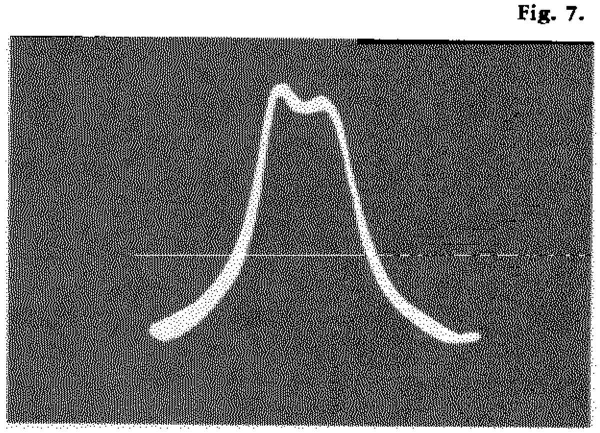


Fig. 5. Overall I. F. Curve

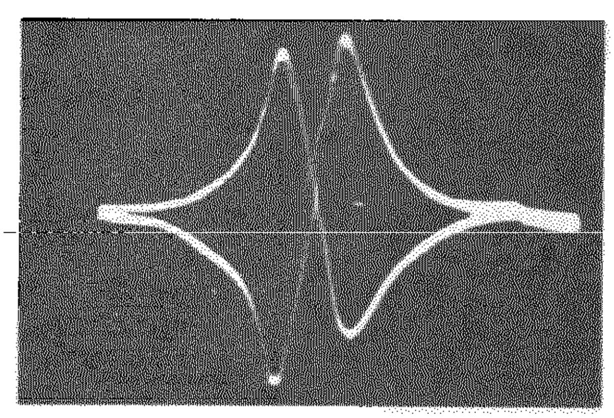


Fig. 6. AFC Trimmer Adjustment Curve

MODEL E-126
Alignment
Dial Notes

GENERAL ELECTRIC CO.

ALIGNMENT PROCEDURE

The receiver should first be allowed to run for fifteen minutes in order to reach its approximate normal operating temperature. Before making any adjustments, it is wise to determine the correctness of the existing alignment. This may be done by supplying a signal from the test oscillator to the receiver and inserting a "Tuning Wand" into the coil involved. The "Tuning Wand" consists of a rod of insulating material having a ring of nonmagnetic metal attached to one end, and a small core of finely divided iron compacted into the opposite end. By inserting the metal ring end into the center of a particular coil, the inductance of the coil is lowered, increasing its resonant frequency. Inserting the iron-filled end into the coil raises its inductance, lowering its resonant frequency. If the circuits are in exact alignment, inserting either end of the tuning wand in any coil will result in a decrease in output. When an increase in signal is obtained with the iron-filled end of the wand, a decrease in resonant frequency of that circuit by increasing its trimmer capacity is indicated. When an increase in signal is obtained with the metal ring, a decrease in trimmer capacity is indicated.

Changes Indicated by Wand

Wand	Signal	Trimmer adjustment required
Metal Ring	Decrease	None
Iron filings	Decrease	
Metal Ring	Increase	Decrease capacity
Iron filings	Decrease	
Metal Ring	Decrease	Increase capacity
Iron filings	Increase	

Alignment Frequencies

I.F.	Band "B"	Band "C"	Band "D"	Wave Trap
465 kc.	580 kc. 1500 kc.	5220 kc.	18,000 kc.	465 kc.

In order to align this receiver properly, it is necessary to have available the following test equipment:

1. A modulated test oscillator with frequencies available of 465, 580, 1500, 5220 and 18,000 kc.
2. An output indicator, such as a high resistance a-c voltmeter with a maximum scale reading of 3 to 5 volts, or a neon lamp indicator.
3. An alignment tool consisting of an insulating shaft with a small screwdriver blade.
4. A tuning wand.

To realize the full advantage of the performance built into these receivers at the factory, circuit alignment using cathode ray oscilloscope equipment is much to be preferred. The oscilloscopic method is particularly advantageous in aligning the I.F. tuned circuits.

See Fig. 4 for location of all trimmer capacitors.

1. *Visual Alignment of I. F.*

For visual alignment it is necessary to vary the frequency of an unmodulated test oscillator signal over a range extending on both sides of the peak frequency. This variation must take place in synchronism with the horizontal traverse of the cathode ray beam on its screen. The frequency modulator must, therefore, provide means for synchronizing the periodic test frequency variation with the cathode ray horizontal deflection circuit. The test oscillator may advantageously have facilities for audio frequency amplitude modulation of a fixed radio frequency test signal, as well as for frequency modulation, but audio modulation is not required for visual I.F. alignment.

In place of an output meter across the speaker voice coil, the vertical plates of the cathode ray tube are connected across the load resistor of the diode rectifier. With the frequency modulator in operation in conjunction with the test oscillator, the resonance curve of the circuit under test will be then shown on the screen.

Set the tuning dial indicator at the low end of the broadcast band at some point where no signal is received, since an extraneous signal might interfere with the aligning process. The volume control should be in an "off" or nearly off position. Apply a frequency modulated signal to the grid of the 1st I.F. amplifier tube through a 0.05 Mfd. (RC-072) capacitor. Connect the vertical plates of the oscilloscope between ground and the junction point between R-23 and R-24, and with the APC switch in the "off" position proceed to align the primary and secondary of the 2nd I.F. and the AFC I.F. transformers.

The object should be to make the two curves coincide with each other at the top and throughout their length with the maximum amplitude obtainable. This will require that all four I.F. trimmers be adjusted in the usual manner *excepting the AFC secondary (hexagonal nut) trimmer which must be adjusted for minimum amplitude* before the curves will coincide properly. Fig. 5 gives the appearance of the curve when the alignment adjustments have been completed satisfactorily thus far. Apply the same frequency modulated input to the grid of the converter (6L7) tube through a 0.05 mfd. capacitor as before. Adjust the primary and secondary of the 1st I.F. transformer until the curves coincide and have the appearance of Fig. 5.

A further adjustment of the A.V.C. secondary (hexagonal nut) trimmer is necessary in order to complete the I.F. alignment satisfactorily. Apply the *same* signal to the grid of the second I.F. amplifier tube. Unsolder the ground end of TC-46 and connect the vertical deflecting plates of the oscilloscope between ground and the 6H6 cathode prong K2 (Fig. 3) or to the center terminal of the AFC switch.

Carefully adjust the AFC secondary trimmer until a curve is obtained which is similar to that shown in Fig. 6. Correct adjustment is made when the two sides of the curve are symmetrical and intersect exactly at the horizontal axis. No adjustment of the other I.F. trimmers should be made at this time.

If a metal aligning tool is used, the curve will change when the tool is withdrawn. Therefore, it is advisable to use a fiber hex-headed wrench for this aligning adjustment. At any rate, the final curve should be as shown with aligning tool removed.

2. *I. F. Wave Trap Alignment*

Leave the band switch at Band "B" and tune receiver to about 1000 kc.

With the test oscillator set at 465 kc. apply this signal to the antenna terminal through a dummy antenna consisting of a 400-ohm resistor and 250-mmfd. capacitor in series.

With the 465-kc. signal applied to the antenna terminal, adjust the I.F. Wave Trap Trimmer for *minimum* output indication.

3. *R.F. Alignment*

First check the position of the dial pointer by rotating the tuning condenser to maximum capacity position, i.e., plates fully meshed. At this position, the pointer should coincide with the end mark at the left-hand end of the scale. If it does not, it may be set by loosening the pointer set screw and setting the pointer to its correct position. During R.F. alignment the APC switch *must* be set in its "off" (counter-clockwise) position.

BAND "B" (535-1640 KC.)

Set the test oscillator for operation at 1500 kc. and connect its output to the antenna terminal of the receiver through the dummy antenna described under "I.F. Wave Trap Alignment." Tune the receiver until the pointer is at 1500 on the scale. Set the tone control for minimum high response and reduce the volume control setting so as to avoid excessive noise response. Adjust the Band "B" oscillator, R.F., and antenna trimmers respectively (location shown on Fig. 4) to give maximum deflection on the output meter. Maintain the test oscillator output at the lowest level which will give an easily readable output indication.

Now set the test oscillator at 580 kc. and tune the receiver to resonance with this signal. Adjust the 580 kc. padding capacitor, C-20, rocking the tuning condenser back and forth through resonance as the padding capacitor is adjusted and note the deflection of the tuning meter each time the receiver is tuned in this manner. Leave the padding capacitor at the setting which gives greatest deflection.

Retune the receiver to 1500 kc. and set the test oscillator for this frequency. Check the alignment by again adjusting the Band "B" oscillator, R. F. and antenna trimmers for maximum deflection on the tuning meter.

BAND "C" (1600-5600 KC.)

With the test oscillator connected to the receiver as above, tune the receiver until the pointer is at 5220 on the "C" band scale. Set the test oscillator for operation on this frequency and, with the volume and tone controls set as above adjust the band "C" oscillator, R. F., and antenna trimmers, respectively (see Fig. 4) to give maximum deflection on the output meter.

BAND "D" (5.5-18.2 MC.)

Turn the band switch to Band "D." Set the test oscillator at 18,000 kc. (18.0 mc.) and tune the receiver until the pointer coincides with the 18.0 mark. Adjust the Band "D" oscillator trimmer to give maximum output indication. It will probably be found that there will be two settings of the oscillator trimmer that will give an output response. The lower capacity setting of the trimmer is the one that should be used. To be sure that correct adjustment has been obtained, tune for the image signal at 17.07 mc. with the test oscillator at 18.0 mc. It may be necessary to increase the test oscillator output to obtain response at this point.

Retune the receiver to 18.0 mc. and adjust Band "D" antenna and R. F. trimmers, respectively (C-5 and C-13) for maximum output indication. When adjusting the R. F. trimmer, C-13, rock the tuning condenser back and forth through resonance as in the 580 kc. padding capacitor adjustment.

Alignment of the receiver is now complete as no adjustments are provided on band "E."

4. *I. F. Alignment with Output Meter*

Although the use of the cathode-ray oscilloscope for alignment purposes is to be preferred, it is possible to make the I. F. trimmer adjustments with reasonable accuracy using a 465 kc. signal generator and output meter.

Place a modulated signal of 465 kc. on the grid of the last I. F. (6K7) tube with the volume control set at maximum and the AFC switch *turned off*. Place a low range A. C. voltmeter or other output indicator across the voice coil of the loud-speaker. Adjust the output of the signal generator so that an indication of not more than two or three volts is obtained on the output meter.

Adjust and readjust the primary trimmer for maximum output and *the secondary for minimum output*. This latter adjustment will be very broad. Apply the signal input to the grid of the 1st I. F. (6K7) tube and adjust both primary and secondary trimmers for maximum output, reducing the input as necessary to obtain approximately the same output indication as before. Apply the signal input to the grid of the converter (6L7) tube and adjust both primary and secondary trimmers for maximum output indication in the same manner.

It is now necessary to make a fine adjustment of the secondary trimmer of the last I. F. (AFC) transformer which is as follows: without changing the frequency of the signal generator, place the input lead on the rubber insulation of the converter (6L7) grid lead. This will provide a small signal input through the capacity between the leads. Increase the attenuator setting if necessary to make the output audible. If the signal generator is provided with a means of removing the modulation, this should be done. However, the adjustment may be carried out satisfactorily even with a modulated generator signal.

Now tune in any broadcast signal in the usual manner and tune the receiver carefully for zero beat between this carrier and the 465 kc. signal generator. It may be necessary to use a short antenna or to remove it entirely if the station is a strong local. Throw the AFC on and adjust the last I. F. secondary (AFC) trimmer to give zero beat. This adjustment is very critical and must be made with great care. When the adjustment is properly made, there will be no appreciable change from zero beat as the AFC switch is thrown off and on. This completes the alignment of the I. F. and AFC circuits.

The alignment of the oscillator and R. F. circuits may be carried out in the usual manner. The AFC switch must remain in the "off" position.

ADJUSTMENT OF DIAL MECHANISM

The dial mechanism (Fig. 7) is rigidly mounted to the "Sentry Box" by means of two brackets and four screws. The dial pointer is operated by means of an "Automatic Vernier" reduction drive unit. Motion imparted to the gang condenser rotor is transmitted through a series of pulleys and an interconnecting cable to the dial pointer slider which is supported on a rail below the dial scale.

To Replace Cables

To replace cord or cable for the pointer or drive, the chassis should be removed from the cabinet and the dial mask (No. 14) removed from the dial scale box (No. 5). The black drive cord (No. 25) should run between the drum (No. 6) on the condenser and the drive pulley without crossing. Both the black cord (No. 25) and the bronze cable (No. 24) fasten on the same hook in the drum (No. 6) which is in front of the single lance on the outside diameter. The springs (21) and (22) are fastened on the ends of the cables after passing through the lances which are close together on the condenser drive drum. The light spring (No. 21) is on the bronze cable (No. 24) and the special spring-loop hooks into the hole in the drum next to the hook for the spring on the black cord (No. 25). The solid end of the cord or cable should be fastened first to the drum, the line should be then strung around the pulleys and drum, and lastly, the spring should be stretched into place.

To Adjust Pointer for Calibration

The pointer (No. 27) is adjustable by removing the escutcheon plate and also the dial mask (No. 14) which is held by four screws. The screw in the center of the pointer (No. 27) can then be loosened and the pointer adjusted as needed.

To Replace Scale

The scale (No. 3) can be removed by taking off the escutcheon and the dial mask (No. 14) as for the adjustment of the pointer. The pointer (No. 27) is moved to the left-hand end, the scale is then pushed to the left and the right-hand end is pulled out with the aid of a small screw driver or a similar tool. When replacing the scale (No. 3) it is advisable to remove the cord (No. 23). The spring (No. 9) is put on the dial shaft and the shaft then inserted into the housing. The scale (No. 3), with the right-hand cap (No. 8) attached, is then inserted into the left-hand cap (No. 7) which is held in position by pulling on the shaft on the outside of the housing. After the scale (No. 3) is inserted it should be rotated from one to two times against the action of the torsion spring (No. 9). The cord (No. 23) is then replaced in the lance provided for it. It is advisable to have the band switch rotated so that the greatest length of cord possible is unwound from the lower pulley (No. 4) on the band switch shaft. It is best that the chassis be removed for the replacement of a scale.

(It is important when replacing the chassis in the cabinet that the rubber grommets should be put in the chassis and not on the wood pins.)

To Adjust Rotation of the Scale

With the chassis out of the cabinet the scale (No. 3) can be adjusted to track properly on the various bands by loosening the set screw and rotating pulley (No. 4) on the band switch shaft

GENERAL ELECTRIC CO.

DESCRIPTION OF ELECTRICAL CIRCUIT

Design features built into this receiver include the "Sentry Box"; separate coils for each frequency band; high efficiency converter with a separate oscillator; two stages of IF amplification for high sensitivity and selectivity; automatic volume control; automatic frequency control (AFC), silent tuning, bass and treble compensated volume control, music-speech switch operated in conjunction with a continuously variable tone control, and colorama tuning.

"Sentry Box"

The RF and oscillator sections of the receiver are contained in the "Sentry Box" which consists of a separately contained and shielded, four band, antenna, RF and oscillator tuning unit. Individual coils are employed for each frequency range and are properly selected and connected into the circuit by the range switch. To avoid absorption effects, the range switch shorts all unused coils which might resonate at some frequency in the range being used. The section of the range switch controlling selection of the antenna coil primary also changes the antenna connection to these coils in such a manner as to insure maximum signal transfer in each range. When the G.E. "V" Doublet Antenna System is connected to terminals "A" and "G" at the rear of the "Sentry Box," the range switch provides for true doublet operation in the short wave (D) band where this connection is advantageous, and for operation as a "T" antenna in all other bands. When a doublet antenna providing noise reduction on the broadcast band is used, it is essential that a link be connected between terminals "G" and "GR" at the back of the "Sentry Box" in order to obtain the desired action.

The antenna is coupled to the control grid of the 6K7 RF tube through the tuned antenna transformer selected by the range switch. Likewise, the output of the amplifier tube is coupled to the control grid of the 6L7 converter tube through the properly selected tuned RF transformer. The only exception to this procedure occurs when the receiver is operating on the ultra-short-wave "E" band, in which position the RF tube is disconnected from the circuit and the antenna coupled directly to the 6L7 grid through the tuned antenna transformer.

The oscillator circuit, with the exception of the ultra-short-wave "E" band, employs a 6J7 tube in a conventional tuned grid, plate feedback circuit. In the ultra-short-wave "E" band, the common impedance between the grid and plate circuits provided by the secondary of L12 in the cathode circuit of the 6K7 oscillator tube, is utilized to provide oscillation. An auxiliary feedback circuit composed of the primary of L-12 together with the capacitor, MC-29, is in the plate circuit of the oscillator tubes on the "B" band. These elements resonate slightly below the low frequency end of the "E" band and tend to improve the oscillator excitation at this end of the band. To minimize capacity effects, the tuned "E" band grid coil L-13 remains in the circuit at all times since its resistance is sufficiently low to permit this procedure. The grid coil of the broadcast "B" band oscillator returns to B plus rather than to ground in order to provide plate voltage for the 6J7 AFC tube. The 580-kc. padding capacitor, C-20, serves to isolate this voltage from the oscillator tuning condenser section. The oscillator signal which is maintained at a frequency 465 kc. higher than the incoming signal is capacity coupled to the injection grid of the 6L7 converter.

The 6J7 AFC tube is also located on the "Sentry Box" and is associated with the broadcast "B" band oscillator. A complete description of the operation of AFC is given in a later paragraph. The output of the converter is applied to the I.F. amplifier.

I. F. Amplifier

The intermediate frequency amplifier consists of a two-stage cascade section composed of three I.F. transformers and two 6K7 amplifier tubes. Each transformer has two tuned circuits which resonate at 465 kc. The third I.F. transformer is of special construction having the primary capacitive coupled to the midpoint of the secondary in order to provide the differential AFC voltage. The operation of this transformer is discussed in a special chapter on AFC.

Detector and AVC

The plates of the 6H6 twin diode are fed in push-pull by the secondary of the third I.F. transformer. Two balanced diode loads consisting of R-24 and the series resistance of R-21, R-22 and R-23 are provided. The AFC voltage is developed across the sum of all these resistors, while the audio voltage appears across the sum of R-21 and R-22 and R-23. The audio frequency thus provided is transferred to the A.F. system for amplification and reproduction. The direct-current component of the rectified signal produces a voltage drop across the above three resistors. That existing across R-21 and R-22 is employed for operating the 6K7 "Colorama" tuning tube. Switch S-10 permits the application of either full or partial voltage to the tube, thereby permitting control of the color indication in accordance with prevailing receiving conditions. A complete description of "Colorama" tuning is given in a later paragraph. The D.C. voltage developed across R-21 is utilized for automatic volume control action by employing the same to bias the R.F. amplifier, converter, and first I.F. amplifier tubes. Initial bias for these tubes is obtained by returning resistor, R-21, to the minus 3 volt tap of the voltage divider. The second I.F. tube receives no A.V.C. and is self-biased. This minimizes the possibility of non-linear distortion on strong signals.

Audio System

The audio voltage developed across the diode load is applied to the volume control, R-32, through the isolating capacitor, TC-49. This control is compensated by means of dual resistance—capacitance networks to provide the proper balance of high and low frequencies at different volume control settings. The movable arm on the volume control selects the amount of audio signal applied to the control grid of the 6C5 audio amplifier tube and thus regulates the output of the receiver. The output of the 6C5 audio tube is transformer coupled to the control grids of the two 6F6 output tubes which operate in a push-pull connection.

The music-speech control consists of a switch actuated at one extreme of the tone control rotation corresponding to that providing maximum high note response. This provides better speech clarity by decreasing the bass compensation which is accomplished by shunting capacitor TC-53 with TC-52. The bass compensation is removed entirely on the short-wave bands by the switch S-2; hence the music-speech control is only effective in the broadcast "B" band. Continuously variable tone control is provided by capacitor TC-59 and variable resistor R-34 shunting the grids of the push-pull output tubes.)

Silent Tuning

Silent tuning is provided by the switch S-9 which is actuated by the tuning knob of the receiver. Pulling the tuning knob out slightly closes switch S-9 and kills the audio output by grounding the 6C5 grid. The AFC is also removed by this operation which permits a sharp indication of resonance by noting the "Colorama" lights. When a station has been satisfactorily located in this manner, the tuning knob is pushed in to its original position and the switch opened.

Power Supply

D.C. power for operation of the receiver is supplied by a power supply system employing a 5Z4 full-wave rectifier tube which, together with a suitable network of resistors and capacitors, supplies the required voltages and filtering action.

COLORAMA TUNING

These receivers are equipped with Color Tuning, a novel method which indicates approach to resonance by means of a change of color of the light illuminating the tuning scale.

The colored light is produced by a group of four red-stained pilot bulbs and a group of three green-stained bulbs behind the scale. At zero signal strength the red group is at full brilliance and the green invisibly dim. As the signal increases from zero, the red gets dimmer and the green brighter over a broad range until at extreme signal strength the green is fully bright and the red below visibility through the dial. Hence, as a station is tuned-in the color changes smoothly, and the maximum change in the green direction is an indication of resonance.

Weak stations will produce a small color change and strong stations a larger change. The difference in signal strength, between the weakest and the strongest station likely to be listened to, has been found to be so great in different localities that the receivers have been equipped with a two-position sensitivity range switch for "sensitive" and "insensitive" settings of the color tuning. The switch is located near the power transformer on the chassis and may be reached from the rear of the cabinet. In the sensitive position, the weakest station to which the user can listen comfortably, above the general noise level, will shift the color to neutral white at resonance. Stronger stations give resonant points at bright greens. In localities near a relatively large group of high-powered stations and having a high noise level, such as Chicago and New York, the range switch must be thrown to the insensitive position when standard outdoor antennas are used, or else the color will be fixed green over so wide a band that resonance cannot be accurately found. The difference in sensitivity is about twenty to one. On short-wave bands the band switch connects the color tuning to the sensitive setting and the switch on the chassis is inoperative. This is because practically all the short-wave signals are relatively weak. The insensitive setting is used only on the 535-1640 kc. band.

There is a group of four red and a group of three green pilot bulbs behind the scale. These are controlled by a Saturable Reactor in a circuit which is shown in the schematic diagram, Fig. 2. The saturable reactor is controlled by a D.C. coil which decreases its reactance smoothly from a high-value at no D.C. to a very low value at maximum D.C. The saturable reactor acts very much like a dimming rheostat except that it is controlled by the D.C. plate current of a 6K7 tube used solely for that purpose. This tube receives for its bias a portion of the A.V.C. voltage of the set so that at no signal the bias is nearly zero. At this point, the plate current is at maximum; therefore, the red is brightest and the green invisibly dim.

SOME THINGS WHICH MAY AFFECT THE OPERATION OF COLOR TUNING ARE AS FOLLOWS:

Seven colored bulbs are used to give good diffusion of color over the scale; but if one of the seven fails it unbalances the whole group and should be replaced immediately. The lamp socket assembly may be removed by reaching into the rear of the cabinet, pulling the lamp socket assembly up on its guides and drawing it partly out. (A shipping screw, which should be removed when the set is unpacked, may need to be removed the first time.) There is enough slack in connecting wires to allow the assembly to be drawn forward. When the socket assembly has been drawn far enough out for unscrewing the bulbs turn on the power switch and replace the bulbs which do not glow. All will not be bad as each group is in series (green) or series parallel (red). Take care the wires do not foul the tuning mechanism when the assembly is replaced. The colored lamps used for replacement *MUST ALL BE 6.3 VOLTS, 0.15 AMPERE LAMPS.* No other size will work.

If the red is unusually dim on no signal and the colored bulbs are all good, try removing the antenna. Next try replacing the 6K7 "Colorama" tube or replace the rectifier. Sometimes the antenna noise level is so high that it dims the red like a signal. If the tubes in the set become weak, or the set is out of alignment, or for any other reason loses its sensitivity, the color tuning will appear insensitive.

AUTOMATIC FREQUENCY CONTROL

These receivers employ automatic frequency control (AFC) which is a device for automatically controlling the oscillator frequency in such a way that, although the receiver is not exactly tuned to the signal being received, an intermediate frequency of 465 kc. will still be produced. This control of the oscillator frequency is secured by means of a 6J7 tube so connected to the oscillator that it draws a lagging current from the tank circuit and thus gives the effect of a shunt inductance. Variation of the D.C. grid bias on the 6J7 control tube will affect the mutual conductance of the tube, thereby changing the amount of lagging current drawn from the oscillator tank with a consequent effect of variation of the amount of shunt inductance connected across the oscillator coil. This alters the total inductance in the oscillator tuned circuit and changes its resonant frequency.

Grid bias for the 6J7 control tube which will vary in accordance with the amount of detuning of the receiver is obtained from the 6H6 diode rectifier operating in conjunction with its special I.F. transformer. This control voltage is the difference between the drop across resistor R-24, the load resistor for one diode section of the 6H6 diode rectifier, and the drop across resistors R-21, R-22 and R-23, which constitute the load resistance for the other diode section. When the receiver is correctly tuned to the incoming signal, the intermediate frequency produced will be 465 kc. which is the resonant frequency of the tuned circuit feeding the 6H6 diode rectifier. Under this condition each diode plate receives equal signal voltage and the D.C. voltage drops across the load resistors will be equal, giving no change in grid bias on the 6J7 control tube. If the receiver is so tuned that the intermediate frequency produced is above 465 kc. the signal voltage applied to diode plate No. 7 will exceed that applied to diode plate No. 8. In this case, the D.C. voltage drop across load resistor R-21, R-22 and R-23 will be larger than that across load resistor R-24 and a resultant voltage will be produced which will increase the 6J7 control tube grid bias lowering the mutual conductance of the tube and causing it to draw less current from the oscillator tank. This is the same effect that would be produced by increasing the amount of shunt inductance across the oscillator coil and the oscillator frequency is thereby lowered by the amount necessary to compensate for the detuning. The opposite takes place when the receiver is tuned so as to produce an intermediate frequency below 465 kc. Diode plate No. 8 then receives more signal voltage than diode plate No. 7 and the resultant voltage developed across the load resistors is such as to decrease the grid bias on the 6J7 control tube. This causes a larger current to be drawn from the oscillator tank circuit, the effect being the same as a decrease in shunt inductance with a consequent increase in oscillator frequency to overcome the detuning.

MODEL E-126
Parts

GENERAL ELECTRIC CO.

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER CHASSIS ASSEMBLY	
*RB-008	BOARD—Terminal Board, Double-lug	$0.10
*RB-009	BOARD—Terminal Board, Single-lug	.15
*RB-019	BOARD—Terminal Board, Three-lug	.10
*RB-023	BOARD—Terminal Board, Four-lug	.10
RB-046	BOARD—Terminal Board, Five-lug	.15
RB-047	BOARD—Resistor Board on Chassis Shelf	.10
RB-048	BOARD—Fuse Board	.15
*RC-011	CAPACITOR—.002 Mfd., 600 V Paper (TC-61, TC-62, TC-63)	.25
*RC-013	CAPACITOR—.002 Mfd., 200 V Paper (Mtd. on Res. Bd.) (TC-55)	.25
*RC-034	CAPACITOR—.01 Mfd., 200 V Paper (Mtd. on Res. Bd.) (TC-49)	.25
RC-036	CAPACITOR—.008 Mfd., 200 V Paper (TC-53)	.25
*RC-046	CAPACITOR—.02 Mfd., 200 V Paper (TC-52, TC-59, TC-60)	.25
*RC-072	CAPACITOR—.05 Mfd., 200 V Paper (TC-35, TC-39, TC-43, TC-64)	.25
*RC-091	CAPACITOR—.05 Mfd., 400 V Paper (TC-34, TC-38)	.30
*RC-150	CAPACITOR—.25 Mfd., 400 V Paper (TC-58)	.35
RC-200	CAPACITOR—1 Mfd., 100 V Paper (TC-46)	.60
RC-234	CAPACITOR—Plate Coupling Capacitor 3rd I. F. Transformer (MC-40)	.25
RC-235	CAPACITOR—Grid Return Filter Capacitor for 3rd I. F. Transformer (MC-42, MC-48)	.25
RC-235	CAPACITOR—100 mmfd., Mica (Mtd. on Res. Bd.) (MC-54)	.25
RC-235	CAPACITOR—100 mmfd., Mica (MC-45)	.25
*RC-258	CAPACITOR—250 mmfd., Mica (MC-47, MC-56)	.25
RC-290	CAPACITOR—400 mmfd., Mica (Mtd. on Res. Bd.) (MC-50)	.25
*RC-411	CAPACITOR—30 Mfd., 400 V Wet Electrolytic (EC-70)	1.55
*RC-412	CAPACITOR—30 Mfd., 280 V Wet Electrolytic (EC-69)	1.20
RC-426	CAPACITOR—10 Mfd., 100 V Wet Electrolytic (EC-67)	.75
RC-551	CAPACITOR—10 Mfd., 25 V and 4 Mfd., 300 V Dry Electrolytic (EC-57 red; EC-65 gn.)	1.25
RC-558	CAPACITOR—50 Mfd., 50 V and 10 Mfd., 25 V Dry Electrolytic (EC-68 red; EC-66 gn.)	2.15
RC-755	CAPACITOR—Line Capacitor, .01-.01 Mfd., 250 V A. C. Paper (TC-71 & 72)	.40
RC-819	CABLE—Speaker Cable (Complete)	.60
RC-860	CORD—Power Cord	.65
RC-946	CUSHION—Front Chassis Mounting Cushion	.10
RC-947	CUSHION—Side Chassis Mounting Cushion and Support Bracket	.20
RE-013	ESCUTCHEON—Escutcheon Plate (with Mtg. Scws.)	1.75
RF-300	FUSE—2 Amp. Fuse (Pkg. of 10)	1.00
*RG-001	GRID CAP—Control Grid Clip (Pkg. of 5)	.10
RG-104	GUARD—Fuse Board Guard	.15
RG-105	GASKET—Escutcheon Rubber Gasket	.25
RG-106	GASKET—Escutcheon Felt Gasket	.10
*RK-004	KNOB—Control Knob (Push on) (Pkg. of 5)	.40
RK-006	KNOB—Large Control Knob (Push on)	.10
RK-007	KNOB—Large Control Knob (Set Scw.)	.10
RL-312	REACTOR—"Colorama Tuning" Saturable Reactor, 60 Cycles (L-21)	3.00
RL-313	REACTOR—"Colorama Tuning" Saturable Reactor, 25/60 Cycles (L-21)	3.00
RQ-047	RESISTOR—330 ohm, ¼ Watt Carbon (R-18) (Pkg. of 5)	.60

Stock No.	Description	List Price
*RQ-059 (RR-014)	RESISTOR—1000 ohm, ¼ Watt Carbon (R-33) (Pkg. of 5)	$0.70
RQ-067	RESISTOR—2200 ohm Plate Resistor for I. F. Trans. (R-13, R-17) (Pkg. of 5)	.60
RQ-075	RESISTOR—4700 ohm, ¼ Watt Carbon (R-39) (Pkg. of 5)	.60
*RQ-083 (RR-021)	RESISTOR—10,000 ohm, ¼ Watt Carbon (Mtd. on Res. Bd.) (R-31) (Pkg. of 5)	.60
RQ-089	RESISTOR—18,000 ohm, ¼ Watt Carbon (R-26) (Pkg. of 5)	.60
RQ-099	RESISTOR—47,000 ohm, Grid Resistor for 3rd I.F. Transformer (R-20) (Pkg. of 5)	.60
RQ-103	RESISTOR—68,000 ohm, ¼ Watt Carbon (R-19, R-35, R-36) (Pkg. of 5)	.60
*RQ-107 (RR-049)	RESISTOR—100,000 ohm, ¼ Watt Carbon (Mtd. on Res. Bd.) (R-25) (Pkg. of 5)	.70
*RQ-107 (RR-049)	RESISTOR—100,000 ohm, ¼ Watt Carbon (R-22) (Pkg. of 5)	.70
*RQ-111 (RR-054)	RESISTOR—150,000 ohm, ¼ Watt Carbon (R-23) (Pkg. of 5)	.70
RQ-115	RESISTOR—220,000 ohm, ¼ Watt Carbon (R-21) (Pkg. of 5)	.70
RQ-123	RESISTOR—470,000 ohm, Grid Resistor for 1st I.F. Transformer (R-14) (Pkg. of 5)	.70
RQ-123	RESISTOR—470,000 ohm, ¼ Watt Carbon (R-16, R-24) (Pkg. of 5)	.70
*RQ-131 (RR-067)	RESISTOR—1 Meg., ¼ Watt Carbon (Mtd. on Res. Bd.) (R-30) (Pkg. of 5)	.70
RQ-139	RESISTOR—2.2 Meg., ¼ Watt Carbon (R-27, R-28) (Pkg. of 5)	.70
RQ-143	RESISTOR—3.3 Meg., ¼ Watt Carbon (Mtd. on Res. Bd.) (R-29) (Pkg. of 5)	.70
RQ-275	RESISTOR—4700 ohm, ½ Watt Carbon (R-15) (Pkg. of 5)	.70
RQ-277	RESISTOR—5600 ohm, ½ Watt Carbon (R-40) (Pkg. of 5)	.70
*RQ-283 (RR-183)	RESISTOR—10,000 ohm, ½ Watt Carbon (R-37) (Pkg. of 5)	.70
RQ-505	RESISTOR—82,000 ohm, 1 Watt Carbon (R-38) (Pkg. of 5)	.75
RR-330	RESISTOR—15 ohm, 2 Watt Flexible (FR-45) (Pkg. of 5)	.85
RR-331	RESISTOR—15 ohm, 1 Watt Flexible (FR-44) (Pkg. of 5)	.75
*RR-705	RESISTOR—50 ohm, 5 Watt Wire Wound (WR-42, WR-43)	.40
RR-720	RESISTOR—Candohm Tapped Bleeder Resistor (R-41)	1.25
*RS-200	SOCKET—8 Pin Tube Socket (Pkg. of 5)	.75
*RS-204	SOCKET—5 Pin Tube Socket (Pkg. of 5)	.75
RS-325	SWITCH—"Colorama" Sensitivity Switch (S-10)	.50
RS-327	SWITCH—Automatic Frequency Control Switch (S-8)	.50
RS-423	SPRING—Knob Spring (Push on Type) (Pkg. of 10)	.25
RT-121	TRANSFORMER—Power Transformer (T-3) 115 V, 50/60 Cycles	7.75
RT-122	TRANSFORMER—Power Transformer (T-3) 115 V, 25/60 Cycles	12.00
RT-123	TRANSFORMER—Universal Power Transformer (T-3) 105/125 200/250 V, 40/60 Cycles	11.75
RT-225	TRANSFORMER—1st I.F. Transformer (Complete)	2.10
RT-226	TRANSFORMER—2nd I.F. Transformer (Complete)	2.10
RT-227	TRANSFORMER—3rd I.F. Transformer (Complete)	4.15
RT-504	TRANSFORMER—Interstage Transformer (T-1)	5.20
RT-711	TONE CONTROL—Tone Control and Speech Clarifier Switch (R-34) (S-11)	1.00
RV-016	VOLUME CONTROL—Volume Control and Power Switch (R-32) (S-12)	1.00

* Indicates part also used on 1936 "A" line receivers.

(Prices subject to change without notice)

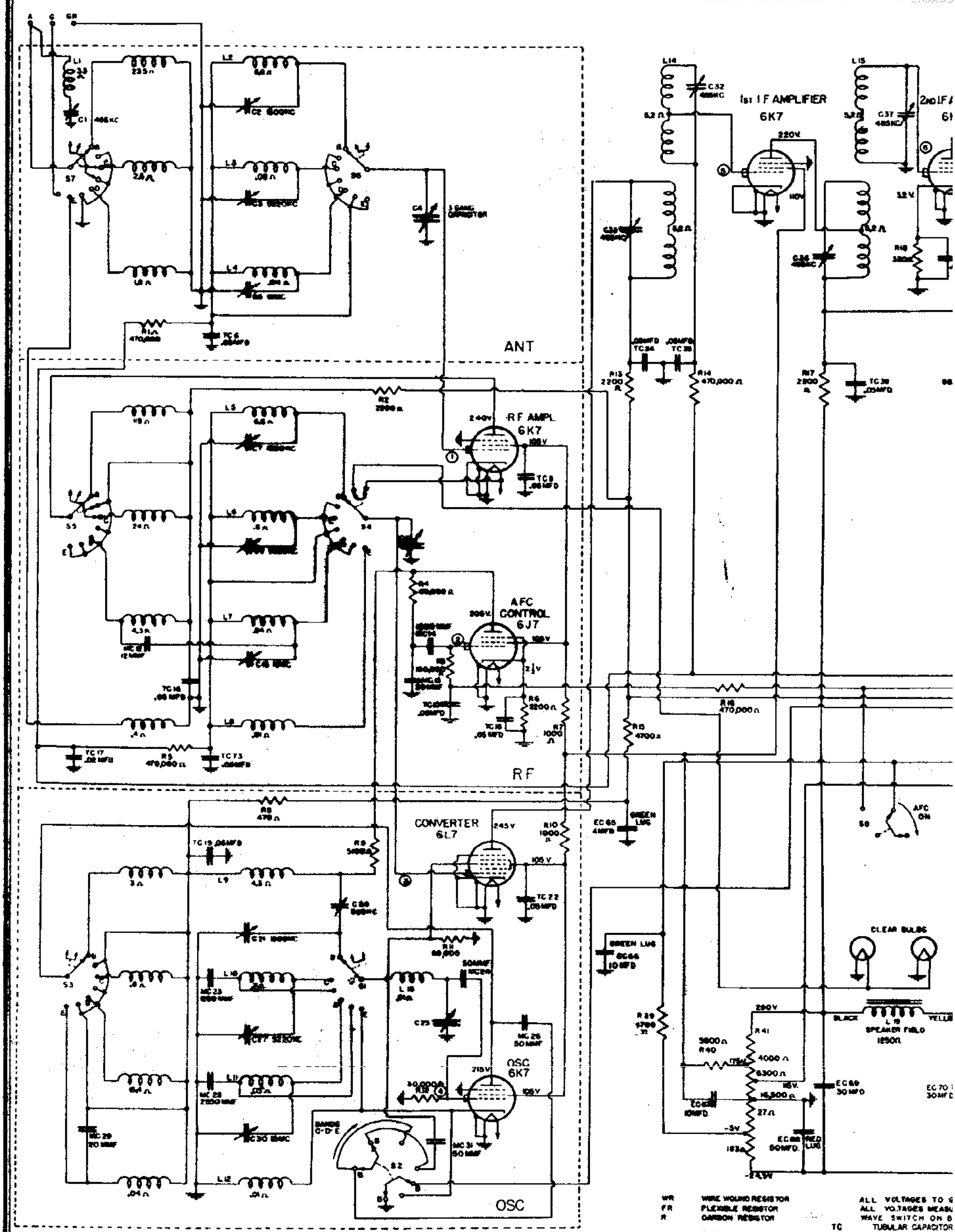
Stock No.	Description	List Price
RW-010	WINDOW—Escutcheon Window	$0.65
RW-101	WASHER—Felt Washer for Control Shafts (Pkg. of ten)	.45
RX-017	CUSHION ASSEMBLY—"Sentry Box" Mounting Cushion, Screw and Washer	.15
	SENTRY BOX ASSEMBLY	
RB-019	BOARD—Terminal Board, Three-lug (Sentry Box)	.10
RB-049	BOARD—Antenna Ground Terminal Board	.10
RB-050	BOARD—Terminal Board, Two-lug (Top of Gang)	.10
RB-141	BRACKET—Condenser Front Mounting Bracket	.50
RB-142	BRACKET—Condenser Rear Mounting Bracket	.15
RB-143	BRACKET—Wave Band Switch Bracket	.10
*RC-046	CAPACITOR—.02 Mfd., 200 V Paper (TC-17)	.25
*RC-072	CAPACITOR—.05 Mfd., 200 V Paper (TC-6, TC-9, TC-10, TC-18, TC-22, TC-73)	.25
*RC-091	CAPACITOR—.05 Mfd., 400 V Paper (TC-16, TC-19)	.30
RC-203	CAPACITOR—12 mmfd., Mica (MC-12)	.35
*RC-205	CAPACITOR—20 mmfd., Mica (MC-15, MC-29)	.35
*RC-210	CAPACITOR—50 mmfd., Mica (MC-24, MC-26, MC-31)	.25
RC-333	CAPACITOR—1000 mmfd., Mica (MC-14)	.30
RC-342	CAPACITOR—1260 mmfd., Mica (MC-23)	.35
RC-360	CAPACITOR—2850 mmfd., Mica (MC-28)	.50
RC-626	CAPACITOR—Triple Trimmers, Ant., R.F. and Oscillator (C-2, C-3, C-5) (C-7, C-8, C-13) (C-21, C-27, C-30)	.60
RC-627	CAPACITOR—Oscillator Padder Capacitor (C-20)	.40
RC-628	CAPACITOR—Wave Trap Trimmer (C-1)	.25
RC-712	CONDENSER—Gang Tuning Condenser (C-4, C-11, C-25)	4.75
RC-996	CUSHION—Condenser Mounting Cushion Assembly	.15
RL-019	COIL—Antenna Coil, Band B (L-2)	.75
RL-020	COIL—Antenna Coil, Band C (L-3)	.70
RL-021	COIL—Antenna Coil, Band D (L-4)	.70
RL-125	COIL—R.F. Coil, Band B (L-5)	.85
RL-126	COIL—R.F. Coil, Band C (L-6)	.75
RL-127	COIL—R.F. Coil, Band D (L-7)	.75
RL-128	COIL—R.F. Coil, Band E (L-8)	.75
RL-229	COIL—Oscillator Coil, Band B (L-9)	.70
RL-230	COIL—Oscillator Coil, Band C (L-10)	.70
RL-231	COIL—Oscillator Coil, Band D (L-11)	.75
RL-232	COIL—Oscillator Coil, Band E (L-12)	.70
RP-054	PULLEY—Wave Band Switch Dial Cord Pulley	.15
RQ-061	RESISTOR—470 ohm, ¼ Watt Carbon (R-8) (Pkg. of 5)	.60
RQ-059 (RR-014)	RESISTOR—1000 ohm, ¼ Watt Carbon (R-7, R-10) (Pkg. of 5)	.70
RQ-067	RESISTOR—2200 ohm, ¼ Watt Carbon (R-2, R-6) (Pkg. of 5)	.60
RQ-076	RESISTOR—5100 ohm, ¼ Watt Carbon (R-9) (Pkg. of 5)	.60
RQ-090	RESISTOR—47,000 ohm, ¼ Watt Carbon (R-12) (Pkg. of 5)	60
RQ-103	RESISTOR—68,000 ohm, ¼ Watt Carbon (R-4, R-11) (Pkg. of 5)	60
*RQ-107 (RR-049)	RESISTOR—100,000 ohm, ¼ Watt Carbon (R-3) (Pkg. of 5)	.70
RQ-123	RESISTOR—470,000 ohm, ¼ Watt Carbon (R-1, R-5) (Pkg. of 5)	.70
RS-165	SHIELD—Antenna Compartment Shield Can	1.25
RS-166	SHIELD—Oscillator Compartment Shield Can	1.25

Stock No.	Description	List Price
*RS-200	SOCKET—8 Pin Tube Socket (Pkg. of 5)	$0.75
RS-328	SWITCH—Wave Band Switch (S-1, 2, 3, 4, 5, 6)	4.00
RW-402	WAVE TRAP—Wave Trap Coil (L-1)	.65
	SPEAKER ASSEMBLY	
RC-912	CONE—12 in. Type Cone and Voice Coil (Gasket Included) (L-18)	1.45
RC-991	CLAMP—12 in. Cone Spider Clamp and Screw	.05
RP-050	PLUG—Female Speaker Plug	.20
RP-051	PLUG—Male Speaker Plug	.20
RS-037	SPEAKER—12 in. Type Speaker (Complete with Output Transformer) (L-17, L-18, L-19, T-2)	11.00
RS-416	SPRING—Voice Coil Leads Spring	.10
RT-417	TRANSFORMER—Output Transformer (T-2)	3.00
	DIAL DRIVE MECHANISM	
RB-144	BRACKET—Dial Scale Box L.H. Bracket (1)	.15
RB-145	BRACKET—Dial Scale Box R.H. Bracket (2)	.15
RB-146	BRACKET—"Colorama" Dial Lamp Bracket (Less Lamps) (17)	1.10
RB-147	BRACKET—"Personalizer" Dial Lamp Bracket (Less Lamp) (18)	.45
RB-148	BRACKET—Reduction Drive and "Silent Tuning" Switch Support Bracket (20)	.10
RB-513	BOX—Dial Scale Box and Pulley Assembly (5)	1.75
RC-820	CABLE—Dial Pointer Cable (24) (Pkg. of 5)	.40
RC-861	CORD—Condenser Drive Cord (25) (Pkg. of 5)	.60
RC-862	CORD—Band Change Cord (23) (Pkg. of 10)	.50
RC-948	CLAMP—Reduction Drive Friction Clamp (13)	.15
RC-949	COLLAR—Condenser Reduction Drive Assembly Shaft Collar and Spring Washer (30)	.20
RC-997	CAP—Scale Cap (Free End) (8)	.10
RC-998	CAP—Scale Cap (Pulley End) (7)	.10
RC-999	CONTACT—Silent Tuning Switch Contact Assembly (12)	.20
RD-038	DIAL—"Slide-Rule" Dial Scale (3)	.70
RD-039	DRIVE—Tuning Condenser Reduction Drive Assembly (10)	1.15
RL-908	LAMP—"Colorama Tuning" Green Lamp (Pkg. of 10)	1.50
RL-909	LAMP—"Colorama Tuning" Red Lamp (Pkg. of 10)	1.50
RM-003	MASK—Dial Mask and Personalizer Strip Holder	1.00
RP-054	PULLEY—Wave Band Switch Dial Cord Pulley (4)	.15
RP-055	POINTER—Dial Pointer (27) (Pkg. of 5)	.40
RP-056	PULLEY—Gang Drive Drum (6)	.35
RS-329	SWITCH—Silent Tuning Switch (Mechanism) (11)	.50
*RS-401	SPRING—Condenser Drive Cord Spring (21) (Pkg. of 5)	.20
RS-419	SPRING—Dial Pointer Cable Spring (22) (Pkg. of 2)	.20
RS-420	SPRING—Dial Scale Tension Spring (9) (Pkg. of 2)	.20
RS-421	SLIDER—Dial Pointer Slider (with screw) (26)	.15
RS-422	STRIP—"Personalizer" Illumination Diffuser (29)	.10
RW-009	WINDOW—"Personalizer Strip" Window (Celluloid)	.15

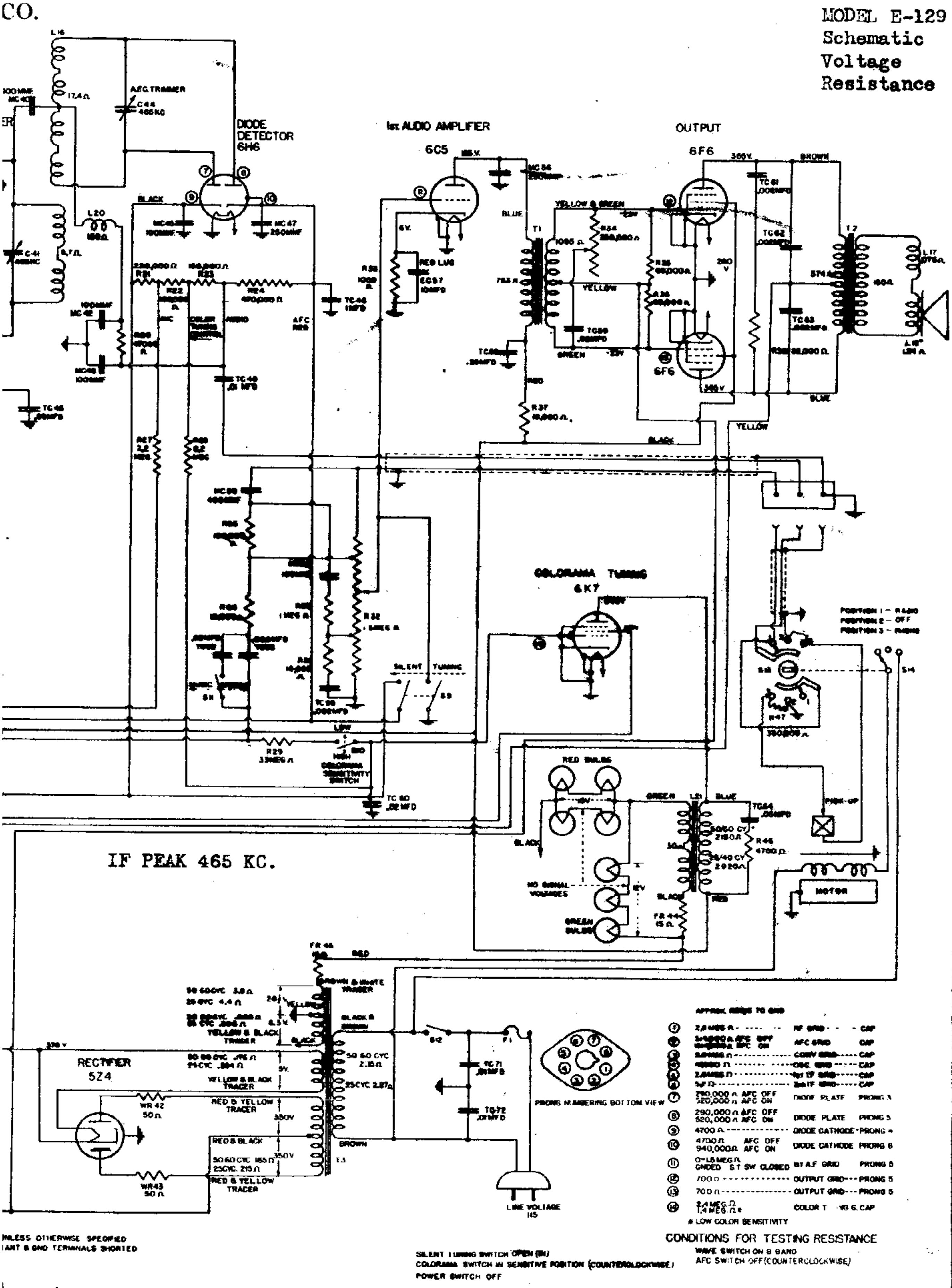
* Indicates part also used on 1936 "A" line receivers.

(Prices subject to change without notice)

GENERAL ELECTR

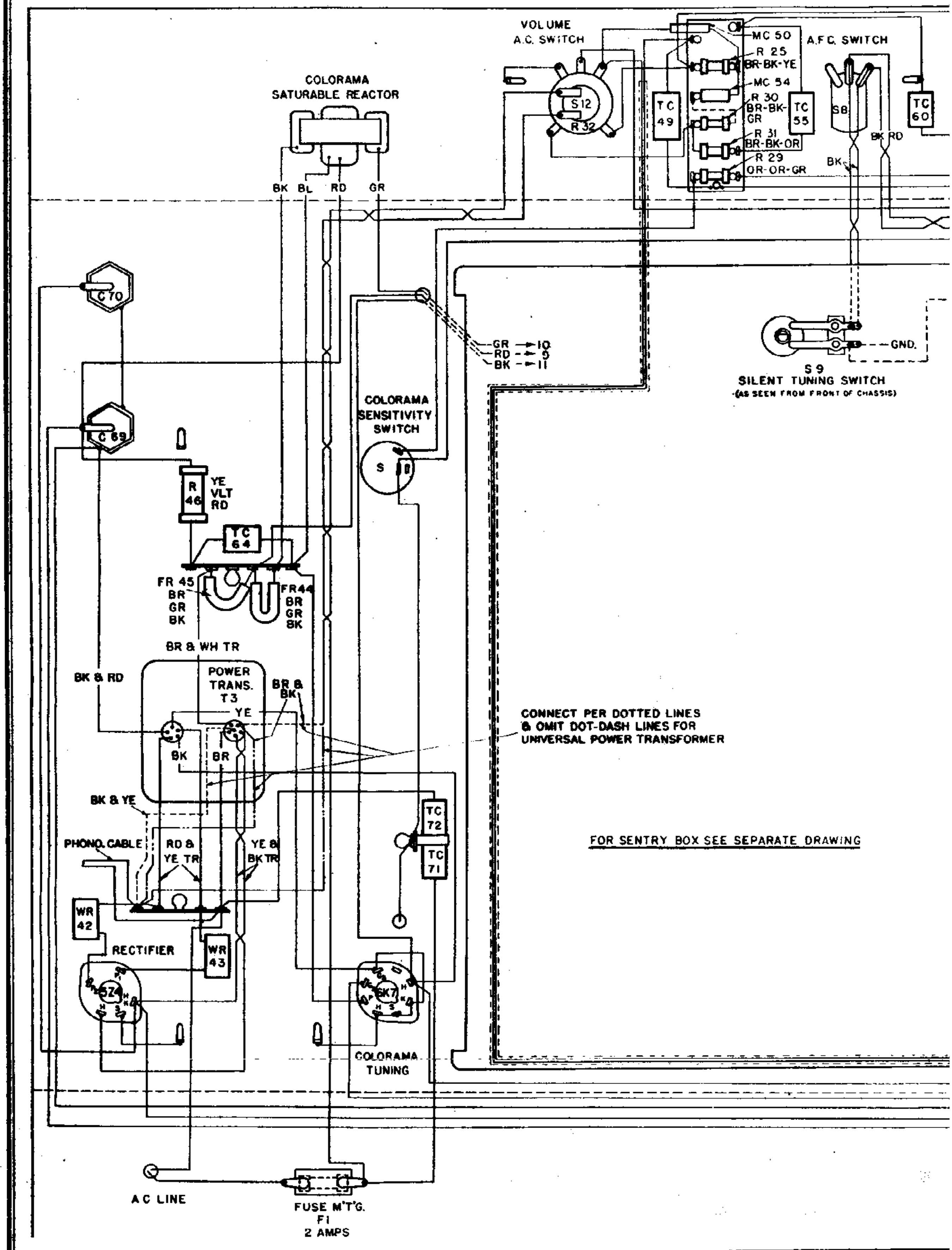


MODEL E-129
Schematic
Voltage
Resistance

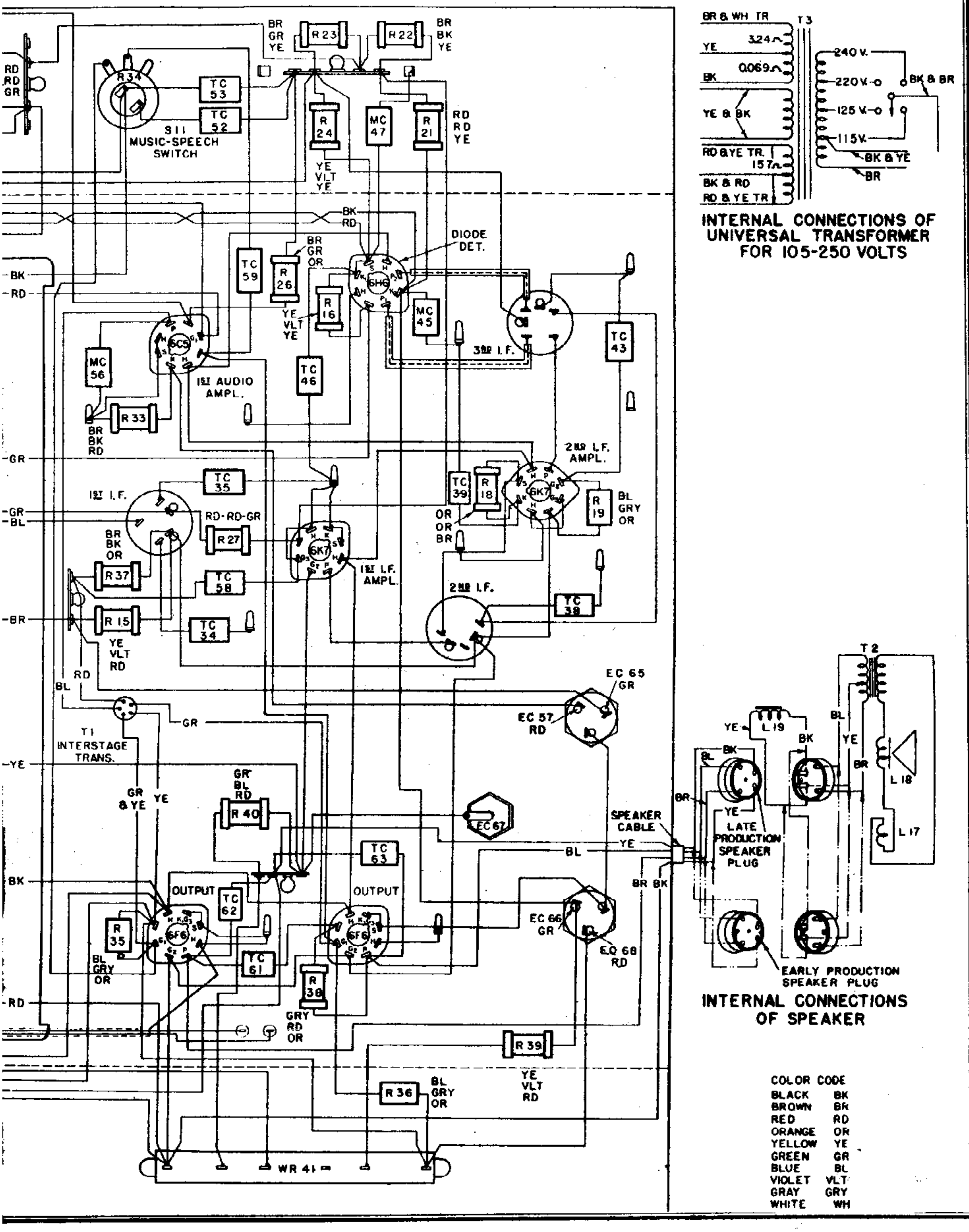


MODEL E-129
Chassis Wiring

GENERAL



ELECTRIC CO.



R 23
R 22
BR GR YE
BR BK YE
R 34
TC 53
TC 52
S11 MUSIC-SPEECH SWITCH
R 24
MC 47
R 21
RD RD YE
YE VLT YE
TC 59
R 26
BR GR OR
R 16
YE VLT YE
DIODE DET.
6H6
MC 45
3RD I.F.
TC 43
MC 56
6C5
1ST AUDIO AMPL.
R 33
BR BK RD
TC 46
2ND I.F. AMPL.
6K7
TC 39
R 18
R 19
BL GRY OR
OR OR BR
1ST I.F.
TC 35
RD-RD-GR
R 27
BR BK OR
R 37
TC 58
1ST I.F. AMPL.
2ND I.F.
TC 38
R 15
TC 34
YE VLT RD
EC 65 GR
EC 57 RD
T1 INTERSTAGE TRANS.
GR & YE
GR BL RD
R 40
EC 67
TC 63
OUTPUT
6F6
TC 62
R 35
BL GRY OR
TC 61
R 38
GRY RD OR
EC 66 GR
EC 68 RD
R 39
YE VLT RD
R 36
BL GRY OR
WR 41
SPEAKER CABLE
BR BK
BR & WH TR
T 3
3.24
0.069
240 V.
220 V.
125 V.
115 V.
BK & BR
YE & BK
RD & YE TR.
1.57
BK & RD
RD & YE TR.
BK & YE
INTERNAL CONNECTIONS OF UNIVERSAL TRANSFORMER FOR 105-250 VOLTS
T 2
L 19
L 18
L 17
LATE PRODUCTION SPEAKER PLUG
EARLY PRODUCTION SPEAKER PLUG
INTERNAL CONNECTIONS OF SPEAKER
COLOR CODE
BLACK BK
BROWN BR
RED RD
ORANGE OR
YELLOW YE
GREEN GR
BLUE BL
VIOLET VLT
GRAY GRY
WHITE WH

GENERAL ELECTRIC CO.

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A 6	115	60	160
A 5	115	50	160
C 2	115	25	160
V 6	105-130/200-250	60	165
V 5	105-130/200-250	50	165
V 4	105-130/200-250	40	165

NOTE.—Taps on universal transformers (Rating "V") are accessible by removing the cap cover on the top of the transformer.

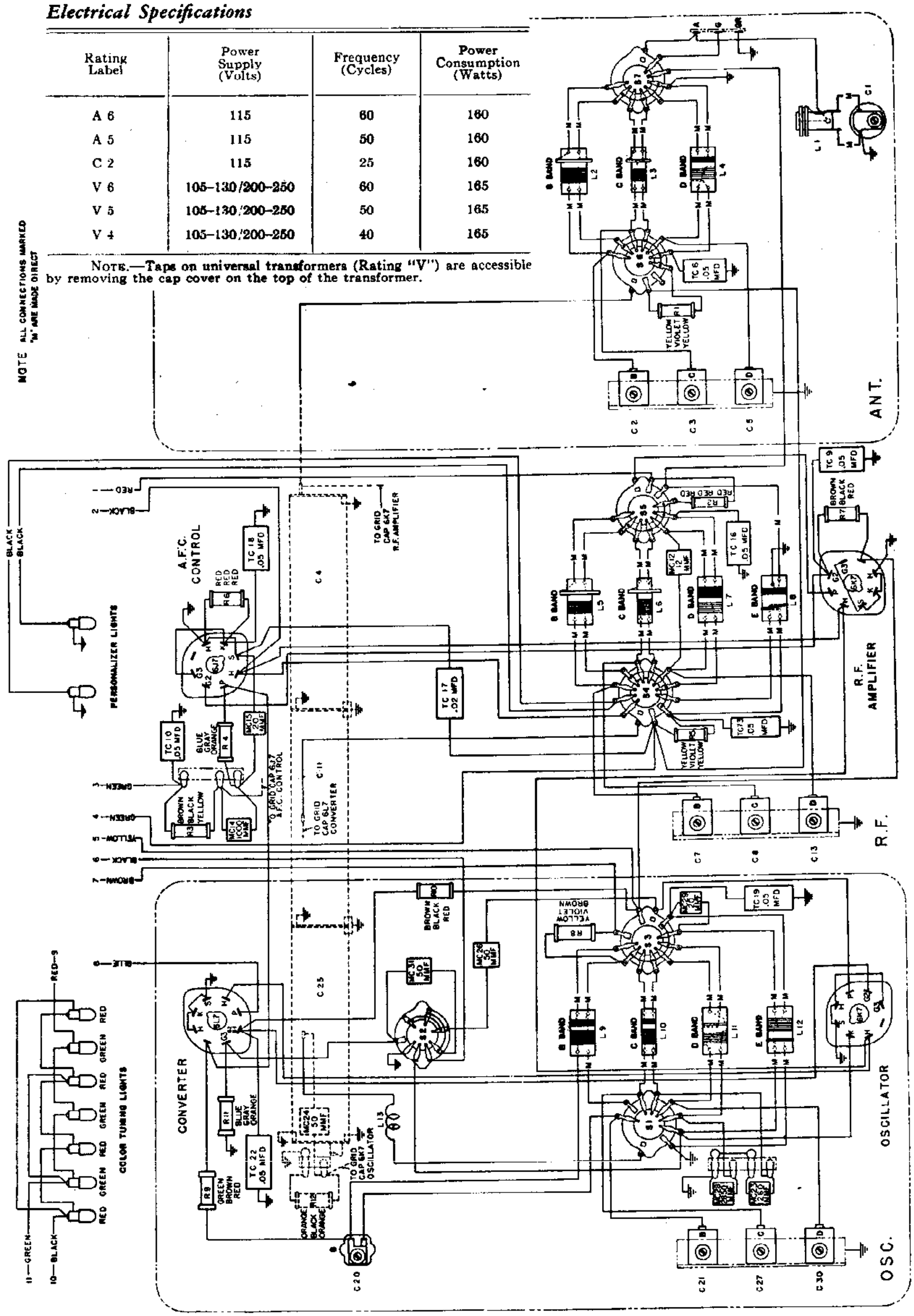


Fig. 1. "Sentry Box" Wiring Diagram

MODEL E-129
Dial Mechanism
Alignment Oscillograms

GENERAL ELECTRIC CO.

Tuning Frequency Range

Band "B"	535–1640 kc.
Band "C"	1600–5600 kc.
Band "D"	5.5–18.2 mc. (5,500–18,200 kc.)
Band "E"	17.5–70 mc. (17,500–70,000 kc.)

Tuning Control Drive Ratio

Fast Tuning	8 to 1
Vernier Tuning	50 to 1

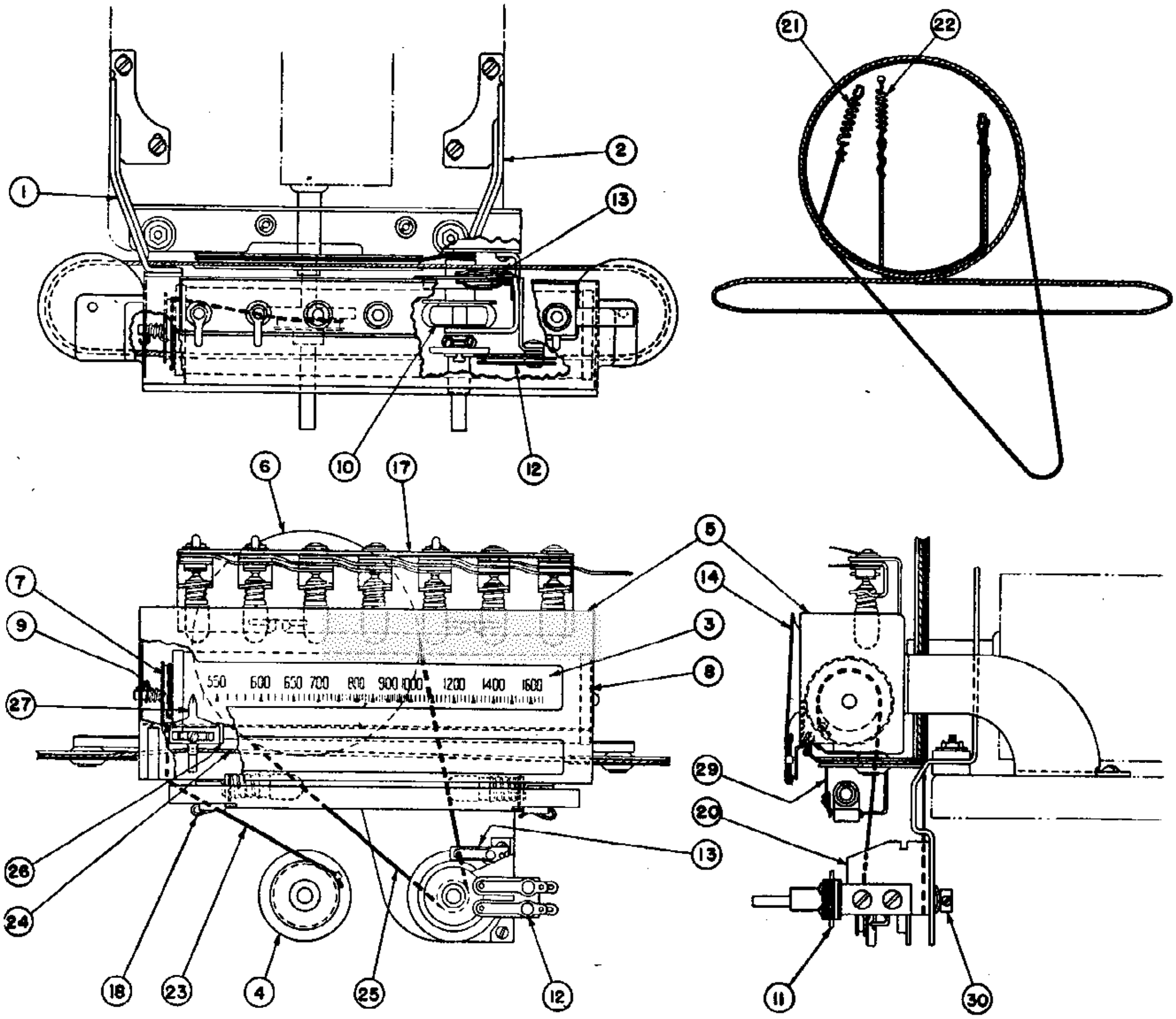


Fig. 7. Dial Drive Mechanism

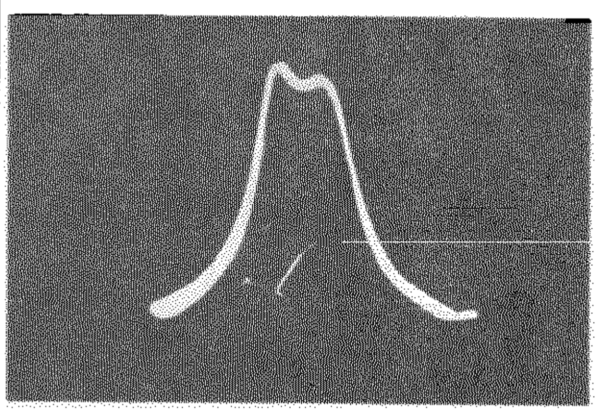


Fig. 5. Overall I. F. Curve

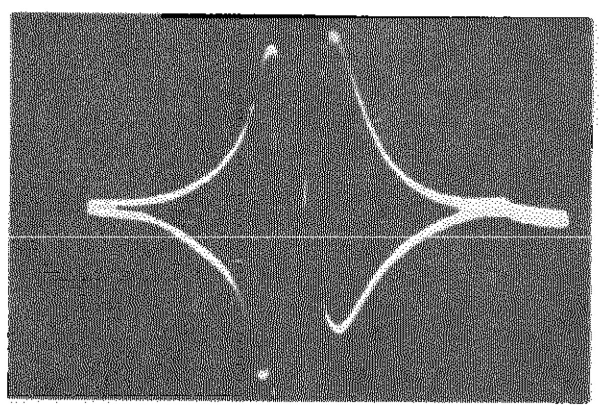


Fig. 6. AFC Trimmer Adjustment Curve

GENERAL ELECTRIC CO.

MODEL E-129
Socket, Trimmer
Voltage

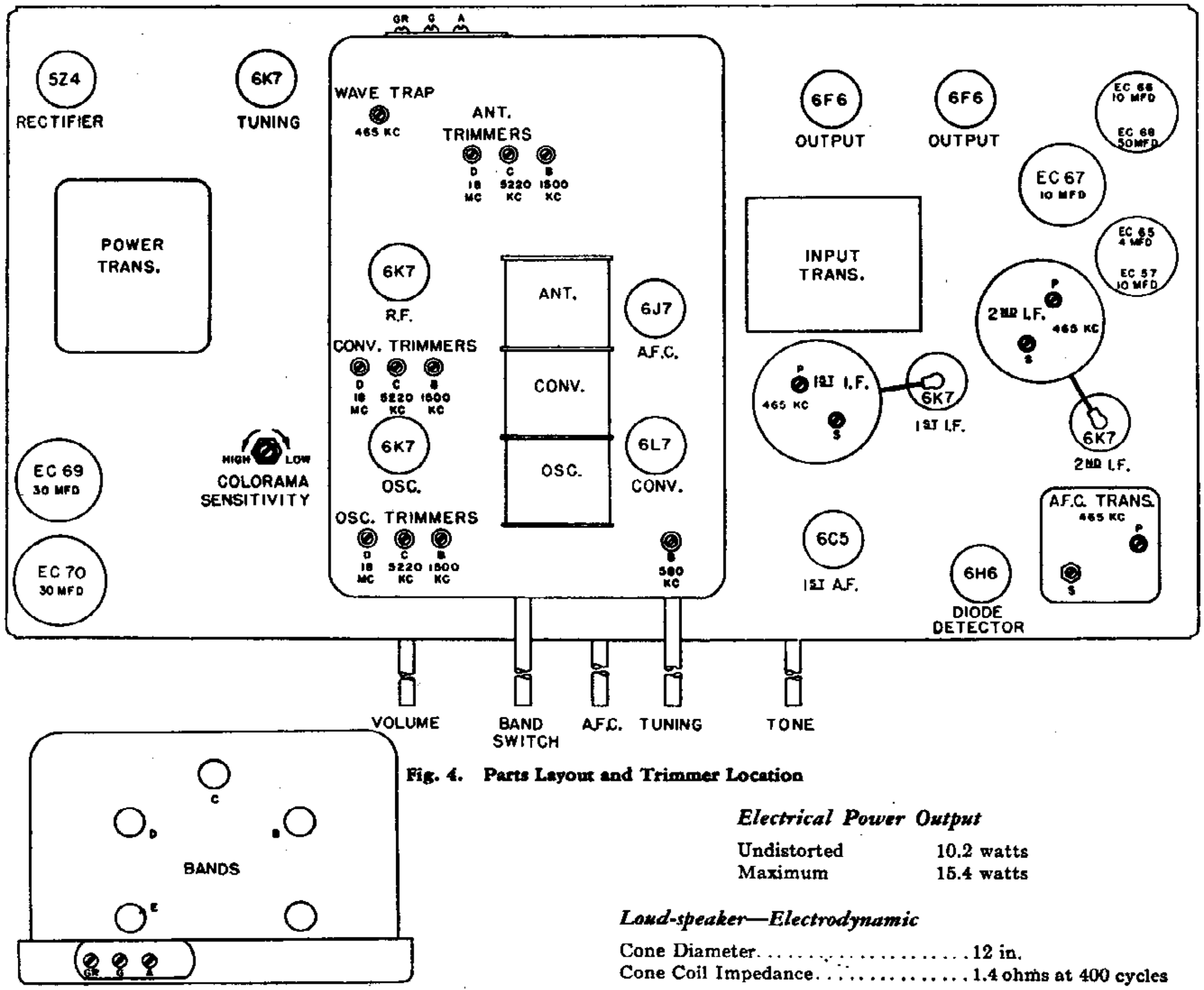


Fig. 4. Parts Layout and Trimmer Location

Electrical Power Output

Undistorted	10.2 watts
Maximum	15.4 watts

Loud-speaker—Electrodynamic

Cone Diameter....................12 in.
Cone Coil Impedance...............1.4 ohms at 400 cycles

SOCKET VOLTAGES

Tube No.	Cathode to Ground Volts D.C.	Screen Grid to Ground Volts D.C.	Plate to Ground Volts D.C.	Cathode Current M.A.	Heater Volts A.C.
6K7 R.F. Amp.	†	105	240	8.5	6.3
6L7 Converter	†	105	245	10.0	6.3
6K7 Oscillator	...	105	215	7.5	6.3
6K7 1st I. F. Amp.	†	110	220	9.5	6.3
6K7 2nd I. F. Amp.	3.0	105	220	10.0	6.3
6H6 Detector & AVC.	...	...	...	...	6.3
6C5 Audio Amplifier	6.0	...	185	5.6	6.3
6F6 Output	*	260	365	21.0	6.3
6F6 Output	*	260	365	21.0	6.3
6K7 Colorama Control	...	115	240	9.0	6.3
6J7 AFC.	2.5	105	205	1.0	6.3
5Z4 Rectifier	370 D.C.	...	700/350 R.M.S.	114.0	5.0

Measured at 115 volts supply. No signal input. Volume control maximum. Voltmeter 1000 ohms per volt. Measurements taken on highest scale giving accurate readable deflection.
† Grid bias at source—3 volts.
* Grid bias at source—23 volts.

MODEL E-129
Alignment

GENERAL ELECTRIC CO.

ALIGNMENT PROCEDURE

The receiver should first be allowed to run for fifteen minutes in order to reach its approximate normal operating temperature. Before making any adjustments, it is wise to determine the correctness of the existing alignment. This may be done by supplying a signal from the test oscillator to the receiver and inserting a "Tuning Wand" into the coil involved. The "Tuning Wand" consists of a rod of insulating material having a ring of nonmagnetic metal attached to one end, and a small core of finely divided iron compacted into the opposite end. By inserting the metal ring end into the center of a particular coil, the inductance of the coil is lowered, increasing its resonant frequency. Inserting the iron-filled end into the coil raises its inductance, lowering its resonant frequency. If the circuits are in exact alignment, inserting either end of the tuning wand in any coil will result in a decrease in output. When an increase in signal is obtained with the iron-filled end of the wand, a decrease in resonant frequency of that circuit by increasing its trimmer capacity is indicated. When an increase in signal is obtained with the metal ring, a decrease in trimmer capacity is indicated.

Changes Indicated by Wand

Wand	Signal	Trimmer adjustment required
Metal Ring	Decrease	None
Iron filings	Decrease	
Metal Ring	Increase	Decrease capacity
Iron filings	Decrease	
Metal Ring	Decrease	Increase capacity
Iron filings	Increase	

Alignment Frequencies

I.F.	Band "B"	Band "C"	Band "D"	Wave Trap
465 kc.	580 kc. 1500 kc.	5220 kc.	18,000 kc.	465 kc.

In order to align this receiver properly, it is necessary to have available the following test equipment:

1. A modulated test oscillator with frequencies available of 465, 580, 1500, 5220 and 18,000 kc.
2. An output indicator, such as a high resistance a-c voltmeter with a maximum scale reading of 3 to 5 volts, or a neon lamp indicator.
3. An alignment tool consisting of an insulating shaft with a small screwdriver blade.
4. A tuning wand.

To realize the full advantage of the performance built into these receivers at the factory, circuit alignment using cathode ray oscilloscope equipment is much to be preferred. The oscilloscopic method is particularly advantageous in aligning the I.F. tuned circuits.

See Fig. 4 for location of all trimmer capacitors.

1. *Visual Alignment of I. F.*

For visual alignment it is necessary to vary the frequency of an unmodulated test oscillator signal over a range extending on both sides of the peak frequency. This variation must take place in synchronism with the horizontal traverse of the cathode ray beam on its screen. The frequency modulator must, therefore, provide means for synchronizing the periodic test frequency variation with the cathode ray horizontal deflection circuit. The test oscillator may advantageously have facilities for audio frequency amplitude modulation of a fixed radio frequency test signal, as well as for frequency modulation, but audio modulation is not required for visual I.F. alignment.

In place of an output meter across the speaker voice coil, the vertical plates of the cathode ray tube are connected across the load resistor of the diode rectifier. With the frequency modulator in operation in conjunction with the test oscillator, the resonance curve of the circuit under test will be then shown on the screen.

Set the tuning dial indicator at the low end of the broadcast band at some point where no signal is received, since an extraneous signal might interfere with the aligning process. The volume control should be in an "off" or nearly off position. Apply a frequency modulated signal to the grid of the 1st I.F. amplifier tube through a 0.05 Mfd. (RC-072) capacitor. Connect the vertical plates of the oscilloscope between ground and the junction point between R-23 and R-24, and with the APC switch in the "off" position proceed to align the primary and secondary of the 2nd I.F. and the AFC I.F. transformers.

The object should be to make the two curves coincide with each other at the top and throughout their length with the maximum amplitude obtainable. This will require that all four I.F. trimmers be adjusted in the usual manner *excepting the AFC secondary (hexagonal nut) trimmer-which must be adjusted for minimum amplitude* before the curves will coincide properly. Fig. 5 gives the appearance of the curve when the alignment adjustments have been completed satisfactorily thus far. Apply the same frequency modulated input to the grid of the converter (6L7) tube through a 0.05 mfd. capacitor as before. Adjust the primary and secondary of the 1st I.F. transformer until the curves coincide and have the appearance of Fig. 5.

A further adjustment of the A.V.C. secondary (hexagonal nut) trimmer is necessary in order to complete the I.F. alignment satisfactorily. Apply the *same* signal to the grid of the second I.F. amplifier tube. Unsolder the ground end of TC-46 and connect the vertical deflecting plates of the oscilloscope between ground and the 6H5 cathode prong K2 (Fig. 3) or to the center terminal of the AFC switch.

Carefully adjust the AFC secondary trimmer until a curve is obtained which is similar to that shown in Fig. 6. Correct adjustment is made when the two sides of the curve are symmetrical and intersect exactly at the horizontal axis. No adjustment of the other I.F. trimmers should be made at this time.

If a metal aligning tool is used, the curve will change when the tool is withdrawn. Therefore, it is advisable to use a fiber hex-headed wrench for this aligning adjustment. At any rate, the final curve should be as shown with aligning tool removed.

2. *I. F. Wave Trap Alignment*

Leave the band switch at Band "B" and tune receiver to about 1000 kc.

With the test oscillator set at 465 kc. apply this signal to the antenna terminal through a dummy antenna consisting of a 400-ohm resistor and 250-mmfd. capacitor in series. With the 465-kc. signal applied to the antenna terminal, adjust the I.F. Wave Trap Trimmer for *minimum* output indication.

3. *R. F. Alignment*

First check the position of the dial pointer by rotating the tuning condenser to maximum capacity position, i.e., plates fully meshed. At this position, the pointer should coincide with the end mark at the left-hand end of the scale. If it does not, it may be set by loosening the pointer set screw and setting the pointer to its correct position. During R.F. alignment the APC switch *must* be set in its "off" (counter-clockwise) position.

BAND "B" (535-1640 KC.)

Set the test oscillator for operation at 1500 kc. and connect its output to the antenna terminal of the receiver through the dummy antenna described under "I.F. Wave Trap Alignment." Tune the receiver until the pointer is at 1500 on the scale. Set the tone control for minimum high response and reduce the volume control setting so as to avoid excessive noise response. Adjust the Band "B" oscillator, R. F., and antenna trimmers respectively (location shown on Fig. 4) to give maximum deflection on the output meter. Maintain the test oscillator output at the lowest level which will give an easily readable output indication.

Now set the test oscillator at 580 kc. and tune the receiver to resonance with this signal. Adjust the 580 kc. padding capacitor, C-20, rocking the tuning condenser back and forth through resonance as the padding capacitor is adjusted and note the deflection of the tuning meter each time the receiver is tuned in this manner. Leave the padding capacitor at the setting which gives greatest deflection.

Retune the receiver to 1500 kc. and set the test oscillator for this frequency. Check the alignment by again adjusting the Band "B" oscillator, R. F. and antenna trimmers for maximum deflection on the tuning meter.

BAND "C" (1600-5600 KC.)

With the test oscillator connected to the receiver as above, tune the receiver until the pointer is at 5220 on the "C" band scale. Set the test oscillator for operation on this frequency and, with the volume and tone controls set as above adjust the band "C" oscillator, R. F., and antenna trimmers, respectively (see Fig. 4) to give maximum deflection on the output meter.

BAND "D" (5.5-18.2 MC.)

Turn the band switch to Band "D." Set the test oscillator at 18,000 kc. (18.0 mc.) and tune the receiver until the pointer coincides with the 18.0 mark. Adjust the Band "D" oscillator trimmer to give maximum output indication. It will probably be found that there will be two settings of the oscillator trimmer that will give an output response. The lower capacity setting of the trimmer is the one that should be used. To be sure that correct adjustment has been obtained, tune for the image signal at 17.07 mc. with the test oscillator at 18.0 mc. It may be necessary to increase the test oscillator output to obtain response at this point.

Retune the receiver to 18.0 mc. and adjust Band "D" antenna and R. F. trimmers, respectively (C-5 and C-13) for maximum output indication. When adjusting the R. F. trimmer, C-13, rock the tuning condenser back and forth through resonance as in the 580 kc. padding capacitor adjustment.

Alignment of the receiver is now complete as no adjustments are provided on band "E."

4. *I. F. Alignment with Output Meter*

Although the use of the cathode-ray oscilloscope for alignment purposes is to be preferred, it is possible to make the I. F. trimmer adjustments with reasonable accuracy using a 465 kc. signal generator and output meter.

Place a modulated signal of 465 kc. on the grid of the last I. F. (6K7) tube with the volume control set at maximum and the AFC switch *turned off*. Place a low range A. C. voltmeter or other output indicator across the voice coil of the loud-speaker. Adjust the output of the signal generator so that an indication of not more than two or three volts is obtained on the output meter.

Adjust and readjust the primary trimmer for maximum output and *the secondary for minimum output*. This latter adjustment will be very broad. Apply the signal input to the grid of the 1st I. F. (6K7) tube and adjust both primary and secondary trimmers for maximum output, reducing the input as necessary to obtain approximately the same output indication as before. Apply the signal input to the grid of the converter (6L7) tube and adjust both primary and secondary trimmers for maximum output indication in the same manner.

It is now necessary to make a fine adjustment of the secondary trimmer of the last I. F. (AFC) transformer which is as follows: without changing the frequency of the signal generator, place the input lead on the rubber insulation of the converter (6L7) grid lead. This will provide a small signal input through the capacity between the leads. Increase the attenuator setting if necessary to make the output audible. If the signal generator is provided with a means of removing the modulation, this should be done. However, the adjustment may be carried out satisfactorily even with a modulated generator signal.

Now tune in any broadcast signal in the usual manner and tune the receiver carefully for zero beat between this carrier and the 465 kc. signal generator. It may be necessary to use a short antenna or to remove it entirely if the station is a strong local. Throw the AFC on and adjust the last I. F. secondary (APC) trimmer to give zero beat. This adjustment is very critical and must be made with great care. When the adjustment is properly made, there will be no appreciable change from zero beat as the AFC switch is thrown off an. m. This completes the alignment of the I. F. and AFC circuits.

The alignment of the oscillator and R. F. circuits may be carried out in the usual manner. The AFC switch must remain in the "off" position.

ADJUSTMENT OF DIAL MECHANISM

The dial mechanism (Fig. 7) is rigidly mounted to the "Sentry Box" by means of two brackets and four screws. The dial pointer is operated by means of an "Automatic Vernier" reduction drive unit. Motion imparted to the gang condenser rotor is transmitted through a series of pulleys and an interconnecting cable to the dial pointer slider which is supported on a rail below the dial scale.

To Replace Cables

To replace cord or cable for the pointer or drive, the chassis should be removed from the cabinet and the dial mask (No. 14) removed from the dial scale box (No. 5). The black drive cord (No. 25) should run between the drum (No. 6) on the condenser and the drive pulley without crossing. Both the black cord (No. 25) and the bronze cable (No. 24) fasten on the same hook in the drum (No. 6) which is in front of the single lance on the outside diameter. The springs (21) and (22) are fastened on the ends of the cables after passing through the lances which are close together on the condenser drive drum. The light spring (No. 21) is on the bronze cable (No. 24) and the special spring-loop hooks into the hole in the drum next to the hook for the spring on the black cord (No. 25). The solid end of the cord or cable should be fastened first to the drum, the line should be then strung around the pulleys and drum, and lastly, the spring should be stretched into place.

To Adjust Pointer for Calibration

The pointer (No. 27) is adjustable by removing the escutcheon plate and also the dial mask (No. 14) which is held by four screws. The screw in the center of the pointer (No. 27) can then be loosened and the pointer adjusted as needed.

To Replace Scale

The scale (No. 3) can be removed by taking off the escutcheon and the dial mask (No. 14) as for the adjustment of the pointer. The pointer (No. 27) is moved to the left-hand end, the scale is then pushed to the left and the right-hand end is pulled out with the aid of a small screw driver or a similar tool. When replacing the scale (No. 3) it is advisable to remove the cord (No. 23). The spring (No. 9) is put on the dial shaft and the shaft then inserted into the housing. The scale (No. 3), with the right-hand cap (No. 8) attached, is then inserted into the left-hand cap (No. 7) which is held in position by pulling on the shaft on the outside of the housing. After the scale (No. 3) is inserted it should be rotated from one to two times against the action of the torsion spring (No. 9). The cord (No. 23) is then replaced in the lance provided for it. It is advisable to have the band switch rotated so that the greatest length of cord possible is unwound from the lower pulley (No. 4) on the band switch shaft. It is best that the chassis be removed for the replacement of a scale.

(It is important when replacing the chassis in the cabinet that the rubber grommets should be put in the chassis and not on the wood pins.)

GENERAL ELECTRIC CO.

DESCRIPTION OF ELECTRICAL CIRCUIT

Model E-129 is a 12 metal tube receiver using a highly sensitive and selective superheterodyne circuit. In addition to the fundamental requirements of superheterodyne design it incorporates many noteworthy technical improvements which are of definite advantage in improving efficiency of performance and ease of operation.

Design features built into this receiver include the "Sentry Box"; separate coils for each frequency band; high efficiency converter with a separate oscillator; two stages of IF amplification for high sensitivity and selectivity; automatic volume control; automatic frequency control (AFC), silent tuning, bass and treble compensated volume control, music-speech switch operated in conjunction with a continuously variable tone control, and colorama tuning.

"Sentry Box"

The RF and oscillator sections of the receiver are contained in the "Sentry Box" which consists of a separately contained and shielded, four band, antenna, RF and oscillator tuning unit. Individual coils are employed for each frequency range and are properly selected and connected into the circuit by the range switch. To avoid absorption effects, the range switch shorts all unused coils which might resonate at some frequency in the range being used. The section of the range switch controlling selection of the antenna coil primary also changes the antenna connection to these coils in such a manner as to insure maximum signal transfer in each range. When the G.E. "V" Doublet Antenna System is connected to terminals "A" and "G" at the rear of the "Sentry Box," the range switch provides for true doublet operation in the short wave (D) band where this connection is advantageous, and for operation as a "T" antenna in all other bands. When a doublet antenna providing noise reduction on the broadcast band is used, it is essential that a link be connected between terminals "G" and "GR" at the back of the "Sentry Box" in order to obtain the desired action.

The antenna is coupled to the control grid of the 6K7 RF tube through the tuned antenna transformer selected by the range switch. Likewise, the output of the amplifier tube is coupled to the control grid of the 6L7 converter tube through the properly selected tuned RF transformer. The only exception to this procedure occurs when the receiver is operating on the ultra-short-wave "E" band, in which position the RF tube is disconnected from the circuit and the antenna coupled directly to the 6L7 grid through the tuned antenna transformer.

The oscillator circuit, with the exception of the ultra-short-wave "E" band, employs a 6J7 tube in a conventional tuned grid, plate feedback circuit. In the ultra-short-wave "E" band, the common impedance between the grid and plate circuits provided by the secondary of L12 in the cathode circuit of the 6K7 oscillator tube, is utilized to provide oscillation. An auxiliary feedback circuit composed of the primary of L-12 together with the capacitor, MC-29, is in the plate circuit of the oscillator tubes on the "E" band. These elements resonate slightly below the low frequency end of the "B" band and tend to improve the oscillator excitation at this end of the band. To minimize capacity effects, the tuned "B" band grid coil L-13 remains in the circuit at all times since its resistance is sufficiently low to permit this procedure. The grid coil of the broadcast "B" band oscillator returns to B plus rather than to ground in order to provide plate voltage for the 6J7 AFC tube. The 580-kc. padding capacitor, C-20, serves to isolate this voltage from the oscillator tuning condenser section. The oscillator signal which is maintained at a frequency 465 kc. higher than the incoming signal is capacity coupled to the injection grid of the 6L7 converter.

The 6J7 AFC tube is also located on the "Sentry Box" and is associated with the broadcast "B" band oscillator. A complete description of the operation of AFC is given in a later paragraph. The output of the converter is applied to the I.F. amplifier.

I. F. Amplifier

The intermediate frequency amplifier consists of a two-stage cascade section composed of three I.F. transformers and two 6K7 amplifier tubes. Each transformer has two tuned circuits which resonate at 465 kc. The third I.F. transformer is of special construction having the primary capacitive coupled to the midpoint of the secondary in order to provide the differential AFC voltage. The operation of this transformer is discussed in a special chapter on AFC.

Detector and AVC

The plates of the 6H6 twin diode are fed in push-pull by the secondary of the third I.F. transformer. Two balanced diode loads consisting of R-24 and the series resistance of R-21, R-22, and R-23 are provided. The AFC voltage is developed across the sum of all these resistors, while the audio voltage appears across the sum of R-21 and R-22 and R-23. The audio frequency thus provided is transferred to the A.F. system for amplification and reproduction. The direct-current component of the rectified signal produces a voltage drop across the above three resistors. That existing across R-21 and R-22 is employed for operating the 6K7 "Colorama" tuning tube. Switch S-10 permits the application of either full or partial voltage to the tube, thereby permitting control of the color indication in accordance with prevailing receiving conditions. A complete description of "Colorama" tuning is given in a later paragraph. The D.C. voltage developed across R-21 is utilized for automatic volume control action by employing the same to bias the R.F. amplifier, converter, and first I.F. amplifier tubes. Initial bias for these tubes is obtained by returning resistor, R-21, to the minus 3 volt tap of the voltage divider. The second I.F. tube receives no A.V.C. and is self-biased. This minimizes the possibility of non-linear distortion on strong signals.

Audio System

The audio voltage developed across the diode load is applied to the volume control, R-32, through the isolating capacitor, TC-49. This control is compensated by means of dual resistance—capacitance networks to provide the proper balance of high and low frequencies at different volume control settings. The movable arm on the volume control selects the amount of audio signal applied to the control grid of the 6C5 audio amplifier tube and thus regulates the output of the receiver. The output of the 6C5 audio tube is transformer coupled to the control grids of the two 6F6 output tubes which operate in a push-pull connection.

The music-speech control consists of a switch actuated at one extreme of the tone control rotation corresponding to that providing maximum high note response. This provides better speech clarity by decreasing the bass compensation which is accomplished by shunting capacitor TC-53 with TC-52. The bass compensation is removed entirely on the short-wave bands by the switch S-2; hence the music-speech control is only effective in the broadcast "B" band. Continuously variable tone control is provided by capacitor TC-59 and variable resistor R-34 shunting the grids of the push-pull output tubes.

Silent Tuning

Silent tuning is provided by the switch S-9 which is actuated by the tuning knob of the receiver. Pulling the tuning knob out slightly closes switch S-9 and kills the audio output by grounding the 6C5 grid. The AFC is also removed by this operation which permits a sharp indication of resonance by noting the "Colorama" lights. When a station has been satisfactorily located in this manner, the tuning knob is pushed in to its original position and the switch opened.

Power Supply

D.C. power for operation of the receiver is supplied by a power supply system employing a 5Z4 full-wave rectifier tube which, together with a suitable network of resistors and capacitors, supplies the required voltages and filtering action.

COLORAMA TUNING

These receivers are equipped with Color Tuning, a novel method which indicates approach to resonance by means of a change of color of the light illuminating the tuning scale.

The colored light is produced by a group of four red-stained pilot bulbs and a group of three green-stained bulbs behind the scale. At zero signal strength the red group is at full brilliance and the green invisibly dim. As the signal increases from zero, the red gets dimmer and the green brighter over a broad range until at extreme signal strength the green is fully bright and the red below visibility through the dial. Hence, as a station is tuned-in the color changes smoothly, and the maximum change in the green direction is an indication of resonance.

Weak stations will produce a small color change and strong stations a larger change. The difference in signal strength, between the weakest and the strongest station likely to be listened to, has been found to be so great in different localities that the receivers have been equipped with a two-position sensitivity range switch for "sensitive" and "insensitive" settings of the color tuning. The switch is located near the power transformer on the chassis and may be reached from the rear of the cabinet. In the sensitive position, the weakest station to which the user can listen comfortably, above the general noise level, will shift the color to neutral white at resonance. Stronger stations give resonant points at bright greens. In localities near a relatively large group of high-powered stations and having a high noise level, such as Chicago and New York, the range switch must be thrown to the insensitive position when standard outdoor antennas are used, or else the color will be fixed green over so wide a band that resonance cannot be accurately found. The difference in sensitivity is about twenty to one. On short-wave bands the band switch connects the color tuning to the sensitive setting and the switch on the chassis is inoperative. This is because practically all the short-wave signals are relatively weak. The insensitive setting is used only on the 535-1640 kc. band.

There is a group of four red and a group of three green pilot bulbs behind the scale. These are controlled by a Saturable Reactor in a circuit which is shown in the schematic diagram, Fig. 2. The saturable reactor is controlled by a D.C. coil which decreases its reactance smoothly from a high-value at no D.C. to a very low value at maximum D.C. The saturable reactor acts very much like a dimming rheostat except that it is controlled by the D.C. plate current of a 6K7 tube used solely for that purpose. This tube receives for its bias a portion of the A.V.C. voltage of the set so that at no signal the bias is nearly zero. At this point, the plate current is at maximum; therefore, the red is brightest and the green invisibly dim.

SOME THINGS WHICH MAY AFFECT THE OPERATION OF COLOR TUNING ARE AS FOLLOWS:

Seven colored bulbs are used to give good diffusion of color over the scale; but if one of the seven fails it unbalances the whole group and should be replaced immediately. The lamp socket assembly may be removed by reaching into the rear of the cabinet, pulling the lamp socket assembly up on its guides and drawing it partly out. (A shipping screw, which should be removed when the set is unpacked, may need to be removed the first time.) There is enough slack in connecting wires to allow the assembly to be drawn forward. When the socket assembly has been drawn far enough out for unscrewing the bulbs turn on the power switch and replace the bulbs which do not glow. All will not be bad as each group is in series (green) or series parallel (red). Take care the wires do not foul the tuning mechanism when the assembly is replaced. The colored lamps used for replacement *MUST ALL BE 6.3 VOLTS, 0.15 AMPERE LAMPS.* No other size will work.

If the red is unusually dim on no signal and the colored bulbs are all good, try removing the antenna. Next try replacing the 6K7 "Colorama" tube or replace the rectifier. Sometimes the antenna noise level is so high that it dims the red like a signal. If the tubes in the set become weak, or the set is out of alignment, or for any other reason loses its sensitivity, the color tuning will appear insensitive.

AUTOMATIC FREQUENCY CONTROL

These receivers employ automatic frequency control (AFC) which is a device for automatically controlling the oscillator frequency in such a way that, although the receiver is not exactly tuned to the signal being received, an intermediate frequency of 465 kc. will still be produced. This control of the oscillator frequency is secured by means of a 6J7 tube so connected to the oscillator that it draws a lagging current from the tank circuit and thus gives the effect of a shunt inductance. Variation of the D.C. grid bias on the 6J7 control tube will affect the mutual conductance of the tube, thereby changing the amount of lagging current drawn from the oscillator tank with a consequent effect of variation of the amount of shunt inductance connected across the oscillator coil. This alters the total inductance in the oscillator tuned circuit and changes its resonant frequency.

Grid bias for the 6J7 control tube which will vary in accordance with the amount of detuning of the receiver is obtained from the 6H6 diode rectifier operating in conjunction with its special I.F. transformer. This control voltage is the difference between the drop across resistor R-24, the load resistor for one diode section of the 6H6 diode rectifier, and the drop across resistors R-21, R-22 and R-23, which constitute the load resistance for the other diode section. When the receiver is correctly tuned to the incoming signal, the intermediate frequency produced will be 465 kc. which is the resonant frequency of the tuned circuit feeding the 6H6 diode rectifier. Under this condition each diode plate receives equal signal voltage and the D.C. voltage drops across the load resistors will be equal, giving no change in grid bias on the 6J7 control tube. If the receiver is so tuned that the intermediate frequency produced is above 465 kc. the signal voltage applied to diode plate No. 7 will exceed that applied to diode plate No. 8. In this case, the D.C. voltage drop across load resistor R-21, R-22 and R-23 will be larger than that across load resistor R-24 and a resultant voltage will be produced which will increase the 6J7 control tube grid bias lowering the mutual conductance of the tube and causing it to draw less current from the oscillator tank. This is the same effect that would be produced by increasing the amount of shunt inductance across the oscillator coil and the oscillator frequency is thereby lowered by the amount necessary to compensate for the detuning. The opposite takes place when the receiver is tuned so as to produce an intermediate frequency below 465 kc. Diode plate No. 8 then receives more signal voltage than diode plate No. 7 and the resultant voltage developed across the load resistors is such as to decrease the grid bias on the 6J7 control tube. This causes a larger current to be drawn from the oscillator tank circuit, the effect being the same as a decrease in shunt inductance with a consequent increase in oscillator frequency to overcome the detuning.

MODEL E-129
Phonograph Data

GENERAL ELECTRIC CO.

AUTOMATIC RECORD CHANGER

The record-changing mechanism used in this receiver has been designed to be simple and fool-proof. Under normal operating conditions, service difficulties should be negligible. Occasionally, however, certain adjustments may be required. These adjustments are explained in the following paragraphs. It is important when servicing the automatic record changer to have it placed on a level support. It is also important to refrain from forcing the mechanism if there is a tendency to bind or jam, since bent levers and possibly broken parts may result.

Operating Instructions and Service Adjustments

The record changer is designed to automatically play eight 10-inch or seven 12-inch standard 78 RPM phonograph records on one side. The last record remains on the turntable and repeats until more records are placed on the turntable or the mechanism is stopped.

To play 12-inch records, referring to Figure 8, pull the thumb stop (K) on the right-hand side of the tonearm forward which allows the needle to locate on the edge of the record, also push the knob (D) at the left rear corner of the changer from 10 inch to 12 inch as marked on the base plate. Either 10-inch or 12-inch records may be repeated as often as desired by lifting the record removing arm (A) to an upright position.

To reject a record from the turntable while playing, pull the lever (L) at the right side of the turntable.

Motor Adjustments

The speed of the turntable motor is controlled by a governor which allows correct adjustment of the turntable rotation to 78 revolutions per minute. A pointer is provided under the turntable and the base plate is marked "F" and "S" to indicate direction to move pointer for faster or slower operation. A check of the turntable rotational speed may be made by placing a piece of paper under a record on the turntable and counting the number of times it rotates past a fixed point in one minute.

The motor bearings and gears are properly lubricated for long operation under normal weather conditions. If the motor chatters or runs uneven, place a few drops of light machine oil on the governor felt.

Trip Mechanism

While playing a record, the tonearm lifting mechanism (L) and the record removing arm (A) are held out of engagement with the motor cam by means of a latch which is formed by the vertical square pin in the pointed latch lever (I) and the notch in the side of the tonearm lift lever (L). ***This pin should engage the notch approximately one-half its depth***, and is adjusted thus by means of an eccentric washer and screw in the trip lever (B) upon which is mounted the cerrated block (H).

The latch is held closed by means of a spring between the latch bar and the trip lever. Be sure the parts work freely without binding so that they will latch when the latch bar swings back past the notch after a record has been removed.

The record changer is designed to trip on an eccentric trip groove record. The eccentric trip is effected by means of a hardened steel pin which is pressed into the end of the tonearm lift crank. This pin ratchets over the top of the grooves in the cerrated block (H) on the trip lever (B). When the eccentric groove in the record swings the tonearm back and forth it pushes the latch out of engagement. Care should be taken to insure that there is at least $\frac{1}{32}$ in. clearance for the end of the pin to raise over the cerrations to provide the ratchet action, when using a short phonograph needle riding on top of one record on the turntable.

The oval head machine screw, which serves as a pivot at the right-hand end of the left lever (L), should be set at such a height to allow the lift lever to be raised by the latch bar and so the roller is able to pass under the end of the lift lever without binding and also without too much clearance.

Unloading Mechanism

The record changer is intended to be operated with at least one record on the turntable in order to prevent the needle from damaging the turntable covering.

The motor mounting screws (G) should be adjusted so that the *elevation of the turntable from the base plate to the top of one record is one inch.*

The set screw and lock nut on the projecting member under the record removing arm (A) is provided for adjusting the elevation of the record separating and lifting finger. This screw should be adjusted so that the finger will remove the second record on the table but barely rise over, and not remove, the first record.

Record Lift Adjustment

To adjust the lift of a record while removing it from the turntable shaft and table the latch bar (I) should be placed in a position at its furthest throw against the face of the cam mounted on the motor spindle. Place a record between the separating finger and lever (A), the same way as the changer holds it while removing it. Let the other side of the record lie on top of the first record on the table. Adjust the lift by means of the eccentric stud and nut (P) at the left of the record removing assembly until the center hole of the record is off the turntable shaft and swings free of it.

Tone Arm Lowering

To adjust for the proper lowering of the tone arm on the edge of a 10-inch record (the difference for the 12-inch record is adjusted at the factory) the screw above the shelf on the right side of the tone arm is provided for moving the tone arm stop right or left until the needle will lower to approximately $\frac{1}{16}$ in. from the edge of the record.

To adjust the proper vertical clearance of the tonearm vertical pivot bearing, two jam nuts are provided on the end of the pivot sleeve, under the changer base plate. These nuts may be adjusted to take up unnecessary play.

Dash Pot Adjustment

Place the tonearm of the record changer in the position which results when the latch bar (I) is against the turntable motor cam at its furthest operating throw. (This position is the other extreme of the operating cycle as shown on Figure 8.) The tonearm stop should be against the cone-shaped cup of the dash pot while in the 10-inch position.

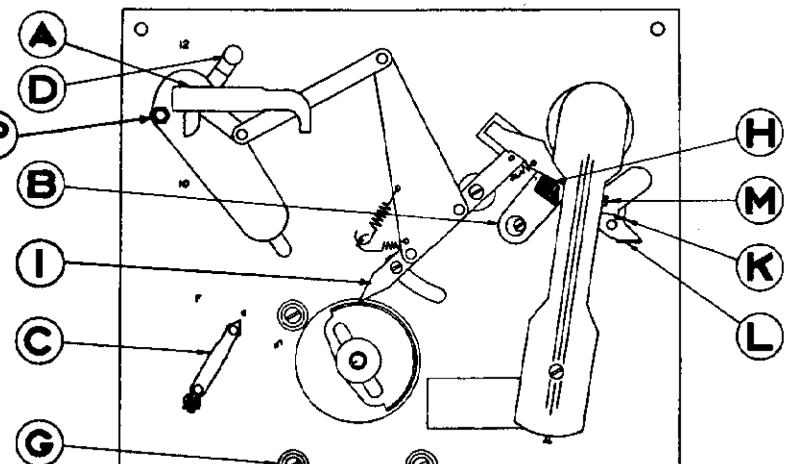
Raise or lower the dash pot plunger by means of the two lock nuts which control the lift of the dash pot lever under the changer base plate. Adjust these two nuts so that there is a clearance of a post card thickness between the dash pot leather tip and the under-side of the tonearm shelf.

Lowering Speed of Dash Pot

The top of the dash pot is provided with a knurled screw cap for adjusting the lowering speed of the dash pot. In case the tone arm descends too fast, put a drop of light machine oil on the plunger above this cap and allow it to work into the felt packing gland. Tighten or loosen the cap to obtain the desired lowering speed.

Crystal Pickup

The pickup used in the phonograph unit is of the piezo electric crystal type. The crystal cartridge (#1 Fig. 9) is a factory sealed unit and no adjustments are provided. The pickup and tonearm assembly should require very little servicing and if treated with reasonable care should perform its function without attention for long periods of time.



Phonograph Pick-up

Type.................Piezo Electric Pick-up
Pick-up Impedance....80,000 ohms at 1000 cycles

Record Changer

Record...........Ejector Type
Capacity.........Eight 10-in. records or seven 12-in. records
Turntable Speed...78 rpm.

Fig. 8. Automatic Record Changer Mechanism

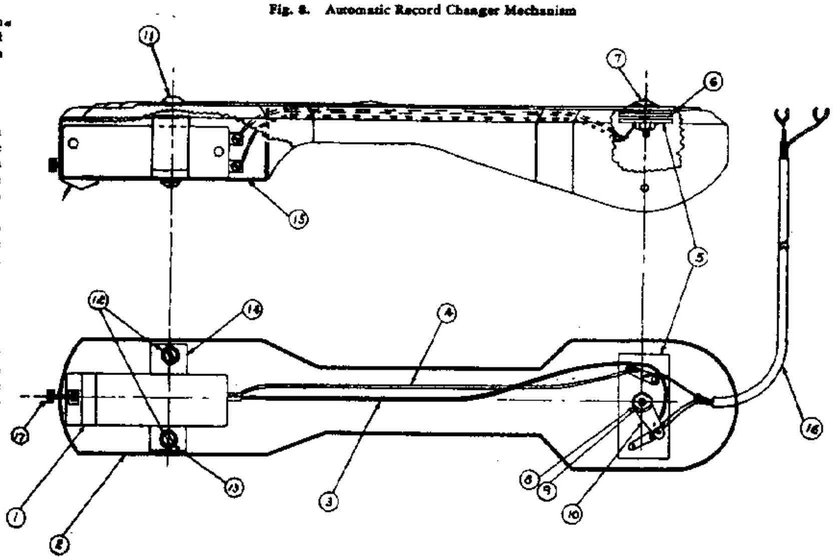


Fig. 9. Piezo Electric Crystal Pickup

MODEL E-12[illegible]
Parts

GENERAL ELECTRIC CO.

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER CHASSIS ASSEMBLY	
*RB-008	BOARD—Terminal Board, Double-lug	$0.10
*RB-009	BOARD—Terminal Board, Single-lug	.15
*RB-019	BOARD—Terminal Board, Three-lug	.10
*RB-023	BOARD—Terminal Board, Four-lug	.10
RB-046	BOARD—Terminal Board, Five-lug	.15
RB-047	BOARD—Resistor Board on Chassis Shelf	.10
RB-048	BOARD—[illegible]use Board	.15
*RC-011	CAPACITOR—.002 Mfd., 600 V Paper (TC-52, TC-53)	.25
*RC-013	CAPACITOR—.002 Mfd., 200 V Paper (Res. Bd.) (TC-55)	.25
*RC-034	CAPACITOR—.01 Mfd., 200 V Paper (Res. Bd.) (TC-40)	.25
RC-036	CAPACITOR—.005 Mfd., 200 V Paper	.25
*RC-046	CAPACITOR—.02 Mfd., 200 V Paper (TC-59, TC-60)	.25
*RC-072	CAPACITOR—.05 Mfd., 200 V Paper (TC-39, TC-43, TC-54)	.25
*R[illegible]	CAPACITOR—.05 Mfd., 400 V Paper (TC-34, TC-38)	.30
*R[illegible]	CAPACITOR—.25 Mfd., 400 V Paper (TC-58)	.35
R[illegible]	CAPACITOR—1 Mfd., 100 V Paper (TC-46)	.60
R[illegible]	CAPACITOR—Plate Coupling Capacitor 3rd I. F. Transformer (MC-40)	.25
R[illegible]	CAPACITOR—Grid Return Filter Capacitor for 3rd I. F. Transformer (MC-42, MC-48)	.25
R[illegible]	CAPACITOR—100 mmfd., Mica (Mtd. on Res. Bd.) (MC-54)	.25
R[illegible]	CAPACITOR—100 mmfd., Mica (MC-46)	.25
*R[illegible]	CAPACITOR—250 mmfd., Mica (MC-47, MC-50)	.25
R[illegible]	CAPACITOR—400 mmfd., Mica (Mtd. on Res. Bd.) (MC-50)	.25
R[illegible]	CAPACITOR—30 Mfd., 400 V Wet Electrolytic (BC-70)	1.55
*R[illegible]	CAPACITOR—30 Mfd., 280 V Wet Electrolytic (BC-69)	1.30
R[illegible]	CAPACITOR—10 Mfd., 100 V Wet Electrolytic (BC-67)	.75
RC-651	CAPACITOR—11 Mfd., 25 V and 4 Mfd., 300 V Dry Electrolytic (BC-57 red; BC-55 gr.)	1.25
RC-658	CAPACITOR—60 Mfd., 60 V and 10 Mfd., 25 V Dry Electrolytic (BC-68 red; BC-56 gr.)	2.15
R[illegible]	CAPACITOR—Line Capacitor, .01-.01 Mfd., 250 V A. C. Paper (TC-71 & 72)	.40
R[illegible]	CABLE—Speaker Cable (Complete)	.60
R[illegible]	CORD—Power Cord	.55
R[illegible]	CUSHION—Front Chassis Mounting Cushion	.10
R[illegible]	CUSHION—Side Chassis Mounting Cushion and Support Bracket	.20
R[illegible]	ESCUTCHEON—Escutcheon Plate (with Mtg. Scws.)	1.75
R[illegible]	FUSE—20 Amp. Fuse (Pkg. of 10)	1.00
R[illegible]	GRID CAP—Control Grid Clip (Pkg. of 5)	.10
R[illegible]	GUARD—Fuse Board Guard	.15
R[illegible]	GASKET—Escutcheon Rubber Gasket	.25
R[illegible]	GASKET—Escutcheon Felt Gasket	.10
R[illegible]	KNOB—Co[illegible] Knob (Push on) (Pkg. of [illegible])	.15
RK-006	KNOB—[illegible] Knob (Push on)	.40
RK-007	KNOB—[illegible] Knob (Set Scw.)	.10
RL-312	REACTOR—[illegible]ma Tuning" Saturation [illegible] (L-21)	.10
RL-313	REACTOR—[illegible] Tuning" Saturation [illegible] Cycles (L-21)	3.00
RQ-047	RESISTOR—[illegible], ½ Watt Carbon	3.00
*RQ-059 (RR-014)	RESISTOR—[illegible]m, ½ Watt Carbon	.60
RQ-067	RESISTOR—[illegible]m Plate Resistor for [illegible] R-17) (Pkg. of 5)	$0.70
RQ-076	RESISTOR—[illegible]m, ½ Watt Carbon	.60
*RQ-083 (RR-021)	RESISTOR—[illegible]hm, ½ Watt Carbon (R-31) (Pkg. of 5)	.60
RQ-089	RESISTOR—[illegible] ½ Watt Carbon	.60
RQ-099	RESISTOR—[illegible]m, Grid Resistor for [illegible] (R-30) (Pkg. of 5)	.60
RQ-103	RESISTOR—[illegible]m, ½ Watt Carbon (Pkg. of 5)	.60
*RQ-107 (RR-049)	RESISTOR—100,000 ohm, ½ Watt Carbon (Mtd. on Res. Bd.) (R-25) (Pkg. of 5)	.60
*RQ-107 (RR-049)	RESISTOR—10,000 ohm, ½ Watt Carbon (R-22) (Pkg. of 5)	.70
*RQ-111 (RR-054)	RESISTOR—150,000 ohm, ½ Watt Carbon (R-22) (Pkg. of 5)	.70
RQ-115	RESISTOR—220,000 ohm, ½ Watt Carbon (R-21) (Pkg. of 5)	.70
RQ-123	RESISTOR—470,000 ohm, Grid Resistor for 1st I. F. Transformer (R-14) (Pkg. of 5)	.70

Stock No.	Description	List Price
RQ-123	RESISTOR—470,000 ohm, ½ Watt Carbon (R-15, R-24) (Pkg. of 5)	.70
*RQ-131 (RR-067)	RESISTOR—1 Meg. ½ Watt Carbon (Mtd. on Res. Bd.) (R-30) (Pkg. of 5)	.70
RQ-139	RESISTOR—2.2 Meg. ½ Watt Carbon (R-27, R-28) (Pkg. of 5)	.70
RQ-143	RESISTOR—3.3 Meg. ½ Watt Carbon (Mtd. on Res. Bd.) (R-29) (Pkg. of 5)	.70
RQ-275	RESISTOR—4700 ohm, ½ Watt Carbon (R-15) (Pkg. of 5)	.70
RQ-277	RESISTOR—5600 ohm, ½ Watt Carbon (R-40) (Pkg. of 5)	.70
*RQ-283 (RR-183)	RESISTOR—10,000 ohm, ½ Watt Carbon (R-37) (Pkg. of 5)	.70
RQ-505	RESISTOR—82,000 ohm, 1 Watt Carbon (R-36) (Pkg. of 5)	.75
RR-330	RESISTOR—15 ohm, 2 Watt Flexible (FR-45) (Pkg. of 5)	.85
RR-331	RESISTOR—15 ohm, 1 Watt Flexible (FR-44) (Pkg. of 5)	.75
*RR-705	RESISTOR—50 ohm, 5 Watt Wire Wound (WR-42, WR-43)	.40
RR-720	RESISTOR—Candohm Tapped Bleeder Resistor (R-41)	1.25
*RS-300	SOCKET—8 Pin Tube Socket (Pkg. of 5)	.75
*RS-304	SOCKET—5 Pin Tube Socket (Pkg. of 5)	.75
RS-325	SWITCH—"Colorama" Sensitivity Switch (S-10)	.50
RS-327	SWITCH—Automatic Frequency Control Switch (S-9)	.50
RS-423	SPRING—Knob Spring (Push on Type) (Pkg. of 10)	.25
RT-121	TRANSFORMER—Power Transformer (T-3) 115 V. 50/60 Cycles	7.75
RT-122	TRANSFORMER—Power Transformer (T-3) 115 V. 25/60 Cycles	12.00
RT-123	TRANSFORMER—Universal Power Transformer (T-3) 105/125 200/250 V.	11.75
RT-225	TRANSFORMER—1st I.F. Transformer	2.10
RT-226	TRANSFORMER—2nd I.F. Transformer	2.10
RT-227	TRANSFORMER—3rd I.F. Transformer	4.15
RT-504	TRANSFORMER—Interstage Transformer	5.20
RT-711	TONE CONTROL—Tone Control and [illegible] Switch (R-34) (S-11)	1.00
RV-016	VOLUME CONTROL—Volume Control and Power Switch (R-32) (S-12)	1.00
RL-230	COIL—Oscillator Coil, Band C (L-10)	.70
RL-231	COIL—Oscillator Coil, Band D (L-11)	.75
RL-232	COIL—Oscillator Coil, Band E (L-12)	.70
RP-054	PULLEY—Wave Band Switch Dial Cord Pulley	.15
RQ-051	RESISTOR—470 ohm, ½ Watt Carbon (R-8) (Pkg. of 5)	.60
*RQ-059 (RR-014)	RESISTOR—1000 ohm, ½ Watt Carbon (R-7, R-10) (Pkg. of 5)	.70
RQ-067	RESISTOR—2200 ohm, ½ Watt Carbon (R-2, R-6) (Pkg. of 5)	.60
RQ-078	RESISTOR—5100 ohm, ½ Watt Carbon (R-9) (Pkg. of 5)	.60
RQ-090	RESISTOR—47,000 ohm, ½ Watt Carbon (R-12) (Pkg. of 5)	.60
RQ-108	RESISTOR—68,000 ohm, ½ Watt Carbon (R-4, R-11) (Pkg. of 5)	.60
*RQ-107 (RR-049)	RESISTOR—100,000 ohm, ½ Watt Carbon (R-3) (Pkg. of 5)	.70
RQ-128	RESISTOR—470,000 ohm, ½ Watt Carbon (R-1, R-5) (Pkg. of 5)	.70
RS-165	SHIELD—Antenna Compartment Shield Can	1.25
RS-166	SHIELD—Oscillator Compartment Shield Can	1.25
*RS-300	SOCKET—8 Pin Tube Socket (Pkg. of 5)	.75
RS-333	SWITCH—Wave Band Switch (S-1, 2, 3, 4, 5, 6)	4.00
RW-010	WINDOW—Escutcheon Window	$0.65
RW-101	WASHER—Felt Washer for Control Shafts (Pkg. of ten)	.45
RX-017	CUSHION ASSEMBLY—"Sentry Box" Mounting Cushion, Screw and Washer	.15
	SENTRY BOX ASSEMBLY	
*RB-019	BOARD—Terminal Board, Three-lug (Sentry Box)	.10
RB-049	BOARD—Antenna Ground Terminal Board	.10
RB-050	BOARD—Terminal Board, Two-lug (Top of Gang)	.10
RB-141	BRACKET—Condenser Front Mounting Bracket	.50
RB-142	BRACKET—Condenser Rear Mounting Bracket	.15
RB-143	BRACKET—Wave Band Switch Bracket	.10
*RC-046	CAPACITOR—.02 Mfd., 200 V Paper (TC-17)	.25

Stock No.	Description	List Price
*RC-072	CAPACITOR—.05 Mfd., 200 V Paper (TC-6, TC-9, TC-10, TC-18, TC-32, TC-73)	.25
*RC-091	CAPACITOR—.05 Mfd., 400 V Paper (TC-16, TC-19)	.30
RC-203	CAPACITOR—12 mmfd., Mica (MC-12)	.35
*RC-205	CAPACITOR—20 mmfd., Mica (MC-15, MC-29)	.35
*RC-210	CAPACITOR—50 mmfd., Mica (MC-24, [illegible] MC-31)	.25
RC-233	CAPACITOR—1000 mmfd., Mica (MC-14)	.30
RC-242	CAPACITOR—1250 mmfd., Mica (MC-23)	.35
RC-260	CAPACITOR—2850 mmfd., Mica (MC-28)	.50
RC-526	CAPACITOR—Triple Trimmers, Ant., R.F. and Oscillator (C-2, C-3, C-5) (C-7, [illegible] 13) (C-21, C-27, C-30)	.60
RB-827	CAPACITOR—Oscillator Padder Capacitor (C-30)	.40
RC-828	CAPACITOR—Wave Trap Trimmer (C-1)	.25
RC-712	CONDENSER—Gang Tuning Condenser ([illegible] 11, C-25)	4.75
RC-996	CUSHION—Condenser Mounting Cushion Assembly	.15
RL-019	COIL—Antenna Coil, Band B (L-2)	.75
RL-020	COIL—Antenna Coil, Band C (L-3)	.70
RL-021	COIL—Antenna Coil, Band D (L-4)	.70
RL-125	COIL—R.F. Coil, Band B (L-5)	.85
RL-126	COIL—R.F. Coil, Band C (L-6)	.75
RL-127	COIL—R.F. Coil, Band D (L-7)	.75
RL-128	COIL—R.F. Coil, Band B (L-8)	.75
RL-229	COIL—Oscillator Coil, Band B (L-9)	.70
RW-402	WAVE TRAP—Wave Trap (Coil L-1)	$0.65
	SPEAKER ASSEMBLY	
RC-012	CONE—12 in. Type Cone and Voice Coil (Gasket Included) (L-18)	1.45
RC-991	CLAMP—12 in. Cone Spider Clamp and Screw	.05
RP-050	PLUG—Female Speaker Plug	.20
RP-051	PLUG—Male Speaker Plug	.20
RS-037	SPEAKER—12 in. Type Speaker (Complete with Output Transformer) (L-17, L-18, L-19, T-2)	11.00
RS-416	SPRING—Voice Coil Leads Spring	.10
RT-417	TRANSFORMER—Output Transformer (T-2)	3.00
	DIAL DRIVE MECHANISM	
RB-144	BRACKET—Dial Scale Box L.H. Bracket (1)	.15
RB-145	BRACKET—Dial Scale Box R.H. Bracket (2)	.15
RB-146	BRACKET—"Colorama" Dial Lamp Bracket (Less Lamps) (17)	1.10
RB-147	BRACKET—"Personaliser" Dial Lamp Bracket (Less Lamp) (18)	.45
RB-148	BRACKET—Reduction Drive and "Silent Tuning" Switch Support Bracket (20)	.10
RB-518	BOX—Dial Scale Box and Pulley Assembly (5)	1.75
RC-820	CABLE—Dial Pointer Cable (24) (Pkg. of 5)	.40
RC-961	CORD—Condenser Drive Cord (25) (Pkg. of 5)	.60
RC-962	CORD—Band Change Cord (23) (Pkg. of 10)	.50
RC-948	CLAMP—Reduction Drive Friction Clamp (12)	.15
RC-949	COLLAR—Condenser Reduction Drive Assembly Shaft Collar and Spring Washer (30)	.20
RC-997	CAP—Scale Cap (Free End) (8)	.10
RC-998	CAP—Scale Cap (Pulley End) (7)	.10
RC-999	CONTACT—Silent Tuning Switch Contact Assembly (13)	.20
RD-038	DIAL—"Slide-Rule" Dial Scale (3)	.70
RD-039	DRIVE—Tuning Condenser Reduction Drive Assembly (10)	1.15
RL-908	LAMP—"Colorama Tuning" Green Lamp (Pkg. of 10)	1.50
RL-909	LAMP—"Colorama Tuning" Red Lamp (Pkg. of 10)	1.50
RM-008	MASK—Dial Mask and Personaliser Strip Holder	1.00
RP-054	PULLEY—Wave Band Switch Dial Cord Pulley (4)	.15
RP-055	POINTER—Dial Pointer (27) (Pkg. of 5)	.40
RP-056	PULLEY—Gang Drive Drum (6)	.35
RS-330	SWITCH—Silent Tuning Switch (Mechanism) (11)	.50
*RS-401	SPRING—Condenser Drive Cord Spring (21) (Pkg. of 5)	.20
RS-419	SPRING—Dial Pointer Cable Spring (22) (Pkg. of 2)	.20
RS-420	SPRING—Dial Scale Tension Spring (9) (Pkg. of 5)	.20
RS-421	SLIDER—Dial Pointer Slider (with screw) (26)	.15
RS-422	STRIP—"Personaliser" Illumination Diffuser (29)	.10
RW-009	WINDOW—"Personaliser Strip" Window (Celluloid)	.15
	RECORD CHANGER MECHANISM ASSEMBLY	
RPA-001	ASSEMBLY—Unloading Arm and Latch Bar Assembly	4.75
RPA-002	ASSEMBLY—Latch Bar Assembly	2.89

Stock No.	Description	List Price
RPA[illegible]	ASSEMBLY—Latch Bar and Pawl Assembly	$1.55
RPB[illegible]	PLATE—14" x 15" Base Plate (Brown Enamel Finish)	3.20
RPC[illegible]	CAM—Motor Cam	.85
RPH[illegible]	HANDLE—Mechanism 10 in.-12 in. Change Handle	.75
RPL[illegible]	LEVER—Lift Lever Complete	1.30
RPL-002	LEVER—Motor Speed Regulator Lever	.30
RPL-003	LEVER—Trip Lever Complete	1.00
RPP-001	PIN—Groove Pin for Mounting Unloading Arm	.10
RPP-002	PLATE—Sliding Plate for Mounting Unloading Arm	.85
RPP-003	PLATE—Turntable Drive Plate (metal)	.05
RPR-001	RIVET—Rivet for Fastening Latch Knee to Latch Bar (Pkg. of 10)	.05
RPR-002	ROLLER—Roller Used in Crescent-shaped slot	.10
RPS-001	SCREW—Latch Bar Mounting Screw	.10
RPS-002	SCREW—Lift Lever Screw (Pkg. of 5)	.20
RPS-003	SCREW—Motor Cam Set Screw (Pkg. of 10)	.25
RPS-004	SCREW—Screw Which Holds Unloading Mechanism to Sliding Plate (Pkg. of 10)	.50
RPS-005	SCREW—Sliding Plate Spring Stud (Pkg. of 10)	.10
RPS-006	SCREW—Trip Lever Mounting Screw (Pkg. of 10)	.10
RPS-007	SPRING—Latch Bar Coil Spring	.10
RPS-008	SPRING—Latch Bar Pawl Tension Spring (Pkg. of 5)	.60
RPS-009	SPRING—Lift Lever Spring (Pkg. of 5)	.15
RPS-010	SPRING—Sliding Plate Coil Spring (Pkg. of 5)	.15
RPS-011	SPRING—Speed Regulator Lever Spring (Pkg. of 5)	.25
RPS-012	STUD—Unloading Arm Bumper Stud and Nut (P)	.25
RPT-001	TURNTABLE—12 in. Turntable (Complete)	2.75
RPW-001	WASHER—Eccentric adjustment Washer for Trip Lever	.10
RPW-002	WASHER—Sliding Plate Washer (Pkg. of 5)	.10
RPW-003	WASHER—Sliding Plate Washer (¼ in. Hole) (Pkg. of 5)	.15
RPW-004	WASHER—Star Mounting Washer (½ in. Hole) (Pkg. of 10)	.20
RPW-005	WASHER—Turntable Drive Washer (Rubber)	.05
RPW-006	WASHER—Washer Used Between Latch Bar and Base Plate (Pkg. of 10)	.25
RPW-007	WASHER—Washer Used Under Star Washer (Pkg. of 10)	.10
RPW-008	WASHER—Star Tension Washer (Pkg. of 10)	.20
RPW-009	WASHER—Trip Lever Mounting Washer (Pkg. of 10)	.10
	MOTOR ASSEMBLIES	
RPM-001	MOTOR—Motor Complete with Cam—78 R.P.M. 115 V. 60 Cycles	27.50
RPM-002	MOTOR—Motor Complete with Cam—78 R.P.M. 115 V. 50 Cycles	17.50
RPM-003	MOTOR—Motor Complete with Cam—78 R.P.M. 115 V. 40 Cycles	19.00
RPM-004	MOTOR—Motor Complete with Cam—78 R.P.M. 115 V. 25 Cycles	19.00
RPX-001	MOUNTING ASSEMBLY—Motor Mounting Spacer, Two Rubber Washers, Plain Washer, and Screw	.15
	PICKUP AND TONEARM ASSEMBLIES	
RPA-004	ARM—Tone Arm (2)	1.10
RPC-002	CRYSTAL—Crystal Cartridge Assembly (1)	5.75
RPC-003	CLAMP—Cartridge Support Clamp (14)	.35
RPC-004	CORD—Pickup Extension Cord (16)	.25
RPK-001	KNOB—Blank Tonearm Knob (Diamond Shape) (7)	.35

Stock No.	Description	List Price
RPP-004	PICKUP—Pickup Unit Complete	$11.00
RPP-005	PLATE—Pickup Cartridge Plate (15)	.15
RPS-013	SCREW—Needle Screw (17)	.05
RPS-014	STRIP—Terminal Strip Assembly (5)	.30
RPW-010	WIRE—Lead Wire (Black) (3)	.10
RPW-011	WIRE—Lead Wire (White) (4)	.10
	TONEARM SUPPORT AND OPERATING ASSEMBLIES	
RPA-005	ASSEMBLY—Tonearm Base and Lift Mechanism Complete	4.00
RPB-002	BASE—Tonearm Base Only (with Mtg. Screws)	.55
RPB-003	BRACKET—Bracket Upon Which Tonearm is Mounted	1.00
RPB-004	BUSHING—Tonearm Support Bushing	.15
RPC-005	CRANK—Tonearm Lift Crank	1.75
RPH-002	HOOK—Tonearm Support Hook	.10
RPN-001	NUT—Nut for Holding Pivot in Tonearm Base (Upper)	.10
RPN-002	NUT—Nut for Holding Pivot in Tonearm Base (Lower)	.10
RPP-006	PIN—Lift Crank Cotter Pin (Pkg. of 10)	.05
RPS-[illegible]5	SCREW—Tonearm Adjusting Screw (M)	.10
RPS-[illegible]6	SCREW—Tonearm Support Adjusting Screw, Lock Washer, Spring Washer and Nut	.15
RPS-[illegible]7	SCREW—Tonearm Support Mounting Screw (Pkg. of 10)	.05
RPS-[illegible]8	SPRING—Lift Crank Spring (Pkg. of 5)	.10
RPS-[illegible]9	STOP—Adjustable Needle Stop (K)	.10
RPS-[illegible]	SUPPORT—Upper Tonearm Support (Bracket)	.30
RPS-[illegible]1	SUPPORT—Lower Tonearm Support	.50
RPW-[illegible]2	WASHER—Lift Crank Washer (Pkg. of 10)	.05
RPW-[illegible]3	WASHER—Washer Used Above and Below Tonearm Bracket Bearing (Pkg. of 10)	.10
	UNLOADING ARM ASSEMBLY	
[illegible]	ASSEMBLY—Unloading Arm Assembly (Complete)	1.75
[illegible]	SCREW—Unloading Arm Adjusting Screw, Nut and Lock Washer	.10
	DASH POT ASSEMBLY	
[illegible]	CAP—Dash Pot Adjusting Cap	.25
[illegible]	DASH POT—Dash Pot Only	1.00
[illegible]	FELT—Dash Pot Adjusting Cap Felt (Pkg. of 10)	.40
RPL[illegible]	LEATHER—Dash Pot Leather (Pkg. of 5)	1.00
RPL[illegible]	LEVER—Dash Pot Lift Lever, Screw and Nut	.20
RPN[illegible]	NUT—Dash Pot Mounting Nut (Pkg. of 5)	.40
RPP[illegible]	PLUNGER—Dash Pot Plunger Assembly	.70
RPS[illegible]	SPACER—Dash Pot Lift Lever Spacer	.15
RPS[illegible]	SPRING—Dash Pot Lift Lever Spring (Pkg. of 5)	.10
RPW[illegible]	WASHER—Dash Pot Felt Washer (Pkg. of 10)	.20
RPW[illegible]	WASHER—Dash Pot Washer (Small) (Pkg. of 5)	.15
RPW[illegible]	WASHER—Dash Pot Washer (Large) (Pkg. of 5)	.35
RPW[illegible]	WASHER—Dash Pot Weight Lock Washer (Pkg. of 10)	.10
RPW-0[illegible]	WEIGHT—Dash Pot Weight	.10
	MISCELLANEOUS ASSEMBLIES	
RPB-0[illegible]	BOARD—Terminal Board for Pickup [illegible]	.15
[illegible]	[illegible] Resistor Board (Chassis Front [illegible])	.10
[illegible]	[illegible]Phonograph Input Cable	.40
[illegible]	[illegible]onograph Power Cord (Com[illegible])	.80
[illegible]	[illegible]Radio-Phono Switch Plate	.35
(RP-025)	[illegible]o Contact Male Connector Plug—Round	.30
RPR-003 (RQ-119)	RESISTOR—330,000 Ohm ½ Watt Carbon (Pkg. of 5)	.70

* Indicates part also used on 1936 "A" line receivers.

(Prices subject to change without notice)

Stock No.	Description	List Price
RPS-301	SWITCH—Radio-Phono Switch	$1.00
RPX-002	SPRING ASSEMBLY—Suspension Springs, Washer and Bolt Assembly for Motor Board—One Bolt, Two Springs, One Rubber Tubing, One Washer and Two Nuts	.50

Tubes

R.F. Amplifier	6K7 Triple-grid Super-control Amplifier
Converter	6L7 Pentagrid Mixer Amplifier
Oscillator	6K7 Triple-grid Super-control Amplifier
1st I.F. Amplifier	6K7 Triple-grid Super-control Amplifier
2nd I.F. Amplifier	6K7 Triple grid Super-control Amplifier
Detector and AVC	6H6 Twin Diode
Audio Amplifier	6C5 Low Gain Triode
Output (Push-pull)	6F6 Power Amplifier Pentodes (2)
AFC Control	6J7 Triple-grid Amplifier
Colorama Control	6K7 Triple-grid Super-control Amplifier
Rectifier	5Z4 Full-wave Rectifier
Lamps	6.3 V.-0.15 A. (4 red and 2 green)

To Change the Dial Lamps

Make certain that the copper-plated hex head shipping screw (which secures the dial lamp bracket during shipment) has been removed before attempting to remove the dial lamp bracket (No. 17). Lift the lamp bracket from the tabs under which it is clipped. Care should be taken that the lamp leads do not put an undue strain upon the drive cable. With the lamp bracket lead laid back horizontally the lamps may be replaced. When the lamp bracket is reinserted care should be exercised to avoid having the lamp leads foul the gang mechanism.

MODEL E-155
Circuit Data

GENERAL ELECTRIC CO.

DESCRIPTION OF ELECTRICAL CIRCUIT

Model E-155 is a 15 metal tube receiver using a highly sensitive and selective superheterodyne circuit. In addition to the fundamental requirements of superheterodyne design it incorporates many noteworthy technical improvements which are of definite advantage in improving efficiency of performance and ease of operation.

Design features built into this receiver include the "Sentry Box"; separate coils for each frequency band; high efficiency converter with a separate oscillator; two stages of I. F. amplification for high sensitivity and selectivity; automatic volume control; automatic frequency control (AFC); noise limiter; silent tuning; bass and treble compensated volume control; music-speech switch operated in conjunction with a continuously variable tone control; push-pull beam power tube output; audio degeneration; extra large electrodynamic speaker; and colorama tuning.

"Sentry Box"

The R. F. and oscillator sections of the receiver are contained in the "Sentry Box" which consists of a separately contained and shielded, five band, antenna—R. F.—oscillator tuning unit. Individual coils are employed for each frequency range and are properly selected and connected into the circuit by the range switch. To avoid absorption effects, the range switch shorts all unused coils which might resonate at some frequency in the band being used. The section of the range switch controlling selection of the antenna coil primary also changes the antenna connection to these coils in such a manner as to insure maximum signal transfer in each range. When the G-E "V" Doublet Antenna System is connected to terminals "A" and "G" at the rear of the "Sentry Box," the range switch provides for true doublet operation in the short wave "D" band where this connection is advantageous, and for operation as a "T" antenna in all other bands. When a doublet antenna providing noise reduction on the broadcast band is used, it is essential that a link be connected between terminals "G" and "GR" at the back of the "Sentry Box" in order to obtain the desired action.

The antenna is coupled to the control grid of the 6K7 R. F. tube through the tuned antenna transformer selected by the range switch. Likewise, the output of the R. F. amplifier tube is coupled to the control grid of the 6L7 converter tube through the properly selected tuned R. F. transformer. The only exceptions to this procedure occur when the receiver is operating on the "Long Wave" "A" band or the ultra short wave "E" band, in which positions the R. F. tube is disconnected from the circuit and the antenna coupled directly to the 6L7 grid through the tuned antenna transformer.

The oscillator circuit, with the exception of the ultra short wave "E" band, employs a 6J7 tube in a conventional tuned grid, plate feedback circuit. In the ultra short wave "E" band, the common impedance between the grid and plate circuits provided by the secondary of L-13 in the cathode circuit of the 6K7 oscillator tube is utilized to provide oscillation. An auxiliary feedback circuit, composed of the primary, L-13, together with the capacitor, MC-38, is in the plate circuit of the oscillator tube on the "E" band. These elements resonate slightly below the low frequency end of the "E" band and tend to improve the oscillator excitation at this end of the band. To minimise capacity effects, the tuned "E" band grid coil, L-15, remains in the circuit at all times since its resistance is sufficiently low to permit this procedure. The grid coil of the broadcast "B" band oscillator returns to B plus rather than to ground in order to provide plate voltage for the 6J7 AFC tube. The 580 kc. padding capacitor, C-27, serves to isolate this voltage from the oscillator tuning condenser section. The oscillator signal, which is maintained at a frequency 465 kc. higher than the incoming signal, is capacitor coupled to the injection grid of the 6L7 converter.

The 6J7 AFC tube is also located on the "Sentry Box" and is associated with the broadcast "B" band oscillator. A complete description of the operation of AFC is given in a later paragraph. The output of the converter is applied to the I. F. amplifier.

I. F. Amplifier

The intermediate frequency amplifier consists of a two-stage cascade section composed of three I. F. transformers and two 6K7 amplifier tubes. Each transformer has two tuned circuits which resonate at 465 kc. The third I. F. transformer is of special construction having a primary capacitor coupled to the midpoint of the secondary in order to provide the differential AFC voltage. The operation of this transformer is discussed in a special section on AFC.

Detector and AVC

The plates of the 6H6 twin diode are fed in push-pull by the secondary of the third I. F. transformer. Two diode loads consisting of R-24 and the series resistance of R-21, R-22, and R-23 are provided. The AFC voltage is developed across the sum of all these resistors, while the audio voltage appears across the sum of R-21, R-22, and R-23. A portion of the audio frequency thus provided is transferred to the A.F. system for amplification and reproduction. The direct current component of the rectified signal produces a voltage drop across the above three resistors. This voltage is employed to operate the 6K7 "Colorama" tuning tube. Switch S-11 permits the application of either full or partial voltage to the tube, thereby permitting control of the color indication in accordance with prevailing receiving conditions. A complete description of "Colorama" tuning is given in a later section. The D.C. voltage developed across R-21 and R-22 is utilized for automatic volume control action by employing the same to bias the R. F. amplifier, converter, and first I. F. amplifier tubes.

Initial control grid bias for these tubes is supplied by the delay bias diode under conditions of little or no signal. Under such conditions, this diode draws current through resistors R-21, R-22, and R-25, thereby maintaining the desired operating bias. When signal voltage above the level of the initial bias is applied, this diode ceases to draw current and the AVC diode takes over the biasing function.

The second I. F. tube receives no AVC and is self-biased. This minimizes the possibility of non-linear distortion on strong signals.

Noise Limiter

The other diode section of the auxiliary twin diode is employed as a transient noise-limiting device. This diode is so connected that its normal D. C. plate voltage has a value greater than the peak voltage of the audio signal applied through it to the manual volume control. Any transient signal of high voltage such as a static impulse will drive the plate negative, rendering the diode non-conducting and limiting the amount of transient voltage developed across the volume control.

Audio System

The manual volume control consists of a tapered potentiometer connected between the noise-limiting diode and the control grid of the 6C5 first audio amplifier. This control is tone-compensated by means of a resistance—capacitance network to provide proper balance of high and low notes at different volume control settings.

The output of the 6C5 first audio tube is resistance coupled to the control grid of the 6F6 second audio amplifier which is connected for triode operation. The output of this stage is transformer coupled to the control grids of the two 6L6 output tubes operating in a push-pull connection. The push-pull output stage is coupled to the loud-speaker through an impedance matching output transformer.

Degeneration

Audio degeneration is provided by applying a portion of the voice coil voltage to the cathode circuit of the 6F6 audio driver. This connection tends to flatten out the frequency characteristic of the audio and reproducing systems and decreases hum and non-linear distortion introduced by the audio amplifier.

The music-speech control consists of a switch actuated at one extreme of the tone control rotation corresponding to that providing maximum high note response. This provides better speech clarity by decreasing the bass compensation which is accomplished by shunting capacitor TC-56 with TC-57. The bass compensation is removed entirely on the short-wave and "A" bands by the switch S-2; hence the music-speech control is only effective in the broadcast (B) band. Continuously variable tone control is provided by capacitor TC-68 and variable resistor R-36 shunting the grids of the push-pull output tubes.

Silent Tuning

Silent tuning is provided by the switch S-9 which is actuated by the tuning knob of the receiver. Pulling the tuning knob out closes the switch S-9 and silences the audio output by grounding the 6F6 control grid. The AFC is also removed by this operation which permits a sharp indication of resonance by noting the Colorama lights. When a station has been satisfactorily located in this manner, the tuning knob is pushed into its original position and the switch opened.

Power Supply

D. C. power for operation of the receiver is supplied by two 5Z4 tubes each operating as a half-wave rectifier. The output of the rectifiers is fed through a two-section filter furnishing substantially pure D. C. to the voltage divider system from which taps supply correct voltages to the various receiver circuits.

Colorama Tuning

These receivers are equipped with Colorama Tuning, a novel method which indicates the approach to resonance by means of a change in the color of the light illuminating the tuning scale.

The colored light is produced by a group of four red-stained pilot bulbs and a group of three green-stained bulbs behind the scale. At zero signal strength the red group is at full brilliance and the green invisibly dim. As the signal increases from zero, the red gets dimmer and the green brighter over a broad range until at extreme signal strength the green is fully bright and the red below visibility through the dial. Hence, as a station is tuned in the color changes smoothly, and the maximum change in the green direction is an indication of resonance.

Weak stations will produce a small color change and strong stations a larger change. The difference in signal strength between the weakest and the strongest station likely to be listened to, has been found to be so great in different localities that the receivers have been equipped with a two-position sensitivity range switch for "sensitive" and "insensitive" settings of the color tuning. The switch is located on the chassis near the power transformer and may be reached from the rear of the cabinet. In the sensitive position, the weakest station to which the user can listen comfortably above the general noise level, will shift the color to neutral white at resonance. Stronger stations give bright green indications a resonance. In localities near a relatively large group of high-powered stations and having a high noise level, such as Chicago and New York, the range switch must be thrown to the insensitive position when standard out-door antennas are used, or else the color will be a fixed green over so wide a band that resonance cannot be accurately found. The difference in sensitivity is about twenty to one. On short-wave bands the band switch connects the color tuning to the sensitive setting and the switch on the chassis is inoperative. This is because practically all the short-wave signals are relatively weak. The insensitive setting is used only on the 540-1620 kc. band.

There is a group of four red and a group of three green pilot bulbs behind the scale. These are controlled by a Saturable Reactor, L-22, in a circuit which is shown in the schematic diagram, Fig. 2. The saturable reactor is controlled by a D.C. coil which decreases its reactance smoothly from a high value at no D.C. to a very low value at maximum D.C. The saturable reactor acts very much like a dimming rheostat except that it is controlled by the D.C. plate current of a 6K7 tube used solely for that purpose. At this point the plate current is at maximum; therefore, the red is brightest and the green invisibly dim.

Some things which may affect the operation of color tuning are as follows:

Seven colored bulbs are used to give good diffusion of color over the scale; but if one of the seven fails it unbalances the whole group and should be replaced immediately. The lamp socket assembly may be removed by reaching into the rear of the cabinet, pulling the lamp socket assembly up on its guides and drawing it partly out. A shipping screw, which should be removed when the set is unpacked, may need to be removed the first time. There is enough slack in connecting wires to allow the assembly to be drawn forward. When the socket assembly has been drawn far enough out for unscrewing the bulbs, turn on the power switch and replace the bulbs which do not glow. All will not be bad as each group is in series (green) or series parallel (red). Take care the wires do not foul the tuning mechanism when the assembly is replaced. The colored lamps used for replacement *must all be 6.3 volts 0.15 ampere lamps.* No other size will work.

If the red is unusually dim on no signal and the colored bulbs are all good, try removing the antenna. Next try replacing the 6K7 colorama tube, or replace the rectifier. Sometimes the antenna noise level is so high that it dims the red color like a signal. If the tubes in the set become weak, or the set is out of alignment, or for any other reason loses sensitivity the color tuning will appear insensitive.

Electrical Power Output

Undistorted.........30 watts
Maximum..........37.5 watts

Loud-speaker—Electrodynamic

Cone Diameter......15 in.
Cone Coil Impedance 10 ohms at 400 cycles

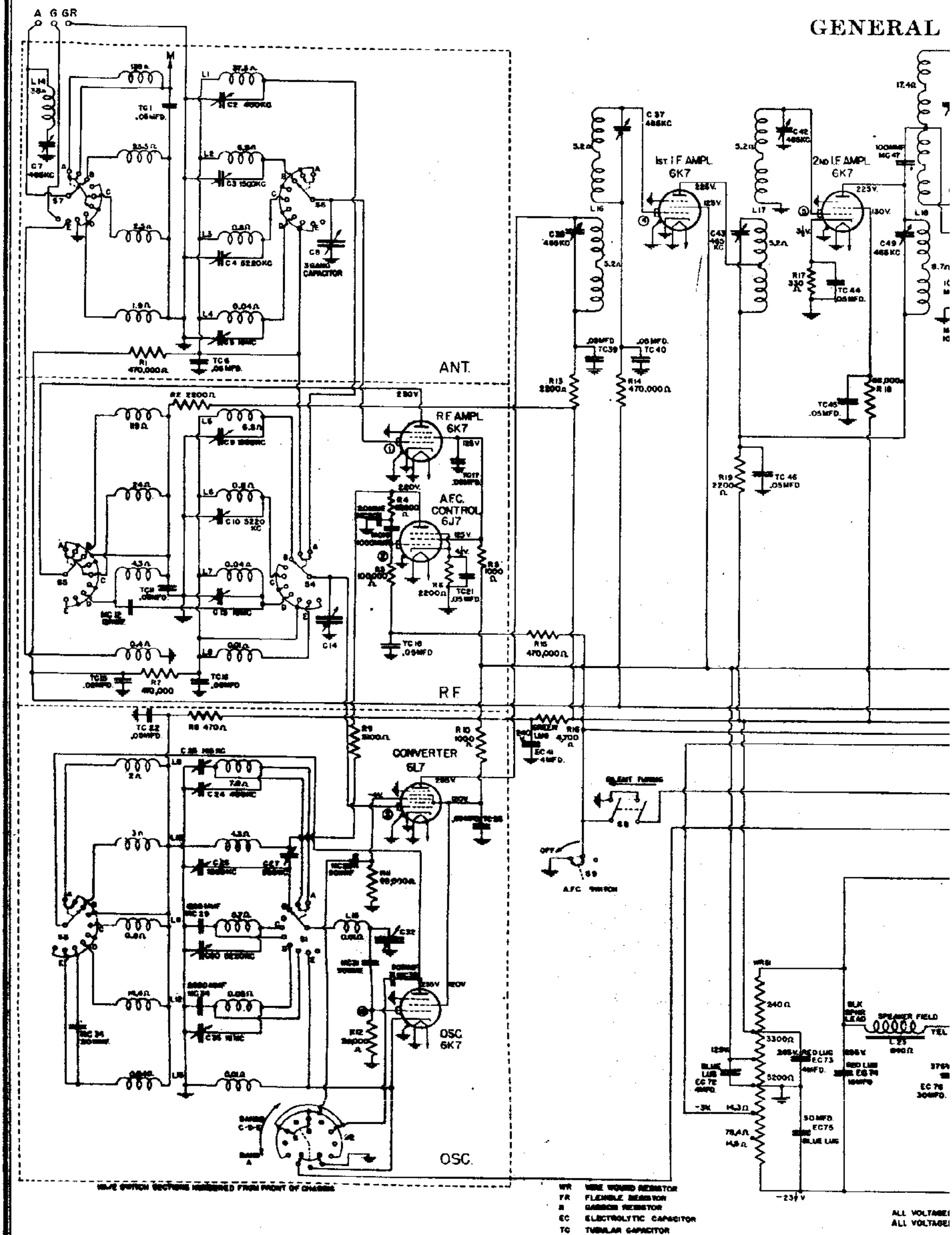
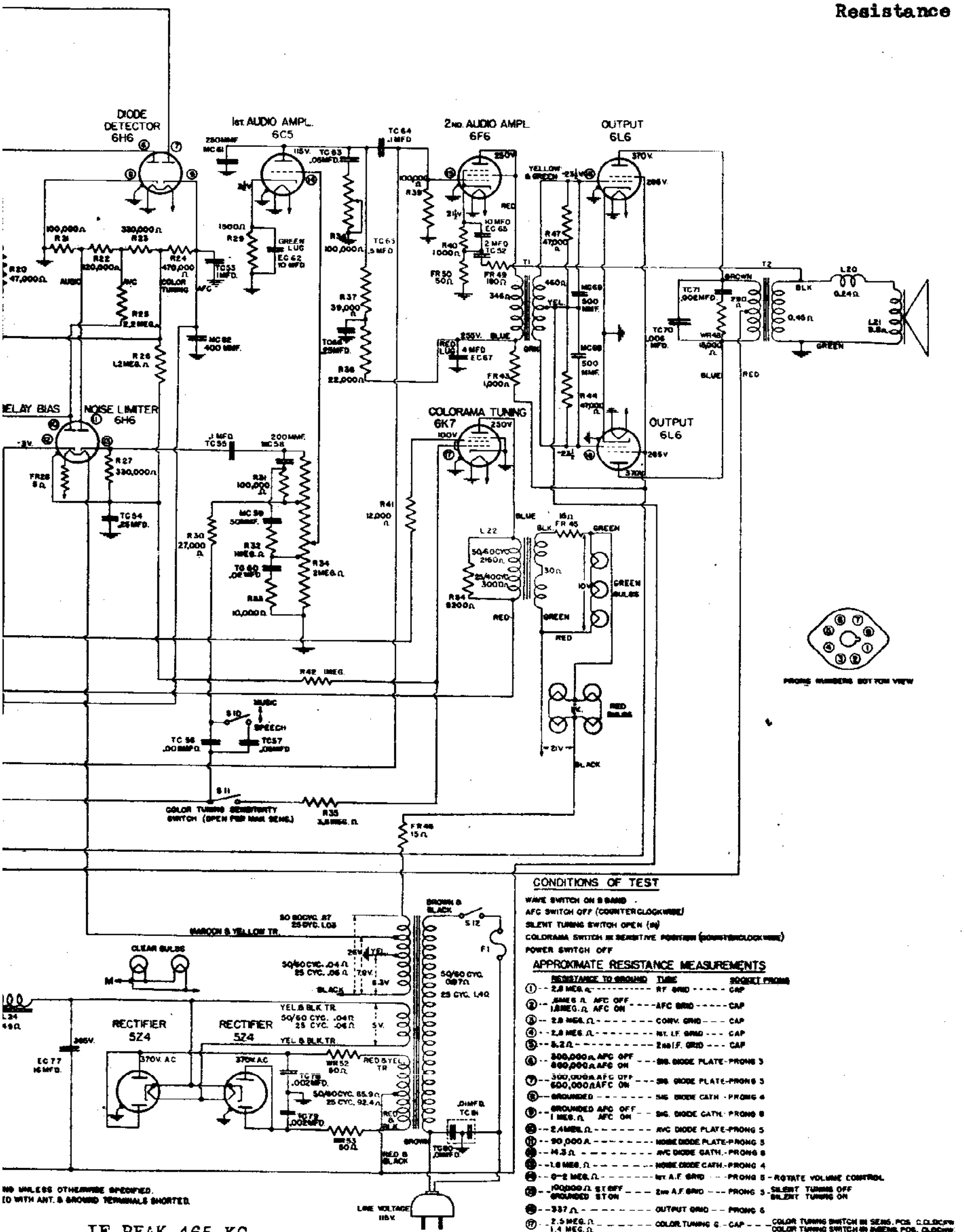


Fig. 2. Schematic Circuit Diagram

ECTRIC CO.

MODEL E-155
Schematic
Resistance



CONDITIONS OF TEST

WAVE SWITCH ON B BAND
AFC SWITCH OFF (COUNTERCLOCKWISE)
SILENT TUNING SWITCH OPEN (IN)
COLORAMA SWITCH IN SENSITIVE POSITION (COUNTERCLOCKWISE)
POWER SWITCH OFF

APPROXIMATE RESISTANCE MEASUREMENTS

	RESISTANCE TO GROUND	TUBE	SOCKET PRONG	
1	2.8 MEG. Ω	RF GRID	CAP	
2	.8 MEG. Ω AFC OFF 1.8 MEG. Ω AFC ON	AFC GRID	CAP	
3	2.8 MEG. Ω	CONV. GRID	CAP	
4	2.8 MEG. Ω	1st. I.F. GRID	CAP	
5	5.2 Ω	2nd I.F. GRID	CAP	
6	300,000 Ω AFC OFF 600,000 Ω AFC ON	SIG. DIODE PLATE	PRONG 3	
7	300,000 Ω AFC OFF 600,000 Ω AFC ON	SIG. DIODE PLATE	PRONG 3	
8	GROUNDED	SIG. DIODE CATH.	PRONG 4	
9	GROUNDED AFC OFF 1 MEG. Ω AFC ON	SIG. DIODE CATH.	PRONG 8	
10	2.4 MEG. Ω	AVC DIODE PLATE	PRONG 5	
11	90,000 Ω	NOISE DIODE PLATE	PRONG 5	
12	14.3 Ω	AVC DIODE CATH.	PRONG 6	
13	1.0 MEG. Ω	NOISE DIODE CATH.	PRONG 4	
14	0-2 MEG. Ω	1st. A.F. GRID	PRONG 5	ROTATE VOLUME CONTROL
15	100,000 Ω S.T. OFF GROUNDED S.T. ON	2nd A.F. GRID	PRONG 3	SILENT TUNING OFF SILENT TUNING ON
16	337 Ω	OUTPUT GRID	PRONG 5	
17	2.5 MEG. Ω 1.4 MEG. Ω	COLOR TUNING G.	CAP	COLOR TUNING SWITCH IN SENS. POS. C.CLOCKW. COLOR TUNING SWITCH IN INSENS. POS. CLOCKW.
18	337 Ω	OUTPUT GRID	PRONG 5	
19	47000 Ω	OSC. GRID	CAP	

...NG UNLESS OTHERWISE SPECIFIED.
...D WITH ANT. & GROUND TERMINALS SHORTED.

IF PEAK 465 KC.

MODEL E-155
Chassis Wiring

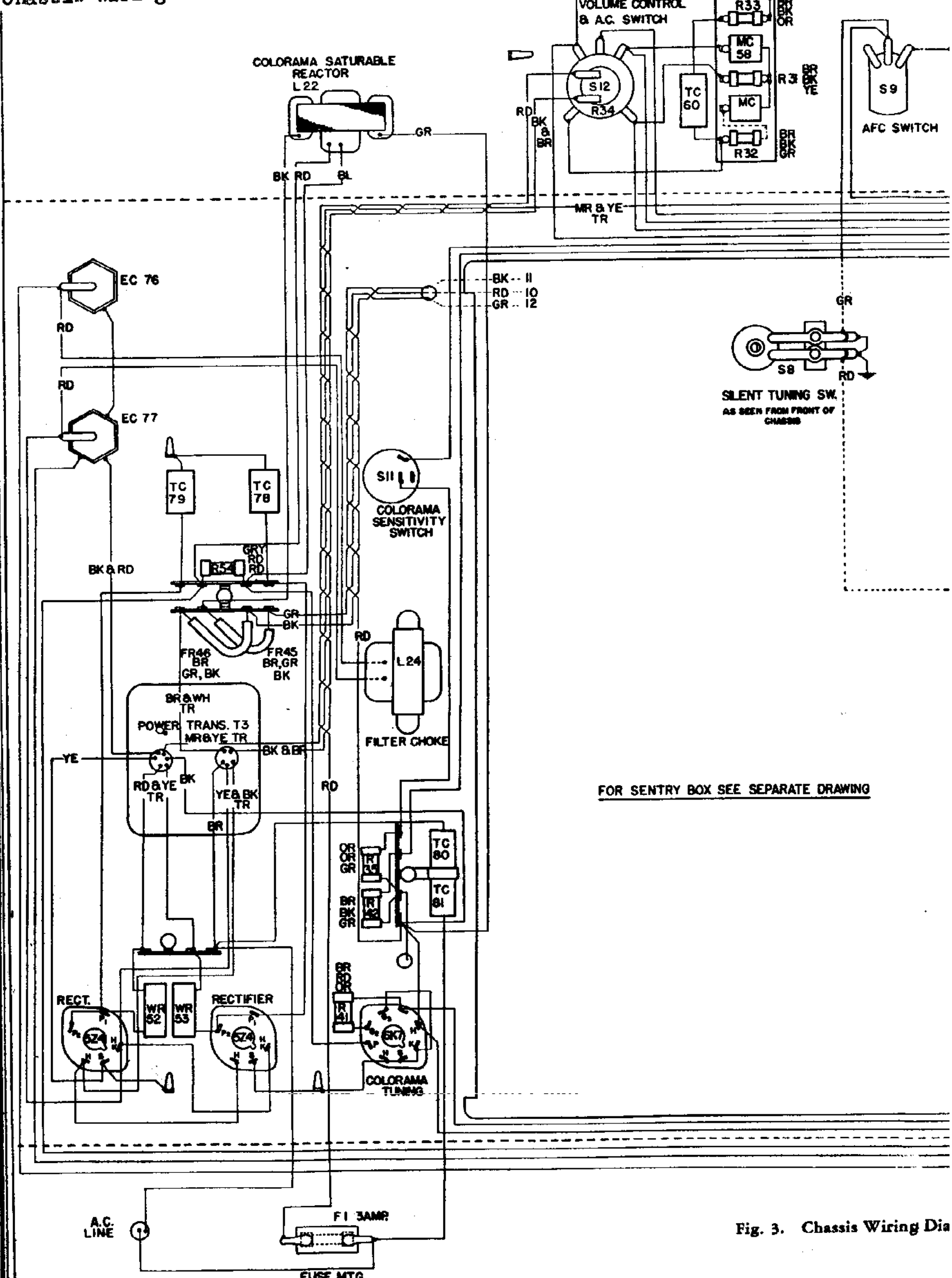
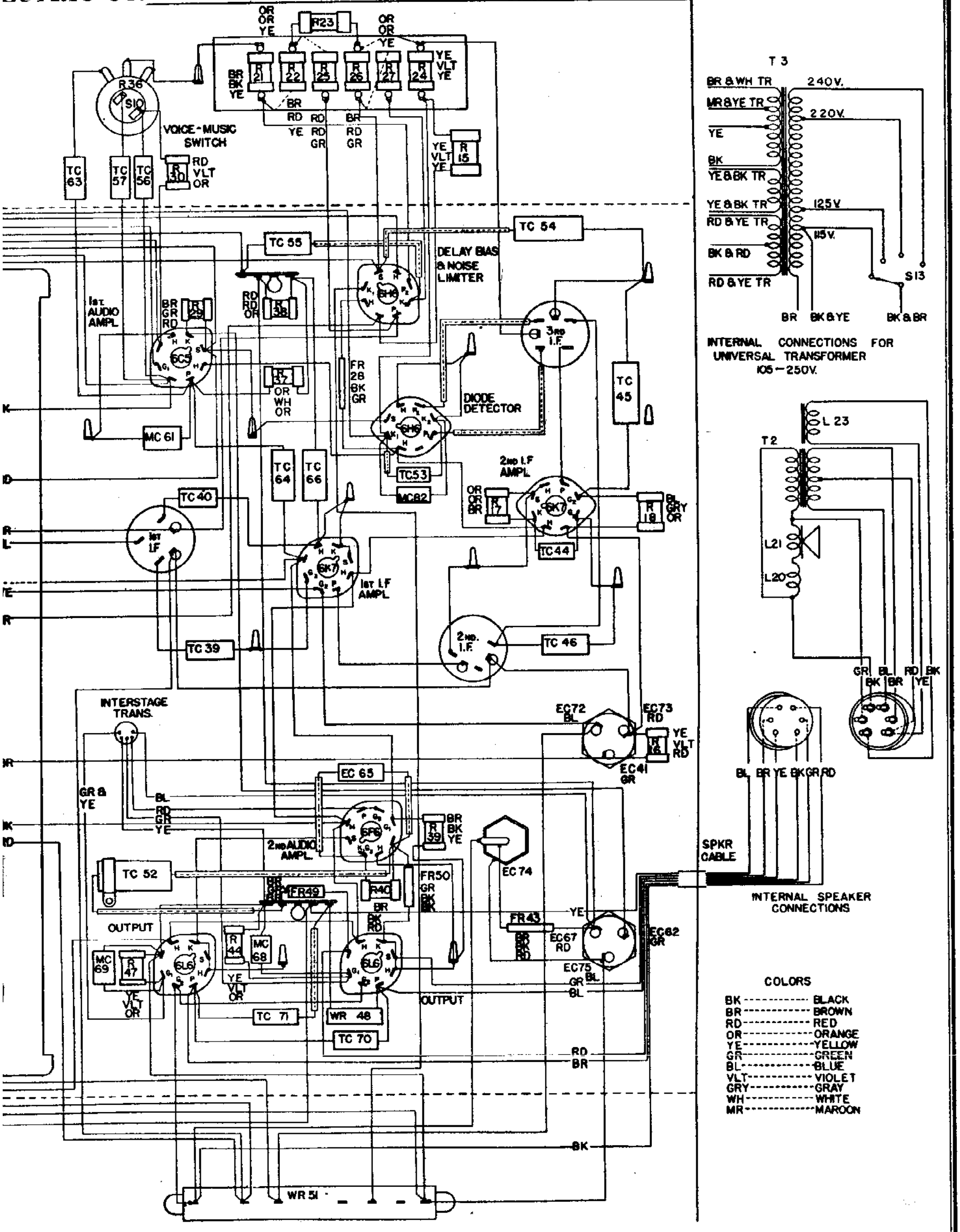


Fig. 3. Chassis Wiring Dia

ECTRIC CO.


R23
R21 R22 R25 R26 R27 R24
R36
S10
VOICE-MUSIC SWITCH
TC 63
TC 57
TC 56
R 30
R 15
T 3
BR & WH TR
MR & YE TR
BK
YE & BK TR
RD & YE TR
BK & RD
240V.
220V.
125V.
115V.
S13
BR BK & YE BK & BR
INTERNAL CONNECTIONS FOR UNIVERSAL TRANSFORMER 105—250V.
TC 54
TC 55
DELAY BIAS & NOISE LIMITER
6H6
1st. AUDIO AMPL.
6C5
R 29
R 38
R 37
3RD I.F.
FR 28
DIODE DETECTOR
TC 45
MC 61
L 23
T 2
TC 64
TC 66
TC53
MC82
2ND I.F AMPL.
6K7
R 17
R 18
TC 40
1st I.F.
TC44
1st I.F AMPL.
L21
L20
TC 39
2ND. I.F.
TC 46
INTERSTAGE TRANS.
EC72
EC73
R 16
EC41
EC 65
2ND AUDIO AMPL.
6F6
R 39
EC 74
SPKR CABLE
TC 52
FR49
R40
FR50
FR43
INTERNAL SPEAKER CONNECTIONS
OUTPUT
MC 69
R 47
6L6
R 44
MC 68
EC67
EC75
EC62
TC 71
WR 48
TC 70
COLORS
BK — BLACK
BR — BROWN
RD — RED
OR — ORANGE
YE — YELLOW
GR — GREEN
BL — BLUE
VLT — VIOLET
GRY — GRAY
WH — WHITE
MR — MAROON
WR 51

GENERAL ELECTRIC CO.

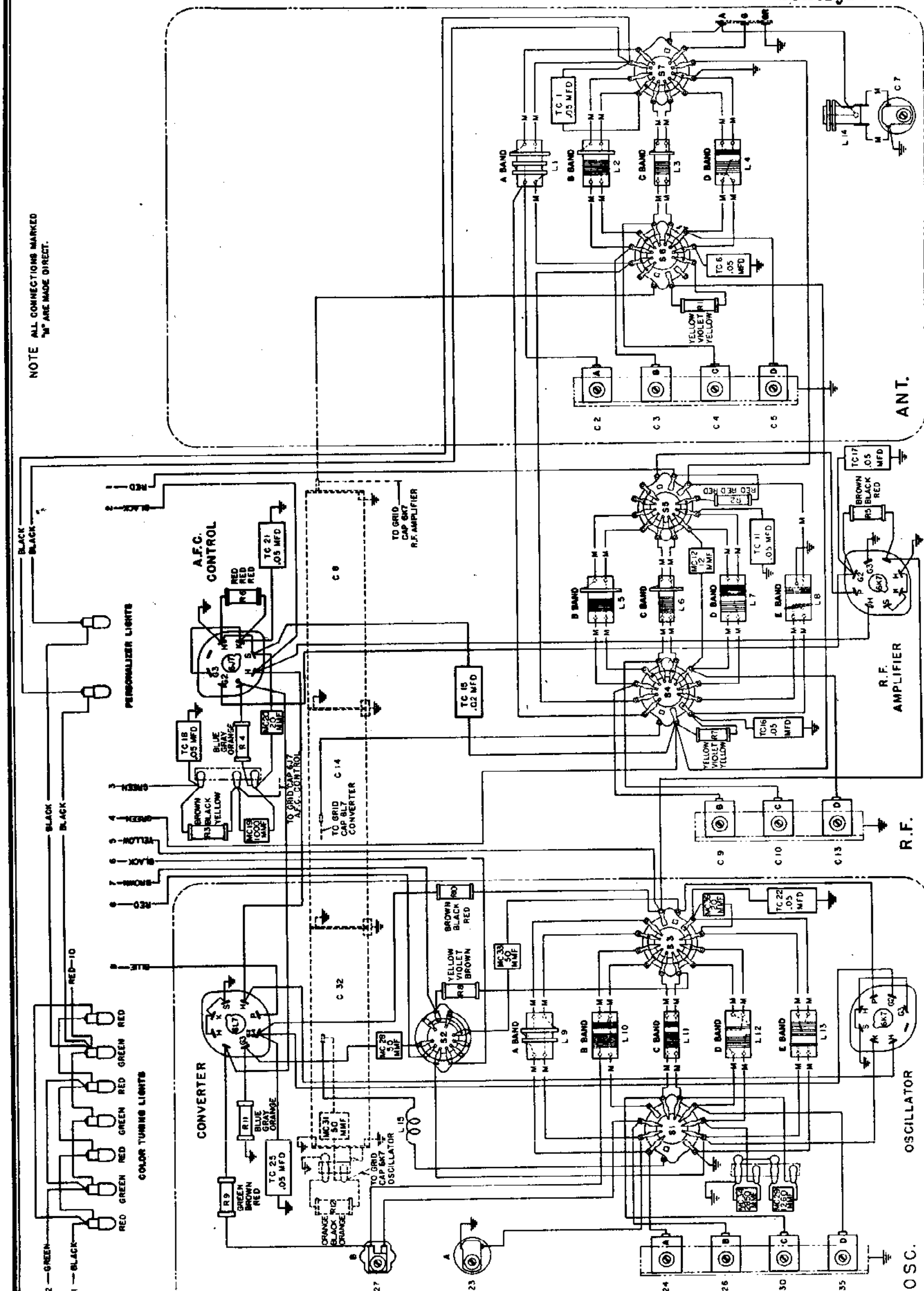


Fig. 1. "Sentry Box" Wiring Diagram

MODEL E-155
Dial Mechanism
Alignment Oscillograms

GENERAL ELECTRIC CO.

Tuning Control Drive Ratio

Fast Tuning........8 to 1
Vernier Tuning......50 to 1

Tuning Frequency Range

Band "A"..........140—420 kc.
Band "B"..........540—1620 kc.
Band "C"..........1610—5580 kc.
Band "D"..........5.5—18.1 mc. (5500—18,100 kc.)
Band "E"..........17.5—70.0 mc. (17,500—70,000 kc.)

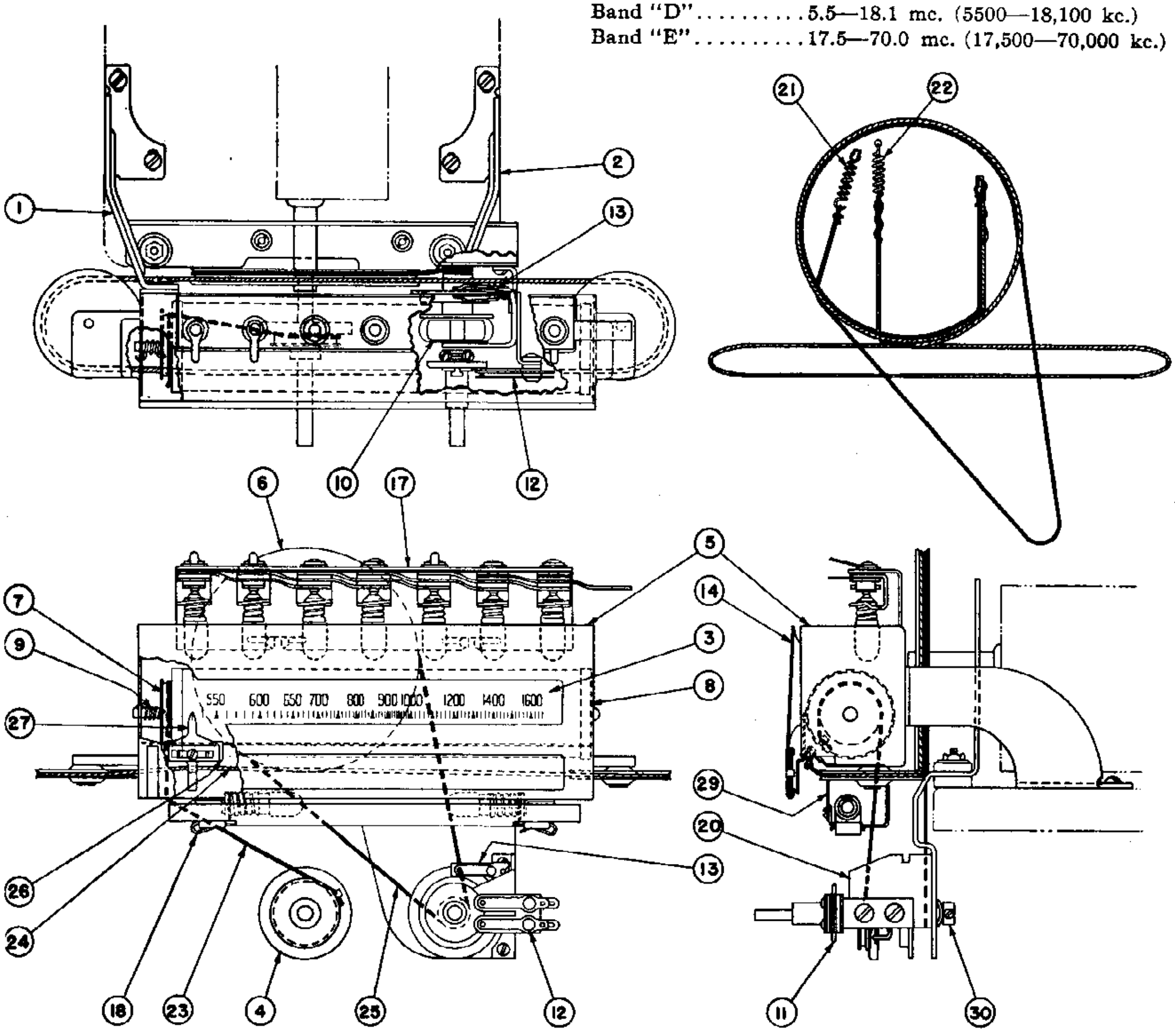


Fig. 7. Dial Mechanism

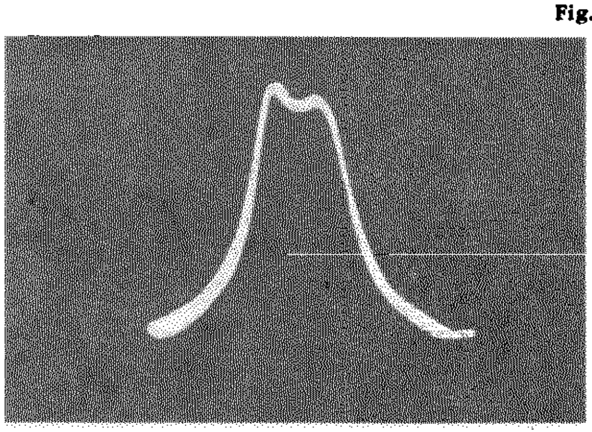


Fig. 5. Overall I.F. Curve

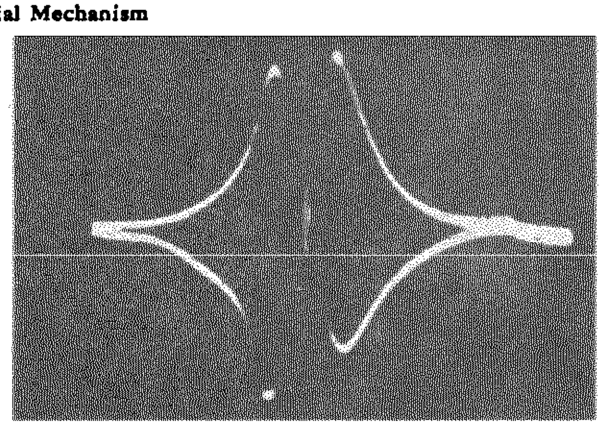


Fig. 6. AFC Adjustment Curve

(Curves taken with RCA Oscillograph Type TMV-122-B)

GENERAL ELECTRIC CO.

MODEL E-155
Socket, Trimmer
Voltage

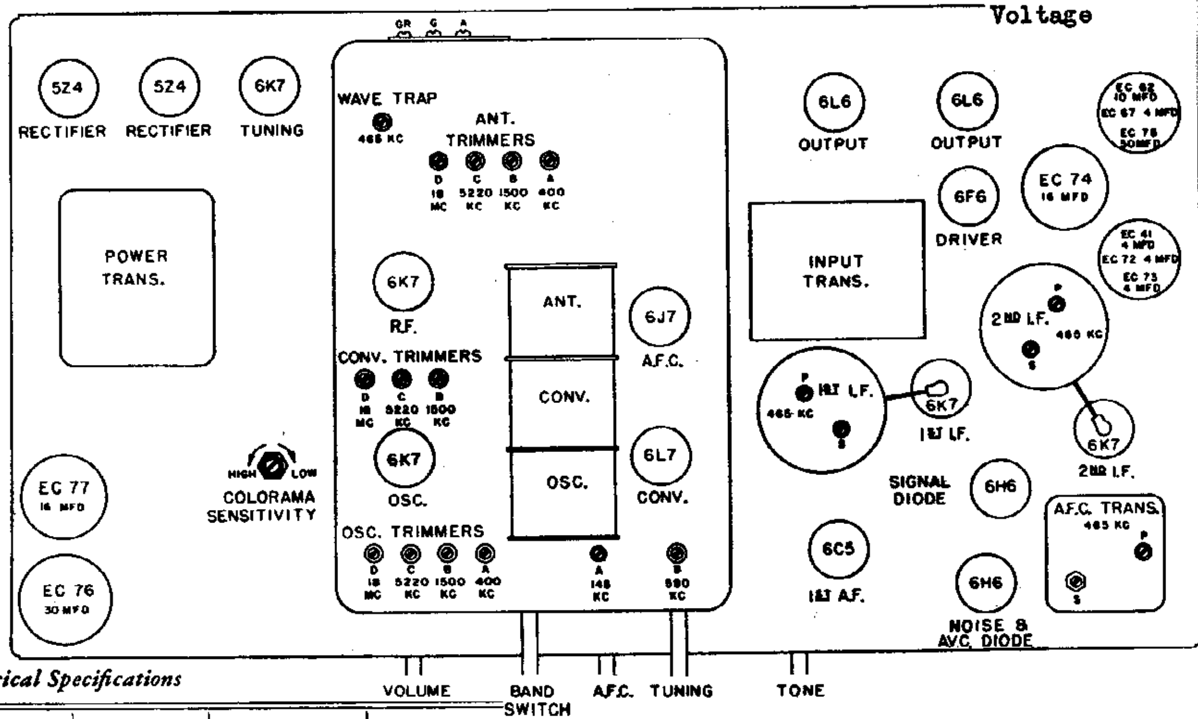
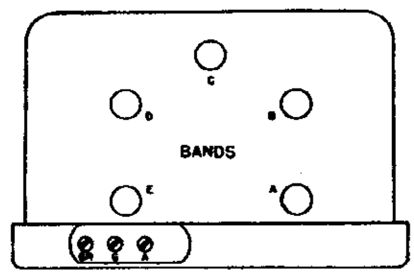


Fig. 4. Chassis Layout and Trimmer Location

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	115	50–60	195
C	115	25–60	195
V	105–130 and 200–250	40–60	200

Note: Taps on universal transformers (Rating "V") are accessible by removing the cap cover on the top of the transformer.



SOCKET VOLTAGES

Tube No.	Cathode to Ground Volts, D.C.	Screen Grid to Ground Volts, D.C.	Plate to Ground Volts, D.C.	Cathode Current M.A.	Heater Volts A.C.
6K7 R. F. Amp.	†	125	250	10.7	6.3
6L7 Converter	†	120	255	10.6	6.3
6K7 Oscillator	...	120	235	8.1	6.3
6K7 1st I. F.	†	125	225	10.6	6.3
6K7 2nd I. F.	3.5	130	225	10.2	6.3
6H6 Det. & AVC	...	...	...	...	6.3
6C5 1st Audio	3.5	...	*115	2.6	6.3
6F6 2nd Audio	21.5	...	250	25.0	6.3
6L6 Output	**	285	370	46.0	6.3
6L6 Output	**	285	370	46.0	6.3
6J7 AFC	4.5	125	220	2.3	6.3
6K7 Colorama Control	†	100	250	12.6	6.3
6H6 Limiter Control	...	...	...	...	6.3
5Z4 Rectifier	385 D.C.	...	370 RMS	105	5.0
5Z4 Rectifier	385 D.C.	...	370 RMS	105	5.0

Measured at 115 volts supply. No signal input. Volume control maximum. Voltmeter 1000 ohms per volt. Measurements taken on highest scale giving accurate readable deflection.
** Grid bias at source—23.5 volts.
* Supply voltage minus drop in load resistor.
† Grid bias at source—3.0 volts.

MODEL E-155
Alignment

GENERAL ELECTRIC CO.

ALIGNMENT PROCEDURE

The receiver should first be allowed to run for fifteen minutes in order to reach its approximate normal operating temperature. Before making any adjustments, it is wise to determine the correctness of the existing alignment. This may be done by supplying a signal to the receiver from the test oscillator at the alignment frequency and inserting a "Tuning Wand" into the coil involved. The tuning wand consists of a rod of insulating material having a ring of non-magnetic metal attached to one end, and a small core of finely divided iron compacted into the opposite end. By inserting the metal ring end into the center of the R. F. coil, the inductance of this coil is lowered, increasing its resonant frequency. Inserting the iron-filled end into the coil raises its inductance, lowering its resonant frequency. If the R. F. circuits are in exact alignment, inserting either end of the tuning wand into the coil will result in a decrease in output. When an increase of signal is obtained with the iron-filled end of the wand, a decrease in resonant frequency of that circuit by increasing its trimmer capacity is indicated. When an increase of signal is obtained with the metal ring, a decrease in trimmer capacity is indicated.

Changes Indicated by Wand

Wand	Signal	Trimmer Adjustment Required
Metal Ring	Decrease	None
Iron Filings	Decrease	

Changes Indicated by Wand (Cont.)

Wand	Signal	Trimmer Adjustment Required
Metal Ring	Increase	Decrease capacity
Iron Filings	Decrease	
Metal Ring	Decrease	Increase capacity
Iron Filings	Increase	

ALIGNMENT FREQUENCIES

I.F.	Band "A"	Band "B"	Band "C"	Band "D"	Wave Trap
465 kc.	145 kc.	580 kc.	5220 kc.	18,000 kc.	465 kc.
	400 kc.	1500 kc.			

In order to align these receivers properly it is necessary to have available:

1. A modulated test oscillator capable of producing the above alignment frequencies.
2. An output indicator, such as a high resistance a-c voltmeter with a maximum scale reading of 3 to 5 volts, or a neon lamp indicator.
3. An alignment tool consisting of a fiber shaft screw-driver.
4. A tuning wand.

To realize the full advantage of the performance built into these receivers at the factory, circuit alignment using cathode ray oscilloscope equipment is much to be preferred. The oscilloscopic method is particularly advantageous in aligning the I. F. tuned circuits.

The location of all alignment trimmer capacitors, as well as socket voltages, is shown in Fig. 4.

1. *Visual Alignment of I. F.*

For visual alignment it is necessary to vary the frequency of an unmodulated test oscillator signal over a range extending on both sides of the peak frequency. This variation must take place in synchronism with the horizontal traverse of the cathode ray beam on its screen. The frequency modulator must, therefore, provide means for synchronizing the periodic test frequency variation with the cathode ray horizontal deflection circuit. The test oscillator may advantageously have facilities for audio frequency amplitude modulation of a fixed radio frequency test signal, as well as for frequency modulation, but audio modulation is not required for visual I. F. alignment.

Instead of an output meter across the speaker voice coil, the vertical plates of the cathode ray tube are connected across the load resistor of the diode rectifier. With the frequency modulator in operation in conjunction with the test oscillator, the resonance curve of the circuit under test will be then shown on the screen.

Set the tuning dial indicator at the low end of the broadcast band at some point where no signal is received, since an extraneous signal might interfere with the aligning process. The volume control should be in an "off" or nearly off position. Apply a frequency modulated signal to the grid of the 1st I. F. amplifier tube through a .05 Mfd. (RC-072) capacitor, leaving the grid cap in place. Connect the vertical plates of the oscilloscope between ground and the junction point between R-23 and R-24, and with the AFC switch in the "off" position proceed to align the primary and secondary of the 2nd I. F. and the AFC I. F. transformers.

The object should be to make the two curves coincide with each other at the top and throughout their length with the maximum amplitude obtainable. This will require that all four I. F. trimmers be adjusted in the usual manner *excepting the AFC secondary (hexagonal nut) trimmer which must be adjusted for minimum amplitude* before the curves will coincide properly. Fig. 5 gives the appearance of the curve when the alignment adjustments have been completed satisfactorily thus far. Apply the same frequency modulated input to the grid of the converter (6L7) tube through a .05 Mfd. capacitor as before. Adjust the primary and secondary of the 1st I. F. transformer until the curves coincide as before and have the appearance of Fig. 5.

A further adjustment of the AFC secondary (hexagonal nut) trimmer is necessary in order to complete the I. F. alignment satisfactorily. Apply the *same* signal to the grid of the second I. F. amplifier tube. Unsolder the ground end of TC-53 and connect the vertical deflecting plates of the oscilloscope between ground and the 6H6 cathode prong K1 (Fig. 3). Since the cathode prong is inaccessible, this connection can be made at the AFC switch center contact.

Carefully adjust the AFC secondary trimmer until a curve is obtained which is similar to that shown in Fig. 6. Correct adjustment is made when the two sides of the curve are symmetrical and intersect exactly at the horizontal axis. No adjustment of the other I. F. trimmer should be made at this time.

If a metal aligning tool is used, the curve will change when the tool is withdrawn. Therefore, it is advisable to use a fiber hex-headed wrench for this aligning adjustment. At any rate, the final curve should be as shown with aligning tool removed.

2. *I. F. Wave Trap Alignment*

Leave the band switch at Band "B" and tune receiver to about 1000 kc.

With the test oscillator set at 465 kc. apply this signal to the antenna terminal through a dummy antenna consisting of a 400 ohm resistor and 250 mmfd. capacitor in series. With the 465 kc. signal applied to the antenna terminal, adjust the I. F. Wave Trap Trimmer for *minimum* output indication.

3. *R. F. Alignment*

First check the position of the dial pointer by rotating the tuning condenser to maximum capacity position, i.e., plates fully meshed. At this position, the pointer should coincide with the end mark at the left-hand end of the scale. If it does not, it may be set by loosening the pointer set screw and setting the pointer to its correct position. During R.F. alignment the AFC switch *must* be set in its "off" (counter-clockwise) position.

Band "A" (140—420 Kc.)

Set the test oscillator for operation at 400 kc. and connect its output to the antenna terminal of the receiver through the dummy antenna described under I. F. Wave Trap Alignment. Tune the receiver until the pointer is at 400 on the scale. Set the tone control for minimum high response and reduce the volume control setting so as to avoid excessive noise response. Adjust the Band "A" oscillator and antenna trimmers respectively (see Fig. 4) to give maximum deflection on the output meter. Maintain the test oscillator at the lowest level which will give an easily readable output indication.

Now set the test oscillator at 145 kc. and tune the receiver to resonance with this signal. Adjust the 145 kc. padding capacitor rocking the tuning condenser back and forth through resonance as the padding capacitor is adjusted and note the deflection of the tuning meter each time the receiver is tuned in this manner. Leave the padding capacitor at the setting which gives greatest deflection.

Retune the receiver to 400 kc. and set the test oscillator for this frequency. Check the alignment by again adjusting the Band "A" oscillator and antenna trimmers for maximum deflection on the tuning meter

Band "B" (540—1620 Kc.)

Set the test oscillator for operation at 1500 kc. and tune the receiver until the pointer is at 1500 on the scale. Adjust the Band "B" oscillator, R. F., and antenna trimmers respectively (see Fig. 4) to give maximum deflection on the output meter. Maintain the test oscillator output at the lowest level which will give an easily readable output indication.

Now set the test oscillator at 580 kc. and tune the receiver to resonance with this signal. Adjust the 580 kc. padding capacitor, rocking the tuning condenser back and forth through resonance as the padding capacitor is adjusted and note the deflection of the tuning meter each time the receiver is tuned in this manner. Leave the padding capacitor at the setting which gives greatest deflection.

Retune the receiver to 1500 kc. and set the test oscillator for this frequency. Check the alignment by again adjusting the Band "B" oscillator, R. F. and antenna trimmers for maximum deflection on the tuning meter.

Band "C" (1610-5580 Kc.)

With the test oscillator connected to the receiver as above, tune the receiver until the pointer is at 5220 on the "C" band scale. Set the test oscillator for operation on this frequency and, with the volume and tone controls set as above, adjust the band "C" oscillator, R. F., and antenna trimmers, respectively (see Fig. 4) to give maximum deflection on the output meter.

Band "D" (5.5—18.1 Mc.)

Turn the band switch to Band "D." Set the test oscillator at 18,000 kc. (18.0 Mc.) and tune the receiver until the pointer coincides with the 18.0 mark. Adjust the Band "D" oscillator trimmer, C-35, to give maximum output indication. It will probably be found that there will be two settings of the oscillator trimmer that will give an output response. The lower capacity setting of the trimmer is the one that should be used. To be sure that correct adjustment has been obtained, tune for the image signal at 17.07 Mc. with the test oscillator at 18.0 Mc. It may be necessary to increase the test oscillator output to obtain response at this point.

Retune the receiver to 18.0 Mc. and adjust Band "D" antenna and R. F. trimmers, respectively (see Fig. 4) for maximum output indication. When adjusting the R. F. trimmer rock the tuning condenser back and forth through resonance as in the 580 kc. padding capacitor adjustment.

Alignment of the receiver is now complete as no adjustments are provided on band "E."

4. *I. F. Alignment with Output Meter*

Although the use of the cathode-ray oscilloscope for alignment purposes is to be preferred, it is possible to make the I. F. trimmer adjustments with reasonable accuracy using a 465 kc. signal generator and output meter.

Place a modulated signal of 465 kc. on the grid of the last I. F. (6K7) tube with the volume control set at maximum and the AFC switch turned off. Place a low range A.C. voltmeter or other output indicator across the voice coil of the loud-speaker. Adjust the output of the signal generator so that an indication of not more than two or three volts is obtained on the output meter.

Adjust and readjust the primary trimmer for maximum output and *the secondary for minimum output*. This latter adjustment will be very broad. Apply the signal input to the grid of the 1st I. F. (6K7) tube and adjust both primary and secondary trimmers for maximum output, reducing the input as necessary to obtain approximately the same output indication as before. Apply the signal input to the grid of the converter (6L7) tube and adjust both primary and secondary trimmers for maximum output indication in the same manner as before.

It is now necessary to make a fine adjustment of the secondary trimmer of the last I. F. (AFC) transformer, which is as follows: without changing the frequency of the signal generator, place the input lead on the rubber insulation of the converter (6L7) grid lead. This will provide a small signal input through the capacity between the leads. Increase the attenuator setting if necessary to make the output audible. If the signal generator is provided with a means of removing the modulation, this should be done. However, the adjustment may be carried out satisfactorily even with a modulated generator signal.

Now tune in any broadcast signal in the usual manner and tune carefully for zero beat between this carrier and the 465 kc. signal generator. It may be necessary to use a short antenna or to remove it entirely if the station is a strong local. Throw the AFC on and adjust the last I. F. secondary (AFC) trimmer to give zero beat. This adjustment is very critical and must be made with great care. When the adjustment is properly made, there will be no appreciable change from zero beat as the AFC switch is thrown off and on. This completes the alignment of the I. F. and AFC circuits.

The alignment of the oscillator and R. F. circuits may be carried out in the usual manner. The AFC switch must remain in the off position.

GENERAL ELECTRIC CO.

ADJUSTMENT OF DIAL MECHANISM

The dial mechanism (**Fig.** 7) is rigidly mounted to the "Sentry Box" by means of two brackets and four screws. The dial pointer is operated by means of an "Automatic Vernier" reduction drive unit. Motion imparted to the gang condenser rotor is transmitted through a series of pulleys and an interconnecting cable to the dial pointer slider which is supported on a rail below the dial scale.

To Replace Cables

To replace cord or cable for the pointer or drive, the chassis should be removed from the cabinet and the dial mask (No. 14) removed from the dial scale box (No. 5). The black drive cord (No. 25) should run between the drum (No. 6) on the condenser and the drive pulley without crossing. Both the black cord (No. 25) and the bronze cable (No. 24) fasten on the same hook in the drum (No. 6) which is in front of the single lance on the outside diameter. The springs (21) and (22) are fastened on the ends of the cables after passing through the lances which are close together on the condenser drive drum. The light spring (No. 21) is on the bronze cable (No. 24) and the special spring loop hooks into the hole in the drum next to the hook for the spring on the black cord (No. 25). The solid end of the cord or cable should be fastened first to the drum, the line should be then strung around the pulleys and drum and lastly, the spring should be stretched into place.

To Adjust Pointer for Calibration

The pointer (No. 27) is adjustable by removing the escutcheon plate and also the dial mask (No. 14) which is held by four screws. The screw in the center of the pointer (No. 27) can then be loosened and the pointer adjusted as needed.

To Replace Scale

The scale (No. 3) can be removed by taking off the escutcheon and the dial mask (No. 14) as for the adjustment of the pointer. The pointer (No. 27) is moved to the left-hand end, the scale is then pushed to the left and the right-hand end is pulled out with the aid of a small screwdriver or a similar tool. When replacing the scale (No. 3) it is advisable to remove the cord (No. 23). The spring (No. 9) is put on the dial shaft and the shaft then inserted into the housing. The scale (No. 3) with the right-hand cap (No. 8) attached is then inserted into the left-hand cap (No. 7) which is held in position by pulling on the shaft on the outside of the housing. After the scale (No. 3) is inserted it should be rotated from one to two turns against the action of the torsion spring (No. 9). The cord (No. 23) is then replaced in the lance provided for it. It is advisable to have the band switch rotated so that the greatest length of cord possible is unwound from the lower pulley (No. 4) on the band switch shaft. It is best that the chassis be removed for the replacement of a scale.

It is important when replacing the chassis in the cabinet that the rubber grommets should be put in the chassis and not on the wood pins.

To Adjust Rotation of the Scale

With the chassis out of the cabinet the scale (No. 3) can be adjusted to track properly on the various bands by loosening the set screw and rotating pulley (No. 4) on the band switch shaft.

To Change the Dial Lamps

Make certain that the copper-plated hex head shipping screw which secures the dial lamp bracket during shipment has been removed before attempting to remove the dial lamp bracket (No. 17). Lift the lamp bracket from the tabs under which it is clipped. Care should be taken that the lamp leads do not put an undue strain upon the drive cable. With the lamp bracket laid back horizontally the lamps may be replaced. When the lamp bracket is reinserted care should be exercised to avoid having the lamp leads foul the gang mechanism.

Automatic Frequency Control

Automatic frequency control (AFC) is a device for automatically controlling the oscillator frequency in such a way that, although the receiver is not exactly tuned to the signal being received, the correct intermediate frequency will still be produced. This control of the oscillator frequency is secured by means of the 6J7 AFC tube, so connected to the oscillator that it draws a lagging current from the tank circuit and thus gives the effect of a shunt inductance. Variation of the D.C. grid bias on the 6J7 control tube will affect the mutual conductance of the tube, thereby changing the amount of lagging current drawn from the oscillator tank with a consequent effect of variation of the amount of shunt inductance connected across the oscillator coil. This alters the total inductance in the oscillator tuned circuit and changes its resonant frequency.

Grid bias for the 6J7 control tube, which will vary in accordance with the amount of detuning of the receiver, is obtained from the 6H6 diode rectifier operating in conjunction with its special I. F. transformer. This control voltage is the difference between the drop across resistor R-24, the load resistance for one diode section of the 6H6 diode rectifier, and the drop across resistors R-21, R-22 and R-23, which constitute the load resistance for the other diode section. When the receiver is correctly tuned to the incoming signal, the intermediate frequency produced will be 465 kc. which is the resonant frequency of the tuned circuit feeding the 6H6 diode rectifier. Under this condition each diode plate receives equal signal voltage and the D.C. voltage drops across the load resistors will be equal, giving no change in grid bias on the 6J7 control tube. If the receiver is so tuned that the intermediate frequency produced is above 465 kc., the signal voltage applied to diode plate No. 6 will exceed that applied to diode plate No. 7. In this case, the D.C. voltage drop across load resistance R-21, R-22 and R-23 will be larger than that across load resistor R-24 and a resultant voltage will be produced which will increase the 6J7 AFC tube grid bias, lowering the mutal conductance of the tube and causing it to draw less lagging current from the oscillator tank. This is the same effect as would be produced by increasing the amount of shunt inductance across the oscillator coil and the oscillator frequency is thereby lowered by the amount necessary to compensate for the detuning. The opposite takes place when the receiver is tuned so as to produce an intermediate frequency below 465 kc. Diode plate No. 7 then receives more signal voltage than diode plate No. 6 and the resultant voltage developed across the load resistance is such as to decrease the grid bias on the 6J7 AFC tube. This causes a larger current to be drawn from the oscillator tank circuit, which in effect is the same as a decrease in shunt inductance with its consequent increase in oscillator frequency to overcome the detuning.

Tubes

R. F. Amplifier......	6K7 Triple-grid Super-control Amplifier
Converter..........	6L7 Pentagrid Converter
Oscillator..........	6K7 Triple-grid Super-control Amplifier
First I. F..........	6K7 Triple-grid Super-control Amplifier
Second I. F.........	6K7 Triple-grid Super-control Amplifier
Detector and AVC...	6H6 Twin Diode
1st Audio..........	6C5 Low Gain Triode
2nd Audio..........	6F6 Power Pentode
Output.............	(2) 6L6 Beam Amplifier Tetrode
AFC Control........	6J7 Triple-grid Amplifier
Colorama Control....	6K7 Triple-grid Super-control Amplifier
Limiter Control......	6H6 Twin Diode
Rectifier............	(2) 5Z4 Full-wave Rectifier
Dial Lamps.........	6.3 V.—0.15 A. (4 red and 3 green)

MODEL E-155
Parts

GENERAL ELECTRIC CO.

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER CHASSIS ASSEMBLY	
RB-019	BOARD—Terminal Board, Three-lug	$0.10
RB-023	BOARD—Terminal Board, Four-lug	.10
RB-047	BOARD—Small Resistor Board on Chassis Wall	.10
RB-051	BOARD—Large Resistor Board on Chassis Wall	.10
RB-052	BOARD—Fuse Board	.15
*RC-011	CAPACITOR—.002 mfd., 600 V Paper (TC-71)	.25
RC-026	CAPACITOR—.006 mfd., 1000 V Paper (TC-70)	.30
RC-036	CAPACITOR—.008 mfd., 200 V Paper (TC-56)	.25
*RC-046	CAPACITOR—.02 mfd., 200 V Paper (Mtd. on small Res. Bd.) (TC-60)	.25
*RC-072	CAPACITOR—.05 mfd., 200 V Paper (TC-44, TC-45, TC-57)	$0.25
*RC-091	CAPACITOR—.05 mfd., 400 V Paper (TC-39, TC-40, TC-46, TC-63)	.30
*RC-096	CAPACITOR—.1 mfd., 200 V Paper (TC-55)	.30
*RC-123	CAPACITOR—.1 mfd., 400 V Paper (TC-63)	.35
*RC-135	CAPACITOR—.25 mfd., 200 V Paper (TC-54)	.30
*RC-150	CAPACITOR—.25 mfd., 400 V Paper (TC-66)	.35
RC-198	CAPACITOR—.002 mfd., 1000 V Paper (TC-78, TC-79)	.30
RC-199	CAPACITOR—2 mfd., 100 V Paper (TC-52)	.75
RC-200	CAPACITOR—1 mfd., 100 V Paper (TC-53)	$0.60
*RC-210	CAPACITOR—50 mmfd., Mica (Mtd. on small Res. Bd.) (MC-59)	.25
RC-234	CAPACITOR—Plate Coupling Capacitor 3rd I.F. transformer, 100 mmfd., Mica (MC-47)	.25
RC-235	CAPACITOR—100 mmfd., Mica (Mtd. on Res. Bd.) (MC-50, MC-51)	.25
RC-250	CAPACITOR—200 mmfd., Mica (Mtd. on small Res. Bd.) (MC-58)	.25
*RC-258	CAPACITOR—250 mmfd., Mica (MC-61)	.25
*RC-289	CAPACITOR—400 mmfd., Mica (MC-82)	.25
*RC-296	CAPACITOR—500 mmfd., Mica (MC-68, MC-69)	.25
*RC-406	CAPACITOR—16 mfd., 480 V Wet Electrolytic (EC-77)	1.25
*RC-409	CAPACITOR—16 mfd., 390 V Wet Electrolytic (EC-74)	1.25
*RC-411	CAPACITOR—30 mfd., 400 V Wet Electrolytic (EC-76)	1.55
*RC-504	CAPACITOR—10 mfd., 25 V Dry Electrolytic (EC-65)	.70
RC-553	CAPACITOR—4 mfd., 350 V; 10 mfd., 25 V; 60 mfd., 25 V Dry Electrolytic (EC-67, EC-75, EC-62)	1.75
RC-554	CAPACITOR—4 mfd., 350 V; 4 mfd., 350 V 4 mfd., 250 V Dry Electrolytic (EC-41, EC-72, EC-73)	1.90
RC-755	CAPACITOR—Line Capacitor, .01—.01 mfd., 250 V A.C. Paper (TC-80, TC-81)	.40
RC-821	CABLE—Speaker Cable	.60
RC-860	CORD—Power Cord	.65
RC-946	CUSHION—Front Chassis Mounting Cushion	.10
RC-947	CUSHION—Side Chassis Mounting Cushion and Support Bracket	.20
RE-013	ESCUTCHEON—Escutcheon Plate (with mtg. scws.)	1.75
RF-301	FUSE—3 amp. Fuse (Pkg. of 10)	1.00
RG-001	GRID CAP—Control Grid Clip (Pkg. of 5)	.10
RG-104	GUARD—Fuse Board Guard	.15
RG-105	GASKET—Escutcheon Rubber Gasket	.25
RG-106	GASKET—Escutcheon Felt Gasket	.10
*RK-004	KNOB—Control Knob (Push-on) (Pkg. of 5)	.40
RK-006	KNOB—Large Control Knob (Push-on)	.10
RK-007	KNOB—Large Control Knob (Set Scw.)	.10
RL-312	REACTOR—"Colorama Tuning" Saturable Reactor, 60 cycles (L-22)	3.00
RL-313	REACTOR—"Colorama Tuning" Saturable Reactor, 25/60 cycles (L-22)	3.00
RL-314	REACTOR—Filter Reactor (L-24)	1.45
RQ-047	RESISTOR—330 ohm, ¼ watt Carbon (R-17) (Pkg. of 5)	.60

Stock No.	Description	List Price
*RQ-0[illegible] (RR-014)	RESISTOR—1000 ohm, ¼ watt Carbon (R-40) (Pkg. of 5)	.70
RQ-063	RESISTOR—1500 ohm, ¼ watt Carbon (R-29) (Pkg. of 5)	.60
RQ-067	RESISTOR—2200 ohm, Plate Resistor for 1st and 2nd I.F. (R-18, R-19) (Pkg. of 5)	.60
RQ-081	RESISTOR—8200 ohm, ¼ watt Carbon (R-54) (Pkg. of 5)	.60
*RQ-083 (RR-021)	RESISTOR—10,000 ohm, ¼ watt Carbon (Mtd. on small Res. Bd.) (R-33) (Pkg. of 5)	.60
RQ-085	RESISTOR—12,000 ohm, ¼ watt Carbon (R-41) (Pkg. of 5)	.60
RQ-091	RESISTOR—22,000 ohm, ¼ watt Carbon (R-38) (Pkg. of 5)	.60
RQ-095	RESISTOR—27,000 ohm, ¼ watt Carbon (R-30) (Pkg. of 5)	.60
RQ-097	RESISTOR—39,000 ohm, ¼ watt Carbon (R-37) (Pkg. of 5)	.60
RQ-099	RESISTOR—47,000 ohm, ¼ watt Carbon (R-20, R-44, R-47) (Pkg. of 5)	.60
RQ-103	RESISTOR—68,000 ohm, ¼ watt Carbon (R-18) (Pkg. of 5)	$0.60
*RQ-107 (RR-049)	RESISTOR—100,000 ohm, ¼ watt Carbon (R-39) (Pkg. of 5)	.70
*RQ-107 (RR-049)	RESISTOR—100,000 ohm, ¼ watt Carbon (Mtd. on small Res. Bd.) (R-31) (Pkg. of 5)	.70
*RQ-107 (RR-049)	RESISTOR—100,000 ohm, ¼ watt Carbon (Mtd. on large Res. Bd.) (R-21) (Pkg. of 5)	.70
RQ-109	RESISTOR—120,000 ohm, ¼ watt Carbon (Mtd. on Large Res. Bd.) (R-22) (Pkg. of 5)	.70
RQ-119	RESISTOR—330,000 ohm, ¼ watt Carbon (Mtd. on Large Res. Bd.) (R-23, R-27) (Pkg. of 5)	.70
RQ-123	RESISTOR—470,000 ohm, ¼ watt Carbon (Mtd. on Large Res. Bd.) (R-24) (Pkg. of 5)	.70
RQ-123	RESISTOR—470,000 ohm, ¼ watt Carbon (R-14) (R-15) (Pkg. of 5)	.70
*RQ-131 (RR-067)	RESISTOR—1 megohm, ¼ Watt Carbon (Mtd. on small Res. Bd.) (R-32) (Pkg. of 5)	.70
*RQ-131 (RR-067)	RESISTOR—1 megohm, ¼ watt Carbon (R-42) (Pkg. of 5)	.70
RQ-133	RESISTOR—1.2 megohm, ¼ watt Carbon (Mtd. on Large Res. Bd.) (R-26) (Pkg. of 5)	.70
RQ-139	RESISTOR—2.2 megohm, ¼ watt Carbon (Mtd. on Large Res. Bd.) (R-25) (Pkg. of 5)	.70
RQ-143	RESISTOR—3.3 megohm, ¼ watt Carbon (R-35) (Pkg. of 5)	.70
RQ-271	RESISTOR—3300 ohm, ½ Watt Carbon (R-16) (Pkg. of 5)	.70
RR-318	RESISTOR—5 ohm, ½ watt Flexible (FR-28) (Pkg. of 5)	.80
RR-319	RESISTOR—50 ohm, ½ watt Flexible (FR-50) (Pkg. of 5)	.80
RR-322	RESISTOR—180 ohm, ½ watt Flexible (FR-49) (Pkg. of 5)	.80
RR-330	RESISTOR—15 ohm, 2 watt Flexible (FR-46) (Pkg. of 5)	.85
RR-331	RESISTOR—15 ohm, 1 watt Flexible (FR-45) (Pkg. of 5)	.75
RR-333	RESISTOR—1000 ohm, 2 watt Flexible (FR-43) (Pkg. of 5)	.85
*RR-705	RESISTOR—50 ohm, Vitreous (WR-52, WR-53)	.40
*RR-711	RESISTOR—15,000 ohm, Vitreous (WR-48)	.50
RR-721	RESISTOR—Candohm Tapped Bleeder Resistor (WR-51)	1.40
*RS-200	SOCKET—8 Pin Tube Socket (Pkg. of 5)	.75
*RS-204	SOCKET—5 Pin Tube Socket (Pkg. of 5)	.75
RS-325	SWITCH—"Colorama" Sensitivity Switch (S-11)	.50
RS-327	SWITCH—Automatic Frequency Control Switch (S-9)	.50
RS-423	SPRING—Knob Spring (Push-on Type) (Pkg. of 10)	.25
RT-151	TRANSFORMER—Power Transformer 115 V, 50/60 cycles	9.50
RT-152	TRANSFORMER—Power Transformer 115 V, 25/60 cycles	15.25

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which may be purchased from authorized dealers

Stock No.	Description	List Price
RT-153	TRANSFORMER—Universal Power Transformer 105/130, 200/250 V, 40/60 cycles	14.50
RT-226	TRANSFORMER—2nd I.F. Transformer (Complete) (L-17)	2.10
RT-227	TRANSFORMER—3rd I.F. Transformer (Complete) (L-18)	4.15
RT-228	TRANSFORMER—1st I.F. Transformer (Complete) (L-16)	2.30
RT-505	TRANSFORMER—Interstage Transformer (T-1)	5.60
RT-712	TONE CONTROL—Tone Control and Speech Clarifier Switch (R-36) (S-10)	$1.10
RV-017	VOLUME CONTROL—Volume Control and Power Switch (R-34) (S-12)	1.15
RW-011	WINDOW—Escutcheon Window	.55
RW-101	WASHER—Felt Washer for Control Shafts (Pkg. of 10)	.45
RX-017	CUSHION ASSEMBLY—"Sentry Box" Mtg. Cushion, Screw and Washer	.15
	SENTRY BOX ASSEMBLY	
RB-019	BOARD—Terminal Board, Three-lug	$0.10
RB-049	BOARD—Antenna Ground Terminal Board	.10
RB-050	BOARD—Terminal Board Two-lug (Top of Gang)	.10
RB-141	BRACKET Tuning Condenser Front Mounting Bracket	.50
RB-142	BRACKET Tuning Condenser Rear Mounting Bracket	.15
RB-143	BRACKET—Wave Band Switch Bracket	.10
*RC-046	CAPACITOR—.02 mfd., 200 V Paper (TC-15)	.25
RC-072	CAPACITOR—.05 mfd., 200 V Paper (TC-16, TC-6, TC-21, TC-25, TC-17, TC-18, TC-1)	.25
RC-091	CAPACITOR—.05 mfd., 400 V Paper (TC-22, TC-11)	.30
RC-203	CAPACITOR—12 mmfd., Mica (MC-12)	.35
RC-205	CAPACITOR—20 mmfd., Mica (MC-20, MC-36)	.35
*RC-210	CAPACITOR—50 mmfd., Mica (MC-28, MC-31, MC-33)	.25
RC-333	CAPACITOR—1000 mmfd., Mica (MC-19)	.30
RC-342	CAPACITOR—1260 mmfd., Mica (MC-29)	.35
RC-360	CAPACITOR—2850 mmfd., Mica (MC-34)	.50
RC-526	CAPACITOR—Triple Trimmers, R.F. (C-9, C-10, C-13)	.60
RC-627	CAPACITOR—Oscillator Padder Capacitor Band B (C-27)	.40
RC-628	CAPACITOR—Wave Trap Trimmer (C-7)	.25
RC-629	CAPACITOR—Quadruple Trimmers, Ant. and Oscillator (C-2, C-3, C-4, C-5; C-24, C-25, C-30, C-35)	.75
RC-630	CAPACITOR—Oscillator Padder Capacitor Band A (C-23)	.40
RC-712	CONDENSER—Gang Tuning Condenser (C-8, C-14, C-32)	4.75
RC-996	CUSHION—Condenser Mounting Cushion Assembly	.15
*RG-001	GRID CAP—Control Grid Clip (Pkg. of 5)	.10
RL-019	COIL—Antenna Coil, Band B (L-2)	.75
RL-020	COIL—Antenna Coil, Band C (L-3)	.70
RL-021	COIL—Antenna Coil, Band D (L-4)	.70
RL-022	COIL—Antenna Coil, Band A (L-1)	.95
RL-125	COIL—R.F. Coil, Band B (L-5)	.85
RL-126	COIL—R.F. Coil, Band C (L-6)	.75
RL-127	COIL—R.F. Coil, Band D (L-7)	.75
RL-128	COIL—R.F. Coil, Band E (L-8)	.75
RL-229	COIL—Oscillator Coil, Band B (L-10)	.70
RL-230	COIL—Oscillator Coil, Band C (L-11)	.70
RL-231	COIL—Oscillator Coil, Band D (L-12)	.75
RL-232	COIL—Oscillator Coil, Band E (L-13)	.70
RL-233	COIL—Oscillator Coil, Band A (L-9)	.80
RP-054	PULLEY—Wave Band Switch Dial Cord Pulley	.15
RQ-051	RESISTOR—470 ohm, ¼ watt Carbon (R-8) (Pkg. of 5)	.60
*RQ-059 (RR-014)	RESISTOR—1000 ohm ¼ watt Carbon (R-5, R-10) (Pkg. of 5)	.70
RQ-067	RESISTOR—2200 ohm, ¼ watt Carbon (R-6, R-2) (Pkg. of 5)	.60
RQ-076	RESISTOR—5100 ohm, ¼ watt Carbon (R-9) (Pkg. of 5)	.60
RQ-099	RESISTOR—47,000 ohm, ¼ watt Carbon (R-12) (Pkg. of 5)	.60
RQ-103	RESISTOR—68,000 ohm, ¼ watt Carbon (R-11, R-4) (Pkg. of 5)	.60
*RQ-107 (RR-049)	RESISTOR—100,000 ohm, ¼ watt Carbon (R-3) (Pkg. of 5)	.70

Stock No.	Description	List Price
RQ-123	RESISTOR—470,000 ohm, ¼ watt Carbon (R-1, R-7) (Pkg. of 5)	$0.70
RS-165	SHIELD—Antenna Compartment Shield Can	1.25
RS-166	SHIELD—Oscillator Compartment Shield Can	1.25
*RS-200	SOCKET—8 Pin Tube Socket (Pkg. of 5)	.75
RS-330	SWITCH—Band Change Switch (S-1, S-2, S-3, S-4, S-5, S-6, S-7)	4.00
RW-402	WAVE TRAP—Wave Trap Coil (L-14)	.65
	DIAL MECHANISM ASSEMBLY	
RB-144	BRACKET—Dial Scale Box L.H. Bracket (1)	$0.15
RB-145	BRACKET—Dial Scale Box R.H. Bracket (2)	.15
RB-146	BRACKET—"Colorama" Dial Lamp Bracket (less lamps) (17)	1.10
RB-148	BRACKET—Reduction Drive and "Silent Tuning" Switch Support Bracket (20)	.10
RB-149	BRACKET—"Personalizer" Dial Lamp Bracket (less lamps) (18)	.45
RB-513	BOX—Dial Scale Box and Pulley Assembly (5)	1.75
RC-820	CABLE—Dial Pointer Cable (24) (Pkg. of 5)	.40
RC-861	CORD—Condenser Drive Cord (25) (Pkg. of 5)	.60
RC-862	CORD—Band Change Cord (23) (Pkg. of 10)	.50
RC-948	CLAMP—Reduction Drive Friction Clamp (13)	.15
RC-949	COLLAR—Condenser Reduction Drive Assembly Shaft Collar and Spring Washer (30)	.20
RC-997	CAP—Scale Cap (Free End) (8)	.10
RC-998	CAP—Scale Cap (Pulley End) (7)	.10
RC-999	CONTACT—Silent Tuning Switch Contact Assembly (12)	.20
RD-039	DRIVE—Tuning Condenser Reduction Drive Assembly (10)	1.15
RD-040	DIAL—"Slide Rule" Dial Scale (3)	.75
RL-908	LAMP—"Colorama Tuning" Green Lamp (Pkg. of 10)	1.50
RL-909	LAMP—"Colorama Tuning" Red Lamp (Pkg. of 10)	1.50
RM-003	MASK—Dial Mask and Personalizer Strip Holder (14)	1.00
RP-054	PULLEY—Wave Band Switch Dial Cord Pulley (4)	.15
RP-055	POINTER—Dial Pointer (27) (Pkg. of 5)	.40
RP-056	PULLEY—Gang Drive Drum (6)	.35
RS-329	SWITCH—Silent Tuning Switch Mechanism (11)	.50
*RS-401	SPRING—Condenser Drive Cord Spring (21) (Pkg. of 2)	.20
RS-419	SPRING—Dial Pointer Cable Spring (22) (Pkg. of 2)	.20
RS-420	SPRING—Dial Scale Tension Spring (9) (Pkg. of 2)	.20
RS-421	SLIDER—Dial Pointer Slider (26)	.15
RS-422	STRIP—"Personalizer" Illumination Diffuser (29)	.10
RW-009	WINDOW—"Personalizer" Strip Window (Celluloid)	.15
	SPEAKER ASSEMBLY E-155	
RC-913	CONE—15-in. Type Cone and Voice Coil Assembly (Gasket Included) (L-20, L-21)	$4.50
RC-961	COVER—Field Magnet Cover	.80
RL-350	COIL—Field Coil	5.20
RL-351	COIL—Hum Buck Coil	.50
RM-200	MAGNET—Field Yoke and Core	3.00
RP-057	PLUG—Female Speaker Plug	.20
RP-058	PLUG—Male Speaker Plug	.20
RS-038	SPEAKER—15-in. Type Speaker (Complete with Output Transformer)	22.00
RT-418	TRANSFORMER—Output Transformer (T-2)	3.50

* Indicates part also used on 1936 "A" line of receivers.

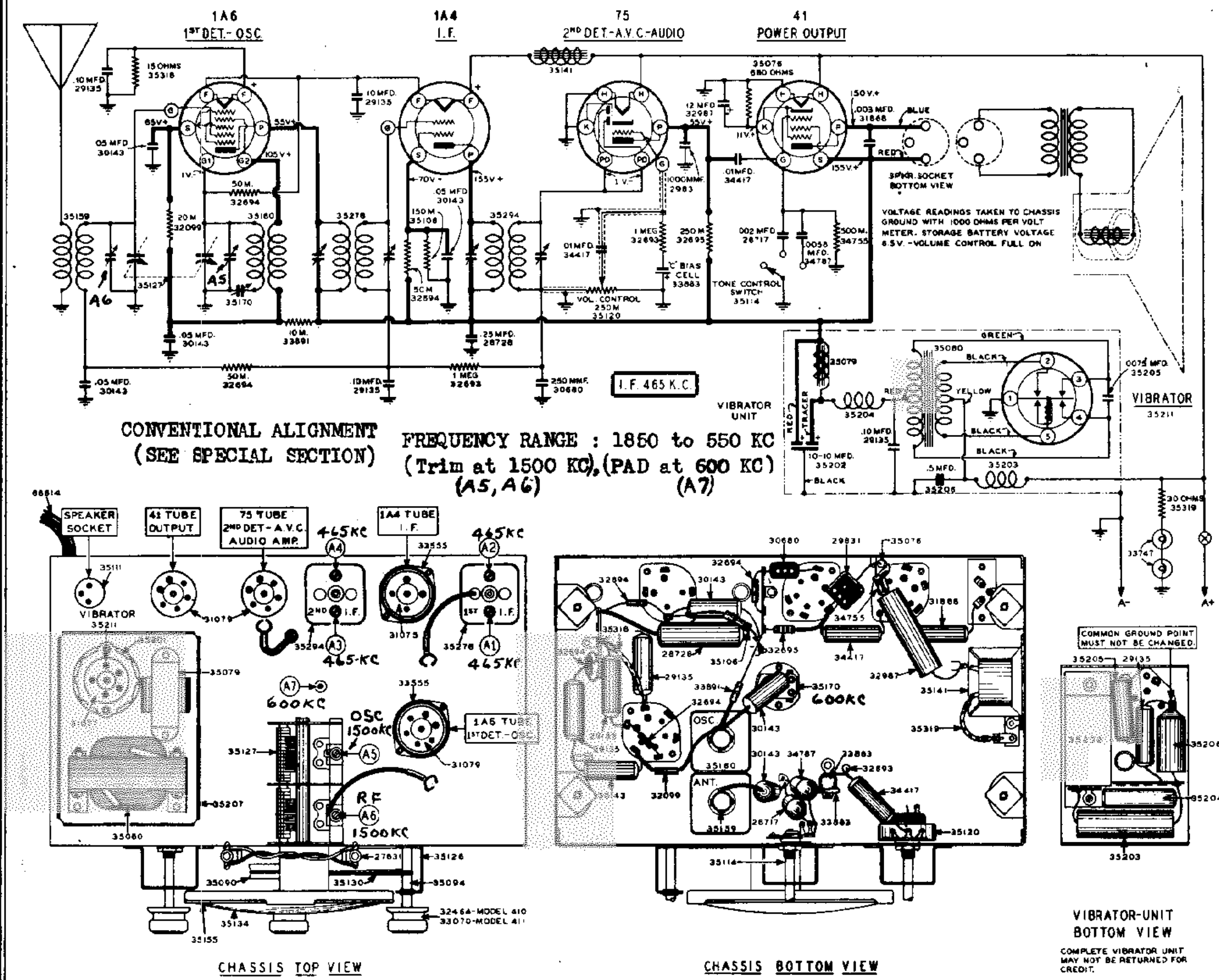
September, 1936 (5m)

(Prices subject to change without notice)

MODELS 410,411
Chassis 4NB
Schematic, Socket
Trimmers, Alignment
Chassis, Parts, Volt.

GENERAL HOUSEHOLD UTILITIES CO.

(PRICES SUBJECT TO CHANGE WITHOUT NOTICE)



PARTS PRICE LIST			
PART NO.	DESCRIPTION	REQ.	PRICE
27831	PILOT LAMP SOCKET	2	.15
28717	CONDENSER-.002 MFD.	1	.30
28728	CONDENSER-.25 MFD.	1	.35
29135	REPLACE WITH 34437		
29818	CONDENSER-.003 MFD	1	.25
29831	CONDENSER-1000 MMF.	1	.50
30143	REPLACE WITH 34436		
30177	DRIVE SPRING	1	.05
30680	CONDENSER-250 MMF	1	.20
31075	4 PRONG SOCKET	1	.15
31077	VIBRATOR SOCKET	1	.15
31079	6 PRONG SOCKET	3	.15
31868	REPLACE WITH 29818		
32099	RESISTOR-20M OHMS	1	.15
32464	KNOB-MODEL 410	3	.20
32693	RESISTOR-1 MEGOHM	2	.15
32694	RESISTOR-50M OHMS	3	.15
32695	RESISTOR-250M OHMS	1	.15
32987	CONDENSER-12 MFD.	1	.75
33070	KNOB-MODEL 411	3	.20
33554	TUBE SHIELD CAP	2	.05
33555	TUBE SHIELD BASE	2	.02
33747	PILOT LAMP	2	.15
33830	BATTERY CLIP	2	.20
33863	BIAS CELL MTG. STRIP	1	.15
33883	"C" BIAS CELL	1	.25
33891	RESISTOR-10M OHMS	1	.15
34417	CONDENSER-.01 MFD.	2	.35
34436	CONDENSER-.05 MFD.	4	.35
34437	CONDENSER-.10 MFD.	3	.35
34755	RESISTOR-500M OHMS	1	.15
34787	CONDENSER-.0056 MFD.	1	.25
35035	HALF TUBE SHIELD	4	.05
35076	RESISTOR-680 OHMS	1	.15
35079	FILTER CHOKE	1	1.25
35080	TRANSFORMER	1	1.75
35090	DRIVE DRUM & HUB	1	.60
35094	DRIVE SHAFT	1	.05
35106	RESISTOR-150M OHMS	1	.15
35111	SPEAKER SOCKET	1	.15
35114	TONE CONTROL SWITCH	1	.60
35120	VOLUME CONTROL	1	1.25
35127	VARIABLE CONDENSER	1	3.00
35126	DIAL MTG. BRACKET	1	1.00
35130	DRIVE STRING	1	.10
35132	DIAL POINTER	1	.10
35133	WINDOW GASKET	1	.10
35134	DIAL WINDOW	1	.15
35141	"A" CHOKE	1	1.50
35155	WINDOW SNAP RING	1	.10
35159	ANTENNA COIL	1	1.00
35180	OSCILLATOR COIL	1	1.00
35170	PADDER CONDENSER	1	.45
35202	10-10 MFD. FILTER COND.	1	1.25
35203	"A" CHOKE	1	.50
35204	R.F. CHOKE	1	.10
35205	CONDENSER-.0075 MFD.	1	.50
35208	CONDENSER-.5 MFD.	1	.50
35211	VIBRATOR	1	4.50
35212	VIBRATOR BOOT	1	.10
35247	DIAL CHART	1	.60
35278	1ST I.F. COIL & SHIELD	1	1.25
35294	2ND I.F. COIL & SHIELD	1	1.35
35318	RESISTOR-15 OHMS	1	.15
35319	RESISTOR-30 OHMS	1	.15
35328	DIAL ESCUTCHEON	1	.55
35808	RESISTOR-8250 OHMS	1	.15
35870	POINTER SCREW	1	.01
66814	BATTERY CABLE ONLY	4 ft	.50
8" SPEAKER PARTS			
35125	SPEAKER PLUG	1	.20
35315	COMPLETE SPEAKER	1	8.00
40041	OUTPUT TRANSFORMER	1	2.00
10" SPEAKER PARTS			
35125	SPEAKER PLUG	1	.20
36209	COMPLETE SPEAKER	1	10.50
40023	CONE & VOICE COIL	1	3.00
40038	OUTPUT TRANSFORMER	1	2.00

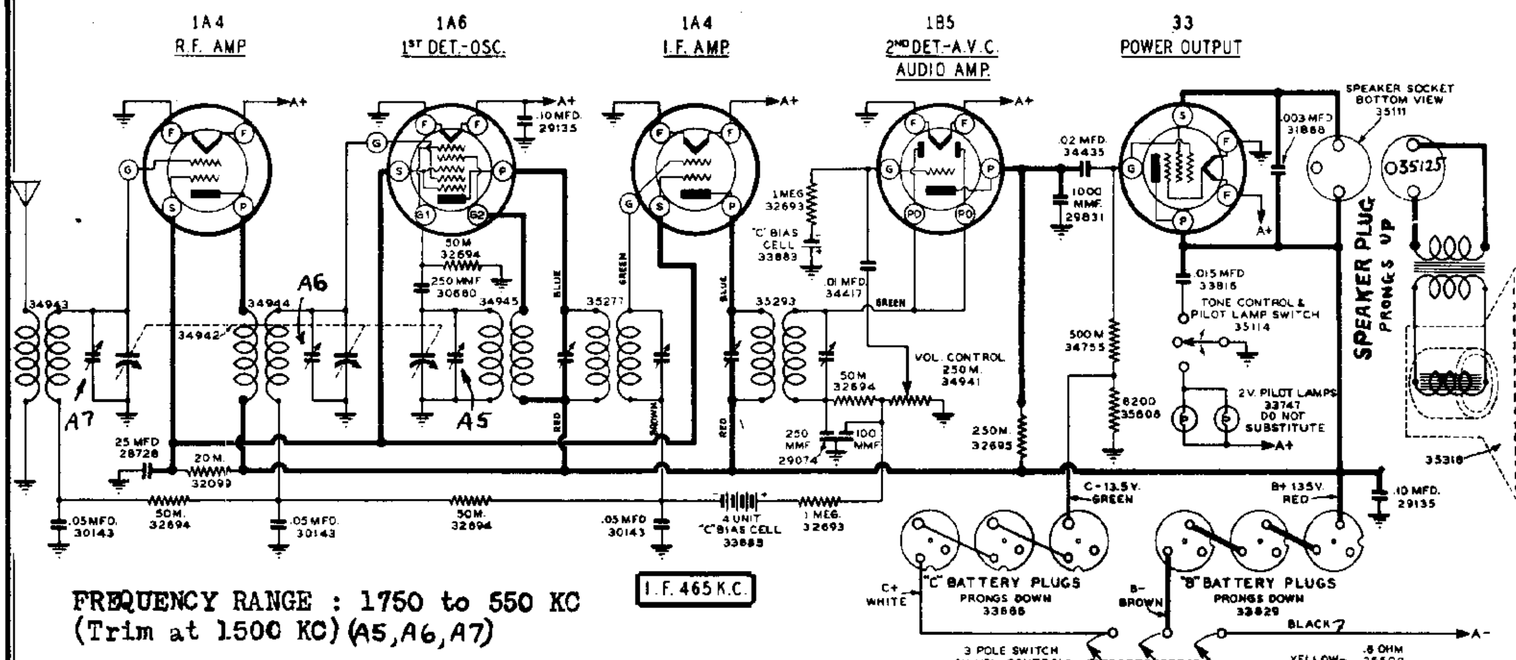
6V. BATTERY
Grunow Radio
CHASSIS TYPE 4NB

RECEIVER MODEL	SPEAKER
410	35315-(8)
411	36209-(10)

GENERAL HOUSEHOLD UTILITIES CO.
RADIO SERVICE DEPARTMENT
CHICAGO U.S.A.
DT 3-28-36. RAS 158

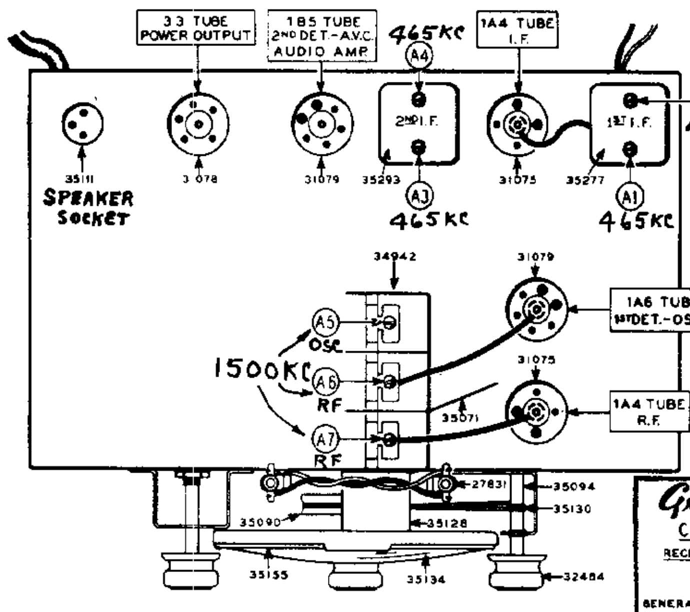
MODEL 510
Chassis 5NB
Schematic
Socket, Parts
Trimmers
Chassis, Volt
Alignment

GENERAL HOUSEHOLD UTILITIES CO.



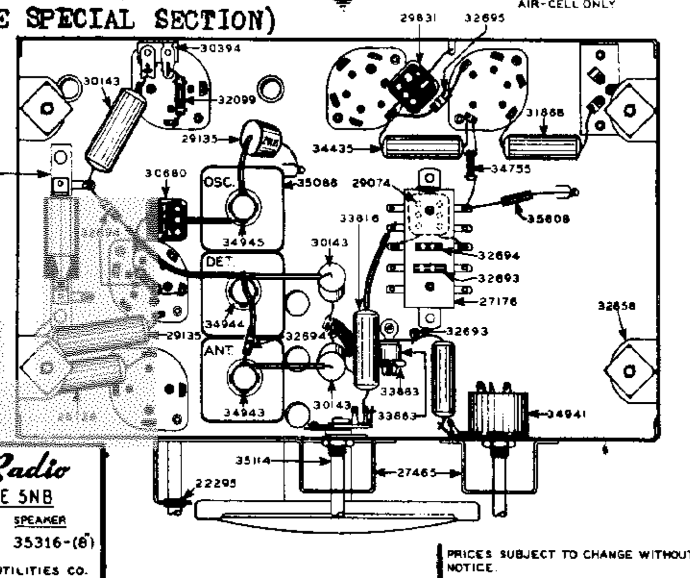
FREQUENCY RANGE : 1750 to 550 KC
(Trim at 1500 KC) (A5, A6, A7)

CONVENTIONAL ALIGNMENT
(SEE SPECIAL SECTION)



CHASSIS TOP VIEW

2V. BATTERY
Grunow Radio
CHASSIS TYPE 5NB
RECEIVER MODEL 510
SPEAKER 35316-(8")
GENERAL HOUSEHOLD UTILITIES CO.
RADIO SERVICE DEPARTMENT
CHICAGO U.S.A.
RAS166



CHASSIS BOTTOM VIEW

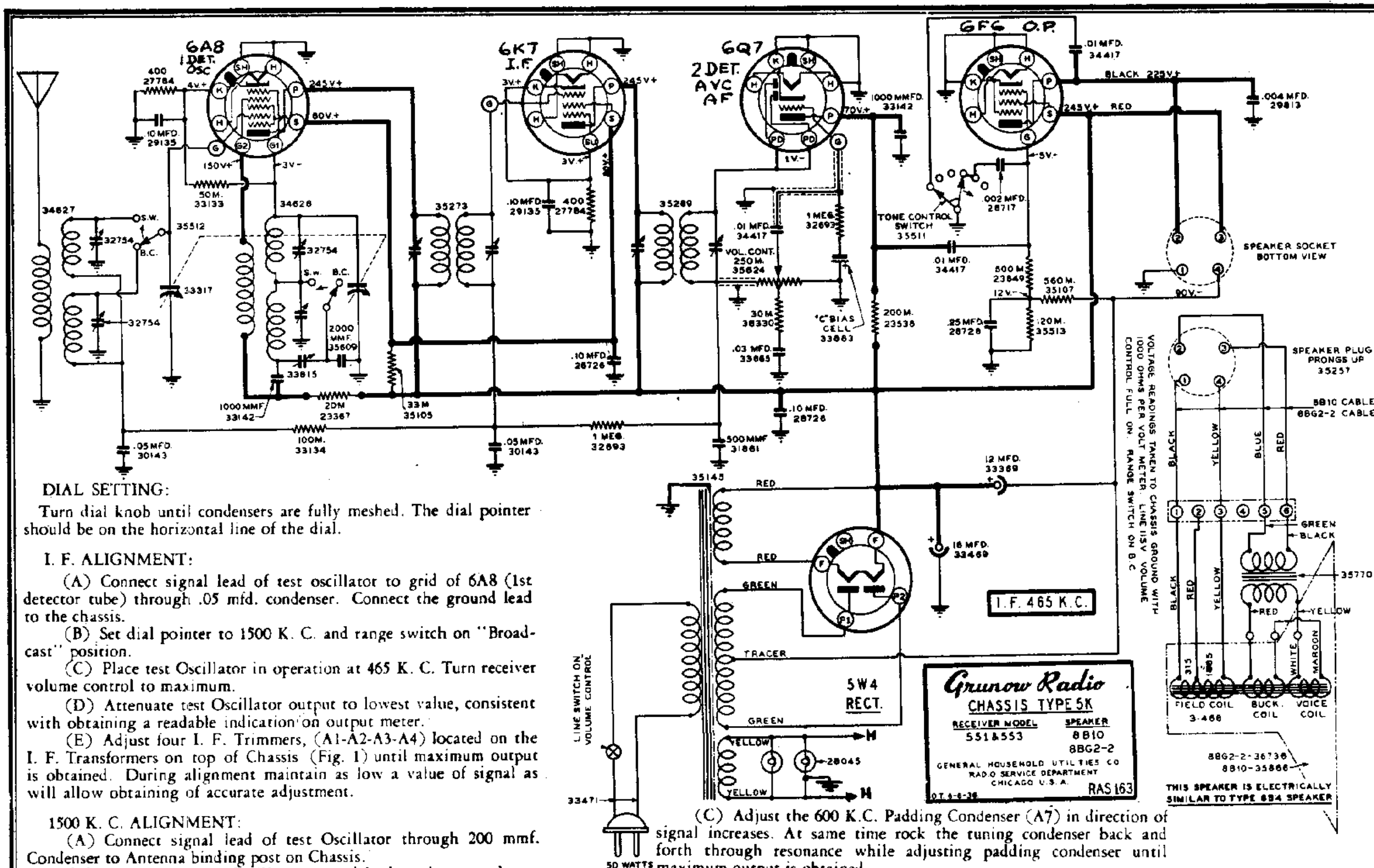
PARTS PRICE LIST

PART NO.	DESCRIPTION	REQ.	PRICE
22295	'C' WASHER	2	.01
27176	TERMINAL BOARD	1	.20
27342	PILOT LAMP SHIELD	2	.02
27465	BRACKET	2	.15
27831	PILOT LAMP SOCKET	2	.15
28838	POINTER SCREW	1	.02
28728	CONDENSER-.25 MFD.	1	.35
29074	100-250 MMF. CONDENSER	1	.30
29135	REPLACE WITH 34437		
29818	CONDENSER-.003 MFD	1	.25
29831	CONDENSER-1000 MMF	1	.30
30143	REPLACE WITH 34436		
30177	DRIVE SPRING	1	.05
30394	TERMINAL STRIP	1	.10
30680	CONDENSER-250 MMF.	1	.20
31075	4 PRONG SOCKET	2	.10
31078	5 PRONG SOCKET	1	.10
31079	6 PRONG SOCKET	2	.15
31868	REPLACE WITH 29818		
32099	RESISTOR-20M OHMS	1	.15
32464	KNOB	3	.20
32693	RESISTOR-1 MEG.	2	.15
32694	RESISTOR-50M OHMS	4	.15
32695	RESISTOR-250M OHMS	1	.15
32858	MOUNTING FOOT	4	.25
33554	TUBE SHIELD CAP	3	.05
33555	TUBE SHIELD BASE	3	.02
33747	PILOT LAMP	2	.15
33818	CONDENSER-.015 MFD.	1	.30
33829	'B' BATTERY PLUG	3	.10
33883	BIAS CELL MTG. STRIP	1	.15
33884	BIAS CELL MTG. STRIP	1	.35
33888	'C' BATTERY PLUG	3	.10
34417	CONDENSER-.01 MFD.	1	.35
34435	CONDENSER-.02 MFD.	1	.35
34436	CONDENSER-.05 MFD.	3	.35
34437	CONDENSER-.10 MFD.	2	.35
34755	RESISTOR-500M OHMS	1	.15
34935	HALF TUBE SHIELD	6	.05
34941	VOLUME CONTROL	1	1.25
34942	VARIABLE CONDENSER	1	3.50
34943	ANTENNA COIL	1	.75
34944	DETECTOR COIL	1	.75
34945	OSCILLATOR COIL	1	.75
35071	GRID SHIELD	1	.10
35088	SHIELD (R.F. COILS)	3	.10
35090	DRIVE DRUM & HUB	1	.80
35094	DRIVE SHAFT	1	.05
35111	SPEAKER SOCKET	1	.15
35114	TONE CONTROL SWITCH	1	.60
35128	DIAL MTG. BRACKET	1	1.00
35130	DRIVE STRING	1	.10
35131	DIAL CHART	1	.75
35132	DIAL POINTER	1	.10
35133	WINDOW GASKET	1	.10
35134	DIAL WINDOW	1	.15
35138	BATTERY CABLE & PLUGS	1	1.25
35155	WINDOW RING	1	.10
35277	1ST I.F. COIL & SHIELD	1	1.75
35293	2ND I.F. COIL & SHIELD	1	1.75
35328	ESCUTCHEON	1	.55
35502	RESISTOR-0.6 OHM	1	.20
35608	RESISTOR-8200 OHMS	1	.15
38204	SPEAKER MTG. SCREW	4	.01
61134	HOLD-DOWN SCREW	2	.01
61207	CHASSIS MTG. SCREW	4	.01
62030	ESCUTCHEON SCREW	4	.01
63838	FELT WASHER	3	.01
63863	CHASSIS MTG. WASHER	4	.01
	SPEAKER PARTS		
35125	SPEAKER PLUG	1	.20
35316	COMPLETE SPEAKER	1	8.50
43028	CONE & VOICE COIL	1	3.00
43027	OUTPUT TRANSFORMER	1	2.00

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

MODELS 551,553
Chassis 5K
Schematic
Alignment
Parts
Voltage

GENERAL HOUSEHOLD UTILITIES CO.



DIAL SETTING:

Turn dial knob until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial.

I. F. ALIGNMENT:

(A) Connect signal lead of test oscillator to grid of 6A8 (1st detector tube) through .05 mfd. condenser. Connect the ground lead to the chassis.

(B) Set dial pointer to 1500 K. C. and range switch on "Broadcast" position.

(C) Place test Oscillator in operation at 465 K. C. Turn receiver volume control to maximum.

(D) Attenuate test Oscillator output to lowest value, consistent with obtaining a readable indication on output meter.

(E) Adjust four I. F. Trimmers, (A1-A2-A3-A4) located on the I. F. Transformers on top of Chassis (Fig. 1) until maximum output is obtained. During alignment maintain as low a value of signal as will allow obtaining of accurate adjustment.

1500 K. C. ALIGNMENT:

(A) Connect signal lead of test Oscillator through 200 mmf. Condenser to Antenna binding post on Chassis.

(B) Connect the test Oscillator ground lead to the ground post of Chassis.

(C) Place test oscillator in operation at 1500 K.C.

(D) Turn dial pointer to 1500 K.C.

(E) Adjust broadcast oscillator trimmer (A5) to maximum output.

(F) Adjust 1st Det. Trimmer (A6) to maximum output.

600 K.C. ALIGNMENT:

(A) Place test oscillator in operation at 600 K.C.

(B) Tune in signal to maximum (this point does not have to be exactly at 600 K.C. dial setting.)

(C) Adjust the 600 K.C. Padding Condenser (A7) in direction of signal increases. At same time rock the tuning condenser back and forth through resonance while adjusting padding condenser until maximum output is obtained.

6.0 M.C. ALIGNMENT

(A) Connect signal lead of test oscillator through 400 Ohm Resistor to Antenna binding post of Chassis.

(B) Connect the ground lead to ground terminal of Chassis.

(C) Set range Switch to "Short Wave" position and turn dial pointer to 6.0 M.C.

(D) Place test Oscillator in operation at 6.0 M.C.

(E) Adjust set oscillator Trimmer (A8) to maximum output.

(F) Adjust Detector Trimmer (A9) to maximum output.

(G) When aligning A8 and A9 rock tuning condenser through resonance to maximum output.

MODELS 551,553
Chassis 5K
Socket,Trimmers
Chassis

GENERAL HOUSEHOLD UTILITIES CO.

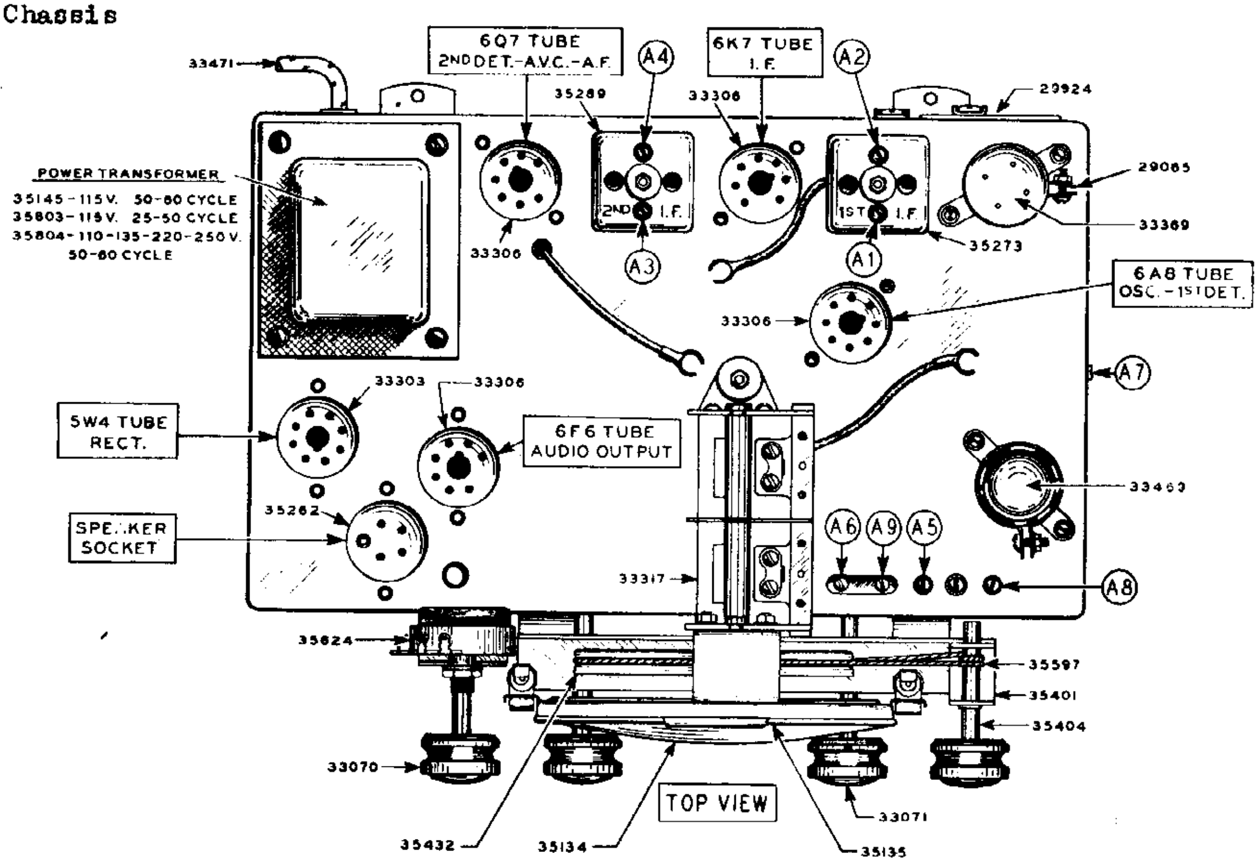


FIG.1

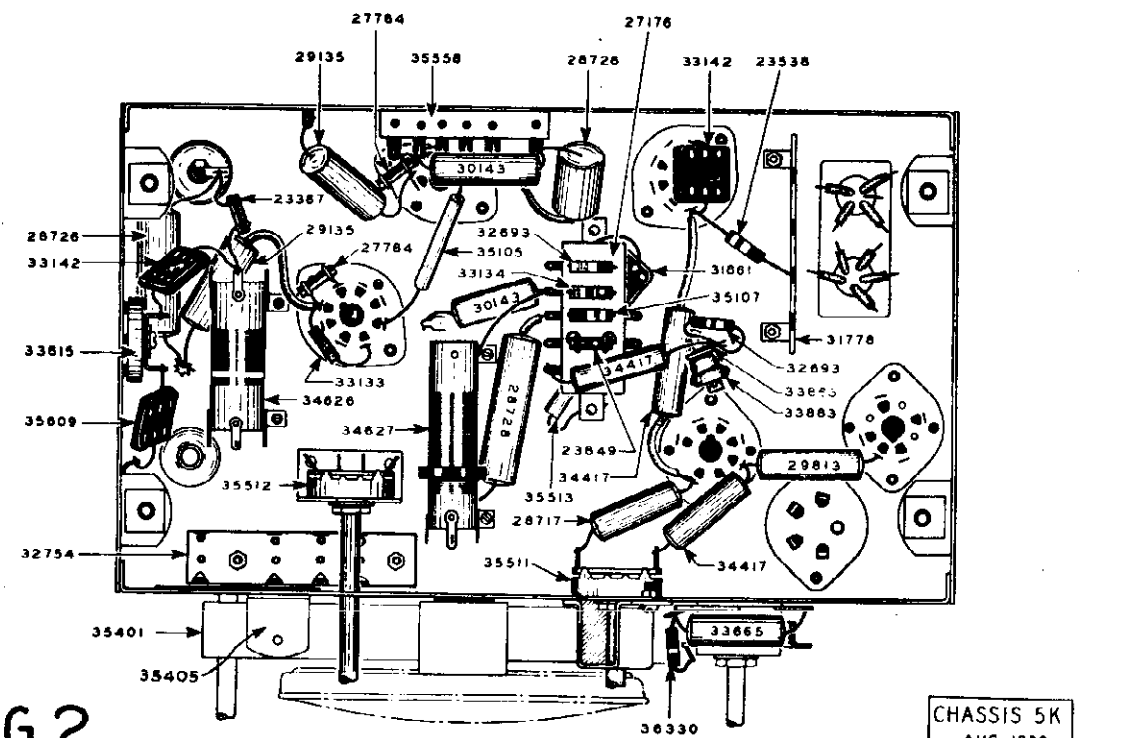
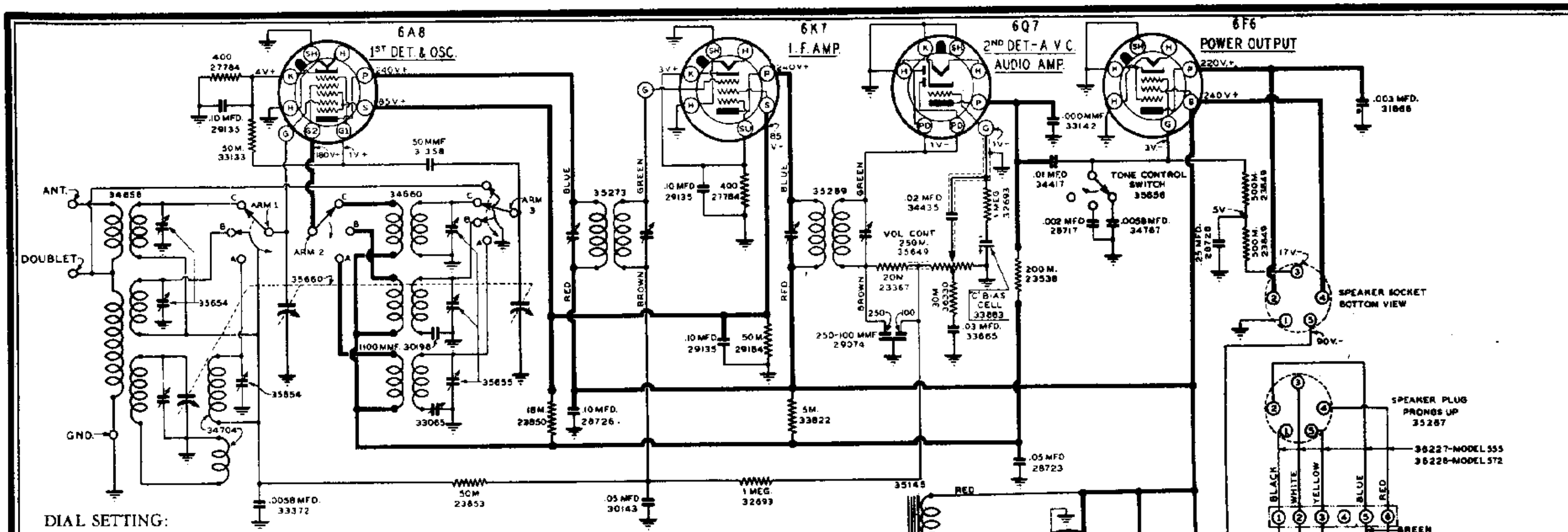


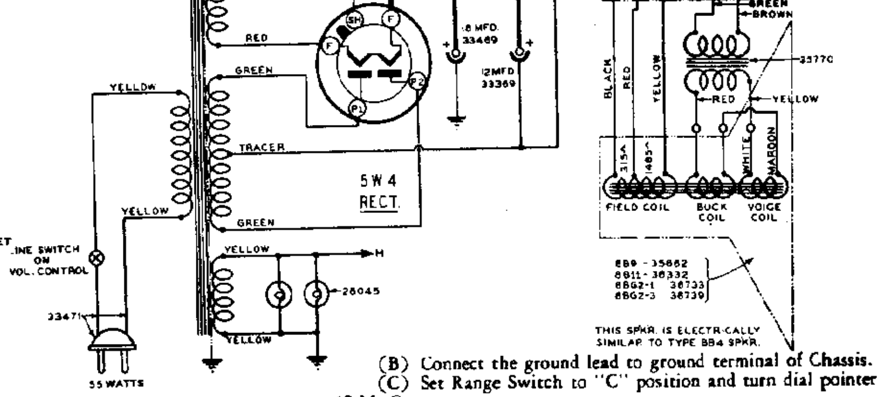
FIG.2

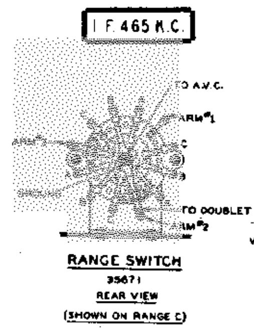
CHASSIS 5K
AUG. 1936.
RAS 182

MODELS 555,572
Chassis 5L
Schematic,Voltage
Alignment,Parts

GENERAL HOUSEHOLD UTILITIES CO.







NOTES

1- TUBE SOCKETS SHOWN BOTTOM VIEW.

2- VOLTAGE READINGS TAKEN TO CHASSIS GROUND WITH 1000 OHMS PER VOLT VOLTMETER. LINE-115V. VOLUME CONTROL FULL ON. RANGE SWITCH ON "A" BAND.

DIAL SETTING:

Turn dial knob until condensers are fully meshed. The dial pointer (Hour Hand) should be on the horizontal line of the dial, pointing to 9 and 3 o'clock. The minute hand should be at 12 o'clock or in a vertical position.

I. F. ALIGNMENT:

(A) Connect signal lead of test oscillator to grid of 6A8 (1st detector tube) through .05 mfd. condenser. Connect the ground lead to the chassis.

(B) Set dial pointer to 1500 K. C. and range switch on "A" position.

(C) Place test Oscillator in operation at 465 K. C. Turn receiver volume control to maximum.

(D) Attenuate test Oscillator output to lowest value, consistent with obtaining a readable indication on output meter.

(E) Adjust four I.F. Trimmers, (A1, A2, A3, A4) located on the I. F. Transformers on top of Chassis (Fig. 1) until maximum output is obtained. During alignment maintain as low a value of signal a will allow obtaining of accurate adjustment.

1500 K. C. ALIGNMENT:

(A) Connect signal lead of test Oscillator through 200 mmf. Condenser to Antenna binding post on Chassis.

(B) Connect the test Oscillator ground lead to the ground post of Chassis.

(C) Place test oscillator in operation at 1500 K. C.

(D) Turn dial pointer to 1500 K. C.

(E) Adjust broadcast oscillator trimmer (A5) to maximum output.

(F) Adjust 1st Detector Trimmer (A6) to maximum output.

(G) Adjust Antenna Trimmer (A7) to maximum output.

600 K. C. ALIGNMENT:

(A) Place test oscillator in operation at 600 K.C.

(B) Tune in signal to maximum (this point does not have to be exactly at 600 K. C. dial setting.)

(C) Adjust the 600 K. C. Padding Condenser (A8) in direction of signal increases. At same time rock the tuning condenser back and forth through resonance while adjusting padding condenser until maximum output is obtained.

5000 K. C. ALIGNMENT:

(A) Set Range Switch to "B" position.

(B) Place test Oscillators in operation at 5000 K. C.

(C) Turn Dial Pointer to 5000 K. C.

(D) Adjust Set Oscillator Trimmer (A9) to maximum output.

(E) Adjust Detector Trimmer (A10) to maximum output.

18 M. C. ALIGNMENT:

(A) Connect signal lead of test oscillator through 400 Ohm Resistor to Antenna binding post of Chassis.

(B) Connect the ground lead to ground terminal of Chassis.

(C) Set Range Switch to "C" position and turn dial pointer to 18 M. C.

(D) Place test Oscillator in operation at 18 M. C.

(E) Adjust set oscillator Trimmer (A11) to maximum output.

(F) Adjust Detector Trimmer (A12) to maximum output.

(G) On the 18 M. C. Oscillator Alignment it will be noted that there are two settings at which the signal will be received. Use the lower of the images for alignment point that is the setting giving most capacity or the point at which the trimmer screw is farthest in.

Grunow Radio
CHASSIS TYPE 5L

RECEIVER MODEL	SPEAKER
555	8B11 OR 8BG2-3
572	8B9 OR 8BG2-1

GENERAL HOUSEHOLD UTILITIES CO.
RADIO SERVICE DEPARTMENT
CHICAGO U.S.A. RAS 164

MODELS 555,572
Chassis 5L
Socket, Trimmers
Chassis

GENERAL HOUSEHOLD UTILITIES CO.

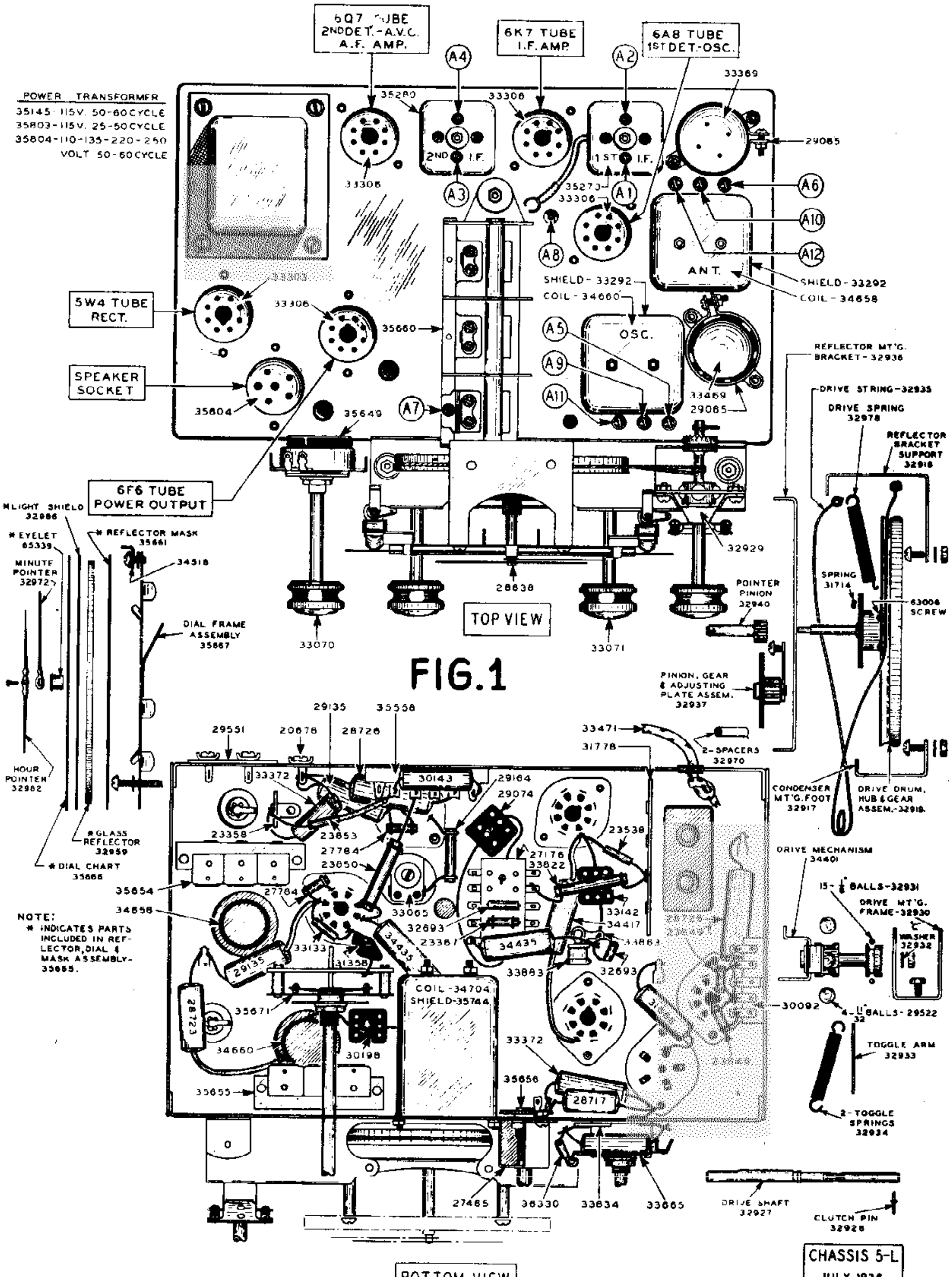


FIG.1

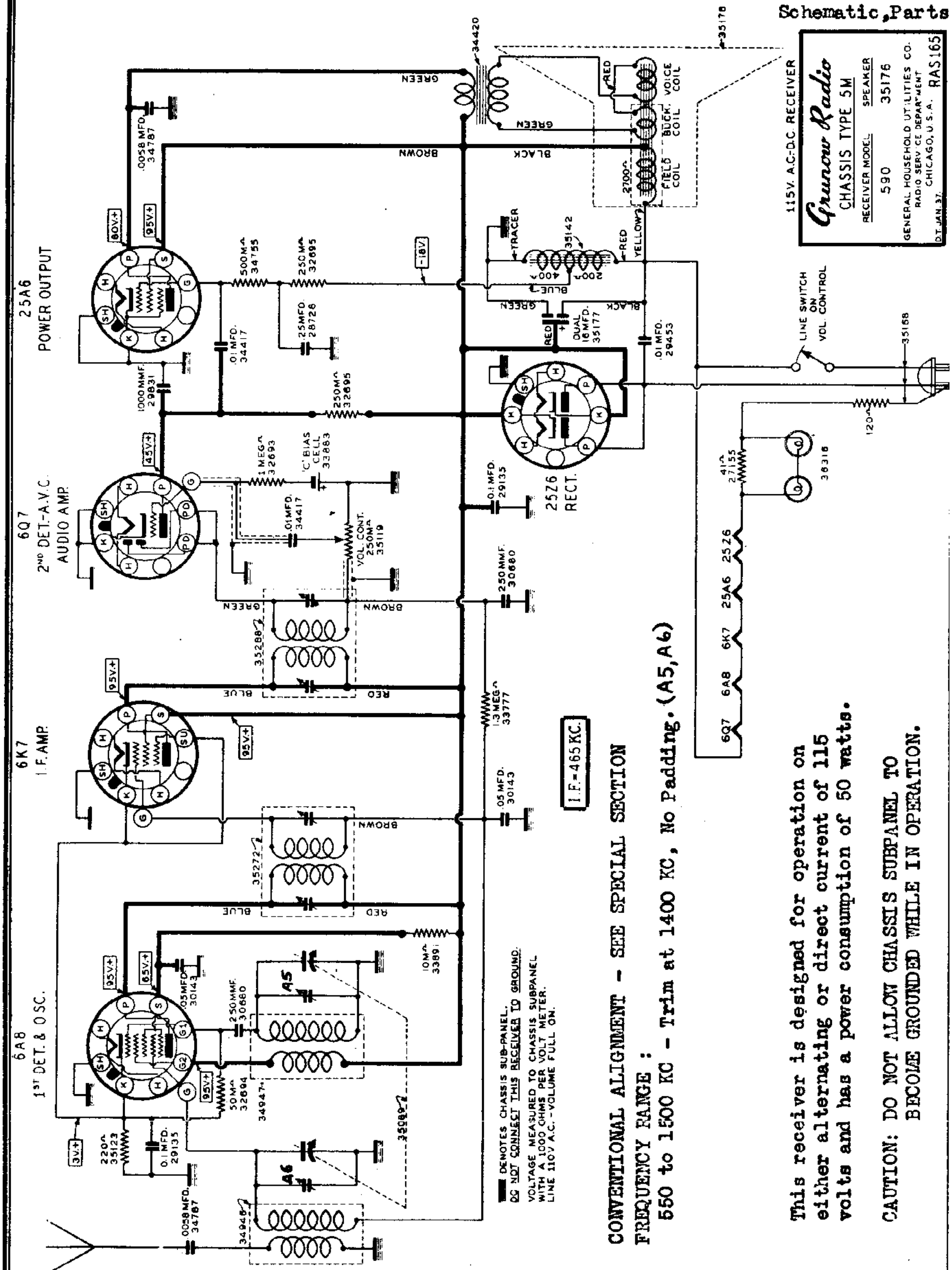
FIG.2

CHASSIS 5-L
JULY 1936
RAS 181

Alignment ,Voltage

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 590
Chassis 5M
Schematic,Parts



CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION

FREQUENCY RANGE :
550 to 1500 KC - Trim at 1400 KC, No Padding. (A5,A6)

This receiver is designed for operation on either alternating or direct current of 115 volts and has a power consumption of 50 watts.

CAUTION: DO NOT ALLOW CHASSIS SUBPANEL TO BECOME GROUNDED WHILE IN OPERATION.

MODEL 590
Chassis 5M
Socket, Trimmers
Chassis

GENERAL HOUSEHOLD UTILITIES CO.

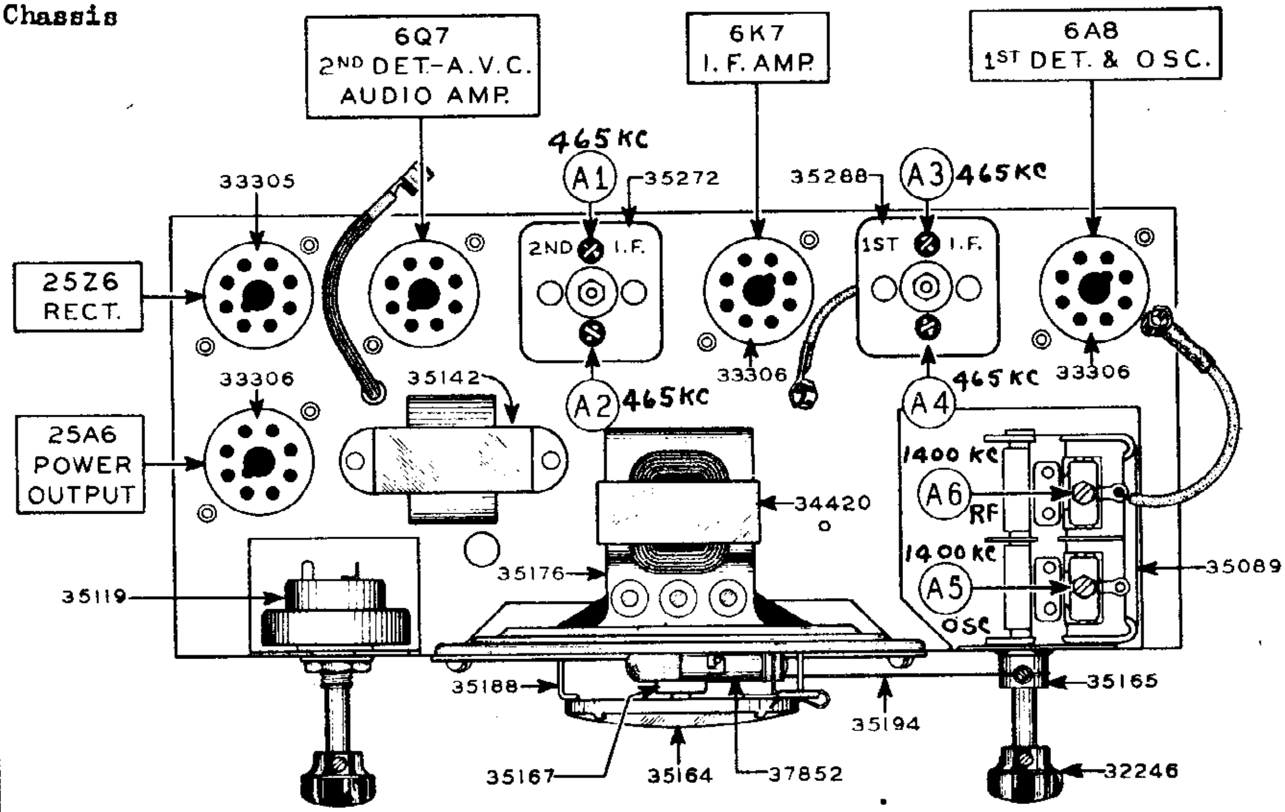


FIG. 1

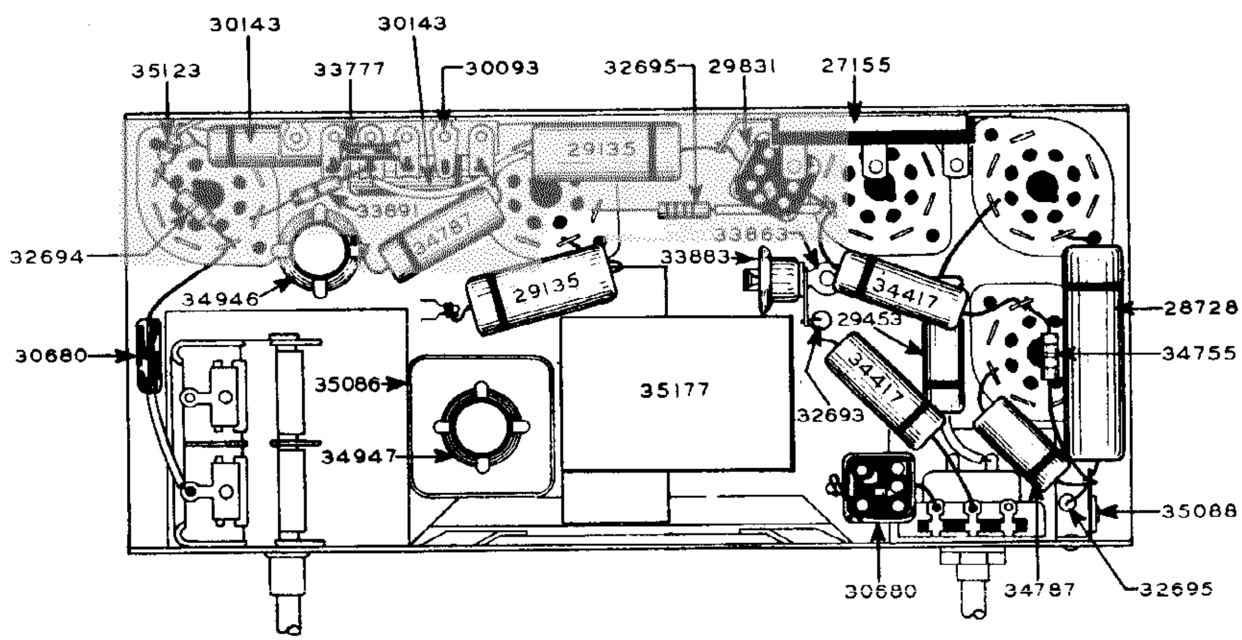


FIG. 2

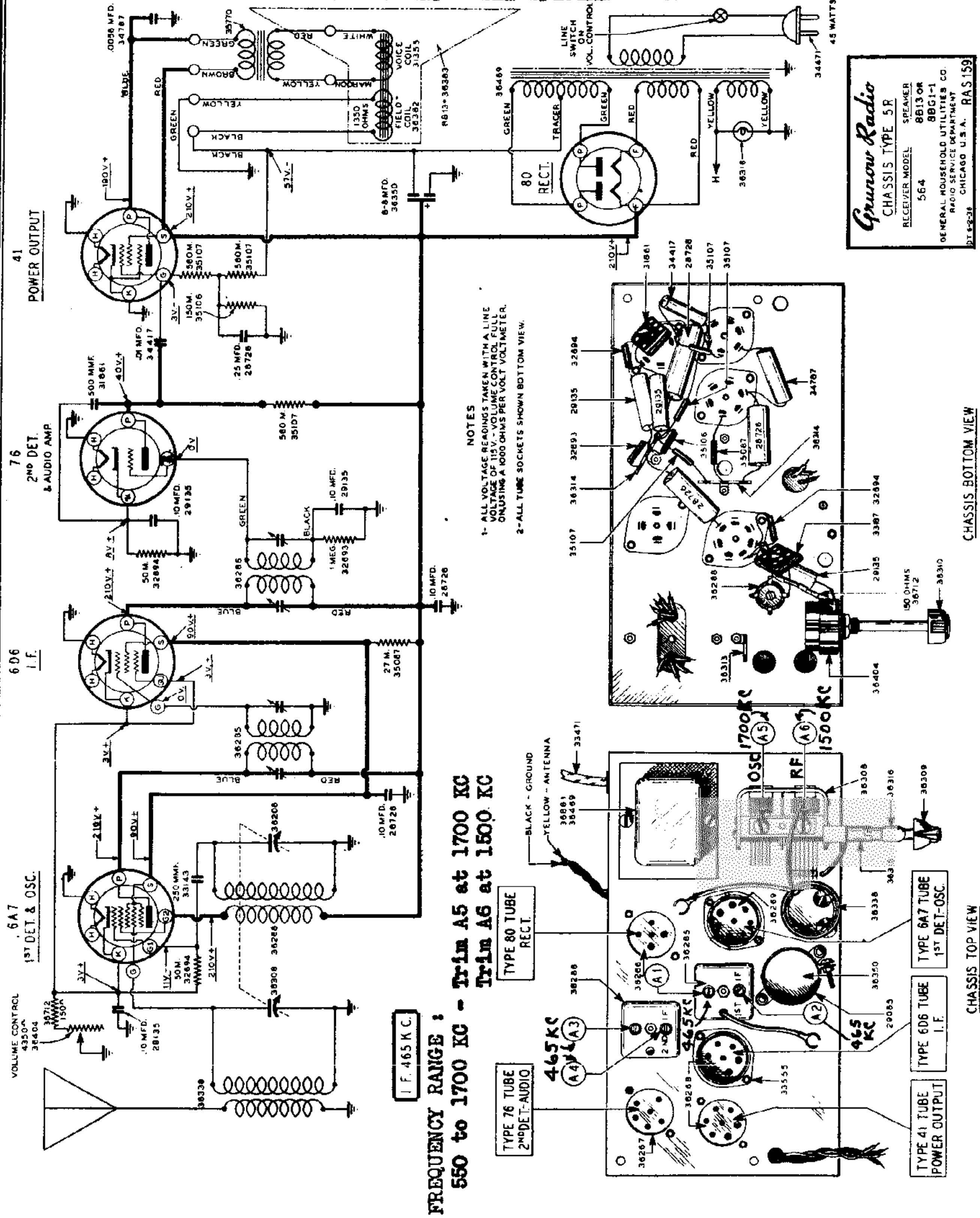
CHASSIS TYPE 5M

Schematic, Voltage
Socket, Trimmers
Chassis, Parts
Alignment

GENERAL HOUSEHOLD UTILITIES CO.

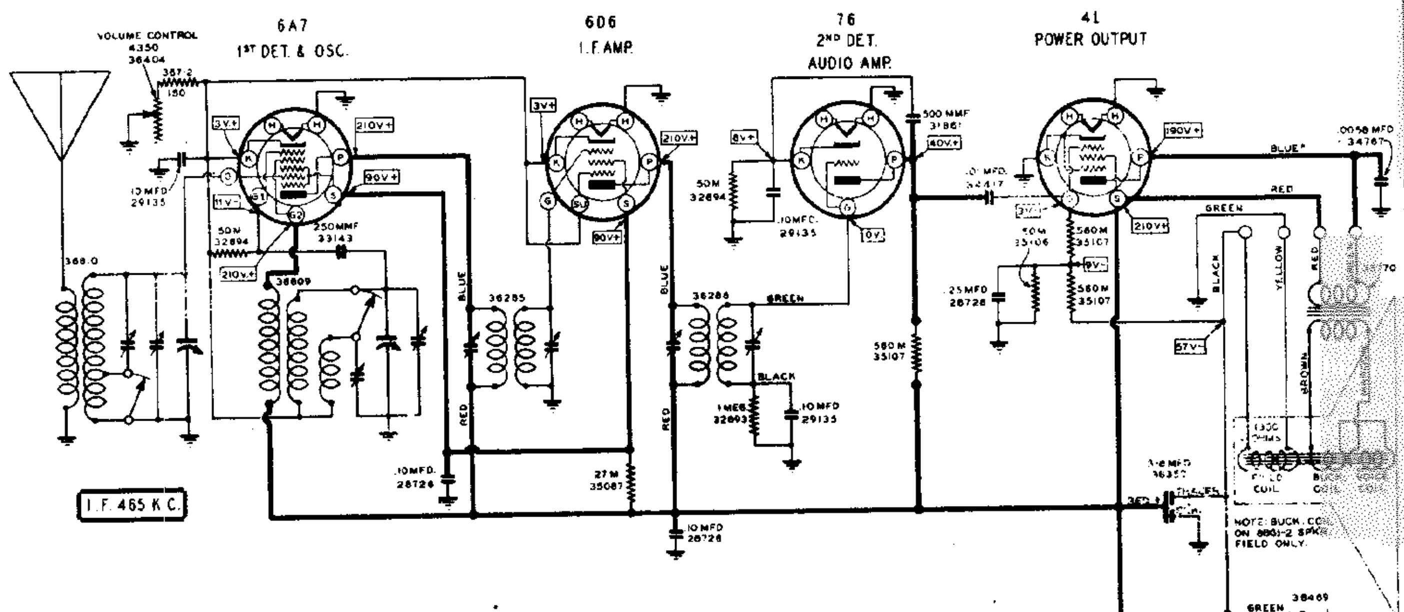
MODEL 564
Chassis 5R

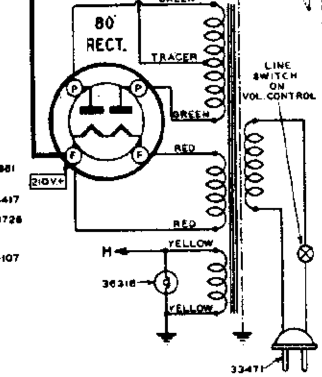
CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION

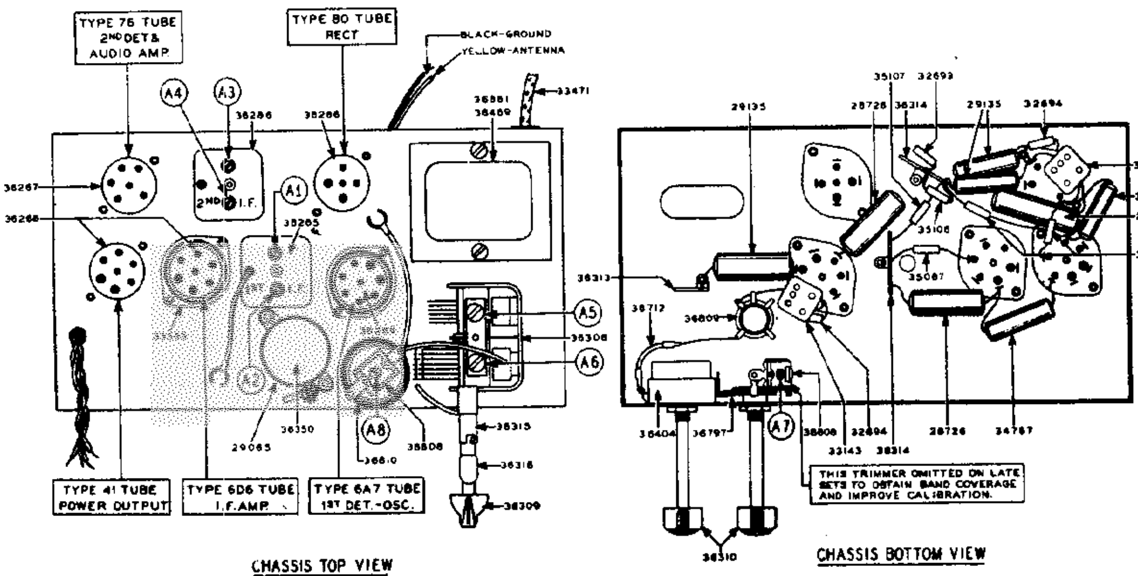


MODEL 566
Chassis 5S
Schematic, Chassis
Socket, Trimmers
Parts, Voltage

GENERAL HOUSEHOLD UTILITIES CO.







CHASSIS TOP VIEW

CHASSIS BOTTOM VIEW

PARTS PRICE LIST

PART NO.	DESCRIPTION	REQ.	PRICE
[illegible]	FIBER WASHER-ANT. COIL	1	.01
[illegible]	REPLACE WITH 34437		
[illegible]	CONDENSER-TUB. .25 MFD.	1	.35
[illegible]	CLAMP-ELECTROLYTIC	1	.05
[illegible]	REPLACE WITH 34437		
[illegible]	CONDENSER-500 MMF.	1	.20
[illegible]	RESISTOR-1 MEG.		.15
[illegible]	RESISTOR-50M	2	.15
[illegible]	CONDENSER-250 MMF.	1	.20
[illegible]	LINE CORD & PLUG	1	.40
[illegible]	TUBE CAP	2	.02
[illegible]	BASE-TUBE SHIELD	2	.02
[illegible]	CONDENSER-TUB. .01 MFD.	1	.25
[illegible]	CONDENSER-TUB. 10 MFD.	5	.30
[illegible]	CONDENSER-.0058 MFD.	1	.25
[illegible]	HALF TUBE SHIELD-SHORT	2	.10
[illegible]	HALF TUBE SHIELD-LONG	2	.10
[illegible]	RESISTOR-27M	1	.15
[illegible]	RESISTOR-150M	1	.15
[illegible]	RESISTOR-580M	3	.15
[illegible]	SCREW-SPKR. MOUNTING	4	.01
[illegible]	SOCKET-4 PRONG TUBE	1	.10
[illegible]	SOCKET-5 PRONG TUBE	1	.15
[illegible]	SOCKET-6 PRONG TUBE	2	.15
[illegible]	SOCKET-7 PRONG TUBE	1	.15
[illegible]	COIL & SHIELD 1ST I.F.	1	1.50
[illegible]	COIL & SHIELD 2ND I.F.	1	1.50
[illegible]	CONDENSER-VARIABLE	1	3.00
[illegible]	KNOB-TUNING	1	.25
[illegible]	KNOB-VOLUME-RANGE SW.	2	.20
[illegible]	TERMINAL STRIP	1	.10
[illegible]	TERMINAL STRIP	2	.15
[illegible]	PILOT LIGHT SOCKET	1	.10
[illegible]	PILOT LIGHT	1	.15
[illegible]	ELECT. CONDENSER	1	2.00
[illegible]	VOLUME CONTROL	1	1.05
[illegible]	POWER TRANSF.-50-60~	1	5.00
[illegible]	RESISTOR-150 OHMS	1	.15
[illegible]	RANGE SWITCH	1	.45
[illegible]	DIAL CHART	1	.40
[illegible]	TRIMMER CONDENSER	2	.25
[illegible]	COIL-OSCILLATOR	1	.85
[illegible]	COIL-ANTENNA	1	1.00
[illegible]	POWER TRANSF. 25-50~	1	6.50
[illegible]	DIAL CHART SHIELD	1	.10
61244	SCREW-CHASSIS MTG.	2	.01

SPEAKER PARTS-8BG1-1

PART NO.	DESCRIPTION	REQ.	PRICE
29036	CONE GASKET	1	.10
33202	TERMINAL STRIP		.10
35185	POLE PIECE	1	.40
35186	CONE TERMINAL STRIP	1	.10
35770	OUTPUT TRANSFORMER	1	.75
36655	8BG1-1 SPKR. COMPLETE	1	7.50
36656	FIELD COIL	1	2.80
38812	CONE & VOICE COIL	1	1.00

SPEAKER PARTS-8BG1-2

PART NO.	DESCRIPTION	REQ.	PRICE
31355	CONE & VOICE COIL	1	1.00
33202	TERMINAL STRIP	1	.10
35185	POLE PIECE	1	.40
35770	OUTPUT TRANSFORMER	1	1.75
37875	8BG1-2 SPEAKER	1	7.50
37871	FIELD COIL	1	2.80

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

RE-ISSUE-JAN. 1937.
THIS SUPERSEDES EARLIER PRINT.

NOTES

1- ALL VOLTAGE READINGS TAKEN WITH A LINE VOLTAGE OF 115V.- VOLUME CONTROL FULL ON USING A 1000 OHMS PER VOLT METER. RANGE SWITCH ON BROADCAST- SET TUNED OFF SIGNAL.

2- TUBE SOCKETS SHOWN BOTTOM VIEW

Grunow Radio
CHASSIS TYPE 5S

RECEIVER MODEL	SPEAKER
566	8BG1-1
	8BG1-2

GENERAL HOUSEHOLD UTILITIES CO.
RADIO SERVICE DEPARTMENT
CHICAGO U.S.A. RAS 175

PRINTED IN U.S.A.

GENERAL HOUSEHOLD UTILITIES CO.

RE-ISSUE - JAN. 1937
THIS SUPERSEDES MANUAL OF PREVIOUS DATE.

SERVICE NOTES

Chassis Type 5-S
Receiver Model 566
Speaker Type 8BG1-1—8BG1-2

Grunow Radio

The following characteristics apply to the GRUNOW Radio—Chassis 5S:

This model is a 5 Tube Super-Heterodyne Dual Wave (540 to 1725 K.C. and 1725 to 4000 K.C.) Receiver, using 1-6A7 tube as 1st Detector and Oscillator, 1-6D6 tube as an I. F. Amplifier, 1-76 tube as 2nd Detector and Audio Amplifier. The 41 output tube is a power amplified pentode and is capable of producing large power output with relatively small signal input. The rectifier tube is an 80, the output of which is well filtered through the action of the speaker field and the two 8 mfd. electrolytic condensers.

SERVICE DATA

CONTINUITY AND VOLTAGE

Continuity and voltage readings should be taken from the underside of the chassis. The values given on the schematic diagram are average and allow the service man to make a quick check of the chassis constants. The socket layouts given on the schematic diagram show each socket from the under side.

ALIGNMENT

1. EQUIPMENT

A—Test Oscillator.

A modulated oscillator capable of producing signals at 465 K. C., 1500 K. C., 1000 K. C., 600 K. C. and 3500 K. C. is necessary for alignment of the 5S Grunow Receiver.

B—Output Meter.

This may be any of the standard output meters on the market, but should be sufficiently sensitive to provide a good deflection at low signal strength.

C—Coupling Means.

Coupling condensers of .05 Mfd. and 200 Mmf. should be used when coupling oscillator to receiver during alignment as specified in following paragraphs.

2. DIAL SETTING.

Turn dial pointer until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial chart.

3. I. F. ALIGNMENT.

A—Connect signal lead of oscillator through .05 Mfd. condenser to grid of 6A7 (1st Detector tube), connect the ground lead to the chassis.

B—Place oscillator in operation of 465 K. C. and turn receiver Volume Control to maximum (Volume Control should remain at maximum during the entire alignment procedure and signal should be attenuated at oscillator to lowest value consistent with obtaining a readable indication on output meter).

C—Align four I. F. trimmers (A1-A2-A3-A4) located on top of I. F. Transformers.

4. 1500 K. C. ALIGNMENT.

A—Connect signal lead of oscillator to antenna lead (the yellow wire) through 200 Mmf. condenser.

B—Set dial pointer at 1500 K. C. and place oscillator in operation at 1500 K. C. Set Range switch on broadcast position. Knob to the left.

C—Align oscillator trimmer (A5), which is the second trimmer on variable condenser as you face the chassis.

D—Align antenna trimmer (A6), which is the first trimmer on Variable Condenser, in direction of signal increase and at the same time rock the tuning condenser back and forth thru resonance. Continue this procedure until maximum signal is obtained on the output meter.

5. 3500 K. C. ALIGNMENT.

A—Set Range Switch to Short Wave Position. Set test oscillator in operation at 3500 K. C. Turn Dial pointer to 3500 K. C. (3.5 M. C.).

B—Adjust Oscillator Trimmer (A7), located on range switch, to maximum output. (Use the higher of the images for alignment point—the setting giving the least capacity—screw farthest out.)(NOT ON LATE SETS)

C—Adjust antenna trimmer (A8), located on top of antenna coil, to maximum output while rocking tuning condenser thru resonance.

D—Check at 1500 K. C.

Note: Best results may be had with this receiver when using a high, long antenna.

OCTOBER, 1936

SERVICE DATA

Chassis Type 5Q
Receiver Model 573

The GRUNOW Chassis 5Q is a five tube three band superheterodyne receiver, using 1-6A8 1st Detector and Oscillator, 1-6K7 I. F. Amplifier, 1-6Q7 2nd Detector, A. V. C. and Audio Amplifier, 1-6F6 Power Output and 1-5W4 Rectifier. The tuning range is divided into three divisions or bands covering from 550 K.C. to 1750 K.C. on the "A" or Broadcast Band, 1750 K.C. to 5.5 M.C. on the "B" or Police Amateur Band and 5.5 M.C. to 18.2 M.C. on the "C" or Foreign Broadcast Band.

SERVICE DATA

CONTINUITY AND VOLTAGE

Tube sockets on the schematic diagram (Fig. 3) are shown bottom view, each element being in its actual position in respect to the guide pin. The voltage measurements shown are average and were taken with a line voltage of 115 V., the volume control "full on" and the range switch in position "A" using a 1000 ohms per volt meter.

REPAIRS

When servicing this chassis it is IMPERATIVE that the service man make all parts replacements in EXACTLY the same way as the original part was located and connected. This applies particularly to ground points. All parts replacements in the R. F. end of the circuit must be exact duplicates of the originals, especially so in the case of coils, R. F. by-pass or coupling condensers. Any repairs in the R. F. circuit will make a complete realignment of the tuned circuit necessary.

BIAS CELL

This Chassis uses a "C" bias cell unit in the control grid of the 6Q7 tube. This type bias cell has an exceedingly long life but occasionally may have to be replaced. When replacing the cell note that the carbon or (+) side is connected to the ground side of all terminal clips. To check the bias cell a new cell or a 1½ volt battery must be substituted, as the cell voltage cannot be measured with an ordinary voltmeter due to its low current rating.

CIRCUIT ALIGNMENT EQUIPMENT

Do not attempt to align the 5Q Chassis without the equipment specified below:

1. Signal Generator—A modulated oscillator capable of delivering signals from 465 K.C. to 18.2 M.C.

2. Alignment Tool—A non-metallic screw driver.

3. Dummy Antenna—.05 Mfd. Condenser (I. F. Alignment); 200 Mmfd. Condenser (Broadcast Alignment); 400 Ohm Carbon Resistor (Short Wave Alignment).

4. Output Meter—A meter of sufficient sensitivity to give a good deflection at very low signal input.

Note: The receiver should be aligned in a location free from local interference. A screen room is recommended.

CIRCUIT ALIGNMENT PROCEDURE

1. HEATING

(A) Allow the receiver to heat up for a period of 20 to 30 minutes. This is necessary in order to eliminate possible alignment variations due to the thermal expansion and contraction of the capacitors and inductances.

(B) Allow the signal generator to warm up in order to prevent frequency drift during alignment.

2. DIAL CALIBRATION

Turn the condenser until the plates are fully meshed, set the pointer (Hour Hand) to 9 and 3 on the outer edge of dial chart. Set the vernier pointer (Minute Hand) to the line pointing to 12.

3. SIGNAL GENERATOR ADJUSTMENT

During the entire alignment procedure the signal input from the generator to the receiver must be continually attenuated at the generator as the various trimmers are brought into resonance. This is necessary in order to hold the signal at the lowest intensity so that the A. V. C. Circuit will remain at the most sensitive point.

4. I. F. ALIGNMENT

(A) Set the generator to 465 K.C. and connect the output lead to the control grid of the 6A8 tube through the .05 Mfd. dummy and the generator ground to the chassis ground post.

(B) Set the receiver dial pointer to 600 K.C., the range switch to position "A" and turn the volume control full on.

(C) Connect the output meter across the two primary terminals on the output transformer.

(D) Adjust the I. F. Trimmers A1, A2, A3, and A4 to maximum output.

5. 1500 K.C. ALIGNMENT

(A) Set the generator to 1500 K.C. and connect the output to the antenna post on the chassis through the 200 Mmfd. dummy.

(B) Set the receiver dial pointer to 1500 K.C.

(C) Adjust the trimmers (A5) Oscillator, (A6) Detector and (A7) Antenna to maximum output.

6. 600 K.C. ALIGNMENT

(A) Set generator to 600 K.C.

(B) Set receiver dial pointer to 600 K.C.

(C) Turn trimmer (A8) in direction of signal increase and at the same time rock tuning condenser slowly back and forth through resonance until the exact resonant point on both is obtained.

7. 5 M.C. ALIGNMENT

(A) Set generator to 5 M.C.

(B) Set receiver range switch to position "B" and dial pointer to 5 M.C.

(C) Adjust trimmer (A9) Oscillator and (A10) Antenna to maximum output.

8. 18 M.C. ALIGNMENT

(A) Set generator to 18 M.C. and connect the output to the chassis Antenna post through the 400 Ohm dummy.

(B) Set the receiver range switch to position "C" and the dial pointer to 18 M.C.

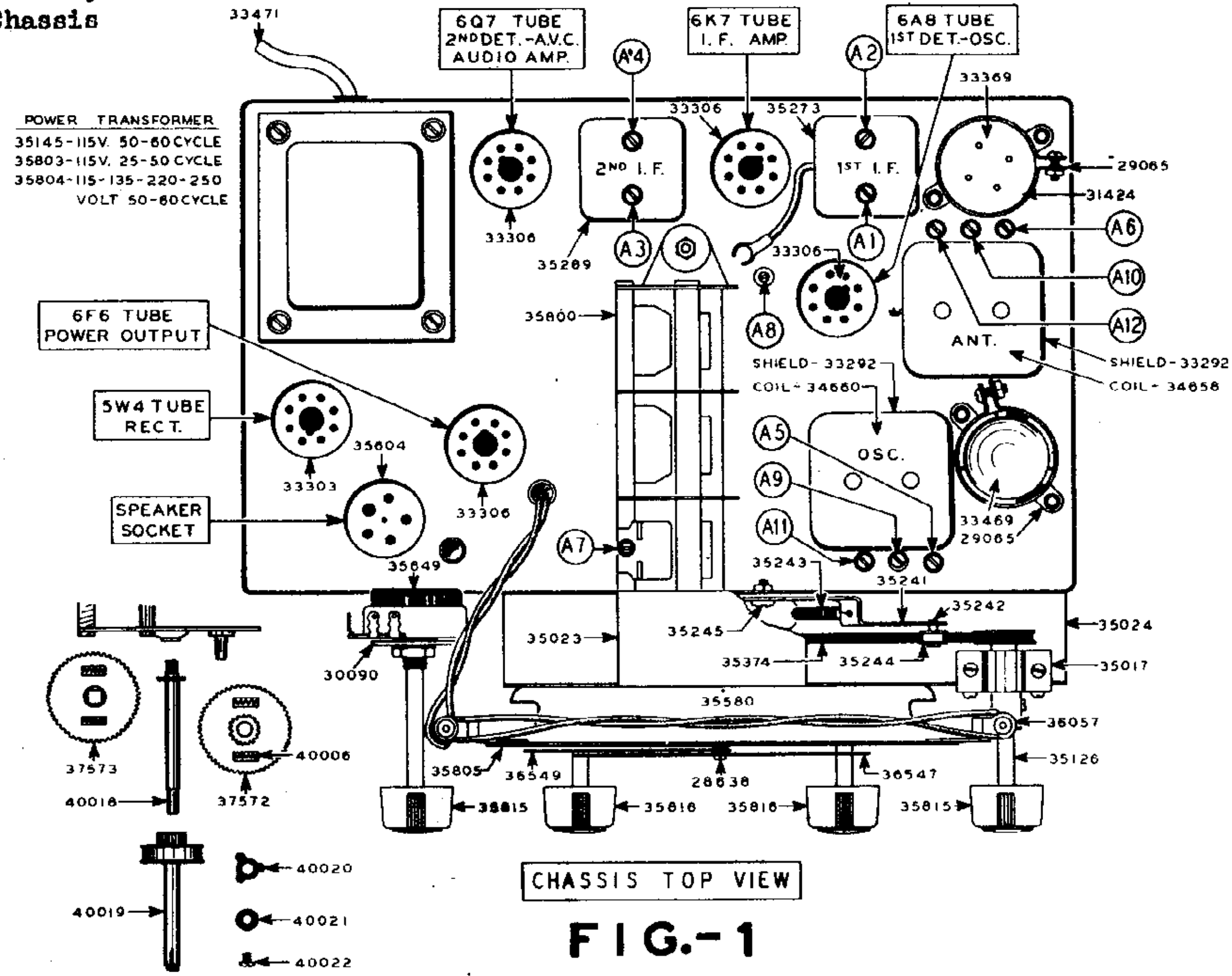
(C) Screw the Oscillator trimmer (A11) down tight and back off until signal is heard, then rock the tuning condenser slowly back and forth through resonance until exact resonant point is determined.

(D) Adjust Antenna trimmer (A12) to maximum output.

(E) Readjust Oscillator trimmer (A11) to maximum output.

MODEL 573
Chassis 5Q
Socket, Trimmers
Chassis

GENERAL HOUSEHOLD UTILITIES CO.



CHASSIS TOP VIEW

FIG.-1

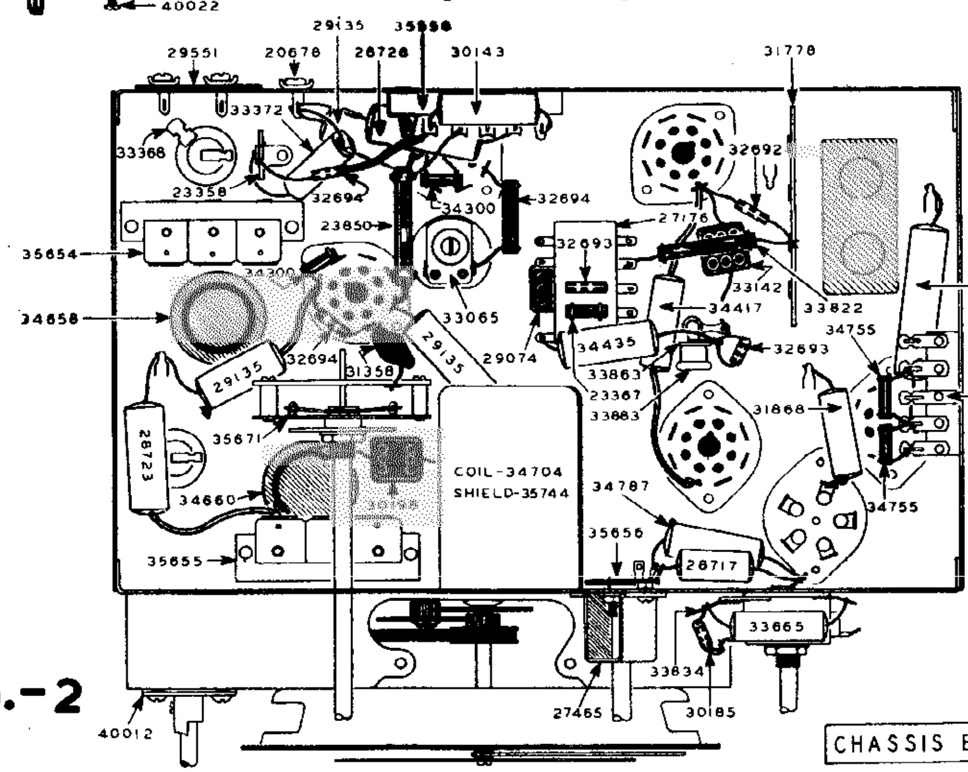


FIG.-2

CHASSIS 5Q
OCT. 1936
RAS 194

CHASSIS BOTTOM VIEW

MODEL 573
Chassis 5 Q
Schematic
Parts, Voltage

GENERAL HOUSEHOLD UTILITIES CO.

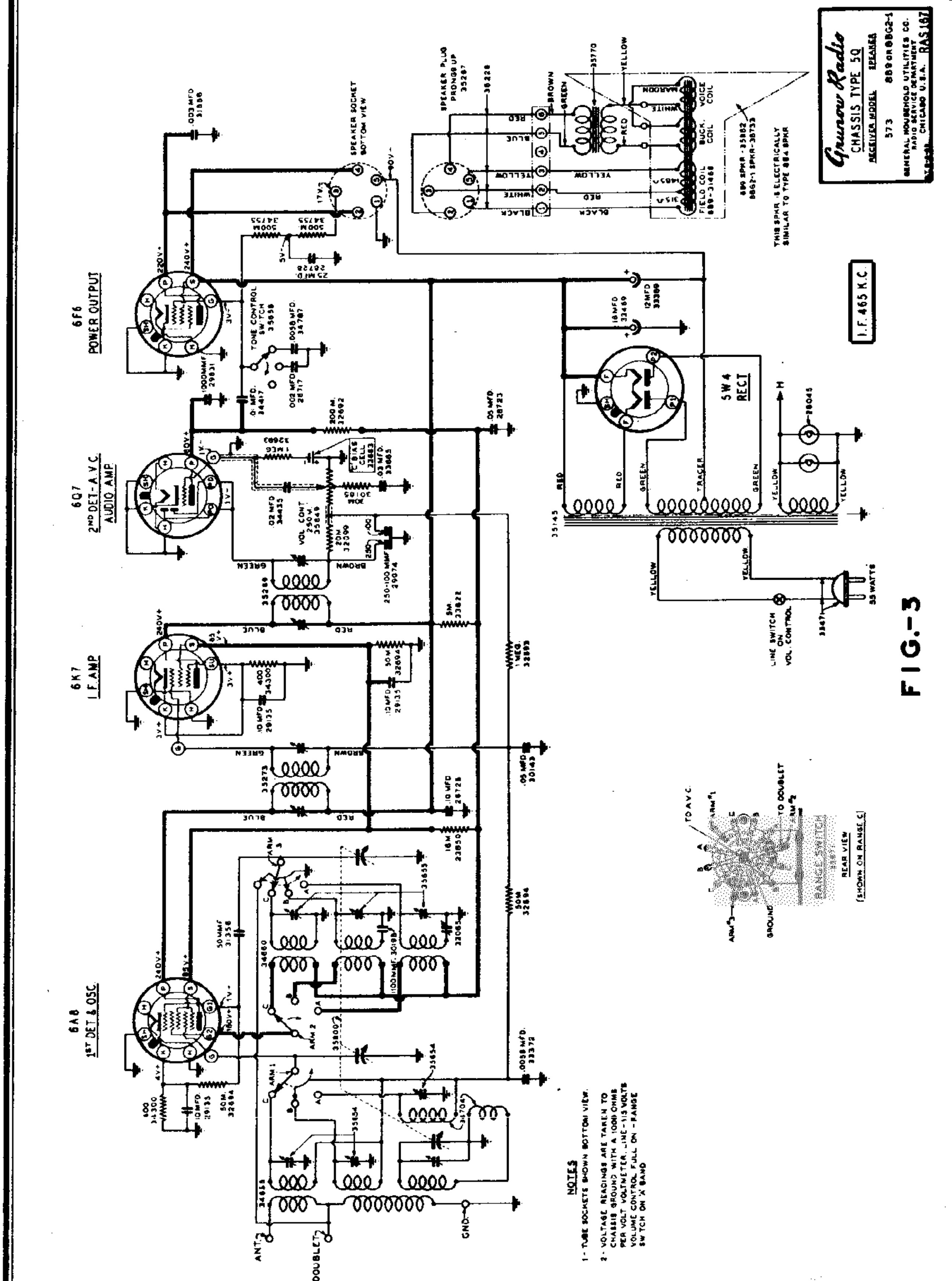
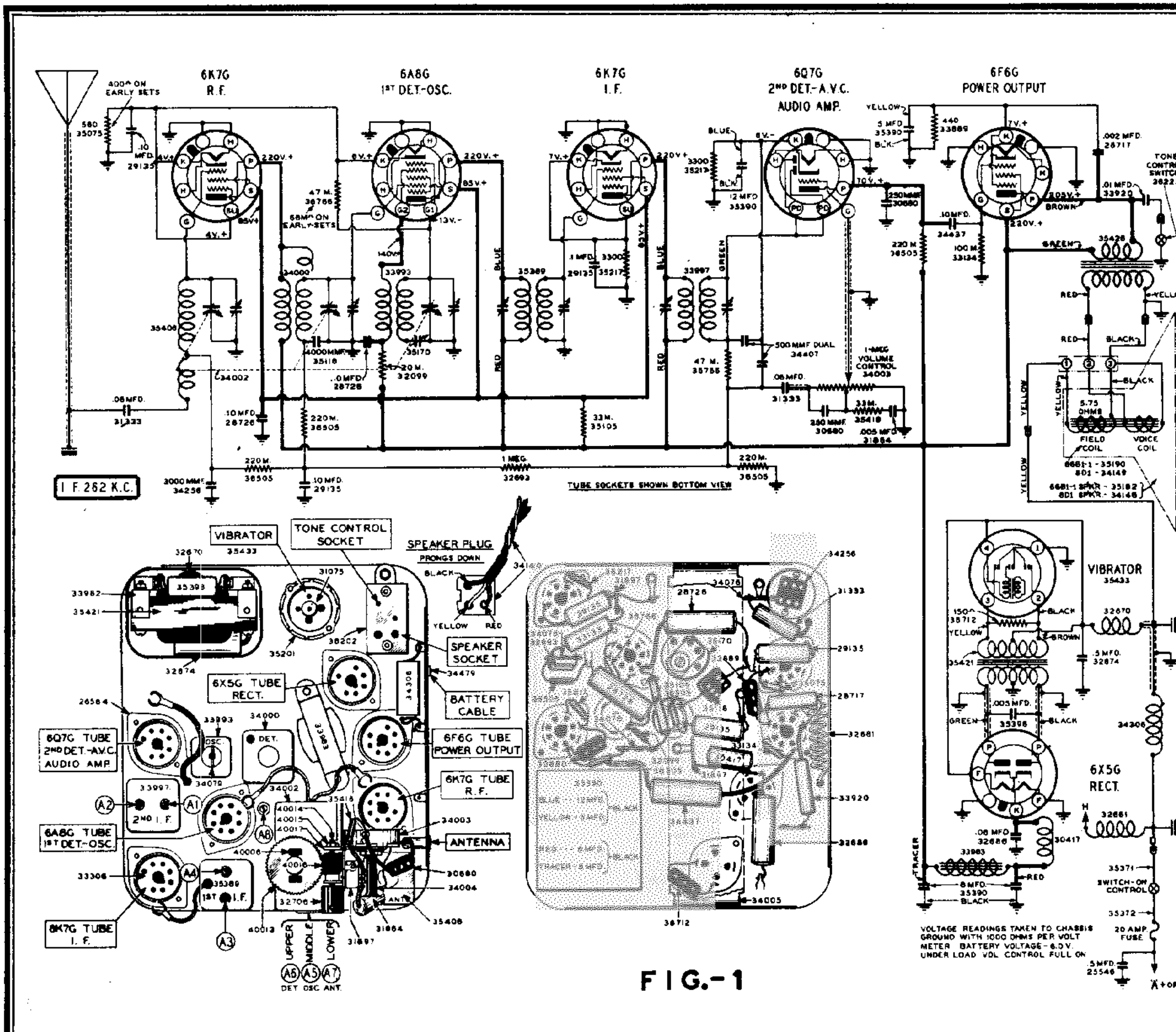


FIG.-3

MODELS 614,618 Auto
Schematic,Parts
Socket,Trimmers
Chassis,Voltage

GENERAL HOUSEHOLD UTILITIES CO.

(PRICES SUBJECT TO CHANGE WITHOUT NOTICE)



F I G.-1

PART NO.	DESCRIPTION	PRICE
24995	ANT CONNECTOR BUSHING	.03
25549	CONNECTOR SPRING	.02
25550	CONNECTOR WASHER	.03
26564	TUBE SHIELD BASE	.10
26898	TUBE SHIELD-6X5G & 6Q7G	.10
27601	VAR. COND. MTG. GROMMET	.05
27602	VAR. COND. CUP WASHER	.02
28717	CONDENSER-.002 MFD.	.30
28726	REPLACE WITH 34437	
29067	TUBE SHIELD-6K7G & 6A8G	.10
29135	REPLACE WITH 34437	
30092	JUNCTION TERMINAL BOARD	.10
30355	DRIVE COUPLING PIN	.02
30417	"B" CHOKE-R.F.	.40
30680	CONDENSER-250 MMF.	.20
31075	4 PRONG SOCKET	.10
31884	CONDENSER-.005 MFD.	.25
31897	MOUNTING LUG STRIP	.05
32099	RESISTOR-20M OHMS	.15
32670	"A" CHOKE	.40
32674	"A" FILTER COND.-.5 MFD.	.40
32681	FILAMENT CHOKE	.10
32686	CONDENSER-.06 MFD.	.30
32693	RESISTOR-1 MEGOHM	.15
32706	DRIVE COUPLING	.15
33134	RESISTOR-100M OHMS	.15
33306	UNIVERSAL TUBE SOCKET	.15
33683	PLUG BUTTON	.02
33889	RESISTOR-440 OHMS	.15
33891	RESISTOR-10M OHMS	.15
33897	RESISTOR-750 OHMS	.15
33920	CONDENSER-.01 MFD.	.30
33978	CANDOHM-11M OHMS	.35
33982	TRANSFORMER BRACKET	.10
33983	FILTER CHOKE	.90
33993	OSCILLATOR COIL	1.20
33997	2ND I.F. COIL & SHIELD	1.75
34000	DETECTOR COIL & SHIELD	1.30
34002	VARIABLE CONDENSER	4.50
34003	VOLUME CONTROL	1.50
34004	VOLUME CONTROL SLEEVE	.15
34005	CHASSIS MTG. BRACKET	.20
34006	5 PRONG VIB. SOCKET-625	.15
34069	CONDENSER-550 MMF.	.20
34076	TERMINAL STRIP	.10
34078	ANTENNA CONN. LEAD	.10
34117	INPUT TRANSFORMER-625	2.25
34119	ELECT. COND.-(625)	3.75
34137	SPKR. SOCKET MTG. STUD	.10
34242	TONE CONTROL-625	.80
34252	TUBE SHIELD-6F6G TUBE	.10
34256	CONDENSER-3000 MMF.	.30
34306	"A" CHOKE	.10
34407	DUAL MICA COND.-500-500	.30
34435	CONDENSER-.02 MFD.	.35
34436	CONDENSER-.05 MFD.	.35
34437	CONDENSER-.10 MFD.	.35
34479	AMMETER CONN. LEAD	.05
34826	TUBE SHIELD SPRING	.08
34932	TUBE SHIELD SPRING	.08
35075	RESISTOR-580 OHMS	.15
35105	RESISTOR-33M OHMS	.20
35118	CONDENSER-4000 MMF.	.30
35170	PADDER CONDENSER	.45
35201	VIBRATOR GROUND RING	.05
35217	RESISTOR-3300 OHMS	.15
35304	POLARITY TERMINAL STRIP	.15
35305	VIBRATOR GROUND RING	.15
35312	VIBRATOR-625	1.50
35351	SPEAKER SOCKET-625	.20
35389	1ST I.F. COIL & SHIELD-614&618	1.75
35390	ELECTROLYTIC COND. 614&618	2.85
35398	BUFFER CONDENSER	.45
35408	ANTENNA COIL & SHIELD	2.00
35406	TRANSFORMER COVER-614&618	.55
35418	RESISTOR-33M OHMS	.15
35421	VIBRATOR TRANSFORMER	3.25
35423	OUTPUT TRANSFORMER-625	2.75
35424	OUTPUT TRANSFORM.-614-618	1.75
35433	VIBRATOR-614 & 618	4.50
35438	CASE (NO COVERS) 614-618-625	.80
35444	FRONT COVER (NO GRILL) 614	.90

auto Grunow Radio
CHASSIS TYPE 614

RECEIVER MODELS	SPEAKER
614	6GBI-1
618	8DI OR 35808

GENERAL HOUSEHOLD UTILITIES CO
RADIO SERVICE DEPARTMENT
CHICAGO, U.S.A.
DT 5-6-36 RAS 153

MODEL 625 Auto
Schematic, Parts
Socket, Trimmers
Voltage, Chassis

GENERAL HOUSEHOLD UTILITIES CO.

(PRICES SUBJECT TO CHANGE WITHOUT NOTICE)

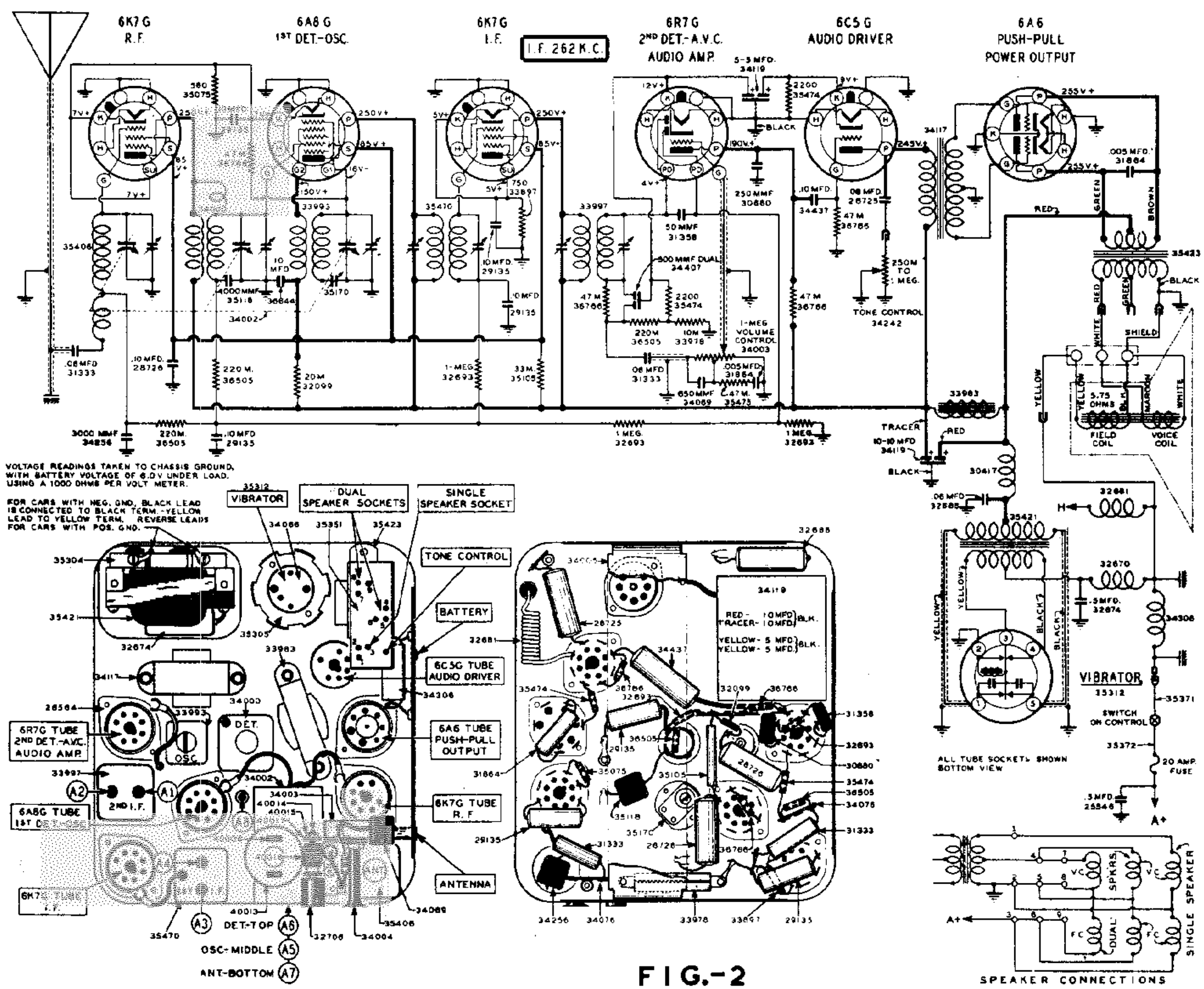


FIG.-2

PART NO	DESCRIPTION	PRICE
PARTS PRICE LIST		
35448	SCREEN GRILL	.50
35449	TONE CONTROL KNOB	.20
35450	TONE CONTROL LEAD	.15
35470	1ST I.F. COIL & SHIELD - 625	2.20
35471	TRANSFORMER COVER - 625	.55
35474	RESISTOR - 2200 OHMS	.15
35481	FRONT COVER - 625	2.25
36198	FRONT COVER - 818	1.80
36202	SPKR. SOCKET - 814 & 818	.15
36225	TONE CONTROL SWITCH	.45
36505	RESISTOR - 220M OHMS	.15
36712	RESISTOR - 150 OHMS	.15
36766	RESISTOR - 47M OHMS	.15
36992	REAR COVER - 814, 818 & 625	.60
40006	GEAR TENSION SPRING	.05
40013	GEAR HUB	.25
40014	ADJ. BEARING SCREW	.10
40015	LOCKNUT	.05
40016	WORM	.50
40017	WORM BRACKET	.20
DASH SPEAKER PARTS		
28724	CONE DUST CAP	.10
34148	SPEAKER LESS CASE	7.00
34149	FIELD COIL	2.25
34171	CONE GASKET	.10
34234	TERMINAL STRIP	.10
35258	CHROME GRILL	.50
35384	CABLE & PLUG	1.00
35370	COVER MTG. BOLT	.02
35448	GRILL SCREEN	.50
35487	8D1 SPKR. WITH CASE	8.85
35490	SPEAKER CASE - LESS GRILL	1.35
35493	MOUNTING PARTS PKG.	.25
40007	CONE & VOICE COIL	1.00
OVERHEAD SPEAKER PARTS		
35355	CABLE & PLUG	1.35
35356	SPKR. MOUNTING BRACKET	.40
35623	SCREEN GUARD	.25
35808	SPEAKER & CASE COMPLETE	8.85
35800	SPEAKER ONLY - LESS CASE	6.60
35810	SPEAKER CASE COMPLETE	3.00
37694	MOUNTING PARTS PKG.	.20
40042	CONE & VOICE COIL	1.75
40043	FIELD COIL	1.50
BUILT-IN SPEAKER PARTS		
34140	CABLE & PLUG	.25
35182	8OBI-1 SPEAKER COMPLETE	7.00
35190	FIELD COIL	1.25
35444	SCREEN GRILL	.50
35446	SPKR. BAFFLE PLATE	.25
36910	CONE & VOICE COIL	1.00
61255	SPKR. MTG. BOLTS	.02
CONTROL & ACCESSORY PARTS		
24759	GENERATOR CONDENSER	.50
25546	AMMETER CONDENSER	.45
34048	CHASSIS MTG. STUD	.05
35302	VOLUME CONTROL CABLE	1.50
35303	VARIABLE COND. CABLE	1.50
3537	CHASSIS 'A' CABLE	.23
35372	AMMETER FUSE CABLE	.40
35453	ACCESSORY PKG. COMPLETE	1.85
35454	MOUNTING PARTS PKG.	.30
35455	DISTRIBUTOR SUPPRESSOR	.40
35456	CONTROL SWITCH - PILOT LAMP - AMMETER LEAD, ETC.	2.20
35460	CONTROL SWITCH ONLY	1.25
3546	PILOT LAMP & SOCKET	.60
35462	CONTROL HEAD PKG.	3.75
3616	KNURLED CABLE RET. NUT	.10
36162	DIAL WINDOW	.30
36163	POINTER SCREW	.02
36164	DIAL POINTER	.15
36165	DIAL CHART	.30
63321	1/4"x20 HEX. NUT	.02
64335	LOCKWASHER	.05

Auto Grunow Radio
CHASSIS TYPE 625

RECEIVER MODEL	SPEAKERS
625	8D1 & 35808

GENERAL HOUSEHOLD UTILITIES CO.
RADIO SERVICE DEPARTMENT
CHICAGO, U.S.A.
RAS136

GENERAL HOUSEHOLD UTILITIES CO.

Grunow Radio

NOVEMBER, 1936
SERVICE DATA

Auto Radio Models 614 - 618 - 625

GENERAL

Model 614 is a single unit remote control superheterodyne receiver using the following tubes: 6K7-G R.F. Amplifier, 6A8-G 1st Det. and Oscillator, 6K7-G I.F. Amplifier, 6Q7-G 2nd Det. A.V.C. and Audio Amplifier, 6F6-G Power Output, 6X5-G Rectifier; Vibrator is a non-synchronous plug-in type.

Model 618 is a double unit, remote control superheterodyne receiver using the same tubes as Model 614, with a separate speaker, either a dash type (8D1) or an overhead speaker. The overhead speaker can also be installed on the back of the front seat.

Model 625 is a double unit, remote control suerheterodyne receiver with provision made for the addition of a second speaker (overhead type). This receiver uses the following tubes: 6K7-G R.F. Amp., 6A8-G 1st Det. and Osc., 6K7-G I.F. Amp., 6R7-G 2nd Det. — A.V.C. and Audio Amp., 6C5-G Audio Driver, 6A6 Push-Pull Power Output. Since this receiver uses a synchronous vibrator, make certain when installing, that polarity of receiver agrees with polarity of car. If it is necessary to reverse polarity, this may be done at the top of the vibrator transformer without removing chassis from its case (see Fig. 2).

CIRCUIT ALIGNMENT

If alignment is found necessary, make all adjustments with the chassis in its case and use a calibrated test oscillator and an output meter. Allow chassis and test oscillator to warm up before making any adjustments.

1. PEAKING I.F. STAGES AT 262 K.C.
   - (a) Connect the ground lead of the test-oscillator to the chassis frame. Connect a .10 mfd. condenser in series with the signal lead and connect this lead to the grid cap of the 6A7 tube (leave grid clip in place.)
   - (b) Set the test-oscillator to exactly 262 K.C.
   - (c) Turn the volume control of the receiver full on.
   - (d) Adjust the I.F. trimmers A1, A2, A3, A4. In order to insure accurate setting of these trimmers, the adjustments should be repeated using the lowest oscillator output that will give a reasonable deflection of the output meter pointer. Make all adjustments for maximum output.
2. ALIGNING GANG CONDENSER AT 1560 AND 1400 K.C.
   - (a) Connect the signal lead of the test-oscillator to the antenna connection of the chassis, substituting a 250 mmf. condenser for the .10 mfd. condenser. Turn the rotor plates of the gang condenser until they are *completely out of mesh.*
   - (b) Change the test-oscillator to 1560 K.C.
   - (c) Adjust the Osc. trimmer A5 *carefully* for maximum output.
   - (d) Change the test-oscillator to 1400 K.C.
   - (e) Turn the condenser rotor plates until the 1400 K.C. signal is tuned in at maximum.
   - (f) Adjust the Det. and Ant. trimmers A6 and A7 for maximum output. Do not disturb Osc. trimmer A5 as this is adjusted at 1560 K.C. only
3. ALIGNING AT 600 K.C.
   - (a) Change the test-oscillator to 600 K.C.
   - (b) Turn the condenser rotor plates until the 600 K.C. signal is tuned in at maximum.
   - (c) Adjust the antenna padding condenser A8 while rocking the condenser gang back and forth slightly until no further improvement in output can be obtained.
   - (d) It is well to return to 1400 K.C. and recheck at this frequency, then recheck 600 K.C. while rocking gang condenser.

Caution—On all of the above operations always use the lowest oscillator output that will give a reasonable deflection of the output meter in order to prevent the A.V.C. from levelling out the output as adjustments are made.

GRUNOW REMOTE CONTROL UNIT KITS
For Use on Grunow Auto Radio Models 614-618 and 625

Make and Year of Car	Kit No.	List Price	Description: Escutcheon	Description: Steering Post
ALL CARS	36100	$1.50		X
AUBURN				
1936-654	36145	2.00	X	
1936-852	36145	2.00	X	
1935 Models	36145	2.00	X	
Older Models	36100	1.50		X
BUICK				
1936-40	36111	2.00	X	
1936-60	36111	2.00	X	
1936-80	36111	2.00	X	
1936-90	36111	2.00	X	
Older Models	36100	1.50		X
CADILLAC				
1936-V8-60	36137	2.50	X	
1936-V8-70-75	36137	2.50	X	
1936-V12	36137	2.50	X	
1936-V16	36137	2.50	X	
1935	36139	2.50	X	
Older Models	36100	1.50		X
CHEVROLET				
1936 Standard	36103	1.50	X	
1936 Master	36103	1.50	X	
1935 Master	36103	1.50	X	
Older Models	36100	1.50		X
CHRYSLER				
1936 Airstream 6	36118	2.00	X	
1936 Airstream 8	36118	2.00	X	
1936 Airflow 8	36118	2.00	X	
1936 Imperial	36119	2.00	X	
1935 Airstream 6	36133	2.00	X	
1935 Airstream 8	36138	2.00	X	
1934 Models	36138	2.00	X	
Older Models	36100	1.50		X
CORD				
1936 8 Cyl.	36100	1.50		X
DE SOTO				
1936 Custom Airstream	36124	2.00	X	
1936 Airstream 6	36124	2.00	X	
1936 Airflow	36125	2.00	X	
1935 Airstream 6	36126	2.00	X	
1935 Airflow	36126	2.00	X	
Older Models	36100	1.50		X
DODGE				
1936	36106	2.00	X	
1935	36107	2.00	X	
1934	36107	2.00	X	
Older Models	36100	1.50		X
FORD				
1936 V-8 DeLuxe	36101	1.50	X	
1936 V-8 Standard	36101	1.50	X	
1935 V-8 Standard	36102	2.00	X	
1935 V-8 DeLuxe	36102	2.00	X	
1934 V-8 DeLuxe	36140	2.00	X	
Older Models	36100	1.50		X
GRAHAM				
1936-80	36100	1.50		X
1936-90	36100	1.50		X
1936-110	36100	1.50		X
1935 Models	36141	2.00	X	
Older Models	36100	1.50		X
HUDSON				
1936 Six Cyl.	36112	2.00	X	
1936 8 Cyl.	36112	2.00	X	
1935 Models	36113	2.00	X	
1934 Models	36113	2.00	X	
Older Models	36100	1.50		X
HUPMOBILE				
1936-618	36142	2.00	X	
1936-621	36142	2.00	X	
1936-35 Eight	36142	2.00	X	
1935 Models	36142	2.00	X	
1934 Models	36142	2.00	X	
Older Models	36100	1.50		X
LAFAYETTE				
1936	36128	2.00	X	
1935	36128	2.00	X	
Older Models	36100	1.50		X

Make and Year of Car	Kit No.	List Price	Description: Escutcheon	Description: Steering Post
LA SALLE				
1936 Models	36137	2.50	X	
1935 Models	36139	2.50	X	
Older Models	36100	1.50		X
LINCOLN				
1936-V-12	36100	1.50		X
Older Models	36100	1.50		X
Zephyr				
1936-V-12	36101	1.50	X	
NASH				
1936-400	36127	2.00	X	
1936 AMB 6	36127	2.00	X	
1936 AMB 8	36127	2.00	X	
1935 Models	36127	2.00	X	
Older Models	36100	1.50		X
OLDSMOBILE				
1936 Six Cyl.	36108	2.00	X	
1936 8 Cyl.	36108	2.00	X	
1935 Models	36109	2.00	X	
Older Models	36100	1.50		X
PACKARD				
1936-120B	36122	2.00	X	
1936-1400	36123	2.50	X	
1935-120	36122	2.00	X	
Older Models	36100	1.50		X
PIERCE-ARROW				
1936 Models	36100	1.50		X
Older Models	36100	1.50		X
PLYMOUTH				
1936 DeLuxe	36105	1.50	X	
1936 Standard	36135	1.50	X	
1935 DeLuxe	36104	2.00	X	
1935 Standard	36136	1.50	X	
1934 Models	36138	2.00	X	
Older Models	36100	1.50		X
PONTIAC				
1936 Master 6	36110	1.50	X	
1936 DeLuxe 6	36110	1.50	X	
1936 DeLuxe 8	36110	1.50	X	
1935 Models	36110	1.50	X	
Older Models	36100	1.50		X
REO				
1936 Fly. Cloud	36143	2.00	X	
1935 Models	36144	2.00	X	
Older Models	36100	1.50		X
STUDEBAKER				
1936 Dictator	36120	2.00	X	
1936 President	36121	2.00	X	
1935 Models	36136	2.00	X	
Older Models	36100	1.50		X
TERRAPLANE				
1936 Models	36114	2.00	X	
1936 Models	36115	2.00	X	
1934 Models	36115	2.00	X	
Older Models	36100	1.50		X
WILLYS				
1936-77	36100	1.50		X
1935-77	36100	1.50		X
Older Models	36100	1.50		X

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Grunow Twin-Type Auto Antenna
No. 35807

This Antenna is of the running board type, to be used with all Grunow Auto Receivers, on cars that do not have a built-in antenna, and cars of all steel or turret-top construction.

No. 35807 Grunow Auto Antenna....$4.00

NO. 35808-GRUNOW OVERHEAD SPEAKER COMPLETE........ 8.95 LIST

MODELS 631, 643
Chassis 6M
Schematic, Part
Voltage

GENERAL HOUSEHOLD UTILITIES CO.

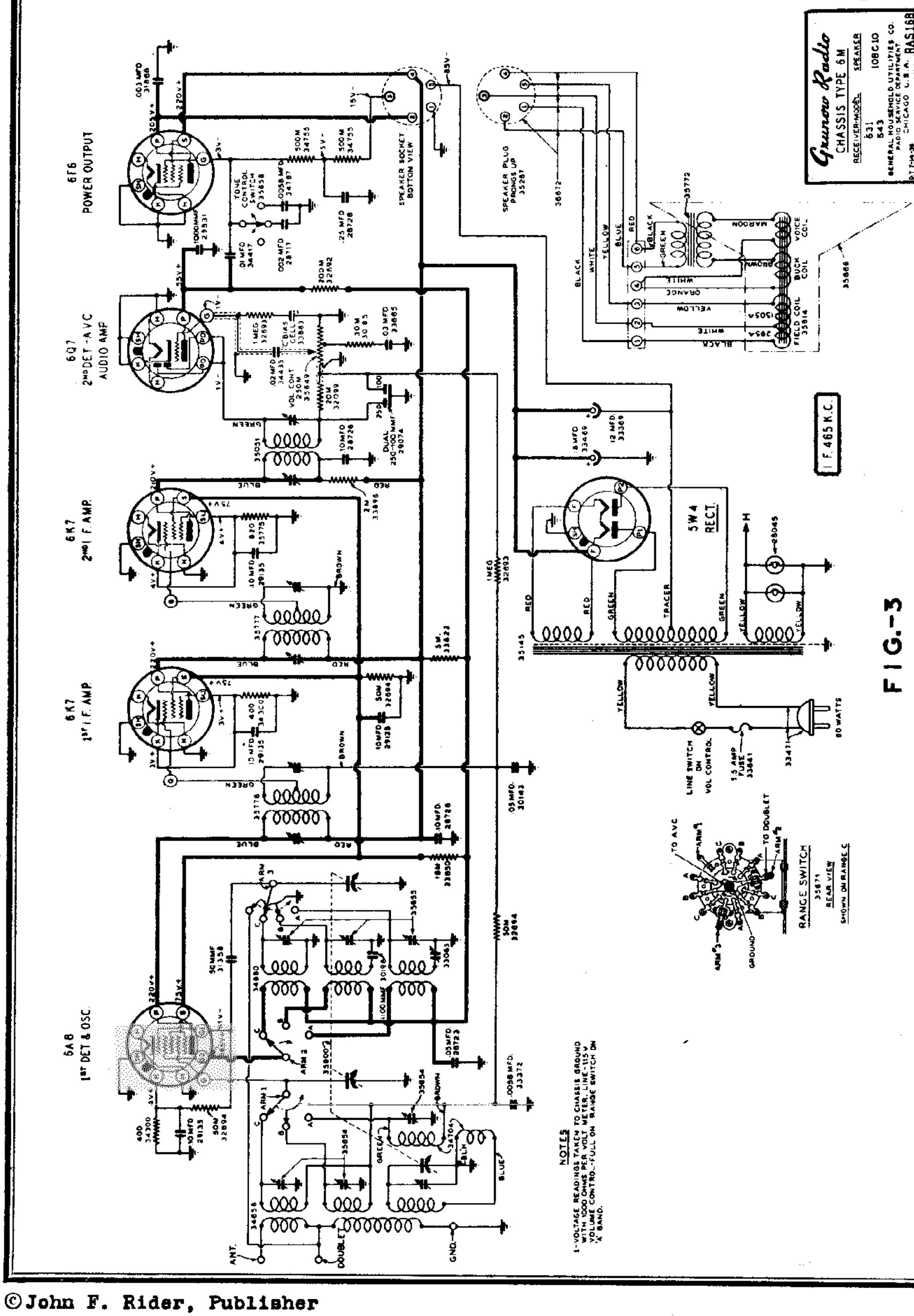
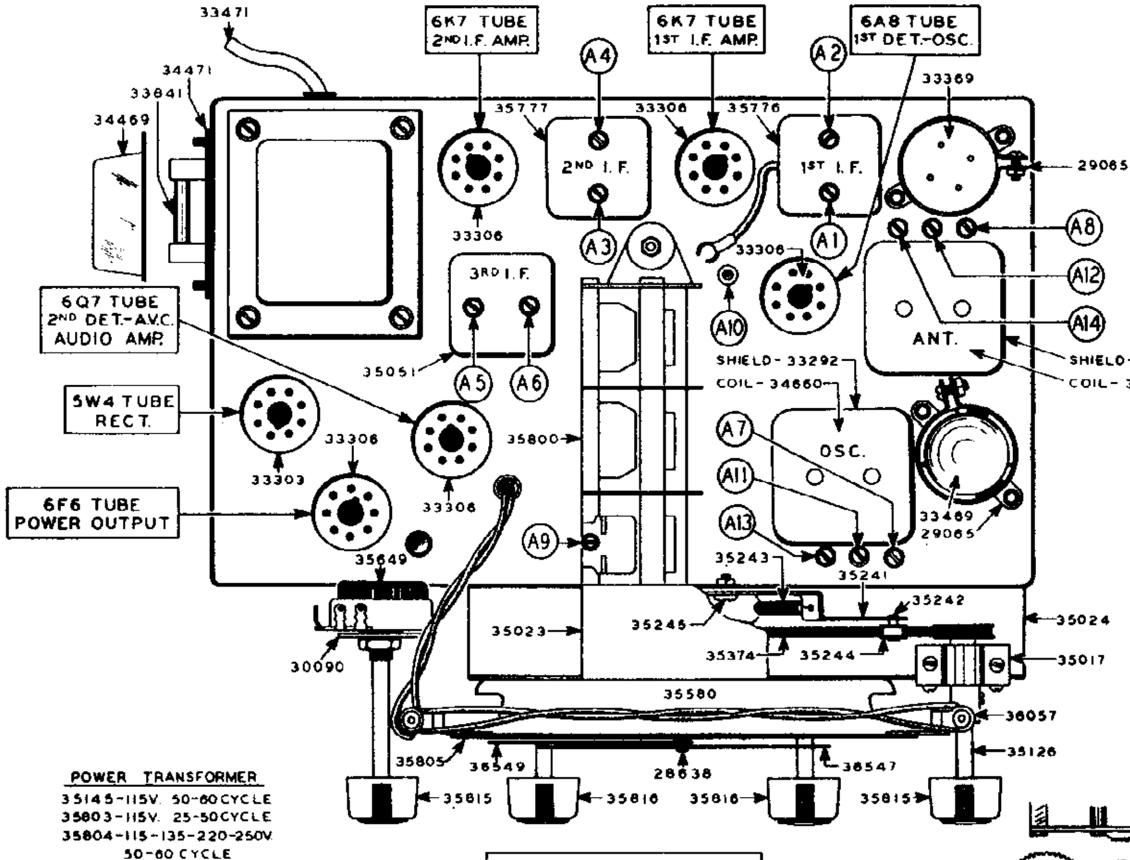


FIG.-3

MODELS 631, 643
Socket, Trimmers
Chassis

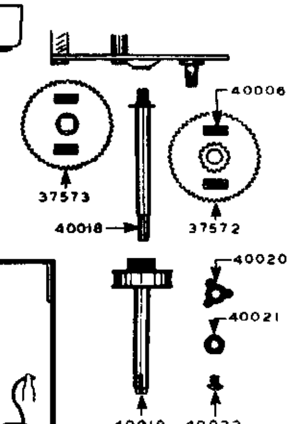
GENERAL HOUSEHOLD UTILITIES CO.

Chassis 6M



CHASSIS TOP VIEW

FIG.-1



CONDENSER DRIVE PARTS

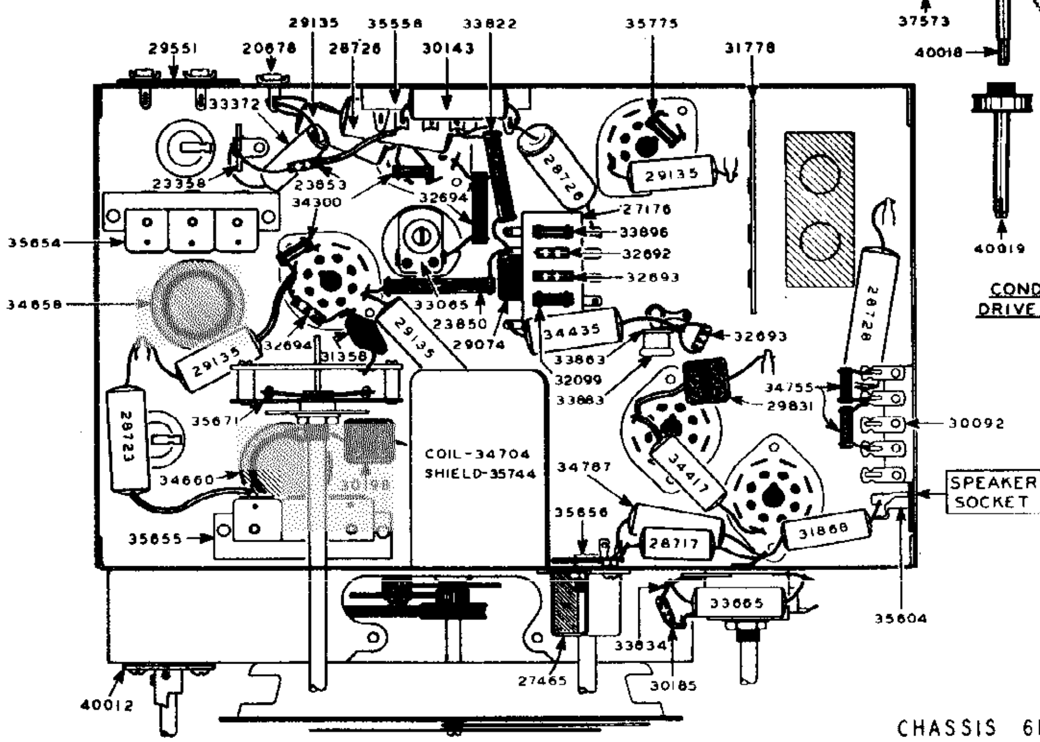


FIG.-2

CHASSIS BOTTOM VIEW

CHASSIS 6M
OCT. 1936
RAS 195

Schematic, Voltage Chassis

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 65- Chassis

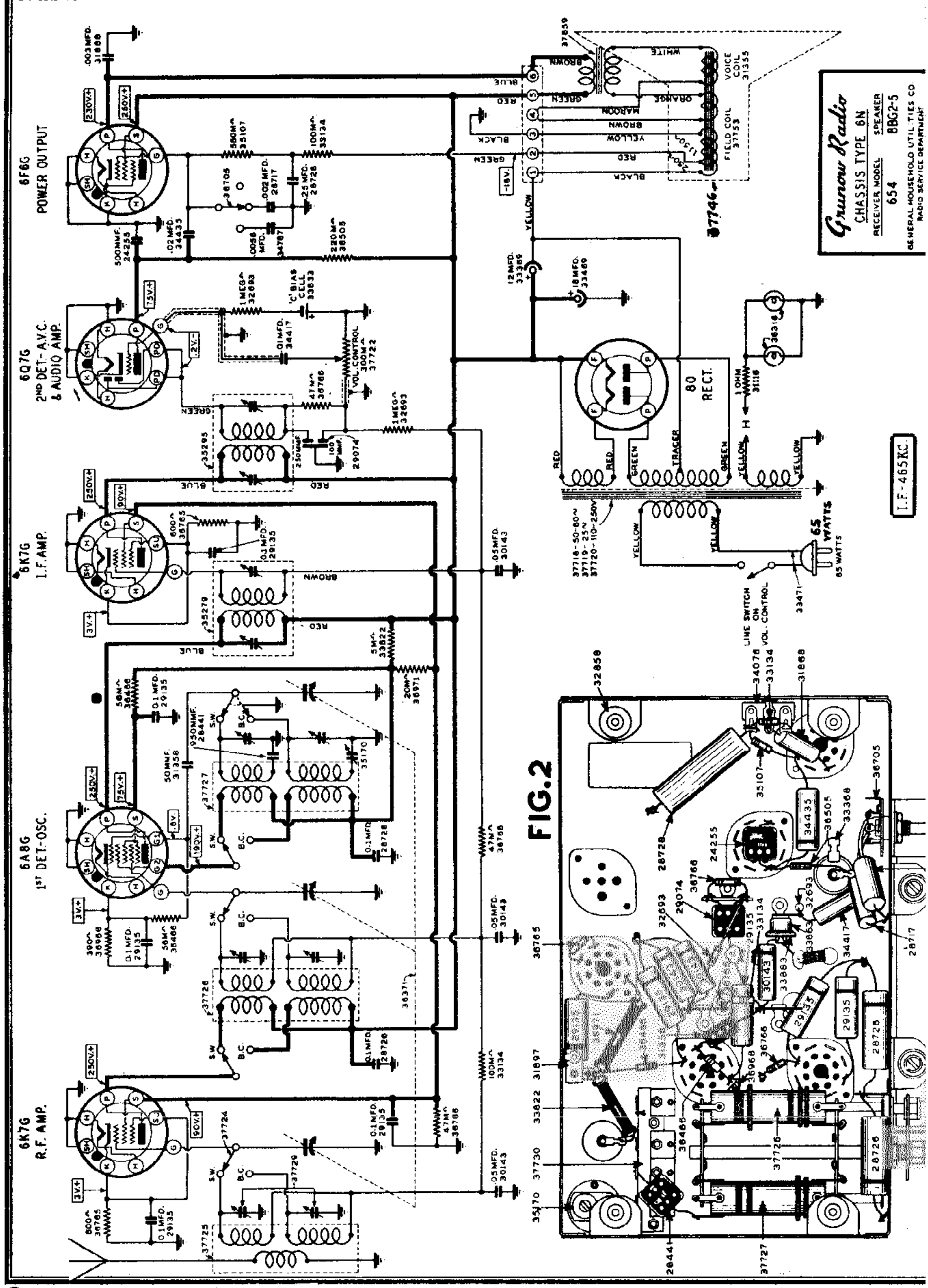
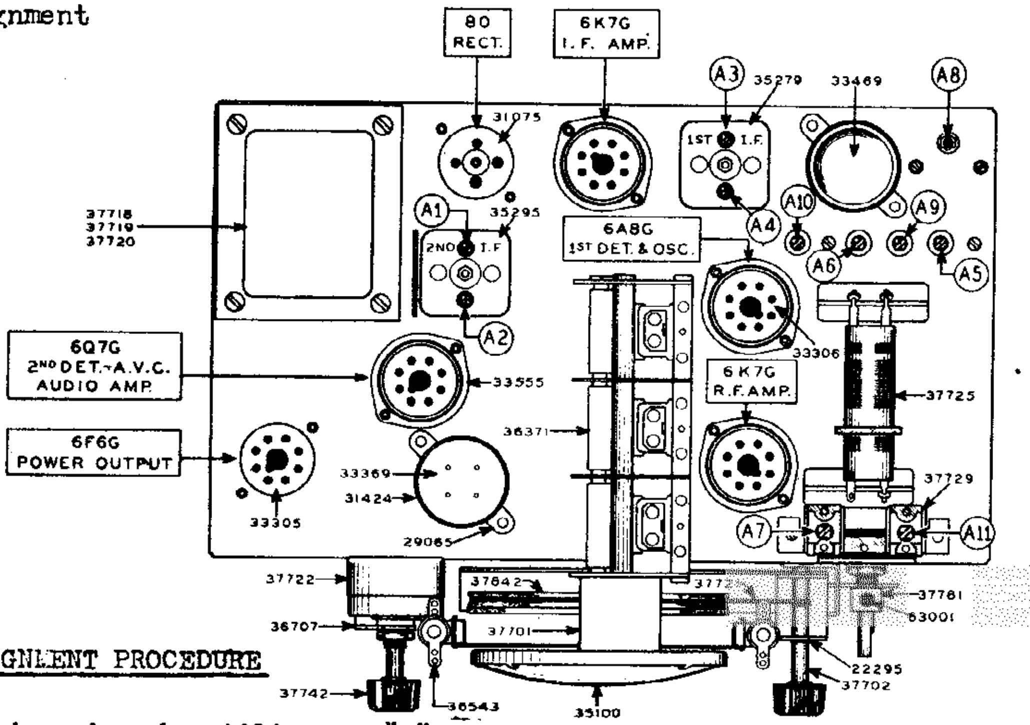


FIG.2

MODEL 654
Chassis 6N
Socket, Trimmers
Alignment

GENERAL HOUSEHOLD UTILITIES CO.



ALIGNMENT PROCEDURE

This chassis utilizes a "C" bias cell in the control grid of the 6Q7 tube. To check the cell, a new one or a 1.5 volt battery must be substituted, a s the cell volta ge cannot be measured with an ordinary voltmeter due to its low current ra ting. When replacing the cell note that the carbon (+) side is connected to the ground side of the terminal clip.

ALIGNING I.F. STAGES AT 465 KC.

Connect the ground lead of the signal generator to the chassis sub-panel. Connect an .05 mfd. cond. in series with the signal lead and connect it to the grid clip of the 6A8 tube. Set sig. gen. at 465 KC and turn receiver volume full-on. Adjust I.F. trimmers A1, A2, A3 & A4 to maximum ouput. To insure accurate adjustment repeat the operation, using the lowest sig. gen. ouput that will give a readable deflection of the output meter.

DIAL CALIBRATION

With the condenser fully meshed the dial pointer should coincide with the horizontal line on the dial chart.

1400 KC. ALIGNMENT

Turn range switch knob to left. Connect a 200 mmf. condenser in series with the signal lead and connect the lead to the antenna wire. Set sig. gen. to 1400 KC. Turn condenser to 140 (1400 KC) dial reading and adjust trimmers A5, A6 & A7 to maximum output.

600 KC. ALIGNMENT

Change sig. gen. to 600 KC. and tune in signal to maximum. (This point may not coincide exactly with 600 KC. dial reading) . Adjust the 600 Kc. padder A8 while rocking the condenser gang slowly in direction of signal increase until no further improvement in output can be obtained.

SHORT WAVE ALIGNMENT

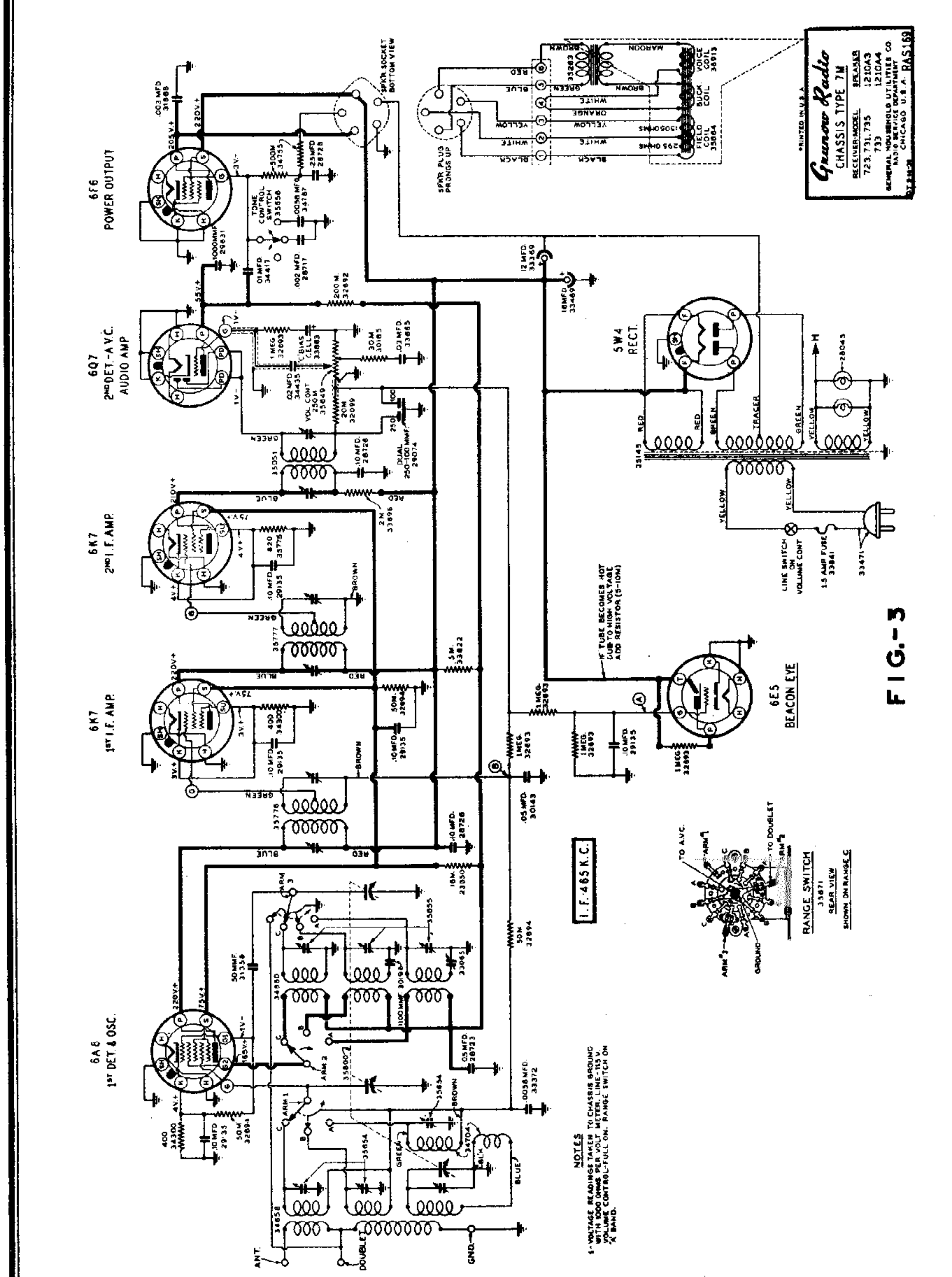
Turn range switch knob to right. Remove 200 mmf. condenser from signal lead and connect a 400 ohm carbon resistor in its place. Change signal gen. to 6 mc. dial reading, adjust trimmers A9, A10 & A11 to maximum output.

Note:- On all of the above operations use the lowest sig. gen. output that will give a readable deflection of the output meter in order to prevent the A . V. C. from levelling the output as adjustments are made.

Schematic, Voltage, Parts

GENERAL HOUSEHOLD UTILITIES CO.

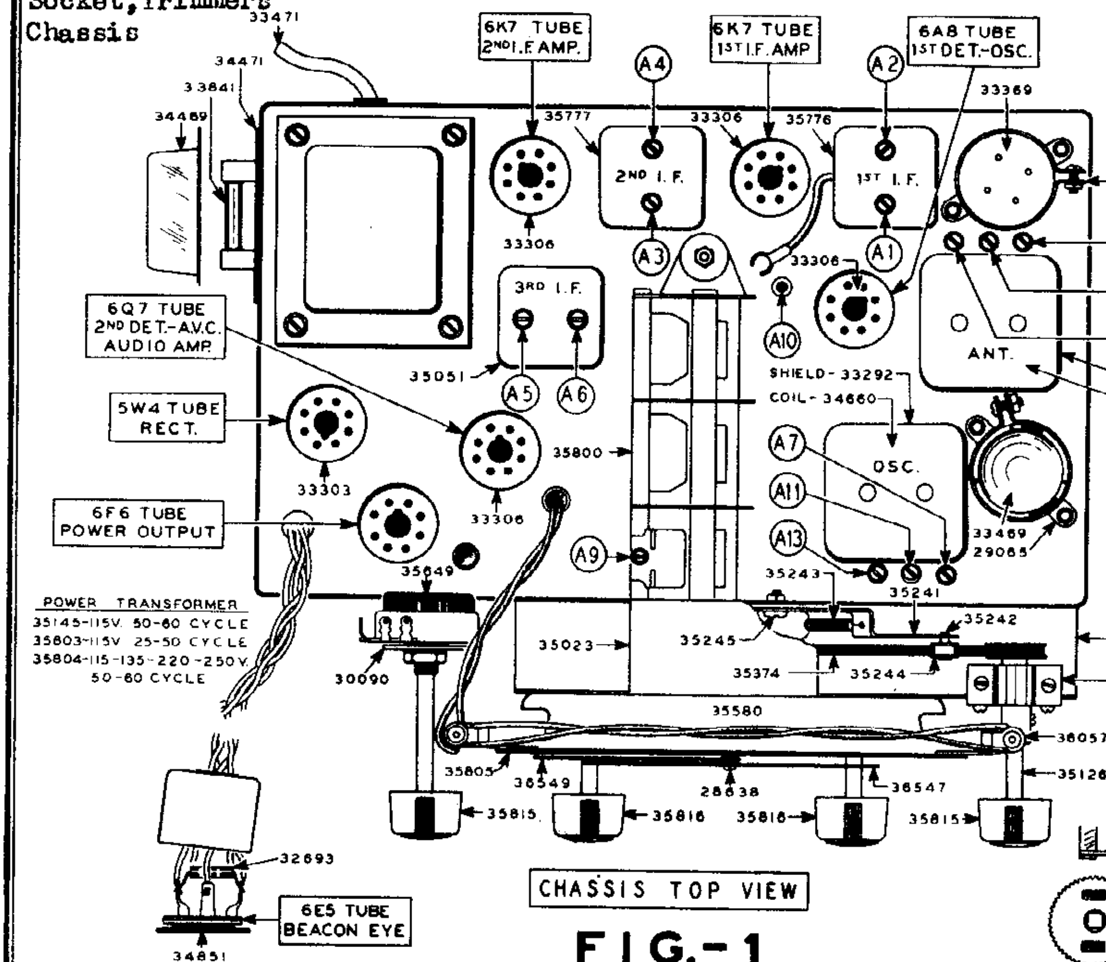
MODELS 723, 731, 733, 735
Chassis 7M



MODELS 723,731
733,735
Socket, Trimmers
Chassis

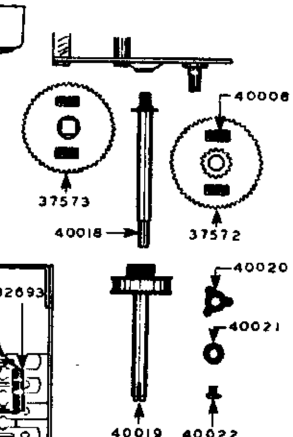
GENERAL HOUSEHOLD UTILITIES CO.

Chassis 7M



CHASSIS TOP VIEW

FIG.-1



CONDENSER DRIVE PARTS

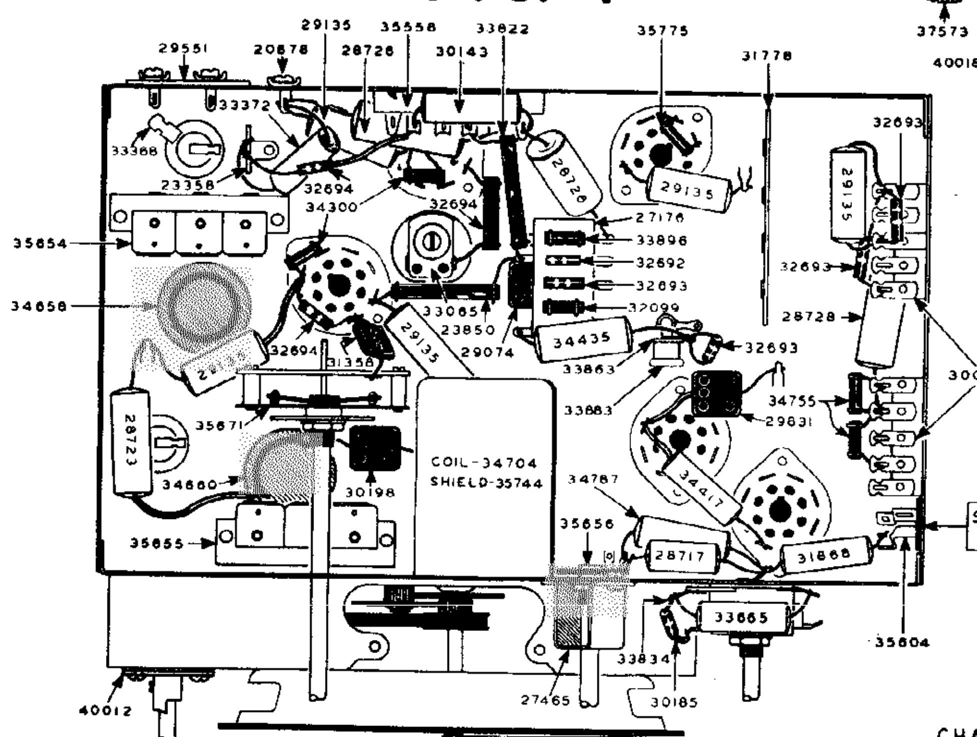


FIG.-2

CHASSIS BOTTOM VIEW

CHASSIS 7M
OCT.1936
RAS 196

Chassis 6M
7M

GENERAL HOUSEHOLD UTILITIES CO.

MODELS 631,643,723
731,733,735
Alignment

Grunow Radio

OCTOBER, 1936
SERVICE DATA

Chassis Type 6M
Receiver Model 631-643

The Grunow Chassis 6M is a six tube, three band superheterodyne receiver, using 1-6A8 1st Detector and Oscillator, 1-6K7 1st I. F. Amplifier, 1-6K7 2nd I. F. Amplifier, 1-6Q7 2nd Detector, A. V.C. and Audio Amplifier, 1-6F6 Power Output, and 1-5W4 Rectifier. The tuning range is divided into three divisions or bands covering from 550 K. C. to 1750 K. C. on the "A" or Broadcast Band, 1750 K. C. to 5.5 M. C. on the "B" or Police Amateur Band and 5.5 M. C. to 18.2 M. C. on the "C" or Foreign Broadcast Band.

SERVICE DATA

CONTINUITY AND VOLTAGE

Tube sockets on the schematic diagram (Fig. 3) are shown bottom view, each element being in its actual position in respect to the guide pin. The voltage measurements shown are average and were taken with a line voltage of 115 V., the volume control "full on" and the range switch in position "A" using a 1000 ohms per volt meter.

REPAIRS

When servicing this chassis it is IMPERATIVE that the service man make all parts replacements in EXACTLY the same way as the original part was located and connected. This applies particularly to ground points. All parts replacements in the R. F. end of the circuit must be exact duplicates of the originals, especially so in the case of coils, R. F. by-pass or coupling condensers. Any repairs in the R. F. circuit will make a complete realignment of the tuned circuit necessary.

BIAS CELL

This Chassis uses a "C" bias cell unit in the control grid of the 6Q7 tube. This type bias cell has an exceedingly long life but occasionally may have to be replaced. When replacing the cell note that the carbon or (+) side is connected to the ground side of all terminal clips. To check the bias cell a new cell or a 1½ volt battery must be substituted, as the cell voltage cannot be measured with an ordinary voltmeter due to its low current rating.

CIRCUIT ALIGNMENT EQUIPMENT

Do not attempt to align the 6M Chassis without the equipment specified below:

1. Signal Generator—A modulated oscillator capable of delivering signals from 465 K.C. to 18.2 M.C.

2. Alignment Tool—A non-metallic screw driver.

3. Dummy Antenna — .05 Mfd. Condenser (I. F. Alignment); 200 Mmfd. Condenser (Broadcast Alignment); 400 Ohm Carbon Resistor (Short Wave Alignment).

4. Output Meter—A meter of sufficient sensitivity to give a good deflection at very low signal input.

Note: The receiver should be aligned in a location free from local interference. A screen room is recommended.

CIRCUIT ALIGNMENT PROCEDURE

1. HEATING

(A) Allow the receiver to heat up for a period of 20 to 30 minutes. This is necessary in order to eliminate possible alignment variations due to the thermal expansion and contraction of the capacitors and inductances.

(B) Allow the signal generator to warm up in order to prevent frequency drift during alignment.

2. DIAL CALIBRATION

Turn the condenser until the plates are fully meshed, set the pointer (Hour Hand) to 9 and 3 on the outer edge of dial chart. Set the vernier pointer (Minute Hand) to the line pointing to 12

3. SIGNAL GENERATOR ADJUSTMENT.

During the entire alignment procedure the signal input from the generator to the receiver must be continually attenuated at the generator as the various trimmers are brought into resonance. This is necessary in order to hold the signal at the lowest intensity so that the A. V. C. Circuit will remain at the most sensitive point.

4. I. F. ALIGNMENT

(A) Set the generator to 465 K.C. and connect the output lead to the control grid of the 6A8 tube through the .05 Mfd. dummy and the generator ground to the chassis ground post.

(B) Set the receiver dial pointer to 600 K.C., the range switch to position "A" and turn the volume control full on.

(C) Connect the output meter across the two primary terminals on the output transformer.

(D) Adjust the I. F. Trimmers A1, A2, A3, A4, A5, and A6 to maximum output.

5. 1500 K.C. ALIGNMENT

(A) Set the generator to 1500 K.C. and connect the output to the antenna post on the chassis through the 200 Mmfd. dummy.

(B) Set the receiver dial pointer to 1500 K.C.

(C) Adjust the trimmers (A7) Oscillator, (A8) Detector and (A9) Antenna to maximum output.

6. 600 K.C. ALIGNMENT

(A) Set generator to 600 K.C.

(B) Set receiver dial pointer to 600 K.C.

(C) Turn trimmer (A10) in direction of signal increase and at the same time rock tuning condenser slowly back and forth through resonance until the exact resonant point on both is obtained.

7. 5 M.C. ALIGNMENT

(A) Set generator to 5 M.C.

(B) Set receiver range switch to position "B" and dial pointer to 5 M.C.

(C) Adjust trimmer (A11) Oscillator and (A12) Antenna to maximum output.

8. 18 M.C. ALIGNMENT

(A) Set generator to 18 M.C. and connect the output to the chassis Antenna post through the 400 Ohm dummy.

(B) Set the receiver range switch to position "C" and the dial pointer to 18 M.C.

(C) Screw the Oscillator trimmer (A13) down tight and back off until signal is heard, then rock the tuning condenser slowly back and forth through resonance until exact resonant point is determined.

(D) Adjust Antenna trimmer (A14) to maximum output

(E) Readjust Oscillator trimmer(A13) to maximum output.

OCTOBER, 1936
SERVICE DATA

Chassis Type 7M
Receiver Model 723, 731, 733, 735
Speaker Type 1210A3-1210A4

The Grunow Chassis 7M is a seven tube, three band superheterodyne receiver using 1-6E5 Beacon Eye tuning indicator, 1-6A8 1st Detector and Oscillator, 1-6K7 1st I. F. Amplifier, 1-6K7 2nd I. F. Amplifier, 1-6Q7 2nd Detector, A.V.C. and Audio Amplifier, 1-6F6 Power Output and 1-5W4 Rectifier. The tuning range is divided into three divisions or bands covering from 550 K.C. to 1750 K.C. on "A" Broadcast Band, 1750 K.C. to 5.5 M.C. on the "B" Police Amateur Band, and 5.5 M.C. to 18.2 M.C. on the "C" Foreign Broadcast Band.

SERVICE DATA

CONTINUITY AND VOLTAGE

Tube sockets on the schematic diagram (Fig. 3) are shown bottom view, each element being in its actual position in respect to the guide pin. The voltage measurements shown are average and were taken with a line voltage of 115 V., the volume control "full on" and the range switch in position "A" using a 1000 ohms per volt meter.

REPAIRS

When servicing this chassis it is IMPERATIVE that the service man make all parts replacements in EXACTLY the same way as the original part was located and connected. This applies particularly to ground points. All parts replacements in the R.F. end of the circuit must be exact duplicates of the originals, especially so in the case of coils, R.F. by-pass or coupling condensers. Any repairs in the R.F. circuit will make a complete realignment of the tuned circuit necessary.

BIAS CELL

This Chassis uses a "C" bias cell unit in the control grid of the 6Q7 tube. This type bias cell has an exceedingly long life, but occasionally may have to be replaced. When replacing the cell, note that the carbon or (+) side is connected to the ground side of cell terminal clip. To check the bias cell, a new cell or a 1½ volt battery must be substituted, as the cell voltage cannot be measured with an ordinary voltmeter due to its low current rating.

BEACON EYE SENSITIVITY ADJUSTMENTS

The 6E5 Beacon Eye tube is designed to give the best results with the proper size antenna. However, where a full sized antenna cannot be erected or an inside antenna must be used, a type 6G5 Beacon Eye Tube can be substituted by making the following changes in the wiring of the circuit:

Refer to schematic diagram Fig. 3 and disconnect the "Green" grid wire at point "A" and connect to point "B". This change can be made quickly and will give a maximum sensitivity on the weaker signals.

CIRCUIT ALIGNMENT EQUIPMENT — Do not attempt to align the 7M Chassis without the equipment specified below:

1. Signal Generator—A modulated oscillator capable of delivering signals from 465 K.C. to 18.2 M.C.

2. Alignment Tool—A non-metallic screw driver.

3. Dummy Antenna — .05 Mfd. Condenser (I. F. Alignment); 200 Mmfd. Condenser (Broadcast Alignment); 400 Ohm Carbon Resistor (Short Wave Alignment).

4. Output Meter—A meter of sufficient sensitivity to give a good deflection at very low signal input.

Note: The receiver should be aligned in a location free from local interference. A screen room is recommended.

CIRCUIT ALIGNMENT PROCEDURE

1. HEATING

(A) Allow the receiver to heat up for a period of 20 to 30 minutes. This is necessary in order to eliminate possible alignment variations due to the thermal expansion and contraction of the capacitors and inductances.

(B) Allow the signal generator to warm up in order to prevent frequency drift during alignment.

2. DIAL CALIBRATION

Turn the condenser until the plates are fully meshed, set the pointer (Hour Hand) to 9 and 3 on the outer edge of dial chart. Set the vernier pointer (Minute Hand) to the line pointing to 12.

3. SIGNAL GENERATOR ADJUSTMENT

During the entire alignment procedure the signal input from the generator to the receiver must be continually attenuated at the generator as the various trimmers are brought into resonance. This is necessary in order to hold the signal at the lowest intensity so that the A. V. C. Circuit will remain at the most sensitive point.

4. I. F. ALIGNMENT

(A) Set the generator to 465 K.C. and connect the output lead to the control grid of the 6A8 tube through the .05 Mfd. dummy and the generator ground to the chassis ground post.

(B) Set the receiver dial pointer to 600 K.C. the range switch to position "A" and turn the volume control full on.

(C) Connect the output meter across the two primary terminals on the output transformer.

(D) Adjust the I. F. Trimmers A1, A2, A3, A4, A5, and A6 to maximum output.

5. 1500 K.C. ALIGNMENT

(A) Set the generator to 1500 K.C. and connect the output to the antenna post on the chassis through the 200 Mmfd. dummy.

(B) Set the receiver dial pointer to 1500 K.C.

(C) Adjust the trimmers (A7) Oscillator, (A8) Detector and (A9) Antenna to maximum output.

6. 600 K.C. ALIGNMENT

(A) Set generator to 600 K.C.

(B) Set receiver dial pointer to 600 K.C.

(C) Turn trimmer (A10) in direction of signal increase and at the same time rock tuning condenser slowly back and forth through resonance until the exact resonant point on both is obtained.

7. 5 M.C. ALIGNMENT

(A) Set generator to 5 M.C.

(B) Set receiver range switch to position "B" and dial pointer to 5 M.C.

(C) Adjust trimmer (A11) Oscillator and (A12) Antenna to maximum output.

8. 18 M.C. ALIGNMENT

(A) Set generator to 18 M.C. and connect the output to the chassis Antenna post through the 400 Ohm dummy.

(B) Set the receiver range switch to position "C" and the dial pointer to 18 M.C.

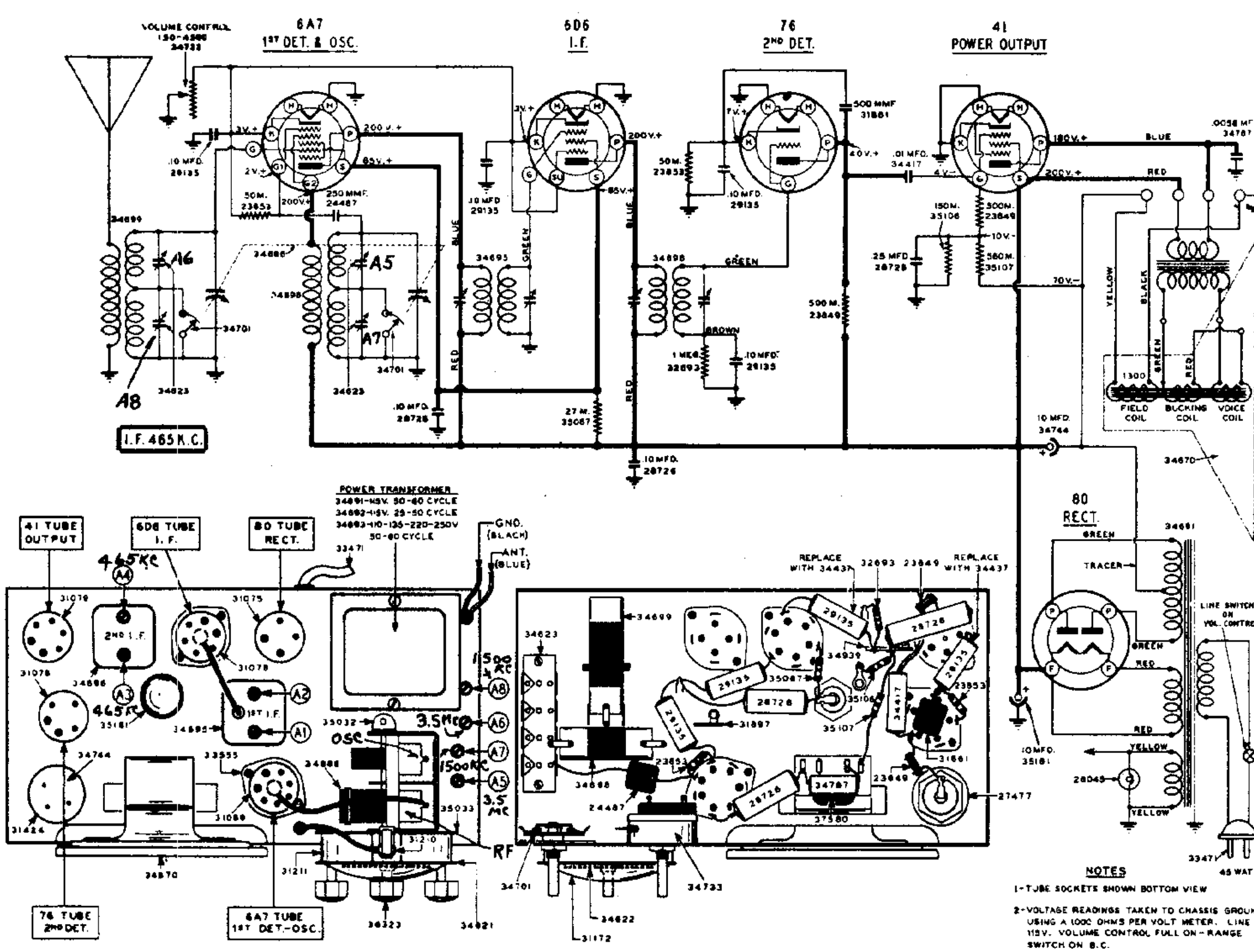
(C) Screw the Oscillator trimmer (A13) down-tight and back off until signal is heard, then rock the tuning condenser slowly back and forth through resonance until exact resonant point is determined.

(D) Adjust Antenna trimmer (A14) to maximum output.

(E) Readjust Oscillator trimmer(A13) to maximum output.

MODEL 532
Chassis 5H
Schematic, Voltage
Parts, Chassis
Socket, Trimmers
Alignment

GENERAL HOUSEHOLD UTILITIES CO.



NOTES
1-TUBE SOCKETS SHOWN BOTTOM VIEW
2-VOLTAGE READINGS TAKEN TO CHASSIS GROUND, USING A 1000 OHMS PER VOLT METER. LINE-115V. VOLUME CONTROL FULL ON-RANGE SWITCH ON B.C.

PARTS PRICE LIST

PART NO.	DESCRIPTION	REQ	PRICE
23849	RES. REPLACE WITH 34755		
23853	RES. REPLACE WITH 32694		
24255	CONDENSER-MICA-500MMF.	1	.20
24487	COND. REPLACE WITH 30880		
27422	STEP WASHER (ELEC. COND.)	1	.02
27427	WASHER-INSUL. (ELEC. COND.)	1	.02
27801	GROMMET-RUBBER	1	.05
27802	CUP WASHER	1	.02
28045	PILOT BULB	1	.15
28726	COND. REPLACE WITH 34437		
28728	CONDENSER-TUB. .25MFD.	1	.35
30880	CONDENSER-MICA-250MMF.	1	.20
31075	SOCKET-4 PRONG TUBE	1	.10
31078	SOCKET-5 PRONG TUBE	1	.10
31079	SOCKET-6 PRONG TUBE	2	.15
31080	SOCKET-7 PRONG TUBE	1	.15
31172	WINDOW (DIAL)	1	.20
31210	SOCKET (PILOT LIGHT)	1	.10
312 1	REFLECTOR	1	.25
31424	SHIELD (ELECTRO. COND.)	1	.10
31881	COND. REPLACE WITH 24255		
31887	MTG. LUG STRIP	1	.10
32693	RESISTOR-1 MEG. OHM	1	.15
32694	RESISTOR-50M	2	.15
33471	LINE CORD & PLUG	1	.40
33554	CAP (TUBE SHIELD)	2	.02
33555	BASE (TUBE SHIELD)	2	.02
34417	CONDENSER-TUB. .01MFD.	1	.25
34437	CONDENSER-TUB. .10MFD.	6	.35
34621	DIAL CHART	1	.40
34622	POINTER	1	.10
34623	TRIMMER ASSEMBLY	1	.70
34686	CONDENSER-VARIABLE	1	3.00
34691	POWER TRANS.-115V. 50-60~	1	5.00
34692	POWER TRANS.-115V. 25-60~	1	6.50
34693	POWER TRANS.-UNIVERSAL	1	6.50
34695	COIL & SHIELD-1ST I.F.	1	2.00
34696	COIL & SHIELD-2ND I.F.	1	1.75
34698	OSCILLATOR COIL	1	.75
34699	ANTENNA COIL	1	.75
34701	RANGE S	1	.80
34733	VOLUME	1	1.25
34744	COND.-EL D.	1	1.25
34755	RESISTO	2	.15
34787	COND.-T	1	.25
34935	HALF TUB T)	2	.03
34936	HALF TUBE SHIELD (LONG)	2	.03
34939	TERMINAL STRIP	1	.10
35032	COND. MTG. BRKT. (REAR)	1	.05
35033	REFLECTOR MTG. PLATE	1	.15
35056	BRACE (SUB. PANEL)	1	.10
35087	RESISTOR-27M OHM	1	.15
35106	RESISTOR-150M OHM	1	.15
35107	RESISTOR-560M OHM	1	.15
35181	COND.-ELECRO.-10MFD.	1	1.00
35326	ESCUTCHEON	1	.50
36323	KNOB	3	.20
4263	SCREW (ESCUTCH. MT'G.)	4	.01
43647	FLAT WASHER	4	.01
43948	FELT WASHER	3	.01
SPEAKER PARTS			
	PLETE	1	5.50
	COIL ASSY.	1	1.50
		1	2.10
	SFORMER	1	1.50
	ASKET	1	.10

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

Grunow Radio
CHASSIS TYPE 5H

RECEIVER MODEL	SPEAKER
532	34670

GENERAL HOUSEHOLD UTILITIES CO.
RADIO SERVICE DEPARTMENT
CHICAGO U.S.A.
RAS 157

FREQUENCY RANGE:
540 to 1560 KC - Trim at 1500 KC, No Pad. (A7, A8)
1500 KC to 4.4 MC - Trim at 3.5 MC, No Pad. (A5, A4)

CONVENTIONAL ALIGNMENT-SEE SPECIAL SECTION

MODEL 711
Chassis 7NB
Schematic, Part
Voltage

GENERAL HOUSEHOLD UTILITIES CO.

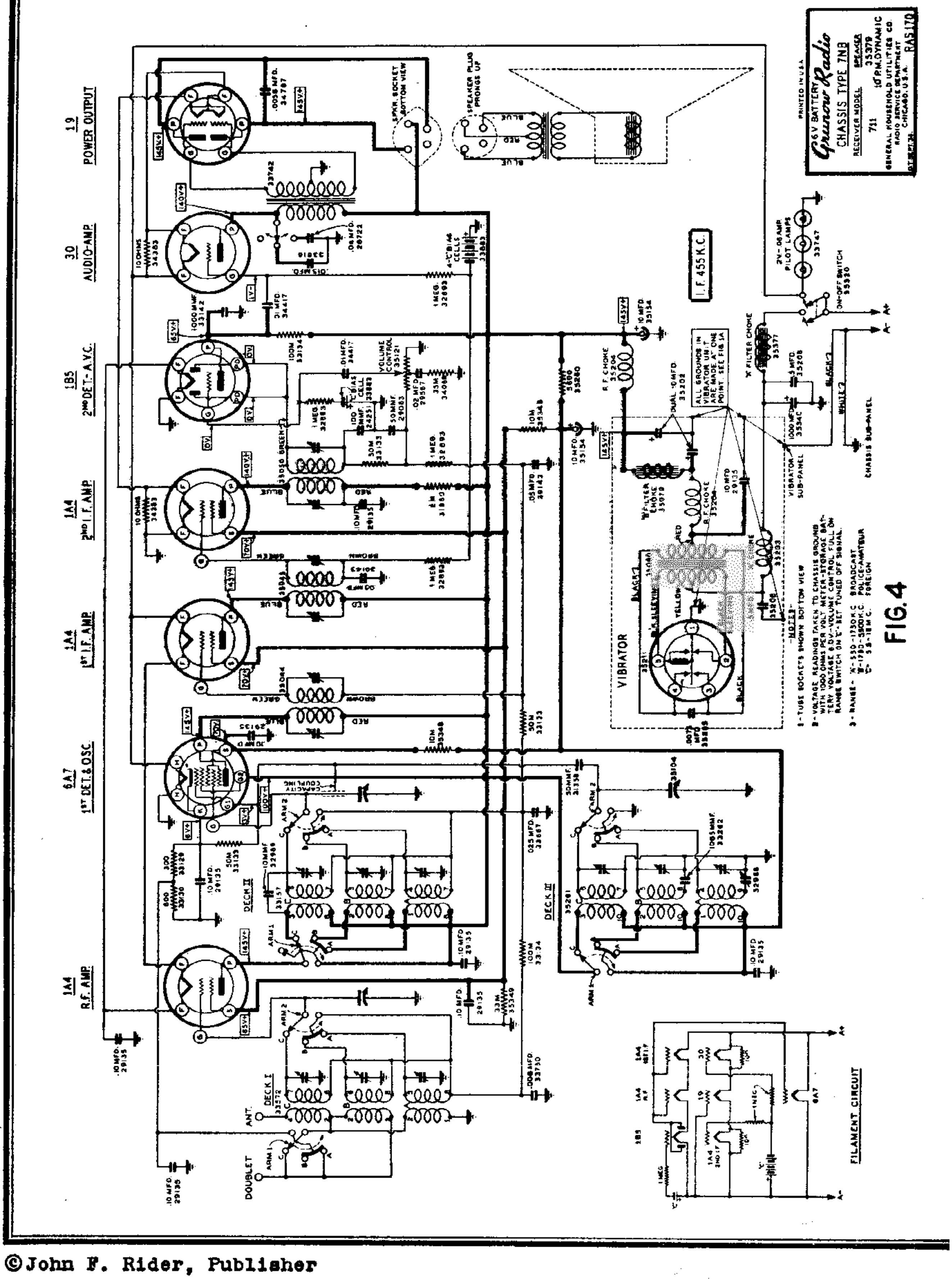
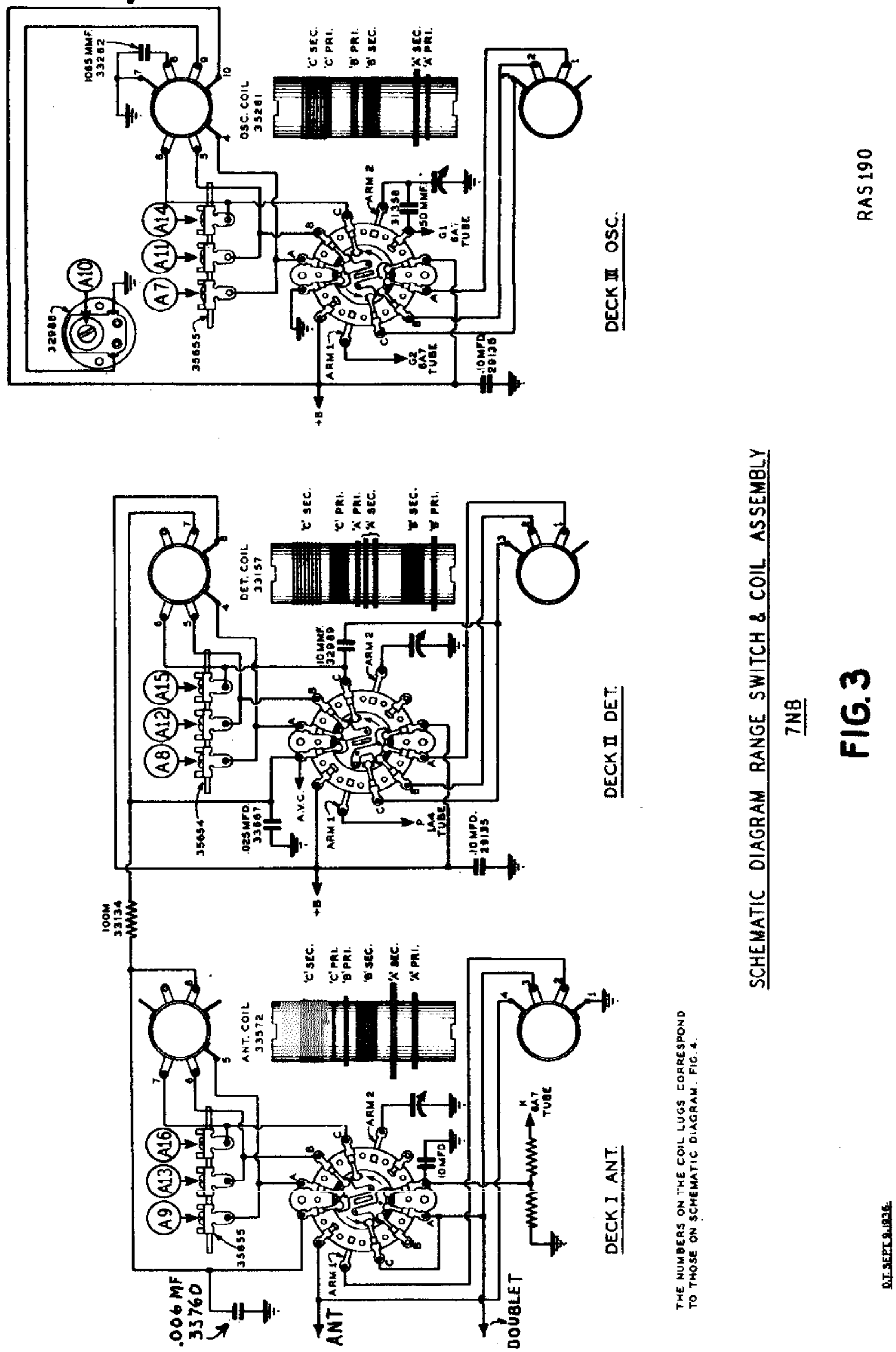


FIG. 4

MODEL 711
Chassis 7NB
Switch and Coil Assembly

GENERAL HOUSEHOLD UTILITIES CO.



SCHEMATIC DIAGRAM RANGE SWITCH & COIL ASSEMBLY
7NB
FIG. 3

MODEL 711
Chassis 7NB
Socket, Trimmers
Chassis, Vibrator

GENERAL HOUSEHOLD UTILITIES CO.

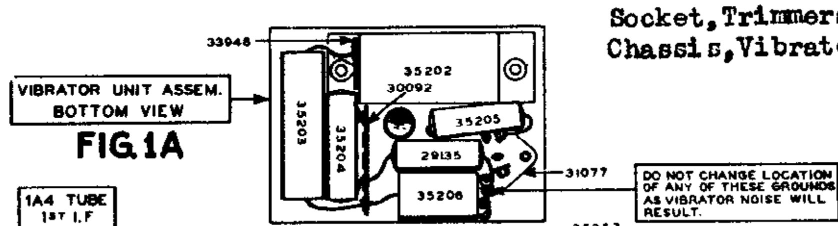
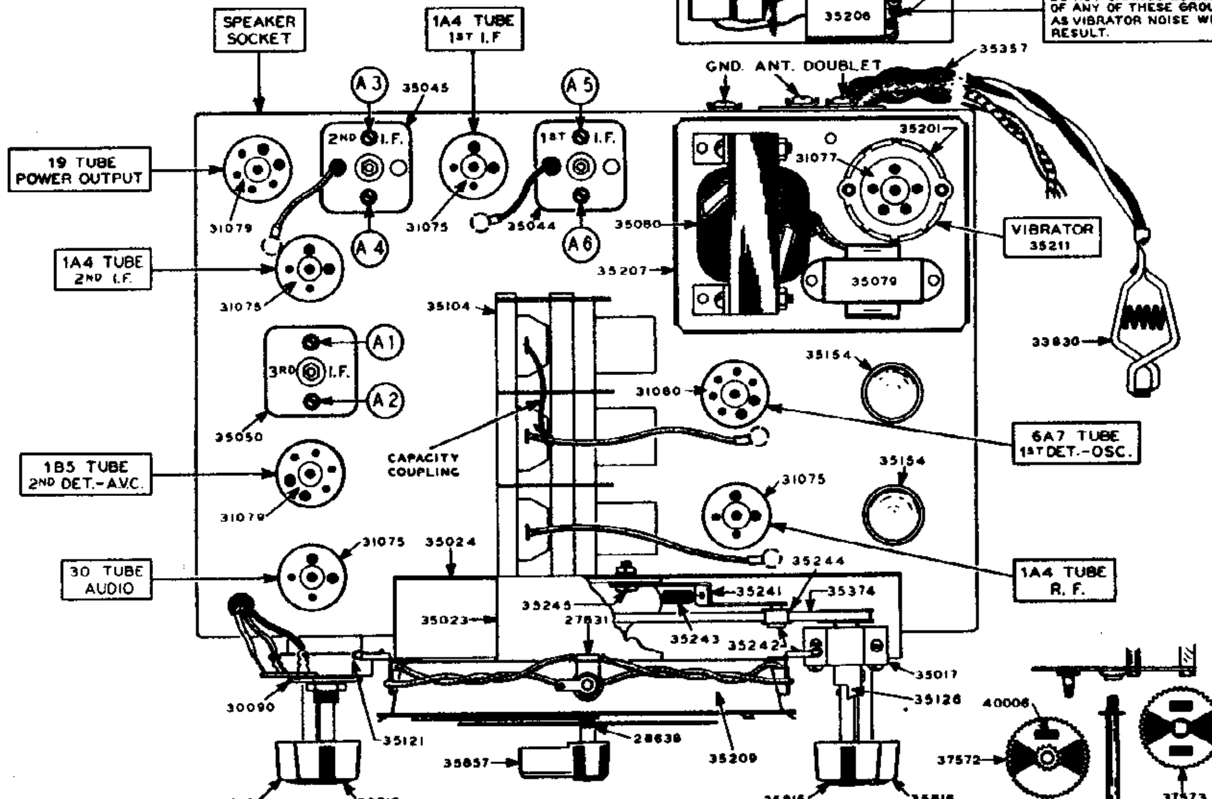
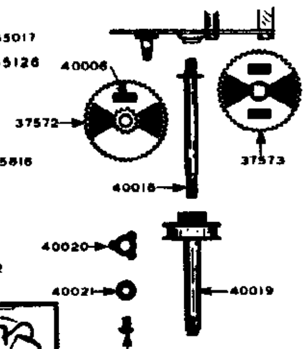


FIG. 1A



CHASSIS TOP VIEW

FIG. 1



CONDENSER DRIVE PARTS

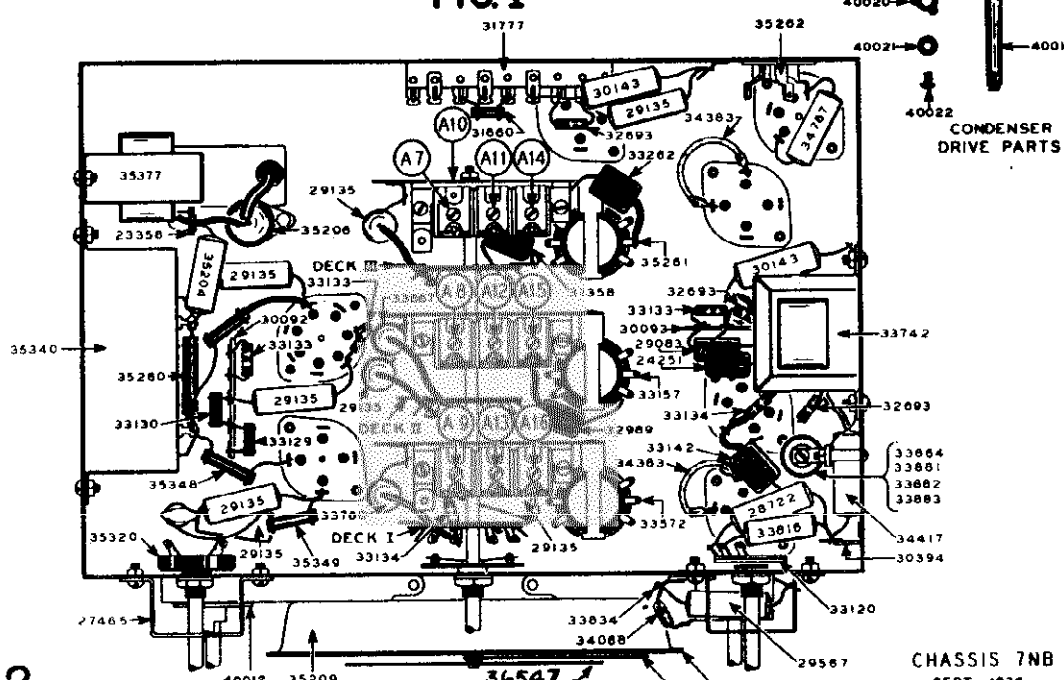


FIG. 2

CHASSIS BOTTOM VIEW

CHASSIS 7NB
SEPT. 1936
RAS 189

MODEL 711
Chassis 7NB
Alignment

GENERAL HOUSEHOLD UTILITIES CO.

Grunow Radio

SEPTEMBER 1936

SERVICE NOTES

Chassis Type 7NB
Receiver Model 711
Speaker Type 10" P.M. Dynamic

SERVICE DATA

The GRUNOW 7 NB Chassis is a seven tube superheterodyne receiver, with a vibrator type power supply designed to operate from a 6 volt battery. The major features are three Tuning Ranges, covering Standard Broadcast, Police, Amateur, and Foreign Broadcast bands, A.V.C., a Full Face "Band Spread" Dial and the new Permo-Flux Speaker.

The three tuning ranges of the receiver cover, First, the Standard Broadcast Band (A) from 550 K.C. to 1750 K.C.; Second, the Police Amateur Band (B) from 1750 K.C. to 5500 K.C.; and Third, the Foreign Reception Band (C) from 5.5 M.C. to 18 M.C.

CONTINUITY AND VOLTAGE

Continuity and voltage measurements should be taken from the underside of the chassis. The values shown on the schematic diagram are based on an average and allow the service man to make a quick check of the chassis constants. All tube connections and sockets are shown on the schematic diagram as viewed from the bottom.

RANGE SWITCH

The Range Switch is a three deck multipole low contact resistance switch, used to connect the various coils into their proper circuits, and is designed to entirely isolate the coils, which are not in use, by grounding them. This method makes it possible for the receiver to operate on each of the three tuning ranges at a maximum sensitivity and selectivity.

The Range Switch and Coil Assembly is shown schematically (Fig. 3) with each section and the proper connections to the coil drawn separately so as to enable the service man to check or make necessary repairs with ease. All connection number designations are duplicated on the chassis schematic (Fig. 4).

POWER SUPPLY UNIT

The Power or "B" voltage in this receiver is the popular six volt vibrator type which eliminates the use of "B" batteries and the vibrator is the "plug in" type ordinarily used in automobile receivers. The electrical layout and vibrator socket connections are shown schematically in Fig. 4. UNDER NO CONDITIONS SHALL THE COMMON GROUND POINT BE CHANGED IN THIS UNIT.

BIAS CELLS

The 7 NB Chassis uses "C" bias cell units in both the Detector A.V.C. and Audio Amplification Circuits, one in the Grid of the 1B5 tube and four in the Grid of the 30 tube.

These cells may have to be replaced occasionally, and when doing so, note that the carbon or (+) side is connected to the ground side of the cell terminal clip.

An indication of a faulty cell will be distorted tone quality. This may be checked by the substitution of new cells in place of the old, or for testing purposes a "C" battery may be used—using a 1½ volt tap for a single cell or 4½ volts for the 4 unit cell.

This bias cell has a voltage of 1½ volts, but due to its low current output it cannot be measured by any ordinary volt meter.

REPAIRS

When servicing this chassis it is IMPERATIVE that the service man make all parts replacements in EXACTLY the same way as the original part was connected and located. This applies particularly to all ground points.

All parts replacements in the R.F. end of the circuit must be exact duplicates of the originals, especially so in the case of R.F. Bypass, or Coupling Condensers.

Any repairs in the R.F. circuit will make a complete realignment of the entire tuned circuit necessary.

ALIGNMENT PROCEDURE

Do not attempt to align the 7 NB Chassis without the proper equipment as the calibration, selectivity and sensitivity absolutely depend upon the conformance to the following instructions.

Alignment trimmer screws are plainly shown in the accompanying illustrations and are numbered in the order of procedure.

1. EQUIPMENT:

(A) Test Oscillator.
A modulated oscillator capable of producing signals at the I.F., Broadcast and Short-Wave frequencies.

(B) Insulated Screw Driver—(All bakelite or fibre) about 6" long.

(C) Output Meter.
A meter of sufficient sensitivity to provide a good deflection at low signal strength.

(D) Dummy Antenna.
.05 mfd. condenser (I.F. Alignment).
200 mmfd. condenser (Broadcast Alignment).
400 Ohm carbon resistor (18 M.C. Alignment).

(E) The receiver should be aligned in a location as free from local interference as possible, as static disturbances will cause difficulties in aligning the Short-Wave section. A screen room is recommended in order to obtain the best results.

2. CALIBRATION OF THE DIAL:

Turn tuning knob until condensers are fully meshed. The dial pointer (Hour Hand) at this position must be set on the horizontal line of the dial, pointing to 9 and 3 o'clock.

The Band Spreading Pointer (Minute Hand) must be set to the vertical position, pointing to 12 o'clock.

3. Connect the chassis to a fully charged storage battery and allow the set to heat up for 20 to 30 minutes. This heating period is necessary in order to allow all coils and condensers to reach their normal temperatures so that when the alignment is complete, there will be no inductance or capacity changes due to thermal expansion or contraction.

Note: The above also applies to the oscillator.

4. I.F. ALIGNMENT:

(A) Connect signal lead of the oscillator to the control grid of the 6A7 First Detector Tube through a .05 mfd. condenser. Connect the oscillator ground to the chassis ground post.

(B) Set the dial pointer to 1400 K.C. and the range switch at position "A" (Standard Broadcast). Turn the volume control to maximum and tone control to high.

(C) Set the oscillator to 455 K.C. and adjust the signal to as low a value as can be read efficiently on the output meter.

(D) Adjust the I.F. Trimmers in sequence of numbering (1-2-3-4-5-6) until the maximum signal with the lowest input is obtained.

The signal input must be kept as low as possible in order to prevent any A.V.C. action in the receiver.

5. 1400 K.C. ALIGNMENT:

(A) Set Oscillator to 1400 K.C.

(B) Turn dial pointer to 1400 K.C. and range switch to position "A" (Broadcast Band).

(C) Adjust Broadcast Oscillator Trimmer, (A7) Fig. 2, to maximum output.

(D) Adjust Detector Trimmer, (A8) Fig. 2, to maximum output.

(E) Adjust Antenna Trimmer, (A9) Fig. 2, to maximum output.

6. 600 K.C. ALIGNMENT:

(A) Set oscillator to 600 K.C.

(B) Set chassis dial pointer to 600 K.C.

(C) Adjust the 600 K.C. padding condenser, (A10) Fig. 2, in the direction of signal increase, at the same time rock the tuning condenser back and forth slowly so as to determine the exact point of greatest output.

7. Recheck the 1400 K.C. alignment (Operation 5.) This is necessary because the change in the capacity of the 600 K.C. padder may have slightly unbalanced the 1400 K.C. alignment.

8. 5000 K.C. ALIGNMENT:

(A) Set oscillator to 5000 K.C.

(B) Set the Range Switch to position "B" (Police Amateur Band).

(C) Set the dial pointer to 5000 K.C.

(D) Adjust the Oscillator Trimmer, (A11) Fig. 2, to maximum output.

(E) Adjust the Detector Trimmer, (A12) Fig. 2, to maximum output.

(F) Adjust Antenna Trimmer, (A13) Fig. 2, to maximum output.

9. 18 MEGACYCLE ALIGNMENT:

(A) Set oscillator to 18 M.C. and connect the output lead to the chassis Antenna post through a 400 ohm resistor.

(B) Set Range Switch on position "B" (Foreign Reception band).

(C) Set the dial pointer to 18 M.C.

(D) Adjust the Oscillator Trimmer, (A14) Fig. 2, to maximum output.

(E) Adjust the Detector Trimmer, (A15) Fig. 2, to maximum output.

(F) Adjust the Antenna Trimmer, (A16) Fig. 2, to maximum output.

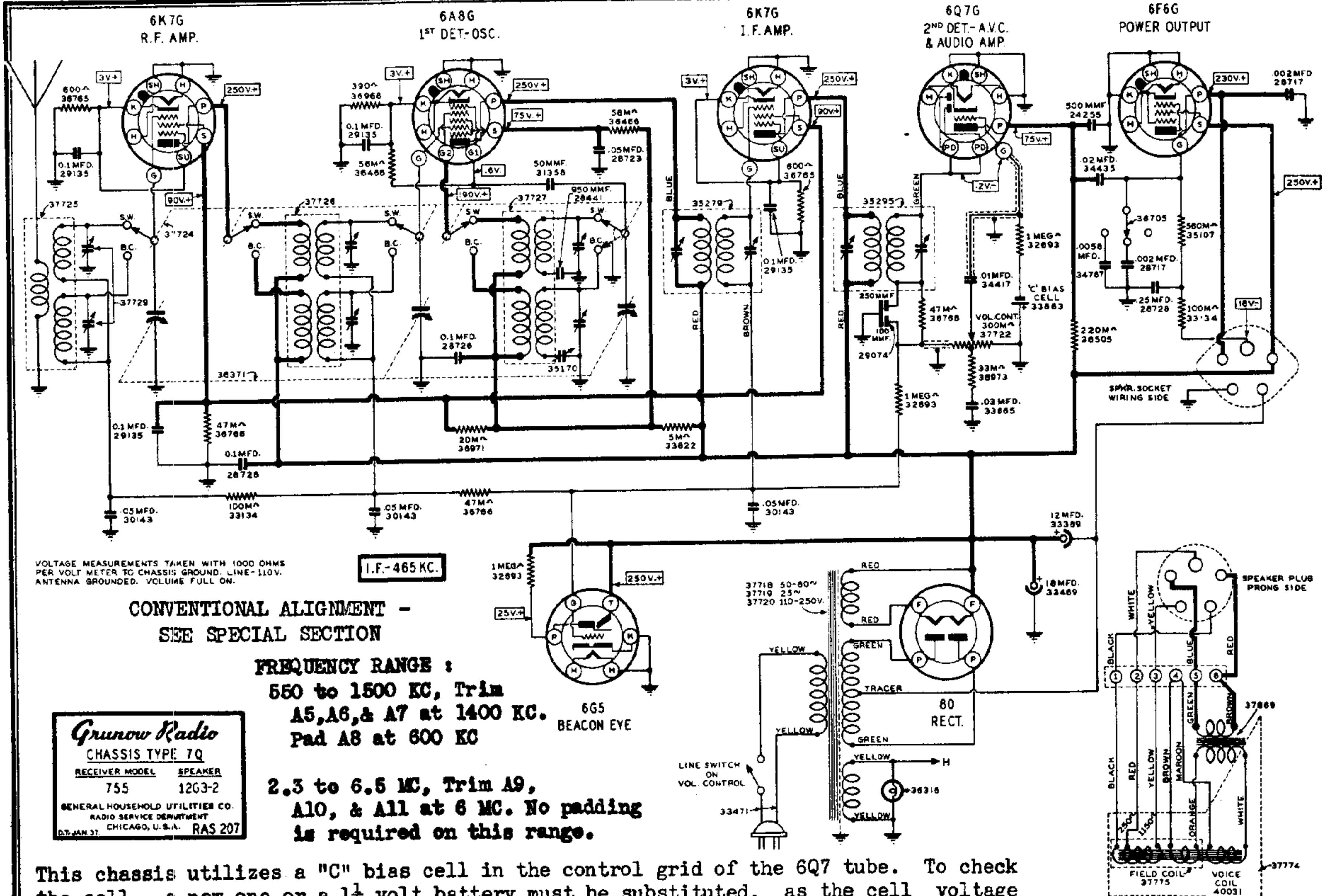
Note: When adjusting the 18 M.C. Oscillator Trimmer, screw down tightly and then back off until signal is heard.

To obtain the utmost sensitivity on the 18 M.C. Band, it is necessary, when adjusting the Detector Trimmer (A15), to rock the tuning condenser slowly through resonance until the point of maximum output is determined. Return to the Oscillator Trimmer and make any necessary re-adjustment.

Schematic, Voltage
Parts, Alignment

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 755
Chassis 7Q



CONVENTIONAL ALIGNMENT -
SEE SPECIAL SECTION

FREQUENCY RANGE :
550 to 1500 KC, Trim A5, A6, & A7 at 1400 KC. Pad A8 at 600 KC

2.3 to 6.5 MC, Trim A9, A10, & A11 at 6 MC. No padding is required on this range.

Grunow Radio
CHASSIS TYPE 7Q

RECEIVER MODEL	SPEAKER
755	12G3-2

GENERAL HOUSEHOLD UTILITIES CO.
RADIO SERVICE DEPARTMENT
CHICAGO, U.S.A. RAS 207
D.T. JAN. 37.

This chassis utilizes a "C" bias cell in the control grid of the 6Q7 tube. To check the cell, a new one or a 1½ volt battery must be substituted, as the cell voltage cannot be measured with an ordinary voltmeter due to its low current rating. When replacing the cell note that the carbon (+) side is connected to the ground side of the terminal clip.

MODEL 755
Chassis 7Q
Socket, Trimmers
Chassis

GENERAL HOUSEHOLD UTILITIES CO.

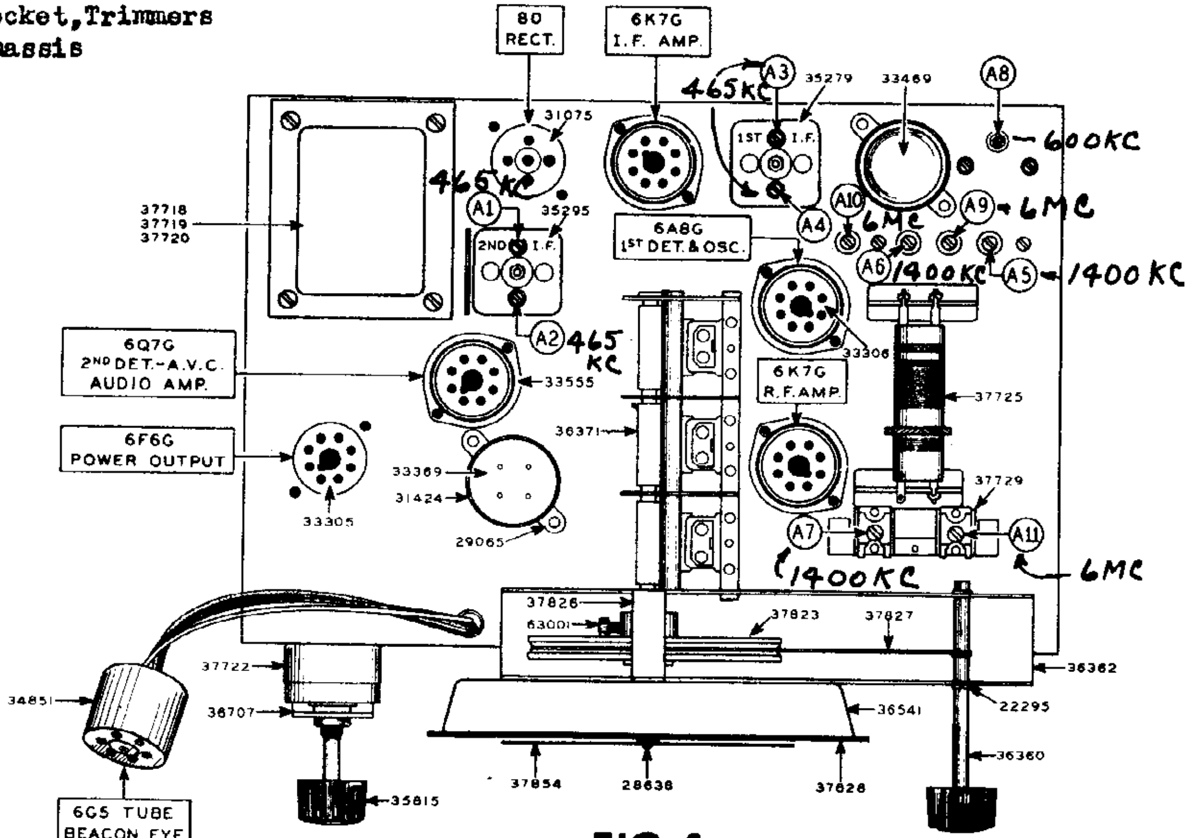


FIG. 1

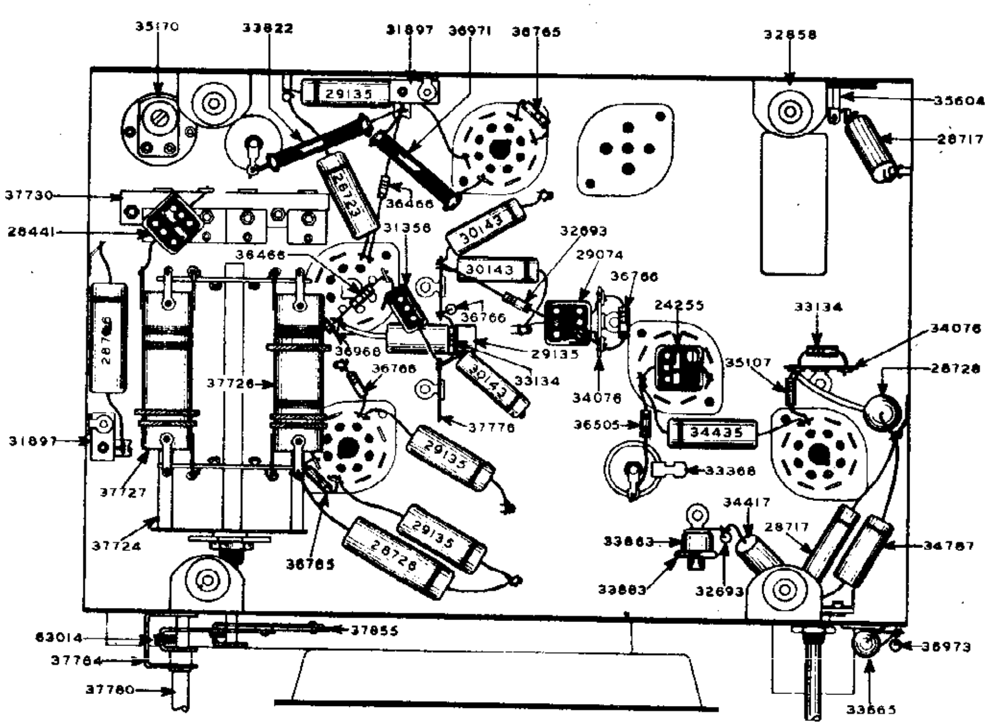


FIG. 2

CHASSIS TYPE 7Q

Schematic, Voltage, Parts

MODELS 823, 831, 833, 835

GENERAL HOUSEHOLD UTILITIES CO.

Chassis 8H

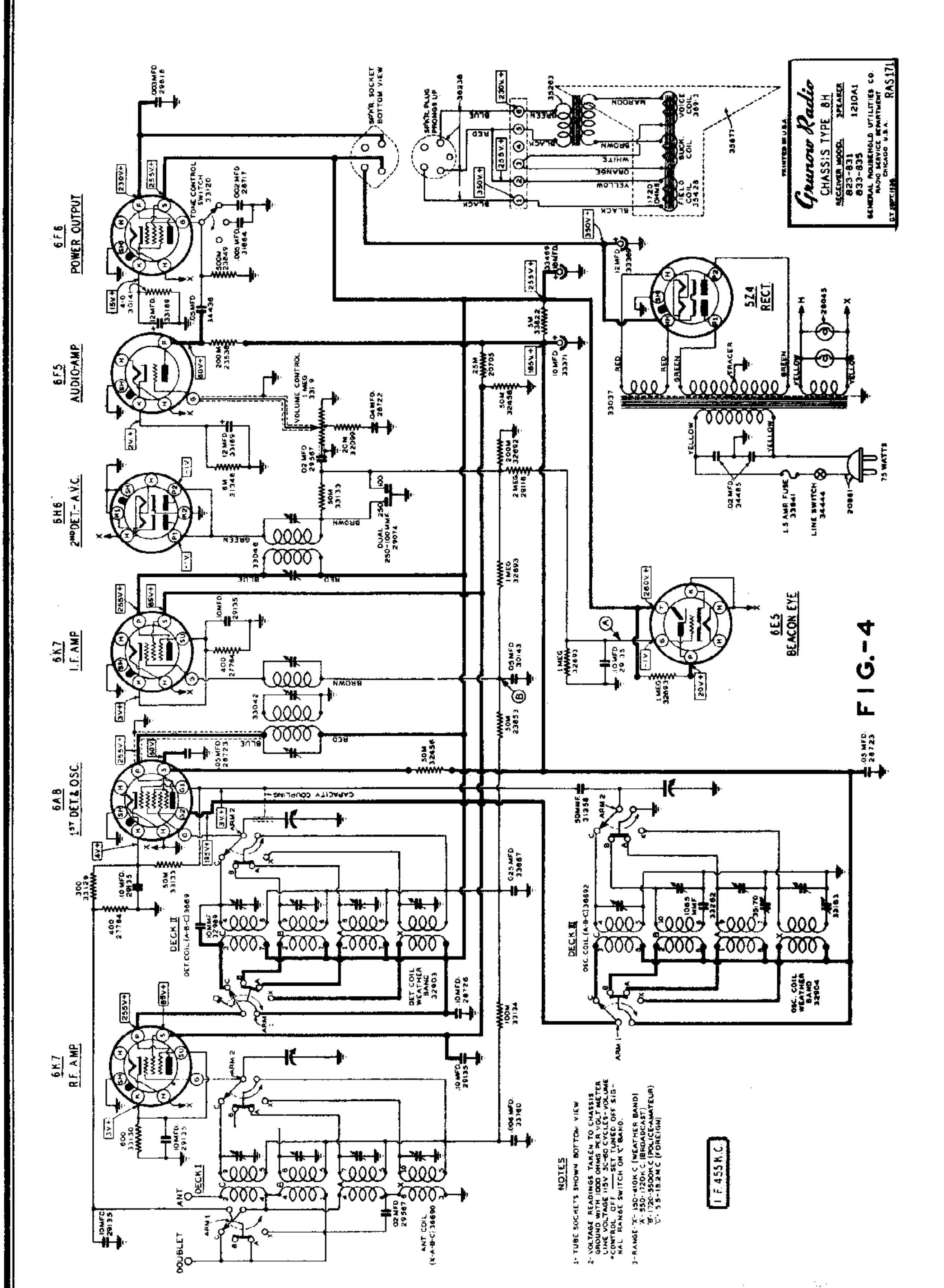


FIG-4

MODELS 823,831
833,835

GENERAL HOUSEHOLD UTILITIES CO.

Chassis 8H
Socket,Trimmers
Chassis

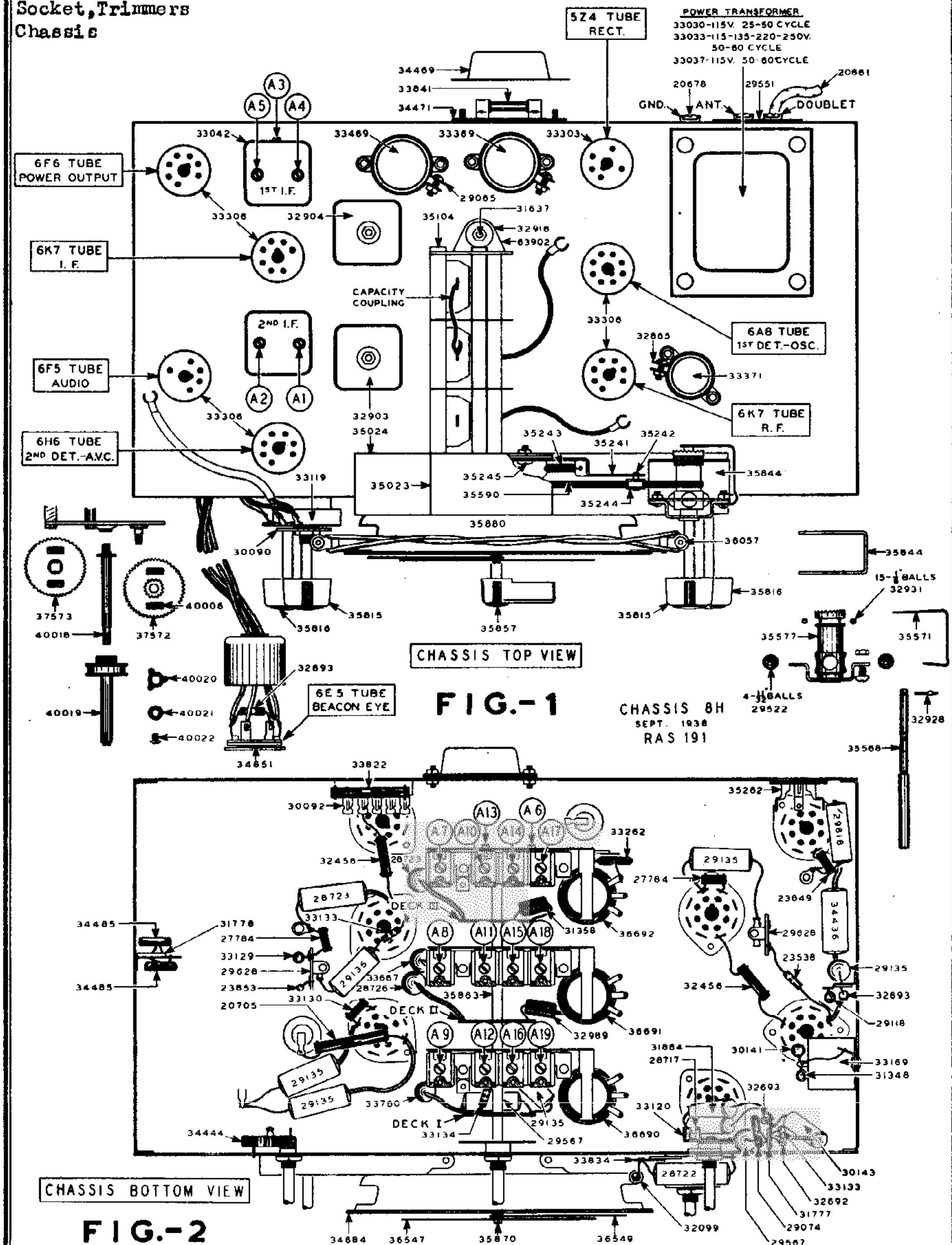


FIG.-1

FIG.-2

GENERAL HOUSEHOLD UTILITIES CO.

Grunow Radio

SEPTEMBER 1936

SERVICE NOTES AND PARTS LIST

Chassis Type 8H
Receiver Model 823-831-833-835
Speaker Type 1210A1

SERVICE DATA

The GRUNOW 8 H Chassis is an eight tube four band superheterodyne receiver using 1—6K7 R. F. amplifier, 1—6A8 first detector and oscillator, 1—6K7 I. F. amplifier, 1—6H6 second detector and A. V. C., 1—6F5 audio amplifier, 1— 6F6 power output, 1—6E5 beacon eye, and 1—5Z4 rectifier.

The frequency coverage is divided into four separate bands, the "X" or weather band 150 to 410 K. C., "A" or Standard Broadcast Band 550 to 1720 K. C., "B" or Police-Amateur Band, 1720 to 5500 K. C., and the Foreign Reception Band 5.5 M. C. to 18.5 M. C.

CONTINUITY AND VOLTAGE

Continuity and voltage measurements should be taken from the underside of the chassis in order to more easily follow the schematic diagram. All sockets are shown on the schematic diagram and have been drawn bottom view. Each element is enumerated and in the exact relationship to the tube guide pin in order to help the service man make a quick and correct check of the chassis constants.

RANGE SWITCH AND COIL ASSEMBLY

The range switch and coil assembly used on the 8H chassis has been designed to allow the receiver to operate on all four bands with maximum sensitivity and selectivity. Each set of coils when not in use is isolated from the coils in use by shorting both ends and grounding through a condenser. This method eliminates all possibilities of open end inductive losses and harmonic pickup.

Schematic diagram Fig. 3 illustrates in detail each section of the range switch with its coil and the proper connections, whose enumerations are duplicated on the chassis schematic diagram.

BEACON EYE SENSITIVITY ADJUSTMENTS

The 6E5 Beacon Eye tube is designed to give the best results with the proper size antenna. However, where a full sized antenna cannot be erected or an inside antenna must be used, a type 6G5 Beacon Eye Tube can be substituted by making the following changes in the wiring of the circuit:

Refer to schematic diagram Fig. 4 and disconnect the "Green" grid wire at point "A" and connect to point "B." This change can be made quickly and will give a maximum sensitivity on the weaker signals.

REPAIRS

When servicing this chassis it is IMPERATIVE that the service man make all parts replacements in EXACTLY the same way as the original part was connected and located. This applies particularly to all ground points.

All parts replacements in the R. F. end of the circuit must be exact duplicates of the originals, especially so in the case of R. F., Bypass, or Coupling Condensers.

Any repairs in the R. F. circuit will make a complete realignment of the entire tuned circuit necessary.

ALIGNMENT PROCEDURE

Do not attempt to align the 8H chassis without the proper equipment as the selectivity, sensitivity, and calibration depend absolutely upon the exact conformance to the following instructions. Each step in the alignment operation is given in its proper sequence and under no conditions should this order be changed.

1. EQUIPMENT:

(A) Signal Generator.

A modulated oscillator capable of generating signals of frequencies from 150 kilocycles to 18 Megacycles.

(B) Non-Metalic screw driver (Alignment Tool).

(C) An output meter of sufficient sensitivity to provide a good deflection at low signal input.

(D) Dummy Antenna.

.05 Mfd. Condenser.
200 Mmfd. Condenser.
400 Ohm Carbon Resistor.

2. HEATING:

(A) Connect the receiver to a 115 V. A. C. source and allow the chassis to warm up for a period of from 20 to 30 minutes. This is necessary in order to eliminate possible alignment variations due to the thermal expansion or contraction of the capacitors and inductances in the various tuned circuits.

(B) The signal generator should also be warmed up before using in order to prevent any frequency changes during the alignment operations.

3. DIAL CALIBRATION:

(A) Turn the tuning knob until the condensers are fully meshed and set the dial pointer (Hour Hand) to horizontal line pointing to 9 and 3 on the outer edge of the dial chart.

(B) Then set the band spreading pointer (Minute Hand) to the vertical line pointing to 12.

4. 455 K.C.—I.F. ALIGNMENT:

(A) Set the generator to a frequency of 455 K. C., connect the output to the control grid of the 6A8 1st Det. & Osc. tube and the ground lead to the ground post on the chassis.

(B) Set the Hour Hand of the chassis to 1500 K. C., turn the volume control full on, set the range switch to the A or Broadcast position and the Tone control to position 1, counter-clockwise.

(C) Connect the output meter across the primary terminals of the output transformer.

(D) Adjust the I. F. Trimmers, located as shown in Fig. 1; in the order of their numbers, A1, A2, A3, A4 and A5, until the maximum sensitivity is obtained.

During this and all following alignment operations the generator must be attenuated as the compensators are brought into resonance until the maximum output is obtained with the lowest possible input. This is necessary in order to hold the A. V. C. tube to its highest sensitivity, at which point only, can precise adjustments of the compensators be obtained.

5. 175 K. C. ALIGNMENT (WEATHER BAND):

(A) Set the generator to a frequency of 175 K. C. and connect the output to the Antenna post of the chassis through a 200 Mmfd. condenser.

(B) Set the chassis range switch to position "X" and the dial pointer to 175 K. C. on the dial chart.

(C) Adjust the 175 K. C. Trimmer A6, as shown on Fig. 2, in the direction of signal increase and at the same time rock the tuning condenser slowly back and forth through resonance until the point of greatest output is obtained.

6. 350 K. C. ALIGNMENT (WEATHER BAND):

(A) Set the generator to 350 K. C.

(B) Set the chassis dial pointer to 350 K. C.

(C) Adjust the Oscillator Trimmer A7—Fig. 2—to maximum output.

(D) Adjust the Detector Trimmer A8—Fig. 2—to maximum ouput.

(E) Adjust the Antenna Trimmer A9—Fig. 2—to maximum output.

7. CHECK 175 K. C. Alignment so as to correct any alignment change which may have occurred due to the slight interaction between the 350 K. C. and 175 K. C. compensators.

8. 1500 K. C. ALIGNMENT (BROADCAST BAND):

(A) Set the Generator to 1500 K. C.

(B) Set the chassis range switch to position "A" and the dial pointer to 1500 K. C.

(C) Adjust the Broadcast Oscillator Trimmer A10—Fig. 2—to maximum output.

(D) Adjust the Broadcast Detector Trimmer A11—Fig. 2—to maximum output.

(E) Adjust the Broadcast Antenna Trimmer A12—Fig. 2—to maximum output.

9. 600 K. C. ALIGNMENT (BROADCAST BAND):

(A) Set the Generator to 600 K. C.

(B) Set the chassis dial pointer to 600 K. C.

(C) Adjust the 600 K. C. Padding Compensator A13—Fig. 2—in the direction of signal increase—at the same time rock the tuning condenser slowly back and forth through resonance until to point of greatest output is obtained on both.

10. Realign 1500 K. C. as instructed in operation No. 8 to correct interaction changes in alignment.

11. 5 M. C. ALIGNMENT (POLICE-AMATEUR BAND):

(A) Set the generator to 5000 K. C. and connect through a 400 Ohm carbon resistor to the antenna post on the chassis.

(B) Set the chassis range switch to position "B" and the dial pointer to 5 M. C.

(C) Adjust the Oscillator Trimmer A14—Fig. 2—to maximum output.

(D) Adjust the Detector Trimmer A15—Fig. 2—to maximum output.

(E) Adjust the Antenna Trimmer A16—Fig. 2—to maximum output.

12. 18 M. C. ALIGNMENT (FOREIGN RECEPTION BAND):

(A) Set the generator to 18 M. C.

(B) Set the chassis range switch to position "C" and the dial pointer to 18 M. C.

(C) Adjust the Oscillator Trimmer A17—Fig. 2—to maximum output.

(D) Adjust the Detector Trimmer A18—Fig. 2—to maximum output.

(E) Adjust the Antenna Trimmer A19—Fig. 2—to maximum output.

Note: To adjust Oscillator Trimmer correctly screw down tightly and then back off until signal is heard.

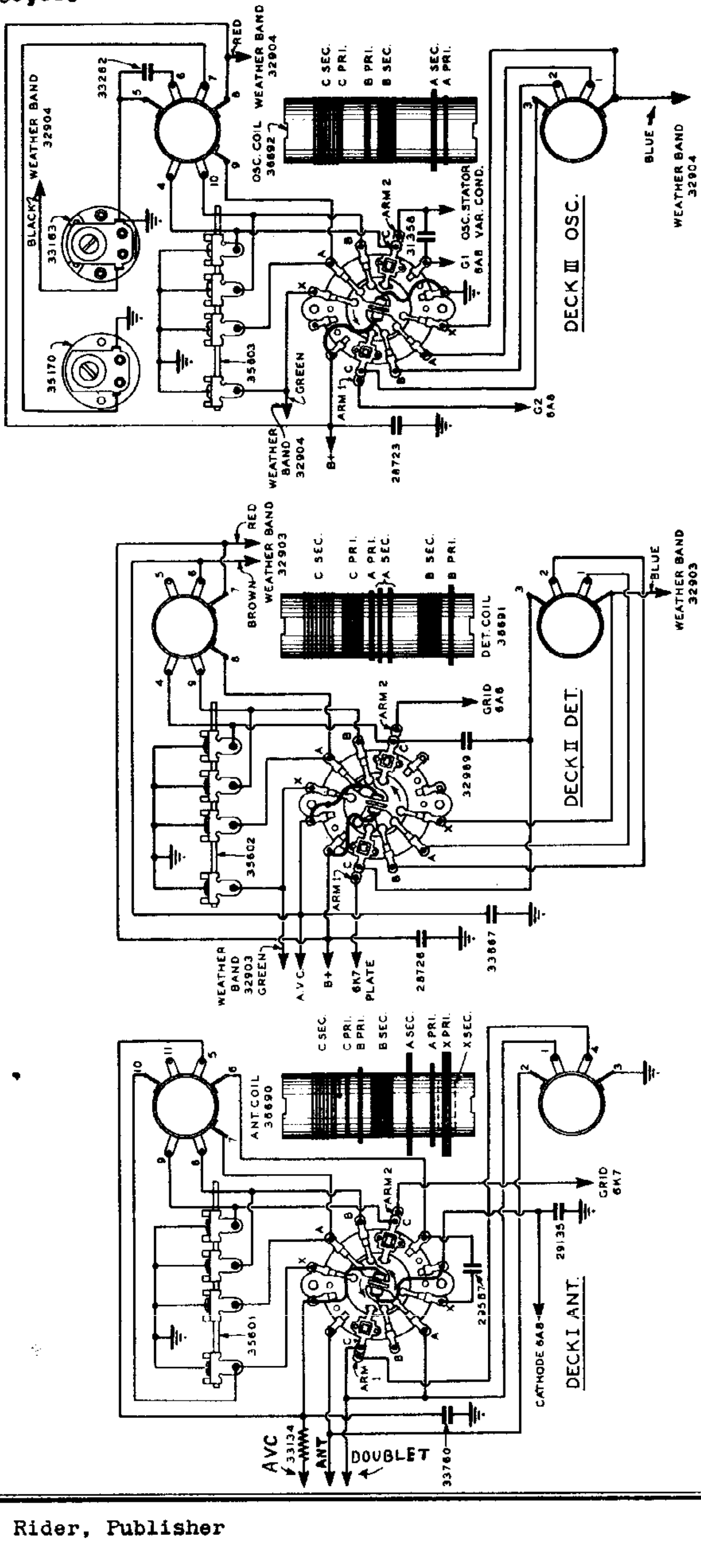
To obtain the utmost sensitivity on the 18 M. C. Band, it is necessary, when adjusting the Detector Trimmer (A18), to rock the tuning condenser slowly through resonance until the point of maximum output is determined Return to the Oscillator Trimmer and make any necessary readjustment.

MODELS 823,831
833,835

MODEL
941

GENERAL HOUSEHOLD UTILITIES CO.

Switch & Coil Assembly



RAS192

SCHEMATIC DIAGRAM RANGE SWITCH & COIL ASSEMBLY

FIG.-3

THE NUMBERS ON THE COIL LUGS CORRESPOND TO THOSE SHOWN ON SCHEMATIC DIAGRAM. FIG.4

D.T. SEPT.28.1936.

MODEL 941
Chassis 9E
Schematic, Voltage
Parts

GENERAL HOUSEHOLD UTILITIES CO.

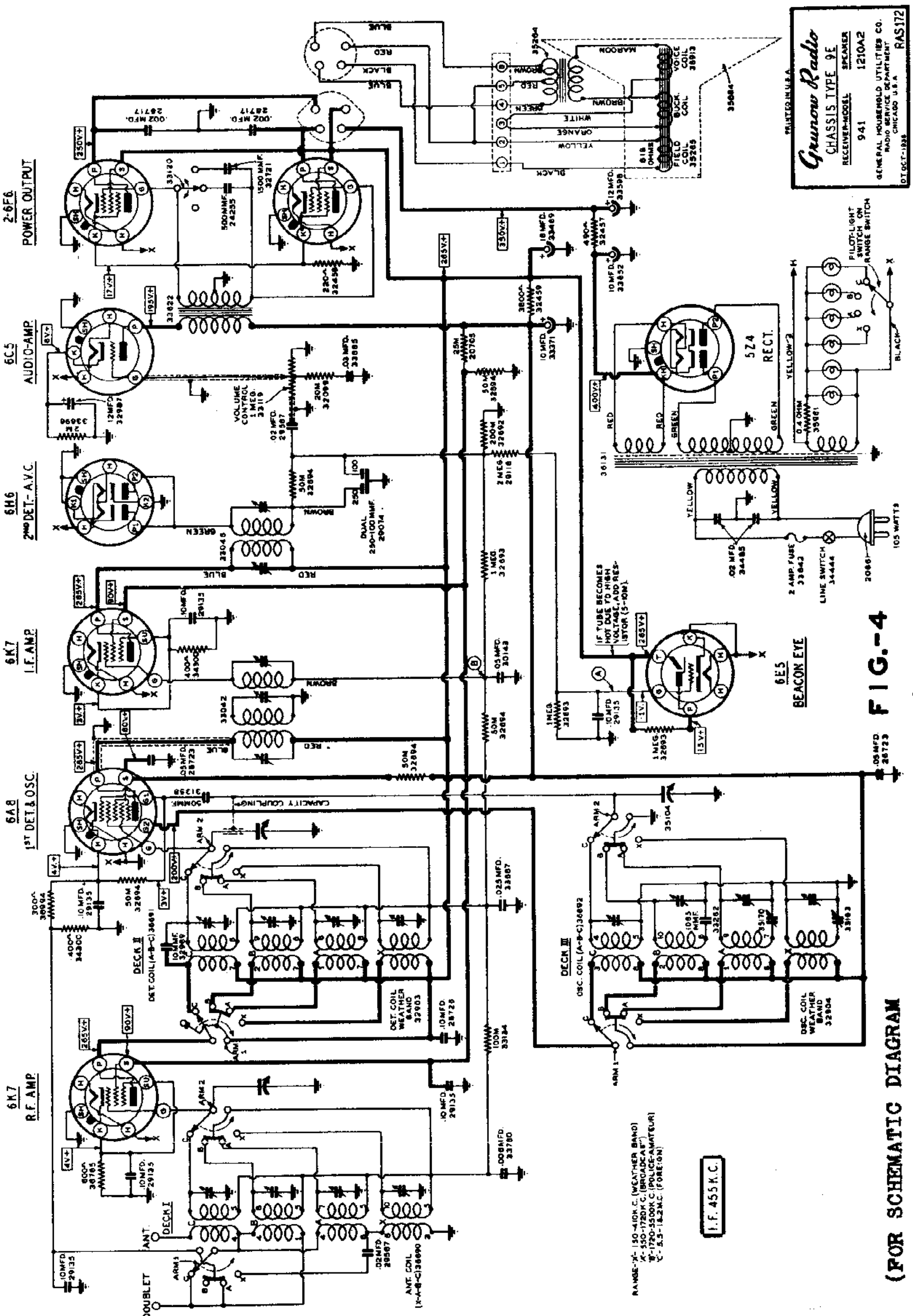


FIG.-4

(FOR SCHEMATIC DIAGRAM OF RANGE SWITCH AND COIL ASSEMBLY, SEE INDEX)

MODEL 941
Chassis 9E
Socket, Trimmers
Chassis

GENERAL HOUSEHOLD UTILITIES CO.

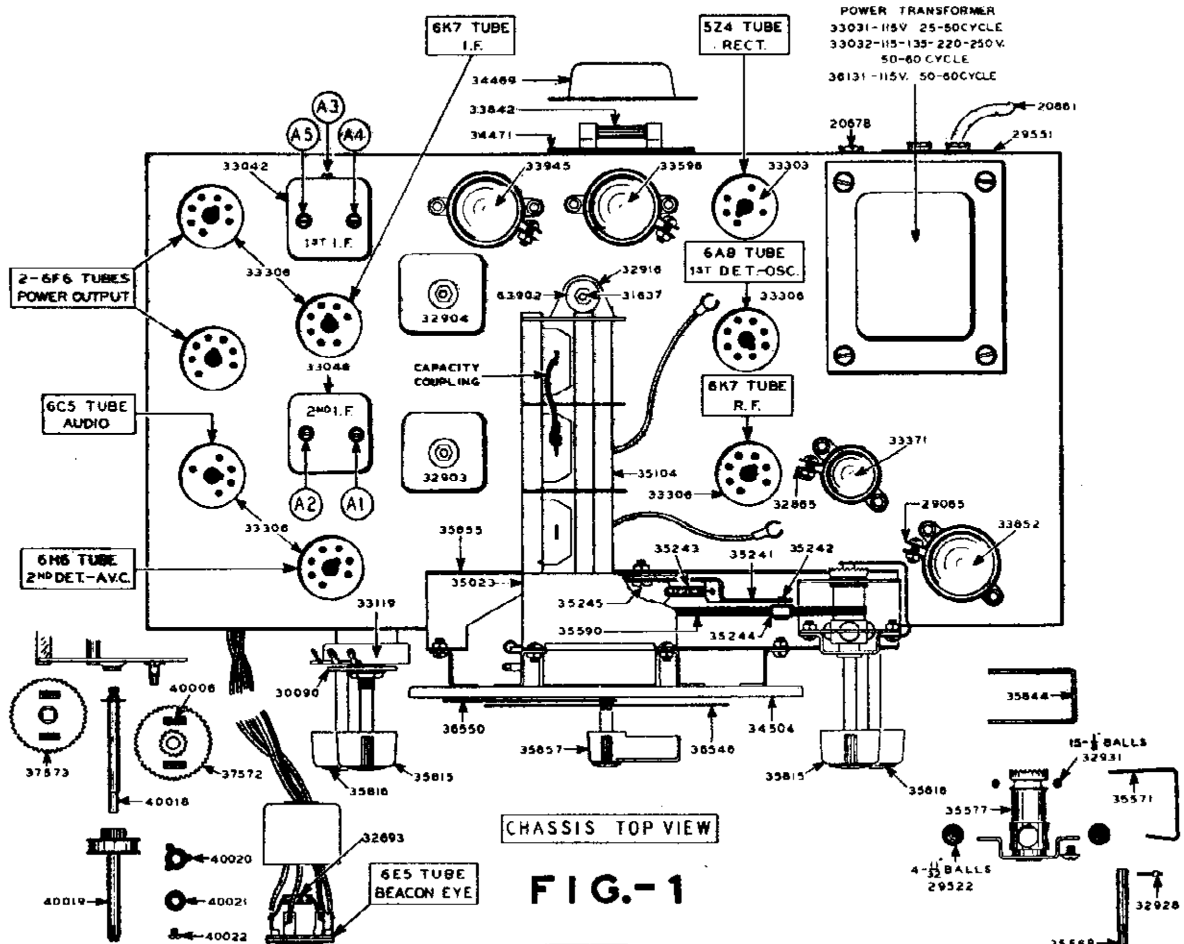


FIG.-1

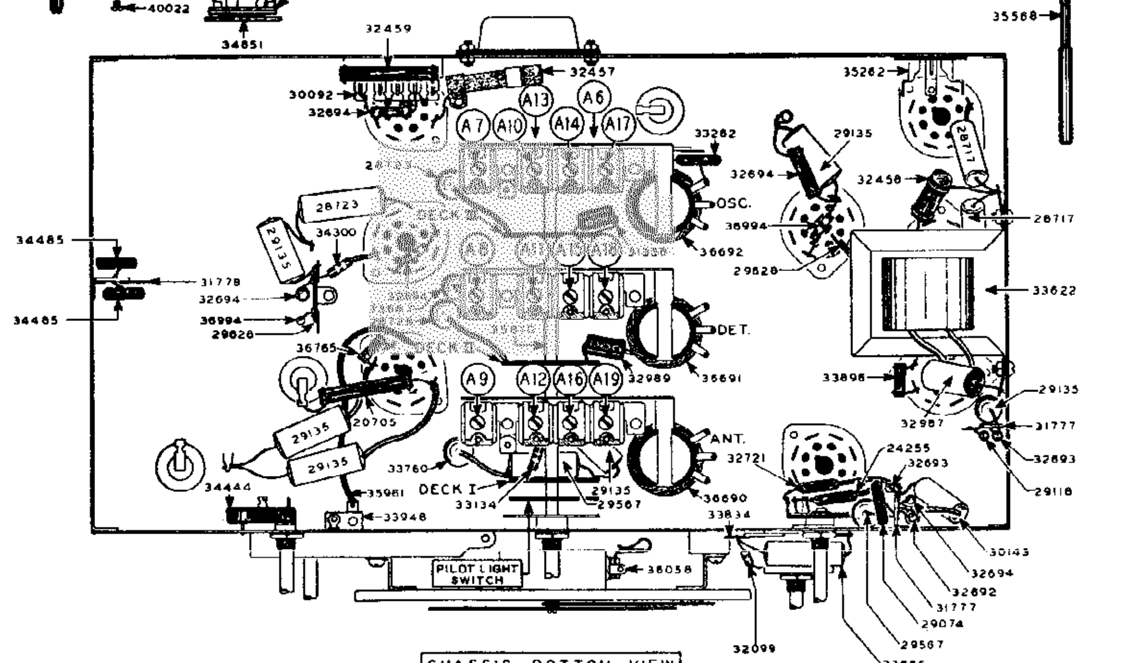


FIG.-2

CHASSIS 9E
OCT. 1936
RAS 193

MODEL 941
Chassis 9E
Alignment, Notes

GENERAL HOUSEHOLD UTILITIES CO.

INTRODUCTION

The Grunow Chassis 9E is a nine tube, four band receiver, using 1—6K7 R.F. Amplifier, 1—6A8 1st Detector and Oscillator, 1—6K7 I.F. Amplifier, 1—6H6 2nd Detector and A.V.C., 1—6C5 Audio Amplifier, 2—6F6 Power Output, 1—5Z4 Rectifier and 1—6E5 "Beacon Eye" Resonance Indicator.

The frequency coverage is divided into four separate tuning ranges or bands; the "X" Weather Band, 150 K.C. to 410 K.C.; "A" Broadcast Band, 550 K.C. to 1720 K.C.; "B" Police-Amateur Band, 1720 K.C. to 5.5 M.C., and the "C" Foreign Broadcast Band, 5.5 M.C. to 18.2 M.C.

Chassis Type 9E
Receiver Model 941
Speaker Type 1210-A-2

SERVICE DATA

CONTINUITY AND VOLTAGE

Tube sockets on the schematic diagram (Fig. 4) are shown bottom view, each element being in its actual position in respect to the guide pin. The voltage measurements shown are average and were taken with a line voltage of 115 V., the volume control "full on" and the range switch in position "C" using a 1000 ohm per volt meter.

REPAIRS

When servicing this chassis it is IMPERATIVE that parts replacements are made in EXACTLY the same way as the original parts were located, and connected. This applies particularly to ground points.

All parts replacements in the R.F. end of the circuit must be exact duplicates of the originals, especially so in the case of coils, R.F. by-pass or coupling condensers.

Any repairs in the R.F. circuit will make a complete realignment of the tuned circuit necessary.

BEACON EYE SENSITIVITY ADJUSTMENTS

The 6E5 "Beacon Eye" tube is designed to give the best results with the proper size antenna. However, where a full size antenna cannot be erected or an inside antenna must be used, a type 6G5 tube can be substituted by making the following changes in the wiring of the circuit:

Refer to schematic diagram Fig. 4 and disconnect the "green" grid wire at point "A" and connect to point "B." This change can be made quickly and will give a maximum sensitivity on weaker signals.

HIGH LINE VOLTAGE

For use in localities having consistent high line voltage (120-130 V.) an extra primary lead has been provided on the Power Transformer. To make this change, merely remove the green lead from the terminal strip and connect the taped yellow lead to its place.

CIRCUIT ALIGNMENT EQUIPMENT

Do not attempt to align this chassis without the equipment specified below:

1. Signal Generator—

A modulated oscillator capable of delivering frequencies from 175 K.C. to 18.2 M.C.

2. Alignment Tool—

A non-metallic screw driver.

3. Dummy Antenna—

.05 Mfd. Condenser (I.F. Alignment).
200 Mmfd. Condenser (Broadcast Alignment).
400 Ohm Carbon Resistor (Short Wave Alignment).

4. Output Meter—

A meter of sufficient sensitivity to give a good deflection at very low signal input.

Note: **The receiver should be aligned in a location free from local interference. A screen room is recommended.**

ALIGNMENT PROCEDURE

1. HEATING:

(A) Allow the receiver to heat up for a period of 20 to 30 minutes. This is necessary in order to eliminate possible alignment variations due to thermal expansion and contraction of capacitors and inductances.

(B) Allow the signal generator to warm up in order to prevent frequency drift during alignment.

2. DIAL CALIBRATION:

Turn the condenser until the plates are fully meshed, set the pointer (Hour Hand) to 9 and 3 on the outer edge of dial chart. Set the vernier pointer (Minute Hand) to the line pointing to 12.

3. SIGNAL GENERATOR ADJUSTMENT:

During the entire alignment procedure, the signal input from the generator to the receiver must be continually attenuated at the generator, as the various trimmers are brought into resonance. This is necessary in order to hold the signal at the lowest intensity so that the A.V.C. circuit will remain at the most sensitive point.

4. 455 K.C.—I.F. ALIGNMENT:

(A) Set the generator to a frequency of 455 K.C., connect the output to the control grid of the 6A8 1st Detector and Oscillator tube thru .05 mfd. dummy and the ground lead to the ground post on the chassis.

(B) Set the dial pointer to 600 K.C., turn the volume control full on, set the range switch to the "A" or Broadcast position and the tone control to position 3 clockwise.

(C) Connect the output meter across the primary terminals of the output transformer.

(D) Adjust the I.F. trimmers, located as shown in Fig. 1, in the order of their numbers, A1, A2, A3, A4 and A5, until maximum sensitivity is obtained.

5. 175 K.C. ALIGNMENT (Weather Band):

(A) Set the generator to a frequency of 175 K.C. and connect the output to the Antenna post of the chassis thru a 200 mmfd. dummy.

(B) Set the chassis range switch to position "X" and the dial pointer to 175 K.C. on the dial chart.

(C) Adjust the 175 K.C. trimmer A6, as shown on Fig. 2, in the direction of signal increase and at the same time rock the tuning condenser slowly back and forth thru resonance until the point of greatest output is obtained.

6. 350 K.C. ALIGNMENT (Weather Band):

(A) Set the generator to 350 K.C.

(B) Set the chassis dial pointer to 350 K.C.

(C) Adjust Oscillator trimmer A7, Detector trimmer A8, and Antenna trimmer A9 to maximum output.

7. Check 175 K.C. Alignment so as to correct any alignment change which may have occurred due to the slight inter-action between the 350 and 175 K.C. trimmers.

8. 1500 K.C. ALIGNMENT (Broadcast Band):

(A) Set the generator to 1500 K.C.

(B) Set the chassis range switch to position "A" and the dial pointer to 1500 K.C.

(C) Adjust Oscillator trimmer A10, Detector trimmer A11, and Antenna trimmer A12 to maximum output.

9. 600 K.C. ALIGNMENT (Broadcast Band):

(A) Set the generator to 600 K.C.

(B) Set the dial pointer to 600 K.C.

(C) Adjust the 600 K.C. padding compensator A13 in the direction of the signal increase—at the same time rock the tuning condenser slowly back and forth thru resonance until the point of greatest output is obtained.

10. Realign 1500 K.C. as instructed in operation No. 8 to correct inter-action changes in alignment.

11. 5 M.C. ALIGNMENT (Police-Amateur Band):

(A) Set the generator to 5 M.C. and connect thru a 400 ohm carbon resistor to the antenna post on the chassis.

(B) Set the chassis range switch to position "B" and the dial pointer to 5 M.C.

(C) Adjust Oscillator trimmer A14, Detector trimmer A15 and Antenna trimmer A16 to maximum output.

To adjust Oscillator trimmer correctly, back trimmer A14 out as far as it will go (minimum capacity) then adjust until signal is heard.

12. 18 M.C. ALIGNMENT (Foreign Broadcast Band):

(A) Set the generator to 18 M.C.

(B) Set the chassis range switch to position "C" and the dial pointer to 18 M.C.

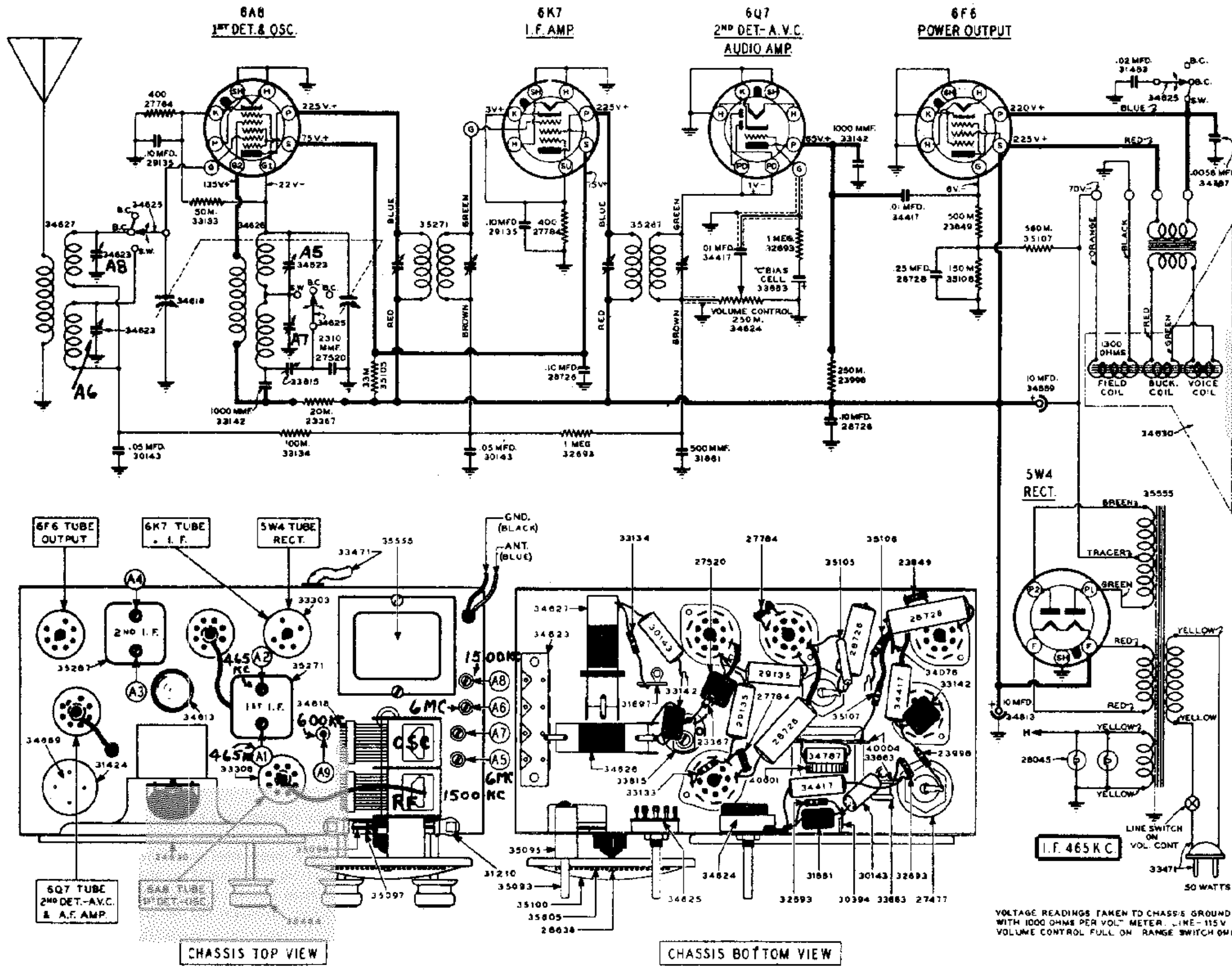
(C) Adjust Oscillator trimmer A17, Detector trimmer A18 and Antenna trimmer A19 to maximum output.

Note: To adjust Oscillator trimmer correctly, screw down tightly and then back off until signal is heard. To obtain the utmost sensitivity on the 18 M.C. Band, it is necessary, when adjusting the Detector trimmer (A18) to rock the tuning condenser slowly thru resonance until the point of maximum output is determined. Return to the Oscillator trimmer and make any necessary readjustment.

MODEL 542
Chassis 5J
Schematic, Voltage
Socket, Trimmers, Parts
Alignment, Chassis

GENERAL HOUSEHOLD UTILITIES CO.

(PRICES SUBJECT TO CHANGE WITHOUT NOTICE)



PARTS PRICE LIST			
PART NO.	DESCRIPTION	REQ.	PRICE
22295	DRIVE SHAFT "C" WASHER	2	.01
23367	RESISTOR (USE 32099)		
23849	RESISTOR (USE 34755)		
23998	RESISTOR (USE 32895)		
27422	ELECT. COND. STEP WASHER	1	.02
27477	ELECT. COND. INSUL. WASHER	1	.02
27520	COND.-MICA-2310 MMFD.	1	.50
27784	RESISTOR (USE 34300)		
27801	COND. MT'G GROMMET	3	.05
27802	COND. MT'G CUP WASHER	3	.02
28045	PILOT LIGHT BULB	2	.15
28638	POINTER SCREW	1	.02
28723	COND. (USE 34438)		
28726	COND. (USE 34437)		
28793	JUNCTION BOX CONNECT. ASSEMBLY (5J2 CHASSIS)	1	1.00
29135	COND. (USE 34437)		
30143	COND. (USE 34436)		
30177	DRIVE SPRING	1	.05
30394	MT'G LUG STRIP	1	.10
31210	PILOT LIGHT SOCKET	2	.10
31424	ELECT. COND. INSUL. SHIELD	1	.10
31483	CONDENSER-TUB-.02 MFD.	1	.25
31661	COND.-MICA-500 MMFD.	1	.20
31887	TERMINAL STRIP	1	.10
32099	RESISTOR-20 M OHMS	2	.15
32484	KNOB	3	.20
32693	RESISTOR-1 MEG. OHM	2	.15
32894	RESISTOR-50 M OHMS	2	.15
32895	RESISTOR-250 M OHMS	1	.15
[illegible]	RESISTOR (USE 32894)		
[illegible]	RESISTOR-100 M OHMS	1	.15
[illegible]	COND.-MICA-1000 MMFD.	1	.20
[illegible]	SOCKET-5 PRONG TUBE	1	.15
[illegible]	SOCKET-8 PRONG-UNIVER.	4	.15
[illegible]	LINE CORD & PLUG	1	.40
[illegible]	OSC. PADDER CONDENSER	1	.45
[illegible]	BIAS CELL MT'G. STRIP	1	.15
[illegible]	GRID BIAS CELL	1	.25
[illegible]	CONDENSER-TUB-.01 MFD.	1	.35
[illegible]	RESISTOR-400 OHMS	2	.15
[illegible]	COND. (USE 33920)		
[illegible]	CONDENSER-TUB.-.05 MFD.	2	.35
[illegible]	CONDENSER-TUB.-.10 MFD.	4	.35
[illegible]	VARIABLE GANG. COND.	1	3.00
[illegible]	DIAL CHART	1	.90
[illegible]	TRIMMER ASSEMBLY	1	.70
[illegible]	VOLUME CONTROL	1	1.25
[illegible]	RANGE SWITCH	1	.70
[illegible]	OSCILLATOR COIL	1	.75
[illegible]	ANTENNA COIL	1	1.00
[illegible]	ELECTRO. COND.-10 MFD.	1	1.25
[illegible]	RESISTOR-500 M OHMS	1	.15
[illegible]	COND.-TUB.-.0056 MFD.	1	.25
[illegible]	COND. ELECTRO.-10 MFD.	1	1.00
[illegible]	DRIVE SHAFT	1	.25
[illegible]	DIAL & DRIVE MTG. BRKT.	1	.40
[illegible]	DRIVE DRUM & HUB		.80
[illegible]	DRIVE STRING	1	.10
[illegible]	DIAL GASKET	1	.05
[illegible]	DIAL WINDOW	1	.20
[illegible]	RESISTOR-33 M OHMS	1	.20
[illegible]	RESISTOR-150 M OHMS	1	.15
[illegible]	RESISTOR-560 M OHMS	1	.15
[illegible]	COIL & SHIELD-1ST I.F.	1	2.30
35287	COIL & SHIELD-2ND I.F.	1	1.75
35327	DIAL ESCUTCHEON	1	1.00
35555	POWER TRANS.-115 V. 50-60~	1	5.00
35805	DIAL POINTER	1	.10
82631	ESCUTCH. MT'G SCREWS	4	.01
83014	HUB SET SCREW	1	.01
83038	FELT WASHER	3	.01
SPEAKER PARTS			
34630	SPEAKER COMPLETE	1	7.00
40000	CONE & VOICE COIL ASSY	1	1.80
4000[illegible]	OUTPUT TRANSFORMER	1	1.20
40002	FIELD COIL	1	1.20
40003	CONE GASKET	1	.10
40004	TERMINAL STRIP	1	.30

Grunow Radio
CHASSIS TYPE 5J

RECEIVER MODEL	SPEAKER
542	34630

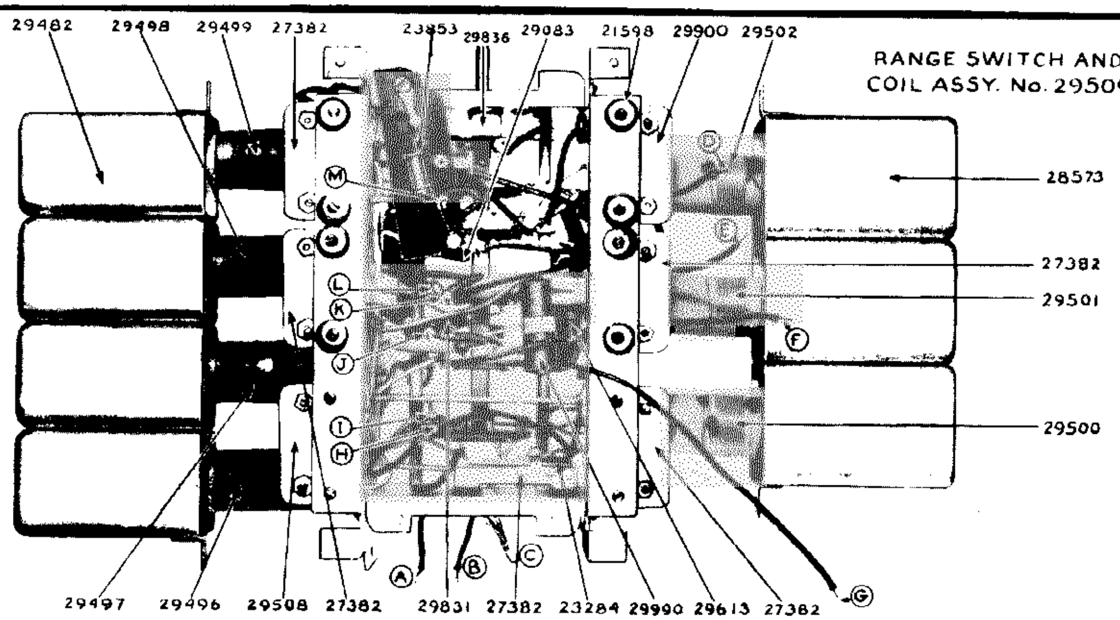
GENERAL HOUSEHOLD UTILITIES CO.
RADIO SERVICE DEPARTMENT
CHICAGO U.S.A.
DT 6-21-36 RAS 162

CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION

FREQUENCY RANGE :
540 to 1760 KC - Trim at 1500 KC, Pad at 600 KC
2.3 to 6.5 MC - Trim at 6 MC, No padding required

FIGURE 7

RANGE SWITCH AND COIL ASSY. No. 29509



INTRODUCTION

The following characteristics apply to the Grunow Radio—Chassis Type 11A:

This model is an 11 tube superhetrodyne All Wave (540 to 21,500 K.C.) Receiver using 1-6D6 tube as an R.F. Amplifier, 1-6A7 tube as a 1st Detector or mixer, being electronicly coupled to a 76 oscillator tube. 1-6D6 tube as an I.F. amplifier with a frequency of 262 K.C., 1-85 tube (double diode triode) used as a diode detector or signal rectifier, delayed automatic volume control (AVC) and audio amplifier. The 85 tube feeds a pair of 76 tubes, connected in parallel, these tubes act as a driver stage, driving a pair of 45 tubes in class A prime push pull, delivering an undistorted output of approximately 9 watts. The 76 driver tubes receive their bias through the 164 ohm section of the candohm resistor. Oscillation in the driver stage is prevented by the 100,000 ohm resistor in the grid of the second 76 tube. The 45 tubes receive their bias through the voltage drop in the speaker field. A separate 76 tube is used as the Signal Beacon or Beat Oscillator, plate voltage of the Signal Beacon being applied by closing the switch on the tone control. The rectifier tube is a 5Z3, the output of which is well filtered through the choke action of the speaker field, the tuned filter choke, and the 4-8 mfd. electrolytic condensers.

The broadcast section of the receiver consists of the following 4 tuned circuits: R.F. input, bi-selector, mixer input and oscillator. These circuits are tuned with a 4-gang variable condenser of rugged construction.

The short wave section of the receiver consists of 3 tuned circuits, the bi-selector being cut out to prevent losses when the receiver is working at the higher frequencies.

The Signal Beacon is a beat oscillator using a 76 tube, and is a feature of the 11A Chassis. When this tube is brought into operation it acts as a local oscillator and beats against the incoming signal. The presence of a station's signal will be indicated by a high pitched "whistle", becoming lower in pitch as "resonance", or exact tuning, is approached. The Signal Beacon note becomes very low and finally reaches zero; at this point the receiver is said to be tuned to "zero beat", which indicates that it is tuned exactly to the station. The Signal Beacon is also used to receive telegraph or continuous wave signals.

The remainder of the circuit is typical and has been designed along the lines of what is considered the best engineering practice to date. Parts are all oversize and of the finest quality.

MODELS 1151,1152
Chassis 11A

GENERAL HOUSEHOLD UTILITIES CO.

Socket,Trimmers
Chassis

FIGURE 5

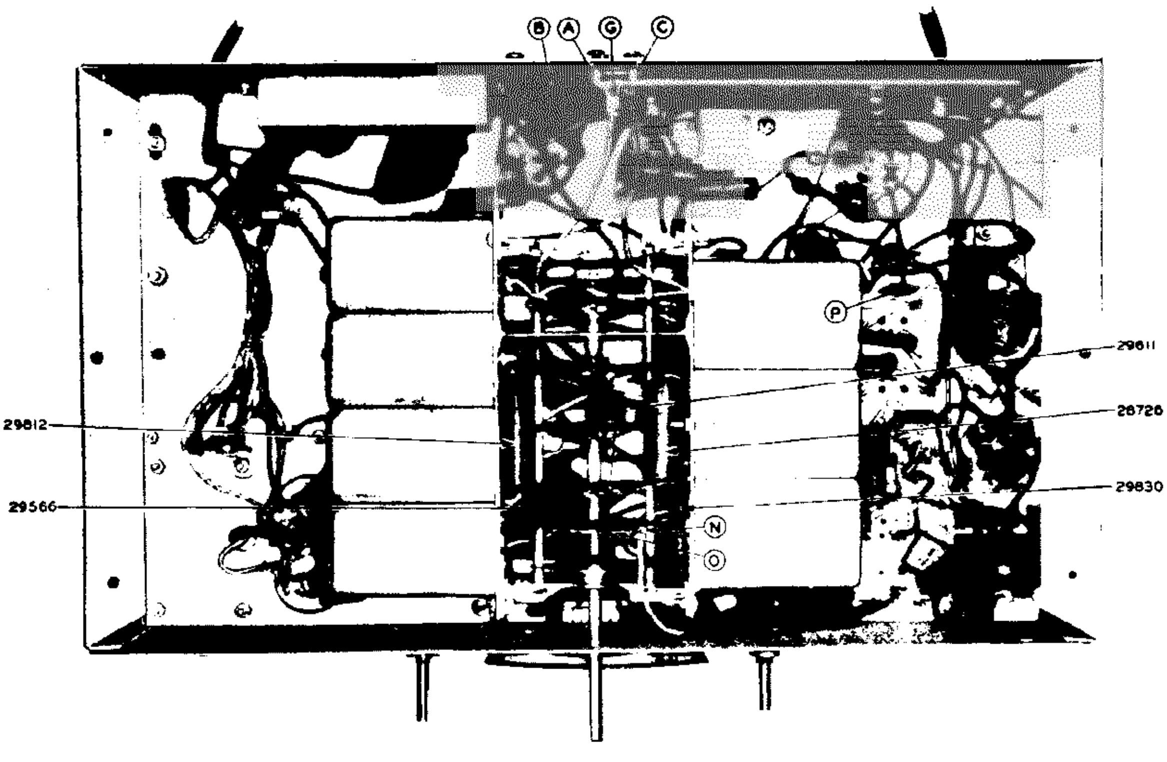
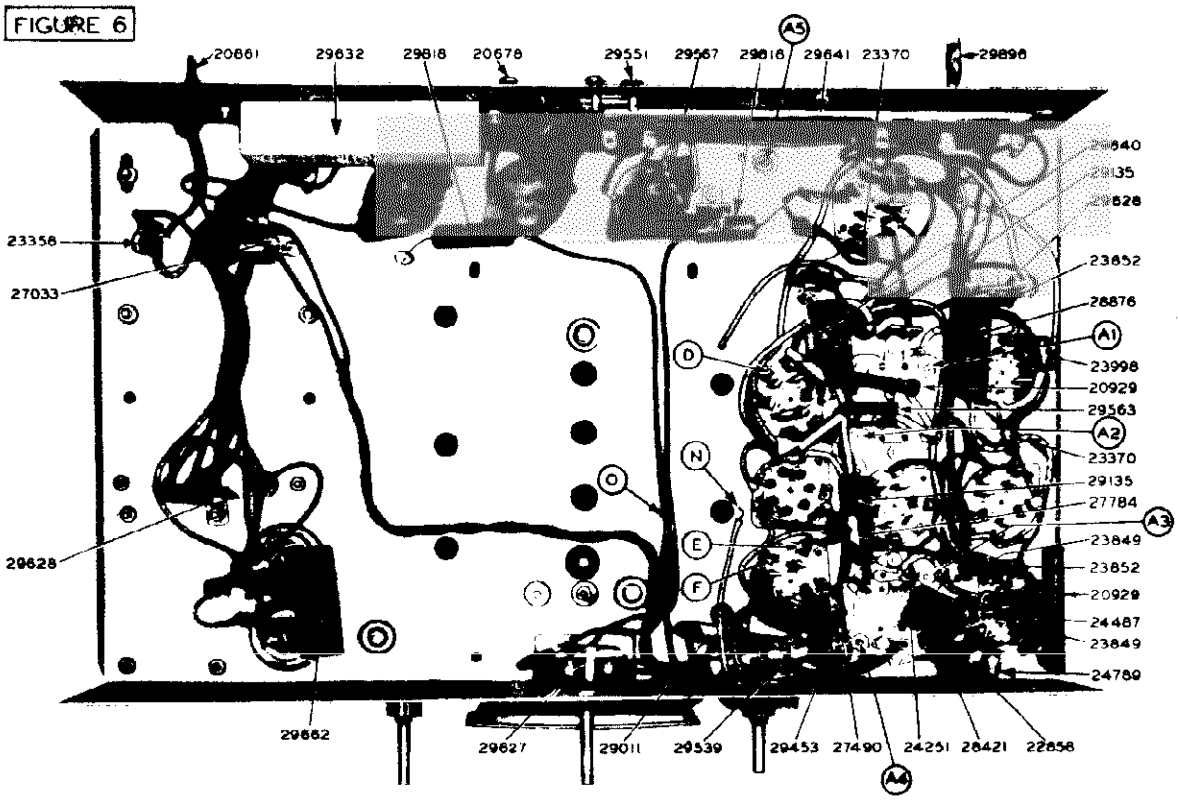


FIGURE 6



MODELS 1191, 1191B
Chassis 11G
Schematic, Voltage
Parts

GENERAL HOUSEHOLD UTILITIES CO.

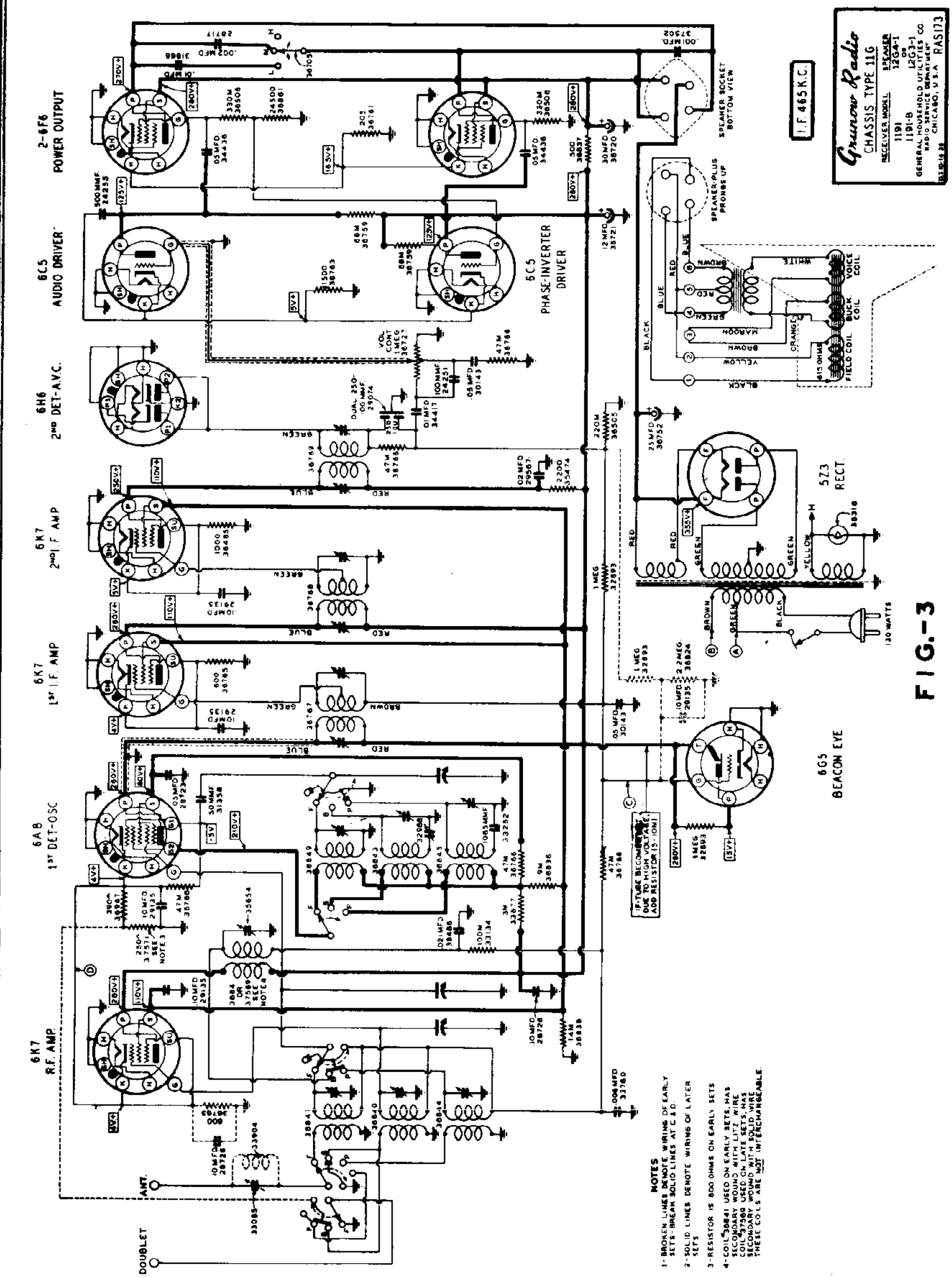


FIG.-3

MODELS 1191,1191B
Chassis 11G
Socket,Trimmers
Chassis

GENERAL HOUSEHOLD UTILITIES CO.

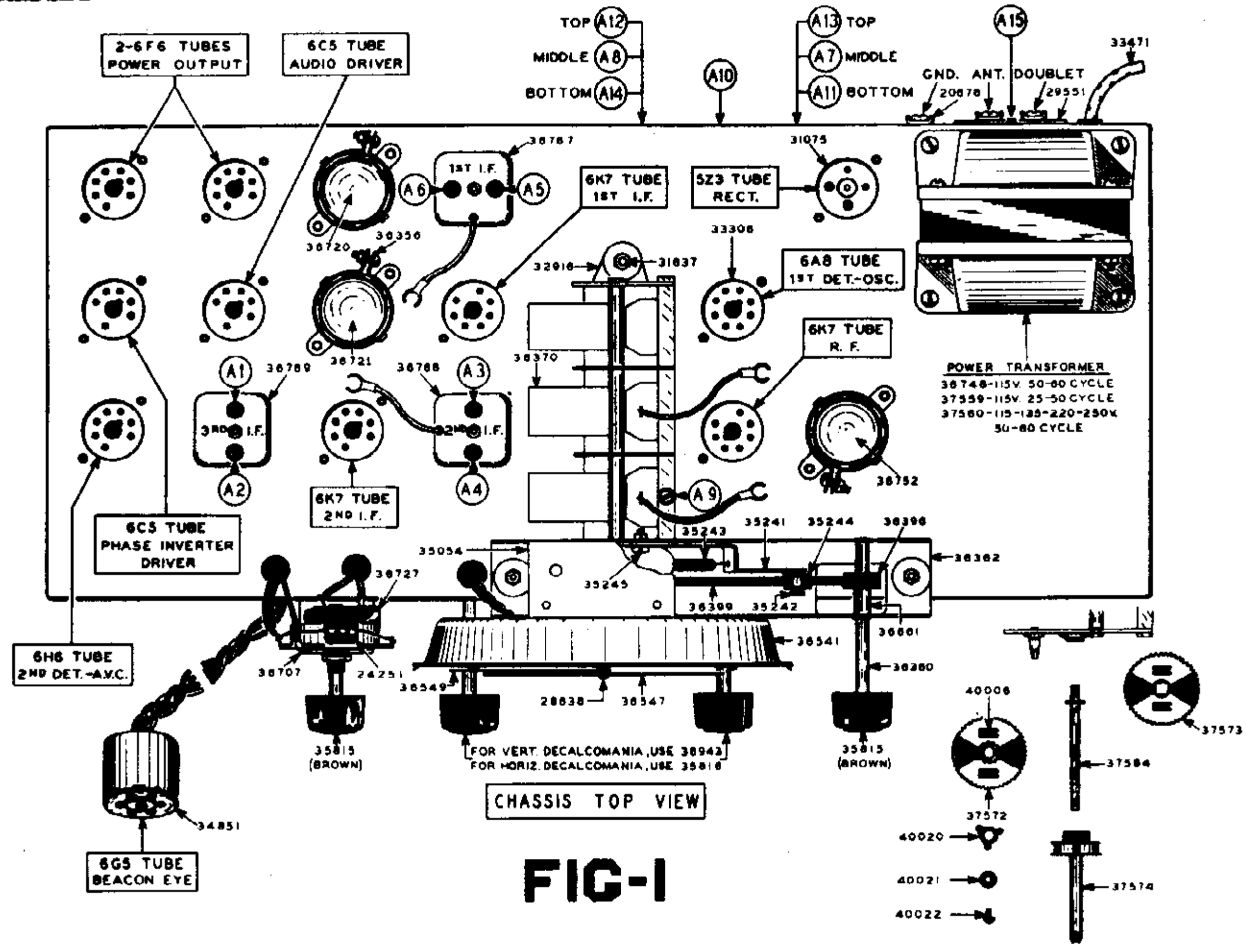


FIG-1

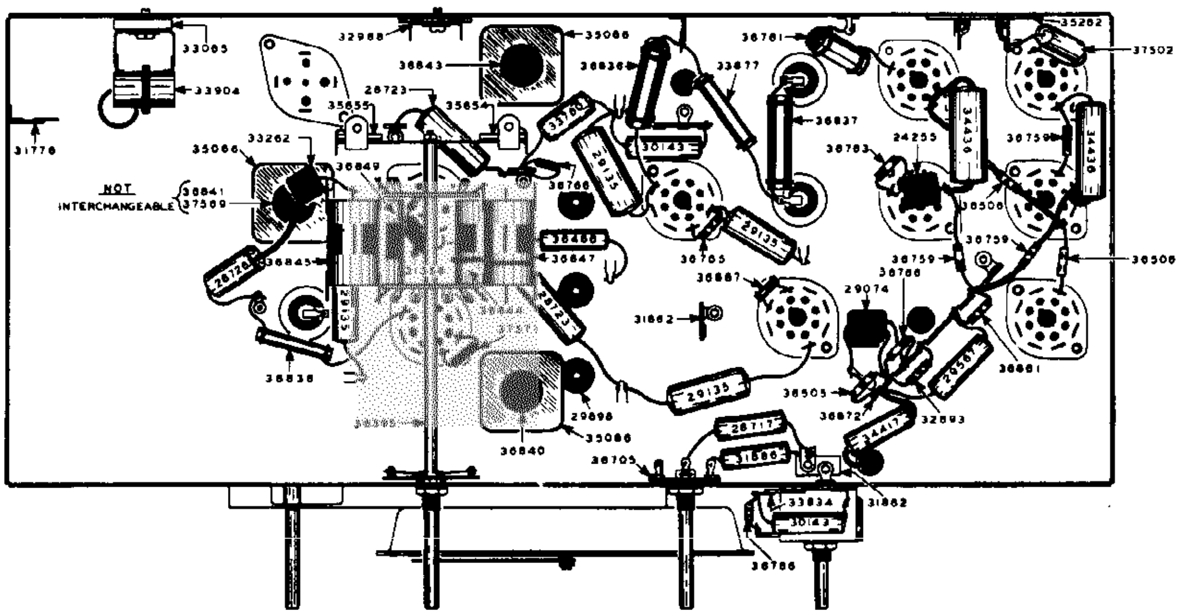


FIG-2

CHASSIS 11G
AUG. 1936
RAS 188

OCTOBER, 1936
SERVICE DATA

Grunow Radio

Chassis Type 11G—Receiver Model 1191 and 1191-B—Speaker Type 12G4-1 or 12G3-1

GENERAL HOUSEHOLD UTILITIES COMPANY

FORM 36905-2 PRINTED IN U. S. A. CHICAGO, ILLINOIS

INTRODUCTION

The Grunow Chassis 11G is an eleven tube, three band superheterodyne receiver with a full face band spread dial and a Beacon Eye tuning indicator.

CIRCUIT DESCRIPTION

The circuit and tube complement of the Grunow 11G Chassis is as follows: 1-6K7 R. F. Amplifier, 1-6A8 1st Detector and Oscillator, 1-6K7 1st I.F. Amplifier, 1-6K7 2nd I.F. Amplifier, 1-6H6 2nd Detector and A.V.C., 1-6C5 Phase Inverter Driver, 1-6C5 Audio Driver, 2-6F6 Power Output, 1-6G5 Beacon Eye and 1-5Z3 Rectifier.

Separate coils are used in the Antenna and Oscillator circuits for each tuning range and have a continuous frequency coverage from 545 K.C. to 1750 K.C. on the "B" Broadcast Band, 1750 K. C. to 5.8 M. C. on the "P" Police Amateur Band and 5.5 M. C. to 18.2 M. C. on the "F" Foreign Broadcast Band.

CONTINUITY AND VOLTAGE

Tube sockets on the schmetic diagram (Fig. 3) are shown bottom view, each element being in its actual position in respect to the guide pin. The voltage measurements shown are average and were taken with a line voltage of exactly 115V. the volume control full on and the range switch on position "B" using a 1000 ohms per volt meter.

REPAIRS

When servicing this chassis it is IMPERATIVE that the service man make all parts replacements in EXACTLY the same way as the original part was located and connected. This applies in particular to all ground points. All parts replacements in the R. F. end of the circuit must be exact duplicates of the originals especially so in the case of coils, R. F. by-pass or coupling condensers. Any repairs in the R. F. circuit will make a complete realignment of the entire tuned circuit necessary.

POWER TRANSFORMER

For use in localities having consistent high voltage (120-130 V.) an extra primary lead has been provided on the Power Transformer. Remove the one line switch lead which is soldered to the green transformer lead (A) and solder to the dummy lug (B) on which the brown transformer lead is soldered. The connections (A) and (B) are shown on the schematic diagram (Fig. 3).

CIRCUIT ALIGNMENT PROCEDURE

Do not attempt to align this chassis without the proper equipment as the sensitivity, selectivity, and calibration absolutely depend on the exact conformance to the following instructions. Each step in the alignment operation is given in its proper sequence and under no conditions should this order be changed. The chassis should be aligned in a location free from local interference (motors, flashers, automobile ignition, etc.) as high frequency disturbances will cause difficulty when the short wave section is adjusted. A screen room is recommended.

1. EQUIPMENT

(A) Signal Generator.

A modulated oscillator capable of generating signals from 465 K. C. to 18 megacycles.

(B) Non-metallic screw-driver (Alignment Tool).

(C) Output Meter.

A standard type output meter with sufficient sensitivity to give a good deflection with a small signal input.

(D) Dummy Antenna.

.05 Mfd. condenser—(I. F. Alignment)
200 Mmfd. condenser—(Broadcast Alignment)
400 Ohm carbon resistor (Short Wave Alignment)
.002 Mfd. condenser (I. F. Rejector Filter Alignment)

2. HEATING

(A) Connect the receiver to a 115 V. source and allow the chassis to warm up to a period of 20 to 30 minutes. This is necessary to eliminate possible alignment variations due to thermal expansion and contraction of the capacitors and inductances in the various tuned circuits.

(B) The signal generator should be warmed up also in order to prevent any frequency changes during alignment.

3. DIAL CALIBRATION

(A) Turn the tuning knob until the condensers are fully meshed and set the dial pointer (Hour Hand) to the horizontal line pointing to 9 and 3 on the outer dial scale.

(B) Set the band spreading pointer (Minute Hand) to the vertical line pointing to 12.

Note. During all of the following alignment operations the signal generator must be attenuated as the compensators are brought into resonance until the maximum output is obtained with the lowest possible input. This is necessary in order to hold the A.V.C. tube to its highest sensitivity at which point only can precise adjustment of the trimmers be had.

4. I. F. ALIGNMENT

(A) Connect the Output Meter across the primary terminals of the output transformer.

(B) Set the signal generator to 465 K. C. and connect the output to the grid of the 6A8 oscillator tube through a .05 mfd. condenser Connect the generator ground lead to the ground post on the receiver.

(C) Set the receiver range switch to position "B" the dial pointer to 600 K. C. and the volume control full on.

(D) Adjust the I. F. Trimmers A1, A2, A3, A4, A5, and A6 to maximum output.

5. 1500 K. C. ALIGNMENT

(A) Set the generator to 1500 K. C. and connect the output to the antenna post on the chassis through a 200 Mmfd. condenser.

(B) Set the receiver dial pointer to 1500 K. C.

(C) Adjust the trimmers A7-Oscillator, A8-Detector and A9-Antenna to maximum output.

6. 600 K.C. ALIGNMENT

(A) Set the generator to 600 K.C.

(B) Set the receiver dial to 600 K.C.

(C) Adjust the trimmer A10 to maximum output and at the same time rock the tuning condenser slowly back and forth through resonance until the exact resonant point is determined.

7. 5000 K.C. ALIGNMENT

(A) Set the generator to 5000 K.C. and connect the output to the Antenna post on the chassis through a 400 Ohm carbon resistor.

(B) Set the receiver dial pointer to 5000 K.C. and the range switch to position "P"

(C) Adjust the trimmers A11-Oscillator and A12-Detector to maximum output.

8. 18 M.C. ALIGNMENT

(A) Set generator to 18 M.C.

(B) Set receiver dial pointer to 18 M.C. and the range switch to position "F."

(C) Screw the Oscillator trimmer (A13) down tightly and slowly back off until signal is heard.

(D) Adjust the Antenna trimmer (A14) to maximum output and at the same time rock the tuning condenser slowly back and forth through resonance until the exact resonant point is determined.

(E) Return to Oscillator trimmer (A13) and repeat operations C. & D.

9. REJECTOR FILTER ALIGNMENT

(A) On 11G chassis having the I.F. Rejector Filter the trimmer will be found on the rear of the chassis near the antenna post.

(B) This filter is aligned at a frequency of 465 K.C. and must NOT be peaked until the rest of the circuit has been completely aligned.

(C) Set generator to 465 K.C. and connect the output to the antenna binding post on the receiver through a .002 mfd. condenser.

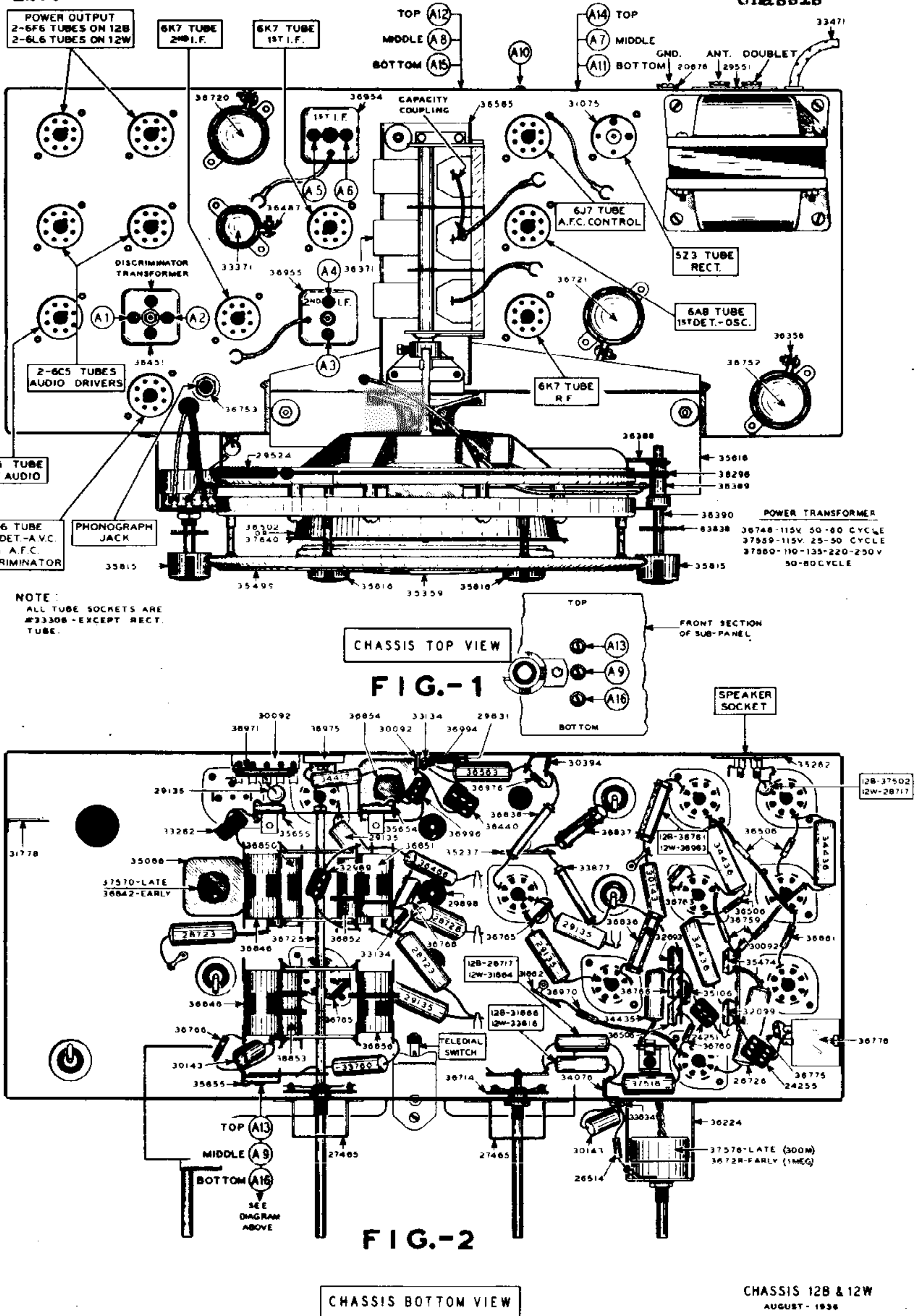
(D) Set the receiver dial pointer to 600 K.C. and the range switch to position "B."

(E) With a strong signal input adjust the trimmer to a *minimum* reading on the output meter.

MODEL 1291
Chassis 12B
MODEL 1297

GENERAL HOUSEHOLD UTILITIES CO.

Chassis 12W
Socket, Trimmers
Chassis



CHASSIS 12B & 12W
AUGUST - 1936
RAS 187

Schematic, Parts
Voltage

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 1291
Chassis 12B
MODEL 1297
Chassis 12W

The GRUNOW Chassis 12B and 12W are twelve tube, three band superheterodyne receivers, incorporating a combination mechanical and automatic tuning system.

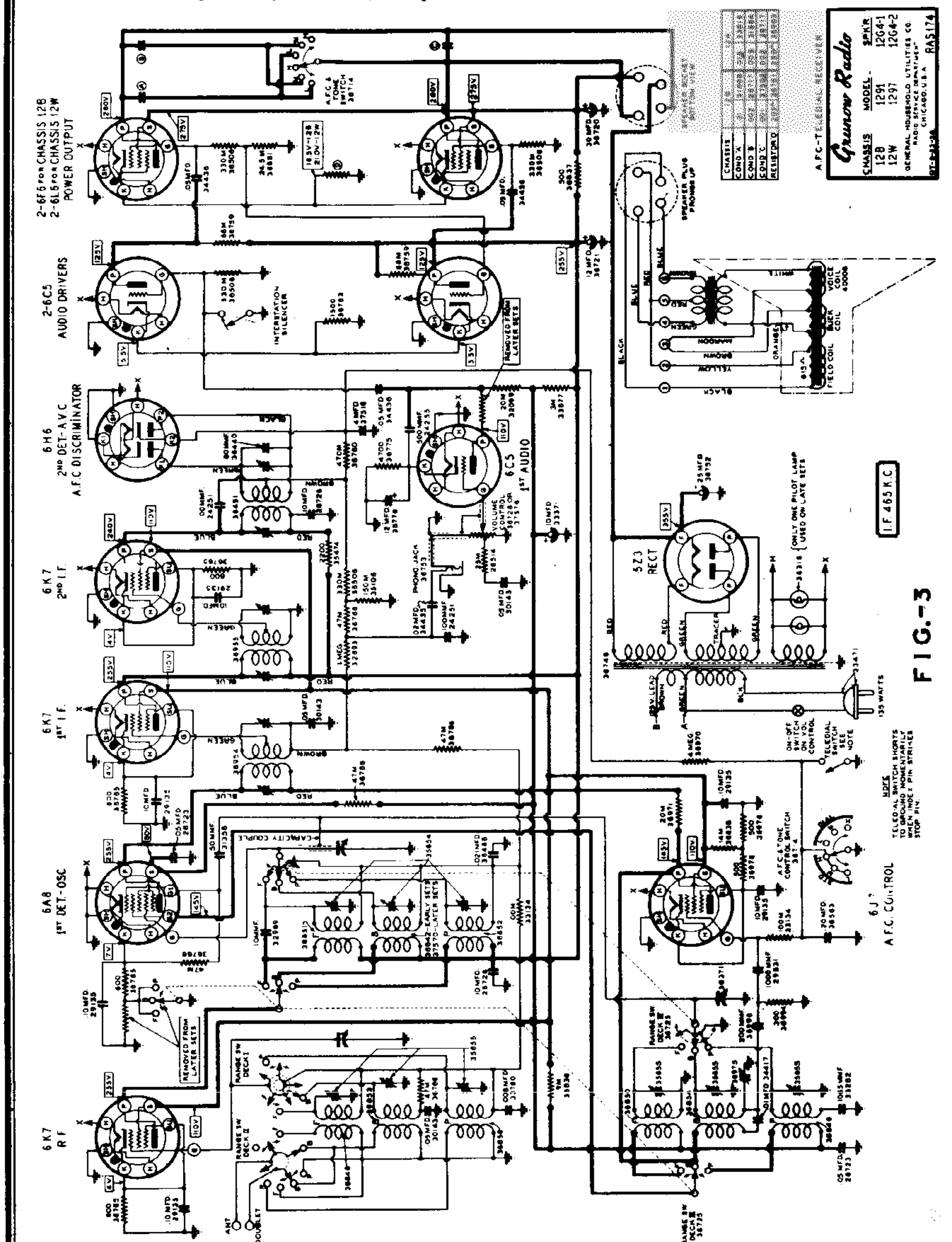


FIG.-3

MODEL 1291
Chassis 12B
MODEL 1297
Chassis 12W

GENERAL HOUSEHOLD UTILITIES CO.

Alignment
Teledial Parts

CIRCUIT ALIGNMENT PROCEDURE

Do not attempt to align this chassis without the proper equipment as the sensitivity, selectivity, and calibration absolutely depend on the exact conformance to the following instructions. Each step in the alignment operation is given in its proper sequence and under no conditions should this order be changed. The chassis should be aligned in a location free from local interference (motors, flashers, automobile ignition, etc.) as high frequency disturbances will cause difficulty when the short wave section is adjusted. A screen room is recommended.

1. EQUIPMENT.

(A) Signal Generator.

A modulated oscillator capable of generating signals from 465 K.C. to 18 Megacycles, having an output of at least .10 volt.

(B) Non-metallic screw-driver (Alignment Tool).

(C) Output Meter.

A standard type output meter with sufficient sensitivity to give a good deflection with a small signal input.

(D) Discriminator Meter.

A galvanometer with sufficient sensitivity to read the current swing of the discriminator circuit. A type No. 699 Weston Galvanometer or equivalent is recommended. It is also suggested that a variable shunt of approximately 200 Ohms (wire wound rheostat) be connected across the galvanometer until approximate balance is reached. The shunt will also act as a safety device and "keeper" when the meter is not in use.

(E) Dummy Antenna.

.05 Mfd. condenser (I.F. Alignment).
200 Mmfd. condenser (Broadcast Alignment).
400 Ohm carbon resistor (Short Wave Alignment).

2. HEATING.

(A) Connect the receiver to a 115 V. A.C. source and allow the chassis to warm up for a period of 20 to 30 minutes. This is necessary to eliminate possible alignment variations due to thermal expansion or contraction of the capacitors and inductances in the various tuned circuits.

(B) The signal generator should be warmed up also, in order to prevent any frequency changes during alignment.

3. DIAL CALIBRATION.

(A) Turn the tuning knob until the condensers are fully meshed and set the dial pointer (Hour Hand) to the horizontal line pointing to 9 and 3 on the outer dial scale.

(B) Set the band spreading pointer (Minute Hand) to the vertical line, pointing to 12.

4. DISCRIMINATOR ALIGNMENT.

(A) Set the signal-generator to a frequency of 465 K.C., connect the output through an .05 mfd. condenser to the control grid of the 6K7—2nd I. F. tube. Connect the ground lead to the ground post on the chassis.

(B) Turn range switch to broadcast position (B), turn volume control full off and set dial pointer to 600 K.C.

(G) Adjust Discriminator primary (A1 or A2) to maximum swing on galvanometer (either positive or negative).

(H) Re-align secondary trimmer to position of zero current. Check signal-generator to be sure frequency has not changed. Do not re-adjust primary unless the entire operation above is repeated.

(I) Vary the frequency of the signal-generator to be certain that discriminator pointer rests at zero at exactly 465 K.C. Check to determine the maximum current on both sides of resonance—maximum positive current should equal maximum negative current.

Note: Discriminator alignment as outlined above is the accepted and most satisfactory method of obtaining an accurate adjustment. However, if a signal-generator of at least .10 volt output is not available, fair results can be obtained by introducing the signal through the grid of the 6A8 tube. If this method is used, the A.F.C. switch must be on "STD." position (A.F.C. circuit inoperative). This method is not recommended for best results.

5. I.F. ALIGNMENT—465 K.C.

(A) Set the signal-generator to a frequency of 465 K.C., connect the output through an .05 Mfd. condenser to the control grid of the 6A8—1st Detector-Oscillator tube and the ground lead to the ground post on the chassis.

(B) Adjust the I.F. Trimmers A3, A4, A5 and A6 to maximum output and at the same time attenuate the signal at the generator so as to have a minimum signal input to the receiver at all times during this and the following operations.

6. 1500 K.C. ALIGNMENT.

(A) Connect the output of the generator to the antenna post of the receiver through a 200 Mmfd. condenser and set the frequency at 1500 K.C.

(B) Set the dial pointer of the receiver to 1500 K.C.

(C) Adjust broadcast trimmers (A7) Oscillator, (A8) Detector and (A9) Antenna to maximum output.

(C) Connect the galvanometer to the two cathodes of the 6H6 Discriminator Tube.

(D) Attenuate signal-generator to *maximum* output, being certain that the frequency remains at 465 K.C.

(E) Determine primary and secondary of Discriminator transformer (A1 or A2) by touching the trimmer screws with a metal screw driver. When the metal comes in contact with the screw on the secondary trimmer, the galvanometer will fluctuate.

(F) With alignment tool back off trimmer screw of Discriminator secondary (A1 or A2) until trimmer is wide open.

7. 600 K.C. ALIGNMENT.

(A) Set the generator frequency to 600 K.C.

(B) Set the receiver dial pointer to 600 K.C.

(C) Adjust the 600 K.C. padder (A10) in direction of signal increase and at the same time rock tuning condenser back and forth through resonance, until the point of exact resonance is determined. This point does not have to be exactly 600 K.C. dial setting.

8. Repeat 1500 K.C. alignment operation No. 6, to correct any slight change which may have occurred due to the variation of the 600 K.C. padder.

9. 5000 K.C. ALIGNMENT.

(A) Set the generator to 5000 K.C. and connect the output to the antenna post of the receiver through a 400 Ohm carbon resistor.

(B) Set the receiver range switch to the Police-Amateur position and the dial pointer to 5000 K.C.

(C) Adjust the trimmers (A11) Oscillator, (A12) Detector and (A13) Antenna to maximum output. When adjusting (A11) use signal with least capacity—trimmer farthest open.

10. 18 M.C. ALIGNMENT.

(A) Set generator to 18 M.C.

(B) Set the receiver range switch to the Foreign Broadcast position and the dial pointer to 18 M.C.

(C) Screw Oscillator Trimmer (A14) down tightly and then back off until signal is heard. Adjust to maximum output.

(D) Adjust the Detector Trimmer (A15) and at the same time rock the tuning condenser slowly back and forth through resonance until the point of maximum output is determined.

(E) Return to Oscillator Trimmer (A14) and re-adjust, if calibration has changed.

(F) Adjust Antenna Trimmer (A16) until maximum output is obtained.

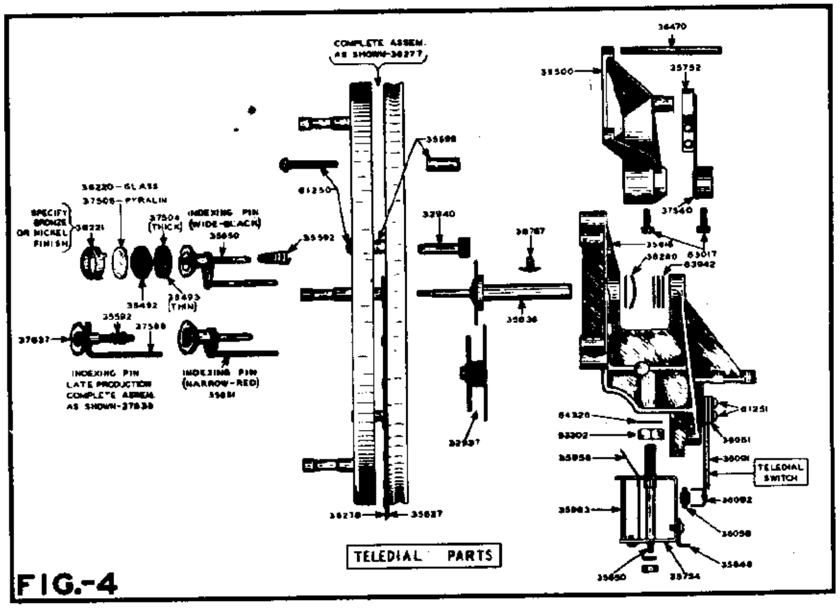
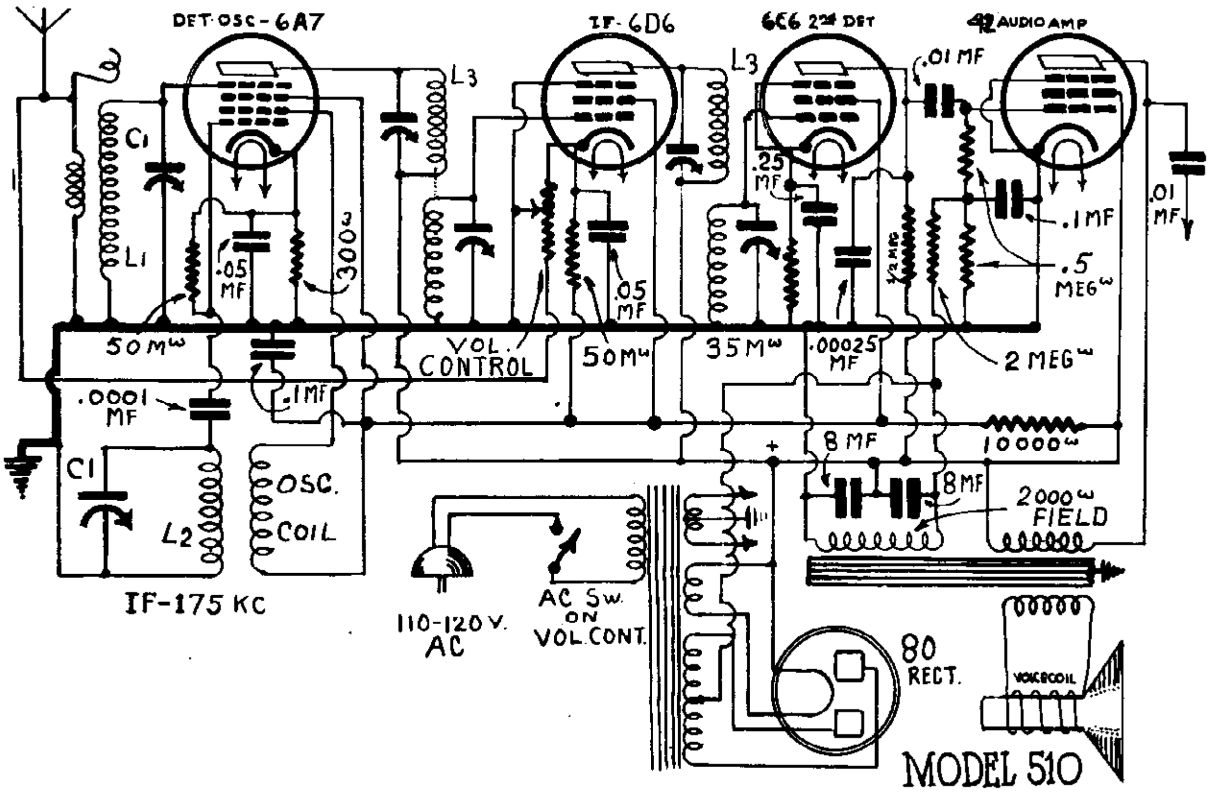
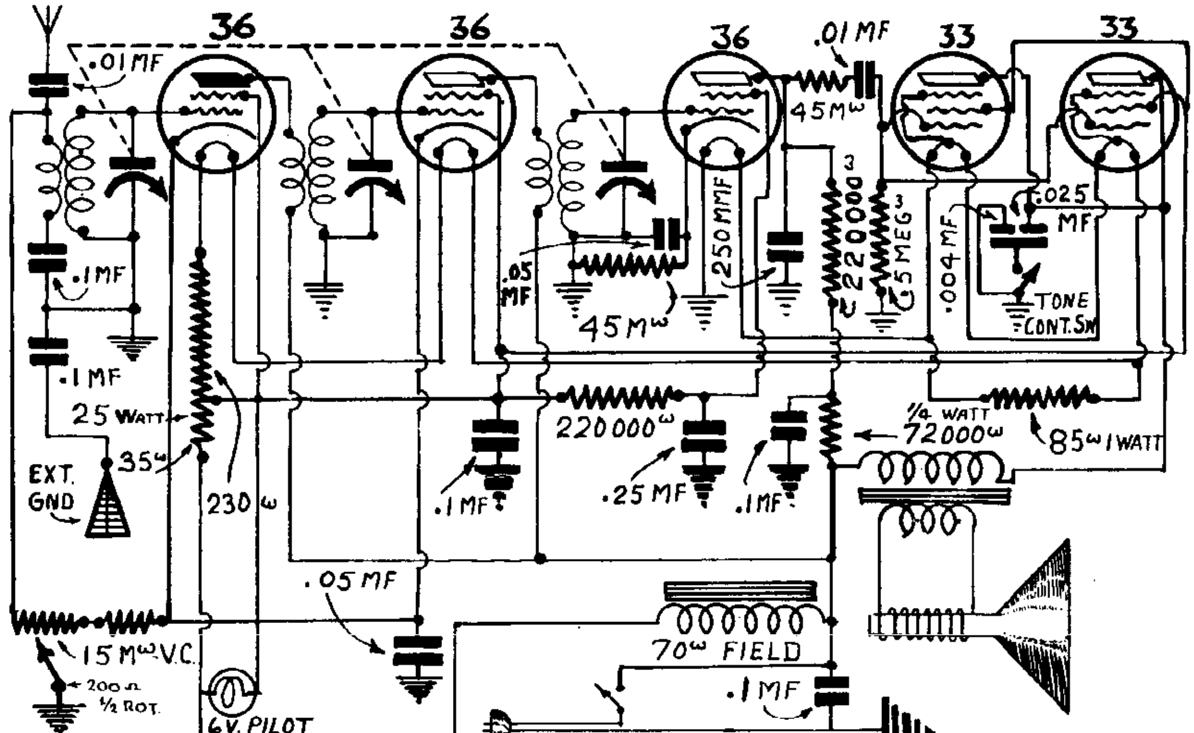


FIG.-4

GENERAL TELEV. & RADIO CORP.



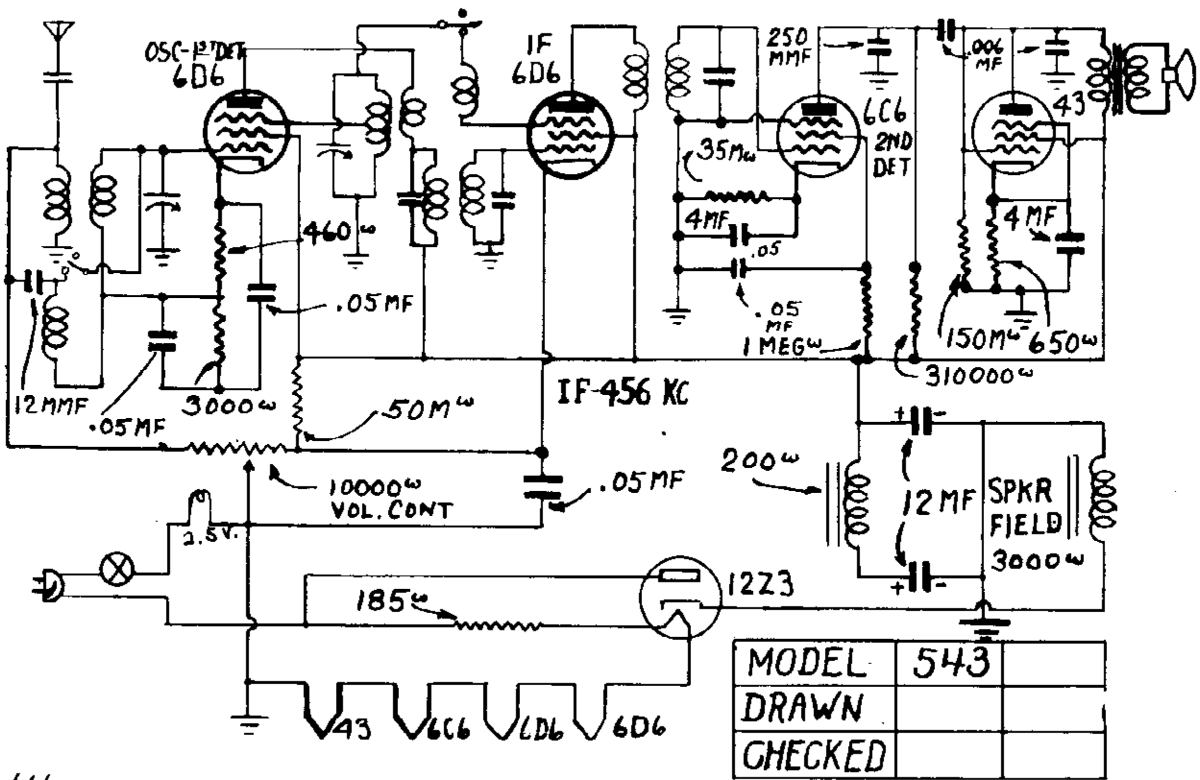
MODEL 510

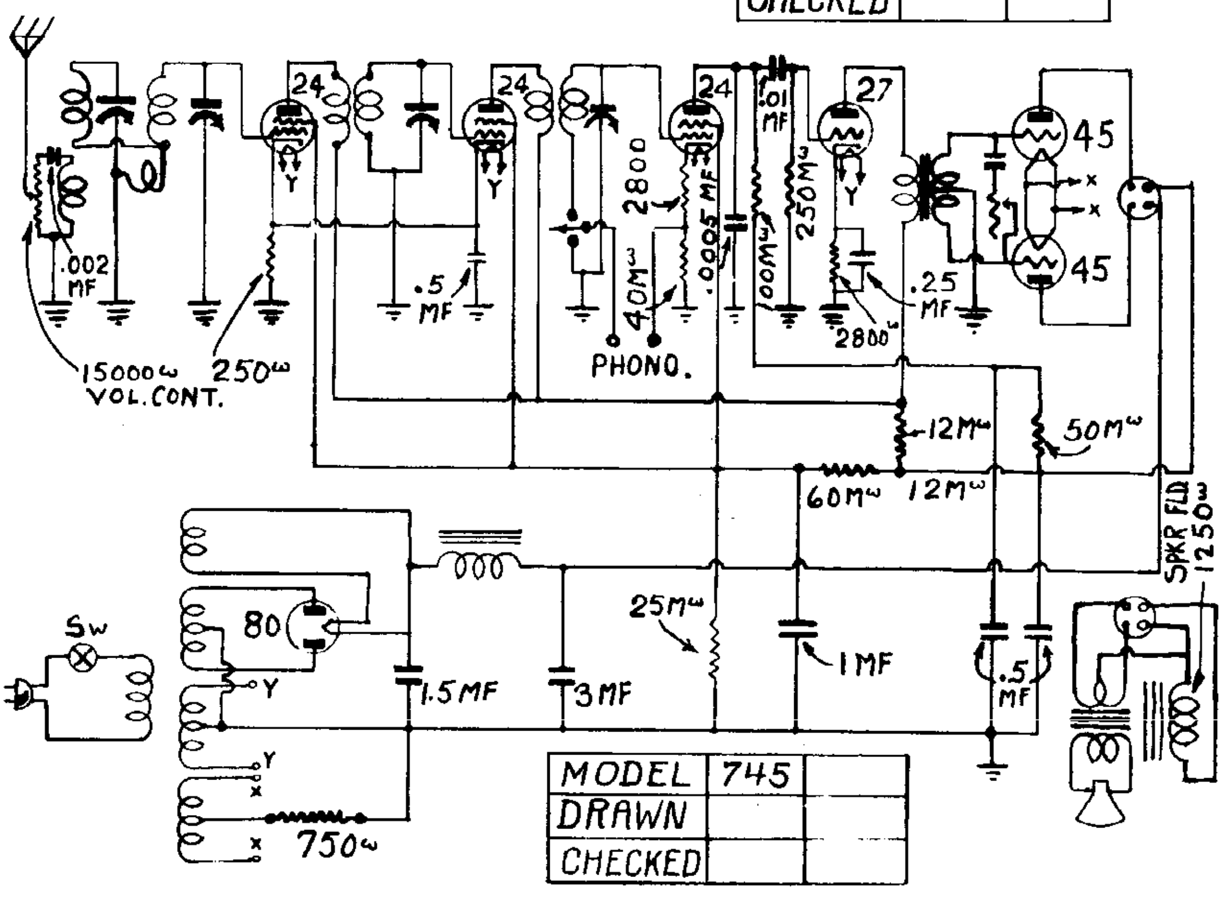


DC-MODEL 533

MODEL 543
MODEL 745
Schematics

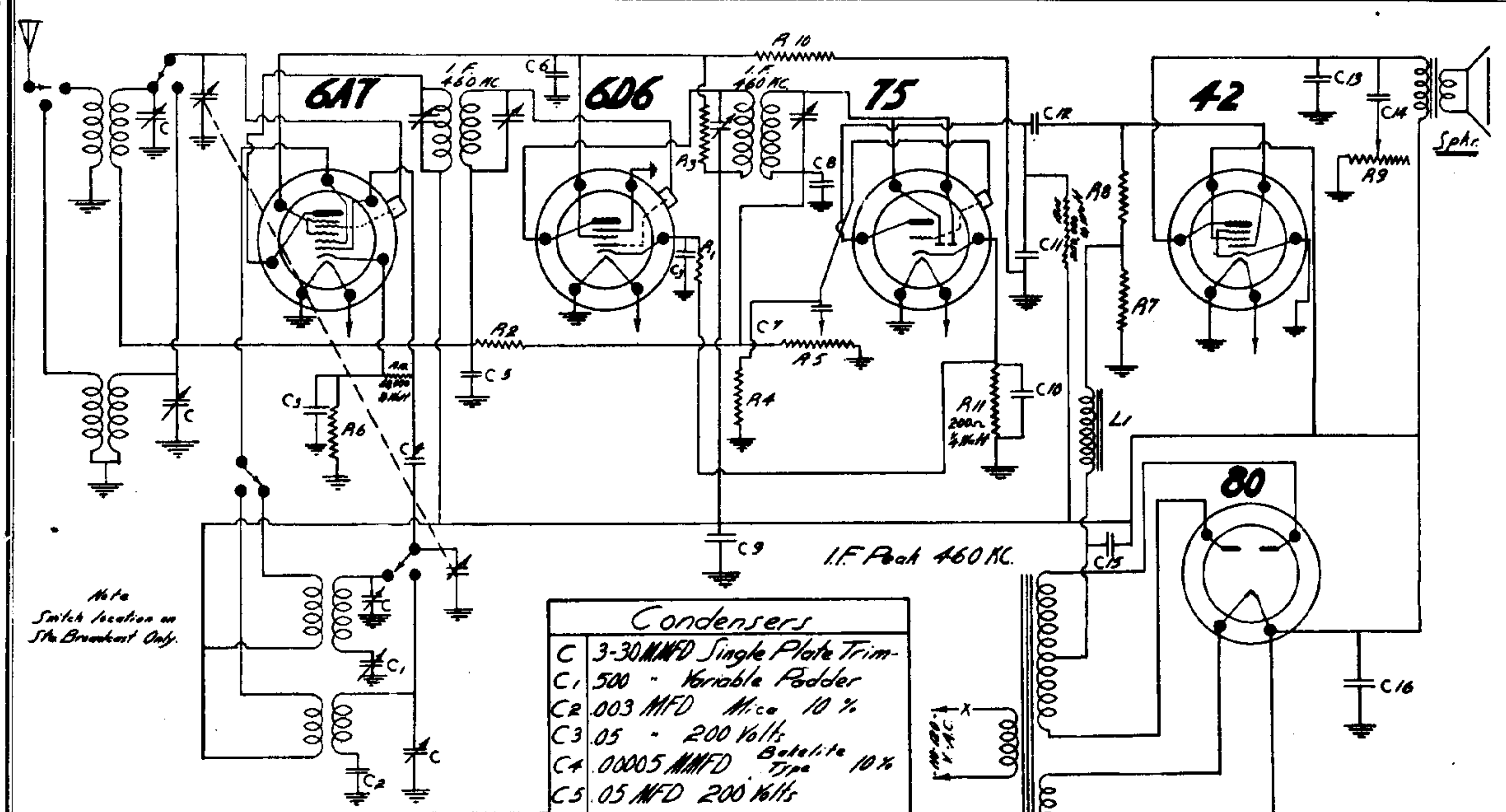
GENERAL TELEV. & RADIO CORP.





MODEL 521T-C
Schematic

GILFILLAN BROS.



Condensers

C	3-30 MMFD Single Plate Trim-
C1	500 " Variable Padder
C2	.003 MFD Mica 10 %
C3	.05 " 200 Volts
C4	.00005 MMFD Bakelite Type 10 %
C5	.05 MFD 200 Volts
C6	.1 " " "
C7	.01 " " "
C8	.00025 MFD Bakelite Type 10 %
C9	.1 MFD - 200 Volts
C10	10 " - 35 " Dry Electrolytic
C11	.00025 MFD Bakelite Type 10 %
C12	.02 MFD - 400 Volts
C13	.006 " - 800 "
C14	.02 " - 600 "
C15	5 " " " Filter
C16	[illegible]

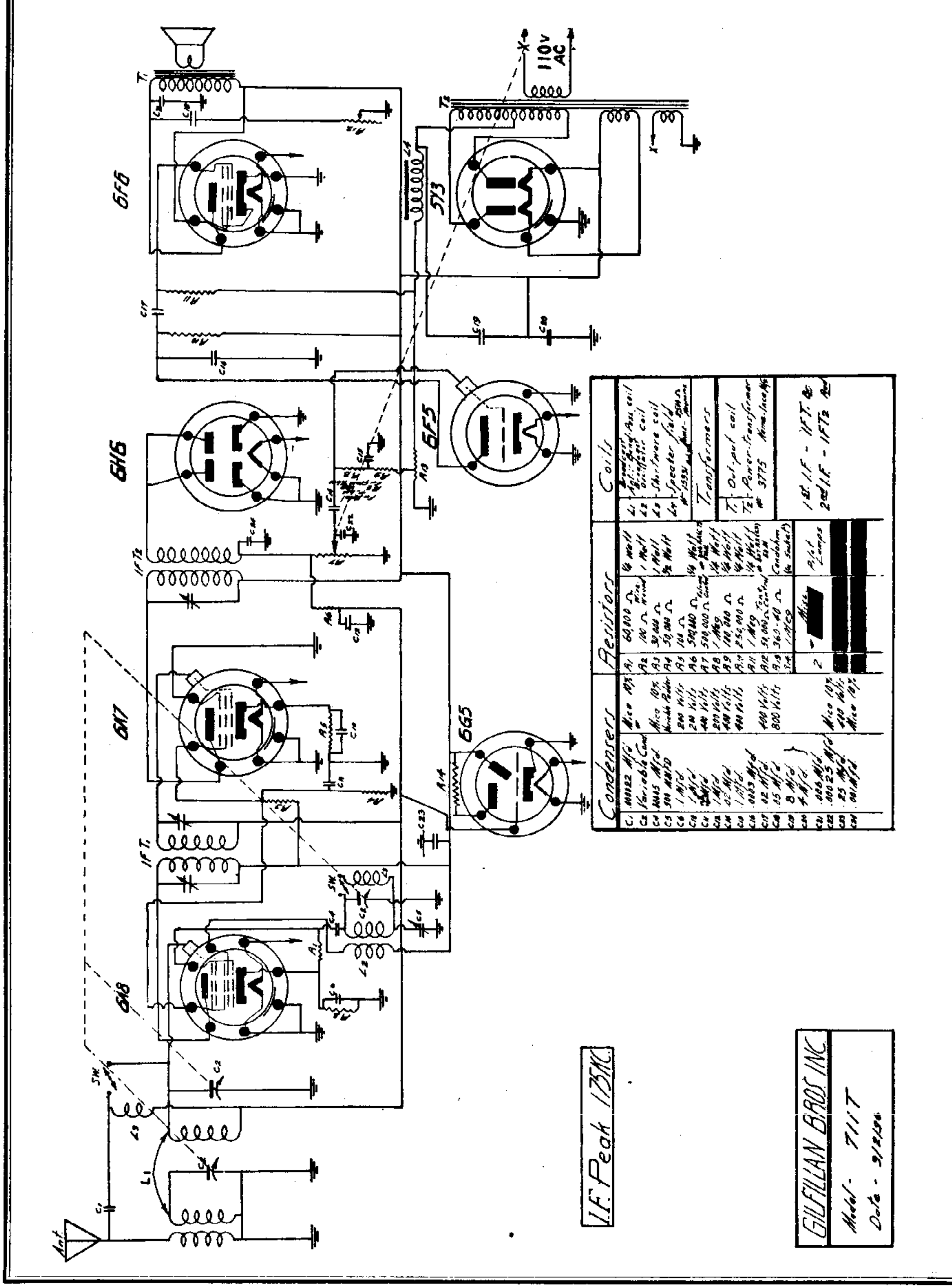
Resistors

R1	200 Ohms - 1 Watt - Wire wound - 10%
R2	1 Meg - ½ " - Carbon " "
R3	250,000 Ohms - 1 " " " "
R4	500,000 " - ¼ " " " "
R5	500,000 " Volume Control
R6	500 " - ¼ Watt - Carbon " "
R7	300 " - 1 " " " "
R8	500,000 " - ¼ " " " "
R9	50,000 " Tone Control
R10	[illegible]

Gilfillan Bros. Inc.
Model 521T-C
June, 1936.

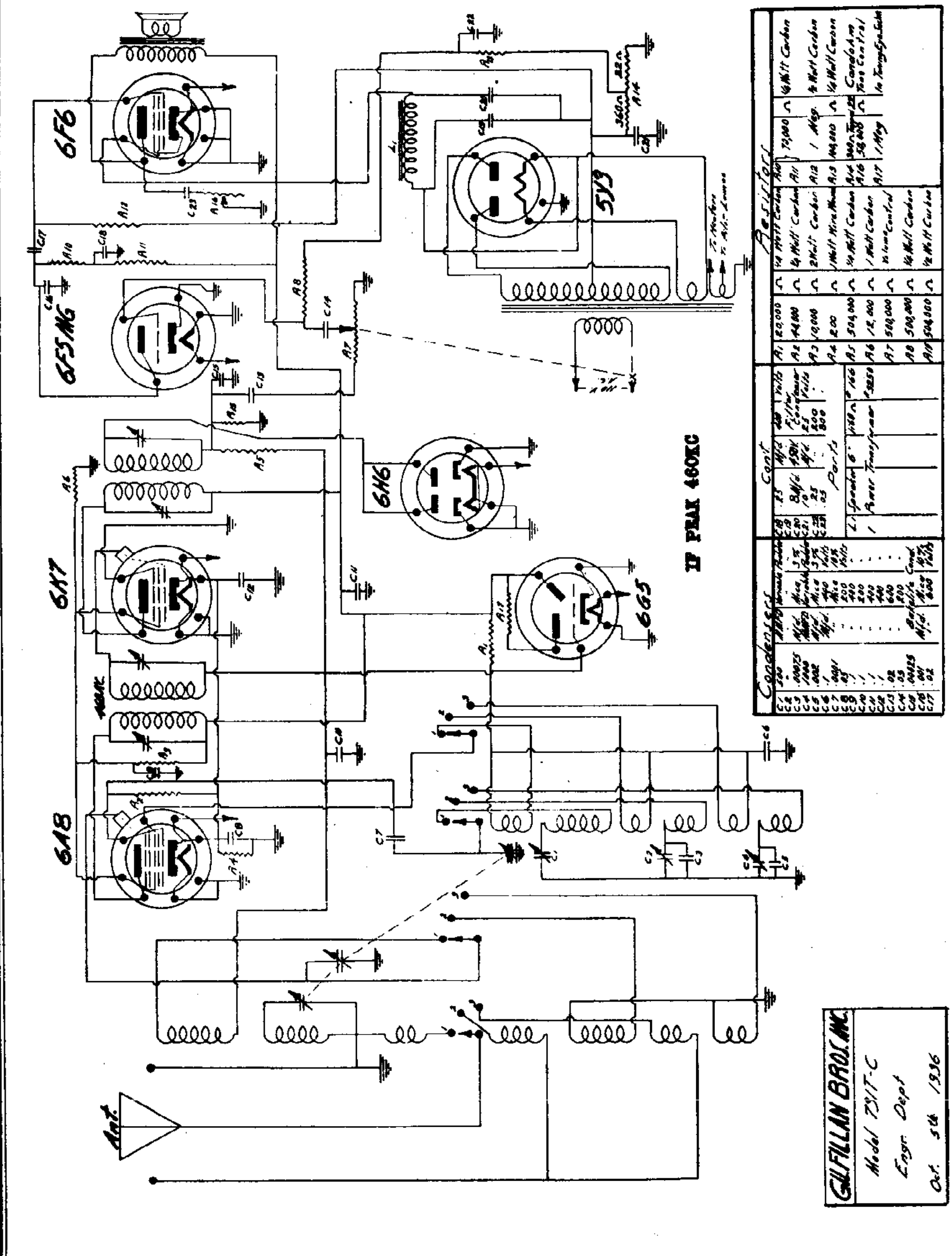
MODEL 711T
Schematic

GILFILLAN BROS.



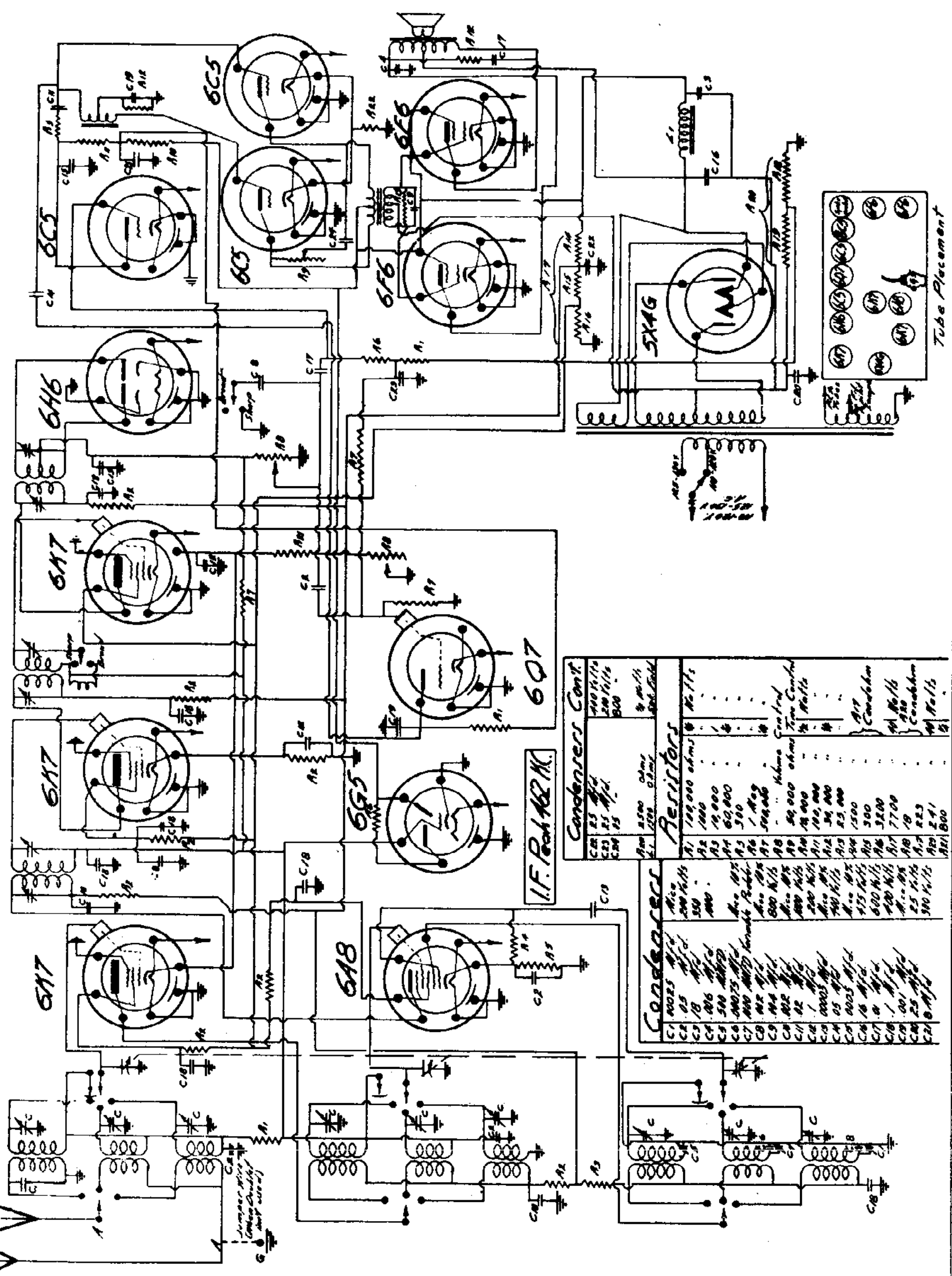
MODEL 731T-C
Schematic

GILFILLAN BROS.



MODEL 1331C
Schematic

GILFILLAN BROS.



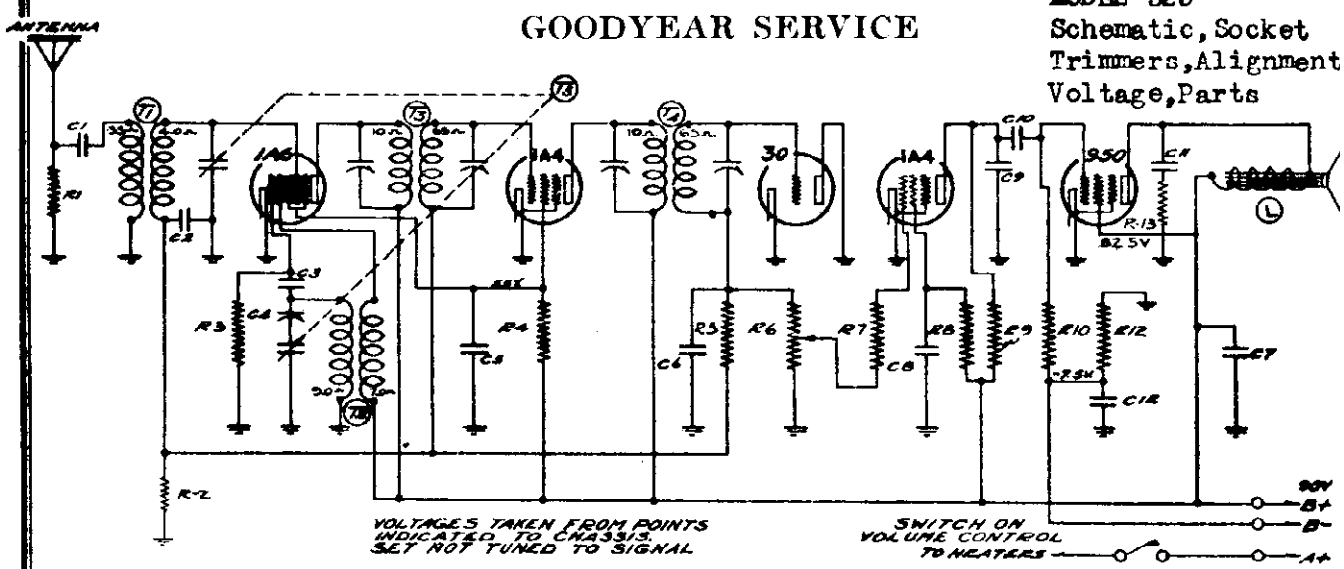
Condensers		
C1	.00025 Mfd.	Mica
C2	.05 Mfd.	200 Volts
C3	18 Mfd.	350 "
C4	.006 Mfd.	1000 "
C5	500 MMFD.	
C6	.00075 Mfd.	Mica 10%
C7	1100 MMFD Variable Padder	
C8	.002 Mfd.	Mica 10%
C9	.004 Mfd.	800 Volts
C10	.002 Mfd.	Mica 10%
C11	.02 Mfd.	1000 Volts
C12	.1 Mfd.	200 Volts
C13	.00005 Mfd.	Mica 10%
C14	.05 Mfd.	400 Volts
C15	.0005 Mfd.	Mica 10%
C16	16 Mfd.	475 Volts
C17	.01 Mfd.	600 Volts
C18	.1 Mfd.	400 Volts
C19	.001 Mfd.	Mica 10%
C20	25 Mfd.	25 Volts
C21	8 Mfd.	300 Volts

Condensers Cont.		
C22	25 Mfd.	400 Volts
C23	25 Mfd.	200 Volts
C24	.15 "	800 "
R20	2500 ohms	1/2 Watt
L1	1500 ohms	Spk. Field

Resistors			
R1	100,000 ohms	1/4	Watts
R2	1000 "	"	"
R3	10,000 "	1	"
R4	60,000 "	1/4	"
R5	300 "	"	"
R6	1 Meg	"	"
R7	500,000 "	1/4	"
R8	" " Volume Control		
R9	50,000 ohms	Tone Control	
R10	18,000 "	1/2	Watts
R11	100,000 "	"	"
R12	30,000 "	1/4	"
R13	25,000 "	"	"
R14	1500 "	A17 Candohm	
R15	300 "		
R16	3200 "		
R17	7700 "	10	Watts
R18	18 "	A20 Candohm	
R19	223 "		
R20	241 "	10	Watts
R21	800 "	1/2	"

MODEL 523
Schematic, Socket
Trimmers, Alignment
Voltage, Parts

GOODYEAR SERVICE



IF PEAK 465KC

No.	Part No.	Description
		RESISTORS
R1	130-17	10M Ohm - 1/3 W. - 20% - Carbon
R2	130-38	2 meg " - 1/3 W. - 20% - Carbon
R3	130-52	50M " - 1/3 W. - 20% - Carbon
R4	130-17	10M " - 1/3 W. - 20% - Carbon
R5	130-38	2 meg " - 1/3 W. - 20% - Carbon
R6	101-69	1 meg " - Volume Control - and Switch
R7	130-52	50M " - 1/3 W. - 20% - Carbon
R8	130-19	1 meg " - 1/3 W. - 20% - Carbon
R9	130-9	200M ohm 1/3 W. - 20% - Carbon
R10	130-19	1 meg " - 1/3 W. - 20% - Carbon
R11	101-44	4.75 " - Rheostat
R12	130-93	450 " - 1/3 W. - 10% - Carbon
R13	130-52	50M " - 1/3 W. - 20% - Carbon
		CONDENSERS
C1	100-11	.01 x 400 v. - 25%
C2	100-22	.05 x 200 v. - 25%
C3	129-12	.00025 Mica - MT - 20%
C4	124-14	Series Pad
C5	100-9	.05 x 200 v. - 25%
C6	129-5	.0001 Mica - MT - 20%
C7	100-48	.25 x 200 v.
C8	100-9	.05 x 200 v. - 25%
C9	129-2	.0005 Mica - MT - 20%
C10	100-11	.01 x 400 v. - 25%
C11	100-11	.01 x 400 v. - 25%
C12	119-22	10.0 mfd. x 25 v. - Working Voltage
		PARTS
T1	111-46	Antenna Coil
T2	110-36	Oscillator Coil
T3	108-67	Input I. F. Coil - 46 kc.
T4	108-68	Output I. F. Coil - 465 kc.
T5	102-42	Two Gang Condenser
L	114-71	Eight Inch Magnetic Speaker

DESCRIPTION

TUBES:

The tube complement of this chassis is as follows:

1 Type 1A6—first detector oscillator.
1 Type 1A4—I.F. amplifier. 465 K. C.
1 Type 30—second detector. A. V. C.
1 Type 1A4—audio.
1 Type 950—output.

FOR BEST OPERATION THIS RECEIVER MUST HAVE AN OUTSIDE AERIAL NOT OVER FIFTY FEET LONG INCLUDING THE LEAD IN.

The following batteries are needed.

2.........45 volt "B" Batteries.

1.........3 Volt Dry "A" Battery or 2 Volt Storage Battery.

ALIGNING I.F. TRANSFORMERS: (465 K.C.)

1. With volume control full on and with variable condenser at its minimum capacity position, plates entirely out of mesh, and wth external oscillator set at 465 K.C. connected in series with a .1 mfd. condenser, to the grid of the 1A6 tube (cap at top of tube), adjust I.F. transformers, parts number 108-67 and 108-68, to resonance. Both of these transformers have two (2) adjustments each, they are accessible from the tops of the cans (for location see top view).

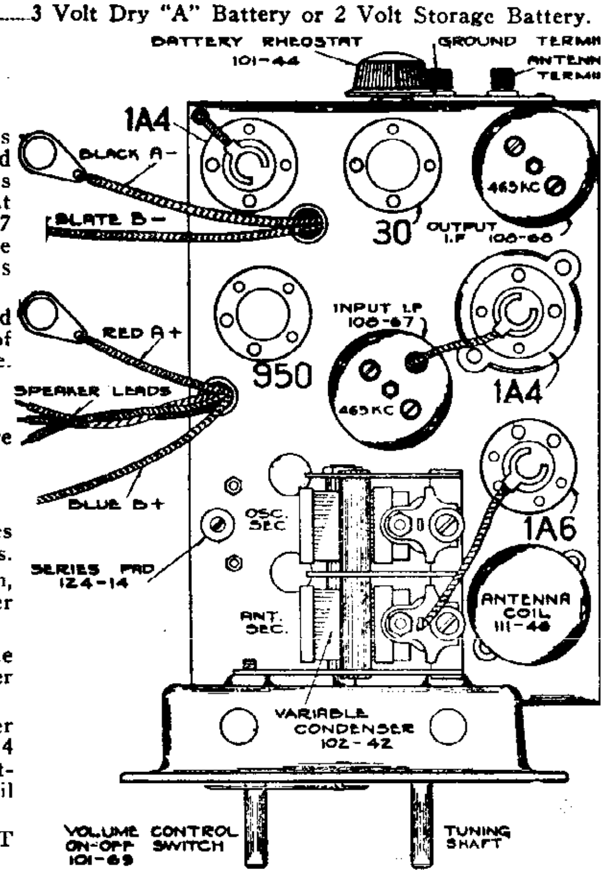
Use as a resonance indicator an output meter connected across the outside terminals of the speaker or by means of an adapter to the plate and screen of the type 950 output tube. Maximum deflection of the volt meter indicates resonance.

Use only enough signal to get a readily readable output.

A low range output meter or the low scale of a multi-range meter should be used.

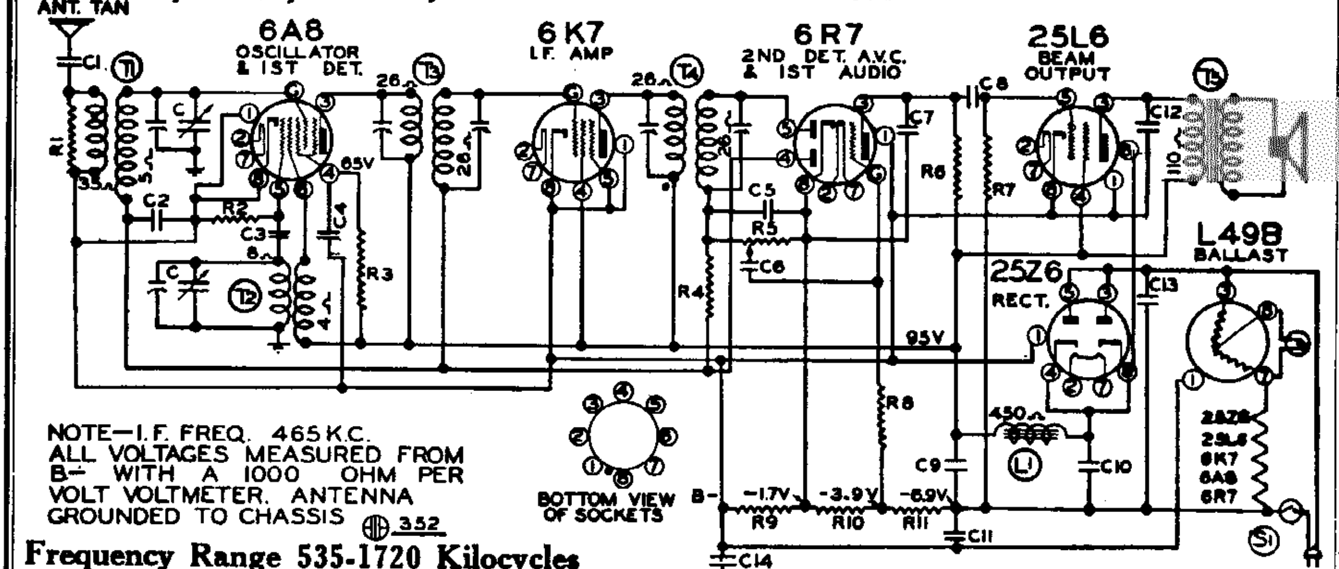
BROADCAST BAND ALIGNMENT:

1. Set external oscillator to 1720 K.C. and connect it in series with a 200 mmfd. condenser to the antenna and ground posts.
   (a) With variable condenser in its minimum capacity position, plates entirely out of mesh, adjust oscillator trimmer (rear section of variable condenser) to resonance.
   (b) Re-set external oscillator to 1400 K.C. Rotate variable condenser, pick up signal and adjust antenna trimmer (front section of variable condenser) to resonance.
   (c) Re -set external oscillator to 600 K.C., move dial pointer to 600 K.C., and adjust series pad, part number 124-14 (see top view), to resonance. While making this adjustment, slowly rock variable condenser to and fro until maximum output is obtained.
   (d) Check for sensitivity at 1400, 1000, 600 K.C. DO NOT BEND PLATES.



MODEL 602

Schematic, Socket, Trimmers, **GOODYEAR SERVICE** Alignment, Voltage, Parts



NOTE—I.F. FREQ. 465 K.C.
ALL VOLTAGES MEASURED FROM B- WITH A 1000 OHM PER VOLT VOLTMETER. ANTENNA GROUNDED TO CHASSIS 352

Frequency Range 535-1720 Kilocycles

RESISTORS

No.	Part No.	Description	
R1	130-17	10M ohm - 1/3 w.	20%
R2	130-12	50M ohm - 1/3 w.	20%
R3	130-149	15M ohm - 1/3 w.	20%
R4	130-4	3 meg ohm - 1/3 w.	20%
R5	101-77	Volume Control (1 Meg)	
R6	130-12	50M ohm - 1/3 w.	20%
R7	130-20	100M ohm - 1/3 w.	20%
R8	130-19	1 megohm - 1/3 w.	20%
R9	106-38	30 ohm	
R10	106-38	40 ohm	
R11	106-38	55 ohm	

R9, R10, and R11 in one unit

CONDENSERS

No.	Part No.	Description	
C	102-48	2 gang variable	
C1	100-25	.002 x 600	25%
C2	100-9	.05 x 200	25%
C3	129-12	.00025 Mica	20%
C4	100-22	.05 x 200	25%
C5	129-5	.0001 Mica	20%
C6	100-11	.01 x 400	25%
C7	129-2	.0005 Mica	20%
C8	100-22	.05 x 200	25%
C9	119-39	20 mfd. lytic - 100 w.v.	
C10	119-39	15 mfd. lytic - 100 w.v.	
C11	100-20	.1 x 200	25%
C12	100-13	.05 x 400	25%
C13	100-39	.1 x 400	20%
C14	100-53	.25x400	20%

PARTS

No.	Part No.	Description
T1	111-58B	Antenna Coil Complete
T2	110-46	Oscillator Coil Complete
T3	108-82B	Input I. F. Complete
T4	108-83B	Output I. F. Complete
T5	114-71	Dynamic Speaker
L1		450 ohm speaker field
S1		Switch on Volume Control

ALIGNING I.F. TRANSFORMERS: (465 K. C.):

Part No. 108-83B Output I.F. Transformer

Part No. 108-82B Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6K7G tube, and adjust the output I.F. transformer (No. 108-83B) to resonance.
   (b) Move oscillator output clip from grid of 6K7G to grid of 6A8G and adjust input I.F. transformer (No. 108-82B) to resonance.
   (c) With oscillator still connected to 6A8G, readjust output I.F. transformer (108-83B) if necessary.

R.F. ALIGNMENT: (535-1720 K.C.)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmf. condenser to the antenna lead and chassis ground and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).
   (c) Check sensitivity at 600 and 1000 kilocycles.

The type and function of each tube is as follows:

Type 6A8G Pentagrid Mixer, First Detector-oscillator.

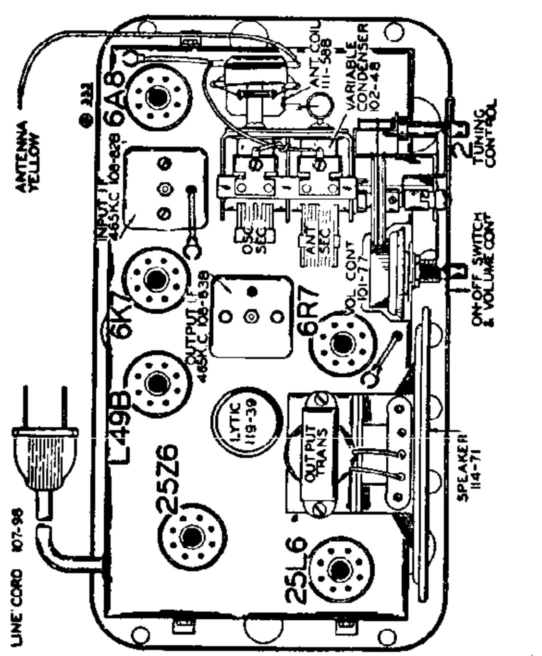
Type 6K7G Remote Cut-Off Pentode, I.F. Amplifier K.C.)

Type 6R7G. Duplex Diode Triode Second Detector, and First Audio.

Type 25L6G Beam Output Amplifier.

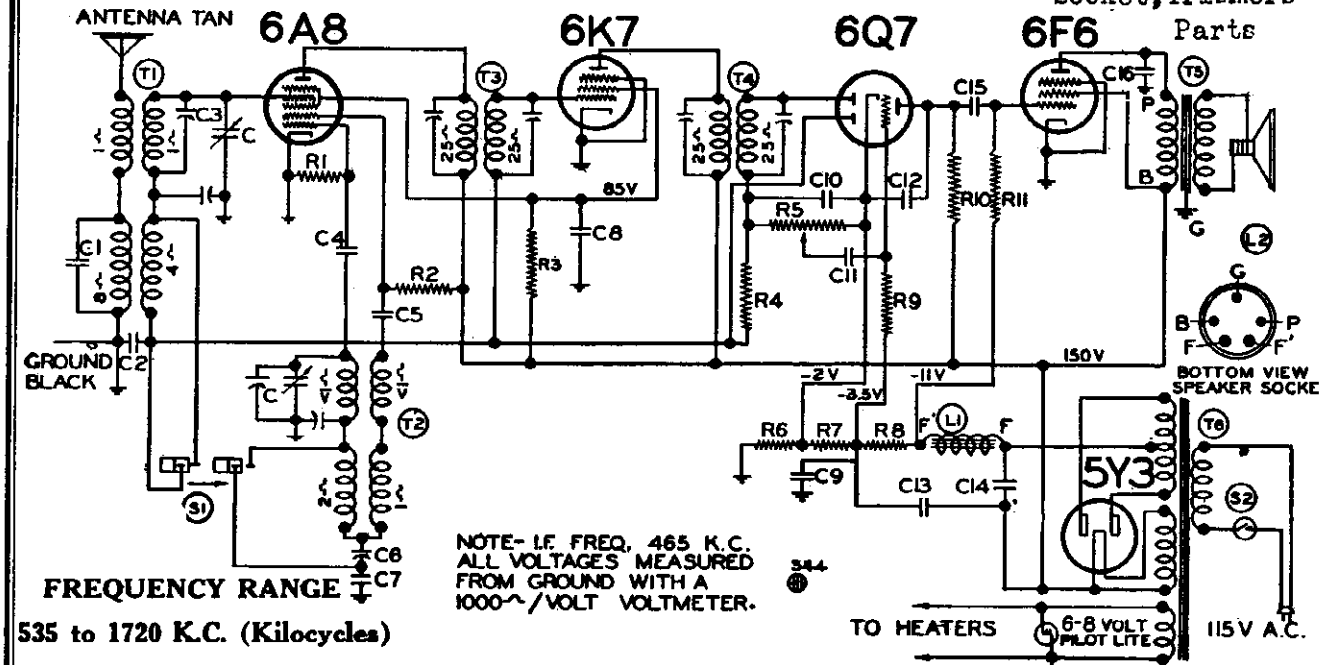
Type 25Z6G High Vacuum Rectifier.

Type L49B Ballast Tube.



MODEL 588
Schematic, Voltage
Socket, Trimmers
Parts

GOODYEAR SERVICE



FREQUENCY RANGE

535 to 1720 K.C. (Kilocycles)

2000 to 7000 K.C. (Kilocycles)

No.	Part No.	Description
		CONDENSERS
C1	129-12	.00025 - Mica 20%
C2	100-22	.05 x 200 25%
C3	124-39	Adjustable Condenser 2-20 mmf.
C4	129-5	.0001 - Mica 20%
C5	100-37	.003 x 600 v. 10%
C6	124-38	Series Pad - 600 mmf.
C7	129-74	.0015 Mica 2½%
C8	100-1	.1 x 400 v. 50% - 10%
C9	100-20	.1 x 200 v. 25%
C10	129-5	.0001 Mica 20%
C11	100-11	.01 x 400 v. 25%
C12	129-2	.0005 Mica 20%
C13	119-38	5 mfd. 200 w. v. Black
C14	119-38	5 mfd. 250 w. v. Brown
C15	100-11	.01 x 400 v. 25%
C16	100-19	.006 x 600 v. 25%
		C13 and C14 - in one unit.
		RESISTORS
R1	130-12	50M ohm - 1/3 w. 20%
R2	130-17	10M ohm - 1/3 w. 20%
R3	130-149	15M ohm - 1/3 w. 20%
R4	130-4	3 megohm - 1/3 w. 20%
R5	101-71	1 megohm - Volume control
R6	106-35	65 ohm - Muter
R7	106-35	45 ohm - Muter
R8	106-35	220 ohm - Muter
R9	130-4	3 megohm - 1/3 w. 20%
R10	130-9	200M ohm - 1/3 w. 20%
R11	130-3	500M ohm - 1/3 w. 20%
		R6, R7 and R8 in one unit
		PARTS
T1	111-75	Antenna coil complete
T2	110-60	Oscillator coil complete
T3	108-104	Input I.F. Assembly complete
T4	108-103	Output I.F. Assembly complete
T5		Output Transformer
T6	104-60B	Power Transformer
L1		2000 ohm - speaker field
L2	114-61	Dynamic speaker
S1	125-27	Wave change switch
S2		Switch on Volume Control

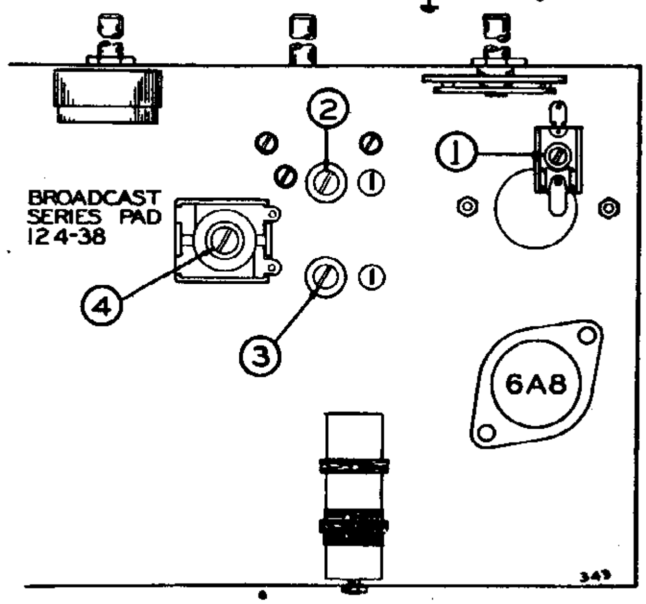
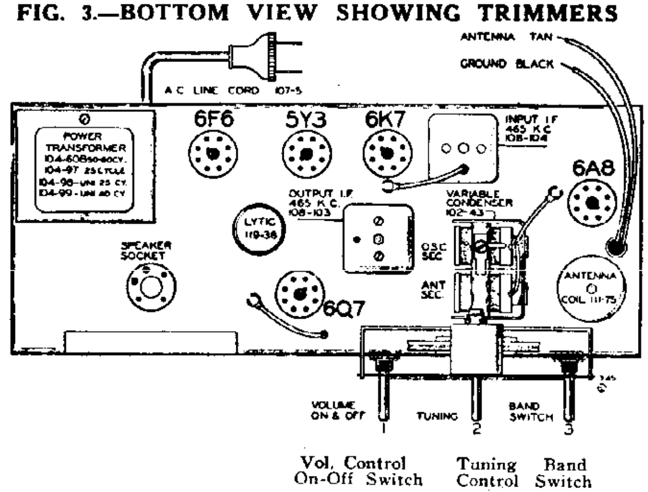


FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS



MODEL 588
Alignment, Notes

GOODYEAR SERVICE

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and screen terminals of the type 6F6G output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-103 Output I.F. Transformer
Part No. 108-104 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser in its minimum capacity position, plates entirely out of mesh, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7G tube, and adjust the output I.F. transformer (No. 108-103) to resonance.

   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7G to grid cap of 6A8G and adjust input I.F. transformer (No. 108-104) to resonance.

SHORT WAVE BAND ALIGNMENT:

2000 to 7000 Kilocycles

1 With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 6 megacycles and connected in series with "Dummy 3" to the antenna and ground leads, make the following adjustments:

   (a) Move dial pointer to 6 megacycles and adjust short wave oscillator trimmer to resonance. This adjustment is the trimmer mounted on the top of rear section of the variable gang condenser (see Fig. 1, top view).

   (b) Adjust short wave antenna trimmer (Adjustment Number 1), to resonance (see Fig. 3, bottom view).

BROADCAST BAND ALIGNMENT:

535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground leads make following adjustments:

   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 3, see bottom view of chassis, Fig. 3).

   (b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (adjustment number 2), to resonance.

   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment number 4), to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).

   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

   (e) Check for tracking and sensitivity at 1400, 1000, and 600 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

ANTENNA AND GROUND LEADS:

For the best results an outside antenna approximately 75-100 feet long including the lead-in should be used. It should be erected as high as possible and as far from surrounding objects as practical. Both the antenna and lead-in should be placed at right angles to street car lines and incoming power lines and as far from any electrical apparatus which may be in the vicinity (such as elevator motors) as practical.

An inside antenna is not recommended, although it occasionally may serve as a temporary installation especially near powerful broadcasting stations. This type of antenna, however, will not be satisfactory in buildings of steel construction.

Reception on the short wave band can be sometimes improved by means of an approved doublet antenna.

This radio will operate without a ground; however, a good ground by means of an approved clamp to water or steam (not gas) pipes or to a pipe driven in the ground will often reduce noise pick-up.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

DESCRIPTION:

The tube complement of this chassis consists of the following octal base glass tubes which are interchangeable with metal tubes:

1—Type 6A8G Pentagrid mixer, first detector-oscillator.
1—Type 6K7G Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6Q7G duplex diode triode second detector, A.V.C. and audio.
1—Type 6F6G—pentode output amplifier.
1—Type 5Y3G or 5W4—high vacuum rectifier.

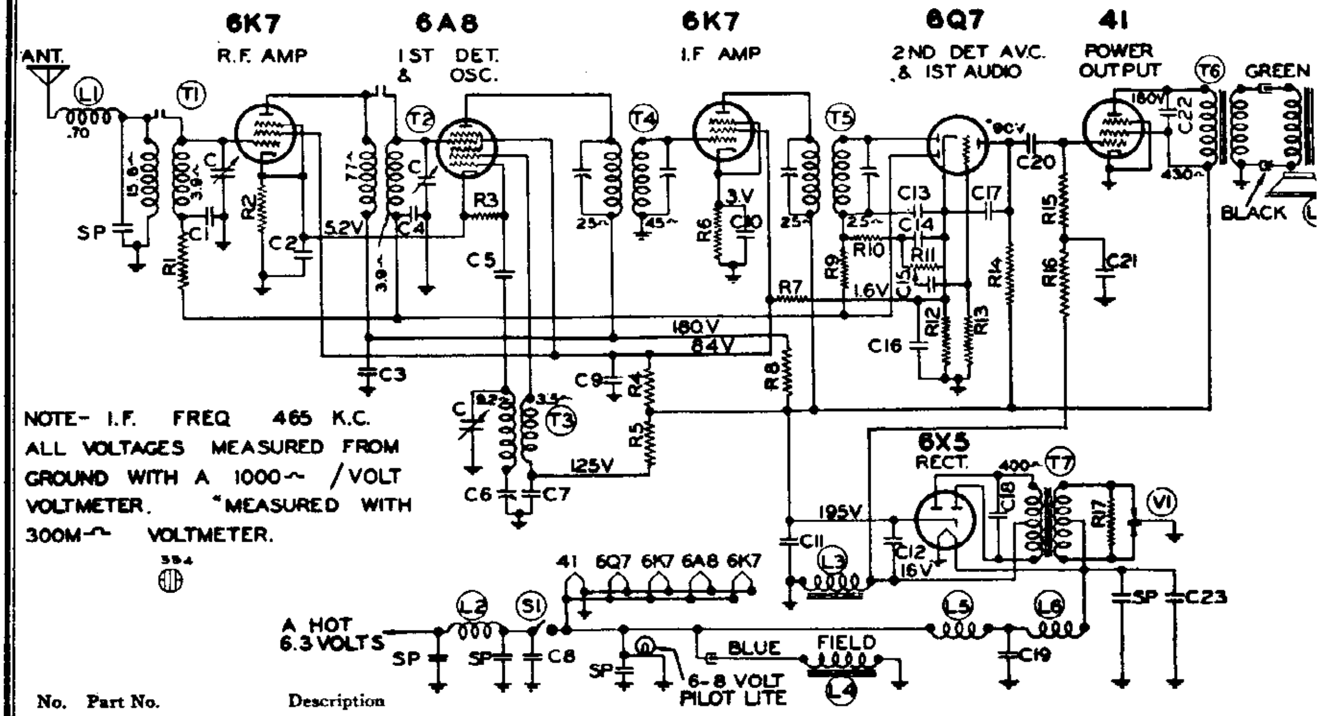
Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 108, 127, 150, 225, and 260 volts, (see instructions) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

Socket, Trimmers
Alignment, Parts

GOODYEAR SERVICE

MODEL 661
Schematic, Voltag



NOTE- I.F. FREQ 465 K.C.
ALL VOLTAGES MEASURED FROM GROUND WITH A 1000~ /VOLT VOLTMETER. *MEASURED WITH 300M~ VOLTMETER.

CONDENSERS

No.	Part No.	Description
C	102-26	3 Gang Variable Condenser
C1	100-63	.05 x 200v. 50 - 10%
C2	100-63	.1 x 200v. 50 - 10%
C3	100-13	.05 x 400v. 25%
C4	100-22	.05 x 200v. 25%
C5	129-12	.00025 Mica - 20%
C6	124-37	Series Pad
C7	100-20	.1 x 200 v. 25%
C8	100-31	.5 x 120 v. 10 50%
C9	100-62	.25 x 200 v. 50 - 10%
C10	100-20	.1 x 200 v. 25%
C11	119-37	8 mfd. lytic 300 wv.
C12	119-37	4 mfd. lytic 300 wv.
C13	129-5	.0001 Mica 20%
C14	129-5	.0001 Mica 20%
C15	100-11	.01 x 400 v. 25%
C16	100-11	.01 x 400 v. 25%
C17	129-5	.0001 Mica 20%
C18	100-58	.005 x 1200 v. 20 - 10%
C19	100-31	.5 x 120 v. - 10 50%
C20	100-11	.01 x 400 v. 25%
C21	100-62	.25 x 200 v. 50 - 10%
C22	100-54	.006 x 600 v. 25%
C23	100-31	.5 x 120 v. - 10 50%
SP		Spark Plate

C1, C2 in same block
C11 and C12 in same block
C9 and C21 in same block

RESISTORS

No.	Part No.	Description
R1	130-20	100M - 1/3 w. - 20%
R2	130-54	500 ohm - 1/3 w. - 20%
R3	130-12A	50M ohm - 1/3 w. insulated 20%
R4	130-165	15M ohm - 1 w. - 20%
R5	130-131A	20M ohm - 1/2 w. - insulated - 10%
R6	130-24	400 ohm - 1/3 w. - 20%
R7	130-139A	40M ohm - 1/3 w. Insulated - 20%
R8	130-31A	1500 ohm - 1/3 w. insulated - 20%
R9	130-19	1 megohm - 1/3 w. - 20%
R10	130-52	50M ohm - 1/3 w. - 20%
R11	101-41	500M ohm - Volume Control
R12	130-153	700 ohm - 1/3 w. - 20%
R13	130-19	1 megohm - 1/3 w - 20%
R14	130-11A	250M - 1/3 w. Insulated - 20%
R15	130-5A	300M ohm - 1/3 w. insulated - 20%
R16	130-11A	250M ohm - 1/3 w. insulated - 20%
R17	130-84	200 ohm - 1/3 w. insulated - 20%

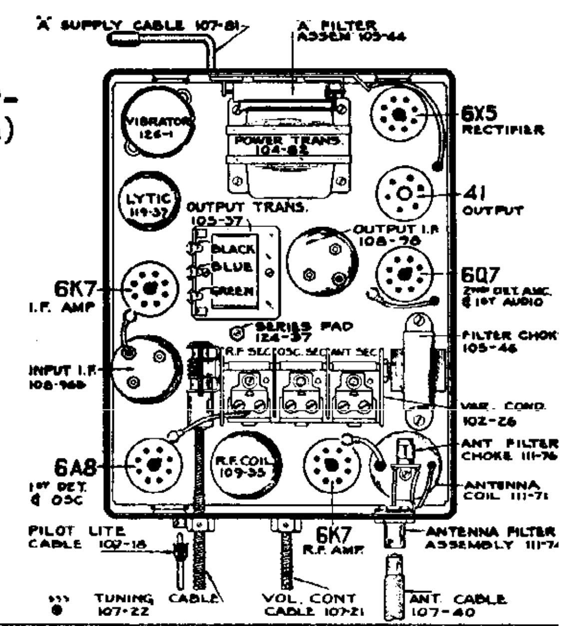
PARTS

No.	Part No.	Description
T1	111-71	Antenna Coil Complete
T2	109-35	R.F. Coil Complete
T3	110-57	Oscillator Coil Complete
T4	108-96B	Input I.F. Complete
T5	108-98	Output I. F. Complete
T6	105-37	Output Transformer
T7	104-82	Power Transformer
L1	111-76	Antenna Filter Choke
L2	105-26	"A" Choke
L3	105-46	"B" Filter Choke, 335 ohm
L4		Speaker Field, 4 ohm
L5	105-24	"A" Choke
L6	105-19	"A" Choke
L7	114-59	Dynamic Speaker
S1		Switch on Volume Control
V1	126-1	Vibrator

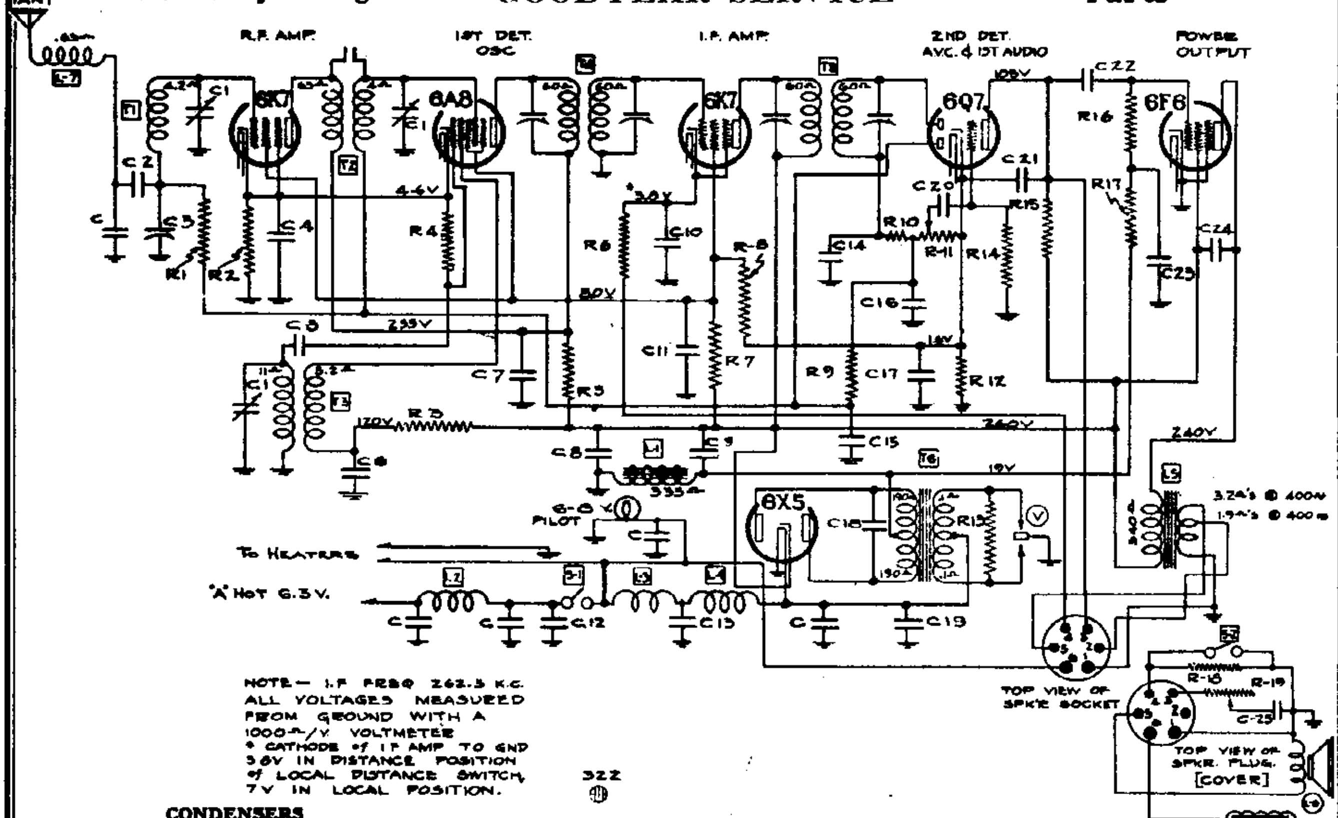
CONVENTIONAL ALIGNMENT-
(see special section)

BROADCAST ALIGNMENT

1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. in series with broadcast dummy to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance. (This adjustment is on the middle section of the three-gang condenser—see top view, Fig. 2).
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust R.F. and antenna trimmers to resonance (see top view, Fig. 2).
4. Re-set test oscillator to 600 K.C. and rotate variable condenser to 600 K.C. Adjust series pad, rocking gang condenser to and fro, at the same time adjusting series pad for maximum gain. This adjustment is accessible from the top of chassis—see top view.
5. Go back and check 1400 K.C. If adjustment is made here, check 600 K.C. again. Check for sensitivity at 1000 K.C.



MODEL 667 | Schematic, Voltage | GOODYEAR SERVICE | Socket, Trimmers Parts



CONDENSERS

C		Spark Plate
C1	102-45	3 Gang Condenser
C2	129-73	.002 Mica - MW-W - 10%
C3	124-36	Series Pad
C4	116-20	.1 x 200 v. - 20%
C5	129-12	.00025 Mica - MT - 20%
C6	116-19	.1 x 400 - 20%
C7	116-19	.1 x 400 - 20%
C8	119-34	8. mfd. - 350 W v.
C9	119-34	4 mfd. 350 W v.
C10	116-19	.05 x 200 v. - 20%
C11	116-20	.25 x 200 v. - 20%
C12	100-31	.5 x 120 v. - 10-50% - Braid leads
C13	100-31	.5 x 120 v. - 10-50%
C14	129-5	.0001 Ceramicon - 20%
C15	116-19	.05 x 200 v. - 20%
C16	129-5	.0001 Ceramicon - 20%
C17	116-20	.02 x 200 - 20%
C18	100-36	.01 x 1400 v. - 20% - 10% "A"
C19	100-31	.5 x 120 v. - 10% - 50%
C20	116-20	.02 x 200 - 20%
C21	129-5	.0001 Ceramicon - 20%
C22	100-55	.01 x 400 - 25%
C23	100-48	.25 x 200 - 20%
C24	100-54	.006 x 600 - 25%
C25	100-11	.01 x 400 - 25%

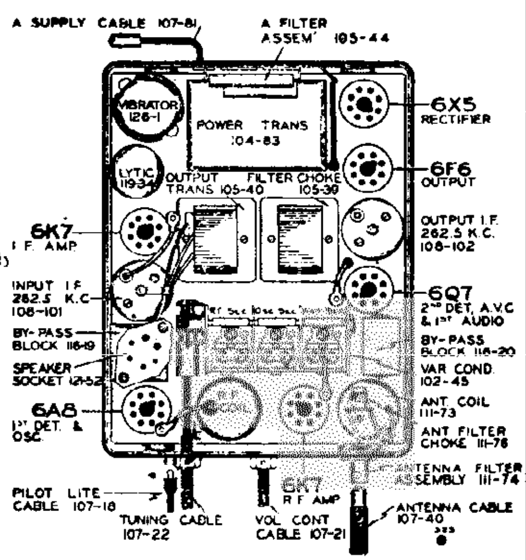
C4, C11, C17, C20 All in Block 116-20

C7, C6, C10, C15 All in Block 116-19

CONNECTIONS TO BATTERY

The battery cable, number 107-82, (red wire with fuse receptacle at one end and terminal lug at other end) must be connected to battery terminal of ammeter. At the same time connect ammeter capacitor, number 148-3, to battery terminal of ammeter, other end of condenser to any convenient grounded screw on back of instrument panel. Make certain that insulating sleeve is slipped over fuse when fuse is placed in receptacle, before connecting to short battery cable from receiver.

When connected properly, the discharge due to current drawn by the receiver should not indicate on the ammeter. This is important, since if improperly connected, as shown by the deflection of ammeter, additional motor interference may be encountered.



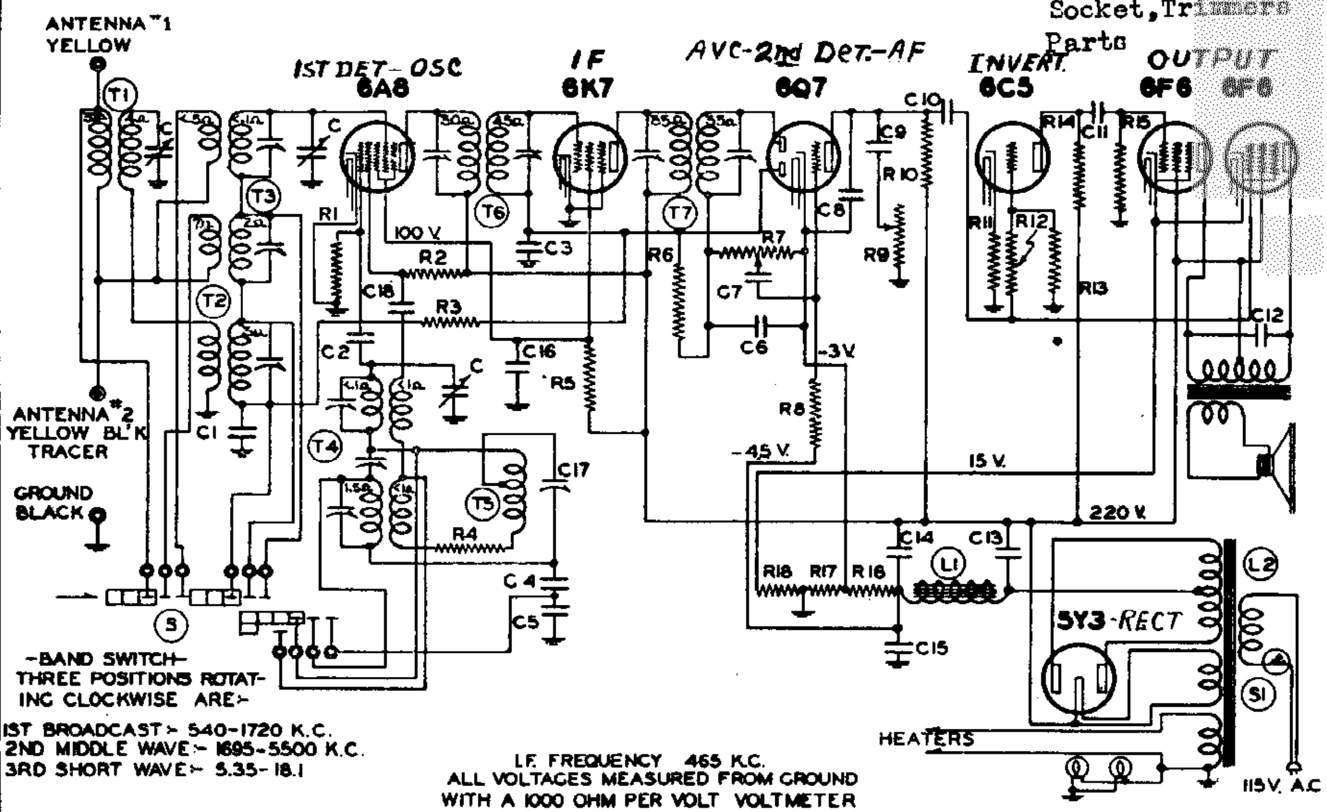
RESISTORS

R1	130-141	250M ohm - 1/3 w. Insulated
R2	130-54	500 ohm - 1/3 w.
R3	130-138	50M ohm - 1/2 w. Insulated
R4	130-52	50M ohm - 1/3 w.
R5	130-137	1500 ohm - 1/3 w. Insulated
R6	130-154	1000 ohm - 1/3 w. Insulated
R7	130-143	30M ohm - 1.2 w.
R8	130-139	40M ohm - 1/3 w. Insulated
R9	130-19	1 meg - 1/3 w.
R10	130-162	50M ohm - 1/3 w. Insulated
R11	101-73	250M ohm - Volume Control
R12	130-153	700 ohm - 1/3 w.
R13	130-84	200 ohm - 1/3 w.
R14	130-19	1 meg ohm - 1/3 w.
R15	130-11	250M ohm - 1/3 w.
R16	130-5	300M ohm - 1/3 w.
R17	130-11	250M ohm - 1/3 w.
R18	130-161	4000 ohm - 1/3 w. Insulated
R19	101-45	Tone Control 1 Meg ohm.

PARTS

L7	111-76	Antenna Filter Choke Assembly
T1	111-73	Antenna Coil Complete
T2	109-36	R.F. Coil Complete
T3	110-59	Oscillator Coil Complete
T4	108-101	I.F. Input
T5	108-102	I.F. Output
T6	104-83	Power Transformer
L1	105-39	Filter Choke (335 ohms)
L2	105-26	"A" Choke
L3	105-24	"A" Choke
L4	105-19	"A" Choke
L5	105-40	Output transformer
L6	114-62	Speaker, Dynamic
S1		Switch on Volume Control
S2	125-28	Sensitivity switch.

GOODYEAR SERVICE



No.	Part No.	Description
		RESISTORS
R1	130-12	50M ohms - 1/3 w.
R2	130-48	15M ohms - 1/3 w.
R3	130-103	100M ohms - 1/3 w.
R4	130-27	50 ohms - 1/3 w.
R5	130-96	25M ohms - 1/2 w.
R6	130-4	3 megohm - 1/3 w.
R7	101-74	1 megohm - Volume Control
R8	130-4	3 megohm - 1/3 w.
R9	101-75	300M ohms - Tone Control
R10	130-100	150M ohms - 1/3 w.
R11	130-22	5M ohms - 1/3 w.
R12	130-163	400M ohms - 1/3 w.
R13	130-103	100M ohms - 1/3 w.
R14	130-12	50M ohms - 1/3 w.
R15	130-100	150M ohms - 1/3 w.
R16	106-37	20 ohms - Muter
R17	106-37	42 ohms - Muter
R18	106-37	250 ohms - Muter

NOTE: R16, R17 and R18 in one unit, No. 106-37

		CONDENSERS
C1	100-22	.05 x 200 v.
C2	129-39	.00005 Mica
C3	100-22	.05 x 200 v.
C4	129-55	.0034 Mica
C5	129-54	.003 Mica
C6	129-5	.0001 Mica
C7	100-11	.01 x 400 v.
C8	129-2	.0005 Mica
C9	100-57	.006 x 600 v.
C10	100-26	.02 x 400 v.
C11	100-26	.02 x 400 v.
C12	100-12	.003 x 600 v.
C13	103-6	8 mfd. x 350 v.
C14	103-14	16 mfd. x 250 v.
C15	100-20	.1 x 200 v.
C16	100-39	.1 x 400 v.
C17	124-35	Adjustable Padder - Working Capacity 740 mmf.
C18	100-12	.003 x 600 v.

BAND	FREQUENCY RANGE
Broadcast	**540 to 1720 K.C. (Kilocycles)**
Middle Wave	**1690 to 5500 K.C. (Kilocycles)**
Short Wave	**5.35 to 18.1 M.C. (Megacycles)**

		PARTS
C	102-46	One section of three gang condenser
T1	111-51	B.C. Pre-Selector
T2	111-49	B.C. Antenna Coil Assembly
T3	111-50	MW - SW Antenna Coil Assembly
T4	110-39	MW - SW Oscillator Coil Assembly
T5	110-55	B.C. Oscillator Coil Assembly
T6	108-105	Input I.F. - 465 kc.
T7	108-106	Output I.F. - 465 kc.
L1	114-66	6" Speaker (Field Resistance 900 ohms)
L2	104-87	Power Transformer (60 cycle) 115 volts
S	125-17	Band Switch
S1	101-74	On-off Switch on volume control.

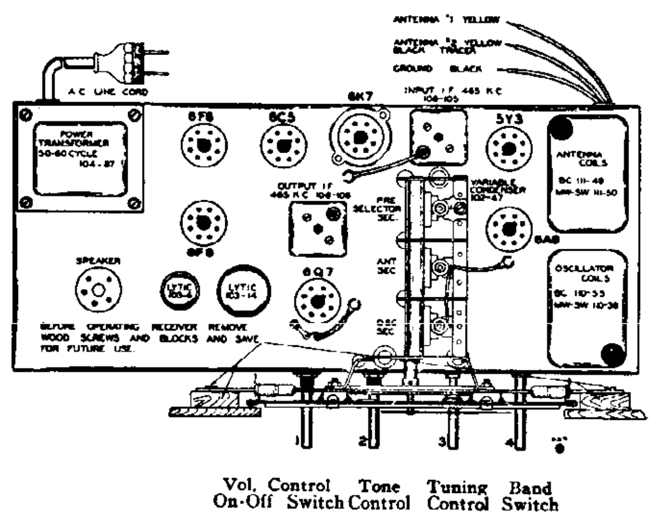


FIG. 1—TOP VIEW

MODEL 741
Alignment, Trimmers

GOODYEAR SERVICE

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-106 Output I.F. Transformer
Part No. 108-105 Input I.F Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-106) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap of 6A8G and adjust input I.F. transformer (No. 108-105) to resonance.

BROADCAST BAND ALIGNMENT:

540 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly. Fig. 3.)
   (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

SHORT WAVE BAND ALIGNMENT:

5.35 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment number 3) and short wave antenna (Adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.3 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 18.3 megacycle signal appears near 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:

1690 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (Adjustment number 2) and middle wave antenna (Adjustment number 5) to resonance.
   (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 5400 kilocycles and 1700 kilocycles for band coverage.
   (d) Recheck broadcast band alignment.

ANTENNA AND GROUND LEADS:

You will notice three wires coming out of the back of the chassis, — the yellow wire and the black with yellow tracer wire are used for doublet antenna connections. The black wire is the ground connection.

For conventional types of antennas connect the yellow wire to the antenna lead and the yellow with black tracer and the black wire together to the ground lead.

When a doublet antenna is used connect the yellow wire and the yellow with black tracer wire to the doublet antenna and the solid black wire to the ground lead. (See Fig. 1—Top View, page 2).

ANTENNA:

For the best results an outside antenna approximately 75-100 feet long including the lead-in should be used. It should be erected as high as possible and as far from surrounding objects as practical. Both the antenna and lead-in should be placed at right angles to street car lines and incoming power lines and as far from any electrical apparatus which may be in the vicinity (such as elevator motors) as practical.

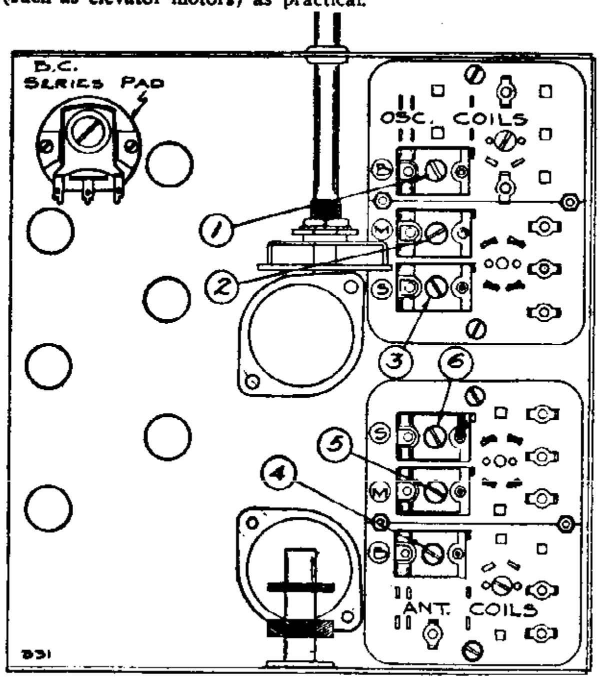
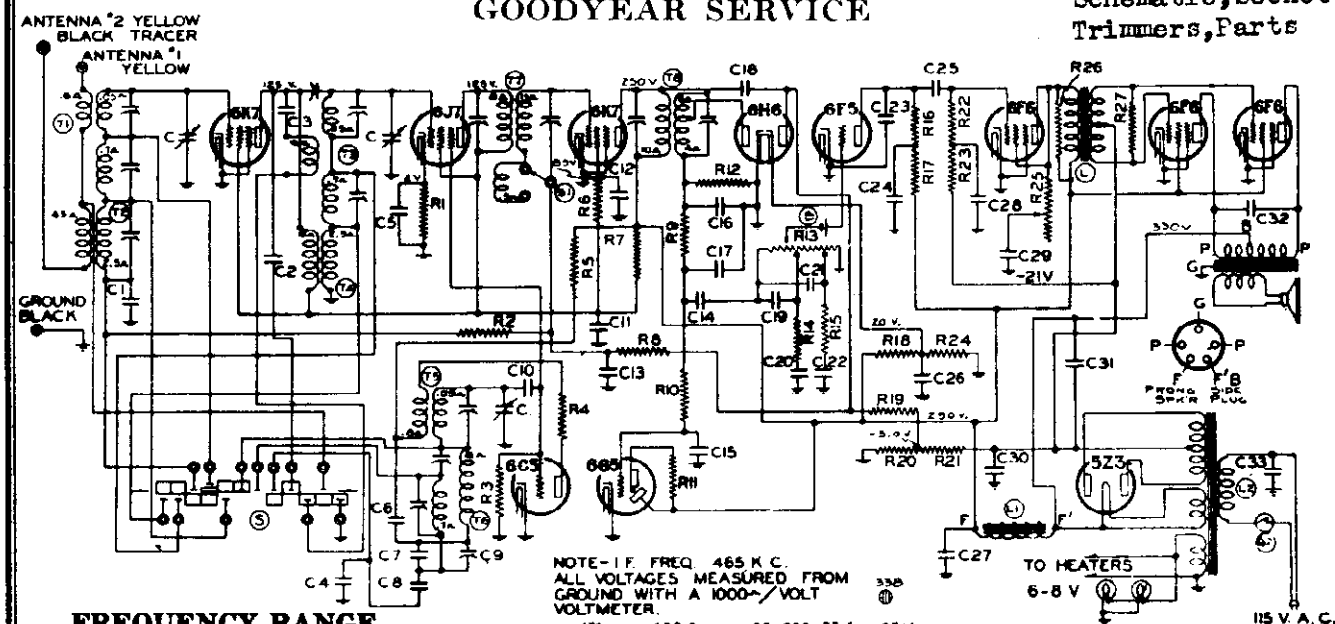


FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS

GOODYEAR SERVICE

MODEL 1173
Schematic, Socket
Trimmers, Parts



FREQUENCY RANGE

535 to 1720 K.C. (Kilocycles)
1690 to 5300 K.C. (Kilocycles)
5.3 to 18.1 M.C. (Megacycles)

R1	130-129	2500 Ohm—1/3 Watt—10%—Carbon
R2	130-20	100M Ohm—1/3 Watt—20%—Carbon
R3	130-12	50M Ohm—1/3 Watt—20%—Carbon
R4	130-60	100 Ohm—1/3 Watt—20%—Carbon
R5	130-77	10M Ohm—1 Watt—20%—Carbon
R6	130-76	30M Ohm—1/3 Watt—20%—Carbon
R7	130-88	10M Ohm—2 Watt—20%—Wire Wound
R8	130-19	1 Megohm—1/3 Watt—20%—Carbon
R9	130-20	100M Ohm—1/3 Watt—20%—Carbon
R10	130-4	3 Megohm—1/3 Watt—20%—Carbon
R11	130-110	1 Megohm—1/10 Watt—10%—Carbon
R12	130-20	100M Ohm—1/3 Watt—20%—Carbon
R13	101-76	1 Megohm—Volume Control
R14	130-22	5M Ohm—1/3 Watt—20%—Carbon
R15	130-85	3M Ohm—1/3 Watt—20%—Carbon
R16	130-20	100M Ohm—1/3 Watt—20%—Carbon
R17	130-20	100M Ohm—1/3 Watt—20%—Carbon
R18	130-130	100M Ohm—½ Watt—10%—Carbon
R19	130-3	500M Ohm—1/3 Watt—20%—Carbon
R20	106-31	30 Ohm—Muter
R21	106-31	175 Ohm—Muter
R22	130-45	250M Ohm—1/3 Watt—20%—Carbon
R23	130-45	250M Ohm—1/3 Watt—20%—Carbon
R24	130-82	10M Ohm—1/3 Watt—10%—Carbon
R25	101-62	5000 Ohm—Tone Control
R26	130-131	20M Ohm—½ Watt—10%—Carbon
R27	130-21	20M Ohm—1/3 Watt—20%—Carbon

Note—R-20 and R21 in one unit No. 106-31.

C1	100-9	.05x200 Volt—25%
C2	129-59	.0003 Mica—5%—MT-O
C3	129-39	.00005 Mica—20%—MT-O
C4	129-69	.0023 Mica—2½%—MT-O
C5	100-9	.05x200 Volt—25%
C6	100-13	.05x400 Volt—25%
C7	129-57	.0005 Mica—5%—MT-O
C8	129-55	.0034 Mica—2½%—MT-O
C9	124-34	200 Mmf. Working Cap. Adju
C10	129-31	.000025 Mica—15%—MT-O
C11	100-41	.25x400 Volt—20%
C12	100-11	.01x400 Volt—25%
C13	100-9	.05x200 Volt—25%
C14	100-22	.05x200 Volt—25%
C15	100-11	.01x400 Volt—25%
C16	129-60	.00015 Mica—20%—MT-O
C17	129-60	.00015 Mica—20%—MT-O
C18	129-3	.00002 Mica—20%—MT-O
C19	129-2	.0005 Mica—20%—MT-O
C20	100-22	.05x200 Volt—25%
C21	129-60	.00015 Mica—20%—MT-O
C22	100-22	.05x200 Volt—25%
C23	129.5	.0001 Mica—20%—MT-O
C24	100-20	.1x200 Volt—25%
C25	100-13	.05x400 Volt—25%
C26	100-19	.006x600 Volt—25%
C27	103-8	14 Mfd.—400 Volt—Elecrolytic
C28	100-20	.1x200 Volt—25%
C29	100-45	.1x600 Volt—25%
C30	100-20	.1x200 Volt—25%
C31	103-10	30 Mfd. — 450 Volt — Electrolytic
C32	100-32	.0005x1000 Volt—20%
C33	100-61	.02x600 Volt—Bakelite Micamold

PARTS

B1	116-22	Bias Cell
C	102-37	One Section of Three Gang Condenser.
T1	111-54	MW and SW Antenna Coil Assem.
T2	111-55	Broadcast Antenna Coil Assem.
T3	109-29	MW and SW R.F. Coil Assem.
T4	109-30	Broadcast R.F. Coil
T5	110-42	MW and SW Osc. Coil Assem.
T6	110-43	Broadcast Osc. Coil Assem.
T7	108-64	Input I.F. Coil—465 KC.
T8	108-63	Output I.F. Coil—465 KC.
L	105-33	Audio Transformer
L1	114-47	Speaker (Field Resistance 1225 Ohm)
L2	104-72	Power Transformer (50-60 Cycle)
S	125-24	Band Switch
S1		Fidelity Switch on Tone Control
S2		On-Off Switch on Volume Control

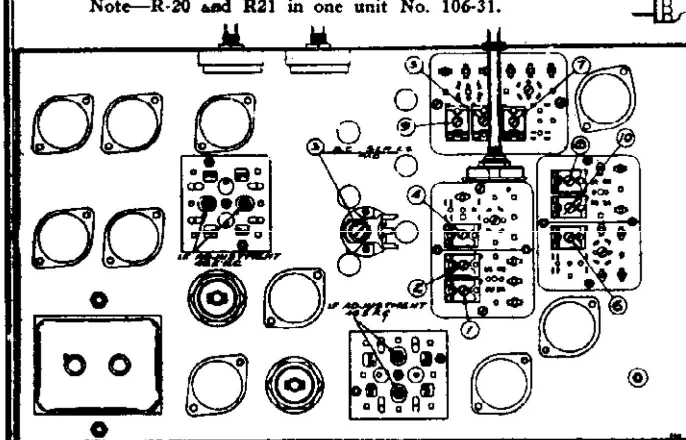
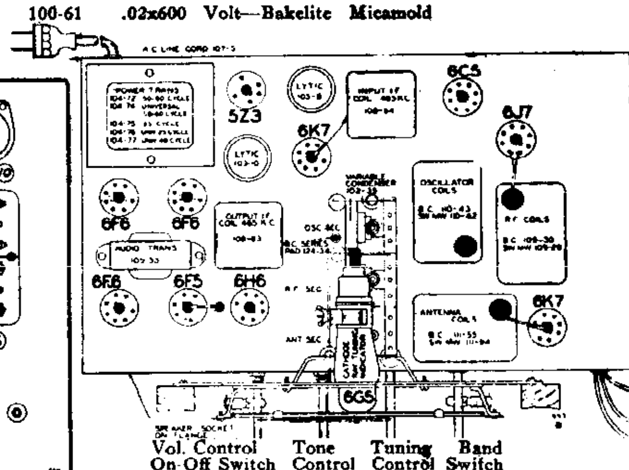


FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS



MODEL 1173
Alignment, Notes

GOODYEAR SERVICE

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of the multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS (465 K.C.)

Part No. 108-63 Output I.F. Transformer
Part No. 108-64 Input I. F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the underside of chassis (see bottom view Fig. 3).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), the tone control on "Hi" part of the sharp position (as much right rotation as possible without operating the Hi Fidelity switch), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, located between the two I.F. transformers, and adjust the output I.F. transformer 108-63 to resonance.

   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6J7 and adjust input I.F. transformer (108-64) to resonance.

   (c) With oscillator still connected to 6J7, re-adjust output I.F. transformer if necessary.

BROADCAST BAND ALIGNMENT:

535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with external oscillator set at 600 kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:

   (a) Adjust broadcast series pad (adjustment number 3) to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained. Note: This adjustment is accessible from the top of the chassis and is located between the variable condenser and the 108-63 output I.F. transformer. See top view, Fig. 1.

   (b) Re-set external oscillator to 1400 K.C., move dial pointer to 1400 K.C. and adjust oscillator (adjustment number 4), R.F. (adjustment number 6) and antenna (adjustment number 7) to resonance. See bottom view for location of these adjustments, Fig. 3.

   (c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

   (d) Check for tracking and sensitivity at 1000 kilocycles. Under no circumstances bend plates of variable condenser to correct tracking.

SHORT WAVE BAND ALIGNMENT:

5.3 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 1), short wave R.F. (adjustment number 8) and short wave antenna (adjustment number 9) to resonance.

   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check for sensitivity.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental on the receiver dial. As an example of this a fundamental 18.3 megacycle can be tuned in not only at 18.3 on the dial, but also at approximately 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:

1690 to 5300 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5 M.C. and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

   (a) Rotate condenser, pick up signal and adjust middle wave R.F. (adjustment number 10), middle wave antenna (adjustment number 5) and middle wave oscillator (adjustment number 2) to resonance.

   (b) Re-check broadcast alignment and if it is found necessary to re-adjust either R.F. or antenna trimmers, repeat the 17 M.C. short wave and 5 M.C. middle wave adjustments.

ANTENNA AND GROUND LEADS:

You will notice three wires coming out of the back of the chassis, — the yellow wire and the yellow with black tracer wire are used for doublet antenna connections. The black wire is the ground connection.

For conventional types of antennas connect the yellow wire to the antenna lead and the yellow with black tracer and the black wire together to the ground lead.

When a doublet antenna is used connect the yellow wire and the yellow with black tracer wire to the doublet antenna and the solid black wire to the ground lead. (See Fig. 1—Top View, page 2).

ANTENNA:

For the best results an outside antenna approximately 75-100 feet long including the lead-in should be used. It should be erected as high as possible and as far from surrounding objects as practical. Both the antenna and lead-in should be placed at right angles to street car lines and incoming power lines and as far from any electrical apparatus which may be in the vicinity (such as elevator motors) as practical.

DESCRIPTION:

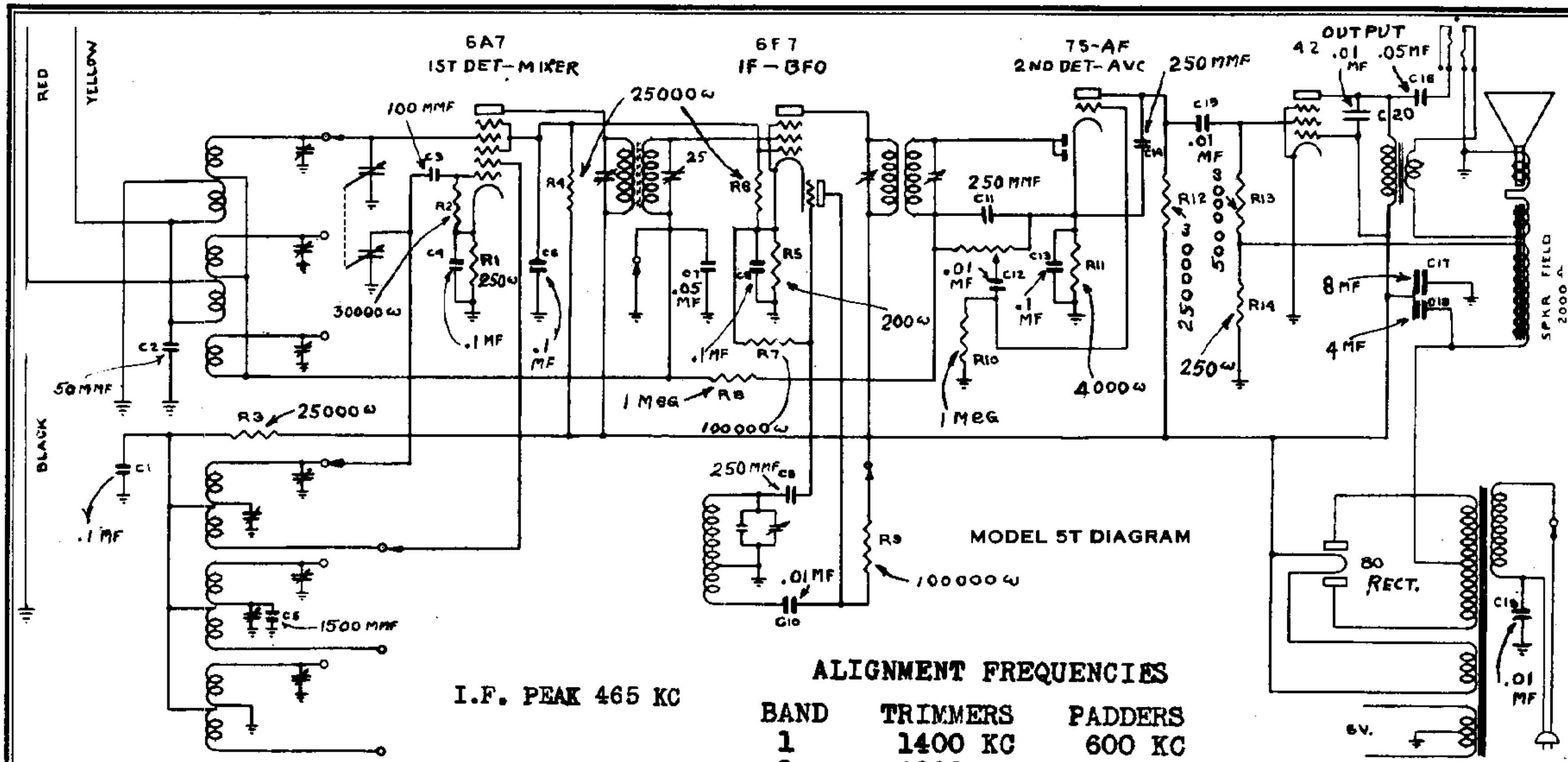
The tube complement of this chassis consists of the following metal and octal base glass tubes which are interchangeable with metal tubes:

1—Type 6K7 Remote cut-off pentode R.F. amplifier
1—Type 6J7 Pentode first detector
1—Type 6C5 Oscillator
1—Type 6K7 Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6H6 Duplex diode second detector and A.V.C.
1—Type 6F5 First audio amplifier
1—Type 6F6 Triode driver stage
2—Type 6F6 Class AB Output pentodes in push-pull
1—Type 5Z3 High vacuum rectifier
1—Type 6G5 Cathode Ray Tuning Indicator.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 108, 127, 150, 225, and 260 volts, (see instructions) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

MODEL 5T, Sky Buddy
Schematic, Alignment
Trimmers

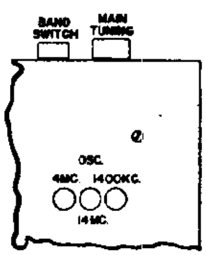
HALLICRAFTERS, INC.



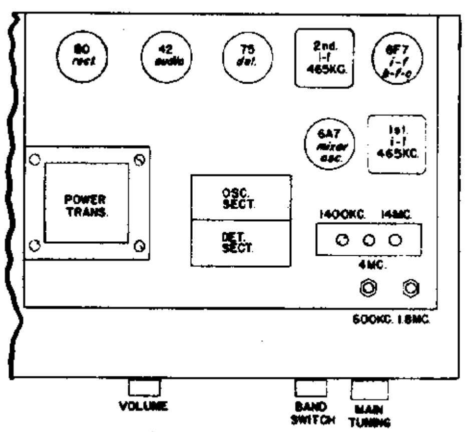
I.F. PEAK 465 KC

ALIGNMENT FREQUENCIES

BAND	TRIMMERS	PADDERS
1	1400 KC	600 KC
2	4000 KC	1800 KC
3	14000 KC	NONE



BOTTOM VIEW



TOP VIEW

CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION

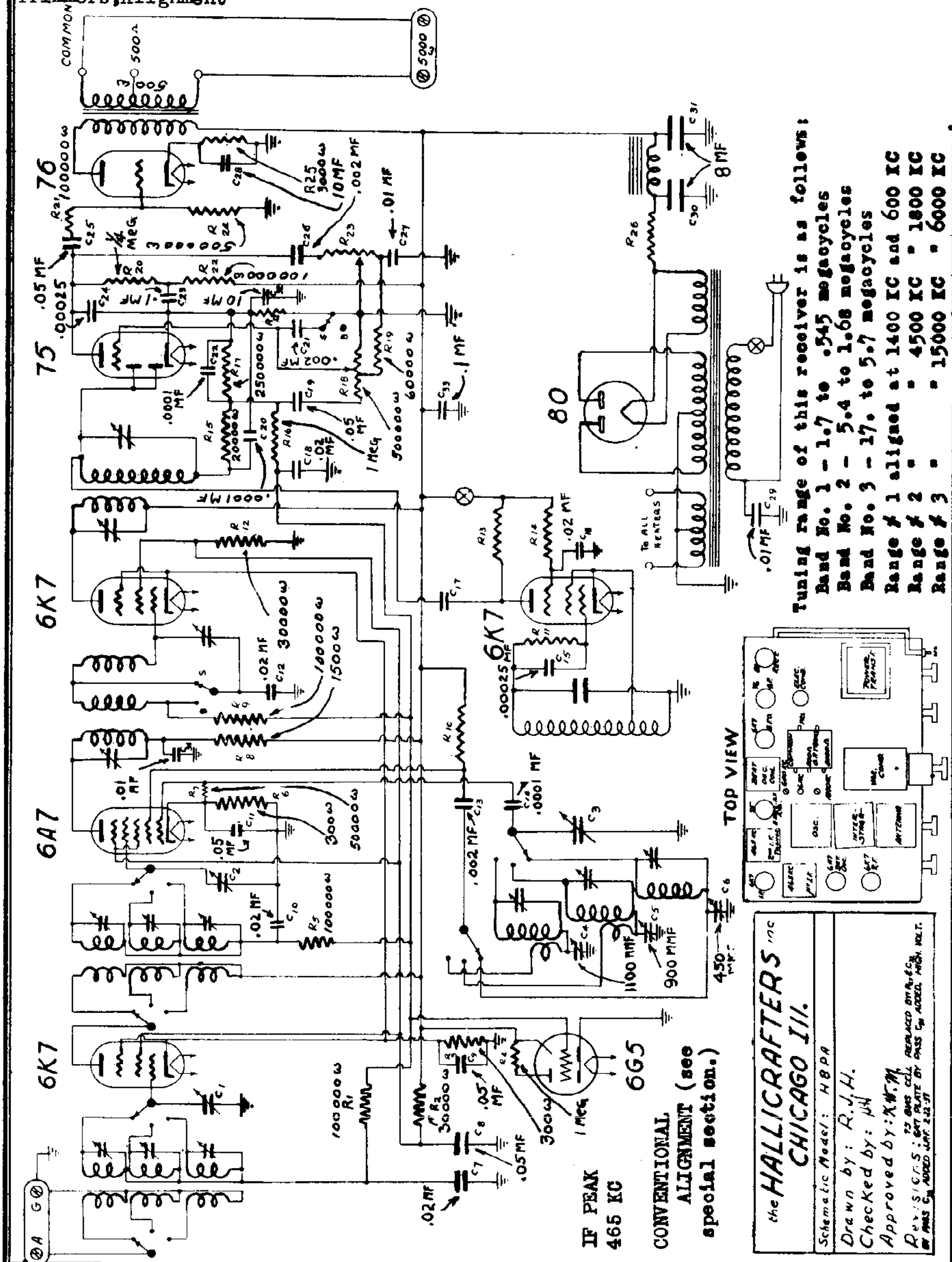
The 1936 Sky-Buddy receiver is a three band receiver tuning the frequencies as follows:

No. 1 Band - 1680 KC to 545 KC
No. 2 Band - 1680 KC to 5.5 MC
No. 3 Band - 5.5 MC to 16 MC

It includes three sets of antenna coils and three oscillator coils.

MODEL H8PA
Schematic, Socket
Trimmers, Alignment

HALLICRAFTERS, INC.

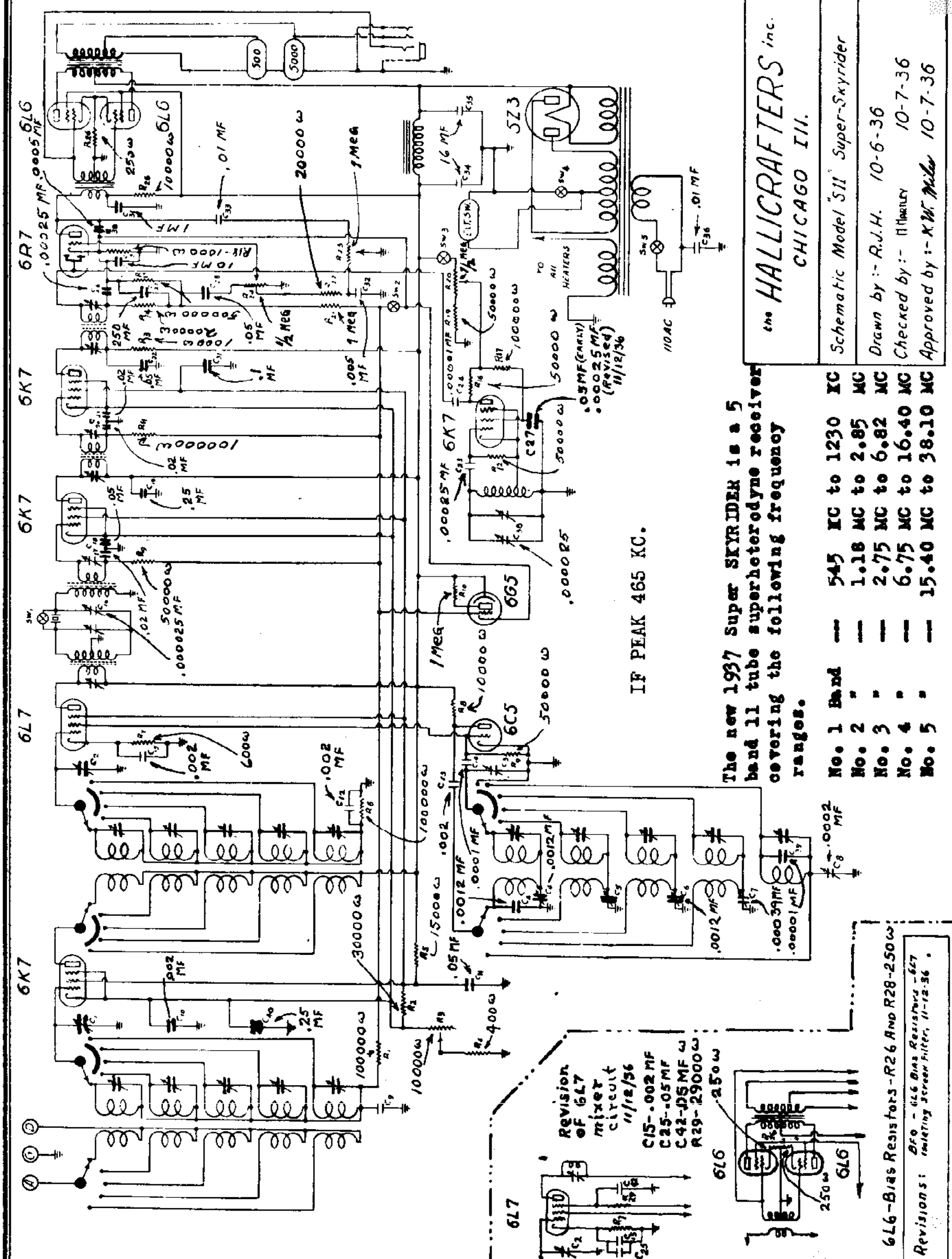


Schematics, Changes

MODEL S11, Super Sky Rider 1937

HALLICRAFTERS, INC.

Early and Late



The new 1937 Super SKYRIDER is a 5 band and 11 tube superheterodyne receiver covering the following frequency ranges.

No. 1 Band	—	545 KC to 1230	KC
No. 2 "	—	1.18 MC to 2.85	MC
No. 3 "	—	2.75 MC to 6.82	MC
No. 4 "	—	6.75 MC to 16.40	MC
No. 5 "	—	15.40 MC to 38.10	MC

MODEL S11, Super Sky Rider 1937
MODEL S15, Sky Challenger
Alignment

HALLICRAFTERS, INC.

MODEL S12, Commercial Sky Rider
Alignment

ALIGNMENT FOR MODELS S11 (SUPER-SKY-RIDER 1937)
and MODEL S15 (SKY CHALLENGER)

INTERMEDIATE FREQUENCY ALIGNMENT

If the receiver is equipped with a crystal, use the crystal in a separate oscillator.

If the receiver is used without a crystal set the signal generator at 465 KC

Before alignment, turn off the AVC, BFO, and Crystal switches. Set the RF and Audio gain controls at maximum. Set Crystal phasing condenser for maximum noise level. Do not remove bottom plate from the chassis.

Remove 6C5 Oscillator tube from socket, and connect the signal generator out put directly to grid of 6L7 1st detector.

Adjust all IF transformers for maximum output.

RF ALIGNMENT

Check dial- at maximum capacity of gang condenser the dial should stop so that "0" on the main tuning dial should be opposite "0" on the vernier scale.

Set band spread condenser at minimum capacity or so that it reads 200 degrees.

Replace 6C5 oscillator tube and connect signal generator output through 400 ohm resistor to antenna and ground posts on receiver. (Leave Jumper connected.)

Set dial of receiver to 600 KC of Band #1, and set signal generator to 600 KC. Now adjust .6 MC pad on top of chassis until signal is resonated.

Reset dial and signal generator to 1100 KC. Adjust 1.1 MC Osc. trimmer condenser beneath the chassis until this signal is properly resonated. Now adjust RF and Detector trimmers for maximum gain. Now reset dial and signal generator to 600 KC and re-pad. It may be necessary to pad and trim at 600 KC and 1100 KC a few times as a change of capacity at one end will affect the other end. Re-check on RF and Detector trimmers and peak for maximum gain.

BAND #2

Follow same procedure as on Band #1 except pad (above chassis) at 1.5 MC. Trim at 2.6 MC

BAND #3

Same procedure as before except pad oscillator at 3 MC. Trim at 6 MC.
Rock the gang condenser when making these adjustments.

BAND #4

Pad oscillator at 7 MC. Trim at 14 MC. Rock gang condenser during adjustment

BAND #5

Pad oscillator at 17 MC and Trim at 34 MC. Rock gang condenser as before.

It may be necessary to go through the above procedure several times before maximum performance is secured. A small change at each end of each Band will affect the other end.

When making adjustments on this receiver back off on RF gain leaving the AF gain at maximum at all times.

Be sure and turn the trimmers all the way in (clock-wise) except as noted below, and back off to find the signal. On air-dielectric trimmers, capacity is reduced when turning the screws in a clock-wise direction.

Detector trimmers on Band #4 and #5 should be backed out all the way and screwed clockwise to find the signal. This will assist in eliminating phasing in the wrong direction or side.

Be sure to check images on Bands #3, #4, and #5. These Images will fall approximately 1.0 MC lower in frequency on all Bands.

ALIGNMENT FOR MODEL S12 (COMMERCIAL-SKY-RIDER)

INTERMEDIATE FREQUENCY ALIGNMENT

If the receiver is equipped with a crystal, use the crystal in a separate oscillator. If the receiver is not an SX12 model, set the generator for 1600 KC.

Before alignment, turn off the AVC, BFO, and Crystal Switches. Set the RF and Audio controls at maximum. Set crystal phasing condenser for maximum noise level. Do not remove the bottom plate from the chassis.

Remove 6C5 oscillator tube from the chassis, and connect the signal generator output directly to the grid of the 6L7 1st detector.

Adjust all IF transformers for maximum output.

RF ALIGNMENT -BAND #1

Check dial- at maximum capacity of gang condenser the dial should stop so that "0" on the main tuning dial should be opposite "0" on the vernier scale.

Set Band Spread condenser at minimum capacity or so that it reads 200 degrees.

Replace 6C5 oscillator tube in receiver, and connect signal generator output through 400 ohm resistance to antenna and ground posts on receiver. (Jumper should remain connected.)

Set signal generator for 115 KC, put receiver on Band #1 and set dial to a reading of 115 KC.

Adjust the 115 KC pad on top of chassis until signal is resonated.

NOTE: On Band #1 and #2 it is necessary to adjust detector and RF trimmers each time oscillator trimmer is changed.

Reset dial to 230 KC and reset signal generator to same frequency.

Adjust 230 KC Osc. trimmer condenser beneath the chassis until the signal is properly resonated. Now adjust RF and detector trimmers for maximum gain. Now reset dial and signal generator to 115 KC and re-pad above chassis.

It may be necessary to pad and trim at 115 KC and 230 KC a few times as a change of capacity at one end will affect the other end. Re-check on RF and the detector trimmers and peak for maximum gain.

Rock main tuning condenser during the course of these adjustments.

BAND #2

Follow same procedure as on Band #1 except pad (above chassis) at 275 KC and set signal generator at 275 KC. Peak RF and trim at 550 KC. Rock main condenser.

BAND #3

Same procedure as before except pad oscillator at 700 KC, trim at 1400 KC, with signal generator set at 700 KC. Rock main tuning condenser during procedure.

BAND #4

Same procedure as before except pad oscillator at 1.9 MC, with signal generator set at 1.9 MC. Peak RF and detector trimmers for maximum gain. Trim at 3.8 MC.
Rock main tuning condenser when making the adjustments.

BAND #5

Same procedure as before. Pad oscillator at 5 MC with signal generator set at 5 MC. Adjust RF and detector trimmers for maximum gain, rocking the gang condenser while adjusting. Trim at 10 MC

It may be necessary to repeat the above adjustments several times before maximum performance is obtained. When making adjustments on this receiver back off on RF gain leaving AF gain at maximum at all times.

Be sure and turn trimmers all the way in (clockwise) (except as noted below) and back out to find the signal. On these air-dielectric trimmers, capacity is reduced in clockwise direction. Check for Images on Band #5, 3600 KC lower.

HALLICRAFTERS, INC.

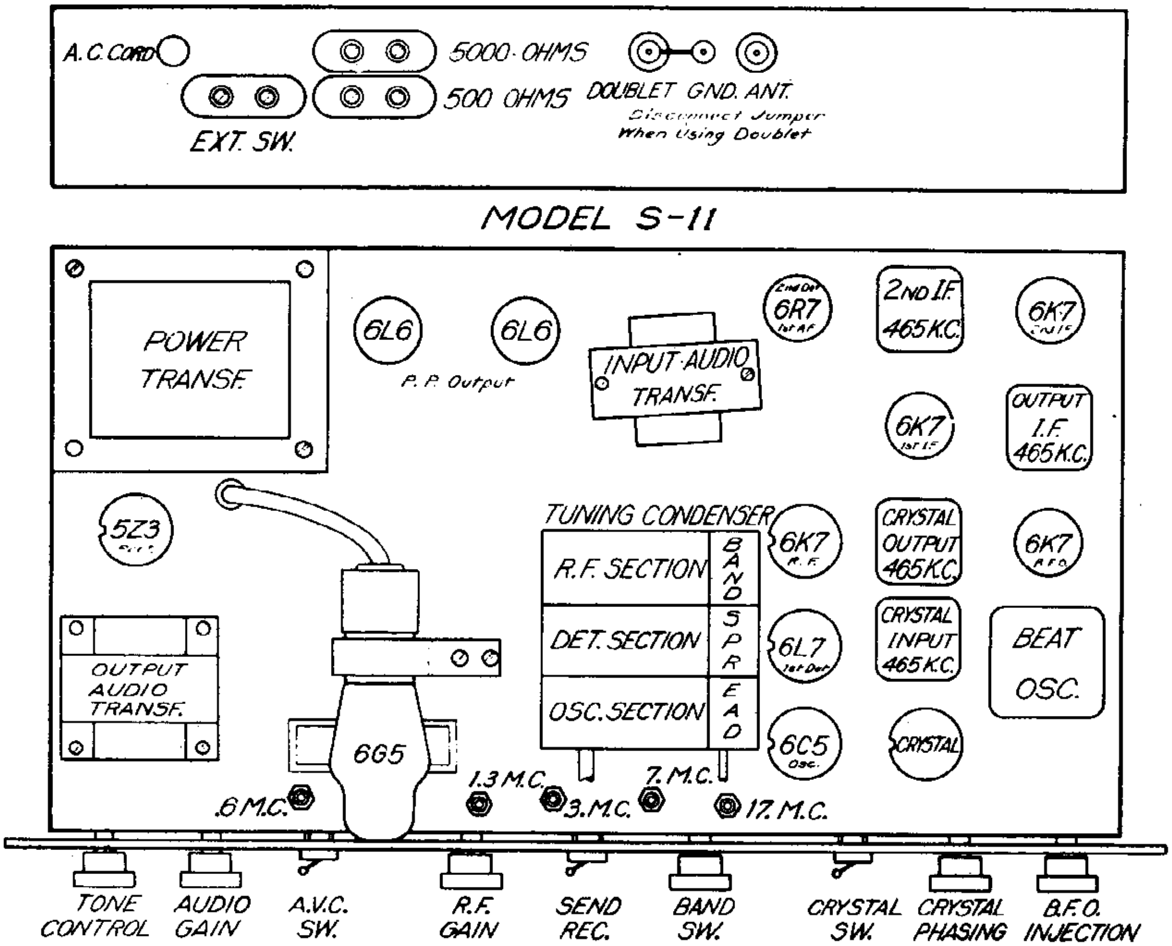


Fig. 1

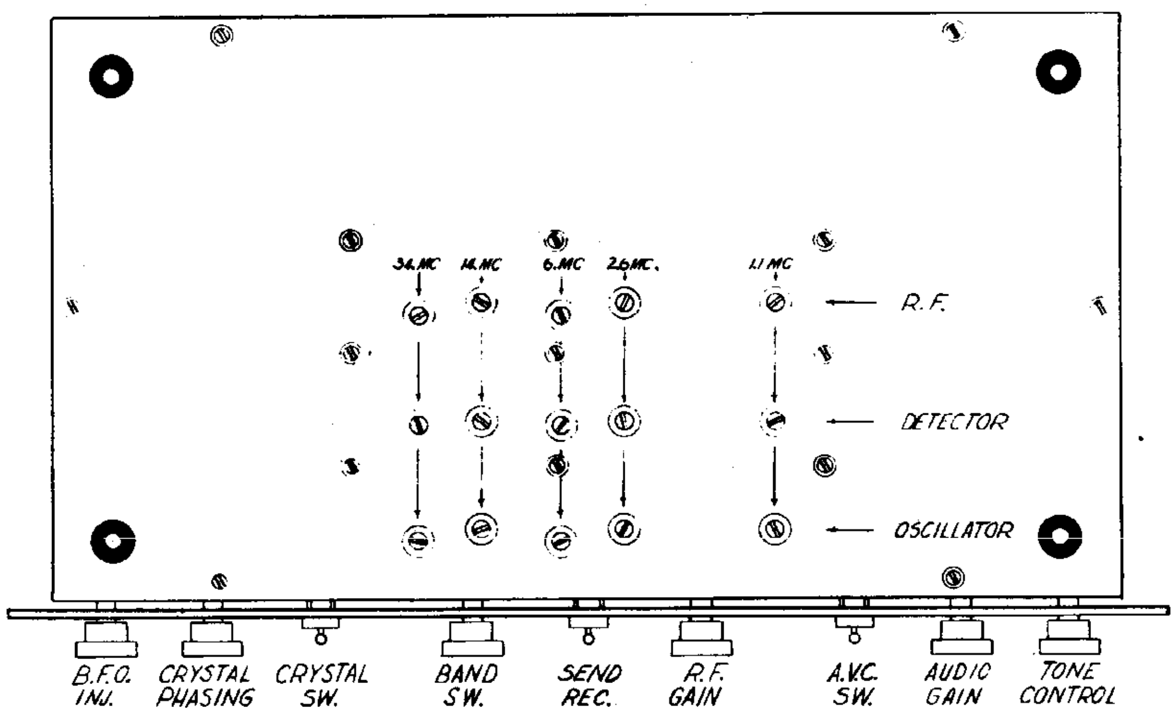
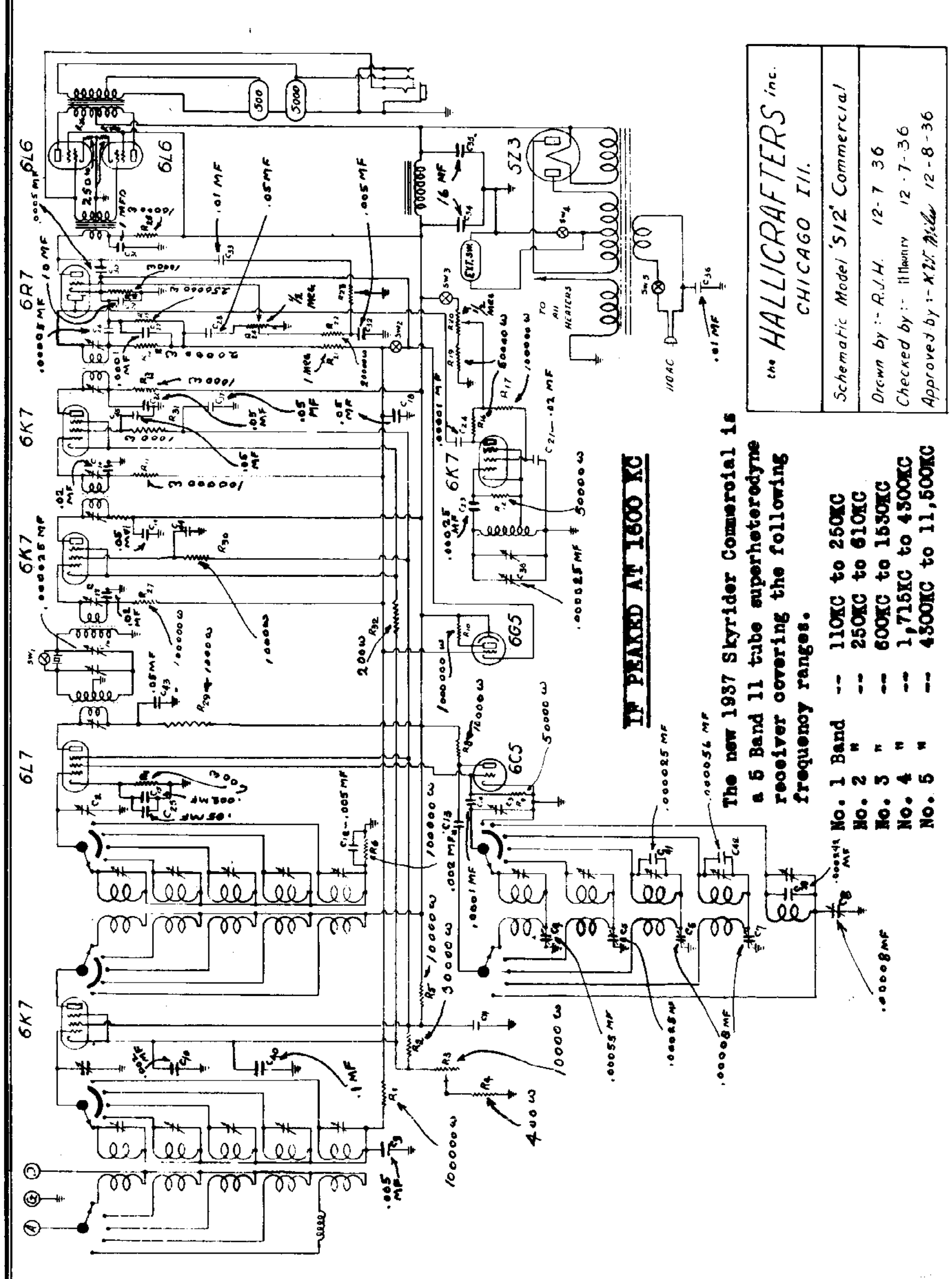


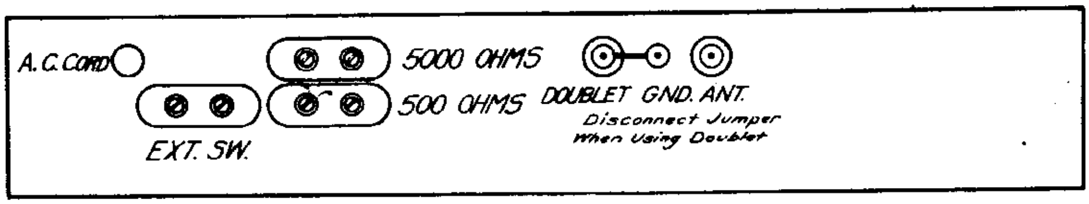
Fig. 2

MODEL S12, Commercial Sky Rider
Schematic

HALLICRAFTERS, INC.



HALLICRAFTERS, INC.



MODEL S-12

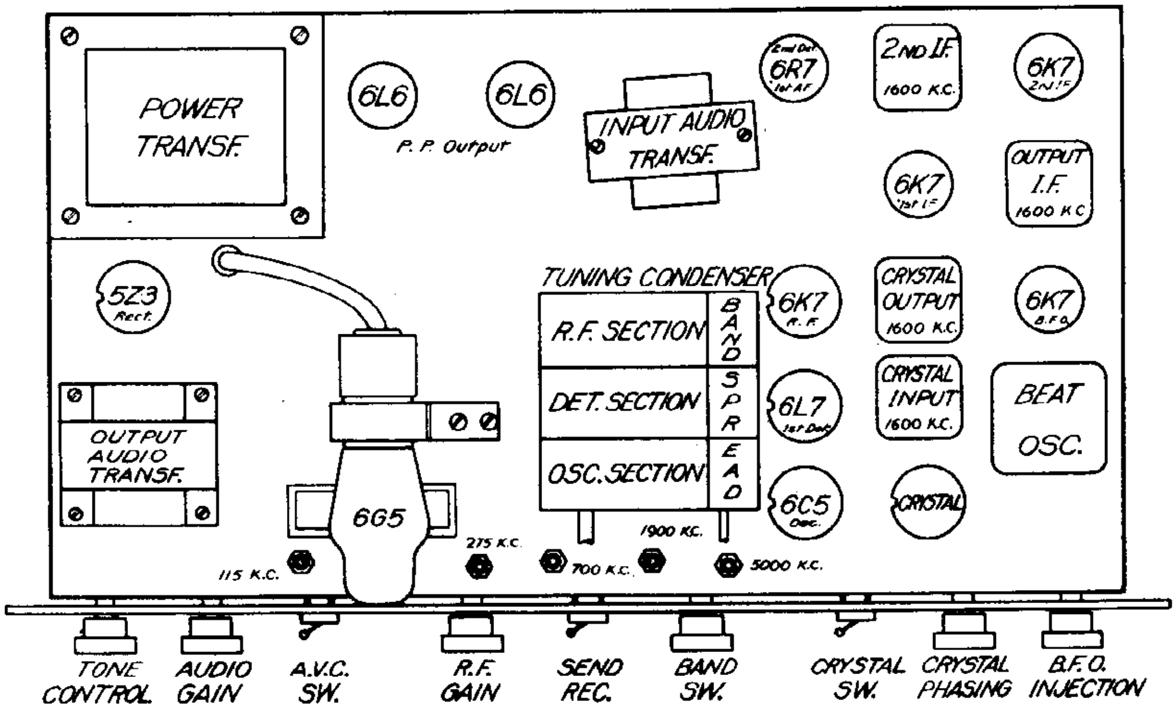


Fig. 1

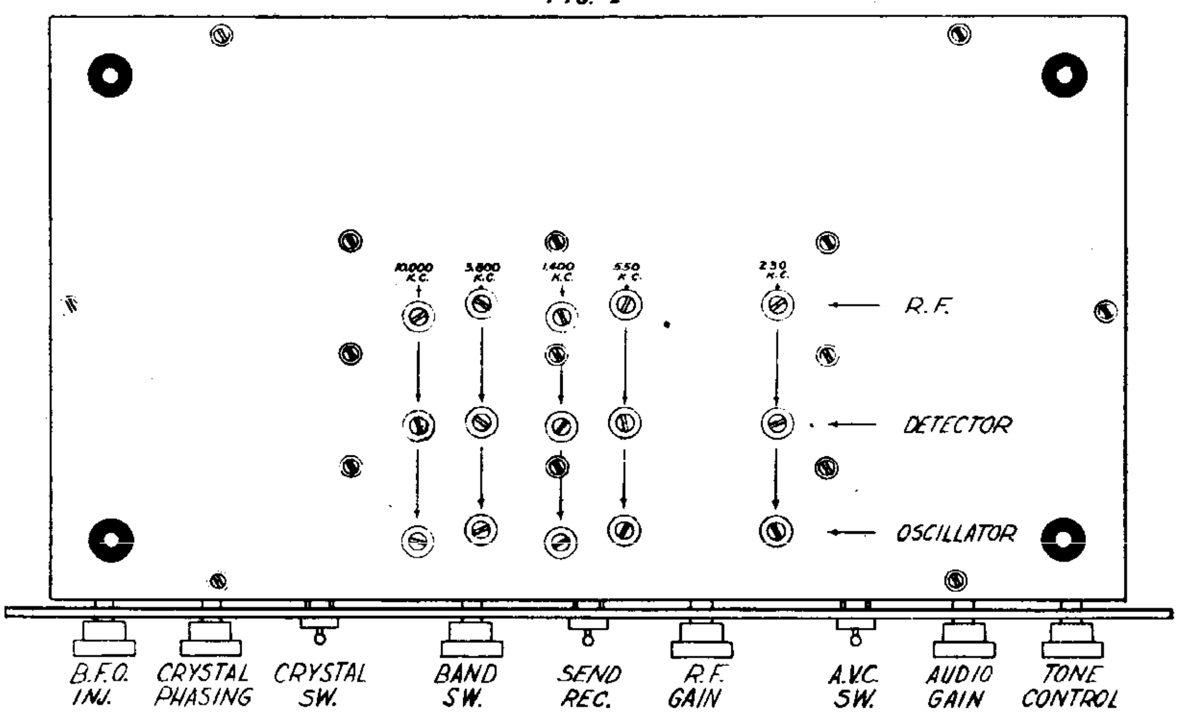


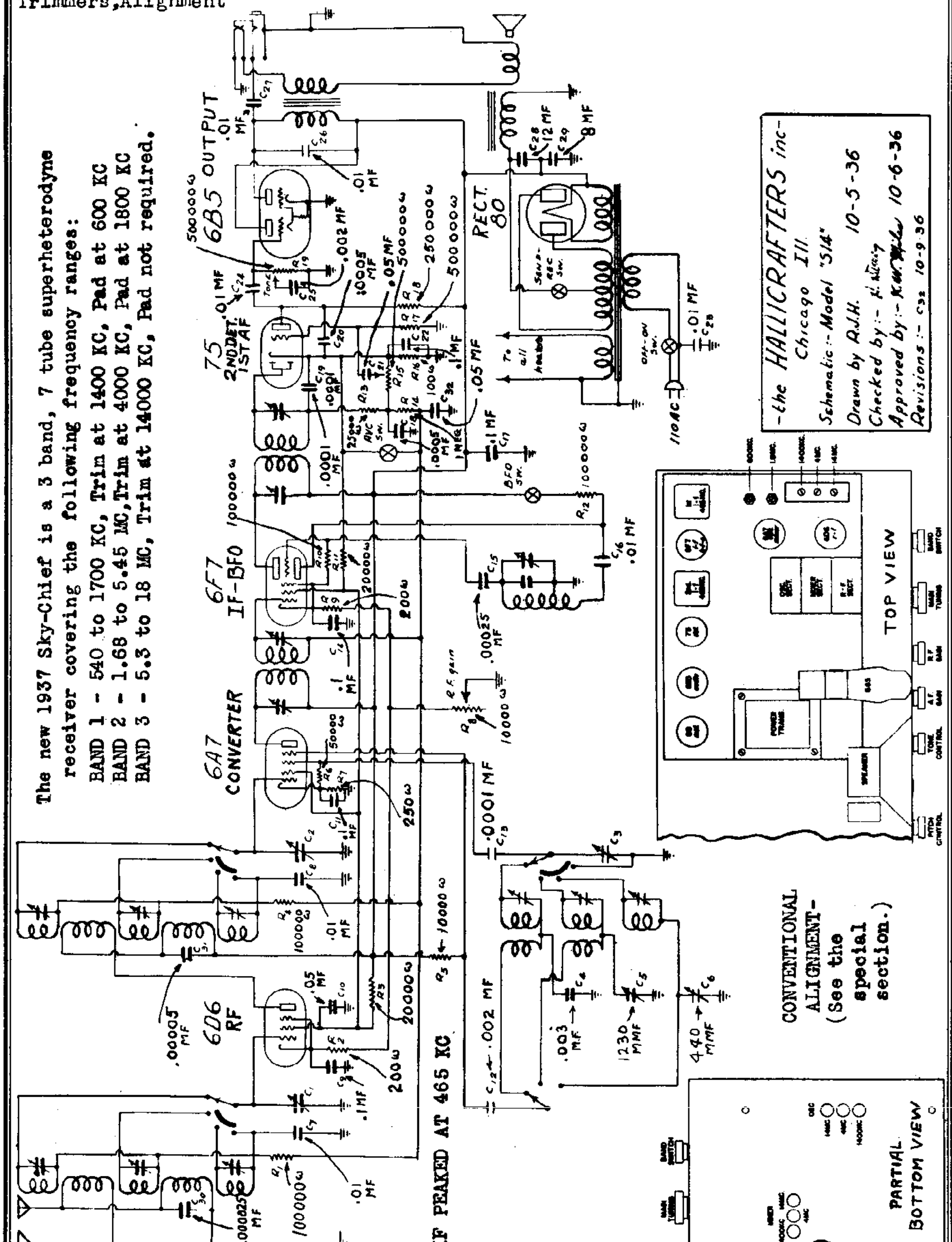
Fig. 2

MODEL S14, Sky Chief
Schematic, Socket
Trimmers, Alignment

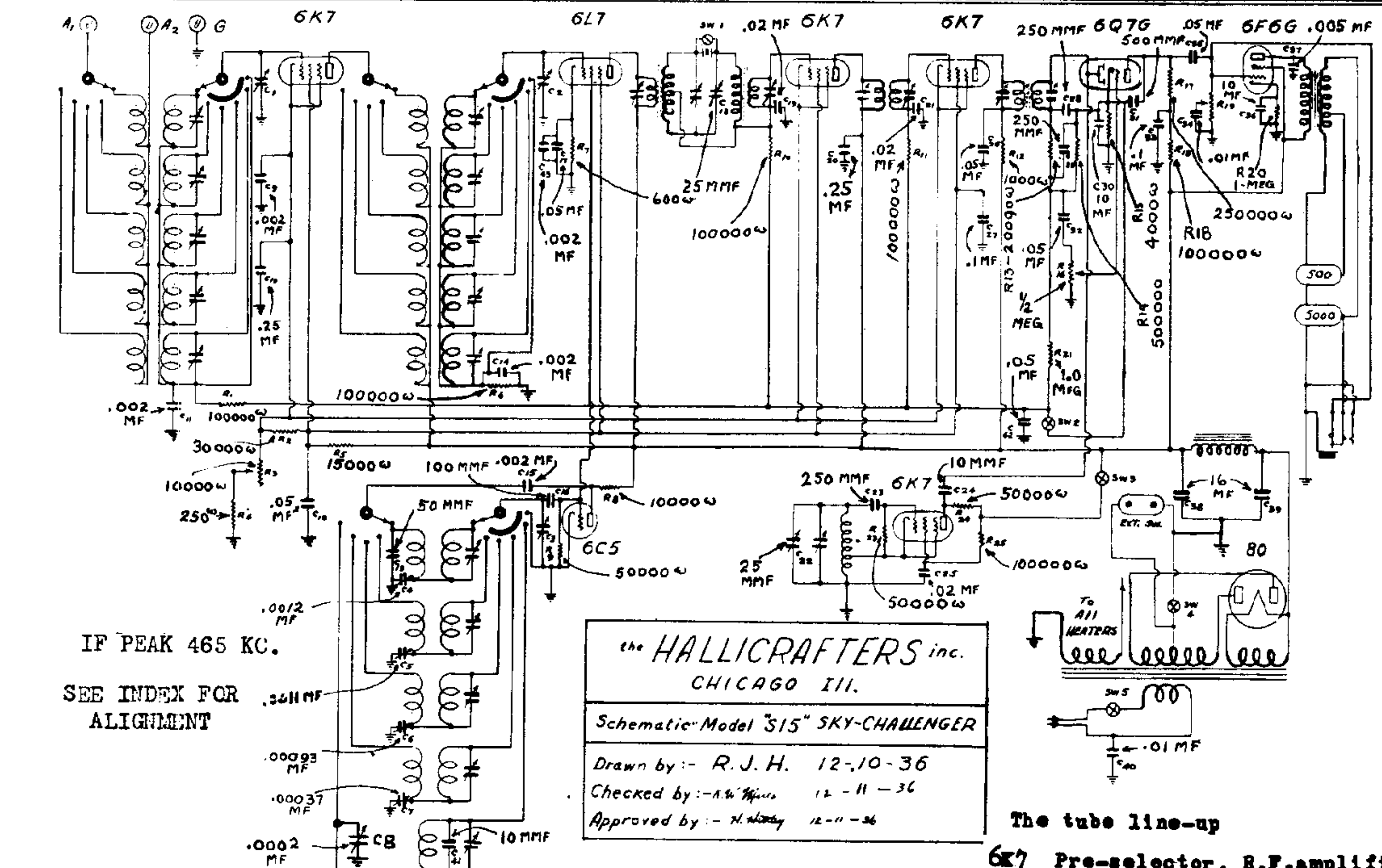
HALLICRAFTERS, INC.

The new 1937 Sky-Chief is a 3 band, 7 tube superheterodyne receiver covering the following frequency ranges:

BAND 1 - 540 to 1700 KC, Trim at 1400 KC, Pad at 600 KC
BAND 2 - 1.68 to 5.45 MC, Trim at 4000 KC, Pad at 1800 KC
BAND 3 - 5.3 to 18 MC, Trim at 14000 KC, Pad not required.



HALLICRAFTERS, INC.



The new 1937 SKY CHALLENGER is a 5 band, 9 tube superheterodyne receiver covering the following frequency ranges.

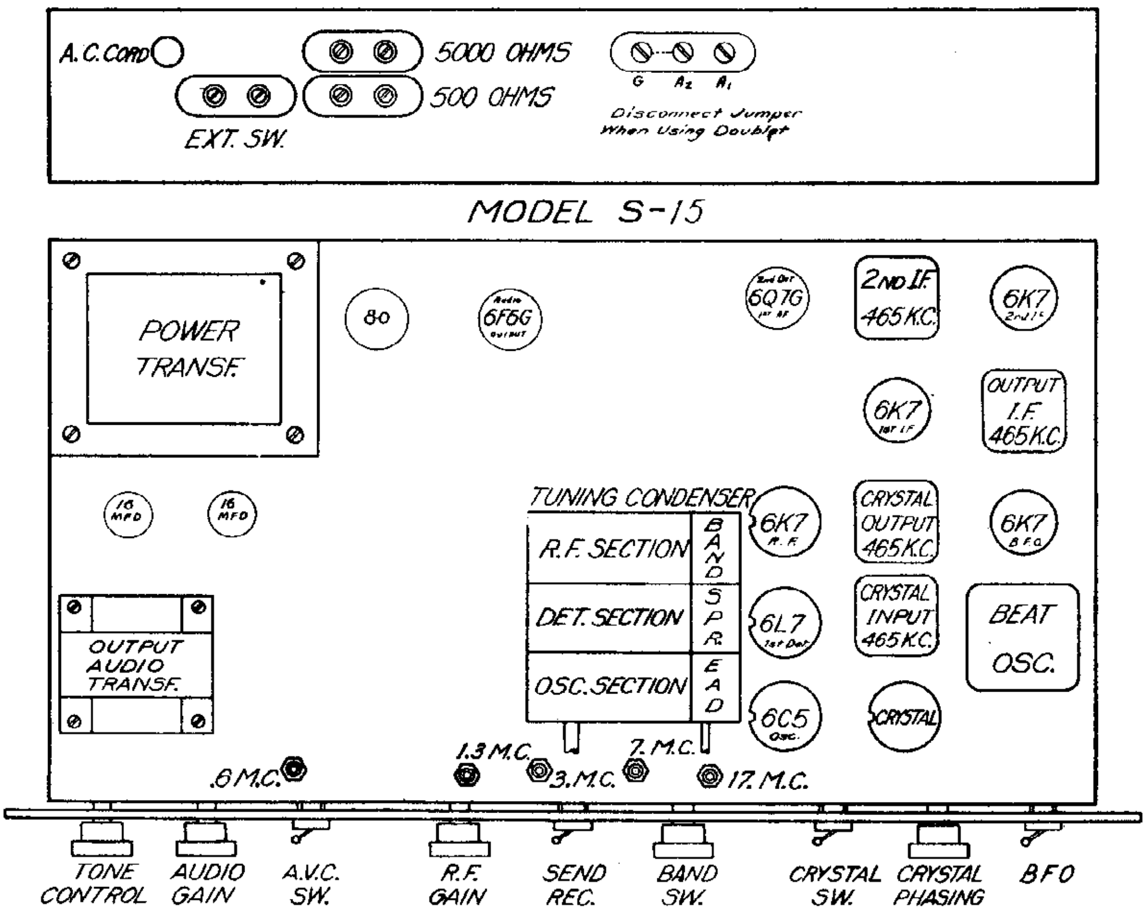
No. 1 Band	--	545 KC to 1230	KC	(550 to 243 meters.)
No. 2 "	--	1.18 MC to 2.85	MC	(254 to 105 meters.)
No. 3 "	--	2.75 MC to 6.82	MC	(109 to 44 meters.)
No. 4 "	--	6.75 MC to 16.40	MC	(45 to 18.3 meters.)
No. 5 "	--	15.40 MC to 38.10	MC	(19.5 to 7.85 meters.)

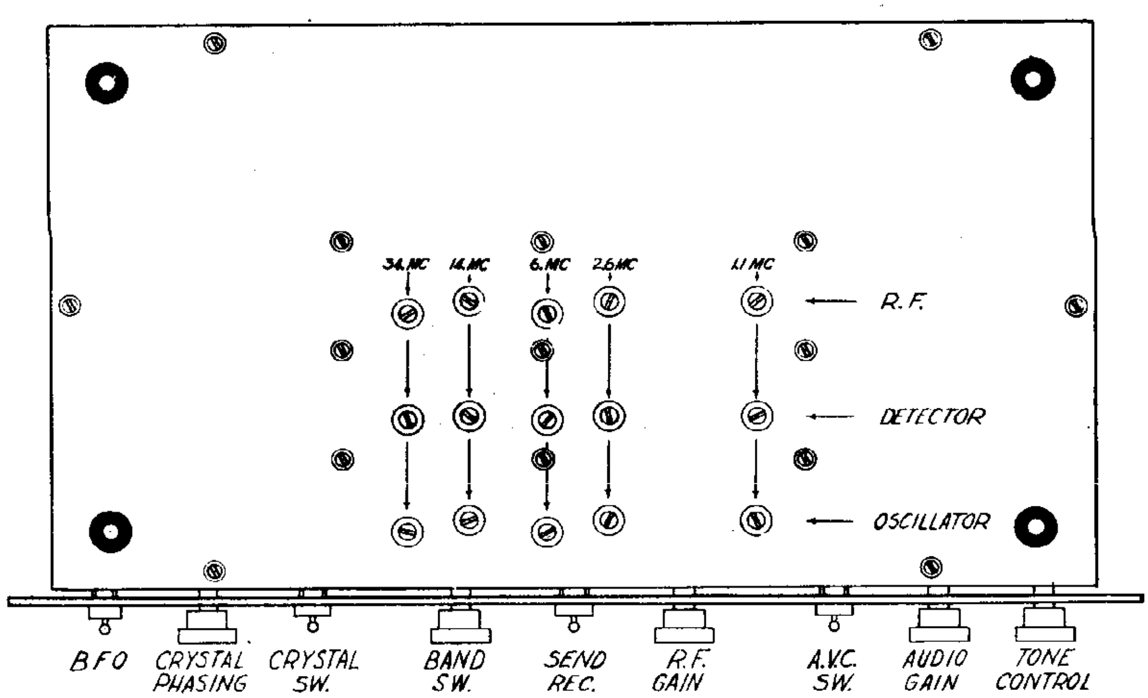
The tube line-up

6K7	Pre-selector, R.F. amplifier
6L7	1st Detector-mixer
6C5	Signal frequency oscillator
6K7	1st I.F. amplifier
6K7	2nd I.F. amplifier
6Q7G	2nd detector; A.V.C.; 1st stage of audio
6F6G	2nd audio stage
6K7	Beat oscillator
80	Full-wave rectifier

MODEL S15, Sky Challenger
Socket, Trimmers

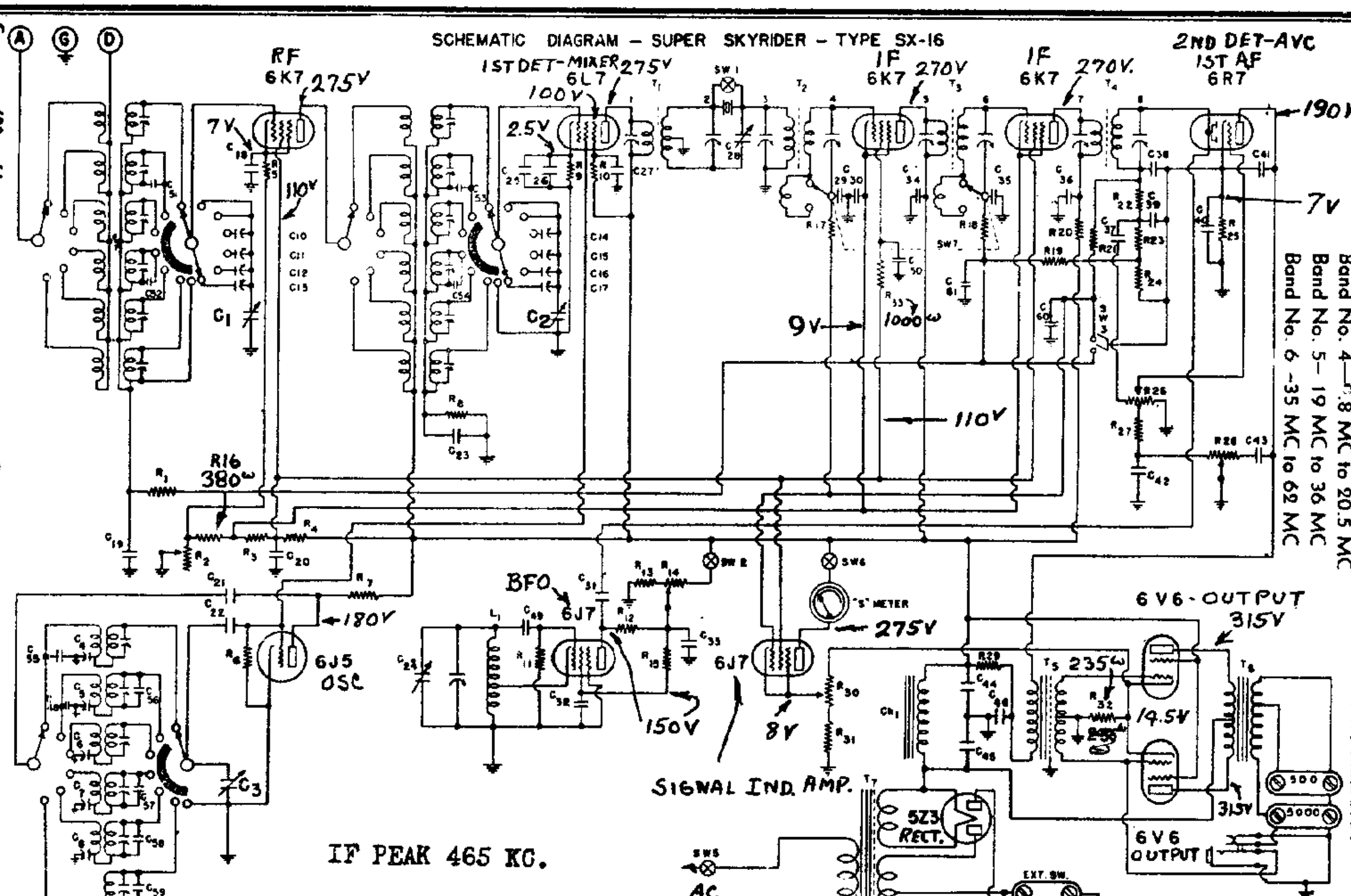
HALLICRAFTERS, INC.





MODEL SX16, Super Sky Rider 19

HALLICRAFTERS, INC. Schematic, Voltage, Par



IF PEAK 465 KC.

Band No. 1—	545 KC to 1555 KC			
Band No. 2—	1545 KC to 4300 KC			
Band No. 3—	4.9 MC to 10.2 MC			
Band No. 4—	9.8 MC to 20.5 MC			
Band No. 5—	19 MC to 36 MC			
Band No. 6—	35 MC to 62 MC			

S_1	Crystal Switch SPST
S_2	Beat Osc. Switch on B.F.O. Injection Control
S_3	A.V.C. Switch DPST
S_4	Send-Receive Switch SPST
S_5	A.C. Switch on Tone Control
S_6	Meter Switch on R.F. Gain Control
S_7	Selectivity Switch DPDT

C_1	420 mmfd	Main Gang			
C_2	420 mmfd				48017
C_3	420 mmfd				
C_4	100 mmfd				44019
C_5	100 mmfd				
C_6	310 mmfd				44020
C_7	880 mmfd				
C_8	1,400 mmfd				44018
C_9	590 mmfd				
C_{10}	1,000 mmfd				44017
C_{11}	350 mmfd				
C_{12}	180 mmfd				44016
C_{13}	120 mmfd				
C_{14}	1,000 mmfd				44017
C_{15}	350 mmfd				
C_{16}	180 mmfd				44016
C_{17}	120 mmfd				
C_{18}	.002 mfd	Mica			40013
C_{19}	.05 mfd		200		41004
C_{20}	.1 mfd		400		41007

C_{21}	.002	mfd	Mica		40013
C_{22}	.0001	mfd	Mica		40003
C_{23}	.05	mfd		200	41004
C_{24}	.000025	mfd	Air		48012
C_{25}	.002	mfd	Mica		40013
C_{26}	.05	mfd		200	41004
C_{27}	.05	mfd		400	41005
C_{28}	.000025	mfd	Air		48012
C_{29}	.05	mfd		200	41004
C_{30}	.25	mfd		200	41008
C_{31}	.000010	mfd	Mica		40021
C_{32}	.01	mfd		400	41001
C_{33}	.01	mfd		400	41001
C_{34}	.05	mfd		400	41005
C_{35}	.05	mfd		200	41004
C_{36}	.05	mfd		400	41005
C_{37}	.05	mfd		200	41004
C_{38}	100	mmfd	Mica		40007

C_{41}	.0005	mfd	Mica		43008
C_{42}	.005	mfd		600	45003
C_{43}	.02	mfd		400	41003
C_{44}	16.	mfd	Electrolytic	400	42019
C_{45}	16.	mfd	Electrolytic	400	42019
C_{46}	1.	mfd		400	41013
C_{47}	.01	mfd		400	41001
C_{48}	.000050	mfd	Mica		40002
C_{49}	.00025	mfd	Mica		40007
C_{50}	.05	mfd		400	41005
C_{51}	.000010	mfd	Mica		40021
C_{52}	.000010	mfd	Mica		40021
C_{53}	.000010	mfd	Mica		40021
C_{54}	.000010	mfd	Mica		40021
C_{55}	.000050	mfd	Mica		40002
C_{56}	.000010	mfd	Mica		40021
C_{57}	.000010	mfd	Mica		40021
C_{58}	.000010	mfd	Mica		40021
C_{59}	.000025	mfd	Mica		40024
C_{60}	.05	mfd		200	41004
C_{61}	.05	mfd		200	41004

R_1	100,000		1/5	20093
R_2	5,000			25021
R_3	10,000	2.5		24037
R_4	10,000	2.5		24037
R_5	285		1/5	22020
R_6	50,000		1/5	20084
R_7	10,000	1.		20061
R_8	100,000		1/5	20093
R_9	285		1/5	22020
R_{10}	29,000	1.		22075
R_{11}	50,000		1/5	20084
R_{12}	50,000		1/5	20084
R_{13}	50,000		1/5	20084

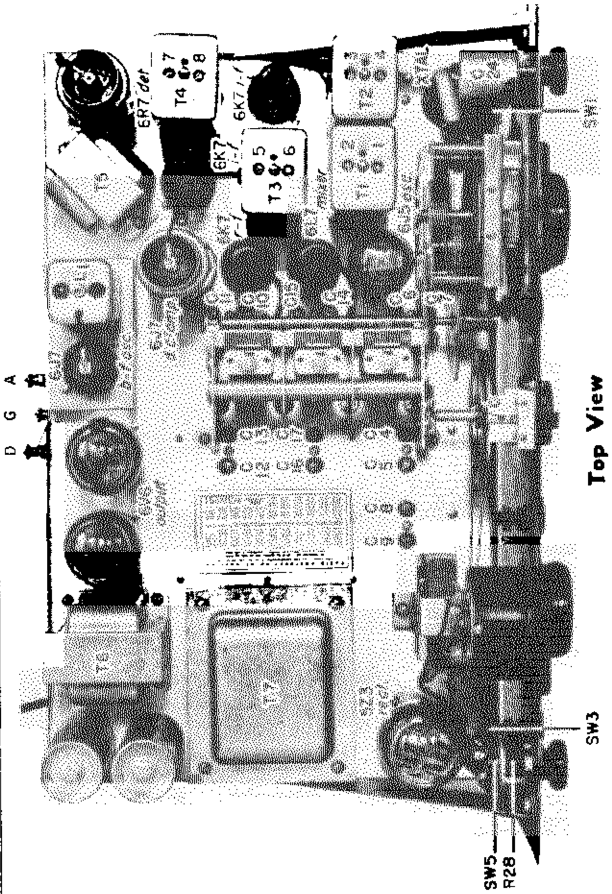
R_{19}	1,000,000	1/5	20108
R_{20}	1,000	1/5	20033
R_{21}	1,000,000	1/5	20108
R_{22}	20,000	1/5	20072
R_{23}	100,000	1/5	20099
R_{24}	100,000	1/5	20099
R_{25}	950	1/5	22032
R_{26}	1,000,000		25023
R_{27}	20,000	1/5	20079
R_{28}	1,000,000		25013
R_{29}	10,000	1/5	20063

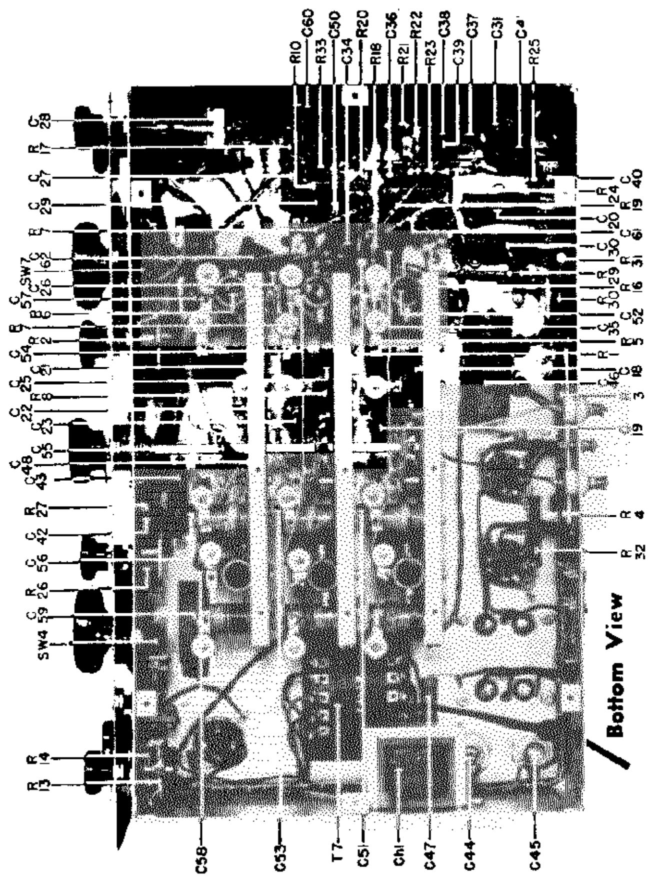
the hallicrafters inc.
Chicago, U.S.A.

Name	Super Skyrider		
Model	SX16		
Drawn by	R.J.N.	Date	5-17-37
Checked by	H.I.		
Approved by	[illegible]		6-18-37
Revisions			

MODEL SX16, Super Sky Rider 1938
Socket, Trimmers, Alignment

HALLICRAFTERS, INC.



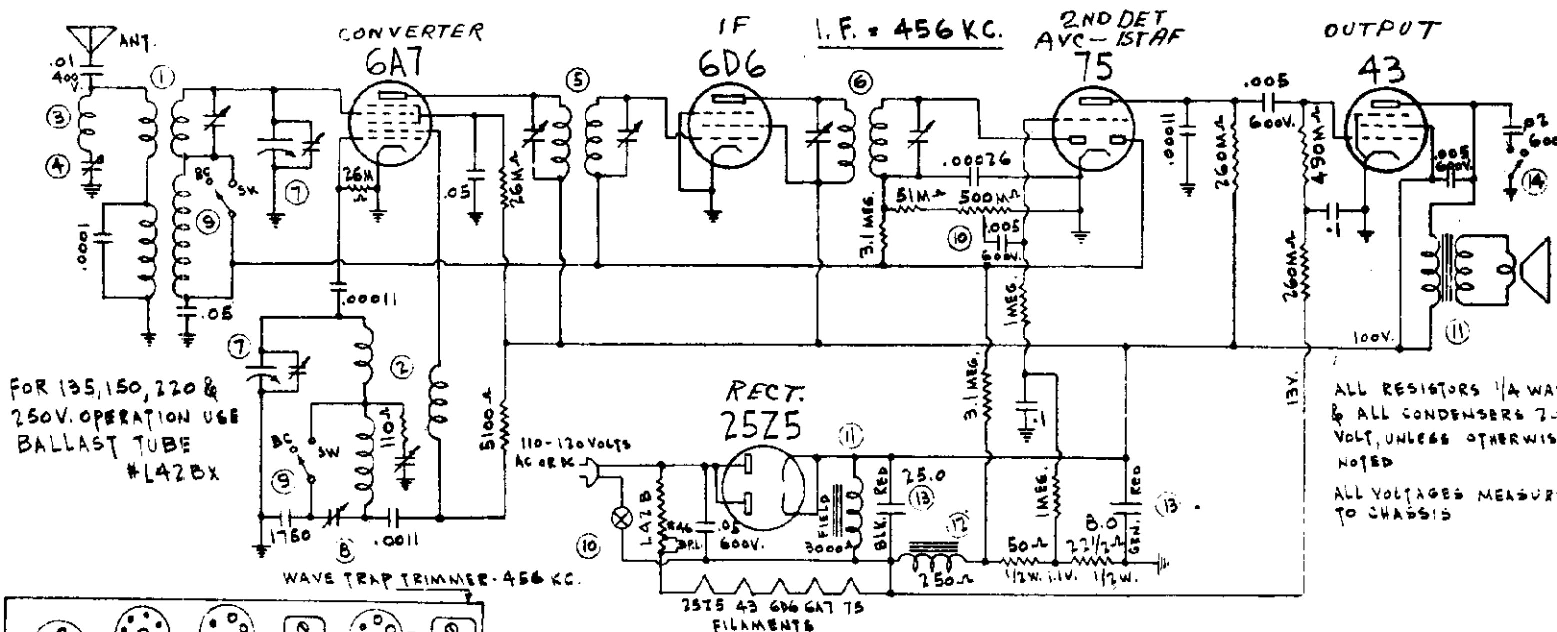


R. F. ALIGNMENT

OPR.	BAND	RECEIVER DIAL SETTING	SIGNAL GENERATOR FREQUENCY	ADJUST OSC. WITH	TRIMMERS ADJ. FOR MAX GAIN	ADJUST OSC. WITH	PADDERS ADJ. FOR MAX GAIN
1	1	600KC	600KC	------	---------	C9	---------
2	1	1400KC	1400KC	CA	CB - CC	------	---------
3	2	1800KC	1800KC	------	---------	C8	---------
4	2	4000KC	4000KC	CD	CE - CF	------	---------
5	3	5000KC	5000KC	------	---------	C6	C14 - C10
6	3	9000KC	9000KC	CG	CH - CI	------	---------
7	4	10,000KC	10,000KC	------	---------	C7	C15 - C11
8	4	18,000KC	18,000KC	CJ	CK - CL	------	---------
9	5	20,000KC	10,000KC	------	---------	C5	C16 - C12
10	5	30,000KC	10,000KC	CM	CN - CO	------	---------
11	6	40,000KC	20,000KC	------	---------	C4	C17 - C13
12	6	60,000KC	20,000KC	CP	CQ - CR	------	---------

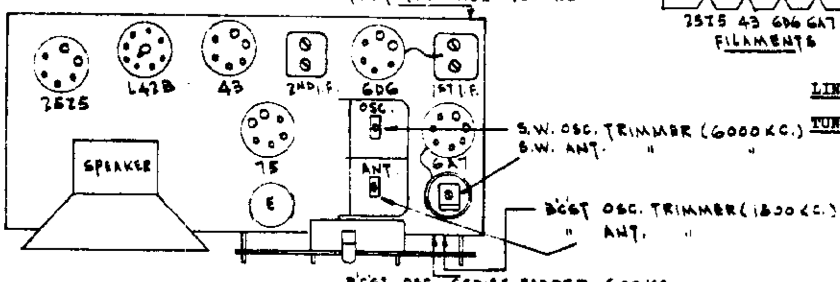
MODEL 25
Schematic, Socket
Trimmers, Alignme[nt]
Parts, Voltage

HALSON RADIO MFG. CORP.



ALL RESISTORS 1/4 WATT & ALL CONDENSERS 200 VOLT, UNLESS OTHERWISE NOTED

ALL VOLTAGES MEASURED TO CHASSIS



TUBE LAYOUT & TRIMMER LOCATIONS

LINE VOLTAGE 110 to 120 Volts, A C or D C, Alternating or direct current.

TUNING RANGES Broadcast and State Police Band - 545 Kilocycles (540 Meters) to 1750 Kilocycles (170 Meters).
Short Wave, Municipal Police, Aviation, Amateur and Foreign Broadcast Band - 2.3 Megacycles (130 M.) to 7.5 Megacycles (40 M)

1 = 2226-3	ANTENNA COIL	
2 = 2240-3	OSCILLATOR COIL	
3 = 2297-1	WAVE TRAP COIL	456 KC.
4 = 2337-1	" " TRIMMER	456 KC.
5 = 1900F	1ST I.F. TRANS.	
6 = 1848K	2ND " "	
7 = 2335	VARIABLE COND. 410 MMFD.	
8 = 1621-1	PADDER CONDENSER	
9 = 2254-2	RANGE SWITCH	
10 = 1908D-2	VOLUME CONTROL & SWITCH - 500M Ω	
11 = 2259	SPEAKER ASSEMBLY	
12 = 1976B	FILTER CHOKE - 250 Ω	
13 = 2263	ELECTROLYTIC COND. 25-8 MFD-150V.	
14 = 1439B-1	TONE CONTROL SWITCH	

ALIGNMENT PROCEDURE

1) Set service oscillator to 456 kilocycles and connect the output lead to the top grid of the 6A7. Adjust the intermediate frequency trimmers for maximum response.

2) Connect oscillator set at 456 kc. to the antenna lead through a .0002 mfd. condenser band switch in the broadcast position, and adjust the wave trap trimmer for minimum signal.

3) Set the oscillator for 6 megacycles (6000 kc.), band switch in the short wave position, dial pointer set for 6 mc. calibration and adjust the short wave oscillator trimmer until the signal is heard.

4) Turn the band switch to the broadcast band, set the dial to 1500 kc. calibration. Feed a 1500 kc. signal from the test oscillator through the antenna, and adjust the broadcast osc. trimmer until the signal is heard, then adjust the broadcast ant. trimmer for maximum response.

5) Set the test oscillator to 600 kc. and adjust the broadcast osc. series padder for maximum response by simultaneously adjusting the padder and rocking the tuning dial.

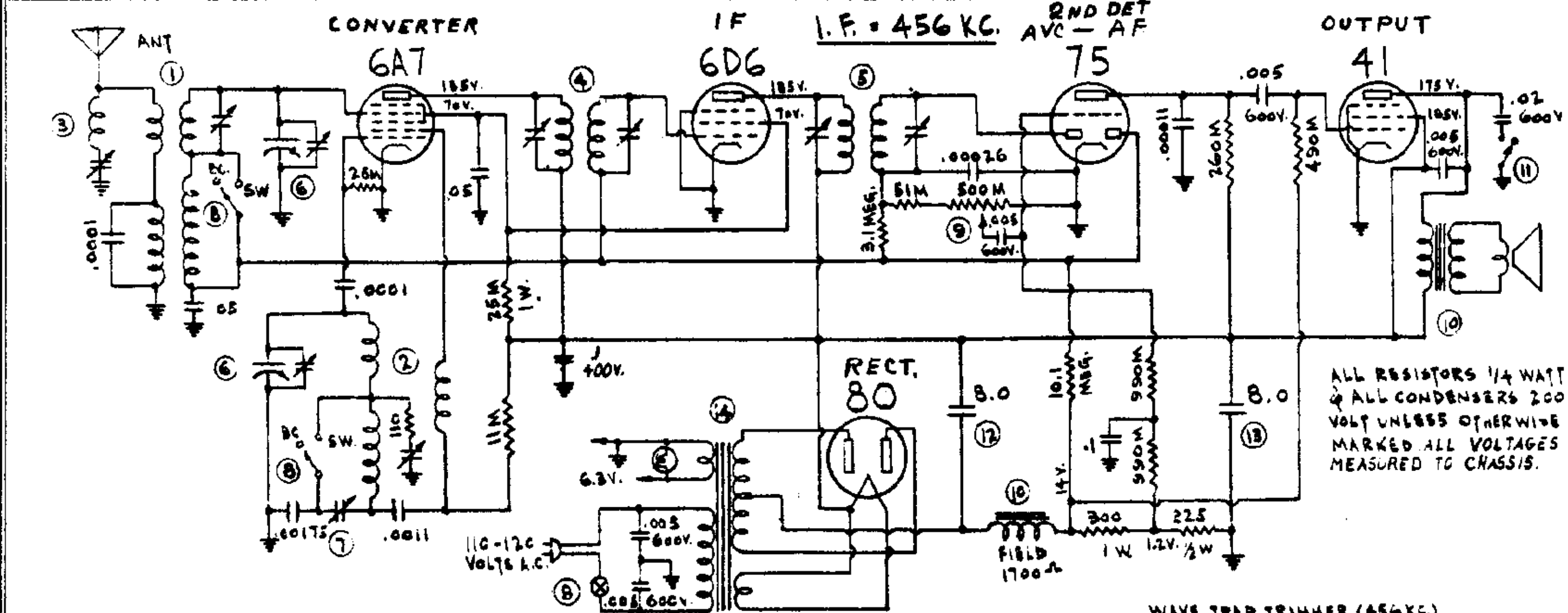
6) Repeat procedure numbers 4 and 5 for greater accuracy.

7) Turn the set to the S. W. band, set the test oscillator to 6000 kc., tune in the

MODEL 25

MODEL 35
Schematic, Socket
Trimmers, Alignment
Voltage, Parts

HALSON RADIO MFG. CORP.



LINE VOLTAGE 110 to 120 Volts alternating current only.

TUNING RANGES Broadcast and State Police Band - 545 Kilocycles (540 Meters) to 1750 Kilocycles (170 Meters).
Short Wave, Municipal Police, Aviation, Amateur and Foreign Broadcast Band - 2.3 Megacycles (130 M.) to 7.5 Megacycles (40 M.).

ALIGNMENT PROCEDURE

1) Set service oscillator to 456 kilocycles and connect the output lead to the top grid of the 6A7. Adjust the intermediate frequency trimmers for maximum response.

2) Connect oscillator, set at 456 kc. to the antenna lead through a .0002 mfd. condenser, band switch in the broadcast position, and adjust the wave trap trimmer for minimum signal.

3) Set the oscillator for 6 megacycles (6000 kc.), band switch in the short wave position, dial pointer set for 6 mc. calibration and adjust the short wave oscillator trimmer until the signal is heard.

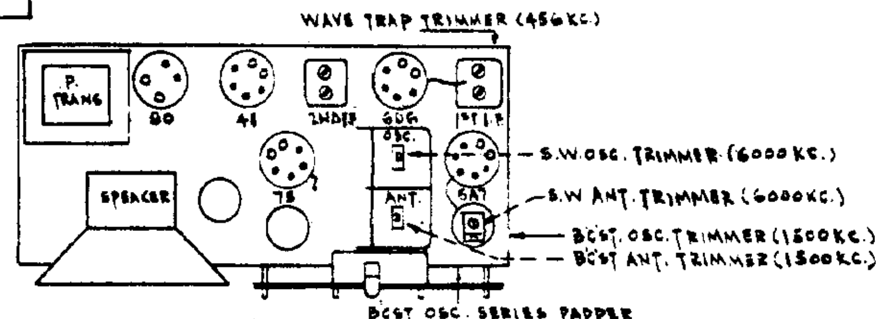
4) Turn the band switch to the broadcast band, set the dial to 1500 kc. calibration. Feed a 1500 kc. signal from the test oscillator through the antenna, and adjust the broadcast osc. trimmer until the signal is heard, then adjust the broadcast ant. trimmer for maximum response.

5) Set the test oscillator to 600 kc. and adjust the broadcast osc. series padder for maximum response by simultaneously adjusting the padder and rocking the tuning dial.

6) Repeat procedure numbers 4 and 5 for greater accuracy.

7) Turn the set to the S. W. band, set the test oscillator to 6000 kc., tune in the signal with the set and adjust the S. W. antenna trimmer for maximum response.

1 = 2226-3 ANTENNA COIL
2 = 2240-3 OSCILLATOR COIL
3 = 2297-1 WAVE TRAP 456 KC.
4 = 1900 F 1ST I.F. TRANS. 456 KC.



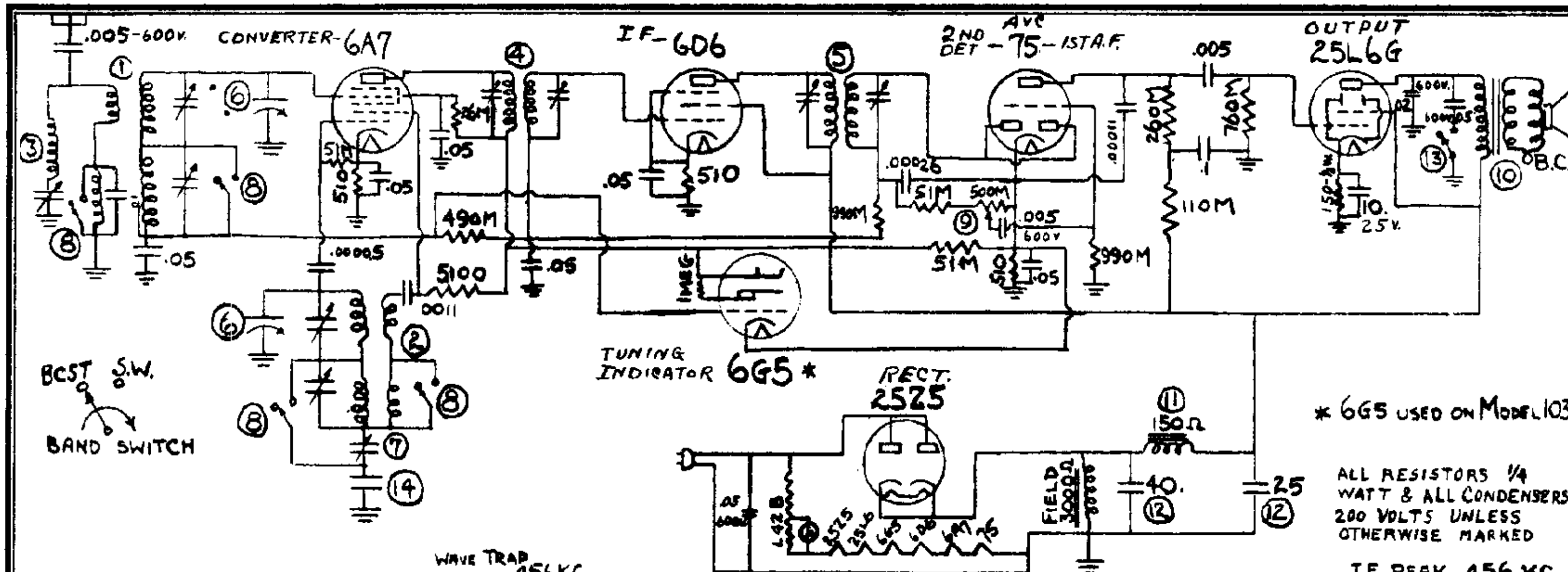
TUBE LAYOUT & TRIMMER LOCATIONS

7-20-37 Ep

5 = 1848K 2ND I.F. TRANS.
6 = 2335 VARIABLE CONDENSER 420 MMFD.
7 = 1621-1 PADDER CONDENSER
8 = 2254-2 RANGE SWITCH
9 = 1908D-2 VOLUME CONTROL & SWITCH
10 = 2272 SPEAKER ASSEMBLY
11 = 1439B-1 TONE CONTROL SWITCH
12 = 2270 ELECTROLYTIC COND (WET) 8 MFD. 350V.
13 = 2271 " " " " 250V.
14 = 2274 POWER TRANSFORMER - 60 CYCLE

MODEL 35

HALSON RADIO MFG. CORP.



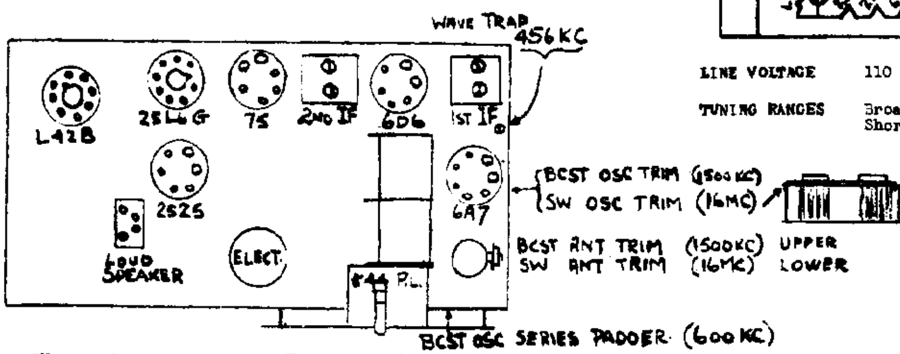
* 6G5 USED ON MODEL 103

ALL RESISTORS 1/4 WATT & ALL CONDENSERS 200 VOLTS UNLESS OTHERWISE MARKED

I.F. PEAK 456 KC

LINE VOLTAGE 110 to 120 Volts, AC or DC, Alternating or Direct current.

TUNING RANGES Broadcast and State Police Band - 545 KC (540 Meters) to 1750 KC (170 Meters)
Short Wave, Foreign Broadcast - 5.75 MC (52 Meters) to 19 MC (16 Meters)



TUBE LAYOUT AND TRIMMER·LOCATION

1-2295 - ANTENNA COIL ASSEMBLY
2-2296 - OSCILLATOR COIL ASSEMBLY
3-2297-1 WAVE TRAP - 456 KC
4-19006 1ST I.F. TRANSFORMER
5-1848L 2ND I.F. TRANSFORMER
6-2290-3 2 GANG VARIABLE COND.
7-1621-1 PADDER CONDENSER
8-2294-1 RANGE SWITCH
9-19080-2 VOLUME CONTROL - SWITCH
10-2299-1 SPEAKER ASSEMBLY
11-2301 FILTER CHOKE
12-2302 ELECTOLYTIC COND. -150V.
13-14394 TONE CONTROL SWITCH
14-2320 M.CA COND. 3200 MMF ±5%

FOR 135,150,220,250 VOLT OPERATION USE BALLAST TUBE NO L42BX

ALIGNMENT PROCEDURE -

(1) Set service oscillator to 456 KC and connect the output lead to the top grid of 6A7. Adjust the I.F. trimmers for maximum response.

(2) Connect oscillator set at 456 KC to the antenna lead through a .0002 MFD condenser, band switch in the broadcast position, and adjust the wave trap for minimum response.

(3) Set oscillator for 16 MC, band switch in the short wave position, dial pointer set for 16 MC calibration, and adjust the short wave oscillator trimmer until the signal is heard.

(4) Turn the band switch to the broadcast position, set dial to 1500 KC calibration and feed a 1500 KC signal from the oscillator through the antenna. Adjust the broadcast oscillator trimmer until the signal is heard, then adjust the broadcast antenna trimmer for maximum response.

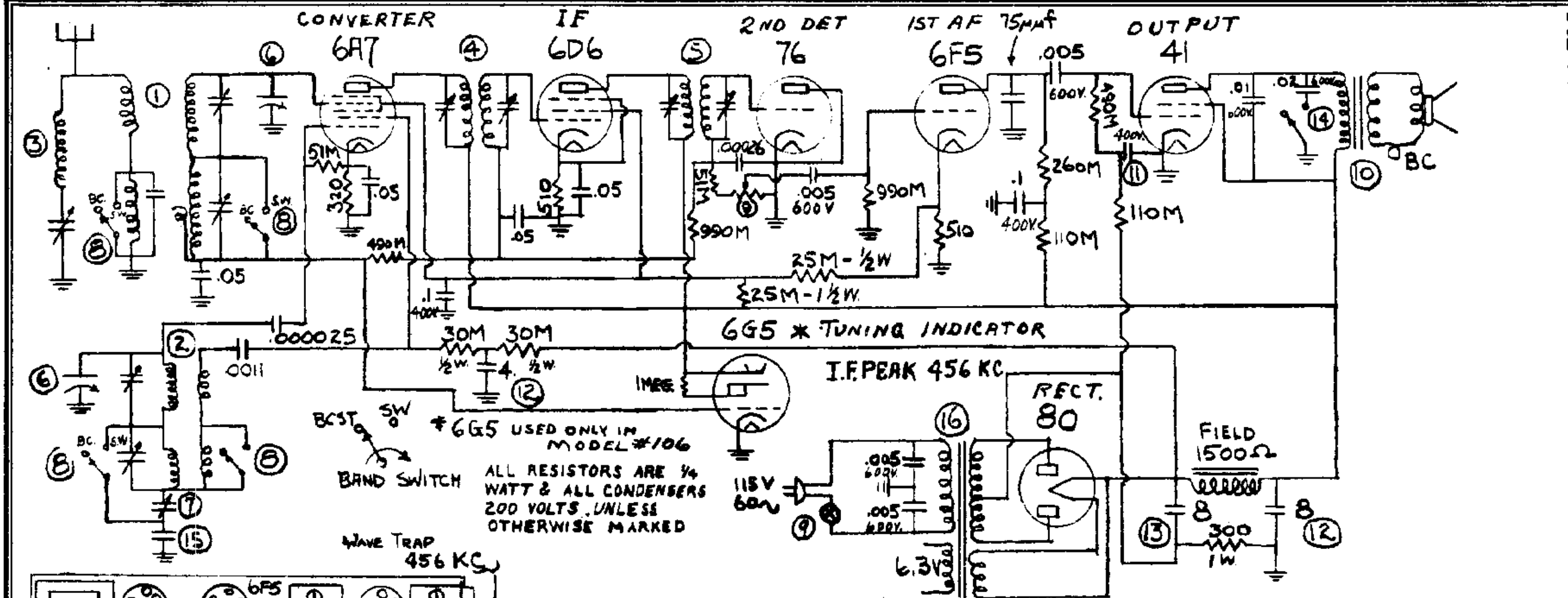
(5) Set the test oscillator to 600 KC and adjust the broadcast osc. series padder for max. response by simultaneously adjusting the padder and rocking the tuning dial.

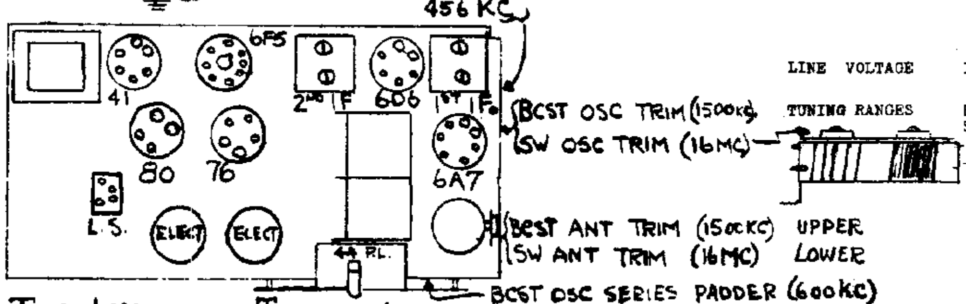
(6) Repeat procedure numbers 4 and 5 for greater accuracy.

MODEL 102,103

MODELS 104,106
Schematic, Socket
Trimmers, Alignment
Parts

HALSON RADIO MFG. CORP.





TUBE LAYOUT AND TRIMMER LOCATION

LINE VOLTAGE 110 to 120 Volts Alternating Current, 60 cycles.

TUNING RANGES Broadcast and State Police Band - 545 KC (540 Meters) to 1750 KC (170 Meters)
Short Wave, Foreign Broadcast - 5.75 MC (52 Meters) to 19 MC (16 Meters)

1- 2295 ANTENNA COIL ASSEMBLY
2- 2296 OSCILLATOR COIL ASSEMBLY
3- 2297-1 WAVE TRAP 456 KC
4- 1900G 1ST I.F. TRANSFORMER
5- 1848L 2ND I.F. TRANSFORMER
6- 2290-3 VARIABLE CONDENSER - 2 GANG
7- 1621-1 PADDER CONDENSER
8- 2294-2 RANGE SWITCH
9- 1905D-3 VOL. CONTROL (500M) - SWITCH
10- 2306-1 SPEAKER ASSEMBLY
11- 2317 .04 MF +10% -20% PAPER COND.
12- 2308-2 8-4 MF - 350V ELECT. COND.
13- 1652 8 MF - 450V ELECT. COND.
14- 1439B-2 TONE CONTROL SWITCH
15- 2320 MICA COND. 3200 MMF ± 5%
16- 2311 POWER TRANSFORMER 60~ - 115V

ALIGNMENT PROCEDURE

(1) Set service oscillator to 456 KC and connect the output lead to the top grid of 6A7. Adjust the I.F. trimmers for maximum response.

(2) Connect oscillator set at 456 KC to the antenna lead through a .0002 MFD condenser, band switch in the broadcast position, and adjust the wave trap for minimum response.

(3) Set oscillator for 16 MC, band switch in the short wave position, dial pointer set for 16 MC calibration, and adjust the short wave oscillator trimmer until the signal is heard.

(4) Turn the band switch to the broadcast position, set dial to 1500 KC calibration and feed a 1500 KC signal from the oscillator through the antenna. Adjust the broadcast oscillator trimmer until the signal is heard, then adjust the broadcast antenna trimmer for maximum response.

(5) Set the test oscillator to 600 KC and adjust the broadcast osc. series padder for max. response by simultaneously adjusting the padder and rocking the tuning dial.

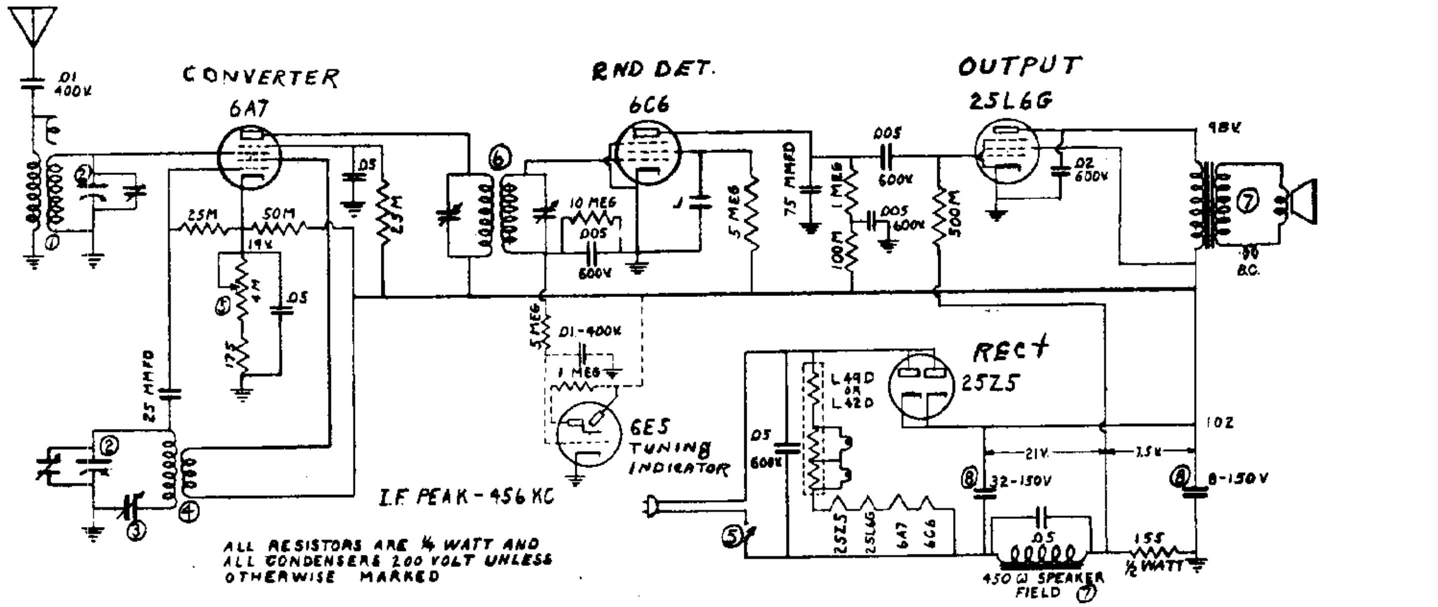
(6) Repeat procedure numbers 4 and 5 for greater accuracy.

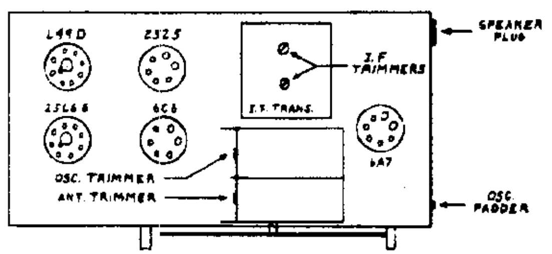
(7) Turn the set to the S.W. band, set the oscillator to 16 MC, tune in signal with the set and adjust the S.W. antenna trimmer for maximum response. Use 400 ohm dummy antenna.

7-21-37

MODEL 104 - 106

HALSON RADIO MFG. CORP.





TUBE LAYOUT AND TRIMMER LOCATION

LINE VOLTAGE 110 to 120 Volts, A C or D C, Alternating or Direct Current.

TUNING RANGES Broadcast Band - 545 Kilocycles (540 Meters) to 1550 Kilocycles (195 Meters).
Police Band - State and Municipal Police - 1600 Kilocycles (190 Meters) to 1750 Kilocycles (170 Meters).

PARTS LIST

1	2387-1	ANTENNA COIL
2	2422	VARIABLE CONDENSER
3	1621-1	PADDER CONDENSER
4	2388-1	OSCILLATOR COIL
5	2202-2A	VOLUME CONTROL & SWITCH
6	2410	I.F. TRANSFORMER
7	2366	SPEAKER ASSEMBLY
8	2412	ELECTROLYTIC CONDENSER

DOTTED LINES ARE 6E5 CONNECTIONS IN MODEL 162 ONLY

ALIGNMENT PROCEDURE

1) Turn the volume control to the full on position and tune the receiver so that no signal is received. Connect the service oscillator output through a .1 mfd. isolating condenser to the top grid cap of the 6A7 and set to 456 kilocycles. Adjust the intermediate frequency trimmers for the maximum response. As the set is brought into line and the signal becomes stronger, attenuate the service oscillator.

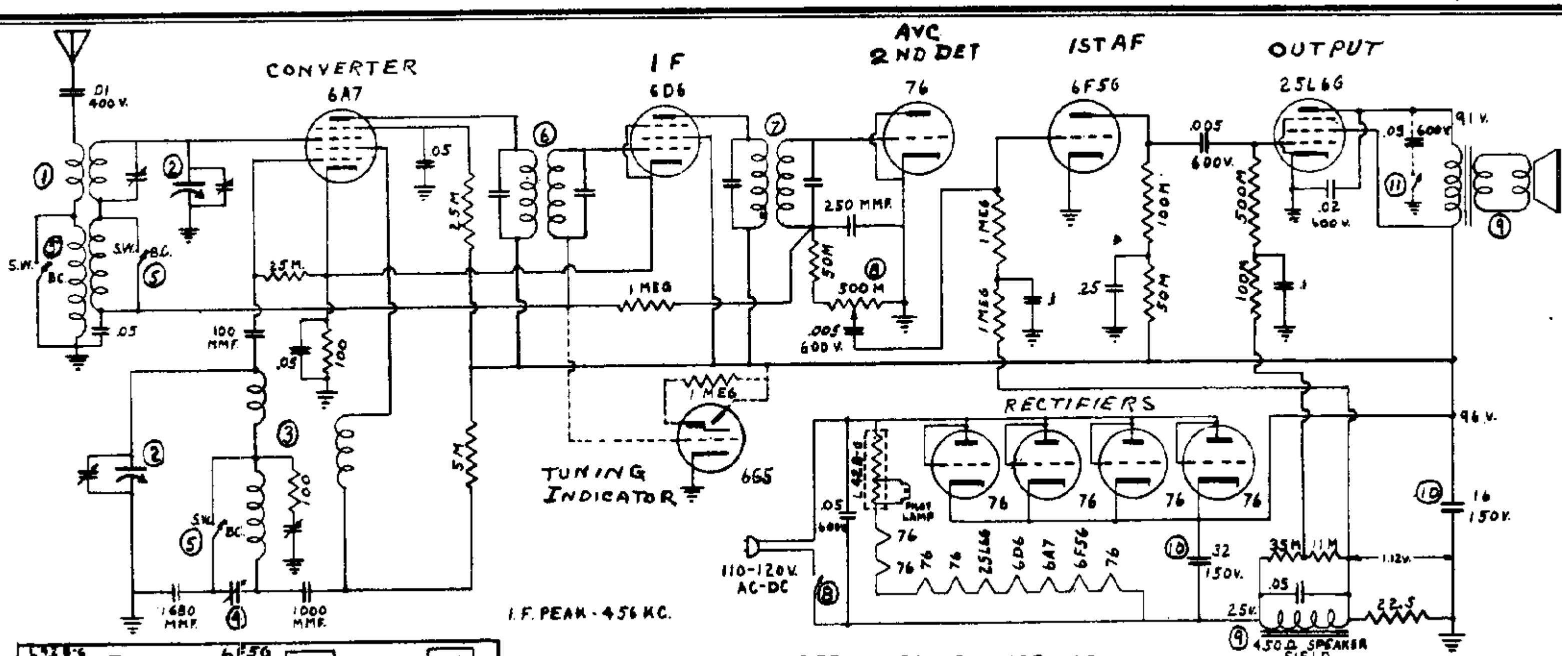
2) Set the dial pointer to the 1500 kilocycle calibration. Feed a 1500 kilocycle signal from the service oscillator through a .0002 condenser to the antenna. Adjust the oscillator trimmer until the signal is heard, then adjust the antenna condenser trimmer for maximum response.

3) Set the service oscillator to 600 kilocycles and adjust the oscillator series padder for maximum response by simultaneously adjusting the padder and rocking the tuning control.

MODEL 161 - 162

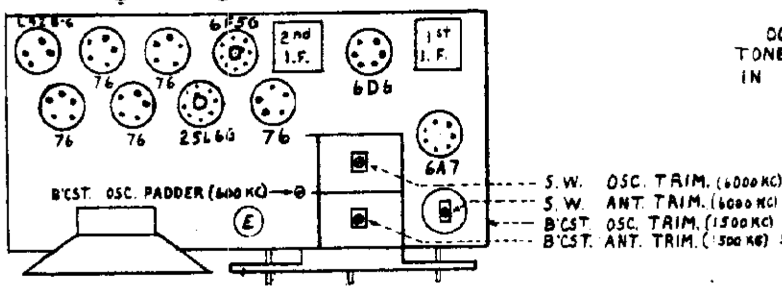
MODELS 310, 711
Schematic, Socket
Trimmers, Alignment
Voltage, Parts

HALSON RADIO MFG. CORP.



DOTTED LINES ARE 6G5 AND
TONE CONTROL CONNECTIONS USED
IN MODEL 711 ONLY

ALL VOLTAGES MEASURED
TO CHASSIS



TUBE LAYOUT AND TRIMMER LOCATION

7-21-37 Ep

LINE VOLTAGE 110 to 120 Volts, A C or D C, Alternating or Direct Current.

TUNING RANGES Broadcast and State Police Band - 545 Kilocycles (540 Meters) to 1750 Kilocycles (170 Meters).
Short Wave, Municipal Police, Aviation, Amateur and Foreign Broadcast Band - 2.3 Megacycles (130 Meters) to 7.5 Megacycles (40 Meters)

ALIGNMENT PROCEDURE

1) Turn the volume control to the full-on position and tune the receiver so that no signal is received. Connect the service oscillator output through a .1 mfd. isolating condenser to the top grid cap of the 6A7 and set to 456 kilocycles. Adjust the intermediate frequency trimmers for maximum response. As the set is brought into alignment and the signal becomes stronger, attenuate the service oscillator.

2) Set the service oscillator for 6 megacycles (6000 kc.), set the band switch in the short wave position and the dial pointer to the 6 megacycles calibration. Adjust the short wave oscillator until the signal is heard. Use a 400 ohm dummy antenna.

3) Turn the band switch to the broadcast band and set the dial to 1500 kc.. Feed a 1500 kc. signal from the service oscillator through a .0002 condenser to the antenna and adjust the broadcast oscillator trimmer until the signal is heard. Adjust the broadcast antenna trimmer for the maximum response at this point.

4) Set the service oscillator to 600 kc. and adjust the broadcast oscillator padder for maximum response by simultaneously adjusting the padder and rocking the tuning dial.

5) Repeat procedure numbers 3 and 4 for greater accuracy.

6) Turn the set to the short wave band, the service oscillator to 6000 kc.. Tune in the signal with dial and adjust the short wave trimmer for maximum response.

PARTS LIST

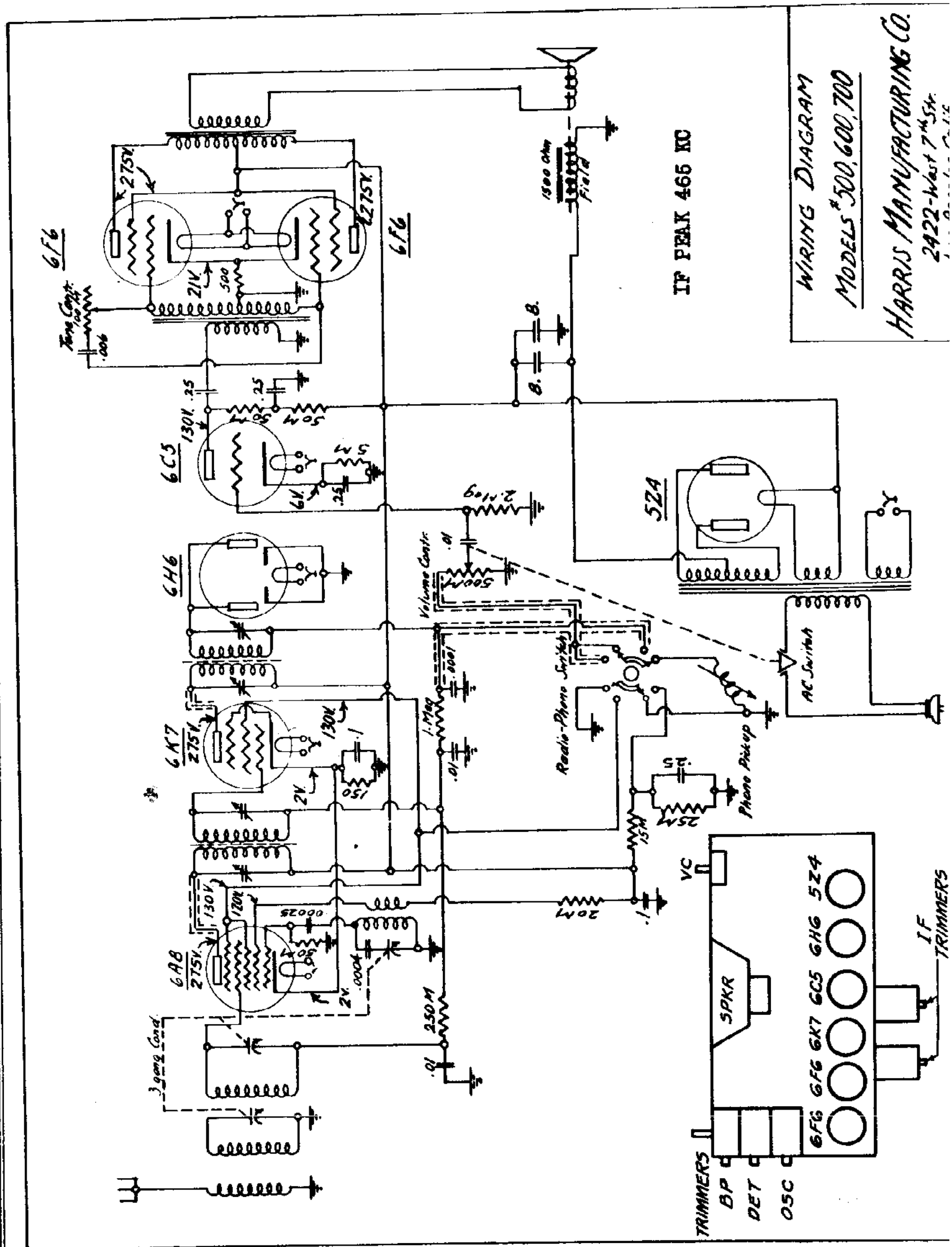
ALL RESISTORS ARE 1/4 WATT AND ALL PAPER CONDENSERS ARE 200 VOLTS UNLESS OTHERWISE MARKED.

1	2437	ANTENNA COIL
2	2436-3	VARIABLE CONDENSER
3	2438	OSCILLATOR COIL
4	1621-1	PADDER CONDENSER
5	2294-2	RANGE SWITCH
6	2389	1ST I.F. TRANSFORMER
7	2390	2ND I.F. TRANSFORMER
8	19CBD-3	VOLUME CONTROL AND SWITCH
9	2366-B	SPEAKER ASSEMBLY - MODEL 310
	2452	SPEAKER ASSEMBLY - MODEL 711
10	2444-1	ELECTROLYTIC CONDENSER
11	1439B-2	TONE CONTROL SWITCH - MODEL 711 ONLY

MODEL 310-711

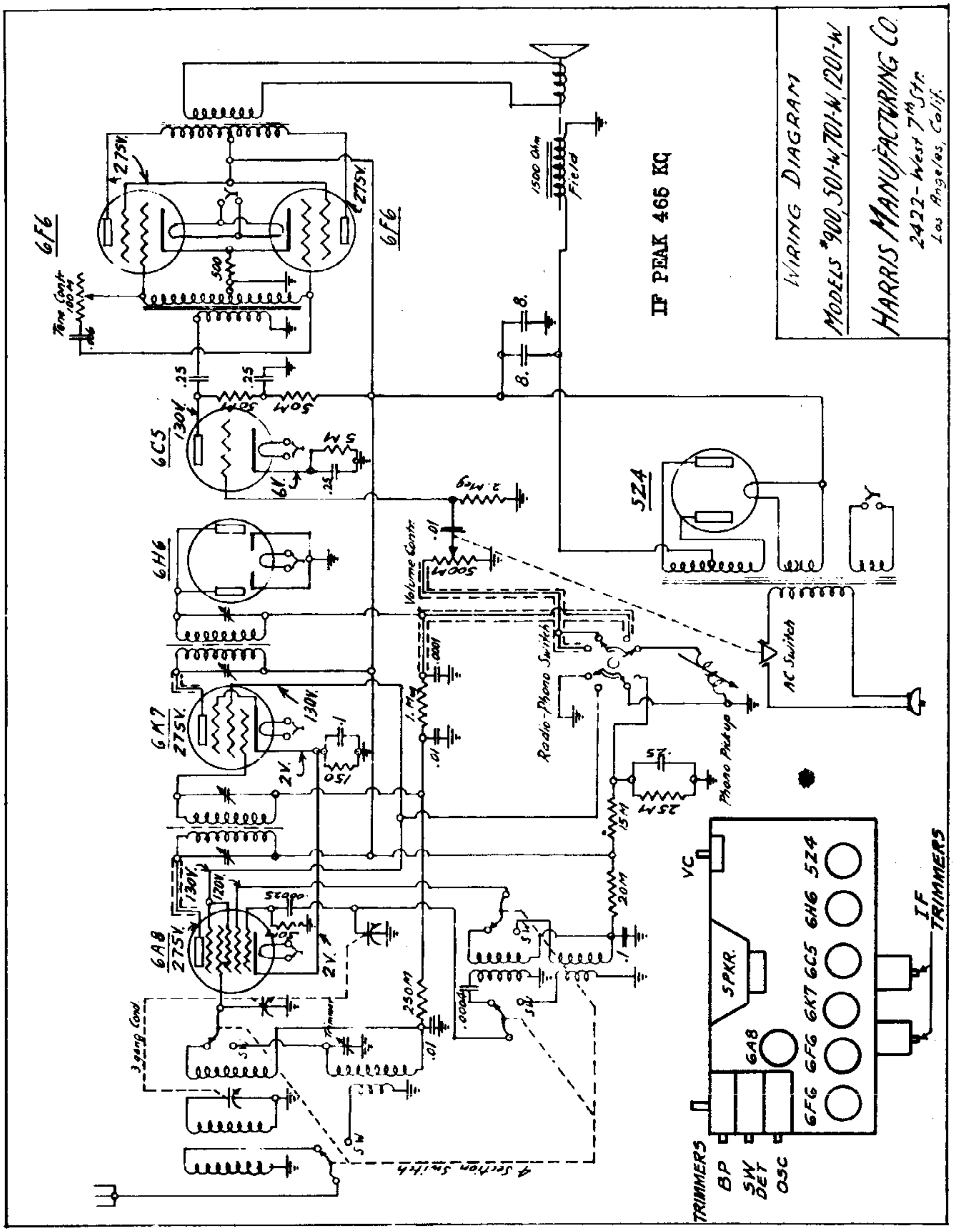
MODELS 500,600,7
Schematic,Socket
Trimmers,Voltage

HARRIS MFG. CO.



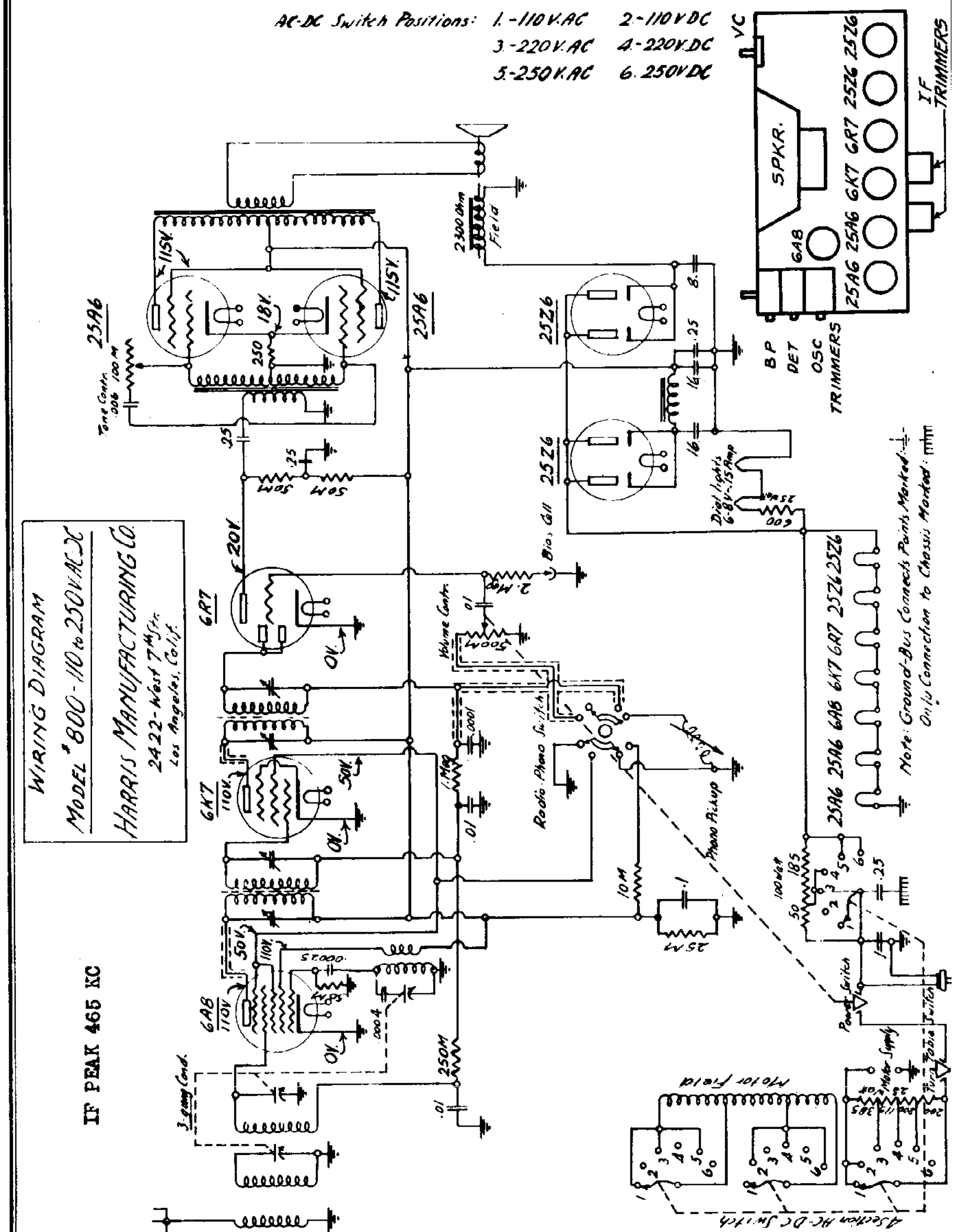
MODELS 501W, 701W, 900
1201W
Schematic, Socket
Trimmers, Voltage

HARRIS MFG. CO.



MODEL 800
Schematic, Socket
Trimmers, Voltage

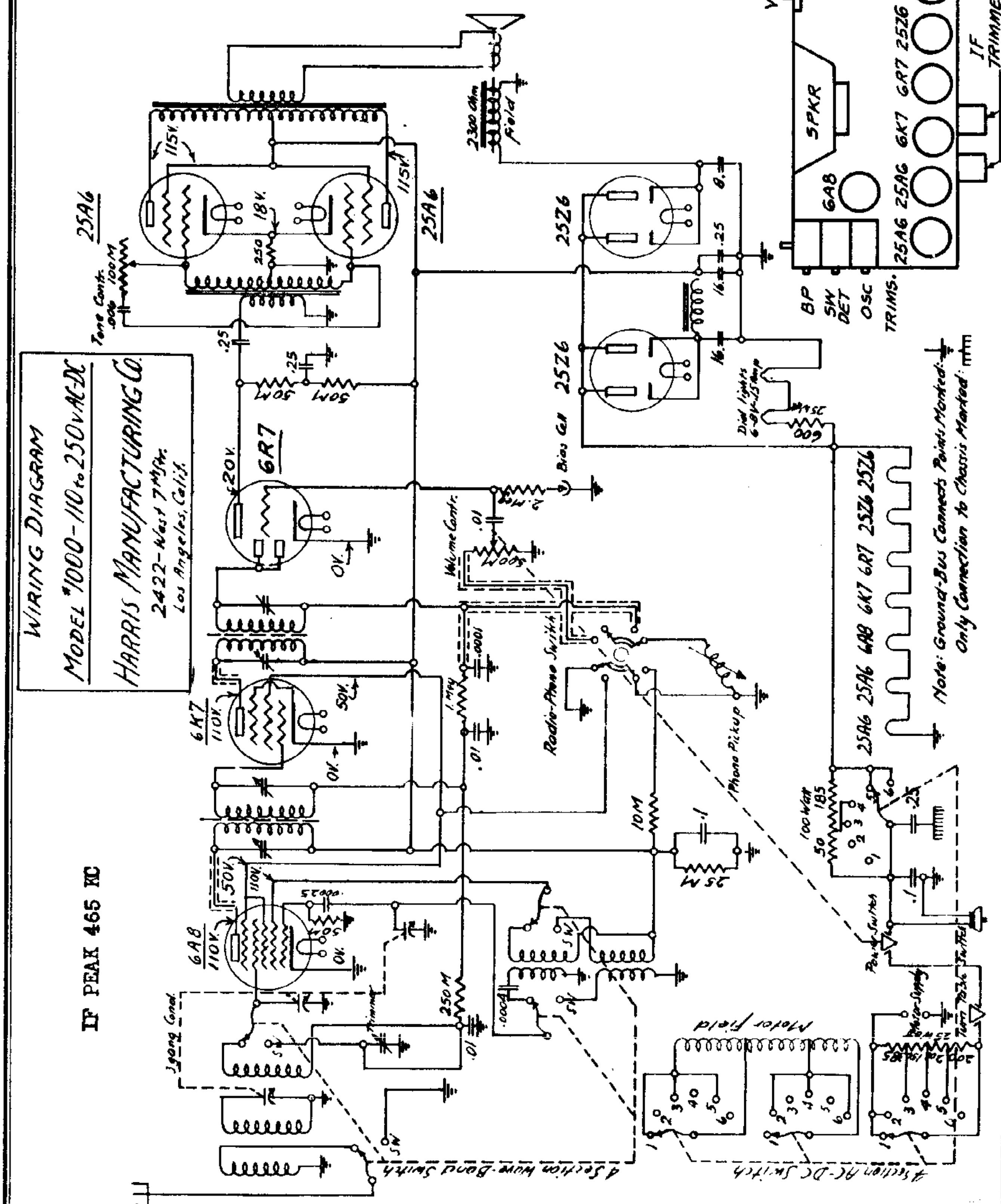
HARRIS MFG. CO.



MODEL 1000
Schematic, Voltage
Socket, Trimmers

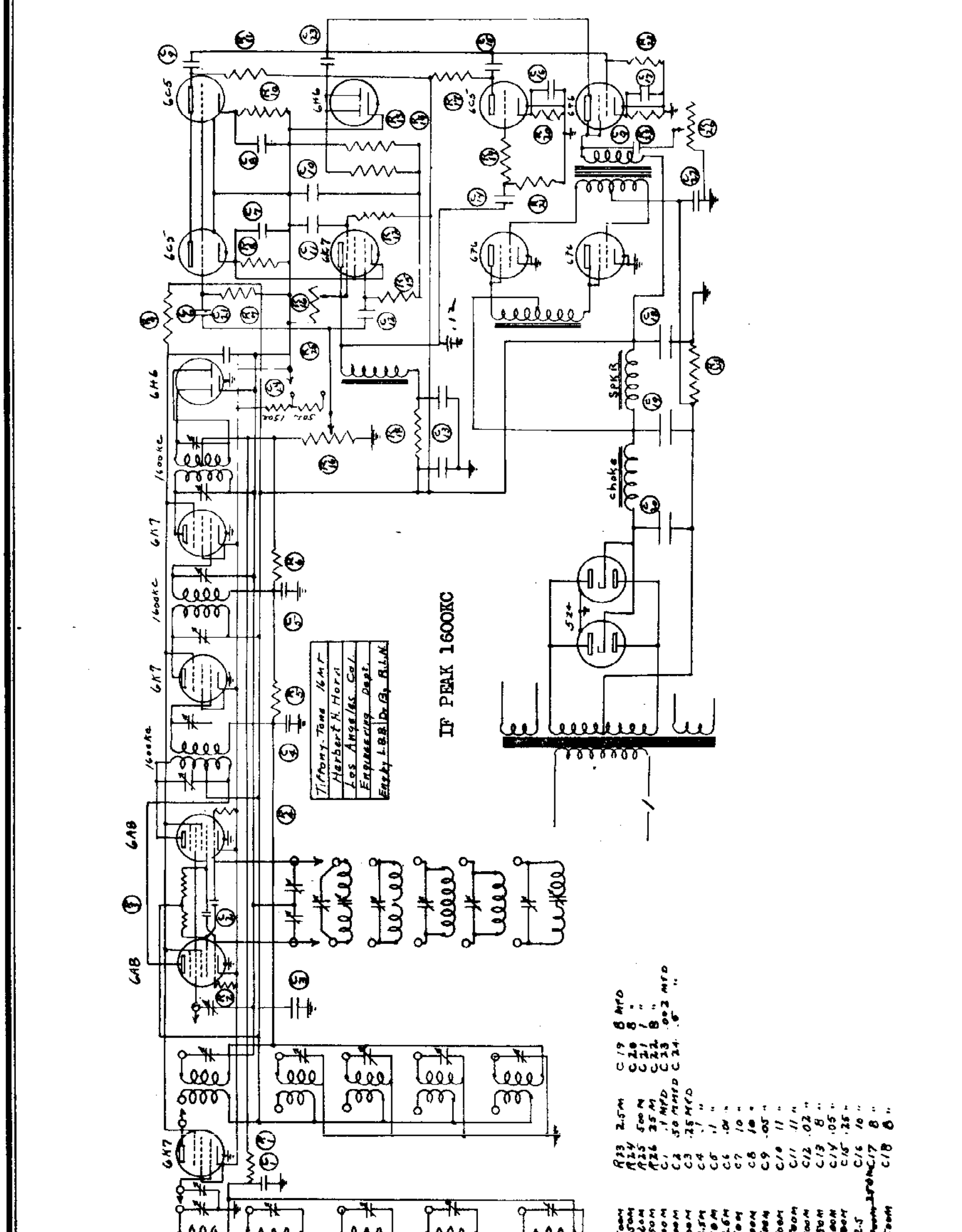
HARRIS MFG. CO.

AC-DC Switch Positions: 1.-110V.AC 2.-110VDC
3.-220V.AC 4.-220VDC
5.-250V.AC 6.250VDC



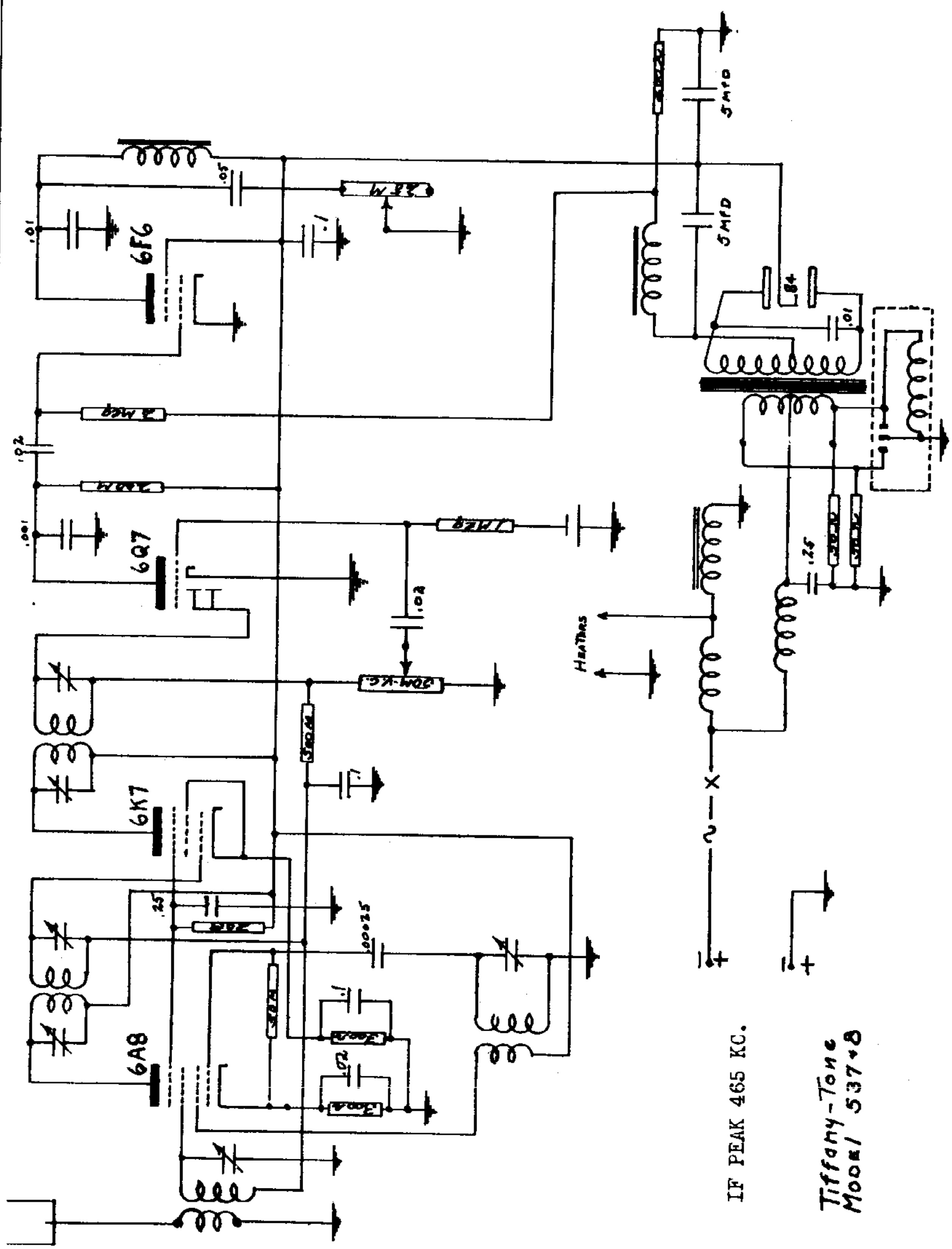
MODEL 16MT
Schematic

HERBERT H. HORN



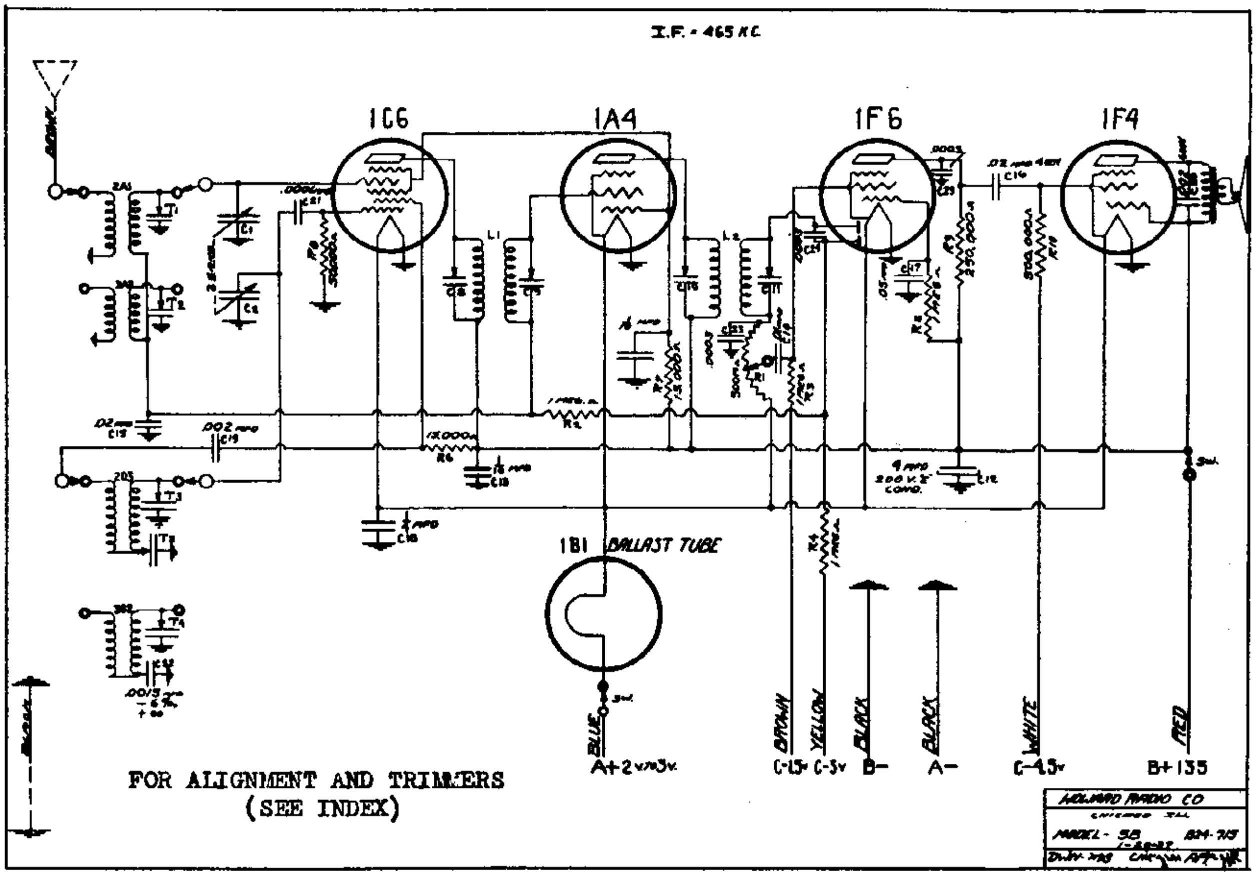
MODELS 537,538
Schematic

HERBERT H. HORN

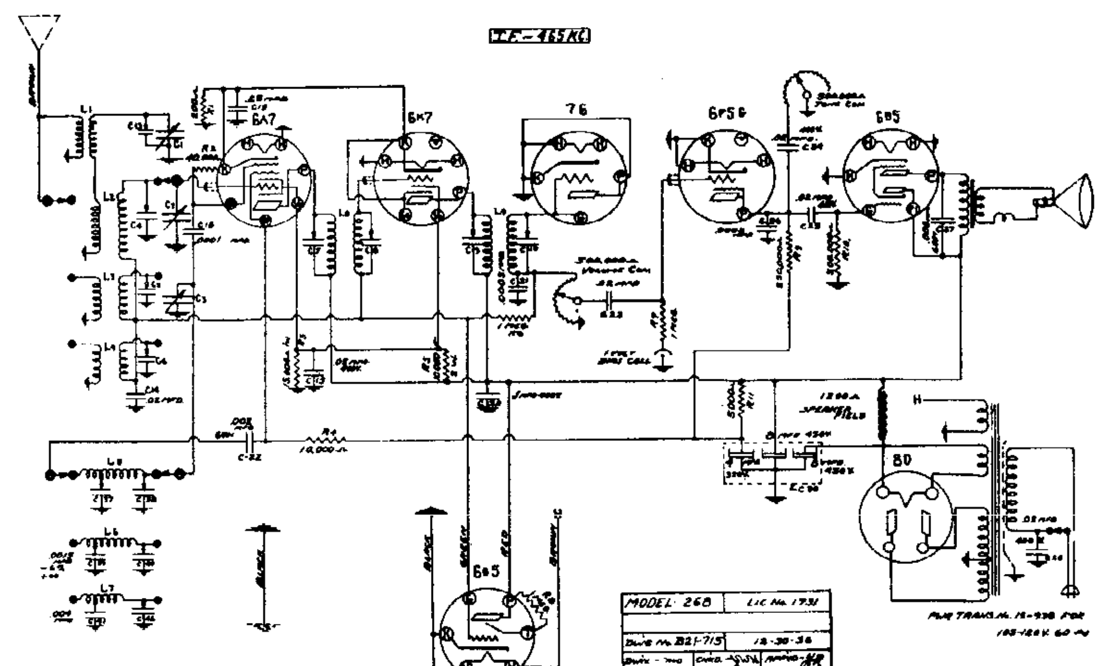


HOWARD RADIO CO.

MODEL 5B
MODEL 268
Schematic



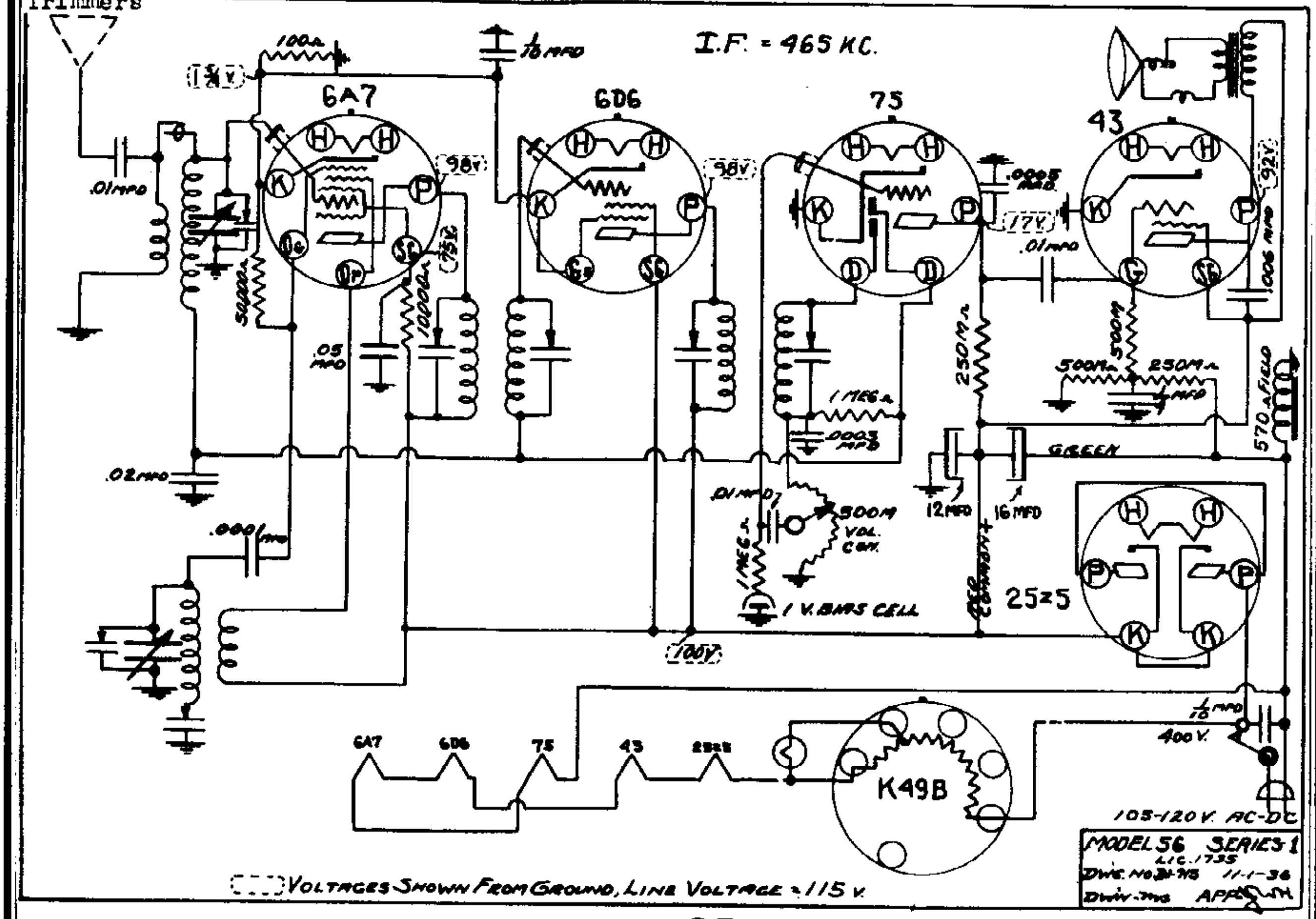
FOR ALIGNMENT AND TRIMMERS
(SEE INDEX)

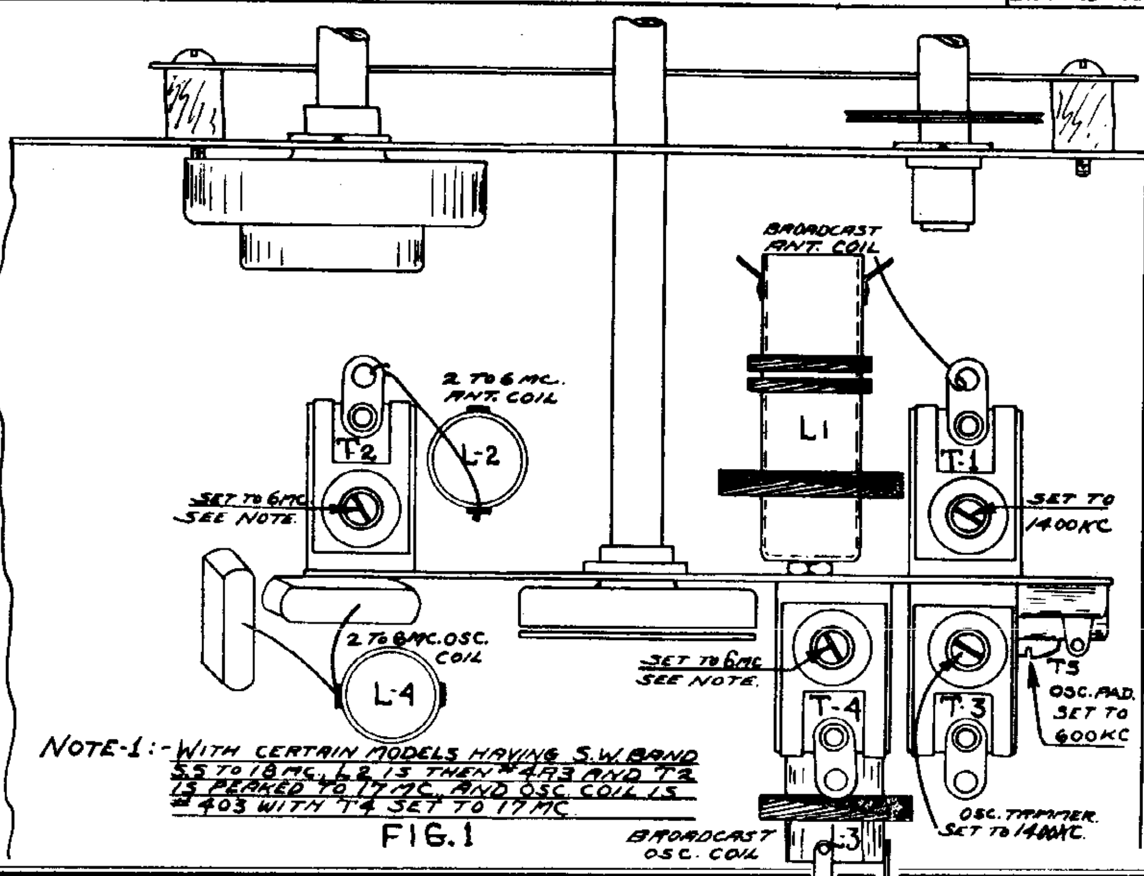


FOR ALIGNMENT AND TRIMMERS
SEE INDEX

MODEL 56
Schematic, Voltage
MODELS 5B, 256, 259, S256, S259
Trimmers

HOWARD RADIO CO.





NOTE-1:- WITH CERTAIN MODELS HAVING S.W. BAND 5.5 TO 18 MC. L2 IS THEN #4R3 AND T2 IS PEAKED TO 17 MC. AND OSC. COIL IS #403 WITH T4 SET TO 17 MC.

FIG. 1

HOWARD RADIO CO.

THE ALIGNMENT PROCEDURE

MODELS 256, 259, S256, S259 AND 5B

The following alignment instructions are given with the assumption that the Service Station has a signal generator capable of accurately covering the range of the receiver.

The only other apparatus necessary is a meter connected, in the output stage to indicate resonance. This can be an 0 to 5 volt AC meter connected across the voice coil of the speaker of preferably an output meter connected in the plate circuit of the power tube in series with an 8 Mfd. paper condenser.

I. THE I.F. STAGES

The intermediate frequency stages are aligned in the usual manner on Models 259, S259 and 5B by feeding 465 KC into the grid of the mixer tube after removing grid cap, placing a series resistor of 500,000 ohms from tube grid to the cap and a series condenser from the tube grid to the hot lead from the signal generator. NOTE WITH MODELS 256 AND S256 LEAVE GRID CAP ON THE MIXER TUBE, TURN BAND SWITCH TO BROADCAST BAND POSITION AND VARIABLE CONDENSER ALL THE WAY OUT TO MINIMUM CAPACITY.

The sensitivity of the I. F. system alone for Models 256, S256, 259 and S259 will be about 25 to 50 Microvolts for a 50 Milliwatt output, and about 125 Microvolts for Model 5B.

The two trimmers in each of the I. F. Cans should be very carefully peaked to resonance as they are very critical and will greatly affect the performance of the set.

Always use as low an output as possible from the signal generator when making the various adjustments.

II. THE S. W. BAND 2 TO 6 MEGACYCLES

SEE SECTION IV FOR MODELS WITH A 5.5 TO 18. MC BAND

First check the position of the dial hand by rotating the condenser plates to full capacity. At this point the dial hand should be straight across in line with the lines dividing the scale in half. If the hand is off position, remove dial glass to get at the screw holding the hand.

With the dial hand set to 6 megacycles and the band switch in the short wave position, (all the way to the right) see Figure 1 and peak trimmer T4 of the oscillator circuit to 6 megacycles.

After adjustment of the oscillator trimmer, peak trimmer T2 to 6 megacycles from the generator.

III. THE BROADCAST BAND

Turn wave band switch all the way to left and dial hand set to 1400 KC (the top scale). The signal generator may be coupled direct to the antenna lead on this band, through a standard 200 MMFD condenser.

Peak oscillator trimmer T3 to 1400 KC from the signal generator.

Peak antenna trimmer T1 to 1400 KC after adjusting oscillator.

Set dial hand to 600 KC and adjust oscillator padding condenser T5 to 600 KC.

IV. MODELS S259 AND S256 WITH A 5.5 TO 18 MC BAND ALIGN AS FOLLOWS:

Tune dial hand to 17 megacycles.

NOTE: FOR ADJUSTMENT AT 17 MEGACYCLES THE OUTPUT FROM THE SIGNAL GENERATOR MUST NOT BE COUPLED DIRECT TO THE ANTENNA LEAD OF THE SET. FOR TRUE ALIGNMENT STRETCH OUT THE RADIO ANTENNA LEAD IN SUCH A MANNER THAT IT WILL PICK UP THE SO CALLED "WILD" SIGNAL OF 17 MEGACYCLES EMITTING FROM THE GENERATOR. IT IS ALSO IMPORTANT THAT THIS SIGNAL ONLY BE STRONG ENOUGH TO JUST BE HEARD.

When the above set-up is arranged peak oscillator T4 to the 17 megacycle weak signal.

After adjusting the oscillator trimmer, peak the S.W. antenna condenser T2 to 17 megacycles.

NOTE: After adjusting the short wave band at 17 megacycles, the signal generator output to antenna should be increased and receiver dial advanced to .9 megacycle lower and note if test oscillator signal is heard.

In case there is no response the oscillator trimmers have been pulled down too tightly. The trimmers should be released until this condition exists then go back to original point of alignment - reduce antenna input voltage and correct the trimmer adjustment.

EXAMPLE: The receiver has been adjusted to 17 megacycles. Tune receiver to approximately 16.9 MC.

Increase oscillator signal by "opening up" the attenuator. Move the dial back and forth at 16.9 MC.

If no signal is heard, let oscillator trimmer off until it is heard at 16.9 MC.

Reduce signal voltage from generator, go back to 17 MC and slightly correct this last trimmer adjustment.

V. SERVICE NOTES

Seal all trimmers after their final adjustment.

The normal voltage readings of the circuits are shown on the schematic diagram of the set.

In any instance when microphonism is present, first check the dial frame and do not let it or any part of the dial touch the inside of the front panel.

Should the calibrated dial card on Models S-256 and S-259 be moved at any time, be sure and relocate it far enough to the right (when facing the front of the set) otherwise the calibration lines will not be true at various points on the dial.

Be sure that the trimmer settings are made to the true fundamental signal from the generator and not to a harmonic or image frequency.

MODELS 68 Revised
268,266
Socket, Trimmers

HOWARD RADIO CO.

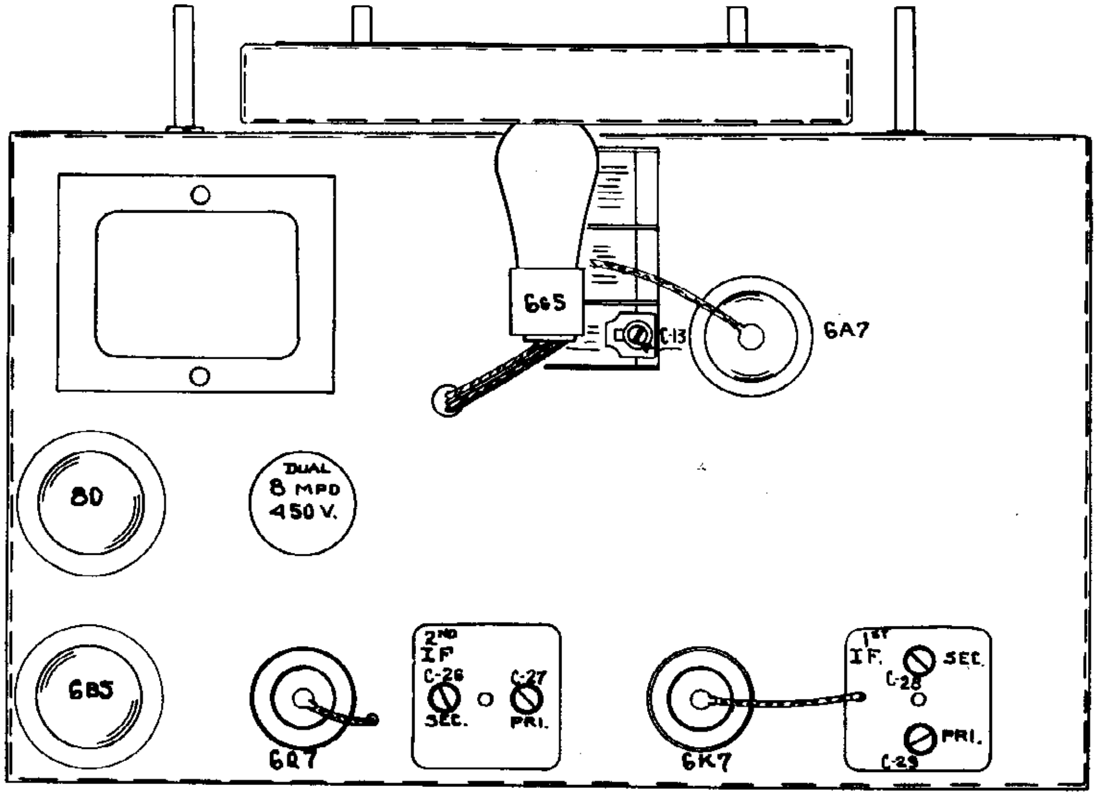


FIG. 2

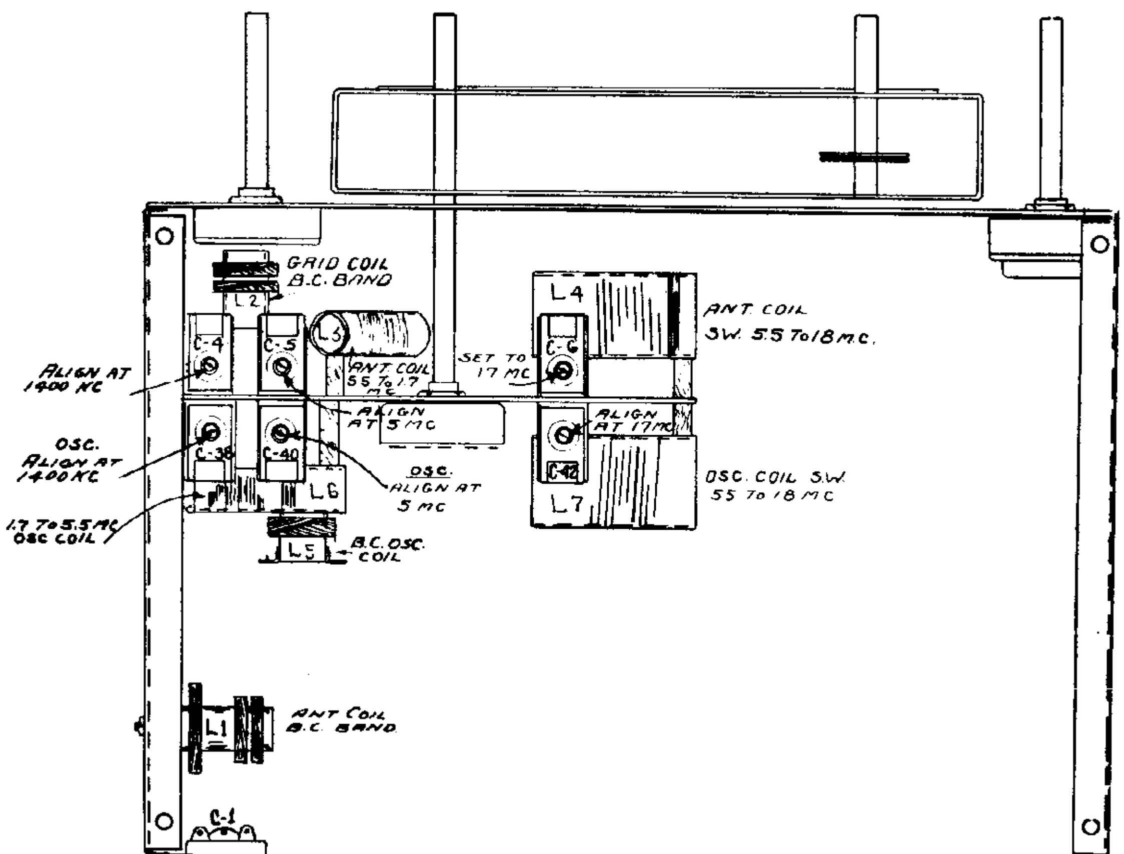
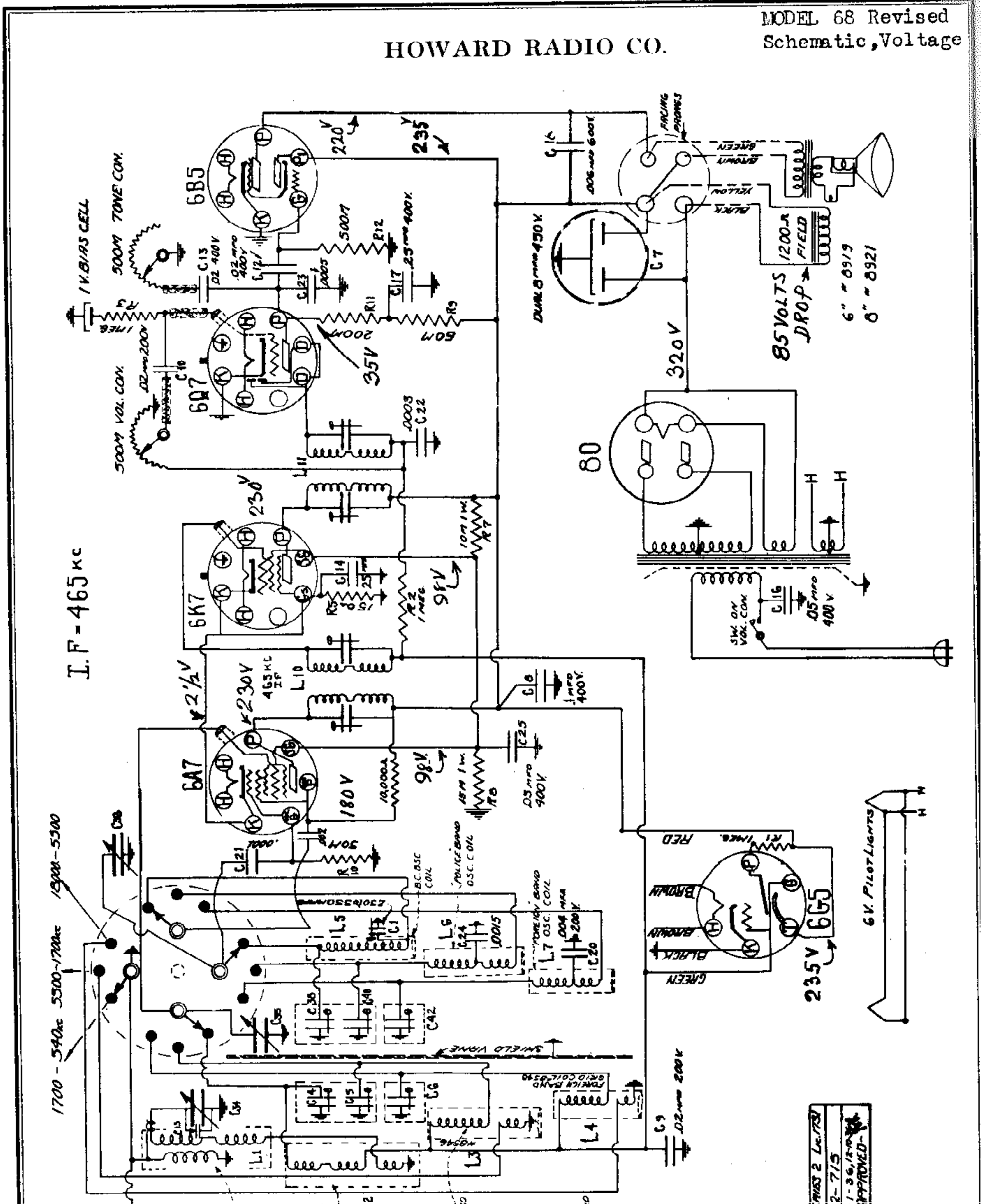


FIG-4

MODEL 68 Revised
Schematic, Voltage



MODELS 68 Revised
266,268
Alignment

HOWARD RADIO CO.

THE ALIGNMENT PROCEDURE

The following alignment instructions are given with the assumption that the Service Station has a signal generator capable of accurately covering the range of the receiver.

The only other apparatus necessary is a meter connected in the output stage to indicate resonance. This can be an 0 to 3 Volt AC meter connected across the voice coil of the speaker of preferably an output meter connected in the plate circuit of the power tube in series with an 8 Mfd. paper condenser.

I. THE I.F. STAGES

The intermediate frequency stages are aligned in the usual manner by feeding 465 K.C. into the grid of the mixer tube 6A7.

The two trimmers in each of the I.F. cans should be very carefully peaked to resonance as they are very critical and will greatly affect the performance of the set. These are trimmers Nos. C-26,27, 28, 29 on Figure 2.

Always use as low an output as possible from the signal generator when making the various adjustments.

The sensitivity of the I.F. system alone will be found to be between 15 and 20 Microvolts.

II. ALIGNMENT OF THE SHORT WAVE BAND 5.5 TO 18 M.C.

First check the position of the dial hand by rotating the variable condenser to full capacity. The hand then should be in line with the lines that divide the dial in half. If the hand is off position it can be lined up by loosening the center screw.

1. Turn band switch all the way to the right for the 5.5 to 18 M.C. Band (Yellow), and set dial hand to 17 M.C.
2. Refer to Figure 3 and with a 17 M.C. signal from the generator, peak oscillator, trimmer condenser C-42 to 17 M.C.
3. Adjust trimmer C-6 of the antenna circuit to 17 M.C. after the above mentioned oscillator trimmer has been set.

III. ALIGNMENT OF SHORT WAVE BAND 1.7 TO 5.5 M.C.

1. With the band switch in the middle position, (Blue) and the dial hand set to 5 M.C., peak trimmer C-40 of the oscillator circuit to 5 M.C.
2. Adjust Antenna stage trimmer C-5 to 5 M.C. after the above oscillator trimmer has been set.

NOTE: After adjusting the two high bands at 17 megacycles and 5 megacycles the test oscillator input to antenna should be increased and receiver dial advanced to .9 megacycle lower and note if test oscillator signal is heard.

In case there is no response, the oscillator trimmers have been pulled down too tightly. The trimmers should be released until this condition exists, then go back to original point of alignment - reduce antenna input voltage and correct the trimmer adjustment.

EXAMPLE: The receiver has been adjusted to 17 megacycles. Tune receiver to approximately 16.9 M.C.

Increase oscillator signal by "opening up" the attenuator. Move the dial back and forth at 16.9 M.C.

If no signal is heard, let oscillator trimmer off until it is heard at 16.9 M.C.

Reduce signal voltage from generator, go back to 17 M.C. and slightly correct this last trimmer adjustment.

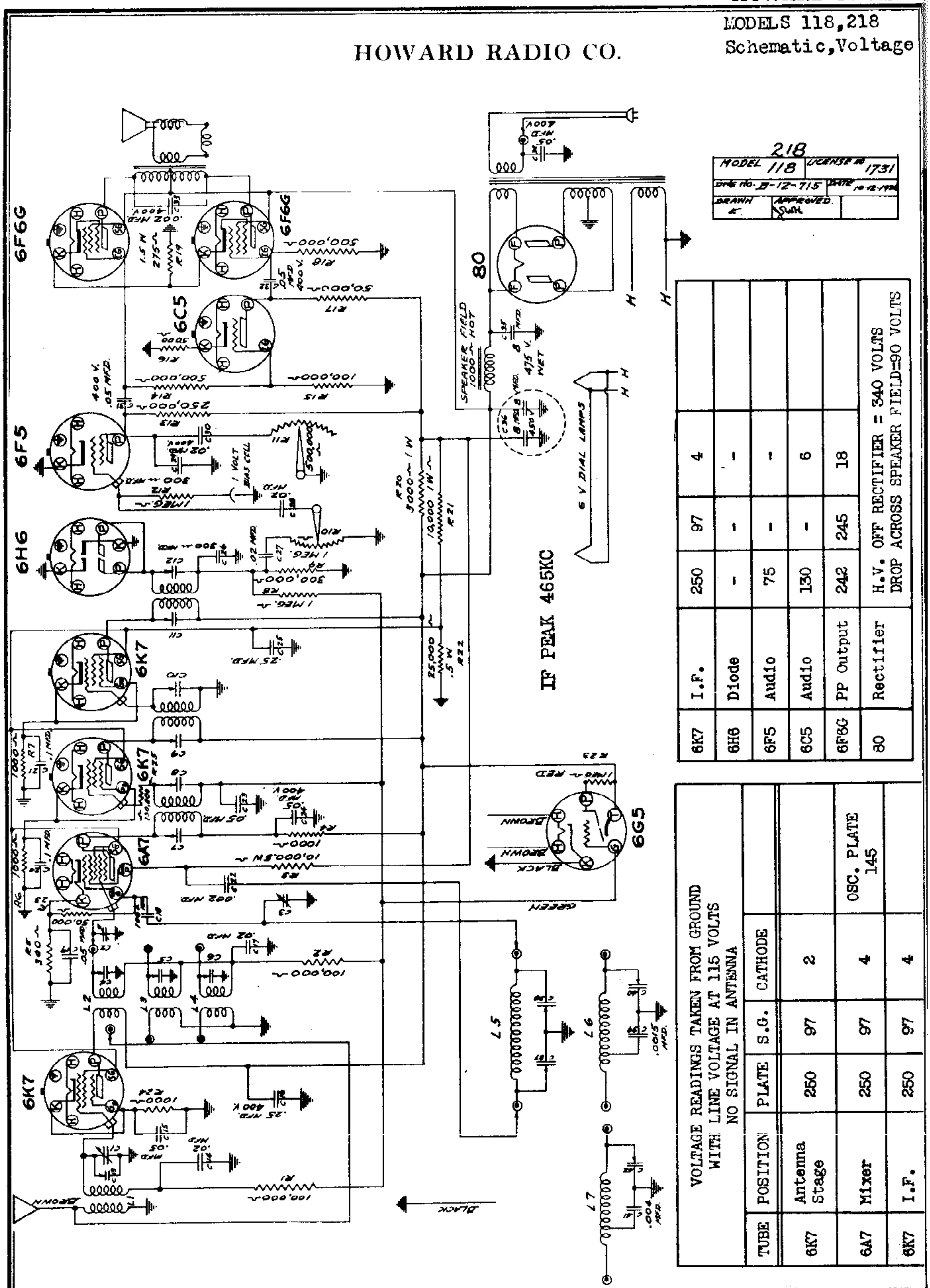
The same thing applies to the 5 M.C. adjustment.

IV. THE ALIGNMENT OF THE BROADCAST BAND

1. Set Band Switch to the 550-1700 K.C. band, and the hand to 1400 K.C.
2. Peak oscillator trimmer C-38 to 1400 K.C., then the R.F. Trimmer C-4 and the antenna stage trimmer C-13 on the variable condenser to 1400 K.C.
3. Rotate dial hand to 550 K.C. and adjust padding condenser C-37 to 550 K.C.
4. Re-check dial at 1400 K.C. as mentioned in (1) and (2).
5. Points in the middle of the dial may be checked and if necessary the plates of the oscillator section of the variable condenser (back section) may be bent for alignment.

V. NOTES

1. Seal all trimmers after their final adjustment.
2. Be sure that the settings are being made to the true fundamental signal from the oscillator and not on a harmonic or image frequency.
3. The normal voltage readings at the sockets are given in a separate chart on the following pages.
4. It is advisable to check the position of the tuning eye tube to make certain that it is not pushed against the inside of the dial card. With the adjustment screw on the bracket, allow a small amount of clearance between the end of the tube and the dial to avoid any possibility of the heat from the tube affecting the dial card.



VOLTAGE READINGS TAKEN FROM GROUND
WITH LINE VOLTAGE AT 115 VOLTS
NO SIGNAL IN ANTENNA

TUBE	POSITION	PLATE	S.G.	CATHODE	
6K7	Antenna Stage	250	97	2	
6A7	Mixer	250	97	4	OSC. PLATE 145
6K7	I.F.	250	97	4	
6K7	I.F.	250	97	4	
6H6	Diode	-	-	-	
6F5	Audio	75	-	-	
6C5	Audio	130	-	6	
6F6G	PP Output	242	245	18	
80	Rectifier	H.V. OFF RECTIFIER = 340 VOLTS DROP ACROSS SPEAKER FIELD=90 VOLTS			

MODELS 118,218
Socket,Trimmers

HOWARD RADIO CO.

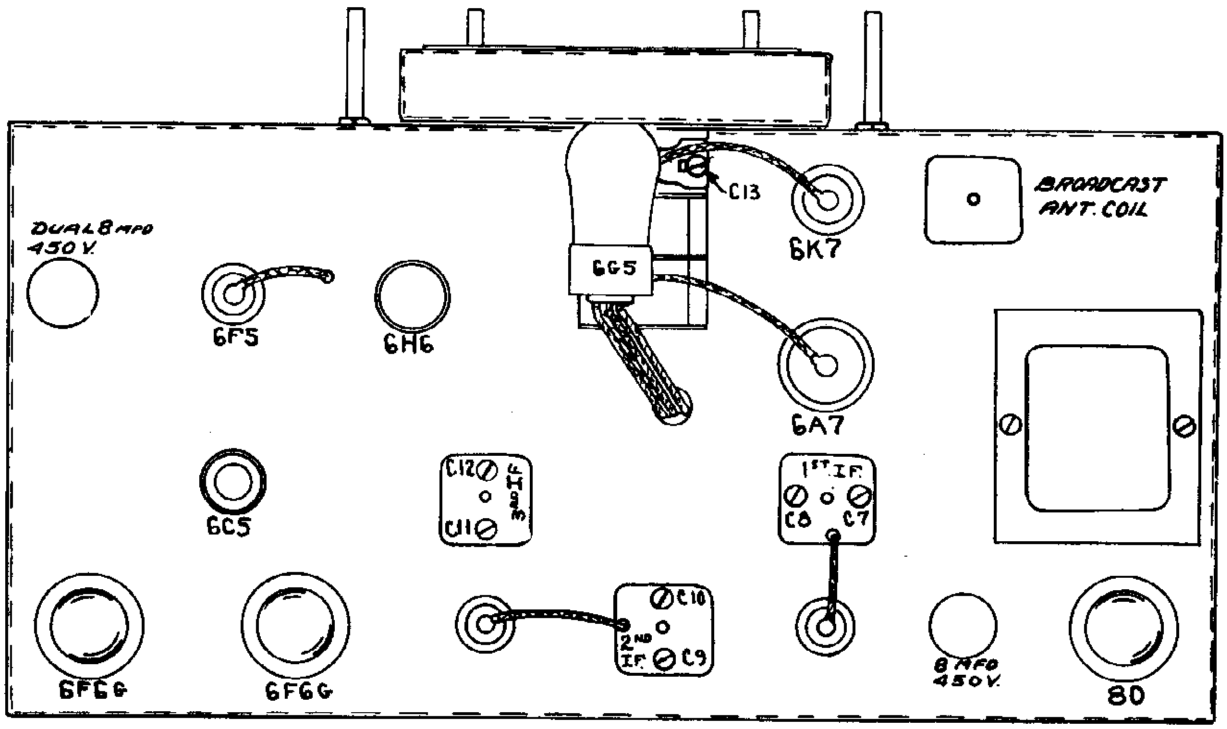


FIG. 1

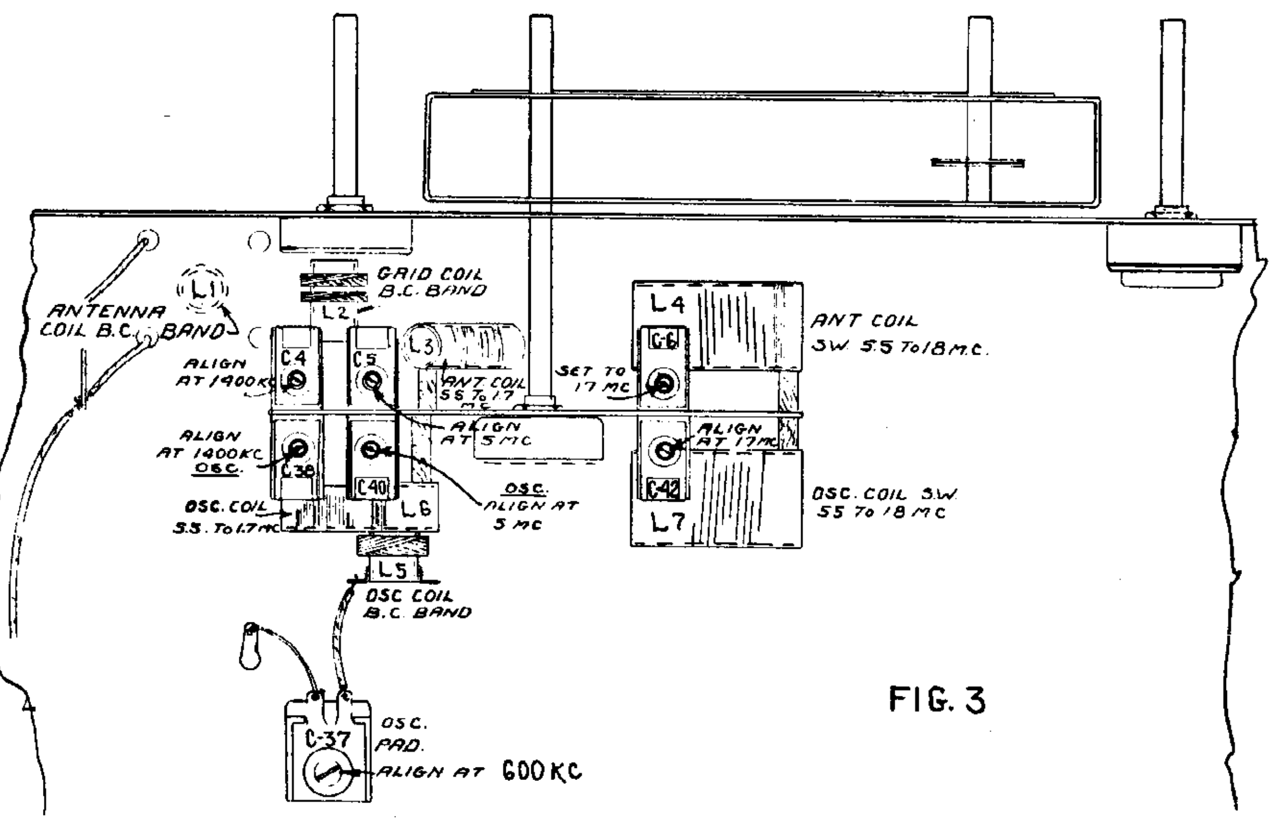


FIG. 3

MODELS 118,218
Alignment

HOWARD RADIO CO.

THE ALIGNMENT PROCEDURE

The following alignment instructions are given with the assumption that the Service Station has a signal generator capable of accurately covering the range of the receiver.

The only other apparatus necessary is a meter connected in the output stage to indicate resonance. This can be an 0 to 3 Volt AC meter connected across the voice coil of the speaker of preferably an output meter connected in the plate circuit of the power tube in series with an 8 Mfd. paper condenser.

I. THE I.F. STAGES

The intermediate frequency stages are aligned in the usual manner by feeding 465 K.C. into the grid of the mixer tube 6A7. Remove grid cap, place series resistor of 500,000 ohms from the tube grid to the cap and a series condenser from the tube grid to the "hot" lead from the signal generator.

The two trimmers in each of the I.F. cans should be very carefully peaked to resonance as they are very critical and will greatly affect the performance of the set. These are trimmers Nos. C-7, C-8, C-9, C-10, C-11 and C-12 (See Fig.1)

Always use as low an output as possible from the signal generator when making the various adjustments.

The sensitivity of the I.F. system alone will be found to be between 15 and 20 Microvolts.

II. ALIGNMENT OF THE SHORT WAVE BAND 5.5 TO 18 M.C.

First check the position of the dial hand by rotating the variable condenser to full capacity. The hand then should be in line with the lines that divide the dial in half. If the hand is off position it can be lined up by loosening the center screw.

1. Turn band switch all the way to the right for the 5.5 to 18 M.C. Band (Yellow), and set dial hand to 17 M.C.

2. Refer to Figure 3 and with a 17 M.C. signal from the generator, peak oscillator, trimmer condenser C-42 to 17 M.C.

3. Adjust trimmer C-6 of the antenna circuit to 17 M.C. after the above mentioned oscillator trimmer has been set. Watch this adjustment that it will not "drag" the oscillator.

III. ALIGNMENT OF SHORT WAVE BAND 1.7 to 5.5 M.C.

1. With the band switch in the middle position, (Blue) and the dial hand set to 5 M.C., peak trimmer C-40 of the oscillator circuit to 5 M.C.

2. Adjust Antenna Stage trimmer C-5 to 5 M.C. after the above oscillator trimmer has been set.

NOTE: After adjusting the two high bands at 17 megacycles and 5 megacycles the test oscillator input to antenna should be increased and receiver dial advanced to .9 megacycle lower and note if test oscillator signal is heard.

In case there is no response, the oscillator trimmers have been pulled down too tightly. The trimmers should be released until this condition exists, then go back to original point of alignment - reduce antenna input voltage and correct the trimmer adjustment.

EXAMPLE: The receiver has been adjusted to 17 megacycles. Tune receiver to approximately 16.9 M.C.

Increase oscillator signal by "opening up" the attenuator. Move the dial back and forth at 16.9 M.C.

If no signal is heard, let oscillator trimmer off until it is heard at 16.9 M.C.

Reduce signal voltage from generator, go back to 17 M.C. and slightly correct this last trimmer adjustment.

The same thing applies to the 5 M.C. adjustment.

IV. THE ALIGNMENT OF THE BROADCAST BAND

1. Set Band Switch to the 550-1700 K.C. band, and the hand to 1400 K.C.

2. Peak oscillator trimmer C-38 to 1400 K.C., then the R.F. Trimmer C-4 and the antenna stage trimmer C-13 on the variable condenser to 1400 K.C.

3. Rotate dial hand to 600 K.C. and adjust padding condenser C-37 to 600 K.C.

4. Re-Check dial at 1400 K.C. as mentioned in (1) and (2).

5. Points in the middle of the dial may be checked and if necessary the plates of the oscillator section of the variable condenser (back section) may be bent for alignment.

V. NOTES

1. With certain Model 118's a 40,000 ohm resistor will be found located from oscillator grid to cathode of the 6A7 in place of 50,000.

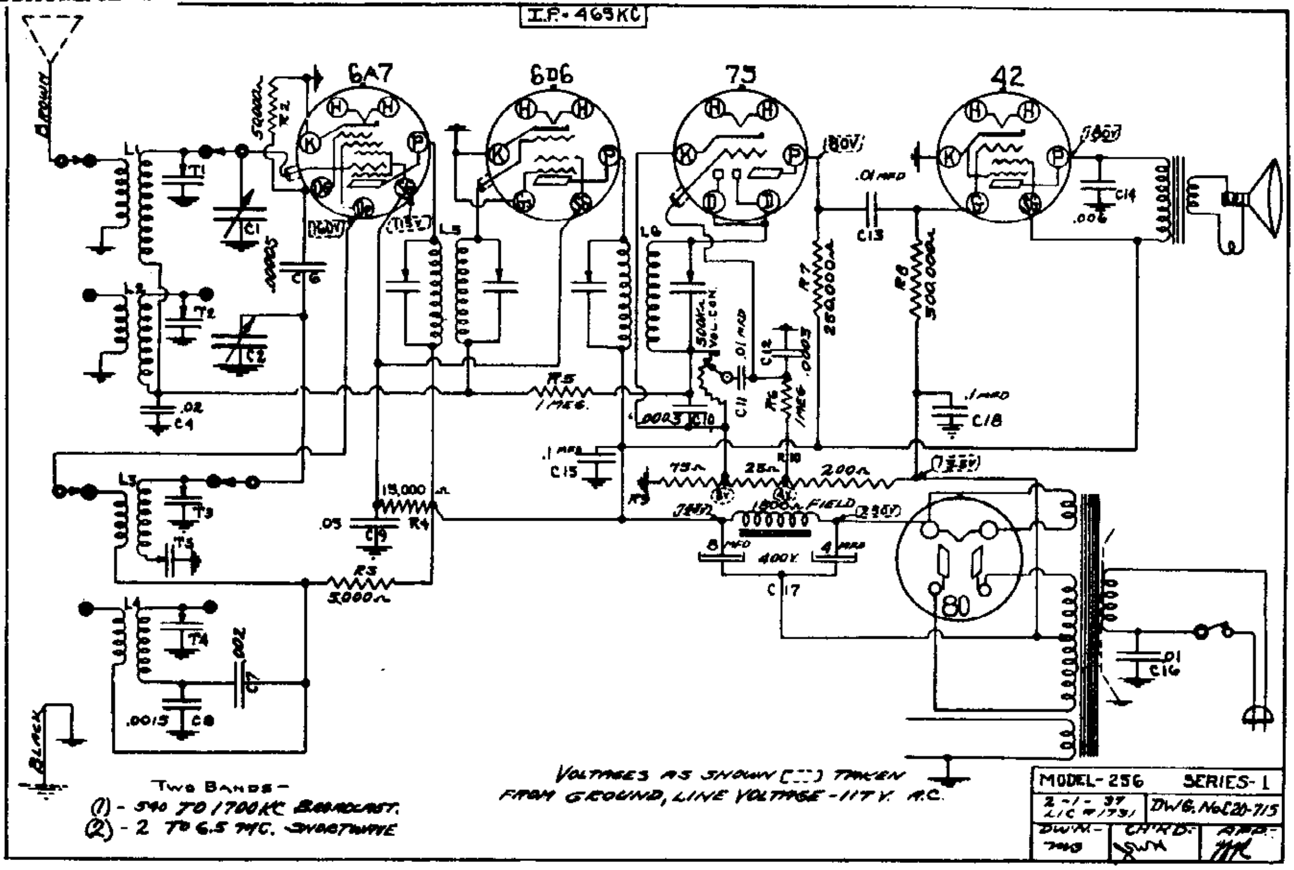
2. Be sure that the settings are being made to the true fundamental signal from the oscillator and not on a harmonic or image frequency.

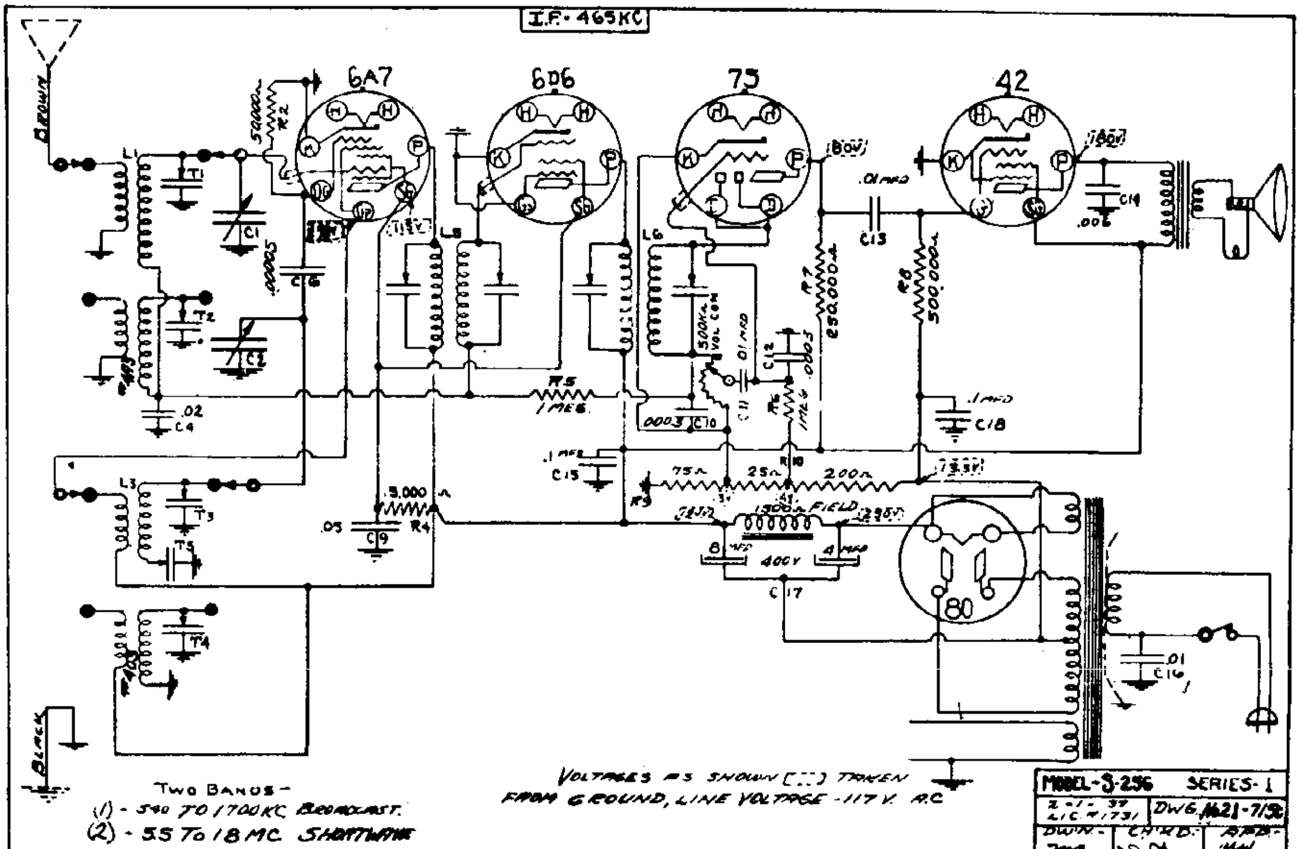
3. The normal voltage readings at the sockets are given in a separate chart on the following pages.

4. It is advisable to check the position of the tuning eye tube to make certain that it is not pushed against the inside of the dial card. With the adjustment screw on the bracket, allow a small amount of clearance between the end of the tube and the dial to avoid any possibility of the heat from the tube affecting the dial card.

MODEL 256
MODEL S-256
Schematics

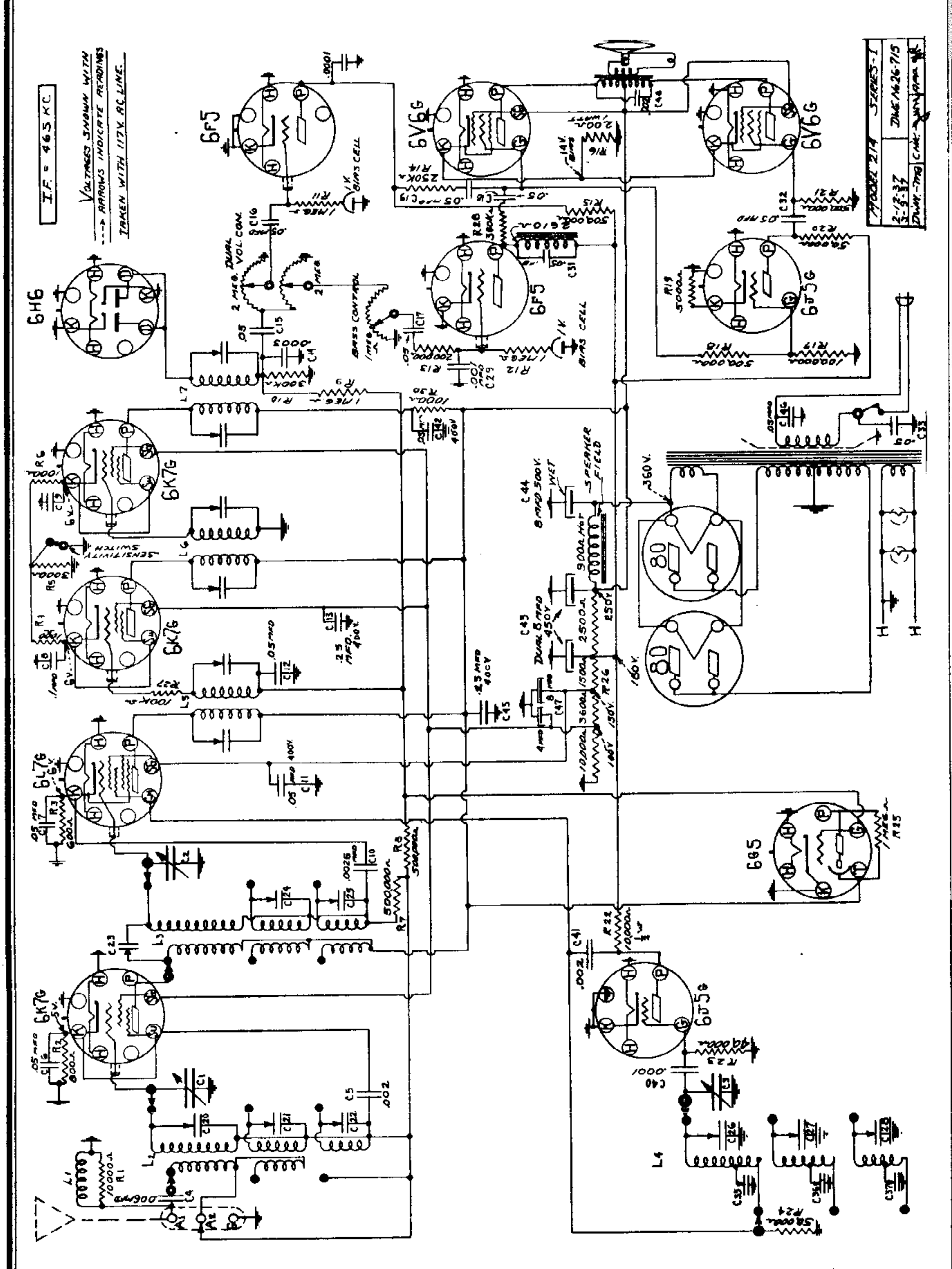
HOWARD RADIO CO.





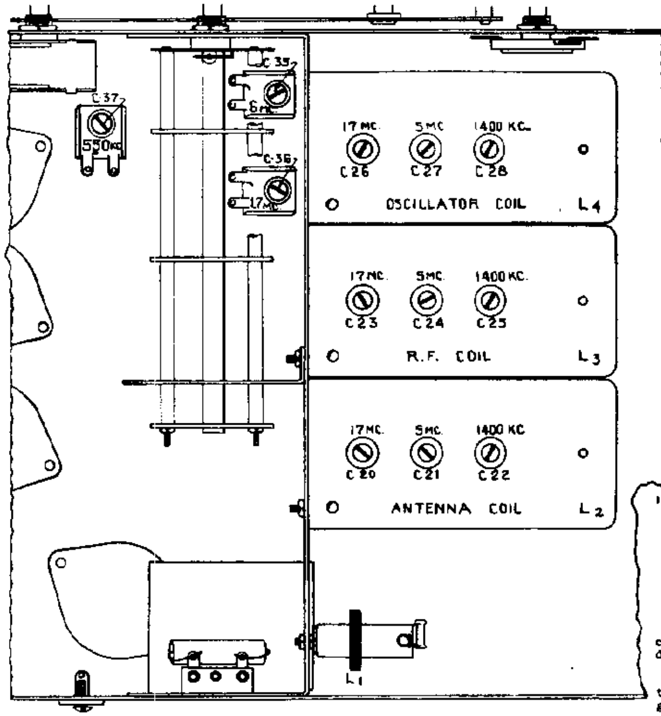
MODEL 214
Schematic
Voltage

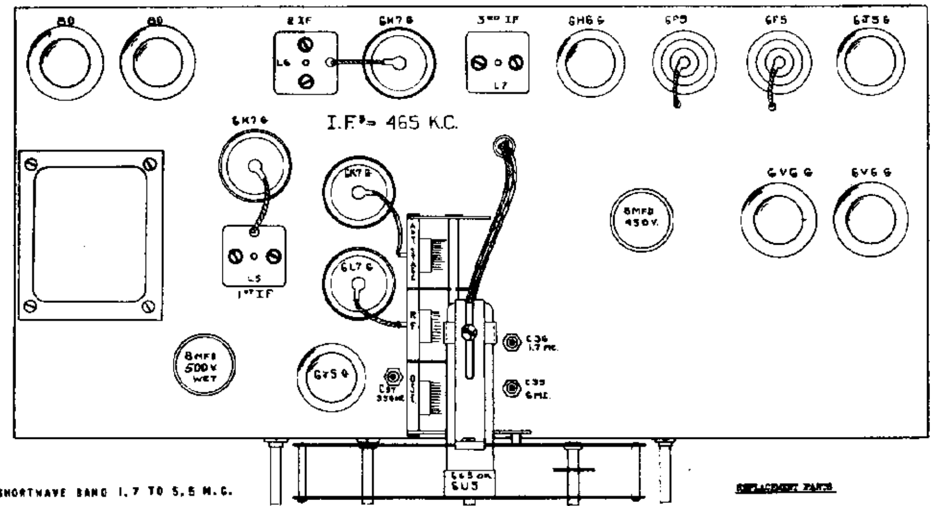
HOWARD RADIO CO.



MODEL 214
Socket, Trimmers
Alignment, Parts

HOWARD RADIO CO.





I THE I.F. STAGES

The I.F.'s are aligned by the usual system of feeding the intermediate frequency of 465KC into the grid of the 6L7G tube.

THE SENSITIVITY SWITCH changes the bias on the two 6K7G tubes of the I. F. stages and should be set to LOW sensitivity position when aligning the set.

The sensitivity of the I. F. stages alone with the switch in the high position should be about 15 microvolts.

II ALIGNMENT OF SHORTWAVE BAND 5.5 TO 18 M.C.

First check the position of the dial hand by rotating the condenser shaft to the left to full capacity. At this point the dial hand should be straight across in line with the lines dividing the scale in half. If the hand is off position it can be lined up by removing dial glass and setting hand with screw in center of dial.

1. Set the test oscillator to 17 megacycles.

2. Turn wave band switch all the way to right for highest S.W. band, and set dial hand to 17 M.C.

3. Peak trimmer condenser C26 of the oscillator coil (See pictorial) to resonance with 17 M.C. fed into antenna.

4. Adjust antenna and R.F. coil trimmers C20 and C23 to same frequency after the above mentioned oscillator trimmer has been set.

5. Turn dial hand to 6 M.C. on same band and peak padding condenser C35 to 6 M.C.

III SHORTWAVE BAND 1.7 TO 5.5 M.C.

1. Set band switch to this band and dial hand to 5 M.C.

2. Peak trimmer C27 to 5 M.C.

3. Peak antenna and R.F. trimmers C21 and C24 to 5 M.C.

4. Rotate dial to 1.7 M.C. and adjust Padding Condenser C36 to 1.7 M.C.

NOTE: After adjusting the two high bands at 17 megacycles and 5 megacycles the test oscillator input to antenna should be increased and receiver dial advanced to .9 megacycle lower and note if test oscillator signal is heard.

In case there is no response the oscillator trimmers have been pulled down too tightly. The trimmers should be released until this condition exists then go back to original point of alignment - reduce antenna input voltage and correct the trimmer adjustment.

EXAMPLE: The receiver has been adjusted to 17 megacycles. Tune receiver to approximatly 16.9 M.C.

Increase oscillator signal by "opening up" the attenuator. Move the dial back and forth at 16.9 M.C.

If no signal is heard, let oscillator trimmer off until it is heard at 16.9 M.C.

Reduce signal voltage from generator, go back to 17 M.C. and slightly correct this last trimmer adjustment.

The same thing applies to the 5 M.C. adjustment.

IV THE BROADCAST BAND

1. Turn wave band switch all the way to left and dial hand set to 1400KC (the top scale).

2. Peak oscillator trimmer C28 to 1400 KC and R.F. circuit trimmers C22 and C25 to same frequency.

3. Set dial hand to 550 KC and adjust oscillator padding condenser C37 to 550 KC.

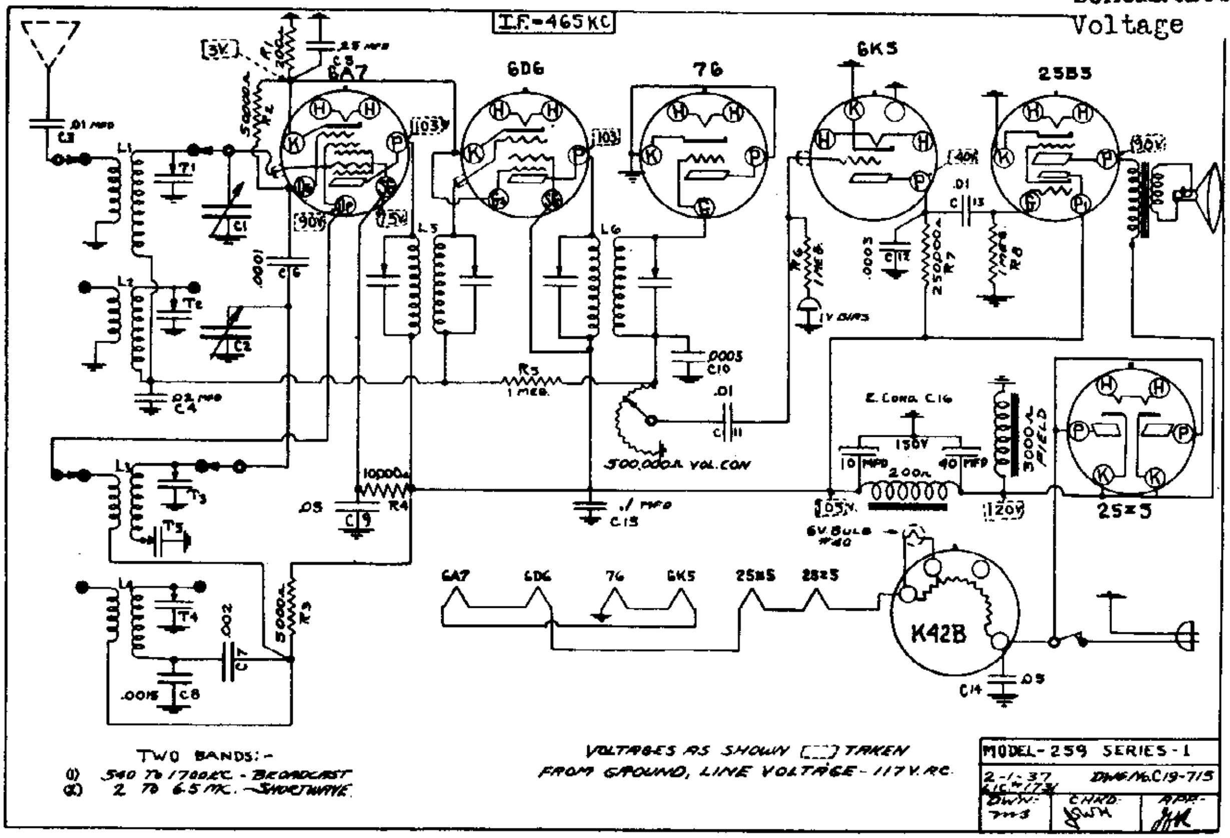
4. Recheck dial at 1400 KC as in number (1) and (2).

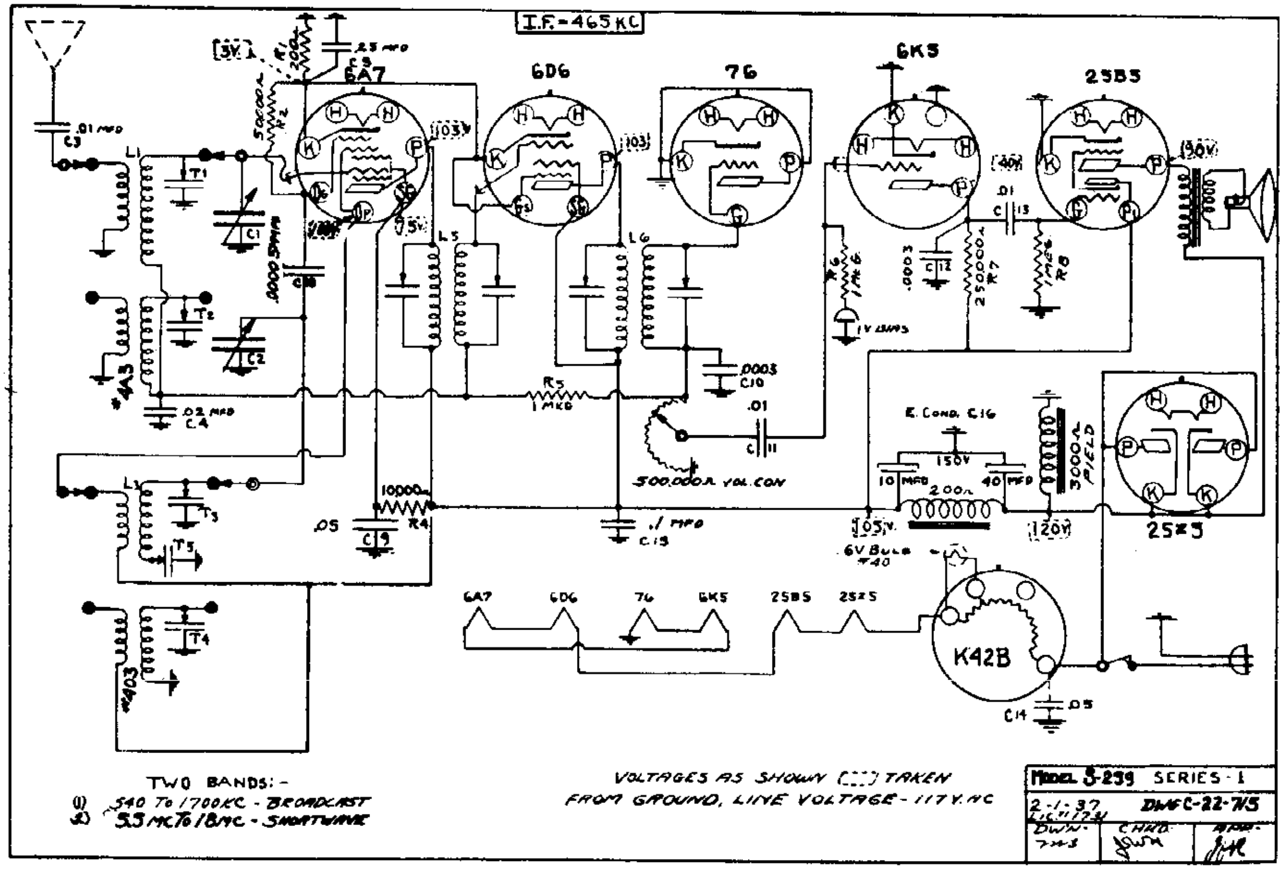
5. Points in the middle of the dial may be checked and if necessary the plates of the front section of variable condenser may be bent for alignment.

REPLACEMENT PARTS

PART NO.	SCHEMATIC LOCATION	DESCRIPTION
7601		Bias Cell - 1 Volt
5-535		Candohm - 4 Section
14-412		Choke - Audio
80-456	L5	Coil - 1st. I. F. Assembly
82-456	L6	Coil - 2nd. I. F. Assembly
83-456	L7	Coil - 3rd. I. F. Assembly
3481	L2	Coil - Antenna, Complete
3482	L3	Coil - Mixer, Complete
3483	L4	Coil - Oscillator, Complete
19-470	C1,C2,C3	Condenser - Variable, 3 Gang
8686-5	C43	Condenser - 8-8 Mfd. 450 Volt Elect
17-366	C44	Condenser - 8 Mfd. 500 Volt (Wet)
8813	C20 to C28	Condenser - Trimmer, 3 Section
21-448	C35,C36,C37	Condenser - Padding, 3 Section
8519	C8,C9	Condenser - .1 Mfd. 200 Volt
8183	C6,C7,C12,C13,C16,C17,C31	Condenser - .05 Mfd. 200 Volt
2757	C11,C15,C19,C32,C33,C42	Condenser - .05 Mfd. 400 Volt
2758	C18,C45	Condenser - .25 Mfd. 400 Volt
3818	C41	Condenser - .008 Mfd. 400 Volt
3530	C4	Condenser - .006 Mfd. 600 Volt
1801	C39	Condenser - .001 Mfd. Mica
2807	C5	Condenser - .008 Mfd. Mica
2365	C40	Condenser - .0001 Mfd. Mica
6500	C10	Condenser - .0025 Mfd. Mica
6804	C14	Condenser - .0005 Mfd. Mica
21-261		Control - Dual Volume
6-276		Control - Bass with Switch
1552		Cord - A.C. Line and Plug
22-510		Dial Glass - Calibrated
25-510		Band Indicator Fan - 3 Color
1019A		Lamp - Dial - 6 Volt
3876	R16	Resistor - 200 Ohm 1 Watt
2851	R3	Resistor - 400 Ohm 1/3 Watt
2804	R2	Resistor - 600 Ohm 1/3 Watt
3251	R4,R6,R20	Resistor - 1000 Ohm 1/3 Watt
1855	R5	Resistor - 3000 Ohm 1/3 Watt
2374	R18	Resistor - 6000 Ohm 1/2 Watt
3567	R1,R23	Resistor - 10M Ohm 1/2 Watt
3376	R25	Resistor - 40M Ohm 1/3 Watt
1842	R22,R24	Resistor - 50M Ohm 1/3 Watt
2887	R27	Resistor - 100M Ohm 1/3 Watt
1844	R17	Resistor - 100M Ohm 1/3 Watt
3288	R14,R26	Resistor - 250M Ohm 1/3 Watt
2773	R10,R15	Resistor - 300M Ohm 1/3 Watt
3583	R7,R8,R12,R13,R21	Resistor - 500M Ohm 1/3 Watt
3536	R9,R11,R18	Resistor - 1 Megohm 1/3 Watt
4-417		Switch - 2 Position - Sensitivity
18-634		Switch - 3 Band, All Wave
18-638		Transformer - Power
6801		Tube Shield
6022A		Tuning Eye Cable and Socket
8515-2		Wing Screw - Cabinet mounting
50-610		Speaker - 15 inch

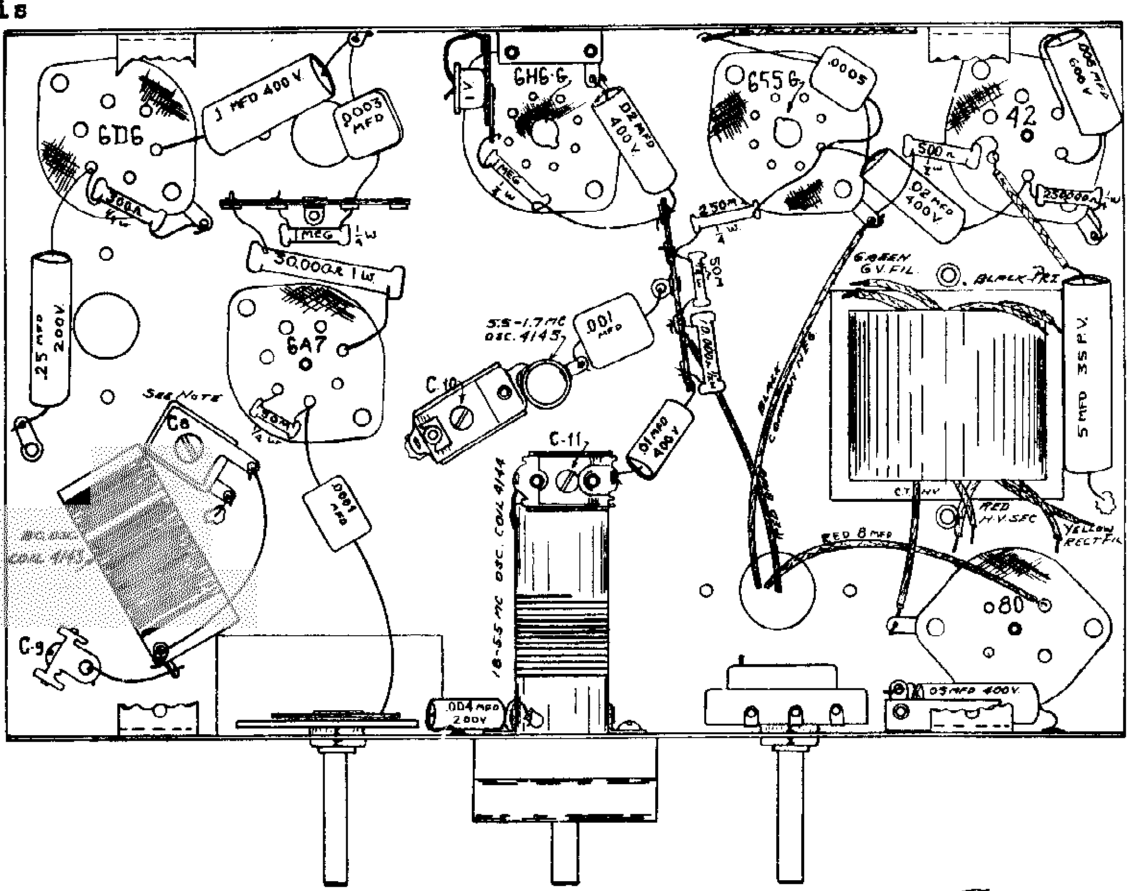
HOWARD RADIO CO.

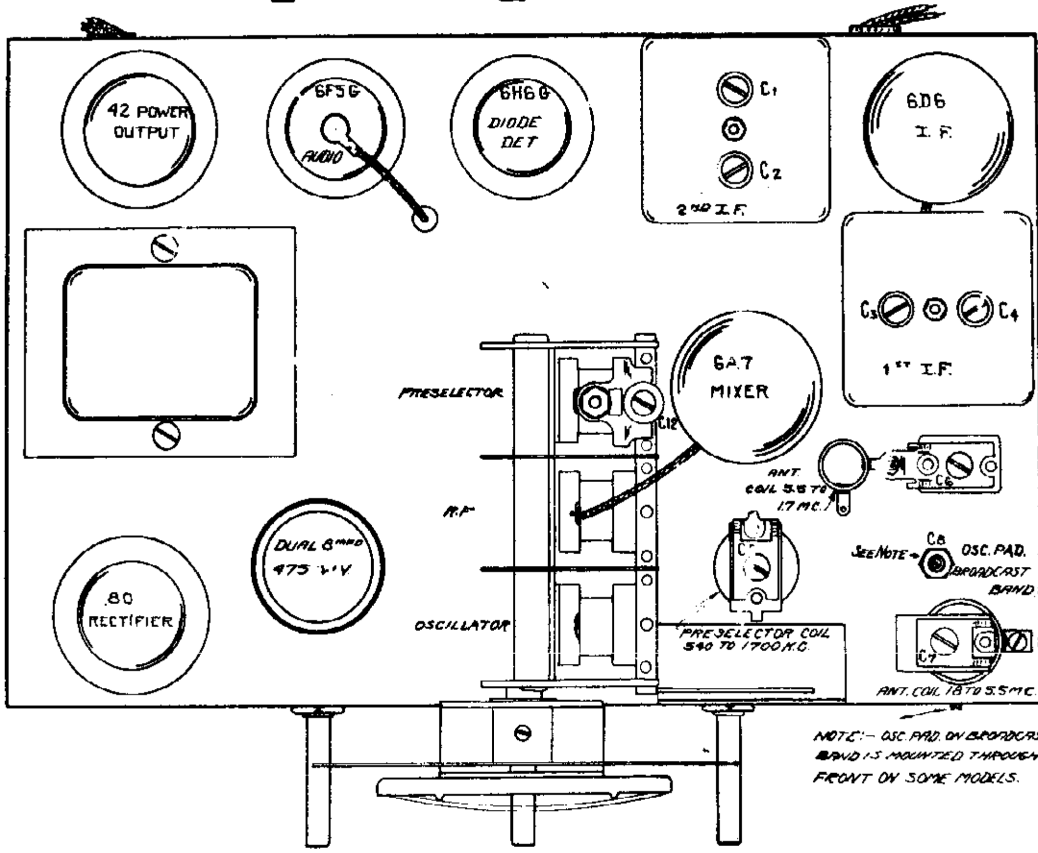




MODELS 626,1626
67C,67T
Socket,Trimmers
Chassis

HOWARD RADIO CO.





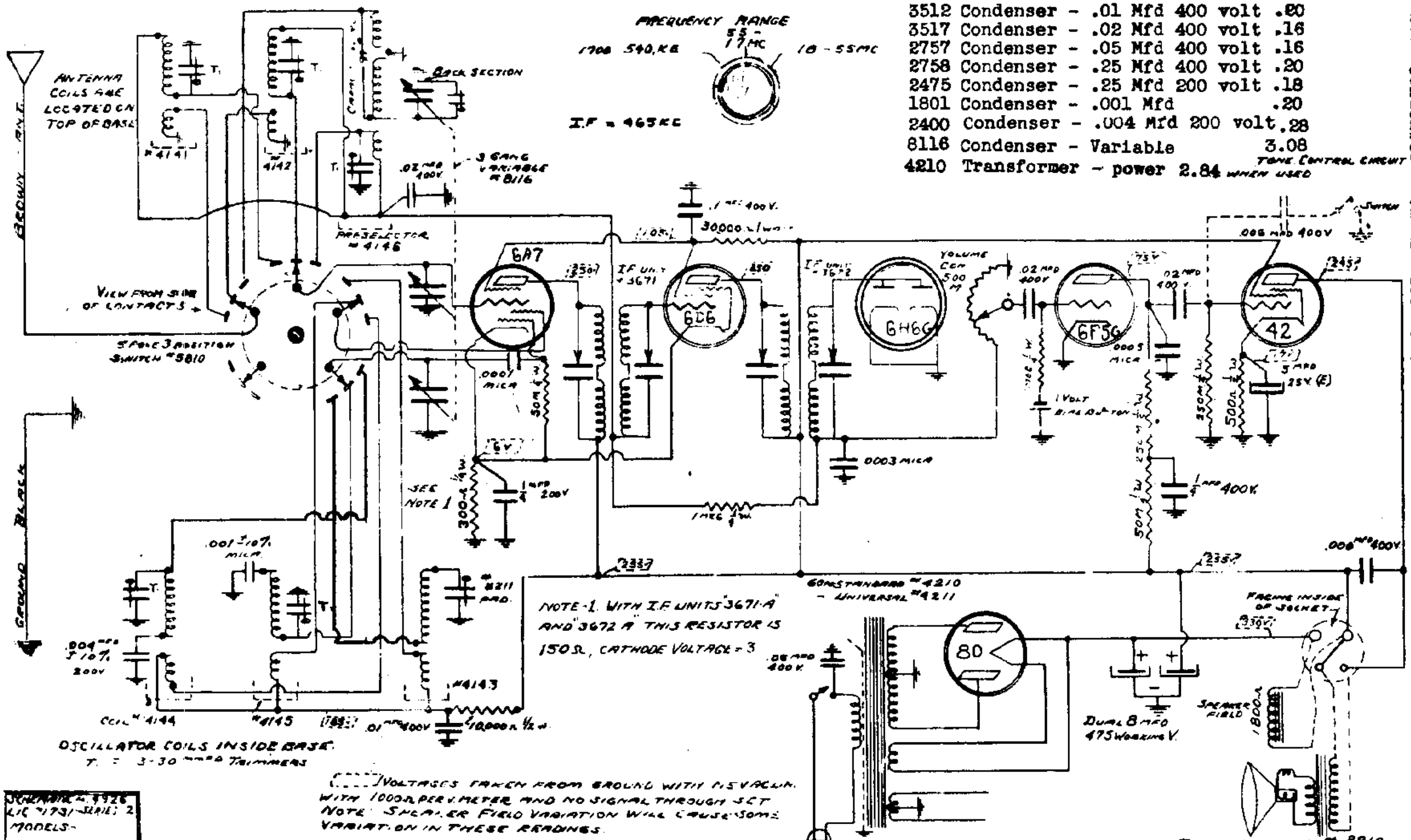
NOTE:- OSC. PAD. ON BROADCAST BAND IS MOUNTED THROUGH FRONT ON SOME MODELS.

MODELS 626,1626
67C,67T
Schematic
Voltage,Parts

HOWARD RADIO CO.

8817	Condenser	-	Dual 8-475 Volt Electrolytic		1.28
8211	Condenser	-	Trimmer 5 Plate		.40
3127	Condenser	-	Single Trimmer 3-30 MMFD		.12
3003	Condenser	-	5 Mfd. Electrolytic		.40
2756	Condenser	-	.1 Mfd 400 volt		.20

3512	Condenser	-	.01 Mfd 400 volt	.20
3517	Condenser	-	.02 Mfd 400 volt	.16
2757	Condenser	-	.05 Mfd 400 volt	.16
2758	Condenser	-	.25 Mfd 400 volt	.20
2475	Condenser	-	.25 Mfd 200 volt	.18
1801	Condenser	-	.001 Mfd	.20
2400	Condenser	-	.004 Mfd 200 volt	.28
8116	Condenser	-	Variable	3.08
4210	Transformer	-	power	2.84



REPLACEMENT PARTS AND PRICE LIST

PART NO.	DESCRIPTION	PRICE
3671-A	Coil - 1st. I.F. Assembly, complete	1.20
3672-A	Coil - 2nd. I.F. Assembly, complete	1.20
4141	Coil - Antenna, 5.5 MC	.58
4142	Coil - Antenna, 1.7 MC	.34
4143	Coil - Oscillator	.30
4144	Coil - Oscillator, 5.5 MC	.60
4145	Coil - Osciliator, 1.7 MC	.40
4146	Coil - B.C. Antenna preselector	.72

3515	Condenser - .006 Mfd 400 volt	.24
2366	Condenser - .0001 Mfd	.12
8304	Condenser - .0003 Mfd	.16
2280	Condenser - .0005 Mfd	.12
3335	Resistor - 1 Megohm ½ Watt	.11
1824	Resistor - 250M ohms, ½ Watt	.11
1843	Resistor - 50M ohms, ½ Watt	.11
2424	Resistor - 30M ohms, 1 Watt	.14
3349	Resistor - 10M ohms, ½ Watt	.12
1890	Resistor - 500 ohms, ½ Watt	.12
1817	Resistor - 150 ohms, ½ Watt	.11

PRICES SUBJECT
TO CHANGE
WITHOUT NOTICE

MODELS 626,1626
67C,67T
Alignment

HOWARD RADIO CO.

THE ALIGNMENT PROCEEDURE

The following alignment instructions are given with the assumption that the service station has an oscillator capable of accurately covering the range of the receiver.

The only other apparatus necessary is a meter connected in the output stage to indicate resonance. This can be 0 to 3 volt AC meter connected across the voice coil of the speaker or preferably an output meter connected in the plate circuit of the 42 power tube in series with an 8 MFD paper condenser.

I THE I.F. STAGES

The I.F's are aligned by the usual system of feeding the intermediate frequency of 465KC into the grid of the 6A7 tube.

The two trimmers in each of the I.F. cans should be very carefully peaked to resonance as they are very critical and will greatly affect the performance of the set. These are trimmers number C1, C2, C3, C4. (See pictorial diagram).

The sensitivity of the I.F. stages will be 40 microvolts or better.

Always use as low an output as possible from the test oscillator in making the various adjustments.

II ALIGNMENT OF SHORTWAVE BAND 5.5 TO 18 M.C.

First check the position of the dial hand by rotating the condenser shaft to the left to full capacity. At this point the dial hand should be straight across in line with the lines dividing the scale in half. If the hand is off position it can be easily lined up by loosening the set screw behind the dial card in the drive hub.

1. Set the test oscillator to 17 megacycles.

2. Turn wave band switch all the way to right for highest S.W. band, and set dial hand to 17 M.C.

3. Peak trimmer condenser C-11 of the oscillator coil (See pictorial 6-2) to resonance with 17 M.C. fed into antenna.

4. Peak Ant. coil trimmer C-7 at same setting to 17 M.C.

III SHORT WAVE BAND 1.7 TO 5.5 M.C.

1. Turn wave switch to middle position.

2. Set dial hand to 5 megacycles on the 1.7 to 5.5 M.C. inner scale.

Peak oscillator trimmer C-10 to 5 M.C. from test oscillator. And Ant. coil trimmer C-6 to same frequency.

NOTE: After adjusting the two high bands at 17 megacycles and 5 megacycles the test oscillator input to antenna should be increased and receiver dial advanced to .9 megacycle lower and note if test oscillator signal is heard.

In case there is no response the oscillator trimmers have been pulled down too tightly. The trimmers should be released until this condition exists then go back to original point of alignment - reduce antenna input voltage and correct the trimmer adjustment.

EXAMPLE: The receiver has been adjusted to 17 megacycles. Tune receiver to approximately 16.9 M.C.

Increase oscillator signal by "opening up" the alternator. Move the dial back and forth at 16.9 M.C.

If no signal is heard, let oscillator trimmer off until it is heard at 16.9 M.C.

Reduce signal voltage from generator, go back to 17 M.C. and slightly correct this last trimmer adjustment.

The same thing applies to the 5 M.C. adjustment.

IV THE BROADCAST BAND

1. Turn wave band switch all the way to left and dial hand set to 1400 KC (the top scale).

2. Peak oscillator trimmer C-9 to 1400 KC., the Antenna preselector C-12 (variable condenser trimmer) to 1400 KC, and trimmer C-5 to 1400 KC.

3. Set dial hand to 550 KC and adjust oscillator padding condenser C-8 to 550 KC.

4. Recheck dial at 1400 KC as in number (1) and (2).

5. Points in the middle of the dial may be checked and if necessary the plates of the front section of variable condenser may be bent for alignment.

V NOTES.

1. Seal all trimmers after their final adjustment.

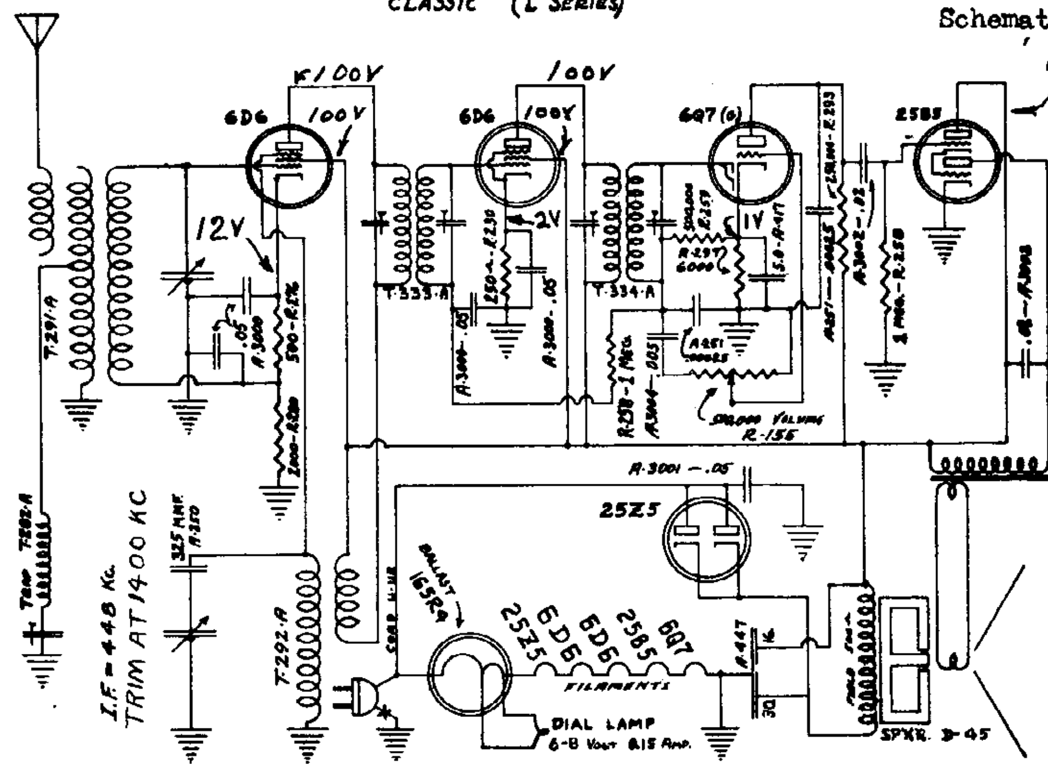
2. Be sure that the settings are being made to the true fundamental signal from the oscillator and not on a harmonic or image frequency.

3. Refer to the schematic for the voltages at the tube sockets.

INTERNATIONAL RADIO CORP.

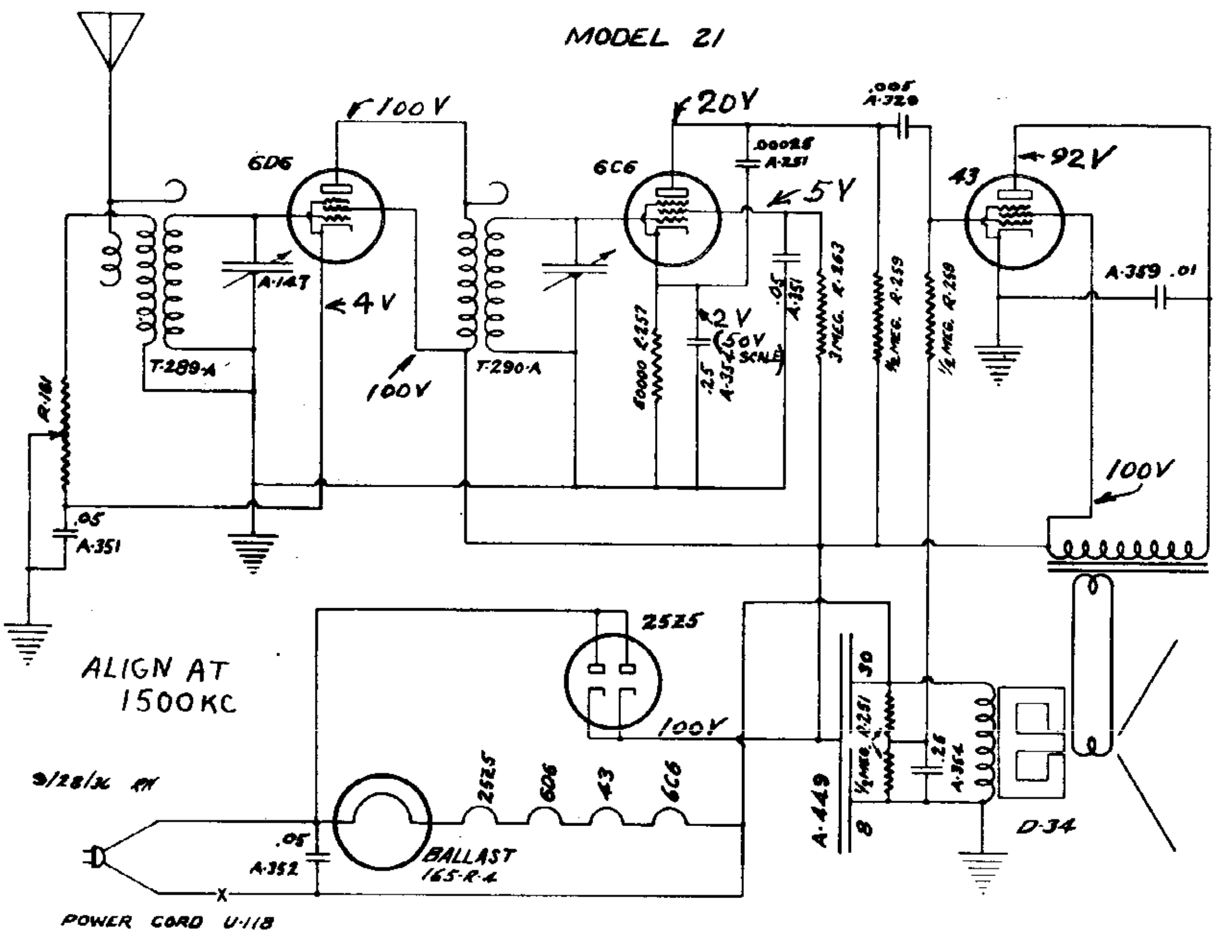
MODELS 10,11,12,13
14,15,16
Chassis L,"Classic"
MODELS 21,22,23
Schematics,Voltage

"CLASSIC" (L SERIES)



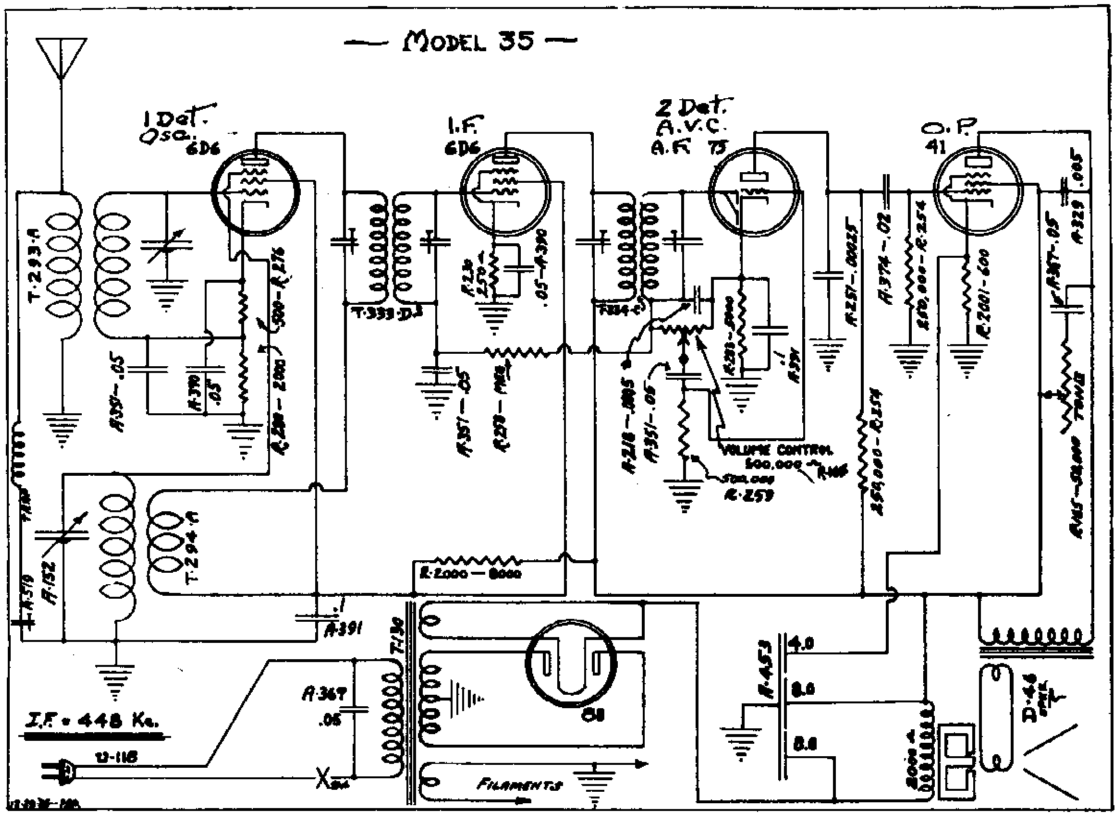
CONVENTIONAL ALIGNMENT
(see special section)

MODEL 21



CONVENTIONAL ALIGNMENT
(see special section)

INTERNATIONAL RADIO CORP.



ESSENTIAL DATA: The intermediate frequency employed is 448 Kc. The oscillator frequency is 448 kilocycles higher than the signal frequency Aligning should be done on the following frequencies: 1,400, 1,000, and 600 Kc.

INTERMEDIATES: To align the I.F. circuits, set the signal generator to 448 Kc. and feed its modulated signal direct to the antenna. Adjust the first I.F. transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process on the second I.F. transformer. If adjustments are not made accurately, selectivity will be poor and I.F. oscillation mav result. Finally, adjust the trimmer on the tuned wave trap for minimum meter reading.

BROADCAST BAND: Turn the dial to 1400 Kc. and feed a *very weak* 1400 Kc. modulated signal from your signal generator to the antenna. Adjust the Broadcast oscillator trimmer for maximum reading. Then peak Broadcast antenna trimmer to this oscillator setting.

There is no adjustable padder condenser in this model so resonance on lower frequencies is accomplished by bending plates on tuning condensers.

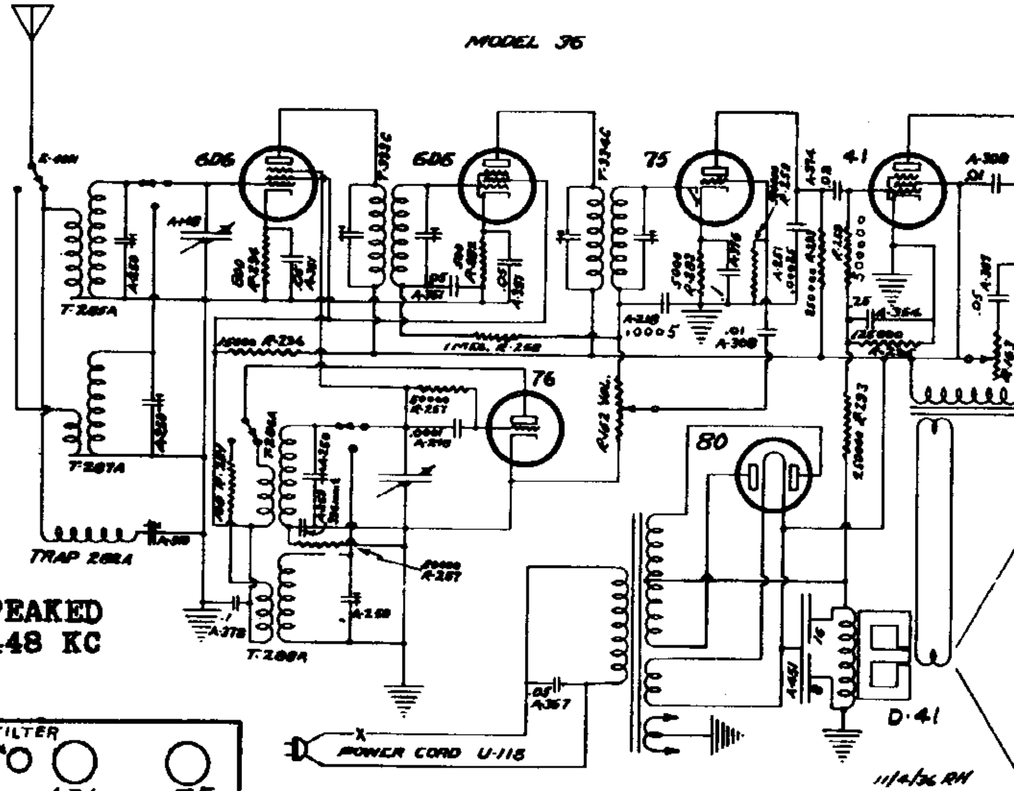
AVERAGE SOCKET VOLTAGES

Tube	Position	Ek	Eg_1	Eg_2	Ep
6D6	Det-Osc.	18	0	110	110
6D6	I.F.	1.7*	1.7*	110	180
75	2nd Det. A.V.C.—A.F.	1*	—	—	90
41	Output	10	—	180	170
80	Rectifier	—	—	—	250 A.C.

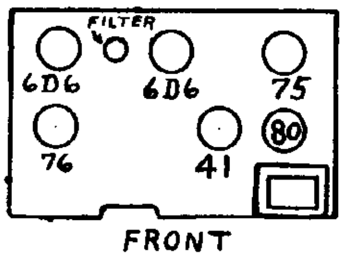
Line 118 volts 10% variation allowable. Measurements made from tube prongs to circuit ground and made with 1,000 ohms per volt instrument on 500 volt scale, except figures with * which are on 5 volt.

MODEL 36
Schematic, Socket
Alignment, Voltage

INTERNATIONAL RADIO CORP.



IF PEAKED AT 448 KC



ALIGNMENT FREQUENCIES -

BROADCAST BAND - 1400 KC Trim.-600 Kc Pad.
SHORT WAVE BAND - 15 MC Trim.- 8 MC Pad.

ALIGNMENT

The four trimmers on the bottom of the chassis are, reading from the side of the chassis by switc toward the center, Short wave antenna, Broadcast antenna, Short wave oscillator and Broadcast oscillator.

INTERMEDIATES: To align the I.F. circuits, set the signal generator to 448 Kc. and feed its modulated signal direct to the antenna. Adjust the first I.F. transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this proces on the second I.F. transformer. If adjustments are not made accurately, selectivity will be poor and I.F. oscillation may result. Finally, adjust the trimmer on the tuned wave trap for minimum meter reading.

BROADCAST BAND: Place the band change switch on Broadcast position. Turn the dial to 1400 Kc. and feed a very weak 1400 Kc. modulated signal from your signal generator to the antenna. Adjust the Broadcast oscillator trimmer for maximum reading. Then peak Broadcast antenna trimmer to thi oscillator setting.

Turn dial and signal generator to 600 Kc. and rock the padder into correct adjustment. This is accomplished by very slowly adjusting the padder condenser and at the same time turning the dial slightly back and forth across 600 Kc. until an adjustment is obtained producing maximum output. Go back to 1400 Kc. and readjust the oscillator trimmer slightly if necessary. Then recheck padder at 600 Kc.

SHORT WAVE BAND: Place the band change switch on the Short Wave position. Turn the dial to 15 megacycles and feed a very weak 15 megacycle modulated signal from your signal generator to the antenna. Adjust the S.W. oscillator trimmer for maximum reading on the output meter. This trimmer should not be touched again when checking alignment on other frequencies. Then peak S.W. antenna trimmer to this oscillator setting.

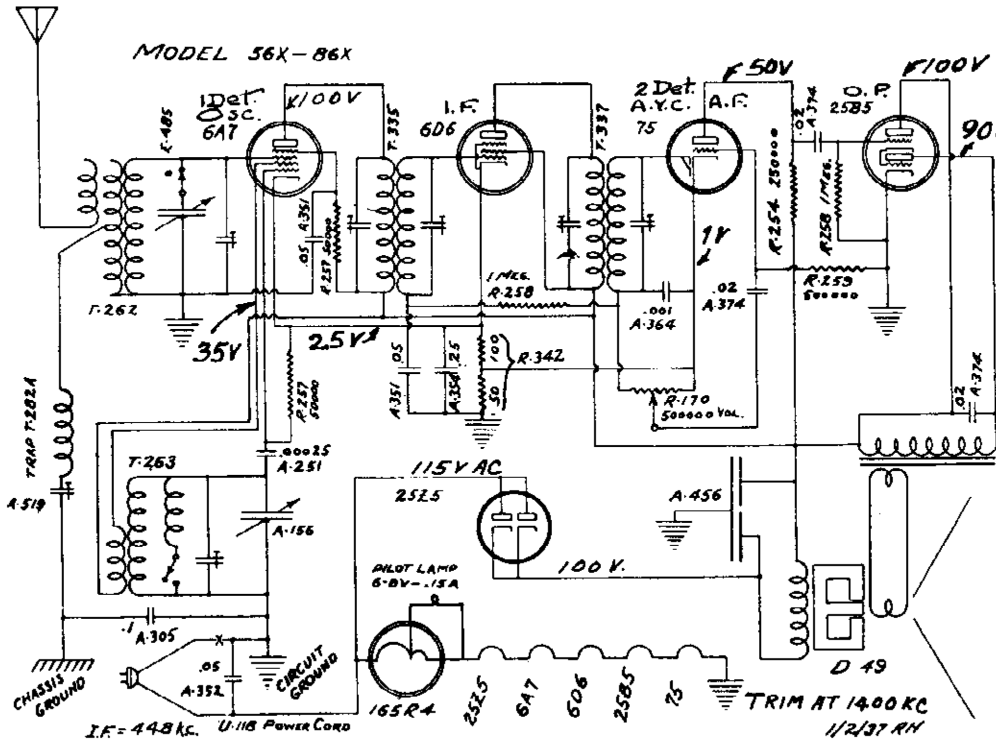
Instead of bending condenser plates at 8 megacycles alignment is accomplished by spreading or crowding turns on the S.W. detector coil. If much crowding or spreading is necessary it is advisable to go back and recheck at 15 megacycles.

AVERAGE SOCKET VOLTAGES

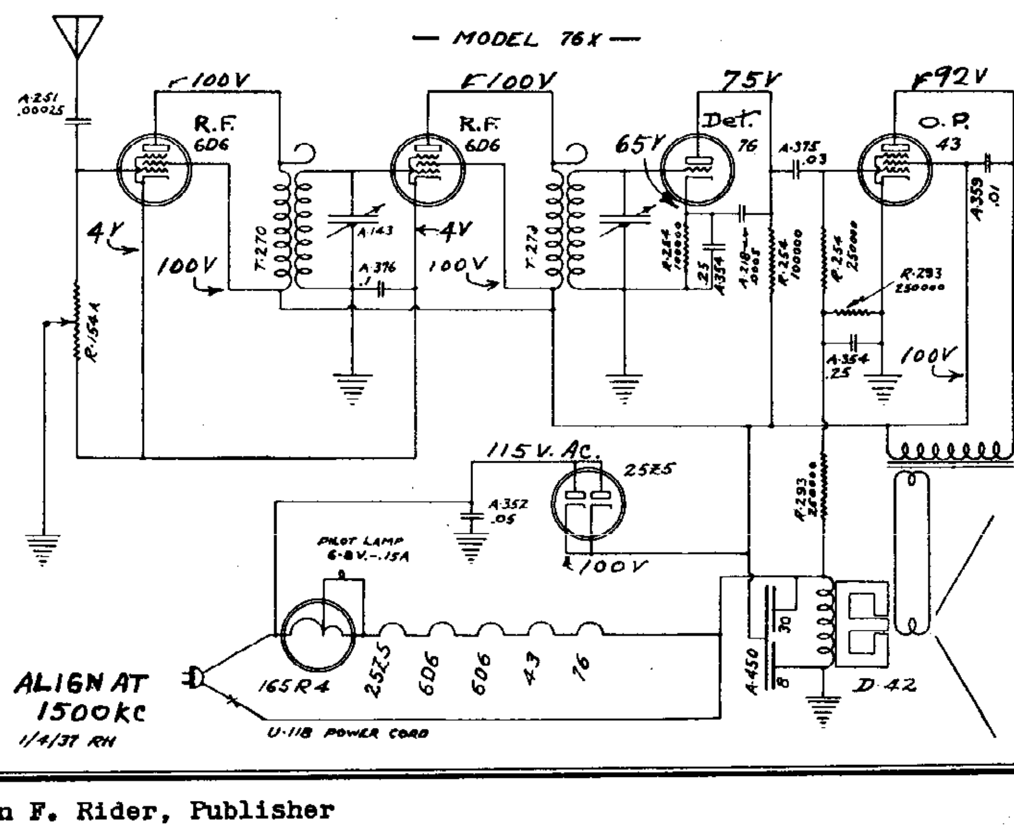
Tube	Position	E_k	E_{g_3}	E_{g_2}	E_p
76	Oscillator	0	-	-	100
6D6	Detector	4	0	100	230
6D6	I.F.	4.5	4.5	100	230
75	2nd Det. A.V.C.-A.F.	1	-	-	100
41	Output	0	-	230	225
80	Rectifier	-	-	-	118 AC

MODELS 56X, 86X
MODELS 76X, 676X
Schematics, Voltage

INTERNATIONAL RADIO CORP.



CONVENTIONAL ALIGNMENT
(see special section)

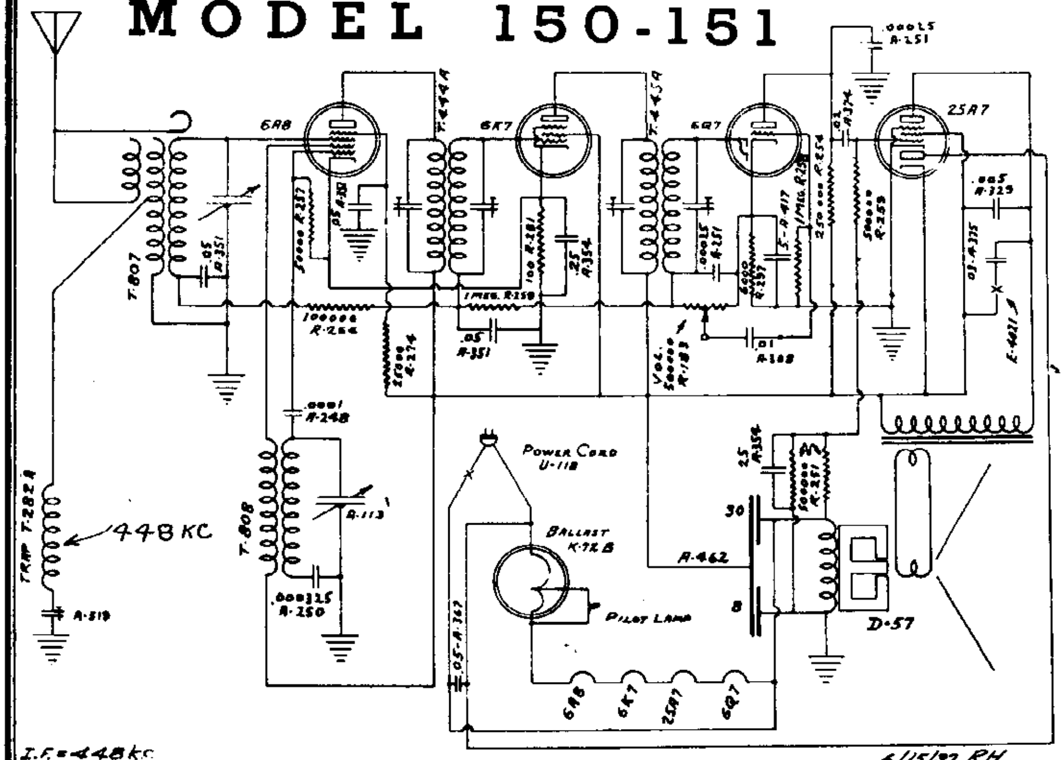


CONVENTIONAL ALIGNMENT
(see special section)

MODELS 150,151
Schematic, Socket Voltage, Alignment

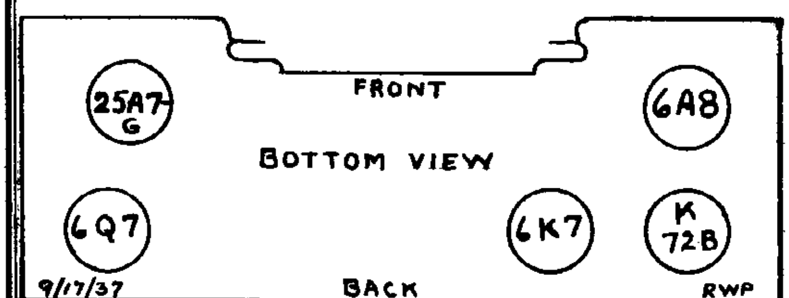
INTERNATIONAL RADIO CORP.

MODEL 150-151



The following tubes are employed:

6A8 —1st Detector-Oscillator
6K7 —I.F. Amplifier
6Q7 —2nd Detector—A.V.C.—A.F.
K72B —Ballast
25A7G—Pentode Output and Rectifier



CONVENTIONAL ALIGNMENT SEE THE SPECIAL SECTION

FREQUENCY RANGE - BROADCAST BAND Trim OSC and ANT trimmers at 1400 KC. Resonance at 600 KC (padding) is accomplished by bending the rotor plates of the gang condenser.

AVERAGE SOCKET VOLTAGES

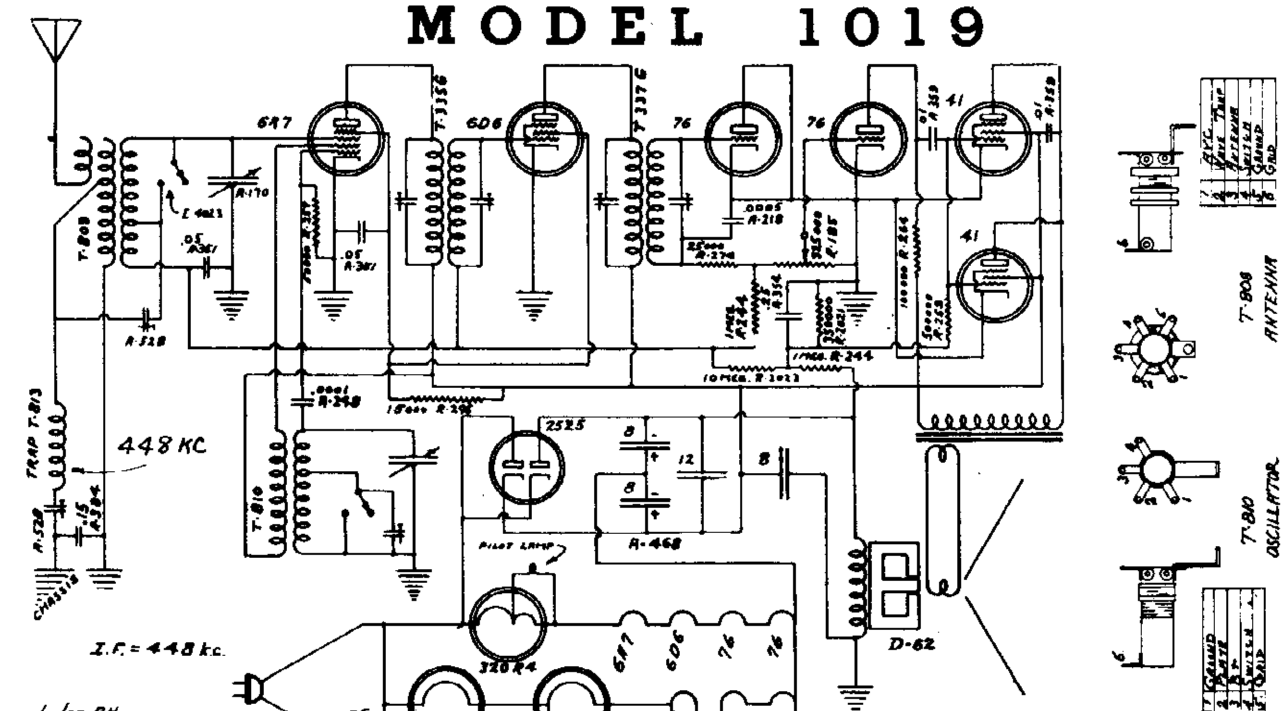
								Rectifier	
Tube	Position	Ek	Eg	Ega	Egs	Esu	Ep	Ep	Ek
6A8	Det.-Osc.	1.5	0	100	50	—	100	—	—
6K7	I.F.	1.5	0	—	100	1.5	100	—	—
6Q7	2nd Det. A.V.C. 1st audio	1	0	—	—	—	*35	—	—
25A7G	Output Rectifier	0	13	—	100	—	100	118 A.C.	100

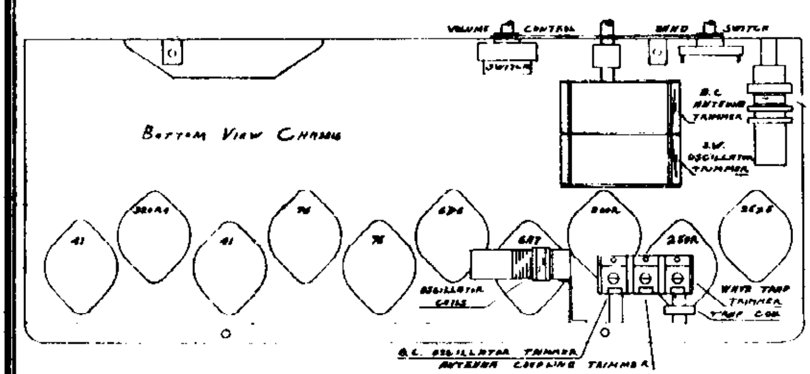
Line voltage 118 volts, 10% variation allowable. Measurements made from tube prongs to circuit ground and made with 1000 ohms per volt instrument on 250 volt scale.
* through .25 megohm

MODEL 1019
Schematic, Socket
Trimmers, Voltage
Alignment

INTERNATIONAL RADIO CORP.

MODEL 1019





The following tubes are employed:
6A7 —1st Detector-Oscilator
6D6 —I.F. Amplifier
76 —2nd Detector
76 —1st Audio
41 —Audio Output
200R —Ballast tube
25Z5 —Rectifier
250R —Ballast tube
320R4—Regulator tube

FREQUENCY RANGES - SHORT WAVE- Trim OSC and ANT at 6 MC BROADCAST - Trim OSC and ANT at 1400 KC, pad at 600 KC by bending plates of gang condenser.

AVERAGE SOCKET VOLTAGES

Tube	Position	Ek	Eg	Ega	Egs	Esu	Ep
6A7	Det.-Osc.	0	*-1.5	165	90	—	165
6D6	I.F.	0	*-1.5	—	90	0	165
76	2nd Det.	0	*-.45	—	—	—	0
76	1st Audio	0	‡	—	—	—	†35
41	Output	0	*-12.5	—	165	—	160
41	Output	0	*-12.5	—	165	—	160
25Z5	Rect.	165	—	—	—	—	AC

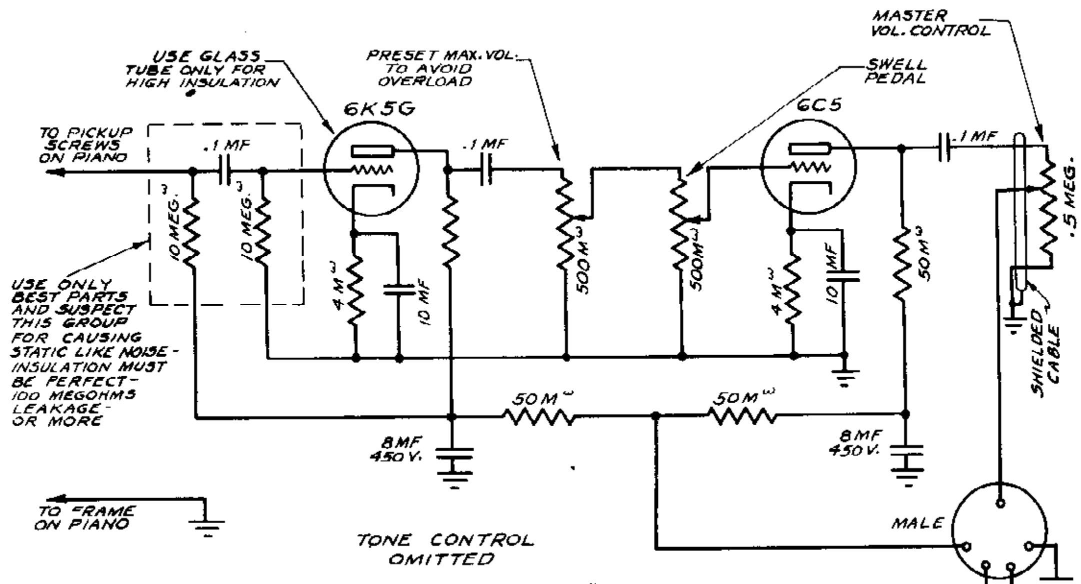
Line voltage 118 volts, 10% variation allowable. Measurements made from tube prong to circuit ground with 1000 ohms per volt instrument on 250 volt scale.
* Not measureable-calculate from 50 volt drop across speaker field.
† Through .1 megohm ‡ Diode biased

CONVENTIONAL ALIGNMENT - SEE THE SPECIAL SECTION.

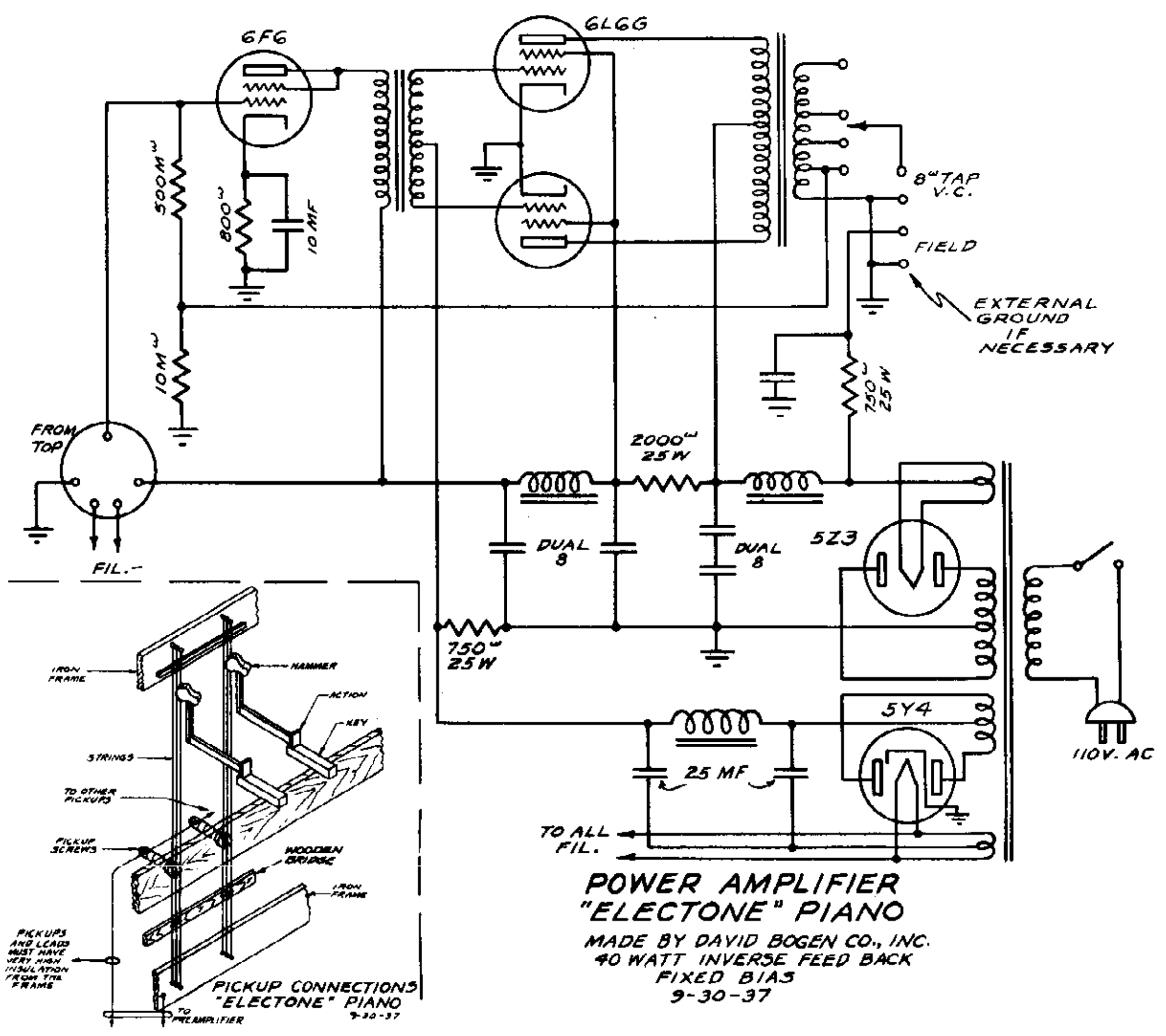
Schematics
Pick-up Connections

KRAKAUER BROS.

MODEL Electone Piano
Preamplifier, Power Amplifier



PREAMPLIFIER "ELECTONE" PIANO
BUILT BY DAVID BOGEN CO., INC. 9-30-37



PICKUP CONNECTIONS
"ELECTONE" PIANO
9-30-37

POWER AMPLIFIER
"ELECTONE" PIANO
MADE BY DAVID BOGEN CO., INC.
40 WATT INVERSE FEED BACK
FIXED BIAS
9-30-37

MODEL Electone Piano
Service Notes

KRAKAUER BROS.

AMPLIFIER CIRCUITS:

The output transformer is especially designed and if it is damaged, an exact replacement is necessary.

The tone control is subject to wide variations according to individual requirements. Some forms depend on the cathode by-pass for control; therefore, replace this component with exact value.

Use only glass tubes in the input, as the leakage is less, and only glass tubes in the output, because of the possibility of a short to the shell.

NOISE ELIMINATION:

First suspect dirt on the pick-up screws. These are insulated with lacquer, but this is not perfect. Clean with a vacuum-cleaner with blower attachment, which should be run for a few minutes so that the hose will be free from dirt. A thin strip of paper can be worked between the strings and the pick-up screws to remove stubborn particles of dirt.

Moisture may get into the wooden strip supporting the pick-up screws. This can be dried by placing in the bottom of the piano a ½ pint fruit jar which is 1/3 filled with calcium chloride. This should be renewed when it disintegrates. When the strip is dry it should be oiled with Nujol.

Another source of noise may be leakage in the input group (the two 10-megohm resistors and the .1-mf condenser). Replace with the best components obtainable. In severe climates place these three components in a small cardboard pill-box and fill it with paraffine wax, bringing out the leads so they can be readily connected to their proper points.

HUM:

Hum may be due to trouble in the filters, unmatched output tubes, or a poor bias rectifier, if trouble is confined to the amplifier.

Electrostatic pick-up to screws is shielded by the back-board of the piano. This board must make good contact with the ground clamps. If proper contact can not be established, cover the back-board with tin-foil shellaced in place and grounded.

REGULATING PICK-UP SCREWS:

This must be done with the help or a professional piano tuner who must be a tone regulator. The tuner should tone regulate the piano very soft, paying attention to eveness of tone and not eveness of volume. Then he can strike the notes, telling the serviceman at the rear of the piano, if the pick-up screws need adjustment. Turn screws to right to make louder -- to the left to make softer. Take care that screws are not turned too far to the right, so that the strings will touch screw when a very hard blow is struck on the key.

These screws should ordinarily need no attention during the life of the piano. Only in case of buckling of the mechanism or tampering need these be touched.

SETTING MASTER LEVEL CONTROL:

The striking of the hammer on the strings sets up tremendous transients in the electrical circuit which last a small fraction of a second. These tend to overload the amplifier and when the average output of the amplifier is 3 or 4 watts, the transients may be of the order of several hundred watts. Accordingly, a 40-watt amplifier is used for low average power. Do not set the screw-driver type volume control too high. The instrument is not supposed to sound much louder than an ordinary acoustic piano.

Overload causes rattling similar to speaker cone rattles. Do not blame the speaker until you are sure.

SWELL PEDAL ADJUSTMENT:

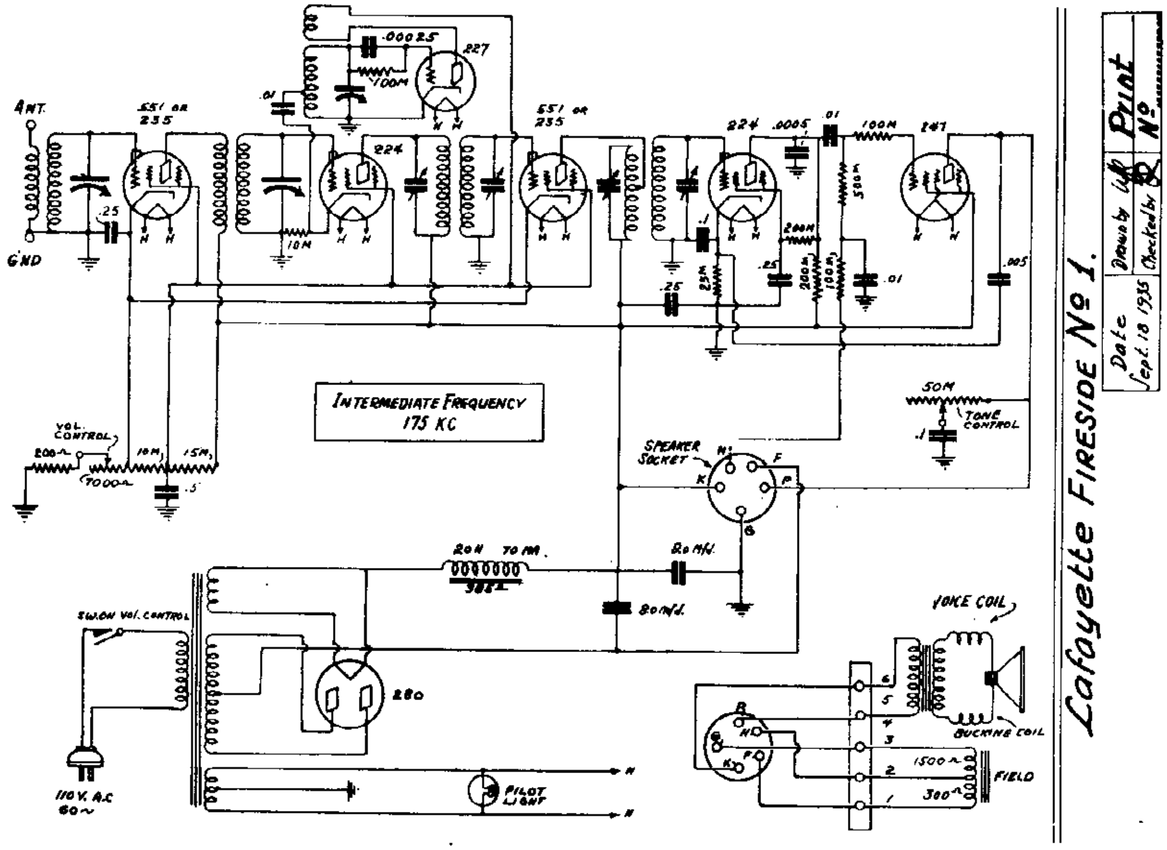
The mechanical connection from the swell pedal to its control should be set so that with the pedal completely depressed, the sound from the speaker is just not noticeable.

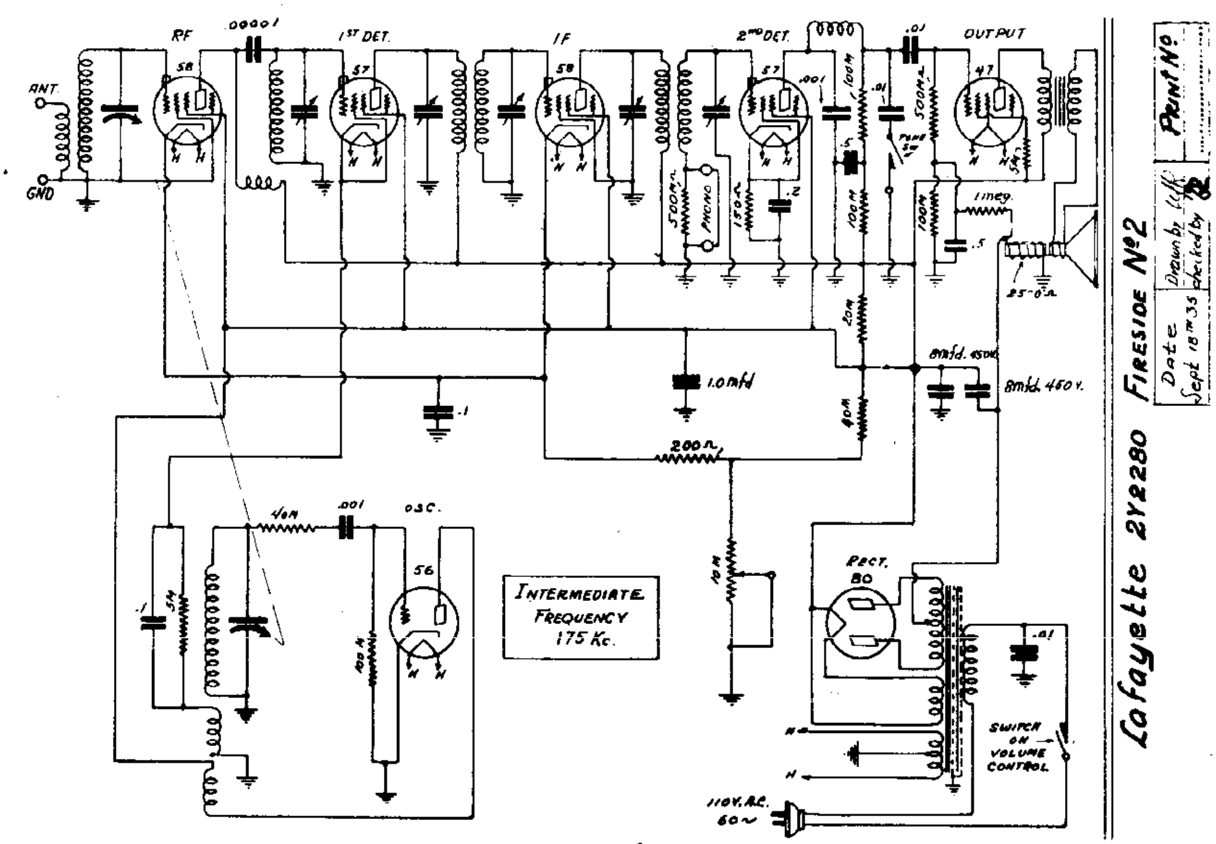
NOTE:

Special parts and further service information may be obtained from Krakauer Brothers 191 Cypress Ave., New York City.

MODEL Fireside #1
MODEL Fireside #2
2Y2280
Schematics

LAFAYETTE RADIO MFG. CO.

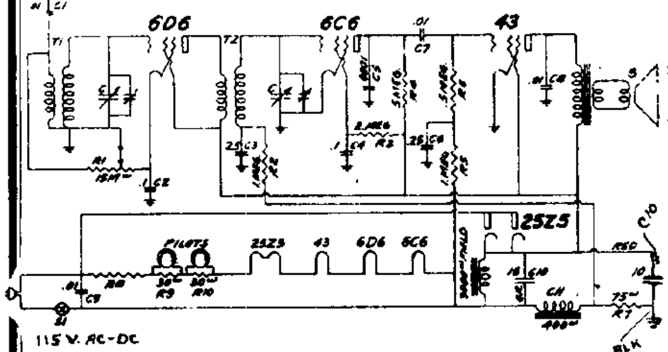


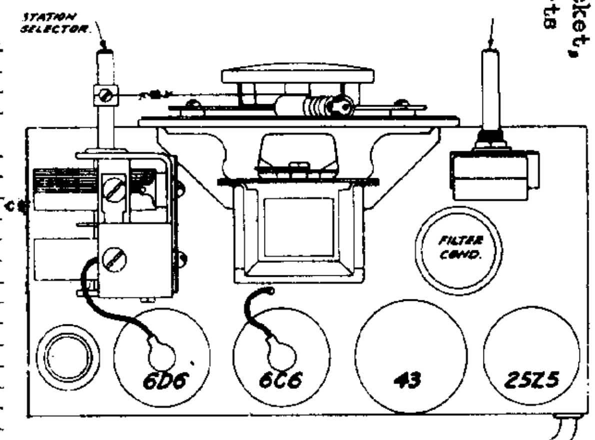


MODEL EB8
MODEL EB9
Schematics
Socket,
Parts

LAFAYETTE RADIO MFG. CO.

Model EB 9





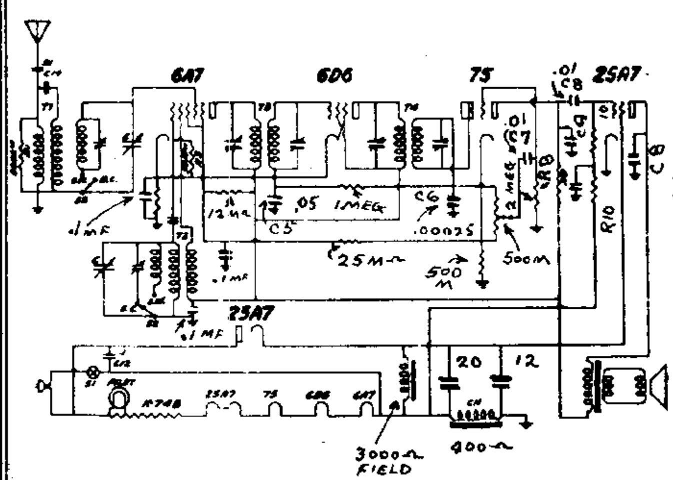
TUBE LAYOUT.

REPLACEMENT PARTS LIST

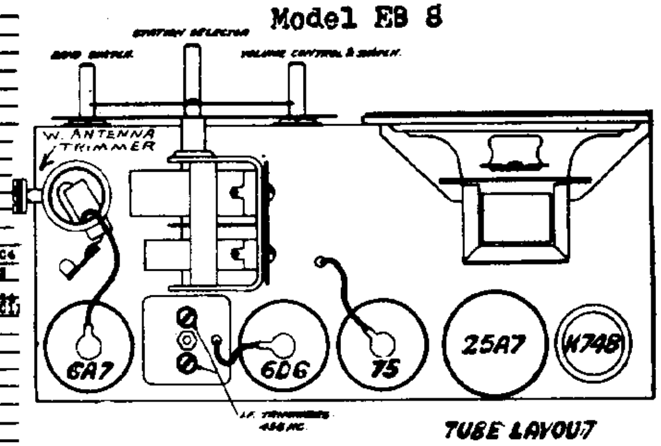
In Ordering Always State Model, Description & Part No.

Part #	Description	Letter
3508-A	Antenna Coil	T1
3804-A	R.F. Coil	T2
50003-A	Loud Speaker	S
6201-C	Choke	CH
3206-A	Tuning Condenser	C
	Mica Condenser .0001 Mf.	C5
	Tubular Condenser .01 Mf. 200 V.	C1,C7,C8 C9
	" " .1 Mf. 200 V.	C2,C4
	" " .25 Mf. 200 V.	C3,C6
4806-A	Filter Condenser 16 & 10 Mf.	C10
4108-A	Volume Control & Switch	R1,S1
	Carbon Resistor 1. meg., ½ watt	R2,R5
	" " 2 meg., ½ watt	R3
	" " .5 meg., ½ watt	R4,R6
	" " 75Ω ½ watt	R7
4652-A	Armored Resistor 30Ω, 30Ω	R9,R10
4654-A	Resistance Cord	R8
4461-F	Pilot Bulb	
4501-D	Antenna Cord	

IF PEAK 456KC



Model EB 8



TUBE LAYOUT

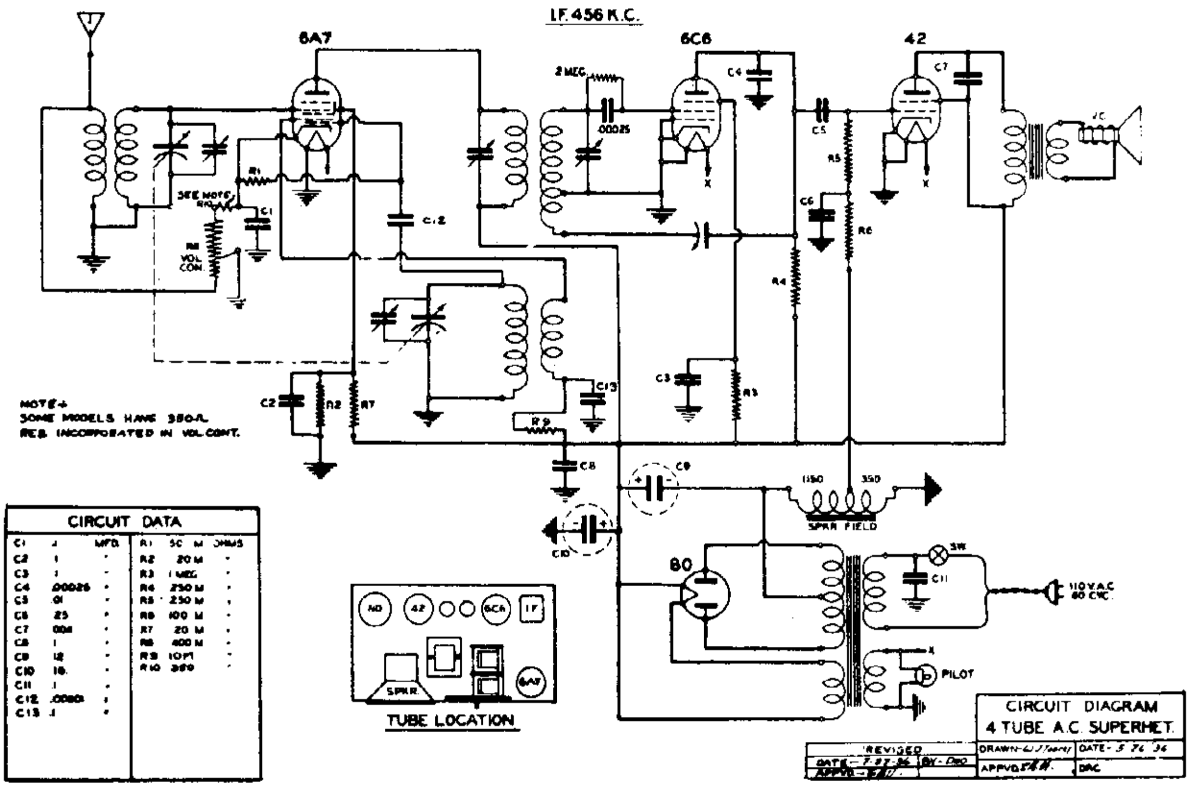
REPLACEMENT PARTS LIST

In Ordering Always State Model, Part No. & Description

Part #	Description	Letter
4407-A	Antenna Coil	T1
4408-A	Oscillator Coil	T2
5708-A	1st I.F. Coil	T3
5707-A	2nd I.F. Coil	T4
6201-B	Choke	CH
4461-E	Pilot Bulb	
5000-C	Loud Speaker	S
4651-B	Line Cord	
4108-A	Volume Control & Switch	R13,S1
4402-B	Band Switch	S2
3205-A	Tuning Condenser	C
	Mica Condenser .00025 Mf.	C2,C6
	Mica Condenser .0005 Mf.	C9
	Tubular Condenser .1 Mf. 200 V.	C1,C3,C4
		C10,C11
	Tubular Condenser .05 Mf. 200 V.	C5
	" " .01 " "	C7,C8,C12
4801-B	Filter Condenser 20 & 12 Mf.	C13
	Resistor 5000Ω ½ Watt	R1
	" 300Ω " "	R2
	" 50MΩ " "	R3
	" 12MΩ " "	R4
	" 1. meg. ½ Watt	R5
	" 25MΩ " "	R6
	" 500Ω " "	R7
	" 2. meg. " "	R8
	" 250Ω " "	R9,R10,R11
4501-G	Antenna Cord	

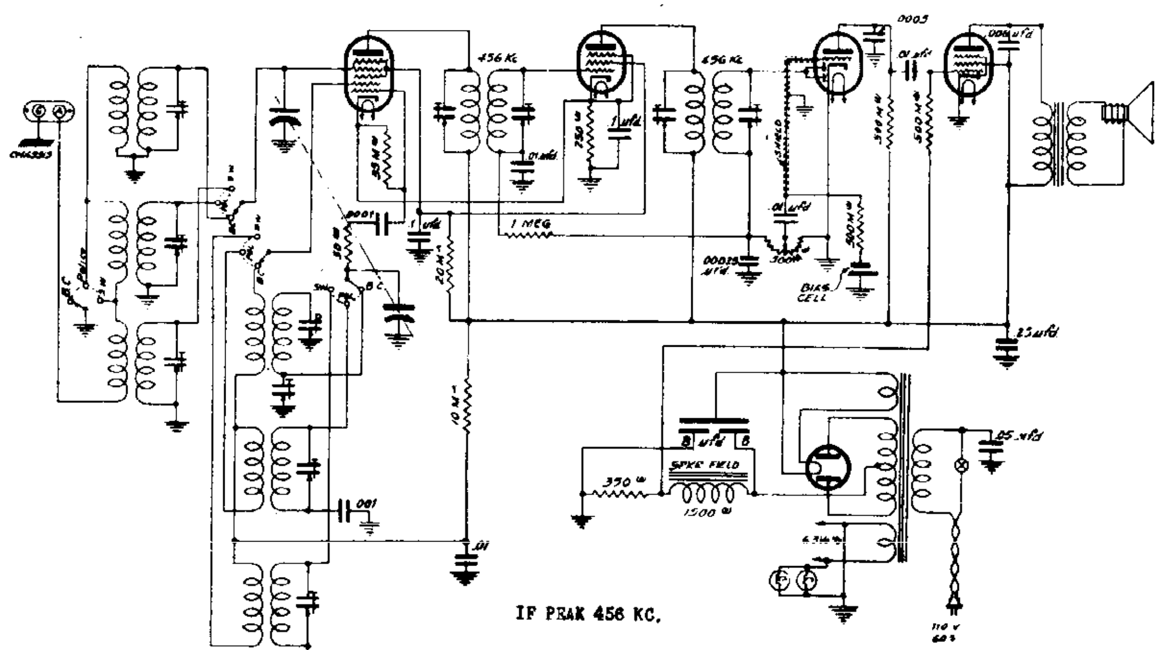
LAFAYETTE RADIO MFG. CO.

MODEL D 10



CIRCUIT DATA					
C1	.1	MFD.	R1	50 M	OHMS
C2	1	"	R2	20 M	"
C3	.1	"	R3	1 MEG	"
C4	.00025	"	R4	250 M	"
C5	.01	"	R5	250 M	"
C6	25	"	R6	100 M	"
C7	.006	"	R7	20 M	"
C8	1	"	R8	400 M	"
C9	12	"	R9	10 Ω	"
C10	16.	"	R10	350	"
C11	.1	"			
C12	.0005	"			
C13	.1	"			

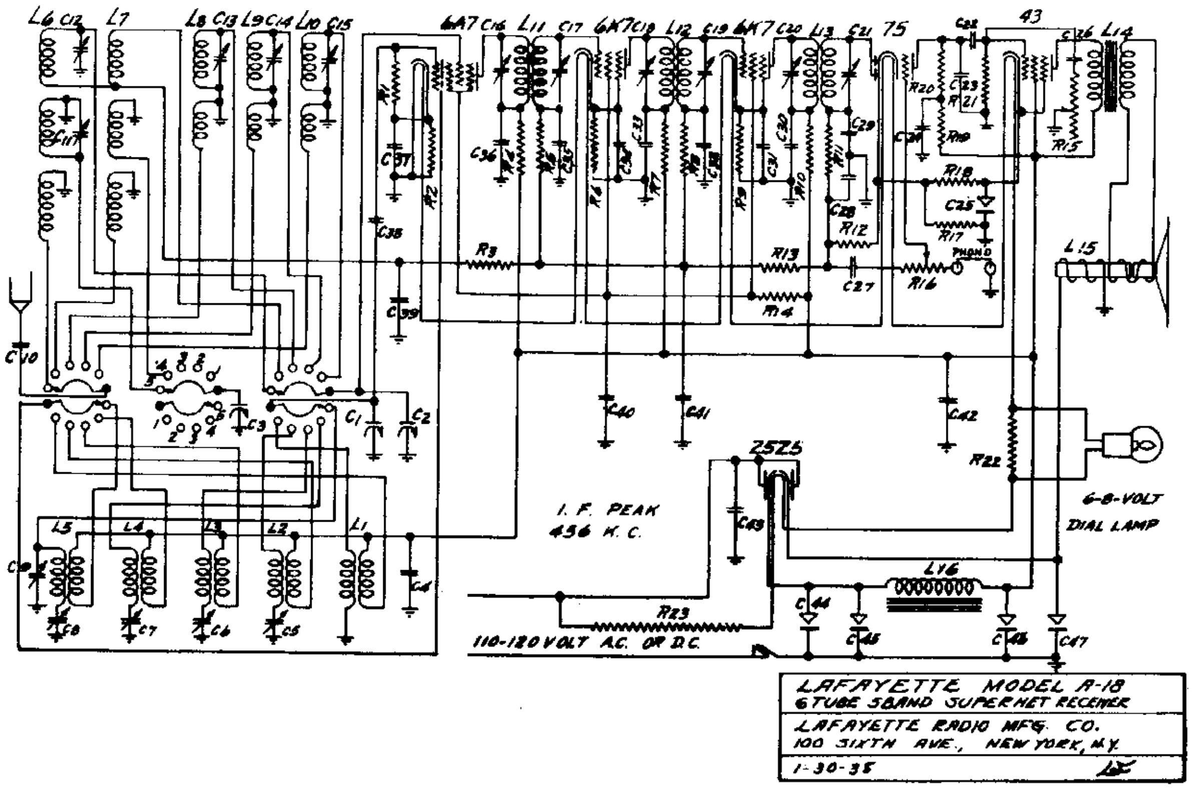
MODEL D 11

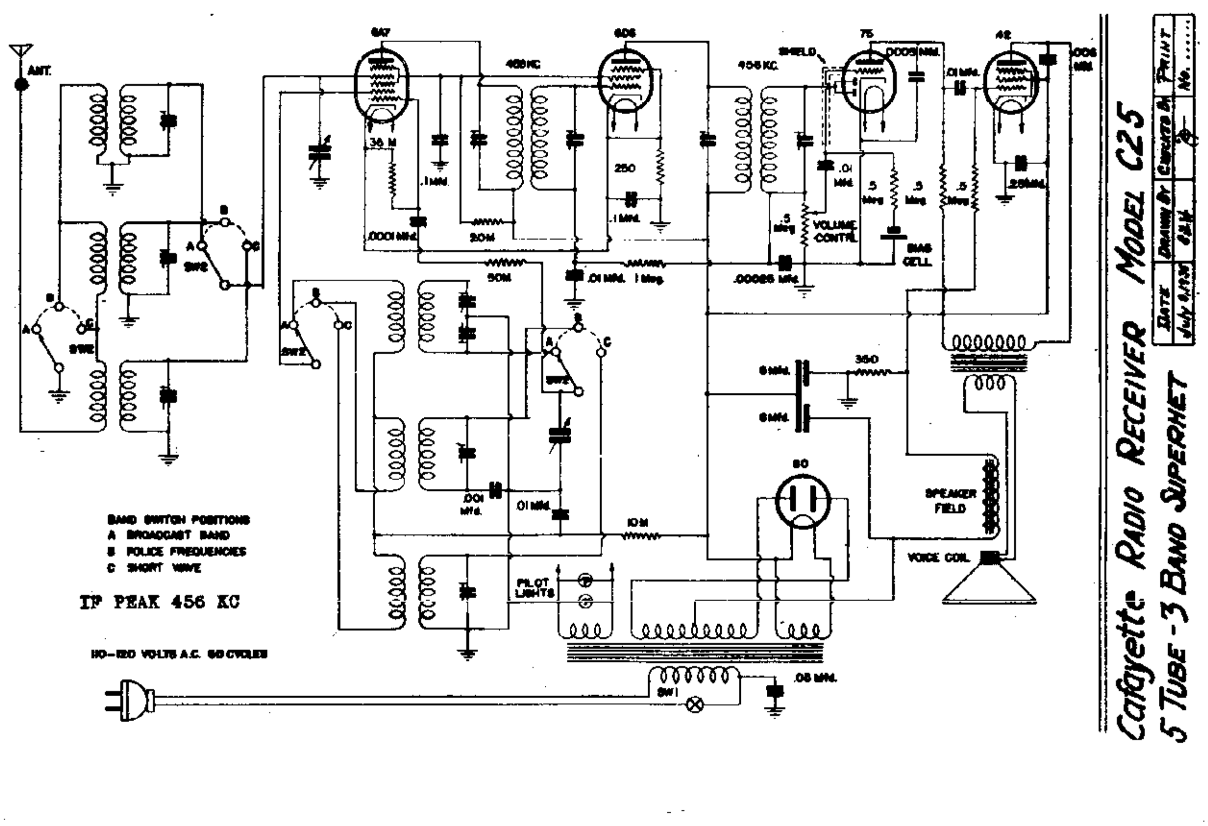


IF PEAK 456 KC.

MODEL A18
MODEL C25
Schematics

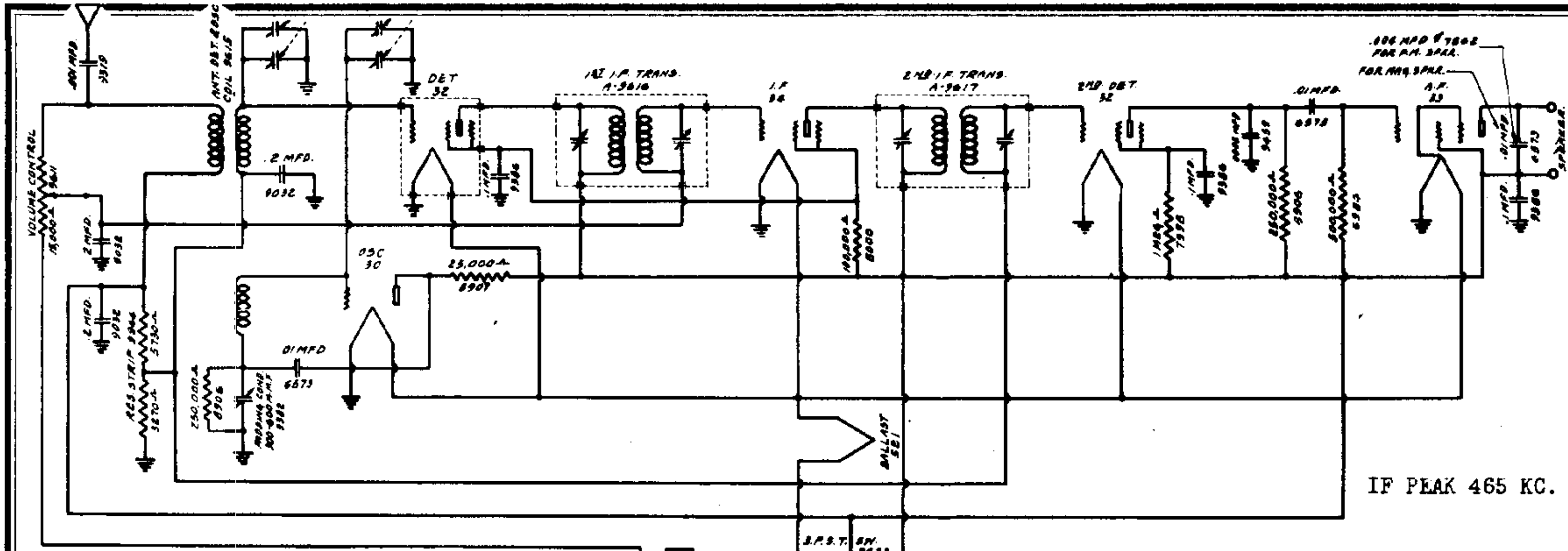
LAFAYETTE RADIO MFG. CO.





MODEL F20
Schematic
Alignment
Parts

LAFAYETTE RADIO MFG. CO.



NOTE:
1. DOTTED LINES DENOTE SHIELDING.
2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NOS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.
4. I.F. = 465 K.C.

INTERMEDIATE ALIGNMENT: Only when an intermediate transformer has become defective due to an open or burned out winding should it be necessary to readjust the intermediate transformer. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device. To align the intermediate transformer:

1. Connect the high side of the oscillator output to the control grid of the No. 32 Modulator tube. The ground side of the oscillator should be connected to the chassis.
2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.
3. Align the first intermediate transformer by turning one of the intermediate transformer trimmer screws up and down until maximum reading is obtained on the output meter. Then adjust the other trimmer screw in the same manner.
4. The second I.F. transformer should next be adjusted in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

To align the variable condenser:

1. Connect the high output side of the oscillator to the set antenna lead and the ground side of the oscillator to the chassis.

2. Tune the receiver to 1400 kilocycles on the dial and set the oscillator to this frequency.

3. Adjust the variable condenser trimmer screws for maximum output reading.

4. Tune the set to approximately 600 kilocycles on the dial and adjust the oscillator frequency to 600 kilocycles. Adjust the padding condenser located on the rear of the chassis adjacent to the antenna and ground leads and accessible through the hole in the chassis for maximum output reading.

When making this adjustment be sure to rock the variable condenser slightly to the right and left using the position where the greatest output reading is obtained.

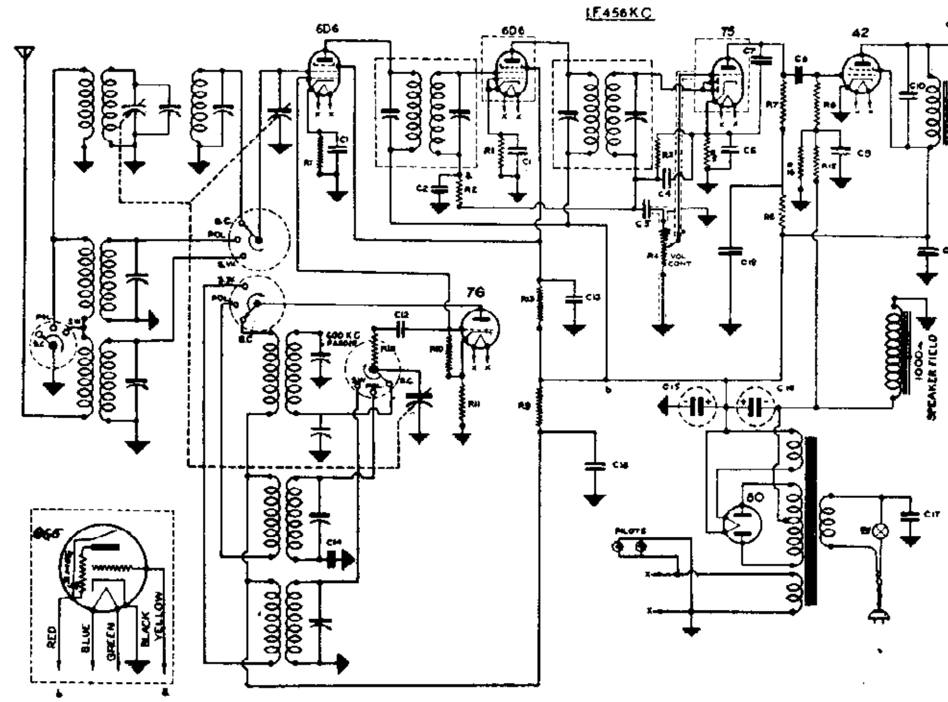
PARTS AND PRICE LIST

PART NUMBER		LIST PRICE
9870	No. 5E1 Tube Socket	$ .11
9619	No. 30 Tube Socket	.11
9620	No. 32 Tube Socket	.11
9621	No. 34 Tube Socket	.11
9622	No. 33 Tube Socket	.11
9221	Tube Shield Base	.20
9222	Tube Shield	.19
9612	Two Gang Condenser	2.54
9615	Antenna, Detector & Oscillator Coil	1.38
9616	1st I. F. Transformer	1.90
9617	2nd I. F. Transformer	1.90
9382	Padding Condenser	.50
9614	Tuning Dial	.55
9611	Volume Control	.91
9623	3 P. S. T. Switch	1.40
9613	Battery Cable	1.02
9625	Wire Wound Resistor Strip	.36
8906	250,000 Ohm 1/3 Watt Resistor	.19
8907	25,000 Ohm 1/3 Watt Resistor	.19
8000	100,000 Ohm 1/3 Watt Resistor	.19
7998	1 Meg Ohm 1/3 Watt Resistor	.19
6984	500,000 Ohm 1/3 Watt Resistor	.19
9319	.001 Mfd. Moulded Condenser	.22
9459	.0005 Mfd. Moulded Condenser	.21
9386	.1 Mfd. 200 Volt Condenser	.18
6573	.01 Mfd. 200 Volt Condenser	.17
9032	.2 Mfd. 200 Volt Condenser	.23
7862	.004 Mfd. 400 Volt Condenser	.17
9718	Knob	.14
9717	Knob with arrow	.14

These prices are subject to change without notice.

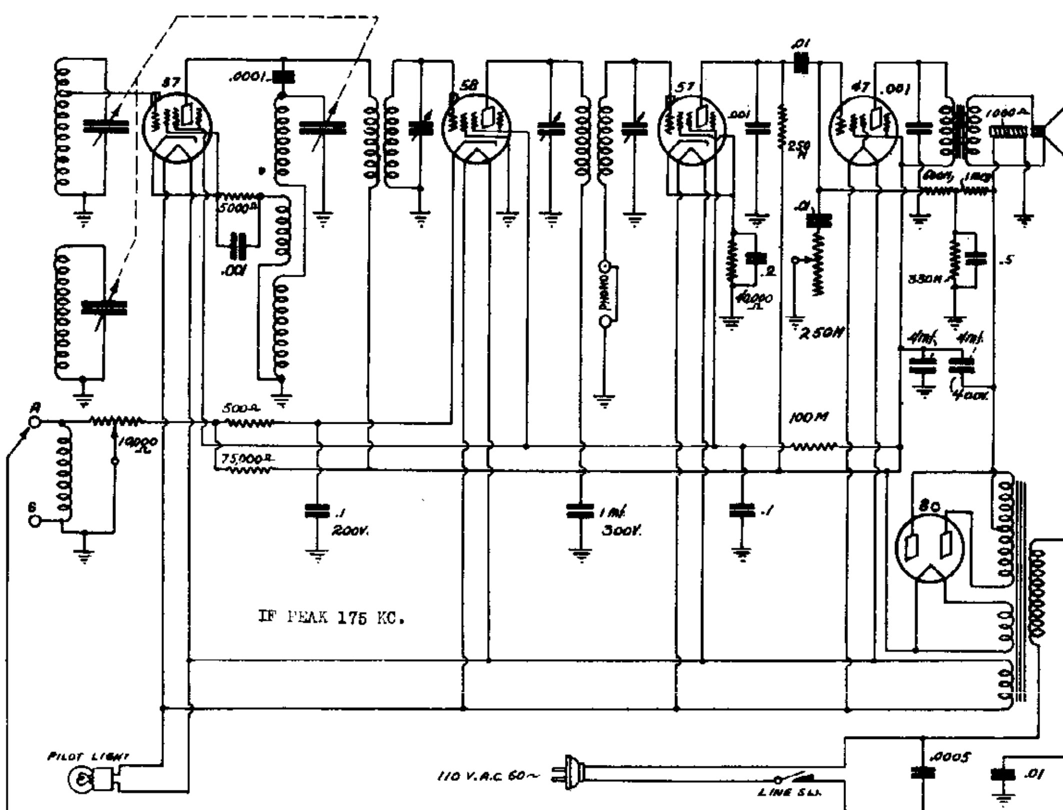
MODELS D30,D31
MODEL M31(1935)
Schematics

LAFAYETTE RADIO MFG. CO.



CIRCUIT DATA					
C1	.1 MFD	200 V	R1	400 Ω	½ W
C2	.05 -		R2	1 MEG Ω	-
C3	.05 -	600 V	R3	.5 MEG Ω	-
C4	.00065	MICA	R4	500,000 Ω	VOL CONT
C5	.01 -	600 V	R5	6000 Ω	½ W
C6	10 MFD	35 V	R6	50,000 Ω	½ W
C7	.0005	MICA	R7	100,000 Ω	½ W
C8	.01	600 V	R8	500,000 Ω	
C9	.01	200 V	R9	15,000 Ω	1 W
C10	.008	600 V	R10	50,000 Ω	½ W
C11	.1	-	R11	250 Ω	-
C12	.0001	MICA	R12	50 Ω	-
C13	.1	400 V	R13	47,000 Ω	½ W
C14	.002	MICA	R14	100,000 Ω	TONE CON.
C15	8	450 V	R15	600,000 Ω	½ W
C16	8	-	R16	100,000 Ω	-
C17	.05	400 V			
C18	.1	-			
C19	.1	400 V			

D-30,31



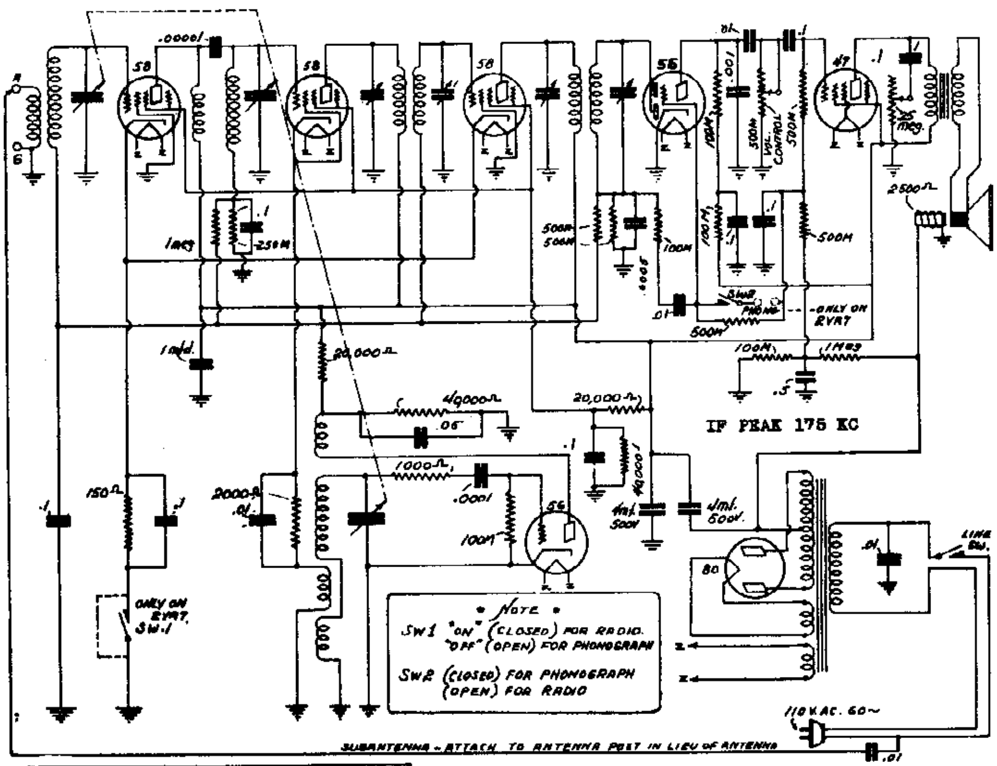
SUB-ANTENNA - ATTACH TO ANTENNA POST IN LIEU OF ANTENNA

MODEL M-31

Print No. 510	
Drawn by	Checked by
Date Sept. 18th 1935	

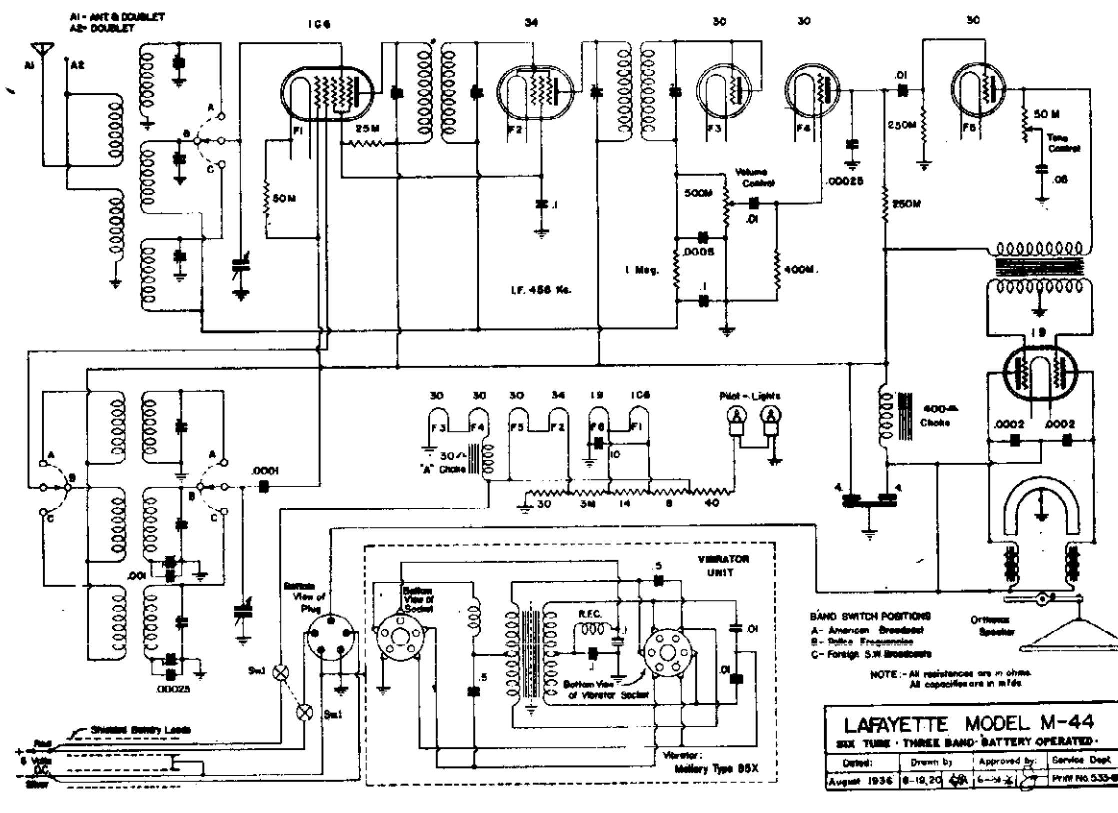
MODEL M37
MODEL M44
Schematic

LAFAYETTE RADIO MFG. CO.



Date	Drawn by	Print
Sept 18th 1935	Checked by	No. 511

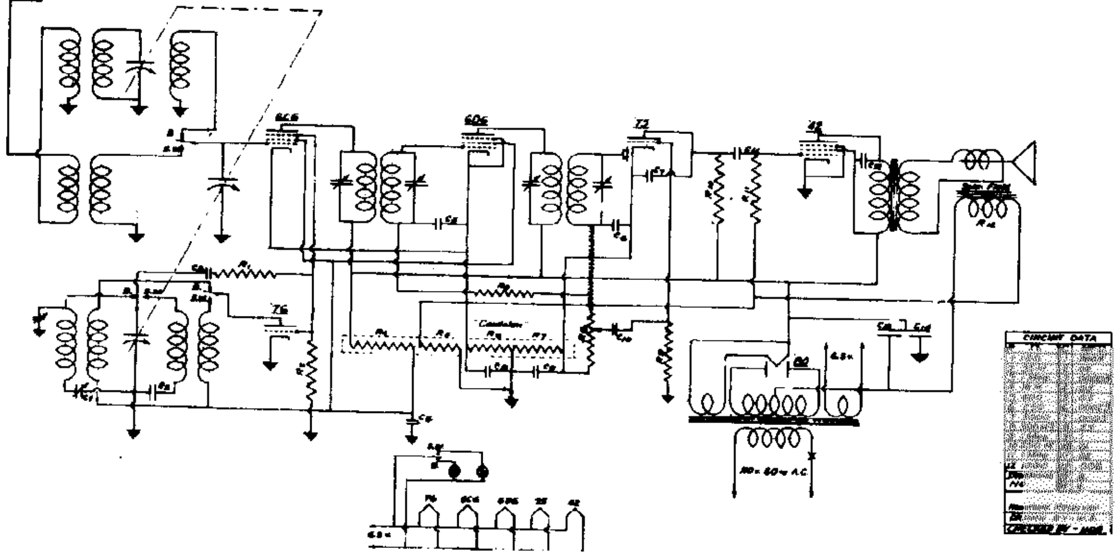
MODEL M-37



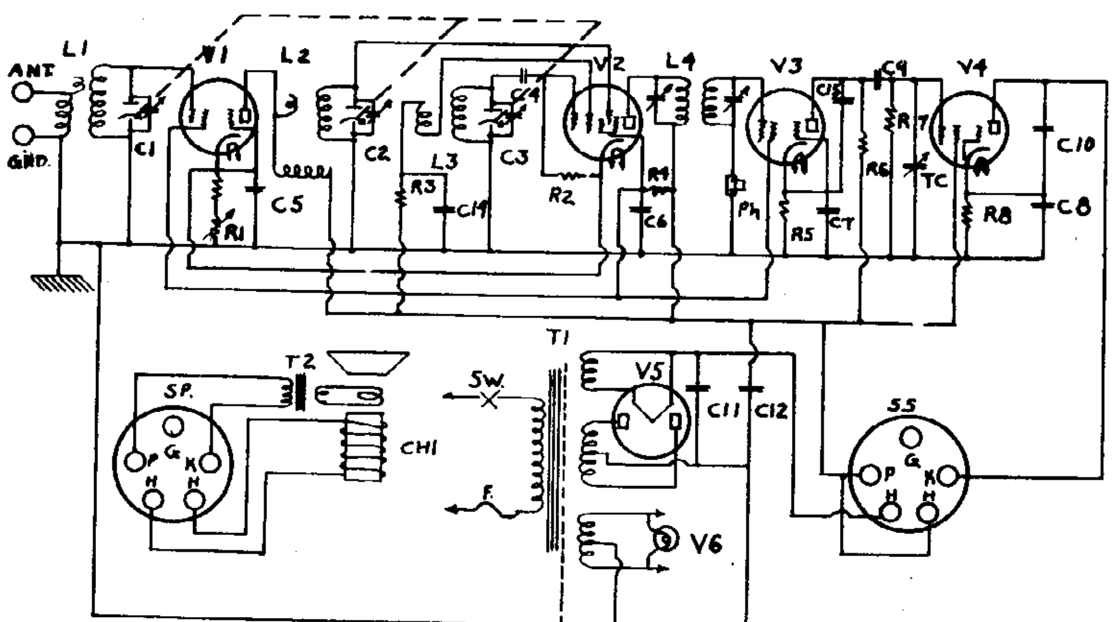
MODEL C40
MODEL SL45
Schematics
Alignment

LAFAYETTE RADIO MFG. CO.

LAFAYETTE MODEL C40



LAFAYETTE MODEL SL45

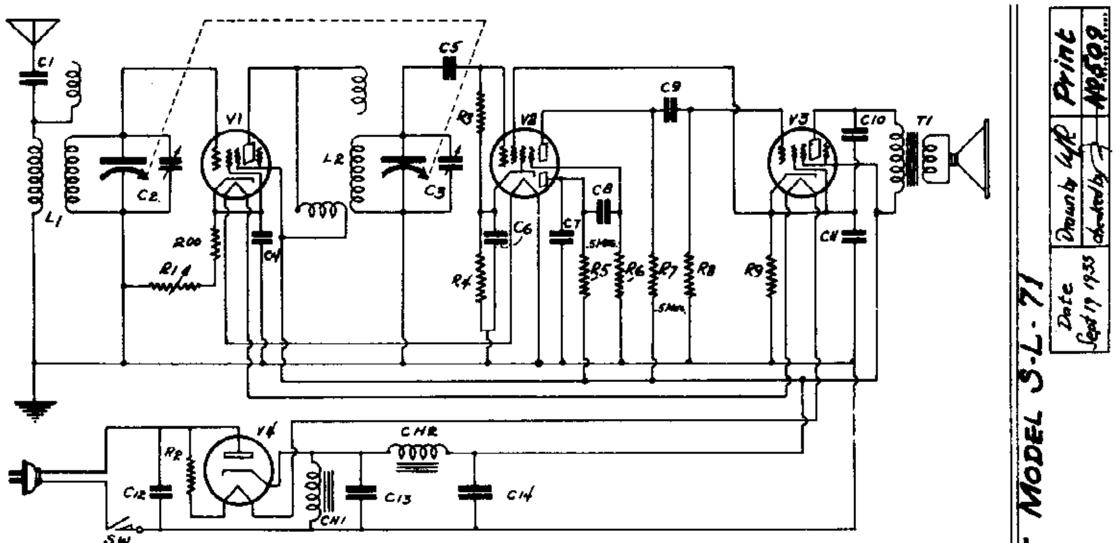


V1—58 Tube
V2—2A7 Tube
V3—57 Tube
V4—2A5 Tube
V5—80 Tube
V6—2.5 V. Pilot Light
C1-2—365 Mmfd. Var. Cond.
C3—175 K.C. oscillator section
C4—.00025 Mfd.
C5-6-14—.05 Mfd.
C7-8-11—10 Mfd.
C9—.01 Mfd.
C10—.006 Mfd.
C12—6 Mfd.
C15—.0005 Mfd.
L1—Antennae Coil
L2—R.F. Coil
L3—Oscillator Coil
L4—I.F. 175 K.C. Coil
R1—4M Vol. con. 190-Ohm min. with switch
R2—50M Resistor
R3—10M Resistor
R4—50M Resistor
R5—10M Resistor
R6—250M Resistor
R7—250 M Resistor
R8—410 Ohms Resistor
PH.—Phono
TC.—Tone Control
T1—Power Trans.
T2—Audio Trans.
CHI—Speaker Field
SW—Switch on Vol. Control
SS.—Speaker Socket
SP.—Speaker Plug

To align receiver—Short C3—apply 175 K.C. to grid of V2 and adjust L4 with R1 fully on—remove short on C3—Tune in 1500 K.C. signal and adjust Trimmer on C3 to 11.5 on dial—adjust trimmers on C1 and C2.

MODEL S-L71
MODEL R71
Schematics

LAFAYETTE RADIO MFG. CO.

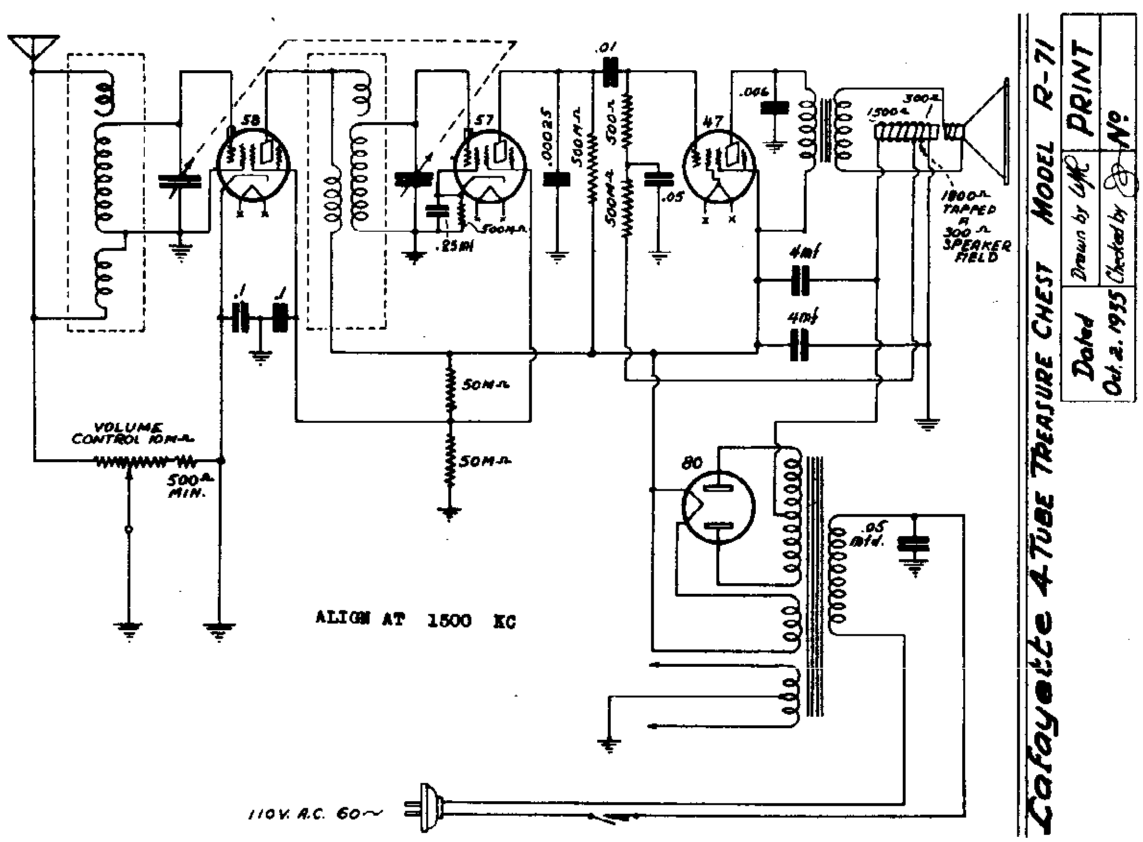


V1	78 TUBE
V2	6-F-7 TUBE
V3	43 TUBE
V4	12-Z-3 TUBE
C-1	.002 mfd. COND.
C2-3	365 mf. VAR. COND.
C4-12	.05 mfd COND.
C 5	.00005 mfd COND.

C6-11	10 mfd. CONDS.
C 7	.0005 mfd. COND. IN
C8-9-10	.01 mfd. CONDS. ONE
C-13	12 mfd. COND. BLOCK
C-14	8 mfd. COND.
R-1	200 M ohm VOL. CONTROL
R-2	230 ohms IN LINE CORD.
R-3	2 Meg. RESISTOR
R-4	5M ohm RESISTOR

R6-8	1 Meg. RESISTOR
R-9	700 ohm RESISTOR
L-1	ANTENNA COIL
L-2	R-F COIL
CH1	3000 ohm SPEAKER FIELD
CH2	200 ohm choke
T-1	SPEAKER TRANSFORMER
SW	SWITCH ON VOL. CONTROL

To Align the Receiver :- Uncoil Antenna wire and adjust trimmers at any high frequency station preferably 1500 k.c.



MODELS B97-98
Socket, Trimmers
Coils, Phono

LAFAYETTE RADIO MFG. CO.

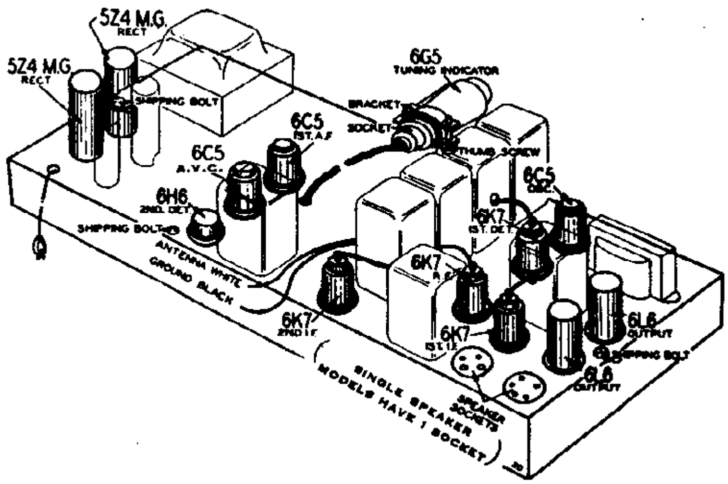


Fig. 5—Location of Tubes

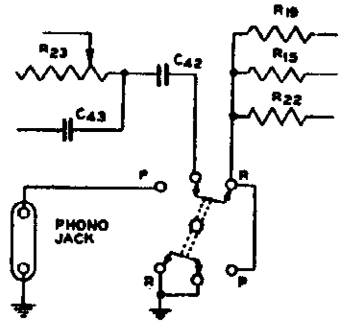


Fig. 7—Phonograph Connections

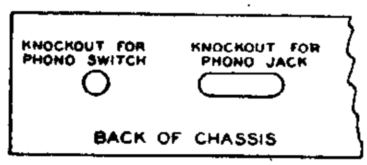
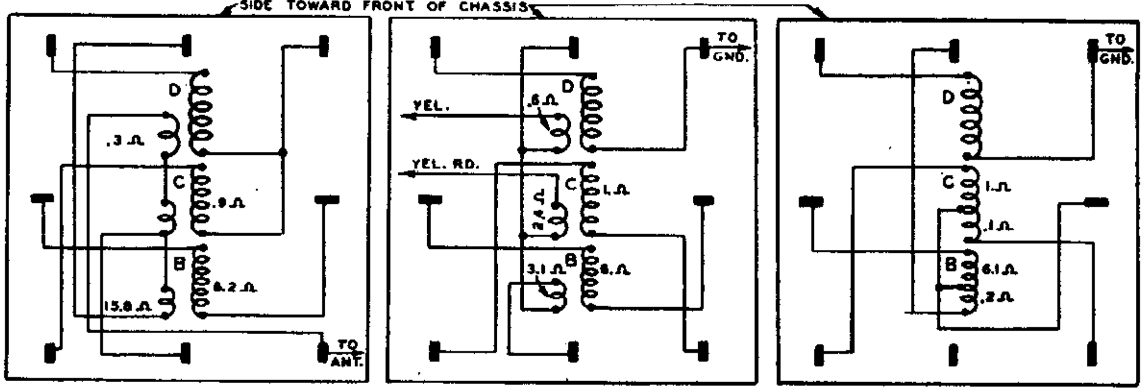


Fig. 8—Location of Phono Knockouts

ANTENNA R.F. TRANS. T_1 1ST INTERSTAGE R.F. TRANS. T_2 2ND INTERSTAGE R.F. TRANS. T_3

SIDE TOWARD FRONT OF CHASSIS



NOTE: RESISTANCES OF WINDINGS LESS THAN .1 Ω ARE NOT SHOWN.

OSC. COIL T_{10}

SIDE TOWARD FRONT OF CHASSIS

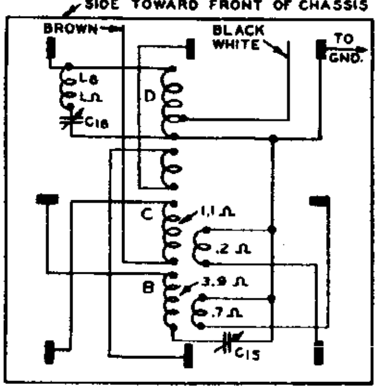


Fig. 6—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

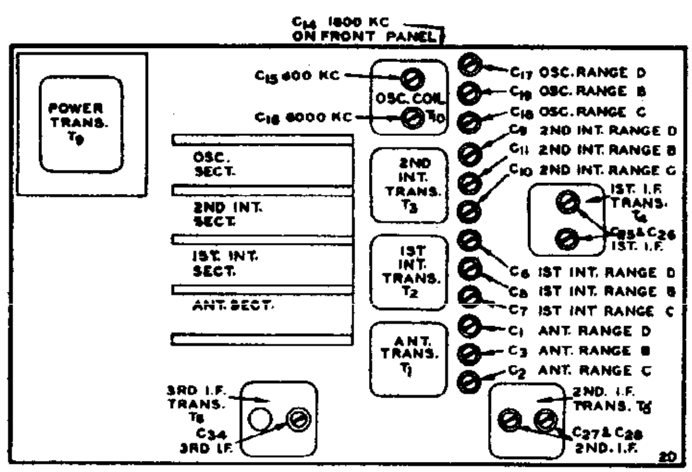
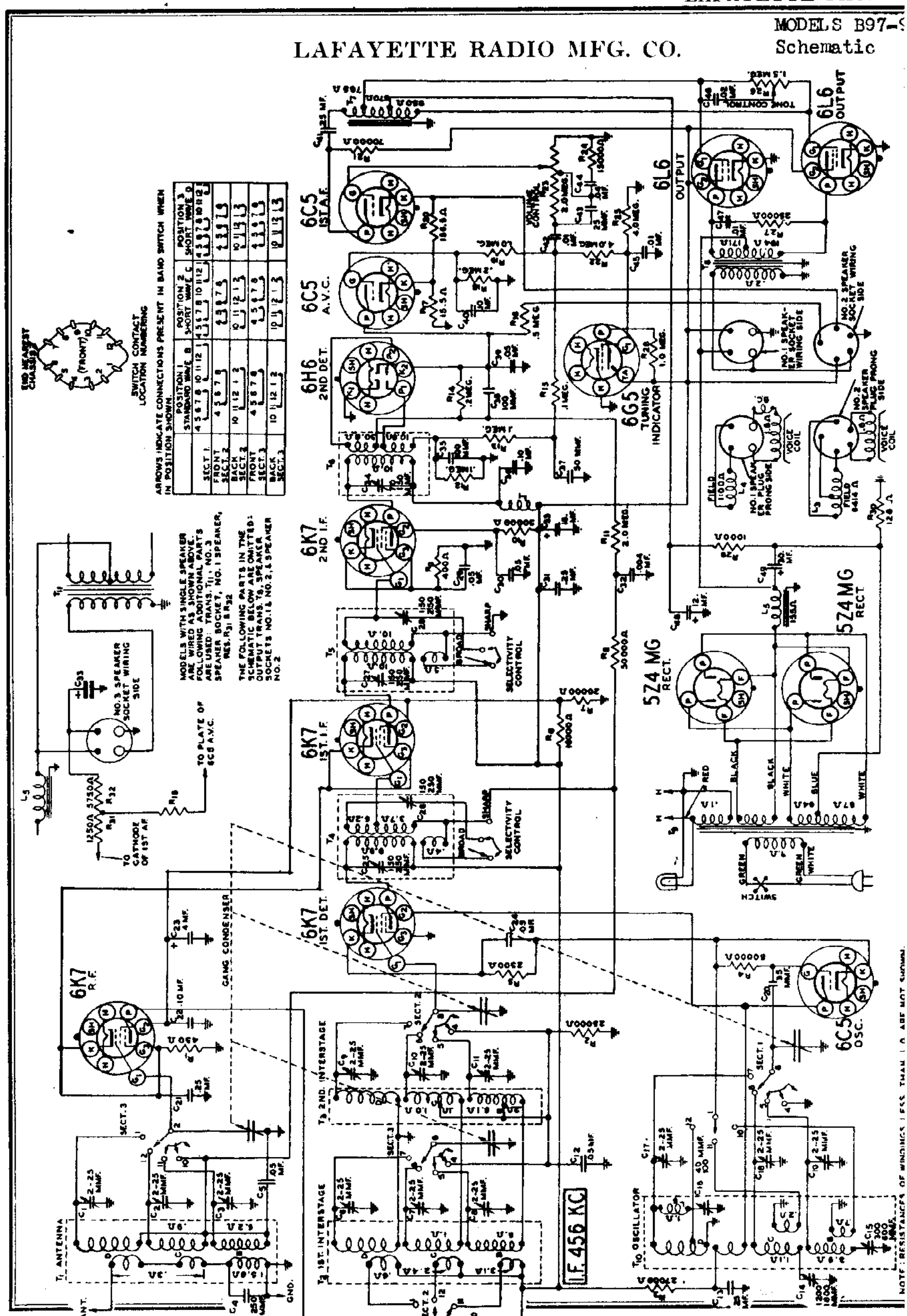


Fig. 3—Location of Trimmers

LAFAYETTE RADIO MFG. CO.

Schematic



MODELS B97-98
Alignment
Voltage
Notes

LAFAYETTE RADIO MFG. CO.

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C19) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

In sets using pointers, loosen the screw of the large pointer and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

In sets using the moving beam of light, there is moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until it is at the 1500 KC mark on the dial. Retighten the screw.

Adjust the 1st and 2nd interstage Range B trimmers (C8 and C11), and antenna Range B trimmer (C3) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C18) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range C trimmers (C7 and C10) and antenna Range C trimmer (C2) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 1800 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C17) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range D trimmers (C6 and C9) and antenna Range D trimmer (C1) to maximum.

When adjusting the 2nd interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Planetary Drive Assembly

The planetary assembly is the unit that is integral with the tuning shaft.

If the nut on the back end of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect.

If this nut is too loose, the drive will slip in slow speed. The remedy in this case, of course, is to tighten the nut.

Should the condenser drive cord slip when the planetary pulley is turning, inspect the tuning condenser, drive drum and gears to see if they are turning properly or if they are being obstructed in some way.

If the drive turns unevenly (rough in spots), this may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required as shown in the parts list. Knockouts are provided in the back of the chassis for mounting the phono jack and phono switch—See Fig. 8.

The phono switch should be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. This is done by removing the wire connecting condenser C42 to resistors R15, R19 and R22, at the terminal strip located near the back of the planetary drive. Cut this wire to correct length and solder it to the proper terminal on the phono switch—See Fig. 7, keeping the wire close to the back of the chassis base.

A wire is then connected from the lug on the above mentioned terminal strip to which C42 was connected, to the correct terminal on the phono switch—See Fig. 7. This wire should be brought directly to the back of the chassis at a point close to the phono jack pin tip nearest the channel provided for a chassis mounting bolt, and then routed over to the switch.

Complete the other connections as illustrated in Fig. 7.

It will be necessary to re-route the AC line cord away from the 6C5 1st audio grid lead by running it between the volume control and the filter choke and then straight back to the hole provided for it in the chassis base.

If a hum is heard when the phono pickup is touched, reverse the two pickup leads.

Twenty-five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

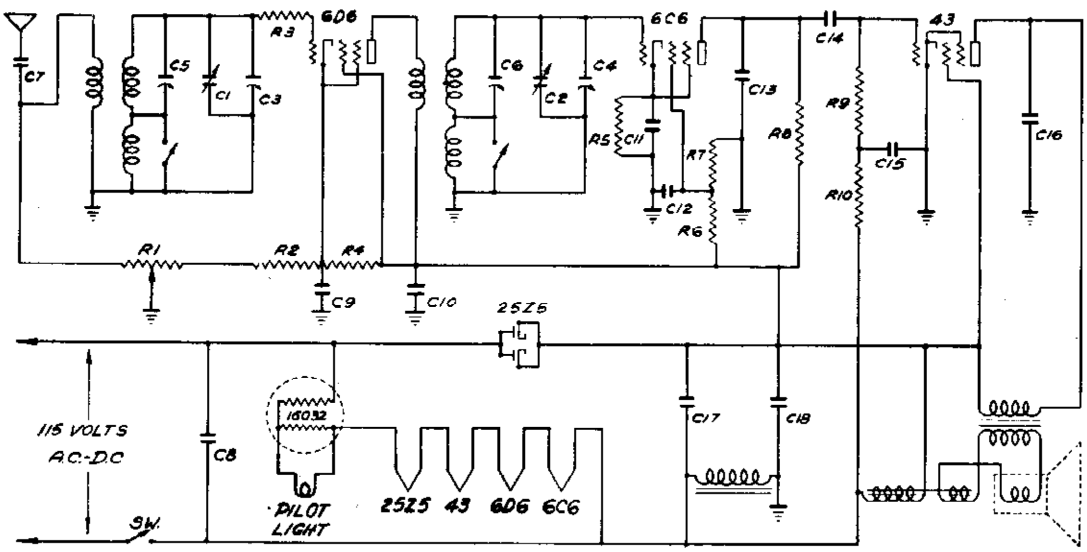
Line Voltage: 115 — Volume Control: Maximum — Antenna Shorted to Ground — Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (unless otherwise indicated) Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	R.F.	0	6.3(1)	250	110	7.8(2)		6.3(1)	7.8(2)
6K7	1st Det.	0	6.3(1)	250	110			6.3(1)	9.6
6C5	Osc.	0	6.3(1)	110				6.3(1)	
6K7	1st I.F.	0	6.3(1)	250	110	7.6		6.3(1)	7.8(2)
6K7	2nd I.F.	0	6.3(1)	250	145	8(2)		6.3(1)	8.6
6H6	2nd Det.	0	6.3(1)					6.3(1)	
6C5	A.V.C.	0	6.3(1)	5(3)				6.3(1)	6.6
6C5	1st A.F.	0	6.3(1)	130				6.3(1)	4.0
6L6	Power	0	6.3(1)	350	250	20(4)		6.3(1)	
5Z4/6X5	Rectifier	0	5.0(5)		1024(6)		1024(6)		5.0(5)
6G5	Tuning Indicator	Plate to Ground 20(2)		Target to Ground 250		Cathode to Ground 0		Across Heater 6.3 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Subject to variation.
(3) As read with 500,000 ohm meter.
(4) As read across R-38.
(5) A.C. voltage as read across heater terminals 2 and 8.
(6) A.C. voltage as read across terminals 4 and 6.

MODEL 50
Schematic, Socl
Trimmers, Volta
Alignment, Par

MAJESTIC RADIO & TELEV. CO.



ALIGNMENT PROCEDURE—Correct alignment is of extreme importance. Your receiver is properly aligned at the factory and realignment should not be attempted by the service technician until all other causes of faulty operation are corrected.

In order to properly realign the receiver, the following equipment is necessary.

1. A signal generator which will provide an accurately calibrated signal at any frequency from 540 to 4000 kilocycles. The generator should have a modulated and adjustable signal output.
2. An output audio voltmeter to be connected across the moving coil of the speaker. This meter should be capable of providing a readable deflection for output levels of ½ volt, to avoid the effects of overload.
3. One screw driver; one .25 Mfd. 600 volt condenser; one 100 Mmfd. mica condenser.

BROADCAST BAND 540 TO 1550 KILOCYCLES

1. Connect output meter across loud speaker voice coil.
2. Connect ground or low potential terminal of signal generator to receiver chassis through a .25 Mfd. 600 volt condenser.
3. Connect antenna or high potential terminal of signal generator through a 100 Mmfd mica condenser to antenna lead from the receiver.
4. Adjust signal generator to 1400 kilocycles and 5000 microvolts output.
5. Adjust receiver range indicator to broadcast or "B" band and pointer to 1400 kilocycles.
6. Adjust trimmers C3 and C4 until maximum output is obtained and reduce volume level with volume control to approximately 0.5 volt. Repeat until C3 and C4 cannot be adjusted to give greater output.
7. Turn volume control to clockwise or most sensitive position; reduce output from signal generator; retune receiver and check sensitivity.
8. Check sensitivity at 1000 kilocycles and 550 kilocycles.

POLICE BAND 1550 to 4000 KILOCYCLES

1. Adjust signal generator to 4000 kilocycles.
2. Adjust receiver range indicator to police or "P" band and pointer to 4000 kilocycles.
3. Turn receiver volume control to maximum or extreme clockwise position, and increase signal generator output until a signal is heard.
4. Adjust trimmers C5 and C6 until maximum output is obtained and reduce output from signal generator until receiver output is approximately 0.5 volt. Repeat until C5 and C6 cannot be adjusted to give greater output.
5. Check sensitivity at 2400 kilocycles and 1600 kilocycles.
6. Sensitivity at 1600 kilocycles may be adjusted by moving position of lead from wave switch to chassis.

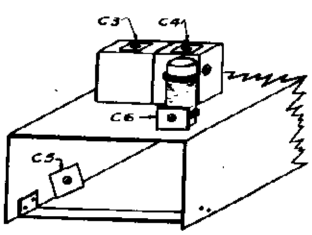


Fig. 2 Location of Trimmers

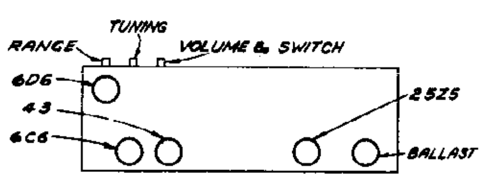


Fig. 1 Tuning Controls and Tube Position

Schematic Location	Part No.	Description
C1 C2	B-16986	Condenser Variable Gang
C3 C4		Condenser Trimmers, part of Variable Gang
C5 C6	A17003	Condenser Trimmer 3-25 Mmfd. bakelite base
C7	15767	Condenser Tubular .001 Mfd. 400 volts
C8	15757	Condenser Tubular .1 Mfd. 400 volts
C9 C12	15752	Condenser Tubular .05 Mfd. 200 volts
C10	15757	Condenser Tubular .1 Mfd. 400 volts
C11	15751	Condenser Tubular .25 Mfd. 200 volts
C13	15928	Condenser Mica 250 Mmfd. +—20% type O
C14 C16	15754	Condenser Tubular .01 Mfd. 400 volts
C15	15775	Condenser Tubular .5 Mfd. 200 volts
C17	B-16973	Condenser Wet Electrolytic 30 Mfd. 150 volts
C18	B-17042	Condenser Wet Electrolytic 25 Mfd. 150 volts
R1	B-16970	Control volume and line switch 50,000 ohms
R2	15569	Resistor Carbon 300 +— 20% ¼ watt
R3	15570	Resistor Carbon 2,000 +—20% ¼ watt
R4	15515	Resistor Carbon 100,000 +—¼ watt
R5	15531	Resistor Carbon 10,000 +—20% ¼ watt
R6	15568	Resistor Carbon 35,000 +—10% ¼ watt
R7	15567	Resistor Carbon 15,000 +—10% ¼ watt
R8	15512	Resistor Carbon 250,000 +—20% ¼ watt
R9	15528	Resistor Carbon 400,000 +—20% ¼ watt
R10	15515	Resistor Carbon 100,000 +—20% ¼ watt
	15089	Bulb Pilot Light, Mazda No. 44
	16032	Ballast Tube
	B-16969	Ballast Tube Socket
	17057	Antenna Coil Assembly
	17058	Interstage Coil Assembly
	16994	Antenna Hank
	A-16971	Wave Switch
	C-16972	Filter Choke
	C-16985	Speaker
	B-16471	Line Cord
	A-17020	Spring, part of Dial Drive Assembly
	6001	String, Dial Drive
	A-16983	Socket, Pilot Light
	A-16997	Dial Glass
	A-17040	Dial Pointer
	A-17027	Wood Spacer, Dial Assembly
	A-17002	Purple Dial Backing
	A-2100	Fibre Washer, Dial Assembly
	1145	Dial Pointer Screw
	A-16988	Fish Paper Insulation, Electrolytic Condenser
		Knob (volume, band switch and tune)
	A-1954	Washer, Felt (small)
	A-17137	Escutcheon

VOLTAGE CHART

Position	Tube	Ef	Ek	Eg Screen	Ep Suppressor	Ep Pentode
R. F. Amplifier	6D6	6.3	3.2	103	3.2	103
Detector	6C6	6.3	1.8	28 Note "C"	1.8 Note "D"	35 Note "C"
Power Output	43	25	Note "A"	103	.....	96
Rectifier	25Z5	25			..	103
Ballast	16032	Note "B"	..	.....	.....	.....

All above voltages to chassis with 115 volt 60 cycle line. Cathode, screen, suppressor and pentode voltages when operating from 115 volt d.c. line will be 10 percent lower.

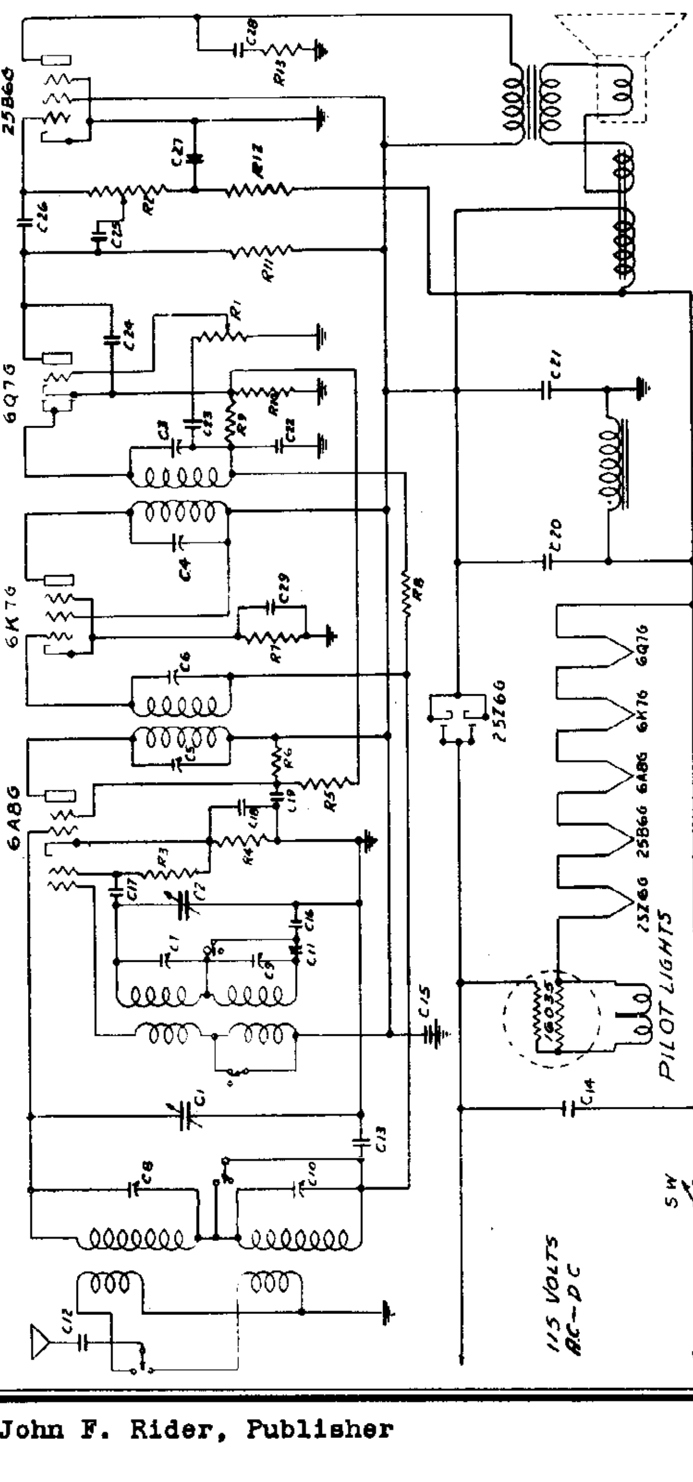
Note "A"—Output pentode bias should be measured across filter choke at 14 volts.
Note "B"—Pins 3 to 7 should measure 50 volts a.c.
Note "C"—Measured with 250,000 ohm voltmeter.
Note "D" Measured with 25,000 ohm voltmeter.

MODEL 60
Schematic, Voltage
Parts

MAJESTIC RADIO & TELEV. CO.

VOLTAGE CHART					
TUBE	FUNCTION	Ef	Ep	E SCREEN	E BIAS
6A8G	Converter	6	106	53	2.3†
6K7G	I. F Amplifier	6	106	106	4.6†
6Q7G	Detector and 1st audio amplifier	6	53*		1.1
25B6G	Power Output Tube	25	99	106	
25Z6G	Rectifier	25			
Ballast	Voltage Equalizer	45			

Line voltage—115 volts A.C.
B supply voltage, B+ to chassis (ground)—106 volts.
B supply voltage, B+ to B— (line)—121 volts
Voltage across filter choke (in negative lead) chassis ground to B——16.5 volts **Note this is the bias voltage for the 25B6G output tube.**
* This reading taken with 1000 ohm voltmeter on 250 volt scale. **True plate voltage is nearer 60 volts.**
† Deduct the bias voltage of the 6Q7G from these values for the net bias.
Voltage across pilot lights approximately 4.8 volts each.
These voltages will be about 10% lower for 115 volts D.C. power supply.



REPLACEMENTS PARTS LIST IF PEAK 456KC

Please Specify Receiver Serial No. When Ordering Parts.

Schematic Location	Part No.	Description
C1 C2	C-17004	Condenser Variable Gang
C11	A-16472	Condenser Variable Padder
C12 C25	15759	Condenser Tubular .006 Mfd. 600 volt
C13 C15	15761	Condenser Tubular .1 Mfd. 200 volt
C14	15757	Condenser Tubular .1 Mfd. 400 volt
C16	15942	Condenser Mica Padder 1710 Mmfd. 5%
C17	15929	Condenser Mica 50 Mmfd. 20%
C18 C19 C29	15752	Condenser Tubular .05 Mfd 200 volt
C20	B-17041-3	Condenser Electrolytic 40 Mfd. 150 volt 1½" can
C21	B-17197	Condenser Electrolytic 40 Mfd. 150 volt 1⅝" can
C22	15928	Condenser Mica 250 Mmfd. (located inside 2nd I. F can)
C23 C26	15760	Condenser Tubular .02 Mfd. 400 volt
C24	15928	Condenser Mica 250 Mmfd.
C27	15775	Condenser Tubular .5 Mfd. 200 volt
C28	15764	Condenser Tubular .03 Mfd. 400 volt
R1	B-17010	Volume control 1,000,000 ohms
R2	B-17047	Tone control 300,000 with on-off line switch
R3	15511	Resistor Carbon 50,000 ohms ¼ watt +— 20%
R4	15571	Resistor Carbon 500 ohms ¼ watt +—10%
R5	15557	Resistor Carbon 20,000 ohms ¼ watt +—10%
R6	15575	Resistor Carbon 12,500 ohms ¼ watt +—10%
R7	15519	Resistor Carbon 700 ohms ¼ watt +—10%
R8	15517	Resistor Carbon 1,000,000 ohms ¼ watt +—20%
R9	15520	Resistor Carbon 500,000 ohms
R10	15537	Resistor Carbon 400 ohms
R11	15504	Resistor Carbon 150,000 ohms
R12	15512	Resistor Carbon 250,000 ohms
R13	15577	Resistor Carbon 7,500 ohms
	15089	Pilot Light Bulb Mazda No. 44
	A-16983	Pilot Light Socket bayonet base
	A-17095	Dial Drive Belt
	A-17020	Dial Drive Belt Spring
	A-17136	Dial Backing
	B-17098	Dial Glass
	17009	Complete Dial and Drive Assembly
	17142	Antenna Transformer Assembly
	17143	Oscillator Transformer Assembly
	17144	1st I. F. transformer Assembly
	B-17007-2	2nd I. F. transformer Assembly
	16994	Antenna Hank
	A-17013	Wave Change Switch
	C-17008-3	Filter Choke
	C-17001	Speaker
	B-16471	Line Cord
	16988	Fish Paper Insulation for Electrolytic Condenser
	A-16598	Knob (Vol. Control, Tuning, Tone Control and Band Switch)
	A-1954	Knob Washers (felt)
	17382	Escutcheon with indicator lens
	16036	Ballast Tube

MODEL 60
MODEL 620
Socket
Trimmers
Alignment

MAJESTIC RADIO & TELEV. CO.

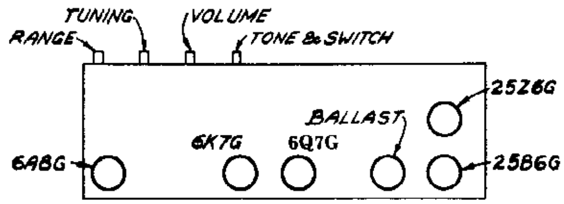
POWER LINE VOLTAGE

The model 620 is designed to operate on 110-115 volts, 50-60 cycles a.c. Serious damage may result if the set is connected to a power supply other than that shown above.

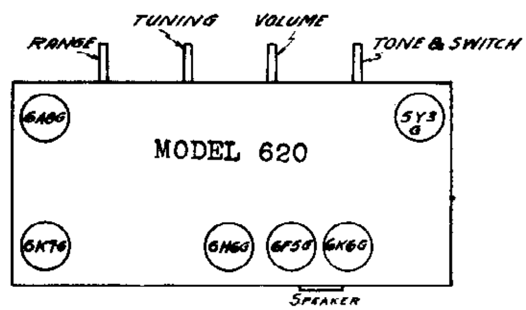
POWER LINE VOLTAGE—The model 60 is designed to operate on 105 to 125 volts, 50-60 cycles a.c. or d.c. Serious damage may result if the set is connected to a power supply other than that shown above. If there is any doubt in your mind, do not plug the set in until you first determine the voltage and cycles from your power supply company.

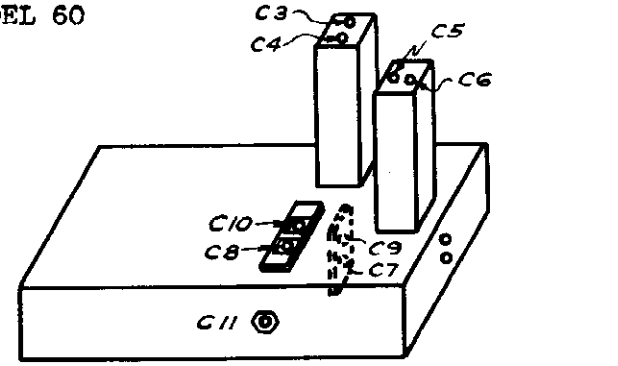
IF THE RECEIVER IS CONNECTED TO A D.C. SUPPLY FOR TWO MINUTES AND NO SIGNAL IS HEARD, REVERSE THE LINE PLUG.

DIAL LIGHTS—There are two No. 44 Mazda bayonet base dial lights in your receiver. It is not considered advisable to operate the receiver when either of the dial lights are defective as this may injure the ballast tube.



MODEL 60





MODEL 620

In order to properly realign the receiver, the following equipment is necessary.

1. A signal generator which will provide an accurately calibrated signal at any frequency from 400 to 7500 kilocycles. The generator should have a modulated and adjustable signal output.

2. An output audio voltmeter to be connected across the moving coil of the speaker. This meter should be of providing a readable deflection for output levels of ½ volt, to avoid the effects of overload.

3. One screw driver; one .25 Mfd. 600 volts condenser; one 200 Mmfd. mica condenser and one 400 ohm resistor.

I. F. SYSTEM

Apply 456 k.c. signal to the grid of 6A8G tube through a tubular condenser on the order of .1 Mfd. Make certain that the wave change switch is in the broadcast position fully counter-clockwise. Turn variable condenser until it is engaged completely.

Referring to figure two which is the trimming diagram: adjust the I. F. capacities in the following order for maximum signal; C6, C5, C3, and C4. Of course to begin with, a very strong signal may be necessary on the input to "find" the preliminary adjustments. As alignment is approached, it is advisable to reduce the generator signal to minimum satisfactory value to prevent the possibility of misalignment due to A.V.C. action When the I. F. system has been adjusted, it will be found advisable to once again readjust C4. In order to derive a symetrical tuning curve, it will be found highly advisable to make all adjustments approach the resonance condition by starting at too high a capacity on the trimmer and working to a smaller value to give maximum output. In other words, having all trimmers down tight, unscrew them and bring the adjustment to a point of resonance. This should be done twice with C4. The general idea being to adjust C4 until the capacity has passed through resonance and has become to small. This is merely to indicate the maximum reading position. Return the capacity to an excess value again and gradually reduce it until it reaches its maximum tuning point.

SHORT WAVE BAND

In all cases the ground side of the generator should be connected to the ground on the chassis of the receiver through a .1 Mfd. or larger tubular paper condenser Apply a 7.2 m.c. signal through a 400 ohm resistance dummy antenna to the terminal strip where the antenna hank connects. Turn the wave change switch in the clockwise direction. Turn the variable condenser until it is completely disengaged. Unscrew trimmer C7 to a minimum capacity. Slowly turn the screw so that trimmer capacity increases until the signal is heard. Adjust C8 until the response is maximum. It may be necessary here to "rock" the variable condenser slightly with the adjustment of C8. The short wave antenna circuit range is now set. Adjust variable condenser until the dial indicator points to 6 m.c. Turn trimmer C7 until signal comes in and reaches maximum. This means that the two circuits are absolutely aligned at this point. Inasmuch as a fixed padder is utilized and comes accurately matched, the two circuits should remain correctly aligned over entire band. It is considered advisable to check this at 4.25 m.c. and 2.4 m.c. These are the three tracking frequencies.

BROADCAST BAND

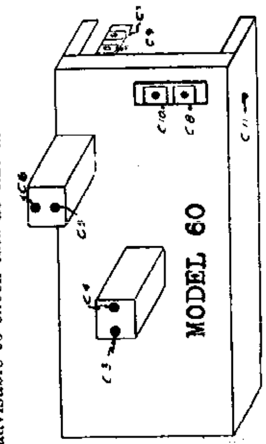


Fig. 2 Location of Trimmers

Shift wave change switch to broadcast position. Replace the 400 ohms dummy antenna with a 200 Mmfd. mica condenser. Apply signal to same input. (Caution—Applying the signal from the generator to the set through the antenna hank may cause serious misalignment.) Apply a 600 k.c. signal. Rotate variable condenser until dial scale pointer indicates 600 k.c. Adjust padder screw C11 until signal is approximately maximum. Disengage variable condenser. Apply 1750 k.c. signal. Turn trimmer C9 to max. sig. Adjust trimmer C10 for max sig. Turn variable condenser until dial indicator reads 1500 k.c. Adjust C9 until signal is maximum at this point. Shift variable condenser to 600 k.c. Apply this frequency on the generator. Note the direction in which this frequency has shifted on the dial scale. Accordingly this will determine whether C11 should be increased or decreased to effect a meeting of the oscillator circuit with th antenna circuit by the usual "rocking" process. Reurn again to 1500 k.c. on both generator and dial scale of the receiver; if necessary make a slight adjustment of C9 until signal is maximum at this point.

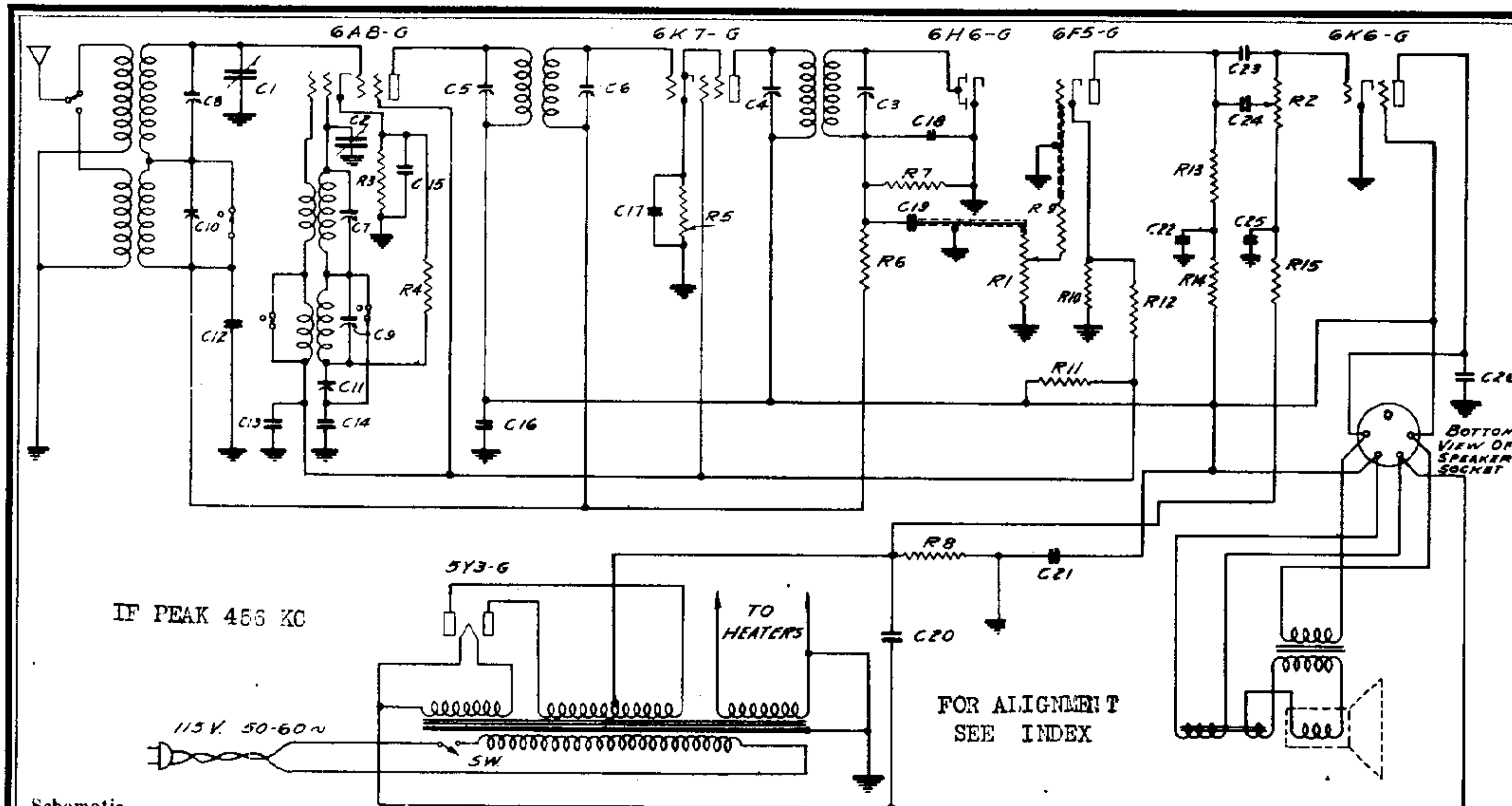
MODEL 620
Schematic, Voltage
Parts

MAJESTIC RADIO & TELEV. CO.

VOLTAGE CHART

TUBE	FUNCTION	Ef	Ep	E SCREEN	E BIAS	E OSC. PLATE
6A8G	Converter	6.3	210	115	4.7	115
6K7G	I. F. Amplifier	6.3	210	115	3.8	
6H6G	Detector—AVC	6.3				
6F5G	Audio Amplifier	6.3	125*		1.5	
6K6G	Power Output	6.3	200	210	14.5	
5Y3G	Rectifier	5.0				

Line voltage—115 volts—60 cycle AC.
All d. c. voltages measured to chassis.
* Measured with 250,000 ohm voltmeter.
Volts across speaker field—100 d. c.



Schematic Location	Part No.	Description
	15089	Bulb Pilot Light (Edgelight)
C1 C2	C-17004	Condenser Variable Gang
C11	A-16472	Condenser Variable Padder
C8 C10	A-17589	Condenser Trimmer (antenna coil)
C7 C9	A-17590	Condenser Trimmer (oscillator coil)
C5 C6	B-17560	Condenser 1st I. F. Trimmer (part of I. F. assembly)
C3 C4	B-17561	Condenser 2nd I. F. Trimmer (part of I. F. assembly)
C15 C17 C25	15752	Condenser Tubular .05 Mfd. 200 V.
C13 C22	15756	Condenser Tubular .05 Mfd. 400 V.
C16	15757	Condenser Tubular .1 Mfd. 400 V.
C12	15761	Condenser Tubular .1 Mfd. 200 V.
C24	15759	Condenser Tubular .006 Mfd. 600 V.
C19 C23	15760	Condenser Tubular .02 Mfd. 400 V.
C26	15771	Condenser Tubular .004 Mfd. 600 V.
C14	15943	Condenser Mica 1710 Mmfd. 5% type W
C20	B-16466	Condenser Wet Electrolytic 16 Mfd. 350 volts
C21	B-16467-2	Condenser Wet Electrolytic 8 Mfd. 250 volts
R1	B-17010	Control Volume 1,000,000 ohms
R2	B-17047	Control Tone 300,000 ohms
R4 R14	15511	Resistor Carbon 50,000 +—20% ¼ watt
R9 R13	15515	Resistor Carbon 100,000 +—20% ¼ watt
R6	15517	Resistor Carbon 1 meg. +—20% ¼ watt
R7	15523	Resistor Carbon 500,000 +—20% ¼ watt
R15	15523	Resistor Carbon 200,000 +—20% ¼ watt
R5	15571	Resistor Carbon 500 +—10% ¼ watt
R8	15584	Resistor Carbon 250 +—10% 1 watt
R12	15586	Resistor Carbon 15,000 +—10% 1 watt
R11	15587	Resistor Carbon 5,000 +—10% 2 watt
R3	15588	Resistor Carbon 350 +—10% ¼ watt
R10	15589	Resistor Carbon 220 +—10% ¼ watt
	A-16829	Socket Speaker
	A-17562	Socket Pilot Light
	A-17095	Dial Drive Belt
	A-17606	Dial Backing
	B-17591	Dial Glass
	17597	Complete Dial and Drive Assembly
	17583	Antenna Coil Assembly
	17584	Oscillator Coil Assembly
	17567	1st I. F. Transformer Assembly
	B-17561	2nd I. F. Transformer Assembly
	A-17013	Wave Change Switch
	C-17580	Speaker 8"
	B-16471	Attachment Cord
	A-16598	Knob
	A-1954	Washer Felt
	17382	Escutcheon with Indicator Lens
	C-16575-6	Transformer Power 110 volts 50-60 cycle

MAJESTIC RADIO & TELEV. CO.

POSITION	TUBE	Ef	Ek	Eg SCREEN	Eg SUPPRESSOR	Ep TRIODE	Ep PENTODE
Converter	6 A8-G	6.3	3.0	90.0		150.0	220.0
I. F. Amplifier	6 K7-G	6.3	3.0	90.0	Connected to gr'd.		220.0
Detector—AVC	6 Q7-G	6.3	2.0			195.0	
Power Output	6 K6-G	6.3	16.0	220.0	Connected to Cathode in Tube		208.0
Rectifier	5 Y3	5.0					

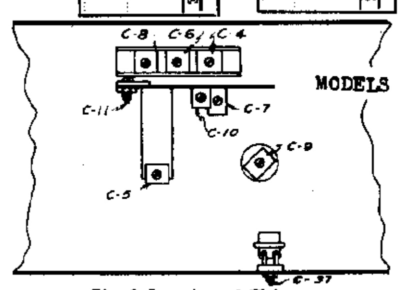
VOLTAGE CHART — MODELS 65 - 66 - 650

POSITION	TUBE	Ef	Ek	Eg SCREEN	Eg SUPPRESSOR	Ep TRIODE	Ep PENTODE
Oscillator	6 C5G	6.3				160.0	
Converter	6 L7G	6.3	3.0	90.0			230.0
I. F. Amplifier	6 K7G	6.3	3.0	90.0			230.0
Detector—AVC	6 Q7G	6.3	2.0			110.0	
Power Output	6 F6G	6.3	14.5	230.0			215.0
Rectifier	5 Y3	5.0					

VOLTAGE CHART — MODELS 75-76-750

POSITION	TUBE	Ef	Ek	Eg SCREEN	Eg SUPPRESSOR	Ep TRIODE	Ep PENTODE
Converter	6 A8-G	6.3	3.0	110.0			225.0
I. F. Amplifier	6 K7-G	6.3	3.0	110.0			230.0
Detector—AVC	6 Q7-G	6.3	2.0			95.0	
Phase Inverter	6 C5G	6.3	7.0			150.0	
Power Output	6 F6G	6.3	14.0	230.0			225
Power Output	6 F6G	6.3	14.0	230.0			225
Rectifier	5 Y3	5.0					

VOLTAGE CHART — MODELS 85-86-850



MODELS 65-66-650
75-76-750

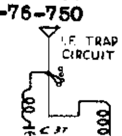


Fig. 2 Location of Trimmers

MODELS 65-66-650; 75-76-750; 85-86-850

ALIGNMENT PROCEDURE

Correct alignment is of extreme importance in all-wave receivers. The receivers are properly aligned at the factory with precision equipment and realignment should not be attempted by the service technician until all other causes of faulty operation are corrected.

In order to properly realign the receiver the following equipment is necessary:

1. A signal generator which will provide an accurately calibrated signal at any frequency from 456 kilocycles to 18 megacycles. The generator should have adjustable signal output.

2. An output audio voltmeter of the low voltage type to be connected across the moving coil of the speaker. This should be capable of providing a readable deflection for relatively low output levels to avoid the effects of overload.

3. An insulated or non-metallic screw driver for the adjustment of trimmers.

I F ALIGNMENT 456 KC

1. Connect the output meter (low scale) across the loud speaker voice coil. Turn the wave band switch to broadcast position. Turn the volume control to its maximum position.

2. Connect the test oscillator ground to chassis and the "hot" lead from the test oscillator to the grid of the converter tube through a series .1 Mfd. condenser. Set test oscillator to 456 KC.

Models 85 and 86 have a two point selectivity or high fidelity control associated with the tone control. This adjustment should be set for highest selectivity during alignment. Highest selectivity is obtained when the switch at the end of the tone control action is in its left or counterclockwise position.

Model 850 has this same control as a separate adjustment (second knob from the left). This adjustment should also be in its left hand or counterclockwise position during alignment.

3. Adjust I F alignment screws of second I F transformer adjacent to power tube to maximum output. reducing output of test oscillator to keep the meter reading on scale as alignment proceeds.

4. Adjust alignment of first I F transformer, (directly behind tuning condenser) to maximum output as described above.

5. Readjust these trimmers for accurate alignment. Always use the lowest possible output from the test oscillator to preclude the possibility of automatic volume control action confusing proper adjustment.

6. Connect "hot" lead of test oscillator to receiver antenna lead in series with 200 Mmfd. condenser, and tune receiver to 550 kilocycles.

7. Adjust C-37 for minimum receiver output.

NOTE: Since coils are used in series it is absolutely necessary to align the high frequency bands first, in the order indicated.

FOREIGN BAND 5.7 TO 18.5 MEGACYCLES

1. With test oscillator connected to the antenna and ground terminals through a 400 ohm resistor set oscillator at 16 megacycles.

2. Set the dial scale to 16 megacycles and adjust the oscillator trimmer condenser (C 4) to a resonance using the counterclockwise or low capacity point.

3. Adjust input circuit trimmer (C 5) to maximum response, rocking the gang condenser back and forth a degree or two to obtain proper maximum.

POLICE OR MIDDLE BAND 1.75 TO 5.8 MEGACYCLES

1. With the test oscillator connected as above set the oscillator and dial to 5.5 megacycles.

2. Adjust oscillator trimmer condenser (C 6) for maximum response using the counterclockwise or low capacity point.

3. Adjust input circuit trimmer (C 7) to maximum response rocking the gang condenser as described above.

BROADCAST BAND 535 TO 1800 KC

1. With test oscillator connected to antenna and ground through a 200 Mfd. condenser set oscillator and receiver dial to 1600 kilocycles.

2. Adjust broadcast oscillator trimmer (C 8) to obtain maximum response.

3. Adjust antenna circuit trimmer (C 9) for maximum output.

4. Adjust preselector trimmer (C 10) for maximum output.

5. Set test oscillator and dial to 600 kilocycles and tune in the signal, then adjust broadcast band padding condenser (C 11) for maximum output This padder is mounted on the aluminum coil deck near the panel and is adjusted through a hole provided in the back of the chassis pan. Rock the condenser back and forth a degree or two in order to obtain proper maximum.

6. Repeat the 1600 KC adjustments described above for greater accuracy.

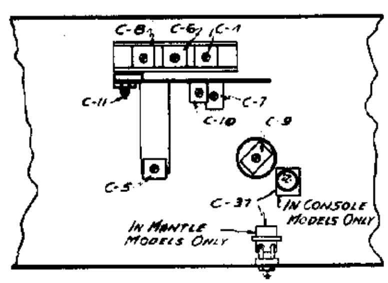


Fig. 2 Location of Trimmers
MODELS 85-86-850

MODELS 65, 66, 650
MODELS 75, 76, 750
MODELS 85, 86, 850
Socket Layouts

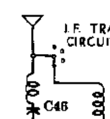
MAJESTIC RADIO & TELEV. CO.

MODEL 1050
Socket, Trimmers
Voltage, Alignment

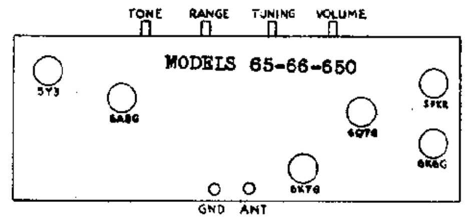
VOLTAGE CHART

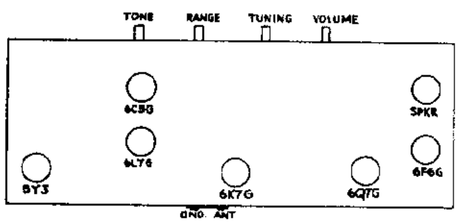
Position	Tube	Ef	Ek	Eg Screen	Eg Suppressor	Ip Triode	Ep Pentode
R. F. Amplifier	6 K7G	6.3	4	90.0	Connected to Cathode		235
Converter	6 L7G	6.3	4	90.0	Connected to Cathode		235
Oscillator	6 C5G	6.3				110	
I. F. Amplifier	6 K7G	6.3	4	90.0	Connected to Cathode		235
Detector A.V.C.	6 Q7G	6.3	1.1			105	
Driver	6 F6G	6.3	16.5	connected to plate	Connected to Cathode in tube	212	
Power Output	6 F6G	6.3	18.5	235	Connected to Cathode in tube		335
Power Output	6 F6G	6.3	18.5	235	Connected to Cathode in tube		335
Rectifier	5 Z3	5.0	340				

MODEL 1050

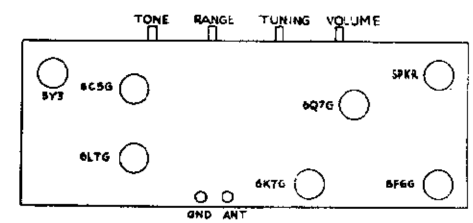


MODEL 1050

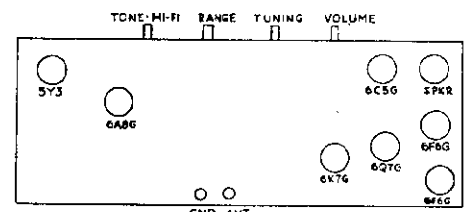




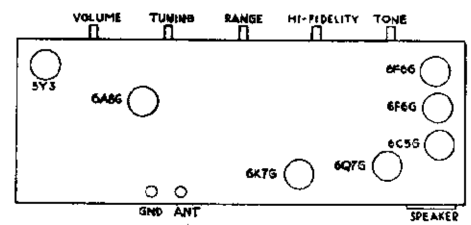
MODELS 75 AND 76



MODEL 750



MODELS 85 AND 86



MODEL 850

ALIGNMENT PROCEDURE

Correct alignment is of extreme importance in all-wave receivers. The receivers are properly aligned at the factory with precision equipment and realignment should not be attempted by the service technician until all other causes of faulty operation are corrected.

In order to properly realign the receiver the following equipment is necessary:

1. A signal generator which will provide an accurately calibrated signal at any frequency from 456 kilocycles to 18 megacycles. The generator should have adjustable signal output.
2. An output audio voltmeter of the low voltage type to be connected across the moving coil of the speaker. This should be capable of providing a readable deflection for relatively low output levels to avoid the effects of overload.
3. An insulated or non-metallic screw driver for the adjustment of trimmers.

I F ALIGNMENT 456 KC

1. Connect the output meter (low scale) across the loud speaker voice coil. Turn the wave band switch to broadcast position. Turn the volume control to its maximum position.
2. Connect the test oscillator ground to chassis and the "hot" lead from the test oscillator to the grid of the 6L7 converter tube through a series .1 Mfd. condenser. Set test oscillator to 456 KC.
3. Turn selectivity control (second from the left) to its high selectivity position. This is the left band or counter-clockwise position.
4. Adjust I. F. alignment screws C17 and C18 of the output transformer to maximum output reducing output of test oscillator to keep meter reading on scale as alignment proceeds.
5. Adjust alignment screws, C15 and C16, of input transformer to maximum output as described above.
6. Readjust all four alignment screws to insure accurate alignment. Always use the lowest possible output from the test oscillator to preclude the possibility of automatic volume control action confusing proper adjustment.
7. Connect "hot" lead of test oscillator to receiver antenna lead in series with 250 Mmfd. condenser and tune receiver to 550 kilocycles.
8. Adjust C-46 for minimum receiver output.

R. F. ALIGNMENT BROADCAST BAND

1. With test oscillator connected to the antenna post through .00025 Mfd., set signal generator to 1600 KC.
2. Set travelite indicator to end of scale (beyond 550 KC calibration) with gang condenser fully meshed at maximum capacitance.
3. Set dial to 1600 KC. Adjust broadcast oscillator trimming condenser, C9, for maximum output meter reading.
4. Adjust detector input trimmer, C14, to a maximum.
5. Adjust antenna stage trimmer, C6, to a maximum.
6. Set test oscillator to 600 KC and tune in the signal, then adjust broadcast oscillator padder, C10, for maximum output. Rock the main tuning adjustment back and forth a degree or two in order to obtain proper maximum.
7. Repeat adjustments described under 3, 4, and 5 for greater accuracy.

POLICE OR SECOND BAND

1. Turn the wave switch to second or police band. Leave oscillator connected as above but with the output set to 5000 KC and the .00025 Mfd. condenser replaced by a 400 ohm resistor. Set dial scale to 5 MC on the second band. Adjust oscillator trimming condenser C8 for maximum output, observing as before that the proper point occurs at the minimum or counter-clockwise position of the screw as two points are found.
2. Adjust detector input trimming condenser, C13, to maximum, while rocking the tuning condenser slightly for maximum response.
3. Adjust antenna stage trimmer, C5, for maximum output.
4. Set test oscillator to 2000 KC and tune in the signal. Adjust oscillator padding condenser, C11, for maximum output, while rocking the tuning condenser as described above.
5. Repeat operations 1, 2 and 3 to assure precise alignment.

FOREIGN OR THIRD BAND

1. With the test oscillator connected the same as above and set to 16000 KC (16MC) set the dial to 16MC on the third band.
2. Adjust oscillator trimming condenser, C7, for maximum response. Use lower capacity or counter-clockwise response point.
3. Adjust detector input trimmer, C12, to maximum, rocking tuning adjustment.
4. Adjust antenna trimmer, C4, for maximum response.

ULTRA HIGH FREQUENCY OR INSIDE BAND

This band was adjusted at the factory and will not require further adjustment.

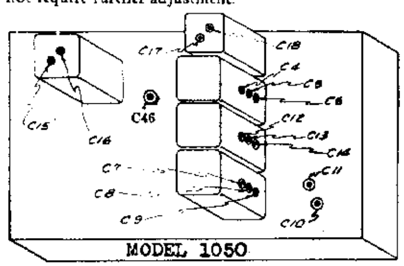
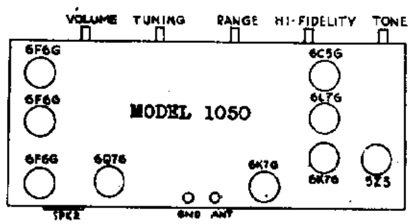
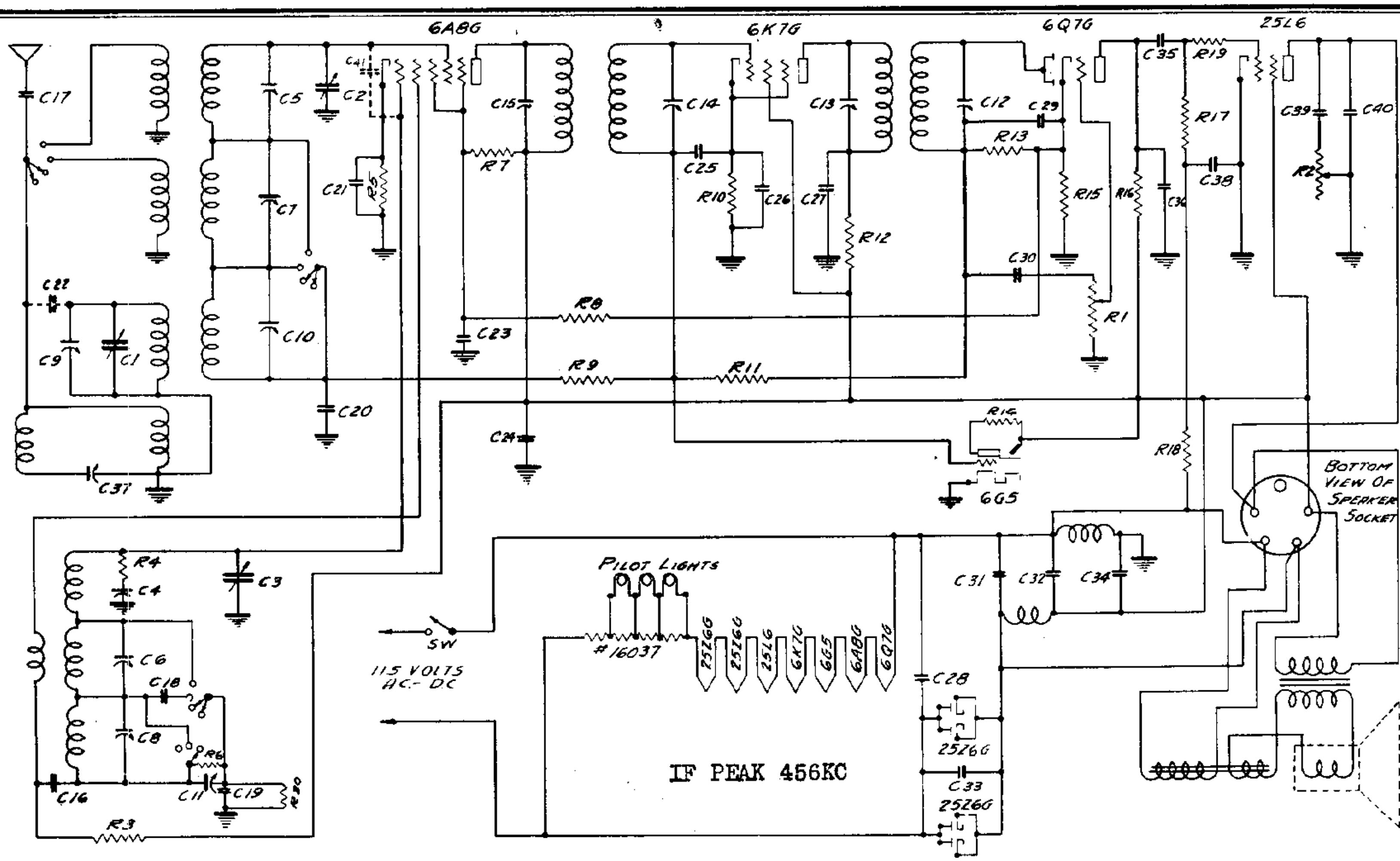


Fig. 2 Location of Trimmers



MAJESTIC RADIO & TELEV. CO.



VOLTAGE CHART							
POSITION	TUBE	Ef	Ek	Eg SCREEN	Ep SUPPRESSOR	Ep OSC.	Ep PENTODE
Converter	6A8G	6.3	2.4	54.0		85	110
I. F. Amplifier	6K7G	6.3	3.8	110.0	3.8		104
Det. AVC	6Q7G	6.3	.95				57 "C"
Power Output	25L6	25	"B"	110.0			103
Rectifier	(2) 25L6G	25					110
Tuning Eye	6G5	6.3	"O"				110
Ballast	A-16037	"A"					

All voltage shown on chart measured to chassis, with receiver connected to 117 volt 60 cycle line. Cathode, screen, suppressor and plate voltages when operating from 117 volt D. C. line will be 10 percent lower.
"A" Pin No. 3 to No. 7—17.0 volts a.c.
"B" 8 volts measured across 2nd filter choke

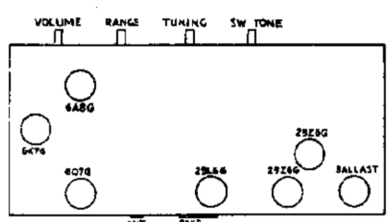
MODEL 800
Socket, Trimmers
Alignment, Parts

MAJESTIC RADIO & TELEV. CO.

REPLACEMENT PARTS MODEL 800

State serial number of receiver when ordering parts.

Schematic Locator	Part No.	Description
	16885	Bulb Pilot Light (Edgelight)
	16589	Bulb Pilot Light (Travelite)
C1 C2 C3	B-16461-3	Condenser Variable Gang
C4 C6 C8	A-16473	Condenser Trimmer 3-30 Mmfd. triple strip bakelite
C5 C9	A-16474	Condenser Trimmer 3-30 Mmfd. ceramic base
C10	A-17486	Condenser Trimmer 1½-10 Mmfd. bakelite base
C7	A-16246-2	Condenser Trimmer 3-30 Mmfd. bakelite base
C11	A-16472	Condenser Variable Padder 340-960 Mmfd.
C16	15930	Condenser Mica 2000 Mmfd. +—20% Type W
C17	15767	Condenser Tubular .001 Mfd. 600 volts
C18	15932	Condenser Mica 1750 Mmfd. +—5% Type W
C19	15931	Condenser Mica 4300 Mmfd. +—5% Type W
C20 C24 C25	15752	Condenser Tubular .05 Mfd. 200 volts
C26 C27	15752	Condenser Tubular .05 Mfd. 200 volts
C21 C23	15761	Condenser Tubular .1 Mfd. 200 volts
C28 C39	15757	Condenser Tubular .1 Mfd. 400 volts
C29	15928	Condenser Mica 250 Mmfd. +—20% Type O
C30 C35	15772	Condenser Tubular .02 Mfd. 200 volts
C31	B-17041-3	Condenser Wet Electrolytic 40 Mfd. 150 volts
C32	3-17197	Condenser Wet Electrolytic 40 Mfd. 150 volts
C33	15754	Condenser Tubular .01 Mfd. 400 volts
C34	B-17042	Condenser Wet Electrolytic 25 Mfd. 150 volts
C36	15918	Condenser Mica 100 Mmfd. +—20% Type O
C37	B-16786	Condenser Padder 20-55 Mmfd.
C38	15751	Condenser Tubular .25 Mfd. 200 volts
C40	15760	Condenser Tubular .02 Mfd. 400 volts
R1	B-17411	Control Volume (1 megohm)
R2	A-17408	Control Tone and line switch (15,000 ohms)
R3	15531	Resistor Carbon 10,000 +—20% ¼ watt
R4	3320	No. 38 D. C. C. Manganin wire 2 ohms
R5 R10	15533	Resistor Carbon 600 ohms +—10% ¼ watt
R6 R20	15529	Resistor Carbon 25,000 ohms +—20% ¼ watt
R7	15575	Resistor Carbon 12,500 ohms +—10% ¼ watt
R8	15557	Resistor Carbon 20,000 ohms +—10% ¼ watt
R9 R19	15515	Resistor Carbon 100,000 ohms +—20% ¼ watt
R11	15517	Resistor Carbon 1 megohm +—20% ¼ watt
R12	15542	Resistor Carbon 1,000 ohms +—20% ¼ watt
R13 R14	15520	Resistor Carbon 500,000 ohms +—20% ¼ watt
R15	15537	Resistor Carbon 400 ohms +—10% ¼ watt
R16	15504	Resistor Carbon 150,000 ohms +—20% ¼ watt
R17	15549	Resistor Carbon 300,000 ohms +—20% ¼ watt
R18	15523	Resistor Carbon 200,000 ohms +—20% ¼ watt
	17499	Coil and mounting assembly (oscillator, antenna and wave switch)
	17501	Preselector coil assembly
	17502	Wave trap assembly
	17436	Drive and Indicator assembly (complete)
	B-17298	Dial Glass
	B-17199	Dial Glass Backing
	17549	Escutcheon with indicator lenses
	A-16598	Knob (tone and volume)
	A-16597	Knob (tune and band switch)
	A-16829	Socket Speaker
	B-17413	Socket 6G5 with leads
	A-17514	Socket pilot light edgelight R. H.
	A-17515	Socket pilot light edgelight L. H.
	17446	Socket pilot light travelite
	C-17495	Speaker
	17505	Transformer 1st I. F.
	B-17317	Transformer 2nd I. F.
	C-17423	Choke Filter
	A-1954	Washer Felt (large)
	A-1955	Washer Felt (small)
	17525	Balance Wheel
	A-16037	Ballast Tube
	17440	Universal Joint
	17453	Band Pulley
	A-5706	Travel light
	A-17133	Dial Glass Clip
	A-17203	Belt Drive
	A-17383	Pilot Light Shield



POWER LINE VOLTAGE

The model 800 is designed to operate on 105 to 125 volts, 50-60 cycles a.c. or d.c. Serious damage may result if the set is connected to a power supply other than that shown above. If there is any doubt in your mind, do not plug in the set until you first determine the voltage and cycles from your power supply company.

ALIGNMENT PROCEDURE

Correct alignment is of extreme importance in all wave receivers. The receivers are properly aligned at the factory with precision equipment and realignment should not be attempted by the service technician until all other causes of faulty operation are corrected.

In order to properly realign the receiver the following equipment is necessary:

1. A signal generator which will provide an accurately calibrated signal at any frequency from 456 kilocycles to 18 megacycles. The generator should have adjustable signal output.

2. An output audio voltmeter of the low voltage type to be connected across the moving coil of the speaker. This should be capable of providing a readable deflection for relatively low output levels to avoid the effects of overload.

3. An insulated or non-metallic screw driver for the adjustment of trimmers.

I. F. ALIGNMENT 456 KC

1. Connect the output meter (low scale) across the loud speaker voice coil. Turn the wave band switch to broadcast position. Turn the volume control to its maximum position.

2. Connect the test oscillator ground to chassis in series with .25 Mfd 600 volt condenser, and the "hot" lead from the test oscillator to the grid of the 6A8G converter tube through a series .1 Mfd. condenser. Set test oscillator to 456 KC.

3. Adjust I. F. alignment screws of second I. F. transformer (at rear corner of chassis) to maximum output, reducing output of test oscillator to keep the meter reading on scale as alignment proceeds.

4. Adjust alignment of first I. F. transformer (rear front corner of chassis) to maximum output as described above.

5. Readjust these trimmers for accurate alignment. Always use the lowest possible output from the test oscillator to preclude the possibility of automatic volume control action confusing proper adjustment.

6. Connect "hot" lead of test oscillator to receiver antenna lead in series with 200 Mmfd. condenser.

7. Adjust C37 for minimum output, increasing test oscillator output until a signal is heard when C37 is adjusted for minimum output.

NOTE: Since coils are used in series it is absolutely necessary to align the high frequency bands first in the order indicated.

FOREIGN BAND 5.7 TO 18.5 MC

1. With test oscillator connected to the receiver antenna lead through a 400 ohm resistor, set oscillator at 16 megacycles.

2. Set the dial scale to 16 megacycles and adjust the oscillator trimmer condenser (C4) to a resonance using the counter-clockwise or low capacity point.

3. Adjust input circuit trimmer (C5) to maximum response, rocking the gang condenser back and forth a degree or two to obtain proper maximum.

POLICE OR MIDDLE BAND 1.75 TO 5.8 MC

1. With the test oscillator connected as above set the oscillator and dial to 5.5 megacycles.

2. Adjust oscillator trimmer condenser (C6) for maximum response using the counter-clockwise or low capacity point.

3. Adjust input circuit trimmer (C7) to maximum response rocking the gang condenser as described above.

BROADCAST BAND 535 TO 1800 KC

1. With test oscillator connected to receiver antenna lead through a 200 Mmfd. condenser, set oscillator and receiver dial to 1600 kilocycles.

2. Adjust broadcast oscillator trimmer (C8) to obtain maximum response.

3. Adjust antenna circuit trimmer (C9) for maximum output.

4. Adjust preselector trimmer (C10) for maximum output.

5. Set test oscillator and dial to 600 kilocycles and tune in the signal, then adjust broadcast band padding condenser (C11) for maximum output. This padder is mounted on the aluminum coil deck near the panel and is adjusted through a hole provided in the back of the chassis pan. Rock the condenser back and forth a degree or two in order to obtain proper maximum.

6. Repeat the 1600 kilocycle adjustments described above for greater accuracy.

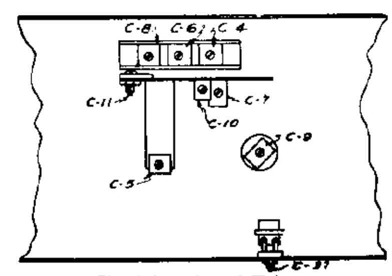
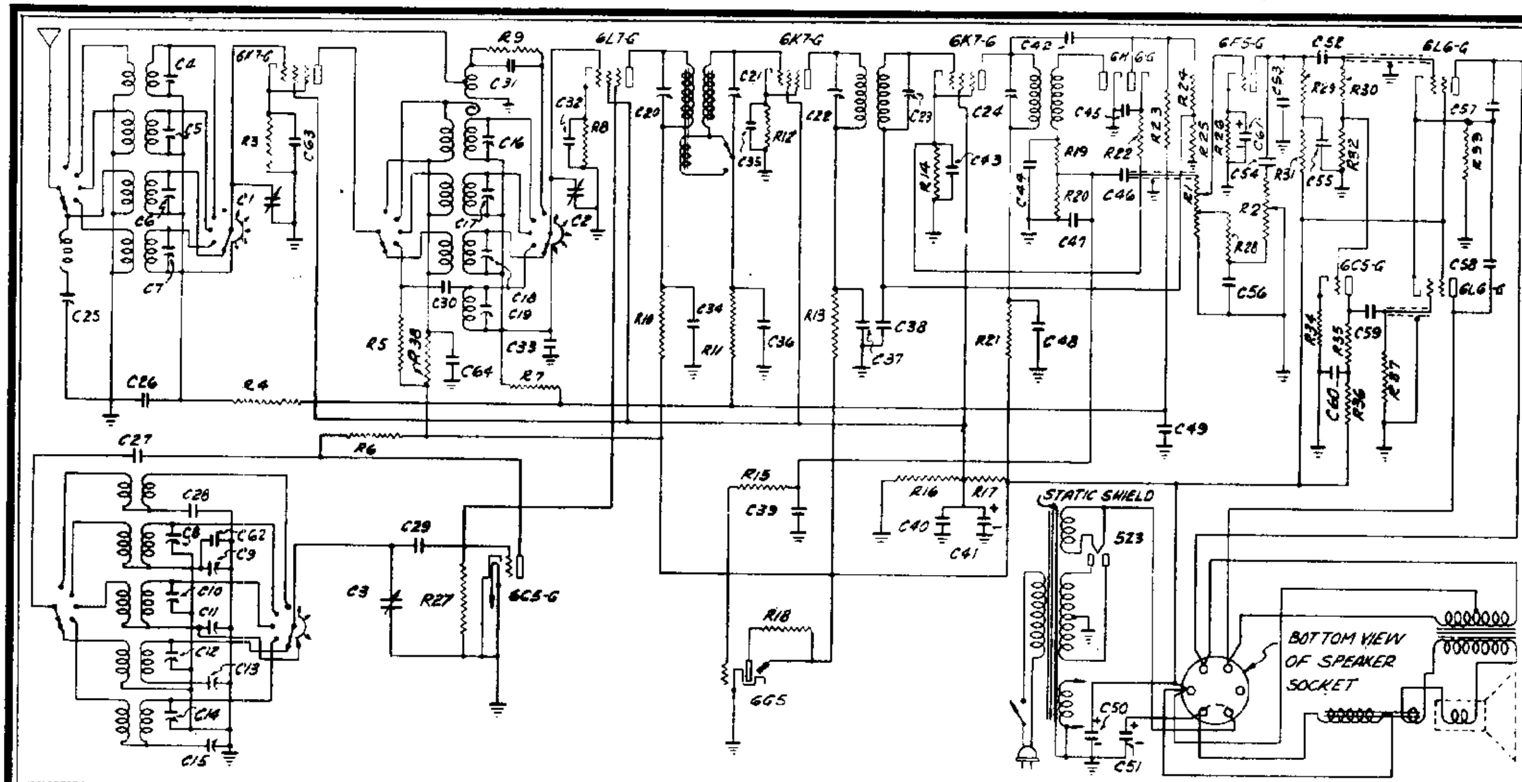


Fig. 2 Location of Trimmers

MAJESTIC RADIO & TELEV. CO.

MODEL 1250
Schematic
Parts

15248	Socket Speaker
B-16637-2	Socket 6G5 with leads
C-16581-2	Speaker 15"
B-16610-2	Transformer 1st I. F.
B-16611-3	Transformer 2nd I. F.
B-16612-3	Transformer 3rd I. F.
C-16578-4	Transformer Power 110 v. 50-60 cycle
A-16701	Trap Wave
A-1954	Washer Felt (large)
A-1955	Washer Felt (small)
17304	Drive and Indicator Assembly
17303	Dial Glass
17161	Dial Glass Backing
17884	Escutcheon No. 4 with Indicator Lens
A-17114	Socket Pilot Light, Edgelight R. H.
A-17115	Socket Pilot Light, Edgelight L. H.
A-17168	Socket Pilot Light, Travelite



IF PEAK 456KC

SCHEMATIC LOCATION	PART. NO.	DESCRIPTION
	15089	Bulb Pilot Light (edgelight)
	16589	Bulb Pilot Light Frosted (travelite)
C1 C2 C3	C-16543-2	Condenser Variable Gang
C4 C5 C6	A-16552	Condenser Trimmer 5-50 Mmfd. (triple strip)
C7 C14 C19	A-16667-2	Condenser Trimmer 8-80 Mmfd. (bakelite base)
C16 C17 C18	A-16552	Condenser Trimmer 3-50 mmfd. (triple strip)
C8 C10 C12	A-16552	Condenser Trimmer 5-50 Mmfd. (triple strip)
C13	B-16603	Condenser Padder 300-700 Mmfd.
C9	B-16604	Condenser Padder 1000-3000 Mmfd.
C11	B-16605	Condenser Padder 600-1800 Mmfd.
C11	B-16606	Condenser Padder 100-300 Mmfd.
C25	B-16786	Condenser Padder 20-55 Mmfd.
C20 C21	B-16610-2	Condenser Trimmer (part of 1st I. F. assembly)
C22 C23	B-16611-3	Condenser Trimmer (part of 2nd I. F. assembly)
C24	B-16612-3	Condenser Trimmer (part of 3rd I. F. assembly)
C50 C51	B-16613-2	Condenser Dry Electrolytic Dual 12 Mfd. 350 V.
C41 C61	B-16614-3	Condenser Tubular Dry Electrolytic Dual 8-10 Mfd. 200-12 V.
C44 C47	15918	Condenser Mica 100 Mmfd. 20% type O
C29	15919	Condenser Mica 50 Mmfd. 10% Type O
C53	15928	Condenser Mica 250 Mmfd. 20% Type O
C42	15929	Condenser Mica 50 Mmfd. 20% Type O
C62	15932	Condenser Mica 17500 Mmfd. 5% Type W
C54	15933	Condenser Mica 4000 Mmfd. 20% Type W
C28 C31	15935	Condenser Mica 650 Mmfd. 20% Type W
C30	15938	Condenser Mica 10 Mmfd. 20% Type G
C26 C33 C49	15752	Condenser Tubular .05 Mfd. 200 volts
C63 C32 C35 C43	15752	Condenser Tubular .05 Mfd. 200 volts
C45 C38 C36	15752	Condenser Tubular .05 Mfd. 200 volts
C46 C57 C58	15753	Condenser Tubular .062 Mfd. 600 volts
C34 C64	15756	Condenser Tubular .05 Mfd. 400 volts
C40 C48 C37	15757	Condenser Tubular .1 Mfd. 100 volts
C55 C60 C52 C59	15760	Condenser Tubular .02 Mfd. 400 volts

SCHEMATIC LOCATION	PART. NO.	DESCRIPTION
C39	15769	Condenser Tubular .01 Mfd. 200 volts
C56	15772	Condenser Tubular .02 Mfd. 200 volts
C27	15774	Condenser Tubular .002 Mfd. 400 volts
R1	B-16565-2	Control Volume with 110 switch
R2	B-16566-2	Control Tone
	A-16541-2	Control High Fidelity
	16890	Coil Antenna in Shield
	16891	Coil Detector in Shield
	16892	Coil Oscillator in Shield
	A-16696	Knob (tune and high fidelity)
	A-16538	Knob (volume and tone)
	A-16597	Knob (band switch)
R28 R19	15510	Resistor Carbon 20,000 +—20% ¼ watt
R35 R5	15511	Resistor Carbon 50,000 +—20% ¼ watt
R25 R29	15512	Resistor Carbon 250,000 +—20% ¼ watt
R16	15560	Resistor Carbon 25,000 +—10% ½ watt
R7 R4 R31 R36 R11	15515	Resistor Carbon 100,000 +—20% ¼ watt
R23 R15	15517	Resistor Carbon 1 meg. +—20% ¼ watt
R9 R20 R24	15520	Resistor Carbon 500,000 +—20% ¼ watt
R22	15531	Resistor Carbon 10,000 +—20% ¼ watt
R3 R8	15588	Resistor Carbon 600 +—10% ¼ watt
R27	15552	Resistor Carbon 30,000 +—20% ¼ watt
R32	15557	Resistor Carbon 20,000 +—10% ¼ watt
R6	15514	Resistor Carbon 25,000 +—20% ½ watt
R30	15561	Resistor Carbon 150,000 +—10% ¼ watt
R10 R13 R21 R38	15564	Resistor Carbon 1,500 +—20% ¼ watt
R26	15565	Resistor Carbon 4,000 +—10% ¼ watt
R37	15605	Resistor Carbon 100,000 +—10% ¼ watt
R34	15611	Resistor Carbon 3,000 +—10% ¼ watt
R17	15618	Resistor Carbon 20,000 +—10% 2 watt
R14	15566	Resistor Carbon 2,000 +—10% ¼ watt
R12	15576	Resistor Carbon 5000-2 +— 10% ¼ watt
R33	A-16785	Resistor Candohm 220 ohm 3 watt

MODEL 1250
Socket, Trimmers
Voltage, Alignment

MAJESTIC RADIO & TELEV. CO.

I. F. ALIGNMENT 456 KC

1. Connect the output meter (low scale) across the loud speaker voice coil. Turn the wave band switch to extreme clockwise position (broadcast band). Turn the volume control to maximum position. Rotate the hi-fidelity switch to the counter-clockwise position and the volume control to the "treble" or clockwise position.
2. Connect the test oscillator ground to chassis and the "hot" lead from the oscillator to the grid of the 6L7 converter tube through a series .1 mfd. condenser. Set test oscillator to 456.0 KC.
3. Adjust I. F. alignment screw of 3rd I. F. assembly, at rear of chassis, to maximum output, reducing output of test oscillator to keep meter reading on scale as alignment proceeds.
4. Adjust I. F. alignment screws of 2nd I. F. transformer adjacent to 3rd I. F. transformer, for maximum output as described above.
5. Adjust alignment screws of 1st I. F. transformer, near front of chassis, for maximum output as described above.
6. Re-adjust alignment screws of all three transformers to make sure of accurate alignment. Always use lowest possible output of test oscillator to preclude the possibility of the automatic volume control action confusing correct alignment.

WAVE TRAP ADJUSTMENT

1. With test oscillator still set at 456.0 KC remove series condenser from grid of 6L7 converter tube and substitute a 200mmfd. condenser in its place.
2. Connect test oscillator lead to antenna post of receiver.
3. Keep variable condenser at maximum capacity position with wave band switch in broadcast position.
4. Raise output of test oscillator until a half scale meter deflection is obtained.
5. Adjust trimmer No. C-25 (located on chassis) until the meter reading is at the minimum deflection (toward zero).

BROADCAST BAND—535-1720 KC

1. Set test oscillator to 1600 KC. Connect oscillator to receive through a 200 mmfd. condenser.
2. Rotate wave band switch to full clockwise direction.
3. Set dial scale to 1600 KC, and adjust trimmer C-19 to a resonance.
4. Adjust trimmer C-18 for maximum response.
5. Adjust trimmer C-6 for maximum response.
6. Set test oscillator to 600 KC.
7. Set dial scale to 600 KC and adjust padding condenser C-13 for maximum response "rocking" gang condenser while adjustment is made, to obtain proper resonance.
8. Repeat the adjustments at 1600 KC to obtain greater accuracy.

WEATHER BAND—140-410 KC

1. Set test oscillator to 400 KC. Use 200 mmfd. condenser in series with oscillator lead.
2. Rotate wave band switch one position in counter-clockwise direction.
3. Set dial scale to 400 KC and adjust trimmer C-14 to a resonance.
4. Adjust trimmer C-19 to a mixmum response.
5. Adjust trimmer C-7 to a maximum response.
6. Set test oscillator to 160 KC.
7. Set dial scale to 160 KC and adjust padding condenser C-15 to maximum response, "rocking" gang condenser while adjustment is made, to obtain proper resonance.

POLICE BAND—1.7-5.8 Megacycles

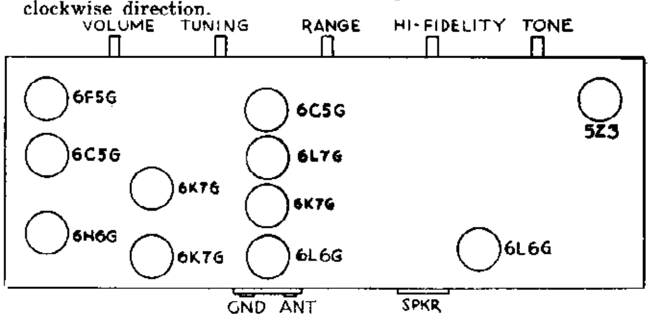
1. Set test oscillator to 5.5 megacycles, (400 ohm resistor in series with oscillator lead).
2. Rotate wave band switch counter-clockwise one position.
3. Set dial scale to 5.5 megacycles, and adjust C-10 to a resonance. The resonance obtained with the trimmer in the low capacity direction, being the correct one.
4. Adjust trimmer C-17 to a maximum response, "rocking" gang condenser while adjustment is made, to obtain proper resonance.
5. Adjust trimmer C-5 to a maximum response, "rocking" gang condenser while adjustment is made, to obtain proper resonance.
6. Set test oscillator to 2.0 megacycles.
7. Set dial scale to 2.0 megacycles, and adjust padding condenser C-11 for maximum response, "rocking" gang condenser while adjustment is made, to obtain proper resonance.
8. Repeat the adjustments at 5.5 megacycles to obtain greater accuracy.

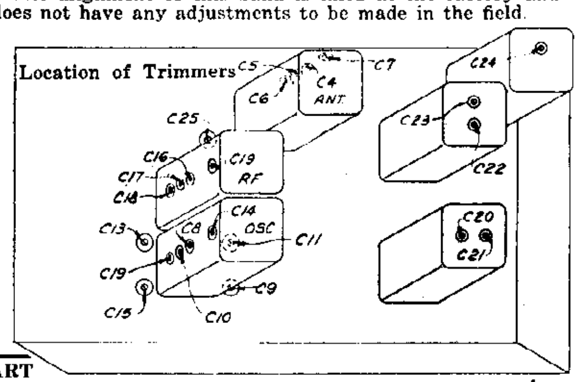
FOREIGN BAND—5.6-18.0 Megacycles

1. With test oscillator connected to the antenna and ground terminals through a 400 ohm resistor, set oscillator at 16.0 megacycles.
2. Rotate the wave band switch to the 4th position in the counter-clockwise position. Set dial scale to 16.0 megacycles.
3. Adjust oscillator trimmer C-8 to a resonance. There will possibly be two resonant points noticed. The one obtained with the trimmer out in the minimum capacity direction, is the correct one.
4. Adjust trimmer C-16 to maximum response, "rocking" the gang condenser back and forth a degree or two to obtain proper resonance.
5. Adjust trimmer C-4 to maximum response, "rocking" gang condenser while trimming to obtain proper resonance.
6. Set test oscillator to 6.0 megacycles.
7. Set dial scale to 6.0 megacycles, and adjust padding condenser C-9 until a maximum response is obtained, "rocking" the gang condenser while adjustment is made to obtain proper resonance.
8. Return to 16.0 megacycles and check adjustment of C-8, C-16, and C-4 to make certain that the adjustment of C-9 has not disturbed their adjustments.

ULTRA HIGH FREQUENCY BAND 16.5-42.0 Megacycles

The alignment of this band is fixed at the factory and does not have any adjustments to be made in the field.





VOLTAGE CHART

Position	Tube	Ef	Ek	Eg Screen	Eg Suppressor	Ep Triode	Ep Pentode
R. F. Amplifier	6 K7G	6.3	3.5	85.0	Tied to Cathode		278.0
1st I. F. Amplifier	6 K7G	6.3	5.0	85.0	Tied to Cathode		275.0
Converter	6 L7G	6.3	3.5				275.0
Oscillator	6 C5G	6.3				100.0	
2nd I. F. Amplifier	6 K7G	6.3	5.0	85.0	Tied to Cathode		275.0
Detector A.V.C.	6 H6G	6.3	2.5				
1st Audio	6 F5G	6.3	1.5			200.0	
Phase Inverter	6 C5G	6.3	3.5			75.0	
Audio Output	6 L6G	6.3	22.0	280.0			275.0
Audio Output	6 L6G	6.3	22.0	280.0			275.0
Rectifier	5 Z3	5.0					

MODEL SW5-36 AC-DC
Schematic, Alignment
Voltage

MID-WEST RADIO CORP.

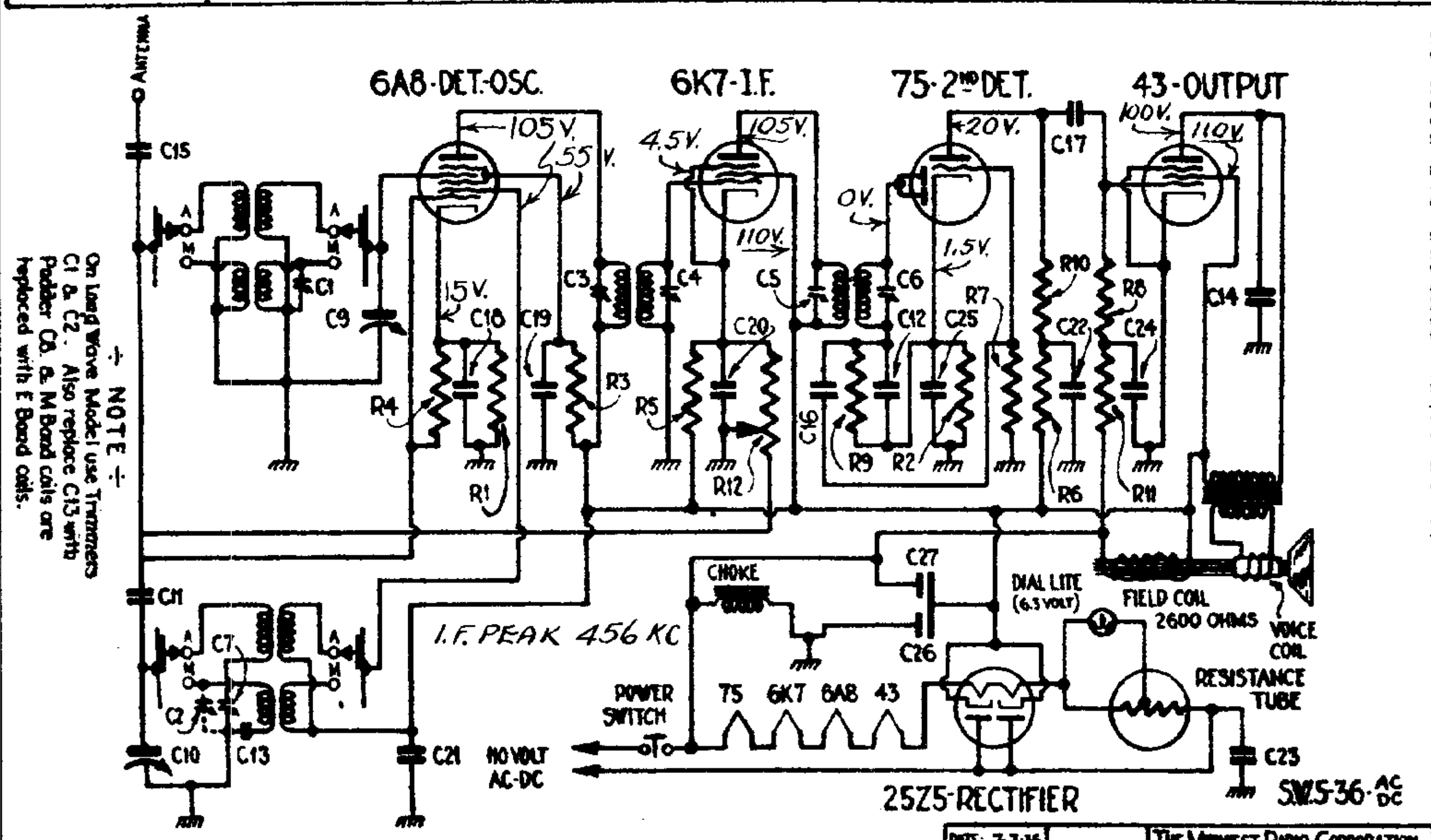
(2) Connect signal generator to antenna post on set through a standard dummy antenna. Remove short circuit from condenser. Set generator and dial to 1500 k.c. and peak bariable condensers for maximum output on meter. For low frequency adjustment set dial at 600 k.c. and peak padding condenser on front of chassis. Short wave calibration is automatically taken care of by fixed calibrated trimmers and padders. No need for further adjustment.

CONDENSERS

C1	L.W. TRIMMER	C7	PADDER	C13	.0028 MFD. MICA	C19	.05 MFD. PAPER	C25	5 MFD. ELECTROLYTIC COND.
C2	" "	C8	"	C14	.006 MFD "	C20	" "	C26	12 MFD. ELECTROLYTIC COND.
C3	I.F. TRIMMER	C9	TUNING CONDENSER	C15	.02 MFD PAPER	C21	" "	C27	20 MFD. ELECTROLYTIC COND.
C4	"	C10	" "	C16	" "	C22	.1 MFD. 200 V.		
C5	"	C11	100 MMFD. MICA	C17	" "	C23	.1 MFD 400 V.		
C6	"	C12	350 MMFD. "	C18	.05 MFD "	C24	.25 MFD. PAPER		

RESISTORS

R1	240 OHMS	R7	100,000 OHMS
R2	6,500 OHMS	R8	260,000 OHMS
R3	25,000 OHMS	R9	500,000 OHMS
R4	50,000 OHMS	R10	" "
R5	" "	R11	" "
R6	67,000 OHMS	R12	VOLUME CONTROL



DATE: 7-3-36
SCALE: NONE

THE MIDWEST RADIO CORPORATION
CINCINNATI, OHIO, U.S.A.

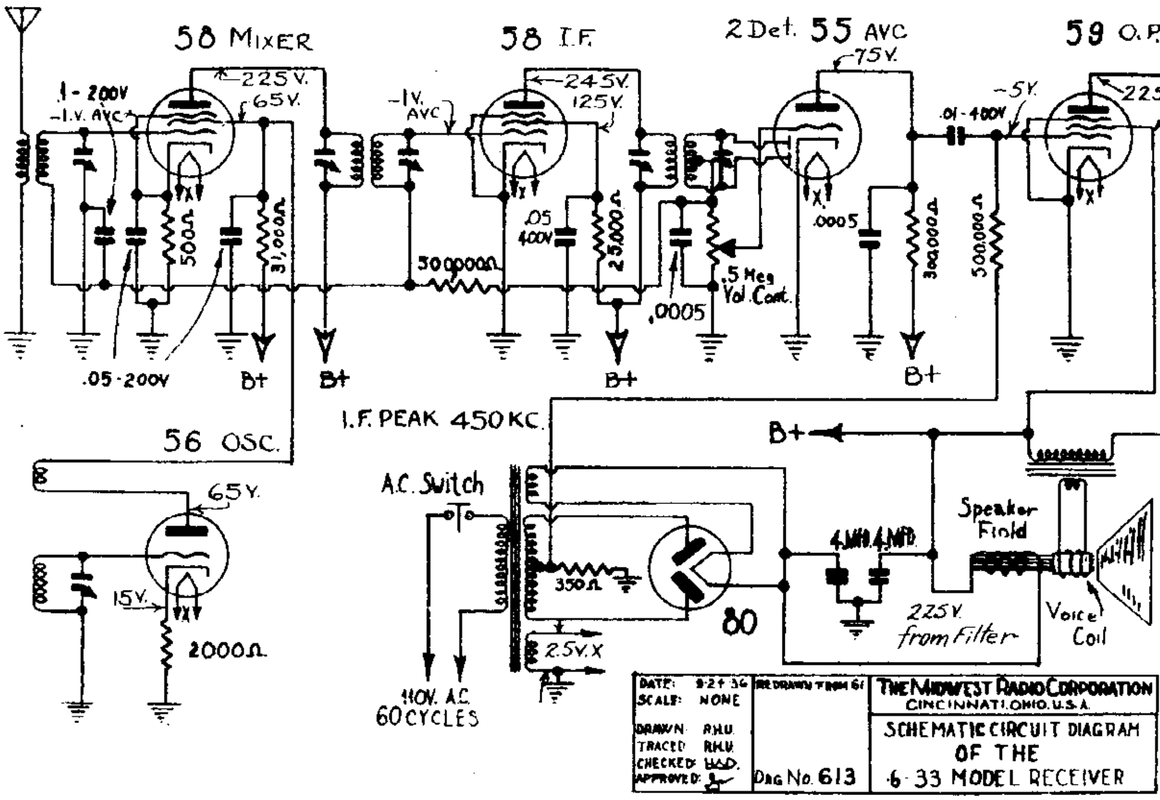
SCHEMATIC CIRCUIT DIAGRAM OF THE SW.5-36 AC-DC MODEL RECEIVER

Dwg. No. 561

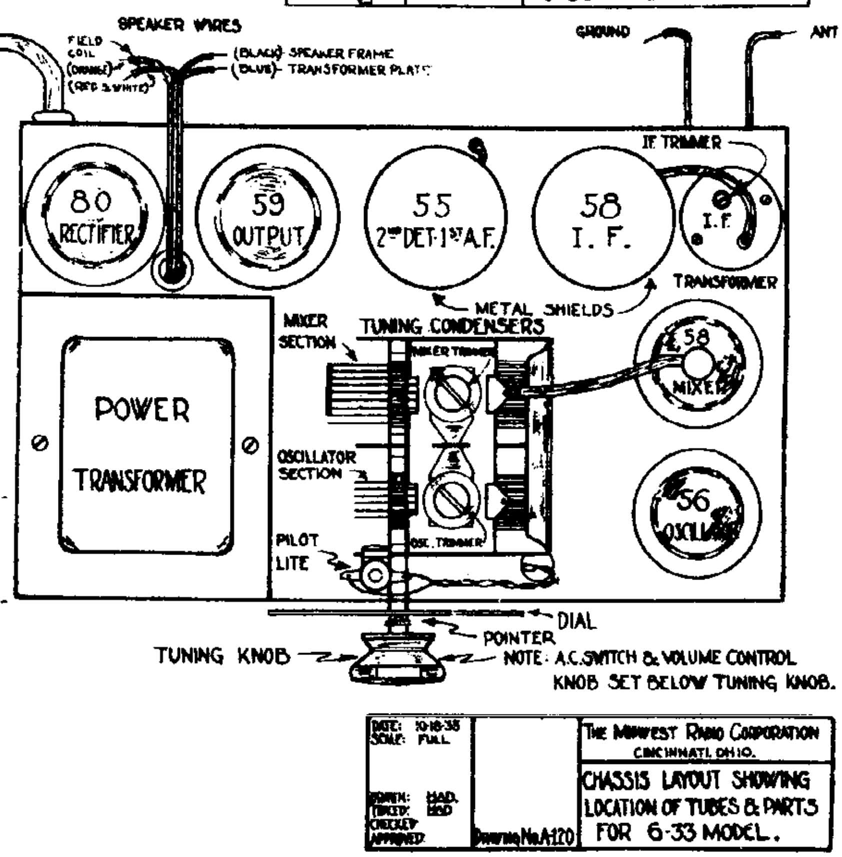
(1) Set signal generator to 456 k.c. and connect output meter from plate of 43 tube to ground. Connect output of signal generator to grid of 6A8 tube. Ground stator of front section of variable condenser. Adjust both grid and plate trimmers of 1st and 2nd I.F. transformers for maximum gain on output meter.

MODEL 6-33
Schematic, Socket
Voltage, Alignment

MID-WEST RADIO CORP.



AC PLUG
110 VOLT AC
60 CYCLES

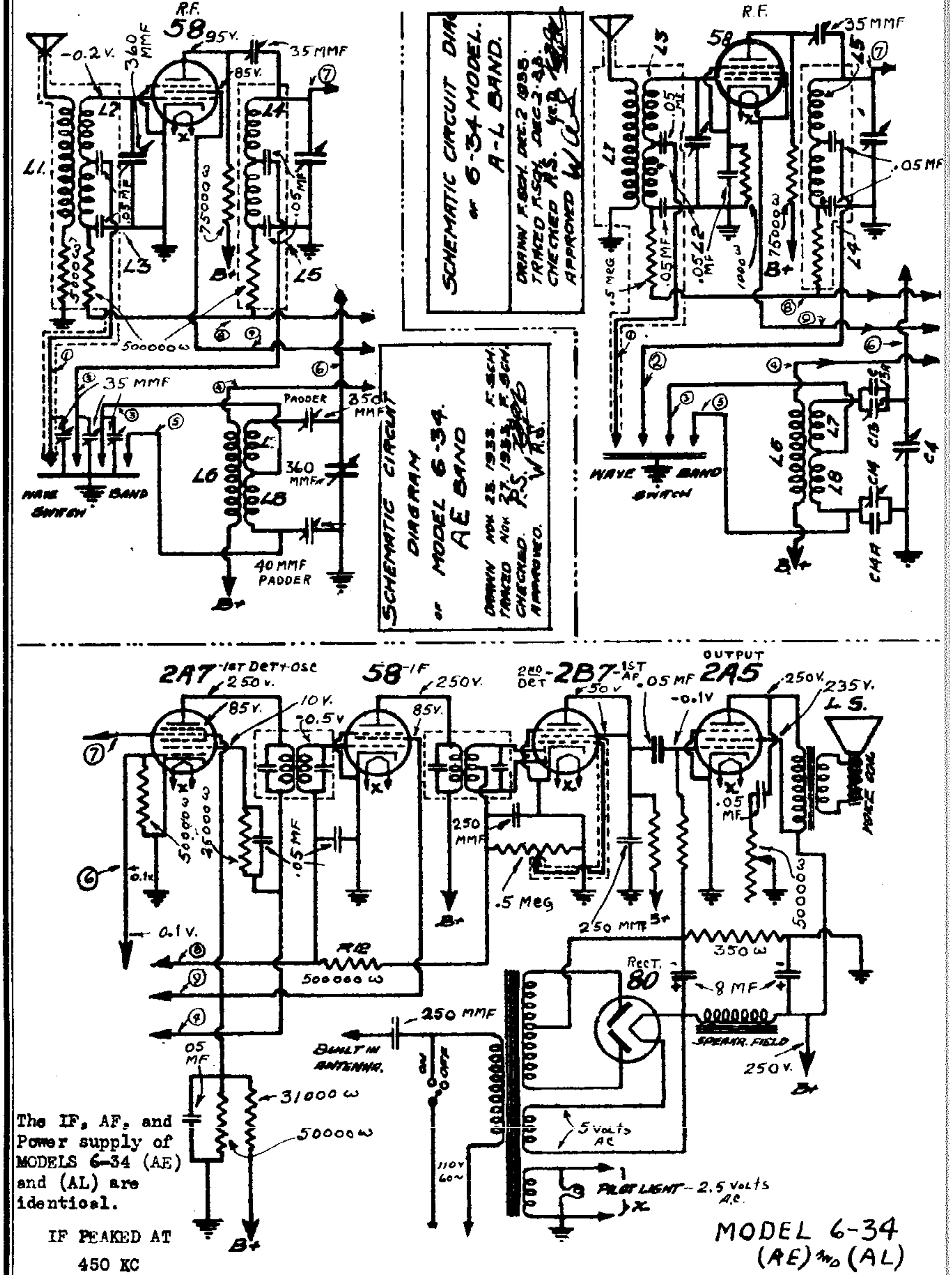


Apply 450 kc to control grid of Mixer, after removing grid cap. Adjust the two i-f transformers' trimmers to maximum AVC voltage developed.

Disengage completely plates of variable condenser. Apply signal of 1712 kc to antenna and adjust trimmers on top of the variable condenser to maximum output. Rotate condensers until one section of the split plates are engaged and bend plates for maximum output. Be sure to change oscillator frequency with each move to a new section.

MODEL 6-34 (A-E)
MODEL 6-34 (A-L)
Schematics, Voltage

MID-WEST RADIO CORP.



The IF, AF, and Power supply of MODELS 6-34 (AE) and (AL) are identical.

IF PEAKED AT 450 KC

MODEL 6-34 (A-E)
MODEL 6-34 (A-L)
Socket, Trimmers
Alignment

MID-WEST RADIO CORP.

INSTRUCTIONS FOR REBALANCING 6 TUBE 1934 MODEL DUAL WAVE RECEIVER. MODEL AE AND AL

Remove the control grid cap of the 2A7 tube (mixer) and apply a modulated signal of 450 K.C. to the control grid of the 2A7 tube. Trimm the first and second I.F. Transformers for maximum AVC voltage developed. Be sure during the alignment procedure to keep the signal imput down as low as possible or double peaking of stations will result. There are two adjustments on each of the I.F. transformers.

To align the R.F. and Osc. and Mixer circuits on the AL Model --

Turn the wave band switch to the A position (all switch contacts open), turn the variable condenser until the plates are entirely engaged. Apply a signal of 530 K.C. to the antenna connection of the receiver and adjust the A band padder until the oscillator signal is received at maximum. Apply signal of 1600 K.C. to the antenna connection of the receiver and turn the variable condenser until the plates are disengaged and trimm the trimmers on the variable condenser until maximum signal is obtained. Adjust the Osc., Mixer and R.F., in order named.

To adjust the L band, apply a signal of 1600 K.C. to the antenna connection of the receiver and adjust the L band padder until maximum signal is obtained.

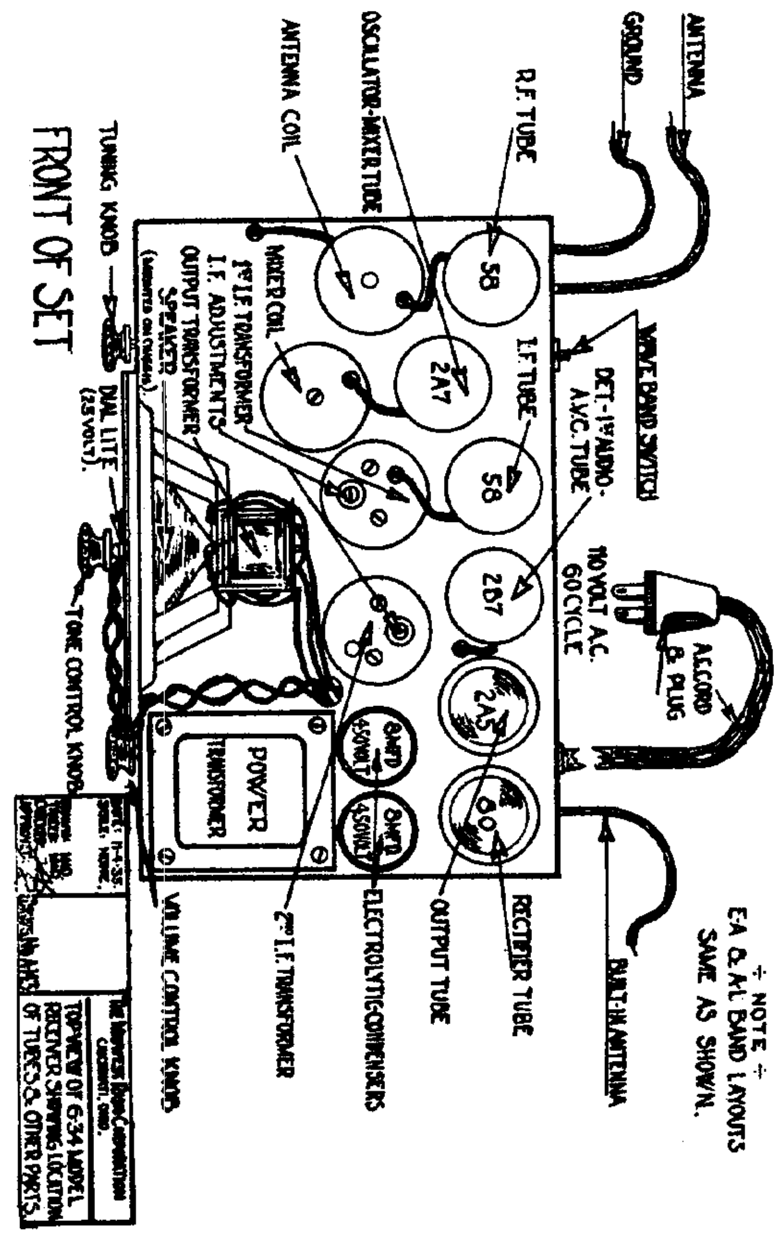
To align the R.F., Osc, and Mixer circuits of the AE model --

Turn the wave band switch to the A position (all contacts closed). Apply a signal of 530 K.C. to the antenna connection of the receiver and adjust the A band padder until maximum signal is received. Condensers being fully engaged or closed. Rotate condensers to the position where the plates are entirely disengaged. Apply a signal of 1600 K.C. to the antenna connection of the receiver and trimm the adjustments on the variable condenser until maximum output is received.

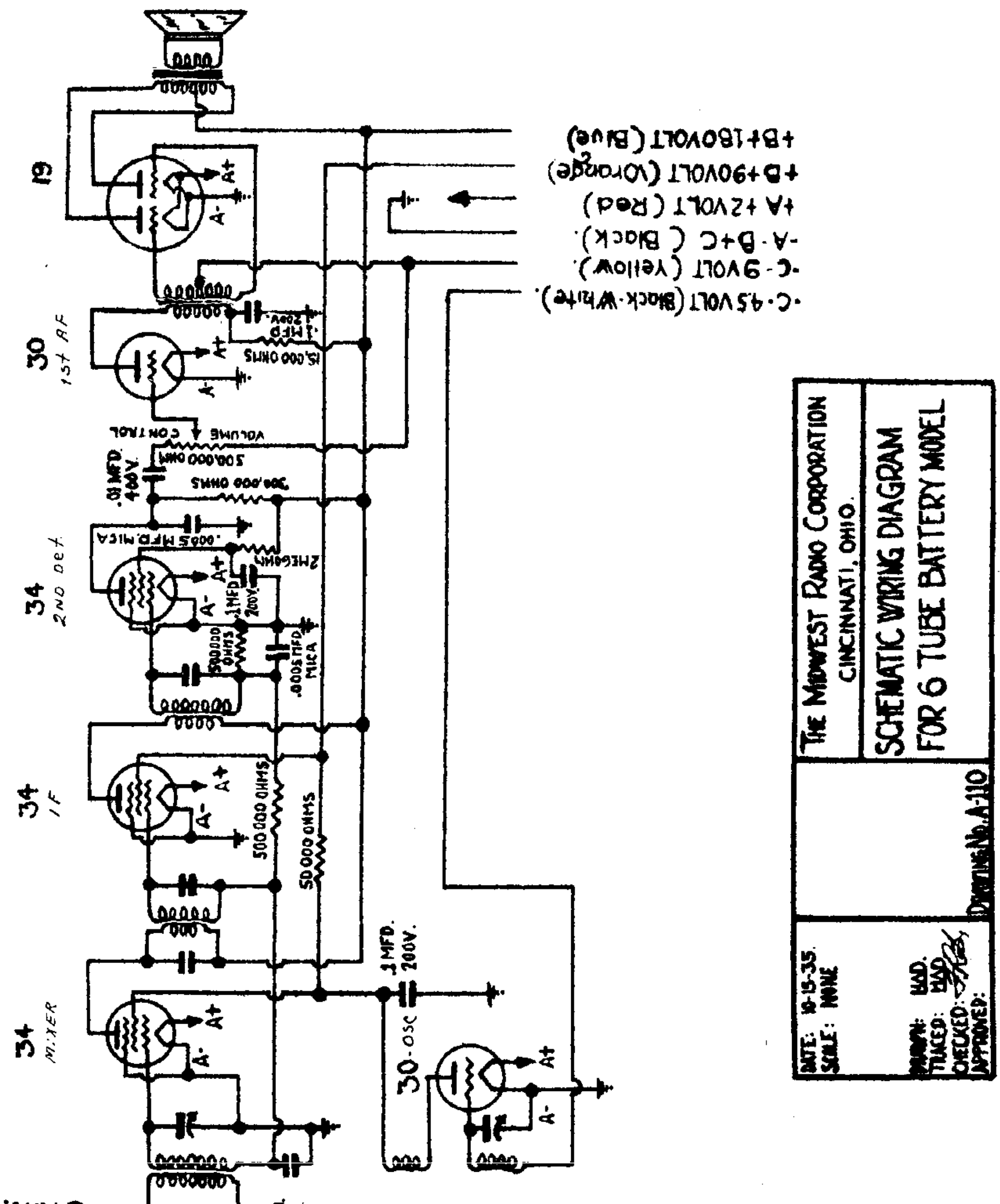
Turn the wave change switch to the E position (all contacts open). Apply a signal of 150 K.C. to the antenna connection of the receiver, and adjust the E band padder until maximum signal is received. Rotate the variable condenser being closed for this operation.

Turn the variable condensers to the position where the plates are entirely disengaged and apply a signal of 370 K.C. to the antenna connection of the receiver and adjust the trimmers on switch until maximum signal is received. This completes the procedure of rebalancing the receiver.

Be sure to always keep the signal imput as low as possible when aligning a receiver.

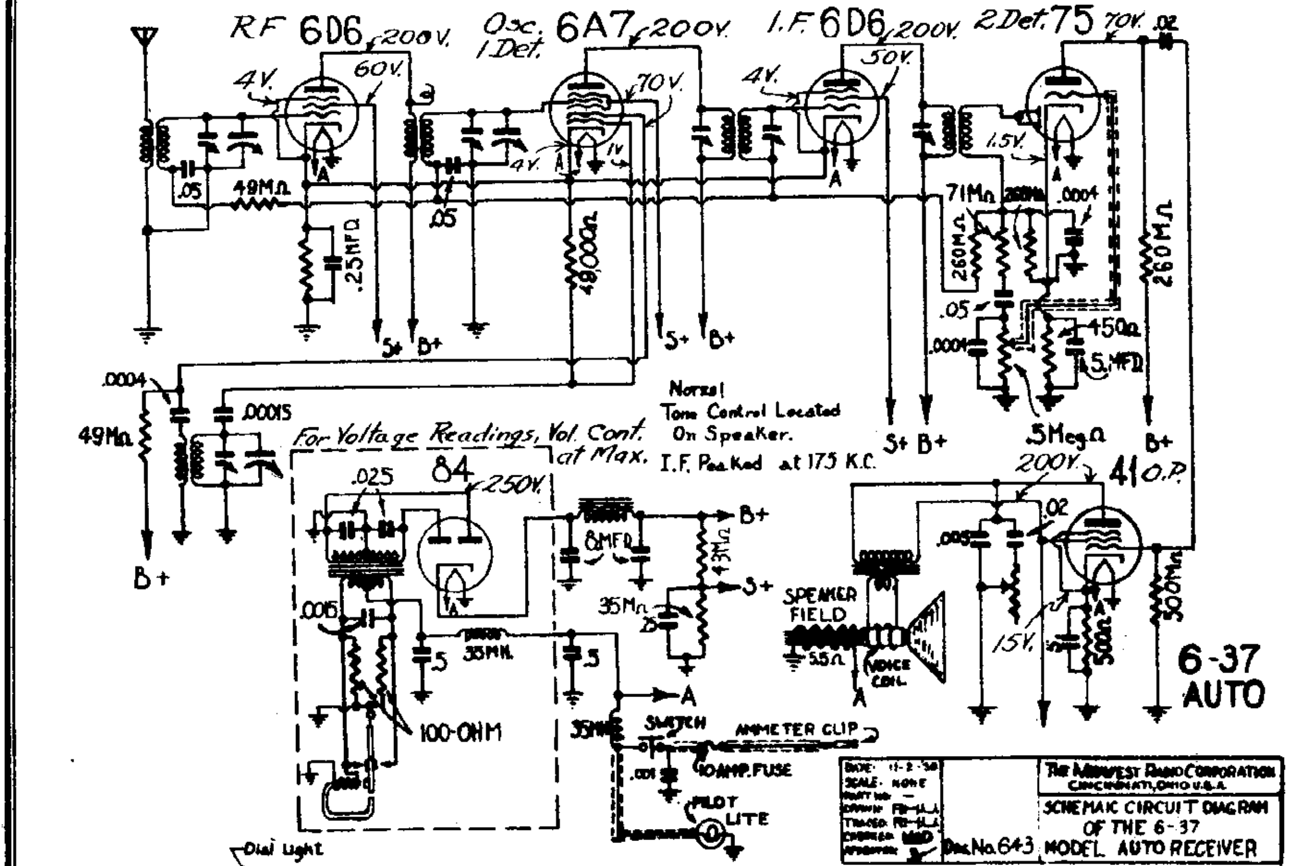


MID-WEST RADIO CORP.

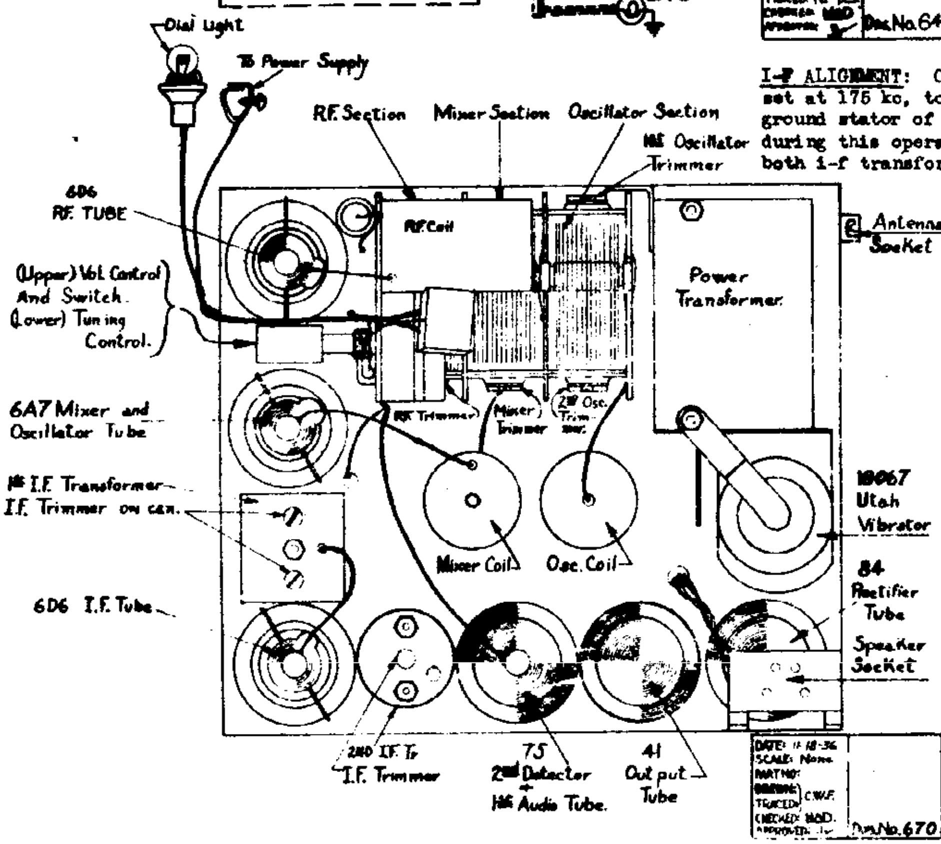


MODEL 6-37 Auto
Schematic, Voltage
Socket, Trimmers
Alignment

MID-WEST RADIO CORP.

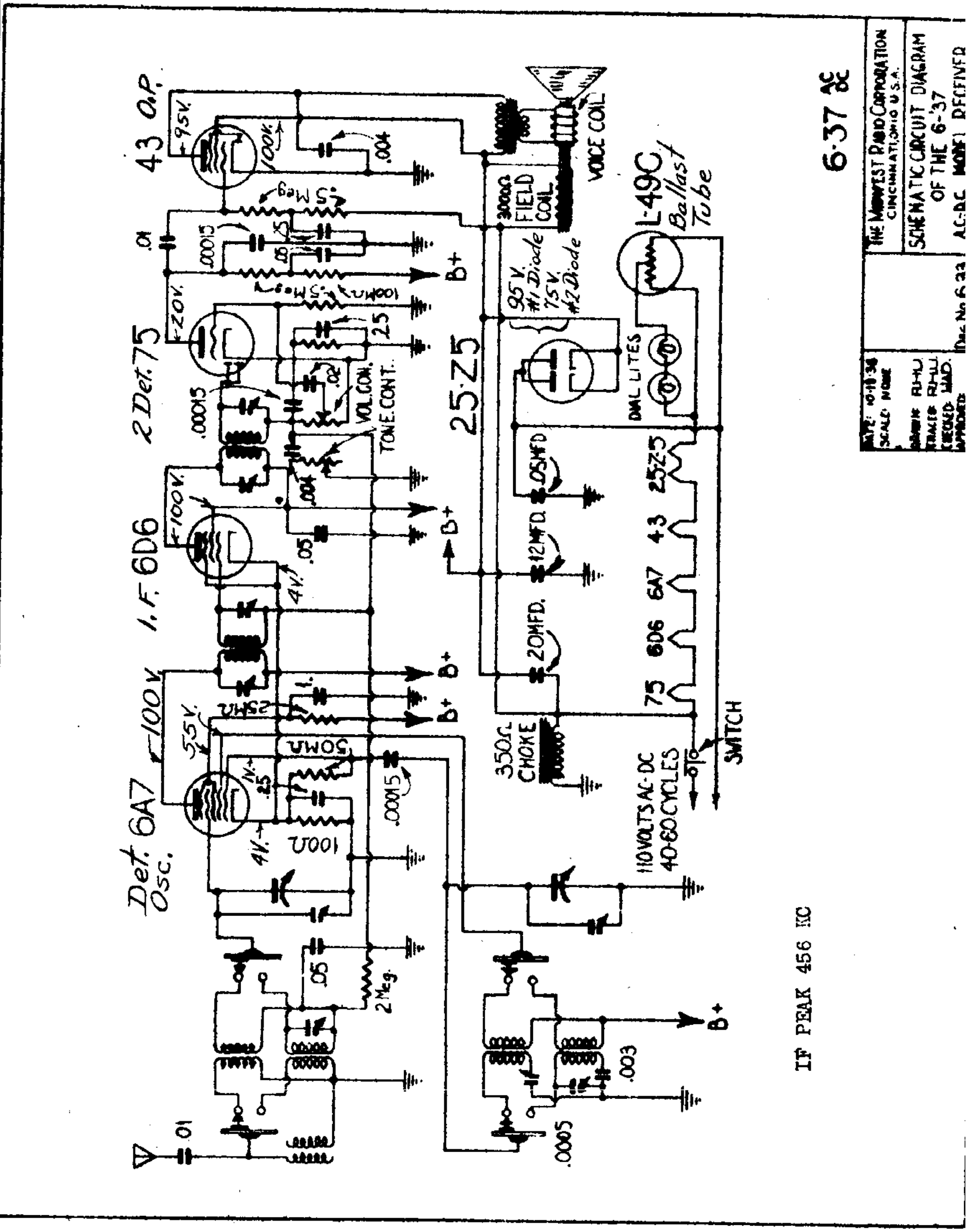


I-F ALIGNMENT: Connect signal generator set at 175 kc, to grid of 6A7 tube and ground stator of oscillator condenser during this operation. Peak trimmers of both i-f transformers for maximum.



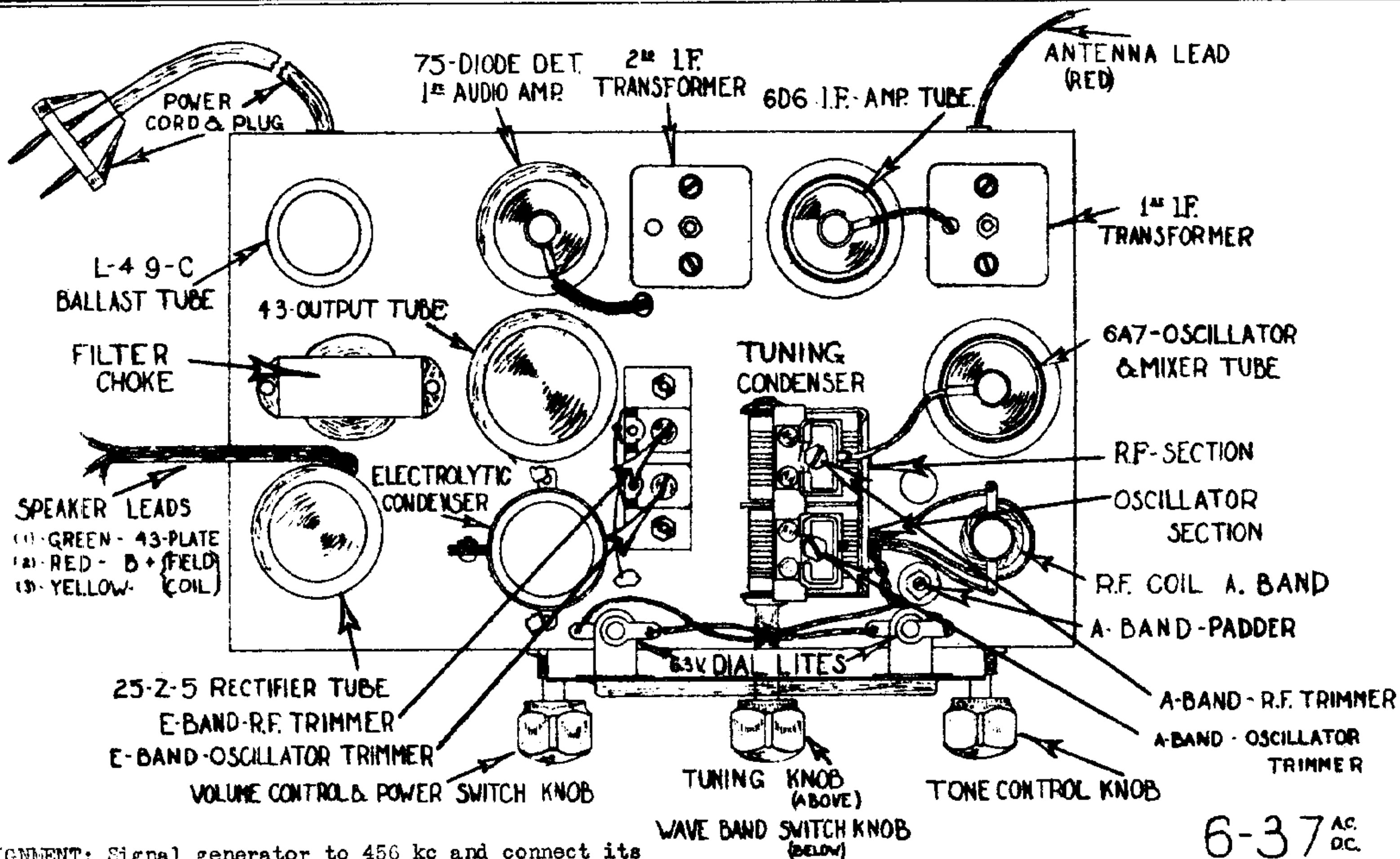
R-F ALIGNMENT: Connect signal generator to antenna post of set through a standard dummy antenna. Remove ground from oscillator condenser. Set dial and signal generator to 1500 kc and align trimmers on variable condensers for maximum output. All other frequencies will be aligned automatically because of cut section oscillator condenser.

MID-WEST RADIO CORP.



MODEL 6-37 AC-DC
Socket, Trimmers
Alignment

MID-WEST RADIO CORP.

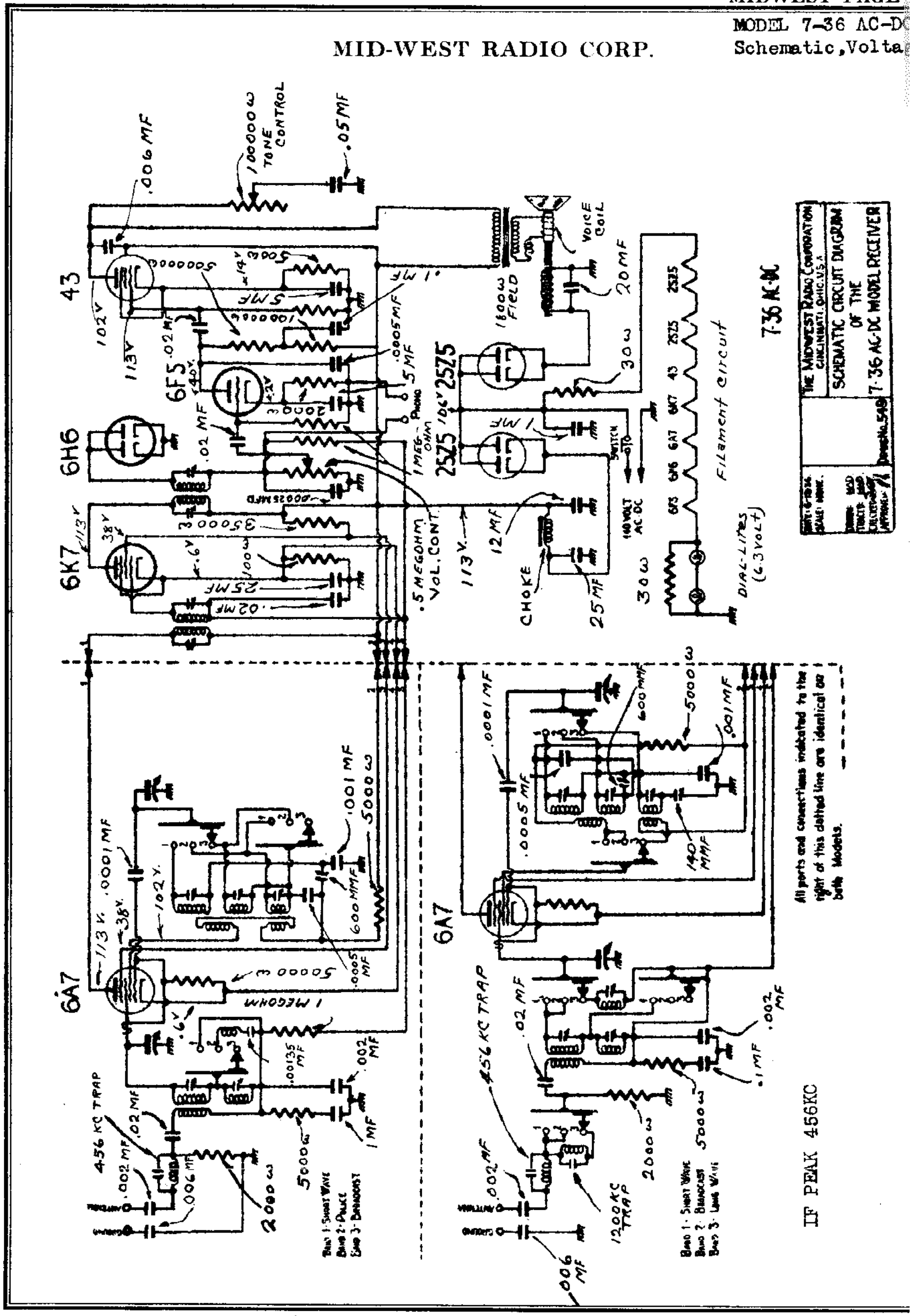


6-37 AC. DC.

DATE: 11-11-36 SCALE: NONE		THE MIDWEST RADIO CORPORATION CINCINNATI, OHIO, U.S.A.
DRAWN: FH-LLJ TRACED: FH-LLJ CHECKED: HAD APPROVED:	Dwg.No. 658	TOP VIEW OF MODEL 6-37 AC DC SHOWING LOCATION OF TUBES, TRIMMERS, AND OTHER PARTS

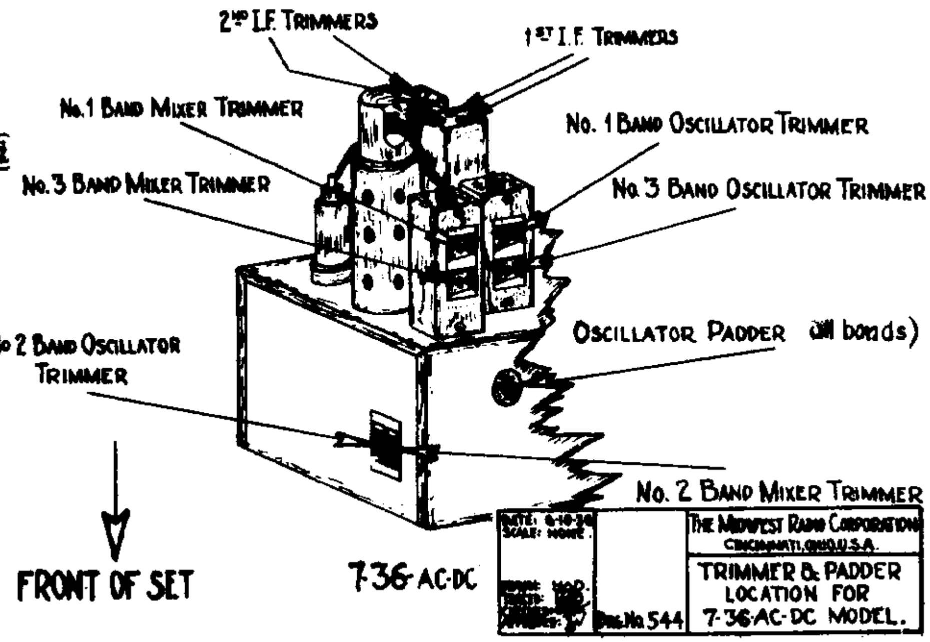
I-F ALIGNMENT: Signal generator to 456 kc and connect its output to grid of 6A7 tube. Short-circuit front section of variable condenser. Adjust trimmers of both i-f transformers for maximum.

R-F ALIGNMENT: Broadcast Band-- Remove short circuit from condenser. Connect signal generator, set at 1500 kc, to antenna post of receiver through standard dummy antenna. Set dial to 1500 kc and peak variable condenser trimmers for maximum. Set signal generator and dial to 600 kc and adjust padder for maximum output. Readjust 1500-kc alignment.
Short-wave Alignment-- Set signal generator and dial to 15 mc and peak trimmers for maximum output. Low-frequency setting is automatically cared for by fixed calibrated padder.


MID-WEST RADIO CORP.
THE MIDWEST RADIO CORPORATION CINCINNATI, OHIO, U.S.A.
SCHEMATIC CIRCUIT DIAGRAM OF THE 7-36 AC-DC MODEL RECEIVER
7-36 AC-DC
43
6F5
6H6
6K7
6A7
25Z5
25Z5
1800 ω FIELD
VOICE COIL
20 MF
30 ω
Filament circuit
DIAL-LITES (6.3 VOLT)
CHOKE
12 MF
25 MF
113 V.
.5 MEGOHM VOL. CONT.
1 MEG-OHM
PHONO
SWITCH
110 VOLT AC-DC
1000000 ω TONE CONTROL
.05 MF
.006 MF
1 MF
5 MF
.0005 MF
.02 MF
.25 MF
35000
500000
1 MEGOHM
50000 ω
456 KC TRAP
1200 KC TRAP
2000 ω
5000 ω
.0001 MF
.001 MF
600 MMF
140 MMF
.002 MF
.00135 MF
Band 1 - Short Wave
Band 2 - Police
Band 3 - Broadcast
Band 1 - Short Wave
Band 2 - Broadcast
Band 3 - Long Wave
All parts and connections indicated to the right of this dotted line are identical on both Models.
IF PEAK 456KC

MODEL 7-36 AC-DC
Socket, Trimmers
Alignment

MIDWEST RADIO CORP.



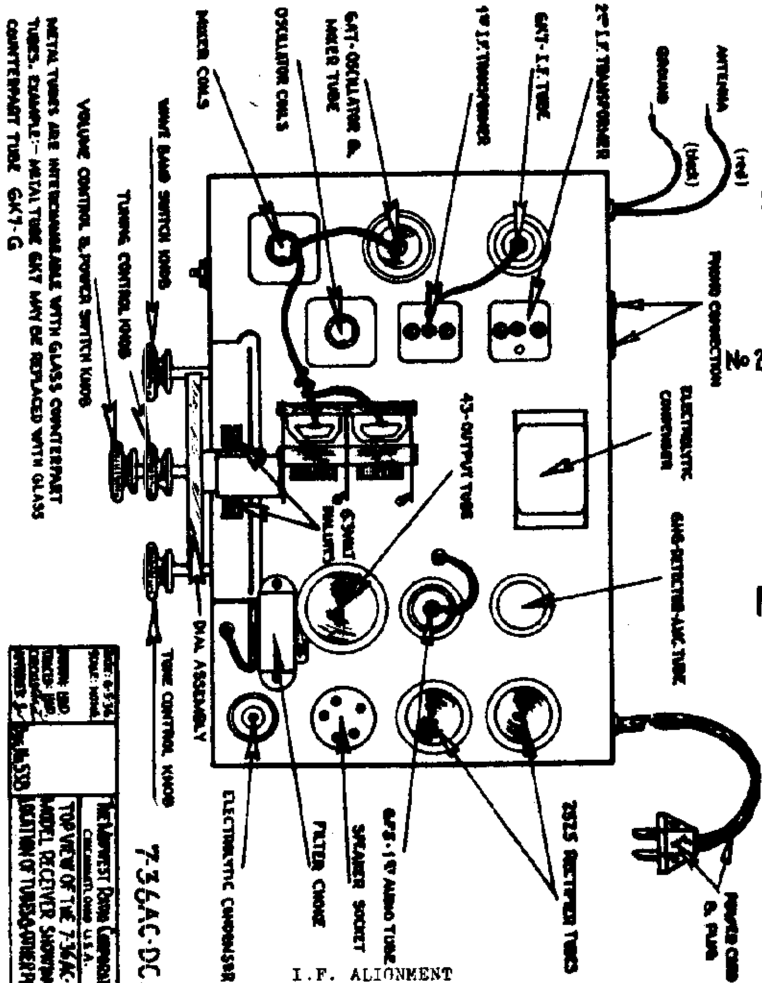
R.F. ALIGNMENT

(2) Band #1 Alignment :- The short circuit is removed from oscillator condenser and the signal generator is connected to the antenna post of the receiver through a standard dummy antenna. The receiver and signal generator are set at 16 m.c. The oscillator trimmer is adjusted so as to bring in the signal at this setting The antenna trimmer is adjusted for maximum output.

(3) Band #2 Alignment: - With the signal generator still connected to antenna post of receiver, set generator and receiver dial at 1400 k.c. Adjust oscillator trimmer so that signal comes in at this setting. The Antenna and R.F. trimmers are adjusted for maximum output. The signal generator is set at 600 k.c. and the padder is adjusted so that the signal comes in at this point on the dial. After making this adjustment the 1400 k.c. adjustment should then be rechecked.

(4) Band #3 Alignment: - With the receiver and signal generator both set at 325 k.c., the oscillator trimmer is adjusted so that this signal agrees with the dial. Antenna trimmer is then adjusted for maximum output.

Note: To assure more accurate trimmer setting always use lowest possible test oscillator output consistent with readable output meter scale deflection.



I.F. ALIGNMENT

Set signal generator to 1456 k.c. Connect output meter from plate of 43 output tube to ground. Connect output of signal generator to grid cap of 6A7 tube. The front section of the tuning condenser if short circuited and the volume control is turned to max-position. The I.F. trimmers are then adjusted for maximum gain on output meter.

Note: To assure more accurate trimmer setting always use lowest possible test oscillator output consistent with readable output meter scale deflection.

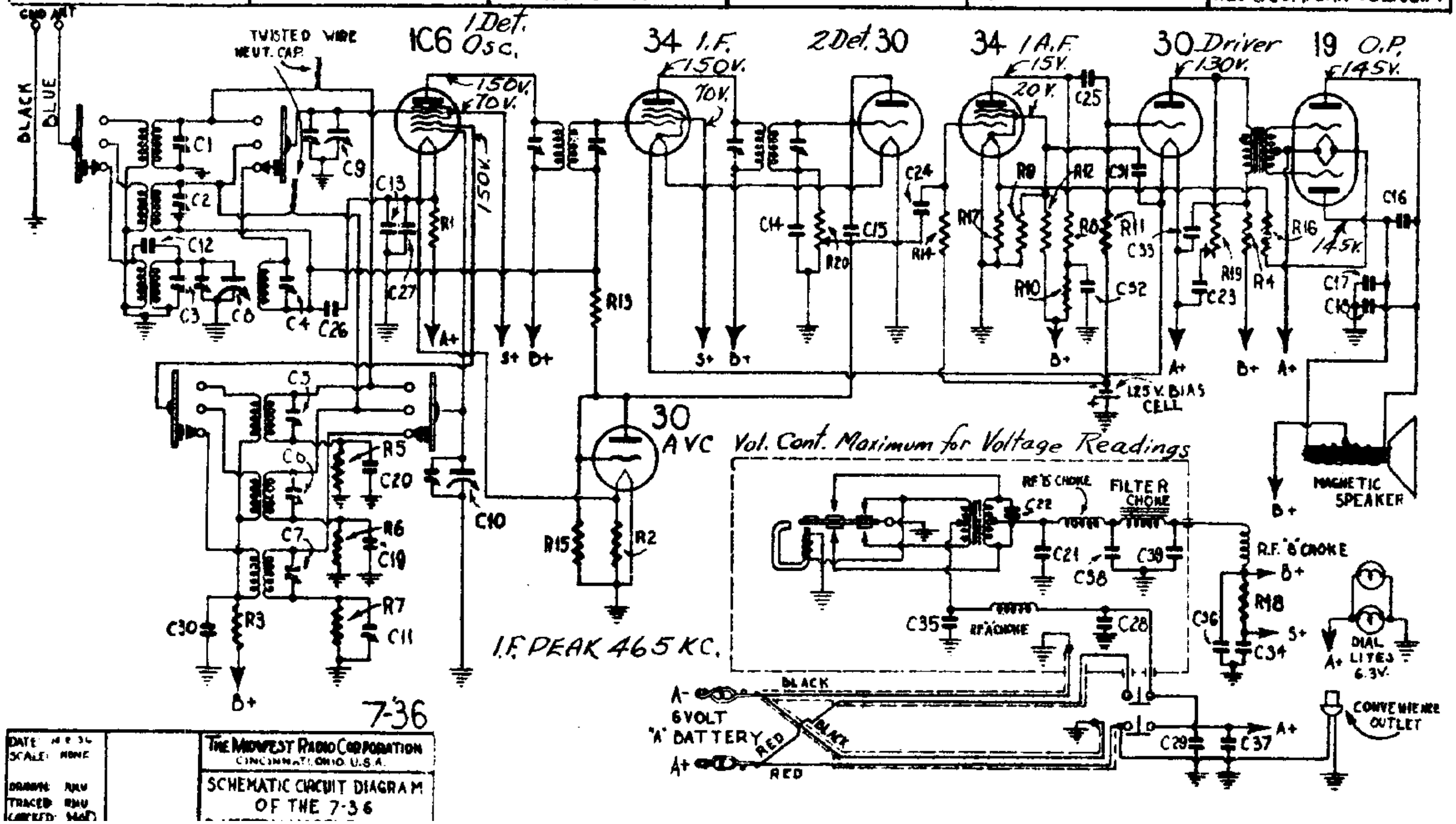
MID-WEST RADIO CORP.

CONDENSERS

C1	50MMFD TRIMMER	C11	600-MMFD-PADDER	C21	.004 MFD	C31	.1 MFD - 400V.
C2	" "	C12	6 MMFD	C22	.02 MFD 1200V.	C32	" "
C3	" "	C13	.00025 MFD.	C23	.03 MFD 600V.	C33	" "
C4	" "	C14	.0005 MFD.	C24	.05 MFD 200V.	C34	" "
C5	" "	C15	"	C25	.05 MFD 400V.	C35	.5 MFD - 200V.
C6	" "	C16	.002 MFD - 600V.	C26	.1 MFD 200V.	C36	.5 MFD - 400V.
C7	" "	C17	" "	C27	" "	C37	1. MFD - 400V.
C8	TUNING COND.	C18	" "	C28	" "	C38	8 MFD - DRY ELECT.
C9	" "	C19	.0021 MFD. "	C29	" "	C39	20 MFD. " "
C10	" "	C20	.0027 MFD. "	C30	.1 MFD 400V.		

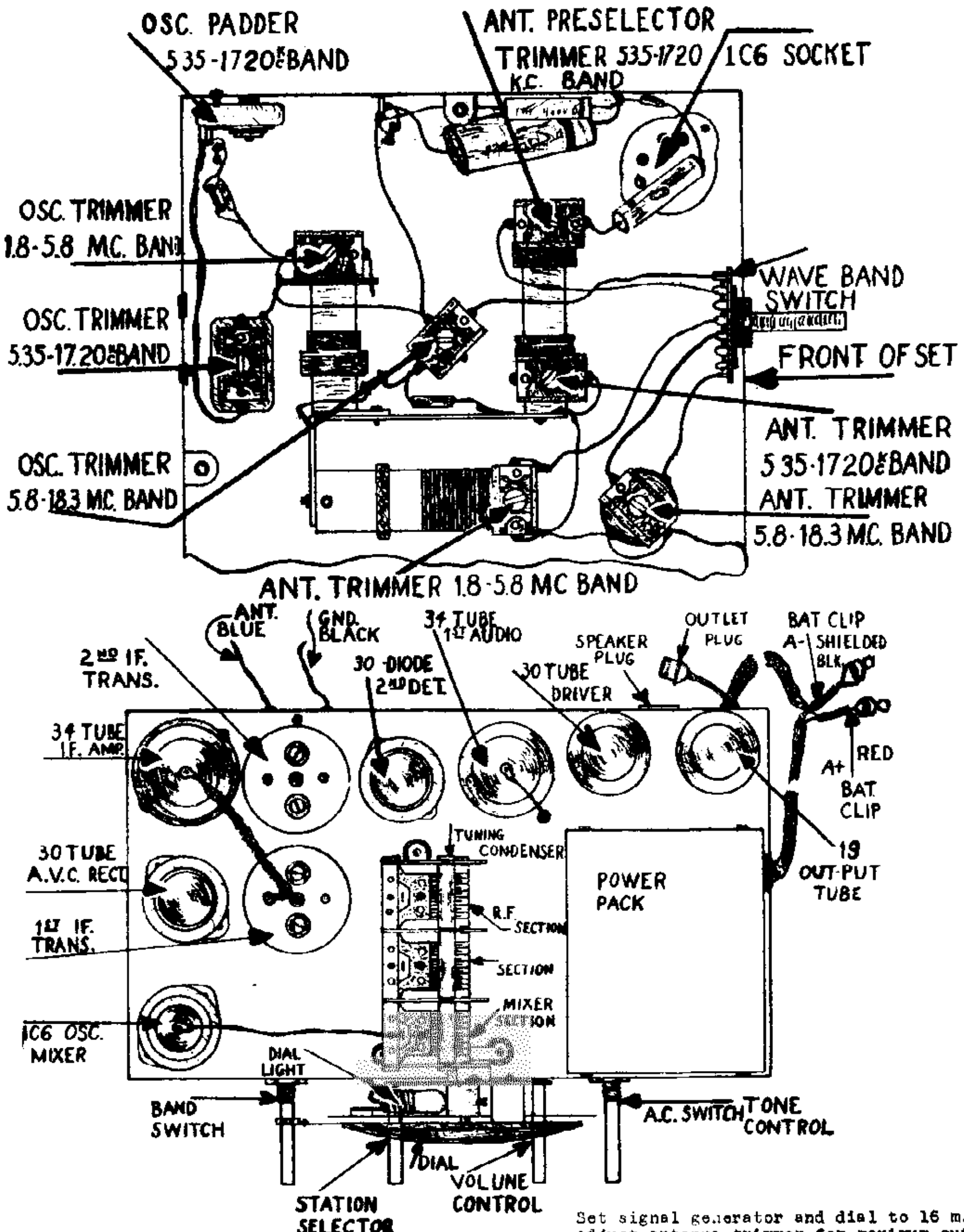
RESISTORS

R1	16.7 OHM - 1/3 WATT	R11	500,000 OHM 1/3 WATT
R2	33.3 OHM - "	R12	"
R3	5,000-OHM "	R13	1. MEG OHM "
R4	"	R14	" "
R5	15,000-OHM "	R15	" "
R6	25,000-OHM "	R16	7.7 OHM .5 WATT
R7	50,000 OHM "	R17	10-OHM "
R8	100,000 OHM "	R18	15,000 OHM "
R9	250,000 OHM "	R19	50M. OHM TONE CONT.
R10	" "	R20	500M. OHM VOL. CONT.



MODEL 7-36 Batt.
Socket, Trimmers
Alignment

MID-WEST RADIO CORP.



(1) Connect output of signal generator to the control grid of the 1C6 tube through a .02 mfd. condenser. Leave the grid cap connected to the grid terminal of the tube and connect the ground side of the signal generator to the receiver ground. Set signal generator to 465 k.c. and connect output meter between plates of the 19 output tube. Adjust grid and plate trimmer screws of 1st and 2nd I. F. transformers for maximum gain.

(2) Connect output of signal generator to antenna post of receiver through a standard dummy antenna.

(a) Place band selector switch for operation on the 5.8 to 18.3 m.c. band. Tune the receiver dial and the signal generator to exactly 18.3 m.c. Adjust the 18.3 m.c. oscillator trimmer for maximum gain. Care must be taken that the fundamental peak and not the image peak is used for aligning the receiver at this frequency. Set signal generator and dial to 16 m.c. and adjust antenna trimmer for maximum output.

(b) Place band selector switch for operation on the 1.8 to 5.8 m.c. band. Set the signal generator and dial to a frequency of 5.8 m.c. Adjust 5.8 m.c. oscillator trimmer for maximum output. Adjust antenna trimmer for maximum output.

(c) Place band selector switch for operating on the 5.35 17.20 k.c. band. Set signal generator and dial to 17.20 k.c. and adjust oscillator trimmer for maximum output. Adjust 1400 k.c. R. F. and antenna trimmers for maximum output. Set signal generator and dial to 600 k.c. and adjust oscillator padder for maximum output.

It will be necessary to recheck the 17.20 k.c. setting after this alignment.

MID-WEST RADIO CORP.

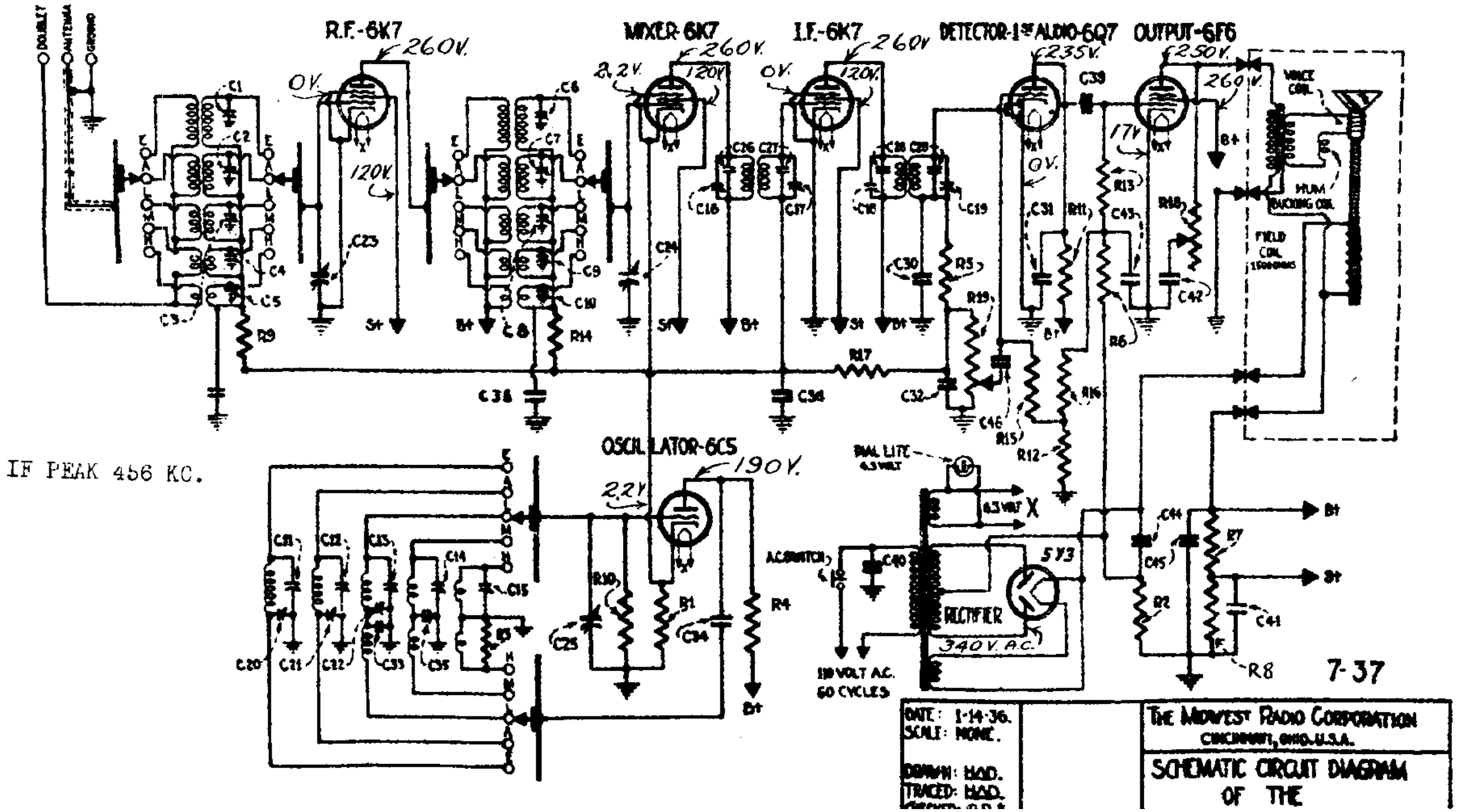
CONDENSERS

C1 - 35MMFD. TRIMMER	C13 - 35MMFD. TRIMMER	C25 - 365 MMFD. TUNING COND.	C37 - .05 MFD. 200 VOLT
C2 - " "	C14 - " "	C26 - 100 MMFD. MICA	C38 - " " "
C3 - " "	C15 - " "	C27 - " " "	C39 - " " "
C4 - " "	C16 - I.F "	C28 - " " "	C40 - " " "
C5 - " "	C17 - " "	C29 - " " "	C41 - " " 400 VOLT
C6 - " "	C18 - " "	C30 - " " "	C42 - " " "
C7 - " "	C19 - " "	C31 - 250 " "	C43 - .1 MFD. 200 VOLT
C8 - " "	C20 - 70 MMFD. PADDER	C32 - " " "	C44 - 8 MFD. 450 VOLT WET ELECTRO-
C9 - " "	C21 - 350 " "	C33 - 500 " "	C45 - " " " LYTIC
C10 - " "	C22 - 700 " "	C34 - 2000 " "	C46 - .05 MFD. 400 VOLT
C11 - " "	C23 - 365 MMFD. TUNING COND.	C35 - 3000 " "	
C12 - " "	C24 - " " " "	C36 - .01 MFD. 200 VOLT	

RESISTORS

R1 - 200 OHMS .25 WATT	R13 - 300,000 OHMS .25 WATT
R2 - 280 " FLEX. 2 WATT	R14 - 500,000 " " "
R3 - 2,000 " .25 WATT	R15 - " " " "
R4 - 15,000 " 1. "	R16 - " " " "
R5 - 25,000 " .1 "	R17 - 1 MEGOHM .1 WATT
R6 - " " .25 "	R18 - 50,000 OHM TONE CONTROL
R7 - 31,000 " .5 "	R19 - 500,000 OHM VOLUME "
R8 - 50,000 " .25 "	
R9 - 100,000 " " "	
R10 - " " " "	
R11 - " " " "	
R12 - " " " "	

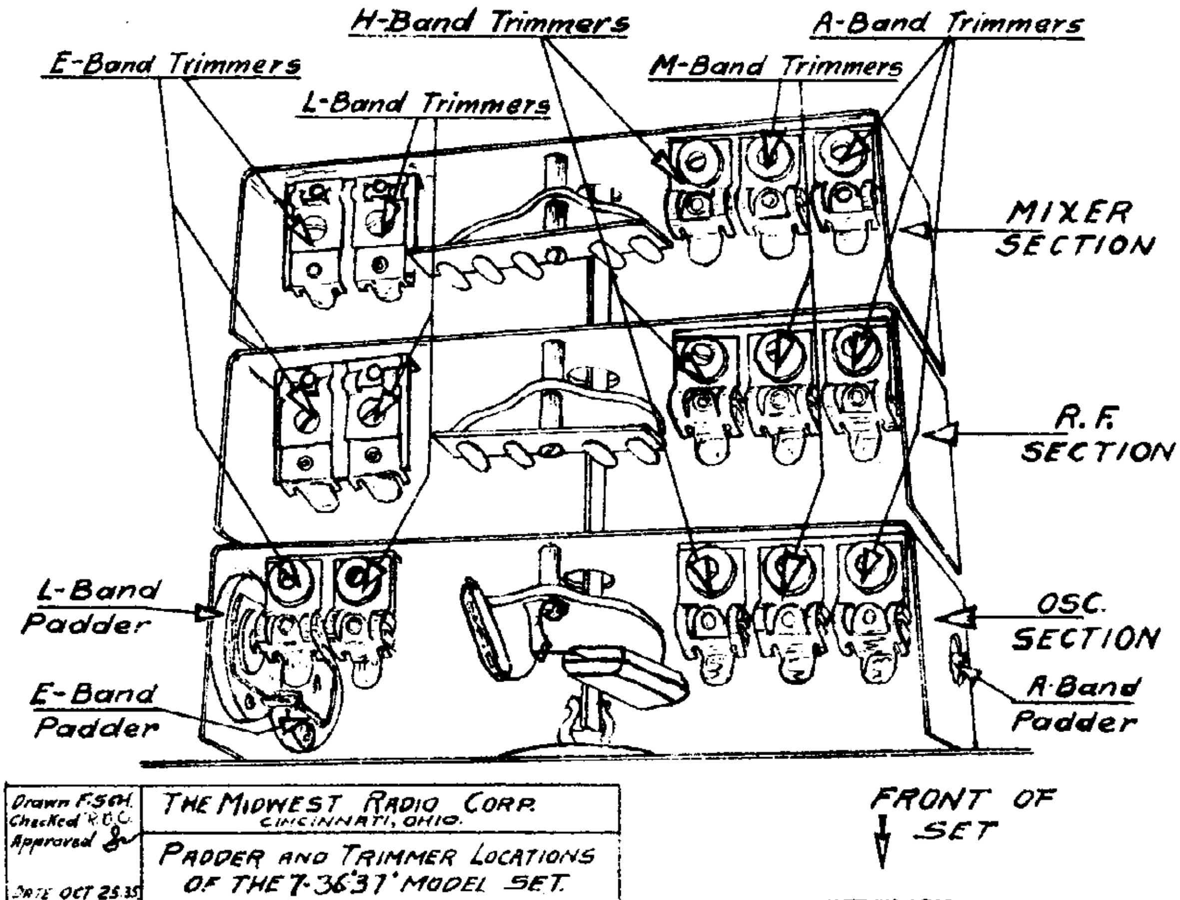
FOR ALIGNMENT, SEE INDEX

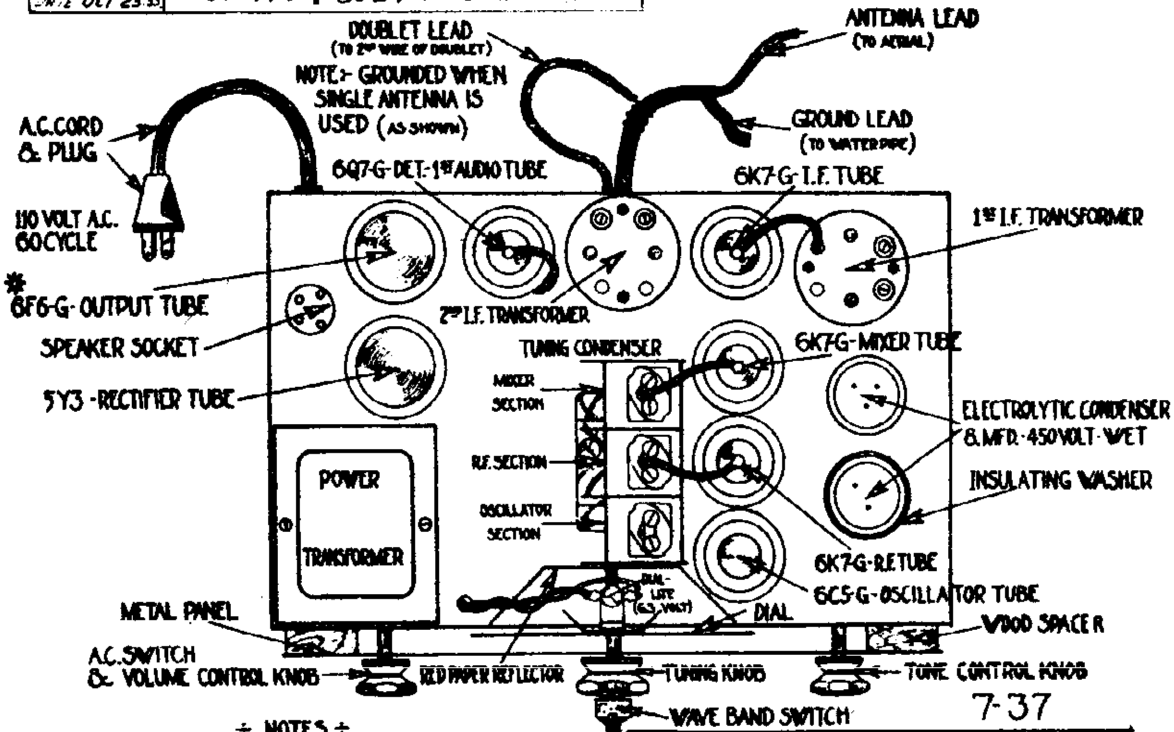


IF PEAK 456 KC.

MODEL 7-37 AC
Socket,Trimmers

MID-WEST RADIO CORP.





7-37

÷ NOTES ÷

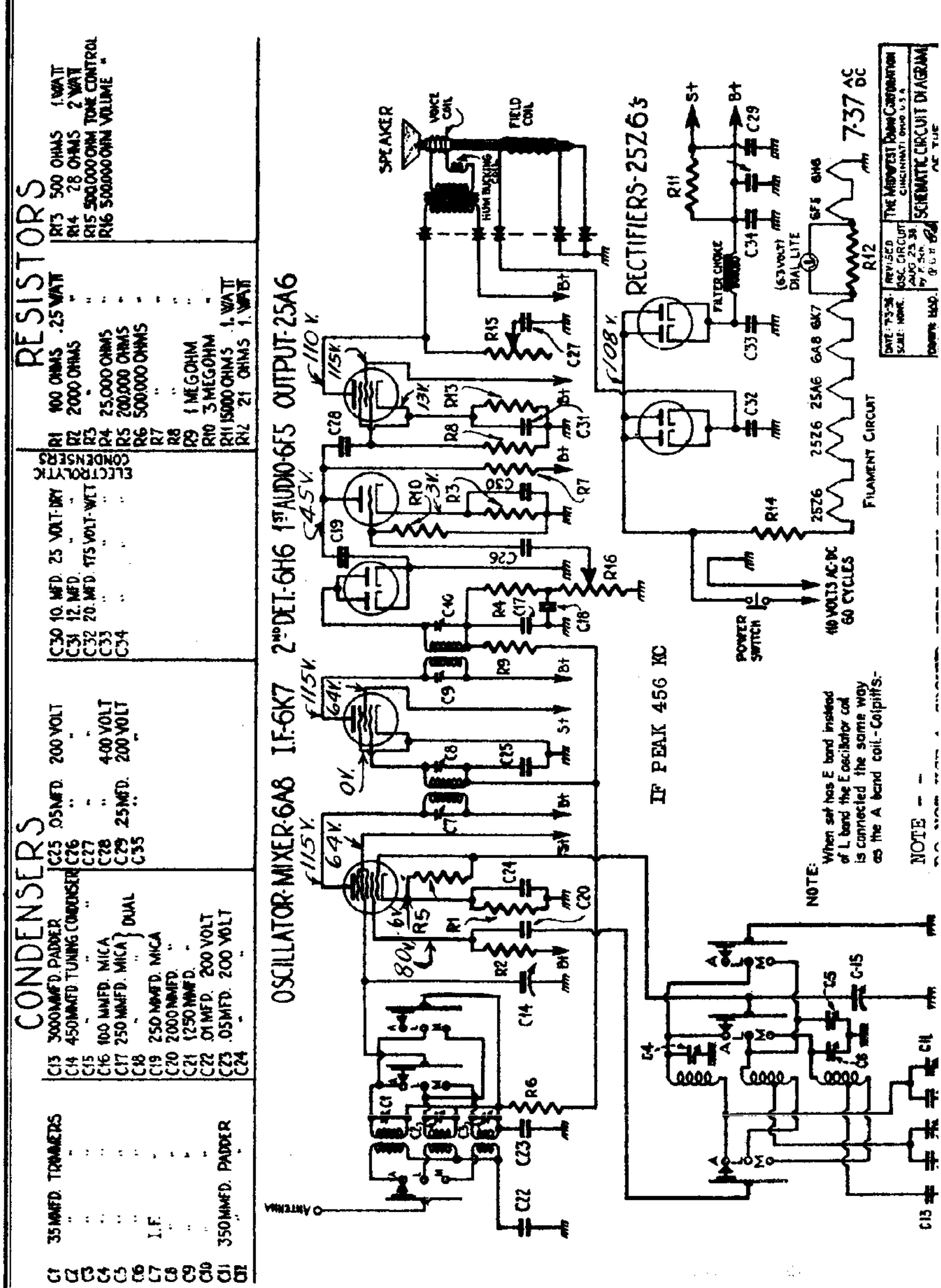
This chassis is shown with glass-counterpart tubes.

* Metal; metal-glass or glass-counterpart tubes may be used. For example the Output tube shown is a glass-counterpart tube numbered 6F6-G. A metal-glass tube would be numbered 6F6-MG and a Metal tube would be numbered 6F6.

Wood spacers and metal panel used in console models only.

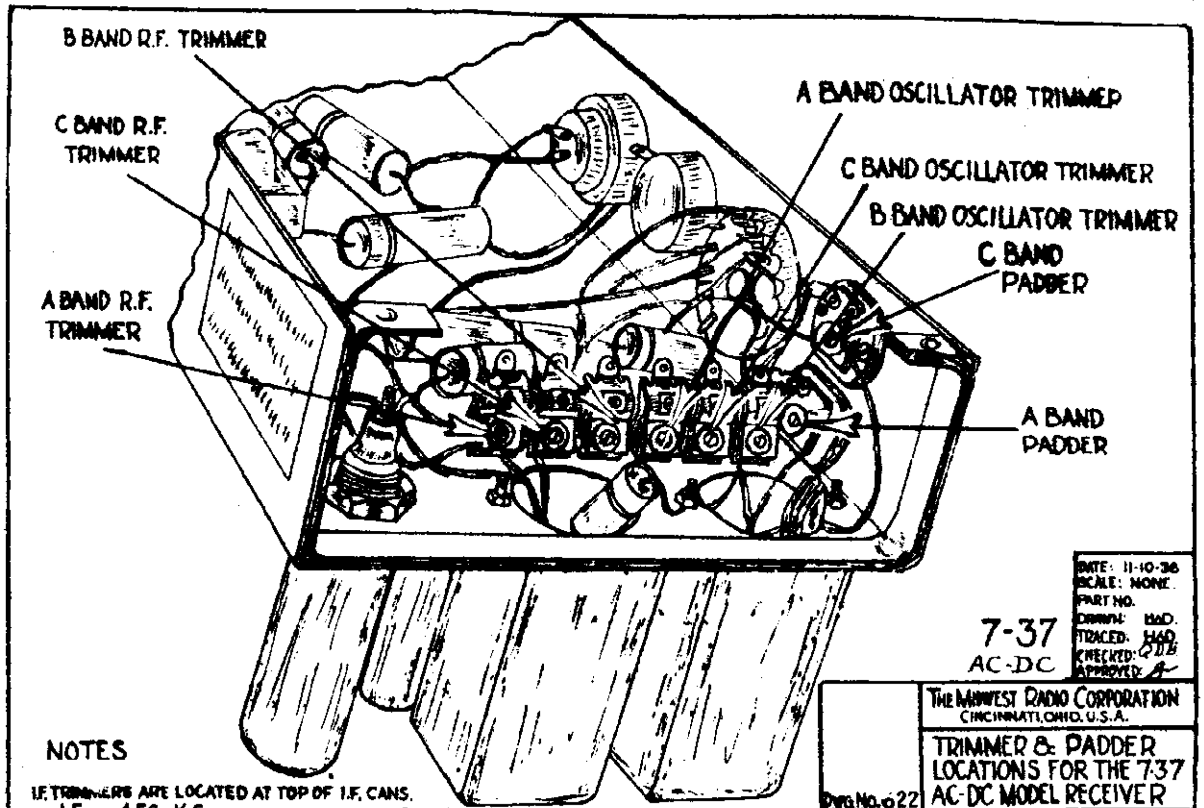
DATE: 1-16-36. SCALE: NONE. DRAWN: M.A.D. TRACED: M.A.D. CHECKED: APPROVED:	Drawing No. A-174	THE MIDWEST RADIO CORPORATION CINCINNATI, OHIO. U.S.A. TOP VIEW OF THE 7-37 MODEL RECEIVER SHOWING LOCATION OF TUBES & OTHER PARTS.

MIDWEST RADIO CORP.

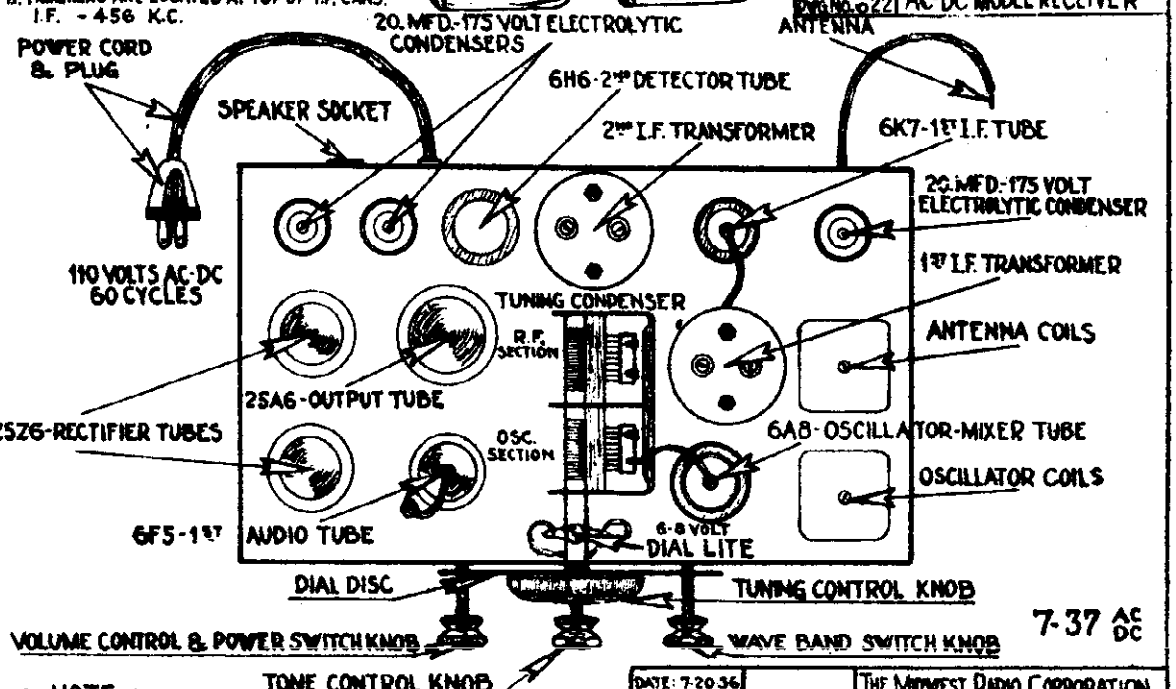


MODEL 7-37 AC-DC
Socket, Trimmers

MID-WEST RADIO CORP.



NOTES
I.F. TRIMMERS ARE LOCATED AT TOP OF I.F. CANS.
I.F. - 456 K.C.



÷ NOTE ÷
Do NOT use a ground wire with this set.

DATE: 7-20-36
SCALE: NONE.
DRAWN: HAD.
TRACED: HAD.
CHECKED:
APPROVED:
DWG. No. 572

THE MIDWEST RADIO CORPORATION
CINCINNATI, OHIO, U.S.A.

TOP VIEW OF THE 7-37 AC-DC MODEL RECEIVER SHOWING LOCATION OF TUBES & OTHER PARTS

MID-WEST RADIO CORP.

INSTRUCTIONS FOR ALIGNING THE MIDWEST 7-TUBE 1935-36 MODEL RECEIVERS

(1) Set the signal generator to 456 k.c. and connect it from the mixer grid to ground.

(2) Remove the oscillator tube from the receiver.

(3) Connect the output meter from the plate of the output tube to positive B +

(4) Using a moderately weak signal approximately 40 micro-volts, align the two I.F. Transformers to maximum output.

(5) Keep decreasing the oscillator input and realigning for maximum gain.

This completes the alignment of the I.F. amplifier.

Insert the oscillator tube. Connect the signal generator and mixer grid lead between antenna and ground.

(1) Set the wave change switch to the "E" Band.

(2) Set the signal generator to 325 k.c.

(3) Adjust the "E" oscillator trimmer to maximum gain, then adjust the "E" Band R.F. and the "E" Band mixer trimmers for maximum gain.

(4) Reset the signal generator to 135 k.c. and rotate the receiver dial to 135 k.c.

(5) Adjust the "E" Band padder for maximum signal.

(6) Repeat the adjustment of trimmers and padders until the adjustment of one does not effect the adjustment of the other.

This completes the alignment of the "E" Band.

(1) Set the wave change switch to the "A" Band.

(2) Set the signal generator to 1490 k.c.

(3) Adjust the "A" oscillator trimmer to maximum gain, then adjust the "A" Band R.F. and the "A" Band mixer trimmers for maximum gain.

(4) Reset the signal generator to 550 k.c. and rotate the receiver dial to 550 k.c.

(5) Adjust the "A" Band padder for maximum signal.

(6) Repeat the adjustment of trimmers and padders until the adjustment of one does not effect the adjustment of the other.

This completes the alignment of the "A" Band.

(1) Set the wave change switch to the "L" Band.

(2) Set the signal generator to 3.8 megacycles.

(3) Adjust the "L" oscillator trimmer to maximum gain, then adjust the "L" Band R.F. and the "L" Band mixer trimmers for maximum gain.

(4) Reset the signal generator to 1.6 megacycles and rotate the receiver dial to 1.6 megacycles.

(5) Adjust the "L" Band padder for maximum signal.

(6) Repeat the adjustment of trimmers and padders until the adjustment of one does not effect the adjustment of the other.

This completes the alignment of the "L" Band.

(1) Set the wave change switch to the "M" Band.

(2) Set the signal generator to 11.5 megacycles.

(3) Adjust the "M" oscillator trimmer to maximum gain, then adjust the "M" Band R.F. and the "M" Band mixer trimmers for maximum gain.

This completes the alignment of the "M" Band.

(1) Set the wave change switch to the "H" Band.

(2) Set the signal generator to 28 megacycles.

(3) Adjust the "H" Band oscillator trimmer to maximum gain, then adjust the "H" Band R.F. and the "H" band mixer trimmers for maximum gain.

This completes the alignment of the "H" Band.

INSTRUCTIONS FOR ALIGNING THE MIDWEST 7-37 AC-DC RECEIVER

(1) Set the signal generator to 456 k.c. and connect it from the mixer grid to ground.

(2) Be sure that set is not tuned to a station.

(3) Connect the output meter from the plate of the output tube to positive B.

(4) Using a moderately weak signal approximately 60 micro-volts, align the two I.F. transformers to maximum gain.

(5) Keep decreasing the oscillator input and realigning for maximum gain.

This completes the alignment of the I.F. amplifier.

Connect the signal generator between antenna and ground.
Connect mixer grid lead to grid of mixer tube.

(1) Set the wave change switch to the "A" band.

(2) Set the signal generator to 1490 k.c.

(3) Adjust the "A" oscillator trimmer to maximum gain, then adjust "A" band mixer trimmer for maximum gain.

(4) Reset the signal generator to 580 k.c. and rotate the receiver dial to 550 k.c.

(5) Adjust the "A" band padder for maximum signal.

(6) Repeat the adjustment of trimmers and padders until the adjustment of one does not effect the adjustment of the other.

This completes the alignment of the "A" band.

(1) Set the wave change switch to the "B" band.

(2) Set the signal generator to 12 mc.

(3) Adjust the "B" oscillator trimmer to maximum gain, then adjust the "B" band mixer for maximum gain.

This completes the alignment of the "B" band.

Short Wave Receiver

(1) Set the wave change switch to the "C" band.

(2) Set the signal generator to 4 m.c. Set dial at 75.

(3) Adjust the "C" oscillator trimmer to maximum gain, then adjust the "C" band mixer trimmers for maximum gain.

(4) Reset the signal generator to 2 m.c. and rotate the receiver dial to 16.

(5) Adjust the "C" band padder for maximum signal.

(6) Repeat the adjustment of trimmers and padders until the adjustment of one does not effect the adjustment of the other.

This completes the alignment of the "C" band s.w.

Long Wave Receiver

(1) Set the wave change switch to the "C" band.

(2) Set the signal generator to 325 k.c.

(3) Adjust the "C" oscillator trimmer to maximum gain, then adjust the "C" band mixer trimmers for maximum gain.

(4) Reset the signal generator to 150 k.c. and rotate the receiver dial to 150 k.c.

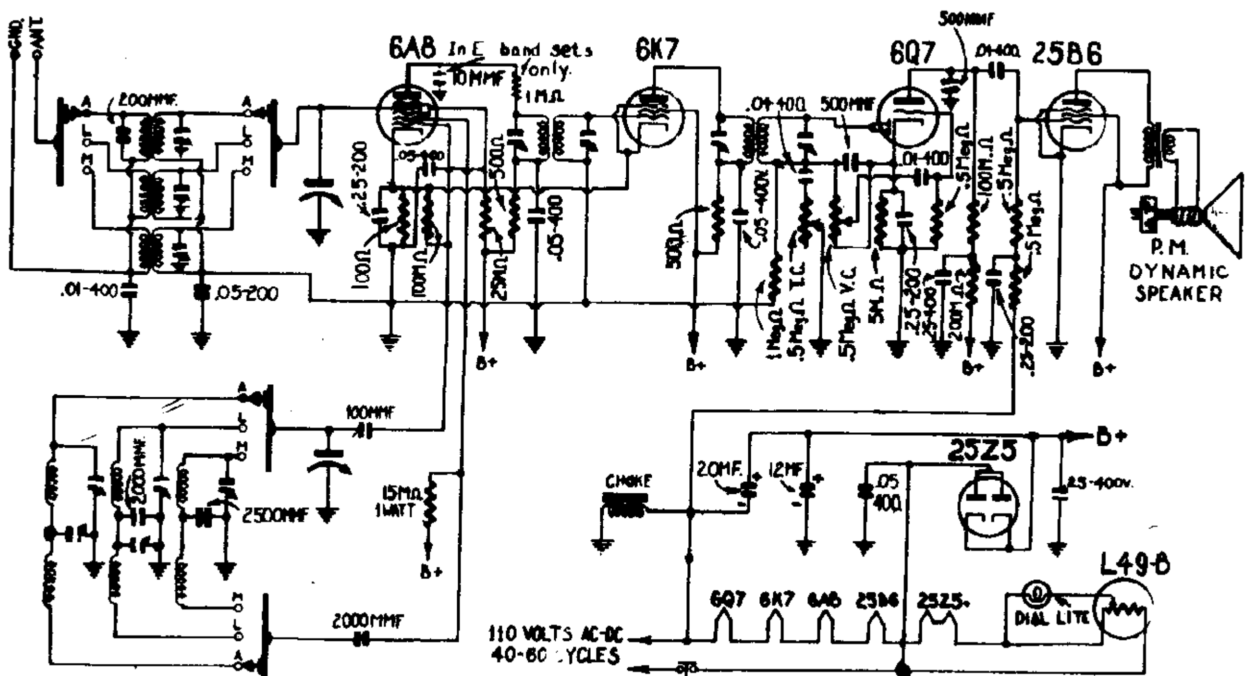
(5) Adjust the "C" band padder for maximum signal.

(6) Repeat the adjustment of trimmers and padders until the adjustment of one does not effect the adjustment of the other.

This completes the alignment of the "C" band l.w.

MODEL 6-38 AC-DC
(Export)
Schematic, Socket

MID-WEST RADIO CORP.



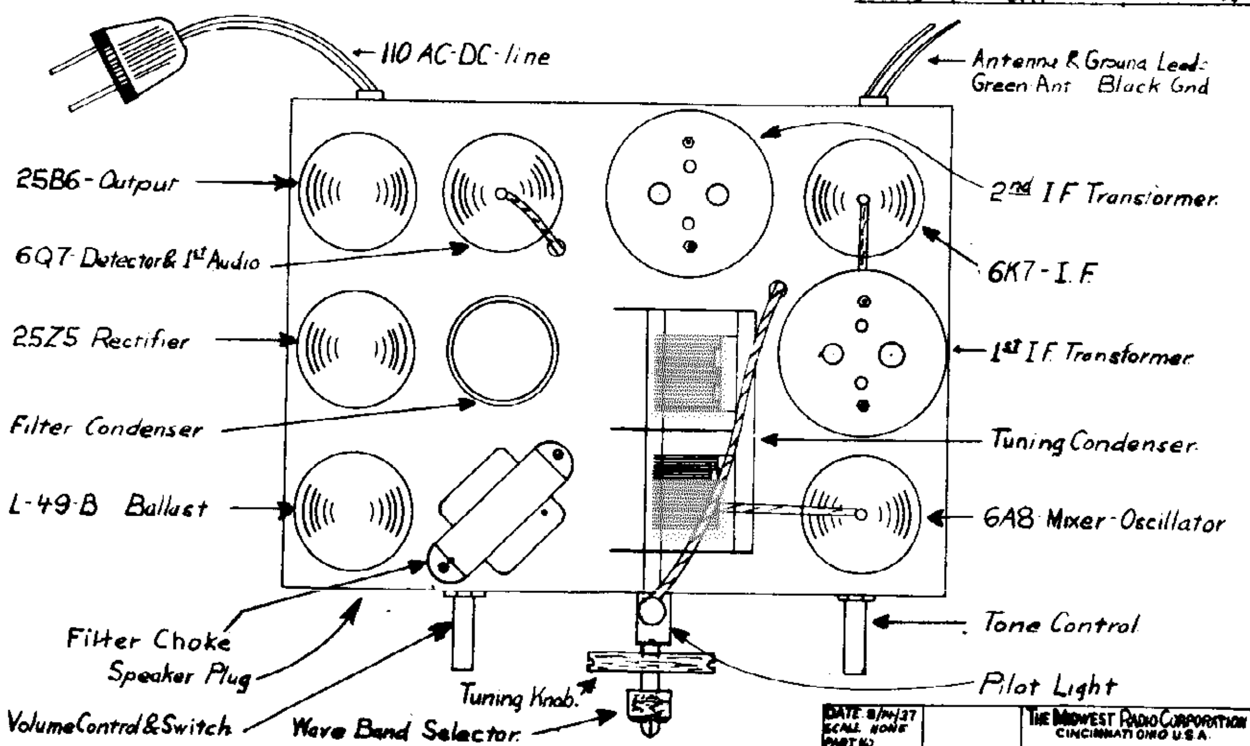
NOTE
ALL RF. & OSC. TRIMMERS ARE 45 MMFD MAX. CAP.
OSC. PADDERS ARE 500 MMFD. MAX. CAP.

E BAND NOTE
In sets having long wave band, E (long wave) band coil replaces L Band coil. The oscillator is connected colpitts

EXPORT 6-38 AC DC

I.F.=456KC.

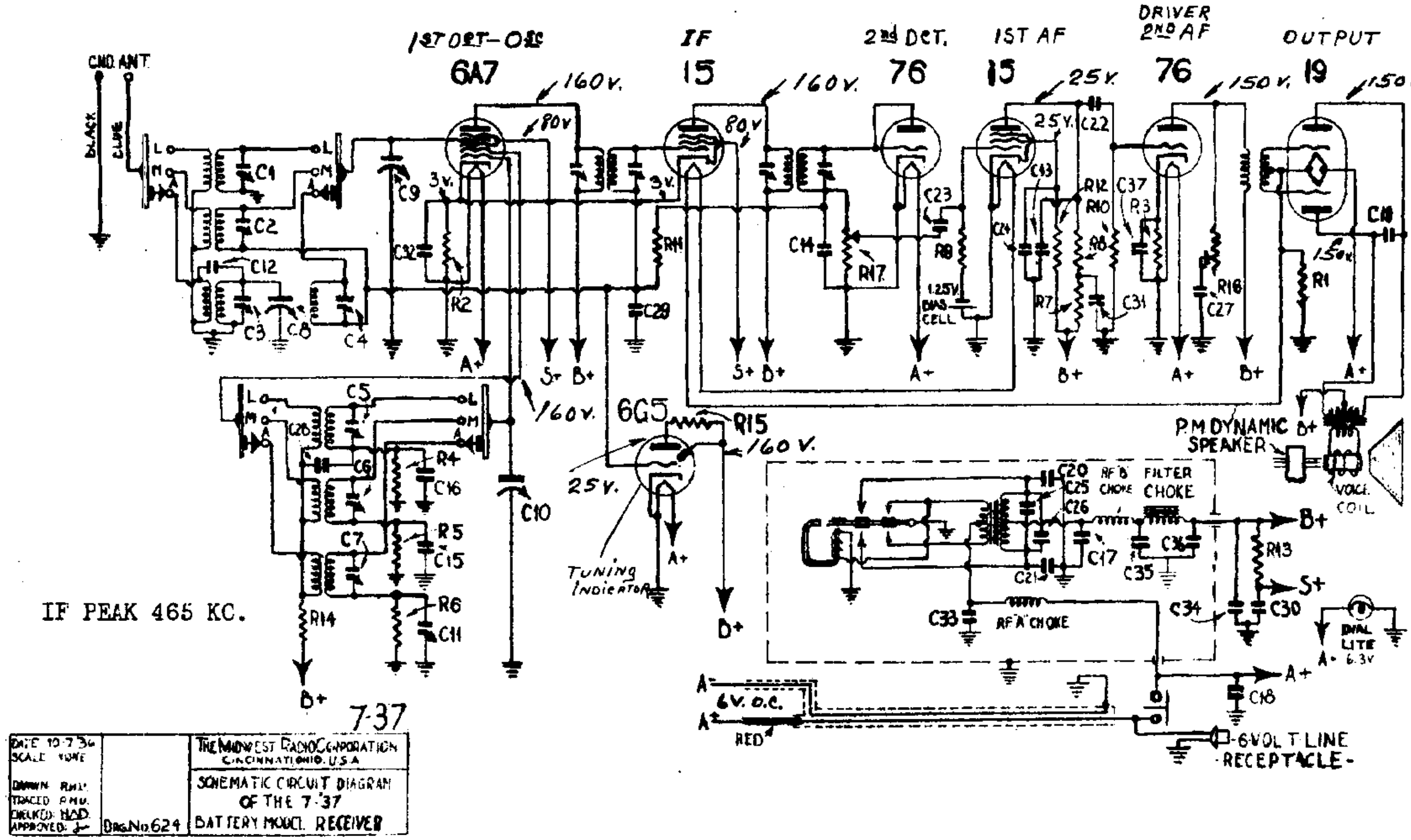
DATE 8-20-37 SCALE NONE DRAWN RHU TRACED RHU Drg. No. 814	THE MIDWEST RADIO CORPORATION CINCINNATI OHIO U.S.A. SCHEMATIC CIRCUIT DIAGRAM OF THE 6-38 A AC DC



DATE 8/14/37 SCALE NONE DRAWN TRACED G W Drg. No. 971	THE MIDWEST RADIO CORPORATION CINCINNATI OHIO U.S.A. Top View of 6-38 Export

FOR TRIMMERS, SEE INDEX

MID-WEST RADIO CORP.



CONDENSERS

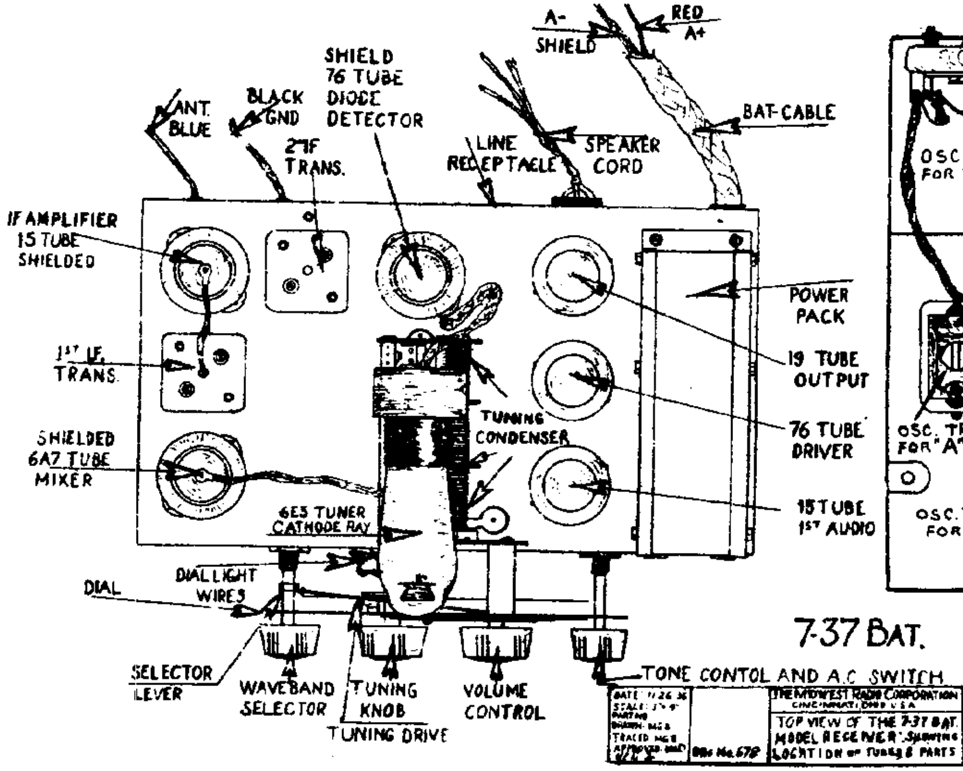
C1	45MMF TRIMMER	C11	600MMF PADDER	C21	.005 MFD - 400V.	C31	.1 MFD. 200V.
C2	" "	C12	6MMF.	C22	.01 MFD "	C32	.2 MFD "
C3	" "	C13	.00025 MFD MICA	C23	" "	C33	.5 MFD "
C4	" "	C14	" "	C24	" "	C34	
C5	" "	C15	.0021 MFD MICA.	C25	.01 MFD-1200V.	C35	8MFD DRY ELECT.
C6	" "	C16	.0027 MFD "	C26	" "	C36	" " "
C7	" "	C17	.004 MFD "	C27	.05 MFD. 400V.	C37	40MFD " "
C8	TUNING COND	C18	.004 MFD "	C28	.1 MFD. 200V.		
C9	" "	C19	.004 MFD 600 V.	C29	" "		
C10	" "	C20	.005 MFD 400V.	C30	" "		

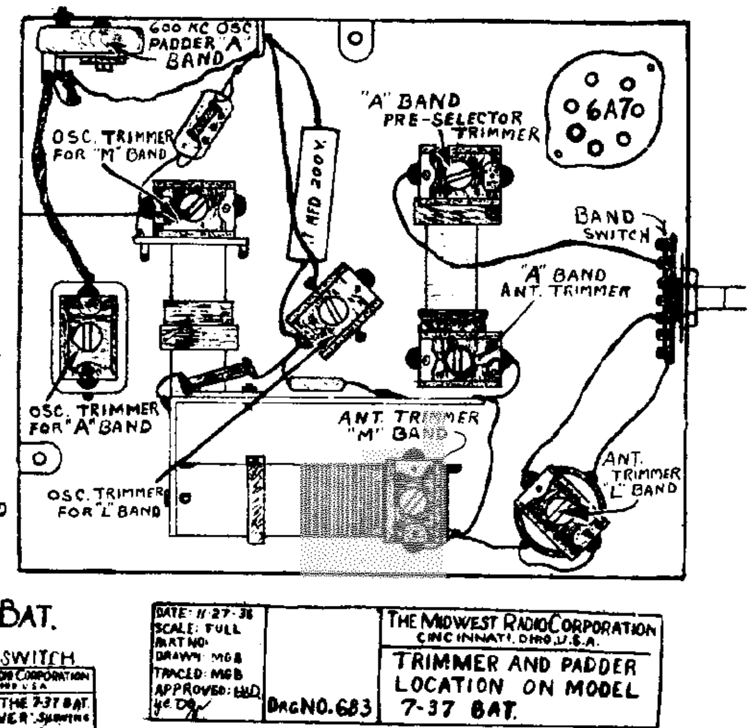
RESISTORS

R1	100 OHM 1/3 WATT	R11	1 MEGOHM 1/3 WATT
R2	200 OHM "	R12	2 MEGOHM "
R3	2,500-OHM "	R13	15,000-OHM .5 WATT
R4	15,000-OHM "	R14	20,000-OHM "
R5	25,000-OHM "	R15	1 MEGOHM 1. WATT
R6	50,000-OHM "	R16	50,000-OHM-TONE CONT.
R7	100,000-OHM "	R17	.5 MEGOHM-VOL. CONT.
R8	250,000-OHM "		
R9	500,000 OHM "		
R10	" "		

MODEL 7-37 Batt.
Socket, Trimmers
Alignment

MID-WEST RADIO CORP.





(1) I.F. Alignment:- Set test oscillator at 465 k.c. and connect output from oscillator to grid of 6A7 tube through an .02 mfd. series condenser.
Important: Do not remove grid clip from tube.
Peak each of the first and second I.F. transformer trimmer for maximum gain on output meter.

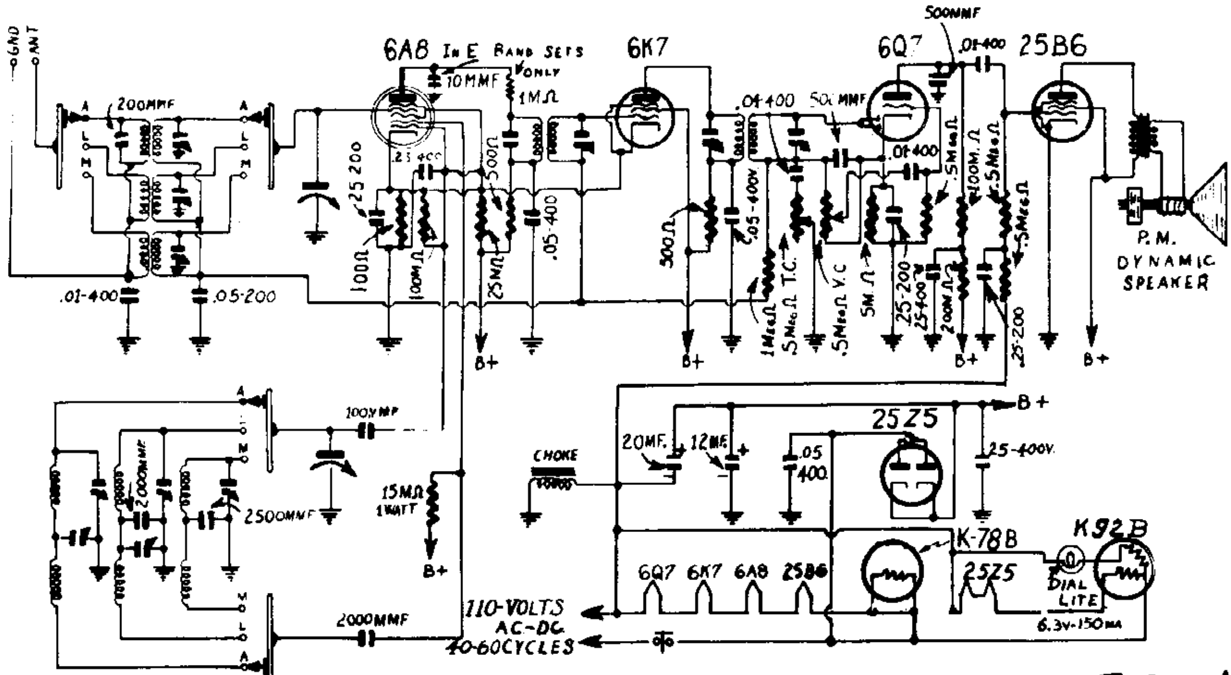
(2) Aligning 720 - 535 k.c. Band:- Check tuning dial.
Adjust by turning gang condenser until plates touch maximum capacity stop, at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration.
Connect test oscillator to antenna lead through a standard dummy antenna.
Set test oscillator to 1720 k.c. and, using 1720 k.c. oscillator trimmer, adjust to maximum signal output at 1720 k.c. on the dial.
Set test oscillator at 1400 k.c. and adjust 1400 k.c. preselector and antenna trimmers for maximum output.
Set test oscillator at 600 k.c. and adjust 600k.c. oscillator padder for maximum signal strength at 600 k.c. on the dial.

(3) Aligning 1.8. - 5.8 m.c. Band:- Disconnect dummy antenna from test oscillator and insert a 400 ohm resistor in series with the test oscillator output.
Set test oscillator frequency to 5.6 m.c. Bring in 5.6 m.c. signal on dial to maximum output by adjusting 5.6. m.c. oscillator trimmers.
Set test oscillator frequency to 5 m.c. and adjust 5 m.c. antenna trimmers for maximum output.

(4) Aligning 5.8 - 18.3 m.c. Band:- Leaving 400 ohm resistor in series with test oscillator output, set oscillator frequency to 18 m.c., and adjust 18 m.c. oscillator trimmers for maximum output.
It is important that the fundamental peak on 18 m.c. be reached.
Start with trimmers at minimum capacity, the first peak on the trimmers will be the fundamental frequency if trimmer is screwed toward maximum capacity another peak will be observed. This is the image peak and is not used in aligning the receiver.
Set test oscillator at 15 m.c. and adjust 15 m.c. antenna trimmers for maximum output.

MODEL 7-38 AC-DC
Schematic
Socket

MID-WEST RADIO CORP.



NOTE:
ALL R.F. & OSC. TRIMMERS ARE 45 MMFD MAX CAP.
OSC. PADDERS ARE 500MMFD. MAX CAP.

E BAND NOTE
IN SETS HAVING LONG WAVE BAND, E (LONG WAVE) BAND COIL REPLACES L BAND COIL THE OSCILLATOR IS CONNECTED COLPITTS

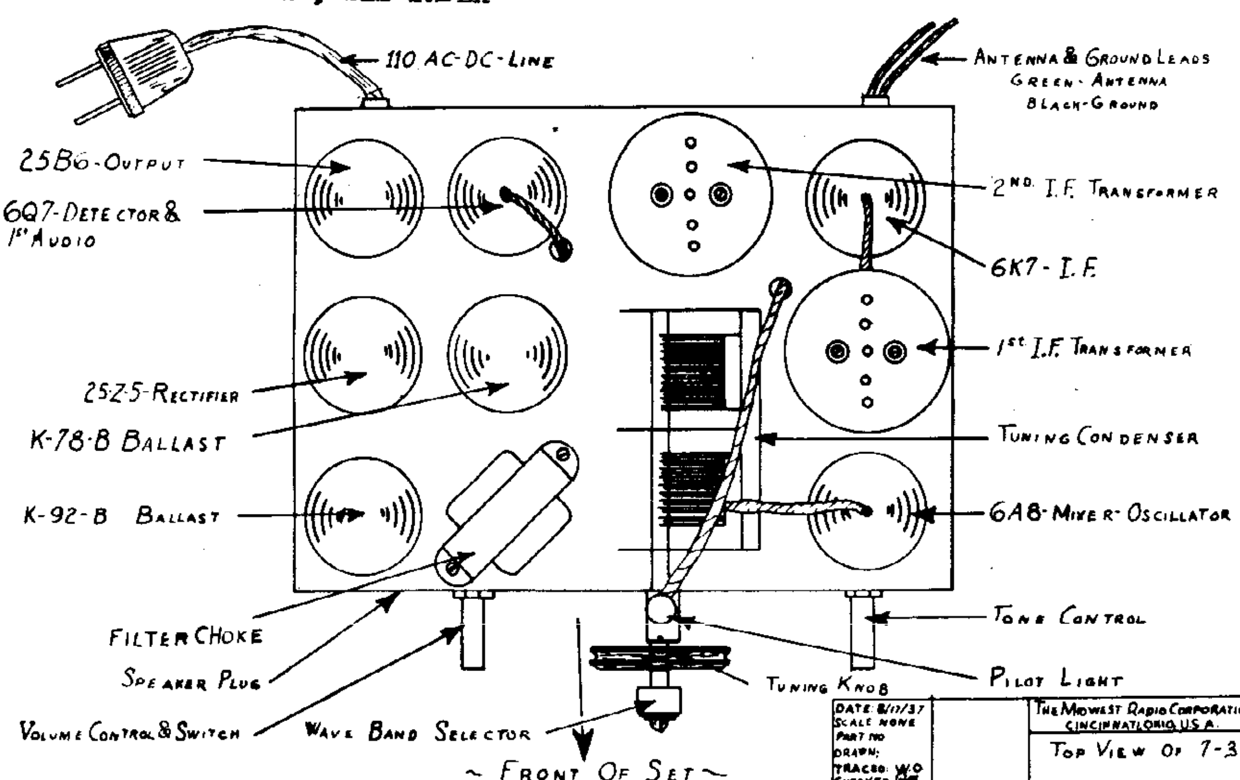
POWER SWITCH (MOUNTED ON VOL. CONT)

I.F.-456KC.

7-38 AC DC

DATE 8-18-37 SCALE NONE PART NO. DRAWN TRACED W.O. CHECKED APPROVED	DWG. No. 984	THE MIDWEST RADIO CORPORATION CINCINNATI, OHIO, U.S.A. SCHEMATIC CIRCUIT DIAGRAM OF THE 7-38 AC-DC

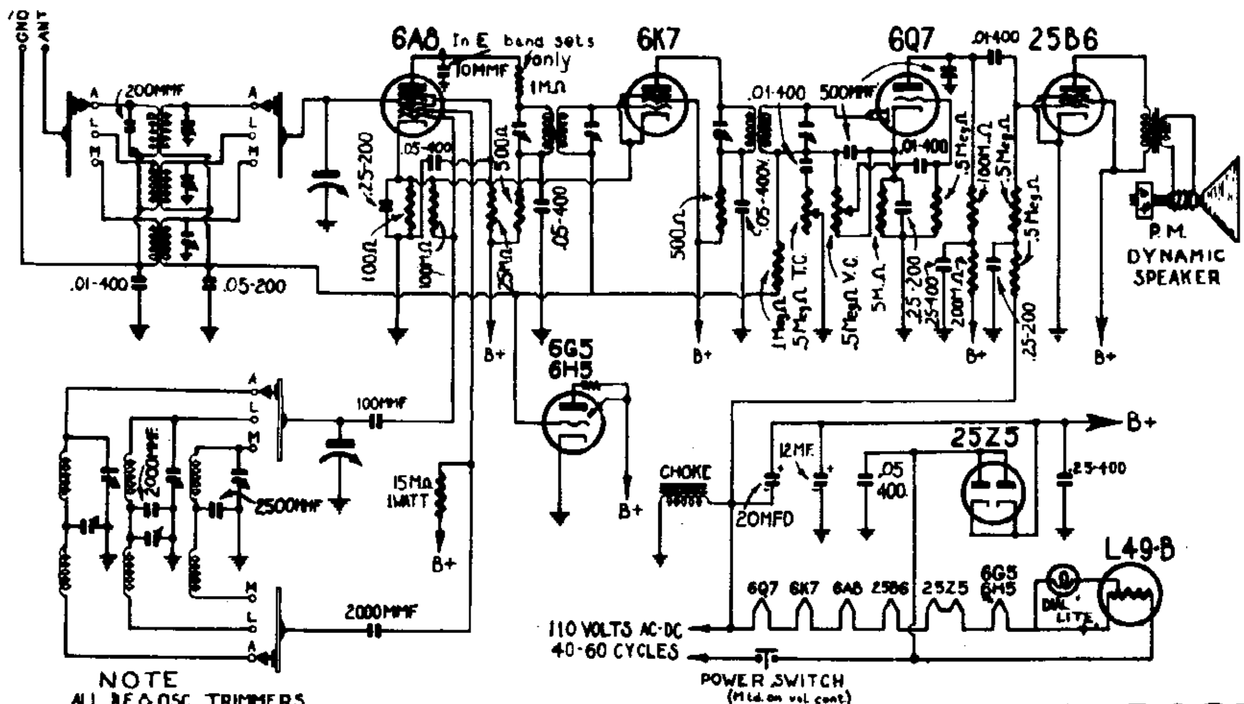
FOR TRIMMERS, SEE INDEX



DATE 8/17/37 SCALE NONE PART NO. DRAWN TRACED W.O. CHECKED APPROVED	DWG. No. 978	THE MIDWEST RADIO CORPORATION CINCINNATI, OHIO, U.S.A. TOP VIEW OF 7-38

MODEL 7-38 AC-DC
(Export)
Schematic, Socket

MID-WEST RADIO CORP.



NOTE
ALL R.F. & OSC. TRIMMERS ARE 45 MMFD MAX. CAP.
OSC. PADDERS ARE 500MMFD. MAX. CAP.

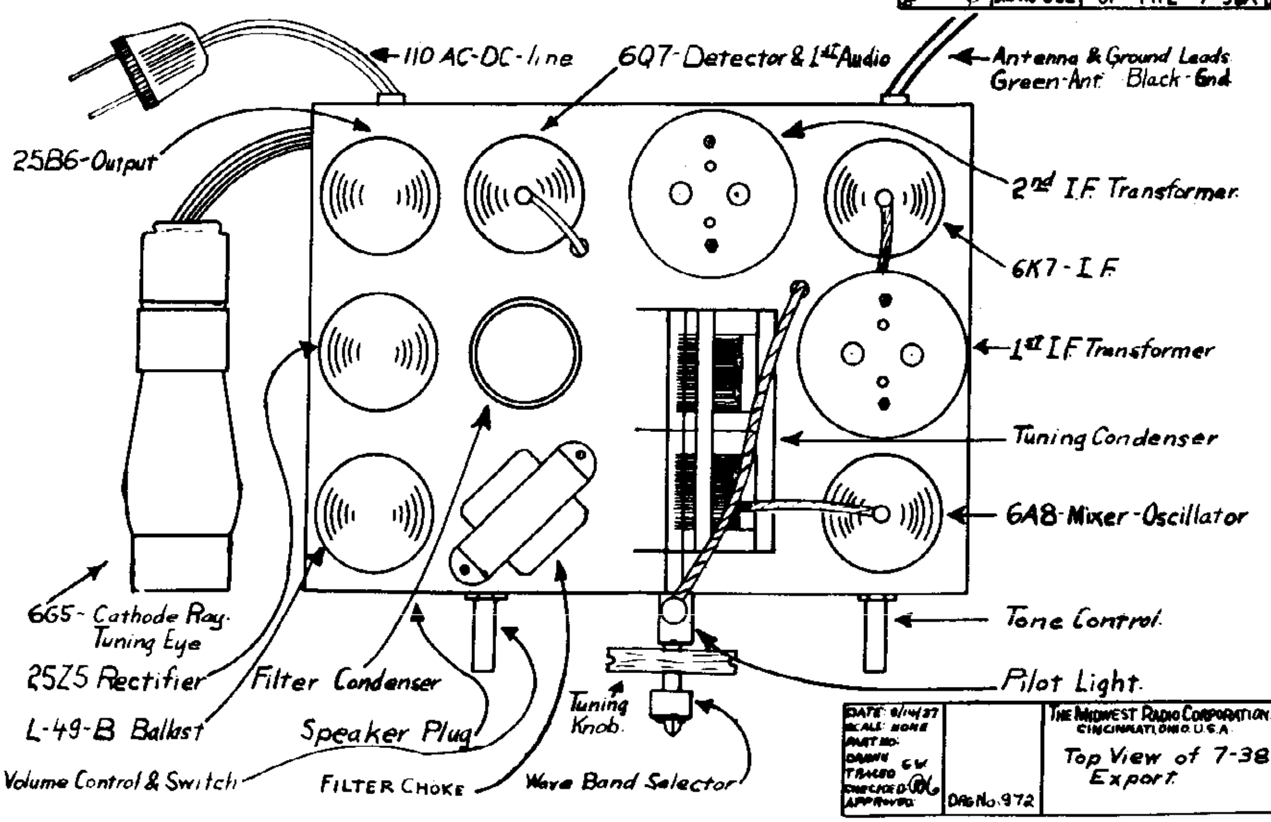
E-BAND NOTE

In sets having long wave band, E (long wave) band coil replaces L band coil. Colpitts oscillator is used—no tickler coil. No fixed padder is used. Variable padder is 140MMFD. Max. Cap. in place of 500 MMFD. R.F. filter is added in plate circuit of 6A8

I.F.=456KC. EXPORT 7-38 AC DC

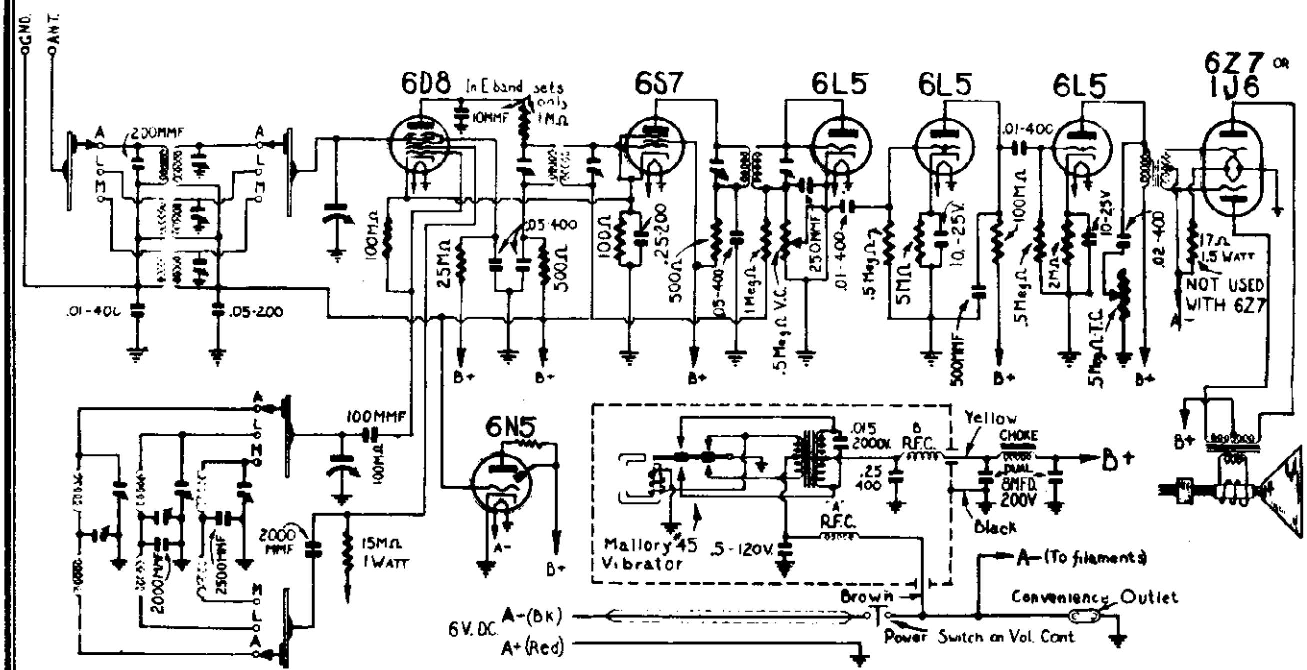
DATE 6-18-37 SCALE — PART NO. — DRAWN R.H.L. TRACED R.H.L. APPROVED	THE MIDWEST RADIO CORPORATION CINCINNATI, OHIO. U.S.A.
DWG No 932	SCHEMATIC CIRCUIT DIAGRAM OF THE 7-38A AC DC

FOR TRIMMERS, SEE INDEX



DATE 6/14/37 SCALE NONE PART NO. DRAWN GW TRACED CHECKED APPROVED	THE MIDWEST RADIO CORPORATION CINCINNATI, OHIO U.S.A.
DWG No. 972	Top View of 7-38 Export

MID-WEST RADIO CORP.



NOTE
All R.F. and Osc. trimmers are 45 MMFD. Max. Cap.
Osc. padders are 500MMFD. Max. Cap.

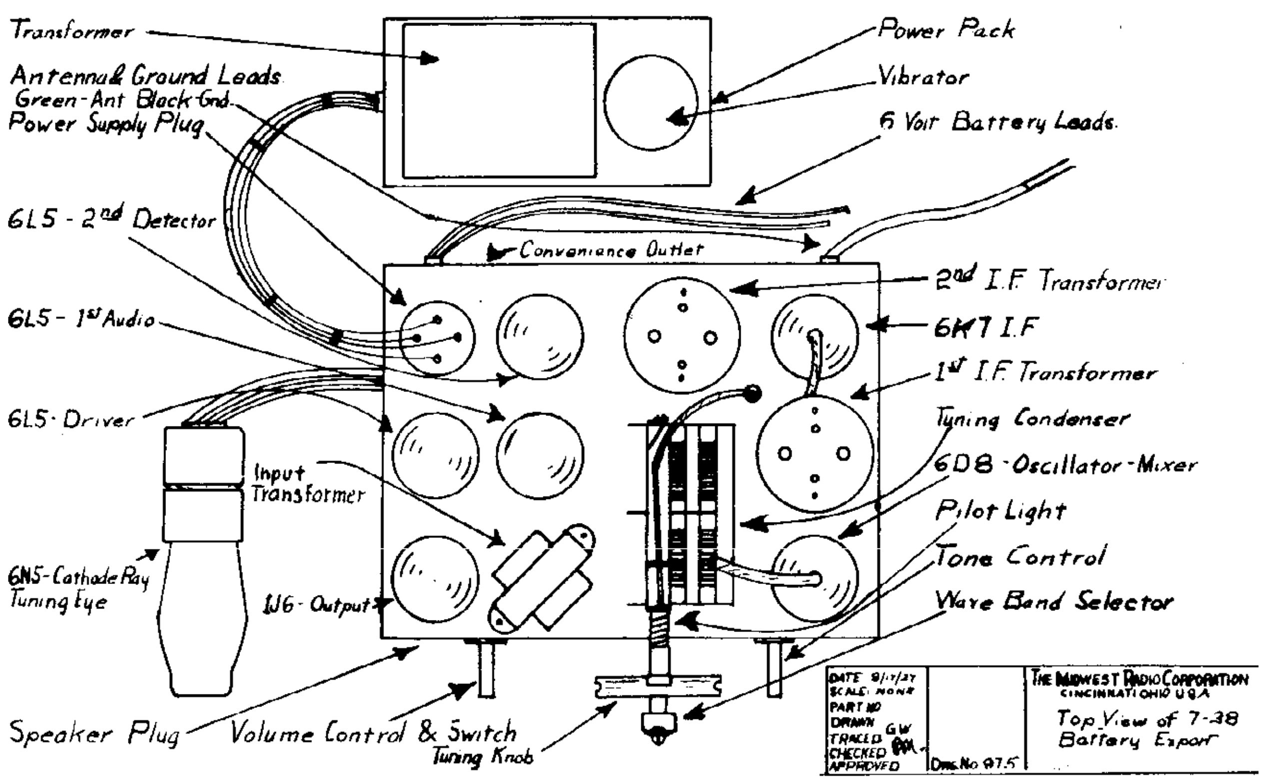
E-BAND NOTE
In sets having long wave band, E (long wave) band coil replaces L band coil. Colpitts oscillator is used—no tickler coil. No fixed padder is used. Variable padder is 140MMFD. Max Cap in place of 500 MMFD. R.F. filter is added in plate circuit of 6D8.

I.F.=456KC.

EXPORT 7-38 BATT

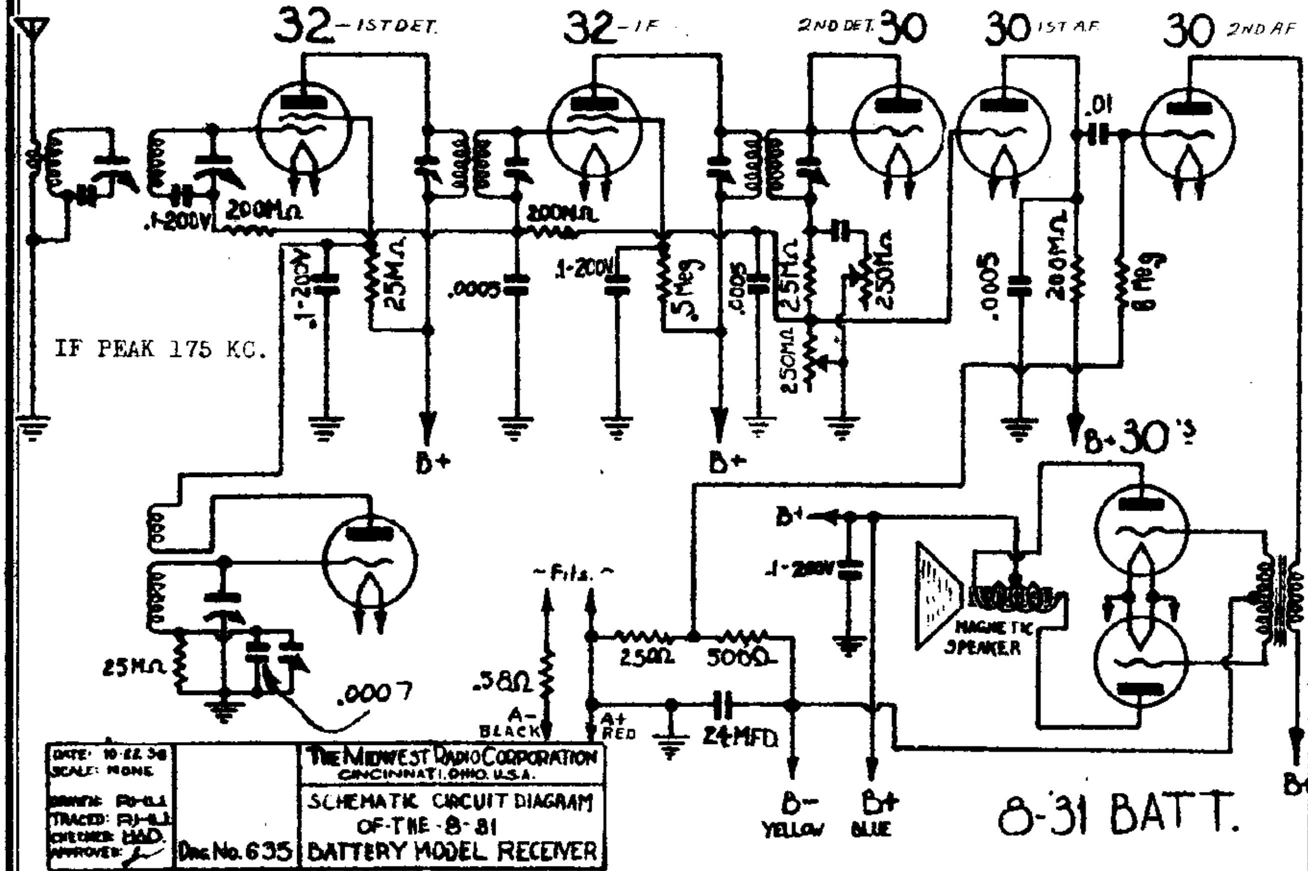
DATE: 6-16-37 SCALE: NONE PART NO: DRAWN: TRACED: CHECKED: APPROVED:	Dwg. No. 828	THE MIDWEST RADIO CORPORATION CINCINNATI, OHIO, U.S.A. SCHEMATIC CIRCUIT DIAGRAM OF THE 7-38A. BATT

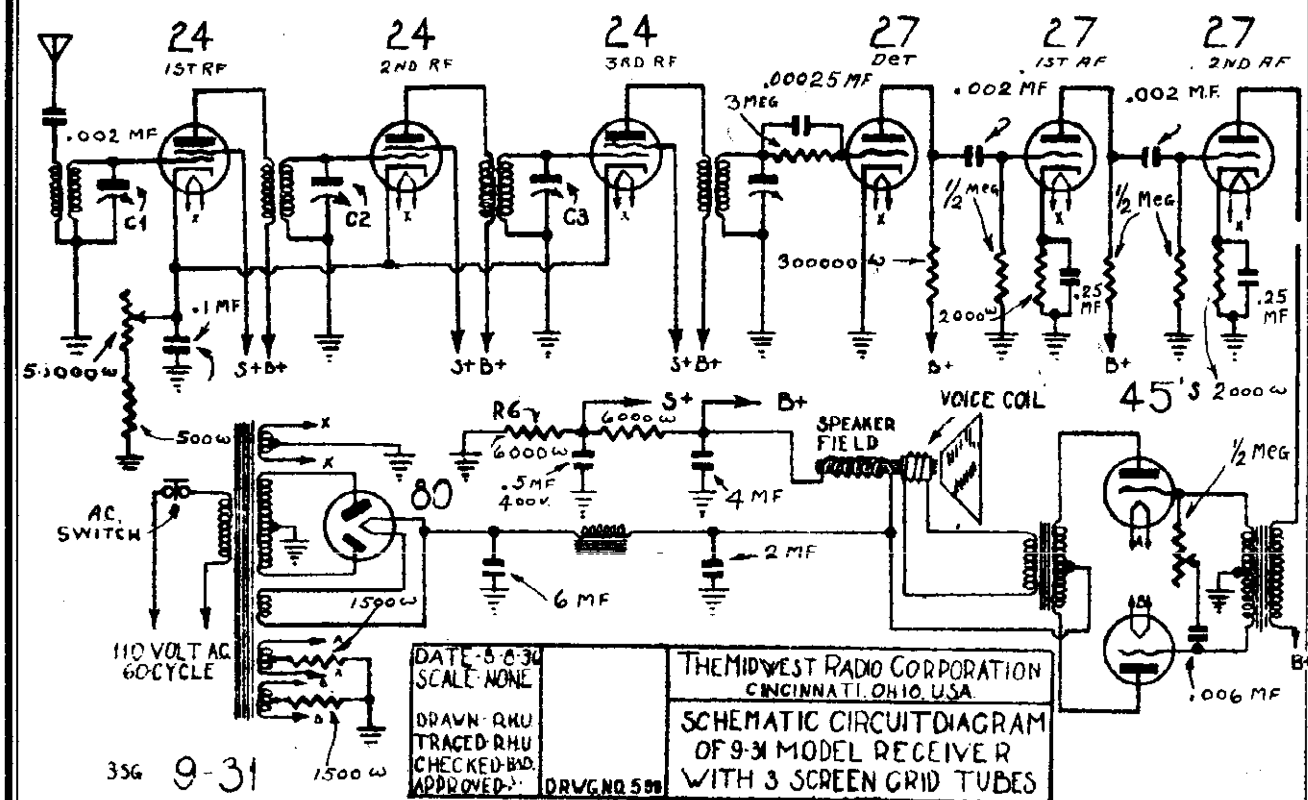
FOR TRIMMERS, SEE INDEX



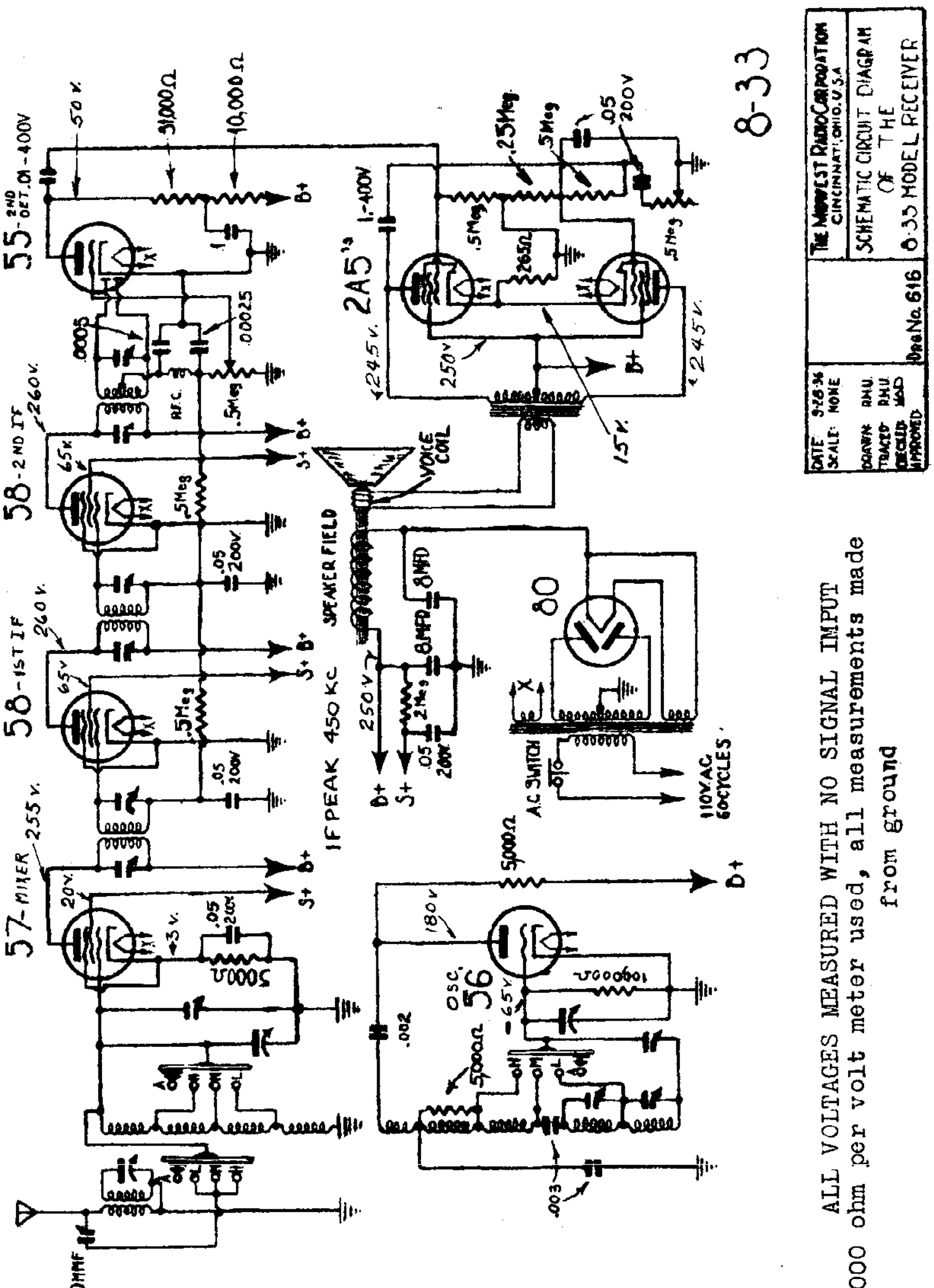
MODEL 8-31 Batt.
MODEL 9-31 (3SG)
Schematics

MID-WEST RADIO CORP.





MID-WEST RADIO CORP.



ALL VOLTAGES MEASURED WITH NO SIGNAL IMPUT
1000 ohm per volt meter used, all measurements made from ground

MODEL 8-33, Early
Socket, Trimmers
Alignment

MID-WEST RADIO CORP.

Using a standard signal generator and having approximate frequency from 400 k.c. to 20 m.c. and a standard output meter.

I. F. ALIGNMENT

(1) Connect output of signal generator to control grid of 57 first detector tube. Connect output meter to plate of output tube to ground. Set signal generator to 450 k.c. and adjust the trimmers of the three I.F. transformers for the greatest output. The 1st I. F. transformer will be found to contain two adjustments; the 2nd, one adjustment; and the 3rd, two adjustments.

This completes the I. F. alignment.

Note: To assure more accurate trimmer setting always use lowest possible test oscillator output consistent with readable output meter scale deflection.

R. F. ALIGNMENT

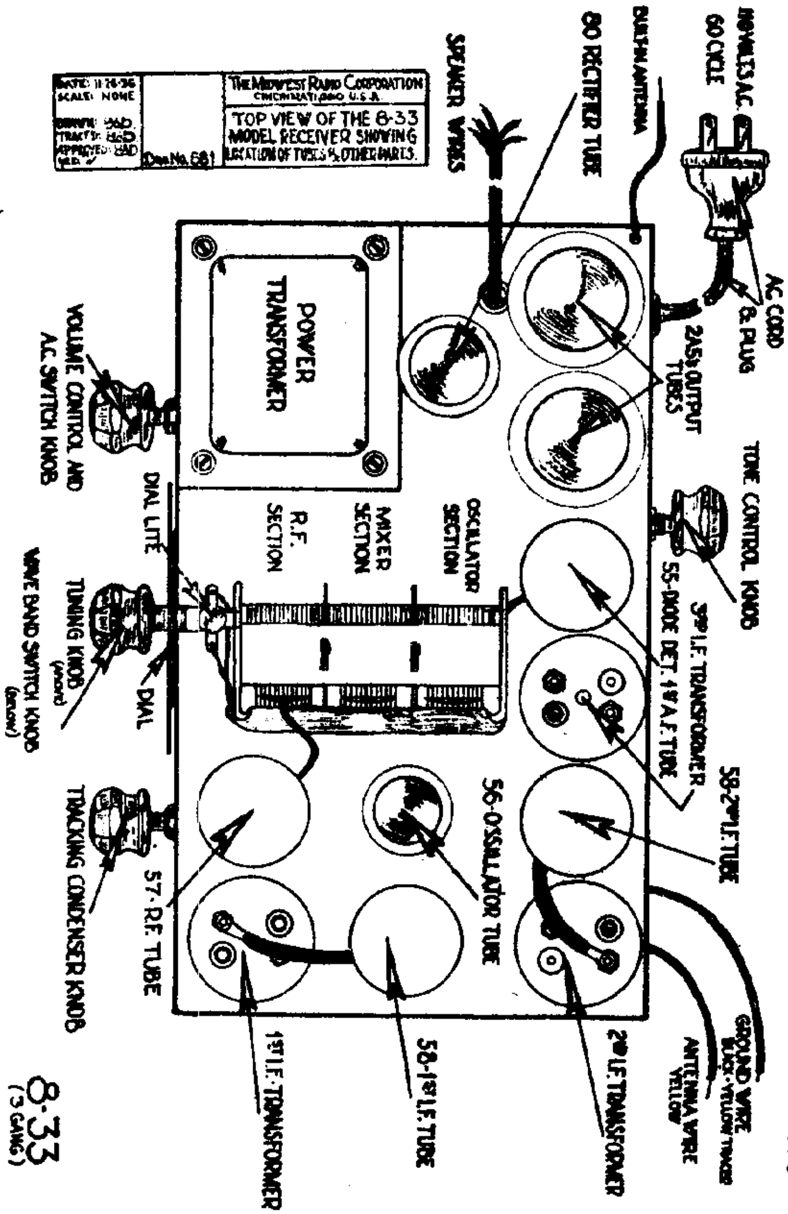
(2) Connect signal generator to antenna post of the receiver through a standard dummy antenna with the band selector switch in the A position and the varible trimmer at minimum capacity and the dial at 100. Set signal generator at 540 k.c. and adjust the A padder for maximum gain. Set signal generator at 1400 k.c. and adjust R. F. and mixer trimmers for maximum gain. Receiver dial during this operation is set at about 15. Tighten the A trimmer as tight as it will go and turn it back one half turn for proper adjustment.

(3) Turn band selector switch to L position. Set signal generator to 3800 k.c. and adjust trimmer D to the greatest output. This setting will be at about 15 on the dial.

This completes the R. F. alignment.

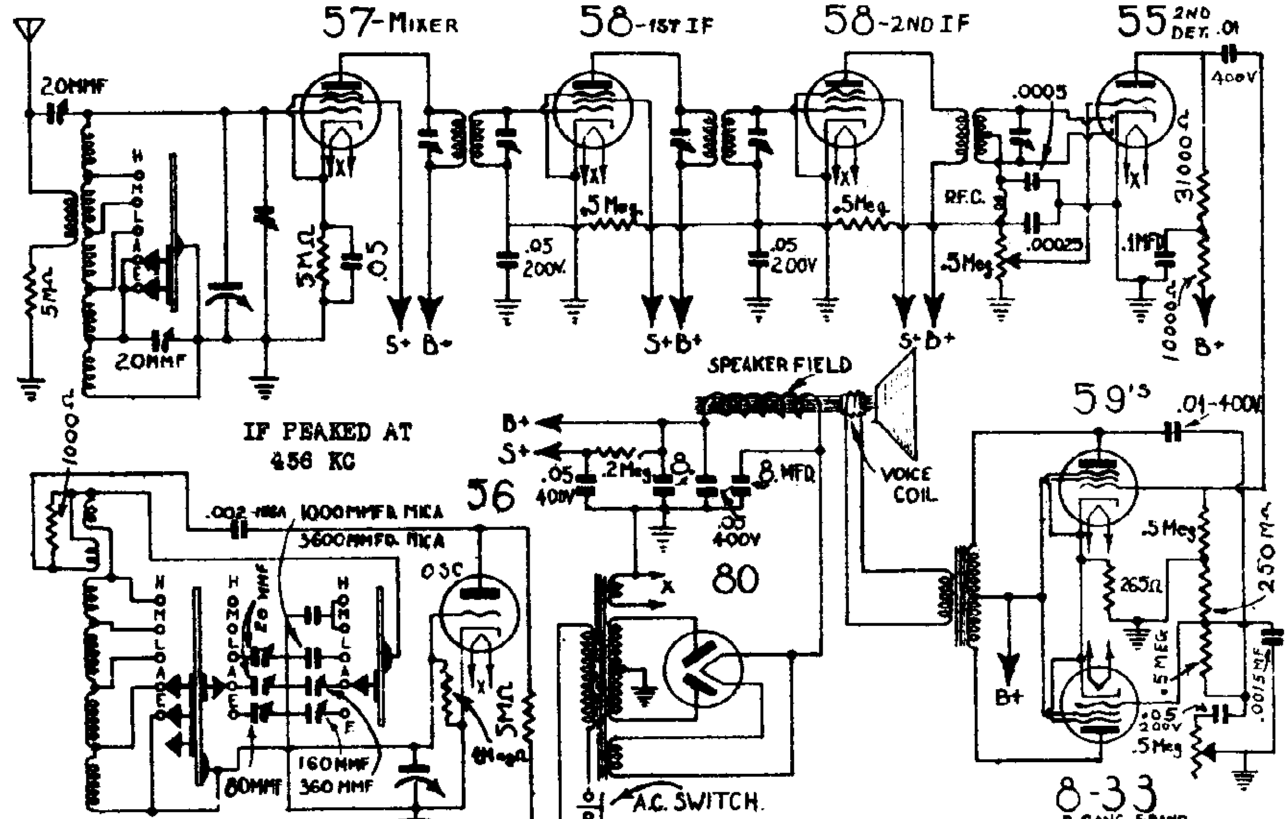
Note: We do not advise the customer to attempt adjustment on the M and H bands as this is done at the factory by experts. If set appears to be broad in tuning, we suggest that you inspect the spacing of the I. F. transformers. The correct spacing for I.F. transformers is 5/8".

Note: To assure more accurate trimmer setting always use lowest possible test oscillator output consistent with readable output meter scale deflection.

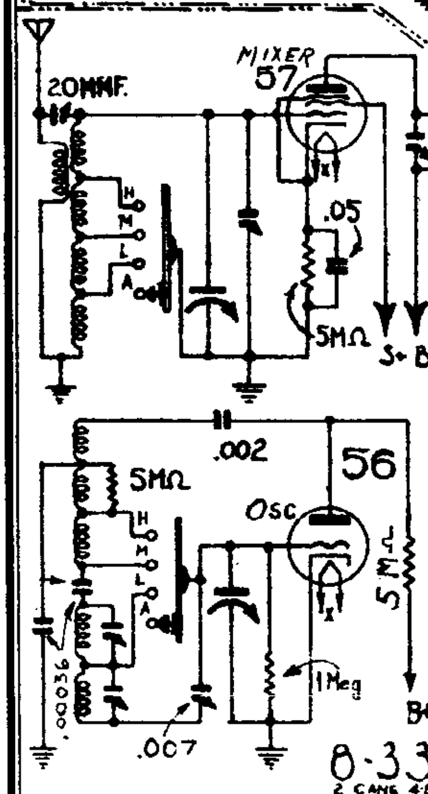


MID-WEST RADIO CORP.

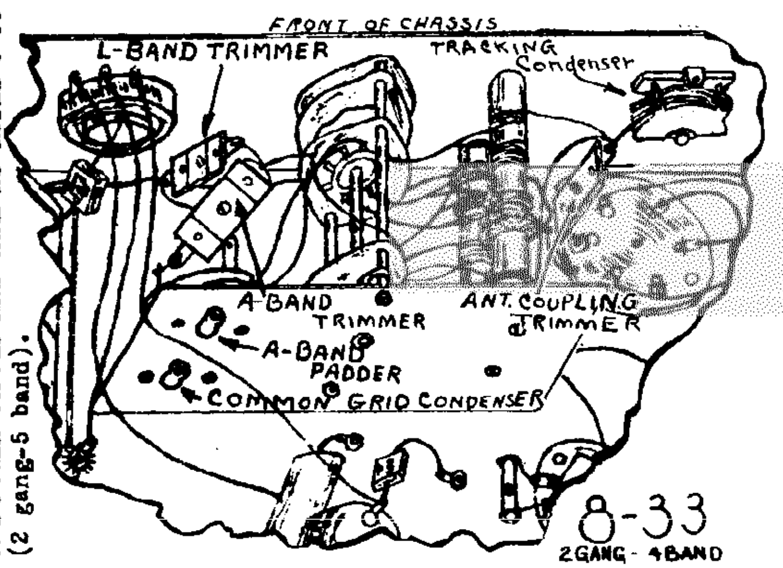
MODEL 8-33(2 Gang,4 Band)
MODEL 8-33(2 Gang,5 Band)
Schematics,Trimmers



DATE 10-14-36 SCALE NONE PART NO DRAWN RHW TRACED RHW CHECKED MAD APPROVED	THE MIDWEST RADIO CORPORATION CINCINNATI, OHIO U.S.A. SCHEMATIC CIRCUIT DIAGRAM OF THE 8-33 MODEL RECEIVER
Drg No. 631	



THE OSCILLATOR AND MIXER CONNECTIONS OF MODEL 8-33 (2 gang-4 band). THE IF,AF, and POWER SUPPLY ARE SAME AS MODEL 8-33 (2 gang-5 band).



DATE 10-17-36 SCALE NONE PART NO DRAWN RHW TRACED RHW CHECKED MAD APPROVED	THE MIDWEST RADIO CORPORATION CINCINNATI, OHIO U.S.A. SCHEMATIC CIRCUIT DIAGRAM OF THE 8-33 MODEL RECEIVER
Drg No. 632	

IF PEAK
456KC

DATE 11-4-36 SCALE NONE PART NO DRAWN RHW TRACED RHW CHECKED MAD APPROVED	THE MIDWEST RADIO CORPORATION CINCINNATI, OHIO U.S.A. TRIMMER AND PADDER LOCATION FOR MODEL 8-33 -RECEIVER
Drg No. 647	

MODEL 8-33(2 Gang,4 Band)
MODEL 8-33(2 Gang,5 Band) MIDWEST RADIO CORP.
Alignment

ALIGNMENT PROCEDURE

MODEL 8-33 (2 GANG-4 BAND), 8-33 (2 GANG-5 BAND)

(1) Set the signal generator to 456 KC and connect it from the mixer grid to ground.
(2) Remove the oscillator tube from the receiver.
(3) Using a moderately weak signal approximately 40 micro-volts, align the three IF transformers to maximum output.
(4) Keep decreasing the oscillator (signal generator) input and repeat the alignment for maximum output and gain.

Insert the oscillator tube into the receiver. Connect the signal generator and mixer grid lead between the antenna and ground.

"E" Band Alignment

(1) Set the wave band change switch to the "E" band position.
(2) Set the signal generator to 325 KC.
(3) Adjust the "E" oscillator trimmer to maximum gain, then adjust the "E" band mixer trimmers for maximum gain.
(4) Reset the signal generator to 135 KC and rotate the receiver dial to 135 KC setting.
(5) Adjust the "E" band padder for maximum signal.

"A" Band Alignment

(1) Set the receiver wave change switch to the "A" band position.
(2) Set the signal generator to 1490 KC.
(3) Adjust the "A" oscillator trimmer to maximum gain, then adjust the "A" band RF and the "A" band mixer trimmers for maximum gain.
(4) Reset the signal generator to 550 KC, and rotate the receiver dial position to 550 KC.
(5) Adjust the "A" band padder for maximum signal.
(6) Repeat the adjustment of trimmers and padders until the adjustment of one does not effect the adjustment of the other.

"L" Band Alignment

(1) Set the wave change switch to the "L" band position.
(2) Set the signal generator to 3.8 MC.
(3) Adjust the "L" band oscillator trimmer to maximum gain, then adjust the "L" band RF and Mixer trimmers for maximum gain.
(4) Reset the signal generator to 1.6 MC, and rotate the receiver dial to the 1.6 MC position.
(5) Adjust the "L" band padder for maximum signal.
(6) Repeat the adjustment of trimmers and padders until the adjustment of one does not effect the adjustment of the other.

"M" Band Alignment

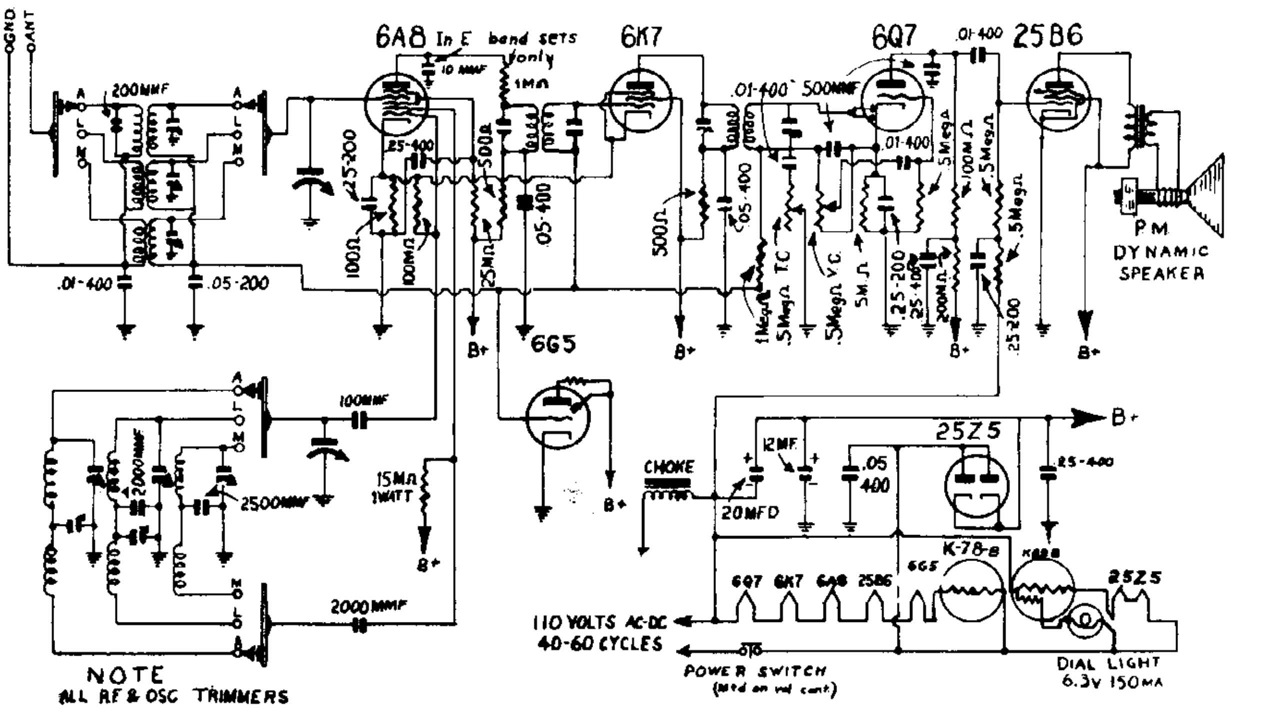
(1) Set the wave change switch to the "M" band position.
(2) Set the signal generator to 11.5 MC.
(3) Adjust the "M" band oscillator trimmer to maximum gain, then adjust the "M" band RF and Mixer trimmers for maximum gain.

"H" Band Alignment

(1) Set the wave change switch to the "H" band psotion.
(2) Set the signal generator to 28 MC.
(3) Adjust the "H" band oscillator trimmer to maximum gain, the adjust the "H" band RF and Mixer trimmers for maximum gain.

MODEL 8-38 AC-DC
Schematic, Socket

MID-WEST RADIO CORP.



NOTE
ALL RF & OSC TRIMMERS ARE 45 MMFD MAX CAP
OSC PADDERS ARE 500MMFD MAX CAP

E-BAND NOTE

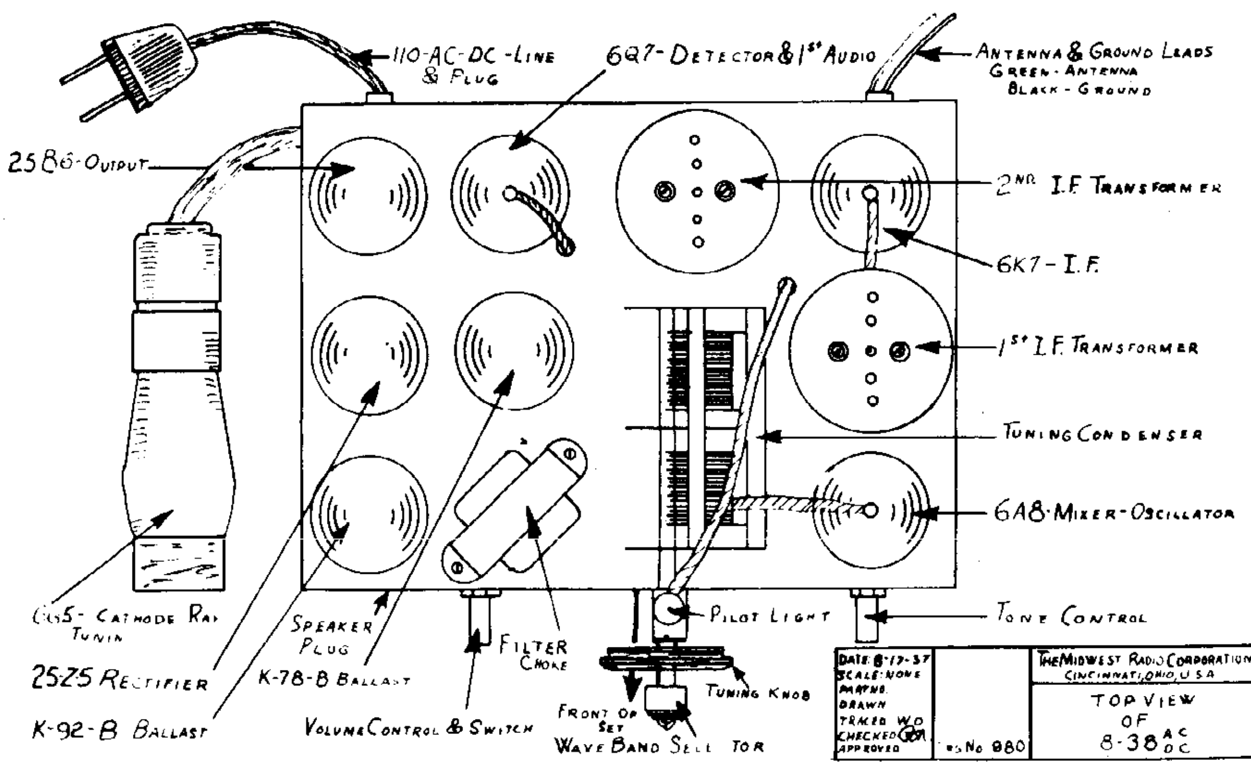
In sets having long wave band, E (long wave) band coil replaces L band coil. Colpitts oscillator is used - no tickler coil. No fixed padder is used. Variable padder is 140MMFD Max Cap in place of 500 MMFD. RF filter is added in plate circuit of 6A8.

I.F. = 456KC.

8-38 AC DC

DATE 4/19/37 SCALE NONE PART NO — DRAWN TRACED G.W. CHECKED APPROVED	DWG NO 986	THE MIDWEST RADIO CORPORATION CINCINNATI OHIO USA SCHEMATIC CIRCUIT DIAGRAM OF THE 8-38 AC DC

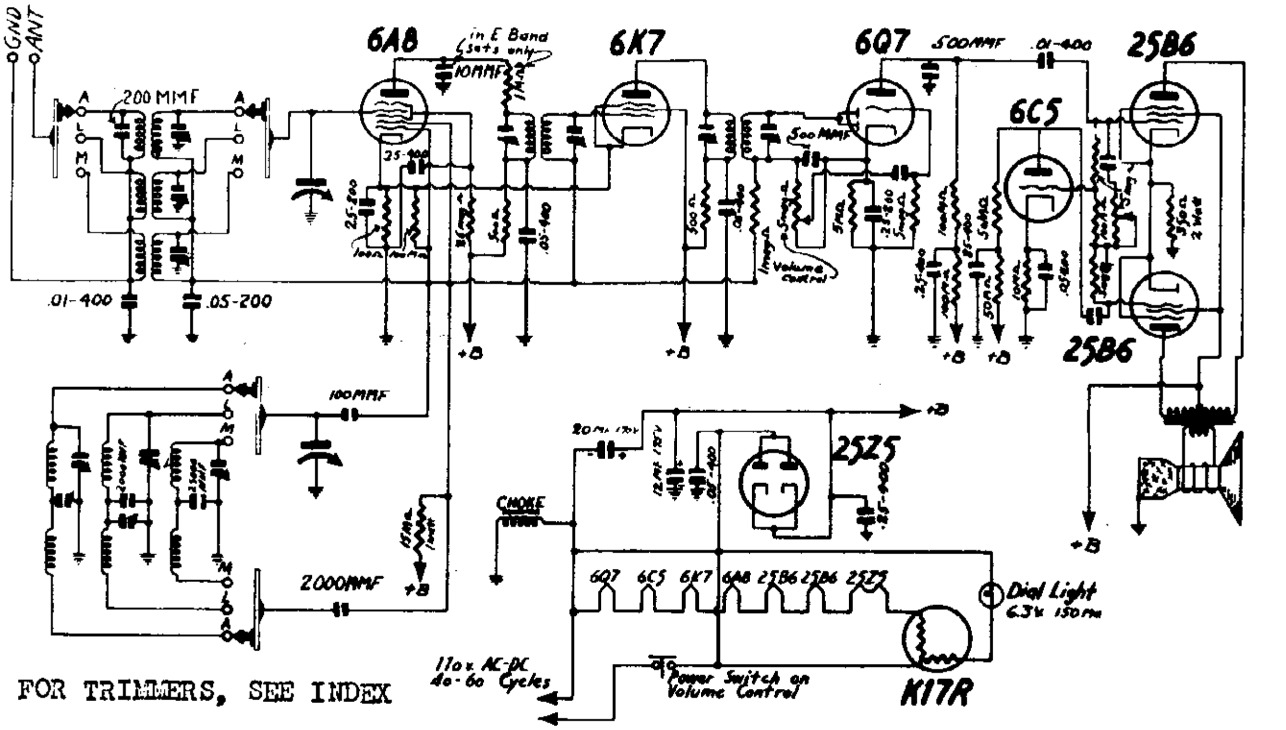
FOR TRIMMERS, SEE INDEX



DATE 8-17-37 SCALE NONE PART NO. DRAWN TRACED W.O. CHECKED APPROVED	DWG No 980	THE MIDWEST RADIO CORPORATION CINCINNATI, OHIO, U.S.A. TOP VIEW OF 8-38 AC DC

MODEL 8-38 AC-DC
Export
Schematic, Socket

MID-WEST RADIO CORP.



FOR TRIMMERS, SEE INDEX

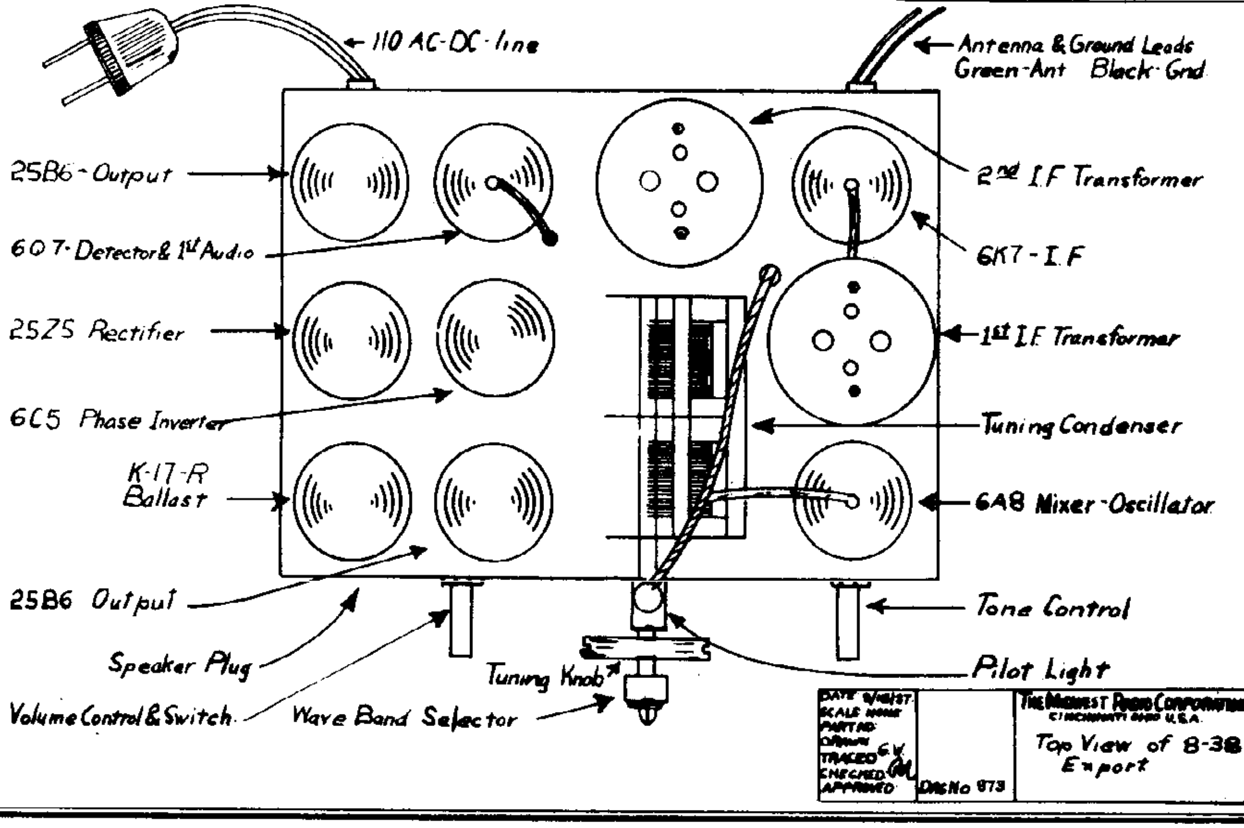
NOTE
All R.F. & Osc. trimmers are 45 MMFD Maximum Capacity. Osc. padders are 500MMFD Maximum Capacity. E Band Padder 150 MMFD Maximum Capacity.

E BAND NOTE
• In sets having long wave band E (long wave) band coil replaces L band coil. The oscillator is connected colpitts.

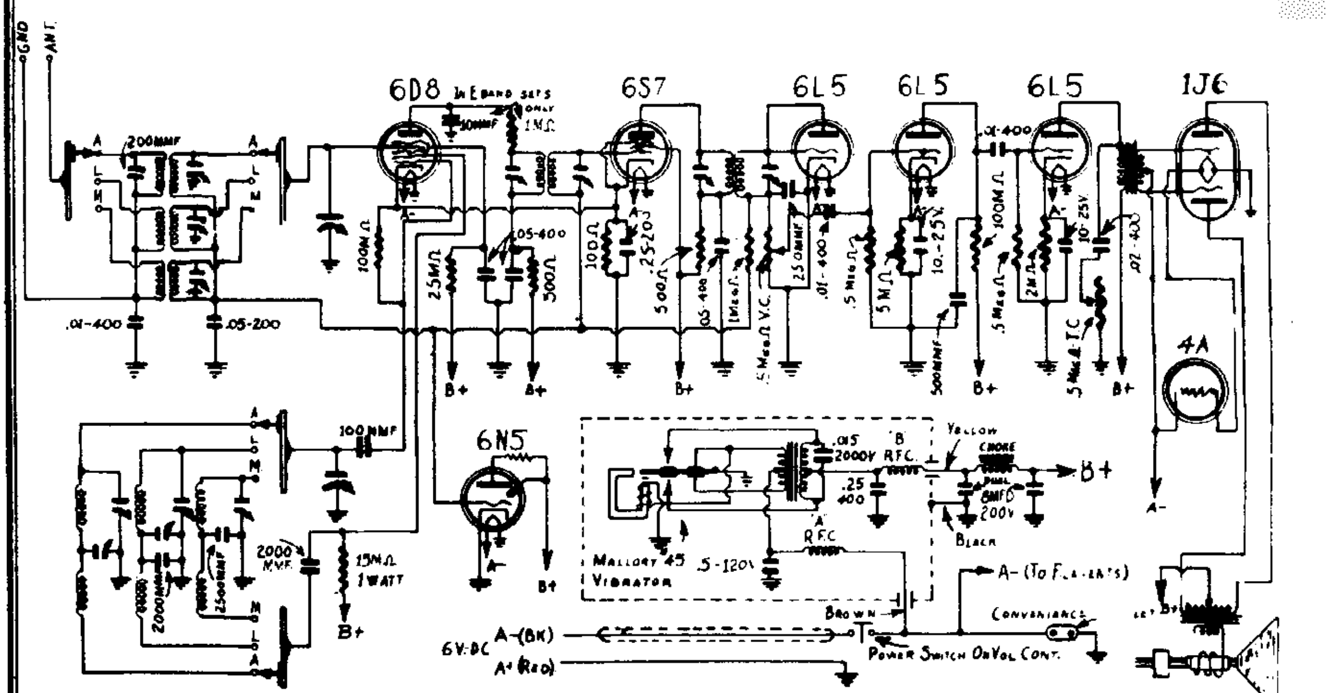
I.F. = 456 KC

EXPORT 8-38 AC/DC

The Midwest Radio Corporation, Cincinnati, Ohio, U.S.A.
SCHEMATIC CIRCUIT DIAGRAM OF THE EXPORT 8-38 AC-DC
Dwg. No. 969



MID-WEST RADIO CORP.



NOTE
All R.F. and Osc. trimmers are 45 MMFD. Max. Cap.
OSC. padders are 500 MMFD Max. Cap.

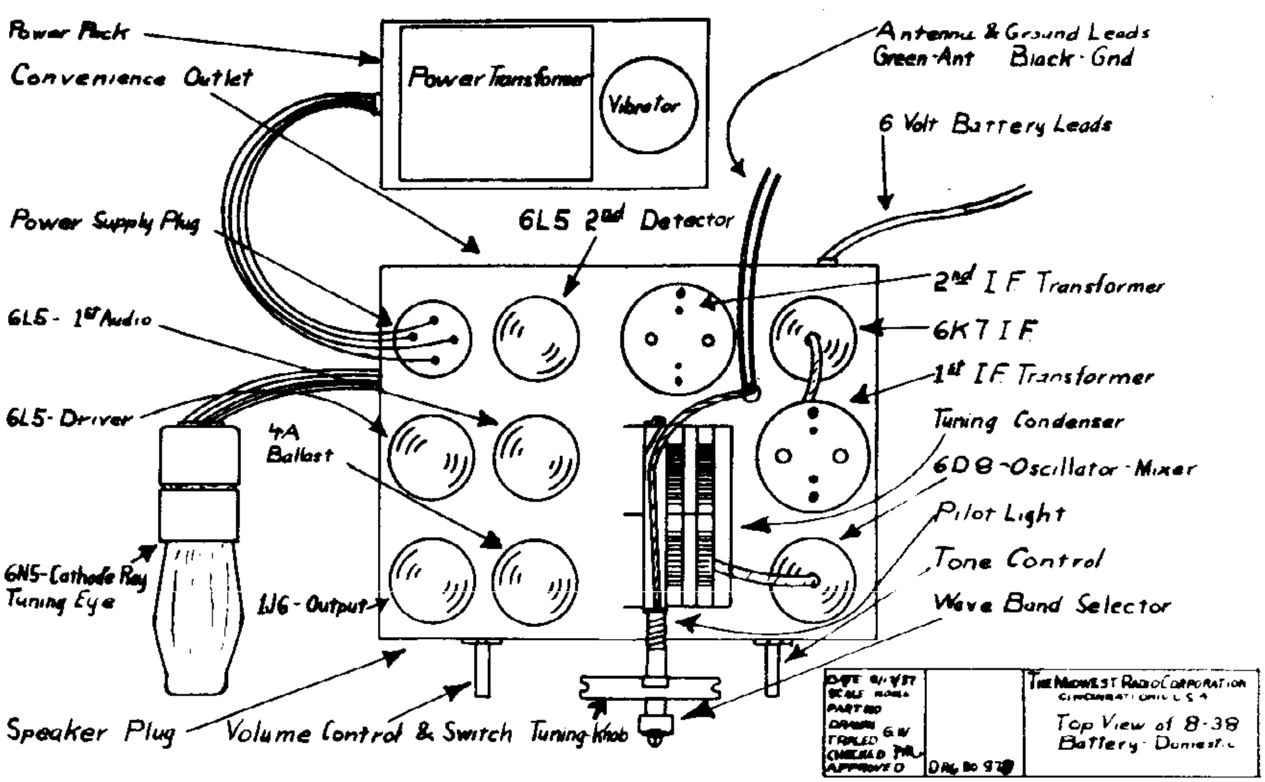
E-BAND NOTE
In sets having long wave band, E (long wave) band coil replaces L band coil. Colpitts oscillator is used — no tickler coil. No fixed padder is used. Variable padder is 140 MMFD max. cap. in place of 500 MMFD. R.F. filter is added in plate circuit of 6D8.

8-38 BATT.

I.F. = 456 KC.

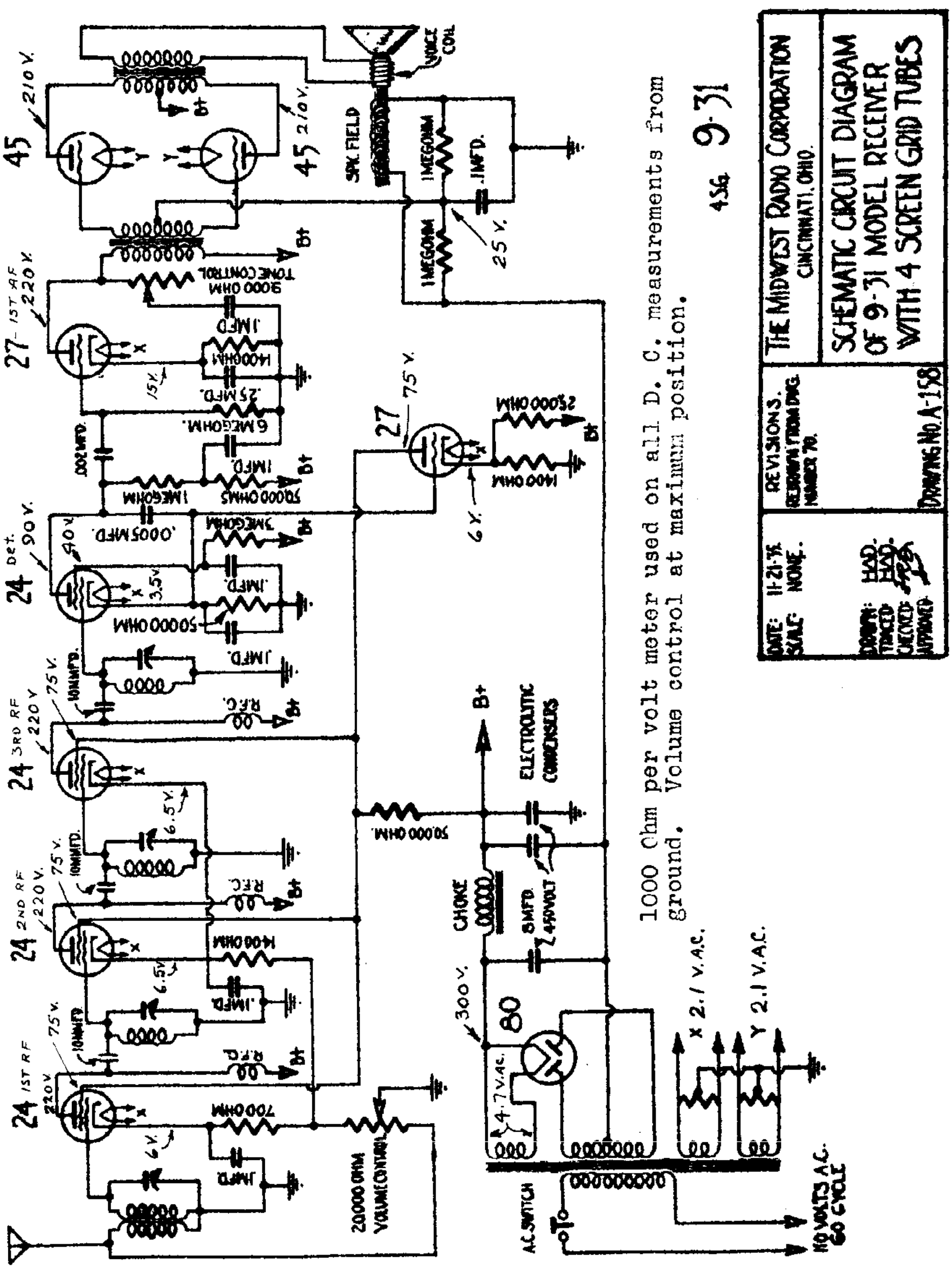
Drawn W.O. / Checked / Drg. No. 987	The Midwest Radio Corporation, Cincinnati, Ohio U.S.A. — Schematic circuit of the 8-38 Batt.

FOR TRIMMERS, SEE INDEX

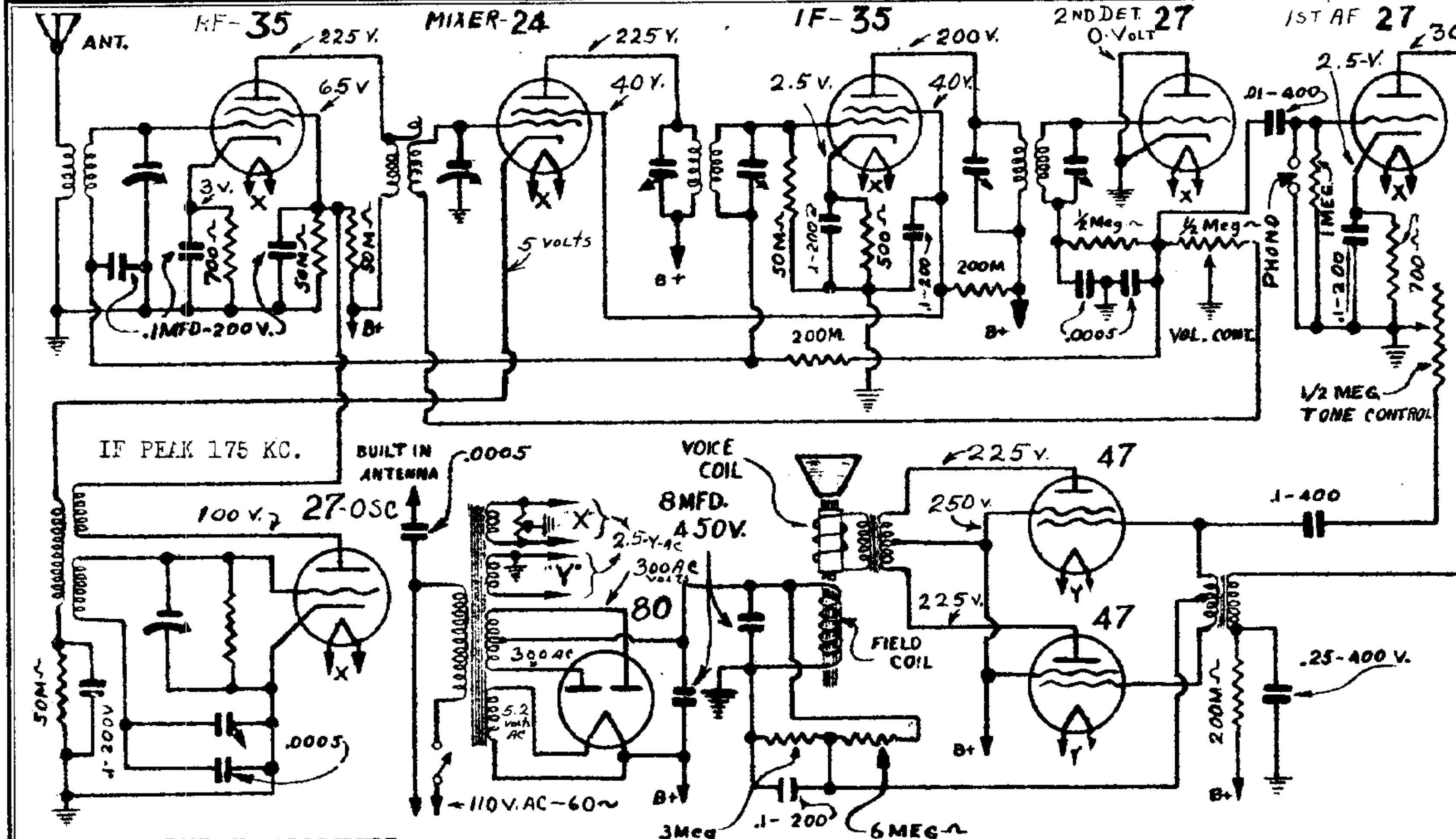


MODEL 9-31 (48G)
Schematic, Voltage

MID-WEST RADIO CORP.



MID-WEST RADIO CORP.



ALIGNMENT PROCEDURE

(1) Set the signal generator to 175 KC and connect it from the mixer grid to ground.
(2) Remove the oscillator tube from the receiver, using weak signal (approx. 40 microvolts), align the IF transformers to maximum output.

Insert the oscillator tube. Connect the signal generator between antenna and ground. Connect the mixer lead to the grid of the mixer tube.

(1) Set signal generator and receiver to 1490 KC, located at 10 on the receiver dial.
(2) Oscillator section is adjusted by bending plates of the (variable condenser.)
(3) Adjust mixer & RF trimmers for maximum gain.

DATE: 10-1-36
SCALE: NONE
PART NO:
DRAWN: } C.W.F.
TRACED: }
CHECKED: H.S.D.
APPROVED: B.

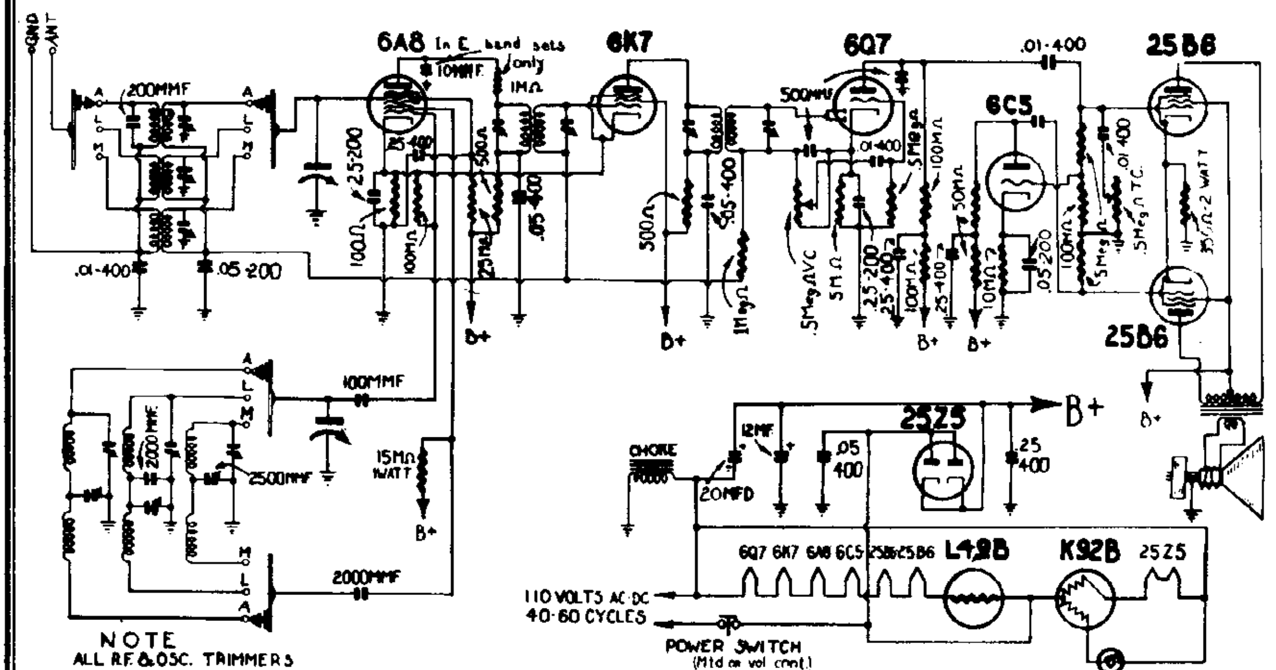
THE MIDWEST RADIO CORPORATION
CINCINNATI, OHIO. U.S.A.

SCHEMATIC CIRCUIT DIAGRAM
OF THE 9-32 MODEL
RECEIVER

DRG. No. 619

MODEL 9-38 AC-DC
Schematic, Socket

MID-WEST RADIO CORP.



NOTE
ALL RF & OSC. TRIMMERS ARE 45 MMFD. MAX CAP.
OSC PADDERS ARE 500MMFD. MAX. CAP.

~ E-BAND NOTE ~

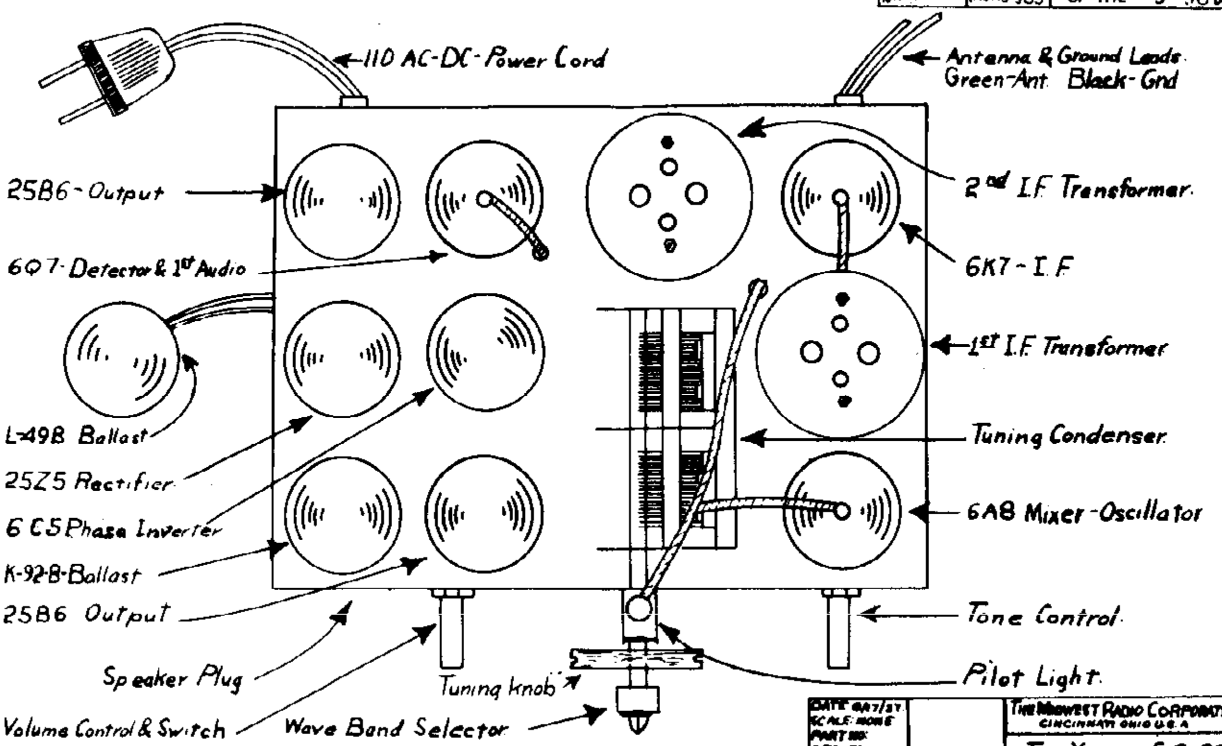
In sets having long wave band, E (long wave) band coil replaces L band coil. - Colpitts oscillator is used - no tickler coil. - No fixed padder is used - Variable padder is 140MMFD Max Cap in place of 500MMFD. - RF filter is added in plate circuit of 6A8.

I.F. 456KC.

9-38 AC DC

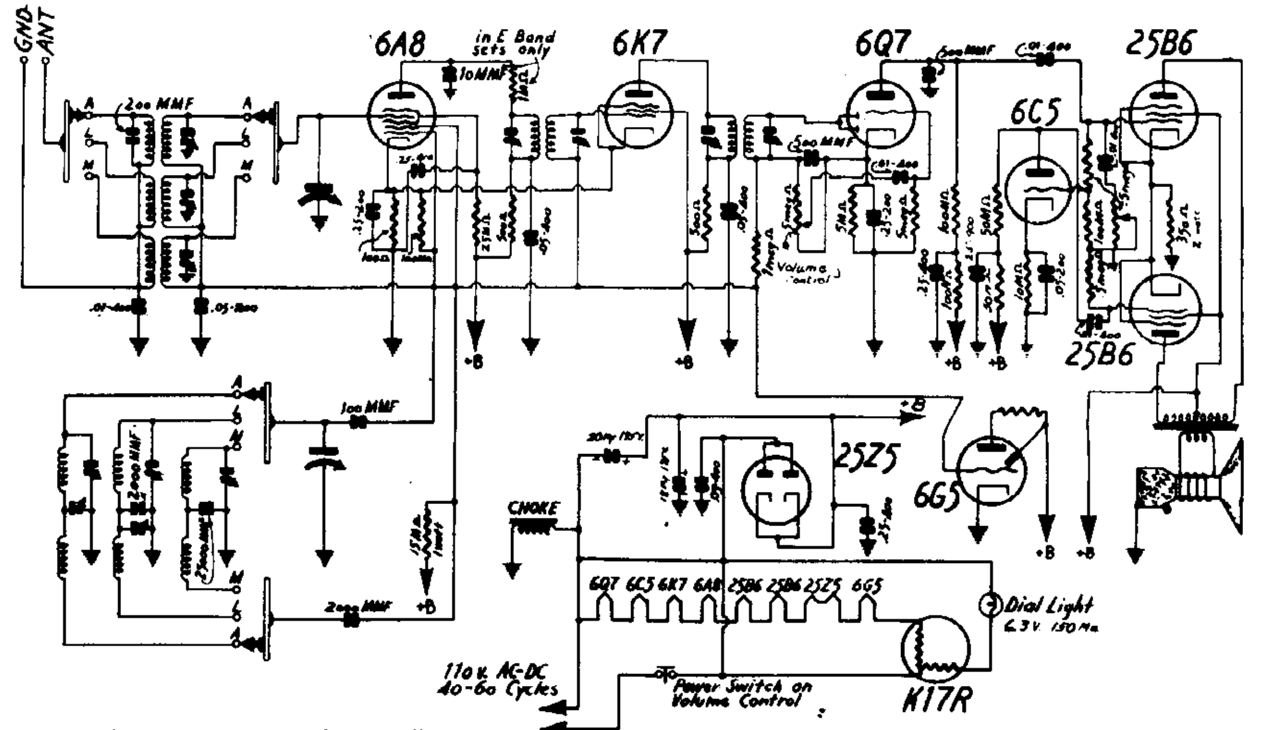
DATE / SCALE / PART NO. / DRAWN RHU / TRACED RHU / CHECKED / APPROVED	DWG No 985	THE MIDWEST RADIO CORPORATION CINCINNATI OHIO U.S.A. SCHEMATIC CIRCUIT DIAGRAM OF THE 9-38 AC DC

FOR TRIMMERS, SEE INDEX



DATE 6A7/37 / SCALE NONE / PART NO. / DRAWN / TRACED G.W. / CHECKED / APPROVED	DWG No 982	THE MIDWEST RADIO CORPORATION CINCINNATI OHIO U.S.A. Top View of 9-38 AC-DC-[redacted]

MID-WEST RADIO CORP.



FOR TRIMMERS, SEE INDEX

NOTE

- All R.F. & Osc. trimmers are 45 MMFD Maximum Capacity.
- Osc. padders are 500 MMFD Maximum Capacity.
- E Band Padder 150 MMFD Maximum Capacity.

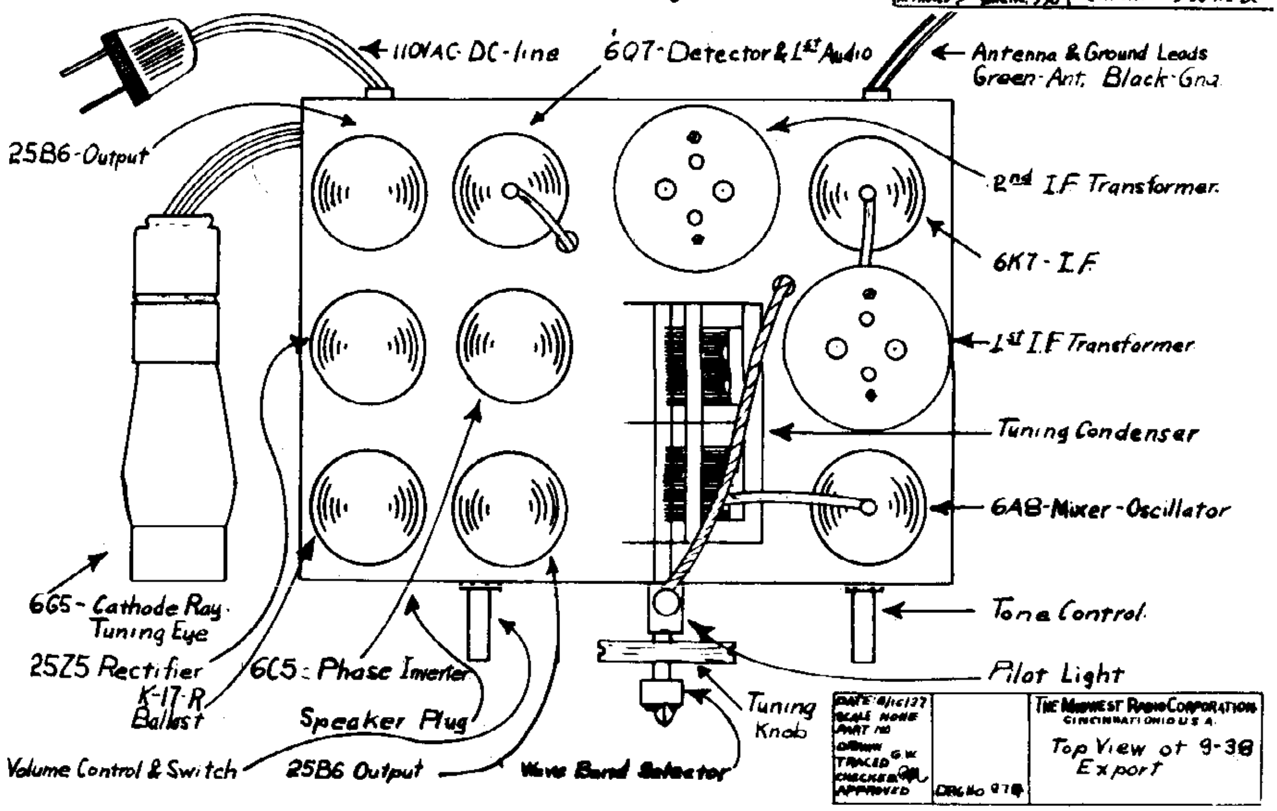
E BAND NOTE

- In sets having long wave band E (long wave) band coil replaces L band coil. The oscillator is connected colpitts.

I.F. = 456 KC

EXPORT 9-38 AC/DC

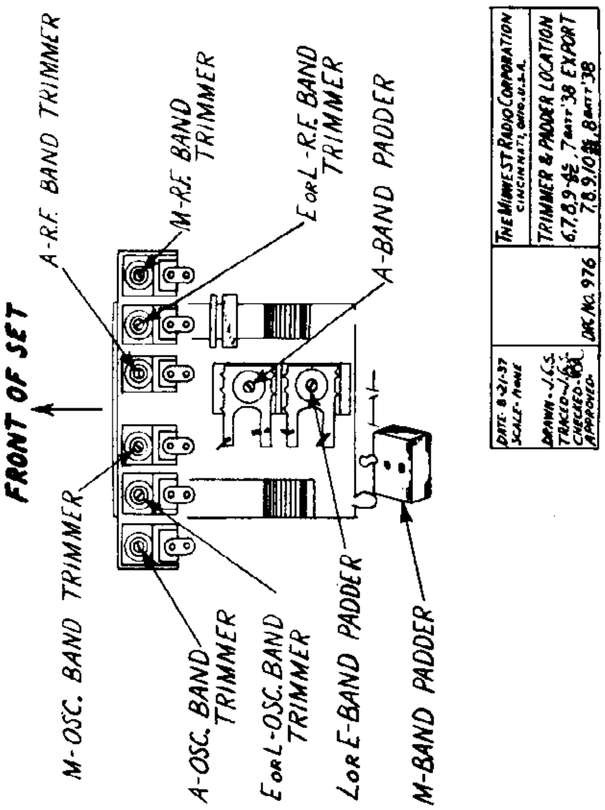
DATE 7-29-37 SCALE NONE	THE MIDWEST RADIO CORPORATION CINCINNATI, OHIO, U.S.A.
DRAWN TRACED CHECKED APPROVED	SCHEMATIC CIRCUIT DIAGRAM OF THE EXPORT 9-38 AC DC
DWG. No. 958	

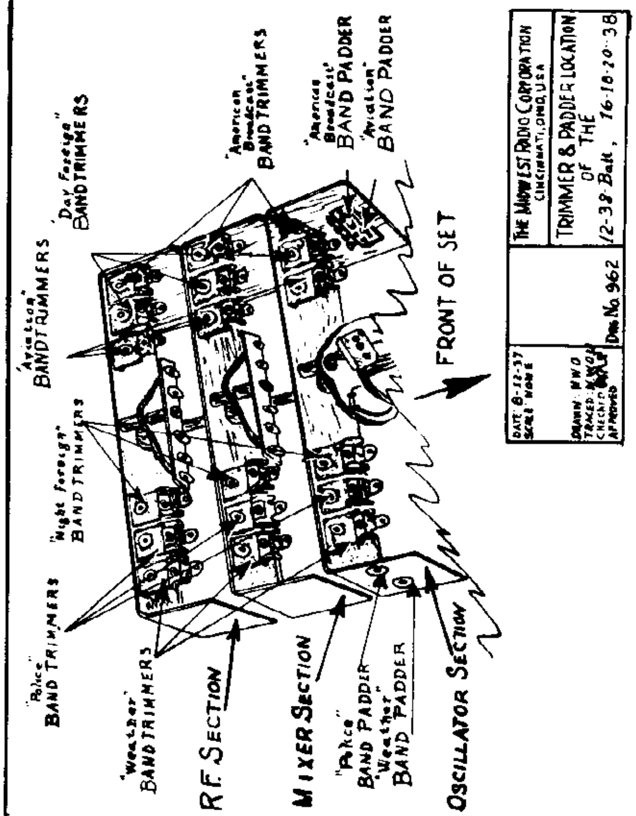


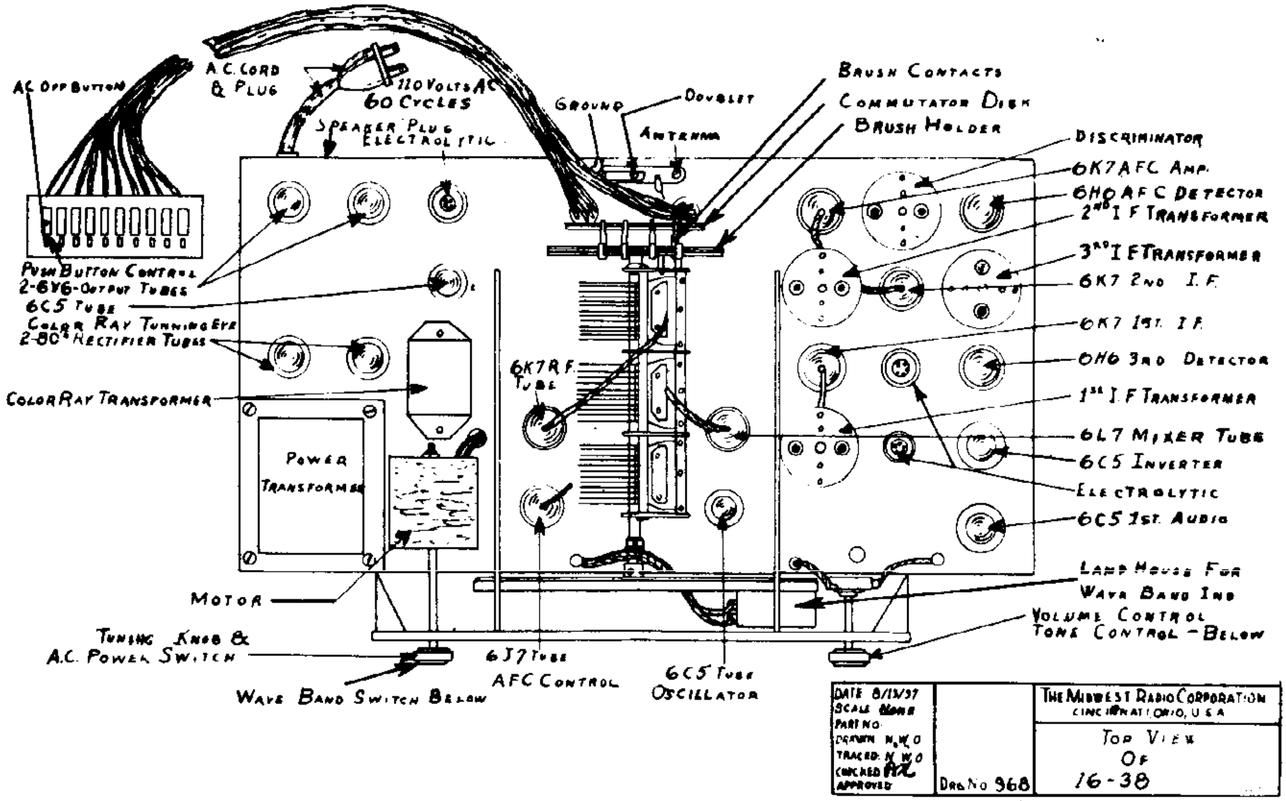
MODELS 6-38,7-38,8-38,
9-38 Export AC-DC
MODEL 7-38 Batt.Export
MODELS 7-38,8-38,9-38
10-38 AC-DC
MODEL 8-38 Batt,12-38 Batt.

MID-WEST RADIO CORP.

MODELS 16-38,18-38,20-38
Trimmers
MODEL 16-38
Socket Layout

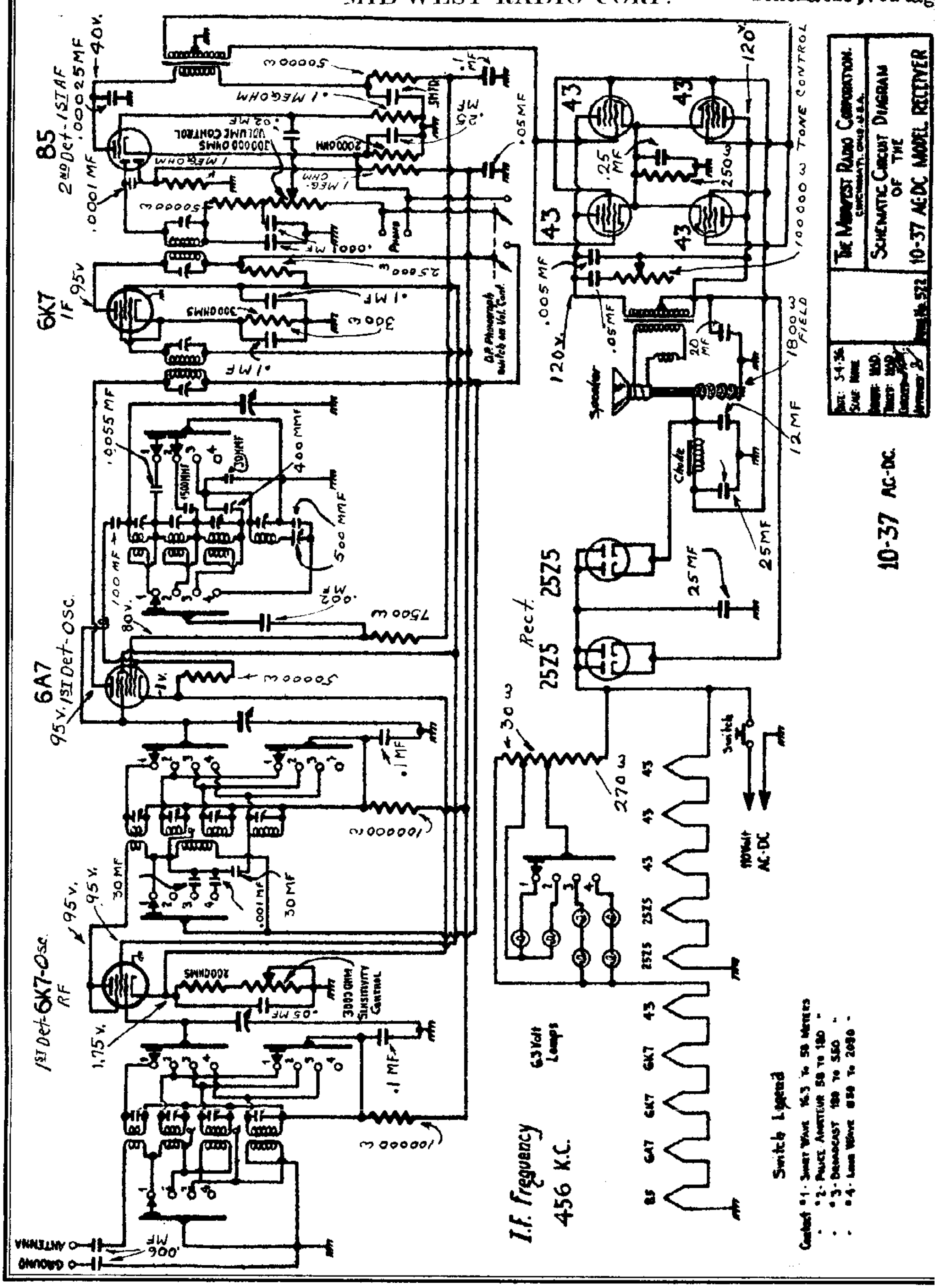






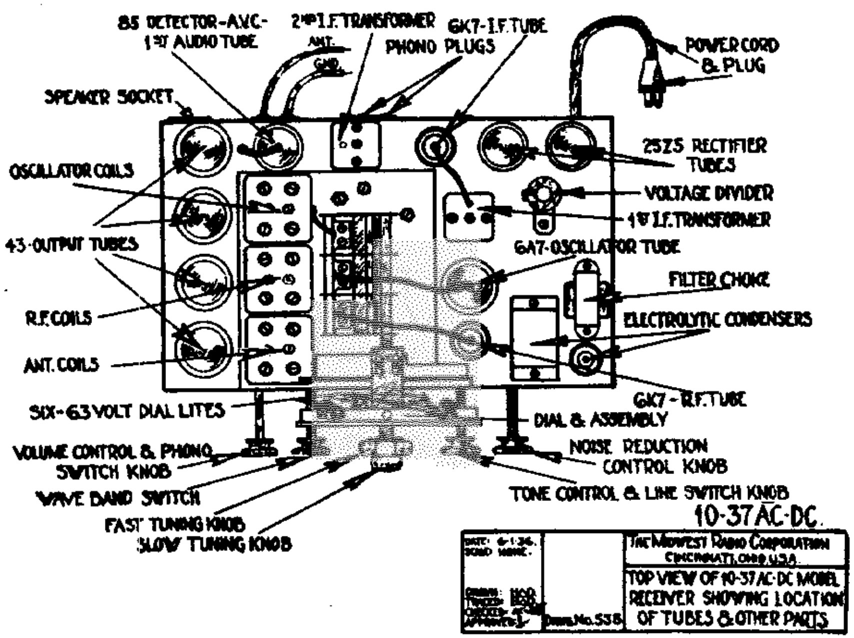
MODEL 10-37 AC-D
Schematic, Voltag

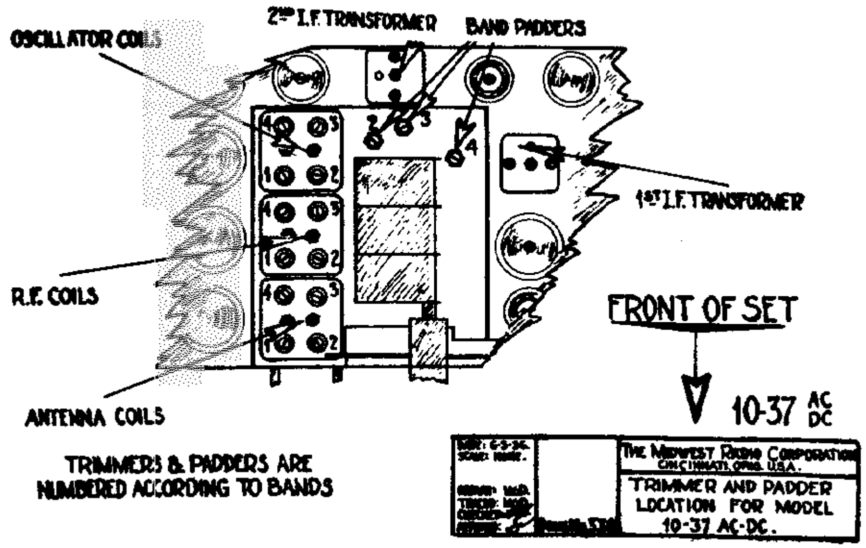
MID-WEST RADIO CORP.



MODEL 10-37 AC-DC
Socket, Trimmers
Alignment

MID-WEST RADIO CORP.





I. F. ADJUSTMENT - The signal generator is set at 456 KC and is connected to the grid of the first detector (6A7). With the oscillator section of the tuning condenser short-circuited and the receiver volume control at its maximum position, the I. F. trimmers are adjustdd for maximum output. These trimmers may be found on the I.F. transformer shield cans to the right and rear of the gang condenser.

18 MEGACYCLE ADJUSTMENT - The high side of the signal generator is connected to the antenna lead of the receiver and the low side of the ground lead. The receiver and the signal are both tuned to a frequency of 18 MC with the selector switch in position for band No. 1. The oscillator trimmer condenser is adjusted so that the 18 MC signal is tuned in exactly at the 18 M C calibration point, with the volume control on full and the signal generator adjusted for minimum input. The antenna preselector and first detector trimmers are then adjusted in the order named for maximum output. These trimmers are located on the tops of the shield cans at the left side of the chassis; reading from front to back, these coils are as follows: -1. antenna preselector; 2. first detector; 3. oscillator. It will be noted that there are four trimmers on each of these coils. The adjustment screw for the trimmer in the front left hand corner of each is painted red. This denotes the trimmer for the No. 1 band.

5 MC ADJUSTMENT - With the band selector switch in position for operation on band No. 2 and the receiver and signal generator both set at 5 MC. The procedure outlined above is repeated. The oscillator trimmer is found on the rear coil can, and is located to the right of the red painted trimmer. The antenna preselector and interstage coil trimmers are located in the same positions on the corresponding shield cans.

The signal generator is set at 1.7 MC and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left. The 5 MC adjustment should then be rechecked. The 1.7 MC padder is located on the subbase on which the gang tuning condenser is mounted and is the left hand one at the group of three found here.

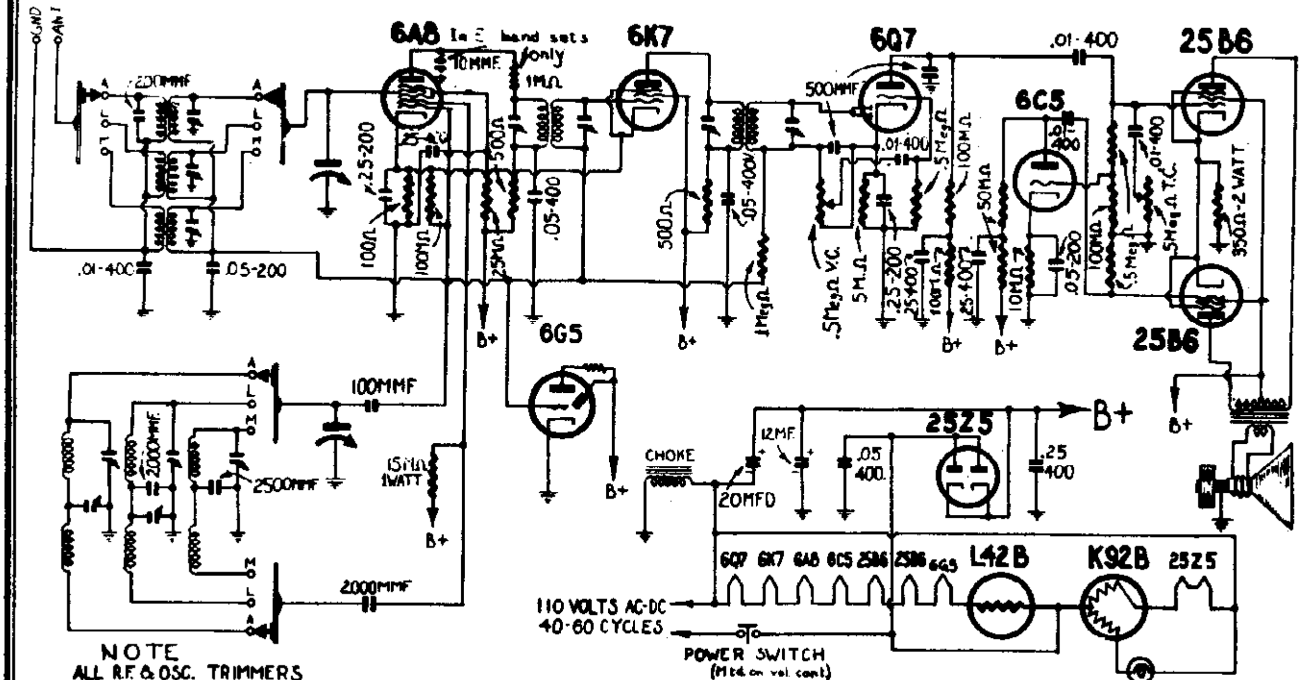
1400 KC ADJUSTMENT - The band selector switch is set in position for operation on the No. 3 band. The receiver and signal generator are both set at 1400 KC and the procedure outlined above is repeated. The oscillator trimmer is found on the rear coil can, and is located diagonally opposite the red painted trimmer. The other trimmers for this band are located in similar positions on the corresponding coil cans.

The signal generator is set at 600 KC and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 1400 KC adjustment should then be rechecked. The 600 KC padder is located on the sub-panel on which the gang tuning condenser is mounted and is the center of the three located at this point.

340 KC ADJUSTMENT - The band selector switch is set in position for operation on band No. 4. The receiver and generator are both tuned to 340 KC and the procedure outlined above is repeated. The oscillator trimmer is located on the rear coil can. It is the one directly behind the trimmer marked in red. The other trimmers for this band are located in similar positions on the corresponding shield cans.

The signal generator is set at 150 KC and the signal is tuned in on the dial. The padder condenser for this band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 340 KC adjustment should then be rechecked. The 150 KC padder is located on the sub-panel on which the tuning condenser is mounted and is the right hand one of this group.

MID-WEST RADIO CORP.



NOTE
ALL R.F. & OSC. TRIMMERS ARE 45 MMFD. MAX. CAP.
OSC. PADDERS ARE 500MMFD. MAX. CAP.

E-BAND NOTE

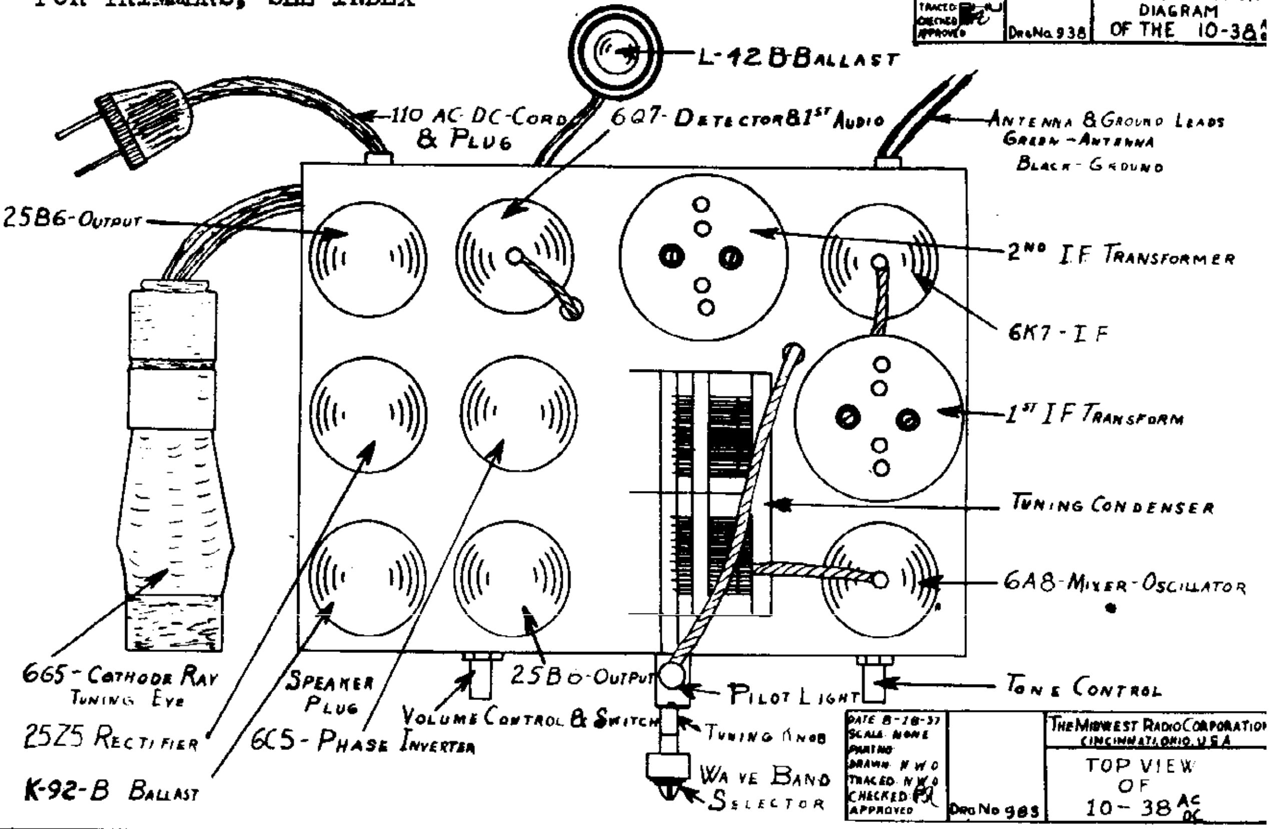
In sets having long wave band, E(long wave) band coil replaces L band coil. Colpitts oscillator is used—no tickler coil. No fixed padder is used. Variable padder is 140MMFD Max. Cap. in place of 500 MMFD. R.F. filter is added in plate circuit of 6A8

I.F.=456K.C.

10-38 AC DC

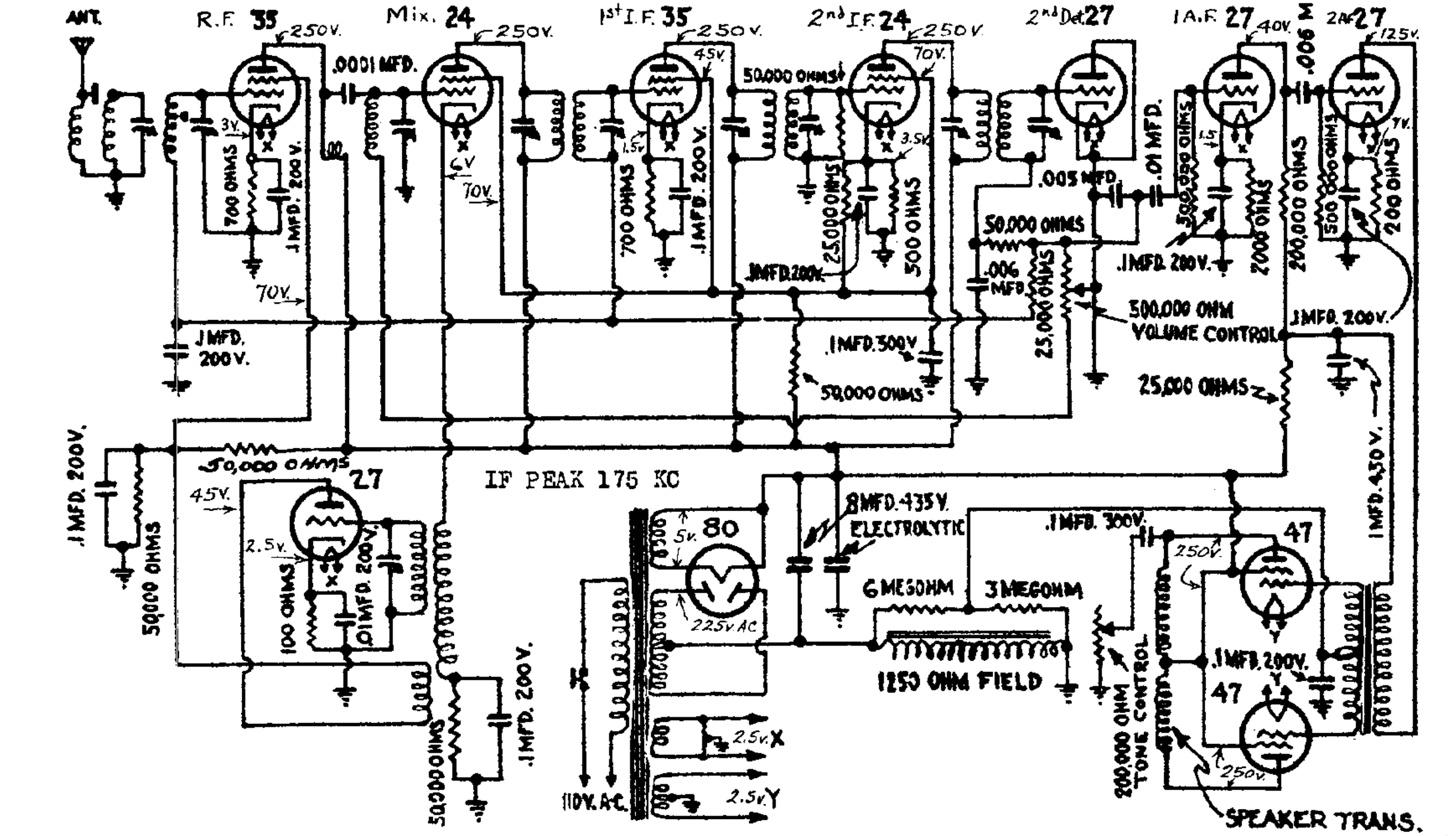
DATE 6-28-37	THE MIDWEST RADIO CORPORATION CINCINNATI, OHIO U.S.A.
SCALE —	SCHEMATIC CIRCUIT DIAGRAM OF THE 10-38 AC DC
DRAWN	
TRACED	
CHECKED	
APPROVED	Drg.No. 938

FOR TRIMMERS, SEE INDEX



MODEL 11-31
Schematic, Voltage
Alignment

MID-WEST RADIO CORP.

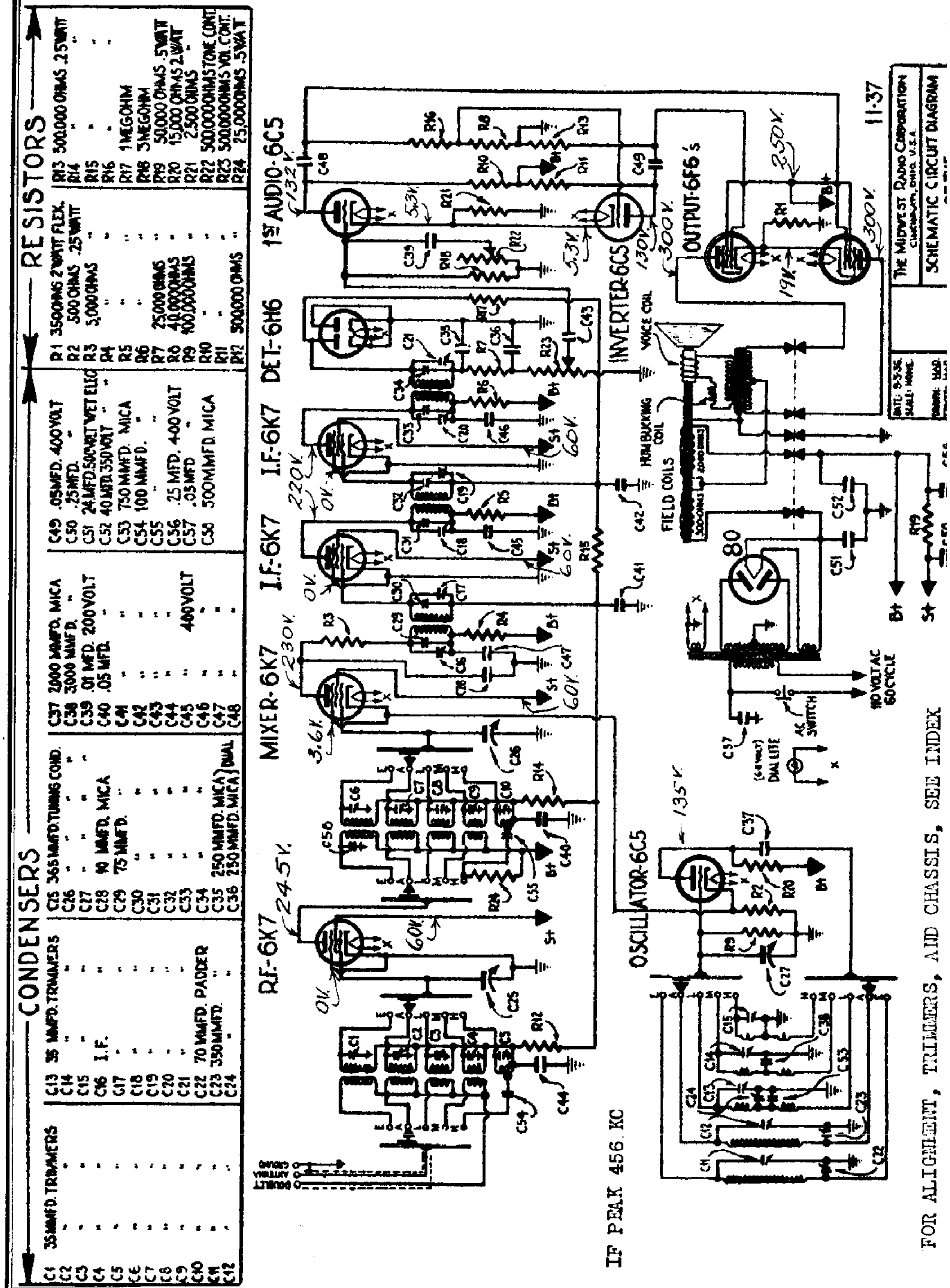


Remove oscillator tube. Align i-f transformers at 175 kc, with signal generator connected between mixer grid and ground. Then insert osc. tube. Set signal generator at 1490 kc and receiver dial at 10 (1490 kc) Adjust osc. section of variable tuning condenser by bending plates. Adjust mixer and r-f trimmers for maximum gain.

DATE: 9-19-35. SCALE: NONE DRAWN: TRACED: M&D CHECKED: [illegible] APPROVED:	DRAWING No. A77	THE MIDWEST RADIO CORPORATION CINCINNATI, OHIO. SCHEMATIC WIRING DIAGRAM OF SUPERHETRODYNE 11-31 MODEL RECIEVER.

MODEL 11-37
Schematic, Volta

MID-WEST RADIO CORP.



IF PEAK 456 KC

FOR ALIGNMENT, TRIMMERS, AND CHASSIS, SEE INDEX

MODEL 11-37 AC-DC
Schematic, Voltage

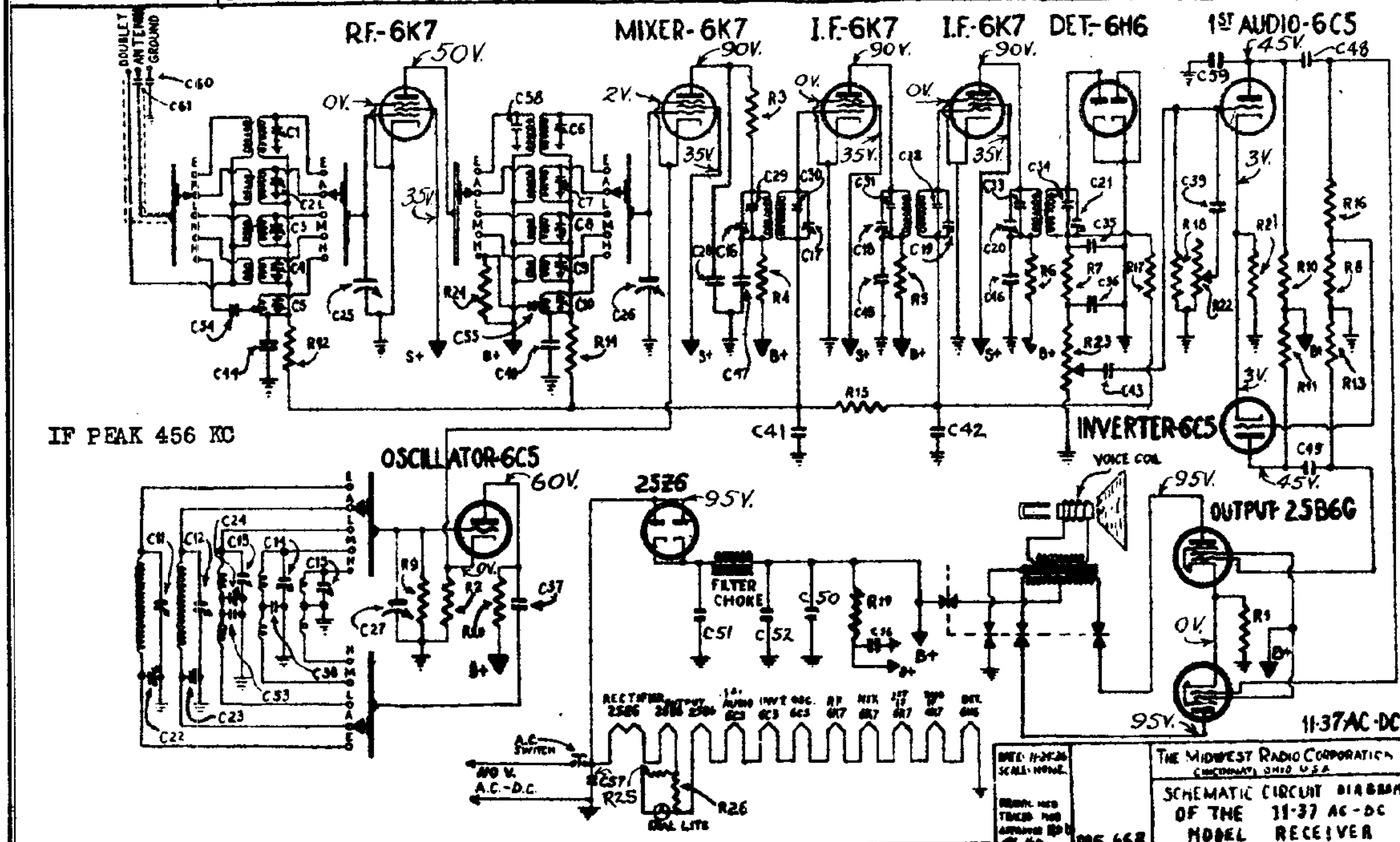
MID-WEST RADIO CORP.

CONDENSERS

C1 35MMFD TRIMMERS	C13 35 MMFD. TRIMMERS	C25 365MMFD. TUNING COND.	C37 2000 MMFD. MICA	C49 .05MFD. 400 VOLT
C2 " "	C14 " "	C26 " " "	C38 3000 MMFD. "	C50 .25MFD. "
C3 " "	C15 " "	C27 " " "	C39 .02 MFD. 200 VOLT	C51 24 MFD. 500 VOLT WET ELEC
C4 " "	C16 I.F. "	C28 10 MMFD. MICA	C40 .05 MFD. "	C52 40 MFD. 350 VOLT " "
C5 " "	C17 " "	C29 75 MMFD. "	C41 " "	C53 750 MMFD. MICA
C6 " "	C18 " "	C30 " "	C42 " "	C54 100 MMFD. "
C7 " "	C19 " "	C31 " "	C43 " "	C55 " "
C8 " "	C20 " "	C32 " "	C44 " "	C56 .25 MFD. 400 VOLT
C9 " "	C21 " "	C33 " "	C45 " 400 VOLT	C57 .05 MFD.
C10 " "	C22 70 MMFD. PADDER	C34 " "	C46 " "	C58 500 MMFD. MICA
C11 " "	C23 350 MMFD. "	C35 250 MMFD. MICA DUAL	C47 " "	C59 250 " "
C12 " "	C24 " "	C36 250 MMFD. MICA DUAL	C48 " "	C60 .01 MMFD. 200 VOLT
				C61 .01 " " " "

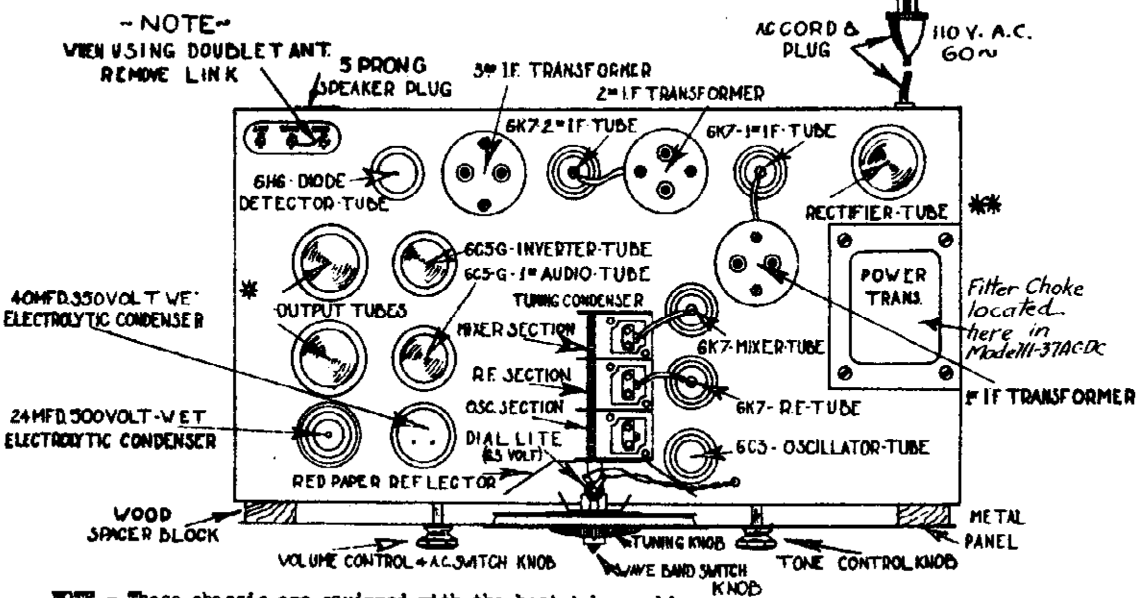
RESISTORS

R1 350 OHMS 2 WATT FLEX.	R13 500,000-OHMS .25 WATT
R2 500-OHMS .25 WATT	R14 " "
R3 5,000-OHMS "	R15 50,000-OHMS "
R4 " "	R16 " "
R5 " "	R17 500,000 OHM "
R6 " "	R18 3 MEGOHM
R7 25,000-OHMS "	R19 50,000-OHMS .5 WATT
R8 40,000-OHMS "	R20 15,000-OHMS 2 WATT
R9 100,000 OHMS "	R21 2,500-OHMS "
R10 " "	R22 500,000-OHM TONE CONT.
R11 " "	R23 500,000-OHM VOL. CONT.
R12 500,000-OHMS "	R24 25,000-OHMS ½ WATT
	R25 [illegible]
	R26 [illegible]



IF PEAK 456 KC

MID-WEST RADIO CORP.

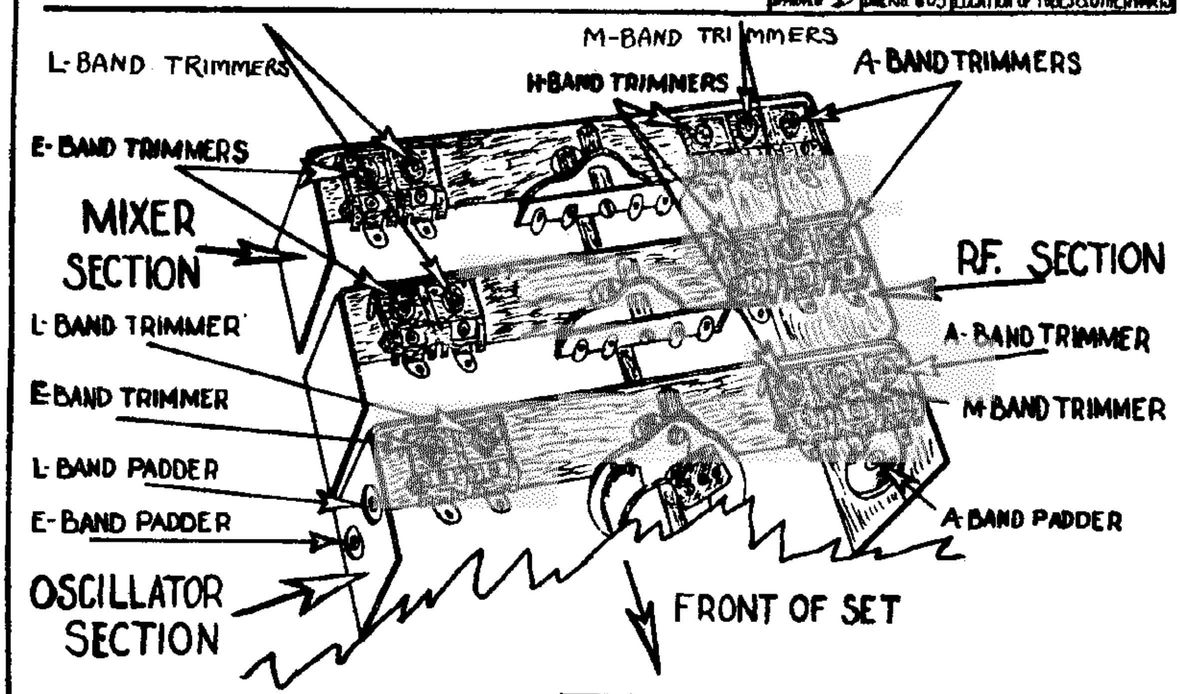


NOTE - These chassis are equipped with the best tube combination available

* 6F6G output tubes in 11-37 AC and 25B6G tubes in 11-37 AC-DC.
** 80 rectifier in 11-37 AC and 25Z6 in 11-37 AC-DC.
Metal, metal-glass, or glass counterpart tubes may be used, but the rectifier tubes should be those specified.

11-37

DATE: SCALE: NONE DRAWN: TRACED: CHECKED: APPROVED:	Drg.No. 605	THE MIDWEST RADIO CORPORATION CINCINNATI, OHIO, U.S.A. TOP VIEW OF THE 11-37 MODEL RECEIVER SHOWING LOCATION OF TUBES & OTHER PARTS



DATE: 11:24:36 SCALE: NONE. DRAWN: RHJ TRACED: RHJ APPROVED: HAO.	Drg.No. 676	THE MIDWEST RADIO CORPORATION CINCINNATI, OHIO, U.S.A. TRIMMER & PADDER LOCATION OF THE 11-37 AC DC & 11-37 MODEL RECEIVER

MODEL 11-37
MODEL 11-37 AC-DC
Alignment

MID-WEST RADIO CORP.

ALIGNMENT INSTRUCTIONS FOR MODEL 11-37 AC AND MODEL 11-37 AC-DC

(1) Set the signal generator to 456 k.c. and connect it from the mixer grid to ground.

(2) Remove the oscillator tube from the receiver.

(3) Connect the output meter from the plate of the output tube to positive B.

(4) Using a moderately weak signal approximately 40 microvolts, align the three I.F. transformers to maximum output.

(5) Keep decreasing the oscillator input and re-aligning for maximum gain.

This completes the alignment of the I.F. amplifier.

Insert the oscillator tube. Connect the signal generator between antenna and ground. Connect micor lead to grid of mixer tube.

(1) Set the wave change switch to the "E" band.

(2) Set the signal generator to 325 k.c., and also the dial.

(3) Adjust the "E" oscillator trimmer to maximum gain, then adjust the "E" band R. F. and the "E" band mixer trimmers for maximum gain.

(4) Reset the signal generator to 135 k.c. and rotate the receiver dial to 135 k.c.

(5) Adjust the "E" band padder for maximum signal.

(6) Repeat the adjustment of trimmers and padders until the adjustment of one does not effect the adjustment of the other.

This completes the alignment of the "E" band.

(1) Set the wave change switch to the "A" band.

(2) Set the signal generator to 1490 k.c.

(3) Adjust the "A" oscillator trimmer to maximum gain, then adjust the "A" band R.F. and The "A" band mixer trimmers for maximum gain.

(4) Reset the signal generator to 550 k.c. and rotate the receiver dial to 550 k.c.

(5) Adjust the "A" band padder for maximum signal.

(6) Repeat the adjustment of trimmers and padders until the adjustment of one does not effect the adjustment of the other.

This completes the alignment of the "A" band.

(1) Set the wave change switch to the "L" band.

(2) Set the signal generator to 3.8 m.c.

(3) Adjust the "L" oscillator trimmer to maximum gain, then adjust the "L" band R.F. and the "L" band mixer trimmers for maximum gain.

(4) Reset the signal generator to 1.6 m.c. and rotate the receiver dial to 1.6 m.c.

(5) Adjust the "L" band padder for maximum signal.

(6) Repeat the adjustment of trimmers and padders until the adjustment of one does not effect the adjustment of the other.

This completes the alignment of the "L" band.

(1) Set the wave change switch to the "M" band.

(2) Set the signal generator to 11.5 m.c.

(3) Adjust the "M" oscillator trimmer to maximum gain, then adjust the "M" band R.F. and the "M" band mixer trimmers for maximum gain.

This completes the alignment of the "M" band.

(1) Set the wave change switch to the "H" band.

(2) Set the signal generator to 28 m.c.

(3) Adjust the "H" band oscillator trimmer to maximum gain, then adjust the "H" band R.F. and the "H" band mixer trimmers for maximum gain.

This completes the alignment of the "H" band.

MODEL 12-
Schematic
Voltage

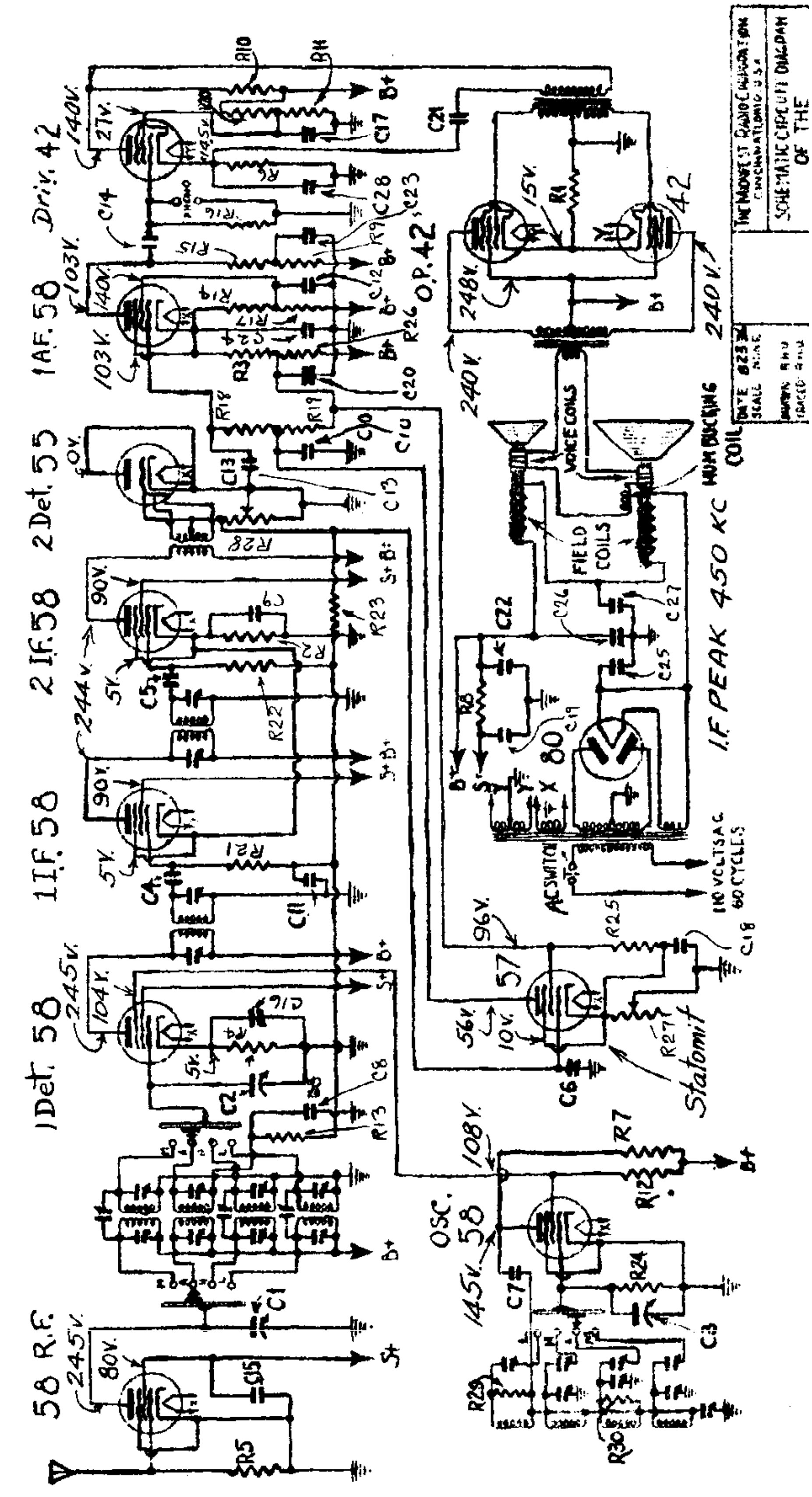
MID-WEST RADIO CORP.

CONDENSERS

C1	TUNING CONDENSER
C2	"
C3	"
C4	250MMFD. MICA
C5	" "
C6	500MMFD
C7	.002 MFD
C8	.05MFD. 200V.
C9	" "
C10	" "
C11	.05MFD - 200V.
C12	" -400V
C13	" "
C14	" "
C15	.1MFD 200V.
C16	" "
C17	" "
C18	" "
C19	" "
C20	" " 300V
C21	.25MFD 400V.
C22	"
C23	4MFD - 300V.
C24	5MFD - 200V.
C25	8MFD WIT-ELECT
C26	" " DRY
C27	"
C28	25MFD 25V

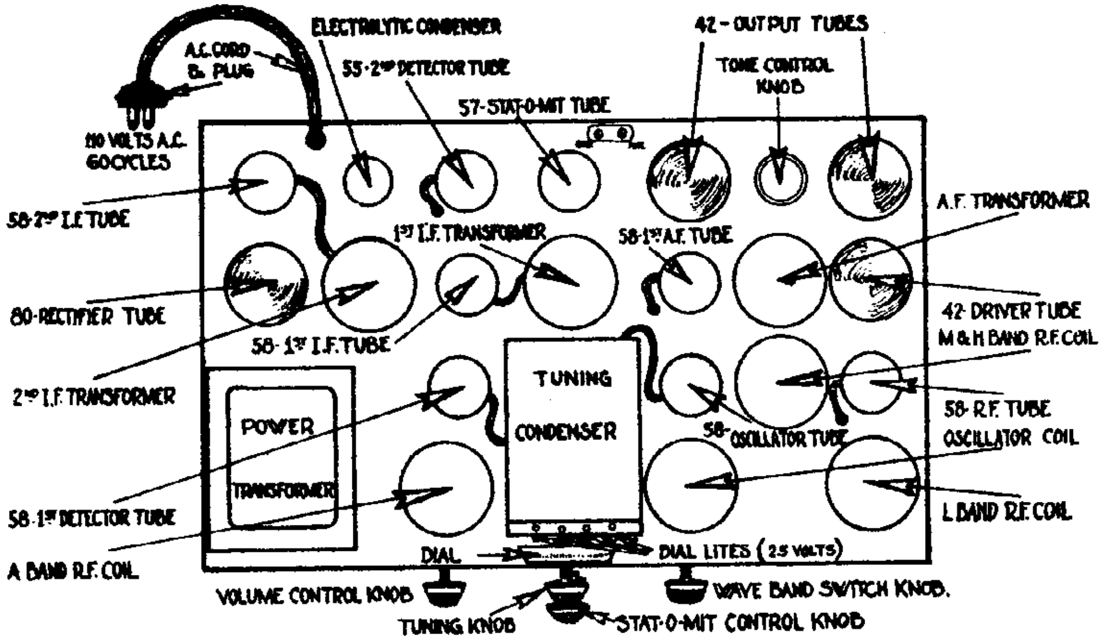
RESISTORS

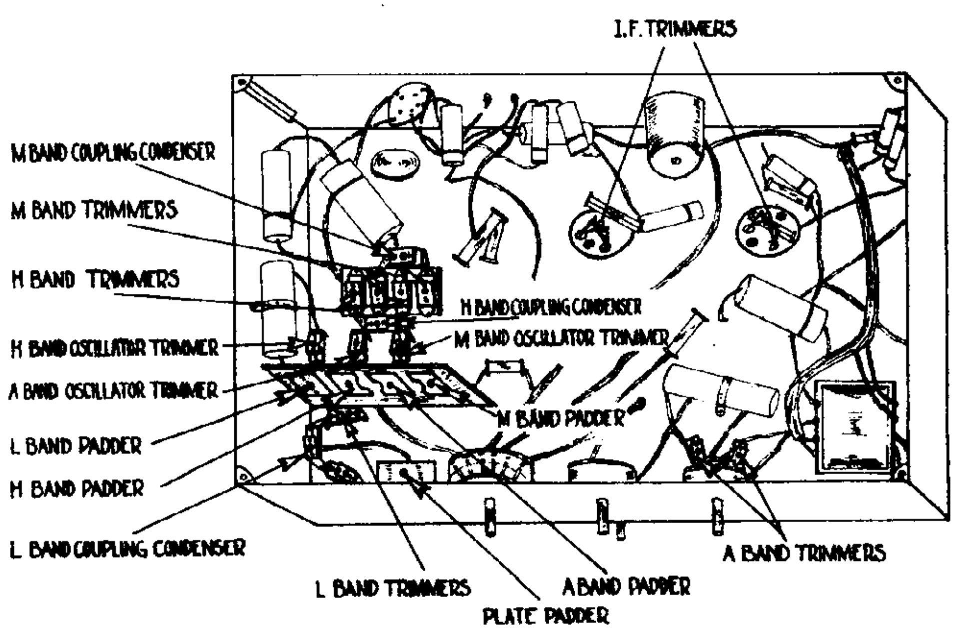
R1	210 OHM FLEXIBLE
R2	700-OHMS "
R3	" "
R4	1000 OHM "
R5	50,000-OHM .25WATT
R6	5,000-OHM .5WATT
R7	19,000-OHM
R8	31,000-OHM
R9	" "
R10	" "
R11	50,000-OHM .5WATT
R12	150,000-OHM
R13	200,000-OHM
R14	"
R15	"
R16	"
R17	"
R18	"
R19	"
R20	"
R21	400,000-OHM .5WATT
R22	"
R23	"
R24	.5MEGOHM
R25	10,000 OHM 1WATT
R26	15,000 OHM .5WATT
R27	1,000 OHM VARIABLE
R28	500,000 OHM VOL CONT
R29	31,000 OHM
R30	50,000 OHM



MODEL 12-33
Socket, Trimmers
Alignment

MID-WEST RADIO CORP.





Before aligning the i-f amplifier, check the spacing of the i-f transformers, as they sometimes collapse resulting in broad tuning. The spacing should be 3/4 inch between faces of the coils. Wax coils in place.
Set signal generator at 450 kc and adjust i-f trimmers. Measure the AVC voltage developed for peaking purposes.

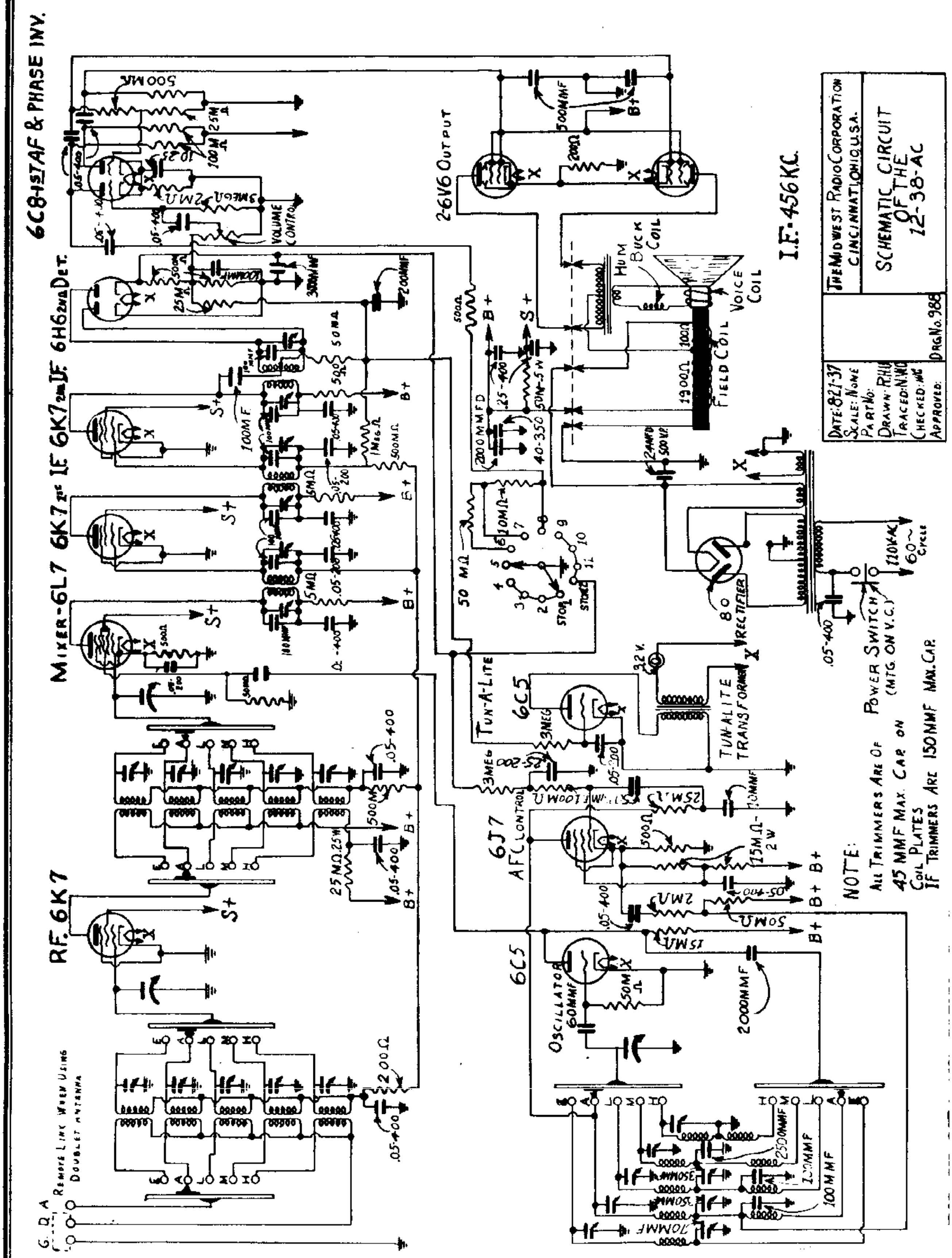
A BAND-WHITE. Do not adjust the plate padder. This has been done at the factory and should not be changed. Set dial at 5 and signal generator at 1490 kc. Adjust A-Band r-f trimmers to maximum output and then padder at 550 kc with dial set at 98.

L BAND-RED. Set dial at 2. Adjust r-f trimmers at 4.1 mc. Set dial at 98 and adjust padder at 1712 kc. Adjust feed condenser until maximum sensitivity is reached over the whole band. Generally this condenser will be tight.

M BAND-GREEN. Set dial at 2. Adjust r-f trimmers at 9 mc. Adjust padder at 4.5 mc. Adjust feed condenser as was done in L Band.

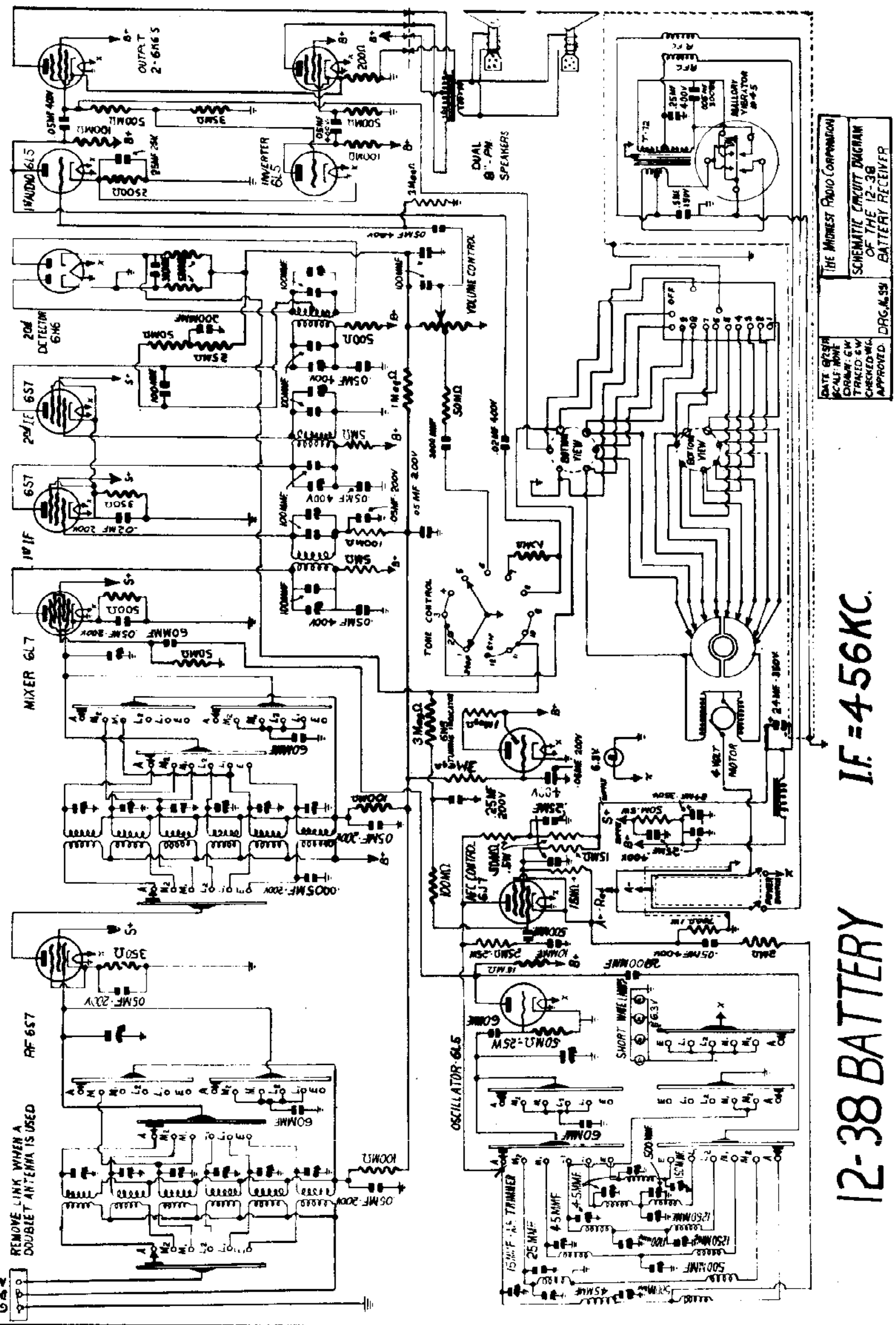
H BAND-AMBER or BLUE. Set dial at 5. Adjust r-f trimmers at 20 mc. Adjust padder at 9 mc. with dial at 98 Adjust feed condenser as was done in L Band.

MID-WEST RADIO CORP.



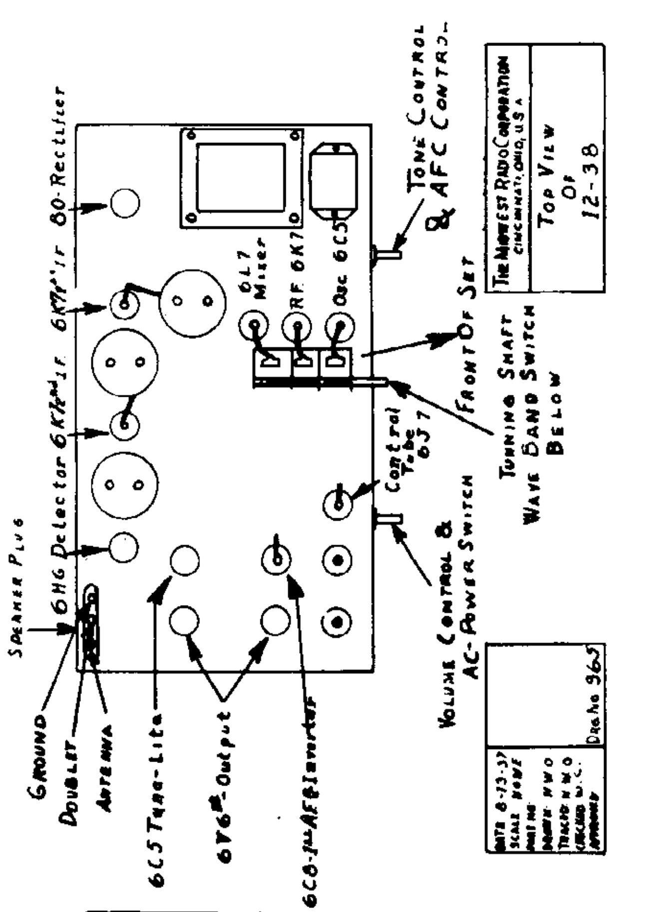
MODEL 12-38 Batt.
Schematic

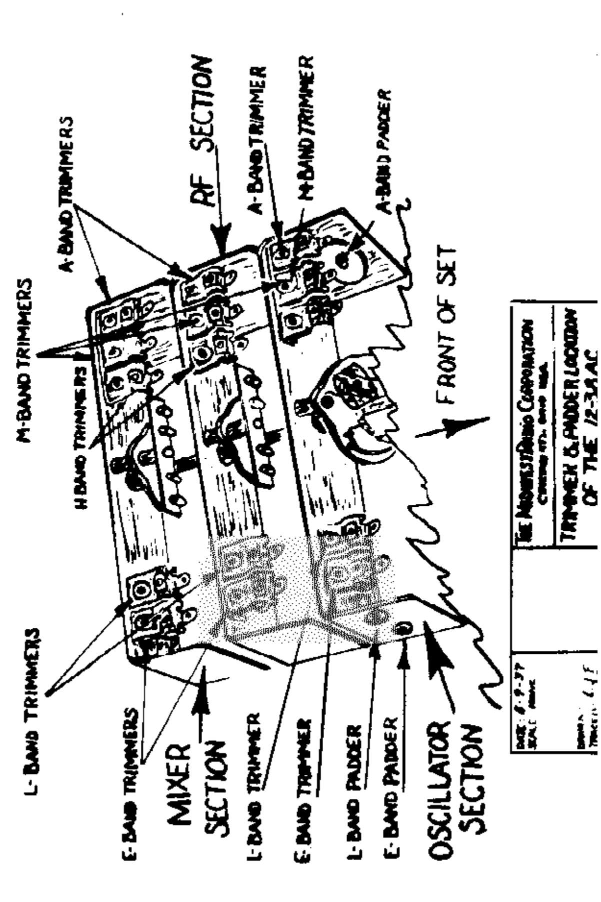
MID-WEST RADIO CORP.

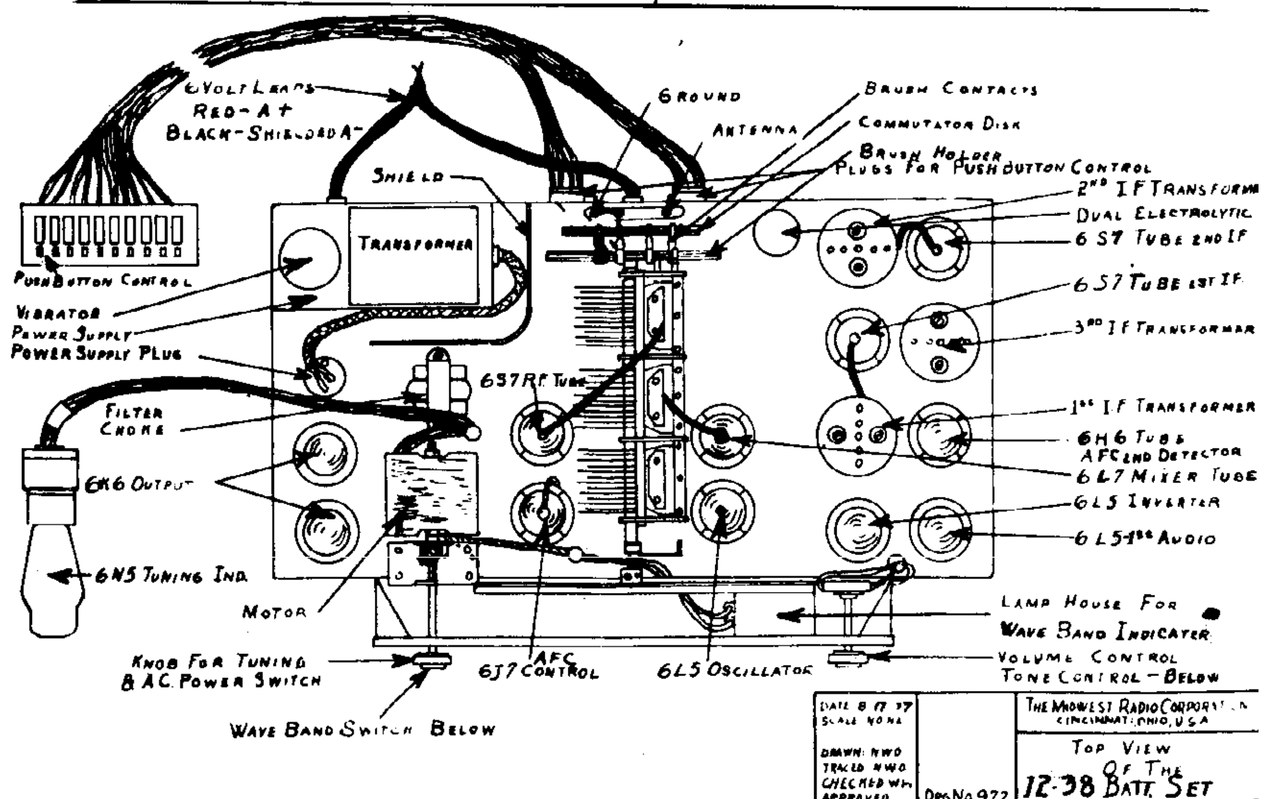


MODEL 12-38 AC
Socket,Trimmers
MODEL 12-38 Bat
Socket

MID-WEST RADIO CORP.

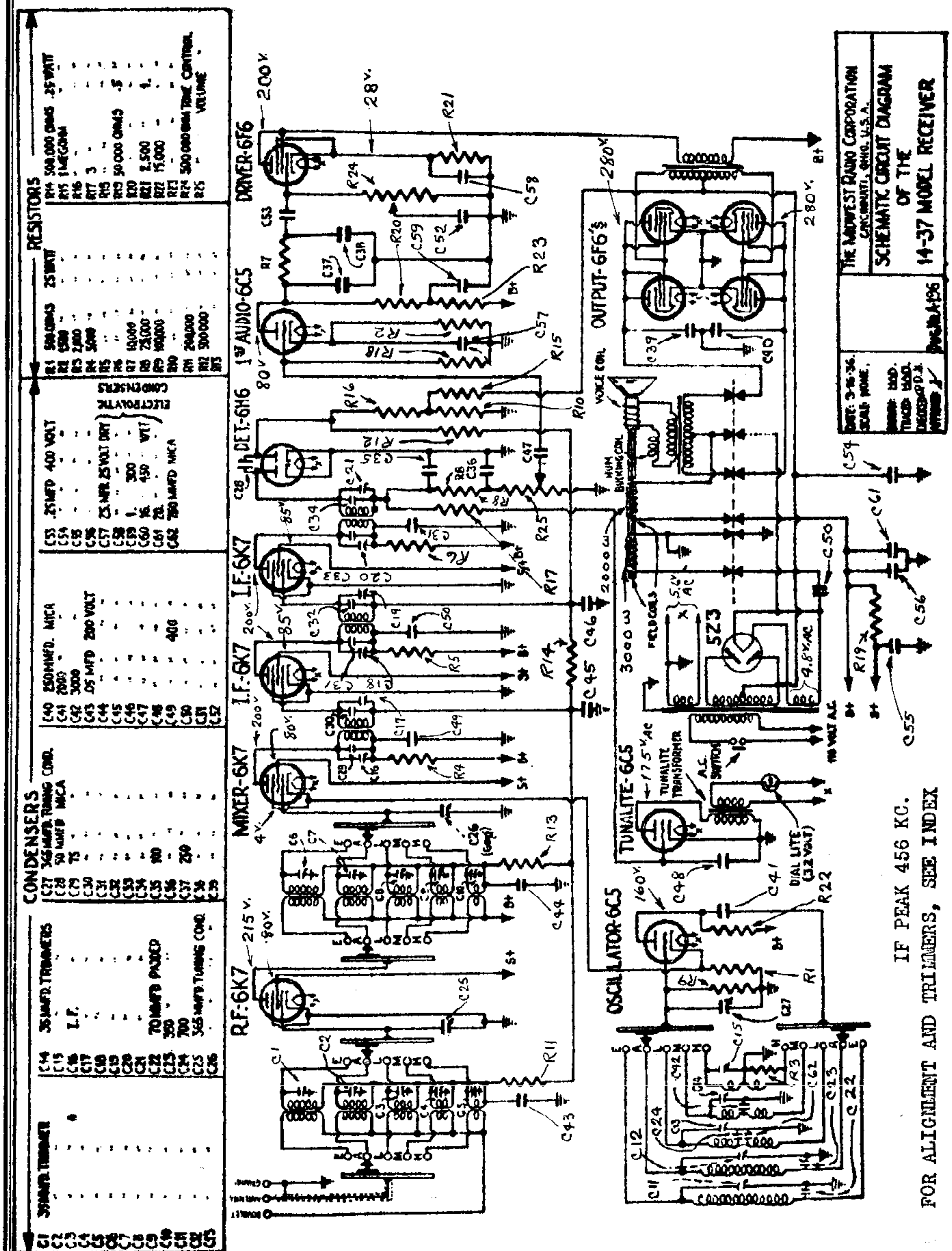






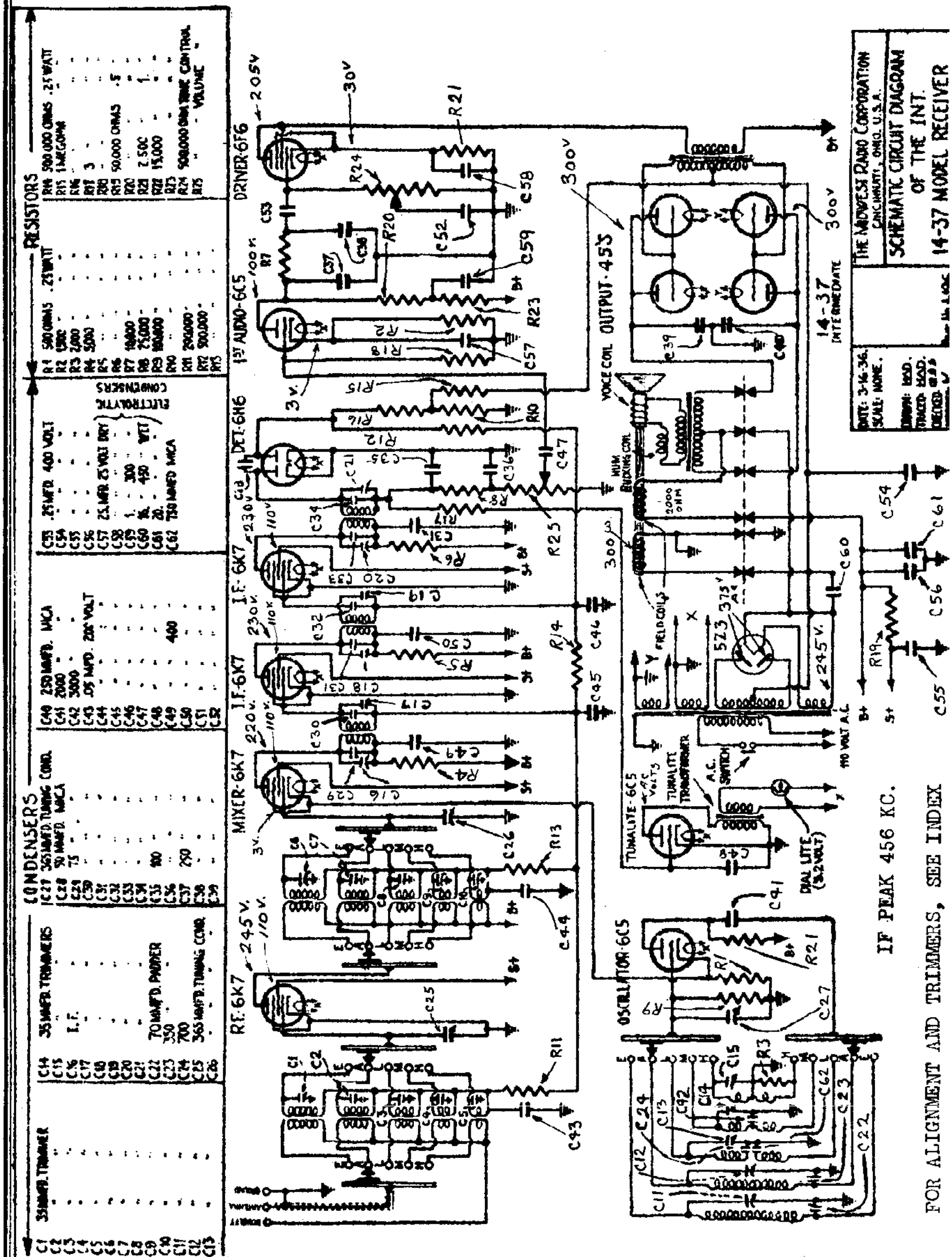
MODEL 14-37
Schematic, Voltage

MID-WEST RADIO CORP.



MODEL 14-37
(Intermediate)
Schematic,Voltag

MIDWEST RADIO CORP.



MODEL 14-37A
Schematic, Voltage

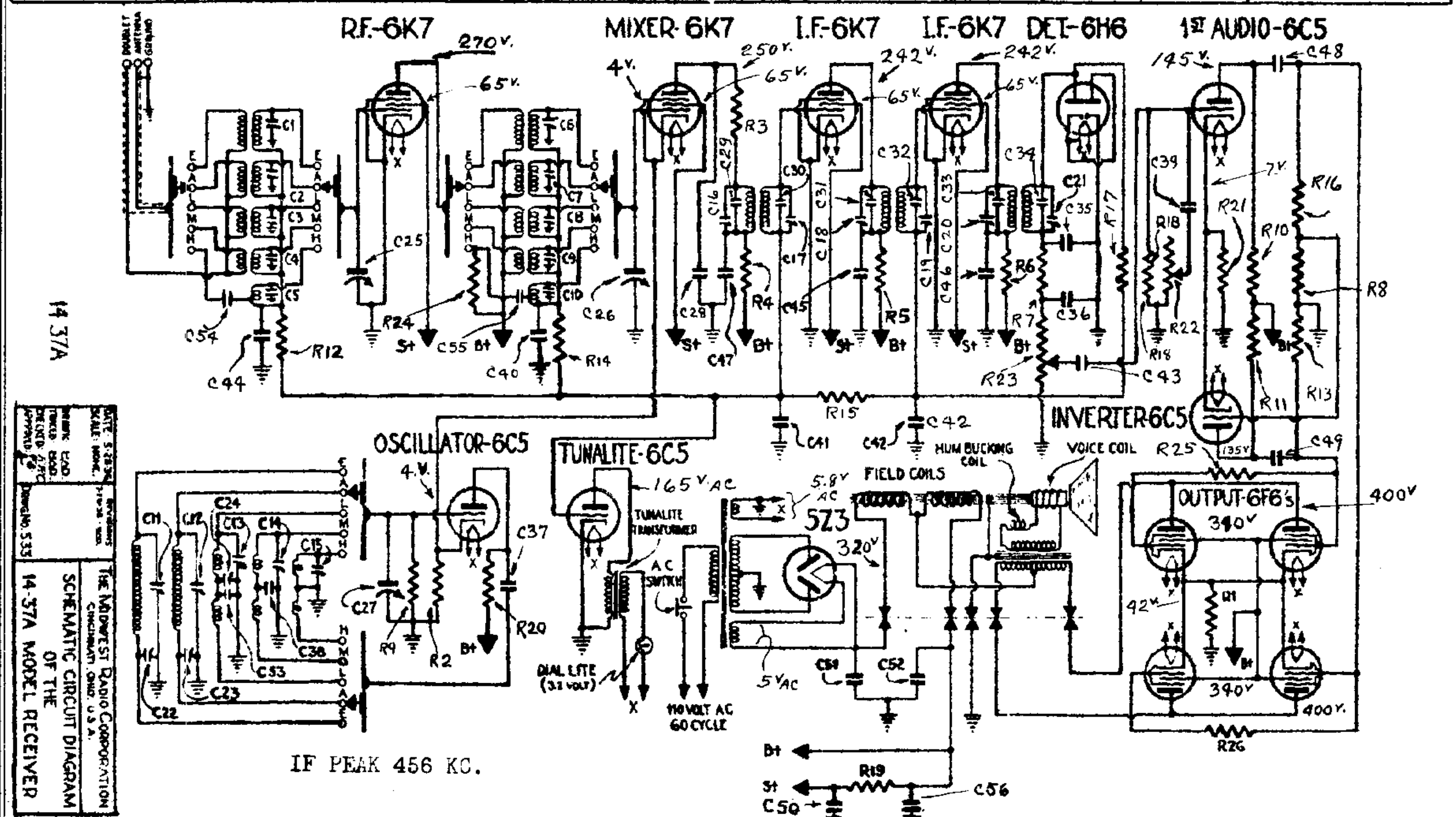
MID-WEST RADIO CORP.

CONDENSERS

C1 35 MMFD. TRIMMERS	C13 35 MMFD. TRIMMERS	C25 365 MMFD. TUNING COND.	C37 2000 MMFD. MICA	C49 .05 MFD. 400 VOLT	
C2 " "	C14 " "	C26 " "	C38 3000 MMFD. "	C50 .25 MFD. "	
C3 " "	C15 " "	C27 " "	C39 .01 MFD. 200 VOLT	C51 24. MFD. 500 VOLT WET ELEC.	
C4 " "	C16 I.F. "	C28 10 MMFD. MICA	C40 .05 MFD. "	C52 40 MFD. 350 VOLT "	
C5 " "	C17 " "	C29 75 MMFD. "	C41 " "	C53 750 MMFD. MICA	
C6 " "	C18 " "	C30 100 MMFD. "	C42 " "	C54 100 MMFD. "	
C7 " "	C19 " "	C31 " "	C43 " "	C55 " "	
C8 " "	C20 " "	C32 " "	C44 " "	C56 .25 MFD. 400 VOLT	
C9 " "	C21 " "	C33 " "	C45 " 400 VOLT		
C10 " "	C22 70 MMFD. PADDER	C34 " "	C46 " "		
C11 " "	C23 350 MMFD. "	C35 250 MMFD. MICA (DUAL)	C47 " "		
C12 " "	C24	C36 250 MMFD. MICA (DUAL)	C48 " "		

RESISTORS

R1 350 OHMS 2 WATT FLEX.	R13 500,000 OHMS .25 WATT
R2 500 OHMS .25 WATT	R14 500,000 OHMS "
R3 5,000 OHMS "	R15 " "
R4 " "	R16 " "
R5 " "	R17 1 MEGOHM "
R6 " "	R18 3 MEGOHM "
R7 25,000 OHMS "	R19 50,000 OHMS .5 WATT
R8 430,000 OHMS "	R20 15,000 OHMS 1 WATT
R9 100,000 OHMS "	R21 2,500 OHMS 1 WATT
R10 " "	R22 500,000 OHMS TONE CONT.
R11 " "	R23 500,000 OHMS VOL. CONT.
R12 500,000 OHMS "	R24 25,000 OHMS .5 WATT
R26 200 OHM 1. WATT	
R25 " "	



MID-WEST RADIO CORP.

ALIGNMENT PROCEDURE

MODELS 14-37, 14-37A, AND 14-37 INTERMEDIATE

INTERMEDIATE FREQUENCY ALIGNMENT

(1) Set the signal generator to 456 KC and connect it from the Mixer tube grid to ground.
(2) Remove the Oscillator tube from the receiver.
(3) Connect the output meter from the plate of the output tube to the positive "B".
(4) Using a moderately weak signal of approximately 40 microvolts, align the three IF transformers to maximum output.
(5) Keep decreasing the signal generator input and re-align for maximum gain.

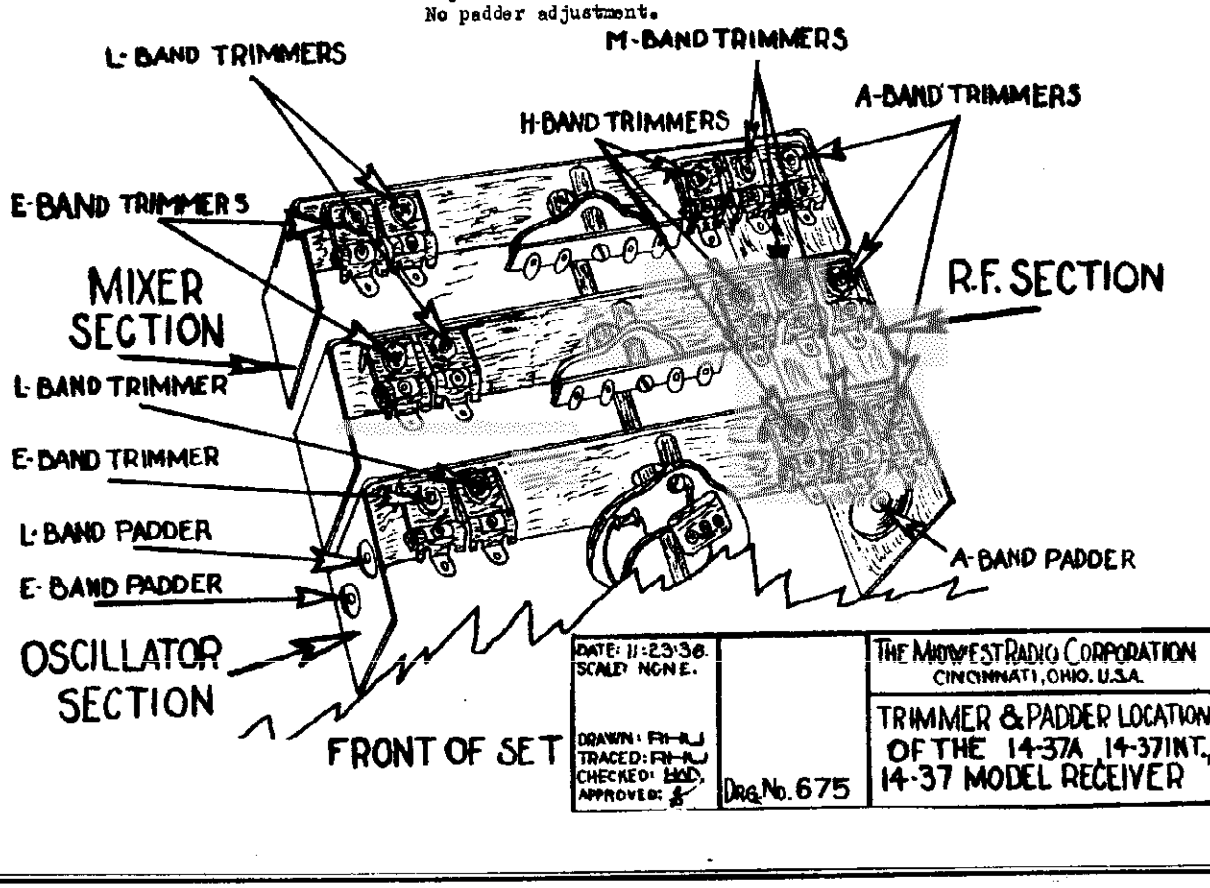
"E" Band ALIGNMENT

(1) Set the receiver wave change switch to the "E" Band.
(2) Set the signal generator to 325 KC.
(3) Adjust the "E" Band Oscillator trimmer to maximum gain, then adjust the RF and Mixer trimmers of the same band to maximum gain.
(4) Reset the signal generator to 135 KC and set the receiver dial to the same frequency.
(5) Adjust the "E" band padder for maximum signal.
(6) Repeat the adjustments of trimmers and padder until the adjustment of one does not affect the adjustment of the other.

"A","L","M", AND "H" BAND ALIGNMENT

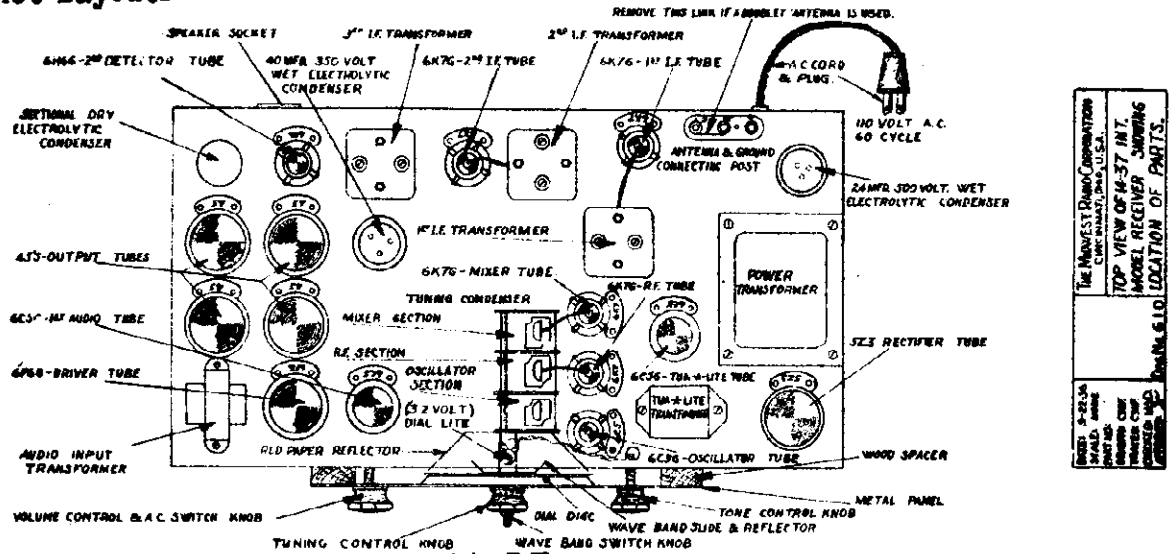
The procedure of alignment of these bands are the same as given above for the "E" band . The frequencies for their adjustment are as follows :-

"A" BAND- Adjust Oscillator,RF,and Mixers trimmers to 1490 KC
Adjust Oscillator padder to 550 KC.
"L" BAND- Adjust Oscillator,RF,and Mixer trimmers to 3.8 MC
Adjust Oscillator padder to 1.6 MC.
"M" BAND- Adjust Oscillator, RF, and Mixer trimmers to 11.5 MC
No padder adjustment.
"H" BAND- Adjust Oscillator, RF, and Mixer trimmers to 28 MC
No padder adjustment.

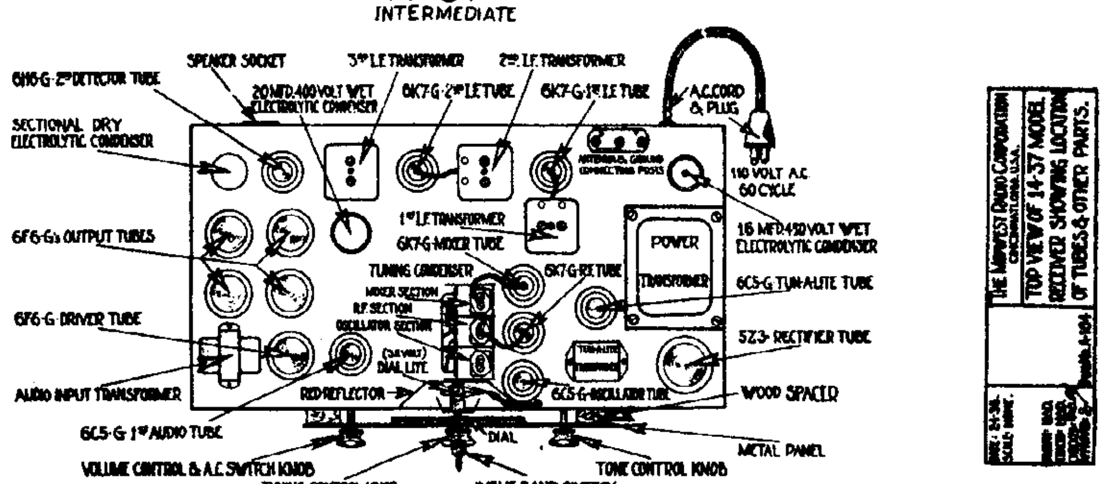


MODEL 14-37
MODEL 14-37(Int.)
MODEL 14-37A
Socket Layouts

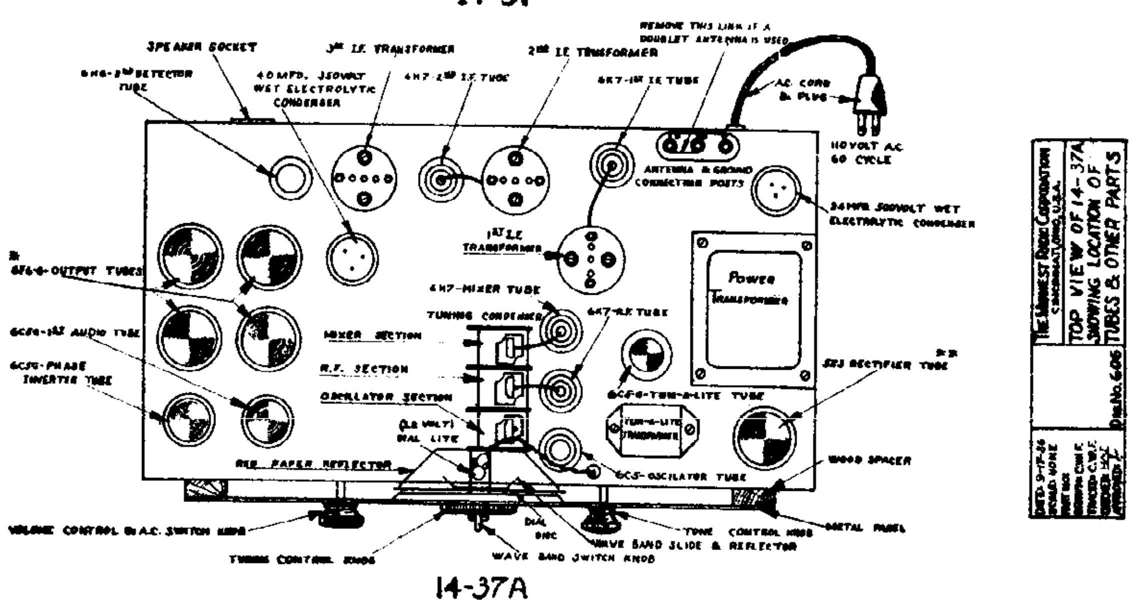
MID-WEST RADIO CORP.



14-37
INTERMEDIATE

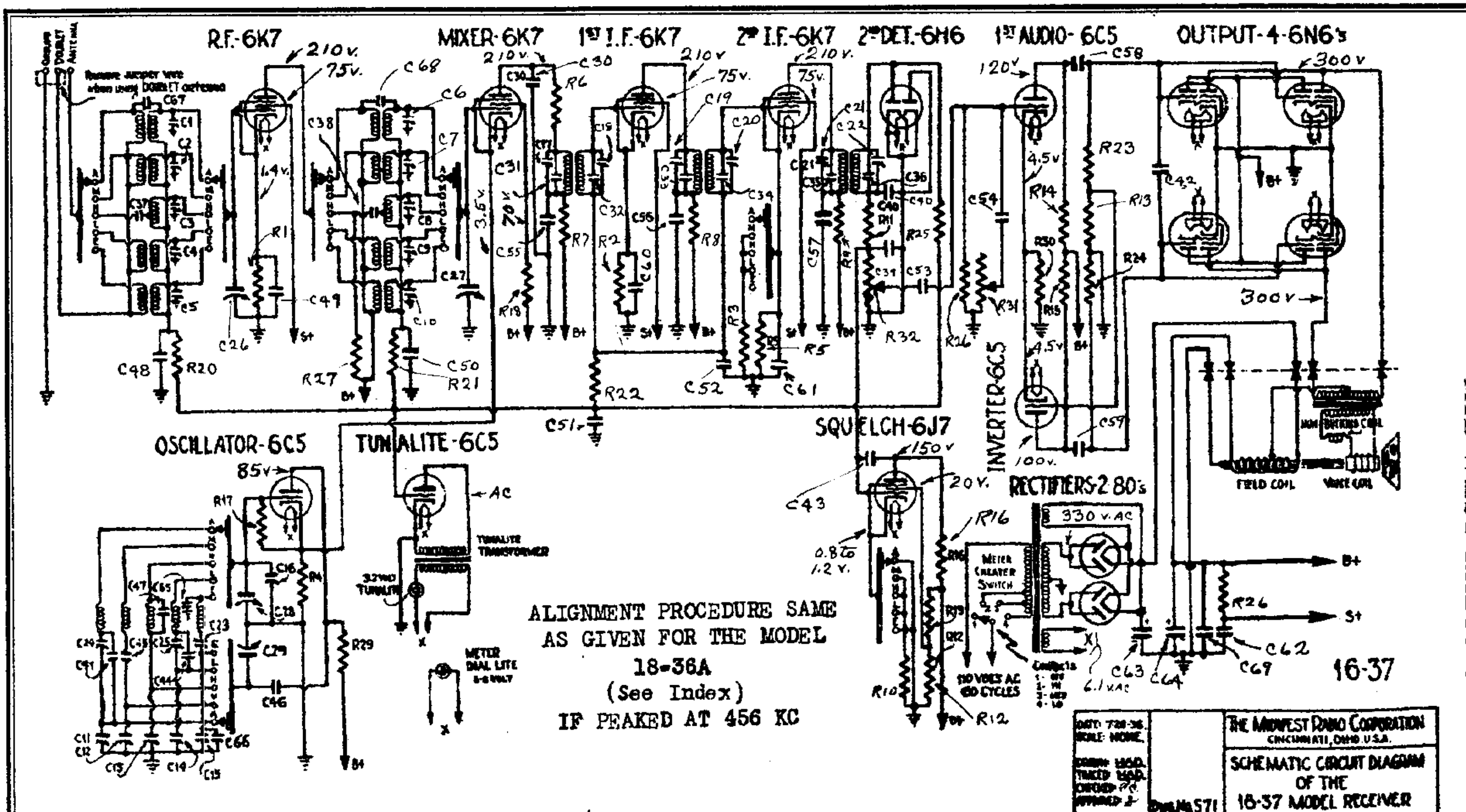


14-37



14-37A

MID-WEST RADIO CORP.



RESISTORS

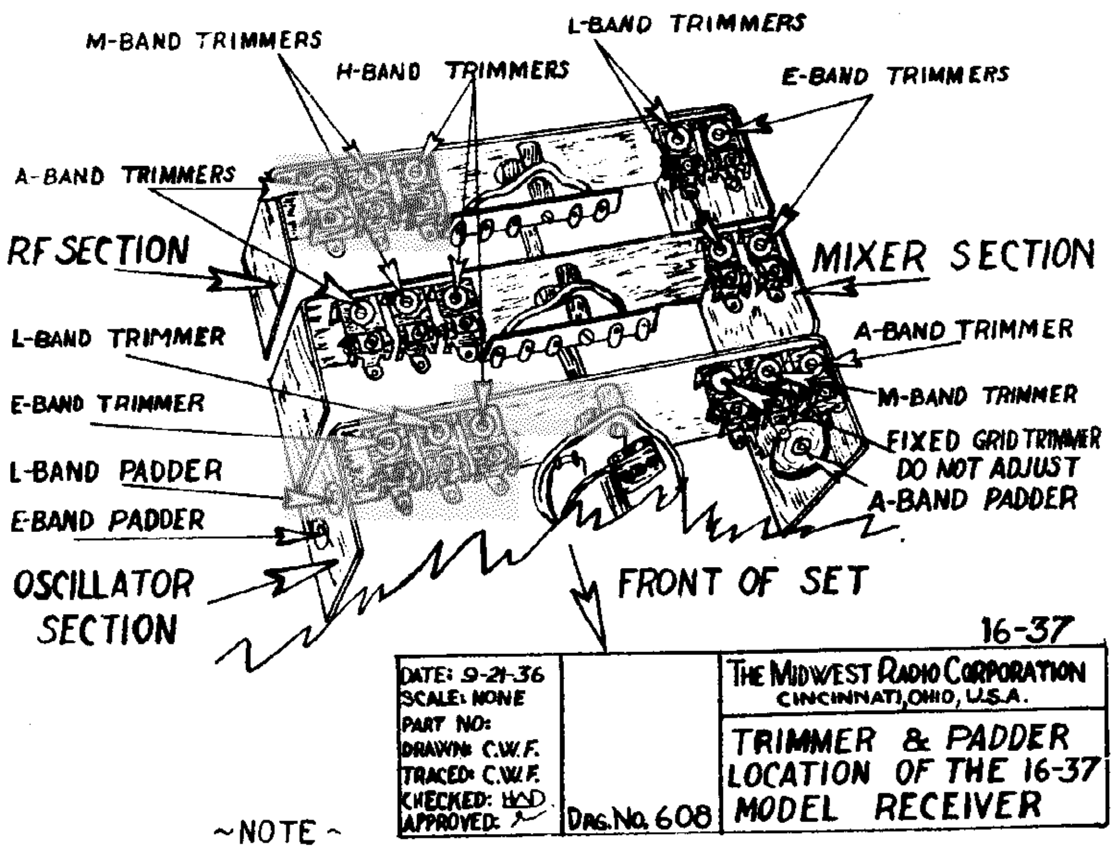
R1	350 OHMS	WIRE WOUND
R2	"	"
R3	"	"
R4	500 OHMS	.25 WATT
R5	1000 OHMS	"
R6	5,000 OHMS	"
R7	"	"
R8	"	"
R9	"	"
R10	"	"
R11	25,000 OHMS	"
R12	"	"
R13	40,000 OHMS	"
R14	100,000 OHMS	"
R15	"	"
R16	"	"
R17	"	"
R18	200,000 OHMS	"
R19	200,000 OHMS	.25 WATT
R20	500,000 OHMS	"
R21	"	"
R22	"	"
R23	"	"
R24	"	"
R25	1 MEGOHM	"
R26	3 MEGOHM	"
R27	25,000 OHMS	.5 WATT
R28	50,000 OHMS	.5 WATT
R29	"	"
R30	2 500 OHMS	1. WATT
R31	500,000 OHM TONE CONTROL	
R32	500,000 OHM VOLUME CONTROL	

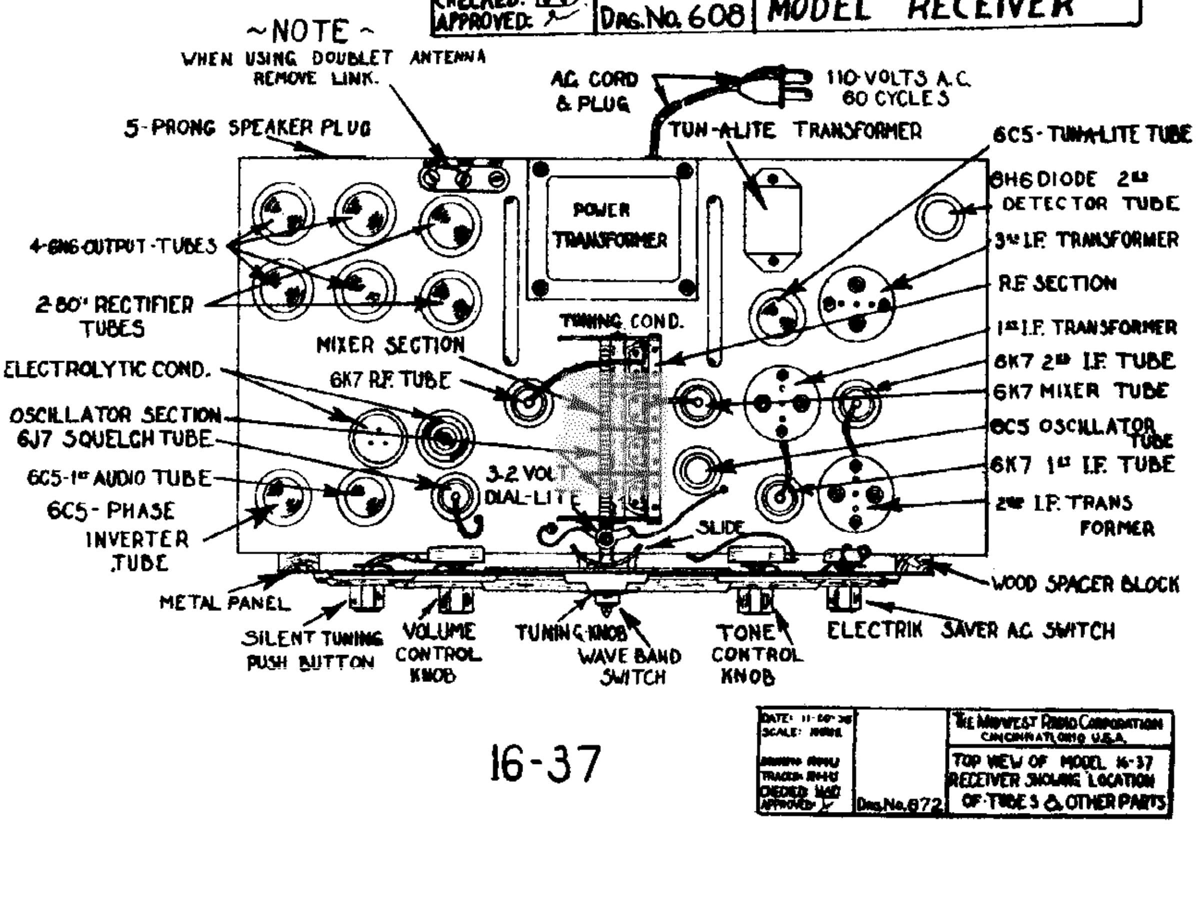
CONDENSERS

C1	35 MMFD.	TRIMMERS
C2	"	"
C3	"	"
C4	"	"
C5	"	"
C6	"	"
C7	"	"
C8	"	"
C9	"	"
C10	"	"
C11	"	"
C12	"	"
C13	"	"
C14	"	"
C15	"	"
C16	"	"
C17	I.F.	TRIMMERS
C18	"	"
C19	I.F.	TRIMMERS
C20	"	"
C21	"	"
C22	"	"
C23	70 MMFD.	PADDER
C24	"	"
C25	350 MMFD	"
C26	385 MMFD.	TUNING CONDENSER
C27	"	" "
C28	"	" "
C29	"	" "
C30	10 MMFD.	MICA
C31	75 MMFD.	"
C32	100 MMFD.	"
C33	"	"
C34	"	"
C35	"	"
C36	"	"
C37	100 MMFD.	MICA
C38	"	"
C39	"	"
C40	"	"
C41	200 MMFD.	"
C42	250 MMFD.	"
C43	"	"
C44	350 MMFD.	"
C45	2000 MMFD.	"
C46	2000 MMFD.	"
C47	10 MMFD.	"
C48	.05 MFD.	200 VOLT
C49	"	"
C50	"	"
C51	"	"
C52	"	"
C53	"	"
C54	.01 MFD.	"
C55	.05 MFD.	400 VOLT
C56	"	"
C57	"	"
C58	"	"
C59	"	"
C60	.25 MFD.	200 VOLT
C61	"	"
C62	"	400 VOLT
C63	25. MFD.	500 VOLT WET ELECTROLYTIC
C64	40. MFD.	350 VOLT " "
C65	10 MMFD.	MICA
C66	25 MMFD.	"
C67	5 MMFD.	"
C68	"	"
C69	.25 MFD.	400 V.

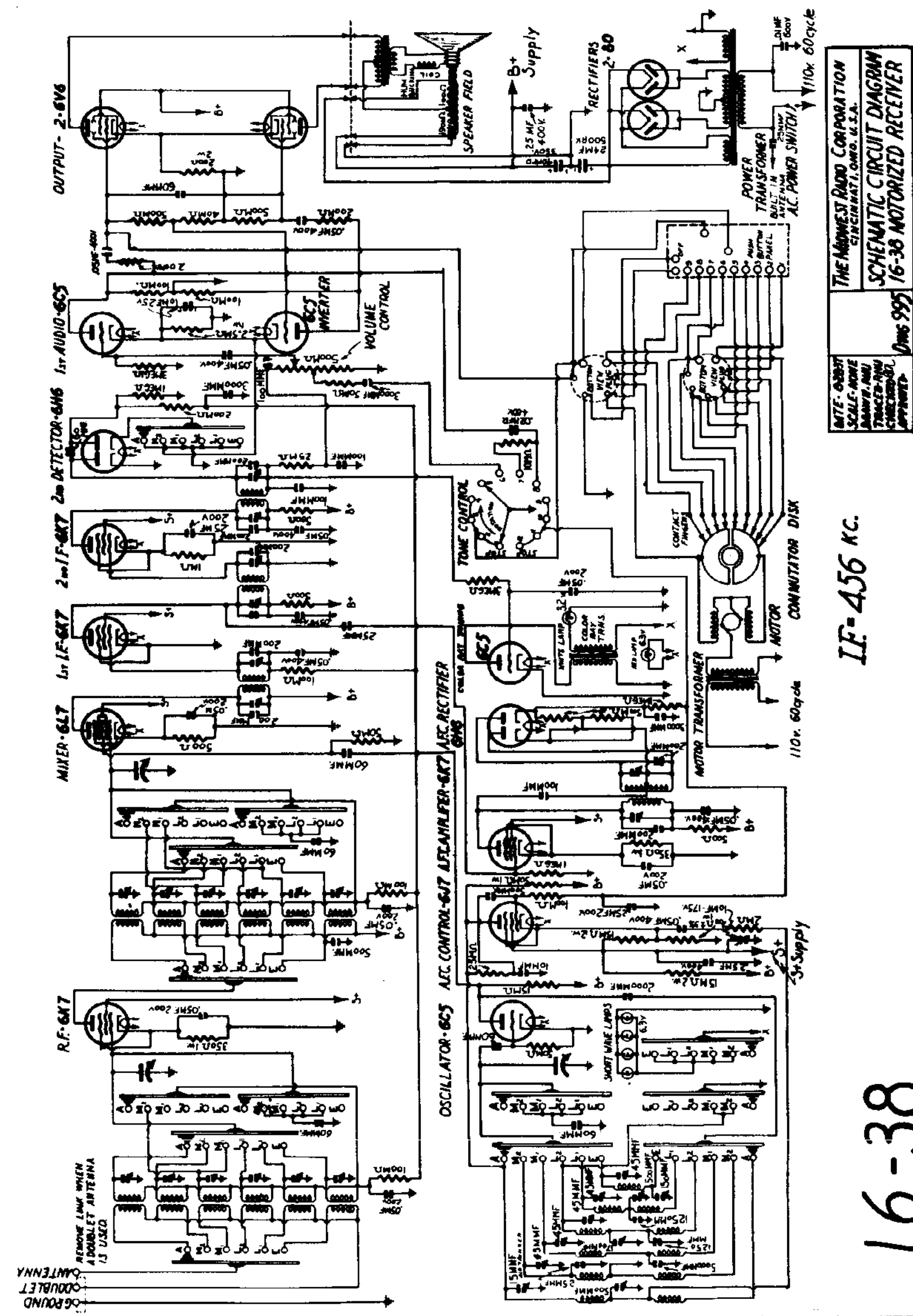
MODEL 16-37 AC
Socket, Trimmers

MID-WEST RADIO CORP.





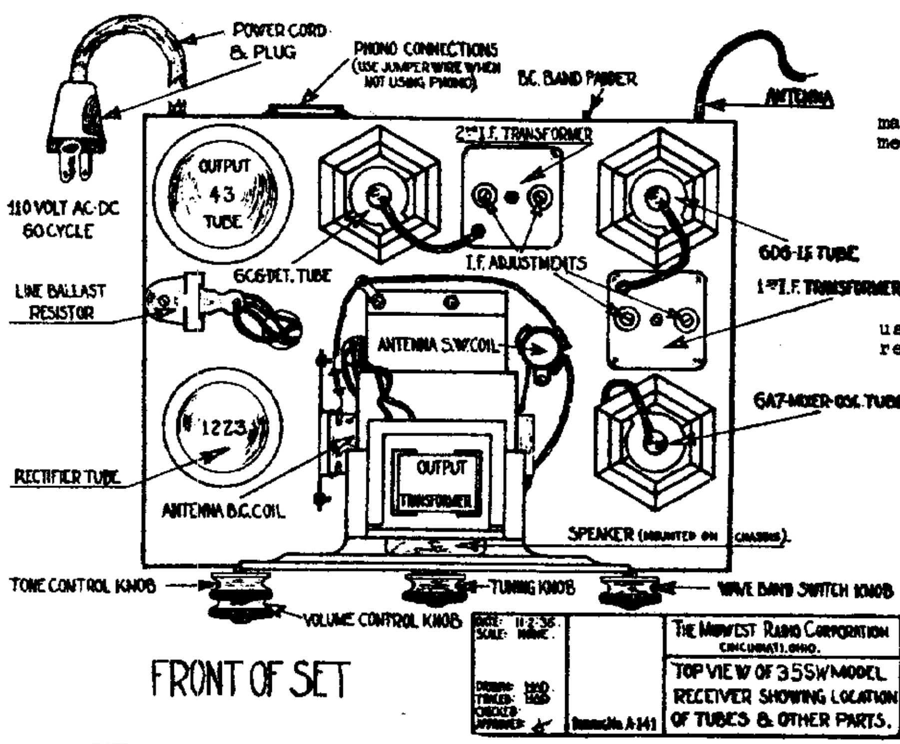
MID-WEST RADIO CORP.



FOR CHASSIS AND TRIMMERS, SEE INDEX

MODEL 35-SW
Socket, Trimmers
Voltage, Alignment
Notes

MID-WEST RADIO CORP.



FRONT OF SET

Using a standard signal generator and having an approximate frequency from 400 k.c. to 14 m.c. and a standard output meter.

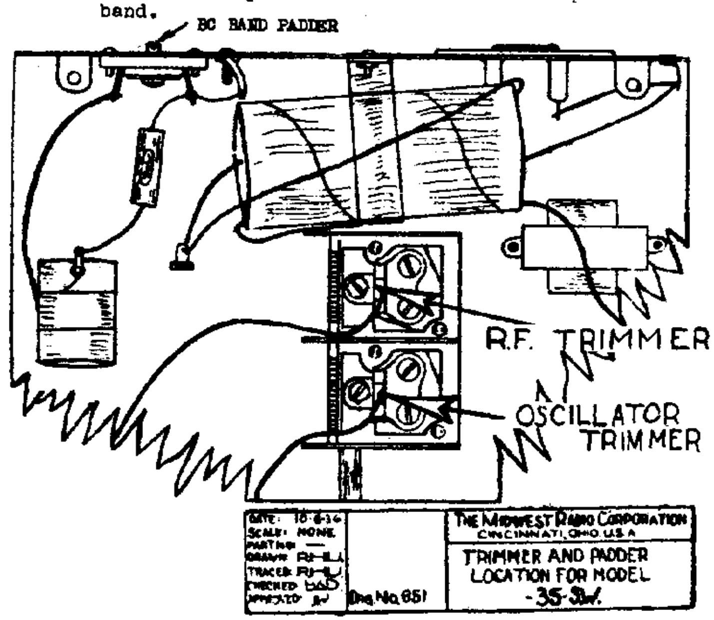
I. F. ALIGNMENT

(1) Set signal generator to 465 k.c. and connect output of signal generator to grid of 6A7 tube, shorting out front section of variable condenser. Connect output meter to plate of 43 tube and ground. Adjust both 1st and 2nd I.F. grid and plate trimmers for maximum output on meter.

NOTE: To assure more accurate trimmer setting always use lowest possible test oscillator output consistent with readable output meter scale deflection.

R. F. ALIGNMENT

(2) Setting dial and signal generator at 1450 k.c., connect signal generator to antenna post of receiver through a standard dummy antenna. Adjust R. F. trimmers on variable condenser so that maximum output is obtained at this frequency. Set signal generator and dial at 550 k.c. and adjust "A" band padder in rear of set for maximum output. Short wave adjustments are automatically taken care of by carefully calibrated coils and fixed condensers. No adjustment is needed for the particular band.



NOTE :-

The schematic of the MODEL 35 SW is the same as the MODEL 35-5-SW, with the exception that the 6A7 screen grid by-pass condenser has a value of 0.1 MFD capacity instead of 0.02 MFD. The Model 35-5-SW schematic should show one side of the line grounded to the same point on chassis that the series filaments are grounded.

The Intermediate Frequency for the Short -Wave Model is 465 KC. For the Long-Wave Model the "IF" is peaked at 175 KC. For the latter additional padders are shown on the top view.

SEE INDEX FOR SCHEMATIC

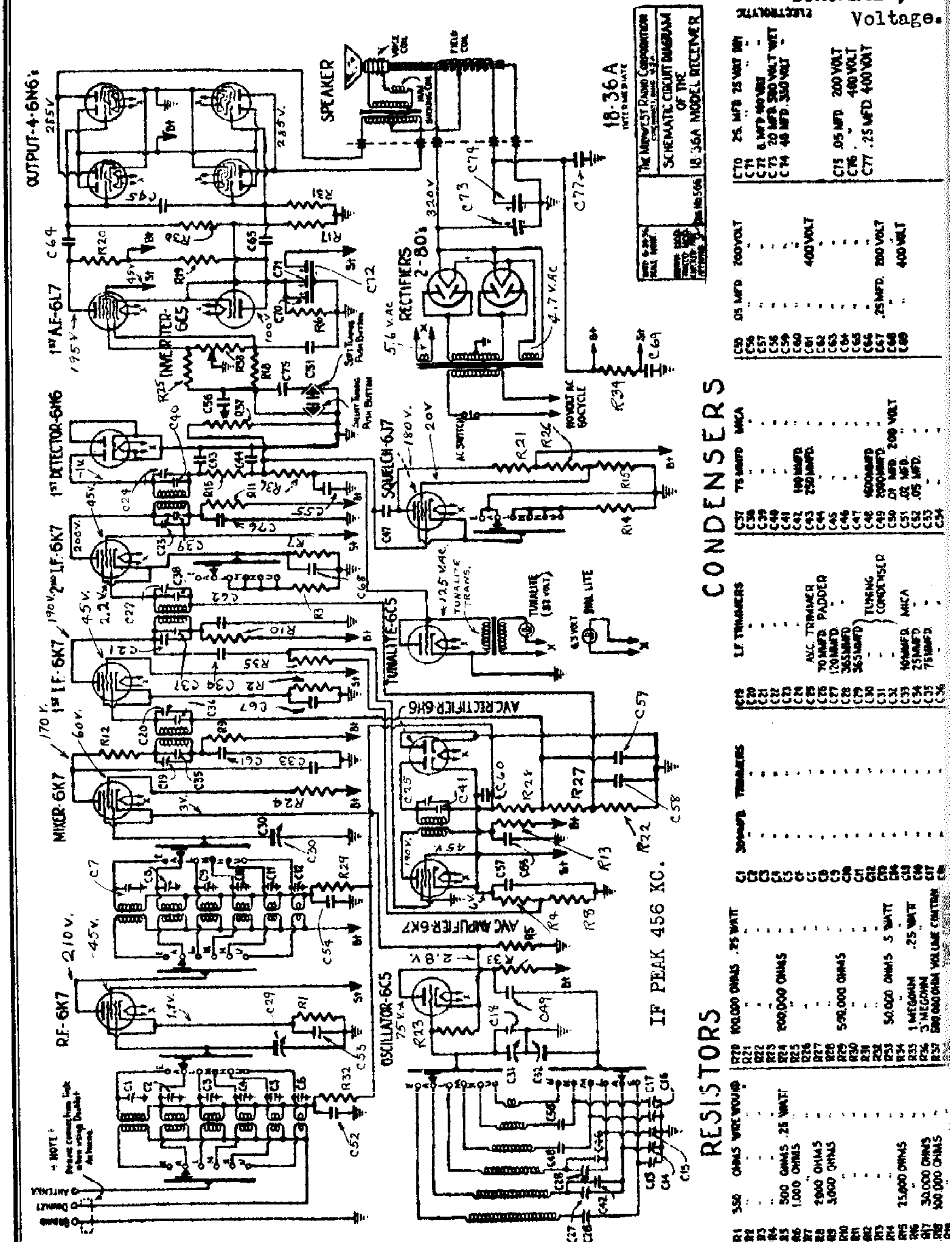
VOLTAGE DATA

TYPE	POSITION	PLATE VOLTS	SCREEN VOLTS	SUPP VOLTS	CATHODE VOLTS	FIL. VOLTS
6A7	OSC Mixer	100 100	60	9	9	6.2
6D6	1st IF	100	60	9	9	6.2
6C6	2nd Det	25	23	4	4	6.2
43	OUTPUT	95	100	----	13	25
12Z3	RECT.	120	----	----	----	12

All voltages measured with no signal input.
Voltages depending on the voltage of the line supplying set.

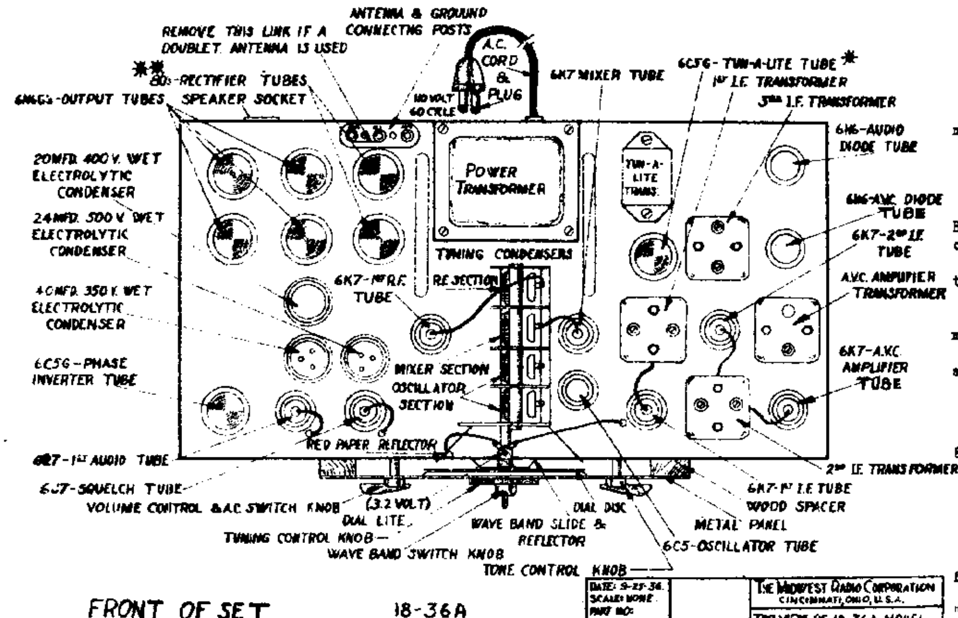
MID-WEST RADIO CORP.

Model 18-36A
(Intermediate)
Schematic,
Voltage.

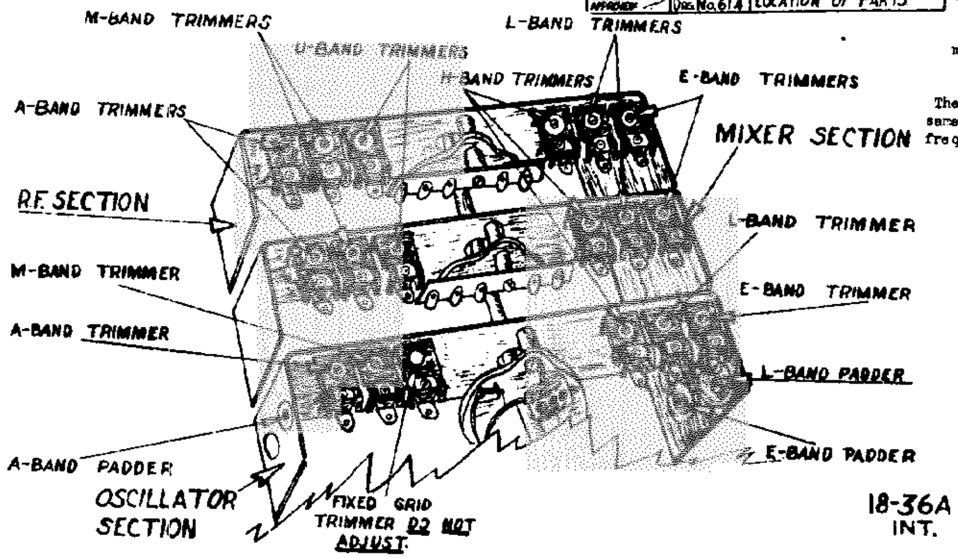


MODEL 18-36A(Int.)
Socket, Trimmers
Alignment

MID-WEST RADIO CORP.



DATE: 9-25-36 SCALE: NONE PART NO: DRAWN: C.W.F. TRACED: C.W.F. CHECKED: H.A.D. APPROVED:	THE MIDWEST RADIO CORPORATION CINCINNATI, OHIO, U.S.A.
DRG. No. 614	TOP VIEW OF 18-36A MODEL RECEIVER SHOWING LOCATION OF PARTS



ALIGNMENT PROCEDURE

A good signal generator with accurate frequency calibration and an output meter are required. An INTERMEDIATE FREQUENCY of 456 KC is used.

(1) Set the signal generator to 456 KC and connect it from the mixer grid to ground.

(2) Remove the Oscillator tube from the receiver.

(3) Connect the output meter from the plate of the output tube to positive B, are from the plates of one pair of tubes to the plates of the other pair of output tubes.

(4) Using a weak signal of approximately 40 microvolts, align the I.F. transformers to maximum output.

(5) Gradually decrease the signal and realign the I.F. amplifier.

(6) Increase the input from the signal generator to approximately 100 microvolts. Align the A.V.C. transformer for minimum output.

(7) Repeat using weaker signal strengths for the I.F. and stronger signal strengths for the A.V.C. adjustments until absolute peak is assured.

Insert the oscillator tube. Connect the signal generator between antenna and ground. Connect mixer lead to grid of the mixer tube.

"E" BAND ADJUSTMENT

(1) Set the receiver wave change switch to the "E" Band.

(2) Set the generator to 325 KC, and set the receiver dial to same frequency setting.

(3) Adjust the "E" Oscillator trimmer to maximum gain, then adjust the "E" Band RF and "MIXER" trimmers for maximum gain.

(4) Reset the signal generator to 135 KC and change the receiver dial to 135 KC frequency setting.

(5) Adjust the "E" Band padder for maximum signal.

(6) Repeat the adjustment of the trimmers and padders until the adjustment of one does not affect the adjustment of the other.

The procedure for adjustments of the "A", "L", "M", "H", and "U" Bands are the same as given above for the "E" Band. The bands are adjusted to the following frequencies :-

"A" Band - Adjust Oscillator, then RF and Mixer trimmers to 1490 KC
Adjust Oscillator padder at 550 KC

"L" Band - Adjust Oscillator, then RF and Mixer trimmers to 3.8 MC
Adjust Oscillator padder at 1.6 MC

"M" Band - Adjust Oscillator, then RF and Mixer trimmers to 11.5 MC
No padder adjustment.

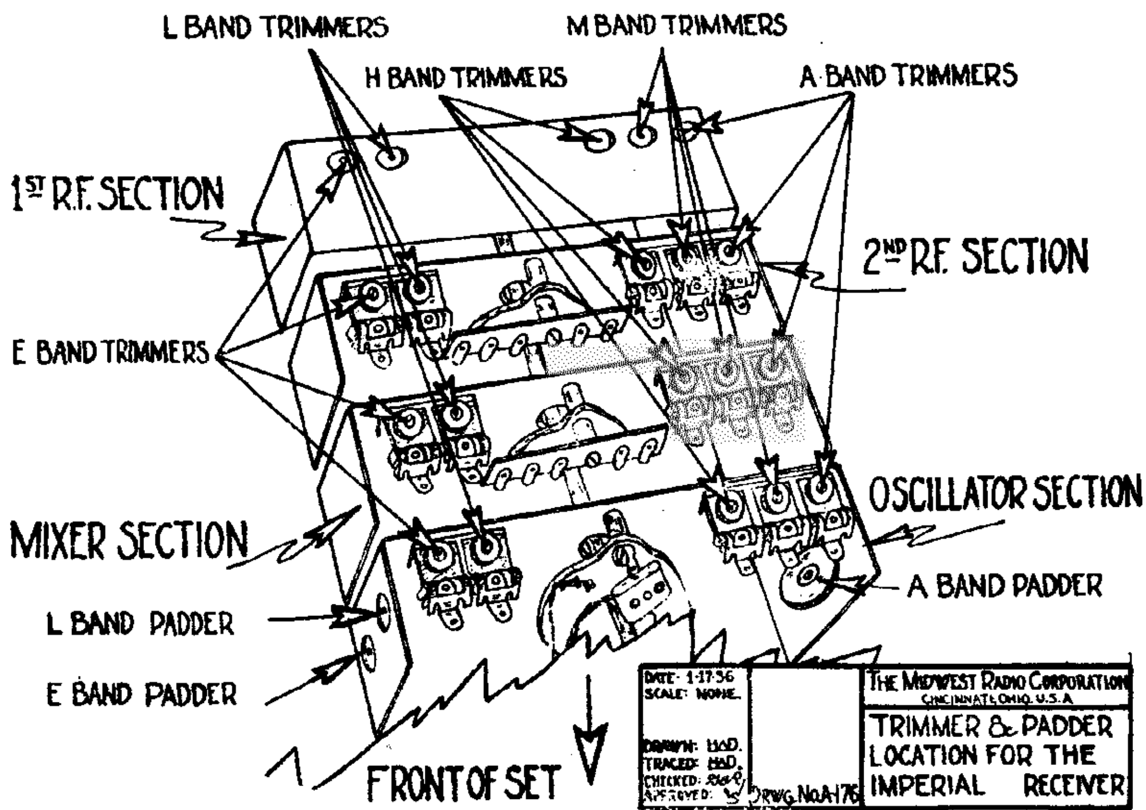
"H" Band - Adjust Oscillator, then RF and Mixer trimmers to 28 MC
No padder adjustment.

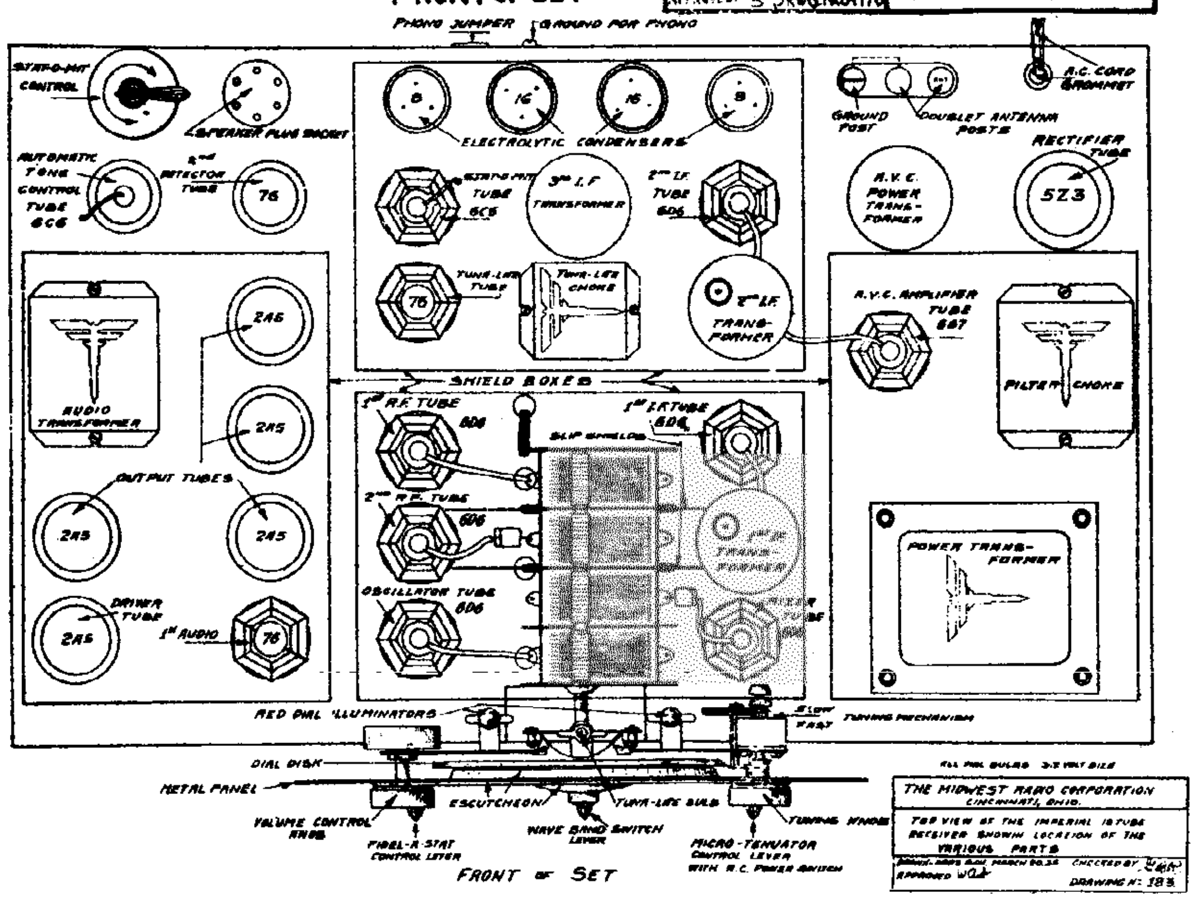
"U" Band - Tune receiver until signal is heard, then adjust the Mixer trimmer for maximum gain. No other adjustments are required on this band.

DATE: 9-25-36 SCALE: NONE. PART NO: DRAWN: C.W.F. TRACED: C.W.F. CHECKED: H.A.D. APPROVED:	THE MIDWEST RADIO CORPORATION CINCINNATI, OHIO, U.S.A.
DRG. No. 615	TRIMMER & PADDER LOCATION OF THE 18-36A MODEL RECEIVER

MODEL Imperial 18(1935)
Socket,Trimmers

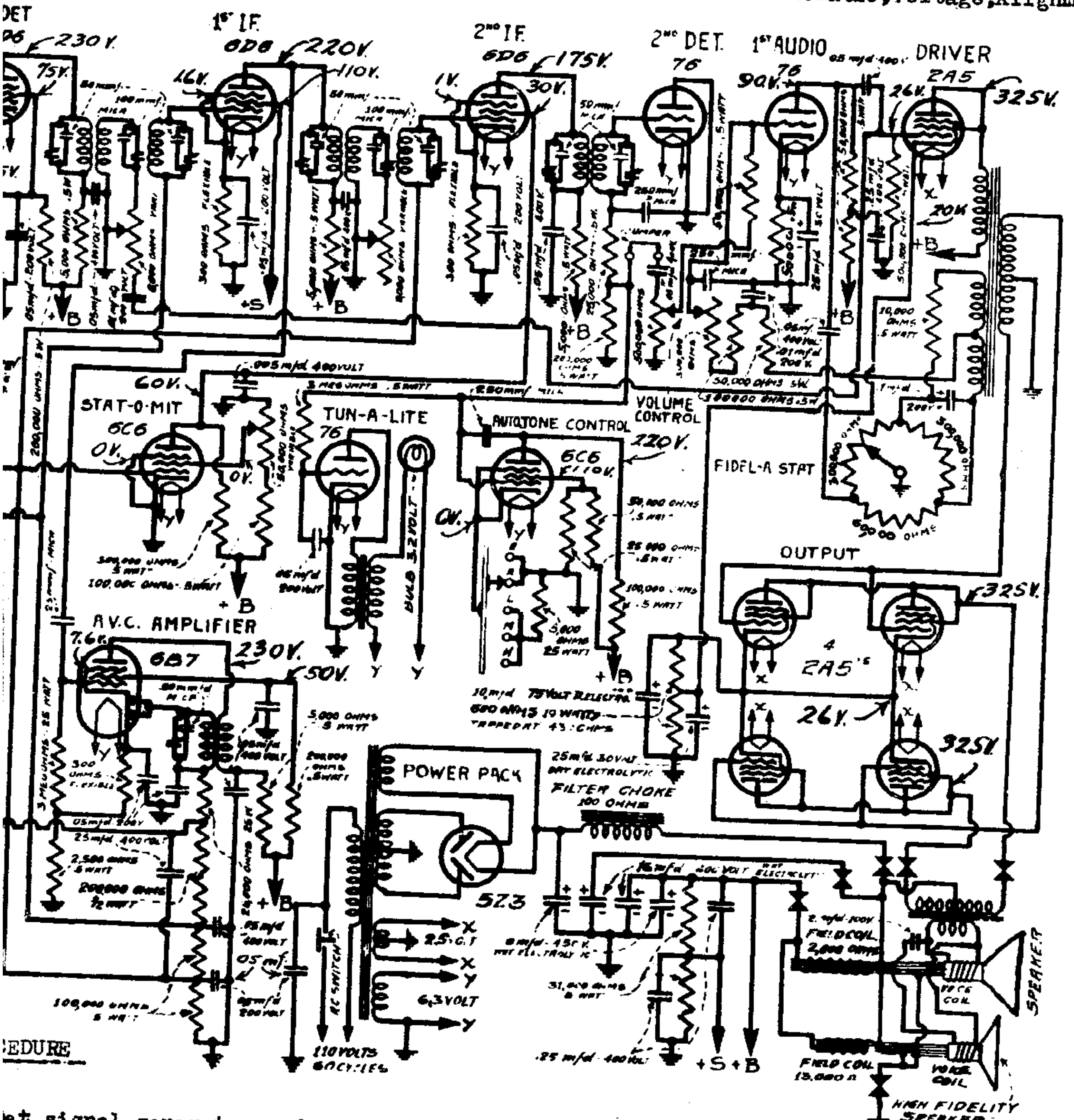
MID-WEST RADIO CORP.





RADIO CORP.

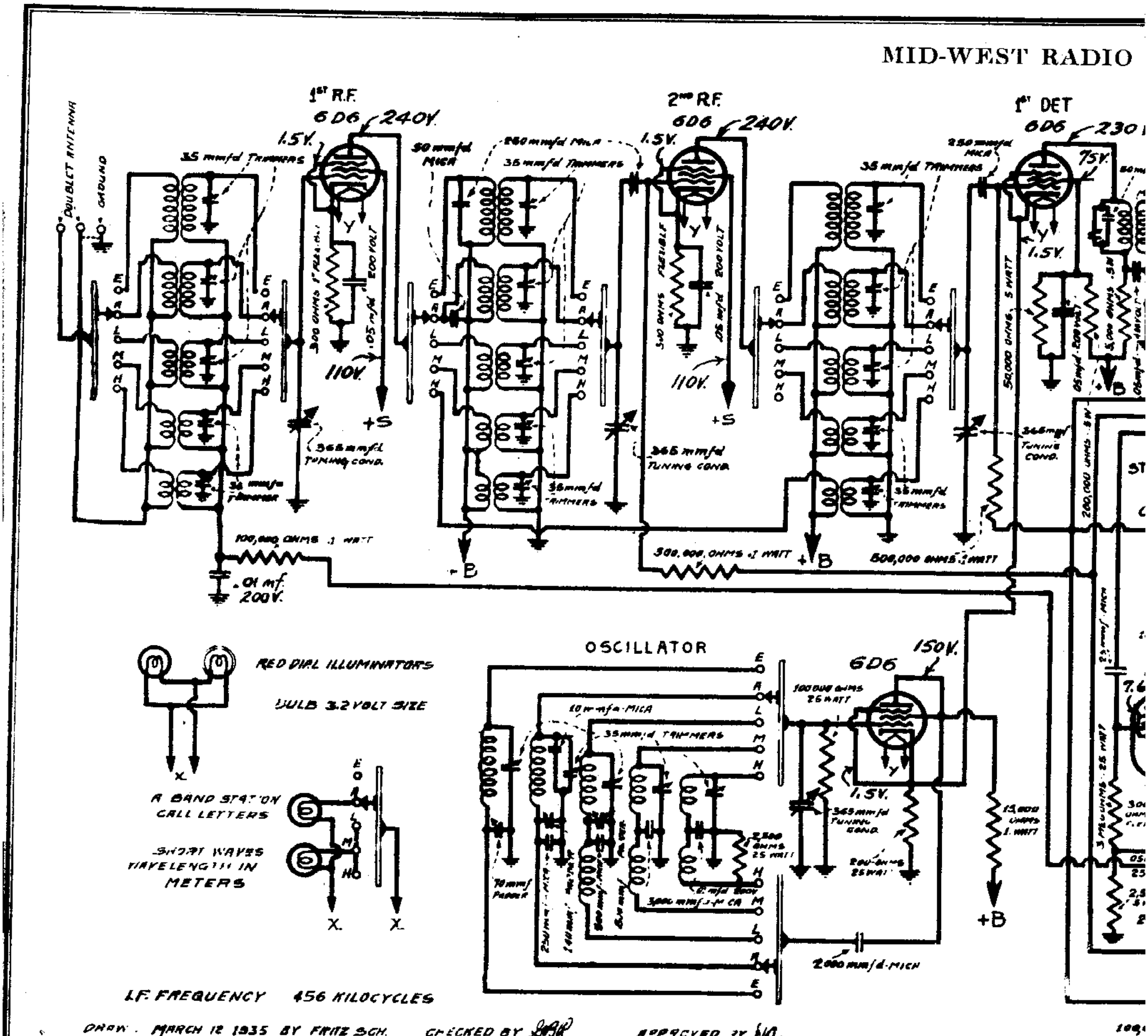
MODEL Imperial 18(1935)
Schematic,Voltage,Alignment



EDURE

et signal generator and receiver to 550 KC. Adjust "A" Band padder to maximum gain.
BAND ADJUSTMENT - Set switch to "L" Band. Set signal generator and receiver to
MC. Trim "L" Band Oscillator, RF, and Mixer trimmers to maximum gain. Reset sig-
generator and receiver to 1.6 MC, and adjust "L" Band padder to maximum signal.
BAND ADJUSTMENT - Set switch to "M" Band. Set signal generator and receiver to
5 MC. Adjust Oscillator, RF, and Mixer trimmers for maximum gain.
der is provided on the "M" Band. No
BAND ADJUSTMENT - Set the wave change switch of the receiver to the "H" Band.
the signal generator and receiver to 28 MC. Adjust the "H" Band trimmers of the
illator, RF, and Mixer circuits until a maximum signal is obtained.
padder adjustment is provided for on the "H" Band.

MID-WEST RADIO



DRAWING Nº 182

ALIGNMENT PROCEDURE

Set the signal generator to 456 KC. Remove oscillator tube from receiver, set the Microtenuator to maximum, with approximately 40 microvolts into the grid of the mixer, peak the 3rd, 2nd, and 1st IF Transformers to maximum audio output. Do not measure AVC as indication of output.

Increase input to Mixer grid to 100 microvolts, tune AVC transformer to maximum dip, set microtenuator at minimum setting. Do not shield coils to maximum dip. Recheck adjustments to the above procedure. Replace oscillator tube in receiver.

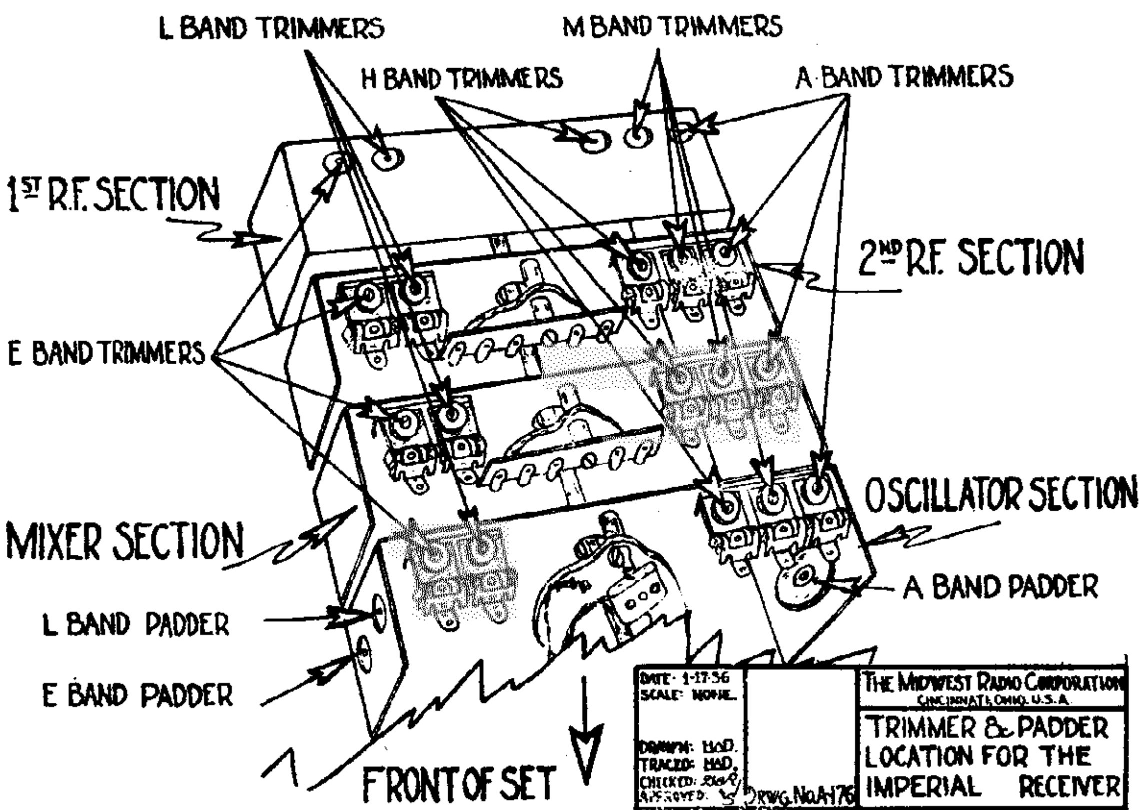
"E" BAND ADJUSTMENT - Connect signal generator to ANT. and Gnd. posts. Set wave change switch to "E" Band. Set signal generator to 325 KC. Trim "E" Band Osc. trimmers for maximum signal. Trim the "E" Band RF and Mixer trimmers for maximum signal, set signal generator and receiver dial to 135 KC. Trim "E" Band padder for maximum gain.

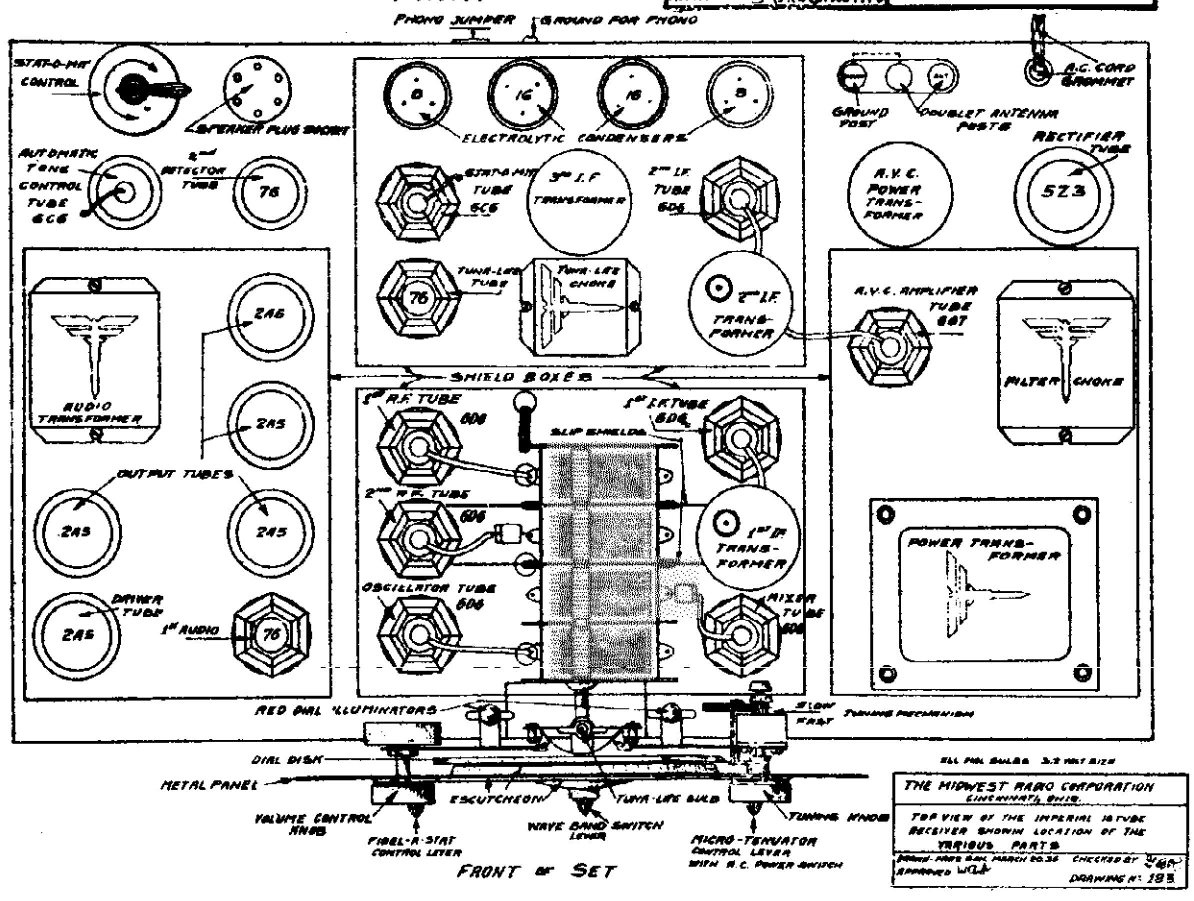
"A" BAND ADJUSTMENT - Set switch to "A" Band. Set signal generator and dial of receiver to 1490 KC. Trim "A" Band OScillator, RF, and Mixer trimmers to maximum gain.

Reset sig
"L" BAND
3.8 MC. T
nal gener
"M" BAND
11.5 MC.
padder is
"H" BAND
Set the s
Oscillato:
No padder

MODEL Imperial 18(1935)
Socket,Trimmers

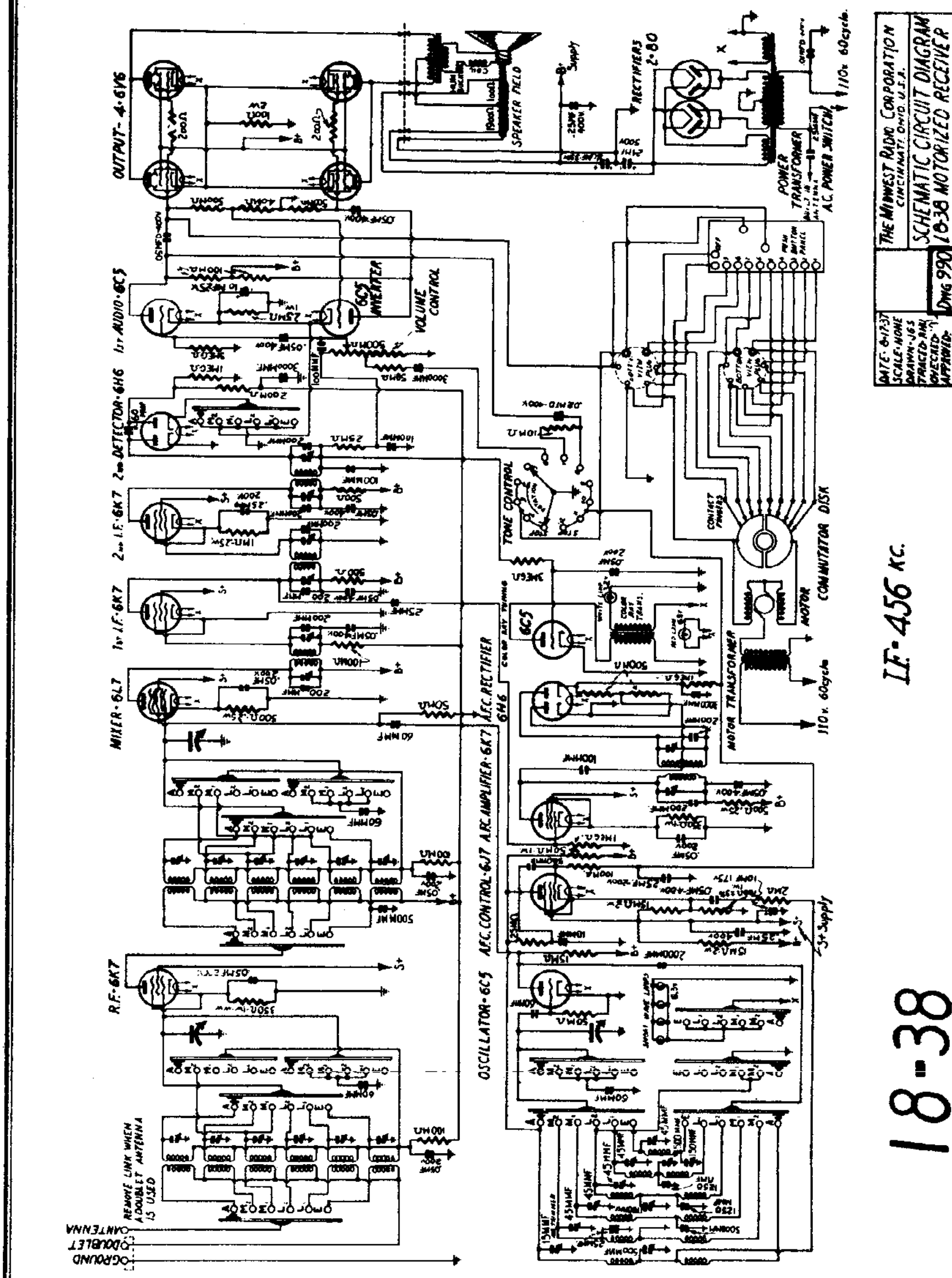
MID-WEST RADIO CORP.





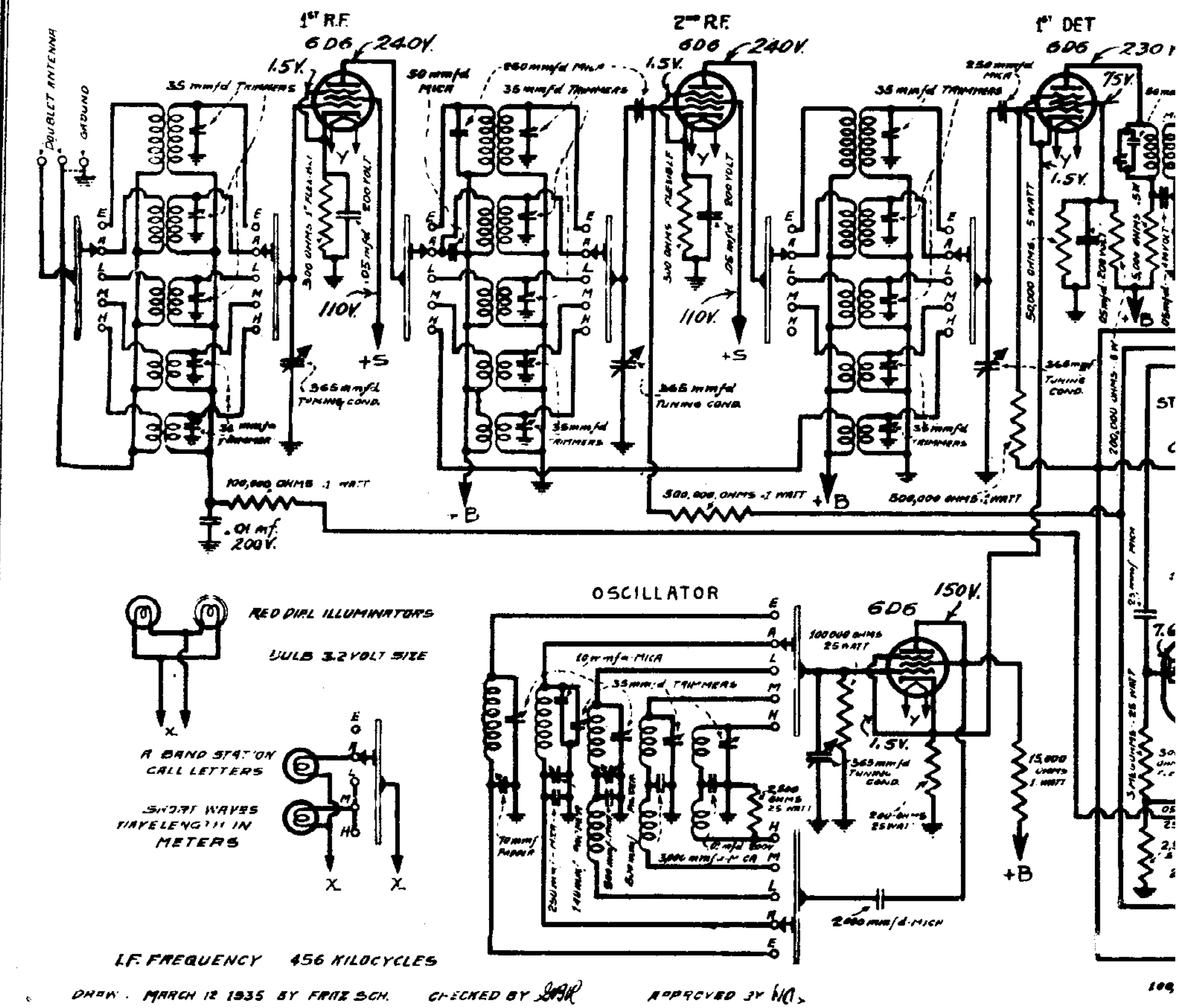
MODEL 18-38AC
Schematic

MID-WEST RADIO CORP.



FOR CHASSIS AND TRIMMERS, SEE INDEX

MID-WEST RADIO (



DRAWING No 182

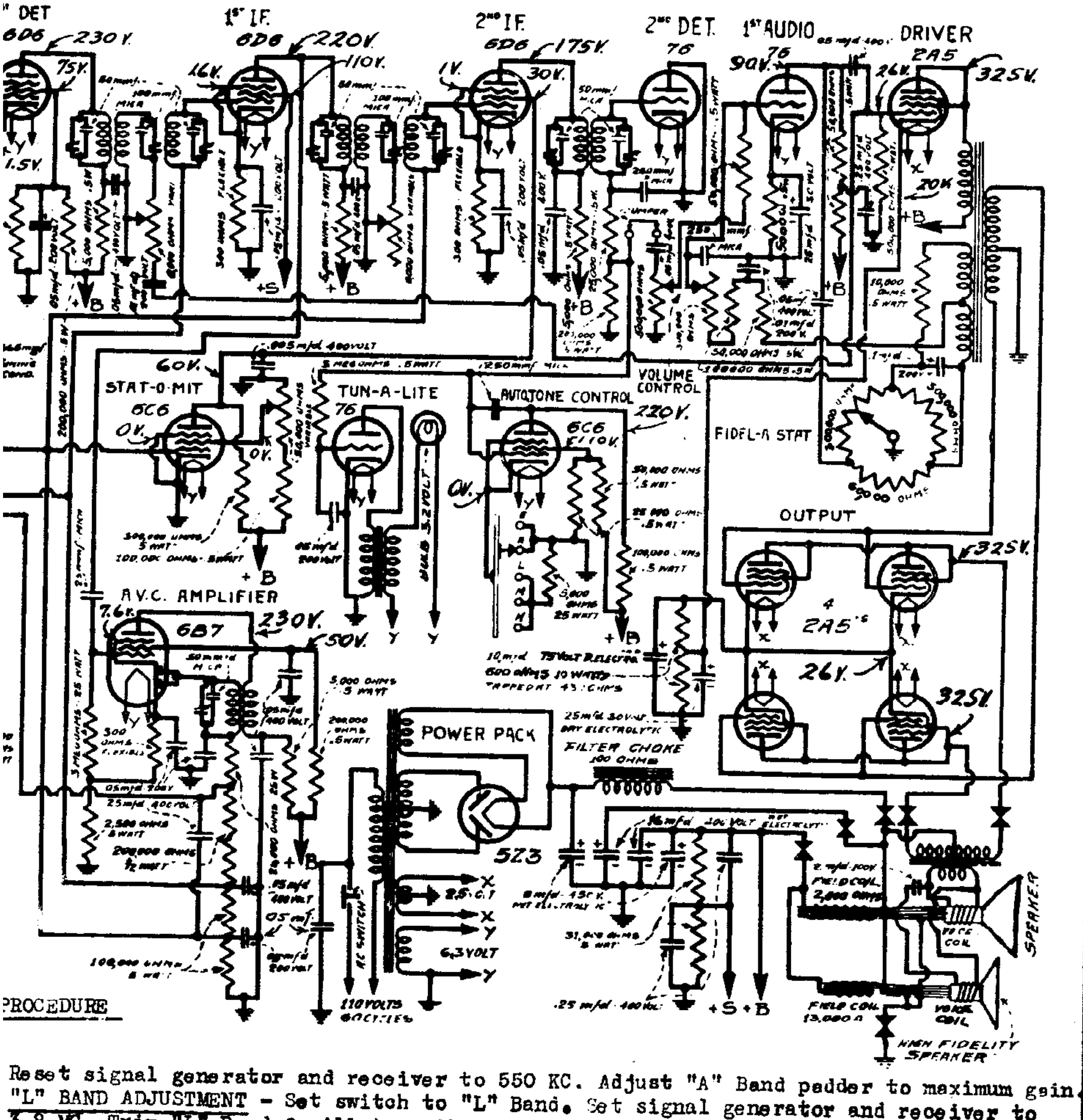
ALIGNMENT PROCEDURE

Set the signal generator to 456 KC. Remove oscillator tube from receiver, set the Microtenuator to maximum, with approximately 40 microvolts into the grid of the mixer, peak the 3rd, 2nd, and 1st IF Transformers to maximum audio output. Do not measure AVC as indication of output.
Increase input to Mixer grid to 100 microvolts, tune AVC transformer to maximum dip, set microtenuator at minimum setting. Do not shield coils to maximum dip. Recheck adjustments to the above procedure. Replace oscillator tube in receiver.
"E" BAND ADJUSTMENT - Connect signal generator to ANT. and Gnd. posts. Set wave change switch to "E" Band. Set signal generator to 325 KC. Trim "E" Band Osc. trimmers for maximum signal. Trim the "E" Band RF and Mixer trimmers for maximum signal, set signal generator and receiver dial to 135 KC. Trim "E" Band padder for maximum gain.
"A" BAND ADJUSTMENT - Set switch to "A" Band. Set signal generator and dial of receiver to 1490 KC. Trim "A" Band OScillator, RF, and Mixer trimmers to maximum gain.

Reset sig
"L" BAND
3.8 MC. T
nal gener
"M" BAND
11.5 MC.
padder is
"H" BAND
Set the s
Oscillato
No padder

' RADIO CORP.

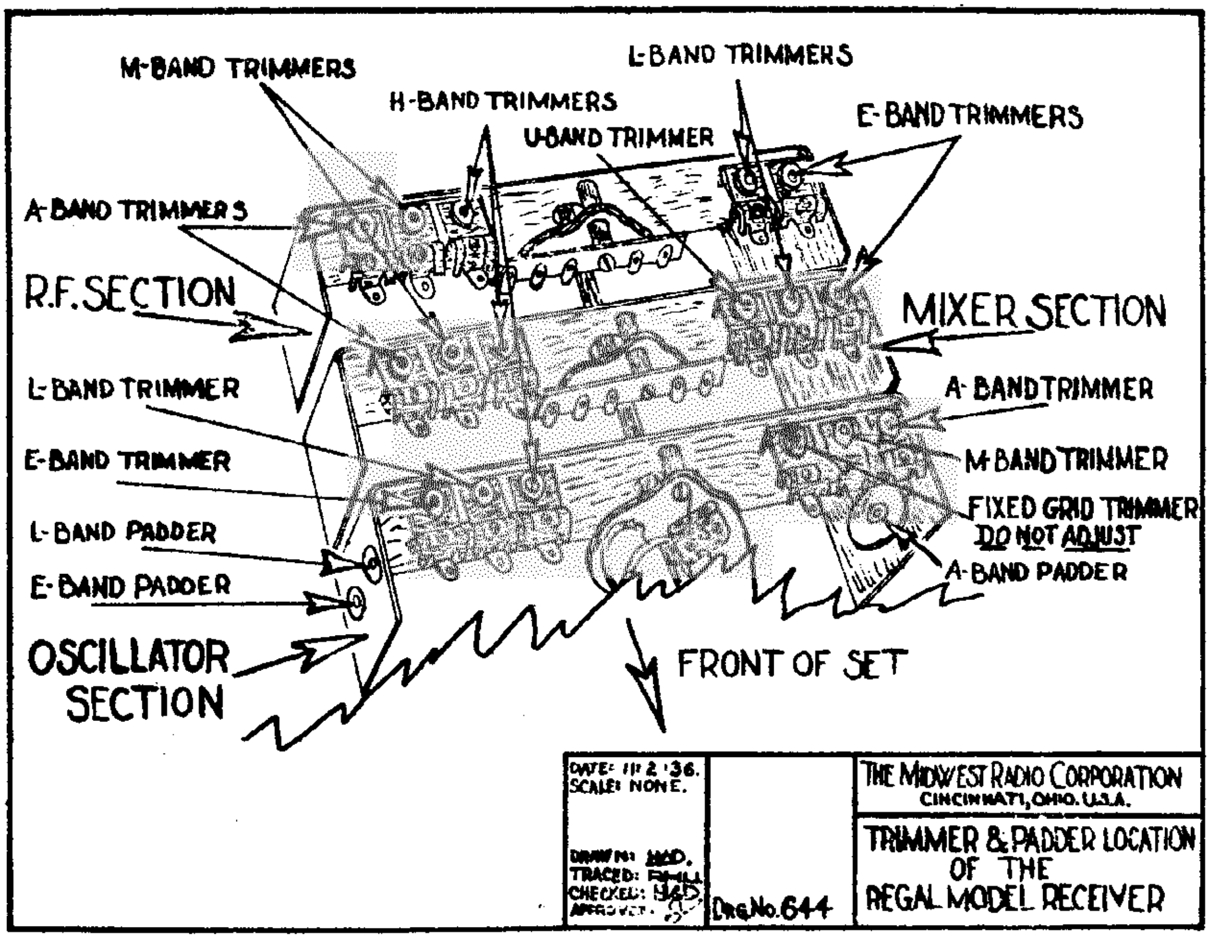
MODEL Imperial 18(1935)
Schematic,Voltage,Alignment



PROCEDURE

Reset signal generator and receiver to 550 KC. Adjust "A" Band padder to maximum gain.
"L" BAND ADJUSTMENT - Set switch to "L" Band. Set signal generator and receiver to 3.8 MC. Trim "L" Band Oscillator, RF, and Mixer trimmers to maximum gain. Reset signal generator and receiver to 1.6 MC, and adjust "L" Band padder to maximum signal.
"M" BAND ADJUSTMENT - Set switch to "M" Band. Set signal generator and receiver to 11.5 MC. Adjust Oscillator, RF, and Mixer trimmers for maximum gain. No padder is provided on the "M" Band.
"H" BAND ADJUSTMENT - Set the wave change switch of the receiver to the "H" Band. Set the signal generator and receiver to 28 MC. Adjust the "H" Band trimmers of the Oscillator, RF, and Mixer circuits until a maximum signal is obtained.
No padder adjustment is provided for on the "H" Band.

MID-WEST RADIO CORP.



I-F ALIGNMENT: Remove oscillator tube from its socket. Set signal generator to 456 kc and connect it from mixer grid to ground. Using a signal of about 40 microvolts, adjust i-f trimmers to maximum. Decrease signal and re-align i-f amplifier. Increase signal to about 100 microvolts and align AVC transformer for minimum output. Repeat using weaker signal for i-f amplifier and stronger signal for AVC adjustments until an absolute peak is assured. Replace oscillator tube.

R-F ALIGNMENT: Signal generator connected to antenna post and ground.

E-Band: Set band switch to E band and signal generator and dial of set to 325 kc. Adjust "E" oscillator trimmer for maximum; then "E" r-f and mixer trimmers for maximum. Set signal generator and dial to 135 kc and adjust "E" padder for maximum. Repeat adjustments until one does not affect the adjustment of the others.

A-Band: Set band switch to A band and signal generator and dial to 1490 kc. Adjust oscillator, r-f, and mixer trimmers of "A" band for maximum. Set signal generator and dial to 550 kc and adjust "A" padder for maximum. Repeat adjustments as before.

L-Band: Set band switch to L band and signal generator and dial to 3.8 mc. Adjust oscillator, r-f, and mixer trimmers of "L" band for maximum. Set signal generator and dial to 1.6 mc and adjust "L" padder for maximum. Repeat adjustments as before.

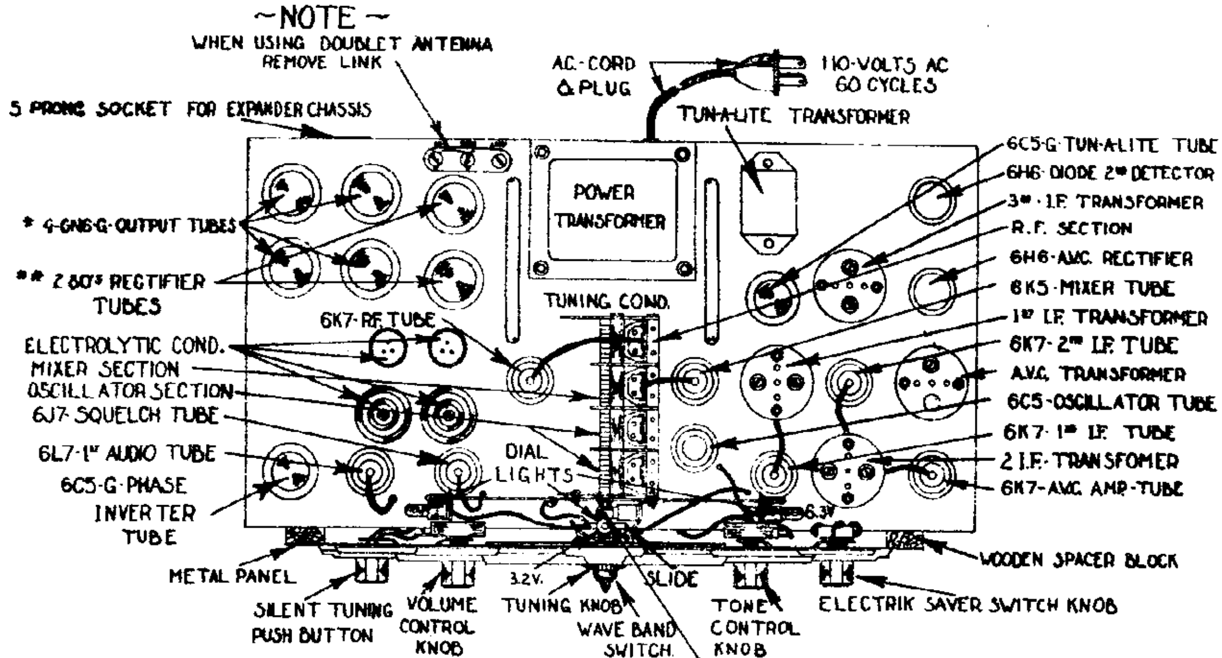
M-Band: Set band switch to M band, and signal generator and dial to 11.5 mc. Adjust oscillator, r-f, and mixer trimmers for maximum.

H-Band: Set band switch to H band and signal generator and dial to 28 mc. Adjust oscillator, r-f, and mixer trimmers for maximum.

U-Band: Set band switch to U band and signal generator to 60 mc. Tune set until signal is received. Adjust "U" mixer trimmer for maximum.

MODEL Regal(1936)
Socket,Chassis

MID-WEST RADIO CORP.



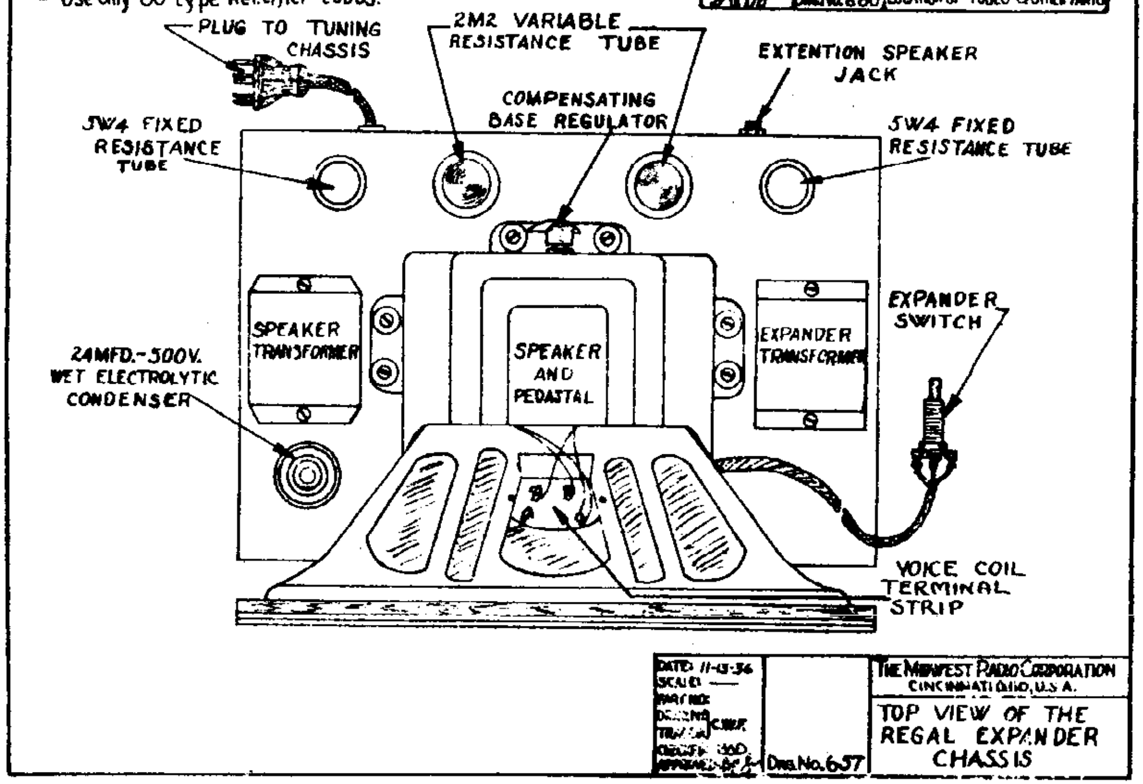
~NOTE~
This chassis is shown equipped with the best tube combination available.
* Metal, metal-glass, or glass counterpart tubes may be used. For example the output tubes shown are glass counter-part tubes numbered -6N6-G; metal glass tubes would be numbered 6N6-MG and metal tubes would be numbered -6N6.
** Use only 80 type Rectifier tubes.

37-REGAL

DATE: 11-26-36
SCALE: NONE
PART NO: —
DRAWN: FR-AJ
TRACED: FR-AJ
APPROVED: HAD
Dwg.No. 880

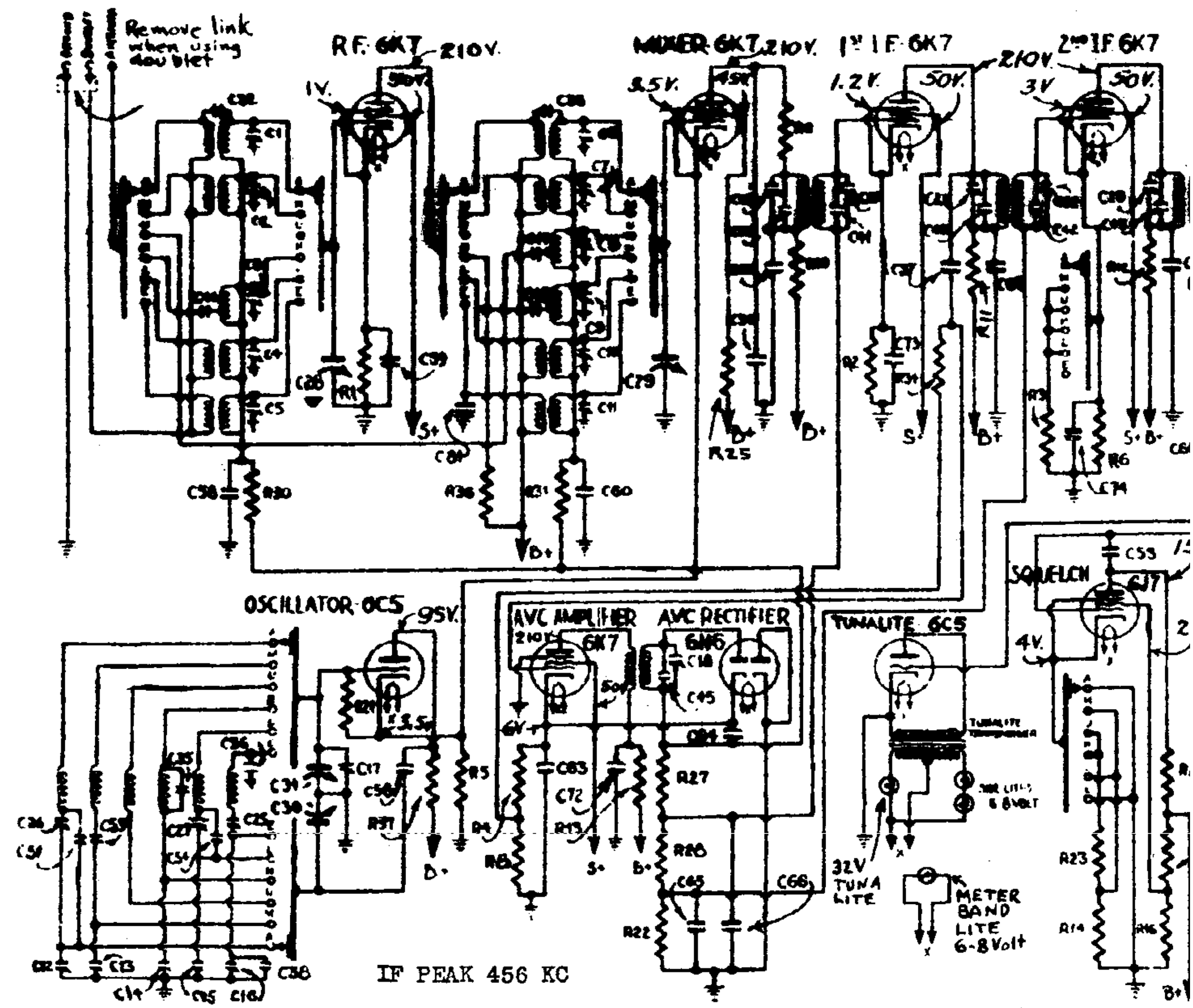
THE MIDWEST RADIO CORPORATION
CINCINNATI, OHIO, U.S.A.

TOP VIEW OF THE REGAL MODEL RECEIVER SHOWING LOCATION OF TUBES & OTHER PARTS



CONDENSERS

C1 35MMFD TRIMMER	C19 I.F TRIMMER	C37 250MMFD MICA	C55 2000 MMFD MICA	C73 .25MF
C2 " "	C20 " "	C38 "	C56	C74 "
C3 " "	C21 " "	C39 100MMFD "	C57 .02 MFD 200 VOLT	C75 .25MF
C4 " "	C22 " "	C40 "	C58 .05 MFD "	C76 "
C5 " "	C23 " "	C41 1000MMFD "	C59 " "	C77 8 MFD
C6 " "	C24 " "	C42 " "	C60 " "	C78 25 MFD
C7 " "	C25 70 MMFD PADDER	C43 " "	C61 " "	C79 40 MFD
C8 " "	C26	C44 " "	C62 " "	C80 60 MFD
C9 " "	C27 350MMFD	C45 " "	C63 " "	
C10 " "	C28 365MMFD TUNING COND	C46 " "	C64 " "	C81 300MM
C11 " "	C29 " " "	C47 " "	C65 " "	C82 .10 MF
C12 " "	C30 " "	C48 " "	C66 " "	C83 .1 MFD
C13 " "	C31 " " "	C49 " "	C67 .05 MFD 400 VOLT	C84 25M
C14 " "	C32 5 MMFD MICA	C50 " "	C68 " "	C85 "
C15 " "	C33 " "	C51 200MMFD "	C69 " "	C86 2 MF
C16 " "	C34 100MMFD "	C52 250MMFD "	C70 " "	C87 "
C17 " "	C35 " "	C53 " "	C71 " "	C88 24 M
C18 " "	C36 " "	C54 3500MMFD "	C72 " "	



RESISTORS

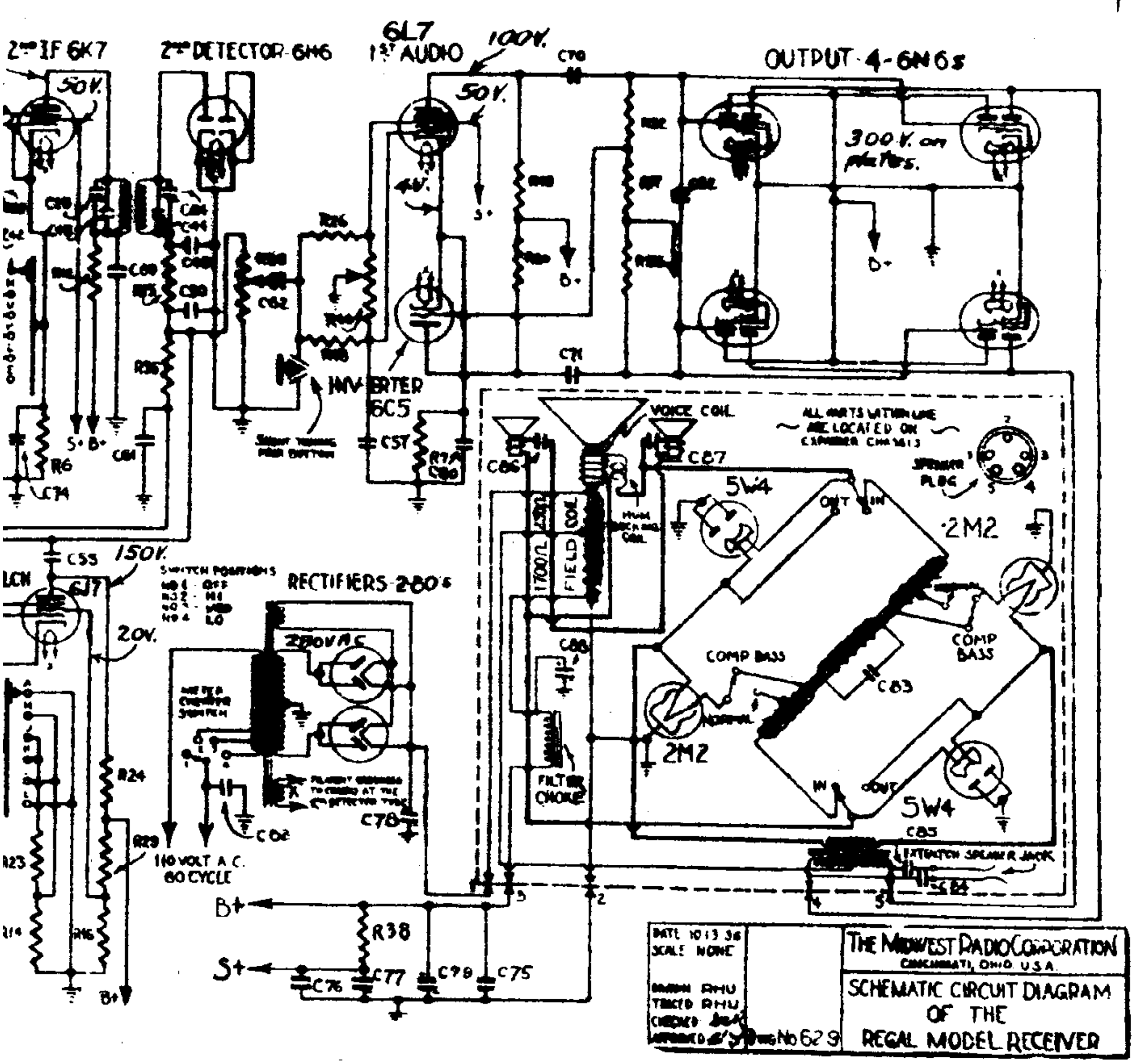
C73 .25MFD 200 VOLT
C74 " "
C75 .25MFD 400VOLT
C76 " "
C77 20MFD. 175V WET ELECTROLYTIC
C78 25. MFD 500V " "
C79 40MFD 350V " "
C80 60MFD. 10 V. " "

C81 300MMFD MICA
C82 .05 MFD 400 VOLT
C83 .1MFD - 200 VOLT
C84 25MFD - 600 VOLT
C85 " "
C86 2 MFD, 200 VOLT "
C87 " "
C88 24 MFD - 300V. WET ELECT.

R1 350 OHMS WIRE WOUND
R2 " "
R3 " "
R4 " "
R5 500 OHM .25 WATT
R6 1,000 OHM "
R7 " "
R8 4,000 OHM "
R9 5,000 OHM "
R10 " "
R11 " "
R12 " "
R13 " "
R14 " "
R15 25,000 OHM "
R16 "
R17 40,000 OHM "
R18 100,000 OHM "

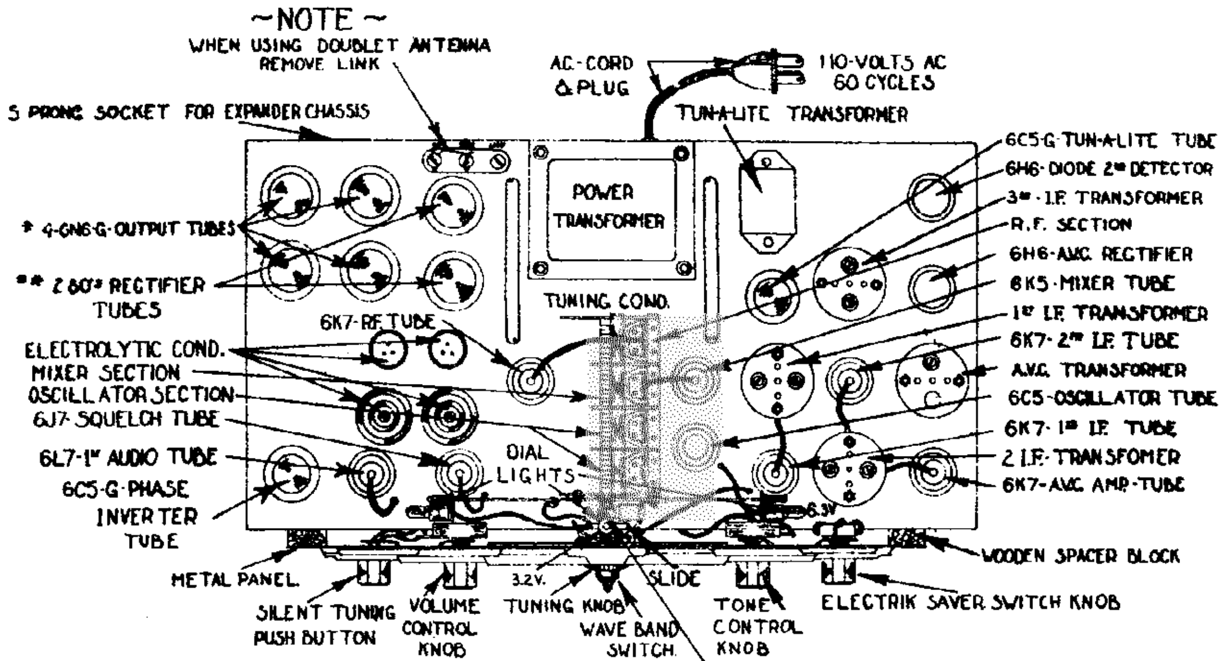
R19 100,000 OHM .25 WATT
R20 " "
R21 " "
R22 45,000 OHMS "
R23 100,000 " "
R24 "
R25 200,000 OHM "
R26 " "
R27 " "
R28 " "
R29 " "
R30 500,000 OHM "
R31 " "
R32 " "
R33 " "
R34 1 MEGOHM "
R35 3 MEGOHM "
R36 25,000 OHM .5 WATT

R37 50,000 OHMS .5 WATT
R38 " " "
R39 500,000 " VOL. CONT.
R40 " " TONE "



MODEL Regal(1936)
Socket,Chassis

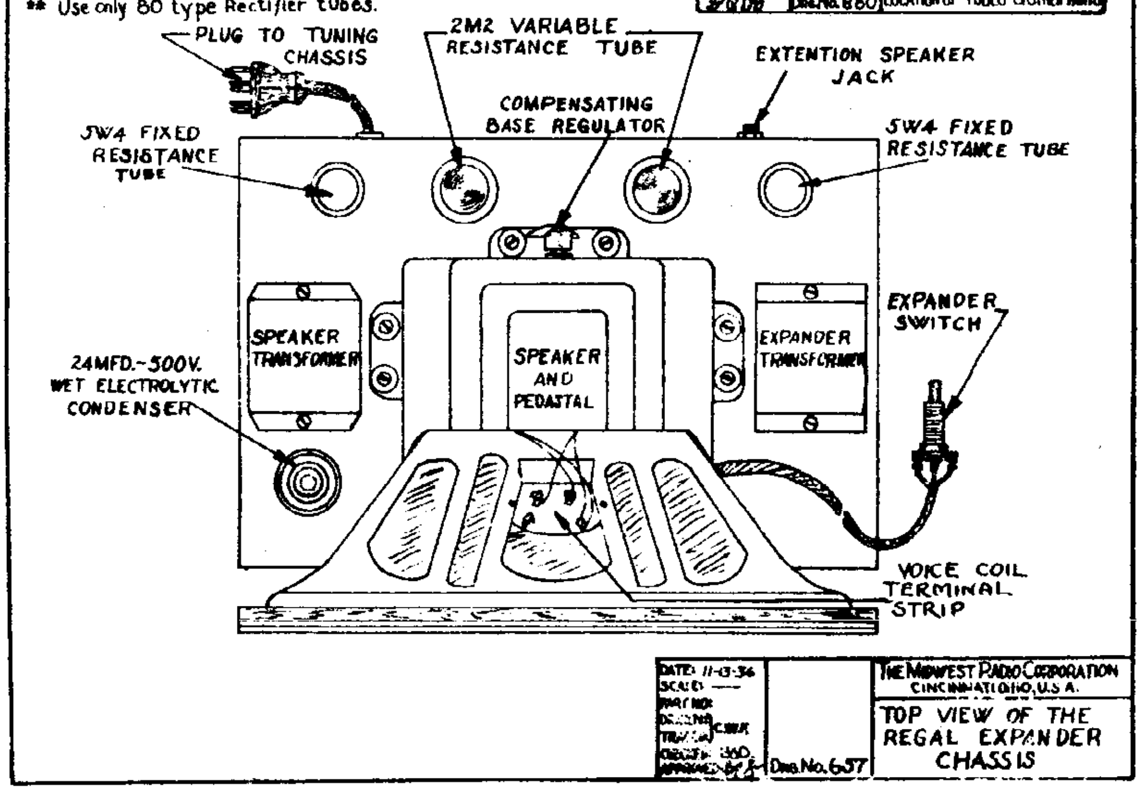
MID-WEST RADIO CORP.



~NOTE~
This chassis is shown equipped with the best tube combination available
* Metal, metal-glass, or glass counterpart tubes may be used. For example the output tubes shown are glass counter-part tubes numbered -6N6-G; metal glass tubes would be numbered 6N6-MG and metal tubes would be numbered -6N6.
** Use only 80 type Rectifier tubes.

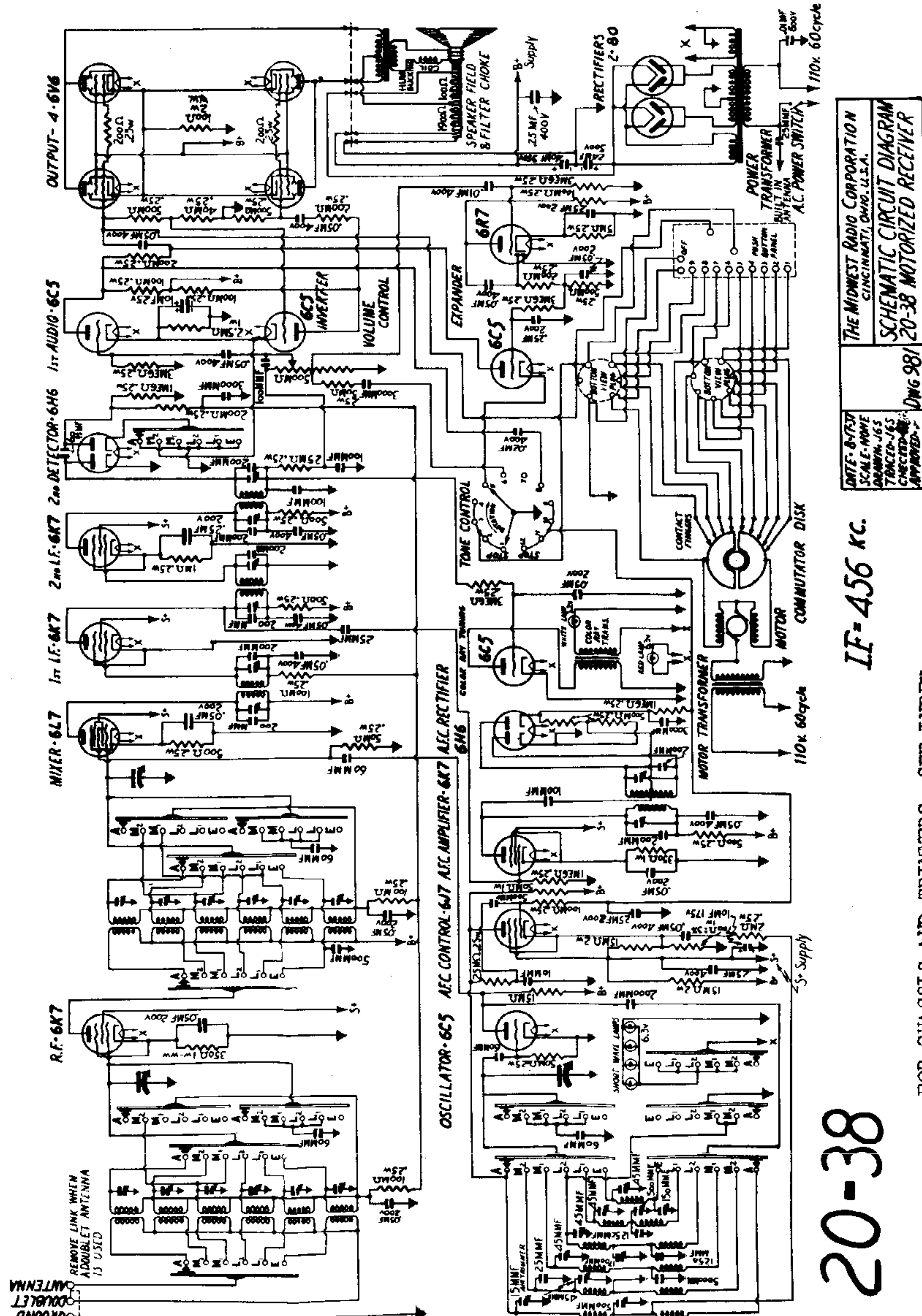
37-REGAL

DATE: 11-26-36
SCALE: NONE
DRG. No. 880
THE MIDWEST RADIO CORPORATION CINCINNATI, OHIO, U.S.A.
TOP VIEW OF THE REGAL MODEL RECEIVER SHOWING LOCATION OF TUBES & OTHER PARTS



MODEL 20-38 AC
Schematic

MID-WEST RADIO CORP.



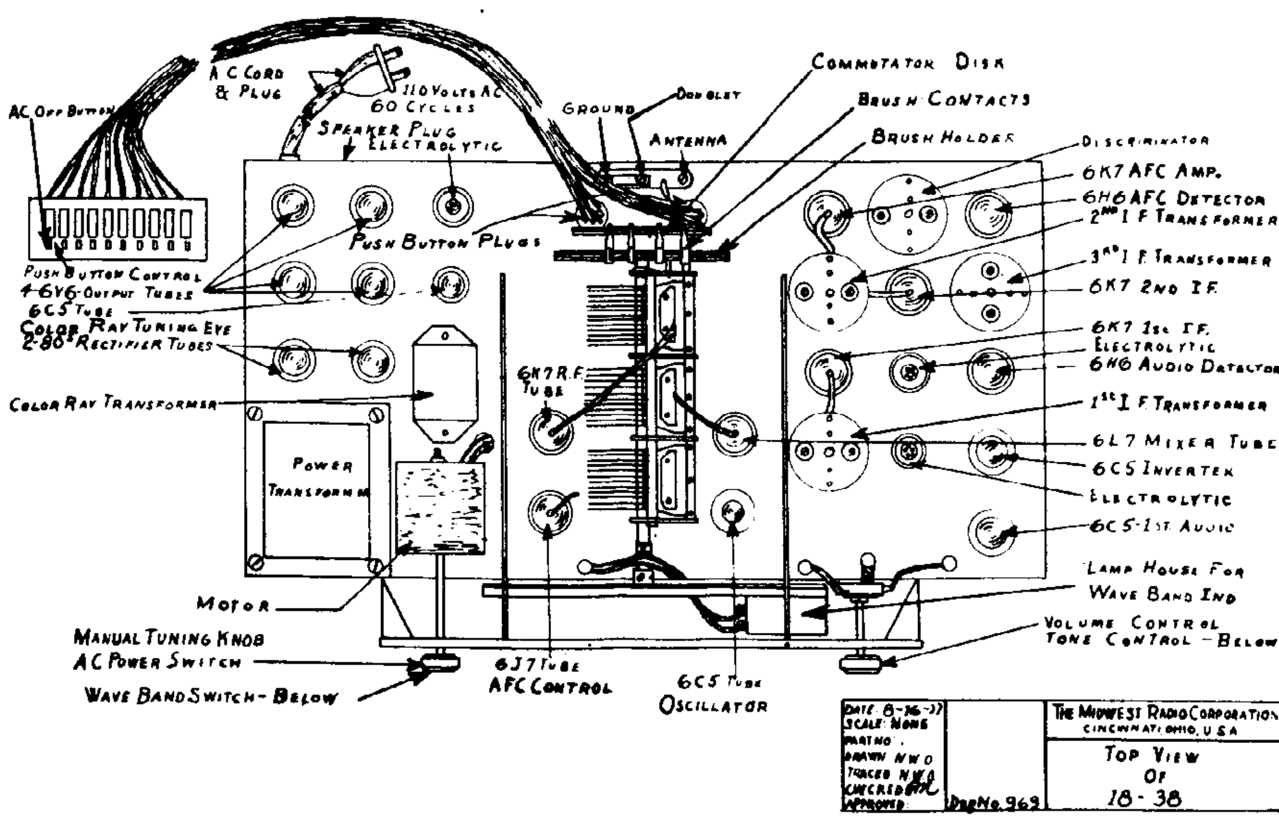
IF=456 KC.

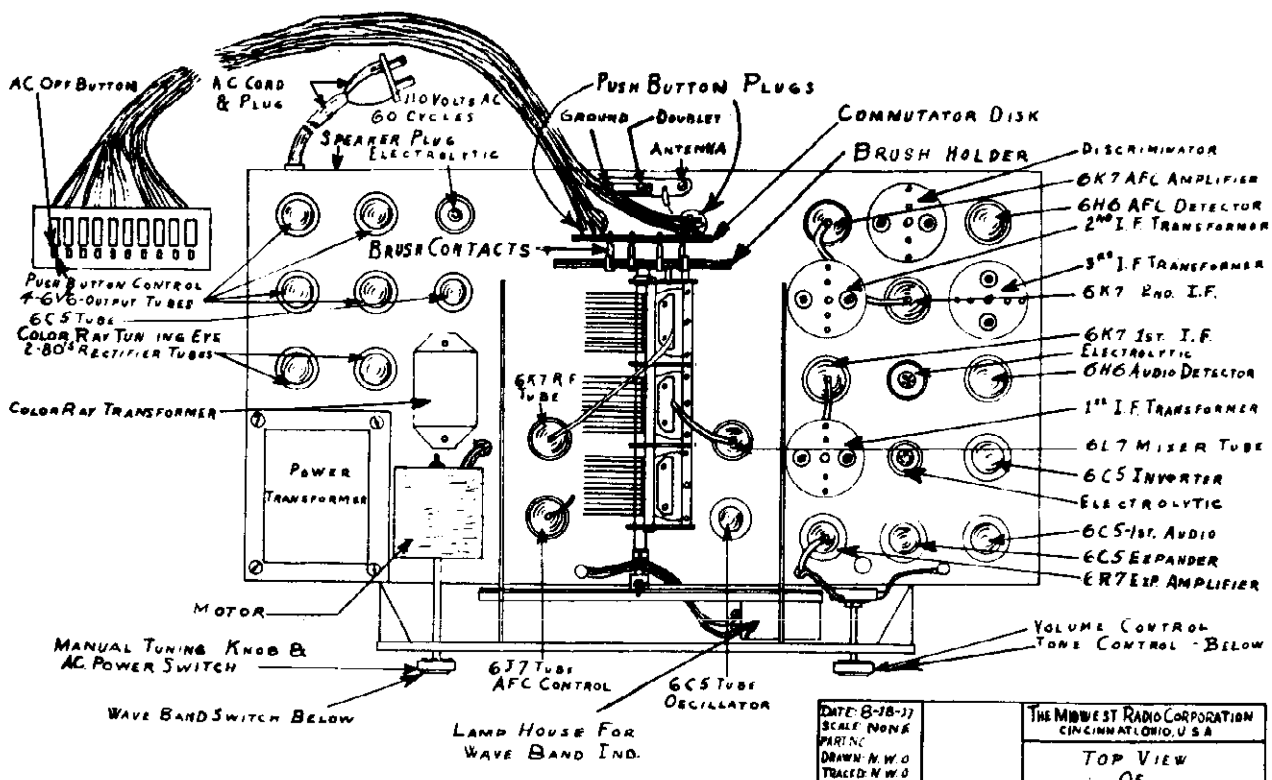
20-38

FOR CHASSIS AND TRIMMERS, SEE INDEX

MODEL 18-38 AC
MODEL 20-38 AC
Socket Layouts

MID-WEST RADIO CORP.





MONTGOMERY-WARD & CO.

Fig. 1—Effect of Lens Focus

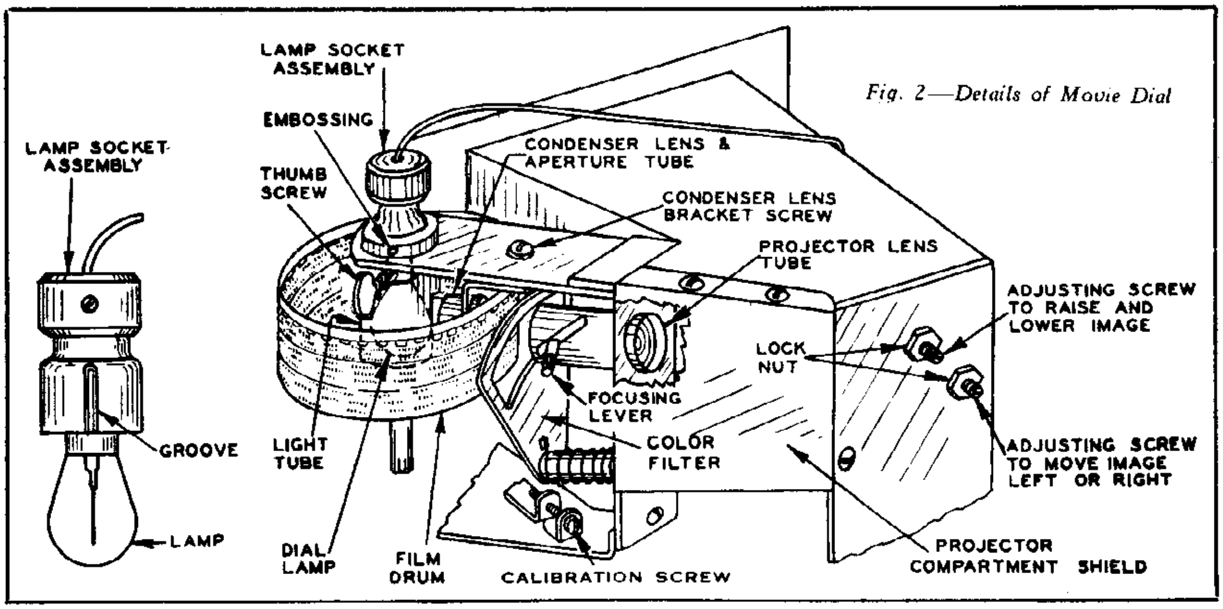


Fig. 2—Details of Movie Dial

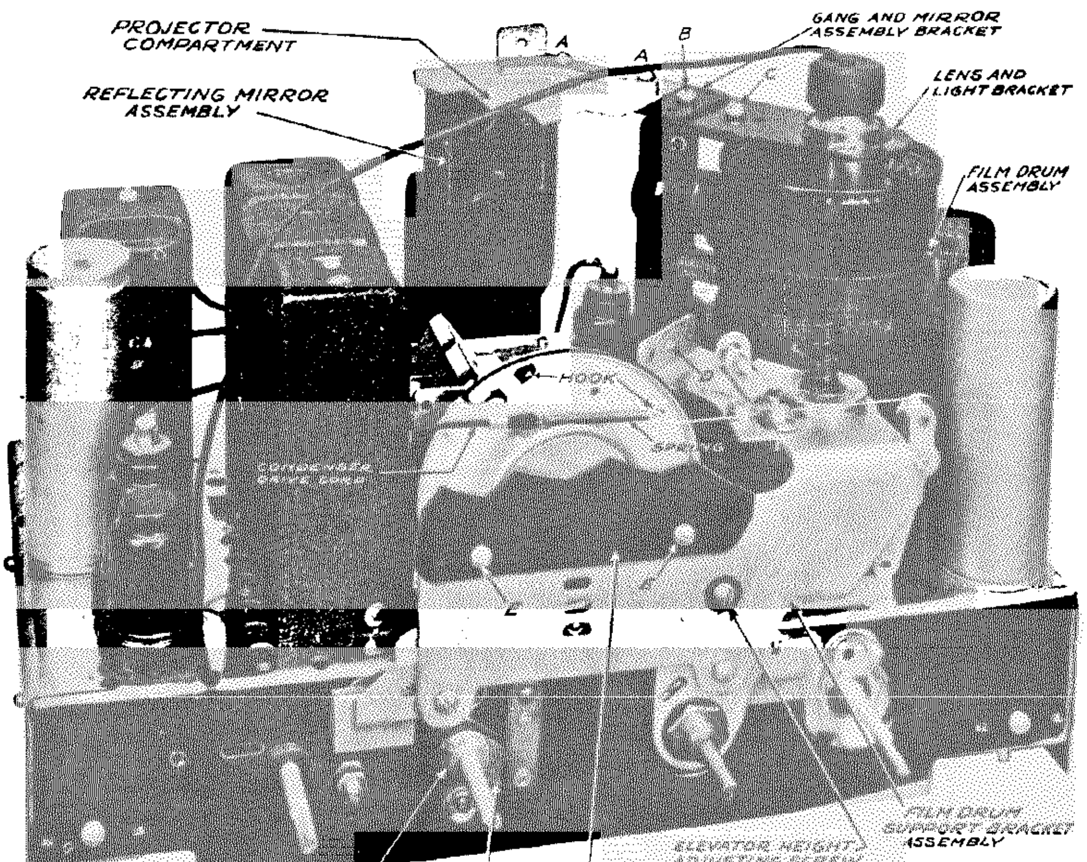


Fig. 4—Movie Dial Chassis

MODEL Movie Dial Drive
Lamp and Takeup Assemblies
Drive Cord Diagram

MONTGOMERY-WARD & CO.

Caution

In all work on the chassis and movie dial, extreme care must be taken not to scratch the film or damage the color filter. The film is easily scratched and should not be touched by the hand or any other object.

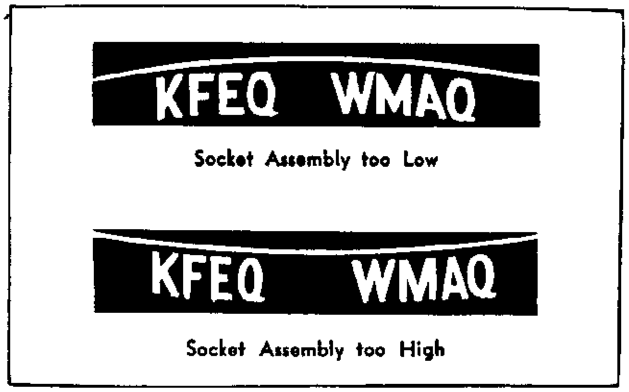


Fig. 5—Effect of Lamp Socket Assembly Height

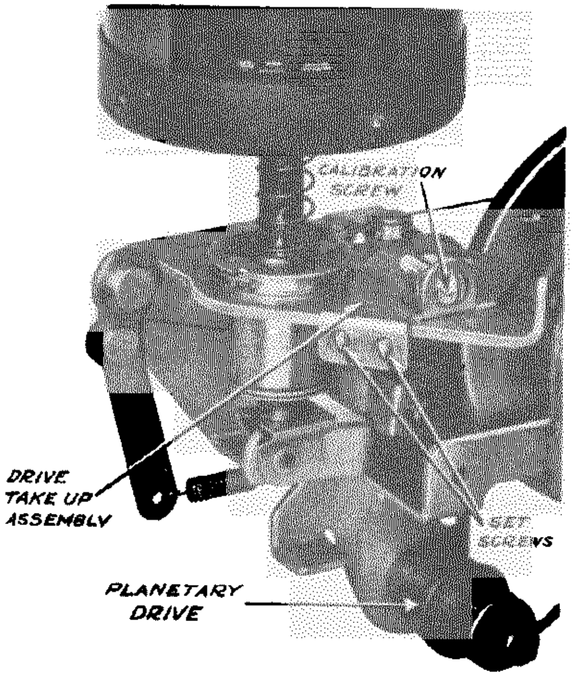


Fig. 3—Drive Takeup Assembly

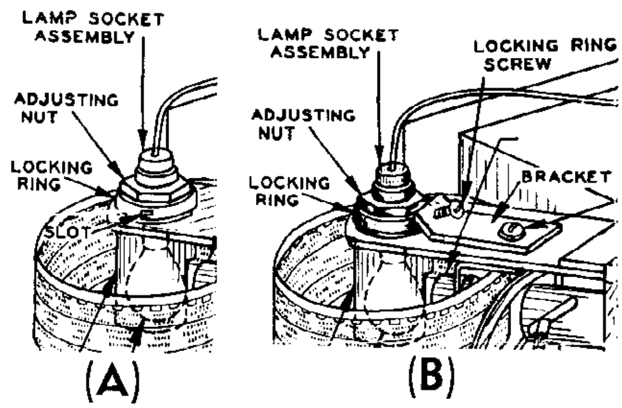


Fig. 6—Early Dial Lamp Assemblies

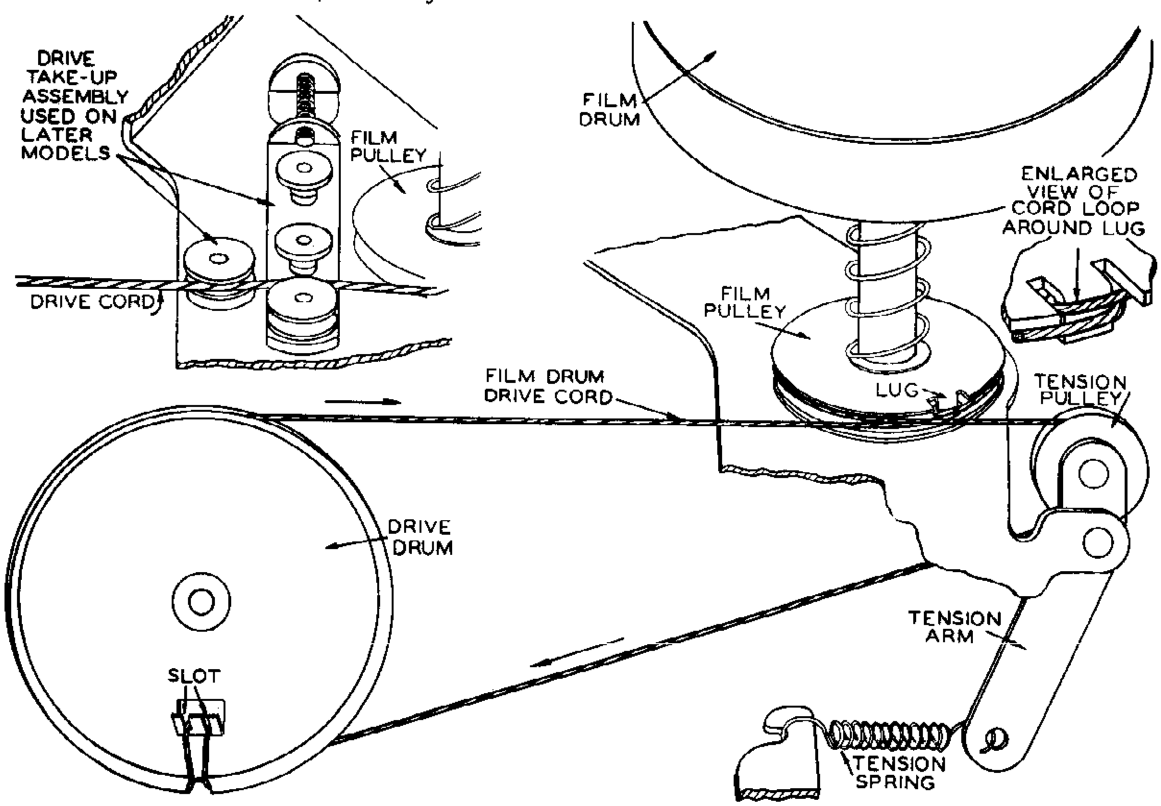


Fig. 7—Replacement of Film Drum Drive Cord

MONTGOMERY-WARD & CO.

Adjustments and Service Data MOVIE DIAL AND DRIVE August, 1936

Bringing Lens Adjustment to a Focus

Important—Turn the band switch to the standard wave position.

Move the focusing lever (see Fig. 2) up or down until the image on the screen is clearest. In Fig. 1 is shown the effect of correct and incorrect focusing. Care should be taken not to touch the color filter.

Adjusting Reflecting Mirror

On the back wall of the projector compartment are two screws as shown in Fig. 2, the purpose of which is to adjust the position of the reflecting mirror vertically and horizontally.

If the raising and lowering adjustment screw (see Fig. 2) is not adjusted properly, the image will be too high or too low on the screen and the kilocycle or megacycle lines will not be horizontal. Also, part of the image may be cut off. If this condition exists loosen the nut which holds this screw in place. Back this nut off about one turn and then carefully turn this screw until the image is centered on the screen and the lines are horizontal. Use a fine blade screwdriver for this adjustment. Retighten the nut.

If the image cannot be centered from top to bottom, it may be necessary to adjust the elevator height in accordance with the article on this subject in this manual.

If the image on the screen is too far to the right, there will be a space at the left of the screen without light. If the image is too far to the left the same condition is true on the right side of the screen. In either case, loosen the nut which holds the left and right adjusting screw in place—see Fig. 2. Back this nut off about one turn and then carefully turn this screw with a fine blade screwdriver until the image is centered. Retighten the nut.

Drive Takeup Assembly

Later models are equipped with a drive takeup assembly illustrated in Fig. 7, by means of which the dial drum can be rotated a slight amount for calibration purposes. The earlier models do not have this adjustment. However, a special unit illustrated in Fig. 3 can be put on.

This unit is assembled to the film drum bracket and drive cord as shown in Fig. 3. Unscrew the two set screws and open the slot to the maximum position by turning the adjusting screw in a counter-clockwise direction. Place the unit in position on the bracket.

Push it as far to the left as possible (from back of chassis) and tighten the two set screws. These will extend beneath the film drum bracket. Then place the drive cord between the two pulleys as shown.

Tighten the calibration screw to secure the required cord tension. When this is done the radio might be out of calibration. If this condition occurs, the film drum may be shifted to the proper position by loosening the two screws inside the drum at the bottom. After these two screws are tightened, a fine calibration adjustment may then be obtained by turning the calibration screw.

Dial Calibration

The radio is properly calibrated if, when a station is correctly tuned in, the vertical red line on the screen crosses the call letters of that station. If the red line is found to be on one side of the call letters of a large number of stations on the standard wave band (the same side in each case), the dial is out of calibration.

To re-calibrate, tune in the signal of one of the larger nearby stations. Choose a station which is near the 1500 KC end of the dial and tune carefully to resonance. Turn the calibration screw (see Fig. 2, 3 or 7) until the vertical red line on the screen is at the center of the call letters of that station.

If the film drum cannot be turned a sufficient amount by means of the calibration screw, loosen the 2 screws at the bottom of the drum which hold it in place. Adjust the position of the drum and tighten the screws. The early models do not have the cord take-up calibration screw mentioned above. These models must be calibrated by loosening the drum screws.

The dial will then be properly calibrated and this adjustment should not be changed unless re-calibration again becomes necessary. It should be remembered that after calibration a few of the stations will be tuned in when the vertical red line is near the end of the call letters and city of a station. That is because of slight variations in the film.

Adjusting Elevator to Raise or Lower Image

Adjust the lamp assembly height until the lines on the screen are straight—see article on this adjustment in this manual.

Turn the upper reflecting mirror adjusting screw—see Fig. 2, until the lines on the screen are horizontal.

Turn the band switch to the second short wave position (green).

Loosen the elevator adjusting screw—see Fig. 4.

Raise and lower the elevator until the megacycle line (at bottom) is between the letters "S" and "T" of the word "West" on the glass at either side of the glass screen.

Tighten the elevator adjusting screw.

Removing Play between Band Switch and Elevator

If the elevator arm stops and the band switch stops do not coincide, there will be a certain amount of play between the band switch and the elevator. When this condition occurs, the position of the image on the screen will not be fixed, but can be moved up or down by turning the band switch knob.

To remedy this condition, first turn the band switch to the second short wave position (green).

Loosen the set screw and square head screw on the band switch shaft collar, see Fig. 4. Turn the band switch shaft clockwise as far as it will go. Push the collar arm clockwise as far as it will go without pulling the elevator arm ball bearing out of the bottom slot.

Then tighten the square head screw and set screw in the elevator arm collar.

Planetary Drive Assembly

The planetary assembly is the unit that is integral with the tuning shaft. It is illustrated in Fig. 3.

If the nut of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect.

If this nut is too loose, the drive will slip in slow speed. The remedy in this case, of course, is to tighten the nut.

Should the condenser drive cord slip when the planetary pulley is turning, inspect the tuning condenser, drive drum and film drum to see if they are turning properly or if they are being obstructed in some way.

If the drive turns unevenly (rough in spots), this may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

Changes in Early Models

Film Drum Base—In the early models a metal film drum base was used. This was replaced in later models with a molded base. The latter type is used in filling orders and is interchangeable with the early type. A clamping plate is now included with the molded base Film Drum Assembly.

Lamp Socket Assembly—Two changes were made in the lamp socket assemblies in the early models The type used with each receiver is illustrated in the instruction book packed with that model. For further information regarding this assembly see the article "Replacing and Positioning the Dial Lamp" in this manual.

Cleaning Light Reflecting and Transmitting Parts

Cleaning the Lenses

It is very seldom necessary to clean the lenses. Occasionally, however, dust or dirt on the lens may cause the image on the screen to be spotted or foggy. If this is the case, the lenses may be removed as explained below and may then be cleaned by wiping carefully with a clean chamois or soft cloth.

Removing Condenser Lens—This lens is inside the film drum as shown in Fig. 2. Turn the band switch to the standard wave position. Take out screw (C) holding the condenser lens bracket in place—see Fig. 4. Turn this bracket in a clockwise direction (from top) and lift it out carefully to avoid scratching the film.

This lens can be cleaned without removal or may be forced out of the tube with a wood block. When the lens is replaced, line up the end of the lens barrel with the edge of the tube.

In replacing the condenser lens bracket, shift this bracket until the end of the condenser lens tube is about ⅛ inch from the dial lamp.

Removing Projector Lens—This lens is inside the projector lens tube as shown in Fig. 2. Turn the band switch to the standard wave position. Take out the three screws which hold the projector compartment shield in place. Then remove the projector compartment shield by tilting the top slightly to the back and toward the right (from back of shield). Move the focusing lever to the highest position. Unscrew and remove this lever.

Push the color filter in a counter-clockwise direction (from front) as far as it will go. Insert a fine blade screwdriver into the projector lens tube (from the front). The blade of the screwdriver should engage the end of the barrel of this lens and push against it until it has been pushed a slight distance toward the projector compartment. CAUTION—Do not let the screwdriver touch the glass. Then insert the screwdriver through the slot in the side of this tube, again engaging the barrel of the lens. Push against the barrel until the lens can be removed by hand from the projector compartment.

Cleaning the Reflecting Mirror, Film, Color Filter and Glass Screen

As in the case of the lenses, it is very seldom necessary to clean the reflecting mirror, film, color filter or glass screen. If, however, the image on the screen is spotted or foggy, it may be necessary to clean these items as explained below.

Reflecting Mirror—The reflecting mirror is located within the projector compartment. Remove the projector compartment shield as described above under "Removing Projector Lens". The glass may then be cleaned without removal of this assembly. Wipe the glass carefully with a clean chamois or soft cloth.

Film—The film may be dusted with a camel hair brush or fine cloth. CAUTION—Extreme care must be taken not to scratch the film.

Color Filter—To clean the color filter, turn the band switch to the second short wave position (green). Clean the filter using a fine cloth or chamois. CAUTION—Extreme care must be taken not to damage the filter.

Glass Screen—If the screen should become dirty, the front may be cleaned by wiping with a clean, dry cloth. If the back of the screen becomes dirty, it should be cleaned with alcohol. Care should be taken not to get any alcohol on the paint on the letters at the sides of the screen, or on the r d line at the front of the screen.

Replacing Parts

Replacing and Positioning the Dial Lamp

Caution—If a new lamp is required, use only the correct lamp as shown in the parts list and on the label on each radio.

These are special lamps and can be purchased only through Wards stores and mail order houses. The life of the lamp is somewhat less than that of a radio tube.

First, turn the radio off.

Loosen the thumb screw and lift the lamp socket assembly out of the light tube—see Fig. 2. This can be lifted vertically by grasping the insulated top of the assembly through which the wire runs.

Remove the old lamp from the socket and put in the new one.

Replace the lamp socket assembly in the light tube with the light tube embossing in the groove of the lamp socket assembly—see Fig. 2. **Do not tighten** the thumb screw yet.

Turn the radio on.

Then grasp the top of the lamp socket assembly and move it up or down until the image on the screen is clearest and the lines are horizontal. The effect of having the lamp assembly too high or low is shown in Fig. 5. Tighten the thumb screw.

Early Types—There were two earlier types of lamp socket assemblies.

In the assembly shown in Fig. 6(A) the procedure differs from the above as follows:

To remove the socket assembly from the light tube, grasp the locking ring and turn it in a counterclockwise direction until the pins are at the vertical portion of the slots. Then lift it out.

When replacing the lamp socket assembly in the light tube, line up the slots in the locking ring over the pins at the top of the light tube. Push the locking ring down and turn it clockwise until the pins move as far as possible into the horizontal portion of the slot—See Fig. 6(A).

To make the image on the screen clear and the lines horizontal, turn the adjusting nut. This moves the lamp assembly up or down depending on the direction of rotation.

In the assembly shown in Fig. 6(B), the procedure differs from that used in the (A) type as follows:

To remove the lamp socket assembly, unscrew the locking ring screw until it is free of the locking ring. Then pry the locking ring upward with a screw driver and lift the assembly out of the light tube.

When replacing the assembly in the light tube, line up one of the holes in the locking ring with the screw in the bracket. Push the locking ring down on the light tube and tighten the locking ring screw until it enters the hole in the locking ring.

Turn the adjusting nut as explained for the type (A) assembly. If the adjusting nut turns hard grasp the black insulated top of the assembly and lift upward slightly until the nut turns freely.

Important—Latest type used for parts orders. In filling orders for this assembly the latest type, illustrated in the parts list, is shipped. This is interchangeable with all early types.

The early types of lamp socket and light tube did not have the groove and embossing illustrated in Fig. 2. When one of the latest type of socket assembly is used in these models, it will be necessary to turn the assembly until the filament is at right angles to the lens.

Replacing the Film Drum Assembly

Remove the lamp socket assembly from the light tube by lifting it out in accordance with instructions in "Replacing and Positioning the Dial Lamp".

Remove the projector compartment shield by taking out the three screws which hold it in place—See Fig. 2.

Take out the two screws (B and D) which hold the lens and light bracket in place—See Fig. 4. Now remove the lens and light bracket taking care not to scratch the inside of the film.

Remove the film drum assembly by unscrewing the two small screws located inside the drum at the bottom.

Mount the new film drum assembly on the film drum supports leaving the paper around the film for protection, and insert the clamping plate within the film drum. The film drum and clamping plate should then be so placed that the small screws are in the center of the two slots.

Replace the lens and light bracket taking care not to scratch the inside of the film.

Replace the projector compartment shield and dial lamp assembly.

Now remove the paper from the film, turn the radio on and calibrate the dial in accordance with the instructions in the article "Dial Calibration".

The film and mounting drum are sold as one assembly and cannot be ordered separately.

Replacing the Glass Screen

Loosen the screws holding the glass screen clamps on each side of the screen. Loosen these only enough to enable the glass screen to be removed by lifting it out from the top.

Mount the new screen from the top being very careful not to touch the back of the screen, as touching the screen will leave fingerprints on the roughened or ground portion.

Push the glass screen down until it rests on the shelves provided for it.

Tighten the four screws holding the screen clamps just enough so that the glass is held firmly in place.

Replacing Film Drum Drive Cord

Remove the projector compartment and glass screen assembly together. To do this, take out the 2 screws (A) see Fig. 4, at the back of the top of the projector compartment, the 2 screws (E) at the bottom of the glass screen bracket, and the 2 brass collars from the volume control and tone control shafts.

Disconnect the tension spring from the arm at the right side of drive mechanism—see Fig. 7.

Remove the old cord by unsoldering it from the small lug on the film pulley. Clean the excess solder off of this lug. With a narrow blade screwdriver carefully bend this lug out toward the vertical position, a slight amount.

Turn the tuning shaft until the condenser plates are completely in mesh.

Turn the film drum so that the lug on the film pulley is in the position shown in Fig. 7. This is important.

Insert the new drive cord in the left slot in the drive drum (from front) and wind the cord in a clockwise direction one half turn around the drive drum.

Continue the cord horizontally to the lug on the film pulley. Loop the cord around this lug in the manner shown in Fig. 7.

Wind the cord on the film pulley one turn counter-clockwise, being sure that the end coming from the pulley passes over the cord from the drive drum.

Bring the cord over the brass tension pulley and back again to the left. Insert the end in the right slot in the drive drum.

Replace tension spring and reassemble projector compartment, glass screen and collars to the chassis.

Set the signal generator to 600 KC and carefully tune in the signal. Adjust the position of the film drum in accordance with the article "Dial Calibration" in this manual until the 600 KC mark on the dial is at the red line on the screen. **Do not touch the film with the fingers.**

When the above adjustments have been made, carefully bend the lug on the film pulley down over the cord and solder, being sure that the upper cord leaving the pulley receives no solder.

Replacing Condenser Drive Cord

Remove the projector compartment and glass screen assembly together. To do this, take out the 2 screws (A) see Fig. 4, at the back of the top of the projector compartment, the 2 screws (E) at the bottom of the glass screen bracket and the 2 brass collars from the volume control and tone control shafts.

Turn the drive drum until it is in the position shown in Fig. 4.

Place the loop at the end of the drive cord (without the spring) over the small hook nearest the cut out part of the drive drum.

Now turn the chassis on its back. Bring the cord down over the right side (from front) of the drive drum and over the planetary drive pulley, keeping the cord in the groove provided for it. Bring the drive cord up over the left side (from front) of the drive drum to the cut out part of the drum. While holding the cord in place, return the chassis to normal position.

Then bring the cord in toward the inside of the drum, attaching the tension spring to the small hook provided for it.

Reassemble the projector compartment, glass screen and collars to the chassis.

Replacing the Color Filter Semaphore

Push the focusing lever up as far as it will go.

Cut a strip of paper the width of the film drum assembly and place this around the film holding it on with a string wound around the drum. This will protect the film from being scratched on the outside.

Remove the projector compartment shield by taking out the three screws which hold it in place—See Fig. 2.

Remove the lens and light bracket by taking out screws (B and D) which hold it in place—See Fig. 4. Care must be taken not to scratch the inside of the film when removing this bracket.

Remove the horseshoe washer from the stud holding the color filter semaphore in place. Then take off the color filter semaphore.

Take the spring off of the old assembly. Put this spring on the new assembly, the straight end of the spring being placed under the small clip provided for it on the color filter semaphore.

Now replace the color filter semaphore on the stud on which it mounts. Put on the horseshoe washer, pinching the open ends together. The free end of the spring should catch the edge of the lens and light bracket.

Next turn the color filter one complete turn in a counter-clockwise direction (from front) to provide tension on the spring.

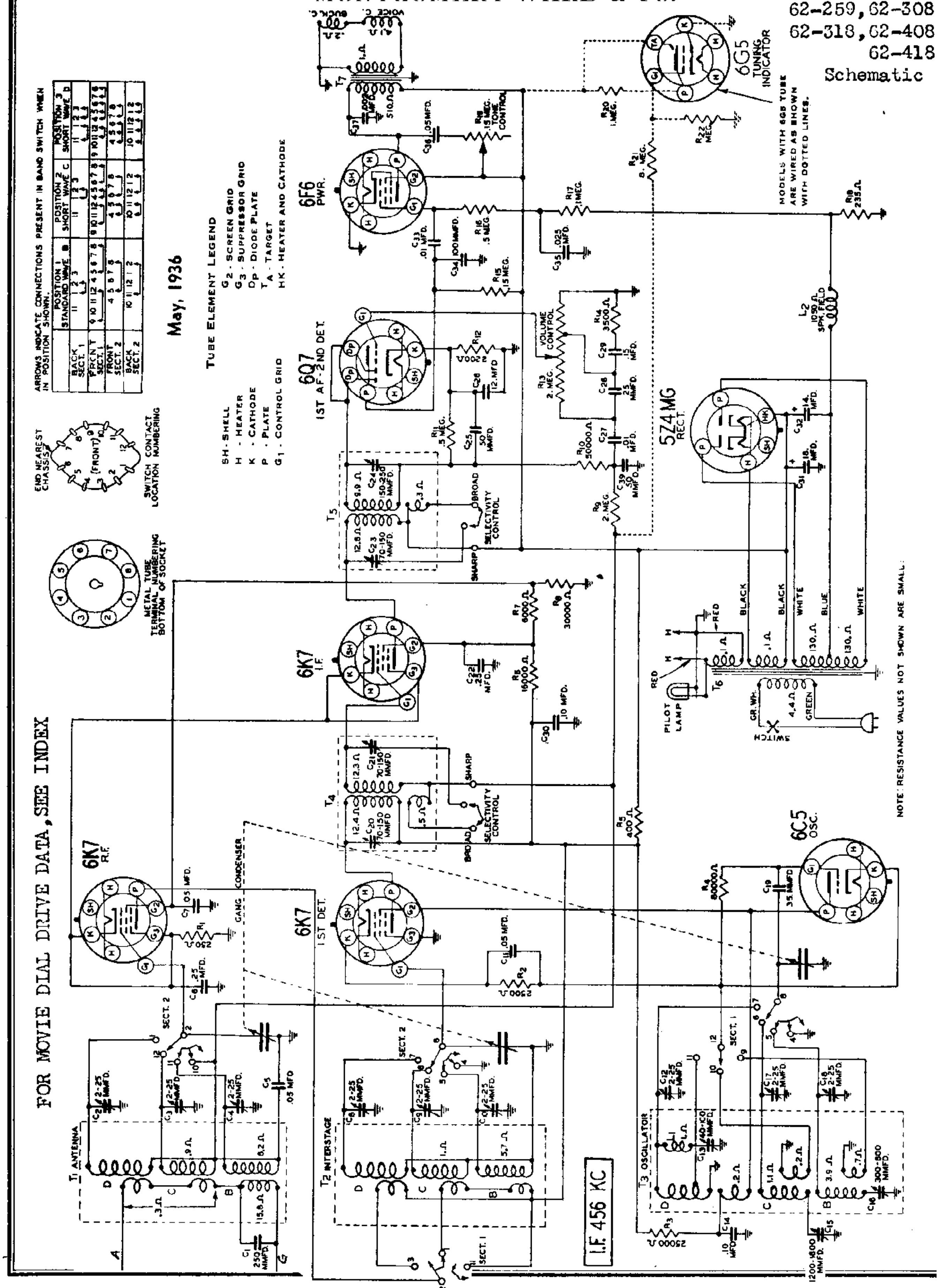
Holding the semaphore in this position, replace the entire assembly with the semaphore stop placed under the film drum. (drum in second short wave or highest position). Care must be taken not to scratch the inside of the film when replacing the lens and light bracket assembly.

Now replace the projector compartment shield and remove the paper from around the film.

Turn the radio on and bring the letters on the screen into proper focus by means of the focusing lever—See Fig. 2. The effects of incorrect focusing are shown in Fig. 1.

MONTGOMERY-WARD & CO.

MODELS 62-226, 62-228
62-259, 62-308
62-318, 62-408
62-418
Schematic



MODELS 62-226, 62-228, 62-259, 62-308, 62-318, 62-408, 62-418

MONTGOMERY-WARD & CO.

Trimmers, Voltage, Socket, Coils, Sensitivity, Phono Data

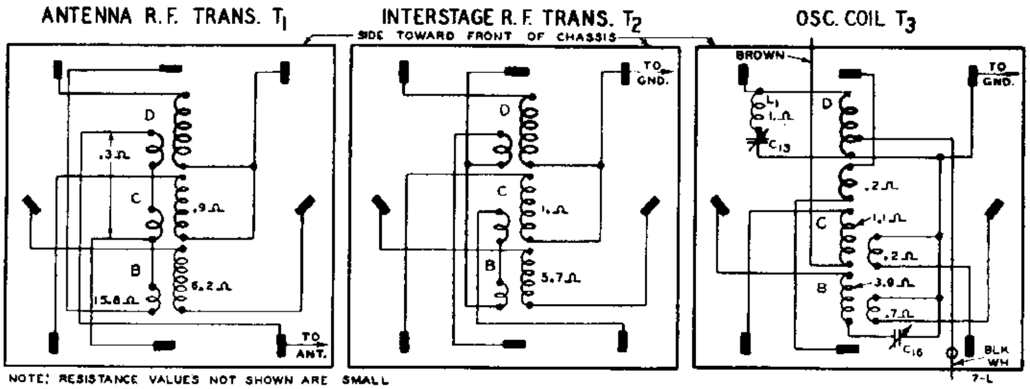


Fig. 4—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

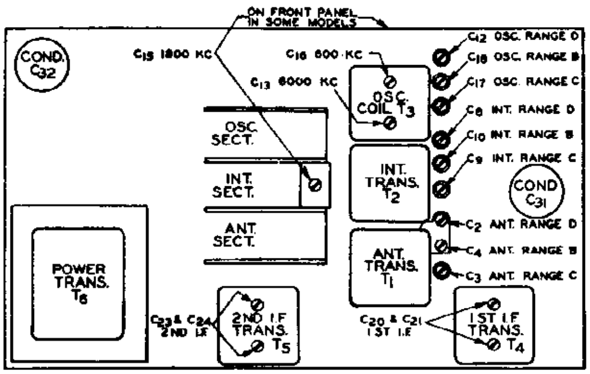


Fig. 3—Location of Trimmers

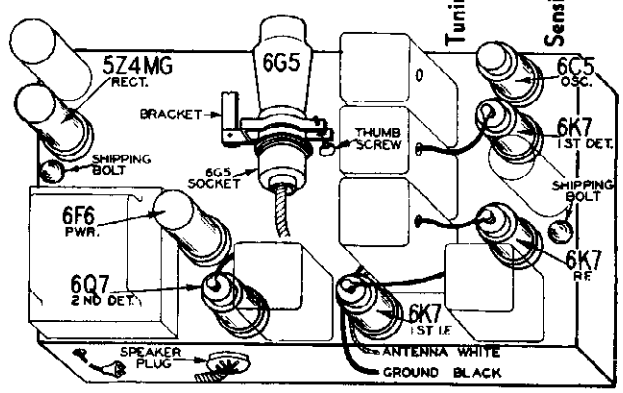


Fig. 6—Location of Tubes

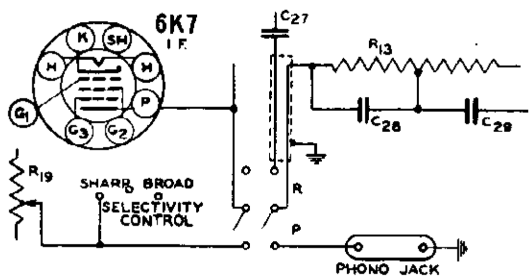


Fig. 7—Phonograph Connections

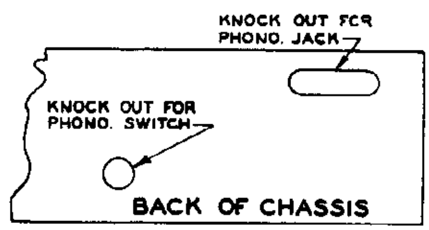


Fig. 8—Location of Phono Knockouts

Tuning Frequency Range
B Range ..... 528 to 1730 KC.
C Range ..... 1710 to 5800 KC.
D Range ..... 5750 to 18300 KC.

Sensitivity
B Range ..... 0.5 to 2 Microvolts Absolute
C Range ..... 0.5 to 2 Microvolts Absolute
D Range ..... 1.0 to 4 Microvolts Absolute

Speaker ..... 8" and 10" Dynamic

Line Voltage: 115
Volume Control: Maximum

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	RF	0	6.1(1)	260	100	4.0	....	6.1(1)	4.0
6K7	1st Det.	0	6.1(1)	260	118	0	....	6.1(1)	9.0
6C5	Osc.	0	6.1(1)	120	...	0	....	6.1(1)	0
6K7	I F.	0	6.1(1)	260	138	4.0	....	6.1(1)	4.0
6Q7	1st A.F.—2nd Det.	0	6.1(1)	105	0	0	....	6.1(1)	1.4
6F6	Power Amp.	0	6.1(1)	238	260	18	....	6.1(1)	0
5Z4MG	Rect.	0	4.9(2)	...	680(3)	...	680(3)	....	4.9(2)

TUBE	FUNCTION	Plate to Ground	Target to Ground	Cathode to Ground	Across Heater
6E5	Tuning Indicator	30(4)	270	0	6.1 A.C.

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) A.C. voltage as read across heater terminals 2 and 8.
(3) A.C. voltage as read across terminals 4 and 6.
(4) As read with 500,000 ohm meter.

Power Consumption ..... 85 Watts (At 115 volts 60 cycles)
Power Output ..... 3 Watts Undistorted
Selectivity ..... 28 KC Broad at 1000 times Signal (Sharp)
Intermediate Frequency ..... 456 KC.

MONTGOMERY-WARD & CO.

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch —See Fig 5.

The phono switch must be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. Unsolder the .01 mf. condenser C27 from the volume control.

Strip about 2¾ inches of the shielding from each end of the cable furnished with the phono attachment parts. Connect one lead of the cable to the terminal on the volume control from which condenser C27 was removed. The other end of this lead is connected to the phono switch as shown in Fig. 7. The second cable lead is connected to the open end of condenser C27. Then connect the other end of this lead to the phono switch as shown in Fig. 7. Both of the shielded cable leads connected to the phono switch are connected to the switch terminals nearest the chassis base. Before connecting the cable leads to the phono switch, it will be necessary to slip a piece of varnished tubing over the portion of the cable that passes near the 6K7 1st I.F. tube socket.

Now ground the shielding by soldering it to the lugs on the chassis base. One of these lugs is located just below the planetary drive; the other is near the rear mounting foot of the gang condenser.

Complete the other connections as illustrated in Fig. 7. The lead between the tone control and the .05 mf. tubular condenser C36 mounted on the back of the chassis base, should be covered with a piece of varnished tubing.

The tin plate shield is soldered to the tone control mounting bracket in such a way that when it is bent down toward the bottom and back of the chassis it will shield the lower leads of the phono switch and the lead between the tone control and tubular condenser C36.

After making the phono connections, the I.F. stages should be realigned

Alignment and Calibration

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and *all* subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C18) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C10) and antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 600 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band).

Adjust the oscillator Range C trimmer (C17) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C9) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 1800 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band).

Adjust the oscillator Range D trimmer (C12) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C8) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Drive Assembly

This model uses a two-speed planetary drive.

All of the early sets are equipped with a flat belt and may be identified by the ¼ inch wide belt. The later sets use the same type of drive, but have a black cord belt. This is a bronze cable with a black fabric covering. It is about ⅙ inch in diameter.

The belt type also has an idler pulley which the cord type does not have.

The planetary assembly is the unit that is integral with the tuning shaft. It is at the bottom of the belt. If the nut of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect. If the nut is too loose, the drive will slip in slow speed. The remedy in this case is, of course, to tighten up the nut.

Should the drive belt slip when the planetary pulley is turning, first inspect the drive drum assembly. This is the assembly which is mounted on the tuning condenser shaft. If this assembly and the tuning condenser rotor turn satisfactorily, the belt is probably too loose and a new one will be required. In the sets with the flat belt type of drive, there is an idler pulley which can be positioned, and by means of which the belt tension can be increased. In this type, therefore, the belt tension should be increased before attempting to put on a new one.

The replacement parts list shows the parts used in each type of drive and the parts common to both types.

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 2. In contact locations not used, the number applying to that particular location is not employed.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Voltage Chart

The voltage readings are taken with a voltmeter having a resistance of 1000 ohms per volt.

The standard metal tube socket terminal numbering system (bottom of socket) is shown in Fig. 5. On the schematic circuit diagram, Fig. 2 is a list giving the complete names of the tube elements and the corresponding symbols as used on the sockets on the schematic.

MODEL 62-236
Voltage, Coils
Panel Mtg. Kits

MONTGOMERY-WARD & CO.

Instrument Panel Mounting Kits

Car	Year & Model	Panel Kit No.
Buick	1936	21A16
Cadillac	1936	21A39
Chevrolet	1936-35 Standard & Master	21A11
Chrysler	1936 Six	21A19
	1936 Eight	21A30
	1936 Airflow	21A31
	1935-34 Except Imperial	21A47
DeSoto	1936 Airflow & Airstream Custom	21A22
	1936 Airstream DeLuxe	21A26
	1935 DeLuxe	21A46
	1934	21A47
Dodge	1936 DeLuxe	21A13
	1935	21A45
	1934	21A49
Ford	1936 Standard & DeLuxe	21A10
	1935 DeLuxe	21A10
	1935 Standard	21A32
	1934	21A38
Hudson	1936	21A17
	1935	21A48
	1934	21A35
Lafayette	1936-35	21A50
LaSalle	1936	21A40
Lincoln	Zephyr 1936	21A10
Nash	1936-35	21A36
Oldsmobile	1936	21A14
	1935	21A34
Packard	1936 120-B	21A21
	1935 120	21A41
Plymouth	1936 DeLuxe	21A12
	1936-35 Standard	21A37
	1935 DeLuxe	21A33
	1934	21A49
Pontiac	1936-35 Standard, DeLuxe 6 & 8	21A15
Studebaker	1936 Dictator	21A20
	1936 President	21A24
Terraplane	1936	21A18
	1935	21A48
	1934	21A35
Steering column and under panel kit		21A23

The mounting kit includes escutcheon plate, dial crystal, knobs, special mounting brackets and small items such as screws. The other items are shipped with the radio.

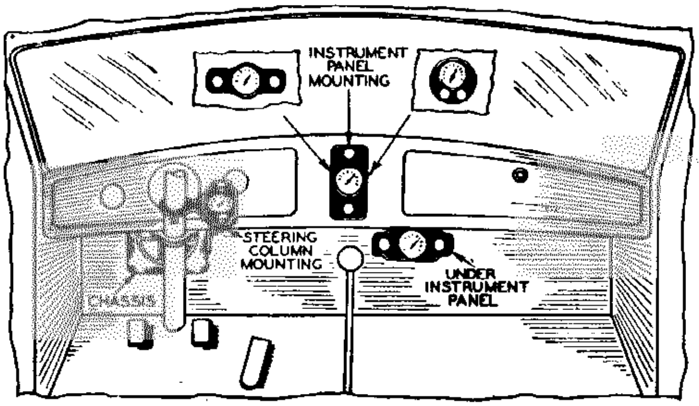


Fig. 6—Various Control Head Mountings

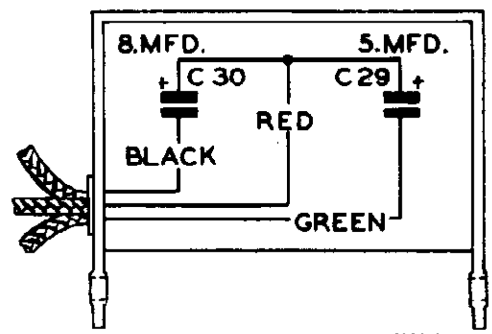


Fig. 5—Condenser Block—Internal Wiring

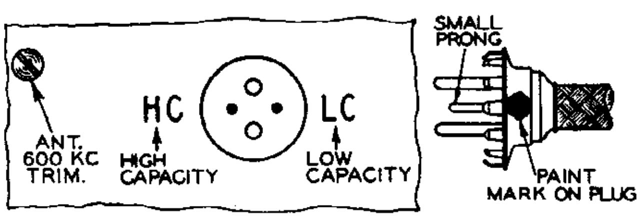


Fig. 3—Antenna Plug Insertion

Antenna Disconnected		Battery 6 Volts Under Load			
Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground
6D6	R.F.	6	233	103	4.0
6C6	1st Det. & Osc.	6	233	103	
6D6	I.F.	6	233	103	4.0
75	2nd Det.	6	130		
41	Power	6	215	233	16.0(1)
84	Rectifier	6	560(2)		

(1) Grid bias read across filter choke L6
(2) Plate to Plate A.C. voltage

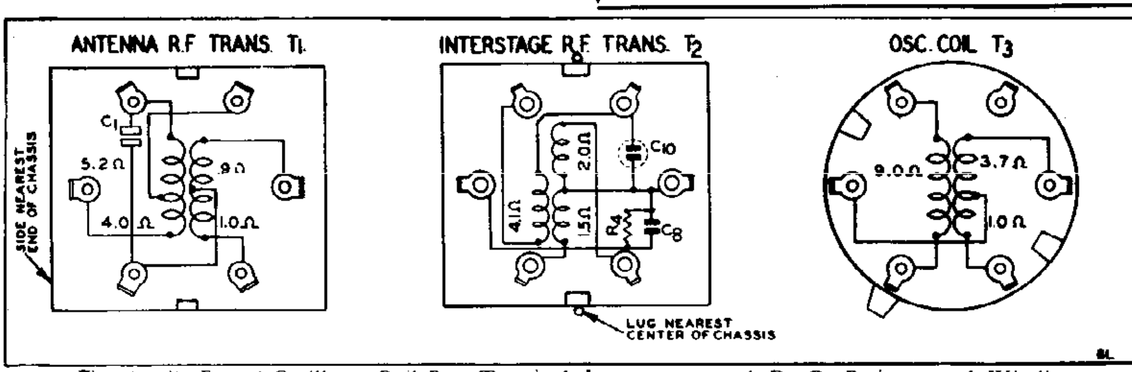
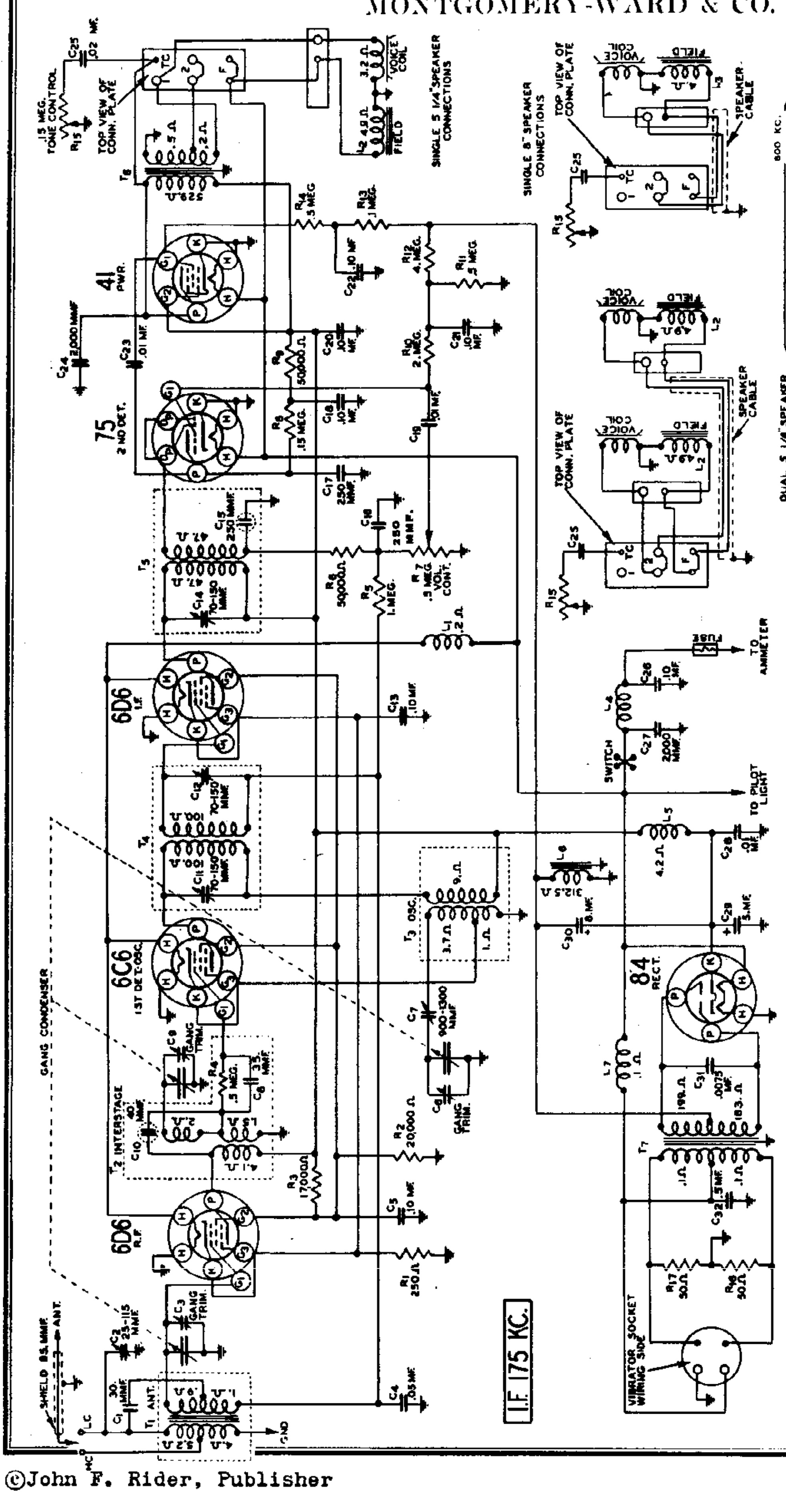


Fig. 4—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

MODEL 62-236
Schematic, Socket
Trimmers

MONTGOMERY-WARD & CO.



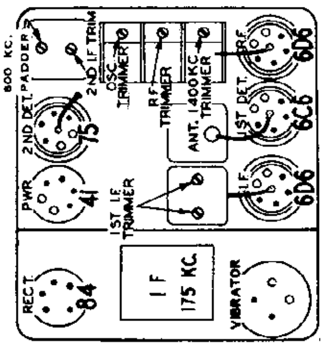


Fig. 2—Location of Tubes and Vibrator

CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.

SPECIFICATIONS

Power Consumption - - 7.0 Amperes at 6.0 Volts
Power Output - - - - 3 Watts Undistorted
Sensitivity - - - - - 1.0 Microvolt Absolute
Selectivity - - 45 KC Broad at 1000 Times Signal
Tuning Frequency Range - - - - 530 to 1575 KC
Intermediate Frequency - - - - - 175 KC
Speaker - - - - - - - - - 5 1/4 inch Dynamic

June 1936

MONTGOMERY-WARD & CO.

Alignment and Calibration

Misalignment of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the standard wave band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide accurately calibrated signals over the standard wave band and at the intermediate frequency, and an output meter are required for indicating the effect of adjustments.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the output of the signal generator through a .05 mf. condenser to the stator of the R. F. interstage section of the tuning condenser. (See Fig. 2 for location of this section.)

Connect the ground lead of the signal generator to the chassis ground.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers is shown in Fig. 2.

1575 KC Adjustment

Set the signal generator for 1575 KC.

Turn the rotor of the tuning condenser to the full open position.

If a low capacity antenna is used, connect the shielded antenna lead from the chassis through a 150 mmf. condenser to the antenna post of the signal generator. (If high capacity, use 1500 mmf.)

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—see Fig. 2 for location of this trimmer.

1400 KC Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the R.F. interstage and antenna 1400 KC trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Connect the output of the signal generator through a .05 mf. condenser to the control grid of the 6D6 R.F. tube.

Turn the tuning condenser rotor until maximum output is obtained. Then turn the tuning condenser rotor back and forth, at the same time adjusting the 600 KC padder (see Fig. 2) until the peak of greatest intensity is obtained.

Re-connect the output of the signal generator to the shielded antenna lead through a 150 mmf. condenser (1500 mmf. if antenna is high capacity).

Adjust the 600 KC antenna trimmer to maximum. This trimmer is reached from the outside of the case —see Fig. 3.

Adjusting Antenna 600 KC Trimmer

After the receiver is installed and the car antenna is connected, it will be necessary to adjust the antenna trimmer. Tune in a weak signal at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained. See Fig. 3 for location of this trimmer

Calibrating the Receiver

To calibrate the receiver, tune in a station of known frequency. At the back of the control head is the calibration screw. Remove the pilot lamp assembly. Insert a fine blade screwdriver and turn this screw until the pointer on the dial scale is at the frequency of the station being received. The knob must be held during this adjustment.

If the control head is inaccessible it may be calibrated by setting the pointer from the front. Remove the crystal by inserting a knife blade under the lower edge. Loosen the pointer screw, set the pointer and retighten.

General Service Data

Roof Speaker

The Ford and General Motors 1936 automobiles have provision for mounting a speaker in the car roof (Ford 5¼ inch speaker, General Motors 5¼ or 8 inch speaker). This model is so designed that roof speaker installations in those cars can readily be made.

There are three general types of speaker installation. In the first type of installation the single 5¼ inch speaker attached to the chassis cover is used. In the second type of installation a single 5¼ inch or 8 inch roof speaker is used. The third type of installation is the dual speaker mounting using two 5¼ inch speakers, one in the car roof and the other on the chassis cover. (The 8 inch and 5¼ inch speakers cannot be used together).

The electrical connections of the different speaker installations are shown in the schematic—Fig. 1. Complete information regarding the method of making the installations and the kits of parts required are in the installation manual packed with each radio.

Control Head Mounting

This auto radio is supplied with a new type of control head known as the No. 4 Universal. This head in conjunction with suitable escutcheon plates and mounting brackets can be mounted in the instrument panel of practically all widely sold 1936 automobiles. In the case of 1935 and earlier cars, it can be mounted in the instrument panel, under the panel or on the steering column.

The escutcheon plate, dial crystal, special mounting brackets and knobs for the various cars are put up in kit form.

The control head, volume control fitting, flexible shafts, pilot lamp assembly, dial scale and pointer are packed with each radio.

In Fig. 6 are shown the various locations at which the control head is mounted. The head is intended for installation primarily in the instrument panel of the car. Most 1936 and many 1935 cars have a name plate or ash receiver on the instrument panel, the removal of which permits installation of the radio control head. Complete installation data is contained in the instruction booklet packed with each radio.

Installation and Noise Suppression

The necessary information for installing this receiver and for suppression of ignition and generator noise is contained in the Installation Manual which is packed with each receiver.

Be sure that the cover is well grounded to the chassis case—clean off paint or particles of dirt which may prevent a good ground.

Voltages at Sockets

In the voltage chart are given the voltages at the sockets with all tubes in and the set in operating condition. The antenna should be disconnected.

The voltages can be read with the chassis in the case, by means of an analyzer plug.

If the chassis unit is taken out of the case all of the socket terminals can easily be reached under the

Circuit

This model is a 6 tube automobile radio covering the standard wave band. It has a tuning range as shown in the specifications above. The signal is fed through an antenna transformer with tuned secondary into a 6D6 tube which functions as an R.F. amplifier. A tapped connection is provided in the primary of the antenna transformer for installations in cars in which a high capacity antenna is used.

The output of the R.F. tube is fed through another R. F. transformer with tuned secondary into a 6C6 tube which functions as the first detector and oscillator. The oscillating circuit is tuned by the oscillator section of the gang condenser and is always resonant at a frequency 175 KC above the frequency to which the R.F. circuits are tuned.

One stage of I.F. amplification is employed using a 6D6 tube. The primary and secondary of the first I.F. transformer and the primary of the second I.F. transformer are tuned by small trimmer condensers.

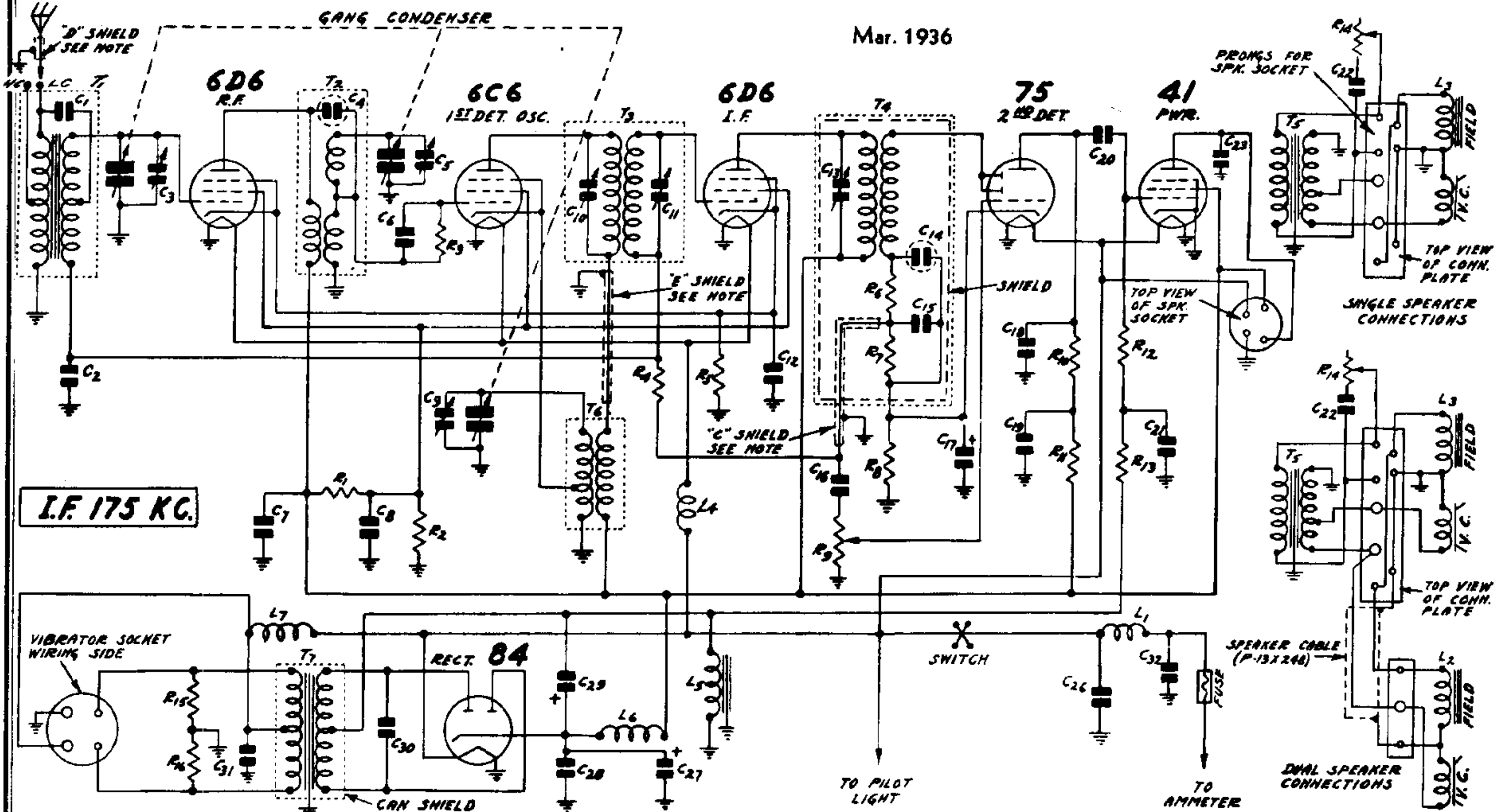
A 75 dual diode-triode tube functions as a diode 2nd detector, AVC tube and a one stage audio amplifier. AVC voltage is applied to the control grid circuits of the 6D6 R.F. and I.F. tubes. The manual volume control varies the audio voltage applied to the grid of the 75 tube.

In the output stage a 41 tube is employed. A dynamic reproducer is used. Provision is made for a single roof speaker and dual speaker (chassis and roof) connections. The electrical connections for the different speaker installations are shown in the schematic. For the single 8 inch or dual 5¼ inch speakers, the tapped connection of the output transformer secondary is used.

The vibrator in the power unit interrupts the current through the primary of the power transformer. The use of a vibrating interrupter in the primary circuit and a high ratio transformer results in the application of high voltage AC to the rectifier tube plates. The 84 full wave rectifier tube, filter choke and filter condensers convert this high voltage AC into high voltage DC for the plate and screen circuits.

MONTGOMERY-WARD & CO.

Mar. 1936



GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.
THE CAPACITY OF "C" SHIELD IS 37 MMF, THE CAPACITY OF "D" SHIELD IS 85 MMF AND THE CAPACITY OF "E" SHIELD IS 15 MMF.

C 1 10 mmf.
C 2 .05 mf. 180 V.
C 3 Gang Trimmer
C 4 40 mmf.
C 5 Gang Trimmer
C 6 35 mmf.
C 7 .10 mf. 360 V.
C 8 .10 mf. 180 V.
C 9 Gang Trimmer
C10 70-150 mmf. } Dual

C12 .10 mf. 180 V.
C13 70-150 mmf.
C14 250 mmf.
C15 250 mmf.
C16 .01 mf. 360 V.
C18 250 mmf.
C19 .10 mf. 360 V.
C20 .01 mf. 360 V.

C22 .02 mf. 600 V.
C23 .002 mf. 600 V.
C26 2000 mmf.
C28 2000 mmf.
C30 .0075 mf. 1600 V.
C31 .50 mf. 180 V.
C32 2000 mmf.
C17 4.0 mf. 25 V. } Electrolytic
C27 5.0 mf. 350 V.

R 1 17000 ohm 1.0 W.
R 2 20000 ohm .5 W.
R 3 .50 Megohm .2 W.
R 4 1.0 Megohm .2 W.
R 5 350 ohm .2 W.
R 6 50000 ohm .2 W.
R 7 500000 ohm .2 W.
R 8 6000 ohm .2 W.
R 9 2.0 Megohm Vol. Control
R10 150000 ohm .2 W.

R12 .50 Megohm .2 W.
R13 100000 ohm .2 W.
R14 150000 ohm Tone Control
R15 50 ohm .5 W.
R16 50 ohm .5 W.

T 1 Antenna Trans.
T 2 R.F. Inter. Trans.
T 3 1st I.F. Trans.
T 4 2nd I.F. Trans.

T 6 Osc. Inductor
T 7 Power Trans.

L 1 Motor Noise Reactor
L 2 Speaker Field 4.9 ohm
L 3 Speaker Field 5.3 ohm
L 4 Filament Reactor
L 5 Filter Reactor
L 6 "B" Reactor

MODEL 62-242
Resistance, Coils
Voltage, Socket, Trimmers

MONTGOMERY-WARD & CO.

Power Consumption - - 7.0 Amperes at 6.0 Volts
Power Output - - - - - 3 Watts Undistorted
Sensitivity - - - - - 1.0 Microvolt Absolute
Selectivity - - 45 KC Broad at 1000 Times Signal

Tuning Frequency Range - - - 530 to 1650 KC
Intermediate Frequency - - - - - - 175 KC
Speaker - - - - - - - - - - 6 inch Dynamic

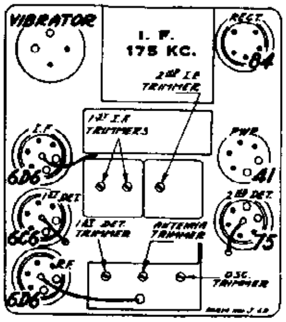


Fig. 2—Location of Tubes and Trimmers

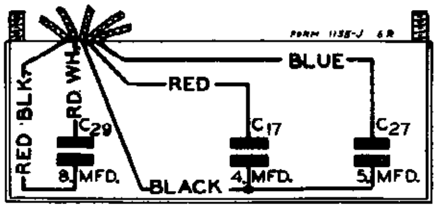


Fig. 4—Condenser Block—Internal Wiring

6 Tube Automobile Radio

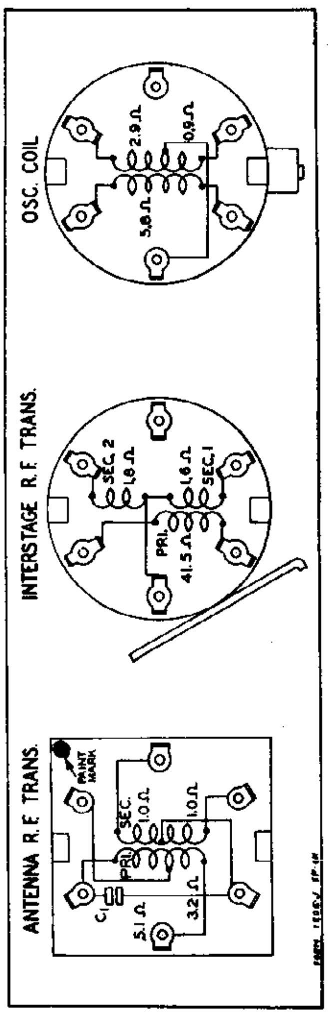


Fig. 3—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Code	Winding	D. C. Resistance in Ohms
T1	Antenna Transformer	
	Primary Winding	
	Long Portion	5.1
	Short Portion	3.2
	Secondary Winding—Either Portion	1.0
T2	Interstage Transformer	
	Primary Winding	41.5
	Secondary Winding	
	No. 1	1.6
	No. 2	1.8
T3	1st I. F. Transformer	
	Primary Winding	88.0
	Secondary Winding	87.0
T4	2nd I. F. Transformer	
	Primary Winding	43.0
	Secondary Winding	48.2

Code	Winding	D. C. Resistance in Ohms
	Dynamic Speaker	
T5	Output Transformer	
	Primary	416.6
	Secondary	Small
L3	Speaker Field	5.3
	Speaker Voice Coil	Small
T6	Oscillator Coils	
	Grid Coil	
	Long Portion	2.9
	Short Portion	0.9
	Plate Coil	5.8
T7	Power Transformer	
	Primary Winding	
	Center Tap to Inside	Small
	Center Tap to Outside	Small
	Secondary Winding	
	Center Tap to Inside	200.0
	Center Tap to Outside	200.0
L1	Motor Noise Reactor	Small
L4	Filament Reactor	.22
L5	Filter Choke	300.0
L6	R. F. "B" Plate Reactor	4.0
L7	Vibrator Filter Reactor	Small

VOLTAGES AT SOCKETS

Antenna Disconnected Battery 6 Volts Under Load

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground	Cathode Current M. A.
6D6	R. F. Amp.	5.6	245	105	5.2	7.5
6C6	1st Det. Osc.	5.6	245	105	0	2.9
6D6	I. F. Amp.	5.6	245	105	5.2	7.5
75	2nd Det.	5.8	120(1)		1.4	0.14
41	Power	5.8	235	245	15.0(2)	30.0
84	Rectifier	5.8				52.0

(1) With 250,000 Ohm Meter
(2) Read Across Filter Choke

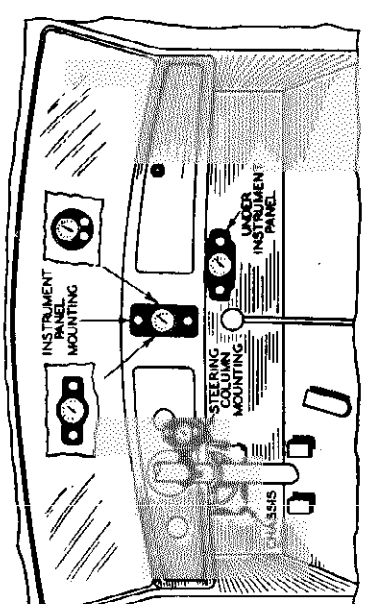


Fig. 5—Various Control Head Mountings

MONTGOMERY-WARD & CO.

Circuit

This model is a 6 tube automobile receiver covering the standard wave band. It has a tuning range as shown in the specifications above. The signal is fed through an antenna transformer with tuned secondary into a 6D6 tube which functions as an R.F. amplifier. The output of this tube is fed through another R.F. transformer with tuned secondary into a 6C6 tube which functions as the first detector and oscillator. The oscillating circuit is tuned by the oscillator section of the gang condenser and is always resonant at a frequency 175 KC above the frequency to which the R.F. circuits are tuned.

One stage of I.F. amplification is employed using a 6D6 tube. The primary and secondary of the first I.F. transformer and the primary of the second I.F. transformer are tuned by small trimmer condensers.

A 75 dual diode-triode tube functions as a diode 2nd detector, AVC tube and a one stage audio amplifier. AVC voltage is applied to the control grid circuits of the 6D6 R.F. and I.F. tubes. The manual volume control varies the audio voltage applied to the grid of the 75 tube.

In the output stage a 41 tube is employed. A dynamic reproducer is used.

The vibrator in the power unit interrupts the current through the primary of the power transformer. The use of a vibrating interrupter in the primary circuit and a high ratio transformer results in the application of high voltage AC to the rectifier tube plates. The 84 full wave rectifier tube, filter choke, and filter condensers convert this high voltage AC into high voltage DC for the plate and screen circuits.

Alignment and Calibration

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the standard wave band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide accurately calibrated signals over the standard wave band and at the intermediate frequency, and an output meter are required for indicating the effect of adjustments.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the antenna lead of the signal generator thru a .05 mf. condenser to the stator of the 1st detector section of the tuning condenser. (See Fig. 2 for location of this section.) This can be done by pushing a wire or conductor between the stator plates or by extending an insulated wire thru the hole in the shield over the stator and pushing the wire thru the hole in the lug which extends up from the insulated stator assembly.

Connect the ground lead of the signal generator to the chassis ground.

Short out the oscillator section of the tuning condenser.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers is shown in Fig. 2.

1650 KC Adjustment

Set the signal generator for 1650 KC.

Turn the rotor of the tuning condenser to the full open position.

If a low capacity antenna is used connect the shielded antenna lead from the chassis through a 150 mmf. condenser to the antenna post of the signal generator. (If high capacity, use 1500 mmf.)

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—see Fig. 2 for location of this trimmer.

1400 KC Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st detector and antenna trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 KC with the volume control about three-fourths on. Remove the cover of the chassis case. The antenna trimmer is on the center tuning condenser section—see Fig. 2. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

Calibrating the Receiver

To calibrate the receiver, tune in a station of known frequency. At the back of the control head is the calibration screw. Remove the pilot lamp assembly. Insert a fine blade screwdriver and turn this screw until the pointer on the dial scale is at the frequency of the station being received. The knob must be held during this adjustment.

If the control head is inaccessible it may be calibrated by setting the pointer from the front. Remove the crystal by inserting a knife blade under the lower edge. Loosen the pointer screw, set the pointer and retighten.

General Service Data

Installation and Noise Suppression

The necessary information for installing this receiver and for suppression of ignition and generator noise is contained in the Installation Manual which is packed with each receiver. Two additional items regarding reduction of noise can be mentioned as follows:

Be sure that the cover is well grounded to the chassis case—clean off paint or particles of dirt which may prevent a good ground.

In extreme cases of motor noise it is advisable to peen the distributor rotor arm, that is, increase the length of the arm by using a small machinist's hammer. This will lessen the gap between the rotor arm and the stationary contacts, reducing the spark.

Be sure, after peening the arm, that it does not strike the stationary contacts.

Voltages at Sockets

In the voltage chart are given the voltages at the sockets with all tubes in and the set in operating condition. The antenna should be disconnected.

The voltages can be read with the chassis in the case, by means of an analyzer plug.

If the chassis unit is taken out of the case all of the socket terminals can easily be reached under the chassis with test prods.

Control Head Mounting

This auto radio is supplied with a new type of control head known as the No. 4 Universal. This head in conjunction with suitable escutcheon plates and mounting brackets can be mounted in the instrument panel of practically all widely sold 1936 automobiles. In the case of 1935 and earlier cars, it can be mounted in the instrument panel, under the panel or on the steering column.

The escutcheon plate, dial crystal, special mounting brackets and knobs for the various cars are put up in kit form.

The control head, volume control fitting, flexible shafts, pilot lamp assembly, dial scale and pointer are packed with each radio.

In Fig. 5 are shown the various locations at which the control head is mounted. The head is intended for installation primarily in the instrument panel of the car. Most 1936 and many 1935 cars have a name plate or ash receiver on the instrument panel, the removal of which permits installation of the radio control head. Complete installation data is contained in the instruction booklet packed with each radio.

Instrument Panel Mounting Kits

Car	Year & Model	Panel Kit No.
Buick	1936	21A16
Cadillac	1936	21A39
Chevrolet	1936-35 Standard & Master	21A11
Chrysler	1936 Six	21A19
	1936 Eight	21A30
	1936 Airflow	21A31
	1935-34 Except Imperial	21A47
DeSoto	1936 Airflow & Airstream Custom	21A22
	1936 Airstream DeLuxe	21A26
	1935 DeLuxe	21A46
	1934	21A47
Dodge	1936 DeLuxe	21A13
	1935	21A45
	1934	21A49

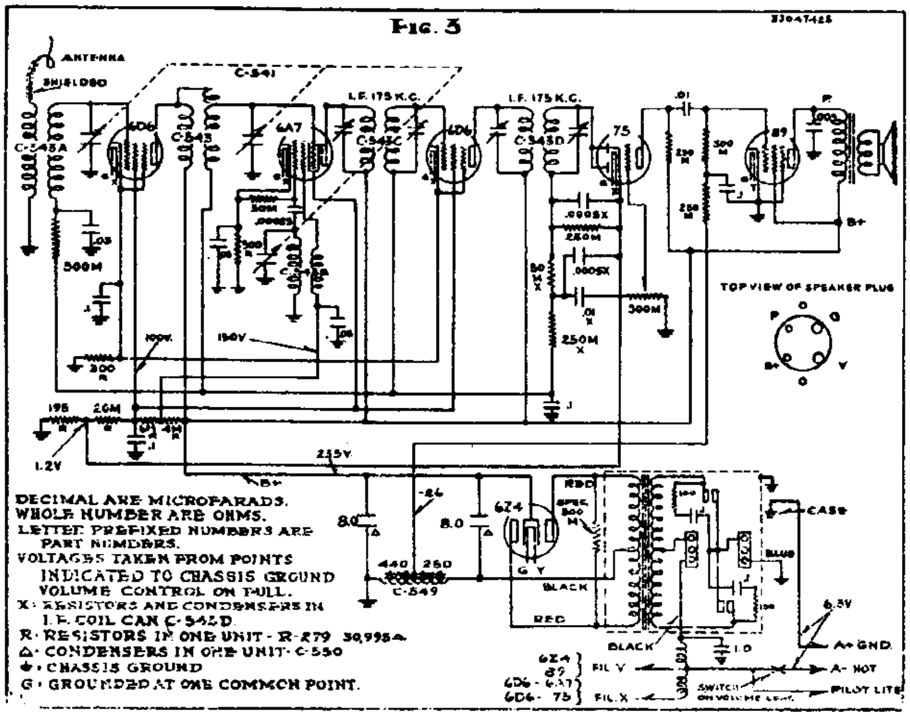
Car	Year & Model	Panel Kit No.
Ford	1936 Standard & DeLuxe	21A10
	1935 DeLuxe	
	1935 Standard	21A32
	1934	21A38
Hudson	1936	21A17
	1935	21A48
	1934	21A35
Lafayette	1936-35	21A36
LaSalle	1936	21A40
Lincoln	Zephyr 1936	21A10
Nash	1936-35	21A36
Oldsmobile	1936	21A14
	1935	21A34
Packard	1936 120-B	21A21
	1935 120	21A41

Car	Year & Model	Panel Kit No.
Plymouth	1936 DeLuxe	21A12
	1936 Standard	21A37
	1935 DeLuxe	21A33
	1934	21A49
Pontiac	1936-35 Standard-DeLuxe 6 & 8	21A15
Studebaker	1936 Dictator	21A20
	1936 President	21A24
Terraplane	1936	21A18
	1935	21A48
	1934	21A35
Steering column and under panel kit		21A23

The mounting kit includes escutcheon plate, dial crystal, knobs, special mounting brackets and small items such as screws. The other items are shipped with the radio.

MODEL 62-130
Schematic, Voltage
Socket, Trimmers
Parts

MONTGOMERY-WARD & CO.



SCHEMATIC CIRCUIT DIAGRAM

See instructions for serial notes etc.

PARTS LIST

Part No.	Description	List Price Each
A 660	Battery Cable—Plug Type	1.75
B 104	Cable Shaft Brackets	.35
B 660	Antenna Cable—Plug Type	.80
C 106	Shaft Couplings	.35
C 117	"A" Choke—Small	.25
C 118	"A" Choke—Large	.35
C 144	Dual .1-200 Volt Condenser	.35
C 152	.00025 Mica Condenser	.20
C 155	.0005 Mica Condenser	.20
C 522	.01-400 Volt Condensers	.25
C 531A	Dual .05 Condenser	.30
C 535	Dual .1—200 Volt Condenser	.35
C 541B	3 Gang Condenser	3.75
C 543	R.F. Coil	.80
C 543A	Antenna Coil	.80
C 543B	Oscillator Coil	.70
C 543C	Input I.F. Transformer	1.25
C 543D	Output I.F. Transformer with Parts	2.50
C 547	.1-200 Volt Condenser	.30
C 549	690 Ohm Choke	1.40
C 550	8-8 Mfd. Electrolytic Condenser	2.25
C 551	1 Mfd.—120 Volt Condenser	.35
C 553	.05-200 Volt Condenser	.25
C 554	.5 Mfd. Generator Condenser	.50
R 232A	Special 500M Ohm Resistor Identified with 2 Yellow Dots	.35
R 279	30,995 Ohm Resistor	.60
R 281	100 Ohm Resistor	.20
S 338	18" Volume Control Shaft	1.25
S 339	18" Selector Control Shaft	1.25
S 338S	Special 24" Volume Control Shaft	1.50
S 339S	Special 24" Selector Control Shaft	1.50
V 660	Complete "B" Unit—OAK	8.00
V 603	Volume Control	1.50
660	Remote Control Head Complete Less Shafts	5.00
	20 Ampere Fuses	.10
	Mounting Bolts	.10
	All carbon resistors	.20
	All sockets	.20
	Dynamic speakers	5.00

IF PEAK 175 KC

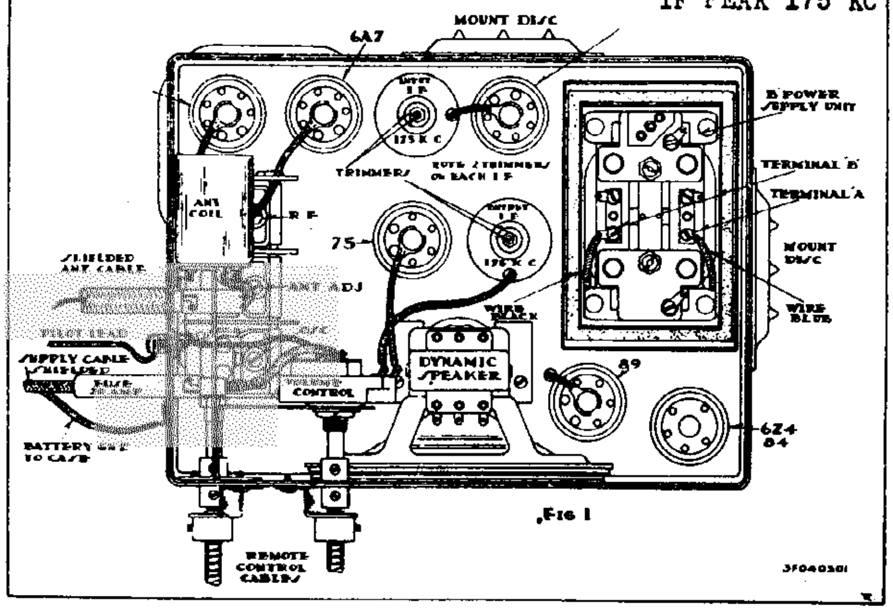
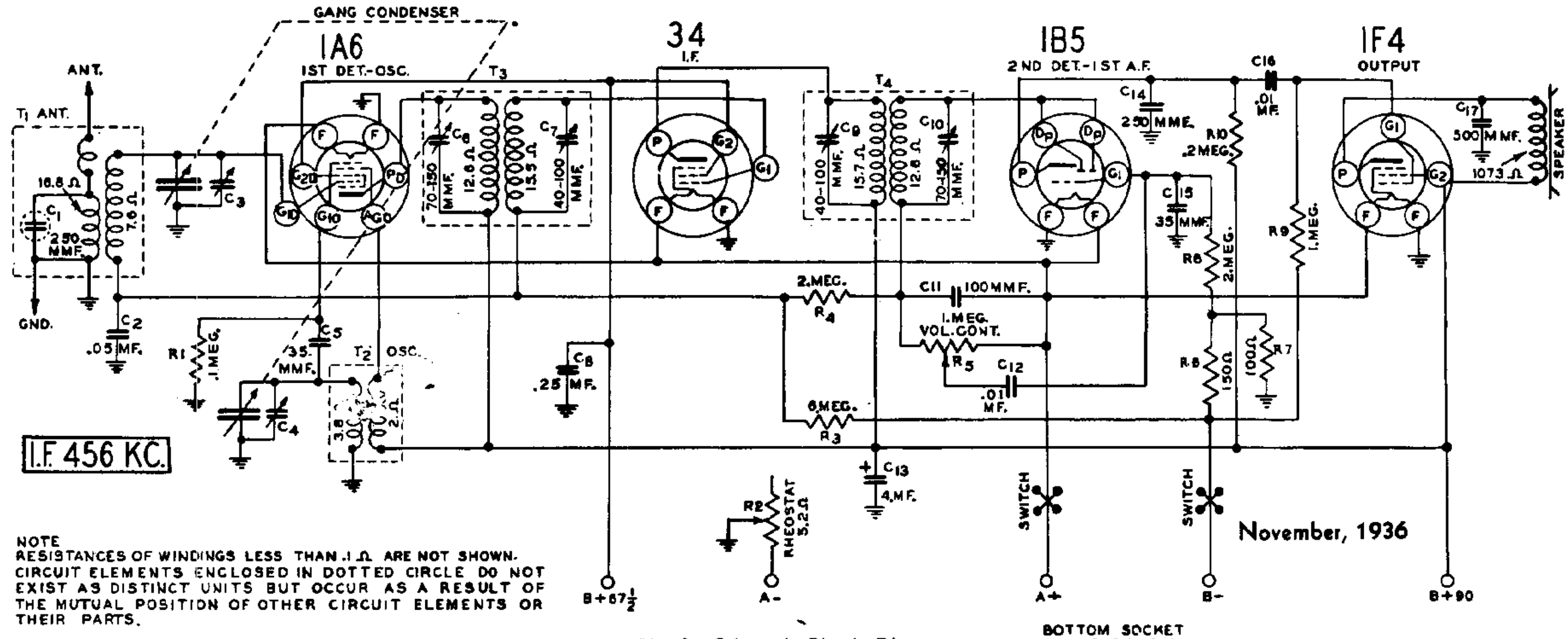


Fig 1

MODEL 62-254
Schematic,Voltag
Socket,Trimmers

MONTGOMERY-WARD & CO.



November, 1936

NOTE
RESISTANCES OF WINDINGS LESS THAN .1 Ω ARE NOT SHOWN.
CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLE DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.

BOTTOM SOCKET CONNECTIONS SHOWN.

Fig. 2—Schematic Circuit Diagram

TUBE ELEMENT LEGEND

F - FILAMENT
P - PLATE
P_D - PLATE DETECTOR
D_P - DIODE PLATE
G_1 - CONTROL GRID
G_{1O} - CONTROL GRID OSCILLATO
G_{1D} - CONTROL GRID DETECTOR
G_2 - SCREEN GRID
G_{2D} - SCREEN GRID DETECTOR
A_{GO} - ANODE GRID OSCILLATOR

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground
"A" Battery — 2 Volts

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Grid to Ground
1A6	1st Det.-Osc.	2.0	87 87(1)	64.5	
34	I.F.	2.0	87	64.5	
1B5	2nd Det.-1st Audio	2.0	42(2)		1.2(3)
1F4	Power	2.0	82	87	3.0(4)

(1) Anode Grid (AGo) to ground
(2) As read on 250 volt scale (1000 ohm per volt meter)
(3) As read across R7
(4) As read across R6 and R7

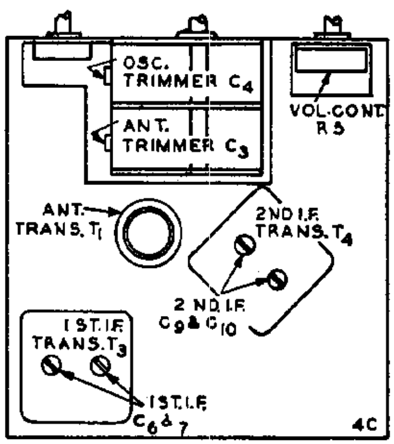


Fig. 5—Location of Trimmers

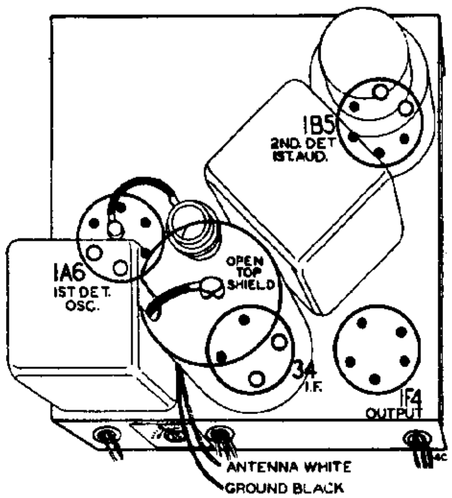


Fig. 6—Tube Arrangement

MODEL 62-254
Alignment, Parts
Batt. Data

MONTGOMERY-WARD & CO.

SPECIFICATIONS

Input Voltages and Currents		**Intermediate Frequency**	456 KC.
"A" Battery	2 Volts—.3 Amperes	**Speaker**	6" Magnetic
"B" Battery	90 Volts—11.5 to 15 Ma.	**Tuning Frequency Range**	538 to 1730 KC.
Power Output	135 Milliwatts Undistorted	**Sensitivity**	45 Microvolts Absolute
Selectivity	40 KC Broad at 1000 Times Signal		

Alignment and Calibration

Alignment Procedure

The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator which will provide an accurately calibrated signal at 456, 1730 and 1500 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector. (G_{1D}).

Connect the ground lead of the radio to the ground post of the signal generator.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 5.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Connect the antenna lead of the radio through a 200 mmf. condenser to the output of the signal generator.

Adjust the oscillator trimmer (C4) until maximum output is obtained. The location of this trimmer is shown in Fig. 5.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the antenna trimmer (C3) to maximum.

Do not change the setting of the oscillator trimmer.

Dial Calibration

To obtain dial scale calibration, carefully tune in the signal of one of the larger nearby stations near the middle of the dial and set the dial pointer at the frequency of the station tuned in. When calibrated in this manner, the setting will be approximately correct at both ends of the scale.

Replacement Parts List

RETAIL STORES: Order any parts from division superintendent at Chicago or Oakland, on stock order. Order by bin number and description. If no bin number is shown order by part number and description.

Return defective parts to division superintendent only.

There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts please be sure to mention the model number and this large letter.

MISCELLANEOUS

SOCKETS

Bin No.	Part No.	Description	Selling Price
	3A247	Tube Socket (6 Prong)	$0.06
	3A248	Tube Socket (5 Prong)	.06
	3A246	Tube Socket (4 Prong)	.06

SPEAKER

Bin No.	Part No.	Description	Selling Price
9874	12A261	6" Magnetic Speaker	2.40
	13X279	Speaker Cable complete	.14

KNOBS

Bin No.	Part No.	Description	Selling Price
10823	10A98	Knobs ea.	.06

GENERAL

Bin No.	Part No.	Description	Selling Price
10665	32X32	Tube Shield (Small-Open Top)	.08
	32X63	Tube Shield (Large)	.10
	32X18	Tube Shield Base (Large)	.06
	32X30	Tube Shield Base (Small)	.04
10804	2X30	Felt Washers doz.	.02
10733	30X14	Grid Clip Only doz.	.06
10822	4A17	Single Lug Terminal Strip	.04
10826	13X214	Antenna and Ground Lead Assembly	.14
	13X277	"A" Battery Cable and Plug	.10
	13X278	"B" Battery Cable (Type without plugs—Used on early models)	.14
	13X280	"B" Battery Cable and Plugs (Used on late models)	.32
	28X301	Chassis Mounting Feet	.04
10385	2A71	On-Off Switch	.30
10824	10X86	Station Pointer	.04
9314	68X162	Dial Strip	.08

TRANSFORMERS AND COILS

Bin No.	Part No.	Code	Description	Selling Price
9123	9A702	T1	Antenna Transformer and Can Assembly	$0.50
9140	9A703	T2	Oscillator Coil and Can Assembly	.30
	9A704	T3	1st I.F. Transformer and Can Assembly	.70
	9A705	T4	2nd I.F. Transformer and Can Assembly	.70

CONDENSERS

TUBULAR

Bin No.	Part No.	Code	Capacitance	Voltage	Selling Price
11307	46X80	C2	.05 mf.	100	$0.08
10903	46X117	C8	.25 mf.	100	.12
11256	46X124	C12	.01 mf.	100	.08
11256	46X124	C16	.01 mf.	100	.06

MOLDED

Bin No.	Part No.	Code	Capacitance	Selling Price
10049	47X53	C5	35 mmf.	.06
10076	47X57	C11	100 mmf.	.06
10097	47X65	C14	250 mmf.	.08
10049	47X53	C15	35 mmf.	.06
10508	47X61	C17	500 mmf.	.08

ELECTROLYTIC

Bin No.	Part No.	Code	Capacitance	Voltage	Selling Price
10851	45X212	C13	4.0 mf.	100 Dry	.32

TRIMMER

Part No.	Code	Description		Selling Price
	C3	Antenna Trimmer	Part of Gang Condenser	
	C4	Oscillator Trimmer	Part of Gang Condenser	
17A51	C6	70-150 mmf.	1st I.F. Trimmers	.18
	C7	40-100 mmf.	1st I.F. Trimmers	
17A51	C9	40-100 mmf.	2nd I.F. Trimmers	.18
	C10	70-150 mmf.	2nd I.F. Trimmers	

MISCELLANEOUS

Bin No.	Part No.	Description	Selling Price
9658	14A42	2 Gang Condenser Only	1.86

RESISTORS

CARBON

Bin No.	Part No.	Code	Resistance	Wattage	Selling Price
10968	A95104	R1	100,000 Ohm	0.2 Watt	$0.06
11062	A94605	R3	6.0 Megohm	0.2 Watt	.08
11086	A94205	R4	2.0 Megohm	0.2 Watt	.08
11087	A94151	R6	150 Ohm	0.2 Watt	.08
11085	A94101	R7	100 Ohm	0.2 Watt	.08
11086	A95205	R8	2.0 Megohm	0.2 Watt	.06
11180	A95105	R9	1.0 Megohm	0.2 Watt	.06
11097	A95204	R10	200,000 Ohm	0.2 Watt	.06

VARIABLE

Bin No.	Part No.	Code	Resistance	Description	Selling Price
11089	43X70	R2	5.2 Ohm	Filament Rheostat (Voltage Regulator)	.32
10216	36X229	R5	1.0 Megohm	Volume Control	.37

Prices subject to change without notice

Batteries

Batteries Required

The batteries and voltages required are shown in Figs. 2 and 3. The "A" drain is .3 amperes at 2 volts while the "B" drain is discussed below.

"B" Battery Life

The majority of potential complaints on short "B" battery life can be prevented if proper instructions are given to the customer at the time the radio is installed.

The "B" consumption will depend, to some extent, upon the strength of the incoming signal as the latter affects the AVC voltage. When no signal is being received, the "B" drain is 15 milliamperes. As the input signal increases, the AVC voltage increases and reduces the "B" drain to 11.5 milliamperes. A **milliammeter in the "B" line will quickly determine if the "B" drain is excessive or normal.**

As this radio does not have a pilot lamp, it is easy to forget to turn it off. When this happens, the radio may be on as long as 24 hours or more. A continuous drain of this kind for a long period will shorten the life of the "B" batteries considerably. **Caution the customer regarding this.**

"A" Battery and Voltage Regulator

The voltage regulator on the back panel of the chassis permits the use of any type of "A" battery delivering from 2 to 3 volts.

3 Volt Dry "A" Battery—When this type of battery is used, turn the voltage regulator pointer (See Fig. 4) to the left as far as possible. The purpose of this regulator is to reduce the voltage of the 3 volt battery to the 2 volts required by the tubes. Keep this pointer turned to the left as far as possible. Advance it one-half mark when reception gets weak. This should be about once a week if the radio is used from two to three hours per day. If it is used from four to five hours a day, it will generally be necessary to turn the pointer up one mark a week.

Caution the customers not to turn the pointer up higher than necessary as it will burn out the tubes and run down the battery. Also tell them to turn the pointer back to the starting position when a new 3 volt "A" battery is installed.

2 Volt Storage Battery—When this type of battery **is used, turn the voltage regulator pointer to the position on the scale marked "2 Volt storage battery," and leave it there at all times.**

Testing Batteries

If the receiver does not operate satisfactorily test the batteries under load. A high resistance meter is required for the "B" voltages. If any of the batteries are considerably below their rated voltage, new ones should be used.

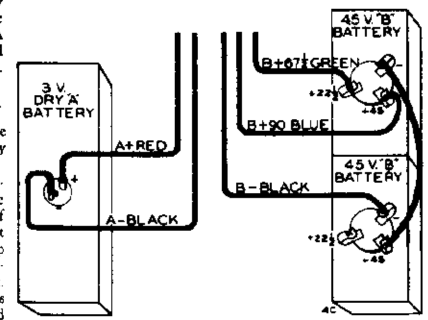


Fig. 3—"A" and "B" Battery Connections

Voltages

Check the voltages at the sockets to see if correct values are being delivered to the tubes. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together. The volume control should be turned to the right or maximum position.

All of the voltage readings as shown in the chart are read with a 1,000 ohm-per-volt meter. As high a range as possible should be used. In general, the higher the resistance of the meter, the more accurate the reading will be.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condition. These voltages are typical of the sets but will vary slightly with variations in individual receivers, tubes, test equipment used and battery voltages.

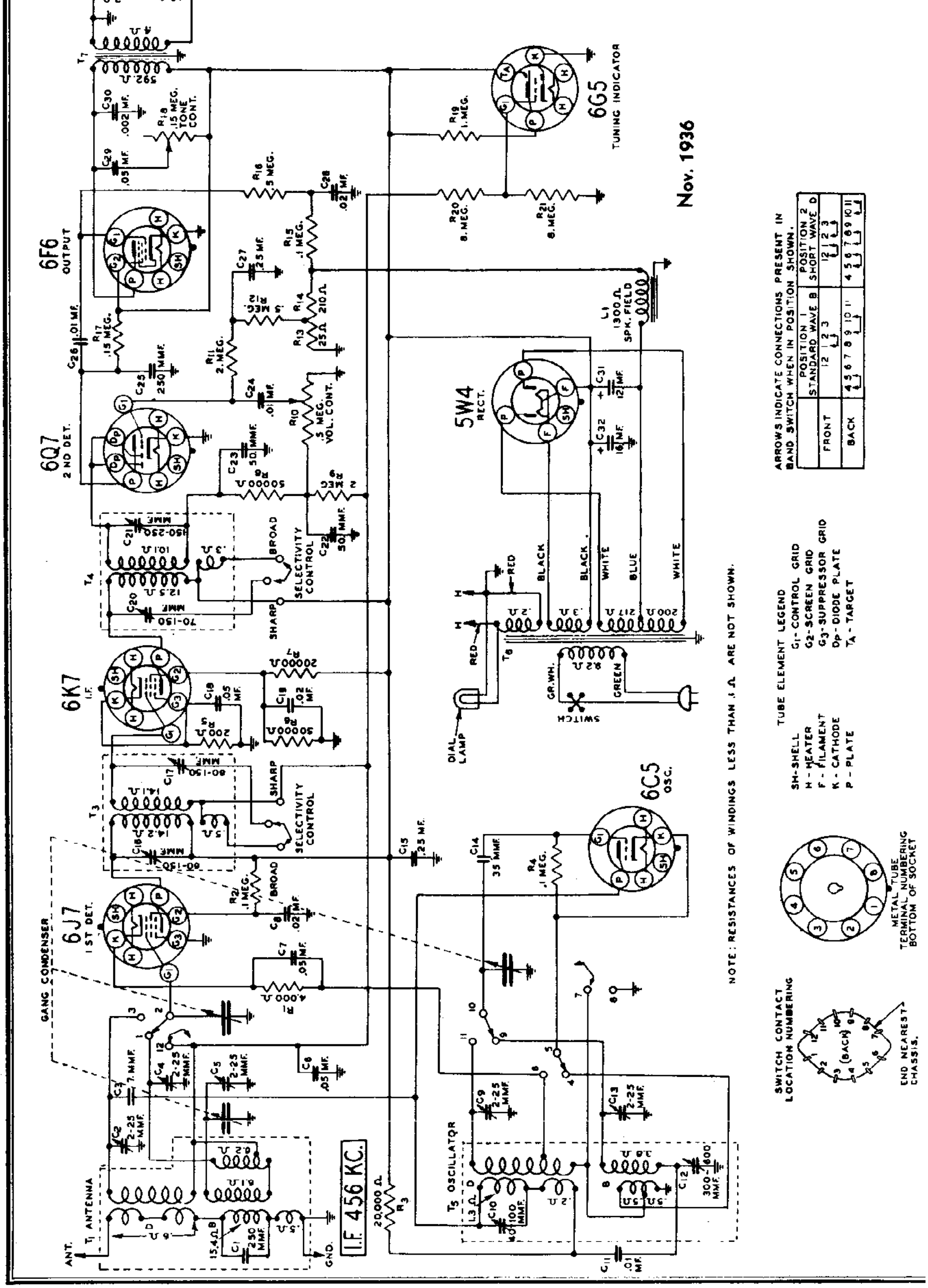
Tubes

The tubes used in this radio are of the 2 volt series. All of them are of the filament or directly heated types. All of them have a 2 volt filament and should not be connected to a power supply not intended for this type of tube. **Maximum filament voltage range is 1.8 to 2.0 volts. Operation of the tubes at under or over these values will be injurious to the tubes and may affect operation of the receiver.**

MODELS 62-267, 62-27

Schematic

MONTGOMERY-WARD & CO.



MODELS 62-267, 62-277
Trimmers, Socket
Voltage, Coils

MONTGOMERY-WARD & CO.

Power Consumption - 60 Watts (At 115 volts 60 cycles)
Power Output - - - - - 2.5 Watts Undistorted
Selectivity - 30 KC Broad at 1000 times Signal (Sharp)
Intermediate Frequency - - - - - - 456 KC
Speaker - - - - - - - - - - - 8" Dynamic

Tuning Frequency Range
B Range........................ 528 to 1730 KC
D Range........................ 5750 to 18300 KC

Sensitivity
B Range............... 4 to 5 Microvolts Absolute
D Range............... 5 to 6 Microvolts Absolute

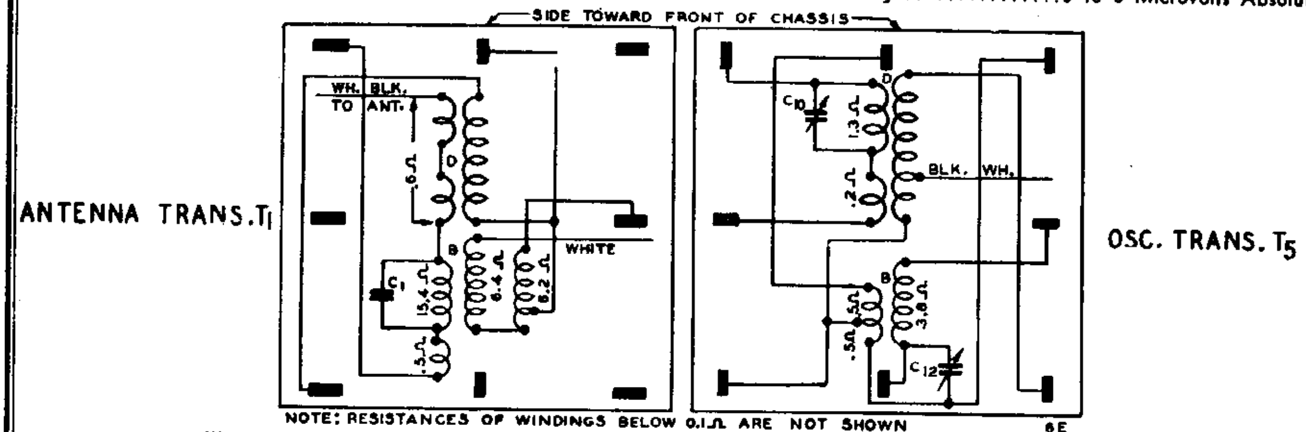


Fig. 6—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings.

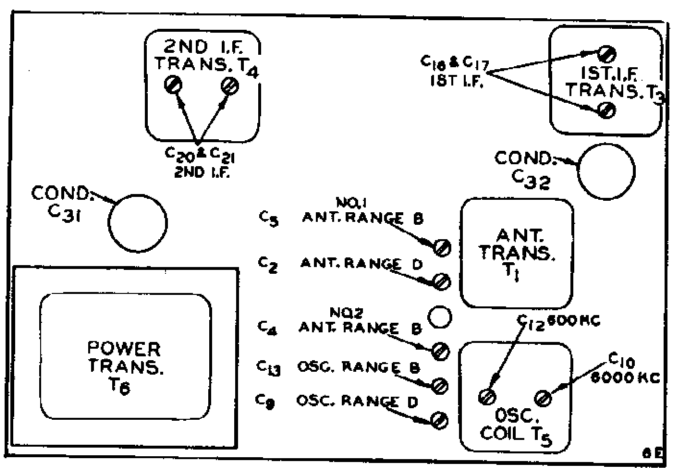


Fig. 3—Location of Trimmers

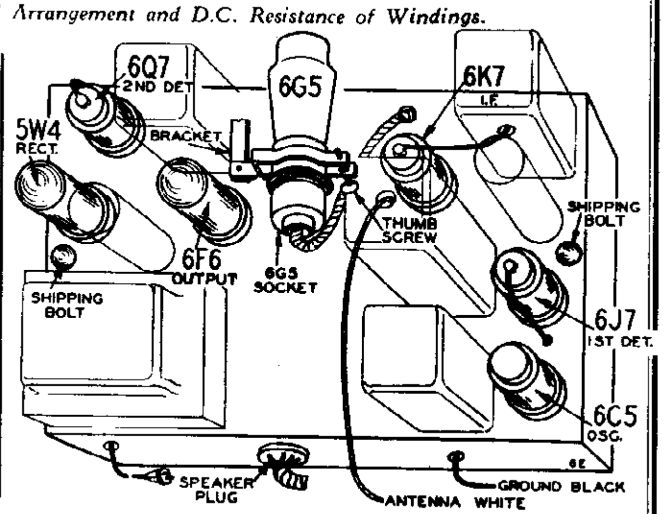


Fig. 5—Location of Tubes

VOLTAGES AT SOCKETS

Line Voltage: 115
Volume Control: Maximum

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated) Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6J7	1st Det.	0	6.1(1)	220	130	0		6.1(1)	9
6C5	Osc.	0	6.1(1)	140		0		6.1(1)	0
6K7	I.F.	0	6.1(1)	220	125	2.1		6.1(1)	2.1
6Q7	1st A.F.-2nd Det.	0	6.1(1)	110	0	0		6.1(1)	0(2)
6F6	Power	0	6.1(1)	200	220	12(3)		6.1(1)	0
5W4	Rectifier	0	4.9(4)		615(5)		615(5)		4.9(4)
6G5	Tuning Indicator	Plate to Ground 20		Target to Ground 220		Cathode to Ground 0		Across Heater 6.1	

(1) A. C. voltage as read across heater terminals 2 and 7.
(2) Bias (1.3 volts) as read across resistor R13.
(3) Bias voltage as read across resistor R13 and R14.
(4) A.C. voltage as read across filament terminals 2 and 8.
(5) A.C. voltage as read across terminals 4 and 6.

MONTGOMERY-WARD & CO.

Alignment and Calibration

Correct alignment is extremely important in connection with standard and short wave radios. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator which will provide an accurately calibrated signal at 456, 1730, 1500, 600, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the radio to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the radio through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C13) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the two screws inside of the film drum at the bottom which hold the drum in place. Set the drum at the 1500 KC mark and retighten the screws.

Adjust the antenna Range B trimmers (C4) and (C5) to maximum.

Do not change the setting of the oscillator Range B trimmer.

Turn the band switch to the Range D position (short wave band).

Adjust the oscillator Range D trimmer (C9) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the antenna Range D trimmer (C2) to maximum.

When adjusting this trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer (C12) until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC. It may be necessary to increase the input signal to hear the image.

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer (C10) until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer 17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Twenty-five Cycle Radios

The twenty-five cycle model differs from the sixty cycle model only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

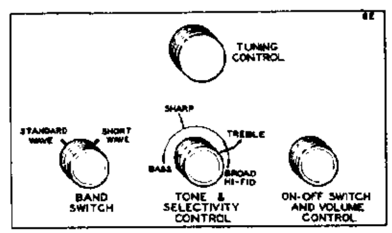


Fig. 1—Arrangement of Controls

Circuit

This model is a two band radio with a tuning range in each band as shown in the specifications above. Two band coverage is accomplished by means of two sets of R.F. and oscillator coils and a single section double throw switch.

Referring to the schematic circuit diagram, Fig. 2, T1 and T5 are the antenna transformer and oscillator coil assemblies. The standard wave and short wave coils are indicated by the letters B and D respectively.

The band switch completes connections to the coils in use. When it is in the Range B position, a double tuned antenna R.F. stage is used while for the D Range, a single tuned secondary is used. A type 6J7 tube functions as the 1st detector.

A separate type 6C5 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

The oscillator potential is fed into the cathode circuit of the 6J7 1st detector tube. As a result of the heating of the two frequencies, the intermediate or beat frequency of 456 KC is present in the plate circuit of this tube.

One stage of I.F. amplification is employed using a 6K7 tube. The primaries and secondaries of the first and second I.F. transformers are tuned by small trimmer condensers.

Referring to the 1st and 2nd I.F. transformers, T3 and T4, in Fig. 2, it will be noted that there is a coupling winding shown below the primary of T3 and below the secondary of T4.

When the selectivity control is in the sharp position, the coupling windings are open circuited and the loose coupling which exists between the primary and secondary of these transformers results in high selectivity.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary in the case of T3 is connected in series with the secondary. In the case of T4, the coupling winding which is wound under the secondary is in series with the primary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

A type 6Q7 duo-diode triode tube functions as the 2nd detector and a one stage amplifier. AVC voltage is applied through isolating resistors to the control grid circuits of the 1st detector and I.F. tubes. The audio voltage developed across volume control resistor R10 is applied through the movable arm to the control grid of the 6Q7 tube.

Resistance coupling is used between the first audio stage and the output stage which employs a type 6F6 output pentode tube. A type 5W4 full wave rectifier is used in the power unit.

The 6G5 tuning indicator tube is wired as shown in the schematic. The action of this tube is described in other service manuals as well as in current literature and will not be repeated here.

MODELS 62-267, 62-277
Movie Dial Data

MONTGOMERY-WARD & CO.

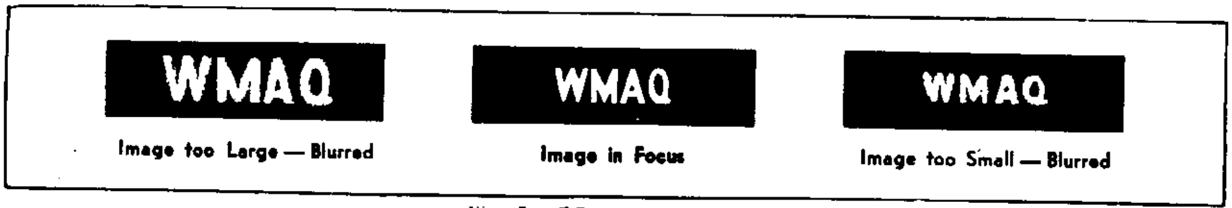


Fig. 7—Effect of Lens Focus

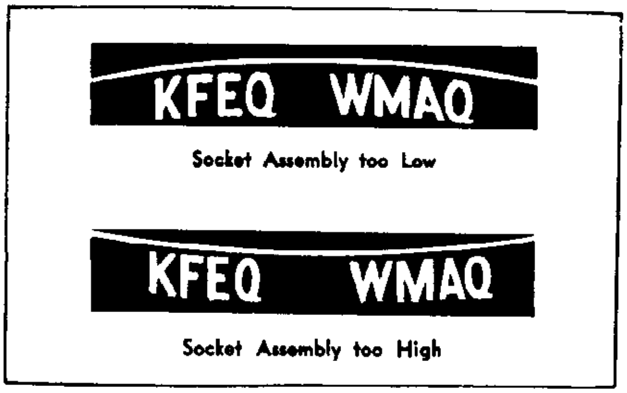


Fig. 8—Effect of Lamp Socket Assembly Height

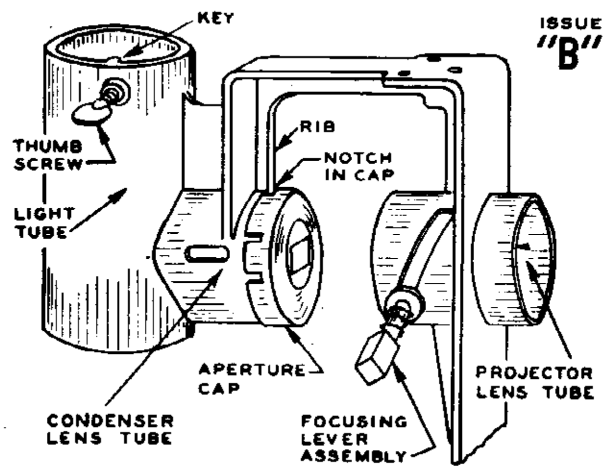


Fig. 10—Issue "B" Lens and Light Bracket

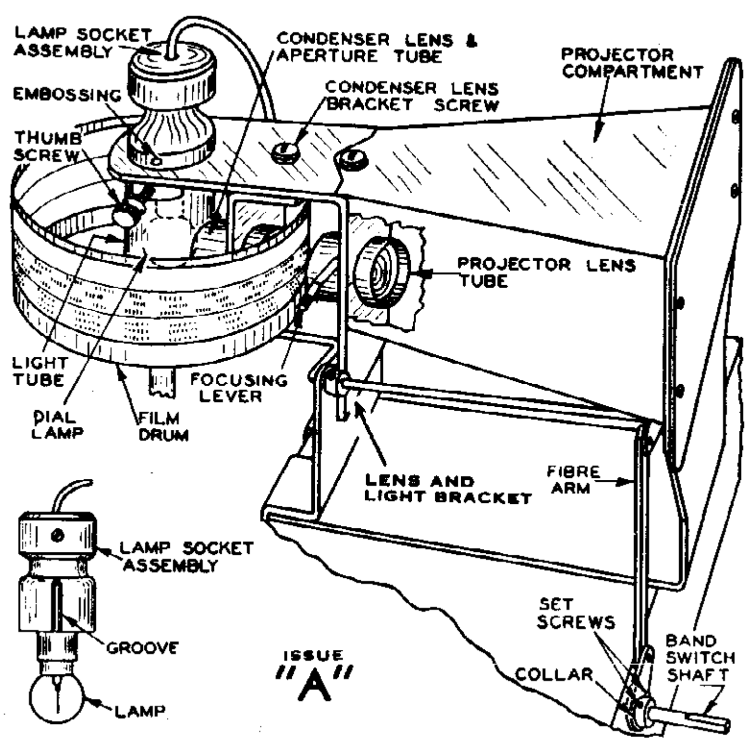


Fig. 9—Details of Movie Dial

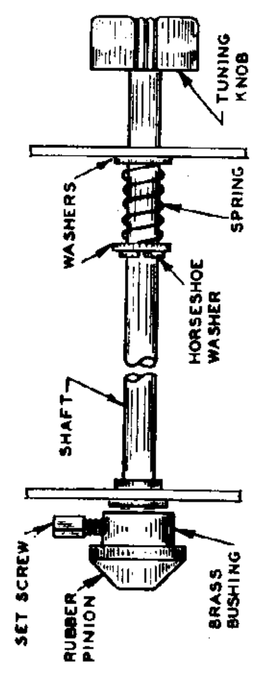


Fig. 11—Drive Shaft Assembly

FOR ADDITIONAL DATA ON MOVIE DIAL, SEE INDEX

MONTGOMERY-WARD & CO.

Movie Dial Adjustments and Replacements

Issue Letter of Radio

The issue letter is the large letter appearing on the under side of the chassis which identifies the chassis as to major part changes. There are two distinct types of chassis known as Issue A and Issue B. The adjustments, as decribed in the following paragraphs, cover both issues unless otherwise specified.

A chassis bearing the issue letter "A" may be further identified by the die stamped Light and Projector Lens Bracket and the separate die stamped Condenser Lens and Aperture Bracket. See Fig. 9.

The chassis bearing the issue letter "B" may be further identified by a die cast combination Lens, Light and Aperture Bracket. See Fig. 10.

Bringing Lens Adjustment to a Focus

Important—Turn the band switch to the standard wave position.

Move the focusing lever (see Fig. 9) up or down until the image on the screen is clearest. In Fig. 7 is shown the effect of correct and incorrect focusing.

Replacing and Positioning the Dial Lamp

Caution—If a new lamp is required, use only a G. E. lamp, Wards catalogue No. 61P8204. Get this from your nearest Ward store or Ward Mail Order House.

First, turn the radio off.

Loosen the thumb screw and lift the lamp socket assembly out of the light tube—see Fig. 9. This can be lifted vertically by grasping the insulated top of the assembly through which the wire runs.

Remove the old lamp from the socket and put in the new one.

Replace the lamp socket assembly in the light tube with the light tube embossing in the groove of the lamp socket assembly—see Fig. 9. Do not tighten the thumb screw yet.

Turn the radio on.

Then grasp the top of the lamp socket assembly and move it up or down until the image on the screen is clearest and the lines are horizontal. The effect of having the lamp assembly too high or low is shown in Fig. 8. Tighten the thumb screw.

Dial Calibration

The radio is properly calibrated if, when a station is correctly tuned in, the vertical red line on the screen crosses the call letters of that station. If the red line is found to be on one side of the call letters of a large number of stations on the standard wave band (the same side in each case), the dial is out of calibration.

To re-calibrate, carefully tune in the signal of one of the larger nearby stations in accordance with the instructions under "Tuning in a Signal." Choose a station which is near the middle of the dial. Loosen the two screws seen at the inside of the film drum at the bottom. Adjust the position of the drum and tighten the screws.

The dial will then be properly calibrated and this adjustment should not be changed unless re-calibration again becomes necessary. It should be remembered that after calibration a few stations may be tuned in when the vertical red line is near one end or the other of the call letters and city of a station. That is because of slight variations in the film.

Adjusting Film Drum Position to Raise or Lower Image

If the raising and lowering mechanism is not adjusted properly, the image will be too high or too low on the screen and part of the image may be cut off.

If this condition exists, turn the radio on and turn the band switch to the standard wave position. Then loosen the two set screws in the collar on the band switch shaft—See Fig. 9. Move the elevator assembly up or down by means of the fibre arm until the image on the screen is centered from top to bottom. Then tighten the two set screws.

Cleaning the Lenses

It is very seldom necessary to clean the lenses. Occasionally, however, dust or dirt on the lens may cause the image on the screen to be spotted or foggy. If this is the case, the lenses may be removed as explained below and may then be cleaned by wiping carefully with a clean chamois or soft cloth.

Removing Condenser Lens—Remove the four screws which hold the projector compartment and glass screen to the glass screen mounting bracket. Remove the screw at the top and back of the projector compartment. See Fig. 9. Lift the projector compartment up and away from the chassis. Remove the screw from the bottom of the lens and light bracket and take out this bracket, being careful not to scratch the film.

Issue A—Remove the condenser lens bracket from the lens and light bracket—See Fig. 9. The lens can then be cleaned without removal, or it may be forced out of the tube with a wood block. After the lens has been cleaned, reinsert it in the lens tube until the end of the lens barrel is about $\frac{1}{16}$ inch inside the tube.

Issue B—Remove the aperture cap—See Fig. 10. Insert a fine blade screw driver into the slot and then push the condenser lens away from the light tube until it is possible to remove the lens. Clean the lens carefully. Replace the lens so that the lens barrel projects about 1/32 inch beyond the lens tube. Replace the aperture cap so that the square notch of the aperture cap fits over the square rib as illustrated.

Removing Projector Lens—Remove the projector compartment and lens and light bracket as explained in the first paragraph of the article "Removing Condenser Lens."

The projector lens may then be removed by first unscrewing the focusing lever assembly (Issue A radios have focusing lever only). Then push the lens barrel out of the projector lens tube. Clean the lens carefully. Replace the lens barrel so that the threaded hole will coincide with the slot opening of the bracket. Replace the focusing lever assembly.

Reassembling—Replace the lens and light bracket taking care not to scratch the inside of the film.

Replace the projector compartment, glass screen and dial lamp assembly.

When replacing the glass screen, the glass is put on with the frosted side toward the inside of the assembly.

Refocus the projector lens.

Cleaning the Film and Glass Screen

As in the case of the lenses, it is very seldom necessary to clean the film or glass screen. If, however, the image on the screen is spotted or foggy, it may be necessary to clean these items as explained below.

Film—The film may be dusted with a camel hair brush or fine cloth. CAUTION—Extreme care must be taken not to scratch the film.

Glass Screen—If the screen should become dirty, the front may be cleaned by wiping with a clean, dry cloth. If the back of the screen becomes dirty, it should be cleaned with alcohol. Care should be taken not to get any alcohol on the red line at the front of the screen.

Replacing the Film Drum Assembly

Remove the lamp socket assembly from the light tube by lifting it out in accordance with instructions in "Replacing and Positioning the Dial Lamp."

Remove the glass screen, projector compartment and lens and light bracket as described in the article "Removing Condenser Lens."

Remove the film drum assembly by unscrewing the two small screws located inside the drum at the bottom.

Mount the new film drum assembly on the film drum supports leaving the paper around the film for protection, and insert the clamping plate within the film drum. The film drum and clamping plate should then be so placed that the small screws are in the center of the two slots.

Replace the lens and light bracket taking care not to scratch the inside of the film.

Replace the projector compartment, glass screen and dial lamp assembly.

Now remove the paper from the film, turn the radio on and calibrate the dial in accordance with the instructions in the article "Dial Calibration."

The film and mounting drum are sold as one assembly and cannot be ordered separately.

Replacing Rubber Friction Drive Pinion

Loosen the set screw on the brass bushing which holds the rubber pinion—See Fig. 11. Push out the small horseshoe washer on the tuning shaft in back and below the glass screen. Pull the tuning shaft from the front until the brass bushing may be removed. Place the new rubber pinion over the brass bushing and replace the bushing on the tuning shaft. Tighten the set screw on the brass bushing after the bushing has been returned to its original position. Replace the horseshoe washer.

Replacing Friction Drive Drum

If it is ever necessary to replace the friction drive drum, be sure that the stop on the drum hits the stop on the condenser before the gang rotor is either completely meshed or completely open (maximum or minimum position).

MODELS 62-310, 62-410
Battery Data

MONTGOMERY-WARD & CO.

Batteries Required

The batteries and voltages required are shown in Figs. 2 and 3. The "A" drain is .6 amperes at 2 volts while the "B" drain is discussed below.

"B" Battery Life

The majority of potential complaints on short "B" battery life can be prevented if proper instructions are given to the customer at the time the receiver is installed.

Class "B" amplification is used in the output stage and the "B" battery consumption will, therefore, depend upon the output volume. The "B" consumption will also depend, to some extent, upon the strength of the incoming signal as the latter affects the AVC voltage. When no signal is being received the "B" drain is 21 milliamperes. When the volume control is at maximum and with high output volume, the "B" drain can become 47 milliamperes. **A milliammeter in the "B" line will quickly determine if the "B" drain is excessive or normal.**

As the dial lamp is not turned on except when tuning in a station, it is easy to forget to turn the radio off. When this happens, the radio may be on as long as 24 hours or more. A continuous drain of this kind for a long period will shorten the life of the "B" batteries considerably. **Caution the customer regarding this.**

"C" Battery

Any special "C" battery may be used from which a 10½ volt connection can be obtained. It is connected as shown in Fig. 3.

"A" Battery (Models with Voltage Regulator)

Models equipped with the voltage regulator on the back panel of the chassis may use any type of "A" battery delivering from 2 to 3 volts.

3 Volt Dry "A" Battery—When this type of battery is used, turn the voltage regulator pointer (See Fig. 5) to the left as far as possible. The purpose of this regulator is to reduce the voltage of the 3 volt battery to the 2 volts required by the tubes. Keep this pointer turned to the left as far as possible. Advance it one-half mark when reception gets weak. This should be about once a week if the radio is used from two to three hours per day. If it is used from four to five hours a day, it will generally be necessary to turn the pointer up one mark a week.

Caution the customers not to turn the pointer up higher than necessary as it will burn out the tubes and run down the battery. Also tell them to turn the pointer back to the starting position when a new 3 volt "A" battery is installed.

2 Volt Storage Battery—When this type of battery is used, turn the voltage regulator pointer to the position on the scale marked "2 Volt storage battery", and leave it there at all times.

"A" Battery (Models without Voltage Regulator)

These models are designed for use with a 2 volt storage battery. Any other battery of higher voltage, if connected directly, will damage the tubes.

Air Cell "A" Battery—If this type of battery is used, a series resistor will be required to reduce the voltage to the proper level of 2 volts for the tube filaments.

Testing Batteries

If the receiver does not operate satisfactorily test the batteries under load. A high resistance meter is required for the "B" and "C" voltages. If any of the batteries are considerably below their rated voltage, new ones should be used. When the "B" batteries are replaced the "C" battery should also be replaced. The reason for this is that the "C" drain is such that the "C" battery is run down in about the same time as the "B" batteries.

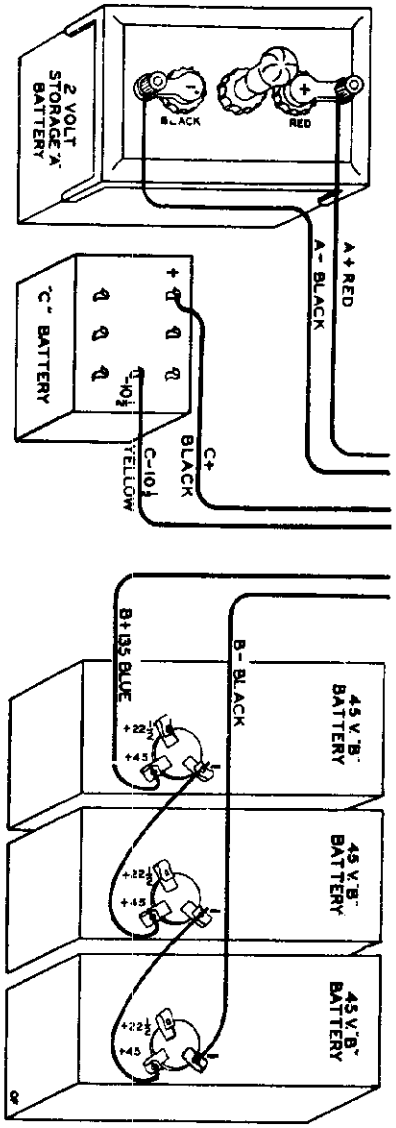


Fig. 3—"A", "B" and "C" Battery Connections

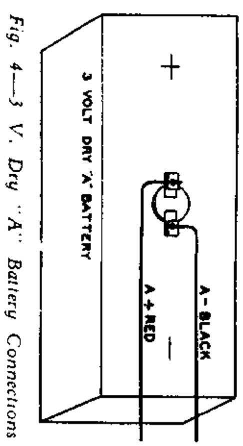


Fig. 4—3 V. Dry "A" Battery Connections

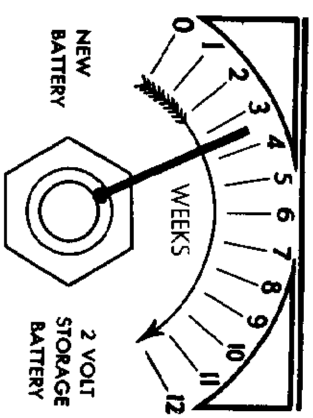
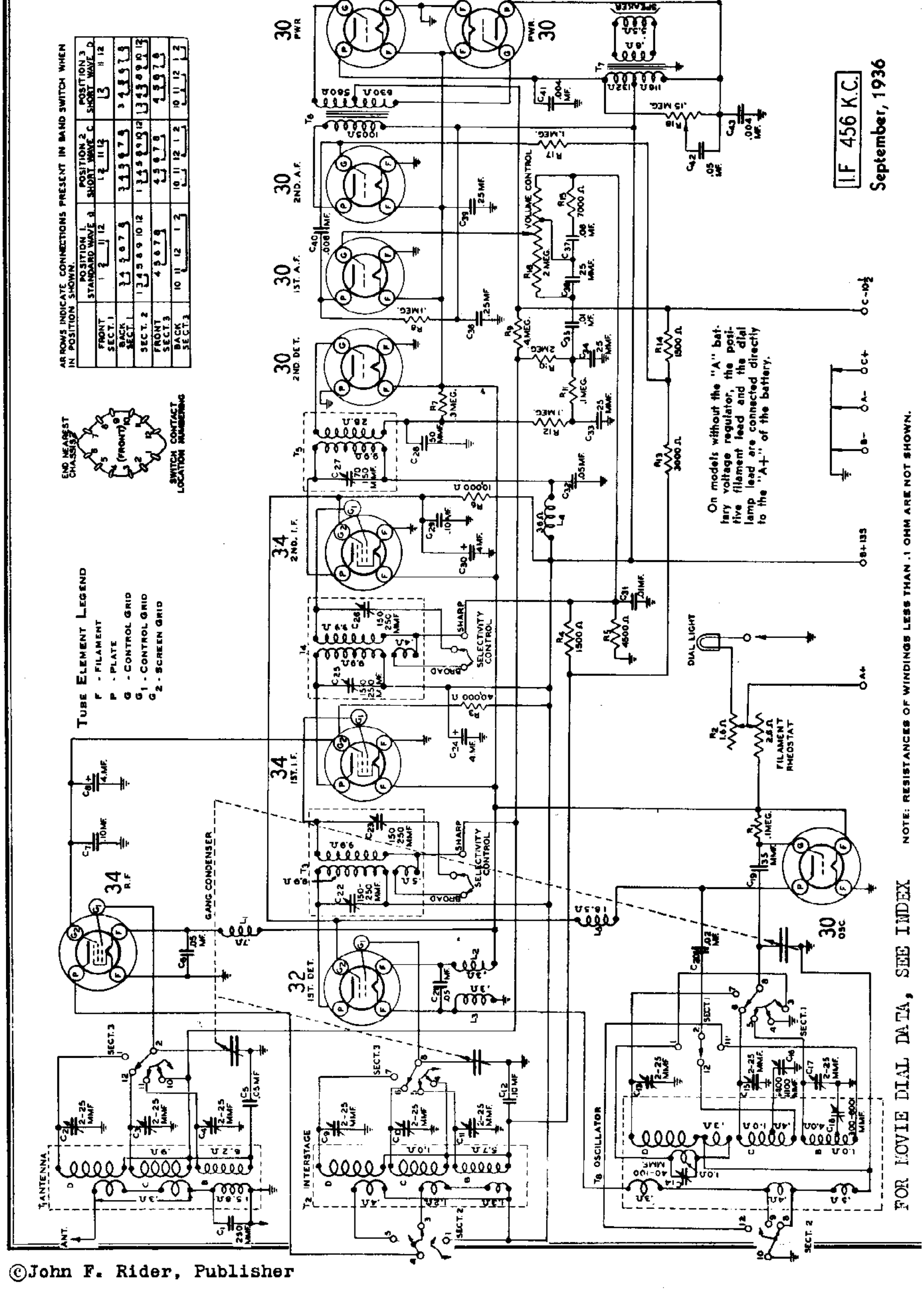


Fig. 5—"A" Battery Voltage Regulator

MODELS 62-310, 62-410
Schematic



MODELS 62-310, 62-410
Socket, Trimmers, Coils
Voltage, Sensitivity

MONTGOMERY-WARD & CO.

SPECIFICATIONS

Input Voltages and Currents

"A" Battery .... 2 Volts—.6 Amperes
"B" Batteries .... 135 Volts—21 to 47 Ma.
"C" Battery .... 10½ Volts

Power Output - - - - 1.4 Watts Undistorted

Selectivity - 21 KC Broad at 1000 times Signal (Sharp)

Intermediate Frequency - - - - - - 456 KC

Speaker - - - - - - - - - 8" P. M. Dynamic

Tuning Frequency Range

B Range........................ 528 to 1730 KC.
C Range........................ 1710 to 5800 KC.
D Range........................ 5750 to 18300 KC.

Sensitivity

B Range.................. 1 to 3 Microvolts Absolute
C Range.................. 1 to 4 Microvolts Absolute
D Range.................. 1 to 7 Microvolts Absolute

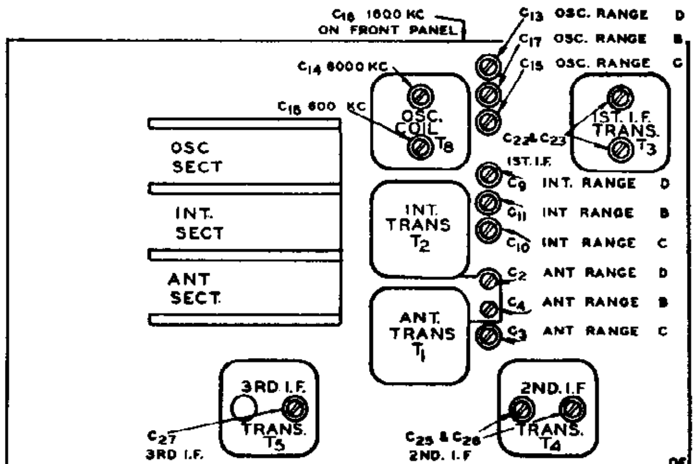


Fig. 6—Location of Trimmers

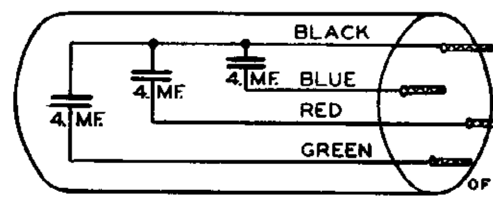


Fig. 9—Electrolytic Condenser Internal Connections

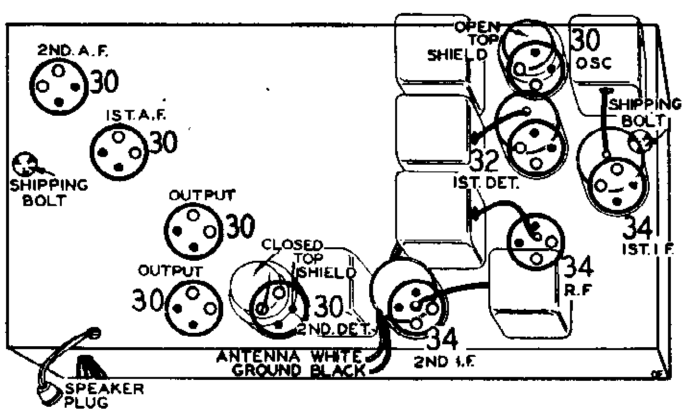


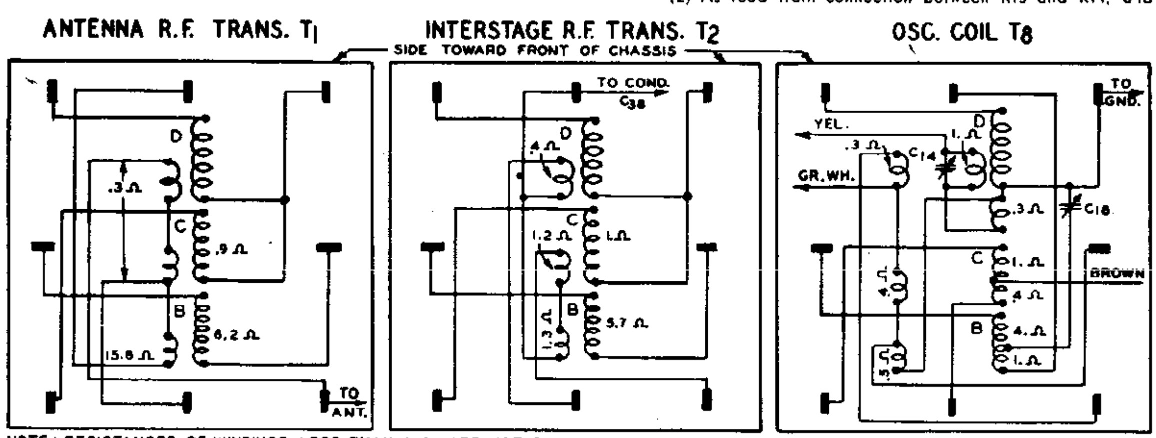
Fig. 7—Location of Tubes

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground
Band Switch in Standard Wave Position

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Control Grid to Ground
34	R. F.	2.0	135	65	
32	1st Det.	2.0	135	90	6
30	Osc.	2.0	90		
34	1st I. F.	2.0	135	65	
34	2nd I. F.	2.0	135	90	4.5
30	2nd Det.	2.0			
30	1st A. F.	2.0	75		4.5 (1)
30	2nd A. F.	2.0	132		9 (2)
30	Power	2.0	135		10.5

(1) Volume control at minimum setting.
(2) As read from connection between R13 and R14, and ground.



NOTE: RESISTANCES OF WINDINGS LESS THAN .1 Ω ARE NOT SHOWN.

Fig. 8—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

MONTGOMERY-WARD & CO.

Alignment and Calibration

Alignment Procedure

Correct alignment is extremely important in connection with all wave radios. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 1800, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 6.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C17) until maximum output is obtained. The location of this trimmer is shown in Fig. 6.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Turn the calibration screw (under color filter) until the 1500 KC mark on the dial scale is at the vertical red line on the screen. If the film drum cannot be turned a sufficient amount by means of the calibration screw, loosen the 2 screws inside the drum which hold it in place. Adjust the position of the drum and tighten the screws. The early models do not have the calibration screw mentioned above. These models must be adjusted by loosening the drum screws.

Adjust the interstage Range B trimmer (C11) and antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 600 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C15) until maximum output is obtained. See Fig. 6 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C10) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 1800 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C13) until maximum output is obtained. See Fig. 6 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage and antenna Range D trimmers, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 6000 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

General Service Data

Tubes

The tubes used in this receiver are of the 2 volt series. All of them are of the filament or directly heated types. All of them have a 2 volt filament and should not be connected to a power supply not intended for this type of tube. **Maximum filament voltage range is 1.8 to 2.0 volts. Operation of the tubes at under or over this value will be injurious to the tubes and may affect operation of the receiver.**

Voltages

Check the voltages at the sockets to see if correct values are being delivered to the tubes. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together. The volume control should be turned to the right or maximum position.

All of the voltage readings as shown in the chart are read with a 1,000 ohm-per-volt meter. As high a range as possible should be used. In general, the higher the resistance of the meter, the more accurate the reading will be.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condition. These voltages are typical of the sets but will vary slightly with variations in individual receivers, tubes, test equipment used and battery voltages.

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 2. In contact locations not used, the number applying to that particular location is not employed.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Planetary Drive Assembly

The planetary assembly is the unit that is integral with the tuning shaft.

If the nut on the back end of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect.

If this nut is too loose, the drive will slip in slow speed. The remedy in this case, of course, is to tighten the nut.

Should the condenser drive cord slip when the planetary pulley is turning, inspect the tuning condenser, drive drum and film drum to see if they are turning properly or if they are being obstructed in some way.

If the drive turns unevenly (rough in spots), this may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

Dial and Drive Assembly

Complete information regarding the movie dial and drive assembly will be found in the Movie Dial Manual No. 108.

MODELS 62-313, 62-314
Voltage, Socket, Coils
Trimmers, Phono data

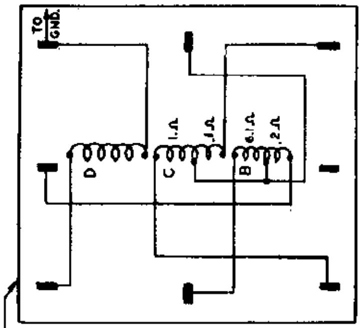
MONTGOMERY-WARD & CO.

Power Consumption - 170 Watts (At 115 volts 60 cycles)

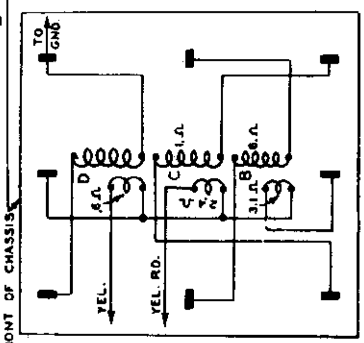
Power Output . . . . . . 20 Watts Undistorted

Selectivity - 19 KC Broad at 1000 times Signal (Sharp)

2ND INTERSTAGE R.F. TRANS. T3

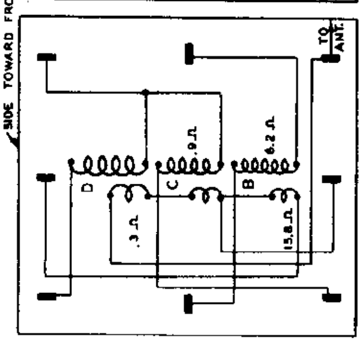


1 ST INTERSTAGE R.F. TRANS. T2



SIDE TOWARD FRONT OF CHASSIS

ANTENNA R.F. TRANS. T1



NOTE: RESISTANCES OF WINDINGS LESS THAN .1 Ω. ARE NOT SHOWN.

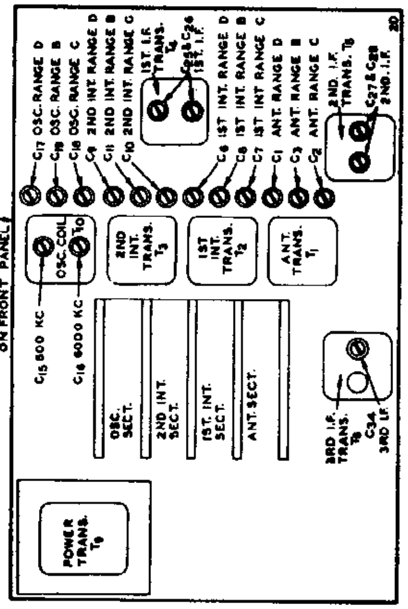
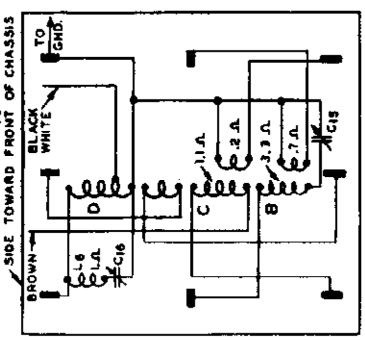


Fig. 6—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

OSC. COIL T10

SIDE TOWARD FRONT OF CHASSIS



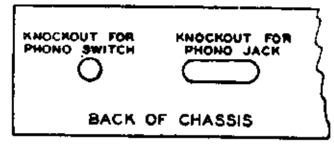


Fig. 8—Location of Phono Knockouts

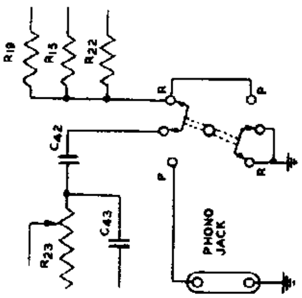


Fig. 3—Location of Trimmers

Fig. 7—Phonograph Connections

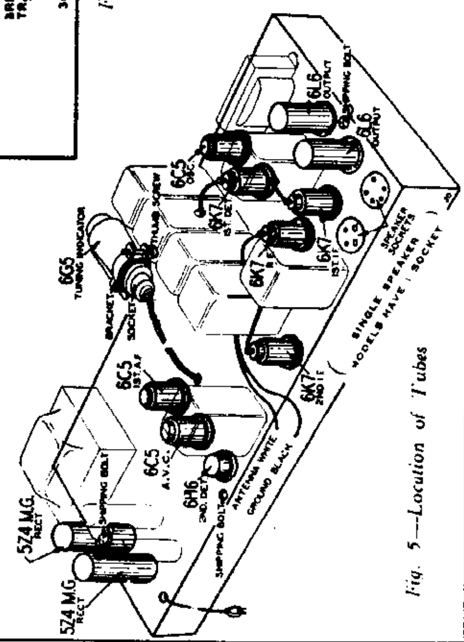


Fig. 5—Location of Tubes

Line Voltage: 115
Volume Control: Maximum

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
		VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
6K7	R.F.	0	6.2(1)	250	110	7.5(2)		6.2(1)	7.5(2)
6K7	1st Det.	0	6.2(1)	250	110			6.2(1)	9.0
6C5	Osc.	0	6.2(1)	110				6.2(1)	
6K7	1st I.F.	0	6.2(1)	250	110	7.5		6.2(1)	7.5(2)
6K7	2nd I.F.	0	6.2(1)	250	145	5(2)		6.2(1)	5.0
6H6	2nd Det.	0	6.2(1)					6.2(1)	
6C5	A.V.C.	0	6.2(1)	5(3)				6.2(1)	0.5
6C5	1st A.F.	0	6.2(1)	130				6.2(1)	6.0
6L6	Power	0	6.2(1)	350	250	20(4)		6.2(1)	
5Z4MG	Rectifier	0	5.0(5)		1024(6)		1024(6)		5.0(5)
6G5	Tuning Indicator	Plate to Ground 25(3)		Target to Ground 250		Cathode to Ground 0		Across Heater 6.2 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Subject to variation.
(3) As read with 500,000 ohm meter.
(4) As read across R-30.
(5) A.C. voltage as read across heater terminals 2 and 8.
(6) A.C. voltage as read across terminals 4 and 6.

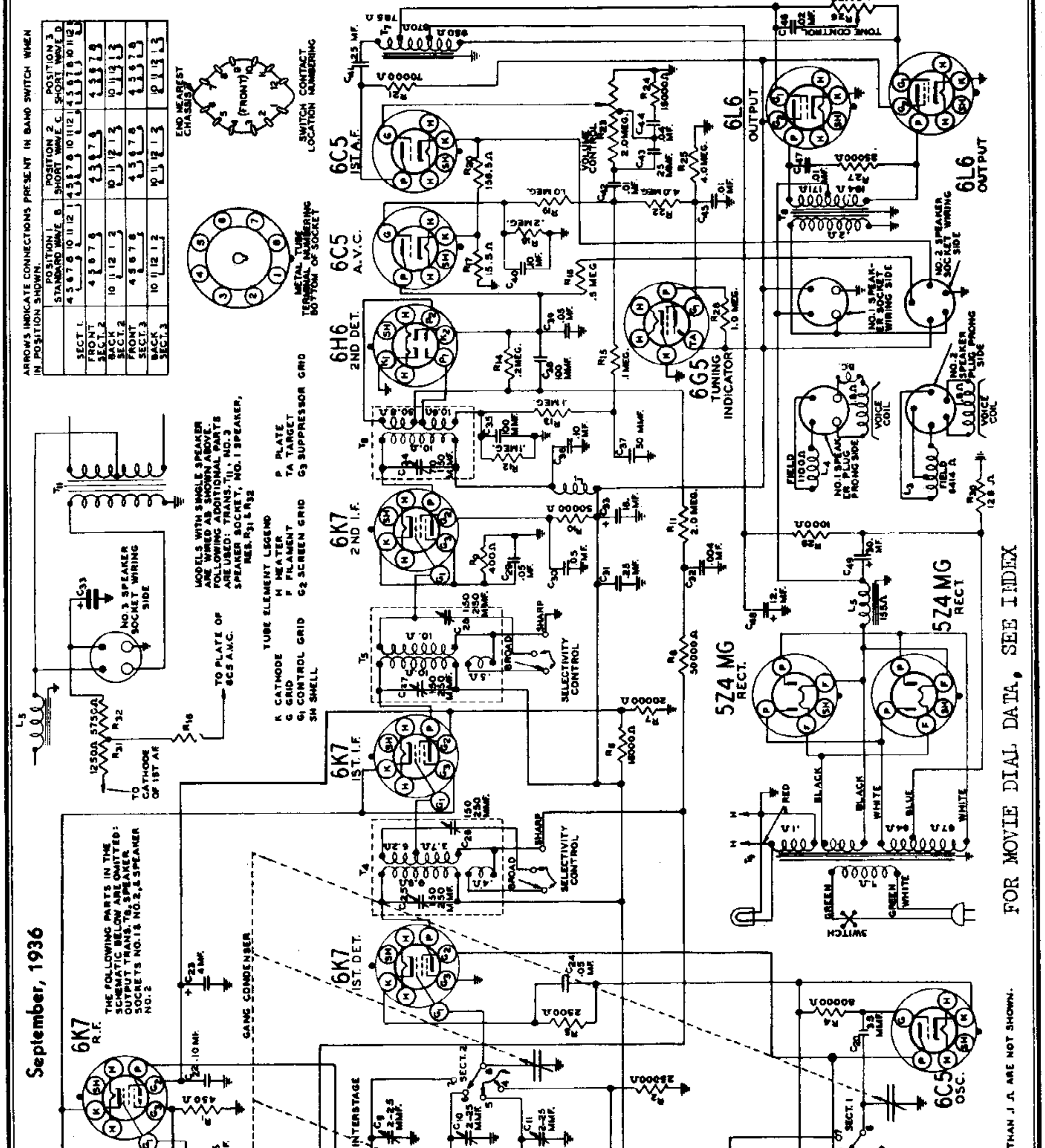
Tuning Frequency Range
B Range . . . . . . 529 to 1730 KC.
C Range . . . . . . 1710 to 5800 KC.
D Range . . . . . . 5750 to 18300 KC.

Sensitivity
B Range . . . . . . 1.0 Microvolt Absolute
C Range . . . . . . 0.5 to 3 Microvolts Absolute
D Range . . . . . . 1.0 to 5 Microvolts Absolute

MODELS 62-313, 62-314

Schematic

MONTGOMERY-WARD & CO.



Alignment and Calibration

Correct alignment is extremely important in connection with all wave radios. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 1800, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C19) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Turn the calibration screw (under color filter) until the 1500 KC mark on the dial scale is at the vertical red line on the screen. If the film drum cannot be turned a sufficient amount by means of the calibration screw, loosen the 2 screws inside the drum which hold it in place. Adjust the position of the drum and tighten the screws. The early models do not have the calibration screw mentioned above. These models must be adjusted by loosening the drum screws.

Adjust the 1st and 2nd interstage Range B trimmer (C8 and C11) and antenna Range B trimmer (C3) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C18) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range C trimmers (C7 and C10) and antenna Range C trimmer (C2) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 1800 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C17) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range D trimmers (C6 and C9) and antenna Range D trimmer (C1) to maximum.

When adjusting the 2nd interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Planetary Drive Assembly

The planetary assembly is the unit that is integral with the tuning shaft.

If the nut on the back end of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect.

If this nut is too loose, the drive will slip in slow speed. The remedy in this case, of course, is to tighten the nut.

Should the condenser drive cord slip when the planetary pulley is turning, inspect the tuning condenser, drive drum and film drum to see if they are turning properly or if they are being obstructed in some way.

If the drive turns unevenly (rough in spots), this may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

Twenty-five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required as shown in the parts list. Knockouts are provided in the back of the chassis for mounting the phono jack and phono switch—See Fig. 8.

The phono switch should be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. This is done by removing the wire connecting condenser C42 to resistors R15, R19 and R22, at the terminal strip located near the back of the planetary drive. Cut this wire to correct length and solder it to the proper terminal on the phono switch—See Fig. 7, keeping the wire close to the back of the chassis base.

A wire is then connected from the lug on the above mentioned terminal strip to which C42 was connected, to the correct terminal on the phono switch—See Fig. 7. This wire should be brought directly to the back of the chassis at a point close to the phono jack pin tip nearest the channel provided for a chassis mounting bolt, and then routed over to the switch.

Complete the other connections as illustrated in Fig. 7.

It will be necessary to re-route the AC line cord away from the 6C5 1st audio grid lead by running it between the volume control and the filter choke and then straight back to the hole provided for it in the chassis base.

If a hum is heard when the phono pickup is touched, reverse the two pickup leads.

Adding 6N5 Tuning Eye Tube
to 6 Volt "B" Batteryless Movie Dial Radios

SERVICE MANUAL SUPPLEMENT

Models 62-273 and 62-283 differ from the earlier models 62-327, etc., only in the inclusion of a 6N5 cathode ray tuning eye tube. This service manual gives the tuning eye circuit and parts list and describes the changes necessary to convert the earlier models to the later by adding the tuning eye.

Installation of Tuning Eye in Early Models

Remove the chassis from the cabinet. Drill the necessary hole in the panel from the front of the cabinet to avoid splitting the veneer—See Fig. 1 for location of the hole. As shown in this illustration, the location of the hole depends upon whether the cabinet is a console or a table model. The location of the tuning eye bracket is shown in dotted lines in Fig. 1. This is attached to the back of the panel by means of two small wood screws.

The circuit connections are made in the following manner: Bring the cable from the 6N5 tube socket through the hole in the chassis base adjacent to the oscillator coil—See Fig. 3 in service manual No. 105 for location of the oscillator coil.

Remove the 3 megohm resistor R14 as shown in Figs. 2 and 3. Solder the terminal strip to the chassis base at the point shown in Fig. 3. Connect resistors R19, R20 and R21 and the wires of the cable as shown schematically and pictorially in Figs. 2 and 3.

The brown lead of the cable, shown soldered to the chassis base, is the shorter of the two brown leads of the cable.

Do not remove any parts, except resistor R14, or any wires from the circuit. The connections to some terminals in Fig. 3 are not shown in order to simplify the illustration.

New Parts Used

(Not Shown in Manual No. 105 Parts List)

Bin No.	Part No.	Description	Selling Price
	21A81	6N5 KIT ASSEMBLY COMPLETE (LESS TUBE).....	$ .84
		Includes the following parts:	
	13X291	6N5 Tube Socket and Cable Assembly...........	.26
	4A17	Terminal Strip	.04
	25A71	Tube Clamp Assembly—Includes screws...........	.20
	9X16	Cardboard Spacer	.04
	4X136	Escutcheon for Tuning Eye—Includes Screws.......	.10
10971	A94254	Resistor R19 250,000 Ohm 0.2 Watt	.08
11115	A94205	Resistor R20 2 Megohm 0.2 Watt	.08
11188	A94105	Resistor R21 1 Megohm 0.2 Watt	.08

Type 6N5 Tuning Eye Tube is not included in the above Assembly

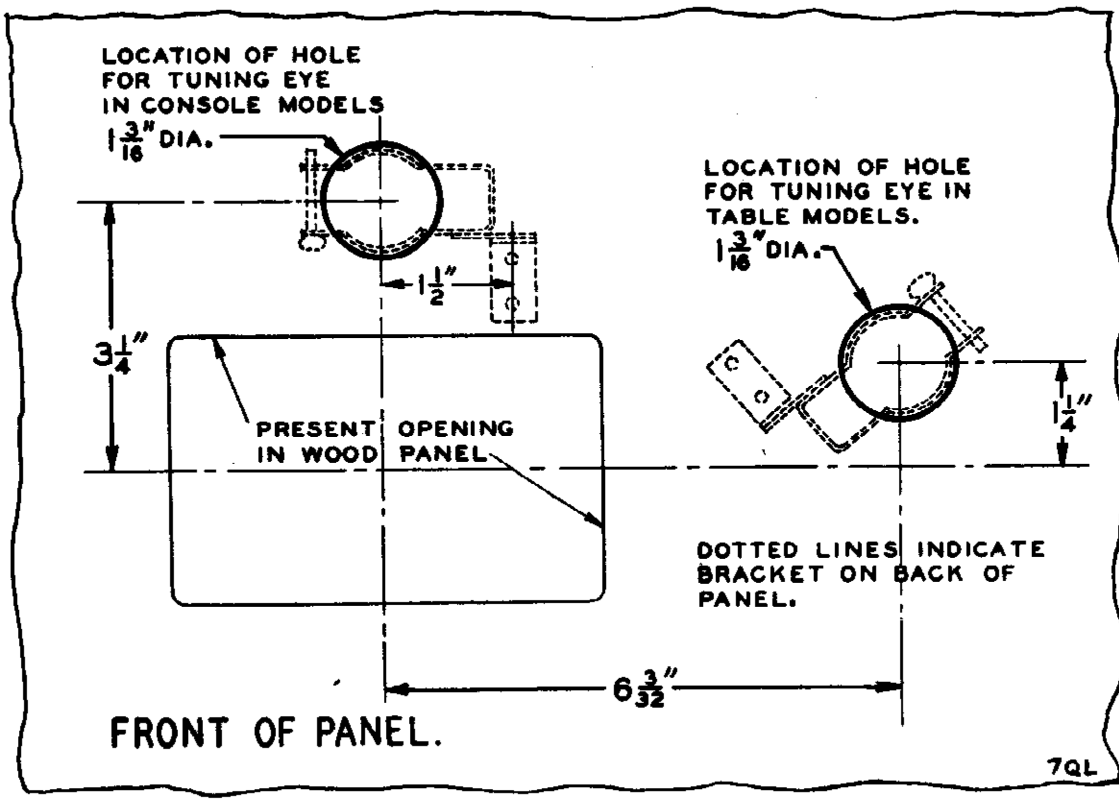
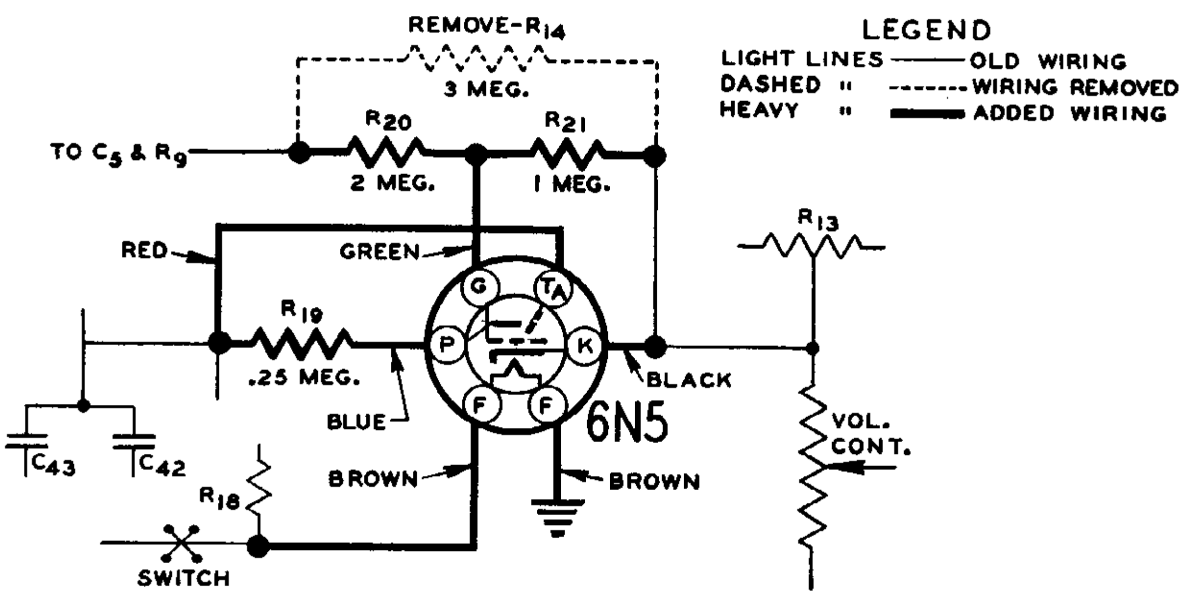


Fig. 1—Location of Holes for Panel Drilling

MODELS 62-273, 62-283
Schematic, Chassis Wiring MONTGOMERY-WARD & CO.



Dec. 1936

Fig. 2—Supplementary Schematic Circuit Diagram

FOR COMPLETE DATA, SEE MODEL 62-327

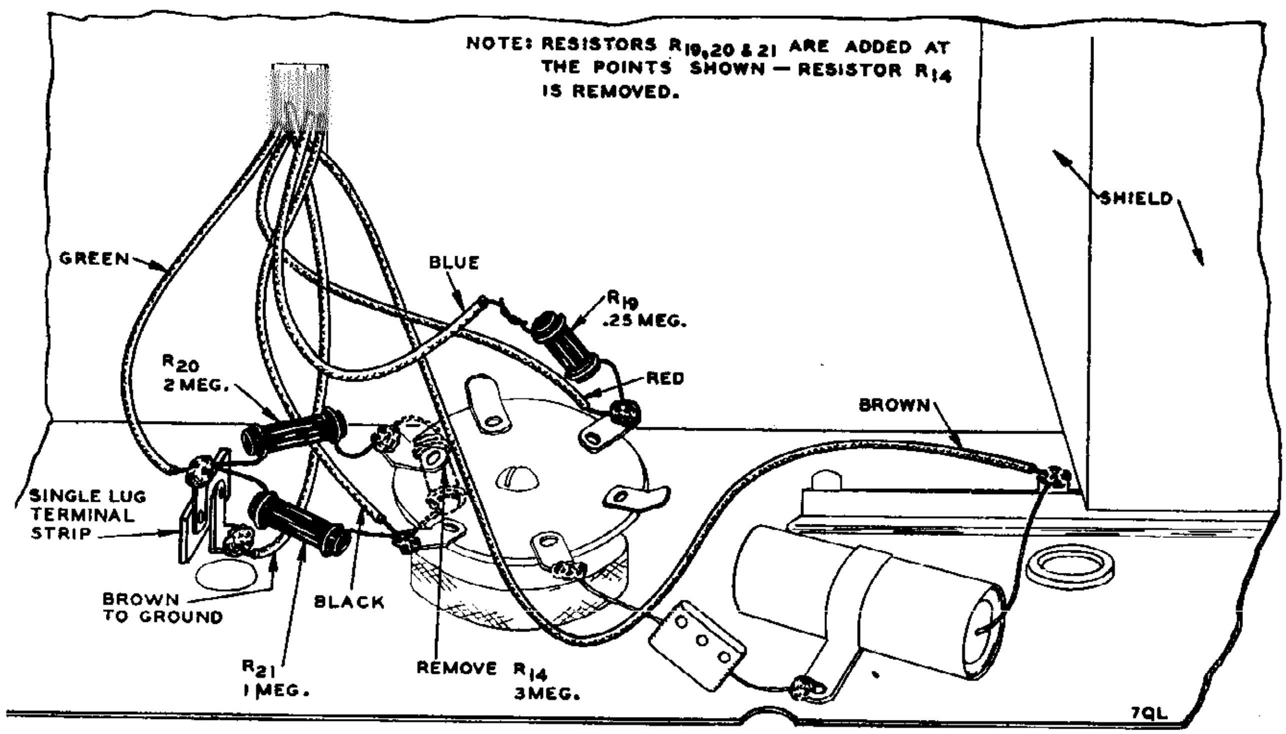
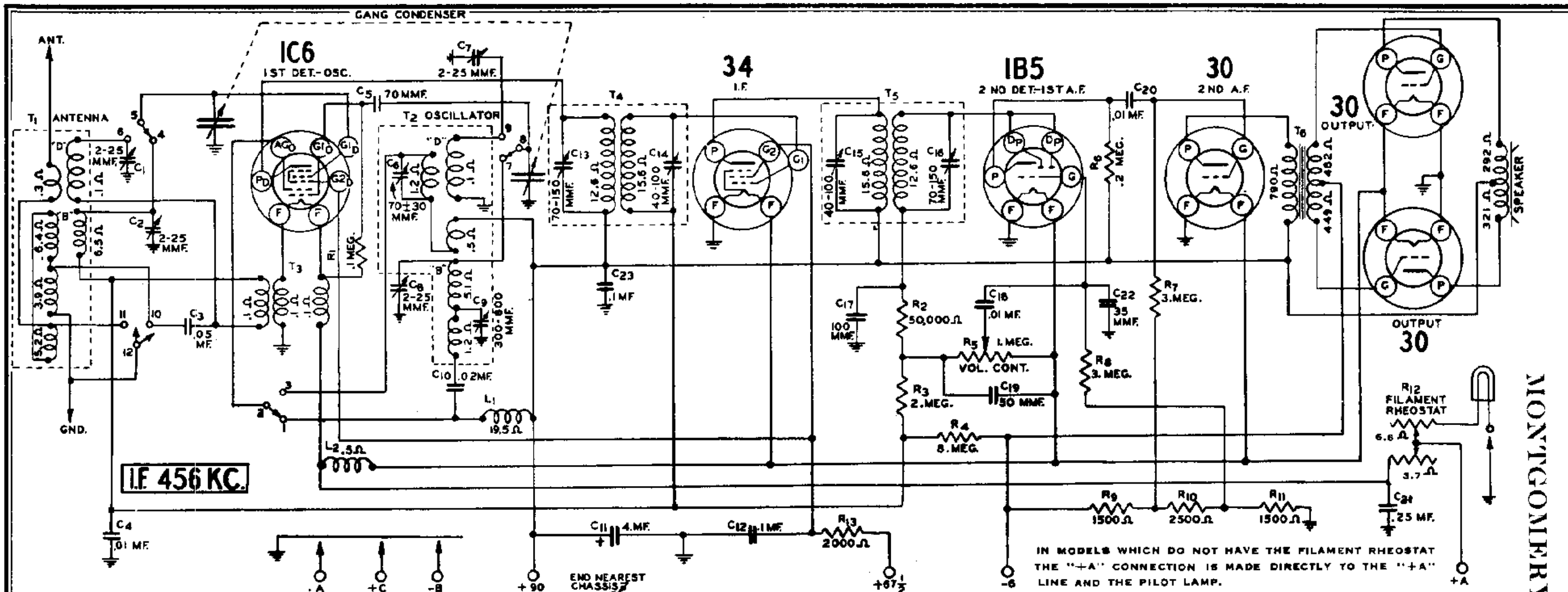


Fig. 3—Location of Parts Added to Chassis and Their Connections

MODELS 62-326, 62-336, 62-426, 62-436

Schematic, Voltage Socket, Trimmers

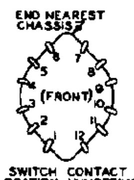
MONTGOMERY-WARD & CO.



IN MODELS WHICH DO NOT HAVE THE FILAMENT RHEOSTAT THE "+A" CONNECTION IS MADE DIRECTLY TO THE "+A" LINE AND THE PILOT LAMP.

ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1 STANDARD WAVE "B"	POSITION 2 SHORT WAVE "D"
FRONT	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12
BACK		



SWITCH CONTACT LOCATION NUMBERING

TUBE ELEMENT LEGEND

- F - FILAMENT
- P - PLATE
- G - CONTROL GRID
- G_1 - CONTROL GRID
- G_2 - SCREEN GRID
- D_P - DIODE PLATE
- $G1_O$ - CONTROL GRID (OSC.)
- $G1_D$ - CONTROL GRID (DET.)
- $G2_O$ - SCREEN GRID (DET.)
- AG_O - ANODE GRID (OSC.)
- P_D - PLATE (DET.)

July 1936

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground — Band Switch in Standard Wave Position

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Grid to Ground
1C6	1st Det.-Osc.	2.0	90 90(1)	60	6(2)
34	I.F.	2.0	90	60	6(2)
1B5	2nd Det.-1st A.F.	2.0	30(3)		1.5(4)
30	2nd A.F.	2.0	90		4.0(5)
30	Power	2.0	90		6

(1) Anode Grid to ground.
(2) As read at "C" Battery.
(3) As read with 500,000 ohm meter.
(4) As read from negative end of R11 to ground.
(5) As read from negative end of R10 to ground.

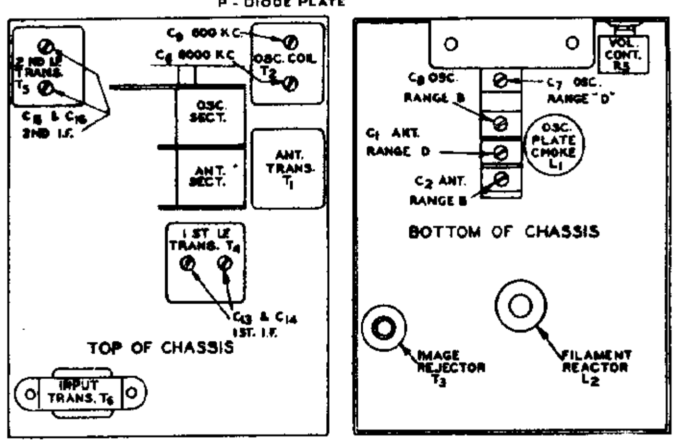


Fig. 7—Location of Trimmers

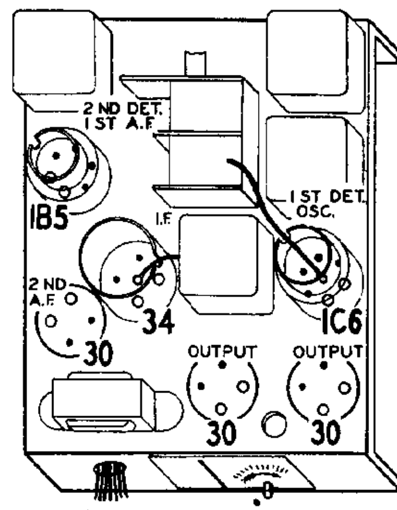


Fig. 9—Tube Arrangement

MODELS 62-326, 62-336
62-426, 62-436
Coils, Batt. Connections

MONTGOMERY-WARD & CO.

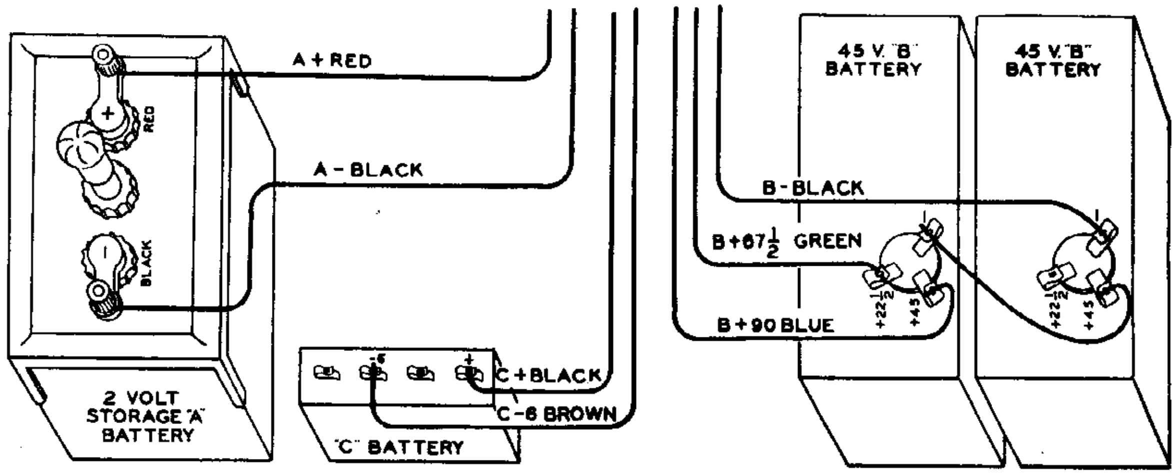


Fig. 3—"A", "B", and "C" Battery Connections

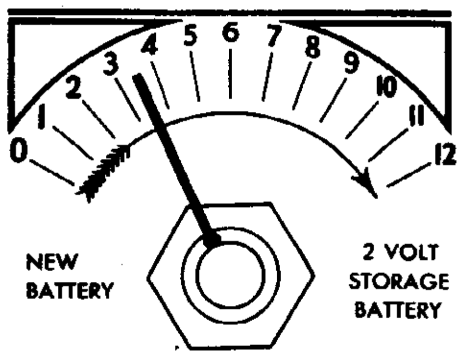


Fig. 6—"A" Battery Voltage Regulator

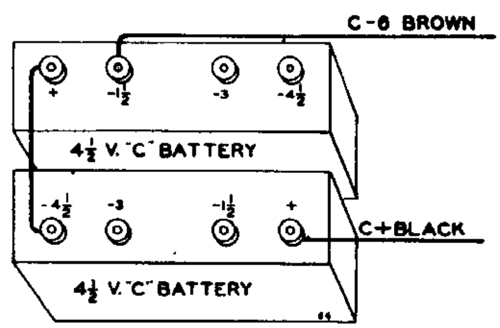


Fig. 4—Optional "C" Battery Connections

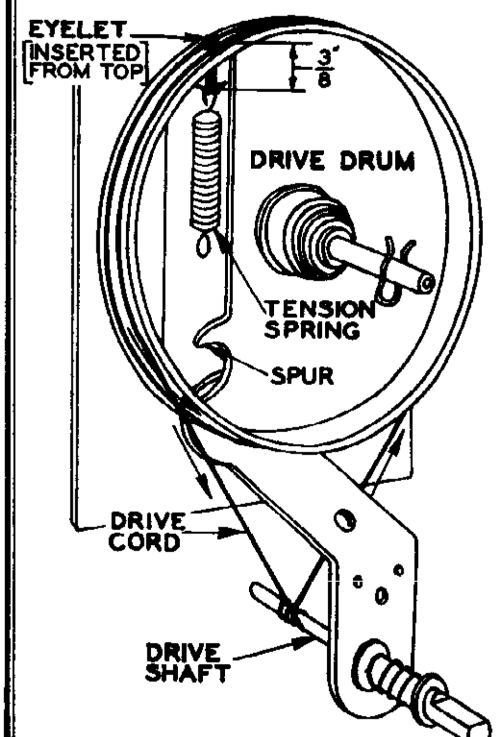


Fig. 10—Replacing Drive Cord

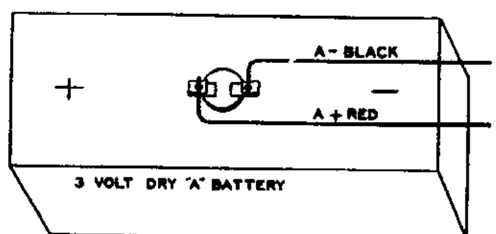


Fig. 5—3 V. Dry "A" Battery Connection

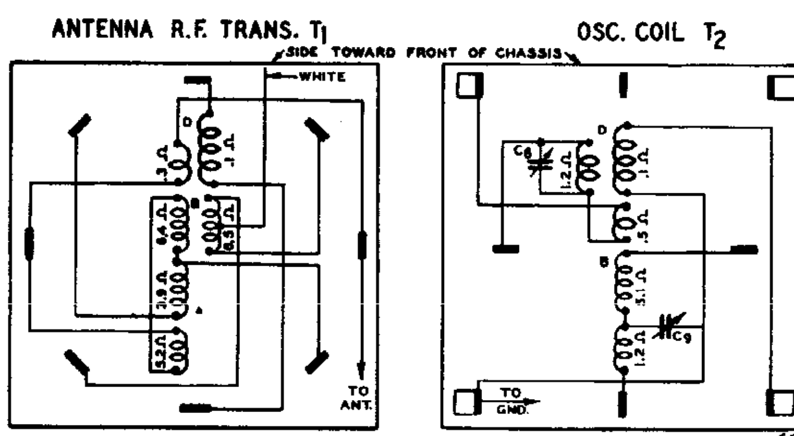


Fig. 8—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

MONTGOMERY-WARD & CO

Input Voltages and Currents

"A" Battery - - - - - - 2 Volts—.42 Amperes
"B" Batteries - 90 & 67½ Volts—11.5 to 25.5 Ma.
"C" Battery - - - - - - - - - - 6 Volts

Power Output - - - 400 Milliwatts Undistorted

Selectivity - - 30 KC Broad at 1000 Times Signal

Intermediate Frequency - - - - - - 456 KC

Speaker - - - 6 inch Magnetic—Mantel Models
8 inch Magnetic—Console Models

Tuning Frequency Range

B Range - - - - - - - - - 528 to 1730 KC
D Range - - - - - - - - - 5650 to 16,000 KC

Sensitivity

B Range Average - 25 to 35 Microvolts Absolute
D Range Average - 25 to 60 Microvolts Absolute

Alignment and Calibration

Alignment Procedure

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 16,000, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the radio to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 7.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the radio through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C8) until maximum output is obtained. The location of this trimmer is shown in Fig. 7.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

Adjust the antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer (C9) until the peak of greatest intensity is obtained. See Fig. 7 for location of this trimmer.

Range D Alignment

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC. It may be necessary to increase the input signal to hear the image.

16,000 KC Adjustment

Set the signal generator for 16,000 KC.

Connect the antenna lead of the radio through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (short wave band).

Adjust the oscillator Range D trimmer (C7) until maximum output is obtained. See Fig. 7 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the antenna Range D trimmer (C1) to maximum. When adjusting this trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC (C6) trimmer until the peak of greatest intensity is obtained. See Fig. 7 for location of this trimmer.

General Service Data

Tubes

The tubes used in this receiver are of the 2 volt series. All of them are of the filament or directly heated types. All of them have a 2 volt filament and should not be connected to a power supply not intended for this type of tube. **Maximum filament voltage range is 1.8 to 2.0 volts. Operation of the tubes at under or over this value will be injurious to the tubes and may affect operation of the receiver.**

Voltages

Check the voltages at the sockets to see if correct values are being delivered to the tubes. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together. The volume control should be turned to the right or maximum position.

All of the voltage readings as shown in the chart are read with a 1,000-ohm-per-volt meter. As high a range as possible should be used. In general, the higher the resistance of the meter, the more accurate the reading will be.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condition. These voltages are typical of the sets but will vary slightly with variations in individual receivers, tubes, test equipment used and battery voltages.

MODELS 62-326, 62-336
62-426, 62-436
Battery Data
Drive Cord Replacements

MONTGOMERY-WARD & CO.

BATTERIES REQUIRED

The batteries and voltages required are shown in Figs. 2 and 3. The "A" drain is .42 amperes at 2 volts while the "B" drain is discussed below.

"B" BATTERY LIFE

The majority of potential complaints on short "B" battery life can be prevented if proper instructions are given to the customer at the time the receiver is installed.

Class "B" amplification is used in the output stage and the "B" battery consumption will, therefore, depend upon the output volume. The "B" consumption will also depend, to some extent, upon the strength of the incoming signal as the latter affects the AVC voltage. When no signal is being received the "B" drain is 11.5 milliamperes. When the volume control is at maximum and with high output volume, the "B" drain can become 25.5 milliamperes. A milliammeter in the "B" line will quickly determine if the "B" drain is excessive or normal.

As the pilot lamp is not turned on except when tuning in a station, it is easy to forget to turn the radio off. When this happens, the radio may be on as long as 24 hours or more. A continuous drain of this kind for a long period will shorten the life of the "B" batteries considerably. Caution the customer regarding this.

"C" BATTERY

Any special "C" battery may be used from which a 6 volt connection can be obtained. It is connected as shown in Fig. 3.

If standard 4 1/2 Volt "C" batteries are used, connect them as shown in Fig. 4.

"A" BATTERY (MODELS WITH VOLTAGE REGULATOR)

Models equipped with the voltage regulator on the back panel of the chassis may use any type of "A" battery delivering from 2 to 5 volts.

3 Volt Dry "A" Battery - When this type of battery is used, turn the voltage regulator pointer (See Fig. 6) to the left as far as possible. The purpose of this regulator is to reduce the voltage of the 3 volt battery to the 2 volts required by the tubes. Keep this pointer turned to the left as far as possible. Advance it one-half mark when reception gets weak. This should be about once a week if the radio is used from two to three hours per day. If it is used from four to five hours a day, it will generally be necessary to turn the pointer up one mark a week.

Caution the customers not to turn the pointer up higher than necessary as it will burn out the tubes and run down the battery. Also tell them to turn the pointer back to the starting position when a new 3 volt "A" battery is installed.

2 Volt Storage Battery - When this type of battery is used, turn the voltage regulator pointer to the position on the scale marked "2 Volt storage battery", and leave it there at all times

"A" BATTERY
(MODELS WITHOUT VOLTAGE REGULATOR)

These models are designed for use with a 2 volt storage battery. Any other battery of higher voltage, if connected directly, will damage the tubes.

Air Cell "A" Battery - If this type of battery is used, a series resistor will be required to reduce the voltage to the proper level of 2 volts for the tube filaments.

TESTING BATTERIES

If the receiver does not operate satisfactorily test the batteries under load. A high resistance meter is required for the "B" and "C" voltages. If any of the batteries are considerably below their rated voltage, new ones should be used. When the "B" batteries are replaced the "C" batteries should also be replaced. The reason for this is that the "C" drain is such that the "C" batteries are run down in about the same time as the "B" batteries.

REPLACING DRIVE CORD

Take off the station pointer by removing the screw at the center of the dial.

Remove the pilot lamp assembly by pulling the socket clip upward off the dial assembly.

Remove the dial assembly by removing the two screws which secure this assembly to the chassis. One screw is located on the drive assembly bracket; the other is on a bracket attached to the top of the gang condenser. The on-off indicator cord tension spring is removed from the small bracket at the upper left hand corner of the dial (from front).

Then lay the complete dial assembly face down in front of the chassis. Remove the on-off indicator disc from the pointer shaft. It is not necessary to remove the volume control collar which holds the indicator cord of this control in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 10.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 10. Insert one end of the new drive cord from the outside through this eyelet in the drive drum.

Tie the end of the cord which has been inserted through the eyelet to one end of the tension spring.

Wrap the cord in a counter clockwise direction (facing front of chassis) around the drive drum approximately one and one-quarter turns progressing toward the front.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap this cord directly below the drive drum three and one-half turns around the drive shaft, as shown in Fig. 10, progressing toward the back of chassis.

Then bring this cord up to the drive drum and wrap it around the drum in back of cord already on the drum until it is up to the eyelet as shown in Fig. 10.

Now insert the free end of the cord through the hole in the eyelet and tie it to the end of the spring. The end of the spring when hanging free and with all slack removed from the drive cord should be 3/8" or less from the flange of the drum, as shown in Fig. 10. Cut off the surplus length of cord after it is tied to the spring.

Then secure the other end of the tension spring over the spur on the drive drum.

Turn the drive shaft back and forth several times.

Replace the dial assembly, pointer and pilot lamp assembly.

MONTGOMERY-WARD & CO.

Circuit

This radio is designed to operate from a battery power supply the values of which are shown in Figs. 2 and 3. The tubes used are of the 2 volt type. The radio is designed to operate at a very low current drain from the batteries.

Two bands are covered with a tuning range in each band as shown in the specifications above. Two band coverage is accomplished by means of two sets of antenna and oscillator coils and a single section double throw switch.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna transformer and oscillator coil assemblies and T3 is the image rejector coil assembly. The standard wave and short wave coils are indicated by the letters B and D respectively.

The band switch completes connections to the antenna transformer secondary and oscillator grid coil in use. It also disconnects the antenna transformer secondary and oscillator grid coil not in use.

The antenna transformer with tuned secondary feeds into a type 1C6 pentagrid converter tube which functions as the oscillator and 1st detector. The image rejector pickup coil which is connected to the antenna "B" range transformer, is effective in bucking out the image frequencies on the standard wave band.

The oscillator potential on the oscillator control grid of this tube modulates the electron stream from the cathode in such a manner as to impress on it the oscillator frequency which is always 456 KC above the frequency to which the R.F. amplifier is tuned. The electron stream is also modulated at the signal frequency by the detector control grid. As a result of the beating of the two frequencies, the intermediate or beat frequency of 456 KC is present in the plate circuit of this tube.

One stage of I.F. amplification is employed using a 34 tube. The primaries and secondaries of the first and second I.F. transformers are tuned by small trimmer condensers.

A type 1B5 duo-diode triode tube functions as the second detector and a one stage audio amplifier. The two diode plates are connected together. AVC voltage is applied through isolating resistors to the control grid circuits of the 1st detector and I.F. tubes. The audio voltage developed across volume control resistor R5 is applied through the movable arm to the control grid of the 1B5 tube.

Resistance coupling is used between the 1st audio tube and the 2nd audio stage which employs a 30 tube. The latter is transformer coupled to the output stage which uses two type 30 tubes in a stage of class "B" amplification. A magnetic reproducer is used.

"C" voltages are obtained from the 6 volt "C" battery connection and from a potentiometer consisting of resistors R9, R10 and R11 connected between the 6 volt "C" connection and ground.

Models with the filament rheostat are connected as shown in Fig. 2. This rheostat permits the use of a 3 volt "A" battery. As shown in Fig. 2, there are two separate variable resistors one of which controls the filament voltage and the other the pilot lamp voltage. In models which do not have the filament rheostat the "+A" connection is made directly to the "+A" line and the pilot lamp.

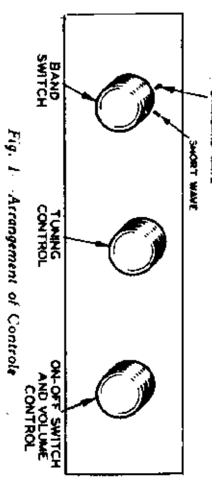


Fig. 1 Arrangement of Controls

Replacement Parts List

MISCELLANEOUS

SOCKETS

Part No.	Description	Selling Price
P-3A64	30 Tube Socket	$0.06
P-3A66	34 Tube Socket	.06
P-3A230	1B5 Tube Socket	.06
P-3A203	1C6 Tube Socket	.06

SPEAKERS

Part No.	Description	Selling Price
P-12A217	6" Magnetic Speaker	2.84
P-12A218	8" Magnetic Speaker	3.16
P-13X212	Speaker Cable and Socket Assembly	.30

KNOBS

Part No.	Description	Selling Price
P-10A69	Volume Control Knob	.08
P-10A72	Tuning Control Knob	.08
P-10A74	Band Switch Knob	.08

GENERAL

Part No.	Description	Selling Price
P-8X23	Rubber Chassis Mounting Cushions	.04
P-32X49	Tube Shield—Large	.10
P-32X32	Tube Shield—Small	.08
P-32X18	Tube Shield Base—Large	.04
P-32X30	Tube Shield Base—Small	.04
P-2X38	Felt Washers (Used behind Knobs) ea.	.04
P-17X16	Glass Dial Crystal	.10
P-28X67	Crystal Retaining Ring	.06
P-2A56	1 Section, 2 Position, Band Change Switch	.36
P-4A49	Single Lug Terminal Strip (Mounting Hole Used)	.04
P-30X14	Grid Clip only	.04
P-13X214	Antenna and Ground Lead Assembly	.14
P-13X266	A, B and C Battery Cable	.50

Prices subject to change without notice

TRANSFORMERS AND COILS

Part No.	Code	Description	Selling Price
P-9A543	T1	Antenna Trans. and Can Assembly	$1.02
P-9A544	T2	Oscillator Coil and Can Assembly	1.22
P-9A548	T3	Image Rejector	.18
P-9A545	T4	1st I. F. Trans. and Can Assembly	.72
P-9A546	T5	2nd I. F. Trans. and Can Assembly	.72
P-50X33	T6	Input Transformer	.62
P-9A547	L1	Oscillator Plate Choke	.18
P-9A612	L2	Filament Choke Coil	.10

DIAL AND DRIVE ASSEMBLY

DIAL ASSEMBLY

Part No.	Description	Selling Price
P-15A64	Dial Bracket Assembly, Less Pilot Lamp, Pilot Light Socket and Spring Clip, Pointer, and On-Off Indicator Assembly	$0.70
P-15X48	Pointer	.04
P-25A77	On-Off Indicator Disc Assembly	.08
P-7A40	Pilot Lamp	.06
P-7A8	Pilot Light Socket and Spring Clip	.06
P-25A94	Pilot Light Spring Contact Assembly (on drive shaft)	.10

RETAIL STORES: Order any parts from division superintendent at Chicago or Oakland, on stock order.

Return defective parts to division superintendent only.

There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts please be sure to mention the model number and this large letter.

DIAL AND DRIVE ASSEMBLY (Continued)

DRIVE ASSEMBLY

Part No.	Description	Selling Price
P-5A32	Drive Bracket Assembly, less Drive Drum and Pointer Shaft	$0.16
P-24X225	Drive Drum and Pointer Shaft (Mounted on Tuning Condenser Shaft)	.22
	20" Black Tuning Drive Cord doz.	.22
P-28X27	Tuning Drive Cord Tension Spring	.04
	8" On-Off Indicator Drive Cord doz.	.10
P-29X20	Brass Collar with Set Screw for Securing above Cord to Shaft	.04
P-28X44	On-Off Indicator Cord Tension Spring	.04

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	Selling Price
P-46X80	C3	.05 mf.	180	$0.06
P-46X188	C4	.01 mf.	180	.08
P-46X187	C10	.02 mf.	180	.08
P-46X98	C12	.1 mf.	180	.10
P-46X124	C18	.01 mf.	180	.08
P-46X124	C20	.01 mf.	180	.08
P-46X197	C21	.25 mf.	180	.12
P-46X98	C23	.1 mf.	180	.10

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage	Selling Price
P-45X212	C11	4.0 mf.	100 Dry	.32

MOLDED

Part No.	Code	Capacitance	Selling Price
P-47X62	C5	70 mmf.	.06
P-47X67	C17	100 mmf.	.04
P-47X56	C19	50 mmf.	.06
P-47X53	C22	35 mmf.	.04

TRIMMER

Part No.	Code	Description	Selling Price
P-17A52	C1	2-25 mmf. Range "D" Antenna Trimmer	.22
	C2	2-25 mmf. Range "B" Antenna Trimmer	
	C7	2-25 mmf. Range "D" Oscillator Trimmer	
	C8	2-25 mmf. Range "B" Oscillator Trimmer	
P-17A35	C6	40-100 mmf. 6000 KC Trimmer	.22
	C9	300-600 mmf. 600 KC Trimmer	
P-17A51	C13	70-150 mmf. 1st I. F. Trimmer	.18
	C14	40-100 mmf.	
P-17A51	C15	70-150 mmf. 2nd I. F. Trimmer	.18
	C16	40-100 mmf.	

MISCELLANEOUS

Part No.	Description	Selling Price
P-14A54	2 Gang Condenser less Drive Drum and Dial Assembly	$1.20

RESISTORS

CARBON

Part No.	Code	Resistance	Watts	Selling Price
P-A95104	R1	100,000 Ohm	0.2	$0.06
P-A95503	R2	50,000 Ohm	0.2	.06
P-A94206	R3	2.0 Megohm	0.2	.08
P-A94806	R4	8.0 Megohm	0.2	.08
P-A95204	R6	200,000 Ohm	0.2	.06
P-A95306	R7	3.0 Megohm	0.2	.06
P-A95305	R8	3.0 Megohm	0.2	.06
P-A94152	R9	1,500 Ohm	0.2	.08
P-A94252	R10	2,500 Ohm	0.2	.08
P-A94152	R11	1,500 Ohm	0.2	.08
P-A95202	R13	2,000 Ohm	0.2	.06

VARIABLE

Part No.	Code	Resistance	Description	Selling Price
P-34X218	R5	1.0 Megohm	Volume Control and On-Off Switch	.50
P-43X55	R12	3.7 Ohm / 6.8 Ohm	Filament Rheostat	.24

MODELS 62-327, 62-337
62-427, 62-437 MONTGOMERY-WARD & CO.

Socket, Trimmers, Coils
Voltage, Batt. Connections

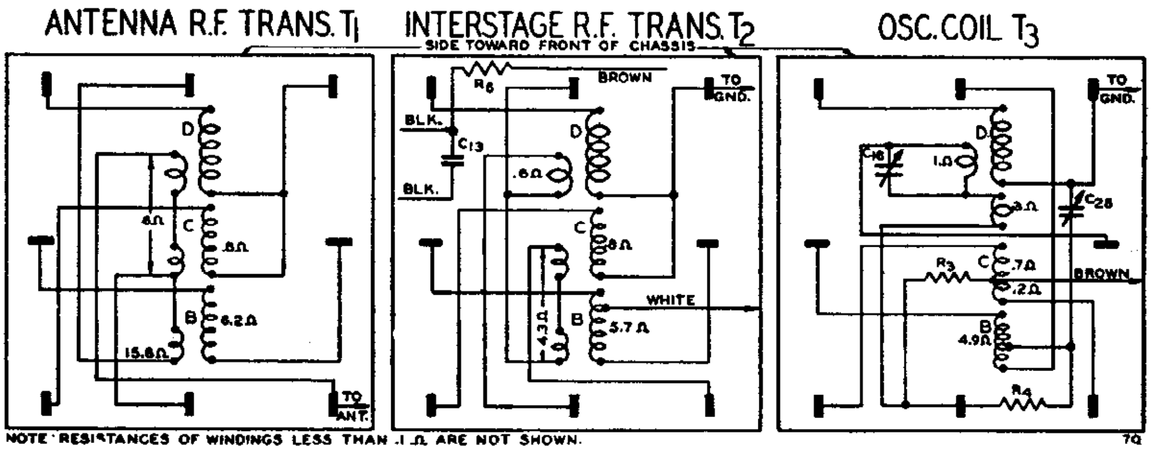


Fig. 7—R.F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

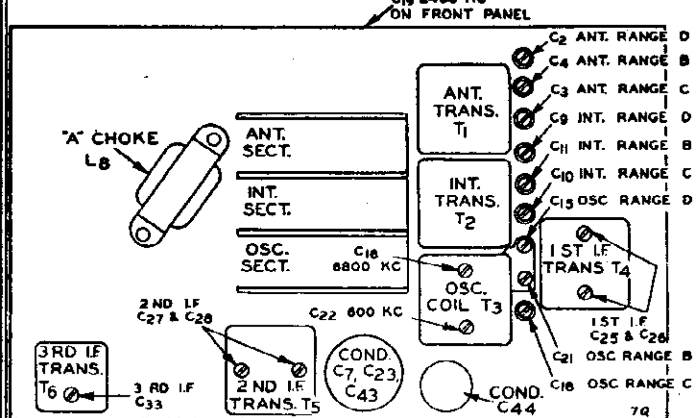


Fig. 3—Location of Trimmers

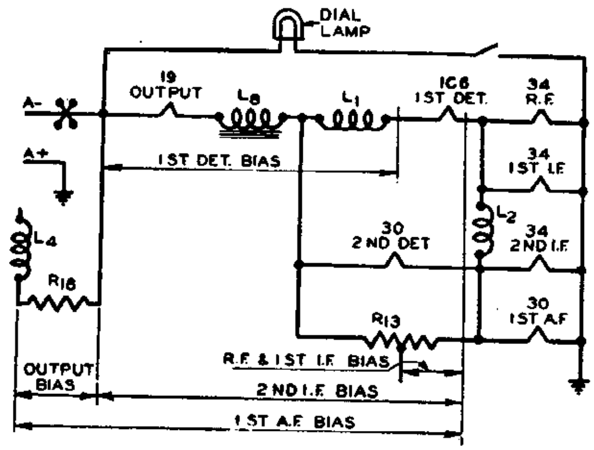


Fig. 5—Abridged wiring diagram showing filament wiring system and points at which no-signal bias voltages are obtained.

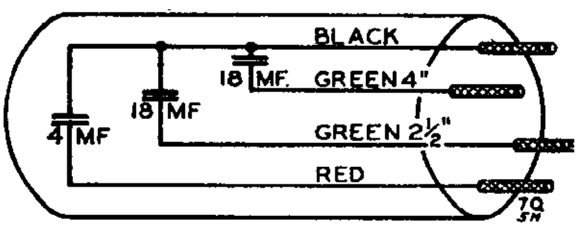


Fig. 8—Electrolytic Condenser Internal Connections

FOR MOVIE DIAL DATA, SEE INDEX

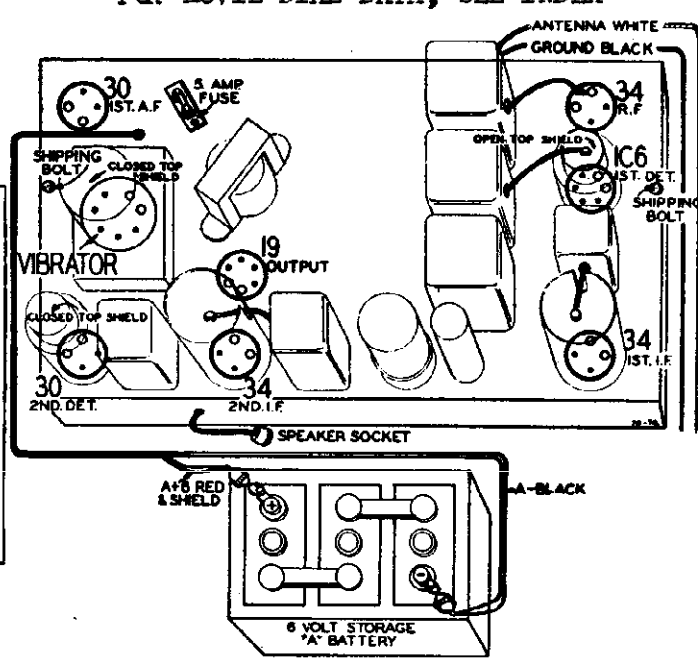


Fig. 4—Tube Arrangement and Battery Connections

VOLTAGES AT SOCKETS

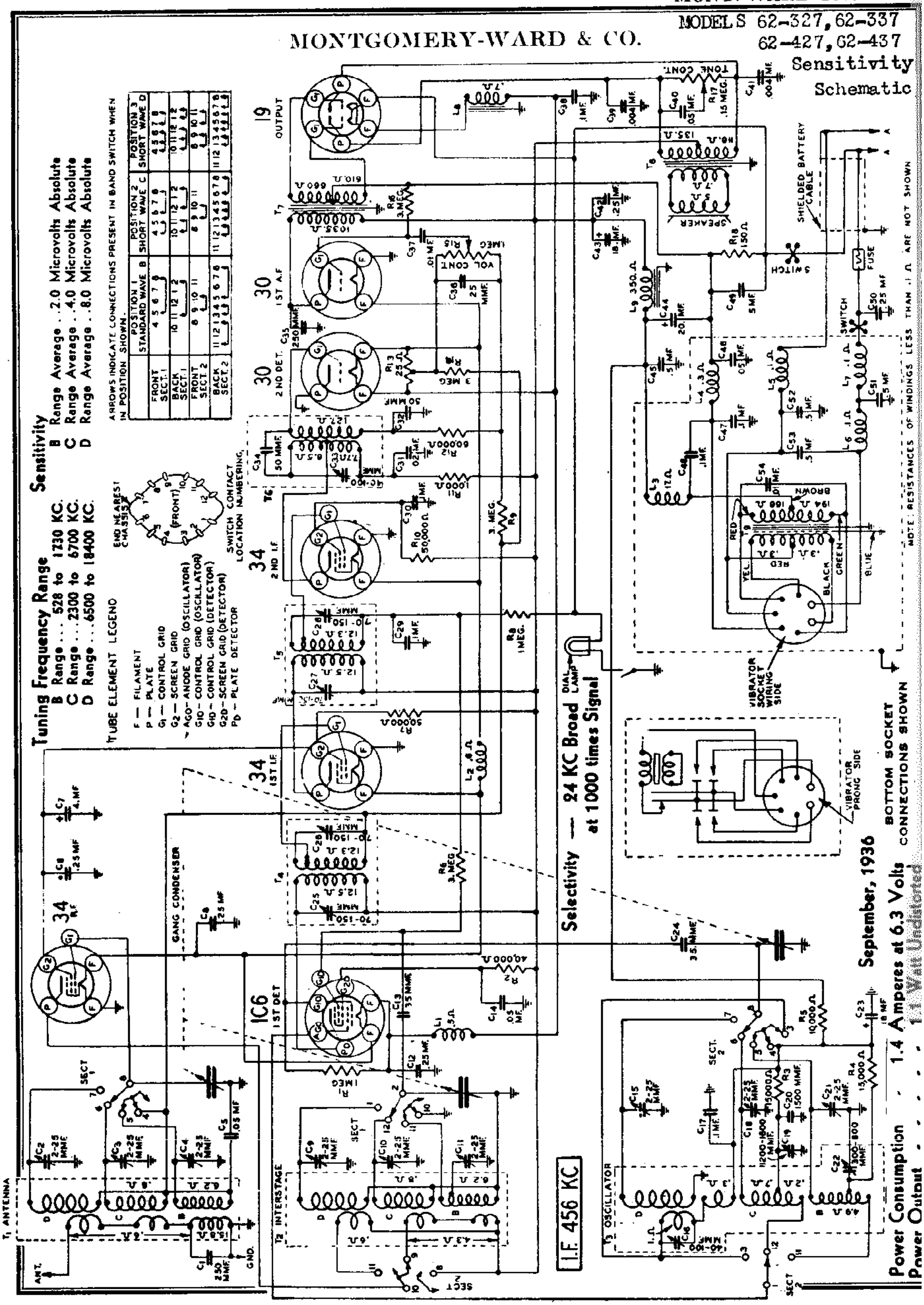
Volume Control at Maximum — Antenna Shorted to Ground
Battery - 6 Volts — Band Switch in Standard Wave Position

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Bias Voltage See Notes
34	R.F.	2.0	145	55	1.0(1)
1C6	1st Det.-Osc.	2.0	145 90(2)	60	2 (3)
34	1st I.F.	2.0	145	55	1.0(1)
34	2nd I.F.	2.0	140	90	4.0(3)
30	2nd Det.	2.0			
30	1st A.F.	2.0	140		9 (4)
19	Power	2.0	140		5 (5)

(1) As read from negative filament leg to tap of resistor R13.
(2) Anode grid to ground.
(3) As read from negative filament leg to A—.
(4) Total voltage drop from negative filament leg to low potential end of resistor R18.
(5) As read across resistor R18.

MODELS 62-327, 62-337
62-427, 62-437
Sensitivity
Schematic

MONTGOMERY-WARD & CO.



MODELS 62-327, 62-337
62-427, 62-437
Alignment, Data, Parts

MONTGOMERY-WARD & CO.

I. F. Adjustment

Set the signal generator for a signal of 416 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector G_{1D}.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C21) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

Adjust the interstage Range B trimmer (C11) and antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

6700 KC Adjustment

Set the signal generator for 6700 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C18) until maximum output is obtained. See Fig. 3 for location of this trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C10) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

2400 KC Adjustment

Set the signal generator for 2400 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 2400 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

18,400 KC Adjustment

Set the signal generator for 18,400 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C15) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage and antenna Range D trimmers, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6800 KC Adjustment

Set the signal generator for 6800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6800 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Caution

Do not turn the radio on unless ALL the tubes are in the sockets. Removal of any of them will result in abnormal voltages on the remaining tubes.

Be sure that the battery clips are connected to the battery with the correct polarity. Reversed connections may damage the radio.

Do not use any power source other than a 6 volt storage battery.

If the radio does not operate after being turned on, turn the switch off immediately, examine the battery connections and the fuse and see if all tubes are properly inserted.

Servicing Power Unit

The power unit is that portion of the chassis assembly contained within the large rectangular shield can and the circuit for which is shown within the dotted lines at the lower right side of the schematic diagram, Fig. 2.

Continuity Resistance Check—The power transformer, choke coil circuits and condenser shorts may be checked by utilizing the vibrator socket terminals and various points on the "A" or "B" lines, without removal of the shield can. For example: when checking the continuity or resistance of the upper half of the transformer secondary, contact may be made with the test prods at the proper vibrator socket terminal, as shown on the circuit diagram, and at the positive terminal of the 20 mf. electrolytic condenser, C44.

Removing Transformer and Vibrator Socket Assembly—Take off the unit shield can by removing the four self-tapping screws at the right side (from front) of the base and the five hex nuts from the bolts at the top of the chassis.

Unsolder the ground connections from the two lugs on the inside of the chassis base (right side from front). Unsolder the black and white coded wire from the terminal strip lug nearest the front of the chassis. This terminal strip is mounted on the transformer cover. Now unsolder the bracket holding the terminal strip to the transformer cover.

Remove the four nuts from the bolts holding the transformer assembly to the chassis. Do not remove these bolts from the transformer core. Then lift the assembly to free it from the chassis so that all parts of the assembly are readily accessible.

Proceed with replacement of the power transformer or with any other necessary service or replacements and then reassemble.

Replacement of Buffer Condenser C54—This condenser is located in the top of the transformer and vibrator assembly just underneath the vibrator socket. To replace, remove the assembly as explained in the preceding article.

In addition, the two screws holding the vibrator socket to the transformer cover assembly should be taken out. The condenser is then easily replaced.

The planetary assembly is the unit that is integral with the tuning shaft.

If the nut on the back end of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect.

If this nut is too loose, the drive will slip in slow speed. The remedy in this case, of course, is to tighten the nut.

Should the condenser drive cord slip when the planetary pulley is turning, inspect the tuning condenser, drive drum and gears to see that they are turning properly and that they are not being obstructed in some way.

If the drive turns unevenly (rough in spots), this may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
P-3A244	Tube Socket (4 Prong)	$0.10
P-3A243	Tube Socket (6 Prong)	.10
*P-3A234	Vibrator Socket (7 Prong)	.20

SPEAKERS

Part No.	Description	List Price
P-12A252	6" P.M. Dynamic Speaker complete with Output Trans. T8	5.70
P-12A253	8" P.M. Dynamic Speaker complete with Output Trans. T8	6.80
P-[illegible]	[illegible] Assembly	.45

KNOBS

Part No.	Description	List Price
Specify Name of Radio and Model of Radio	[illegible] Push-on Type	.15
	[illegible] Push-on Type	.15
	[illegible] Push-on Type	.15
	[illegible] Screw Type	.20

GENERAL

Part No.	Description	List Price
P-7[illegible]	[illegible]	ea. .10
P-8[illegible]	[illegible]	ea. .10
P-4[illegible]	[illegible] (with Mounting Hole to left of lug)	.10
P-4A[illegible]	[illegible] (with Mounting Hole at end)	.10
P-4A8[illegible]	[illegible] (with Mounting Hole in Center)	.10
P-4A17	[illegible] (with Mounting Hole to Right of Lug)	.10
P-10X14	[illegible]	.10
P-13X269	[illegible]	1.00
P-10X36	[illegible]	ea. .15
P-13X214	[illegible] Assembly	.70
P-1AX9	[illegible]	.10
P-1AX19	[illegible]	.10
*P-20X52	[illegible]	.10
*P-32X10	[illegible]	.10
P-32X72	[illegible]	.20
P-19A27	[illegible]	4.95
P-32X18	[illegible]	.10
P-32X30	[illegible]	.10
P-32X63	[illegible]	.20
P-32X32	[illegible]	.15
P-32X59	[illegible]	.10
P-2A88	[illegible] Switch	1.95
P-8X43	[illegible] Gang Condenser (Front)	ea. .10
P-8X44	[illegible] Gang Condenser (Rear)	.10
P-8X46	[illegible] Gang Condenser (Rear, [illegible])	.10
P-30X71	[illegible] (Under Vibrator Assembly)	.50
P-26X221	[illegible]	ea. .10

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
P-9A634	T1	Antenna Trans. and Can Assembly	$1.85
P-9A636	T2	R.F. Interstage Trans. and Can Assembly	2.35
P-9A634	T3	Oscillator Coil and Can Assembly	2.50
P-9A637	T4	1st I.F. Trans. and Can Assembly	1.50
P-9A638	T5	2nd I.F. Trans. and Can Assembly	1.50
P-9A639	T6	3rd I.F. Trans. and Can Assembly	1.60
P-98X35	T7	Input Transformer	1.95
P-87X44	T8	Output Transformer (Part of Speaker Assembly)	1.30
*P-63X120	T9	Power Transformer Only	2.45
P-26A86		Power Transformer Assembly (Includes Parts Marked *)	3.85
P-9A613	L1	1st Det. Filament Reactor	.40
P-9A607	L2	Filament Reactor	.35
P-9A609	L3	"B" Reactor	.30
P-9A611	L4	"B" Reactor	.30
P-9A603	L5	"A" Line Reactor	.35
P-9A608	L6	"A" Line Reactor	.35
P-9A603	L7	"A" Line Reactor	.35
P-52X47	L8	"A" Choke (Iron Core)	.85
P-52X27	L9	"B" Choke (Iron Core)	1.00

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
P-44X80	C5	.05 mf.	180	.15
P-44X117	C6	.25 mf.	180	.25
P-44X117	C8	.25 mf.	180	.25
P-44X117	C12	.25 mf.	180	.25
P-44X80	C14	.05 mf.	180	.15
P-44X70	C17	.1 mf.	180	.20
P-44X70	C29	.1 mf.	180	.20
P-44X70	C30	.1 mf.	180	.20
P-44X107	C31	.02 mf.	180	.15
P-44X124	C37	.01 mf.	180	.15
P-44X196	C38	.1 mf.	180	.15
P-44X114	C39	.006 mf.	400	.15
P-44X109	C40	.05 mf.	240	.16
P-44X114	C41	.006 mf.	400	.16
P-44X117	C42	.25 mf.	180	.25
P-44X135	C45	.5 mf.	180	.40
P-44X70	C46	.1 mf.	180	.20
P-44X70	C47	.1 mf.	180	.20
P-44X80	C48	.05 mf.	180	.15
P-44X196	C49	.5 mf.	180	.30
P-44X117	C50	.25 mf.	180	.25
P-44X135	C51	.5 mf.	180	.40
P-44X135	C52	.5 mf.	180	.40
P-44X204	C53	.5 mf.	180	.30
P-44X201	C54	.1 mf.	1000	.15

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage	Type	List Price
P-46X215	C7	4 mf.	180	Dry	1.50
	C23	10 mf.	150		
	C43	10 mf.	160		
P-44X17	C44	20 mf.	150	Wet	.95

MOLDED

Part No.	Code	Capacitance	Description	List Price
P-47X45	C1	250 mmf.		.15
P-47X83	C13	36 mmf.		.10
P-47X76	C20	1500 mmf.		.20
P-47X53	C24	35 mmf.		.10
P-47X56	C32	50 mmf.		.10
P-47X66	C34	90 mmf.		.10
P-47X68	C35	250 mmf.		.15
P-47X72	C36	25 mmf.		.10
P-17A46 Trimmer Strip	C2	2-25 mmf.	Range "D" Antenna Trimmer	.95
	C3	2-25 mmf.	Range "C" Antenna Trimmer	
	C4	2-25 mmf.	Range "B" Antenna Trimmer	
	C9	2-25 mmf.	Range "D" Interstage Trimmer	
	C10	2-25 mmf.	Range "C" Interstage Trimmer	
	C11	2-25 mmf.	Range "B" Interstage Trimmer	
	C15	2-25 mmf.	Range "D" Oscillator Trimmer	
	C18	2-25 mmf.	Range "C" Oscillator Trimmer	
	C21	2-25 mmf.	Range "B" Oscillator Trimmer	

See Part Number 17A36 for replacement of any one section

Part No.	Code	Capacitance	Description	List Price
P-17A35	C16	40-100 mmf.	Oscillator Padding Condensers	.45
	C22	300-600 mmf.		
P-17A50	C19	1200-1600 mmf.	Oscillator Padding Condenser	.50
P-17A32	C25	70-150 mmf.	1st I.F. Trimmer Condensers	.40
	C26	70-150 mmf.		
P-17A33	C27	70-150 mmf.	2nd I.F. Trimmer Condensers	.40
	C28	70-150 mmf.		
P-17A30	C33	40-100 mmf.	3rd I.F. Trimmer Condenser	.25
P-17A36		2-25 mmf.	(To be used for replacement of any one section of Trimmer Strip P-17A46)	.10

MISCELLANEOUS

Part No.	Description	List Price
P-14A60	3 Gang Condenser Less Drive Mechanism and Dial Assembly	3.60

RESISTORS

Part No.	Code	Resistance	Wattage	List Price
P-AM104	R1	100,000 Ohm	0.2	.15
P-AM403	R2	40,000 Ohm	0.2	.10
P-AM153	R3	15,000 Ohm	0.2	.10
P-AM153	R4	15,000 Ohm	0.2	.10
P-AM103	R5	10,000 Ohm	0.2	.15
P-AM306	R6	3 Megohm	0.2	.10
P-AM603	R7	60,000 Ohm	0.2	$0.15
P-AM104	R8	100,000 Ohm	0.2	.10
P-AM305	R9	3 Megohm	0.2	.15
P-AM503	R10	50,000 Ohm	0.2	.15
P-AM102	R11	1,000 Ohm	0.2	.10
P-AM603	R12	60,000 Ohm	0.2	.10
P-AM305	R14	3 Megohm	0.2	.15
P-AM305	R16	3 Megohm	0.2	.10

WIRE WOUND

Part No.	Code	Resistance	Wattage	List Price
P-43X60	R13	25 Ohm	0.3	.45
	R18	150 Ohm	2.0	

VARIABLE

Part No.	Code	Description	List Price
P-16X222	R15	1 Megohm Volume Control and On-Off Switch	1.00
P-40X215	R17	.15 Megohm Tone Control	.65

DIAL AND DRIVE ASSEMBLY

DIAL ASSEMBLY

Part No.	Description	List Price
Specify Name and Model of Radio	Dial Assembly Complete with Dial Glass; Dial Plate; Dial Cardboard; Small Pointers; Reflectors; Small Pointer Cords, Springs, Pulleys and Collars; and Band Indicator Assembly less Large Station Pointer and Micrometer Pointer	$3.85
See above	Dial Glass Only	1.45
P-28A125	Dial Assembly Mounting Plate, Includes Small Pointer Shafts and Pulleys, and Band Indicator Assembly	1.20

DIAL AND DRIVE ASSEMBLY—Continued

DIAL ASSEMBLY

Part No.	Description	List Price
P-25X291	Dial Assembly Support Brackets (Attached to Gang Condenser)	ea. $0.10
P-15X59	Large Station Pointer	.25
P-15X60	Micrometer Pointer	.10
P-15X57	Small Volume or Tone Control Pointer	ea. .10
P-9X16	Dial Cardboard	.10
P-11X41	Fibre Strip (At Bottom of Dial Glass)	.10
P-41X12	Dial Lamp Reflectors (At each side of Dial Plate)	ea. .10
P-7A17	Dial Lamp Sockets and Clips	ea. .10
P-7A12	Dial Lamps	ea. .20
	10" Black Cord for Small Pointers	doz. .45
P-27X20	Brass Collars with Set Screws for Securing Small Pointer Cords to Shafts	ea. .10
P-28X44	Tension Springs for Small Pointer Cords	ea. .10
P-26X229	Small Pointer Shafts and Pulleys	ea. .10
P-17X15	Glass Dial Crystal	.35
P-28X50	Crystal Retaining Ring	.15
P-2A40	Dial Lamp Push Button Switch Assembly	.60

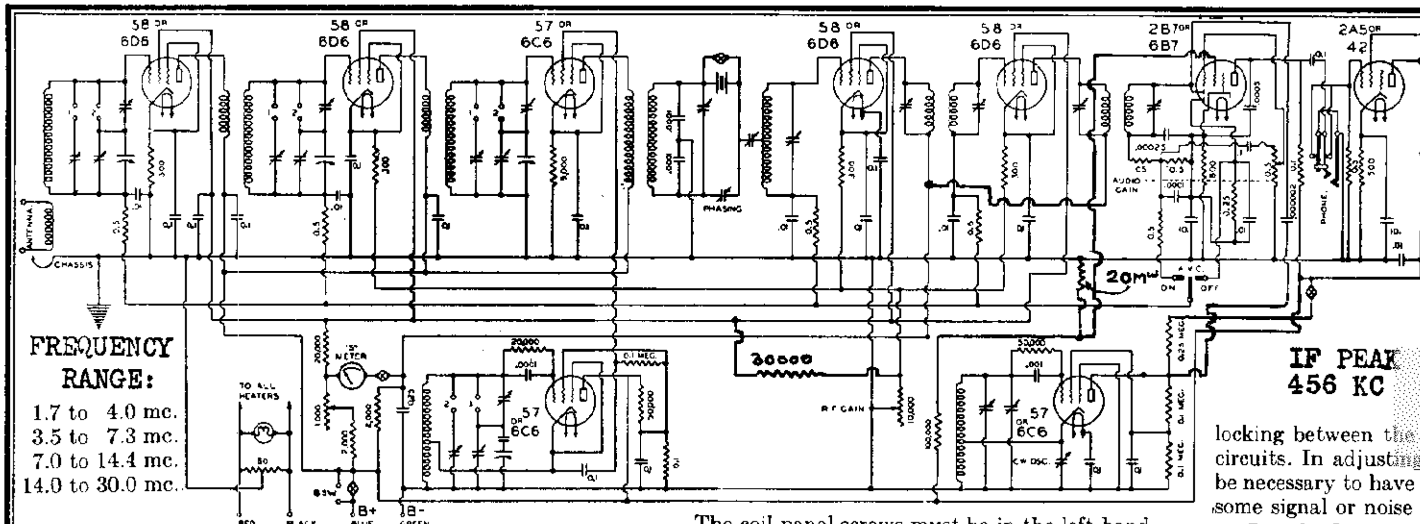
DRIVE ASSEMBLY

Part No.	Description	List Price
P-8A34	Planetary Assembly Complete with Hex Nut and Lockwasher (This is the unit mounted at the front of the chassis base. It is integral with the tuning shaft.)	1.25
P-10X14	Black Tuning Drive Cord Only	.30
P-28X69	Tension Spring for Tuning Drive Cord	.10
P-25X269	Drive Assembly Bracket Only (Mounted on Gang Condenser)	.25
P-25X283	Rear Mounting Foot for Gang Condenser	.10
P-24X239	Drive Drum Assembly Complete with Gears, Micrometer and Main Pointer Shaft	1.75
P-20X34	Spreader Spring for Rotary Gear (Part of Above Assembly)	.10
P-20X33	Spreader Spring for Stationary Gear (Part of Above Assembly)	.10

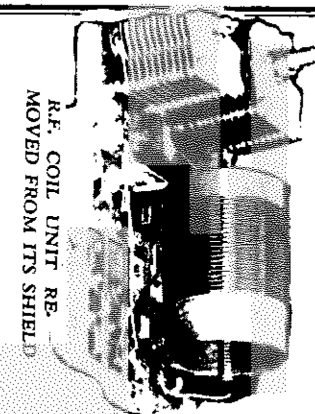
Prices Subject to Change Without Notice

MODEL HRO
Schematic, Socket
Trimmers, Alignment

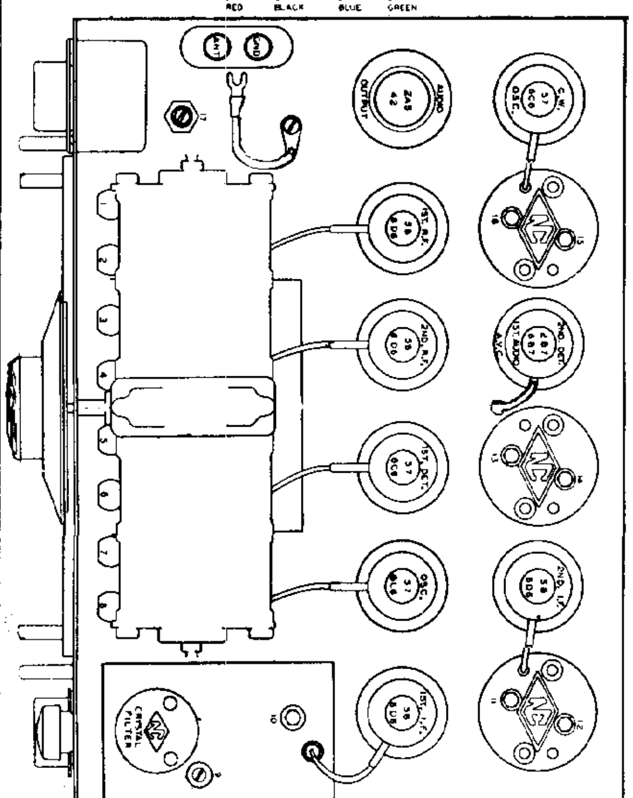
NATIONAL COMPANY, INC.



FREQUENCY RANGE:
1.7 to 4.0 mc.
3.5 to 7.3 mc.
7.0 to 14.4 mc.
14.0 to 30.0 mc.



R.F. COIL UNIT REMOVED FROM ITS SHIELD



The coil panel screws must be in the left-hand terminal blocks to give the full coverage range. The tuning dial is turned to approximately 490 and a frequency meter, or accurate test oscillator, is set to the frequency indicated by the general coverage calibration chart.

The oscillator coil trimmer, shown on the layout diagram of the receiver as No. 8, is then adjusted so that the dial reading checks the calibration curve. Trimmers Nos. 2, 4 and 6 are then adjusted for maximum sensitivity.

The ganging is checked by pressing the outside rotor plate of the oscillator condenser sideways toward the stator. If sensitivity increases, the oscillator coil inductive trimmer must be adjusted to decrease inductance. In the case of the 14 to 30 megacycle coils, inductive trimming is accomplished by moving a loop of wire around the end of the oscillator coil. Bending this loop from right to left across the end of the coil form will increase inductance. After any change in the oscillator coil inductance has been made, it will be necessary to tune back to the high-frequency end of the range in order to readjust the No. 8 trimmer condenser.

In the case of the 14 to 30 megacycle coils, special care must be exercised to see that the oscillator is operating on the high-frequency side of the signal. Two points will be found when adjusting the No. 8 trimmer and of these, the correct one is on the counter-clockwise side. Furthermore, in adjusting the No. 6 trimmer of this coil assembly, there will be some interaction or interlocking between the first detector and oscillator circuits. In adjusting the No. 2 trimmer, it will be necessary to have the antenna connected with some signal or noise input.

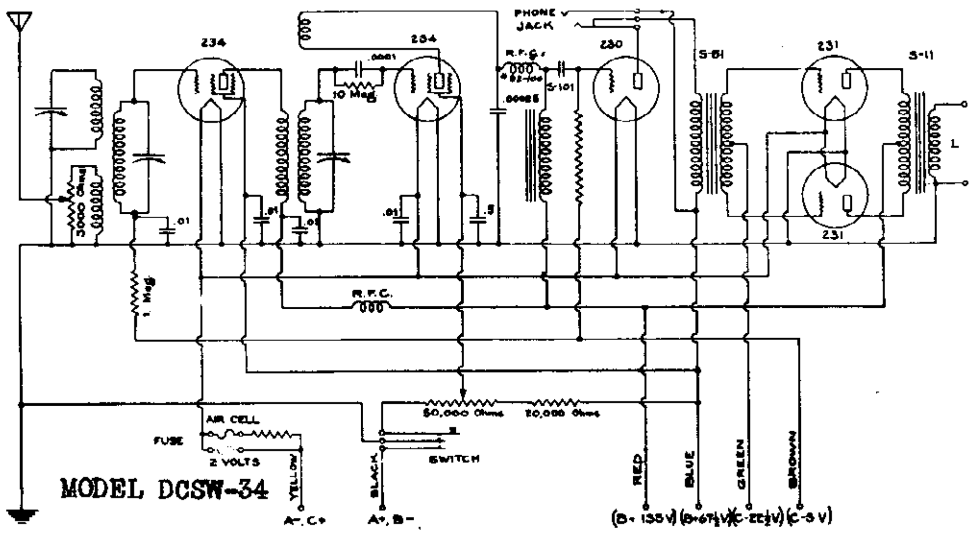
Band-Spread Adjustment

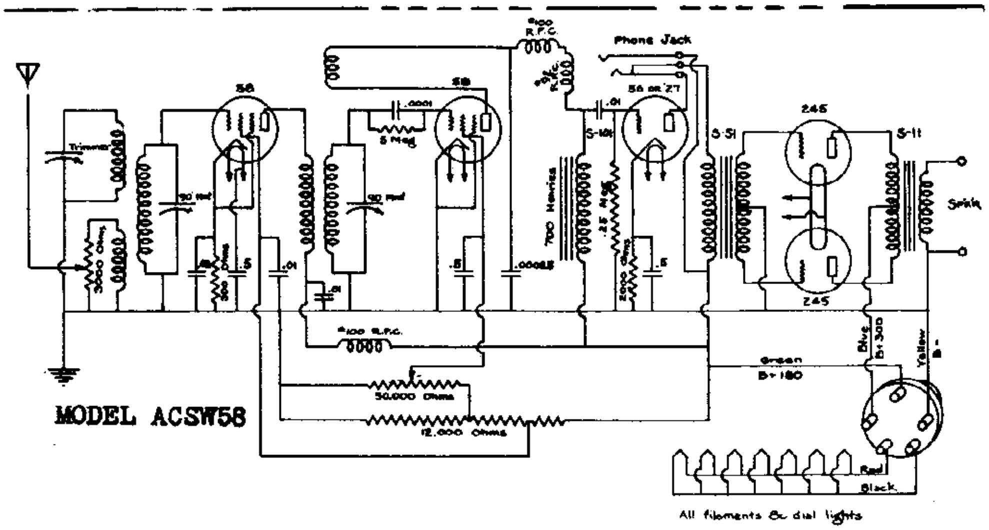
The four screws must be shifted to the right-hand terminal blocks, as outlined under "Coil Ranges" in the preceding section. The tuning dial is set at 450 and a test oscillator adjusted to the exact high-frequency edge of the proper amateur band. Trimmer No. 7 (of the layout diagram) is adjusted until the signal is picked up. Trimmers Nos. 1, 3 and 5 are then adjusted for maximum sensitivity. The dial is then rotated to the low-frequency end of the band; that is, to 50; and the left-hand calibration curve should be checked. If found incorrect, it will be necessary to adjust the band-spread series padding condenser, mounted inside the oscillator coil and adjustable from the rear by means of a socket wrench. If the low-frequency end of the band is tuned in at any dial reading above 50, the capacity of this series padding condenser must be decreased.

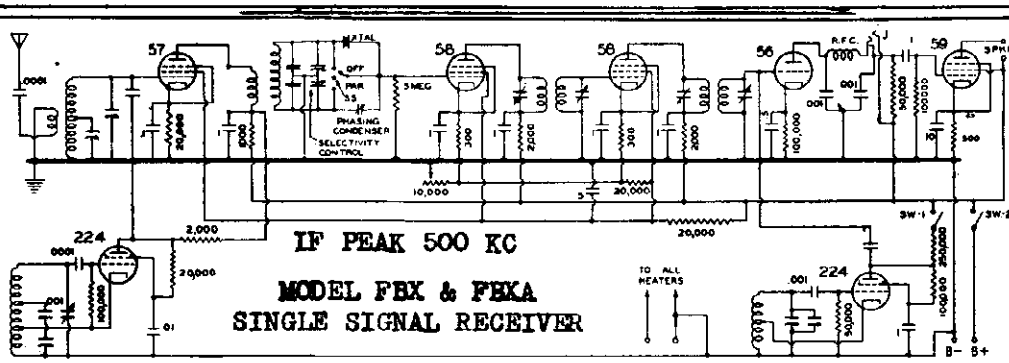
Tracking of the two R. F. and first detector circuits may then be checked by tuning to the low-frequency end of the band and checking the adjustment of the Nos. 1, 3 and 5 trimmers. If more capacity is needed for best sensitivity (as indicated by improved signal strength when the trimmer is rotated clockwise), the series padding condenser of the coil being adjusted must have more capacity. If any of the Nos. 1, 3 or 5 trimmers require less capacity, a corresponding decrease must be made in the capacity of the series padding condenser. After the series padding condenser has been adjusted for trial, the dial is returned to 450 and the procedure repeated.

MODEL DCSW-34
MODEL ACSW-58
MODELS FBX,FBXA
Schematics,Notes

NATIONAL COMPANY, INC.







FREQUENCY RANGE AND COILS

Five sets of coils are furnished with each SW-58 and SW-34, two coils to a set, and covering wavelengths from 13.5 to 200 meters. One coil of each set is plugged into the r-f circuit (left hand coil socket) and one coil into the detector coil socket. The two coils of each set are identical, and the wave bands they cover are indicated on the chart on the cover of the receiver and in the catalog coil list. The coils for the a-c receiver are designated by numbers only, beginning with the number 60 and increasing with wavelength. The d-c coils may be identified by number — from 10 to 21 increasing with wavelength — and by the color strip molded into the top ring. The wavelength of the coils increases with the number of turns of wire.

Coils can be had extending the wavelengths of the receivers as high as 2000 meters (see catalog page 19), and the coils forms are available for the home winding of special inductors.

See Special Section and Model NC100 (see index) for Alignment of this receiver.

FREQUENCY RANGES
(Approximate, see calibration chart on inside of receiver cover)

Coil A -11500 to 19500 KC
Coil B - 6900 to 11750 KC
Coil C - 4100 to 7400 KC
Coil D - 2350 to 4350 KC
Coil E - 1500 to 2550 KC

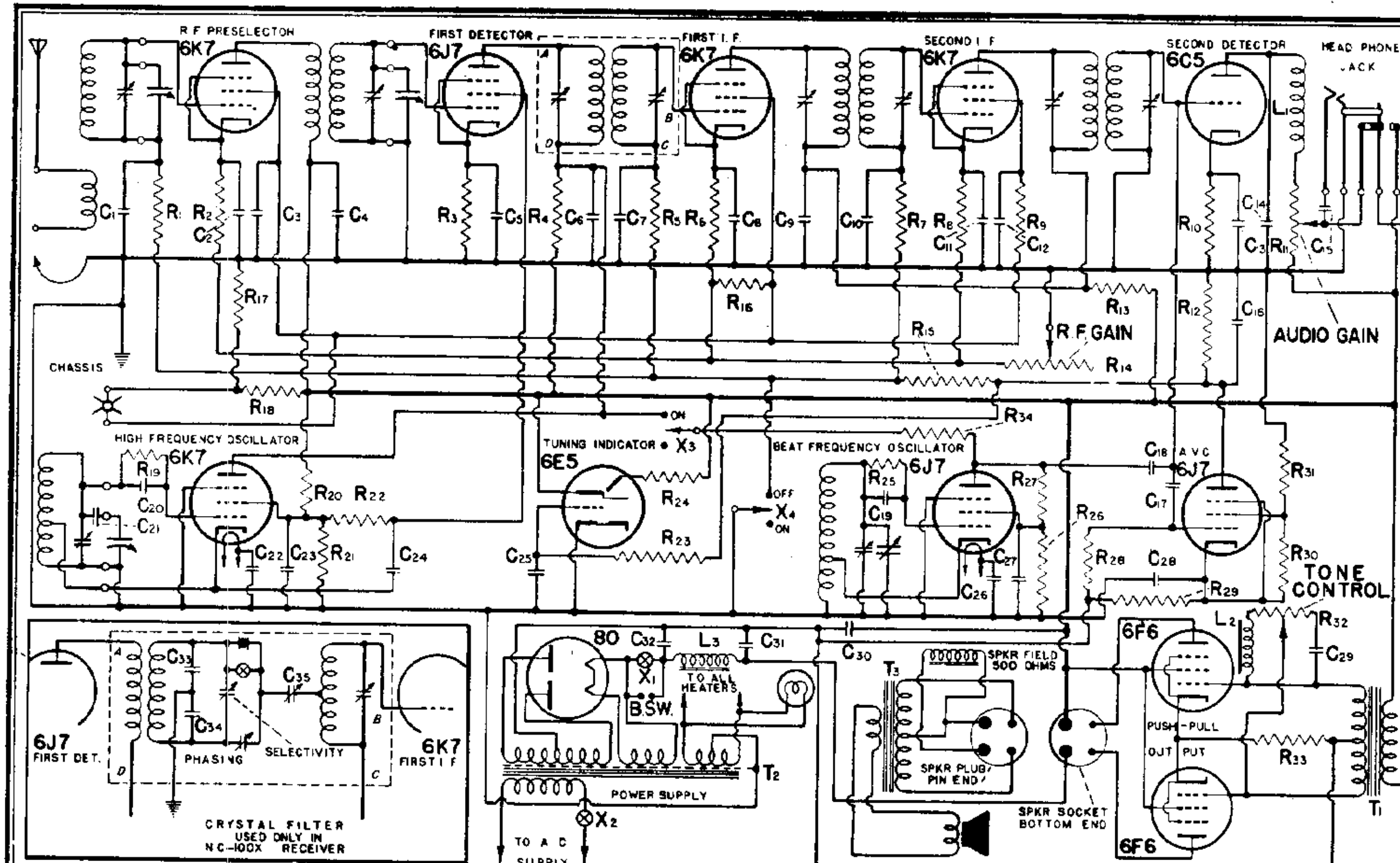
MODEL NC-100
Schematic, Parts

NATIONAL COMPANY, INC.

TYPE NC-100 RECEIVER

C24	H.F. Oscillator Coupling	.01 mfd.	400 volt
C25	Tuning Indicator Grid Filter	.01 mfd.	400 volt
C26	C.W. Oscillator Heater Bypass	.1 mfd.	200 volt
C27	C.W. Oscillator Screen Bypass	.1 mfd.	200 volt
C28	AVC Cathode Bypass	.1 mfd.	200 volt
C29	Tone Control	.01 mfd.	400 volt
C30	B-Supply Filter	8 mfd.	450 volt
C31	B-Supply Filter	8 mfd.	450 volt
C32	B-Supply Filter	8 mfd.	450 volt
C33	Crystal Filter Bridge	.0001 mfd.	Mica
C34	Crystal Filter Bridge	.0001 mfd.	Mica
C35	Crystal Filter Coupling	35 mmf.	Variable
X1	B+ (stand-by) Switch		
X2	AC On-Off Switch		
X3	C.W. Oscillator Switch		
X4	AVC On-Off Switch		
L1	2nd Det. I.F. Choke	7. mh.	
L2	Tone Filter Choke	18. Henry	
L3	B-Supply Filter Choke	20. Henry	

T1 Push-Pull Input Audio Transformer 4:1 Ratio
T2 Power Transformer
T3 Output Transformer Mounted on Speaker



IF PEAK 456 KC

R1	R.F. Grid filter	.5 megohm	½ watt
R2	R.F. Cathode Bias	350 ohms	½ watt
R3	1st Det. Cathode Bias	5000 ohms	½ watt
R4	H.F. Circuit B+ Filter	2000 ohms	½ watt
R5	1st I.F. Grid Filter	.5 megohm	½ watt
R6	1st I.F. Cathode Bias	350 ohms	½ watt
R7	2nd I.F. Grid Filter	.5 megohm	½ watt
R8	2nd I.F. Cathode Bias	500 ohms	½ watt
R9	2nd I.F. Screen Filter	2000 ohms	½ watt
R10	2nd Det. Cathode Bias	20,000 ohms	½ watt
R11	Audio Volume Control	50,000 ohm potentiometer	
R12	AVC Plate	.5 megohm	½ watt
R13	I.F. B+ Filter	2000 ohms	½ watt
R14	R.F. Gain Control	10,000 ohm variable	
R15	Common Grid Filter	.5 megohm	½ watt
R16	Gain Control Bleeder	50,000 ohms	½ watt
R17	Voltage Divider	20,000 ohms	2 watt
R18	Voltage Divider	20,000 ohms	2 watt
R19	H.F. Oscillator Grid Leak	20,000 ohms	½ watt
R20	H.F. Oscillator Voltage Divider	50,000 ohms	½ watt
R21	H.F. Oscillator Voltage Divider	100,000 ohms	½ watt
R22	1st Det. Screen Filter	100,000 ohms	½ watt
R23	Tuning Indicator Grid Filter	.5 megohm	½ watt
R24	Tuning Indicator Target	.1 megohm	½ watt
R25	C.W. Oscillator Grid Leak	50,000 ohms	½ watt
R26	C.W. Oscillator Voltage Divider	100,000 ohms	½ watt
R27	C.W. Oscillator Voltage Divider	100,000 ohms	½ watt
R28	AVC Grid Return	.5 megohm	½ watt
R29	AVC Voltage Divider	350 ohms	1 watt
R30	AVC Voltage Divider	1000 ohms	2 watt
R31	AVC Voltage Divider	1000 ohms	2 watt
R32	Tone Control	500,000 ohm potentiometer	
R33	Output Cathode Bias	250 ohms	2 watt
R34	C.W. Oscillator Plate Filter	.25 megohm	½ watt

C1	R.F. Grid Filter	.01 mfd.	400 volt
C2	R.F. Cathode Bypass	.1 mfd.	200 volt
C3	R.F. and 1st I.F. Screen Bypass	.1 mfd.	200 volt
C4	R.F. and H.F. Osc. Plate Bypass	1 mfd.	400 volt
C5	1st Det. Cathode Bypass	.1 mfd.	200 volt
C6	1st Det. Plate Filter	.1 mfd.	400 volt
C7	1st I.F. Grid Filter	.01 mfd.	400 volt
C8	1st I.F. Cathode Bypass	.1 mfd.	200 volt
C9	1st and 2nd I.F. Plate Filter	.1 mfd.	400 volt
C10	2nd I.F. Grid Filter	.01 mfd.	400 volt
C11	2nd I.F. Cathode Bypass	.1 mfd.	200 volt
C12	2nd I.F. Screen Filter	.1 mfd.	200 volt
C13	2nd Det. Cathode Bypass	10. mfd.	50 volt
C14	2nd Det. Plate Bypass	.001 mfd.	Mica
C15	Phone Coupling	.1 mfd.	400 volt
C16	AVC Plate Bypass	.1 mfd.	200 volt
C17	AVC Grid Coupling	.0001 mfd.	Mica
C18	C.W. Oscillator Coupling	2 mmf.	Special
C19	C.W. Oscillator Grid	.001 mfd.	Mica
C20	H.F. Oscillator Grid	.0001 mfd.	Mica
C21	H.F. Oscillator Series Padding — Different for each range		
C22	H.F. Oscillator Heater Bypass	.01 mfd.	400 volt
C23	H.F. Oscillator Screen Bypass	.1 mfd.	200 volt

MODEL NC-100
Chassis, Trimmers
Alignment, Socket

NATIONAL COMPANY, INC.

Preliminary Adjustments — The I.F.

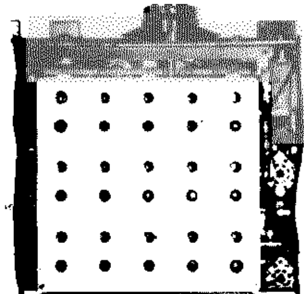
All the I.F. transformers are now adjusted for maximum signal. This adjustment need not be made with any great degree of precision, since the crystal will not oscillate at exactly the same frequency to which it will be resonant in the receiver. The Phasing control should be set at "0".

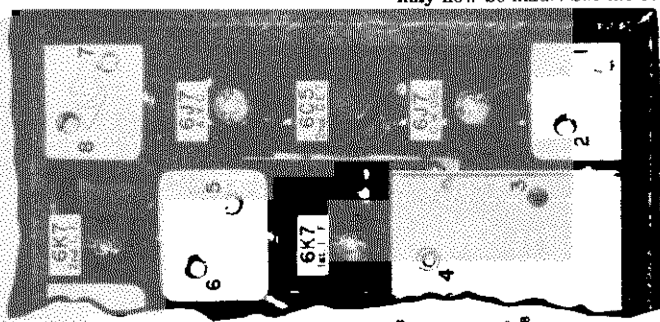
The I.F. adjustments are indicated on the layout diagram, page 4, Nos. 4 to 8 (inclusive).

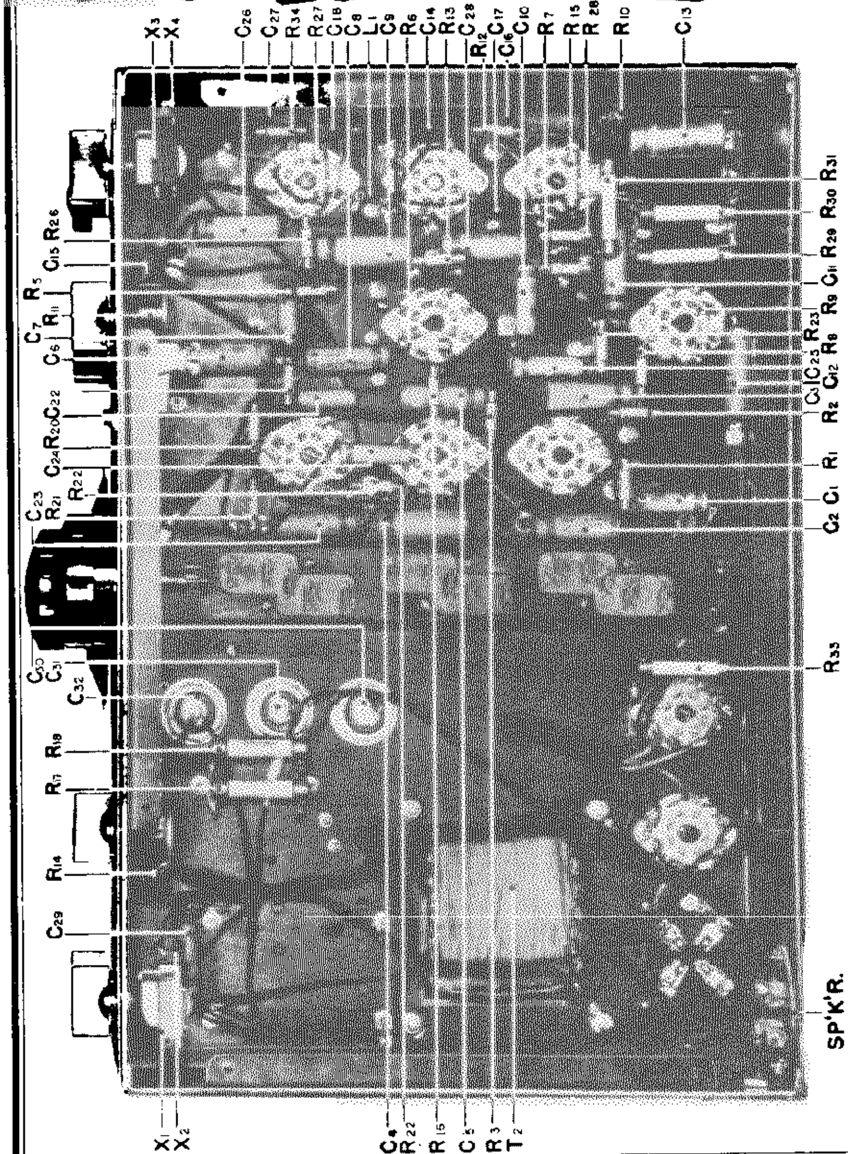
The crystal filter output coupling condenser, adjustment No. 3, serves as a fixed I.F. gain control and, in general, **should not** be touched.

The crystal may now be removed from the oscillator and installed in the receiver. Throw the switch to connect the crystal for single signal reception. Set the selectivity control for maximum selectivity; that is, with the pointer rotated all the way to the right. Now, tune in a steady signal from a local oscillator or monitor. Tuning very slowly across the carrier, there should be one point at which the signal will peak very sharply. The audio pitch of this peak will be nearly the same as the pitch of the beat used when the crystal oscillator was being picked up.

The final adjustment of the I.F. transformers may now be made. Set the control for maximum selectivity, carefully tune in a steady signal until it is exactly on the crystal peak, and adjust each of the I.F. transformer tuning condensers for maximum signal strength. (*In almost all cases where the I.F. amplifier has once been aligned to the crystal, this check is all that would be required, and it is not necessary to put the crystal in an external oscillator.*) Even if the I.F. amplifier is considerably out of alignment, the crystal frequency may be found by employing a strong local signal from a monitor or frequency meter, slowly tuning across it while listening for a peak in the audio beat note. If the peak is found at a very high audio pitch it will be necessary to change the tuning of the beat oscillator so that the audio peak will be well inside the limits of audibility. It is probable that if the peak signal is found at all, the I.F. amplifier will not be far out of tune and the readjustments required will be small.







R.F. and H.F. Oscillator Alignment

Complete alignment of any one coil range is made as follows: Set the tuning dial near the high frequency end of the range between 470 and 490, check the dial reading against the calibration curve by means of an accurate test oscillator or a signal of known frequency; readjustment should be made if the dial reading is in error by more than five or six divisions. In checking the error, disregard the numbers between 495 and 500.

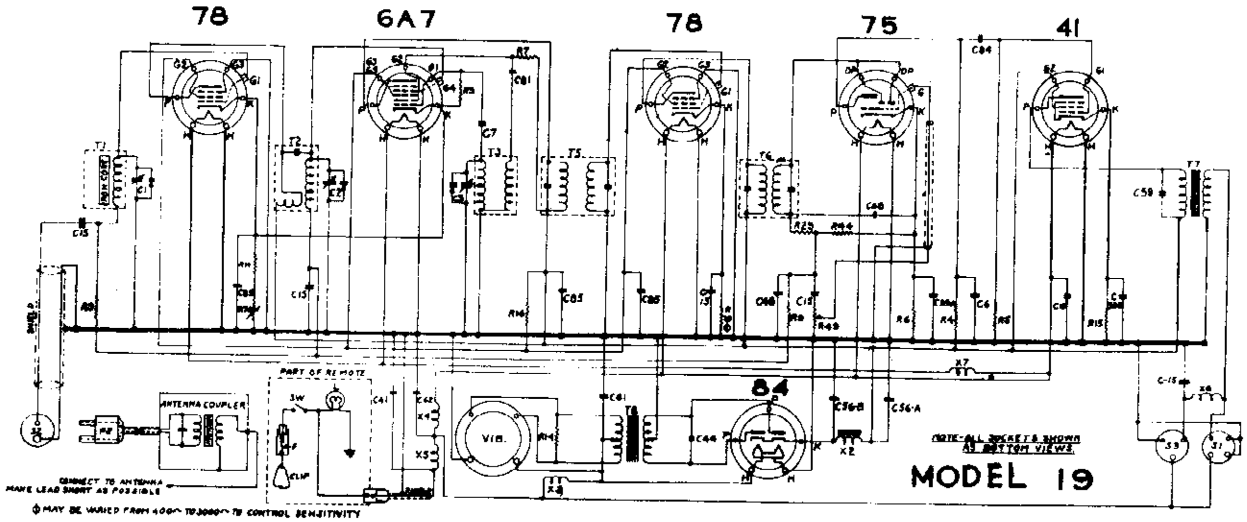
Correction for calibration is made by adjustment of the high frequency oscillator trimmer (nearest the front of the receiver).

With calibration correct at the high frequency end of the range, the dial should be rotated toward the lower numbers. The background noise may vary slightly over the range but should not get appreciably weaker except in the case of the .54 to 1.3 mc. coils. Ganging is checked by pressing one of the outside rotor plates of the oscillator condenser sideways toward the stator, but not enough to make the plates touch. The same check may be applied to the first detector and R.F. tuning condensers. Any bending of the rotor plates should make the background noise definitely weaker. A similar check can, of course, be made by bending the rotor plates out, away from the stator, care being taken not to bend the plates so far that they will not return to their original position.

On the two highest frequency ranges, it may be possible to make the initial oscillator adjustment incorrectly. There are two settings of the oscillator trimmer condenser which will tune in the desired signal at the proper point on the dial; of these, the higher frequency setting (least trimmer capacity) is correct. In checking the ganging of the 13.5 to 30. mc. range, the R.F. condenser has little effect upon the background noise at the low frequency end of the scale and at this one point it is better to use a test signal. Should any error in tracking be found on one range, it is probable that the same error will be present on all ranges and correction may be made by permanently bending the rotor plates of the tuning condenser section in question.

MODEL 19 Auto
Schematic, Voltage
Resistance, Parts

NOBLITT SPARKS INDUSTRIES



RESISTORS R	OHMS	W	PART NO.
3	100M	1/4	17-2068
4	200M	1/4	17-2069
5	500M	1/4	17-2070
6	5M	1/4	17-2071
7	20M	1/4	17-2072
8	1MEG	1/4	17-2080
10	500	[illegible]	[illegible]
14	250	1/4	17-4287
15	500	1/2	17-4717
16	50M	1	17-4763
18	50M	[illegible]	17-2060
44	150M	1/4	17-4288
49	200M	V.C.	17-14526
74	600		17-14102

CONDENSERS C	CAPACITY	VOLT	PART NO.
1, 2, 3	3 GANG VARIABLE		17-14732
7	.0001 MICA	600	17-2064
15	.05 P.M.	160	17-14652
41	.1	15	17-4708
44	.005	1600	17-14037
48	.00025 MICA	600	17-4287
58-A, 58-B	ELECT.	25	17-14606
56-A, 56-B	ELECT.	250	17-14614
60	.01 P.M.	400	17-14615
62	.5	15	17-4708
81	.002 MICA	600	17-14606
84	.01 A.M.	600	17-14100
85	.1 R.M.	400	17-14101
6	.002 MICA	600	17-2065

CHOKES & TRANSFORMERS	TYPE	PART NO.
T	TRANSFORMERS	
1	ANTENNA COIL	00-14748
2	R.F. COIL	00-14773
3	OSC. COIL	00-14760
5	1ST. I.F. COIL	00-14743
6	2ND. I.F. COIL	00-14750
7	OUTPUT TRANSF.	00-14660
8	POWER TRANSF.	00-14662
X	CHOKES	
2	"B" CHOKE [illegible]	00-4764
3	"A" FILTER CHOKE	00-4516
4	"A" FILTER CHOKE	00-4515
5	SUPPRESSOR [illegible]	00-14641
6	M.C. R.F. FILTER	00-14676
7	HEATER FILTER	00-14677

MISCELLANEOUS UNITS SYMBOL	DESCRIPTION	PART NO.
S1	SPEAKER SOCKET (INSIDE CASE)	17-2230
S2	ANTENNA COUPLER SOCKET	17-14526
S3	SPEAKER SOCKET (EXTERNAL SPKR.)	17-14527
PL	ANTENNA COUPLER PLUG	17-14526
L	DIAL LIGHT (REMOTE CONTROL)	17-15864
SW	POWER SWITCH (REMOTE CONTROL)	
VIB	VIBRATOR	17-14553
F	FUSE 10 AMP. 25 VOLT	17-2187
	ANTENNA COUPLER	00-14759

IF PEAK 170 K.C.
BALANCE AT 1400 K.C.
CHECK AT 1000 & 600 K.C.

MODEL 19 SOCKET VOLTAGES

Voltages given here are actually for an input battery voltage of 5.8 amp., even though the nor mal heater voltage is shown as 6.3 amp.

Tube	Heater	Cathode	Suppressor Grid	Screen Grid	Plate	*Oscillator Grid	Anode Grid	†Diode Plates
78	6.3	2.5-4.5	0	76	227	....	....	....
6A7	6.3	2.5-4.5	....	76	227	5-12	160	....
78	6.3	2.5	0	76	227	....	....	....
75	6.3	1.3	....	....	100	....	....	2.0
41	6.3	12.0	....	2.30	220	....	....	....
84	6.3	235	....	....	250	....	....	....

* Measured at 1500 K. C.
† Measured with Vacuum Tube Voltmeter.

POINT TO POINT RESISTANCES—MODEL 19

78—R. F. Amplifier

Heater	0
Heater	∞
Cathode, adj. max.	1,000 Ω
Suppressor	0
Screen to +B	50,000 Ω
Plate to +B	100 Ω
Control Grid	1,255,000 Ω

6A7—1st Det. Oscillator

Heater	0
Heater	∞
Cathode, adj. max	1,000 Ω
Osc. Grid	100,600 Ω
Anode Grid to +B	20,000 Ω
Screen Grid to +B	50,000 Ω
Plate to +B	74 Ω
Control Grid	1,155,000 Ω

78—I. F. Amplifier

Heater	0
Heater	∞
Cathode (See Diag.)	1,000 Ω
Suppressor	0
Screen to +B	50,000 Ω
Plate to +B	74 Ω
Control Grid	74 Ω

75—AVC Det; 1st Audio

Heater	0
Heater	∞
Cathode	5,000 Ω
Diode	205,000 Ω
Diode	205,000 Ω
Plate to +B	200,000 Ω
Control Grid, V. C. on	500,000 Ω
Control Grid, V. C. off	Max. 25 Ω

41—Power Output

Heater	0
Heater	∞
Cathode	500 Ω
Control Grid	500,000 Ω
Screen to +B	0
Plate to +B	625 Ω

84—Rectifier

Heater	0
Heater	∞
Cathode to +B	140 Ω
Plate	250 Ω
Plate	270 Ω
Plate to Plate	520 Ω

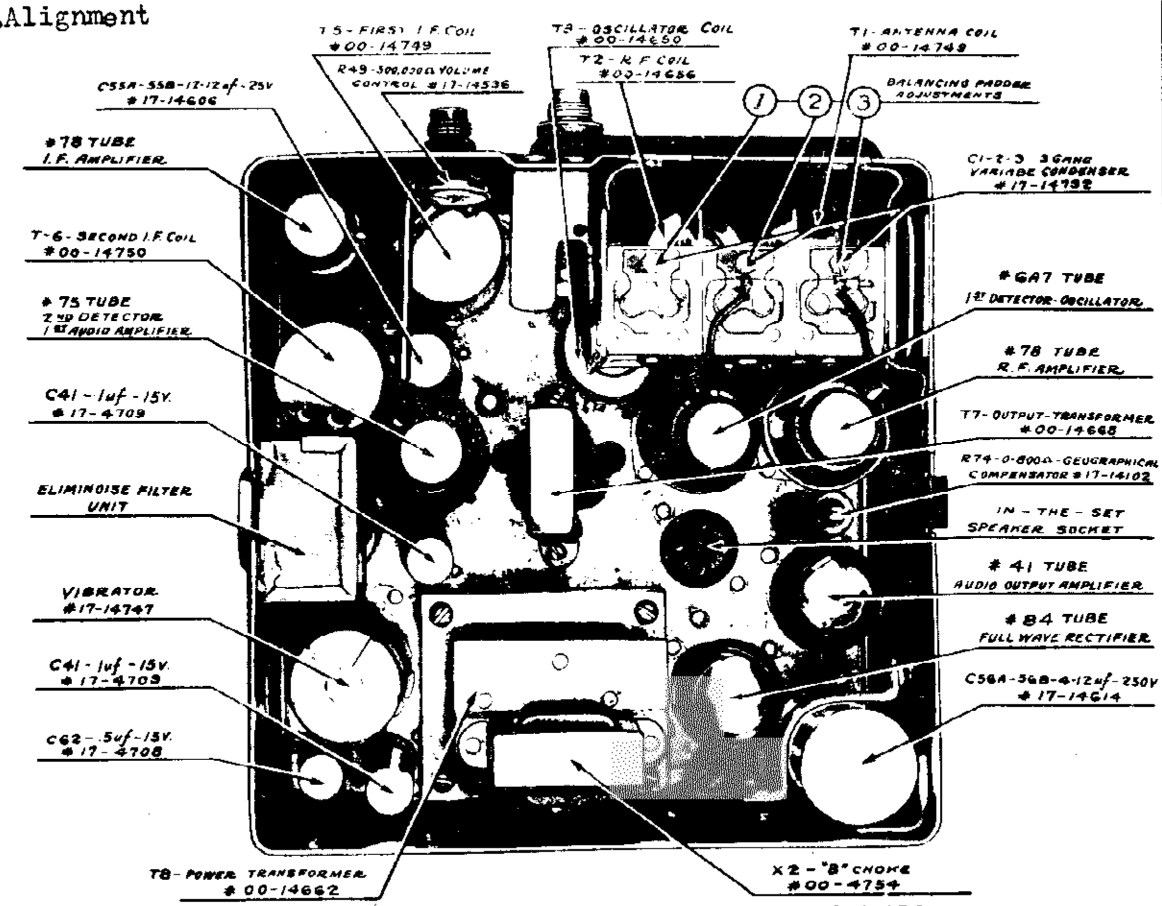
COIL AND TRANSFORMER RESISTANCES

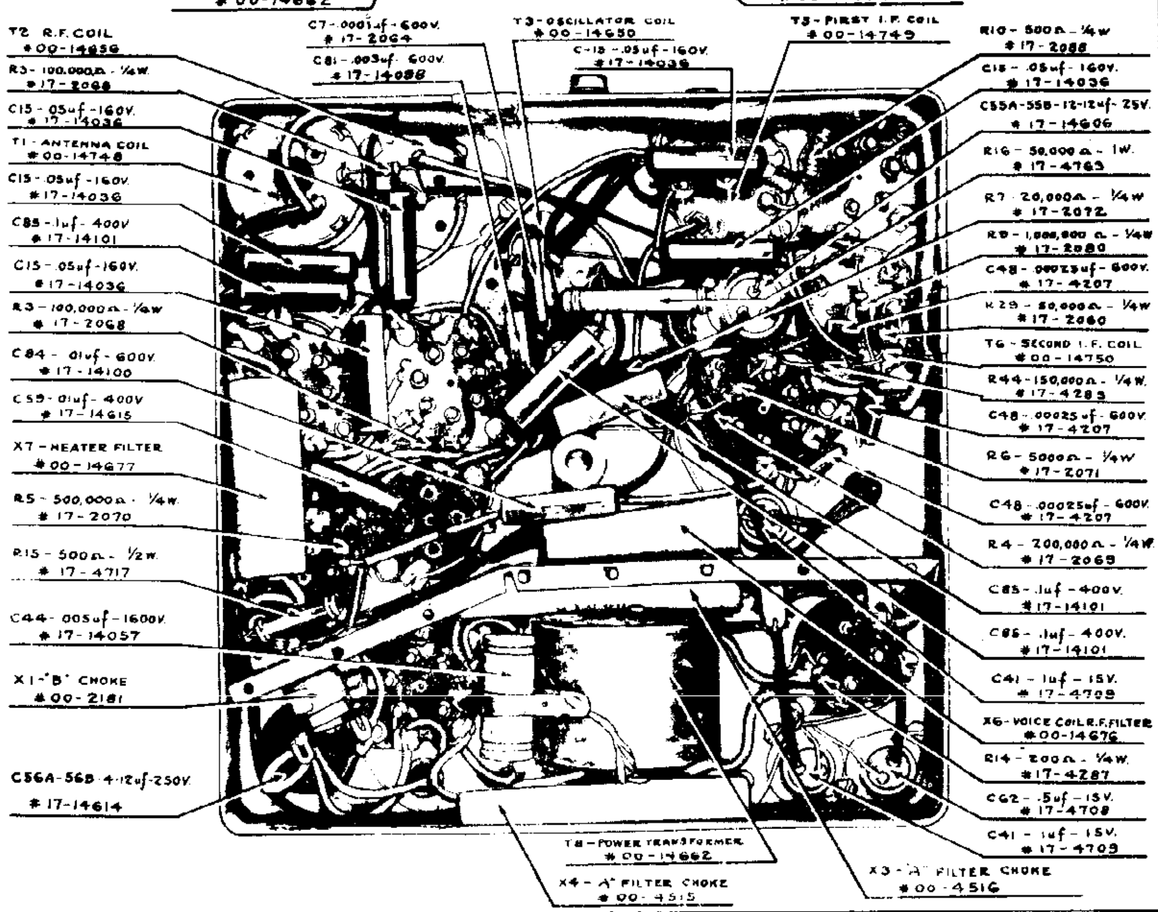
Phant. Filter Pri.	8.5 Ω
Phant. Filter Sec.	1.0 Ω
Antenna Coil	2.325 Ω
R. F. Coil Pri.	100.0 Ω
R. F. Coil Sec.	3.475 Ω
Osc. Coil Pri.	3.0 Ω
Osc. Coil Sec.	1.8 Ω
1st I. F. Trans. Pri.	75.0 Ω
1st I. F. Trans. Sec.	75.0 Ω
2nd I. F. Trans. Pri.	75.0 Ω
2nd I. F. Trans. Sec.	75.0 Ω
Output Trans. Pri.	625.0 Ω
Output Trans. Sec.	.40 Ω
"B" Filter Choke	140.0 Ω
"B" R. F. Choke	1.35 Ω
Power Trans. Pri.	.075-0-.075 Ω
Power Trans. Sec.	175.0-0-200.0 Ω

MODEL 19 Auto
Socket, Chassis
Trimmers, Alignment

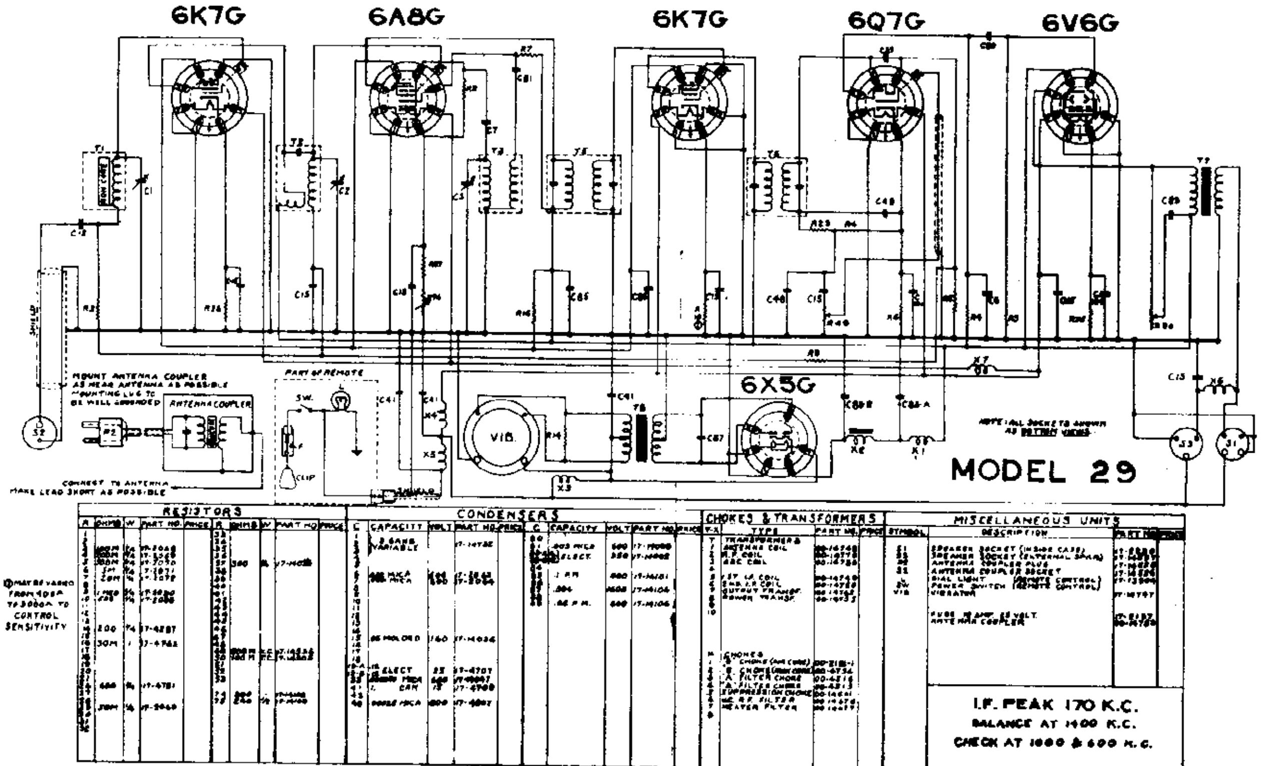
NOBLITT SPARKS INDUSTRIES

ALIGNMENT-Permaset prebalanced IF transformers require no adjustment. Gen. connected to Ant. post of Phantom-Filter. Gang out of mesh. Gen. grounded to chassis. Generator set to 1575 KC, adjust Padder No.1 for maximum output. Reset Generator to 1400 KC, rotate gang until signal is resonated. Reduce Generator output, then adjust padders No.2 and No.3 for maximum output. After installation in a car tune in a weak station between 1150 and 1400 KC, readjust padder No.3 for maximum output.





NOBLITT SPARKS INDUSTRIES



Voltages given here are actually for an input battery voltage of 5.8 amp., even though the normal heater voltage is shown as 6.3 amp.

Tube	Heater	Cathode	Suppressor Grid	Screen Grid	Plate	*Oscillator Grid	Anode Grid	†Diode Plates
6K76	6.3	2.7	0	74	243	....	....	....
6A8G	6.3	2-6.4	....	74	243	5-12	176	....
6K7G	6.3	3.1	0	74	242	....	....	....
6Q7G	6.3	1.8	....	....	146	....	....	2.0
6V6G	6.3	10.5	....	250	224	....	....	....
6X5G	6.3	255	....	....	275	....	....	....

* Measured at 1500 K.C.
† Measured with Vacuum Tube Voltmeter.

POINT TO POINT RESISTANCES—MODEL 29

6K7G—R. F. Amplifier

Heater 0
Heater .... ∞
Cathode .... 600 Ω
Suppressor 0
Screen to +B .... 50,000 Ω
Plate to +B .... 100 Ω
Control Grid .... 1,600,000 Ω

6A8G—1st Det. Oscillator

Heater 0
Heater .... ∞
Cathode, adj. max. .... 1,000 Ω
Osc. Grid .... 100,600 Ω
Anode Grid to +B .... 20,000 Ω
Screen to +B .... 50,000 Ω
Plate to +B .... 74 Ω
Control Grid .... 1,500,000 Ω

6K7G—I. F. Amplifier

Heater 0
Heater .... ∞
Cathode .... 500 Ω
Suppressor 0
Screen to +B .... 50,000 Ω
Plate to +B .... 74 Ω
Control Grid .... 74 Ω

6Q7G—AVC 2nd Det.; 1st Audio

Heater 0
Heater .... ∞
Cathode .... 5,000 Ω
Diode .... 205,000 Ω
Diode .... 205,000 Ω
Plate to +B .... 200,000 Ω
Control Grid, V. C. on .... 500,000 Ω
Control Grid, V. C. off .... Max. 25 Ω

6V6G—Beam Power Output

Heater 0
Heater .... ∞
Cathode .... 240 Ω
Control Grid .... 100,000 Ω
Screen to +B 0
Plate to +B .... 395 Ω

6X5G—Rectifier

Heater 0
Heater .... ∞
Cathode to +B .... 140 Ω
Plate .... 185 Ω
Plate .... 163 Ω
Plate to Plate .... 348 Ω

COIL AND TRANSFORMER RESISTANCES

Phant. Filter Pri. .... 8.5 Ω
Phant. Filter Sec. .... 1.0 Ω
Antenna Coil .... 2.325 Ω
R. F. Coil Pri. .... 100.0 Ω
R. F. Coil Sec. .... 3.475 Ω
Osc. Coil Pri. .... 3.0 Ω

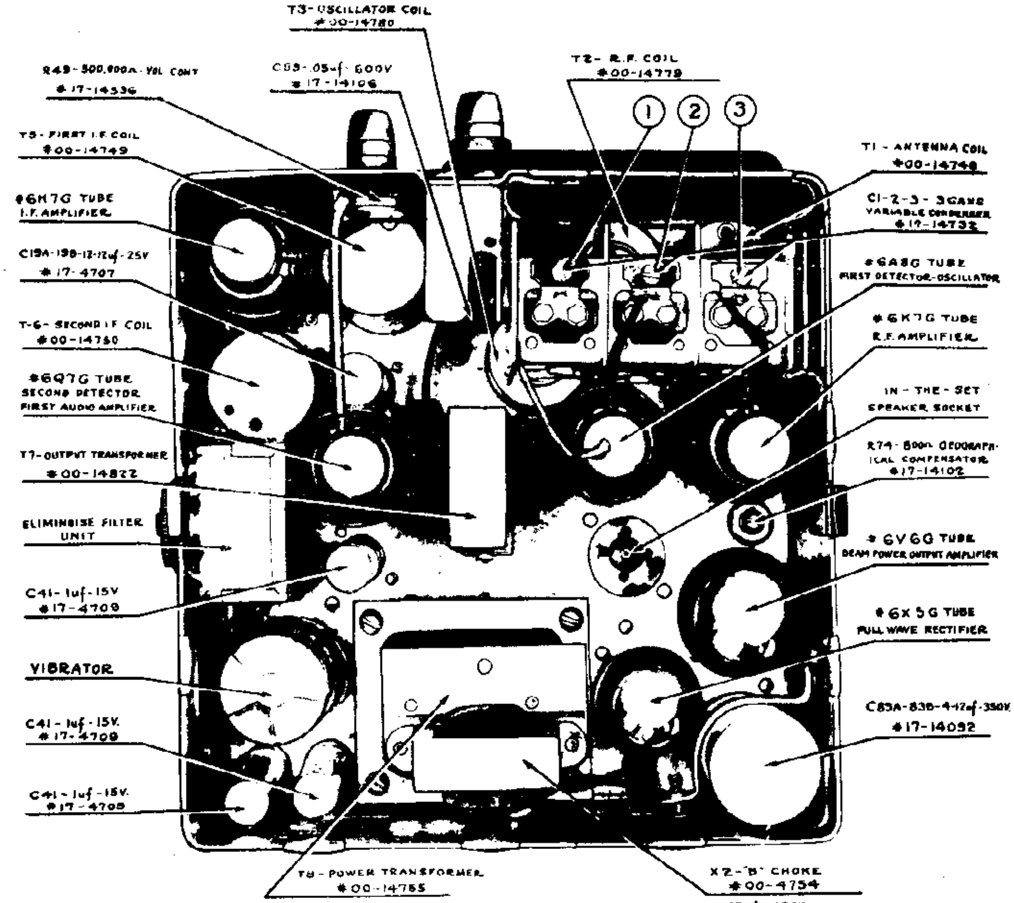
Osc. Coil Sec. .... 1.8 Ω
1st I. F. Trans. Pri. .... 75.0 Ω
1st I. F. Trans. Sec. .... 75.0 Ω
2nd I. F. Trans. Pri. .... 75.0 Ω
2nd I. F. Trans. Sec. .... 75.0 Ω

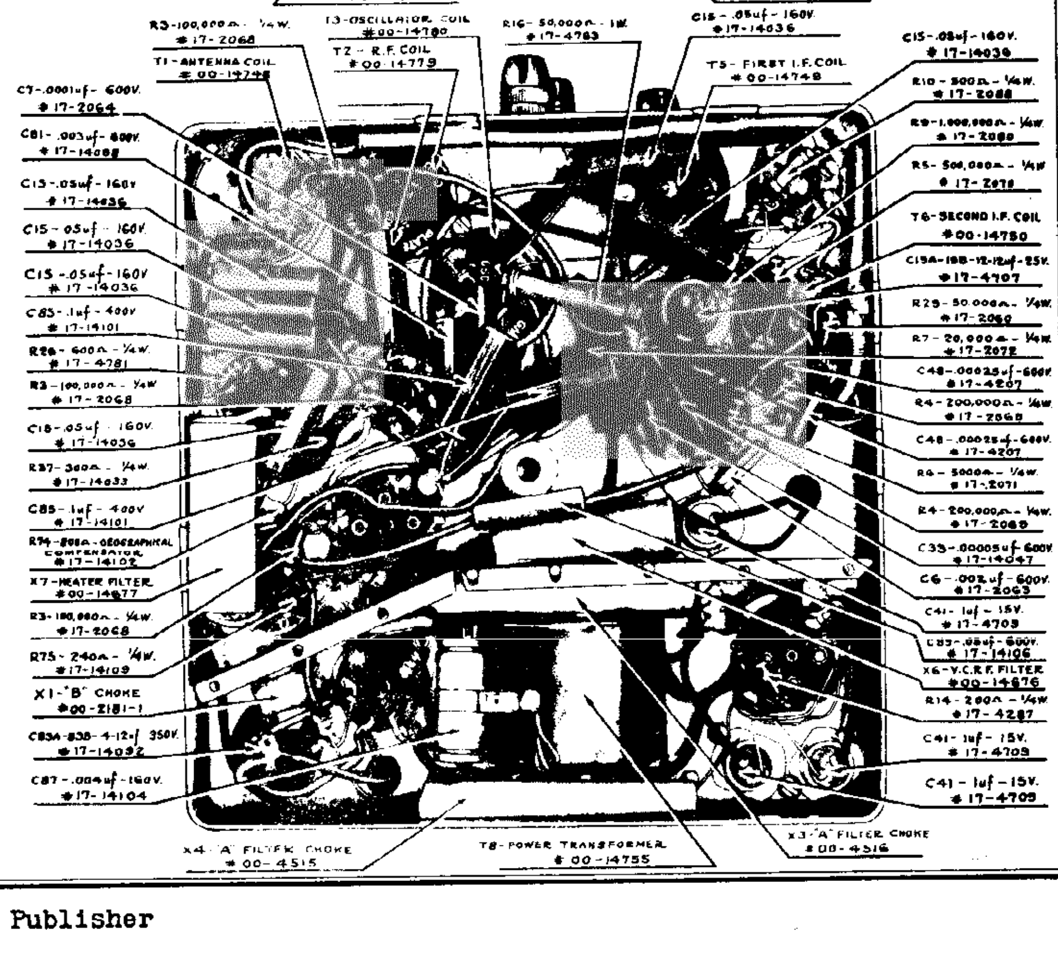
Output Trans. Pri. .... 395.0 Ω
Output Trans. Sec. .... .1 Ω
Power Trans. Pri. .... .075-.075 Ω
Power Trans. Sec. .... 175-0-200.0 Ω
"B" Filter Choke .... 140.0 Ω
"B" R. F. Choke .... 1.35 Ω

MODEL 29
Socket,Trimmers
Chassis,Alignment

NOBLITT SPARKS INDUSTRIES

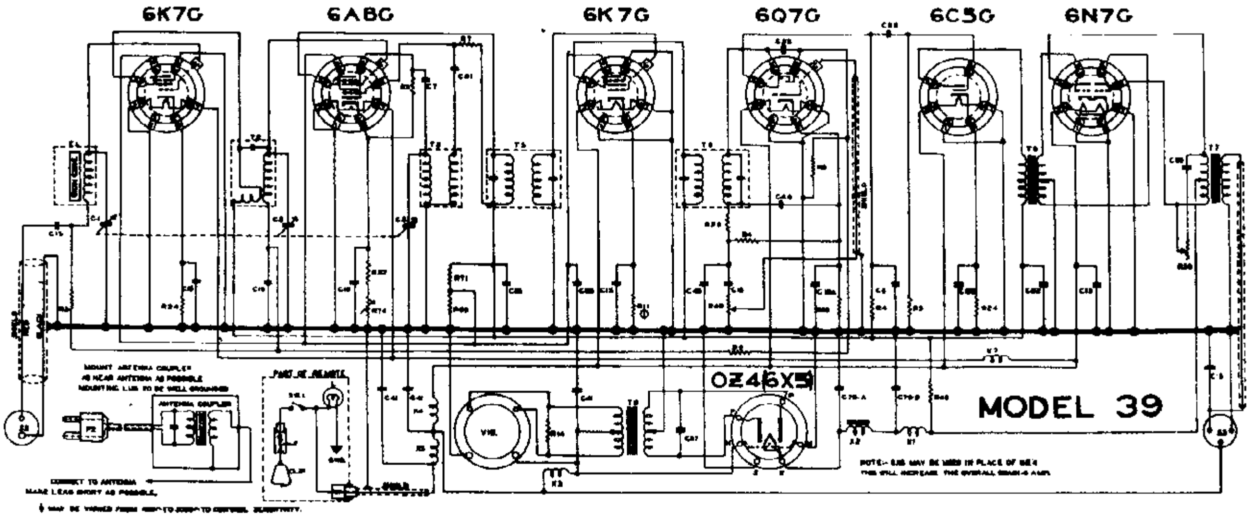
ALIGNMENT- Permaset prebalanced IF transformers require no adjustment. Gen. connected to ANT. post of Phantom-Filter. Gang out of mesh, Generator grounded to chassis, and set to 1575 KC, adjust padder NO. 1 for maximum output. Reset generator to 1400 KC, rotate gang until signal is resonated. Reduce the generator output, then adjust padders NO.2 and NO.3 for maximum output. After installation in a car tune in a weak station between 1150 and 1400 KC, readjust padder NO.3 for maximum output.





MODEL 39
Schematic, Voltage
Resistance, Parts

NOBLITT SPARKS INDUSTRIES



RESISTORS								CONDENSERS								CHOKES & TRANSFORMERS			MISCELLANEOUS UNITS		
R	Ω	W	PART NO.	R	Ω	W	PART NO.	C	CAPACITY	VOLT	PART NO.	C	CAPACITY	VOLT	PART NO.	TX	TYPE	PART NO.	SYMBOL	DESCRIPTION	PART NO.
3	100 M	1/4	[illegible]	76	600	–	[illegible]	1, 2, 3	3 GANG VARIABLE		[illegible]	70-A, 70-B	12-12 ELECT.	450	[illegible]	T	TRANSFORMERS			ANTENNA COUPLER	[illegible]
4	[illegible]	1/4	[illegible]					6	.002 MICA	600	[illegible]	82	4. ELECT.	350	17-4714	1	ANT. COIL	00-14745	S2	ANT. COUPLER SOCKET	[illegible]
5	500 M	1/4	[illegible]					7	.0001 MICA	600	[illegible]	81	.002 MICA	600	[illegible]	2	R.F. COIL	00-14779	S3	SPEAKER SOCKET	[illegible]
7	20 M	1/4	[illegible]					15	.05 MOULDED	150	[illegible]	85	.1 P.M.	400	[illegible]	3	OSC. COIL	[illegible]	P2	ANT. COUPLER PLUG	[illegible]
8	1 MEG	1/4	[illegible]					16-A, 16-B	15-15 ELECT.	25	[illegible]	87	.004	1600	[illegible]	5	FIRST I.F. COIL	[illegible]	L	DIAL LIGHT (IN REMOTE CONTROL)	[illegible]
11	2 M	1/4	[illegible]					33	[illegible] MICA	600	[illegible]	88	.02 P.M.	600	[illegible]	6	SECOND I.F. COIL	[illegible]	SW	POWER SWITCH (INTEGRAL WITH REMOTE)	———
14	200	1/4	[illegible]					41	[illegible]	15	[illegible]	89	.05 P.M.	600	[illegible]	7	OUTPUT TRANSF.	[illegible]	F	FUSE RENEWAL [illegible]	[illegible]
24	[illegible]	1/4	[illegible]					46	.00025 MICA	600	[illegible]					8	POWER TRANSF.	[illegible]	VIB.	VIBRATOR	[illegible]
[illegible]	30 M	1/4	[illegible]													9	INPUT TRANSF.	[illegible]			
37	250	1/4	[illegible]													X	CHOKES				
[illegible]	[illegible]	1	[illegible]													1	"C" CHOKE	[illegible]			
[illegible]	[illegible]	V.C.	[illegible]													2	"B" CHOKE (IRON CORE)	[illegible]			
[illegible]	[illegible]	V.C.	[illegible]													3	"A" FILTER CHOKE	[illegible]			
[illegible]	[illegible]	1/4	[illegible]													4	"A" FILTER CHOKE	[illegible]			
[illegible]	[illegible]	1/4	[illegible]													6	SUPPRESSION CHOKE	[illegible]			
[illegible]	[illegible]	1	[illegible]													7	HEATER FILTER	[illegible]			

I.F. PEAK 170 K.C.
BALANCE AT 1400 K.C.
CHECK AT 600 K.C.

MODEL 39 SOCKET VOLTAGES

Voltages given here are actually for an input battery voltage of 5.8 amp., even though the normal heater voltage is shown as 6.3 amp.

Tube	Heater	Cathode	Suppressor Grid	Screen Grid	Plate	*Oscillator Grid	Anode Grid	†Diode Plates
6K76	6.3	3.5	0	78	273	....	....	....
6A8C	6.3	3.0	....	78	273	5-12	184	....
6K76	6.3	5.0	0	78	273	....	....	....
6Q7C	6.3	1.9	....	....	150	....	....	2.0
6C5	6.3	7.15	....	....	265	....	....	....
6N7	6.3	0	....	....	290	....	....	....
6X4G	6.3	285	....	....	310	....	....	....

* Measured at 1500 K. C.
† Measured with Vacuum Tube Voltmeter.

POINT TO POINT RESISTANCES—MODEL 39

6K7G—R. F. Amplifier

Heater 0
Heater .... ∞
Cathode ....600 Ω
Suppressor 0
Screen to +B..........................40,000 Ω
Screen ....60,000 Ω
Plate to +B..............................100 Ω
Control Grid ....1,700,000 Ω

6A8G—1st Det. Oscillator

Heater 0
Heater .... ∞
Cathode, adj. max.....................1,000 Ω
Osc. Grid ....100,600 Ω
Anode Grid to +B......................20,000 Ω
Screen to +B..........................50,000 Ω
Plate to +B..............................74 Ω
Control Grid ....400,000 Ω

6K7G—I. F. Amplifier

Heater 0
Heater .... ∞
Cathode ....†2,000 Ω
Suppressor 0
Screen to +B..........................40,000 Ω
Screen ....60,000 Ω
Plate to +B..............................74 Ω
Control Grid ....500,000 Ω

6Q7G—AVC, 2nd Det.; 1st Audio

Heater 0
Heater .... ∞
Cathode ....8,000 Ω
Diode ....258,000 Ω
Diode ....600,000 Ω
Plate to +B..........................200,000 Ω
Control Grid, V. C. on...............500,000 Ω
Control Grid, V. C. off...............Max. 25 Ω

6C5G—2nd Audio

Heater 0
Heater .... ∞

Cathode ....1,000 Ω
Plate to +B...............................1,200 Ω
Control Grid ....500,000 Ω

6N7G—Power Output

Heater 0
Heater .... ∞
Cathode 0
Control Grid ....320 Ω
Control Grid ....235 Ω
Plate to +B................................175 Ω
Plate to +B................................160 Ω

0Z4 (or 6X5)—Rectifier

Heater 0
Heater .... ∞
Cathode to +B.............................140 Ω
Plate ....175 Ω
Plate ....200 Ω
Plate to Plate.............................375 Ω

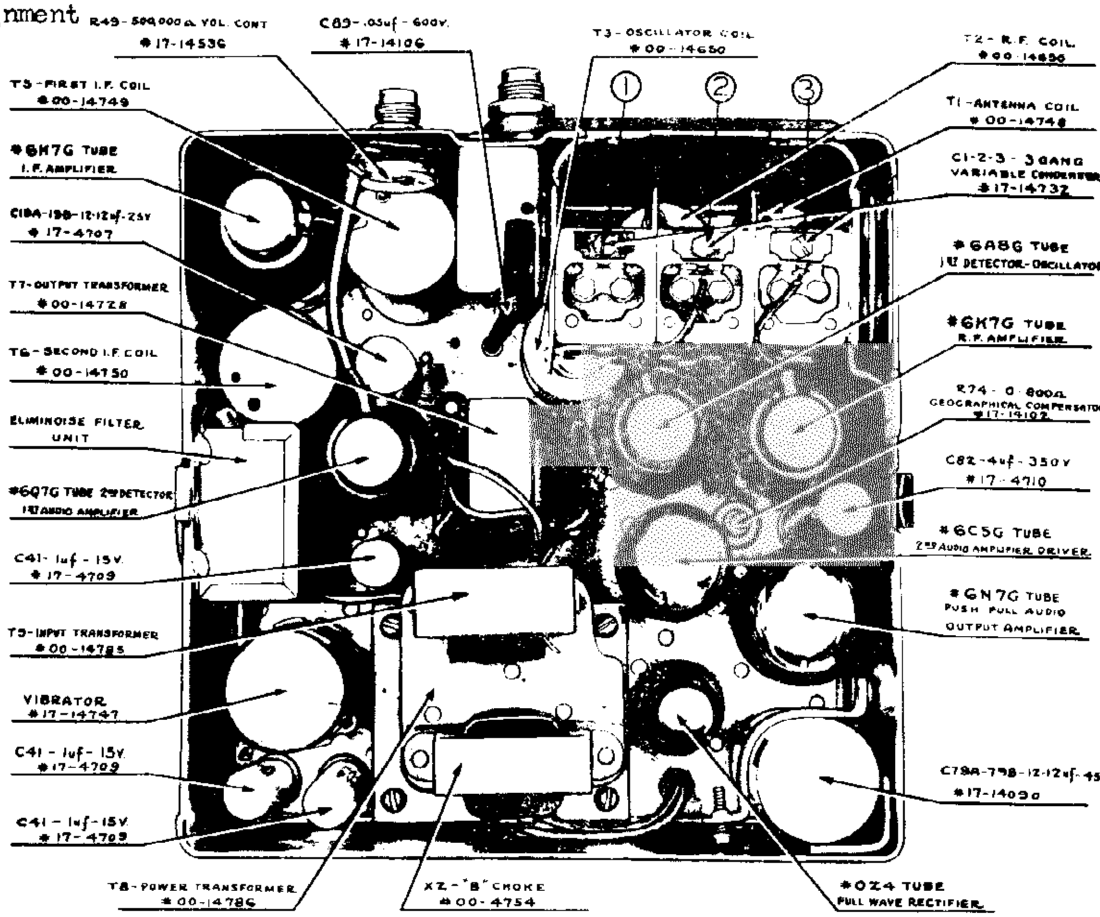
†This resistor may be varied to further control receiver sensitivity.

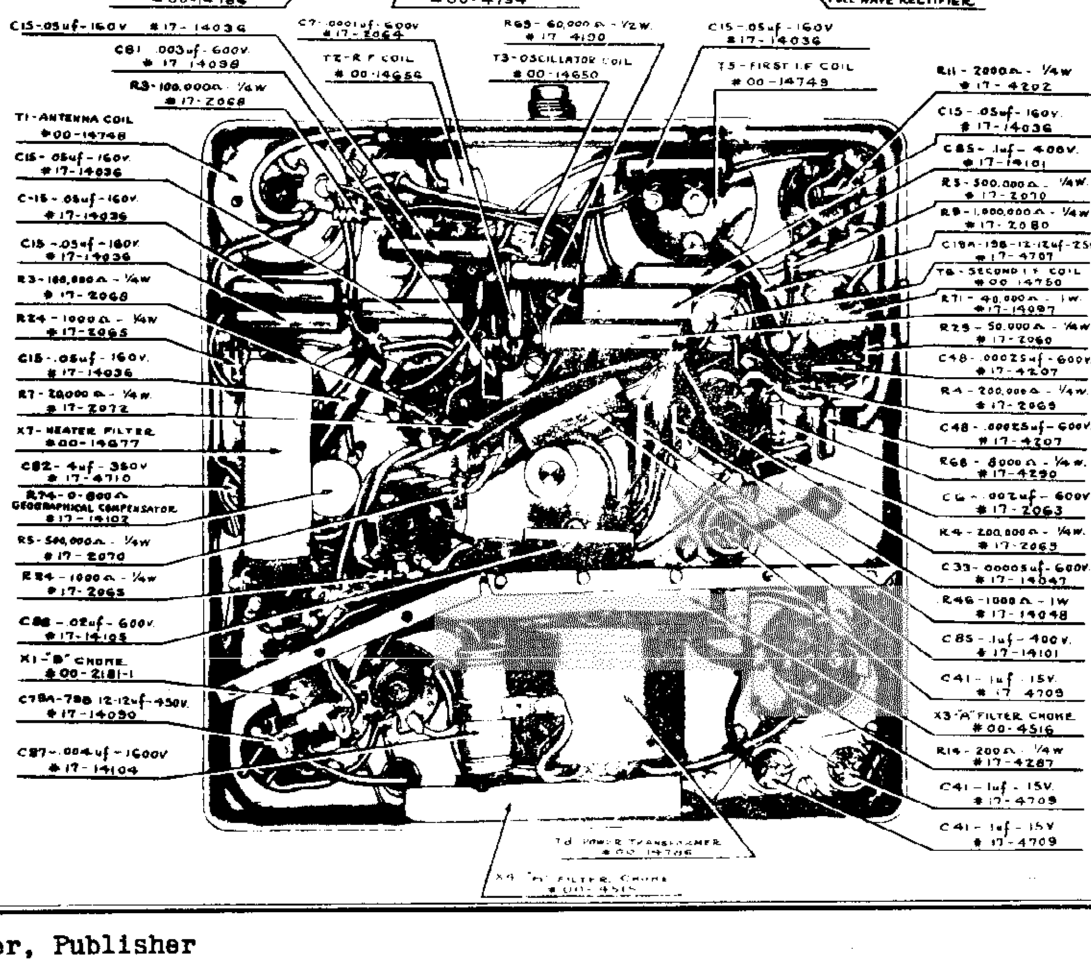
COIL AND TRANSFORMER RESISTANCES

Phant. Filter Pri. ....8.5 Ω
Phant. Filter Sec. ....1.0 Ω
Antenna Coil ....2.325 Ω
R. F. Coil Pri. ....100.0 Ω
R. F. Coil Sec. ....3.475 Ω
Osc. Coil Pri. ....3.0 Ω
Osc. Coil Sec. ....1.8 Ω
1st I. F. Trans. Pri. ....75 Ω
1st I. F. Trans. Sec. ....75 Ω
2nd I. F. Trans. Pri. ....75 Ω
2nd I. F. Trans. Sec. ....75 Ω
Output Trans. Pri. ....175-0-160 Ω
Output Trans. Sec. ....1 Ω
Power Trans. Pri. ....075-0-.075 Ω
Power Trans. Sec. ....175-0-200 Ω
"B" Filter Choke ....140. Ω
"B" R. F. Choke ....1.35 Ω

MODEL 39
Socket, Trimmers
Chassis, Alignment

NOBLITT SPARKS INDUSTRIES



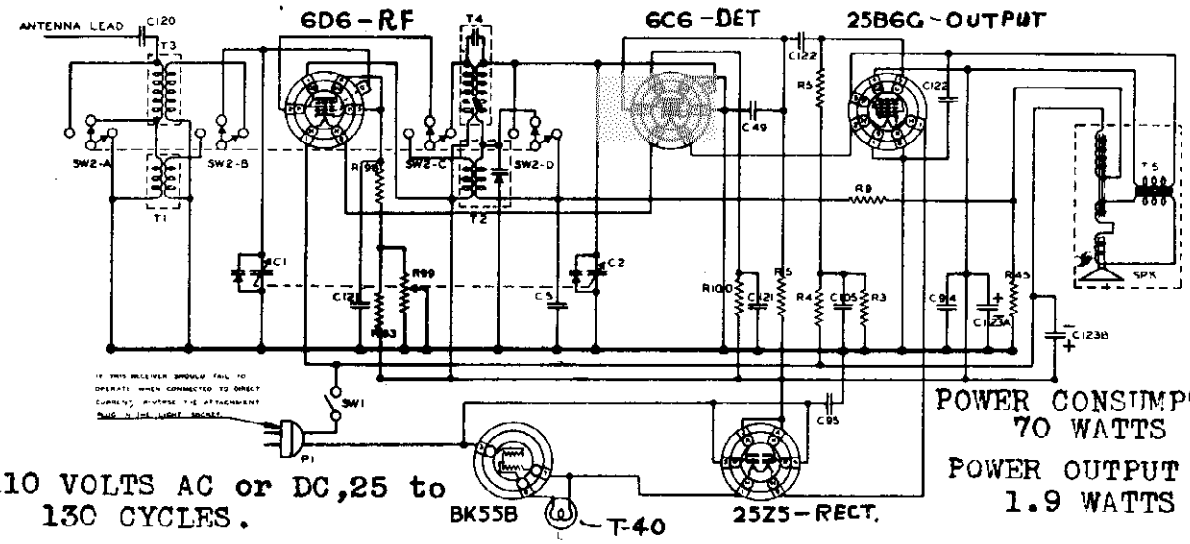


ALIGNMENT- Permaset prebalanced IF transformers require no adjustment. Gen. connected to Ant. post of Phantom -Filter. Gang out of mesh, Generator grounded to chassis, and set to 1575 KC, adjust the Padder No.1 for maximum output. Reset generator to 1400 KC, rotate gang until signal is resonated. Reduce the generator output, then adjust the padders No.2 and No.3 for maximum output. After the installation in a car readjust padder No.3 on a signal between 1150 and 1400 KC for maximum output.

MODEL 508 AC-DC
Schematic, Voltage
Resistance, Parts

NOBLITT SPARKS INDUSTRIES

ARVIN HOME RADIO MODEL 508



POWER CONSUMPTION
70 WATTS

POWER OUTPUT -
1.9 WATTS

110 VOLTS AC or DC, 25 to 130 CYCLES.

RESISTORS				CONDENSERS				TRANSFORMERS			MISCELLANEOUS		
R	OHM	W	PART NO	C	CAPACITY	VOLT	PART NO	T	TYPE	PART NO	SYMBOL	DESCRIPTION	PART NO
1	100M	1/4	[illegible]	1	TWO GANG		17-5722	1	SHORT WAVE ANTENNA	[illegible]	SPK	DYNAMIC SPEAKER	[illegible]
4	20M	1/4	[illegible]	2	VARIABLE			2	SHORT WAVE R.F. COIL	[illegible]		PILOT LIGHT T-40 MAZDA	
3	500M	1/4	[illegible]	5	.05	[illegible]	[illegible]	3	BROADCAST ANTENNA	[illegible]	P1	LINE CORD & PLUG ASSEMBLY	[illegible]
5	1 MEG	1/4	17-2080	49	.0005	600	[illegible]	4	BROADCAST R.F. COIL	[illegible]	SW1	LINE SWITCH - PART OF R99	
				94	[illegible]	200	[illegible]	5	OUTPUT TRANS	[illegible]	SW2	BAND SWITCH	[illegible]
45	25	1/2	[illegible]	95	.02	600	[illegible]						
63	[illegible]	1/4	[illegible]	105	.25	200	[illegible]						
98	200	1/4	[illegible]	120	.001	400	[illegible]						
99	15M	[illegible]	[illegible]	121	.05	200	[illegible]						
100	3 MEG	1/4	[illegible]	122	[illegible]	400	[illegible]						
				123A	8	150	[illegible]						
				123B	16	150							

"A" BAND - BALANCE AT 1400 K.C.
CHECK AT 600 K.C.
"B" BAND - BALANCE AT 3.5 M.C.
CHECK AT 17 M.C.

FREQUENCY RANGE-
BAND "A"-540 to 1600 KC
BAND "B"-1600 to 4250 KC

SENSITIVITY -
BAND A - 250 Microvolts minimum
50 milliwatts output.
BAND B - 400 Microvolts minimum
at 2400 KILOCYCLES.

MODEL 508 SOCKET VOLTAGES

(INPUT VOLTAGE 110 AC)

	Heater	Plate	Screen	Suppressor	Cathode	Grid Bias
6D6	6.3	94	94	....	2	....
6C6	6.3	30	20	0	0	....
25B6	25.0	87	94	....	0	15
25Z5	25.0	—44	....	....	94	....
BK55B	51.4	....	....	....	....	....
DIAL LITE	6.0	....	....	....	....	....

POINT TO POINT RESISTANCES

All readings taken to ground unless otherwise specified. Tubes in sockets and speaker connected. All shell terminals grounded. Volume control in full-on position.

6D6
Heater to Ground .... 780 Ω
Heater to 110 V. Cord .... 6 Ω
*Cathode .... 200 Ω
*Suppressor .... 200 Ω
Screen to B+ 0
‡ Plate to B+ .... 60 Ω
* Volume control off .... 15,200 Ω
‡ Broadcast Band only ....
x Volume control off .... 40,000 Ω

6C6
Heater to 110 V. Cord .... .015 Ω
Heater to 110 V. Cord .... .5 Ω
Cathode 0
Suppressor 0
Screen to B+ .... 3,000,000 Ω
Plate to B+ .... 500,000 Ω

25B6G
Heater to 110 V. Cord .... 4.2 Ω
Heater to 110 V. Cord .... 18.2 Ω

BK55B—Cold
Resistance Terminal 3 to 8 .... 145.0 Ω
Resistance Terminal 7 to 8 .... 10.0 Ω

Cathode 0
Control Grid .... 600,000 Ω
Screen Grid to B+ 0
Plate to B+ .... 110 Ω

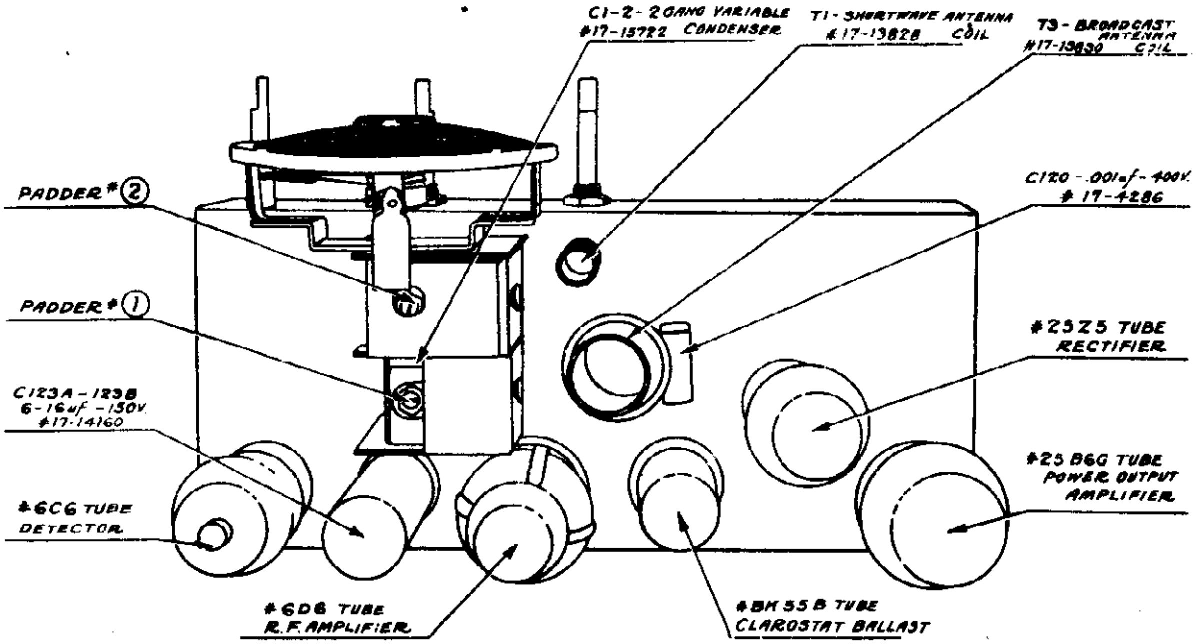
25Z5
Heater to 110 V. Cord .... 18.2 Ω
Heater to 110 V. Cord .... 30.0 Ω
x Cathode .... 25,000 Ω
x Cathode .... 25,000 Ω
Plate .... 185 Ω
Plate .... 185 Ω

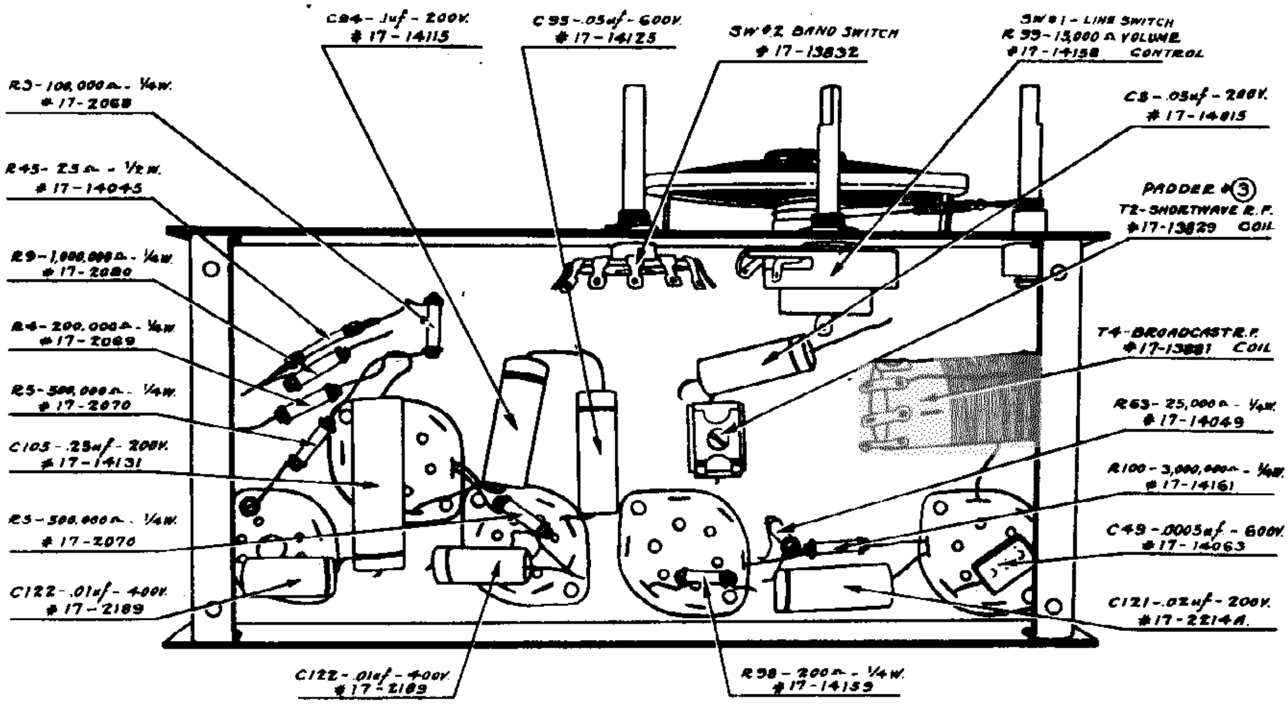
COIL, TRANSFORMER AND SPEAKER RESISTANCES

T1 Broadcast Ant. Pri. .... 60.0 Ω
T1 Broadcast Ant. Sec. .... 3.6 Ω
T3 Short Wave Ant. Pri. .... .3 Ω
T3 Short Wave Ant. Sec. .... .2 Ω
T2 Broadcast R. F. Pri. .... 60.0 Ω
T2 Broadcast R. F. Sec. .... 3.7 Ω
T4 Short Wave R. F. Pri. .... .5 Ω
T4 Short Wave R. F. Sec. .... 1.0 Ω
T5 Output Trans. Pri. .... 110 Ω
T5 Output Trans. Sec. .... .6 Ω
Speaker Field .... 740 Ω
Speaker Voice Coil .... 1.7 Ω

MODEL 508 AC-DC
Socket, Trimmers
Alignment

NOBLITT SPARKS INDUSTRIES





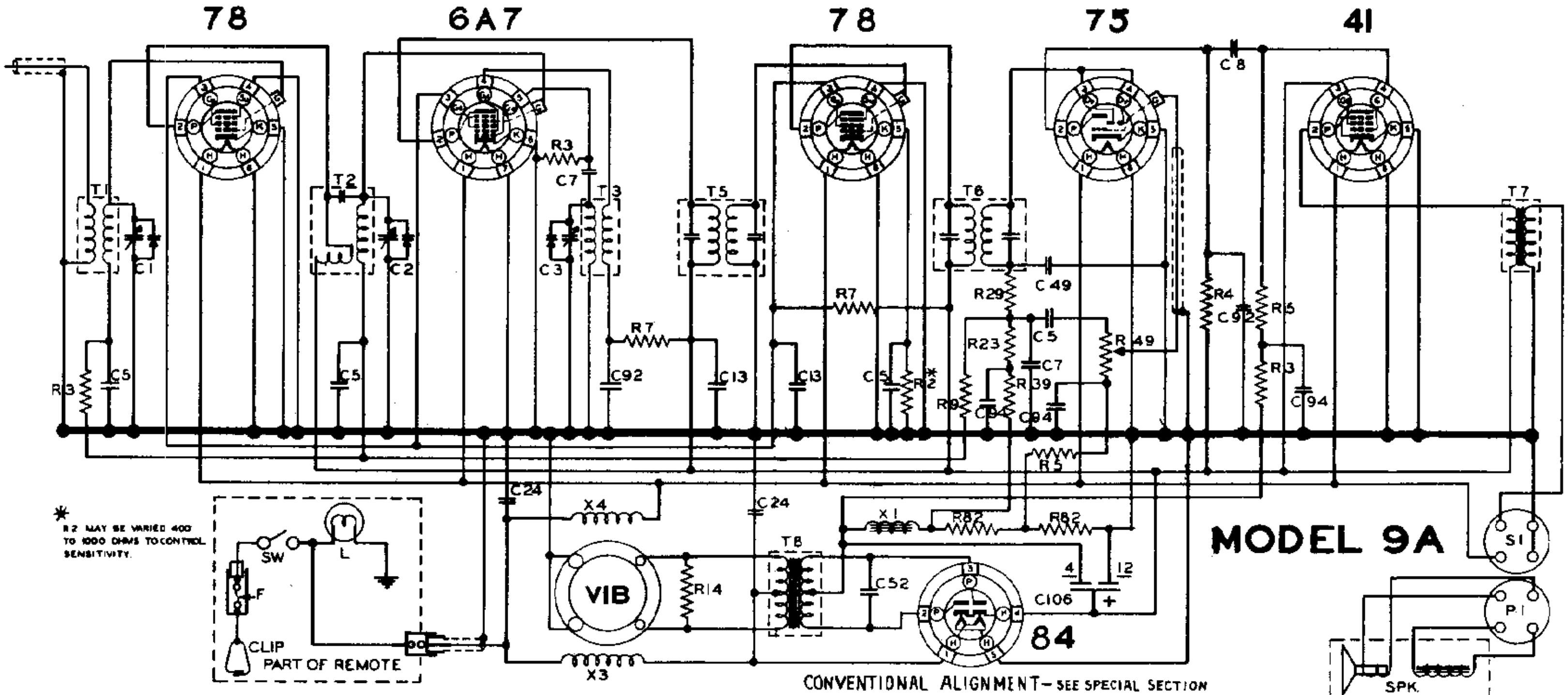
BALANCING INSTRUCTIONS

1. Rotate tuning condenser to extreme left and check to see that pointer lines up with horizontal lines across dial face.

2. Connect Generator to antenna terminal thru 200 MMF condenser. Set dial and signal generator to 1400 KC. Set wave band switch to Broadcast position. Adjust padders 1 and 2 for maximum output.

3. Set dial and Generator to approximately 2400 KC. Set wave band switch to short wave position. Adjust padder No. 3 for maximum output.

NOBLITT SPARKS INDUSTRIES



CONVENTIONAL ALIGNMENT — SEE SPECIAL SECTION

RESISTORS

R	OHMS	W	PART NO		R	OHMS	W	PART NO	
3	100K	1/4	17-2068		2	400	1/4	17-4782	
4	200K	1/4	17-2069						
5	500K	1/4	17-2070						
7	20K	1/2	17-2072						
8	1MEG.	1/4	17-2080						
14	200	1/4	17-4267						
23	250K	1/4	17-3011						
29	50K	1/4	17-2060						
39	300K	1/4	17-14051						
49	500K	V.C.	17-14536						
51	200	1	17-14060						
82	30	1/4	17-14117						

CONDENSERS

C	CAPACITY	VOLT	PART NO		C	CAPACITY	VOLT	PART NO	
1	THREE								
2	GANG		17-14732						
3	VARIABLE								
5	.05	200	17-14015						
7	.0001	600	17-2064						
8	.01	600	17-14016						
13	.1	300	17-14044						
24	.5	200	17-14040						
49	.0005	600	17-14063						
52	.01	1200	17-14602						
92	.001	600	17-14113						
94	.1	200	17-14115						
104	.01	200	17-4206						
105	.25	200	17-14131						
106	4-12 CAEW	250	17-14132						

CHOKES & TRANSFORMERS

T-X	TYPE	PART NO	
T	TRANSFORMERS		
1	ANTENNA COIL	00-1463	
2	RF COIL	00-14918	
3	OSC COIL	00-14919	
5	1ST I.F COIL	00-14749	
6	2ND I.F COIL	00-14750	
7	OUTPUT TRANS.	00-14666	
8	POWER TRANS.	00-14659	
X	CHOKES		
3	"A" FILTER	00-4518	
4	"A" FILTER	00-4515	
1	"B" FILTER	00-14917	

MISCELLANEOUS UNITS

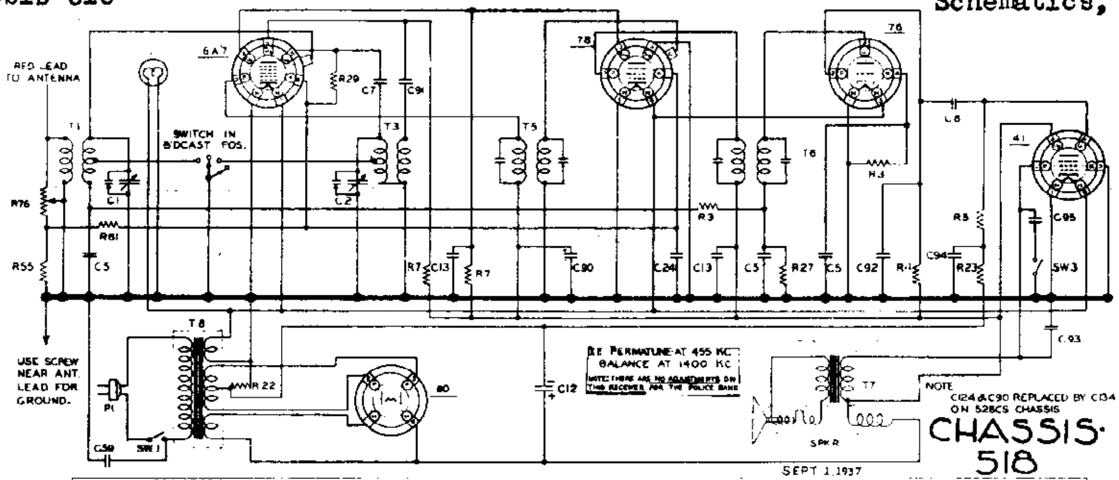
SYMBOL	DESCRIPTION	PART NO	
S1	SPEAKER SOCKET	17-2230	
L	DIAL LIGHT (IN REMOTE CONTROL)	17-13904	
VIB	VIBRATOR	17-14747	
SW	POWER SWITCH (IN REMOTE CONTROL)		
F	FUSE 10AMP - 25VOLT	17-2197	
SPK	SPEAKER	17-14951	
P1	PLUG (ASSEMBLED TO SPEAKER)		

I.F. PEAK 170 K.C.
BALANCE AT 1400 K.C.
CHECK AT 1000 & 600 K.C.

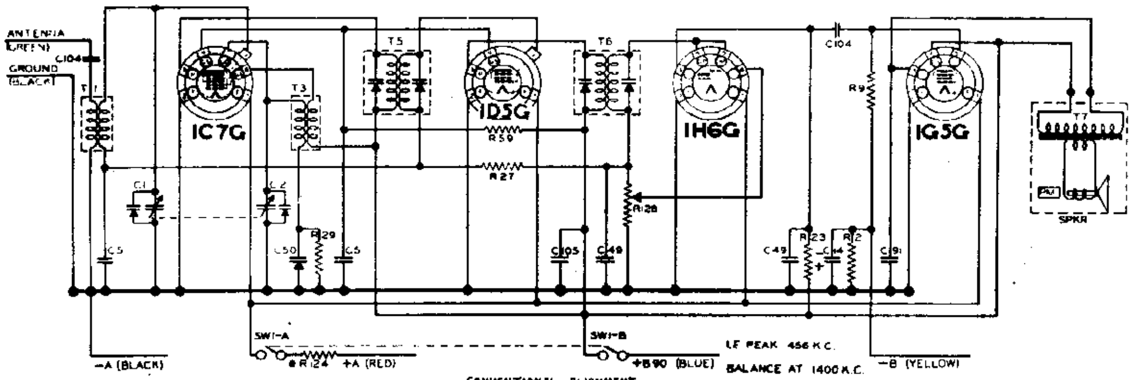
MODELS 518, 518A, 518DW
528CS, 568, 568A
568DW
Chassis 518

NOBLITT SPARKS INDUSTRIES

MODEL 578B 628CS
MODELS 618, 618A, 628
638, 638CS
Schematics, Parts



RESISTORS								CAPACITORS								TRANSFORMERS			MISCELLANEOUS		
R	OHM	W	PART NO	R	OHM	W	PART NO	C	CAPACITY	VOLT	PART NO	C	CAPACITY	VOLT	PART NO	T	TYPE	PART NO	SYMBOL	DESCRIPTION	PART NO
[illegible]	100M	[illegible]	[illegible]	76	[illegible]	[illegible]	[illegible]	1	2 GANG VARIABLE		[illegible]	94	.1	200	[illegible]	1	ANTENNA COIL	[illegible]	SW 1	[illegible]	[illegible]
5	60M	[illegible]	[illegible]	[illegible]	270	[illegible]	[illegible]	2				95	.02	600	[illegible]	3	OSCILLATOR COIL	[illegible]	SW 2	[illegible]	[illegible]
7	30M	[illegible]	[illegible]	81	150	¼	[illegible]	5	.05	200	[illegible]	124	DUAL 8 MF	450	[illegible]	5	1ST I.F. TRANSFORMER	[illegible]			
23	250M	¼	[illegible]	22	300	1	17-4724	7	.0001	600	17-2044	88	.02	400	17-14105	6	2ND I.F. TRANSFORMER	00-13899	L	DIAL LIGHT	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	6	30000	½	[illegible]	8	.01	600	[illegible]	90	8 MF [illegible]	200	[illegible]	7	OUTPUT TRANSFORMER	17-13067	P1	POWER CORD AND PLUG ASSEMBLY	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]					12	[illegible]	475	[illegible]	91	.002	600	[illegible]	8	POWER TRANSFORMER	[illegible]	SW3	TONE SWITCH	[illegible]
[illegible]	300	[illegible]	[illegible]					13	.1 MF	300	[illegible]	92	.001	600	[illegible]				SPK	DYNAMIC [illegible] FOR STANDARD 518 CHASSIS [illegible]	[illegible]
[illegible]	80	[illegible]	[illegible]					24	.5	200	[illegible]	93	.005	600	[illegible]						
[illegible]	[illegible]	[illegible]	[illegible]					42	.05	400	[illegible]										



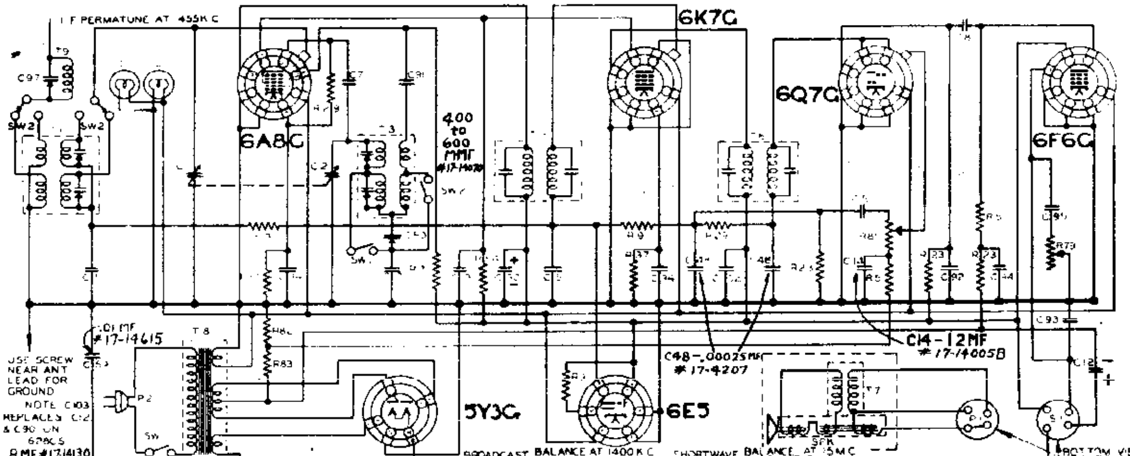
I.F. PEAK 456 K.C.
BALANCE AT 1400 K.C.
PAD AT 600 K.C.

CONVENTIONAL ALIGNMENT
(SEE SPECIAL SECTION)

* NOTE - [illegible]

MODEL 578B

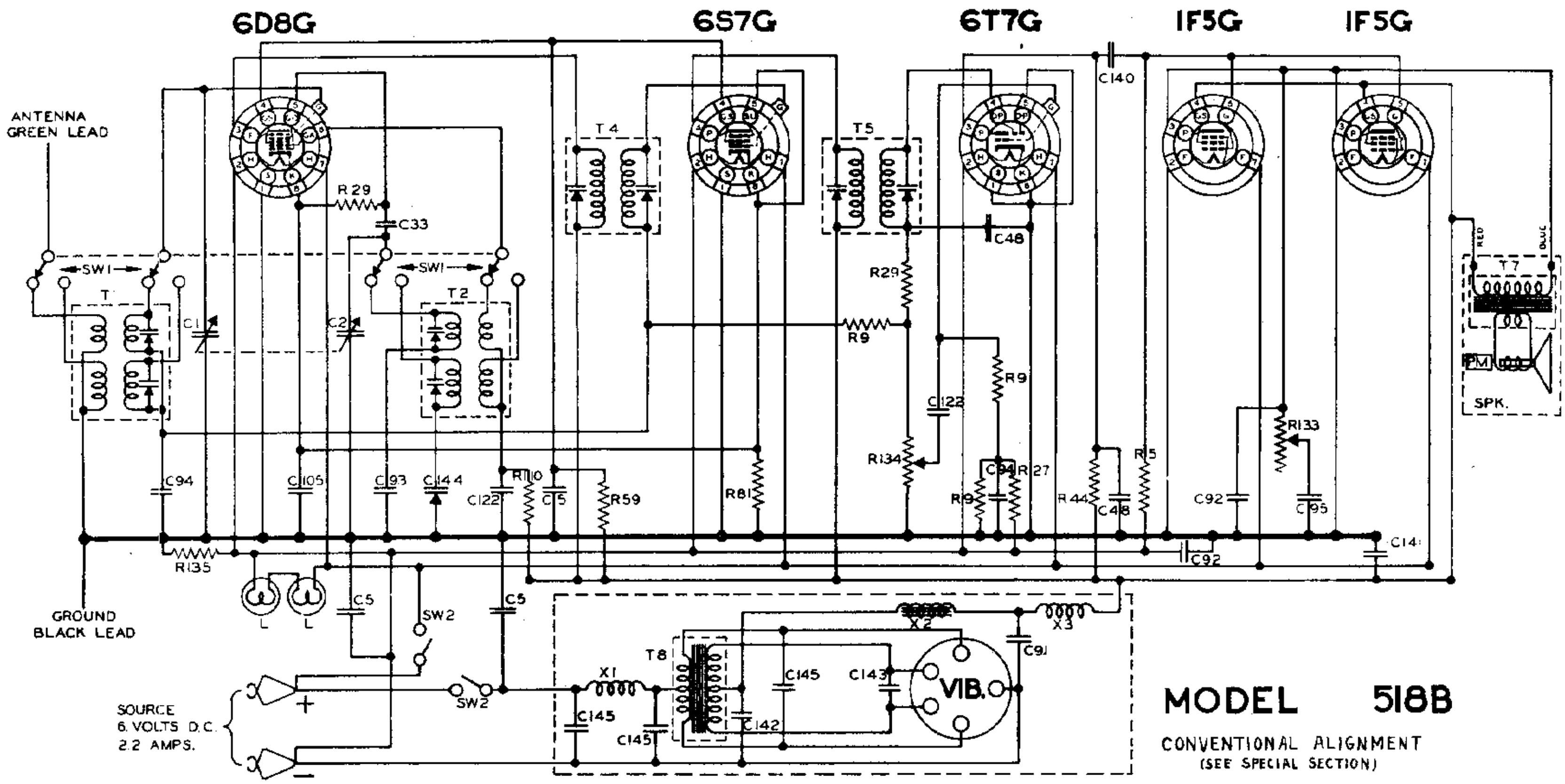
RESISTORS								CONDENSERS				TRANSFORMERS			MISCELLANEOUS UNITS		
R	OHM	W	PART NO	R	OHM	W	PART NO	C	CAPACITY	VOLT	PART NO	T	TRANSFORMER	PART NO	SYMBOL	DESCRIPTION	PART NO
[illegible]	[illegible]	[illegible]	[illegible]					1	TWO GANG		[illegible]	1	ANTENNA COIL	[illegible]	SPKR	PERMANENT MAGNET DYNAMIC SPEAKER	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]					2	[illegible]			3	OSCILLATOR COIL	[illegible]	SW1-A	FILAMENT SWITCH - SEE [illegible]	
[illegible]	[illegible]	[illegible]	[illegible]					[illegible]	[illegible]	[illegible]	[illegible]	5	FIRST I.F. COIL	[illegible]	SW1-B	"B" SWITCH - SEE [illegible]	
[illegible]	[illegible]	[illegible]	[illegible]					[illegible]	[illegible]	[illegible]	[illegible]	6	SECOND I.F. COIL	[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]					[illegible]	[illegible]	[illegible]	[illegible]	7	OUTPUT TRANS.	[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]					[illegible]	[illegible]	[illegible]	[illegible]						
[illegible]	[illegible]	[illegible]	[illegible]					[illegible]	[illegible]	[illegible]	[illegible]						
[illegible]	[illegible]	[illegible]	[illegible]					[illegible]	[illegible]	[illegible]	[illegible]						
[illegible]	[illegible]	[illegible]	[illegible]					[illegible]	[illegible]	[illegible]	[illegible]						



RESISTORS	CONDENSERS	TRANSFORMERS	MISCELLANEOUS
[illegible]	[illegible]	[illegible]	[illegible]

MODELS
618-618A
628-638
-628CS
-638CS

NOBLITT SPARKS INDUSTRIES



MODEL 518B

CONVENTIONAL ALIGNMENT
(SEE SPECIAL SECTION)

RESISTORS

R	OHM	W	PART NO.
5	500K	1/4	17-2070
9	1M	1/4	17-2080
27	2M	1/4	17-4788
29	50K	1/4	17-2060
44	150K	1/4	17-4283
59	15K	1/4	17-4191
81	1.5K	1/4	17-14116
110	5K	1/4	17-14175
133	75K	T.C.	17-15600
134	2M	V.C.	17-15599
135	15	1/4	17-14206

CONDENSERS

C	CAPACITY	VOLT	PART NO
1	TWO-GANG		17-15724
2	VARIABLE		
5	.05	200	17-14015
33	.00005	800	17-14047
48	.00025	800	17-4207
91	.002	800	17-14112
92	.001	800	17-14113
93	.005	800	17-14114
94	.1	200	17-14115
105	.25	200	17-14131
122	.01	400	17-2189
95	.02	800	17-14125
140	.02	400	17-2214
141	25 ELECT.	150	17-14202
142	8.0 ELECT.	200	17-14203
143	.015	200	17-14204
144	200-400MMF	PADDER	17-14205
145	.5	15	17-4264

TRANSFORMERS & CHOKES

T	TRANSFORMERS	PART NO.
1	ANTENNA COIL	17-15598
2	OSCILLATOR COIL	17-15597
4	FIRST I.F. COIL	17-15596
5	SECOND I.F. COIL	17-15595
7	OUTPUT TRANS.	17-15593
8	POWER TRANS.	17-15594
X	CHOKES	
1	R.F. CHOKE	
2	FILTER CHOKE	17-15590
3	R.F. CHOKE	

MISCELLANEOUS

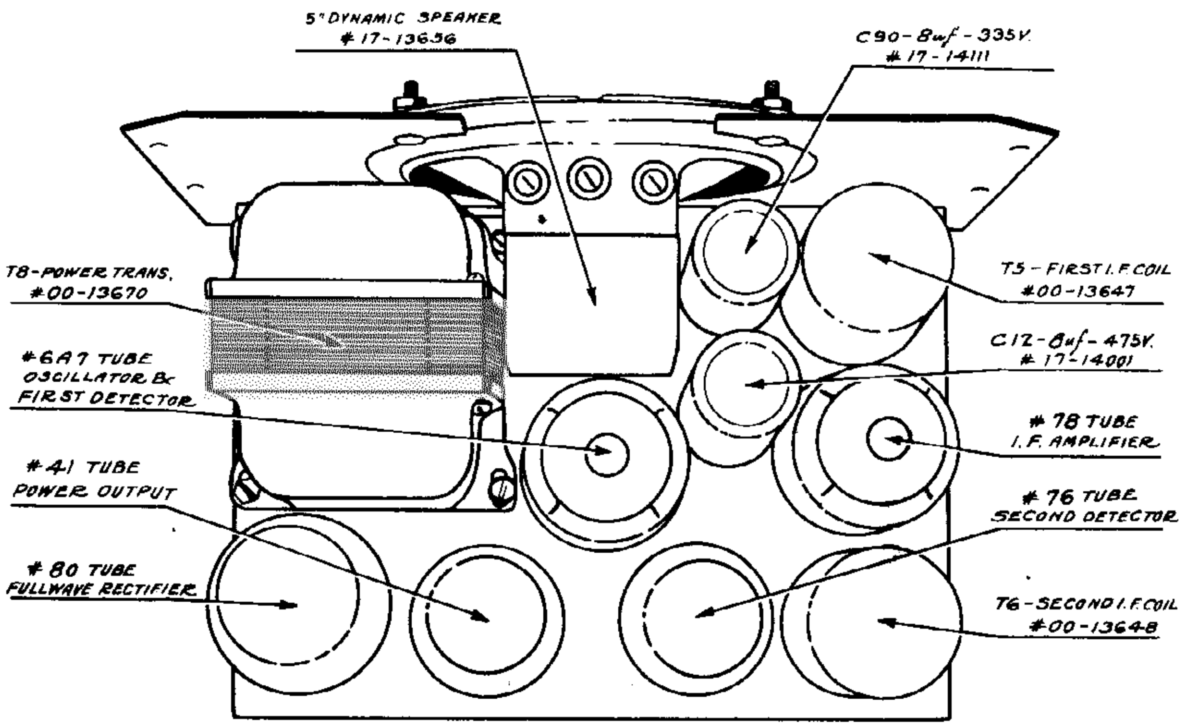
SYMBOL	DESCRIPTION	PART NO
SPK.	PERMANENT MAGNET SPEAKER	17-15592
SW1	BAND SWITCH	17-15591
SW2	"A" SUPPLY SWITCH - SEE R134	17-15600
L	LAMP - MAZDA 502	———
VIB.	VIBRATOR	17-15589

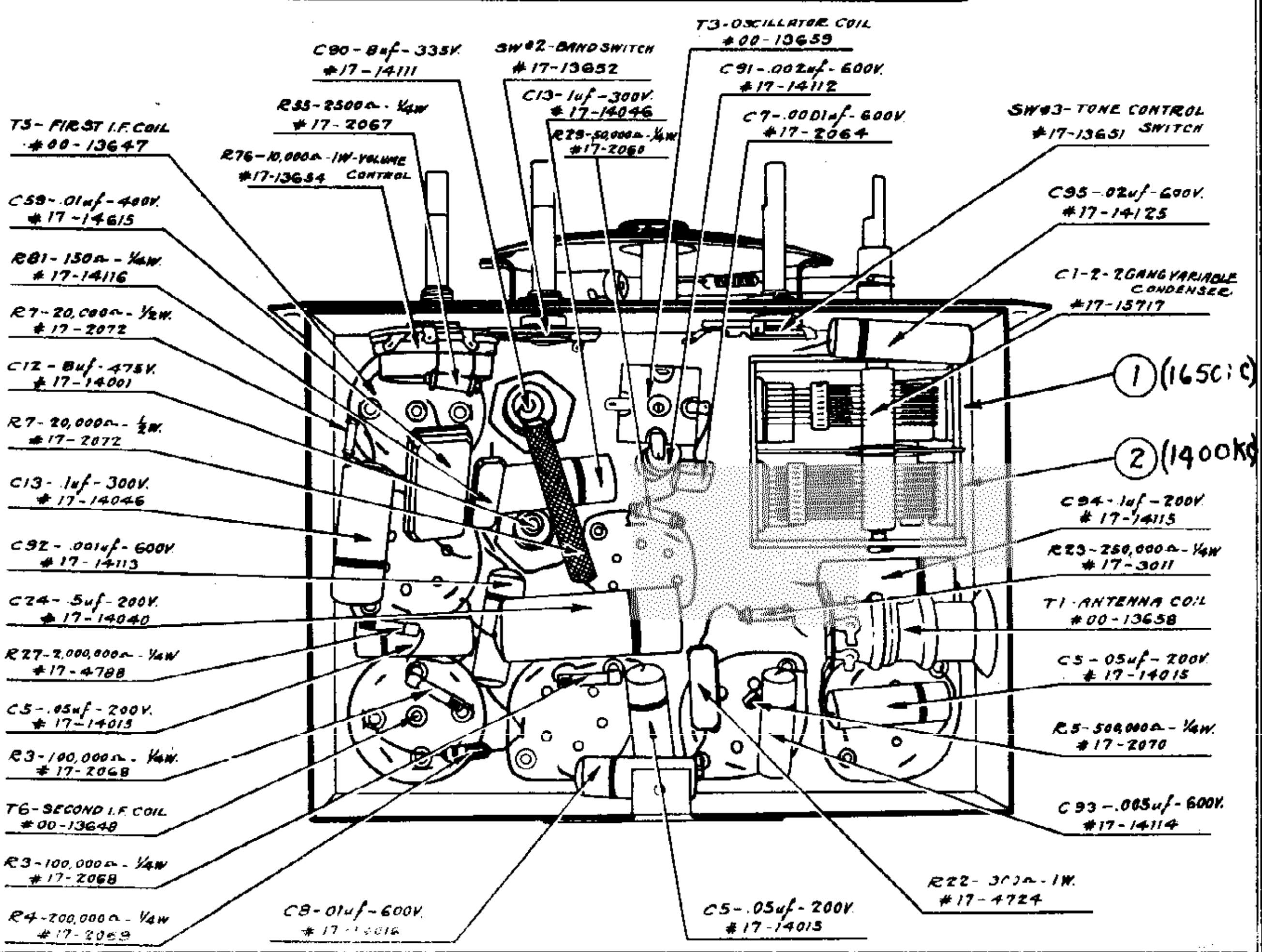
I.F. PEAK 456 K.C.
BALANCE AT 1400 K.C. - PAD AT 600 K.C.
BALANCE AT 14.0 M.C. - CHECK AT 6.0 M.C.

MODELS 518, 518A, 518DW
528CS, 568, 568A
568DW

NOBLITT SPARKS INDUSTRIES

Socket, Trimmers, Chassis





MODELS 518, 518A, 518DW
528CS, 568, 568A
568DW
Voltage, Resistance
Alignment, Sensitivity

NOBLITT SPARKS INDUSTRIES

POWER OUTPUT: 3.5 watts

SPEAKER: 5" Dynamic; 3 ohm voice coil

VOLTAGE & FREQUENCY: 110 V. 60 cycles

WATTS POWER CONSUMPTION: 65 watts

SENSITIVITY: 1400 KC 100 microvolts minimum for 50 milliwatts
2400 KC 100 microvolts minimum for 50 milliwatts

6A7—1st Detector—Oscillator
78—I. F. Amplifier
76—2nd Detector—AVC Bias Rectifie
41—Audio Output Amplifier
80—Full Wave Rectifier

FREQUENCY RANGE:
540-1650 Kilocycles
1650-4000 Kilocycles

MODEL 518-518A-568-568A SOCKET VOLTAGES

Tube	Heater	Plate	Screen	Suppressor	Cathode	Osc. Grid	Osc. Plate
6A7	6.3	225	100	......	2.8	6-15	150
78	6.3	225	100	0	2.8	......	......
76	6.3	190	......	......	8.4	......	......
41	6.3	200	225	......	15	......	......
80	5.0	385	......	......	325	......	......

POINT TO POINT RESISTANCES

All Readings taken to ground unless otherwise specified. Tubes removed and speaker connected.

6A7

Heater	.25 Ω
Heater	0
Anode Grid to B+	20,000 Ω
Plate to B+	11 Ω
Screen to B+	20,000 Ω
Cathode	V.C. on— 150 Ω; V.C. off—12,500 Ω
*Control Grid	2,100,000 Ω
Oscillator Grid	50,150 Ω

*Band Switch in Broadcast Position

78

Heater	.25 Ω
Heater	0
Cathode	2,650 Ω
Suppressor	0
Screen Grid to B+	20,000 Ω
Control Grid	11 Ω
Plate to B+	11 Ω

76

Heater	.25 Ω
Heater	0
Cathode	100,000 Ω
Control Grid	2,000,000 Ω
Plate to B+	200,000 Ω

41

Heater	.25 Ω
Heater	0
Cathode	0
Control Grid	750,000 Ω
Screen to B+	0
Plate to B+	700 Ω

80

Filament to B+	1,600 Ω
Filament to B+	1,600 Ω
Plate	740 Ω
Plate	700 Ω

COIL, TRANSFORMER AND SPEAKER RESISTANCES

Speaker Field	1,600 Ω
Speaker Voice Coil	1 Ω
T1 Ant. Primary	.25 Ω
T1 Ant. Secondary	3 Ω
T3 Oscillator Primary	2.5 Ω
P3 Oscillator Secondary	2.8 Ω
T5 1st I. F. Primary	11 Ω
T5 1st I. F. Secondary	11 Ω
T6 2nd I. F. Primary	11 Ω
T6 2nd I. F. Secondary	11 Ω
T7 Output Trans. Primary	700 Ω
T7 Output Trans. Secondary	1 Ω
T8 Power Trans. Primary	20 Ω
T8 Power Trans. Sec. (High Voltage)	740-700 Ω
T8 Power Trans. Sec. (5 volt)	.9 Ω
T8 Power Trans. Sec. (6 volt)	.25 Ω

BALANCING INSTRUCTIONS

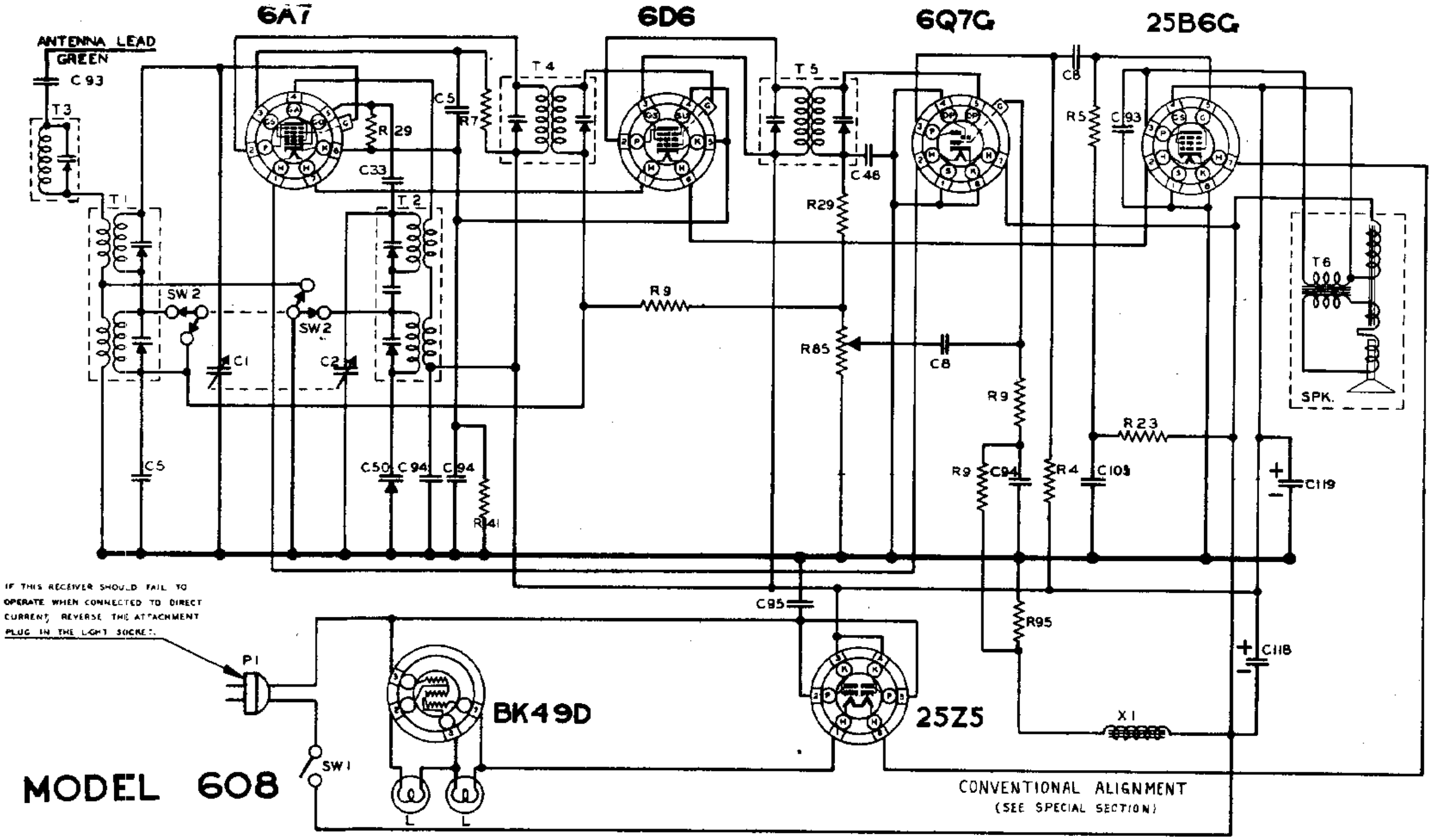
Models 518, 518A, 568, and 568A uses the Permatune Intermediate frequency tra formers. All intermediate frequency adjustments are therefore eliminated.

If a check of sensitivity of the I.F. circuits is desired simply connect the output of a signal generator through 200 MMF dummy antenna to the grid cap of th 6A7 tube. Rotate the volume control to full position. The sensitivity at 455 K should be 200 microvolts minimum for 50 milliwatts at three ohms load across the output of the voice coil winding of the speaker transformer.

1. Connect the Generator to the red antenna wire on the rear of radio chassis Ground the outside shield of the generator output cable to the radio chassis.
2. Rotate the tuning condenser entirely out of mesh and set dial pointer to 1650 KC. Adjust padder No.1 for maximum output with 1650 KC input from the signa generator.
3. Reset the balancing or signal generator to 1400 KC and retune the radio until the signal is received.
4. Adjust the padder No.2 for maximum output.

MODEL 608
Schematic
Parts

NOBLITT SPARKS INDUSTRIES



RESISTORS

R	OHM	W	PART NO.		R	OHM	W	PART NO	
4	200K	1/4	17-2389						
5	500K	1/4	17-2070						
1	20M	1/2	17-2072						
9	1MEG	1/4	17-2080						
23	250K	1/4	17-3011						
29	50K	1/4	17-2060						
41	100	1/4	17-14052						
85	500K	VC.	17-13712						
95	20	1/2	17-14152						

CONDENSERS

C	CAPACITY	VOLT	PART NO		C	CAPACITY	VOLT	PART NO	
1	TWO-GANG		17-15721						
2	VARIABLE								
5	.05	200	17-14015						
8	.01	600	17-14016						
33	.00005	600	17-14047						
48	.00025	600	17-4207						
93	.005	600	17-14114						
94	.1	200	17-1485						
95	.02	600	17-14125						
105	.25	200	17-14131						
118	16	150	17-14153						
119	24	150	17-14154						
50	.0004-.0008		17-14070						

TRANSFORMERS & CHOKES

T-X	TYPE	PART NO.	
T	TRANSFORMERS		
1	ANTENNA COIL	17-13818	
2	OSCILLATOR COIL	17-13619	
3	WAVE TRAP	17-13620	
4	FIRST I.F COIL	17-13621	
5	SECOND I.F COIL	17-13622	
6	OUTPUT TRANS	17-13824	
X	CHOKES		
1	FILTER	17-13625	

MISCELLANEOUS UNITS

SYMBOL	DESCRIPTION	PART NO.	
L	T-40 MAZDA PILOT LIGHT	———	
P1	LINE CORD	17-5791	
SPK	DYNAMIC SPEAKER & OUTPUT TRANS. ASSM.	17-13823	
SW1	SWITCH - PART OF R85	———	
SW 2	BAND SWITCH	17-13826	

I.F PEAK 456 K.C.
"A" BAND - BALANCE AT 1400 K.C.
PAD AT 600 K.C.
"B" BAND - BALANCE AT 5. M.C.
CHECK AT 2. M.C.

MODELS 618,618A,628
628CS,638,638CS
Voltage,Resistance
Alignment,Sensitivity

NOBLITT SPARKS INDUSTRIES

FREQUENCY RANGE: 540 to 1750 Kilocycles
5.7 to 18.0 Megacycles

POWER OUTPUT: 3.75 Watts

SPEAKER: 6″ Dynamic in Model 618, 8″ Dynamic in 618, 618A, 628, 628CS

VOLTAGE AND FREQUENCY: 110 V. 60 cycles

SENSITIVITY: At any point on either broadcast or short wave band not less than 60 microvolts for 50 milliwatts output.

Intermediate sensitivity: Not less than 100 microvolts for 50 milliwatts output.

WATTS POWER CONSUMPTION: 75 Watts

TUBES:

6A8G—1st Detector Oscillator
6K7G—I. F. Amplifier
6Q7G—2nd Detector, 1st Audio Amplifier AVC
6F6G—Audio Output Amplifier
5Y3G—Full Wave Rectifier
6E5 —Electric Tuning Indicator

CONVENTIONAL ALIGNMENT
(see special section)

MODEL 618-618A-628-628CS SOCKET VOLTAGES

(INPUT VOLTAGE 110 V. 60S)

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Anode Grid	Oscillator Grid	Target	Grid Bias
6A8G	6.3	238	95	3.2	......	131	6-15	238	......
6K7G	6.3	238	95	1.9	0	......	......	......	......
6Q7G	6.3	155	......	0	......	......	......	......	1.5
6F6G	6.3	221	238	0	......	......	......	......	13.8
5Y3G	5.0	395	......	355	......	......	......	......	......
6E5	6.3	*40	......	0	......	......	......	......	......

* No Signal.

POINT TO POINT RESISTANCES

All Readings taken to ground unless otherwise specified. Tubes removed and speaker connected. Volume and tone control in full on position. All shell pins grounded.

6A8G

Heater	0
Heater	.25 Ω
Cathode	300 Ω
Oscillator Grid	50,000 Ω
Anode Grid to B+	20,000 Ω
Screen to B+	30,000 Ω
Plate to B+	11 Ω
Control Grid	1,350,000 Ω

6K7G

Heater	0
Heater	.25 Ω
Cathode	300 Ω
Suppressor Grid	0
Screen Grid to B+	30,000 Ω
Plate to B+	11 Ω
Control Grid	1,250,000 Ω

6Q7G

Heater	0
Heater	.25 Ω
Cathode	0
Diode Plate	300,000 Ω
Diode Plate	300,000 Ω
Plate to B+	250,000 Ω
Control Grid	1,500,000 Ω

6F6G

Heater	0
Heater	.25 Ω
Cathode	0
Control Grid	750,000 Ω
Screen Grid to B+	0
Plate to B+	500 Ω

5Y3G

Filament to B+	1,450 Ω
Filament to B+	1,450 Ω
Plate	600 Ω
Plate	620 Ω

6E5

Heater	0
Heater	.25 Ω
Cathode	0
Control Grid	1,250 000 Ω
Plate to, B+	1,000,000 Ω
Target to B+	0

COIL TRANSFORMER AND SPEAKER RESISTANCES

T1 Antenna Coil Pri. (BC)	17 Ω
T1 Antenna Coil Sec. (BC)	3.5 Ω
T1 Antenna Coil Pri. (SW)	.3 Ω
T1 Antenna Coil Sec. (SW)	.07 Ω
T3 Oscillator Coil Pri	.1 Ω
T3 Oscillator Coil Sec	2.3 Ω
T5 1st I. F. Trans. Pri	11 Ω
T5 1st I. F. Trans. Sec	11 Ω
T6 2nd I. F. Trans. Pri	11 Ω
T6 2nd I. F. Trans. Sec.	11 Ω
T7 Output Trans. Pri (618)	600 Ω
T7 Output Trans. Sec. (618)	1 Ω
T7 Output Trans. Pri. (618A-628-628CS)	500 Ω
T7 Output Trans. Sec (618A-628-628CS)	1 Ω
T8 Power Trans. Pri. 110 Volt	17 Ω
T8 Power Trans. Sec. Hi-Volt	600-0-620 Ω
T8 Power Trans. Sec. 6 Volt	.15 Ω
T8 Power Trans. Sec. 5 Volt	.25 Ω
T9 Wave Trap	2.3 Ω
Speaker Field	1,450 Ω

ALIGNMENT

Models 618,618A,628,628CS,638, and 638CS are designed to utilize the full efficiency of the Permatune Intermediate Frequency transformers. Therefore all IF adjustments are eliminated. If a check of sensitivity is desired, connect the output of a standard signal generator thru a 200 MMF antenna dummy to grid cap of the 6A8G tube. Rotate the volume control to maximum position. The sensitivity at 455 KC should be 100 Microvolts for 50 Milliwatts at 3 ohms load across the output of the voice coil winding of speaker transformer.

1.- Rotate tuning condenser completely out of mesh and check to see that dial pointer is parallel to horizontal dial stripes.

2.- Connect Generator to receiver with a standard 200 MMF dummy antenna and after setting the wave band switch to the Short wave position, tune dial to 15 MC, and Generator to same frequency.

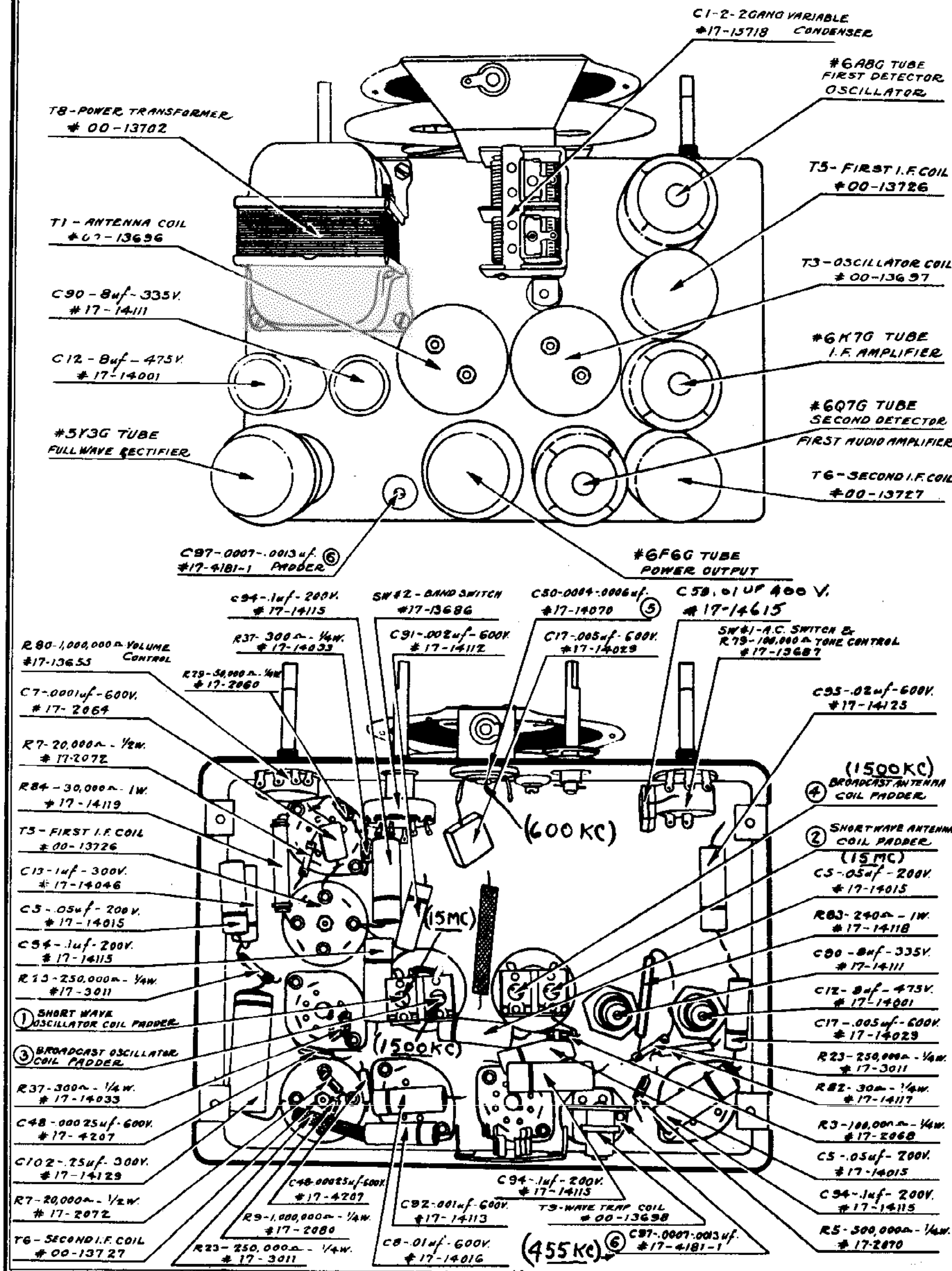
3.-Adjust padder No.1 and then padder No.2 for maximum output.

4.- Reset band switch to broadcast band. Set dial to 1500 KC and Generator to same frequency. Adjust padders No.3 and 4 for maximum output.

5.- Retune radio set to 600 KC, reset generator to same frequency, adjust padder No.5 for maximum output. Leave radio tuned to 600 KC, change Generator to 455 KC and increase the output of Generator until signal is heard thru the speaker. Adjust padder No.6 for minimum output. Repeat adjustments.

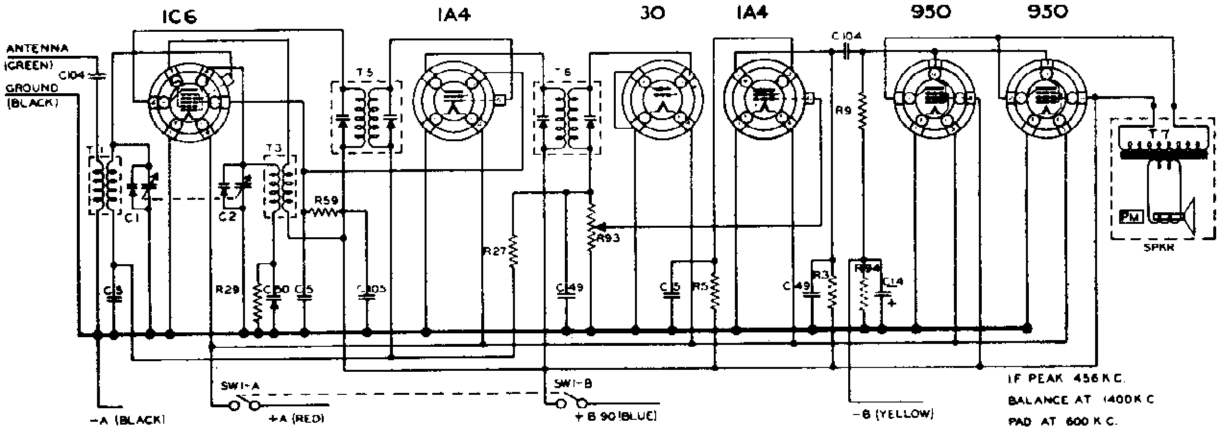
MODELS 618, 618A, 628
628CS, 638, 638CS
Socket, Trimmers, Chassis

NOBLITT SPARKS INDUSTRIES



NOBLITT SPARKS INDUSTRIES

ARVIN HOME RADIO MODELS 618B-628B



RESISTORS				CONDENSERS				CHOKES & TRANSFORMERS			MISCELLANEOUS UNITS		
R	OHMS	W	PART NO	C	CAPACITY	VOLT	PART NO	T	TYPE	PART NO	SYM	DESCRIPTION	PART NO
3	100K	1/4	17-2060	1	TWO GANG		17-354	7	TRANSFORMER		SPKR	PERMANENT MAG DYNAMIC 618B	[illegible]
4	400K	1/4	17-2670	2	VARIABLE			1	ANTENNA COIL	17-930	SPKR	PERMANENT MAGNET DYNAMIC 628B	[illegible]
9	1M	1/4	17-2060	5	.05	200	17-14015	3	OSCILLATOR COIL	17-464	SW-A	FILAMENT SWITCH [illegible]	
27	2M	1/4	17-4700	14	12MF	25	17-14005	5	FIRST IF COIL	[illegible]	SW-B	[illegible]	
29	30K	1/4	17-2600	49	.0005	400	17-14051	6	SECOND IF COIL	[illegible]			
59	5K	1/4	17-4101	50	600 MMF MAX	PAD	17-14070	7	OUTPUT TRANS.	[illegible]			
93	500K	[illegible]	17-13794	104	.01	200	17-4206						
94	[illegible]	[illegible]	17-16150	105	.25	200	17-14131						

POWER OUTPUT - 315 MILLIWATTS

VOLTAGE AND POWER CONSUMPTION -
"A" Battery -540 MA at 2.1 Volts
"B" Battery -15 to 18 MA at 90 Volts.

SENSITIVITY - 1500 to 600 KC - 50 Microvolts minimum for 50 Milliwatts output.
456 KC - 150 Microvolts minimum for 50 Milliwatts output.

FREQUENCY RANGE - 540 TO 1725 KILOCYCLES

TUBES - 1C6 -1st Det.and Osc.
1A4 -1st IF Amplifier.
30 -2nd Det., AVC.
1A4 -1st AF Amplifier.
950 -Power output.
950 -Power output.

CONVENTIONAL ALIGNMENT
(see special section)

MODEL 618B-628B SOCKET VOLTAGES

Tube	Filament	Plate	Screen	Control Grid	Anode Grid	Oscillator Grid
1C6	2.1	90	45	*10 V. max.	90	6 to 10 V.
1A4	2.1	90	45	*10 V. max.	......	......
30	2.1	0	....	....	......	......
1A4	2.1	26	15	*10 V. max.	......	......
950	2.1	90	90	8.2	......	......
950	2.1	90	90	8.2	......	......

Measured with vacuum tube voltmeter; 100,000 microvolts R. F. input to Antenna Terminal.

POINT TO POINT RESISTANCES

All tubes removed and speaker disconnected. Volume control in full-on position. All resistances to ground unless otherwise specified.

1C6

Filament	0
Filament	∞
Plate to B+	15.0 Ω
Screen to B+	15,000 Ω
Oscillator Grid	50,000 Ω
Anode Grid to B+	4.0 Ω
Control Grid	2,500,000 Ω

1A4

Filament	0
Filament	∞
Plate to B+	15.0 Ω
Screen to B+	15,000 Ω
Control Grid	2,500,000 Ω

30

Filament	0
Filament	∞
Grid	500,000 Ω
Plate	0

1A4

Filament	0
Filament	∞
Screen to B+	500,000 Ω
Plate to B+	100,000 Ω
Control Grid	500,000 Ω

950

Filament	0
Filament	∞
Plate to B+	750 Ω
Screen to B+	0
Control Grid	1,000,000 Ω

950

Filament	0
Filament	
Plate to B+	750 Ω
Screen to B+	0
Control Grid	1,000,000 Ω

COIL, TRANSFORMER AND SPEAKER RESISTANCES

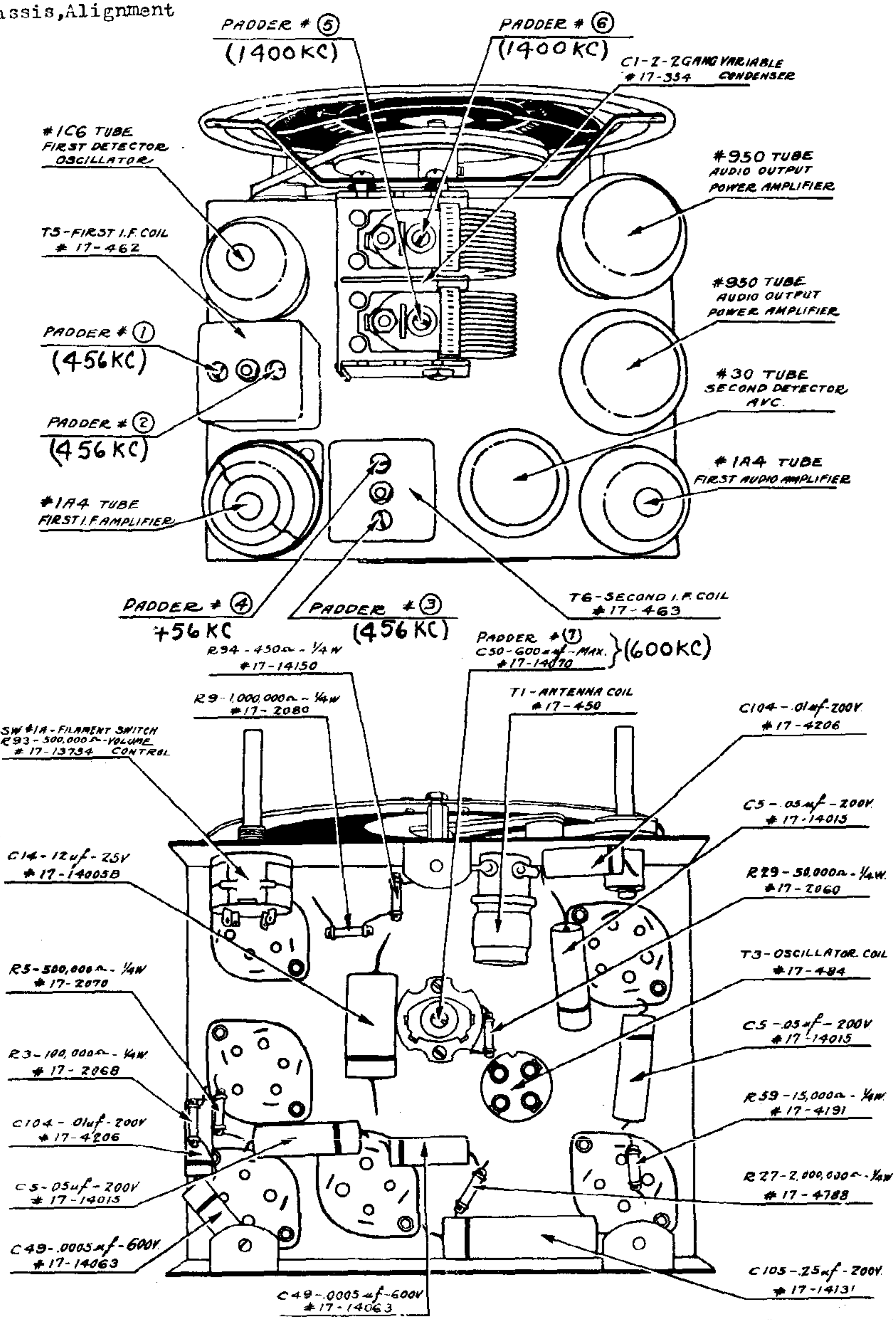
T1 Antenna Coil Pri.	13.0 Ω
T1 Antenna Coil Sec.	3.0 Ω
T3 Oscillator Coil Pri.	4.0 Ω
T3 Oscillator Coil Sec.	3.8 Ω
T5 1st I. F. Trans. Pri.	15.0 Ω
T5 1st I. F. Trans. Sec.	15.0 Ω
T6 2nd I. F. Trans. Pri.	15.0 Ω
T6 2nd I. F. Trans. Sec.	15.0 Ω
T7 Output Trans. Pri.	750 Ω
T7 Output Trans. Sec.	1.3 Ω
Speaker Voice Coil	4.0 Ω

COLOR CODE OF BATTERY CABLES

+90 V. "B"	BLUE
—B	YELLOW
+2.1 V. "A"	RED
—2.1 V. "A"	BLACK
ANTENNA	GREEN
GROUND	BLACK

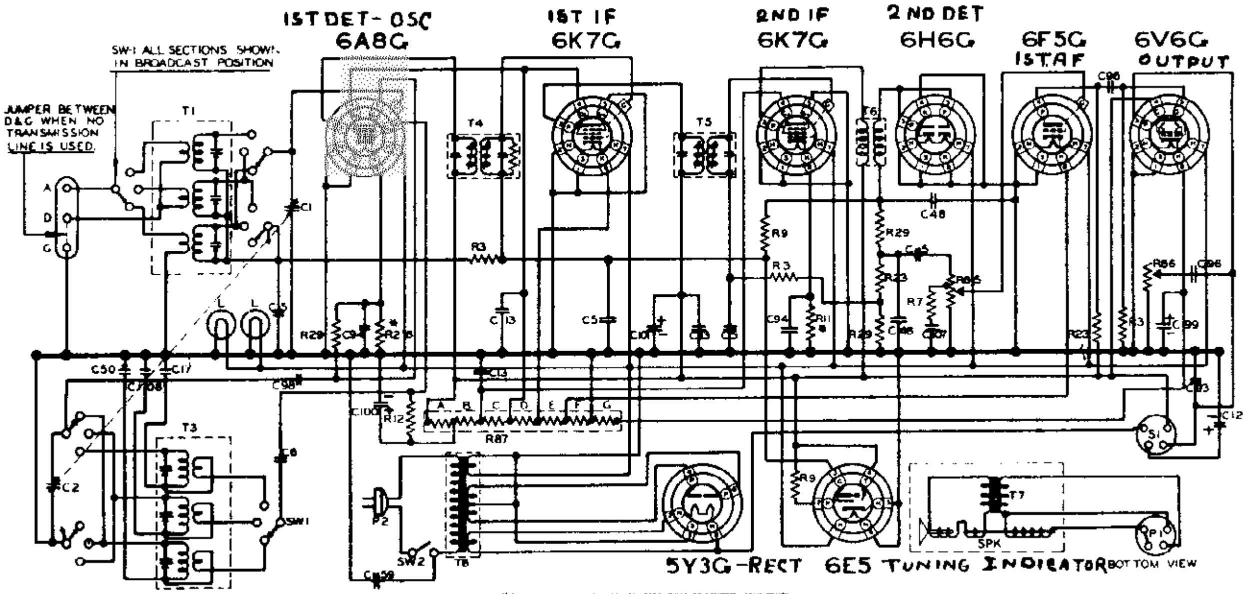
MODELS 618B, 628B
Socket, Trimmers
Chassis, Alignment

NOBLITT SPARKS INDUSTRIES



Parts, Alignment
Sensitivity, Resistance **NOBLITT SPARKS INDUSTRIES**

MODELS 818, 828
828A, 838CS
Schematic, Voltage



NOTE R87
A - 1640 OHMS
B - 4285
C - 860
D - 3490
E - 225
F - 55
G - 240

NOTE R8 MAY BE VARIED FROM 400 TO 2000 OHMS TO CONTROL SENSITIVITY

RESISTORS

R	OHM	W	PART NO		R	OHM	W	PART NO
3	80K	1/4	17-2068		11	2K	1/4	17-4282
7	20K	1/2	17-2072		28	1500	1/4	17-4205
8	1 MEG	1/4	17-2080					
12	.04	1/4	17-4275					
23	250K	1/4	17-3011					
29	50K	1/4	17-2080					
37	300	1/4	17-14033					
85	500K	VC	17-13712					
86	100K	TC	17-13713					
87	TAPPED		17-14127	SEE NOTE				

CONDENSERS

C	CAPACITY	VOLT	PART NO	C	CAPACITY	VOLT	PART NO
1	2-GANG		17-15718	96	.05	600	17-1412[illegible]
2	VARIABLE			98	.000075	600	17-14122
3	.05	400	17-14015	99	50 ELECT	25	17-14123
6	.002	600	17-2083	100	8 ELECT	300	17-14124
12	8 ELECT	475	17-14091	01	16 ELECT	300	17-14128
13	.1	300	17-14044	07	.03	200	17-14133
17	.005 ±10%	600	17-14026	108	.0015 ±2%	400	17-14134
50	.0006 MAX [illegible]		17-14070				
46	.00025	600	17-4207				
48	.01	400	17-1485				
93	.005	600	17-14114				
94	.1	200	17-14115				
95	.02	600	17-14123				

TRANSFORMERS

T	TYPE	PART NO
1	ANTENNA COIL	00-13724
2		
3	OSCILLATOR COIL	00-13725
4	1ST IF TRANS	00-13746
5	2ND IF TRANS	00-13747
6	3RD IF TRANS	00-13752
7	OUTPUT TRANS 818	17-13730
7	OUTPUT TRANS 828	17-13731
8	POWER TRANS	00-13700

MISCELLANEOUS

SYMBOL	DESCRIPTION	PART NO
SPK	8" SPEAKER FOR MODEL 818	17-13728
SPK	10" SPEAKER FOR MODEL 828	17-13720
S1	SPEAKER SOCKET	17-13248
P1	SPEAKER PLUG	
P2	LINE CORD & PLUG	17-13781
L	DIAL LIGHT	13-13664
SW 1	BAND SWITCH	17-13726
SW 2	LINE SWITCH - SEE R86	17-13713

CONVENTIONAL ALIGNMENT
(SEE SPECIAL SECTION)

IF PEAK 455 KC
3 BANDS: BALANCE 1.5 MC. PAD .60 MC.
BALANCE 4.7 MC. CHECK 2.0 MC.
BALANCE 15.0 MC. CHECK 6.0 MC.

SENSITIVITY :
BAND A -50 microvolts minimum
BAND B -75 microvolts minimum
BAND C -100 microvolts minimum

POWER OUTPUT :
5 Watts maximum

FREQUENCY RANGE :
BAND A - 540 to 1750 KC
BAND B - 1750 to 5500 KC
BAND C - 5.5 to 18 MC

MODEL 818-828 SOCKET VOLTAGES
(INPUT VOLTAGE 118 V RMS)

Tube	Heaters	Plate	Screen	Cathode	Osc. Grid	Anode Grid	Control Grid Bias
6A8G	6.3	252	75	3.4	5 to 22V	155	......
6K7G	6.3	252	75	5.8	......	......	......
6K7G	6.3	252	114	3.1	......	......	......
6H6G	6.3	......	......	0	......	......	......
6F5G	6.3	135	......	1.0	......	......	......
6V6G	6.3	240	252	10.8	......	......	‡
6E5	6.3	150	......	0	......	......	......
5Y3G	5.0	365	......	325	......	......	......

‡ AVC Voltage developed approx. 30 volts with 100,000 Microvolts Input to Antenna.

CONVENTIONAL ALIGNMENT
(see special section)

POINT TO POINT RESISTANCES

All Readings taken to ground unless otherwise stated. Tubes removed but speaker connected. Volume control in full on position. All shell terminals grounded to chassis.

6A8G

Heater	0
Heater	.05 Ω
Cathode	400 Ω
Oscillator Grid	50,400 Ω
Anode Grid to B+	11,640 Ω
Screen to B+	7,750 Ω
Plate to B+	12.0 Ω
Control Grid	1,450,000 Ω

6K7G

Heater	0
Heater	.05 Ω
Cathode	270 Ω
Suppressor	0
Screen to B+	7,750 Ω
Plate to B+	12.0 Ω
Control Grid	1,350,000 Ω

6K7G

Heater	0
Heater	.05 Ω
Cathode	400 Ω
Suppressor	0
Screen to B+	5,840 Ω
Plate to B+	64 Ω
Control Grid	150,000 Ω

6H6G

Heater	0
Heater	.05 Ω
Cathode	0
Plate	350,000 Ω
Plate	350,000 Ω
Cathode	0

6F5G

Heater	0
Heater	.05 Ω
Cathode	50 Ω
Control Grid	500,000 Ω
Plate to B+	250,000 Ω

6V6G

Heater	0
Heater	.05 Ω
Cathode	235 Ω
Control Grid	100,000 Ω
Screen Grid to B+	0
Plate to B+	760 Ω

6E5

Heater	0
Heater	.05 Ω
Cathode	0
Control Grid	1,350,000 Ω
Plate to B+	1,000,000 Ω
Target to B+	0

5Y3G

Filament to B+	1,000 Ω
Filament	11,860 Ω
Plate	155 Ω
Plate	145 Ω

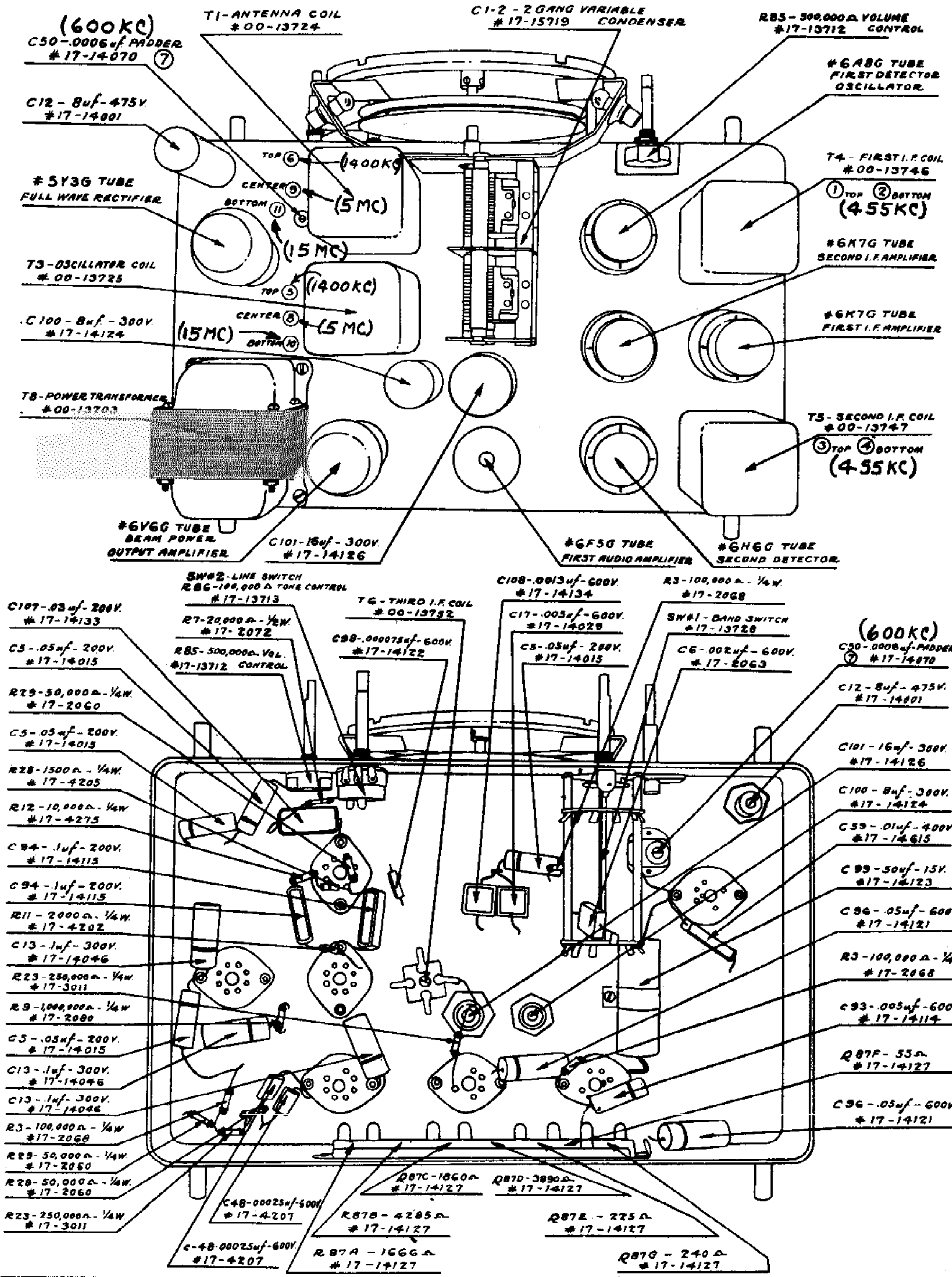
R87 TAPPED AS FOLLOWS: A—1,640 ohms; B—4,200 ohms; C—1,950 ohms; D—3,800 ohms; E—220 ohms; F—50 ohms; G 235 ohms.

COIL TRANSFORMER AND SPEAKER RESISTANCES

T1 A Band Ant. Pri.	18.5 Ω
T1 B Band Ant. Pri.	.1 Ω
T1 C Band Ant. Pri.	.05 Ω
T1 A Band Ant. Sec.	.35 Ω
T1 B Band Ant. Sec.	.07 Ω
T1 C Band Ant. Sec.	.02 Ω
T3 A Band Osc. Pri.	.15 Ω
T3 B Band Osc. Pri.	.08 Ω
T3 C Band Osc. Pri.	.08 Ω
T3 A Band Osc. Sec.	.27 Ω
T3 B Band Osc. Sec.	.06 Ω
T3 C Band Osc. Sec.	.01 Ω
T4 1st I. F. Trans. Pri.	12.0 Ω
T4 1st I. F. Trans. Sec.	12.0 Ω
T5 2nd I. F. Trans. Pri.	12.0 Ω
T5 2nd I. F. Trans. Sec.	12.0 Ω
T6 3rd I. F. Trans. Pri.	64.0 Ω
T6 3rd I. F. Trans. Sec.	64.0 Ω
T7 Output Trans. Pri. (818)	760 Ω
T7 Output Trans. Sec. (818)	.1 Ω
T7 Output Trans. Pri. (828)	760 Ω
T7 Output Trans. Sec. (828)	.1 Ω
T8 Power Trans. 110 V. Pri.	6.5 Ω
T8 Power Trans. Hi Volt. Sec.	150-0-145 Ω
T8 Power Trans. 6 Volt Sec.	.05 Ω
T8 Power Trans. 5 Volt Sec.	.05 Ω
Speaker Field 818 or 828	1,000 Ω

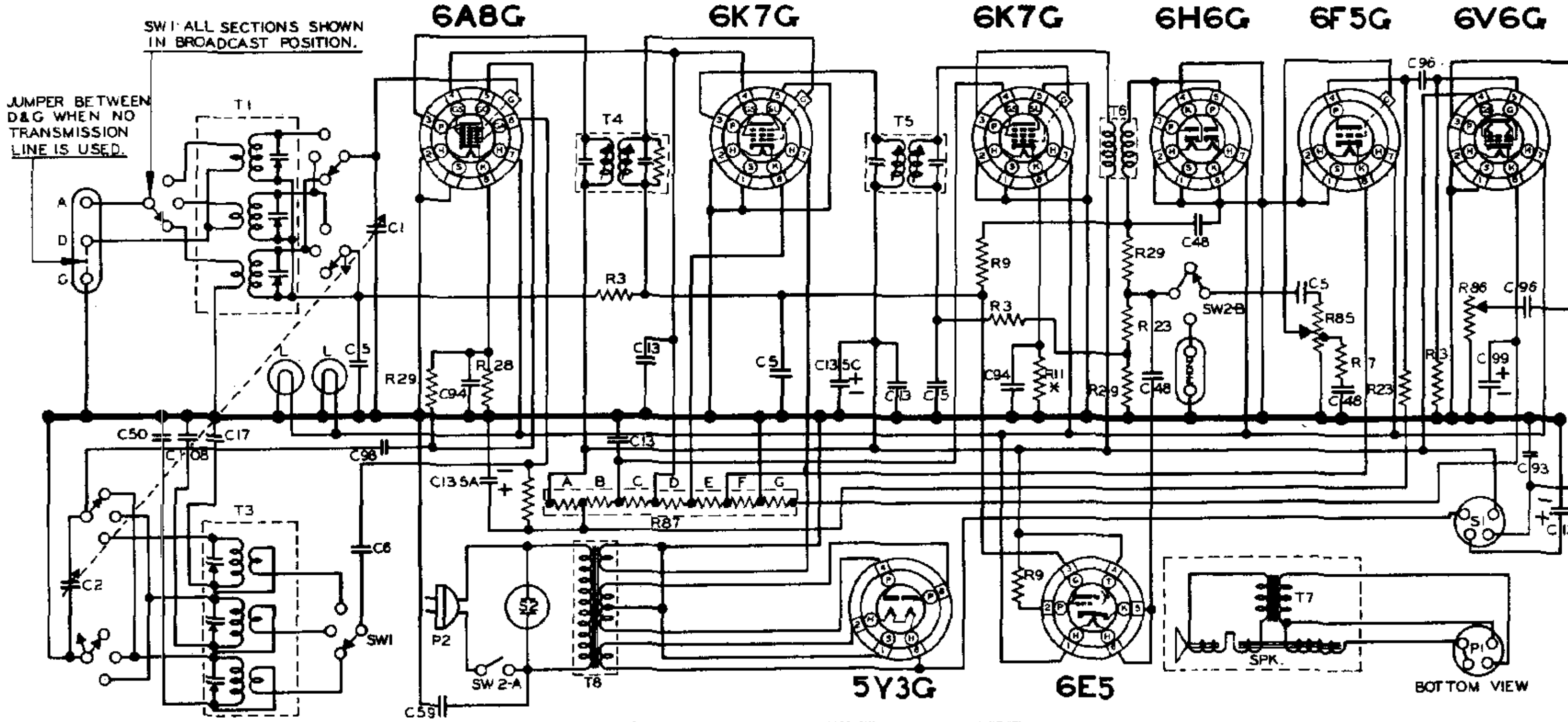
MODELS 818, 828
828A, 838CS
Socket, Trimmers
Chassis

NOBLITT SPARKS INDUSTRIES



NOBLITT SPARKS INDUSTRIES

ARVIN HOME RADIO MODEL 848CS



NOTE: R87 MAY BE VARIED FROM 400 TO 2000 OHMS TO CONTROL SENSITIVITY.

NOTE
R87
A - 1466 OHMS
B - 4265 "
C - 1880 "
D - 3690 "
E - 225 "
F - 55 "
G - 240 "

RESISTORS

R	OHM	W	PART NO.		R	OHM	W	PART NO.	
3	100K	1/4	17-2086						
7	20K	1/2	17-2072						
9	1M	1/4	17-2080						
11	2K	1/4	17-4202						
12	10K	1/2	17-4275						
23	250K	1/4	17-3011						
28	1500	1/4	17-4205						
29	50K	1/4	17-2080						
37	300	1/4	17-14033						
85	500K	V.C.	17-13712						
87	TAPPED		17-14127	SEE NOTE					
132	100K	T.C.	17-14984						

CONDENSERS

C	CAPACITY	VOLT	PART NO.		C	CAPACITY	VOLT	PART NO.	
1	TWO-GANG		7-45719		98	.05	600	17-14121	
2	VARIABLE				96	.000075	600	17-14122	
5	.05	200	17-14015		99	50. ELECT.	15	17-14123	
6	.002	600	17-2063		107	.05	200	17-14133	
13	.1	300	17-14046		108	.0013 ± 2%	600	17-14134	
17	.005 +10% −5%	600	17-14029		135A	10M.F.		17-14185	
50	.0008 MAX.PAD		17-14070		135B	10M.F.	450		
48	.00025	600	17-4207		135C	16M.F.			
59	.01	400	17-14813						
93	.005	600	17-14114						
94	.1	200	17-14115						
95	.02	600	17-14125						

TRANSFORMERS

T	TYPE	PART NO.	
1	ANTENNA COIL	00-13724	
3	OSCILLATOR COIL	00-13725	
4	FIRST I.F. TRANS.	00-13748	
5	SECOND I.F. TRANS.	00-13747	
6	THIRD I.F. TRANS.	00-13752	
7	OUTPUT TRANS.	17-13721	
8	POWER TRANS.	00-13703	

MISCELLANEOUS UNITS

SYMBOL	DESCRIPTION	PART NO.	
SPK.	DYNAMIC SPEAKER 10"	17-13720	
S1	SPEAKER SOCKET	17-13249	
S2	PHONO MOTOR SOCKET & CORD	17-14985	
P1	SPEAKER PLUG PART OF SPEAKER	SEE ABOVE	
P2	LINE CORD & PLUG	17-15781	
—	DIAL LIGHT	17-13904	
SW1	BAND SWITCH	17-13728	
SW2	AC & PHONO SWITCH	17-14983	

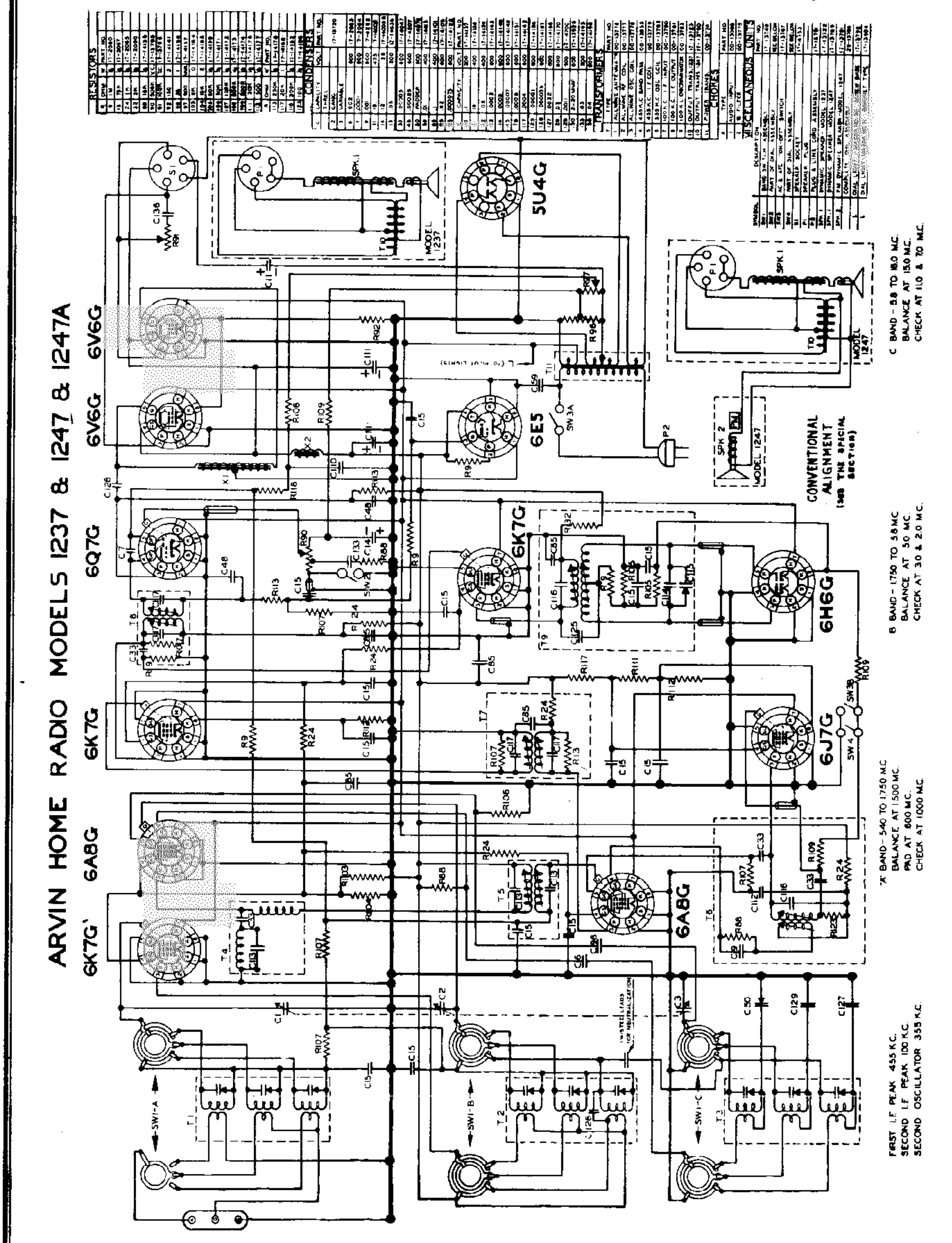
CONVENTIONAL ALIGNMENT (SEE SPECIAL SECTION)

I.F. PEAK 455K.C.

3 BANDS:
- BALANCE 1.5M.C. PAD .60M.C.
- BALANCE 4.7M.C. CHECK 2.0M.C.
- BALANCE 15.0M.C. CHECK 6.0M.C.

MODELS 1237,1247
1247A
Schematic,Parts
Alignment

NOBLITT SPARKS INDUSTRIES



MODEL 37-643
Alignment, Trimmers
Notes

PHILCO RADIO & TELEV. CORP.

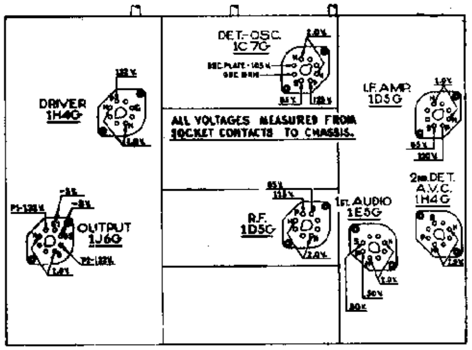


Fig. 1. Socket Voltages and R. F. Compensators

The voltages indicated by arrows were measured with a Philco 025 Circuit Tester which contains a voltmeter having a resistance of 1000 ohms per volt. Volume control at minimum; Range Switch in broadcast position; Storage Battery fully charged.

Aerial Connections

The red and black leads of the High Efficiency Aerial "transmission line" are connected to terminals 1 and 2 respectively, of the terminal panel provided on the rear of the chassis. Connect the jumper on the terminal panel across terminals 3 and 4.

If a temporary aerial is used, the jumper should be across terminals 2 and 3. The aerial connects to terminal 1 and the ground lead to terminal 3. A good ground connection is desirable in all installations.

Dial Calibration

In order to adjust this receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this rotate the tuning control to the extreme counter-clockwise position (maximum capacity). Loosen the set screw of the dial hub, then turn dial until the glowing indicator is centered on second index line of dial scale (see Fig. 2). Now tighten the dial hub set screw in this position.

Shadow Meter Adjustment

With receiver turned ON, remove aerial lead and adjust the shadow meter as follows:

1. Move the shadow meter coil backwards and forwards, until the opposite edges of the shadow are 1/8 of an inch from each end of the shadow screen, measuring along the bottom edge of the screen. Adjustment of the shadow meter light bracket may be necessary for perfect centering.

2. Remove the "B" Battery plug from its socket and rotate coil until shadow reaches minimum width. This width must not exceed 5/16 of an inch.

3. Replace the "B" Battery plug in its socket. The shadow should then widen until it is not more than 5/16 inch or less than 1/8 inch from each side of the screen, measuring along the bottom edge. If these limits are not obtained readjust the shadow meter as given in paragraphs 1 and 2 until they are obtained.

TYPE CIRCUIT: Superheterodyne; battery operated; with Class "B" output circuit; the Philco Automatic Aerial Tuning System, and built-in connection for the Philco High-Efficiency Aerial.

BATTERY REQUIRED: "A" Philco 172-R, storage battery or a dry "A" battery Philco Part No. 41-8011. If a dry "A" battery is used, a ballast lamp Philco type 1Z1 must be inserted in the socket provided in the dry "A" battery. This lamp acts as a voltage regulator and maintains a constant potential of two volts on the filament of the receiver tubes.

"BC" battery—Philco Part No. 41-8007 is used to supply B and C voltages. This battery contains a socket into which the receiver battery cable plug is inserted.

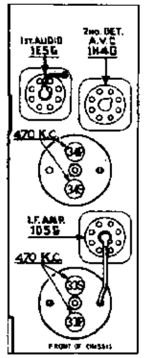


Fig. 5 I. F. Compensators

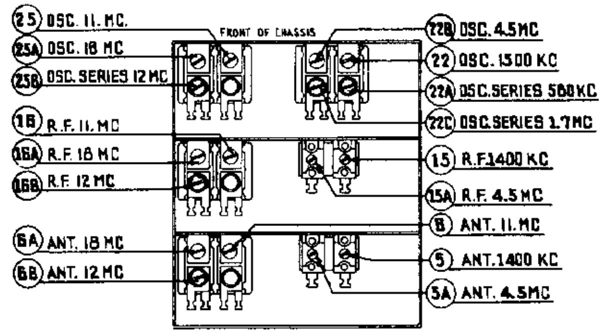


Fig. 6 R. F. Compensators

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator; Philco Model 088 (fundamental frequency 110 to 20,000 K. C.) is the correct instrument for this purpose; (2) output meter. Philco Model 025 Circuit Tester incorporates a sensitive output meter and is recommended; (3) Fibre handle screw driver (Philco Part No. 27-7059); (4) Special variable condenser (Philco Part No. 45-2325).

OUTPUT METER: The 025 Output Meter is connected between the plate prong of the 1H4G Driver tube and the chassis. Then adjust the meter to use the (0-30) volt scale.

INTERMEDIATE FREQUENCY CIRCUIT

Set controls as follows:

a. Range switch position one (broadcast)
b. Volume control maximum
c. Connect the 088 Signal Generator output lead through a .1 mfd. condenser to the control grid of the 1C7G tube, and the ground connection of the output lead to the chassis.
d. Receiver dial at 580 K. C.
e. Signal Generator 470 K. C.
f. Adjust compensators (34S), (34P), (33S), and (33P) for maximum output.

RADIO FREQUENCY CIRCUIT

Tuning Range 11.5 to 18.2 M. C.

1. Connect signal generator output lead with the .1 mfd. series condenser to terminal No. 1 and the ground lead to terminal No. 3. Terminals 2 and 3 must be connected with the shorting link provided on the aerial panel.
2. Adjust compensators as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
4	18.0 M. C.	18.0 M. C.	(25A) check image at 17.06 M. C. on receiver dial (See Note B)
4	18.0 M. C.	18.0 M. C.	(6A), (16A) use shunt condenser on 25A. First lug from left side of R. F. Unit fig. 6. (See Note A)
4	12.0 M. C.	12.0 M. C.	(25B), (16B), (6B)
4	18.0 M. C.	18.0 M. C.	(25A)
4	18.0 M. C.	18.0 M. C.	(6A), (16A) use shunt condenser on (25A). First lug from left side of R. F. Unit fig. 6. See Note (A)

Tuning Range 7.35 to 11.6 M. C.

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
3	11.0 M. C.	11.0 M. C.	(25) check image 10.06 M. C. on receiver
3	11.0 M. C.	11.0 M. C.	(16), (6) use shunt on (25). Third lug from left side of R. F. Unit fig. 6. (See Note A)
3	11.0 M. C.	11.0 M. C.	(25)

Tuning Range 4.7 to 7.4 M. C.

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
2	4.5 M. C.	4.5 M. C.	(22B), (15A), (5A)
2	1.7 M. C.	1.7 M. C.	(22C)
2	4.5 M. C.	4.5 M. C.	(22B), (15A), (5A)

Tuning Range 580 to 1600 K. C.

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
1	1500 K. C.	1500 K. C.	(22), (15), (5)
1	580 K. C.	580 K. C.	(22A) roll tuning condenser
1	1500 K. C.	1500 K. C.	(22)
1	1400 K. C.	1400 K. C.	(15), (5)

NOTE "A"—To eliminate the effect of the Ant. and R. F. compensators detuning the Osc. circuit, a variable tuning condenser, Philco Part No. 45-2325 is connected from the oscillator compensators to ground when designated in the padding instruction above. Tune the added condenser from the minimum capacity position until the second harmonic of the receiver oscillator beats against the signal from the generator, resulting in a maximum indication on the output meter. Then adjust compensators as noted for maximum output.

NOTE "B"—To accurately adjust the compensator to the fundamental and not the image signal, turn the oscillator compensator to the maximum capacity position clockwise. Then slowly turn the compensators counter-clockwise until a second maximum peak is obtained on the output meter. The first peak is the image signal and the receiver must not be adjusted to it. If the above procedure is correctly performed, the image signal will be found 940 K. C. below the frequency being used on any high frequency band.

PHILCO RADIO & TELEV. CORP.

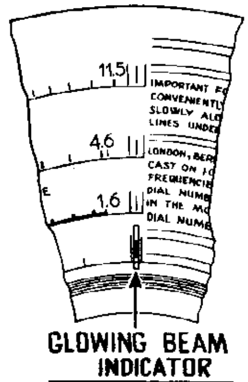


Fig. 2—Dial

SPEAKER:
"B" KR-17
"X" HR-12

CURRENT DRAIN:
"A" battery 0.9 amps
"B" battery 23 M.A.

FREQUENCY RANGES: Four:
Range 1—530 to 1600 K. C.
Range 2—1.58 to 4.8 M. C.
Range 3—4.7 to 11.6 M. C.
Range 4—11.5 to 18.2 M. C.

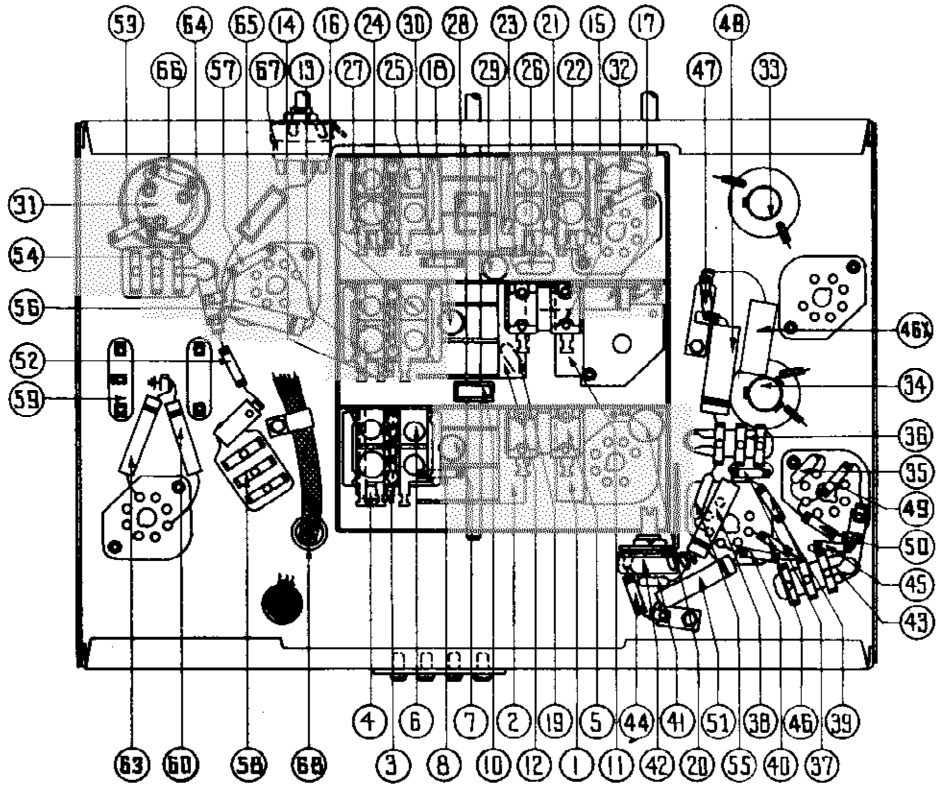


Fig. 4. Base View of Chassis

Replacement Parts—Model 37-643

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2106	$1.60
2	Antenna Transformer (Range 2)	32-2146	1.20
3	Antenna Transformer (Range 3)	32-2150	1.20
4	Antenna Transformer (Range 4)	32-2175	1.20
5	Compensator (two section)	31-6093	.40
6	Compensator (three section)	31-6128	1.00
7	Condenser (.05 mfd. tubular)	30-4020	.20
8	Resistor (51,000 ohms, ½ watt)	33-351339	.20
9	Tuning Condenser	31-1855	4.50
10	Condenser (40 mmfd. mica)	30-1076	.20
11	R. F. Transformer (Range 1)	32-2105	1.00
12	R. F. Transformer (Range 2)	32-2147	.70
13	R. F. Transformer (Range 3)	32-2151	.70
14	R. F. Transformer (Range 4)	32-2176	1.20
15	Compensator (two section)	31-6120	.50
16	Compensator (three section)	31-6127	1.00
17	Condenser (.05 mfd. tubular)	30-4020	.20
18	Condenser (.05 mfd. tubular)	30-4020	.20
19	Condenser (5 mmfd. mica)	30-1077	.20
20	Condenser (.1 mfd. tubular)	30-4122	.20
21	Oscillator Transformer (Range 1)	32-2120	1.00
22	Compensator (four section)	32-6108	....
23	Oscillator Transformer (Range 2)	32-2149	.70
24	Oscillator Transformer (Range 3)	32-2152	.70
25	Compensator (three section)	32-6128	
26	Condenser (650 mmfd. mica)	5863	.25
27	Oscillator Transformer (Range 4)	32-2182	.70
28	Condenser (2675 mmfd.)	30-1085	.40
29	Condenser (.001 mmd. tubular)	30-4453	.20
30	Resistor (5,000 ohms, ½ watt)	33-250339	.20
31	Electrolytic Condenser (8, 2, 2, mfd.)	30-2161	1.60
32	Resistor (51,000 ohms, ½ watt)	33-351339	.20
33	1st I. F. Transformer	32-2253	1.80
34	2nd I. F. Transformer	32-2255	1.80
35	Condenser (110 mmfd. mica) 80 mmf.	30-1031	.20
36	Condenser (110 mmfd. dual)	8035-DG	.25
37	Resistor (99,000 ohms, ½ watt)	33-399339	.20
38	Condenser (.01 mfd. tubular)	30-4124	.20
39	Resistor (490,000 ohms, ½ watt)	33-449339	.20
40	Resistor (1,000 ohms, ½ watt)	33-210339	.20
41	Condenser (75 mmfd. mica)	30-1053	....
42	Volume Control	33-5158	1.00
43	Condenser (.015 mfd. bakelite)	3793-SU	.35
44	Resistor (51,000 ohms, ½ watt)	33-351339	.20
45	Resistor (1 megohm, ½ watt)	33-510339	.20
46	Resistor (1000 ohms, ½ watt)	33-210339	.20
46X	Condenser (.05 mfd. tubular)	30-4020	....
47	Resistor (1,000 ohms, ½ watt)	33-210339	$0.20
47X	Shadow Meter	45-2307	....
48	Condenser (.25 mfd. tubular)	30-4446	.25
49	Resistor (1 megohm, ½ watt)	33-510339	.20
50	Resistor (1 megohm, ½ watt)	33-510339	.20
51	Condenser (.006 mfd. tubular)	30-4125	.20
52	Resistor (240,000 ohms, ½ watt)	33-424339	.20
53	Resistor (240,000 ohms, ½ watt)	33-424339	.20
54	Condenser (.15 mfd. tubular)	6287-SG	.20
55	Condenser (250 mmfd. mica)	30-1032	.25
56	Condenser (.015 mfd. tubular)	30-4226	.20
57	Resistor (1 megohm, ½ watt)	33-510339	.20
58	Condenser (.04 mfd. dual bakelite)	8327-DU	.40
59	Audio Transformer (Input)	32-7637	2.00
60	Condenser (.004 mfd. tubular)	30-4456	.20
61	Output Transformer KR-17—HR-12	32-7639	1.60
62	Cone and Voice Coil KR-17	36-3540	.80
	Cone and Voice Coil HR-12	36-3557	1.20
63	Condenser (.004 mfd. tubular)	30-4456	.20
64	Resistor (8,000 ohms, ½ watt)	33-280339	.20
65	Resistor (1,000 ohms, ½ watt)	33-1223	.20
66	Resistor (2,000 ohms, ½ watt)	33-220339	.20
67	Switch and Tone Control	42-1241	1.00
68	Battery Cable Assembly	41-3198	1.40
69	Ant. Range Switch	42-1202	....
70	R. F. Range Switch	42-1254	....
71	Oscillator Range Switch	42-1204	....
72	Pilot Lamp (dial) and Shadow Meter	34-2150	.22
	Shadow Meter Receptacle Assem.	41-3225	....
	Range Switch Shaft and Index Plate	42-1186	.50
	Pilot Lamp Assembly	38-7875	.45
	Dial	27-5250	.70
	Hub	28-7187	.12
	Clamp	28-2837	.10
	Set Screw	W-1641	.02
	Dial Hole Cover	27-8425	.02
	Gear (Dial)	28-7185	.10
	Gear (Drive)	31-1884	.25
	Thrust Spring	28-8611	.01
	Thrust Washer	28-3976	.30 C
	"C" Washer	28-3904	.01
	Mask	27-5240	.30
	Mask Arm and Link Assembly	31-1959	.30
	Mask Washer	27-8318	.50 C
	Mask Guide and Lamp Bracket	38-7844	.15
	Indicator Bracket and Lens Assembly	31-1900	.30
	Scale Guard	27-8324	.02

Description	Part No.	List Price
Volume Control Shaft	38-8060	$0.12
Retaining Clip	28-4394	.01
Spring	28-4117	.40 C
Tube Shield	28-2726	.10
Tube Shield Base	28-3898	.03
Shield Shadow Meter	28-2917	.02
Socket (7 prong)	27-6057	.11
Socket (8 prong)	27-6058	.11
Grommet Mtg. R. F. Unit	27-4317	.04
Sleeve Mtg. R. F. Unit	28-2257	.01
Washer Mtg. R. F. Unit	27-7807	.50 C
Screw Mtg. R. F. Unit	W-729	.45 C
Mtg. Rubber (Gang Condenser)	27-4325	.02
Mtg. Spring (Shadow Meter)	28-8623	.70 C
Mtg. Plate (R. F. Transformer)	28-3808	.02
Mtg. Spacer (R. F. Transformer)	27-8228	.01
Mtg. Screw (R. F. Transformer)	W-1635	.30 C
Mtg. Busher (Cabinet)	27-4360	.04
Mtg. Rubber (Cabinet)	3558	.03
Speaker Cable	41-3207	.30
Knob (Tuning)	27-4330	.10
Knob (Tuning Vernier)	27-4331	.10
Knob (Tone and Volume)	27-4332	.10
Knob (Range Switch)	27-4326	.10
"A" Battery	172-R	....
"B" Battery	41-8007	....

"B" CABINET

Description	Part No.	List Price
Speaker KR-17	36-1248	....
Baffle and Silk Assembly	40-5975	.40
Bezel Assembly	40-5946	.75
Gasket	27-8312	.01
Screw	W-1644	.50 C
Glass	27-8299	.06
Ring	28-3987	.40

"X" CABINET

Description	Part No.	List Price
Baffle Silk Assembly	40-6036	1.20
Speaker HR-12	36-1250	11.00
Bezel and Plate Assembly	40-5948	.80
Glass	27-8300	.06
Ring	28-3988	.45
Gasket	27-8313	.01
Screw	W-1644	.50 C

Prices Subject to Change Without Notice

PHILCO RADIO & TELEV. CORP.

Electrical Specifications

TYPE CIRCUIT:

Superheterodyne, with a High-Frequency tuning range; covering from 25 to 42 megacycles and a Push-Pull pentode audio output circuit.

POWER SUPPLY:

Voltage	Frequency	Power Consumption
115	50 to 60	130 watts
115	25 to 40	130 watts

Power transformers for the different voltage and frequency ratings are listed in the parts list.

Shadow Meter Adjustment

Remove aerial and allow tubes to warm up. Then adjust shadow meter as follows:

1. Move the shadow meter coil backwards and forwards, until the opposite edges of the shadow are 1/8 of an inch from end of the shadow screen, measuring along the bottom edge of the screen. Adjustment of the shadow meter light bracket may be necessary for perfect centering.

2. Remove the rectifier tube from its socket, and rotate coil until shadow reaches minimum width. This width must not exceed 1/32 of an inch.

3. Replace the 5Y4G rectifier tube in its socket. The shadow should then widen to not more than 3/16 of an inch or less than 1/16 inch from each side of the screen measuring along the bottom edge. If these limits are not obtained readjust the shadow meter as given in paragraphs 1 and 2 until they are reached.

PHILCO TUBES USED: Nine.

Two 6K7G; two 6F6G; two 6J5G; one 6A8G; one 6K5G and one 5Y4G.

Dial Calibration

In order to adjust this receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this rotate the tuning control to the extreme counter-clockwise position (maximum capacity). Loosen the set screw of the dial hub, then turn dial until the glowing indicator is centered on the middle index line of dial scale (see Fig. 5). Now tighten the dial hub set screw in this position.

Aerial Connections

To obtain the full advantage of the sensitivity of this receiver the Philco High Efficiency Aerial supplied with the receiver must be used. The connections for the aerial are as follows:

The red and black leads of the High-Efficiency Aerial "transmission line" are connected to terminals 1 and 2 respectively, of the terminal panel provided on the rear of the chassis. Connect the jumper on the terminal panel across terminals 3 and 4.

If a temporary aerial is used, the jumper should be across terminals 2 and 3. The aerial connects to terminal 1 and the ground lead to terminal 3. A good ground connection is desirable in all installations.

SPEAKERS: B Cabinet, K35. Part No. 36-1231.
X Cabinet, H26. Part No. 36-1238.

INTERMEDIATE FREQUENCY:
470 K. C.

TUNING RANGES: Four.

Range 1—530 to 1720 K. C.
Range 2—2.3 to 7.4 M. C.
Range 3—7.35 to 22 M. C.
Range 4—25 to 42 M. C.

UNDISTORTED OUTPUT: 7 watts.

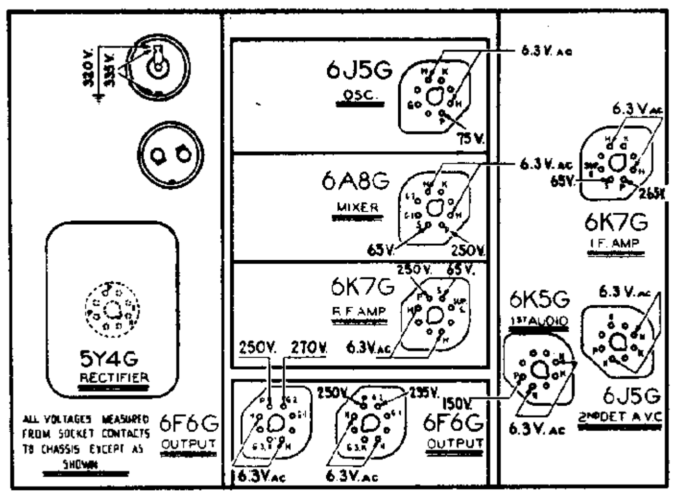


Fig. 1—Socket Voltages—Underside of Chassis View

The voltages indicated by arrows were measured with a Philco 025 Circuit Tester which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

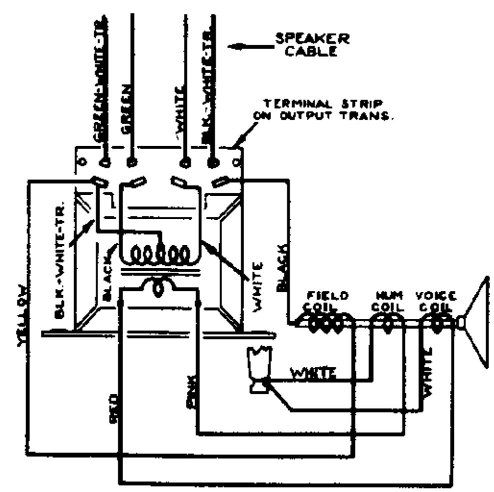
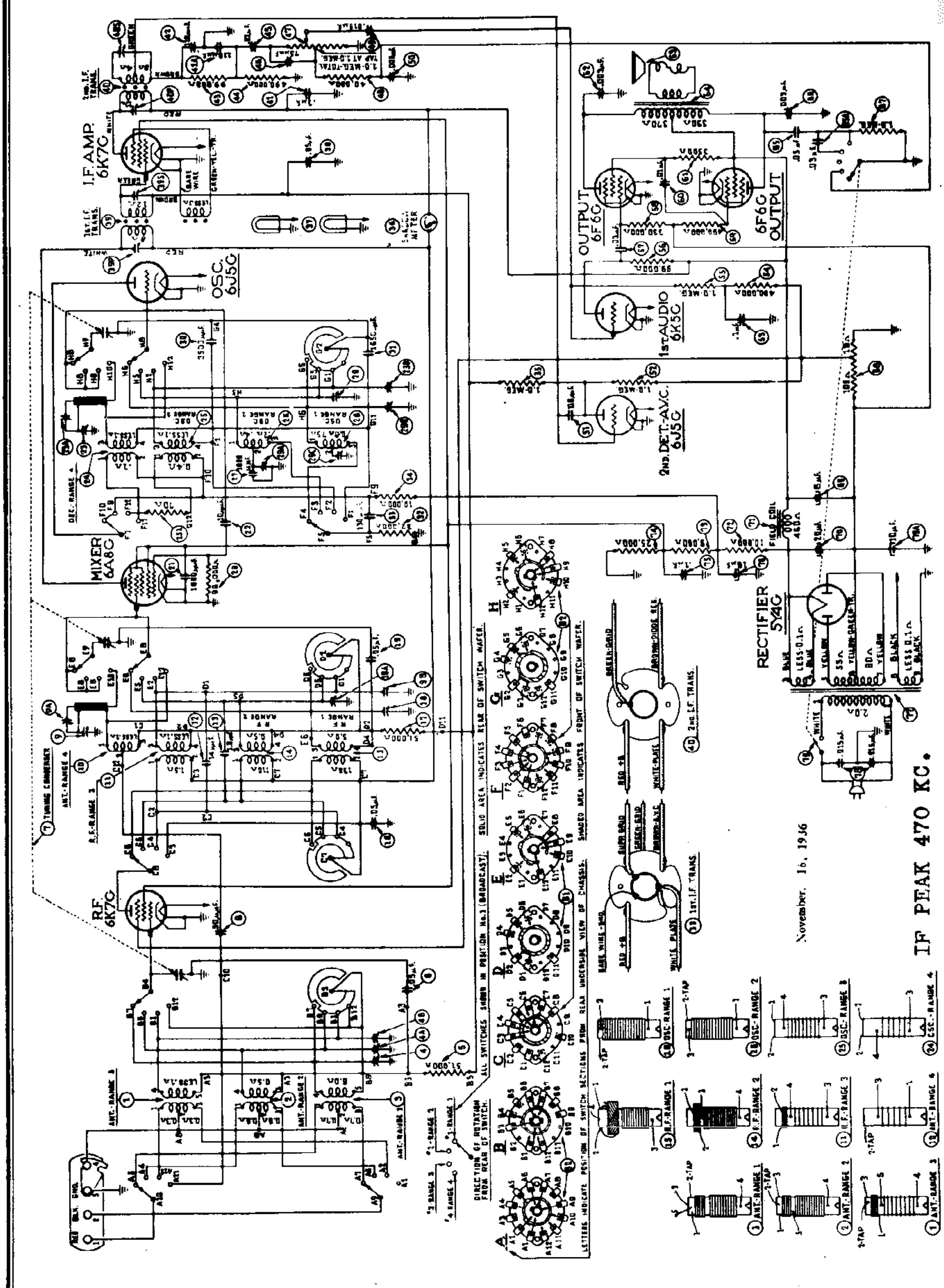


Fig. 2—Speaker Wiring, K-35, H-26

PHILCO RADIO & TELEV. CORP.



MODEL 37-665
Alignment
Trimmers

PHILCO RADIO & TELEV. CORP.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator; Philco **Model 088** (fundamental frequency 110 to 20000 K. C.) is the correct instrument for this purpose; (2) output meter. **Philco Model 025 Circuit Tester** incorporates an accurate, sensitive output meter and is recommended; (3) Fibre handle screw-driver (Philco Part No. 27-7059); (4) Special variable condenser (Philco Part No. 45-2325).

OUTPUT METER: The 025 Output Meter is connected between the plate and cathode prongs of one of the 6F6G tubes. The meter is adjusted to use the (0-30) volt scale.

INTERMEDIATE FREQUENCY CIRCUIT

1. Set controls as follows:
   a. Range switch position one (broadcast)
   b. Receiver dial 580 K. C.
   c. Volume control maximum
   d. Signal generator 470 K. C.
   e. Connect the 088 signal generator output lead through a .1 mfd. condenser to the control grid of the 6A8G tube and the generator ground connection to the chassis.
2. Adjust the following I. F. compensators for maximum output: (39P), (39S), (40P) and (40S).

RADIO FREQUENCY CIRCUIT

Tuning Range (28 to 42 M. C.)

1. Set controls as follows:
   a. Range switch position 4
   b. Connect the signal generator output lead and ground to terminals 1 and 3 respectively on the aerial input panel. Terminals 2 and 3 must be connected with the shorting link provided on the aerial panel.
2. Adjust compensators as follows for maximum output:

Signal Generator	Receiver Dial	Compensators in Order
13 M. C.	39 M. C.	(23) Check image signal at 38.06 on the Receiver Dial. (See Note A)
13 M. C.	39 M. C.	(9) Roll gang
13 M. C.	26 M. C.	(23A)
13 M. C.	26 M. C.	(9A)
13 M. C..	39 M. C.	(23) check image (Note A)
13 M. C.	39 M. C.	(9) Roll gang

Tuning Range 7.35 to 22 M. C.

1. Set controls and adjust compensators for maximum output as follows:
   Range Switch Position 3.

Signal Generator & Receiver Dials	Compensators in Order
18 M. C.	(23B) check image 17.06 M. C.
18 M. C.	(9B), (4B) use shunt condenser on (23B). See Note B

Tuning Range 2.3 to 7.4 M. C.

1. Range Switch Position 2
2. Signal Generator & Receiver Dials

Signal Generator & Receiver Dials	Compensators in Order
7.0 M. C.	(29), (18A), (4A)
2.35 M. C.	(29A)
7.0 M. C.	(29)
6.0 M. C.	(18A), (4A)

Tuning Range 530 to 1720 K. C.

1. Range Switch Position 1
2. Signal Generator & Receiver Dials

Signal Generator & Receiver Dials	Compensators in Order
1600 K. C.	(29B), (18), (4)
580 K. C.	(29C) Roll gang
1600 K. C.	(29B)
1500 K. C.	(18), (4)

NOTE "A"—To accurately adjust the compensator to the fundamental and not the image signal, turn the oscillator compensator to the maximum capacity position clockwise. Then slowly turn the compensators counter-clockwise until a second maximum peak is obtained on the output meter. The first peak is the image signal and the receiver must not be adjusted to it. If the above procedure is correctly performed, the image signal will be found 940 K. C. below the frequency being used on any high frequency band.

NOTE "B"—To eliminate the effect of the Ant. and R. F. compensators detuning the Osc. circuit, a variable tuning condenser, Philco Part No. 43-2325 is connected from the oscillator compensators to ground when designated in the padding instruction above. Tune the added condenser from the minimum capacity position until the second harmonic of the receiver oscillator beats against the signal from the generator, resulting in a maximum indication on the output meter. Then adjust compensators as noted for maximum output.

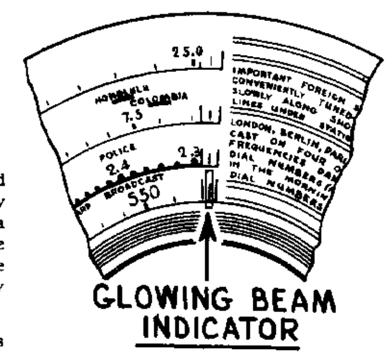


Fig. 5—Dial Calibration

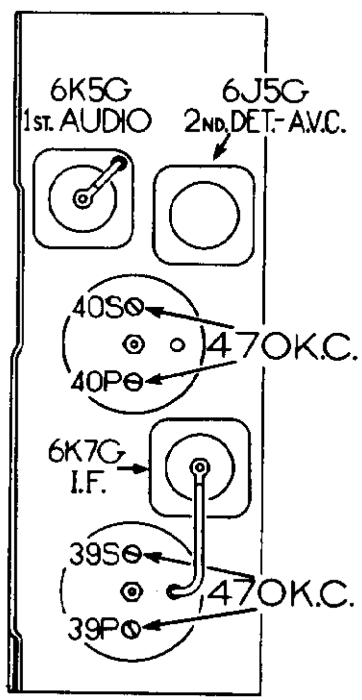


Fig. 6—I. F. Compensators

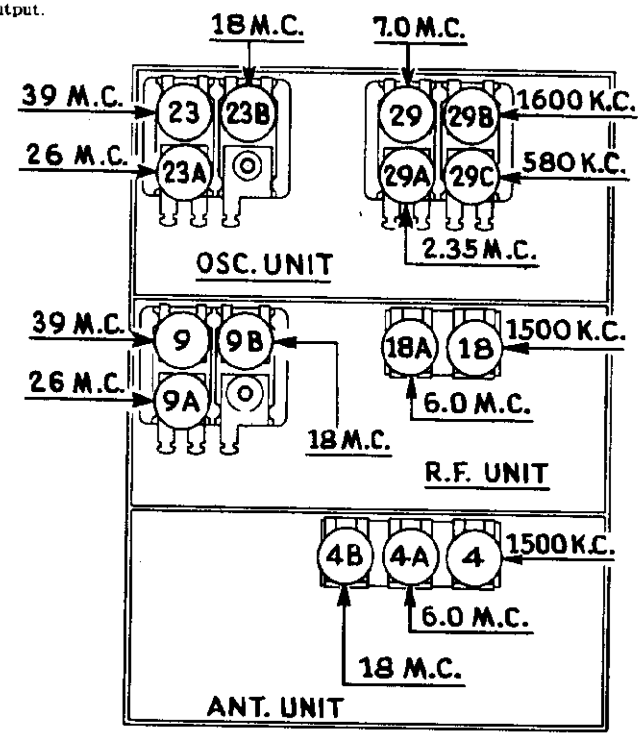


Fig. 7—R. F. Compensators

PHILCO RADIO & TELEV. CORP.

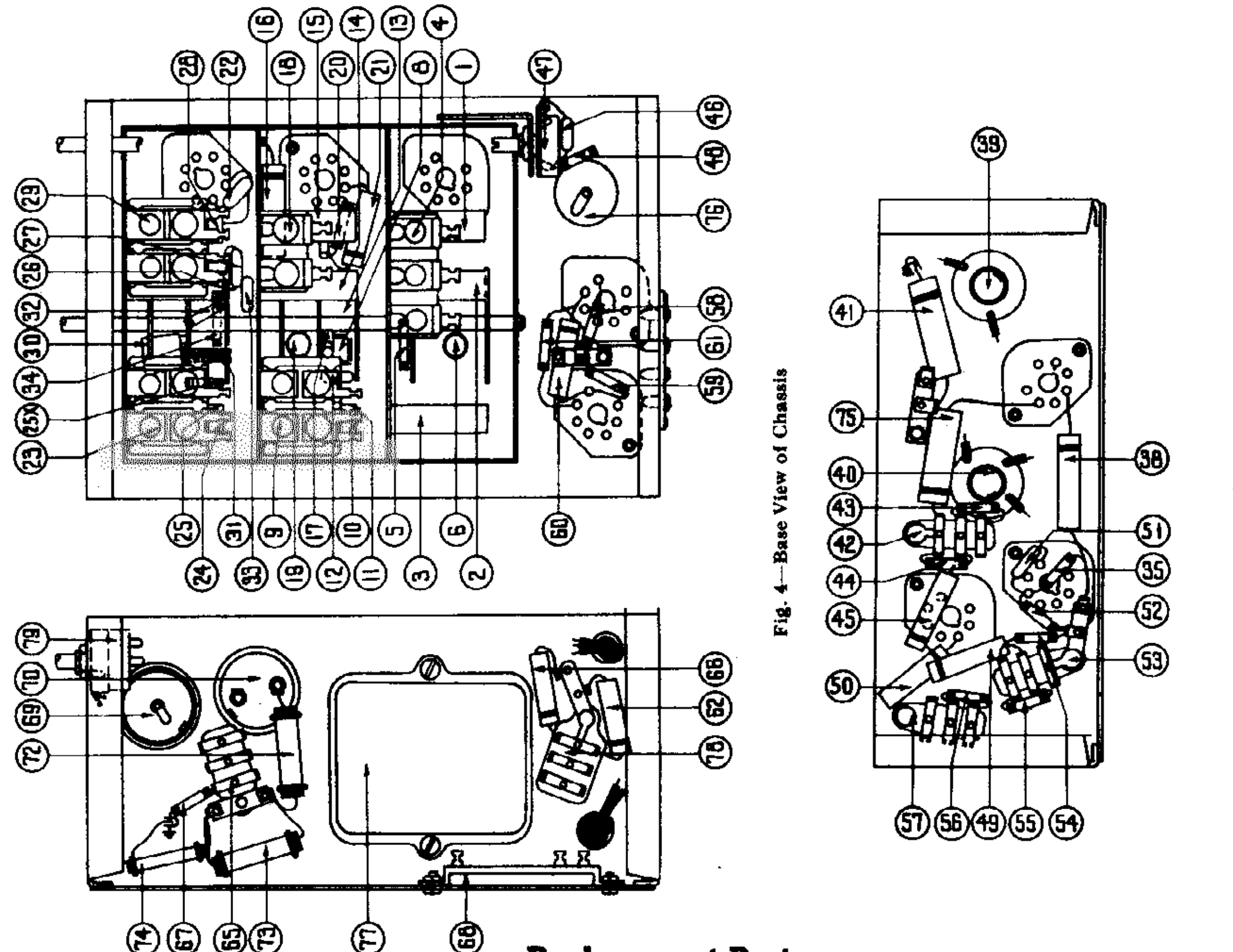


Fig. 4—Base View of Chassis

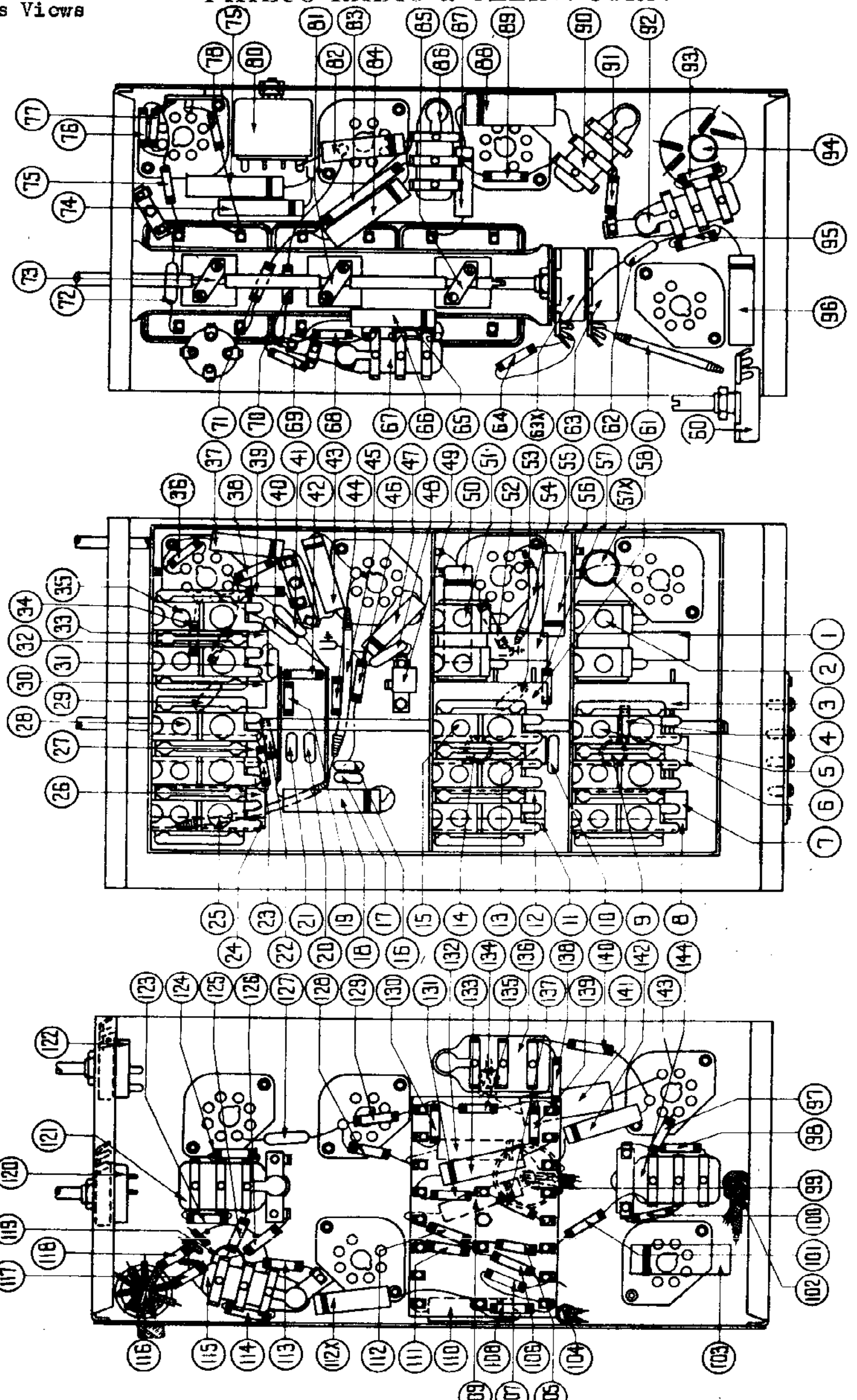
Replacement Parts

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 3)	32-2109	$1.20
2	Antenna Transformer (Range 2)	32-2119	1.20
3	Antenna Transformer (Range 1)	32-2108	1.60
4	Compensator (three section)	31-6092	.60
5	Resistor (51000 ohms, ½ watt)	33-351339	.20
6	Condenser (.05 mfd. tubular)	30-4444	.20
7	Tuning Condenser	31-1938	4.80
8	Condenser (50 mmfd. mica)	30-1029	.20
9	Compensator (3 section)	31-6226	
10	Ant. Transformer (Range 4)	32-2192	.70
11	R. F. Transformer (Range 3)	2-2126	.70
12	Condenser (14 mmfd.)	30-1073	.20
13	Condenser (1.0 mmfd.) twisted wire and lug	38-7878	.04
14	R. F. Transformer (Range 2)	32-2106	.70
15	R. F. Transformer (Range 1)	32-2105	1.00
16	Condenser (.05 mfd. Tubular)	30-4123	.20
17	Resistor (51000 ohms, ½ watt)	33-351339	.20
18	Compensator (two section)	31-6093	.40
19	Condenser (.05 mfd. Tubular)	30-4444	.20
20	Resistor (99,000 ohms)	33-399339	.20
21	Condenser (1000 mmfd.)	30-4453	.20
22	Condenser (10 mmfd.)	30-1065	.20
23	Compensator (three section)	31-6225	
24	Osc. Transformer (Range 4)	32-2196	1.20
25	Osc. Transformer (Range 3)	32-2110	.70
25X	Resistor (70 ohms, ½ watt)	33-070339	
26	Osc. Transformer (Range 2)	32-2121	.70
27	Condenser (1000 mmfd. mica Green, White)	30-1007	.30
28	Osc. Transformer (Range 1)	32-2120	1.00
29	Compensator (four section)	31-6108	1.00
30	Condenser (3500 mmfd.)	31-6097	.50
31	Condenser (1650 mmfd.)	31-6096	.40
32	Resistor (32000 ohms, ½ watt)	33-332339	.20
33	Condenser (130 mmfd.)	30-1050	.25
34	Resistor (10000 ohms, ½ watt)	33-310339	.20
35	Resistor (1.0 megohm, ½ watt)	33-510339	.20
36	Shadowmeter	45-2307	2.50
37	Shadowmeter and Pilot Lamp	34-2039	.07
38	Condenser (.05 mfd. tubular)	30-4020	.20
39	1st I. F. Transformer	32-2169	1.80
40	2nd I. F. Transformer	32-2171	1.80
41	Condenser (.1 mfd. tubular)	30-4465	.25
42	Condenser (110 mmfd. Dual Bakelite)	8035-DG	.25
43	Resistor (99,000 ohms, ½ watt)	33-399339	.20
44	Resistor (490,000 ohms, ½ watt)	33-449339	.20
45	Condenser (.01 mfd. tubular)	30-4124	.25
46	Condenser (75 mmfd. mica)	30-1031	.20
47	Volume Control	33-5158	1.00
48	Resistor (40,000 ohms, ½ watt)	33-340339	$0.20
49	Condenser (.015 mfd. tubular)	30-4358	.20
50	Condenser (.006 mfd. tubular)	30-4125	.20
51	Condenser (110 mfd. mica)	30-1031	.20
52	Resistor (1.0 megohm, ½ watt)	33-510339	.20
53	Condenser (.1 mfd. Bakelite)	4969-SG	.20
54	Resistor (490,000 ohms, ½ watt)	33-449339	.20
55	Resistor (1.0 megohm, ½ watt)	33-510339	.20
56	Resistor (99,000 ohms, ½ watt)	33-399339	.20
57	Condenser (.03 mfd. bakelite)	8318-SU	.35
58	Resistor (330,000 ohms, ½ watt)	33-433339	.20
59	Resistor (490,000 ohms, ½ watt)	33-449339	.20
60	Condenser (.01 mfd. tubular)	30-4169	.20
61	Resistor (3500 ohms, ½ watt)	33-235339	.20
62	Condenser (.003 mfd. tubular)	30-4469	.20
63	Cone & Voice Coil K35	36-3174	.80
	Cone & Voice Coil H26	36-3801	
64	Output Transformer K35 and H26	32-7634	1.50
65	Condenser (.05, .03 mfd. dual bakelite)	3615-YU	.40
66	Condenser (.003 mfd. tubular)	30-4469	.20
67	Resistor (1.0 megohm, ½ watt)	33-510339	.20
68	Resistor (128 ohms, wirewound)	33-3280	.30
69	Electrolytic Condenser (8 mfd.)	30-2024	1.10
70	Electrolytic Condenser (10, 20 mfd.)	30-2163	2.40
71	Field Coil Assembly K35 and H26	36-3687	4.00
72	Resistor (10,000 ohms, 3 watts)	33-310639	.30
73	Resistor (9000 ohms, 2 watts)	33-290639	.30
74	Resistor (25,000 ohms, 1 watt)	33-325439	.20
75	Condenser (.1 mfd. tubular)	30-4170	.25
76	Electrolytic Condenser (16 mfd.)	30-2118	1.65
77	Power Transformer 115 V., 50 to 60 cycles	32-7606	6.25
	Power Transformer 115 V., 25 to 40 cycles	32-7607	9.00
	Power Transformer 115/220 V., 50 to 60 cycles	32-7608	8.00
78	Condenser (.015 mfd. dual bakelite)	3793-DG	.40
79	Power & Tone Control Switch	42-1184	.75
80	Range Switch Ant.	42-1227	1.25
81	Range Switch R. F.	42-1228	1.60
82	Range Switch Osc.	42-1229	1.60
	Switch Index Plate & Shaft	42-1186	.50
	Pilot Lamp Assembly	38-7706	.35
	Dial	27-5244	.70
	Hub	28-7187	.12
	Clamp	28-2837	.10
	Set Screw	W-1641	.02
	Gear (Dial)	28-7185	.10
	Gear (Drive)	31-1884	.25
	Thrust Spring	28-8611	.01
	Thrust Washer	28-3976	$0.30 C
	"C" Washer	28-3904	.01
	Mask	27-5240	.30
	Mask Washer	27-8318	.50 C
	Mask Arm & Link Assembly	31-1887	.45
	Mask Guide & Bracket	38-7876	.25
	Indicator & Lens Assembly	31-1900	.30
	Volume Control Shaft	38-8060	.12
	Retaining Clip	28-4394	.01
	Shaft Spring	28-4117	.40 C
	Shield (Tube)	28-2726	.10
	Base (Shield)	28-3898	.03
	Socket 7 prong	27-6057	.11
	Socket 8 prong	27-6058	.11
	Socket rectifier	27-6052	.11
	Terminal Panel (Ant.)	38-7714	.15
	Grommet Mtg. R. F. Unit	27-4317	.04
	Sleeve Mtg. R. F. Unit	27-7807	.50 C
	Screw Mtg. R. F. Unit	W-729	.45 C
	Rubber Mtg. (Gang Condenser)	27-4325	.02
	Spring Mtg. Shadowmeter	28-8623	.70 C
	Plate Mtg. R. F. Transformer	28-3808	.02
	Spacer Mtg. R. F. Transformer	27-8228	.01
	Screw Mtg. R. F. Transformer	W-1635	.30 C
	Shield (Receiver Bottom)	38-8316	
	Snap Fasteners	28-4279	.75 C
	Cable Speaker	41-3202	.40
	A. C. Cord	L-2183	.40
	Knob (tuning)	27-4330	.10
	Knob (tuning vernier)	27-4331	.10
	Knob (tone & volume)	27-4332	.10
	Knob Range Switch	27-4326	.10
	Receptacle (Shadowmeter)	41-3225	.40
	"B" CABINET		
	Speaker K35	36-1731	7.25
	Baffle & Silk Assembly	40-5975	.40
	Bezel Assembly	40-5946	.75
	Gasket	27-8312	.01
	Screw	W-1644	.50 C
	Glass	27-8299	.06
	Ring	28-3987	.40
	"X" CABINET		
	Speaker H26	36-1238	8.25
	Bezel Assembly	40-5948	.80
	Gasket	27-8313	.01
	Glass	27-8300	.06
	Ring	28-3988	
	Speaker Baffle	16276	.70
	Silk	44-1185	.40

Prices Subject to Change Without Notice

MODEL 37-690
Chassis Views

PHILCO RADIO & TELEV. CORP.



PHILCO RADIO & TELEV. CORP.

Electrical Specifications

TYPE CIRCUIT: Superheterodyne, with Magnetic Tuning; Fidelity-selectivity control in the intermediate frequency unit; 10 K. C. audio filter circuit; individual A.V.C. circuits for the R.F. and I.F. amplifiers; Automatic Bass Compensation circuit and Class "A" audio output circuit.

TUNING DIAL: Philco Automatic Dial Tuning Mechanism.

POWER SUPPLY:	Voltage	Frequency	Consumption
	115	50 to 60 cycles	275 watts
	115	25 to 40 cycles	285 watts

PHILCO TUBES USED: Twenty.

Five 6K7G; two 6B4G; four 6J5G; two 5X4G; one 6N7G; one 6B8G; one 6L7G; one 6H6G; one 6A8G; one 6R7G; one 6F6G.

TONE CONTROLS:

A. Treble response adjustable by the Fidelity-selectivity control.
B. Continuously variable Bass Response.

SPEAKERS: One W2 Cathedral High-fidelity Speaker.
Two—CB2 High Frequency Speakers.

INTERMEDIATE FREQUENCY: 470 K. C.

UNDISTORTED OUTPUT: 15 watts.

TUNING RANGES: Five.

Range 1—530 to 1600 K. C.
Range 2—1.58 to 4.75 M. C.
Range 3—4.7 to 7.4 M. C.
Range 4—7.35 to 11.6 M. C.
Range 5—11.5 to 18.2 M. C.

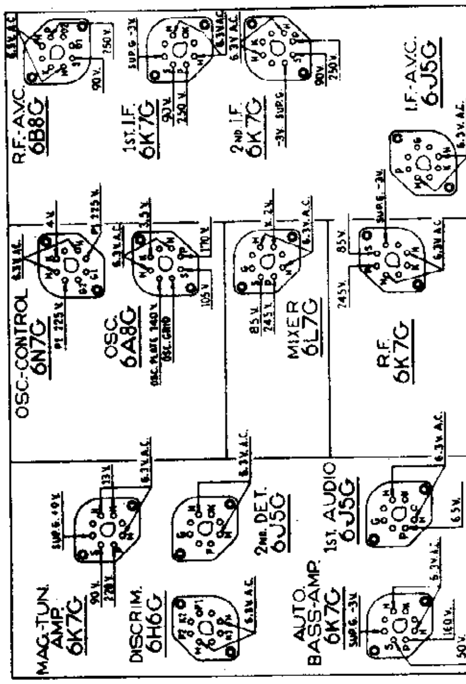


Fig. 1. Receiver Socket Voltage

Aerial Connections

To obtain the full advantage of the sensitivity of this receiver the Philco High Efficiency Aerial supplied with the receiver must be used. The connections for the aerial are as follows:

The red and black leads of the High-Efficiency Aerial "transmission line" are connected to terminals 1 and 2 respectively, of the terminal panel provided on the rear of the chassis. Connect the jumper on the terminal panel across terminals 3 and 4.

If a temporary aerial is used, the jumper should be across terminals 2 and 3. The aerial connects to terminal 1 and the ground lead to terminal 3. A good ground connection is desirable in all installations.

Removing Cabinet Top and Adjusting Door Hardware

Remove screws from under side of top frame (on some cabinets it will be necessary to loosen the high frequency speaker baffle to reach screws above them). The top is located by two dowels and will lift off after screws are removed.

To adjust doors after removing top, pull nails from washers, loosen nuts, move hardware in direction to align doors. Tighten nuts and drive nails through holes in washers after turning washers to provide new nail hole locations.

If doors are to be removed, lift loose pin out of hardware in top frame; tip door forward slightly and lift off of pin in bottom frame. For this operation it is also necessary to first remove the top.

CAUTION: The top frame (that section which bears the Philco trademark) should never be removed from the cabinet.

Do not glue top when replacing it on cabinet.

Dial Calibration

In order to adjust this receiver correctly the dial must be aligned to track properly with the tuning condenser. To do this proceed as follows:

1. Loosen the set screws on the shaft coupling of the tuning condenser. Then turn the tuning condenser until the plates are in the maximum capacity position. Now set the glowing beam indicator on the index line at the low frequency end of the broadcast band. With dial and tuning condenser in this position tighten set screws.

2. Turn the tuning condenser control until the indicator is on the first division from the index line.

3. With the dial in this position, loosen the shaft coupling set screws. Then turn the dial until the indicator is again on the index line. Tighten the set screws in this position.

NOTE: Be careful when turning the dial that the position of the tuning condenser is not disturbed.

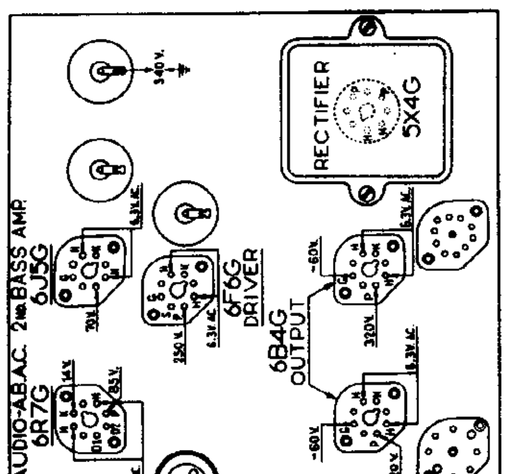
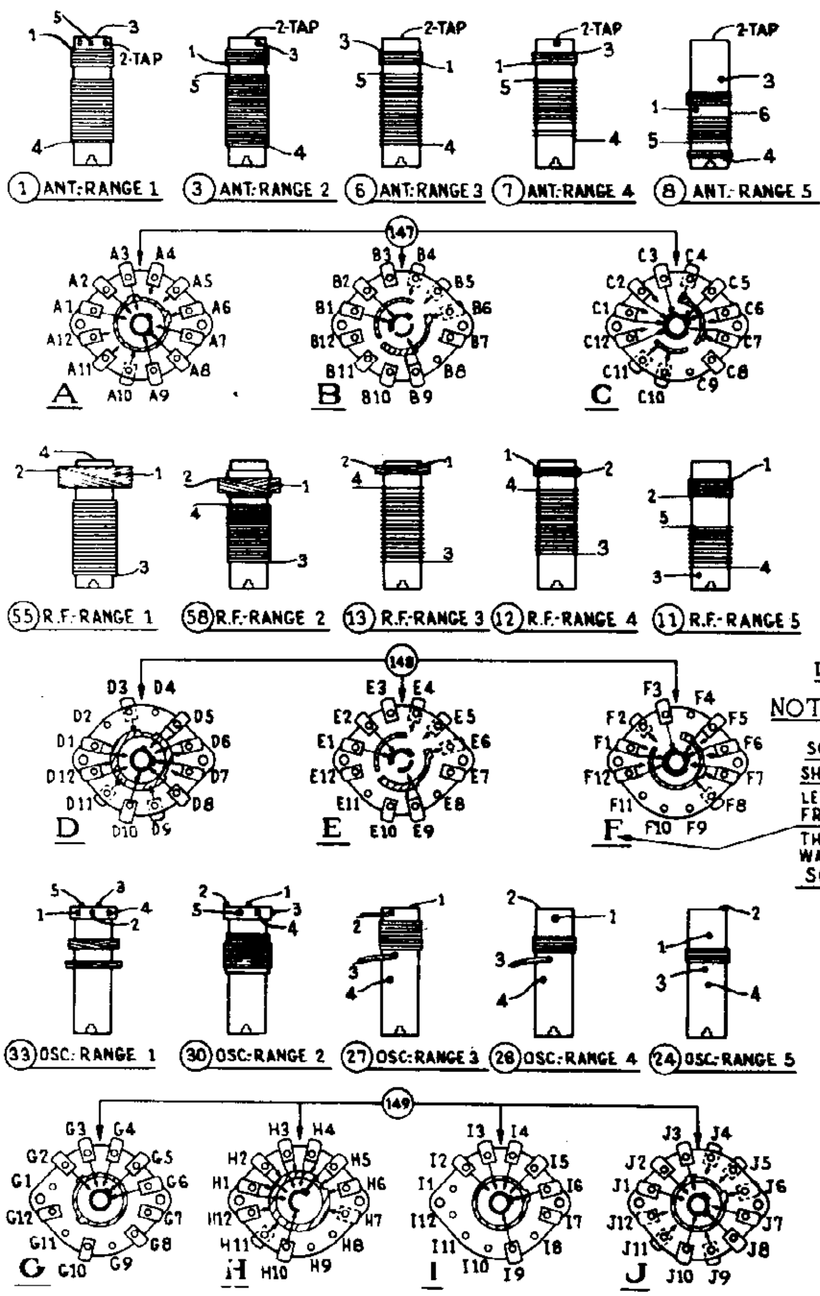


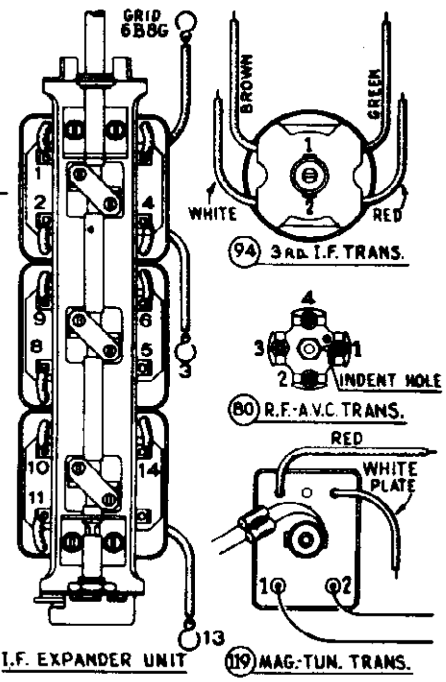
Fig. 2. Power Amplifier Socket Voltage
The voltages indicated by arrows were measured with a Philco 025 Circuit Tester which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

MODEL 37-690
Coil & Switch
Connections
Spkr.Wiring,Notes

PHILCO RADIO & TELEV. CORP.

Coil and Range Switch Connections





NOTE- ALL SWITCHES SHOWN IN POSITION No.1-(BROADCAST.)

SOLID AREA INDICATES REAR OF SWITCH WAFER.

SHADED AREA INDICATES FRONT OF SWITCH WAFER.

LETTERS INDICATE POSITION OF SWITCH WAFERS FROM REAR UNDERSIDE VIEW OF CHASSIS.

THE NUMBERS ON THE COILS AND RANGE SWITCH WAFERS, CORRESPOND TO THOSE SHOWN ON THE SCHEMATIC DIAGRAM.

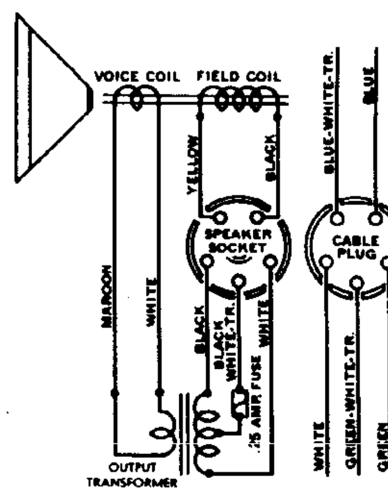


Fig. 3. Speaker Wiring W2

Hum Adjustment and Elimination

Adjust compensator (185) for minimum hum with volume control retarded.

If abnormal hum develops with bass compensation control at maximum, change the 6K7G bass amplifier tube. It also may be necessary to interchange the 6B4G output tubes for perfect balance.

PHILCO RADIO & TELEV. CORP.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Replacement Parts—Model 37-690

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2108	$1.60
2	Compensator (two section)	31-6093	.40
3	Antenna Transformer (Range 2)	32-2146	1.20
4	Resistor (51,000 ohms, ½ watt)	33-351339	.20
5	Compensator (six section)	31-6112	1.40
6	Antenna Transformer (Range 3)	32-2183	1.20
7	Antenna Transformer (Range 4)	32-2185	1.20
8	Antenna Transformer (Range 5)	32-2175	1.20
9	Condenser (.05 mfd. tubular)	30-4020	.20
10	Condenser (40 mmfd. mica)	30-1076	.20
11	R. F. Transformer (Range 5)	32-2176	1.20
12	R. F. Transformer (Range 4)	32-2178	.70
13	R. F. Transformer (Range 3)	32-2177	.70
14	Condenser (.05 mfd. tubular)	30-4020	.20
15	Compensator (six section)	31-6113	1.40
16	Condenser (55 mmfd. mica)	30-1045	.20
17	Condenser (25 mmfd. mica)	30-1067	.20
18	Condenser (.05 mfd. tubular)	30-4123	.20
19	Resistor (20,000 ohms, ½ watt)	33-320339	.20
20	Condenser (250 mmfd. mica)	30-1032	.25
21	Condenser (600 mmfd. mica)	30-1049	.25
22	Resistor (20,000 ohms, ½ watt)	33-320339	.20
23	Resistor (8,000 ohms, ½ watt)	33-280339	.20
24	Oscillator Transformer (Range 5)	32-2199	.70
25	Resistor (200 ohms, wirewound)	7217	.20
26	Oscillator Transformer (Range 4)	32-2198	.70
27	Oscillator Transformer (Range 3)	32-2197	.70
28	Compensator (Osc. six section)	31-6117	1.20
29	Condenser (600 mmfd. mica)	30-1049	.25
30	Oscillator Transformer (Range 2)	32-2194	1.00
31	Condenser (600 mmfd. mica)	30-1049	.25
32	Resistor (20 ohms, ½ watt)	33-020339	.20
33	Oscillator Transformer (Range 1)	32-2191	1.00
34	Resistor (20 ohms, ½ watt)	33-020339	.20
35	Compensator (Four section)	31-6124	1.00
36	Resistor (700 ohms wirewound)	33-170330	.20
37	Condenser (.02 mfd. tubular)	30-4481	.20
38	Resistor (99,000 ohms, ½ watt)	33-399339	.20
39	Resistor (99,000 ohms, ½ watt)	33-399339	.20
40	Condenser (250 mmfd. mica)	30-1032	.25
41	Condenser (250 mmfd. mica)	30-1032	.25
42	Resistor (10,000 ohms, ½ watt)	33-310339	.20
43	Condenser (.02 mfd. tubular)	30-4481	.20
44	Resistor (75,000 ohms, ½ watt)	33-375339	.20
45	Resistor (100 ohms, ½ watt)	33-3023	.25
46	Resistor (32,000 ½ watt)	33-332339	.20
47	Condenser (.01 mfd. tubular)	30-4169	.20
48	Condenser (200 mmfd. mica)	30-1047	.25
49	Plate Coil 6A8G	32-2242	.30
50	Condenser (.05 mfd. tubular)	30-4123	.20
51	Compensator (two section)	31-6093	.40
52	Resistor (1 megohm, ½ watt)	33-510339	.20
53	Condenser (5 mmfd. mica)	30-1077	.20
54	Resistor (400 ohms flexible)	33-3016	.20
55	R. F. Transformer (Range 1)	32-2105	1.00
56	Condenser (.05 mfd. tubular)	30-4444	.20
57	Resistor (10,000 ohms, ½ watt)	33-310339	.20
58	R. F. Transformer (Range 2)	32-2147	.70
59	Tuning Condenser	31-1892	3.60
60	Volume Control	33-5183	1.00
61	Resistor (500 ohms flexible)	33-150439	.20
62	Condenser (110 mmfd. mica)	30-1031	.25
63	Potentiometer (Expander Unit)	33-5178	1.50
64	Resistor (490,000 ohms)	33-449339	.20
65	Resistor (1. megohm, ½ watt)	33-510339	.20
66	Condenser (.02 mfd. tubular)	30-4113	.20
67	Condenser (.05 mfd. bakelite)	3615-SG	.35
68	Resistor (490,000 ohms, ½ watt)	33-449339	.20
69	Resistor (1. megohm, ½ watt)	33-510339	.20
70	Resistor (490,000 ohms, ½ watt)	33-449339	.20
71	Resistor (1000 ohms, ½ watt)	33-210339	.20
72	Condenser (110 mmfd. mica)	30-1031	.20
73	1st I. F. Transformer (Expander)	32-2288	1.80
74	Condenser (.01 mfd. tubular)	30-4169	.20
75	Resistor (1. megohm, ½ watt)	33-510339	.20
76	Resistor (500 ohms, ½ watt)	33-150339	.20
77	Resistor (2000 ohms, ½ watt)	33-220339	.20
78	Resistor (51,000 ohms, ½ watt)	33-351339	.20
79	Condenser (.05 mfd. tubular)	30-4444	.20
80	Transformer (R. F. A.V.C.)	32-2300	1.80
81	2nd I. F. Transformer (Expander)	32-2291	1.80
82	Condenser (.001 mfd. tubular)	30-4201	.20
83	Resistor (500 ohms, ½ watt)	33-150439	.20
84	Condenser (.05 mfd. tubular)	30-4123	.20
85	3rd I. F. Transformer (Expander)	32-2293	1.80
86	Condenser (.1 mfd. bakelite)	4989-SG	.35
87	Condenser (.05 mfd. tubular)	30-4444	.20
88	Condenser (.25 mfd. tubular)	30-4134	.25
89	Resistor (1000 ohms, ½ watt)	33-110339	.20
90	Condenser (.05 mfd. Bakelite)	3615-SG	.35
91	Resistor (1000 ohms, ½ watt)	33-110339	.20
92	Condenser (110 mmfd. dual bakelite)	8035-DG	.25
93	Resistor (99,000 ohms, ½ watt)	33-399339	.20
94	4th I. F. Transformer	32-2302	2.20
95	Resistor (99,000 ohms, ½ watt)	33-399339	.20
96	Condenser (.02 mfd. tubular)	30-4113	$0.20
97	Resistor (25,000 ohms, ½ watt)	33-325339	.20
98	Resistor (490,000 ohms, ½ watt)	33-449339	.20
99	Electrolytic Condenser (2, 2, 1 mfd.)	30-2177	1.40
100	Resistor (490,000 ohms, ½ watt)	33-449339	.20
101	Resistor (15,000 ohms, ½ watt)	33-315339	.20
102	Audio Cable	41-3233	2.00
103	Condenser (.15 mfd. tubular)	30-4191	.25
104	Audio Choke (bass amplifier)	32-7528	1.35
105	Resistor (99,000 ohms, ½ watt)	33-399339	.20

Schem. No.	Description	Part No.	List Price
106	Resistor (25,000 ohms, ½ watt)	33-325339	.20
107	Resistor (40,000 ohms, ½ watt)	33-340339	.20
108	Resistor (60,000 ohms, ½ watt)	33-360339	.20
109	Condenser (.05 mfd. tubular)	30-4123	.20
110	Condenser (.05 mfd. tubular)	30-4123	.20
111	Resistor (70 ohms, ½ watt)	33-070339	.20
112	Resistor (1000 ohms, ½ watt)	33-210339	.20
112X	Condenser (.008 mfd. tubular)	30-4455	.20
113	Resistor (490,000 megohms, ½ watt)	33-449339	.20
114	Resistor (1. megohm, ½ watt)	33-510339	.20
115	Condenser (110 mmfd. dual bakelite)	8035-DG	.25
116	Power Cable (Chassis)	41-3232	4.00
117	Resistor (490,000 megohms, ½ watt)	33-449339	.20
118	Resistor (490,000 megohms, ½ watt)	33-449339	.20
119	Magnetic Tuning Transformer	32-2361	4.00
120	Bass Amplifier Control & A.C. Switch	33-5182	.90
121	Condenser (.05 mfd. bakelite)	3615-DG	.40
122	Magnetic Tuning Switch (Manual)	42-1216	.75
123	Resistor (500 ohms, ½ watt)	33-150339	.20
124	Resistor (2000 ohms, ½ watt)	33-220339	.20
125	Resistor (1. megohm, ½ watt)	33-510339	.20
126	Resistor (490,000 ohms, ½ watt)	33-449339	.20
127	Condenser (110 mfd. mica)	30-1031	.20
128	Resistor (1. megohm, ½ watt)	33-510339	.20
129	Resistor (330,000 ohms, ½ watt)	33-433339	.20
130	Resistor (1. megohm, ½ watt)	33-510339	.20
131	Resistor (40,000 ohms, ½ watt)	33-340339	.20
132	Condenser (.05 mfd. tubular)	30-4123	.20
133	Condenser (.15 mfd. tubular)	30-4191	.25
134	Condenser (.1, .1, .8 mfd.)	30-4466	1.40
135	Resistor (160,000 ohms, ½ watt)	33-416339	.20
136	Condenser (.15 mfd. bakelite)	6287-DG	.40
137	Resistor (20,000 ohms, ½ watt)	33-320339	.20
138	Resistor (490,000 ohms, ½ watt)	33-449339	.20
139	Resistor (490,000 ohms, ½ watt)	33-449339	.20
140	Resistor (1. megohm, ½ watt)	33-510339	.20
141	Condenser (.15 mfd. tubular)	30-4191	.25
142	Condenser (.05 mfd. tubular)	30-4444	.20
143	Part of 144 (.03 mfd.)		
144	Condenser (.03 mfd. bakelite)	8318-DU	
145	Magnetic Tuning Switch (Automatic Dial)	45-2330	
146	Flood Lamp Assembly	38-8210	2.40
147	Antenna Range Switch	42-1211	1.60
148	R. F. Range Switch	42-1255	1.60
149	Oscillator Range Switch	42-1217	2.00
150	Switch (audio shorting, auto. dial)	45-2350	
151	Electrolytic Condenser (8 mfd.)	30-2025	1.35
152	Electrolytic Condenser (8, 10 mfd.)	30-2176	1.40
153	Electrolytic Condenser (2, 3, 3 mfd.)	30-2159	1.80
154	Coil (10 K. C. Filter)	32-7764	.80
155	Resistor (1. megohm, ½ watt)	33-510339	.20
156	Audio Transformer (Interstage)	32-7725	3.20
157	Resistor (490,000 ohms, ½ watt)	33-449339	.20
157X	Resistor (240,000 ohms, ½ watt)	33-424339	
158	Condenser (410 mfd. mica)	30-1000	.25
159	Compensator (10 K. C. Filter)	04000-T	.35
160	Condenser (.025 mfd. bakelite)	7653-SU	.35
161	Resistor (99,000 ohms, ½ watt)	33-399339	.20
162	Condenser (1000 mmfd. mica)	30-1007	.30
163	Resistor (15,000 ohms, ½ watt)	33-315339	.20
164	Condenser (.1 mfd. bakelite)	4989-SG	.35
165	Electrolytic Condenser (8 mfd.)	30-2024	1.10
166	Electrolytic Condenser (8 mfd.)	30-2025	1.35
167	Condenser (.05 mfd. tubular)	30-4020	.20
168	Electrolytic Condenser (8 mfd.)	30-2025	1.35
169	Filter Choke	32-7056	2.20
170	Resistor (490,000 ohms, ½ watt)	33-449339	.20
171	Condenser (.1 mfd. bakelite)	4989-SG	.35
172	Resistor (490,000 ohms, ½ watt)	33-449339	.20
173	Condenser (.3 mfd. bakelite)	6287-DU	.40
174	Resistor (51,000 ohms, ½ watt)	33-351339	.20
175	Condenser (.015 mfd. bakelite)	3793-DG	.40
176	Power Transformer	32-7731	7.50
	Power Transformer (25 to 40 cycles)	32-7732	
177	Resistor (wirewound three taps)	33-3302	1.00
177X	Resistor (30 ohm flexible)	33-3119	
177Y	Resistor (30 ohm flexible)	33-3119	
178	Condenser (.05 mfd. bakelite)	3615-SU	.35
179	Resistor (51,000 ohms, ½ watt)	33-351339	.20
180	Resistor (51,000 ohms, ½ watt)	33-351339	.20
181	Condenser (.05 mfd. bakelite)	3615-SU	.35
182	Resistor (51,000 ohms, ½ watt)	33-351339	.20
183	Resistor (32,000 ohms, ½ watt)	33-332339	.20
184	Cable Speaker	41-3242	.90
185	Hum Control	33-5176	$1.60
186	Cable CB2 Speaker	41-3245	
187	Resistor (32,000 ohms, ½ watt)	33-332339	.20
188	Cable CB2 Speaker	41-3245	
189	Condenser (.015 mfd. tubular)	30-4226	.20
190	CB2 Speaker Transformer	32-7663	1.00
191	Power Transformer	32-7728	6.50
	Power Transformer (25 to 40 cycles)	32-7729	
192	Resistor (wirewound two taps)	33-3301	.60
193	Condenser (.15 mfd. bakelite)	6287-SU	.40
194	Condenser (.3 mfd. bakelite)	6287-DG	.40
195	Filter Choke	32-7115	1.80
196	Field W-2 Speaker	36-3782	
197	Field Coil (High Audio Frequency) CB2	36-3739	3.50
198	Cone Voice Coil W-2 Speaker	36-3647	2.25
199	Cone Voice Coil (Speaker, CB2)	36-3654	.80
200	Output Transformer W-2, Speaker	32-7753	1.70

CABINET PARTS

Description	Part No.	List Price
Bezel Assembly	40-5980	1.00
Baffle Wood (Left & Right Side)	24045	.30
Baffle Wood	16284	3.60
Baffle Card Board	27-8572-A	.35
Gasket (Bezel)	27-8517	.05
Silk (Right & Left Side)	44-1174	.20
Silk (Cardboard Baffle)	44-1175	1.00
Screw (Bezel)	W-480	.55 C
Speaker Felt	27-8498	.15

November 1936

Description	Part No.	List Price
Fuse A.C. Cable	45-2046	.05
Fuse (Speaker)	45-2113	.16
Knob (Tuning)	27-4330	.10
Knob (Vernier)	27-4331	.10
Knob (Tone & Volume)	27-4332	.10
Knob (Range Switch)	27-4326	.10
Panel (Ant.)	38-7714	.15
Plug A. C.	27-4117	.40
Shield (6N7G)	8005	.10
Shield Tubes	28-2726	.10
Shield (Expander)	28-4169	1.00
Shaft (Expander)	28-5506	.40
Shaft (Volume Control)	38-8061	.12
Shaft & Index Plate (Range Switch)	42-1208	.50
Socket (8 Prong)	27-6058	.11
Socket (7 Prong)	27-6057	.11
Socket (Power Supply)	27-6067	.15
Socket (Audio)	27-6066	.15
Socket (Rectifier)	27-6052	
Speaker (W-2)	36-1282	22.50
Speaker (High Frequency CB-2)	36-1270	4.50

Description	Part No.	List Price
Pilot Lamp	34-2039	.07
Pilot Lamp Assembly	38-8051	.35
Pilot Lamp Cable	41-3253	
Ring (Mask Assembly)	28-7195	.20
Spring (Mask Assembly)	28-8629	.04
Set Screw (Handle)	28-8493	.02
Screw (cover)	W-1869	.40 C
Snap Fastener	28-4279	.75 C
Vernier Drive Assembly	45-2342	
Washer Felt (Mask)	27-8399	.30 C
Washer (Mask)	W-495	.30 C

MISCELLANEOUS PARTS

Description	Part No.	List Price
Clarifier (Type K)	36-1155	1.25
Cord (Drive)	27-8495	
Cord (Drive)	27-8496	
Cable (I. F. Unit)	L-2331	.90
Cable (Power Unit)	L-2330	2.00
Cable (A.C. Power)	L-2288	
Clamp (I. F. Cord)	28-4147	.01

DIAL PARTS

Description	Part No.	List Price
Brace (Drive Mtg.)	28-4119	.05
Bracket Assembly	45-2349	
Coupling Assembly (tuning condenser)	31-1961	
Coupling (range switch)	28-7198	.15
Cover (Handle)	28-4077	.25
Dial	27-5207	.80
Dial Screen Holder Assembly	31-1968	
Dial Guide	27-8580	.03
Dial Escutcheon Assembly	45-2324	.40
Gasket (Dial Scale)	27-8398	.01
Gear No. 1 (front)	45-2347	
Gear No. 2 (rear)	45-2348	
Flood Lamp Assembly (4 unit)	38-8210	2.40
Flood Lamp Assembly (single)	38-7937	.40
Handle (Indexing)	45-2329	
Hub Assembly (Handle)	45-2344	
Mask & Link Assembly	45-2328	
Mask Guide	28-4118	.25

MODEL 37-2620
Alignment, Trimmers
Voltage, Chassis

PHILCO RADIO & TELEV. CORP.

Electrical Specifications

Type of Circuit: Superheterodyne with Pentode Output.

Power Supply:

Voltage	Frequency	Power Consumption
115	50 to 60	65 Watts
115	25 to 40	65 Watts
220	50 to 60	65 Watts

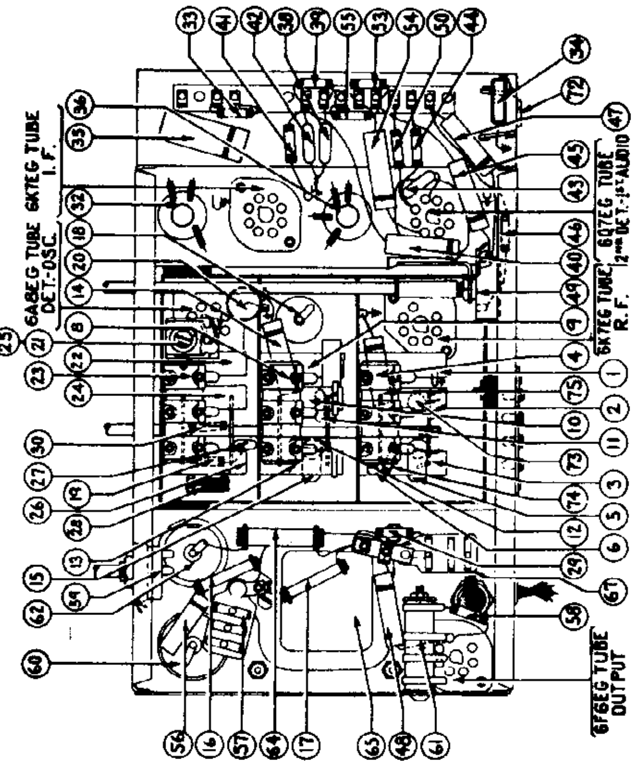
Power transformers for the different voltages and frequencies are listed on the Parts List.
Intermediate Frequency: 470 K. C.
Tuning Ranges: Three. Range 1—150 to 350 K. C.; Range 2—530 to 1720 K. C.; Range 3—5.7 to 18 M. C.
Philco Tubes Used: *Six. Two 6K7EG; one 6A8EG; one 6Q7EG; one 6F6EG; one 5Y4G.
Speakers: "B" Cabinet—S7; "J" Cabinet—HS; "CS" Cabinet—K38.
*NOTE—Receivers in the United States use tubes without the "E" designation.

Alignment

MODEL NO. 37-2620

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number (FIG. 1)	Output Signal
Control grid [1] of 6A8G	470 k.c.	580 k.c.	Broadcast	37A	Max.
"	"	"	"	37	Max.
"	"	"	"	31A	Max.
"	"	"	"	31	Max.
Ant. term.[2] #1	18 m.c.	18 m.c.	Range 3 5.7-18 m.c.	23B	Max.[3]
"	"	17.06 m.c.	"	Image check	
"	18 m.c.[4]	18 m.c.	"	8B	Max.
"	"	"	"	4B	Max.
"	18 m.c.[5]	"	"	23B	Max.
"	1600 k.c.	1600 k.c.	Broadcast	23A	Max.
"	"	"	"	8A	Max.
"	"	"	"	4A	Max.
"	580 k.c.	580 k.c.	"	25	Max.*
"	1600 k.c.	1600 k.c.	"	23A	Max.
"	"	"	"	8A	Max.
"	"	"	"	4A	Max.
"	1500 k.c.	1500 k.c.	"	8A	Max.
"	"	"	"	4A	Max.
Ant. term.[6] #1	300 k.c.	300 k.c.	Range 1 150-350 k.c.	23	Max.
"	"	"	"	8	Max.
"	"	"	"	4	Max.
"	160 k.c.	160 k.c.	"	21	Max.*
"	300 k.c.	300 k.c.	"	23	Max.
"	"	"	"	8	Max.
"	"	"	"	4	Max.
"	160 k.c.	160 k.c.	"	21	Max.*
"	300 k.c.	300 k.c.	"	23	Max.
"	"	"	"	8	Max.
"	"	"	"	4	Max.

Fig. 4—Base View of Chassis



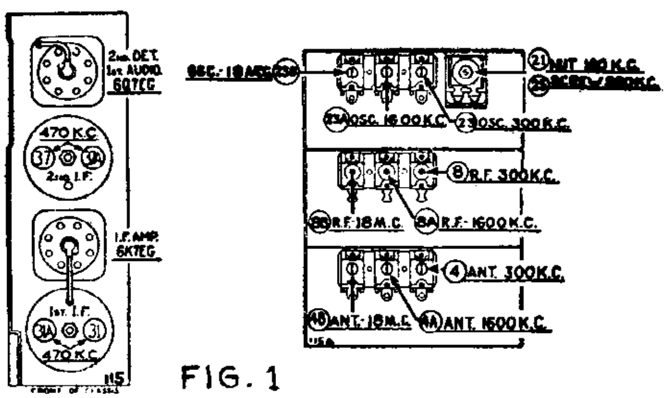
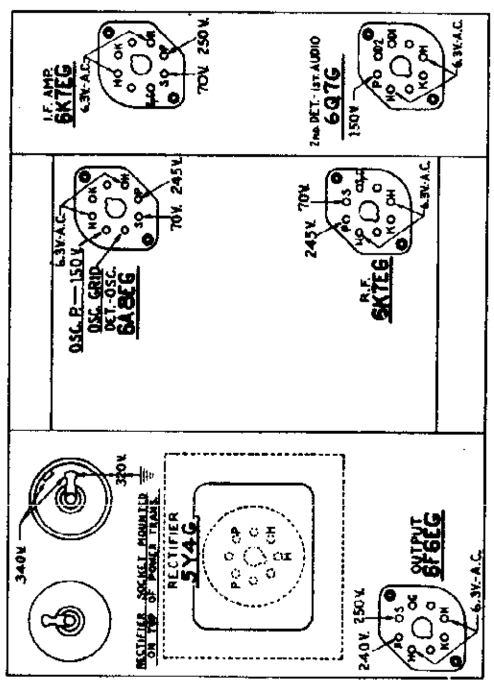


FIG. 1

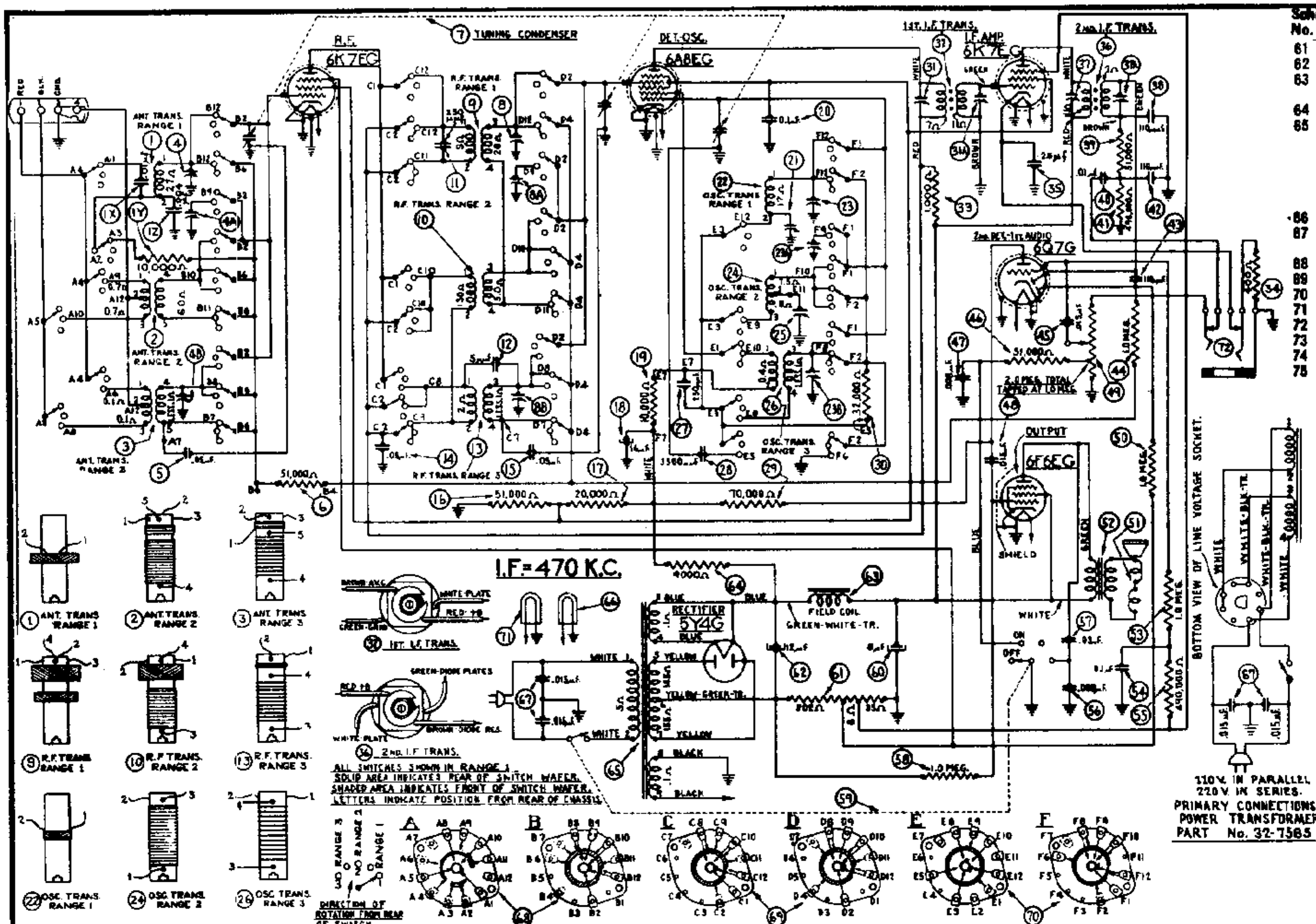


Socket Voltages, Measured from Underside of Chassis

The voltages indicated by arrows were measured with a Philco 025 Circuit Tester which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

Note 1.—Through a .1 mfd. condenser.
Note 2.—Link terminals 2 and 3 together.
Note 3.—Use lower capacity peak.
Note 4.—Connect an external variable condenser. (Philco Part No. 45-2325) from the oscillator compensator to ground (First contact from left rear underside view of r.f. unit). Tune the added condenser from the minimum capacity position until the second harmonic of the oscillator beats against the signal to produce maximum output.
Note 5.—Remove the external variable condenser.
Note 6.—Through a 250 mmfd. condenser.
* While rocking.

PHILCO RADIO & TELEV. CORP.



Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2218	$0.80
2	Antenna Transformer (Range 2)	32-2108	.65
3	Antenna Transformer (Range 3)	32-2142	.75
4	Compensator Ant. 1500 K. C.	31-6122	.60
5	Condenser (.05 mfd. tubular)	30-4020	.20
6	Resistor (51000 ohms ½ watt)	33-351339	.20
7	Tuning Condenser	31-1818	4.50
8	Compensator (R. F. 1500 K. C.)	31-6122	.60
9	R. F. Transformer (L. W.)	32-2219	.75
10	R. F. Transformer (Broadcast)	32-2105	.65
11	Condenser (250 mmfd.)	30-1032	
12	Condenser (5 mmfd. Mica)	30-1077	.20
13	R. F. Transformer (S. W.)	32-2222	.85
14	Condenser (.05 mfd. Tubular)	30-4123	.20
15	Condenser (.05 mfd. Tubular)	30-4020	.20
16	Resistor (51000 ohms 1 watt)	33-351439	.20
17	Resistor (20000 ohms 1 watt)	33-320439	.20
18	Electrolytic Condenser (16 mfd.)	30-2118	1.65
19	Resistor (10000 ohms ½ watt)	33-310339	.20
20	Condenser (.1 mfd. Tubular)	30-4170	.25

Schem. No.	Description	Part No.	List Price
21	Compensator (Osc. Series Nut 160 K. C.)	31-6060	.55
22	Osc. Transformer (L. W.)	32-2221	.65
23	Compensator (Osc. 1600 K. C.)	31-6223	.60
24	Osc. Transformer (Broadcast)	32-2120	.40
25	Condenser (Screw 580 K. C.)	Part of (21)	
26	Osc. Transformer (S. W.)	32-2143	.75
27	Condenser (250 mmfd. Mica)	30-1032	.25
28	Condenser (3500 mmfd. Semi-fixed)	31-6097	.50
29	Resistor (70000 ohms ½ watt)	33-370339	.20
30	Resistor (32000 ohms ½ watt)	33-332339	.20
31	Compensator (1st I. F. Pri. 470 K. C.)	Part of (39)	
32	1st I. F. Transformer	32-2311	
33	Resistor (1000 ohms ½ watt)	33-210339	.20
34	Resistor (400 ohm bakelite)	33-1211	.20
35	Condenser (.25 mfd. Tubular)	30-4446	.20
36	2nd I. F. Transformer	32-2312	1.50
37	Compensator (2nd I. F. Pri. 470 K. C.)	Part of (42)	
38	Condenser (110 mmfd. Mica)	30-1031	.20
39	Resistor (51000 ohms ½ watt)	33-351339	.20
40	Condenser (.01 mfd. Tubular)	30-4124	.25
41	Resistor (490000 ohms ½ watt)	33-449339	.20
42	Condenser (110 mmfd. Mica)	30-1031	.20
43	Condenser (110 mmfd. Mica)	30-1031	.20
44	Resistor (1 megohm ½ watt)	33-510339	$0.20
45	Condenser (.015 mfd. Tubular)	30-4358	.20
46	Resistor (51000 ohms ½ watt)	33-351339	.20
47	Condenser (.006 mfd. Tubular)	30-4112	.20
48	Condenser (.015 mfd. Tubular)	30-4226	.20
49	Volume Control	33-5158	1.00
50	Resistor (1 megohm ½ watt)	33-510339	.20
51	Voice Coil and Cone, S7 Speaker	36-3014	.80
	Voice Coil and Cone, HS Speaker	36-3796	
52	Output Transformer S7 & HS Speaker	32-7019	.85
53	Resistor (1 megohm ½ watt)	33-510339	.20
54	Condenser (0.1 mfd. Tubular)	30-4122	.20
55	Resistor (490000 ohms ½ watt)	33-449339	.20
56	Condenser (.008 mfd. Tubular)	30-4112	.20
57	Condenser (.03 mfd.)	8318-SU	
58	Resistor (1 megohm ½ watt)	33-510339	.20
59	Tone Control & A. C. Switch	42-1182	.75
60	Electrolytic Condenser (8 mfd.)	30-2024	1.10

Schem. No.	Description	Part No.	List Price
61	Bias Resistor	33-3264	
62	Electrolytic Condenser (12 mfd.)	30-2117	1.20
63	Field Coil Assembly, S7 Speaker	36-3039	2.75
	Field Coil Assembly, HS Speaker	36-3690	
64	Resistor (9000 ohms, 2 watt)	33-290539	.30
65	Power Transformer (115 Volt 50-60 cycle)	32-7583	4.50
	Power Transformer (115 Volt 25-40 cycle)	32-7584	
	Power Transformer (110-220 Volt 50-60 cycle)	32-7585	
66	Pilot Lamp	34-2039	.15
67	Condenser (.015-.015 mfd. Double Bakelite)	3793-DG	.40
68	Wave Switch Antenna	42-1170	1.10
69	Wave Switch R. F.	42-1245	1.00
70	Wave Switch Osc.	42-1246	1.10
71	Lamp	34-2039E	
72	Phono Jack	42-1197	
73	Condenser (.01 mfd. Tubular)	30-4169	
74	Resistor (10000 ohms ½ watt)	33-310339	
75	Condenser (.004 mfd. Tubular)	30-4185	
	Wave Switch Indexing Plate & Shaft	42-1173	.50
	Pilot Lamp Assembly	38-7706E	.35
	Dial	27-5245	.50
	Dial Hub	28-7187	.12

Prices Subject to Change Without Notice

Description	Part No.	List Price
Dial Clamp	28-2837	$0.10
Dial Hub Set Screw	W-1641	.02
Dial Gear	28-7185	.10
Dial Guard	27-8324	.02
Thrust Spring	28-8611	.01
Thrust Washer	28-3976	.30 C
"C" Washer	28-3904	.01
Drive Gear	31-1884	.25
Vernier Drive	31-1871	.75
Mask	27-5198	.30
Mask Arm Assembly	31-1940	.35
Mask Guide on Lamp Bracket Support	28-7844	.15
Mask Washer	27-8318	.50 C
Dial Screen Assembly	38-7912	.30
Volume Control Shaft	38-8059	.10
Volume Control Shaft Spring	28-4117	.40 C
Retaining Clips	28-4394	.03
Socket 8 prong	27-6058	.11
Socket 7 prong	27-6057	.11
Tube Shield	28-2726	.10
Tube Shield Base	28-3898	.03
I. F. Shield	38-7763	.20
Terminal Panel I. F. Unit	38-7703	.25
Grommet R. F. Unit	27-4317	.04
Sleeve Mtg. R. F. Unit	28-2257	.01
Spacer Mtg. R. F. Unit	27-8339	.40 C
Screw Mtg. R. F. Unit	W-729	.45 C
Washer Mtg. R. F. Unit	28-3927	.01
Antenna Panel	38-7714	.15
Speaker Cable	L-2181	.25
A. C. Cord	L-2183	.40
Speaker S7—B Cabinet	36-1009	5.75
Speaker HS—J Cabinet	36-1220	6.25
Speaker K-38 (CS 124 Cabinet)	36-1262	
Knobs Tuning	27-4330	.10
Knobs Tuning Vernier	27-4331	.10
Knobs Wave Switch	27-4326	.10
Knobs Tone & Volume	27-4332	.10
Bezel Frame & Plate Assembly	40-5039	.75
Gasket	27-8311	.01
Glass	27-8298	.05
Ring	28-3967	.35
Screw Bezel Mtg.	W-1644	.50 C

December 1936

MODEL 37-2650
Chassis, Parts

PHILCO RADIO & TELEV. CORP.

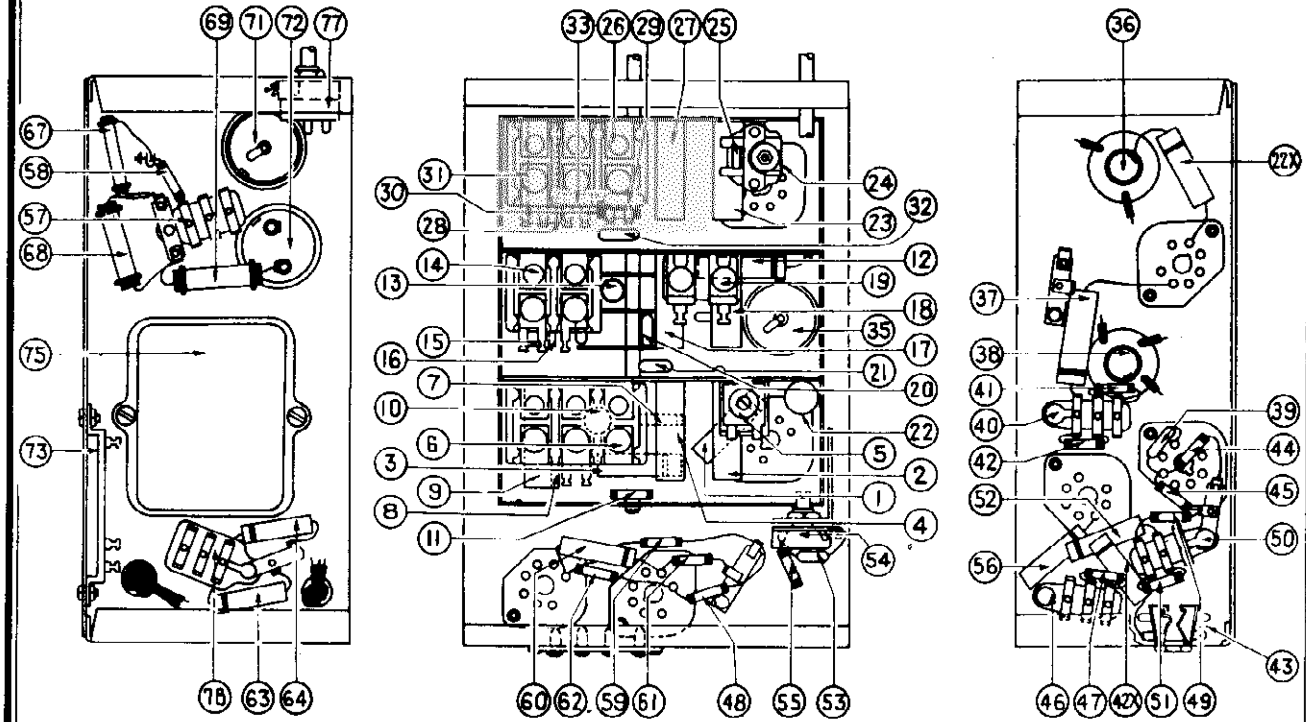


Fig. 4—View of Parts Underside of Chassis

Replacement Parts — Model 37-2650

Schem. No.	Description	Part No.	List Price
1	Condenser .004 mfd. tubular	30-4185	$0.25
2	Ant. Trans. (Range 1)	32-2218	.50
3	Condenser (.01 mfd. tubular)	30-4169	.20
4	Ant. Transformer (Range 2)	32-2108	1.00
5	Compensator, Long Wave	31-6126	.40
6	Compensator (Five sections)	31-6153	1.50
7	Resistor (10,000 ohms, ½ watt)	33-310339	.20
8	Ant. Trans. (Range 3)	32-2150	1.20
9	Ant. Trans. (Range 4)	32-2175	1.20
10	Condenser (.05 mfd. tubular)	30-4444	.20
11	Resistor (51,000 ohms, ½ watt)	33-351339	.20
12	Condenser (.05 mfd. tubular)	30-4123	.20
13	Condenser (.05 mfd. tubular)	30-4444	.20
14	Compensator, R. F. (Four sections)	31-6125	1.00
15	R. F. Trans. (Range 4)	32-2178	1.20
16	R. F. Trans. (Range 3)	32-2151	.70
17	R. F. Trans. (Range 2)	32-2105	1.00
18	R. F. Trans. (Range 1)	32-2219	1.00
19	Compensator R. F. (Two sections)	31-6115	.50
20	Condenser (40 mmfd. mica)	30-1076	.20
21	Condenser (250 mmfd. mica)	30-1032	.25
22	Condenser (.1 mfd. tubular)	30-4455	.25
22X	Condenser (.05 mfd. tubular)	30-4020	.20
23	Osc. Trans. (Range 1)	32-2221	.50
24	Compensator (Osc. two sections)	31-6074	.40
25	Condenser (35 mmfd. mica)	30-1044	.20
26	Compensator (Osc. 6 sections)	31-6111	1.50
27	Osc. Trans. (Range 2)	32-2120	1.00
28	Osc. Trans. (Range 3)	32-2152	.70
29	Condenser (3000 mmfd. mica)	30-1028	.45
30	Resistor (32,000 ohm, ½ watt)	33-332339	.20
31	Osc. Trans. (Range 4)	32-2182	.70
32	Condenser (250 mmfd. mica)	30-1032	.25
33	Resistor (10,000 ohms, ½ watt)	33-310339	.20
34	Tuning Condenser	31-1857	5.00
35	Elect. Cond. (16 mfd.)	30-2118	1.65
36	First I. F. Trans.	32-2170	2.20
37	Condenser (.1 mfd. tubular)	30-4170	.25
38	2nd I. F. Trans.	32-2172	2.20
39	Condenser (110 mmfd. mica)	30-1031	.20
40	Condenser (110 mmfd. dual bakelite)	8035DG	.25
41	Resistor (240,000 ohms, ½ watt)	33-424339	.20
42	Resistor (240,000 ohms, ½ watt)	33-424339	.20
42X	Condenser (.01 mfd. tubular)	30-4479	
43	Phono Jack	42-1197	.60
44	Resistor (1 megohm, ½ watt)	33-510339	.20
45	Resistor (1 megohm, ½ watt)	33-510339	.20
46	Condenser (.03 mfd. Bakelite)	8318-SU	.35
47	Resistor (99,000 ohms, ½ watt)	33-399339	.20
48	Resistor (330,000 ohms, ½ watt)	33-433339	$0.20
49	Resistor (490,000 ohms, ½ watt)	33-449339	.20
50	Condenser (.1 mfd. Bakelite)	4989-SG	.35
51	Resistor (1 megohm, ½ watt)	33-510339	.20
52	Condenser (.015 mfd. tubular)	30-4358	.20
53	Condenser (75 mmfd. mica)	30-1053	.20
54	Volume Control	33-5158	1.00
55	Resistor (51,000 ohms, ½ watt)	33-351339	.20
56	Condenser (.006 mfd. tubular)	30-4024	.25
57	Condenser (.03, .05 mfd. dual bakelite)	3615-YU	.40
58	Resistor (1 megohm, ½ watt)	33-510339	.20
59	Resistor (490,000 ohms, ½ watt)	33-449339	.20
60	Condenser (.01 mfd. tubular)	30-4169	.20
61	Resistor (3500 ohm, ½ watt)	33-235339	.20
62	Resistor (330,000 ohms, ½ watt)	33-433339	.20
63	Condenser (.003 mfd. tubular)	30-4469	.20
64	Condenser (.003 mfd. tubular)	30-4469	.20
65	Output Trans.	32-7634	1.50
66	Cone & Voice Coil, K 35	36-3174	1.00
	H 26	02625	1.40
67	Resistor (25,000 ohms, 1 watt)	33-325439	.20
68	Resistor (9000 ohms, 2 watts)	33-290639	
69	Resistor (10,000 ohms, 3 watts)	33-310639	
70	Field Coil, K 35, H 26 Speakers	36-3687	4.00
71	Elect. Cond. (8 mfd.)	30-2024	1.10
72	Elect. Cond. (20, 10 mfd.)	30-2163	2.40
73	Bias Resistor (128 ohms, 1 tap)	33-3280	.30
74	Pilot & Shadowmeter Lamps	34-2039	.15
75	Power Trans. 115 volt (50 to 60 cycle)	32-7606	6.25
	Power Trans. 115 volt (25 to 40 cycle)	32-7607	9.00
	Power Trans. 110/220 volt (50 to 60 cycle)	32-7608	8.00
76	Socket (line voltage socket)		
77	Power Switch & Tone Control	42-1184	.75
78	Condenser (.015 mfd. Dual Bakelite)	3793-DG	.40
79	Range Switch Ant.	42-1202	1.50
80	Range Switch R. F.	42-1254	1.50
81	Range Switch Osc.	42-1204	1.50
82	Shadowmeter	45-2307	2.50
	Bracket (Indicator and Lens Ass'y)	38-7912	.30
	Clip (Volume Control)	28-4394	.01
	Clamp	28-3900	.03
	Clamp Locking Plate	28-3982	.01
	Coupling (Range Switch)	31-1941	.12
	Dial	27-5209	.50
	Dial Guard	27-5324	.02
	Gear (Drive)	31-1884	.25
	Gear (Dial Assembly)	28-7185	
	Hub (Dial)	28-7187	.12
	Mask	27-5273	$0.20
	Mask Arm & Link Assembly	31-1940	.15
	Mask Washer	27-8318	.50 C
	Mask Guide & Lamp Support Ass'y	38-7844	.15
	Mtg. Grommet (R. F. unit)	27-4317	.04
	Mtg. Sleeve (R. F. unit)	28-2257	.01
	Mtg. Screw (R. F. unit)	W-729	.45 C
	Mtg. Washer (R. F. unit)	27-3927	
	Mtg. Washer (R. F. unit)	27-7807	.50 C
	Mtg. Bushing, Rubber, (Chassis)	27-4360	.04
	Mtg. Washer, Rubber (Chassis)	3558	.03
	Mtg. Washer, Chassis	28-2089	.50 C
	Mtg. Bolt	W-783	2.20 C
	Pilot Lamp Assembly	38-7706E	.35
	Panel (Ant. & Ground)	38-7714	.15
	Set Screw (Dial Drive)	W-1641	.02
	Sleeve Paper (Vol. Draft)	27-8697	
	Socket (rectifier)	27-6052	
	Socket (7 prong)	27-6057	.11
	Socket (8 prong)	27-6058	.11
	Shield (Shadowmeter Light)	28-2917	.02
	Shaft & Plate (range switch)	42-1237	.70
	Shaft (Volume control)	38-8060	.12
	Spring (Shadowmeter)	28-8623	.70 C
	Spring (Volume Shaft)	28-4117	.40 C
	Spring Thrust (Dial Drive)	28-8611	.01
	Washer		
	Washer "C" (Dial Drive)	28-3904	.01
	Washer, Thrust (Dial Drive)	28-3976	.30 C
	Washer, Felt (Range switch coupling)	27-8399	1.25
	X CABINET		
	Baffle & Silk	40-5976	.60
	Baffle (wood)	16271	
	Bezel & Frame Assembly	40-5947	.80
	Bolt (Speaker)	W-1495	1.60 C
	Gasket (Bezel)	27-8313	.01
	Glass (Bezel)	27-8300	.06
	Ring (Bezel)	28-3988	.45
	Speaker H 26	36-1238	8.25
	Shield (Chassis)	38-8276	.45
	B CABINET		
	Baffle & Silk	40-5975	.40
	Bezel Assembly	40-5945	.70
	Gasket (Bezel)	27-8312	.01
	Glass (Bezel)	27-8299	.06
	Ring (Bezel)	28-3987	.40
	Speaker (K 35)	36-1231	7.25

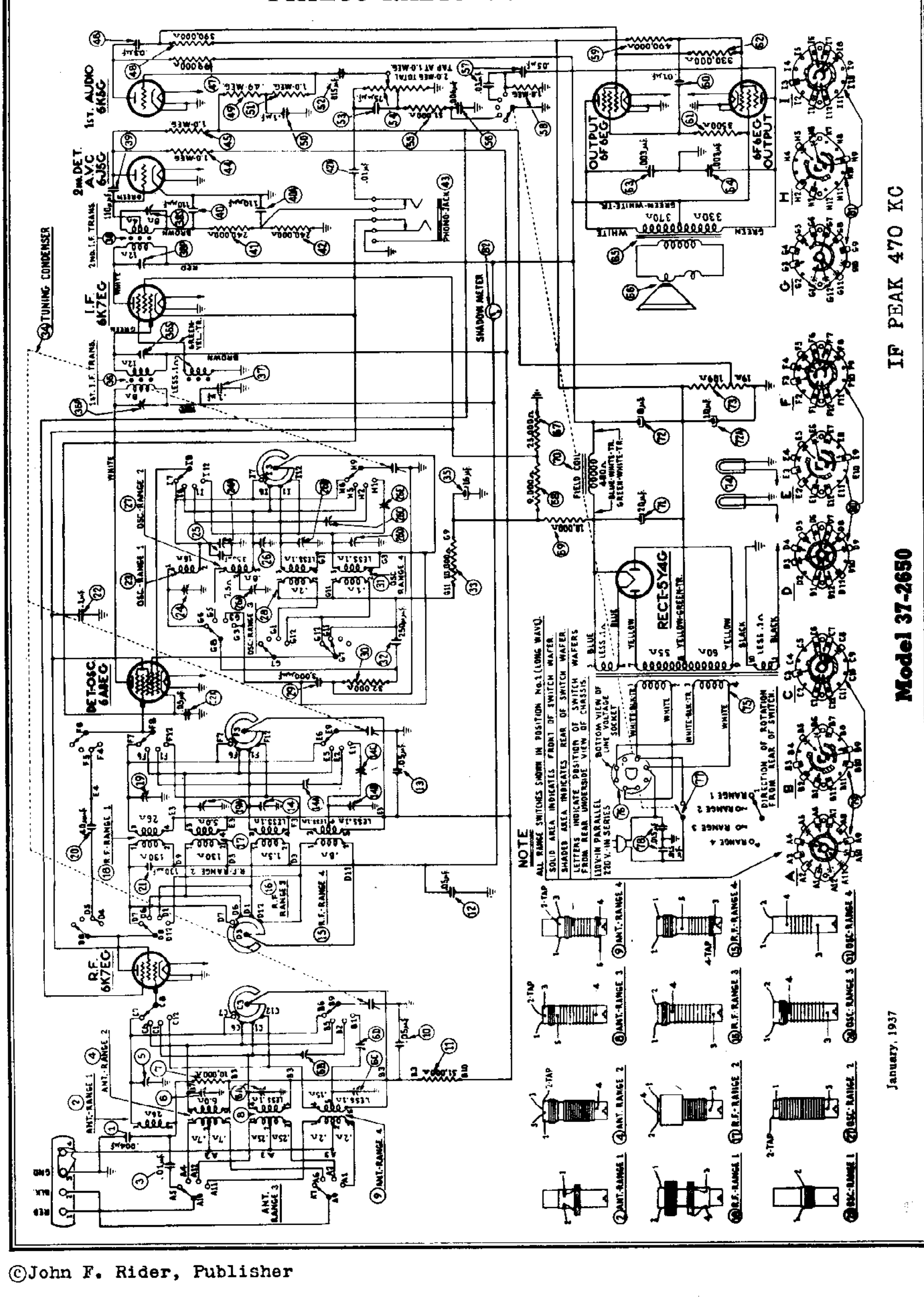
Prices Subject to Change Without Notice

EQUIPMENT REQUIRED: (1) Signal Generator; Philco Model 088 (fundamental frequency 110 to 20,000 K. C.) is the correct instrument for this purpose; (2) Output Meter; Philco Model 025 Circuit Tester incorporates an accurate, sensitive output meter and is recommended; (3) Fibre handle screw-driver (Philco Part No. 27-7059); (4) Philco fibre wrench part No. 3164.

JANUARY 1937

MODEL 37-2650
Schematic

PHILCO RADIO & TELEV. CORP.



MODEL 37-2650
Alignment, Trimmers

PHILCO RADIO & TELEV. CORP.

DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, rotate the tuning condenser control to the extreme counter-clockwise position (maximum capacity). Set range switch in the long wave position. Loosen the screw of dial hub, then turn dial until the glowing indicator is centered on the middle index line of dial scale (See Fig. 7.) Now tighten the dial hub set screw in this position.

INTERMEDIATE FREQUENCY CIRCUIT

1. Set controls as follows:
   a. Range switch position 2 (Broadcast).
   b. Receiver Dial at 580 K.C.
   c. Adjust signal generator for 470 K. C.
   d. Connect the 088 signal generator output lead through a .1 mfd. condenser to the control grid of the 6A8EG tube and the ground connection to the chassis.
2. Adjust the following I. F. compensators for maximum output: (36P), (36S), (38P), and (38S).

RADIO FREQUENCY CIRCUIT

Tuning Range 11.5 to 18.2 M. C.

1. Connect the signal generator output lead through .1 mfd. condenser to terminal No. 1 and the generator ground lead to terminal No. 3 on aerial input panel. Terminals 2 and 3 must be connected with the shorting link provided on the panel.

2. Set controls and adjust compensators for maximum output as follows:

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 4	18 M. C.	(26D) Check image at 17.060. See note A
Position 4	18 M. C.	(14B) Use shunt condenser on (26D) (First contact from left side of chassis facing rear underside view.) when adjusting this compensator. See note C. then adjust (6C)
Position 4	18 M. C.	(26D)
Position 4	12 M. C.	(26E), (14C), (16D)
Position 4	18 M. C.	(26D) Check image at 17.060 M. C. See note A
Position 4	18 M. C.	(14B) Use shunt condenser on (26D) when adjusting this compensator. See note C. Then adjust (6C)
Position 4	18 M. C.	(26D) Check image at 17.060 M. C.

Tuning Range 5.7 to 11.6 M. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 3	11 M. C.	(26B)
Position 3	11 M. C.	(14) Use shunt condenser on (26B) (Third contact from left side of chassis facing rear underside view.) when adjusting this compensator (See note C). Then adjust (6A)
Position 3	11 M. C.	(26B)
Position 3	6 M. C.	(26C), (14A), (6B)
Position 3	11 M. C.	(26B)
Position 3	11 M. C.	(14) Use shunt condenser on (26B) when adjusting this compensator. See Note C. Then adjust (6A)

Tuning Range 530 to 1720 K. C.

1. Set controls and adjust compensator for maximum output as follows:

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 2	1600 K. C.	(26), (6), and (19A)
Position 2	580 K. C.	(26A) Roll gang through signal for maximum output. See note B
Position 2	1600 K. C.	(26)
Position 2	1500 K. C.	(6), (19A)

Tuning Range 150 to 350 K. C.

1. Connect the 088 signal generator lead through a 200 mmfd. condenser to terminal No. 1 of the aerial input panel. Set controls and adjust compensators for maximum output as follows:

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 1	300 K. C.	(24), (5), (19)
Position 1	160 K. C.	(24A) Roll gang for maximum output through signal. See note B
Position 1	300 K. C.	(24), (5), (19)
Position 1	160 K. C.	(24A) Roll gang for maximum output through signal. See note B

January, 1937

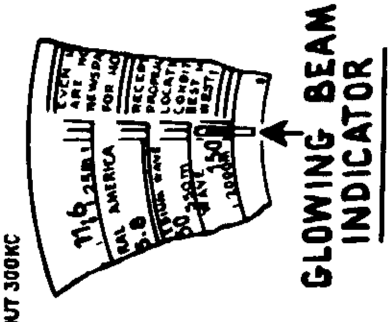


Fig. 7—Dial Scale

OUTPUT METER: The 025 Output Meter is connected to the plate and cathode terminals of one of the (6F6EG) tubes. Adjust the meter to use the (0-30) Volt Scale.

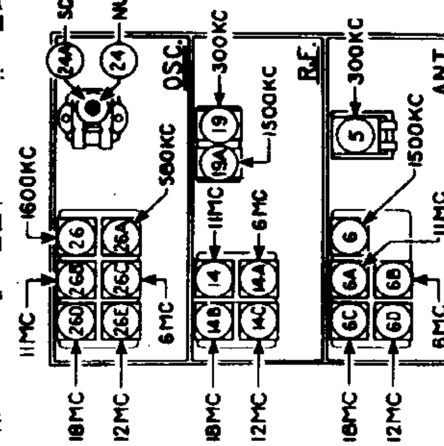


Fig. 5—R. F. Compensators Underside of Chassis

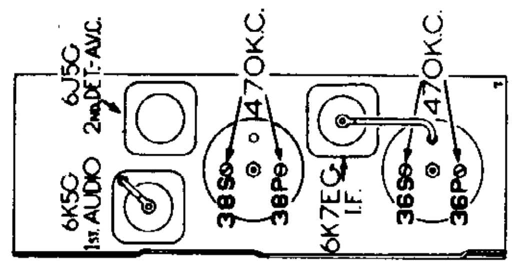


Fig. 6—I. F. Compensators Top of Chassis

NOTE A—To accurately adjust the compensator to the fundamental and not the image signal, turn the oscillator compensator to the maximum capacity position clockwise. Then slowly turn the compensators counter-clockwise until a second maximum peak is obtained on the output meter. The first peak is the image signal and the receiver must not be adjusted to it. If the above procedure is correctly performed, the image signal will be found 940 K. C. below the frequency being used on any high frequency band.

NOTE B—First tune the compensator for maximum output then vary the tuning condenser of the receiver for maximum output about the frequency mark on the dial. Now turn the compensator slightly to the right or left and again vary the receiver turning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

NOTE C—To eliminate the effect of the R. F. Compensator detuning the oscillator circuit, a variable condenser of approximately 350 mmfd. is connected from the oscillator compensator to ground where designated in the instructions above. Tune the added condenser from the minimum capacity position until the second harmonic of the receiver oscillator beats with the signal from the generator, resulting in a maximum reading on the output meter. Then adjust compensators as noted for maximum output.

PHILCO RADIO & TELEV. CORP.

AERIAL CONNECTIONS

The red and black leads of the High-Efficiency Aerial "transmission line" are connected to terminals 1 and 2 respectively, of the terminal panel provided on the rear of the chassis. Connect the jumper on the terminal panel across terminals 3 and 4.

If a temporary aerial is used, the jumper should be across terminals 2 and 3. The aerial connects to terminal 1 and the ground lead to terminal 3. A good ground connection is desirable in all installations.

SHADOWMETER ADJUSTMENT

Apply power to the receiver and allow tubes to warm up. Then adjust shadowmeter as follows:

1. Move the shadow meter coil backwards and forwards, until the opposite edges of the shadow are 1/8 of an inch from each end of the shadow screen, measuring along the bottom edge of the screen. Adjustment of the shadow meter light bracket may be necessary for perfect centering.

2. Remove the rectifier tube from its socket, and rotate coil until shadow reaches minimum width. This width must not exceed 1/32 of an inch.

3. Replace the 5Y4G rectifier tube in its socket. The shadow should then widen to not more than 3/16 inch or less than 1/16 inch from each side of the screen measuring along the bottom edge. If these limits are not obtained readjust the shadow meter as given in paragraphs 1 and 2 again.

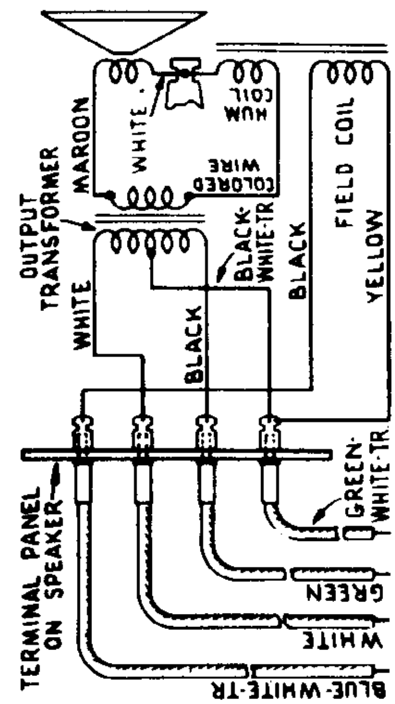


Fig. 2—Speaker Wiring, Types K35, H26

Tone Control:
Four positions, brilliant, bright, mellow, and deep.

***Philco Tubes Used:** Eight—Two 6K7EG; Two 6F6EG; one 6A8EG; one 6K5G; one 6J5G and one 5Y4G.

***Note:** Receivers in the United States use tubes without the "E" designation.

Speaker: K35, B cabinet.
H26, X cabinet.

Type of Circuit:
Superheterodyne, with four tuning ranges; Delayed A. V. C.; Connections for a phonograph; Shadowmeter tuning; Connections for the Philco High Efficiency Aerial, and a push-pull pentode audio output circuit.

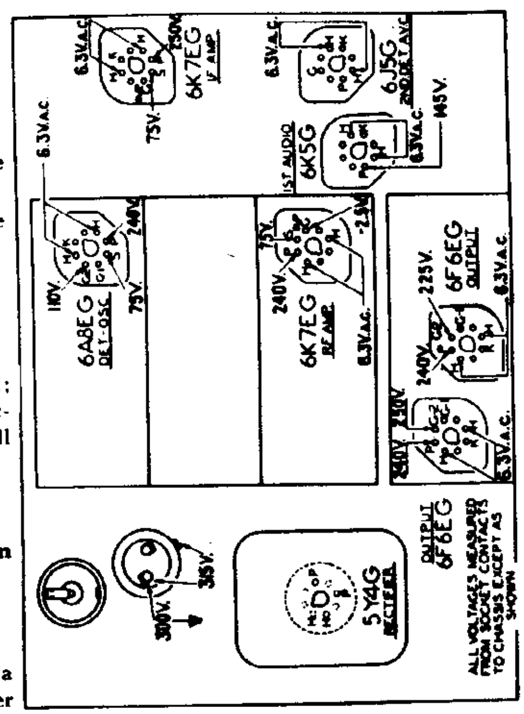


Fig. 1—Socket Voltages—Underside of Chassis View

The voltages indicated by arrows were measured with a Philco 025 Circuit Tester which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

Power Supply:

Voltage	Frequency	Consumption
115	50 to 60 cycle	110 watts
115	25 to 40 cycle	110 watts
110/220	50 to 60 cycle	110 watts

The 110/220 volt power transformer Part No. 32-7608 has a voltage selection plug and socket, mounted on top of the power transformer. Place the plug with arrow pointing towards voltage being used.

Tuning Ranges: Four
Range 1—150 to 350 K. C.
Range 2—530 to 1720 K. C.
Range 3—5.7 to 11.6 M. C.
Range 4—11.5 to 18.2 M. C.

Intermediate Frequency: 470 K. C.

Undistorted Output: 7 watts.

MODEL 37-2670
Voltage, Notes
Spkr. Wiring

PHILCO RADIO & TELEV. CORP.

Electrical Specifications

Model 37-2670

TYPE OF CIRCUIT: Superheterodyne, with five tuning ranges; push pull class A output; automatic volume control; bass compensation in the volume control circuit; tone control and connections for a phonograph.

POWER SUPPLY:

Voltage	Frequency	Consumption
115	50 to 60 cycle	130 watts
115	25 to 40 cycle	130 watts
110/220	50 to 60 cycle	130 watts

For 110/220 volt operation a transformer part no. 32-7642 is required. These transformers are built into export receivers only. The transformer has a plug and socket, mounted on top of the power transformer, adjacent to the rectifier tube. Place the plug with arrow pointing towards voltage being used.

INTERMEDIATE FREQUENCY: 470 K. C.

TUNING RANGES: Five.
- Range 1—150 to 350 K. C.
- Range 2—530 to 1600 K. C.
- Range 3—1.6 to 4.8 M. C.
- Range 4—4.6 to 11.5 M. C.
- Range 5—11.5 to 22 M. C.

UNDISTORTED OUTPUT: 10 watts

PHILCO TUBES USED: Two 6K7EG; one 6A8EG; Five 6J5G; Two 6F6EG; and one 5X4G.

NOTE: Receivers in the United States use tubes without the "E" designation.

TONE CONTROL: Four positions.

SPEAKER:		
	"X" cabinet	H 28
	"B" cabinet	K 37

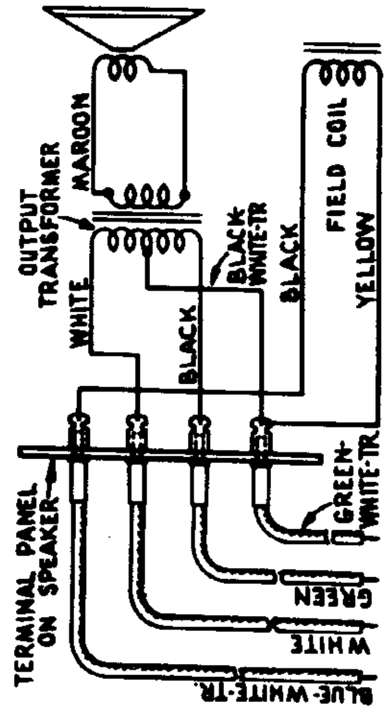


Fig. 2—Speaker Wiring K37, H28

AERIAL CONNECTIONS

The red and black leads of the High-Efficiency Aerial "transmission line" are connected to terminals 1 and 2 respectively, of the terminal panel provided on the rear of the chassis. Connect the jumper on the terminal panel across terminals 3 and 4.

If a temporary aerial is used, the jumper should be across terminals 2 and 3. The aerial connects to terminal 1 and the ground lead to terminal 3. A good ground connection is desirable in all installations.

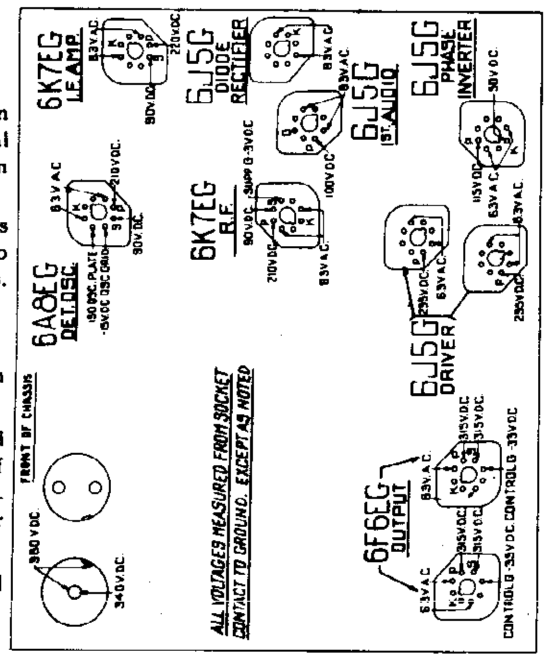
SHADOW METER ADJUSTMENT

Apply power to the receiver and allow tubes to warm up. Then adjust shadow meter as follows:

1. Move the shadow meter coil backwards and forwards, until the opposite edges of the shadow are 1/8 of an inch from each end of the shadow screen, measuring along the bottom edge of the screen. Adjustment of the shadow meter light bracket may be necessary for perfect centering.

2. Remove the rectifier tube from its socket, and rotate coil until shadow reaches minimum width. This width must not exceed 1/32 of an inch.

3. Replace the 5X4G rectifier tube in its socket. The shadow should then widen to not more than 3/16 inch or less than 1/16 inch from each side of the screen measuring along the bottom edge. If these limits are not obtained readjust the shadow meter as given in paragraphs 1 and 2 again.

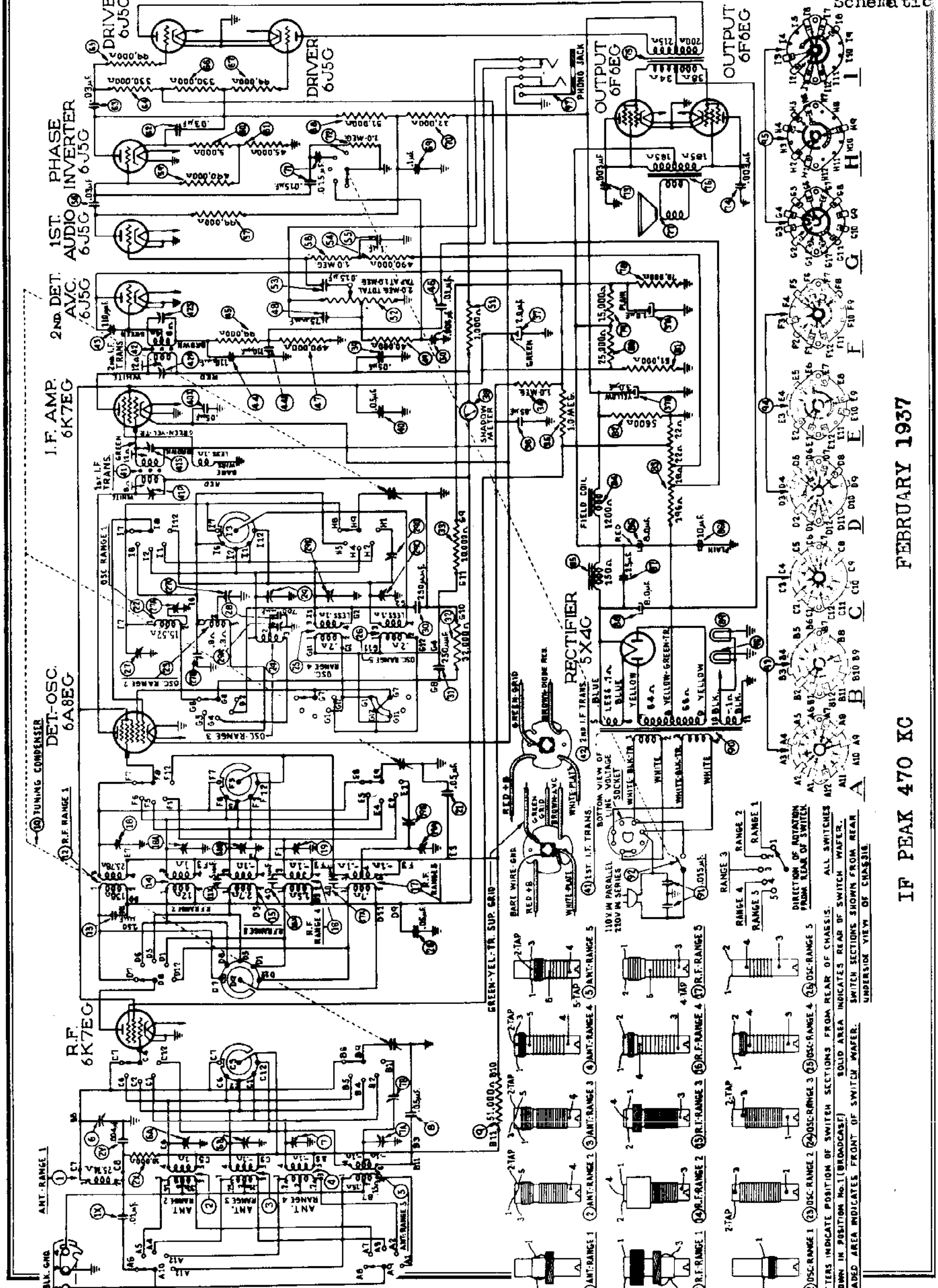


The voltages indicated by arrows were measured with a Philco 025 Circuit Tester which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

Fig. 1—Socket Voltages—Underside of Chassis View

PHILCO RADIO & TELEV. CORP.

MODEL 37-2670
Schematic



MODEL 37-2670

Alignment Trimmers

PHILCO RADIO & TELEV. CORP.

DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, rotate the tuning condenser control to the extreme counter-clockwise position (maximum capacity). Set range switch in the long wave position. Loosen the screw of dial hub, then turn dial until the glowing indicator is centered on the middle index line of dial scale (See Fig. 5.) Now tighten the dial hub set screw in this position.

OUTPUT METER: The Output Meter is connected to the plate and cathode terminals of one of the (6F6EG) tubes. Adjust the meter to use the (0-30) Volt Scale.

INTERMEDIATE FREQUENCY CIRCUIT

Frequency 470 K. C.

1. Set controls as follows:
   a. Range switch position 2 (Broadcast).
   b. Receiver dial at 580 K. C.
   c. Adjust signal generator for 470 K. C.
   d. Connect the 088 Signal generator output lead through a .1 mfd. condenser to the control grid of the 6A8EG tube and the ground connection to the chassis.
2. Adjust the following I. F. compensators for maximum output: (42S) (42P) (41S) (41P)

RADIO FREQUENCY CIRCUITS

Tuning Range 11.5—22 M. C.

1. Connect the signal generator output lead through a .1 mfd. condenser to terminal No. 1 and the generator ground lead to terminal no. 3 on aerial input panel. Terminals 2 and 3 must be connected with shorting link provided on the panel.
2. Set controls and adjust compensators for maximum output as follows:

Range Switch Position	Signal Generator and Receiver Dial	Compensators
5	20 M. C	(29C) check image at 19.06 M. C. See Note A
5	20 M. C.	(19 A) Use shunt condenser on 29C (first contact from left underside view of chassis) when adjusting this compensator. Then adjust 7A. (See note C)
5	20 M. C	(29C)
5	12 M. C	(29D), (19B), (7B)
5	12 M. C	(29D)

Range Switch Position	Signal Generator and Receiver Dial	Compensator
5	20 M. C.	(29C) check image
5	20 M. C.	(19A) use shunt, then adjust 7A
5	20 M. C.	(29C)

Tuning Range 4.6 to 11.5 M. C.

Range Switch Position	Signal Generator and Receiver Dial	Compensator
4	11 M. C.	(29B)
4	11 M. C.	(19) use shunt condenser on 29B (third contact from left underside view of R. F. unit) when adjusting this compensator. Then adjust 7.

Tuning Range 1.6 to 4.8 M. C.

Range Switch Position	Signal Generator and Receiver Dial	Compensator
3	4.5 M. C.	(29), (18B), (6B)
3	1.7 M. C.	(29A) (Note B).
3	4.5 M. C.	(29), (18B), (6B)

Tuning Range 530 to 1600 K. C.

Range Switch Position	Signal Generator and Receiver Dial	Compensator
2	1500 K. C.	(27B), (18A), (6A)
2	580 K. C.	(27C) See Note B
2	1500 K. C.	(27B)
2	1400 K. C.	(18A), (6A)

Tuning Range 150 to 350 K. C.

1. Connect the 088 signal generator lead through a 200 mmfd. condenser to terminal No. 1 of the aerial input panel. Set controls and adjust compensators for maximum output as follows:

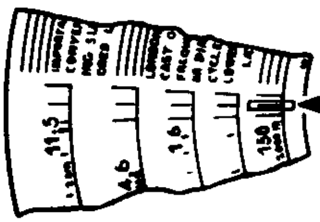


Fig. 5 Dial Calibration

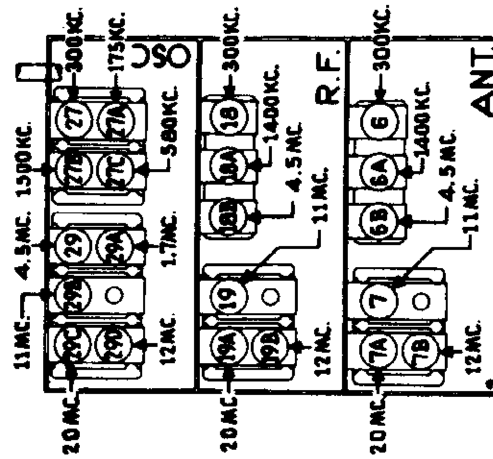


Fig. 7. R. F. Compensators

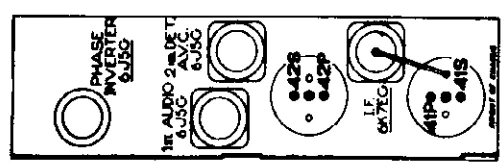


Fig. 6. I. F. Compensators

2.

Range Switch Position	Signal Generator and Receiver Dial	Compensator
1	300 K. C.	(27), (18), (6)
1	175 K. C.	(27A) (See Note B)
1	300 K. C.	(27), (18), (6)
1	175 K. C.	(27A) Note B
1	300 K. C.	(27), (18), (6)

NOTE A—To accurately adjust the compensator to the fundamental and not the image signal, turn the oscillator compensator to the maximum capacity position clockwise. Then slowly turn the compensators counter-clockwise until a second maximum peak is obtained on the output meter. The first peak is the image signal and the receiver must not be adjusted to it. If the above procedure is correctly performed, the image signal will be found 940 K. C. below the frequency being used on any high frequency band.

NOTE B—First tune the compensator for maximum output then vary the tuning condenser of the receiver for maximum output about the frequency mark on the dial. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

NOTE C—To eliminate the effect of R. F. compensator detuning the oscillator circuit, a variable condenser of approximately 350 mmfd. is connected from the oscillator compensator to ground where designated in the instructions above. Tune the added condenser from the minimum capacity position until the second harmonic of the receiver oscillator beats with the signal from the generator, resulting in a maximum reading on the output meter. Then adjust compensators as noted for maximum output.

PHILCO RADIO & TELEV. CORP.

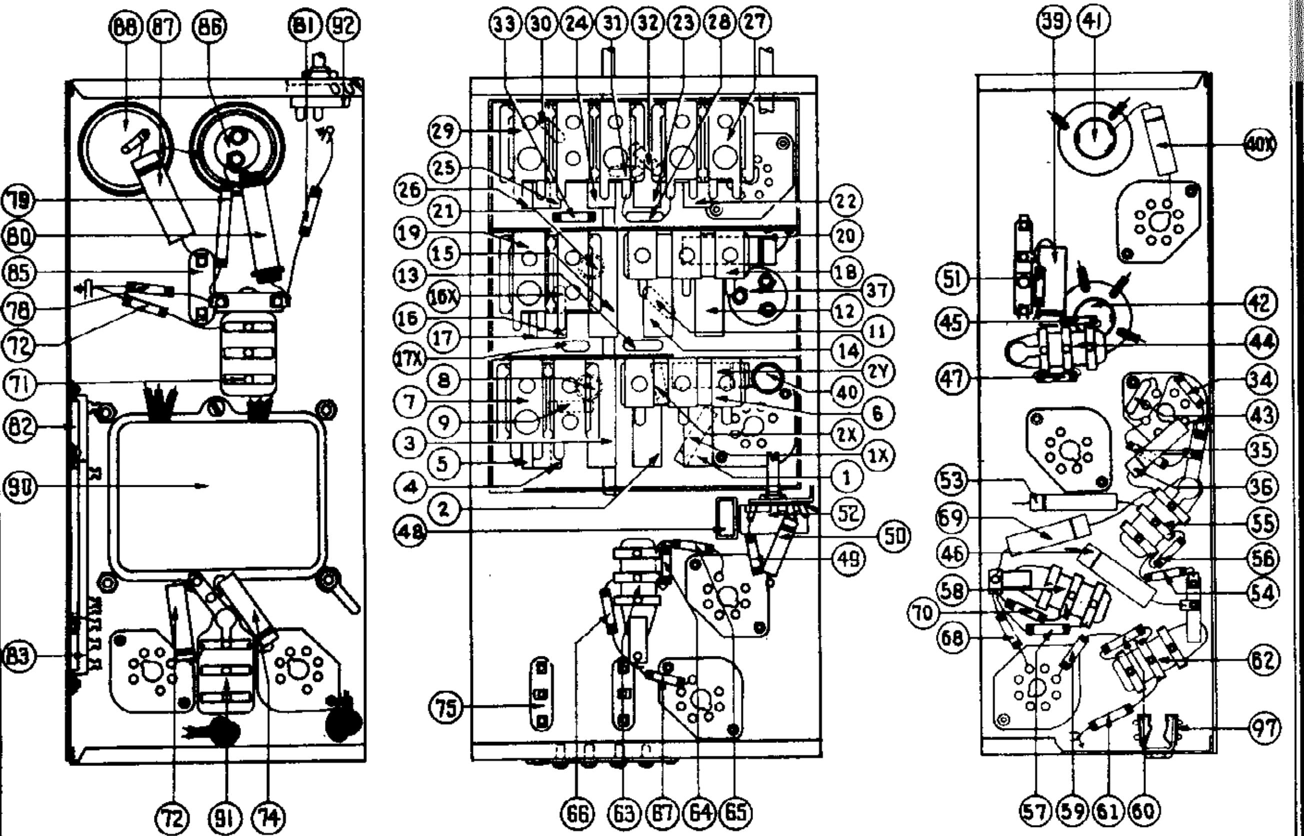


Fig. 4—View of Parts Underside of Chassis

REPLACEMENT PARTS—MODEL 37-2670

Schem. No.	Description	Part No.	List Price
1	Ant. Trans. (Range 1)	32-2218	$0.50
1X	Condenser (.01 mfd.)	30-4479	
2	Ant. Trans. (Range 2)	32-2108	1.60
2X	Resistor (10000 ohms, ½ watt)	33-310339	.20
2Y	Condenser (.004 mfd., Tubular)	30-4185	.25
3	Ant. Trans. (Range 3)	32-2146	1.20
4	Ant. Trans. (Range 4)	32-2150	1.20
5	Ant. Trans. (Range 5)	32-2175	1.20
6	Compensator	31-6131	
7	Compensator	31-6135	
8	Condenser (.05 mfd., Tubular)	30-4444	.20
9	Resistor (51000 ohms, ½ watt)	33-351339	.20
10	Tuning Condenser	31-1857	5.00
11	Condenser (5 mmfd., mica)	30-1080	.20
12	R. F. Trans. (Range 1)	32-2219	1.00
13	Condenser (250 mmfd., mica)	30-1032	.25
14	R. F. Trans. (Range 2)	32-2105	1.00
15	R. F. Trans. (Range 3)	32-2147	.70
16	R. F. Trans. (Range 4)	32-2317	
16X	Condenser (40 mmfd.)	30-1076	.20
17	R. F. Trans. (Range 5)	32-2318	
17X	Condenser (40 mmfd.)	30-1076	
18	Compensator (Three Section)	31-6223	.75
19	Compensator (Three Section)	31-6136	
20	Condenser (.05 mfd., Tubular)	30-4123	.20
21	Condenser (.05 mfd. Tubular)	30-4444	.20
22	Oscillator Trans. (Range 1)	32-2221	.50
23	Osc. Trans. (Range 2)	32-2120	1.00
24	Osc. Trans. (Range 3)	32-2149	.70
25	Osc. Trans. (Range 4)	32-2152	.70
26	Osc. Trans. (Range 5)	32-2182	.70
27	Compensator (4 section, osc.)	31-6134	
28	Condenser (700 mmfd. mica)	5863	.25
29	Compensator (5 section)	31-6133	
30	Condenser (250 mmfd.)	30-1038	
31	Condenser (250 mmfd. mica)	30-1032	.25
32	Resistor (32000 ohm, ½ watt)	33 332339	.20
33	Resistor (10,000 ohms, ½ watt)	33-310339	.20
34	Resistor (1 megohm, ½ watt)	33-510339	.20
35	Resistor (1 megohm, ½ watt)	33-510339	.20
36	Condenser (.05 mfd. Tubular)	30-4444	.20
37	Elect. Cond. (1, 2, 3 mfd.)	30-2122	1.85
38	Shadowmeter	45-2307	2.50
39	Condenser (.05 mfd. Tubular)	30-4123	.25
40	Condenser (.05 mfd. Tubular)	30-4123	
40X	Condenser (.05 mfd. Tubular)	30-4123	.20
41	1st I. F. Trans. Ass'y	32-2169	1.80
42	2nd I. F. Trans. Ass'y	32-2171	1.80
43	Condenser (110 mmfd. mica)	30-1031	.20
44	Condenser (110 mmfd. Dual Bakelite)	8035DG	.25
45	Resistor (99000 ohms, ½ watt)	33-399339	.20
46	Condenser (.01 mfd. Tubular)	30-4479	.20
47	Resistor (490000 ohms, ½ watt)	33-449339	.20
48	Condenser (75 mmfd. mica)	30-1053	.20
49	Resistor (40000 ohms)	33-340339	.20
50	Condenser (.006 mfd. tubular)	30-4467	.20
51	Resistor (1000 ohms ½ watt)	33-210339	.20
52	Volume control	33-5158	1.00
53	Condenser (.015 mfd. tubular)	30-4358	.20
54	Resistor (490000 ohms, ½ watt)	33-446339	.20
55	Condenser (.1 mfd. Bakelite)	4989SG	
56	Resistor (1 megohm, ½ watt)	33-510339	.20
57	Resistor (99000 ohms, ½ watt)	33-399339	.20
58	Condenser (.03 mfd. Bakelite)	8318SU	.35
59	Resistor (490000 ohms, ½ watt)	33-446339	.20
60	Resistor (5000 ohms, ½ watt)	33-250339	.20
61	Resistor (45000 ohms, ½ watt)	33-345339	.20
62	Condenser (.03 mfd. Bakelite)	8318SU	.35
63	Condenser (.03 mfd. Bakelite)	8318SU	.35
64	Resistor (330000 ohms, ½ watt)	33-433339	.20
65	Resistor (99000 ohm, ½ watt)	33-399339	.20
66	Resistor (330000 ohms, ½ watt)	33-433339	.20
67	Resistor (99000 ohms, ½ watt)	33-399339	.20
68	Resistor (51000 ohms, ½ watt)	33-351339	.20
69	Condenser (.1 mfd. tubular)	30-4455	.25
70	Resistor (32000 ohms, ½ watt)	33-332339	.20
71	Condenser (.015 Dual Bakelite)	3793DU	.40
72	Resistor (1 megohm, ½ watt)	33-510339	.20
73	Condenser (.003 mfd. tubular)	30-4469	.20
74	Condenser (.003 mfd. tubular)	30-4469	.20
75	Transformer (input audio)	32-7671	2.50
76	Transformer (audio output) K37 H28	32-7638	1.50
77	Cone & Voice Coil Ass'y. K37	36-3020	1.00
	Cone & Voice Coil Ass'y. H28	02825	1.40
78	Resistor (70,000 ohms, 1 watt)	33 370439	.20
79	Resistor (15000 ohms, 1 watt)	33-315339	.20
80	Resistor (25000 ohms, 3 watt)	33-325639	.30
81	Resistor (51000 ohm, ½ watt)	33-351339	.20
82	Resistor (5600 ohm, wire wound)	33-3282	
83	Resistor (Three taps, wire wound)	33-3281	.60
84	Field Coil Ass'y. (K37, H28)	36-3104	2.70
85	Choke (Filter)	32-7115	1.80
86	Elect. Cond. (8,10 mfd.)	30-2045	1.80
87	Condenser (.25 mfd. tubular)	30 4446	.25
88	Elect. Condenser (8 mfd.)	30-2025	1.35
89	Pilot lamp	34-2039	.07
90	Power Trans. 115 volt 50 to 60 cycle	32-7640	6.50
	Power Trans. 115 volt 25 to 40 cycle	32-7641	10.00
	Power Trans. 110/220 50 — 60 cy.	32-7642	8.50
91	Condenser (.015 mfd. Dual bakelite)	3793DG	.40
92	Tone Control & A. C. Switch	42-1184	.75
93	Range Switch (Ant.)	42-1211	1.60
94	Range Switch (R. F.)	42-1255	1.60
95	Range Switch Osc.	42-1253	1.60
96	Shadowmeter lamp	34 2039E	
97	Phono Jack	42-1197	
	Cable (speaker)	41-3210	.45
	Cable (power)	L-2183	.40
	Dial	27-5266	.50
	Dial Hub	28-7187	.12
	Dial Clamp	28-2837	.10
	Dial Set Screw	W-1641	.02
	Mask	27-5206	.30
	Mask Arm Link	31-1887	.45
	Mask Washer	27-8318	.50C
	Mask Guard	38-7876	.25
	Pilot Lamp Ass'y	38-7706E	.35
	Shaft & Plate Range Switch	42-1187	.50
	Screen & Lens Holder Ass'y	31-1967	.50
	Shadowmeter Receptacle Ass'y	41-3225	.40
	ShadowmeterSpring	28-8623	.70C
	Shield (tube)	28-2726	.10
	Shield Base (tube)	28-3808	.03
	Socket 7 prong	27-6057	.11
	Socket 6 prong	27-6058	.11
	Socket Rectifier	27-6052	.11
	Socket E. Z. Switch	27-6053	.11
	Volume Control Shaft Ass'y	38-8060	.12
	Volume Control Clip	28-4394	.01
	Volume Control Spring	28-4117	.40C

B CABINET

Description	Part No.	List Price
Baffle & Silk Ass'y. (10244A, Cabinet)	40-5977	.40
Baffle & Silk Ass'y. (10273A, Cabinet)	40-6070	
Bezel Plate Ass'y	40-5948	.80
Bezel Gasket	27-8313	.01
Bezel Glass	27-8300	.06
Bezel Ring	28-3988	.45
Mtg. Rubbers	3558	.03
Mtg. Washer	28-2089	.50C
Mtg. Bolts	W 1495	1.50C
Mtg. Bushing	27-4360	.04
Speaker K37	36-1235	7.25

X CABINET

Description	Part No.	List Price
Baffle & Silk	40-6015	.80
Grille Silk (10275B. Cabinet)	44-1198	
Speaker H28	36-1242	8.25
Mtg. Rubber	5189	.03
Mtg. Bushing	27-4360	.04

Prices subject to change without notice.

MODEL 38-1, Code 121
Chassis, Parts

PHILCO RADIO & TELEV. CORP.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Replacement Parts Model 38-1, Code 121

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2575	$0.70
2	Antenna Transformer (Range 2)	32-2576	.70
3	Antenna Transformer (Range 3)	32-2573	.70
4	Compensator, Antenna (Range 3)	31-6160	.30
5	Condenser (.05 μf tubular)	30-4519	.20
6	Condenser (.05 μf—.05 μf Bakelite)	3615DG	.40
7	Resistor (51,000 Ω, ½ watt)	33-351339	.20
8	Tuning Condenser Assembly	30-2075	
9	Resistor (100 Ω, ½ watt)	33-110339	.20
10	Condenser (.05 μf, tubular)	30-4020	.20
11	R. F. Transformer (Range 1)	32-2379	.40
12	R. F. Transformer (Range 2)	32-2382	1.00
13	R. F. Transformer (Range 3)	32-2385	1.20
14	Condenser (5 μμf mica)	30-1097	.20
15	Compensator (R. F. Range 3)	31-6212	
16	Condenser—Part of 6		
17	Condenser (.05 μf tubular)	30-4519	.20
18	Compensator, Osc. (Range 1)	31-6212	
19	Osc. Transformer (Range 1)	32-2373	1.60
20	Osc. Transformer (Range 2)	32-2383	.70
21	Osc. Transformer (Range 3)	32-2386	.70
22	Compensator, Range 1 series	31-6151	.40
23	Condenser (1605 μμf mica)	31-6201	.40
24	Resistor (700 Ω, ½ watt)	33-170339	.20
25	Condenser (.01 μf tubular)	30-4479	.20
26	Condenser (110 μμf mica)	30-1031	.20
27	Condenser (110 μμf mica)	30-1031	.20
28	Resistor (99,000 Ω, ½ watt)	33-399339	.20
29	Resistor (85 Ω, ½ watt)	33-085339	.20
30	Resistor (99,000 Ω, ½ watt)	33-399339	.20
31	Condenser (.3 μf Bakelite)	6287DG	.40
32	Compensator (2 sections)	31-6211	
33	Condenser (250 μμf mica)	[illegible]	.25
34	Resistor (32,000 Ω, ½ watt)	33-332339	.20
35	Resistor (10,000 Ω, ½ watt)	33-310339	.20
36	Condenser (4280 μμf mica)	31-6202	.50
37	1st I. F. Transformer	32-2741	3.50
38	2nd I. F. Transformer	32-2742	
39	Condenser (110 μμf—110 μμf Bakelite)	8035DG	.25
40	Resistor (51,000 Ω, ½ watt)	33-351339	.20
41	Resistor (330,000 Ω, ½ watt)	33-433339	.20
42	Condenser (.01 μf tubular)	30-4479	.20
43	Resistor (4.0 meg., ½ watt)	33-540339	.20
44	Resistor (4.0 meg., ½ watt)	33-540339	.20
45	Resistor (1.0 meg., ½ watt)	33-510339	.20
46	Resistor (1.0 meg., ½ watt)	33-510339	.20
47	Resistor (1.0 meg., ½ watt)	33-510339	.20
48	Resistor (1.0 meg., ½ watt)	33-510339	.20
49	Resistor (1,000 Ω, ½ watt)	33-210339	.20
50	Condenser (.1 μf tubular)	30-4455	.25
51	Condenser (110 μμf mica)	30-1031	.20
52	Condenser (110 μμf mica)	30-1031	.20
53	Condenser (.05 μf Bakelite)	3615SG	.35
54	Resistor (490,000 Ω, ½ watt)	33-449339	.20
55	Resistor (490,000 Ω, ½ watt)	33-449339	.20
56	Condenser (.15 μf—.15 μf Bakelite)	6287DG	.40
57	Condenser (.015 μf tubular)	30-4226	.20
58	Resistor (240,000 Ω, ½ watt)	33-424339	.20
59	Condenser (.015 μf tubular)	30-4226	.20
60	Resistor (32,000 Ω, ½ watt)	33-332339	.20
61	Resistor (25,000 Ω, ½ watt)	33-325339	.20
62	Resistor (99,000 Ω, ½ watt)	33-399339	.20
63	Resistor (51,000 Ω, ½ watt)	33-351339	.20
64	Volume Control	33-5233	
65	Resistor (1.0 meg., ½ watt)	33-510339	.20
66	Resistor (20,000 Ω, ½ watt)	33-370339	.20
67	Condenser (.1 μf tubular)	30-4455	.25
68	Condenser (.006 μf tubular)	30-4445	.20
69	Audio Shorting Switch (Part of Auto. Tuner—See parts (6) and (16) Bulletin 273)		
70	Resistor (490,000 Ω, ½ watt)	33-449339	.20
71	Condenser (.1 μf tubular)	30-4499	.20
72	Condenser (.05 μf Bakelite)	3615SU	.35
73	Condenser (.02 μf tubular)	30-4113	.20
74	Resistor (1.0 meg., ½ watt)	33-510339	.20
75	Resistor, wire-wound (7,500 Ω—9,000 Ω)	33-3320	.65

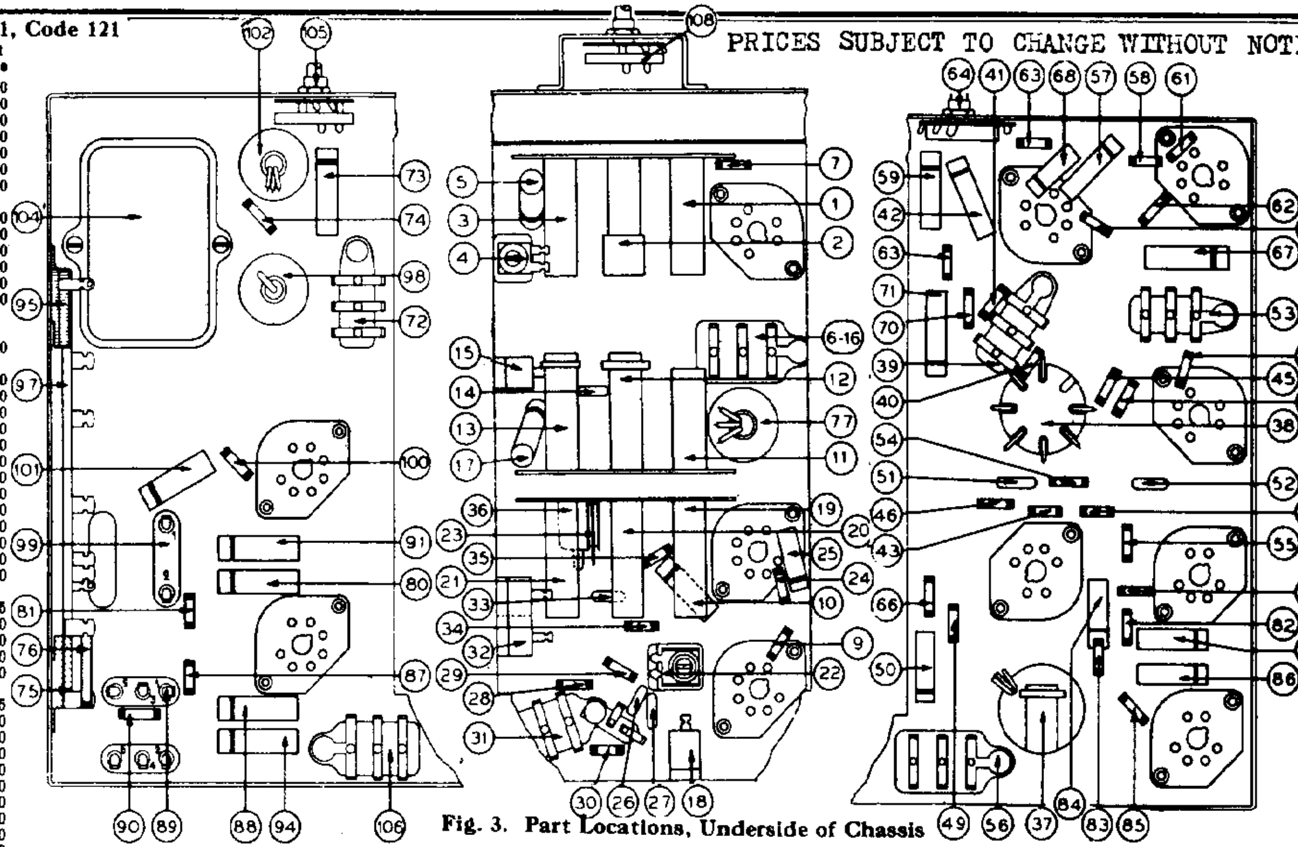


Fig. 3. Part Locations, Underside of Chassis

Schem. No.	Description	Part No.	List Price
76	Resistor (51,000 Ω, 1 watt)	33-351439	$0.20
77	Electrolytic Condenser (4 μf—3 μf)	30-2243	1.50
78	Condenser (.1 μf tubular)	30-4455	.25
79	Resistor (330,000 Ω, ½ watt)	33-433399	.20
80	Condenser (.1 μf tubular)	30-4455	.25
81	Resistor (70,000 Ω, ½ watt)	33-370339	.20
82	Resistor (32,000 Ω, ½ watt)	33-332339	.20
83	Resistor (32,000 Ω, ½ watt)	33-332339	.20
84	Condenser (.05 μf tubular)	30-4177	.25
85	Resistor (330,000 Ω, ½ watt)	33-433339	.20
86	Condenser (.1 μf tubular)	30-4455	.25
87	Resistor (70,000 Ω, ½ watt)	33-370339	.20
88	Condenser (.1 μf tubular)	30-4455	.25
89	Input Transformer	32-7671	2.50
90	Resistor (51,000 Ω, ½ watt)	33-351339	.20
91	Condenser (.01 μf tubular)	30-4381	.25
92	Output Transformer	32-7914	1.85
93	Cone & Voice Coil Assembly (U28 Speaker)	36-3799	
94	Condenser (.01 μf tubular)	30-4381	.25
95	Resistor (5,600 Ω, wire-wound)	33-3282	.60
96	Field & Pot Assembly (U28 Speaker)	36-3162	11.00
97	Resistor, Three Sections (124 Ω—33 Ω—19 Ω)	33-3319	.50
98	Electrolytic Condenser (18 μf)	30-2200	1.40
99	Choke	32-7115	1.80
100	Resistor (3,000 Ω, ½ watt)	33-230339	.20
101	Condenser (.25 μf tubular)	30-4446	$0.25
102	Electrolytic Two Sections (8 μf—10 μf)	30-2201	1.75
103	Pilot Lamp	34-2064	.09
104	Power Transformer (115 v. 50 to 60 cycles)	32-7869	
	Power Transformer (115 v. 25 to 40 cycles)	32-7870	
	Power Transformer (115/230 v, 50 to 60 cycles)	32-7871	
105	Tone Control	42-1268	.75
106	Condenser (.015 μf—.015 μf Bakelite)	3793DG	.40
107	A.F.C. Shorting Switch (Part of Auto. Tuner—See part (8) Bulletin 273)	45-2330	
108	A.F.C. Switch Manual	42-1269	1.80
109	Flood Lamp	34-2064	.09
110	Wave Switch Complete	42-1362	3.00

MODEL 38-1

Description	Part No.
Automatic Tuning Mechanism Complete	38-9145
Brace (Automatic Mechanism)	28-4119
Cable (Speaker)	41-3329
Cable (Power)	L-2183
Clip (Mtg. R. F. Coils)	28-5002
Coupling (Tuning Condenser)	31-1961
Coupling (Range Switch Shaft & Mask)	38-8693
Knob (Range Switch)	27-4326
Knob (Tuning)	27-4330
Knob (Vernier)	27-4331
Knob (Tone, Volume)	27-4332
Mtg. Rubber (Chassis)	27-4564
Mtg. Rubber (Rear of R. F. Unit)	27-4197
Mtg. Rubber (Front of R. F. Unit)	27-4581
Pilot Lamp Assembly	38-9100
Shield (R. F. Unit)	38-8969
Shield Base (Round)	8004
Shield Base	28-2725
Shield (Tube) (Square)	28-2726
Shield (6U7G Tube)	28-5031
Shield (Round)	8005
Socket (6 prong)	27-6066
Socket (7 prong) (6F6G Tubes)	27-6057
Socket (7 prong)	27-6087
Speaker (U-28)	36-1361
Support (Rear of R. F. Unit)	38-8923
Terminal Panel (Ant.)	38-8746

CABINET PARTS

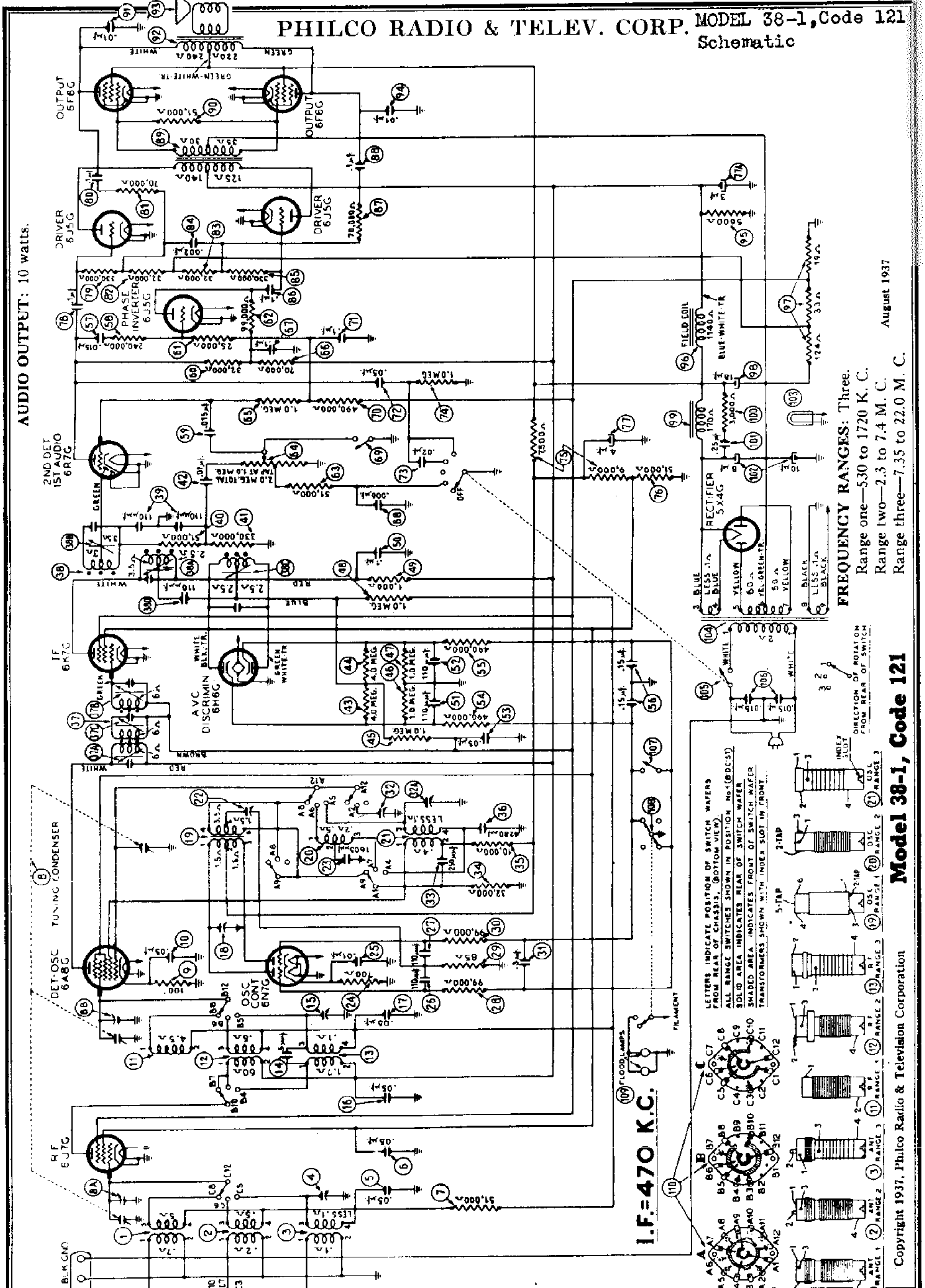
Description	Part No.
Bezel Assembly	38-8833
Cover (Back of Cabinet)	27-8865

AUTOMATIC TUNING MECHANISM

Description	Part No.
*Cover (Handle)	28-5092
*Dial	27-5358
*Dial Screen Holder	31-2053
*Escutcheon Assembly (Station tabs)	45-2472

*These Automatic Tuning Mechanism parts differ from those shown in Service Bulletin 273.

PHILCO RADIO & TELEV. CORP. MODEL 38-1, Code 121
Schematic



©John F. Rider, Publisher

MODEL 38-1, Code 121
Alignment, Trimmers
Voltage

PHILCO RADIO & TELEV. CORP.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, having a fundamental frequency range covering the intermediate and tuning frequencies of the receiver. Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36000 K.C. is the correct instrument for this purpose; (2) Output Meter, Philco Model 026 Circuit Tester incorporates a sensitive output meter and is recommended; (3) Philco Fiber Handle Screw Driver, part number 27-7059 and Fibre Wrench, part number 3164.

OUTPUT METER: The 026 Output Meter is connected to the plate and cathode terminals of one of the 6F6G tubes. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter after signal is applied to stage being adjusted.

DIAL CALIBRATION: In order to adjust the compensators of this receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this proceed as follows:

1. Loosen the set screws on the shaft coupling of the tuning condenser. Then turn the tuning condenser until the plates are in the maximum capacity position. Now turn the dial until the glowing beam indicator is on the INDEX LINE at the low frequency end of Range 2. See Fig. 4. With dial and tuning condenser in this position tighten set screws.

2. Turn the tuning condenser control until the indicator is on the 2.2 M. C. mark.

3. With the dial in this position, loosen the shaft coupling set screws. Then turn the dial until the indicator is again on the INDEX LINE. Tighten the set screws in this position.

NOTE: Be careful when turning the dial that the position of the tuning condenser is not disturbed.

INTERMEDIATE FREQUENCY CIRCUIT

A. Set the receiver and signal generator controls as follows:
1. Range Switch (Broadcast Position)
2. Volume Control (Maximum)
3. Magnetic Tuning Switch "Off"
4. Tone Control First Position
5. Signal Generator Dial 470 K.C.

B. Connect the signal generator output cable through a .1 mfd. condenser to the grid of the 6A8G Det. Osc. tube and connect the cableground to the receiver chassis. Set the generator "attenuator" for maximum output. Adjust the I. F. Compensators as follows:

1. Turn compensator (37C) in until the output meter reading decreases almost to zero.

2. Now adjust the compensators, (37B) and (37A), for maximum output; then readjust (37C) for maximum output.

3. Turn compensator (38C) in about three turns; then adjust compensators (38B) and (38A) for maximum output. The adjustment of compensator 38C is given in the "Magnetic Tuning Circuit Adjustments" below.

RADIO FREQUENCY CIRCUIT

1. Set the controls as given under "Intermediate Frequency Circuit" 1 to 4 and set the range switch, signal generator and receiver dials as given under the adjustments of each tuning range in the following procedure.

Connect the Signal Generator output cable into the "Med" jack of the generator panel and connect the other end through a .1 mfd. condenser to the "Red" terminal of the receiver aerial panel (rear of chassis). The ground connection of the cable should be connected to the "Blk" terminal.

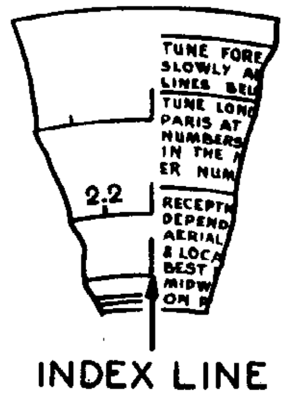


Fig. 4. Dial Calibration

2. Adjust the "R. F." compensators for maximum output as follows:

Tuning Range: 530 to 1720 K. C.

Range Switch Position	Signal Generator and Receiver Dial	Compensators in Order
1	1550 K. C.	(18), (8B), and (8A)
1	580 K. C.	(22), Roll Tuning Condenser. See Note B.
1	1550 K. C.	(18), (8B), (8A)

Tuning Range 2.3 to 7.4 M. C.

Range Switch Position	Signal Generator and Receiver Dial	Compensators in Order
2	6.0 M. C.	(32)

Tuning Range: 7.35 to 22.0 M. C.

Range Switch Position	Signal Generator and Receiver Dial	Compensators in Order
3	18.0 M. C.	(32A), (15), (4) Roll tuning condensers when adjusting (15) and (4). See Note B, check image at 17.060. See Note A.
3	18.0 M. C.	(32A)

MAGNETIC TUNING CIRCUIT ADJUSTMENTS

1. Set the Magnetic Tuning switch in the "out" position.

2. Turn the signal generator indicator to 1000 K. C. and adjust the "Attenuator" control for a weak signal.

3. Adjust volume control for a readable indication on the output meter.

4. Now tune the receiver dial for maximum output at 1000 K. C. The dial must be tuned very accurately to the 1000 K. C. signal in order to make the following adjustment correctly.

5. Turn the Magnetic Tuning Switch "In" and adjust compensator (38C) for maximum output.

The above adjustments are now checked for accuracy as follows:

FREQUENCY TEST:

With the 1000 K. C. signal tuned for maximum output turn the Magnetic Tuning control back and forth; that is, from the "out" to "in" position. The reading of the output meter should not change in either position. If the output meter reading changes, the above magnetic tuning circuit adjustments should be repeated.

A further check on the magnetic tuning adjustment is to very carefully tune in a broadcasting station and turn the switch from the "out" to the "in" position. With the switch in either position, the tone of the station being received should not change. If a change of tone or hiss develops repeat the above Magnetic Tuning Adjustments.

SENSITIVITY TEST:

1. To check the magnetic tuning circuit for sensitivity, turn the magnetic tuning switch to the "off" position, and tune in the 1000 K. C. signal. Then adjust the "attenuator" control of the signal generator for a good audible signal. Approximately 20 volts on the output meter.

2. Now detune the signal (first above and then below the 1000 K. C. mark to a point at which the signal is weakly heard. At each point turn the magnetic tuning control "on". When the control is turned on the signal should return to normal output strength. If the magnetic tuning circuit does not pull the signal into resonance, the compensator (38C) should be carefully readjusted.

NOTE "A"—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a second maximum peak is obtained on the output meter. Adjust the compensator for maximum output using this second peak. The first peak from maximum capacity position of the compensator is the image signal and must not be used in adjusting the compensator.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 940 K. C. below the frequency being used on any high frequency range.

NOTE "B"—When adjusting the low frequency compensator of Range One (Broadcast) or the antenna and R. F. compensators of the high frequency tuning ranges; the receiver Tuning Condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output about the frequency dial mark. Now turn the compensator slightly to the right or left and vary the receiver tuning condenser for maximum output. If the out reading increases, turn the compensator in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

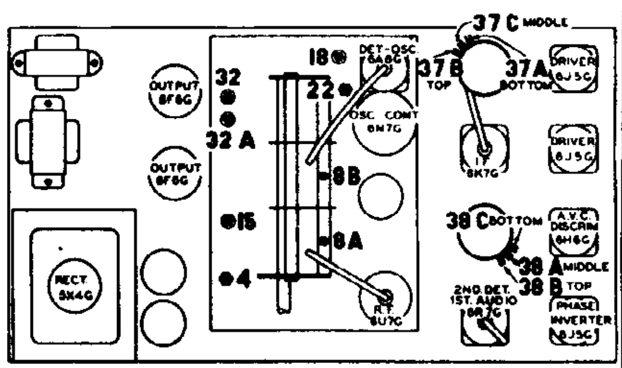


Fig. 5. Compensator Locations

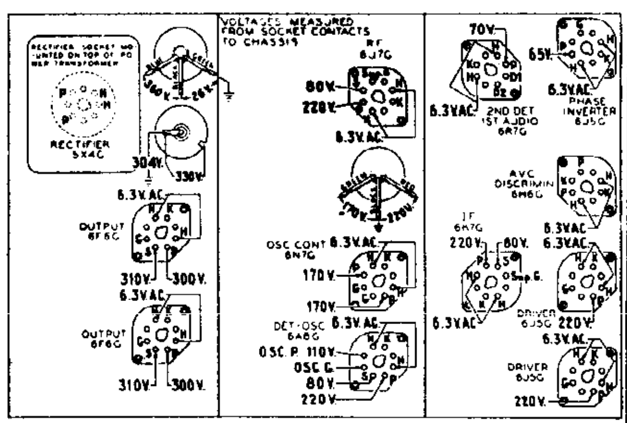


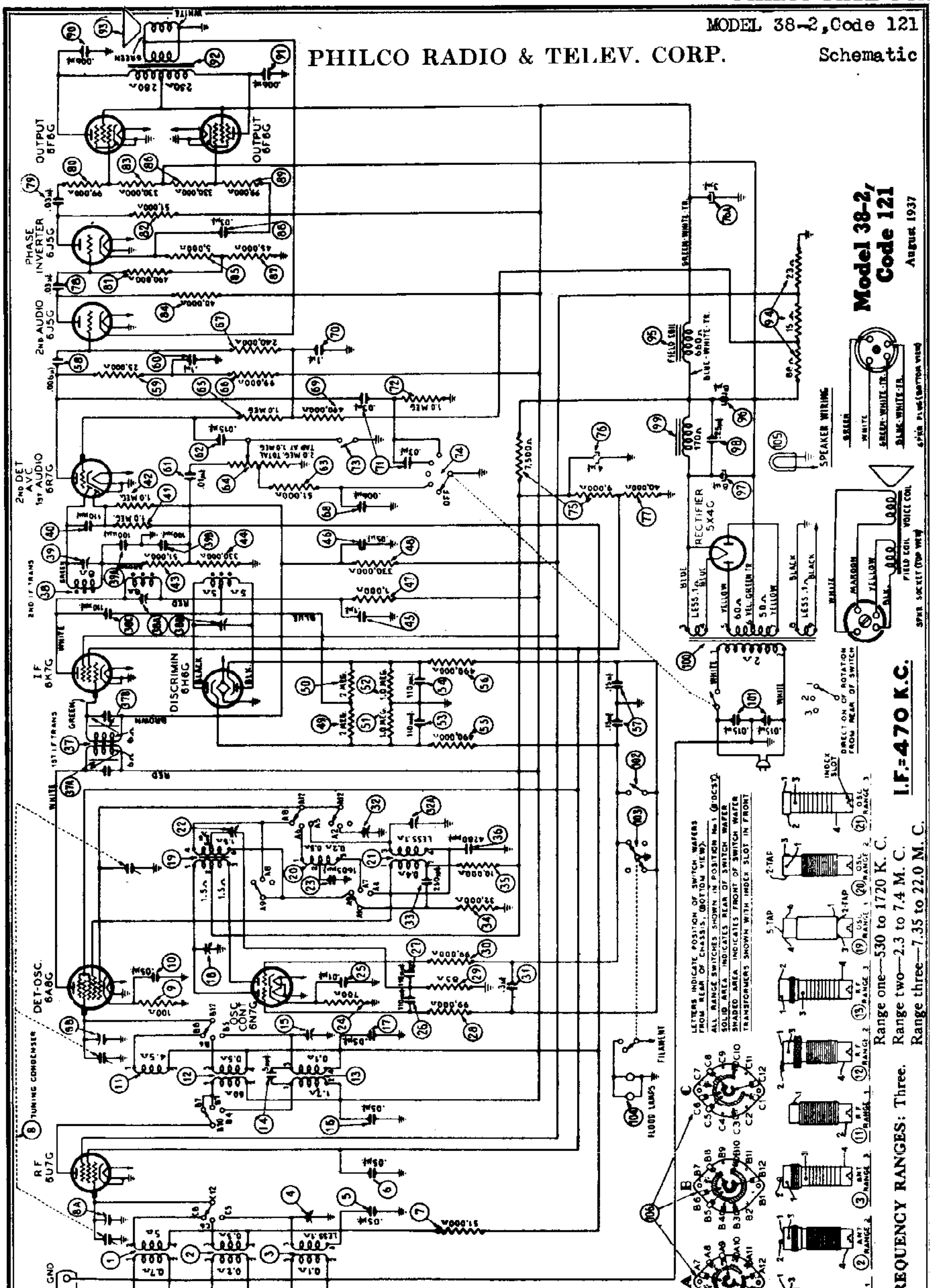
Fig. 1. Underside View of Chassis showing Socket Voltages

The voltages indicated by the arrows were measured with a **Philco 026 Circuit Tester**, which contains a sensitive voltmeter. Line voltage 115 A. C.—Volume control minimum—Dial set at point where no signal is present—Range Switch in broadcast position.

MODEL 38-2, Code 121

PHILCO RADIO & TELEV. CORP.

Schematic



MODEL 38-2, Code 121
Alignment, Trimmers
Voltage

PHILCO RADIO & TELEV. CORP.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, having a fundamental frequency range covering the intermediate and tuning frequencies of the receiver. Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36000 K. C. is the correct instrument for this purpose; (2) Output Meter, Philco Model 026 Circuit Tester incorporates a sensitive output meter and is recommended; (3) Philco Fibre Handle Screw Driver, Part No. 27-7059 and Fibre Wrench, Part No. 3164.

OUTPUT METER: The 026 Output Meter is connected to the plate and cathode terminals of one of the 6F6G tubes. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter after signal is applied to stage being adjusted.

DIAL CALIBRATION: In order to adjust the compensators of this receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this proceed as follows:

1. Loosen the set screws on the shaft coupling of the tuning condenser. Then turn the tuning condenser until the plates are in the maximum capacity position. Now turn the dial until the glowing beam indicator is on the INDEX LINE at the low frequency end of Range 2. See Fig. 4. With dial and tuning condenser in this position, tighten set screws.
2. Turn the tuning condenser control until the indicator is on the 2.2 M. C. Mark.
3. With the dial in this position, loosen the shaft coupling set screws. Then turn the dial until the indicator is again on the INDEX LINE. Tighten the set screws in this position. Be careful when turning the dial that the position of the tuning condenser is not disturbed.

INTERMEDIATE FREQUENCY CIRCUIT

A. Set the receiver and signal generator controls as follows:

1. Range Switch (Broadcast)
2. Volume Control (Maximum)
3. Magnetic Tuning Switch "out"
4. Tone control & A. C. switch first position.
5. Signal generator dial 470 K. C.

B. Connect the signal generator output cable through a .1 mfd. condenser to the grid of the 6A8G Det. Osc. tube and connect the cableground to the receiver chassis. Now adjust the following compensators for maximum output (38A), (39), (37B), and (37A).

RADIO FREQUENCY CIRCUIT

1. Set the controls as given under "Intermediate Frequency Circuit" 1 to 4 and set the range switch, signal generator and receiver dials as given under the adjustments of each tuning range in the following procedure.

Connect the Signal Generator output cable into the "Med" jack of the generator panel and connect the other end through a .1 mfd. condenser to the "Red" terminal of the receiver aerial panel (rear of chassis). The ground connection of the cable should be connected to the "Blk" terminal.

2. Adjust the "R. F." compensators for maximum output as follows:

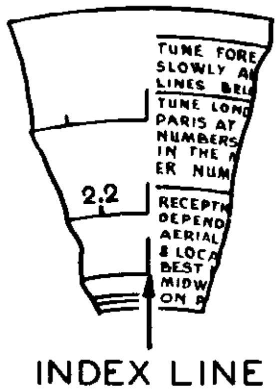


Fig. 4. Dial Calibration

Tuning Range: 530 to 1720 K. C.

Range Switch Position	Signal Generator and Receiver Dials	Compensators in Order
1	1550 K. C.	(18), (8B) and (8A)
1	580 K. C.	(22) Roll gang. Note B
1	1550 K. C.	(18), (8B), (8A)

Tuning Range 2.3 to 7.4 M. C.

Range Switch Position	Signal Generator and Receiver Dial	Compensators in Order
2	6.0 M. C.	(32)

Tuning Range 7.35 to 22.0 M. C.

Range Switch Position	Signal Generator and Receiver Dial	Compensators in Order
3	20.0 M. C.	(32A), (15), (4) **Roll Tuning condensers when adjusting (15) and (4). See Note B. Check image at 17.060. See Note A.**
3	20.0 M. C.	(32A)

MAGNETIC TUNING CIRCUIT ADJUSTMENTS

1. Set the Magnetic Tuning switch in the "out" position.
2. Turn the signal generator indicator to 1000 K. C. and adjust the "Attenuator" control for a weak signal.
3. Adjust volume control for a readable indication on the output meter.
4. Now tune the receiver dial for maximum output at 1000 K. C. The dial must be tuned very accurately to the 1000 K. C. signal in order to make the following adjustment correctly.
5. Turn the Magnetic Tuning switch "in" and adjust compensator (38B) for maximum output.

The above adjustments are now checked for accuracy as follows:

FREQUENCY TEST

With the 1000 K. C. signal tuned for maximum output turn the Magnetic Tuning control back and forth; that is, from the "out" to "in" position. The reading of the output meter should not change in either position. If the output meter reading changes, the above magnetic tuning circuit adjustments should be repeated.

A further check on the Magnetic Tuning adjustment is to very carefully tune in a broadcasting station and turn the switch from the "out" to the "in" position. With the switch in either position, the tone of the station being received should not change. If a change of tone or hiss develops repeat the above Magnetic Tuning Adjustments.

SENSITIVITY TEST

1. To check the magnetic tuning circuit for sensitivity, turn the magnetic tuning switch to the "out" position, and tune in the 1000 K. C. signal. Then adjust the "attenuator" control of the signal generator for a good audible signal. Approximately 20 volts on the output meter.

2. Now detune the signal (first above and then below) the 1000 K. C. mark to a point at which the signal is weakly heard. At each point turn the magnetic tuning control "on" When the control is turned on the signal should return to normal output strength. If the magnetic tuning circuit does not pull the signal into resonance, the compensator should be carefully readjusted.

NOTE "A"—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a second maximum peak is obtained on the output meter. Adjust the compensator for maximum output using this second peak. The first peak from maximum capacity position of the compensator is the image signal and must not be used in adjusting the compensator.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 940 K. C. below the frequency being used on any high frequency range.

NOTE "B"—When adjusting the low frequency compensator of Range One (Broadcast) or the antenna and R. F. compensators of the high frequency tuning ranges; the receiver Tuning Condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output about the frequency dial mark. Now turn the compensator slightly to the right or left and vary the receiver tuning condenser for maximum output. If the out reading increases, turn the compensator in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

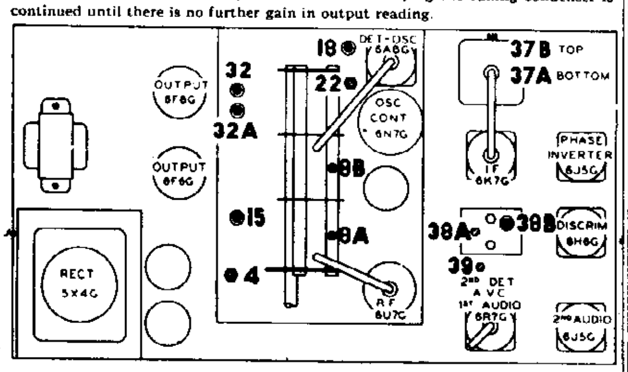


Fig. 5. Compensator Locations

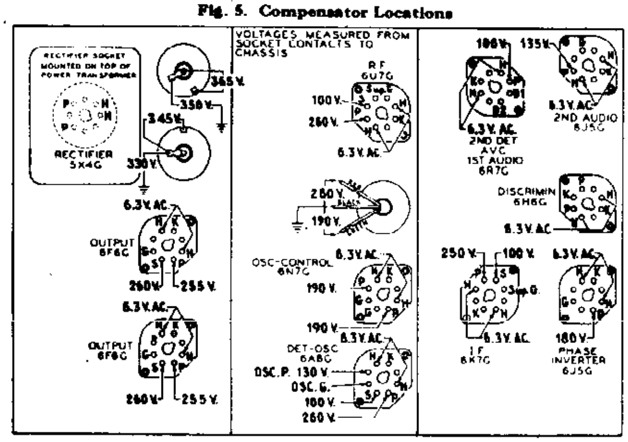


Fig. 1. Underside View of Chassis showing Socket Voltages

The voltages indicated by the arrows were measured with a **Philco 026 Circuit Tester**, which contains a sensitive voltmeter. Line voltage 115 A. C.—Volume control minimum—Dial set at point where no signal is present—Range Switch in broadcast position.

PHILCO RADIO & TELEV. CORP.

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2575	$0.70
2	Antenna Transformer (Range 2)	32-2576	.70
3	Antenna Transformer (Range 3)	32-2573	.70
4	Compensator, Antenna (Range 3)	31-6160	.30
5	Condenser (.05µf tubular)	30-4519	.20
6	Condenser (.05µf—.05µf, Bakelite)	3615DG	.40
7	Resistor (51,000 Ω, ½ Watt)	33-351339	.20
8	Tuning Condenser Assembly	31-2075	
9	Resistor (.100 Ω, ½ Watt)	33-110339	.20
10	Condenser (.05 µf, tubular)	30-4020	.20
11	R. F. Transformer (Range 1)	32-2379	.40
12	R. F. Transformer (Range 2)	32-2382	1.00
13	R. F. Transformer (Range 3)	32-2385	1.20
14	Condenser (5 µµf, Mica)	30-1097	.20
15	Compensator (R. F. Range 3)	31-6212	
16	Condenser—Part of 6		
17	Condenser (.05 µf, Tubular)	30-4519	.20
18	Compensator Osc. (Range 1)	31-6212	
19	Osc. Transformer (Range 1)	32-2373	1.60
20	Osc. Transformer (Range 2)	32-2383	.70
21	Osc. Transformer (Range 3)	32-2386	.70
22	Compensator (Range 1 Series)	31-6151	.40
23	Condenser (1605 µµf, Mica)	31-6201	.40
24	Resistor (200 Ω, ½ Watt)	33-170339	.20
25	Condenser (.01 µf, Tubular)	30-4479	.20
26	Condenser (110 µµf, Mica)	30-1031	.20
27	Condenser (110 µµf, Mica)	30-1031	.20
28	Resistor (99,000 Ω, ½ Watt)	33-399339	.20
29	Resistor (85 Ω, ½ Watt)	33-085339	.20
30	Resistor (99,000 Ω, ½ Watt)	33-399339	.20
31	Condenser (.3 µf, Bakelite)	6287DG	.40
32	Compensator (2 Sections)	31-6211	
33	Condenser (250 µµf, Mica)	30-1032	.25
34	Resistor (32,000 Ω, ½ Watt)	33-332339	.20
35	Resistor (10,000 Ω, ½ Watt)	33-310339	.20
36	Condenser (4280 µµf, Mica)	31-6202	.50
37	1st. I. F. Transformer	32-2604	2.20
38	2nd I. F. Transformer	32-2362	3.30
39	Compensator	31-6203	.30
40	Condenser (110 µµf, Mica)	30-1031	.20
41	Resistor (1.0 Meg., ½ Watt)	33-510339	.20
42	Resistor (1.0 Meg., ½ Watt)	33-510339	.20
43	Resistor (51,000 Ω, ½ Watt)	33-351339	.20
44	Resistor (330,000 Ω, ½ Watt)	33-433339	.20
45	Condenser (.1 µf, Tubular)	30-4455	.25
46	Condenser (.05, Bakelite)	3615SG	.35
47	Resistor (1000 Ω, ½ Watt)	33-210339	.20
48	Resistor (330,000 Ω, ½ Watt)	33-433339	.20
49	Resistor (2.0 Meg., ½ Watt)	33-520339	.20
50	Resistor (2.0 Meg., ½ Watt)	33-520339	.20
51	Resistor (1.0 Meg., ½ Watt)	33-510339	.20
52	Resistor (1.0 Meg., ½ Watt)	33-510339	.20
53	Condenser (110 µµf, Mica)	30-1031	.20
54	Condenser (110 µµf, Mica)	30-1031	.20
55	Resistor (490,000 Ω, ½ Watt)	33-449339	.20
56	Resistor (490,000 Ω, ½ Watt)	33-449339	.20
57	Condenser (.15 µf—.15 µf, Bakelite	6287DG	.40
58	Condenser (.006 µf, Tubular)	30-4445	.20
59	Resistor (25,000 Ω, ½ Watt)	33-325339	.20
60	Condenser (.1 µf, Tubular)	30-4455	.25
61	Condenser (.01 µf, Tubular)	30-4479	.20
62	Condenser (.015 µf, Tubular)	30-4226	.20
63	Resistor (51,000 Ω, ½ Watt)	33-351339	.20
64	Volume Control	33-5233	1.00
65	Resistor (1.0 Meg., ½ Watt)	33-510339	.20
66	Resistor (99,000 Ω, ½ Watt)	33-399339	.20
67	Resistor (240,000 Ω, ½ Watt)	33-424339	.20
68	Condenser (.006 µf, Tubular)	30-4467	.20
69	Resistor (490,000 Ω, ½ Watt)	33-449339	.20
70	Condenser (.1 µf, Tubular)	30-4499	.20
71	Condenser (.03 µf—.03 µf, Bakelite)	8318DU	.40
72	Resistor (1.0 Meg., ½ Watt)	33-510339	.20
73	Audio Shorting Switch (Parts (6) and (16) Bulletin 273)		
74	Tone Control	42-1268	.75
75	Resistor (7,500 Ω — 9,000 Ω Wire Wound)	33-3320	.65
76	Electrolytic Condenser [illegible]	30-2243	1.50

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

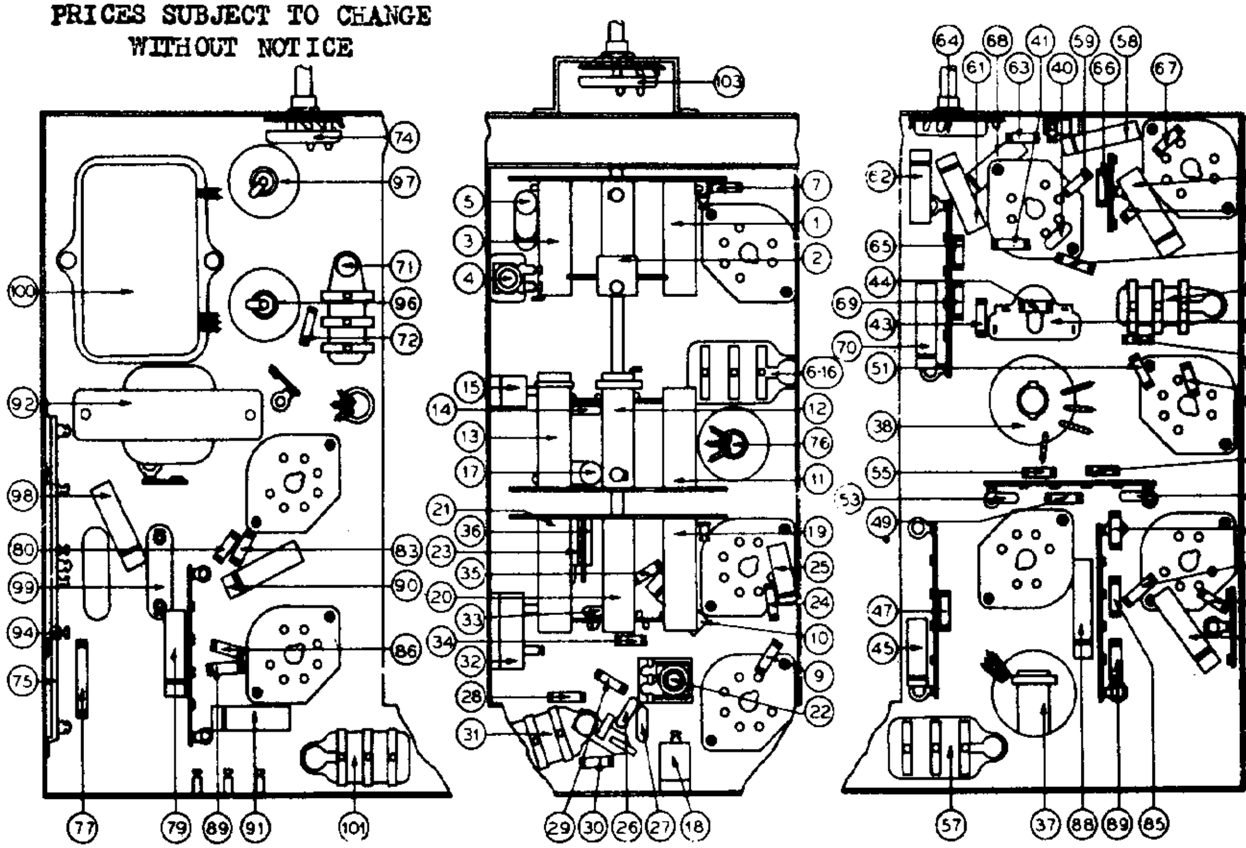


Fig. 3. Part Locations, Underside of Chassis

Schem. No.	Description	Part No.	List Price
77	Resistor (40,000 Ω, 1 Watt)	33-340439	$0.20
78	Condenser (.03 µf, Tubular)	30-4449	.20
79	Condenser (.03 µf, Tubular)	30-4449	.20
80	Resistor (99,000 Ω, ½ Watt)	33-399339	.20
81	Resistor (490,000 Ω, ½ Watt)	33-449339	.20
82	Resistor (51,000 Ω, ½ Watt)	33-351339	.20
83	Resistor (330,000 Ω, ½ Watt)	33-433339	.20
84	Resistor (40,000 Ω, ½ Watt)	33-340339	.20
85	Resistor (5,000 Ω, ½ Watt)	33-250339	.20
86	Resistor (330,000 Ω, ½ Watt)	33-433339	.20
87	Resistor (45,000 Ω, ½ Watt)	33-345339	.20
88	Condenser (.03 µf, Tubular)	30-4449	.20
89	Resistor (99,000 Ω, ½ Watt)	33-399339	.20
90	Condenser (.006 µf, Tubular)	30-4445	.20
91	Condenser (.006 µf, Tubular)	30-4445	.20
92	Output Transformer	32-7754	1.40
93	Cone & Voice Coil Assembly	36-3801	1.40
94	Resistor (88—15—23 Ω)	33-3321	.40
95	Field & Pot. Assembly	36-3941	[illegible]
96	Electrolytic Condenser	30-2211	[illegible]
97	Electrolytic Condenser	30-2211	[illegible]
98	Condenser (.25 µf, Tubular)	30-4446	[illegible]
99	Choke	32-7115	[illegible]

Schem. No.	Description	Part No.	List Price
100	Power Transformer (115V — 50-60 Cycles)	32-7869	
	Power Transformer (115V, 25-40 cycles)	32-7870	
	Power Transformer (115/230V, 50-60 cycles)	32-7871	
101	Condenser (.015 µf—.015 µf, Bakelite)	3793DG	$0.40
102	A. F. C. Shorting Switch	45-2330	1.20
103	A. F. C. Switch	42-1269	
104	Flood Lamp Bulb	34-2064	.09
105	Pilot Lamp	34-2064	.09
106	Wave Switch	42-1362	3.00
	Automatic Tuning Mechanism (complete)	38-9145	
	Cable (Power)	L-2183	.40
	Cable (Speaker)	41-3329	
	Clip (R. F. Coils)	28-5002	.02
	Coupling (Tuning Condenser)	31-1961	.80
	Coupling (Range Switch & Mash)	38-8693	
	Knob (Range Switch)	27-4326	.10
	Knob (Tuning)	27-4330	.10
	Knob (Vernier)	27-4331	.10
	Knob (Tone, Volume)	27-4332	.10
	Mtg. Rubber (Chassis)	27-4564	.10
	Mtg. Rubber (Rear of R. F. Unit)	27-4197	.08
	Mtg. Rubber (Front of R. F. Unit)	27-4581	
	Shield (R. F. Unit)	38-8969	
	Shield (Tube) (Square)	28-2726	$0.10
	Shield (Tube) (Round)	8005	.10
	Shield Base (Square)	28-2725	.03
	Socket Assembly (Pilot Lamp)	38-9100	
	Socket (6 prong)	27-6066	.11
	Socket (7 prong) (6F6G tubes)	27-6057	.11
	Socket (7 prong)	27-6087	.11
	Speaker H-32	36-1299	
	Support (rear of R. F. Unit)	38-8923	
	Terminal Panel (Antenna)	38-8746	.15
	CABINET PARTS		
	Besel Assembly	38-8833	2.50
	Cover (Back of cabinet)	27-8864	1.00
	AUTOMATIC TUNING MECHANISM PARTS		
	*Cover (handle)	28-5092	.50
	*Dial	27-5358	
	*Dial Screen Holder	31-2053	.75
	*Escutcheon Assembly (Station tabs)	45-2472	

*These Automatic Tuning Mechanism Parts differ from those shown in Service Bulletin 273.

MODEL 38-3
Chassis, Parts

PHILCO RADIO & TELEV. CORP.

Replacement Parts — Model 38-3

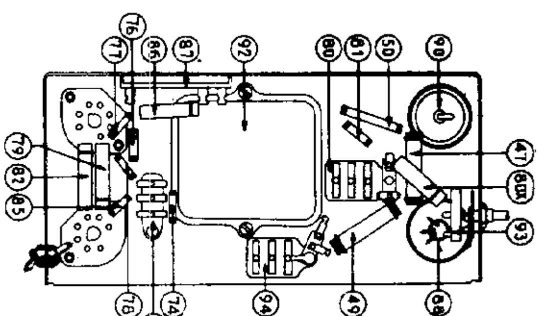
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Schem. No.	Description	Part No.	List Price
1	Antenna transformer (range 1)	32-2575	
2	Antenna transformer (range 2)	32-2576	
3	Antenna transformer (range 3)	32-2573	
4	Compensator antenna, single	31-6161	$0.30
5	Condenser (0.05 mf. tubular)	30-4444	.20
6	Resistor (51,000 ohms, ½ watt)	33-351339	.20
7	Tuning Condenser	31-1963	4.00
8	Remove prior to production		
9	R. F. transformer (range 1)	32-2379	.40
10	R. F. transformer (range 2)	32-2382	1.00
11	Compensator (single) R. F.	31-6160	.30
12	R. F. Transformer (range 3)	32-2385	1.20
13	Condenser (0.05 mf. tubular)	30-4123	.20
14	Condenser (0.05 mf. tubular)	30-4020	.20
15	Condenser (0.05 mf. tubular)	30-4020	.20
16	Resistor (100 ohms, ½ watt)	33-110339	.20
17	Resistor (700 ohms, ½ watt)	33-170339	.20
18	Condenser (0.01 mf. tubular	30-4479	.20
19	Condenser (110 mmf. mica)	30-1031	.20
20	Resistor (99,000 ohms, ½ watt)	33-399339	.20
21	Condenser (110 mmf. mica)	30-1031	.20
22	Resistor (99,000 ohms, ½ watt)	33-399339	.20
23	Resistor (10,000 ohms, ½ watt)	33-310339	.20
24	Condenser (250 mmf. mica)	30-1032	.25
25	Resistor (32,000 ohms, ½ watt)	33-332339	.20
26	Osc. transformer (range 1)	32-2373	1.60
27	Compensator (osc. series)	31-6151	.40
28	Compensator osc.	31-6170	.75
29	Resistor (85 ohms, ½ watt)	33-085339	.20
30	Osc. transformer (range 2)	32-2383	.70
31	Condenser (1605 mmf. tracking)	31-6155	.40
32	Osc. transformer (range 3)	32-2386	.70
33	Condenser (4280 mmf. tracking)	31-6156	.60
34	Switch (magnetic tuning, manual)	42-1269	.75
35	Switch (magnetic tuning, automatic dial)	45-2330	1.20
36	Condensers (0.15 mf. dual bakelite)	6287 DG	.40
37	Condenser (0.3 mf. double bakelite)	6287 DU	.40
38	Resistor (490,000 ohms, ½ watt)	33-449339	.20
39	Resistor (490,000 ohms, ½ watt)	33-449339	.20
40	Condensers (110 mmf. dual bakelite)	8035 DG	.25
41	Resistor (1.0 meg., ½ watt)	33-510339	.20
42	Resistor (1.0 meg., ½ watt)	33-510339	.20
43	Resistor (2.0 meg., ½ watt)	33-520339	.20
44	Resistor (2.0 meg., ½ watt)	33-520339	.20
45	1st I. F. transformer	32-2604	
46	Resistor (1000 ohms, ½ watt)	33-210339	.20
47	Resistor (9000 ohms, 2 watts)	33-290539	.30
48	Condenser (16 mf. electrolytic)	30-2194	1.60
49	Resistor (7500 ohms, 3 watts)	33-275639	.30
50	Resistor (32,000 ohms, 1 watt)	33-332439	$0.20
51	2nd I. F. transformer (discriminator)	32-2376	3.30
52	Condenser (110 mmf. mica) mounted in 51	30-1031	.20
53	Compensator	31-6147	.40
54	Resistor (51,000 ohms, ½ watt)	33-351339	.20
55	Condenser (110 mmf. dual bakelite)	8035 DG	.25
56	Resistor (490,000 ohms, ½ watt)	33-349339	.20
57	Condenser (0.1 mf. tubular)	30-4455	.25
58	Resistor (330,000 ohms, ½ watt)	33-333339	.20
59	Condenser (110 mmf. mica)	30-1031	.20
60	Resistor (1.0 meg., ½ watt)	33-510339	.20
61	Resistor (1.0 meg., ½ watt)	33-510339	.20
62	Condenser (0.01 mf. tubular)	30-4479	.20
63	Condenser (60 mf. mica)	30-1040	
64	Resistor (40,000 ohms, ½ watt)	33-340339	.20
65	Condenser (0.03 mf. tubular)	30-4449	.20
66	Condenser (0.1 mf. dual bakelite)	4989 DG	.40
67	Condenser (0.006 mf. tubular)	30-4445	.20
68	Volume Control	33-5158	1.00
69	Condenser (0.015 mf. tubular)	30-4358	.20
70	Resistor (1.0 meg., ½ watt)	33-510339	.20
71	Part of 66		
72	Resistor (490,000 ohms, ½ watt)	33-449339	.20
73	Audio shorting switch (stationary insulated section)	28-4110	.15
	Audio shorting switch (movable section)	45-2350	.15
74	Resistor (99,000 ohms, ½ watt)	33-399339	.20
75	Condenser (0.03 mf. bakelite)	8318 SU	.35
76	Resistor (190,000 ohms, ½ watt)	33-319339	.10
77	Resistor (490,000 ohms, ½ watt)	33-349339	.20
78	Resistor (330,000 ohms, ½ watt)	33-433339	.20
79	Condenser (0.01 mf. tubular)	30-4169	.20
80	Condenser (0.05 mf. bakelite)	8326 SU	.25
80A	Condenser (0.03 mf. tubular)	30-4447	.20
81	Resistor (1.0 meg., ½ watt)	33-510339	.20
82	Condenser (0.003 mf. tubular)	30-4469	.20
83	Output transformer	32-7754	1.50
84	Cone and voice coil assembly	36-3801	1.40
85	Resistor (3500 ohms, ½ watt)	33-235330	.20
86	Condenser (0.003 mf. tubular)	30-4469	.20
87	Resistor (bias 128 ohms)	33-3280	.30
88	Condenser (electrolytic 8 mf., 10 mf.)	30-2201	1.75
89	Field Coil Assembly	36-3218	4.25
90	Condenser (electrolytic 18 mf.)	30-2200	1.40
91	Pilot Lamp	34-2039	.07
92	Power transformer (115 volts, 50 to 60 cycles)	32-7606	6.25
	Power transformer (115 volts, 25 cycle)	32-7607	9.00
	Power transformer (110/220 volts, 50 to 60 cycles)	32-7608	$8.00
93	Tone Control and A. C. Switch	42-1268	.75
94	Condensers (0.015 mf. dual bakelite)	3793 DG	.40
95	Range Switch (antenna)	42-1324	
96	Range Switch (R. F.)	42-1314	.75
97	Range Switch (osc.)	42-1284	.75
98	Flood Lamps	34-2039	.07
99	Condenser (0.1 mf. tubular)	30-4455	.25

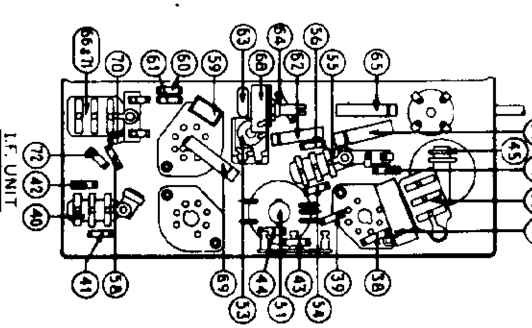
38-3 Code 121

Description	Part No.	List Price
Brace	28-4119	.05
Cable A. C.	L-2778	
Cable Speaker	41-3258	.50
Coupling (Tuning Condenser)	31-1961	.80
Coupling (Range Switch)	28-7198	.15
Clip (volume shaft)	28-4394	.01
Control Screw (station index)	31-1898	.15
*Cover (handle)	28-5092	
Dial	27-5283	.90
*Dial & Station Tab Escutcheon	45-2472	
Floodlight Socket Assembly	38-8802	
Gear, Dial Assembly (small)	45-2348	.60
Gear, Dial Assembly (large)	45-2347	.60
Handle (Dial)	45-2329	.75
Hub Assembly (Handle)	45-2344	.50
Housing (Control Screws)	28-7196	1.00
Knob Tuning	27-4330	.10
Knob Vernier	27-4331	.10
Knob Tone & Volume	27-4332	.10
Knob (Range Switch)	27-4326	.10
Mask Guide	28-4118	.25
Mask & Link Assembly	45-2401	.70
Mtg. Feet-Rubber—(Chassis)	27-4564	.10
Pilot Lamp Assembly	38-7706	.35
Reflector Ring	28-4609	.35
Ring Retaining Mask Assembly	28-7195	.20
Screen Holder Assembly	31-2053	
Shaft (Vol. Cont.)	38-8285	.12
Shaft & Plate (Range Switch)	42-1287	.50
Socket (7 prong)	27-6087	
Socket (6 prong)	27-6086	
Speaker H-29	36-1293	
Vernier Drive Assembly	45-2342	2.40

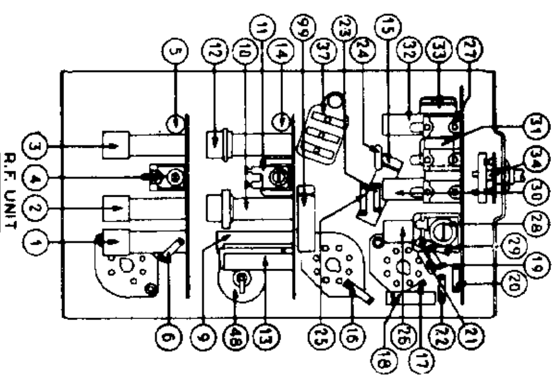
*A complete list of the automatic tuning mechanism parts is given in Bulletin 273. Those parts shown above marked with an asterisk differ from those shown on Bulletin 273.



AUDIO & POWER UNIT



I.F. UNIT



R.F. UNIT

PHILCO RADIO & TELEV. CORP.

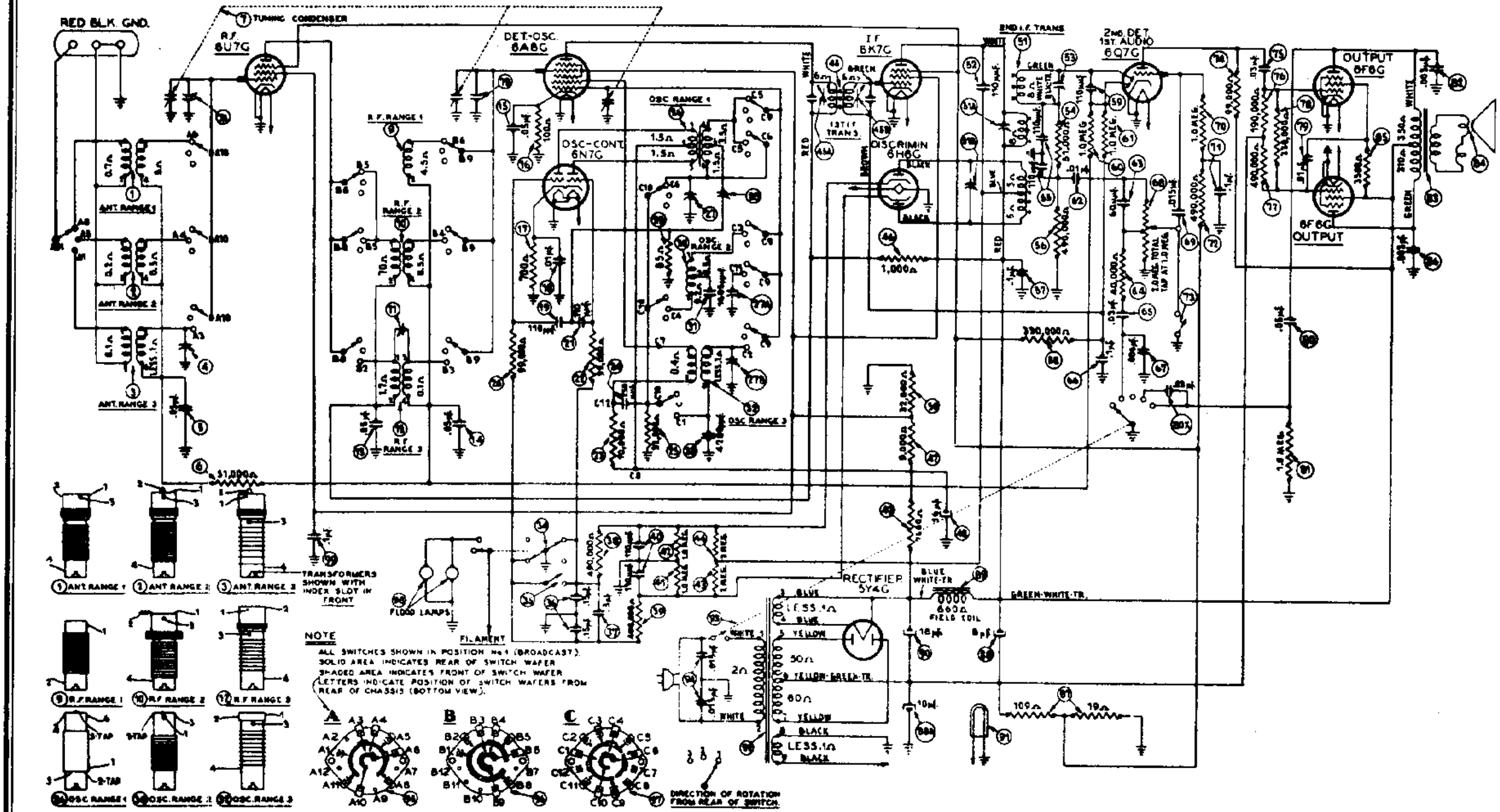


Fig. 4. Schematic Diagram Model 38-3

Electrical Specifications

IF PEAK 470KC

TYPE CIRCUIT: Superheterodyne, with such features as: magnetic tuning control on the broadcast range; automatic volume control; Iron core adjusted first I. F. transformer; push-pull Pentode audio output, using screen phase inversion; Bass compensation in the Volume Control circuit, and the Philco Automatic Tuning Mechanism.

POWER SUPPLY:

Voltage	Frequency	Consumption
115	50 to 60 cycles	110 watts
115	25 to 40 cycles	110 watts

Different Transformers are required for operation on the frequencies list above. These are shown on the parts list.

INTERMEDIATE FREQUENCY: 470 K. C.

UNDISTORTED OUTPUT: 5 watts.

PHILCO TUBES USED: Nine. One 6U7GRF, one 6K7G I. F. amplifier; one 6A8G, Det. Osc.; one 6N7G, osc. control; one 6H6G, discriminator; one 6Q7G, 2nd det. 1st audio; two 6F6G output, and one 5Y4G rectifier.

TUNING RANGE: Three. Range one—530 to 1720 K. C. Range two—2.3 to 7.4 M. C. Range three—7.35 to 22 M. C.

TONE CONTROL: Four positions.

SPEAKER: H20

MODEL 38-3
Alignment, Voltage
Trimmers

PHILCO RADIO & TELEV. CORP.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator; Philco Model 077 signal generator, using fundamental frequency from 115 to 36000 K. C. is the correct instrument for the purpose; (2) Output meter; Philco model 026 circuit tester incorporates a sensitive output meter and is recommended; (3) Philco fibre handle screw-driver, part No. 27-7059 and fibre wrench part No. 3164.

OUTPUT METER: The 026 output meter is connected to the plate and cathode terminals of one of the 6F6G tubes. Adjust the meter to use the (0-30) volt scale and advance volume control of receiver until a readable indication is noted after signal generator is connected in the following adjustments.

DIAL CALIBRATION: In order to adjust this receiver correctly the dial must be aligned to track properly with the tuning condenser. To do this proceed as follows:

1. Loosen the shaft coupling set screws. Then turn the tuning condenser fully closed and the dial to the first index line. Now tighten the shaft coupling set screws, and rotate the dial until the 520 K. C. mark is midway between the index line and the glowing beam indicator.
2. With condenser in this position loosen the set screws of the shaft coupling on the tuning condenser.
3. Then turn the tuning dial until the glowing beam indicator is entered on the index line.

NOTE: Be careful when turning the dial that the position of the tuning condenser is not disturbed.

4. Now tighten the shaft coupling set screws.

INTERMEDIATE FREQUENCY CIRCUIT

With signal generator output lead connected through a .1 mfd. condenser to the grid of the 6A8G det-osc. tube; and controls set as follows, adjust I. F. compensators for maximum output.

a. Magnetic Tuning Knob (34) off
b. Tone Control (93) normal
c. Volume Control (68) maximum
d. Receiver dial 580 K. C.
e. Signal generator 470 K. C.
f. Range Switch position (Broadcast)
g. Compensators in order (53), (51A), (45A), (45B).

RADIO FREQUENCY CIRCUIT

Tuning Range 530 to 1720 K. C.

1. Connect the signal generator output lead through a .1 mfd. condenser to "RED" terminal of the aerial panel and the generator ground to the chassis of the receiver.
2. Other controls set as given under intermediate frequency circuit, with the exception of those as follows: Adjust compensators for maximum output as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
1	1600 K. C.	1600 K. C.	(27) (7B) (7A)
1	580 K. C.	580 K. C.	(28) Roll gang through signal when padding this compensator. (See Note B)
1	1600 K. C.	1600 K. C.	(27)
1	1500.K. C.	1500 K. C.	(7B) (7A)

Tuning Range 2.3 to 7.4 M. C. Adjust compensators for maximum output as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
2	6 M. C.	6 M. C.	(27A)

Tuning Range 7.35 to 22 M. C. Adjust compensators for maximum output as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
3	18 M. C.	18 M. C.	(27B) check image at 17.06 M. C. (See Note A) (11) (4) Use shunt condenser on (27B) or rock gang through signal when padding compensator No. 11 (See Note C)
3	18 M. C.	18 M. C.	(27B)

MAGNETIC TUNING ADJUSTMENT: Set the range switch in position one (530 to 1720 K. C.) and the magnetic tuning switch in the "out" position. Now turn the signal generator and receiver dial to any frequency in the Broadcast band. The receiver dial must be adjusted very accurately for maximum output.

Set the magnetic tuning control in the "on" position (clockwise). Compensator (51B) of the magnetic tuning transformer is now adjusted for maximum output.

The above adjustment is now checked for accuracy, by turning the magnetic tuning control "off" and "on." In either position, there should be no change in the tone of the signal. If a change of tone or hiss develops, it indicates a shift in frequency and the adjustment must be repeated.

NOTE A—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). Then slowly turn compensator counter-clockwise until a second maximum peak is obtained on the output meter. This second peak is the fundamental signal, and the compensator must be adjusted for maximum output with it. The first peak from maximum capacity position of the compensator is the image signal and must not be used in adjusting this compensator.

If the above procedure is correctly performed, the image signal will be found (much weaker) 940 K. C. below the frequency being used on any high frequency range.

NOTE B—First tune compensator (28) for maximum output, then vary the tuning condenser of the receiver for maximum output about the 580 K. C. dial mark. Now turn compensator (28) slightly to the right or left and vary the receiver tuning condenser for maximum output. If the output reading increases, turn compensator (28) in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

NOTE C—To eliminate the effect of the R. F. compensator detuning the Osc. circuit, a variable tuning condenser of approximately 350 mmfd. is connected from the oscillator compensator to ground when designated in the padding instruction above. Tune the added condenser until the second harmonic of the receiver oscillator beats against the signal from the generator, resulting in a maximum indication on the output meter. Then adjust compensators as noted for maximum output.

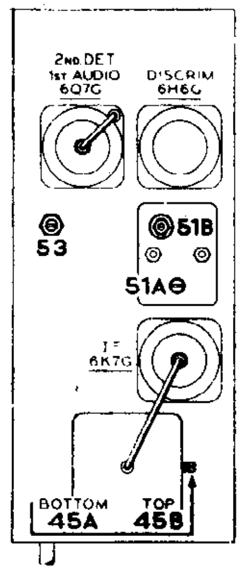


Fig. 2. I. F. Compensators Top of Chassis

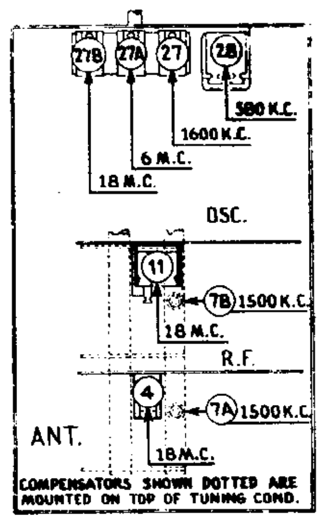


Fig. 3. R. F. Compensators Underside of Chassis

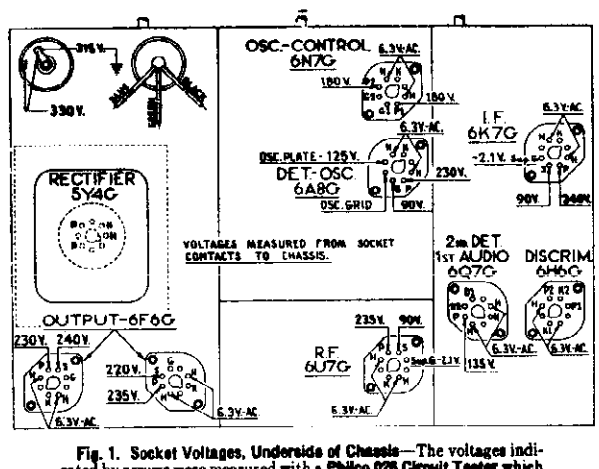
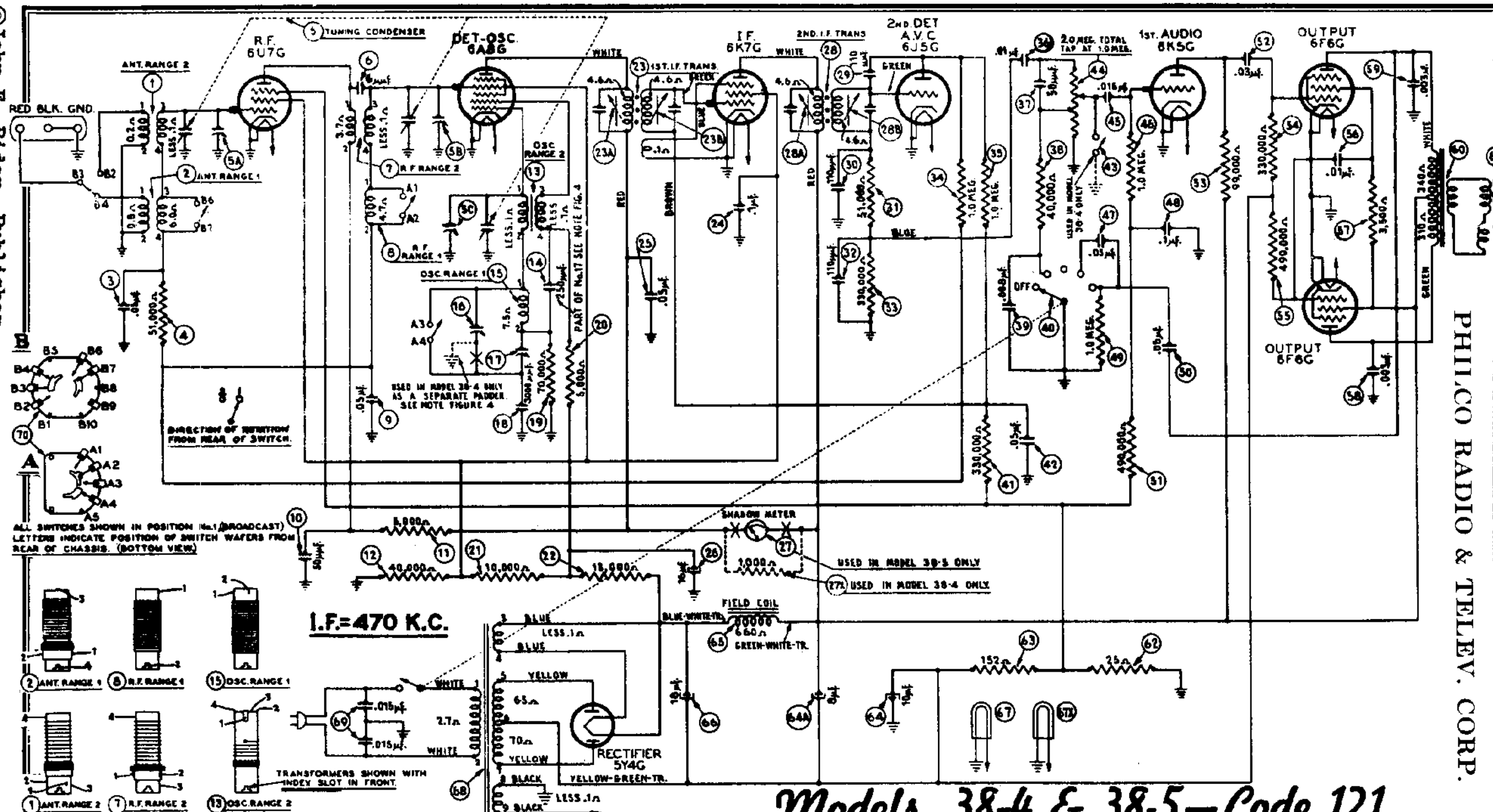


Fig. 1. Socket Voltages, Underside of Chassis—The voltages indicated by arrows were measured with a **Philco 026 Circuit Tester which** contains an accurate voltmeter. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

PHILCO RADIO & TELEV. CORP.



Models 38-4 & 38-5—Code 121

Model 38-4 employs the **Philco Cone-Centric Automatic Tuning System**; Type "H29" dynamic speaker unit and is assembled in a console cabinet type "XX".

Model 38-5 differs from the 38-4 in the tuning mechanism. The tuning mechanism of this receiver is of the manually operated type with vernier control and incorporates a shadowmeter for visual tuning. The receiver is designed for a table model cabinet type "B" and a console cabinet type "X". The B cabinet utilizes a dynamic speaker type "K39" and the "X" cabinet a dynamic speaker type "H29"

TUNING RANGES: Two Range 1—540 to 1720 K. C.
Range 2—5.7 to 18.2 M. C.

INTERMEDIATE FREQUENCY: 470 K. C.

POWER SUPPLY:

Voltage	Frequency	Consumption
110	60 cycle	95 watts
110	25 to 40 cycle	95 watts
115/230	50 to 60 cycle	95 watts

Different transformers are required for operation on the frequencies listed above. The part numbers of these transformers are listed on page 3.

UNDISTORTED OUTPUT: 5 watts.

TONE CONTROL: Four positions.

SPEAKERS:	38-4	38-5
B cabinet	—	K39
X cabinet	—	H29
XX cabinet	H29	—

May, 1937

MODELS 38-4, 38-5 Code 121
Alignment, Parts

PHILCO RADIO & TELEV. CORP.

REPLACEMENT PARTS—Models 38-4, 38-5

Schem. No.	Description	Part No.	List Price
1	Antenna transformer (range 2)	32-2566	
2	Antenna transformer (range 1)	32-2629	
3	Condenser (.06 mfd. tubular	30-4444	$0.20
4	Resistor (51000 ohms, ½ watt)	33-351339	.20
5	Tuning Condenser assembly (Model 4)	31-2058	
	Tuning Condenser (Model 5)	31-2062	
6	Condenser (strip of copper foil, 6 mmfd.)		
7	R. F. transformer (range 2)	32-2632	
8	R. F. transformer (range 1)	32-2630	
9	Condenser (.06 mfd., tubular)	30-4444	.20
10	Condenser (50 mmfd., mica)	30-1029	.20
11	Resistor (5000 ohms, ½ watt)	33-250339	.20
12	Resistor (40000 ohms, 1 watt)	33-340439	.20
13	Osc. transformer (range 2)	32-2633	1.25
14	Condenser (260 mmfd.) on compensator section. See Note fig. 4		
15	Osc. transformer (range 1)	32-2631	
16	Compensators (dual, 1500 and 580 K.C. Model 5)	31-6194	
	Compensators (air type, 1500 K.C. Model 4)	31-6196	
17	Compensator (580 K.C., Model 5; Part of 16)		
	Compensator (580 K.C. Model 4, condenser 14 is part of this unit	31-6199	
18	Condenser (3000 mmfd., mica)	30-1028	.45
19	Resistor (70,000 ohms, ½ watt)	33-370339	.20
20	Resistor (5000 ohms, ½ watt)	33-250339	.20
21	Resistor (10000 ohms, 1 watt)	33-310439	.20
22	Resistor (13000 ohms, 2 watt)	33-313539	.30
23	First I. F. transformer	32-2643	
24	Condenser (0.1 mfd., tubular)	30-4455	.35
25	Condenser (0.05 mfd., tubular)	30-4123	.20
26	Condenser (electrolytic, 16 mfd.)	30-2212	1.05
27	Shadowmeter (Model 38-5)	45-2307	2.50
27X	Resistor (1000 ohms, ½ watt)	33-210339	.20
28	Second I. F. transformer	32-2645	
29	Condenser (110 mmfd., mica)	30-1031	.20
30	Condenser (110 mmfd., mica)	30-1031	.20
31	Resistor (51000 ohms, ½ watt)	33-351339	.20
32	Condenser (110 mmfd., mica)	30-1031	.20
33	Resistor (330000 ohms, ½ watt)	33-433339	.20
34	Resistor (1.0 megohm, ½ watt)	33-510339	.20
35	Resistor (1.0 megohm, ½ watt)	33-510339	.20
36	Condenser (0.01 mfd., tubular)	30-4124	.25
37	Condenser (50 mmfd., mica)	30-1029	.20
38	Resistor (40000 ohms, ½ watt)	33-340339	.20
39	Condenser (0.006 mfd., tubular)	30-4112	.20
40	Tone Control Switch and off-on switch	42-1341	
41	Resistor (330000 ohms, ½ watt)	33-433339	.20
42	Condenser (0.06 mfd., tubular)	30-4619	$0.20
43	(Used on Model 38-4 only) Audio shorting switch, section of 45-2476 Selector arm		
44	Volume Control (Model 5)	33-5334	
	Volume Control (Model 4)	33-5335	
45	Condenser (0.015 mfd., tubular)	30-4368	.20
46	Resistor (1.0 megohms, ½ watt)	33-510339	
47	Condenser (.02 mfd., tubular)	30-4447	
48	Condenser (0.1 mfd. bakelite)	4969BG	.25
49	Resistor (1.0 megohms, ½ watt)	33-510339	.20
50	Condenser (.05 mfd., bakelite)	8795BU	.25
51	Resistor (490000 ohms, ½ watt)	33-449339	.20
52	Condenser (0.02 mfd., bakelite)	8318BU	.36
53	Resistor (99000 ohms, ½ watt)	33-399339	.20
54	Resistor (330000 ohms, ½ watt)	33-433339	.20
55	Resistor (490000 ohms, ½ watt)	33-449339	.20
56	Condenser (0.01 mfd., tubular)	30-4169	.20
57	Resistor (3500 ohms, ½ watt)	33-235339	.20
58	Condenser (0.008 mfd., tubular)	30-4469	.20
59	Condenser (0.003 mfd., tubular)	30-4469	.20
60	Out put transformer (H29, K39)	32-7754	1.50
61	Voice Coil and Cone Assembly (K39)	36-3174	1.00
	Voice Coil and Cone Assembly (H29)	36-3801	1.40
62	Bias resistors (25 ohms and 152 ohms)	33-3317	
63	Part of 62, 152 ohm Section		
64	Dual Electrolytic Condenser (8 & 10 mfd.)	30-2201	1.75
65	Field Coil and Pot Assembly (H29)	36-3218	4.25
	Field Coil and Pot Assembly (K39)	36-3239	4.25
66	Electrolytic Condenser (18 mfd.)	30-2200	1.40
67	Pilot Lamp	34-2064	.07
67X	Lamp (Shadowmeter Model 5)	34-2064	
68	Power Transformer, 115V, 50/60 cycles	32-7637	
	" " 115V, 25/40 cycles	32-7608	8.00
	" " 115/230V, 50-60 cycles	32-7639	
69	Condensers (0.015 mfd., dual bakelite)	3793DG	.40
70	Range Switch (Model 5)	42-1335	
	Range Switch (Model 4)	42-1340	
	Brace (38-4, Tuning Unit)	28-5119	
	Cable (Speaker) (38-5 & 38-4)	41-3324	
	Cable Power	L-2778	.40
	Cable (Shadowmeter, Model 5)	41-3225	.40
	Clip (R. F. Transformer)	28-5007	.02
	Dial (38-4, Supplied by Distributor, in each district)	27-5337	
	Dial Pointer Assembly	38-8026	
	Dial 38-5	27-5330	
	Dial Washer 38-5	27-4866	
	Dial Clamp 38-5	28-5089	.03
	Gear (Small) Cone-Centric	45-2490	
	Gear (Large) Cone-Centric	45-2491	
	Knob Ass'y Vernier (Large) 38-4	45-2477	
	Knob Ass'y Selector (Small) 38-4	27-4572	
	Knob (Tuning) (Model 5)	27-4330	$0.10
	Knob (Tuning, Vernier) (Model 5)	27-4331	.10
	Knob (Tone & Volume)	27-4332	.10
	Mtg. Plate Ass'y, Cone-Centric Tuning Mechanism	45-2479	
	Mtg. Washer, Rubber, (Chassis)	27-4871	
	Mtg. Cushion (Tuning Condenser)	27-4899	
	Mtg. Corners (Chassis)	27-4564	.10
	Pilot Lamp Socket Assembly (38-5)	38-8954	
	Reflector Assembly Cone-Centric Mechanism	45-2478	
	Selector Arm Assembly (Cone-Centric)	45-2476	
	Shield (R. F. Unit) 38-5	38-8814	
	Screen Brkt. Assembly (38-5)	31-2060	
	Socket (7 prong)	27-6067	.11
	Socket (8 prong)	27-6066	.11
	Socket (8 Prong) Power Tubes	27-6067	.11
	Terminal Panel (Ant.)	38-8746	
	Tube Shield (Square)	28-2726	.10
	Tube Shield (Round)	28-5031	.12
	Tube Shield Base (Square)	28-2725	.03
	Tube Shield Base (Round)	28-5030	
	Vernier Drive (Model 5)	31-2069	
	Wrench (Station, Setting) Model 4	45-2475	.45
	Wrench (Set Screws)	45-2481	.40

38-4XX CABINET

Description	Part No.	List Price
Bezel Ring (Cabinet)	28-5128	
Bezel Gasket	27-8903	
Speaker H29	36-1293	8.25

38-5 X CABINET

Description	Part No.	List Price
Bezel Frame Assembly	40-6129	1.10
Bezel Gasket	27-8913	.01
Bezel Glass	27-8300	.06
Bezel Ring	28-5080	.70

38-5 B CABINET

Description	Part No.	List Price
Bezel (Frame Assembly)	40-6127	
Bezel Gasket	27-8212	.01
Bezel Glass	27-8299	.06
Bezel Ring	28-5079	.60
Speaker K39	36-1295	

Prices subject to change without notice.

Electrical Specifications

TYPE CIRCUIT: An eight tube A.C. operated super-heterodyne circuit is incorporated in these receivers with features, such as Philco foreign tuning system; a high gain R.F. amplifier; two tuning ranges; iron core adjusted I.F. transformers; automatic volume control; bass compensation, and a pentode push-pull audio output circuit.

The same circuit is used in both models. The features, however, such as tuning mechanism; speaker, and cabinets differ in each model.

PHILCO TUBES USED: Eight—6U7G, R. F. amp.; 6A8G, Det. Osc.; 6K7G, I. F. amp.; 6J5G, 2nd Det., A.V.C.; 6K5G, 1st audio; two 6F6G, audio output; and one 5Y4G rectifier.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, having a fundamental frequency range covering the tuning and intermediate frequencies of the receiver. Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36000 K. C. is the correct instrument for this purpose; (2) Output meter, Philco Model 026 circuit tester incorporates a sensitive output meter and is recommended; (3) Philco Fibre Handle Screw Driver, part No. 27-7059 and Fibre Wrench, part No. 3164.

OUTPUT METER: The 026 output meter is connected to the plate and cathode terminals of one of the 6F6G tubes. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter after signal is applied.

DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial of each model proceed as follows:

Model 38-4

1. Loosen the tuning condenser shaft coupling set screws (use wrench Part No. 45-2481), and turn the tuning condenser to the maximum capacity position (Plates fully meshed). Turn the selector knob until the dial pointer is on the small black dot at the low frequency end of the Range One scale. With condenser and pointer set in this position tighten set screws.
2. Now turn the selector knob clockwise until the dial pointer moves 1/16 of an inch to the left of the small dot and the first straight line on the scale (See Fig. 6). Hold pointer and condenser in this position, and carefully loosen shaft coupling set screws.
3. After set screws are loose, turn the selector knob until dial pointer is again on the small black dot at the low frequency end of Range One scale.

Be careful when turning the selector knob that the position of the tuning condenser is not disturbed.

Tighten shaft coupling set screws with condenser and dial pointer in this position.

Model 38-5

1. Turn the tuning condenser to maximum capacity position (plate fully meshed).
2. Holding the tuning condenser in this position, loosen the dial clamp; then turn the dial until the indicator is centered on the middle index line (See Fig. 7). Tighten clamp in this position.

Before any of the following adjustments are made, the receiver should be turned "on" for at least 5 minutes.

INTERMEDIATE FREQUENCY CIRCUIT

Insert the signal generator shielded output lead into the "Med" jack on the panel of the generator. Connect the other end of the output lead through a .1 mfd. condenser to the grid of the 6A8G, det. osc. tube and the ground connection of the signal generator to the chassis. Set the signal generator and receiver controls, and adjust the I. F. compensators as follows:

1. Set Signal Generator at 470 K. C. Turn "Multiplier" Control to 1000 and the "Attenuator" for maximum output.
2. Turn the receiver dial to 580 K. C.
3. Receiver Volume Control maximum.
4. Range Switch Broadcast Position.
5. Adjust compensators (28B), (28A), (23B), and (23A) for maximum output. If the output meter goes off scale when adjusting the compensators retard signal generator attenuator

RADIO FREQUENCY CIRCUIT

Tuning Range: 5.7 to 18.2 M. C.

1. With one end of the shielded lead of the signal generator output lead in the "Med" jack, connect the other end through the .1 mfd. condenser to the "Red" terminal of the aerial panel of the receiver. The output lead ground must be connected to the black terminal or to the chassis.
2. Set the controls and adjust the R. F. compensators as follows:

Volume Control	Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Max.	2	18 M. C.	(5C) See Note A

Tuning Range: 530 to 1720 K. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
1	1500 K. C.	(16), (5B), (5A)
1	580 K. C.	(17)
1	1500 K. C.	(16), (5B), (5A)

NOTE A—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a second maximum peak is obtained on the output meter. Adjust the compensator for maximum output using this second peak. The first peak from maximum capacity position of the compensator is the image signal and must not be used in adjusting the compensator.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 940 K. C. below the frequency being used on the high frequency range.

Service Data

FOR CONE-CENTRIC TUNING MECHANISM—MODEL 4

Complete information for setting the stations on the Cone-Centric Tuning mechanism of Model 38-4 will be found in the instruction sheet (Form No. 39-5533) which is supplied with each set.

The locations of a few assemblies of the Cone-Centric Automatic Tuning mechanism is illustrated in Fig. 2. The part numbers and prices of these assemblies are listed on page 3. A complete list of replacement parts and detailed service data for the mechanism will be found in bulletin 282.

Aerial Connections

To obtain the full advantage of the sensitivity of these receivers, the Philco High Efficiency Aerial Part No. 40-6112 must be used.

For attaching the aerial to the receiver a terminal panel is provided at the rear of the chassis. This panel contains three screw terminals marked "Red", "Blk" and "Gnd". Connect the red and black wires of the Philco High Efficiency Aerial transmission line to the "Red" and "Blk" terminals respectively.

If you use a temporary aerial, connect it to the "Red" terminal. A good ground connection is necessary for best reception. The terminal mark "Gnd" should be connected to a water pipe or any other good ground source.

Dial Adjustments

PHILCO RADIO & TELEV. CORP.

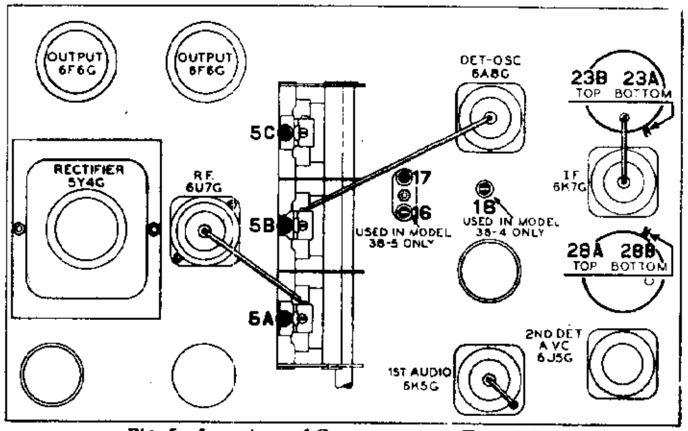


Fig. 5. Locations of Compensators Top of chassis

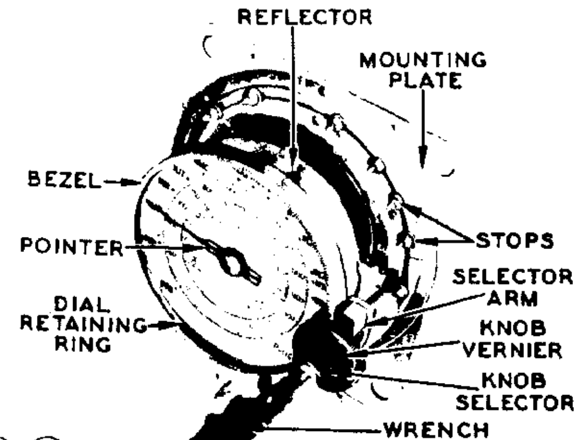


Fig. 2—Cone-Centric Automatic Tuning Mechanism, Model 4

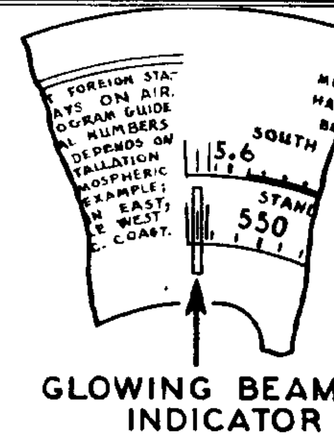


Fig. 7. Dial Calibration Model 5

Models 38-4, 38-5
Code 121

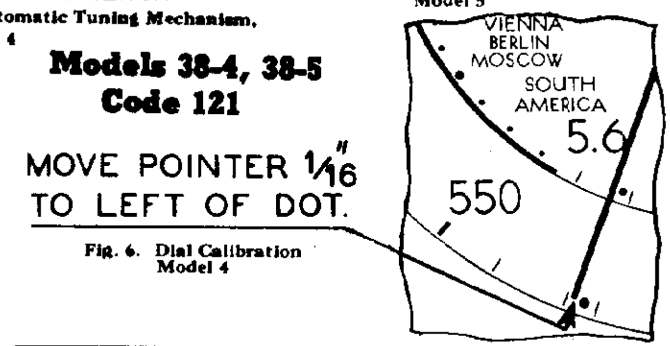
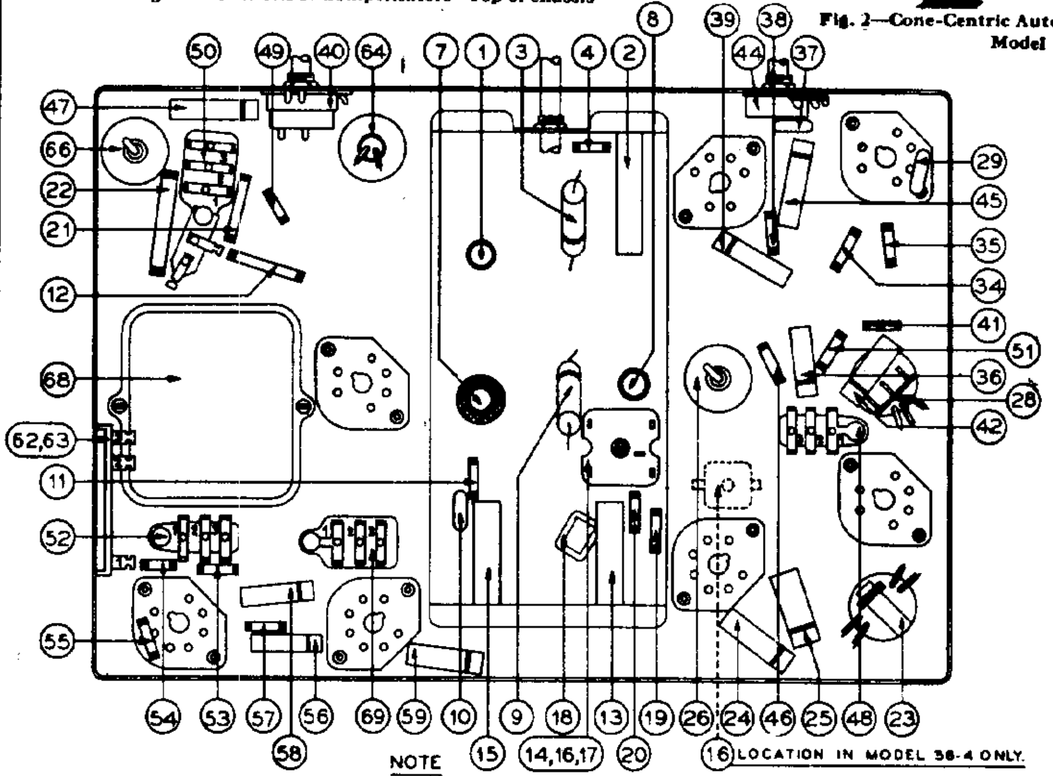


Fig. 6. Dial Calibration Model 4



NOTE
No'S 14,16,17, IS A SINGLE UNIT COMPENSATOR WHEN USED IN MODEL 38-5. IN MODEL 38-4, No.16 IS A SINGLE COMPENSATOR, AND No'S 14 & 17 ARE CONTAINED IN A SINGLE UNIT.

Fig. 4—Locations of Parts, Underside of Chassis

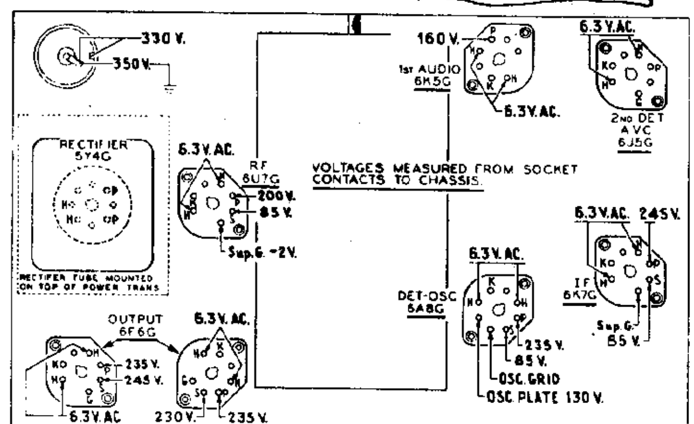


Fig. 1—Socket Voltages—Underside of Chassis View
The Voltages indicated by arrows were measured with a Philco 026 Circuit Tester which contains a sensitive voltmeter. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

MODELS 38-7(121,124)
38-8(121),38-9(121) PHILCO RADIO & TELEV. CORP.
Voltage,Trimmers,Chassis

PHILCO TUBES USED: Six—one 6A8G, det. osc.; one 6K7G, I. F. amp.; one 6J5G, 2nd Det. A. V. C.; one 6K5G 1st audio; one 6F6G, output; one 5Y4G rectifier.

CABINETS AND SPEAKERS:

	Cabinet	Speaker
38-7 Code 121	XX	H31
38-7 Code 121	T	K41
38-7 Code 124	CS	K41
38-8 Code 121	X	HS
38-9 Code 121	K	HS
38-9 Code 121	T	S7
38-9 Code 121	X	HS

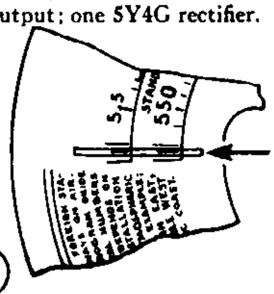


Fig. 6 Dial Calibration Models 38-8; 38-9

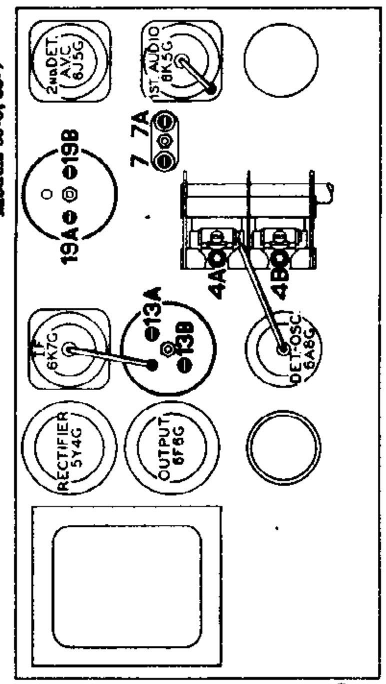


Fig. 4—Locations of Compensators—Top of Chassis

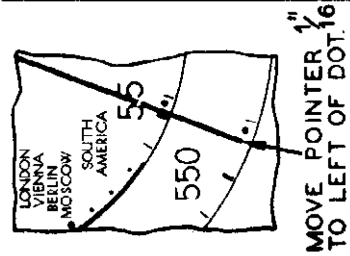
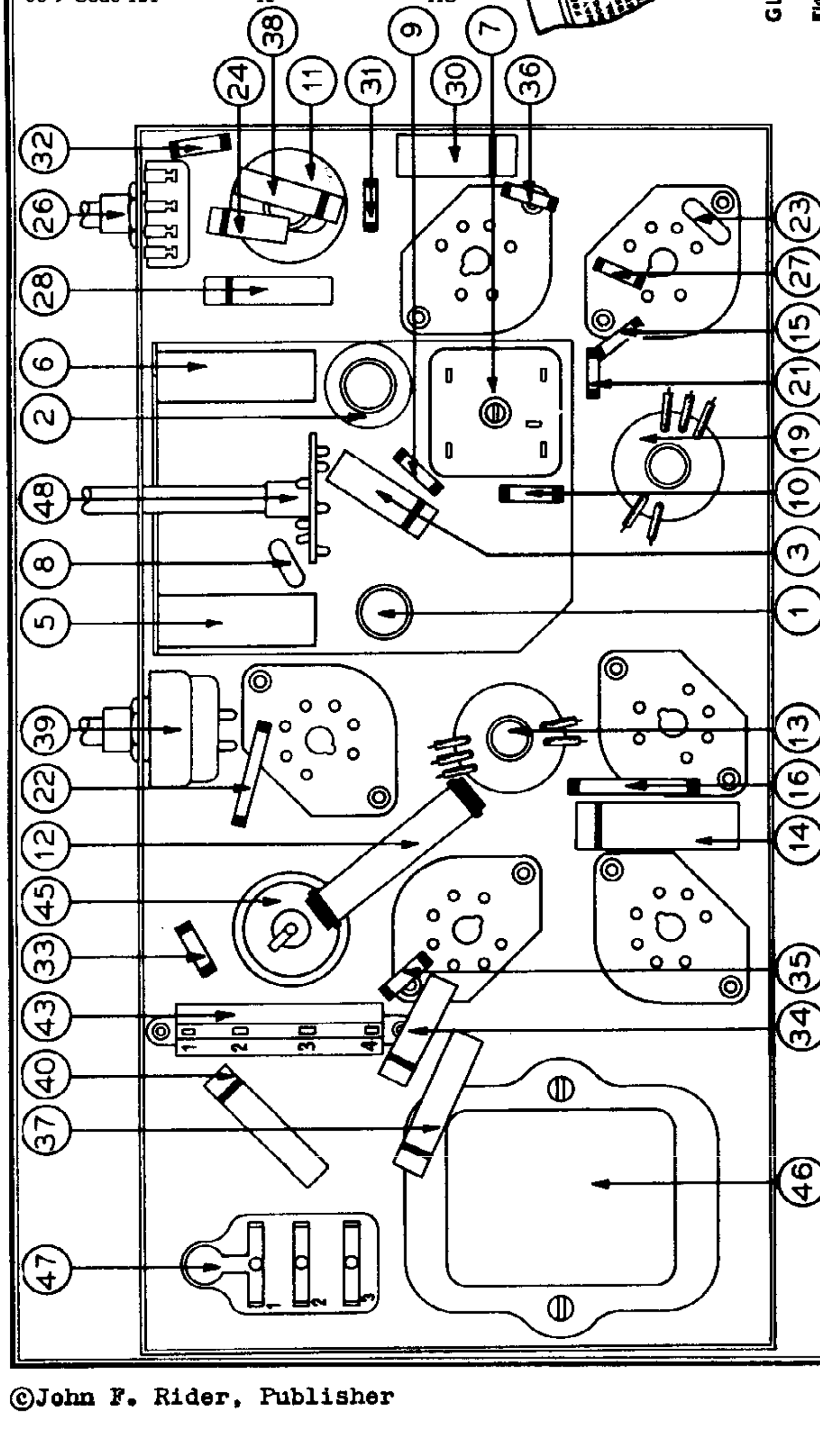


Fig. 5 Dial Calibration Model 38-7



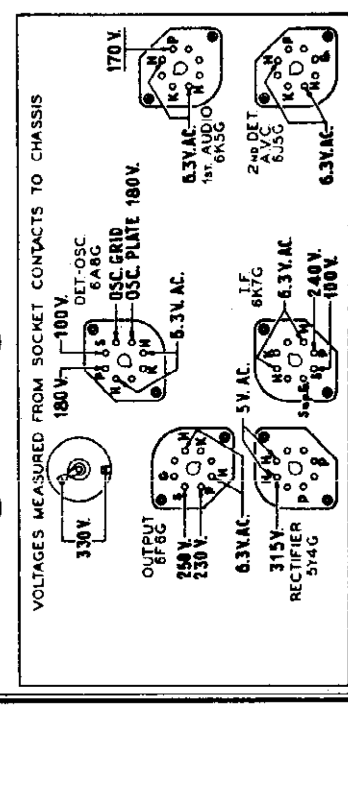
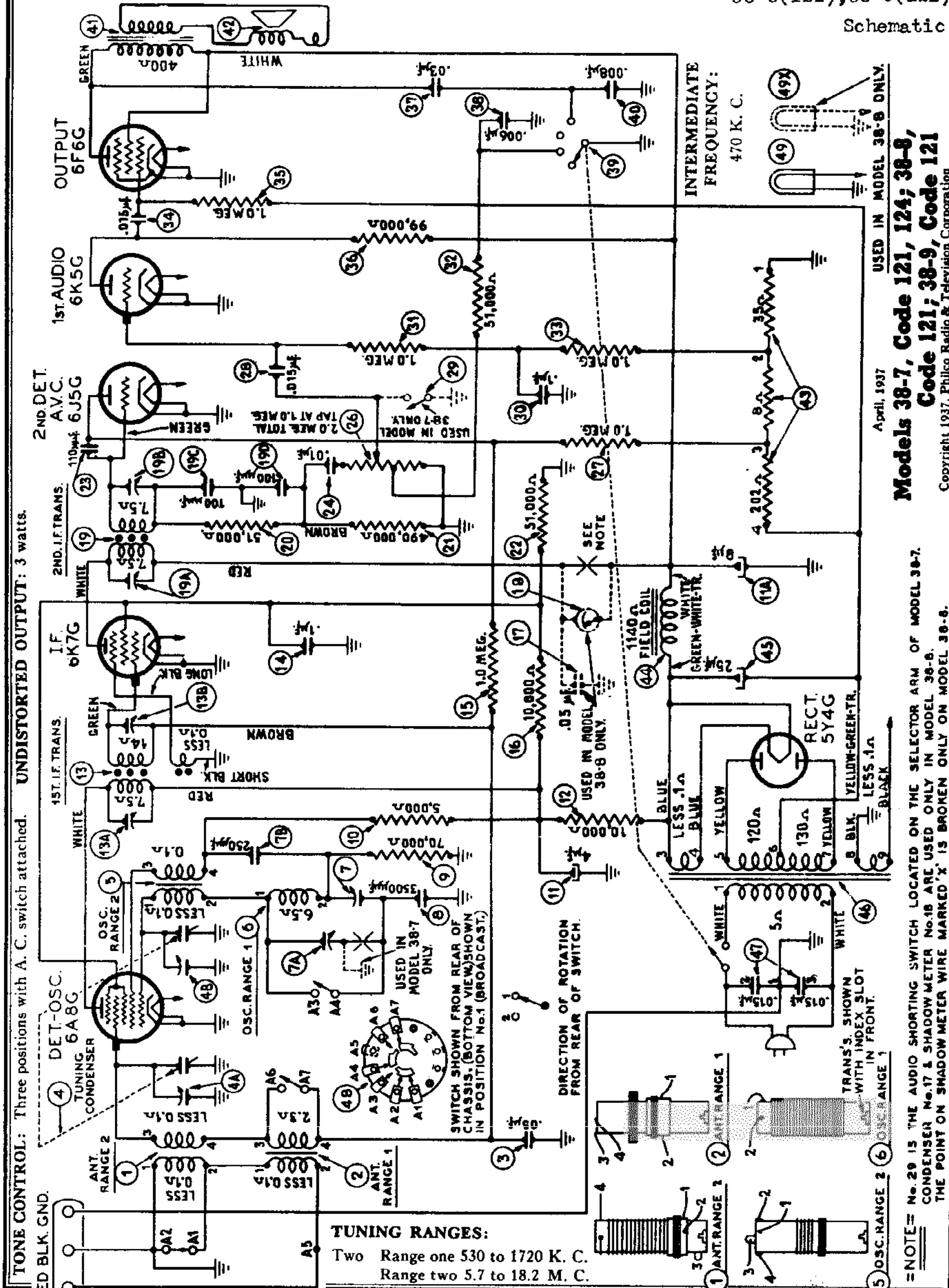


Fig. 1—Socket Voltages—Underside of Chassis View
The Voltages indicated by arrows were measured with a Philco 026 Circuit Tester which contains a sensitive voltmeter. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

PHILCO RADIO & TELEV. CORP. MODELS 38-7(121,124) 38-8(121),38-9(121)

Schematic



MODELS 38-7(121,124)
38-8(121),38-9(121)
Alignment,Parts

PHILCO RADIO & TELEV. CORP.

Electrical Specifications

Models 38-7, 38-8 and 38-9 receivers employ a six tube A. C. operated superheterodyne circuit with such features as: Two tuning ranges covering standard and short wave broadcasts; Philco foreign tuning system; automatic volume control; bass compensation; tone control, and pentode audio output circuit.

The same circuit is used for each receiver. The features, however such as, tuning mechanism, speakers and cabinets differ in each model.

Model 38-7 in addition to the features given above employs the Philco automatic tuning mechanism with cone-centric tuning. The chassis of this model is built into a console cabinet type XX, Table Cabinet Type "T" and is designated code 121. The same chassis built into a type "CS" cabinet is identified as code 124.

Model 38-8 differs from the 38-7 in that a manually operated tuning mechanism with shadowmeter tuning is used. This receiver is built into a type "X" cabinet with a type "HS" dynamic speaker.

Model 38-9 is identically the same as model 38-8 with the exception that the shadowmeter is not used, and that the speaker and cabinet types differ. This model is assembled in a type "T" cabinet with dynamic speaker type "S7" and a "K" type cabinet using a dynamic speaker type "HS".

POWER SUPPLY:

Voltage	Frequency	Consumption
115	50 to 60 cycles	70 Watts
115	25 to 40 cycles	70 Watts
115/220V	50 to 60 cycles	70 Watts

Different transformers are required for operation on the frequencies listed above. These are shown on the Parts List.

SERVICE DATA FOR AUTOMATIC TUNING MECHANISM—MODEL 7

Complete information for setting the stations on the cone-centric tuning mechanism of Model 38-7 is covered in the instruction form no. (39-5533) which is supplied with each set.

A few major assemblies of the automatic cone-centric tuning mechanism are listed on page 3 of this bulletin. A complete list of replacement parts, however, and detailed service data for the automatic mechanism, will be found in bulletin 282.

SHADOW METER ADJUSTMENT
Model 38-8

Apply power to the receiver and allow tubes to warm up. Then adjust shadow meter as follows:

1. Move the shadow meter coil backwards and forwards, until the opposite edges of the shadow are 1/8 of an inch from each end of the shadow screen, measuring along the bottom edge of the screen. Adjustment of the shadow meter light bracket may be necessary for perfect centering.

2. Remove the rectifier tube from its socket, and rotate the shadowmeter coil until shadow reaches minimum width. This width should not exceed 3/32 of an inch.

3. Replace the 5Y4G rectifier tube in its socket. The shadow should then widen to not more than 3/16 inch or less than 1/16 inch from each side of the screen measuring along the bottom edge. If these limits are not obtained readjust the shadow meter as given in paragraphs 1 and 2 again.

Alignment of Compensator

EQUIPMENT REQUIRED: (1) Signal Generator, using a fundamental frequency covering the intermediate and tuning ranges of the receivers. Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36000 K. C. is the correct instrument for this purpose; (2) Output meter, Philco Model 026 circuit tester incorporates a sensitive output meter and is recommended: (3) Philco Fibre Handle Screw Driver, part No. 27-7059 and Fibre Wrench No. 3164.

OUTPUT METER: The 026 output meter is connected to the plate and cathode terminals of the 6F6G tube. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter.

DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial of each model proceed as follows:

Model 38-7: 1. Loosen the shaft coupling set screws, using wrench Part No. 45-2481; then turn the tuning condenser to the maximum capacity position (plate fully meshed). Now turn the selector knob until the dial pointer is on the small black circle at the low frequency end of the Range One scale. With condenser and pointer set in this position tighten set screws. 2. Now turn the selector knob (clockwise) until the dial pointer moves 1/16 of an inch from the small circle (clockwise), see Fig. 5. Leave pointer in this position and loosen coupling set screws. 3. After loosening set screws, turn the selector knob until pointer is again on the small black dot at low frequency end of Range One scale. Be careful when turning the selector knob that the position of tuning condenser is not disturbed. Tighten coupling set screws with condenser and dial pointer in this position.

Models 8 and 9: 1. Turn the tuning condenser to maximum capacity position (plates fully meshed). 2. Loosen the clamp of dial, then turn the dial—being careful that position of tuning condenser is not disturbed—until the glowing indicator is centered on the middle index line at the low frequency end of Range One scale. Tighten the dial clamp in this position.

Note—Before the following adjustments are performed, the receiver must be turned on and allowed to heat for 15 minutes.

INTERMEDIATE FREQUENCY CIRCUIT

Insert the signal generator output lead into the "Med" Jack on the panel of the generator. Connect the other end of the output lead through a .1 mfd. condenser to the grid of the 6A8G, det. osc. tube and the ground connection of the signal generator to the chassis. Set the signal generator and receiver controls, and adjust the I. F. compensator as follows:

1. Set Signal Generator at 470 K. C. Turn "Multiplier" Control to 1000 and the "Attenuator" for maximum output.
2. Turn the receiver dial to 580 K. C.
3. Receiver Volume Control maximum.
4. Range Switch Broadcast Position.
5. Adjust compensators (19B), (19A), (13B), and (13A) for maximum output. If the output meter goes off scale when adjusting the compensators retard signal generator attenuator.

RADIO FREQUENCY CIRCUIT

Tuning Range: 5.7 to 18 M. C.

1. Insert the Signal Generator output lead in the "Med." jack on the panel, and connect the other end through the .1 mfd. condenser to the "Red" terminal of the aerial panel of the receiver. The output lead ground must be connected to the "Blk" terminal or to the chassis.

2. Leave the receiver volume control at maximum. Then set the controls and adjust the R. F. compensators as follows:

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
2	18 MC.	4B See Note A

Tuning Range: 530 to 1720 K. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
1	1500 KC.	(7A), (4A)
1	580 KC.	7
1	1500 KC.	7A

NOTE A—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). Now, slowly turn compensator counter-clockwise until a second maximum peak is obtained on the output meter. The second peak is the fundamental signal, and must be used in adjusting the receiver for maximum output. The first peak from maximum capacity position of the compensator is the image signal and must not be used in adjusting this compensator.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 940 KC. below the frequency being used on any high frequency range.

REPLACEMENT PARTS

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer—Short Wave	32-2558	
2	Antenna Transformer—Broadcast	32-2557	$1.25
3	Condenser .05 mf.	30-4519	.30
4	Tuning Condenser, Models 8 and 9	31-2025	
	Tuning Condenser, Model 7	31-2040	
5	Osc. Transformer—Short Wave	32-2560	1.25
6	Osc. Transformer—Broadcast	32-2559	
7	Compensator Dual Models 8 and 9	31-6188	
	Compensator ... (Model 7)	31-6195	
7A	Compensator Model 7 (1500 KC.)	31-6196	
8	Condenser ... mmf. mica	30-1094	.40
9	Resistor 70,000 ohms (½ watt)	33-370339	.20
10	Resistor 6000 ohms (½ watt)	33-260339	.20
11	Condenser, Electrolytic Dual (4 and 8 mfd.)	30-2217	
12	Resistor 10,000 ohms (3 watt)	33-310439	.30
13	1st I. F. Transformer	32-2580	
14	Condenser .1 mf.	30-4456	.25
15	Resistor 1.0 meg. (½ watt)	33-510339	.20
16	Resistor 10,000 ohms (1 watt)	33-310439	.20
17	Condenser .05 mf. (38-8 only)	30-4454	
18	Shadowmeter (38-8 only)	45-2307	2.50
19	2nd I. F. Transformer	32-2582	
20	Resistor 51,000 ohms (mounted in 19)	33-351339	.20
21	Resistor 490,000 ohms (½ watt)	33-449339	.20
22	Resistor 51,000 ohms (1 watt)	33-351439	.20
23	Condenser, mica, 110 mmf.	30-1031	.20
24	Condenser .01 mf.	30-4479	.20
25	Removed Prior to Production		
26	Volume Control	33-5216	
27	Resistor 1 meg. (½ watt)	33-510339	.20
28	Condenser .015 mf.	30-4358	.20
29	Audio Shorting Switch (38-7 only) Part of Selector Crank		
30	Condenser .2 mf.	30-4409	.20
31	Resistor 1.0 meg. (½ watt)	33-510339	.20
32	Resistor 51,000 mf. (½ watt)	33-351339	.20
33	Resistor 1.0 meg. (½ watt)	33-510339	.20
34	Condenser .015 mf.	30-4515	.20
35	Resistor 1.0 meg. (½ watt)	33-510339	.20
36	Resistor 99,000 ohms (½ watt)	33-399339	.20
37	Condenser .03 mf.	30-4447	.20
38	Condenser .06 mf.	30-4467	.20
39	Tone Control	42-1327	
40	Condenser .006 mf.	30-4112	$0.20
41	Output Transformer (Model 7)	32-7861	
	Output Transformer (Models 8 and 9)	32-7019	.85
42	Cone and Voice Coil Assembly (H31)	36-3801	1.40
	Cone and Voice Coil Assembly (K41)	36-3174	1.00
	Cone and Voice Coil Assembly (HS)	36-3796	1.20
	Cone and Voice Coil Assembly (S7)	36-3157	1.00
43	Bias Resistor	33-3316	
44	Field Coil Assembly (H31)	36-3065	4.75
	Field Coil Assembly (K41)	36-3931	
	Field Coil Assembly (HS)	36-3660	3.50
	Field Coil Assembly (S7)	36-3039	3.50
45	Electrolytic Condenser	30-2319	
46	Power Transformer, 115V, 50/60 cycle	32-7833	
	Power Transformer, 110V, 25 to 40 cycle	32-7627	
	Power Transformer, 115/230V, 50/60 cycle	32-7835	
47	Condenser .015—.015 mf., 25 mf.	3793DG	.40
48	Wave Switch	42-1335	
49	Pilot Lamp, Models 8 and 9	34-2064	

MODELS 38-7, 8, 9 PARTS

Description	Part No.	List Price
Pilot Lamp, Model 7	34-2184	
Cable (Power)	L-2778	.40
Cable (Speaker)	L-2840	
Cable (Shadowmeter, Model 8)	41-3225	.40
Dial, Models 8 and 9	27-5327	
Dial Clamp	27-5089	
Dial Washer	27-4446	
Knob	27-4330	.10
Knob	27-4331	.10
Knob	27-4332	.10
Mtg. Corner, Rubber (Chassis)	27-4564	.10
Mtg. Rubber (Tuning Condenser)	27-4599	
Screen Brkt. Assembly (Models 8 and 9)	31-2047	
Socket (7 prong)	27-6087	
Socket (6 prong)	27-6086	
Socket Ass'y (Pilot lamp) Models 8 & 9	38-6844	
Vernier Drive Ass'y, Models 8 and 9	31-2072	

MODEL 37-8 PARTS

Description	Part No.	List Price
Bracket Assembly	45-2479	
Brace (Mtg. Unit)	28-5118	

Schem. No.	Description	Part No.	List Price
	Bearing (Main Shaft)	28-7242	
	Bezel Assembly (Scale)	40-6136	
	Coupling Assembly	31-2056	
	Dial Model 7, suppl. by your distributor	27-5336	
	Dial Retaining Ring	28-5107	
	Dial Mechanism, Cone-centric complete	31-2092	
	Escutcheon Ring	28-5128	
	Felt (Stop Cover)	27-8872	
	Gear, Tuning Condenser (small)	45-2490	
	Gear, Tuning Condenser (large)	45-2491	
	Knob (Selector)	27-4372	
	Knob (Vernier)	45-2477	
	Knob Spring	28-8761	
	Knob Retaining Screw	28-6672	
	Reflector Assembly	45-2478	
	Selector Crank Assembly	45-2476	
	Shaft (Coupling)	28-6675	
	Stop Assembly	31-2085	
	Stop Cover (Mounted on Selector Crank)	28-5088	
	Shaft (Tuning Condenser Gear)	28-6675	
	Pointer Assembly	38-8925	
	Wrench (Setting Stops)	45-2475	

CABINET PARTS MODEL 8

Description	Part No.	List Price
Baffle and Silk Assembly (X)	40-6448	
Bezel Plate Assembly (X)	40-6129	
Bezel Gasket	27-8313	$0.01
Bezel Glass	27-8300	.06
Bezel Ring	28-5080	

CABINET PARTS MODEL 9

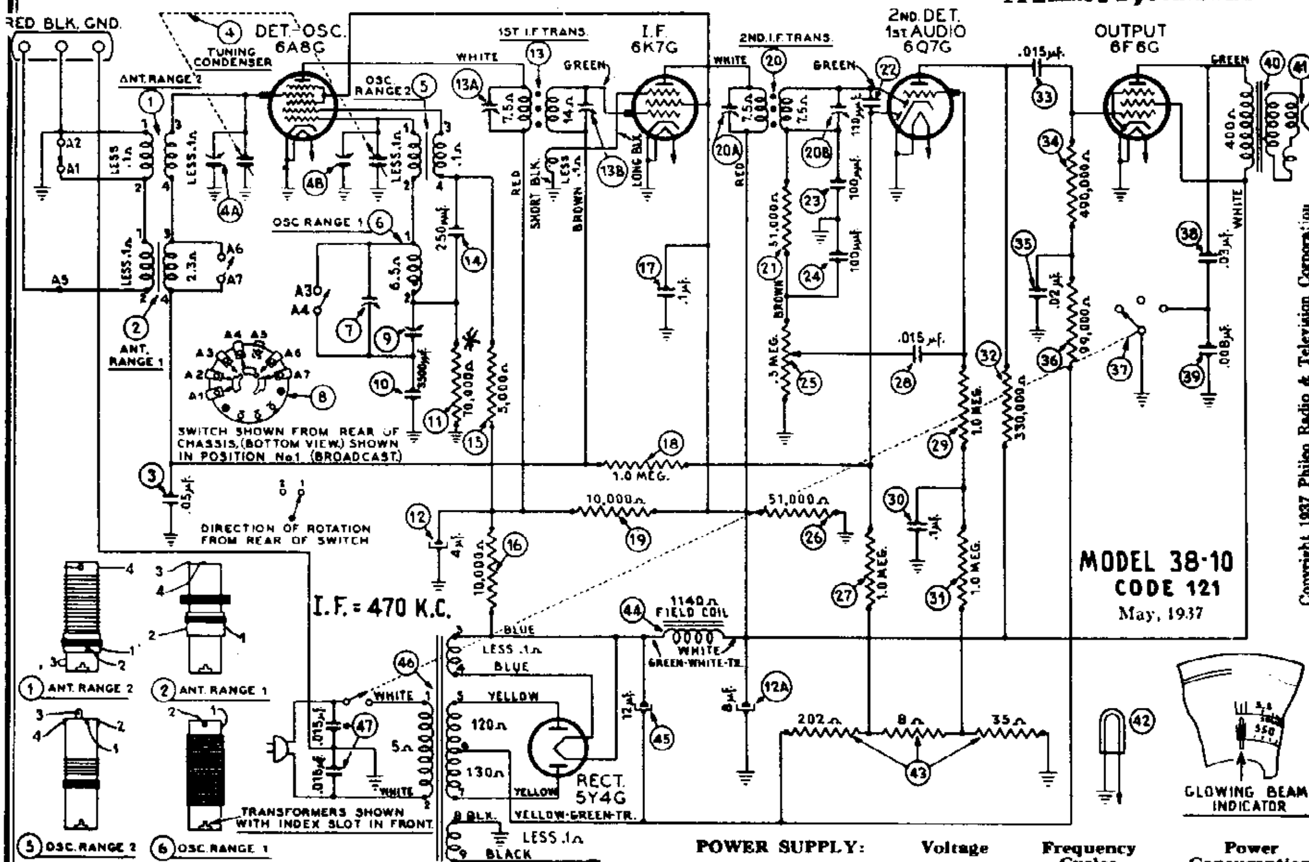
Description	Part No.	List Price
Baffle and Silk Assembly (X cabinet)	40-6448	
Baffle and Silk Assembly (K cabinet)	40-6139	
Baffle and Silk Assembly (T cabinet)	40-6140	
Bezel Plate Assembly (K, X)	40-6128	
Bezel Plate Assembly (T)	40-6124	.90
Bezel Gasket (X, K)	27-8313	.01
Bezel Gasket (T)	27-8311	.01
Bezel Glass (K, X)	27-8300	.06
Bezel Glass (T)	27-8298	.05
Bezel Ring (K, X)	28-5080	
Bezel Ring (T)	28-5078	.35

Prices to subject to change without notice.

* Change to 40K to improve oscillator performance see Riders C10-2

PHILCO RADIO & TELEV. CORP.

MODEL 38-10, Code 121
Schematic, Voltage
Trimmers, Chassis



POWER SUPPLY:

Voltage	Frequency Cycles	Power Consumption
115	50 to 60	60 watts
115	25 to 40	60 watts
115/230	50 to 60	60 watts

The part number of these transformers are shown on the Parts List Page

Electrical Specifications

TYPE OF CIRCUIT: Five tube, A.C. operated superheterodyne circuit with features; such as two tuning ranges covering the frequencies shown under "Tuning Ranges"; Automatic Volume Control; and a Pentode Audio Output Stage.

PHILCO TUBES USED: Five—one 6A8G, Det. osc.; one 6K7G, I. F.; one 6Q7G, 2nd Det. 1st audio; one 6F6G, output, and one 5Y4G, Rectifier.

TONE CONTROL: Two position with A.C. switch attached.

SPEAKERS: Type S7 in T Cabinet, HS in F Cabinet.

INTERMEDIATE FREQUENCY: 470 K. C.

TUNING RANGES: Two—Range 1, 540 to 1720 K. C.
Range 2, 5.7 to 18 M. C.

UNDISTORTED OUTPUT: 3 watts.

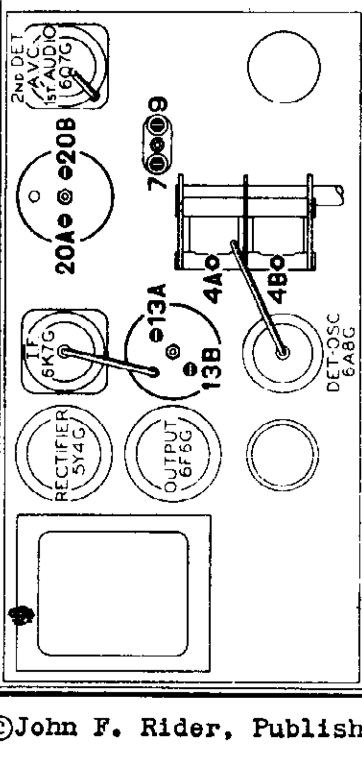


Fig. 2. Locations of Compensators—Top of Chassis

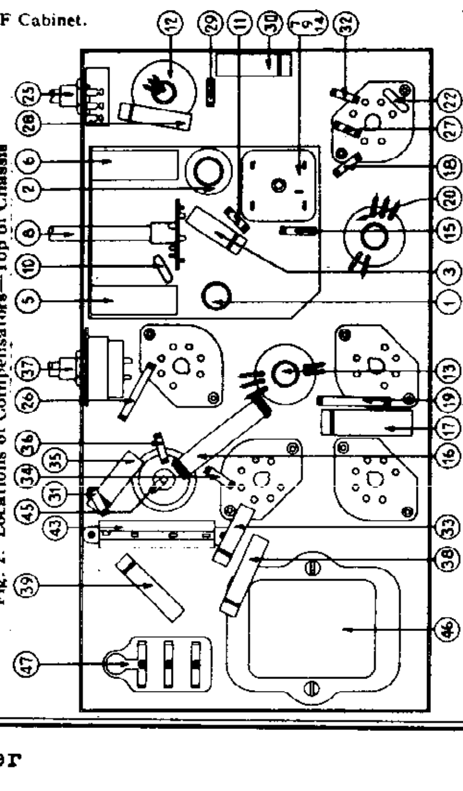


Fig. 4. Part locations, Underside of Chassis

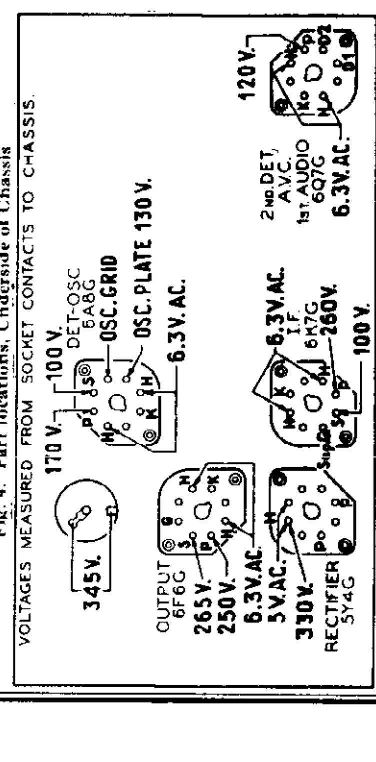


Fig. 1. Socket Voltages, Underside of Chassis
The voltages indicated by arrows were measured with a Philco #26 Circuit Tester which contains an accurate voltmeter. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

MODEL 38-10, Code 121
Alignment, Parts

PHILCO RADIO & TELEV. CORP.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, using a fundamental frequency range covering the tuning and intermediate frequencies of the receiver. Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36,000 K. C. is the correct instrument for this purpose; (2) Output Meter, Philco Model 026 Circuit Tester incorporates a sensitive output meter and is recommended; (3) Philco Fibre Handle Screw Driver, part No. 27-7059 and Fibre Wrench, part No. 3164.

OUTPUT METER: The 026 Output Meter is connected to the plate and cathode terminals of the 6F6G tubes. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter after signal is applied.

DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows:

1. Turn the tuning condenser to maximum capacity position (plate fully meshed).

2. Holding the tuning condenser in this position, loosen the clamp and turn the dial until the indicator is centered on the middle index line (See Fig. 3). Tighten clamp with dial in this position.

INTERMEDIATE FREQUENCY CIRCUIT

Insert the signal generator shielded output lead into the "Med" jack on the panel of the generator. Connect the other end of the output lead through a .1 mfd. condenser to the grid of the 6A8G, det. osc. tube and the ground connection of the signal generator to the chassis. Set the Signal Generator and receiver controls, and adjust the I. F. compensators as follows:

1. Set Signal Generator at 470 K. C. Turn "Multiplier" Control to 1000 and the "Attenuator" for maximum output.
2. Turn the receiver dial to 580 K. C.
3. Receiver volume control maximum.
4. Range Switch Broadcast Position.
5. Adjust compensators (20B), (20A), (13B), (13A) for maximum output.

If the output meter goes off scale when adjusting the compensators retard signal generator attenuator.

RADIO FREQUENCY CIRCUIT

Tuning Range: 5.7 to 18 M. C.

1. With one end of the shielded lead of the signal generator output lead in the "Med" jack, connect the other end through the .1 mfd. condenser to the "Red" terminal of the aerial panel of the receiver. The output lead ground must be connected to the black terminal or to the chassis.

2. Set the controls and adjust the R. F. compensators as follows:

Volume Control	Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Max.	2	18 M. C.	4B

Tuning Range: 530 to 1720 K. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
1	1500 K. C.	7, 4A
1	580 K. C.	(9)
1	1500 K. C.	7, 4A

NOTE A—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counterclockwise until a second maximum peak is obtained on the output meter. Adjust the compensator for maximum output using this second peak. The first peak from maximum capacity position of the compensator is the image signal, and must not be used in adjusting this compensator.

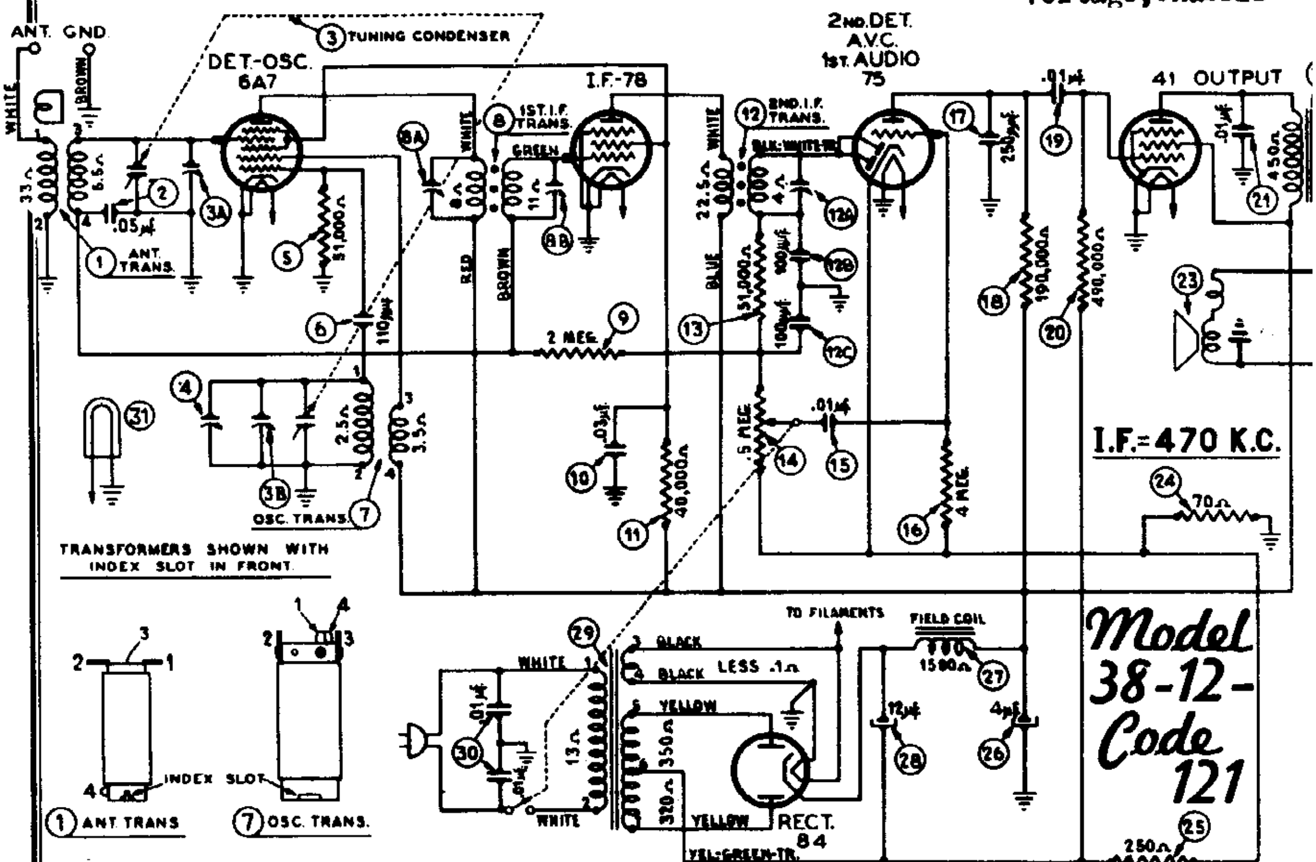
If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 940 K. C. below the frequency being used on the high frequency range.

Replacement Parts

Prices to subject to change without notice.

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (range 2)	32-2558	$0.70
2	Antenna Transformer (range 1)	32-2557	1.25
3	Condenser (0.05 mfd. tubular)	30-4519	.20
4	Tuning Condenser Assembly	31-2026	5.00
5	Osc. Transformer (range 2)	32-2560	
6	Osc. Transformer (range 1)	32-2559	.50
7	Compensators (dual, 1500 K. C.)	31-6188	.50
8	Range Switch	42-1325	.75
9	Compensator (Part of 7, 580 K. C.)		
10	Condenser (3500 mmfd., mica)	30-1094	.40
11	Resistor (70,000 ohms, ½ watt)	33-370330	.20
12	Condenser (dual electrolytic 4 and 8 mfd.)	30-2217	
13	1st I. F. Transformer	32-2580	
14	Condenser (250 mmfd.) Part of 7		
15	Resistor (5,000 ohms, ½ watt)	33-250339	.20
16	Resistor (10,000 ohms, 3 watts)	33-310639	.30
17	Condenser (0.1 mfd., tubular)	30-4455	.25
18	Resistor (1.0 megohm, ½ watt)	33-510339	.20
19	Resistor (10,000 ohms, 1 watt)	33-310439	.20
20	2nd I. F. Transformer	32-2582	
21	Resistor (51,000 ohms, ½ watt)	33-351339	.20
22	Condenser (110 mmfd., mica)	30-1031	.20
23	Condenser (100 mmfd.) part of No. (20)		
24	Condenser (100 mmfd.) part of No. (20)		
25	Volume Control	33-5215	
26	Resistor (51,000 ohms, 1 watt)	33-351439	.20
27	Resistor (1.0 megohm, ½ watt)	33-510339	.20
28	Condenser (0.015 mfd. tubular)	30-4358	.20
29	Resistor (1.0 megohm, ½ watt)	33-510339	.20
30	Condenser (0.1 mfd. tubular)	30-4499	.20
31	Resistor (1.0 megohm, ½ watt)	33-510339	.20
32	Resistor (330,000 ohms, ½ watt)	33-433339	.20
33	Condenser (0.015 mfd. tubular)	30-4515	.20
34	Resistor (490,000 ohms, ½ watt)	33-449339	.20
35	Condenser (0.02 mfd., tubular)	30-4215	.20
36	Resistor (99,000 ohms, ½ watt)	33-399339	.20
37	Tone Control off-on switch	42-1326	
38	Condenser (0.03 mfd., tubular)	30-4447	.20
39	Condenser (0.008 mfd. tubular)	30-4112	.20
40	Output Transformer	32-7019	.85
41	Cone and Voice Coil Assembly (S-7)	36-3157	1.00
	Cone and Voice Coil Assembly (HS)	36-3796	1.20
42	Pilot Lamp	34-2064	.09
43	Bias Resistor	33-3316	.35
44	Field Coil Assembly (S7)	36-3039	3.50
	Field Coil Assembly (HS)	36-3690	3.50
45	Condenser (electrolytic, 12 mfd.)	30-2210	1.20
46	Power Transformer		
	110 volt, 50 to 60 cycle	32-7833	4.00
	110 volt, 25 to 40 cycle	32-7627	5.50
	Power Trans. 115/230, 50 to 60 cycles	32-7835	
47	Condenser (0.015 mfd., dual bakelite)	3793DG	.40
	Cable (Power)	L-2778	.40
	Cable (Speaker)	L-2840	
	Dial	27-5327	
	Dial Washer	27-4598	
	Dial Clamp	28-5089	.03
	Knob (Tuning)	27-4330	.10
	Knob (Vernier)	27-4331	.10
	Knob (Tone & Volume)	27-4332	.10
	Mtg. Cushions (Tuning Condenser)	27-4599	.20
	Mtg. Rubber (Chassis)	27-4564	.10
	Pilot Lamp Assembly	38-8844	
	Screen Bracket Assembly	31-2047	
	Socket (6 prong)	27-6086	.11
	Socket (7 prong)	27-6087	.11
	Socket (7 prong)	27-6053	.11
	Socket (7 prong)	27-6057	.11
	Terminal Panel (Ant.)	38-8746	
	Vernier Drive	31-2072	
	38-10 F CABINET		
	Speaker (HS)	36-1220	$6.25
	Bezel Plate & Frame	40-6126	
	Bezel Gasket	27-8312	.01
	Bezel Glass	27-8299	.06
	Bezel Ring	28-5079	.60
	38-10 T CABINET		
	Speaker S7	36-1009	5.75
	Bezel Plate & Frame	40-6124	.90
	Bezel Gasket	27-8311	.01
	Bezel Glass	27-8298	.05
	Bezel Ring	28-5078	.55

PHILCO RADIO & TELEV. CORP.



TYPE OF CIRCUIT: A.C. operated, superheterodyne with automatic volume control, Pentode audio output, and covers the standard broadcast and state police frequencies.

POWER SUPPLY:

Voltage	Frequency Cycles	Power Consumption
115	50 to 60	40 watts

PHILCO TUBES USED: Five: One 6A7, Det. Osc.; One 78, I.F.; One 75, 2nd Det., 1st Audio; One 41, Output, and One 84, Rectifier.

INTERMEDIATE FREQUENCY: 470 K.C.

R.F. TUNING RANGE: 540 to 1720 K.C.

June, 19

AUDIO OUTPUT: 2 watts.

TUNING MECHANISM: 8 to 1 Ratio using Pulley and Cord.

CABINET: Type "T" and "C."

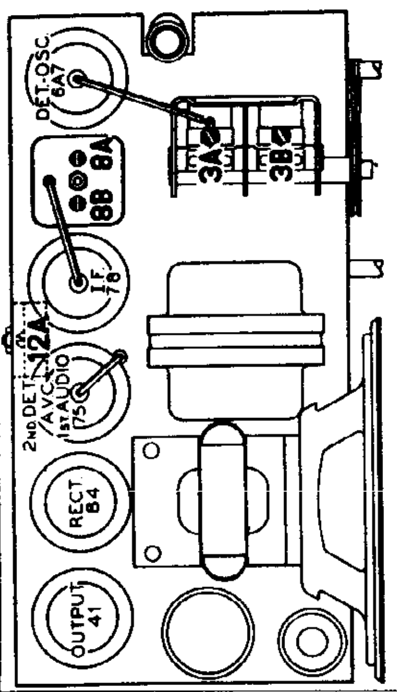


FIG. 2.—Locations of Compensators.

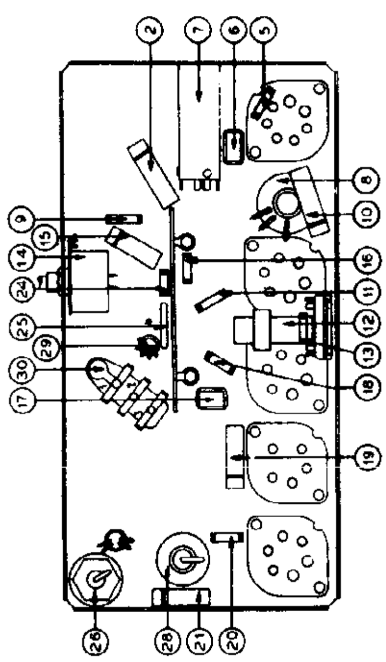


FIG. 3.—Part Locations Underside of Chassis.

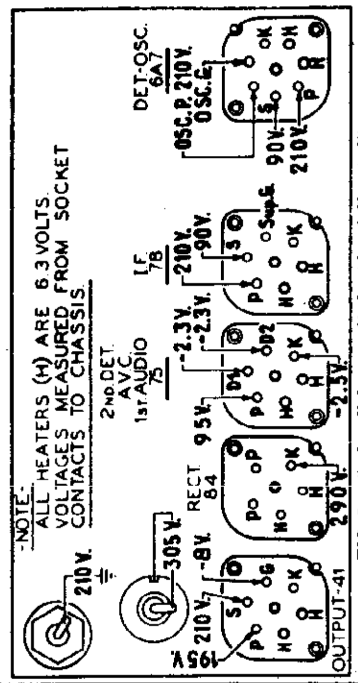


FIG. 1.—Socket Voltages—Underside of Chassis View. The Voltages indicated by arrows were measured with a Philco 026 Circuit

MODEL 38-12,Code 121
Alignment,Parts

PHILCO RADIO & TELEV. CORP.

Alignment of Compensators

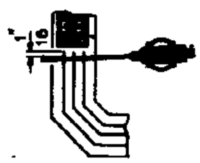
EQUIPMENT REQUIRED: (1) Signal Generator, using a fundamental frequency range covering the tuning and intermediate frequencies of the receiver. Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36,000 K.C. is the correct instrument for this purpose; (2) Output Meter, Philco Model 026 Circuit Tester incorporates a sensitive output meter and is recommended; (3) Philco Fibre Handle Screw Driver, Part No. 27-7059 and Fibre Wrench, Part No. 3164.

OUTPUT METER: The 026 Output Meter is connected to the plate and cathode terminals of the 41 tube. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter after signal is applied.

DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows:

1 Turn the tuning condenser to maximum capacity position (plates fully meshed).

2 Holding the tuning condenser in this position, turn the pointer until it is 1/16 of an inch below the three lines of the scale at the 550 K.C. end. (See Fig. 3.) This is the correct position of pointer at maximum capacity of tuning condenser.



POINTER SETTING
TUNING CONDENSER
CLOSED

FIG. 3.—Dial Pointer Calibration.

Intermediate Frequency Circuit

Insert the signal generator shielded output lead into the "Med." jack on the panel of the generator. Connect the other end of the output lead through a .1 mfd. condenser to the grid of the 6A7 Det. Osc. tube, and the ground connection of the signal generator to the chassis. Set the Signal Generator and receiver controls, and adjust the I.F. compensators as follows:

1 Set Signal Generator at 470 K.C. Turn "Multiplier" Control to 1000 and the "Attenuator" for maximum output.

2 Turn the receiver dial to 580 K.C.

3 Receiver volume control maximum.

4 Adjust compensators, (12A), (8B), (8A), for maximum output. If the output meter goes off scale when adjusting the compensators, retard the signal generator attenuator.

Radio Frequency Circuit

TUNING RANGE: 540 to 1720 K.C.

1 With one end of the shielded lead of the signal generator output lead in the "Med." jack, connect the other end through a 100 mmfd. condenser to the white aerial wire (rear of chassis). Connect the signal generator ground to the brown lead or to the chassis of the receiver.

2 Set the controls and adjust the R.F. compensators as follows:

Volume Control	Signal Generator and Receiver Dial	R.F. Compensators in Order
Max.	1500 K.C.	(3B) (3A)

Replacement Parts
Model 38-12

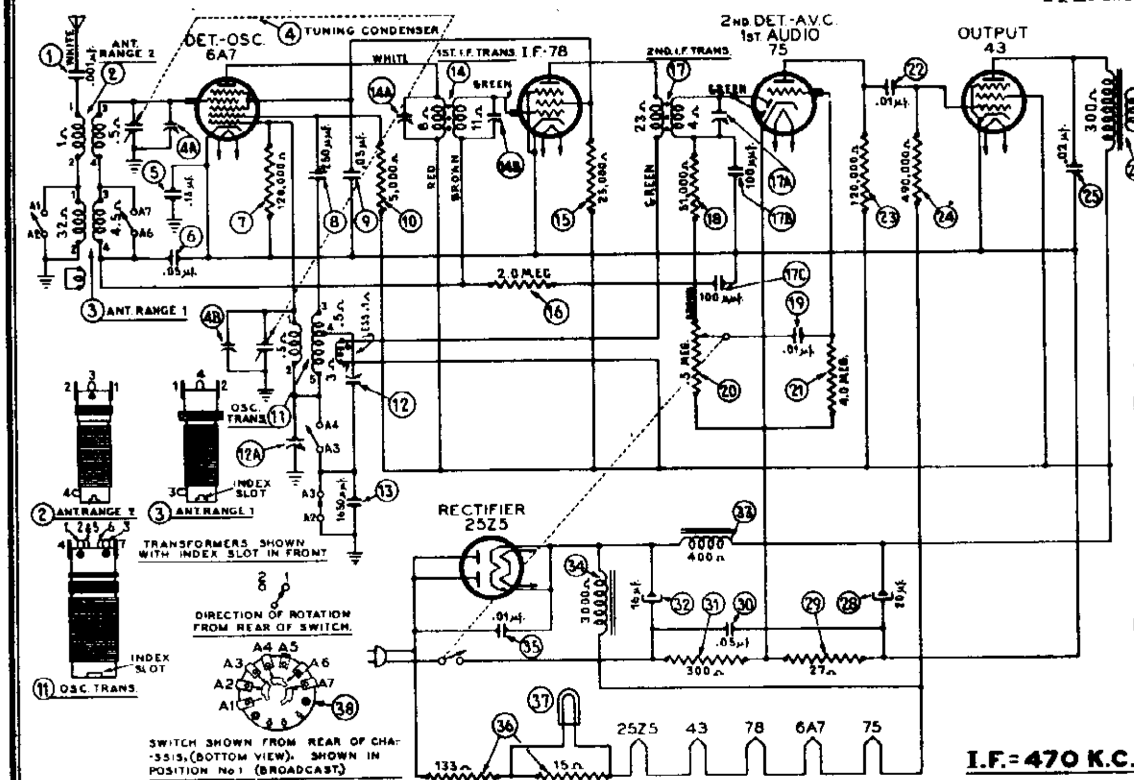
Schematic No.	Description	Part No.	List Price
1	Antenna Transformer ...	32-2583	
2	Condenser (0.05 mfd. tubular) ...	30-4444	$0.20
3	Tuning Condenser Assembly) ...	31-2068	
4	Compensator (Part of tuning condenser 3)		
5	Resistor (51,000 ohms, ½ watt) ...	33-351339	.20
6	110 mmfd. mica ...	30-1031	.20
7	Oscillator Transformer ..	32-2586	
8	First I.F. Transformer ...	32-2672	
9	Resistor (2 megohms) ...	33-520339	.20
10	Condenser (0.03 mfd. tubular) ...	30-4449	.20
11	Resistor (40,000 ohms, ½ watt) ...	33-340339	.20
12	Second I.F. Transformer.	32-2674	
13	Resistor (51,000 ohms, ½ watt) ...	33-351339	.20
14	Volume Control ...	33-5230	1.45
15	Condenser (0.01 mfd. tubular) ...	30-4479	.20
16	Resistor (4 megohms, ½ watt) ...	33-540339	.20
17	Condenser (250 mmfd. mica) ...	30-1032	.25
18	Resistor (190,000 ohms, ½ watt) ...	33-419339	.20
19	Condenser (0.01 mfd. tubular) ...	30-4169	.20
20	Resistor (490,000 ohms, ½ watt) ...	33-449339	.20
21	Condenser (0.01 mfd. tubular) ...	30-4169	.20
22	Output Transformer	32-7861	
23	Cone and Voice Coil Assembly ...	36-3981	
24	Resistor (70 ohms, ½ watt) ...	33-070339	.20
25	Resistor (250 ohms, ½ watt) ...	33-1259	
26	Condenser (Electrolytic 4 mfd.) ...	30-2236	.90
*27	Field coil assembly (not supplied; see Note)		
28	Condenser (Electrolytic 12 mfd.) ...	30-2235	1.20
29	Power Transformer (115V, 50 to 60 cycle) ...	32-7826	3.00
30	Condenser (0.01 mfd., .01 mfd.) ...	3903-DG	.30
31	Pilot Lamp ...	34-2068	.12
	Bezel and Glass Assembly	40-6158	
	Bezel Clamp ...	28-5153	.01
	Bracket (Tuning Condenser) ...	28-5060	
	Cable (Power) ...	L-2778	.40
	Clip (R.F. Trans. small) ...	28-5002	.02
	Clip (R.F. Trans. large) ...	28-5003	.03
	Clip (Tuning Shaft) ...	28-8610	.03
	Dial Assembly ...	31-2097	
	Dial Pointer ...	28-5185	.15
	Dial Drive Cord Assembly ...	31-2082	.10
	Dial Drive Drum ...	28-6662	
	Dial Drive Spring ...	28-8751	
	Knob (Tuning and Volume).	27-4604	
	Shaft Assembly (Tuning) ...	38-9102	
	Shield (Tube) ...	28-5059	
	Socket (6 prong) ...	27-6036	.11
	Socket (7 prong) ...	27-6037	.11
	Socket (5 prong) ...	27-6035	.11
	Stop—Rubber ...	27-4540	
	Speaker Model BO-1 ...	36-1366	
	Pilot Lamp Assembly ...	38-9041	

* Entire Speaker must be replaced when field coil is open or damaged.

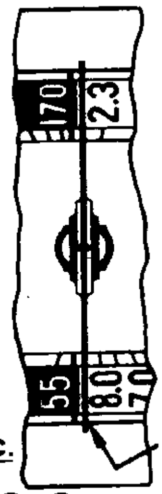
Prices Subject to Change without Notice

MODEL 38-14, Codes 121, 124
Schematic, Voltage Trimmers, Chassis

PHILCO RADIO & TELEV. CORP.



Model 38-14
Code 121 - 124
July, 1937



SET POINTER PARALLEL WITH INDEX LINES
Fig. 3. Dial Pointer Calibration

POWER SUPPLY: Voltage 115 — **Power Consumption** 55 watts

INTERMEDIATE FREQUENCY: 470 K. C.

R. F. TUNING RANGES: 540 to 1720 K. C.
2.3 to 7.4 M. C.

AUDIO OUTPUT: 1 watt

PHILCO TUBES USED: Five: one 6A7, Det. osc.; one 78, I. F.; one 75, 2nd Det., 1st Audio; one 43, Output, and one 25Z5 Rectifier.

TUNING MECHANISM: 12 to 1 Ratio using Pulley and Cord.

CABINET: Type "T," Code 121
Type "CS," Code 124

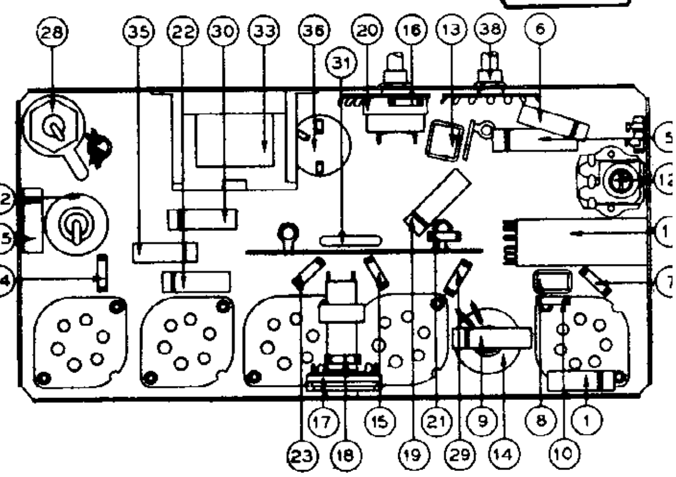


Fig. 5. Part locations, Underside of Chassis

Electrical Specifications

TYPE OF CIRCUIT: A. C. or D. C. operated superheterodyne with automatic volume control, pentode audio output, and covers the standard broadcast, municipal and state police frequencies, first class amateur (night) and many night foreign and American short-wave stations.

Code 121 & 124 chasses of this Model are identical with the exception of electrolytic condensers, speaker and cabinets. These differences are listed on the part list.

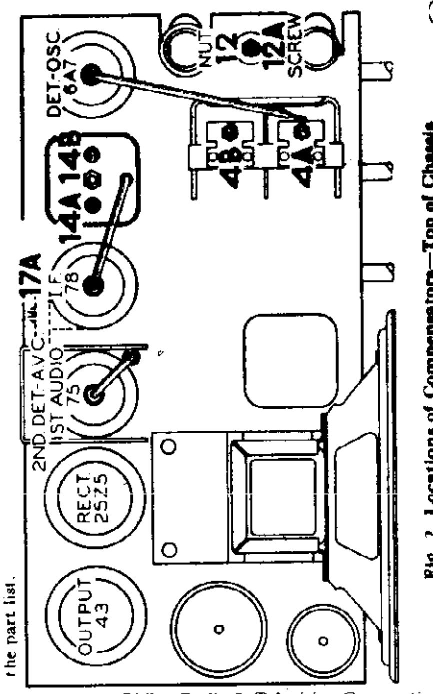


Fig. 2. Locations of Compensators—Top of Chassis

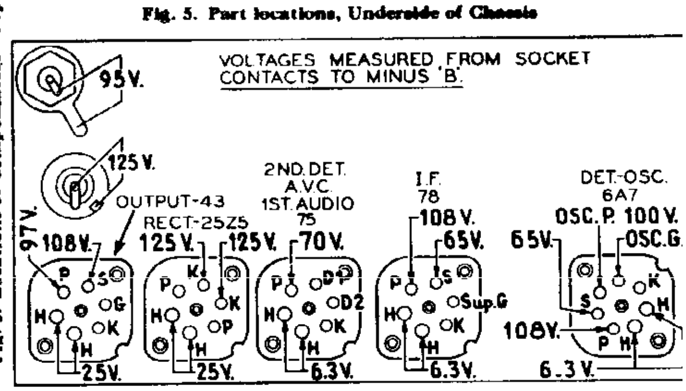


Fig. 1. Socket Voltage—Underside of Chassis View

The voltages indicated by arrows were measured with a **Philco 026 Circuit Tester**, which contains a sensitive voltmeter. Volume Control at minimum—Tuning Condenser set for no signal—line voltage 115 A. C.

MODEL 38-14, Codes 121, 124
Alignment, Parts

PHILCO RADIO & TELEV. CORP.

Replacement Parts

Schem. No.	Description	Part No.	List Price
1	Cond. (tubular .001 mf.)	30-4453	$0.20
2	Ant. Trans. (Range 2)	32-2720	
3	Ant. Trans. (Range 1)	32-2718	
4	Tuning Cond. Assembly	31-2094	
5	Cond. (tubular .15 mf.)	30-4191	.25
6	Cond. (tubular .05 mf.)	30-4519	.20
7	Resistor (120,000 ohm ½ watt)	33-412399	.30
8	Cond. (mica 250 mmf.)	30-1032	.25
9	Cond. (tubular .05 mf.)	30-4444	.20
10	Resistor (5000 ohm ½ watt)	33-250339	.20
11	Osc. Trans.	32-2719	
12	Compensator	31-6200	
13	Cond. (mica 1650 mmf.)	5877	.35
14	I. F. Trans. (1st)	32-2672	2.20
15	Resistor (25,000 ohm ½ watt)	33-325339	.20
16	Resistor (2 meg. ½ watt)	33-520339	.20
17	I. F. Trans. (2nd)	32-2674	1.50
18	Resistor (51,000 ohm ½ watt)	33-351339	.20
19	Cond. (tubular .01 mf.)	30-4479	.20
20	Volume Control	33-5236	
21	Resistor (4.0 meg. ½ watt)	33-540339	.20
23	Resistor (120,000 ohm ½ watt)	33-412339	.20
24	Resistor (490,000 ohm ½ watt)	33-449339	.20
25	Cond. (tubular .02 mf.)	30-4215	.20
26	Output Trans. (B 0-2)	32-7874	
	Output Trans. (S-18)	32-7395	1.10
27	Cone and Voice Coil Assembly (S-18)	36-3014	
	Cone and Voice Coil Assembly (B-0-2)	36-3981	
28	Electrolytic Cond. (20 mf. Code 121)	30-2245	.95
	Electrolytic Cond. (Code 124)	30-2275	
29	Resistor (27 ohm ½ watt)	33-027339	.20
30	Cond. (tubular) .05 mf.	30-4444	.20
31	Resistor (300 ohm, 2 watt)	33-1258.	
32	Electrolytic Cond. (16 mf. Code 121)	30-2246	.90
	Electrolytic Cond. (Code 124)	30-2277	
33	Choke	32-7868	
34	Field Coil and Pot. Assembly (S-18)	36-3985	
	*Field Coil and Pot. Assembly (B 0-2) (See Speaker Note below).		
35	Condenser (tubular .01 mf.)	30-4169	.20
36	Filament Resistor (133 ohm—15 ohm)	33-3322	.65
37	Pilot Lamp	34-2068	.12
38	Range Switch	42-1366	.70
	Cable Speaker (Code 124)	L-2984	
	Cable (Power)	L-2778	.40
	Clip, Small (Mtg. R. F. Coil)	28-5002	.02
	Clip, Large (Mtg. R. F. Coil)	28-5003	.03
	Dial Ass'y	31-2098	
	Dial Pointer	28-5201	.20
	Dial Drive Cord	31-2096	.10
	Dial Drive Shaft	38-9001	
	Insulator Washer (Electrolytic)	27-8882	
	Insulator Washer (Electrolytic)	27-8883	
	Insulator Cover 1¾ (Elec. Cond. 32)	27-8900	
	Insulator Cover, 2¼ (Elec. Cond. 32)	27-8905	
	Mtg. Rubber Dial	27-4150	$0.01
	Mtg. Rubber (Tuning Condenser)	27-4596	
	Pilot Lamp Ass'y.	38-9127	
	Pilot Lamp	34-2068	.12
	Pully (Tuning Condenser)	31-1283	.30
	Speaker (B 0-2, Code 121)	36-1367	
	Speaker (S-18, Code 124)		
	Socket (6 prong)	27-6036	.11
	Socket (7 prong)	27-6037	.11
	Washer "C" (Tuning Shaft)	28-3904	.01
	Bezel and Glass (Code 121)	40-6156	
	Bezel and Glass (Code 124)	40-6364	
	Bezel Clamp	28-6153	.02

*Entire Speaker must be replaced when field coil is open or damaged.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, using a fundamental frequency range covering the tuning and intermediate frequencies of the receiver. Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36,000 K. C. is the correct instrument for this purpose; (2) Output meter, Philco Model 026 circuit tester incorporates a sensitive output meter and is recommended; (3) Philco Fibre Handle Screw Driver, Part No. 27-7059 and Fibre Wrench, Part No. 3164.

OUTPUT METER: The 026 Output Meter is connected to the plate and cathode terminals of the 43 tube. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter after signal is applied.

DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows:

1. Turn the tuning condenser to maximum capacity position (plates fully meshed).
2. Holding the tuning condenser in this position, turn the pointer until it is parallel with the index lines (see Fig. 3). This is the correct position of pointer at maximum capacity of tuning condenser.

INTERMEDIATE FREQUENCY CIRCUIT

When adjusting the following compensators, a Philco Set Transformer Part No. 32-2763 must be connected in the signal generator output circuit as follows: Insert the signal generator output lead into the "Med" jack and the ground lead into the "Gnd" jack of the signal generator.

Connect the other end of the output lead to terminal No. 1 on the Set Transformer and the cable ground to Terminal No. 2. No. 3 and 4 terminals of Set Transformer are then connected to the chassis and 6A7 grid respectively of the receiver with short pieces of wire. Insert a 0.1 mfd. in series with the No. 4 lead which connects to the grid.

Set the signal generator and receiver controls and adjust the I. F. compensators as follows:

1. Set Signal Generator at 470 K. C. Turn "Multiplier" Control to 1000 and the "Attenuator" for maximum output.
2. Turn the receiver dial to 580 K. C.
3. Range Switch Broadcast position.
4. Receiver volume control maximum.
5. Adjust compensators, (17A), (14B), (14A), for maximum output. If the output meter goes off scale when adjusting the compensators, retard the signal generator attenuator.

RADIO FREQUENCY CIRCUIT

Tuning Range: 2.3 to 7.4 M. C.

1. Remove terminal No. 4 lead of set transformer from the 6A7 grid and connect to the aerial wire of the receiver through a 400 ohm resistor. Remove the .1 mfd. condenser when using the 400 ohm resistor.
2. Set the controls and adjust the R. F. compensators as follows:

Range Switch	Volume Control	Signal Generator and Receiver Dial	R. F. Compensators
Shortwave	Max.	6 M. C.	(4B)

Tuning Range: 530 to 1720 K. C.

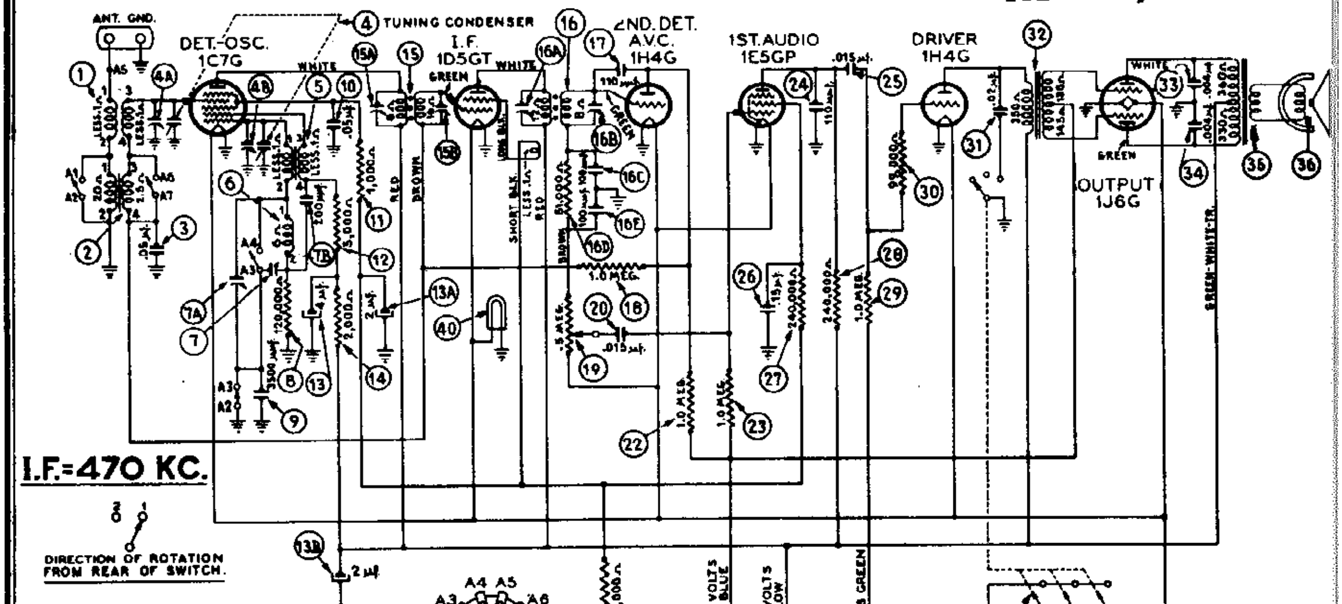
1. Remove the 400 ohm resistor from the No. 4 lead and replace with a 100 mmfd. condenser and reconnect to the aerial wire.

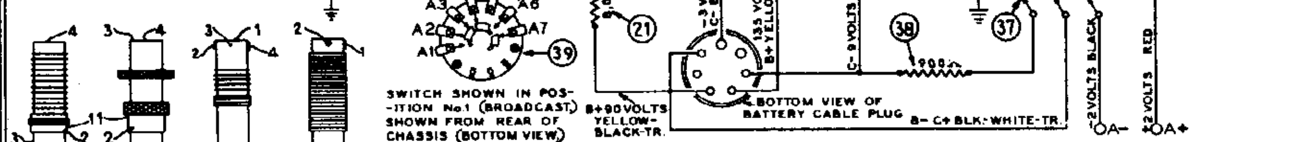
Set the controls and adjust the R. F. compensators as follows:

Range Switch	Volume Control	Signal Generator and Receiver Dial	R. F. Compensators in Order
Broadcast	Max.	1550 K. C.	(12A), (4A)
	Max.	580 K. C.	(12) Roll Tuning Condenser
	Max.	1550 K. C.	(12A), (4A)

MODEL 38-38, Code 121
Schematic, Voltage
Trimmers, Chassis

PHILCO RADIO & TELEV. CORP.





TYPE OF CIRCUIT: Six tube, battery operated superheterodyne circuit, having two tuning ranges covering broadcast and short-wave frequencies; Automatic Volume Control; Tone Control, and a class "B" output stage.

BATTERIES REQUIRED:

"A" Battery: Two volt storage battery Philco type 172R or Dry "A" battery Philco Part No. 41-8011.

If a dry A Battery is used, a ballast lamp "type 1F1" **MUST** be inserted in the socket provided in the (41-8011) battery. This lamp acts as a voltage regulator and maintains a constant potential of two volts on the filament of the tubes.

"BC" Battery: Philco battery Part No. 41-8007 is used to supply "B" and "C" voltages. This battery contains a socket into which the receiver battery cable plug is inserted.

INTERMEDIATE FREQUENCY: 470 K. C.

TUNING RANGES: Two—Range 1, 530 to 1720 K. C.
Range 2, 5.7 to 18.0 M. C.

POWER OUTPUT: 1 watt.

TYPE AERIAL: "L" type, Philco Part No. 45-2428.

CABINETS AND SPEAKERS USED:

Cabinet Type	Speaker Used
T	KR26
K	HR20
X	HR20

July, 1937

Model 38-38, Code 121

PHILCO TUBES USED: One 1C7G, 1st Det. & Osc.; one 1D5GT, I. F. amplifier; One 1H4G, 2nd Det. (A.V.C.); one 1E5GP, 1st Audio; one 1H4G, Audio Driver, and one 1J6G, output.

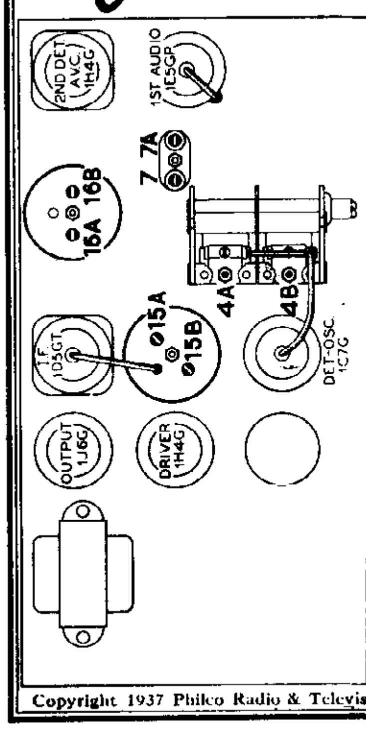


Fig. 2. Locations of Compensators—Top of Chassis

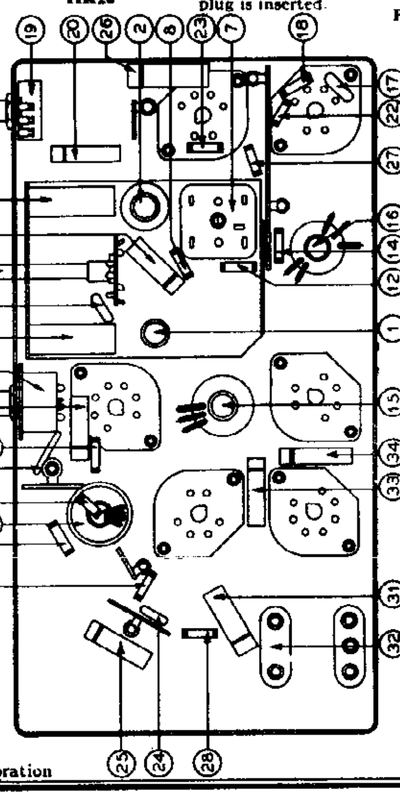


Fig. 4. Part locations, Underside of Chassis

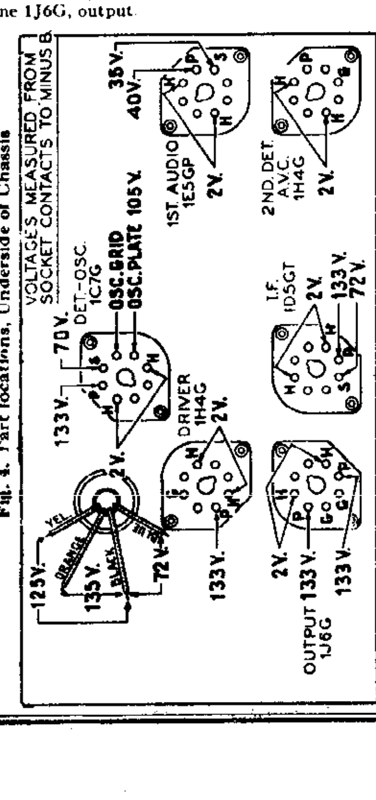


Fig. 1. Socket Voltages, Underside of Chassis
The voltages indicated by arrows were measured with a Philco 026 Circuit Tester which contains a sensitive voltmeter. Volume Control at minimum, range switch in broadcast position.

MODEL 38-38,Code 121
Alignment,Parts

PHILCO RADIO & TELEV. CORP.

Replacement Parts

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer Range (2)	32-2558	$0.70
2	Antenna Transformer Range (1)	32-2667	1.60
3	Condenser (0.5 μf, tubular)	30-4519	.20
4	Tuning Condenser	31-2025	5.00
5	Oscillator Coil Range (2)	32-2668	1.25
6	Oscillator Coil Range (1)	32-2559	.50
7	Padding Condenser	31-6186	
8	Resistor (120,000 Ω, ½ W.)	33-412339	.20
9	Condenser (3500 μμf, Mica)	30-1094	.40
10	Condenser (.05 μf, tubular)	30-4444	.20
11	Resistor (1000 Ω ½ W.)	33-210339	.20
12	Resistor (5000 Ω, ½ W.)	33-250339	.20
13	Electrolytic Condenser (4—2—2 μf)	30-2241	1.50
14	Resistor (2000 Ω, ½ W.)	33-220339	.20
15	First I. F. Transformer	32-2664	2.20
16	Second I. F. Transformer	32-2666	2.20
17	Condenser (110 μμf, Mica)	30-1031	.20
18	Resistor (1 megohm, ½ W.)	33-510339	.20
19	Volume Control	33-5234	1.00
20	Condenser (.015 μf tubular)	30-4358	.20
21	Resistor (8000 Ω, ½ W.)	33-280339	.20
22	Resistor (1 megohm, ½ W.)	33-510339	.20
23	Resistor (1 megohm, ½ W.)	33-510339	.20
24	Condenser (110 μμf, Mica)	30-1031	.20
25	Condenser (.015 μf, tubular)	30-4515	.20
26	Condenser (.15 μf, tubular)	30-4191	.25
27	Resistor (240,000 Ω, ½ W.)	33-424339	.20
28	Resistor (240,000 Ω, ½ W.)	33-424339	.20
29	Resistor (1 megohm, ½ W.)	33-510339	.20
30	Resistor (99,000 Ω, ½ W.)	33-399339	.20
31	Condenser (.02 μf, tubular)	30-4215	.20
32	Input Transformer	32-7637	2.00
33	Condenser (.004 μf, tubular)	30-4456	.20
34	Condenser (.004 μf, tubular)	30-4456	.20
35	Output Transformer	32-7756	1.50
36	Cone and Voice Coil Assembly	36-3540	1.00
37	Power and Tone Switch	42-1351	
38	Resistor (900 Ω, 1 W.)	33-1233	.20
39	Range Switch	42-1356	.75
40	Pilot Light	34-2150	.22
	Cable (Battery)	41-3198	1.40
	Cable (Speaker)	41-3326	.40
	Clip (Mtg. R. F. Trans.)	28-[illegible]	
	Dial	27-5323	.06
	Dial Washer	27-4596	.05
	Dial Clamp	27-[illegible]	
	Knob (Tuning)	27-[illegible]	
	Knob (Vernier)	27-4331	
	Knob (Tone, Volume)	27-4332	
	Mtg. Rubber (Chassis)	27-4504	
	Mtg. Rubber (Tuning Condenser)	27-[illegible]	
	Mtg. Rubber (Screen Bracket)	27-[illegible]	
	Screen	27-[illegible]	
	Shield (Tube)	28-2725	
	Socket Assembly (Pilot Lamp)	28-[illegible]	
	Socket (6 prong)	27-[illegible]	.11
	Socket (7 prong)	27-[illegible]	.11
	Terminal Panel (Ant.)	38-[illegible]	.10
	Vernier Drive Assembly	31-2072	1.00

MODEL 38-38T

Description	Part No.	List Price
Bezel Frame Assembly	40-6124	$0.90
Bezel Gasket	27-8811	.01
Bezel Glass	27-[illegible]	.06
Bezel Ring	28-5078	.55
Speaker KR-26	36-1353	10.00

MODEL 38-38 K, X

Description	Part No.	List Price
Bezel Frame Assembly	40-6128	1.06
Bezel Gasket	27-8813	.01
Bezel Glass	27-[illegible]	.06
Bezel Ring	28-[illegible]	.70
Speaker (HR-20)	36-1361	
Battery (A)	172R	
Battery (B)	41-[illegible]	

PRICES SUBJECT TO CHANGE
WITHOUT NOTICE

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, having a fundamental frequency range covering the tuning and intermediate frequencies of the receiver. Philco Model 077 A. C. operated Signal Generator or Model 088, battery operated Signal Generator which have the required frequency range are the correct instruments for this purpose; (2) Output meter, Philco Model 026 circuit tester incorporates a sensitive output meter and is recommended; (3) Philco Fibre Handle Screw Driver, Part No. 27-7059 and Fibre Wrench, Part No. 3164.

OUTPUT METER: The 026 Output Meter is connected to the plate terminals of the 1J6G tube. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter after signal is applied.

DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows:

1. Turn the tuning condenser to maximum capacity position (plates fully meshed).

2. Holding the tuning condenser in this position, loosen the dial clamp; then turn the dial until the indicator is centered on the middle index line. Tighten clamp in this position. See Fig. 3

INTERMEDIATE FREQUENCY CIRCUIT

Insert the signal generator shielded output lead into the "Med" jack on the panel of the generator. Connect the other end of the output lead through a .1 mfd. condenser to the grid of the 1C7G Det. Osc. tube and the ground connection of the signal generator to the chassis. Set the signal generator and receiver controls and adjust the I. F. compensators as follows:

1. Set Signal Generator at 470 K. C. Turn "Multiplier" Control to 1000 and adjust the attenuator for a readable indication on the output meter.
2. Turn the receiver dial to 580 K. C.
3. Receiver Volume Control maximum.
4. Range Switch Broadcast Position.
5. Adjust compensators (16B), (16A), (15B) and (15A) for maximum output.

If the output meter goes off scale when adjusting the compensators retard signal generator "attenuator."

RADIO FREQUENCY CIRCUIT

Tuning Range: 5.7 to 18 M. C.

1. With one end of the shielded lead of the signal generator output cable in the "Med" jack, connect the other end through a 400 ohm carbon resistor to the "Ant." terminal of the aerial panel of the receiver. The output lead ground must be connected to the "Gnd" terminal or to the chassis.

2. Set the controls and adjust the R. F. compensators as follows:

Volume Control	Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Max.	2	18 M. C.	(4B) See Note A

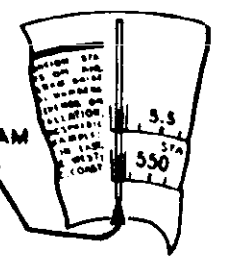
Tuning Range: 530 to 1720 K. C.

Remove the 400 ohm resistor from the generator output cable and replace with a 200 mmfd. condenser. Then set the controls and adjust the compensators as follows:

Volume Control	Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Max.	1	1500 K. C.	(7A), (4A)
Max.	1	580 K. C.	(7)
Max.	1	1500 K. C.	(7A), (4A)

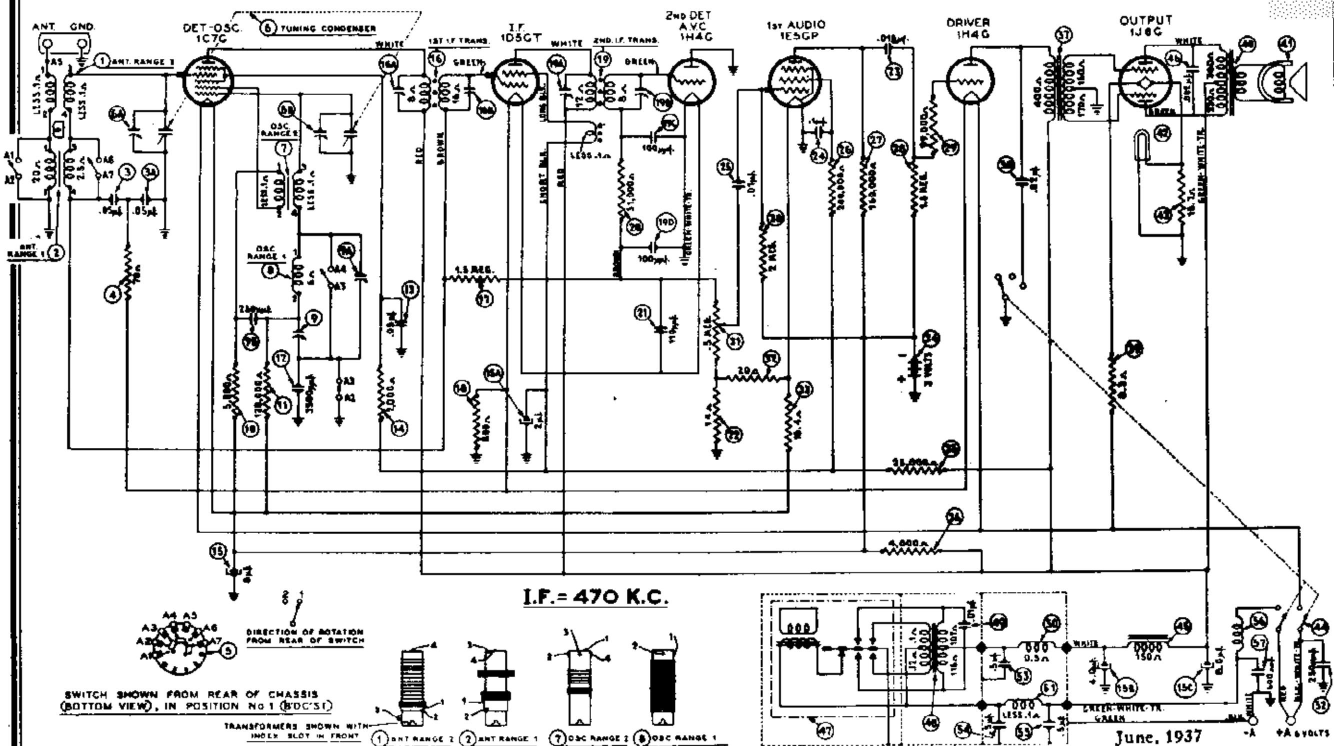
NOTE A—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a second maximum peak is obtained on the output meter. Adjust the compensator for maximum output using this second peak. The first peak from maximum capacity position of the compensator is the image signal and must not be used in adjusting the compensator.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 940 K. C. below the frequency being used on the high frequency range.



GLOWING BEAM INDICATOR
Dial Calibration

PHILCO RADIO & TELEV. CORP.



Model 38-39, Code 121

TYPE OF CIRCUIT: A six tube superheterodyne circuit is used in this model having two tuning ranges covering standard and short wave broadcasts. The receiver is operated by a 6 volt storage battery and uses a synchronous vibrator for supplying "B" voltage. The vibrator unit is mounted in the cabinet and connected to the receiver chassis through a cable and plug.

Additional design features included in this model are: Automatic Volume Control: two point tone control: Class "B" audio output circuit.

The receiver is designed to operate from a standard "I" type aerial, Philco Part No. 45-2428. This aerial system should be used to obtain the maximum performance from the receiver. Instructions for installing the aerial are provided in each kit.

POWER SUPPLY: 6 volt storage battery Philco Type 116K
Current Drain 1.4 Amps.

INTERMEDIATE FREQUENCY: 470 K. C.

FREQUENCY RANGES: Range one 530 to 1720 K. C.
Range two 5.7 to 18.0 M. C.

OUTPUT: 1.5 watts.

SPEAKERS USED: Philco Type KR26 in "T" Cabinet.
Philco Type HR20 in "K" Cabinet.
Philco Type HR20 in "X" Cabinet.

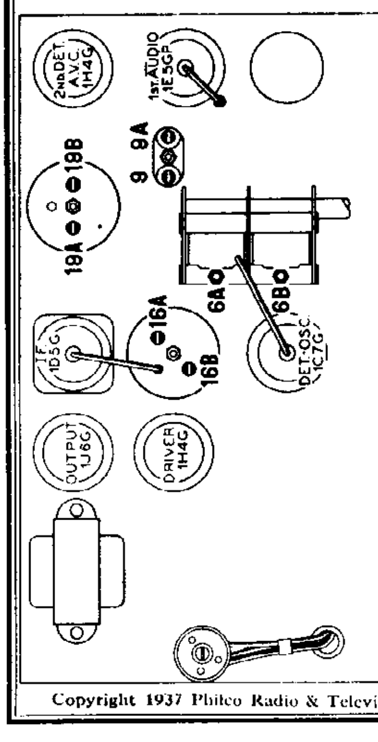


Fig. 2. Locations of Compensators—Top of Chassis

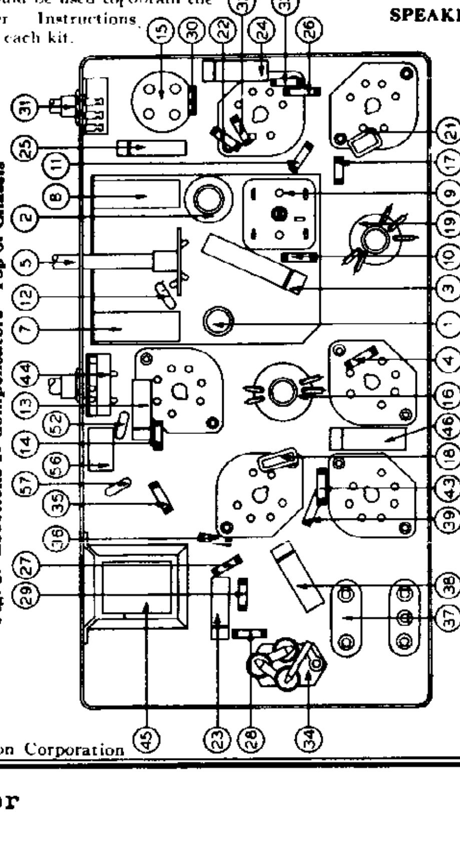


Fig. 5. Part locations, Underside of Chassis

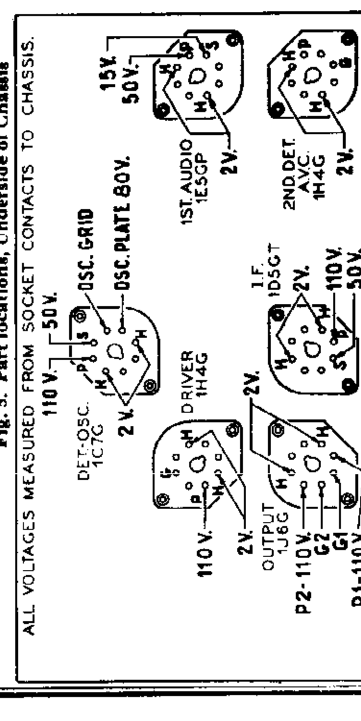


Fig. 1 Socket Voltages—Underside of Chassis
The voltages indicated by arrows were measured with a Philco 026 Circuit Tester which contains a sensitive voltmeter. Volume Control minimum—Range Switch in broadcast position—Storage Battery fully charged.

MODEL 38-39, Code 121
Alignment, Parts

PHILCO RADIO & TELEV. CORP.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, having a fundamental frequency range covering the tuning and intermediate frequencies of the receiver. Philco Model, 077 A. C. operated, Signal Generator or Model 088 Battery operated, Signal Generator, which have the required frequency range are the correct instruments for this purpose; (2) Output meter, Philco Model 026 circuit tester incorporates a sensitive output meter and is recommended; (3) Philco Fibre Handle Screw Driver, part no. 27-7059 and Fibre Wrench, part no. 3164.

OUTPUT METER: The 026 output meter is connected to the plate terminals of the 1J6G tube. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter after signal is applied.

DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows:

1. Turn the tuning condenser to maximum capacity position (plate fully meshed).

2. Holding the tuning condenser in this position, loosen the dial clamp; then turn the dial until the indicator is centered on the middle index line (See Fig. 2). Tighten clamp in this position.

INTERMEDIATE FREQUENCY CIRCUIT

Insert the signal generator shielded output lead into the "Med" jack on the panel of the generator. Connect the other end of the output lead through a .1 mfd. condenser to the grid of the 1C7G Det. Osc. tube and the ground connection of the signal generator to the chassis. Set the signal generator and receiver controls and adjust the I. F. compensators as follows:

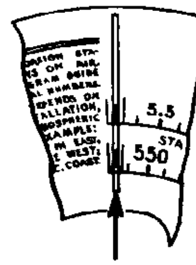
1. Set Signal Generator at 470 K. C. Turn "Multiplier" Control to 1000 and adjust the attenuator for a readable indication on the output meter.

2. Turn the receiver dial to 580 K. C.

3. Receiver Volume Control maximum.

4. Range Switch Broadcast Position.

5. Adjust compensators (19B), (19A), (16B) and (16A) for maximum output. If the output meter goes off scale when adjusting the compensators retard signal generator "attenuator."



GLOWING BEAM INDICATOR

Fig. 2. Dial Calibration

RADIO FREQUENCY CIRCUIT

Tuning Range: 5.7 to 18 M. C.

1. With one end of the shielded lead of the signal generator output cable in the "Med" jack, connect the other end through a 400 ohm carbon resistor to the "Ant." terminal of the aerial panel of the receiver. The output lead ground must be connected to the "Gnd." terminal or to the chassis.

2. Set the controls and adjust the R. F. compensators as follows:

Volume Control	Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Max.	2	18 M. C.	(6B) See Note A

Tuning Range: 530 to 1720 K. C.

Remove the 400 ohm resistor from the generator output cable and replace with a 200 mmfd. condenser. Then set the controls and adjust the compensators as follows:

Volume Control	Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Max.	1	1500 K. C.	(9A), (6A)
Max.	1	580 K. C.	(9)
Max.	1	1500 K. C.	(9A), (6A)

NOTE A—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a second maximum peak is obtained on the output meter. Adjust the compensator for maximum output using this second peak. The first peak from maximum capacity position of the compensator is the image signal and must not be used in adjusting the compensator.

If the above procedure is correctly followed, the image signal will be found (much weaker) by turning the receiver dial 940 K. C. below the frequency being used on the high frequency range.

MODEL 38-39T CABINET

Bezel Frame Assembly	40-6124	.90
Bezel Gasket	27-8311	.01
Bezel Glass	27-8298	.05
Bezel Ring	28-5078	.55
Speaker KR-26	36-1353	10.00

Replacement Parts

Schem. No.	Description	Part No.	List Price
1	Transformer, Antenna Short Wave	32-2558	$0.70
2	Transformer, Antenna Broadcast	32-2667	1.60
3	Condenser (.05 μf—.05 μf)	30-4489	.35
4	Resistor (70 Ω, ½ Watt)	33-070339	.20
5	Wave Switch	42-1358	.75
6	Tuning Condenser Assembly	31-2045	
7	Transformer, Oscillator Short Wave	32-2666	1.25
8	Transformer, Oscillator Broadcast	32-2559	.50
9	Padder	31-6188	.50
10	Resistor (5000 Ω, ½ Watt)	33-250339	.20
11	Resistor (120,000 Ω, ½ Watt)	33-412339	.20
12	Condenser, Mica (3500 μμf)	30-1094	.40
13	Condenser, (.05 μf)	30-4444	.20
14	Resistor (2000 Ω, ½ Watt)	33-220339	.20
15	Electrolytic Condenser	30-2226	
16	I. F. Transformer, First	32-2664	2.20
17	Resistor (1.5 megohms, ½ Watt)	33-515339	.20
18	Resistor (600 Ω, ½ Watt)	33-1235	.20
19	I. F. Transformer, Second	32-2666	2.20
20	Resistor (51,000 Ω, ½ Watt)	33-351339	.20
21	Condenser, Mica (110 μμf)	30-1031	.20
22	Resistor (11.7 Ω, ½ Watt)	33-1264	.20
23	Condenser (.015 μf)	30-4515	.20
24	Condenser (.1 μf)	30-4122	.20
25	Condenser (.01 μf)	30-4479	.20
26	Resistor (240,000 Ω, ½ Watt)	33-424339	.20
27	Resistor (240,000 Ω, ½ Watt)	33-424339	.20
28	Resistor (1 megohm, ½ Watt)	33-510339	.20
29	Resistor (99,000 Ω, ½ Watt)	33-399339	.20
30	Resistor (2.0 megohms, ½ Watt)	33-520339	.20
31	Volume Control (.5 megohm)	33-5234	1.00
32	Resistor (20 Ω, ½ Watt)	33-1265	.20
33	Resistor (16.4 Ω, ½ Watt)	33-1266	.20
34	Bias Cell Assembly	38-7275	.20
35	Resistor (25,000 Ω, ½ Watt)	33-325339	.20
36	Resistor (4,000 Ω, ½ Watt)	33-240239	.20
37	Transformer—Push-pull Input	32-7637	2.00
38	Condenser (.02 μf)	30-4215	.20
39	Resistor (8.3 Ω, ½ Watt)	33-1268	.20
40	Transformer—Output	32-7758	
41	Cone & Voice Coil Assembly (KR26)	36-3540	1.00
	Cone & Voice Coil Assembly (HR20)	36-3797	
42	Dial Lamp	34-2150	.22
43	Resistor (16.7 Ω, ½ Watt)	33-1267	.20
44	Power Switch Tone Control	42-1363	1.00
45	Choke	32-7543	1.35
46	Condenser, (0.002 μf tubular)	30-4177	.25
47	Vibrator	41-3222	5.25
48	Power Transformer	32-7682	2.20
49	Condenser (.01 μf)	30-4381	.25
50	Choke ("B")	32-1932	.25
51	Choke ("A")	32-1954	.40
52	Condenser, Mica .250 μμf	5858	.25
53	Condenser, (.5 μf)	30-4296	.60
54	Condenser, (.5 μf)	30-4296	.60
55	Condenser, (.5 μf)	30-4296	.60
56	Choke	32-2247	
57	Condenser, (600 μμf) mica	30-1049	.25

MODEL 38-39 (Code 121)

Cable (Vibrator Unit)	41-3328	
Cable (Battery)	41-3204	
Cable (Speaker)	41-3326	.40
Clip (R. F. Coils)	28-5002	.02
Dial	27-5333	
Dial Washer	27-4598	.03
Dial Clamp	28-5099	.03
Knob (Tuning)	27-4330	.10
Knob (Tuning Vernier)	27-4331	.10
Knob (Tone & Volume)	27-4332	
Mtg. Panel (Bias Cell)	38-9104	
Mtg. Corner (Chassis)	27-4564	.10
Mtg. Rubber (Vibrator) (Small)	27-4307	
Mtg. Rubber (Vibrator, Assem.) (large)	27-4585	
Mtg. Rubber (Vibrator) (Square)	27-4287	
Mtg. Sleeve (Vibrator)	28-6521	
Mtg. Screw (Vibrator)	W-614	
Shield (Vibrator)	38-9022	
Shield (Tube)	28-3726	$0.10
Screen	27-5320	.75
Socket (Pilot Lamp)	38-9006	
Socket (6 prong)	27-6086	.11
Socket (7 prong)	27-6087	.11
Socket (Vibrator)	27-6036	
Terminal Panel (Ant.)	38-8849	.10
Vernier Drive	31-2072	1.90
Vibrator Socket Assembly	41-3327	

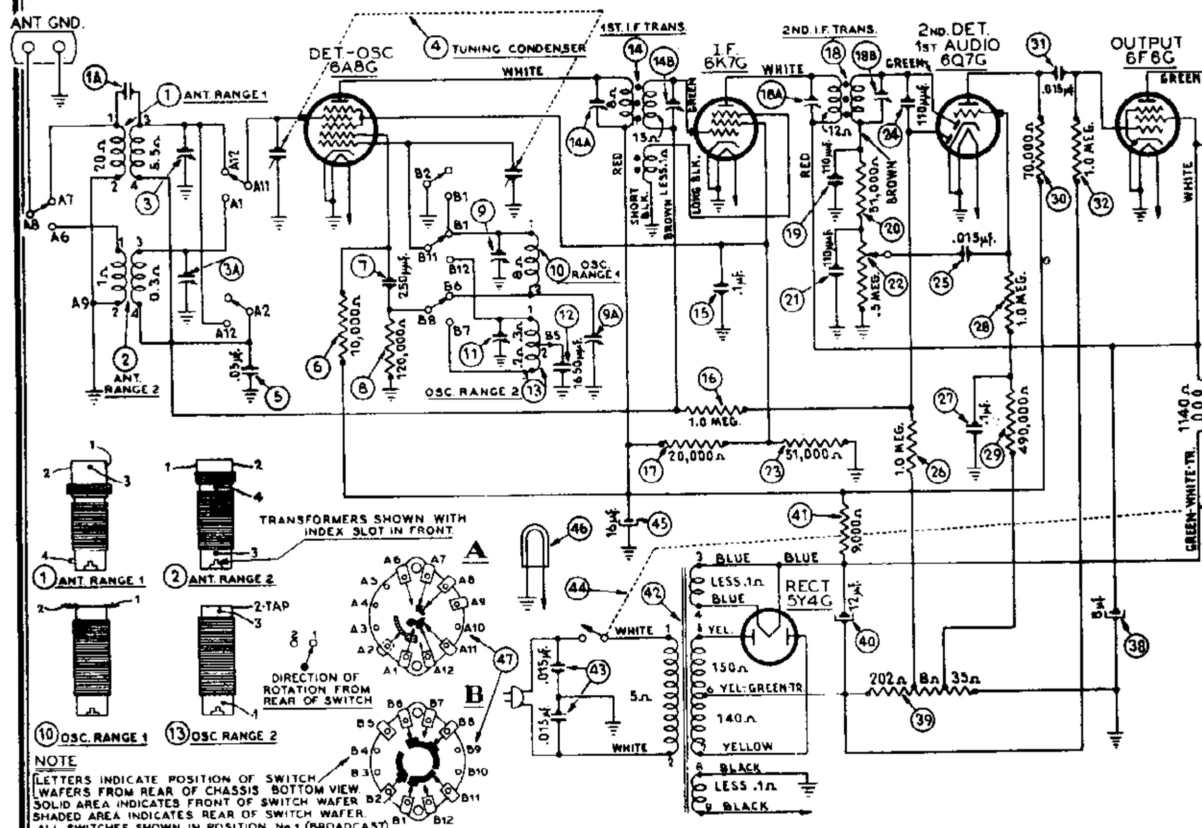
MODEL 38-39X and K CABINETS

Speaker H. R. 20	36-1351	
Bezel Frame Assembly	40-6128	1.05
Bezel Basket	27-8313	.01
Bezel Glass	27-8300	.06
Bezel Ring	28-5080	.70
Battery	110R	

PRICES SUBJECT TO CHANGE
WITHOUT NOTICE

MODEL 38-60,Code 125

PHILCO RADIO & TELEV. CORP. Schematic,Voltage Trimmers,Chassis



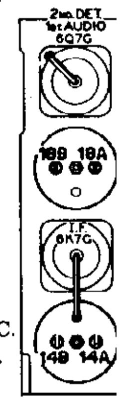


Fig. 2. I. F. Compensators top of chassis

Model 38-60—Code 125

April, 1937

INTERMEDIATE FREQUENCY: 470 K. C.

TUNING RANGE: Two—Range one 530 to 1720 K. C. Range two 2.3 to 7.4 M. C.

UNDISTORTED OUTPUT: 3 watts.

TONE CONTROL: Two position.

Electrical Specifications

TYPE CIRCUIT: Superheterodyne, with Automatic Volume Control and a pentode audio output circuit.

POWER SUPPLY:

Voltage	Frequency	Consumption
115	50 to 60	60 watts
115	25 to 40	60 watts
115/220	50 to 60	60 watts

PHILCO TUBES USED: One 6A8G, Det. Osc.; one 6K7G, I. F.; one 6Q7G, 2nd Det. audio; one 6F6G, audio output; and one 5Y4G, Rectifier.

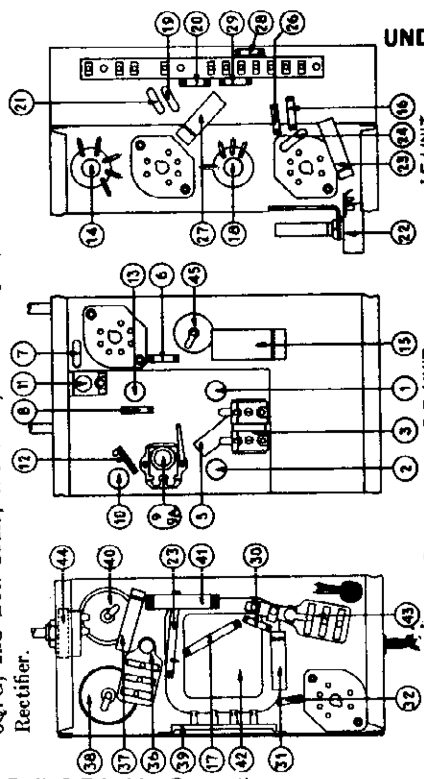


Fig. 4. Part Locations, underside of chassis

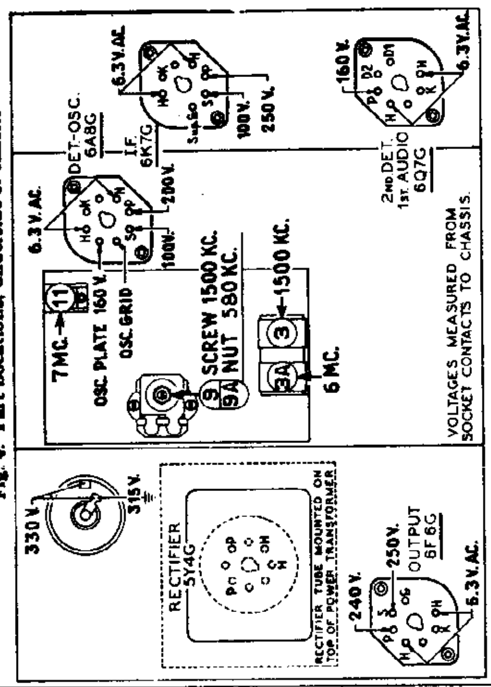


Fig. 1. R. F. Compensators and Voltage Readings, underside of chassis. The voltages indicated by arrows were measured with a Philco #26 Circuit Tester which contains a sensitive voltmeter. Volume control at minimum, range switch

MODEL 38-60,Code 125
Alignment,Parts

PHILCO RADIO & TELEV. CORP.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator using a fundamental frequency range covering the intermediate and tuning ranges of the receiver. Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36,000 K. C., is the correct instrument for this purpose; (2) output meter, Philco Model 026 circuit tester incorporates a sensitive output meter, and is recommended; (3) Philco Fibre Handle Screw Driver, part No. 27-7059 and Fibre Wrench part No. 3164.

OUTPUT METER: The 026 output meter is connected to the plate and cathode terminals of the 6F6G tube. Adjust the meter to use the (0-30) volt scale and advance attenuator control of the generator until a readable indication is noted or the output meter after a signal is applied to the receiver in the following adjustments.

DIAL CALIBRATION: In order to adjust this receiver correctly the dial must be aligned to track properly with the tuning condenser. To do this proceed as follows:

1. Turn the tuning condenser to the maximum capacity position, then loosen dial hub, set screws and rotate the dial (condenser at maximum capacity) until the glowing beam indicator is centered between the first and second index lines at the low frequency end of the broadcast scale.

2. With dial in this position, tighten dial hub set screws.

INTERMEDIATE FREQUENCY CIRCUIT

Connect the 077 signal generator output lead through a .1 mfd. condenser to the control grid of the 6A8G tube and the ground connection of the output lead to the chassis. Then set the controls of the signal generator and receiver as follows:

a. Signal Generator 470 K. C.

b. Receiver dial at 580 K. C.

c. Range switch of receiver at Range One.

d. Volume Control maximum.

e. Adjust I. F. Compensator (18B), (18A), (14B), (14A) for maximum output.

RADIO FREQUENCY CIRCUIT

Tuning Range 530 to 1720 K. C.

1. Connect the signal generator output lead through a 200 mmfd. condenser from the "med" post of the generator to the aerial terminal; and the output lead ground connection to the chassis.

2. The R. F. Compensators are adjusted as follows for maximum output:

Range Switch Position	Signal Generator and Receiver Dial	Compensators in Order
1	1500 K. C.	(9) (3)
1	580 K. C.	(9A) Note A
1	1500 K. C.	(9) (3)

Tuning Range 2.3 to 7.4 M. C.

Remove the 200 mmfd. from the output lead and replace with a 400 ohm carbon resistor and reconnect to the antenna terminal.

Range Switch Position	Signal Generator and Receiver Dial	Compensators in Order
2	7.0 M. C.	(11)
2	6.0 M. C.	(3A)

NOTE A—First tune compensator (9A) for maximum output, then vary the tuning condenser of the receiver for maximum output about the 580 K. C. dial mark. Now turn compensator (9A) slightly to the right or left and vary the receiver tuning condenser for maximum output. If the output reading increases, turn compensator (9A) in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

Replacement Parts

Schem. No.	Description	Part No.	List Price
1	Antenna transformer (range 1)	32-2568	$1.00
2	Antenna transformer (range 2)	32-2246	.70
3	Compensator (2 section)	31-6093	.40
4	Tuning condenser	31-1826	3.00
5	Condenser (.05 mf. tubular)	30-4444	.20
6	Resistor (10,000 ohms, ½ watt)	33-310339	.20
7	Condenser (250 mmf. mica)	30-1032	.25
8	Resistor (120,000 ohms, ½ watt)	33-412339	.20
9	Compensator (2 section)	31-6100	.40
10	Oscillator transformer (range 1)	32-2380	.50
11	Compensator	31-6101	.20
12	Condenser (1650 mmf.)	31-6096	.40
13	Oscillator transformer (range 2)	32-2121	.70
14	I. F. Transformer (first)	32-2580	2.20
15	Condenser (.1 mf. tubular)	30-4455	.25
16	Resistor (1 meg., ½ watt)	33-510339	.20
17	Resistor (20,000 ohms, 1 watt)	33-320439	.20
18	Second I. F. transformer	32-2582	2.20
19	Condenser (110 mmf.) Part of 18		
20	Resistor (51,000 ohms)	33-351339	.20
21	Condenser (110 mmf.) Part of 18		
22	Volume control	33-5157	1.00
23	Resistor (51,000 ohms, 1 watt)	33-351439	.20
24	Condenser (110 mmf. mica)	30-1031	.20
25	Condenser (.015 mf. tubular)	30-4358	.20
26	Resistor (1 meg., ½ watt)	33-510339	.20
27	Condenser (.1 mf. tubular)	30-4122	.20
28	Resistor (1 meg., ½ watt)	33-510339	.20
29	Resistor (490,000 ohms, ½ watt)	33-449339	.20
30	Resistor (70,000 ohms, ½ watt)	33-370339	.20
31	Condenser (.015 mf. tubular)	30-4226	.20
32	Resistor (1 meg., ½ watt)	30-510339	.20
33	Output transformer (S7)	32-7019	.85
34	Cone and voice coil assembly	36-3157	1.00
35	Field coil assembly (S7)	36-3039	3.50
36	Condenser (.03 mf. bakelite)	8328-SU	.35
37	Condenser (.008 mf. tubular)	30-4317	.20
38	Condenser (8 mf. electrolytic)	30-2211	
39	Bias resistor (wire wound)	33-3316	
40	Condenser (12 mf. electrolytic)	30-2210	
41	Resistor (9000 ohms, 2 watts)	33-290539	.30
42	Power transformer		
	115 volts, 50-60 cycle	32-7583	4.50
	115 volts, 25-40 cycle	32-7584	6.50
	115/230 volts, 50-60 cycle	32-7585	6.50
43	Condenser (.015 mf.-.015 mf. dual bakelite)	3793-DG	.40
44	Tone control and off-on switch	42-1180	.75
45	Condenser (16 mf. electrolytic)	30-2212	
46	Pilot lamp	34-2039	.07
47	Range switch	42-1333	
	Cable Speaker	L-2181	.25
	Cable A. C.	L-2778	
	Dial	27-5196	.45
	Dial Hub	28-7152	.10
	Dial Clamp	28-2837	.10
	Dial Set Screw	W-1506	2.00 C
	Knob (Tuning)	27-4321	.10
	Knob (Tone & Volume)	27-4332	.10
	Pilot Lamp Socket Assembly	38-7706	.35
	Screen Bracket Assembly	31-1878	.25
	Speaker S7	36-1009	5.75
	Shaft (Vol. Cont.)	38-8058	.12
	Shaft Spring	28-4117	.40 C
	Shaft Clip	28-4394	.01
	Socket (6 prong)	27-6086	
	Socket (7 prong)	27-6087	
	Vernier Drive Assembly	31-1863	

F CABINET

Description	Part No.	List Price
Baffle & Silk	40-6142	
Bezel Assembly	40-6130	$1.00
Bezel Gasket	27-8312	.01
Bezel Glass	27-8299	.06
Bezel Ring	28-5079	.60

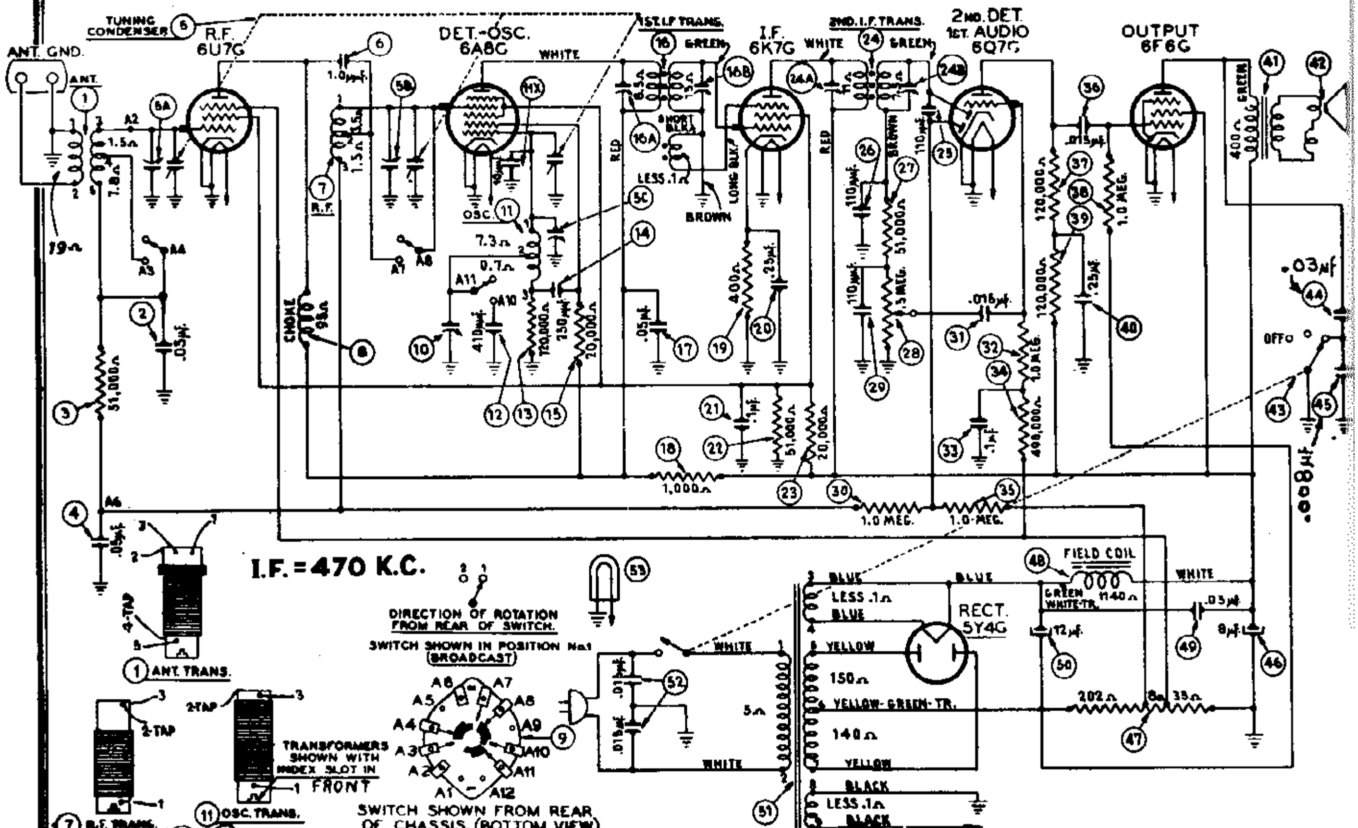
B CABINET

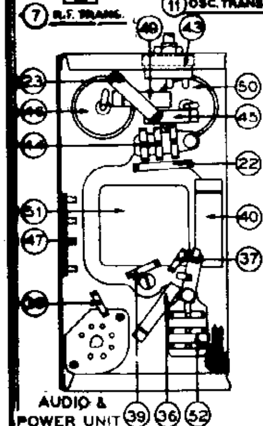
Description	Part No.	List Price
Baffle & Silk	40-6093	
Bezel Plate & Frame	40-6117	.90
Bezel Gasket	27-8311	.01
Bezel Glass	27-8298	.05
Bezel Ring	27-5078	.55

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL 38-89, Code 125

PHILCO RADIO & TELEV. CORP. Schematic, Voltage
Chassis





TYPE OF CIRCUIT: Superheterodyne with automatic volume control and a pentode audio output circuit.

POWER SUPPLY:

Voltage	Frequency	Consumption
115	50 to 60 cycles	65 watts
115	25 to 40 cycles	65 watts
115/220	50 to 60 cycles	

Different transformers are required for operation on the frequencies listed above. They are shown on the parts list.

TUNING RANGES) Two—Range one 530 to 1650 K. C.
Range two 1500 to 3700 K. C.

INTERMEDIATE FREQUENCY: 470 K. C.

TONE CONTROL: Two positions.

SPEAKERS: Type S in B cabinet.
Type HS in K cabinet.

UNDISTORTED OUTPUT: 3 watts.

Model 38-89
Code 125

April, 1937

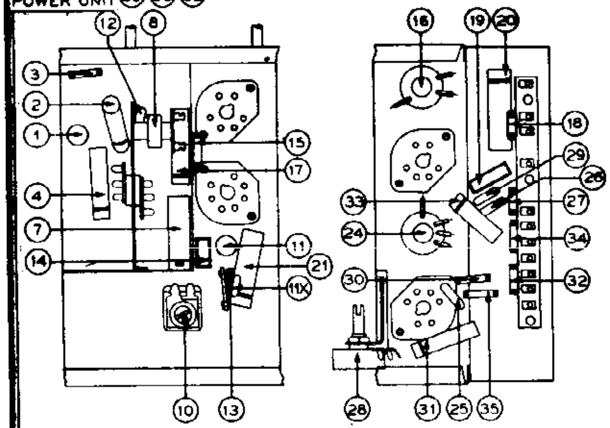


Fig. 4. Part Locations, underside of chassis.

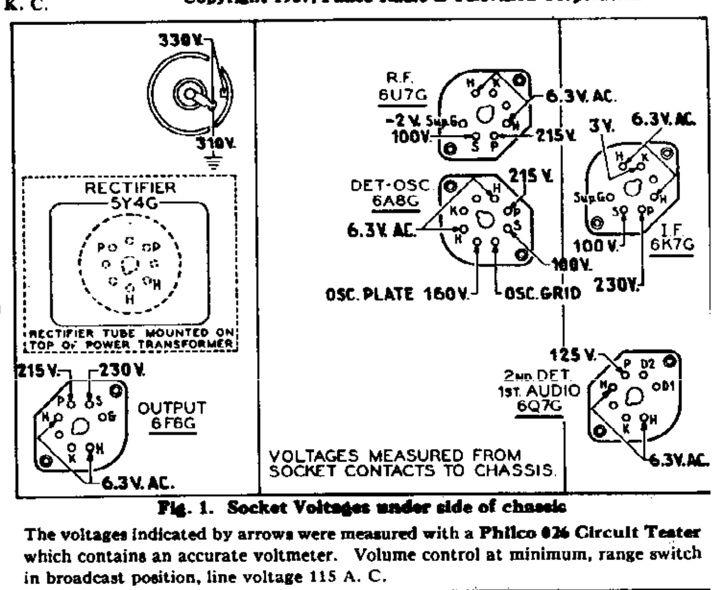


Fig. 1. Socket Voltages under side of chassis

The voltages indicated by arrows were measured with a **Philco 026 Circuit Tester** which contains an accurate voltmeter. Volume control at minimum, range switch in broadcast position, line voltage 115 A. C.

MODEL 38-89,Code 125
Alignment,Trimmers
Parts.

PHILCO RADIO & TELEV. CORP.

Replacement Parts

Schem. No.	Description	Part No.	List Price
1	Antenna transformer	32-2592	
2	Condenser (0.05 mf. tubular)	30-4519	$0.20
3	Resistor (51,000 ohms, ½ watt)	33-351339	.20
4	Condenser (0.05 mf. tubular)	30-4519	.20
5	Tuning Condenser assembly	31-2033	
6	Condenser (1.0 mmf. twisted wire)		
7	R. F. transformer	32-2128	.70
8	R. F. choke coil	32-2139	.35
9	Wave Switch	42-1334	
10	Compensator	31-6056	.55
11X	Condenser (10 mmf. mica)	30-1065	.20
11	Oscillator transformer	32-2120	1.00
12	Condenser (410 mmf. mica)	30-1000	.25
13	Resistor (120,000 ohms, ½ watt)	33-412339	.20
14	Condenser (250 mmf. mica)	30-1032	.25
15	Resistor (20,000 ohms, ½ watt)	33-320339	.20
16	1st I. F. transformer	32-2580	2.20
17	Condenser (0.05 mf. tubular)	30-4123	.20
18	Resistor (1,000 ohms, ½ watt)	33-210339	.20
19	Resistor (400 ohms, 1 watt, wire wound)	33-1211	.20
20	Condenser (0.25 mf. tubular)	30-4446	.25
21	Condenser (0.1 mf. tubular)	30-4455	.25
22	Resistor (51,000 ohms, ½ watt)	33-351, 339	.20
23	Resistor (20,000 ohms, ½ watt)	33-320, 339	.20
24	2nd I. F. transformer	32-2582	2.20
25	Condenser (110 mmf. mica)	30-1031	.20
26	Condenser (110 mmf. mica)	30-1031	.20
27	Resistor (51,000 ohms, ½ watt)	33-351,339	.20
28	Volume Control	33-5157	1.00
29	Condenser (110 mmf. mica)	30-1031	.20
30	Resistor (1.0 meg., ½ watt)	33-510, 339	
31	Condenser (0.015 mf. tubular)	30-4358	.20
32	Resistor (1.0 meg., ½ watt)	33-510, 339	.20
33	Condenser (0.1 mf. tubular)	30-4122	.20
34	Resistor (490,000 ohms, ½ watt)	33-449, 339	.20
35	Resistor (1.0 meg., ½ watt)	33-510, 339	.20
36	Condenser (0.015 mf. tubular)	30-4226	.20
37	Resistor (120,000 ohms, ½ watt)	33-412, 339	.20
38	Resistor (1.0 meg., ½ watt)	33-510, 339	.20
39	Resistor (120,000 ohms, ½ watt)	33-412, 339	.20
40	Condenser (0.25 mf. tubular)	30-4449	.20
41	Output transformer	32-7019	.85
42	Cone and voice coil assembly (S16)	36-3014	1.00
	Cone and voice coil assembly (HS3)	36-3796	
43	Tone control and power switch	42-1180	
44	Condenser (0.03 mf. bakelite)	8328-SU	.35
45	Condenser (0.008 mf. tubular)	30-4317	.20
46	Condenser (electrolytic, 8 mf.)	30-2211	
47	Bias resistor	33-3284	.30
48	Field coil assembly (S16)	36-3664	
	Field coil assembly (HS3)	36-3928	
49	Condenser (0.05 mf. tubular)	30-4020	.20
50	Condenser (electrolytic, 12 mf.)	30-2210	
51	Power transformer (115 v., 50-60 cycles)	32-7583	4.50
	(115 v., 25-40 cycles)	32-7584	6.50
	(115/230 v., 50-60 cycles)	32-7585	6.50
52	Condensers (0.015 mf. dual bakelite)	3793-DG	.40
53	Pilot Lamp	34-2064	.07
	Cable (Power)	L-2778	
	Cable (Speaker)	L-2181	.25
	Dial	27-5204	.35
	Dial Hub	28-7152	.10
	Dial Clamp	28-2837	.10
	Dial Set Screws	W-1506	2.00c
	Knob (Tuning)	27-4321	.10
	Knob (Vol., Range, Tone)	27-4332	.10
	Mtg. Spacer Bushing	27-4359	.02
	Mtg. Rubber Chassis	5189	.03
	Pilot Lamp Assembly	38-7706	.35
	Screen Bracket assembly	31-1878	
	Shield Tube, Round	28-5031	
	Shield Tube, Square	28-2726	$0.10
	Shield Base (Tube)	27-5030	.35
	Shaft (Volume Control)	38-8058	.12
	Socket 7 prong	27-6087	
	Socket 6 prong	27-6086	
	"K" CABINET		
	Baffle & Silk	40-6139	
	Bezel Frame & Plate	40-6130	1.00
	Bezel Gasket	27-8312	.01
	Bezel Glass	27-8299	.06
	Bezel Ring	28-5079	
	Speaker (HS3)	36-1350	
	"B" CABINET		
	Baffle & Silk Assembly	40-6093	
	Bezel Frame & Plate Assembly	40-6117	.90
	Bezel Gasket	27-8311	.01
	Bezel Glass	27-8298	.05
	Bezel Ring	28-5078	
	Speaker (S16)	36-1225	5.75

PRICES SUBJECT TO CHANGE
WITHOUT NOTICE

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator—Philco Model 077 Signal Generator—using fundamental frequency from 115 to 36000 K. C. is the correct instrument for the purpose; (2) Output Meter, Philco Model 026 circuit tester incorporates a sensitive output meter and is recommended; (3) Philco Fibre Handle Screw Driver, part No. 27-7059 and Fibre Wrench part No. 3164.

OUTPUT METER: The 026 output meter is connected to the plate and cathode terminals of the 6F6G tube. Adjust the meter to use the (0-30) volt scale and advance attenuator control of the generator until a readable indication is noted.

DIAL CALIBRATION: In order to adjust this receiver correctly the dial must be aligned to track properly with the tuning condenser. To do this proceed as follows:

1. Turn the tuning condenser to the maximum capacity position. Then loosen dial hub, set screws and rotate the dial (condenser at maximum capacity) until the glowing beam indicator is center on second index line at the low frequency end of the broadcast scale.

2. With dial in this position, tighten dial hub set screws.

INTERMEDIATE FREQUENCY CIRCUIT

Insert the signal generator output lead in the med. jack, and connect the other end through a .1 mfd. condenser to the grid of the 6A8G det. osc. tube. The ground connection of the signal generator is connected to the chassis. Set the signal generator controls and adjust the I. F. compensators as follows:

a. Set 077 Signal Generator indicator at 470 K. C. Turn the multiplier control to 1000, and set the gain control for maximum output.
b. Receiver Dial 580 K. C.
c. Receiver volume control full "on".
d. Adjust compensator (24B), (24A), (16B) and (16A) for maximum output.

If the output meter goes off scale when adjusting the compensators retard signal generator attentuator.

RADIO FREQUENCY CIRCUIT

Tuning Range 530 to 1650 K. C.

1. Insert the signal generator output lead in the "medium jack" on the panel, and connect the other end through the .1 mfd. condenser to the antenna terminal of the receiver. The output lead ground must be connected to the chassis.

2. Leave the receiver volume control full on. Then set the controls and adjust the R. F. compensators as follows:

Range Switch Position	Signal Generator and Receiver Dial	Compensators In Order
1	1500 K. C.	(5C), (5B), (5A)
1	580 K. C.	(10) (See Note A)
1	1500 K. C.	(5C), (5B), (5A)

Tuning Range 1500 to 3700 K. C.

The alignment of this tuning range is taken care of by the Range 1 adjustments.

NOTE A—First tune compensator (10) for maximum output, then vary the tuning condenser of the receiver for maximum output about the 580 K. C. dial mark. Now turn compensator (10) slightly to the right or left and vary the receiver tuning condenser for maximum output. If the out reading increases, turn compensator (10) in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

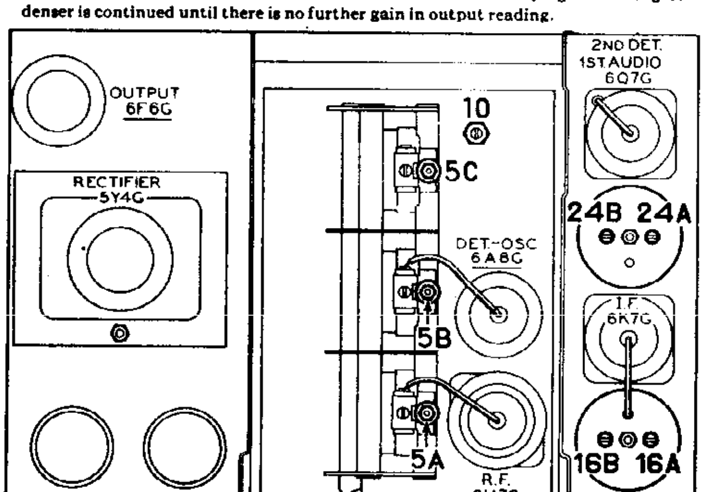
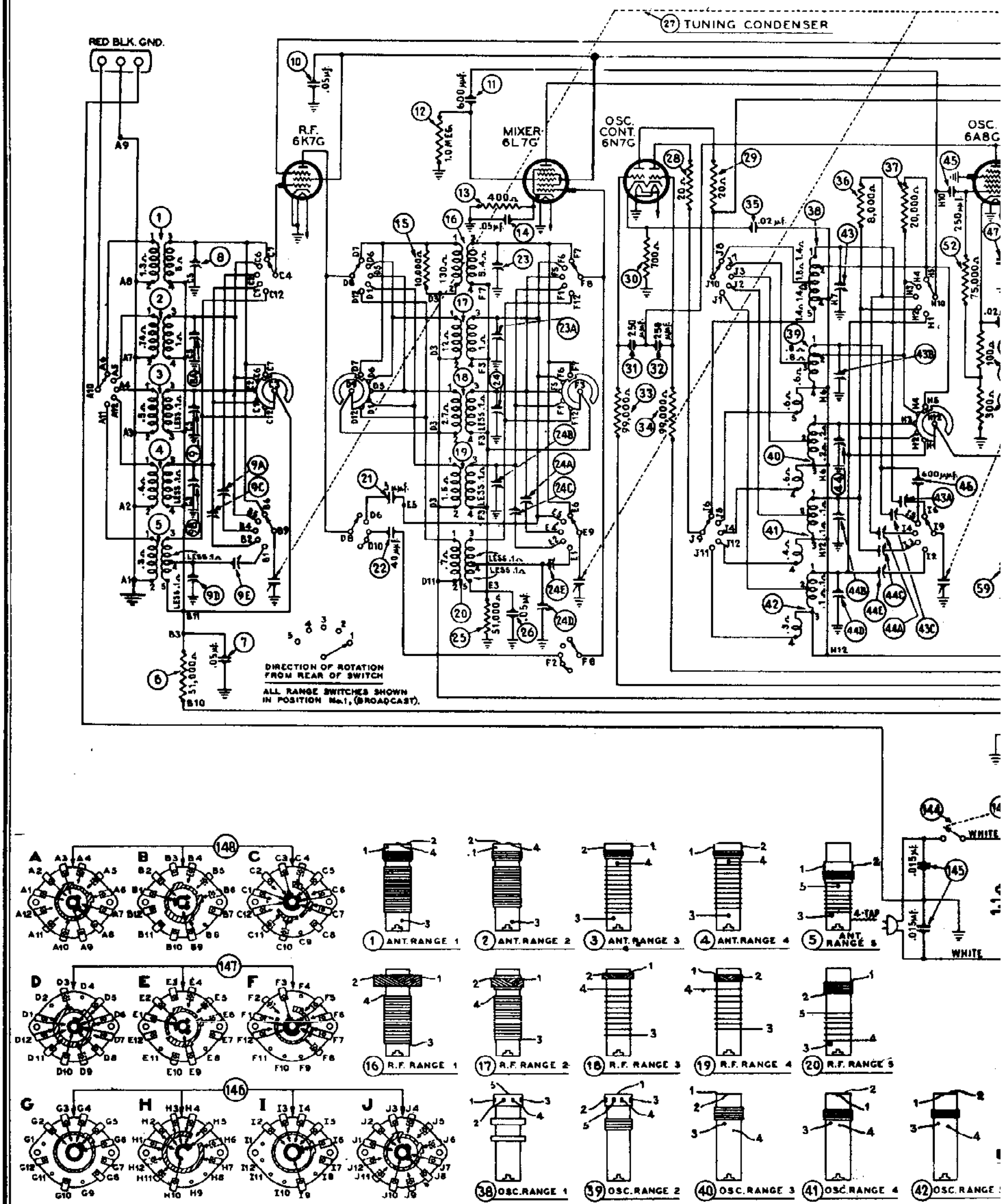
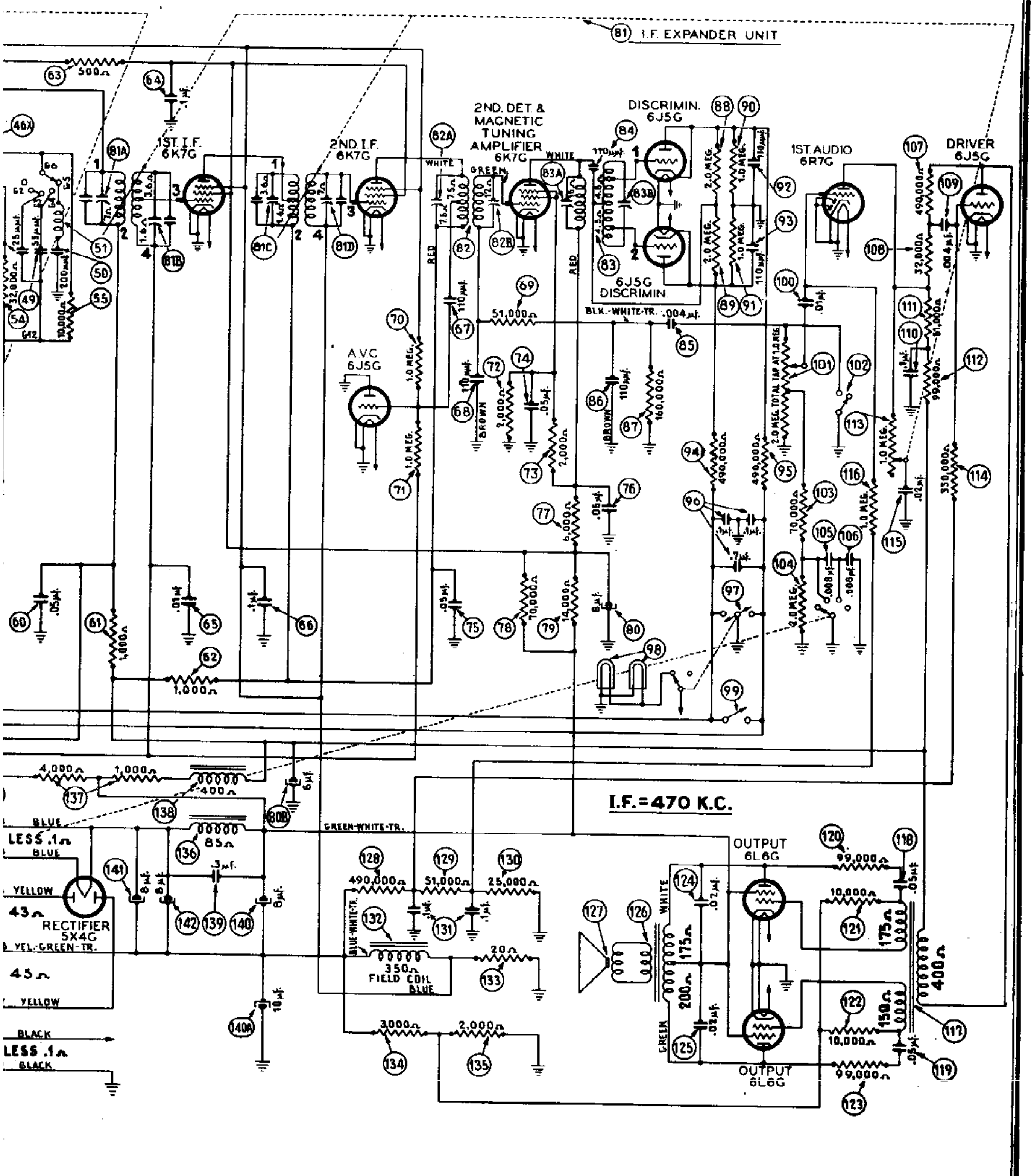


Fig. 2. Locations of Compensators. Top of chassis.


27 TUNING CONDENSER
RED BLK. GND.
R.F. 6K7G
MIXER 6L7G
OSC. CONT. 6N7G
OSC. 6A8G
DIRECTION OF ROTATION FROM REAR OF SWITCH
ALL RANGE SWITCHES SHOWN IN POSITION No.1, (BROADCAST).
WHITE
1 ANT. RANGE 1
2 ANT. RANGE 2
3 ANT. RANGE 3
4 ANT. RANGE 4
5 ANT. RANGE 5
16 R.F. RANGE 1
17 R.F. RANGE 2
18 R.F. RANGE 3
19 R.F. RANGE 4
20 R.F. RANGE 5
38 OSC. RANGE 1
39 OSC. RANGE 2
40 OSC. RANGE 3
41 OSC. RANGE 4
42 OSC. RANGE

TELEV. CORP.

MODEL 38-116, Code 121
Schematic



I.F.=470 K.C.

E
AREA INDICATES RING AT REAR OF SWITCH WAFER.
ED AREA INDICATES RING AT FRONT OF SWITCH WAFER.
RS INDICATE POSITION OF SWITCH WAFERS FROM REAR OF CHASSIS, (BOTTOM VIEW)

Model 38-116, Code 121

June, 1937

the
rary

in broadcast position.

for a weak signal, and turn the indicator to 1000 K.C. Then adjust the receiver dial for maximum output at this frequency.

PHILCO RADIO & TELEV. CORP.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator, having a fundamental frequency range covering the tuning and intermediate frequencies of the receiver. **Philco Model 077 Signal Generator** which has a fundamental frequency range from 115 to 36000 K. C. is the correct instrument for this purpose; (2) Output Meter. **Philco Model 026 Circuit Tester** incorporates a sensitive output meter and is recommended; (3) Philco Fibre Handle Screw Driver, Part No. 27-7059 and Fibre Wrench, Part No. 3164.

OUTPUT METER: The 026 Output Meter is connected to the plate and cathode terminals of one of the 6L6G tubes. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter after signal is applied to stage being adjusted.

DIAL CALIBRATION: In order to adjust the compensators of this receiver correctly the dial must be aligned to track properly with the tuning condenser. To do this proceed as follows:

1. Loosen the set screws on the shaft coupling of the tuning condenser. Then turn the tuning condenser until the plates are in the maximum capacity position. Now turn the dial until the glowing beam indicator is on the **Index Line** at the low frequency end of the broadcast band. See Fig. 6. With dial and tuning condenser in this position tighten set screws.
2. Turn the tuning condenser control until the indicator is on the 520 K.C. mark. See Fig. 6.
3. With the dial in this position, loosen the shaft coupling set screws. Then turn the dial until the indicator is again on the **Index Line**. Tighten the set screws in this position.

NOTE: Be careful when turning the dial that the position of the tuning condenser is not disturbed.

INTERMEDIATE FREQUENCY CIRCUIT

1. Viewing each instrument from the front, set the receiver and Signal Generator controls as follows:

a. Selectivity-fidelity control (clockwise)
b. Volume Control at maximum (clockwise)
c. Magnetic Tuning switch (off)
d. Bass Compensation switch first position from "off"
e. Range Switch position one (broadcast)
f. Receiver dial 580 K. C.
g. Signal Generator indicator set at 470 K. C. and the "Attenuator" control for maximum output.

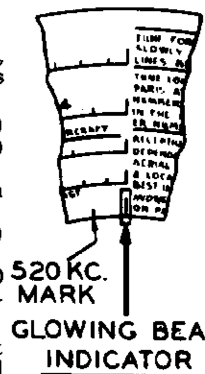


Fig. 6. Dial Calibration

2. Connect the Signal Generator output cable through a .1 mfd. condenser to the grid of the second 6K7G I. F. tube. Then adjust the I. F. compensators as follows:

a. Close compensator (**82B**) by turning to the extreme clockwise position, then pad compensator (**82A**) for maximum output. Now readjust compensator (**82B**) for maximum output.
b. Connect the Signal Generator output lead through the .1 mfd. condenser to the grid of the 6L7G tube, and adjust the following compensators for maximum output: (**81D**), (**81C**), (**81A**), (**81B**).
c. Repad (**82A**)—See **Note A**. Check for two equal peaks. Fidelity control in expanded position (counter-clockwise).

RADIO FREQUENCY CIRCUIT

1. Set the controls as given under "Intermediate Frequency Circuit" (a-b-c-d) and set the Range Switch, Signal Generator and Receiver Dials as given under the adjustments of each tuning range in the following procedure.

Connect the Signal Generator output cable to the "Red" and "Blk" terminals on the aerial panel (rear of chassis). The ground connection of the cable should be connected to the "Blk" terminal.

2. Set the controls and adjust the compensators for maximum output as follows:

Tuning Ranges 530 to 1600 K. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 1	1500 K. C.	(43), (8), (23) See Note B
Position 1	1500 K. C.	(43)
Position 1	1400 K. C.	(8), (23)

Tuning Range 4.7 to 7.4 M. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 3	7.0 M. C.	(44)
Position 3	5.0 M. C.	(44A)
Position 3	7.0 M. C.	(44), (9), (24)
Position 3	5.0 M. C.	(44A), (9A), (24A)
Position 3	7.0 M. C.	(44), (9), (24)

Tuning Range 7.35 to 11.6 M. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 4	11.0 M. C.	(44B)
Position 4	7.5 M. C.	(44C)
Position 4	11.0 M. C.	(44B), (9B), (24B) Roll Tuning Condenser. See Note B
Position 4	7.5 M. C.	(44C), (9C), (24C)
Position 4	11.0 M. C.	(44B), (9B), (24B) Roll Tuning Condenser. See Note B

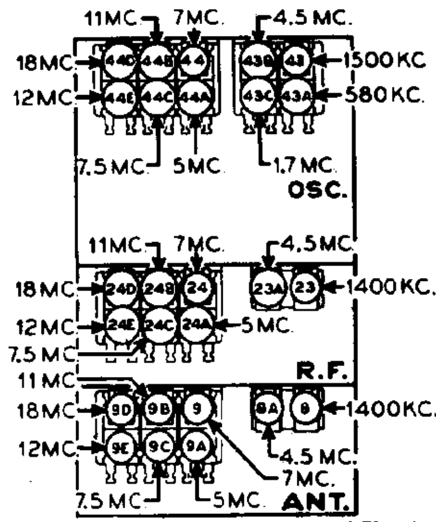
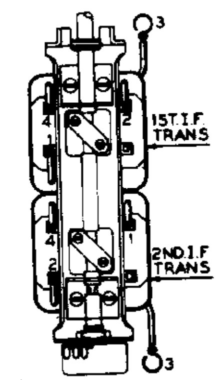


Fig. 8. R.F. Compensator Underside of Chassis



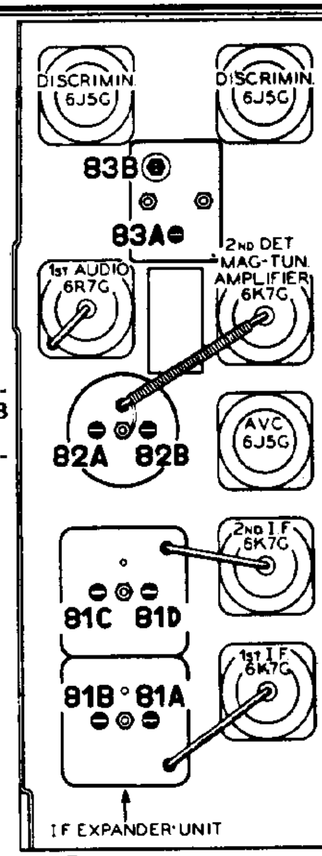
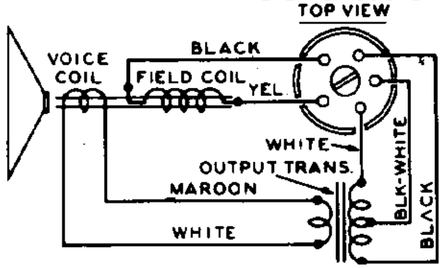
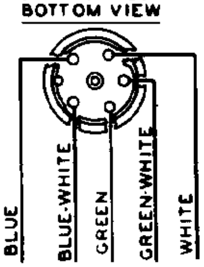
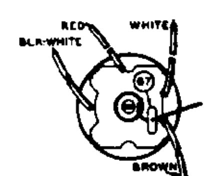
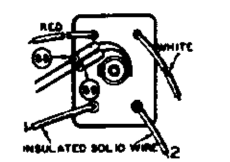


Fig. 7. I.F. Compensators









MODEL 38-116, Code 121
Alignment, Part 2
Voltage

PHILCO RADIO & TELEV. CORP.

Aerial Connections

To obtain the full advantage of the sensitivity of this receiver the **Philco High Efficiency Aerial** supplied with the instrument must be used. Connect the aerial as follows:

The aerial terminal panel located on the rear of the chassis, contains three terminals marked "Red," "Blk" and "Gnd". Connect the red and black wires of the aerial lead in (Transmission Line) to the "Red" and "Blk" terminals respectively. Connect the "Gnd" terminal to a good ground source. If a temporary aerial is used, connect it to the "Red" terminal.

Tuning Range 1.58 to 4.75 M. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 2	4.5 M. C.	(43B), (8A), (23A)
Position 2	1.7 M. C.	(43C)
Position 2	4.5 M. C.	(43B), (8A), (23A)

Tuning Range 11.5 to 18.2 M. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Position 5	18.0 M. C.	(44D)
Position 5	12.0 M. C.	(44E)
Position 5	18.0 M. C.	(44D), (9D), (24D) Roll Tuning Condenser. See Note B and C. Check image at 17.060 M. C.
Position 5	12.0 M. C.	(44E), (9E), (24E) Roll Tuning Condenser. See Note B
Position 5	18.0 M. C.	(44D), (9D), (24D), Roll Tuning Condenser. See Note B and C. Check image at 17.060 M. C.

NOTE "A"—Slowly shift signal generator indicator between 460 and 480 K. C. As the indicator is turned, two peaks will be noted on the Output Meter; one about 465 K. C. and the other about 475 K. C. These peaks should give the same deflection or reading on the output meter. If the peaks are unequal Compensator (82A) must be slightly readjusted to the right or left (not more than ¼ of a turn) until the peaks are equalized. This adjustment is used to compensate for slight differences between peaks. If the compensator must be turned more than ¼ of a turn in either direction to equalize the peaks, all padders should be carefully readjusted as given under "Intermediate Frequency Circuit" adjustment procedure. Each time the compensator is set in another position, rotate the signal generator through the 460 or 480 K. C. range and note the reading of each peak.

NOTE "B"—When adjusting the low frequency compensator of Range One (Broadcast) or the antenna and R. F. compensators of the high frequency tuning ranges; the receiver Tuning Condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output about the frequency dial mark. Now turn the compensator slightly to the right or left and vary the receiver tuning condenser for maximum output. If the out reading increases, turn the compensator in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

NOTE "C"—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a second maximum peak is obtained on the output meter. Adjust the compensator for maximum output using this second peak. The first peak from maximum capacity position of the compensator is the image signal and must not be used in adjusting the compensator.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 940 K. C. below the frequency being used on any high frequency range.

MAGNETIC TUNING CIRCUIT ADJUSTMENT

a. Set the Magnetic Tuning switch in the "out" position (counter-clockwise).

b. Volume control maximum (extreme clockwise).

c. Turn Treble-Selectivity control to the expanded position (extreme clockwise).

d. Now, adjust the "Attenuator" control of the signal generator for a weak signal, and turn the indicator to 1000 K. C. Then adjust the receiver dial for **maximum** output at this frequency.

NOTE: The receiver dial **MUST** be tuned very accurately to the 1000 K. C. signal in order to make the following adjustments correctly.

e. After adjusting the receiver dial, turn the Magnetic Tuning switch "on."

f. Now, turn compensator (83B) slightly to the right or left (about ¼ turn) and proceed with adjustment "g."

g. Adjust compensator (83A) primary of the discriminator transformer for **minimum** output; then readjust compensator (83B) secondary of discriminator transformer for **maximum** output.

The above adjustments are now checked for accuracy as follows:

Frequency Test:

With the 1000 K. C. signal tuned for maximum output turn the Magnetic Tuning control back and forth; that is, from the "out" to "in" position. The reading of the output meter should not change in either position. If the output meter reading changes, the above magnetic tuning circuit adjustments should be repeated.

Sensitivity Test:

1. To check the magnetic tuning circuit for sensitivity, turn the magnetic tuning switch to the "off" position, and tune in the 1000 K. C. signal. Then adjust the "attenuator" control of the signal generator for a good audible signal. Approximately 20 volts on the output meter.

2. Now detune the signal (first above and then below the 1500 K. C. mark) to a point at which the signal is weakly heard. At each point turn the magnetic tuning control "on." When the control is turned on the signal should return to normal output strength. If the magnetic tuning circuit does not pull the signal into resonance, the primary compensator (83A) should be carefully readjusted.

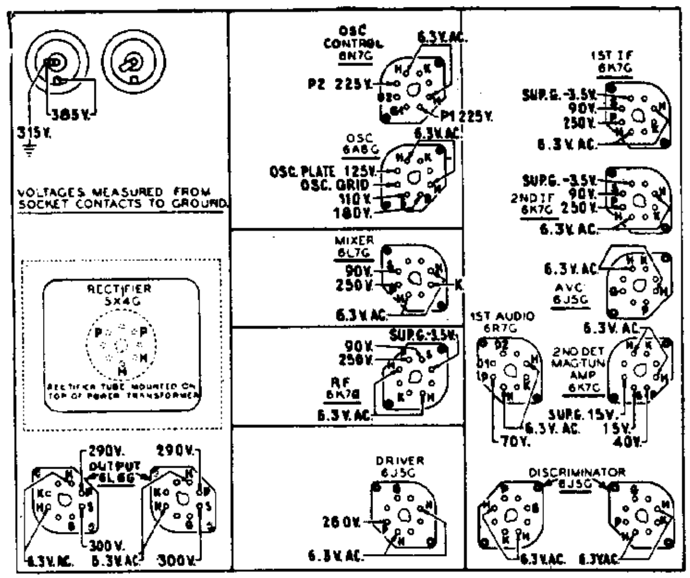


Fig. 1. Underside View of Chassis showing Socket Voltages

The voltages indicated by the arrows were measured with a **Philco 026 Circuit Tester,** which contains a sensitive voltmeter. Line voltage 115 A. C.—Volume control minimum—Dial set at point where no signal is present—Range Switch in broadcast position.

PHILCO RADIO & TELEV. CORP.

PHILCO TUBES USED: 6K7G R.F.; 6L7G Mixer; 6A8G Oscillator; 6N7G Oscillator control; two 6K7G I. F.; 6K7G 2nd Detector Magnetic tuning amplifier; two 6J5G discriminator; 6J5G A. V. C.; 6R7G 1st audio; 6J5G audio driver; two 6L6G audio output, and one 5X4G rectifier.

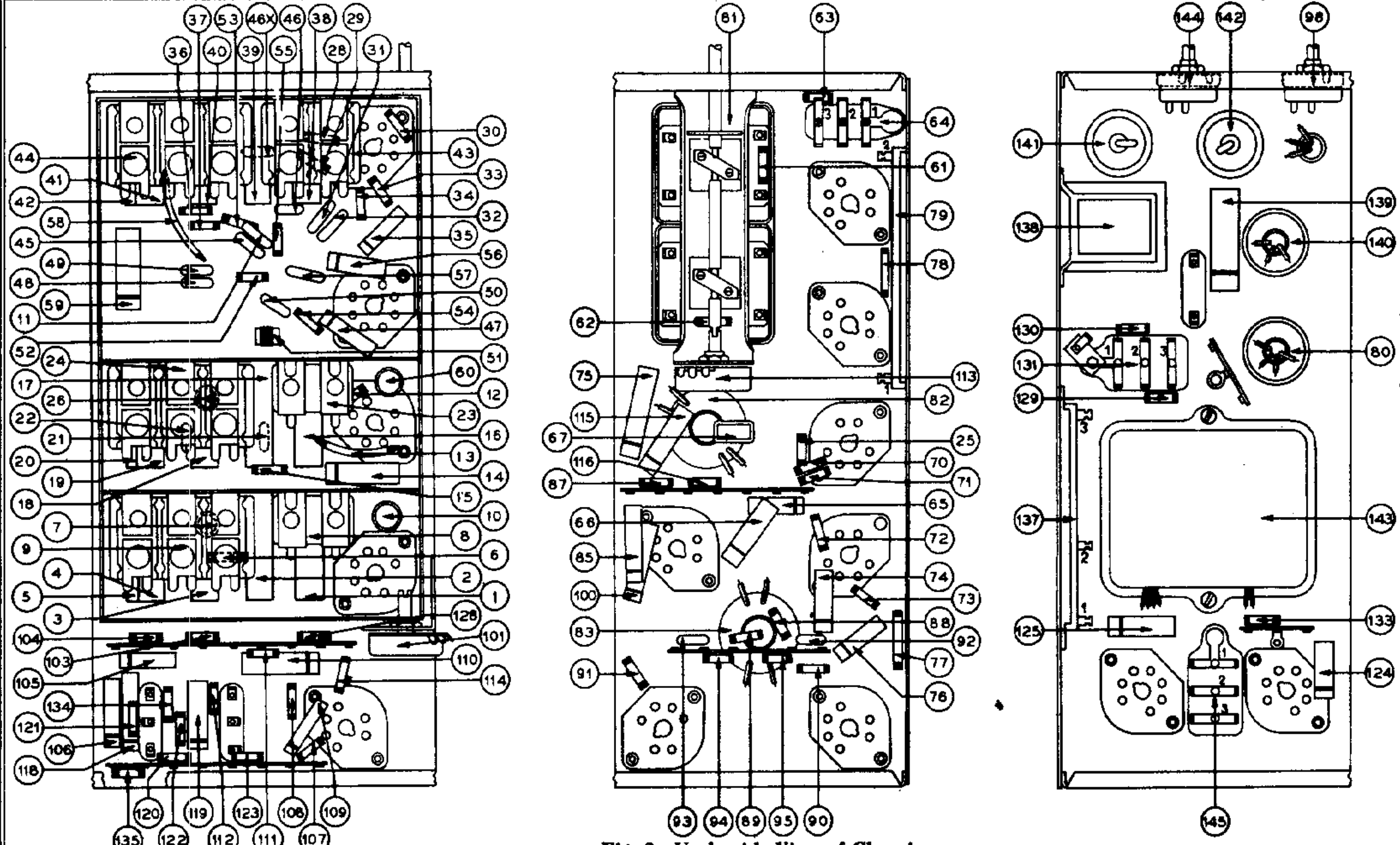


Fig. 2. Underside View of Chassis

TYPE OF CIRCUIT: Model 38-116, code 121 employs a fifteen tube A.C. operated superheterodyne circuit with a spread-band dial having five tuning ranges covering a frequency range from 530 K.C. to 18.2 M.C.

Incorporated in this model are design features such as: magnetic tuning control on each tuning range; automatic volume control; treble-selectivity expander unit in the intermediate frequency circuit; audio bass compensation; acoustic clarifiers to eliminate cabinet resonance; special push-pull audio output circuit using 6L6G beam tubes, and the **Philco** automatic tuning mechanism.

POWER SUPPLY:	Voltage	Frequency Cycles	Power Consumption
	115	50 to 60	165 watts
	115	25 to 40	165 watts

Different transformers are required for operation on the voltages and frequencies listed above. The part numbers for these transformers are listed on page 5. A special transformer for operation on either 115 or 230 volt—50 to 60 cycle A.C. power circuit can be obtained. This transformer is provided with a plug and socket for selection of either voltage rating. Place the plug with arrow pointing toward voltage being used.

TONE CONTROLS: Two—1. High audio-frequency tone varied by Treble-Selectivity control.

2. Low audio-frequency tone varied by "Bass Tone Control," in the volume control circuit.

PHILCO SPEAKERS USED: One type "W4" with three acoustic clarifiers.

FREQUENCY RANGES:

Range	
One	530 to 1600 K.C.
Two	1.58 to 4.75 M.C.
Three	4.7 to 7.4 M.C.
Four	7.35 to 11.6 M.C.
Five	11.5 to 18.2 M.C.

UNDISTORTED OUTPUT: 15 watts.

CABINET: Type XX.

PHILCO RADIO & TELEV. CORP.

REPLACEMENT PARTS—Models 38-116, Code 121

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Schem. No.	Description	Part No.	List Price
1	Ant. Trans. (Range 1)	32-3208	
2	Ant. Trans. (Range 2)	32-2146	$1.20
3	Ant. Trans. (Range 3)	32-2183	1.20
4	Ant. Trans. (Range 4)	32-2185	1.20
5	Ant. Trans. (Range 5)	32-2175	1.20
6	Resistor (51,000—½ watt)	33-351339	.20
7	Condenser (0.5 mf. tubular)	30-4444	.20
8	Compensator (Range 1 & 2 Ant.)	31-6093	.40
9	Compensator (3, 4 & 5 Ant.)	31-6112	1.40
10	Condenser (.05 mf. tubular)	30-4123	.20
11	Condenser (600 mmf. mica)	30-1049	.25
12	Resistor (1 meg. ½ watt)	33-510339	.20
13	Resistor (400 ohms 1 watt wire wound)	33-1211	.20
14	Condenser (.05 mf. tubular)	30-4444	.20
15	Resistor (10,000 ohms ½ watt)	33 310339	.20
16	R. F. Trans. (Range 1)	32-2105	1.00
17	R. F. Trans. (Range 2)	32-2147	.70
18	R. F. Trans. (Range 3)	32-2177	.70
19	R. F. Trans. (Range 4)	32-2178	.70
20	R. F. Trans. (Range 5)	32-2176	1.20
21	Condenser (5 mmf. mica)	30-1077	.20
22	Condenser (40 mmf. mica)	30-1076	.20
23	Compensator (R. F. Range 1 & 2 R. F.)	31-6093	.40
24	Compensator (R. F. Range 3, 4, 5)	31-6113	1.40
25	Resistor (51,000 ½ watt)	33-351339	.20
26	Condenser (.05 mf. tubular)	30-4519	.20
27	Tuning Condenser	31-1892	3.75
28	Resistor (20 ohms, ½ watt)	33-020339	.20
29	Resistor (20 ohms, ½ watt)	33-020339	.20
30	Resistor (700 ohms, ½ watt)	33-170339	.20
31	Condenser (250 mmf. mica)	30-1032	.25
32	Condenser (250 mmf. mica)	30-1032	.25
33	Resistor (99,000 ohms, ½ watt)	33-399339	.20
34	Resistor (99,000 ohms, ½ watt)	33-399339	.20
35	Condenser (.02 mf. tubular)	30-4481	.20
36	Resistor (8,000 ohms, ½ watt)	33-280339	.20
37	Resistor (20,000, ½ watt)	33-320339	.20
38	Osc. Trans. (Range 1)	32-2191	1.00
39	Osc. Trans. (Range 2)	32-2194	1.00
40	Osc. Trans. (Range 3)	32-2197	.70
41	Osc. Trans. (Range 4)	32-2198	.70
42	Osc. Trans. (Range 5)	32-2199	.70
43	Compensator (Range 1 & 2 Osc.)	31-6124	1.00
44	Compensator (Range 3, 4 & 5 Osc.)	31-6117	1.20
45	Condenser (250 mmf. mica)	30-1032	.25
46	Condenser (600 mmf. mica)	30-1049	.25
46X	Condenser (600 mmf. mica)	30-1049	.25
47	Condenser (.01 mf. tubular)	30-4169	.20
48	Condenser (25 mmf. mica)	30-1067	.20
49	Condenser (55 mmf. mica)	30-1045	.20
50	Condenser (200 mmf. mica)	30-1078	.25
51	Choke (R. F.)	32-2242	.30
52	Resistor (75,000 ½ watt)	33-375339	.20
53	Resistor (20,000 ½ watt)	33-320339	.20
54	Resistor (32,000 ½ watt)	33-332339	.20
55	Resistor (10,000 ½ watt)	33-310339	$0.20
56	Condenser (.02 mf. tubular)	30-4481	.20
57	Resistor (10 ohms wire wound)	33-1219	.20
58	Resistor (300 ohms, wire wound)	33-3121	.25
59	Condenser (.05 mf. tubular)	30-4123	.20
60	Condenser (.05 mf. tubular)	30-4123	.20
61	Resistor (1000 ohms, ½ watt)	33-210339	.20
62	Resistor (1000 ohms, ½ watt)	33-210339	.20
63	Resistor (500 ohms, ½ watt)	33-150339	.20
64	Condenser (.1 mf. Bakelite)	4989SG	.35
65	Condenser (.01 mf. tubular)	30-4514	.20
66	Condenser (.01 mf. tubular)	30-4499	.20
67	Condenser (110 mmf. mica)	30-1031	.20
68	Condenser (110 mmf., Part of 82)	30-1031	
69	Resistor (51,000 ohms, ½ watt, Part of 82)	33-351339	.20
70	Resistor (1 meg., ½ watt)	33-510339	.20
71	Resistor (1 meg., ½ watt)	33-510339	.20
72	Resistor (2000 ohms, ½ watt)	33-220339	.20
73	Resistor (2000 ohms, ½ watt)	33-220339	.20
74	Condenser (.05 mf. tubular)	30-4444	.20
75	Condenser (.05 mf. tubular)	30-4518	.20
76	Condenser (.05 mf. tubular)	30-4444	.20
77	Resistor (6,000 1 watt)	33-260439	.20
78	Resistor (70,000 1 watt)	33-370439	.20
79	Resistor (14,000 wire wound)	33-3291	.40
80	Condenser (Elec. 8—8—6 mf.)	30-2232	2.50
‡81	I. F. Expander Unit (For 1st and 2nd I. F. Trans. See Note)	38-8912	10.00
82	I. F. Transformer (3rd)	32-2660	
83	Discriminator Trans.	32-2661	
84	110 mf. Condenser (Part of 83)	30-1031	.20
85	Condenser (.004 mf.)	30-4456	.20
86	Condenser (Part of 82)		
87	Resistor (160,000 ohm, ½ watt)	33-416339	.20
88	Resistor (2 meg., ½ watt)	33-520339	.20
89	Resistor (2 meg., ½ watt)	33-520339	.20
90	Resistor (1 meg., ½ watt)	33-510339	.20
91	Resistor (1 meg., ½ watt)	33-510339	.20
92	Condenser (110 mmf. mica)	30-1031	.20
93	Condenser (110 mmf. mica)	30-1031	.20
94	Resistor (490,000 ohms, ½ watt)	33-449339	.20
95	Resistor (490,000 ohms, ½ watt)	33-449339	.20
96	Condenser (.1—.1—.7 mf.)	30-4466	1.40
97	A.F.C. Shorting Switch	42-1216	.75
98	Flood Lights	34-2064	.09
99	A.F.C. Shorting Switch (Part of Mech. Tuner)	45-2330	1.20
100	Condenser (.01 mf. tubular)	30-4169	.20
101	Volume Control	33-5158	1.00
102	Audio Shorting Switch (Part of Mech. Tuner—See parts (6) and (16) Bulletin 273)		
103	Resistor (70,000 ohms, ½ watt)	33-370339	.20
104	Resistor (2 meg., ½ watt)	33-520339	.20
105	Condenser (.008 mf. tubular)	30-4112	.20
106	Condenser (.008 mf. tubular)	30-4112	.20
107	Resistor (490,000 ohms, ½ watt)	33-449339	.20
108	Resistor (32,000 ohms, ½ watt)	33-332339	.20
109	Condenser (.004 mf. tubular)	30-4456	.25
110	Condenser (.01 mf. tubular)	30-4455	.20
111	Resistor (51,000 ohms, ½ watt)	33-351339	.20
112	Resistor (99,000 ½ watt)	33-399339	.20
113	Potentiometer	33-5235	
114	Resistor (330,000 ohms, ½ watt)	33-433339	.20
115	Condenser (.02 mf. tubular)	30-4481	.20
116	Resistor (1 meg., ½ watt)	33-510339	.20
117	Input Trans.	32-7865	
118	Condenser (.05 mf. tubular)	30-4518	.20
119	Condenser (.05 mf. tubular)	30-4518	.20
120	Resistor (99,000 ½ watt)	33-399339	.20
121	Resistor (10,000 ½ watt)	33-310339	.20
122	Resistor (10,000 ½ watt)	33-310339	.20
123	Resistor (99,000 ½ watt)	33-399339	.20
124	Condenser (.02 mf. tubular)	30-4481	.20
125	Condenser (.02 mf. tubular)	30-4189	.35
126	Output Trans.	32-7751	2.00
127	Cone and Voice Coil Assembly	36-3647	2.50
128	Resistor (490,000 ½ watt)	33 449339	.20
129	Resistor (51,000 ½ watt)	33 351339	.20
130	Resistor (25,000 ½ watt)	33 325339	.20
131	Condenser (.1—.1 mf. Bakelite)	4899DG	.40
132	Field Coil Assembly	36-3788	15.00
133	Resistor (20 ohms, ½ watt)	33-020339	.20
134	Resistor (3,000 ohms, ½ watt)	33-230339	.20
135	Resistor (2,000 ohms, ½ watt)	33-220339	.20
136	Choke (85 ohm)	32-7056	2.20
137	Resistor (4,000 — 1,000 ohms, wire wound)	33-3289	.50
138	Choke (400 ohm)	32-7722	1.20
139	Condenser (.3 mf. tubular)	30-4465	.25
140	Condenser Elec. (8—10 mf.)	30-2201	1.75
141	Elec. Cond. (8 mf.)	30-2026	1.05
142	Elec. Cond. (8 mf.)	30-2026	1.05
143	Power Transformer (115 V., 50 to 60 cycle)	32-7699	7.50
	Power Transformer (115 V., 25 to 40 cycle)	32-7700	
	Power Transformer (115/220 V., 50 to 60 cycle)	32-7701	
144	Power and Tone Switch	42-1196	$0.75
145	Condenser (.015—.015 Bakelite)	3793DG	.40
146	Range Switch (Osc.)	42-1217	2.00
147	Range Switch (R. F.)	42-1255	1.60
148	Range Switch (Ant.)	42-1211	1.60
149	Pilot Lamp	34-2064	
	Acoustic Clarifier	36-1155	1.25
	Automatic Tuning Mech. Complete	31-2063	
	Bezel Assembly (Cabinet)	38-8833	
	Bezel Gasket	27-8828	.08
	Brace (Dial Mechanism)	28-4119	.05
	†Cable and Plug (Floodlights)	41-3253	.25
	Cable (Power)	L-2183	.40
	Cable and Plug (Speaker)	41-3338	
	Clamp (R. F. Unit Rear Mtg.)	28-3900	.03
	Clamp Locking Plate (R. F. unit)	28-3982	.01
	Clamp (I. F. Cord)	28-4147	.01
	Cord (I. F. Expander Drive)	27-8411	.04
	Coupling (Range Switch and Mask)	38-8693	
	Coupling (Tuning Condenser and Dial Mechanism)	31-1961	
	*Cover (Handle of Automatic Mech.)	28-5092	
	*Dial	27-5340	.80
	*Dial Screen Holder	31-2053	
	*Escutcheon Assembly (Station Tabs)	45-2472	
	†Floodlight Socket Assembly, 4 Sockets	38-8210	
	Knob (Range Switch)	27-4326	.10
	Knob (Tuning)	27-4330	.10
	Knob (Vernier)	27-4331	.10
	Knob (Bass, Volume, Expander Magnetic)	27-4332	.10
	Mask Guide (Tuning Mechanism)	28-4118	.25
	†Pilot Lamp Socket Assembly	38-8051	
	Shaft and Index Plate (Range Switch)	42-1208	.50
	Shaft (I. F. Expander)	28-6496	.30
	Shaft (Volume Control)	38-8061	.12
	Shield (Tube, Square)	28-2726	.10
	Shield (Round 6N7G)	8005	.10
	Shield 3rd (I. F.)	38-1962	
	Shield (I. F. Expander)	38-9025	
	Shield Base (Square)	28-2725	.20
	Shield Base (Round 6N7G)	8004	.03
	Speaker (W4)	36-1284	
	Socket (7 prong, Power tubes)	27-6057	.11
	Socket (7 prong)	27-6087	.11
	Socket (6 prong)	27-6086	.11
	Socket (Power Transformer)	27-6052	.11
	Terminal Panel (Ant.)	38-8746	

MISCELLANEOUS MOUNTING PARTS

Description	Part No.	List Price
Bolt (Mtg. Speaker)	W-862	
Bushing (Mtg. R. F. Unit)	28-2257	.01
Clip (Volume Shaft Front Section)	28-4394	.01
Cover (Back of Cabinet)	27-8866	
Felt (Mtg. Speaker)	27-8498	.15
Rubber Grommet (Mtg. R. F. Unit)	27-4317	.04
Rubber Bushing (Mtg. Chassis)	27-4202	.08
Rubber Bushing (Mtg. Chassis)	27-4360	
Rubber Cushion (Mtg. Chasis)	3558	
Pin (I. F. Shaft)	3014	
Screw (Mtg. R. F. Unit Rear Section)	W-729	
Screw (I. F. Cord Clamp)	W-1324	
Screws (Back Cover, Cabinet)	W-1803	
Snap Fastener (Range Switch Coupling)	28-4279	
Spacer (Mtg. R. F. Unit)	27-7807	
Spring (Retaining I. F. Shaft Front Section)	28-8610	
Spring Clip (I. F. Shaft, Rear Section)	28-4117	per C .40
Washer—Flat—(I. F. Shaft)	W-174	
Washer (Mtg. R. F. Unit)	28-3927	.01
Washer—Spring—(Mtg. I. F. Shaft)	28-4186	per C .75

*These Automatic Tuning Mechanism Parts differ from those shown in Service Bulletin 273.

‡1st I. F. Transformer Section 32-2727

2nd I. F. Transformer Section 32-2728

†Pilot and Floodlight Socket Assembly, 3 Sockets. Used on later type receivers....... 38-8487

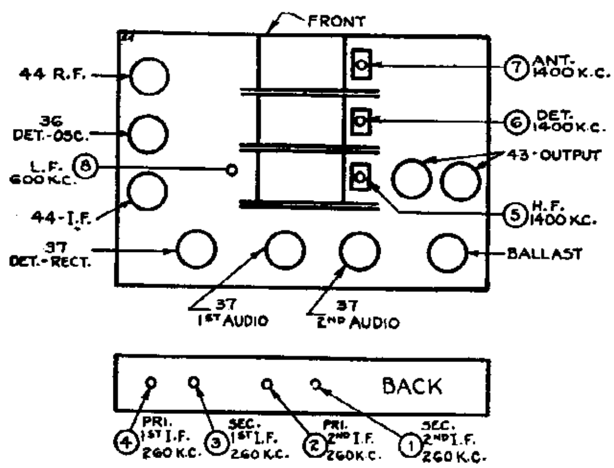
PHILCO RADIO & TELEV. CORP.

MODEL 47
MODEL 48
MODELS 90,90A(with 1-47)
Alignment,Trimmers

MODEL NO. 47

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from det.-osc.					
Control grid of det.-osc.	260 k.c.	60	...	1 [1]	Max.
"	"	"	...	2 [1]	Max.
"	"	"	...	3 [1]	Max.
"	"	"	...	4 [1]	Max.
Connect grid clip to det.-osc.					
Ant.*	1400 k.c.	140	...	5	Max.
"	"	"	...	6	Max.
"	"	"	...	7	Max.
"	600 k.c.	60	...	8 [2]	Max.**
"	1400 k.c.	140	...	5	Max.

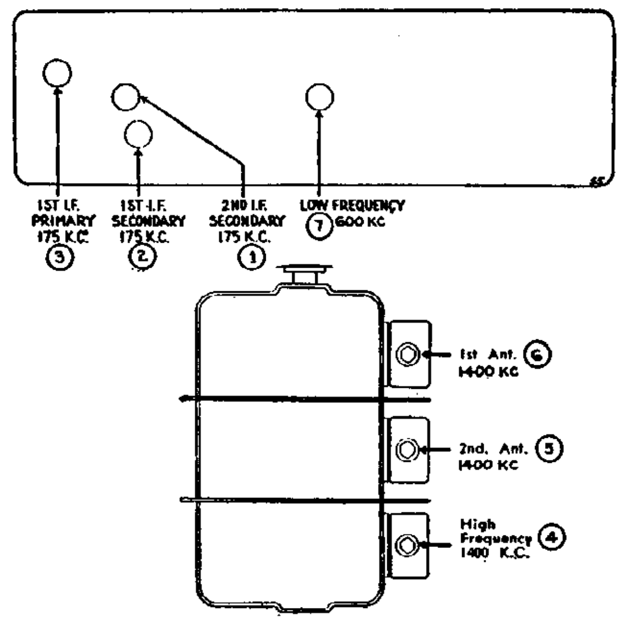
Note 1.—Accessible through holes in rear of chassis.
Note 2.—Accessible through hole from top of chassis.
* Connect a 200-mmf. condenser between signal generator and antenna post of set, at the antenna post.
** Adjust while rocking.



MODEL NO. 48

Signal Generator Connection	Signal Generator Frequency	Dial Position	Trimmer Number	Output Signal
Remove grid clip from det.-osc.				
Control grid of det.-osc.	175 k.c.	60	1	Max.
"	"	"	2	Max.
"	"	"	3	Max.
Connect grid clip to det.-osc.				
Ant.*	1400 k.c.	140	4	Max.
"	"	"	5	Max.
"	"	"	6	Max.
"	600 k.c.	60	7	Max.
"	1400 k.c.	140	4	Max.

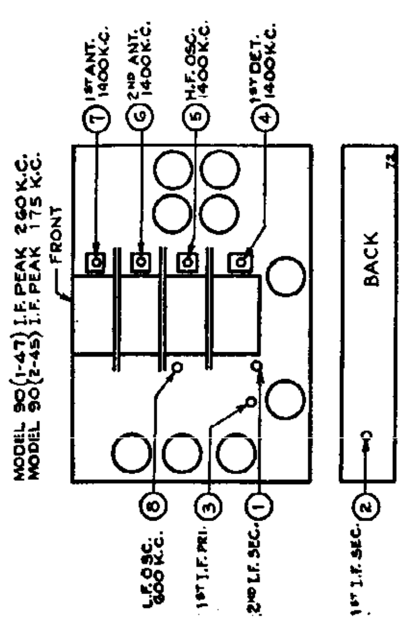
* Connect a 200-mmf. condenser between signal generator and antenna post of set, at the antenna post.



MODEL NOS. 90, 90A, (with 1-47)

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from 1st det.					
Control grid of 1st det.	Note 1	55	...	1	Max.
"	"	"	...	2	Max.
"	"	"	...	3	Max.
Connect grid clip to 1st det.					
Ant.*	1400 k.c.	140	...	5	Max.
"	"	"	...	4	Max.
"	"	"	...	6	Max.
"	"	"	...	7	Max.
"	600 k.c.	60	...	8	Max.**
"	1400 k.c.	140	...	5	Max.

* Connect a 200-mmf. condenser between signal generator and antenna post of set, at the antenna post.
** While rocking.
Note 1.—175 k.c. for models with two 45s and 260 k.c. for models with one 47.



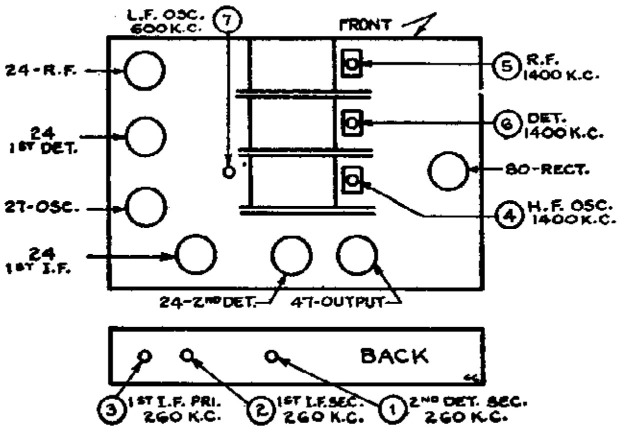
MODEL 70(Below Ser.#B22,000)
270
MODEL 80
MODEL 81
Alignment,Trimmers

PHILCO RADIO & TELEV. CORP.

MODEL NOS. 70 (below ser. #B22,000), 270

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from 1st det.					
Control grid of 1st det.	260 k.c.	55	...	1	Max.
"	"	"	...	2	Max.
"	"	"	...	3	Max.
Connect grid clip to 1st det.					
Ant.*	1400 k.c.	140	...	4	Max.
"	"	"	...	5	Max.
"	"	"	...	6	Max.
"	600 k.c.	60	...	7	Max.**
"	1400 k.c.	140	...	4	Max.

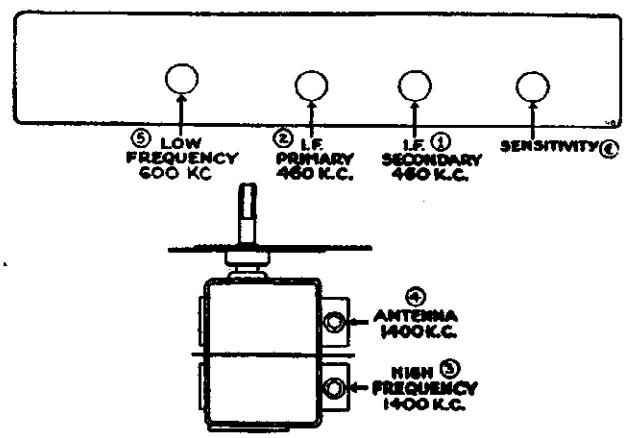
* Connect a 200-mmf. condenser between signal generator and antenna post of set, at the antenna post.
** While rocking.



MODEL NO. 80

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from det.-osc.					
Control grid of det.-osc.	460 k.c.	55	...	1	Max.
"	"	"	...	2	Max.
Connect grid clip to det.-osc.					
Ant.*	1400 k.c.	140	...	3	Max.
"	"	"	...	4	Max.
"	600 k.c.	60	...	5	Max.**
"	1400 k.c.	140	...	3	Max.
Note 1	Note 1	Note 1	...	6	Note 1

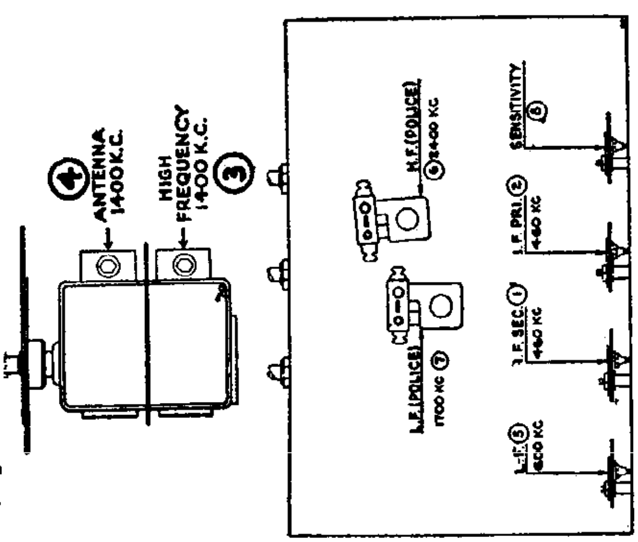
* Use a 100-mmf. condenser as dummy antenna.
** While rocking.
Note 1.—Connect antenna to receiver. Tune in station, first at about 130 and adjust (6) to a point just before squealing starts. Tune in stations along other points on dial. If squealing is present at any point readjust (6) slightly until there is none at any point along dial. This adjustment may have to be changed if set is moved to different location or if antenna length or 2nd det. tube is changed.



MODEL NO. 81

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from det.-osc.					
Control grid of det.-osc.	460 k.c.	55	Broadcast	1	Max.
"	"	"	"	2	Max.
Connect grid clip to det.-osc.					
Ant.*	1400 k.c.	140	"	3	Max.
"	"	"	"	4	Max.
"	600 k.c.	60	"	5	Max.**
"	1400 k.c.	140	"	3	Max.
"	2400 k.c.	2400 k.c.	Police	6	Max.
"	1700 k.c.	1700 k.c.	"	7	Max.
Note 1	Note 1	Note 1	Broadcast	8	Note 1

* Use a 100-mmf. condenser as dummy antenna.
** While rocking.
Note 1.—Connect antenna to receiver. Tune in station, first at about 130 and adjust (8) to a point just before squealing starts. Tune in stations along other points on dial. If squealing is still present, back off (8) slightly until there is none at any point along dial. This adjustment may have to be changed if antenna length or 2nd det. tube are changed.

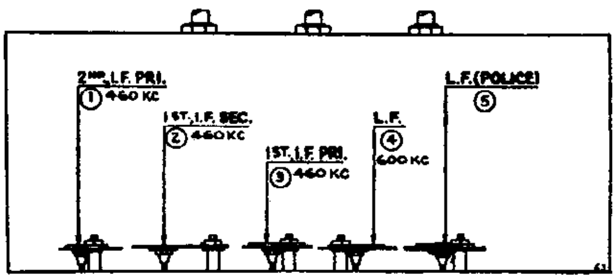


PHILCO RADIO & TELEV. CORP.

MODEL NO. 505

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from 6A7					
Control grid of 6A7	460 k.c.	55	Broadcast	1	Max.
"	"	"	"	2	Max.
"	"	"	"	3	Max.
Connect grid clip to 6A7					
Ant.*	"	"	"	Wave[1] Trap	*Min.*
"	1400 k.c.	140	"	H.F. Osc.[2]	Max.
"	"	"	"	Ant.[2]	Max.
"	600 k.c.	60	"	4	Max.**
"	1400 k.c.	140	"	H.F. Osc.	Max.
"	Note 3	Low-freq. end	Police	5	Max.

Note 1.—Wave trap in series with antenna was not used on early production.
Note 2.—H.F. osc. and ant. trimmers are located on tuning-condenser frame—the ant. trimmer is nearest front of chassis.
Note 3.—Set signal generator frequency to same as point on dial chosen near low frequency end. Adjustment of (5) will correct the dial calibration.
* Connect a 200-mmf. condenser between signal generator and antenna post of set, at the antenna post.
** While rocking.



MODEL NOS. 95, 96, 296

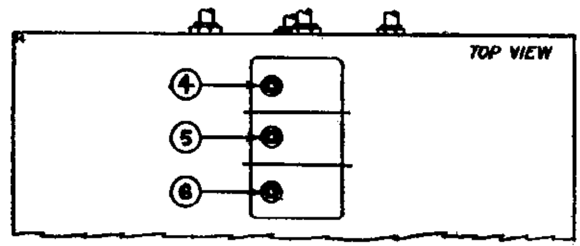
Signal Generator Connection	Signal Generator Frequency	Dial Position	Trimmer Number	Output Signal
Ant.*	1300 k.c.	130	Det.[1]	Max.
"	"	"	3rd[1] R.F.	Max.
"	"	"	2nd[1] R.F.	Max.
"	"	"	Ant.[1]	Max.

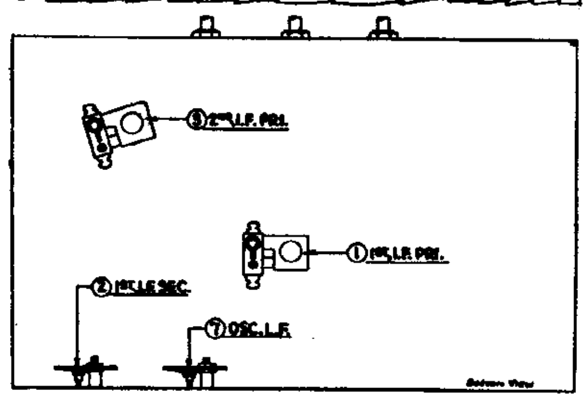
Note 1.—Located on top of chassis, behind gang condenser and between r.f. coil shields.
* Connect a 200-mmf. condenser between the signal generator and the antenna post of the set, at the antenna post.

MODEL NO. 503

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from 6A7					
Control grid of 6A7	260 k.c.	55	...	3	Max.
"	"	"	...	2	Max.
"	"	"	...	1	Max.
Connect grid clip to 6A7					
Ant.**	1500 k.c.	150	...	6	Max.
"	1400 k.c.	140	...	5	Max.
"	1400 k.c.	"	...	4	Max.
"	600 k.c.	60	...	7	Max.*
"	1500 k.c.	150	...	6	Max.

* While rocking.
** Connect a 200-mmf. condenser between signal generator and antenna post of set, at antenna post.

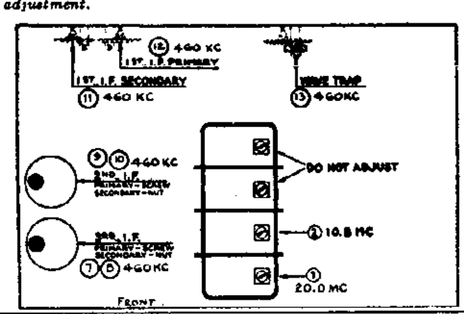


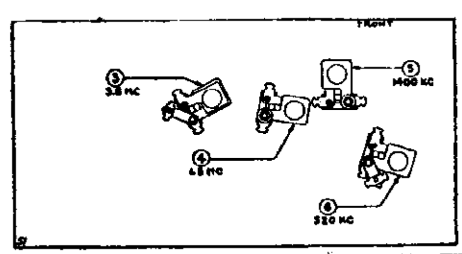


MODEL NO. 504

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from 6A7					
Control grid of 6A7	460 k.c.	520 k.c.	Range 1	7[1]	Max.
"	"	"	"	8[2]	Max.
"	"	"	"	9[1]	Max.
"	"	"	"	10[2]	Max.
"	"	"	"	11	Max.
"	"	"	"	12	Max.
Connect grid clip to 6A7					
Ant.*	"	"	"	13	*Min.*
"	20 m.c.	20 m.c.	Range 4	1	Max.
"	10.8 m.c.	10.8 m.c.	Range 3	2	Max.
"	3.6 m.c.	3.6 m.c.	Range 2	3	Max.
"	1500 k.c.	1.5 m.c.	"	4	Max.
"	1400 k.c.	1400 k.c.	Range 1	5	Max.
"	520 k.c.	520 k.c.	"	6	Max.

* Use a 200-mmf. condenser as dummy antenna on broadcast band and a 400-ohm carbon resistor on shortwave band.
Note 1.—Nut adjustment.
Note 2.—Screw adjustment.
Caution: The two trimmers on the rear sections of the tuning condenser gang are correctly adjusted and sealed at the factory. *Do not change this adjustment.*





MODEL 98
Chassis, Parts

PHILCO RADIO & TELEV. CORP.

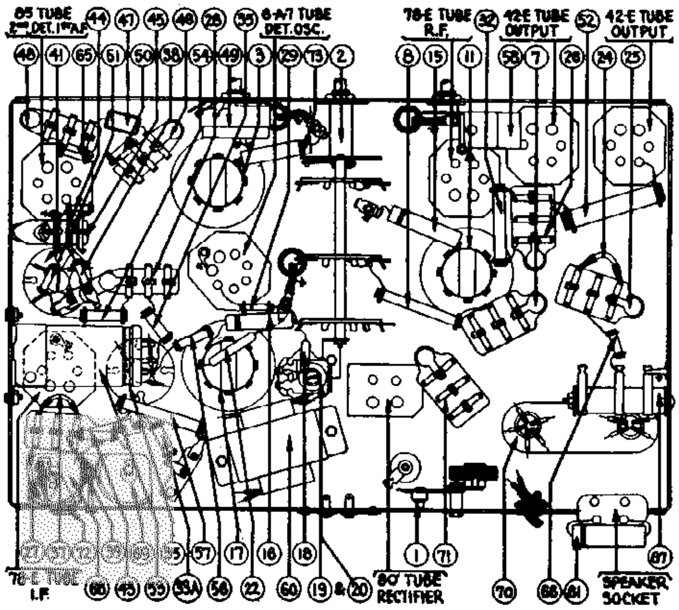
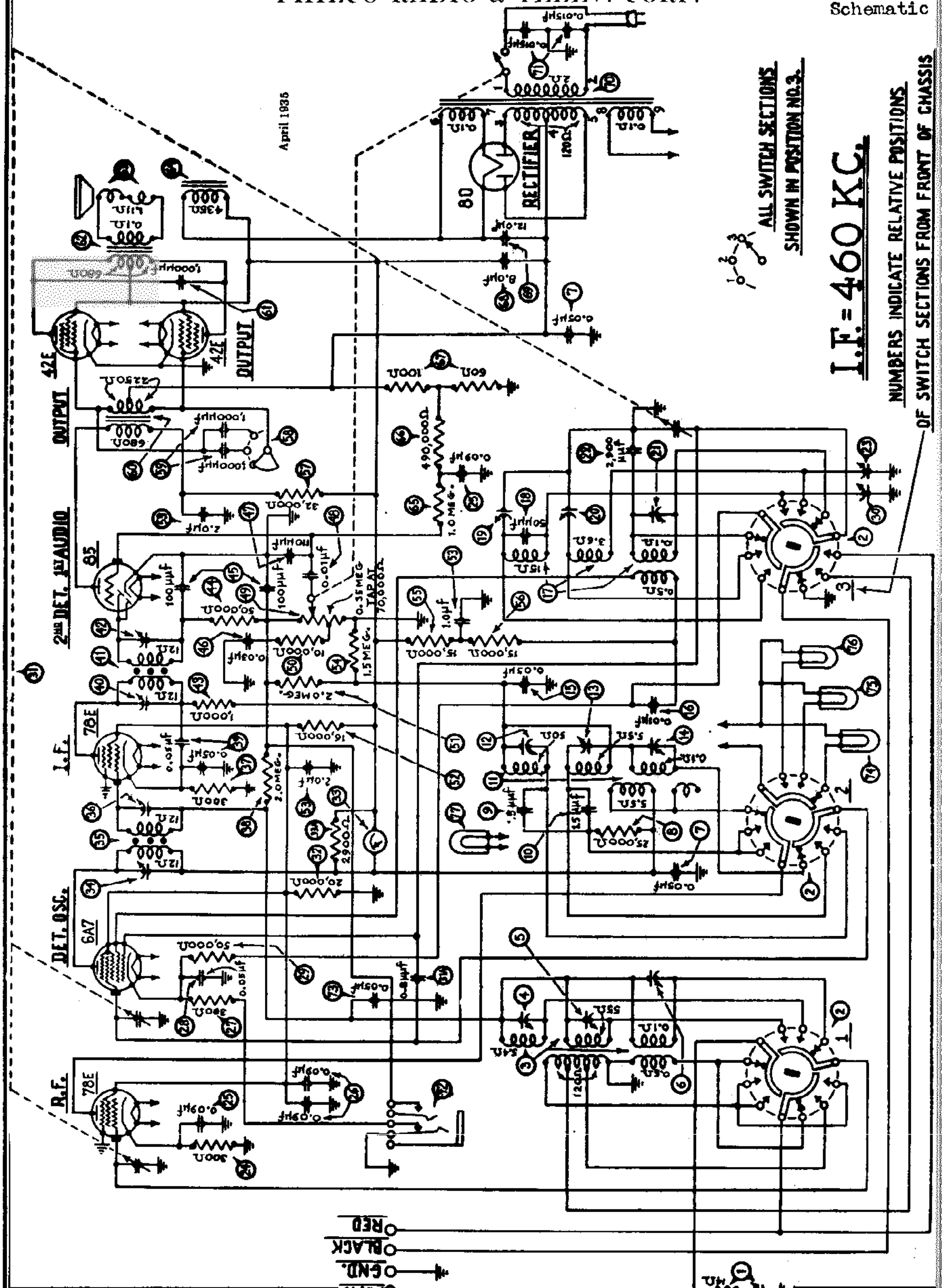


Fig. 3. Bottom View of Chassis

	Description	Part No.
(1)	Wavetrap	38-6718
(2)	Waveband Switch	42-1106
(3)	Ant. Transformer	32-1664
(4)	Compensating Condenser (Ant., Medium Wave)	Part of (3)
(5)	Compensating Condenser (Ant., Long Wave)	Part of (3)
(6)	Compensating Condenser (Ant., Short Wave)	Part of (3)
(7)	Condenser (.05 Mfd. Twin Bakelite Block)	3615-DG
(8)	Resistor (25000 ohms) (Red, Green, Orange)	3656
(9)	Condenser (.0000015 Mfd.)	Part of (11)
(10)	Condenser (.0000015 Mfd.)	Part of (11)
(11)	R.F. Transformer	32-1666
(12)	Compensating Condenser (R.F. Long Wave)	Part of (11)
(13)	Compensating Condenser (R.F. Medium Wave)	Part of (11)
(14)	Compensating Condenser (R.F. Short Wave)	Part of (11)
(15)	Condenser (.05 Mfd. Tubular)	30-4020
(16)	Condenser (.01 Mfd. Tubular)	30-4169
(17)	Oscillator Transformer	32-1665
(18)	Condenser (.00005 Mfd. Mica)	30-1029
(19)	Compensating Condenser (Osc., Long Wave Series)	31-6044
(20)	Compensating Condenser (Osc., Medium Series)	31-6044
(21)	Compensating Condenser (Osc., Short Wave)	Part of (17)
(22)	Condenser (.0029 Mfd. Mica)	30-1054
(23)	Compensating Condenser (Osc., Medium H.F. End)	Part of (17)
(24)	Resistor (300 ohms Flexible) (Orange, Black, Brown)	33-3010
(25)	Condenser (.09 Mfd. Twin Bakelite Block)	4989-DG
(26)	Condenser (.09 Mfd. Twin Bakelite Block)	4989-DG
(27)	Resistor (300 ohms Flex.) (Orange, Black, Brown)	33-3010
(28)	Condenser (.05 Mfd. Bakelite Block)	3615-SG
(29)	Resistor (50000 ohms) (Green, Brown, Orange)	6098
(30)	Compensating Condenser (Osc., Long Wave, H.F. End)	Part of (17)
(31)	Tuning Condenser Assembly	31-1362
(31)A	Condenser (.8 Mmfd.)	Part of (31)
(32)	Resistor (20000 ohms) (Red, Black, Orange)	6649
(33)	Shadow Tuning Meter	45-2028
(33)A	Resistor (2900 ohms) (Red, White, Red)	5309
(34)	Compensating Condenser (1st I.F. Pri.)	Part of (35)
(35)	First I.F. Transformer	32-1631
(36)	Compensating Condenser (1st I.F. Sec.)	Part of (35)
(37)	Resistor (300 ohms Flex.) (Orange, Black, Brown)	33-3010
(38)	Resistor (2 Megs.) (Red, Black, Green)	33-1172
(39)	Condenser (.05 Mfd. Twin Bakelite Block)	3615-DG
(40)	Compensating Condenser (2nd I.F. Pri.)	Part of (41)
(41)	2nd I.F. Transformer	32-1632
(42)	Compensating Condenser (2nd I.F. Sec.)	Part of (41)
(43)	Resistor (1000 ohms) (Brown, Black, Red)	5837
(44)	Resistor (50000 ohms) (Green, Brown, Orange)	6098
(45)	Condenser (.00011 Mfd. Twin Bakelite Block)	8035-DG
(46)	Condenser (.03 Mfd. Bakelite Block)	6287-P
(47)	Condenser (.00011 Mfd. Mica)	30-1031
(48)	Condenser (.01 Mfd. Bakelite Block)	3903-SU
(49)	Volume Control & On-Off Switch	33-5102
(50)	Resistor (10000 ohms) (Brown, Black, Orange)	33-1000
(51)	Resistor (2 Megs.) (Red, Black, Green)	33-1172
(52)	Resistor (16000 ohms) (Brown, Blue, Orange)	7500
(53)	Condenser (Electrolytic, 1 Mfd., 2 Mfd., 2 Mfd.)	30-2114
(54)	Resistor (1.5 Meg.) (Brown, Green, Green)	7009
(55)	Resistor (15000 ohms) (Brown, Green, Orange)	6208
(56)	Resistor (15000 ohms) (Brown, Green, Orange)	6208
(57)	Resistor (32000 ohms) (Orange, Red, Orange)	3525
(58)	Tone Control	30-4311
(59)	Condensers (in Tone Control)	Part of (58)
(60)	Input (Audio) Transformer	32-7372
(61)	Condenser (.001 Mfd. Tubular)	30-4201
(62)	Output Transformer (on Speaker)	2585
(63)	Voice Coil & Cone Assembly K-31	36-3174
	Voice Coil & Cone Assembly H-21	02625
(64)	Field Coil & Pot Assembly K-31	36-3463
	Field Coil & Pot Assembly H-21	36-3461
(65)	Resistor (1 Meg.) (Brown, Black, Green)	33-1171
(66)	Resistor (490000 ohms) (Yellow, White, Yellow)	33-1169
(67)	Resistor (Wirewound Porcelain Base, 60 ohms, 100 ohms)	33-3208
(68)	Condenser (Electrolytic, 8 Mfd.)	30-2025
(69)	Condenser (Electrolytic, 12 Mfd.)	30-2117
(70)	Power Transformer 115 volts 60 cycles	32-7369
	Power Transformer 115 volts 25 cycles	32-7370
	Power Transformer 230 volts 50 cycles	32-7371
(71)	Condenser (.015 Mfd. Twin Bakelite Block)	3793-DG
(72)	Headphone Jack	6585
(73)	Condenser (.05 Mfd. Tubular)	30-4020
(74)	Dial Lamp (Long Wave Band)	34-2031
(75)	Dial Lamp (Medium Wave Band)	34-2031
(76)	Dial Lamp (Short Wave Band)	34-2031
(77)	Pilot Lamp for Shadow Tuning Meter	Part of (33)
	Tube Socket 4 Prong	27-6019
	Tube Socket 6 Prong	27-6020
	Tube Socket 7 Prong	27-6012
	Socket (Speaker)	27-6018
	Tube Shield Body	28-1107
	Tube Shield Base	28-1110
	Dial Assembly	31-1514
	Electric Cord & Plug	L-943A

PHILCO RADIO & TELEV. CORP.



MODEL 98
Alignment, Voltage
Trimmers

PHILCO RADIO & TELEV. CORP.

Adjusting Compensating Condensers

The adjustment of the compensating condensers in Model 98 requires a signal generator covering the broadcast and police band, and also one capable of producing a signal on several frequencies in the short wave band. We recommend the Philco model 024 or 048A instrument for the broadcast frequencies, and the Model 091 crystal controlled short wave signal generator for the "short wave" frequencies. The location of all compensating condensers is shown in Fig. 4.

Adjustment of I. F.

1. Remove the antenna connection from the receiver, disconnect the grid clip from the first detector (type 6A7 tube), and connect the "ANT" output terminal of the Model 048A or 024 signal generator to the grid cap of this tube; connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver.

2. Connect the 0 to 20 volt range of the output meter in the Model 048A or 025 tester to the plate prongs of the two output (42E) tubes or to the two bottom prongs of the speaker plug.

3. Adjust the signal generator to a frequency of 460 K.C. Place the receiver in operation with the dial turned to the low frequency end of the scale, wave band switch to center position, and with the volume control adjusted near its maximum setting. Adjust the signal generator attenuator for approximately half-scale reading of the output meter.

4. The I.F. compensating condensers are located at the tops of the I.F. coil shields (smaller square top cans) and adjusted thru hole in top. The primary is adjusted by the screw, and the secondary by the nut. Adjust condensers (40) and (42) (2d I.F.) for maximum reading in the output meter, and then condensers (34) and (36) (1st I.F.).

Adjustment of Wave-Trap

Connect the signal generator leads to the antenna and ground terminals of the receiver. Replace the grid clip on the 6A7 grid cap.

With the signal generator still in operation at 460 K.C., adjust the wave-trap (1) condenser until a MINIMUM reading is obtained on the output meter. The Philco fibre wrench, part No. 3164, is used for this adjustment.

Adjustment of High and Low Frequency Compensators

1. Leaving the output meter connected to the receiver connect the Philco Model 091 signal generator to the antenna and ground terminals of the chassis and place the signal generator in operation

2. Turn the wave-band switch to the extreme right (short-wave) and adjust the station selector to 18.0 megacycles, at which point the fifth harmonic of the 3600 K.C. signal will be heard. By means of the Philco wrench, part No. 3164, adjust the oscillator S.W., R.F.S.W. and antenna S.W. compensators for maximum reading in the output meter. These are numbered (21), (14) and (6), respectively in figure No. 2.

3. It will now be necessary to again use the broadcast type signal generator Models 024, 048 or equivalent. Connect the output of this signal generator to the antenna and ground terminals of the chassis. Turn the waveband switch to center position and set the station selector dial at 1700 K.C. Adjust the signal generator to the same frequency. Adjust the three compensators for the H.F. end of the broadcast (medium) scale. These are (23), (13) and (4).

4. Turn the dial to 60 and set the signal generator at 600 K.C. Adjust compensator (20) (nut) for maximum output.

5. Turn the waveband switch to the extreme left (long-wave) and set the dial at 30 and the signal generator at 300. Adjust condensers (30), (12) and (5) (oscillator, R.F. and antenna) for maximum output.

6. Turn the dial to 17 and set signal generator at 170. Adjust condenser (19) (screw) (long-wave series) for maximum output.

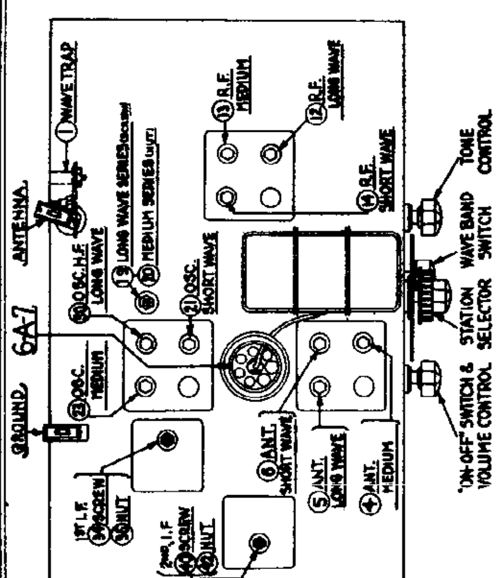


Fig. 4. Locations of Compensating Condensers

Power Transformer Data (110 Volt 60 Cycle)

Terminals	A.C. Volts	Current	Circuit	Color
1–2	120	....	Primary	White
3–5	710	118 M.A.	Secondary	Yellow
6–7	5.0	2.0 A.	Fil. Rect.	Blue
8–9	6.3	3.5 A.	Filaments	Black
4	...	.....	Center Tap of 3–5	Yellow, Green Tracer

Tube Socket Voltages Measured to Ground

Tube	78E R.F.	6A7 Det. Osc.	78E I.F.	85 2d Det.	42E Output
Plate Long & Medium Wave	98	246	250	100	246
Plate Short Wave	250	"	"	"	"
Screen Grid	92	92	92	...	257
Cathode	2.3	2.5	2.3	0	0

6A7: $G_{3\&5}$ = 165.

Above voltages were obtained by using a PHILCO type 025 Circuit Tester (or 048A All-purpose Tester), using test prods applied to underside of chassis. Volume control at maximum; dial at low frequency end.

MODELS 233G,233AG
Schematic,Chassis
Parts

PHILCO RADIO & TELEV. CORP.

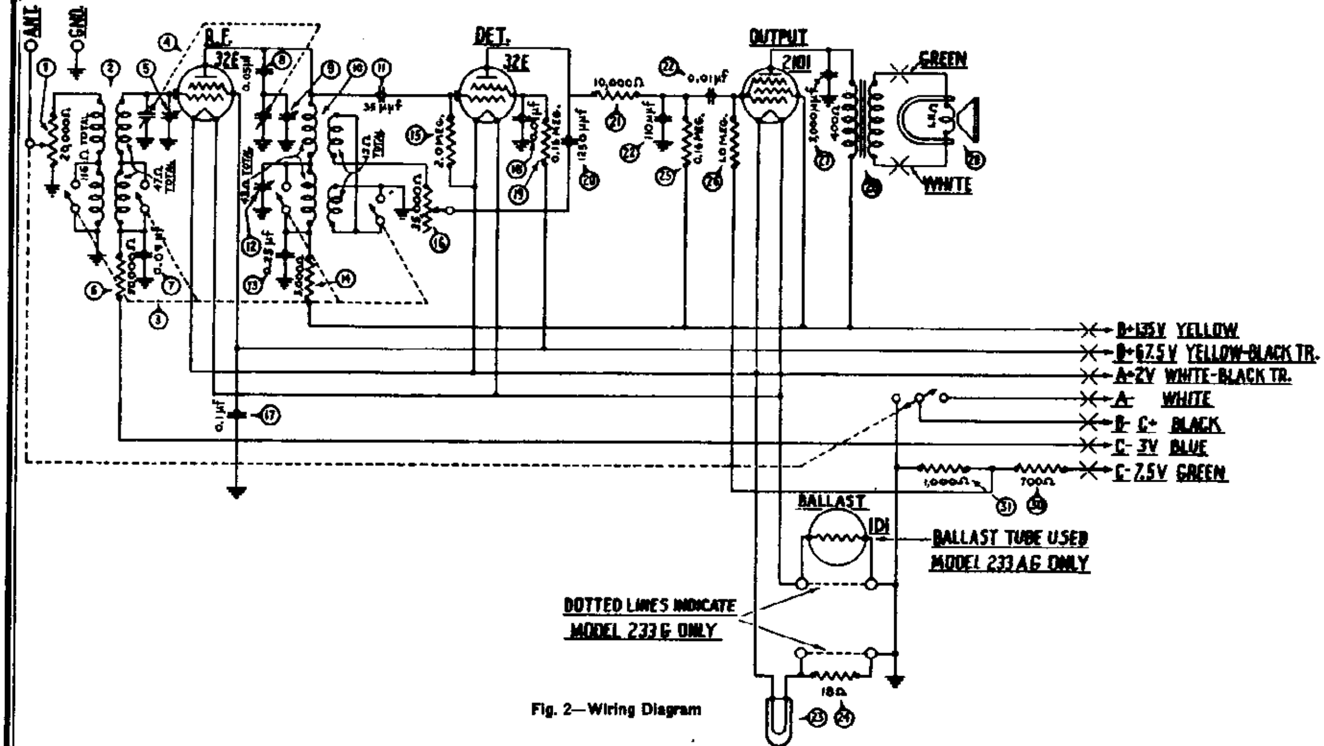


Fig. 2—Wiring Diagram

Replacement Parts for Model 233

Nos. on Diagram	Description	Part No.
1	Volume Control (20,000 ohms) & On-Off Switch	33-5075
2	Antenna Transformer	32-1451
3	Wave-Band Switch	42-1081
4	Tuning Condenser Assembly	31-1361
5	Compensating Condenser (R. F.)	Part of 4
6	Resistor (50,000 ohms) (Green-Brown-Orange)	6098
7	Condenser (.09 Mfd.) (Bakelite Block Type)	4989F
8	Condenser (.05 Mfd.) (Tubular)	30-4020
9	Compensating Condenser (Det.)	Part of 4
10	Detector Transformer	32-1452
11	Condenser (35 Mfd. Mica)	30-1055
12	Compensating Condenser (Low Frequency)	04000E
13	Condenser (.25 Mfd. Tubular)	30-4146
14	Resistor (3,000 ohms) (Red-White-Red)	5309
15	Resistor (2 Meg.) (Red-Black-Green)	33-1025
16	Regeneration Control	33-5076
17	Condenser (.1 Mfd. Tubular)	30-4122
18	Condenser (.09 Mfd. Bakelite Block)	4989F
19	Resistor (160,000 ohms) (Brown-Blue-Yellow)	5331
20	Condenser (.00125 Mfd. Mica)	5886
21	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000
22	Condenser (.00011 Mfd. & .015 Mfd.)	8035D
23	Pilot Lamp	5316
24	Pilot Lamp Resistor*	33-3185
25	Resistor (160,000 ohms) (Brown-Blue-Yellow)	5331
26	Resistor (1 Meg.) (Brown-Black-Green)	33-1096
27	Condenser (.003 Mfd. Tubular)	30-4042
28	Output Transformer	32-7287
29	Voice Coil and Cone Assembly (KR-8 Speaker)	36-3159
30	Resistor (700 ohms)	6443
31	Resistor (1,000 ohms)	33-3017
	Four Prong Socket	7545
	Five Prong Socket	27-6013

Nos. on Diagram	Description	Part No.
	Shorting Jumper Wire	38-6138
	Speaker Cable	L-1729
	Battery Cable (233G)	41-3110
	Battery Cable (233AG)	41-3111
	Pilot Lamp Bracket Assembly	38-6052
	Tube Shield	8C05

*Shorted by Jumper wire on 233G. Jumper removed on 233AG.

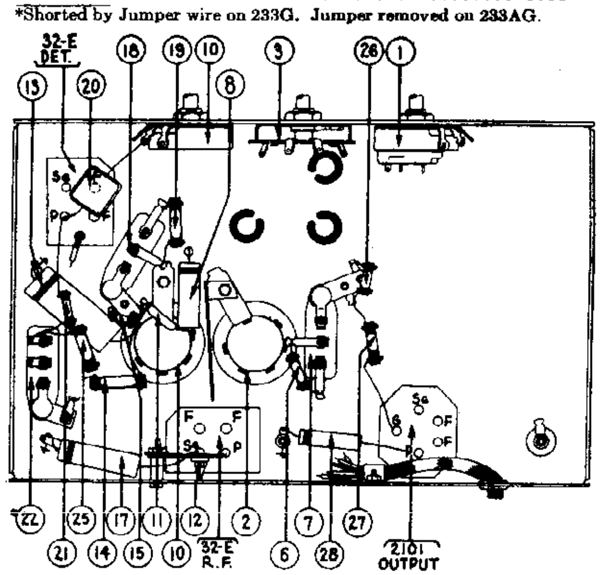


Fig. 3—Bottom of Chassis.

October, 1934

Models 233G and 233AG

Models 233G and 233AG are battery operated radio receivers covering a frequency range of 535 to 1510 kilocycles (standard wave) and 145 to 310 kilocycles (long wave). A two-position switch changes from one range to the other. The upper scale on the dial covers standard frequencies; the lower scale, low frequencies or long waves.

Model 233G is to be operated from a 2-volt storage (wet) cell for the filament voltage; model 233AG uses a dry battery for the filament supply. The 233AG requires the use of a ballast tube (in the socket provided on the chassis); in model 233G the ballast tube is not needed, and the jumper clip should be left across the two contacts of the ballast tube socket.

These sets use two type 32-E tubes,—one as radio frequency amplifier and one as detector—and one pentode output tube, type 2101.

Models 233G and 233AG utilize the regeneration or "reaction" circuit. This feature is controlled by the reaction control knob (see Fig. 1).

The filament current drain is 0.42 Ampere and the "B" or plate battery drain varies from 12 M. A. to 14 M. A.

Adjusting Compensating Condensers

There are three compensating condensers in these sets. Two are located on the top of the sections of the tuning condenser gang; and one underneath chassis and reached from the rear (thru hole in sub-base).

Connect the set up to the batteries and the antenna lead from signal generator to antenna post of set. Set signal generator at 1500 K.C. Turn wave-band switch to right and set dial at 150. (If set is removed from cabinet, obtain a piece of flat steel, 006" thick, about ½" wide and four or five inches long; open condenser gang and bring heel of detector section down on this steel strip; then remove the strip without disturbing setting of condenser gang).

Turn volume control full on and reaction control about ¾ of the way to full on; then with a suitable hex wrench (such as Philco No. 3164) adjust condensers ④ and ⑨ (located on tuning condenser gang) to obtain maximum reading in the output meter, which should be connected to primary terminals of the output transformer.

While making the adjustment, advance the reaction control as far as possible without causing oscillation, working for maximum output on both condensers.

Now throw wave-band switch to left and turn dial to 300 K.C. (30 on lower scale of dial). In this position the condenser gang is approximately open. Now adjust condenser ⑲ (reached from rear) for maximum output, keeping the reaction control advanced as explained above, to just below point of oscillation.

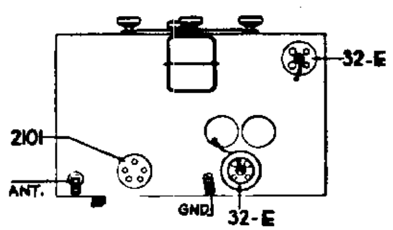


Fig. 1—Tube Locations

Models 264 and 265

Philco Models 264 and 265 are five-tube superheterodyne radio receivers designed for operation on alternating current. The voltage and frequency for which each type of these models is intended is indicated on the chassis nameplate.

These receivers cover two bands or ranges of receivable frequencies: (1) Long waves or low frequency from 140 to 320 kilocycles (2140 to 935 meters), and (2) medium wave or standard (American) frequencies, from 540 to 1500 kilocycles (555 to 200 meters). A switch on the panel permits quick change from one to the other range.

The tubes used are: 1 type 6A7 detector-oscillator; 1 type 78-E intermediate frequency; 1 type 75 2d detector-1st A. F.; 1 type 42-E output, and 1 type 80 rectifier. The intermediate frequency is 125 kilocycles (K. C.) and the power consumption is 65 watts. The chief difference between Models 264 and 265 is that the latter is equipped with a shadow tuning meter and a phonograph jack.

Tube Socket Voltages*

	6A7 Det.-Osc.	78-E I. F.	75 2d Det. A. F.	42-E Output
P to Gnd.	265	255	180	260
SG. to Gnd.	45	100	...	267
K to Gnd.	2.2	3.4	0	—.36

6A7, G2 to Gnd.: 265. 80, Fil. to chassis: 345.
*Tests made with high resistance voltmeter. Refer to Fig. 1.

Power Transformer Data
(260 VOLT TYPE RECEIVER)

Terminals	A. C. Volts	Circuit	Color
1–2	[illegible]	Primary	White
3–5	6.3	Filaments	Black
6–7	5.0	Fil. of Rect.	Blue
8–10	680	Sec. High Volt.	Yellow
4	...	Center Tap of 3-5	Black—Yellow Tr.
9	...	Cen. Tap of 8-10	Yel.—Green Tr.

Adjusting Compensating Condensers

Adjustment of compensating condensers in Models 264 and 265 requires the use of an accurate signal generator (such as the Philco Model 024), an output meter (Philco Model 012 or 025 is recommended) and a special adjusting wrench (Philco No. 3164). The I. F. or intermediate frequency of the set is 125 K. C. Adjustments are made in the following order:

I. F.—Set signal generator at 125 K. C. Remove grid clip from cap of 6A7 tube and connect antenna lead from signal generator to cap of tube, connect ground lead to ground post of set. Set dial of receiver at 55 (upper scale) and wave-band switch at right. See that set is connected to proper current and volume control full "On." Connect output meter to plate and cathode of output tube (42-E). Adjust the three I. F. compensating condensers ⑨, ⑧ and ⑥ to give maximum response in the output meter. These adjustments are all made from the rear of the chassis (see Fig. 3), through holes in sub-base.

ANT.-DET. and OSC.-H. F. (standard wave)—These are condensers ①, ⑪ and ⑬ located on top of the tuning condenser assembly and adjusted from above. ① is the one nearest the front of chassis.

Set signal generator at 1500. Replace grid clip on cap of 6A7 tube and connect antenna and ground leads from signal generator direct to antenna and ground posts of set. Turn dial of set to 150 and adjust condensers ①, ⑪ and ⑬ for maximum reading in output meter.

OSC.-L. F. (standard wave)—Set signal generator at 600 and turn dial of set to 60. Adjust condenser ⑮, reached from rear of chassis, to give maximum reading in output meter.

H. F. and L. F. (long-wave band)—Turn wave-band switch to the left. Set signal generator at 300 and dial at 80 (lower scale). Adjust condenser ⑭ to give maximum response in output meter. This condenser is reached from underneath chassis.

Now turn dial to 15 and set signal generator at 150. Adjust condenser ⑰ for maximum response. Condenser ⑰ is reached from the rear.

NOTE—If reading on output meter is too great during adjustments, turn down "attenuator" on signal generator.

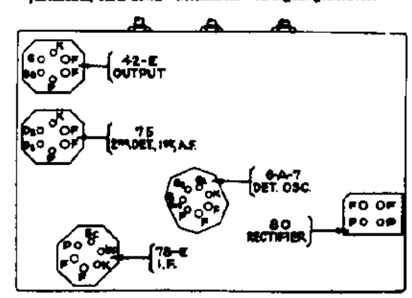


Fig. 1.—Tube Sockets as Seen From Bottom of Chassis.

PHILCO RADIO & TELEV. CORP.

MODEL 245
Schematic, Parts
Chassis

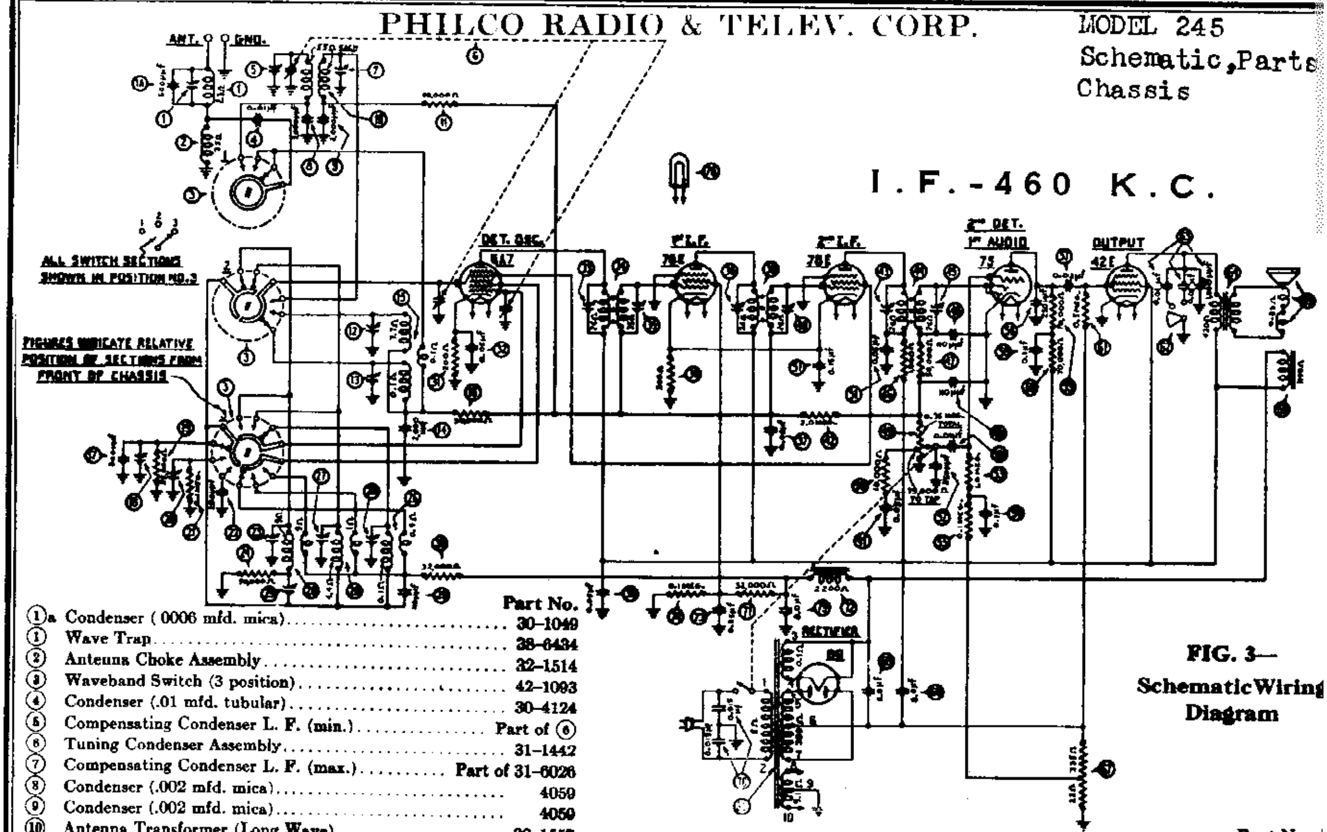


FIG. 3—Schematic Wiring Diagram

No.	Part	Part No.
1a	Condenser (.0006 mfd. mica)	30-1049
1	Wave Trap	38-6434
2	Antenna Choke Assembly	32-1514
3	Waveband Switch (3 position)	42-1093
4	Condenser (.01 mfd. tubular)	30-4124
5	Compensating Condenser L. F. (min.)	Part of (6)
6	Tuning Condenser Assembly	31-1442
7	Compensating Condenser L. F. (max.)	Part of 31-6026
8	Condenser (.002 mfd. mica)	4059
9	Condenser (.002 mfd. mica)	4059
10	Antenna Transformer (Long Wave)	32-1557
11	Resistor (50,000 ohms) (Green-Brown-Orange)	6098
12	Compensating Condenser ANT (Med.)	Part of 31-6026
13	Compensating Condenser ANT (S. W.)	Part of 31-6026
14	Condenser (.002 mfd. mica)	4059
15	Antenna Transformer (Standard and Short-wave)	32-1556
16	Resistor (50,000 ohms) (Green-Brown-Orange)	6098
17	Condenser (.0008 mfd. mica)	5878
18	Compensating Condenser (S. W. Ser.)	04000-S
19	Resistor (25,000 ohms) (Red-Green-Orange)	33-1013
20	Compensating Condenser (Med. Ser.)	Part of 31-6033
21	Resistor (100,000 ohms) (White-White-Orange)	6099
22	Condenser (.00025 mfd. mica)	5858
23	Compensating Condenser (Osc. Long Wave)	Part of 31-6032
24	Resistor (50,000 ohms) (Green-Brown-Orange)	6098
25	Compensating Condenser (Long Wave Ser.)	Part of 31-6033
26	Oscillator Transformer	32-1558
27	Compensating Condenser OSC (Med.)	Part of 31-6032
28	Compensating Condenser OSC (S. W.)	Part of 31-6026
29	Condenser (.00011 mfd. mica)	30-1031
30	Resistor (32,000 ohms) (Orange-Red-Orange)	5279
31	Resistor (200 ohms flexible)	7217
32	Condenser (.05 mfd. twin bakelite block)	3615-AJ
33	Compensating Condenser (1st I. F. pri.)	Part of (34)
34	1st I. F. Transformer	32-1369
35	Compensating Condenser (1st I. F. sec.)	Part of (34)
36	Resistor (300 ohms flexible)	33-3010
37	Condenser (.05 mfd. bakelite block)	3615-BW
38	Compensating Condenser (2nd I. F. pri.)	Part of (39)
39	2nd I. F. Transformer	32-1410
40	Compensating Condenser (2nd I. F. sec.)	Part of (39)
41	Condenser (.05 mfd. tubular)	30-4020
42	Resistor (2,000,000 ohms) (Red-Black-Green)	5872
43	Compensating Condenser (3rd I. F. pri.)	Part of (44)
44	3rd I. F. Transformer	32-1411
45	Compensating Condenser (3rd I. F. sec.)	Part of (44)
46	Resistor (1,000 ohms) (Brown-Black-Red)	5837
47	Resistor (50,000 ohms) (Green-Brown-Orange)	6098
48	Condenser (.00011 mfd. mica)	30-1031
48a	Condenser (.00011 mfd. mica)	30-1031
49	Volume Control (350,000 ohms tapped at 75,000)	33-5066
50	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000
50a	Condenser (.01 mfd. tubular)	30-4124
51	Condenser (.15 & .05 mfd. bakelite block)	6287-M
52	Condenser (.00025 mfd. mica)	5858
53	Resistor (1,000,000 ohms) (Brown-Black-Green)	4409
54	Condenser (.1 mfd. tubular)	30-4122
55	Resistor (100,000 ohms) (White-White-Orange)	4411
56	Condenser (.00025 mfd. mica)	5858
57	Condenser (.02 mfd. tubular)	30-4113
58	Condenser (.1 mfd. bakelite block)	3615-BM
59	Resistor (70,000 ohms) (Violet-Black-Orange)	5385
60	Resistor (70,000 ohms) (Violet-Black-Orange)	5385
61	Resistor (500,000 ohms) (Yellow-White-Yellow)	4517
62	Tone Control (3 point)	30-4178
63	Condensers in Tone Control	Part of (62)
64	Output Transformer (code 121, using P-19 speaker)	32-7041
65	Cone and Voice Coil Assembly (P-19 speaker)	02861
66	Field Coil & Pot Assembly (P-19 speaker)	36-3298
67	B. C. Resistor (wire wound, 22 ohms, 235 ohms)	33-3037
68	Electrolytic Condenser (8 & 8 mfd.)	30-2079
69	Power Transformer—115 volts, 60 cycles	32-7226
69	Power Transformer—115 volts, 25 cycles	32-7227
69	Power Transformer—230 volts, 50 cycles	32-7228
70	Condenser (.015 twin bakelite block)	3793-E
71	Resistor (32,000 ohms) (Orange-Red-Orange)	33-1026
72	Filter Choke	32-7018
73	Condenser (.25 mfd. tubular)	30-4146
74	Resistor (100,000 ohms) (White-White-Orange)	4411
75	Electrolytic Condenser (8 mfd.)	30-2108
76	Pilot Lamp (6.3 volt)	6608

Part	Part No.
A. C. Cord and Plug Assembly	L-943-A
Speaker Socket (code 122 only)	4957
Dial Assembly	31-1451
Tube Shield	28-1107

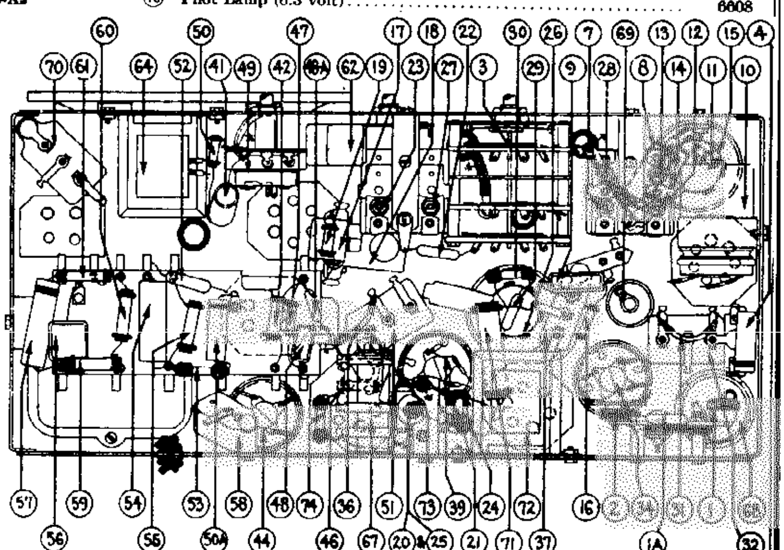


Fig. 4. Bottom View of Chassis

MODEL 245
Trimmers, Socket

PHILCO RADIO & TELEV. CORP.

Voltage, Alignment
Transformer Data

PHILCO Model 245 is a six-tube superheterodyne receiver designed to receive three different ranges or bands of radio frequencies, viz: (1) Low frequency, 125 to 340 kilocycles (K. C.); (2) Medium or standard American broadcast frequencies, 540 to 1500 kilocycles; and (3) Short-wave, or high frequencies, from 5.5 to 16.0 megacycles (5500 to 16000 K. C.). A three-position waveband switch changes the reception from one band to the next, starting with low frequency, at the left-hand or counter-clockwise position.

This model has three-point tone control with fixed bass compensation, automatic volume control and pentode output. The tubes used are: Type 6A7 detector oscillator, two type 78-E intermediate frequency, type 75 second detector—1st audio frequency, and type 42-E pentode output tube. A type 80 is used as rectifier.

The intermediate frequency of the set is 460 K. C. and the power consumption is 65 watts.

This receiver is designed for alternating current (AC) only, of the voltage and cycles indicated on the chassis nameplate.

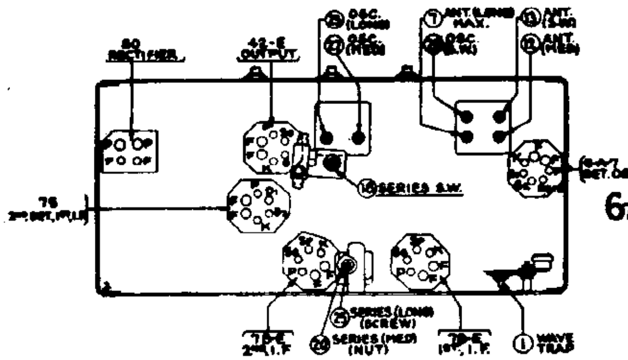


FIG. 1--View of Tube Sockets and Compensating Condensers underneath Chassis.

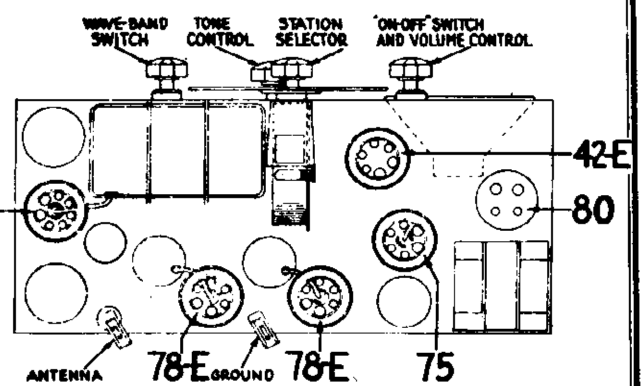


FIG. 2—Tube Sockets and Controls as seen from top of Chassis.

Tube Socket Voltages

(At Line Voltage 115V)

Tube	6A7	78-E	78-E	75	42-E
P to Chassis	272	272	265	170	253
S G to Chassis	95	95	95	..	272
K to Chassis	3	3.9	3.9	0	0

6A7. G_2 to Chassis: 180V; G_1 = -27V.

Above voltages obtained with PHILCO Model 025 or Model 048 Set Tester, from socket terminals of Set, underneath chassis. See Fig. 1. Volume control at minimum. Dial at 60.

Power Transformer Data

(115 Volt 60 Cycle Type)

Terminal	A. C. Volts	Circuit	Color of Leads
1–2	115	Primary	White
3–4	5.0	Fil. of 80	Blue
5–7	680	Plates of 80	Yellow
8–10	6.3	Filaments	Black
6	....	Center Tap 5-7	Yellow, Green Tr.
9	....	Center Tap 8-10	Black-Yellow Tr.

Adjusting Compensating Condensers

(Intermediate Frequency 460 K. C.)

The adjustment of compensating condensers in Model 245 requires the use of signal generators capable of producing a signal on both standard and long-wave broadcast frequencies, as well as short-waves or high frequencies. For the former two we suggest Philco Model 024 Signal Generator, and for the Short-Wave, Model 091 Crystal Controlled Oscillator. The Model 024 covers frequencies from 105 to 2000 K. C. and the other has a fundamental frequency of 3600 K. C. (3.6 M. C.) any harmonic of which may be used.

Other equipment needed includes some form of output meter, and a suitable insulated-handle wrench and screwdriver for adjusting the condensers. Philco equipment available includes Model 025 or 012 output meter and Part 3164 wrench and 27-7059 screwdriver.

First connect the output meter to the plate and cathode prongs of the 42-E output tube.

Adjustments are then made in the following order; positions of all compensators are shown in Fig. 1.

ADJUSTMENT OF THE INTERMEDIATE FREQUENCY

Remove the grid clip from the type 6A7 tube and connect the "ANT" output terminal of the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Set the signal generator at 460 K. C. (the intermediate frequency of Model 245) and with the receiver and signal generator turned on, the wave band switch at center and dial at 600 K. C., adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The three pairs of I. F. compensating condensers are located one pair at the top of each of the three I. F. transformer shields. These are the three metal "cans" near the rear of the chassis. Each of the transformers has a dual compensating condenser mounted at its top, and accessible through a hole in the top of the coil shield. In the dual compensators the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut. The condenser numbers, referring to Fig. 2, are [illegible] and [illegible].

ADJUSTMENT OF THE WAVE TRAP

Replace the grid clip upon the Detector-Oscillator tube (Type 6A7). Connect the output leads from the signal generator directly to the antenna and ground terminals of the receiver. Set the Wave-Band Switch of the receiver to the standard broadcast band (center position) and the Station Selector at the low frequency (540 K. C.) end. Adjust the Wave Trap condenser to give MINIMUM response to a 460 K. C. signal from the signal generator. The Wave Trap ① is located at rear and underneath the chassis, and is shown in Fig. 1. It is reached from the rear of the chassis, by inserting the fibre wrench through the hole near rear corner of chassis.

ADJUSTMENT OF SHORT-WAVE COMPENSATORS

H. F. end: The crystal controlled signal generator is used for these adjustments. Turn the wave band switch to the right and the signal generator "on." Turn the dial of the set to about half way between 14 and 15 megacycles (right hand scale) and you should there pick up the 4th harmonic of the 3.6 M. C. signal. Adjust the ant. S. W. compensator [illegible] and the oscillator S. W. compensator [illegible] (see Fig. 1) to give maximum response in the output meter.

L. F. end: Turn dial of set to a little more than 7 megacycles at which point the second harmonic of the signal generator (7.2 M. C.) should be heard. Adjust condenser ⑩ (S. W. series) for maximum response. This condenser is also reached from underneath the chassis.

ADJUSTMENT OF MEDIUM OR STANDARD WAVES

The standard broadcast signal generator is now used again.

H. F. end: Turn waveband switch to center position. Set signal generator at 1500 K. C. and dial at 150 (center scale). Now adjust condensers [illegible] (Antenna Medium) and [illegible] (oscillator medium) to get maximum response.

L. F. end: Turn dial to 60 and set signal generator at 600. Adjust condenser [illegible] (nut) (Series Medium) for maximum output.

ADJUSTMENT OF LONG-WAVE COMPENSATORS

Turn wave-band switch to left-hand position (long wave). Set signal generator at 300 K. C. and dial at 300 (left-hand scale). Connect antenna lead from signal generator to grid cap of 6A7 tube instead of to antenna post of set. Adjust condenser [illegible] (oscillator, long-wave) to get maximum response.

Transfer antenna lead of signal generator to antenna post, and adjust condenser ⑦ (long-wave, maximum) to get maximum response.

Turn dial so that condenser gang is open (dial just beyond end of scale) and adjust condenser ⑧ (antenna long wave minimum) so that there is no oscillation, and noise is reduced to a minimum. This adjustment is located on top of one section of the tuning condenser and is reached from above. Turn the dial to the other end of scale and be sure no oscillation occurs. Finally set signal generator at 175 and dial of set at approximately 175. Adjust condenser [illegible] (screw) (long-wave series) to get maximum reading.

PHILCO RADIO & TELEV CORP.

MODEL 261
Schematic
Parts

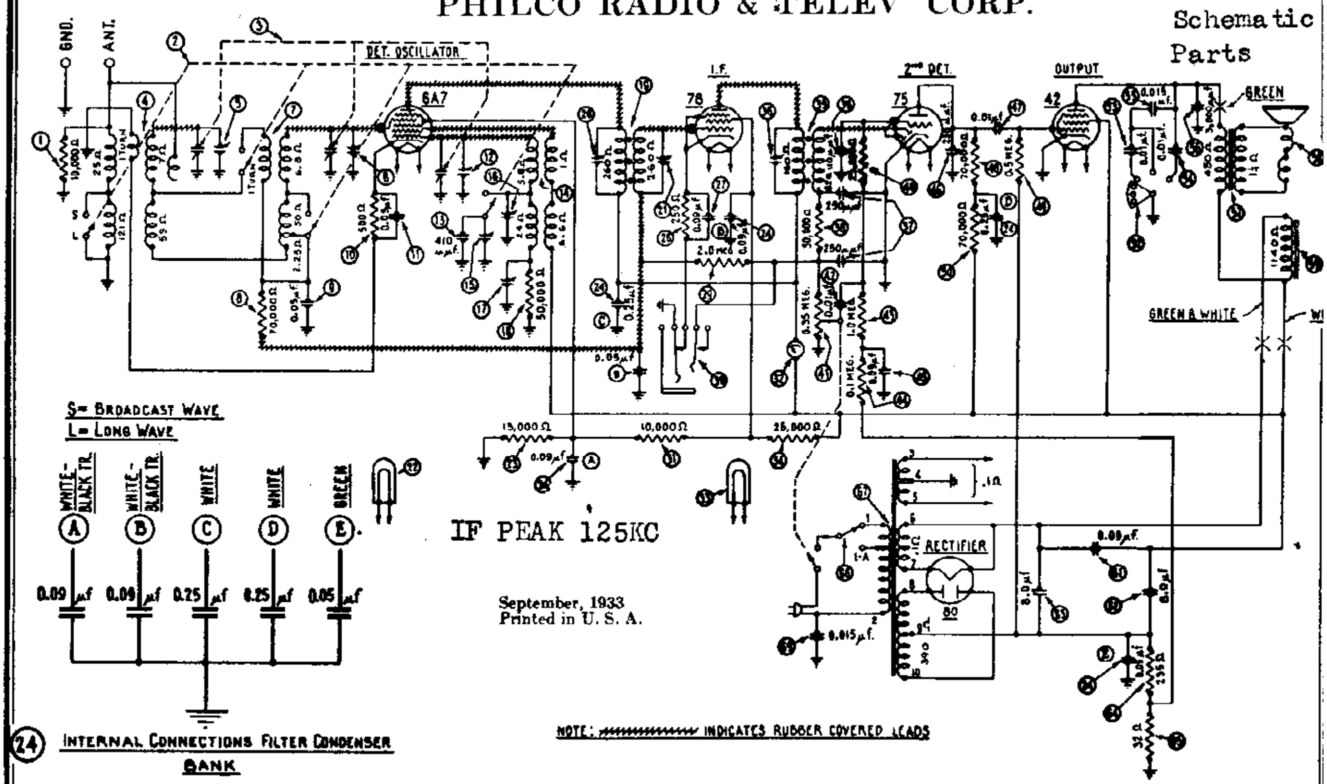


Fig. 3—Schematic Wiring Diagram

COMPONENT PARTS FOR MODEL 261

No. on Figs.	Description	Part No.
1	Resistor (10,000) (Brown-Black-Orange) (½ watt)	4412
2	Wave-band Switch	42-1001
3	Tuning Condenser Assembly	31-1037
4	Antenna (H. F.) Transformer	32-1157
5	Compensating Condenser (Ant.; Part of 3)	....
6	Compensating Condenser (Det.; Part of 3)	....
7	Detector Transformer	32-1158
8	Resistor (70,000) (Violet-Black-Orange) (½ watt)	5385
9	Condenser (.05) (Double)	3615-AJ
10	Resistor (500) (Flexible Wire-Wound) (Green-Black-Brown)	6977
11	Condenser (.09)	4989-AB
12	Compensating Condenser (Osc.; Part of 3)	....
13	Condenser (410 MMf)	5120
14	Oscillator Transformer	32-1159
15	Compensating Condenser (Osc.; Series Broadcast Wave)	04000-S
16	Compensating Condenser (Osc.; Long Wave)	04000-D
17	Compensating Condenser (L. F. Series Oscillator)	04000-S
18	Resistor (50,000) (Green-Brown-Orange) (½ watt)	4518
19	1st I. F. Transformer	32-1160
20	Compensating Condenser (1st I. F. Primary)	04000-A
21	Compensating Condenser (1st I. F. Sec.)	04000-A
22	Pilot Lamp (Station Selector)	6608
23	Resistor (13,000) (Brown-Orange-Orange) (1 watt)	3766
24	Filter Condenser Bank	30-4044
26	Resistor (250) (Flexible Wire-Wound) (Red-Black-Brown)	7217
27	Condenser (.09)	4989-D
29	Resistor (2. meg.) (Red-Black-Green) (½ watt)	5872
30	Gramophone Jack	6585
31	Resistor (10,000) (Brown-Black-Orange) (½ watt)	4412
32	Shadow Tuning Meter	6497
33	Pilot Lamp (Shadow Tuning Meter; Part of 32)	....
34	Resistor (25,000) (Red-Green-Orange) (1 watt)	3656
35	2nd I. F. Transformer	32-1223
36	Compensating Condenser (2nd I. F. Primary)	04000-W
37	Condenser (250MMf) (Double)	8317-B
38	Resistor (50,000) (Green-Brown-Orange) (½ watt)	4518
39	Condenser (110 MMf) (Blue-Yellow)	4519
40	Resistor (25,000) (Red-Green-Orange) (½ watt)	4516
41	Volume Control and "On-Off" Switch	33-5006
42	Condenser (.01)	3903-AM
43	Resistor (1. meg.) (Brown-Black-Green) (½ watt)	4409
44	Resistor (.1 meg.) (White-White-Orange) (½ watt)	4411
45	Condenser (.09)	4989-D
46	Condenser (250 MMf) (Yellow)	3082
47	Condenser (.01)	3903-W
48	Resistor (70,000) (Violet-Black-Orange) (½ watt)	5385
49	Resistor (.5 meg.) (Yellow-White-Yellow) (½ watt)	4517
50	Resistor (70,000) (Violet-Black-Orange) (½ watt)	5385
52	Tone Control	30-4043
53	Condenser (Internal to 52). (.01)	....
54	Condenser (Internal to 52). (.01)	....
55	Condenser (Internal to 52). (.015)	....
56	Condenser (3,000 MMf)	30-4042
57	Output Transformer (Mounted on Speaker)	2580
58	Voice Coil and Cone Assembly { K-7 (Code 121)	36-3020
	Voice Coil and Cone Assembly { H-9 (Code 122)	02625
59	Speaker Field assembled with Pot { K-7 (Code 121)	02741
	Speaker Field assembled with Pot { H-9 (Code 122)	02807
61	Condenser (.09)	4989-AB
62	Electrolytic Condenser (8. Mf)	7557
63	Electrolytic Condenser (8. Mf)	7558
64	Resistor (Wire-Wound) (235 ohms section) }	7998
65	Resistor (Wire-Wound) (32. ohms section) }	7998
67	Mains Transformer (200-260 V., A. C.; 40-60 ~) with Tapped Primary	32-7074
68	Tap Switch; Part of 67 (in schematic)	3116
69	Condenser (.015)	3793-Z
	Valve Shield	28-1107
	Four-Prong valve holder	7544
	Six-Prong valve holder	7547
	Seven-Prong valve holder	27-6005

MODEL 261
Voltage, Socket

PHILCO RADIO & TELEV. CORP.

Trimmers, Chassis
Alignment

THE MODEL 261 is a five-valve superheterodyne receiver, designed for dual wave reception, of 525–1510 kilocycles (570–200 meters), and 140–320 kilocycles which completely covers the 1000–2000 meter band. This Model contains a Type 6A7E valve as combination first detector and oscillator, a Type 78E valve for the intermediate frequency, a Type 75 valve as second detector and first low frequency stage, a Type 42E as low frequency power output, and a Type 80 rectifier valve. The intermediate frequency is 125 K. C. The power consumption is 63 watts.

Table 1—Valve Holder Data—A. C. Mains Voltage, 240 Volts*

Circuit	Det. Osc.	I. F.	2nd Det. and L. F.	L. F. Power Output	Rectifier
Valve Type	6A7E	78E	75	42E	80
Low Tension—F to F (Volts)	6.3	6.3	6.3	6.3	5.0
High Tension—P to K (Volts)	250	250	190	240	360
Screen Grid Volts—SG to K (6A7E; G3/5 to K)	50	100	.25	260	
Control Grid Volts—CG to K (6A7E; G4 to K)	0	4	.25	.5	
Cathode Volts—K to F	2.2	2.7	0	0	

Additional Type 6A7E Values: G1 to K = .4 volt; G2 to K = 260 volts.

* All of the above values were obtained from the under side of chassis, using test prods and leads with a suitable A. C. voltmeter for L. T. voltages, and a high-resistance, multi-range D. C. voltmeter for all other values. Volume control at maximum and station selector at 525 K. C. Mains Transformer Primary tap on 230–260. Readings taken with a plug-in adapter will NOT be satisfactory.

Table 2—Mains Transformer Data

Terminal	A. C. Volts	Circuit	Color
1	230-260	Primary (Full Primary Winding)	White—20% Black Tr.
1A	200-230	Primary (Tapped Primary Winding)	Green
2	200-260 with (1) or (1A)	Primary (Common)	White
3-5	6.3	Low Tension	Black
6-7	5.0	L. T. of "80" Valve	Blue
8-10	680	H. T. (Anodes) of "80"	Yellow
4		Center Tap of 3-5	Black-Yellow Tracer
9		Center Tap of 8-10	Yellow-Green Tracer

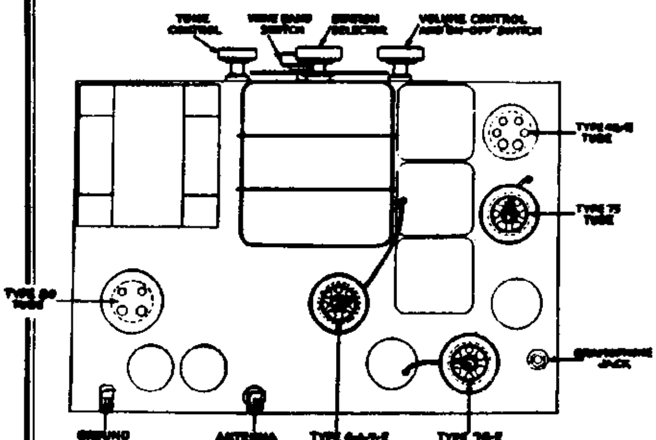


Fig. 1—Top View of Chassis

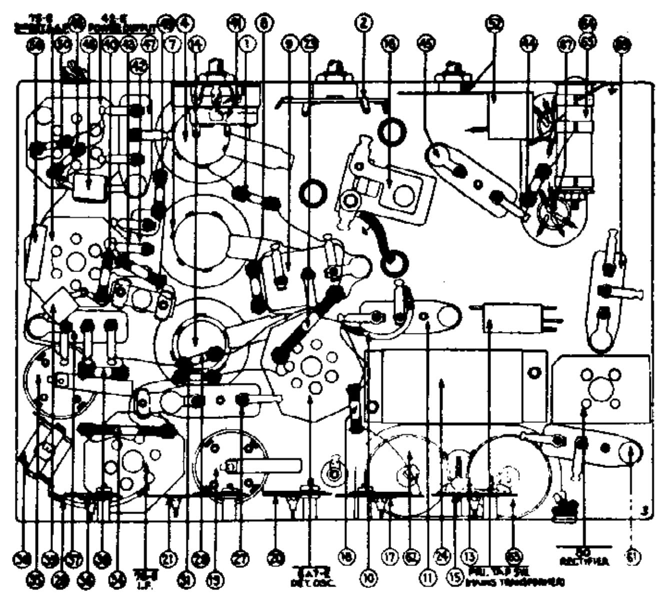


Fig. 2 Bottom View of Chassis, Showing Parts

ADJUSTMENT OF MODEL 261

The receivers are accurately adjusted prior to shipment from the factory. Adjustments of the compensating condensers should *only* be undertaken with proper instructions and equipment available. An accurately calibrated signal generator is necessary. One will be found in the **Philco 048 All-Purpose Set Tester.**

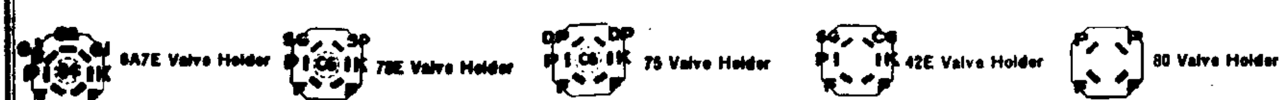
The adjustment of the compensating condensers is similar to the procedure outlined in Service Bulletin No. 120–C.

Location of the several compensating condensers can be ascertained by reference to Fig. 3 for their electrical location in the receiver, and to Fig. 2 for the physical location of the compensating condensers at the rear and upon the underside of the receiver chassis.

The intermediate frequency compensating condensers first should be adjusted. The intermediate frequency is 125 kilocycles. These condensers are (20), (21), and (30), accessible from the rear of the chassis.

The Antenna (6), Detector (4), and High Frequency (1400 K. C.) Oscillator (12) compensating condensers next should be adjusted. These are mounted upon the tuning condenser (3). (6) is nearest the front of chassis. The low frequency compensating condensers are adjusted last. These are (15), (16), and (17). (15) is the 600 K. C. compensating condenser; (16) the 300 K. C. compensating condenser; and (17) the 150 K. C. compensating condenser. The sequence of adjustment should be: (15), (16), (17). (15) and (17) are accessible from rear of chassis; (16) is mounted upon the underside of the chassis.

The I. F. compensating condensers should be given a final retrimming after these adjustments are completed.



Terminal Arrangement of Valve Holders, Viewed From Under Side of Chassis

PHILCO RADIO & TELEV. CORP.

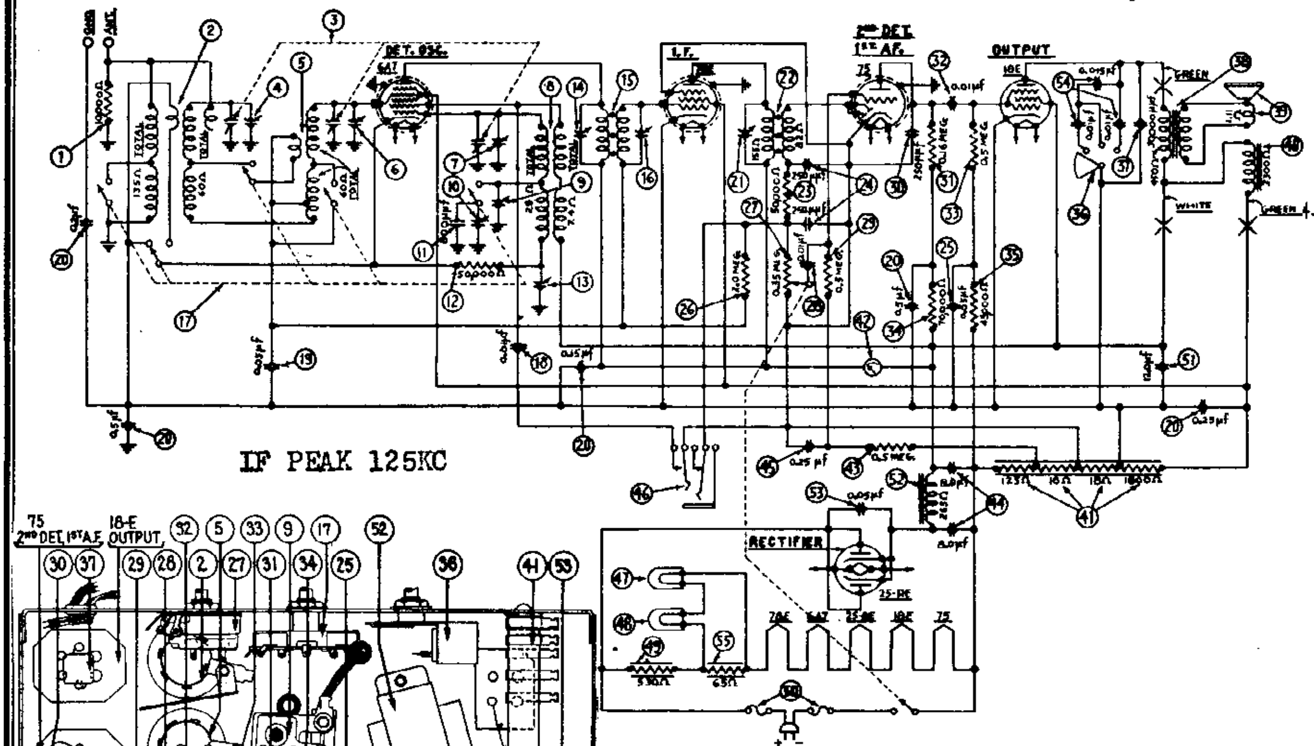


Fig. 4—Wiring Diagram

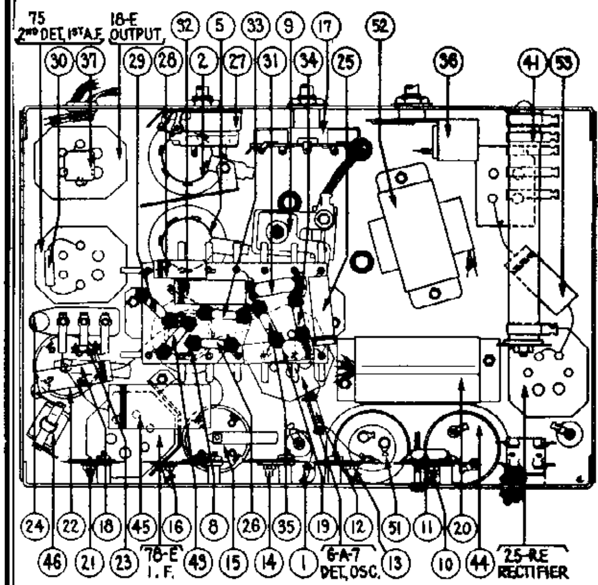


Fig. 3—Bottom of Chassis, showing components

MODEL 263-E COMPONENTS

1	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000
2	Antenna Transformer	32-1351
3	Tuning Condenser Assembly	31-1171
4	Compensating Condenser (Ant.)	Part of 3
5	Detector Transformer	32-1159
6	Compensating Condenser (Det.)	Part of 3
7	Compensating Condenser (Osc. H. F. Standard)	Part of 3
8	Oscillator Transformer	32-1158
9	Compensating Condenser (Osc. Long-wave)	04000-D
10	Compensating Condenser (Osc. Series Standard)	04000-S
11	Condenser (.0008 mfd.) (Mica)	5120
12	Resistor (50,000 ohms) (Green-Brown-Orange)	4518
13	Compensating Condenser (Long-wave Series Osc.)	04000-S
14	Compensating Condenser (1st I. F. Pri.)	04000-A
15	First I. F. Transformer	32-1160
16	Compensating Condenser (1st I. F. Sec.)	04000-A
17	Wave-band Switch	42-1057
18	Condenser (.01 mfd.) (Tubular)	30-4145
19	Condenser (.05 mfd.) (Tubular)	30-4020
20	Condenser Block (.5—.25—.2—.15—.5)	30-4157
21	Compensating Condenser (2nd I. F. Pri.)	04000-M
22	Second I. F. Transformer	32-1223
23	Resistor (50,000 ohms) (Green-Brown-Orange)	6098
24	Condenser (.00025 mfd. Twin) (Block Type)	8317-C
25	Condenser (.05 mfd.) (Tubular)	30-4020
26	Resistor (2 megs.) (Red-Black-Green)	5872
27	Volume Control and On-Off Switch	33-5065
28	Condenser (.01 mfd.) (Tubular)	30-4124
29	Resistor (.5 meg.) (Yellow-White-Yellow)	4517
30	Condenser (.00025 mfd.) (Mica)	5858
31	Resistor (160,000 ohms) (Brown-Blue-Yellow)	5331
32	Condenser (.01 mfd.) (Tubular)	30-4145
33	Resistor (.5 meg.) (Yellow-White-Yellow)	4517
34	Resistor (70,000 ohms) (Violet-Black-Orange)	5385
35	Resistor (45,000 ohms) (Yellow-Green-Orange)	5256
36	Tone Control	30-4043
37	Condenser (.002 mfd.) (Mica)	6853
38	Output Transformer	2580
39	Voice Coil and Cone Assembly:	
	H-18	02625
	K-25	36-3174
40	Speaker Field Coil	02803
41	B. C. Resistor (125, 18, 18, 1800 ohms)	33-3136
42	Shadowmeter	45-2028
43	Resistor (.5 meg.) (Yellow-White-Yellow)	4517
44	Condenser (Electrolytic—8 mfd.—8 mfd.)	30-2028
45	Condenser (.25 mfd.) (Tubular)	30-4134
46	Phonograph Jack	6585
47	Pilot Lamp	6608
48	Pilot Lamp (Shadowmeter)	Part of 42
49	Line Resistor (530 ohms)	33-3134
50	Line Fuses (2)	7227
51	Condenser: Electrolytic—12 mfd.—(8 mfd.+4 mfd.)	30-2030
52	Filter Choke	4819
53	Condenser (.05 mfd.)	30-4123
54	Condensers (Inside 36)	Part of 36
55	Resistor (65 ohms) (Pilot Lamps)	33-3135

October, 1934.
Printed in U. S. A.

MODEL 263-E
Socket, Voltage
Alignment

PHILCO RADIO & TELEV. CORP.

Model 263-E

Philco model 263-E is a five-valve superheterodyne receiver designed for reception of two bands of frequencies; either 530 to 1500 kilocycles (K.C.) or 140 to 320 kilocycles. It may be operated on either 230 volts (50-60 cycles) alternating current (A.C.), or 230 volts direct current (D.C.) It employs the following valves: One type 6A7 detector oscillator; one type 78-E intermediate frequency; one type 75, second detector and first low frequency; one type 18-E low frequency power output; and one type 25RE as rectifier.

The intermediate frequency of the set is 125 kilocycles and the power consumption is 90 watts.

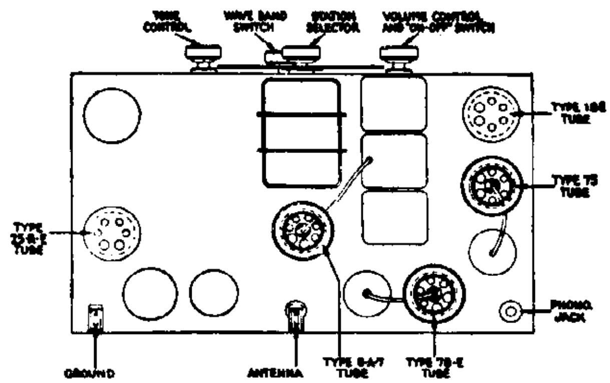


Fig. 1—Top View of Chassis

Valve-holder Voltages
(Mains Voltage 230 A.C.)

Valve	6A7	78-E	75	18-E	25RE
Circuit P to K	190	190	100	185	235
Sg to K	70	70	....	220	....

6A7: G_1 to K = .2 volt
6A7: G_2 to K = 200 volts

Above readings made with high resistance D.C. voltmeter using test prods on valve-holders under chassis (see Fig. 1).

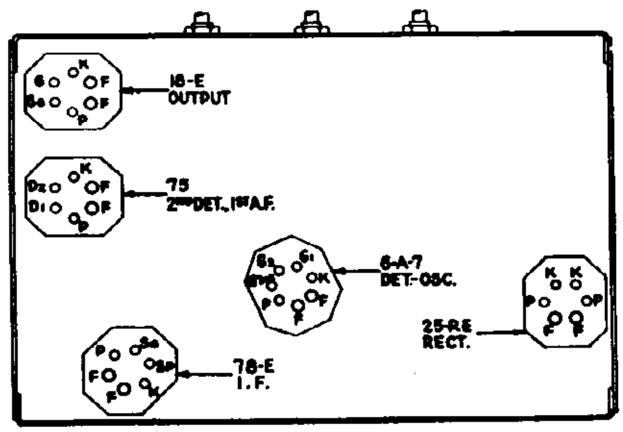


Fig. 2—Valve-holder Terminals (Viewed from underneath—for tests)

ADJUSTING COMPENSATING CONDENSERS

The Intermediate Frequency of Model 263-E is 125 kilocycles.

With the exception of the three compensating condensers located on the three sections of the tuning condenser, all are located underneath chassis, and are reached either through the rear holes in sub-base, or from underneath. Fig. 3 shows all condensers which are located under the chassis.

For proper adjustment, an accurate signal generator having a range from 100 to at least 1600 K.C. is required; also an output meter and a suitable adjusting wrench. Philco Model 024 signal generator, model 012 output meter and No. 3164 fibre hex wrench, are recommended.

Connect the output meter to the plate and cathode prongs of the output valve (type 18E). Turn on the set and signal generator. Turn wave band switch of set to right.

I. F. Compensating Condensers

Remove grid clip from cap of 6A7 valve and connect shielded antenna lead from signal generator to cap of valve. Connect ground terminal of signal generator to ground post of set. Set signal generator at 125 K.C., dial of set at 55 (wave band switch to right). Adjust each of the I. F. condensers (14), (16) and (20) in Figs. 3 and 4) in turn, to give maximum reading in the output meter. These condensers are all reached from the rear of the chassis.

Antenna, Detector and Osc. HF. (Standard Wave)

Remove antenna lead of signal generator from grid cap of 6A7 valve and replace grid clip. Connect signal generator antenna lead to antenna post on set. Set signal generator at 1500 and turn dial of set to 150. Adjust condensers (4), (6) and (7) (located on sections of tuning condenser assembly), so as to get maximum reading in output meter. (4) is located nearest front of chassis and (7) nearest rear.

Osc. Long Wave and Long Wave Series; Standard Wave Series

These are condensers (9), (13) and (10) in the order named. (9) is reached from underneath the chassis; (10) and (13) from the rear.

First adjust (10) (series or L. F. standard wave) with signal generator set at 600 and dial at 60, for maximum output.

Then turn waveband switch to left. Set signal generator at 300 and dial at 30 (lower scale) and adjust (9) for maximum signal; then turn dial to 15 and set signal generator at 150 and adjust (13) for maximum signal.

PHILCO RADIO & TELEV. CORP.

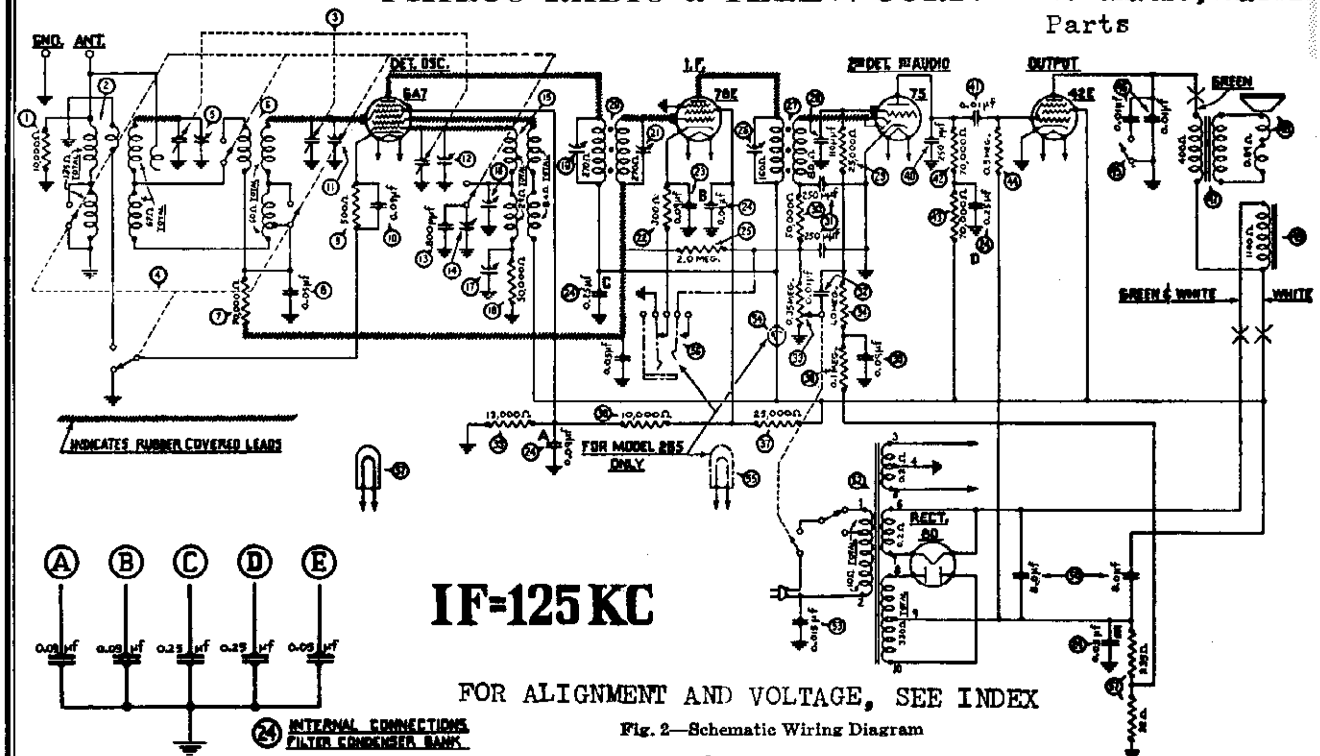


Fig. 2—Schematic Wiring Diagram

No. on Figs.	Description	Part No.
1	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000
2	Antenna Transformer	32-1157
3	Tuning Condenser Assembly (Model 264)	31-1091
	(Model 265)	31-1037
4	Wave-Band Switch	42-1057
5	Compensating Condenser (Antenna)	Part of 3
6	Detector Transformer	32-1158
7	Resistor (70,000 ohms) (Violet-Black-Orange)	5385
8	Condenser (Bakelite block type, .05 mfd. twin)	3615-AJ
9	Resistor (500 ohms—Flexible wirewound)	6977
10	Condenser (.09 mfd.—Blakelite block type)	4989-AB
11	Compensating Condenser (Det.)	Part of 3
12	Compensating Condenser (Osc. H. F.)	Part of 3
13	Condenser (.0008 mfd.—Mica)	5878
14	Compensating Condenser (H. F. Series)	04000-S
15	Oscillator Transformer	32-1159
16	Compensating Condenser (Osc. Long Wave)	04000-D
17	Compensating Condenser (L. F. Series)	04000-S
18	Resistor (50,000 ohms) (Green-Brown-Orange)	6098
19	Compensating Condenser (1st I. F. Pri.)	04000-A
20	First I. F. Transformer	32-1160
21	Compensating Condenser (1st I. F. Sec.)	04000-A
22	Resistor (300 ohms—Flexible wirewound)	33-3010
23	Condenser (.09 mfd.—Bakelite block)	4989-D
24	Condenser (Metal Case; .25—.09—.09—.25—.05)	30-4044
25	Resistor (2 megohms) (Red-Black-Green)	5972
26	Compensating Condenser (2d I. F. Pri.)	04000-M
27	2d I. F. Transformer	32-1223
28	Condenser (.00011 mfd.—Mica)	30-1031
29	Resistor (25,000 ohms) (Red-Green-Orange)	33-1013
30	Resistor (50,000 ohms) (Green-Brown-Orange)	6098
31	Condenser (.00025 mfd. twin—Bakelite Black)	8317-B
32	Condenser (.01 mfd.—Bakelite block)	3903-AM
33	"On-Off" Switch and Volume Control	33-5006
34	Resistor (1 megohm) (Brown-Black-Green)	33-1096
35	Condenser (.09 mfd.—Bakelite block)	4989-D
36	Resistor (.1 meg.) (White-White-Orange)	4411
37	Resistor (25,000 ohms) (Red-Green-Orange)	3656
38	Resistor (10,000 ohms) (Brown-Black-Orange)	4412
39	Resistor (13,000 ohms) (Brown-Orange-Orange)	3766
40	Condenser (.00025 mfd.—Mica)	3082
41	Condenser (.01 mfd.—Bakelite block)	3903 W
42	Resistor (70,000 ohms) (Violet-Black-Orange)	5385
43	Resistor (70,000 ohms) (Violet-Black-Orange)	5385
44	Resistor (.5 meg.) (Yellow-White-Yellow)	4517
45	Tone Control (Two-position)	30-4046
46	Condensers in Tone Control	Part of 45
47	Output Transformer (S-7 Speaker)	32-7019
48	Voice Coil and Cone Assembly (S-7)	36-3157
49	Field Coil and Pot Assembly	36-3039
50	Condenser (Electrolytic) (8 mfd.—8 mfd.)	30-2028
51	Resistor (Wirewound, 235, 32 ohms)	7998
52	Power Transformer: 115 Volt, 50-60 Cycles	8046*
	230 Volt, 50-60 Cycles	8048
	230 Volt, 25-40 Cycles	32-7074
53	Condenser (.015 mfd.—Bakelite block)	3793-Z
54	Shadow Tuner (Model 265 only)	6497
55	Pilot Lamp for Shadow Tuner (Model 265 only)	Part of 54
56	Phonograph Jack (Model 265 only)	6585

*Model 265 only.

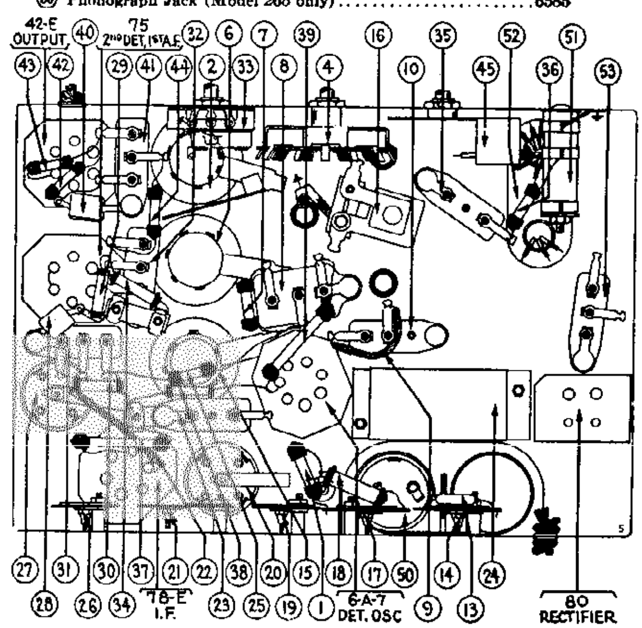
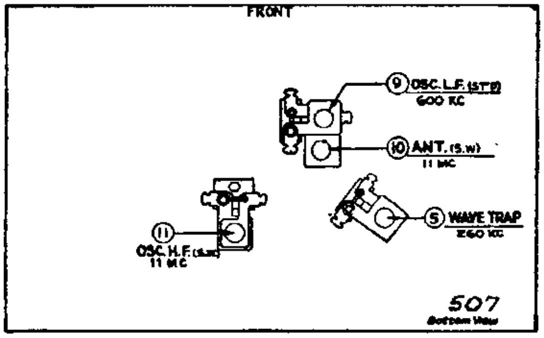


Fig. 3—Bottom View of Chassis

MODEL 507
MODEL 509
Alignment
Trimmers

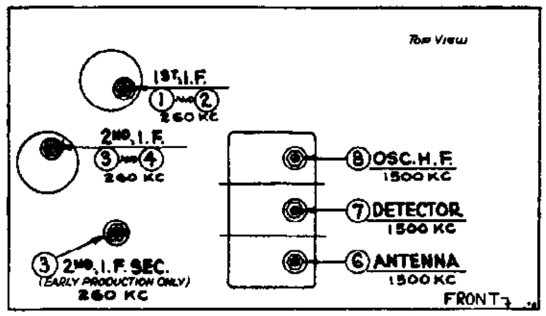
PHILCO RADIO & TELEV. CORP.



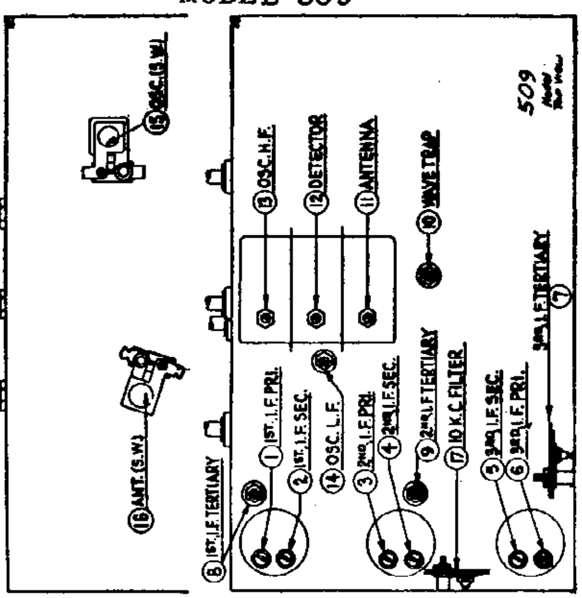
MODEL NO. 507

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from 6A7					
Control grid of 6A7	260 k.c.	55	Broadcast (left)	4[1]	Max.
"	"	"	"	3[2]	Max.
"	"	"	"	2[1]	Max.
"	"	"	"	1[2]	Max.
Connect grid clip to 6A7					
Ant.*	"	"	"	5	*Min.*
"	1500 k.c.	150	"	6	Max.
"	"	"	"	7	Max.
"	"	"	"	8	Max.
"	600 k.c.	60	"	9	Max.
"	11 m.c.	11 m.c.	Short Wave (right)	10	Max.
"	"	"	"	11	Max.

* Use a 200-mmf. condenser dummy antenna on broadcast band and a 400-ohm carbon resistor on shortwave band.
Note 1.—Nut adjustment.
Note 2.—Screw adjustment.



MODEL 509

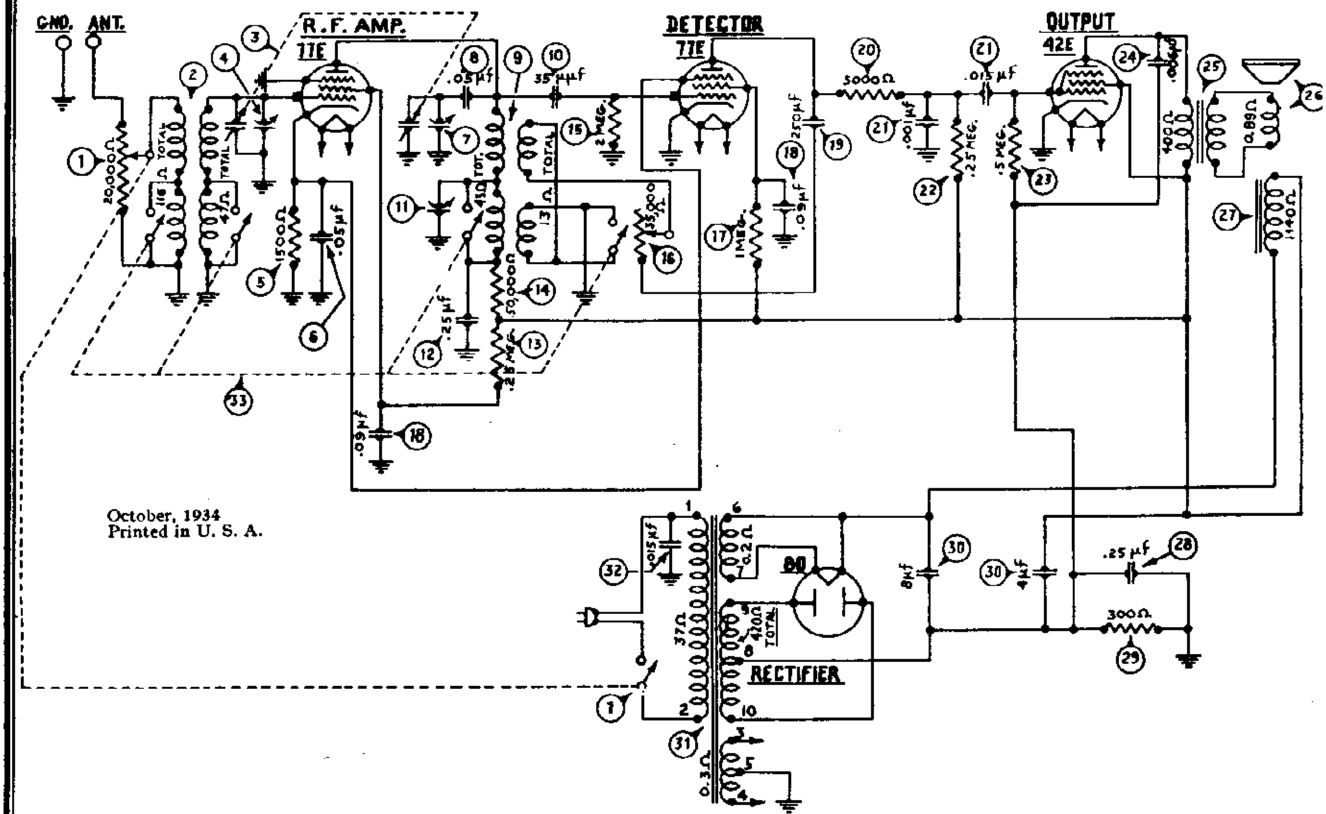


MODEL NO. 509

Signal Generator Connection	Signal Generator Frequency	Dial Position	Wave Band Switch Position	Trimmer Number	Output Signal
Remove grid clip from 6A7					
Control grid of 6A7	260 k.c.[1]	550 k.c.	Broadcast[2] (left)	1	Min.[3]
"	"	"	"	2	Min.
"	"	"	"	3	Min.
"	"	"	"	4	Min.
"	"	"	"	5[4]	Min.
"	"	"	"	6[5]	Min.
"	260 k.c.[6]	"	"	7	Note 7
"	260 k.c.[8, 9]	"	"	8	*Max.*
"	"	"	"	9	*Max.*
"	Note 10	"	"	8	Note 10
Connect grid clip to 6A7					
Ant.	260 k.c.[11]	"	"	10	*Max.*
Ant.[12]	1500 k.c.	1500 k.c.	"	11	Min.
"	"	"	"	12	Min.
"	"	"	"	13	Min.
"	600 k.c.	600 k.c.	"	14	Min.*
Ant.[13]	11.0 m.c.	11.0 m.c.	Short Wave (right)	15[14]	*Max.*[15]
"	"	10.48 m.c.	"	Image check	
"	"	11.0 m.c.	"	16	*Max.*
Note 16	10 k.c.	...	...	17	Min.

Note 1.—Adjust signal generator to give an unmodulated output, which should be regulated to give a reading of about two volts on the voltmeter scale (see note 3) during the first four i-f. adjustments.
Note 2.—Turn fidelity-selectivity control all the way to the left.
Note 3.—The usual output meter cannot be used with an unmodulated signal. Use indirect indication through a.v.c. system (for all adjustments unless otherwise noted) by connecting a high-resistance d.c. voltmeter (scale 0-5 or 0-10 volts) across the r.f. cathode resistor. This method will give *minimum scale reading* for maximum receiver output, and vice-versa. The voltmeter will indicate about 3.5 volts bias when no signal is applied to the antenna and will decrease upon application of signal.
Note 4.—Connect 500 mmfd. condenser from plate of second i-f. tube to ground.
Note 5.—Remove 500 mmfd. condenser (note 4) from plate of second i-f. tube and connect across the third i-f. secondary. Remove this condenser after adjustment is completed.
Note 6.—Set signal-generator for maximum output.
Note 7.—Adjust (7) to give *minimum width* on shadow-tuning meter of receiver.
Note 8.—Set signal-generator output to give reading of 2 volts on voltmeter.
Note 9.—Turn fidelity-selectivity control all the way to the right.
Note 10.—When varying signal-generator frequency through 253 k.c. and 267 k.c., a definite peak on the voltmeter should be noted for each. If these two readings are not the same, they can be equalized by slight readjustment of (8).
Note 11.—Turn fidelity-selectivity control all the way to the left.
Note 12.—Through [illegible] mmfd. condenser.
Note 13.—Through 400 ohm resistance.
Note 14.—Remove voltmeter from [illegible] cathode resistor and connect regular output meter to plates of output tubes in the usual manner for adjustment of (15), (16) and (17).
Note 15.—Use "lower capacity peak" for adjustment of (15) to maximum indication on output meter. Neglect "higher-capacity peak."
Note 16.—The accurate adjustment of the 10 k.c. audio filter (17) requires a calibrated audio oscillator. Connect the low side of the audio oscillator to ground and the high side to the variable tap on the receiver volume control.
* While rocking.

PHILCO RADIO & TELEV. CORP.



October, 1934
Printed in U. S. A.

Fig. 2—Schematic Wiring Diagram

NOTE: In current production a 2500 ohm resistor Part No. 33-1100, is connected across the two contacts of the wave band switch nearest (in diagram) to the volume control ⑯.

REPLACEMENT PARTS—MODEL 267-E

No. on Figs.	Description	Part Number
①	Volume Control (20,000 ohms) and On-off Switch	33-5055
②	Antenna Transformer	32-1451
③	Tuning Condenser Assembly	31-1361
④	Compensating Condenser (Antenna)	Part of ③
⑤	Resistor (1500 ohms) (Brown-Green-Red)	7951
⑥	Condenser (.05 Mfd. Bakelite Block)	3615-AA
⑦	Compensating Condenser (Detector)	Part of ③
⑧*	Condenser (.05 Mfd. Tubular)	30-4012
⑨	Detector Transformer	32-1452
⑩	Condenser (.000035 Mfd. Mica)	30-1048
⑪	Compensating Condenser (Low Frequency)	04000E
⑫	Condenser (.25 Mfd. Tubular)	30-4146
⑬	Resistor (.25 Meg.) (Red-Yellow-Yellow)	33-1097
⑭	Resistor (50,000 ohms) (Green-Brown-Orange)	6098
⑮	Resistor (2 Meg.) (Red-Black-Green)	33-1025
⑯	Regeneration Control (35,000 ohms)	33-5076
⑰	Resistor (1 Meg.) (Brown-Black-Green)	33-1096
⑱	Condenser (.09 Mfd. Twin Bakelite Block)	4989-AK
⑲	Condenser (.00025 Mfd. Mica)	30-1032
⑳	Resistor (5,000 ohms) (Green-Black-Red)	5310
㉑	Condenser (.0001 and .015 Bakelite Block)	7762-B
㉒	Resistor (.25 Meg.) (Red-Yellow-Yellow)	33-1097
㉓	Resistor (.5 Meg.) (Yellow-White-Yellow)	6097
㉔	Condenser (.006 Mfd., Tubular)	30-4024
㉕	Output transformer (On Speaker)	32-7019
㉖	Voice Coil and Cone Assembly (SB Speaker)	36-3157
㉗	Speaker Field Coil and Pot. Assembly	36-3243
㉘	Condenser (.25 Mfd. Tubular)	30-4146
㉙	Resistor (Wirewound, 300 ohms)	7465
㉚	Condenser (Electrolytic 4 and 8 Mfd.)	30-2013
㉛	Power Transformer (50-60 Cycles)	7423
㉜	Condenser (.015 Mfd. Bakelite Block)	3793-AJ
㉝	Wave-Band Switch	42-1081

* Production after 10-23-34 uses Part No. 30-4123.

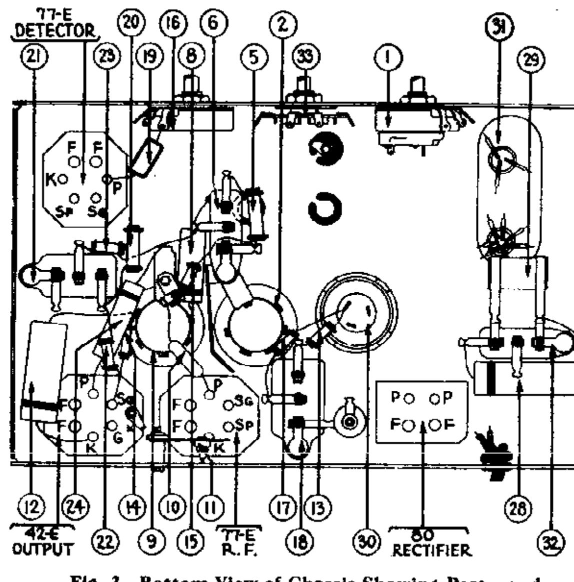


Fig. 3—Bottom View of Chassis Showing Parts, and Location of Tube Sockets for Voltage Tests

PHILCO RADIO & TELEV. CORP.

MODEL 267-E

Philco Model 267-E is a four tube receiver designed for operation on 230 volts 50-60 cycles alternating current (A. C.). It receives over two frequency ranges, viz: 535 to 1510 kilocycles (standard wave) and 145 to 310 K.C. (long wave). The circuit used is the regenerative or "reaction" circuit. Model 267-E employs the following tubes: Type 77-E R. F., type 77-E detector, type 42-E pentode output and type 80 as rectifier. The power consumption is 46 watts.

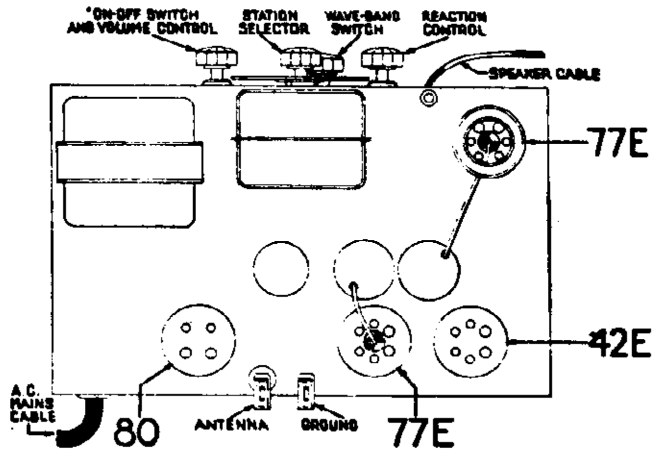


Fig. 1—Top View

Power Transformer Data
(Line Voltage 240)

Terminals (See Fig. 2)	A. C. Voltage	Current	Circuit	Color
1-2	240	....	Primary	White
3-4	6.3	1.5 A	Filaments	Black
6-7	5.0	2.0 A	Filaments of 80	Blue
9-10	630	55 MA	Plates of 80	Yellow
5	...	....	Center tap of 3-4	Black-Yellow tracer
8	...	....	Center tap of 9-10	Yellow-Green tracer

Tube Socket Voltage
(Line Voltage 230)

	R. F. 77-E	Det 77-E	Output 42-E
P-K	42	137	245
SG K	35	87	255
K to Gnd	0	3.8	0

Above values were obtained by a high resistance D.C. voltmeter and test prods applied to underside of chassis. See Fig. 3.

ADJUSTING COMPENSATING CONDENSERS

There are three compensating condensers in these sets. Two are located on the top of the sections of the tuning condenser gang; and one underneath chassis and reached from the rear (thru hole in sub-base).

Connect the set up to the A. C. line and the antenna lead from signal generator to antenna post of set. Set signal generator at 1500 K.C. Turn wave-band switch to right and set dial at 150. (If set is removed from cabinet, obtain a piece of flat steel, .006" thick, about ½" wide and four or five inches long; open condenser gang and bring heel of detector section down on this steel strip; then remove the strip without disturbing setting of condenser gang).

Turn volume control full on and reaction control about ¾ of the way to full on; then with a suitable hex wrench (such as Philco No. 3164) adjust condensers (4) and (7) (located on tuning condenser gang) to obtain maximum reading in the output meter, which should be connected to primary terminals of the output transformer.

While making the adjustment, advance the reaction control as far as possible without causing oscillation, working for maximum output on both condensers.

Now throw wave-band switch to left and turn dial to 300 K.C. (30 on lower scale of dial). In this position the condenser gang is approximately open. Now adjust condenser (11) (reached from rear) for maximum output, keeping the reaction control advanced as explained above, to just below point of oscillation.

PHILCO RADIO & TELEV. CORP.

September, 1934
Printed in U. S. A.

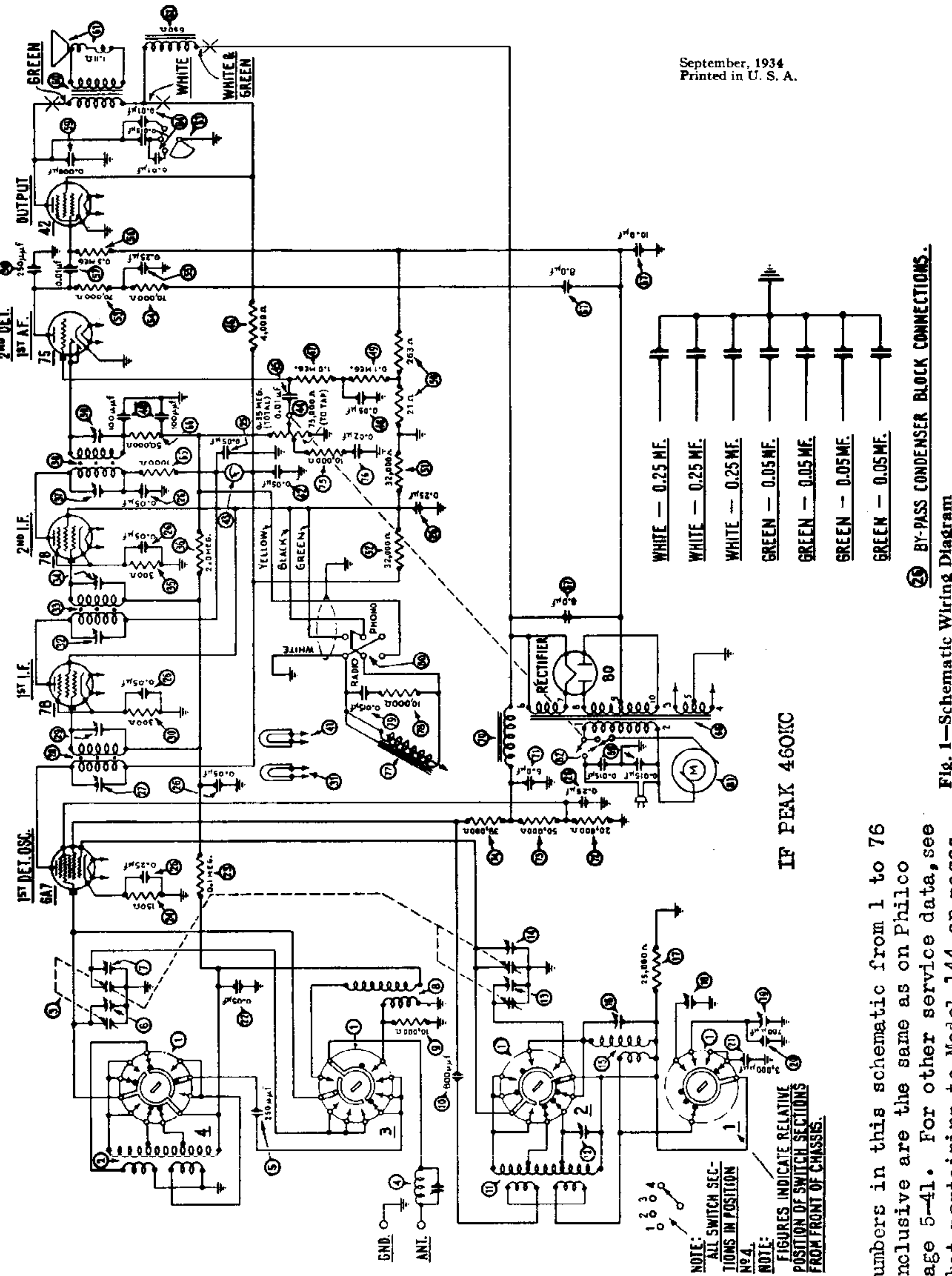


Fig. 1—Schematic Wiring Diagram

Numbers in this schematic from 1 to 76 inclusive are the same as on Philco page 5-41. For other service data, see that pertaining to Model 144 on pages 5-42 and 5-43 of Rider's Volume V.

MODEL 506
Notes,Parts

PHILCO RADIO & TELEV. CORP.

Radio-Phonograph Model 506

PHILCO MODEL 506 has the same superheterodyne broadcast and short-wave receiver chassis as Model 144, and must be operated upon the exact frequency (cycles) of alternating current given upon the name-label of the radio receiver chassis,—for correct speed of the phonograph motor.

Service Bulletin No. 193 on Model 144 gives the data necessary to test and adjust the radio receiver of Model 506, and includes a full description of the adjustment of its compensating condensers.

The radio circuits are the same as those of Model 144,— with the additional phonograph reproducing circuits. Complete schematic wiring diagram of Model 506 is given in Figure 1 of this Bulletin. The audio frequency system of the radio chassis amplifies the impulses generated in the pick-up.

Replacement Parts for the radio chassis and speaker are given in Service Bulletin No. 193 (Model 144); the additional *phonograph* parts are:

No. on Fig. 1	Description	Part No.	List Price
77	Pick-up and Tone Arm Assembly	35-2002	
78	Resistor (10,000 ohm) (Brown-Black-Orange)	33-1000	$0.20
79	Condenser (.015 Mfd.)	3793-S	.35
80	Phonograph-Radio Switch	42-1067	.65
81	Phonograph Motor (115 volt, 60 cycle)	35-1002	23.00
	Phonograph Motor (115 volt, 25 cycle)	35-1006	35.00
82	Automatic-Stop Switch (Motor)	6345	3.15
	Phonograph-Radio Switch Indicator	4277	.02
	Phonograph-Radio Switch Plate	28-2250	.10
	Radio-Phono Cord Assembly	35-3002	1.35
	Turntable	35-3001	12.50
	Speed-Change Lever	28-1648	.25
	Speed-Change Lever Spacer	28-6103	.03
	Speed-Change Lever Spring	28-1649	.05

No. on Fig. 1	Description	Part No.	List Price
	Motor Board	28271	$3.00
	Motor Board Mounting Screw	W-461B	.01
	Motor Board Mounting Washer (Finishing)	W-464B	1.50 per C.
	Mounting Board *Rubber* Washer	4074	.06
	Motor Mounting Screw	W-247A	.30 per C.
	Motor Mounting Washer	W-151A	.20 per C.
	Motor Mounting Nut	W-139A	.35 per C.
	Pick-up Mounting Screw	W-230B	.30 per C.
	Pick-up Mounting Washer	W-151A	.20 per C.
	Pick-up Mounting Nut	W-139A	.35 per C.
	Pick-up Needle Screw	4108	.18
	Cord-Connector Plug	4091	.30
	Needle Cup	28-2222	.05
	Needle Cup Cover	28-2223	.05

NOTE: Part 71 electrolytic condenser is 30-2014 in Model 506 instead of a 30-2020 as used in early Model 144 (30-2026 in current 144).

The electric pick-up is of the high-impedance type. Its impedance, at 1000 cycles, is 10,000 ohms. Its D. C. resistance is 700 ohms A description of the adjustment of the pick-up is given in Service Bulletin No. 89, "Adjusting the Electric Pick-up".

The electric motor depends upon the frequency (cycles) of the power supply for its correct speed. The power line frequency must be the same as that given in the name-label upon the radio chassis and upon the motor frame. Only a motor of the correct frequency will give the proper turntable speed.

The motor is of the self-starting, synchronous type. The motor should be lubricated at least once every six months. To do this, lift off the turntable and place a few drops of a good grade of light machine oil in the oil-hole in the top-plate of the motor.

If the electric motor should develop a fault, it should be replaced. Do not attempt to repair it; get in touch with your Distributor regarding the faulty motor.

The tone arm must be free to rotate upon its axis at all times. Damage to records will result if it is not.

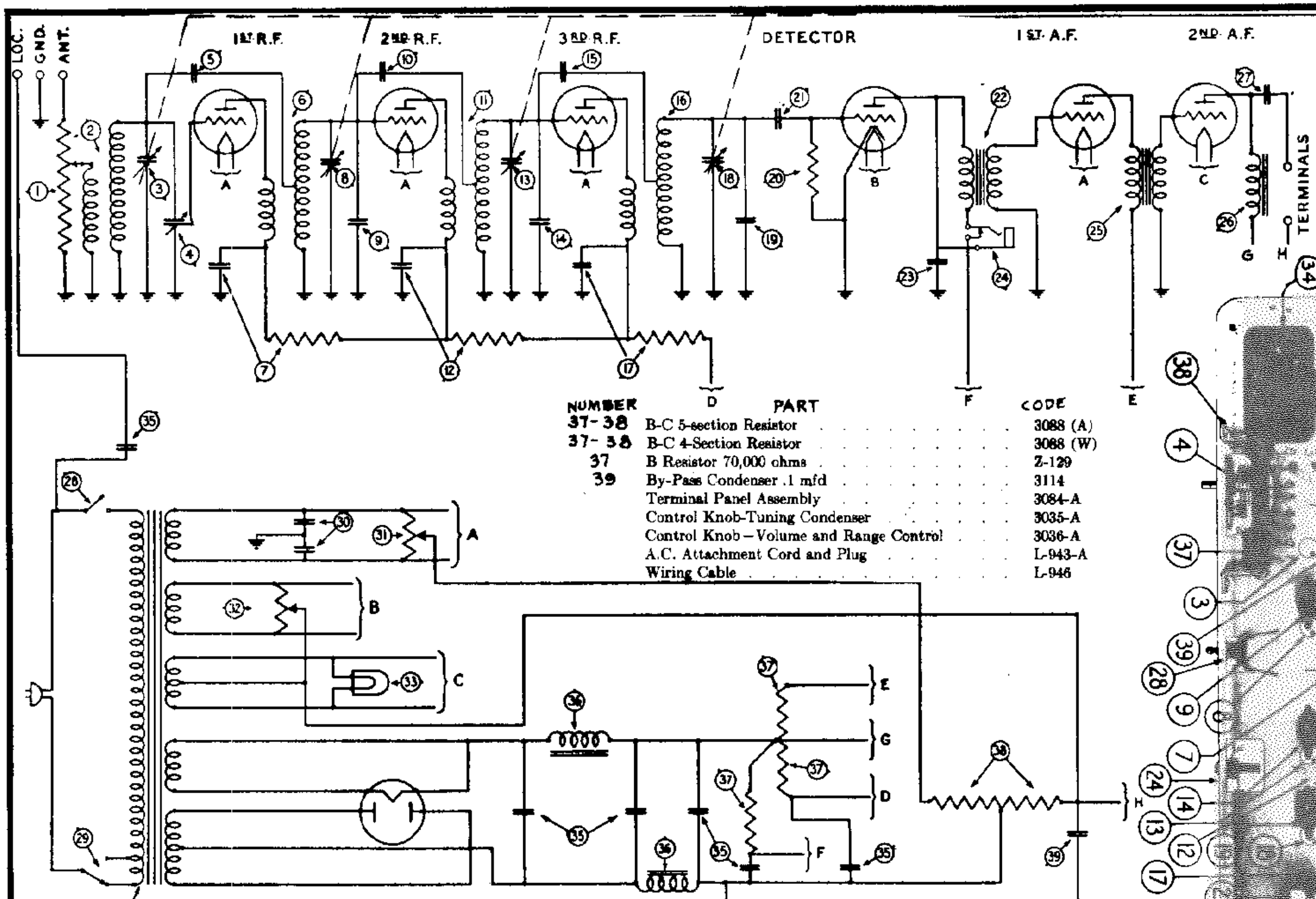
The speaker unit of Model 506 is Type H-16.

The power consumption of Model 506,—with motor running,— is 100 watts.

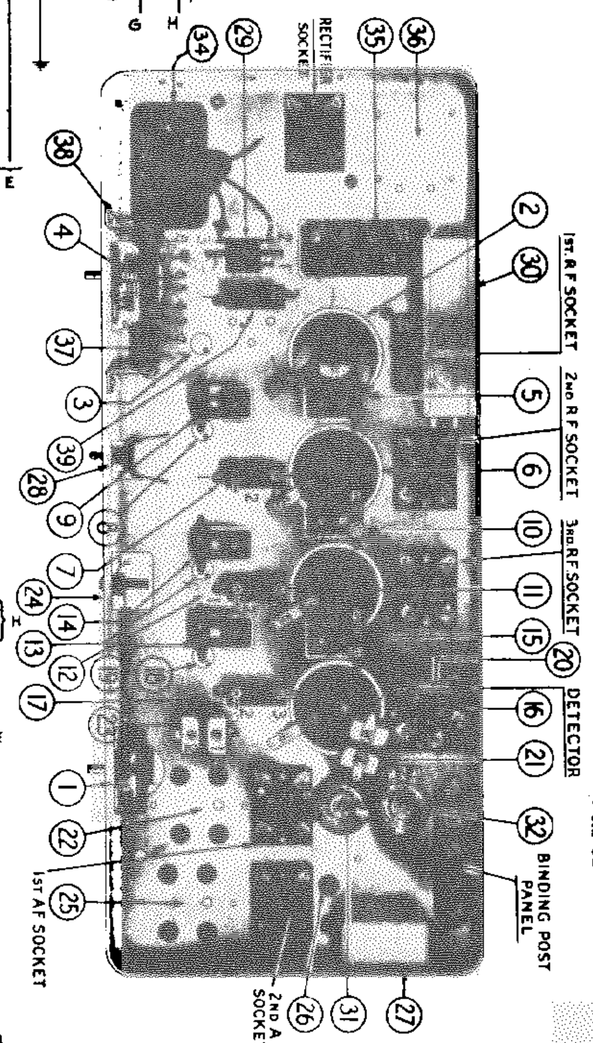
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL 511
Schematic, Chassis
Parts

PHILCO RADIO & TELEV. CORP.



NUMBER	PART	CODE
37-38	B-C 5-section Resistor	3088 (A)
37-38	B-C 4-Section Resistor	3088 (W)
37	B Resistor 70,000 ohms	Z-129
39	By-Pass Condenser .1 mfd	3114
	Terminal Panel Assembly	3084-A
	Control Knob-Tuning Condenser	3035-A
	Control Knob—Volume and Range Control	3036-A
	A.C. Attachment Cord and Plug	L-943-A
	Wiring Cable	L-946



Number	Name of Part	Factory Part Number (Order by this Number)
1	Volume Control	3076
2	R. F. Transformer (Antenna Tuning)	3075-B
3-11-16	R. F. Transformer	3075-A
4	Range Control	3133
	Tuning Condenser (complete with drum and shield)	3001-B
5-10-15	Neutralizing Condenser	3025-A
9-14-19	Compensating Condenser	3025-B
7-12-17	By-Pass Condenser .1 mfd. with Plate Resistance Winding	3114-A
23	By-Pass Condenser .001 mfd.	3081
30	Filament By-Pass Condenser (2 sections .5 mfd.)	3080
20	Grid Leak	3083

NUMBER	PART	CODE
21	Grid Condenser	3082
22-25	A. F. Transformer	3077
24	Phonograph Pick-Up Jack	3087
26	Output Filter Choke	3078
27	Output Filter Condenser .5 mfd.	3079
28	Power Switch—Toggle	3117
29	Primary Tap Switch	3116
31	6-ohm Hum Adjustor	3096
32	20-ohm Hum Adjustor	3066
33	Pilot Lamp	3105
34	Power Transformer—50 - 60 cycle	3073
34	Power Transformer—25 - 40 cycle	3106
35	Filter Condenser Block—50 - 60 cycle	3108
35	Filter Condenser Block—25 - 40 cycle	3109
36	Filter Choke Coils	Z-224

MODEL 642
Chassis, Parts.

PHILCO RADIO & TELEV. CORP.

Replacement Parts for Model 642

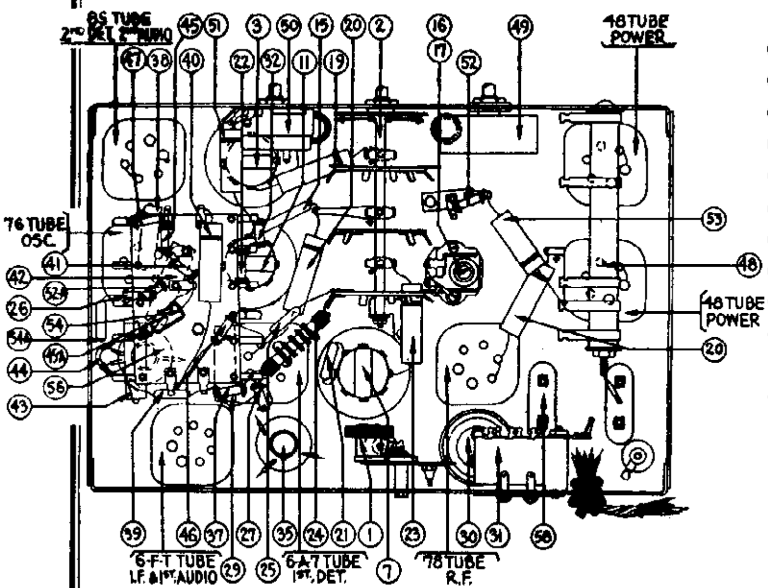


Fig. 4. Bottom View of Chassis

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

No.	Description	Part No.	List Price
1	Wavetrap	38-6972	$0.75
2	Waveband Switch	42-1107	1.75
3	Antenna Transformer	32-1867	3.00
4	Compensating Condenser (Std.)	Part of 3	....
5	Compensating Condenser (Police)	Part of 3	....
6	Compensating Condenser (S. W.)	Part of 3	....
7	R. F. Transformer	32-1868	3.00
8	Compensating Condenser (Std.)	Part of 7	....
9	Compensating Condenser (Police)	Part of 7	....
10	Compensating Condenser (S. W.)	Part of 7	....
11	Oscillator Transformer	32-1869	2.50
12	Compensating Condenser (Std.)	Part of 11	....
13	Compensating Condenser (Police)	Part of 11	....
14	Compensating Condenser	Part of 11	....
15	Condenser (.0047 mf.)	30-1052	.55
16	Compensating Condenser (L. F. Police)	31-6027	.70
17	Compensating Condenser (L. F. Std.)	Part of 16	....
18	Tuning Condenser	31-1526	2.75
19	Condenser (0.05 mf.)	30-4020	.20
20	Condenser (0.05 mf.)	30-4020	.20
21	Condenser (.000050 mf.)	30-1029	.20
22	Resistor (99,000 ohms)	6099	.20
23	Condenser (0.05 mf.)	30-4020	.20
24	Choke (R.F.)	32-1842	.50
25	Condenser (.00015 mf.)	30-1033	.25
26	Resistor (20,000 ohms)	33-1178	.20
27	Resistor (13,000 ohms)	8267	.20
28	Choke (Filter)	32-7215	.90
29	Condenser (0.05 mf.)	30-4020	.20

No.	Description	Part No.	List Price
30	Condenser (5.0 mf.)	30-2132	$0.70
31	Condenser (0.15-0.15 mf.)	6287-DU	.40
32	Resistor (2.0 meg.)	33-1025	.20
33	Condenser (0.05 mf.)	30-4020	.20
34	Compensating Condenser (1st I. F. Pri.)	Part of 35	....
35	I. F. Transformer (1st)	32-1843	1.50
36	Compensating Condenser (1st I. F. Sec.)	Part of 35	....
37	Resistor (170,000 ohms)	33-1191	.20
38	Condenser (0.02 mf.)	30-4215	.20
39	Condenser (.00011 mf.)	30-1031	.20
40	Condenser (0.02 mf.)	30-4124	.25
41	Resistor (2 meg.)	33-1025	.20
42	Condenser (0.05 mf.)	30-4020	.20
43	Condenser (0.05 mf.)	30-4020	.20
44	Resistor (300 ohms)	33-3010	.20
45	Resistor (1.0 meg.)	33-1096	.20
46	Resistor (1.0 meg.)	33-1096	.20
47	Resistor (1.0 meg.)	33-1096	.20
48	B. C. Resistor	38-7026	.30
49	Tone Control	30-4332	.75
50	Volume Control	33-5120	1.45
51	Condenser (0.02 mf.)	30-4215	.20
52	Resistor (25,000 ohms)	33-1013	.20
53	Condenser (0.02 mf.)	30-4215	.20
54	Condenser (.00011 mf.)	30-1031	.20
54A	Condenser (.00011 mf.)	30-1031	.20
55	Compensating Condenser (2nd I. F. Pri.)	Part of 56	....
56	2nd I. F. Transformer	32-1844	1.50
57	Compensating Condenser (2nd I. F. Sec.)	Part of 56	....
58	Input Transformer	3242	2.50
59	Output Transformer	32-7309	1.30
60	Speaker Cone Assembly (K-29)	36-3159	.80
	Field Coil Assembly	36-3407	3.25
	5 Prong Socket	27-6035	.11
	6 Prong Socket	27-6036	.11
	7 Prong Socket	27-6037	.11
	R. F. Shield Assembly	38-6938	.35
	Tube Shield Body	28-2726	.10
	Tube Shield Base	28-2725	.03
	Pilot Lamp	34-2068	.16
	Dial	27-5098	.25
	Hub and Set Screw Assembly	31-1550	.15
	Spring Clamp	28-2837	.10
	Speaker Cable	L-1885	.25
	Bezel	28-3163	.50
	Bezel Glass	27-8006	.55
	Bezel Gasket	27-7980	.01
	Bezel Frame Gasket	27-7971	.02
	Knob (Station Selector)	27-4206	.12
	Knob (Fine Tuning)	27-4207	.10
	Knob (Volume Control, Tone Control)	27-4208	.10
	Knob (Wave Band Switch)	27-4225	.10

MODEL 642
Schematic

PHILCO RADIO & TELEV. CORP.

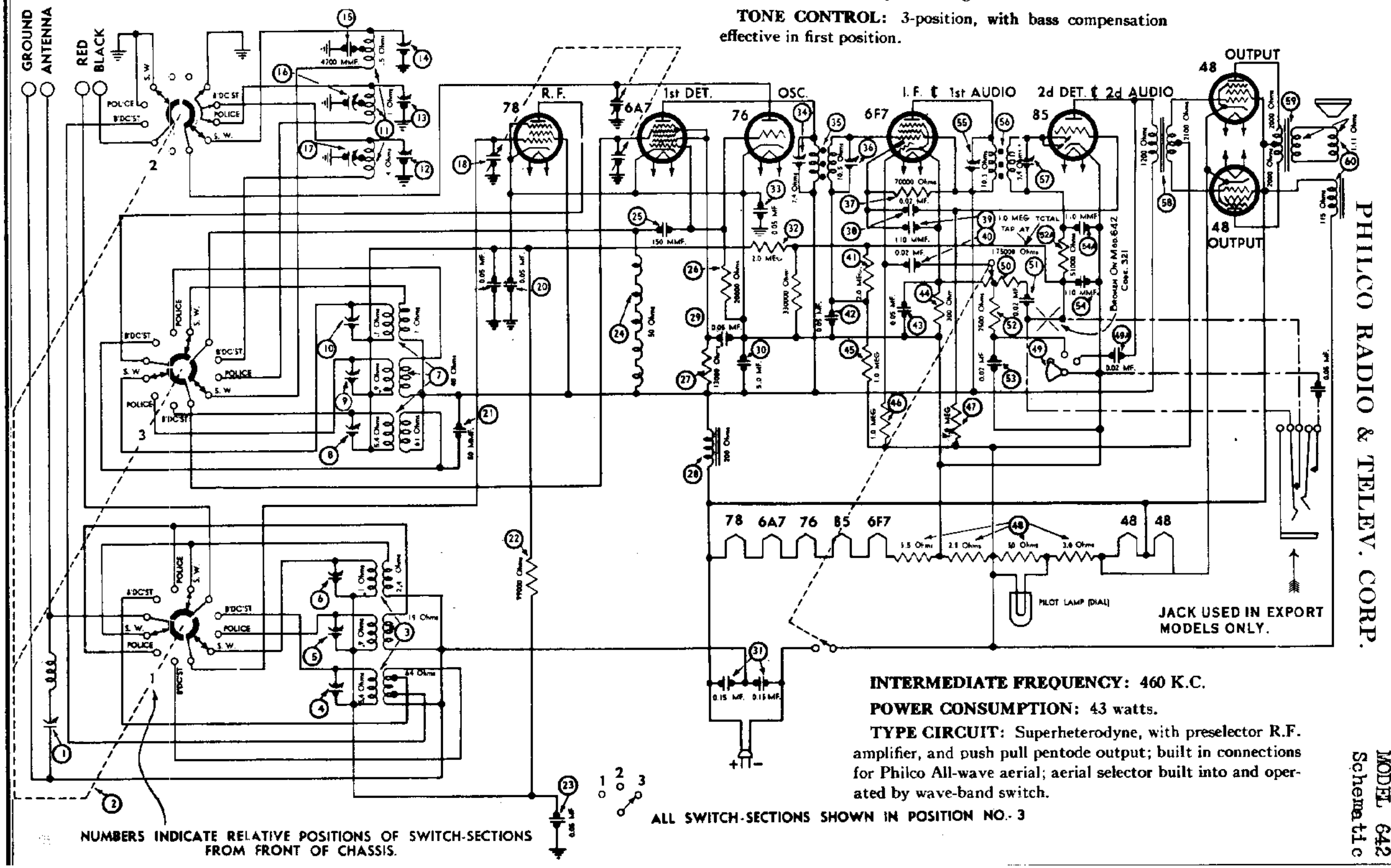
POWER SUPPLY: Direct Current, 32 volt.

WAVE BANDS: Three—(1) standard (with some Police); (2) Police, Aircraft and Amateur; (3) Short-wave.

COVERAGE OF EACH BAND: Band 1, 540-1750 K.C.; Band 2, 1750 to 5800 K.C. (1.75-5.8 megacycles); Band 3, 5700-18000 K.C. (5.7 to 18.0 megacycles).

TUNING DRIVE: Two-speed gear drive, ball bearing. 50 to 1 ratio for slow-speed tuning.

TONE CONTROL: 3-position, with bass compensation effective in first position.



INTERMEDIATE FREQUENCY: 460 K.C.

POWER CONSUMPTION: 43 watts.

TYPE CIRCUIT: Superheterodyne, with preselector R.F. amplifier, and push pull pentode output; built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

MODEL 642
Voltage, Socket
Trimmers, Alignment

PHILCO RADIO & TELEV. CORP.

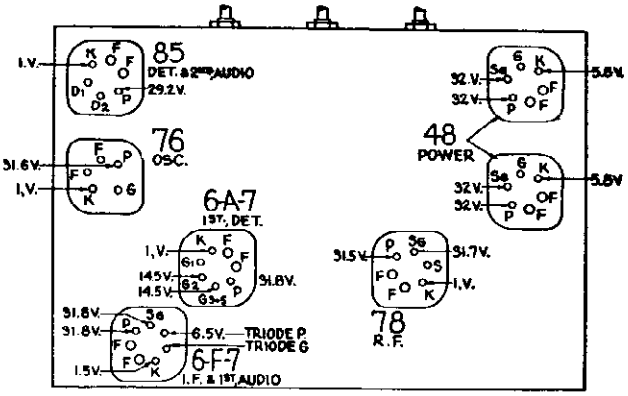


Fig. 1. Tube Sockets as viewed from bottom and Voltage Measurements

Above voltages were obtained by using a PHILCO type 025 Circuit Tester (or 048A All purpose Tester), using test prods applied to underside of chassis. Volume control at minimum; dial at 55; waveband switch counter-clockwise (band 1). Use Fig. 1 for test points. Line voltage 32 volts.

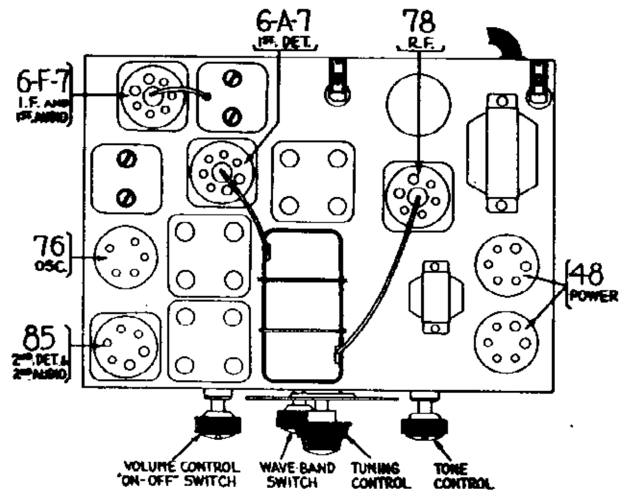


Fig. 2. Location of Tubes (Top View)

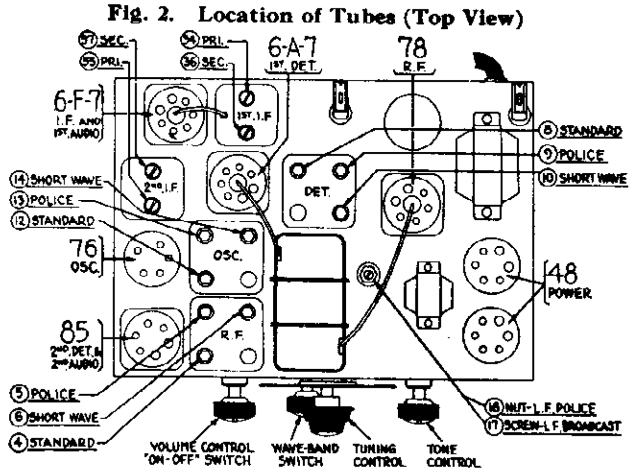


Fig. 5. Location of Compensating Condensers

Adjusting Compensating Condensers

The adjustment of the compensating condensers in Model 642 requires a signal generator covering the broadcast and police band, and also one capable of producing a signal at certain frequencies in the short wave band. Philco Model 088 All-wave signal generator is ideal for these requirements. The location of all compensating condensers is shown in Fig. 5. An output meter is also needed, such as the Philco Model 025.

Adjustment of I. F.

I. F. ADJUSTMENTS: Set the signal generator at 460 K.C. with attenuator set at minimum, and attach its antenna lead to the grid of the 6F7 I. F. amplifier tube (removing grid cap). Connect ground lead to ground terminal on set. Set the dial at 55 and turn the waveband switch to position 1 (standard). Adjust the volume control of set to almost maximum (just before oscillator hiss becomes noticeable), and the signal generator attenuator so that about one-fourth (1/4) scale reading is had on the output meter. With a fibre screw driver adjust condensers (56) and (57) (2nd I. F.) for maximum reading on output meter. Turn attenuator of signal generator to minimum and remove its antenna lead from the grid of the 6F7 I. F. tube, replacing grid cap. Then place the antenna lead on the grid of the 6A7. Adjust attenuator as before, then proceed to adjust condensers (54) and (55) (1st I. F.) for maximum reading. Care should be taken to keep the output meter reading during adjustments at about one-fourth scale reading. This should be done by using the signal generator attenuator control.

Adjustment of Wave-Trap

1. Connect the signal generator leads to the antenna and ground terminals of the receiver.

2. With the wave-band switch of the receiver still in the extreme left (standard band), (540-1750 K.C.), turn the station selector to 55.

3. With the signal generator in operation at 460 K.C., adjust the wave-trap (1) condenser until a MINIMUM reading is obtained on the output meter. The Philco fibre wrench, part No. 3164, is used for this adjustment. The wave-trap compensator is reached from rear of chassis.

Adjustment of R. F., Oscillator and Detector Stages

1. **SHORT WAVE:** Connect the antenna lead of the signal generator to the grid of the 78 R.F. tube (removing grid clip), and the ground lead to the ground terminal of the set. Set the signal generator dial at 18.0 MC. Turn waveband switch to position 3. Turn the set dial to 18.0 MC. Turn condenser (10) one-half turn from tight. Adjust condenser (14) for maximum output. Turn the set dial and signal generator dial to 6.0 MC and adjust condenser (10) for maximum reading.

Remove the signal generator antenna lead from the 78 grid (replacing grid clip) and connect to the antenna post of the set.

Tune the set and signal generator back to 18.0 MC and adjust condenser (6) for maximum output. Check image frequency at approximately 17.1 MC.

2. **POLICE:** Turn the waveband switch to position 2 and tune the set and signal generator to 5.5 MC. Adjust condensers (5), (9) and (13) for maximum output. Next tune the set and signal generator to 1800 K.C. and adjust condenser (18) (Nut) for maximum output. Tune the set and signal generator again to 5.5 MC and re-adjust condenser (13) for maximum output.

3. **STANDARD:** Throw waveband switch to position 1. Tune the set and signal generator to 1500 K.C. Adjust condensers (4), (8) and (12) for maximum output. Next tune the set and signal generator to 580 K.C. and adjust condenser (17) (Screw) for maximum output. Readjust the set at 1500 K.C. by tuning condenser (12) for maximum output.

MODEL 821P
Schematic, Chassis
Parts

PHILCO RADIO & TELEV. CORP.

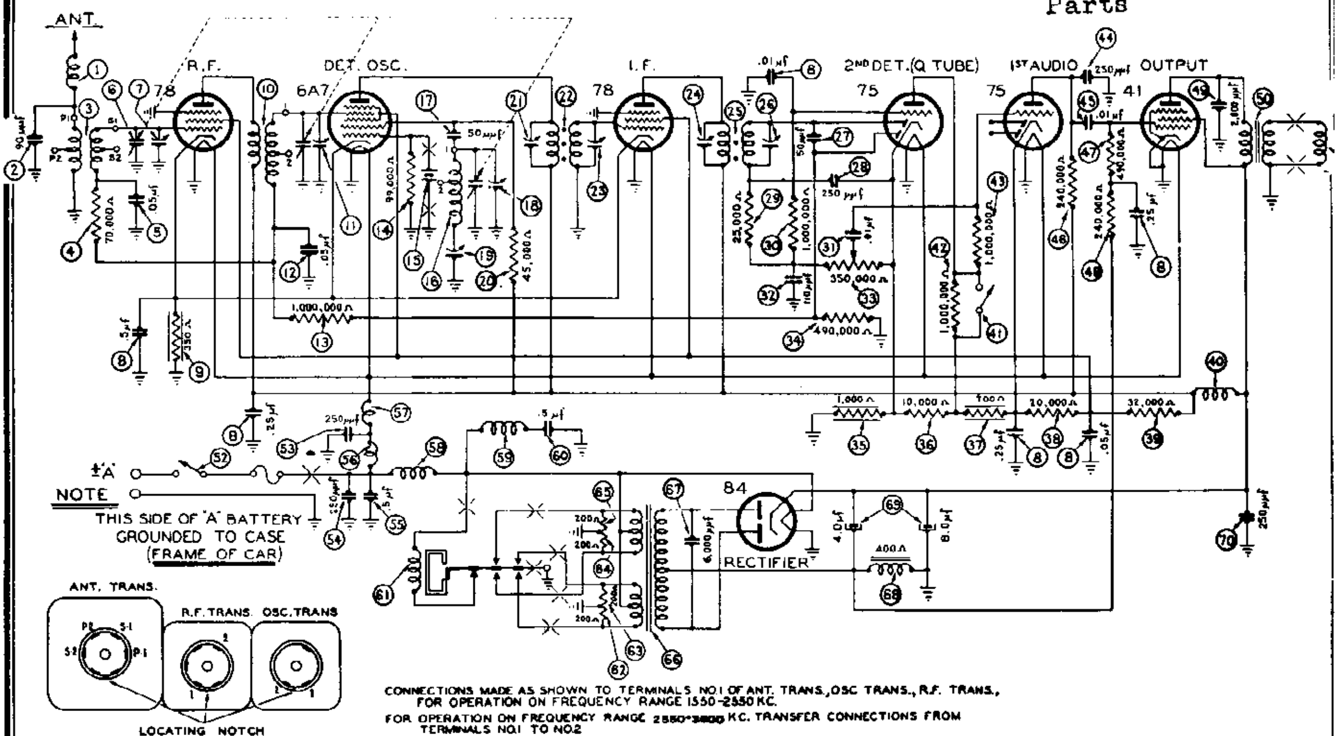


Figure 3

PARTS LIST — MODEL 821P

No.	Description	Part No.
1	Antenna Choke	38-8697
2	Condenser (90 mmfd.)	30-1046
3	Antenna Transformer	32-2605
4	Resistor (70,000 ohms)	33-370344
5	Condenser (.05 mfd.)	30-4444
6	Tuning Condenser	31-2046
7	First Padder (on Tun. Cond.)	
8	Condenser (.01-.05-.25-.25-.5 mfd.)	30-4526
9	Resistor (350 ohms)	33-1241
10	R. F. Transformer	32-2596
11	Second Padder (on Tun. Cond.)	
12	Condenser (.05 mfd.)	3615-0SU
13	Resistor (1,000,000 ohms)	33-510344
14	Resistor (99,000 ohms)	33-399344
15	Crystal (821P)	
	1875 K. C.	45-2101
	Frequencies 1596-1610-1626 K.C.	
	1908 K. C.	45-2194
	Frequencies 1630-1634-1642-1650 1658-1666 K.C.	
	1953 K. C. Crystal	45-2195
	Frequencies 1674-1683-1690 1698-1706-1712 K. C.	
	2578 K. C.	45-2251
	Frequencies 2310-2318-2326 2334 K. C.	
	2618 K. C. Crystal	45-2231
	Frequencies 2342-2350-2358 23-66-2374 K. C.	
	2658 K.C. Crystal	45-2196
	Frequencies 2382-2390-2398 2406-2414 K.C.	
	2696 K.C. Crystal	45-2197
	Frequencies 2422-2430-2442 2450 K.C.	
	2734 K.C. Crystal	45-2198
	Frequencies 2458-2466-2474 2482-2490 K.C.	
	3000 K. C. Crystal	45-2230
	Frequencies 2726 K. C.	
	3360 K. C. Crystal	45-2496
	Frequencies 3105 K. C.	
16	Oscillator Transformer	32-2597
17	Condenser (50 mmfd.)	30-1029
18	Third Padder (on Tun. Cond.)	
19	Low Frequency Padder	31-6079
20	Resistor (45,000 ohms)	33-345344
21	Padder (Pri. 1st I.F. Trans.)	
22	First I. F. Transformer	32-2026
23	Padder (Sec. 1st I.F. Trans.)	
24	Padder (Pri. 2nd I.F. Trans.)	
25	Second I. F. Transformer	32-2027
26	Padder (Sec. 2nd I.F. Trans.)	
27	Condenser (50 mmfd.)	30-1029
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Resistor (1,000,000 ohms)	33-510344
31	Condenser (.01 mfd.)	3903-0SU
32	Condenser (110 mmfd.)	30-1031
33	Volume Control (350,000 ohms)	33-5148
34	Resistor (490,000 ohms)	33-449344
35	Resistor (1,000 ohms)	33-210344
36	Resistor (10,000 ohms)	33-310344
37	Resistor (700 ohms)	33-1220
38	Resistor (20,000 ohms)	33-320344
39	Resistor (32,000 ohms)	33-332434
40	"B" Choke	32-1281
41	Sensitivity Switch	42-1140
42	Resistor (1,000,000 ohms)	33-510344
43	Resistor (1,000,000 ohms)	33-510344
44	Condenser (250 mmfd.)	30-1032
45	Condenser (.01 mfd.)	3903-0SU
46	Resistor (240,000 ohms)	33-424344
47	Resistor (490,000 ohms)	33-449344
48	Resistor (240,000 ohms)	33-424344
49	Condenser (2,000 mmfd.)	30-4177
50	Output Transformer	32-7831
51	Complete Speaker (DR-4)	36-1342
52	On & Off Switch	42-1188
53	Condenser (250 mmfd.)	30-1032
54	Condenser (250 mmfd.)	30-1032
55	Condenser (.5 mfd.)	30-4015
56	"A" Choke	32-1604
57	Filament Choke	32-2535
58	Vibrator Choke	32-2039
59	Choke	32-1374
60	Condenser (.5 mfd.)	30-4015
61	Vibrator	41-3315-3
62	Resistor (200 ohms)	33-120344
63	Resistor (200 ohms)	33-120344
64	Resistor (200 ohms)	33-120344
65	Resistor (200 ohms)	33-120344
66	Power Transformer	32-7820
67	Condenser (6,000 mmfd.)	30 4512
68	Filter Choke	32-7545
69	Filter Condenser (4-8 mfd.)	30-2150
70	Condenser (250 mmfd.)	30-1032
	Control Assembly	42-5591

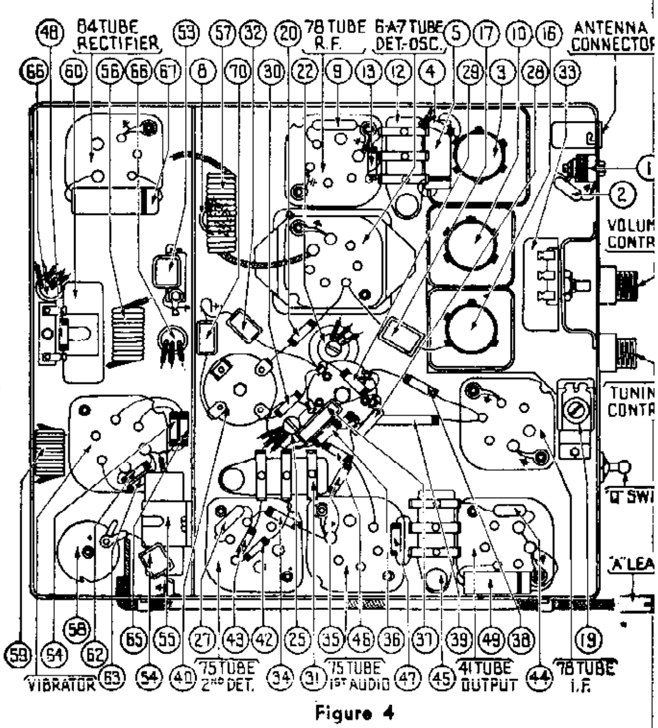


Figure 4

No.	Description	Part No.	Description	Part No.
	Volume Shaft	28-8620	Speaker Clamp	28-3131
	Volume Knob	27-4208	Clamp Nut	W-124
	Antenna Lead	41-3191	Fuse	7227
	Four Prong Socket	27-6044	Fuse Insulator	27-7729
	Five Prong Socket	27-6035	Receiver Mtg. Plate	28-4650
	Six Prong Socket	27-6036	Receiver Housing	38-8777
	Seven Prong Socket	27-6037		

MODEL 821P
Alignment
Trimmers

PHILCO RADIO & TELEV. CORP.

The Model 821P, in addition to utilizing all the precautions requisite for circuit stability, uses a sealed, precision QUARTZ CRYSTAL to control the oscillator circuit and hold it on the required frequency. This feature is indispensable in any fixed frequency Receiver used for emergency service

The Receivers, when used with the proper crystals, can be adjusted for any specified frequency between 1550 K.C. and 3600 K.C. Different crystals are used to obtain these frequencies. The crystal frequency, however, is no indication of the Receiver frequency adjustment.

FREQ. OF CRYSTAL	RECEIVER FREQ.	PART No. CRYSTAL
1875 K.C.	1596-1610-1626 K.C.	45-2101
1908 K.C.	1630-1634-1642 1650-1658-1666 K.C.	45-2194
1953 K.C.	1674-1683-1690 1698-1706-1712 K.C.	45-2195
2578 K.C.	2310-2318-2326-2334 K.C.	45-2251
2618 K.C.	2342-2350-2358-2366-2374 K.C.	45-2231
2658 K.C.	2382-2390-2398 2406-2414 K.C.	45-2196
2696 K.C.	2422-2430-2442 2450 K.C.	45-2197
2734 K.C.	2458-2466-2474 2482-2490 K.C.	45-2198
3000 K.C.	2726 K.C.	45-2230
3360 K.C.	3105 K.C.	45-2496

The I. F. stages can be tuned to any frequency between 242 K.C. and 278 K.C.

The I. F. frequency used in each Receiver is the difference between the frequency of the crystal in the Receiver and the frequency of the transmitter, i.e., the transmitter frequency is 2422 K.C., the crystal used is 2696 K.C., the difference is 274 K.C., which is the frequency to which the I. F. amplifier must be tuned.

The Receiver must be padded while warm and repadded after it has been operated for several hours.

The Receiver "Q" switch must be in the off position, cutting out the carrier relay circuit.

I. F. STAGES — The signal generator must be set exactly to the predetermined frequency and the generator lead connected to the grid cap of the 6A7 detector oscillator tube in series with a .1 mfd. condenser. Adjust padders (21), (23), (24) and (26) on the first and second I. F. transformers for maximum reading on the output meter.

R. F. STAGE — Tune the signal generator to the frequency of the transmitter and connect the output of the signal generator to the grid cap of the R. F. tube in series with a .1 mfd. condenser. Turn the tuning condenser to the input frequency and adjust padders (18) and (11) for maximum reading on the output meter. Notice the position of the padders. They should be out as far as possible, yet with sufficient tension to keep them firmly in place. If the padders are too tight, turn the tuning condenser plates in mesh slightly and repad (18) and (11). If the padders are too loose, turn the tuning condenser plates out of mesh slightly and repad (18) and (11). Repeat these adjustments until the correct padding settings are obtained.

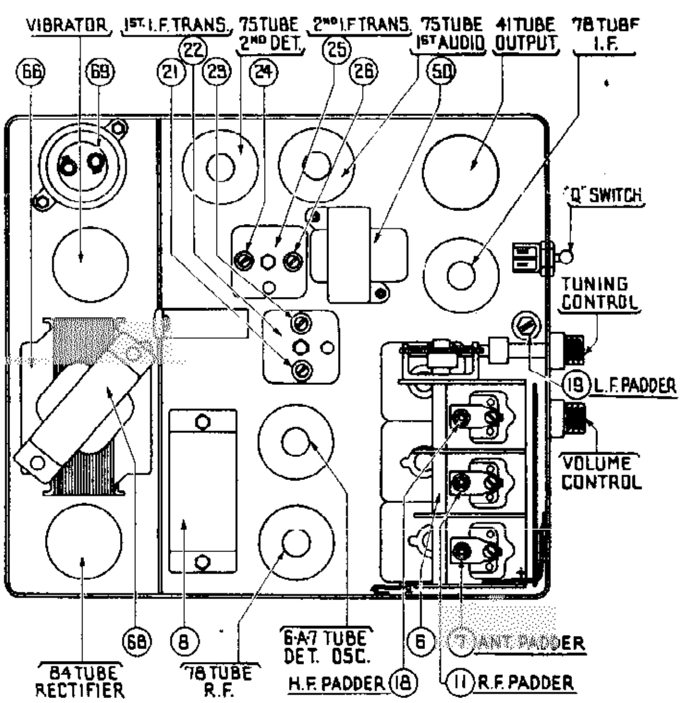
The low frequency padder (19) must be adjusted to a position where padders (11) and (18) are not too tight or too loose, i.e., if padder (18) is too tight and padder (11) too loose, turn the tuning condenser plates out of mesh slightly and screw in a little on padder (19). If padder (18) is too loose and padder (11) too tight, turn the tuning condenser plates in mesh slightly and loosen the padder (19) somewhat.

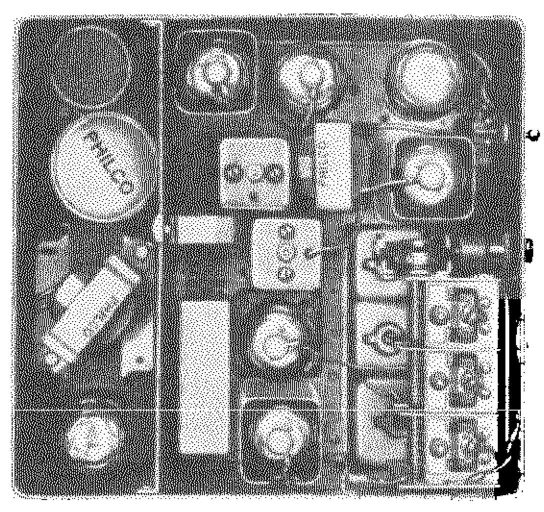
For any given frequency padder (19) should be screwed in almost tight (approximately a ½ to ¾ of a turn from tight) for best results and at the same time obtain the correct tuning condenser setting and adjustments of padders (11) and (18).

Special attention must be given to the adjustment of the oscillator padder (18), which should be backed off the peak slightly to obtain stable crystal operation.

ANTENNA STAGE — Connect the antenna lead, Part No. 41-3191, to the antenna receptacle on the Receiver in series with a 55 mmfd. condenser and set the signal generator to the frequency of the transmitter. Adjust padders (7), (21), (23), (24) and (26) for maximum reading on the output meter.

DO NOT OPEN THE CRYSTAL HOLDER. If for any reason whatever it has been opened, the crystal plates should be very carefully cleaned with carbon tetrachloride. After cleaning, the crystal must not be touched by the fingers. Use a clean cloth for handling.

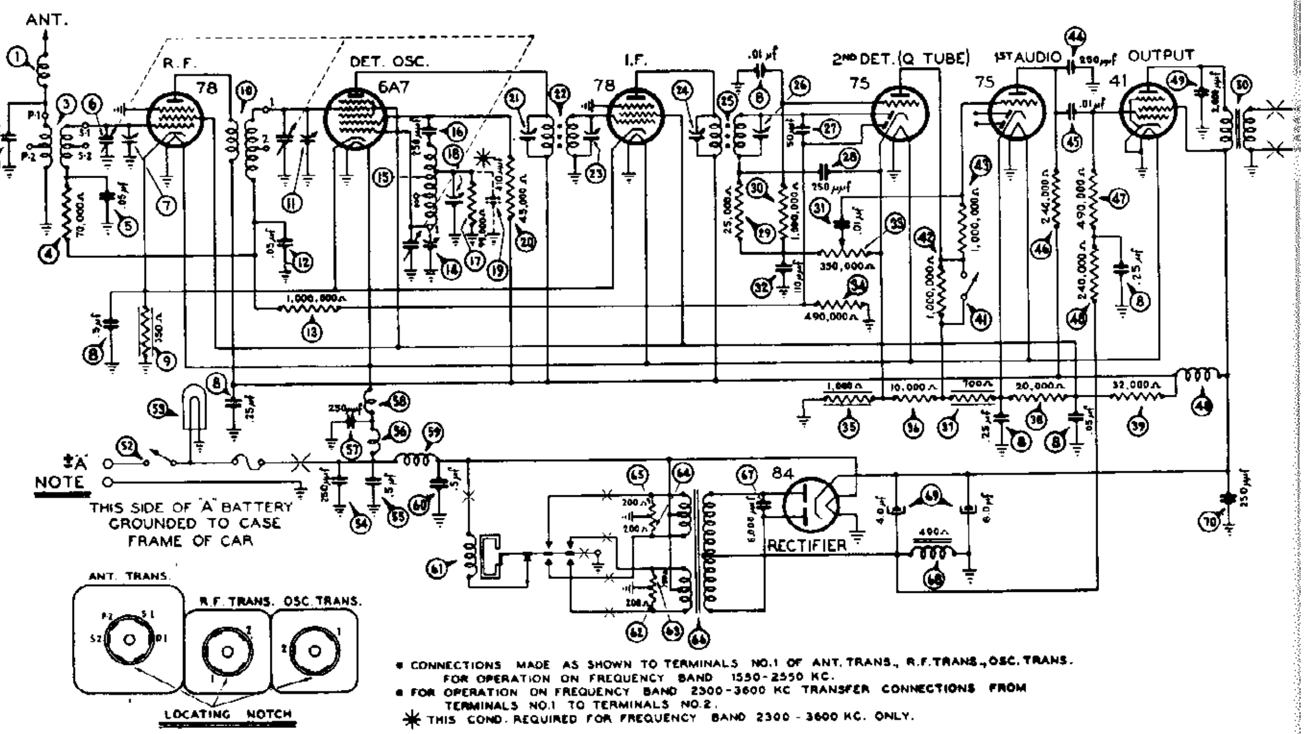




JULY, 1937

Figure 5 — Model 821P Top View

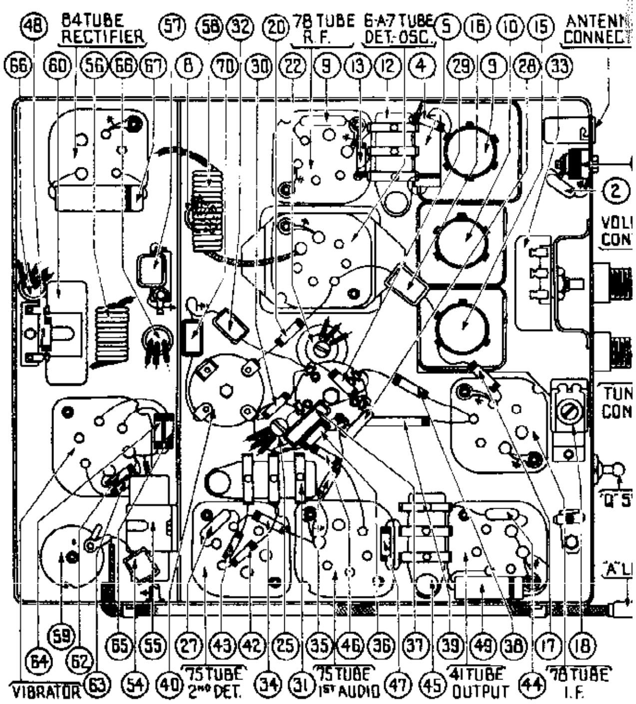
PHILCO RADIO & TELEV. CORP.



I.F.=260 KC

PARTS LIST — MODEL 821PV

No.	Description	Part No.
1	Antenna Choke	38-8697
2	Condenser (90 mmfd.)	30-1046
3	Antenna Transformer	32-2605
4	Resistor (70,000 ohms)	33-370344
5	Condenser (.05 mfd.)	30-4444
6	Tuning Condenser	31-2031
7	First Padder (on Tun. Cond.)	
8	Condenser (.01-.05-.25-.25-.5 mfd.)	30-4526
9	Resistor (350 ohms)	33-1241
10	R. F. Transformer	32-2596
11	Second Padder (on Tun. Cond.)	
12	Condenser (.05 mfd.)	3615-0SU
13	Resistor (1,000,000 ohms)	33-510344
14	Third Padder (on Tun. Cond.)	
15	Oscillator Transformer	32-2598
16	Condenser (250 mmfd.)	30-1032
17	Resistor (99,000 ohms)	33-399344
18	Low Frequency Padder	31-6079
19	Condenser (410 mmfd.)	30-1093
20	Resistor (45,000 ohms)	33-345344
21	Padder (Pri. 1st I.F. Trans.)	
22	First I. F. Transformer	32-2026
23	Padder (Sec. 1st I.F. Trans.)	
24	Padder (Pri. 2nd I.F. Trans.)	
25	Second I. F. Transformer	32-2027
26	Padder (Sec. 2nd I.F. Trans.)	
27	Condenser (50 mmfd.)	30-1029
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Resistor (1,000,000 ohms)	33-510344
31	Condenser (.01 mfd.)	3903-0SU
32	Condenser (110 mmfd.)	30-1031
33	Volume Control (350,000 ohms)	33-5148
34	Resistor (490,000 ohms)	33-449344
35	Resistor (1,000 ohms)	33-210344
36	Resistor (10,000 ohms)	33-310344
37	Resistor (700 ohms)	33-1220
38	Resistor (20,000 ohms)	33-320344
39	Resistor (32,000 ohms)	33-532434
40	"B" Choke	32-1281
41	Sensitivity Switch	42-1140
42	Resistor (1,000,000 ohms)	32-510344
43	Resistor (1,000,000 ohms)	33-510344
44	Condenser (250 mmfd.)	30-1032
45	Condenser (.01 mfd.)	3903-0SU
46	Resistor (240,000 ohms)	33-424344
47	Resistor (490,000 ohms)	33-449344
48	Resistor (240,000 ohms)	33-424344
49	Condenser (2,000 mmfd.)	30-4177
50	Output Transformer	32-7831
51	Complete Speaker (DR-4)	36-1342
52	On & Off Switch	42-1318
53	Pilot Lamp	34-2040
54	Condenser (250 mmfd.)	30-1032
55	Condenser (.5 mfd.)	30-4015
56	"A" Choke	32-1604
57	Condenser (250 mmfd.)	30-1032
58	Filament Choke	32-2535
59	Vibrator Choke	32-2039
60	Condenser (.5 mfd.)	30-4015
61	Vibrator	41-3315-3
62	Resistor (200 ohms)	33-120344
63	Resistor (200 ohms)	33-120344
64	Resistor (200 ohms)	33-120344
65	Resistor (200 ohms)	33-120344
66	Power Transformer	32-7820
67	Condenser (6,000 mmfd.)	30-4512
68	Filter Choke	32-7545
69	Filter Condenser (4-8 mfd.)	30-2150
70	Condenser (250 mmfd.)	30-1032
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Speaker Clamp	28-3131
	Clamp Nut	W-124
	Control Assembly	42-5739
	Scale Assembly	42-5736
	Tuning & Volume Shaft	28-8740
	Pilot Lamp Assembly	38-7734
	Tuning & Volume Knob	27-4521
	Switch Lever Knob	27-4525
	Antenna Lead	41-3191
	Fuse	7227
	Fuse Insulator	27-7729
	Receiver Mtg. Plate	28-4650
	Receiver Housing	38-8777



MODEL 821PV
Alignment, Trimmers
Notes
MODEL 821P Notes

PHILCO RADIO & TELEV. CORP.

MODELS 821PV

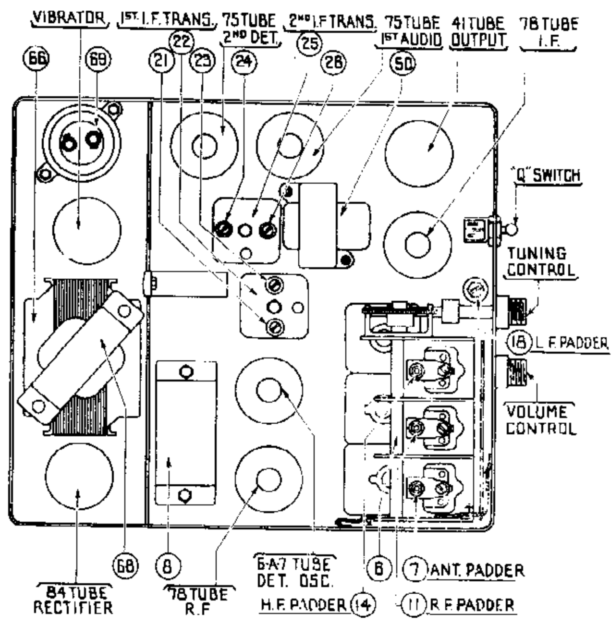
OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	*260 K. C.	To Grid of 78 Tube—I.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection. Turn Tuning Condenser Plates out of mesh as far as they will go	24 - 26
2	*260 K. C.	To Grid of 6A7 Tube	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection. Turn Tuning Condenser Plates out of mesh as far as they will go	21 - 23 24 - 26
FOR FREQUENCIES BETWEEN 1550 K.C. AND 2550 K.C.					
3	*2550 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection. Turn Tuning Condenser Plates out of mesh as far as they will go	14 - 11
4	*1650 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection. Turn Tuning Condenser to 1650 K. C.	18 Note 1
5	*2550 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection. Turn Tuning Condenser Plates out of mesh as far as they will go	14
6	*2400 K. C.	Note 2	55 Mmfd. Condenser Note 2	Turn Tuning Condenser to 2400 K. C.	7 - 11
FOR FREQUENCIES BETWEEN 2550 K.C. AND 3600 K.C.					
7	*3600 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection. Turn Tuning Condenser Plates out of mesh as far as they will go	14 - 11
8	*2400 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection. Set Tuning Condenser at 2400 K. C.	18 Note 1
9	*3600 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection. Turn Tuning Condenser Plates out of mesh as far as they will go	14
10	*3400 K. C.	Note 2	55 Mmfd. Condenser Note 2	Set Tuning Condenser at 3400 K. C.	7 - 11

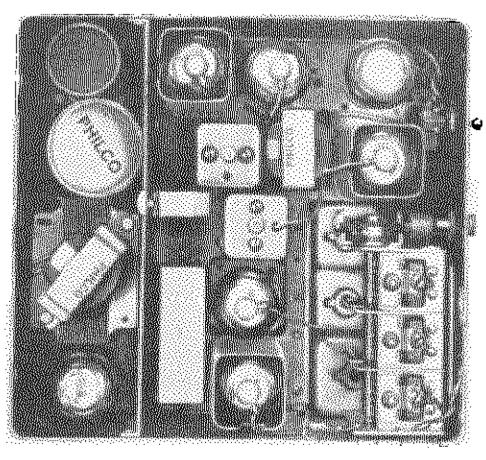
Adjust for maximum reading on the output meter.

NOTE 1—Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then re-adjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 2—Connect the antenna lead, Part No. 41-3191, to the antenna receptacle on the Receiver in series with a 55 mmfd. condenser.

* The Receiver "Q" switch must be in the off position, cutting out the carrier relay circuit.





JULY 1937

Figure 8 — Model 821PV Top View

RECEIVER FREQUENCY RANGE

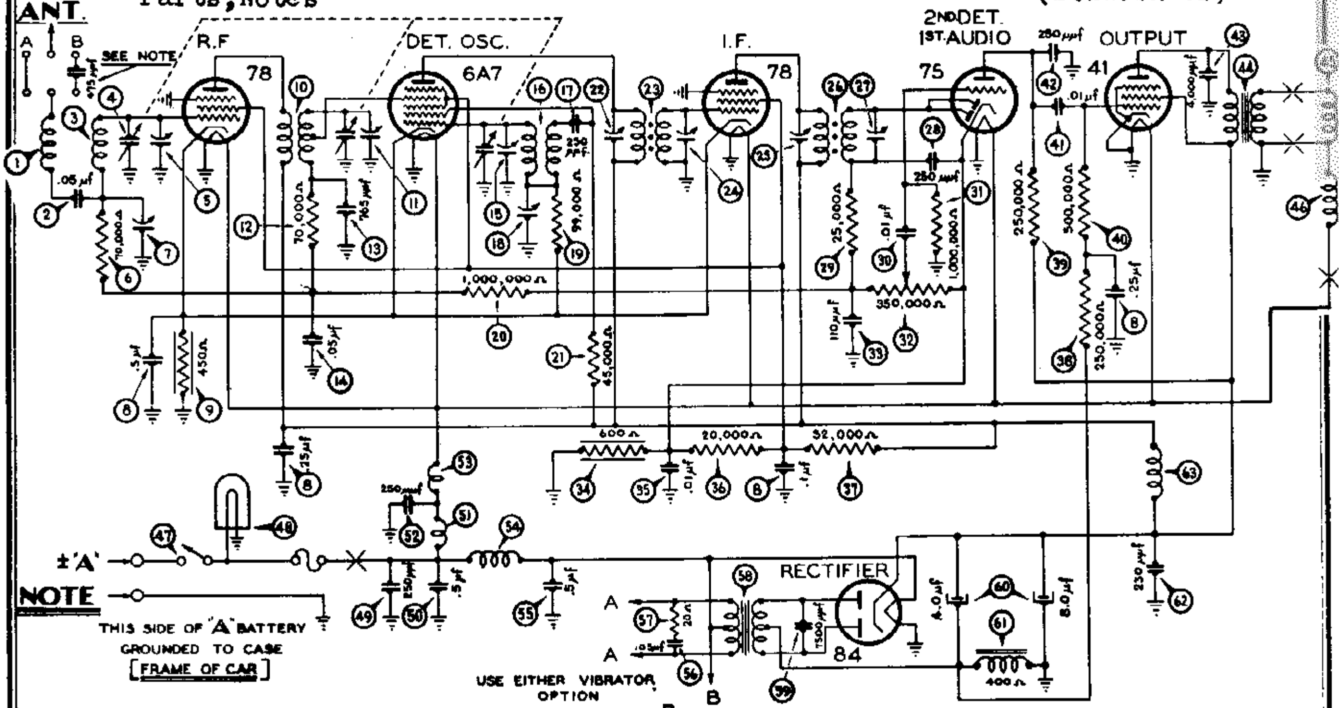
The Model 821P is a fixed frequency, crystal controlled Receiver designed for the medium high frequencies. These are the frequencies used by the Municipal Police, State Police, Marine Fire, Geophysical and Temporary Service and the Forestry, Forest Fire Control, Flood Control, National Park Service, Coast Guard Service, etc. (1550 K. C. to 3600 K. C.).

The Model 821PV is a variable frequency Receiver, designed for use in these same services when it is necessary to receive signals from transmitters operating on different frequencies within these bands. The Model 821PV normally covers the frequency band of 1550 K.C. to 2550 K.C. It can be obtained for use on the higher frequencies, 2300 K.C. to 3600 K.C., on special order at a slight increase in cost.

Schematic, Chassis Parts, Notes

PHILCO RADIO & TELEV. CORP.

MODELS 826, S-1416 (Studebaker)



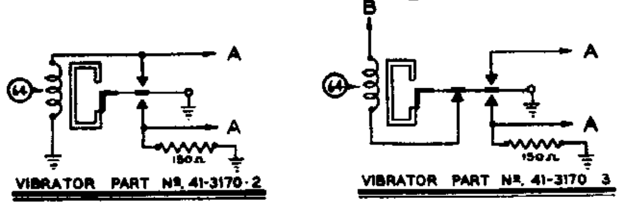


Figure 1

FEBRUARY 1937

I.F.=260 KC

NOTE: When the Receiver is installed in a car having a top antenna, under-car antenna, spare wheel antenna or antenna having a simil low relative capacitance (50 mmf. to 450 mmf.) use connector plug in "A".

When the Receiver is installed in a car having a metal insert top antenna, insulated door antenna, insulated trunk cover antenna antenna having similarly high relative capacitance (450 mmf. to 2500 mmf.) use condenser plug in "B".

MODEL 826 PARTS LIST

No.	Description	Part No.
1	Antenna Choke	38-8532
2	Condenser (.05 mfd.)	30-4444
3	Antenna Transformer	32-2516
4	Tuning Condenser	31-1930
5	First Padder (on Tun. Cond.)	
6	Resistor (70,000 ohms)	33-370344
7	Antenna Compensator Condenser	31-6082
8	Condenser (.1-.25-.25-.5 mfd.)	30-4415
9	Resistor (450 ohms)	33-1218
10	R. F. Transformer	32-2307
11	Second Padder (on Tun. Cond.)	
12	Resistor (70,000 ohms)	33-370344
13	Condenser (765 mmfd.)	30-1069
14	Condenser (.05 mfd.)	3615-0SG
15	Third Padder (on Tun. Cond.)	
16	Oscillator Transformer	32-2308
17	Condenser (250 mmfd.)	30-1032
18	Low Frequency Padder	31-6102
19	Resistor (99,000 ohms)	33-399344
20	Resistor (1,000,000 ohms)	33-510344
21	Resistor (45,000 ohms)	33-345344
22	Padder (Pri. 1st I. F. Trans.)	
23	First I. F. Transformer	32-2026
24	Padder (Sec. 1st I. F. Trans.)	
25	Padder (Pri. 2nd I. F. Trans.)	
26	Second I. F. Transformer	32-2027
27	Padder (Second 2nd I. F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (.01 mfd.)	3903-0SU
31	Resistor (1,000,000 ohms)	33-510344
32	Volume Control (350,000 ohms)	33-5148
33	Condenser (110 mmfd.)	30-1031
34	Resistor (600 ohms)	33-1212
35	Condenser (.01 mfd.)	3903-0SG
36	Resistor (20,000 ohms)	33-320344
37	Resistor (32,000 ohms)	33-332434
38	Resistor (250,000 ohms)	33-424344
39	Resistor (250,000 ohms)	33-424344
40	Resistor (500,000 ohms)	33-449344
41	Condenser (.01 mfd.)	3903-0SU
42	Condenser (250 mmfd.)	30-1032
43	Condenser (4000 mmfd.)	30-4185
44	Output Transformer	32-7495
45	Cone & Voice Coil	36-3526
46	Field Coil Assembly	32-9236
47	On & Off Switch	42-1318
	Complete Speaker	36-1279
48	Pilot Lamp	34-2040
49	Condenser (250 mmfd.)	30-1032
50	Condenser (.5 mfd.)	30-4015
51	"A" Choke	32-1604
52	Condenser (250 mmfd.)	30-1032
53	Filament Choke	32-2535
54	Vibrator Choke	32-2039
55	Condenser (.5 mfd.)	30-4015
56	Condenser (.05 mfd.)	30-4444
57	Resistor (20 ohms)	33-020344
58	Power Transformer	32-7550
59	Condenser (7500 mmfd.)	30-4420
60	Filter Condenser (4-8 mfd.)	30-2150
61	Filter Choke	32-7545
62	Condenser (250 mmfd.)	30-1032
63	"B" Choke	32-1281
64	Vibrator (Optional)	41-3170-2 41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Tuning & Volume Knob	27-4521
	On & Off Knob	27-4525
	Pilot Lamp Assembly	38-7734
	Scale Assembly	42-5714
	Tuning & Volume Shaft	28-8740
	Control Assembly	42-5713
	Distributor Resistor	33-1196
	Interference Condenser	30-4007
	Antenna Condenser	30-4412
	Antenna Connector	28-6423
	Insulator	27-8199
	Fuse	7227
	Fuse Insulator	27-7729
	Tee Bolt	28-6161
	Nut	W518
	Receiver Housing	38-8562

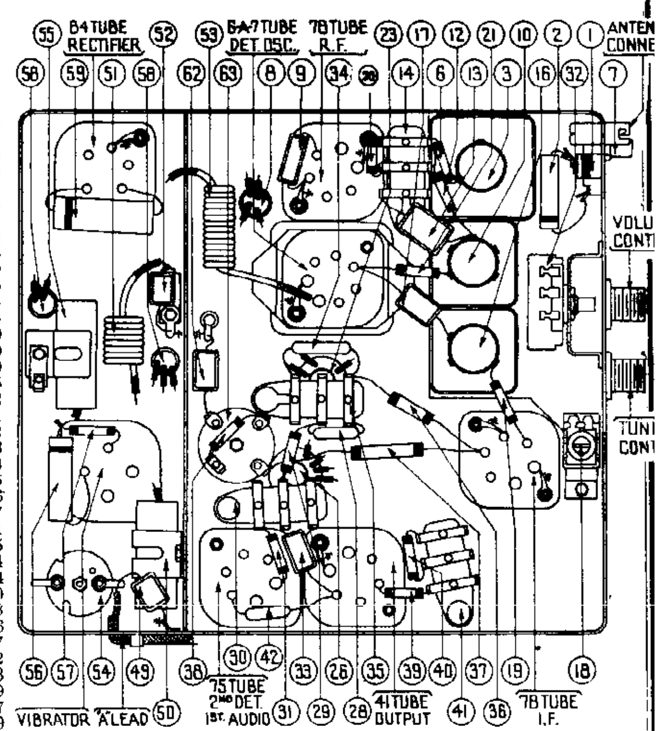


Figure 2

The circuit of the Model S-1416 is similar to the Model 826 with the following exception: The Model S-1416 does not use a condenser plug or connector plug in the Antenna connector on the Receiver. The Antenna connect changed so that this is not necessary.

MODELS 826,827,S1416
Socket,Trimmers
Alignment

PHILCO RADIO & TELEV CORP.

I. F. TRANSFORMERS AND PADDERS

The I. F. Transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 4).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 3.

FIGURE 3

If replacements are ever necessary, replace the entire coil assembly, 32-2026 for the first I. F. stage and 32-2027 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A or 099 Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR — With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F. — Set the signal generator at exactly 260 K.C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder (27) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (25) for maximum reading. (See Figure 4 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder (24) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (22) for maximum reading. Readjust padders (25) and (27) with the generator lead connected to the type 6A7 tube. (See Figure 4 for location of padders).

HIGH FREQUENCY AND R. F. After padding the first I. F. stage remove the generator lead from the 6A7 tube.

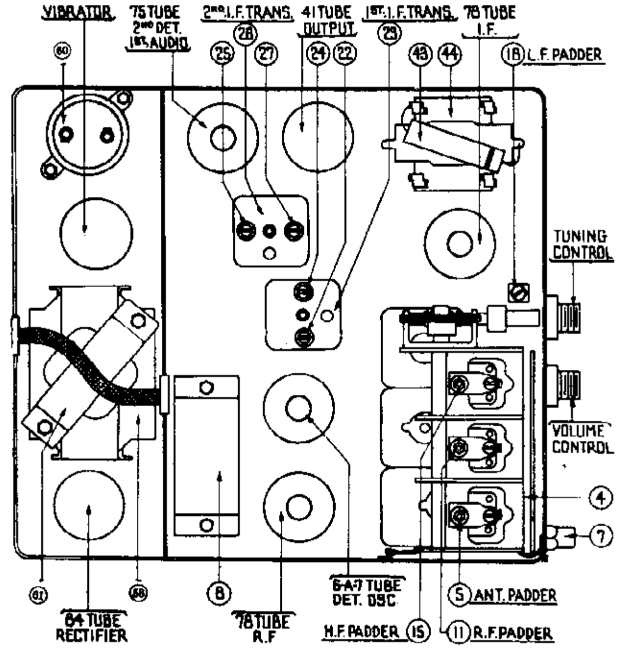
Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Turn the tuning condenser plates out of mesh as far as they will go.

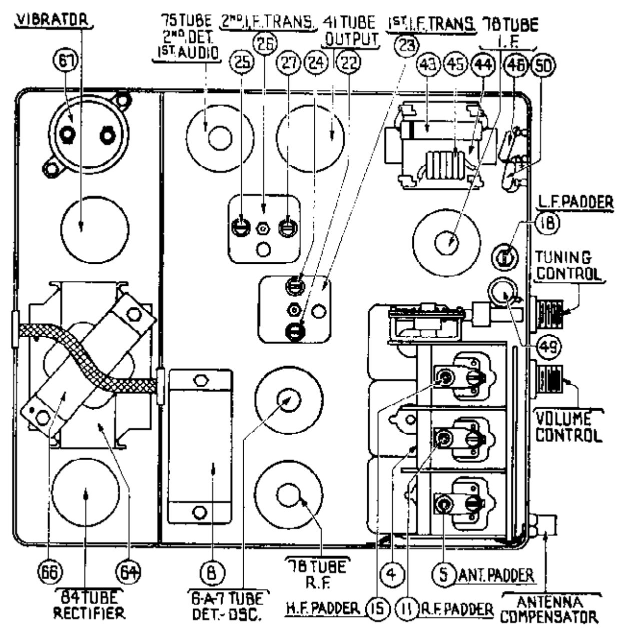
With the tuning condenser in this position, adjust the high frequency padder (15) and the R. F. padder (11) until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

LOW FREQUENCY—Turn the tuning condenser plates in mesh to approximately 580 K. C., 58 on the dial scale and set the signal generator at 580 K. C. Roll the tuning condenser and adjust the low frequency padder screw (18) for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder (15) again for maximum reading on the output meter.



MODEL 826 — S-1416 FIGURE 4



MODEL 827 FIGURE 4

Remove the generator lead from the 78 R. F. tube.

ANTENNA—WHEN PADDING THE ANTENNA STAGE IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE CONSTRUCTED AND USED.

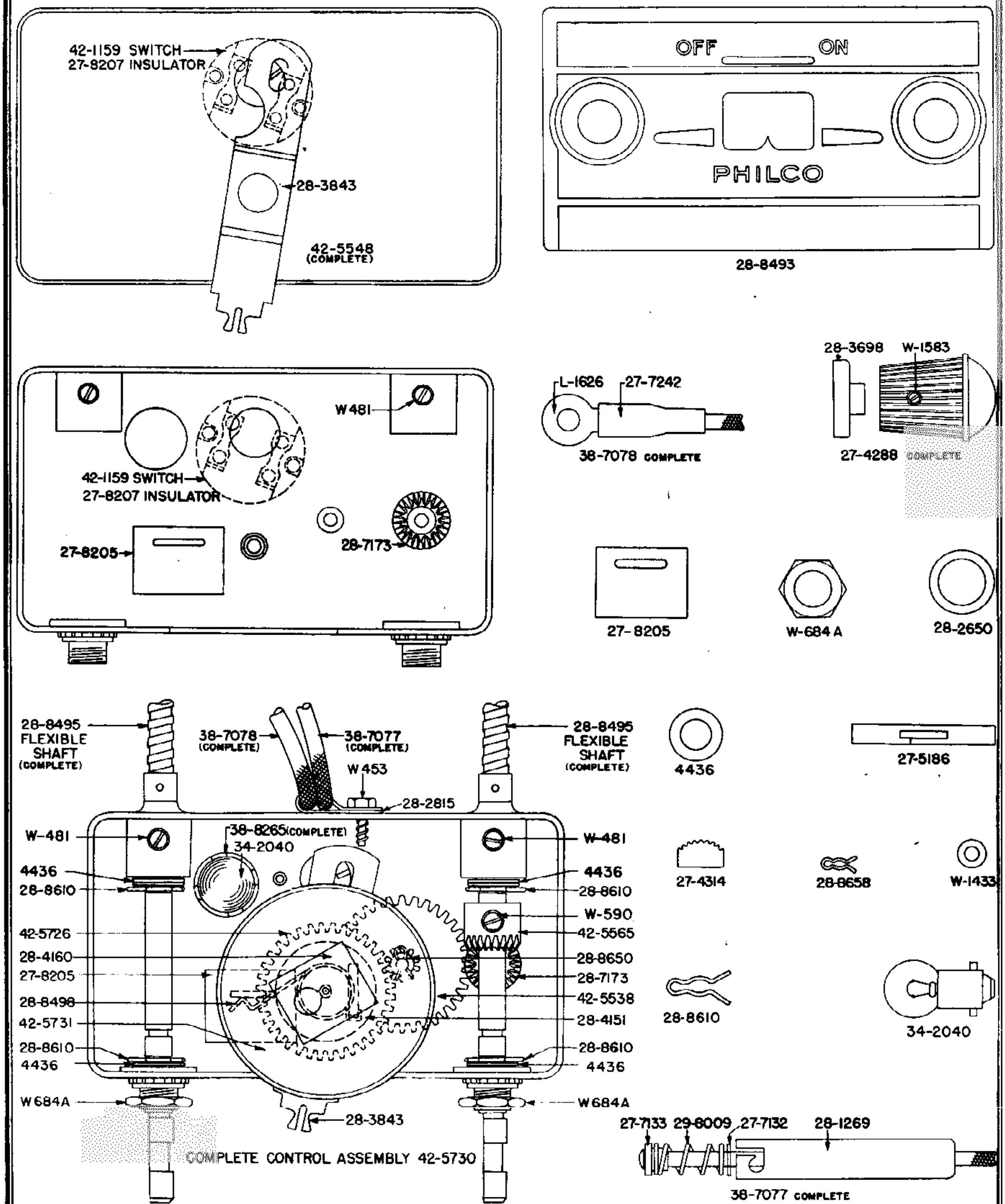
Connect the signal generator lead to the antenna cable assembly (made up of Part No. 41-3191 cable and a 200 mmfd. condenser Part No. 30-1013) in series between the Receiver antenna receptacle and the signal generator. Plug the cable into the antenna receptacle on the end of the Receiver.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders (11) and (5) for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

PHILCO RADIO & TELEV. CORP.

CHEVROLET CONTROL MODELS 826 - 827 - 827K - 828 - 828K

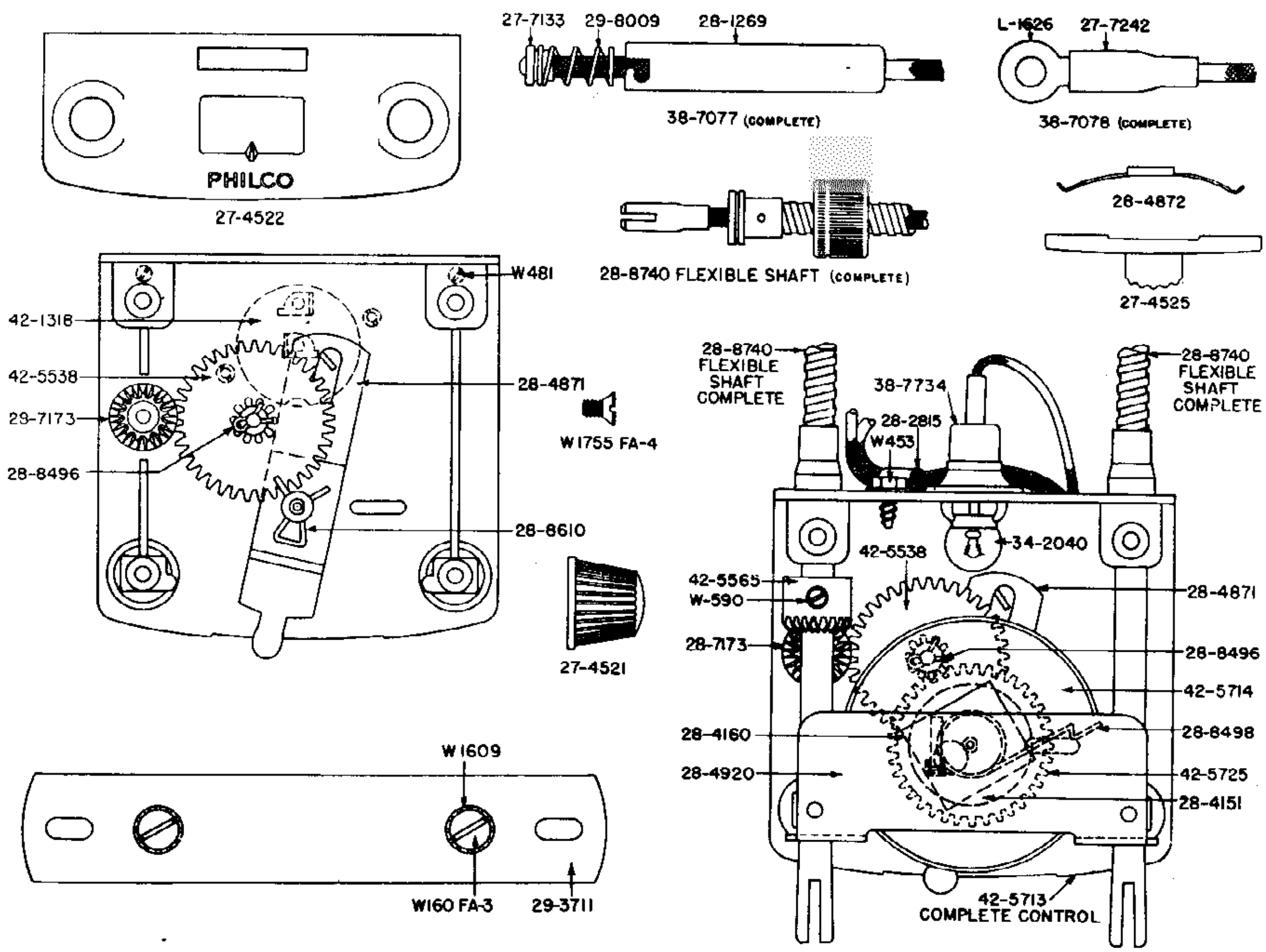


AUGUST 1937

MODELS 826,827,827K
828,828K
Standard Control
Parts

PHILCO RADIO & TELEV. CORP.

STANDARD CONTROL MODELS 826 - 827 - 827K - 828 - 828K



AUGUST 1937

PARTS LIST AND PRICES

(Prices Subject to Change Without Notice)

PART NUMBER	DESCRIPTION		LIST PRICE
L-1626	Lug		$ .01
W-160FA3	Screw (Brkt. mtg.)	per 100	.30
W-453	Screw	per 100	1.80
W-481	Screw	per 100	2.00
W-590	Screw	per 100	2.00
W-684FA3	Nut	per 100	1.25
W-1433	Washer	per 100	.50
W-1609	Lockwasher	per 100	.50
W-1755FA4	Screw (Cover mtg.)	per 100	.30
4436	Washer	per 100	1.50
27-4288	Knob		.15
27-4314	Knob		.04
27-4521	Knob		.10
27-4522	Cover		.75
27-4525	Switch Lever Knob		.10
27-5186	Light Shield		.01
27-7133	Ferrule		.01
27-7242	Insulator	per 100	.40
27-8205	Shield	per 100	.50
28-1269	Fuse Housing		.01
28-2650	Washer	per 100	.45
28-2815	Clamp		.01
28-3698	Knob Base		.04
28-4151	Friction Washer		.02
28-4160	Friction Spring		.01
28-4871	Switch Lever		*
28-4872	Switch Knob Retaining Spring		.02
28-4893	Bezel Plate		.10
28-4920	Shaft Bearing Plate		*
28-7173	Miter Gear		.10
28-8495	Flexible Shaft		1.15
28-8496	Spring		.05
28-8498	Anti-back Lash Spring		.10
28-8610	Spring		.03
28-8653	Spring		.03
28-8740	Flexible Shaft		1.00
29-3711	Bracket		.03
29-8009	Spring	per 100	.50
34-2040	Pilot Lamp		.07
38-7077	Fuse Lead Assembly		.15
38-7078	Ammeter Lead Assembly		.15
38-7734	Pilot Lamp Assembly		.35
38-8265	Pilot Lamp Assembly		.30
42-1318	On & Off Switch		.40
42-5538	Intermediate Gear Assembly		.15
42-5548	Cover Assembly		.65
42-5565	Miter Gear Assembly		.15
42-5713	Standard Control		6.75
42-5714	Scale Assembly		.35
42-5725	Drum Drive Gear Assembly		*
42-5726	Drum Gear and Shaft Assembly		*
42-5730	Chevrolet Control		6.00
42-5731	Scale Assembly		.30

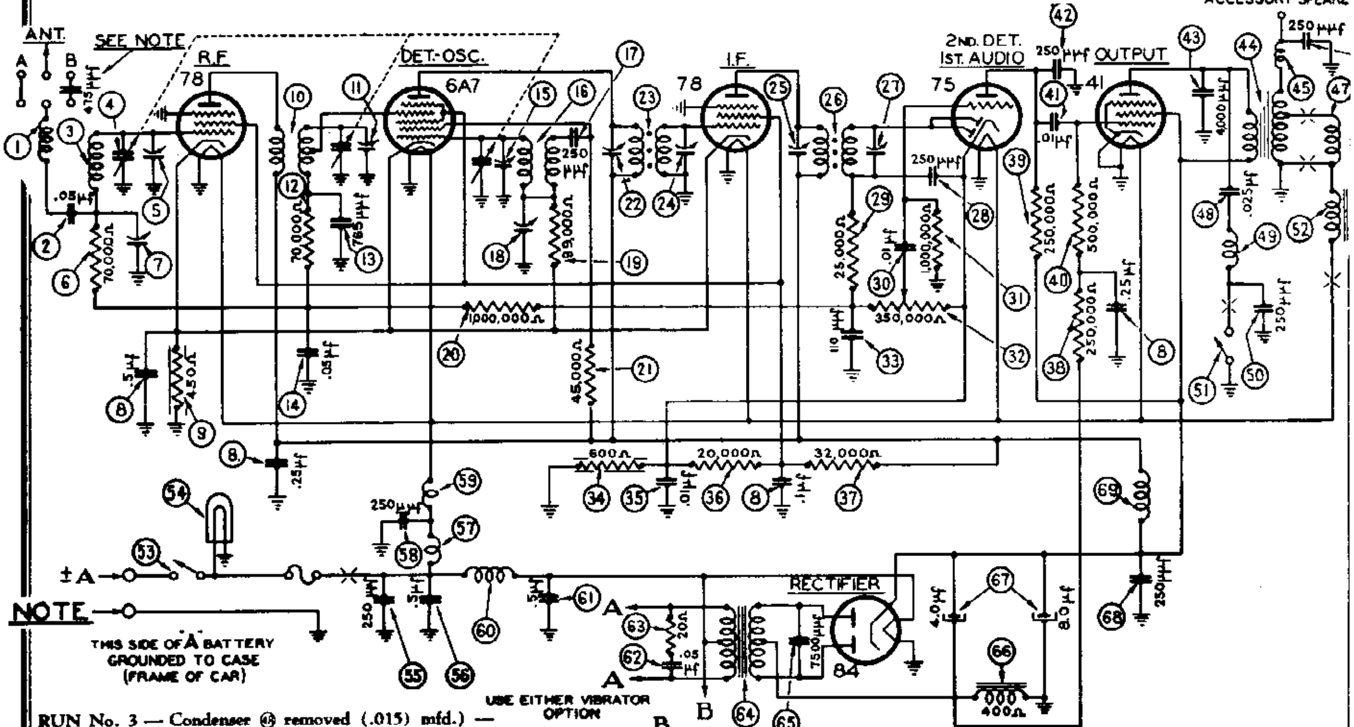
*Prices not available at this time.

Parts

MODEL 827

PHILCO RADIO & TELEV. CORP.

Schematic, Chassis

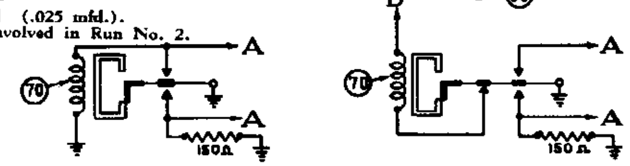


RUN No. 3 — Condenser ㊽ removed (.015) mfd.) — Part No. 7653-OSU added (.025 mfd.).
No major changes were involved in Run No. 2.

FEBRUARY 20, 1937

I.F.-260KC

Figure 1



NOTE: When the Receiver is installed in a car having a top antenna, under-car antenna, spare wheel antenna or antenna having a simil low relative capacitance (50 mmf. to 450 mmf.) use connector plug in "A".
When the Receiver is installed in a car having a metal insert top antenna, insulated door antenna, insulated trunk cover antenna antenna having similarly high relative capacitance (450 mmf. to 2500 mmf.) use condenser plug in "B".

MODEL 827 PARTS LIST

No.	Description	Part No.	No.	Description	Part No.
1	Antenna Choke	38-8651	44	Output Transformer	32-7815
2	Condenser (.05 mfd.)	30-4444	45	Choke	32-1374
3	Antenna Transformer	32-2516	46	Condenser (250 mmfd.)	30-1032
4	Tuning Condenser	31-1930	47	Cone & Voice Coil	36-3586
5	First Padder (on tun. cond.)		48	Condenser (.025 mfd.)	7653-0SU
6	Resistor (70,000 ohms)	33-370344	49	Choke	32-1464
7	Antenna Compensating Condenser	31-6082	50	Condenser (250 mmfd.)	30-1032
8	Condenser (.1-.25-.25-.5 mfd.)	30-4415	51	Tone Control Switch	42-1225
9	Resistor (450 ohms)	33-1218	52	Field Coil Assembly	36-3597
				Complete Speaker (CD)	36-1267
10	R. F. Transformer	32-2307	53	On & Off Switch	42-1318
11	Second Padder (on tun. cond.)		54	Pilot Lamp	34-2040
12	Resistor (70,000 ohms)	33-370344	55	Condenser (250 mmfd.)	30-1032
13	Condenser (765 mmfd.)	30-1069	56	Condenser (.5 mfd.)	30-4015
14	Condenser (.05 mfd.)	3615-0SG	57	"A" Choke	32-1604
15	Third Padder (on tun. cond.)		58	Condenser (250 mmfd.)	30-1032
16	Oscillator Transformer	32-2308	59	Filament Choke	32-2535
17	Condenser (250 mmfd.)	30-1032	60	Vibrator Choke	32-2039
18	Low Frequency Padder	31-6102	61	Condenser (.5 mfd.)	30-4015
19	Resistor (99,000 ohms)	33-399344	62	Condenser (.05 mfd.)	30-4444
20	Resistor (1,000,000 ohms)	33-510344	63	Resistor (20 ohms)	33-020341
21	Resistor (45,000 ohms)	33-345344	64	Power Transformer	32-7550
22	Padder (Pri. 1st I.F. Trans.)		65	Condenser (7,500 mmfd.)	30-4420
23	First I. F. Transformer	32-2026	66	Filter Choke	32-7545
24	Padder (Sec. 1st I. F. Trans.)		67	Filter Condenser (4-8 mfd.)	30-2150
25	Padder (Pri. 2nd I.F. Trans.)		68	Condenser (250 mmfd.)	30-1032
26	Second I. F. Transformer	32-2027	69	"B" Choke	32-1281
27	Padder (Sec. 2nd I.F. Trans.)		70	Vibrator (OPTIONAL)	41-3170-2 41-3170-3
28	Condenser (250 mmfd.)	30-1032		Four Prong Socket	27-6044
29	Resistor (25,000 ohms)	33-325344		Five Prong Socket	27-6035
30	Condenser (.01 mfd.)	3903-0SU		Six Prong Socket	27-6036
31	Resistor (1,000,000 ohms)	33-510344		Seven Prong Socket	27-6037
32	Volume Control (350,000 ohms)	33-5148		Tuning & Volume Knob	27-4521
33	Condenser (110 mmfd.)	30-1031		On & Off Knob	27-4525
34	Resistor (600 ohms)	33-1212		Pilot Lamp Assembly	38-7734
35	Condenser (.01 mfd.)	3903-0SG		Scale Assembly	42-5714
36	Resistor (20,000 ohms)	33-320344		Tuning & Volume Shaft	28-8740
37	Resistor (32,000 ohms)	33-332434		Tone Control Shaft	L-2767
38	Resistor (250,000 ohms)	33-424344		Control Assembly	42-5713
39	Resistor (250,000 ohms)	33-424344		Distributor Resistor	33-1196
40	Resistor (500,000 ohms)	33-449344		Interference Condenser	30-4007
41	Condenser (.01 mfd.)	3903-0SU		Antenna Condenser	30-4412
42	Condenser (250 mmfd.)	30-1032		Antenna Connector	28-6423
43	Condenser (4000 mmfd.)	30-4185		Insulator	27-8199
				Fuse	7227

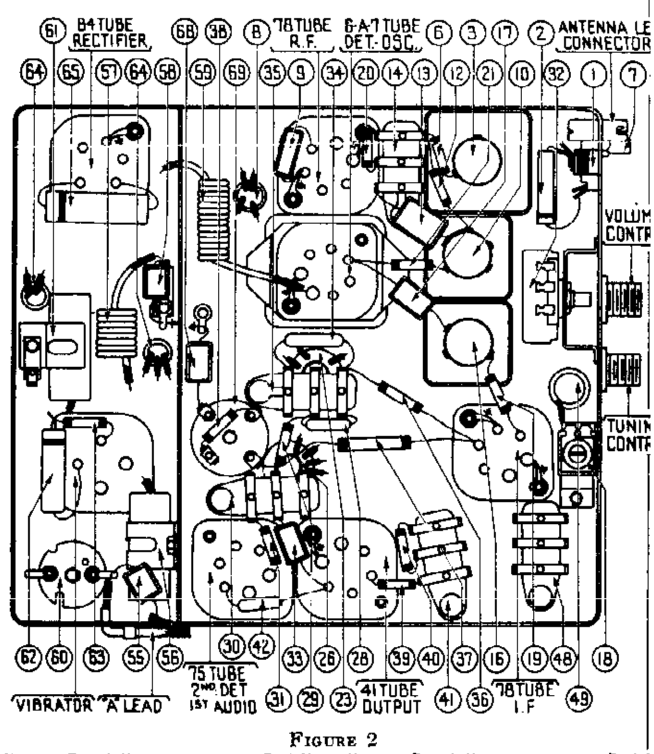


Figure 2

No.	Description	Part No.	No.	Description	Part No.
	Fuse Insulator	27-7729		Nut	W-5
	Tee Bolt	28-6161		Receiver Housing	38-83

MODEL 828
Schematic, Chassis
Parts

PHILCO RADIO & TELEV. CORP.

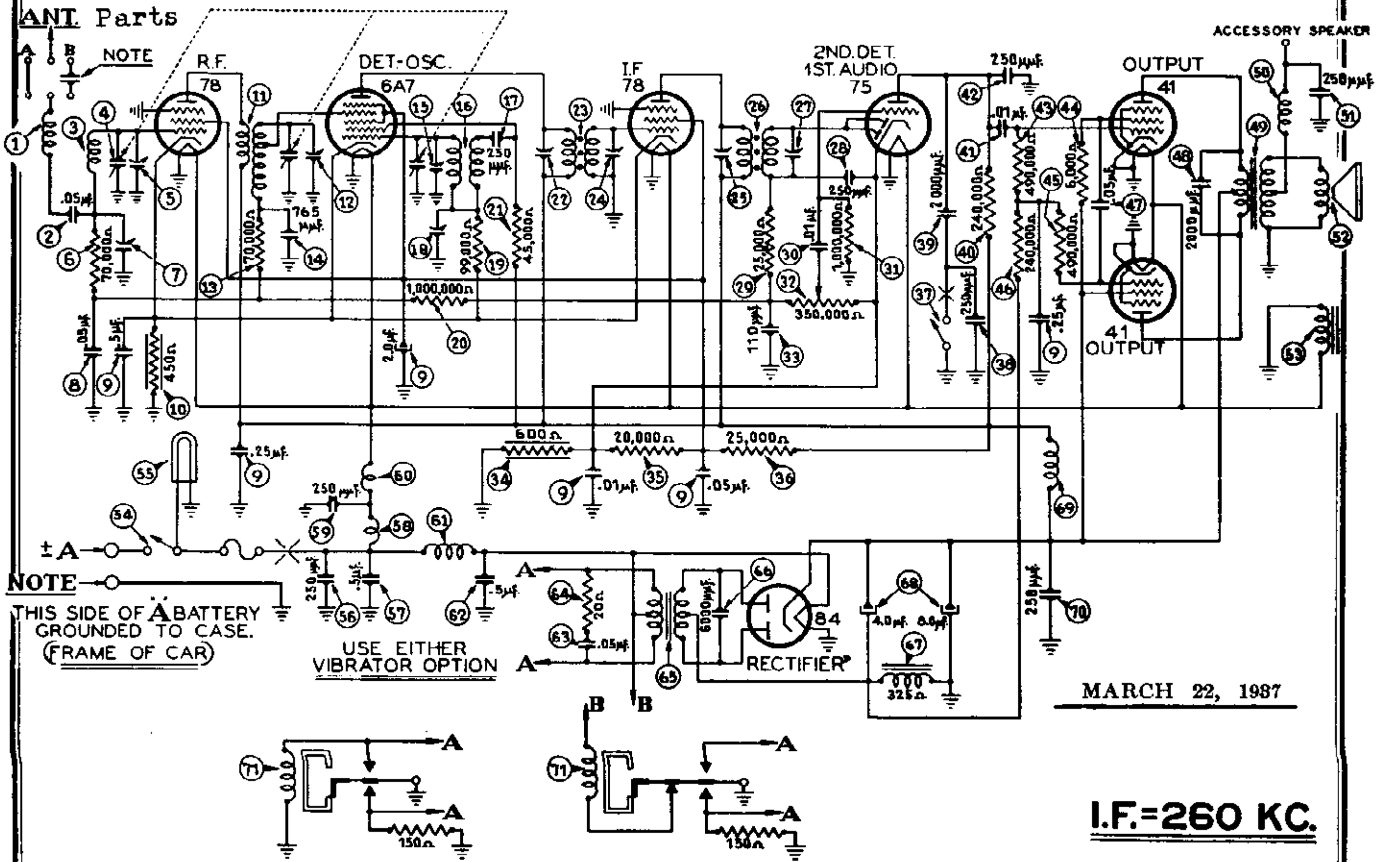


Figure 1

NOTE: When the Receiver is installed in a car having a top antenna, under-car antenna, spare wheel antenna or antenna having a similarly low relative capacitance (50 mmf. to 450 mmf.) use connector plug in "A"

When the Receiver is installed in a car having a metal insert top antenna, insulated door antenna, insulated trunk cover antenna or antenna having similarly high relative capacitance (450 mmf. to 2500 mmf.) use condenser plug in "B"

MODEL 828 PARTS LIST

No.	Description	Part No.
1	Antenna Choke	38-8651
2	Condenser (.05 mfd.)	30-4444
3	Antenna Transformer	32-2516
4	Tuning Condenser	31-1930
5	First Padder (on Tun. Cond.)	
6	Resistor (70,000 ohms)	33-370344
7	Antenna Compensating Condenser	31-6082
8	Condenser (.05 mfd.)	3615-0SG
9	Condenser (.01-.05-.25-.25-.5-2 mfd.)	30-4510
10	Resistor (450 ohms)	33-1218
11	R. F. Transformer	32-2307
12	Second Padder (on Tun. Cond.)	
13	Resistor (70,000 ohms)	33-370344
14	Condenser (765 mmfd.)	30-1069
15	Third Padder (on Tun. Cond.)	
16	Oscillator Transformer	32-2308
17	Condenser (250 mmfd.)	30-1032
18	Low Frequency Padder	31-6102
19	Resistor (99,000 ohms)	33-399344
20	Resistor (1,000,000 ohms)	33-510344
21	Resistor (15,000 ohms)	33-345344
22	Padder (Pri. 1st I. F. Trans.)	
23	First I. F. Transformer	32-2026
24	Padder (Sec. 1st I.F. Trans.)	
25	Padder (Pri. 2nd I.F. Trans.)	
26	Second I. F. Transformer	32-2027
27	Padder (Sec. 2nd I.F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (.01 mfd.)	3903-0SU
31	Resistor (1,000,000 ohms)	33-510344
32	Volume Control (350,000 ohms)	33-5148
33	Condenser (110 mmfd.)	30-1031
34	Resistor (600 ohms)	33-1212
35	Resistor (20,000 ohms)	33-320344
36	Resistor (25,000 ohms)	33-325444
37	Tone Control Switch	42-1225
38	Condenser (250 mmfd.)	30-1032
39	Condenser (2000 mmfd.)	30-4177
40	Resistor (240,000 ohms)	33-424344
41	Condenser (.01 mfd.)	3903-0SU
42	Condenser (250 mmfd.)	30-1032
43	Resistor (490,000 ohms)	33-449344
44	Resistor (6,000 ohms)	33-260344
45	Resistor (490,000 ohms)	33-449344
46	Resistor (240,000 ohms)	33-424344
47	Condenser (.05 mfd.)	30-4454
48	Condenser (2000 mmfd.)	30-4177
49	Output Transformer	32-7818
50	Choke	32-1464
51	Condenser (250 mmfd.)	30-1032
52	Cone & Voice Coil	36-3586
53	Field Coil Assembly	36-3597
	Complete Speaker (CB)	36-1203
54	On & Off Switch	42-1318
55	Pilot Lamp	34-2040
56	Condenser (250 mmfd.)	30-1032
57	Condenser (.5 mfd.)	30-4015
58	"A" Choke	32-1604
59	Condenser (250 mmfd.)	30-1032
60	Filament Choke	32-2535
61	Vibrator Choke	32-2039
62	Condenser (.5 mfd.)	30-4015
63	Condenser (.05 mfd.)	30-4414
64	Resistor (20 ohms)	33-020344
65	Power Transformer	32-7821
66	Condenser (6000 mmfd.)	30-4512
67	Filter Choke	32-7822
68	Filter Condenser (4-8 mfd.)	30-2150
69	"B" Choke	32-1281
70	Condenser (250 mmfd.)	30-1032
71	Vibrator (OPTIONAL)	41-3170-2 41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Tuning & Volume Knob	27-4521
	On & Off Knob	27-4525
	Pilot Lamp Assembly	38-7734
	Scale Assembly	42-5714
	Tuning & Volume Shaft	28-8740
	Tone Control Cable	L-2767
	Control Assembly	42-5713
	Distributor Resistor	33-1196
	Interference Condenser	30-4007
	Antenna Condenser	30-4412
	Antenna Connector	28-6423
	Insulator	27-8199
	Fuse	7227
	Fuse Insulator	27-7729
	Tee Bolt	28-6161
	Nut	W518
	Receiver Housing	38-8571

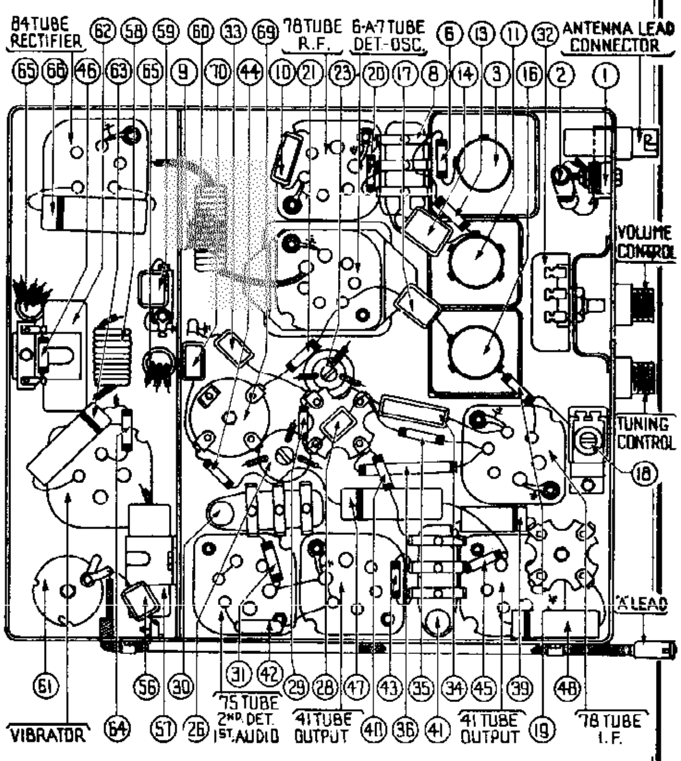


Figure 2

PHILCO RADIO & TELEV. CORP.

MODEL 827K
Schematic, Chassis
Parts

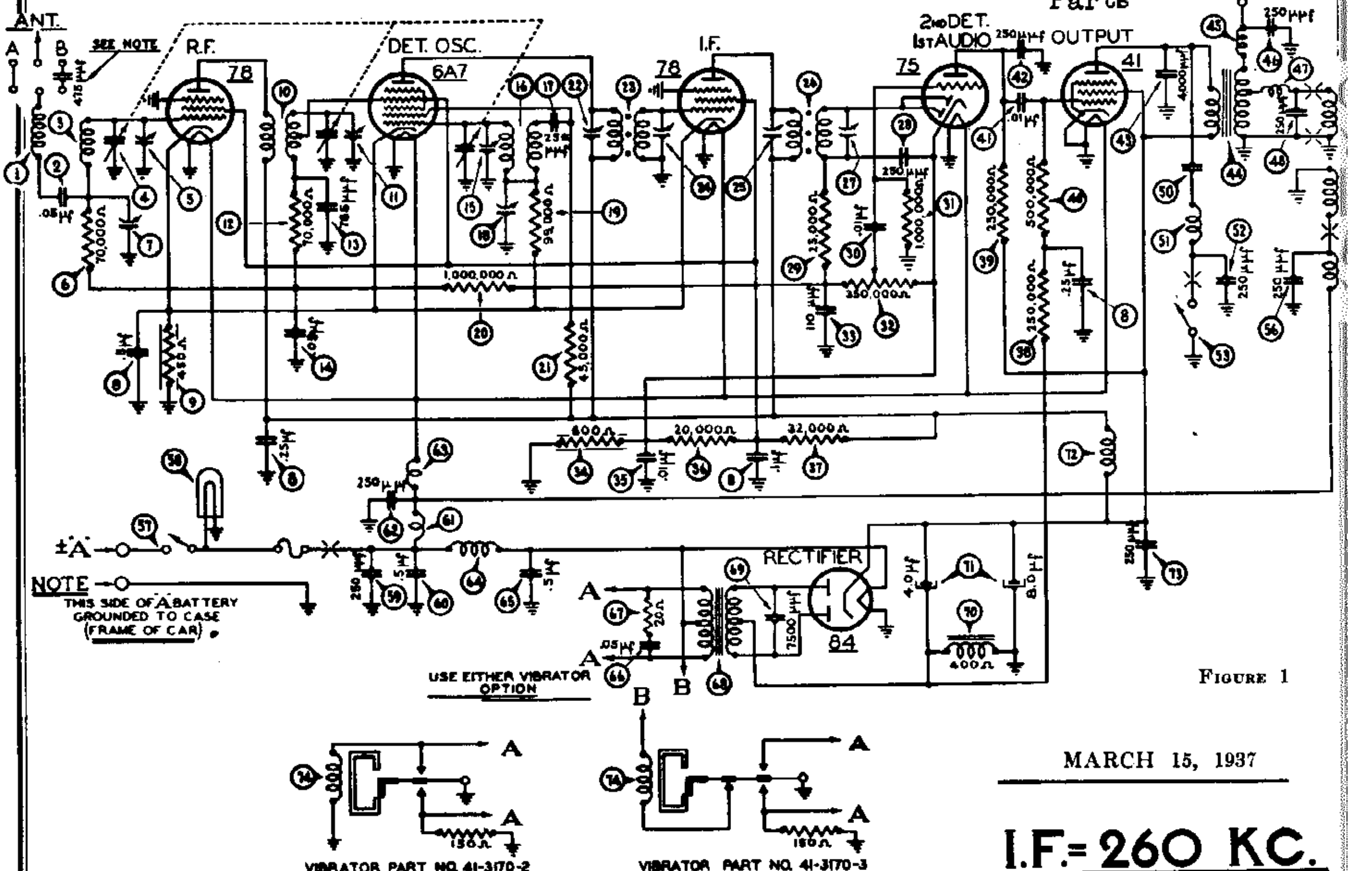


Figure 1

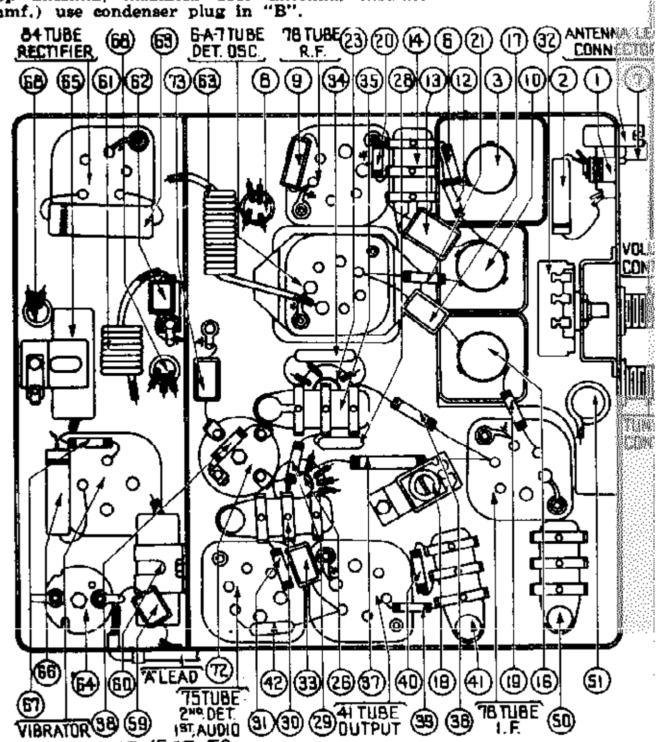
MARCH 15, 1937

I.F.= 260 KC.

NOTE: When the Receiver is installed in a car having a top antenna, under-car antenna, spare wheel antenna or antenna having a simil low relative capacitance (50 mmf. to 450 mmf.) use connector plug in "A".
When the Receiver is installed in a car having a metal insert top antenna, insulated door antenna, insulated trunk cover antenna antenna having similarly high relative capacitance (450 mmf. to 2500 mmf.) use condenser plug in "B".

MODEL 827K PARTS LIST

No.	Description	Part No.
1	Antenna Choke	38-8651
2	Condenser (.05 mfd.)	30-4444
3	Antenna Transformer	32-2516
4	Tuning Condenser	31-1930
5	First Padder (on Tun. Cond.)	
6	Resistor (70,000 ohms)	33-370344
7	Antenna Compensating Condenser	31-6082
8	Condenser (.1-.25-.25 .5 mfd.)	30-4415
9	Resistor (450 ohms)	33-1218
10	R. F. Transformer	32-2307
11	Second Padder (on Tun. Cond.)	
12	Resistor (70,000 ohms)	33-370344
13	Condenser (765 mmfd.)	30-1069
14	Condenser (.05 mfd.)	3615-0SG
15	Third Padder (on Tun. Cond.)	
16	Oscillator Transformer	32-2308
17	Condenser (250 mmfd.)	30-1032
18	Low Frequency Padder	31-6102
19	Resistor (99,000 ohms)	33-399344
20	Resistor (1,000,000 ohms)	33-510344
21	Resistor (45,000 ohms)	33-345344
22	Padder (Pri. 1st I.F. Trans.)	
23	First I. F. Transformer	32-2026
24	Padder (Sec. 1st I.F. Trans.)	
25	Padder (Pri. 2nd I.F. Trans.)	
26	Second I. F. Transformer	32-2027
27	Padder (Sec. 2nd I.F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (.01 mfd.)	3903-0SU
31	Resistor (1,000,000 ohms)	33-510344
32	Volume Control (350,000 ohms)	33-5148
33	Condenser (110 mmfd.)	30-1031
34	Resistor (600 ohms)	33-1212
35	Condenser (.01 mfd.)	3903-0SG
36	Resistor (20,000 ohms)	33-320344
37	Resistor (32,000 ohms)	33-332434
38	Resistor (250,000 ohms)	33-424344
39	Resistor (250,000 ohms)	33-424344
40	Resistor (500,000 ohms)	33-449344
41	Condenser (.01 mfd.)	3903-0SU
42	Condenser (250 mmfd.)	30-1032
43	Condenser (4000 mmfd.)	30-4185
44	Output Transformer	32-7816
45	Choke	32-1374
46	Condenser (250 mmfd.)	30-1032
47	Choke	32-2535
48	Condenser (250 mmfd.)	30-1032
49	Cone & Voice Coil	36-3159
50	Condenser (.025 mfd.)	7653-0SU
51	Choke	32-1464
52	Condenser (250 mmfd.)	30-1032
53	Tone Control Switch	42-1225
54	Field Coil Assembly	36-3513
	Complete Speaker (A47)	36-1331
55	Choke	32-1930
56	Condenser (250 mmfd.)	30-1032
57	On & Off Switch	42-1318
58	Pilot Lamp	34-2040
59	Condenser (250 mmfd.)	30-1032
60	Condenser (.5 mfd.)	30-4015
61	"A" Choke	32-1604
62	Condenser (250 mmfd.)	30-1032
63	Filament Choke	32-2535
64	Vibrator Choke	32-2039
65	Condenser (.5 mfd.)	30-4015
66	Condenser (.05 mfd.)	30-4444
67	Resistor (20 ohms)	33-020344
68	Power Transformer	32-7550
69	Condenser (7500 mmfd.)	30-4420
70	Filter Choke	32-7545
71	Filter Condenser (4-8 mfd.)	30-2150
72	"B" Choke	32-1281
73	Condenser (250 mmfd.)	30-1032
74	Vibrator (OPTIONAL)	41-3170-2 41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Tuning & Volume Knob	27-4521
	On & Off Knob	27-4525
	Pilot Lamp Assembly	38-7734
	Scale Assembly	42-5714
	Tuning & Volume Shaft	28-8740
	Tone Control Shaft	L-2767
	Distributor Resistor	33-1196
	Interference Condenser	30-4007
	Antenna Condenser	30-4412
	Antenna Connector	28-6423
	Insulator	27-8199
	Fuse	7227



PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Figure 2

No.	Description	Part No.	No.	Description	Part N
	Fuse Insulator	27-7729		Receiver Housing	38-85
	Tee Bolt (Rec. Mtg.)	28-6161		Stud (Speaker Mtg.)	61
	Nut (Rec. Mtg.)	W518		Nut (Speaker Mtg.)	W

MODEL 827K
Socket, Trimmers
Alignment

PHILCO RADIO & TELEV. CORP.

I. F. TRANSFORMERS AND PADDERS

The I. F. Transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 4).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 3.

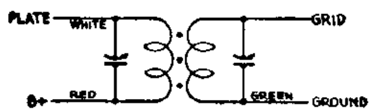


FIGURE 3

If replacements are ever necessary, replace the entire coil assembly, 32-2026 for the first I. F. stage and 32-2027 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

MODEL 827-K ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A or 099 Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR — With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F. — Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder (27) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (25) for maximum reading. (See Figure 4 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder (24) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (22) for maximum reading. Readjust padders (25) and (27) with the generator lead connected to the type 6A7 tube. (See Figure 4 for location of padders).

HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Set the signal generator at 1550 K. C. and then connect the generator lead to the grip cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Turn the tuning condenser plates out of mesh as far as they will go.

With the tuning condenser in this position, adjust the high frequency padder (15) and the R. F. padder (11) until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

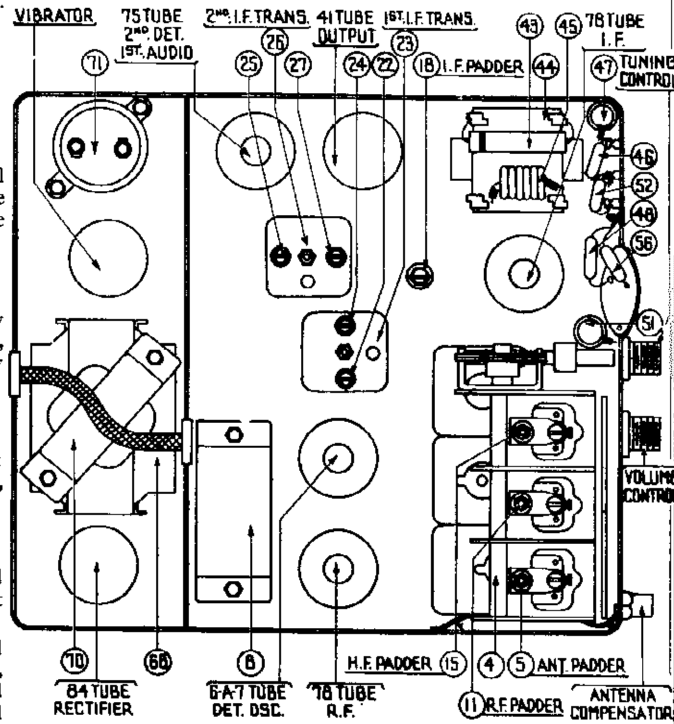


FIGURE 4

LOW FREQUENCY — Turn the tuning condenser plates in mesh to approximately 580 K. C., 58 on the dial scale and set the signal generator at 580 K. C. Roll the tuning condenser and adjust the low frequency padder screw (18) for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT — Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder (15) again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.

ANTENNA — WHEN PADDING THE ANTENNA STAGE IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE CONSTRUCTED AND USED.

Connect the signal generator lead to the antenna lead assembly (made up of Part No. 41-3191 lead and a 200 mmfd condenser, Part No. 30-1013), in series between the lead and the signal generator. Plug the lead into the antenna lead connector on the end of the Receiver.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders (11) and (5) for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

PHILCO RADIO & TELEV. CORP.

MODEL 828K
Schematic, Chassis
Parts

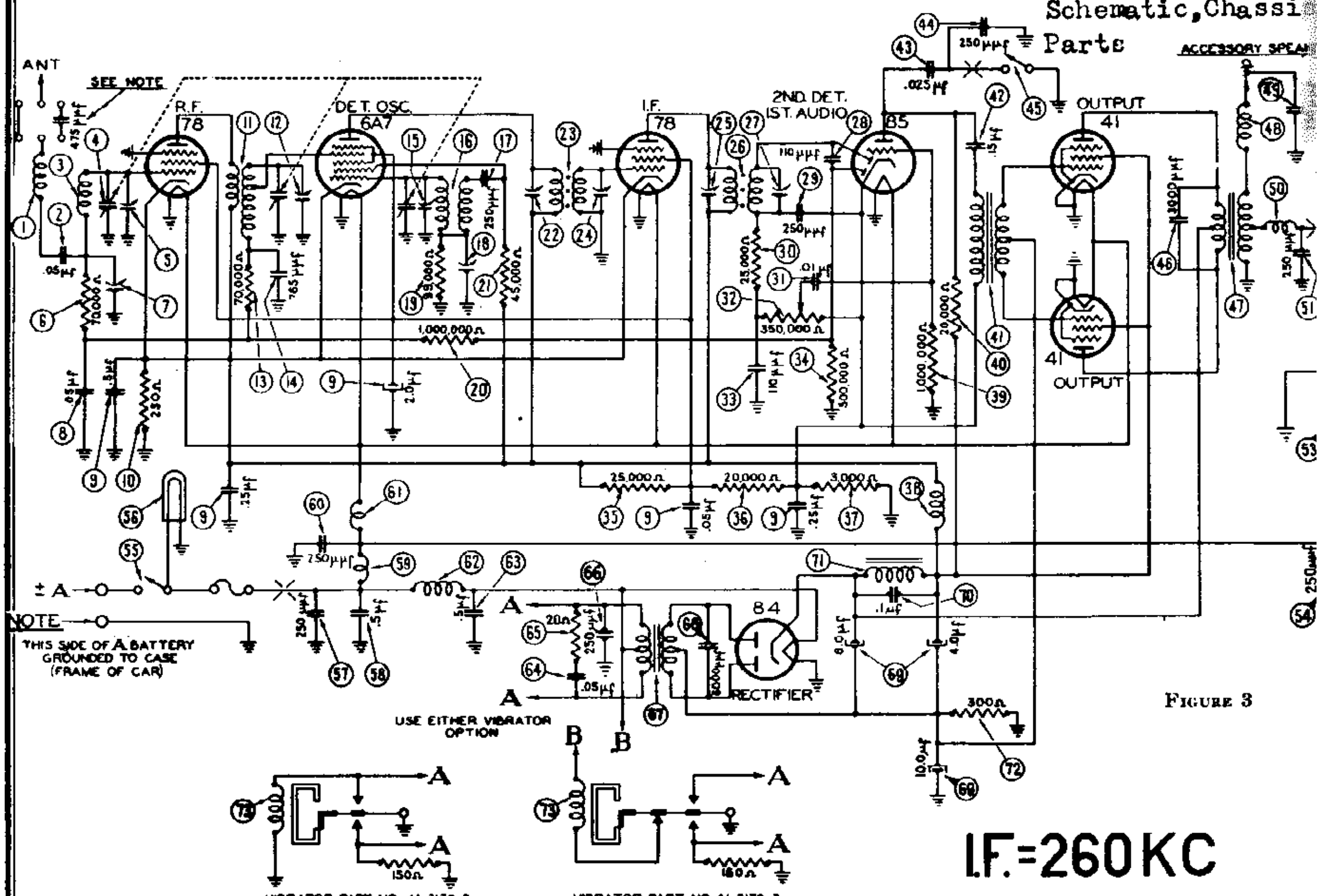


FIGURE 3

NOTE: When the Receiver is installed in a car having a top antenna, under-car antenna, spare wheel antenna or antenna having a simil low relative capacitance (50 mmf. to 450 mmf.) use connector plug in "A".
When the Receiver is installed in a car having a metal insert top antenna, insulated door antenna, insulated trunk cover antenna antenna having similarly high relative capacitance (450 mmf. to 2500 mmf.) use condenser plug in "B".

MODEL 828K PARTS LIST

No.	Description	Part No.	No.	Description	Part No.
1	Antenna Choke	38-8532	46	Condenser (3000 mmfd.)	30-4469
2	Condenser (.05 mfd.)	30-4444	47	Output Transformer	32-7829
3	Antenna Transformer	32-2516	48	Choke	32-1464
4	Tuning Condenser	31-1770	49	Condenser (250 mmfd.)	30-1032
5	First Padder (on tun. cond.)		50	Choke	32-2269
6	Resistor (70,000 ohms)	33-370344	51	Condenser (250 mmfd.)	30-1032
7	Antenna Compensating Condenser	31-6082	52	Cone & Voice Coil	36-3159
8	Condenser (.05 mfd.)	3615-0SG	53	Field Coil Assembly	36-3513
				Complete Speaker (A48)	36-1332
9	Condenser (.05-.25-.25-.5-2 mfd.)	30-4513	54	Condenser (250 mmfd.)	30-1032
10	Resistor (250 ohms)	33-1259	55	On & Off Switch	42-1318
11	R. F. Transformer	32-2307	56	Pilot Lamp	34-2040
12	Second Padder (on tun. cond.)		57	Condenser (250 mmfd.)	30-1032
13	Resistor (70,000 ohms)	33-370344	58	Condenser (.5 mfd.)	30-4015
14	Condenser (765 mmfd.)	30-1069	59	"A" Choke	32-1604
15	Third Padder (on tun. cond.)		60	Condenser (250 mmfd.)	30-1032
16	Oscillator Transformer	32-2308	61	Filament Choke	32-2535
17	Condenser (250 mmfd.)	30-1032	62	Vibrator Choke	32-2039
18	Low Frequency Padder	31-6102	63	Condenser (.5 mfd.)	30-4015
19	Resistor (99,000 ohms)	33-399344	64	Condenser (.05 mfd.)	30-4444
20	Resistor (1,000,000 ohms)	33-510344	65	Resistor (20 ohms)	33-020344
21	Resistor (45,000 ohms)	33-345344	66	Condenser (250 mmfd.)	30-1032
22	Padder (Pri. 1st I.F. Trans.)		67	Power Transformer	32-7821
23	First I. F. Transformer	32-2026	68	Condenser (6000 mmfd.)	30-4512
24	Padder (Sec. 1st I.F. Trans.)		69	Filter Condenser (4-8 10 mfd.)	30-2213
25	Padder (Pri. 2nd I.F. Trans.)		70	Condenser (.1 mfd.)	30-4455
26	Second I. F. Transformer	30-2034	71	Filter Choke	32-7827
27	Padder (Sec. 2nd I.F. Trans.)		72	Resistor (300 ohms)	33-1258
28	Condenser (110 mmfd.)	30-1031	73	Vibrator (OPTIONAL)	41-3170-2
29	Condenser (250 mmfd.)	30-1032			41-3170-3
30	Resistor (25,000 ohms)	33-325344		Four Prong Socket	27-6044
31	Condenser (.01 mfd.)	3903-0SU		Five Prong Socket	27-6035
32	Volume Control (350,000 ohms)	33-5148		Six Prong Socket	27-6036
				Seven Prong Socket	27-6037
33	Condenser (110 mmfd.)	30-1031		Tuning & Volume Knob	27-4521
34	Resistor (500,000 ohms)	33-449344		On & Off Knob	27-4525
35	Resistor (25,000 ohms)	33-325444		Pilot Lamp Assembly	38-7734
36	Resistor (20,000 ohms)	33-320344		Scale Assembly	42-5714
37	Resistor (3,000 ohms)	33-230344		Tuning & Volume Shaft	28-8740
38	"B" Choke	32-1281		Tone Control Cable	L-2767
39	Resistor (1,000,000 ohms)	33-510344		Control Assembly	42-5713
40	Resistor (20,000 ohms)	33-320344		Distributor Resistor	33-1196
41	Input Transformer	32-7828		Interference Condenser	30-4007
42	Condenser (.15 mfd.)	30-4505		Antenna Condenser	30-4412
43	Condenser (.025 mfd.)	7653-0SU		Antenna Connector	28-6423
44	Condenser (250 mmfd.)	30-1032		Insulator	27-8199
45	Tone Control Switch	42-1225		Fuse	7227

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

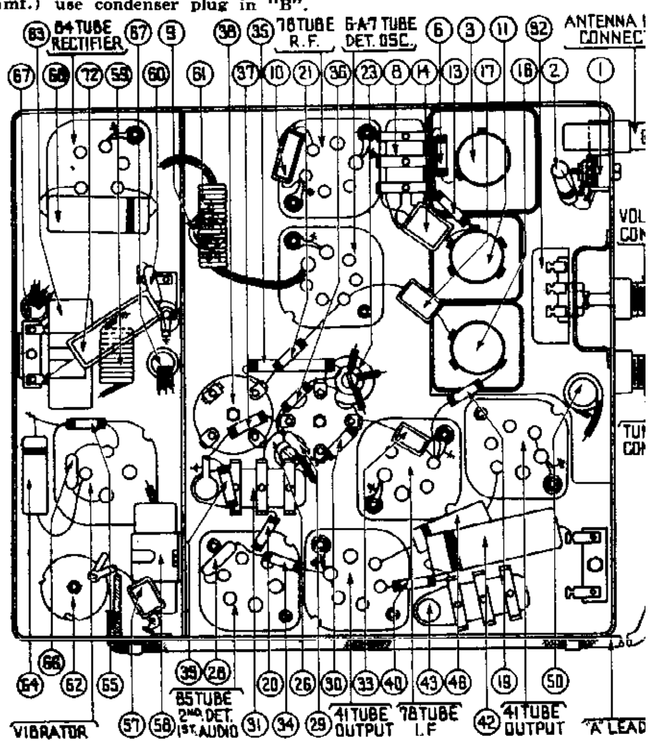


FIGURE 4

No.	Description	Part No.	No.	Description	Part No.
	Fuse Insulator	27-7729		Nut	W[illegible]
	Tee Bolt	28-6161		Receiver Housing	38-8[illegible]

MODELS 828, 828K
Socket, Trimmers
Alignment

PHILCO RADIO & TELEV. CORP.

I. F. TRANSFORMERS AND PADDERS

The I. F. Transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure).

The coil windings terminate in the leads instead of terminals or lugs. The color scheme of the leads is given in Figure 5

FIGURE 5

If replacements are ever necessary, replace the entire coil assembly, 32-2026 for the first I. F. stage and 32-2084 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

ADJUSTMENTS

OUTPUT METER — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR — With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F. — Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder (27) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (25) for maximum reading. (See Figure 6 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder (24) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (22) for maximum reading. Readjust padders (25) and (27) with the generator lead connected to the type 6A7 tube. (See Figure for location of padders).

HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

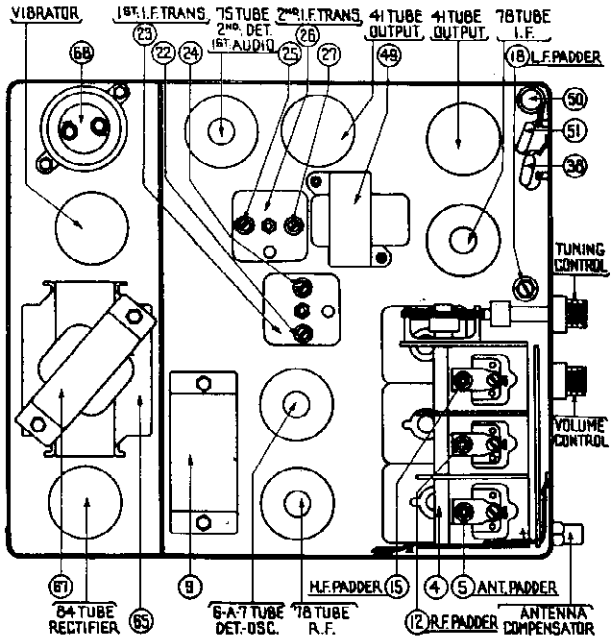
Turn the tuning condenser plates out of mesh as far as they will go.

With the tuning condenser in this position, adjust the high frequency padder (15) and the R. F. padder (12) until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

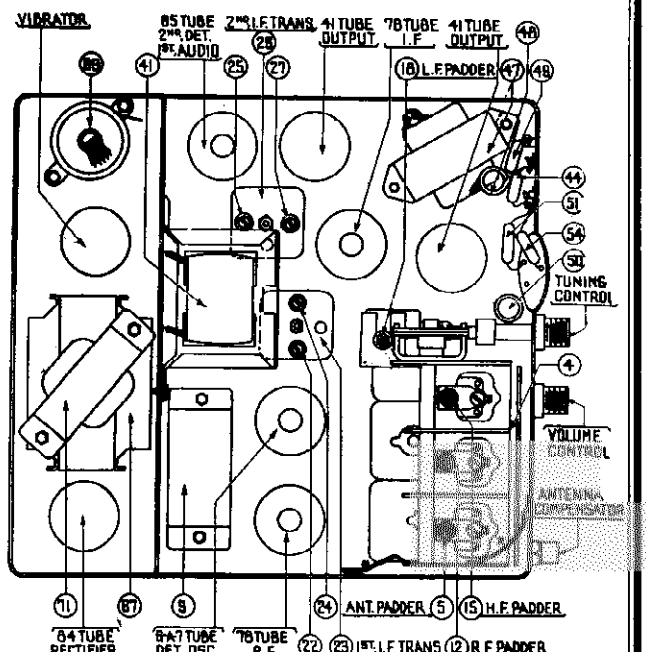
LOW FREQUENCY — Turn the tuning condenser plates in mesh to approximately 580 K. C., 58 on the dial scale and set the signal generator at 580 K. C. Roll the tuning condenser and adjust the low frequency padder screw (18) for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT — Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder (15) again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.



MODEL 828



MODEL 828-K

ANTENNA — WHEN PADDING THE ANTENNA STAGE IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE CONSTRUCTED AND USED.

Connect the signal generator lead to the antenna lead assembly (made up of Part No. 41-3191 lead and a 200 mmfd. condenser, Part No. 30-1013), in series between the lead and the signal generator. Plug the lead into the antenna lead connector on the end of the Receiver.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders (12) and (5) for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

PHILCO RADIO & TELEV. CORP.

MODELS R-1415 Reo
W-1419 Willys-Overland
Schematic, Chassis, Parts

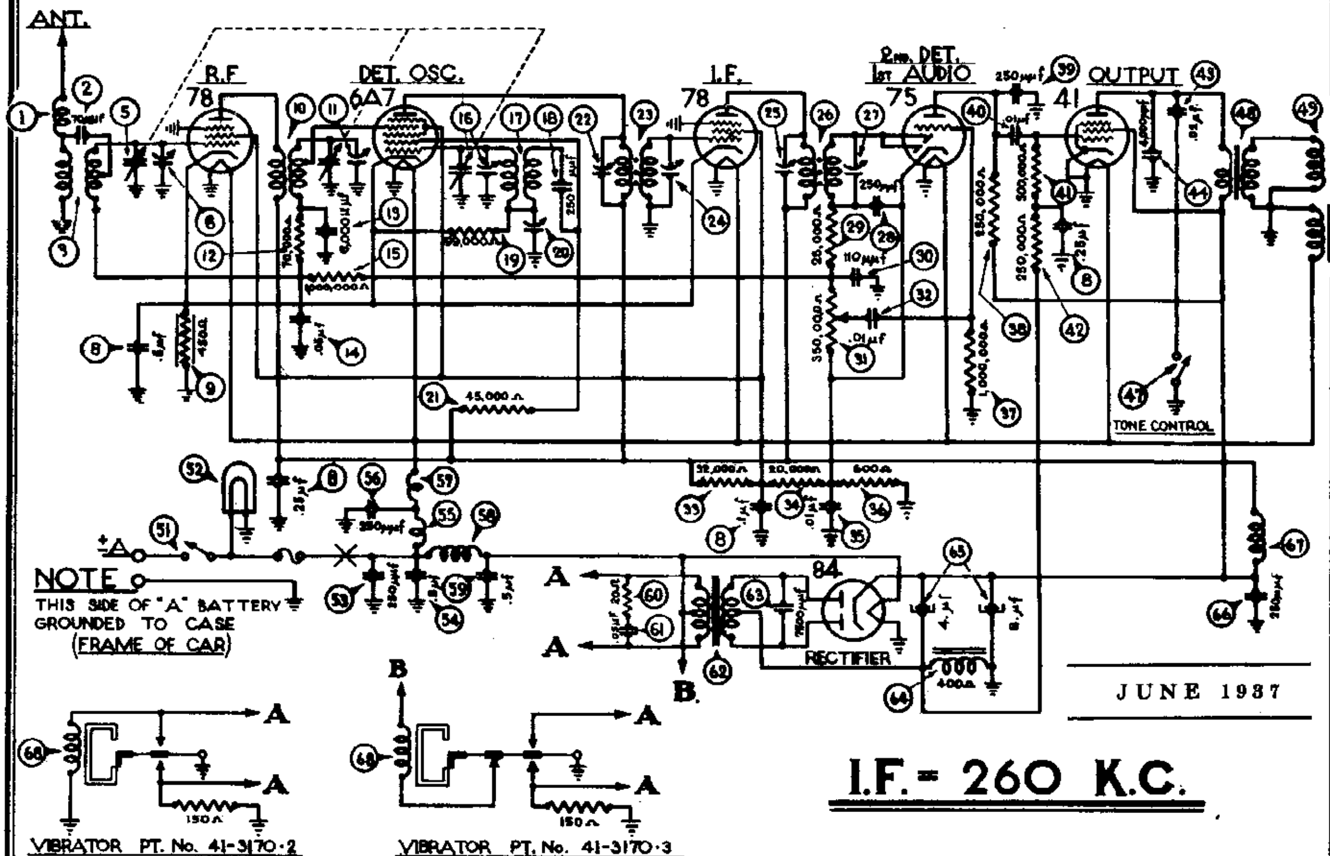


FIGURE 1

PARTS LIST

No.	Description	Part No.
1	Antenna Choke	38-8623
2	Condenser (70 mmfd.)	30-1068
3	Antenna Transformer	32-2494
5	Tuning Condenser	31-2004
6	First Padder (on Tun. Cond.)	
8	Condenser (.1-.25-.25-.5 mfd.)	30-4415
9	Resistor (450 ohms)	33-1218
10	R. F. Transformer	32-2495
11	Second Padder (on Tun. Cond.)	
12	Resistor (70,000 ohms)	33-370344
13	Condenser (6,000 mmfd.)	30-4467
14	Condenser (.05 mfd.)	3615-08G
15	Resistor (1,000,000 ohms)	33-510344
16	Third Padder (on Tun. Cond.)	
17	Oscillator Transformer	32-2496
18	Condenser (250 mmfd.)	30-1032
19	Resistor (99,000 ohms)	33-399344
20	Low Frequency Padder	31-6056
21	Resistor (45,000 ohms)	33-345344
22	Padder (Pri. 1st I. F. Trans.)	
23	First I. F. Transformer	32-2026
24	Padder (Sec. 1st I. F. Trans.)	
25	Padder (Pri. 2nd I. F. Trans.)	
26	Second I. F. Transformer	32-2027
27	Padder (Sec. 2nd I. F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (110 mmfd.)	30-1031
31	Volume Control (350,000 ohms)	33-5139
32	Condenser (.01 mfd.)	3903-08U
33	Resistor (32,000 ohms)	33-332434
34	Resistor (20,000 ohms)	33-320344
35	Condenser (.01 mfd.)	3903-08G
36	Resistor (600 ohms)	33-1212
37	Resistor (1,000,000 ohms)	33-510344
38	Resistor (250,000 ohms)	33-424344
39	Condenser (250 mmfd.)	30-1032
40	Condenser (.01 mfd.)	3903-08U
41	Resistor (500,000 ohms)	33-449344
42	Resistor (250,000 ohms)	33-424344
43	Condenser (.02 mfd.)	30-4419
44	Condenser (4,000 mmfd.)	30-4185
47	Tone Control Switch	42-1140
48	Output Transformer	32-7495
49	Cone & Voice Coil	36-3586
50	Field Coil Assembly	36-3597
51	On & Off Switch	42-5617
52	Pilot Lamp	34-2040
53	Condenser (250 mmfd.)	30-1032
54	Condenser (.5 mfd.)	30-4015
55	"A" Choke	32-1604
56	Condenser (250 mmfd.)	30-1032
57	Filament Choke	32-2535
58	Vibrator Choke	32-2039
59	Condenser (.5 mfd.)	30-4015
60	Resistor (20 ohms)	33-020344
61	Condenser (.05 mfd.)	30-4444
62	Power Transformer	32-7550
63	Condenser (7,500 mmfd.)	30-4420
64	Filter Choke	32-7545
65	Filter Condenser (4-8 mfd.)	30-2150
66	Condenser (250 mmfd.)	30-1032
67	"B" Choke	32-1281
68	Vibrator (OPTIONAL)	41-3170-2 / 41-3170-3
	Inductive Suppressor	33-2250
	Interference Condenser	30-4007
51	On & Off Switch (R-1415)	42-5493
51	On & Off Switch (W-1419)	42-5817
52	Pilot Lamp (R-1415)	34-2039
52	Pilot Lamp (W-1419)	34-2040
	Glass (R-1415)	27-7325
	Knob (R-1415)	27-4161
	Scale Assembly (W-1419)	42-5698
	Tun. & Vol. Knob (W-1419)	27-4524

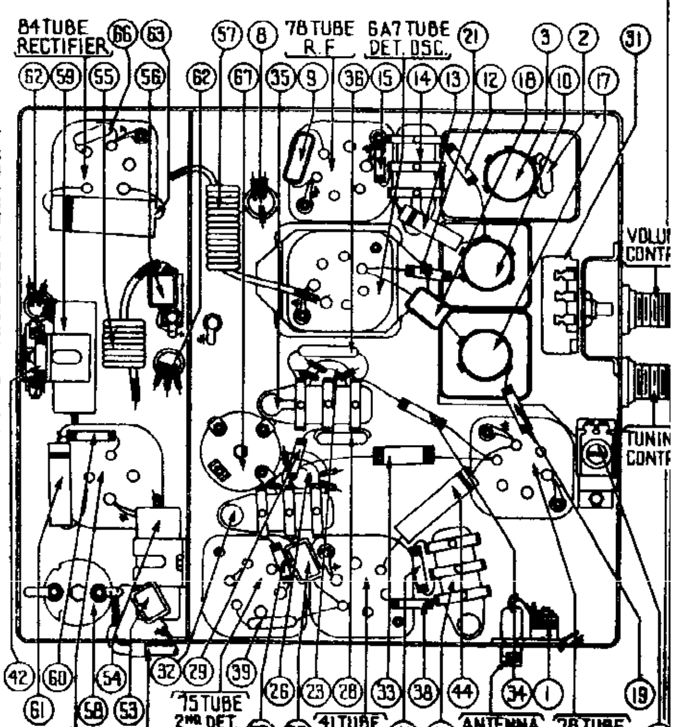


FIGURE 2

MODELS R-1415 Reo W-1419 Willys-Overland
Socket, Trimmers
Alignment

PHILCO RADIO & TELEV. CORP.

I. F. TRANSFORMERS AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 4).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 3.

FIGURE 3

If replacements are ever necessary, replace the entire coil assembly, 32-2026 for the first I. F. stage and 32-2027 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A or 099A Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR — With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F. — Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder (27) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (25) for maximum reading. (See Figure 4 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder (24) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (22) for maximum reading. Readjust padders (25) and (27) with the generator lead connected to the type 6A7 tube. (See Figure 4 for location of padders).

HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Turn the tuning condenser plates out of mesh as far as they will go. With the tuning condenser in this position, adjust the high frequency padder (16) and the R. F. padder (11) until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

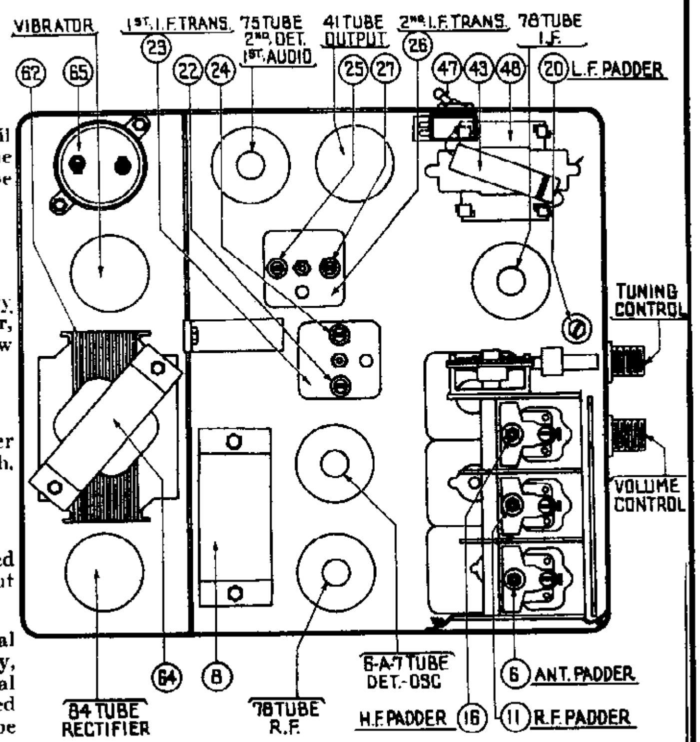


FIGURE 4

LOW FREQUENCY — Turn the tuning condenser plates in mesh to approximately 600 K. C., 60 on the dial scale and set the signal generator at 600 K. C. Rock the tuning condenser and adjust the low frequency padder screw (20) for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT — Turn the tuning condenser plates out of mesh as far as they will go and set the signal generator at 1550 K. C. Then adjust the high frequency padder (16) again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.

Connect the signal generator lead to the antenna lead, Part No. 41-3191.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders (11) and (6) for the maximum reading on the output meter.

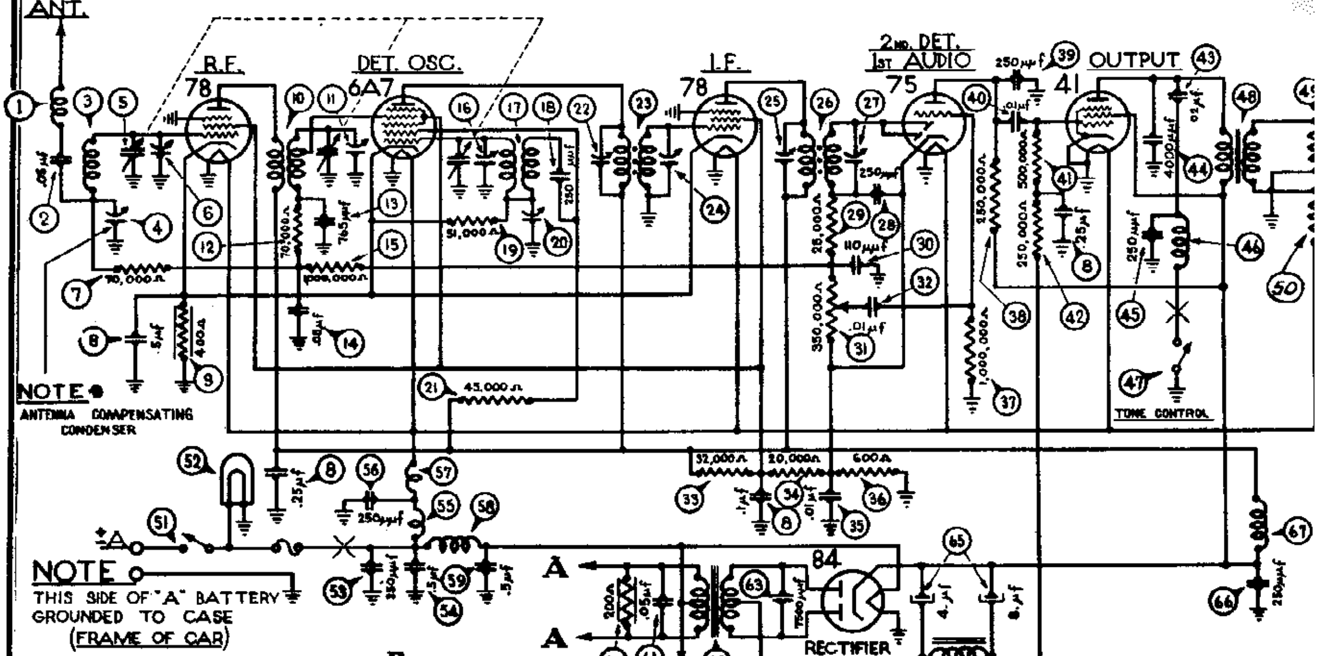
When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

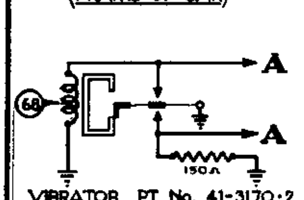
JUNE 1937

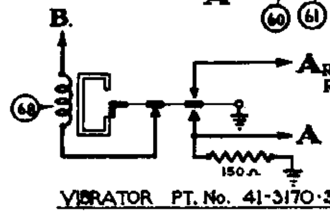
The Model R-1415 is a Special Custom Receiver used exclusively by the Reo Motor Car Company.
The Model W-1419 is a Special Custom-Built Receiver used exclusively by the Willys-Overland Motors Inc.

MODEL P-1417 Packa
Schematic, Chassis
Parts

PHILCO RADIO & TELEV. CORP.







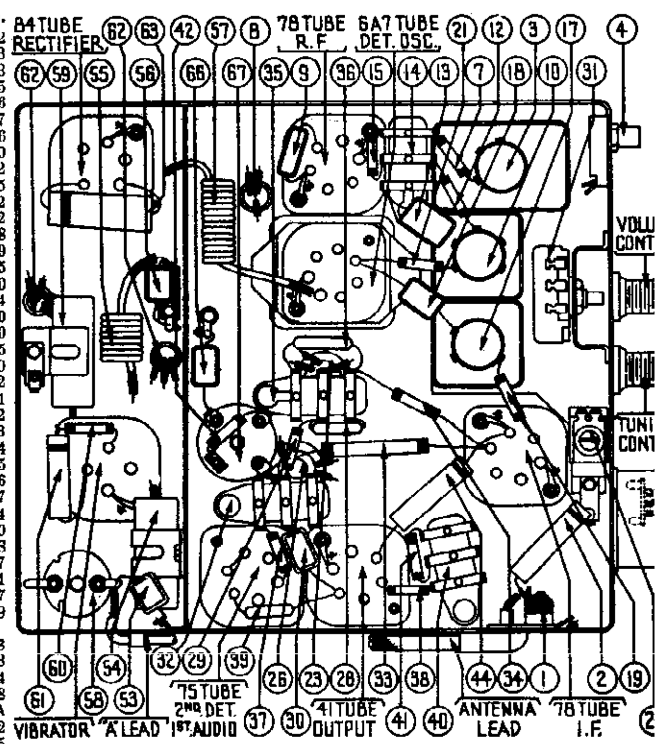
RUN No. 2 — Volume Control ⑪ removed — Part No. 33-5139 added.
RUN No. 3 — Resistor ⑲ removed (51,000 ohms) — Part No. 33-399 added (99,000 ohms).
Add one W-467 washer under volume control to prevent control fr binding.

I.F. = 260 K.C.

OCTOBER 1, 1936

MODEL — P-1417 PARTS LIST

No.	Description	Part No.
1	Antenna choke	32-2344
2	Condenser (.05 mfd.)	30-4444
3	Antenna transformer	32-2306
*4	Antenna coupling condenser	31-6082
*5	Tuning condenser	31-1769
6	First padder (On tun. cond.)	
7	Resistor (70,000 ohms)	33-370334
8	Condenser (.1-.25-.25-.5 mfd)	30-4415
9	Resistor (400 ohms)	33-1211
10	R. F. transformer	32-2307
11	Second padder (On tun. cond.)	
12	Resistor (70,000 ohms)	33-370334
13	Condenser (765 mmfd.)	30-1069
14	Condenser (.05 mfd.)	3615-OSG
15	Resistor (1,000,000 ohms)	33-510344
16	Third padder (On tun. cond.)	
17	Oscillator transformer	32-2308
18	Condenser (250 mmfd.)	30-1032
19	Resistor (51,000 ohms)	33-351344
*20	Low frequency padder	31-6102
21	Resistor (45,000 ohms)	33-345344
22	Padder (Pri. 1st I. F. trans.)	
23	First I.F. transformer	32-2026
24	Padder (Sec. 1st I.F. trans.)	
25	Padder (Pri. 2nd I.F. trans.)	
26	Second I.F. transformer	32-2027
27	Padder (Sec. 2nd I.F. trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (110 mmfd.)	30-1031
31	Volume control (350,000 ohms)	33-5139
32	Condenser (.01 mfd.)	3903-OSU
33	Resistor (32,000 ohms)	33-332344
34	Resistor (20,000 ohms)	33-320334
35	Condenser (.01 mfd.)	3903-OSG
36	Resistor (600 ohms)	33-1212
37	Resistor (1,000,000 ohms)	33-510344
38	Resistor (250,000 ohms)	33-424344
39	Condenser (250 mmfd.)	30-1032
40	Condenser (.01 mfd.)	3903-OSU
41	Resistor (500,000 ohms)	33-449344
42	Resistor (240,000 ohms)	33-424344
43	Condenser (.02 mfd.)	30-4419
44	Condenser (4000 mmfd.)	30-4185
45	Condenser (250 mmfd.)	30-1032
46	Choke	32-2063
*47	Tone control switch	42-5603
*48	Output transformer	32-7495
49	Cone & voice coil	36-3586
*50	Field coil assembly	36-3597
51	On & Off switch assembly	42-5606
52	Pilot lamp	34-2040
53	Condenser (250 mmfd.)	30-1032
54	Condenser (.05 mfd.)	30-4015
55	"A" choke	32-1432
56	Condenser (250 mmfd.)	30-1032
57	Filament choke	32-2038
58	Vibrator choke	32-2039
59	Condenser (.5 mfd.)	30-4015
60	Resistor (200 ohms)	33-1210
61	Condenser (.05 mfd.)	30-4444
62	Power transformer	32-7550
63	Condenser (7500 mmfd.)	30-4420
64	Filter choke	32-7545
65	Filter condenser (4-8 mfd.)	30-2150
66	Condenser (250 mmfd.)	30-1032
67	"B" choke	32-1281
68	Vibrator (Optional)	41-3170-2 / 41-3170-3
	Four prong socket	27-6044
	Five prong socket	27-6035
	Six prong socket	27-6036
	Seven prong socket	27-6037
	Ground clamp	41-3194
	Antenna loom	38-8030
	Interference condenser	45228
	Interference condenser	30-4007
	Distributor resistor	4851
	Fuse	7227
	Fuse insulator	27-7729
	Tuning & volume control knob	27-4318
	Tone control lever	28-7208
	Knob base	28-4184
	Tee bolt	28-6268
	Nut (Rec. mtg.)	W518A
	Tuning & volume shaft	28-8662
	Dial assembly	42-5635
	Antenna lead (on Receiver)	L-2308

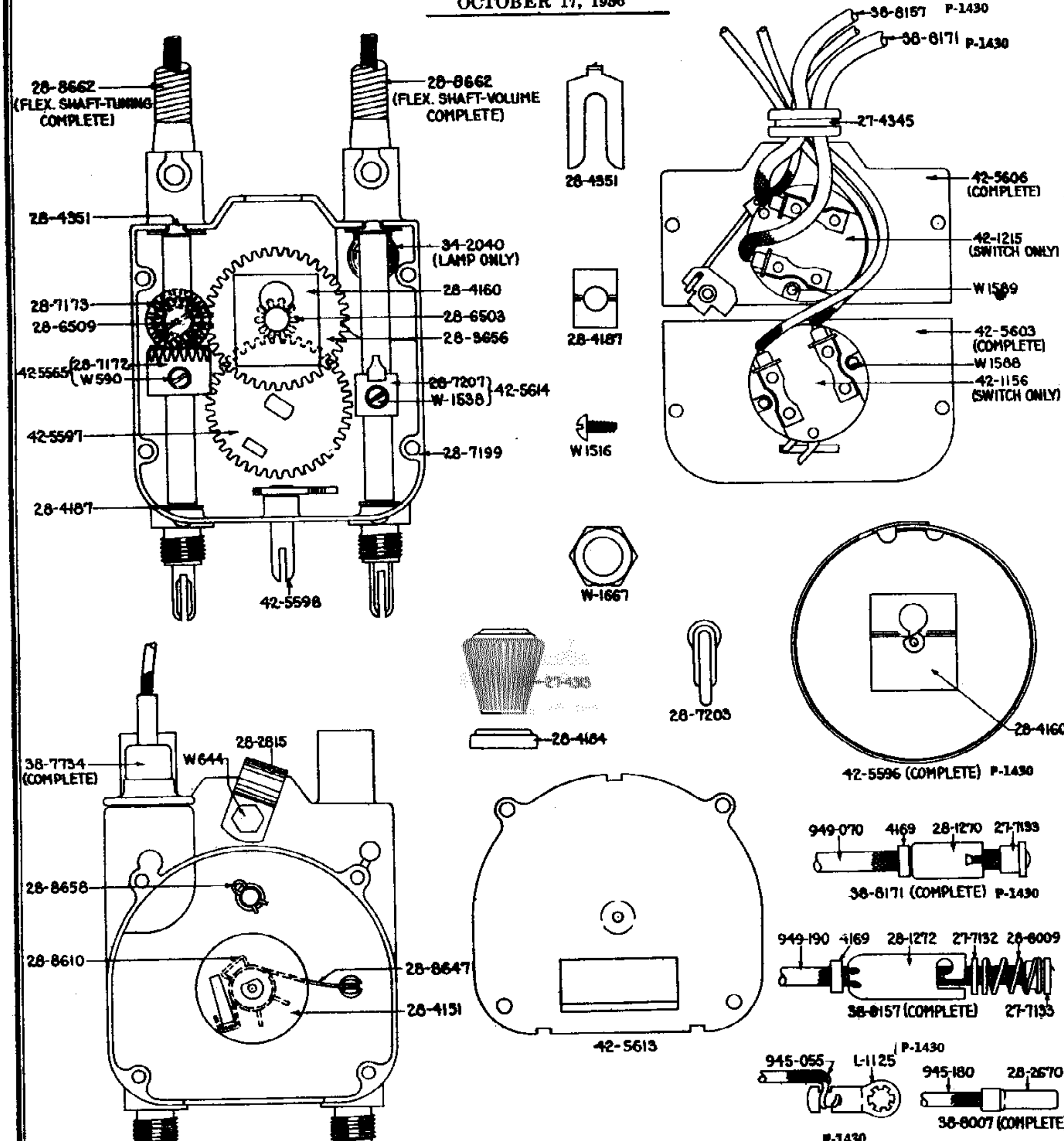


NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicag

MODELS P-1417,P-1430
Packard
Control Parts

PHILCO RADIO & TELEV. CORP.

OCTOBER 17, 1936



PARTS LIST

Part No.	Description
L-1125	Lug (P-1430)
L-1833	Lug (P-1417)
W-590	Set Screw
W-644	P.K. Screw
W-1516	Screw
W-1538	Set Screw
W-1588	Rivet
W-1589	Rivet
W-1667	Nut
945-055	Wire
949-070	Wire
949-180	Wire
949-190	Wire
4169	Rubber Washer
27-4313	Tuning & Volume Knob
27-4345	Grommet
27-7132	Washer
27-7133	Ferrule
28-1270	Housing
28-1272	Housing
28-2670	Prong
28-2815	Clamp
28-3656	Intermediate Gear (large)
28-4151	Drum Washer
28-4160	Drum Spring
28-4184	Knob Base
28-4187	Spring Washer
28-4351	Shaft Retainer
28-6503	Intermediate Gear (small)
28-6509	Miter Idler Screw
28-7172	Miter Gear
28-7173	Miter Idler Gear
28-7199	Control Housing
28-7203	Knob
28-7207	Switch Arm
28-8009	Spring
28-8610	Gear Retaining Spring
28-8647	Back Lash Spring
28-8658	Retaining Spring
28-8662	Tuning & Volume Shaft
34-2040	Pilot Lamp
38-7062	"A" Lead (P-1417)
38-7621	"A" Lead (P-1417)
38-7734	Pilot Lamp Assembly
38-8007	Sensitivity Lead Assembly
38-8157	"A" Lead (P-1430)
38-8171	"A" Lead (P-1430)
42-1156	Sensitivity Switch Only
42-1215	On & Off Switch Only
42-5565	Miter Gear Assembly
42-5596	Scale Assembly (P-1430)
42-5597	Shaft & Gear Assembly
42-5598	Sensitivity Switch Shaft Assembly
42-5603	Sensitivity Switch Assembly
42-5606	On & Off Switch Assembly
42-5613	Top Cover
42-5614	Switch Arm Assembly
42-5635	Scale Assembly (P-1417)

MODEL N-1418 Nash
Socket, Trimmers
Alignment

PHILCO RADIO & TELEV. CORP.

MODEL P-1417 Packard
MODEL G-1418 Graham

I. F. TRANSFORMERS AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield.

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 7.

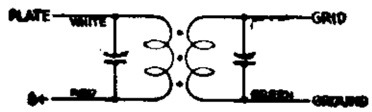


FIGURE 7

If replacements are ever necessary, replace the entire coil assembly, 32-2026 for the first I. F. stage and 32-2027 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

General

OUTPUT METER—The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR—With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F.—Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder 27 on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder 26 for maximum reading. (See Figure 8 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder 24 on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder 22 for maximum reading. Readjust padders 26 and 27 with the generator lead connected to the type 6A7 tube. (See Figure 8 for location of padders).

HIGH FREQUENCY AND R. F.—After padding the first I. F. stage remove the generator lead from the 6A7 tube. Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

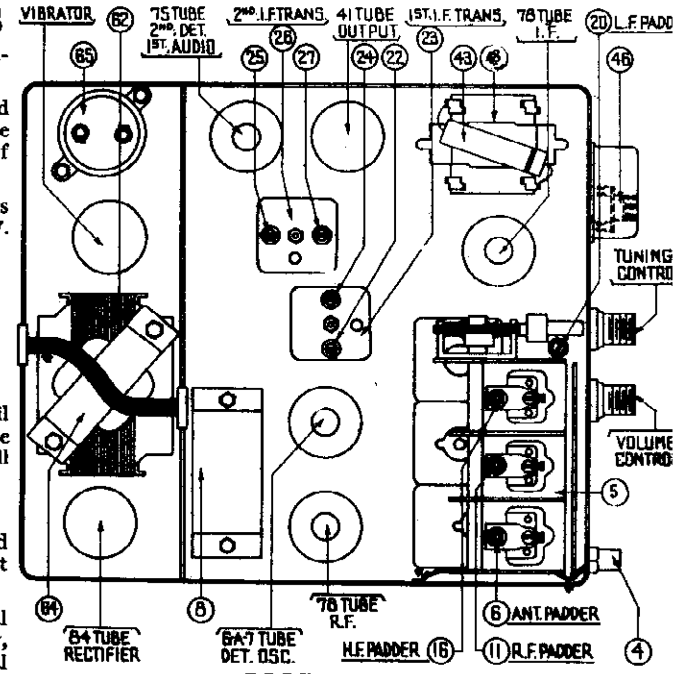
Turn the tuning condenser plates out of mesh as far as they will go.

With the tuning condenser in this position, adjust the high frequency padder 16 and the R. F. padder 11 until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

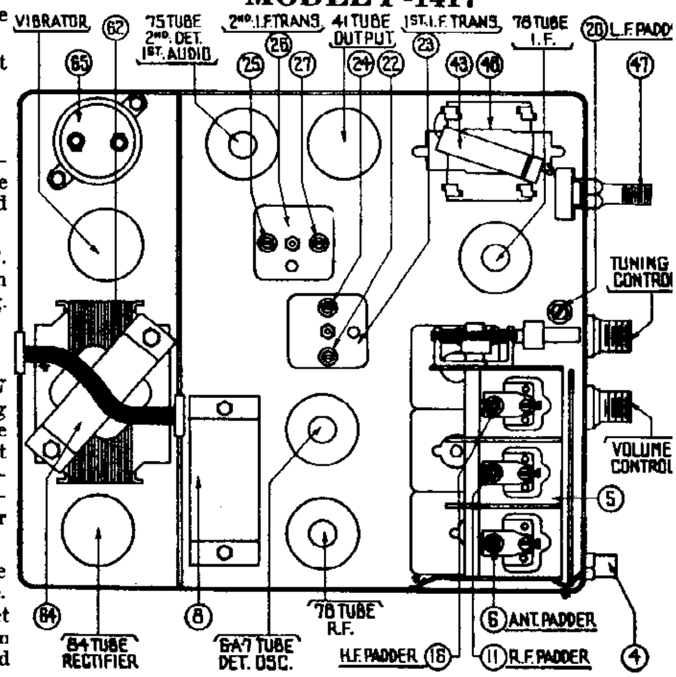
LOW FREQUENCY—Turn the tuning condenser plates in mesh to approximately 600 K. C., 60 on the dial scale and set the signal generator at 600 K. C. Roll the tuning condenser and adjust the low frequency padder screw 20 for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT—Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder 16 again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.



MODEL P-1417



MODEL G-1418 MODEL N-1418

ANTENNA—WHEN PADDING THE ANTENNA STAGE IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE CONSTRUCTED AND USED.

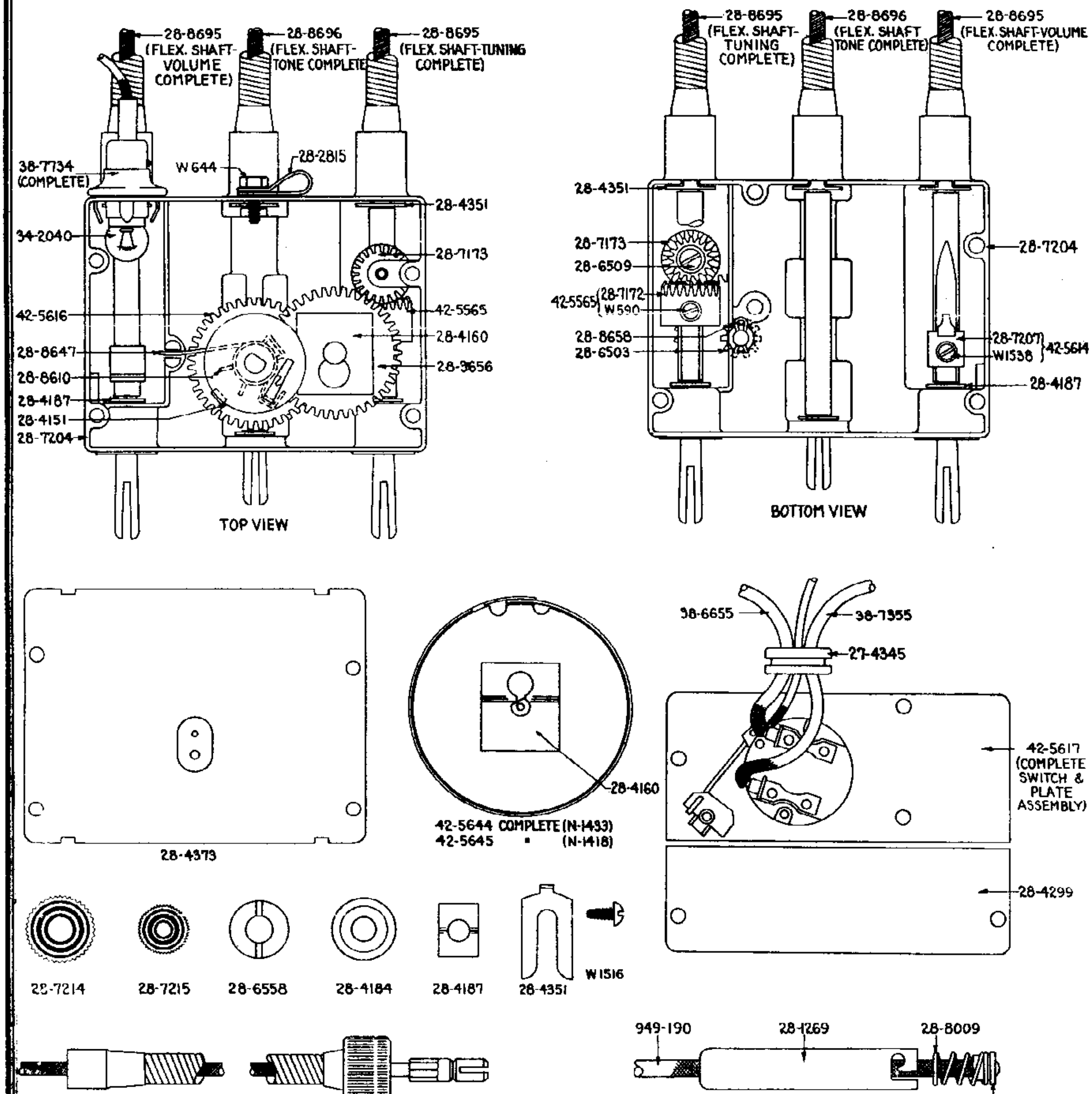
Connect the signal generator lead to the antenna cable assembly (made up of Part No. 38-7295 cable and a 155 mmfd condenser in series between the lead and the signal generator. Plug the cable into the antenna receptacle on the top of the Receiver.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders 11 and 6 for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

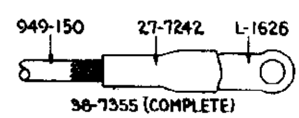
MODELS N-1418, N-1433
Nash
Control Parts

PHILCO RADIO & TELEV. CORP.



28-8695 TUNING & VOLUME (16)
28-8696 TONE (16?)

PARTS LIST



38-7355 (COMPLETE)

Part No.	Description
L-1626	Lug
W-590	Set Screw
W-644	Screw (clamp mtg.)
W-1516	Screw
W-1538	Set Screw
949-150	Wire
949-190	Wire
27-4345	Grommet
27-7133	Ferrule
27-7242	Sleeve
28-1269	Fuse Housing

Part No.	Description
28-2815	Clamp
28-3656	Intermediate Gear (large)
28-4151	Drum Friction Washer
28-4160	Drum Spring
28-4184	Knob Base
28-4187	Spring Washer
28-4299	Cover
28-4351	Shaft Retainer
28-4373	Cover
28-6503	Intermediate Gear (small)
28-6509	Miter Idler Screw

Part No.	Description
28-6558	Gland Nut
28-7172	Miter Gear
28-7173	Miter Idler Gear
28-7204	Control Housing
28-7207	Switch Arm
28-7214	Tuning and Volume Knob
28-7215	Tone Control Knob
28-8009	Spring
28-8610	Gear Retaining Spring
28-8647	Back Lash Spring
28-8658	Retaining Spring

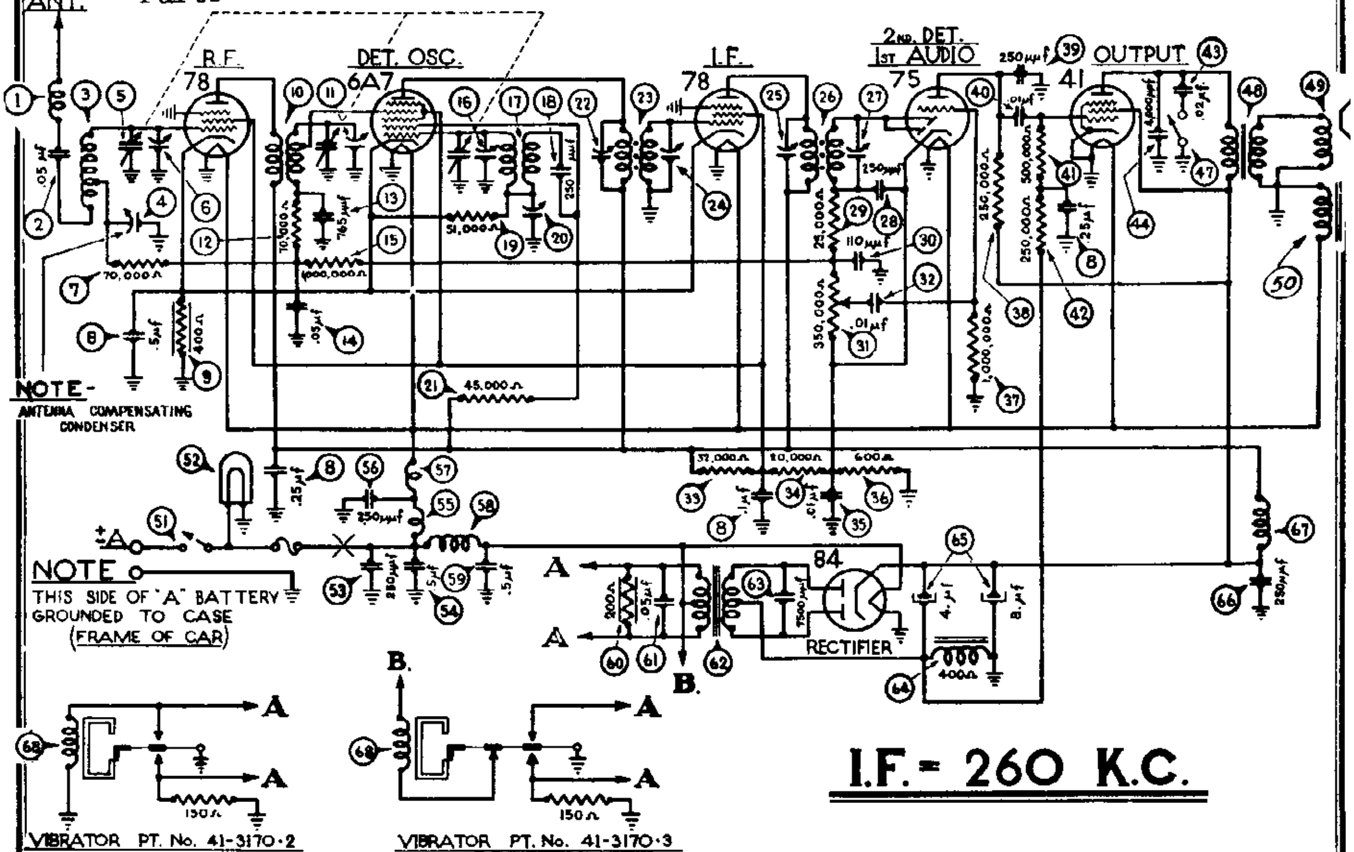
Part No.	Description
28-8695	Tuning and Volume Control Shaft
28-8696	Tone Control Shaft
34-2040	Pilot Lamp
38-7734	Pilot Lamp Assembly
38-6055	"A" Lead
38-7355	"A" Lead
42-5614	Switch Arm Assembly
42-5616	Drum Shaft and Gear Assembly
42-5617	On and Off Switch Assembly
42-5644	Scale Assembly (N-1433)
42-5645	Scale Assembly (N-1418)
42-5565	Miter Gear Assembly

NOVEMBER 15, 1936

Schematic, Chassis Parts

PHILCO RADIO & TELEV. CORP.

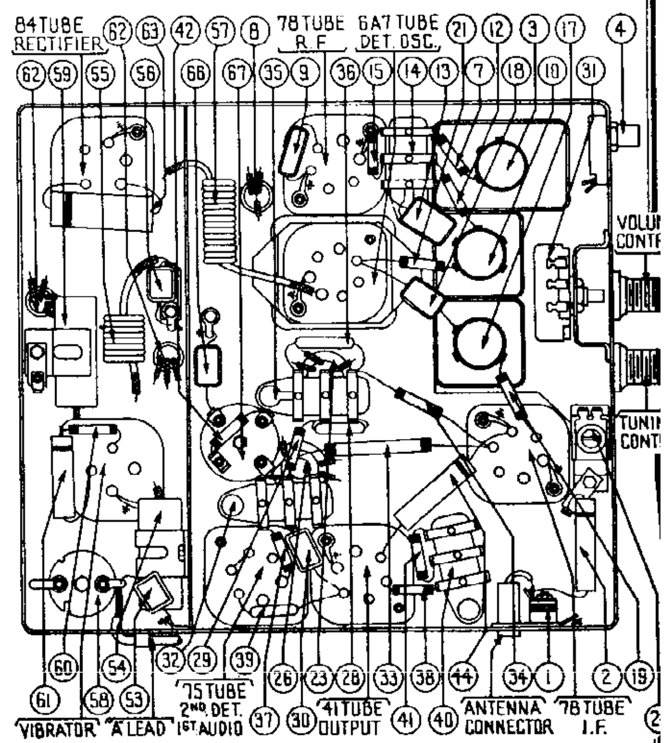
MODELS N-1418 Nash
G-1418 Graham



OCTOBER 20, 1936

MODEL G-1418 PARTS LIST

No.	Description	Part No.
1	Antenna Choke	38-8244
2	Condenser (.05 mfd.)	30-4444
3	Antenna Transformer	32-2326
*4	Antenna Coupling Condenser	31-6082
*5	Tuning Condenser	31-1769
6	First Padder (on tun. cond.)	
7	Resistor (70,000 ohms)	33-370334
8	Condenser (.1-.25-.25-.5 mfd.)	30-4415
9	Resistor (400 ohms)	33-1211
10	R. F. Transformer	32-2307
11	Second Padder (on tun. cond.)	
12	Resistor (70,000 ohms)	33-370334
13	Condenser (765 mmfd.)	30-1069
14	Condenser (.05 mfd.)	3615-OSG
15	Resistor (1,000,000 ohms)	33-510344
16	Third Padder (on tun. cond.)	
17	Oscillator Transformer	32-2308
18	Condenser (250 mmfd.)	30-1032
19	Resistor (51,000 ohms)	33-351344
*20	Low Frequency Padder	31-6102
21	Resistor (45,000 ohms)	33-345344
22	Padder (Pri. 1st I. F. Trans.)	
23	First I. F. Transformer	32-2026
24	Padder (Sec. 1st I. F. Trans.)	
25	Padder (Pri. 2nd I. F. Trans.)	
26	Second I. F. Transformer	32-2027
27	Padder (Sec. 2nd I. F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (110 mmfd.)	30-1031
31	Volume Control (350,000 ohms)	33-5139
32	Condenser (.01 mfd.)	3903-OSU
33	Resistor (32,000 ohms)	33-332434
34	Resistor (20,000 ohms)	33-320334
35	Condenser (.01 mfd.)	3903-OSG
36	Resistor (600 ohms)	33-1212
37	Resistor (1,000,000 ohms)	33-510344
38	Resistor (250,000 ohms)	33-424344
39	Condenser (250 mmfd.)	30-1032
40	Condenser (.01 mfd.)	3903-OSU
41	Resistor (500,000 ohms)	33-449344
42	Resistor (240,000 ohms)	33-424344
43	Condenser (.02 mfd.)	30-4419
44	Condenser (4000 mmfd.)	30-4185
45	Condenser (250 mfd.)	30-1032
46	Choke	32-2063
*47	Tone Control Switch	42-5646
*48	Output Transformer	32-7495
49	Cone & Voice Coil	36-3586
*50	Field Coil Assembly	36-3597
51	On & Off Switch Assembly	42-5617
52	Pilot Lamp	34-2040
53	Condenser (250 mmfd.)	30-1032
54	Condenser (.05 mfd.)	30-4015
55	"A" Choke	32-1432
56	Condenser (250 mmfd.)	30-1032
57	Filament Choke	32-2038
58	Vibrator Choke	32-2039
59	Condenser (.5 mfd.)	30-4015
60	Resistor (200 ohms)	33-1210
61	Condenser (.05 mfd.)	30-4444
62	Power Transformer	32-7550
63	Condenser (7500 mmfd.)	30-4420
64	Filter Choke	32-7545
65	Filter Condenser (4-8 mfd.)	30-2150
66	Condenser (250 mmfd.)	30-1032
67	"B" Choke	32-1281
68	Vibrator (Optional)	41-3170-2 41-3170-3
	Four-prong Socket	27-6044
	Five-prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven-prong Socket	27-6037
	Interference Condenser	30-4007
	Distributor Resistor	33-1196
	Fuse	7227
	Fuse Insulator	27-7729
	Tuning & Volume Control Knob	27-4428
	Tone Control Knob	27-4430
	Knob Base	28-4184
	Control Wrench	28-4380
	Tee Bolt (Rec. mtg.)	28-6161
	Nut (Rec. mtg.)	W-518A
	Tuning & Volume Shaft	28-8684
	Tone Control Shaft	28-8686
	Dial Assembly	42-5652
	Pilot Lamp Assembly	38-7734

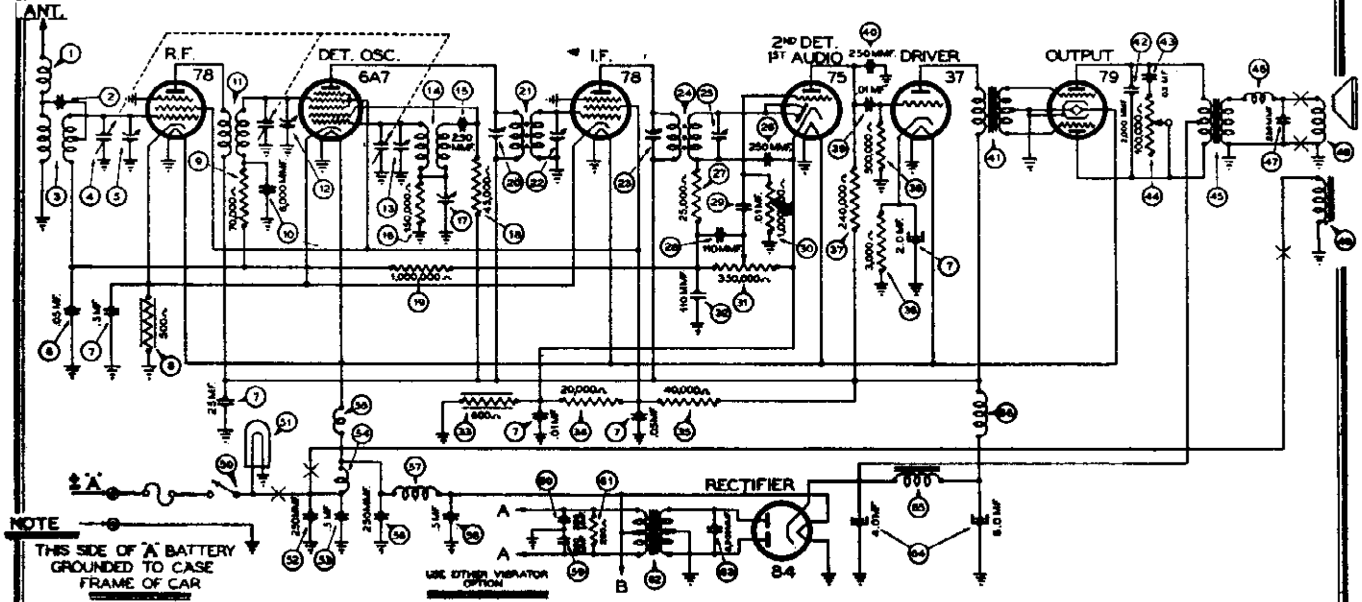


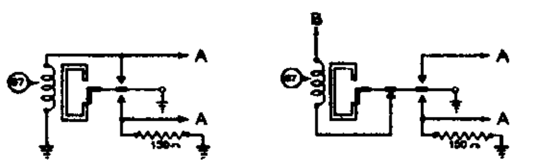
NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the le service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chica

MODELS L-1420, L-1424, L-1425, Lincoln

PHILCO RADIO & TELEV. CORP.

Schematic, Chassis Parts





VIBRATOR PT. No. 41-3170-2 VIBRATOR PT. No. 41-3170-3

FOR ALIGNMENT SEE INDEX

I.F. = 260 KC

MODEL L-1424 — PARTS LIST

No.	Description	Part No.
1	Antenna Choke	38-8210
2	Condenser (90 mmfd.)	30-1046
3	Antenna Transformer	32-2365
4	Tuning Condenser	31-1954
5	First Padder (on tun. cond.)	
6	Condenser (.05 mfd.)	30-4444
7	Condenser (.01, .05, .25, .5, 2 mfd.)	30-4493
8	Resistor (500 ohms)	33-1213
9	Resistor (70,000 ohms)	33-370344
10	Condenser (6000 mmfd.)	30-4445
11	R. F. Transformer	32-2231
12	Second Padder (on tun. cond.)	
13	Third Padder (on tun. cond.)	
14	Oscillator Transformer	32-2232
15	Condenser (250 mmfd.)	30-1032
16	Resistor (150,000 ohms)	33-415344
17	Low Frequency Padder	31-6056
18	Resistor (45,000 ohms)	33-345344
19	Resistor (1,000,000 ohms)	33-510344
20	Padder (Pri. 1st I.F. trans.)	
21	First I.F. Transformer	32-2286
22	Padder (Sec. 1st I.F. trans.)	
23	Padder (Pri. 2nd I.F. trans.)	
24	Second I.F. Transformer	32-2167
25	Padder (Sec. 2nd I.F. trans.)	
26	Condenser (250 mmfd.)	30-1032
27	Resistor (25,000 ohms)	33-325344
28	Condenser (110 mmfd.)	30-1031
29	Condenser (.01 mfd.)	30-4479
30	Resistor (1,000,000 ohms)	33-510344
31	Volume Control (350,000 ohms)	33-5202
32	Condenser (110 mmfd.)	30-1031
33	Resistor (600 ohms)	33-1212
34	Resistor (20,000 ohms)	33-320344
35	Resistor (40,000 ohms)	33-340444
36	Resistor (3000 ohms)	33-230344
37	Resistor (240,000 ohms)	33-424344
38	Resistor (500,000 ohms)	33-449344
39	Condenser (.01 mfd.)	30-4145
40	Condenser (250 mmfd.)	30-1032
41	Input Transformer	32-7779
42	Condenser (2000 mmfd.)	30-4177
43	Condenser (.03 mfd.)	30-4447
44	Tone Control (100,000 ohms)	33-5141
44	Tone Control (L-1425)	33-5101
45	Output Transformer	32-7778
45	Output Transformer (L-1425)	32-7788
46	Choke	32-2269
47	Condenser (250 mmfd.)	30-1032
48	Cone & Voice Coil	36-3159
49	Field Coil Assembly	36-3513
50	On & Off Switch	42-5617
51	Pilot Lamp	34-2040
52	Condenser (250 mmfd.)	30-1032
53	Condenser (.5 mfd.)	30-4474
54	"A" Choke	32-1374
55	Filament Choke	32-1561
56	Condenser (250 mmfd.)	30-1032
57	Vibrator Choke	32-2249
58	Condenser (.5 mfd.)	30-4474
59	Condenser (250 mmfd.)	30-1032
60	Condenser (250 mmfd.)	30-1032
61	Resistor (200 ohms)	33-120344
62	Power Transformer	32-7720
63	Condenser (8000 mmfd.)	30-4420
64	Filter Condenser (4-8 mfd.)	30-2167
65	Filter Choke	32-7722
66	"B" Choke	32-1281
67	Vibrator (OPTIONAL)	41-3170-2 41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	26-6036
	Seven Prong Socket	27-6037
	Fuse	7227
	Fuse Insulator	27-7729
	Water Gauge Condenser	30-4007
	Generator Condenser	30-4181
	Oil Gauge Condenser	30-4307
	Gas Gauge Condenser	30-4663
	Distributor Condenser	30-4404
	Antenna Shield Loom	L-2569
	Plate (Rec. mtg.)	29-3734
	Screw (Rec. mtg.)	W-1614
	Speaker Cable	41-3260
	Adapter Plate	28-4560
	Wrench	28-4380
	Tuning Shaft	28-8704
	Volume Shaft	28-8700
	Tone Control Shaft	28-8701
	Scale Assembly	42-5666
	Pilot Lamp Assembly	38-7734
	Tuning & Volume Knob	27-4426
	Tone Knob	27-4427
	Receiver Housing	38-1756

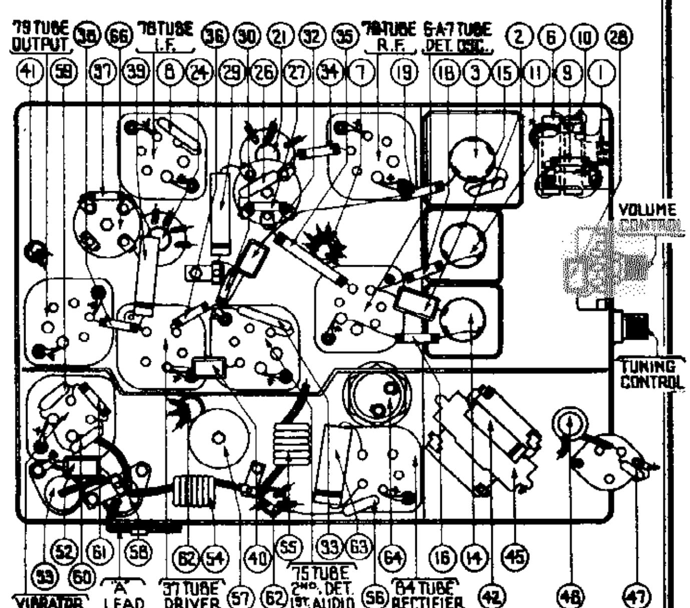


FIGURE 136

CHANGES — "Run Numbers" are stamped on the chassis sub-base for identification. These "Run Numbers" are changed consecutively as major changes are made in the Receiver wiring and parts.

RUN No. 2 — Volume Control 30 removed — Part No. 33-5202 added.

SEE INDEX FOR ALIGNMENT

The Circuit of the Model L-1420 and L-1425 is identical to the Model L-1424 with the following exception:—

The Field for the L-1425 is supplied from the center tap of chokes 54 and 55.

The Models L-1420, L-1424 and L-1425 are Special Custom-Built Receivers used exclusively by the Lincoln Motor Company in their 1937 cars.

Socket, Trimmers
Alignment

PHILCO RADIO & TELEV. CORP.

MODELS L1420, P1421, P1422
L1424, L1425, P1426
P1439, L1460
MODELS F1440, F1442

MODELS L1420, P1421, P1422, L1424, L1425, P1426 AND P1439, L-1460

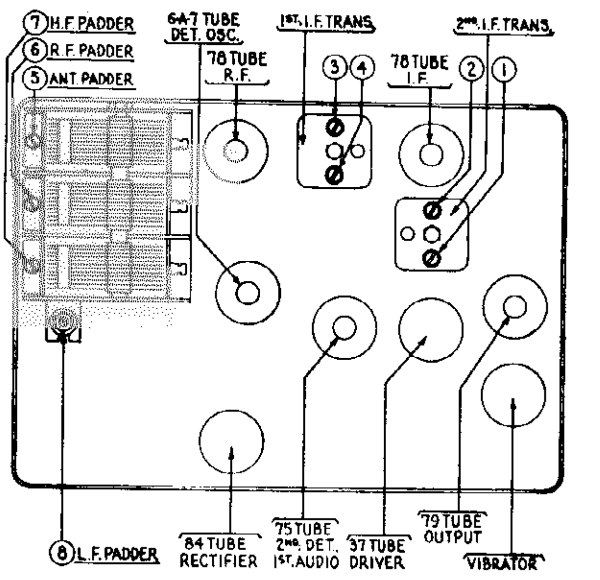
OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	260 K. C.	To Grid of 78 Tube—I.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection	1 - 2
2	260 K. C.	To Grid of 6A7 Tube	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection	3 - 4 1 - 2
3	1500 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Note 1	7 - 6
4	580 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Set Tuning Condensers at 580 K. C.	8 Note 2
5	1550 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Set Tuning Condensers at 1550 K. C.	7
6	1400 K. C.	Note 4	Note 4	Set Tuning Condensers at 1400 K. C.	6 - 5

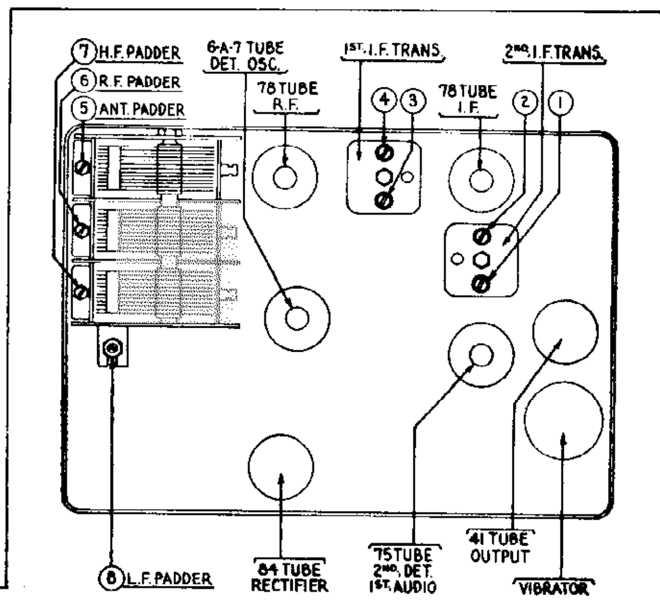
Adjust for maximum reading on the output meter.

NOTE 1—Turn the condenser rotor plates completely out of mesh. Use a piece of bond letterhead paper as a gauge between the heel of the rotor plates and the stator plates and turn the condenser plates in mesh until they strike against the paper.

NOTE 2—Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then re-adjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4—Connect the Antenna lead Part No. 41-3191 to the Antenna receptacle on the Receiver in series with the correct dummy capacity. For the L1420, L1424 and L1425 use a 565 mmfd. condenser, for the P1421, P1426 and P1439 use a 230 mmfd. condenser.





MODELS F1440 AND F1442

OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	260 K. C.	To Grid of 78 Tube—I.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection	1 - 2
2	260 K. C.	To Grid of 6A7 Tube	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection	3 - 4 1 - 2
3	1500 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Note 1	7 - 6
4	580 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Set Tuning Condensers at 580 K. C.	8 Note 2
5	1550 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Set Tuning Condensers at 1550 K. C.	7
6	1400 K. C.	Note 4	Note 4	Set Tuning Condensers at 1400 K. C.	6 - 5

Adjust for maximum reading on the output meter.

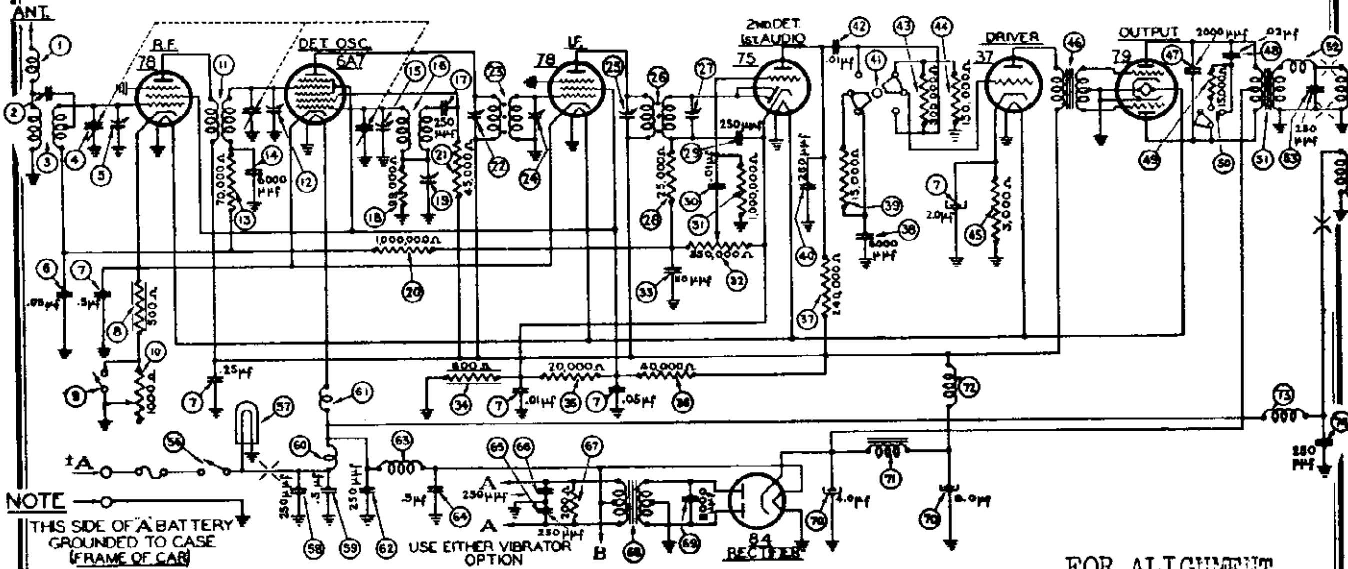
NOTE 1—Turn the condenser rotor plates completely out of mesh. Use a piece of bond letterhead paper as a gauge between the heel of the rotor plates and the stator plates and turn the condenser plates in mesh until they strike against the paper.

NOTE 2—Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then re-adjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

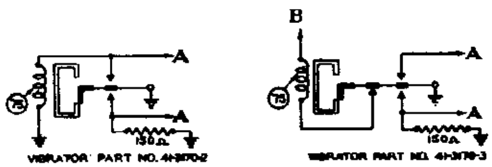
NOTE 4—For the F1440 use the Ford Antenna transformer and lead assembly, connected in series to the signal generator with a 15 mmfd. condenser. For the F1442 use the standard antenna lead Part No. 41-3191 connected directly to the Antenna terminal of the signal generator.

MODEL P-1426 Packard
Schematic, Chassis
Changes, Parts

PHILCO RADIO & TELEV. CORP.



FOR ALIGNMENT
SEE INDEX



I.F.= 260 KC.

FOR ALIGNMENT
SEE INDEX

PARTS LIST

No.	Description	Part No.
1	Antenna Choke	38-8074
2	Condenser (80 mmfd.)	30-1066
3	Antenna Transformer	32-2230
4	Tuning Condenser	31-1913
5	First Padder (on Tun. Cond.)	
6	Condenser (.05 mfd.)	30-4444
7	Condenser (.01-.05-.25-.5-2 mfd.)	30-4493
8	Resistor (500 ohms)	33-1218
9	Sensitivity Control Switch	42-1225
10	Sensitivity Control	33-5129
11	R. F. Transformer	32-2231
12	Second Padder (on Tun. Cond.)	
13	Resistor (70,000 ohms)	33-370344
14	Condenser (6000 mmfd.)	30-4445
15	Third Padder (on Tun. Cond.)	
16	Oscillator Transformer	32-2232
17	Condenser (250 mmfd.)	30-1032
18	Resistor (99,000 ohms)	33-399344
19	Low Frequency Padder	31-6056
20	Resistor (1,000,000 ohms)	33-510344
21	Resistor (45,000 ohms)	33-345344
22	Padder (Pri. 1st I.F. Trans.)	
23	First I. F. Transformer	32 2286
24	Padder (Sec. 1st I.F. Trans.)	
25	Padder (Pri. 2nd I.F. Trans.)	
26	Second I. F. Transformer	32-2167
27	Padder (Sec. 2nd I.F. Trans.)	
28	Resistor (25,000 ohms)	33-325344
29	Condenser (250 mmfd.)	30-1032
30	Condenser (.01 mfd.)	30-4479
31	Resistor (1,000,000 ohms)	33-510344
32	Volume Control (350,000 ohms)	38-8596
33	Condenser (110 mmfd.)	30-1031
34	Resistor (600 ohms)	33-1212
35	Resistor (20,000 ohms)	33-320344
36	Resistor (40,000 ohms)	33-340344
37	Resistor (240,000 ohms)	33-424344
38	Condenser (6000 mmfd.)	30-4445
39	Resistor (15,000 ohms)	33-315344
40	Condenser (250 mmfd.)	30-1032
41	Bass Compensation Switch	42-1316
42	Condenser (.01 mfd.)	30-4145
43	Resistor (300,000 ohms)	33-430344
44	Resistor (150,000 ohms)	33-415344
45	Resistor (3000 ohms)	33-230344
46	Input Transformer	32-7779
47	Condenser (2000 mmfd.)	30-4177
48	Condenser (.02 mfd.)	30-4419
49	Resistor (15,000 ohms)	33-315344
50	Tone Control Switch	42-1315
51	Output Transformer	32-7778
52	Choke	32-2269
53	Condenser (250 mmfd.)	30-1032
54	Cone & Voice Coil	36-3159
55	Field Coil Assembly	36-3513
	Speaker Assembly (A-41)	36-1260
56	On & Off Switch	42-5615
57	Pilot Lamp	34-2040
58	Condenser (250 mmfd.)	30-1032
59	Condenser (.5 mfd.)	30-4474
60	"A" Choke	32-1374
61	Filament Choke	32-1561
62	Condenser (250 mmfd.)	30-1032
63	Vibrator Choke	32-2249
64	Condenser (.5 mfd.)	30-4474
65	Condenser (250 mmfd.)	30-1032
66	Condenser (250 mmfd.)	30-1032
67	Resistor (200 ohms)	33-120344
68	Power Transformer	32-7720
69	Condenser (8000 mmfd.)	30-4420
70	Filter Condenser (4-8 mfd.)	30-2167
71	Filter Choke	32-7811
72	"B" Choke	32-1281
73	Choke	32-2268
74	Condenser (250 mmfd.)	30-1032
75	Vibrator (OPTIONAL)	41-3170-2 41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Speaker Socket	27-6030
	Receiver Housing	38-1830
	Inductive Suppressor	32-2250
	Interference Condenser (gen.)	30-4475
	Interference Condenser (Dome Light)	30-4476
	Interference Condenser	30-4477
	Fuse	7227
	Fuse Insulator	27-7729
	Stud	28-6231
	Nut	W-55
	Washer	4486
	Washer	6691
	Dial	27-5247
	Tuning Shaft	28-8656
	Volume Shaft	28-8657
	Pilot Lamp Assembly	38-6750
	Switch & Lead Assembly	41-3217

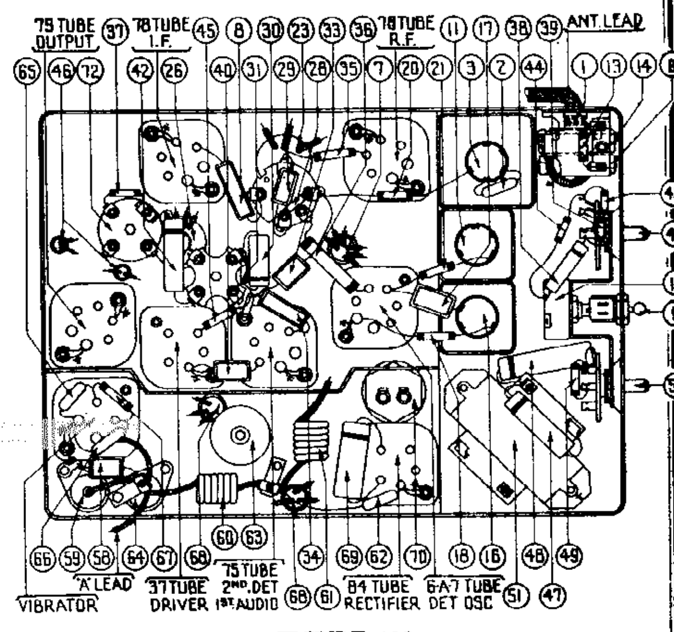


FIGURE 138

CHANGES — "Run Numbers" are stamped on the chassis sub-base for identification. These "Run Numbers" are changed consecutively as major changes are made in the Receiver wiring and parts.

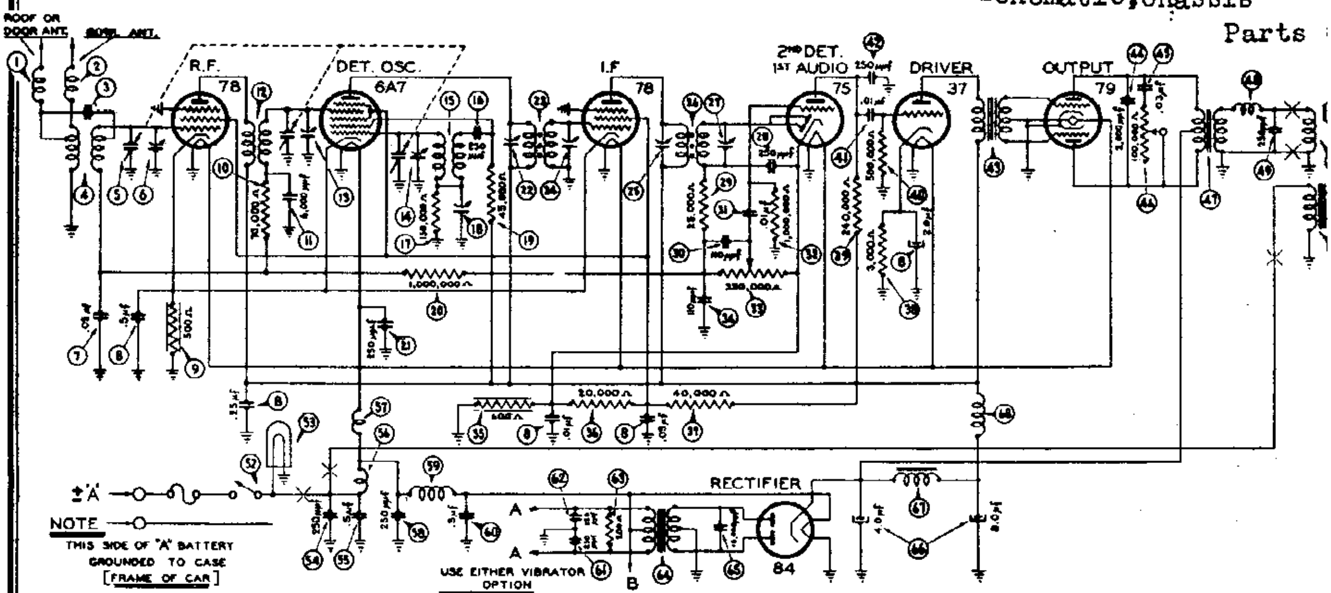
RUN No. 2 — Condenser ② removed (110 mmfd.) — Part No. 30-1066 added (80 mmfd.).

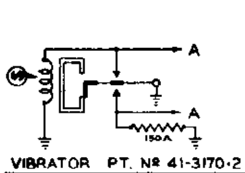
The Model P-1426 is a Special Custom-Built Receiver used exclusively by the Packard Motor Company in the 1937 Packard cars.

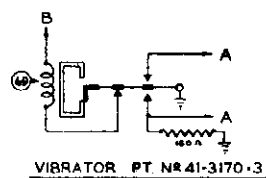
MODELS L-1427, L-1429
L-1460 Lincoln

PHILCO RADIO & TELEV. CORP.

Schematic, Chassis
Parts







IF = 260 KC

PARTS LIST

No.	Description	Part No.
1	Antenna Choke	38-8106
2	Antenna Choke	38-8106
3	Condenser (50 mmfd.)	30-1029
4	Antenna Transformer	32-2517
5	Tuning Condenser	31 1984
6	First Padder (on Tun. Cond.)	
7	Condenser (.05 mfd.)	30-4444
	(.01-.05-.25-.5-2 mfd.)	30-4493
8	Condenser (.01-.05-.25-.5-2 mfd.)	30-4493
9	Resistor (500 ohms)	33-1213
10	Resistor (70,000 ohms)	33-370344
11	Condenser (6000 mmfd.)	30-4445
12	R. F. Transformer	32-2231
13	Second Padder (on Tun. Cond.)	
14	Third Padder (on Tun. Cond.)	
15	Oscillator Transformer	32-2232
16	Condenser (250 mmfd.)	30-1032
17	Resistor (150,000 ohms)	33-415344
18	Low Frequency Padder	31-6056
19	Resistor (45,000 ohms)	33-345344
20	Resistor (1,000,000 ohms)	33-510344
21	Condenser (250 mmfd.)	30-1032
22	Padder (Pri. 1st I.F. Trans.)	
23	First I. F. Transformer	32-2286
24	Padder (Sec. 1st I.F. Trans.)	
25	Padder (Pri. 2nd I.F. Trans.)	
26	Second I. F. Transformer	32-2167
27	Padder (Sec. 2nd I.F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (110 mmfd.)	30-1031
31	Condenser (.01 mfd.)	30-4479
32	Resistor (1,000,000 ohms)	33-510344
33	Volume Control (350,000 ohms)	33-5202
34	Condenser (110 mmfd.)	30-1031
35	Resistor (600 ohms)	33-1212
36	Resistor (20,000 ohms)	33-320344
37	Resistor (40,000 ohms)	33-340444
38	Resistor (3000 ohms)	33-230344
39	Resistor (240,000 ohms)	33-424344
40	Resistor (500,000 ohms)	33-449344
41	Condenser (.01 mfd.)	30-4145
42	Condenser (250 mmfd.)	30-1032
43	Input Transformer	32-7779
44	Condenser (2000 mmfd.)	30-4177
45	Condenser (.03 mfd.)	30-4447
46	Tone Control (100,000 ohms)	33-5141
47	Output Transformer (L-1427)	32-7778
47	Output Transformer (L-1429)	32-7788
48	Choke	32-1432
49	Condenser (250 mmfd.)	30-1032
50	Cone & Voice Coil	36-3159
51	Field Coil Assembly	36-3513
	Speaker Assembly (A-44)	36-1326
52	On & Off Switch	42-5617
53	Pilot Lamp	34-2040
54	Condenser (250 mmfd.)	30-1032
55	Condenser (.5 mfd.)	30-4474
56	"A" Choke	32-1374
57	Filament Choke	32-1604
58	Condenser (250 mmfd.)	30-1032
59	Vibrator Choke	32-2537
60	Condenser (.5 mfd.)	30-4474
61	Condenser (250 mmfd.)	30-1032
62	Condenser (250 mmfd.)	30-1032
63	Resistor (200 ohms)	33-120344
64	Power Transformer	32-7720
65	Condenser (8000 mmfd.)	30-4420
66	Filter Condenser (4-8 mfd.)	30-2167
67	Filter Choke	32-7722
68	"B" Choke	32-1281
69	Vibrator (OPTIONAL)	41-3170-2 41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Fuse	7227
	Fuse Insulator	27-7729
	Water Gauge Condenser	30-4007
	Generator Condenser	30-4181
	Oil Gauge Condenser	30-4307
	Gas Gauge Condenser	30-4663
	Distributor Condenser	30-4404
	Plate (Rec. Mtg.)	28-3734
	Screw (Rec. Mtg.)	W-1614
	Speaker Cable	41-3260
	Adapter Plate	42-5691
	Wrench	28-4380
	Tuning Shaft	28-8704
	Volume Shaft	28-8700
	Tone Control Shaft	28-8701
	Scale Assembly	42-5666
	Pilot Lamp Assembly	38-7734
	Tuning & Volume Knob	27-4426
	Tone Control Knob	27-4427
	Receiver Housing	38-8565

FOR ALIGNMENT SEE INDEX

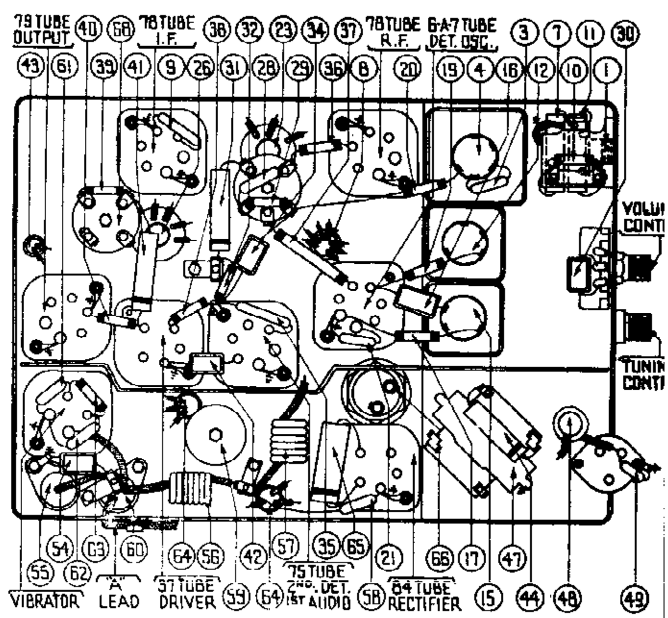


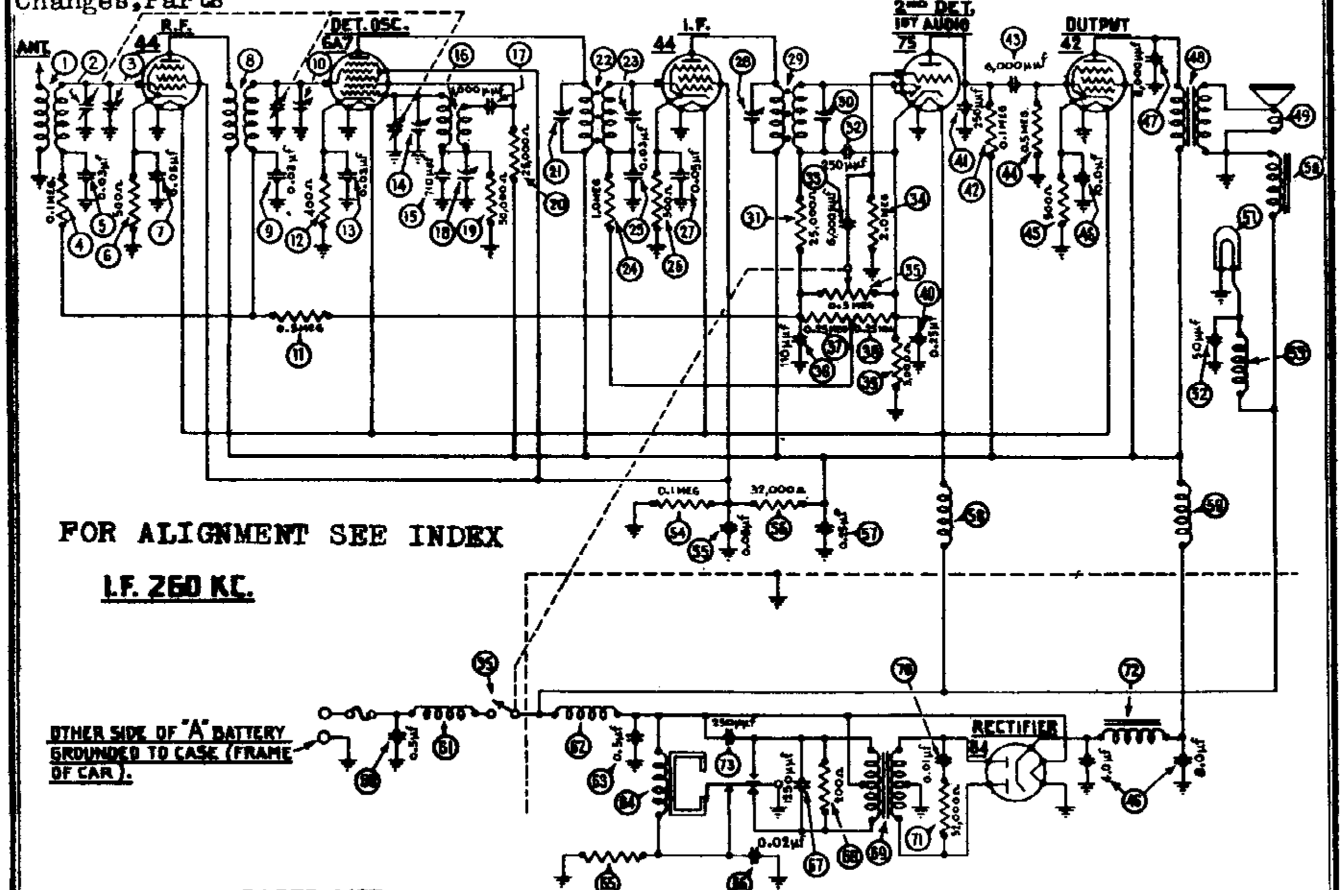
FIGURE 140

The circuit for the Model L-1429 is the same as for the L-1427.

The Models L-1427 and L-1429 are Special Custom-Built Receivers used exclusively by the Lincoln Motor Company in their 1937 cars.

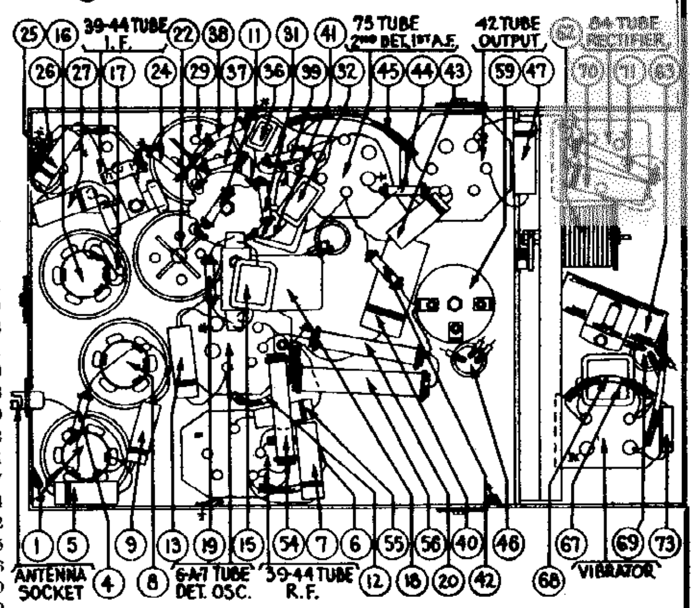
MODELS DP, DPV Police
Schematic, Chassis
Changes, Parts

PHILCO RADIO & TELEV. CORP.



PARTS LIST

No.	Description	Part No.	No.	Description	Part No.
1	Antenna Transformer	32-1445	40	Condenser (.25 mfd.)	30-4146
2	Tuning Condenser	31-1321	41	Condenser (250 mmfd.)	5858
3	First Padder (on Tun. Cond.)		42	Resistor (100,000 ohms)	6099
4	Resistor (100,000 ohms)	6099	43	Condenser (6,000 mmfd.)	30-4125
5	Condenser (.03 mfd.)	30-4025	44	Resistor (500,000 ohms)	6097
6	Resistor (500 ohms)	33-3031	45	Resistor (500 ohms)	33-3031
7	Condenser (.05 mfd.)	30-4020	46	Condenser (4-8-10 mfd.)	30-2072
8	R. F. Transformer	32-1446	47	Condenser (6,000 mmfd.)	30-4024
9	Condenser (.03 mfd.)	30-4025	48	Output Transformer	32-7214
10	Second Padder (on Tun. Cond.)		49	Cone & Voice Coil	02861
11	Resistor (500,000 ohms)	6097	50	Field Coil Assembly	36-3097
12	Resistor (400 ohms)	33-3016	51	Pilot Lamp	34-2031
13	Condenser (.03 mfd.)	30-4025	52	Condenser (50 mmfd.)	30-1029
14	Third Padder (on Tun. Cond.)		53	Choke	32-1438
15	Condenser (710 mmfd.)	5863	54	Resistor (100,000 ohms)	4411
16	Oscillator Transformer	32-1447	55	Condenser (.05 mfd.)	30-4020
17	Condenser (1,000 mmfd.)	30-1007	56	Resistor (32,000 ohms)	33-1026
18	Padder	04000R	57	Condenser (.25 mfd.)	04360
19	Resistor (50,000 ohms)	6098	58	Choke	32-1402
20	Resistor (25,000 ohms)	3656	59	R. F. Choke	32-1281
21	Padder (Pri. 1st. I. F. Trans.)		60	Condenser (.5 mfd.)	30-4147
22	First I. F. Transformer	32-1448	61	"A" Choke	32-1374
23	Padder (Sec. 1st I. F. Trans.)		62	Vibrator Choke	32-1282
24	Resistor (1,000,000 ohms)	33-1096	63	Condenser (.5 mfd.)	30-4015
25	Condenser (.03 mfd.)	30-4025	64	Vibrator	41-3186
26	Resistor (500 ohms)	33-3031	65	Resistor (300 ohms)	33-3010
27	Condenser (.05 mfd.)	30-4020	66	Condenser (.02 mfd.)	30-4039
28	Padder (Pri. 2nd I. F. Trans.)		67	Condenser (1,250 mmfd.)	5886
29	Second I. F. Transformer	32-1449	68	Resistor (200 ohms)	7217
30	Padder (Sec. 2nd I. F. Trans.)		69	Power Transformer	32-7216
31	Resistor (25,000 ohms)	33-1013	70	Condenser (.01 mfd.)	30-4051
32	Condenser (250 mmfd.)	5858	71	Resistor (32,000 ohms)	7836
33	Condenser (6,000 mmfd.)	30-4125	72	"B" Filter Choke	32-7215
34	Resistor (2,000,000 ohms)	33-1025	73	Condenser (250 mmfd.)	5858
35	Vol. Con. & Switch Assm.	38-5534		Glass (variable frequency)	27-7325
36	Condenser (110 mmfd.)	30-1031		Flexible Shafts	28-8206
37	Resistor (250,000 ohms)	33-1097		Knobs	27-4058
38	Resistor (250,000 ohms)	33-1097		Glass (red) fixed frequency	27-7710
39	Resistor (5,000 ohms)	6096		Pointer	28-1957



CHANGES — "Run numbers" are stamped on the chassis sub-base for identification. These "Run numbers" are changed consecutively as major changes are made in the Receiver wiring and parts.

RUN No. 2 — Condenser 47 removed (6000 mmfd.) — Part No. 30-4145 added (.01 mfd.)
Condenser 60 removed (.5 mfd.) — Part No. 30-4306 added (.5 mfd.)

ADJUSTMENT — The correct padding procedure for the Models DP and DPV is given

PHILCO RADIO & TELEV. CORP.

MODELS DP, DPV
MODELS P1430, S1431, P1432
N1433, N1434, G1436
S1437
Socket, Trimmers, Alignment

MODELS DP and DPV POLICE RADIO

OPERATION	SIGNAL GENERATOR		DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
	FREQUENCY	CONNECTION			
1	260 K. C.	To Grid of Detector Oscillator Tube	.1 Mfd. Condenser in Series with Generator Lead	Note 3	1 - 2 3 - 4
2	3500 K. C.	Note 4	150 Mmfd. Condenser Note 4	Note 1	7 - 6 - 5
3	1600 K. C.	Note 4	150 Mmfd. Condenser Note 4	Set Tuning Condenser at 1.6 K. C.	8 Note 2

Adjust for maximum reading on the output meter.

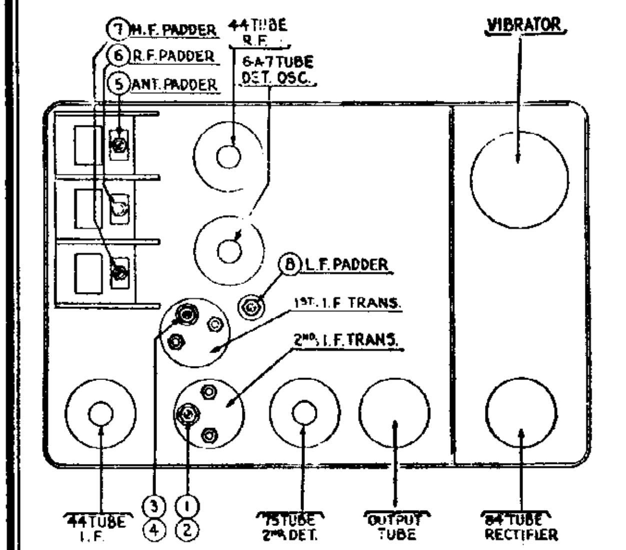
NOTE—When using the Model DPV as a fixed frequency Receiver, use the procedure given above first and then lock the tuning condenser at the desired frequency. If possible, the R.F. and Antenna padders should be adjusted while using the signal from the police transmitter.

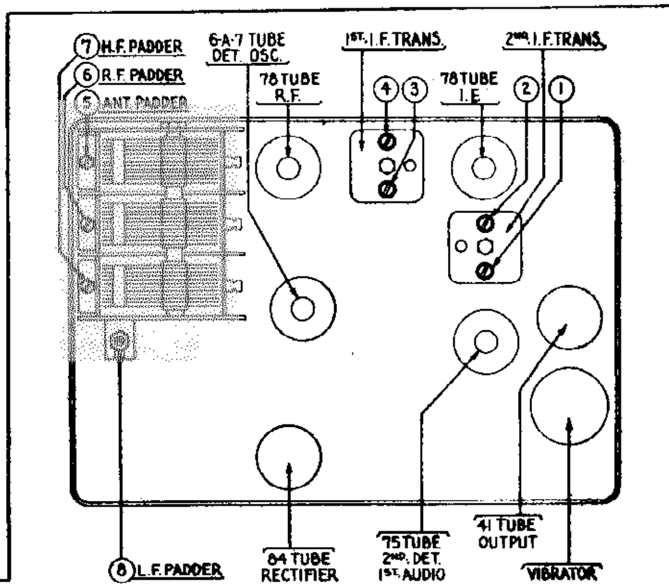
NOTE 1—Turn the condenser rotor plates completely out of mesh. Use a piece of bond letterhead paper as a gauge between the heel of the rotor plates and the stator plates and turn the condenser plates in mesh until they strike against the paper.

NOTE 2—Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then re-adjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 3—Turn the adjusting screw all the way in, then adjust the nut for maximum reading on the output meter. Next adjust the screw for maximum reading on the output meter. This adjustment is critical. Note the maximum reading obtained, turn the screw in again, and readjust, bringing the adjustment up to the maximum reading. Do not pass it and back off.

NOTE 4—Connect the antenna lead, Part No. 41-3191, to the antenna receptacle on the Receiver in series with a 150 mmfd. condenser





MODELS P1430, S1431, P1432, N1433, N1434, G1436, AND S1437

OPERATION	SIGNAL GENERATOR		DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
	FREQUENCY	CONNECTION			
1	260 K. C.	To Grid of 78 Tube—I.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection	1 - 2
2	260 K. C.	To Grid of 6A7 Tube	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection	3 - 4 1 - 2
3	1500 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Note 1	7 - 6
4	580 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Set Tuning Condensers at 580 K. C.	8 Note 2
5	1550 K. C.	To Grid of 78 Tube—R.F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Set Tuning Condensers at 1550 K. C.	7
6	1400 K. C.	Note 4	Note 4	Set Tuning Condensers at 1400 K. C.	6 - 5

Adjust for maximum reading on the output meter.

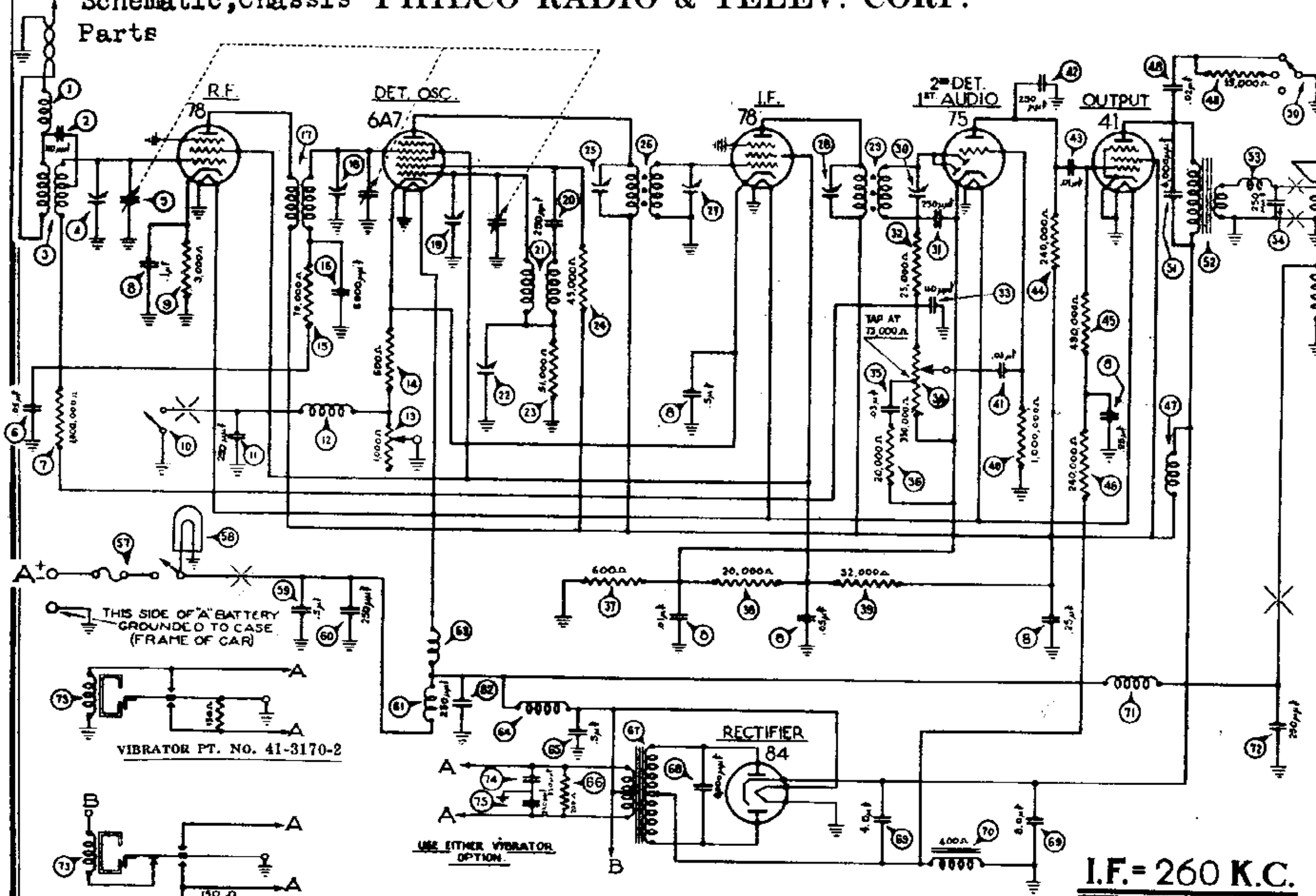
NOTE 1—Turn the condenser rotor plates completely out of mesh. Use a piece of bond letterhead paper as a gauge between the heel of the rotor plates and the stator plates and turn the condenser plates in mesh until they strike against the paper.

NOTE 2—Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then re-adjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4—Connect the Antenna lead Part No. 41-3191 to the Antenna receptacle on the Receiver in series with the correct dummy capacity. For the P1430 and P1432 use a 230 mmfd. condenser, for the S1431 use a 25 mmfd. condenser (connect lead to the Roof Antenna connector), for the N1433 use a 50 mmfd. condenser (connect lead to the Roof Antenna connector), for the N1434 and S1437 use the standard antenna lead connected directly to the output terminal on the signal generator, for the G1436 use a 1690 mmfd. condenser.

MODEL P-1430 Packard
Schematic, Chassis
Parts

PHILCO RADIO & TELEV. CORP.



FOR ALIGNMENT SEE INDEX

OCTOBER 1, 1936

MODEL P-1430 PARTS LIST

No.	Description	Part No.	No.	Description	Part No.
1	Antenna Choke	32-1372	43	Condenser (.01 mfd.)	30-4145
2	Condenser (110 mmfd.)	30-1031	44	Resistor (240,000 ohms)	33-424344
3	Antenna Transformer	32-2230	45	Resistor (490,000 ohms)	33-449344
4	First Padder (on tun. cond.)	....	46	Resistor (240,000 ohms)	33-424344
*5	Tuning Condenser	31-1912	47	"B" Choke	32-1281
6	Condenser (.05 mfd.)	30-4444	48	Condenser (.02 mfd.)	30-4419
7	Resistor (1,000,000 ohms)	33-510344	49	Resistor (15,000 ohms)	33-315344
8	Condenser (.01-.05-.1-.25-.25-.5 mfd.)	30-4478	*50	Tone Control Switch	42-1139
9	Resistor (3,000 ohms)	33-230344	51	Condenser (4000 mmfd.)	30-4185
10	Sensitivity Switch	42-5603	*52	Output Transformer	32-7721
11	Condenser (250 mmfd.)	30-1032	53	Choke	32-1374
12	Choke	32-2063	54	Condenser (250 mmfd.)	30-1032
13	Sensitivity Control	33-5129	55	Cone & Voice Coil	36-3159
14	Resistor (600 ohms)	33-1212	*56	Field Coil Assembly	36-3513
15	Resistor (70,000 ohms)	33-370344	*57	On & Off Switch	42-5606
16	Condenser (6,000 mmfd.)	30-4445	58	Pilot Lamp	34-2039
17	R. F. Transformer	32-2231	59	Condenser (.5 mfd.)	30-4474
18	Second Padder (on tun. cond.)	....	60	Condenser (250 mmfd.)	30-1032
19	Third Padder (on tun. cond.)	....	61	"A" Choke	32-1374
20	Condenser (250 mmfd.)	30-1032	62	Condenser (250 mmfd.)	30-1032
21	Oscillator Transformer	32-2232	63	Filament Choke	32-1561
*22	Low Frequency Padder	31-6056	64	Vibrator Choke	32-2249
23	Resistor (51,000 ohms)	33-351344	65	Condenser (.5 mfd.)	30-4474
24	Resistor (45,000 ohms)	33-345344	66	Resistor (200 ohms)	33-120344
25	Padder (Pri. 1st I. F. Trans.)		67	Power Transformer	32-7720
26	First I. F. Transformer	32-2286	68	Condenser (8000 mmfd.)	30-4420
27	Padder (Sec. 1st I. F. Trans.)	....	69	Filter Condenser (4-8 mfd.)	30-2168
28	Padder (Pri. 2nd I. F. Trans.)	....	70	Filter Choke	32-7722
29	Second I. F. Transformer	32-2167	71	Choke	32-2269
30	Padder (Sec. 2nd. I. F. Trans)	....	72	Condenser (250 mmfd.)	30-1032
31	Condenser (250 mmfd.)	30-1032	73	Vibrator (Optional)	41-3170-2 41-3170-3
32	Resistor (25,000 ohms)	33-325344	74	Condenser (250 mmfd.)	30-1032
33	Condenser (110 mmfd.)	30-1031	75	Condenser (250 mmfd.)	30-1032
34	Volume Control (350,000 ohms)	33-5121		Four Prong Socket	27-6044
35	Condenser (.03 mfd.)	30-4449		Five Prong Socket	27-6035
36	Resistor (20,000 ohms)	33-320344		Six Prong Socket	27-6036
37	Resistor (600 ohms)	33-1212		Seven Prong Socket	27-6037
38	Resistor (20,000 ohms)	33-320344		Tuning & Volume Shaft	28-8662
39	Resistor (32,000 ohms)	33-332444		Sensitivity Shaft	28-6502
40	Resistor (1,000,000 ohms)	33-510344		Scale Assembly	42-5596
41	Condenser (.01 mfd.)	30-4479		Sensitivity Switch Knob	28-7203
42	Condenser (250 mmfd.)	30-1032		Tuning & Volume Knob	27-4313
				Knob Base	28-4184

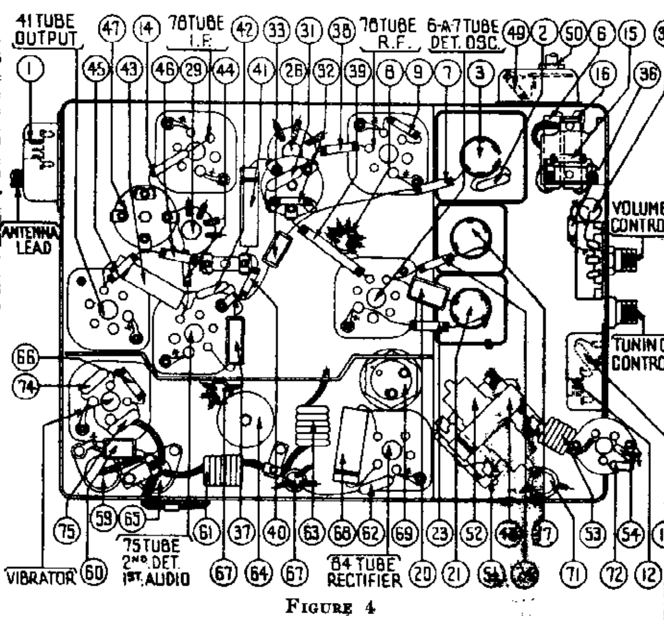


FIGURE 4

Description	Part No.	No.	Description	Part No.
Distributor Resistor	4851		Stud (Speaker mtg.)	28-6088
Interference Condenser	4522		Nut (Speaker mtg.)	W-55A
Interference Condenser	30-4007		Ground Strap	38-6606
Fuse	7227		Antenna Loom	38-8030
Fuse Insulator	27-7729		Ground Clamp	41-3194
Tee Bolt (Rec. mtg.)	28-6268		Receiver Housing	38-1707
Nut (Rec. mtg.)	W-518A			

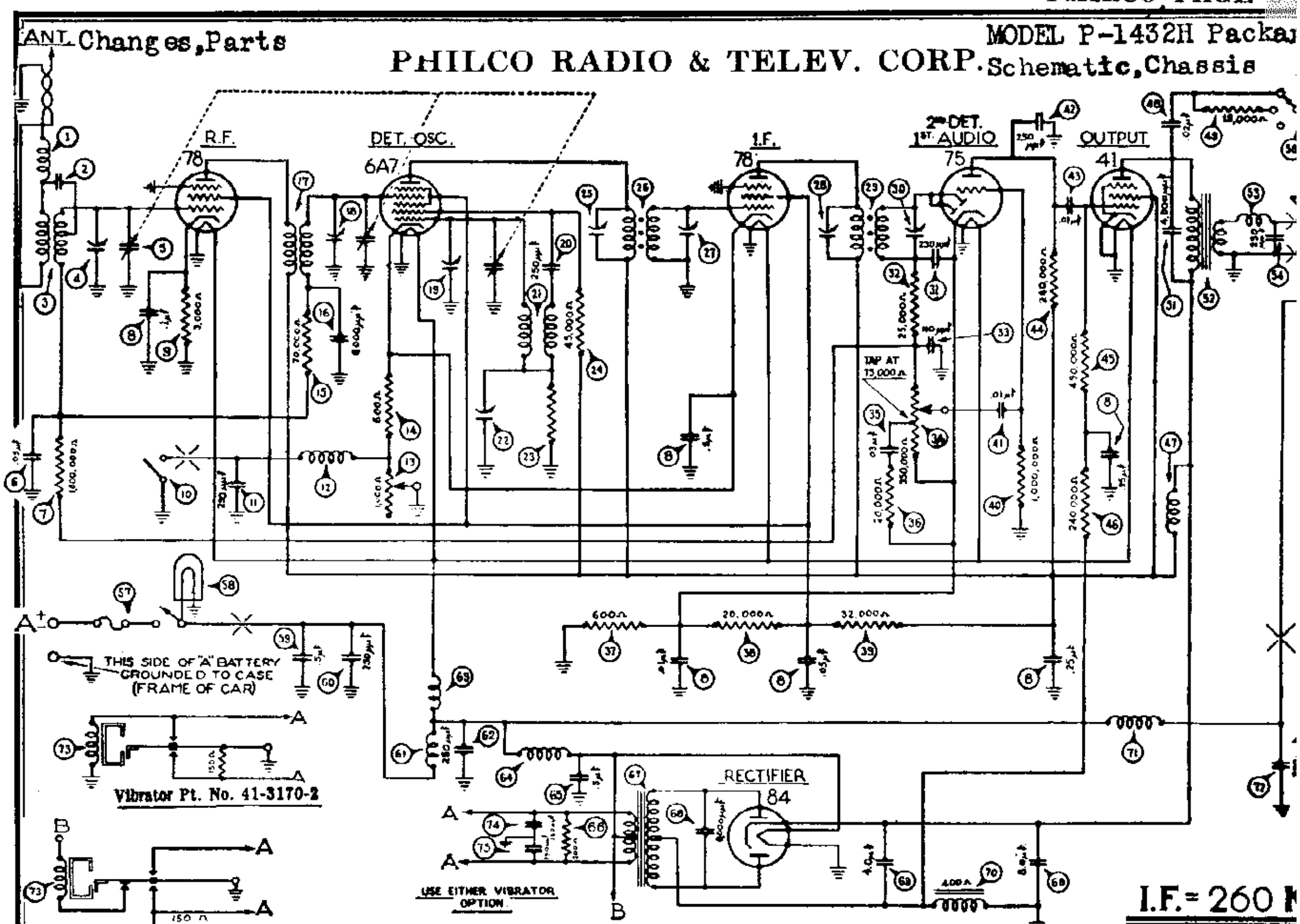
The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicago.

Changes, Parts

MODEL P-1432H Packa

PHILCO RADIO & TELEV. CORP.

Schematic, Chassis



FOR ALIGNMENT SEE INDEX

PARTS LIST

No.	Description	Part No.	No.	Description	Part No.
1	Antenna Choke	32-2063	43	Condenser (.01 mfd.)	30-4145
2	Condenser (80 mmfd.)	30-1066	44	Resistor (240,000 ohms)	33-424344
3	Antenna Transformer	32-2236	45	Resistor (490,000 ohms)	33-449344
4	First Padder (on tun. cond.)		46	Resistor (240,000 ohms)	33,424344
5	Tuning Condenser	31-1912	47	"B" Choke	32,1281
6	Condenser (.05 mfd.)	30-4444	48	Condenser (.02 mfd.)	30-4495
7	Resistor (1,000,000 ohms)	33-510344	49	Resistor (15,000 ohms)	33-315344
8	Condenser (.01 .05-.1-.25-.25-.5 mfd.)	30-4478	50	Tone Control Switch	42-1139
9	Resistor (3,000 ohms)	33-230344	51	Condenser (4000 mmfd.)	30-4185
10	Sensitivity Switch	42-5603	52	Output Transformer	32-7495
11	Condenser (250 mmfd.)	30-1032	53	Choke	32-1374
12	Choke	32-2063	54	Condenser (250 mmfd.)	30-1032
13	Sensitivity Control	33-5129	55	Cone and Voice Coil	36-3526
14	Resistor (600 ohms)	33-1212	56	Field coil assembly	32-9236
15	Resistor (70,000 ohms)	33-370344	57	On & Off Switch	42-5606
16	Condenser (6,000 mmfd.)	30-4445	58	Pilot Lamp	34-2039
17	R. F. Transformer	32-2231	59	Condenser (.5 mfd.)	30-4474
18	Second Padder (on tun. cond.)		60	Condenser (250 mmfd.)	30-1032
19	Third Padder (on tun. cond.)		61	"A" Choke	32-1374
20	Condenser (250 mmfd.)	30-1032	62	Condenser (250 mmfd.)	30-1032
21	Oscillator Transformer	32-2232	63	Filament Choke	32-1438
22	Low Frequency Padder	31-6056	64	Vibrator Choke	32-2537
23	Resistor (99,000 ohms)	33-399344	65	Condenser (.5 mfd.)	30-4474
24	Resistor (45,000 ohms)	33-345344	66	Resistor (200 ohms)	33-120344
25	Padder (Pri. 1st I.F. Trans.)		67	Power Transformer	32-7720
26	First I. F. Transformer	32-2286	68	Condenser (8000 mmfd.)	30-4420
27	Padder (Sec. 1st I. F. Trans.)		69	Filter Condenser (4-8 mfd.)	30-2179
28	Padder (Pri. 2nd I. F. Trans.)		70	Filter Choke	32-7722
29	Second I. F. Transformer	32-2167	71	Choke	32-2269
30	Padder (Sec. 2nd I. F. Trans.)		72	Condenser (250 mmfd.)	30-1032
31	Condenser (250 mmfd.)	30-1032	73	Vibrator (Optional)	41-3170-2 41-3170-3
32	Resistor (25,000 ohms)	33-325344	74	Condenser (250 mmfd.)	30-1032
33	Condenser (110 mmfd.)	30-1031	75	Condenser (250 mmfd.)	30-1032
34	Volume Control (350,000 ohms)	33-5121		Tuning & Volume Shaft	28-8662
35	Condenser (.03 mfd.)	30-4449		Sensitivity Shaft	28-6502
36	Resistor (20,000 ohms)	33-320344		Scale Assembly	42-5596
37	Resistor (600 ohms)	33-1212		Sensitivity Switch Knob	28-7203
38	Resistor (20,000 ohms)	33-320334		Tuning & Volume Knob	27-4313
39	Resistor (32,000 ohms)	33-332444		Knob Base	28-4184
40	Resistor (1,000,000 ohms)	33-510344		Antenna Loom Assembly	38-8030
41	Condenser (.01 mfd.)	30-4479		Tee Bolt (Rec. mtg.)	28-6268
42	Condenser (250 mmfd.)	30-1032		Switch and Lead Assembly	41-3217
				Speaker Cable	41-3235

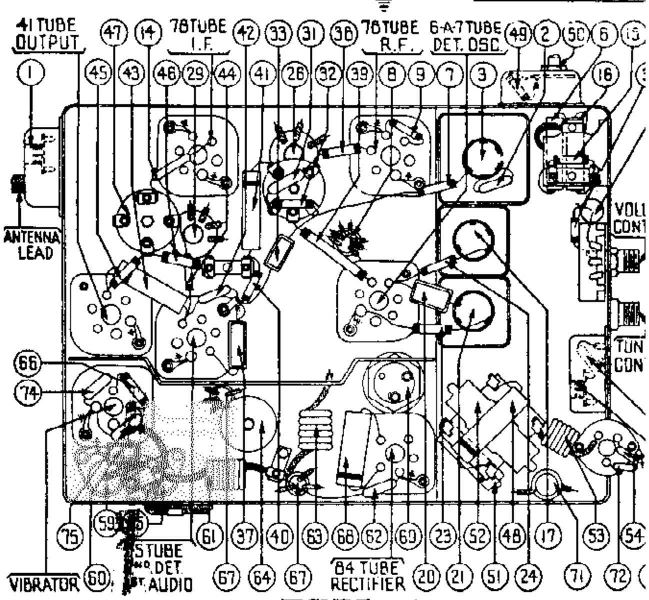


FIGURE 146

CHANGES — "Run Numbers" are stamped on the chassis sub-base for identification. These "Run Numbers" are changed consecutively as major changes are made in the Receiver wiring and parts.

RUN No. 2 — Condenser 41 removed (.01 mfd.) — Part No. 30-4479 added (.01 mfd.).

RUN No. 3 — Remove Choke 63. Add Choke 32-1438. One side is connected to the filament of the type 41 Tube Socket. The other side connected to Choke 61.

Connect a 250 mmfd. condenser Part No. 30-1032 across the filament o type 6A7 Tube Socket.

Connect one side of a 250 mmfd. condenser Part No. 30-1032 between 8 mfd. section of Condenser 69 and the "B" Choke 47 and the other to ground.

RUN No. 5 — Resistor 23 removed (51,000 ohms) Part No. 33-399344 a (99,000 ohms).

RUN No. 6 — A 10,000 ohms resistor Part No. 33-310344 has been a to the Receiver. This is connected in series between the B+ sid Choke 47 and the 8 mfd. section of Condenser 69.

RUN No. 7 — Condnser 2 removed (110 mmfd.) Part No. 30-1066 a (80 mmfd.).

No major change was involved in Run No. 4.

ADJUSTMENTS — The correct padding procedure for the Model P-1 given

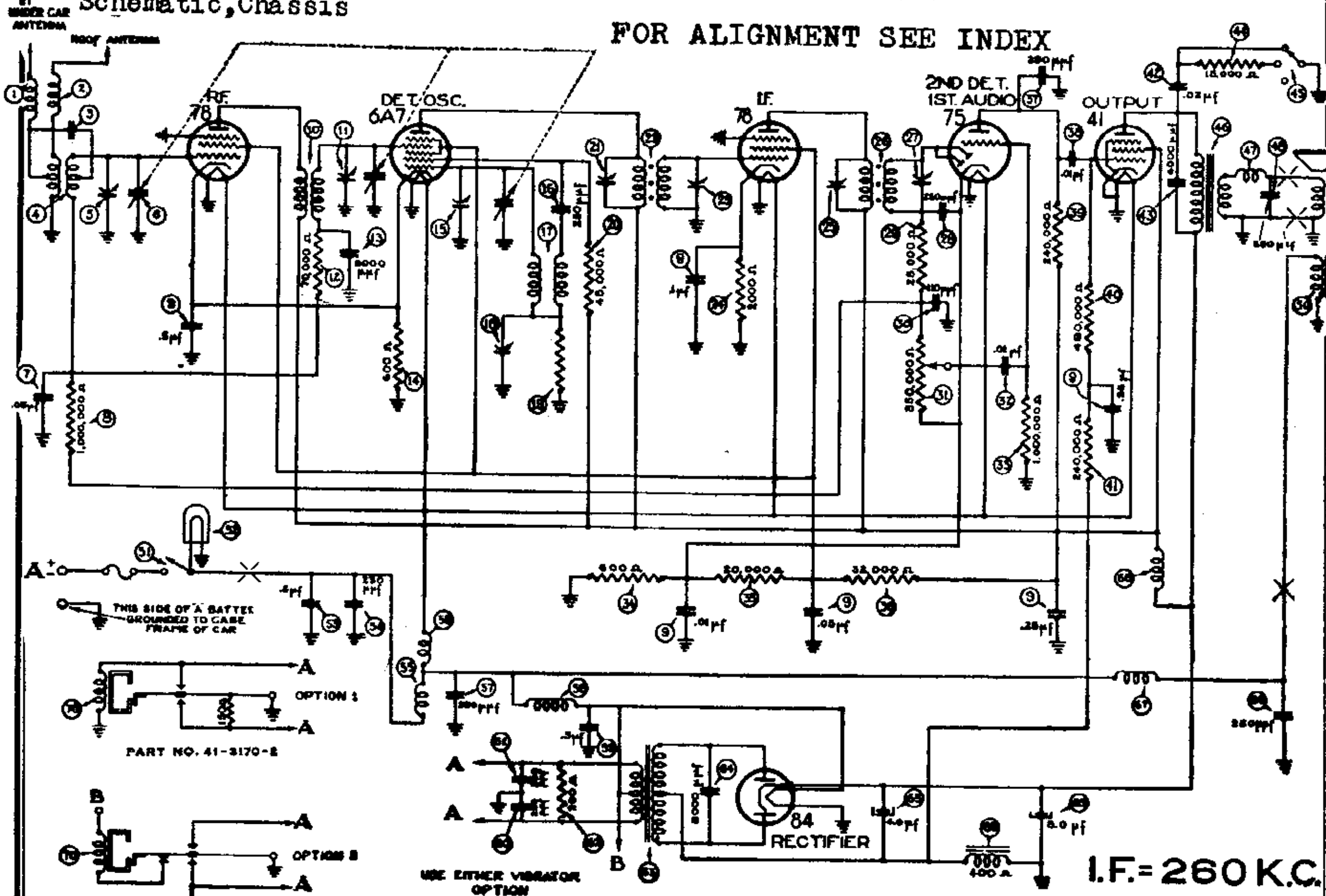
The Model P-1432H is a Special Custom-Built Receiver used exclusively Packard Motor Car Company in 1937 Packard cars.

MODEL N-1433H Nash
Schematic, Chassis

PHILCO RADIO & TELEV. CORP.

Changes, Parts

FOR ALIGNMENT SEE INDEX



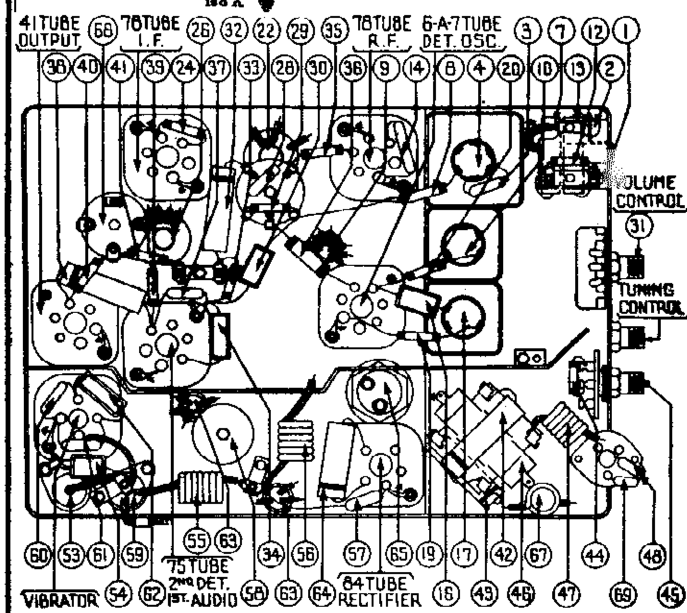


FIGURE 148

PARTS LIST

No.	Description	Part No.
1	Antenna choke	38-8106
2	Antenna Choke	38-8106
3	Condenser (70 mmfd.)	30-1068
4	Antenna Transformer	32-2281
5	First Padder (on tun. cond.)	
6	Tuning Condenser	31-1912
7	Condenser (.05 mfd.)	30-4444
8	Resistor (1,000,000 ohms)	33-510344
9	Condenser (.01-.05-.1-.25-.25-.5 mfd.)	30-4478
10	R. F. Transformer	32-2231
11	Second padder (on tun. cond.)	
12	Resistor (70,000 ohms)	33-370344
13	Condenser (6,000 mmfd.)	30-4445
14	Resistor (600 ohms)	33-1212
15	Third Padder (on tun. cond.)	
16	Condenser (250 mmfd.)	30-1032
17	Oscillator Transformer	32-2232
18	Low Frequency Padder	31-6056
19	Resistor (51,000 ohms)	33-351344
20	Resistor (45,000 ohms)	33-345344
21	Padder (Pri. 1st I. F. Trans.)	
22	First I. F. Transformer	32-2286
23	Padder (Sec. 1st I. F. Trans.)	
24	Resistor (2,000 ohms)	32-220334
25	Padder (Pri. 2nd I. F. Trans.)	
26	Second I. F. Transformer	32-2167
27	Padder (Sec. 2nd I. F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (110 mmfd.)	30-1031
31	Volume Control (350,000 ohms)	33-5139
32	Condenser (.01 mfd.)	30-4124
33	Resistor (1,000,000 ohms)	33-510344
34	Resistor (600 ohms)	33-1212
35	Resistor (20,000 ohms)	33-320334
36	Resistor (32,000 ohms)	33-332444
37	Condenser (250 mmfd.)	30-1032
38	Condenser (.01 mfd.)	30-4145
39	Resistor (240,000 ohms)	33-424344
40	Resistor (490,000 ohms)	33-449344
41	Resistor (240,000 ohms)	33-424344
42	Condenser (.02 mfd.)	30-4419
43	Condenser (4,000 mmfd.)	30-4185
44	Resistor (15,000 ohms)	33-315344
45	Tone Control Switch	42-1273
46	Output Transformer	32-7495
47	Choke	32-1374
48	Condenser (250 mmfd.)	30-1032
49	Cone and Voice Coil	36-3526
50	Field Coil Assembly	32-9236
51	On and Off Switch Assembly	42-5617
52	Pilot Lamp	34-2039
53	Condenser (.5 mfd.)	30-4474
54	Condenser (250 mmfd.)	30-1032
55	"A" Choke	32-1374
56	Filament Choke	32-1561
57	Condenser (250 mmfd.)	30-1032
58	Vibrator Choke	32-2249
59	Condenser (.5 mfd.)	30-4474
60	Condenser (250 mmfd.)	30-1032
61	Condenser (250 mmfd.)	30-1032
62	Resistor (200 ohms)	33-120344
63	Power Transformer	32-7720
64	Condenser (8,000 mmfd.)	30-4420
65	Filter Condenser (4-8 mfd.)	30-2168
66	Filter Choke	32-7722
67	Choke	32-2269
68	"B" Choke	32-1281
69	Condenser (250 mmfd.)	30-1032
70	Vibrator (Optional)	41-3170-2 / 41-3170-3
	Inductive Suppressor	32-2250
	Tee Bolt (Rec. mtg.)	28-6161
	Nut (Rec. mtg.)	W518A
	Speaker Cable	41-3247
	Tuning and Volume Knob	28-7214
	Tone Control Knob	28-7215
	Knob Base	28-4184
	Tuning & Volume Shaft	28-8695
	Tone Control Shaft	28-8696
	Scale Assembly	42-5644
	Receiver Housing	38-1727

CHANGES — "Run Numbers" are stamped on the chassis sub-base for identification. These "Run Numbers" are changed consecutively as major changes are made in the Receiver wiring and parts.

RUN No. 2 — Remove Tone Control Switch (45). Add Part No. 42-1273.

RUN No. 3 — Remove Tone Control Switch (46). Add Part No. 42-1273.

RUN No. 4 — Choke (56) removed, Part No. 32-1438 added. One side is connected to the filament of the type 41 Tube, and the other side is connected to Choke (55).
Connect a 250 mmfd. condenser Part No. 30-1032 across the filament of the type 6A7 Tube Socket.
Connect one side of a 250 mmfd. Condenser Part No. 30-1032 between the 8 mfd. section of Condenser (65) and the "B" Choke (68) and the other side to ground.

RUN No. 5 — The Antenna Transformer (4) is replaced with a new type having the same part number. It can be identified by the orange paint mark on the fibre.

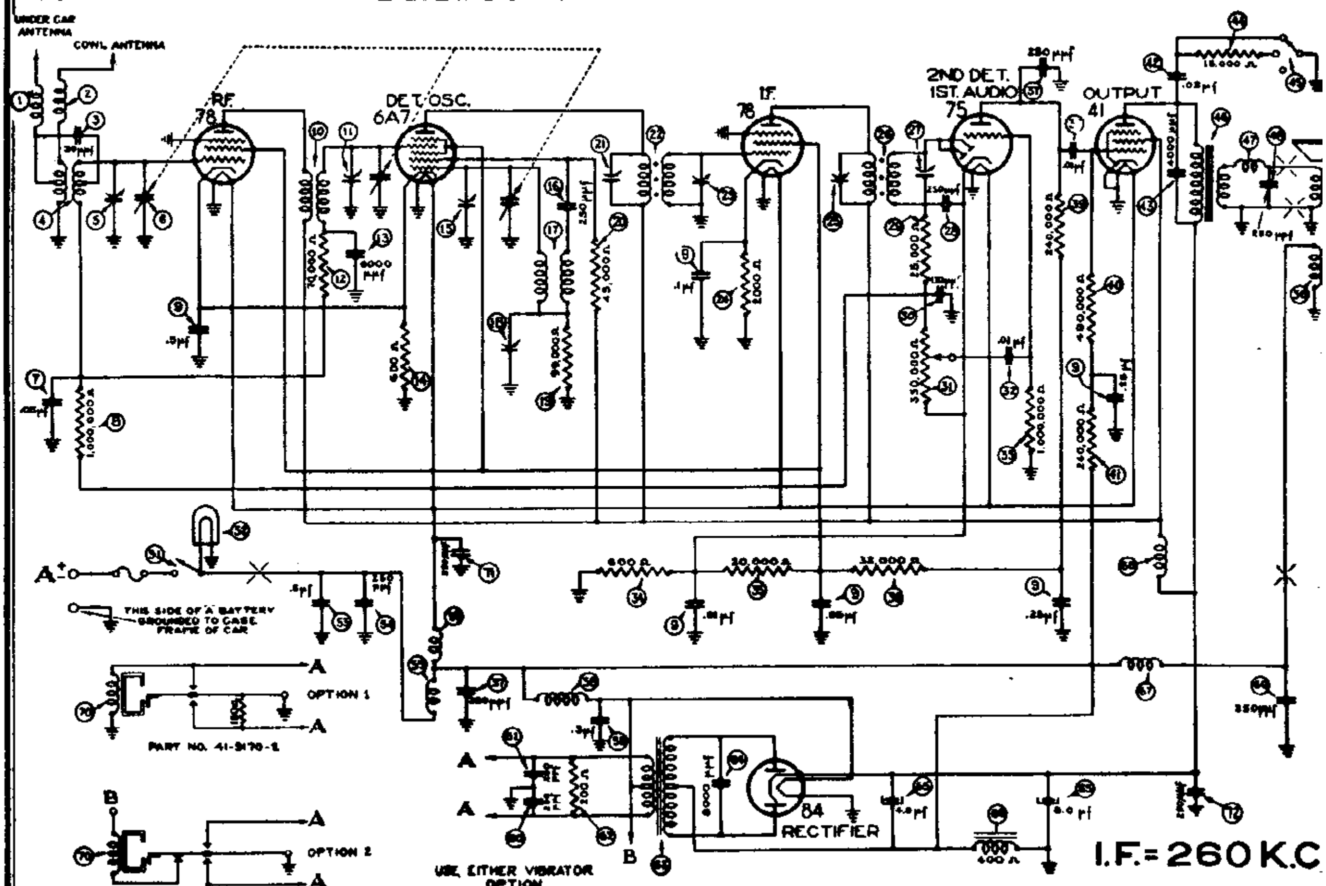
RUN No. 6 — Resistor (19) removed (51,000 ohms) Part No. 33-399344 added (99,000 ohms).

Model N-1433H is a Special Custom-Built Receiver used exclusively by Nash Motor Company in 1937 Nash cars.

Schematic, Chassis
Parts

PHILCO RADIO & TELEV. CORP.

MODEL N-1434H
Two-Unit Receiver



FOR ALIGNMENT SEE INDEX

MARCH 5, 1937

MODEL N-1434-H PARTS LIST

No.	Description	Part No.
1	Antenna Choke	38-8106
2	Antenna Choke	38-8106
3	Condenser (30 mmfd.)	30-1059
4	Antenna Transformer	32-2461
5	First Padder (on tun. cond.)	
*6	Tuning Condenser	31-1912
7	Condenser (.05 mfd.)	30-4444
8	Resistor (1,000,000 ohms)	33-510344
9	Condenser (.01-.05-.1-.25-.25-.5 mfd)	30-4478
10	R. F. Transformer	32-2231
11	Second Padder (on tun. cond.)	
12	Resistor (70,000 ohms)	33-370344
13	Condenser (6,000 mmfd.)	30-4445
14	Resistor (600 ohms)	33-1212
15	Third Padder (on tun. cond.)	
16	Condenser (250 mmfd.)	30-1032
17	Oscillator Transformer	32-2232
*18	Low Frequency Padder	31-6056
19	Resistor (99,000 ohms)	33-399344
20	Resistor (45,000 ohms)	33-345344
21	Padder (Pri. 1st I.F. Trans.)	
22	First I. F. Transformer	32-2286
23	Padder (Sec. 1st I.F. Trans.)	
24	Resistor (2,000 ohms)	32-220334
25	Padder (Pri. 2nd I.F. Trans.)	
26	Second I. F. Transformer	32-2167
27	Padder (Sec. 2nd I.F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (110 mmfd.)	30-1031
31	Volume Control (350,000 ohms)	33-5139
32	Condenser (.01 mfd.)	30-4479
33	Resistor (1,000,000 ohms)	33-510344
34	Resistor (600 ohms)	33-1212
35	Resistor (20,000 ohms)	33-320334
36	Resistor (32,000 ohms)	33-332444
37	Condenser (250 mmfd.)	30-1032
38	Condenser (.01 mfd.)	30-4145
39	Resistor (240,000 ohms)	33-424344
40	Resistor (490,000 ohms)	33-449344

No.	Description	Part No.
41	Resistor (240,000 ohms)	33-424344
42	Condenser (.02 mfd.)	30-4495
43	Condenser (4,000 mmfd.)	30-4185
44	Resistor (15,000 ohms)	33-315344
*45	Tone Control Switch	42-1273
*46	Output Transformer	32-7495
47	Choke	32-1374
48	Condenser (250 mmfd.)	30-1032
49	Cone & Voice Coil	36-3526
*50	Field Coil Assembly	32-9236
*51	On & Off Switch Assembly	42-5617
52	Pilot Lamp	34-2039
53	Condenser (.5 mfd.)	30-4474
54	Condenser (250 mmfd.)	30-1032
55	"A" Choke	32-1374
56	Filament Choke	32-1438
57	Condenser (250 mmfd.)	30-1032
58	Vibrator Choke	32-2537
59	Condenser (.5 mfd.)	30-4474
60	Condenser (250 mmfd.)	30-1032
61	Condenser (250 mmfd.)	30-1032
62	Resistor (200 ohms)	33-120344
63	Power Transformer	32-7720
64	Condenser (8,000 mmfd.)	30-4420
65	Filter Condenser (4-8 mfd.)	30-2179
66	Filter Choke	32-7722
67	Choke	32-2269
68	"B" Choke	32-1281
69	Condenser (250 mmfd.)	30-1032
70	Vibrator (OPTIONAL)	41-3170-2 41-3170-3
71	Condenser (250 mmfd.)	30-1032
72	Condenser (250 mmfd.)	30-1032
	Four-prong Socket	27-6044
	Five prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven-prong Socket	27-6037
	Inductive Suppressor	32-2250
	Interference Condenser	30-4007
	Fuse	7227
	Fuse Insulator	27-7729
	Tee Bolt (Rec. mtg.)	28-6161

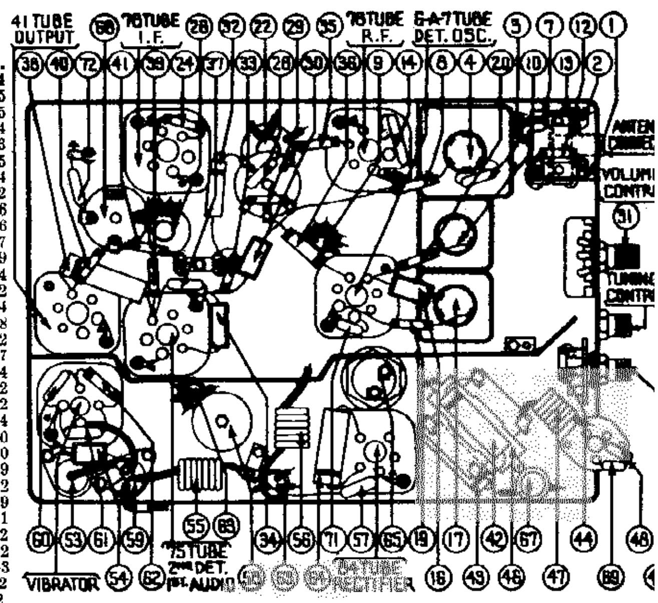


FIGURE 2

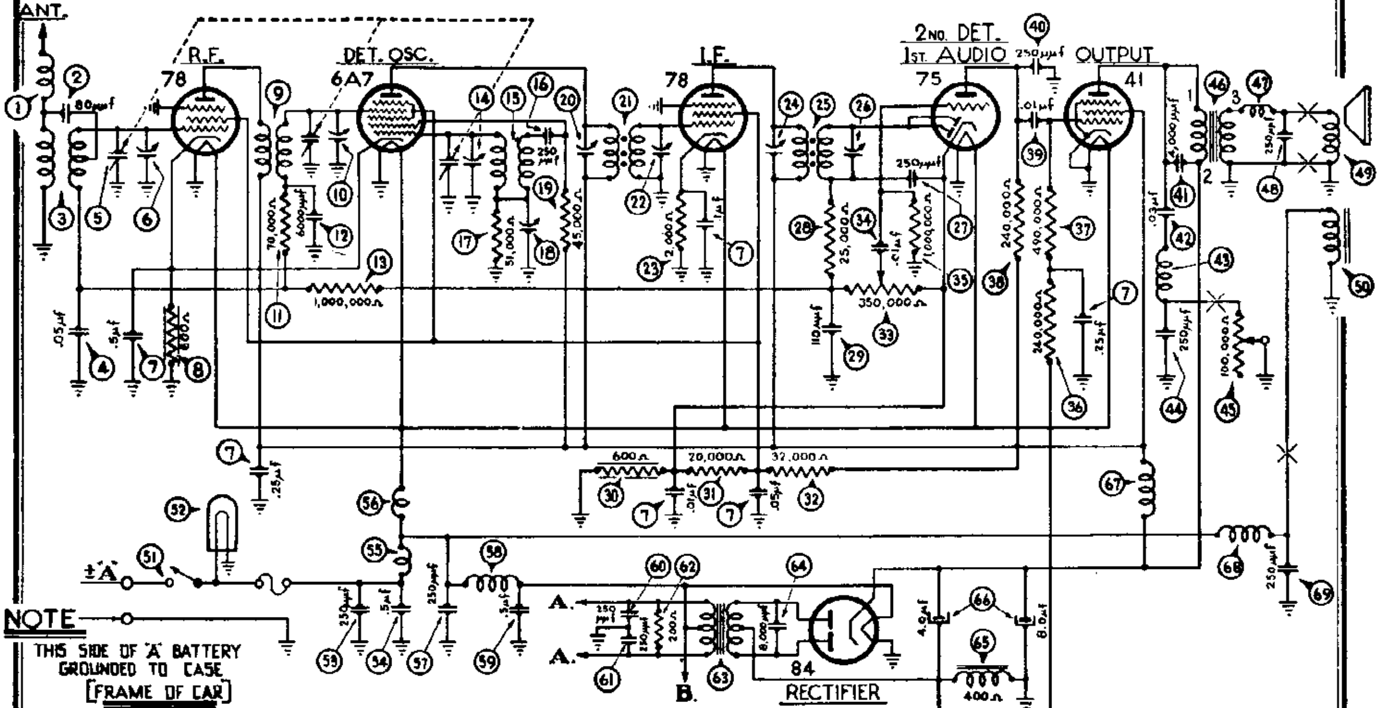
No.	Description	Part No.
	Nut (Rec. mtg.)	W518A
	Speaker Cable	41-3247
	Tuning & Volume Knob	28-7214
	Tone Control Knob	28-7215
	Knob Base	28-4184
	Tuning & Volume Shaft	28-8695

No.	Description	Part
	Tone Control Shaft	28-8
	Scale Assembly	42-5
	Control Mtg. Wrench	28-4
	Receiver Housing	38-1
	Tow Strap	36-3-

NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the l service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chica

MODEL G-1436
Schematic, Chassis
Parts

PHILCO RADIO & TELEV. CORP.



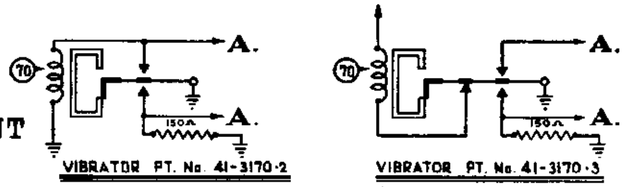


Figure 3

FOR ALIGNMENT SEE INDEX

I.F. = 260 K.C.

OCTOBER 15, 1936

MODEL G-1436 PARTS LIST

No.	Description	Part No.
1	Antenna Choke	32-1956
2	Condenser (80 mmfd.)	30-1066
3	Antenna Transformer	32-2331
4	Condenser (.05 mfd.)	30-4444
*5	Tuning Condenser	31-1912
6	First Padder (on tun. cond.)	
7	Condenser (.01-.05-.1-.25-.25-.5 mfd.)	30-4478
8	Resistor (600 ohms)	33-1212
9	R. F. Transformer	32-2231
10	Second Padder (on tun. cond.)	
11	Resistor (20,000 ohms)	33-370344
12	Condenser (6000 mmfd.)	30-4445
13	Resistor (1,000,000 ohms)	33-510344
14	Third Padder (on tun. cond.)	
15	Oscillator Transformer	32-2232
16	Condenser (250 mmfd.)	30-1032
17	Resistor (51,000 ohms)	33-351344
*18	Low Frequency Padder	31-6056
19	Resistor (45,000 ohms)	33-345344
20	Padder (Pri. 1st I. F. Trans.)	
21	First I. F. Transformer	32-2286
22	Padder (Sec. 1st I. F. Trans.)	
23	Resistor (2000 ohms)	33-220344
24	Padder (Pri. 2nd I. F. Trans.)	
25	Second I. F. Transformer	32-2167
26	Padder (Sec. 2nd I. F. Trans.)	
27	Condenser (250 mmfd.)	30-1032
28	Resistor (25,000 ohms)	33-325344
29	Condenser (110 mmfd.)	30-1031
30	Resistor (600 ohms)	33-1212
31	Resistor (20,000 ohms)	33-320344
32	Resistor (32,000 ohms)	33-332444
33	Volume Control (350,000 ohms)	33-5139
34	Condenser (.01 mfd.)	30-4479
35	Resistor (1,000,000 ohms)	33-510344
36	Resistor (240,000 ohms)	33-424344
37	Resistor (490,000 ohms)	33-449344
38	Resistor (240,000 ohms)	33-424344
39	Condenser (.01 mfd.)	30-4145
40	Condenser (250 mmfd.)	30-1032
41	Condenser (4000 mmfd.)	30-4185
42	Condenser (.03 mfd.)	30-4380
43	Choke	32-1374
44	Condenser (250 mmfd.)	30-1032
*45	Tone Control (100,000 ohms)	33-5192
*46	Output Transformer	32-7495
47	Choke	32-1374
48	Condenser (250 mmfd.)	30-1032
*49	Cone & Voice Coil	36-3822
*50	Field Coil Assembly	36-3823
51	On & Off Switch Assembly	
52	Pilot Lamp	34-2040
53	Condenser (250 mmfd.)	30-1032
54	Condenser (.5 mfd.)	30-4474
55	"A" Choke	32-1374
56	Filament Choke	32-1561
57	Condenser (250 mmfd.)	30-1032
58	Vibrator Choke	32-2249
59	Condenser (.5 mfd.)	30-4474
60	Condenser (250 mmfd.)	30-1032
61	Condenser (250 mmfd.)	30-1032
62	Resistor (200 ohms)	33-120344
63	Power Transformer	32-7720
64	Condenser (8000 mmfd.)	30-4420
65	Filter Choke	32-7722
66	Filter Condenser (4-8 mfd.)	30-2168
67	"B" Choke	32-1281
68	Choke	32-2269
69	Condenser (250 mmfd.)	30-1022
70	Vibrator (Optional)	41-3170-2 41-3170-3
	Four-prong Socket	27-6044
	Five-prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven-prong Socket	27-6037
	Distributor Resistor	33-1196

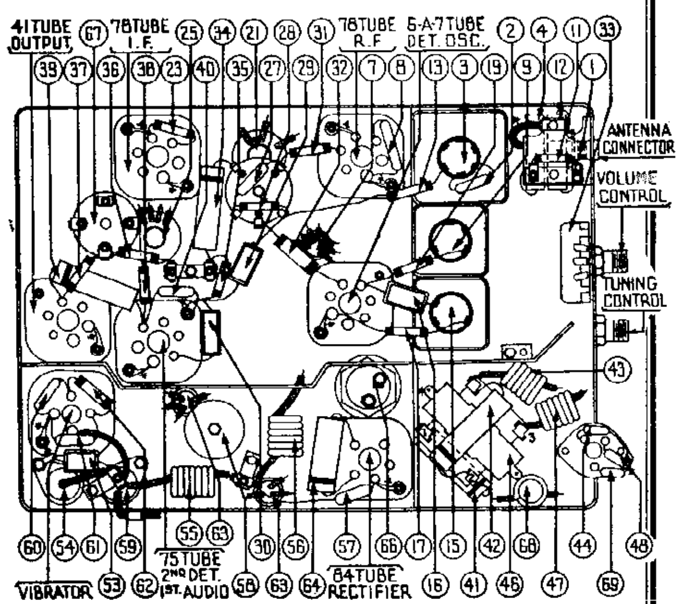


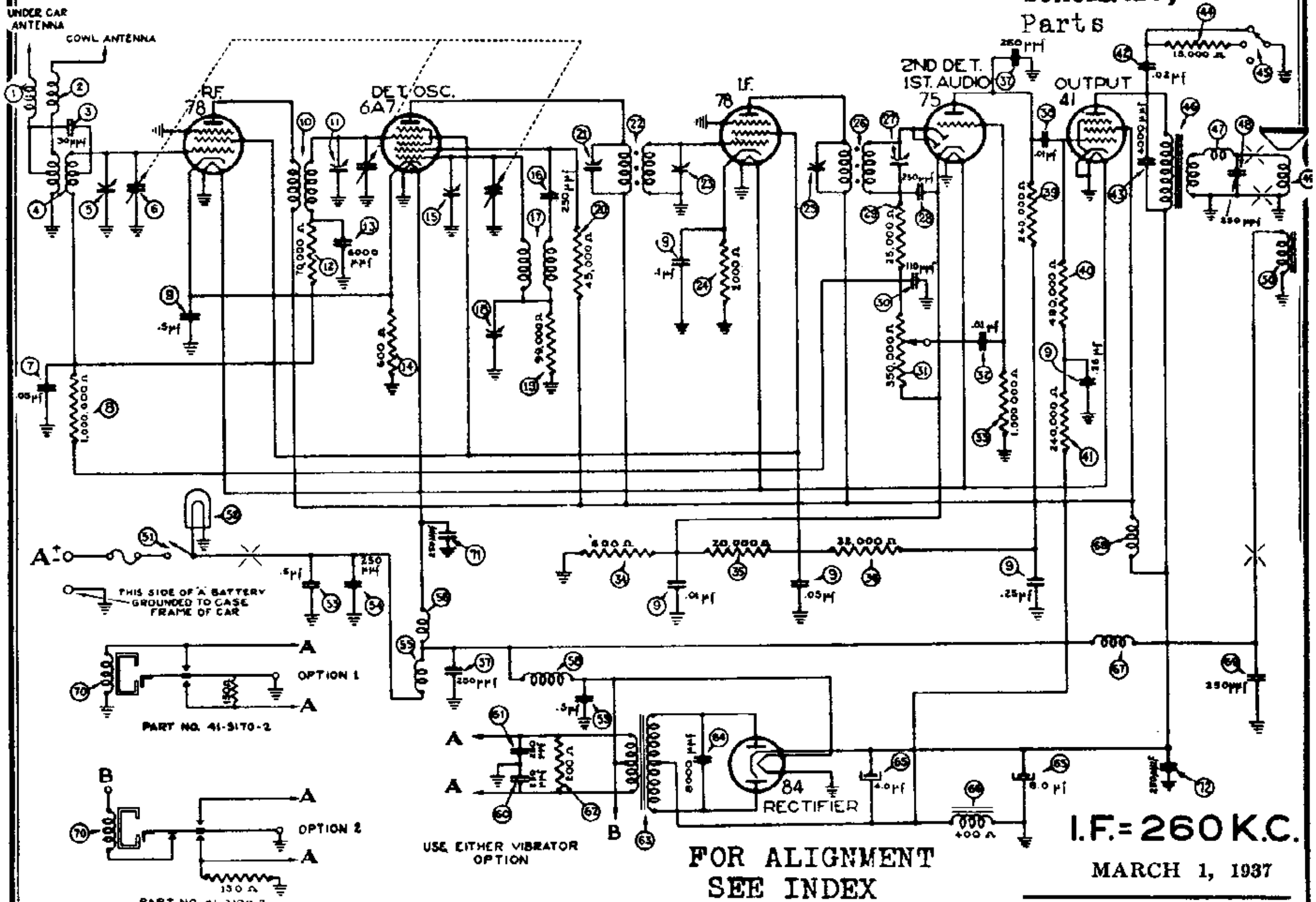
Figure 4

No.	Description	Part No.
	Interference Condenser	30-4007
	Interference Condenser	30-4486
	Fuse	7227
	Fuse Insulator	27-7729
	Tee Bolt (Rec. mtg.)	28-6161
	Nut (Rec. mtg.)	W158A
	*Speaker Cable Assembly	41-3255
	*Shielded Loom Assembly	38-8230

Note: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicago.

PHILCO RADIO & TELEV. CORP.

MODEL S-1437 Studebaker Two Unit Receiver
Schematic, Chassis Parts



FOR ALIGNMENT SEE INDEX

I.F. = 260 K.C.

MARCH 1, 1937

MODEL S-1437 PARTS LIST

No.	Description	Part No.	No.	Description	Part No.
1	Antenna Choke	38-8106	42	Condenser (.02 mfd.)	30-4495
2	Antenna Choke	38-8106	43	Condenser (4,000 mmfd.)	30-4185
3	Condenser (30 mmfd.)	30-1059	44	Resistor (15,000 ohms)	33-315344
4	Antenna Transformer	32-2461	*45	Tone Control Switch	42-1273
5	First Padder (on tun. cond.)		*46	Output Transformer	32-7405
*6	Tuning Condenser	31-1912	47	Choke	32-1374
7	Condenser (.05 mfd.)	30-4444	48	Condenser (250 mmfd.)	30-1032
8	Resistor (1,000,000 ohms)	33-510341	49	Cone and Voice Coil	36-3526
9	Condenser (.01-.05-.1-.25-.25-.5 mfd)	30-4478	*50	Field Coil Assembly	32-9236
10	R. F. Transformer	32-2231	*51	On & Off Switch Assembly	42-5617
11	Second Padder (on tun. cond.)		52	Pilot Lamp	34-2039
12	Resistor (70,000 ohms)	33-370344	53	Condenser (.5 mfd.)	30-4474
13	Condenser (6,000 mmfd.)	30-4445	54	Condenser (250 mmfd.)	30-1032
14	Resistor (600 ohms)	33-1212	55	"A" Choke	32-1374
15	Third Padder (on tun. cond.)		56	Filament Choke	32-1438
16	Condenser (250 mmfd.)	30-1032	57	Condenser (250 mmfd.)	30-1032
17	Oscillator Transformer	32-2232	58	Vibrator Choke	32-2537
*18	Low Frequency Padder	31-6056	59	Condenser (.5 mfd.)	30-4474
19	Resistor (99,000 ohms)	33-399344	60	Condenser (250 mmfd.)	30-1032
20	Resistor (45,000 ohms)	33-345344	61	Condenser (250 mmfd.)	30-1032
21	Padder (Pri. 1st I.F. Trans.)		62	Resistor (200 ohms)	33-120344
22	First I. F. Transformer	32-2286	63	Power Transformer	32-7720
23	Padder (Sec. 1st I.F. Trans.)		64	Condenser (8,000 mmfd.)	30-4420
24	Resistor (2,000 ohms)	33-220334	65	Filter Condenser (4-8 mfd.)	30-2179
25	Padder (Pri. 2nd I.F. Trans.)		66	Filter Choke	32-7722
26	Second I. F. Transformer	32-2167	67	Choke	32-2269
27	Padder (Sec. 2nd I.F. Trans.)		68	"B" Choke	32-1281
28	Condenser (250 mmfd.)	30-1032	69	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344	70	Vibrator (OPTIONAL)	41-3170-2 / 41-3170-3
30	Condenser (110 mmfd.)	30-1031	71	Condenser (250 mmfd.)	30-1032
31	Volume Control (350,000 ohms)	33-5139	72	Condenser (250 mmfd.)	30-1032
32	Condenser (.01 mfd.)	30-4479		Four-prong Socket	27-6044
33	Resistor (1,000,000 ohms)	33-510344		Five-prong Socket	27-6035
34	Resistor (600 ohms)	33-1212		Six-prong Socket	27-6036
35	Resistor (20,000 ohms)	33-320334		Seven-prong Socket	27-6037
36	Resistor (32,000 ohms)	33-332444		Inductive Suppressor	32-2250
37	Condenser (250 mmfd.)	30-1032		Interference Condenser	30-4007
38	Condenser (.01 mfd.)	30-4145		Distributor Condenser	30-1087
39	Resistor (240,000 ohms)	33-424344		Fuse	7227
40	Resistor (400,000 ohms)	33-440344		Fuse Insulator	27-7729
41	Resistor (240,000 ohms)	33-424344		Static Collector (Pres.)	28-3584
				Static Collector (Dict.)	38-7405

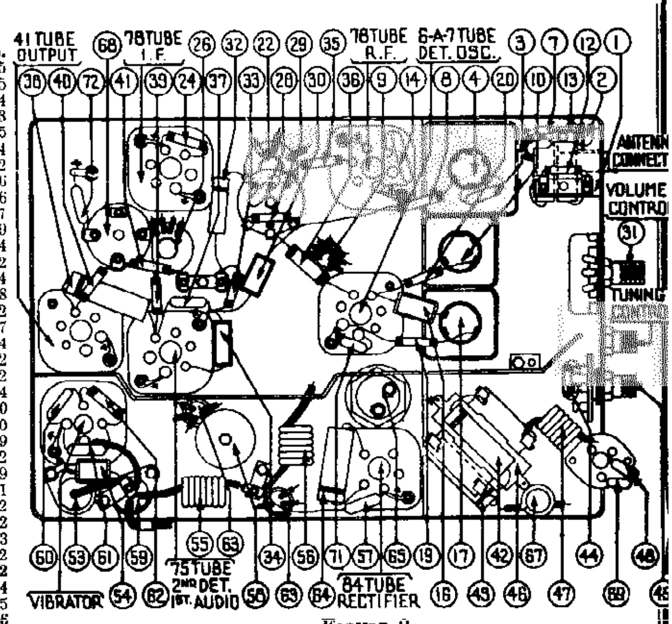


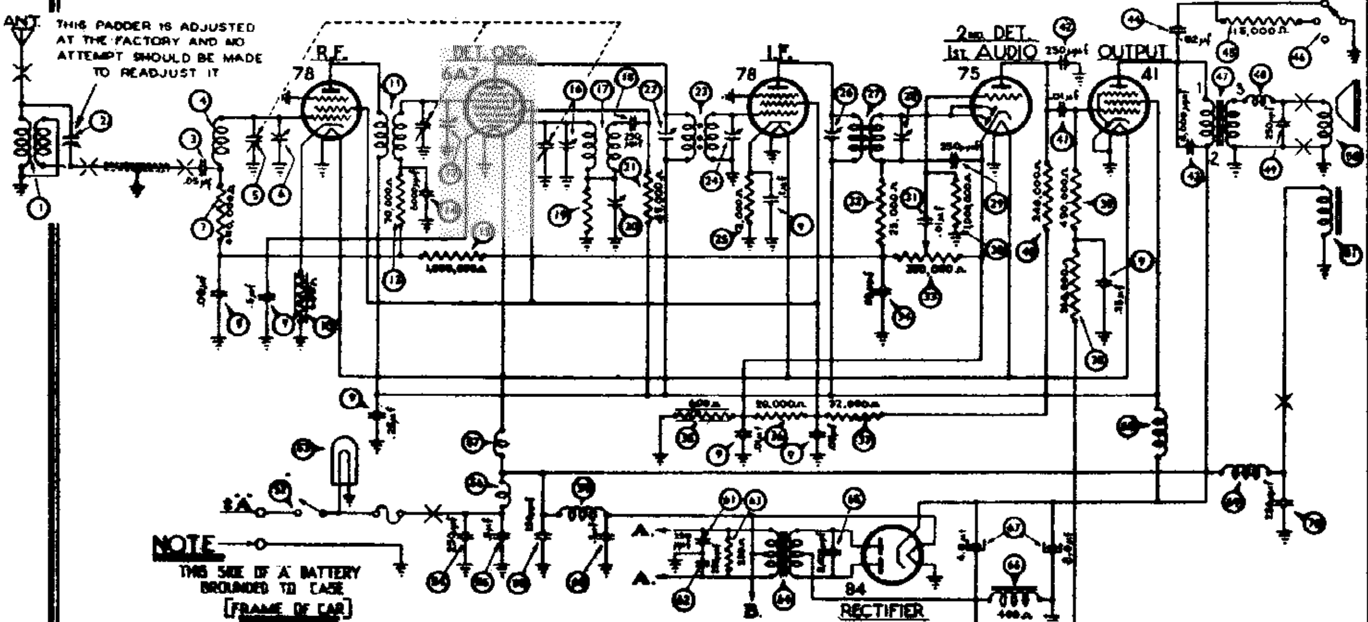
Figure 2

No.	Description	Part No.	No.	Description	Part No.
	Tee Bolt (Rec. Mtg.)	28-6161		Tuning Shaft	28-86
	Nut (Rec. Mtg.)	W-518A		Volume Shaft	28-86
	Speaker Cable	41-3231		Tone Control Shaft	28-86
	Ground Strap	38-7425		Scale Assembly	42-56
	Tuning & Volume Knob	28-7211		Receiver Housing	38-17
	Tone Control Knob	28-7212			

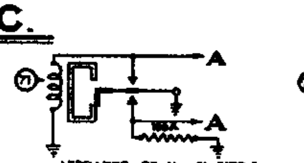
NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the lo service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicag

MODEL F-1440 Ford
Schematic, Chassis
Changes, Parts

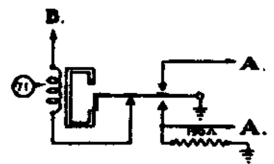
PHILCO RADIO & TELEV. CORP.



I.F. = 260 K.C.



VIBRATOR PT. No. 41-3170-2



VIBRATOR PT. No. 41-3170-3

FOR ALIGNMENT SEE INDEX

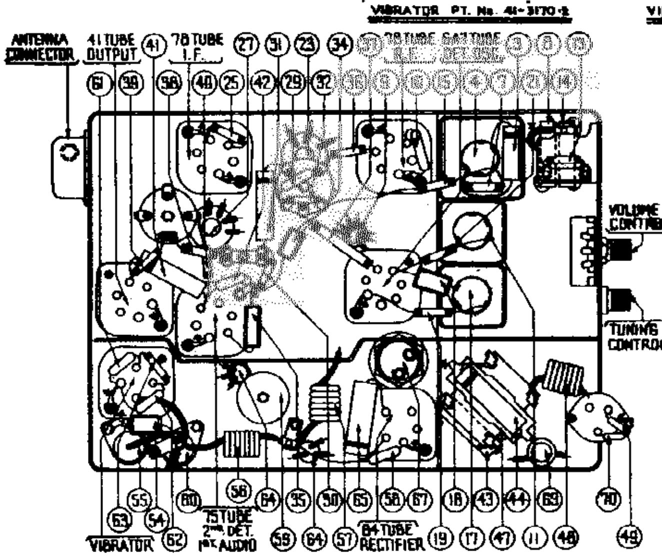


FIGURE 156

CHANGES — "Run Numbers" are stamped on the chassis sub-base for identification. These "Run Numbers" are changed consecutively as major changes are made in the Receiver wiring and parts.

RUN No. 2 — Tuning Condenser (5) removed Part No. 31-1985 added.

RUN No. 4 — Choke (57) removed Part No. 32-1438 added. One side is connected to the filament of the type 41 Tube and the other side is connected to Choke (56).
A 250 mmfd. Condenser Part No. 30-1032 has been added across the filament of the type 6A7 Tube Socket.
A 250 mmfd. Condenser Part No. 30-1032 has been added to the Receiver. One side is connected between the 8 mfd. section of Condenser (67) and the "B" Choke (68) and the other side grounded.

RUN No. 5 — Resistor (19) removed (51,000 ohms) Part No. 33-399344 added (99,000 ohms).

RUN No. 6 — Antenna Choke Part No. 32-2063 added to the Receiver. One side is connected to Condenser (3) and the other side connected to the Antenna Connector on the Receiver.

RUN No. 7 — The grid wire from the type 41 Tube was removed from its original location on the "B" Choke (68) and wired to the other side of "B" Choke (68).
No major change was involved in Run No. 3.

PARTS LIST

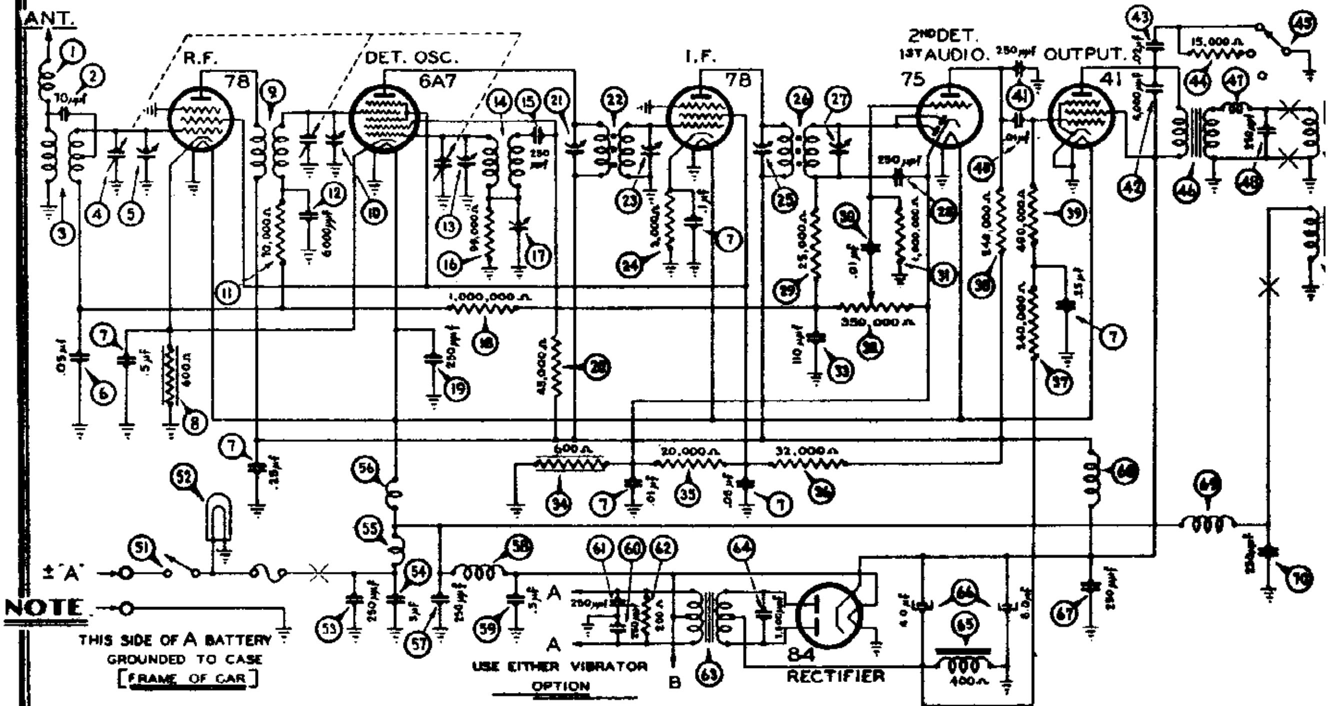
No.	Description	Part No.	No.	Description	Part No.
1	Roof Antenna Transformer	32-2418	45	Resistor (15,000 ohms)	33-315344
2	Padder	31-6165	46	Tone Control Switch	42-1139
3	Condenser (.05 mfd.)	30-4444	47	Output Transformer	32-7495
4	Receiver Antenna Transformer	32-2422	48	Choke	32-1374
5	Tuning Condenser	31-1954	49	Condenser (250 mmfd.)	30-1032
6	First Padder (on Tun. Cond.)		50	Cone & Voice Coil	36-3586
7	Resistor (490,000 ohms)	33-449344	51	Field Coil Assembly	32-9236
8	Condenser (.05 mfd.)	30-4444	52	On & Off Switch	42-1277
9	Condenser (.01-.05-.1 .25-.25-.5 mfd.)	30-4478	53	Pilot Lamp	34-2040
10	Resistor (600 ohms)	33-1212	54	Condenser (250 mmfd.)	30-1032
11	R. F. Transformer	32-2231	55	Condenser (.5 mfd.)	30-4474
12	Second Padder (on Tun. Cond.)		56	"A" Choke	32-1374
13	Resistor (70,000 ohms)	33-370344	57	Filament Choke	32-1561
14	Condenser (6,000 mmfd.)	30-4445	58	Condenser (250 mmfd.)	30-1032
15	Resistor (1,000,000 ohms)	33-510344	59	Vibrator Choke	32-2249
16	Third Padder (on Tun. Cond.)		60	Condenser (.5 mfd.)	30-4474
17	Oscillator Transformer	32-2232	61	Condenser (250 mmfd.)	30-1032
18	Condenser (250 mmfd.)	30-1032	62	Condenser (250 mmfd.)	30-1032
19	Resistor (99,000 ohms)	33-399344	63	Resistor (200 ohms)	33-120344
20	Low Frequency Padder	31-6056	64	Power Transformer	32-7720
21	Resistor (45,000 ohms)	33-345344	65	Condenser (8,000 mmfd.)	30-4420
22	Padder (Pri. 1st I. F. Trans.)		66	Filter Choke	32-7723
23	First I. F. Transformer	32-2286	67	Filter Condenser	30-2168
24	Padder (Sec. 1st I. F. Trans.)		68	"B" Choke	32-1281
25	Resistor (3,000 ohms)	33-230344	69	Choke	32-2269
26	Padder (Pri. 2nd I. F. Trans.)		70	Condenser (250 mmfd.)	30-1032
27	Second I. F. Transformer	32-2167	71	Vibrator (OPTIONAL)	41-3170-2 / 41-3170-3
28	Padder (Sec. 2nd I. F. Trans.)			Four-prong Socket	27-6044
29	Condenser (250 mmfd.)	30-1032		Five-prong Socket	27-6035
30	Resistor (1,000,000 ohms)	33-510344		Six-prong Socket	27-6036
31	Condenser (.01 mfd.)	30-4124		Seven-prong Socket	27-6037
32	Resistor (25,000 ohms)	33-325344		Tuning Shaft	28-8699
33	Volume Control (350,000 ohms)	33-5139		Volume Shaft	28-8714
34	Condenser (110 mmfd.)	30-1031		Knob	27-4437
35	Resistor (600 ohms)	33-1212		Pilot Lamp Assembly	38-8265
36	Resistor (20,000 ohms)	33-320344		Dial	27-4456
37	Resistor (32,000 ohms)	33-332444		Glass	27-8656
38	Resistor (240,000 ohms)	33-424344		Pointer	27-4457
39	Resistor (490,000 ohms)	33-449344		Fuse	7227
40	Resistor (240,000 ohms)	33-424344		Fuse Insulator	27-7729
41	Condenser (.01 mfd.)	30-4145		Speaker Cable	41-3250
42	Condenser (250 mmfd.)	30-1032		"U" Clamp (Cont. Mtg.)	28-4080
43	Condenser (4,000 mmfd.)	30-4185		Transformer Lead (Shield)	L-2651
44	Condenser (.02 mfd.)	30-4419		Transformer Assembly	32-2424

The Model F-1440 Concealed Header Bar Speaker with Ear Level Reception is a Special Custom-Built Receiver used exclusively by the Ford Motor Company for the 1937 Ford V-8 cars.

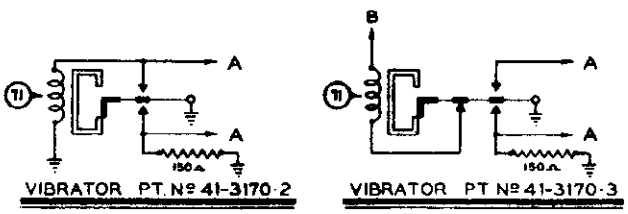
Changes, Parts

PHILCO RADIO & TELEV. CORP.

MODEL F-1442 Ford
Schematic, Chassis



FOR ALIGNMENT SEE INDEX



I.F. = 260 KC.

PARTS LIST

No.	Description	Part No.
1	Antenna Choke	32-2063
2	Condenser (70 mmfd.)	30-1068
3	Antenna Transformer	32-2524
4	Tuning Condenser	31-1984
5	First Padder (on Tun. Cond.)	
6	Condenser (.05 mfd.)	30-4444
7	Condenser (.01-.05-.1-.25-.25-.5 mfd.)	30-4478
8	Resistor (600 ohms)	33-1212
9	R. F. Transformer	32-2231
10	Second Padder (on Tun. Cond.)	
11	Resistor (70,000 ohms)	33-370344
12	Condenser (6,000 mmfd.)	30-4445
13	Third Padder (on Tun. Cond.)	
14	Oscillator Transformer	32-2232
15	Condenser (250 mmfd.)	30-1032
16	Resistor (99,000 ohms)	33-399344
17	Low Frequency Padder	31-6056
18	Resistor (1,000,000 ohms)	33-510344
19	Condenser (250 mmfd.)	30-1032
20	Resistor (45,000 ohms)	33-345344
21	Padder (Pri. 1st I. F. Trans.)	
22	First I. F. Transformer	32-2286
23	Padder (Sec. 1st I. F. Trans.)	
24	Resistor (3,000 ohms)	33-230344
25	Padder (Pri. 2nd I. F. Trans.)	
26	Second I. F. Transformer	32-2167
27	Padder (Sec. 2nd I. F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (.01 mfd.)	30-4124
31	Resistor (1,000,000 ohms)	33-510344
32	Volume Control (350,000 ohms)	33-5139
33	Condenser (110 mmfd.)	30-1031
34	Resistor (600 ohms)	33-1212
35	Resistor (20,000 ohms)	33-320344
36	Resistor (32,000 ohms)	33-332444
37	Resistor (240,000 ohms)	33-424344
38	Resistor (240,000 ohms)	33-424344
39	Resistor (490,000 ohms)	33-449344
40	Condenser (.01 mfd.)	30-4145
41	Condenser (250 mmfd.)	30-1032
42	Condenser (4,000 mmfd.)	30-4185
43	Condenser (.02 mfd.)	30-4495
44	Resistor (15,000 ohms)	33-315344
45	Tone Control Switch	42-1139
46	Output Transformer	32-7495
47	Choke	32-1374
48	Condenser (250 mmfd.)	30-1032
49	Cone & Voice Coil	36-3586
50	Field Coil Assembly	32-9236
51	On & Off Switch	42-1277
52	Pilot Lamp	34-2040
53	Condenser (250 mmfd.)	30-1032
54	Condenser (.5 mfd.)	30-4474
55	"A" Choke	32-1374
56	Filament Choke	32-1438
57	Condenser (250 mmfd.)	30-1032
58	Vibrator Choke	32-2537
59	Condenser (.5 mfd.)	30-4474
60	Condenser (250 mmfd.)	30-1032
61	Condenser (250 mmfd.)	30-1032
62	Resistor (200 ohms)	33-120344
63	Power Transformer	32-7720
64	Condenser (7.500 mmfd.)	30-4420
65	Filter Choke	32-7722
66	Filter Condenser (4-8 mfd.)	30-2168
67	Condenser (250 mmfd.)	30-1032
68	"B" Choke	32-1281
69	Choke	32-2269
70	Condenser (250 mmfd.)	30-1032
71	Vibrator (OPTIONAL)	41-3170-2, 41-3170-3
	Four-prong Socket	27-6044
	Five-prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven-prong Socket	27-6037
	Tuning Shaft	28-8699
	Volume Shaft	28-8714
	Knob	27-4437
	Pilot Lamp Assembly	38-8265
	Dial	27-4456
	Glass	27-8656
	Pointer	27-4457
	Fuse	7227
	Fuse Insulator	27-7729
	Speaker Cable	41-3250
	Antenna Lead	L-2804
	"U" Clamp (Control Mtg.)	28-4680
	Gas Gauge Condenser	30-4663
	Oil Gauge Condenser	30-4307
	Interference Condenser	30-4500

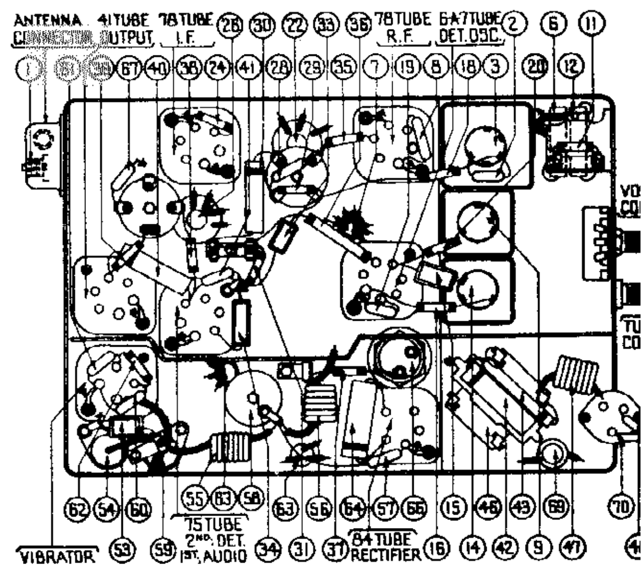


FIGURE 158

CHANGES — "Run Numbers" are stamped on the chassis sub-base for ide[ntifi]cation. These "Run Numbers" are changed consecutively as major cha[nges] are made in the Receiver wiring and parts.

RUN No. 2 — Resistor 34 removed (300 ohms) Part No. 33-220344 a[nd] (2000 ohms).

RUN No. 3 — Resistor 24 removed (2000 ohms) Part No. 33-225344 a[nd] (2500 ohms).

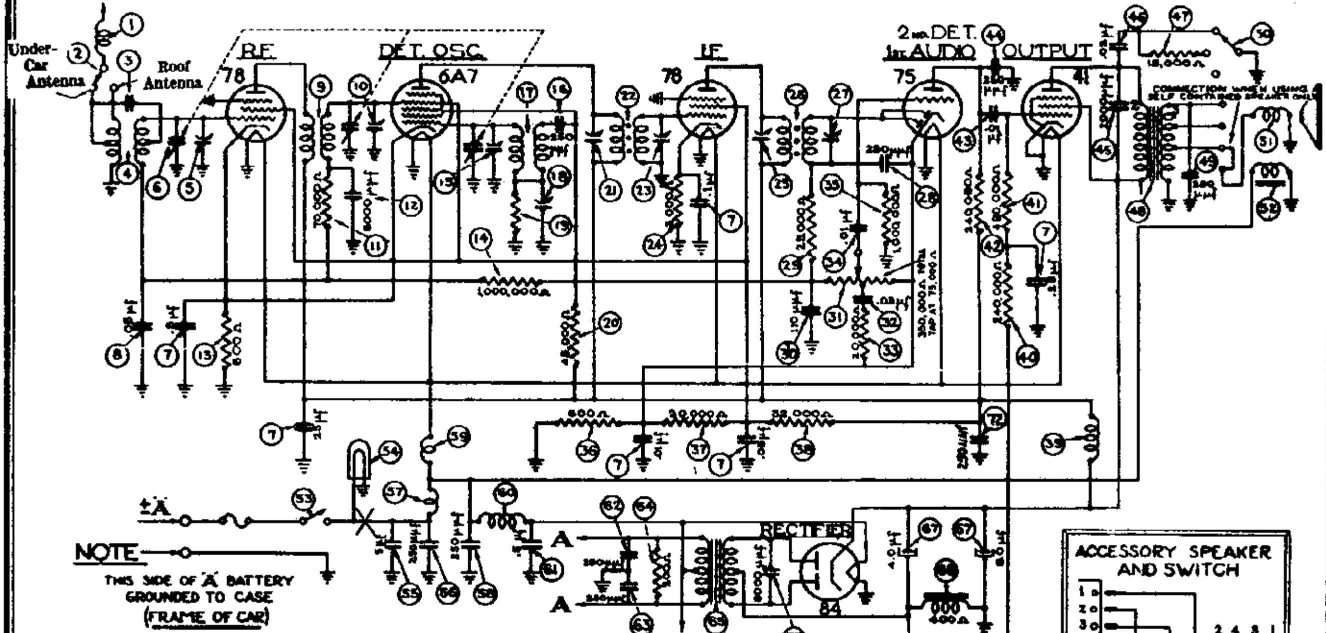
RUN No. 4 — Reverse all lug connections on "B" Choke 68.

ADJUSTMENTS — The correct padding procedure for the Model F-144[2] given on Page 107.

The Model F-1442 Concealed Header Bar Speaker with Ear Level Reception is a Special Custom-Built Receiver used exclusively by the Ford Motor Company for the 1937 Ford V-8 cars.

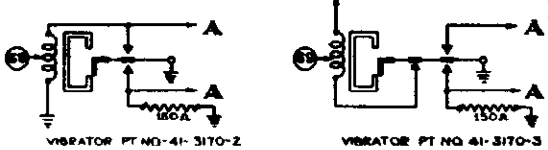
MODEL C-1540 Chrysler
Schematic, Chassis
Parts

PHILCO RADIO & TELEV. CORP.

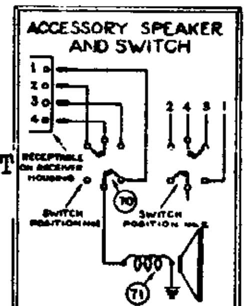


NOV. 20, 1936

I.F. = 260 K.C.



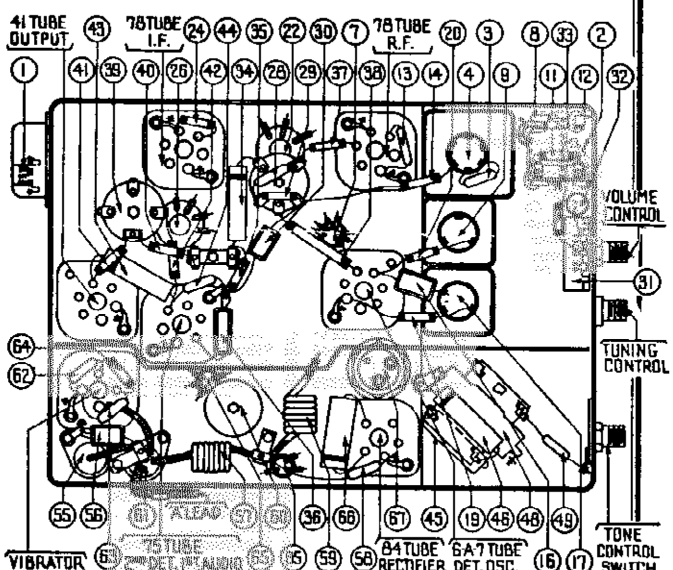
FOR ALIGNMENT
SEE INDEX



MODEL C-1450 PARTS LIST

No.	Description	Part No.
1	Antenna Choke	32-2063
*2	Antenna Switch	42-1259
3	Condenser (70 mmfd.)	30-1068
4	Antenna Transformer	32-2350
5	First Padder (on Tun. Cond.)	
*6	Tuning Condenser	31-1984
7	Condenser — (.01-.05-.1 .25-.25-.5 mfd.)	30-4478
8	Condenser (.05 mfd.)	30-4444
9	R. F. Transformer	32-2231
10	Second Padder (on Tun. Cond.)	
11	Resistor (70,000 ohms)	33-370344
12	Condenser (6,000 mmfd.)	30-4415
13	Resistor (600 ohms)	33-1212
14	Resistor (1,000,000 ohms)	33-510344
15	Third Padder (on Tun. Cond.)	
16	Condenser (250 mmfd.)	30-1032
17	Oscillator Transformer	32-2232
*18	Low Frequency Padder	31-6056
19	Resistor (99,000 ohms)	33-399344
20	Resistor (45,000 ohms)	33-345344
21	Padder (Pri. 1st I. F. Trans.)	
22	First I. F. Transformer	32-2286
23	Padder (Sec. 1st I. F. Trans.)	
24	Resistor (3,000 ohms)	33-230344
25	Padder (Pri. 2nd I. F. Trans.)	
26	Second I. F. Transformer	32-2167
27	Padder (Sec. 2nd I. F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (110 mmfd.)	30-1031
31	Volume Control (350,000 ohms)	33 5121
32	Condenser (.03 mfd.)	30-4449
33	Resistor (20,000 ohms)	33-320344
34	Condenser (.01 mfd.)	30-4124
35	Resistor (1,000,000 ohms)	33-510344
36	Resistor (600 ohms)	33-1212
37	Resistor (20,000 ohms)	33-320344
38	Resistor (32,000 ohms)	33-332444
39	"B" Choke	32-1281
40	Resistor (240,000 ohms)	33-424344
41	Resistor (490,000 ohms)	33-449344
42	Resistor (240,000 ohms)	33-424344
43	Condenser (.01 mfd.)	30-4145
44	Condenser (250 mmfd.)	30-1032
45	Condenser (2,000 mmfd.)	30-4177
46	Condenser (.02 mfd.)	30-4495

No.	Description	Part No.
47	Resistor (15,000 ohms)	33-315344
*48	Output Transformer	32-7765
49	Condenser (250 mmfd.)	30-1032
*50	Tone Control Switch	42-1273
51	Cone and Voice Coil	36-3159
*52	Field Coil Assembly	36-3513
53	On & Off Switch	42-5317
54	Pilot Lamp	34-2040
55	Condensers (.5 mfd.)	30-4474
56	Condenser (250 mmfd.)	30-1032
57	"A" Choke	32-1374
58	Condenser (250 mmfd.)	30-1032
59	Filament Choke	32-1438
60	Vibrator Choke	32-2249
61	Condenser (.5 mfd.)	30-4474
62	Condenser (250 mmfd.)	30-1032
63	Condenser (250 mmfd.)	30-1032
64	Resistor (200 ohms)	33-120344
65	Power Transformer	32-7720
66	Condenser (8,000 mmfd.)	30 4420
67	Filter Condenser (4-8 mfd.)	30-2179
68	Filter Choke	32-7722
69	Vibrator (Optional)	41-3170-2 41-3170-3
70	Accessory Speaker Switch	42-1257
71	Accessory Speaker Cone	36-3526
72	Condenser (250 mmfd.)	30-1032
73	Condenser (250 mmfd.)	30-1032
	*Accessory Speaker Cable	41-3237
	*Accessory Speaker Knob	03334
	*Complete Cable and Adapter	41-3234
	Four-prong Socket	27-6044
	Five-prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven-prong Socket	27-6037
	*Accessory Speaker Socket	27-6025
	*Receiver Housing	38-1736
	Distributor Resistor	33-1113
	Generator Condenser	30-4490
	Interference Condenser	30-4007
	Fuse	7227
	Fuse Insulator	27-7729
	Rec. Mtg. Plate (Plymouth)	28-3086
	Rec. Mtg. Plate (Chrysler-Dodge-DeSoto)	28-4650
	Tun. & Vol. Knob (Plymouth)	27-4363
	Tun. & Vol. Knob (Dodge)	27-4365



Description	Part No.
Tun. & Vol. Knob (DeSoto)	27-4367
Tun. & Vol. Knob (Chrysler)	27-4377
Tun. & Vol. Knob (Motor Parts)	27-4401
Tone Control Knob (Plymouth)	27-4371
Tone Control Knob (Dodge)	27-4373
Tone Control Knob (DeSoto)	27-4375
Tone Control Knob (Chrysler)	27-4379

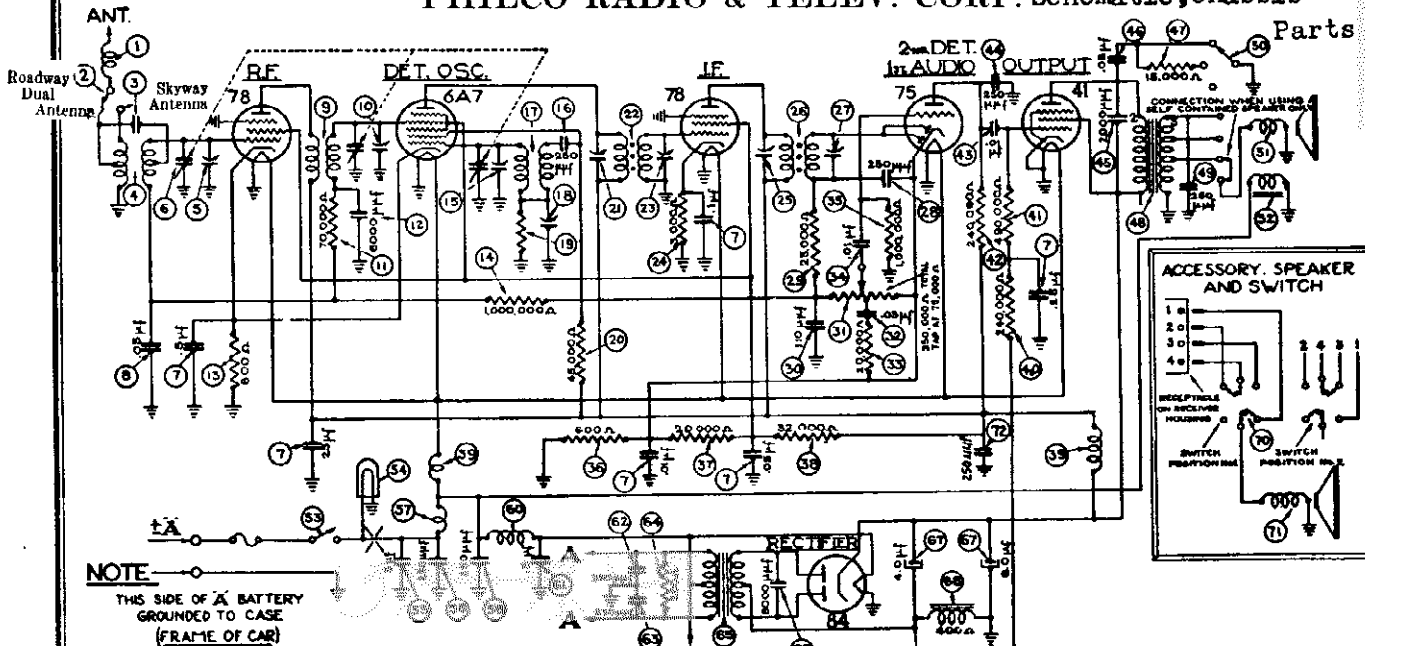
No.	Description	Part No.
	Tone Control Knob (Motor Parts)	27-4400
	Tuning Control Shaft	28-8674
	Volume Control Shaft	28-8675
	Tone Control Shaft	28-8676
	Bolt (Rec. Mtg.)	W825A
	Scale Assembly	42-5637
	Anti Back Lash Spring	28-8647
	Pilot Lamp Assembly	38-7734
	Wrench	28-4380

A Condenser 72 has been added to the Receiver. One side is connected to the filament of the type 6A7 tube and the other side to the ground.

NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicago.

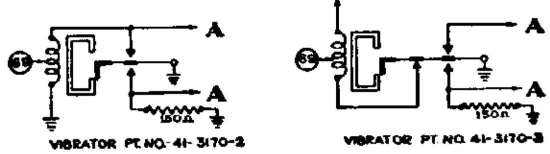
MODEL C-1452 Chrysler
Schematic, Chassis
Parts

PHILCO RADIO & TELEV. CORP.



NOV. 20, 1936

FIGURE 3



I.F. = 260 KC.

MODEL C-1452 PARTS LIST

No.	Description	Part No.
1	Antenna Choke	32-2063
*2	Antenna Switch	42-1259
3	Condenser (30 mmfd.)	30-1059
4	Antenna Transformer	32-2433
5	First Padder (on Tun. Cond.)	
*6	Tuning Condenser	31-1984
7	Condenser — (.01-.05-.1-.25-.25-.5 mfd.)	30-4478
8	Condenser (.05 mfd.)	30-4444
9	R. F. Transformer	32-2231
10	Second Padder (on Tun. Cond.)	
11	Resistor (70,000 ohms)	33-370344
12	Condenser (6,000 mmfd.)	30-4445
13	Resistor (600 ohms)	33-1212
14	Resistor (1,000,000 ohms)	33-510344
15	Third Padder (on tun. Cond.)	
16	Condenser (250 mmfd.)	30-1032
17	Oscillator Transformer	32-2232
*18	Low Frequency Padder	31-6056
19	Resistor (99,000 ohms)	33-399344
20	Resistor (45,000 ohms)	33-345344
21	Padder (Pri. 1st I. F. Trans.)	
22	First I. F. Transformer	32-2286
23	Padder (Sec. 1st I. F. Trans.)	
24	Resistor (3,000 ohms)	33-230344
25	Padder (Pri. 2nd I. F. Trans.)	
26	Second I. F. Transformer	32-2167
27	Padder (Sec. 2nd I. F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (110 mmfd.)	30-1031
31	Volume Control (350,000 ohms)	33-5121
32	Condenser (.03 mfd.)	30-4449
33	Resistor (20,000 ohms)	33-320344
34	Condenser (.01 mfd.)	30-4124
35	Resistor (1,000,000 ohms)	33-510344
36	Resistor (600 ohms)	33-1212
37	Resistor (20,000 ohms)	33-320344
38	Resistor (32,000 ohms)	33-332444
39	"B" Choke	32-1281
40	Resistor (240,000 ohms)	33-424344
41	Resistor (490,000 ohms)	33-449344
42	Resistor (240,000 ohms)	33-524344
43	Condenser (.01 mfd.)	30-4145
44	Condenser (250 mmfd.)	30-1032
45	Condenser (2,000 mmfd.)	30-4177
46	Condenser (.02 mfd.)	30-4495
47	Resistor (15,000 ohms)	33-315344
*48	Output Transformer	32-7765
49	Condenser (250 mmfd.)	30-1032
*50	Tone Control Switch	42-1273
51	Cone and Voice Coil	36-3159
*52	Field Coil Assembly	36-3513
53	On & Off Switch	42-5317
54	Pilot Lamp	34-2040
55	Condensers (.5 mfd.)	30-4474
56	Condenser (250 mmfd.)	30-1032
57	"A" Choke	32-1374
58	Condenser (250 mmfd.)	30-1032
59	Filament Choke	32-1438
60	Vibrator Choke	32-2249
61	Condenser (.5 mfd.)	30-4474
62	Condenser (250 mmfd.)	30-1032
63	Condenser (250 mmfd.)	30-1032
64	Resistor (200 ohms)	33-120344
65	Power Transformer	32-7720
66	Condenser (8,000 mmfd.)	30-4420
67	Filter Condenser (4-8 mfd.)	30-2179
68	Filter Choke	32-7722
69	Vibrator (Optional)	41-3170-2 41-3170-3
70	Accessory Speaker Switch	42-1257
71	Accessory Speaker Cone	36-3526
72	Condenser (250 mmfd.)	30-1032
73	Condenser (250 mmfd.)	30-1032
	*Accessory Speaker Cable	41-3237
	*Accessory Speaker Knob	03334
	*Complete Cable and Adapter	41-3234
	Four-prong Socket	27-6044
	Five-prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven prong Socket	27-6037
	*Accessory Speaker Socket	27-6025
	*Receiver Housing	38-1736
	Distributor Resistor	33-1113
	Generator Condenser	30-4490
	Interference Condenser	30-4007
	Fuse	7227
	Fuse Insulator	27-7729
	Rec. Mtg. Plate (Plymouth)	28-3086
	Rec. Mtg. Plate (Chrysler-Dodge-DeSoto)	28-4650
	Tun. & Vol. Knob (Plymouth)	27-4363

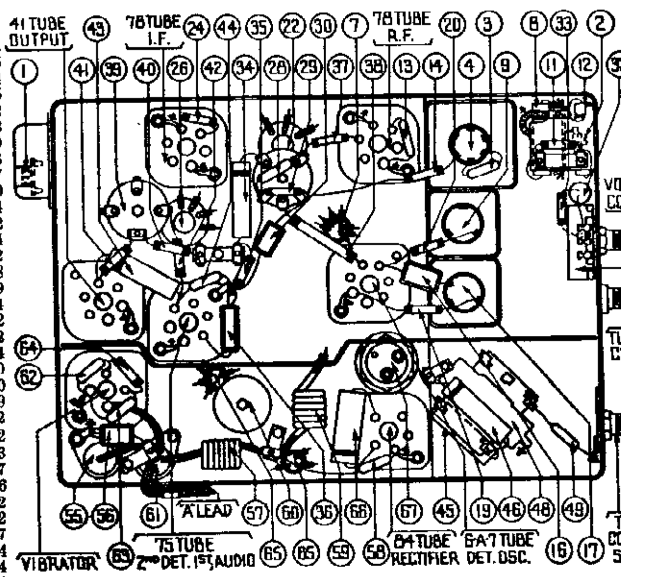


FIGURE 4

No.	Description	Part No.
	Tun. & Vol. Knob (Dodge)	27-4365
	Tun. & Vol. Knob (DeSoto)	27-4367
	Tun. & Vol. Knob (Chrysler)	37-4377
	Tun. & Vol. Knob (Motor Parts)	27-4401
	Tone Control Knob (Plymouth)	27-4371
	Tone Control Knob (Dodge)	27-4373
	Tone Control Knob (DeSoto)	27-4375
	Tone Control Knob (Chrysler)	27-4379
	Tone Control Knob (Motor Parts)	27-44[illegible]
	Tuning Control Shaft	28-86[illegible]
	Volume Control Shaft	28-86[illegible]
	Tone Control Shaft	28-86[illegible]
	Bolt (Rec. Mtg.)	W82[illegible]
	Scale Assembly	42-56[illegible]
	Anti Back Lash Spring	28-80[illegible]
	Pilot Lamp Assembly	38-77[illegible]
	Wrench	28-43[illegible]

A Condenser 73 has been added to the Receiver. One side is connected to the filament of the type 6A7 tube and the side to the ground.

NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Cl

MODELS C-1450, C-1452
Socket, Trimmers

PHILCO RADIO & TELEV. CORP.

Alignment

I. F. TRANSFORMERS AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

Both the primary and secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 6).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 5.

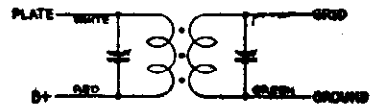


FIGURE 5

If replacements are ever necessary, replace the entire coil assembly, 32-2286 for the first I. F. stage and 32-2167 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048 Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR — With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F. — Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder (27) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (25) for maximum reading. (See Figure 6 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder (23) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (21) for maximum reading. Readjust padders (25) and (27) with the generator lead connected to the type 6A7 tube. (See Figure 6 for location of padders).

HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube. Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Using a piece of paper approximately .006" thick as a gauge between the heel of the rotor plates and the stator plates, turn the rotor plates in mesh until they strike against the paper.

With the tuning condenser in this position, adjust the high frequency padder (15) and the R. F. padder (10) until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

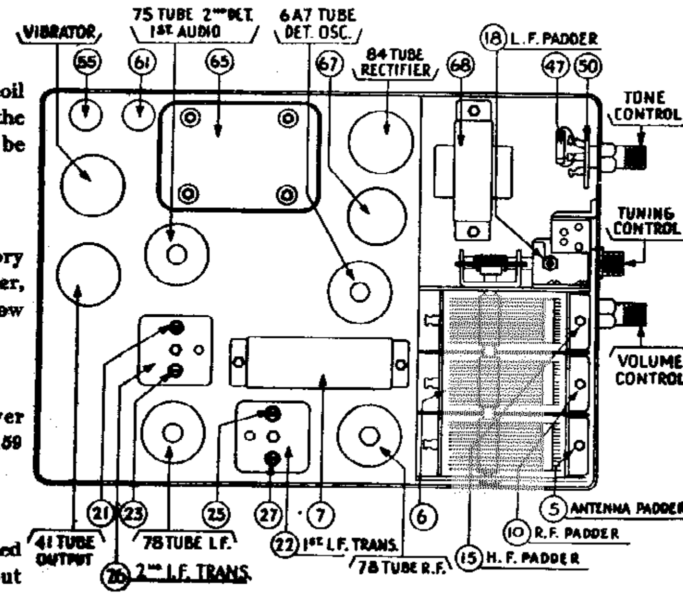


FIGURE 6

LOW FREQUENCY — Turn the tuning condenser plates in mesh to approximately 600 K. C., 60 on the dial scale and set the signal generator at 600 K. C. Roll the tuning condenser and adjust the low frequency padder screw (18) for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT — Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder (15) again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.

ANTENNA — WHEN PADDING THE ANTENNA STAGE, IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE CONSTRUCTED AND USED.

Connect the signal generator to the Antenna Cable Assembly (made up of the "Skyway Antenna" lead, Part No. L-2665 lead and a 22 mmfd. condenser in series between the lead and the signal generator). Plug the cable into the antenna connector on the end of the Receiver.

Remove the snap button cover over the antenna selector and advance the selector switch to the Skyway antenna position.

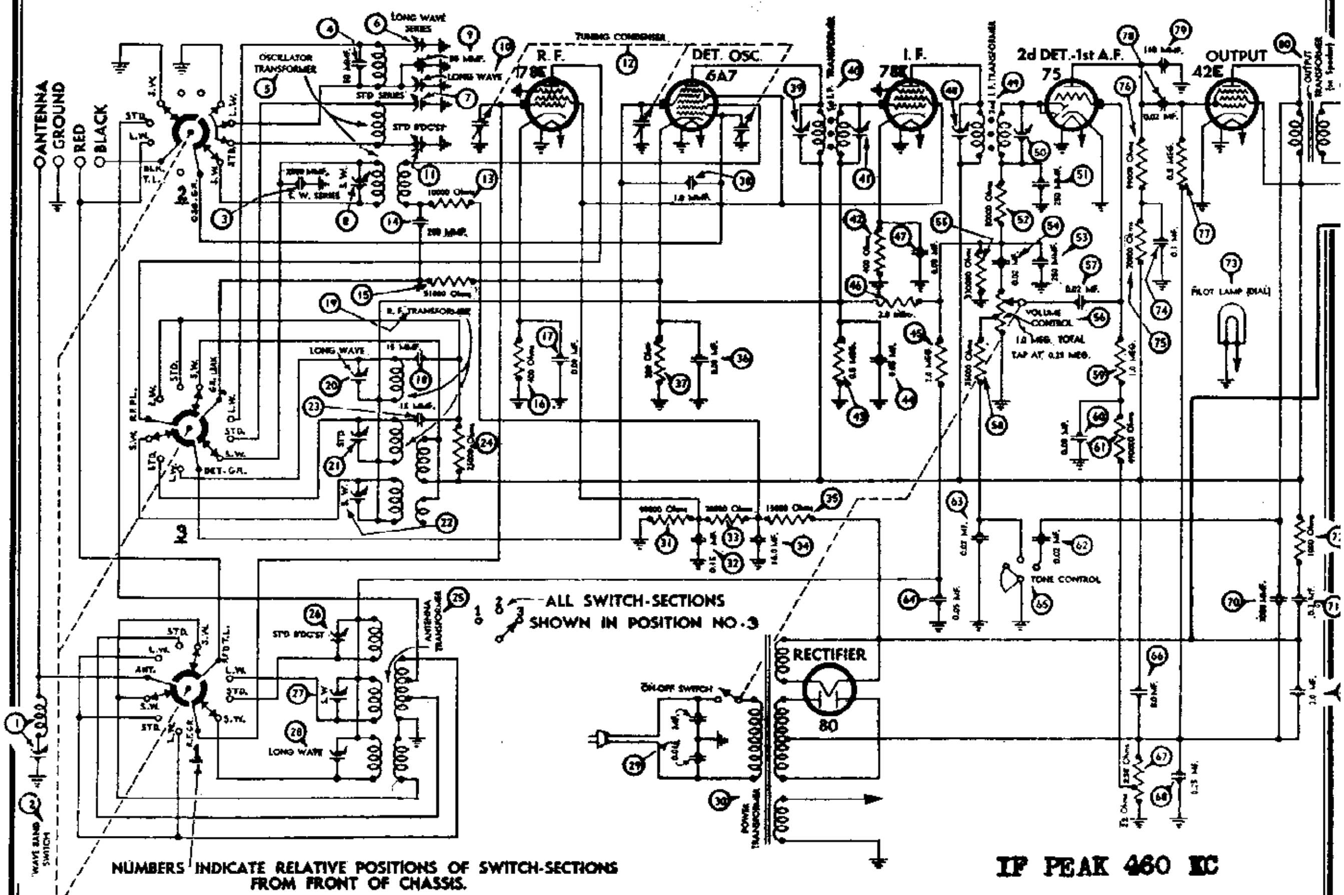
Follow this padding procedure regardless of whether the Receiver is used with the Roadway or with the Skyway antenna.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders (10) and (5) for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the antenna lead must be connected to the Receiver in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

MODEL 2620
Schematic, Parts

PHILCO RADIO & TELEV. CORP.



Schematic Number	Description	Part Number	List Price
(1)	Wave Trap	38-6850	
(2)	Waveband Switch	42-1107	
(3)	Condenser (2900 mmf.)	30-1054	
(4)	Condenser (50 mmf.)	30-1029	
(5)	Oscillator Coil	32-1665	
(6)	Padder (LONGWAVE LF.)	31-6044	
(7)	Padder (STANDARD LF.)	Part of (6)	
(8)	Padder	Part of (5)	
(9)	Condenser (50 mmf.)	30-1029	
(10)	Padder	Part of (5)	
(11)	Fadder	Part of (5)	
(12)	Tuning Condenser Assembly	31-1526	
(13)	Resistor (10,000 ohms)	4412	
(14)	Condenser (250 mmf.)	30-1032	
(15)	Resistor (51,000 ohms)	6098	
(16)	Condenser (0.09 mf.)	4989-DG	
(17)	Resistor (400 ohms)	33-3016	
(18)	Condenser (1.5 mmf.)		
(19)	R. F. Transformer	32-1666	
(20)	Padder	Part of (19)	
(21)	Padder	Part of (19)	
(22)	Padder	Part of (19)	
(23)	Condenser (1.5 mmf.)		
(24)	Resistor (25,000 ohms)	33-1013	
(25)	Antenna Transformer	32-1664	
(26)	Padder	Part of (25)	
(27)	Padder	Part of (25)	
(28)	Padder	Part of (25)	
(29)	Condenser (0.015-0.015 mf.)	3793-DG	
(30)	Power Transformer (110 V., AC)	32-7381	
(31)	Resistor (99,000 ohms)	4411	
(32)	Condenser (0.15 mf.)	30-4191	
(33)	Resistor (20,000 ohms)	6649	
(34)	Condenser (Electrolytic 16.0 mf.)	30-2118	
(35)	Resistor (15,000 ohms)	5718	
(36)	Condenser (0.09 mf.)	30-4122	
(37)	Resistor (300 ohms)	30-3010	
(38)	Condenser (1.0 mmf.)		
(39)	Padder	Part of (40)	
(40)	1st I. F. Transformer	32-1646	
(41)	Padder	Part of (40)	
(42)	Resistor (400 ohms)	33-3016	
(43)	Resistor (0.5 meg.)	6097	
(44)	Condenser (0.05 mf.)	30-4020	
(45)	Resistor (2.0 meg.)	33-1025	
(46)	Resistor (2.0 meg.)	33-1025	
(47)	Condenser (0.09 mf.)	30-4122-S	

Schematic Number	Description	Part Number
(48)	Padder	Part of (49)
(49)	2nd I. F. Transformer	32-1647
(50)	Padder	Part of (49)
(51)	Condenser (250 mmf.)	30-1032
(52)	Resistor (50,000 ohms)	6098
(53)	Condenser (250 mmf.)	30-1032
(54)	Condenser (0.02 mf.)	30-4215
(55)	Resistor (330,000 ohms)	33-1200
(56)	Volume Control and Switch	33-5105-F
(57)	Condenser (0.02 mf.)	30-4215
(58)	Resistor (25,000 ohms)	33-1013
(59)	Resistor (1.0 meg.)	33-1096
(60)	Condenser (0.09 mf.)	Part of (16)
(61)	Resistor (490,000 ohms)	6097
(62)	Condenser (0.02 mf.)	Part of (65)
(63)	Condenser (0.02 mf.)	30-4215
(64)	Condenser (0.05 mf.)	30-4020
(65)	Tone Control	30-4332
(66)	Condenser (Electrolytic 8.0 mf.)	Part of (69)
(67)	B.C. Resistor (257 ohms)	38-5418
(68)	Condenser (0.25 mf.)	30-4146
(69)	Condenser (Electrolytic 8.0-8.0 mf.)	30-2079
(70)	Condenser (3.000 mmf.)	30-4042
(71)	Condenser (0.3 mf.)	6287-DU
(72)	Resistor (1,000 ohms)	5837
(73)	Pilot Lamp	34-2064
(74)	Condenser (0.1 mf.)	30-4122
(75)	Resistor (70,000 ohms)	5385
(76)	Resistor (99,000 ohms)	4411
(77)	Resistor (0.5 meg.)	6097
(78)	Condenser (0.02 mf.)	30-4113
(79)	Condenser (110 mmf.)	30-1031
(80)	Output Transformer	32-7019
(81)	Replacement Speaker Cone	36-3157
(82)	Field Coil Assembly	36-3579
	Dial	27-5128
	Spring and Clamp	28-2837
	Hub and Set Screw Assembly	31-1515
	Knob (Station Selector)	27-4206
	Knob (Fine Tuning)	27-4207
	Knob (Volume and Tone)	27-4208
	Knob (Waveband)	27-4219
	Bezel	28-8168
	Bezel Gasket	27-7980
	Bezel Frame Gasket	27-7971
	Bezel Glass	27-8006

MODEL 2620
Socket, Trimmers
Chassis, Alignment

PHILCO RADIO & TELEV. CORP.

TYPE CIRCUIT: Superheterodyne, with preselector R. F. amplifier and pentode output (3 watts); built in connections for ***Philco All-Wave Aerial,*** aerial selector built into and operated by waveband switch.

POWER SUPPLY: Alternating current, voltage and frequency as specified on nameplate of chassis.

TUBES USED: 1 type 78E, R. F.; 1 type 6A7, 1st detector and oscillator; 1 type 78E, I. F.; 1 type 75, detector, AVC, and 1st audio; 1 type 42E, output; 1 type 80, rectifier.

WAVE BANDS: Three (1) long wave (weather); (2) standard, (with some police); (3) short wave.

COVERAGE OF EACH BAND: Band 1, 145 to 350 K.C. Band 2, 540 to 1720 K.C.; Band 3, 5.7 to 18.0 MC.

TUNING DRIVE: Two-speed gear drive, ball bearing, 50 to 1 ratio for slow tuning.

TONE CONTROLS: 3 position, with bass compensation effective in first position.

INTERMEDIATE FREQUENCY: 460 K.C.

POWER CONSUMPTION: 60 watts.

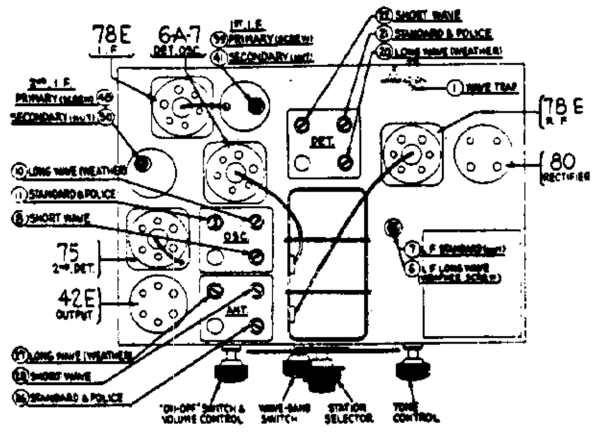


FIGURE 1

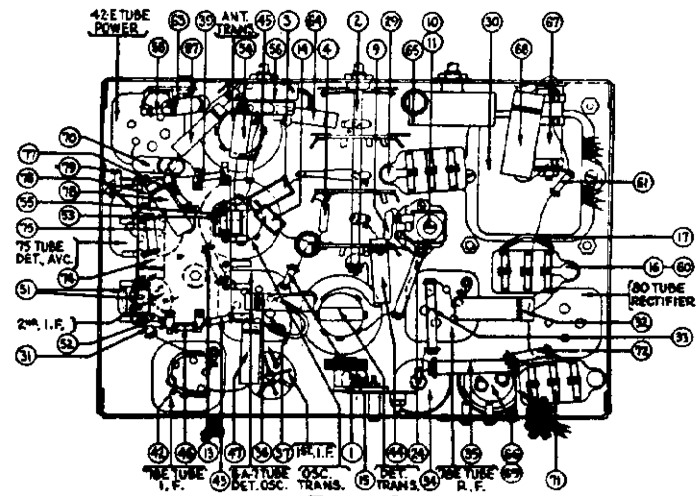


FIGURE 2

ADJUSTING COMPENSATING CONDENSERS

Adjustment of compensating condensers in Model 2620 requires an accurate signal generator covering long-wave, standard wave, police, and short-wave frequencies. The PHILCO Model 088 All-Wave Signal Generator, having a continuous range of from 100 to 20,000 K.C., is ideal for this purpose.

An output meter is also needed. PHILCO Model 025 Circuit Tester includes a high grade output meter.

Philco No. 3164 fibre wrench and No. 27-7059 fibre-handled screwdriver complete the equipment needed for making these adjustments. The location of the various compensating condensers is shown in Fig. 1. Connect the output meter to the plate and cathode contacts of the 42E output tube (using the adapters provided with the "025") and set it at the 0-30 volt range.

I. F. — Connect the antenna lead from the 088 Signal Generator to the grid cap of the 78E, I. F. amplifier (having removed the grid clip from the tube), and the ground lead to the ground post on the chassis. Set the Signal Generator (088) at 460 K.C., volume control of set full on, tone control counter-clockwise, wave band switch in No. 2 position, and condenser gang all the way in. Adjust the signal generator attenuator for approximately ¼ scale reading on the output meter, now adjust condensers 46 and 50 for maximum reading of the output meter. Remove the signal generator antenna lead from the grid cap (replacing grid clip) and connect to the 6A7 grid cap. Repeat procedure, this time tuning condensers No. 39 and 41 for maximum output reading. Care should be taken to keep the signal input from the signal generator low at all times to insure proper peaking of the transformers.

WAVE TRAP—Connect the Signal Generator antenna and ground leads to the antenna and ground posts of the set. Replace the grid clip on the 6A7 tube cap. With the signal generator operating at 460 K.C. and the set controls adusted as for I.F., adjust wavetrap (1) until a minimum reading is obtained in the output meter.

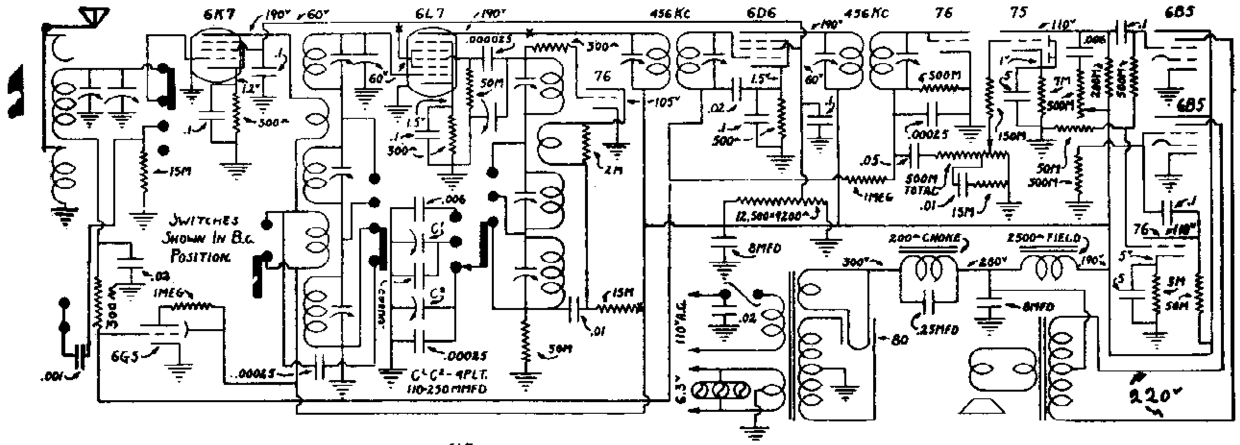
SHORT-WAVE: Turn wave band switch to extreme right (position 3) and set dial at 18.0 meg. Set Signal Generator at 18.0 meg. Connect a shunt condenser across the oscillator section of the gang and tune the shunt for maximum output. Adjust condensers 12 and 18 for maximum output. Remove shunt condenser and adjust condenser 8 for correct calibration. Check the alignment by tuning the set dial at approximately 7.1 meg. for the image frequency.

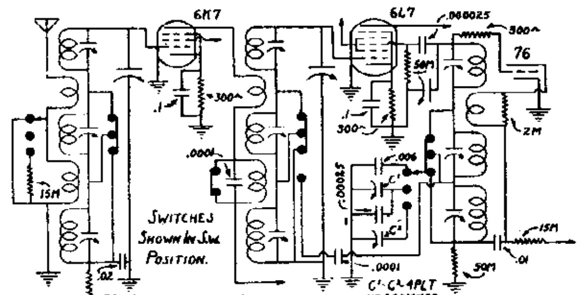
STANDARD: Turn wave switch to Standard (position 2) and set dial at 1500 K.C. Set Signal Generator at 1500 K.C., adjust condensers 11, 13 and 36 for maximum. Turn dial of set and signal generator to 580 K.C. and adjust condenser 7 for maximum output, retune 11 at 1500 K.C.

LONG WAVE: (Weather) — Turn waveband switch to position 1 (left) (longwave). Set dial at 85 and signal generator at 350 K.C. Adjust condensers 10, 20 and 17 (oscillator, R. F., and Antenna Longwave) for maximum reading.

Turn dial to 17, signal generator to 170 and adjust condenser 6 (longwave series) for maximum reading.

PILGRIM ELECTRIC CORP.





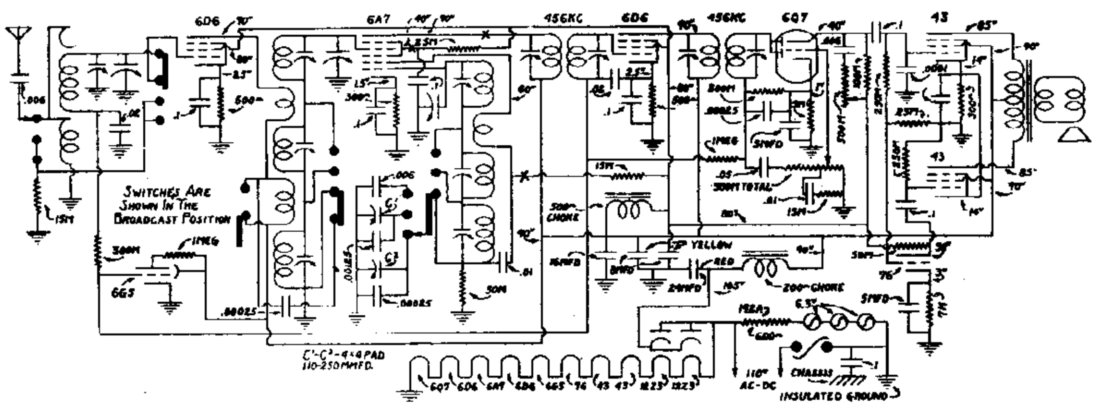
MODEL NTE.

IF PEAK 456 KC

ALL VOLTAGES MEASURED WITH 1000~ PER VOLT METER.
ALL OTHER CONSTANTS ON MODEL NTE SAME AS MODEL NT.

MODEL NT

902,001 AND UP.

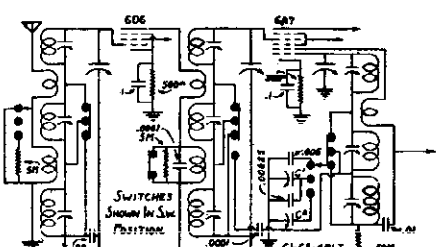


IF PEAK 456 KC

MODEL NTH

200,001 AND UP.

MODEL NTHE - ADDITIONAL PARTS - .0002 MICA, 6Q7 GRID TO GROUND. .0005 MICA, 6Q7 PLATE TO GROUND. 150M, ½ WATT RESISTOR, IN SERIES WITH 6Q7 GRID LEAD. .25 MFD-150V. INS. GND TO CHASSIS.

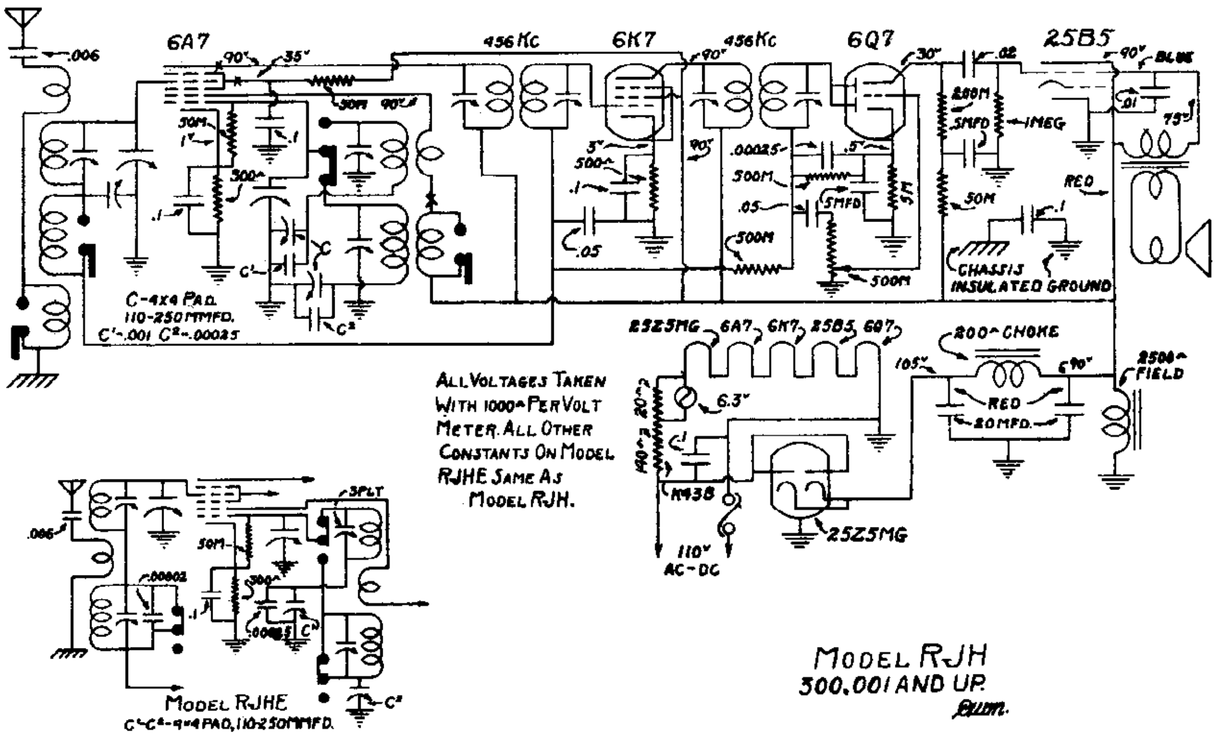


MODEL NTHE

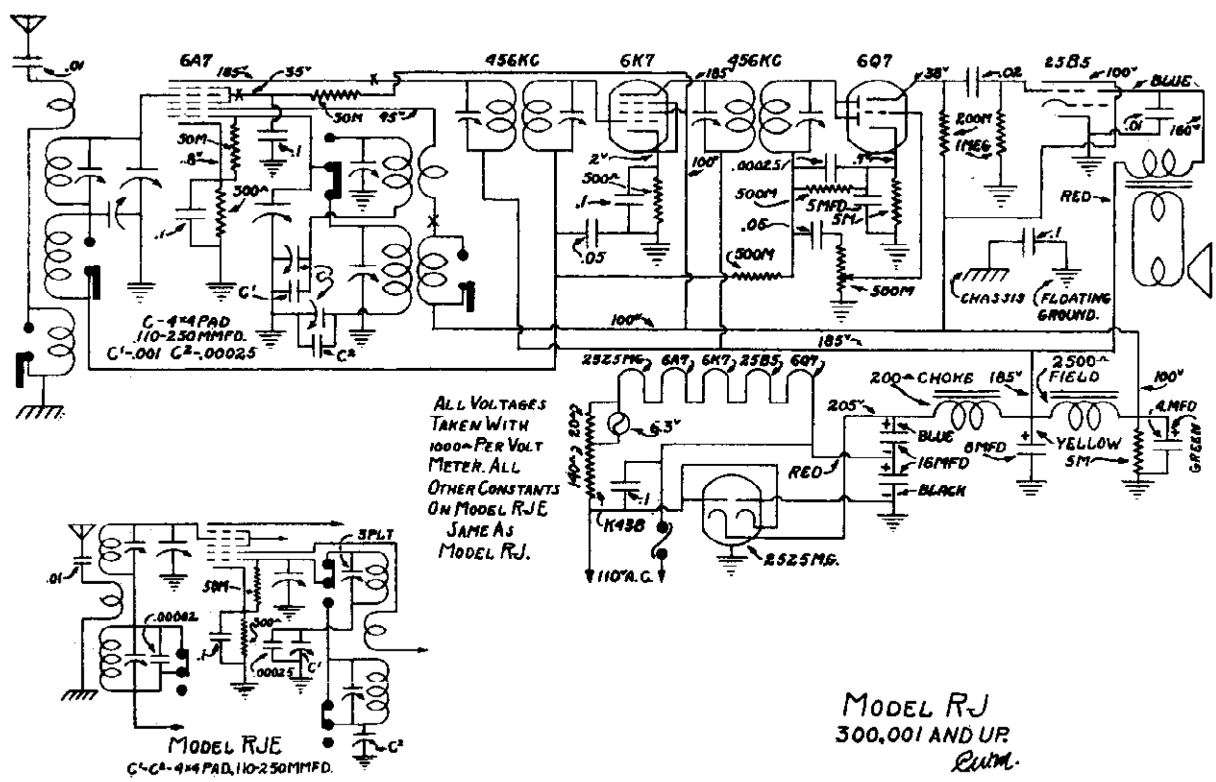
MODEL NTHE

MODELS RJ, RJE
MODELS RJH, RJHE
Schematics, Voltage

PILGRIM ELECTRIC CORP.



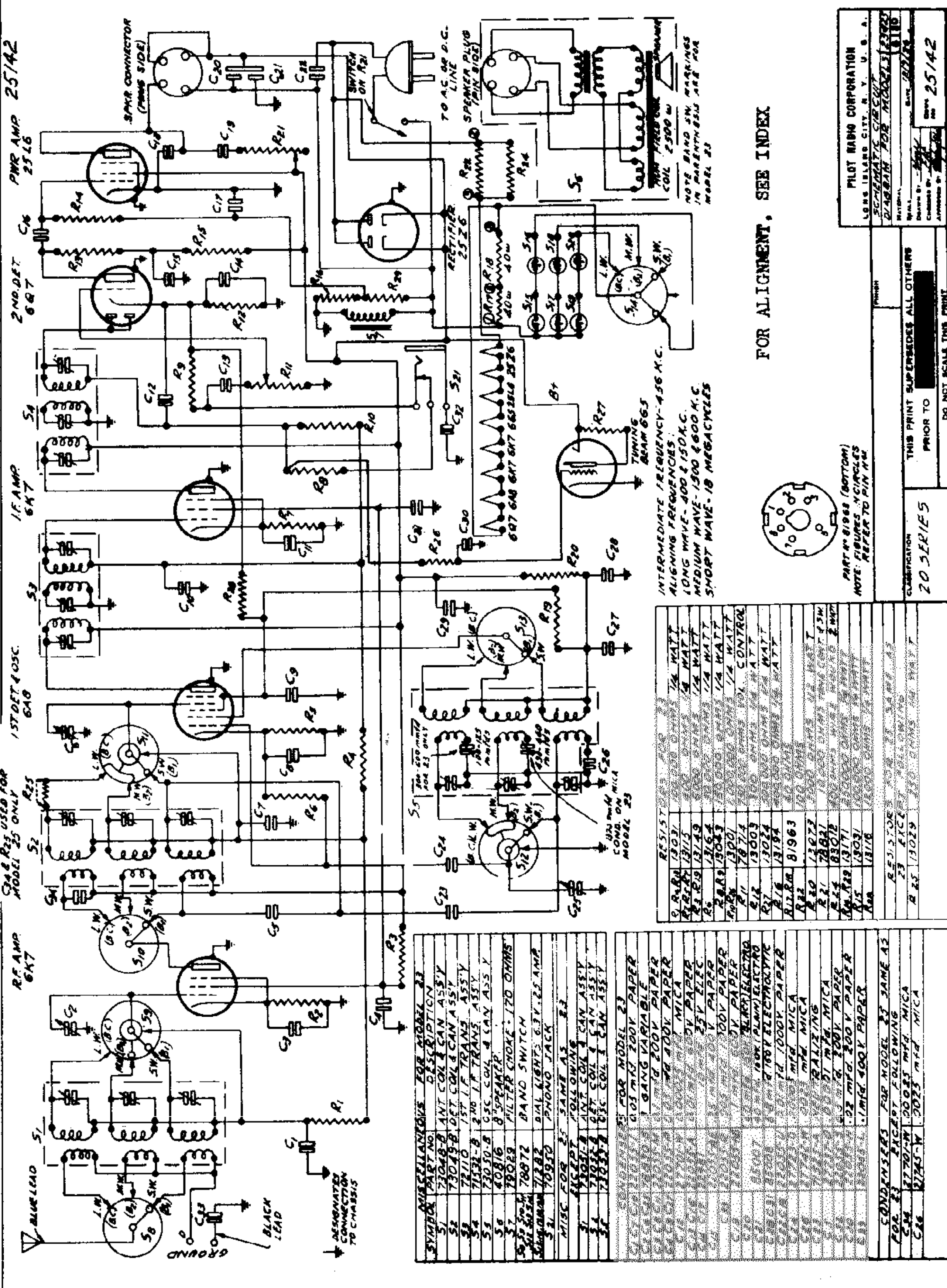
Model RJH
300,001 AND UP.



Model RJ
300,001 AND UP.

PILOT RADIO CORP.

MODELS 23,P23,25,P25
Schematic,Parts

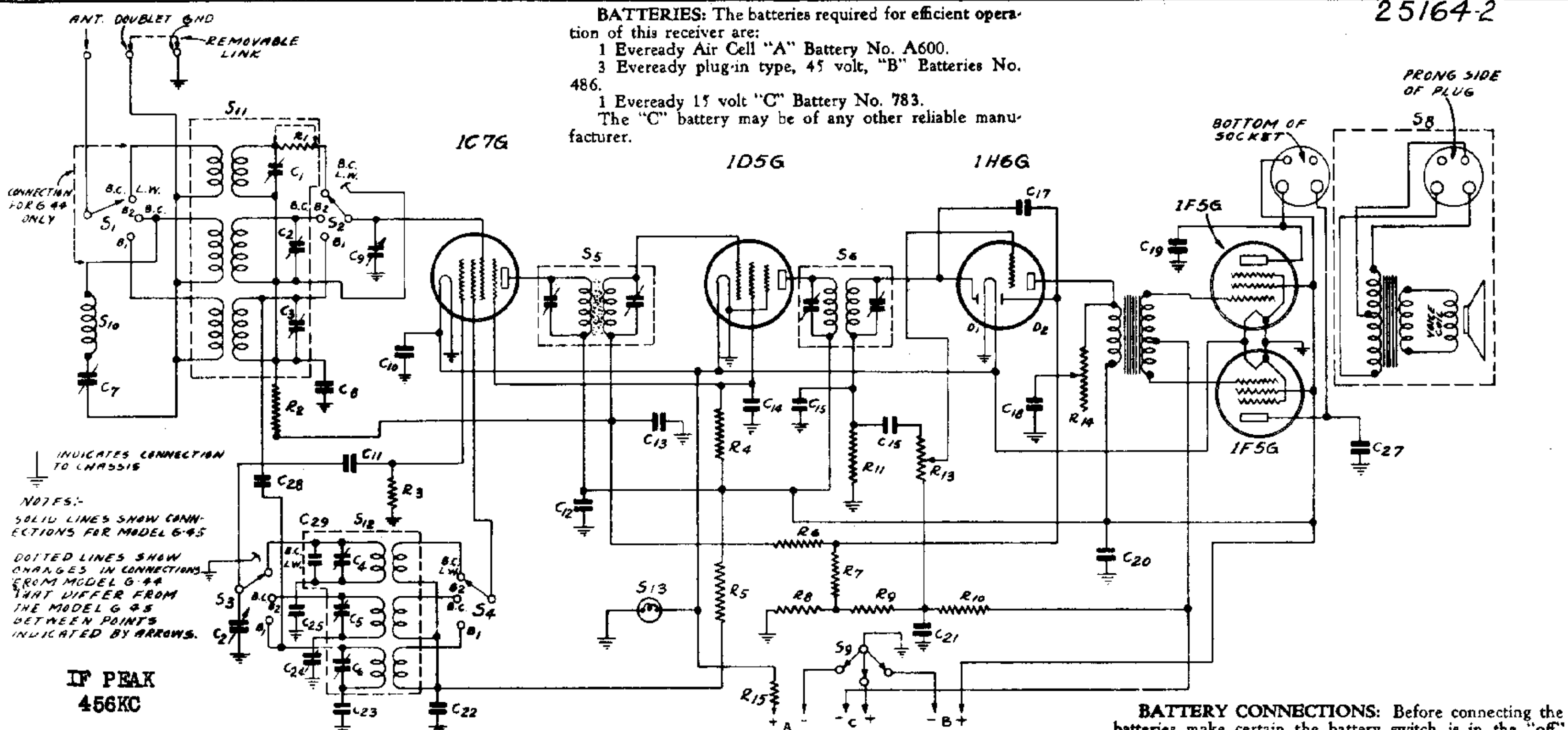


MODELS G-44, G-45
Schematic, Parts
Batt. Connections

PILOT RADIO CORP.

25164-2

BATTERIES: The batteries required for efficient operation of this receiver are:
1 Eveready Air Cell "A" Battery No. A600.
3 Eveready plug-in type, 45 volt, "B" Batteries No. 486.
1 Eveready 15 volt "C" Battery No. 783.
The "C" battery may be of any other reliable manufacturer.



IF PEAK 456KC

CONDENSERS FOR MODEL G-45		
C1 C2 C3	78022 A	ANT. TRIMMER STRIP ASS'Y.
C4 C5 C6	78030	OSC. TRIMMER STRIP ASS'Y.
C7	7-503 F	35-100 MFD. PADDER
C8 C13 C22	22055 I	.05 MFD. 200V. PAPER
C9 C26	79332	2 GANG CONDENSER
C10 C14	22055-F	.25 MFD. 200V. PAPER
C11 C17	27723-0	50 MMFD. MICA
C12	22055-S	.5 MFD. 200V. PAPER
C16	28016-0	100 MMFD. MICA
C16 C18	22055-A	.5 MFD. 200V. PAPER
C19 C27	22055 AD	.002 MFD. 1000V. PAPER
C20	71203	8 MFD. 200V. ELEC. COND.
C21	22481	10 MFD. 25V. ELEC. COND.
C23	28107-W	.003 MFD. MICA
C24 C25	72355 G	300-600 & 30-150 MMFD. DUAL PADDER
C28	71525 A	NEUT. COND. ASS'Y.
C29	28101-0	.00015 MFD. MICA (G-45 ONLY)

CONDENSERS FOR MODEL G-44 SAME AS G-45 EXCEPT FOLLOWING		
C24	27741 W	1150 MMFD. MICA
C25	71503-A	250-500 MMFD. PADDER COND.

RESISTORS FOR MODEL G-45		
R1	13080	50 OHMS 1/4 WATT CARBON
R2	13031	100,000 OHMS 1/4 WATT CARBON
R3 R10	13164	50,000 OHMS 1/4 WATT CARBON
R4	13199	22,000 OHMS 1/4 WATT CARBON
R5	13133	3,000 OHMS 1/4 WATT CARBON
R6 R7	13001	1 MEGOHM 1/4 WATT CARBON
R8 R9	13030	10000 OHMS 1/4 WATT CARBON
R11	13024	500,000 OHMS 1/4 WATT CARBON
R13	74297	1 MEGOHM VOL. CONTROL
R14	78846	100,000 OHMS TONE CONTROL
R15	79529	.5 OHMS 2 WATT FLEX. LEADRES.

RES FOR MODEL G-44 SAME AS G-45 EXCEPT FOLLOWING		
R1	13080	NOT USED ON G-44

MISC FOR MODEL G-45		
S1 S2 S3 S4	79327	BAND SWITCH ASS'Y
S5	73108-A	1ST I.F. TRANS ASS'Y
S6	73094	2ND I.F. TRANS. ASS'Y
S7	79325	AUDIO TRANS. ASS'Y
S8	40826	8" P.M. SPEAKER
S10	73029 A	WAVE TRAP COIL ASS'Y
S11	73091	ANT. COIL & CAN ASS'Y.
S12	73092	OSC. COIL & CAN ASS'Y
S13	72127	2V. .06 AMP PILOT

MISC FOR G-44 SAME AS G-45 EXCEPT FOLLOWING		
S11	73089	ANT. COIL & CAN ASS'Y
S12	73090	OSC. COIL & CAN ASS'Y

BATTERY CONNECTIONS: Before connecting the batteries make certain the battery switch is in the "off" position. The two heavy leads are connected to the Air Cell. Connections to the positive and negative terminals should be made as indicated by markers on leads.

Connection to the 45 volt batteries is made by simply inserting the cable plugs in the battery receptacles.

The lead marked C— should be connected to the —10½ volt terminal of the "C" battery and the C+ lead to the + terminal.

FUSE: A ¼ ampere fuse is built into the battery cable. This is to protect the tubes and batteries in case of a short circuit. When it is necessary to replace the fuse, it is important to use a ¼ ampere replacement fuse.

ALTERATIONS | FINISH
CLASSIFICATION: G-40 SERIES
THIS PRINT SUPERSEDES ALL OTHERS PRIOR TO [redacted]
DO NOT SCALE THIS PRINT

PILOT RADIO CORPORATION
LONG ISLAND CITY N. Y. U. S. A.
SCHEMATIC DIAGRAM FOR MODELS G-44 & G-45
DRAWN BY: E.F.
DATE: 6/3/37
DWG. No. 25164-2

PILOT RADIO CORP.

Range, Model 23 and P-23
16 - 555 m. (18,800 - 540 kc.)

Range, Model 25 and P-25
16 - 51 m. (18,800 - 5,880 kc.)
181 - 555 m. (1,650 - 540 kc.)
731 - 2140 m. (410 - 140 kc.)

SERVICE INFORMATION FOR PILOT MODELS 23, 25, P-23, and P-25

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the "slip-on" knobs and felt washers from the controls and loosen the set screw on the tuning knob.

Remove the speaker plug from the socket at the rear of the chassis. Models P-23 and 25 have the socket mounted on the speaker.

Remove the four mounting screws, located underneath the cabinet.

Remove the tuning beam plug from the socket at the front of the chassis.

When removing Models P-23 and P-25 from the cabinet remove the phono-radio switch from the motor board, and disconnect wires going to matching transformer. Also disconnect line and ground leads to phono motor.

REALIGNMENT: Should the receiver require re-alignment, the procedure outlined below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

The R. F. alignment trimmer condensers are mounted on the side of the coil shields.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6K7 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6K7 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in both I. F. Units.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Insert a 200 mmf. condenser in series with the antenna lead. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located on the top of the oscillator coil. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT WAVE-BANDS:—The procedure in aligning the short wave-bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. Insert a 400 ohm non-inductive resistor in series with the antenna lead. The alignment frequencies are as follows:

Band 2: 50 Meters—(6,000 kc.)
Band 1: 16.6 Meters—(18,000 kc.)

When aligning Band 2, set the Band Selector Switch in the position marked "Band 2". Set the tuning control pointer at 50 meters. Adjust the oscillator alignment capacitor on Band 2 for maximum output. Next adjust the interstage and antenna section alignment capacitors for maximum output.

To align Band 1, set the Band Selector Switch in the position marked "Band 1". Set the tuning control pointer at the 16.6 meter mark. Set the external oscillator at 16.6 meters. Adjust the oscillator section alignment capacitor on Band 1 for maximum output.

Proceed next to align the interstage section of Band 1. In doing this, it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonance peak. Next align the antenna section for maximum sensitivity.

LONG WAVE MODEL 25

The above alignment positions refer to the Model 23 only, which is calibrated in frequency. The alignment points for the Model 25, which is calibrated in meters only, is as follows:

Long Wave	Align at 750 meters. Pad at 2,000 meters.
Broadcast	Align at 200 meters. Pad at 500 meters.
Band 1	Align at 17 meters.

The Long Wave alignment procedure is similar to that for the Broadcast. A 200 mmf. condenser should be used in series with the antenna lead in aligning this band.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

Model G-44
16.4 - 51 m. (18,300 - 5,900 kc.)
48 - 146 m. (6,250 - 2,050 kc.)
187 - 555 m. (1,600 - 540 kc.)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the battery cable is removed from the batteries.

Remove the "slip-on" knobs and felt washers from the controls and loosen the set screw on the tuning knob.

Remove the speaker plug from the socket at the rear of the speaker.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require re-alignment, the procedure outlined below should be followed. In the schematic wiring diagram, the location and function of the various alignment capacitors are clearly illustrated. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the batteries, reconnect the speaker cable in its socket at the rear of the chassis.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast," and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 1D5G tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator leads from the type 1D5G I. F. Amplifier tube and connect it in the same manner to the control grid at the top of the type 1C7G tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. Amplifier, it is essential to repeat the alignment process in both I. F. units with the external oscillator leads connected across the control grid of the 1C7G tube.

WAVE TRAP ADJUSTMENT: With the oscillator still set at 456 kc., connect the oscillator to the antenna through a 200 mmfd. condenser. Then adjust the wave trap condenser for minimum deflection on the output meter. The wave trap condenser is located underneath the gang condenser.

LOCATION OF TRIMMERS: The trimmers are mounted on the rear of the antenna and oscillator coil shields.

The antenna coil and trimmer assembly is mounted on the rear right corner of the chassis. The oscillator assembly is to the left of the antenna assembly.

In Model G-44 the Broadcast trimmers (oscillator and antenna) are the top trimmers.

The middle trimmers are for B2 and the bottom trimmers for B1.

The top trimmers in Model G-45 are for the long wave band. The middle trimmers are for the medium wave band and the bottom trimmers for the short wave band.

The padding condenser adjusting screw for 600 kc. is accessible through the hole at the rear of the chassis of the G-44 Model. On the G-45 Model this screw is the padding adjustment for the long wave band and the hexagon head through which this screw passes is the padding adjustment for medium wave band.

Model G-45
16.4 - 51 m. (18,800 - 5,900 kc.)
187 - 555 m. (1,600 - 540 kc.)
740 - 2,220 m. (405 - 135 kc.)
(MODEL G-45 IS SOLD OUTSIDE THE U. S. A. ONLY)

BROADCAST ALIGNMENT: After the I. F. Amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads, through a .0002 mfd. condenser. Set the Band Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response. Adjust the signal section trimmer in the same manner.

Next adjust the 600 kc. padder condenser. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT-WAVE BANDS: The procedure in aligning the short-wave bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser which is of fixed value and requires no adjustment. The alignment frequency is 16.6 Meters—(18,000 kc.)

Turn the Band Switch to the right. Tune the external oscillator to 16.6 meters. Tune the receiver so that the dial pointer is in a position coincidental with the 16.6 meter indication on the dial scale. Adjust the short wave oscillator trimmer for maximum response. Next adjust the signal circuit trimmer for maximum resonance. Repeat all adjustments to assure correct alignment, rocking the gang condenser to right or left for maximum gain.

Model G-44 is aligned in the same manner at 6,000 kc. with the switch in Band 2 position.

LONG WAVE ALIGNMENT: Procedure in the Model G-45 is similar to the Broadcast section of that receiver. Align at 375 kc. Adjust the padder at 150 kc.

Should it be necessary to remove the band switch assembly, it is advisable to realign the receiver after reinstalling.

LONG-WAVE BAND: Model G-45 (sold only outside the U. S. A.) has a third band covering 740 to 2,220 meters. Broadcast stations operating on long waves have a limited range, and are located chiefly in Europe. Hence, Model G-45 is not sold in the U. S. A. To tune the long-wave stations, simply turn the Band Switch to the third position.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDER-IN PASTE OR ACID FLUXES OF ANY TYPE.

ANTENNA: While this set will give you amazing results with a few feet of wire for an antenna, you will be well repaid for the slight expense of a good antenna by the improvement in broadcast quality, the increase of distance on foreign short waves, and the reduction of interference noises.

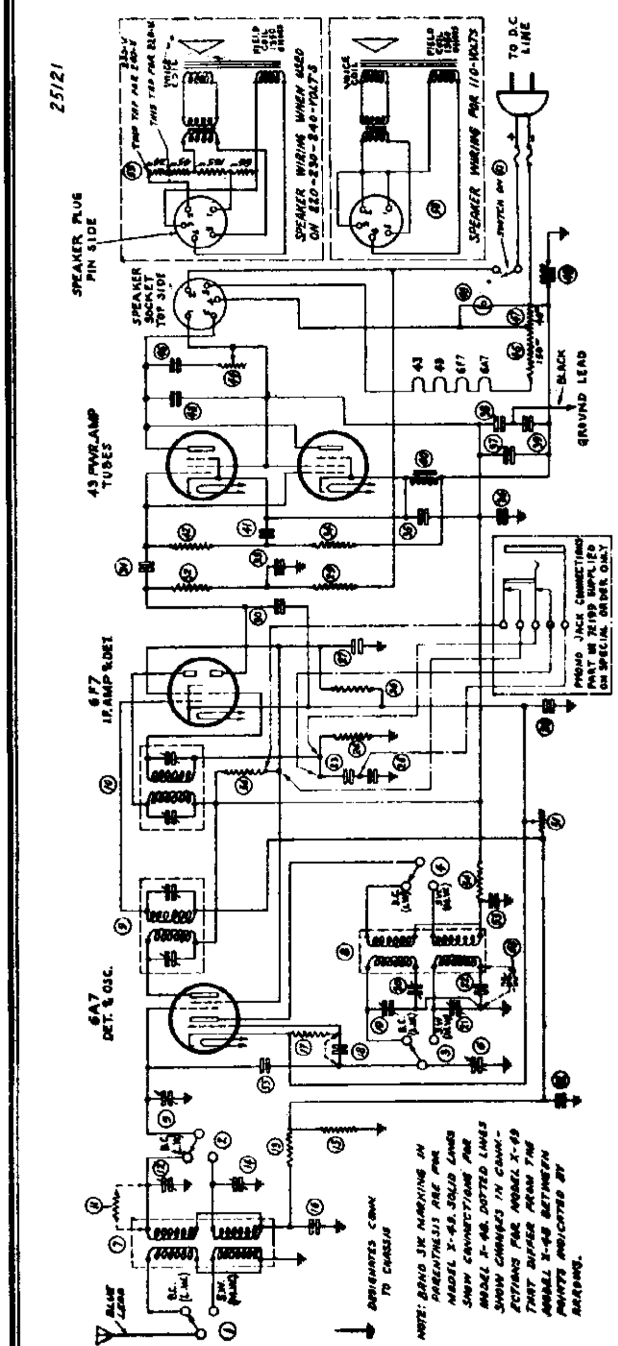
Pilot engineers recommend the doublet antenna. When using a doublet, connect one lead-in wire to terminal "A" at the rear of the set, and the other one to terminal "D".

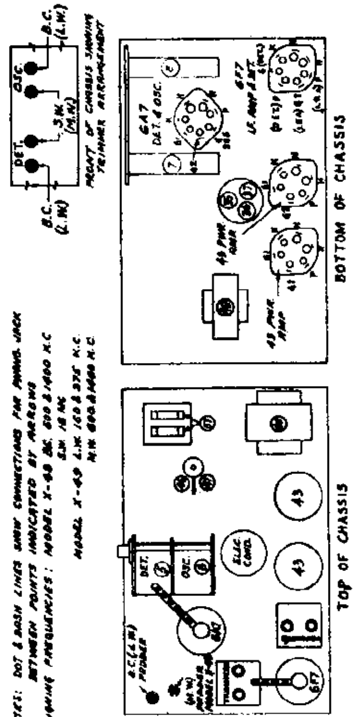
If you use an ordinary single-wire antenna, connect the antenna to the "A" terminal on the set. Then short the "D" and "G" terminals and connect to a good ground.

If you are in doubt about the best antenna for your location, consult your Pilot dealer. He is best able to assist you. Do not depend upon self-styled "experts".

MODELS X-48, X-49
Schematic, Socket
Trimmers, Parts

PILOT RADIO CORP.





IF PEAK 456 KC

MODEL X48 SUPERHETERODYNE
Range: 16-52 Meters (18,800-5,700 kc.)
178-550 Meters (1,680-545 kc.)

MODEL X49 SUPERHETERODYNE
Range: 178-550 Meters (1,680-545 kc.)
789-2,142 Meters (380-140 kc.)
(Sold in the European area only)

A good antenna is most essential for the reception of signals from stations located thousands of miles from the receiver. The flat top portion of the antenna should be placed as high above the ground and grounded objects as possible. Both lead-in wire and antenna should be located as far from sources of man-made static as possible. Automobile ignition systems, telephone communication lines, electric oil burner installations, motor and trolley power lines are some of the more common offenders of this nature. The installation of a good antenna requires a small amount of additional labor, but the extra effort is always rewarded with improved reception with a minimum of static interference. A properly installed antenna is almost as good as an extra stage of tuned radio frequency amplification.

It is advisable to place the radio receiver close to the incoming lead-in, as frequently an extension about the interior of the house picks up a considerable amount of static along with the desired signal. The illustration shows how to install a lightning arrester if one is desired.

The kit contains two 75 ft. lengths of No. 14 wire. The illustration suggests the use of at least 25 ft. per section. Use as much of the wire up to 75 ft. per section as your location will permit. The letters at the right form a reference to the parts as arranged in the illustration.

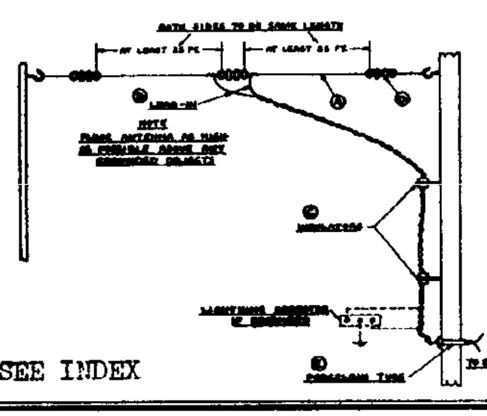
Method No. 1: Join the ends of both leads together and connect to antenna terminal of set.

Method No. 2: Connect one wire to antenna lead of set; connect the other wire to the ground lead. Use the method on your set which gives the best performance.

CONTENTS OF PILOT KIT

2—75 ft. lengths of No. 14 enameled, copper wire........A
100 ft. twisted pair lead-in wire........B
2—Insulated stand-off insulators........C
6—Porcelain insulators........D
2—Porcelain tubes........D
6—Insulated staples

ALL-WAVE ANTENNA SYSTEM



[illegible]

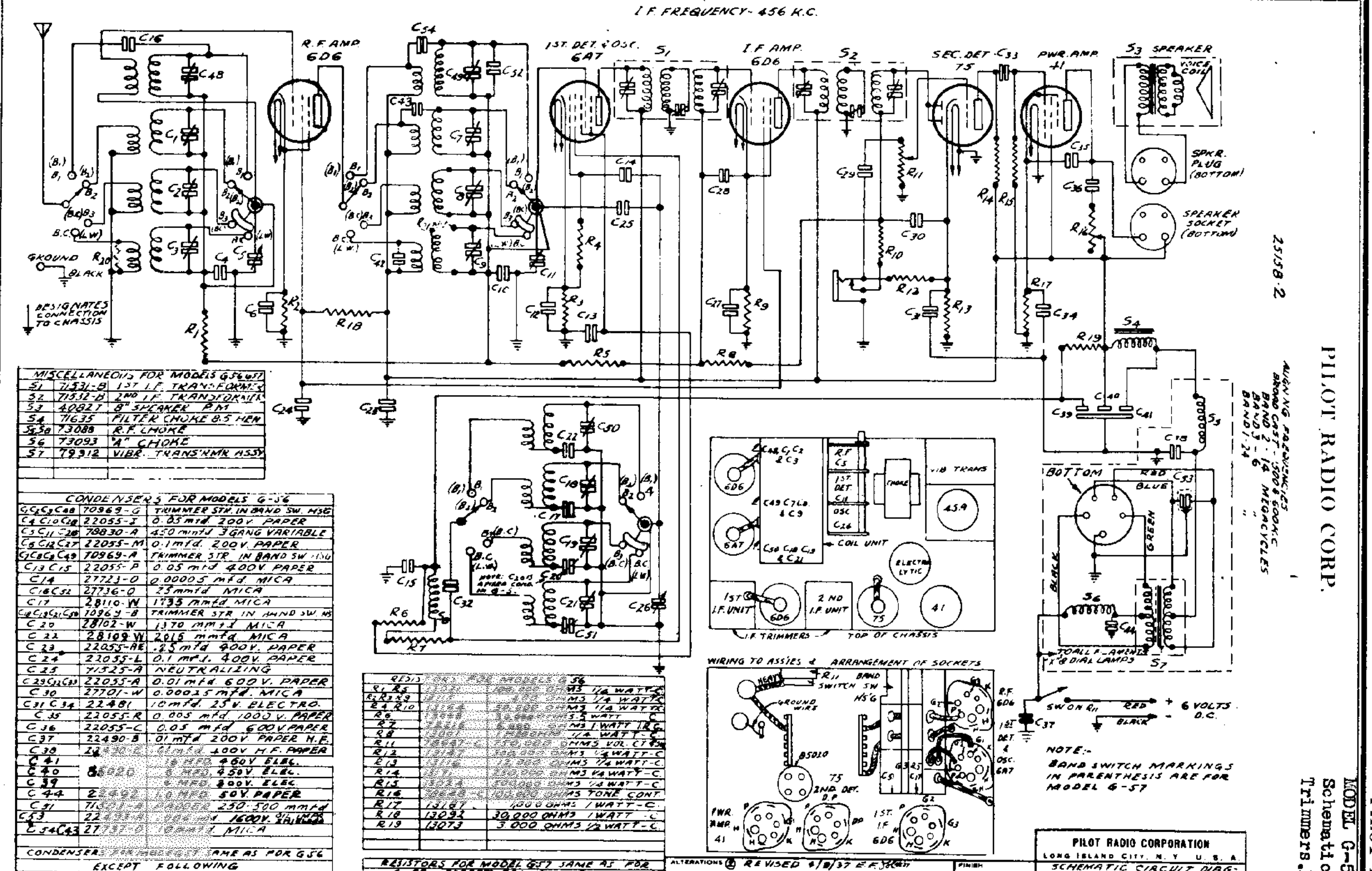
FOR ALIGNMENT, SEE INDEX

PILOT RADIO CORP.

25158-2

ALIGNING FREQUENCIES
BROAD CAST - 500 & 600 K.C.
BAND 2 - 14 MEGACYCLES
BAND 3 - 6 "
BAND 1 - 24 "

I.F. FREQUENCY - 456 K.C.



MISCELLANEOUS FOR MODELS G56 & 57		
S1	71531-B	1ST I.F. TRANSFORMER
S2	71532-B	2ND I.F. TRANSFORMER
S3	40827	8" SPEAKER P.M.
S4	71635	FILTER CHOKE 8.5 HEN
S5 S8	73088	R.F. CHOKE
S6	73093	"A" CHOKE
S7	79312	VIBR. TRANS'RMR ASSY

CONDENSERS FOR MODELS G-56		
C1 C2 C3 C48	70969-G	TRIMMER STR. IN BAND SW. HSG
C4 C10 C28	22055-J	0.05 mfd. 200 V. PAPER
C5 C11 C26	78830-A	450 mmfd 3 GANG VARIABLE
C6 C12 C27	22055-M	0.1 mfd. 200 V. PAPER
C7 C8 C9 C49	70969-A	TRIMMER STR. IN BAND SW. HSG
C13 C15	22055-P	0.05 mfd 400 V. PAPER
C14	27723-0	0.00005 mfd. MICA
C16 C52	27736-0	25 mmfd MICA
C17	28110-W	1735 mmfd MICA
C18 C19 C21 C50	70969-B	TRIMMER STR IN BAND SW. HS
C 20	28102-W	1370 mmfd MICA
C 22	28109-W	2015 mmfd MICA
C 23	22055-AE	.25 mfd 400 V. PAPER
C 24	22055-L	0.1 mfd. 400 V. PAPER
C 25	71525-A	NEUTRALIZING
C 29 C32 C33	22055-A	0.01 mfd 600 V. PAPER
C 30	27701-W	0.00025 mfd. MICA
C31 C34	22481	10 mfd. 25 V. ELECTRO.
C 35	22055-R	0.005 mfd 1000 V. PAPER
C 36	22055-C	0.05 mfd 600 V. PAPER
C 37	22490-B	.01 mfd 200 V. PAPER H.F.
C 38	22[illegible]	[illegible] 400 V H.F. PAPER
C 41	[illegible]	[illegible] 460 V ELEC.
C 40	8[illegible]	[illegible] 450 V. ELEC.
C 39	[illegible]	[illegible] 300 V. ELEC.
C 44	2[illegible]	[illegible] 50 V. PAPER
C 51	71[illegible]	[illegible] 250-500 mmfd
C 53	22[illegible]	[illegible] 1600 V. [illegible]
C 54 C43	27[illegible]	[illegible] MICA
CONDENSERS [illegible] SAME AS FOR G 56		
EXCEPT FOLLOWING		
C 41	27701-0	250 mmfd MICA
C 51	71577-C	DUAL 30-150 MMFD.
C 20		PADDER 250-500 MMFD.

RESIS[illegible] 56		
R1 R5	[illegible]	[illegible] MS 1/4 WATT-C
R2 R3 R9	[illegible]	[illegible] MS 1/4 WATT-C
R4 R10	[illegible]	[illegible] MS 1/4 WATT-C
R6	[illegible]	[illegible] 5.5 WATT C
R7	[illegible]	[illegible] MS 1 WATT I.R.C.
R8	[illegible]	[illegible] 1/4 WATT-C.
R11	[illegible]	[illegible] OHMS VOL. CT [illegible]
R12	[illegible]	[illegible] MS 1/4 WATT-C
R13	[illegible]	[illegible] MS 1/4 WATT-C.
R14	[illegible]	[illegible] MS 1/4 WATT-C.
R15	[illegible]	[illegible] MS 1/4 WATT-C.
R16	[illegible]	[illegible] MS TONE CONT.
R17	13187	1,000 OHMS 1 WATT-C.
R18	13092	30,000 OHMS 1 WATT -C
R19	13073	3,000 OHMS 1/2 WATT-C.

RESISTORS FOR MODEL G57 SAME AS FOR G-56 EXCEPT FOLLOWING		
R 20	13164	50,000 OHMS 1/4 WATT
R 21	13023	330 OHMS 1/4 WATT

PILOT RADIO CORPORATION
LONG ISLAND CITY, N.Y. U.S.A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODELS G-56 & G-57
DATE 2/25/37
DRWG. NO. 25158-2

ALTERATIONS: REVISED 4/8/37 E.F.S.

CLASSIFICATION: G-50 SERIES

THIS PRINT SUPERSEDES ALL OTHERS PRIOR TO [redacted]

DO NOT SCALE THIS PRINT

MODELS X-48, X-49
Voltage, Alignment
MODELS G-56, G-57
Alignment

PILOT RADIO CORP.

MODELS X- 48 & X-49

1. Examine the label on the rear of the chassis to make sure that the voltage is correct for the power supply in your home.
2. Connect the blue wire at the rear of the chassis to your antenna. For best results use an antenna of the type described in the PILOT antenna instruction sheet. If you are not experienced in erecting antennas, we strongly advise having this done by your radio service man. Good results can be obtained from a single wire about fifty feet long, and as high above surrounding objects as possible.
3. Connect the black lead at the rear of the chassis to the ground. This lead should be as short as possible, connected to the nearest water pipe.
4. When the connections have been made, switch on the set by turning the upper left-hand knob clockwise. This is the volume control knob as well as the line switch. On the right is the tuning knob for the compass dial, and at the lower right, the Band Switch.
5. When tuning in a station, be very careful to adjust the dial to the center of the response with the volume control set at the lowest position that will give sufficient volume. Unless that is done, the tone will be distorted.
6. If signals from local stations are loud enough to overload the speaker, reducing the volume slightly will clear up the tone.
7. The tone control is at the lower left. Turning the knob to the left emphasizes the bass. Full musical response is obtained when this knob is turned all the way to the right.
8. If there is no sound in the speaker after the set has been turned on and the tubes have had time to become warm, reverse the position of the plug in the line socket.

NOTE: This PILOT set, in design, the quality of the materials, and the workmanship, is a fine musical instrument. It deserves careful treatment. Protect it from excessive dampness and from dry heat. Have it inspected and have the tubes checked twice a year by your radio dealer, to assure the maintenance of its fine musical quality.

SERVICE INFORMATION

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the slip-on knobs and felt washers from the controls on the front panel.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require realignment, the procedure outlined below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

I. F. ALIGNMENT: When aligning the intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The tuning condenser should be set at maximum capacity. Connect the antenna lead of the external oscillator to the control grid of the type 6F7 tube in the I. F. Amplifier stage through a 0.1 mfd. fixed condenser. Connect the ground lead of the external oscillator to the receiver ground clip. The I. F. alignment capacitors are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator leads from the type 6F7 I. F. Amplifier tube and connect it in the same manner to the control grid at the top of the type 6A7 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. Amplifier, it is essential to repeat the alignment process in both I. F. units with the external oscillator leads connected across the control grid of the 6A7 tube.

BROADCAST ALIGNMENT: After the I. F. Amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads, this time with a .0002 mfd. condenser in the antenna lead. Adjust the tuning control pointer at the 1400 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response. Adjust the signal section trimmer in the same manner.

Next adjust the 600 kc. padder condenser. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1400 kc. trimmer adjustment, following in every detail the procedure previously described.

SHORT-WAVE ALIGNMENT: The procedure in aligning the short-wave bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. A 400 ohm resistor should be inserted in the antenna lead. The alignment frequency is 16.8 Meters—(17,800 kc.).

Turn the Band Switch to the right. Tune the external oscillator to 16.8 meters. Tune the receiver so that the dial pointer is in a position coincidental with the 16.8 meter indication on the dial scale. Adjust the short wave oscillator trimmer for maximum response. Next adjust the signal circuit trimmer for maximum resonance. Repeat all adjustments to assure correct alignment, rocking the gang condenser to right or left for maximum gain.

HIGH BAND ALIGNMENT: Procedure in the Model 49 is similar to the Broadcast section of this receiver. Align at 375 kc. Adjust the padder at 180 kc.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

VOLTAGES MEASURED AT TUBE SOCKETS

	6A7 Det., Osc.	6F7 Amp., Det.	43 Output	43 Output
Plate	125 (110)	125 (110)	175 (95)	175 (95)
Screen	45 (45)	45 (45)	135 (110)	135 (110)
Cathode	10 (8)	10 (8)	21* (16)*	21* (16)*
Filament	6.3 (6.3)	6.3 (6.3)	25 (25)	25 (25)

Speaker field volts—105 (105) volts.
Anode grid of 6A7—110 (80) volts.
Triode plate of 6F7—95 (70) volts.

Note: Values are given for 220-volt line. For 110-volt line use values in parentheses.

* Measured across choke No. 40

Note: All measurements made with volt meter of at least 1,000 ohms per volt.

Note: All measured to chassis frame.

Model G-56
Four Tuning Bands Cover 12.4-566 m. (24,200-530 kc.)
Model G-57
Four Tuning Bands: 12.4-32.5 meters (24,200-9,200 kc.)—20.5-61 meters (14,600-4,900 kc.) 182-566 meters (1,650-530 kc.) — 755-2,300 meters (397-130 kc.)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Disconnect the battery from the receiver.

Remove the "slip-on" knobs and felt washers from the controls and loosen the set screw on the tuning knob. Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require realignment, the procedure outlined below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the battery, reconnect the speaker cable in its socket at the rear of the chassis.

The location of the R. F. alignment trimmer condensers is on the side of the band switch. The trimmers in the lowest row are those for aligning Band 1. Those in the second row from bottom are for Band 2. Those in the third row up are for Band 3. The trimmers in the top row are for the Broadcast band. The Broadcast and Long Wave trimmers for Model G-57, are located in the third and fourth rows respectively from the bottom.

The padder condenser is located under the rear section of the band switch. Access to the padder condenser is made through a hole provided in the rear of the chassis frame. Model G-57 has a Long Wave and a Broadcast padding condenser.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6K7 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6K7 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in both I. F. Units.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Insert a 200 mmf. condenser in series with the antenna lead. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer.

Next adjust the 600 kc. padder condenser, located in the lower rear partition of the band switch, under the chassis. Set the external oscillator at 600 kc. Rotate the receiver tuning control to the resonance position, and at the same time adjust the padder condenser for the highest peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

The alignment frequencies are as follows:

Model G-56

Band 4—500 and 200 meters—600 and 1,500 kc.
Band 3—50 meters— 6,000 kc.
Band 2—21.4 meters—14,000 kc.
Band 1—12.5 meters—24,000 kc.

Model G-57

Band 4—1,875 and 800 meters—160 and 375 kc.
Band 3— 500 and 200 meters—600 and 1,500 kc.
Band 2—21.4 meters—14,000 kc.
Band 1—12.5 meters—24,000 kc.

The .0002 mfd. condenser should be replaced with a 400 ohm resistor when aligning Band 3 (Model G-56). Rotate the tuning condenser to the 6,000 kc. indication on the dial scale. Set the external oscillator at 6,000 kc. Adjust the Band 3 oscillator trimmer for maximum sensitivity. Next adjust the interstage and antenna trimmer condensers for maximum sensitivity. Check the overall sensitivity of the band at several points along the dial scale.

Align Band 2 in a similar manner. The alignment frequency is 14,000 kc. (21.4 meters).

The alignment of Band 1 requires greater care due to the higher frequencies covered by this band. The alignment frequency is 24,000 kc. or 12.5 meters. Set the external oscillator at 24,000 kc. Rotate the tuning condenser of the receiver until the dial pointer is co-incidental with the 24,000 kc. indication on the dial scale. Adjust the oscillator trimmer condenser for maximum sensitivity. Proceed next to align the interstage section. In doing this it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonant peak. Next align the antenna section for minimum sensitivity.

The Long Wave alignment procedure for Model G-57 is similar to that for Broadcast.

REMOVAL OF BAND SELECTOR SWITCH ASSEMBLY: Should it be necessary to remove the switch assembly, this is easily done by removing the supporting screws. Before doing this, however, it is essential to unsolder the leads between the switch and the chassis.

It is advisable to realign the receiver after reinstalling the switch assembly.

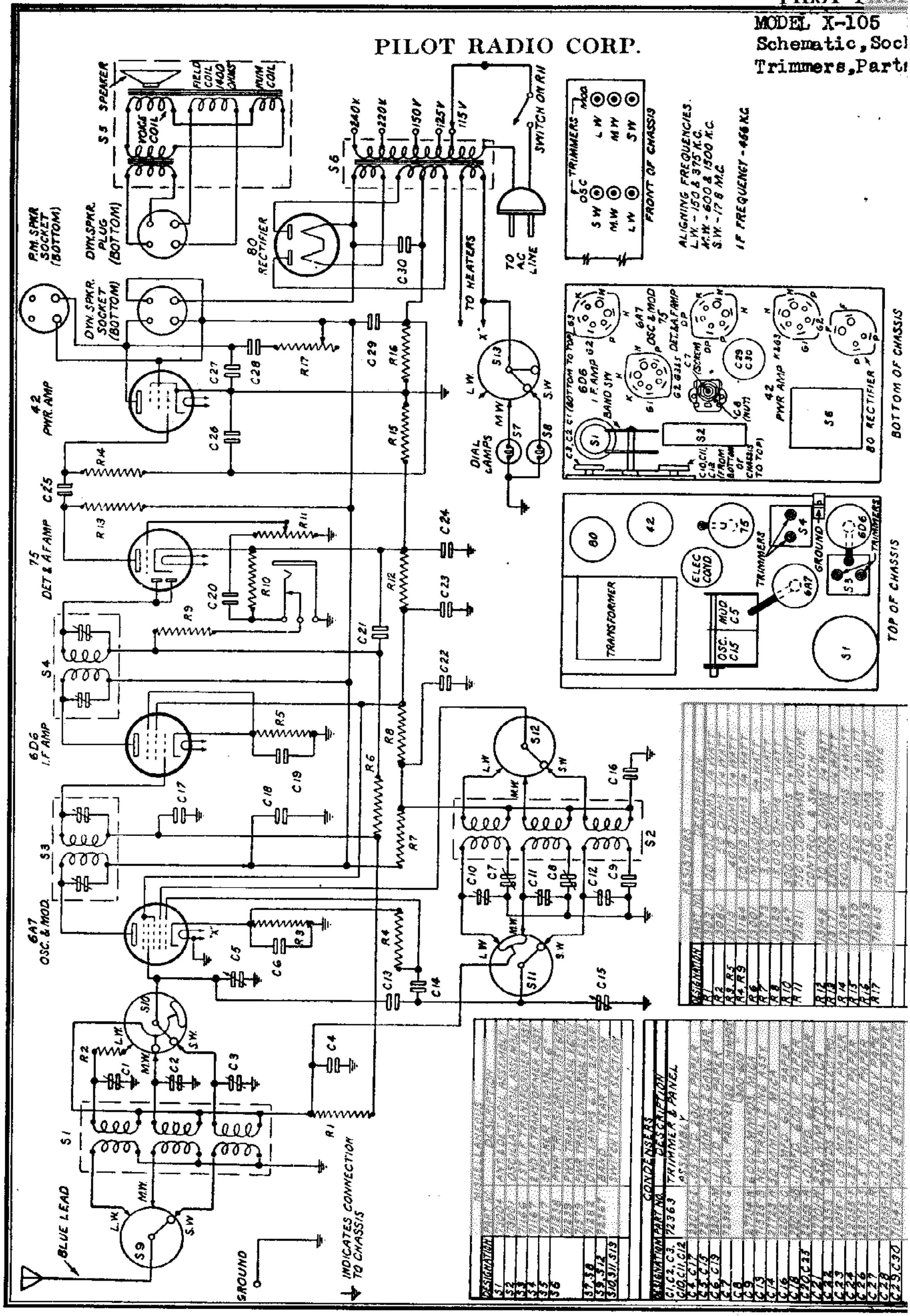
PHONOGRAPH PICK-UP: A jack is provided at the rear of the chassis for plugging in an electric phonograph pick-up, in order that records can be reproduced by the loudspeaker, through the high-quality amplifier with which this set is equipped. The pick-up should be of the high-impedance type.

SHORT WAVE BAND 3: Amateurs and police transmitters are included in Band 3. (Model G-56 only.)

LONG WAVE BAND: Stations operating on wavelengths between 755 and 2,300 meters will be received when the band switch is in the fourth position. (Model G-57 only.)

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

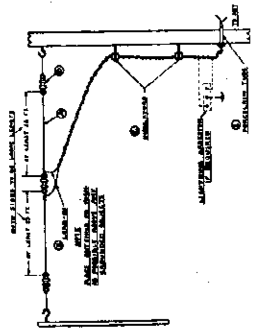
MODEL X-105
Schematic, Sock
Trimmers, Part



PILOT RADIO CORP.

M O D E L 2 2 3

ALL-WAVE ANTENNA SYSTEM



A good antenna is most essential for the reception of signals from stations located thousands of miles from the receiver. The flat top portion of the antenna should be placed as high above the ground and grounded objects as possible. Both lead-in wire and antenna should be located as far from sources of man-made static as possible. Automobile ignition systems, telephone communication lines, electric oil burner installations, motor and trolley power lines are some of the more common offenders of this nature. The installation of a good antenna requires a small amount of additional labor, but the extra effort is always rewarded with improved reception with a minimum of static interference. A properly installed antenna is almost as good as an extra stage of tuned radio frequency amplification.

It is advisable to place the radio receiver close to the incoming lead-in, as frequently an extension about the interior of the house picks up a considerable amount of static along with the desired signal. The illustration shows how to install a lightning arrester if one is desired.

The kit contains two 75 ft. lengths of No. 14 wire. The illustration suggests the use of at least 25 ft. per section. Use as much of the wire up to 75 ft. per section as your location will permit. The letters at the right form a reference to the parts as arranged in the illustration.

Method No. 1: Join the ends of both leads together and connect to antenna terminal of set.

Method No. 2: Connect one lead to antenna of set; connect the other lead to the ground. Use the method on your set which gives the best performance.

CONTENTS OF PILOT KIT

2—75 ft. lengths of No. 14 enameled, copper wire.......A
100 ft. twisted pair lead-in wire.......B
2—Insulated stand-off insulators.......C
6—Porcelain insulators.......D
2—Porcelain tubes.......D
6—Insulated staples

SERVICE INFORMATION

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the "slip-on" knobs and felt washers from the controls on the front panel.

Remove the speaker plug from the socket at the top of the chassis.

Remove the four mounting screws located underneath the cabinet.

REALIGNMENT: Should the receiver require realignment, the outlined procedure below should be followed. In the schematic wiring diagram the location and function of the various alignment capacitors are clearly illustrated. For best results an external modulated oscillator with adequate frequency range, and a visual output meter should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the top of the chassis.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6D6 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver chassis. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6D6 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A7 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the **least possible input to prevent broadening of the resonance peaks.**

In order to obtain the most accurate realignment of the I. F. Amplifier, it is essential to repeat the alignment process in both I. F. Units, with the external oscillator connected to the 6A7 tube.

BROADCAST ALIGNMENT: After the I. F. Amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and chassis, this time with a 200 mmf. condenser in the antenna lead. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located on the top of the oscillator coil. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest response.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT WAVE BANDS: The procedure in aligning the short wave bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. A 400-ohm resistor should be connected in the antenna lead. The alignment frequency of Band 1 is 16.8 **Meters—(17,800 kc.)** and of Band 2, 6000 kc.

Turn the Band Switch to Band 1. Tune the external oscillator to 16.8 meters. Tune the receiver so that the dial pointer is in a position coincidental with the 16.8 meter indication on the dial scale. Adjust Band 1 oscillator trimmer for maximum response. Next adjust the signal circuit trimmer for maximum resonance. Repeat all adjustments to assure correct alignment, rocking the gang condenser to right or left for maximum gain. Then align Band 2 in the same manner at 6000 kc.
NOTE: Should it be necessary to remove any part of the band switch assembly, it is advisable to realign the receiver after reinstalling.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

MODEL X105 SUPERHETERODYNE SERVICE INFORMATION Range: 16-52 Meters (18,800-5,700 kc.)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Use a small screw driver to loosen the set screw on the tuning knob.

Remove the "slip-on" knobs and felt washers from the controls on the front panel.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require realignment, the outlined procedure below should be followed. In the schematic wiring diagram, the location and function of the various alignment capacitors are clearly illustrated. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast," and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6D6 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator leads from the type 6D6 I. F. Amplifier tube and connect it in the same manner to the control grid at the top of the type 6A7 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. Amplifier, it is essential to repeat the alignment process in both I. F. units with the external oscillator leads connected across the control grid of the 6A7 tube.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads, through a .0002 mfd. condenser. Set the Band Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response. Adjust the signal section trimmer in the same manner.

Next adjust the 600 kc. padder condenser. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT-WAVE BANDS: The procedure in aligning the short wave-bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser which is of fixed value and requires no adjustment. The alignment frequency is 16.6 Meters - (18,000 kc.)

Turn the Band Switch to the right. Tune the external oscillator to 16.6 meters. Tune the receiver so that the dial pointer is in a position coincidental with the 16.6 meter indication on the dial scale. Adjust the short wave oscillator trimmer for maximum response. Next adjust the signal circuit trimmer for maximum resonance. Repeat all adjustments to assure correct alignment, rocking the gang condenser to right or left for maximum gain.

LONG WAVE ALIGNMENT: Procedure in the Model X105 is similar to the Broadcast section of that receiver. Align at 375 k.c. Adjust the padder at 160 k.c.

Should it be necessary to remove the band switch assembly, it is advisable to realign the receiver after reinstalling.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

RECEIVER DESCRIPTION

Operating Voltages—115, 125, 150, 220, 240 volts, Alternating Current.
Frequency Rating —50 to 60 cycles.
Power Consumption—50 Watts.
Tubes —1 type 6A7, 1 type 6D6, 1 type 75, 1 type 42, 1 type 80.
Wavelength Range—16 meters to 52.6 meters—178.5 meters to 550 meters—789 to 2142 meters.
Undistorted power output—3 watts.
Intermediate Frequency—456 kc.
Tube Functions —Type 6A7: Electron emission control oscillator-detector.
Type 6D6: I. F. Amplifier.
Type 75: Duo-diode detector amplifier.
Type 42: Class "A" power pentode.
Type 80: Full-wave rectifier for power supply.

VOLTAGES

The D. C. Voltages measured at the tube sockets of the set should be read with a high resistance voltmeter of at least 1000 ohms per volt.

	OSC. DET. Type 6A7	I. F. Type 6D6	DIODE DET. Type 75	POWER PENTODE Type 42	RECTIFIER Type 80
Plate	230	230	105*	205	***
Cathode	4.	3.8	1.4	**	
Screen	85	85		230	
Filament	6.3	6.3	6.3	6.3	

*Voltages measured through 250,000 ohm plate resistor.

Speaker field voltage 90 volts. All plate voltages measured to cathode. All screen voltages measured to cathode. All cathode voltages measured to chassis frame.

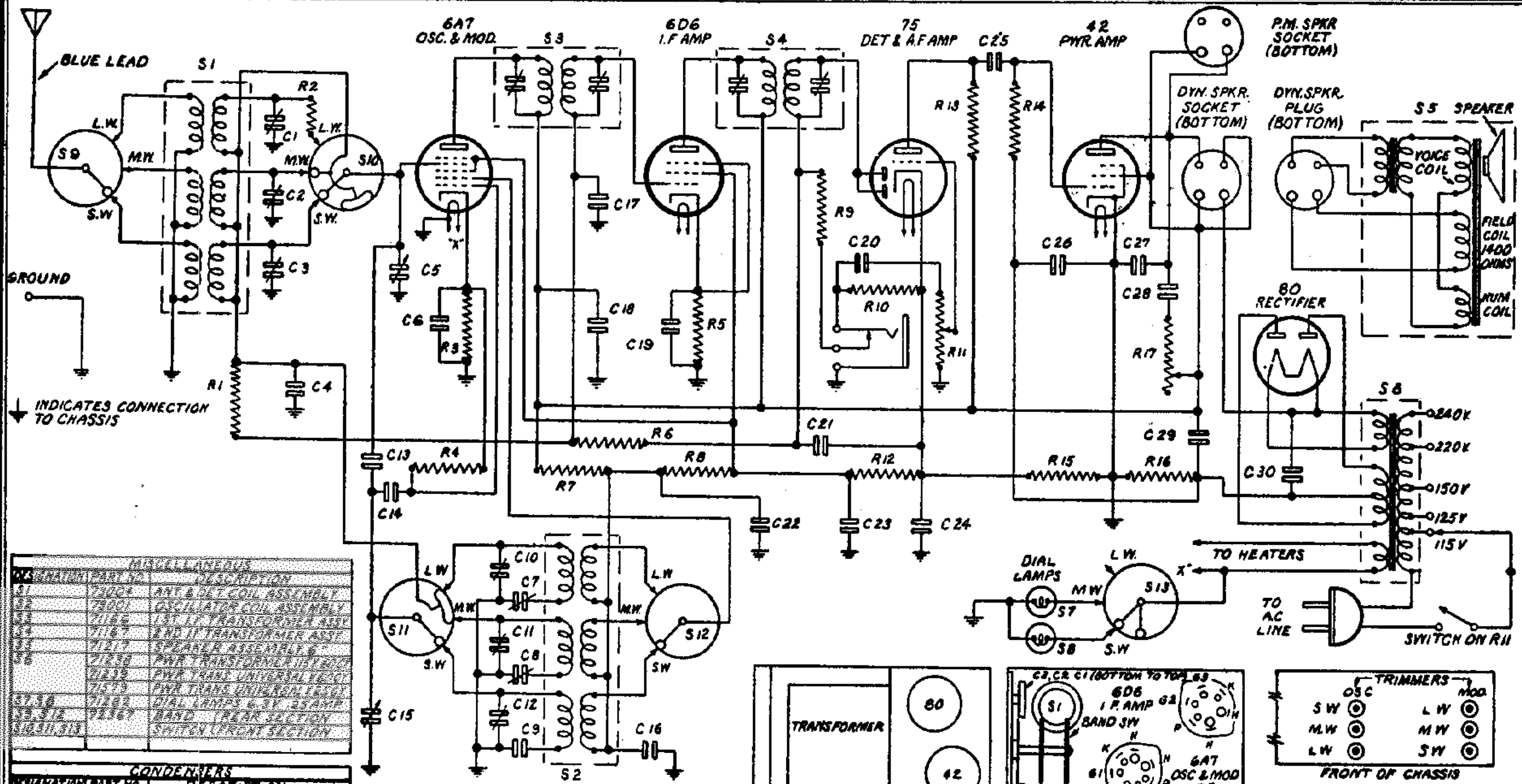
**Grid bias voltage for No. 42 tube obtained across R-16 (250 ohms resistor).

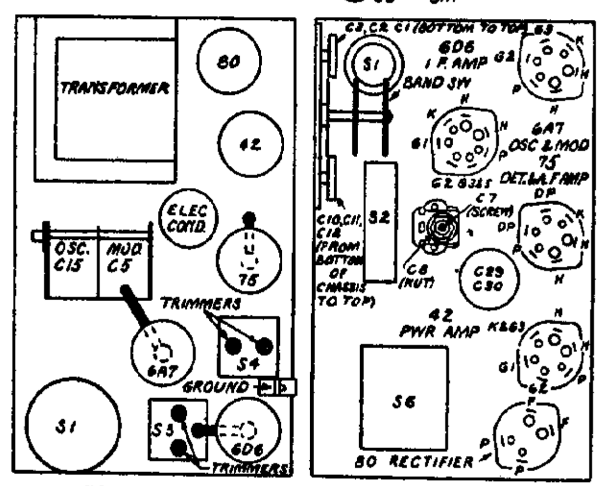
***Filament to chassis ground 315 volts D. C.

Anode grid of 6A7 to cathode—175 volts.

MODEL X-105
Schematic, Socke[ts,]
Trimmers, Parts

PILOT RADIO CORP.





TRIMMERS			
OSC		MOD	
S W	◎	L W	◎
M W	◎	M W	◎
L W	◎	S W	◎

FRONT OF CHASSIS

ALIGNING FREQUENCIES.
L.W. - 150 & 375 K.C.
M.W. - 600 & 1500 K.C.
S.W. - 17 & M.C.

I F FREQUENCY - 456 K.C.

MISCELLANEOUS		
DESIGNATION	PART NO.	DESCRIPTION
S1	[illegible]	ANT & DET. COIL ASSEMBLY
S2	[illegible]	OSCILLATOR COIL ASSEMBLY
S3	71166	1ST I.F. TRANSFORMER ASSY.
S4	71167	2ND I.F. TRANSFORMER ASSY.
S5	71217	SPEAKER ASSEMBLY
S6	71238	PWR. TRANSFORMER [illegible]
	71239	PWR. TRANS. UNIVERSAL [illegible]
	71579	PWR. TRANS. UNIVERSAL [illegible]
S7, S8	71282	DIAL LAMPS 6.3V .25 AMP
S9, S12	72367	BAND [illegible] REAR SECTION
S10, S11, S13		SWITCH FRONT SECTION

CONDENSERS		
DESIGNATION	PART NO.	DESCRIPTION
C1, C2, C3, C10, C11, C12	72363	TRIMMER & PANEL ASSEMBLY
C4, C17	22033-I	.05 MFD. 200V PAPER
C5, C15	72371	405 MMFD. [illegible] VAR.
C6, C19	22055-M	.1 MFD. 200V PAPER
C7	72355-G	DUAL PADDER [illegible]
C8		
C9	[illegible]	[illegible] MMFD. MICA
C13	[illegible]	NEUTRALIZING ASSY.
C14	[illegible]	50 MMFD. MICA
C16	[illegible]	.05 MFD. 600V PAPER
C18	[illegible]	.1 MFD. 200V PAPER
C20, C25	[illegible]	.01 MFD. 400V PAPER
C21	[illegible]	250 MMFD. MICA
C22	[illegible]	[illegible] ELECTROLYTIC
C23	[illegible]	.05 MFD. 400V PAPER
C24	[illegible]	.25 MFD. 200V PAPER
C26	[illegible]	.5 MFD. 200V PAPER
C27	[illegible]	.005 MFD. 600V PAPER
C28	[illegible]	.05 MFD. 400V PAPER
C29, C30	[illegible]	DUAL 8 MFD. 475V ELEC.

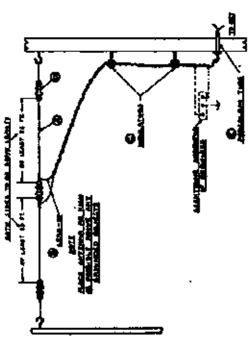
RESISTORS		
DESIGNATION	PART NO.	DESCRIPTION
R1	13031	100,000 OHMS 1/4 WATT
R2	13080	50 OHMS 1/4 WATT
R3, R5	13115	400 OHMS 1/4 WATT
R4, R9	13164	50,000 OHMS 1/4 WATT
R6	13001	1 MEGOHM 1/4 WATT
R7	13073	3,000 OHMS 1/2 WATT
R8	13129	15,000 OHMS 1 WATT
R10	13147	300,000 OHMS 1/4 WATT
R11	71211	750,000 OHMS VOLUME CONTROL & SWITCH
R12	13148	30,000 OHMS 1/4 WATT
R13	13171	250,000 OHMS 1/4 WATT
R14	13024	500,000 OHMS 1/4 WATT
R15	13130	420 OHMS 1/4 WATT
R16	13059	250 OHMS 1 WATT
R17	71615	100,000 OHMS TONE CONTROL

MODEL X-105
Voltage, Alignment
MODEL 223
Alignment

PILOT RADIO CORP.

MODEL 225

ALL-WAVE ANTENNA SYSTEM



A good antenna is most essential for the reception of signals from stations located thousands of miles from the receiver. The flat top portion of the antenna should be placed as high above the ground and grounded objects as possible. Both lead-in wire and antenna should be located as far from sources of man-made static as possible. Automobile ignition systems, telephone communication lines, electric oil burner installations, motor and trolley power lines are some of the more common offenders of this nature. The installation of a good antenna requires a small amount of additional labor, but the extra effort is always rewarded with improved reception with a minimum of static interference. A properly installed antenna is almost as good as an extra stage of tuned radio frequency amplification.

It is advisable to place the radio receiver close to the incoming lead-in, as frequently an extension about the interior of the house picks up a considerable amount of static along with the desired signal. The illustration shows how to install a lightning arrester if one is desired.

The kit contains two 75 ft. lengths of No. 14 wire. The illustration suggests the use of at least 25 ft. per section. Use as much of the wire up to 75 ft. per section as your location will permit. The letters at the right form a reference to the parts as arranged in the illustration.

Method No. 1: Join the ends of both leads together and connect to antenna terminal of set.

Method No. 2: Connect one lead to antenna of set; connect the other lead to the ground. Use the method on your set which gives the best performance.

CONTENTS OF PILOT KIT

2—75 ft. lengths of No. 14 enameled, copper wire .... A
100 ft. twisted pair lead-in wire .... B
2—Insulated stand-off insulators C
6—Porcelain insulators .... D
2—Porcelain tubes .... D
6—Insulated staples

SERVICE INFORMATION

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the "slip-on" knobs and felt washers from the controls on the front panel.

Remove the speaker plug from the socket at the top of the chassis.

Remove the four mounting screws located underneath the cabinet.

REALIGNMENT: Should the receiver require realignment, the outlined procedure below should be followed. In the schematic wiring diagram the location and function of the various alignment capacitors are clearly illustrated. For best results an external modulated oscillator with adequate frequency range, and a visual output meter should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the top of the chassis.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6D6 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver chassis. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6D6 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A7 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. Amplifier, it is essential to repeat the alignment process in both I. F. Units, with the external oscillator connected to the 6A7 tube.

BROADCAST ALIGNMENT: After the I. F. Amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and chassis, this time with a 200 mmf. condenser in the antenna lead. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response. Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located on the top of the oscillator coil. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest response.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT WAVE BANDS: The procedure in aligning the short wave bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. A 400-ohm resistor should be connected in the antenna lead. The alignment frequency of Band 1 is 16.8 Meters—(17,800 kc.) and of Band 2, 6000 kc.

Turn the Band Switch to Band 1. Tune the external oscillator to 16.8 meters. Tune the receiver so that the dial pointer is in a position coincidental with the 16.8 meter indication on the dial scale. Adjust Band 1 oscillator trimmer for maximum response. Next adjust the signal circuit trimmer for maximum resonance. Repeat all adjustments to assure correct alignment, rocking the gang condenser to right or left for maximum gain. Then align Band 2 in the same manner at 6000 kc.
NOTE: Should it be necessary to remove any part of the band switch assembly, it is advisable to realign the receiver after reinstalling.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

MODEL X105 SUPERHETERODYNE SERVICE INFORMATION

Range: 16-52 Meters (18,800-5,700 kc.)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Use a small screw driver to loosen the set screw on the tuning knob.

Remove the "slip-on" knobs and felt washers from the controls on the front panel.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require realignment, the outlined procedure below should be followed. In the schematic wiring diagram, the location and function of the various alignment capacitors are clearly illustrated. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast," and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6D6 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator leads from the type 6D6 I. F. Amplifier tube and connect it in the same manner to the control grid at the top of the type 6A7 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. Amplifier, it is essential to repeat the alignment process in both I. F. units with the external oscillator leads connected across the control grid of the 6A7 tube.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads, through a .0002 mfd. condenser. Set the Band Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response. Adjust the signal section trimmer in the same manner.

Next adjust the 600 kc. padder condenser. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT-WAVE BANDS: The procedure in aligning the short wave-bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser which is of fixed value and requires no adjustment. The alignment frequency is 16.6 Meters—(18,000 kc.)

Turn the Band Switch to the right. Tune the external oscillator to 16.6 meters. Tune the receiver so that the dial pointer is in a position coincidental with the 16.6 meter indication on the dial scale. Adjust the short wave oscillator trimmer for maximum response. Next adjust the signal circuit trimmer for maximum resonance. Repeat all adjustments to assure correct alignment, rocking the gang condenser to right or left for maximum gain.

LONG WAVE ALIGNMENT: Procedure in the Model X105 is similar to the Broadcast section of that receiver. Align at 375 k.c. Adjust the padder at 160 k.c.

Should it be necessary to remove the band switch assembly, it is advisable to realign the receiver after reinstalling.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

RECEIVER DESCRIPTION

Operating Voltages—115, 125, 150, 220, 240 volts, Alternating Current.
Frequency Rating —50 to 60 cycles.
Power Consumption—50 Watts.
Tubes —1 type 6A7, 1 type 6D6, 1 type 75, 1 type 42, 1 type 80.
Wavelength Range—16 meters to 52.6 meters—178.5 meters to 550 meters—789 to 2142 meters.
Undistorted power output—3 watts.
Intermediate Frequency—456 kc.
Tube Functions —Type 6A7: Electron emission control oscillator-detector.
Type 6D6: I. F. Amplifier.
Type 75: Duo-diode detector amplifier.
Type 42: Class "A" power pentode.
Type 80: Full-wave rectifier for power supply.

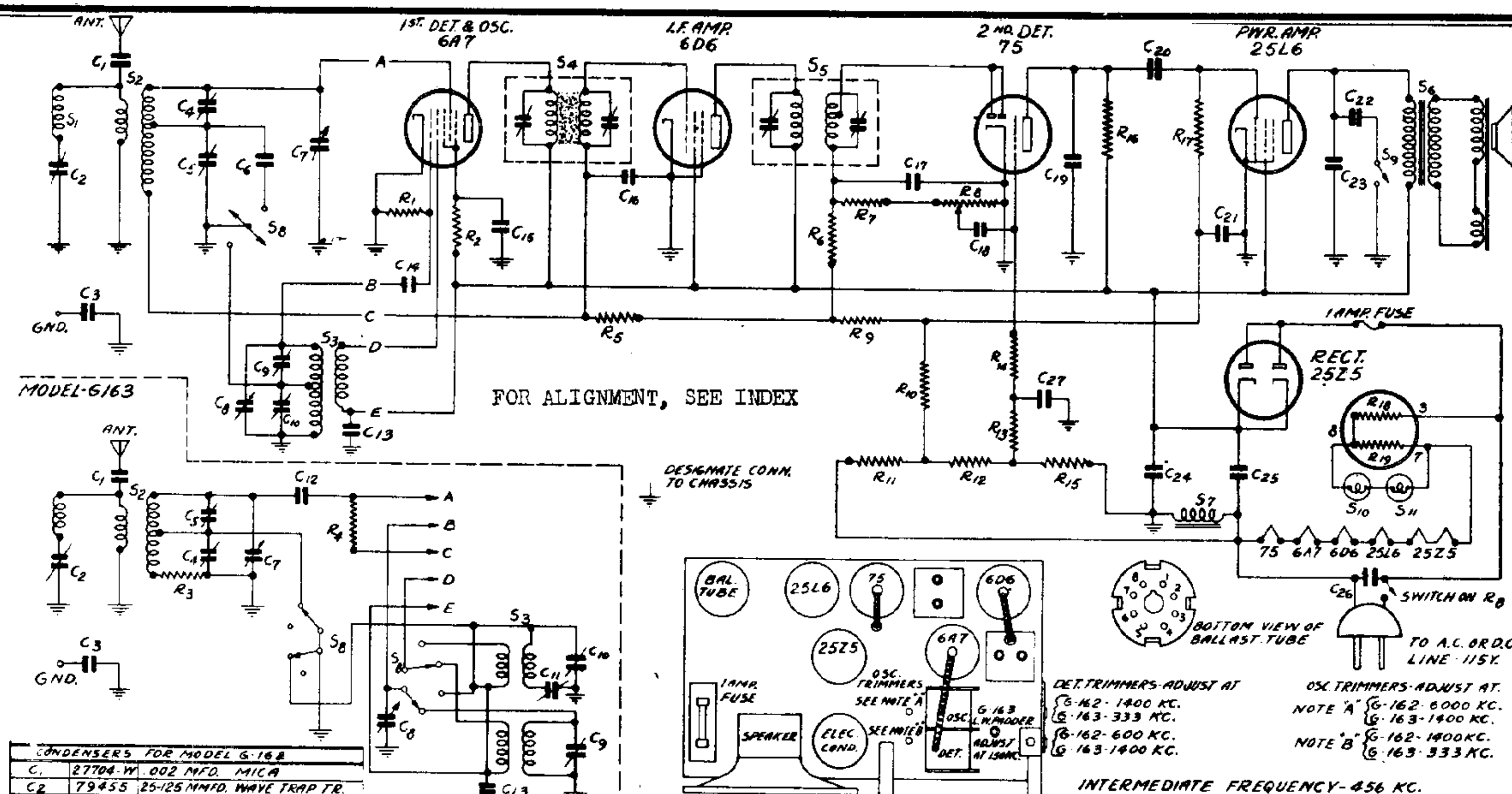
VOLTAGES

The D. C. Voltages measured at the tube sockets of the set should be read with a high resistance voltmeter of at least 1000 ohms per volt.

	OSC. DET. Type 6A7	I. F. Type 6D6	DIODE DET. Type 75	POWER PENTODE Type 42	RECTIFIER Type 80
Plate	230	230	105*	205	***
Cathode	4.	3.8	1.4	**	
Screen	85	85		230	
Filament	6.3	6.3	6.3	6.3	

*Voltages measured through 250,000 ohm plate resistor.
Speaker field voltage 90 volts. All plate voltages measured to cathode.
All screen voltages measured to cathode. All cathode voltages measured to chassis frame.
**Grid bias voltage for No. 42 tube obtained across R-16 (250 ohms resistor).
***Filament to chassis ground 315 volts D. C.
Anode grid of 6A7 to cathode—175 volts.

PILOT RADIO CORP.



CONDENSERS FOR MODEL G-162		
C_1	27704-W	.002 MFD. MICA
C_2	79455	25-125 MMFD. WAVE TRAP TR.
C_3	22055-R	.005 MFD. 1000 V. PAPER
C_4 C_5	70969 J	TRIMMER DETECTOR
C_6	28108-W	.001 MFD. MICA (G-162 ONLY)
C_7 C_8	79432	2 GANG COND.
C_9 C_{10}	70969-E	TRIMMER OSCILLATOR
C_{13}	22055-L	.1 MFD. 400 V. PAPER
C_{14}	27723-0	.00005 MFD. MICA
C_{15} C_{16}	22055-I	.05 MFD. 200 V. PAPER
C_{17} C_{19}	27701-W	.00025 MFD. MICA
C_{18} C_{20} C_{23}	22055-W	.01 MFD. 400 V. PAPER
C_{21} C_{27}	22055-F	.25 MFD. 200 V. PAPER
C_{22}	22055-P	.05 MFD. 400 V. PAPER
C_{24}	85026	20 MFD. 150 V. ELEC. COND.
C_{25}		30 MFD. 150 V ELEC. COND.
C_{26}	22055-U	.01 MFD. 1000 V. PAPER

COND. FOR G 163 SAME AS G 162 PLUS FOLLOWING		
C_{11}	79431-A	30 TO 100 MMFD. PADDER
C_{12}	27701-W	.00025 MFD. MICA

RESISTORS FOR MODEL G-162		
R_1 R_7	13164	50,000 OHMS 1/4 WATT
R_2	13074	20,000 OHMS 1/4 WATT
R_5 R_9	13001	1 MEGOHM 1/4 WATT
R_6 R_{13} R_{14}	13024	500,000 OHMS 1/4 WATT
R_8	79540	250,000 OHMS VOL. CONT. & SW.
R_{10}	13031	100,000 OHMS 1/4 WATT
R_{11}	13072	750,000 OHMS 1/4 WATT
R_{12}	13204	120,000 OHMS 1/4 WATT
R_{15}	13148	30,000 OHMS 1/4 WATT
R_{16} R_{17}	13171	250,000 OHMS 1/4 WATT
R_{18}	81966	120 OHMS (IN BALLAST TUBE)
R_{19}		50 OHMS (IN BALLAST TUBE)

RESISTORS FOR G 163 SAME AS G-162 PLUS FOLLOWING		
R_3	13080	50 OHMS 1/4 WATT
R_4	13024	500,000 OHMS 1/4 WATT

MISC. FOR MODEL G-162		
S_1	73029-B	WAVE TRAP COIL ASS'Y.
S_2	73099	ANT. COIL ASS'Y. (G 162 ONLY)
S_3	73100	OSC. COIL ASS'Y. (G-162 ONLY)
S_4	73108-A	1 ST. I.F. TRANS. ASS'Y.
S_5	73104	2 ND. I.F. TRANS. ASS'Y.
S_6 S_7	40833	5" A.C. D.C. SPEAKER 450 W FIELD
S_8	79430	BAND SWITCH (G-162 ONLY)
S_9	72049	TONE CONTROL SWITCH
S_{10} S_{11}	72151	6.3 150 M.A. PILOT LAMPS

MISC. FOR G 163 SAME AS G-162 EXCEPT FOLLOWING		
S_2	73101	ANT. COIL ASS'Y.) G 163 ONLY)
S_3	73102	OSC. COIL ASS'Y. (G 163 ONLY)
S_8	79454	BAND SWITCH (G 163 ONLY)

ALTERATIONS

FINISH

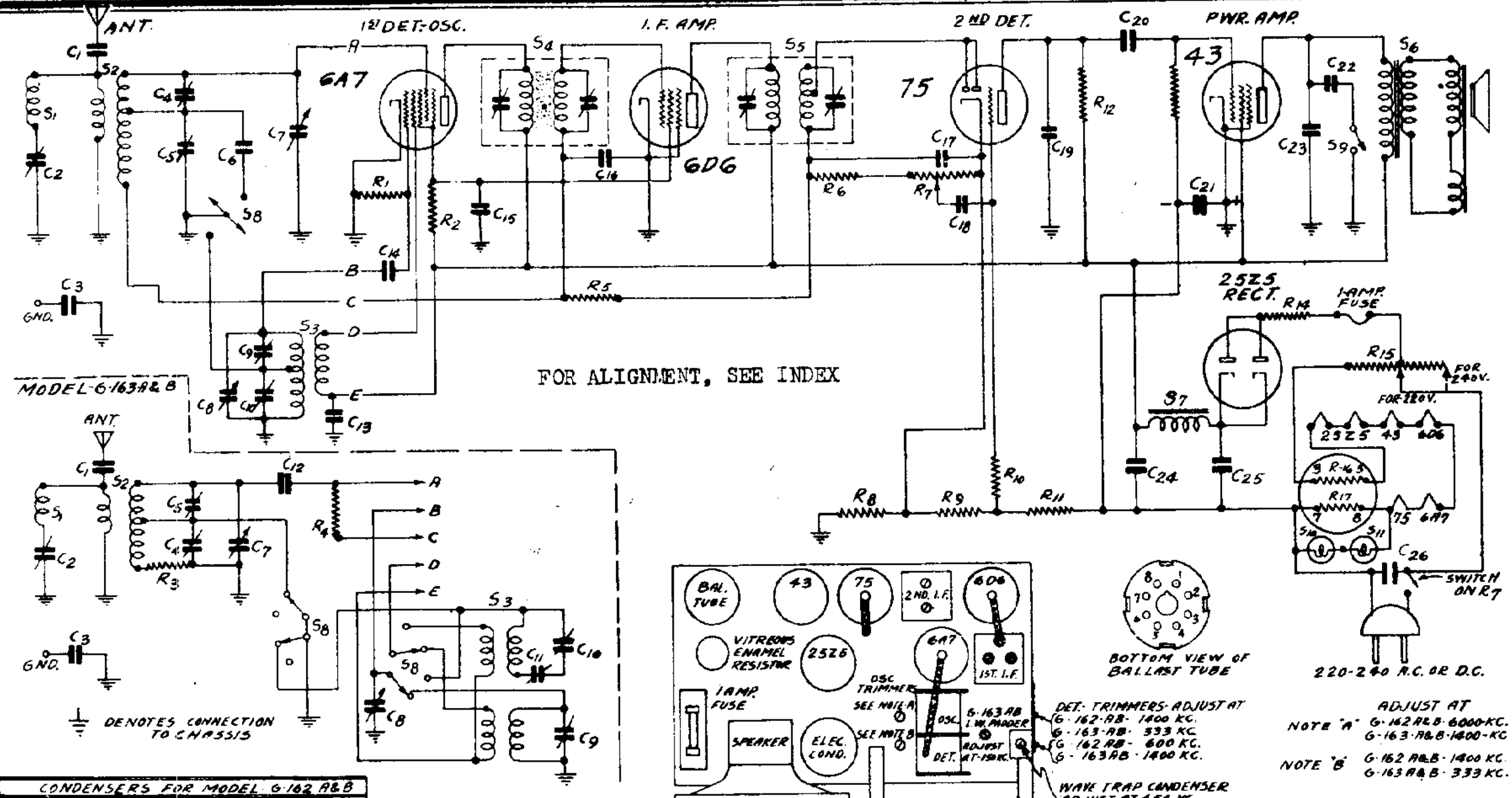
CLASSIFICATION G-160 SERIES

THIS PRINT SUPERSEDES ALL OTHERS PRIOR TO [redacted]

PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
SCHEMATIC CIRCUIT DIAGRAM G 162 & G 163
MATERIAL
SCALE
DRAWN BY E.F.
DATE 5/29/37

MODELS G-162A, G-162B
G-163A, G-163B
Schematic, Socket
Trimmers, Parts

PILOT RADIO CORP.



INT. FREQ. - 456 KC.

CONDENSERS FOR MODEL G-162 A&B		
C_1	27704-W	.002 MFD. MICA
C_2	79455	25-125 MMFD. WAVE TRAP TR.
C_3	22055-R	.005 MFD. 1000V. PAPER
C_4 C_5	70969-J	TRIMMER MIXER
C_6	28108-W	.001 MFD. MICA
C_7 C_8	79432	2 GANG CONDENSER
C_9 C_{10}	70969-E	TRIMMER OSC.
C_{13}	22055-L	.1 MFD. 400V. PAPER
C_{14}	27723-O	.00005 MFD. MICA
C_{15} C_{16}	22055-I	.05 MFD. 200V. PAPER
C_{17} C_{19}	27701-W	.00025 MFD. MICA
C_{18} C_{20}	22055-W	.01 MFD. 400V. PAPER
C_{21}	22481	10 MFD. 25V. ELEC.
C_{22}	22055-AJ	.03 MFD. 600V. PAPER
C_{23} C_{26}	22055-U	.01 MFD. 1000V. PAPER
C_{24}	85027	12 MFD. 250V. ELEC.
C_{25}		16 MFD. 250V. ELEC

COND. FOR G-163 A&B SAME AS G-162 A&B PLUS FOLLOWING		
C_{11}	79431-A	50 TO 100 MMFD. PADDER
C_{12}	27701-W	.00025 MFD. MICA

RESISTORS FOR MODELS G-162 A&B		
R_1 R_6	13164	50,000 OHMS 1/4 WATT CARBON
R_2	13075	15,000 OHMS 1/2 WATT CARBON
R_5 R_{10}	13007	2 MEGOHMS 1/4 WATT CARBON
R_7	79540	250,000 OHMS VOL. CONTROL & SW.
R_8	13080	50 OHMS 1/4 WATT CARBON
R_9	13206	16 OHMS 1/4 WATT CARBON
R_{11}	13036	200 OHMS 1 WATT CARBON
R_{12}	13171	250,000 OHMS 1/4 WATT CARBON
R_{13}	13024	500,000 OHMS 1/4 WATT CARBON
R_{14}	13207	100 OHMS 1 WATT CARBON
R_{15}	83029	VITREOUS ENAM. WIRE W. RES. 310 OHMS TAPPED AT 240 OHMS
R_{16}	81967	210 OHMS (IN BALLAST TUBE)
R_{17}		80 OHMS (IN BALLAST TUBE)

RES. FOR G-163 A&B SAME AS G-162 A&B PLUS FOLLOWING		
R_3	13080	50 OHMS 1/4 WATT CARBON
R_4	13024	500,000 OHMS 1/4 WATT CARBON

MISC. FOR MODEL G-162 A&B		
S_1	73029-B	WAVE TRAP COIL ASS'Y.
S_2	73099	ANT. COIL ASS'Y (G-162 A&B ONLY)
S_3	73100	OSC. COIL ASS'Y (G-162 A&B ONLY)
S_4	73108-A	1ST I.F. TRANS. ASS'Y.
S_5	73104	2ND I.F. TRANS. ASS'Y.
S_6 S_7	40835	5" A.C.-D.C. SPKR. 1100-OHM FIELD
S_8	79430	BAND SWITCH (G-162 A&B ONLY)
S_9	72049	TONE CONTROL SWITCH
[illegible]	[illegible]	[illegible] LAMPS

MISC. FOR G-163 A&B SAME AS G-162 A&B EXCEPT THE FOLLOWING		
[illegible]	[illegible]	[illegible] 3 A&B ONLY)
[illegible]	[illegible]	[illegible] A&B ONLY)
[illegible]	[illegible]	[illegible] ONLY)

① FIL. STRING WRONG E.F. 6/8/37

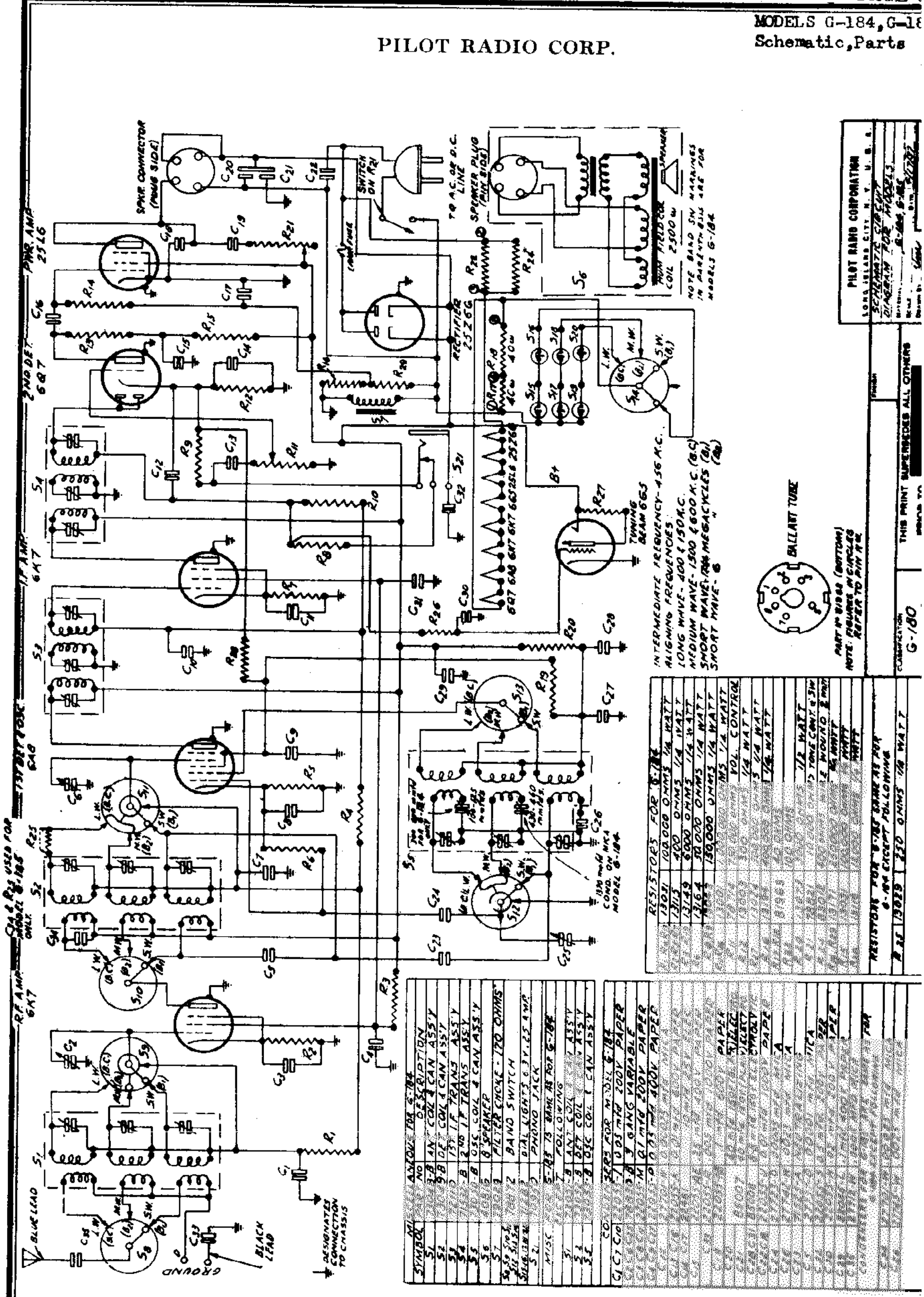
FINISH

CLASSIFICATION
G-162 A&B
G-163 A&B

THIS PRINT SUPERSEDES ALL OTHERS
PRIOR TO [redacted]
DO NOT SCALE THIS PRINT

PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODELS G-162 A&B G-163 A&B
MATERIAL
SCALE DATE 5/18/37
DRAWN BY E.F.
CHECKED BY
APPROVED BY
DWG. NO. 25166-3

PILOT RADIO CORP.



MODELS G-162, G-162A, G-162B
G-163, G-163A, G-163B
MODELS G-184, G-185
Alignment G-174, G-175

PILOT RADIO CORP.

MODEL G-162 & G-163 (G-163 sold outside of U.S.)
Model G-162A 220 Volt - AC DC 50-60 cycles Model G-163A
Model G-162B 240 Volt - AC DC 50-60 cycles Model G-163B

44.5-126 m. (6,750-2380 kc.)
187-566 m. (1,600-530 kc.)

187-566 m. (1,600-530 kc.)
800-2170 m. (375-138 kc.)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the knobs and felt washers from the controls on the front panel.

Remove the four mounting screws, located underneath the cabinet and pull chassis out.

REALIGNMENT: If the receiver requires alignment, the procedure outlined below should be followed. In the schematic diagram sheet, the location and function of the various alignment capacitors are clearly illustrated. For best results, an external modulated oscillator with adequate frequency range and a visual output meter, should be used.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. When aligning the receiver on all positions, the volume control should be turned to the maximum clockwise position. Connect the antenna lead of the external oscillator to the control grid of the 6D6 tube in the I. F. Amplifier through a .1 mfd. fixed condenser. Connect the ground lead of the external oscillator to the chassis. The I. F. alignment trimmers are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. Following this, connect the external oscillator leads to the control grid of the 6A7 tube. Adjust each trimmer on I. F. Unit No. 1 for maximum gain.

During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in all I. F. Units, with the external oscillator leads connected to the control grid of the 6A7 tube.

WAVE TRAP ADJUSTMENT: With the oscillator still set at 456 kc., connect the oscillator to the antenna through a 200 mmfd. condenser. Then adjust the wave trap condenser for minimum deflection on the output meter.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground through a .0002 mfd. condenser. Leave the Band Switch in the "Broadcast" position and place the tuning control pointer at the 1400 kc. mark. Tune the external oscillator to 1400 kc. Adjust the broadcast band oscillator trimmer to maximum response.

Next adjust the antenna section trimmer for maximum output.

The alignment frequencies are as follows:

Longwave Band	— 900 meters (333 kc.)	
	—2,000 meters (150 kc.)	
Broadcast Band	— 214 meters (1,400 kc.)	
Band 1	— 50 meters (6,000 kc.)	

BAND 1: Align the Short-wave band in a similar manner using a 400-ohm non-inductive resistor in place of the .0002 mfd. condenser. The alignment frequency is 6,000 kc. (50 meters).

THE LONG WAVE ALIGNMENT procedure in the Models G-163A and B is as follows: Turn the Band Switch to the Long Wave position. The alignment frequency is 333 kc. Adjust the padder condenser at 150 kc. and at the same time rock the gang until at some setting of both padder and gang condenser maximum output is obtained. Use a .0002 mfd. condenser in the antenna lead from the external oscillator.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

TONE CONTROL SWITCH: The tone control is at the rear of the chassis. In one position the treble response is increased and in the other position the bass frequencies are emphasized. When tuning in short waves the latter position will probably be found preferable.

BAND SWITCH: The center knob controls the band switch. You will see that positions are indicated on the escutcheon, corresponding to the positions to which the dot on the knob can be set. These tuning bands are for the different types of stations

ANTENNA: Due to the high sensitivity of this receiver, it is recommended that an aerial not over fifty feet long be used.

If you use an ordinary single-wire antenna, connect the antenna to the blue lead on the set. Then connect the clip on the chassis to the ground.

LONG WAVE BAND: Models G-163A and B (sold only outside the U. S. A.) have a tuning band covering 800 to 2170 meters. Broadcast stations operating on long waves have a limited range, and are located chiefly in Europe. Hence, Models G-163A and B are not sold in the U. S. A.

Tranex AC-DC Model G-184—110-125 V. (50-60 Cycles)—Tranex AC-DC Model G-185
16 - 555 m. (18,800 - 540 kc.)

16 - 555 m. (18,800 - 540 kc.)
731 - 2140 m. (410 - 140 kc.)

MODEL G-174 (MODELS G-175 and G-185 ARE SOLD OUTSIDE THE U. S. A. ONLY)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the "slip-on" knobs and felt washers from the controls and loosen the set screw on the tuning knob.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

Remove the tuning beam plug from the socket at the front of the chassis.

REALIGNMENT: Should the receiver require realignment, the procedure outlined below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

The R. F. alignment trimmer condensers are mounted on the side of the coil shields.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6K7 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6K7 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in both I. F. Units.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Insert a 200 mmf. condenser in series with the antenna lead. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located on the top of the oscillator coil. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT WAVE-BANDS:—The procedure in aligning the short wave-bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. Insert a 400 ohm non-inductive resistor in series with the antenna lead. The alignment frequencies are as follows:

Band 2: 50 Meters—(6,000 kc.)
Band 1: 16.6 Meters—(18,000 kc.)

When aligning Band 2, set the Band Selector Switch in the position marked "Band 2". Set the tuning control pointer at 50 meters. Adjust the oscillator alignment capacitor on Band 2 for maximum output. Next adjust the interstage and antenna section alignment capacitors for maximum output.

To align Band 1, set the Band Selector Switch in the position marked "Band 1". Set the tuning control pointer at the 16.6 meter mark. Set the external oscillator at 16.6 meters. Adjust the oscillator section alignment capacitor on Band 1 for maximum output.

Proceed next to align the interstage section of Band 1. In doing this, it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonance peak. Next align the antenna section for maximum sensitivity.

LONG WAVE MODELS G-175 and G-185

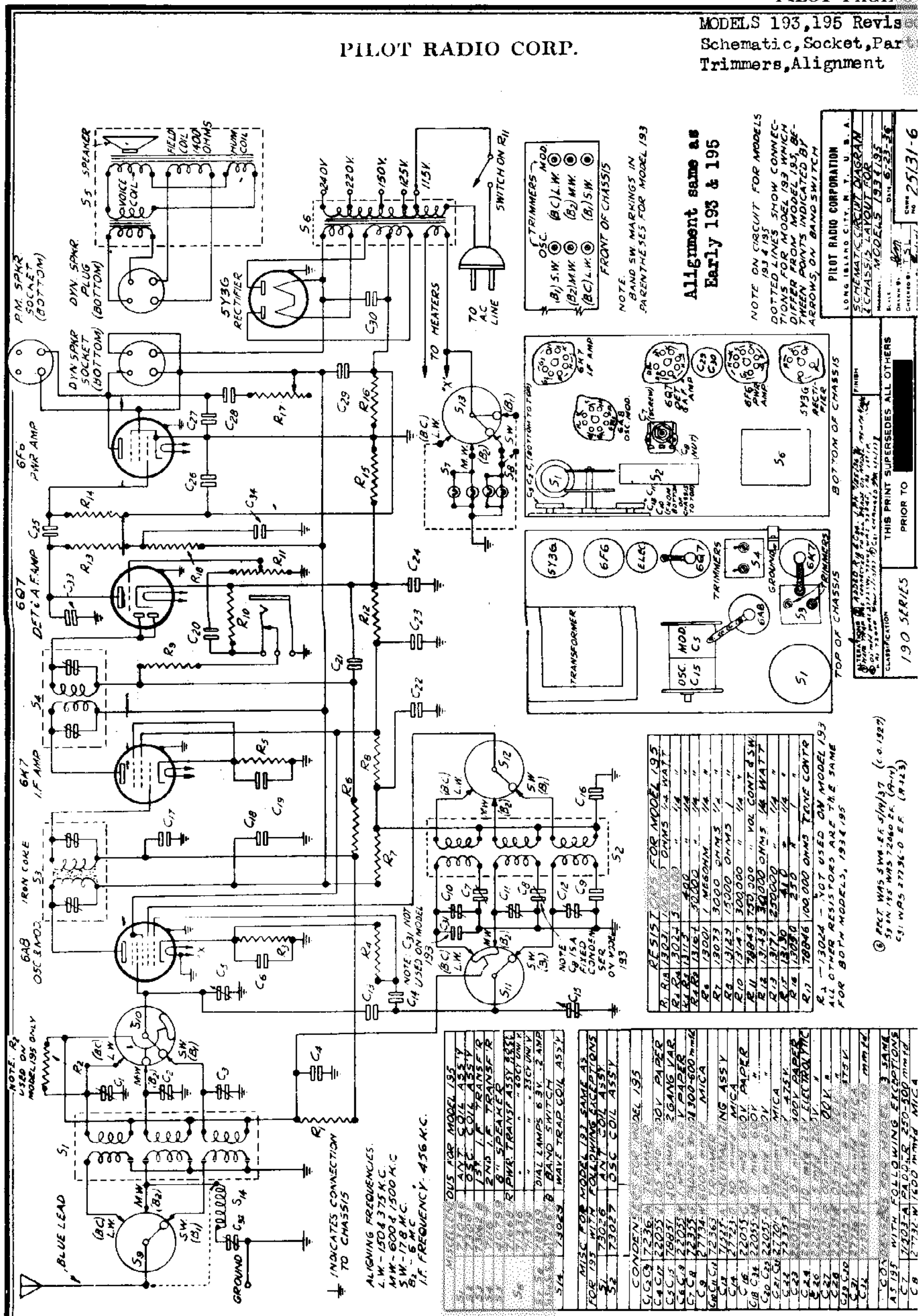
The above alignment positions refer to the Models G-174 and G-184 only, which are calibrated in frequency. The alignment points for the Models G-175 and G-185, which are calibrated in meters only, are as follows.

Long Wave	Align at 750 meters.	
	Pad at 2,000 meters.	
Broadcast	Align at 200 meters.	
	Pad at 500 meters.	
Band 1	Align at 17 meters.	

The Long Wave alignment procedure is similar to that for the Broadcast. A 200 mmf. condenser should be used in series with the antenna lead in aligning this band.

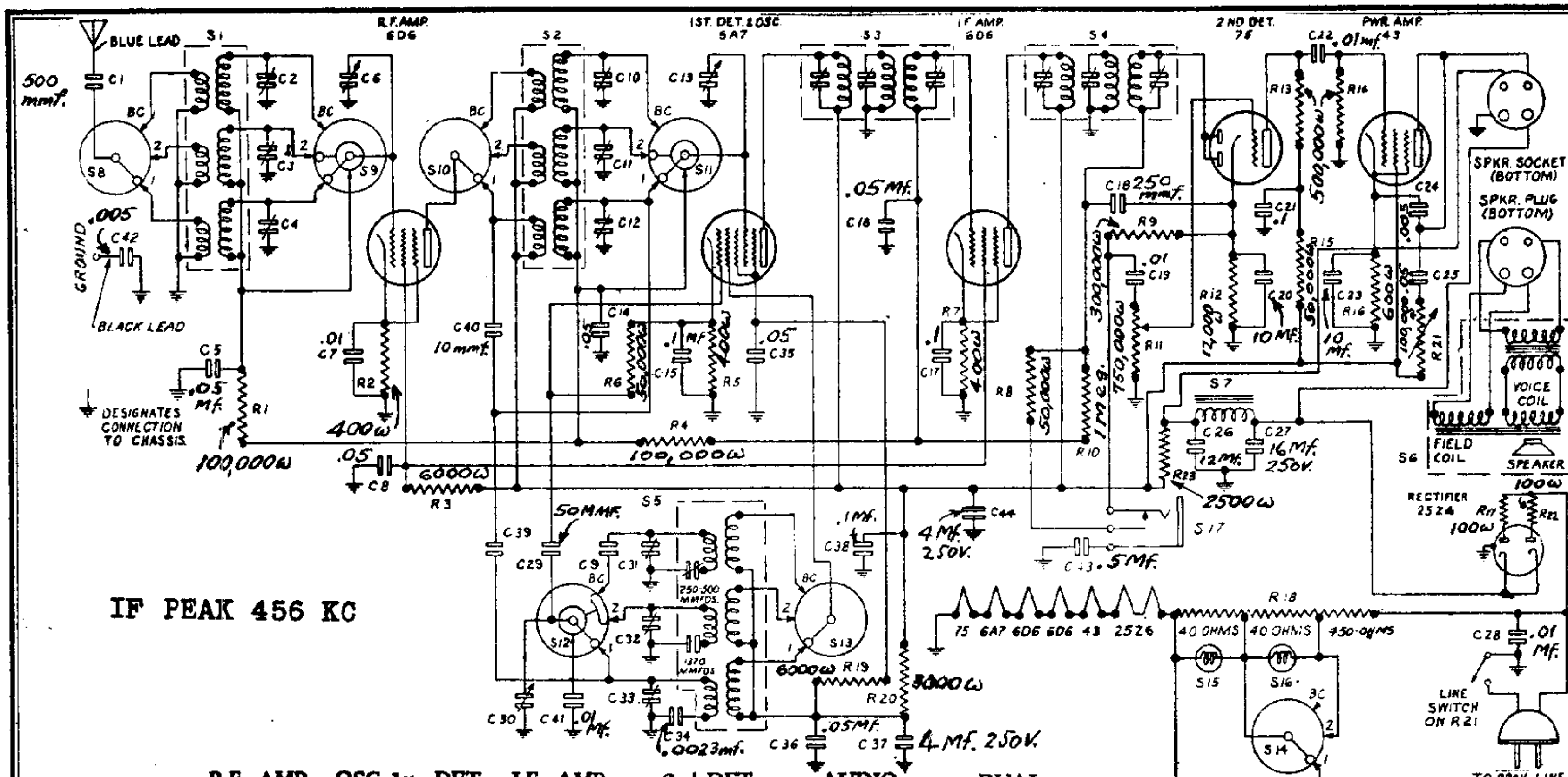
CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

MODELS 193,195 Revised
Schematic,Socket,Parts
Trimmers,Alignment



MODEL 223
Schematic, Voltage

PILOT RADIO CORP.



IF PEAK 456 KC

	R.F. AMP.	OSC.-1st DET.	I.F. AMP.	2nd DET. DIODE	AUDIO OUTPUT	DUAL RECTIFIER
	6D6	6A7	6D6	75	43	25Z6
PLATE	115	115	115	50*	175	—
SCREEN	90	75	90	—	120	—
CATHODE	2.6	2.25	2.6	.5	15	215**
FILAMENT	6.3	6.3	6.3	6.3	25	25

REVERSING D.C. PLUG: When the Model 223 is operated on D.C., if the set seems dead, reverse the line plug in the socket. The set will work with the plug in one position, but not in the other.

NOTE: The D.C. voltages measured at the tube sockets of the set should be read with a high resistance voltmeter of at least 1,000 ohms per volt.

All voltages measured to chassis.
Speaker field voltage 215 volts.
Anode Grid of 6A7 100 volts.
* Measured through Plate Resistor.
** Cathode to chassis.
NOTE: These measurements should be made with the volume control turned to the right, and with the tuning adjusted at "No signal" position on dial.

Power Consumption .... 100 Watts
Line Volts .... 220 volts A.C.-D.C.
I. F. Frequency .... 456 Kc.
Power Output .... 2.3 Watts

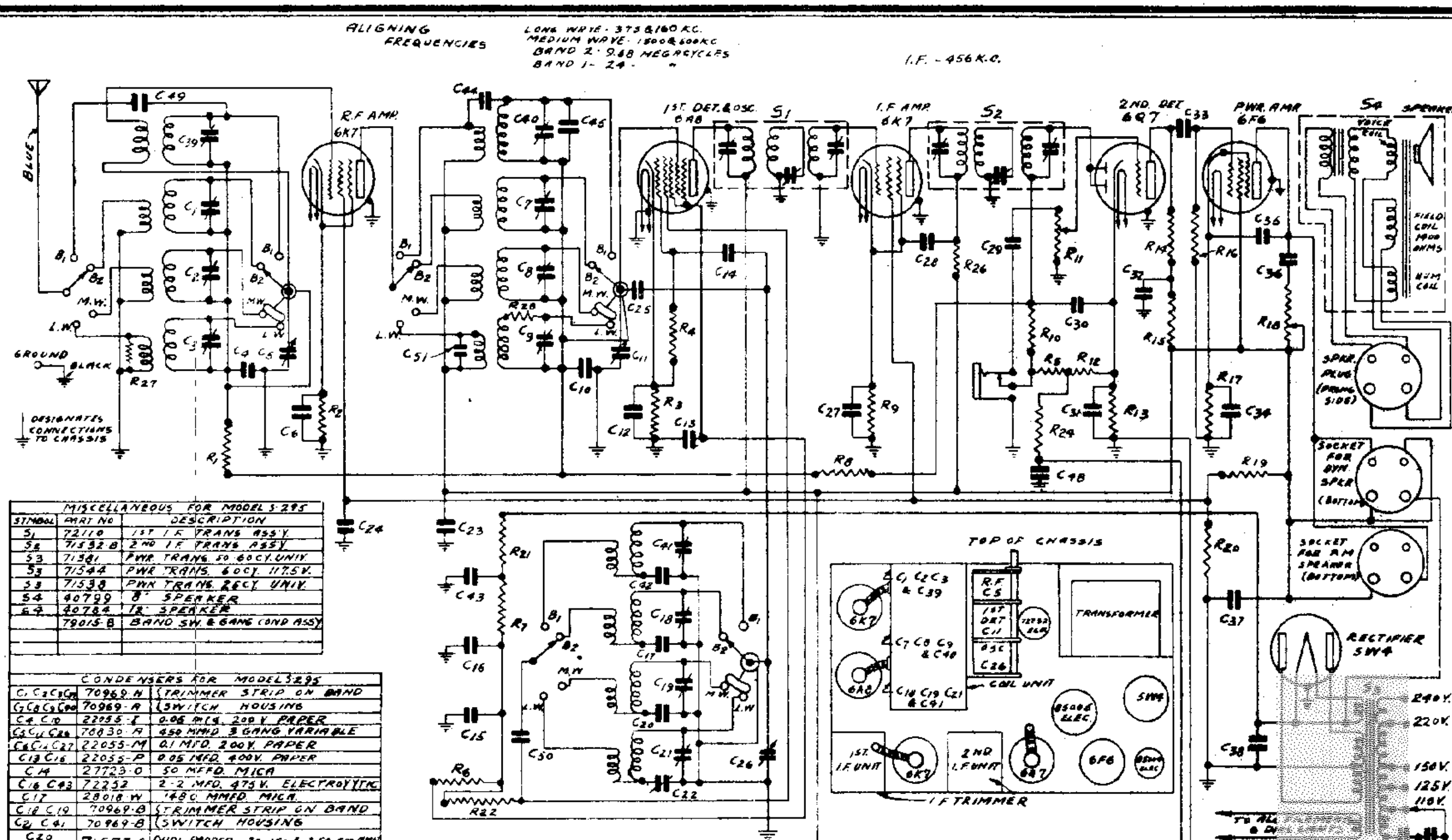
Range: 16-555 Meters (18,800-545 kc.)

For Operation on 220 Volts—AC-DC

FOR ALIGNMENT, SEE INDEX

MODEL S-295
Schematic, Socket
Trimmers, Parts

PILOT RADIO CORP.



MISCELLANEOUS FOR MODEL S-295		
SYMBOL	PART NO.	DESCRIPTION
S_1	72110	1ST I.F. TRANS. ASS'Y.
S_2	71532-B	2ND I.F. TRANS. ASS'Y.
S3	71581	PWR. TRANS. 50-60 CY. UNIV.
S_3	71544	PWR. TRANS. 60 CY. 117.5 V.
S3	71538	PWR. TRANS. 25 CY. UNIV.
S4	40799	8" SPEAKER
S4	40784	12" SPEAKER
	79015-B	BAND SW. & GANG COND. ASSY.

CONDENSERS FOR MODEL S-295		
$C_1 C_2 C_3 C_{39}$	70969-H	TRIMMER STRIP ON BAND
$C_7 C_8 C_9 C_{40}$	70969-A	SWITCH HOUSING
$C_4 C_{10}$	22055-E	0.05 MFD. 200 V. PAPER
$C_5 C_{11} C_{26}$	78830-A	450 MMFD. 3 GANG VARIABLE
$C_6 C_{12} C_{27}$	22055-M	0.1 MFD. 200 V. PAPER
$C_{13} C_{16}$	22055-P	0.05 MFD. 400 V. PAPER
C_{14}	27723-O	50 MFD. MICA
C_{16} C_{43}	72252	2-2 MFD. 475 V. ELECTROLYTIC
C_{17}	28018-W	1480 MMFD. MICA
$C_{18} C_{19}$	70969-B	TRIMMER STRIP ON BAND
$C_{21} C_{41}$	70969-B	SWITCH HOUSING
C_{20} C_{22}	71577-C	DUAL PADDER 30-150 & 250-500 MMFD.
C_{23}	22055-AP	0.25 MFD. 600 V. PAPER
$C_{24} C_{32}$	22055-AB	0.1 MFD. 600 V. PAPER
C_{25}	71525-A	NEUT. COND.
$C_{28} C_{36}$	22055-C	0.05 MFD. 600 V. PAPER
$C_{29} C_{33}$	22055-A	.01 MFD. 600 V. PAPER
C_{30}	27701-W	.00025 MFD. MICA
[illegible]	[illegible]	[illegible] ELEC.
[illegible]	[illegible]	[illegible] PAPER
[illegible]	[illegible]	[illegible] ELEC.
[illegible]	[illegible]	[illegible] ELEC.
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible] DUAL
[illegible]	[illegible]	[illegible] PAPER
[illegible]	[illegible]	[illegible] PAPER
[illegible]	[illegible]	[illegible]

FOR ALIGNMENT, SEE INDEX

RESISTORS FOR MODEL S-295		
$R_1 R_{15}$	13031	100,000 OHMS 1/4 WATT
$R_2 R_3$	13115	400 OHMS 1/4 WATT
$R_4 R_5 R_{10} R_{20}$	13164	50,000 OHMS 1/4 WATT
R_6	13068	30,000 [illegible]
$R_7 R_{21}$	13020	5,000 [illegible]
$R_8 R_{24} R_{25}$	13001	1 MEG. [illegible]
R_{11}	78714	1 MEG. [illegible]
R_{12}	13147	300,000 [illegible]
$R_{13} R_{26}$	13113	4,000 [illegible]
R_{14}	13171	250,000 [illegible]
R_{16}	13024	500,000 [illegible]
R_{17}	13108	410 [illegible]
R_{18}	78715	100,000 [illegible]
R_{19}	13092	32,000 [illegible]
R_{22}	13181	600 [illegible]
R_{22}	13179	18,000 [illegible]
R_{27}	13164	50,000 [illegible]
R_{28}	13029	250 O[illegible]

ALTERATIONS | FINISH

CLASSIFICATION S-295

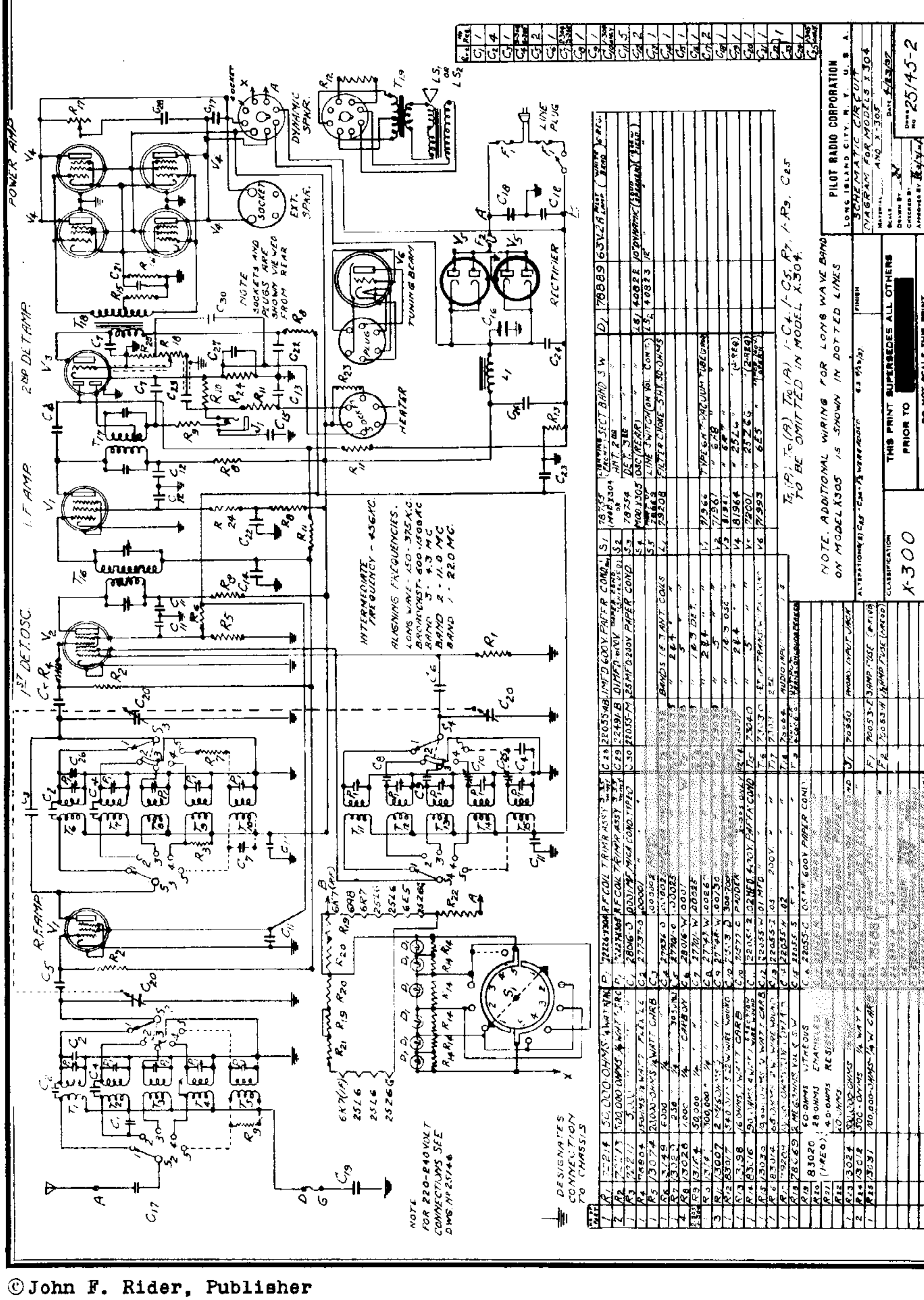
THIS PRINT SUPERSEDES ALL OTHERS PRIOR TO [redacted]

DO NOT SCALE THIS PRINT

PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y., U. S. A.
DIAGRAM
25139

MODELS X-304, X-305
Schematic, Parts

PILOT RADIO CORP.



PILOT RADIO CORP.

MODEL S-295, FOR ALTERNATING CURRENT

Four Tuning Bands: 12.4-32.8 meters (24,100-9,150 kc.) — 29.7-79 meters (10,100-3,800 kc.)
182-560 meters (1,650-537 kc.) — 755-2,300 meters (397-130 kc.)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the "slip-on" knobs and felt washers from the controls and loosen the set screw on the tuning knob.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

Remove the tuning beam plug from the socket at the front of the chassis.

REALIGNMENT: Should the receiver require realignment, the procedure outlined below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

The location of the R.F. alignment trimmer condensers **is on the side of the band switch. The trimmers in the lowest row are those for aligning Band 1. Those in the second row from the bottom are for Band 2. Those in the third row up are for the Broadcast band. The trimmers in the top row are for the Long Wave band.**

The padder condensers for Long Wave and Broadcast bands are located under the rear section of the band-switch. Access to the padder condenser is made through a hole provided in the rear of the chassis frame. The adjusting screw on the right is the Long Wave Padder.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6K7 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the side of the shielded I. F. transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6K7 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in both I. F. units.

LONG WAVE ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Insert a 200 mmf. condenser in series with the antenna lead. Set the Band Selector Switch in the Long Wave position and place the tuning control pointer at the 800 meter mark. The external oscillator should be tuned to 800 meters. Adjust the Long Wave band oscillator trimmer.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 1875 meter padder condenser, located in the lower rear partition of the band switch, under the chassis. Set the external oscillator at 1875 meters. Rotate the receiver tuning control to the resonance position, and at the same time adjust the padder condenser for the highest peak.

Now repeat the 800 meter trimmer adjustment, following in every detail the procedure previously described.

BROADCAST ALIGNMENT: The Broadcast alignment procedure is similar to that for Long Wave. A 200 mmf. condenser should be connected in series with the antenna when aligning this band.

The alignment frequencies are as follows:

Band 4—800 and 1875 meters.
Band 3—200 and 500 meters.
Band 2— 31 meters.
Band 1— 12.5 meters.

When aligning Band 2, set the Band Switch in the position marked Band 2. Replace the .0002 mfd. condenser with a 400 ohm non-inductive resistor. Rotate the tuning condenser to the 31 meter indication on the dial scale. Set the external oscillator at 31 meters. Adjust the Band 2 oscillator trimmer for maximum sensitivity. Next adjust the interstage and antenna trimmer condensers for maximum sensitivity. Check the overall sensitivity of the band at several points along the dial scale.

The alignment of Band 1 requires greater care due to the higher frequencies covered by this band. The alignment frequency is 12.5 meters. Set the external oscillator at 12.5 meters. Rotate the tuning condenser of the receiver until the dial pointer is co-incidental with the 12.5 meter indication on the dial scale. Adjust the oscillator trimmer condenser for maximum sensitivity. Proceed next to align the interstage section. In doing this it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonant peak. Next align the antenna section for maximum sensitivity.

REMOVAL OF BAND SELECTOR SWITCH ASSEMBLY: Should it be necessary to remove the switch assembly, this is easily done by removing the supporting screws. Before doing this, however, it is essential to unsolder the leads between the switch and the chassis.

It is advisable to realign the receiver after **reinstalling the switch assembly.**

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

PHONOGRAPH PICK-UP: A jack is provided at the rear of the chassis for plugging in an electric phonograph pick-up, in order that records can be reproduced by the loudspeaker, through the high-quality amplifier with which this set is equipped. The pick-up should be of the high-impedance type.

EXTRA SPEAKER: At the rear of the chassis there is a socket for plugging in an extra speaker, which can be located in the kitchen, in one of your up-stairs rooms, or down cellar in the game room. This will give you the equivalent of an extra radio, at the small expense of the extra speaker. We recommend a permanent magnet dynamic speaker of 10,000 ohms. These speakers operate without any field exciting current.

Model X-304

12.7 - 570 m. (23,600 - 525 kc.)

Model X-305

12.7 - 570 m. (23,600 - 525 kc.)
740 - 2150 m. (405 - 136 kc.)

(MODEL X-305 IS SOLD OUTSIDE THE U. S. A. ONLY)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the knobs and felt washers from the controls on the front panel.

Remove the back from the cabinet.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet and pull chassis out.

Remove the tuning beam connector cable from the socket at the front of the chassis.

REALIGNMENT: If the receiver requires alignment, the procedure outlined below should be followed. In the service information sheet, the location and function of the various alignment capacitors are clearly illustrated. For best results, an external modulated oscillator with adequate frequency range and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis, and reinsert the tuning beam cable plug in the socket at the front of the chassis.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. When aligning the receiver on all positions, the volume control and the tone control should be turned to the maximum clockwise position. Connect the antenna lead of the external oscillator to the control grid of the 6K7 tube in the I. F. Amplifier through a .1 mfd. fixed condenser. Connect the ground lead of the external oscillator to the chassis. The I. F. alignment trimmers are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. Following this, connect the external oscillator leads to the control grid of the 6A8 tube. Adjust each trimmer on I. F. Unit No. 1 for maximum gain.

During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in all I. F. Units, with the external oscillator leads connected to the control grid of the 6A8 tube.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads through a .0002 mfd. condenser. Leave the Band Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc mark. Tune the external oscillator to 1500 kc. Adjust the broadcast band oscillator trimmer to maximum response.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located in the lower rear partition of the band switch, under the chassis. Set the external oscillator at 600 kc. Rotate the receiver tuning control to the resonance position, and at the same time adjust the padder condenser for the highest peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

The alignment frequencies are as follows:

Band 5—150 and 375 kc.—2000 and 800 m.
Band 4—600 and 1500 kc.—500 and 200 m.
Band 3—69.7 meters— 4,300 kc.
Band 2—27.2 meters—11,000 kc.
Band 1—13.6 meters—22,000 kc.

When aligning Band 3, set the Band Switch in the position marked Band 3. Rotate the tuning condenser to the 4300 kc. indication on the dial scale. Set the external oscillator at 4300 kc. Adjust the Band 3 oscillator trimmer for maximum sensitivity. Next adjust the interstage and antenna trimmer condensers for maximum sensitivity. Check the overall sensitivity of the band at several points along the dial scale.

Align Band 2 in a similar manner using a 400-ohm non-inductive resistor in place of the .0002 mfd. condenser. The alignment frequency is 11,000 kc. (27.2 meters).

The alignment of Band 1 requires greater care due to the higher frequencies covered by this band. The tracking characteristic of Band 1 of this receiver differs from that of the other bands, in that the 1st detector and T.R.F. circuits resonate on the high frequency side of the oscillator. This condition applies only to Band 1. The alignment frequency is 22,000 kc. or 13.6 meters. Set the external oscillator at 22,000 kc. Rotate the tuning condenser of the receiver until the dial pointer is co-incidental with the 22,000 kc. indication on the dial scale. Adjust the oscillator trimmer condenser for maximum sensitivity. Proceed next to align the interstage section. In doing this it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonant peak. Next align the antenna section for maximum sensitivity.

THE LONG WAVE ALIGNMENT procedure in the Model X-305 is similar to that of the broadcast. Turn the Band Switch to the Long Wave position. The alignment frequency is 375 kc. Adjust the padder condenser at 150 kc. Use a .0002 mfd. condenser in the antenna lead from the external oscillator.

REMOVAL OF BAND SELECTOR SWITCH ASSEMBLY: Should it be necessary to remove the switch assembly, it is advisable to realign the receiver after reinstalling it.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

RECEIVER DESCRIPTION

Maximum power output—6 watts.
I. F.—456 kc.

Type of Circuit — All wave Superheterodyne with TRF stage on all bands, A. V. C., Class "A" push pull parallel power output stage.

VOLTAGES

The D. C. Voltages listed below were measured at the tube sockets of the set with a high resistance voltmeter of 1,000 ohms per volt, and on a 115 volt A.C. line.

	R.F. 6K7	Osc. & 1st Det. 6A8		I.F. 6K7	2nd Det. & Amp. 6R7	Pwr. Pent. 25L6	Pwr. Pent. 25L6	Pwr. Pent. 25L6	Pwr. Pent. 25L6	Rect. 25Z6	Rect. 25Z6	T.B. 6E5
Plate	95	78	94	90	69	93	93	93	93	....	....	*6
Screen	78	....	49	78	....	96	96	96	96	....	....	....
Cathode	0	0	0	0	0	8	8	8	....	104	104	....
Filament	6.3	6.5	....	6.3	6.3	26	26	26	26	26	26	6.3

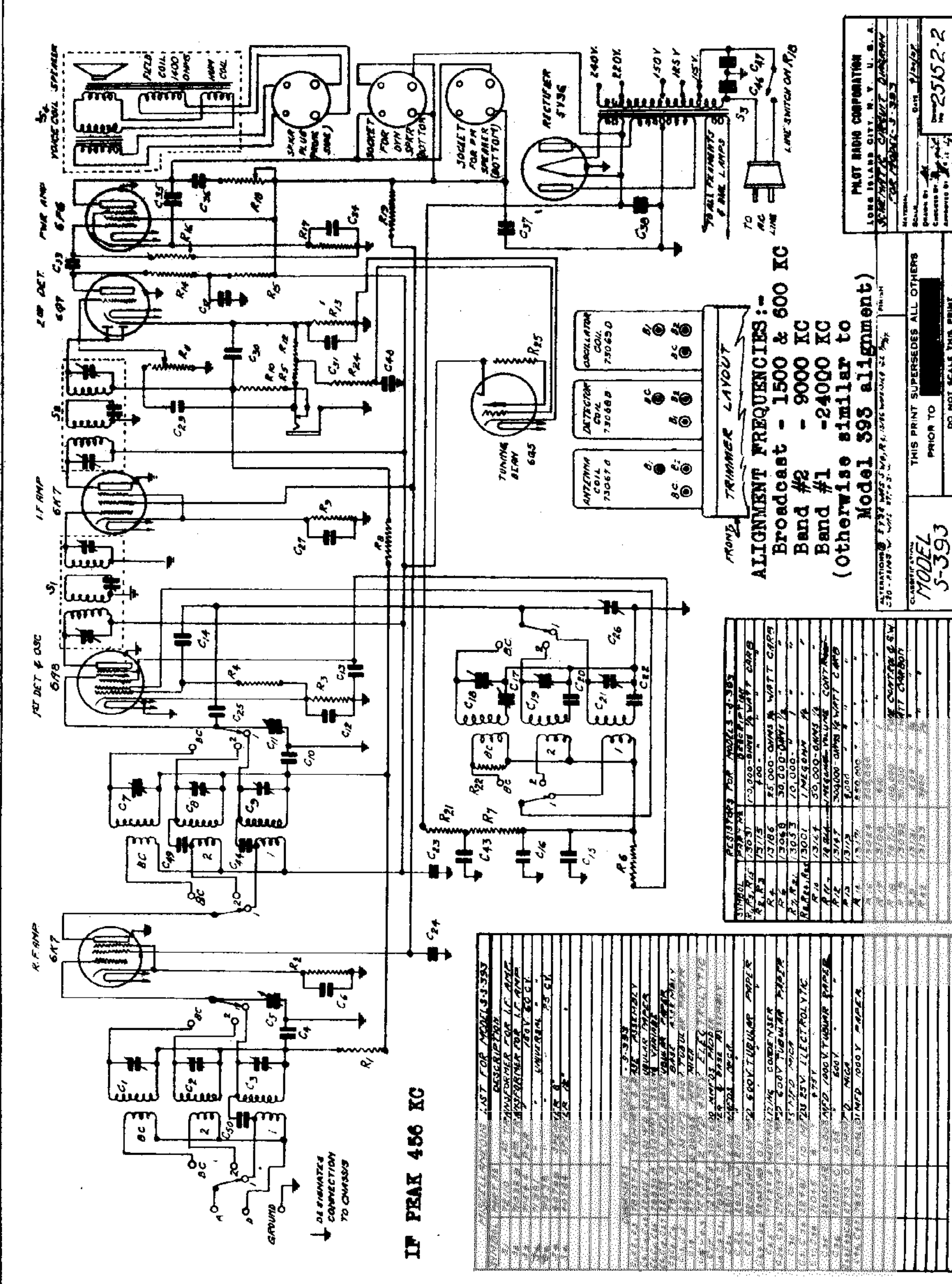
Speaker field—106 Volts. Tuning Beam—Target 96 volts to ground.

A 6E5 tuning beam should be plugged into the tuning beam socket on the chassis, whenever the receiver is operated outside the cabinet.

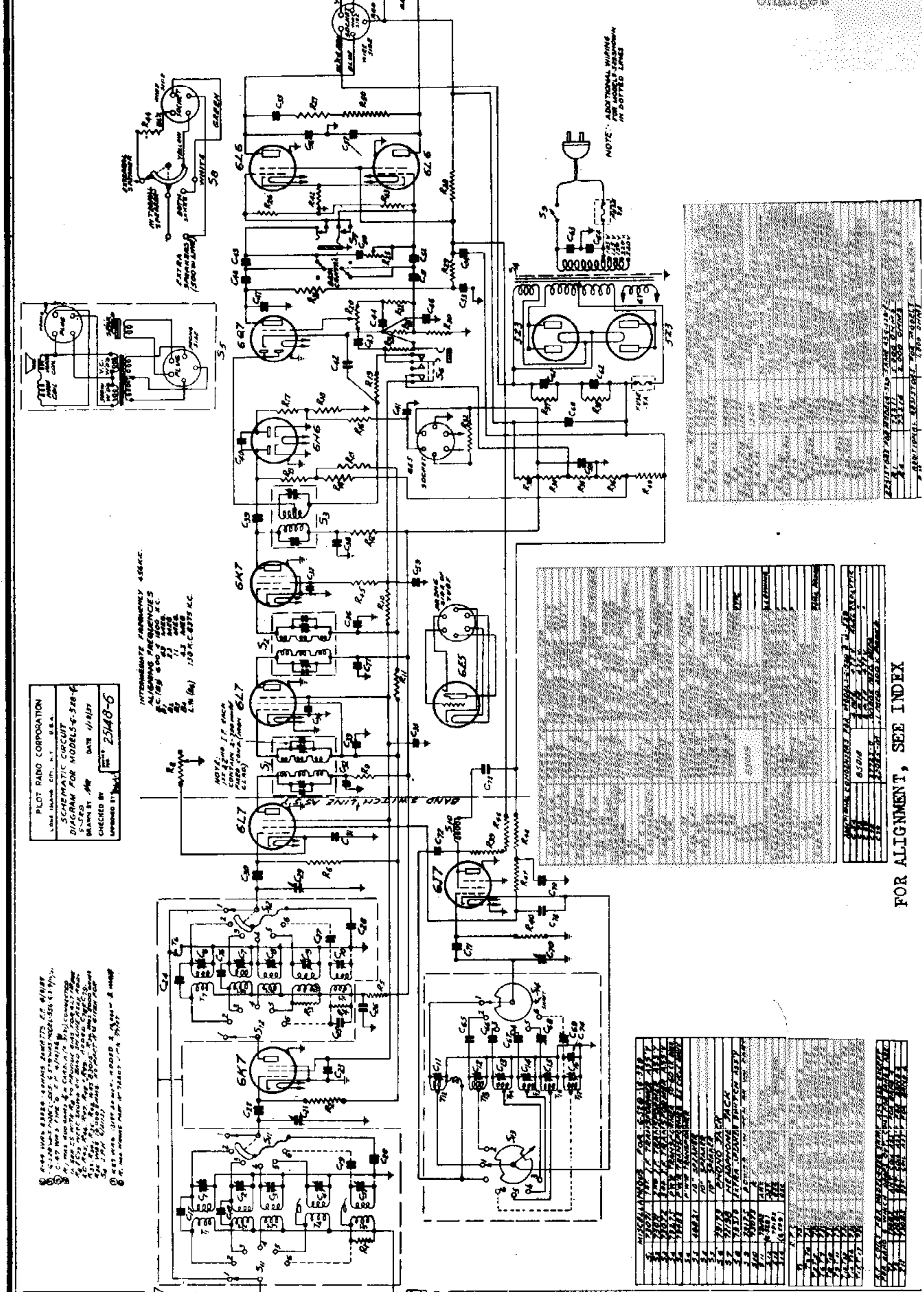
* Measured through 1 megohm.

MODEL S-393
Schematic, Trimmers
Alignment, Parts

PILOT RADIO CORP.



PILOT RADIO CORP.



FOR ALIGNMENT, SEE INDEX

MODELS G-528, G-529
Socket, Trimmers
Phono. Data

PILOT RADIO CORP.

MODELS TG-528, TG-529
Speaker Connections

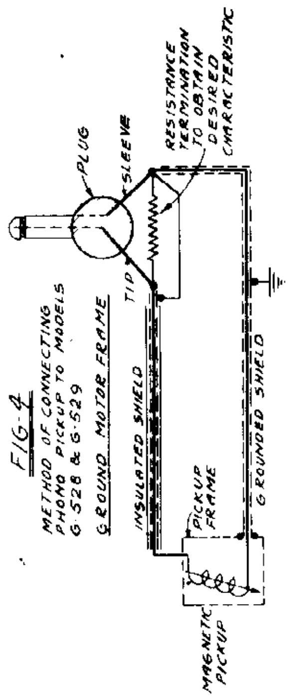


FIG-4 METHOD OF CONNECTING PHONO PICKUP TO MODELS G-528 & G-529 GROUND MOTOR FRAME

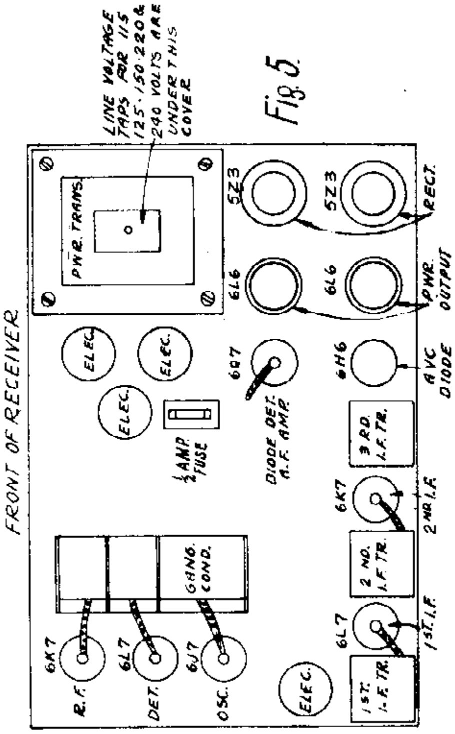
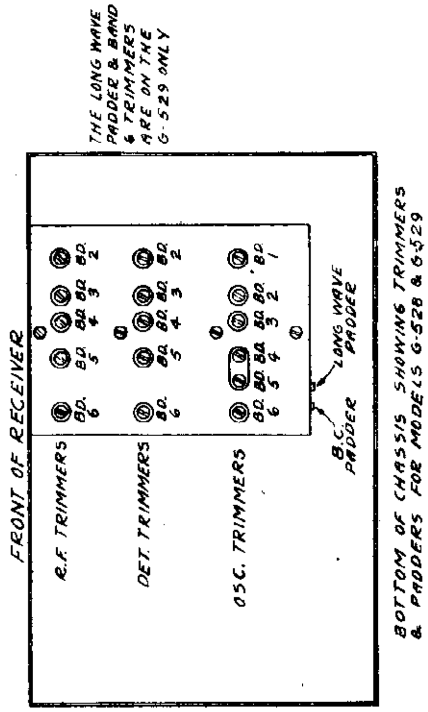


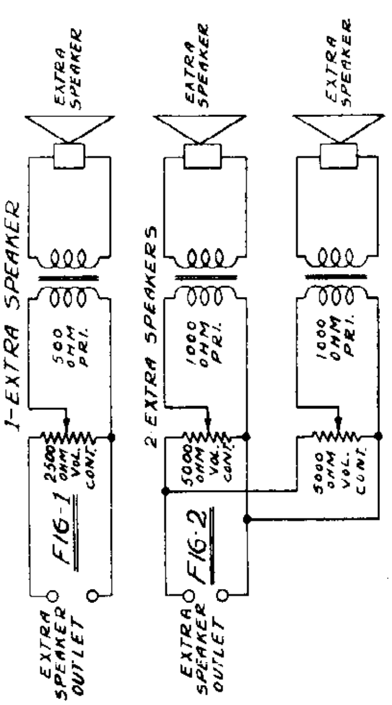
Fig. 5



BOTTOM OF CHASSIS SHOWING TRIMMERS & PADDERS FOR MODELS G-528 & G-529

Schematic Wiring Diagram
and special circuits for the
Models TG-528 and TG-529

EXTRA SPEAKER CONNECTIONS FOR MODELS G-528 & G-529



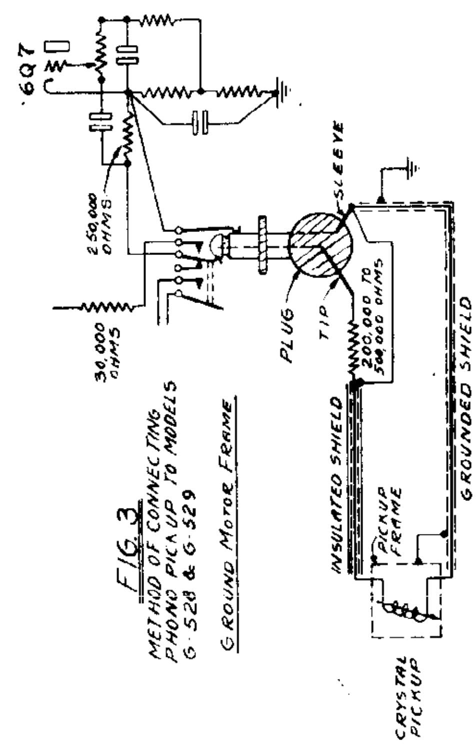
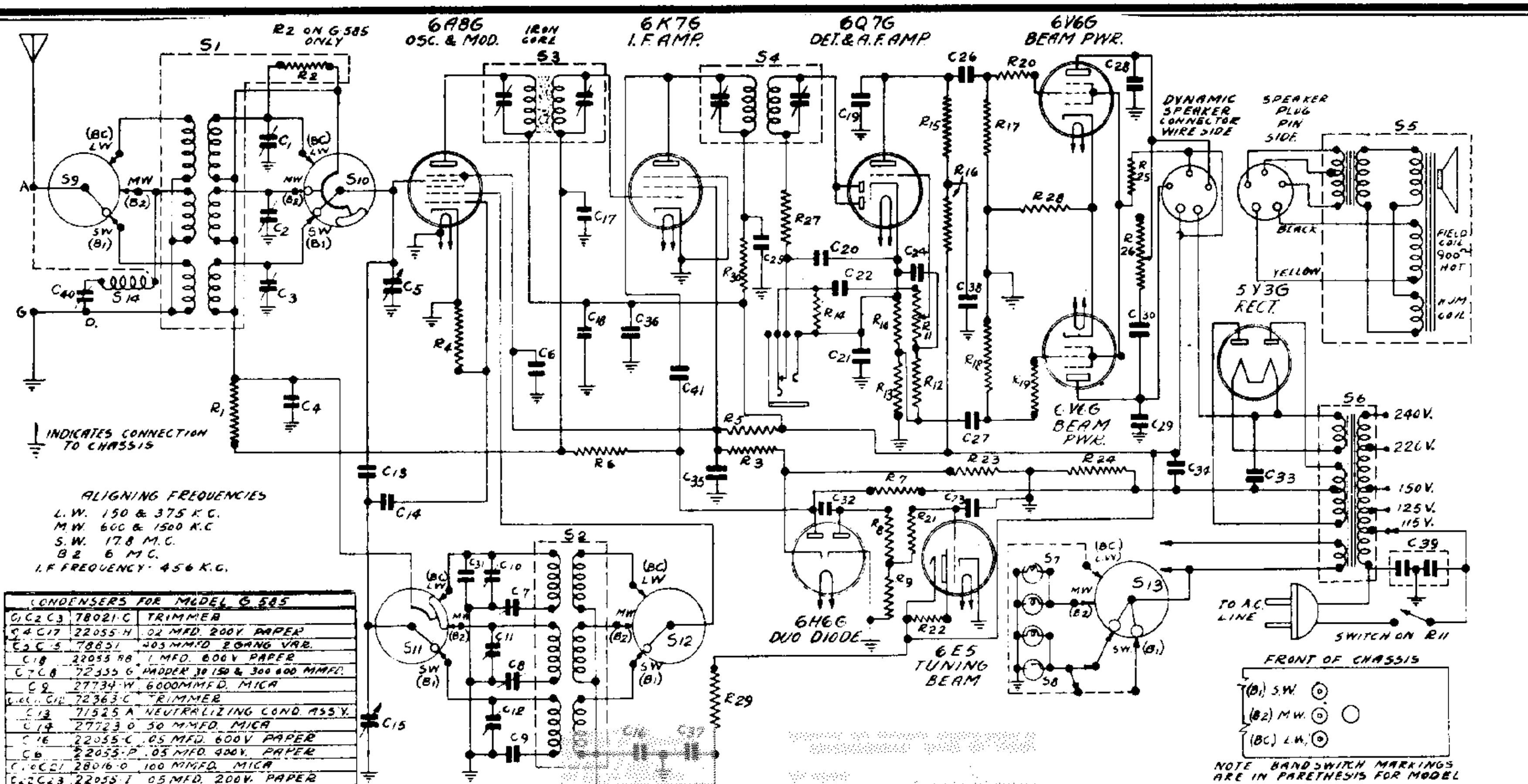


FIG. 3 METHOD OF CONNECTING PHONO PICKUP TO MODELS G-528 & G-529 GROUND MOTOR FRAME

MODEL G-584, G-585
Schematic, Trimmers
Parts

PILOT RADIO CORP.



ALIGNING FREQUENCIES
L.W. 150 & 375 K.C.
M.W. 600 & 1500 K.C.
S.W. 17.8 M.C.
B2 6 M.C.
I.F. FREQUENCY - 456 K.C.

CONDENSERS FOR MODEL G 585		
C1 C2 C3	78021-C	TRIMMER
C4 C17	22055-H	.02 MFD. 200V. PAPER
C5 C15	78851	405 MMFD. 2 GANG VAR.
C18	22055 BB	.1 MFD. 600V PAPER
C7 C8	72355 G	PADDER 30 150 & 300 600 MMFD.
C9	27734-W	6000 MMFD. MICA
C10 C11 C12	72363-C	TRIMMER
C13	71525 A	NEUTRALIZING COND. ASS'Y.
C14	27723 O	50 MMFD. MICA
C16	22055-C	.05 MFD. 600V PAPER
C6	22055-P	.05 MFD. 400V. PAPER
C20 C21	28016-O	100 MMFD. MICA
C22 C23	22055-I	.05 MFD. 200V. PAPER
C24	22481	10 MFD. 25V ELEC.
C25 C26	22055 AC	.02 MFD. 600V PAPER
C27	22055-Z	.02 MFD. 400V PAPER
C28 C29	22055 AL	.002 MFD. 1000V. PAPER
C30	22055 AC	.02 MFD 600V PAPER
C33	85024	10 MFD. 450V ELEC.
C34		8 MFD 450V. ELEC.
C19 C31 C41	27736-O	25 MMFD. MICA
C35	85025	8 MFD 450V ELEC.
C36		8 MFD. 250V ELEC.
C37 C38		4-4 MFD. 250V. ELEC.
C39	78503	.01-.01 MFD. SHIELDED PAPER
C40	71503-F	35 100 MMFD. PAPPER
C19	28016-W	100 MMFD MICA.

CONDENSERS FOR MODEL G 584 SAME AS G 585 EXCEPT FOLLOWING		
C7	71503-R	250-500 MMFD. PADDER
C8	27732-W	1600 MMFD. MICA.
C31	27736-O	NOT USED ON G-584

RESISTORS FOR MODELS G 584 & G 585		
R1 R13 R15	13031	[illegible]000 OHMS 1/4 WATT CARBON
R2	13029	[illegible]00 OHMS 1/4 WATT CARBON (G 585 ONLY)
R17 R18	13024	[illegible]000 OHMS 1/4 WATT CARBON
R19 R20	13115	[illegible] OHMS 1/4 WATT CARBON
R16	13474	[illegible]00 OHMS 1/4 WATT CARBON
R10	13195	[illegible] 1/4 WATT CARBON
R12 R14	13171	[illegible]MS 1/4 WATT CARBON
R6 R7	13007	[illegible] 1/4 WATT CARBON
R8 R9 R21	13001	[illegible] 1/4 WATT CARBON
R22	13001	[illegible] 1/4 WATT CARBON
R11	79492	[illegible] VOL. CONT. & SWITCH
R3	13129	[illegible]S 1 WATT CARBON
R4	13164	[illegible]S 1/4 WATT CARBON
R5	13201	[illegible]S 2 WATT CARBON
R23	13029	[illegible] OHMS 1/4 WATT CARBON
R24	13188	[illegible] OHMS 1 WATT CARBON
R25	13028	[illegible] OHMS 1/4 WATT CARBON
R26	79493	[illegible] OHMS TONE CONTROL
R27	13148	[illegible]0 OHMS 1/4 WATT CARBON
R28	83026	[illegible] OHMS 3 WATT WIRE WOUND
R29	13052	[illegible] OHMS 1/2 WATT CARBON
R30	13149	[illegible] OHMS 1/4 WATT CARBON

MISC. FOR MODEL G 585		
[illegible]	[illegible]	[illegible]S'Y.
[illegible]	[illegible]	[illegible]Y.
[illegible]	[illegible]	[illegible] ASS'Y
[illegible]	[illegible]	[illegible] ASS'Y
[illegible]	[illegible]	[illegible]KER
[illegible]	[illegible]	[illegible]S Y. 60~ 117.3V.
[illegible]	[illegible]	[illegible] 60~ UNIV.
S7 S8	78889	DIAL LAMPS 6.3 V. .2 AMP.
S9 S10 S11 S12 S13	72367-C	BAND SWITCH
S14		WAVE TRAP COIL ASS'Y.

MISC. FOR MODEL G 584 SAME AS G 585 EXCEPT THE FOLLOWING		
S1	73109	ANT. COIL ASSY.
S2	73111	OSC. COIL ASS'Y.

NOTE ON CIRCUIT FOR MODELS G-584 & G 585 DOTTED LINES SHOW CONNECTIONS FOR MODEL G-584 WHICH DIFFER FROM MODEL G-585 BETWEEN POINTS INDICATED BY ARROWS ON BAND SWITCH

ALTERATIONS

FINISH

CLASSIFICATION G-580 SERIES

THIS PRINT SUPERSEDES ALL OTHERS PRIOR TO [redacted]

PILOT RADIO CORPORATION
LONG ISLAND CITY N.Y. U.S.A.
SCHEMATIC CIRCUIT DIAGRAM MODELS G-584 & G 585
DRAWN BY E.F.
DATE 6/22/37
DRWG. NO. 25169-

MODELS G-528, G-529
Voltage, Alignment
MODELS G-584, G-585
Alignment

PILOT RADIO CORP.

MODELS G-528 & G-529

RECEIVER ALIGNMENT

EQUIPMENT REQUIRED:
Signal Generator, having accurate frequency calibration.
Output Meter
Dummy Antenna; 900 ohm non-inductive resistor
.1 mfd. condenser
.0002 mfd. condenser

CONNECTIONS: The posts marked D and G on the rear of the chassis should be connected to ground side of the signal generator. The hot side of the signal generator is connected to the grid of the 6L7 mixer tube thru a .1 mfd. condenser when aligning the intermediate frequency amplifier. The hot lead is transferred to the post marked A in series with a .0002 mfd. condenser when aligning Bands 4, 5, and 6. The .0002 mfd. condenser is replaced with a 400-ohm resistor when aligning Bands 1, 2 and 3.

The output meter may be connected to the extra speaker terminals.

SIGNAL GENERATOR OUTPUT: The signal generator output control should permit attenuation of the signal to zero output. If this is not possible on the higher frequencies a harmonic of a lower frequency may be used. Apparent broad tuning of the trimmers will be noticed if the aligning signal is too strong.

The broadness is due to the automatic volume control action. It is for this reason that the signal generator output must be kept low for accurate alignment.

ALIGNMENT PROCEDURE: All the control knobs should be turned to the extreme clockwise positions. The positions of the various trimmers are clearly shown in Figure 5. Connect the signal generator and output meter for aligning the intermediate-frequency amplifier as described under "connections". Turn the loud-speaker switch to the external speaker position. Set the signal generator at 456 kc. and increase its output until a reading is obtained on the output meter. Adjust the trimmers mounted on the side of the intermediate frequency transformers in the order listed below under IF alignment. Decrease the signal generator output so that a very small deflection is read on the output meter and repeat the adjustment of the IF trimmers.

Next connect the signal-generator for aligning Band 5. Set the signal generator and receiver dial at 1500 kc. Adjust the B5 oscillator trimmer for maximum output. The detector and R.F. trimmers should next be adjusted for maximum output.

Band 5 should now be adjusted at the low frequency end of the dial. For this adjustment set the signal generator to 600 kc. and follow instructions under "rocking the gang". Repeat the 1500 kc. adjustment after aligning at 600 kc.

Model 529 has a long wave band (Band 6) which is adjusted in a manner similar to that for Band 5.

Bands 1, 2, 3 and 4 have no adjustment at the low frequency end of the band.

IMAGE FREQUENCY: All bands except Band 1 are aligned with the oscillator frequency adjuster higher than the signal frequency. Band 1 has the oscillator adjusted to a frequency below the signal frequency. The possibility of aligning the receiver to the image frequency on Bands 2, 3 and 4 can be eliminated by adjusting the signal generator to the alignment frequency with sufficient output to receive two signals separated by twice the intermediate frequency. The signal which is received at a higher frequency on the receiver dial is the correct signal for alignment. The reverse is true on Band 1.

INTERMEDIATE FREQUENCY ALIGNMENT

Set Signal Generator at	Set Receiver Dial at	Adjust in Order Listed Below
456 kc.	530 kc.	I.F.T.1
		I.F.T.2
		I.F.T.3

RADIO FREQUENCY ALIGNMENT

Set Signal Generator and Receiver Dial at		Adjust in Order Listed Below
Band 6	375 kc.	Osc. 6, Det. 6, RF6.
Band 6	150 kc.	Long wave padder, rock gang* Repeat 375 kc. adjustment
Band 5	1,500 kc.	Osc. 5, Det. 5, RF5.
Band 5	600 kc.	Broadcast padder, rock gang* Repeat 1,500 kc. adjustment
Band 4	4,300 kc.	Osc. 4, Det. 4, RF4
Band 3	11,000 kc.	Osc. 3, Det. 3, RF3
Band 2	23,000 kc.	Osc. 2, Det. 2, RF2
Band 1	60,000 kc.	Osc. 1

*Rocking the gang is necessary to obtain correct alignment of the RF circuits. The signal generator should be set to the padding frequency and the gang rotated until the output meter reads maximum output.

The padding condenser for the band to be adjusted is turned a slight amount and the gang condenser turned to the new peak. If the output reading is greater at this setting of the padder, continue adjusting the padder and the gang condenser in the same direction until a point is reached where the output decreases when the padder and gang are rotated further in either direction. The padder should be turned in the opposite direction where decreased output follows an adjustment of the padder.

ALIGNMENT OF BANDS 2 and 3: Greater care is required when aligning Bands 2 and 3 due to the higher frequencies covered. The signal generator and receiver dial indicator are set at the alignment frequency and the oscillator trimmer is adjusted for maximum output, care being taken to avoid adjustment to the image frequency. The interstage trimmer is now adjusted and the gang condenser rocked at the same time around the resonance position, until at some position of both trimmer and gang condenser, maximum output is obtained. The R.F. trimmer is adjusted in the same manner.

BAND 1 ALIGNMENT: The 60,000 kc. signal necessary for alignment may not be obtainable with most signal generators. The third harmonic of 20,000 kc. can be used satisfactorily. Two signals will be heard near 60,000 kc. on the dial. The oscillator trimmer should be adjusted to bring the lower frequency signal to the 60,000 kc. calibration on the dial.

SOCKET VOLTAGES

	6K7 RF Amp.	6L7 Mixer	6J7 Osc.	6L7 IF Amp.	6K7 IF Amp.	6H6 AVC	6Q7 Det, AF, Amp.	6L6 (2) Power Amp.	5Z3 (2) Rect.	6E5 Tun. Beacon
Cathode	0	3*	0	0	0	0	.40†	20	—	—
Screen grid	93	95	185	95	90	—	—	305	—	0
Plate	230	228	185	242	230	—	130†	310	—	†
Filament	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5	6.3
Target										242

Grid bias voltage applied to I. F. and R. F. tubes—2.6 volts (Measure across R36)
The above voltages were measured to chassis with a 1000 ohm per volt voltmeter and a 115 volt AC line.
*Sensitivity control in maximum position. Cathode voltage measured with sensitivity control in minimum position, 9 volts.
†Measured through high resistance.
Operating Voltages 115-125-150-220-240 volts Alternating current
Line frequency 50-60 cycles
Power consumption 200 watts
Undistorted power output—20 watts

Model G-584

16 - 51 m. (18,800 - 5,880 kc.)
48 - 146 m. (6,250 - 2,050 kc.)
190 - 571 m. (1,580 - 525 kc.)

Model G-585

16 - 51 m. (18,800 - 5,880 kc.)
190 - 571 m. (1,580 - 525 kc.)
780 - 2,190 m. (385 - 140 kc.)

(MODEL G-585 IS SOLD OUTSIDE THE U.S.A. ONLY)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the "slip-on" knobs and felt washers from the controls and loosen the set screw on the tuning knob.

Remove the speaker plug from the socket at the rear of the speaker.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require realignment, the procedure outlined below should be followed. In the schematic wiring diagram, the location and function of the various alignment capacitors are clearly illustrated. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast," and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6K7-G tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator leads from the type 6K7-G I. F. Amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8-G tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. Amplifier, it is essential to repeat the alignment process in both I. F. units with the external oscillator leads connected across the control grid of the 6A8-G tube.

WAVE TRAP ADJUSTMENT: With the oscillator still set at 456 kc., connect the oscillator to the antenna through a .0002 mfd. condenser. Then adjust the wave trap condenser for minimum deflection on the output meter.

BROADCAST ALIGNMENT: After the I. F. Amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads, through a .0002 mfd. condenser. Set the Band Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response. Adjust the signal section trimmer in the same manner.

Next adjust the 600 kc. padder condenser. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT-WAVE BANDS: The procedure in aligning the short-wave bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser which is of fixed value and requires no adjustment. The alignment frequency is 17 Meters—(17,600 kc.)

Turn the Band Switch to the right. Tune the external oscillator to 17 meters. Tune the receiver so that the dial pointer is in a position coincidental with the 17 meter indication on the dial scale. Adjust the short wave oscillator trimmer for maximum response. Next adjust the signal circuit trimmer for maximum resonance. Repeat all adjustments to assure correct alignment, rocking the gang condenser to right or left for maximum gain.

Model G-584 is aligned in the same manner at 6,000 kc. with the switch in Band 2 position.

LONG WAVE ALIGNMENT: Procedure in the Model G-585 is similar to the Broadcast section of that receiver. Align at 375 kc. Adjust the padder at 150 kc.

Should it be necessary to remove the band switch assembly, it is advisable to realign the receiver after reinstalling.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

RECEIVER DESCRIPTION

Frequency Rating —50 to 60 cycles.

Power Consumption—90 Watts.

Tubes —1 type 6A8-G, 1 type 6K7-G, 1 type 6Q7-G, 2 type 6V6-G, 1 type 5Y3-G, 1 type 6E5, type 6H6G

Undistorted power output—6 watts.

Intermediate Frequency—456 kc.

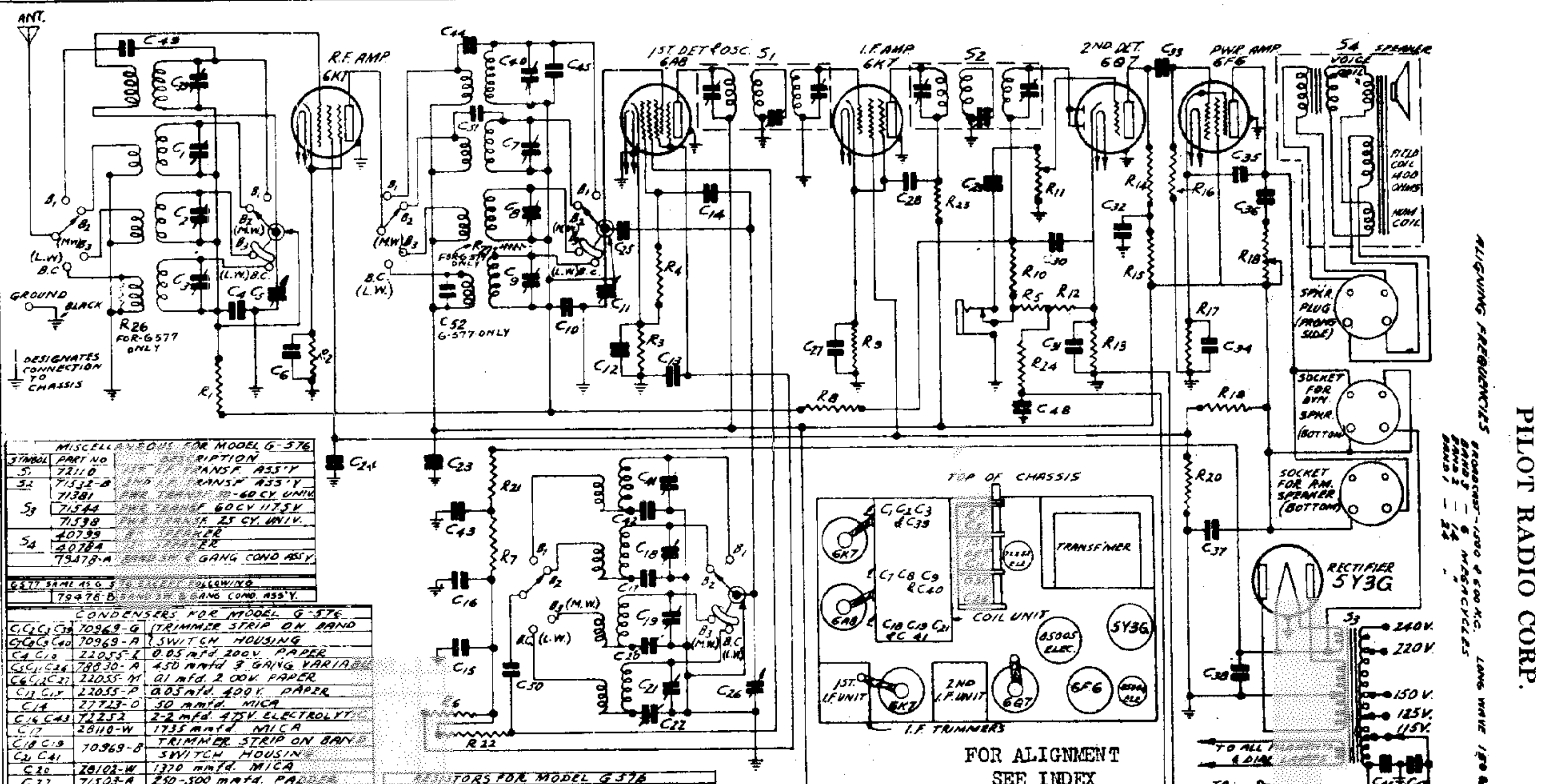
Tube Functions —Type 6A8-G Electron emission control oscillator-detector.
Type 6K7-G I. F. amplifier.
Type 6Q7-G Duo-diode det. amplifier.
Type 6V6-G (2) Class "A" power pentode.
Type 5Y3-G Full-wave rectifier for power supply.
Type 6E5 Tuning Beacon
Type 6H6G. AVC diode

MODELS G-576, G-577
Schematic, Socket Trimmers, Parts

PILOT RADIO CORP.

ALIGNING FREQUENCIES BROADCAST - 1500 & 600 K.C. LONG WAVE 150 & 400 K.C.
BAND 3 - 6 MEGACYCLES
BAND 2 - 14 "
BAND 1 - 24 "

I.F. - 456 K.C.



FOR ALIGNMENT SEE INDEX

	MISCELLANEOUS FOR MODEL G-576	
SYMBOL	PART NO.	DESCRIPTION
S1	72110	[illegible]ANSF. ASS'Y
S2	71532-B	[illegible]RANSF. ASS'Y
S3	71381	[illegible]-60 CY. UNIV.
	71544	[illegible]F. 60 CY. 117.5 V.
	71538	[illegible]F. 25 CY. UNIV.
S4	40799	[illegible]ER
	40784	[illegible]ER
	79478-A	[illegible] GANG COND ASS'Y.
G577 SAME AS G-5[illegible] FOLLOWING		
	79478-B	[illegible]ANG COND. ASS'Y.

	CONDENSERS FOR MODEL G-576	
$C_1 C_2 C_3 C_{39}$	70969-G	TRIMMER STRIP ON BAND
$C_7 C_8 C_9 C_{40}$	70969-A	SWITCH HOUSING
$C_4 C_{10}$	22055-L	0.05 mfd. 200 V. PAPER
$C_5 C_{11} C_{26}$	78830-A	450 mmfd 3 GANG VARIA[illegible]
$C_6 C_{12} C_{27}$	22055-M	0.1 mfd. 200 V. PAPER
$C_{13} C_{17}$	22055-P	0.05 mfd. 400 V. PAPER
C_{14}	27723-0	50 mmfd. MICA
$C_{16} C_{43}$	72252	2-2 mfd. 475 V. ELECTROLYT[illegible]
C_{17}	28110-W	1735 mmfd. MICA
$C_{18} C_{19}$	70969-B	TRIMMER STRIP ON BAN[illegible]
$C_{21} C_{41}$		SWITCH HOUSIN[illegible]
C_{20}	28102-W	1370 mmfd. MICA
C_{22}	71503-A	250-500 mmfd. PA[illegible]
C_{23}	22055-AP	0.25 mfd. 600 V. PA[illegible]
$C_{24} C_{32}$	22055-AB	.01 mfd. 600[illegible]
C_{25}	71525-A	NEUTRALIZ[illegible]
$C_{28} C_{36}$	22055-C	0.05 mfd. 6[illegible]
$C_{29} C_{33}$	22055-A	.01 mfd. 60[illegible]
C_{30}	27701-W	.000[illegible]
$C_{31} C_{34}$	22481	10 mf[illegible]
C_{35}	22055-R	.005 [illegible]
C_{37}	85005	16 mf[illegible]
C_{38}	85004	[illegible]
C_{42}	28109-W	[illegible]
C_{44}	27737-0	[illegible]
C_4[illegible]	[illegible]	[illegible]
C_{46}	[illegible]	[illegible]
C_4[illegible]	[illegible]	[illegible]
C_5[illegible]	[illegible]	[illegible]
C_5[illegible]	[illegible]	[illegible]
G[illegible]		
C_{20} [illegible]	[illegible]	[illegible]
C_5[illegible]	[illegible]	[illegible]

	[illegible]TORS FOR MODEL G576	
[illegible]	13031	100,000 OHMS 1/4 WATT
[illegible]	13003	300 OHMS 1/4 WATT
[illegible]	13164	50,000 OHMS 1/4 WATT
[illegible]	13068	30,000 OHMS 1/2 WATT
[illegible]	13020	5,000 OHMS 1 WATT
[illegible]	13001	1 MEGOHM 1/4 WATT
[illegible]	78714	1 MEG VOLUME CONTROL
[illegible]	13147	300,000 OHMS 1/4 WATT
[illegible]	13113	4,000 OHMS 1/4 WATT
[illegible]	13171	250,000 OHMS 1/4 WATT
[illegible]	13024	500,000 OHMS 1/4 WATT
[illegible]	13108	410 OHMS 1 WATT
[illegible]	78715	100,000 Ω TONE CONTROL [illegible]
[illegible]	13082	30,000 OHMS 1 WATT
[illegible]	13179	18,000 OHMS 2 WATTS
[illegible] SAME AS G-576 PLUS FOLLOWING.		
[illegible]	13164	50,000 OHMS 1/4 WATT CARBON
[illegible]	13029	250 OHMS 1/4 WATT CARBON

ALTERATIONS: (2) RECT. WAS 5W4 E.F. 5/19/37 (1327) 79478-A WAS 49478-A ADDED-L.W. G-577

CLASSIFICATION G-570

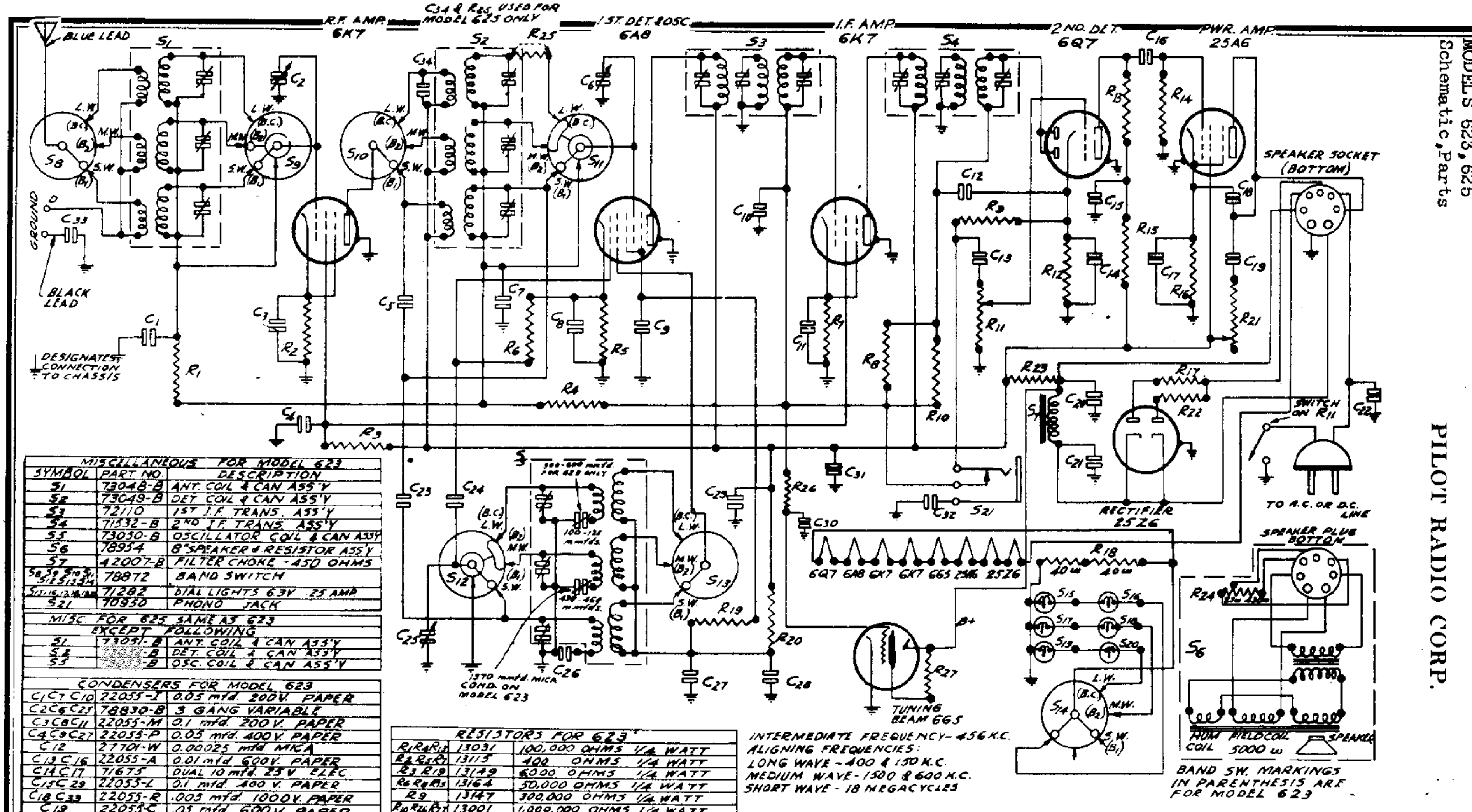
THIS PRINT SUPERSEDES ALL OTHERS PRIOR TO [redacted]

DO NOT SCALE THIS PRINT

PILOT RADIO CORPORATION
LONG ISLAND CITY, N.Y. U.S.A.
SCHEMATIC CIRCUIT DIAGRAM & CHASSIS LAYOUT FOR MODELS G576 & G577
DATE 3/23/37
No. 25157-2

MODELS 623, 625
Schematic, Parts

PILOT RADIO CORP.



MISCELLANEOUS FOR MODEL 623		
SYMBOL	PART NO.	DESCRIPTION
S_1	73048-B	ANT. COIL & CAN ASS'Y
S_2	73049-B	DET. COIL & CAN ASS'Y
S_3	72110	1ST I.F. TRANS. ASS'Y
S_4	71532-B	2ND I.F. TRANS. ASS'Y
S_5	73050-B	OSCILLATOR COIL & CAN ASS'Y
S_6	78954	8" SPEAKER & RESISTOR ASS'Y
S_7	42007-B	FILTER CHOKE - 450 OHMS
$S_8 S_9 S_{10} S_{11} S_{12} S_{13} S_{14}$	78872	BAND SWITCH
$S_{15,16,17,18,19,20}$	71282	DIAL LIGHTS 6.3V .25 AMP
S_{21}	70930	PHONO JACK

MISC. FOR 625 SAME AS 623 EXCEPT FOLLOWING		
S_1	73051-B	ANT. COIL & CAN ASS'Y
S_2	[illegible]-B	DET. COIL & CAN ASS'Y
S_5	[illegible]-B	OSC. COIL & CAN ASS'Y

CONDENSERS FOR MODEL 623		
$C_1 C_7 C_{10}$	22055-I	0.05 mfd. 200V. PAPER
$C_2 C_6 C_{25}$	78830-B	3 GANG VARIABLE
$C_3 C_8 C_{11}$	22055-M	0.1 mfd. 200V. PAPER
$C_4 C_9 C_{27}$	22055-P	0.05 mfd. 400V. PAPER
C_{12}	27701-W	0.00025 mfd. MICA
$C_{13} C_{16}$	22055-A	0.01 mfd. 600V. PAPER
$C_{14} C_{17}$	71675	DUAL 10 mfd. 25V ELEC.
$C_{15} C_{29}$	22055-L	0.1 mfd. 400 V. PAPER
$C_{18} C_{33}$	22055-R	.005 mfd. 1000V. PAPER
C_{19}	22055-C	.05 mfd. 600V. PAPER
C_{20}	78594	12 mfd. 250 ELECTROLYTIC
C_{21}		16 mfd. 250 "
C_{28}		4 mfd. 250 "
C_{22}	22055-U	0.01 mfd. 1000V. PAPER
C_{24}	27723-W	.00005 mfd. MICA
C_{26}	27745-W	.0025 mfd. MICA
C_{23}	71525-A	NEUTRALIZING
C_5	27737-O	.00001 mfd. MICA
C_{32}	22055-S	0.5 mfd. 200V. PAPER
C_{31}	78595	4 mfd. 250V. ELEC.
C_{30}	22055-H	.02 mfd. 200V. PAPER

CONDENSERS FOR MODEL 625 SAME AS FOR 623 EXCEPT FOLLOWING		
C_{34}	27701-W	.00025 mfd. MICA

RESISTORS FOR 623		
$R_1 R_4 R_{13}$	13031	100,000 OHMS 1/4 WATT
$R_2 R_5 R_7$	13115	400 OHMS 1/4 WATT
$R_3 R_{19}$	13149	6000 OHMS 1/4 WATT
$R_6 R_8 R_{15}$	13164	50,000 OHMS 1/4 WATT
R_9	13147	300,000 OHMS 1/4 WATT
$R_{10} R_{26} R_{27}$	13001	1,000,000 OHMS 1/4 WATT
R_{11}	78714	750,000 ω VOL. CONTROL
R_{12}	13149	6000 OHMS 1/4 WATT
R_{14}	13024	500,000 OHMS 1/4 WATT
R_{16}	13192	440 OHMS 1 WATT
$R_{17} R_{22}$	13077	100 OHMS 1/2 WATT
R_{18}	83002	80 OHMS TAPPED AT 40 ω
R_{20}	13073	3000 OHMS 1/2 WATT
R_{21}	78715	100,000 OHMS TONE CONT. & SW.
R_{23}	78610	2500 OHMS 3 WATTS WIRE W'D
R_{24}	83010	455 ω TAPPED AT 25 ω " "

RESISTORS FOR 625 SAME AS 623 EXCEPT FOLLOWING		
R_{25}	13029	250 OHMS 1/4 WATT

FOR ALIGNMENT, SEE INDEX

ALTERATIONS ② BAND SW. MARKINGS & CONDENSER VALUES FINISH

CLASSIFICATION 620 SERIES

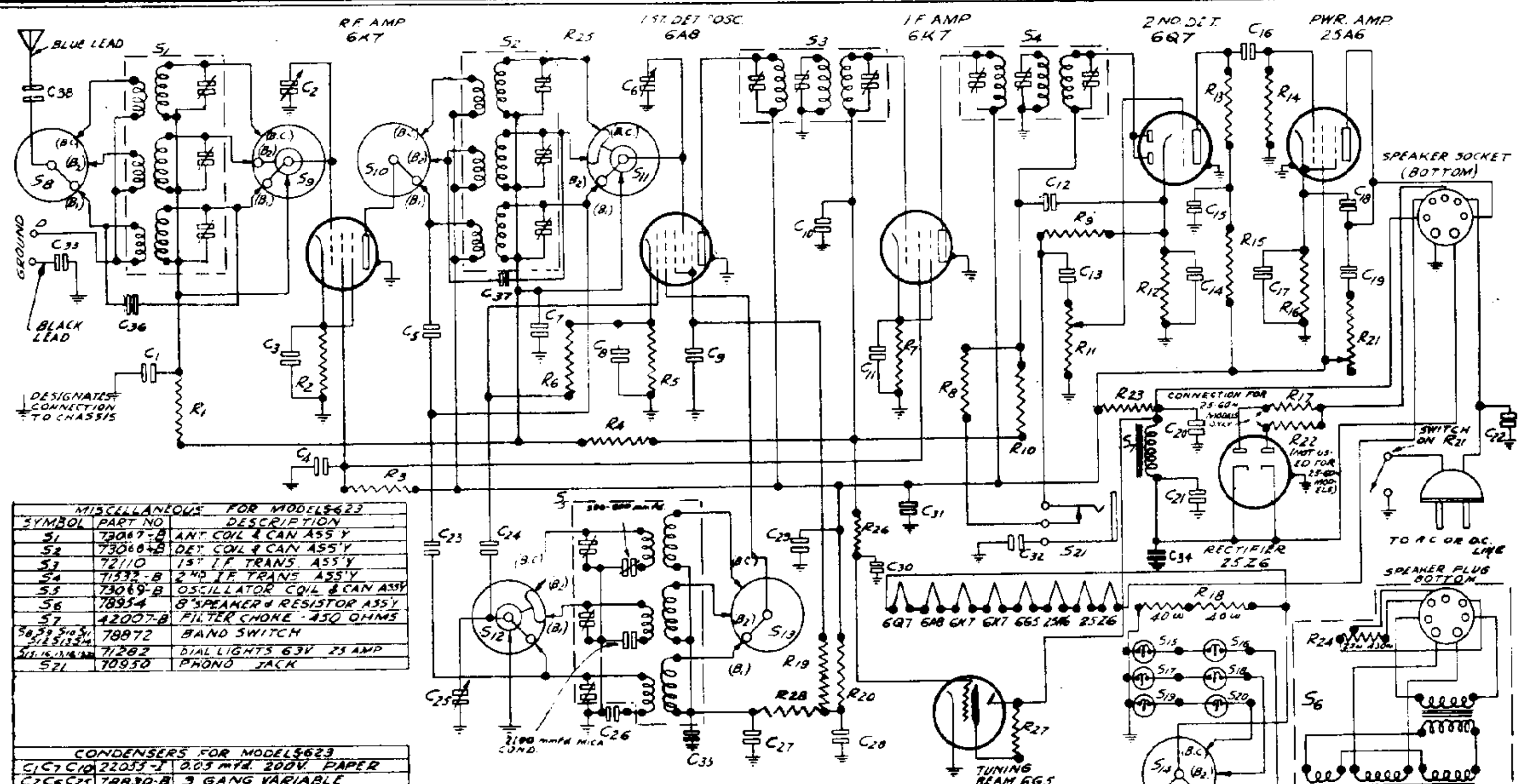
THIS PRINT SUPERSEDES ALL OTHERS PRIOR TO [redacted]

DO NOT SCALE THIS PRINT

PILOT RADIO CORPORATION
LONG ISLAND CITY, N.Y. U.S.A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODELS 623 & 625
DATE 8/7/36
DWG. No. 25134-2

MODELS S-623, S-623J
Schematic, Parts

PILOT RADIO CORP.



MISCELLANEOUS FOR MODEL S623		
SYMBOL	PART NO	DESCRIPTION
S1	73067-B	ANT. COIL & CAN ASS'Y
S2	73066-B	DET. COIL & CAN ASS'Y
S3	72110	1ST I.F. TRANS. ASS'Y
S4	71532-B	2ND I.F. TRANS ASS'Y
S5	73069-B	OSCILLATOR COIL & CAN ASS'Y
S6	78954	8" SPEAKER & RESISTOR ASS'Y
S7	42007-B	FILTER CHOKE - 450 OHMS
S8 S9 S10 S11 S12 S13 S14	78872	BAND SWITCH
S15, 16, 17, 18, 19, 20	71282	DIAL LIGHTS 6.3V .25 AMP
S21	70950	PHONO JACK

CONDENSERS FOR MODEL S623		
C1 C7 C10	22055-J	0.05 mfd. 200V. PAPER
C2 C6 C25	78830-B	3 GANG VARIABLE
C3 C8 C11	22055-M	0.1 mfd. 200 V. PAPER
C4 C9 C27	22055-P	0.05 mfd. 400 V. PAPER
C12	27701-W	0.00025 mfd MICA
C13 C16	22055-A	0.01 mfd 600V PAPER
C14 C17	22481	10 mfd. 25 V ELEC.
C15 C29	22055-L	0.1 mfd 400 V. PAPER
C18 C33	22055-R	.005 mfd 1000V. PAPER
C19	22055-C	.05 mfd 600 V. PAPER
C20	78594	12 mfd. 250 ELECTROLYTIC
C21		16 mfd. 250 "
C28		4 mfd. 250 "
C22	22055-U	0.01 mfd. 1000V. PAPER
C24	27723-0	.00005 mfd. MICA
C26	28103-W	.0021 MFD. MICA
C23	71525-A	NEUTRALIZING
C5	27737-0	.00001 mfd. MICA
C32	22055-S	0.5 mfd. 200 V. PAPER
C35	85013	4 mfd. 250 V. ELEC.
C30	22055-H	0.2 mfd. 200 V. PAPER
C-31	85013	12 MFD. 250 V. ELEC.
C36 C37	27737-0	10 MMFD. MICA
C34	22055-C	.05 MFD. 600 V. PAPER
C38	22055-R	.005 MFD. 1000 V. PAPER

RESISTORS FOR S623		
R1 R4 R13	13031	100,000 OHMS 1/4 WATT
R2 R5 R7	13113	400 OHMS 1/4 WATT
R3 R19	13149	6,000 OHMS 1/4 WATT
R6 R8 R15	13164	50,000 OHMS 1/4 WATT
R9	13147	300,000 OHMS 1/4 WATT
R10 R26 R27	13001	1,000,000 OHMS 1/4 WATT
R11	78714	750,000 Ω VOL. CONTROL
R12	13149	6000 OHMS 1/4 WATT
R14	13024	500,000 OHMS 1/4 WATT
R16	13192	440 OHMS 1 WATT
R17 R22	13077	100 OHMS 1/2 WATT
R18	83002	80 OHMS TAPPED AT 40 Ω
R20	13066	2000 OHMS 1/2 WATT
R21	78715	100,000 OHMS TONE CONT. .05W.
R23	78610	2500 OHMS 3 WATTS WIRE WD
R24	83010	455 Ω TAPPED AT 25 Ω " "
R28	13028	1000 OHMS 1/4 WATT

FOR ALIGNMENT, SEE INDEX

INTERMEDIATE FREQUENCY - 456 K.C.
ALIGNING FREQUENCIES:
B.C. 600 & 1500 K.C.
B_1 24 MEG.
B_2 9 MEG.

BAND SW. MARKINGS IN PARENTHESIS ARE FOR MODEL S623

CONDENSERS FOR MODEL S623J (25-60~)		
SAME AS FOR MODEL S623 EXCEPT FOLLOWING:		
C20	85012	12 MFD 250V. ELECTRO.
C35		4 " 250V. "
C31		12 " 250V "
C21	85010	34 MFD 250V ELECTRO.
C28		4 " 250V. "

RESISTORS FOR MODEL S623J (25-60~)		
SAME AS FOR MODEL S623 EXCEPT FOLLOWING:		
R17	83013	100 OHMS 2 WATTS WIRE WND
R22		NOT USED

ALTERATIONS

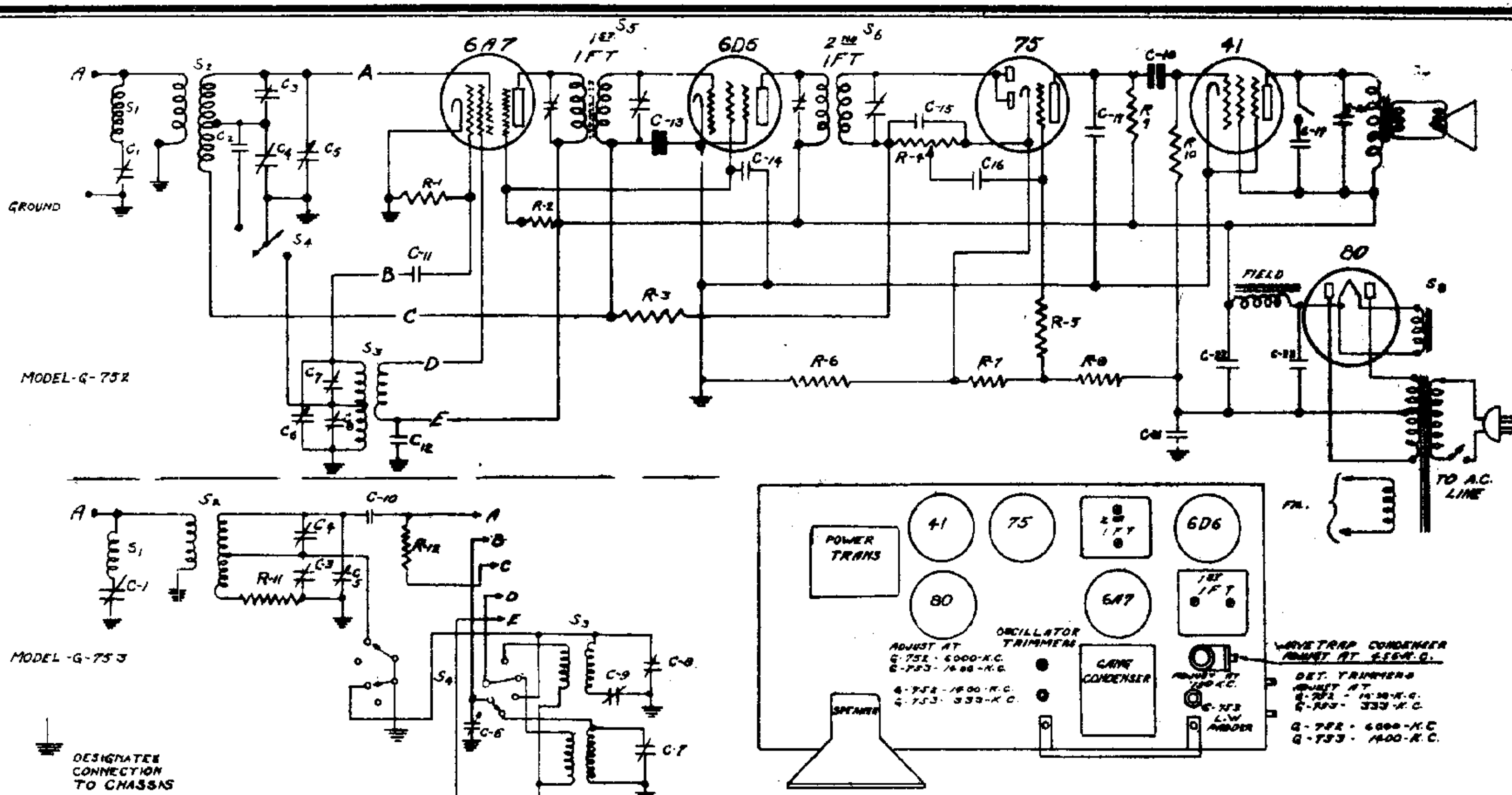
CLASSIFICATION
S623
S623J (25-60~)

THIS PRINT SUPERSEDES ALL OTHERS
PRIOR TO [redacted]
DO NOT SCALE THIS PRINT

PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODELS S623, S623J (25-60~)
SCALE
DATE 8/7/36
DRAWN BY
CHECKED BY
APPROVED BY
DRWG NO 25144

MODELS G-752, G-753
Schematic, Socket
Trimmers, Parts

PILOT RADIO CORP.



INTERMEDIATE FREQUENCY - 456-K.C.
ALIGNING FREQUENCIES:

MODEL-G-752
BROADCAST - 1400 K.C.
SHORT WAVE - 6000 K.C.

MODEL-G-753
LONG WAVE - 333-150-K.C. (900-2000-M)
MEDIUM WAVE - 1400-K.C. (214-M)

CONDENSERS FOR MODEL-G-752		
DESIGNATION	PART NO.	DESCRIPTION
C-1	79455	22-125 MMFD. WAVETRAP TRIMMER
C-2	38108-W	.001 MFD. MICA
C-3-C-4	70969-J	TRIMMER MIXER
C-5-C-6	79432	GANG CONDENSER
C-7-C-8	70969-E	TRIMMER OSCILLATOR
C-11	27723-O	.00005 MFD. MICA
C-12-C-14	22055-L	.1 MFD. 400 V. PAPER
C-13	22055-X	.05 MFD. 200 V. PAPER
C-15	27712-W	.0005 MFD. MICA
C-16	22055-W	.01 MFD. 400 V. PAPER
C-18	22055-Z	.02 MFD. 400 V. PAPER
C-19	22055-U	.01 MFD. 1000 V. PAPER
C-20	22055-R	.005 MFD. 1000 V. PAPER
C-22-C-23	85022	8-8 MFD. 400 V. ELECTROLYTIC

CONDENSERS FOR MODEL-G-753-SAME AS G-752 EXCEPT FOLLOWING		
C-9	79431-A	30-100 MMFD PADDER
C-10	27701-O	850 MMFD. MICA
C-21	22481	10 MFD. 25V. ELECTROLYTIC COND.
C-12		OMITTED ON MODEL-G-753
C-17	27726-W	.0002 MFD. MICA

CARBON RESISTORS FOR MODEL-G-752		
DESIGNATION	PART NO.	DESCRIPTION
R-1	13144	[illegible] RESISTOR
R-2	13082	[illegible] "
R-3	13031	[illegible] "
R-4	13084	[illegible] VOLUME CONTROL
R-5	13407	[illegible] CARBON RESISTOR
R-6	13157	[illegible] CARBON RESISTOR
R-7	14483	[illegible] " "
R-8	13096	[illegible] WATT
R-9	13171	[illegible] WATT " "
R-10	13024	[illegible] WATT " "

CARBON RESISTORS FOR MODEL-G-753-SAME AS -752 EXCEPT FOLLOWING		
R-11	13088	50-OHM-½ WATT-CARBON RES.
R-12	13094	100,000-OHM-½ WATT " "

MISCELLANEOUS FOR MODEL-G-752		
S-1	73029-B	WAVETRAP COIL
S-2	73099-	ANTENNA COIL ASS'Y
S-3	73100	OSCILLATOR COIL ASS'Y
S-4	79430	BAND SWITCH
S-5	73108-A	FIRST I.F. TRANS. ASS'Y.
S-6	73103	SECOND I.F. TRANS. ASS'Y.
S-7	40830	5" LOUDSPEAKER
S-8	79428	POWER TRANSFORMER

MISCELLANEOUS FOR MODEL-G-753-SAME AS FOR MODEL-G-752-EXCEPT FOLLOWING		
S-2	73101	ANTENNA COIL ASS'Y
S-3	73102	OSCILLATOR COIL ASS'Y
S-4	79454	BAND SWITCH
S-6	73104	SECOND I.F. TRANS. ASS'Y

ALTERATIONS

FINISH

CLASSIFICATION G-750

THIS PRINT SUPERSEDES ALL OTHERS
PRIOR TO [redacted]
DO NOT SCALE THIS PRINT

PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODELS-G-752 & 753
No. 23159

PILOT RADIO CORP.

Range, Model 623
16 - 555 m. (18,800 - 540 kc.)

Range, Model 625
16 - 555 m. (18,800 - 540 kc.)
731 - 2140 m. (410 - 140 kc.)

220-240 V. AC-DC

(MODEL 625 IS SOLD OUTSIDE THE U. S. A. ONLY)

AC-DC Model S-623, for 220-240 V. (50-60 Cycles)
AC-DC Model S-623-J, for 220-240 V. (25-60 Cycles)
Three tuning bands covering 12-94 m. (25,000-3.200 kc.) and 187-560 m. (1,600-535 kc.)

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6K7 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6K7 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in both I. F. Units.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Insert a 200 mmf. condenser in series with the antenna lead. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located on the top of the oscillator coil. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT FOR SHORT WAVE BANDS (ALL EXCEPT S-623 & S-623J)

The procedure in aligning the short wave-bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. Insert a 400 ohm non-inductive resistor in series with the antenna lead. The alignment frequencies are as follows:

Band 2: 50 Meters—(6,000 kc.)
Band 1: 16.6 Meters—(18,000 kc.)

When aligning Band 2, set the Band Selector Switch in the position marked "Band 2". Set the tuning control pointer at 50 meters. Adjust the oscillator alignment capacitor on Band 2 for maximum output. Next adjust the interstage and antenna section alignment capacitors for maximum output.

To align Band 1, set the Band Selector Switch in the position marked "Band 1". Set the tuning control pointer at the 16.6 meter mark. Set the external oscillator at 16.6 meters. Adjust the oscillator section alignment capacitor on Band 1 for maximum output.

Proceed next to align the interstage section of Band 1. In doing this, it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonance peak. Next align the antenna section for maximum sensitivity.

ALIGNMENT FOR SHORT WAVE BANDS (S-623 & S623J ONLY)

The procedure in aligning the short wave-bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. Insert a 400 ohm non-inductive resistor in series with the antenna lead. The alignment frequencies are as follows:

Band 2: 33.4 Meters—(9,000 kc.)
Band 1: 12.5 Meters—(24,000 kc.)

When aligning Band 2, set the Band Selector Switch in the position marked "Band 2". Set the tuning control pointer at 33.4 meters. Adjust the oscillator alignment capacitor on Band 2 for maximum output. Next adjust the interstage and antenna section alignment capacitors for maximum output.

To align Band 1, set the Band Selector Switch in the position marked "Band 1". Set the tuning control pointer at the 12.5 meter mark. Set the external oscillator at 12.5 meters. Adjust the oscillator section alignment capacitor on Band 1 for maximum output.

Proceed next to align the interstage section of Band 1. In doing this, it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonance peak. Next align the antenna section for maximum sensitivity.

LONG WAVE MODEL 625 ONLY

The above alignment positions refer to the Model 623 only, which is calibrated in frequency. The alignment points for the Model 625, which is calibrated in meters only, is as follows:

Long Wave	Align at 750 meters.
	Pad at 2,000 meters.
Broadcast	Align at 200 meters.
	Pad at 500 meters.
Band 1	Align at 17 meters.

The Long Wave alignment procedure is similar to that for the Broadcast. A 200 mmf. condenser should be used in series with the antenna lead in aligning this band.

Model G-752
44.5-126 m. (6,750-2380 kc.)
187-566 m. (1,600-530 kc.)

Model G-753
187-566 m. (1,600-530 kc.)
800-2170 m. (375-138 kc.)

(MODEL G-753 IS SOLD OUTSIDE THE U. S. A. ONLY)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the knobs and felt washers from the controls on the front panel.

Remove the four mounting screws, located underneath the cabinet and pull chassis out.

REALIGNMENT: If the receiver requires alignment, the procedure outlined below should be followed. In the schematic diagram sheet, the location and function of the various alignment capacitors are clearly illustrated. For best results, an external modulated oscillator with adequate frequency range and a visual output meter, should be used.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. When aligning the receiver on all positions, the volume control should be turned to the maximum clockwise position. Connect the antenna lead of the external oscillator to the control grid of the 6D6 tube in the I. F. Amplifier through a .1 mfd. fixed condenser. Connect the ground lead of the external oscillator to the chassis. The I. F. alignment trimmers are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. Following this, connect the external oscillator leads to the control grid of the 6A7 tube. Adjust each trimmer on I. F. Unit No. 1 for maximum gain.

During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in all I. F. Units, with the external oscillator leads connected to the control grid of the 6A7 tube.

WAVE TRAP ADJUSTMENT: With the oscillator still set at 456 kc., connect the oscillator to the antenna through a 200 mmfd. condenser. Then adjust the wave trap condenser to minimum deflection on the output meter.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground through a .0002 mfd. condenser. Leave the Band Switch in the "Broadcast" position and place the tuning control pointer at the 1400 kc. mark. Tune the external oscillator to 1400 kc. Adjust the broadcast band oscillator trimmer to maximum response.

Next adjust the antenna section trimmer for maximum output.

The alignment frequencies are as follows:

Longwave Band	—	900 meters (333 kc.)
Broadcast Band	—	214 meters (1,400 kc.)
Band 1	—	50 meters (6,000 kc.)

BAND 1: Align the Short-wave band in a similar manner using a 400-ohm non-inductive resistor in place of the .0002 mfd. condenser. The alignment frequency is 6,000 kc. (50 meters).

THE LONG WAVE ALIGNMENT procedure in the Model G-753 is as follows: Turn the Band Switch to the Long Wave position. The alignment frequency is 333 kc. Adjust the padder condenser at 150 kc. and at the same time rock the gang until at some setting of both padder and gang condenser maximum output is obtained. Use a .0002 mfd. condenser in the antenna lead from the external oscillator.

LONG WAVE BAND: Model G-753 (sold only outside the U. S. A.) has a tuning band covering 800 to 2170 meters. Broadcast stations operating on long waves have a limited range, and are located chiefly in Europe. Hence, Model G-753 is not sold in the U. S. A.

SHORT-WAVE BAND: This band covers 44.5 to 126 meters, and is calibrated in both meters and megacycles because some program time-tables show the dial settings in meters, while others use megacycles.

The receiving range on the 49-meter band is about 300 miles during the daytime, and 1,500 miles or more at night.

ANTENNA: Due to the high sensitivity of this receiver, it is recommended that an aerial not over fifty feet long be used.

If you use an ordinary single-wire antenna, connect the antenna to the blue lead on the set. Then connect the clip on the chassis to the ground.

TONE CONTROL SWITCH: The tone control is at the rear of the chassis. In one position the treble response is increased and in the other position the bass frequencies are emphasized. When tuning in short waves the latter position will probably be found preferable.

BAND SWITCH: The center knob controls the band switch. When this knob is in the counterclockwise position the band switch is in the broadcast position on Model G-752 and in the long-wave position on Model G-753. Turning the switch to the right or clockwise on Model G-752 permits reception of shortwave signals and medium wave signals on Model G-753.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

MODELS M-2203, M-2205
Schematic, Socket, Trimmers
Alignment, Parts, Voltage

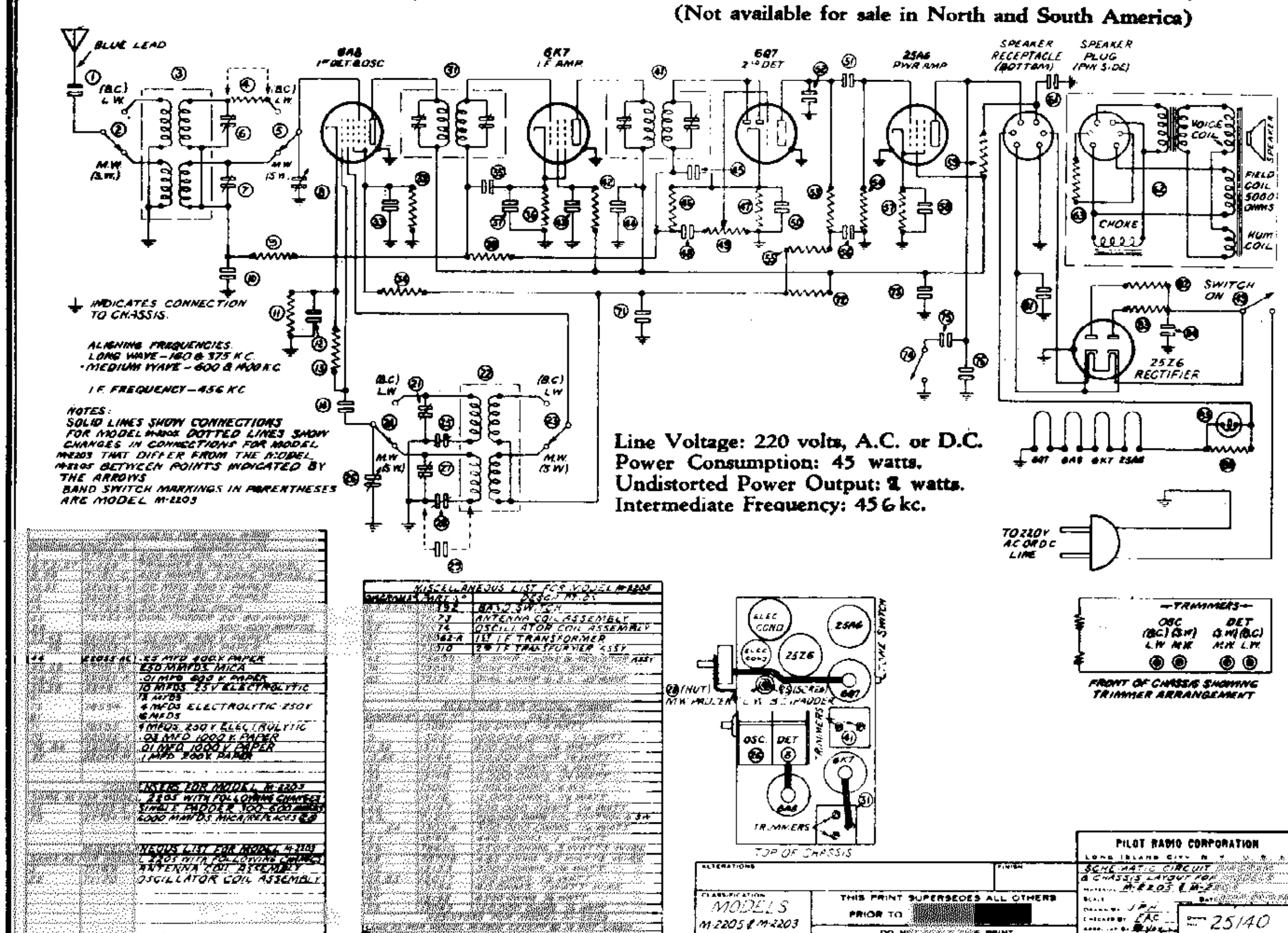
PILOT RADIO CORP.

MODEL M- 2203 SUPERHETERODYNE

Range: 16-52 Meters (18,800-5,700 kc.)
178-550 Meters (1,680-545 kc

MODEL M- 2205 SUPERHETERODYNE

Range: 178-550 Meters (1,680-545 kc.)
789-2,142 Meters (380-140 kc.)
(Not available for sale in North and South America)



Voltages: Read tube socket voltages with meter having resistance of at least 1,000 ohms per volt. All voltages measured to chassis.

	Osc.-Det.	I.F.	Det. Amp.	Aud. Output	Recti-fier
Tube	6A8	6K7	6Q7	25A6	25Z6
Plate	130	130	50*	180	—
Cathode	2.5	3.5	1	17.	210.
Screen	60	100	—	130	—
Filament	6.3	6.3	6.3	25.	25.

*Voltage measured through plate resistor.
Speaker field voltage, 210 volts.
Anode grid of 6A8, 100 volts.

REALIGNMENT: Should the receiver require realignment, the outlined procedure below should be followed. In the service information sheet, the location and function of the various alignment capacitors are clearly illustrated. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the speaker.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6K7 tube in the I.F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I.F. alignment capacitors are located at the top of the shielded I.F. Transformers. Rotate the adjusting screw of each capacitor on I.F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator leads from the type 6K7 I.F. Amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8 tube.

Now rotate each adjustment screw on I.F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I.F. Amplifier, it is essential to repeat the alignment process in both I.F. units with the external oscillator leads connected across the control grid of the 6A8 tube.

BROADCAST ALIGNMENT: After the I.F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads with a .0002 mfd. condenser in the antenna lead. Set the Band Switch in the "Broadcast" position and place the tuning control pointer at the 1400 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response. Adjust the signal section trimmer in the same manner.

Next adjust the 600 kc. padder condenser. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1400 kc. trimmer adjustment, following in every detail the procedure previously described.

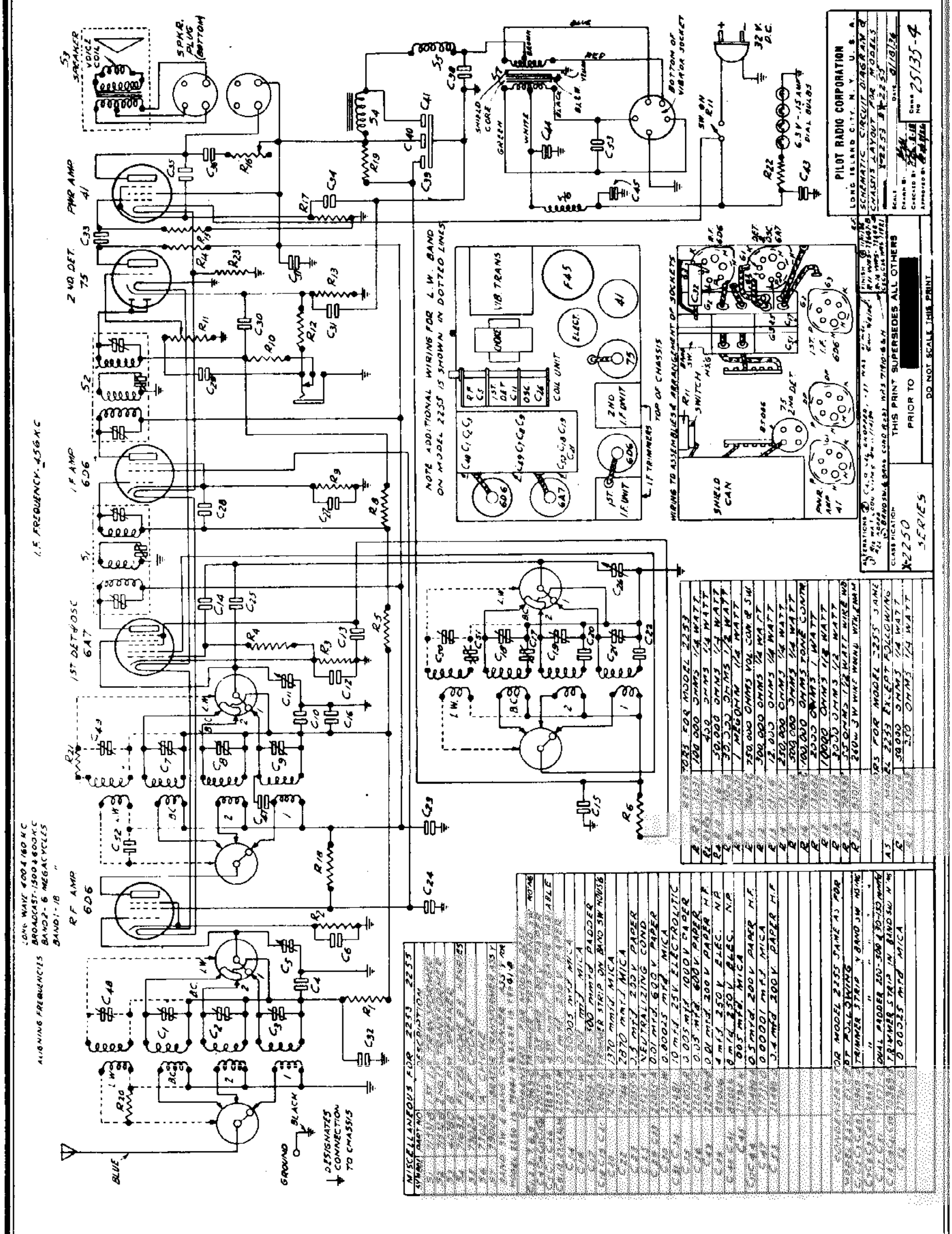
SHORT-WAVE ALIGNMENT: The procedure in aligning the short-wave bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. The alignment frequency is 16.8 Meters—(17,800 kc.) Turn the Band Switch to the right. Tune the external oscillator to 16.8 meters. Tune the receiver so that the dial pointer is in a position coincidental with the 16.8 meter indication on the dial scale. Adjust the short wave oscillator trimmer for maximum response. Next adjust the signal circuit trimmer for maximum resonance. Repeat all adjustments to assure correct alignment, rocking the gang condenser to right or left for maximum gain.

THE LONG WAVE ALIGNMENT: Procedure in the Model 2205 is similar to the Broadcast section of that receiver. Align at 375 kc. Adjust the padder at 160 kc.

Should it be necessary to remove the band switch assembly, it is advisable to realign the receiver after reinstalling.

MODELS X-2253, X-2255
Schematic, Socket
Trimmers, Parts

PILOT RADIO CORP.



PILOT RADIO CORP.

Model X2253
16 - 550 m. (18,800 - 545 kc.)

Model X2255
16 - 550 m. (18,800 - 545 kc.)
750 - 2000 m. (400 - 150 kc.)

FOR 32-VOLT BATTERY OPERATION

(MODEL X2255 IS SOLD OUTSIDE THE U. S. A. ONLY)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the "slip-on" knobs and felt washers from the controls and loosen the set screw on the tuning knob.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require re-alignment, the procedure outlined below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

The location of the R. F. alignment trimmer condensers is on the side of the band switch. The trimmers in the lowest row are those for aligning Band 1. Those in the second row from the bottom are for Band 2. Those in the third row up are for the Broadcast. In the Model 2255 there is an additional row of trimmers located immediately above those for the Broadcast.

The padder condenser is located under the rear section of the band switch. In the Model 2255 an additional padder for the long wave range is located at the right of the Broadcast padder. Access to the padder condenser is made through a hole provided in the rear of the chassis frame.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast" and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6D6 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6D6 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A7 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in both I. F. Units.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Insert a 200 mmf. condenser in series with the antenna lead. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located in the lower rear section of the band switch, under the chassis. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT-WAVE BANDS:—The procedure in aligning the short-wave bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. Insert a 400 ohm non-inductive resistor in series with the antenna lead. The alignment frequencies are as follows:

Band 2: 50 Meters—(6,000 kc.)
Band 1: 16.6 Meters—(18,000 kc.)

When aligning Band 2, set the Band Selector Switch in the position marked "Band 2". Set the tuning control pointer at 50 meters. Adjust the oscillator alignment capacitor on Band 2 for maximum output. Next adjust the interstage and antenna section alignment capacitors for maximum output.

To align Band 1, set the Band Selector Switch in the position marked "Band 1". Set the tuning control pointer at the 16.6 meter mark. Set the external oscillator at 16.6 meters. Adjust the oscillator section alignment capacitor on Band 1 for maximum output.

Proceed next to align the interstage section of Band 1. In doing this, it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonance peak. Next align the antenna section for maximum sensitivity.

LONG WAVE MODEL X2255

The above alignment positions refer to the Model 2253 only, which is calibrated in frequency. The alignment points for the Model 2255, which is calibrated in meters only, is as follows:

Long Wave	Align at 750 meters.
	Pad at 2,000 meters.
Broadcast	Align at 200 meters.
	Pad at 500 meters.
Band 2	Align at 49 meters.
Band 1	Align at 17 meters.

The Long Wave alignment procedure is similar to that for the Broadcast. A 200 mmf. condenser should be used in series with the antenna lead in aligning this band.

REMOVAL OF BAND SELECTOR SWITCH ASSEMBLY: Should it be necessary to remove the switch assembly, this is easily done by removing the supporting screws. Before doing this, however, it is essential to unsolder the leads between the switch and the chassis.

It is advisable to realign the receiver after reinstalling the switch assembly.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

Model G-576 G-577
Four Tuning Bands Cover 12.3-566 m. (24,200-530 kc.)

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the "slip-on" knobs and felt washers from the controls and loosen the set screw on the tuning knob.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

Remove the tuning beam plug from the socket at the front of the chassis.

REALIGNMENT: Should the receiver require re-alignment, the procedure outlined below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

The location of the R. F. alignment trimmer-condensers is on the side of the band switch. The trimmers in the lowest row are those for aligning Band 1. Those in the second row from the bottom are for Band 2. Those in the third row up are for Band 3. The trimmers in the top row are for the Broadcast band.

The padder condenser is located under the rear section of the band switch. Access to the padder condenser is made through a hole provided in the rear of the chassis frame.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6K7 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6K7 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in both I. F. Units.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Insert a 200 mmf. condenser in series with the antenna lead. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer.

Next adjust the 600 kc. padder condenser, located in the lower rear partition of the band switch, under the chassis. Set the external oscillator at 600 kc. Rotate the receiver tuning control to the resonance position, and at the same time adjust the padder condenser for the highest peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

The alignment frequencies are as follows:

Band 4—600 and 1500 kc.—500 and 200 m.
Band 3—50 meters— 6,000 kc.
Band 2—21.4 meters—14,000 kc.
Band 1—12.5 meters—24,000 kc.

When aligning Band 3, set the Band Switch in the position marked Band 3. Replace the 200 mmf. condenser with a 400 ohm resistor. Rotate the tuning condenser to the 6,000 kc. indication on the dial scale. Set the external oscillator at 6,000 kc. Adjust the Band 3 oscillator trimmer for maximum sensitivity. Next adjust the interstage and antenna trimmer condensers for maximum sensitivity. Check the overall sensitivity of the band at several points along the dial scale.

The alignment of Bands 1 and 2 requires greater care due to the higher frequencies covered. Set the external oscillator to the alignment frequency of the band to be adjusted. Rotate the tuning condenser of the receiver until the dial pointer is co-incidental with the alignment frequency indication on the dial scale. Adjust the oscillator trimmer condenser for maximum sensitivity. Proceed next to align the interstage section. In doing this it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonant peak. Next align the antenna section for minimum sensitivity.

REMOVAL OF BAND SELECTOR SWITCH ASSEMBLY: Should it be necessary to remove the switch assembly, this is easily done by removing the supporting screws. Before doing this, however, it is essential to unsolder the leads between the switch and the chassis.

It is advisable to realign the receiver after reinstalling the switch assembly.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

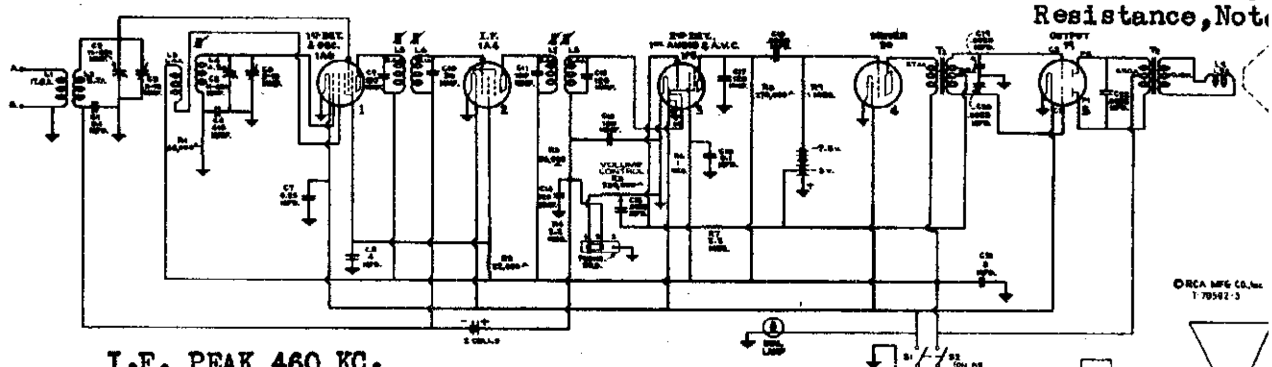
PHONOGRAPH PICK-UP: A jack is provided at the rear of the chassis for plugging in an electric phonograph pick-up, in order that records can be reproduced by the loudspeaker, through the high-quality amplifier with which this set is equipped. The pick-up should be of the high-impedance type.

EXTRA SPEAKER: At the rear of the chassis there is a socket for plugging in an extra speaker, which can be located in the kitchen, in one of your up-stairs rooms, or down cellar in the game room. This will give you the equivalent of an extra radio, at the small expense of the extra speaker. We recommend a permanent magnet dynamic speaker of 10,000 ohms. These speakers operate without any field exciting current.

MODEL 5BT

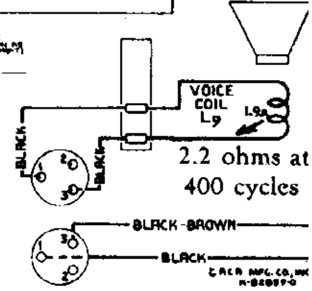
Schematic, Sock[et]
Chassis Wiring
Resistance, Not[es]

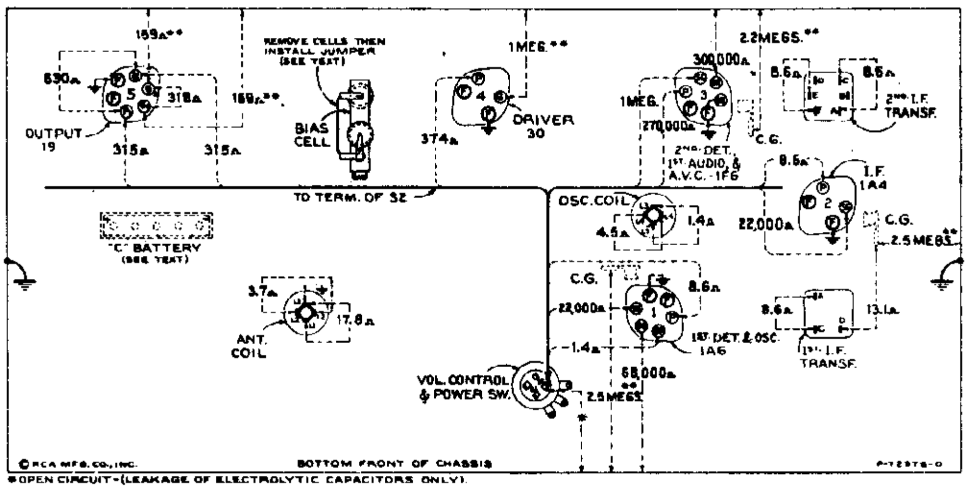
RCA MFG. CO., INC.



I.F. PEAK 460 KC.

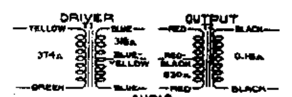
***Before making any resistance measurements, remove the two bias cells and connect jumpers on bias-cell board as shown. Also, remove the "C" battery and connect the two leads (—7½ v. and —3 v.) to chassis ground. After measurements are completed, remove jumpers from bias-cell board and then carefully insert bias cells. Next, insert "C" battery and restore leads to their respective positions.*

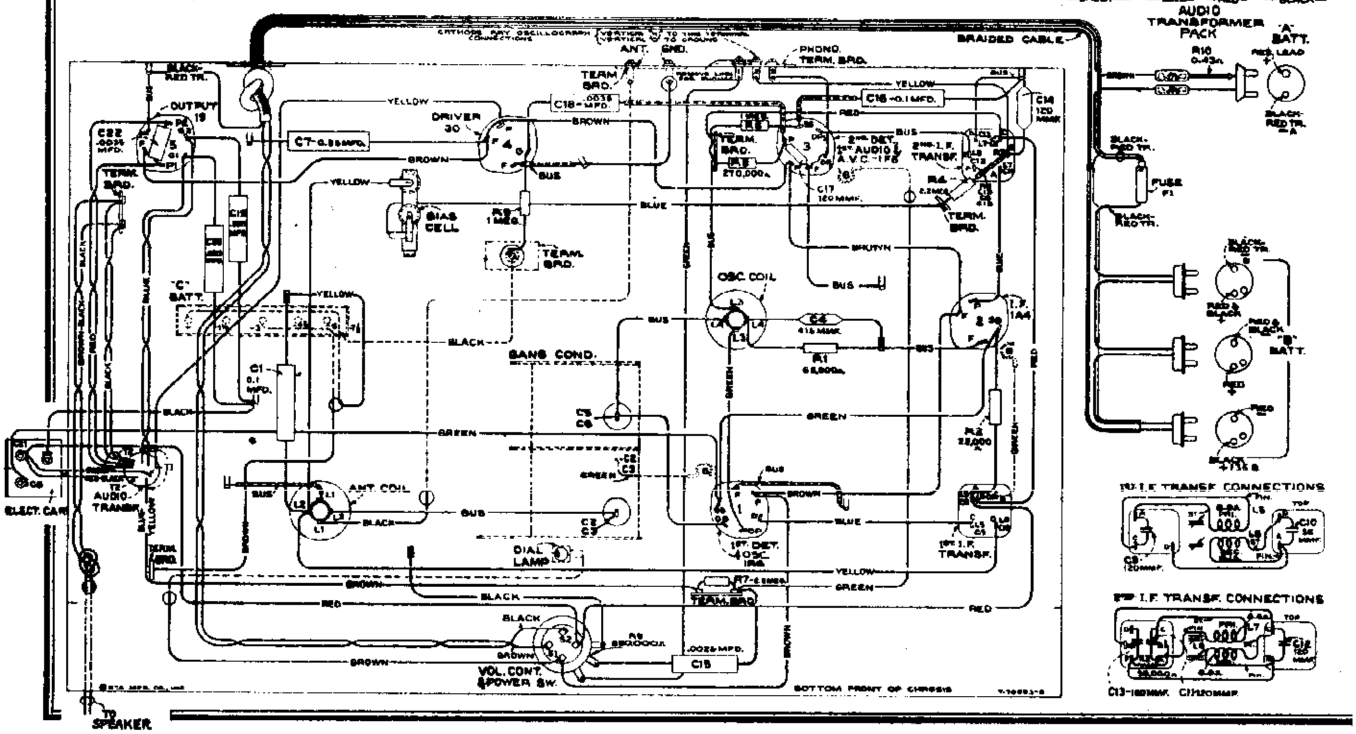




*OPEN CIRCUIT-(LEAKAGE OF ELECTROLYTIC CAPACITORS ONLY).

Resistance Diagram Battery cable disconnected -- Tubes removed -- Tuning condenser in full mesh -- Bias cells and C battery removed -- Volume setting optional.





MODEL 5BT
Trimmers, Voltage
Alignment

RCA MFG. CO., INC.

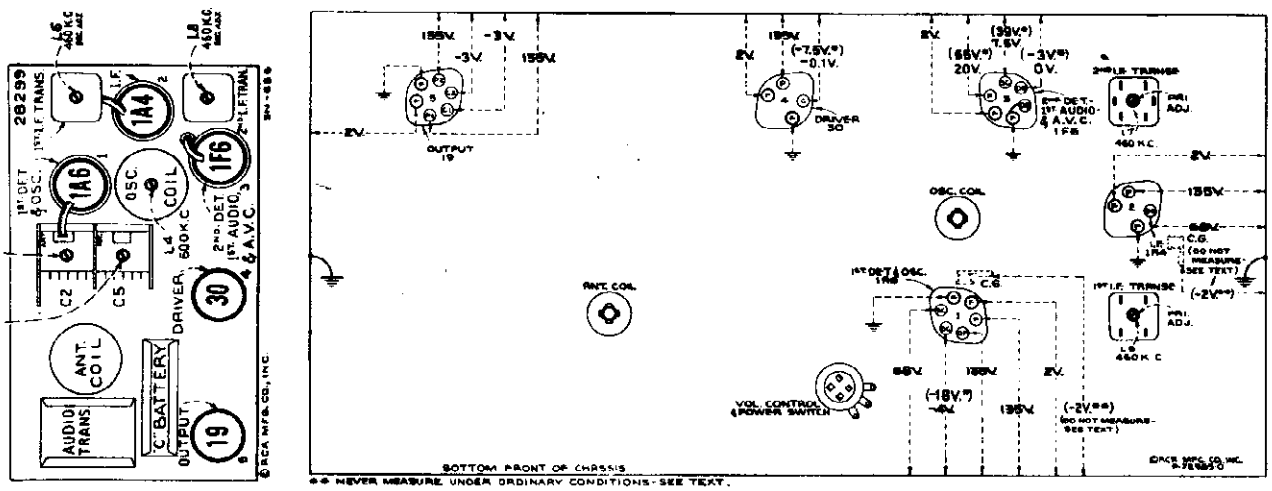


Figure 6—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured with all batteries at normal voltage—Tuned to approximately 1,000 kc—
No signal being received—Volume control optional

Radiotron Socket Voltages

CAUTION: ***Do not attempt to measure voltages on control grids of RCA-1A6 or RCA-1A4, with any conventional voltmeter, due to presence of bias cells. See "Caution" under "Service data" for method of measuring these cells.***

Note: ***Two voltage values are shown for some readings. The higher value shown in parenthesis with asterisk (*) indicates operating conditions without voltmeter loading. The lower value is the actual measured voltage and differs from the higher value because of the additional loading of the voltmeter through the high series circuit resistance.***

Radiotron Plate Current Readings

Measured with Milliammeter Connected at Tube Socket Plate Terminals under Conditions Similar to Those of Voltage Measurements

(1)	RCA-1A6—1st. Det.	2.26 ma.
	—Osc.	1.86 ma.
(2)	RCA-1A4—I.F.	3.6 ma.
(3)	RCA-1F6—2nd Det.—A.F.—A.V.C.	0.3 ma.
(4)	RCA-30—Driver	3.8 ma.
(5)	RCA-49—Output	2.8 ma.**

(** Total plate current.)

I-F Adjustments

The four adjustment screws (attached to molded magnetite cores) of the two i-f transformers (one on top and one on bottom of each i-f transformer) are located as shown by figures 3 and 6. Each circuit must be aligned to a basic frequency of **460 kc.**

Connect the "Ant." output of the test-oscillator to the control grid of the RCA-1A6 through a **.001 mfd.** capacitor. Connect the test oscillator "Gnd." terminal to the ground terminal of the receiver chassis. Tune the test oscillator to **460 kc.** Adjust the receiver tuning control to a point, within its range, where no interference is encountered either from broadcast stations or short stator of oscillator tuning condenser C5 to ground, eliminating local (hetrodyne) oscillator signals.

Adjust the two magnetite core screws **L8** and **L7** of the second i-f transformer to produce maximum (peak) indicated receiver output. Then, adjust the two magnetite core screws **L6** and **L5** of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. It is advisable to repeat the adjustment of all i-f magnetite core screws to assure that the interaction between them has not disturbed the original adjustments. Remove temporary jumper, stator C5 to ground, if used.

R-F Adjustments

Calibrate the tuning dial by adjusting the dial pointer to the extreme low-frequency end calibration mark **(530 kc)** on dial scale while the gang tuning condenser plates are in their full-mesh position. Reduce output of test oscillator to minimum. Set receiver dial pointer to **600 kc.** Tune the test oscillator to **600 kc** and increase its output until an indication is obtained on the output indicator.

Adjust oscillator magnetite core screw L4 (top of oscillator coil) so that maximum (peak) indication is shown by the output indicator.

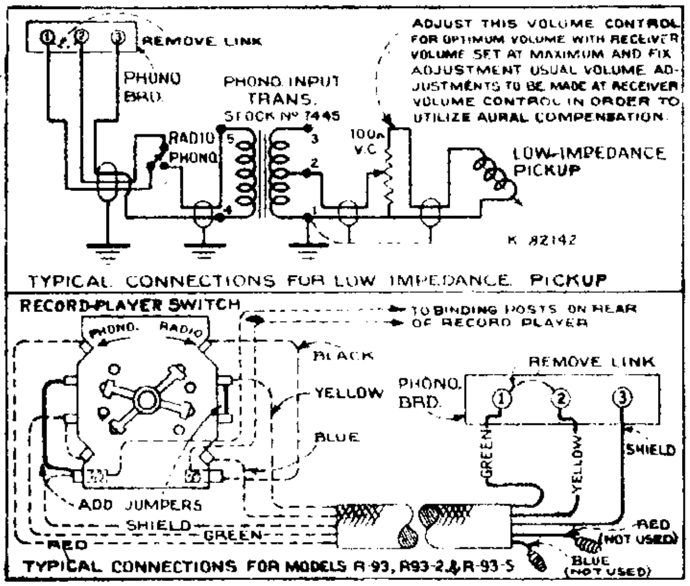
Set receiver dial pointer to **1,500 kc.** Tune test oscillator to **1,500 kc.** Adjust the oscillator and antenna trimmers **C6** and **C3** for maximum (peak) indicated output.

Tune test oscillator to **600 kc** and adjust receiver to pick up this signal **near 600 kc.** Readjust the oscillator magnetite core screw **L4** for maximum (peak) indicated output while rocking the receiver gang tuning condenser back and forth through this signal.

Repeat adjustments of **C6** and **C3** as above to correct for any changes in the oscillator tuning caused by the adjustment of **L4.**

MODEL 5BT
Phoho-Data
Notes,Parts

RCA MFG. CO., INC.



Caution: The two bias cells are used only for the purpose of supplying bias potential and should never be measured with an ordinary voltmeter or other device which draws any current. A simple check on these cells may be made by connecting a milliammeter in the plate circuit of the RCA-1A4 tube and noting the plate current reading. Then remove the two bias cells, being careful that the spring contact clips do not short-circuit them during removal. Connnect a 2-volt battery between the + and — 2v. (— battery to grid side) terminals of the bias cell board, and again note the plate current reading. If the first reading obtained (with bias cells) is more than 40% from the latter reading (with 2-volt battery), the bias cells should be replaced. This 40% difference is equivalent to a change of approximately 25% battery voltage.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
13216	Board—Antenna and ground terminal board	$0.25
12717	Board—Phonograph terminal board	.22
4289	Body—Female section of fuse holder—Package of 10	.35
4286	Bushing—Bushing and ferrule assembly for fuse holder—Package of 10	.38
13217	Cable—Battery cable complete with four 2-contact male connectors, fuse holder and fuse	3.05
4288	Cap—Male section of fuse holder—Package of 10	.36
12629	Capacitor—56 Mmfd. (C10)	.20
12404	Capacitor—120 Mmfd. (C9, C11, C12)	.26
12724	Capacitor—120 Mmfd. (C14, C17)	.28
12406	Capacitor—180 Mmfd. (C13)	.26
13297	Capacitor—415 Mmfd. (C4)	.25
5107	Capacitor—.0025 Mfd. (C15, C19, C20)	.16
5005	Capacitor—.0035 Mfd. (C18, C22)	.16
4841	Capacitor—0.1 Mfd. (C1, C16)	.22
4840	Capacitor—0.25 Mfd. (C7)	.30
13295	Capacitor Pack—Comprising one 4 mfd. and one 8 mfd. sections (C8, C21)	1.70
13293	Coil—Antenna coil with shield (L1, L2)	1.00
13294	Coil—Oscillator coil with shield (L3, L4)	1.00
13212	Condenser—2-gang variable tuning condenser (C2, C3, C5, C6)	3.40
12828	Connector—2-contact male connector for cable, Stock No. 13217	.20
12827	Connector—2-contact and guide pin male connector for cable Stock No. 13217	.30
5119	Connector—3-contact female connector for speaker cable	.25
12006	Core—Adjustable core and stud assembly for Stock Nos. 12801 and 12802	.22
12681	Cell—Bias cell	.30
13391	Dial—Station selector dial scale	.45
3748	Fuse—½ ampere—Package of 5 (F1)	.40
13215	Holder—Bias cell holder	.25
13213	Indicator—Station selector indicator pointer	.15
4290	Insulator—Insulator for female section of fuse holders—Package of 10	.35
4348	Lamp—Dial lamp	.38
13298	Resistor—Flexible type, 0.43 ohm—Package of 5 (R10)	.90

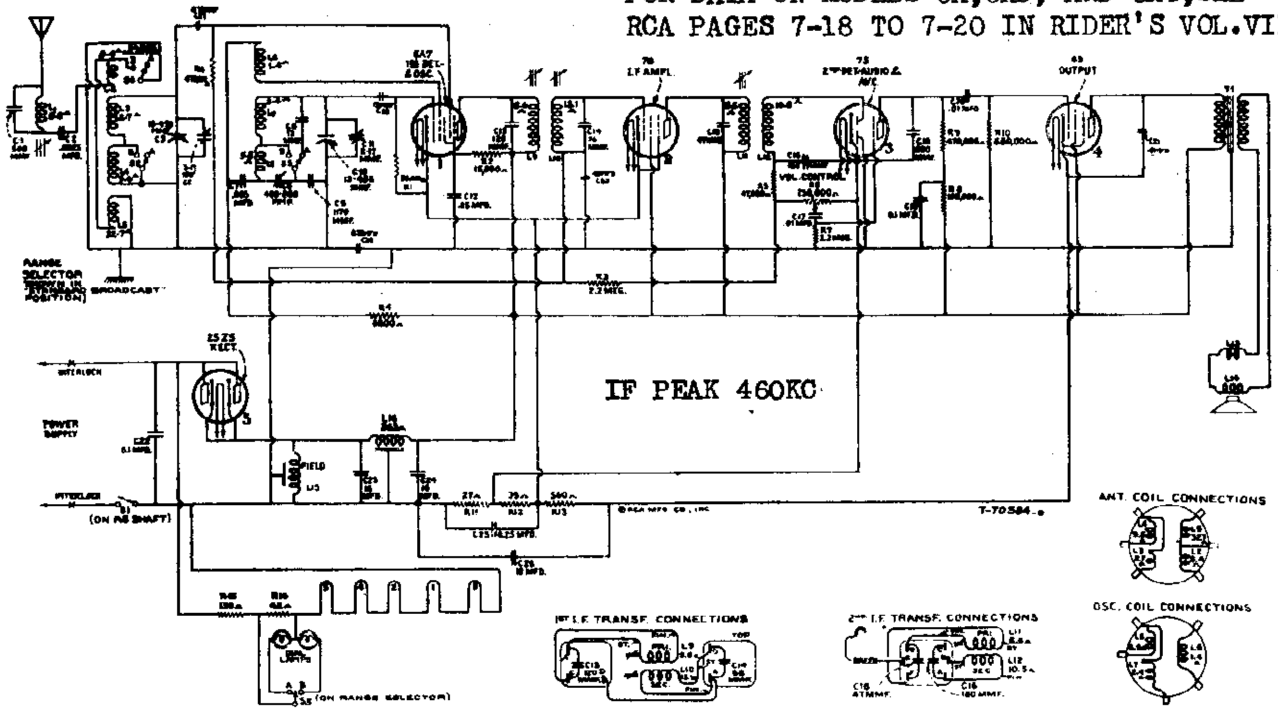
Stock No.	DESCRIPTION	List Price
11305	Resistor—22,000 ohms, carbon type, ¼ watt—Package of 5 (R2)	1.00
11282	Resistor—56,000 ohms, carbon type, 1/10 watt—Package of 5 (R3)	.75
12009	Resistor—68,000 ohms, carbon type, ¼ watt—Package of 5 (R1)	$1.00
11323	Resistor—270,000 ohms, carbon type, ¼ watt—Package of 5 (R8)	1.00
12200	Resistor—1 meg., insulated, ¼ watt—Package of 5 (R6, R9)	1.00
11626	Resistor—2.2 meg., carbon type, ¼ watt—Package of 5 (R4, R7)	1.00
13296	Shield—Coil shield for coil Stock Nos. 13293 and 13294	.30
12008	Shield—First or second I. F. transformer shield	.28
12607	Shield—First I. F. transformer shield top	.30
12581	Shield—Second I. F. transformer shield top	.36
3682	Shield—1A4, 1A6, or 1F6 Radiotron shield	.22
8098	Socket—Dial lamp socket	.10
4794	Socket—4-contact 1A4 or 30 Radiotron socket	.15
4786	Socket—6-contact 1A6, 1F6 or 19 Radiotron socket	.15
12007	Spring—Retaining spring for core, Stock No. 12006—Package of 10	.36
4284	Spring—Spring for female section fuse holder—Package of 10	.30
12803	Transformer—Audio transformer pack (T1, T2)	3.55
12801	Transformer—First I. F. transformer (L5, L6, C9, C10)	1.70
12802	Transformer—Second I. F. transformer (L7, L8, C11, C12, C13, R3)	1.85
13214	Volume control and power switch (R5, S1, S2)	1.50
4285	Washer—Insulating washer for female section of fuse holder—Package of 10	.22
	REPRODUCER ASSEMBLIES	
12642	Cone—Reproducer cone and dust cap	.94
5118	Plug—3-contact male connector for reproducer	.25
9712	Reproducer—Complete	6.60
	MISCELLANEOUS ASSEMBLIES	
12638	Knob—Station selector control knob—Package of 5	.58

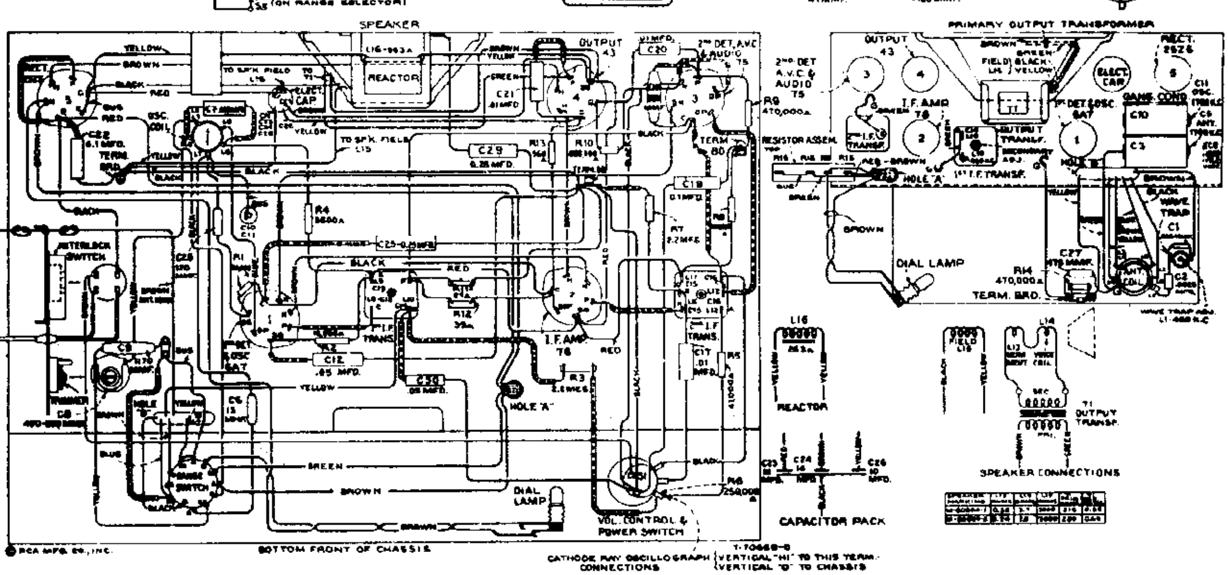
MODELS 5XA, 5XA3, 5XA4
Schematic, Socket, Voltage
Chassis Wiring, Resistance

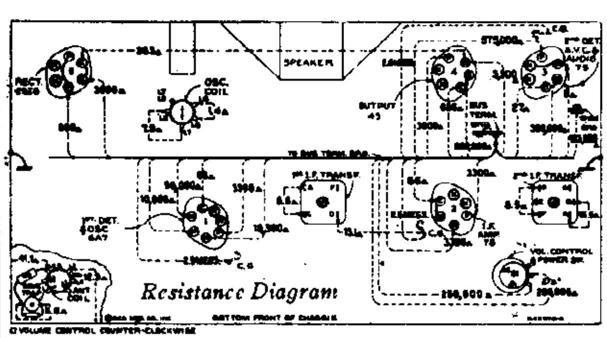
RCA MFG. CO., INC.

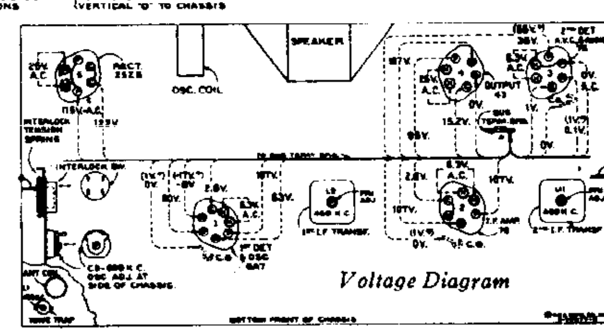
RCA Victor Models 5XA, 5XA3, and 5XA4 are similar to RCA Victor Models 5X, 5X3, and 5X4 respectively. Technical Information and Service Data for Models 5X, 5X3, and 5X4 is directly applicable except as contained herein.

FOR DATA ON MODELS 5X, 5X3, AND 5X4, SEE RCA PAGES 7-18 TO 7-20 IN RIDER'S VOL. VII



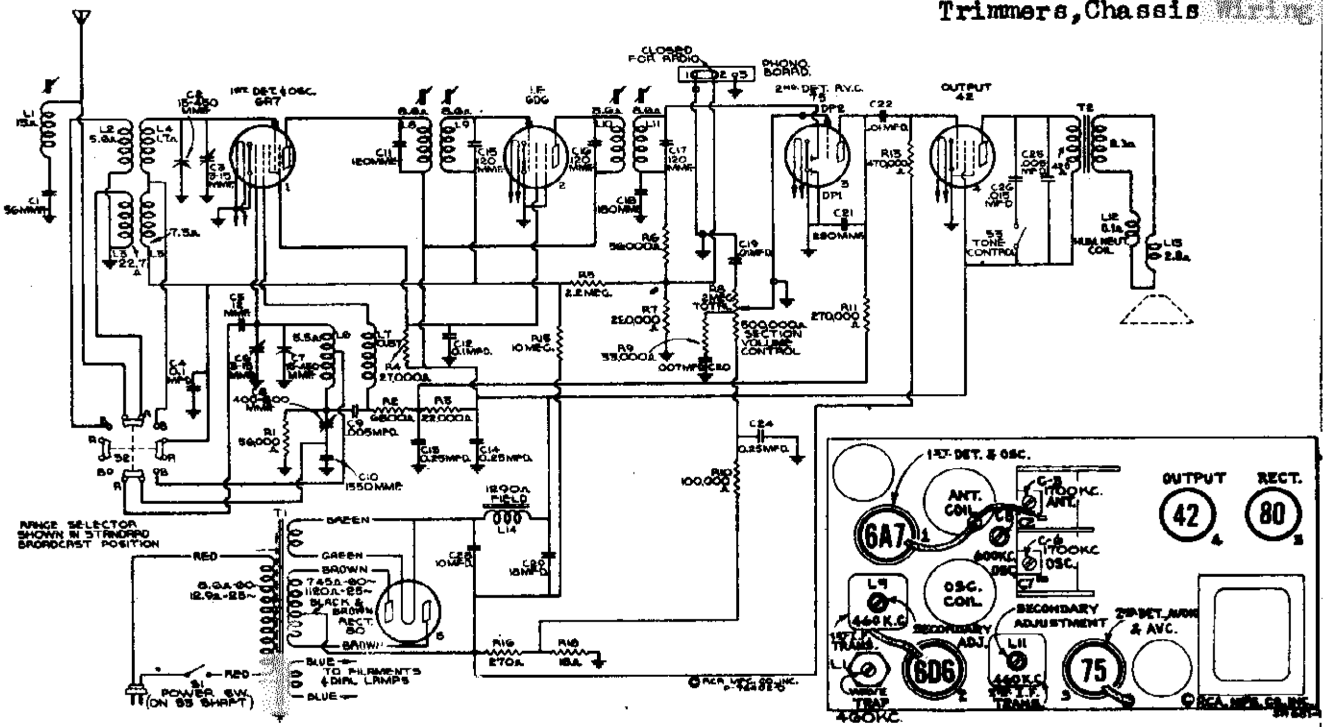






MODEL 5T1
Schematic, Socket Trimmers, Chassis Wiring

RCA MFG. CO., INC.



IF PEAK 460 KC

Figure 2—Schematic Circuit Diagram

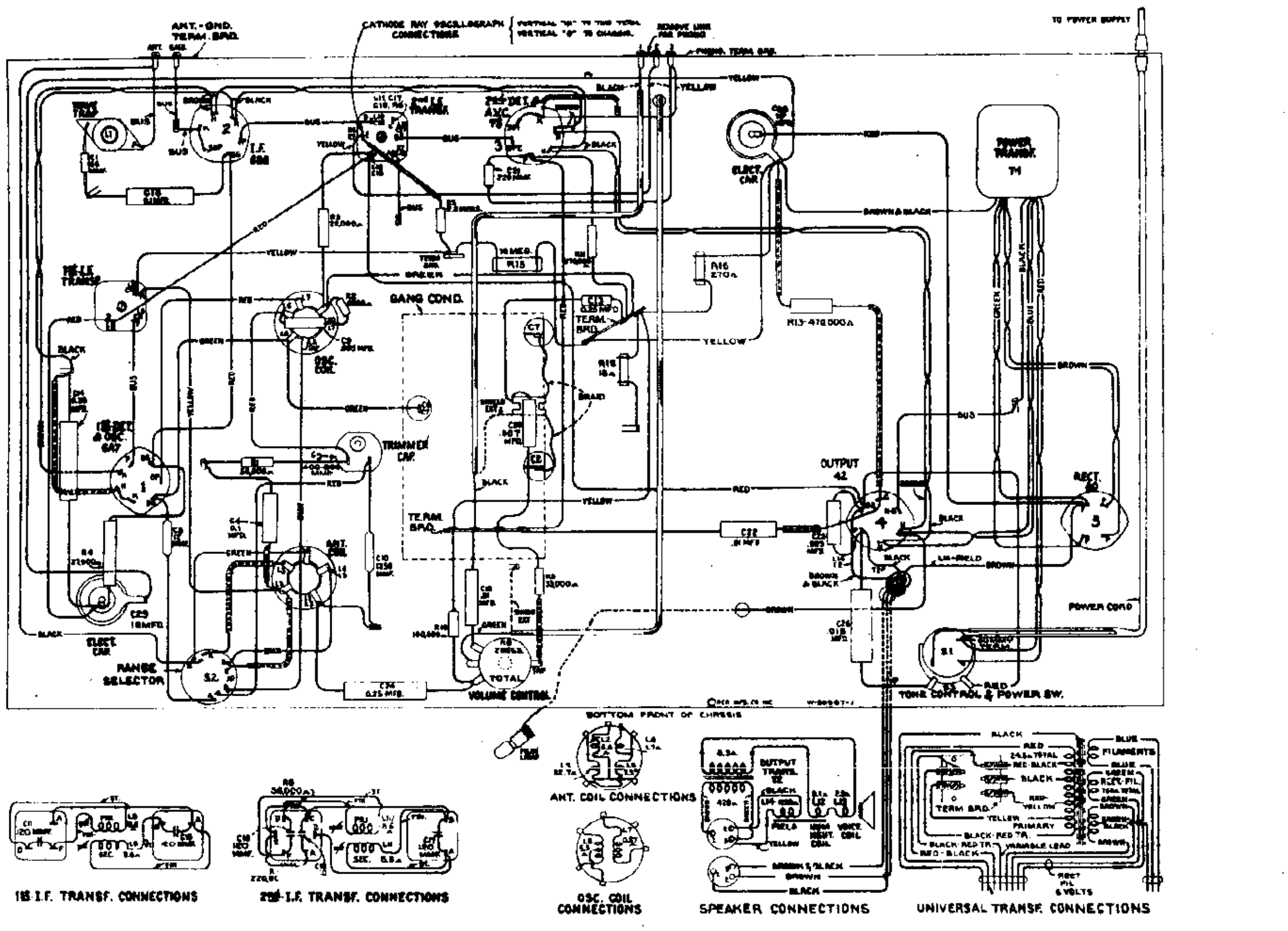


Figure 3—Chassis Wiring Diagram

MODEL 5T1
Voltage,Alignment

RCA MFG. CO., INC.

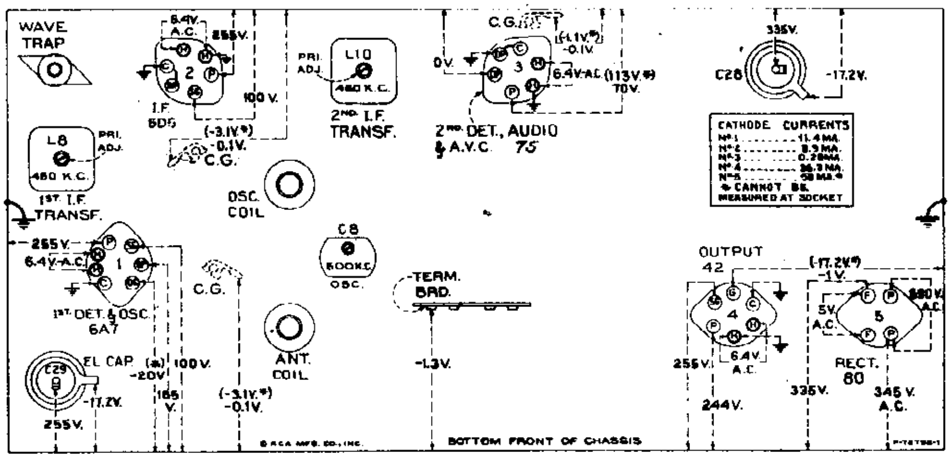


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard Broadcast")—
No signal being received—Volume control minimum

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the extreme low-frequency end calibration mark on the "Standard broadcast" dial scale with the two-gang tuning condenser in full-mesh position.

Perform alignment in proper order tabulated below, starting with No. 1 and following all operations across, then No. 2, etc.

Cathode-ray alignment is preferable; the connections to the chassis are shown on figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

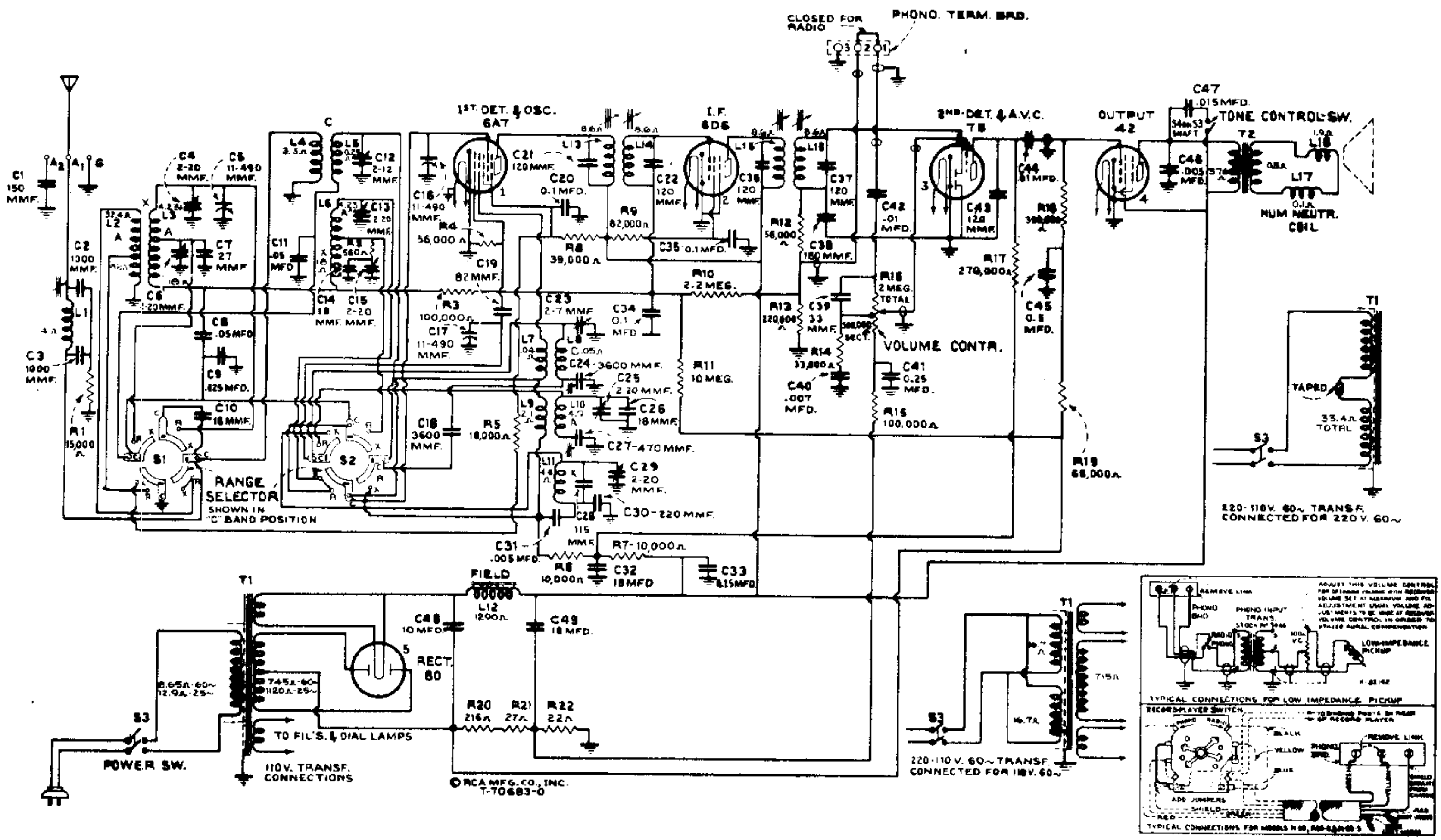
Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal is received from a station or the local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator: Connection to Receiver	Test Oscillator: Dummy Antenna	Test Oscillator: Frequency Setting	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
1	6D6 i-f Grid Cap	.001 Mfd.	460 kc	No signal 550-750 kc	2nd i-f Trans.	L10 and L11	Max. (peak)
2	6A7 Det. Grid Cap	.001 Mfd.	460 kc	No signal 550-750 kc	1st i-f Trans.	L8 and L9	Max. (peak)
3	Ant. Post	200 Mmfd.	460 kc	No signal S. W. Band	Wave Trap	L1	Minimum Output
4	Ant. Post	200 Mmfd.	600 kc	600 kc	L-F Osc.	C8	Max. (peak)
5	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	H-F Osc.	C6	Max. (peak)
6	Ant. Post	200 Mmfd.	600 kc	Rock thru 600 kc	L-F Osc.	C8	Max. (peak)
7	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	H-F Osc.	C6	Max. (peak)
8	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	Ant.	C3	Max. (peak)

RCA MFG. CO., INC.



Frequency or Wave-length Ranges

Band "X" ... 145-350 kc (approx. 2,068-857 meters)
Band "A" .. 525-1,550 kc (approx. 571-193 meters)
Band "C" .... 5.8-22 megacycles

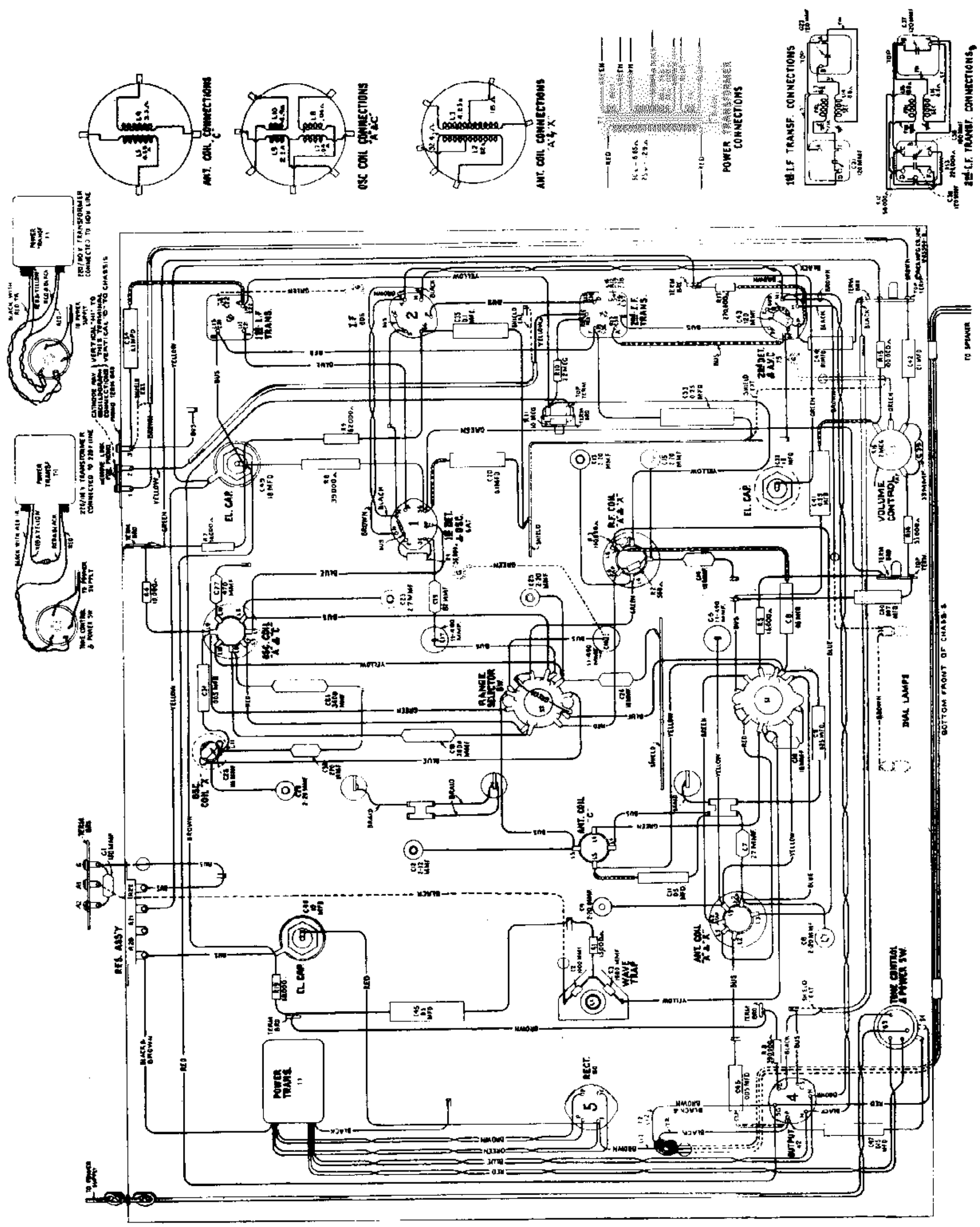
Alignment Frequencies

Band "X" .... 175 kc (osc.), 350 kc (osc., det., ant.)
Band "A" .. 600 kc (osc.), 1,500 kc (osc., det., ant.)
Band "C" .... 20,000 kc (osc., ant.)

Intermediate Frequency .... 460 kc

MODEL 5T4
Chassis Wiring

RCA MFG. CO., INC.



Pilot Lamps (2) .... Mazda No. 46, 6.3 volts, 0.25 ampere

POWER SUPPLY RATINGS

Rating A .... 105-125 volts, 50-60 cycles, 75 watts
Rating B .... 105-125 volts, 25-50 cycles, 75 watts
Rating C .... 100-125/200-250 volts, 50-60 cycles, 75 watts

POWER OUTPUT RATING

Undistorted .... 2.0 watts
Maximum .... 4.5 watts

LOUDSPEAKER

Type .... Electrodynamic
Voice Coil Impedance ...... 2.2 ohms at 400 cycles

RCA MFG. CO., INC.

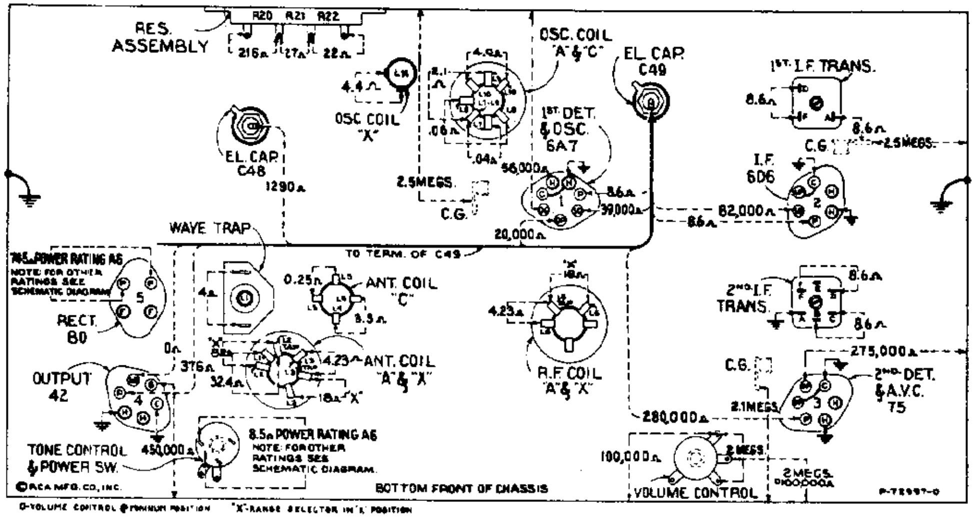


Figure 4—Resistance Diagram

Power supply disconnected—Radiotrons in sockets—Tuning condenser in full mesh—Volume control maximum—Range selector in "A" position

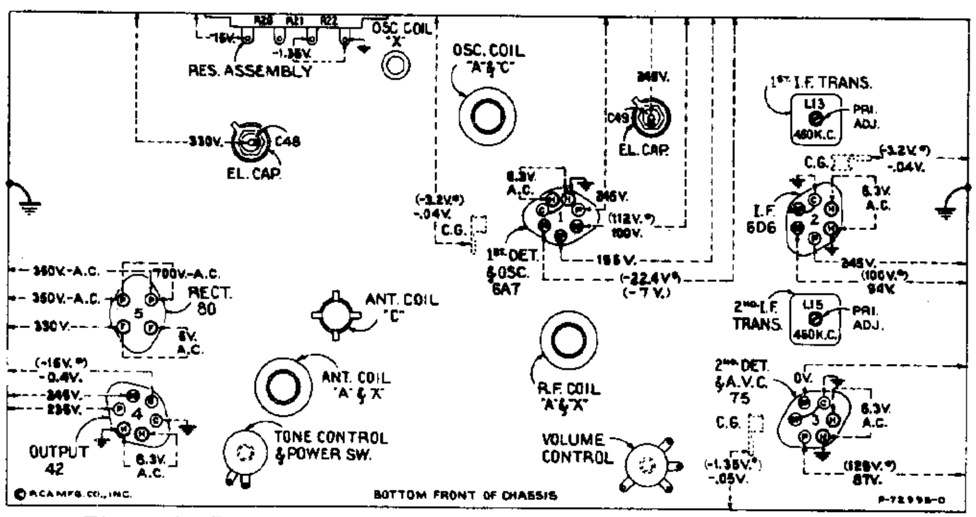
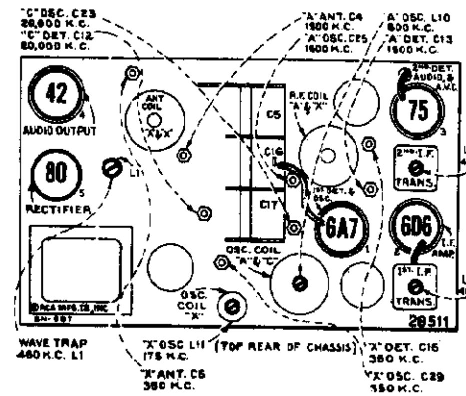


Figure 6—Radiotron Socket Voltages, Coil and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc or 300 meters "A" band—No signal being received—Volume control minimum



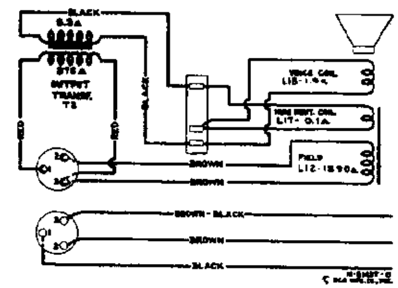


Figure 5—Loudspeaker Wiring

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminal under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6A7—1st Det.—Osc.	12.4	ma.
(2)	RCA-6D6—I. F. Amp.	10.2	ma.
(3)	RCA-75—2nd Det., A.V.C. and A. F.	0.23	ma.
(4)	RCA-42—Power Amp.	39	ma.
(5)	RCA-80—Rectifier	64	ma.*

(*Cannot be measured at socket)

***Note:** Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.*

Alignment Procedure

There are ten alignment trimmers provided in the antenna transformer, detector, and oscillator coil tuned circuits. The i-f transformer, low-frequency oscillator, and wave-trap adjustments are made by means of screws attached to molded magnetite cores. All of these circuits have been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions or altered during servicing. Loss of sensitivity, improper tone quality, and poor selectivity are the usual indications of improper alignment.

The correct performance of this receiver can only be obtained when the aligning has been done with adequate and reliable apparatus. The manufacturer of this receiver has available for sale, through its distributors and dealers, a complete assortment of such service equipment as may be needed for the alignment operation.

A test oscillator, such as the RCA Stock No. 9595, is required as a source of the specified alignment frequencies. Visual indication of receiver output during the adjustment is necessary and should be accomplished by the use of an indicator such as the RCA Stock No. 4317 Neon Output Indicator.

The procedure outlined below should be followed in adjusting the various trimmer capacitors and molded cores:

I-F Adjustments

The four adjustment screws (attached to molded magnetite cores) of the two i-f transformers (one on top and one on bottom of each i-f transformer) are located as shown by figures 3 and 6. Each circuit must be aligned to a basic frequency of 460 kc. To do this, attach the output indicator across the loudspeaker voice coil.

Connect the "Ant" output of the test oscillator to the control grid of the RCA-6A7 through a .001 mfd. capacitor. Connect the test oscillator "Gnd" terminal to the ground terminal of the receiver chassis. Tune the oscillator to 460 kc. Advance the receiver volume control to its full-on position and adjust the receiver tuning control to a point, within its range, where no interference is encountered from local broadcast stations or from the local (heterodyne) oscillator. To eliminate signals from the local oscillator short stator of C17 to chassis-ground. Increase the output of the test oscillator until a slight indication is present on the output indicator. Adjust the two magnetite core screws of the second i-f transformer L16 and L15 to produce maximum (peak) indicated receiver output. Then adjust the two magnetite core screws L14 and L13 of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. During these adjustments, regulate the test oscillator output so that the indication is always as low as possible. By doing so, broadness of tuning due to a.v.c. action will be avoided. It is advisable to repeat the adjustment of all i-f magnetite core screws to assure that the interaction between them has not disturbed the original adjustment. Remove temporary jumper, stator C17 to chassis-ground if used.

R-F Adjustments

Calibrate the tuning dial by adjusting the scale pointer to the extreme right-hand end calibration mark, on any scale, while the three-gang tuning condenser plates are in full mesh.

Wave-Trap Adjustment

Attach the "Ant" output of the test oscillator to the receiver "A1" terminal through a 200 mmfd. (important) capacitor. The ground connections remain connected together. Leave the test oscillator adjusted to 460 kc. Adjust range selector to band "A" position. Then adjust the wave-trap screw to the point which causes maximum suppression (minimum output) of the 460 kc signal.

"C" Band

(a) Attach the "Ant" output of the test oscillator to the receiver "A1" terminal through a 300-ohm resistor, leaving the "Gnd" of the oscillator connected to the receiver chassis.
Adjust range selector to band "C" position. Set receiver dial pointer to 20,000 kc (20 on scale).

(b) Tune test oscillator to 20,000 kc. Set oscillator trimmer C23 to minimum capacity (plunger full out), and detector trimmer C12 to maximum capacity (plunger full in). Slowly push in oscillator trimmer C23 until maximum (peak) output is reached. Two peaks may be found. Adjust C23 to the peak with minimum capacity (plunger near out) for maximum indication. Tighten lock nut. Slowly pull out plunger of detector trimmer C12 until maximum (peak) indicated output is reached while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacity (plunger near in) should be used. Tighten lock nut.

"A" Band

(c) Attach the "Ant" output of the test oscillator to the receiver "A1" terminal through a 200 mmfd. capacitor, leaving the "Gnd" of the oscillator connected to the receiver chassis. Adjust range selector to band "A" position. Reduce output of test oscillator to a minimum. Tune the test oscillator to 600 kc and set receiver dial pointer to 600 kc (500 meters). Adjust output of test oscillator until a slight indication of output is visible.

(d) Adjust the oscillator magnetite core screw L10 (top of oscillator coil) so that maximum (peak) indicated output results.

(e) Set receiver dial pointer to 1,500 kc (200 meters). Tune the test oscillator to 1,500 kc. Carefully adjust the oscillator, detector, and antenna trimmers C25, C13 and C4 respectively so that each brings about maximum (peak) indicated output.

(f) Tune the test oscillator to 600 kc. Adjust the receiver to pick up this signal disregarding the dial reading at which it is best received. Adjust oscillator magnetite core screw L10 (top of oscillator coil), simultaneously rocking the tuning control of the receiver backward and forward through the signal, until maximum (peak) output results from the combined operations. After completing this adjustment, the trimmers C25, C13 and C4 should be re-adjusted as in (e) to correct for any change in the oscillator high-frequency tuning which has been caused by the preceding adjustment.

"X" Band

(g) Adjust receiver range selector to band "X" position and set receiver tuning control to a dial reading of 350 kc or 857.14 meters (19.75 on "C" scale). Tune test oscillator to 350 kc and adjust oscillator, detector, and antenna trimmers C29, C15 and C6, respectively, for maximum indicated receiver output.

(h) Set receiver to 175 kc or 1,714.28 meters (7.4 on "C" scale) and tune test oscillator to 175 kc. Adjust screw L11 for maximum indicated output, simultaneously rocking tuning control of the receiver backward and forward through the signal.

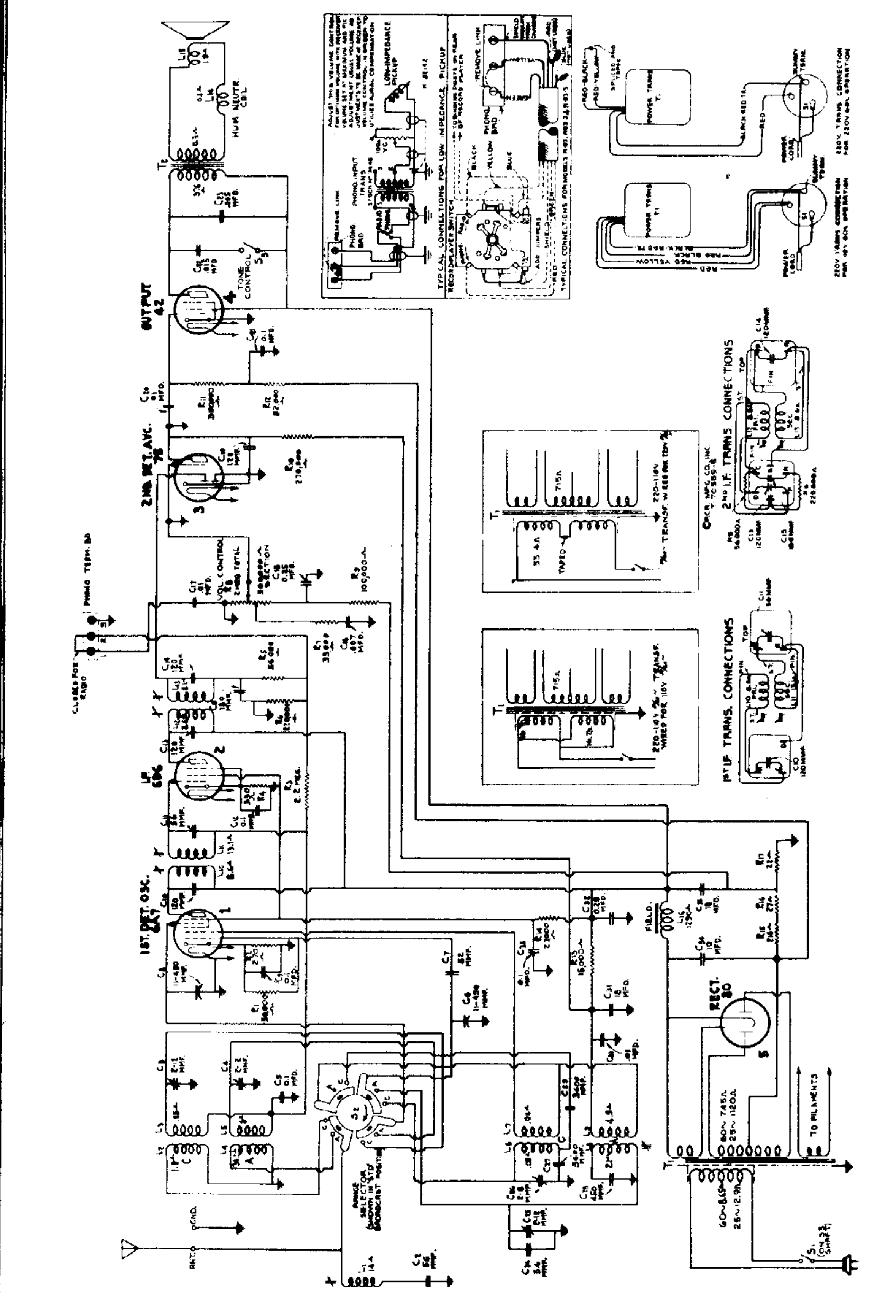
(i) The adjustment of C29, C15 and C6 should now be repeated at 350 kc as described in (g) to compensate for any changes caused by the low-frequency adjustment L11.

Loudspeaker

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed by softening its cement with a very light application of acetone, using care not to allow the acetone to flow down into the air gap. The dust cover may be cemented back in place with ambroid upon completion of adjustment.

MODEL 5T5
Schematic
Phono.Data

RCA MFG. CO., INC.



Frequency Ranges

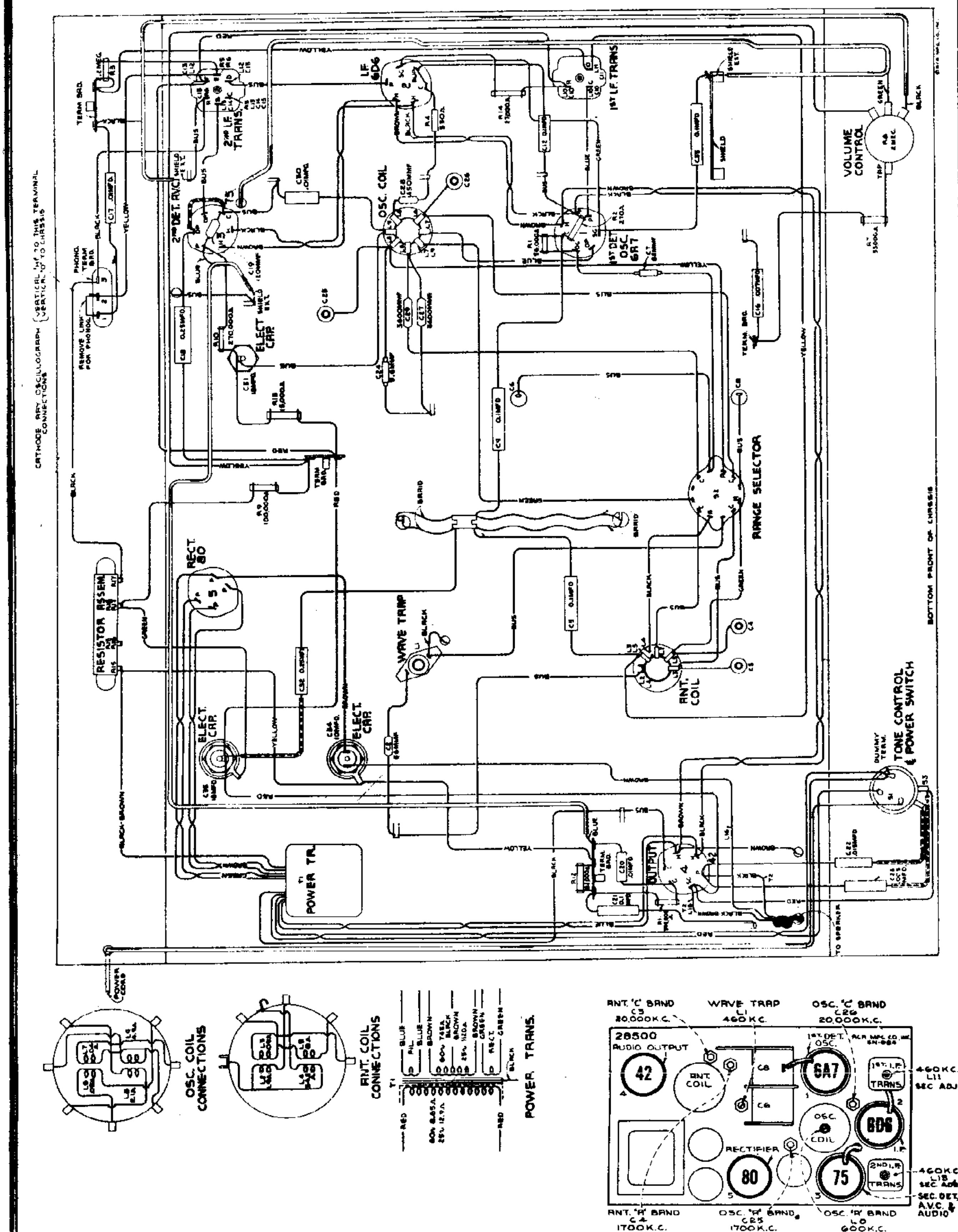
"Standard broadcast" (A) .... 530-1,900 kc
"Short wave" (C) .... 5,800-21,600 kc
Intermediate Frequency .... 460 kc

Alignment Frequencies

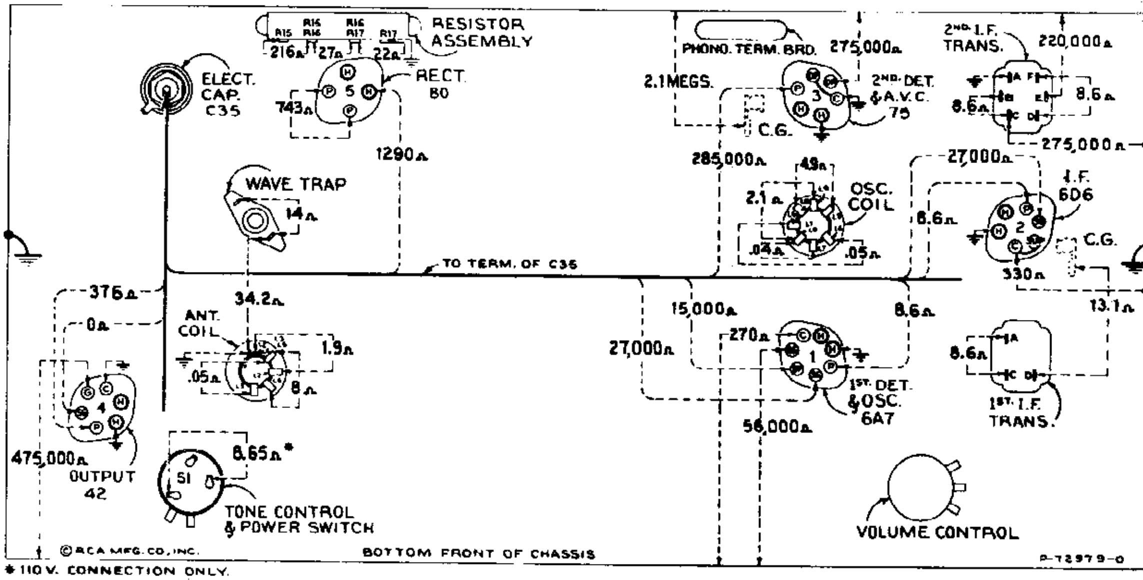
"Standard broadcast" (A) .... 600 kc (osc.), 1,700 kc (osc., ant.)
"Short wave" (C) .... 20,000 k

MODEL 5T5
Chassis Wiring
Trimmers, Socket

RCA MFG. CO., INC.



RCA MFG. CO., INC.



* 110 V. CONNECTION ONLY.

Figure 4—Resistance Diagram

Power supply disconnected—Radiotrons in sockets—Tuning condenser in full mesh—Volume control maximum

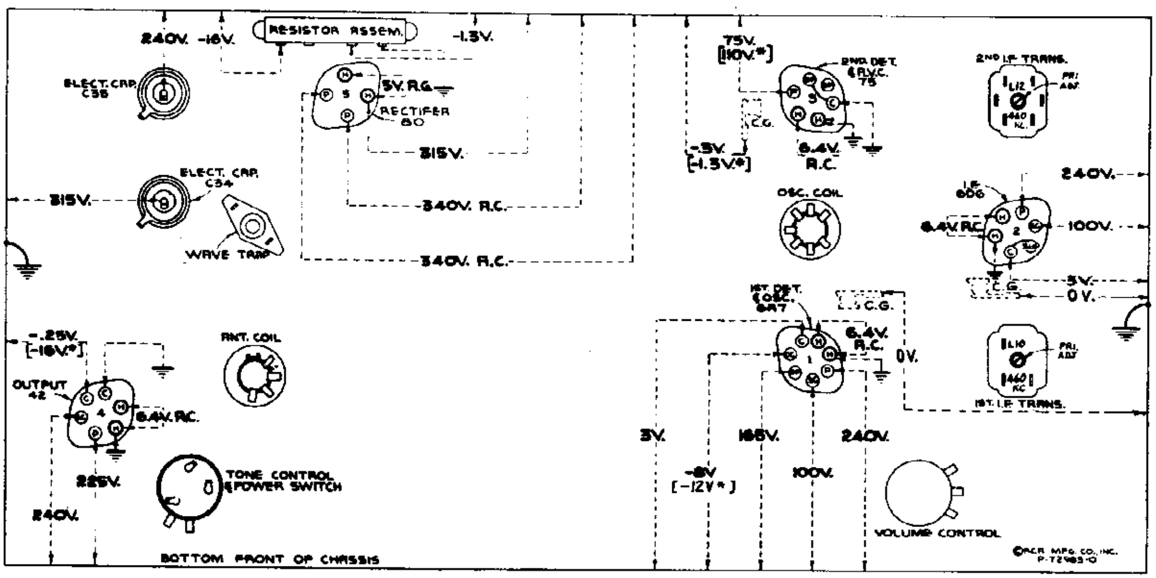


Figure 6—Radiotron Socket Voltages, Coil and Trimmer Locations.

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard broadcast")—No signal being received—Volume control minimum

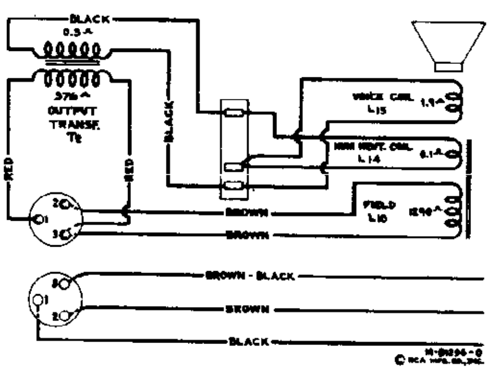


Figure 5—Loudspeaker Wiring

***Note:** Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.*

Radiotron Plate Current Readings

Measured with Milliammeter Connected at Tube Socket Plate Terminals Under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6A7—1st Det.—Osc.	11.0 ma.
(2)	RCA-6D6—I. F. Amp.	10.0 ma.
(3)	RCA-75—2nd Det., A.V.C. and A. F.	0.22 ma.
(4)	RCA-42—Power Amp.	42.0 ma.
(5)	RCA-80—Rectifier	—

MODEL 5T5
Alignment
Parts

RCA MFG. CO., INC.

Alignment Procedure

There are five alignment trimmers provided in the antenna transformer and oscillator coil tuned circuits. The i-f transformer and wave-trap adjustments are made by means of screws attached to molded magnetite cores. All of these circuits have been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions or altered during servicing. Loss of sensitivity, improper tone quality, and poor selectivity are the usual indications of improper alignment.

The correct performance of this receiver can only be obtained when the aligning has been done with adequate and reliable apparatus. The manufacturer of this receiver has available for sale, through its distributors and dealers, a complete assortment of such service equipment as may be needed for the alignment operation.

A test oscillator, such as the RCA Stock No. 9595, is required as a source of the specified alignment frequencies. Visual indication of receiver output during the adjustment is necessary and should be accomplished by the use of an indicator such as the RCA Stock No. 4317 Neon Output Indicator.

The procedure outlined below should be followed in adjusting the various trimmer capacitors and molded cores:

I-F Adjustments

The four adjustment screws (attached to molded magnetite cores) of the two i-f transformers (one on top and one on bottom of each i-f transformer) are located as shown by figures 3 and 6. Each circuit must be aligned to a basic frequency of 460 kc. To do this, attach the output indicator across the loudspeaker voice coil.

Connect the output of the test oscillator to the control grid of the RCA-6A7 through a .001 mfd. capacitor. Connect the test oscillator "Gnd" terminal to the ground terminal of the receiver chassis. Tune the oscillator to 460 kc. Advance the receiver volume control to its full-on position and adjust the receiver tuning control to a point, within its range, where no interference is encountered from local broadcast stations or from the local (heterodyne) oscillator. To eliminate signals from the local oscillator short stator of C6 to chassis-ground. Increase the output of the test oscillator until a slight indication is present on the output indicator. Adjust the two magnetite core screws of the second i-f transformer L13 and L12 to produce maximum (peak) indicated receiver output. Then adjust the two magnetite core screws L11 and L10 of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. During these adjustments, regulate the test oscillator output so that the indication is always as low as possible. By doing so, broadness of tuning due to a.v.c. action will be avoided. It is advisable to repeat the adjustment of all i-f magnetite core screws to assure that the interaction between them has not disturbed the original adjustment.

R-F Adjustments

Calibrate the tuning dial by adjusting the scale pointer to the extreme end calibration mark (beyond 55 on dial) while the two-gang tuning condenser plates are in full mesh.

Wave-Trap Adjustment

Attach the output of the test oscillator to the receiver "Antenna" terminal through a 200 mmfd. (important) capacitor. The ground connections remain connected together. Leave the test oscillator tuned to 460 kc. Adjust range selector to "Short wave" (C) position. Then adjust the wave-trap screw to the point which causes maximum suppression (minimum received) of the 460 kc signal.

"Standard Broadcast" Band

(a) Adjust range selector to "Standard broadcast" (A) position. Reduce output of test oscillator to a minimum. Tune the test oscillator to 600 kc and set receiver dial pointer to 600 kc. Adjust output of test oscillator until a slight indication of output is visible.

(b) Adjust the oscillator magnetite core screw L8 (top of oscillator coil) so that maximum (peak) indicated output results.

(c) Set receiver dial pointer to 1,700 kc. Tune the test oscillator to 1,700 kc. Carefully adjust the oscillator and antenna trimmers C25 and C4 respectively so that each brings about maximum (peak) indicated output.

(d) Tune the test oscillator to 600 kc. Adjust the receiver to pick up this signal disregarding the dial reading at which it is best received. Adjust oscillator magnetite core screw L8 (top of oscillator coil) for maximum (peak) output while rocking gang tuning condenser. After completing this adjustment, the trimmers C25 and C4 should be re-adjusted as in (c) to correct for any change in the oscillator high-frequency tuning which has been caused by the preceding adjustment.

"Short-Wave" Band

(e) Connect the "Ant." output of the test oscillator to the "Antenna" terminal through a 300-ohm resistor, leaving the "Gnd." of the oscillator connected to the receiver chassis.

(f) Adjust range selector to its "Short wave" (C) position. Set receiver dial pointer to 20,000 kc. Tune test oscillator to 20,000 kc. Set oscillator trimmer C26 to minimum capacity (plunger full out), and antenna trimmer C3 to maximum capacity (plunger full in). Slowly push in oscillator trimmer C26 until maximum (peak) output is reached. Two peaks may be found. Adjust C26 to the peak with minimum capacity (plunger near out) for maximum indication. Tighten lock nut. Slowly pull out plunger of antenna trimmer C3 until maximum (peak) indicated output is reached while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacity (plunger near in) should be used. Tighten lock nut.

Loudspeaker

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed by softening its cement with a very light application of acetone, using care not to allow the acetone to flow down into the air gap. The dust cover may be cemented back in place with ambroid upon completion of adjustment.

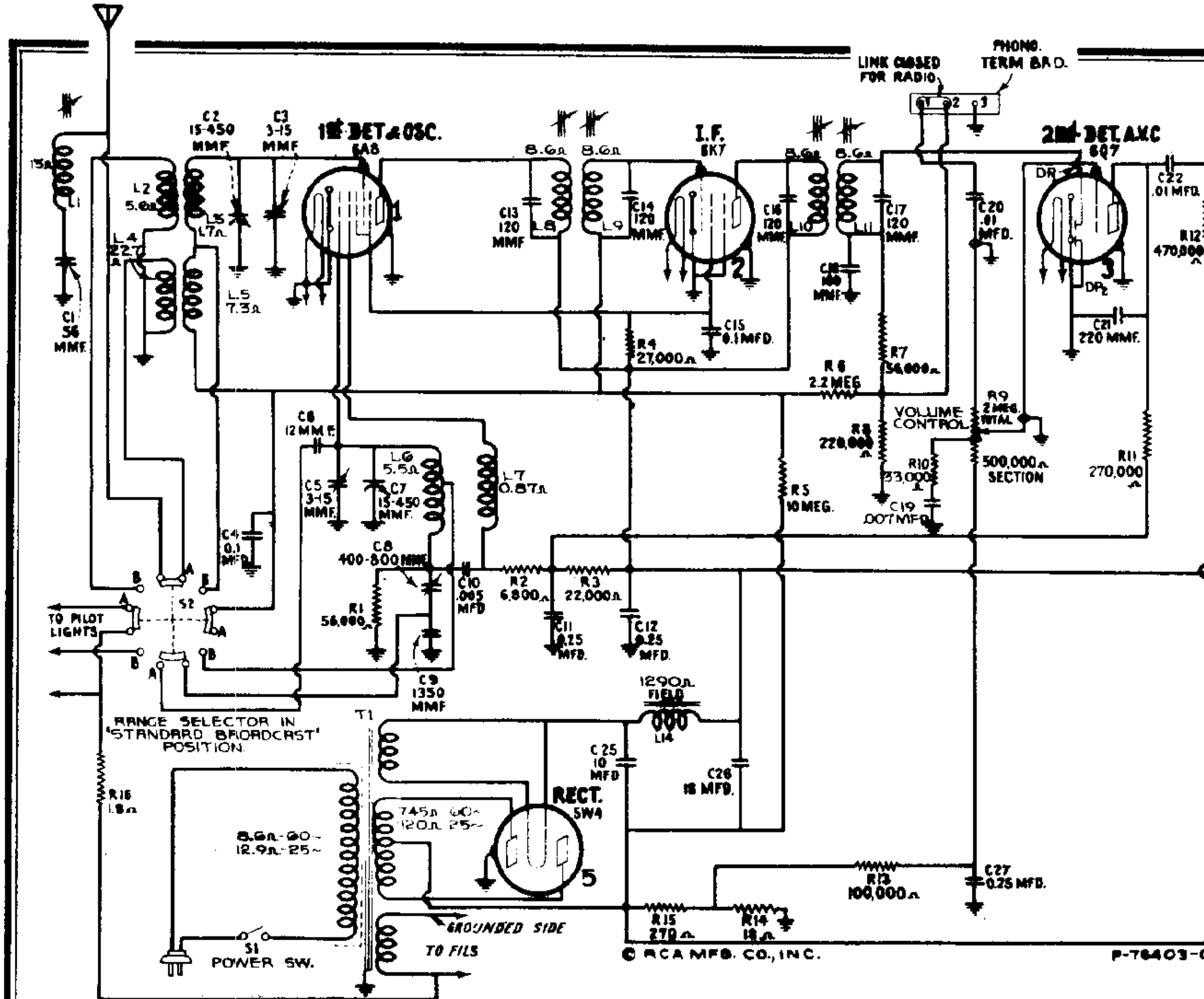
REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
13216	Board—Antenna and ground terminal board	$0.25
12717	Board—Phonograph terminal board	.22
5237	Bushing—Variable condenser mounting bushing assembly—Package of 3	.43
12118	Cap—Grid contact cap—Package of 5	.15
12714	Capacitor—Adjustable trimmer (C3, C4, C25)	.38
12807	Capacitor—Adjustable trimmer (C26)	.35
12973	Capacitor—5.6 Mmfd. (C24)	.20
12723	Capacitor—56 Mmfd. (C2)	.20
12629	Capacitor—56 Mmfd. (C11)	.20
13394	Capacitor—82 Mmfd. (C7)	.20
12724	Capacitor—120 Mmfd. (C19)	.28
12404	Capacitor—120 Mmfd. (C10, C13, C14)	.26
12406	Capacitor—180 Mmfd. (C15)	.26
12812	Capacitor—450 Mmfd. (C28)	.25
12811	Capacitor—3,600 Mmfd. (C27, C29)	.35
4868	Capacitor—.005 Mfd. (C23)	.20
5148	Capacitor—.007 Mfd. (C16)	.20
11315	Capacitor—.015 Mfd. (C22)	.20
4858	Capacitor—.01 Mfd. (C17, C20, C30)	.25
4840	Capacitor—0.25 Mfd. (C18)	.30
5170	Capacitor—0.25 Mfd. (C32)	.25
4841	Capacitor—0.1 Mfd. (C5, C9, C12, C21, C33)	.22
11240	Capacitor—10 Mfd. (C34)	1.08
5212	Capacitor—18 Mfd. (C31, C35)	1.16
12797	Coil—Antenna coil and shield (L2, L3, L4, L5)	1.30
12798	Coil—Oscillator coil and shield (L6, L7, L8, L9)	1.65
12701	Condenser—2-gang variable tuning condenser (C6, C8)	4.00
5119	Connector—3-contact female connector for speaker cable	.25
12006	Core—Adjustable core and stud for Stock Nos. 12653 and 12801	.22
12664	Core—Adjustable core and stud for Stock No. 12654	.22
13313	Dial—Station selector dial	.45
12702	Drive—Vernier drive for variable condenser	.68
13314	Indicator—Station selector indicator pointer	.15
5226	Lamp—Dial lamp, 6.3 volts—Package of 5	.70
13310	Resistor—Voltage divider comprising one 216-ohm, one 27-ohm and one 22-ohm sections (R15, R16, R17)	.55
6135	Resistor—270 ohms, carbon type, ¼ watt watt—Package of 5 (R2)	1.00
11296	Resistor—330 ohms, carbon type, ¼ watt—Package of 5 (R4)	1.00
12759	Resistor—15,000 ohms, carbon type, ½ watt—Package of 5 (R13)	1.00
12011	Resistor—27,000 ohms, carbon type, 1 watt—Package of 5 (R14)	1.10
11364	Resistor—33,000 ohms, carbon type, ¼ watt—Package of 5 (R7)	1.00
5029	Resistor—56,000 ohms, carbon type, ¼ watt—Package of 5 (R1)	1.00
11282	Resistor—56,000 ohms, carbon type, 1/10 watt—Package of 5 (R5)	.75
11365	Resistor—82,000 ohms, carbon type, ¼ watt—Package of 5 (R12)	1.00
5145	Resistor—100,000 ohms, carbon type, ¼ watt—Package of 5 (R9)	1.00
11398	Resistor—220,000 ohms, carbon type, 1/10 watt—Package of 5 (R6)	.75
11323	Resistor—270,000 ohms, carbon type, ¼ watt—Package of 5 (R10)	$1.00
11847	Resistor—390,000 ohms, carbon type, ¼ watt—Package of 5 (R11)	1.00
11626	Resistor—2.2 meg., carbon type, ¼ watt—Package of 5 (R3)	1.00
12651	Shield—Antenna coil shield	.22
13311	Shield—Chassis end shield and rubber mounting foot assembly—Package of 2	.80
12607	Shield—First I. F. transformer shield top	.30
12008	Shield—I. F. transformer shield	.28
12799	Shield—Oscillator coil shield	.15
12581	Shield—Second I. F. transformer shield top	.34
3682	Shield—6A7 or 75 Radiotron shield	.22
3950	Shield—6D6 Radiotron shield	.26
4794	Socket—4-contact 80 Radiotron socket	.15
4786	Socket—6-contact 6D6, 42 or 75 Radiotron socket	.15
4787	Socket—7-contact 6A7 Radiotron socket	.15
11199	Socket—Dial lamp socket	.14
12007	Spring—Retaining spring for Stock Nos. 12006 and 12664—Package of 10	.36
12796	Switch—Range switch (S2)	1.00
13309	Switch—Tone control and power switch (S1, S3)	.55
12801	Transformer—First I. F. transformer complete (L10, L11, C10, C11)	1.70
12653	Transformer—Second I. F. transformer complete (L12, L13, C13, C14, C15, R5, R6)	2.06
13392	Transformer—Power transformer, 105-125 volts, 50-60 cycles (T1)	4.95
13566	Transformer—Power transformer, 105-125 volts, 25-60 cycles (T1)	4.80
13393	Transformer—Power transformer, 110 and 220 volts, 50-60 cycles (T1)	4.95
12654	Trap—Wave-trap complete (L1)	.75
13144	Volume control (R8)	1.00
	REPRODUCER ASSEMBLIES	
12641	Board—3-contact reproducer terminal board	.15
12640	Bracket—Output transformer mounting bracket	.18
12012	Coil—Field coil (L16)	1.85
11469	Coil—Neutralizing coil (L14)	.20
12642	Cone—Reproducer cone and dust cap (L15)	.94
5118	Connector—3-contact male speaker cable connector	.25
9699	Reproducer—Complete	6.38
11253	Transformer—Output transformer (T2)	1.56
11886	Washer—Spring washer to hold field coil securely—Package of 5	.20
	MISCELLANEOUS ASSEMBLIES	
12785	Crystal—Station selector escutcheon and crystal	1.00
12699	Knob—Large station selector knob—Package of 5	.68
12700	Knob—Small (vernier) station selector knob—Package of 5	.58
11347	Knob—Volume control, tone control or range switch knob—Package of 5	.75
11377	Screw—Chassis mounting screw and washer assembly—Package of 4	.12
4982	Spring—Retaining spring for knob, Stock No. 12699—Package of 10	.50
11349	Spring—Retaining spring for knob, Stock Nos. 11347 and 12700—Package of 5	.25

Prices quoted above are subject to change without notice.

RCA MFG. CO., INC.



Frequency Ranges	
"Standard broadcast" (A)	540-1,820 kc
"Short wave" (B)	1,820-6,600 kc

Alignment Frequencies
"Standard broadcast" (A) 600 kc (osc.), 1,700 kc (osc., ant.)
"Short wave" (B) .... None required

Intermediate Frequency .... 460 kc

Pilot Lamps (3) .... Mazda No. 46, 6.3 volts, 0.25 amperes

Power Supply Ratings
Rating A .... 105-125 volts, 50-60 cycles, 80 watts
Rating B .... 105-125 volts, 25-60 cycles, 80 watts
Rating C .... 100-130/140-160/195-250 volts, 40-60 cycles, 80 watts

Power Output Rating
Undistorted .... 2.0 watts
Maximum .... 4.5 watts

Loudspeaker
Type .... Electrodynamic
Voice Coil Impedance .... 2¼ ohms at 400 cycles

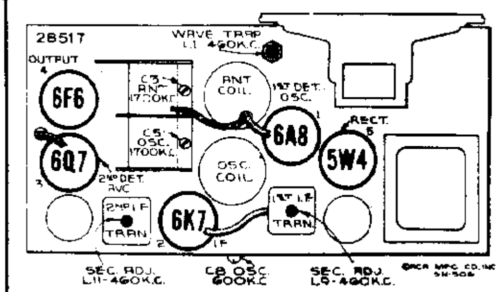
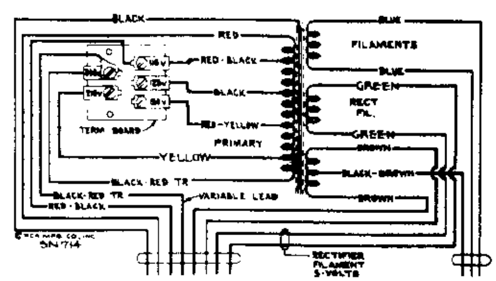


Figure 1—Radiotron, Coil, and Trimmer Locations

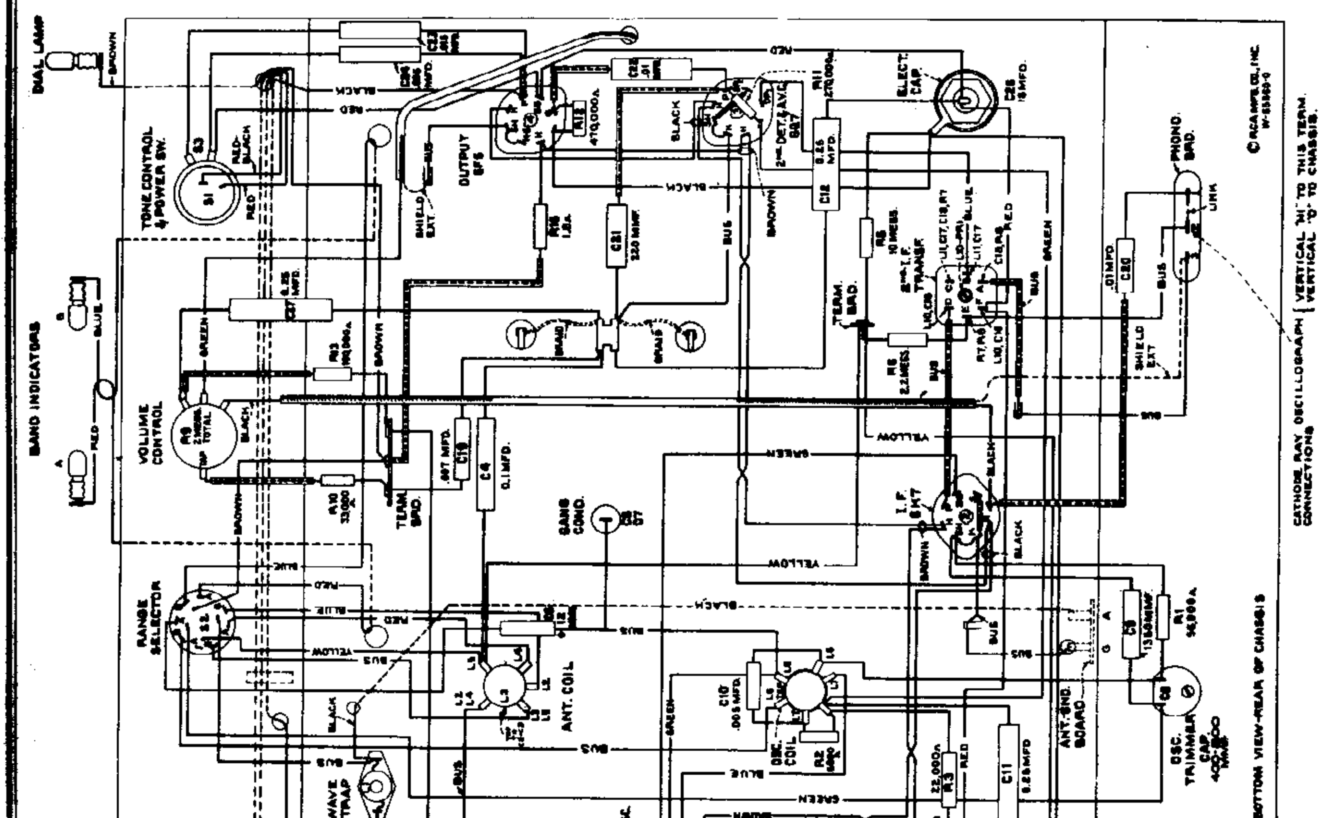


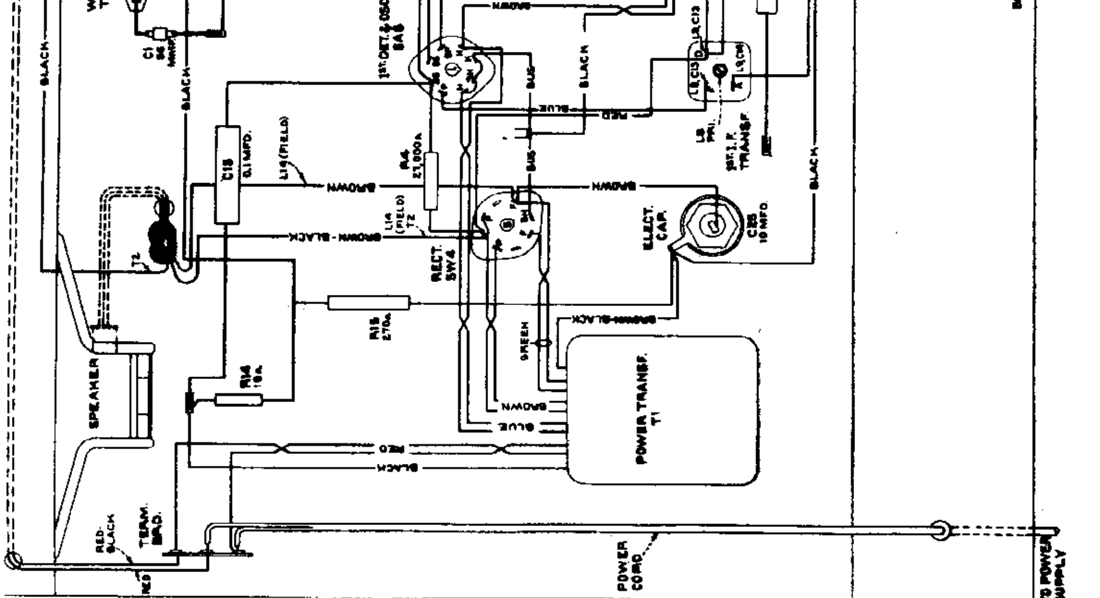
Primary resistance—24.6 ohms total
Secondary resistance—780 ohms total

Figure 5—Universal Transformer

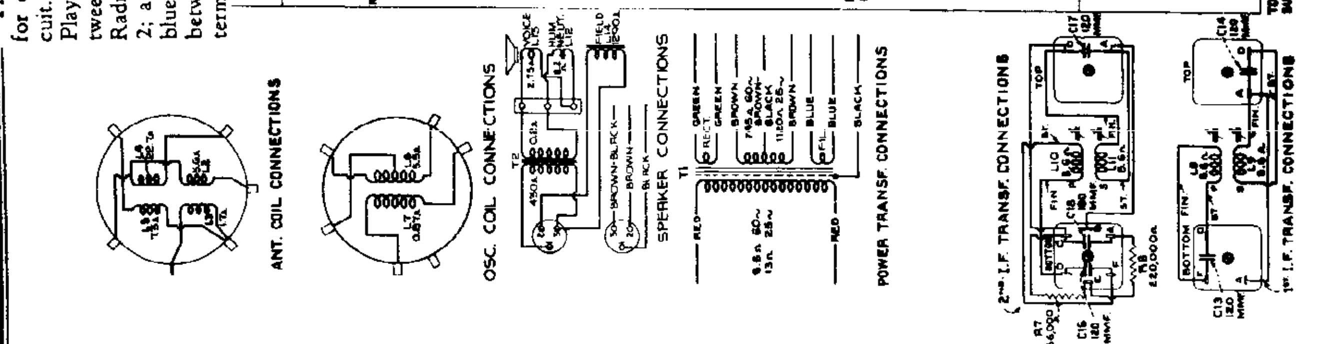
MODELS 5T6,5T7,5T8
Chassis Wiring
Phono.Data

RCA MFG. CO., INC.





Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio-amplifying circuit. RCA Victor Models R-93, R-93-2, or R-93-S Record Players should be connected as follows: Remove link between terminals 1 and 2 on receiver. Connect green wire in Radio-Record switch cable to terminal 1, yellow to terminal 2; and shield extension to terminal 3. Tape unused red and blue leads separately. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch.



RCA MFG. CO., INC.

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the horizontal center line (between the two dial scales) with the two-gang tuning condenser in full-mesh position. Two screws are provided on the dial hub for this adjustment.

Perform alignment in proper order tabulated below, starting with No. 1 and following all operations across, then No. 2, etc.

Cathode-ray alignment is preferable; the connections to the chassis are shown on figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal is received from a station or the local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Align-ment	Test Oscillator Connec-tion to Receiver	Dummy Antenna	Frequency Setting	Receiver Dial Setting	Circuit to Adjust	Adjust-ment Symbols	Adjust to Obtain	Adjustment Location
1	6K7 i-f Grid Cap	.001 Mfd.	460 kc	No signal 550-750 kc	2nd i-f Trans.	L11 and L10	Max. (peak)	Figs. 1-4
2	6A8 Det. Grid Cap	.001 Mfd.	460 kc	No signal 550-750 kc	1st i-f Trans.	L9 and L8	Max. (peak)	Figs. 1-4
3	Ant. Post	200 Mmfd.	460 kc	No signal S. W. Band	Wave Trap	L1	Minimum Output	Fig. 1
4	Ant. Post	200 Mmfd.	600 kc	600 kc	L-F Osc.	C8	Max. (peak)	Fig. 1
5	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	H-F Osc.	C5	Max. (peak)	Fig. 1
6	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	Ant.	C3	Max. (peak)	Fig. 1
7	Ant. Post	200 Mmfd.	600 kc	Rock thru 600 kc	L-F Osc.	C8	Max. (peak)	Fig. 1
8	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	H-F Osc.	C5	Max. (peak)	Fig. 1
9	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	Ant.	C3	Max. (peak)	Fig. 1

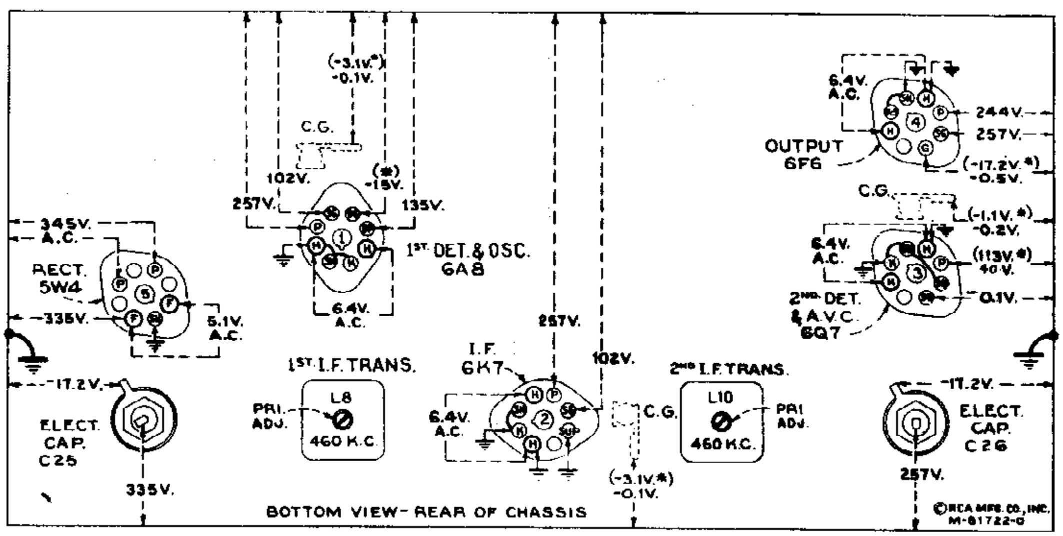


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations
Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard broadcast")—
No signal being received—Volume control minimum

Radiotron Socket Voltages

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals Under Conditions Similar to Those of Voltage Measurements

(1) RCA-6A8—1st Det.—Osc. .... 11.7 ma.
(2) RCA-6K7—I. F. Amp. .... 9.4 ma.
(3) RCA-6Q7—2nd Det., A.V.C. and A. F. ... 0.3 ma.
(4) RCA-6F6—Power Amp. .... 39.6 ma.
(5) RCA-5W4—Rectifier .... 61.0 ma.*
* Cannot be measured at socket.

MODELS 5T6,5T7,5T8
MODEL 6T5
Parts Lists

RCA MFG. CO., INC.

REPLACEMENT PARTS FOR MODEL 5T6,5T7,5T8

STOCK No.	DESCRIPTION
13098	Board—Antenna and ground terminal board
12717	Board—Phonograph terminal board
5237	Bushing—Variable condenser mounting bushing assembly
12511	Cap—Grid contact cap
11465	Capacitor—Adjustable capacitor (C8)
12659	Capacitor—12 Mmfd. (C6)
12661	Capacitor—56 Mmfd. (C1)
12404	Capacitor—120 Mmfd. (C13, C14, C16, C17)
12406	Capacitor—180 Mmfd. (C18)
12818	Capacitor—220 Mmfd. (C21)
12660	Capacitor—1,350 Mmfd. (C9)
4868	Capacitor—.005 Mfd. (C10, C24)
5148	Capacitor—.007 Mfd. (C19)
13138	Capacitor—.01 Mfd. (C20)
4858	Capacitor—.01 Mfd. (C22)
11315	Capacitor—.015 Mfd. (C23)
4841	Capacitor—0.1 Mfd. (C4, C15)
4840	Capacitor—0.25 Mfd. (C11, C27)
5170	Capacitor—0.25 Mfd. (C12)
11240	Capacitor—10 Mfd. (C25)
5212	Capacitor—18 Mfd. (C26)
12648	Coil—Antenna coil—less shield (L2, L3, L4, L5)
12649	Coil—Oscillator coil—less shield (L6, L7)
13811	Condenser—2-gang variable tuning condenser (C2, C3, C5, C7)
5119	Connector—3-contact female speaker cable connector
12006	Core—Adjustable core and stud assembly for I.F. transformer, Stock Nos. 12652 and 12653)
12664	Core—Adjustable core and stud assembly for wave trap, Stock No. 12654
13814	Dial—Station selector dial
13816	Disc—Station selector drive disc and lamp socket assembly
13815	Drive—Variable condenser drive shaft, spool and bearing
14301	Fuse—¼ amp. resistor-fuse, 1.8 ohms (R16)
13817	Indicator—Station selector indicator
5226	Lamp—Dial lamp
13812	Range Switch (S2)
13674	Resistor—18 ohm, carbon type, ¼ watt (R14)
13819	Resistor—270 ohm, wire wound, 1.1 watt (R15)
8070	Resistor—22,000 ohm, carbon type, ¼ watt (R3)
12011	Resistor—27,000 ohm, carbon type, 1 watt (R4)
11364	Resistor—33,000 ohm, carbon type, ¼ watt (R10)
11282	Resistor—56,000 ohm, carbon type, 1/10 watt (R7)
5029	Resistor—56,000 ohm, carbon type, ¼ watt (R1)
11454	Resistor—6,800 ohm, carbon type, ¼ watt (R2)
5145	Resistor—100,000 ohm, carbon type, ¼ watt (R13)
11398	Resistor—220,000 ohm, carbon type, 1/10 watt (R6)
11323	Resistor—270,000 ohm, carbon type, ¼ watt (R11)
11172	Resistor—470,000 ohm, carbon type, ¼ watt (R12)
11626	Resistor—2.2 megohm, carbon type, ¼ watt (R6)
13673	Resistor—10 megohm, carbon type, ¼ watt (R5)
4669	Screw—No. 8-32x5/32 set screw for drive disc, Stock No. 13816
12650	Shield—Antenna coil shield
12735	Shield—Dial lamp shield
12607	Shield—First I.F. transformer shield top
12008	Shield—First or second I.F. transformer shield
12651	Shield—Oscillator coil shield
12581	Shield—Second I.F. transformer shield top
11195	Socket—5-contact 5W4 Radiotron socket
11198	Socket—8-contact 6A8, 6F6, 6K7 or 6Q7 Radiotron socket
11199	Socket—Dial lamp socket
12007	Spring—Retaining spring for core, Stock Nos. 12006 and 12664
13813	Tone Control and Power Switch (S1, S3)
13106	Transformer—First I.F. transformer, complete (L8, L9, C13, C14)
13107	Transformer—Second I.F. transformer, complete (L10, L11, C16, C17, C18, R7, R8)
12644	Transformer—Power transformer, 115 volt, 60 cycle (T1)
12645	Transformer—Power transformer, 115 volt, 25 cycle (T1)
12646	Transformer—Power transformer, 240-210, 150-125-110 volts, 60 cycle (T1)
12654	Trap—Wave trap (L1)
13144	Volume Control (R9)
	REPRODUCER ASSEMBLIES
13822	Coil—Field coil (L14)
13821	Cone—Reproducer cone and dust cap (L13)
5118	Connector—3-contact male speaker cable connector
9776	Reproducer, complete
13823	Transformer—Output transformer (T2)
	MISCELLANEOUS ASSEMBLIES
13824	Escutcheon—Station selector escutcheon
12673	Knob—Station selector or volume control knob
13825	Knob—Tone control or range switch knob
11586	Screw—Chassis mounting screw No. 14x1 in.
13885	Screw—No. 8-32x¼ in. headless set screw for knob, Stock No. 13825
4119	Screw—No. 8-32x¼ in. headless set screw for knob, Stock No. 12673

REPLACEMENT PARTS FOR MODEL 6T5

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
13216	Board—Antenna and ground terminal board
12717	Board—Phonograph terminal board
5237	Bushing—Variable condenser mounting bushing assembly
13870	Cable—Tuning tube cable and socket
12118	Cap—Grid contact cap
12714	Capacitor—Adjustable trimmer (C8)
12807	Capacitor—Adjustable trimmer (C5)
12723	Capacitor—56 Mmfd. (C1)
12629	Capacitor—56 Mmfd. (C16)
13394	Capacitor—82 Mmfd. (C7)
12724	Capacitor—120 Mmfd. (C24)
12404	Capacitor—120 Mmfd. (C15, C17, C18)
12406	Capacitor—180 Mmfd. (C9)
12812	Capacitor—450 Mmfd. (C11)
12811	Capacitor—3,600 Mmfd. (C9)
4868	Capacitor—.005 Mfd. (C28)
5148	Capacitor—.007 Mfd. (C21)
11315	Capacitor—.015 Mfd. (C27)
4858	Capacitor—.01 Mfd. (C10, C22, C25)
4841	Capacitor—0.1 Mfd. (C2, C14, C26)
4840	Capacitor—0.25 Mfd. (C23)
5170	Capacitor—0.25 Mfd. (C13)
11240	Capacitor—10 Mfd. (C29)
5212	Capacitor—18 Mfd. (C12, C30)
12797	Coil—Antenna coil and shield (L2, L3, L4, L5)
12798	Coil—Oscillator coil and shield (L6, L7, L8, L9)
13679	Condenser—2-gang variable tuning condenser (C3, C4, C6)
5119	Connector—3-contact female connector for speaker cable
12006	Core—Adjustable core and stud for Stock Nos. 12653 and 12801
12664	Core—Adjustable core and stud for Stock No. 12654
13868	Dial—Station selector dial
13680	Drive—Vernier drive for variable condenser
13314	Indicator—Station selector indicator pointer
5226	Lamp—Dial lamp, 6.3 volts
13674	Resistor—18 ohms, carbon type, ¼ watt (R17)
13819	Resistor—270 ohms, wire wound, 1.1 watts (R16)
12759	Resistor—15,000 ohms, carbon type, ½ watt (R2)
12011	Resistor—27,000 ohms, carbon type, 1 watt (R3)
11364	Resistor—33,000 ohms, carbon type, ¼ watt (R9)
5029	Resistor—56,000 ohms, carbon type, ¼ watt (R1)
11282	Resistor—56,000 ohms, carbon type, 1/10 watt (R8)
11365	Resistor—82,000 ohms, carbon type, ¼ watt (R13)
5145	Resistor—100,000 ohms, carbon type, ¼ watt (R10)
11398	Resistor—220,000 ohms, carbon type, 1/10 watt (R6)
11323	Resistor—270,000 ohms, carbon type, ¼ watt (R12)
11847	Resistor—390,000 ohms, carbon type, ¼ watt (R14)
12013	Resistor—1 meg., carbon type, 1/10 watt (R15)
11626	Resistor—2.2 meg., carbon type, ¼ watt (R5, R7)
13732	Resistor—10 meg., carbon type, ¼ watt (R4)
12651	Shield—Antenna coil shield
13311	Shield—Chassis end shield and rubber mounting foot assembly
12607	Shield—First I. F. transformer shield top
12008	Shield—I. F. transformer shield
12799	Shield—Oscillator coil shield
12581	Shield—Second I. F. transformer shield top
3682	Shield—6A7 or 75 Radiotron shield
3950	Shield—6D6 Radiotron shield
13871	Socket—Tuning tube socket and cover
4794	Socket—4-contact 80 Radiotron socket
4786	Socket—6-contact 6D6, 42 or 75 Radiotron socket
4787	Socket—7-contact 6A7 Radiotron socket
11199	Socket—Dial lamp socket
12007	Spring—Retaining spring for Stock Nos. 12006 and 12664
12796	Switch—Range switch (S2)
13309	Switch—Tone control and power switch (S1, S3)
12801	Transformer—First I. F. transformer complete (L10, L11, C15, C16)
12653	Transformer—Second I. F. transformer complete (L12, L13, C17, C18, C19, R6, R8)
12644	Transformer—Power transformer, 105-125 volts, 50-60 cycles (T1)
12645	Transformer—Power transformer, 105-125 volts, 25-60 cycles (T1)
13869	Transformer—Power transformer, 110 and 220 volts, 50-60 cycles (T1)
12654	Trap—Wave-trap complete (L1)
13144	Volume control (R11)
	REPRODUCER ASSEMBLIES
12641	Board—3-contact reproducer terminal board
12640	Bracket—Output transformer mounting bracket
12012	Coil—Field coil (L16)
11469	Coil—Neutralizing coil (L14)
12642	Cone—Reproducer cone and dust cap (L15)
5118	Connector—3-contact male speaker cable connector
9699	Reproducer—Complete
11253	Transformer—Output transformer (T2)
11886	Washer—Spring washer to hold field coil securely
	MISCELLANEOUS ASSEMBLIES
12038	Band—Rubber band for tuning tube
13615	Bracket—Tuning tube mounting bracket and clamp
12785	Crystal—Station selector escutcheon and crystal
12742	Escutcheon—Tuning tube escutcheon
12699	Knob—Large station selector knob
12700	Knob—Small (vernier) station selector knob
11347	Knob—Volume control, tone control or range switch knob
11377	Screw—Chassis mounting screw and washer assembly
4982	Spring—Retaining spring for knob, Stock No. 12699
11349	Spring—Retaining spring for knob, Stock Nos. 11347 and 12700

Prices quoted above are subject to change without notice.

MODEL 6K2(2nd Prod.
Schematic
Chassis Wiring

RCA MFG. CO., INC.

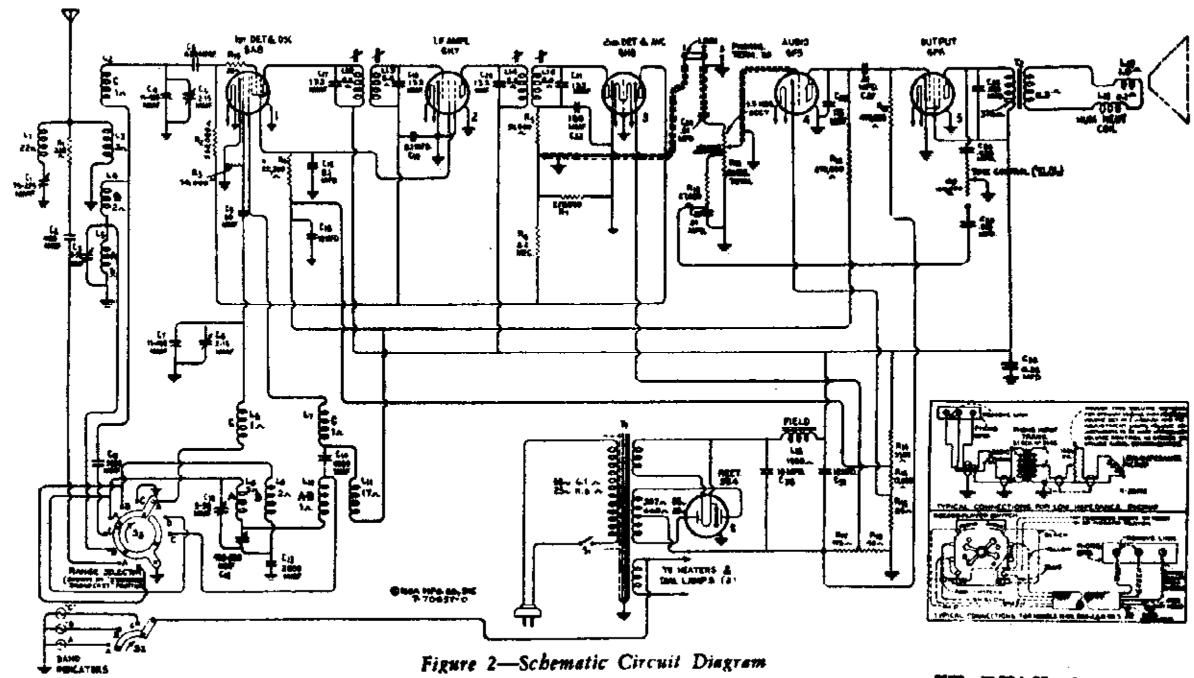


Figure 2—Schematic Circuit Diagram
(Model 6K2, Second Production)

IF PEAK 460KC

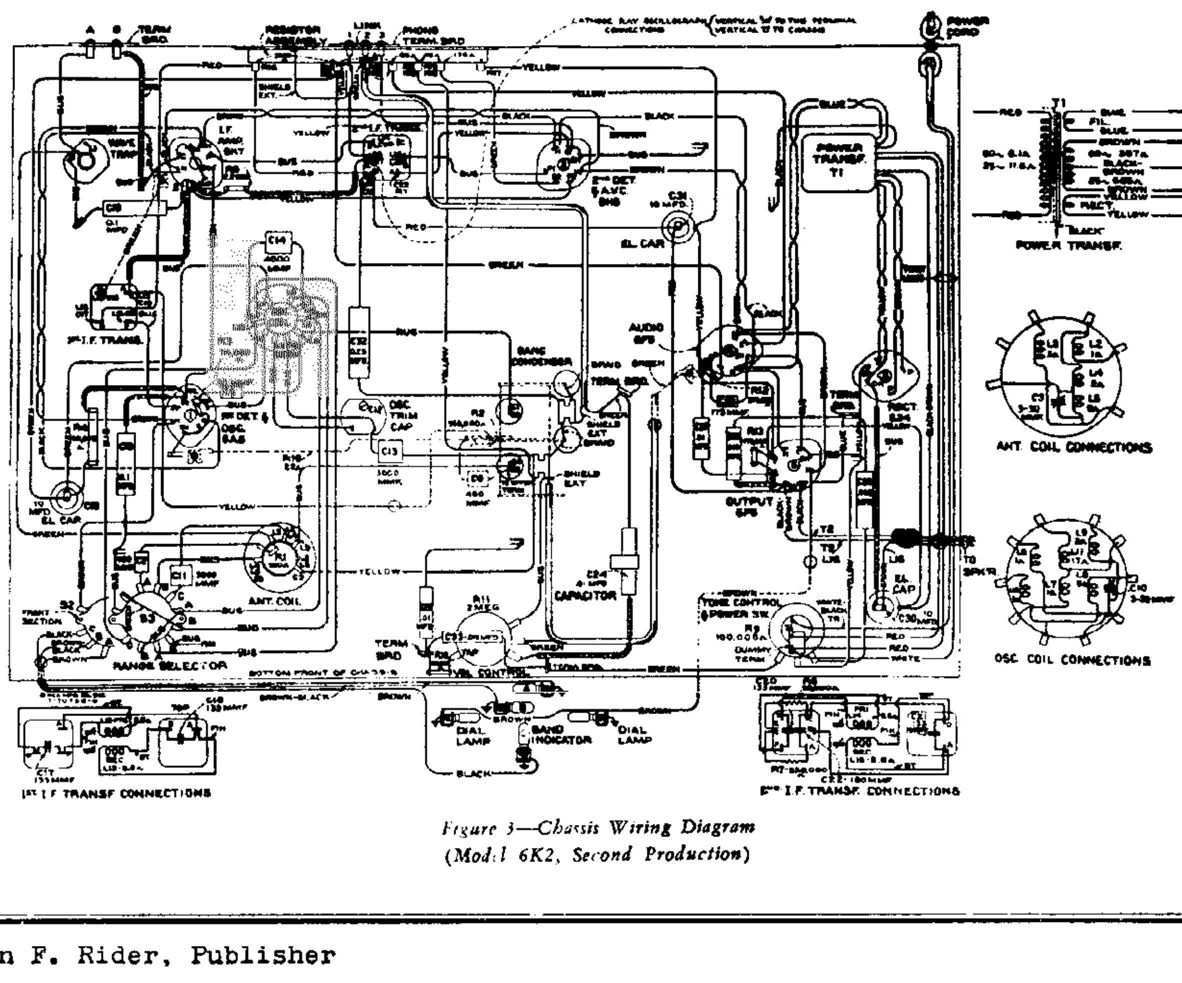


Figure 3—Chassis Wiring Diagram
(Model 6K2, Second Production)

MODEL 6K2(2nd Prod.)
Socket,Trimmers
Parts

RCA MFG. CO., INC.

RCA VICTOR MODEL 6K2 (Second Production)

WITH MAGNETITE CORE I-F TRANSFORMERS

FOR DATA ON MODEL 6K2 (1st Prod.), SEE PAGES 7-41 TO 7-43 IN RIDER'S VOL. VII

These receivers are similar to Model 6K2 (first production) except for the i-f transformers, loudspeaker, and a few component parts. Visual inspection of the i-f transformers will readily identify these receivers. Service Data for Model 6K2 are directly applicable to these receivers except the information contained herein. The primary adjustments for the i-f transformers are located on the bottom of the transformers while the secondary adjustments are located on top.

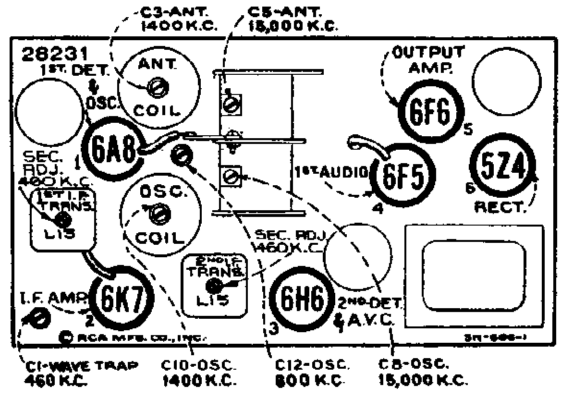


Figure 1—Radiotron, Coil, and Trimmer Locations (Model 6K2, Second Production)

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION
	RECEIVER ASSEMBLIES
12930	Board—Antenna and ground terminal board.
12717	Board—Phonograph terminal board.
12772	Bracket—Top dial lamp socket bracket.
5237	Bushing—Variable tuning condenser mounting bushing assembly.
11350	Cap—Grid contact cap used on resistor—Stock No. 11624.
12511	Cap—Grid contact cap.
11256	Capacitor—Adjustable trimmer—(C1).
11465	Capacitor—Adjustable trimmer—(C12).
11289	Capacitor—50 Mmfd.—(C9).
12946	Capacitor—133 Mmfd.—(C17, C18, C20, C21).
11623	Capacitor—175 Mmfd.—(C26).
12406	Capacitor—180 Mmfd.—(C22).
11290	Capacitor—400 Mmfd.—(C2, C6).
11622	Capacitor—3000 Mmfd.—(C13).
11621	Capacitor—3600 Mmfd.—(C11).
11287	Capacitor—4500 Mmfd.—(C14).
4868	Capacitor—.005 Mfd.—(C29).
11395	Capacitor—.01 Mfd.—(C24).
4858	Capacitor—.01 Mfd.—(C25, C27).
11315	Capacitor—.015 Mfd.—(C33).
12670	Capacitor—.035 Mfd.—(C28).
4841	Capacitor—0.1 Mfd.—(C19).
11414	Capacitor—0.1 Mfd.—(C15).
5170	Capacitor—0.25 Mfd.—(C32).
11367	Capacitor—10 Mfd.—(C16).
11240	Capacitor—10 Mfd.—(C30).
5212	Capacitor—18 Mfd.—(C31).
11617	Coil—Antenna coil less shield—(L2, L3, L4, L5, C3, R1).
11618	Coil—Oscillator coil less shield—(L6, L7, L8, L9, L10, L11, C10).
13597	Condenser—2-gang variable tuning condenser—(C4, C5, C7, C8).
5119	Connector—3-contact female connector for speaker cable.
12006	Core—Adjustable core and stud for Stock No. 13106 and 13107.
12792	Dial—Station selector dial.
13598	Drive—Variable tuning condenser vernier drive.
13599	Foot—Chassis mounting foot and bracket.
12770	Holder—Dial scale holder and lamp bracket assembly less bracket for top dial lamp socket.
12712	Indicator—Station selector indicator pointer.
5226	Lamp—Dial lamp—6.3 volt.
12718	Mask—Dial light diffuser complete with red, orange and green-colored screen.
11466	Resistor—Voltage divider resistor—comprising one 3,500-ohm, one 13,000-ohm, one 85-ohm, one 40-ohm and one 175-ohm sections—(R14, R15, R16, R17, R18).
11624	Resistor—22 ohms—Flexible type complete with grid contact cap—(R19).
11620	Resistor—220 ohms—Carbon type—1/10 watt—(R1).
8070	Resistor—22,000 ohms—Carbon type—½ watt—(R4).
11400	Resistor—27,000 ohms—Carbon type—¼ watt—(R10).
11282	Resistor—56,000 ohms—Carbon type—1/10 watt—(R5).
12286	Resistor—56,000 ohms—Insulated—¼ watt—(R3).
11398	Resistor—220,000 ohms—Carbon type—1/10 watt—(R7).
11453	Resistor—270,000 ohms—Carbon type—1/10 watt—(R12).
11452	Resistor—470,000 ohms—Carbon type—1/10 watt—(R13).
11597	Resistor—560,000 ohms—Carbon type—1/10 watt—(R2).
11626	Resistor—2.2 megohms—Carbon type—¼ watt—(R6).
12008	Shield—I. F. transformer shield for Stock Nos. 13106 and 13107.
12607	Shield—First I. F. transformer shield top.
12581	Shield—Second I. F. transformer shield top.
11603	Shield—Coil shield for Stock Nos. 11617 and 11618.
12735	Shield—Dial lamp shield.
12771	Socket—Dial lamp socket—Located at top of dial scale.
11199	Socket—Dial lamp socket.
11195	Socket—5-contact 5Z4 Radiotron socket.
11198	Socket—7-contact 6F5, 6H6 Radiotron socket.
11196	Socket—8-contact 6A8, 6F6 or 6K7 Radiotron socket.
12007	Spring—Retaining spring for core Stock No. 12006.
12769	Switch—Range switch—(S2, S3).
12668	Tone Control—Control and power switch—(R9, S1).
13106	Transformer—First I. F. transformer—(L12, L13, C17, C18).
13107	Transformer—Second I. F. transformer—(L14, L15, C20, C21, C22, R5, R7).
11848	Transformer—Power transformer—105-125-volt, 50-60-cycle—(T1).
11849	Transformer—Power transformer—105-125-volt, 25-40-cycle—(T1).
11850	Transformer—Power transformer—105-250-volt, 40-60-cycle—(T1).
11391	Trap—Wave trap—(L1, C1).
13144	Volume control—(R11).
	REPRODUCER ASSEMBLIES
12641	Board—Reproducer terminal board.
12640	Bracket—Output transformer mounting bracket and clamp.
13600	Coil—Field coil—(L16).
11469	Coil—Neutralizing coil—(L18).
12667	Cone—Reproducer cone complete—(L17).
5118	Connector—3-contact male connector for speaker cable.
9766	Reproducer complete.
11253	Transformer—Output transformer—(T2).
11886	Washer—Spring washer to hold field coil securely.
	MISCELLANEOUS ASSEMBLIES
12666	Cover—Reproducer cover assembly.
12698	Crystal—Station selector crystal and escutcheon.
11582	Knob—Range switch knob.
12699	Knob—Large station selector knob.
12700	Knob—Small (vernier) station selector knob.
11347	Knob—Tone control or volume control knob.
11210	Screw—Chassis mounting screw assembly.
11349	Spring—Retaining spring for knob—Stock No. 11347, No. 11582 and No. 12700.
4982	Spring—Retaining spring for knob—Stock No. 12699.

MODELS 6K3,7T1,7K1
Schematic,Phono.Da
Spkr.& Trans.Wirin

RCA MFG. CO., INC.

Phonograph Attachment. — A terminal board is provided for connecting a phonograph into the audio-amplifying circuit. RCA Victor Models R-93, R-93-2, or R-93-S Record Players should be connected as follows: Remove link between terminals 1 and 2 on receiver. Connect green wire in Radio-Record switch cable to terminal 2, yellow to terminal 1; and shield extension to terminal 3. Tape unused red and blue leads separately. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch.

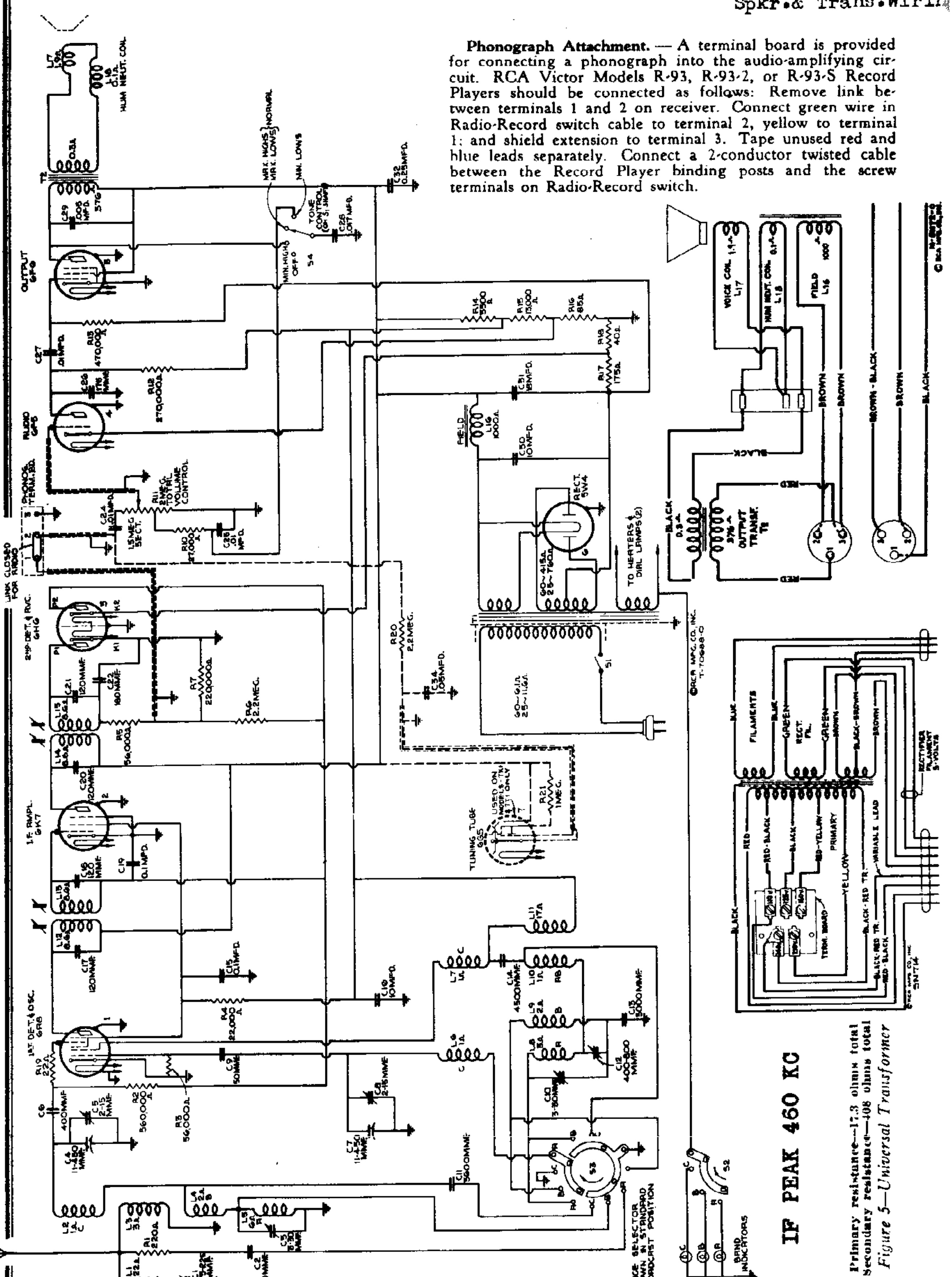


Figure 5—Universal Transformer

MODELS 6K3, 7T1, 7K1
Chassis Wiring

RCA MFG. CO., INC.

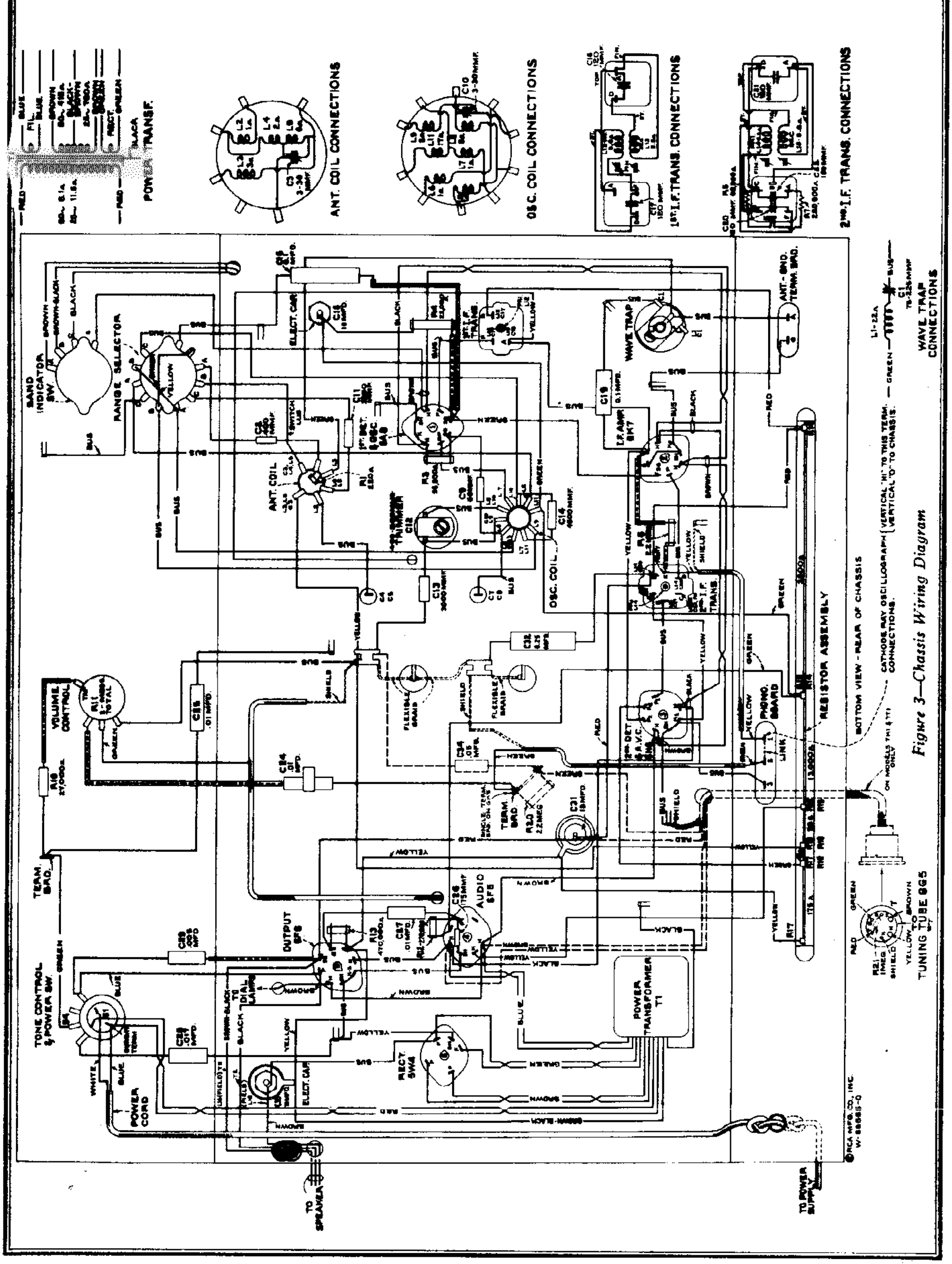


Figure 3—Chassis Wiring Diagram

RCA MFG. CO., INC.

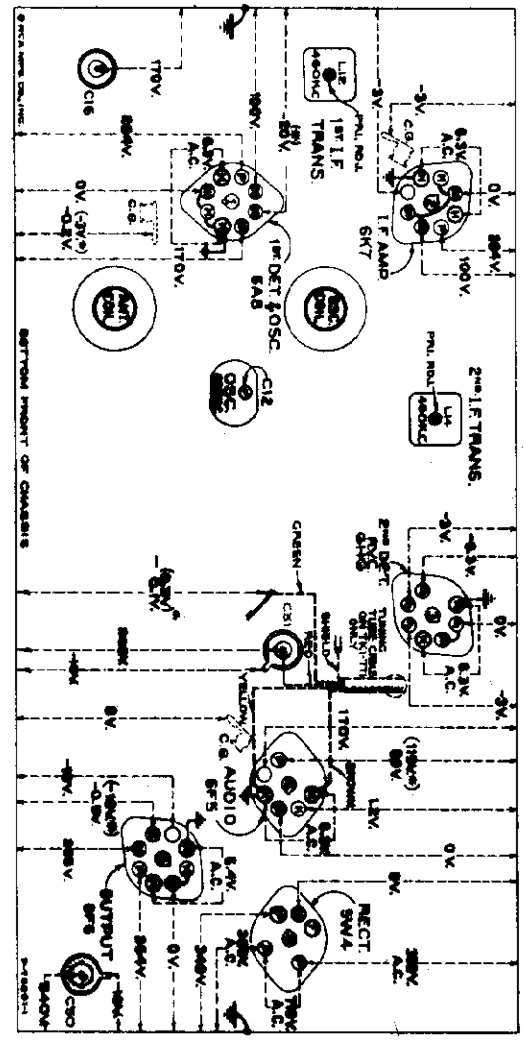


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations
Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard broadcast")—
No signal being received—Volume control minimum

Loudspeaker. — Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the low-frequency (end) calibration mark on "Standard broadcast" scale with the gang tuning-condenser plates in full-mesh position. This is a friction adjustment.

Perform alignment in proper order tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown by figures 1 and 4.

Cathode-ray alignment is preferable: the connections to the chassis are shown on figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator: Connection to Receiver	Test Oscillator: Dummy Antenna	Test Oscillator: Frequency Setting	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
1	6K7 i-f Grid Cap	.001 Mfd.	460 kc	No signal 550-750 kc	2nd i-f Trans.	L14 and L15	Max. (peak)
2	6A8 Det. Grid Cap	.001 Mfd.	460 kc	No signal 550-750 kc	1st i-f Trans.	L12 and L13	Max. (peak)
3	Ant. Post	200 Mmfd.	460 kc	No signal 550-750 kc	Wave Trap	C1	Minimum Output
4	Ant. Post	300 Ohms	15,000 kc	15,000 kc	"C" Osc.	C8	Max. (peak)*
5	Ant. Post	300 Ohms	15,000 kc	Rock thru 15,000 kc	"C" Ant.	C5	Max. (peak)
6	Ant. Post	200 Mmfd.	600 kc	600 kc	L-F Osc.	C12	Max. (peak)
7	Ant. Post	200 Mmfd.	1,400 kc	1,400 kc	H-F Osc.	C10	Max. (peak)
8	Ant. Post	200 Mmfd.	1,400 kc	1,400 kc	"A" Ant.	C3	Max. (peak)
9	Ant. Post	200 Mmfd.	600 kc	Rock thru 600 kc	L-F Osc.	C12	Max. (peak)
10	Ant. Post	200 Mmfd.	1,400 kc	1,400 kc	H-F Osc.	C10	Max. (peak)
11	Ant. Post	200 Mmfd.	1,400 kc	1,400 kc	"A" Ant.	C3	Max. (peak)

* Use maximum capacity peak if two peaks can be obtained.

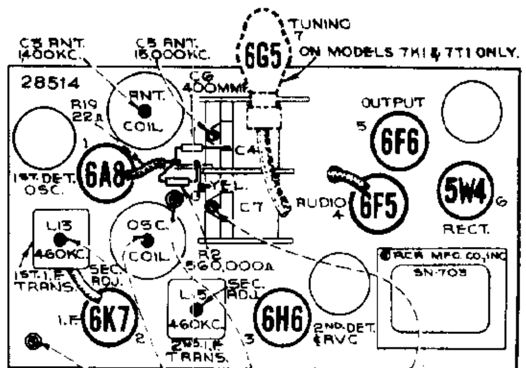


Figure 1—Radiotron, Coil, and Trimmer Locations

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals Under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6A8—1st Det.—Osc.	12.3 ma.
(2)	RCA-6K7—I-F Amp.	9.8 ma.
(3)	RCA-6H6—2nd Det. and A.V.C.	.....
(4)	RCA-6F5—Audio Driver	0.2 ma.
(5)	RCA-6F6—Power Amplifier	34.0 ma.
(6)	RCA-5W4—Rectifier	76.0 ma.*
(7)	RCA-6G5—Tuning Tube	2.0 ma.

*Cannot be measured at socket.

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.

MODELS 6K3, 7T1, 7K1
Data, Parts

RCA MFG. CO., INC.

These receivers are of the superheterodyne type and have many distinctive features. Model 6K3 is a six-tube console model employing a 12-inch loudspeaker. Models 7T1 and 7K1 are table and console models respectively having similar chassis to Model 6K3 except for the addition of a tuning tube "Magic Eye": the former has an 8-inch loudspeaker while the latter has a 12-inch loudspeaker.

Frequency Ranges

"Standard Broadcast" (A)............ 540— 1,625 kc
"Medium Wave" (B)................ 1,625— 5,700 kc
"Short Wave" (C).................. 5,700—18,000 kc

Alignment Frequencies

"Standard Broadcast" (A)....... 600 kc (osc.), 1,400 kc (osc. and ant.)
"Medium Wave" (B)................ None required
"Short Wave" (C)........... 15,000 kc (osc. and ant.)

Intermediate Frequency.. 460 kc

Radiotron Complement

(1) RCA-6A8............... First Detector—Oscillator
(2) RCA-6K7.................Intermediate Amplifier
(3) RCA-6H6............... Second Detector—A.V.C.
(4) RCA-6F5................ Audio Voltage Amplifier
(5) RCA-6F6................ Audio Power Amplifier
(6) RCA-5W4.................... Full-Wave Rectifier
(7) RCA-6G5—(Models 7T1 and 7K1 only) Tuning Tube

Pilot Lamps (5)........... 7T1 and 7K1, Mazda No. 40, 6.3 volts, 0.15 amp.; 6K3, Mazda No. 46, 6.3 volts, 0.25 amp.

Power Supply Ratings

Rating A.............................. 105-125 volts, 50-60 cycles, 90 watts
Rating B.............................. 105-125 volts, 25-60 cycles, 90 watts
Rating C.............................. 100-130/140-160/195-250 volts, 40-60 cycles, 90 watts

Power Output

Undistorted................................ 2.0 watts
Maximum................................... 4.5 watts

Loudspeaker

Type.................................. Electrodynamic
Impedance (v.c.)................ 2.2 ohms at 400 cycles

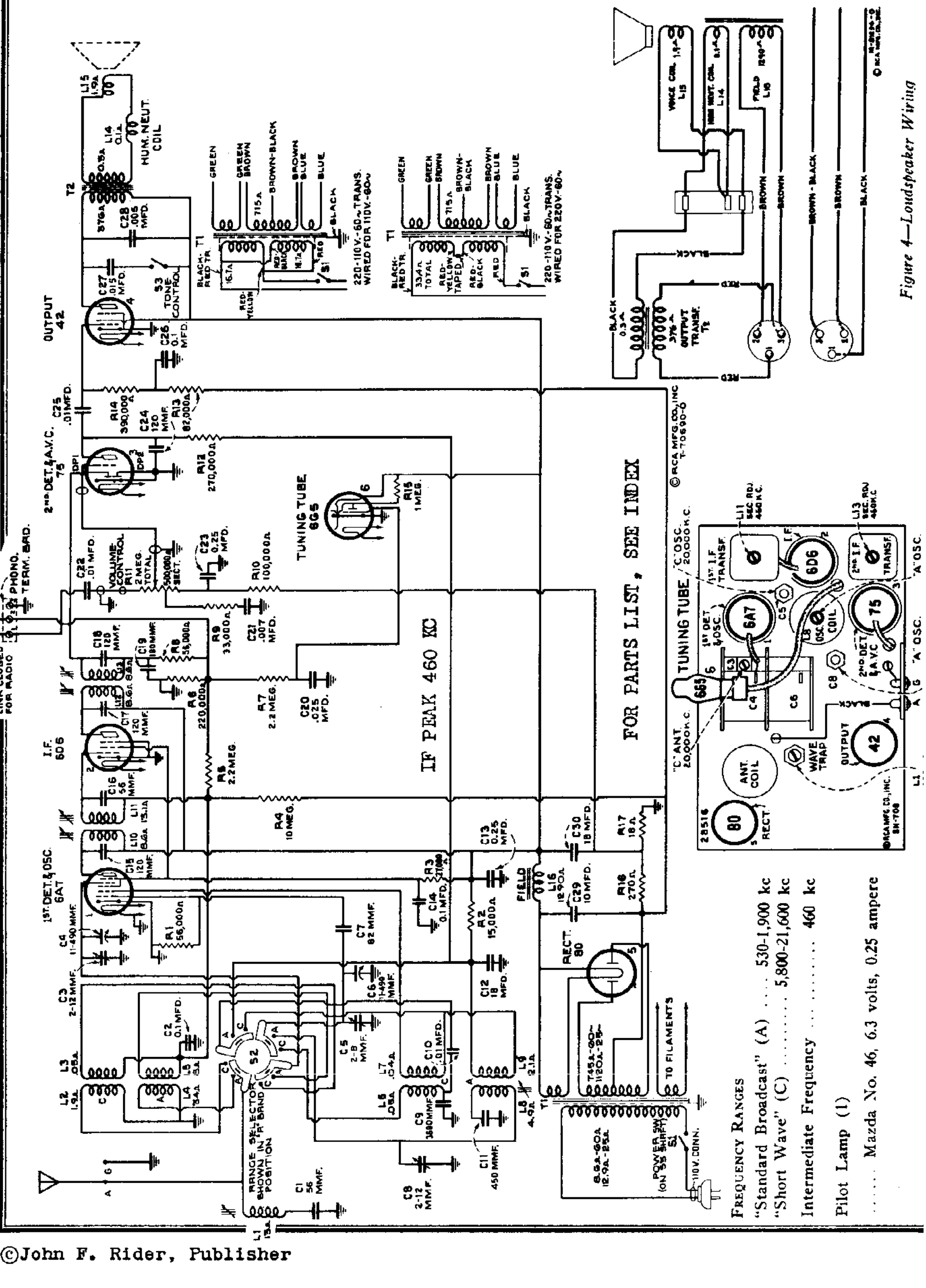
STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
12930	Board—Antenna and ground terminal board
12717	Board—Phonograph terminal board
12772	Bracket—Top dial lamp socket bracket
5237	Bushing—Variable tuning condenser mounting bushing assembly
11888	Cable—Tuning tube cable and socket—Models 7T1 and 7K1 only
12511	Cap—Grid contact cap
11350	Cap—Grid contact cap used on resistor—Stock No. 11624
11465	Capacitor—Adjustable capacitor (C12)
11256	Capacitor—Adjustable trimmer (C1)
12404	Capacitor—120 Mmfd. (C17, C18, C20, C21)
11289	Capacitor—50 Mmfd. (C9)
11623	Capacitor—175 Mmfd. (C26)
12406	Capacitor—180 Mmfd. (C22)
11290	Capacitor—400 Mmfd. (C2, C6)
11622	Capacitor—3000 Mmfd. (C13)
11621	Capacitor—3600 Mmfd. (C11)
11287	Capacitor—4500 Mmfd. (C14)
4868	Capacitor—.005 Mfd. (C29)
11395	Capacitor—.01 Mfd. (C24)
4858	Capacitor—.01 Mfd. (C25, C27)
11315	Capacitor—.015 Mfd. (C33)
11451	Capacitor—.017 Mfd. (C28)
4836	Capacitor—.05 Mfd. (C34)—Models 7T1 and 7K1 only
4841	Capacitor—0.1 Mfd. (C19)
11414	Capacitor—0.1 Mfd. (C15)
5170	Capacitor—0.25 Mfd. (C32)
11387	Capacitor—10 Mfd. (C16)
11240	Capacitor—10 Mfd. (C30)
5212	Capacitor—18 Mfd. (C31)
11617	Coil—Antenna coil less shield (L2, L3, L4, L5, C3, R1)
11618	Coil—Oscillator coil less shield (L6, L7, L8, L9, L10, L11, C10)
13597	Condenser—2-gang variable tuning condenser (C4, C5, C7, C8)
5119	Connector—3-contact female connector for speaker cable
12006	Core—Adjustable core and stud for Stock Nos. 13106 and 13107
13682	Dial—Station selector dial
13598	Drive—Variable tuning condenser vernier drive
13599	Foot—Chassis mounting foot and bracket
12770	Holder—Dial scale holder and lamp bracket assembly less bracket for top dial lamp socket
12712	Indicator—Station selector indicator pointer
4340	Lamp—Dial lamp—Models 7T1 and 7K1 only
5226	Lamp—Dial lamp—Model 6K3 only
13683	Mask—Dial light diffuser complete with colored screen
11466	Resistor—Voltage divider resistor—comprising one 3,500-ohm, one 13,000-ohm, one 85-ohm, one 40-ohm and one 175-ohm sections (R14, R15, R16, R17, R18)
11624	Resistor—22 ohms—Flexible type complete with grid contact cap (R19)
11620	Resistor—220 ohms—Carbon type—1/10 watt (R1)
8070	Resistor—22,000 ohms—Carbon type—½ watt (R4)
11400	Resistor—27,000 ohms—Carbon type—½ watt (R10)
12286	Resistor—56,000 ohms—Insulated—½ watt (R3)
11282	Resistor—56,000 ohms—Carbon type—1/10 watt (R5)
11398	Resistor—220,000 ohms—Carbon type—1/10 watt (R7)
11453	Resistor—270,000 ohms—Carbon type—1/10 watt (R12)
11452	Resistor—470,000 ohms—Carbon type—1/10 watt (R13)
11397	Resistor—560,000 ohms—Carbon type—1/10 watt (R2)

STOCK No.	DESCRIPTION
12013	Resistor—1 megohm—Carbon type—1/10 watt (R21)—Models 7T1 and 7K1 only
11626	Resistor—2.2 megohms — Carbon type — ½ watt (R6, R20)
12008	Shield—I. F. transformer shield for Stock Nos. 13106 and 13107
12607	Shield—First I. F. transformer shield top
12581	Shield—Second I. F. transformer shield top
11603	Shield—Coil shield for Stock Nos. 11617 and 11618
12735	Shield—Dial lamp shield
12771	Socket—Dial lamp socket—Located at top of dial scale
11199	Socket—Dial lamp socket
11195	Socket—5-contact 5W4 Radiotron socket
11198	Socket—7-contact 6F5, 6H6 Radiotron socket
11196	Socket—8-contact 6A8, 6F6 or 6K7 Radiotron socket
11381	Socket—Tuning tube socket and cover—Models 7T1 and 7K1 only
12007	Spring—Retaining spring for core, Stock No. 12006
12769	Switch—Range switch (S2, S3)
13681	Tone Control—Tone and power switch (S1, S4)
13106	Transformer—First I. F. transformer (L12, L13, C17, C18)
13107	Transformer—Second I. F. transformer (L14, L15, C20, C21, C22, R5, R7)
11458	Transformer—Power transformer — 105-125-volt, 50-60-cycle (T1)
11585	Transformer—Power transformer — 105-125-volt, 25-40-cycle (T1)
11584	Transformer—Power transformer — 105-250-volt, 40-60-cycle (T1)
11391	Trap—Wave trap (L1, C1)
13144	Volume Control (R11)
	REPRODUCER ASSEMBLIES
12641	Board—Reproducer terminal board
12640	Bracket—Output transformer mounting bracket and clamp
13600	Coil—Field coil (L16)
11469	Coil—Neutralizing coil (L18)
12642	Cone—Reproducer cone complete (L17)—Model 7T1
12667	Cone—Reproducer cone complete (L17)—Models 6K3 and 7K1
5118	Connector—3-contact male connector for speaker cable
9771	Reproducer complete—Model 7T1
9766	Reproducer complete—Models 6K3 and 7K1
11253	Transformer—Output transformer (T2)
11886	Washer—Spring washer to hold field coil securely
	MISCELLANEOUS ASSEMBLIES
12038	Band—Rubber band for tuning tube
13615	Bracket—Tuning tube mounting bracket and clamp
12698	Crystal—Station selector crystal and escutcheon
12742	Escutcheon—Tuning tube escutcheon
12699	Knob—Large station selector knob
12700	Knob—Small (vernier) station selector knob
11347	Knob—Tone control, range switch or volume control knob
11377	Screw—Chassis mounting screw assembly—Used on Model 7T1
11210	Screw — Chassis mounting screw assembly — Used on Models 6K3 and 7K1
11349	Spring—Retaining spring for knob—Stock Nos. 11347 and 12700
4982	Spring—Retaining spring for knob—Stock No. 12699

First Edition

MODEL 6T5
Schematic, Socket
Trimmers, Spkr. Wirin

RCA MFG. CO., INC.



FOR PARTS LIST, SEE INDEX

Figure 4—Loudspeaker Wiring

FREQUENCY RANGES
"Standard Broadcast" (A) .... 530-1,900 kc
"Short Wave" (C) .... 5,800-21,600 kc
Intermediate Frequency .... 460 kc
Pilot Lamp (1)
...... Mazda No. 46, 6.3 volts, 0.25 ampere

MODEL 6T5
Chassis Wiring

RCA MFG. CO., INC.

Power Supply Ratings

Rating A .... 105-125 volts, 50-60 cycles, 75 watts
Rating B .... 105-125 volts, 25-60 cycles, 75 watts
Rating C .... 100-125/200-250 volts, 50-60 cycles, 75 watts

Alignment Frequencies

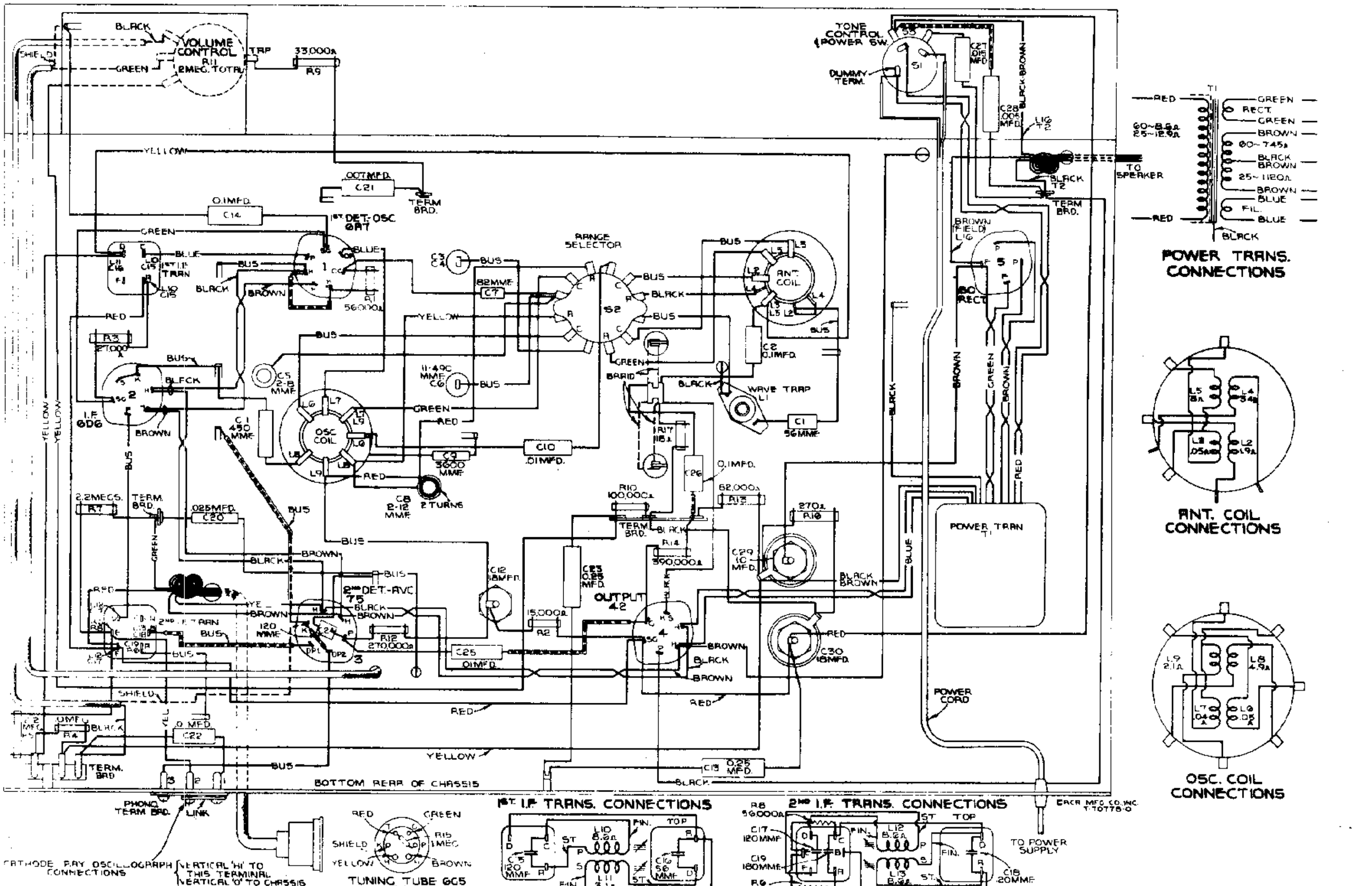
"Standard Broadcast" (A) 600 kc (osc.), 1,700 kc (osc.)
"Short Wave" (C) .... 20,000 kc (osc., ant.)

Power Output Rating

Undistorted .... 2.0 watts
Maximum .... 4.5 watts

Loudspeaker

Type .... Electrodynamic
Voice Coil Impedance .... 2¼ ohms at 400 cycles



RCA MFG. CO., INC.

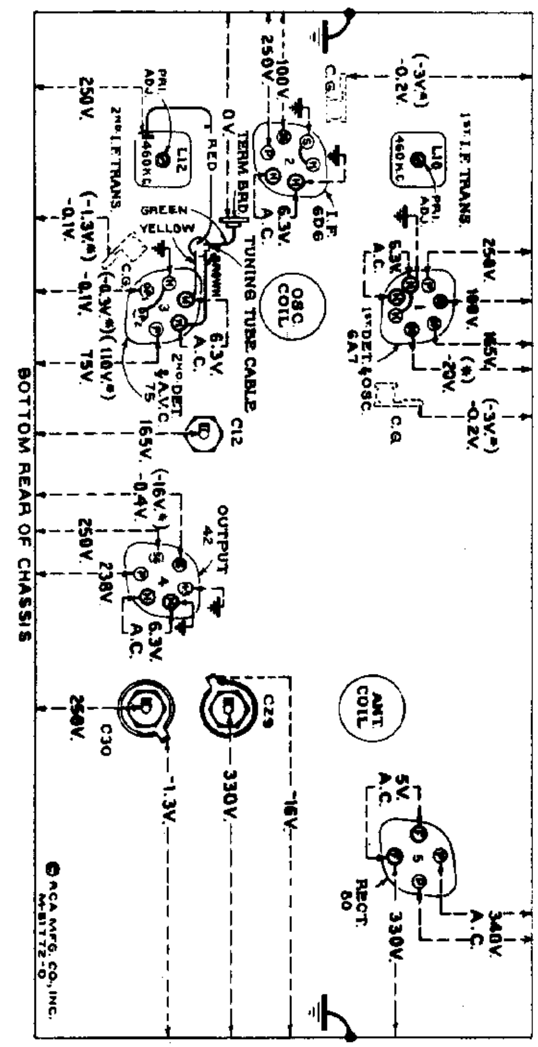


Figure 5—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard broadcast")—No signal being received—Volume control minimum

Note: *Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.*

Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio-amplifying circuit. RCA Victor Models R-93, R-93-2, or R-93-S Record Players should be connected as follows: Remove link between terminals 1 and 2 on receiver. Connect green wire in Radio-Record switch cable to terminal 1, yellow to terminal 2; and shield extension to terminal 3. Tape unused red and blue leads separately. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch.

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals Under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6A7—1st Det.—Osc.	11.0 ma.
(2)	RCA-6D6—I-F Amp.	10.0 ma.
(3)	RCA-75—2nd Det., A.V.C. and A. F.	0.22 ma.
(4)	RCA-42—Power Amplifier	42.0 ma.
(5)	RCA-80—Rectifier	66.0 ma.*
(6)	RCA-6G5—Tuning Tube	2.0 ma.

(*Cannot be measured at socket.)

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the low-frequency (end) calibration mark on "Standard broadcast" scale with the gang tuning-condenser plates in full-mesh position. This is a friction adjustment.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on Figures 1 and 5.

Cathode-ray alignment is preferable; the connections to the chassis are shown on Figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator			Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting				
1	6D6 I-F Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	2nd I-F Trans.	L12 and L13	Max. (peak)
2	6A7 Det. Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	1st I-F Trans.	L10 and L11	Max. (peak)
3	Ant. Post	200 Mmfd.	460 kc	No Signal S-W Band	Wave Trap	L1	Minimum Output
4	Ant. Post	300 Ohms	20,000 kc	20,000 kc	"C" Osc.	C5	Max. (peak)*
5	Ant. Post	300 Ohms	20,000 kc	Rock Thru 20,000 kc	"C" Ant.	C3	Max. (peak)†
6	Ant. Post	200 Mmfd.	600 kc	600 kc	"A" L-F Osc.	L8	Max. (peak)
7	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	"A" H-F Osc.	C8	Max. (peak)
8	Ant. Post	200 Mmfd.	600 kc	Rock Thru 600 kc	"A" L-F Osc.	L8	Max. (peak)
9	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	"A" H-F Osc.	C8	Max. (peak)

* Use minimum capacity peak.
† Use maximum capacity peak.

MODEL 7U2
Phono•Data
Notes

RCA MFG. CO., INC.

Pilot Lamps (5) .... Mazda No. 46, 6.3 volts, 0.25 amperes

Power Supply Ratings		Radio	Total Radio and Phonograph
Rating A-6	105-125 volts, 60 cycles	95 watts	120 watts
Rating A-5	105-125 volts, 50 cycles	95 watts	120 watts
Rating B-2	105-125 volts, 25 cycles	95 watts	120 watts
Rating C-6	105-130/140-160/200-250 volts, 60 cycles	95 watts	120 watts
Rating C-5	105-130/140-160/200-250 volts, 50 cycles	95 watts	120 watts

Alignment

The r-f and i-f adjustments on this instrument should be performed as outlined under "Alignment" in "Technical Information and Service Data" for Model 7U, substituting the magnetite-core symbols L15, L14, L13 and L12 for the trimming capacitor symbols C21, C20, C18 and C17 respectively in "I-F Adjustments."

FOR DATA ON MODEL 7U, SEE RCA PAGES 7-61 TO 7-66 IN RIDER'S VOLUME VII.

Phonograph

The phonograph motor is of the governor induction type and is designed to be simple and foolproof. Occasionally, however, certain adjustments may be required. These adjustments are illustrated and explained in Figures 4 and 5. Application of oil to the felt pad which rubs against the governor disc will insure smooth operation.

Pickup adjustments are the same as outlined for Model 7U.

Resistance and Voltage Measurements

Voltage and resistance measurements for this receiver are the same as for Model 7U (Figures 4 and 7), with the following exception:

The resistance value shown on Figure 4, between the plate and capacitor C31 terminals of the RCA-6A8 first-detector and oscillator, and the RCA-6K7 i-f amplifier, should be 8.6 ohms instead of 13 ohms.

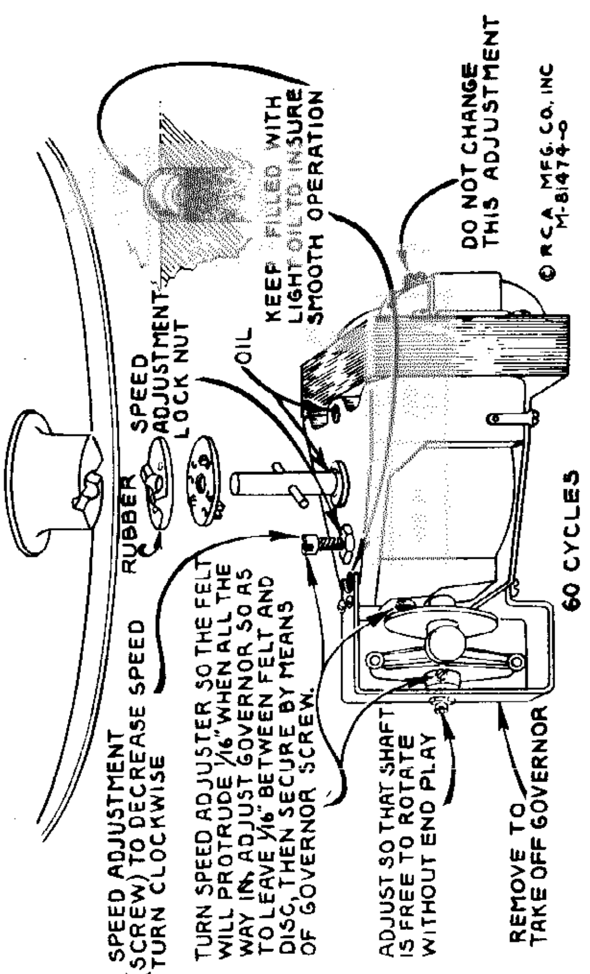


Figure 4—Details of 60-Cycle Motor

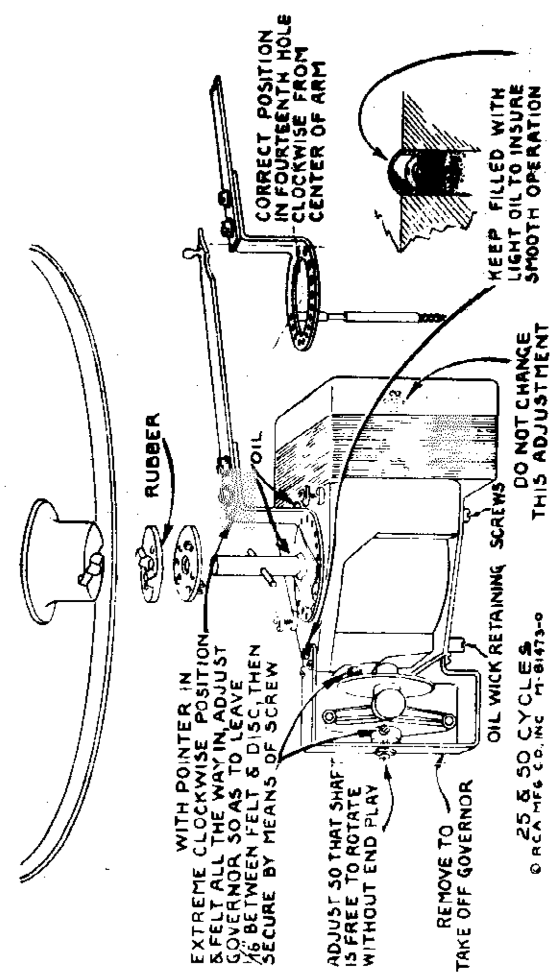
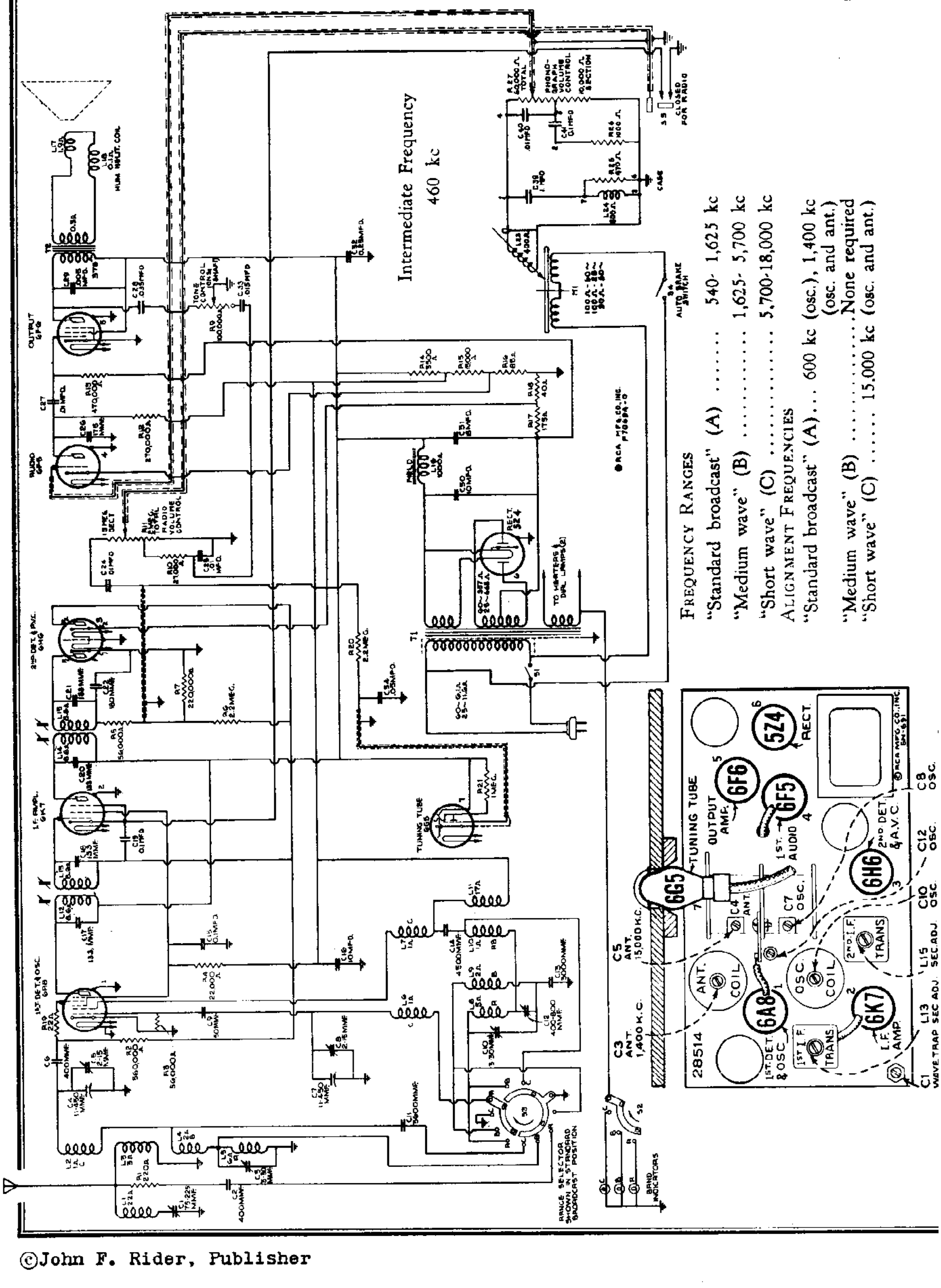


Figure 5—Details of 25- or 50-Cycle Motor

RCA MFG. CO., INC.



FREQUENCY RANGES

"Standard broadcast" (A) .... 540- 1,625 kc

"Medium wave" (B) .... 1,625- 5,700 kc

"Short wave" (C) .... 5,700-18,000 kc

ALIGNMENT FREQUENCIES

"Standard broadcast" (A)... 600 kc (osc.), 1,400 kc (osc. and ant.)

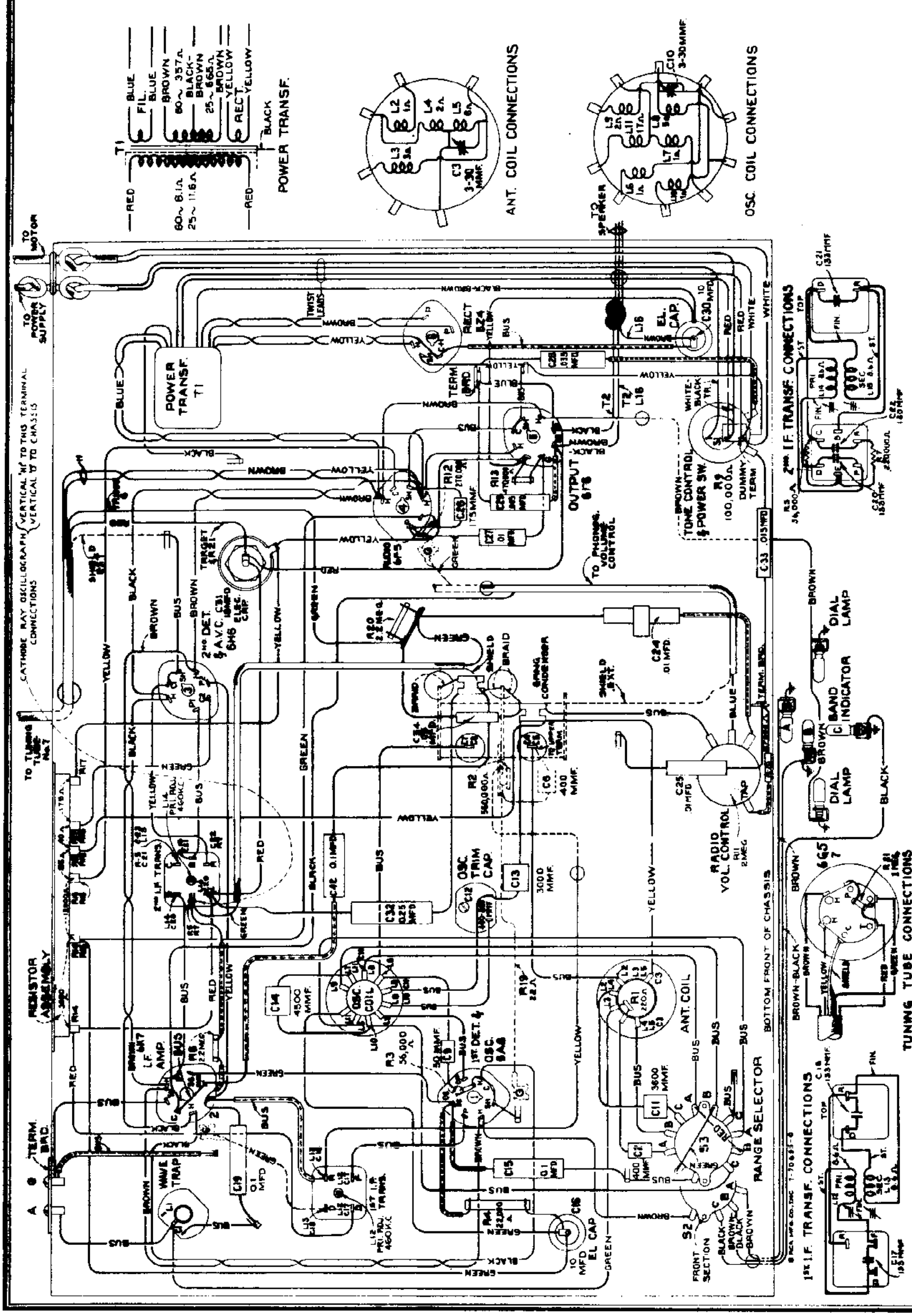
"Medium wave" (B) ....None required

"Short wave" (C) ...... 15,000 kc (osc. and ant.)

MODEL 7U2

Chassis Wiring

RCA MFG. CO., INC.



Power Output

Undistorted	2.0 watts
Maximum	4.5 watts

Loudspeaker

Type	Electrodynamic	Type of Pickup	High-impedance magnetic
Impedance (v.c.)	2.2 ohms at 400 cycles	Pickup Impedance	1,400 ohms at 1,000 cycles

RCA MFG. CO., INC.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
12930	Board—Antenna and ground terminal board	$0.20
5237	Bushing—Variable condenser mounting bushing assembly—Package of 3	.43
11888	Cable—Tuning lamp cable and socket	1.06
12032	Cable—3-conductor, shielded, volume control cable, approx. 8 inches long, complete with 4-contact male connector and grid contact cap	.90
11350	Cap—Grid contact cap—Package of 5	.20
12511	Cap—Grid contact cap—Package of 5	.15
11289	Capacitor—50 Mmfd. (C9)	.26
12946	Capacitor—133 Mmfd. (C17, C18, C20, C21)	.20
11623	Capacitor—175 Mmfd. (C26)	.18
12406	Capacitor—180 Mmfd. (C22)	.26
11290	Capacitor—400 Mmfd. (C2, C6)	.25
11622	Capacitor—3,000 Mmfd. (C13)	.36
11621	Capacitor—3,600 Mmfd. (C11)	.38
11287	Capacitor—4,500 Mmfd. (C14)	.30
4868	Capacitor—.005 Mfd. (C29)	.20
11315	Capacitor—0.15 Mfd. (C33)	.20
12670	Capacitor—.035 Mfd. (C28)	.20
11395	Capacitor—.01 Mfd. (C24)	.18
4858	Capacitor—.01 Mfd. (C25, C27)	.25
4836	Capacitor—.05 Mfd. (C34)	.30
11414	Capacitor—0.1 Mfd. (C15, C42)	.20
4841	Capacitor—0.1 Mfd. (C19)	.22
5170	Capacitor—.25 Mfd. (C32)	.25
11240	Capacitor—10 Mfd. (C30)	1.08
11387	Capacitor—10 Mfd. (C16)	.86
5212	Capacitor—18 Mfd. (C31)	1.16
11465	Capacitor—Adjustable trimmer (C12)	.48
11256	Capacitor—Adjustable trimmer for wave-trap, Stock No. 11391 (C1)	.48
11617	Coil—Antenna coil less shield (L2, L3, L4, L5, C3, R1)	1.68
11618	Coil—Oscillator coil less shield (L6, L7, L8, L9, L10, L11, C10)	2.22
13597	Condenser—2-gang variable tuning condenser (C4, C5, C7, C8)	4.55
4573	Connector—2-contact female connector for motor cable, receiver section	$0.30
5119	Connector—3-contact female connector for chassis reproducer cable	.25
6123	Connector—4-contact male connector for cable, Stock No. 12032	.30
12006	Core—Adjustable core and stud for Stock No. 13106 and No. 13107	.22
13598	Drive—Variable tuning condenser vernier drive	.80
13599	Foot—Chassis mounting foot and bracket assembly—Package of 2	.55
12770	Holder—Dial scale holder and lamp bracket assembly	.55
12712	Indicator—Station selector indicator pointer	.22
4340	Lamp—Dial lamp—Package of 5	.60
12718	Mask—Dial light diffuser complete with red, orange and green-colored screen	.40
11466	Resistor—Voltage divider, comprising one 3,500-ohm, one 13,000-ohm, one 85-ohm, one 40-ohm and one 175-ohm sections (R14, R15, R16, R17, R18)	.95
11624	Resistor—22 ohms, flexible type complete with grid contact cap (R19)	.22
11620	Resistor—220 ohms, carbon type, 1/10 watt—Package of 5 (R1)	.75
8070	Resistor—22,000 ohms, carbon type, ½ watt—Package of 5 (R4)	1.00
11400	Resistor—27,000 ohms, carbon type, ¼ watt—Package of 5 (R10)	1.00

Stock No.	DESCRIPTION	List Price
11282	Resistor—56,000 ohms, carbon type, 1/10 watt—Package of 5 (R5)	.75
12286	Resistor—56,000 ohms, insulated, ¼ watt—Package of 5 (R3)	1.00
11398	Resistor—220,000 ohms, carbon type, 1/10 watt—Package of 5 (R7)	.75
11453	Resistor—270,000 ohms, carbon type, 1/10 watt—Package of 5 (R12)	.75
11452	Resistor—470,000 ohms, carbon type, 1/10 watt—Package of 5 (R13)	.75
11397	Resistor—560,000 ohms, carbon type, 1/10 watt—Package of 5 (R2)	.75
12013	Resistor—1 megohm, carbon type, 1/10 watt—Package of 5 (R21)	.75
11626	Resistor—2.2 megohms, carbon type, ¼ watt—Package of 5 (R6, R20)	$1.00
12607	Shield—First I. F. transformer shield top	.30
12581	Shield—Second I. F. transformer shield top	.36
11603	Shield—Coil shield for Stock Nos. 11617 and 11618	.26
12735	Shield—Dial lamp shield—Package of 5	.25
12008	Shield—I. F. transformer shield for Stock Nos. 13106 and 13107	.28
11199	Socket—Dial lamp socket	.14
12771	Socket—Dial lamp socket, located at top of dial scale	.25
11381	Socket—Tuning lamp socket and cover	.45
11195	Socket—5-contact 5Z4 Radiotron socket	.15
11198	Socket—7-contact 6F5 or 6H6 Radiotron socket	.15
11196	Socket—8-contact 6A8, 6F6 or 6K7 Radiotron socket	.15
12007	Spring—Retaining spring for core, Stock No. 12006—Package of 10	.36
12769	Switch—Range switch (S2, S3)	1.25
12668	Tone control and power switch (R9, S1)	1.22
11391	Trap—Wave-trap (L1, C1)	1.22
13106	Transformer—First I. F. transformer (L12, L13, C17, C18)	1.60
13107	Transformer—Second I. F. transformer (L14, L15, C20, C21, C22, R5, R7)	2.06
11848	Transformer—Power transformer, 100-125 volts, 50-60 cycles (T1)	4.40
11849	Transformer—Power transformer, 100-125 volts, 25-40 cycles (T1)	5.70
11850	Transformer—Power transformer, 105-250 volts, 40-60 cycles (T1)	8.00
13144	Volume control (R11)	1.00
	MOTOR BOARD ASSEMBLIES	
4577	Connector—2-contact male connector for motor leads	.30
13575	Escutcheon—Motor speed regulator escutcheon for 25- or 50-cycle motors only	.25
13065	Lever—Brake mechanism actuating lever, fastens to pivot shaft under base	.20
3261	Rest—Pickup rubber rest—Package of 5	.40
13573	Screw—Motor mounting screw assembly, for 60-cycle motor only—Package of 3	.85
13574	Screw—Motor mounting screw assembly, for 25- or 50-cycle motors only—Package of 3	.85
11750	Screw—No. 4-40 x 9/32, cone pointed, headless set screw for lever, Stock No. 13065—Package of 10	.22
	AUTOMATIC BRAKE AND SWITCH ASSEMBLIES	
13582	Brake—Automatic brake and switch complete	2.65
4577	Connector—2-contact male connector for brake switch power supply leads	.30
3994	Cover—Switch cover and screw	.26

Stock No.	DESCRIPTION	List Price
10174	Springs—Complete set of springs for automatic brake—Package of 2 sets	.50
3322	Switch—Automatic brake switch (S4)	.75
	PICKUP AND ARM ASSEMBLIES	
11731	Armature—Pickup armature	.64
11732	Coil—Pickup coil (L23)	.60
4543	Damper—Pickup damper block complete with damper plate	.10
13579	Pickup and arm complete	7.85
11951	Screw—Needle holding screw—Package of 10	.46
12641	Board—Terminal board assembly	$0.15
12640	Bracket—Output transformer mounting bracket	.18
13600	Coil—Field coil (L16)	1.75
11469	Neutralizing coil (L18)	.20
12667	Cone—Reproducer cone (L17)	1.00
5118	Connector—3-contact male connector for reproducer	.25
5119	Connector—3-contact female connector for reproducer cable	.25
9766	Reproducer complete	7.25
11253	Transformer—Output transformer (T2)	1.56
11886	Washer—Spring washer used to hold field coil securely—Package of 5	.20
13576	Motor—105-125 volts, 60-cycle motor complete (M1)	18.90
13577	Motor—105-125 volts, 50-cycle motor complete	25.20
13578	Motor—105-125 volts, 25-cycle motor complete	25.20
13583	Regulator—Motor speed regulator pointer, used on 25- and 50-cycle motors only	.25
11762	Box—Used needle box	.25
11996	Bracket—Tuning lamp mounting bracket and clamp	.22
12030	Cable—2-conductor shielded cable, approx. 18 inches long, connects phonograph volume control to compensator pack	.52
12031	Cable—3-conductor shielded cable, approx. 19 inches long, complete with 4-contact female connector, connects phonograph volume to receiver	1.04
11272	Clamp—Cable clamp for phonograph volume control cable, Stock Nos. 12030 and 12031—Package of 5	.10
11760	Compensator—Phonograph compensator pack, comprising one 470-ohm and one 1,000-ohm resistors, one .01 Mfd., one .1 Mfd. and one 1 Mfd. capacitors and one .25 Henry reactor, L24, C39, C40, C41, R25, R26)	3.85
4153	Connector—4-contact female connector for cable, Stock No. 12031	.48
12666	Cover—Reproducer cover	.65
12698	Escutcheon—Station selector escutcheon and crystal	1.02
12742	Escutcheon—Tuning tube escutcheon	.22
11347	Knob—Phonograph volume control, receiver volume control, or range switch knob—Package of 5	.75
12699	Knob—Large station selector knob—Package of 5	.68
11210	Screw—Chassis mounting screw assembly, comprising one screw, one washer, and one lockwasher—Package of 4	.28
4982	Spring—Retaining spring for large knob in Stock No. 12699—Package of 10	.50
11349	Spring—Retaining spring for small knob in Stock Nos. 12699, 11347 anl 11582—Package of 5	.25
11696	Turntable—Complete	2.48
11695	Volume control—Phonograph volume control and switch (R27, S5)	1.60

The prices quoted above are subject to change without notice.

RCA MFG. CO., INC.

Alignment Procedure

The low-frequency oscillator tracking (600 kc.), wave-trap, and i-f transformer adjustments are made by means of six screws attached to molded magnetite cores. The remaining adjustments in the antenna and oscillator circuits are made with six plunger-type air-dielectric trimming capacitors and require the use of an RCA Stock No. 12636 Adjusting Tool. Before adjusting the plunger-type trimmers, they must be unlocked by loosening their hexagon lock nuts. The lock nuts should be tightened upon completion of adjustments. For location of these adjustments refer to figures 3 and 5.

A standard test oscillator, such as the RCA Stock No. 9595, will be required as a source of signal at the specified alignment frequencies. Means for indication of the receiver output during alignment is also necessary to show when the correct point of adjustment is reached. The RCA Stock No. 4317 Neon Glow Indicator is designed for this purpose.

Attach the output indicator across the loudspeaker voice coil. Advance the receiver volume control to its maximum position, letting it remain in such position for all adjustments. For each adjusting operation, regulate the test-oscillator output control so that the signal level is as low as possible and still be observable at the receiver output. Use of such small signal will obviate broadness of tuning which would otherwise result from a.v.c. action on a strong signal.

I-F Adjustments

Connect the "Ant." output of the test-oscillator to the grid cap of the RCA-6L7 through a .001 mfd. capacitor. Connect the test oscillator "Gnd." terminal to the ground terminal of the receiver chassis. Place the receiver range selector in its "Standard broadcast" (A) position and set receiver dial pointer to a position of no extraneous signals near 600 kc. Ground stator of local oscillator tuning condenser C23 to eliminate local oscillator signals. Adjust the test oscillator to 460 kc.

Adjust the two magnetite core screws L16 and L15 of the second i-f transformer to produce maximum (peak) indicated receiver output. Then adjust the two magnetite core screws L14 and L13 of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. It is advisable to repeat the adjustment of all i-f magnetite core screws to assure that the interaction between them has not disturbed the original adjustments. Remove temporary chassis ground from oscillator stator C23.

R-F Adjustments

Calibrate the tuning dial by adjusting the scale pointer to the extreme low-frequency end calibration mark (530 kc.) on "Standard broadcast" scale while the gang tuning condenser plates are in their full-mesh position. Alignment should be made in sequence of "Wave-trap," "Short wave," "Medium wave," and "Standard broadcast."

Wave-Trap Adjustment

Attach the "Ant." output of the test oscillator to the receiver antenna terminal "A1" through a 200-mmfd. (important) capacitor. The ground connections remain connected together. Leave the test oscillator adjusted to 460 kc. and range selector in "Standard broadcast" position as before. Then adjust the wave-trap screw L1 to the point which causes maximum suppression (minimum indicated output) of the 460 kc. signal.

"Short Wave" Band

Connect the "Ant." output of the test oscillator to the receiver antenna terminal "A1" through a 300-ohm resistor, leaving the ground connections as before. Place the receiver range selector to its "Short wave" (C) position and set the dial pointer to 20,000 kc. Adjust test oscillator to 20,000 kc. Adjust the oscillator trimmer C14 to produce maximum (peak) output. Two positions of this trimmer may be found which produce maximum output. The position of minimum capacitance (plunger near out) should be used. Tighten lock nut. Adjust the antenna trimmer C7 to produce maximum (peak) output while slightly rocking the gang tuning condenser back and forth through the signal. Two positions may be found on this trimmer which produce maximum output. The position of maximum capacitance (plunger near in) should be used. Tighten lock nut. Check for image signal by changing the receiver dial setting to 19,080 kc. If the oscillator trimmer C14 has been correctly adjusted, the image signal will be received at this position. No adjustments should be made while checking for the image signal.

"Medium Wave" Band

Connections for test oscillator remain the same as for "Short Wave" (C) Band. Adjust the test oscillator to 6,000 kc. Place receiver range selector to "Medium Wave" (B) position and set receiver dial pointer to 6,000 kc. Then adjust the two trimmers C16 and C8 of the oscillator and antenna coils so that each produces maximum (peak) indicated receiver output. Tighten trimmer lock nuts.

"Standard Broadcast" Band

Change test oscillator connections by substituting 200 mmfd. condenser for the 300-ohm resistor. Adjust test oscillator and set receiver dial pointer to 1,500 kc. Place receiver range selector to "Standard broadcast" (A) position.

Then adjust the two trimmers, C17 and C9, of the oscillator and antenna coils so that each produces maximum (peak) receiver output. Shift the test oscillator frequency to 600 kc. Tune the receiver to pick up this signal near 600 kc., disregarding the dial reading at which it is best received. Then adjust the oscillator magnetite core screw L11 simultaneously rocking the receiver tuning control backward and forward through the signal until maximum receiver output results from these combined operations. The adjustments at 1,500 kc. should then be repeated to correct for any change which may have been caused by the 600 kc. oscillator adjustment. Tighten lock nuts on C17 and C9.

Loudspeaker.—Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed by softening its cement with a very light application of acetone, using care not to allow the acetone to flow down into the air gap. The dust cover may be cemented back in place with ambroid upon completion of adjustment.

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
12716	Board—Antenna and ground terminal board	$0.20
12717	Board—Phonograph terminal board	.22
5237	Bushing—Tuning condenser mounting bushing assembly—Package of 3	.43
12511	Cap—Grid contact cap—Package of 5	.15
12714	Capacitor—Adjustable trimmer (C7, C9, C16, C17)	.38
12807	Capacitor—Adjustable trimmer (C8, C14)	.35
13001	Capacitor—8.2 Mmfd. (C22)	.20
13002	Capacitor—12 Mmfd. (C18)	.20
12948	Capacitor—33 Mmfd. (C24)	.20
12723	Capacitor—56 Mmfd. (C3)	.20
12629	Capacitor—56 Mmfd. (C26)	.20
12404	Capacitor—120 Mmfd. (C25, C27, C28)	.26
12724	Capacitor—120 Mmfd. (C36)	.28
12725	Capacitor—150 Mmfd. (C1)	.28
12406	Capacitor—180 Mmfd. (C29)	.26
13003	Capacitor—180 Mmfd. (C13)	.20
12408	Capacitor—270 Mmfd. (C19)	.20
12537	Capacitor—560 Mmfd. (C11, C21)	.20
12727	Capacitor—555 Mmfd. (C20)	.20
12947	Capacitor—1,800 Mmfd. (C15)	.40
5005	Capacitor—.0035 Mfd. (C37)	.16
11315	Capacitor—.015 Mfd. (C34)	.20
4886	Capacitor—.05 Mfd. (C5, C6, C39)	.20
4841	Capacitor—0.1 Mfd. (C12, C30, C35)	.22
4858	Capacitor—.01 Mfd. (C2, C4, C31, C33, C38, C45)	.25
5170	Capacitor—0.25 Mfd. (C32)	.25
4840	Capacitor—0.25 Mfd. (C40)	.30
5212	Capacitor—18 Mfd. (C43)	1.16
12998	Capacitor—Pack comprising one 24 Mfd., one 16 Mfd. and on 10 Mfd. sections (C41, C42, C44)	3.70
12708	Coil—Antenna coil and shield (L2, L3, L4, L5)	2.04
12943	Coil—Oscillator coil and shield (L6, L7, L8, L9, L10, L11, L12)	2.30
12701	Condenser—2-gang variable tuning condenser (C10, C23)	4.00
11979	Connector—2-contact male connector for power leads	.30
5119	Connector—3-contact female connector for speaker leads	.25
12800	Core—Adjustable core and stud for Stock No. 12709	.20
12006	Core—Adjustable core and stud for Stock No. 12801 and No. 12653	.22
12664	Core—Adjustable core and stud for Stock No. 12654	.22
12996	Dial—Station selector dial scale	.80
12702	Drive—Vernier drive for tuning condenser	.68
12712	Indicator—Station selector indicator pointer	.22
4340	Lamp—Dial lamp—Package of 5	.60
12718	Mask—Dial light diffuser complete with colored screen	.40
12997	Range switch—(S1, S2)	2.05
12999	Reactor—Filter reactor (L18)	1.60
11955	Resistor—27 ohms, carbon type, ¼ watt—Package of 5 (R21)	1.00
12453	Resistor—27 ohms, insulated, ¼ watt—Package of 5 (R20)	1.00
13004	Resistor—2,200 ohms, carbon type, ½ watt—Package of 5 (R22)	1.00
11647	Resistor—5,600 ohms, carbon type, ¼ watt—Package of 5 (R3)	1.00
11400	Resistor—27,000 ohms, carbon type, ¼ watt—Package of 5 (R3)	1.00
11282	Resistor—56,000 ohms, carbon type, 1/10 watt—Package of 5 (R6)	.75
11281	Resistor—100,000 ohms, carbon type, 1/10 watt—Package of 5 (R4)	.75
5145	Resistor—100,000 ohms, carbon type, ¼ watt—Package of 5 (R2, R19)	1.00
11398	Resistor—220,000 ohms, carbon type, 1/10 watt—Package of 5 (R7)	$0.75
11453	Resistor—270,000 ohms, carbon type, 1/10 watt—Package of 5 (R12)	.75
13005	Resistor—390,000 ohms, carbon type, 1/10 watt—Package of 5 (R13)	.75
11452	Resistor—470,000 ohms, carbon type, 1/10 watt—Package of 5 (R1)	.75
11811	Resistor—680,000 ohms, carbon type, ¼ watt—Package of 5 (R10)	1.00
4241	Resistor—1.5 meg., carbon type, ¼ watt—Package of 5 (R11)	1.00
12651	Shield—Coil shield for Stock No. 12708	.22
12710	Shield—Coil shield for Stock No. 12709	.28
12607	Shield—1st I. F. transformer shield cap	.30
12008	Shield—I. F. transformer shield for Stock Nos. 12801, 12653	.28
12581	Shield—2nd I. F. transformer shield cap	.36
12110	Shield—Top cap shield for 6J7 Radiotron	.14
12704	Shutter—Dial scale holder and shutter assembly	.88
11198	Socket—7-contact 6J7, 6K7 or 6L7 Radiotron socket	.15
11196	Socket—8-contact 25A6, 25Z6, 6H6 or 6J7 Radiotron socket	.15
3529	Socket—Dial lamp socket	.32
12007	Spring—Retaining spring for Stock Nos. 12800, 12006 and 12664—Package of 10	.36
12849	Spring—Tension spring for band indicator shutter link—Package of 5	.18
12668	Tone control and power switch (R14, S3)	1.22
12801	Transformer—First I. F. transformer complete (L13, L14, C25, C26)	1.70
12653	Transformer—Second I. F. transformer complete (L15, L16, C27, C28, C29, R6, R7)	2.06
12654	Trap—Wave trap complete (L1)	.75
13144	Volume control (R9)	1.00
	REPRODUCER ASSEMBLIES	
12914	Board—2-contact reproducer terminal board	.25
12640	Bracket—Output transformer mounting bracket	.18
12642	Cone—Reproducer cone and dust cap (L17)	.94
5118	Connector—3-contact male connector for speaker leads	.25
9717	Reproducer complete	16.20
11828	Transformer—Output transformer (T1)	1.46
	MISCELLANEOUS ASSEMBLIES	
11824	Connector—2-contact female connector for power cord, Stock No. 11823	.34
11823	Cord—Power cord complete	.65
12698	Crystal—Station selector escutcheon and crystal	1.02
12699	Knob—Large station selector knob—Package of 5	.68
12992	Knob—Small vernier station selector knob—Package of 5	.45
12995	Knob—Tone and power switch knob—Package of 5	.45
12994	Knob—Volume control or range switch knob—Package of 5	.45
11377	Screw—Chassis mounting screw assembly—Package of 4	.12
12993	Screw—8-32 x ⅛ headless set screw for knob, Stock Nos. 12992, 12993, 12994 and 12995—Package of 10	.20
4982	Spring—Retaining spring for knob, Stock No. 12699—Package of 10	.50
12679	Resistor—2.2 meg., insulated, ¼ watt—Package of 5 (R5)	1.00
13000	Resistor—Ballast resistor, comprising one 50-ohm and three 40-ohm sections (R15, R16, R17, R18)	1.40
4669	Screw—8-32 set screw for Stock No. 12704—Package of 10	.25

Prices quoted above are subject to change without notice.

MODEL 7X
Schematic, Voltage
Socket, Trimmers
Alignment, Resistanc

RCA MFG. CO., INC.

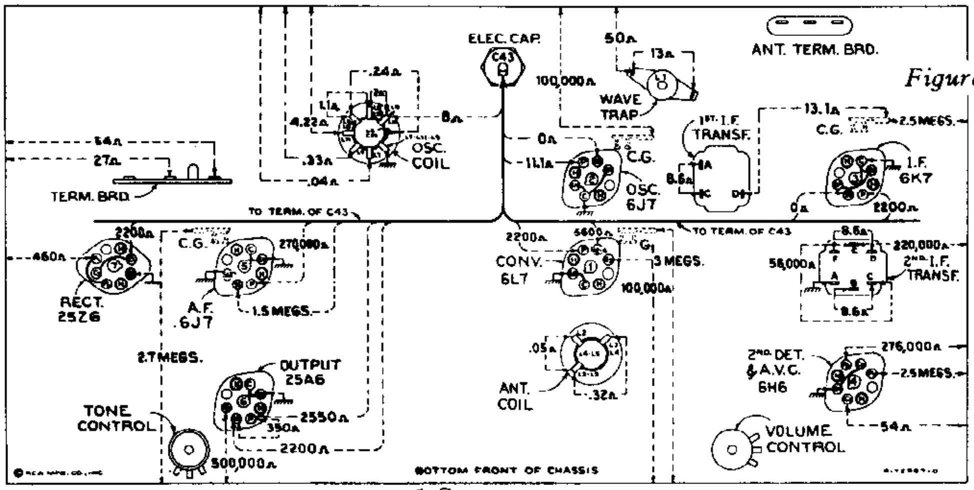
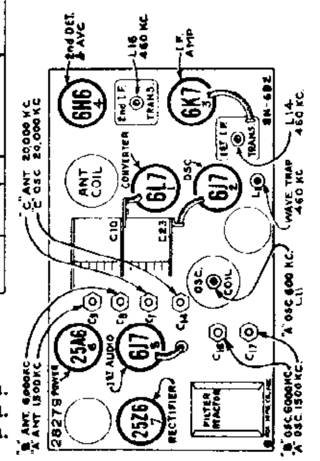
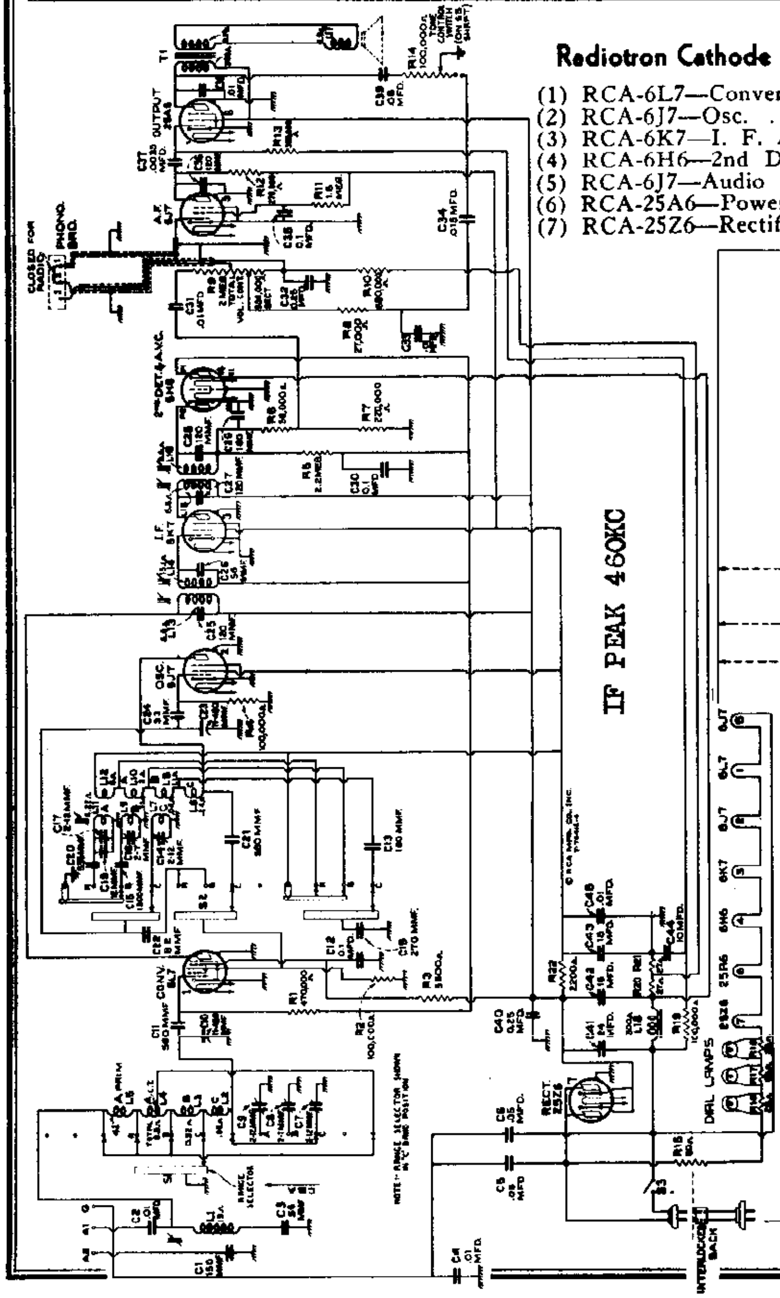


Figure 4—Resistance Diagram





Radiotron Cathode Current Readings

(1) RCA-6L7—Converter	7.5	ma.
(2) RCA-6J7—Osc.	3.5	ma.
(3) RCA-6K7—I. F. Amp.	8.5	ma.
(4) RCA-6H6—2nd Det.-A.V.C.	—	
(5) RCA-6J7—Audio	0.22	ma.
(6) RCA-25A6—Power	27.0	ma.
(7) RCA-25Z6—Rectifier	48.0	ma.

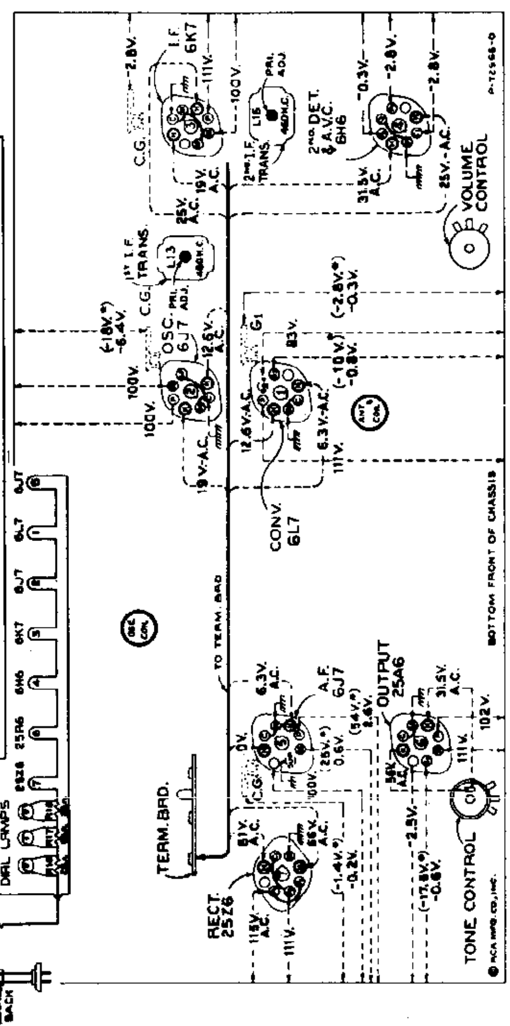
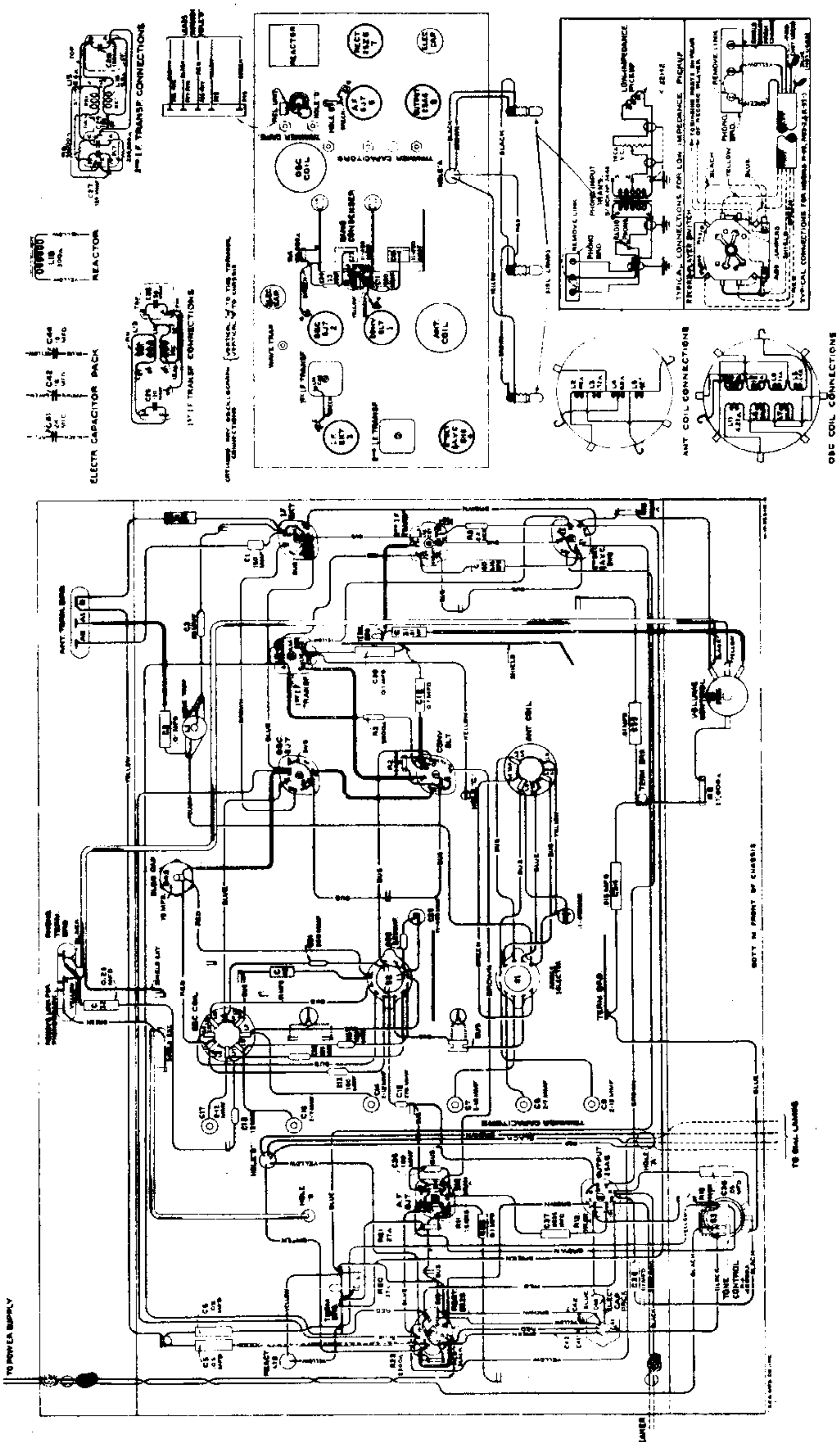


Figure 5—Radiotron Socket Voltages and Trimmer Locations
Measured at 115 volts, 60-cycle supply—For 115-volt d-c supply approximately 10% lower—Tuned to approximately 1,000 kc—No signal being received—Tone control optional—

MODEL 7X

Chassis Wiring

RCA MFG. CO., INC.



FREQUENCY RANGES

"Standard Broadcast" (A)	530-1,780 kc.
"Medium Wave" (B)	1,780-6,300 kc.
"Short Wave" (C)	6,300-22,000 kc.
Intermediate Frequency	460 kc.

ALIGNMENT FREQUENCIES

"Standard Broadcast" (A)	600 kc. (osc.), 1,500 kc. (osc., ant.)
"Medium Wave" (B)	6,000 kc. (osc., ant.)
"Short Wave" (C)	20,000 kc. (osc., ant.)

RCA MFG. CO., INC.

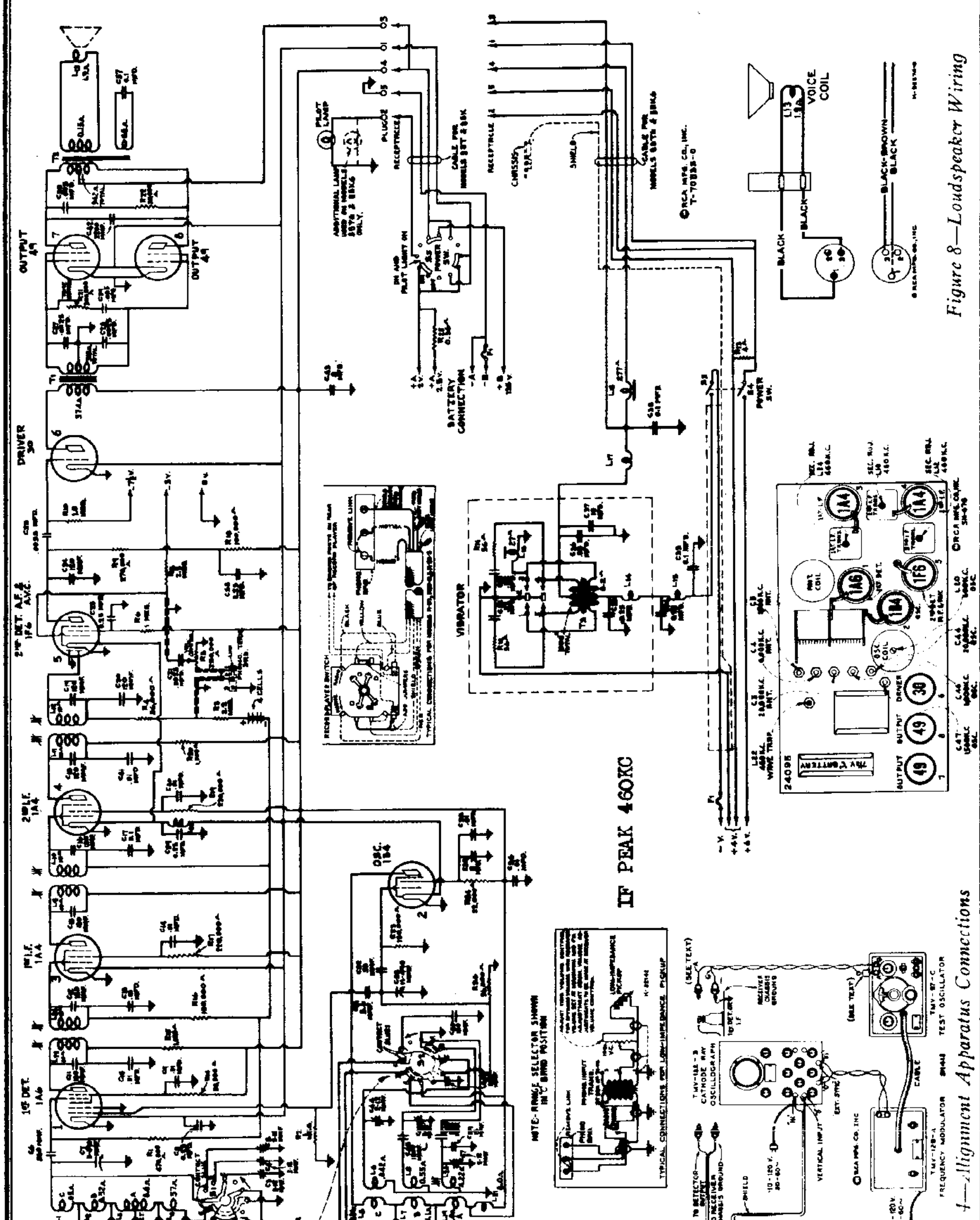


Figure 8—Loudspeaker Wiring

Figure 4—Alignment Apparatus Connections

MODELS 8BT6, 8BK6
Power Unit Wiring
Chassis Wiring

RCA MFG. CO., INC.

MODELS 8BT, 8BK
Batt. Cable, Chassis Wiring

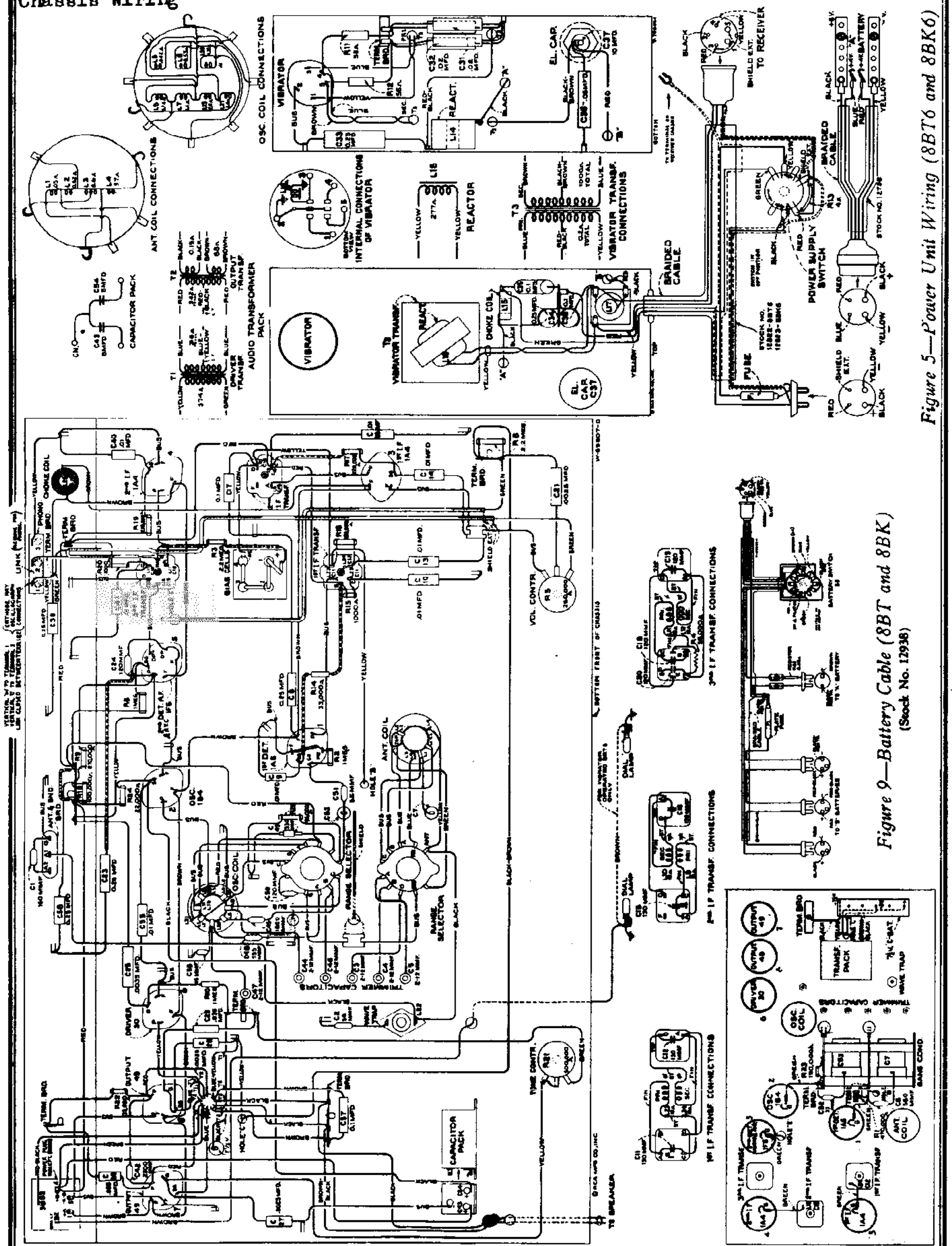


Figure 5—Power Unit Wiring (8BT6 and 8BK6)

Figure 9—Battery Cable (8BT and 8BK)
(Stock No. 12938)

RCA MFG. CO., INC.

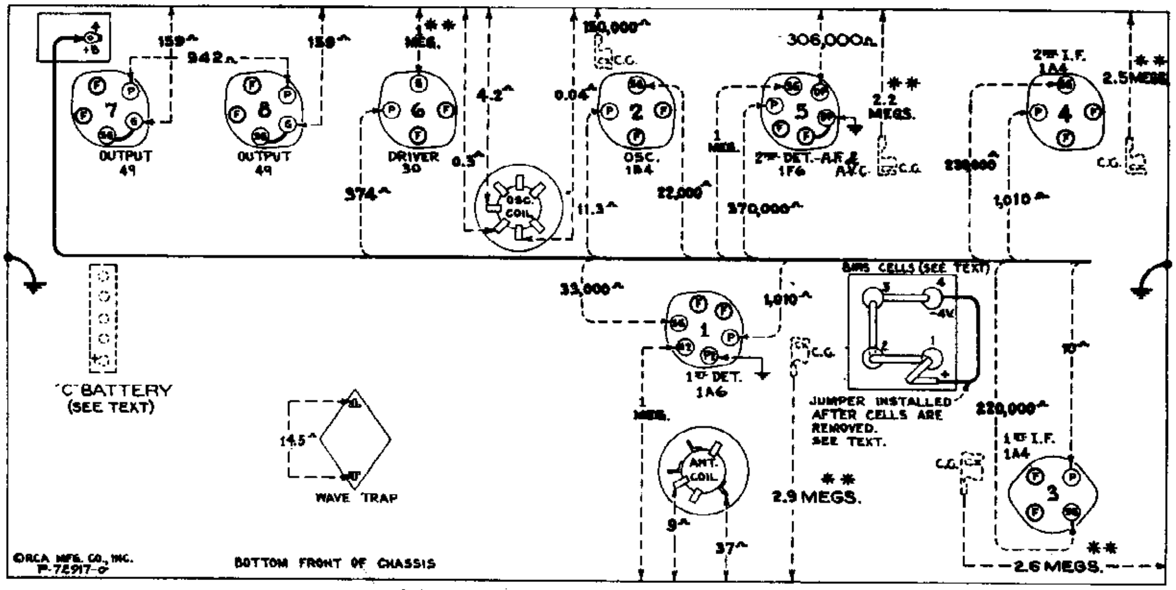


Figure 6—Resistance Diagram

Power-supply cable disconnected—Radiotrons in sockets—Tuning condenser in full-mesh—Bias cells and "C" battery removed—Volume setting optional

Resistance Measurements

***Before making any resistance measurements, remove the four bias cells and connect jumpers on bias-cell board as shown. Also, remove the "C" battery and connect the two leads (—7½ v. and —3 v.) to chassis ground. After measurements are completed, remove jumpers from bias-cell board and then carefully insert bias cells. Next, insert "C" battery and restore leads to their respective positions.*

Radiotron Plate Current Readings

Measured with Milliammeter Connected at Tube Socket Plate Terminals under Conditions Similar to Those of Voltage Measurements

(1)	RCA-1A6—1st Det.	1.2 ma.
(2)	RCA-1B4—Osc.	3.8 ma.
(3)	RCA-1A4—1st I.F.	0.9 ma.
(4)	RCA-1A4—2nd I.F.	0.9 ma.
(5)	RCA-1F6—2nd Det.—A.F.—A.V.C.	0.25 ma.
(6)	RCA-30 —Driver	3.2 ma.
(7)	RCA-49 —Output	1.5 ma.
(8)	RCA-49 —Output	1.5 ma.

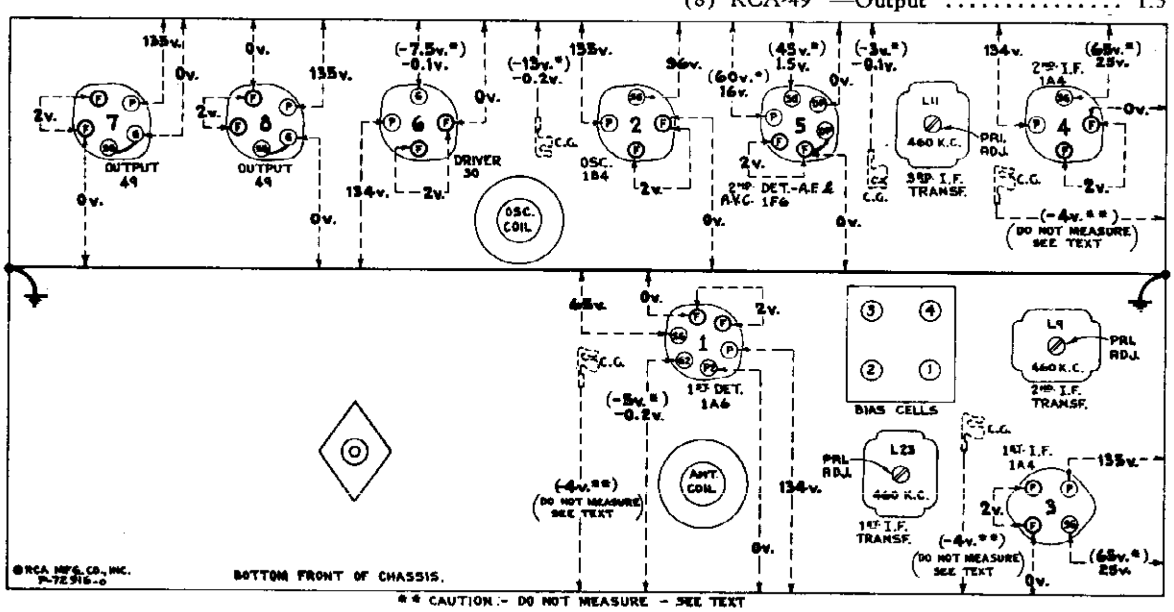


Figure 7—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured with all batteries at normal voltage—Tuned to approximately 1,000 kc ("Standard broadcast")—No signal being received—Volume control optional

RCA MFG. CO., INC.

The signal entering the antenna circuit is coupled to control grid No. 1 of the RCA-1A6 through a tuned r-f transformer. This transformer is tapped to provide correct inductance for the band being used, and at the same time selecting the proper winding which serves as the primary and shorts out the unused coils to prevent any interaction which might otherwise occur. The locally generated oscillator signal is fed to control grid No. 2 of the RCA-1A6 through capacitor C51. Separate windings are employed in the oscillator stage for each band. The unused portions of the oscillator coil are shorted out when not in use. The output of the first-detector stage is fed through a two-stage i-f amplifier, consisting of two RCA-1A4's and three i-f transformers, to the diode portion of the RCA-1F6. Such an i-f amplifier arrangement provides excellent selectivity and gain, while its design gives increased fidelity due to its flat-top characteristic. The audio frequency secured by the detection process develops a voltage across resistors R4 and R5. The voltage developed across R5 is applied as a.v.c. bias to the first detector and i-f tubes. The arm of the volume control R5 selects a portion of the audio voltage which is applied to the control grid of the RCA-1F6 for voltage amplification. The output of this stage is resistance-capacitance coupled to the RCA-30 driver tube. The output of the driver stage is transformer coupled to the class "B" push-pull output stage using RCA-49's. The output of this push-pull stage is transformer coupled to the permanent magnet dynamic loudspeaker. A tertiary winding on the output transformer shunted by C57 provides sharp cutoff of the high audio frequencies. A continuously variable high-frequency tone control R21 in series with C29 provides manual high-frequency tone control.

Models 8BT6 and 8BK6 obtain their plate supply from a vibrator-type power unit. The vibrator together with the power transformer T3 combine the functions of generating alternating current and rectification. Filter chokes and capacitors are built into this unit to eliminate interference (noise) which would otherwise be introduced into the receiver circuits.

Caution: The four bias cells are used only for the purpose of supplying bias potential and should never be measured with an ordinary voltmeter or other device which draws any current. A simple check on these cells may be made by connecting a milliammeter in the plate circuit of either RCA-1A4 tube and noting the plate current reading. Then remove the two bias cells (3 and 4), being careful that the spring contact clips do not short-circuit them during removal. Connect a 4-volt battery between the + and — 4v. terminals of the bias cell board, and again note the plate current reading. If the first reading obtained (with bias cells) is more than 40% from the latter reading (with 4-volt battery), all bias cells should be replaced. This 40% difference is equivalent to a change of approximately 25% battery voltage.

Alignment Procedure

There are seven alignment adjustments provided in the antenna and oscillator coil tuned circuits. Six of these adjustments are plunger type air trimmers and require use of an RCA Stock No. 12636 Adjusting Tool. The i-f transformer adjustments are made by means of screws attached to molded magnetite cores.

The cathode-ray method of alignment is preferred due to the flat-top i-f characteristics of these receivers. This type of alignment is possible through use of apparatus such as the RCA Stock No. 9558 Frequency Modulator and the RCA Stock No. 9545 Cathode-Ray Oscillograph. If this equipment is not available, an approximate alignment may be performed by the output-indicator method with an instrument such as the RCA Stock No. 4317 Neon Glow Indicator attached across the loudspeaker voice coil. Alignment by this method is similar to the cathode-ray method outlined below except that the receiver volume control should be at maximum, and the test oscillator sweeping operations omitted. The i-f adjustments should be made so that the test-oscillator frequency can be shifted 2 kc above and below the 460 kc alignment frequency with little change in output. The r-f adjustments should be peaked.

Cathode-Ray Alignment

Make alignment apparatus connections shown on figure 4. Remove the plug of the frequency modulator cable from the test oscillator jack. Connect the receiver chassis to a good external ground. Connect oscillograph "Vertical" input terminals as indicated on figure 2. Set oscillograph power switch to "On" and adjust "Intensity" and "Focus" controls to give a clearly defined spot, or line, on the screen. Set oscillograph "Ampl. A" switch to "On," "Vertical gain" control full-clockwise, "Ampl. B" switch to "Timing," "Range" switch to No. 2 position, and "Timing" switch to "Int." Place the "Sync." control, "Freq." control, and "Horizontal gain" control to about their mid-positions. For each of the following adjustments, the test oscillator output must be regulated so that the image obtained on the oscillograph screen will be of the minimum size for accurate observation. The receiver volume control setting is optional.

I-F Adjustments

(a) Connect the "Ant." output of the test oscillator to the grid cap of RCA-1A4 second i-f tube (with grid lead in place) through a .05-mfd. capacitor, with "Gnd." to receiver chassis. Tune the test oscillator to 460 kc, place its modulation switch to "On" and its output switch to "Hi."

(b) Turn on the receiver and test oscillator. Increase the output of the test oscillator until a deflection is noticeable on the oscillograph screen. The figures obtained represent several waves of the detected signal, the amplitude of which may be observed as an indication of output. Cause the wave image formed (400-cycle waves) to be spread completely across the screen by adjusting the "Horizontal gain" control. The image should be synchronized and made to remain motionless by adjusting the "Sync." and "Freq." controls.

(c) Adjust the two magnetite core screws L12 and L11 (see figures 3 and 7) of the third i-f transformer (one on top and one on bottom) to produce maximum vertical deflection of the oscillographic image. This adjustment places the transformer in exact resonance with the 460-kc signal.

(d) The sweeping operation should follow using the frequency modulator. Shift the oscillograph "Timing" switch to "Ext." Insert plug of frequency-modulator cable in test-oscillator jack. Turn the test-oscillator modulation switch to "Off." Turn on the frequency modulator and place its sweep-range switch to "Hi."

(e) Increase the frequency of the test oscillator by slowly turning its tuning control until two separate, distinct, and similar waves appear on the screen. If only one wave appears, increase the "Freq." control on the oscillograph to obtain two waves. These waves will be identical in shape, totally disconnected, and appear in reversed positions. They will have a common base line, which is discontinuous. Adjust the "Freq." and "Sync." controls of the oscillograph to make them remain motionless on the screen. Continue increasing the test oscillator frequency until these forward and reverse curves move together and overlap, with their highest points exactly coincident. This condition will be obtained at a test oscillator setting of approximately 575 kc.

(f) With the images established as in (e), re-adjust the two magnetite core screws on the third i-f transformer so that they cause the curves on the oscillograph screen to become exactly coincident throughout their lengths and have maximum amplitude.

(g) Without altering the adjustments of the apparatus, shift the "Ant." output of the test oscillator along with the .05-mfd. capacitor to the grid cap of the RCA-1A4 first i-f tube (with grid lead in place). Adjust the two second i-f transformer magnetite core screws L10 and L9 so that they cause the forward and reverse curves to become coincident throughout their lengths and have maximum amplitude.

(h) Shift the "Ant." output of the test oscillator along with the .05-mfd. capacitor to the grid cap of the RCA-1A6 first detector tube. Adjust the two magnetite core screws L24 and L23 of the first i-f transformer so that they cause the forward and reverse curves to become coincident and have maximum amplitude. The composite wave obtained in this manner represents the resonance characteristic of the total i-f system. Lack of symmetry or irregularity of the resultant image will indicate the presence of a defect in the i-f system.

R-F Adjustments

Calibrate the pointer of the tuning dial by adjusting it to the extreme low-frequency end of dial scale (530 kc) with the plates of the gang tuning condenser in full mesh. Alignment must be made in the sequence of "Short wave" band, "Medium wave" band, "Wave-trap," and "Standard broadcast" band.

"Short Wave" Band

(i) Connect the "Ant." output of the test oscillator to the antenna terminal "A1" through a 300-ohm resistor. Remove the plug of the frequency-modulator cable from test-oscillator jack. Turn test-oscillator modulation switch to "On." Shift the oscillograph "Timing" switch to "Int."

(j) Set receiver range selector to its "Short wave" position and dial pointer to 20,000 kc. Adjust the test oscillator to 20,000 kc. Adjust oscillator air trimmer C44 until maximum (peak) amplitude of output is reached. Two peaks may be found. The peak with minimum capacity (plunger near out) should be used. Tighten lock nut. Adjust antenna air trimmer C3 until maximum (peak) amplitude of output is reached while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacity (plunger near in) should be used. Tighten lock nut. Check the image frequency by changing the receiver dial setting to 19,080 kc. The test oscillator signal should be faintly received at this position indicating that the adjustment of C44 has been correctly made. No adjustments should be made while checking for this image signal.

"Medium Wave" Band

(k) Place receiver range selector to its "Medium wave" position with the receiver dial pointer set to 6,000 kc. Tune the test oscillator to 6,000 kc. Adjust the oscillator air trimmer C46 for maximum (peak) amplitude of output as shown by the waves on the oscillograph screen. Two peaks may be found. The peak obtained with minimum capacity (plunger near out) should be used. Tighten lock nut. Adjust antenna air trimmer C4 for maximum (peak) output. Tighten lock nut.

"Wave-Trap" Adjustment

(l) Connect the output of the test oscillator to the antenna terminal "A1" through a 200-mmfd. (important) capacitor. Place receiver range selector in "Standard broadcast" position. Set the receiver dial to a position of no extraneous signals near 600 kc. Tune the test oscillator to 460 kc. Adjust the wave-trap magnetite core screw to the point which causes minimum amplitude of output (maximum suppression of signal) as shown by the waves on the oscillograph.

"Standard Broadcast" Band

(m) Reduce output of test oscillator to minimum. Set receiver dial pointer to 600 kc. Tune the test oscillator to 600 kc and increase its output until a deflection is noticeable on the oscillograph screen.

(n) Adjust oscillator magnetite core screw L20 (top of oscillator coil) so that maximum (peak) amplitude of output is shown on the oscillograph screen.

(o) Set receiver dial pointer to 1,500 kc. Tune test oscillator to 1,500 kc. Adjust the oscillator and antenna air trimmers C47 and C5 for maximum (peak) output.

(p) Set test oscillator to 600 kc and tune receiver to pick up this signal near 600 kc. Re-adjust the oscillator magnetite core screw L20 for maximum (peak) output while rocking the receiver gang tuning condenser back and forth through this signal.

(q) Repeat adjustments in (o) above to correct for any changes in the oscillator tuning caused by the adjustment of L20. Tighten lock nuts on C47 and C5 after each is adjusted.

Antenna and Ground Terminals

These receivers are equipped with an antenna-ground terminal board having three terminals. These terminals are marked "A2," "A1," and "G," the latter being the ground terminal.

RCA MFG. CO., INC.

nected to a good external ground. The transmission line leads of the RCA RK-40A antenna system should be connected to terminals "A2" and "A1." The receiver coupling units of the RCA RK-40 and the RCA Spider-Web antenna systems should be connected to terminals "A1" and "G." Connect a single-wire antenna to terminal "A1."

Phonograph Attachment

A terminal board is provided for connecting a phonograph into the audio amplifying circuit. Typical methods of connecting a low-impedance pickup, or the RCA Victor Models R-93, R-93-2, and R-93-S Record Players are shown on the schematic diagram (figure 1).

Loudspeaker

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed by softening its cement with a very light application of acetone using care not to allow the acetone to flow down into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

Power Supply (Models 8BT and 8BK)

Filament voltage for these receivers is obtained from either a 2½-volt Air-cell or a 2-volt storage battery. When the Air-cell is used, the 0.36 ohm resistor R25 must be connected in series with the A-battery lead as shown on figure 9. When operating on a 2-volt storage battery, this resistor R25 should be removed. Plugs are provided on the battery cable (see figure 9) for plugging in the Air-cell and B batteries. The A-battery plug should be removed when operating on a 2-volt storage battery. The 7½-volt C battery is located on the top-side of the chassis and securely held in place by a metal cover (see figure 3). The four bias cells are located underneath the chassis (see figures 2 and 6).

Power Supply (Models 8BT6 and 8BK6)

The vibrator power unit supplies the necessary plate, grid, and cathode voltages for proper operation of these receivers. It contains a plug-in type vibrator, step-up transformer, and an efficient filter system. Rectification of the high voltage is accomplished by means of the synchronous vibrator. The complete unit is acoustically shielded to prevent noise. The vibrator-power-unit chassis should be insulated from the receiver chassis, when removed for service, to avoid vibrator buzz. The vibrator unit has been carefully adjusted by means of special equipment to insure quiet operation over an extensive period of life. No adjustments should be attempted on a vibrator suspected of being in a defective condition, but a renewal installed. The plug-in arrangement affords easy removal or replacement.

A 6-volt storage battery supplies power for the vibrator and for the tube filaments. Four connections are required to the 6-volt battery. The +6-volt (black) lead and the +4-volt (blue) lead supply filament voltage to the receiver, while the +4-volt (red) lead and — volt (yellow) lead supply voltage to the vibrator power unit. The two 4-volt leads (blue and red) should make separate connections to the same battery strap to avoid against vibrator buzz which might otherwise result if these two leads are joined together or touch each other. The 7½-volt C battery is located on the top-side of the receiver chassis and securely held in place by a metal cover (see figure 3). The four bias cells are located underneath the receiver chassis (see figures 2 and 6).

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
12806	Board—3-contact antenna and ground terminal board and bracket assembly	.25
12717	Board—3-contact phonograph terminal board	.22
5237	Bushing—Variable condenser mounting bushing assembly—Package of 3	.43
12118	Cap—Grid contact cap—Package of 5	.15
12714	Capacitor—Adjustable trimmer (C3, C4, C5, C44, C46, C47)	.38
12814	Capacitor—5.6 Mmfd. (C51)	.20
12896	Capacitor—15 Mmfd. (C59)	.20
12948	Capacitor—33 Mmfd. (C52)	.20
12723	Capacitor—56 Mmfd. (C2)	.20
12950	Capacitor—120 Mmfd. (C50)	.25
12404	Capacitor—120 Mmfd. (C18, C19, C20)	.26
12724	Capacitor—120 Mmfd. (C24)	.28
12946	Capacitor—130 Mmfd. (C11, C12, C15, C16)	.20
12725	Capacitor—150 Mmfd. (C1)	.28
12952	Capacitor—330 Mmfd. (C49)	.25
12727	Capacitor—555 Mmfd. (C48)	.20
12537	Capacitor—560 Mmfd. (C6)	.20
12947	Capacitor—1,800 Mmfd. (C45)	.40
12951	Capacitor—2,200 Mmfd. (C42)	.40
5107	Capacitor—.0025 Mfd. (C21, C27, C28)	.16
5005	Capacitor—.0035 Mfd. (C25)	.16
4868	Capacitor—.005 Mfd. (C30)	.20
4858	Capacitor—.01 Mfd. (C9, C10, C13, C14, C40, C41, C55, C56)	.25
5196	Capacitor—.035 Mfd. (C29)	.18
4841	Capacitor—0.1 Mfd. (C17, C57)	.22
4840	Capacitor—0.25 Mfd. (C8, C23, C39, C58)	.30
12804	Capacitor—Pack, comprising 2 sections 8 Mfd. each (C43, C54)	1.70
12179	Coil—Choke coil (L25)	.45
12708	Coil—Antenna coil and shield complete (L1, L2, L3, L4)	2.04
12943	Coil—Oscillator coil and shield complete (L5, L6, L7, L8, L19, L20, L21)	2.30
12701	Condenser—2-gang variable tuning condenser (C7, C53)	4.00
5119	Connector—3-contact female connector for speaker cable	.25
12805	Connector — 5-contact male receptacle located on rear of receiver chassis for power cable	.20
12800	Core—Adjustable core and stud for Stock No. 12943	.20
12006	Core—Adjustable core and stud for Stock No. 12945 and 12949	.22
12664	Core—Adjustable core and stud for Stock No. 12654	.22
12681	Cell—Bias cell	.30
12940	Dial—Station selector dial	.85
12702	Drive—Vernier drive complete for variable tuning condenser	.68
12808	Holder—Bias cell holder	.35
12712	Indicator—Station selector indicator pointer	.22
4348	Lamp—Dial lamp, 2-volt	.38
12941	Mask—Dial light diffuser	.15
5112	Resistor—1,000 ohm—carbon type—¼ watt—Package of 5 (R15, R20)	1.00
11305	Resistor—22,000 ohm—carbon type—¼ watt—Package of 5 (R24)	1.00
11364	Resistor—33,000 ohm—carbon type—¼ watt—Package of 5 (R22)	1.00
12454	Resistor—33,000 ohm—insulated type—¼ watt—Package of 5 (R14)	1.00
11282	Resistor—56,000 ohm—carbon type—1/10 watt—Package of 5 (R4)	.75
5029	Resistor—56,000 ohm—carbon type—¼ watt—Package of 5 (R26)	1.00
5145	Resistor—100,000 ohm—carbon type—¼ watt—Package of 5 (R16, R18)	1.00
12478	Resistor—150,000 ohm—carbon type—1/10 watt—Package of 5 (R23)	.75
5158	Resistor—220,000 ohm—carbon type—¼ watt—Package of 5 (R17, R19)	1.00
11323	Resistor—270,000 ohm—carbon type—¼ watt—Package of 5 (R9)	1.00
11452	Resistor—470,000 ohm—carbon type—1/10 watt—Package of 5 (R1)	.75
5033	Resistor—1 meg.—carbon type—¼ watt—Package of 5 (R2, R6)	1.00
12200	Resistor—1 meg.—insulated type—¼ watt—Package of 5 (R10)	1.00
11626	Resistor—2.2 meg.—carbon type—¼ watt—Package of 5 (R3, R8)	1.00
12651	Shield—Coil shield for Stock No. 12708	.22
12710	Shield—Coil shield for Stock No. 12943	.28
12008	Shield—I.F. transformer shield for Stock No. 12945 and 12949	.28
12581	Shield—I.F. transformer shield top for Stock No. 12949	.36
12607	Shield—I.F. transformer shield top for Stock No. 12945	.30
4236	Shield—Front 1A4 Radiotron shield	.22
3682	Shield—1A4, 1B4, 1A6 or 1F6 Radiotron shield	.22
4794	Socket—4-contact 1A4, 1B4 or 30 Radiotron socket	.15
4814	Socket—5-contact 49 Radiotron socket	.15
4786	Socket—6-contact 1A6 or 1F6 Radiotron socket	.15
11199	Socket—Dial lamp socket	.14
12007	Spring—Retaining spring for core Stock Nos. 12800, 12006 and 12664—Package of 10	.36
12942	Switch—Range switch (S1, S2)	1.60
11219	Tone Control—(R21)	1.00
12944	Transformer—Audio transformer pack (T1, T2)	5.20
12945	Transformer—First I.F. transformer complete (L23, L24, C11, C12)	1.85
12945	Transformer — Second I.F. transformer complete (L9, L10, C15, C16)	1.85
12949	Transformer—Third I.F. transformer complete (L11, L12, C18, C19, C20, R4)	2.10
12654	Trap—Wave trap (L22)	.75
11589	Volume Control—(R5)	.85
	REPRODUCER ASSEMBLIES Console Model 8BK—8BK6	
12667	Cone—Reproducer cone and dust cap (L13)	1.00
5118	Plug—3-contact male connector for reproducer	.25
9713	Reproducer—Complete	14.85
	REPRODUCER ASSEMBLIES Table Model 8BT—8BT6	
12642	Cone—Reproducer cone and dust cap (L13)	.94
5118	Plug—3-contact male connector for reproducer	.25
9712	Reproducer—Complete	6.60
	VIBRATOR ASSEMBLIES 8BT6—8BK6	
4289	Body—Fuse connector female body—Package of 10	.35
12822	Cable—Power cable (set end) approximately 63-in. long complete with one 5-contact female connector and one 4-contact male connector—less power switch—used in 8BT6 Model only	4.50
12823	Cable—Power cable (set end) approximately 44-in. long complete with one 5-contact female connector and one 4-contact male connector—less power switch—used in 8BK6 Model only	4.00
4288	Cap—Fuse connector male cap—Package of 10	.36
4937	Capacitor—.01 Mfd. (2 used in parallel) (C31, C32)	.25
4836	Capacitor—.05 Mfd. (C36)	.30
4841	Capacitor—0.1 Mfd. (C35)	.22
12821	Capacitor—0.1 Mfd. (C38)	.40
12820	Capacitor—0.25 Mfd. (C34)	.45
4840	Capacitor—0.25 Mfd. (C33)	.30
11387	Capacitor—10 Mfd. (C37)	.86
12819	Coil—Vibrator choke coil and terminal board assembly (L17)	.40
12179	Coil—Vibrator choke coil (L15)	.45
12793	Connector—4-contact male connector for power cable	.25
12791	Connector—5-contact female connector and cover for power cable	.30
4286	Ferrule—Fuse connector ferrule and bushing—Package of 10	.38
10907	Fuse—3-ampere—Package of 5 (F1)	.40
4290	Insulator—Fuse connector body insulator—Package of 10	.35
12815	Reactor—Air core reactor (L14)	.80
12818	Reactor—Iron core (L18)	.95
12825	Resistor—4 ohm—flexible type—(R13)	.25
5034	Resistor—56 ohm—carbon type—½ watt—Package of 5 (R11, R12)	1.00
4814	Socket—5-contact vibrator socket	.15
4284	Spring—Fuse connector spring—Package of 10	.30
12824	Switch—Power switch (S3, S4)	1.00
12816	Transformer—Vibrator transformer (T3)	3.00
12817	Vibrator—Complete (L16)	4.85
4285	Washer—Fuse connector insulating washer—Package of 10	.22
	MISCELLANEOUS ASSEMBLIES	
4289	Body—Fuse connector female body—Package of 10 (8BT—8BK)	.35
12938	Cable—Power cable (set end) approximately 60-in. long complete with four 2-contact male connectors and one 5-contact female connector—less power switch (8BT—8BK)	4.40
12786	Cable—Power cable (battery section) complete with battery connectors and female section of 4-contact connector (8BT6—8BK6)	2.00
4288	Cap—Fuse connector male cap—Package of 10 (8BT—8BK)	.36
12827	Connector—2-contact and guide pin male connector and cover for power cable Stock No. 12938 (8BT—8BK)	30
12828	Connector—2-contact male connector for power cable Stock No. 12938 (8BT—8BK)	20
12788	Connector—4-volt battery connector for Stock No. 12786—Package of 2 (8BT6—8BK6)	.20
12790	Connector—4-contact female connector for cable Stock No. 12786 (8BT6—8BK6)	.45
12791	Connector—5-contact female connector and cover for power cable for Stock No. 12938 (8BT—8BK)	.30
12787	Connector—6-volt battery connector for Stock No. 12786—Package of 2 (8BT6—8BK6)	.20
12698	Crystal—Station selector dial escutcheon and crystal	1.02
4286	Ferrule—Fuse connector ferrule and bushing—Package of 10 (8BT—8BK)	.38
3748	Fuse—½ ampere—Package of 5 (F1) (8BT—8BK)	.40
4290	Insulator—Fuse connector body insulator—Package of 10 (8BT—8BK)	.35
12699	Knob—Station selector knob (large)—Package of 5	68
12700	Knob — Station selector vernier knob (small)—Package of 5	.58
11347	Knob—Volume control, range switch, tone switch or power switch knob—Package of 5	.75
12939	Resistor—0.36 ohm—flexible type—Package of 5 (R25) (8BT—8BK)	.55
11377	Screw—Chassis mounting screw assembly for table model only—Package of 4 (8BT—8BT6)	.12
12829	Switch—Power switch (S3) (8BT—8BK)	1.05
4285	Washer—Fuse connector insulating washer—Package of 10 (8BT—8BK)	.22

The prices quoted above are subject to change without notice.

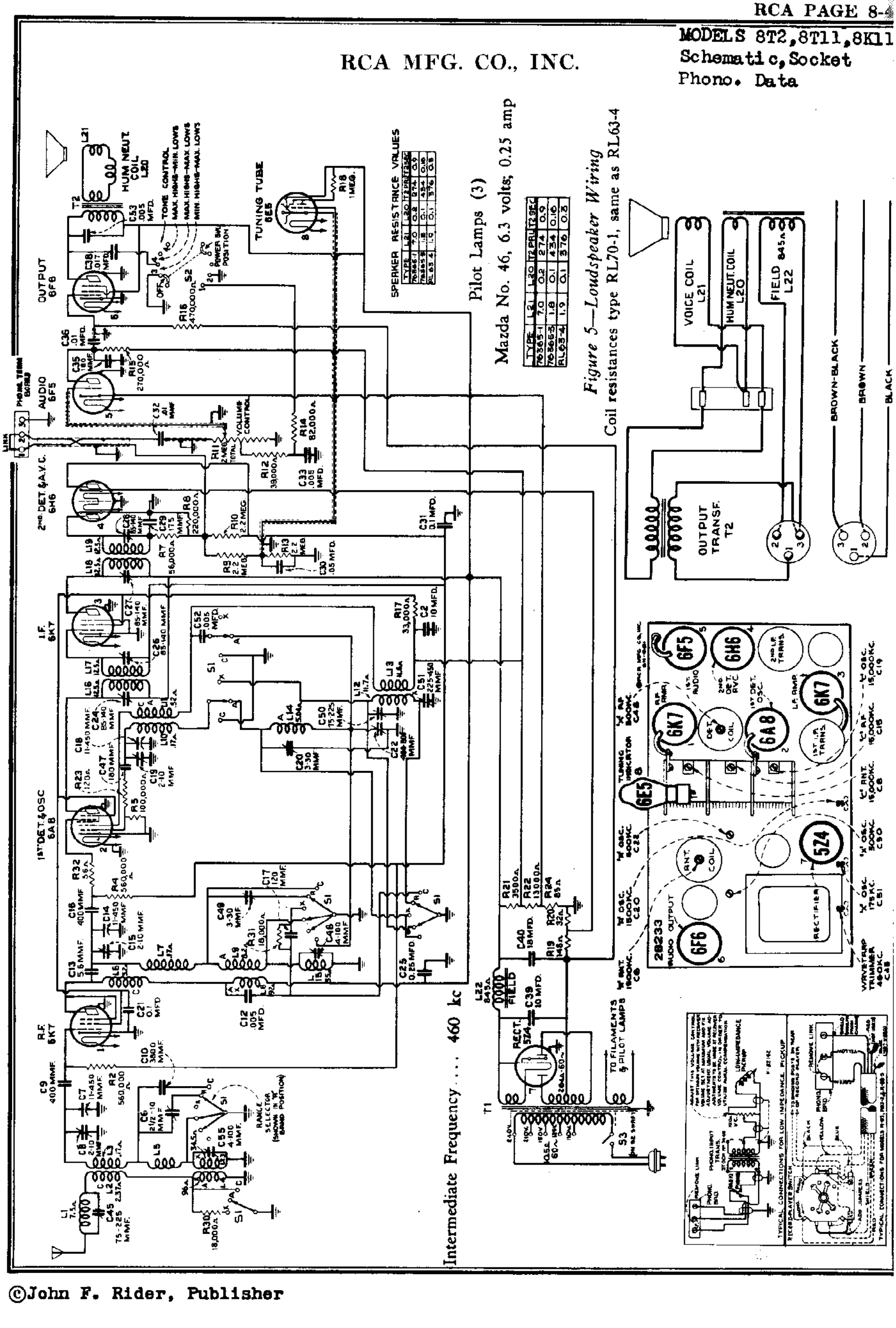
RCA MFG. CO., INC.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
12706	Arm—Arm and hub assembly for operating shutter	$0.22
13098	Board—Antenna and ground terminal board	.25
12717	Board—Phonograph terminal board	.22
5237	Bushing—Variable tuning condenser mounting bushing assembly—Package of 3	.43
11625	Cable—Radiotron tuning tube cable complete with socket	1.26
12511	Cap—Contact cap—Package of 5	.15
4955	Capacitor—Adjustable trimmer (C45)	.48
11256	Capacitor—Adjustable trimmer (C50)	.48
11465	Capacitor—Adjustable trimmer (C22)	.48
12065	Capacitor—Adjustable trimmer (C51)	.65
12814	Capacitor—5.6 Mmfd.—(C13)	.20
12974	Capacitor—120 Mmfd.—(C17)	.20
13003	Capacitor—180 Mmfd.—(C35, C47)	.20
5116	Capacitor—175 Mmfd.—C29)	.18
11290	Capacitor—400 Mmfd.—(C9, C16)	.25
11621	Capacitor—3,600 Mmfd.—(C10)	.38
4868	Capacitor—.005 Mfd.—(C12, C33, C52, C53)	.20
11451	Capacitor—.017 Mfd.—(C38)	.18
11395	Capacitor—.01 Mfd.—(C32)	.18
4858	Capacitor—.01 Mfd.—(C36)	.25
4839	Capacitor—0.1 Mfd.—(C21)	.28
4841	Capacitor—0.1 Mfd.—(C31)	.22
5170	Capacitor—0.25 Mfd.—(C25)	.25
4836	Capacitor—.05 Mfd.—(C30)	.30
11240	Capacitor—10 Mfd.—(C39)	1.08
11387	Capacitor—10 Mfd.—(C2)	.86
5212	Capacitor—18 Mfd.—(C40)	1.16
12061	Coil—Antenna coil—Less shield—(L2, L3, L4, L5, L23, C6, C55)	1.90
12062	Coil—Detector coil—Less shield—(L6, L7, L8, L9, L15, C48, C49)	1.94
12063	Coil—Oscillator coil—Less shield—(L10, L11, L12, L13, L14, C20)	2.62
12965	Condenser—Three-gang variable tuning condenser—(C7, C8, C14, C15, C18, C19)	6.15
13094	Dial—Station selector dial scale	$1.05
11394	Foot—Chassis foot assembly—Package of 2	.70
12712	Indicator—Station selector indicator pointer	.22
5226	Lamp—Dial lamp—Package of 5	.70
12718	Mask—Dial Light Diffuser with colored screen	.40
11393	Resistor—Voltage divider resistor—comprising one 3,500 ohm and one 13,000 ohm sections—(R21, R22)	.74
11329	Resistor—Voltage divider resistor—comprising one 148 ohm, one 32 ohm and one 85 ohm sections—(R19, R20, R24)	.52
12075	Resistor—56 ohms—Flexible type complete with contact cap—(R32)	.28
12071	Resistor—120 ohms—Carbon type—¼ watt—(R23)—Package of 5	1.00
12070	Resistor—18,000 ohms—Carbon type—1/10 watt—(R30, R31)—Package of 5	.75
5033	Resistor—33,000 ohms—Carbon type—1 watt—(R17)—Package of 5	1.10
11322	Resistor—39,000 ohms—Carbon type—¼ watt—(R12)—Package of 5	1.00
11365	Resistor—82,000 ohms—Carbon type—¼ watt—(R14)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt—(R5)—Package of 5	1.00
11453	Resistor—270,000 ohms—Carbon type—1/10 watt—(R15)—Package of 5	.75
11452	Resistor—470,000 ohms—Carbon type—1/10 watt—(R16)—Package of 5	.75
11397	Resistor 560,000 ohms—Carbon type—1/10 watt—(R2, R4)—Package of 5	.75
12013	Resistor—1 megohm—Carbon type—1/10 watt—(R18)—Package of 5	.75
11626	Resistor—2.2 megohms—Carbon type—¼ watt—(R9, R10, R13)—Package of 5	1.00
4669	Screw—No. 8-32 set screw for arm stk No. 12706—Package of 10	.25
12064	Shield—Antenna or detector coil shield	.28
11604	Shield—Oscillator coil shield	$0.24
11390	Shield—Intermediate frequency transformer shield	.25
12735	Shield—Dial lamp shield—Package of 5	.25
12971	Shutter—Dial scale holder and shutter assembly	.85
11222	Socket—Dial lamp socket	.18
11195	Socket—5-contact rectifier Radiotron socket	.15
11198	Socket—7-contact 6K7—6F5—or 6H6 Radiotron socket	.15
11196	Socket—8 contact 6A8 or 6F6 Radiotron socket	.15
12966	Switch—Range switch—(S1)	1.75
11392	Switch—Tone control and power switch assembly—(S2, S3)	1.14
11388	Transformer—First intermediate frequency transformer—(L16, L17, C24, C26)	1.90
11389	Transformer—Second intermediate frequency transformer—(L18, L19, C27, C28, C29, R7, R8)	3.02
11804	Transformer—Power transformer—105-125 volts—25-50 cycles (T1)	6.02
11805	Transformer—Power transformer—105-130, 140-160, 195-250 volts—40-60 cycles (T1)	7.95
11667	Trap—Wave trap—(L1, C45)	1.22
13144	Volume control—(R11)	1.00
	REPRODUCER ASSEMBLIES	
	Speaker No. RL63-4 or RL70-1	
11232	Board—Terminal board with two lead wire clips	.18
11231	Bolt—Yoke and core assembly bolt and nut	.16
8060	Bracket—Output transformer mounting bracket	.14
11257	Clamp—Cone center suspension clamping nut and screw assembly—Package of 5	.25
11254	Coil—Field coil—(L22)	2.00
11233	Coil—Neutralizing coil (L20)	.30
11235	Cone—Reproducer cone—(L21)—(Speaker No. RL63-4)—Models 8T2 or 8T11	1.00
11258	Cone—Reproducer cone—(L21)—(Speaker No. RL70-1)—Model 8K11	1.00
5119	Connector—3-contact female connector for reproducer cable	.25
5118	Connector—3 contact male connector for reproducer	.25
9618	Reproducer—Complete (Speaker No. RL63-4)—Models 8T2 or 8T11	6.40
9619	Reproducer—Complete (Speaker No. RL70-1)—Model 8K11	6.05
11253	Transformer—Output transformer—(T2)	1.56
11886	Washer—Spring washer used to hold field coil securely—Package of 5	.20
	Speaker No. 76365-1	
11836	Cone—Reproducer cone	1.75
5118	Connector—3-contact male connector for reproducer	.25
9534	Reproducer—Complete	$6.40
11837	Transformer—Output transformer (Field and hum coils are not removable)	1.56
11844	Coil—Field coil	2.00
11842	Coil—Hum neutralizing coil	.30
11838	Cone—Reproducer Cone	2.00
5118	Connector—3 contact male connector for reproducer	.25
9635	Reproducer—Complete	6.40
11839	Spring—Reproducer center support clamping spring—Package of 2	.30
11843	Transformer—Output transformer	1.56
	MISCELLANEOUS ASSEMBLIES	
11996	Bracket—Tuning tube mounting bracket and clamp	.22
12666	Cover—Reproducer cover—(Model 8K11)	.65
12698	Crystal—Station selector escutcheon and crystal—(Model 8T2)	1.02
13303	Crystal—Station selector escutcheon and crystal—(Model 8T11 or 8K11)	1.50
11276	Escutcheon—Tuning tube escutcheon—(Model 8T2)	.40
13275	Escutcheon—Tuning tube escutcheon (Model 8T11 or 8K11)	.25
11347	Knob—Range switch, tone control or volume control knob—Package of 5 (Model 8T2)	.75
11610	Knob—Station selector knob—includes one large and one small knob—Package of 5—(Model 8T2)	1.00
13304	Knob—Large station selector knob—Model 8T11 only—Package of 5	.75
13395	Knob—Large station selector knob—Model 8K11 only—Package of 5	.80
13305	Knob—Small (Vernier) Station selector knob—Model 8T11 only—Package of 5	.80
13396	Knob—Small (Vernier) Station selector knob—Model 8K11 only—Package of 5	.75
13306	Knob—Tone control, volume control or range switch knob—Model 8T11 only—Package of 5	.80
13278	Knob—Tone control, volume control or range switch knob—Model 8K11 only—Package of 5	.80
11210	Screw—Chassis mounting screw assembly for console model only—Package of 4	.28
11377	Screw—Chassis mounting screw assembly for table model only—Package of 4	.12
4982	Spring—Retaining spring for large knob in Stk. No. 11610, 13304 and 13395—Package of 10	.50
11349	Spring—Retaining spring for knob Stk. No. 11347, 13278, 13305, 13306, 13396 and small knob in Stk. No. 11610—Package of 5	.25

The prices quoted above are subject to change without notice.

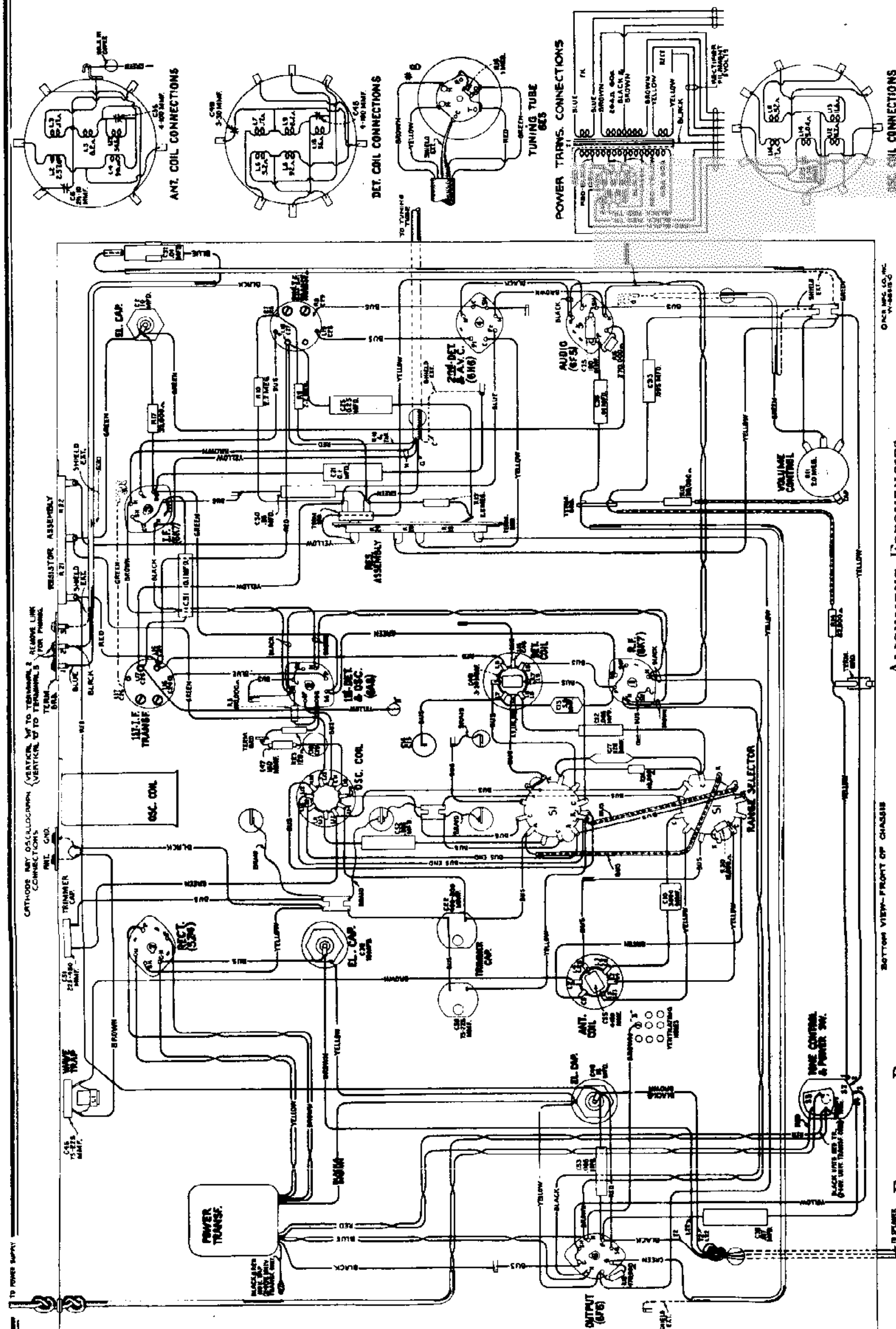
MODELS 8T2, 8T11, 8K11
Schematic, Socket
Phono. Data

RCA MFG. CO., INC.



MODELS 8T2,8T11,8K11
Chassis Wiring

RCA MFG. CO., INC.



Frequency Ranges

"Long Wave" (X) .... 155-320 kc
"Medium Wave" (A) .... 530-1,500 kc
"Short Wave" (C) .... 5,400-18,000 kc

Alignment Frequencies

"Long Wave" (X) .... 175 kc (osc.), 300 kc (osc., det., ant.)
"Medium Wave" (A) .... 600 kc (osc.), 1,500 kc (osc., det., ant.)
"Short Wave" (C) .... 15,000 kc (osc., det., ant.)

RCA MFG. CO., INC.

Power Supply Ratings

Rating A	105-125 volts, 50-60 cycles, 100 watts
Rating B	105-125 volts, 25-60 cycles, 105 watts
Rating C	100-130/140-160/195-250 volts, 40-60 cycles, 100 watts

Power Output Rating

Undistorted	2¼ watts
Maximum	5 watts

Loudspeaker

Type	Electrodynamic
Voice Coil Impedance	2.25 ohms at 400 cycles

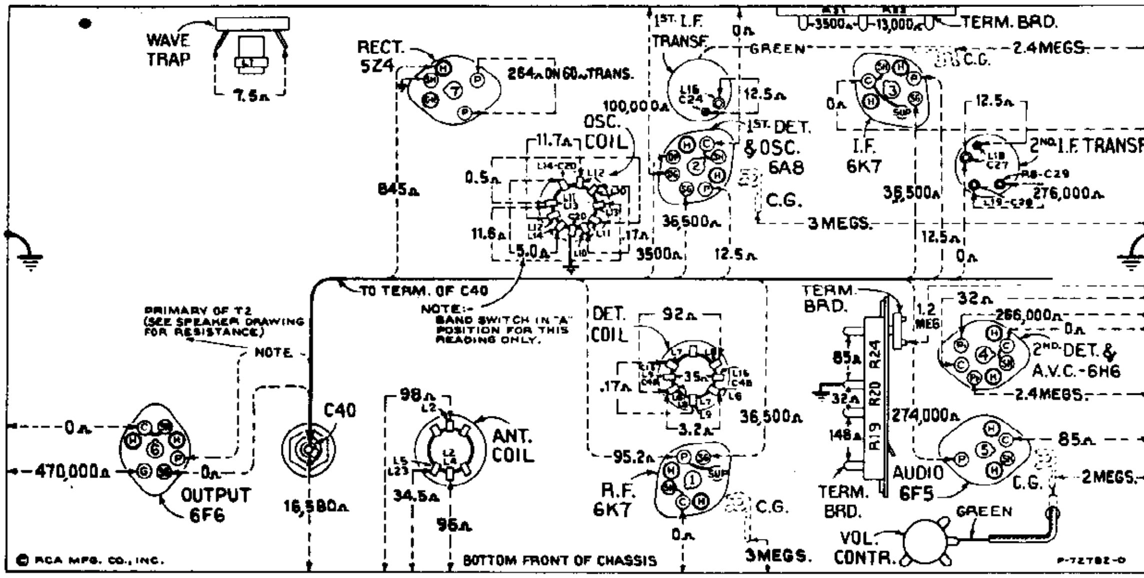


Figure 4—Resistance Diagram

Power supply disconnected—Radiotrons in sockets—Tuning condenser in full-mesh—Range selector in "Long wave" position—Volume control maximum—Power switch-Tone in "OFF" position

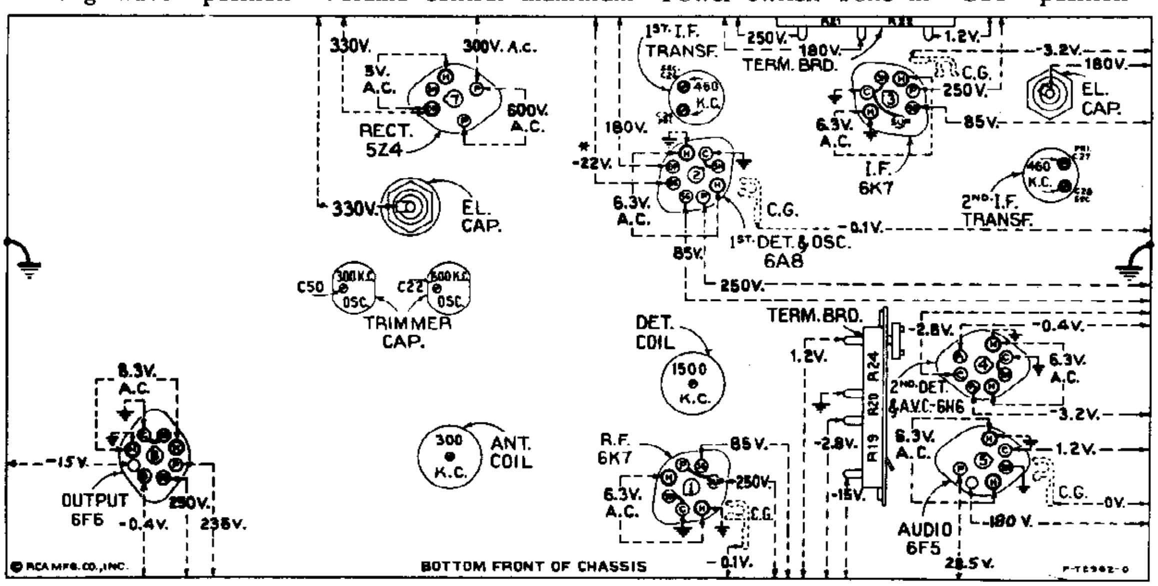


Figure 6—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc—No signal being received—Volume control minimum—Power switch-Tone full clockwise

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals under Conditions Similar to Those of Voltage Measurements

(1) RCA-6K7—R-F	12.5 ma.
(2) RCA-6A8—Det.-Osc.	13.8 ma.
(3) RCA-6K7—I.F.	9.0 ma.
(4) RCA-6H6—2nd Det.-A.V.C.	—
(5) RCA-6F5—Audio	0.25 ma.
(6) RCA-6F6—Power	40.0 ma.
(7) RCA-5Z4—Rect.	90.0 ma.*
(8) RCA-6E5—Eye	3.0 ma.

(* Cannot be measured at socket.)

RCA MFG. CO., INC.

The conventional Superheterodyne type of circuit, consisting of an r-f stage, a combined first-detector—oscillator stage, a single i-f stage, a diode-detector—automatic-volume-control stage, an audio voltage-amplifier stage, an audio power-output stage, and a high-voltage rectifier power-supply stage is used.

Tuned Circuits

The antenna coil system and the detector coil system each consist of two series-connected primary and three series-connected secondary windings to provide the three ranges of tuning. The oscillator coil system is wound on a single form. A range selector switch (S1) is used for connecting the various sections of these three coil systems into the circuit to provide operation on the band desired. The coils are tuned by a variable three-section gang condenser having trimmer capacitors in shunt with each section. There are additional trimmer capacitors across the section of each coil used for the "Medium wave" (A) band as well as the "Long wave" (X) band. A series trimmer is also associated with the "Medium wave" (A) and "Long wave" (X) band oscillator coils.

The intermediate-frequency amplifier system consists of an RCA-6K7 in a transformer-coupled circuit. This stage operates at a basic frequency of 460 kc. Each winding of both i-f transformers (input and output) is tuned by an adjustable trimmer.

Detector and A.V.C.

The modulated signal as obtained from the output of the i-f stage is detected by an RCA-6H6 twin-diode tube (No. 1 di de). The audio frequency secured by this process is transferred to the a-f system for amplification and final reproduction. The d-c voltage which results from detection of the signal is used for automatic volume control. This voltage, which develops across resistor R8, is applied as automatic control-grid bias to the r-f, first-detector, and i-f tubes through a suitable resistance filter circuit. The No. 2 diode of the RCA-6H6 is used to supply residual bias for the controlled tubes under conditions of little or no signal. This diode, under such conditions, draws current which flows through resistors R10 and R8, thereby maintaining the desired minimum operating bias on such tubes. On application of signal energy above a certain level, however, the auxiliary bias-diode ceases to draw current and the a.v.c diode takes over the biasing function.

Audio System

The manual volume control consists of an acoustically tapered potentiometer in the audio circuit between the output of the detector diode and the input grid of the audio-voltage-amplifier tube. This control has a tone compensating filter connected to it so that the correct aural balance will be obtained at different volume settings.

Resistance-capacitance coupling is used between the first-audio stage and the power-output stage. The output of the power amplifier is transformer-coupled into the dynamic loudspeaker. High-frequency tone control is effected by a capacitor across the plate circuit of the output tube. Speech-music control is effected by a resistor connected to the compensated volume control circuit. Control of tone is obtained by means of the switch (S").

"Magic Eye"

An RCA-6E5 cathode-ray tuning tube is used as a means of visually indicating when the receiver is accurately tuned to the incoming signal. This tube consists of an amplifier section and a cathode-ray section built in the same glass envelope. Correct tuning of the receiver to the incoming carrier is evidenced by the minimum width of the dark sector of the tuning tube.

Rectifier

The power required for operation of this receiver is supplied through transformer T1. This transformer has an efficient electrostatic shield between its primary and secondary windings. This shield prevents interference which is on the power-supply circuit from entering the receiver and conversely reduces the tendency of the receiver to re-radiate into the power circuit. An RCA-5Z4 furnishes the d-c voltages necessary for plate, screen, cathode, and grid potentials. The field winding of the loudspeaker is used as a reactor in the filter circuit from which it simultaneously receives its magnetizing current.

Alignment Procedure

Precise alignment is vital to the proper functioning of this receiver. There are four trimming adjustments provided in the i-f system, five in the oscillator coil system, three in the detector coil system, and three in the antenna coil system. Each of these trimmers has been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions of climate or have been altered for service purposes. Incorrect alignment is usually evidenced by loss of sensitivity, improper tone quality, and poor selectivity. These indications will generally be present together.

The correct performance of these receivers can only be obtained when the alignment is performed with adequate and reliable test apparatus and in the sequence given. The manufacturer of these instruments has a complete assortment of such service equipment available for sale through its dealers and distributors.

A test oscillator (signal generator) is required as a source of the specified alignment frequencies. Visual indication of the receiver output during the adjustments is necessary to enable the serviceman to obtain an accuracy of alignment which is not possible by listening to the signal. The RCA Stock No. 9595 **Full-Range Test Oscillator** and the RCA Stock No. 4317 **Neon Output Indicator** are especially suitable and fulfill the above requirements.

The following procedure should be adhered to in adjusting the various trimmer capacitors.

I-F Trimmer Adjustments

The four trimmers of the two i-f transformers are located as shown by figure 6. Each must be aligned to a basic frequency of 460 kc. To do this, attach the output indicator across the voice-coil circuit. Attach the receiver chassis to a good external ground. Connect the output of the test oscillator between the control-grid of the RCA-6A8 first-detector tube and chassis-ground through a .001 mfd. capacitor. Tune the test oscillator to 460 kc. Advance the receiver volume control to its full-on position and adjust the receiver tuning control to a point where no interference is encountered from broadcast stations, or short stator of oscillator tuning capacitor C18 to chassis eliminating local oscillator signals. Increase the output of the test oscillator until a slight indication is apparent on the output indicator. Adjust the two trimmers, C28 and C27 of the second i-f transformer to produce maximum (peak) indicated receiver output. Then, adjust the two trimmers, C26 and C24, of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. During these adjustments, regulate the test oscillator output so that the receiver output indication is always as low as possible. By doing so, broadness of tuning, due to a.v.c., action will be avoided. It is advisable to repeat the adjustment of all i-f trimmers a second time to assure that the inter-action between them has not disturbed the original adjustment.

R-F Trimmer Adjustments

The eleven trimmers associated with the r-f, first detector, and oscillator tuned circuits have their locations shown by figures 3 and 6. The three trimmers which are at all times directly in shunt with the variable tuning condensers necessitate that the "Short wave" (C) band be aligned first. The range selector switch should, therefore, be turned to its "Short wave" position for the first adjustments. Leave the output indicator connected to the output system.

Calibrate the dial by rotating the tuning control until the variable condenser plates are in their full-mesh (maximum capacity) position and adjust the dial pointer so that its end points to the horizontal graduation (520 kc) at the low-frequency end of the "Medium wave" (A) dial scale.

Wave-Trap Adjustment

Connect the test oscillator to the antenna and ground terminals of the receiver, leaving it tuned to 460 kc. Adjust the wave-trap trimmer C45 for maximum suppression of the 460 kc signal. An increase in test-oscillator output may be necessary before the point of minimum output (maximum suppression of signal) is obtained.

"Short Wave" Band

(a) Adjust the test oscillator to 15,000 kc and set the receiver tuning control to a dial reading of 15,000 kc.

(b) Adjust trimmer C19 on the oscillator section of the variable condenser to the point at which it produces maximum indicated receiver output. Two points may be found, each of which produces such a maximum. The one of maximum trimmer capacitance is correct and should be used. The local (heterodyne) oscillator will be 460 kc below the signal frequency at this adjustment point.

(c) Adjust trimmer C15 of the detector section of the variable condenser, simultaneously rocking the receiver tuning control backward and forward through the 15,000 kc input signal, until maximum receiver output results from these combined operations.

(d) With the receiver tuning control set to 15,000 kc adjust trimmer C8 on the antenna section of the variable condenser to the point which produces maximum (peak) indicated receiver output.

"Medium Wave" Band

(e) Change the receiver range selector to its "Medium wave" (A) band position and set the receiver tuning control to a dial reading of 1,500 kc. Tune the test oscillator to 1,500 kc and regulate its output to produce a slight indication on the receiver output indicating device.

(f) Adjust the high-frequency trimmers of the oscillator, detector, and antenna coils, C20, C49 and C6 respectively, to the points at which each produces maximum indicated receiver output.

(g) Shift the test-oscillator frequency to 600 kc and tune the receiver to pick up this signal, disregarding the dial reading at which it is best received.

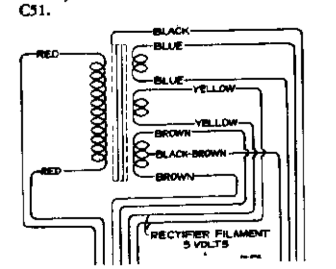
(h) Adjust the low-frequency trimmer C22 of the oscillator coil, simultaneously rocking the tuning control of the receiver backward and forward through the signal, until maximum indicated receiver output results from these combined operations. The adjustment of C19, C15 and C8 should be corrected at 15,000 kc as in (b), (c), and (d); also C20, C49 and C6 should be corrected at 1,500 kc, as in (f) to compensate for any changes caused by the adjustment of the low-frequency oscillator coil trimmer C22.

"Long Wave" Band

(i) Change receiver band selector to "Long wave" (X) band and set receiver tuning control to a dial reading of 300 kc. Tune test oscillator to 300 kc and adjust oscillator, detector, and antenna trimmers C50, C48 and C55, respectively, for maximum indicated receiver output.

(j) Set receiver to 175 kc and tune test oscillator to 175 kc. Adjust trimmer C51 for maximum indicated output, simultaneously rocking tuning control of the receiver backward and forward through the signal.

(k) The adjustment of C50, C48 and C55 should now be repeated at 300 kc as described in (i) to compensate for any changes caused by the adjustment of the low-frequency trimmer C51.



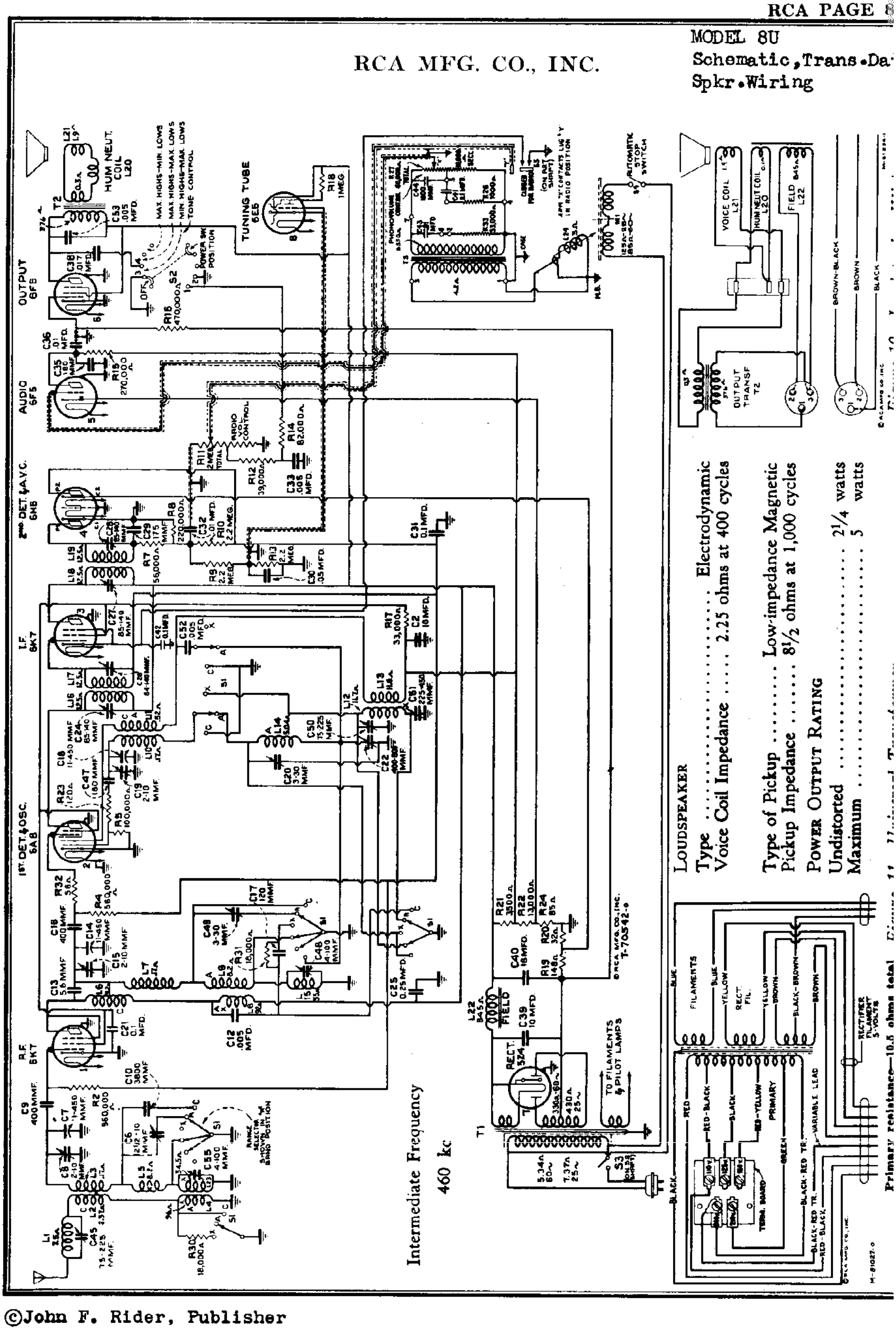
D. C. Resistance Values

110 volts, 50-60 cycles	110 volts, 25 cycles
Primary, 5.34 ohms	Primary, 7.37 ohms
Secondary, 330 ohms	Secondary, 430 ohms

Figure 7—Standard Transformer

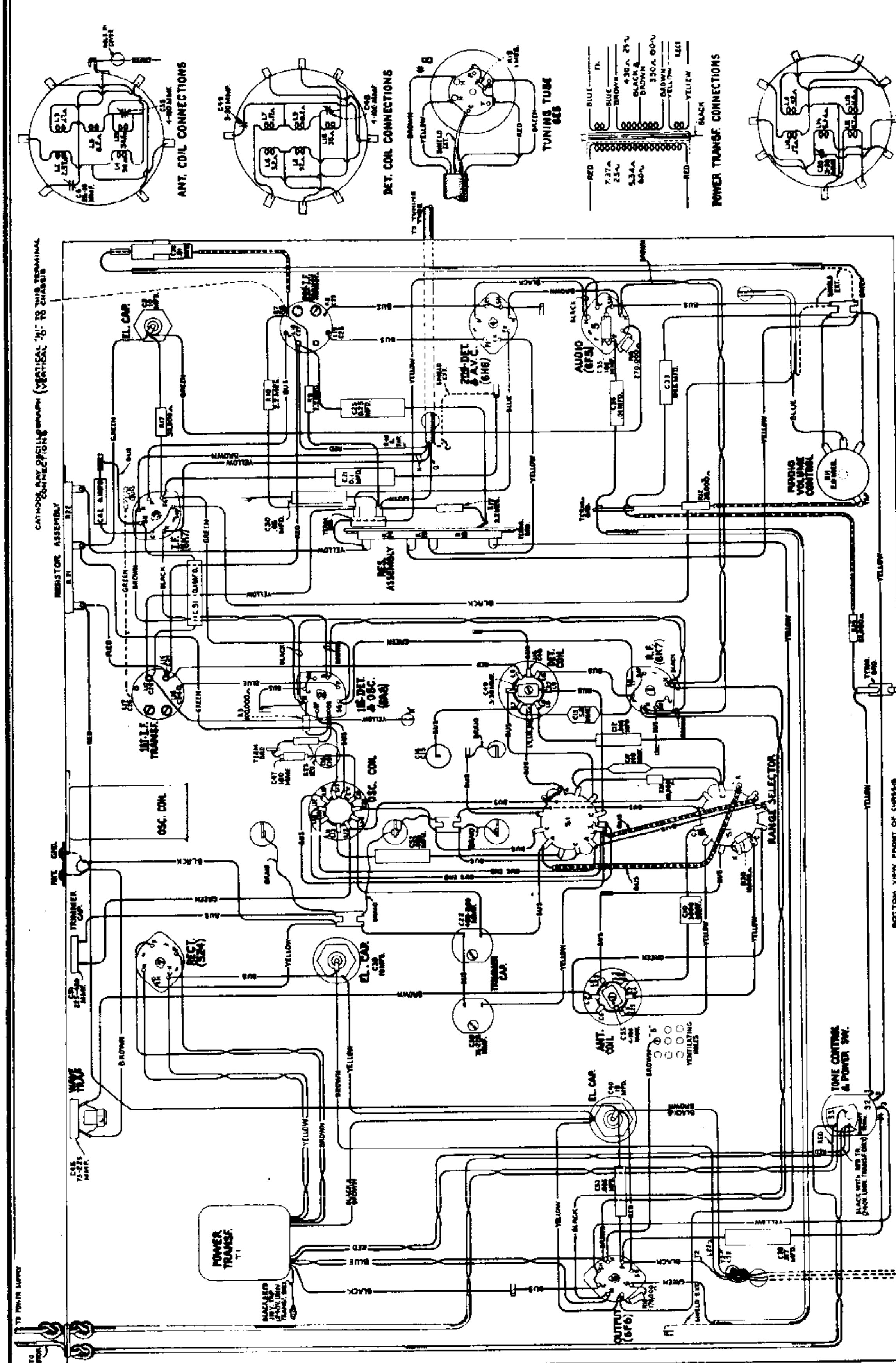
MODEL 8U
Schematic, Trans. Da
Spkr. Wiring

RCA MFG. CO., INC.



MODEL 8U
Chassis Wiring

RCA MFG. CO., INC.



Frequency Ranges

"Long Wave" (X) .... 155-320 kc
"Medium Wave" (A) .... 530-1,500 kc
"Short Wave" (C) .... 5,400-18,000 kc

Alignment Frequencies

"Long Wave" (X) .... 175 kc (osc.), 300 kc (osc., det., ant.)
"Medium Wave" (A) .... 600 kc (osc.), 1,500 kc (osc., det., ant.)
"Short Wave" (C) .... 15,000 kc (osc., det., ant.)

RCA MFG. CO., INC.

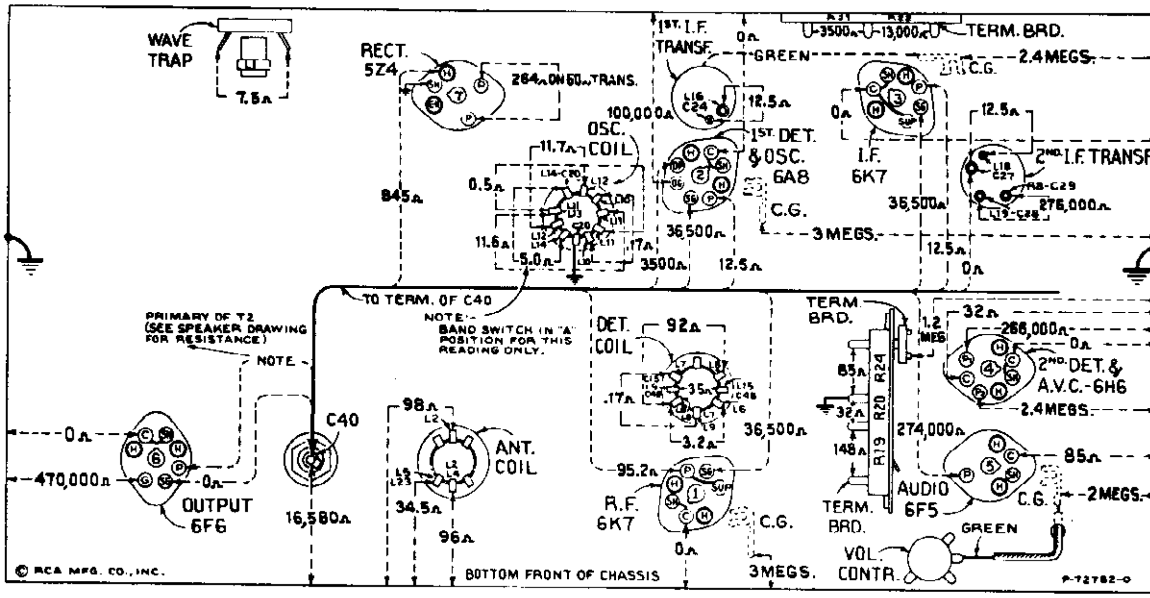
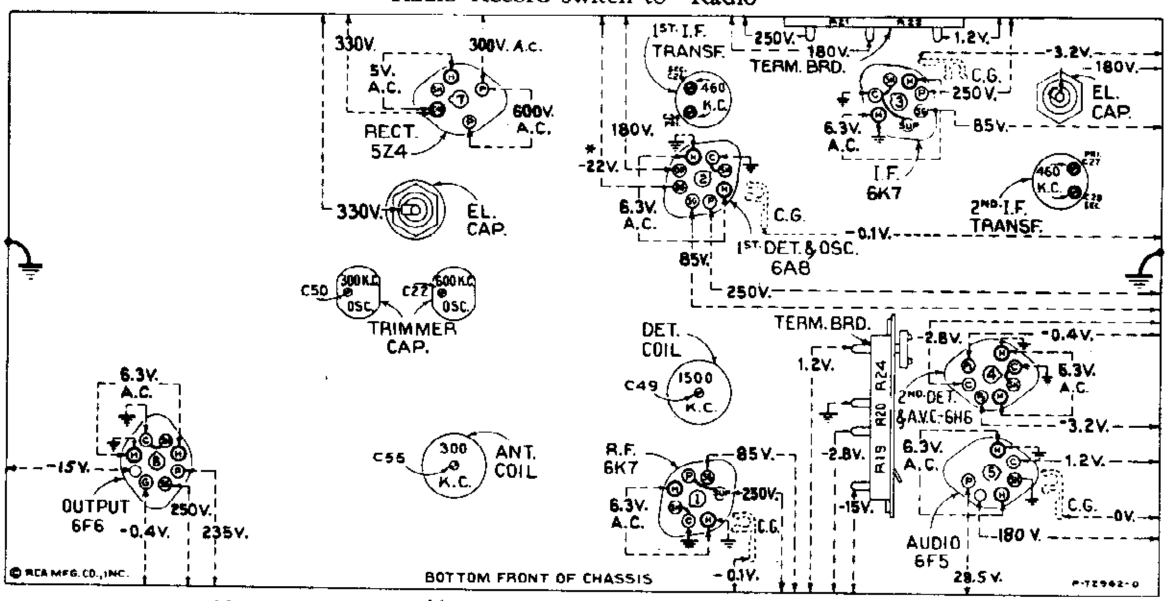


Figure 4—Resistance Diagram

Power supply disconnected—Radiotrons in sockets—Tuning condenser in full-mesh—Range selector "Long wave" position—Volume control maximum—Power switch-Tone in "OFF" position—Radio-Record switch to "Radio"



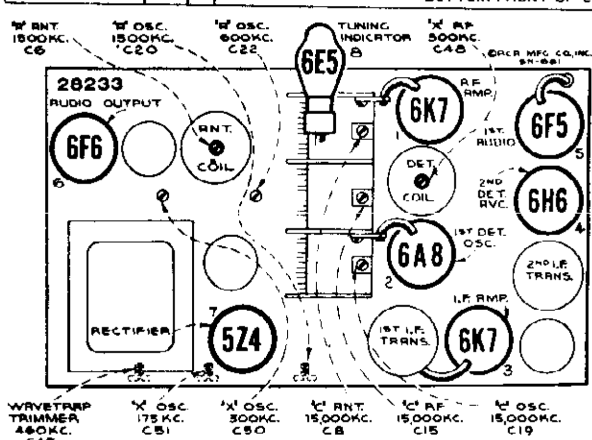


Figure 5—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc—No signal being received—Volume control minimum—Power switch-Tone full clockwise—Radio-Record switch to "Radio"

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tub Socket Cathode Terminals under Conditions Similar to Those of Voltage Measurements

(1) RCA-6K7—R-F	12.5 ma.
(2) RCA-6A8—Det.-Osc.	13.8 ma.
(3) RCA-6K7—I.F.	9.0 ma.
(4) RCA-6H6—2nd Det.-A.V.C.	—
(5) RCA-6F5—Audio	0.25 ma.
(6) RCA-6F6—Power	40.0 ma.
(7) RCA-5Z4—Rect.	90.0 ma.*
(8) RCA-6E5—Eye	3.0 ma.

(* Cannot be measured at socket.)

MODEL 8U
Phono. Wiring
Motor Details

RCA MFG. CO., INC.

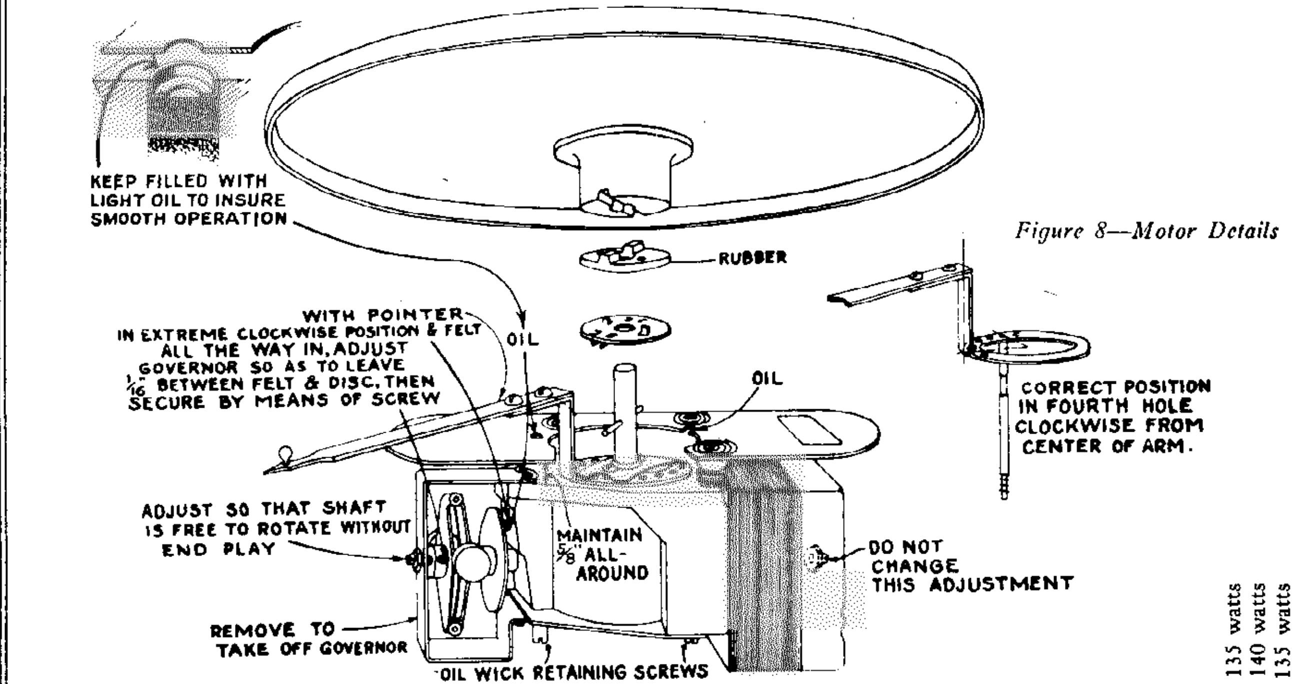


Figure 8—Motor Details

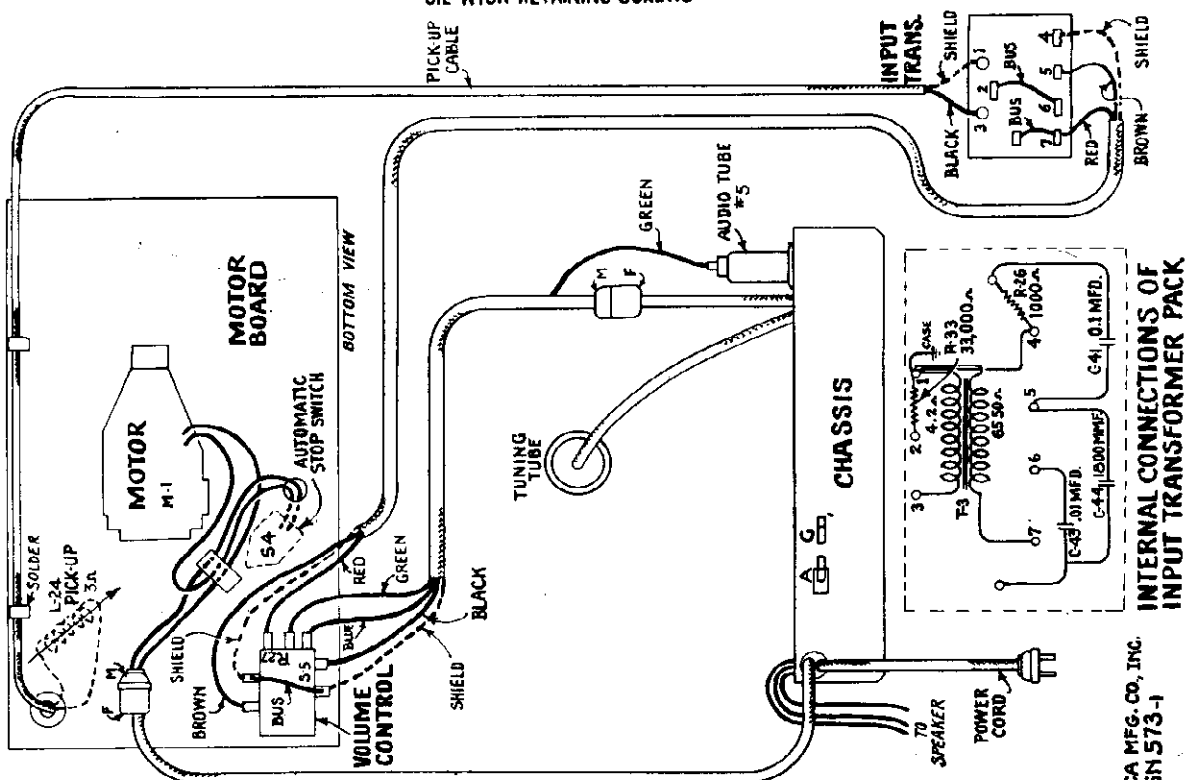
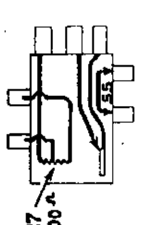


Figure 6—Assembly Wiring



INTERNAL CONNECTIONS OF PHONOGRAPH VOLUME CONTROL

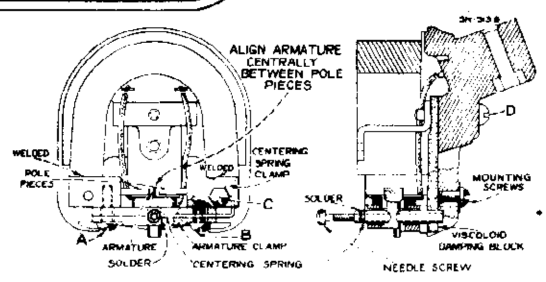


Figure 7—Details of Pickup

© RCA MFG. CO., INC. SN 573-1

POWER SUPPLY RATING

Rating A .... 105-125 volts, 50-60 cycles, 135 watts
Rating B .... 105-125 volts, 25 cycles, 140 watts
Rating C .... 100-130/140-160/195-250 volts, 50-60 cycles, 135 watts

RCA MFG. CO., INC

The conventional superheterodyne type of circuit, consisting of an r-f stage, a combined first-detector--oscillator stage, a single i-f stage, a diode-detector—automatic-volume-control stage, an audio voltage-amplifier stage, an audio power-output stage, a high-voltage rectifier power-supply stage, and a tuning indicator "Magic Eye" stage, is used.

Tuned Circuits

The antenna coil system and the detector coil system each consist of two series-connected primary and three series-connected secondary windings to provide the three ranges of tuning. The oscillator coil system is wound on a single form. A range selector switch (S1) is used for connecting the various sections of these three coil systems into the circuit to provide operation on the band desired. The coils are tuned by a variable three-section gang condenser having trimmer capacitors in shunt with each section. There are additional trimmer capacitors across the section of each coil used for the "Medium wave" (A) band as well as the "Long wave" (X) band. A series trimmer is also associated with the "Medium wave" (A) and "Long wave" (X) band oscillator coils.

The intermediate-frequency amplifier system consists of an RCA-6K7 in a transformer-coupled circuit. This stage operates at a basic frequency of 460 kc. Each winding of both i-f transformers (input and output) is tuned by an adjustable trimmer.

Detector and A.V.C.

The modulated signal as obtained from the output of the i-f stage is detected by an RCA-6H6 twin-diode tube (No. 1 diode). The audio frequency secured by this process is transferred to the a-f system for amplification and final reproduction. The d-c voltage which results from detection of the signal is used for automatic volume control. This voltage, which develops across resistor R8, is applied as automatic control-grid bias to the r-f, first-detector, and i-f tubes through a suitable resistance filter circuit. The No. 2 diode of the RCA-6H6 is used to supply residual bias for the controlled tubes under conditions of little or no signal. This diode, under such conditions, draws current which flows through resistors R10 and R8, thereby maintaining the desired minimum operating bias on such tubes. On application of signal energy above a certain level, however, the auxiliary bias-diode ceases to draw current and the a.v.c diode takes over the biasing function.

Audio System

The manual volume control consists of an acoustically tapered potentiometer in the audio circuit between the output of the detector diode and the input grid of the audio-voltage-amplifier tube. This control has a tone compensating filter connected to it so that the correct aural balance will be obtained at different volume settings.

Resistance-capacitance coupling is used between the first-audio stage and the power-output stage. The output of the power amplifier is transformer-coupled into the dynamic loudspeaker. High-frequency tone control is effected by a capacitor across the plate circuit of the output tube. Speech-music control is effected by a resistor connected to the compensated volume control circuit. Control of tone is obtained by means of the switch (S2).

Phonograph Circuit

The electrical impulses generated in the pickup L24 are boosted in the step-up transformer T3, after which they are applied to the grid of the RCA-6F5 audio amplifier stage through the compensated phonograph volume control R27. This phonograph volume control also incorporates switches for transferring from radio to record reproduction. In the radio position, arm "X" of the phonograph volume control contacts lug "Y" which completes the audio circuit from the radio volume control R11 to the grid of the RCA-6F5 audio amplifier; also, switch S5 closes which completes the cathode circuit of the RCA-6K7 i-f amplifier stage. In the phonograph position, switch S5 opens and arm "X" of the phonograph volume control disconnects from lug "Y" and moves onto the phonograph volume control resistance as shown by figure 2.

"Magic Eye"

An RCA-6E5 cathode-ray tuning tube is used as a means of visually indicating when the receiver is accurately tuned to the incoming signal. This tube consists of an amplifier section and a cathode-ray section built in the same glass envelope. Correct tuning of the receiver to the incoming carrier is evidenced by the minimum width of the dark sector of the tuning tube.

Rectifier

The power required for operation of this receiver is supplied through transformer T1. This transformer has an efficient electrostatic shield between its primary and secondary windings. This shield prevents interference which is on the power-supply circuit from entering the receiver and conversely reduces the tendency of the receiver to re-radiate into the power circuit. An RCA-5Z4 furnishes the d-c voltages necessary for plate, screen, cathode, and grid potentials. The field winding of the loudspeaker is used as a reactor in the filter circuit from which it simultaneously receives its magnetizing current.

Phonograph Mechanism

An improved manually-operated phonograph mechanism is used in this model. The 12-inch turntable will accommodate either the 10-inch or the 12-inch phonograph records. The turntable rotates at a speed of 78 r.p.m. A speed regulator is provided for accurate adjustment of this speed. *It is important that a machine of any particular rating be operated at the frequency and voltage for which it is rated.* Attempts to operate at ratings other than specified for the particular instrument may result in damage to both the phonograph motor and the radio receiver. An automatic switch is provided to turn "off" the phonograph motor at the completion of record play when the eccentric-type inside groove record is used.

Alignment Procedure

Precise alignment is vital to the proper functioning of this receiver. There are four trimming adjustments provided in the i-f system, five in the oscillator coil system, three in the detector coil system, and three in the antenna coil system. Each of these trimmers has been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions of climate or have been altered for service purposes. Incorrect alignment is usually evidenced by loss of sensitivity, improper tone quality, and poor selectivity. These indications will generally be present together.

The correct performance of this receiver can only be obtained when the alignment is performed with adequate and reliable test apparatus and in the sequence given. The manufacturer of this instrument has a complete assortment of such service equipment available for sale through its dealers and distributors.

Two methods of alignment are applicable. One method requires the cathode-ray oscillograph, while the other requires a voltmeter or glow-type indicator. The oscillographic method is advantageous in that the indication is in the form of a wave-image which represents the resonance characteristic of the tuned circuits. Alignment by this method should be performed with equipment such as an RCA Stock No. 9545 Cathode-Ray Oscillograph and an RCA Stock No. 9558 Frequency Modulator. For the output indicator method, an instrument such as an RCA Stock No. 4317 should be used. Either of the above methods requires a reliable test oscillator for the source of alignment frequencies such as the RCA Stock No. 9595 Test Oscillator. Cathode-ray alignment is similar to the output indicator alignment outlined below, except as follows: The frequency modulator should be used to sweep the test oscillator signal when aligning the i-f amplifier and the low-frequency oscillator series trimmers. It will only be necessary to first adjust the trimmers to peak response, as outlined below, without the frequency modulator connected. Then, interconnect the test oscillator with the frequency modulator and re-tune the test oscillator (increase frequency) until the forward and reverse curves coincide at their highest points. Next, adjust the trimmers until the curves coincide throughout their length and have maximum amplitude. The proper place for connection of the oscillograph input to the receiver is indicated on the Chassis Wiring Diagram (figure 3). The high-frequency trimmers on all three bands should be adjusted for maximum (peak) amplitude of the images.

I-F Trimmer Adjustments

The four trimmers of the two i-f transformers are located as shown by figure 5. Each must be aligned to a basic frequency of 460 kc. To do this, attach the output indicator across the voice-coil circuit. Attach the receiver chassis to a good external ground. Connect the output of the test oscillator between the control-grid of the RCA-6A8 first-detector tube and chassis-ground through a .001 mfd. capacitor. Tune the test oscillator to 460 kc. Advance the receiver volume control to its full-on position and adjust the receiver tuning control to a point where no interference is encountered from broadcast stations, or short stator of oscillator tuning capacitor C18 to chassis eliminating local oscillator signals. Increase the output of the test oscillator until a slight indication is apparent on the output indicator. Adjust the two trimmers, C28 and C27 of the second i-f transformer to produce maximum (peak) indicated receiver output. Then, adjust the two trimmers, C26 and C24, of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. During these adjustments, regulate the test-oscillator output so that the receiver output indication is always as low as possible. By doing so, broadness of tuning, due to a.v.c., action will be avoided. It is advisable to repeat the adjustment of all i-f trimmers a second time to assure that the inter-action between them has not disturbed the original adjustment.

R-F Trimmer Adjustments

The eleven trimmers associated with the r-f, first detector, and oscillator tuned circuits have their locations shown by figures 1 and 5. The three trimmers which are at all times directly in shunt with the variable tuning condensers necessitate that the "Short wave" (C) band be aligned first. The range selector switch should, therefore, be turned to its "Short wave" position for the first adjustments. Leave the output indicator connected to the output system.

Calibrate the dial by rotating the tuning control until the variable condenser plates are in their full-mesh (maximum capacity) position and adjust the dial pointer so that its end points to the horizontal graduation (520 kc) at the low-frequency end of the "Medium wave" (A) dial scale.

Wave-Trap Adjustment

Connect the test oscillator to the antenna and ground terminals of the receiver, leaving it tuned to 460 kc. Adjust the wave-trap trimmer C45 for maximum suppression of the 460 kc signal. An increase in test-oscillator output may be necessary before the point of minimum output (maximum suppression of signal) is obtained.

"Short Wave" Band

(a) Adjust the test oscillator to 15,000 kc and set the receiver tuning control to a dial reading of 15,000 kc.

(b) Adjust trimmer C19 on the oscillator section of the variable condenser to the point at which it produces maximum indicated receiver output. Two points may be found, each of which produces such a maximum. The one of maximum trimmer capacitance is correct and should be used. The local (heterodyne) oscillator will be 460 kc below the signal frequency at this adjustment point.

(c) Adjust trimmer C15 of the detector section of the variable condenser, simultaneously rocking the receiver tuning control backward and forward through the 15,000 kc input signal, until maximum receiver output results from these combined operations.

(d) With the receiver tuning control set to 15,000 kc adjust trimmer C8 on the antenna section of the variable condenser to the point which produces maximum (peak) indicated receiver output.

"Medium Wave" Band

(e) Change the receiver range selector to its "Medium wave" (A) band position and set the receiver tuning control to a dial reading of 1,500 kc. Tune the test oscillator to 1,500 kc and regulate its output to produce a slight indication on the receiver output indicating device.

(f) Adjust the high-frequency trimmers of the oscillator, detector, and antenna coils, C20, C49, and C6 respectively, to the points at which each produces maximum indicated receiver output.

(g) Shift the test-oscillator frequency to 600 kc and tune the receiver to pick up this signal, disregarding the dial reading at which it is best received.

(h) Adjust the low-frequency trimmer C22 of the oscillator coil, simultaneously rocking the tuning control of the receiver backward and forward through the signal, until maximum indicated receiver output results from these combined operations. The adjustment of C19,

MODEL 8U
Alignment, Page 2
Phono Data, Parts

RCA MFG. CO., INC.

C15, and C8 should be corrected at 15,000 kc as in (b), (c), and (d); also C20, C49, and C6 should be corrected at 1,500 kc, as in (f) to compensate for any changes caused by the adjustment of the low-frequency oscillator coil trimmer C22.

Long Wave" Band

(i) Change receiver band selector to "Long wave" (X) band and set receiver tuning control to a dial reading of 300 kc. Tune test oscillator to 300 kc and adjust oscillator, detector, and antenna trimmers C50, C48, and C55, respectively, for maximum indicated receiver output.

(j) Set receiver to 175 kc and tune test oscillator to 175 kc. Adjust trimmer C51 for maximum indicated output, simultaneously rocking tuning control of the receiver backward and forward through the signal.

(k) The adjustment of C50, C48, and C55 should now be repeated at 300 kc as described in (i) to compensate for any changes caused by the adjustment of the low-frequency trimmer C51.

Phonograph Mechanism

The phonograph motor is of the governor induction type and designed to be simple and foolproof. Under normal operating conditions, service difficulties should be negligible. Occasionally, however, certain adjustments may be required. These adjustments are illustrated and explained in figure 8. Application of oil to the felt pad which rubs against the governor disc will insure smooth operation.

Magnetic Pickup

The pickup used in the phonograph unit is of an improved design. The horseshoe magnet is rigidly welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. The frequency response is substantially uniform over a wide range. Service operations which may be necessary on the pickup are as follows:

Centering Armature

Refer to figure 7 showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces i. e., exactly centered. Whenever this centering adjustment has been disturbed, the screws A, B, and C should be loosened and the armature clamp adjusted to the point where the vertical axis of the armature is at right angles to the horizontal axis of the pole pieces, and centered between them. This centering operation may be facilitated by inserting a small rod or nail into the armature needle hole, using it as a lever to test the angular movement of the armature. The limitations of the movement in each direction will be caused by the armature striking the pole pieces. The proper adjustment is obtained when there is equal angular displacement of the armature and adjustment rod or nail to each side of the vertical axis of the magnet and coil assembly. The screws A and B should then be secured, observing care not to disturb the adjustment of the armature clamp. Then place the pickup in a vise and secure the centering spring-clamp by means of the screw C, allowing the centering spring to remain in the position at which the armature is exactly centered between the pole pieces. With a little practice, the correct adjustment of the armature may be readily obtained. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other such foreign materials which would obstruct the movement of the pickup armature.

Damping Block

The viscoloid block which is attached to the back end of the armature shank serves as a mechanical filter to eliminate undesirable resonances and to cause the frequency response to be uniform. Should it be necessary to replace this damping block, it may be done by removing screw D and the cover support bracket from the mechanism and taking off the old viscoloid block. The surface of the armature which is in contact with the viscoloid should be thoroughly

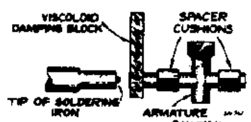


Figure 9—Special Soldering-Iron Tip

cleaned with fine emery cloth. Then insert the new block so that it occupies the same position as it did originally. Make certain that the block is in correct vertical alignment with the armature. The hole in the new viscoloid block is somewhat smaller than the diameter of the armature in order to permit a snug fit. With the viscoloid aligned on the armature, screw D and the cover support bracket should then be replaced. Heat should be applied to the armature (viscoloid side) so that the viscoloid block will fuse at the point of contact and become rigidly attached to the armature. A special-tip soldering iron constructed as shown in figure 9 will be found very useful in performing this operation. The iron should be applied only long enough to slightly melt the block and cause a small bulge on both sides.

Replacing Coil

Whenever there is defective operation due to an open or shorted pickup coil, this coil should be replaced. The method of replacement will be obvious upon inspection of the pickup assembly and by study of the cut-a-way illustrations. Make sure that the new coil is properly centered with the hole in the support strip and glued securely in that position. It is important to re-adjust the armature as previously explained after re-assembly of the mechanism. Only rosin core solder should be used for soldering the coil leads in the pickup. This same type of solder should be used when necessary for soldering the centering spring to the armature.

Magnetizing

Loss of magnetization will not usually occur when the pickup has received normal care because the magnet and pole pieces are one unit and the magnetic circuit remains practically closed at all times. When the pickup has been mishandled, subjected to a strong a-c field, jolted, or dropped, there may be an appreciable loss of magnetic strength, in which case it will be necessary to re-magnetize the entire structure. To do this, it will be necessary to first remove the pickup mechanism from the tone arm, and then remove the magnet assembly. Place the magnet assembly on the poles of a standard pickup magnetizer such as the RCA Stock No. 9549 Pickup Magnetizer and charging the magnet in accordance with the instructions accompanying the magnetizer. It is preferable to check the polarity of the pickup magnet and to re-magnetize it so that the same polarity is maintained.

Loudspeaker

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed by softening its cement with a very light application of acetone, using care not to allow the acetone to flow down into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

Universal Transformer

The transformer used on some models of this receiver is adaptable to several ranges of voltage as given under Rating C of Electrical Specifications. Its schematic and wiring are shown by figure 11. Terminals are provided at the top of the transformer case for changing the primary connections to suit the voltage being used. Note that a 110-volt tap is brought out separately for supplying a phonograph motor.

Stock No.	REPLACEMENT PARTS	List Price
	RECEIVER ASSEMBLIES	
12706	Arm—Arm and hub assembly for operating shutter	$0.22
13098	Board—Antenna and ground terminal board	.25
5237	Bushing—Variable tuning condenser mounting bushing assembly—Package of 3	.43
11625	Cable—Radiotron tuning tube cable complete with socket	1.26
11759	Cable—2-conductor shielded volume control cable—complete with 4-contact female connector	.92
12511	Cap—Contact cap—Package of 5	.15
11465	Capacitor—Adjustable trimmer (C22)	.48
11256	Capacitor—Adjustable trimmer (C50)	.48
4955	Capacitor—Adjustable trimmer (C45)	.48
12065	Capacitor—Adjustable trimmer (C51)	.65
12814	Capacitor—5.6 Mmfd.—(C13)	.20
12974	Capacitor—120 Mmfd.—(C17)	.20
5116	Capacitor—175 Mmfd.—C29)	.18
13003	Capacitor—180 Mmfd.—(C35, C47)	.20
11290	Capacitor—400 Mmfd.—(C9, C16)	.25
11621	Capacitor—3,600 Mmfd.—(C10)	.38
4868	Capacitor—.005 Mfd.—(C12, C33, C52, C53)	.20
11451	Capacitor—.017 Mfd.—(C38)	.18
11395	Capacitor—.01 Mfd.—(C32)	.18
4858	Capacitor—.01 Mfd.—(C36)	.25

Stock No.	DESCRIPTION	List Price
11394	Foot—Chassis foot assembly—Package of 2	$0.70
12712	Indicator—Station selector indicator pointer	.22
5226	Lamp—Dial lamp—Package of 5	.70
12718	Mask—Dial Light Diffuser with colored screen	.40
11393	Resistor—Voltage divider resistor—comprising one 3,500 ohm and one 13,000 ohm sections—(R21, R22)	.74
11329	Resistor—Voltage divider resistor—comprising one 148 ohm, one 32 ohm and one 85 ohm sections—(R19, R20, R24)	.52
12075	Resistor—56 ohms—Flexible type complete with contact cap—(R32)	.28
12071	Resistor—120 ohms—Carbon type—¼ watt—(R23)—Package of 5	1.00
12070	Resistor—18,000 ohms—Carbon type—1/10 watt—(R30, R31)—Package of 5	.75
5033	Resistor—33,000 ohms—Carbon type—1 watt—(R17)—Package of 5	1.10
11322	Resistor—39,000 ohms—Carbon type—¼ watt—(R12)—Package of 5	1.00
11365	Resistor—82,000 ohms—Carbon type—¼ watt—(R14)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt—(R5)—Package of 5	1.00
11453	Resistor—270,000 ohms—Carbon type—1/10 watt—(R15)—Package of 5	.75
11452	Resistor—470,000 ohms—Carbon type—1/10 watt—(R16)—Package of 5	.75
11397	Resistor 560,000 ohms—Carbon type—1/10 watt—(R2, R4)—Package of 5	.75
12013	Resistor—1 megohm—Carbon type—1/10 watt—(R18)—Package of 5	.75
11626	Resistor—2.2 megohms—Carbon type—¼ watt—(R9, R10, R13)—Package of 5	1.00
4669	Screw—No. 8-32 set screw for arm Stk No. 12706—Package of 10	.25
12064	Shield—Antenna or detector coil shield	.28
11604	Shield—Oscillator coil shield	.24
11390	Shield—Intermediate frequency transformer shield	.25
12735	Shield—Dial lamp shield—Package of 5	.25
12971	Shutter—Dial scale holder and shutter assembly	.85
11222	Socket—Dial lamp socket	.18
11195	Socket—5-contact rectifier Radiotron socket	.15
4839	Capacitor—.1 Mfd.—(C21)	.28
4841	Capacitor—.1 Mfd.—(C31)	.22
11414	Capacitor—.1 Mfd.—(C42)	.20
5170	Capacitor—.25 Mfd.—(C25)	.25
4836	Capacitor—.5 Mfd.—(C30)	.30
11240	Capacitor—10 Mfd.—(C39)	1.08
11387	Capacitor—10 Mfd.—(C2)	.86
5212	Capacitor—18 Mfd.—(C40)	1.16
12061	Coil—Antenna coil—Less shield—(L2, L3, L4, L5, L23, C6, C55)	1.90
12062	Coil—Detector coil—Less shield—(L6, L7, L8, L9, L15, C48, C49)	1.94
12063	Coil—Oscillator coil—Less shield—(L10, L11, L12, L13, L14, C20)	2.62
12965	Condenser—Three-gang variable tuning condenser—(C7, C8, C14, C15, C18, C19)	6.15
4153	Connector—4-contact female connector for volume control cable	.48
4573	Connector—2-contact female connector for motor cable	.30
13094	Dial—Station selector dial scale	1.05
11198	Socket—7-contact 6K7—6F5—or 6H6 Radiotron socket	.15
11196	Socket—8 contact 6A8 or 6F6 Radiotron socket	.15
12849	Spring—Tension spring shutter—Package of 5	.18
12966	Switch—Range switch—(S1)	1.75
11392	Switch—Tone control and power switch assembly—(S2, S3)	1.14

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

RCA MFG. CO., INC.

Stock No.	DESCRIPTION	List Price
11388	Transformer—First intermediate frequency transformer—(L16, L17, C24, C26)	1.90
11389	Transformer—Second intermediate frequency transformer—(L18, L19, C27, C28, C29, R7, R8)	3.02
11803	Transformer—Power transformer—105-125 volts—50-60 cycles—(T1)	4.38
11805	Transformer—Power transformer—105-130, 140-160, 195-250 volts—40-60 cycles (T1)	7.95
11667	Trap—Wave trap—(L1, C45)	1.22
13144	Volume control—(R11)	1.00
	MOTOR ASSEMBLIES	
11703	Governor—Governor complete for phonograph motor—Stock No. 11701 or No. 11702	3.05
11701	Motor—Phonograph turntable motor—110 volts—50 to 60 cycles—(M1)	21.20
	MOTOR BOARD ASSEMBLIES	
4594	Box—Used needle box (cup)	.30
4577	Connector—2-contact male connector for motor cable	.30
7084	Cover—Turntable cover	.40
11704	Damper—Turntable rubber damper and damper plate	.24
4596	Escutcheon—Speed regulator escutcheon plate	.36
4597	Screw—Motor mounting screw assembly—comprising four screws, four lockwashers, four spacers, and four nuts	.22
11696	Turntable—Complete	2.48
11695	Volume control—Phonograph volume control—(R27, S5)	1.60
	ECCENTRIC AUTOMATIC BRAKE SWITCH ASSEMBLIES	
3994	Cover—Eccentric automatic switch cover and screw	.26
10174	Springs—Automatic brake springs—comprising one each of four springs—Package of 2 sets	.50
6896	Switch—Eccentric automatic brake and switch assembly—less switch cover	2.50
3322	Switch—Eccentric automatic switch only—less cover—(S13)	.75
	PICKUP AND ARM ASSEMBLIES	
11944	Arm—Pickup arm complete—less pickup unit	6.00
13404	Armature—Pickup armature	.95
11548	Back—Pickup housing back	.52
11946	Coil—Pickup coil—(L24)	.65
3521	Cover—Pickup back cover	.18
11708	Cover—Pickup front cover	.15
12354	Damper—Pickup damper	.16
3516	Damper—Pickup arm damper—comprising one upper and one lower damper, one upper bushing and one lower bearing	.14
3390	Escutcheon—Pickup arm escutcheon	.46
11945	Pickup unit—Complete—(L24)	5.50
3389	Rod—Eccentric automatic brake trip rod—Package of 5	$0.40
3387	Screw assembly—Pickup mounting screw assembly—comprising one screw,	

Stock No.	DESCRIPTION	List Price
	one lockwasher and one nut—Package of 10	.50
11549	Screw—Pickup front cover screw—Package of 10	.42
11547	Screw—Pickup needle holding screw—Package of 10	.42
	REPRODUCER ASSEMBLIES	
11232	Board—Terminal board with two lead wire clips	.18
11231	Bolt—Yoke and core assembly bolt and nut	.16
8060	Bracket—Output transformer mounting bracket	.14
11257	Clamp—Cone center suspension clamping nut and screw assembly—Package of 5	.25
11254	Coil—Field coil—(L22)	2.00
11233	Coil—Neutralizing coil (L20)	.30
11258	Cone—Reproducer cone—(L21)	1.00
5118	Connector—3 contact male connector for reproducer	.25
5119	Connector—3-contact female connector for reproducer cable	.25
9619	Reproducer—Complete	6.05
11253	Transformer—Output transformer—(T2)	1.56
11886	Washer—Spring washer used to hold field coil securely—Package of 5	.20
	MISCELLANEOUS ASSEMBLIES	
11996	Bracket—Tuning tube mounting bracket and clamp	.22
11947	Cable—2-conductor shielded cable, approximately 35 inches long—connects volume control to input transformer	.85
11948	Cable—3-conductor shielded volume control cable (control end)—complete with 4-contact male connector	1.50
6123	Connector—4-contact male connector for volume control cable	.30
12698	Crystal—Station selector escutcheon and crystal	1.02
11276	Escutcheon—Tuning tube escutcheon	.40
11347	Knob—Phonograph volume control, radio volume control, range switch, or tone control and power switch knob—Package of 5	.75
11610	Knob—Station selector knob assembly, comprising one large and one small knob—Package of 5	1.00
12556	Receptacle—Needle holder	.40
11210	Screw—Chassis mounting screw assembly—Package of 4	.28
11349	Spring—Retaining spring for knob Stk. No. 11347, and small knob in Stk. No. 11610—Package of 5	.25
4982	Spring—Retaining spring for large knob in Stk. No. 11610—Package of 10	.50
3391	Spring—Suspension spring and washer assembly for mounting motor board, comprising 1 bolt, 1 top spring, 1 bottom spring, 2 cup washers, 1 C washer and 1 cap nut	.50
11949	Transformer—Phonograph input transformer pack, comprising one input transformer, one 1,800 Mmfd., one .01 Mfd. and one 0.1 Mfd. capacitors and one 1,000-ohm, one 33,000-ohm resistors (T3, C41, C43, C44, R26, R33)	7.05

The prices quoted above are subject to change without notice.

MODEL CV-8 "Pak-O-Powr"
Schematic,Chassis Wiring
Parts

RCA MFG. CO., INC.

MODEL CV-8 PAK-O-POWR

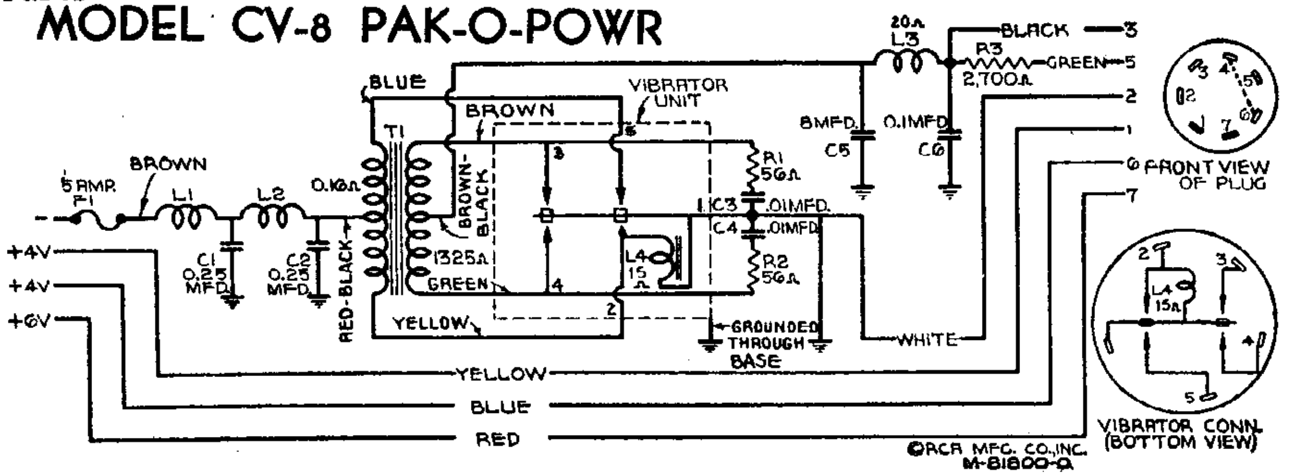


Figure 1. - Schematic Circuit Diagram

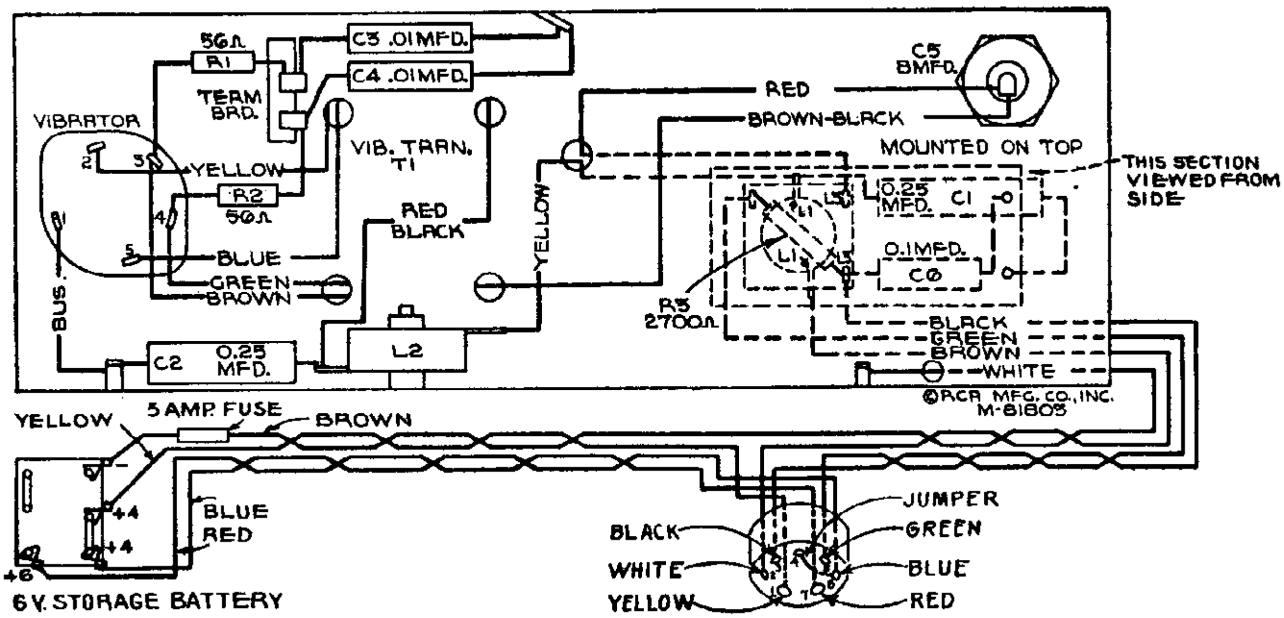
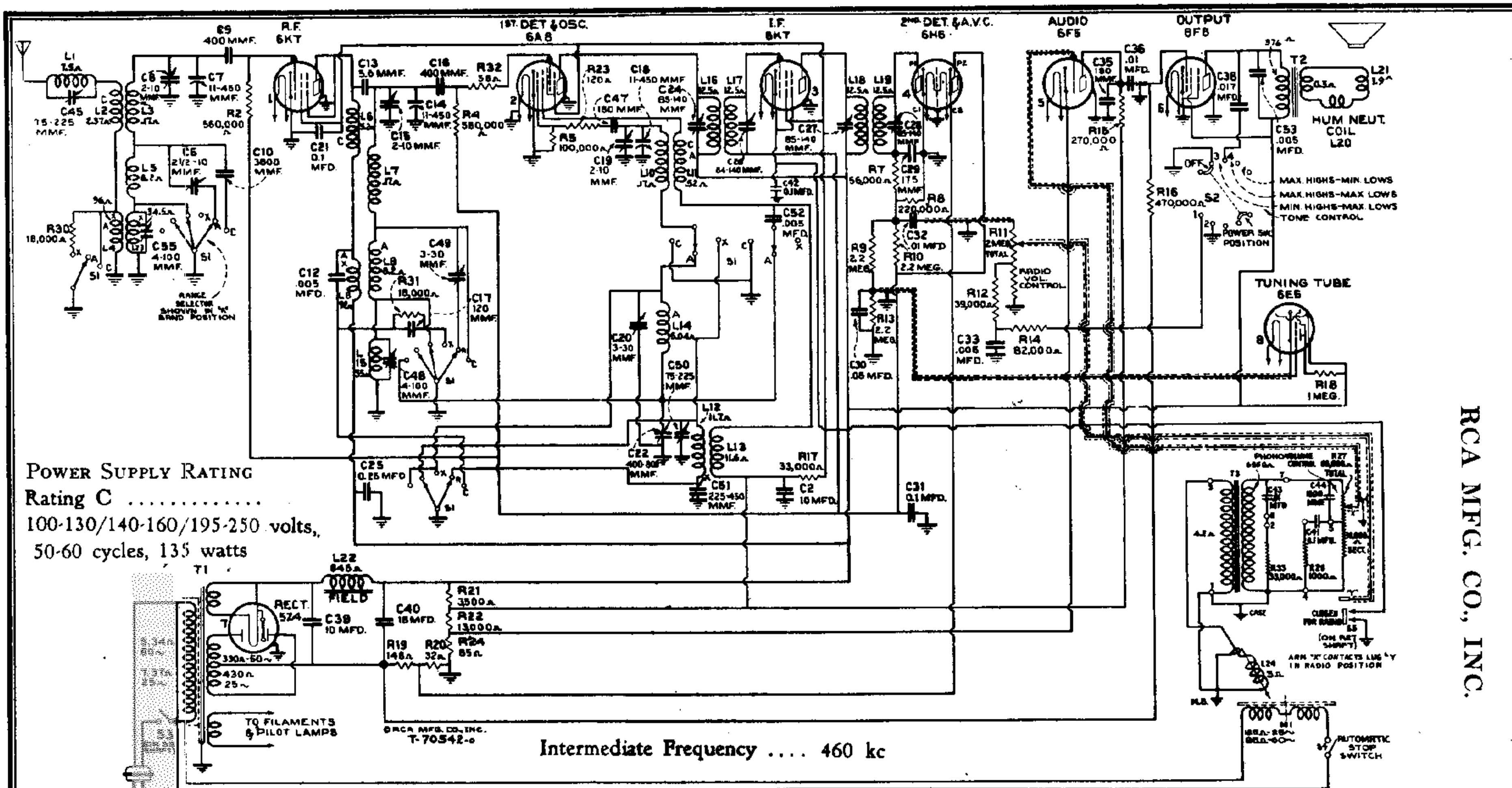


Figure 2. - Chassis Wiring Diagram

Stock No.	Description
13046	Capacitor--8 mfd. (C5)
14289	Clip--Two battery clips, one marked "+" and one unmarked
12819	Coil--Choke coil and terminal board assembly (L3)
12179	Coil--Choke coil. (L1, L2)
5140	Fuse--5 ampere (F1)
4290	Insulator--Fuse holder insulating sleeve
14419	Mounting--Rubber mounting for vibrator chassis
14409	Plug--7-contact female plug for battery cable
13220	Resistor--56 ohms, carbon type, 1/4 watt (R1, R2)
14421	Resistor--2700 ohms, insulated, 1 watt (R3)
4284	Spring--Fuse holder tension spring
14420	Transformer--Vibrator transformer (T1)
14422	Vibrator--Plug-in vibrator unit (L4)
4285	Washer--Fuse holder insulating washer

RCA MFG. CO., INC.



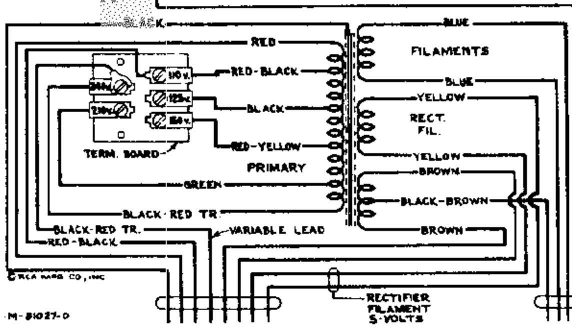
Power Supply Rating
Rating C ....
100-130/140-160/195-250 volts,
50-60 cycles, 135 watts

Intermediate Frequency .... 460 kc

Loudspeaker
Type .... Electrodynamic
Voice Coil Impedance ..... 2.25 ohms at 400 cycles

Type of Pickup .... Low-impedance Magnetic
Pickup Impedance .... 8½ ohms at 1,000 cycles

Power Output Rating
Undistorted .... 2¼ watts
Maximum .... 5 watts



Primary resistance—10.5 ohms total

Figure 10—Loudspeaker Wiring

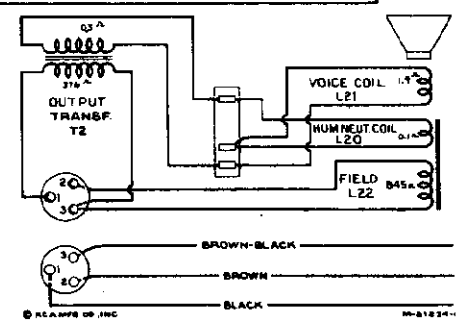
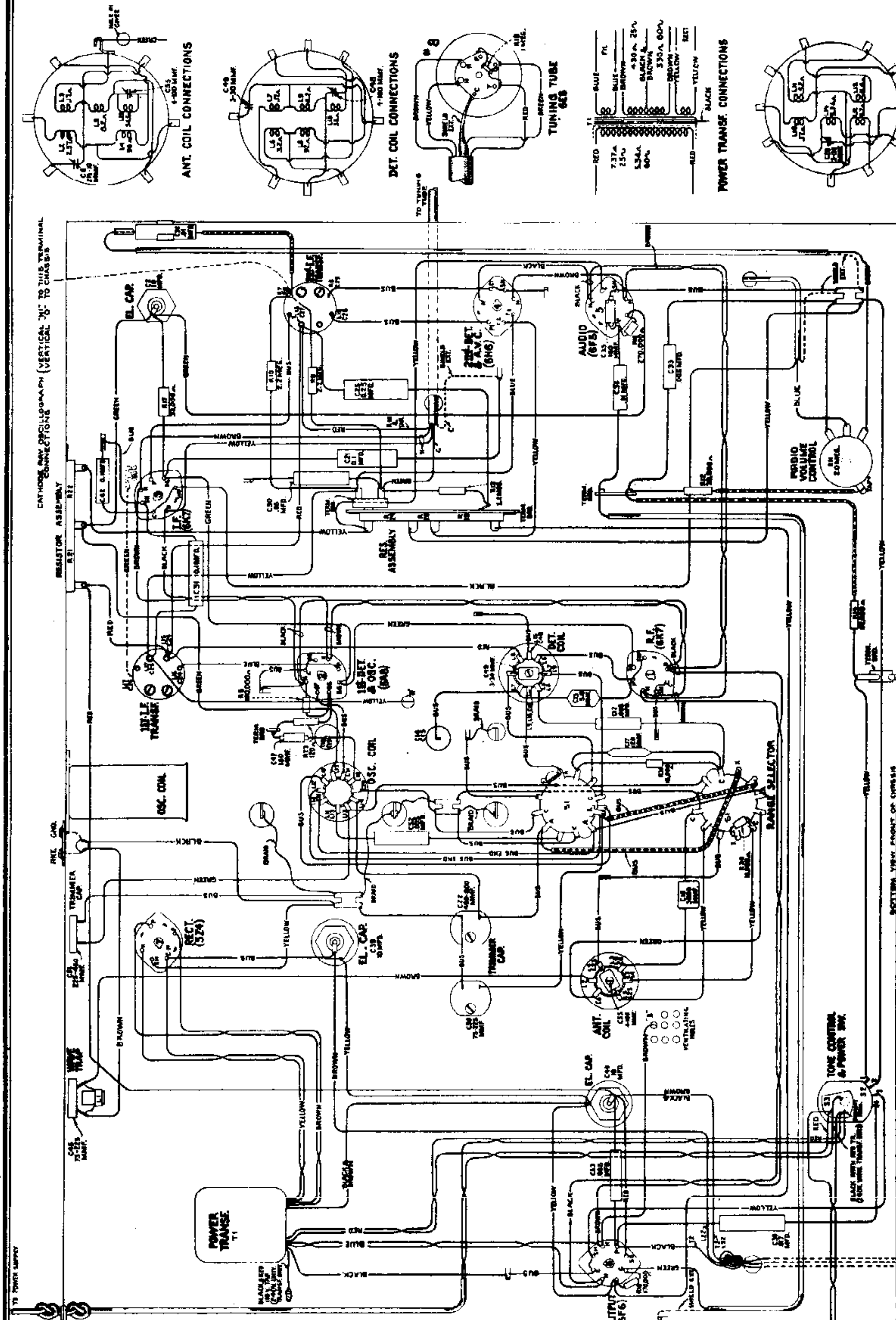


Figure 11—Universal Transformer

MODEL 8U2
Chassis Wiring

RCA MFG. CO., INC.



Frequency Ranges

"Long Wave" (X) .... 155-320 kc
"Medium Wave" (A) .... 530-1,500 kc
"Short Wave" (C) .... 5,400-18,000 kc

Alignment Frequencies

"Long Wave" (X) .... 175 kc (osc.), 300 kc (osc., det., ant.)
"Medium Wave" (A) .... 600 kc (osc.), 1,500 kc (osc., det., ant.)
"Short Wave" (C) .... 15,000 kc (osc., det., ant.)

MODEL 8U2
Voltage, Resistance
Socket, Trimmers

RCA MFG. CO., INC.

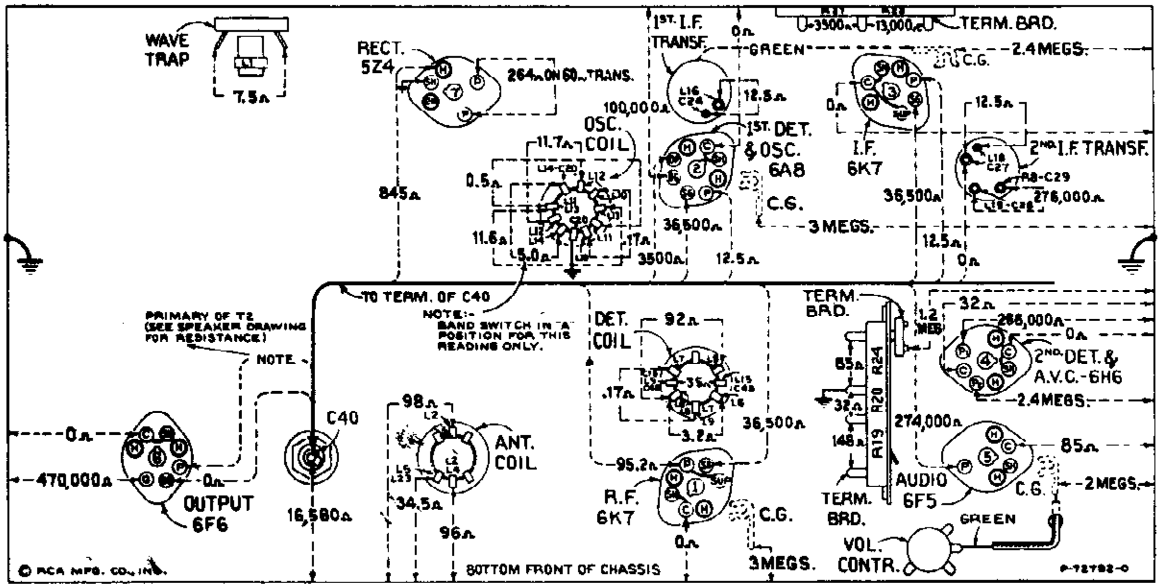


Figure 4—Resistance Diagram

Power supply disconnected—Radiotrons in sockets—Tuning condenser in full-mesh—Range selector "Long wave" position—Volume control maximum—Power switch–Tone in "OFF" position—Radio–Record switch to "Radio"

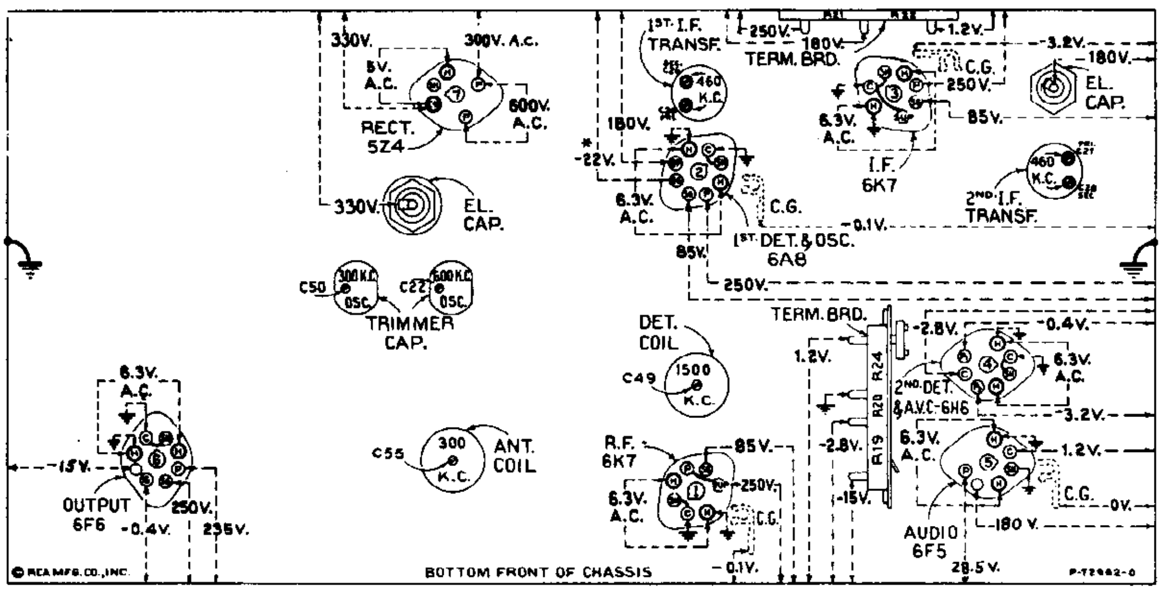


Figure 5—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc—No signal being received—Volume control minimum—Power switch–Tone full clockwise—Radio–Record switch to "Radio"

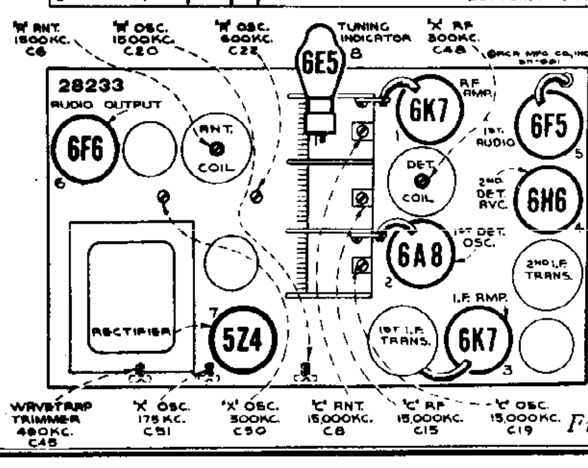


Figure 1—Radiotron, Coil, and Trimmer Locations

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6K7—R-F	12.5 ma.
(2)	RCA-6A8—Det.-Osc.	13.8 ma.
(3)	RCA-6K7—I.F.	9.0 ma.
(4)	RCA-6H6—2nd Det.-A.V.C.	—
(5)	RCA-6F5—Audio	0.25 ma.
(6)	RCA-6F6—Power	40.0 ma.
(7)	RCA-5Z4—Rect.	90.0 ma.*
(8)	RCA-6E5—Eye	3.0 ma.

(* Cannot be measured at socket.)

MODEL 8U2
Assembly Wiring
Phono.Details,Pick-up

RCA MFG. CO., INC.

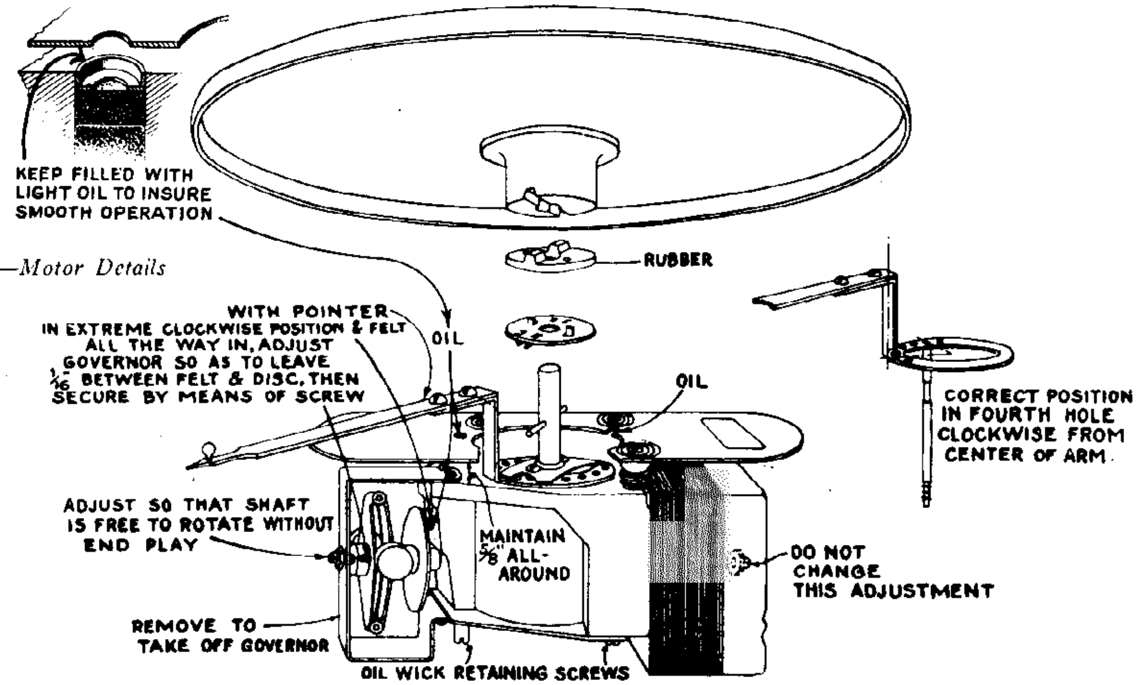


Figure 8—Motor Details

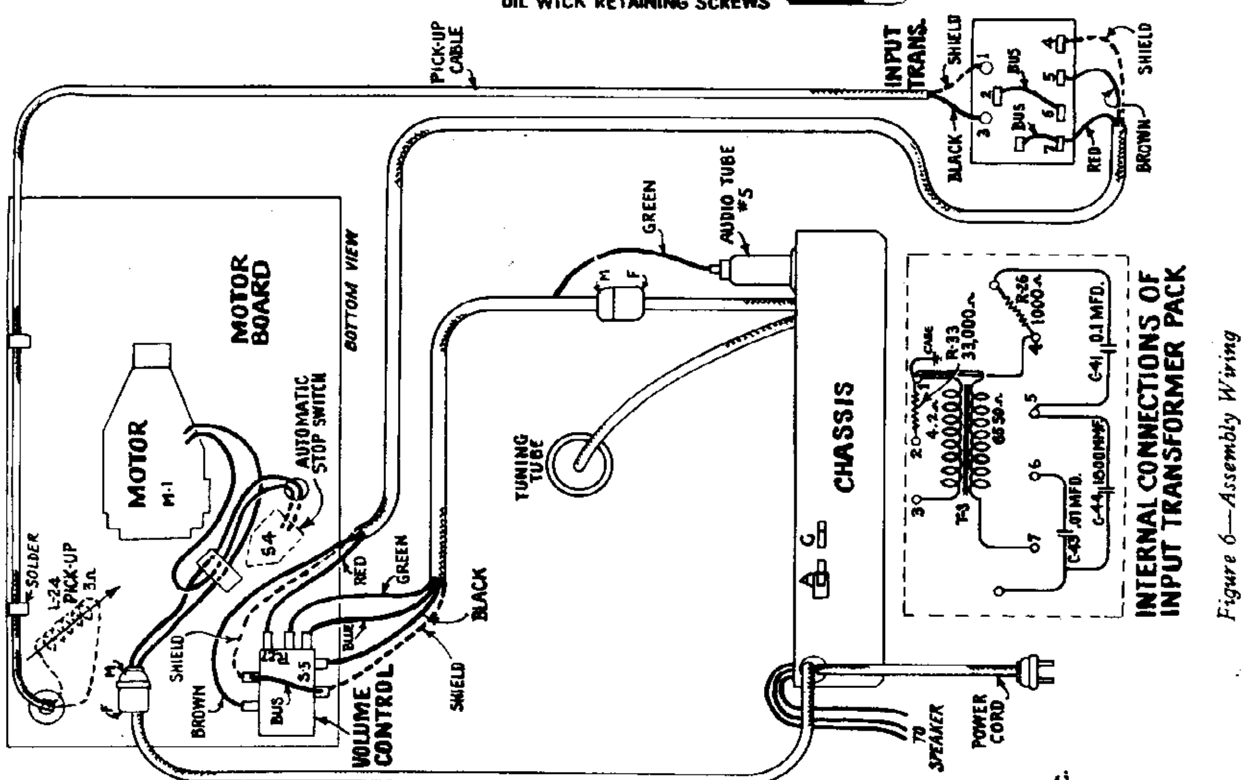


Figure 6—Assembly Wiring

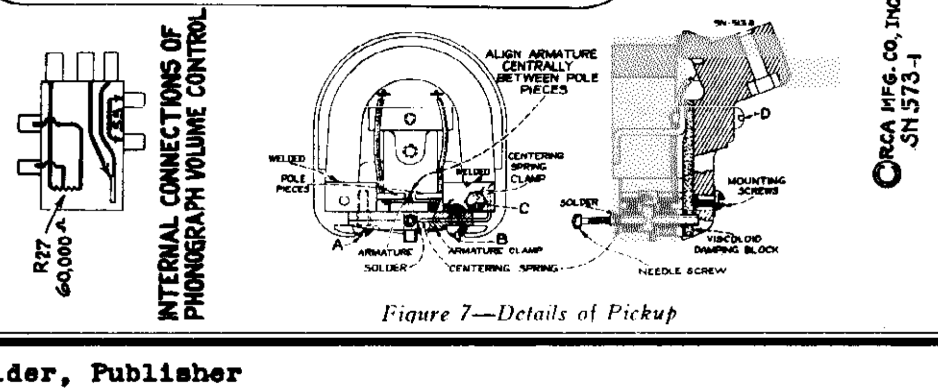


Figure 7—Details of Pickup

RCA MFG. CO., INC.

Alignment Procedure

Precise alignment is vital to the proper functioning of this receiver. There are four trimming adjustments provided in the i-f system, five in the oscillator coil system, three in the detector coil system, and three in the antenna coil system. Each of these trimmers has been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions of climate or have been altered for service purposes. Incorrect alignment is usually evidenced by loss of sensitivity, improper tone quality, and poor selectivity. These indications will generally be present together.

The correct performance of this receiver can only be obtained when the alignment is performed with adequate and reliable test apparatus and in the sequence given. The manufacturer of this instrument has a complete assortment of such service equipment available for sale through its dealers and distributors.

Two methods of alignment are applicable. One method requires the cathode-ray oscillograph, while the other requires a voltmeter or glow-type indicator. The oscillographic method is advantageous in that the indication is in the form of a wave-image which represents the resonance characteristic of the tuned circuits. Alignment by this method should be performed with equipment such as an RCA Stock No. 9545 **Cathode-Ray Oscillograph** and an RCA Stock No. 9558 **Frequency Modulator.** For the output indicator method, an instrument such as an RCA Stock No. 4317 should be used. Either of the above methods requires a reliable test oscillator for the source of alignment frequencies such as the RCA Stock No. 9595 **Test Oscillator.** Cathode-ray alignment is similar to the output indicator alignment outlined below, except as follows: The frequency modulator should be used to sweep the test oscillator signal when aligning the i-f amplifier and the low-frequency oscillator series trimmers. It will only be necessary to first adjust the trimmers to peak response, as outlined below, without the frequency modulator connected. Then, interconnect the test oscillator with the frequency modulator and re-tune the test oscillator (increase frequency) until the forward and reverse curves coincide at their highest points. Next, adjust the trimmers until the curves coincide throughout their length and have maximum amplitude. The proper place for connection of the oscillograph input to the receiver is indicated on the Chassis Wiring Diagram (figure 3). The high-frequency trimmers on all three bands should be adjusted for maximum (peak) amplitude of the images.

I-F Trimmer Adjustments

The four trimmers of the two i-f transformers are located as shown by figure 5. Each must be aligned to a basic frequency of 460 kc. To do this, attach the output indicator across the voice-coil circuit. Attach the receiver chassis to a good external ground. Connect the output of the test oscillator between the control-grid of the RCA-6A8 first-detector tube and chassis-ground through a .001 mfd. capacitor. Tune the test oscillator to 460 kc. Advance the receiver volume control to its full-on position and adjust the receiver tuning control to a point where no interference is encountered from broadcast stations, or short stator of oscillator tuning capacitor C18 to chassis eliminating local oscillator signals. Increase the output of the test oscillator until a slight indication is apparent on the output indicator. Adjust the two trimmers, C28 and C27 of the second i-f transformer to produce maximum (peak) indicated receiver output. Then, adjust the two trimmers, C26 and C24, of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. During these adjustments, regulate the test-oscillator output so that the receiver output indication is always as low as possible. By doing so, broadness of tuning, due to a.v.c., action will be avoided. It is advisable to repeat the adjustment of all i-f trimmers a second time to assure that the inter-action between them has not disturbed the original adjustment.

R-F Trimmer Adjustments

The eleven trimmers associated with the r-f, first detector, and oscillator tuned circuits have their locations shown by figures 1 and 5. The three trimmers which are at all times directly in shunt with the variable tuning condensers necessitate that the "Short wave" (C) band be aligned first. The range selector switch should, therefore, be turned to its "Short wave" position for the first adjustments. Leave the output indicator connected to the output system.

Calibrate the dial by rotating the tuning control until the variable condenser plates are in their full-mesh (maximum capacity) position and adjust the dial pointer so that its end points to the **horizontal** graduation (520 kc) at the low-frequency end of the "Medium wave" (A) dial scale.

Wave-Trap Adjustment

Connect the test oscillator to the antenna and ground terminals of the receiver, leaving it tuned to 460 kc. Adjust the wave-trap trimmer C45 for maximum suppression of the 460 kc signal. An increase in test-oscillator output may be necessary before the point of minimum output (maximum suppression of signal) is obtained.

"Short Wave" Band

(a) Adjust the test oscillator to 15,000 kc and set the receiver tuning control to a dial reading of 15,000 kc.

(b) Adjust trimmer C19 on the oscillator section of the variable condenser to the point at which it produces maximum indicated receiver output. Two points may be found, each of which produces such a maximum. The one of **maximum trimmer capacitance** is correct and should be used. The local (heterodyne) oscillator will be 460 kc below the signal frequency at this adjustment point.

(c) Adjust trimmer C15 of the detector section of the variable condenser, simultaneously rocking the receiver tuning control backward and forward through the 15,000 kc input signal, until maximum receiver output results from these combined operations.

(d) With the receiver tuning control set to 15,000 kc adjust trimmer C8 on the antenna section of the variable condenser to the point which produces maximum (peak) indicated receiver output.

"Medium Wave" Band

(e) Change the receiver range selector to its "Medium wave" (A) band position and set the receiver tuning control to a dial reading of 1,500 kc. Tune the test oscillator to 1,500 kc and regulate its output to produce a slight indication on the receiver output indicating device.

(f) Adjust the **high-frequency** trimmers of the oscillator, detector, and antenna coils, C20, C49, and C6 respectively, to the points at which each produces maximum indicated receiver output.

(g) Shift the test-oscillator frequency to 600 kc and tune the receiver to pick up this signal, disregarding the dial reading at which it is best received.

(h) Adjust the low-frequency trimmer C22 of the oscillator coil, simultaneously rocking the tuning control of the receiver backward and forward through the signal, until maximum indicated receiver output results from these combined operations. The adjustment of C19, C15, and C8 should be corrected at 15,000 kc as in (b), (c), and (d); also C20, C49, and C6 should be corrected at 1,500 kc, as in (f) to compensate for any changes caused by the adjustment of the low-frequency oscillator coil trimmer C22.

Long Wave" Band

(i) Change receiver band selector to "Long wave" (X) band and set receiver tuning control to a dial reading of 300 kc. Tune test oscillator to 300 kc and adjust oscillator, detector, and antenna trimmers C50, C48, and C55, respectively, for maximum indicated receiver output.

(j) Set receiver to 175 kc and tune test oscillator to 175 kc. Adjust trimmer C51 for maximum indicated output, simultaneously rocking tuning control of the receiver backward and forward through the signal.

(k) The adjustment of C50, C48, and C55 should now be repeated at 300 kc as described in (i) to compensate for any changes caused by the adjustment of the low-frequency trimmer C51.

Stock No.	REPLACEMENT PARTS	List Price
	RECEIVER ASSEMBLIES	
12706	Arm—Arm and hub assembly for operating shutter	$0.22
13098	Board—Antenna and ground terminal board	.25
5237	Bushing—Variable tuning condenser mounting bushing assembly—Package of 3	.43
11625	Cable—Radiotron tuning tube cable complete with socket	1.26
11759	Cable—2-conductor shielded volume control cable—complete with 4-contact female connector	.92
12511	Cap—Contact cap—Package of 5	.15
11465	Capacitor—Adjustable trimmer (C22)	.48
11256	Capacitor—Adjustable trimmer (C50)	.48
4955	Capacitor—Adjustable trimmer (C45)	.48
12065	Capacitor—Adjustable trimmer (C51)	.65
12814	Capacitor—5.6 Mmfd.—(C13)	.20
12974	Capacitor—120 Mmfd.—(C17)	.20
5116	Capacitor—175 Mmfd.—C29)	.18
13003	Capacitor—180 Mmfd.—(C35, C47)	.20
11290	Capacitor—400 Mmfd.—(C9, C16)	.25
11621	Capacitor—3,600 Mmfd.—(C10)	.38
4868	Capacitor—.005 Mfd.—(C12, C33, C52, C53)	.20
11451	Capacitor—.017 Mfd.—(C38)	.18
11395	Capacitor—.01 Mfd.—(C32)	.18
4858	Capacitor—.01 Mfd.—(C36)	.25
4839	Capacitor—0.1 Mfd.—(C21)	.28
4841	Capacitor—0.1 Mfd.—(C31)	.22
11414	Capacitor—0.1 Mfd.—(C42)	.20

Stock No.	DESCRIPTION	List Price
5170	Capacitor—0.25 Mfd.—(C25)	.25
4836	Capacitor—.05 Mfd.—(C30)	.30
11240	Capacitor—10 Mfd.—(C39)	1.08
11387	Capacitor—10 Mfd.—(C2)	.86
5212	Capacitor—18 Mfd.—(C40)	1.16
12061	Coil—Antenna coil—Less shield—(L2, L3, L4, L5, L23, C6, C55)	1.90
12062	Coil—Detector coil—Less shield—(L6, L7, L8, L9, L15, C48, C49)	1.94
12063	Coil—Oscillator coil—Less shield—(L10, L11, L12, L13, L14, C20)	2.62
12965	Condenser—Three-gang variable tuning condenser—(C7, C8, C14, C15, C18, C19)	6.15
4153	Connector—4-contact female connector for volume control cable	.48
4573	Connector—2-contact female connector for motor cable	.30
13094	Dial—Station selector dial scale	1.05
11394	Foot—Chassis foot assembly—Package of 2	$0.70
12712	Indicator—Station selector indicator pointer	.22
5226	Lamp—Dial lamp—Package of 5	.70
12718	Mask—Dial Light Diffuser with colored screen	.40
11393	Resistor—Voltage divider resistor—comprising one 3,500 ohm and one 13,000 ohm sections—(R21, R22)	.74
11329	Resistor—Voltage divider resistor—comprising one 148 ohm, one 32 ohm and one 85 ohm sections—(R19, R20, R24)	.52
12075	Resistor—56 ohms—Flexible type complete with contact cap—(R32)	.28
12071	Resistor—120 ohms—Carbon type—¼ watt—(R23)—Package of 5	1.00
12070	Resistor—18,000 ohms—Carbon type—1/10 watt—(R30, R31)—Package of 5	.75
5033	Resistor—33,000 ohms—Carbon type—1 watt—(R17)—Package of 5	1.10
11322	Resistor—39,000 ohms—Carbon type—¼ watt—(R12)—Package of 5	1.00
11365	Resistor—82,000 ohms—Carbon type—¼ watt—(R14)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt—(R5)—Package of 5	1.00
11453	Resistor—270,000 ohms—Carbon type—1/10 watt—(R15)—Package of 5	.75
11452	Resistor—470,000 ohms—Carbon type—1/10 watt—(R16)—Package of 5	.75
11397	Resistor 560,000 ohms—Carbon type—1/10 watt—(R2, R4)—Package of 5	.75
12013	Resistor—1 megohm—Carbon type—1/10 watt—(R18)—Package of 5	.75
11626	Resistor—2.2 megohms—Carbon type—¼ watt—(R9, R10, R13)—Package of 5	1.00
4669	Screw—No. 8-32 set screw for arm Stk No. 12706—Package of 10	.25
12064	Shield—Antenna or detector coil shield	.28
11604	Shield—Oscillator coil shield	.24
11390	Shield—Intermediate frequency transformer shield	.25
12735	Shield—Dial lamp shield—Package of 5	.25
12971	Shutter—Dial scale holder and shutter assembly	.85
11222	Socket—Dial lamp socket	.18
11195	Socket—5-contact rectifier Radiotron socket	.15
11198	Socket—7-contact 6K7—6F5—or 6H6 Radiotron socket	.15
11196	Socket—8 contact 6A8 or 6F6 Radiotron socket	.15
12849	Spring—Tension spring shutter—Package of 5	.18
12956	Switch—Range switch—(S1)	1.75
11392	Switch—Tone control and power switch assembly—(S2, S3)	1.14
388	Transformer—First intermediate frequency transformer—(L16, L17, C24, C26)	1.80

The prices quoted above are subject to change without notice.

MODEL 8U2
Parts,Page 2

RCA MFG. CO., INC.

Stock No.	DESCRIPTION	List Price
11389	Transformer—Second intermediate frequency transformer—(L18, L19, C27, C28, C29, R7, R8)	3.02
11803	Transformer—Power transformer—105-125 volts—50-60 cycles—(T1)	4.38
11805	Transformer—Power transformer—105-130, 140-160, 195-250 volts—40-60 cycles (T1)	7.95
11667	Trap—Wave trap—(L1, C45)	1.22
13144	Volume control—(R11)	1.00
	MOTOR ASSEMBLIES	
11703	Governor—Governor complete for phonograph motor—Stock No. 11701 or No. 11702	3.05
11701	Motor—Phonograph turntable motor—110 volts—50 to 60 cycles—(M1)	21.20
	MOTOR BOARD ASSEMBLIES	
4594	Box—Used needle box (cup)	.30
4577	Connector—2-contact male connector for motor cable	.30
7084	Cover—Turntable cover	.40
11704	Damper—Turntable rubber damper and damper plate	.24
4596	Escutcheon—Speed regulator escutcheon plate	.36
4597	Screw—Motor mounting screw assembly—comprising four screws, four lockwashers, four spacers, and four nuts	.22
11696	Turntable—Complete	2.48
11695	Volume control—Phonograph volume control—(R27, S5)	1.60
	ECCENTRIC AUTOMATIC BRAKE SWITCH ASSEMBLIES	
3994	Cover—Eccentric automatic switch cover and screw	.26
10174	Springs—Automatic brake springs—comprising one each of four springs—Package of 2 sets	.50
6896	Switch—Eccentric automatic brake and switch assembly—less switch cover	2.50
3322	Switch—Eccentric automatic switch only—less cover—(S13)	.75
	PICKUP AND ARM ASSEMBLIES	
11944	Arm—Pickup arm complete—less pickup unit	6.00
13404	Armature—Pickup armature	.95
11548	Back—Pickup housing back	.52
11946	Coil—Pickup coil—(L24)	.65
3521	Cover—Pickup back cover	.18
11708	Cover—Pickup front cover	.15
12354	Damper—Pickup damper	.16
3516	Damper—Pickup arm damper—comprising one upper and one lower damper, one upper bushing and one lower bearing	.14
3390	Escutcheon—Pickup arm escutcheon	.46
11945	Pickup unit—Complete—(L24)	5.50
11949	Transformer—Phonograph input transformer pack, comprising one input transformer, one 1,800 Mmfd., one .01 Mfd. and one 0.1 Mfd. capacitors and one 1,000-ohm, one 33,000-ohm resistors (T3, C41, C43, C44, R26, R33)	7.05

Stock No.	DESCRIPTION	List Price
3389	Rod—Eccentric automatic brake trip rod—Package of 5	$0.40
3387	Screw assembly—Pickup mounting screw assembly—comprising one screw, one lockwasher and one nut—Package of 10	.50
11549	Screw—Pickup front cover screw—Package of 10	.42
11547	Screw—Pickup needle holding screw—Package of 10	.42
	REPRODUCER ASSEMBLIES	
11232	Board—Terminal board with two lead wire clips	.18
11231	Bolt—Yoke and core assembly bolt and nut	.16
8060	Bracket—Output transformer mounting bracket	.14
11257	Clamp—Cone center suspension clamping nut and screw assembly—Package of 5	.25
11254	Coil—Field coil—(L22)	2.00
11233	Coil—Neutralizing coil (L20)	.30
11258	Cone—Reproducer cone—(L21)	1.00
5118	Connector—3 contact male connector for reproducer	.25
5119	Connector—3-contact female connector for reproducer cable	.25
9619	Reproducer—Complete	6.05
11253	Transformer—Output transformer—(T2)	1.56
11886	Washer—Spring washer used to hold field coil securely—Package of 5	.20
	MISCELLANEOUS ASSEMBLIES	
11996	Bracket—Tuning tube mounting bracket and clamp	.22
11947	Cable—2-conductor shielded cable, approximately 35 inches long—connects volume control to input transformer	.85
11948	Cable—3-conductor shielded volume control cable (control end)—complete with 4-contact male connector	1.50
6123	Connector—4-contact male connector for volume control cable	.30
12698	Crystal—Station selector escutcheon and crystal	1.02
11276	Escutcheon—Tuning tube escutcheon	.40
11347	Knob—Phonograph volume control, radio volume control, range switch, or tone control and power switch knob—Package of 5	.75
11610	Knob—Station selector knob assembly, comprising one large and one small knob—Package of 5	1.00
12556	Receptacle—Needle holder	.40
11210	Screw—Chassis mounting screw assembly—Package of 4	.28
11349	Spring—Retaining spring for knob Stk. No. 11347, and small knob in Stk. No. 11610—Package of 5	.25
4982	Spring—Retaining spring for large knob in Stk. No. 11610—Package of 10	.50
3391	Spring—Suspension spring and washer assembly for mounting motor board, comprising 1 bolt, 1 top spring, 1 bottom spring, 2 cup washers, 1 C washer and 1 cap nut	.50

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL 9K1
Schematic, Socket
Trimmers

RCA MFG. CO., INC.

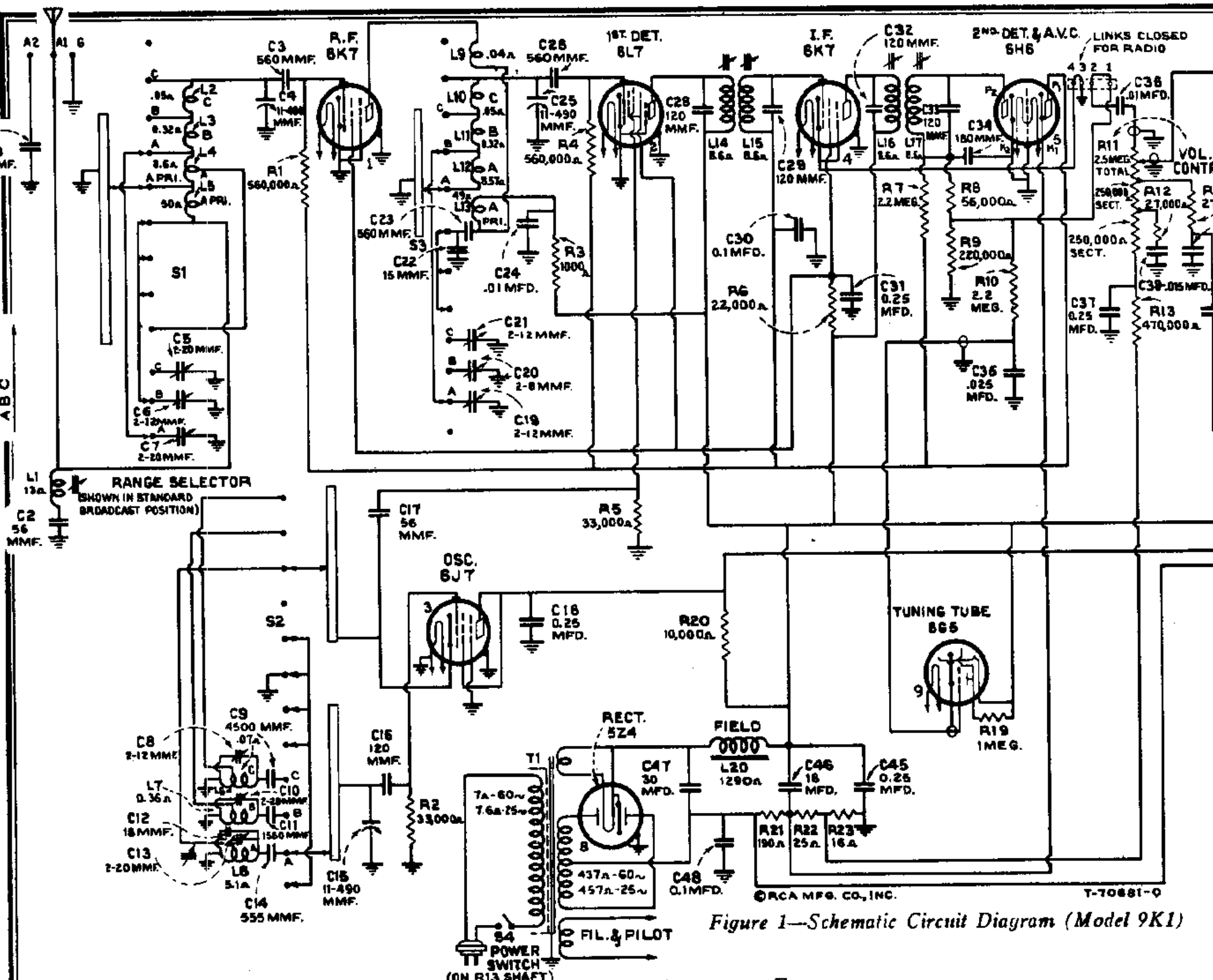


Figure 1—Schematic Circuit Diagram (Model 9K1)

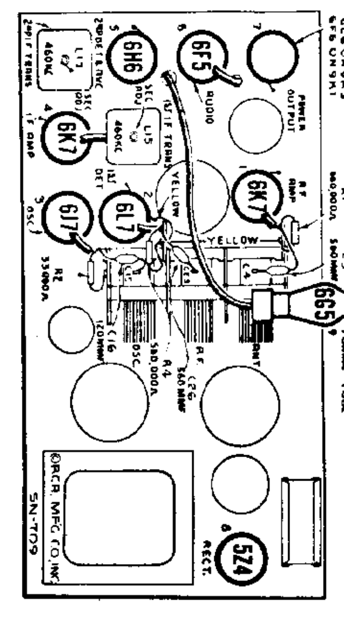


Figure 9—Radiotron and I-F Trimmer Locations

FREQUENCY RANGES

"Standard Broadcast" (A)	530-1,800 kc
"Medium Wave" (B)	1,800-6,400 kc
"Short Wave" (C)	6,400-23,000 kc

ALIGNMENT FREQUENCIES

"Short Wave" (C)	20,000 kc (osc., det., ant.)
"Medium Wave" (B)	6,000 kc (osc., det., ant.)
"Standard Broadcast" (A)	600 kc (osc.), 1,500 kc (osc., det., ant.)

Intermediate Frequency .... 460 kc

Pilot Lamps (3, Model 9K1) (4, Model 9K3) .... Mazda No. 46, 6.3 volts, 0.25 amp.

POWER SUPPLY RATINGS

		9K1	9K3
Rating A	105-125 volts, 50-60 cycles	95 watts	135 watts
Rating B	105-125 volts, 25-60 cycles	95 watts	135 watts

MODEL 9K1
Chassis Wiring

RCA MFG. CO., INC.

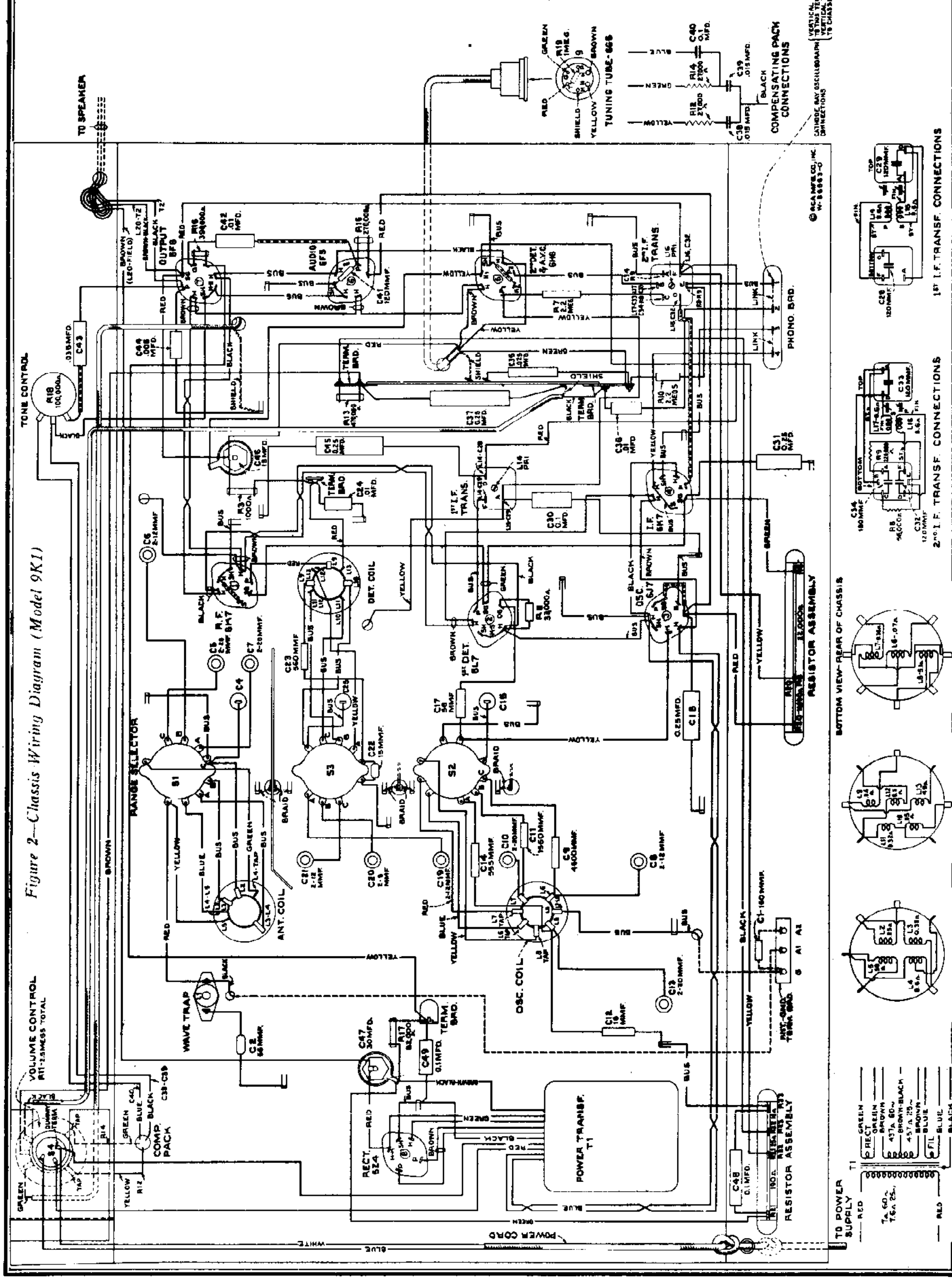


Figure 2—Chassis Wiring Diagram (Model 9K1)

MODEL 9K3
Schematic, Trans. Data
Spkr. Wiring

RCA MFG. CO., INC.

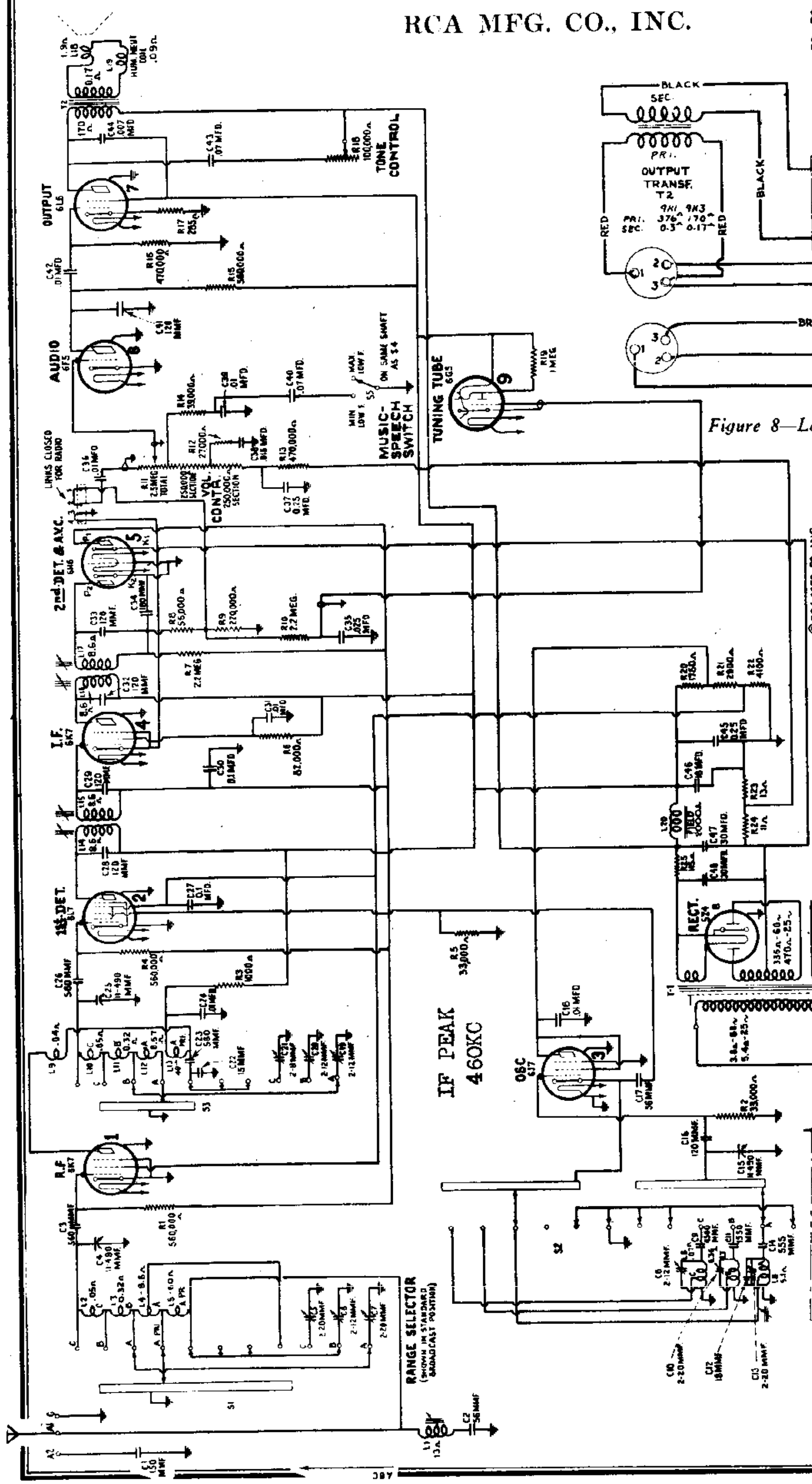


Figure 3—Schematic Circuit Diagram (Model 9K3)

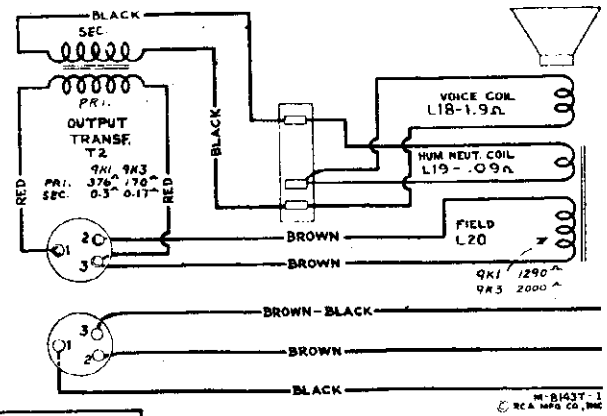
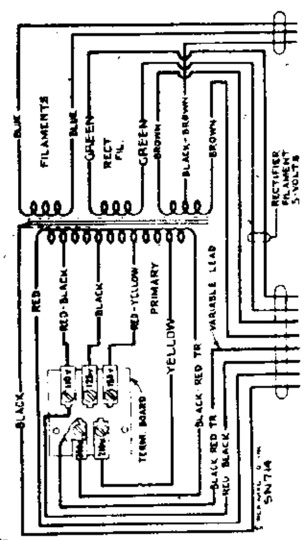


Figure 8—Loudspeaker Wiring



Primary Resistance—7.4 ohms total
Secondary Resistance—284 ohms total

Figure 11—Universal Transformer (Model 9K3)

MODEL 9K3
Chassis Wiring

RCA MFG. CO., INC.

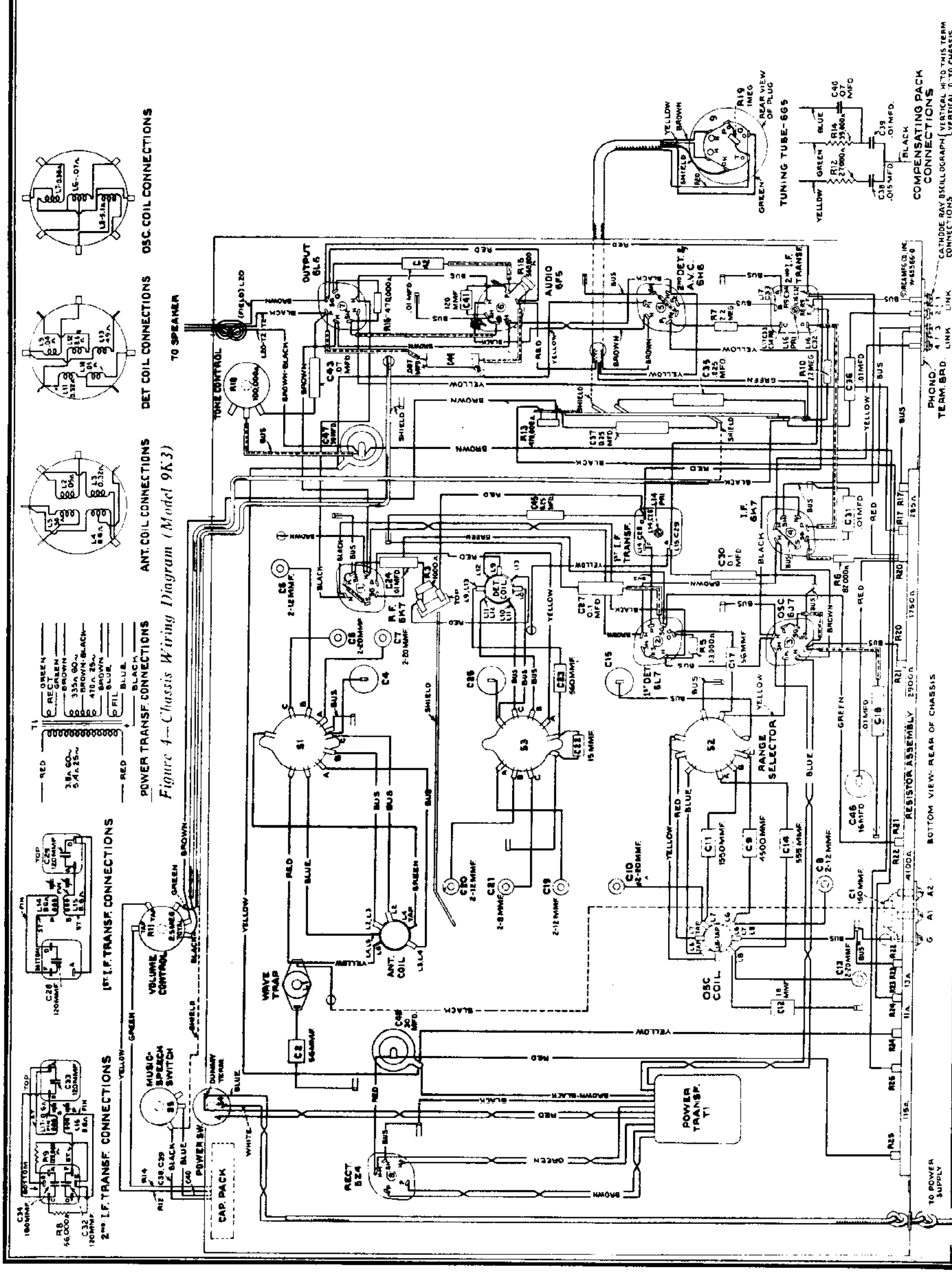


Figure 4—Chassis Wiring Diagram (Model 9K3)

RCA MFG. CO., INC.

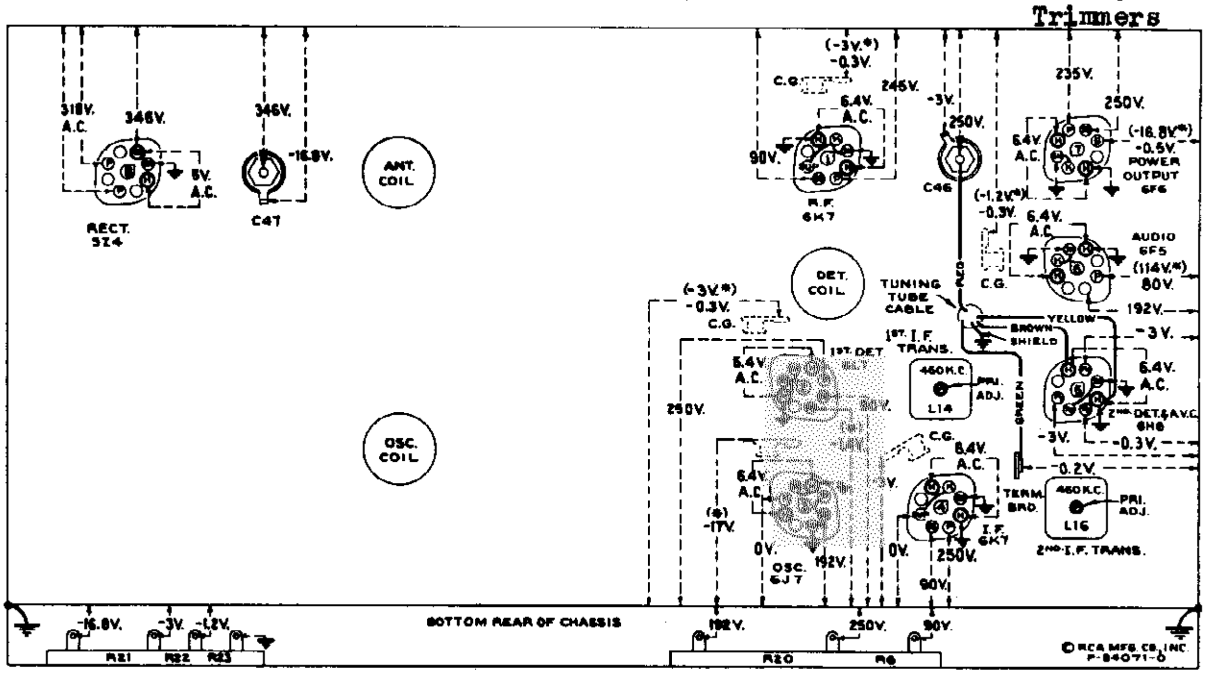


Figure 6—Radiotron Socket Voltages and I-F Trimmer Locations (Model 9K1)

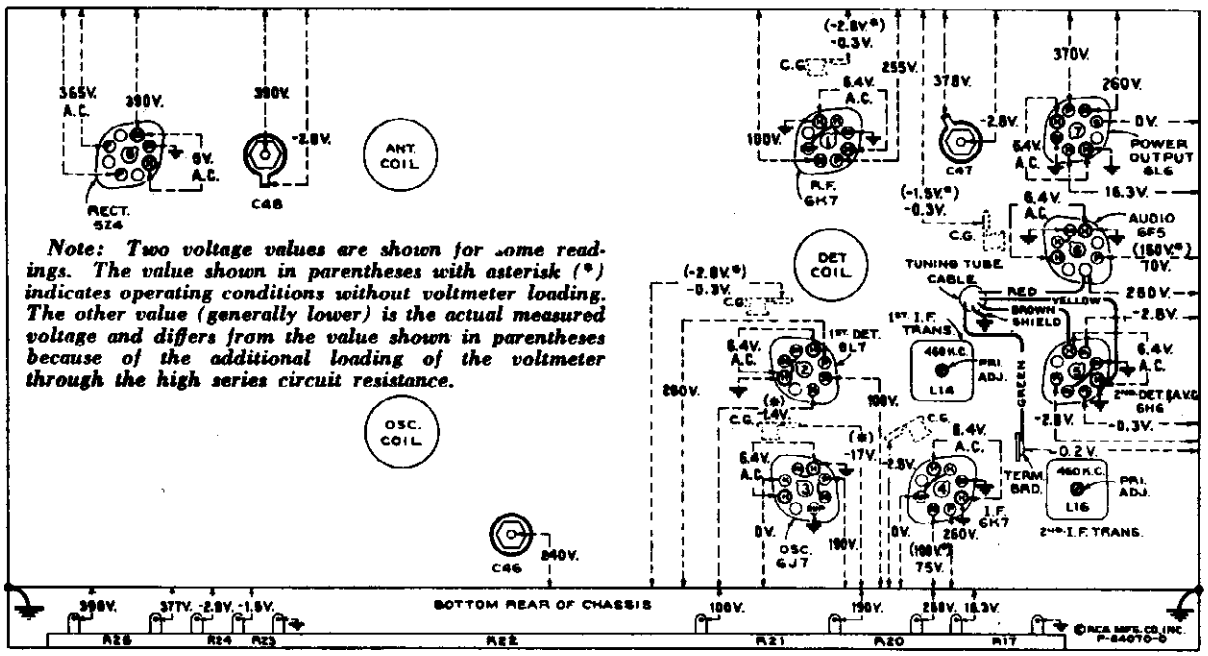


Figure 7—Radiotron Socket Voltages and I-F Trimmer Locations (Model 9K3)

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard broadcast")—No signal being received—Volume control minimum

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals Under Conditions Similar to Those of Voltage Measurements

	9K1	9K3		9K1	9K3
(1) RCA-6K7—R-F Amp.	7.5	7.5 ma.	(6) RCA-6F5—1st Audio	0.3	0.2 ma.
(2) RCA-6L7—1st Det.	6.4	7.2 ma.	(7) RCA-6F6—Output	41	— ma.
(3) RCA-6J7—Osc.	5.4	6.3 ma.	(7) RCA-6L6—Output	—	60 ma.
(4) RCA-6K7—I-F Amp.	7.5	7.5 ma.	(8) RCA-5Z4—Rectifier	72*	118 ma.*
(5) RCA-6H6—2nd Det. & A.V.C.	—	—	(9) RCA-6G5—Tuning Tube	2.0	2.0 ma.

(*Cannot be measured at socket.)

MODELS 9K1, 9K3
Alignment, Trimmers

RCA MFG. CO., INC.

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the low-frequency (end) calibration mark on "Standard broadcast" scale with the gang tuning-condenser plates in full-mesh position. This is a friction adjustment.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on Figures 5, 6, 7, and 9.

Cathode-ray alignment is preferable; the connections to the chassis are shown in Figures 2 and 4. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

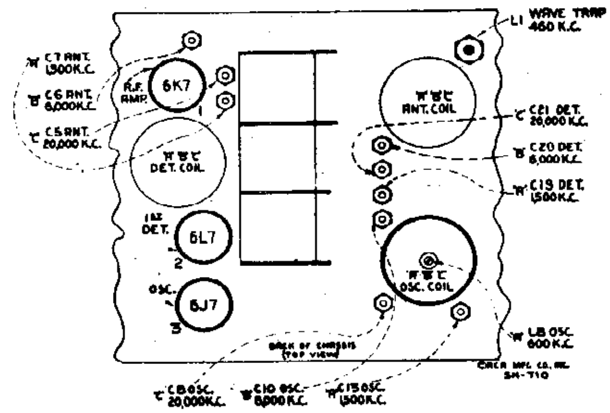


Figure 5—R-F Trimmer Locations

Note.—The locations of C20 and C21 are interchanged on some chassis of Model 9K1.

Order of Alignment	Test Oscillator: Connection to Receiver	Test Oscillator: Dummy Antenna	Test Oscillator: Frequency Setting	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
1	6K7 I-F Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	2nd I-F Trans.	L16 and L17	Max. (peak)
2	6L7 Det. Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	1st I-F Trans.	L14 and L15	Max. (peak)
3	"A1" Ant. Term.	200 Mmfd.	460 kc	No Signal 550-750 kc	Wave Trap	L1	Minimum Output
4	"A1" Ant. Term.	300 Ohms	20,000 kc	20,000 kc	"C" Osc.	C8	Max. (peak)*
5	"A1" Ant. Term.	300 Ohms	20,000 kc	Rock thru 20,000 kc	"C" Det.	C21	Max. (peak)†
6	"A1" Ant. Term.	300 Ohms	20,000 kc	20,000 kc	"C" Ant.	C5	Max. (peak)‡
7	"A1" Ant. Term.	300 Ohms	6,000 kc	6,000 kc	"B" Osc.	C10	Max. (peak)
8	"A1" Ant. Term.	300 Ohms	6,000 kc	6,000 kc	"B" Det.	C20	Max. (peak)
9	"A1" Ant. Term.	300 Ohms	6,000 kc	6,000 kc	"B" Ant.	C6	Max. (peak)
10	"A1" Ant. Term.	200 Mmfd.	600 kc	600 kc	"A" L-F Osc.	L8	Max. (peak)
11	"A1" Ant. Term.	200 Mmfd.	1,500 kc	1,500 kc	"A" H-F Osc.	C13	Max. (peak)
12	"A1" Ant. Term.	200 Mmfd.	600 kc	Rock thru 600 kc	"A" L-F Osc.	L8	Max. (peak)
13	"A1" Ant. Term.	200 Mmfd.	1,500 kc	1,500 kc	"A" H-F Osc.	C13	Max. (peak)
14	"A1" Ant. Term.	200 Mmfd.	1,500 kc	1,500 kc	"A" Det.	C19	Max. (peak)
15	"A1" Ant. Term.	200 Mmfd.	1,500 kc	1,500 kc	"A" Ant.	C7	Max. (peak)

* Use minimum capacity peak if two peaks can be obtained.
† Use maximum capacity peak if two peaks can be obtained.
‡ After this adjustment, check for image signal by shifting receiver dial to 19,080 kc.

MODELS 9K1,9K3
Notes,Dial Data
Parts,Page 1

RCA MFG. CO., INC.

General Description

These receivers each employ a nine-tube, three-band superheterodyne circuit. Model 9K1 uses an RCA-6F6 power-output tube, delivering a maximum output of 4.5 watts, while Model 9K3 uses an RCA-6L6 beam-power-output tube, delivering a maximum output of 12.5 watts. The tuning range for each model is continuous from 530 to 23,000 kc, which includes the standard broadcast band and the important short-wave bands at 49, 31, 25, 19, 16, and 13 meters, along with channels assigned for police, aviation, and amateur communication.

Features of design include an r-f amplifier stage; magnetite-core adjusted i-f transformers, wave-trap, and low-frequency oscillator tracking; full automatic volume control; phonograph terminal board; "Magic Eye" tuning tube; 12-inch electrodynamic loudspeaker; new plunger-type, air-dielectric trimming capacitors; aural-compensated audio volume control; continuous high-frequency tone control; and a two-point low-frequency tone control. In addition, Model 9K3 has a cabinet incorporating the "Magic Voice."

Service Data

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation if such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such as R1, L1, C1, etc., provide reference between the illustrations and Replacement Parts List. The coils, transformer windings, and reactors are rated in terms of d-c resistance to permit continuity checks.

Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio-amplifying circuit. RCA Victor Models R-93, R-93-2, R-93-A, or R-94 Record Players should be connected as follows: Remove the two links from the phonograph terminal board. Connect green wire in Radio-Record switch cable to terminal 2; yellow to terminal 1; red to terminal 4; and both the blue lead and shield to terminal 3. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch.

Loudspeaker.—Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with **ambroid** upon completion of adjustment.

Selector Dial (Model 9K3).—Figure 10 illustrates the relation of the various parts of the dial mechanism when in its "Standard broadcast" position with the range switch likewise turned to its "Standard broadcast" position. In re-assembling the dial after repairs, see that the gears are meshed in accordance with the diagram, at the same time noting that the range switch is in its "Standard broadcast" position and the lever attached to the range-switch shaft placed in the position shown.

To adjust the dial mechanism, set the range switch to its "Standard broadcast" position. Place a straight-edge across the center of the dial so that its edge is even with the lower (end) marking at both the low-frequency and high-frequency ends of the dial. Under such conditions the straight-edge should be parallel with the top of the chassis base. If the straight-edge is not parallel with the top of the chassis base, loosen the nut on the rear of the roller link pivot stud and move the stud up or down until the link roller moves the dial to the desired position so that the end calibration marks obtain the position mentioned above. Tighten the nut on the roller link pivot stud.

Set the gang tuning condenser to its maximum capacity position. Adjust the dial pointer to the low-frequency (end) mark on "Standard broadcast" scale. This is a friction adjustment.

With the gang tuning condenser plates still in full mesh, loosen the two set screws on the vernier-dial hub. Rotate the vernier dial until the "0" marking is in a vertical plane above the center of the shaft. Tighten set screws.

Antenna and Ground Terminals.—These receivers are equipped with an antenna-ground terminal board having three terminals. These terminals are marked "A2," "A1," and "G," the latter being the ground terminal and should always be connected to a good external ground. The transmission-line leads of the RCA RK-40A antenna system should be connected to terminals "A2" and "A1." The receiver coupling units of the RCA RK-40 and the RCA Spider-Web antenna systems should be connected to terminals "A1" and "G." Connect a single-wire antenna to terminal "A1."

POWER OUTPUT	9K1	9K3
Undistorted	2.0 watts	7.0 watts
Maximum	4.5 watts	12.5 watts

LOUDSPEAKER	
Type	12-inch Electrodynamic
Impedance (v. c.)	2.2 ohms at 400 cycles

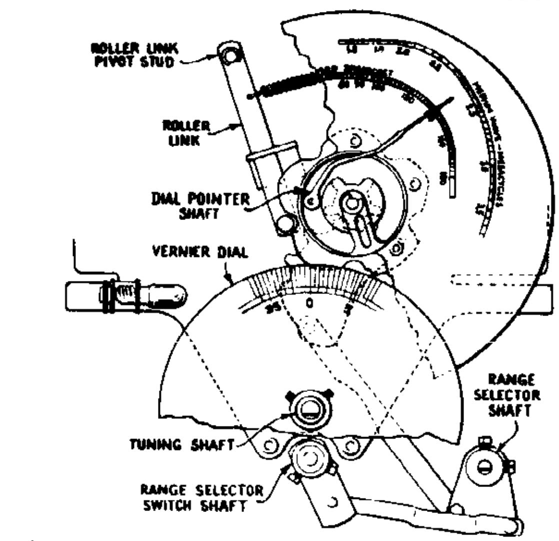


Figure 10—Selector Dial Mechanism (Model 9K3)

STOCK No.	PARTS
	REPRODUCER ASSEMBLIES (Model 9K1 Only)
12641	Board—3-contact reproducer terminal board
12640	Bracket—Output transformer mounting bracket and clamp
12012	Coil—Field coil (L20)
11469	Coil—Neutralizing coil (L19)
12667	Cone—Reproducer cone and dust cap (L18)
5118	Connector—3-contact male speaker cable connector
9696	Reproducer—Complete
11253	Transformer—Output transformer (T2)
11886	Washer—Spring washer to hold field coil securely
	REPRODUCER ASSEMBLIES (Model 9K3 Only)
12914	Board—Reproducer terminal board
13842	Bracket—Output transformer mounting bracket and clamp
13660	Coil—Field coil (L20)
11469	Coil—Neutralizing coil (L19)
12667	Cone—Reproducer cone and dust cap (L18)
5118	Connector—3-contact male speaker cable connector
9778	Reproducer—Complete
12913	Transformer—Output transformer (T2)
11886	Washer—Spring washer to hold field coil securely

Prices quoted above are subject to change without notice.

MODELS 9K1, 9K3
Parts, Page 2

RCA MFG. CO., INC.

STOCK No.	DESCRIPTION
13834	Resistor—100 ohms, wire wound, 4 watts, for 25-cycle model only (R26) (Model 9K3 only)
5112	Resistor—1,000 ohms, carbon type, ¼ watt (R3)
11300	Resistor—33,000 ohms, carbon type, 1/10 watt (R2, R5)
11282	Resistor—56,000 ohms, carbon type, 1/10 watt (R8)
11365	Resistor—82,000 ohms, carbon type, ¼ watt (Model 9K1, R17) (Model 9K3, R6)
11398	Resistor—220,000 ohms, carbon type, 1/10 watt (R9)
11453	Resistor—270,000 ohms, carbon type, 1/10 watt (R15) (Model 9K1 only)
13005	Resistor—390,000 ohms, carbon type, 1/10 watt (R16) (Model 9K1 only)
11172	Resistor—470,000 ohms, carbon type, ¼ watt (R13)
11452	Resistor—470,000 ohms, carbon type, 1/10 watt (R16) (Model 9K3 only)
11397	Resistor—560,000 ohms, carbon type, 1/10 watt (R1, R4)
5035	Resistor—560,000 ohms, carbon type, ¼ watt (R15) (Model 9K3 only)
12013	Resistor—1 megohm, carbon type, 1/10 watt (R19)
11626	Resistor—2.2 megohms, carbon type, ¼ watt (Model 9K1, R10) (Model 9K3, R7, R10)
12679	Resistor—2.2 megohms, insulated, ¼ watt (R7) (Model 9K1 only)
12927	Resistor—Voltage divider, comprising one 16-ohm, one 25-ohm, and one 190-ohm sections (R21, R22, R23) (Model 9K1 only)
12715	Resistor—Voltage divider, comprising one 10,000-ohm, and one 22,000-ohm sections (R6, R20) (Model 9K1 only)
13840	Resistor—Voltage divider, comprising one 115-ohm, one 11-ohm, one 13-ohm, one 4,100-ohm, one 2,900-ohm, one 1,750-ohm, and one 285-ohm sections (R17, R20, R21, R22, R23, R24, R25) (Model 9K3 only)
4669	Screw—No. 8-32 x 5/32 set screw for link, Stock No. 12868 (Model 9K3 only)
3903	Screw—No. 8-32 x 3/16 headless, cup-point set screw for dial, Stock No. 12870 (Model 9K3 only)
12925	Shaft—Range switch and band indicator operating shaft and hub assembly (Model 9K3 only)
12710	Shield—Coil shield for Stock No. 12709
12799	Shield—Coil shield for Stock Nos. 12708 and 13654
12926	Shield—Chassis end shield and mounting foot assembly
12733	Shield—Dial lamp shield (Model 9K1 only)
12008	Shield—I. F. transformer shield for Stock Nos. 12652 and 12653
12607	Shield—Top shield for I. F. transformer, Stock No. 12652
12581	Shield—Top shield for I. F. transformer, Stock No. 12653
13652	Shutter—Dial scale holder and shutter assembly complete with link (Model 9K1 only)
11195	Socket—5-contact 5Z4 Radiotron socket
11198	Socket—7-contact 6F5, 6H6, 6K7, or 6L7 Radiotron socket
11196	Socket—8-contact 6F6, 6J7, or 6L6 Radiotron socket
11222	Socket—Dial lamp socket (Model 9K1, all sockets) (Model 9K3, upper right or lower left socket)
13095	Socket—Upper left or lower right dial lamp socket (Model 9K3 only)
11381	Socket—Tuning tube socket and cover
12007	Spring—Retaining spring for core, Stock Nos. 12006, 12664, or 12800
12849	Spring—Tension spring for dial shutter link (Model 9K1 only)
13648	Switch—Range switch (S1, S2, S3) (Model 9K1 only)
13839	Switch—Range switch (S1, S2, S3) (Model 9K3 only)
13649	Tone control (R18) (Model 9K1 only)
12921	Tone control—High-frequency tone control (R18) (Model 9K3 only)
12860	Tone control—Low-frequency tone control switch and power switch (S4, S5) (Model 9K3 only)
12652	Transformer—First I. F. transformer, complete (L14, L15, C28, C29)
12653	Transformer—Second I. F. transformer, complete (L16, L17, C32, C33, C34, R8, R9)
12918	Transformer—Power transformer, 105-125 volts, 50-60 cycles (T1) (Model 9K1 only)
12857	Transformer—Power transformer, 105-125 volts, 25-60 cycles (T1) (Model 9K1 only)
11211	Transformer—Power transformer, 105-125 volts, 50-60 cycles (T1) (Model 9K3 only)
11212	Transformer—Power transformer, 105-125 volts, 25-60 cycles (T1) (Model 9K3 only)
11213	Transformer—Power transformer, 100-250 volts, 40-60 cycles (T1) (Model 9K3 only)
12654	Trap—Wave trap, complete (L1)
13647	Volume control and power switch (R11, S4) (Model 9K1 only)
12861	Volume control (R11) (Model 9K3 only)
	RECEIVER ASSEMBLIES
12706	Arm—Hub and arm assembly complete with set screws for operating shutter link (located on range-switch shaft) (Model 9K1 only)
12806	Board—3-contact antenna and ground terminal board
12863	Board—4-contact and 2-link phonograph terminal board
12929	Bracket—Mounting bracket for L. F. tone control or volume control (Model 9K3 only)
5237	Bushing—Variable condenser mounting bushing assembly
13656	Button—Plug button for top of detector coil shield, Stock No. 12799
11625	Cable—Tuning tube cable and socket
12511	Cap—Grid contact cap
12884	Capacitor—Adjustable trimmer (long) (C5, C7, C10, C13)
12714	Capacitor—Adjustable trimmer (medium) (C6, C8, C19, C21)
12807	Capacitor—Adjustable trimmer (short) (C20)
12896	Capacitor—15 Mmfd. (C22)
12722	Capacitor—18 Mmfd. (C12)
12723	Capacitor—56 Mmfd. (C2, C17)
12404	Capacitor—120 Mmfd. (C28, C29, C32, C33)
12724	Capacitor—120 Mmfd. (C16, C41)
12725	Capacitor—150 Mmfd. (C1)
12406	Capacitor—180 Mmfd. (C34)
12727	Capacitor—555 Mmfd. (C14)
12537	Capacitor—560 Mmfd. (C3, C23, C26)
12729	Capacitor—1,550 Mmfd. (C11)
12728	Capacitor—4,500 Mmfd. (C9)
4838	Capacitor—.005 Mfd. (C44) (Model 9K1 only)
13033	Capacitor—.007 Mfd. (C44) (Model 9K3 only)
4858	Capacitor—.01 Mfd. (Model 9K1, C24, C36, C42) (Model 9K3, C18, C24, C31, C36, C42)
4870	Capacitor—.025 Mfd. (C35)
12670	Capacitor—.035 Mfd. (C43 (Model 9K1 only)
13841	Capacitor—.07 Mfd. (C43) (Model 9K3 only)
4841	Capacitor—0.1 Mfd. (Model 9K1, C30, C48, C49) (Model 9K3, C27, C30)
4840	Capacitor—0.25 Mfd. (Model 9K1, C31, C37 (Model 9K3, C37)
5170	Capacitor—0.25 Mfd. (Model 9K1, C18, C45) (Model 9K3, C45)
5212	Capacitor—16 Mfd. (C46)
12467	Capacitor—30 Mfd. (Model 9K1, C47) (Model 9K3, C47, C48)
13655	Capacitor pack—Comprising two sections each .015 Mfd., one section 0.1 Mfd., and two 27,000-ohm resistors (C38, C39, C40, R12, R14) (Model 9K1 only)
12708	Coil—Antenna coil and shield (L2, L3, L4, L5)
13654	Coil—Detector coil and shield (L9, L10, L11, L12, L13)
12709	Coil—Oscillator coil and shield (L6, L7, L8)
13657	Compensator pack—Comprising one .015 Mfd., one .01 Mfd., one .07 Mfd. capacitors and one 27,000-ohm and one 39,000-ohm resistors (C38, C39, C40, R12, R14) (Model 9K3 only)
13650	Condenser—3-gang variable tuning condenser (C4, C15, C25) (Model 9K1 only)
12922	Condenser—3-gang variable tuning condenser (C4, C15, C25) (Model 9K3 only)
5119	Connector—3-contact female connector for reproducer cable
12006	Core—Adjustable core and stud for Stock Nos. 12652 and 12653
12664	Core—Adjustable core and stud for Stock No. 12654
12800	Core—Adjustable core and stud for Stock No. 12709
13653	Dial—Station selector dial scale (Model 9K1 only)
12870	Dial—Vernier dial and disc assembly (Model 9K3 only)
13651	Drive—Variable tuning condenser vernier drive with pinion gear (Model 9K1 only)
12712	Indicator—Station selector indicator pointer (Model 9K1 only)
5226	Lamp—Dial lamp, 6.3 volts
12868	Link—Range switch and band indicator operating link, complete with set screws (Model 9K3 only)
13683	Mask—Dial scale mask, complete with colored screens (Model 9K1 only)
	DRIVE ASSEMBLIES (Model 9K3 Only)
10705	Ball—5/32-inch diameter steel ball for planetary drive
10941	Ball—⅛-inch diameter steel ball for planetary drive bearing
12904	Bushing—Plate and bushing assembly for planetary drive mounting
12905	Coupling—Flexible coupling and shaft assembly, complete
12909	Dial—Band indicating dial and cam assembly
12899	Drive—Variable tuning condenser drive, complete—including mounting bracket, drive, dial scale and indicator, less vernier dial, Stock No. 12870, and link, Stock No. 12868
12906	Gear—Anti-lash drive gear, complete
12910	Gear—Sector gear and link assembly for band selector
12908	Indicator—Station selector indicator pointer
8051	Link—Link and roller assembly, complete with spring
12911	Screen—Dial lamp screen and light diffuser
4669	Screw—Set screw for flexible coupling or gear, Stock Nos. 12905 and 12906
12901	Shaft—Direct drive shaft and pinion gear for planetary drive
12900	Shaft—Vernier drive shaft for planetary drive
12903	Spring—Tension spring for planetary drive bearing
12907	Spring—Tension spring for gear, Stock No. 12906
8052	Spring—Tension spring for link, Stock No. 8051
	MISCELLANEOUS ASSEMBLIES (Model 9K1 Only)
11996	Bracket—Tuning tube mounting bracket and clamp
12666	Cover—Reproducer field coil and yoke cover
12698	Crystal—Station selector escutcheon and crystal
12742	Escutcheon—Tuning tube escutcheon
12699	Knob—Large station selector knob
12700	Knob—Small (vernier) station selector knob
11347	Knob—Range switch, tone control, or volume control knob
11210	Screw—Chassis mounting screw, washer, and lockwasher assembly
4982	Spring—Retaining spring for knob, Stock No. 12699
11349	Spring—Retaining spring for knob, Stock Nos. 11347 or 12700
	MISCELLANEOUS ASSEMBLIES (Model 9K3 Only)
13615	Bracket—Tuning tube mounting bracket and clamp
12915	Crystal—Station selector escutcheon and crystal
12742	Escutcheon—Tuning tube escutcheon
12699	Knob—Large station selector knob
12700	Knob—Small (vernier) station selector knob
11347	Knob—Low-frequency tone control and power switch, volume control, range switch or high-frequency tone control knob
11210	Screw—Chassis mounting screw assembly
11349	Spring—Retaining spring for knob, Stock Nos. 11347 or 12700
4982	Spring—Retaining spring for knob, Stock No. 12699

The prices quoted above are subject to change without notice.

MODELS 9U, 9U2
Schematic

RCA MFG. CO., INC

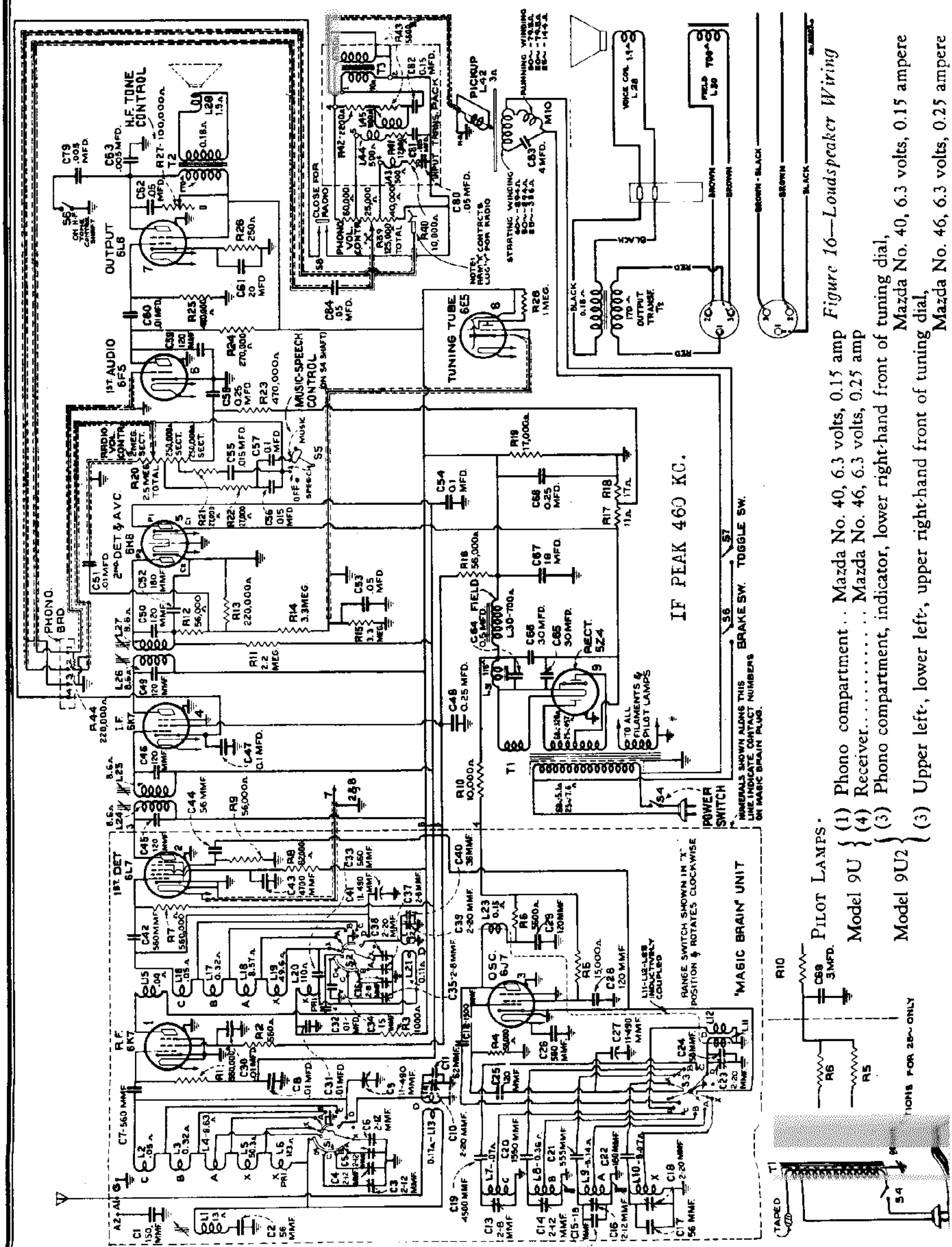
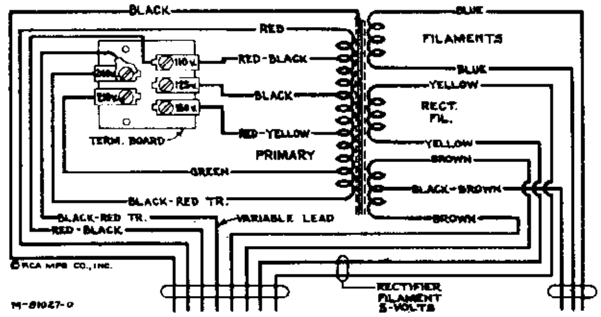


Figure 16—Loudspeaker Wiring

MODEL 9U
Chassis Wiring

RCA MFG. CO., INC.



Primary resistance—10 ohms total
Secondary resistance—260 ohms total

Figure 15—Universal Transformer

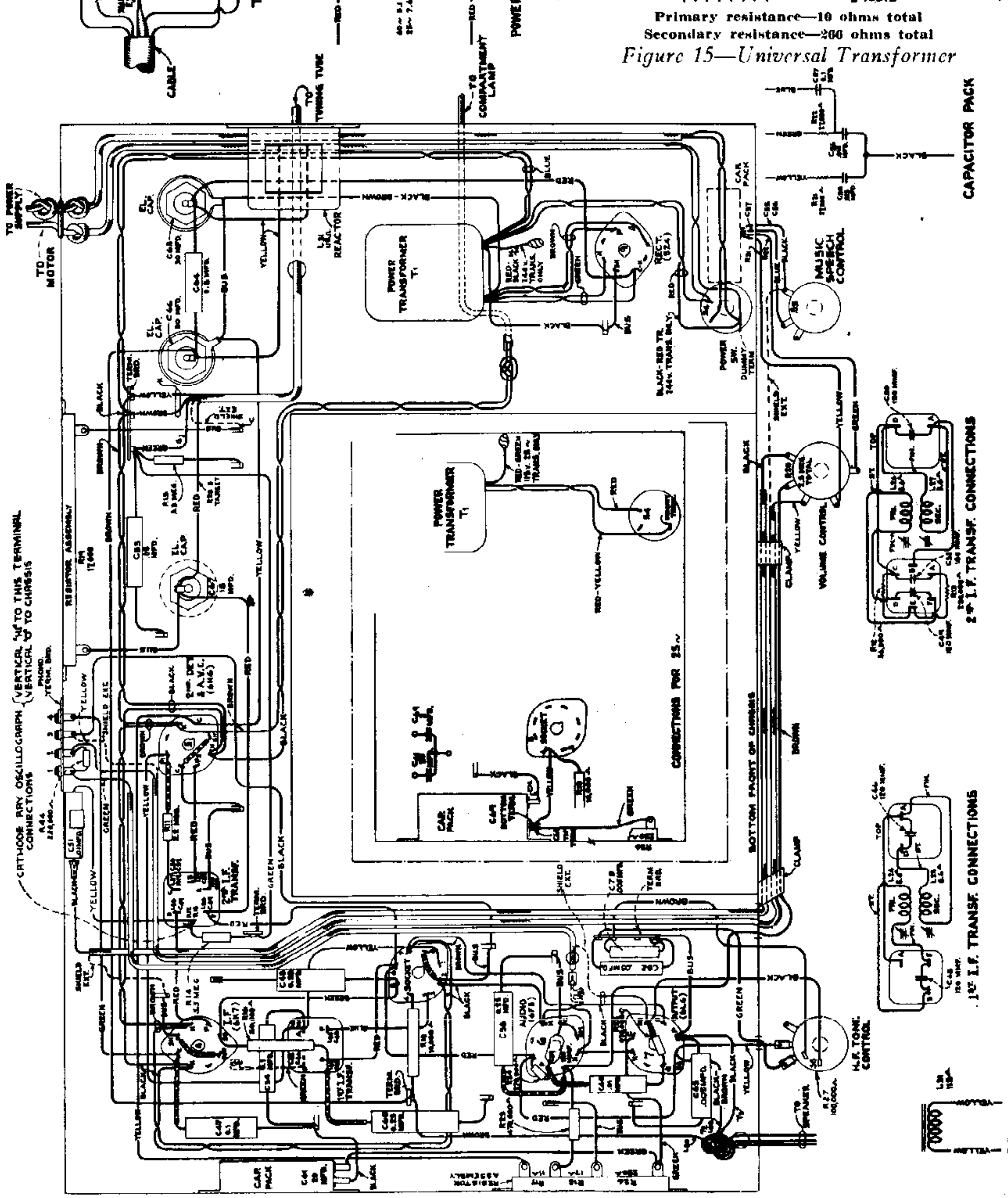


Figure 2—Chassis Wiring Diagram (Less "Magic Brain") Model 9U

RCA MFG. CO., INC.

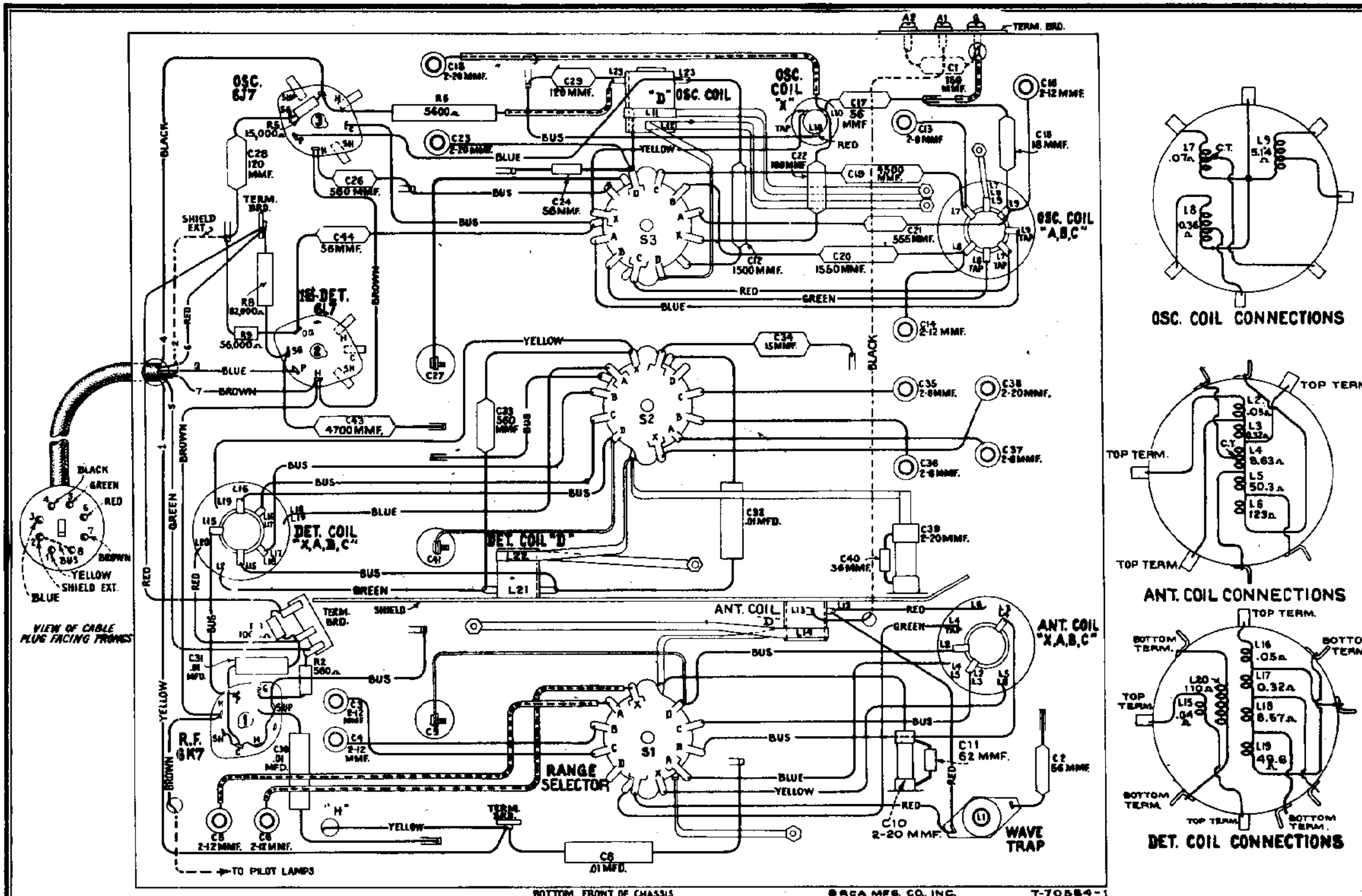


Figure 5—"Magic Brain" Wiring Diagram

Phonograph

Type	Automatic Record Ejector
Record Capacity	Seven 10-inch or Six 12-inch
Turntable Speed	78 R.P.M.
Type of Pickup	Low-Impedance Magnetic
Pickup Impedance	8.5 ohms at 1,000 cycles

Power Output Ratings

Undistorted	5 watts
Maximum	9 watts

Loudspeaker

Type	12-inch Electrodynamic
Impedance (V.C.)	2.2 ohms at 400 cycles

MODEL 9U2
Chassis Wiring

RCA MFG. CO., INC.

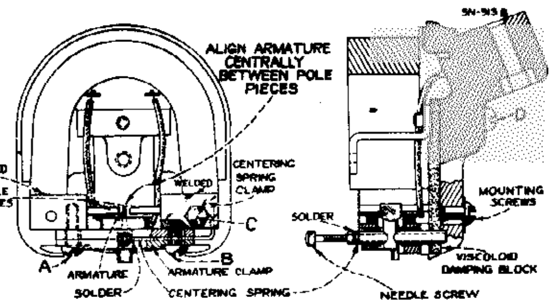


Figure 13—Details of Pickup

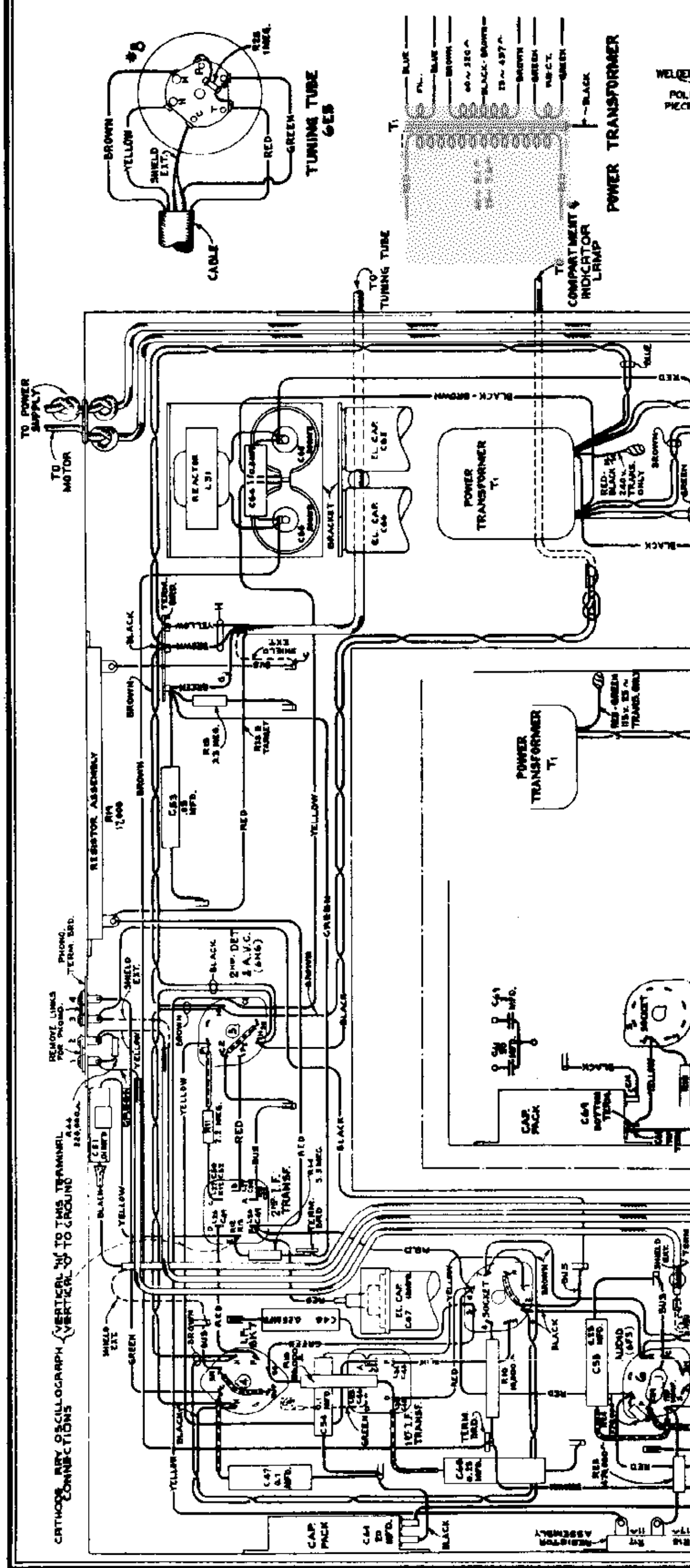


Figure 3—Chassis Wiring Diagram (Less "Magic Brain") Model 9U2

RCA MFG. CO., INC.

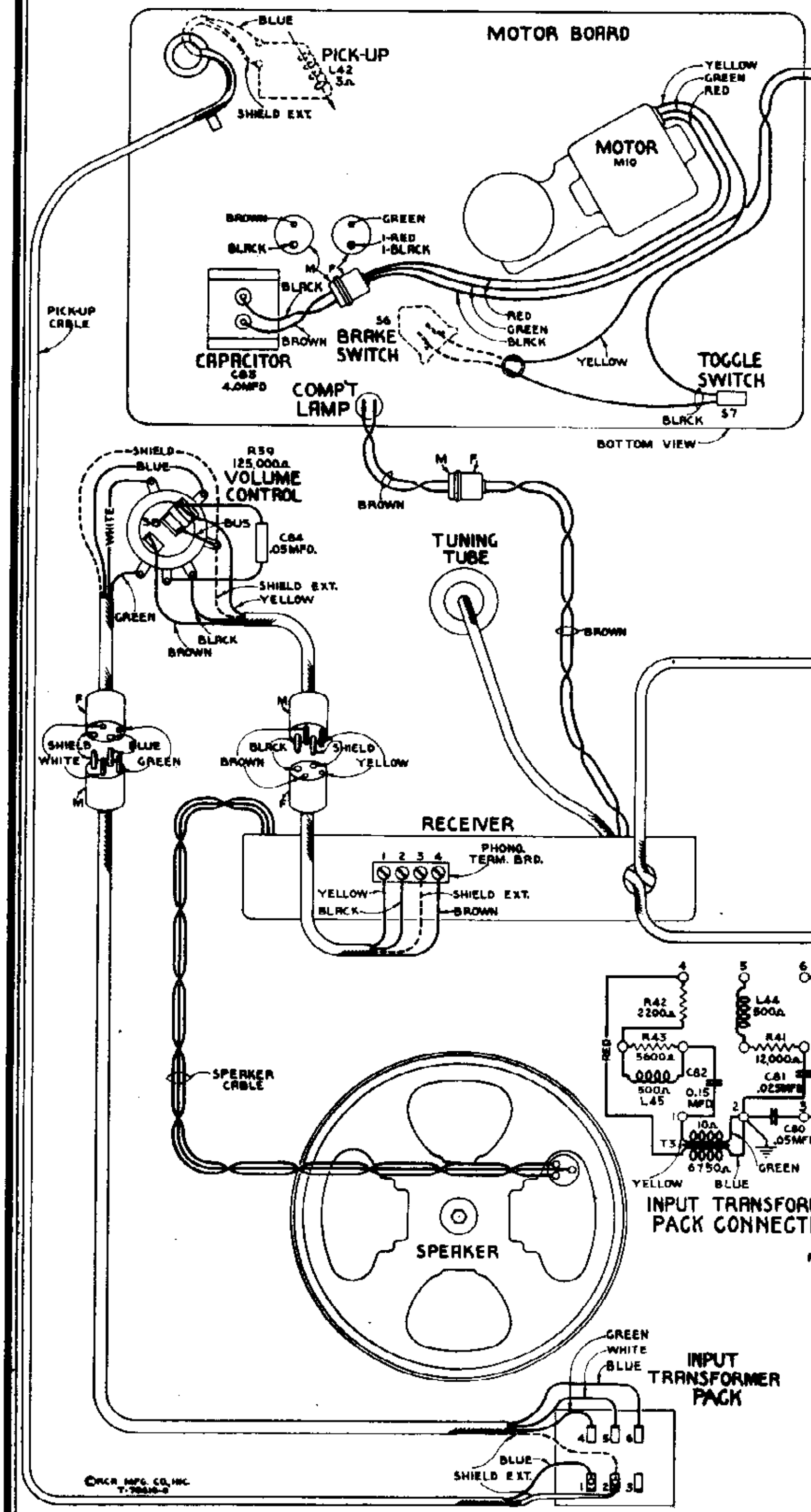


Figure 8—Assembly Wiring

POWER SUPPLY RATINGS

Rating A-6 (Model 9U only) .... 105-125 volts, 60 cycles, 150 watts
Rating A-5 (Model 9U only) .... 105-125 volts, 50 cycles, 155 watts
Rating B-2 .... 105-125 volts, 25 cycles, 150 watts
Rating C-6 .... 105-130/140-160/200-250 volts, 60 cycles, 150 watts
Rating C-5 .... 105-130/140-160/200-250 volts, 50 cycles, 155 watts

Electrical Specifications

FREQUENCY RANGES

"Long Wave" (X) .... 150-410 kc
"Standard Broadcast" (A) .... 530-1,800 kc
"Medium Wave" (B) .... 1,800-6,400 kc
"Short Wave" (C) .... 6,400-23,000 kc
"Ultra Short Wave" (D) .... 23,000-60,000 kc
Intermediate Frequency .... 460 kc

ALIGNMENT FREQUENCIES

"Long Wave" (X) .... 175 kc (osc.), 350 kc (osc., det., ant.)
"Standard Broadcast" (A) 600 kc (osc.), 1,500 kc (osc., det., ant.)
"Medium Wave" (B) .... 6,000 kc (osc., det., ant.)
"Short Wave" (C) .... 20,000 kc (osc., det., ant.)
"Ultra Short Wave" (D) .... 57,000 kc (osc., det., ant.)

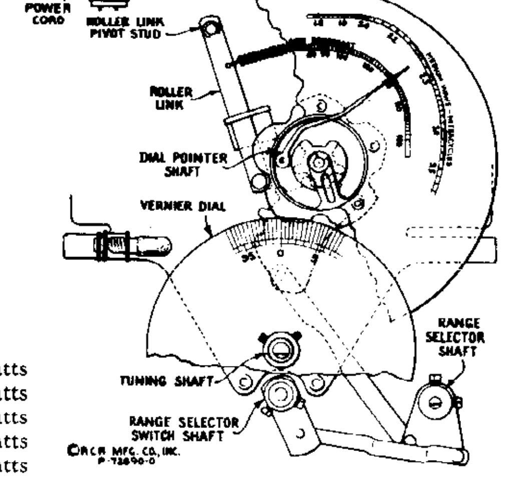


Figure 12—Selector Dial Change Mechanism

MODELS 9U, 9U2
Socket, Trimmers
Voltage, Resistance

RCA MFG. CO., INC.

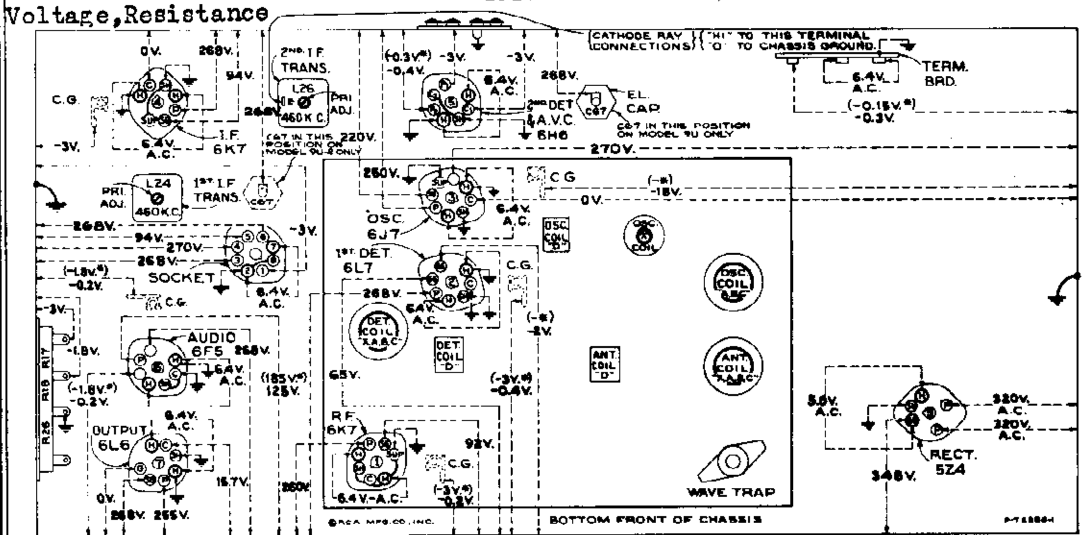


Figure 11—Radiotron Socket Voltages, Coil, and I-F Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc—No signal being received—Radio volume control counter-clockwise—Phono volume control extreme counter-clockwise—Other controls optional

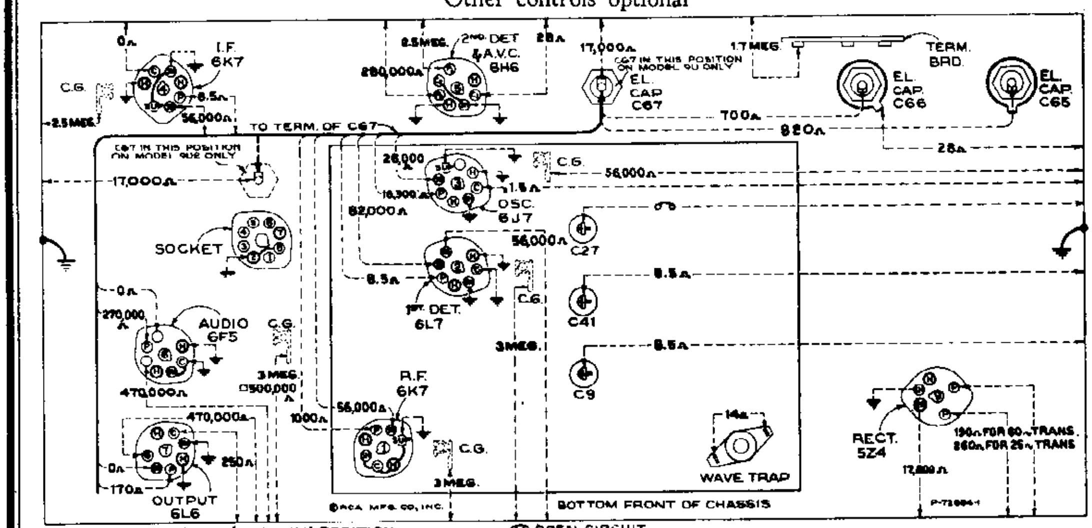


Figure 10—Resistance Diagram

Power supply disconnected—Radiotrons in sockets—Tuning condenser in full-mesh—Range selector in "Standard broadcast" position—Radio volume control clockwise—Phono volume control extreme counter-clockwise—Other controls optional

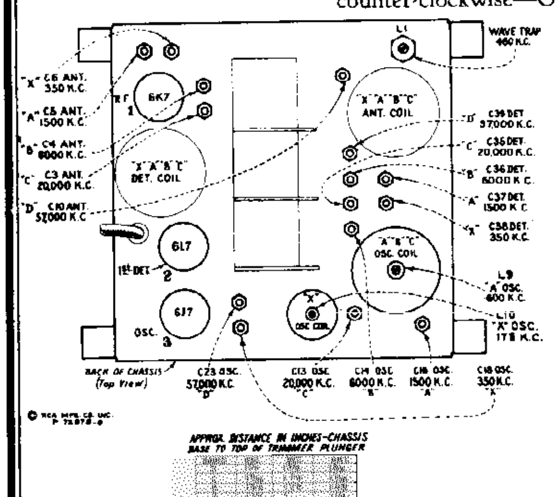


Figure 7—"Magic Brain" Trimmer Locations

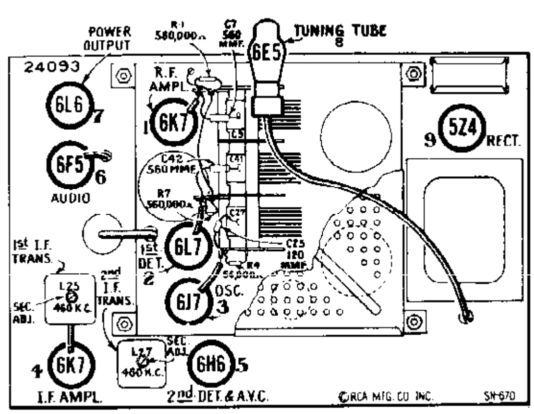


Figure 4—Radiotron and I-F Trimmer Locations

Note: Two voltage values are shown for some readings. The value shown in parenthesis with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parenthesis because of the additional loading of the voltmeter through the high series circuit resistance.

Radiotron Cathode Current Readings
Measured with Milliammeter Connected at Tube Socket Cathode Terminal under Conditions Similar to Those of Voltage Measurements

(1) RCA-6K7—R-F	8.0 ma.
(2) RCA-6L7—1st Det.	4.4 ma.
(3) RCA-6J7—Osc.	6.7 ma.
(4) RCA-6K7—I.F.	8.0 ma.
(5) RCA-6H6—2nd Det·A.V.C.	—
(6) RCA-6F5—A.F.	0.3 ma.
(7) RCA-6L6—Power	63 ma.
(8) RCA-6E5—Eye	3.0 ma.
(9) RCA-5Z4—Rect.	110 ma.*

(*Cannot be measured at socket)

RCA MFG. CO., INC.

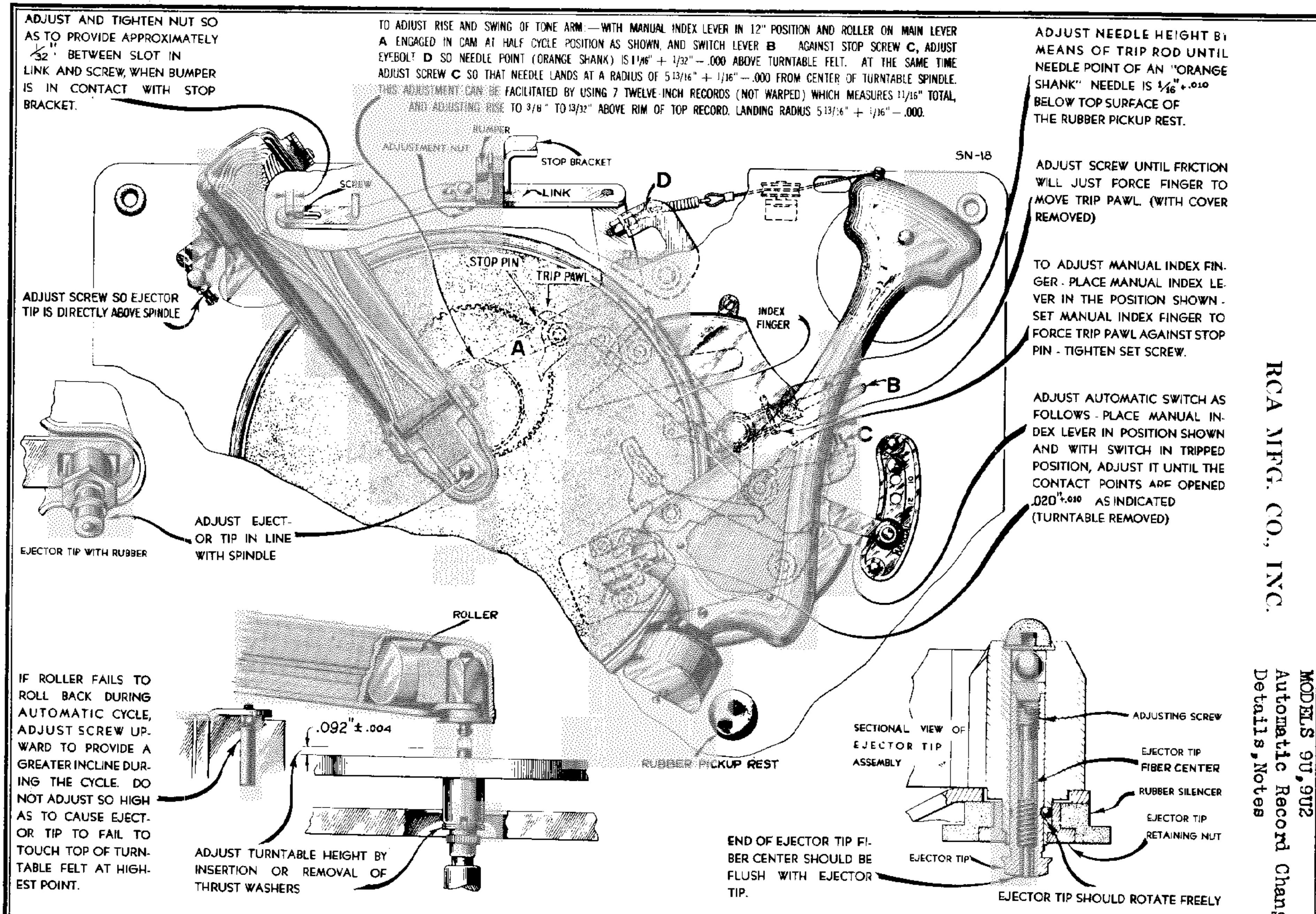


Figure 9—Automatic Record Changer Adjustments

RCA MFG. CO., INC.

There are seventeen adjustments required for the alignment of the oscillator, first-detector, and antenna-tuned circuits; one adjustment for the wave-trap; and four adjustments for the i-f system. Fifteen of these adjustments are made with plunger-type air trimming capacitors and require the use of an **RCA Stock No. 12636 Adjusting Tool.** Each of these capacitors has a lock nut for securing the plunger in place after adjustment. The remaining seven adjustments are made by means of screws attached to molded magnetite cores. These cores change the inductance of the particular coils in which they are inserted to provide exact alignment. All of these adjustments are accurately made during manufacture and should remain in proper alignment unless affected by abnormal conditions of climate or purported alterations for servicing, or unless altered by other means. Loss of sensitivity, improper tone quality, and poor selectivity are the usual indications of improper alignment. Correct conditions will usually exist simultaneously. Correct performance of this receiver can only be obtained when these adjustments have been made by a skilled service engineer with the use of adequate and reliable test equipment. The manufacturer of this receiver has such test equipment available for sale through its distributors and dealers.

The extensive frequency range of this receiver necessitates a more or less involved method of alignment. However, if the following directions are carefully applied in the sequence given, normal performance of the instrument will be obtained.

The plunger-type air trimming capacitors have their approximate plunger settings tabulated on figure 7. If the plungers have been disturbed from their original adjustments, they may be roughly set to the specified dimensions prior to alignment.

For alignment, the test-oscillator frequency should be quite accurate. A convenient and reliable means of accurately checking the frequency of test oscillators, receivers, etc., is the **RCA Stock No. 9572 Crystal Calibrator.**

If the test-oscillator signal cannot be heard as the receiver (heterodyne) oscillator air-trimmer plunger is changed from its minimum-capacity to maximum-capacity position (receiver dial and test oscillator set to the specified frequencies, and the correct oscillator air-trimmer used) it may be an indication that the test-oscillator frequency is outside the range covered by the air-trimmer. Under such conditions, when a more accurate setting of the test oscillator cannot be determined, set the oscillator air-trimmer plungers to the approximate settings given on figure 7. Tune the test oscillator until the signal is heard in the speaker. Each of two test-oscillator settings (the fundamentals or the harmonics of which are 920 kc apart) produce a signal. The low-frequency test-oscillator setting should be used as this places the test-oscillator (signal) frequency 460 kc below the frequency of the receiver heterodyne oscillator.

Holes are provided in the top of the r-f and antenna coil cans on some models to enable a tuning check with the **RCA Stock No. 6679 Tuning Wand.** The hole in the top of the detector coil can has a cinch button which must be removed before insertion of the tuning wand. When the brass end of the wand is inserted in the coil, the inductance of the coil is decreased. If this results in an increase of output, the respective air-trimmer capacitance should be decreased (plunger pulled out). If inserting the iron end of the tuning wand causes an increase in output, resulting from an increase of inductance of the coil, the respective air-trimmer capacitance **should be** increased (plunger pushed in). If the range of the air trimmer is not sufficient to give the desired results, the lead-dress may be changed in the particular circuit being aligned, so as to cause the circuit to resonate within the range of the trimmer. An increase in the capacity-to-ground of the circuit will be required if the iron end of the tuning wand causes an increase of signal output when the air-trimmer plunger is full-in, while a decrease in the capacity-to-ground will be required if the brass end of the tuning wand causes an increase in signal output when the air-trimmer plunger is full-out.

In performing services on the "Magic Brain", the leads should be restored to their original positions, since the lead-dress is important for proper operation and dial calibration.

Precautionary Dressing of Leads for "Magic Brain" Alignment

(Refer to Figure 5)

Band "X"

1. Keep blue lead A of S1 to antenna coil L4-5 dressed away from chassis, and from yellow lead X of S1 to antenna coil L5-6.
2. Bus lead from C-10 to S1 should be as short as possible.
3. Keep blue lead A of S2 to detector coil L18-19 clear of chassis, coil shield, coil, and other leads.
4. Keep spaghetti lead C6 to X of S1 apart from spaghetti lead C5 to A of S1, and from chassis.

Band "A"

1. Keep green lead terminal S1 to antenna coil tap L4 away from chassis, coil shield, and coil.
2. Keep spaghetti lead C5 to A of S1 apart from spaghetti lead C6 to X of S1 and from chassis.

Band "C"

Lead from C19 to oscillator coil L7 should be maintained as short and straight as possible.

Two methods of alignment are applicable—one requires use of the cathode-ray oscillograph, and the other requires a voltmeter or glow-type indicator. The cathode-ray alignment method is advantageous in that the indication provided is in the form of a wave-image which represents the resonance characteristics of the circuit being tuned. This method is preferred because of the i-f characteristics of these receivers. This type of alignment is possible through use of apparatus such as the **RCA Stock No. 9558 Frequency Modulator** and the **RCA Stock No. 9545 Cathode-Ray Oscillograph.** If this equipment is not available, an approximate alignment may be performed by the output-indicator method with an instrument such as the **RCA Stock No. 4317 Neon Glow Indicator** attached across the loudspeaker voice coil. Alignment by this method is similar to the cathode-ray method outlined below except that the receiver volume control should be at maximum, the trimmers adjusted to peak response (with the exception of the wave-trap) and the test-oscillator sweeping operations omitted. Either of these methods require the use of a reliable test oscillator such as the RCA Stock No. 9595.

Cathode-Ray Alignment

Make alignment apparatus connections shown on figure 6. Remove the plug of the frequency-modulator cable from the test-oscillator jack. Connect the receiver chassis to a good external ground. Connect oscillograph "Vertical" input terminals as indicated on figure 11. Set oscillograph power switch to "On" and adjust "Intensity" and "Focus" controls to give a clearly defined spot, or line, on the screen. Set oscillograph "Ampl. A" switch to "On," "Vertical gain" control full-clockwise, "Ampl. B" switch to "Timing," "Range" switch to No. 2 position, and "Timing" switch to "Int." Place the "Sync" control, "Freq." control, and "Horizontal gain" control to about their mid-positions. For each of the following adjustments, the test-oscillator output must be regulated so that the image obtained on the oscillograph screen will be of the minimum size for accurate observation. The receiver volume-control setting is optional.

I-F Adjustments

(a) Turn range selector to its "Standard broadcast" (A) position and tune receiver to a position of no extraneous signals near 600 kc. Connect the "Ant." output of the test oscillator to the grid cap of RCA-6K7 i-f tube (with grid lead in place) through a .001-mfd. capacitor, with "Gnd." to receiver chassis. Tune the test oscillator to 460 kc and place its modulation switch to "On" and its output switch to "Hi."

(b) Turn on the receiver and test oscillator. Increase the output of the test oscillator until a deflection is noticeable on the oscillograph screen. The figures obtained represent several waves of the detected signal, the amplitude of which may be observed as an indication of output. Cause the wave-image formed (400-cycle waves) to be spread completely across the screen by adjusting the "Horizontal gain" control. The image should be synchronized and made to remain motionless by adjusting the "Sync." and "Freq." controls.

(c) Adjust the two magnetite core screws L27 and L26 (see figures 4 and 11) of the second i-f transformer (one on top and one on bottom) to produce maximum vertical deflection of the oscillographic image. This adjustment places the transformer in exact resonance with the 460-kc signal.

(d) The sweeping operation should follow using the frequency modulator. Shift the oscillograph "Timing" switch to "Ext." Insert plug of frequency-modulator cable in test-oscillator jack. Turn the test-oscillator modulation switch to "Off." Turn on the frequency modulator and place its sweep-range switch to "Hi."

(e) Increase the frequency of the test oscillator by slowly turning its tuning control until two separate, distinct, and similar waves appear on the screen. If only one wave appears, increase the "Freq." control on the oscillograph to obtain two waves. These waves will be identical in shape, totally disconnected, and appear in reversed positions. They will have a common base line, which is discontinuous. Adjust the "Freq." and "Sync." controls of the oscillograph to make them remain motionless on the screen. Continue increasing the test-oscillator frequency until these forward and reverse curves move together and overlap, with their highest points exactly coincident. This condition will be obtained at a test-oscillator setting of approximately 575 kc.

(f) With the images established as in (e), re-adjust the two magnetite core screws L27 and L26 on the second i-f transformer so that they cause the curves on the oscillograph screen to become exactly coincident throughout their lengths and have maximum amplitude.

(g) Without altering the adjustments of the apparatus, shift the "Ant." output of the test oscillator to the input of the i-f system, i.e., to the RCA-6L7 first-detector grid cap, through a .001-mfd. capacitor (with grid lead in place). Regulate the test-oscillator output so that the amplitude of the oscillographic image is approximately the same as used for adjustment (f) above.

(h) The two first i-f transformer magnetite core screws L25 and L24 (one on top and one on bottom) should then be adjusted so that they cause the forward and reverse curves to become coincident throughout their lengths and have maximum amplitude. The composite wave obtained in this manner represents the resonance characteristic of the total i-f system. Lack of symmetry or irregularity of the resultant image will indicate the presence of a defect in the i-f system.

R-F Adjustments

Make receiver dial adjustments as outlined by "Selector dial," figure 12. Alignment must be made in sequence of "Wave-trap," "Ultra short wave" band, "Short wave" band, "Medium wave" band, "Standard broadcast" band, and "Long wave" band.

"Wave-Trap" Adjustment

(a) Connect the output of the test oscillator to the antenna terminal "A1" through a 200-mmfd. **(important).** capacitor. Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn test-oscillator modulation switch to "On." Shift the oscillograph "Timing" switch to "Int." Place receiver range selector in "Standard broadcast" position. Set the receiver dial to a position of no extraneous signals near 600 kc. Tune the test oscillator to 460 kc. Adjust the wave-trap magnetite core screw to the point which causes minimum amplitude of output (maximum suppression of signal) as shown by the waves on the oscillograph. An increase of the test-oscillator output may be necessary before this point of minimum amplitude, obtained by correct adjustment of wave-trap screw, becomes apparent on oscillograph screen.

"Ultra Short Wave" Band

(b) Connect the "Ant." output of the test oscillator to the antenna terminal "A1" of the receiver through a 300-ohm resistor. Set the receiver range selector to its "Ultra short wave" position and its dial pointer to 57,000 kc. Adjust the test oscillator to 19,000 kc. The third harmonic of 19,000 kc is used for this adjustment. If the indication on the oscillograph screen is not sufficient for the following adjustments at 57,000 kc, the vertical-input terminals of the cathode-ray oscillograph may be connected thus: "Hi" to the plate contact of the RCA-6L6 power-output tube socket with the "0" terminal to chassis-ground. The receiver should be turned off while making this connection since the plate potential is impressed across the oscillograph input and a severe shock will result if contact is made between these two points. If this connection is made, advance the receiver volume control to its maximum position. Adjust oscillator air-trimmer C23 for maximum (peak) output. Two positions, each producing maximum output, may be found. The position of minimum capacitance (plunger near out) should be used. This places the receiver

RCA MFG. CO., INC.

heterodyne oscillator 460 kc higher in frequency than the incoming signal. Tighten lock nut. Adjust the detector air-trimmer C39, while slightly rocking the gang tuning condenser back and forth through the signal, for maximum (peak) output. Two peaks may be found on this trimmer. The peak of maximum capacitance (plunger near in) should be used. Tighten lock nut. Adjust the antenna air-trimmer C10 for maximum (peak) output while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found on this trimmer which produce maximum output. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Check the image frequency by changing the receiver dial setting to 56,080 kc. If the image signal is received at this position, the adjustment of the oscillator air-trimmer C23 has been correctly made. No adjustments should be made while checking for the image signal.

(c) Re-tune receiver for maximum response to 57,000 kc (not image response) without disturbing test-oscillator adjustments. Change test oscillator to 6,800—14,000 kc range. Tune test oscillator until signal is heard in speaker (should occur at approximately 14,250 kc, fourth harmonic of test oscillator used). Two test-oscillator settings (230 kc apart) will produce a signal at this point. The lower frequency test-oscillator setting should be used, as this places the test oscillator harmonic 460 kc below the frequency of the receiver heterodyne oscillator. Tune receiver for maximum response at a dial setting of approximately 28,500 kc (image should tune in at a dial setting approximately 27,580 kc) without altering test-oscillator adjustment. Test-oscillator second harmonic of 14,250 kc is used for the following check. Check calibration of receiver dial. A receiver-dial reading of less than 28,500 kc indicates that the inductance of the oscillator secondary coil L11 is too low and should be increased. If the receiver dial reading is greater than 28,500 kc, the inductance of L11 is too high and should be decreased. If it is necessary to change the inductance of L11, first remove bottom cover of "Magic Brain" and then set receiver dial pointer to 28,500 kc. To decrease inductance, move the grounded ends (straps) of L11 and L12 (see figure 5) nearer chassis. **Do not allow straps to touch chassis except where connected.** To increase inductance, move the straps farther away from chassis. Adjust position of straps till maximum (peak) output results. The alignment of the detector tuned circuit should next be checked at 28,500 kc without changing either the receiver or test oscillator adjustments. An increase of output when the brass end of a tuning wand is brought near L22 indicates that L22 is too high in inductance, while an increase when the iron end is brought near the coil indicates that the inductance is too low. The inductance of L22 may be varied by changing the spacing between the grounded end (strap) of L22 and the strap connected from C41 to contact on S2 (figure 5). An increase of spacing will increase the inductance, while a decrease of spacing will decrease the inductance. Adjust the spacing until maximum (peak) output results. Replace "Magic Brain" bottom cover and repeat adjustments in (b) prior to those of "Short wave" band.

"Short Wave" Band

(d) Set the receiver range selector to its "Short wave" position and its dial pointer to 20,000 kc. Adjust the test oscillator to 20,000 kc. If the vertical input cathode-ray connections were changed for adjustment (b) above, they should be restored to their original position as shown on figure 11. Adjust oscillator air-trimmer C13 until maximum (peak) output is reached. Two peaks may be found with this circuit. The peak with minimum capacitance (plunger near out) should be used. Tighten lock nut. Adjust detector air-trimmer C35 until maximum (peak) output is reached, while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Adjust antenna air-trimmer C3 until maximum (peak) output is reached while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacity (plunger near in) should be used. Tighten lock nut. Check the image frequency by changing the receiver dial setting to 19,080 kc. The image signal should be received at this position indicating that the adjustment of C13 has been correctly made. No adjustments should be made while checking for the image signal.

"Medium Wave" Band

(e) Place receiver range selector to its "Medium wave" position with its dial pointer set to 6,000 kc. Tune the test oscillator to 6,000 kc. Adjust oscillator air-trimmer C14 to produce maximum (peak) output as shown by the waves on the oscillograph. Two peaks may be found with this circuit. The peak with minimum capacitance (plunger near out) should be used. Tighten lock nut. Adjust the detector air-trimmer C36 for maximum (peak) output while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Adjust antenna air-trimmer C4 to produce maximum (peak) output. Tighten lock nut.

"Standard Broadcast" Band

(f) Remove the 300-ohm resistor from between the test-oscillator "Ant." post and receiver antenna terminal "A1" and insert a 200-mmfd. capacitor in its place. Place receiver range selector to "Standard broadcast" position with receiver dial pointer set to 600 kc. Tune the test oscillator to 600 kc. Adjust oscillator magnetite core screw L9 (top of large oscillator coil can) for maximum (peak) output as shown by the waves on the oscillograph screen.

(g) Set receiver dial pointer to 1,500 kc. Tune test oscillator to 1,500 kc (1,500—3,100-kc range) and increase its output to produce a registration on the oscillograph screen. Carefully adjust the oscillator, detector, and antenna air-trimmers C16, C37 and C5, respectively, to produce maximum (peak) output as shown by the waves on the oscillograph screen. Shift the oscillograph "Timing" switch to "Ext." Place the frequency modulator sweep-range switch to its "Lo" position and insert plug of the frequency-modulator cable in test-oscillator jack. Turn test-oscillator modulation switch to "Off." Re-tune the test oscillator (increase frequency) until the forward and reverse waves show on the oscillograph screen and become coincident at their highest points. This will occur at a test-oscillator setting of approximately 1,680 kc. Adjust trimmers C16, C37, and C5 again, setting each to the point which produces the best coincidence and maximum amplitude of the images.

(h) Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn test-oscillator modulation switch to "On." Set oscillograph "Timing" switch to "Int." Tune test oscillator to 200 kc (200—400-kc range). Tune receiver for maximum response to this signal at a dial reading of approximately 600 kc. The third harmonic of the 200-kc signal is used for this adjustment. Shift oscillograph "Timing" switch to "Ext." Insert the plug of the frequency-modulator cable in test-oscillator jack. Turn test-oscillator modulation switch to "Off." Re-tune the test oscillator (increase frequency) until the forward and reverse waves show on the oscillograph screen. This will occur at a test-oscillator setting of approximately 230 kc. Disregarding the fact that the two images may or may not come together, adjust the oscillator magnetite core screw L9 (top of large oscillator coil can) to produce maximum (peak) amplitude of the images. Shift the oscillograph "Timing" switch to "Int." Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn the test-oscillator modulation switch to "On." Repeat adjustments in (g) above to compensate for any changes caused by the adjustment of L9 core, tightening lock nuts on C16, C37, and C5, respectively, after each is adjusted.

"Long Wave" Band

(i) Shift the oscillograph "Timing" switch to "Int." Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn the test-oscillator modulation switch to "On." Place receiver range selector to its "Long wave" position. Set the receiver dial pointer to 175 kc. Tune the test oscillator to 175 kc and increase its output until a deflection is noticeable on the oscillograph screen. Adjust oscillator magnetite core screw L10 (located on top of small oscillator coil can) so that maximum (peak) amplitude of output is shown on the oscillograph screen.

(j) Set receiver dial pointer to 350 kc. Tune test oscillator to 350 kc. Adjust the oscillator, detector, and antenna air-trimmers C18, C38, and C6 to produce maximum (peak) output as shown by the waves on the oscillograph screen. Without disturbing the connections, shift the oscillograph "Timing" switch to "Ext." Place the frequency-modulator sweep-range switch to its "Hi" position and insert plug of frequency-modulator cable in test-oscillator jack. Turn test-oscillator modulation switch to "Off." Re-tune the test oscillator (decrease frequency) until the forward and reverse waves show on the oscillograph screen and become coincident at their highest points. This will occur at a test-oscillator setting of approximately 198 kc. This setting places the test-oscillator frequency to 175 kc. The second harmonic is now used for the 350 kc adjustment. Adjust air-trimmers C18, C38, and C6, again, to produce maximum amplitude of the images and best coincidence throughout their lengths.

(k) Re-tune the receiver to approximately 175 kc so that the forward and reverse waves appear on the oscillograph screen. Adjust the oscillator magnetite core screw L10 to produce maximum (peak) amplitude of the waves, disregarding the fact that the two images may or may not come together.

(l) Shift the receiver dial setting to 350 kc without altering any other adjustments (frequency modulator still in operation). Adjust air-trimmers C18, C38, and C6, respectively, to produce maximum amplitude and best coincidence of the waves. These adjustments compensate for any changes caused by the adjustment of the magnetite core screw L10. Tighten lock nuts on C18, C38, and C6, respectively, after each is adjusted.

Selector Dial

Figure 12 illustrates the relation of the various parts of the dial mechanism when in its "Standard broadcast" position with the range switch likewise turned to its "Standard broadcast" position. In re-assembling the dial after repairs, see that the gears are meshed in accordance with the diagram, at the same time noting that the range switch in in its "Standard broadcast" position and the lever attached to the range-switch shaft placed in the position shown.

To adjust the dial mechanism, set the range switch to its "Standard broadcast" position. Place a straight-edge across the center of the dial so that its edge is even with the lower (end) marking at both the low-frequency and high-frequency ends of the dial. Under such conditions the straight-edge should be parallel with the top of the chassis base. If the straight-edge is not parallel with the top of the chassis base, loosen the nut on the rear of the roller link pivot stud and move the stud up or down until the link roller moves the dial to the desired position so that the end calibration marks obtain the position mentioned above. Tighten the nut on the roller link pivot stud.

Set the gang tuning condenser to its maximum capacity position. Adjust the dial pointer to the low-frequency (end) mark on "Standard broadcast" scale. This is a friction adjustment.

With the gang tuning condenser plates still in full mesh, loosen the two set screws on the vernier-dial hub. Rotate the vernier dial until the "0" marking is in a vertical plane above the center of the shaft. Tighten set screws.

Antenna and Ground Terminals

These receivers are equipped with an antenna-ground terminal board having three terminals. These terminals are marked "A2," "A1," and "G," the latter being the ground terminal and should always be connected to a good external ground. The transmission-line leads of the RCA RK-40A antenna system should be connected to terminals "A2" and "A1." The receiver coupling units of the RCA RK-40 and the RCA Spider-Web antenna systems should be connected to terminals "A1" and "G." Connect a single-wire antenna to terminal "A1."

Magnetic Pickup

The pickup used in the phonograph unit is of an improved design. The horseshoe magnet is rigidly

MODELS 9U, 9U2
Notes, Page 2
Parts, Page 1

RCA MFG. CO., INC.

welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. The frequency response is substantially uniform over a wide range. Service operations which may be necessary on the pickup are as follows:

Centering Armature

Refer to figure 13 showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces, i.e., exactly centered. Whenever this centering adjustment has been disturbed, the screws A, B, and C should be loosened and the armature clamp adjusted to the point where the vertical axis of the armature is at right angles to the horizontal axis of the pole pieces, and centered between them. This centering operation may be facilitated by inserting a small rod or nail into the armature needle hole, using it as a lever to test the angular movement of the armature. The limitations of the movement in each direction will be caused by the armature striking the pole pieces. The proper adjustment is obtained when there is equal angular displacement of the armature and adjustment rod or nail to each side of the vertical axis of the magnet and coil assembly. The screws A and B should then be secured, observing care not to disturb the adjustment of the armature clamp. Then place the pickup in a vise and secure the centering spring-clamp by means of the screw C, allowing the centering spring to remain in the position at which the armature is exactly centered between the pole pieces. With a little practice, the correct adjustment of the armature may be readily obtained. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other such foreign materials which would obstruct the movement of the pickup armature.

Damping Block

The viscoloid block which is attached to the back end of the armature shank serves as a mechanical filter to eliminate undesirable resonances and to cause the frequency response to be uniform. Should it be necessary to replace this damping block, it may be done by removing screw D and the cover support bracket from the mechanism and taking off the old viscoloid block. The surface of the armature which is in contact with the viscoloid should be thoroughly cleaned with fine emery cloth. Then insert the new block so that it occupies the same position at it did originally. Make certain that the block is in correct vertical alignment with the armature. The hole in the new viscoloid block is somewhat smaller than the diameter of the armature in order to permit a snug fit. With the viscoloid aligned on the armature, screw D and the cover support bracket should then be replaced. Heat should be applied to the armature (viscoloid side) so that the viscoloid block will fuse at the point of contact and become rigidly attached to the armature. A special-tip soldering iron constructed as shown in figure 14 will be found very useful in performing this operation. The iron should be applied only long enough to slightly melt the block and cause a small bulge on both sides.

Replacing Coil

Whenever there is defective operation due to an open or shorted pickup coil, this coil should be replaced. The method of replacement will be obvious upon inspection of the pickup assembly and by study of the cut-a-way illustrations. Make sure that the new coil is properly centered with the hole in the support strip and glued securely in that position. It is important to re-adjust the armature as previously explained after re-assembly of the mechanism. Only rosin core solder should be used for soldering the coil leads in the pickup. This same type of solder should be used when necessary for soldering the centering spring to the armature.

Magnetizing

Loss of magnetization will not usually occur when the pickup has received normal care because the magnet and pole pieces are one unit and the magnetic circuit remains practically closed at all times. When the pickup has been mishandled, subjected to a strong a-c field, jolted, or dropped, there may be an appreciable loss of magnetic strength, in which case it will be necessary to re-magnetize the entire structure. To do this, it will be necessary to first remove the pickup mechanism from the tone arm, and then remove the magnet assembly. Place the magnet assembly on the poles of a standard pickup magnetizer such as the **RCA Stock No. 9549 Pickup Magnetizer** and charging the magnet in accordance with the instructions accompanying the magnetizer. It is preferable to check the polarity of the pickup magnet and to remagnetize it so that the same polarity is maintained

Automatic Record Ejector

The record changing mechanism is designed to be simple and fool-proof. Under normal operating conditions, service difficulties should be negligible. Occasionally, however, certain adjustments may be required. These adjustments are illustrated and explained in figure 9.

It is important when servicing the automatic mechanism, to have it placed on a level support. It is also important to refrain from forcing the mechanism if there is a tendency to bind or jam, since bent levers and possibly broken parts may result.

The tip of the record ejector is adjustable in relation to the turntable spindle, the two being exactly coaxial when properly adjusted. To align the tip, remove the rubber silencer of the ejector assembly, loosen ejector tip retaining nut and slide the tip assembly to the position where it is in true-line with the axis of the turntable spindle. This adjustment may be simplified by placing several records on the turntable, depressing the spindle through the top record hole and lining up the ejector tip in the spindle hole of the record.

To insure that the ejector tip rotates freely, apply a slight amount of oil to the shank of the tip at the point where it is in contact with the ball bearing.

Loudspeaker

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed by softening its cement with a very light application of acetone using care not to allow the acetone to flow down into the air gap. The dust cover may be cemented back in place with ambroid upon completion of adjustment.

Stock No.	Description	List Price
11723	Escutcheon—Pickup arm escutcheon....	.62
11721	Pickup—Pickup unit, complete........	5.50
11549	Screw—Pickup front cover screw—Package of 10..........	.42
3387	Screw—Nut and washer for mounting pickup to arm—Package of 10........	.50
11547	Screw—Pickup needle screw—Package of 10	.42
	OPERATING MECHANISM	
6502	Cam—Cam and gear assembly.........	1.18
6808	Clutch—Trip lever friction clutch.......	.30
11558	Cover—Metal cover for trip lever and friction finger assembly............	.36
6809	Finger—Manual index lever finger assembly	.25
3670	Finger—Friction finger assembly........	.32
11554	Lever—Manual index lever—less pin....	.62
11556	Lever—Main lever and link assembly....	2.10
11557	Lever—Main spring lever............	.42
3677	Lever—Pickup arm cable lever assembly—Comprising lever with cable screw, spring and nut..........	.40
11555	Lever—Trip lever and friction clutch assembly	.94
6503	Pawl—Trip pawl assembly............	.40
4124	Plate—Eject arm actuating plate assembly	.50
4563	Screw—Cable lever screw and nut—Package of 10..........	.60
4564	Screw—Manual index lever finger set screw—Package of 10..........	.20
4059	Screw—Trip lever clutch tension adjustment screw—Package of 10.........	.22
4566	Screw—Special screw used to fasten main lever and link assembly bushing—Package of 10..........	.30
11559	Spacer—Pickup arm mounting spacer...	.28
4127	Spring—Actuating spring—Package of 10	.24
3666	Spring—Cable lever tension spring—Package of 10..........	.44
4565	Spring—Manual index lever finger tension spring—Package of 10..........	.30
4061	Spring—Main spring lever tension spring—Package of 10..........	.38
2893	Spring—Trip lever latch plate tension—Package of 10..........	.30
2917	Washer — Spring washer — "U" type — Package of 10..........	.25
	MOTOR ASSEMBLIES	
9735	Motor—105-125 volts—25 cycles (M1)..	49.50
9651	Motor—105-125 volts—50 cycles (M1)..	35.35
9650	Motor—105-125 volts—60 cycles (M1)..	35.35
12050	Suspension Spring—Motor mounting spring, washer, and stud assembly—Comprising six springs, six cup washers, three spring washers and three studs..	.60
	AUTOMATIC SWITCH ASSEMBLIES	
3994	Cover—Motor switch cover............	.26
10184	Plate—Automatic brake latch plate—Package of 5..........	.40
10174	Springs—Automatic brake springs—Package of 2 sets..........	.50
6805	Switch Assembly—Automatic switch, complete	1.90
3322	Switch—Motor switch (S6)............	.75
	MOTOR BOARD ASSEMBLIES	
11881	Base—Phonograph compartment lamp socket and base..........	.55
12051	Capacitor—2 Mfd, complete with 2-contact male connector for use with motor, Stock No. 9650 or No. 9651 only (C83)	4.18
13101	Capacitor—4 Mfd., complete with 2-contact male connector for use with motor, Stock No. 9735 only (C83)..........	5.05
4674	Connector—2-contact male connector for Stock Nos. 12051, 13101 or phono compartment lamp leads............	.25
4577	Connector—2-contact male connector motor cable..........	.30

Stock No.	Description	List Price
11488	Connector — 2-contact female connector for motor leads..........	.14
11542	Cover—Turntable cover............	.88
11553	Escutcheon—Index escutcheon engraved "Manual -12—10"	.44
4340	Lamp—Phonograph compartment lamp—6.3 volts—Package of 5..........	.60
3764	Nut—Cap nut for motor board suspension assembly—Package of 4.........	.40
3672	Pin—Manual index pin..............	.42
11551	Rest—Pickup rest..................	.14
3654	Roller—Pickup arm cable guide roller—Comprising bracket, roller and guide pin	.34
11711	Shade—Phonograph compartment lamp shade	.16
3763	Suspension Spring — Suspension spring, washer and bolt assembly for motor board—Comprising one bolt, two cup washers, two springs, two "C" washers and one cap nut..........	.42
4671	Switch — Operating switch — toggle type (S7)	.72
11599	Turntable—Complete	2.90
	MISCELLANEOUS CABLE ASSEMBLIES	
13226	Cable—3-conductor shielded compensator cable (volume control end), approximately 18 inches long, complete with one 4-contact female connector, Stock No. 12494..........	2.20
13227	Cable—3-conductor shielded compensator cable (transformer end), approximately 8 inches long, complete with one 4-contact male connector, Stock No. 12565 and three pin type terminals—for Model 9U2 only..........	1.45
13232	Cable—3-conductor shielded compensator cable (transformer end), approximately 27 inches long, complete with one 4-contact male connector, Stock No. 12565 and three pin type terminals—for Model 9U only..........	2.00
13225	Cable—3-conductor shielded volume control cable (chassis end), approximately 13 inches long, complete with one 4-contact female connector, Stock No. 12494—for Model 9U2 only..........	1.75
13228	Cable—3-conductor shielded volume control cable (control end), approximately 9½ inches long, complete with one 4-contact male connector, Stock No. 12565	1.55
13231	Cable—3-conductor shielded volume control cable (chassis end), approximately 24 inches long, complete with one 4-contact female connector, Stock No. 12494—for Model 9U only..........	2.00
12494	Connector—4-contact female for cable, Stock Nos. 13225, 13226 or 13231....	.18
12565	Connector — 4-contact male for cable, Stock Nos. 13227, 13228 or 13232....	.20
	REPRODUCER ASSEMBLIES	
12914	Board—3-contact reproducer terminal board	.25
12640	Bracket — Output transformer mounting bracket and clamp assembly..........	.18
12912	Coil—Field coil (L30)............	1.70
12667	Cone—Reproducer cone and dust cap (L28)	1.00
5118	Plug—3-contact male reproducer plug...	.25
9736	Reproducer—Complete	8.70
12913	Transformer—Output transformer (T2).	1.45
11886	Washer—Spring washer to hold field coil securely—Package of 5..........	.20
	MISCELLANEOUS ASSEMBLIES	
4391	Box—Used needle box..........	.70
11996	Bracket—Tuning lamp mounting bracket and clamp..........	.22

Prices quoted above are subject to change without notice.

RCA MFG. CO., INC.

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
12863	Board—4 contact and 2 link phonograph terminal board	.25
4427	Bracket—Mounting bracket for H.F. tone control, L.F. tone control or volume control	.18
12867	Cable—Tuning lamp cable and socket	1.70
13230	Cable—2 conductor compartment and pilot lamp cable (chassis end) approx. 34-in. long complete with two female connectors Stock No. 11488—Model 9U2 only	1.30
12511	Cap—Grid contact cap—Package of 5	.15
12859	Capacitor Pack—Comprising two sections .015 Mfd., one section .1 Mfd., and two resistors 27,000 ohms each (C55, C56, C57, R21, R22)	1.50
12873	Capacitor Pack—Comprising one 3 Mfd. and one 20 Mfd. section used in 25 cycle Model only (C61, C69)	1.20
12724	Capacitor—120 Mmfd. (C59)	.28
12404	Capacitor—120 Mmfd. (C45, C46, C49, C50)	.26
12406	Capacitor—180 Mmfd. (C52)	.26
4838	Capacitor—.005 Mfd. (C63, C79)	.20
4624	Capacitor—.01 Mfd. (C51)	.54
4858	Capacitor—.01 Mfd. (C60)	.25
4836	Capacitor—.05 Mfd. (C53)	.30
4886	Capacitor—.05 Mfd. (C62)	.20
4841	Capacitor—0.1 Mfd. (C54)	.22
11414	Capacitor—0.1 Mfd. (C47)	.20
4840	Capacitor—.25 Mfd. (C58)	.30
5170	Capacitor—.25 Mfd. (C48, C68)	.25
12741	Capacitor—0.5 Mfd. (C64)	.30
5212	Capacitor—18 Mfd. (C67)	1.16
12872	Capacitor—20 Mfd. (C61)	.90
12467	Capacitor—30 Mfd. (C65, C66)	1.40
5119	Connector—3-contact female connector for speaker leads	.25
4573	Connector—2-contact female connector for motor cable (Chassis End)	.30
11488	Connector—2-contact female connector for phonograph compartment lamp cable (Chassis End)	.14
12006	Core—Adjustable core and stud for Stock No. 12652 and 12653	.22
12870	Dial—Vernier dial and disc assembly	.65
4340	Lamp—Dial lamp 6.3 volt, lower R.H. socket Model 9U2 only—Package of 5	.60
5226	Lamp—Dial lamp, 6.3 volt—Package of 5	.70
12868	Link—Range switch and band indicator operating link complete with set screw	.45
12871	Reactor—Filter reactor (L31)	1.50
12865	Resistor—Voltage divider resistor—Comprising one section 250 ohm, one section 17 ohm, and one section 11 ohm (R17, R18, R26)	.45
12876	Resistor—10,000 ohms—wire wound—10 watt (R10)	.55
12864	Resistor—17,000 ohms—wire wound (R19)	.70
11282	Resistor—56,000 ohms—carbon type—1/10 watt (R12)—Package of 5	.75
12875	Resistor—56,000 ohms—carbon type—1 watt (R16)—Package of 5	1.10
12264	Resistor—220,000 ohms—insulated—¼ watt (R44)—Package of 5	1.00
11398	Resistor—220,000 ohms—carbon type—1/10 watt (R13)—Package of 5	.75
11453	Resistor—270,000 ohms—carbon type—1/10 watt (R24)—Package of 5	.75
11172	Resistor—470,000 ohms—carbon type—¼ watt (R23)—Package of 5	1.00

Stock No.	Description	List Price
11452	Resistor—470,000 ohms—carbon type—1/10 watt (R25)—Package of 5	.75
12013	Resistor—1 Megohm—carbon type—1/10 watt (R28)—Package of 5	.75
11626	Resistor—2.2 Megohm—carbon type—¼ watt (R11)—Package of 5	1.00
12874	Resistor—3.3 Megohm—carbon type—¼ watt (R14, R15)—Package of 5	1.00
4669	Screw—No. 8-32-5/32 set screw for link Stock No. 12868—Package of 10	.25
3903	Screw—No. 8-32-3/16 headless cup point set screw for Stock No. 12870—Package of 20	.36
12869	Shaft—Range switch and band indicator operating shaft and hub—assembly	.25
12008	Shield—I.F. transformer shield for Stock No. 12652, 12653	.28
12607	Shield—I.F. transformer shield top for Stock No. 12652	.30
12581	Shield—I.F. transformer shield top for Stock No. 12653	.36
12110	Shield—Shield cap for 6F5 Radiotron	.14
13095	Socket—Dial lamp socket, upper left or lower right hand	.25
11222	Socket—Dial lamp socket, upper right or lower left hand	.18
11381	Socket—Tuning lamp socket and cover	.45
11195	Socket—5-contact 5Z4 Radiotron socket	.15
11198	Socket—7-contact 6H6, 6K7, 6L6, or 6F5 Radiotron socket	.15
11196	Socket—8-contact socket for R.F. Unit power cable plug	.15
12007	Spring—Retaining spring for Stock No. 12006	.36
12860	Tone Control—Low frequency tone control and power switch (S4, S5)	1.50
13468	Tone Control—High frequency tone control (R27, S6)	1.50
12652	Transformer—First I.F. transformer complete (L24, L25, C45, C46)	1.60
12653	Transformer—Second I.F. transformer complete (L26, L27, C49, C50, C52, R12, R13)	2.06
12856	Transformer—Power transformer, 105-125 volt, 50-60 cycle (T1)	5.35
12857	Transformer—Power transformer, 105-125 volt, 25 cycle (T1)	7.10
12858	Transformer—Power transformer, 100-250 volt, 50-60 cycle (T1)	8.75
12861	Volume Control—(R20)	1.00
	MAGIC BRAIN UNIT ASSEMBLIES	
12806	Board—3-contact antenna and ground terminal board	.25
5237	Bushing—Variable condenser mounting bushing assembly—Package of 3	.43
12886	Cable—Shielded power cable approx. 4-in. long complete with 8-contact male plug	1.50
12511	Cap—Grid contact cap—Package of 5	.15
12714	Capacitor—Adjustable trimmer capacitor (C3, C4, C5, C6, C14, C16)	.38
12807	Capacitor—Adjustable trimmer capacitor (C13, C35, C36, C37)	.35
12884	Capacitor—Adjustable trimmer capacitor (C10, C18, C23, C38, C39)	.40
12896	Capacitor—15 Mmfd. (C34)	.20
12722	Capacitor—18 Mmfd. (C15)	.20
12891	Capacitor—36 Mmfd. (C40)	.20
12629	Capacitor—56 Mmfd. (C24)	.20
12895	Capacitor—56 Mmfd. (C17)	.20
12723	Capacitor—56 Mmfd. (C2, C44)	.20
13307	Capacitor—62 Mmfd. (C11)	.20

Stock No.	Description	List Price
12724	Capacitor—120 Mmfd. (C25, C28, C29)	.28
12725	Capacitor—150 Mmfd. (C1)	.28
12894	Capacitor—180 Mmfd. (C22)	.20
12727	Capacitor—555 Mmfd. (C21)	.20
12537	Capacitor—560 Mmfd. (C7, C26, C33, C42)	20
12898	Capacitor—1,500 Mmfd. (C12)	.20
12729	Capacitor—1,550 Mmfd. (C20)	.26
12728	Capacitor—4,500 Mmfd. (C19)	.36
12897	Capacitor—4,700 Mmfd. (C43)	.40
4858	Capacitor—.01 Mfd. (C8, C30, C31, C32)	.25
12879	Coil—Antenna coil and shield, XABC bands (L2, L3, L4, L5, L6)	1.90
12888	Coil—Antenna coil, "D" band (L13, L14)	.60
12880	Coil—Detector coil and shield, XABC bands (L15, L16, L17, L18, L19, L20)	2.05
12709	Coil—Oscillator coil and shield, ABC bands (L7, L8, L9)	2.02
12881	Coil—Oscillator coil and shield, X band only (L10)	.80
12890	Coil—Oscillator coil, "D" band (L11, L12, L23)	.70
12889	Coil—R.F. coil, "D" band (L21, L22)	.65
12877	Condenser—3-gang variable tuning condenser (C9, C27, C41)	5.10
12887	Connector—8-contact male connector and cover for power cable, Stock No. 12886	.40
12664	Core—Adjustable core and stud for Stock No. 12654	.22
12800	Core—Adjustable core and stud for Stock No. 12709	.20
12882	Core—Adjustable core and stud for Stock No. 12881	.20
11324	Resistor—560 ohms—carbon type—¼ watt (R2)—Package of 5	1.00
5112	Resistor—1,000 ohms—carbon type—¼ watt (R3)—Package of 5	1.00
11298	Resistor—5,600 ohms—carbon type—1 watt (R6)	.22
3998	Resistor—15,000 ohms—carbon type, ¼ watt (R5)—Package of 5	1.00
11282	Resistor—56,000 ohms—carbon type—1/10 watt (R4, R9)—Package of 5	.75
8064	Resistor—82,000 ohms—carbon type, ½ watt (R8)—Package of 5	1.00
11397	Resistor—560,000 ohms—carbon type—1/10 watt (R1, R7)—Package of 5	.75
12651	Shield—Coil shield for Stock Nos. 12879 and 12880	.22
12710	Shield—Coil shield for Stock No. 12709	.28
12883	Shield—Coil shield for stock No. 12881	.20
11198	Socket—7-contact 6K7 Radiotron socket	.15
11279	Socket—7-contact 6L7 Radiotron socket	.20
12885	Socket—8-contact 6J7 Radiotron socket	.20
12007	Spring—Retaining spring for core, Stock Nos. 12664, 12800, 12882—Package of 10	.36
12878	Switch—Range switch and mounting nut (S1, S2, S3)	3.60
12654	Trap—Wave-trap, complete (L1)	.75
	DRIVE ASSEMBLIES	
10705	Ball—5/32-inch diameter steel ball for planetary drive—Package of 20	.25
10941	Ball—⅛-inch diameter steel ball for planetary drive bearing—Package of 20	.25
12904	Bushing—Plate and bushing assembly for planetary drive mounting	.20
12905	Coupling—Flexible coupling and shaft assembly, complete	.50
12909	Dial—Band indicating dial and cam assembly	1.05

Stock No.	Description	List Price
12899	Drive—Variable tuning condenser drive, complete, including mounting bracket, drive, dial scale and indicator, less vernier dial, Stock No. 12870, and link, Stock No. 12868	4.40
12906	Gear—Anti-lash drive gear, complete	.75
12910	Gear—Sector gear and link assembly for band selector	.20
12908	Indicator—Station selector indicator pointer	.20
8051	Link—Link and roller assembly, complete with spring	.30
12911	Screen—Dial lamp and light diffuser	.20
4669	Screw—Set screw for flexible coupling or gear, Stock Nos. 12905 and 12906—Package of 10	.25
12901	Shaft—Direct drive shaft and pinion gear for planetary drive	.75
12900	Shaft—Vernier drive shaft for planetary drive	.25
12903	Spring—Tension spring for planetary drive bearing—Package of 10	.20
12907	Spring—Tension spring for gear, Stock No. 12906—Package of 10	.20
8052	Spring—Tension spring for link, Stock No. 8051—Package of 5	.32
	EJECT ARM ASSEMBLIES	
11541	Arm—Eject arm, complete	8.15
11533	Ball—1/16-inch diameter steel ball—Package of 10	.20
10129	Ball—3/16-inch diameter steel ball—Package of 20	.25
11529	Bearing—Ejector tip bearing and nut	.32
11538	Bracket—Eject arm bracket	1.72
11537	Collar—Eject arm shaft collar and set screw	.24
11540	Cover—Eject arm cover	1.52
11536	Cushion—Counter balance roller cushion located inside of eject arm	.14
4055	Post—Vertical adjustment post—located on eject arm bracket	.30
3729	Roller—Eject arm counter balance roller—located inside of eject arm	.45
4580	Screw—No 6—32-3/16-inch square head set screw for eject arm collar—Package of 10	.25
11534	Screw—No. 8—36-7/32-inch special screw for eject arm tip center adjustment—Package of 10	.14
11535	Shaft and Collar—Eject arm vertical action shaft and collar assembly	.15
11528	Silencer—Ejector tip silencer	.14
4067	Spring—Ejector arm bracket spring—Package of 10	.30
11531	Spring—Ejector tip spring—Package of 10	.42
11530	Tip—Ejector tip with tip center, adjusting screw and cap	.32
11539	Yoke—Eject arm yoke assembly	.94
	PICKUP AND ARM ASSEMBLIES	
13469	Arm—Pickup arm, complete less pickup unit	6.00
11724	Armature—Pickup armature	.38
11548	Back—Pickup back	.52
4064	Cable—Pickup arm operating cable—Package of 5	1.00
11722	Coil—Pickup coil (L24)	.52
13470	Connector—Shielded pickup cable and connector assembly—approximately 59 inches long	.90
11545	Cover—Pickup front cover	.22
11546	Cover—Pickup back cover with mounting screws	.14

Prices quoted above are subject to change without notice.

MODELS 9U,9U2
Parts,Page 3
Circuit Data

RCA MFG. CO., INC.

REPLACEMENT PARTS

Stock No.	Replacement Parts	List Price
3737	Damper—Pickup damper—Package of 5.	.65
3516	Damper—Damper assembly for pickup arm base—Comprising one upper and one lower damper, one upper bushing and one lower bearing	.14
13103	Cap — Pilot lamp cap — Package of 5 — Model 9U2 only	.65
4836	Capacitor—.05 Mfd. (for phonograph volume control) (C84)	.30
12915	Crystal—Station selector escutcheon and crystal	1.30
11580	Cover — Pilot lamp cover — Model 9U2 only	.12
12742	Escutcheon—Tuning lamp escutcheon	.22
4340	Lamp—Pilot lamp—6.3 volts—Package of 5—Model 9U2 only	.60
12699	Knob—Large station selector knob—Package of 5	.68
11347	Knob—Low frequency tone control and power switch phonograph or radio volume control, range switch, or high frequency tone control knob — Package of 5	.75
12700	Knob—Small (vernier) station selector knob—Package of 5	.58
11607	Receptacle—Needle card holder	.38
11210	Screw—Chassis mounting screw assembly for Model 9U only—Package of 4	.28
4560	Screw—Chassis mounting screw assembly (front)—Comprising one screw, one washer and one lockwasher—Package of 10—Model 9U2 only	.30
13102	Screw—Chassis mounting screw assembly (bottom)—Comprising one screw, two cushions, one spacer, one washer and one lockwasher — Package of 2 — for Model 9U2 only	.30
12916	Shield—Complete R.F. unit shield	.90
11573	Socket—Pilot lamp socket—Model 9U2 only	.28
11349	Spring—Retaining spring for knob, Stock Nos. 11347 and 12700—Package of 5.	.25
4982	Spring—Retaining spring for knob, Stock No. 12699—Package of 10	.50
13415	Tube—Magic voice tube—7 inches long.	.35
13416	Tube—Magic voice tube—8 inches long.	.35
13417	Tube—Magic voice tube—9 inches long.	.35
13127	Transformer — Phonograph input transformer — Comprising one transformer, three choke coils, three capacitors and four resistors (T3, L43, L44, L45, C80, C81, C82, R40, R41, R42, R43)	6.40
13126	Volume Control — Phonograph volume control and switch (R39, S8)	1.50

"Magic Brain"

The new "Magic Brain" is constructed as a separate, self-contained, completely shielded, five-band, oscillator-detector-antenna-tuning unit which plugs into the main chassis.

A single-wire antenna, or a doublet antenna, when connected to the proper input terminals of the receiver, is coupled to the control grid of the RCA-6K7 r-f amplifier tube through the tuned r-f transformer consisting of L6, L5, L4, L3, and L2 (except when range selector is in "Ultra short wave" position). The primary coil L13 of the "Ultra short wave" (D) band tuned r-f transformer remains in the antenna circuit at all times. A unique method of switching is used. In the "Long wave" (X) band, L6 becomes the primary with L5, L4, L3, and L2 as secondary. In the "Standard broadcast" (A) band, L5 becomes the primary with L4, L3, and L2 as secondary (L6 shorted out). In the "Medium wave" (B) band, L4 becomes the primary with L3 and L2 as secondary (L6 and L5 shorted out). In the "Short wave" (C) band, L3 becomes the primary with L2 as secondary (L6, L5, L4, and tap on L4 shorted out). The tap on L4 is provided to prevent interaction with L3 and L2 when operating receiver in "Short wave" band. In the "Ultra short wave" (D) band, L6, L5, L4, and L3 are shorted out and grounded, and secondary L14 is placed in shunt with L2. The latter connection prevents undesirable interaction of L2 with L14. This method of switching reduces the total number of coils and leads, and results in having a low-loss primary and secondary winding for each band with high efficiency of operation.

The band switching of the detector circuits is similar to that of the antenna circuits. Coils L15, L21, and L20 are always connected in series with the plate circuit of the RCA-6K7 r-f amplifier tube. In the "Long wave" (X) band, L19, L18, L17, and L16 are connected in series as the secondary circuit. The ground of the coil system is at the low end of L19. L20 acts as the primary which transfers energy to the secondary L19. Capacitor C33 resonates primary L20 at the proper frequency. In the "Standard broadcast" (A) band, L18, L17, and L16 are connected in series as the secondary circuit. The ground of the coil system is now between L18 and L19. L19 is used as the primary and is resonated at the proper frequency by capacitors C34 and C35 which are in shunt with this coil. Capacitor C33 is connected to transfer energy to the primary coil L19. In the "Medium wave" (B) band, L17 and L16 are connected in series as the secondary. The ground of the coil system is now between L17 and L18. L18 is used as the primary and is resonated at the proper frequency by capacitor C34 which is in shunt with this coil. L19 is shorted by the range selector. Capacitor C33 transfers the r-f energy from the plate circuit to the primary L18. In the "Short wave" (C) band, L16 is the secondary. The ground of the coil system is now between L16 and L17. L17 is used as the primary and is resonated to the proper frequency by capacitor C34. In addition, L15 acts as a high-frequency primary which resonates above 20 mc and improves the gain at the high-frequency end of the "Short wave" band. Coils L19 and L18 are shorted by the range selector. L21 is effectively r-f bypassed in this position by capacitor C32. In the "Ultra short wave" (D) band, L22 is the secondary, or grid coil, and consists of approximately a single turn of silver plated strap around a 7/8-inch coil form. The primary coils, L21 and L15 are in series on this band, with L21 acting as a low-frequency primary and L15 as a high-frequency primary. L16 is shunted by L22 instead of being shorted directly by the range selector. Any inductive effect of L16 is thus eliminated. L19, L18, and L17 are shorted directly by the range selector.

Separate windings, with the exception of L23, are employed in the oscillator stage for each position of the range selector. L23 (inductively coupled to L11 and L12) is placed in the oscillator plate circuit to provide additional feed-back when operating receiver on the "Ultra short wave" (D) band. This coil is effectively r-f bypassed by capacitor C12, when range selector is in the "Short wave" (C) position, to prevent undesirable reactions. Its effect on the remaining bands is negligible. The inherent stability of the oscillator circuit provides minimum frequency drift which is especially advantageous for high-frequency reception. The locally generated signal is capacitance coupled to grid No. 3 of the RCA-6L7 first detector.

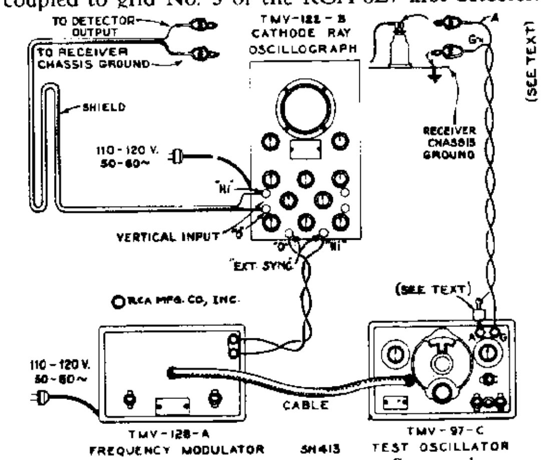
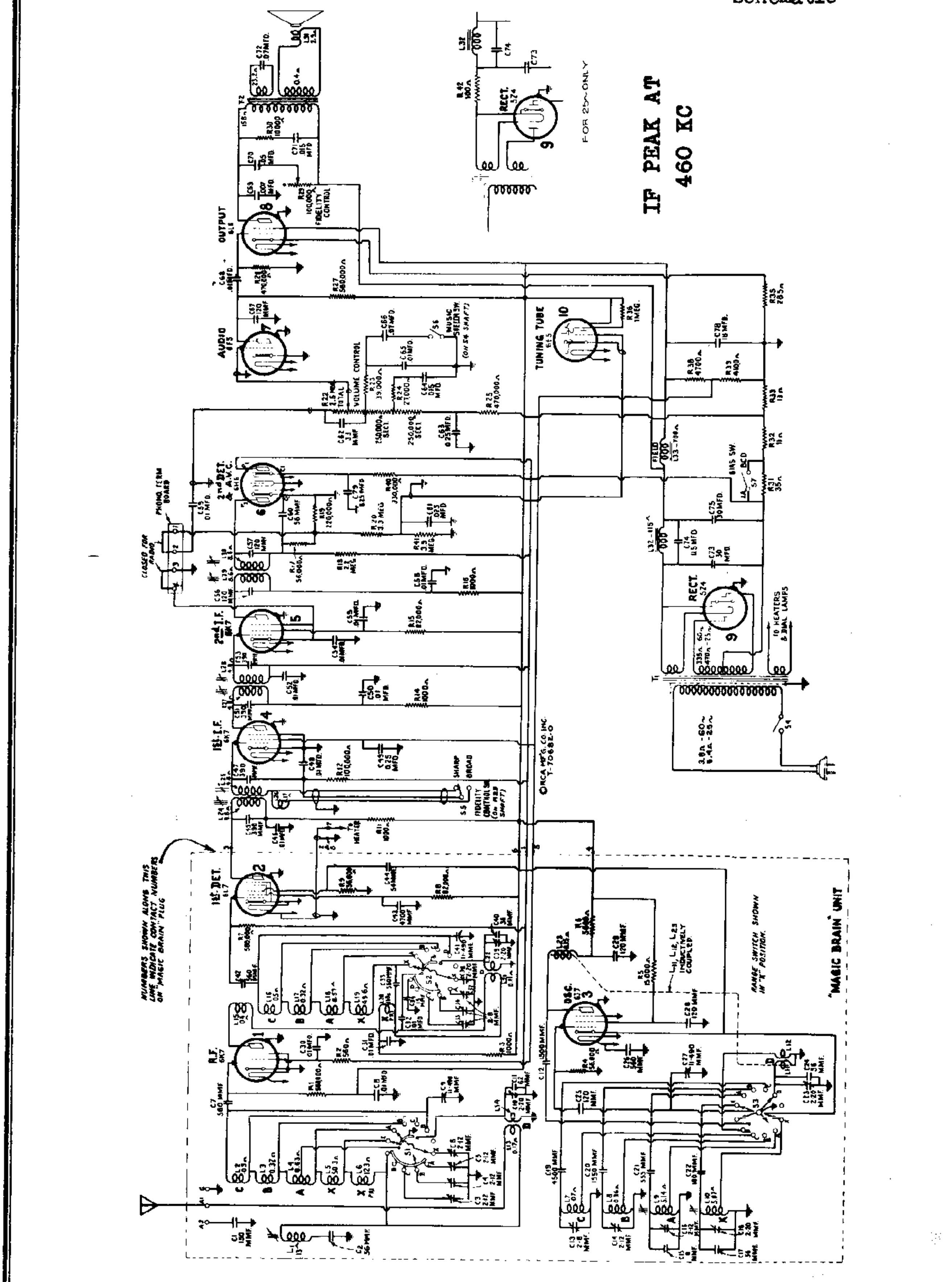


Figure 6—Alignment Apparatus Connections

MODELS 10K1
10T(2nd Prod.
Schematic

RCA MFG. CO., INC.



MODELS 10K1, 10T(2nd Prod.)
Chassis Wiring

RCA MFG. CO., INC.

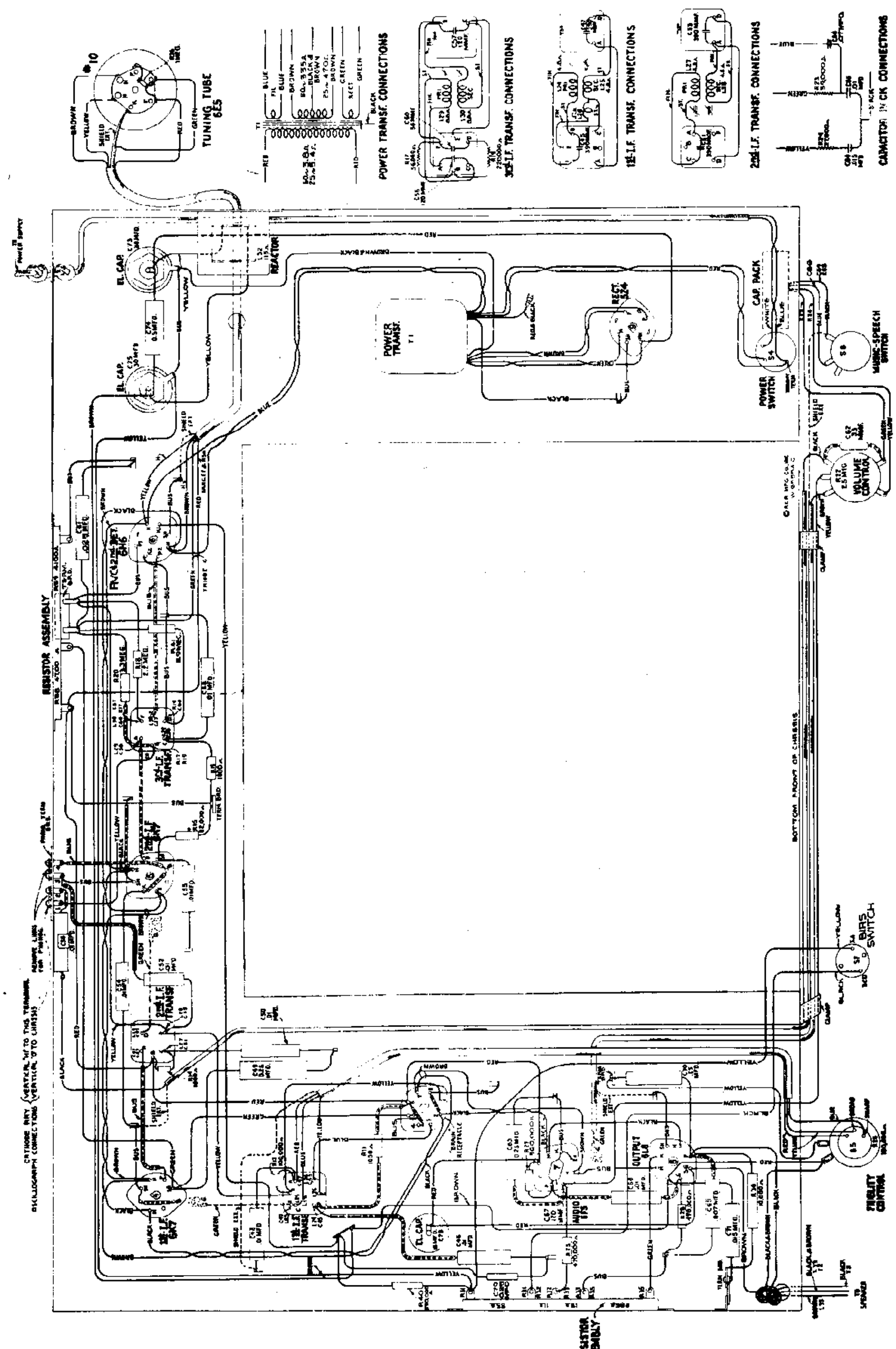


Figure 3—Chassis Wiring Diagram (Less "Magic Brain")
[Model 10K1 and Model 10T (Second Production)]

RCA MFG. CO., INC.

RCA VICTOR MODEL 10K1
and
MODEL 10T (Second Production)

TECHNICAL INFORMATION AND SERVICE DATA

These receivers are similar to Models 10T (first production) and 10K except for slight changes in the filter and bleeder circuits, loudspeakers, power transformers, and a few component parts. The loudspeakers, for the Model 10T second and first productions may be identified by the stampings RL63E1 and RL63D2 respectively. Model 10T (second production) chassis may be identified by visual inspection of the resistor assembly at the rear bottom of chassis. In the second production the assembly is comprised of one 4,700-ohm and one 4,100-ohm section (R38, R39), while the assembly in the first production consists of a single 17,000-ohm section R34. Model 10T (second production) has the 20 mfd. capacitor C76 at the bottom left rear of chassis omitted. Service data for Models 10T and 10K is directly applicable to these receivers except for the data contained herein. Power Supply Ratings (A, B and C)—135 watts. Undistorted and Maximum Power Outputs—7 and 10 watts. Cabinet Dimensions (height, width, and depth) Model 10K1—41, 29, and 14¾ inches. Weights (net and shipping) Model 10K1—91 and 135 pounds. Resistance Diagram and Cathode Current Readings to be disregarded. Universal Power Transformer resistances (pri. and sec.) —7.4 and 240 ohms total.

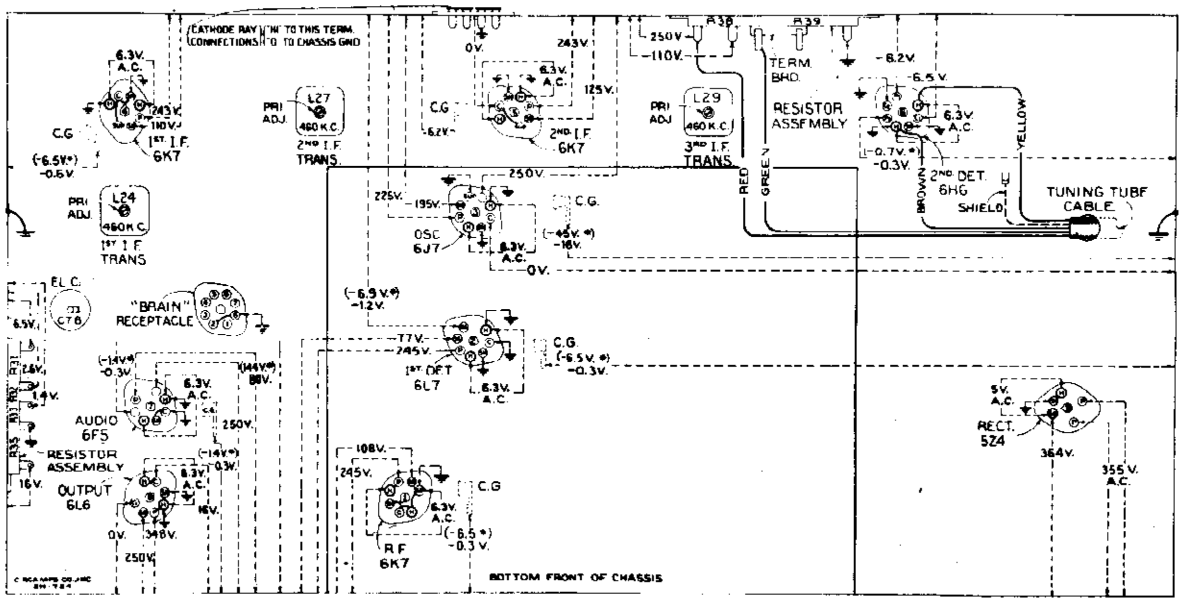


Figure 1—Radiotron Socket Voltages, Coil, and I-F Trimmer Locations
[Model 10K1 and Model 10T (Second Production)]

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES	4886	Capacitor—.05 Mfd. (C70)
12863	Board—Phonograph input terminal board	4870	Capacitor—.025 Mfd. (C61)
4427	Bracket—Volume control mounting bracket	4840	Capacitor—0.25 Mfd. (C49, C63, C79)
12987	Bracket—Band changeover switch bracket	12741	Capacitor—0.5 Mfd. (C74)
12985	Cable—Tuning lamp cable and socket	5212	Capacitor—18 Mfd. (C78)
12991	Cable—3-conductor shielded fidelity control cable, approximately 7½ inches long	12467	Capacitor—30 Mfd. (C73, C75)
12511	Cap—Grid contact cap	13657	Compensator Pack—Comprising one .015-Mfd., one .01-Mfd., one .07-Mfd. capacitors, one 27,000-ohm and one 39,000-ohm resistors (C64, C65, C66, R23, R24)
12948	Capacitor—33 Mmfd. (C62)	12006	Core—Core and stud assembly for intermediate frequency transformer
12629	Capacitor—56 Mmfd. (C60)	12866	Foot—Chassis foot assembly
12404	Capacitor—120 Mmfd. (C56, C57)	5226	Lamp—Pilot lamp
12724	Capacitor—120 Mmfd. (C67)	12868	Link—Link mechanism on band indicator operating arm
13022	Capacitor—390 Mmfd. (C45, C47, C51, C53)	12871	Reactor—Filter reactor (L32)
13033	Capacitor—.007 Mfd. (C69)	13658	Resistor—Voltage divider—Comprising one 4,700-ohm and one 4,100-ohm sections (R38, R39)
4858	Capacitor—.01 Mfd. (C46, C48, C50, C52, C54, C55, C58, C68)		
4624	Capacitor—.01 Mfd. (C59)		
11315	Capacitor—.015 Mfd. (C71)		

MODELS 10K1, 10T(2nd Prod.)
Parts

RCA MFG. CO., INC.

STOCK No.	DESCRIPTION
13659	Resistor—Voltage divider—Comprising one 285-ohm, one 13-ohm, one 11-ohm and one 35-ohm sections (R31, R32, R33, R35)
13834	Resistor—100 ohms—wire wound, 4 watt—For 25-cycle model only (R42)
12311	Resistor—1,000 ohms—insulated, ¼ watt (R11, R16)
13030	Resistor—1,000 ohms—carbon type, 1/10 watt (R14)
13097	Resistor—10,000 ohms—insulated, 1 watt (R30)
11282	Resistor—56,000 ohms—carbon type, 1/10 watt (R17)
11365	Resistor—82,000 ohms—carbon type, ¼ watt (R15)
11281	Resistor—100,000 ohms—carbon type, 1/10 watt (R12)
11398	Resistor—220,000 ohms—carbon type, 1/10 watt (R19)
5108	Resistor—330,000 ohms—carbon type, ¼ watt (R40)
11172	Resistor—470,000 ohms—carbon type, ¼ watt (R25, R28)
5035	Resistor—560,000 ohms—carbon type, ¼ watt (R27)
12013	Resistor—1.0 megohm—carbon type, 1/10 watt—Located in tuning tube socket (R36)
11626	Resistor—2.2 megohm—carbon type, ¼ watt (R18)
12874	Resistor—3.3 megohm—carbon type, ¼ watt (R20)
13167	Resistor—3.9 megohm—carbon type, ¼ watt (R41)
12870	Scale—Vernier dial scale
12008	Shield—Intermediate frequency transformer shield
12607	Shield—1st or 2nd I.F. transformer shield top
12581	Shield—3rd I.F. transformer shield top
11195	Socket—5-contact 5Z4 Radiotron socket
11198	Socket—7-contact 6K7 or 6H6 Radiotron socket
11196	Socket—8-contact 6F5, 6L6 Radiotron or Magic Brain power supply socket
13095	Socket—Upper left or lower right hand dial lamp socket
11222	Socket—Upper right or lower left hand dial lamp socket
11381	Socket—Tuning tube socket and cover
12007	Spring—Retaining spring for core in I.F. transformer
12986	Stud—Band indicator operating arm stud
12860	Switch—Low frequency tone and power switch (S4, S6)
12988	Switch—Bias switch (S7)
12979	Tone Control—High frequency tone and fidelity control (R29, S5)
12981	Transformer—First intermediate frequency transformer (L24, L25, L26, C45, C47)
12990	Transformer—Second intermediate frequency transformer (L27, L28, C51, C53)
12982	Transformer—Third intermediate frequency transformer (L29, L30, C56, C57, C60, R17, R19)
11211	Transformer—Power transformer, 105-125 volts, 50-60 cycles (T1)
11212	Transformer—Power transformer, 105-125 volts, 25-60 cycles (T1)
11213	Transformer—Power transformer, 110-125-150-210-240 volts, 40-60 cycles (T1)
12861	Volume Control (R22)

MAGIC BRAIN UNIT ASSEMBLIES

STOCK No.	DESCRIPTION
12806	Board—3-contact antenna and ground terminal board
5237	Bushing—Variable condenser mounting bushing assembly
12886	Cable—Shielded power cable, approximately 4 inches long, complete with 8-contact male plug
12511	Cap—Grid contact cap
12714	Capacitor—Adjustable trimmer capacitor (C3, C4, C5, C6, C14, C16)
12884	Capacitor—Adjustable trimmer capacitor (C10, C18, C23, C38, C39)
12807	Capacitor—Adjustable trimmer capacitor (C13, C35, C36, C37)
12896	Capacitor—15 Mmfd. (C34)
12722	Capacitor—18 Mmfd. (C15)
12891	Capacitor—36 Mmfd. (C40)
12629	Capacitor—56 Mmfd. (C24)
12895	Capacitor—56 Mmfd. (C17)
12723	Capacitor—56 Mmfd. (C2, C44)
13307	Capacitor—62 Mmfd. (C11)
12724	Capacitor—120 Mmfd. (C25, C28, C29)
12725	Capacitor—150 Mmfd. (C1)
12894	Capacitor—180 Mmfd. (C22)
12727	Capacitor—555 Mmfd. (C21)
12537	Capacitor—560 Mmfd. (C7, C26, C33, C42)
12898	Capacitor—1,500 Mmfd. (C12)
12729	Capacitor—1,550 Mmfd. (C20)
12728	Capacitor—4,500 Mmfd. (C19)
12897	Capacitor—4,700 Mmfd. (C43)
4858	Capacitor—.01 Mfd. (C8, C30, C31, C32)
12879	Coil—Antenna coil and shield, XABC bands (L2, L3, L4, L5, L6)
12888	Coil—Antenna coil, "D" band (L13, L14)
12880	Coil—Detector coil and shield, XABC bands (L15, L16, L17, L18, L19, L20)
12709	Coil—Oscillator coil and shield, ABC bands (L7, L8, L9)
12881	Coil—Oscillator coil and shield, X band only (L10)
12890	Coil—Oscillator coil, "D" band (L11, L12, L23)
12889	Coil—R.F. coil, "D" band (L21, L22)
12877	Condenser—3-gang variable tuning condenser (C9, C27, C41)
12887	Connector—8-contact male connector and cover for power cable, Stock No. 12886
12664	Core—Adjustable core and stud for Stock No. 12654
12800	Core—Adjustable core and stud for Stock No. 12709
12882	Core—Adjustable core and stud for Stock No. 12881
11324	Resistor—560 ohms—carbon type, ¼ watt (R2)
5112	Resistor—1,000 ohms—carbon type, ¼ watt (R3)
11298	Resistor—5,600 ohms—carbon type, 1 watt (R6)
3998	Resistor—15,000 ohms—carbon type, ¼ watt (R5)
11282	Resistor—56,000 ohms—carbon type, 1/10 watt (R4, R9)
8064	Resistor—82,000 ohms—carbon type, ½ watt (R8)
11397	Resistor—560,000 ohms—carbon type, 1/10 watt (R1, R7)
12651	Shield—Coil shield for Stock Nos. 12879, 12880
12710	Shield—Coil shield for Stock No. 12709
12883	Shield—Coil shield for Stock No. 12881
11198	Socket—7-contact 6K7 Radiotron socket
11279	Socket—7-contact 6L7 Radiotron socket
12885	Socket—8-contact 6J7 Radiotron socket
12007	Spring—Retaining spring for core, Stock Nos. 12664, 12800, 12882
12878	Switch—Range switch and mounting nut (S1, S2, S3)
12654	Trap—Wave-trap, complete (L1)

DRIVE ASSEMBLIES

STOCK No.	DESCRIPTION
10705	Ball—5/32-inch diameter steel ball for planetary drive
10941	Ball—¼-inch diameter steel ball for planetary drive bearing
12904	Bushing—Plate and bushing assembly for planetary drive mounting
12905	Coupling—Flexible coupling and shaft assembly, complete
12909	Dial—Band indicating dial and cam assembly
12899	Drive—Variable tuning condenser drive, complete, including mounting bracket drive, dial scale and indicator, less vernier dial, Stock No. 12870 and link, Stock No. 12868
12906	Gear—Anti-lash drive gear, complete
12910	Gear—Sector gear and link assembly for band selector
12908	Indicator—Station selector indicator pointer
8051	Link—Link and roller assembly, complete with spring
12911	Screen—Dial lamp screen and light diffuser
4669	Screw—Set screw for flexible coupling or gear, Stock Nos. 12905 and 12906
12901	Shaft—Direct drive shaft and pinion gear for planetary drive
12900	Shaft—Vernier drive shaft for planetary drive
12903	Spring—Tension spring for planetary drive bearing
12907	Spring—Tension spring for gear, Stock No. 12906
8052	Spring—Tension spring for link, Stock No. 8051

REPRODUCER ASSEMBLIES

STOCK No.	DESCRIPTION
12914	Board—Reproducer terminal board
12640	Bracket—Output transformer mounting bracket and clamp (Model 10T, 2nd Production)
13842	Bracket—Output transformer mounting bracket and clamp (Model 10K1)
13660	Coil—Reproducer field coil (L33)
12642	Cone—Reproducer cone and dust cap (L31) (Model 10T, 2nd Production)
12667	Cone—Reproducer cone and dust cap (L31) (Model 10K1)
5118	Connector—3-contact male connector for speaker leads
9768	Reproducer, complete (Model 10T, 2nd Production)
9780	Reproducer, complete (Model 10K1)
13661	Transformer—Output transformer (T2, C72)
11886	Washer—Spring washer to hold field coil securely

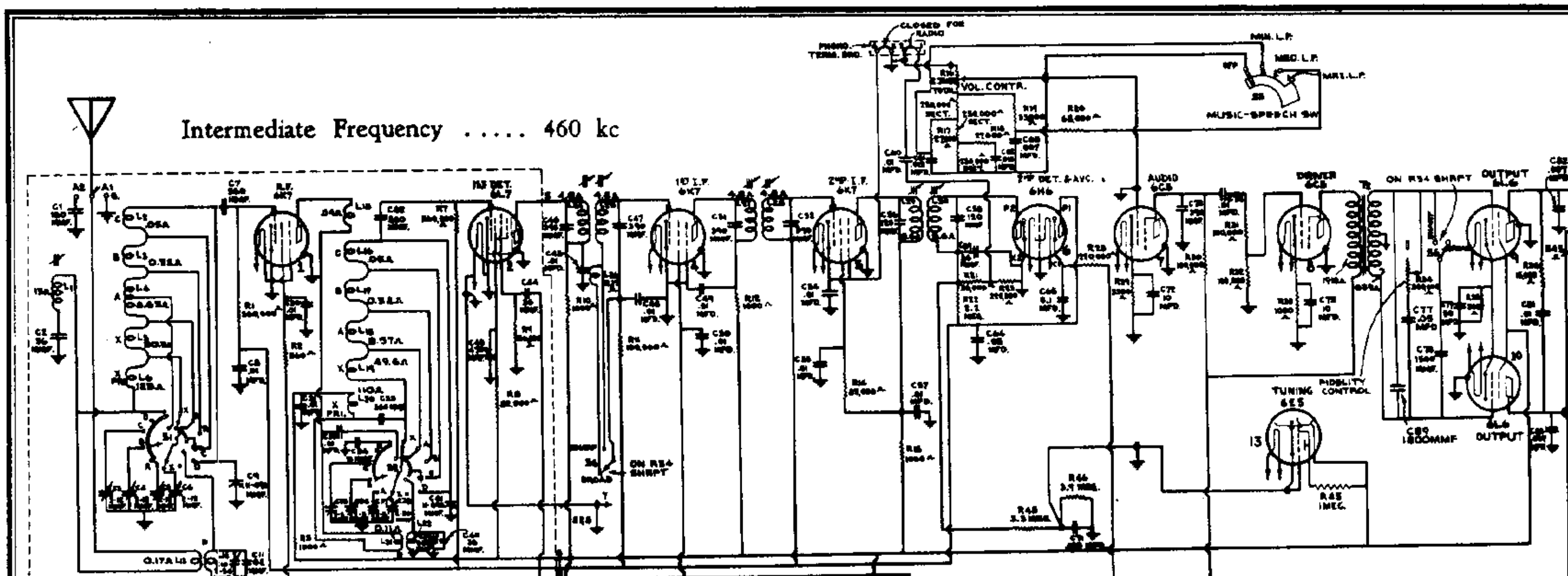
MISCELLANEOUS ASSEMBLIES

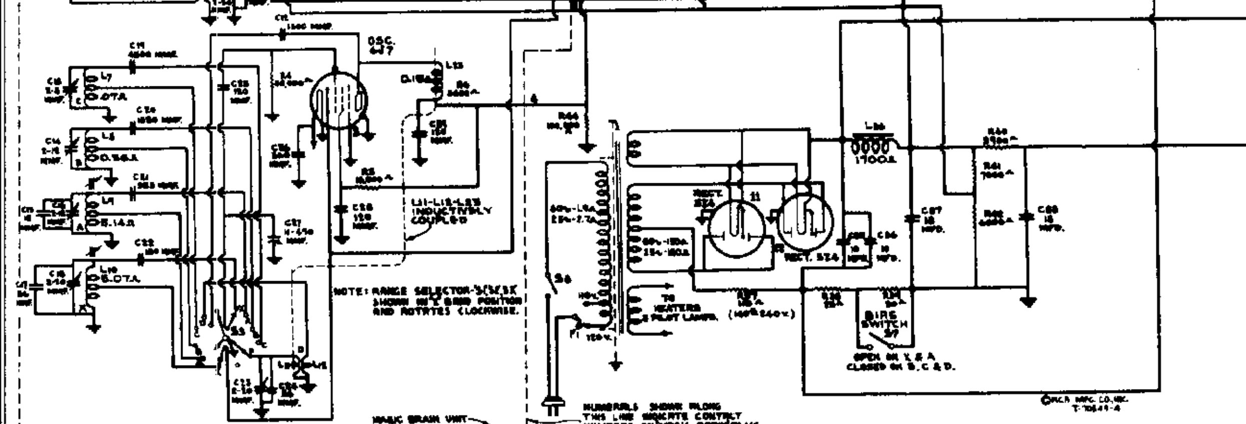
STOCK No.	DESCRIPTION
12038	Band—Rubber band for tuning tube
11996	Bracket—Tuning lamp bracket and clamp
12915	Escutcheon—Station selector escutcheon and crystal
12742	Escutcheon—Tuning lamp escutcheon
12699	Knob—Large station selector knob
12700	Knob—Small (vernier) station selector knob
11347	Knob—Music-speech and power switch—volume control—range selector or fidelity control knob
11377	Screw—Chassis mounting screw assembly (Model 10T)
11210	Screw—Chassis mounting screw assembly (Model 10K1)
12916	Shield—Complete r-f unit top shield
4982	Spring—Holding spring for station selector or volume control knob, Stock No. 12699
11349	Spring—Retaining spring for knob, Stock Nos. 12700 and 11347

MODEL 13K
Schematic, Spkr. Wirin
Transformer Wiring

RCA MFG. CO., INC.

Intermediate Frequency ..... 460 kc





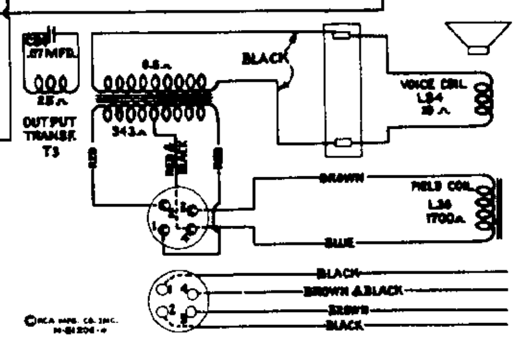


Figure 11—Loudspeaker Wiring

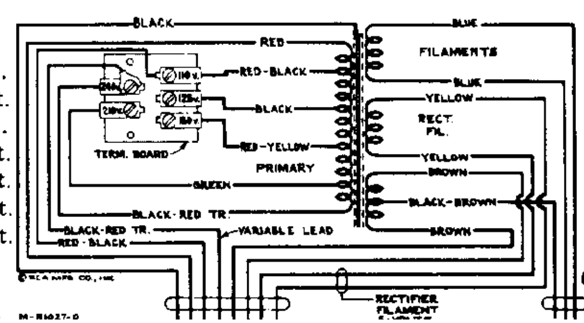
FREQUENCY RANGES

"Long Wave" (X)	150-410 kc
"Standard Broadcast" (A)	530-1,800 kc
"Medium Wave" (B)	1,800-6,400 kc
"Short Wave" (C)	6,400-23,000 kc
"Ultra Short Wave" (D)	23,000-60,000 kc

Pilot Lamps (4) .... Mazda No. 46, 6.3 volts, 0.25 ampere

ALIGNMENT FREQUENCIES

"Long Wave" (X) .... 175 kc (osc.), 350 kc (osc., det., ant.
"Standard Broadcast" (A) .... 600 kc (osc.), 1,500 kc (osc., det., ant.
"Medium Wave" (B) ... 6,000 kc (osc., det., ant.
"Short Wave" (C) .... 20,000 kc (osc., det., ant.
"Ultra Short Wave" (D) 57,000 kc (osc., det., ant.



Primary resistance—3.6 ohms total
Secondary resistance—112 ohms total

MODEL 13K
Chassis Wiring

RCA MFG. CO., INC.

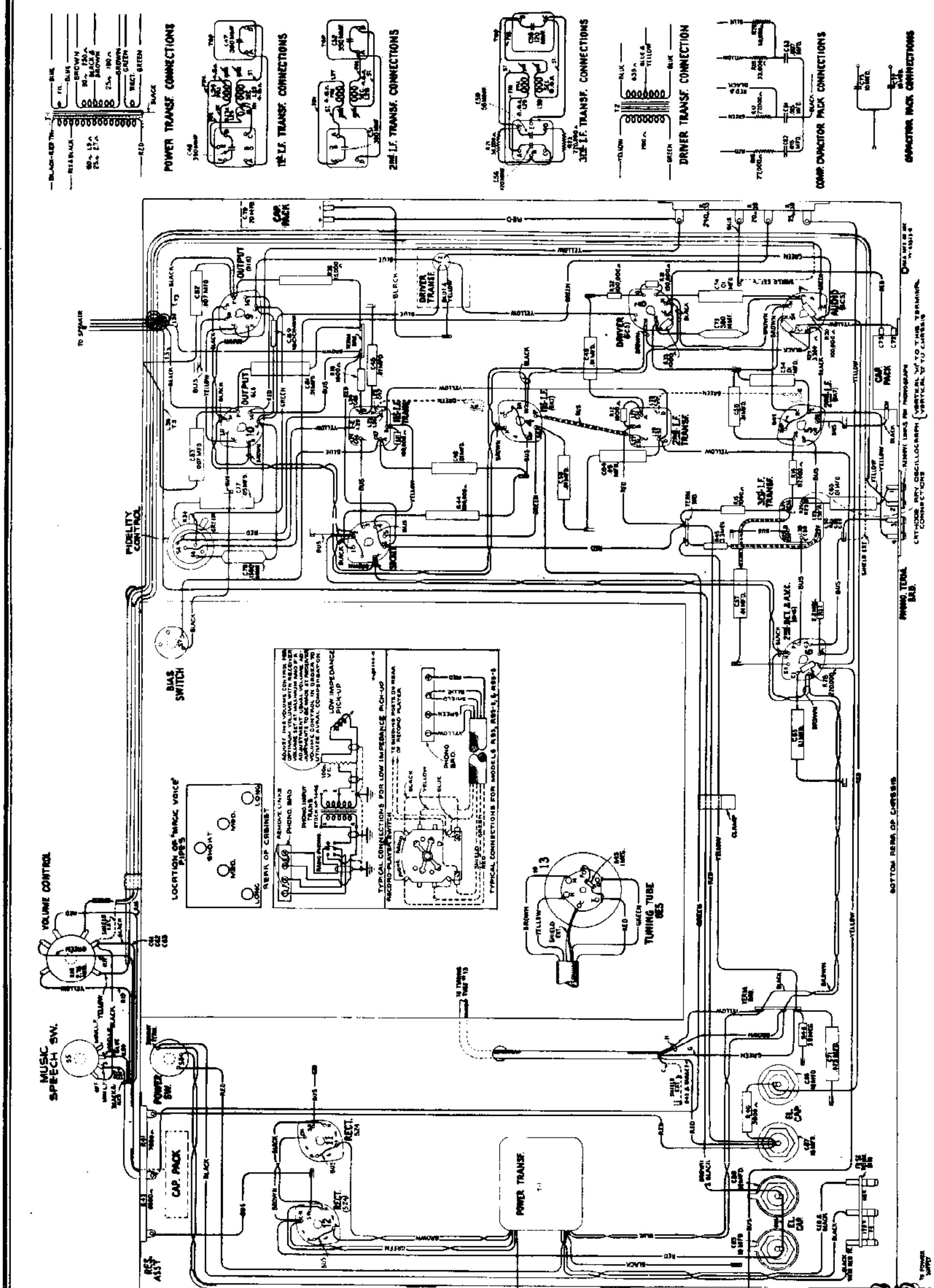
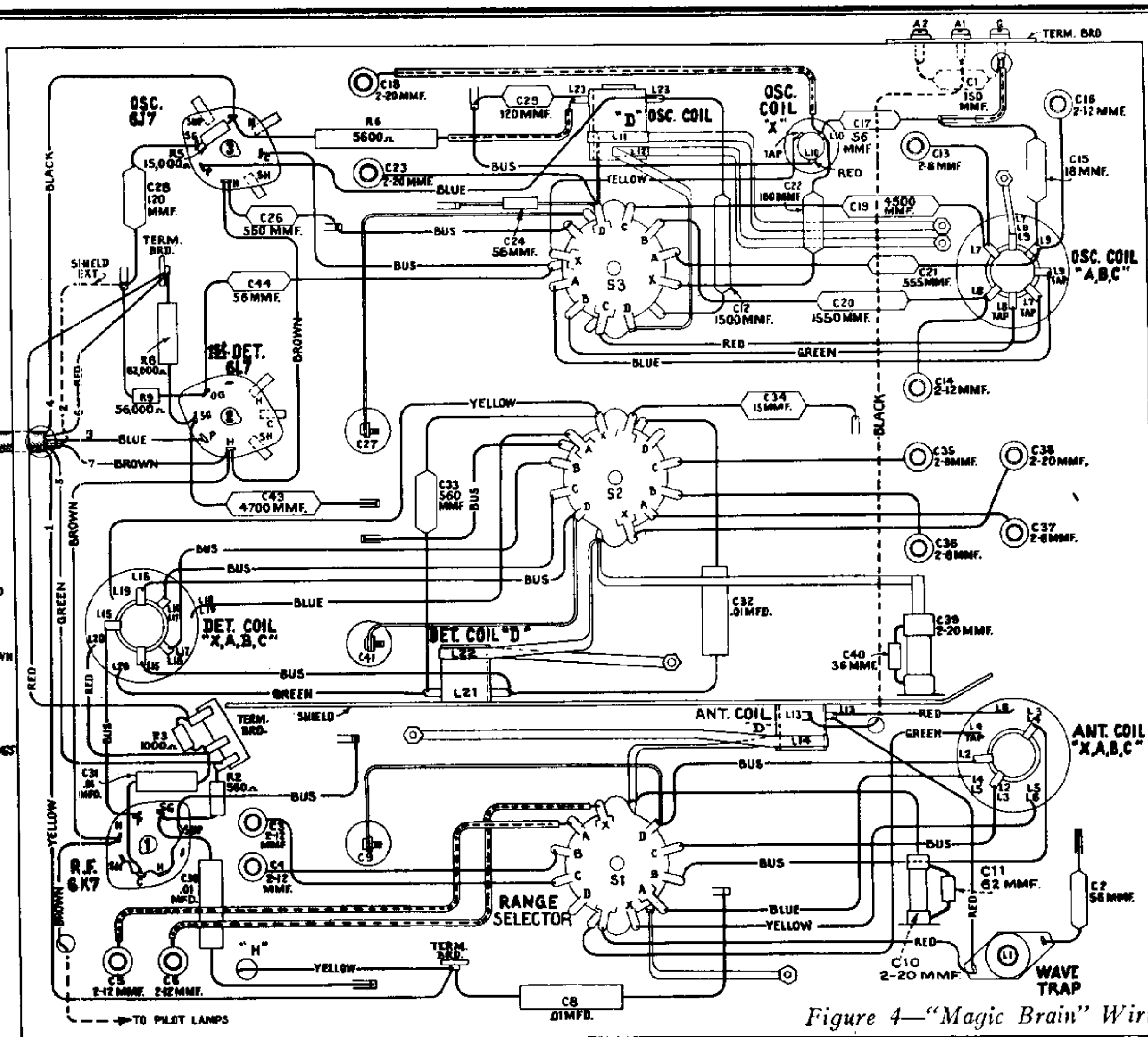


Figure 3—Chassis Wiring Diagram (Less "Magic Brain")

RCA MFG. CO., INC.



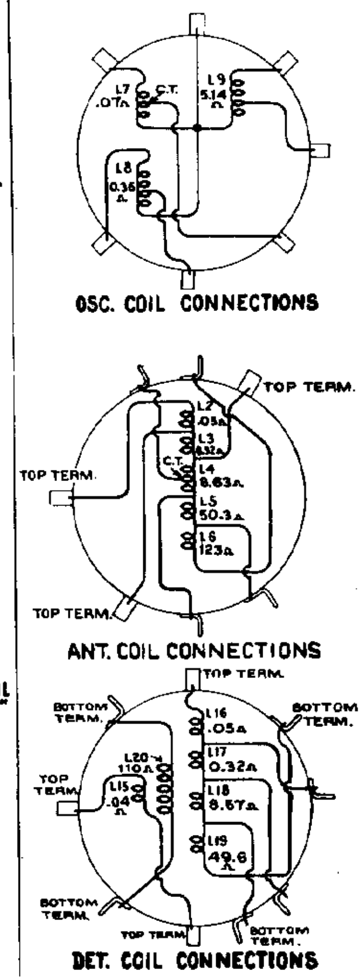


Figure 4—"Magic Brain" Wiring Diagram

Power Supply Ratings

Rating A .... 105-125 volts, 50-60 cycles, 165 watts
Rating B .... 105-125 volts, 25-60 cycles, 165 watts
Rating C .... 100-130/140-160/195-250 volts, 40-60 cycles, 165 watts

Power Output

Undistorted .... 20 watts

Loudspeaker

Type .... Electrodynamic

MODEL 13K
Resistance, Voltage
Socket, Trimmers

RCA MFG. CO., INC.

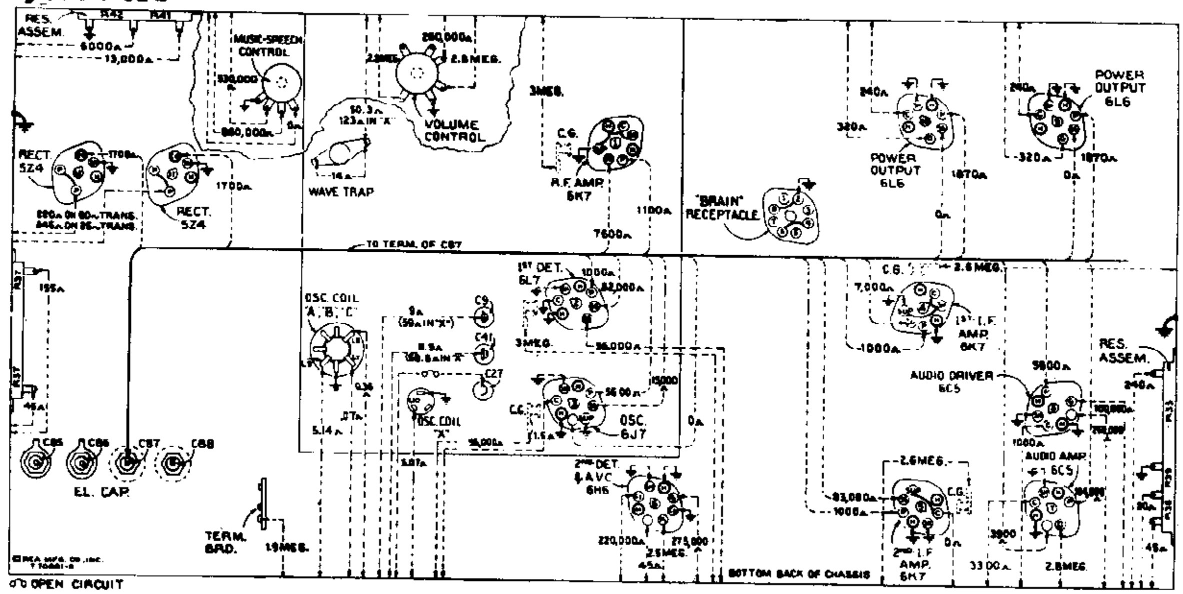


Figure 9—Resistance Diagram

Power supply disconnected—Radiotrons in sockets—Tuning condenser in full-mesh—Range selector in "Standard broadcast" position—Volume control maximum—Fidelity control optional—Music-speech Control Clockwise

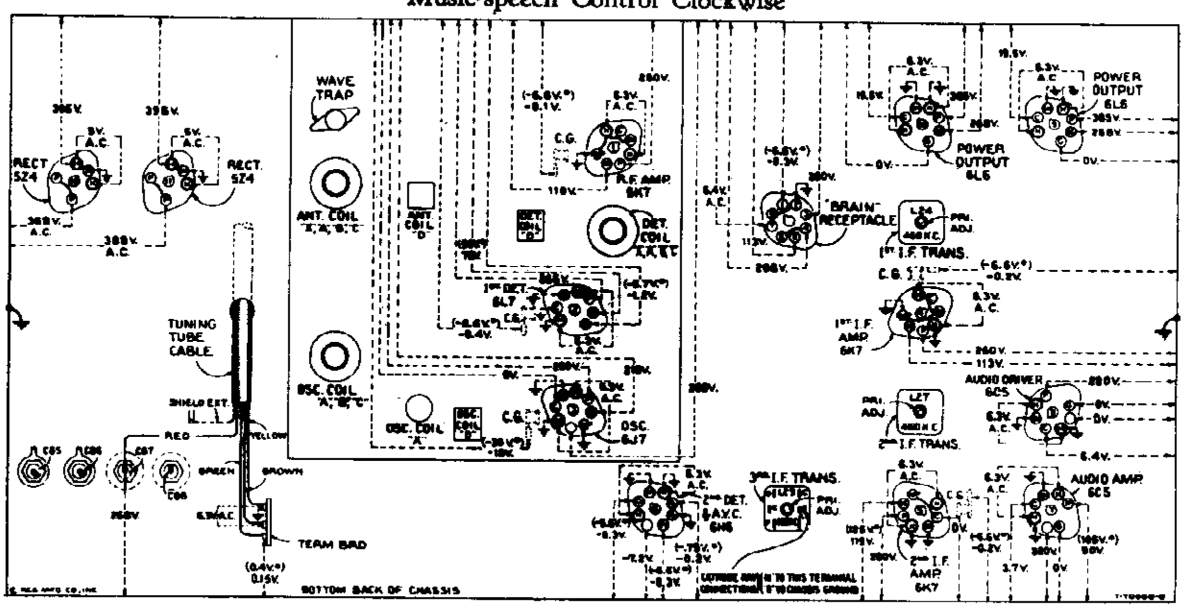


Figure 10—Radiotron Socket Voltages, Coil, and I-F Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc—No signal being received-Volume control minimum—Fidelity control optional

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6K7—R-F Amp.	6.2 ma.
(2)	RCA-6L7—1st Det.	4.0 ma.
(3)	RCA-6J7—Osc.	6.6 ma.
(4)	RCA-6K7—1st I-F Amp.	6.2 ma.
(5)	RCA-6K7—2nd I-F Amp.	7.5 ma.
(6)	RCA-6H6—2nd Det.—A.V.C.	—
(7)	RCA-6C5—Audio Voltage Amp.	1.25 ma.
(8)	RCA-6C5—Audio Driver Amp.	6.4 ma.
(9)	RCA-6L6—Power Output	43 ma.
(10)	RCA-6L6—Power Output	43 ma.
(11)	RCA-5Z4—Rectifier	80 ma.*
(12)	RCA-5Z4—Rectifier	80 ma.*
(13)	RCA-6E5—Tuning Tube	3.0 ma.

(*Cannot be measured at socket)

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.

RCA MFG. CO., INC.

Phonograph Terminal Board

A terminal board is provided for connecting a phonograph into the audio amplifying circuit. Typical methods of connecting a low-impedance pickup, or the RCA Victor Models R-93, R-93-2, and R-93-S Record Players are shown on the Schematic Diagram (figure 2).

Selector Dial

Figure 12 illustrates the relation of the various parts of the dial mechanism when in its "Standard broadcast" position with the range switch likewise turned to its "Standard broadcast" position. In re-assembling the dial after repairs, see that the gears are meshed in accordance with the diagram, at the same time noting that the range switch is in its "Standard broadcast" position and the lever attached to the range-switch shaft placed in the position shown.

To adjust the dial mechanism, set the range switch to its "Standard broadcast" position. Place a straight-edge across the center of the dial so that its edge is even with the lower (end) marking at both the low-frequency and high-frequency ends of the dial. Under such conditions the straight-edge should be parallel with the top of the chassis base. If the straight-edge is not parallel with the top of the chassis base, loosen the nut on the rear of the roller link pivot stud and move the stud up or down until the link roller moves the dial to the desired position so that the end calibration marks obtain the position mentioned above. Tighten the nut on the roller link pivot stud.

Set the gang tuning condenser to its maximum capacity position. Adjust the dial pointer to the low-frequency (end) mark on "Standard broadcast" scale. This is a friction adjustment.

With the gang tuning condenser plates still in full mesh, loosen the two set screws on the vernier-dial hub. Rotate the vernier dial until the "0" marking is in a vertical plane above the center of the shaft. Tighten set screws.

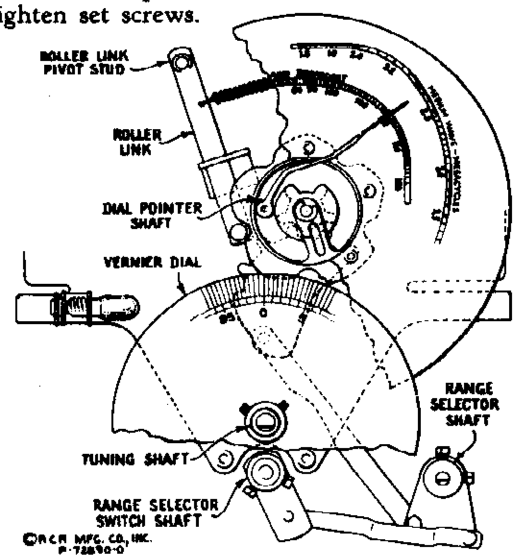


Figure 12—Selector Dial Change Mechanism

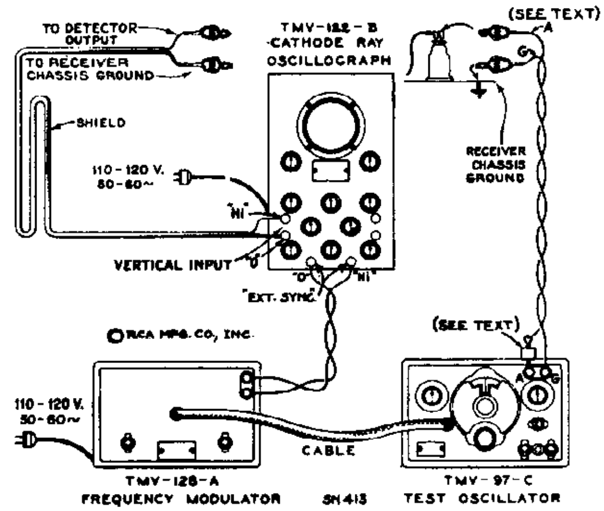


Figure 5—Alignment Apparatus Connections

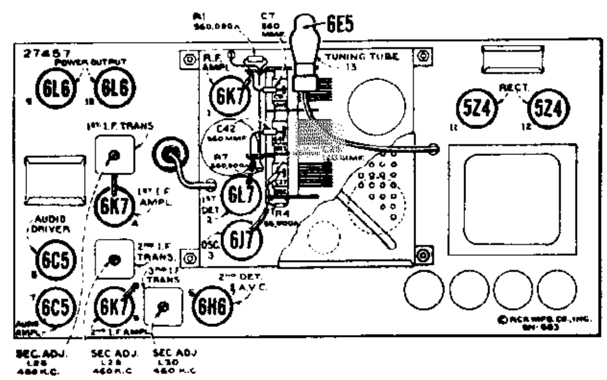


Figure 1—Radiotron and I-F Trimmer Locations

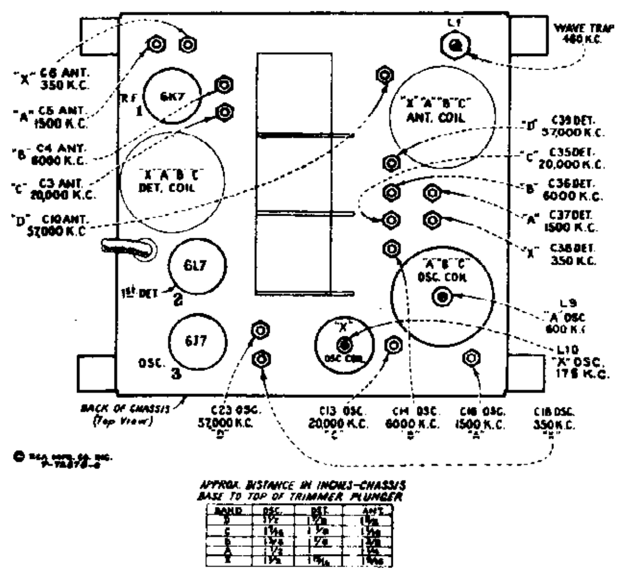


Figure 7—"Magic Brain" Trimmer Locations

MODEL 13K
Alignment, Page 1
Oscillograms

RCA MFG. CO., INC.

Alignment Procedure

There are seventeen adjustments required for the alignment of the oscillator, first-detector, and antenna-tuned circuits; one adjustment for the wave-trap; and six adjustments for the i-f system. Fifteen of these adjustments are made with plunger-type air trimming capacitors and require the use of an **RCA Stock No. 12636 Adjusting Tool.** Each of these capacitors has a lock nut for securing the plunger in place after adjustment. The remaining nine adjustments are made by means of screws attached to molded magnetite cores. These cores change the inductance of the particular coils in which they are inserted to provide exact alignment. All of these adjustments are accurately made during manufacture and should remain in proper alignment unless affected by abnormal conditions of climate or purported alterations for servicing, or unless altered by other means. Loss of sensitivity, improper tone quality, and poor selectivity are the usual indications of improper alignment. Such conditions will usually exist simultaneously. Correct performance of this receiver can only be obtained when these adjustments have been made by a skilled service engineer with the use of adequate and reliable test equipment. The manufacturer of this receiver has such test equipment available for sale through its distributors and dealers.

The extensive frequency range of this receiver necessitates a more or less involved method of alignment. However, if the following directions are carefully applied in the sequence given, normal performance of the instrument will be obtained.

The plunger-type air trimming capacitors have their approximate plunger settings tabulated on figure 7. If the plungers have been disturbed from their original adjustments, they may be roughly set to the specified dimensions prior to alignment.

In performing services on the "Magic Brain", the leads should be restored to their original positions, since the lead-dress is important for proper operation and dial calibration.

Precautionary Dressing of Leads for "Magic Brain" Alignment

(Refer to Figure 4)

Band "X"

1. Keep blue lead A of S1 to antenna coil L4-5 dressed away from chassis and from yellow lead X of S1 to antenna coil L5-6.
2. Bus lead from C10 to S1 should be as short as possible.
3. Keep blue lead A of S2 to detector coil L18-19 clear of chassis, coil shield, coil, and other leads.
4. Keep spaghetti lead C6 to X of S1 apart from spaghetti lead of C5 to A of S1, and from chassis.

Band "A"

1. Keep green lead terminal S1 to antenna coil tap L4 away from chassis, coil shield, and coil.
2. Keep spaghetti lead C5 to A of S1 apart from spaghetti lead C6 to X of S1 and from chassis.

Band "C"

Lead from C19 to oscillator coil L7 should be maintained as short and straight as possible.

For alignment, the test-oscillator frequency should be quite accurate. A convenient and reliable means of accurately checking the frequency of test oscillators, receivers, etc., is the RCA Stock No. 9572 **Crystal Calibrator.**

If the test-oscillator signal cannot be heard as the receiver (heterodyne) oscillator air-trimmer plunger is changed from its minimum-capacity to maximum-capacity position (receiver dial and test oscillator set to the specified frequencies, and the correct oscillator air trimmer used) it may be an indication that the test-oscillator frequency is outside the range covered by the air-trimmer. Under such conditions, when a more accurate setting of the test oscillator cannot be determined, set the oscillator air-trimmer plungers to the approximate settings given on figure 7. Tune the test oscillator until the signal is heard in the speaker. Each of two test-oscillator settings (the fundamentals or the harmonics of which are **920 kc** apart) produce a signal. The lower-frequency test-oscillator setting should be used as this places the test-oscillator (signal) frequency **460 kc** below the frequency of the receiver heterodyne oscillator.

Holes are provided in the top of the r-f and antenna coil cans on some models to enable a tuning check with the **RCA Stock No. 6679 Tuning Wand.** The hole in the top of the detector coil can has a cinch button which must be removed before insertion of the tuning wand. When the brass end of the wand is inserted in the coil, the inductance of the coil is decreased. If this results in an increase of output, the respective air-trimmer capacitance should be decreased (plunger pulled out). If inserting the iron end of the tuning wand causes an increase in output, resulting from an increase of inductance of the coil, the respective air-trimmer capacitance should be increased (plunger pushed in). If the range of the air trimmer is not sufficient to give the desired results, the lead-dress may be changed in the particular circuit being aligned, so as to cause the circuit to resonate within the range of the trimmer. An increase in the capacity-to-ground of the circuit will be required if the iron end of the tuning wand causes an increase of signal output when the air-trimmer plunger is full-in, while a decrease in the capacity-to-ground will be required if the brass end of the tuning wand causes an increase in signal output when the air-trimmer plunger is full-out.

Two methods of alignment are applicable—one requires use of the cathode-ray oscillograph, and the other requires a voltmeter or glow-type indicator. The cathode-ray alignment method is advantageous in that the indication provided is in the form of a wave-image which represents the resonance characteristics of the circuit being tuned. This method is preferred because of the i-f characteristics of this receiver. This type of alignment is possible through use of apparatus such as the RCA Stock No. 9558 **Frequency Modulator** and the RCA Stock No. 9545 **Cathode-Ray Oscillograph.** If this equipment is not available, an approximate alignment may be performed by the output-indicator method with an instrument such as the RCA Stock No. 4317 **Neon Glow Indicator** attached across the loud-speaker voice coil. Alignment by this method is similar to the cathode-ray method outlined below except that the receiver volume control should be at maximum, the trimmers adjusted to peak response (with the exception of the wave-trap) and the test-oscillator sweeping operations omitted. Either of these methods require the use of a reliable test oscillator such as the **RCA Stock No. 9595.**

Cathode-Ray Alignment

Make alignment apparatus connections shown on figure 5. Remove the plug of the frequency-modulator cable from the test-oscillator jack. Connect the receiver chassis to a good external ground. Connect oscillograph "Vertical" input terminals as indicated on figure 3. Set oscillograph power switch to "On" and adjust "Intensity" and "Focus" controls to give a clearly defined spot, or line, on the screen. Set oscillograph "Ampl. A" switch to "On," "Vertical gain" control full-clockwise, "Ampl. B" switch to "Timing," "Range" switch to No. 2 position, and "Timing" switch to "Int." Place the "Sync." control, "Freq." control, and "Horizontal gain" control to about their mid-positions. For each of the following adjustments, the test-oscillator output must be regulated so that the image obtained on the oscillograph screen will be of the minimum size for accurate observation. The receiver volume-control setting is optional

I-F Adjustments

(a) Turn range selector to its "Standard broadcast" (A) position and tune receiver to a position of no extraneous signals near **600 kc.** Set fidelity control to counter-clockwise position. Connect the "Ant." output of the test oscillator to the grid cap of RCA-6K7 second i-f tube (with grid lead in place) through a **.001-mfd.** capacitor, with "Gnd." to receiver chassis. Tune the test oscillator to **460 kc** and place its modulation switch to "On" and its output switch to "Hi."

(b) Turn on the receiver and test oscillator. Increase the output of the test oscillator until a deflection is noticeable on the oscillograph screen. The figures obtained represent several waves of the detected signal, the amplitude of which may be observed as an indication of output. Cause the wave-image formed (400-cycle waves) to be spread completely across the screen by adjusting the "Horizontal gain" control. The image should be synchronized and made to remain motionless by adjusting the "Sync." and "Freq." controls.

(c) Adjust the two magnetite core screws **L30** and **L29** (see figures 1 and 10) of the third i-f transformer (one on top and one on bottom) to produce maximum vertical deflection of the oscillographic image. This adjustment places the transformer in exact resonance with the **460 kc** signal.

(d) The sweeping operation should follow using the frequency modulator. Shift the oscillograph "Timing" switch to "Ext." Insert plug of frequency-modulator cable in test-oscillator jack. Turn the test-oscillator modulation switch to "Off." Turn on the frequency modulator and place its sweep-range switch to "Hi."

(e) Increase the frequency of the test oscillator by slowly turning its tuning control until two separate, distinct, and similar waves appear on the screen. If only one wave appears, increase the "Freq." control on the oscillograph to obtain two waves. These waves will be identical in shape, totally disconnected, and appear in reversed positions. They will have a common base line which is discontinuous. Adjust the "Freq." and "Sync." controls of the oscillograph to make them remain motionless on the screen. Continue increasing the test-oscillator frequency until these forward and reverse curves move together and overlap, with their highest points exactly coincident. This condition will be obtained at a test-oscillator setting of **approximately 575 kc.**

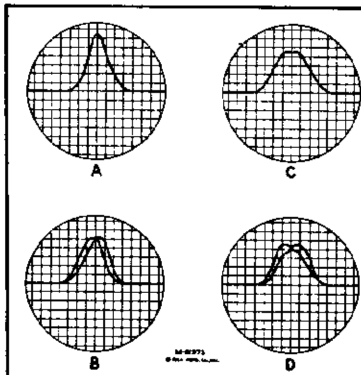


Figure 6—I-F Alignment Oscillograph Curves

A—Correct curve showing proper i-f alignment as obtained with fidelity control counter-clockwise.

B—Incorrect curve similar to A showing improper alignment of i-f system caused by one or more circuits being slightly detuned.

C—Correct showing broadening of curve A obtained when fidelity control is rotated fully clockwise.

D—Incorrect curve showing broadening of curve B obtained when fidelity control is rotated fully clockwise.

(f) With the images established as in (e), re-adjust the two magnetite core screws **L30** and **L29** on the third i-f transformer so that they cause the curves on the oscillograph screen to become exactly coincident throughout their lengths and have maximum amplitude.

(g) Without altering the adjustments of the apparatus, shift the "Ant." output of the test oscillator to the grid cap of the RCA-6K7 first i-f tube (with grid lead in place), through a **.001-mfd.** capacitor. Regulate the test-oscillator output so that the amplitude of the oscillographic image is approximately the same as used for adjustment (f) above.

(h) The two second i-f transformer magnetite core screws **L28** and **L27** (one on top and one on bottom) should then be adjusted so that they cause the forward and reverse curves to become coincident throughout their lengths and **have** maximum amplitude.

(i) Without altering the adjustments of the apparatus, shift the "Ant." output of the test oscillator to the input of the i-f system, i.e., to the grid cap of the RCA-6L7 first-detector, (with grid lead in place) through a .001-mfd. capacitor. Regulate the test-oscillator output so the amplitude of the oscillographic image is approximately the same as used for adjustment (h) above.

(j) The two first i-f transformer magnetite core screws L25 and L24 (one on top and one on bottom) should then be adjusted so that they cause the forward and reverse waves to coincide throughout their lengths and have maximum amplitude.

(k) Note width of oscillographic image at a point which is 50% of maximum amplitude. Turn receiver fidelity control to extreme clockwise position. Note width of oscillographic image at a point which is 50% of maximum amplitude. Under normal conditions the latter measurement should be approximately 60% greater in width than the former measurement. The image should also appear slightly double humped. These conditions indicate proper broadening of the band width of the i-f amplifier. Turn range selector to "Medium wave" (B) band and note increase of amplitude. The amplitude should increase several times. It may be necessary to decrease output of test oscillator to keep image on screen. Turn receiver fidelity control to extreme counter-clockwise position and proceed to "R-F Adjustments."

R-F Adjustments

Make receiver dial adjustments as outlined by "Selector dial," figure 12. Alignment must be made in sequence of "Wave-trap," "Ultra short wave" band, "Short wave" band, "Medium wave" band, "Standard broadcast" band, and "Long wave" band.

"Wave-Trap" Adjustment

(a) Connect the "Ant." output of the test oscillator to the antenna terminal "A1" through a 200-mmfd. (important) capacitor. Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn test-oscillator modulation switch to "On." Shift the oscillograph "Timing" switch to "Int." Place receiver range selector in "Standard broadcast" position. Set the receiver dial to a position of no extraneous signals near 600 kc. Tune the test oscillator to 460 kc. Adjust the wave-trap magnetite core screw L1 to the point which causes minimum amplitude of output (maximum suppression of signal) as shown by the waves on the oscillograph. An increase of the test-oscillator output may be necessary before this point of minimum amplitude, obtained by correct adjustment of wave-trap screw, becomes apparent on oscillograph screen.

"Ultra Short Wave" Band

(b) Connect the "Ant." output of the test oscillator to the antenna terminal "A1" of the receiver through a 300-ohm resistor. Set the receiver range selector to its "Ultra short wave" position and its dial pointer to 57,000 kc. Adjust the test oscillator to 19.000 kc. The third harmonic of 19,000 kc is used for this adjustment.

Adjust oscillator air-trimmer C23 for maximum (peak) output. Two positions, each producing maximum output, may be found. The position of minimum capacitance (plunger near out) should be used. This places the receiver heterodyne oscillator 460 kc higher in frequency than the incoming signal. Tighten lock nut. Adjust the detector air-trimmer C39, while slightly rocking the gang tuning condenser back and forth through the signal, for maximum (peak) output. Two peaks may be found on this trimmer. The peak of maximum capacitance (plunger near in) should be used. Tighten lock nut. Adjust the antenna air-trimmer C10 for maximum (peak) output while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found on this trimmer which produce maximum output. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Check the image frequency by changing the receiver dial setting to 56,080 kc. If the image signal is received at this position, the adjustment of the oscillator air-trimmer C23 has been correctly made. No adjustments should be made while checking for the image signal.

(c) Re-tune receiver for maximum response to the 57,000 kc input signal (not image response) without disturbing test-oscillator adjustments. Change test oscillator to 6,800—14,000 kc range. Tune test oscillator until signal is heard in speaker (should occur at approximately 14,250 kc, fourth harmonic of test oscillator used). Two test-oscillator settings (230 kc apart) will produce a signal at this point. The lower frequency test-oscillator setting should be used as this places the test-oscillator harmonic 460 kc below the frequency of the receiver heterodyne oscillator. Tune receiver for maximum response at a dial setting of approximately 28,500 kc (image should tune in at a dial setting approximately 27,580 kc) without altering test-oscillator adjustment. Test oscillator second harmonic of 14,250 kc is used for the following check. Check calibration of receiver dial. A receiver-dial reading of less than 28,500 kc indicates that the inductance of the oscillator secondary coil L11 is too low and should be increased. If the receiver dial reading is greater than 28,500 kc, the inductance of L11 is too high and should be decreased. If it is necessary to change the inductance of L11, first remove bottom cover of "Magic Brain" and then set receiver dial pointer to 28,500 kc. To decrease inductance, move the grounded ends (straps) of L11 and L12 (see figure 4) nearer chassis. Do not allow straps to touch chassis except where connected. To increase inductance, move the straps farther away from chassis. Adjust position of straps until maximum (peak) output results. The alignment of the detector tuned circuit should next be checked at 28,500 kc without changing either the receiver or test-oscillator adjustments. An increase of output when the brass end of a tuning wand is brought near L22 indicates that L22 is too high in inductance, while an increase when the iron end is brought near the coil indicates that the inductance is too low. The inductance of L22 may be varied by changing the spacing between the grounded end (strap) of L22 and the strap connected from C41 to contact on S2 (figure 4). An increase of spacing will increase the inductance, while a decrease of spacing will decrease the inductance. Adjust the spacing until maximum (peak) output results. Replace "Magic Brain" bottom cover and repeat adjustments in (b) prior to those of "Short wave" band.

"Short Wave" Band

(d) Set the receiver range selector to its "Short wave" position and its dial pointer to 20,000 kc. Adjust the test oscillator to 20,000 kc. Adjust oscillator air-trimmer C13 until maximum (peak) output is reached. Two peaks may be found with this circuit. The peak with minimum capacitance (plunger near out) should be used. Tighten lock nut. Adjust detector air-trimmer C35 until maximum (peak) output is reached, while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Adjust antenna air-trimmer C3 until maximum (peak) output is reached while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Check the image frequency by changing the receiver dial setting to 19,080 kc. The image signal should be received at this position indicating that the adjustment of C13 has been correctly made. No adjustments should be made while checking for the image signal.

"Medium Wave Band"

(e) Place receiver range selector to its "Medium wave" position with its dial pointer set to 6,000 kc. Tune the test oscillator to 6,000 kc. Adjust oscillator air-trimmer C14 to produce maximum (peak) output as shown by the waves on the oscillograph. Two peaks may be found with this circuit. The peak with minimum capacitance (plunger near out) should be used. Tighten lock nut. Adjust the detector air-trimmer C36 for maximum (peak) output while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Adjust antenna air-trimmer C4 to produce maximum (peak) output. Tighten lock nut.

"Standard Broadcast" Band

(f) Remove the 300-ohm resistor from between the test-oscillator "Ant." post and receiver antenna terminal "A1" and insert a 200-mmfd. capacitor in its place. Place receiver range selector to "Standard broadcast" position with receiver dial pointer set to 600 kc. Tune the test oscillator to 600 kc. Adjust oscillator magnetite core screw L9 (top of large oscillator coil can) for maximum (peak) output as shown by the waves on the oscillograph screen.

(g) Set receiver dial pointer to 1,500 kc. Tune test oscillator to 1,500 kc (1,500–3,100-kc range) and increase its output to produce a registration on the oscillograph screen. Carefully adjust the oscillator, detector, and antenna air-trimmers C16, C37, and C5, respectively, to produce maximum (peak) output as shown by the waves on the oscillograph screen. Shift the oscillograph "Timing" switch to "Ext." Place the frequency modulator sweep-range switch to its "Lo" position and insert plug of the frequency-modulator cable in test-oscillator jack. Turn test-oscillator modulation switch to "Off." Re-tune the test oscillator (increase frequency) until the forward and reverse waves show on the oscillograph screen and become coincident at their highest points. This will occur at a test-oscillator setting of approximately 1,680 kc. Adjust air-trimmers C16, C37, and C5 again, setting each to the point which produces the best coincidence and maximum amplitude of the images.

(h) Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn test-oscillator modulation switch to "On." Set oscillograph "Timing" switch to "Int." Tune test oscillator to 200 kc (200–400-kc range). Tune receiver for maximum response to this signal at a dial reading of approximately 600 kc. The third harmonic of the 200-kc signal is used for this adjustment. Shift oscillograph "Timing" switch to "Ext." Insert the plug of the frequency modulator cable in test-oscillator jack. Turn test-oscillator modulation switch to "Off." Re-tune the test oscillator (increase frequency) until the forward and reverse waves show on the oscillograph screen. This will occur at a test-oscillator setting of approximately 230 kc. Disregarding the fact that the two images may or may not come together, adjust the oscillator magnetite core screw L9 (top of large oscillator coil can) to produce maximum (peak) amplitude of the images. Shift the oscillograph "Timing" switch to "Int." Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn the test-oscillator modulation switch to "On." Repeat adjustments in (g) above to compensate for any changes caused by the adjustment of L9 core, tightening lock nuts on C16, C37, and C5, respectively, after each is adjusted.

"Long Wave" Band

(i) Shift the oscillograph "Timing" switch to "Int." Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn the test-oscillator modulation switch to "On." Place receiver range selector to its "Long wave" position. Set the receiver dial pointer to 175 kc. Tune the test oscillator to 175 kc and increase its output until a deflection is noticeable on the oscillograph screen. Adjust oscillator magnetite core screw L10 (located on top of small oscillator coil can) so that maximum (peak) amplitude of output is shown on the oscillograph screen.

(j) Set receiver dial pointer to 350 kc. Tune test oscillator to 350 kc. Adjust the oscillator, detector, and antenna air-trimmers C18, C38, and C6 to produce maximum (peak) output as shown by the waves on the oscillograph screen. Without disturbing the connections, shift the oscillograph "Timing" switch to "Ext." Place the frequency-modulator sweep-range switch to its "Hi" position and insert plug of frequency-modulator cable in test-oscillator jack. Turn test-oscillator modulation switch to "Off." Re-tune the test oscillator (decrease frequency) until the

MODEL 13K
Alignment, Page 3
Notes, Parts

RCA MFG. CO., INC.

forward and reverse waves show on the oscillograph screen and become coincident at their highest points. This will occur at a test-oscillator setting of approximately 198 kc. This setting places the test-oscillator frequency to 175 kc. The second harmonic is now used for the 350 kc adjustment. Adjust air-trimmers C18, C38, and C6, again, to produce maximum amplitude of the images where they best coincide throughout their lengths.

(k) Re-tune the receiver to approximately 175 kc so that the forward and reverse waves appear on the oscillograph screen. Adjust the oscillator magnetite core screw L10 to produce maximum (peak) amplitude of the waves, disregarding the fact that the two images may or may not come together.

(l) Shift the receiver dial setting to 350 kc without altering any other adjustments (frequency modulator still in operation). Adjust air-trimmers C18, C38, and C6, respectively, to produce maximum amplitude and best coincidence of the waves. These adjustments compensate for any changes caused by the adjustment of the magnetite core screw L10. Tighten lock nuts on C18, C38, and C6, respectively, after each is adjusted.

Loudspeaker

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed by softening its cement with a very light application of acetone using care not to allow the acetone to flow down into the air gap. The dust cover may be cemented back in place with ambroid upon completion of adjustment.

Antenna and Ground Terminals

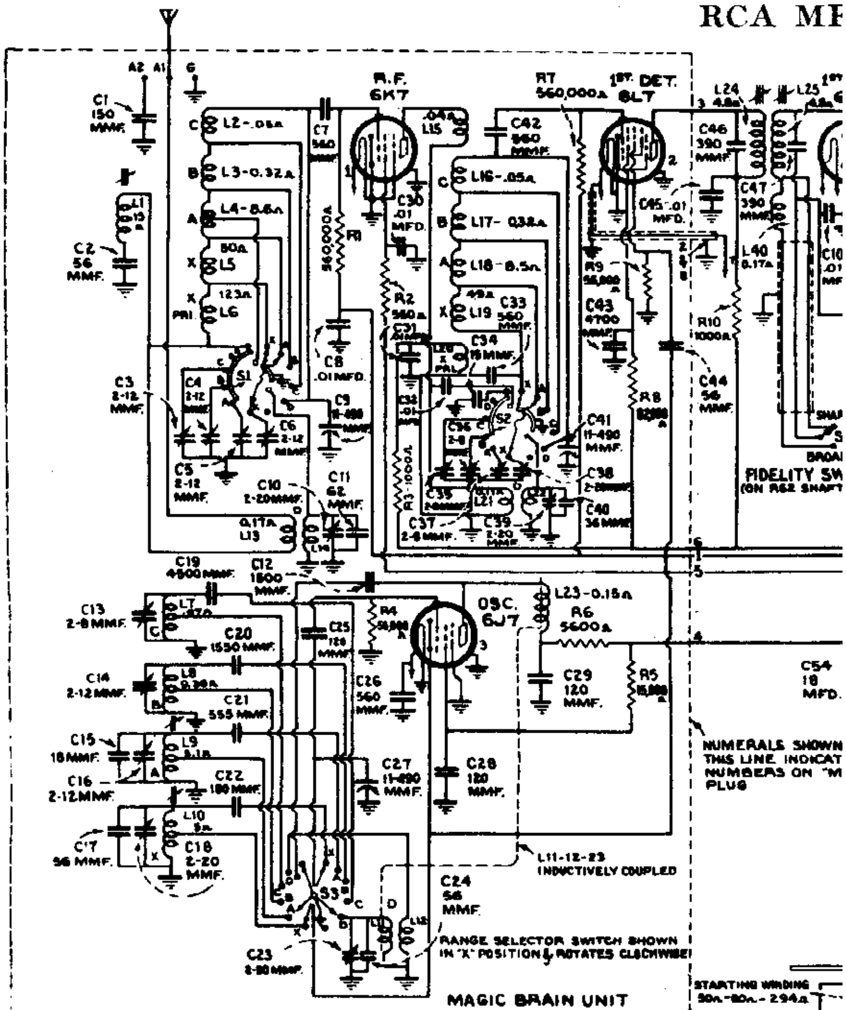
These receivers are equipped with an antenna-ground terminal board having three terminals. These terminals are marked "A2," "A1," and "G," the latter being the ground terminal and should always be connected to a good external ground. The transmission-line leads of the RCA RK-40A antenna system should be connected to terminals "A2" and "A1." The receiver coupling units of the RCA RK-40 and the RCA Spider-Web antenna systems should be connected to terminals "A1" and "G." Connect a single-wire antenna to terminal "A1."

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
12863	Board—Phonograph terminal board	$0.25
12987	Bracket—Mounting bracket for bias switch	.15
4427	Bracket—Volume control and L. F. tone control mounting bracket	$0.18
13024	Cable—Tuning lamp cable and socket	1.25
12511	Cap—Grid contact cap—Package of 5	.15
12629	Capacitor—56 Mmfd. (C59)	$0.20
12404	Capacitor—120 Mmfd. (C56, C58)	.26
13034	Capacitor—390 Mmfd. (C73)	.25
13301	Capacitor—390 Mmfd. (C46, C47, C51, C52)	.25
12898	Capacitor—1,500 Mmfd. (C78)	.20
13580	Capacitor—1,800 Mmfd. (C89)	.25
13033	Capacitor—.007 Mfd. (C82, C83)	.20
4870	Capacitor—.025 Mfd. (C71)	.20
4858	Capacitor—.01 Mfd. (C45, C48, C49, C50, C54, C55, C57, C60, C74)	.25
4937	Capacitor—.01 Mfd. (C81)	.25
4836	Capacitor—.05 Mfd. (C64, C77)	.30
4841	Capacitor—0.1 Mfd. (C65)	.22
11203	Capacitor—10 Mfd. (C85, C86)	1.18
5212	Capacitor—18 Mfd. (C87, C88)	1.16
12470	Capacitor—20 Mfd. (C79)	1.10
13011	Capacitor—Compensating pack comprising two .015 Mfd., one .007 Mfd. capacitors and two 27,000-ohm, one 33,000-ohm, and one 68,000-ohm resistors (C61, C62, C63, R17, R18, R19, R20)	2.00
13025	Capacitor—Pack comprising two 10 Mfd. sections (C72, C75)	1.00
5040	Connector—4-contact female connector for speaker cable	.25
12006	Core—Adjustable core and stud for Stk. Nos. 12981, 12990, 12982	.22
5240	Cover—Fuse mounting cover	.24
12870	Dial—Vernier dial scale	.65
10907	Fuse—3 Amp.—Package of 5—(F1)	.40
5226	Lamp—Dial lamp—6.3 volts—Package of 5	.70
12868	Link—Range switch and band indicator operating link complete with set screws	.45
13012	Mounting—Fuse mounting, 100-120-volt models only	.35
13026	Mounting—Fuse mounting, 220-volt models only	.35
13027	Resistor—110 ohms, wire wound—used in 110-volt models only (R37)	.50
13029	Resistor—140 ohms, wire wound—used in 220-volt models only (R37)	.75
13030	Resistor—1,000 ohms—Carbon type—1/10 watt—Package of 5 (R12)	.75
5112	Resistor—1,000 ohms—Carbon type—¼ watt—Package of 5 (R10, R15)	1.00
13031	Resistor—3,300 ohms—Carbon type—1/10 watt—Package of 5 (R29)	.75
13032	Resistor—3,900 ohms—Carbon type—1 watt—Package of 5 (R40)	1.10
5114	Resistor—15,000 ohms—Carbon type—1 watt (R36)	.22
11282	Resistor—56,000 ohms—Carbon type—1/10 watt—Package of 5 (R21)	.75
11365	Resistor—82,000 ohms—Carbon type—¼ watt—Package of 5 (R14)	1.00
11281	Resistor—100,000 ohms—Carbon type—1/10 watt—Package of 5 (R11)	.75
12263	Resistor—100,000 ohms—Insulated—¼ watt—Package of 5 (R30)	1.00
3058	Resistor—100,000 ohms—Carbon type—1 watt—Package of 5 (R44)	1.10
12476	Resistor—150,000 ohms—Carbon type—1/10 watt—Package of 5 (R31)	.75
12264	Resistor—220,000 ohms—Insulated—¼ watt—Package of 5 (R28)	1.00
11398	Resistor—220,000 ohms—Carbon type—1/10 watt—Package of 5 (R23)	.75
12013	Resistor—1 meg—Carbon type—1/10 watt—Package of 5 (R43)	$0.75
12679	Resistor—2.2 meg—Insulated—¼ watt—Package of 5 (R22)	1.00
12874	Resistor—3.3 meg—Carbon type—¼ watt—Package of 5 (R45)	1.00
13167	Resistor—3.9 meg—Carbon type—¼ watt—Package of 5 (R46)	1.00
13017	Resistor—Voltage divider comprising one 7,000-ohm and one 6,000-ohm sections (R41, R42)	.90
13018	Resistor—Voltage divider comprising one 240-ohm, one 20-ohm and one 25-ohm sections (R35, R38, R39)	.55
4669	Screw—No. 8-32 x 5/32 set screw for link assembly—Stock No. 12868—Package of 10	.25
12008	Shield—I. F. transformer shield for Stock Nos. 12981, 12990, 12982	.28
12607	Shield—Transformer shield top for first or second I. F. transformer	.30
12581	Shield—Transformer shield top for third I. F. transformer	.36
11195	Socket—5-contact 5Z4 Radiotron socket	.15
11198	Socket—7-contact 6K7 or 6L6 Radiotron socket	.15
11196	Socket—8-contact 6C5 or 6H6 Radiotron and Magic Brain power supply socket	.15
11381	Socket—Tuning lamp socket and cover	.45
13095	Socket—Upper left or lower right hand dial lamp socket	.25
11222	Socket—Upper right or lower left hand dial lamp socket	.18
12007	Spring—Retaining spring for core, Stock No. 12006—Package of 10	.36
12986	Stud—Stud, nut and washer for connecting link assembly, Stock No. 12868, to sector gear and link, Stock No. 12910—Package of 5	.65
12988	Switch—Bias switch (S7)	.65
13015	Tone control—Fidelity control (R34, S4, S6)	1.00
13013	Tone control—Music-speech and power switch (S5, S8)	1.15
12981	Transformer—First I. F. transformer complete (L24, L25, L26, C46, C47)	2.15
12990	Transformer—Second I. F. transformer complete (L27, L28, C51, C52)	1.85
12982	Transformer—Third I. F. transformer complete (L29, L30, C56, C58, C59, R21, R23)	2.25
13023	Transformer—Driver transformer (T2)	2.25
13008	Transformer—Power transformer, 100-120 volts, 50-60 cycles (T1)	7.55
13009	Transformer—Power transformer, 100-120 volts, 25-50 cycles (T1)	11.20
13010	Transformer—Power transformer, 100-250 volts, 50-60 cycles (T1)	12.65
13014	Volume control—(R16)	1.00
	MAGIC BRAIN	
	UNIT ASSEMBLIES	
12806	Board—3-contact antenna and ground terminal board	.25
5237	Bushing—Variable condenser mounting bushing assembly—Package of 3	.43
12886	Cable—Shielded power cable, approx. 4 inches long, complete with 8-contact male plug	1.50
12511	Cap—Grid contact cap—Package of 5	.15
12714	Capacitor—Adjustable trimmer capacitor (C3, C4, C5, C6, C14, C16)	$0.38
12807	Capacitor—Adjustable trimmer capacitor (C13, C35, C36, C37)	.35
12884	Capacitor—Adjustable trimmer capacitor (C10, C18, C23, C38, C39)	.40
12896	Capacitor—15 Mmfd. (C34)	.20
12722	Capacitor—18 Mmfd. (C15)	.20
12891	Capacitor—36 Mmfd. (C40)	.20
12629	Capacitor—56 Mmfd. (C24)	.20
12895	Capacitor—56 Mmfd. (C17)	.20
12723	Capacitor—56 Mmfd. (C2, C44)	.20
13307	Capacitor—62 Mmfd. (C11)	.20
12724	Capacitor—120 Mmfd. (C25, C28, C29)	.28
12725	Capacitor—150 Mmfd. (C1)	.28
12894	Capacitor—180 Mmfd. (C22)	.20
12727	Capacitor—555 Mmfd. (C21)	.20
12537	Capacitor—560 Mmfd. (C7, C26, C33, C42)	.20
12898	Capacitor—1500 Mmfd. (C12)	.20
12729	Capacitor—1550 Mmfd. (C20)	.26
12728	Capacitor—4500 Mmfd. (C19)	.36
12897	Capacitor—4700 Mmfd. (C43)	.40
4858	Capacitor—.01 Mfd. (C8, C30, C31, C32)	.25
12879	Coil—Antenna coil and shield XABC bands (L2, L3, L4, L5, L6)	1.90
12888	Coil—Antenna coil "D" band (L13, L14	.60
12880	Coil—Detector coil and shield XABC bands (L15, L16, L17, L18, L19, L20)	2.05
12709	Coil—Oscillator coil and shield ABC bands (L7, L8, L9)	2.02
12881	Coil—Oscillator coil and shield X band only (L10)	.80
12890	Coil—Oscillator coil "D" band (L11, L12, L23)	.70
12889	Coil—R. F. Coil "D" band (L21, L22)	.65
12877	Condenser—3 gang variable tuning condenser (C9, C27, C41)	5.10
12887	Connector—8 contact male connector and cover for power cable Stk. No. 12886	.40
12664	Core—Adjustable core and stud for Stk. No. 12654	.22
12800	Core—Adjustable core and stud for Stk. 12709	.20
12882	Core—Adjustable core and stud for Stk. No. 12881	.20
11324	Resistor—560 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
5112	Resistor—1,000 ohms—Carbon type—¼ watt (R3)—Package of 5	1.00
11298	Resistor—5,600 ohms—Carbon type—1 watt (R6)	.22
3998	Resistor—15,000 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
11282	Resistor—56,000 ohms—Carbon type—1/10 watt (R4, R9)—Package of 5	.75
8064	Resistor—82,000 ohms—Carbon type—½ watt (R8)—Package of 5	1.00
11397	Resistor—560,000 ohms—Carbon type—1/10 watt (R1, R7)—Package of 5	.75
12651	Shield—Coil shield for Stk. Nos. 12879 and 12880	.22
12710	Shield—Coil shield for Stk. No. 12709	.28
12883	Shield—Coil shield for Stk. No. 12881	.20
11198	Socket—7 contact 6K7 Radiotron socket	.15
11279	Socket—7 contact 6L7 Radiotron socket	.20
12885	Socket—8 contact 6J7 Radiotron socket	.20
12007	Spring—Retaining spring for core Stk. Nos. 12664, 12800 and 12882—Package of 10	.36
12878	Switch—Range switch and mounting nut (S1, S2, S3)	3.60
12654	Trap—Wave trap complete (L1)	.75
	DRIVE ASSEMBLIES	
10705	Ball—5/32 in. diameter steel ball for planetary drive—Package of 20	$0.25
10941	Ball—1/8 in. diameter steel ball for planetary drive bearing—Package of 20	.25
12904	Bushing—Plate and bushing assembly for planetary drive mounting	.20
12905	Coupling—Flexible coupling and shaft assembly complete	.50
12909	Dial—Band indicating dial and cam assembly	1.05
12899	Drive—Variable tuning condenser drive complete including mounting bracket, drive, dial scale, and indicator less vernier dial Stk. No. 12870 and link Stk. No. 12868	4.40
12906	Gear—Anti-lash drive gear complete	.75
12910	Gear—Sector gear and link assembly for band selector	.20
12908	Indicator—Station selector indicator pointer	.20
8151	Link—Link and roller assembly complete with springs	.30
12911	Screen—Dial lamp screen and light diffuser	.20
4669	Screw—Set screw for flexible coupling or gear stock Nos. 12905 and 12906—Package of 10	.25
12901	Shaft—Direct drive shaft and pinion gear for planetary drive	.75
12900	Shaft—Vernier drive shaft for planetary drive	.25
12903	Spring—Tension spring for planetary drive bearing—Package of 10	.20
12907	Spring—Tension spring for gear stock No. 12906—Package of 10	.20
8052	Spring—Tension spring for link stock No. 8051—Package of 5	32

The prices quoted above are subject to change without notice.

RCA MF



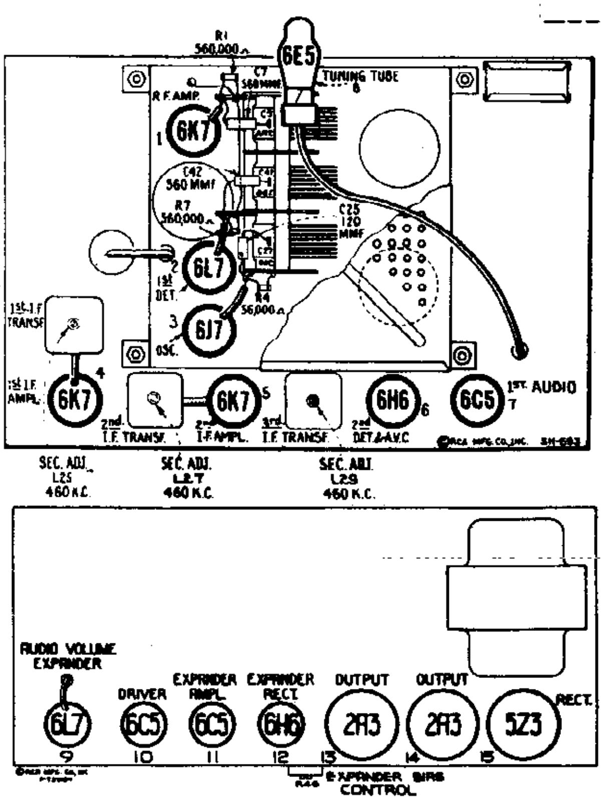


Figure 3—Radiotron and I-F Trimmer Locations

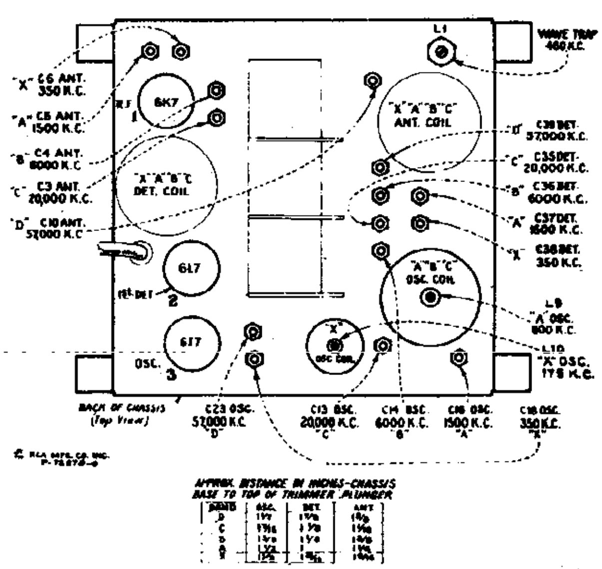
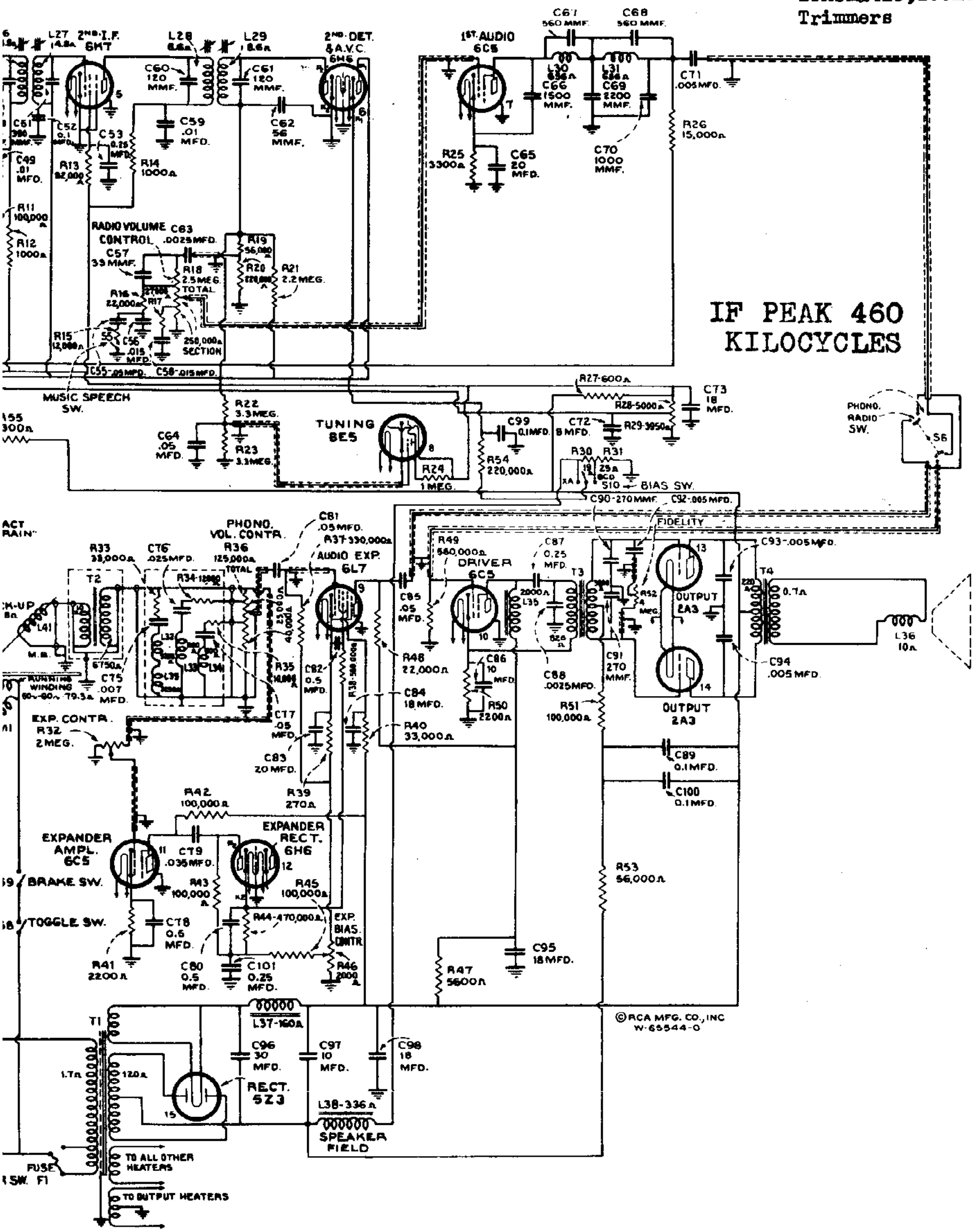


Figure 8—"Magic Brain" Trimmer Locations

F

CO., INC.

MODEL 15U
Schematic, Socket
Trimmers



IF PEAK 460 KILOCYCLES

e 1—*Schematic Circuit Diagram*

MODEL 15U
Receiver Chassis Wiring

RCA MFG. CO., INC.

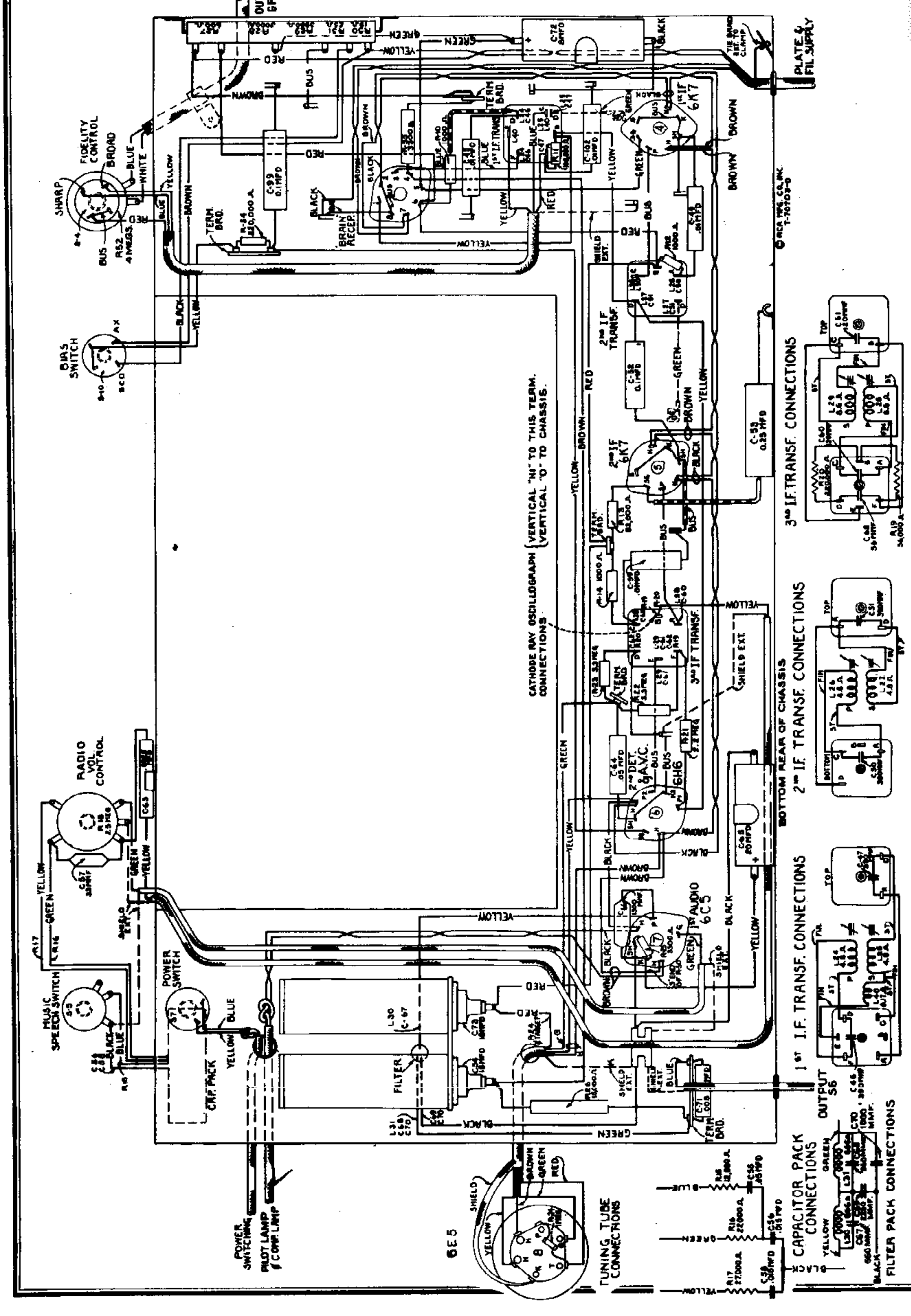


Figure 2—Receiver Chassis Wiring Diagram (Less "Magic Brain")

MODEL 15U
"Magic Brain"
Chassis Wiring

RCA MFG. CO., INC.

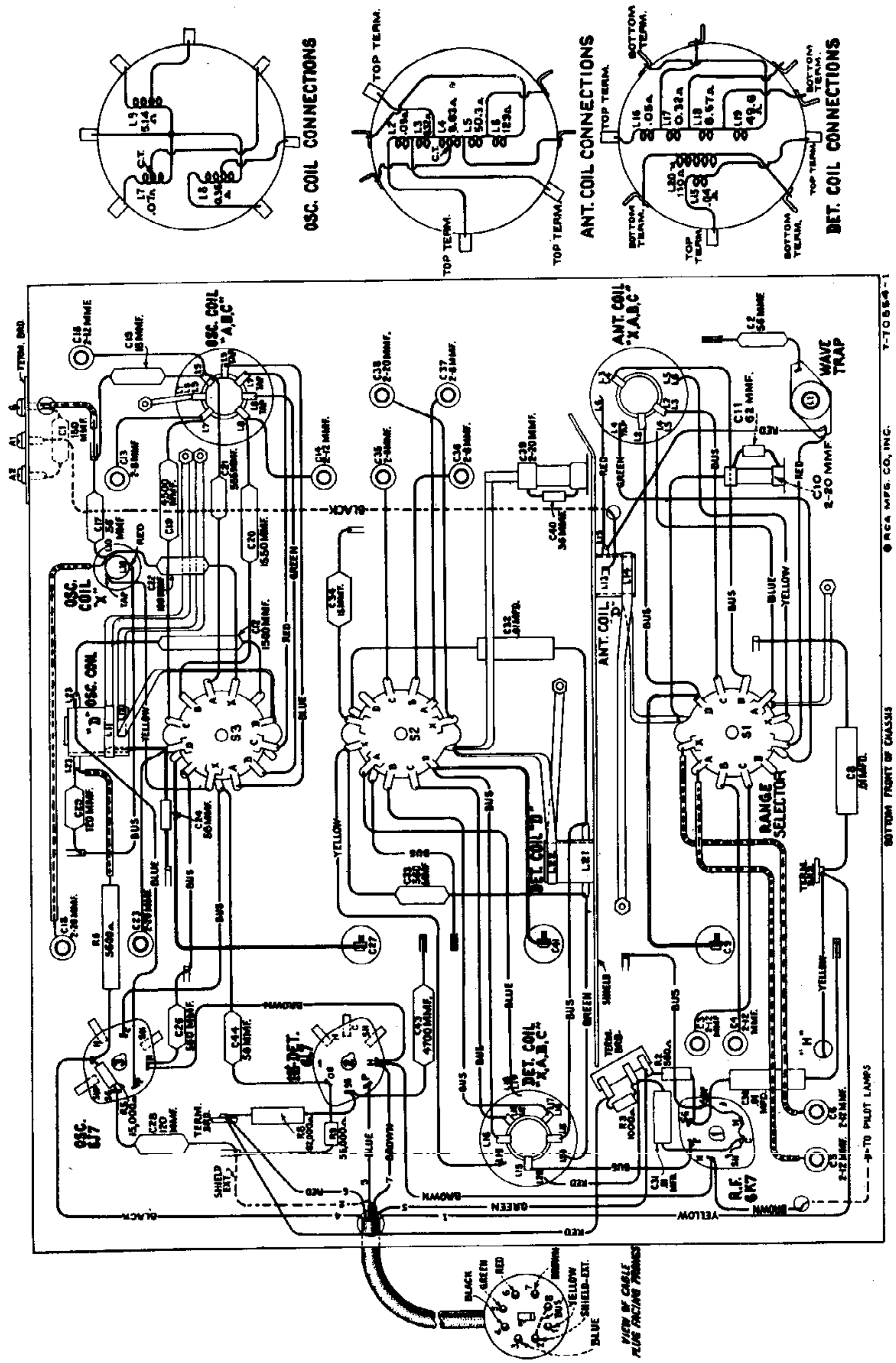


Figure 4—"Magic Brain" Wiring Diagram.

MODEL 15U
Power Amplifier
Chassis Wiring
Spkr. Wiring, Pick-up

RCA MFG. CO., INC.

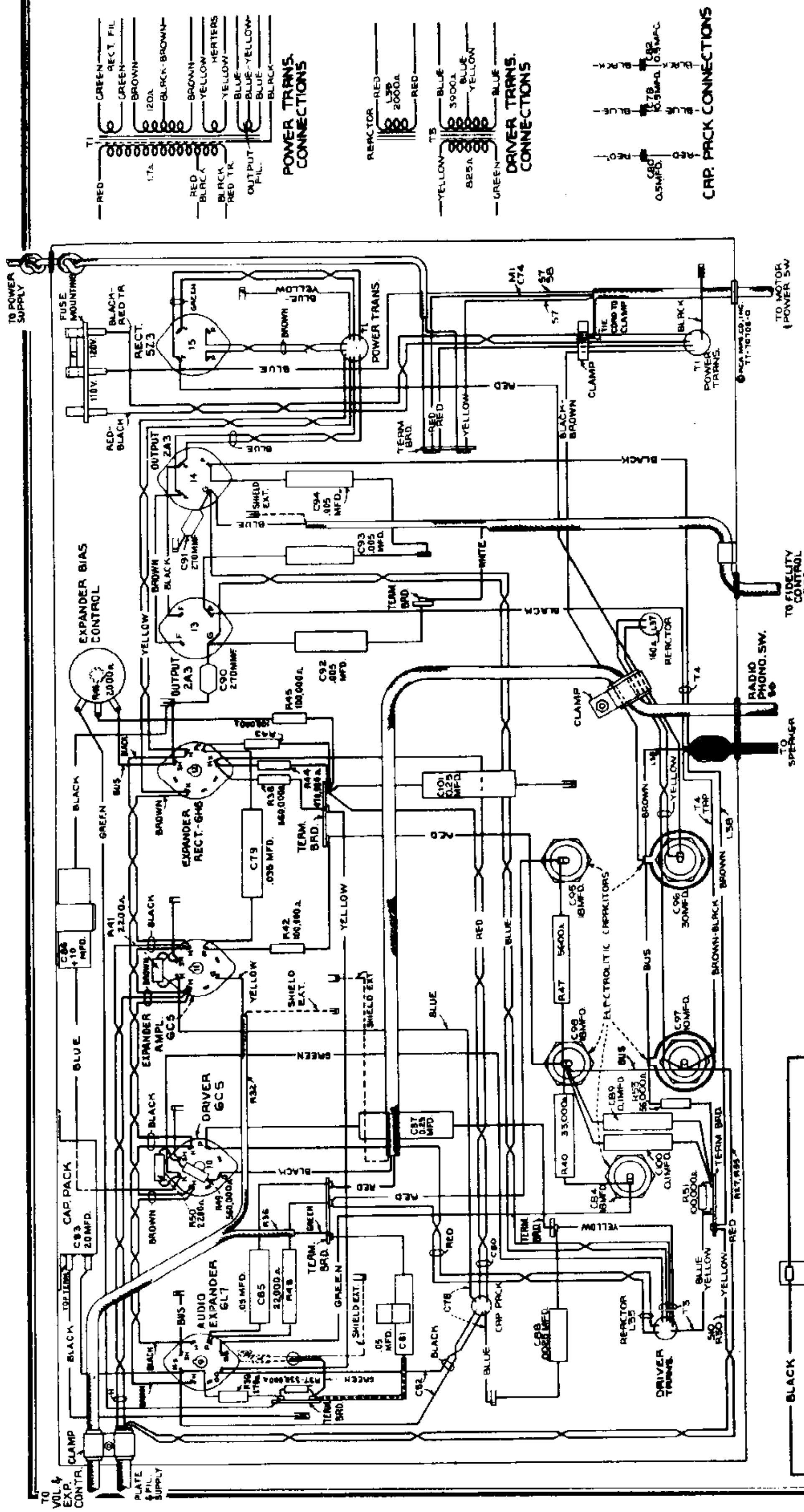


Figure 5—Power Amplifier Wiring Diagram

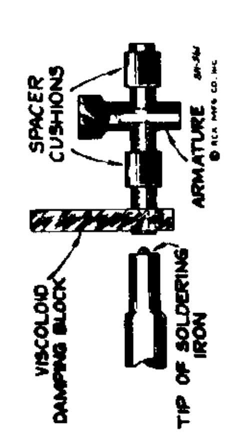


Figure 16—Special Soldering-Iron Tip

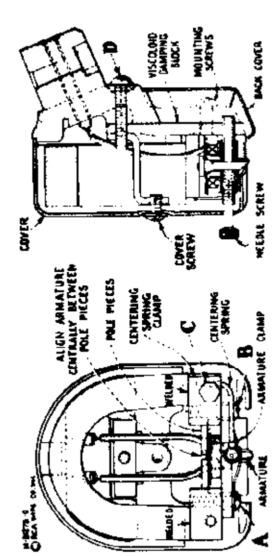


Figure 15—Details of Pickup

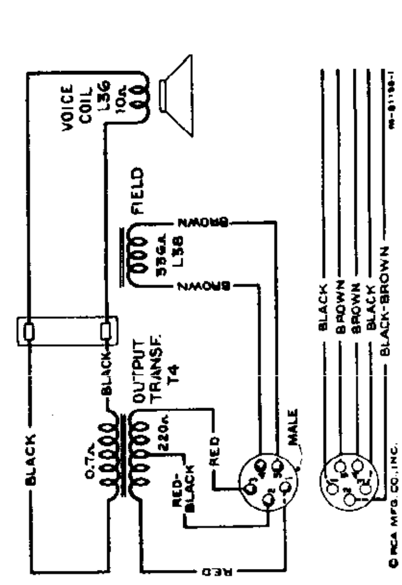


Figure 9—Loudspeaker Wiring

MODEL 15U
Specifications
Notes

RCA MFG. CO., INC.

Electrical Specifications

Frequency Ranges

"Long Wave" (X) .... 150-410 kc
"Standard Broadcast" (A) .... 530-1,800 kc
"Medium Wave" (B) .... 1,800-6,400 kc
"Short Wave" (C) .... 6,400-23,000 kc
"Ultra Short Wave" (D) .... 23,000-60,000 kc

Alignment Frequencies

"Long Wave" (X) .... 175 kc (osc.), 350 kc (osc., det., ant.)
"Standard Broadcast" (A) .... 600 kc (osc.), 1,500 kc (osc., det., ant.)
"Medium Wave" (B) .... 6,000 kc (osc., det., ant.)
"Short Wave" (C) ...... 20,000 kc (osc., det., ant.)
"Ultra Short Wave" (D). 57,000 kc (osc., det., ant.)

Intermediate Frequency .... 460 kc

Radiotron Complement

(1) RCA-6K7 .... R-F Amplifier
(2) RCA-6L7 .... First Detector
(3) RCA-6J7 .... Heterodyne Oscillator
(4) RCA-6K7 .... First I-F Amplifier
(5) RCA-6K7 .... Second I-F Amplifier
(6) RCA-6H6 ...... Second Detector and A.V.C.
(7) RCA-6C5 .... Audio Voltage Amplifier
(8) RCA-6E5 ....."Magic Eye" Tuning Indicator
(9) RCA-6L7 .... Audio Volume Expander
(10) RCA-6C5 .... Audio Driver Amplifier
(11) RCA-6C5 .... Expander Amplifier
(12) RCA-6H6 .... Expander Rectifier
(13) RCA-2A3 .... Power Output
(14) RCA-2A3 .... Power Output
(15) RCA-5Z3 .... Full-Wave Rectifier

Pilot Lamps (6) .... Mazda No. 40, 6.3 volts, 0.15 ampere

Power-Supply Ratings

		Radio Only	Total
Rating A-6	105-125 volts, 60 cycles	180 watts	205 watts
Rating A-5	105-125 volts, 50 cycles	180 watts	210 watts

For 220-volt operation, a step-down transformer (Stock No. 7217) must be used.

Fuse Rating .... 3 amperes

Phonograph

Type .... Automatic Record Ejector
Record Capacity ...... Seven 10-inch or Six 12-inch
Turntable Speed .... 78 R.P.M.
Type of Pickup .... Low-Impedance Magnetic
Pickup Impedance .... 100 ohms at 1,000 cycles

Power-Output Ratings

Undistorted .... 12 watts
Maximum .... 15 watts

Loudspeaker

Type .... Super 12-inch Electrodynamic
Impedance (V.C.) .... 11¼ ohms at 400 cycles

Mechanical Specifications

Cabinet Dimensions

Height .... 34 inches
Width .... 48⅞ inches
Depth .... 18 11/16 inches

Weights

Net .... 222 pounds
Shipping .... 311 pounds
Chassis Base Dimensions .... 15 inches x 9¾ inches x 3 inches
Over-all Height of Chassis .... 9¼ inches
Amplifier Base Dimensions .... 16¼ inches x 7½ inches x 2¾ inches
Over-all Height of Amplifier .... 7⅝ inches

Operating Controls

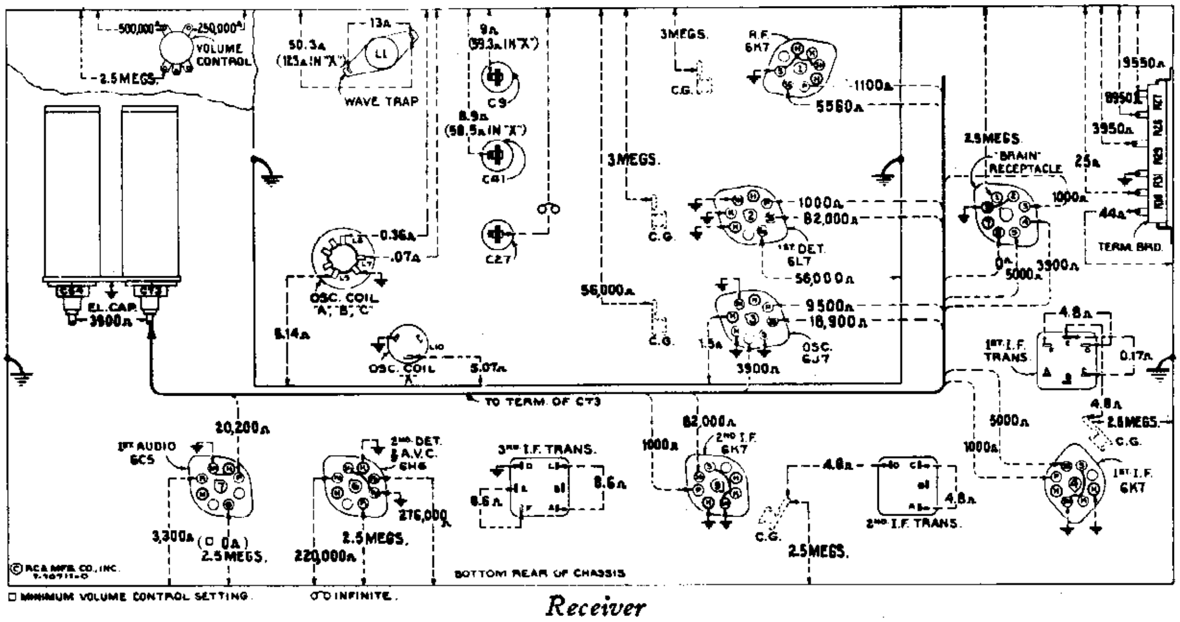
Radio .... (1) Music-Speech—Power Switch, (2) Volume, (3) Tuning, (4) Range Selector (5) Fidelity
Phonograph .... (1) Turntable Switch, (2) Radio-Phono Transfer Switch, (3) Index, (4) Dynamic Amplifier, (5) Phonograph Volume

Tuning Drive Ratios .... 20 to 1 and 100 to 1

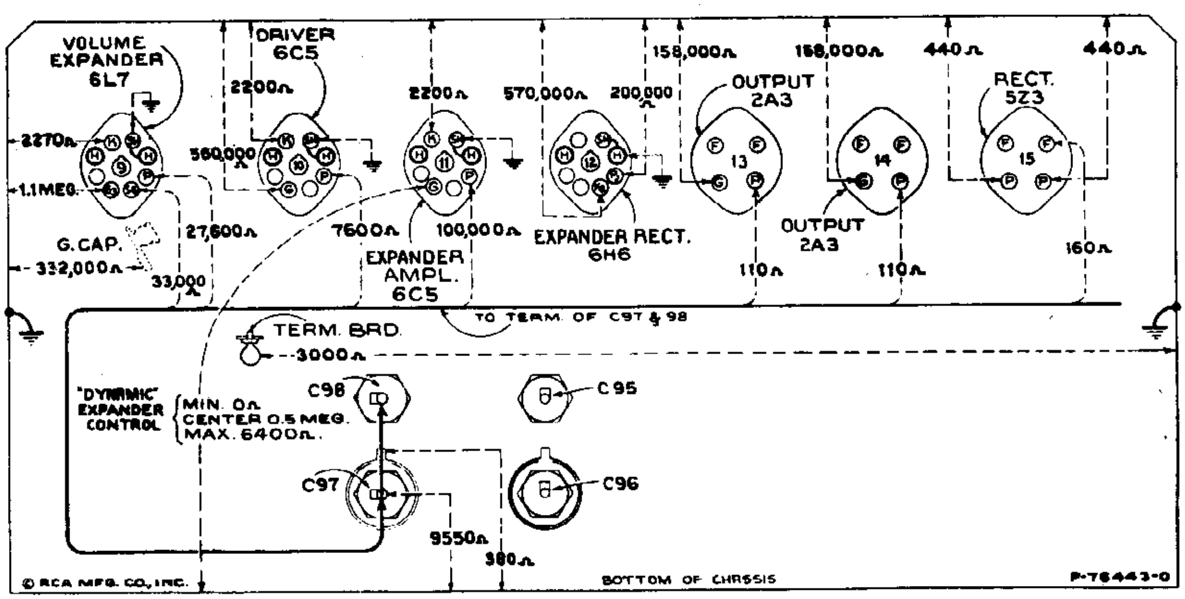
General Description

The Model 15U Phonograph-Radio Combination employs all of the latest developments in the art of record and radio reproduction. A few of the design features include higher-fidelity reproduction from both records and radio; the revolutionary dynamic expander; "Magic Brain"; improved automatic record changer; selector dial; "Magic Voice"; magnetite-core i-f transformers, wave-trap, and low-frequency oscillator tracking adjustments; new plunger-type air trimmers; and a super 12-inch electrodynamic loudspeaker with aluminum voice coil and high-frequency tone diffuser.

RCA MFG. CO., INC.



Receiver



Power Amplifier

Figure 10—Resistance Diagram

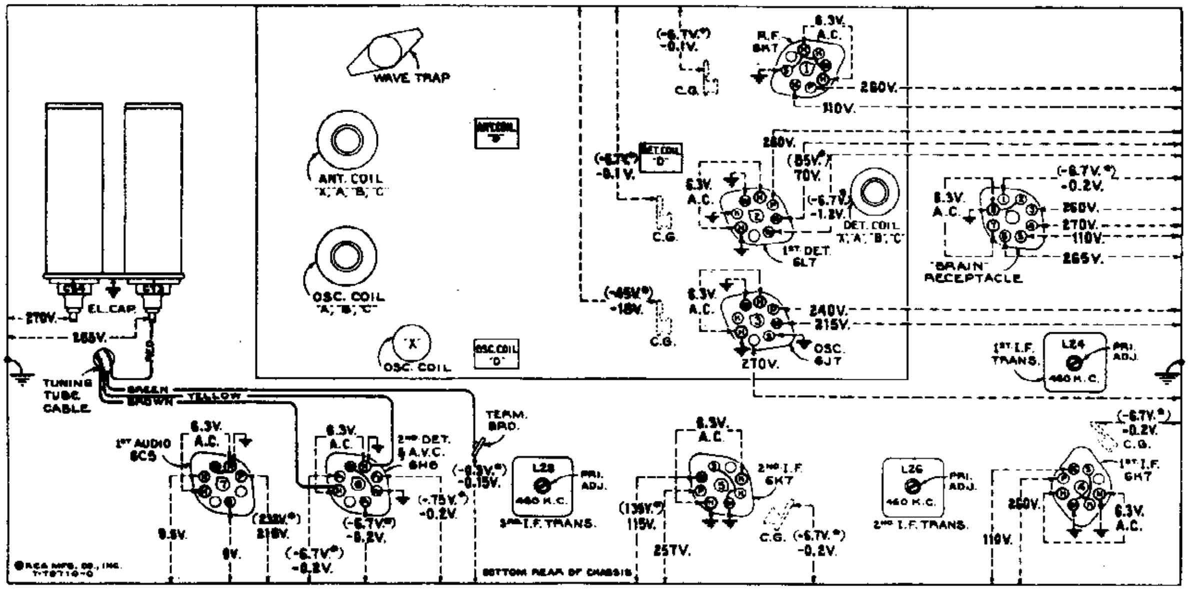
Power supply disconnected—Radiotrons in sockets—All cables connected—Tuning condenser in full-mesh —Range selector in "Standard broadcast" position—Both volume controls maximum—Radio-Phono switch either position

Resistance Measurements

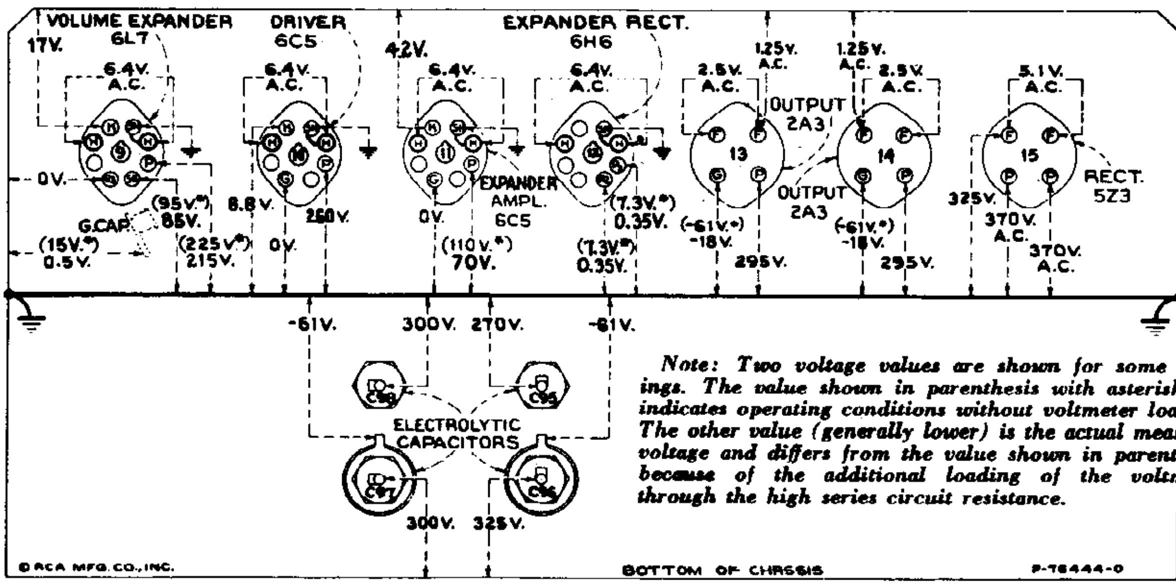
The resistance values shown between Radiotron socket contacts, grid caps, resistors, and terminals to chassis ground or other pertinent point on figure 10, permit a rapid continuity check of the circuits. The use of this diagram in conjunction with the Schematic Circuit Diagram, figure 1, and Wiring Diagrams, figures 2, 4, and 5, will permit the location of certain troubles which might otherwise be difficult to ascertain. Each value as specified should hold within ± 20%. Variations in excess of this limit will usually be indicative of trouble in circuit under test. When measuring the resistance between points of the circuit and ground, it will be necessary to connect the negative terminal of the resistance meter to chassis-ground. If the polarity of the resistance meter is not known, it may be readily ascertained by connecting a d-c voltmeter of indicated polarity across the terminals of the device.

MODEL 15U
Voltage, Socket
Trimmers

RCA MFG. CO., INC.



Receiver



Note: Two voltage values are shown for some readings. The value shown in parenthesis with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parenthesis because of the additional loading of the voltmeter through the high series circuit resistance.

Power Amplifier

Figure 11—Radiotron Socket Voltages, Coil, and I-F Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc—No signal being received—Both volume controls minimum—Radio-Phono switch either position

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminal under Conditions Similar to Those of Voltage Measurements

(1) RCA-6K7—R-F Amp.	5.0 ma.	(9) RCA-6L7—Audio Volume Exp.	7.5 ma.
(2) RCA-6L7—1st Det.	3.7 ma.	(10) RCA-6C5—Audio Driver	4.0 ma.
(3) RCA-6J7—Osc.	7.0 ma.	(11) RCA-6C5—Expander Amplifier.	1.9 ma.
(4) RCA-6K7—1st I-F Amp.	5.0 ma.	(12) RCA-6H6—Expander Rectifier.	—
(5) RCA-6K7—2nd I-F Amp.	7.5 ma.	(13) RCA-2A3—Power Output	41.8 ma.
(6) RCA-6H6—2nd Det.—A.V.C.	—	(14) RCA-2A3—Power Output	41.8 ma.
(7) RCA-6C5—Audio Voltage Amp.	2.5 ma.	(15) RCA-5Z3—Rectifier	165 ma.*
(8) RCA-6E5—Tuning Tube	1.2 ma.		

(*Cannot be measured at socket)

RCA MFG. CO., INC.

MODEL 15U
Automatic Record Changer
Details, Notes

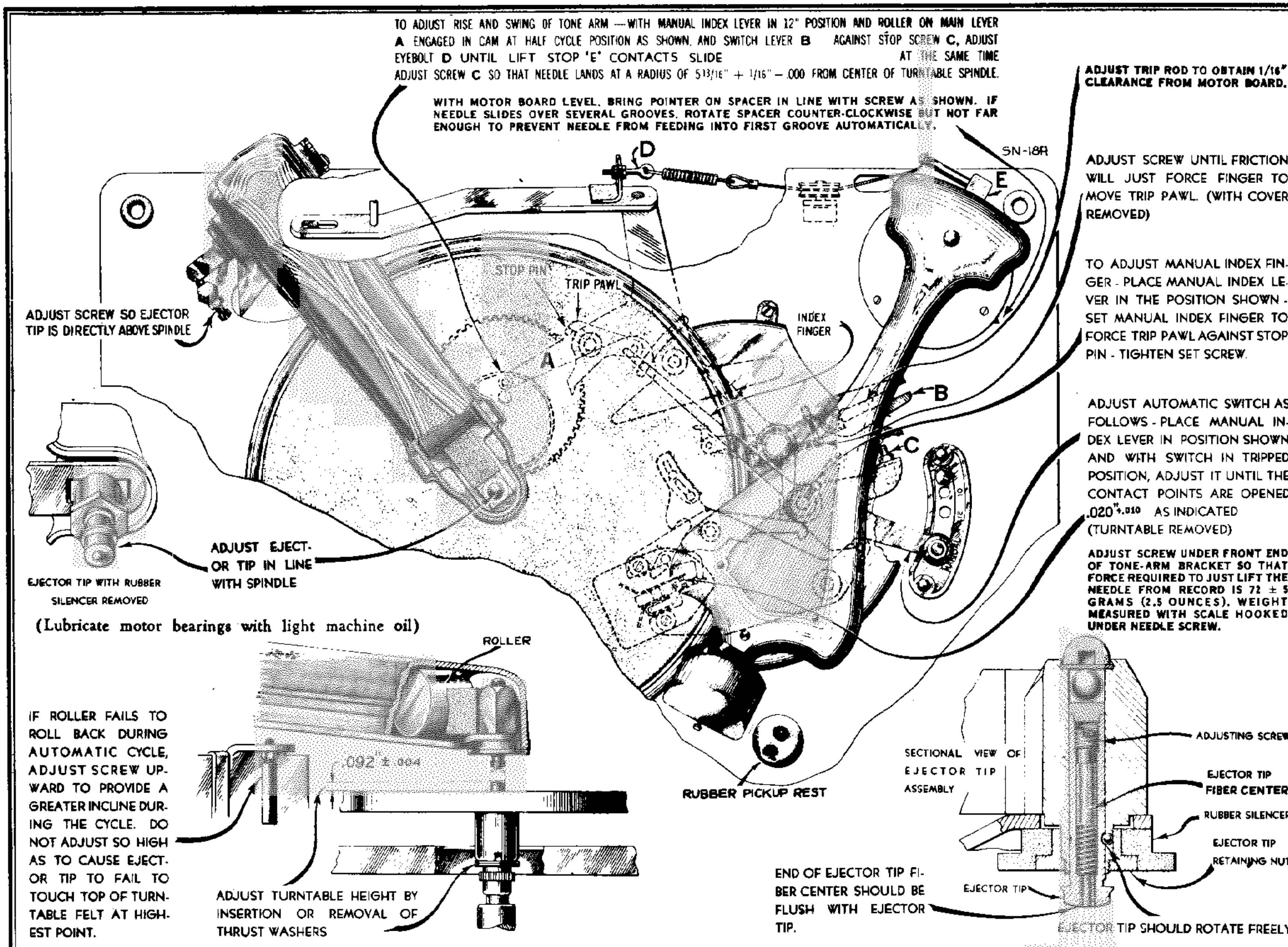


Figure 13—Automatic Record Changer Adjustments

RCA MFG. CO., INC.

Alignment Procedure

There are seventeen adjustments required for the alignment of the oscillator, first-detector, and antenna-tuned circuits; one adjustment for the wave-trap; and six adjustments for the i-f system. Fifteen of these adjustments are made with plunger-type air trimming capacitors and require the use of an RCA Stock No. 12636 **Adjusting Tool**. Each of these capacitors has a lock nut for securing the plunger in place after adjustment. The remaining nine adjustments are made by means of screws attached to molded magnetite cores. These cores change the inductance of the particular coils in which they are inserted to provide exact alignment. All of these adjustments are accurately made during manufacture and should remain in proper alignment unless affected by abnormal conditions of climate or purported alterations for servicing, or unless altered by other means. Loss of sensitivity, improper tone quality, and poor selectivity are the usual indications of improper alignment. Such conditions will usually exist simultaneously. Correct performance of this receiver can only be obtained when these adjustments have been made by a skilled service engineer with the use of adequate and reliable test equipment. The manufacturer of this receiver has such test equipment available for sale through its distributors and dealers.

The extensive frequency range of these receivers necessitates a more or less involved method of alignment. However, if the following directions are carefully applied in the sequence given, normal performance of the instruments will be obtained.

The plunger-type air trimming capacitors have their approximate plunger settings tabulated on figure 8. If the plungers have been disturbed from their original adjustments, they may be roughly set to the specified dimensions prior to alignment.

In performing services on the "Magic Brain", the leads should be restored to their original positions, since the lead-dress is important for proper operation and dial calibration.

Precautionary Dressing of Leads for "Magic Brain" Alignment
(Refer to Figure 4)

Band "X"

1. Keep blue lead A of S1 to antenna coil L4-5 dressed away from chassis, and from yellow lead X of S1 to antenna coil L5-6.
2. Bus lead from C10 to S1 should be as short as possible.
3. Keep blue lead A of S2 to detector coil L18-19 clear of chassis, coil shield, coil, and other leads.
4. Keep spaghetti lead C6 to X of S1 apart from spaghetti lead C5 to A of S1, and from chassis.

Band "A"

1. Keep green lead terminal S1 to antenna coil tap L4 away from chassis, coil shield, and coil.
2. Keep spaghetti lead C5 to A of S1 apart from spaghetti lead C6 to X of S1 and from chassis.

Band "C"

Lead from C19 to oscillator coil L7 should be maintained as short and straight as possible.

For alignment, the test-oscillator frequency should be quite accurate. A convenient and reliable means of accurately checking the frequency of test oscillators, receivers, etc., is the RCA Stock No. 9572 **Crystal Calibrator**.

If the test-oscillator signal cannot be heard as the receiver (heterodyne) oscillator air-trimmer plunger is changed from its minimum-capacity to maximum-capacity position (receiver dial and test oscillator set to the specified frequencies, and the correct oscillator air-trimmer used) it may be an indication that the test-oscillator frequency is outside the range covered by the air-trimmer. Under such conditions, when a more accurate setting of the test oscillator cannot be determined, set the oscillator air-trimmer plungers to the approximate settings given on figure 8. Tune the test oscillator until the signal is heard in the speaker. Each of two test-oscillator settings (the fundamentals or the harmonics of which are 920 kc apart) produce a signal. The lower-frequency test-oscillator setting should be used as this places the test-oscillator (signal) frequency 460 kc below the frequency of the receiver heterodyne oscillator.

Holes are provided in the top of the r-f and antenna coil cans on some models to enable a tuning check with the RCA Stock No. 6679 **Tuning Wand**. The hole in the top of the detector coil can has a cinch button which must be removed before insertion of the tuning wand. When the brass end of the wand is inserted in the coil, the inductance of the coil is decreased. If this results in an increase of output, the respective air-trimmer capacitance should be decreased (plunger pulled out). If inserting the iron end of the tuning wand causes an increase in output, resulting from an increase of inductance of the coil, the respective air-trimmer capacitance should be increased (plunger pushed in). If the range of the air trimmer is not sufficient to give the desired results, the lead-dress may be changed in the particular circuit being aligned, so as to cause the circuit to resonate within the range of the trimmer. An increase in the capacity-to-ground of the circuit will be required if the iron end of the tuning wand causes an increase of signal output when the air-trimmer plunger is full-in, while a decrease in the capacity-to-ground will be required if the brass end of the tuning wand causes an increase in signal output when the air-trimmer plunger is full-out.

Two methods of alignment are applicable—one requires use of the cathode-ray oscillograph, and the other requires a voltmeter or glow-type indicator. The cathode-ray alignment method is advantageous in that the indication provided is in the form of a wave-image which represents the resonance characteristics of the circuit being tuned. This method is preferred because of the i-f characteristics of these receivers. This type of alignment is possible through use of apparatus such as the RCA Stock No. 9558 **Frequency Modulator** and the RCA Stock No. 9545 **Cathode-Ray Oscillograph**. If this equipment is not available, an approximate alignment may be performed by the output-indicator method with an instrument such as the RCA Stock No. 4317 **Neon Glow Indicator** attached across the loudspeaker voice coil. Alignment by this method is similar to the cathode-ray method outlined below except that the receiver volume control should be at maximum, the trimmers adjusted to peak response and the test-oscillator sweeping operations omitted. Either of these methods require the use of a reliable test oscillator such as the RCA Stock No. 9595.

Cathode-Ray Alignment

Make alignment apparatus connections shown on figure 6. Remove the plug of the frequency-modulator cable from the test-oscillator jack. Connect the receiver chassis to a good external ground. Connect oscillograph "Vertical" input terminals as indicated on figure 2. Set oscillograph power switch to "On" and adjust "Intensity" and "Focus" controls to give a clearly defined spot, or line, on the screen. Set oscillograph "Ampl. A" switch to "On," "Vertical gain" control full-clockwise, "Ampl. B" switch to "Timing," "Range" switch to No. 2 position, and "Timing" switch to "Int." Place the "Sync." control, "Freq." control, and "Horizontal gain" control to about their mid-positions. For each of the following adjustments, the test-oscillator output must be regulated so that the image obtained on the oscillograph screen will be of the minimum size for accurate observation. The receiver volume-control setting is optional.

I-F Adjustments

(a) Set "Fidelity" control to counter-clockwise position, "Radio-Phono" switch to "Radio," and "Range Selector" to "Standard Broadcast" band. Connect the "Ant." output of the test oscillator to the grid cap of RCA-6K7 second i-f tube (with grid lead in place) through a .001-mfd. capacitor, with "Gnd." to receiver chassis. Tune the test oscillator to 460 kc and place its modulation switch to "On" and its output switch to "Hi."

(b) Turn on the receiver and test oscillator. Increase the output of the test oscillator until a deflection is noticeable on the oscillograph screen. The figures obtained represent several waves of the detected signal, the amplitude of which may be observed as an indication of output. Cause the wave-image formed (400-cycle waves) to be spread completely across the screen by adjusting the "Horizontal gain" control. The image should be synchronized and made to remain motionless by adjusting the "Sync." and "Freq." controls.

(c) Adjust the two magnetite core screws L29 and L28 (see figures 3 and 11) of the third i-f transformer (one on top and one on bottom) to produce maximum vertical deflection of the oscillographic image. This adjustment places the transformer in exact resonance with the 460-kc signal.

(d) The sweeping operation should follow using the frequency modulator. Shift the oscillograph "Timing" switch to "Ext." Insert plug of frequency-modulator cable in test-oscillator jack. Turn the test-oscillator modulation switch to "Off." Turn on the frequency modulator and place its sweep-range switch to "Hi."

(e) Increase the frequency of the test oscillator by slowly turning its tuning control until two separate, distinct, and similar waves appear on the screen. If only one wave appears, increase the "Freq." control on the oscillograph to obtain two waves. These waves will be identical in shape, totally disconnected, and appear in reversed positions. They will have a common base line, which is discontinuous. Adjust the "Freq." and "Sync." controls of the oscillograph to make them remain motionless on the screen. Continue increasing the test-oscillator frequency until these forward and reverse curves move together and overlap, with their highest points exactly coincident. This condition will be obtained at a test-oscillator setting of approximately 575 kc.

(f) With the images established as in (e), re-adjust the two magnetite core screws L29 and L28 on the third i-f transformer so that they cause the curves on the oscillograph screen to become exactly coincident throughout their lengths and have maximum amplitude.

(g) Without altering the adjustments of the apparatus, shift the "Ant." output of the test oscillator to the grid cap of the RCA-6K7 first i-f tube (with grid lead in place), through a .001-mfd. capacitor. Regulate the test-oscillator output so that the amplitude of the oscillographic image is approximately the same as used for adjustment (f) above.

(h) The two second i-f transformer magnetite core screws L27 and L26 (one on top and one on bottom) should then be adjusted so that they cause the forward and reverse curves to become coincident throughout their lengths and have maximum amplitude.

(i) Without altering the adjustments of the apparatus, shift the "Ant." output of the test oscillator to the input of the i-f system, i.e., to the grid cap of the RCA-6L7 first-detector, (with grid lead in place) through a .001-mfd. capacitor. Regulate the test-oscillator output so the amplitude of the oscillographic image is approximately the same as used for adjustment (h) above.

(j) The two first i-f transformer magnetite core screws L25 and L24 (one on top and one on bottom) should then be adjusted so that they cause the forward and reverse waves to become coincident throughout their lengths and have maximum amplitude.

(k) Note width of oscillographic image at a point which is 50% of maximum amplitude. Turn receiver fidelity control to extreme clockwise position. Note width of oscillographic image at a point which is 50% of maximum amplitude. Under normal conditions the latter measurement should be approximately 60% greater in width than the former measurement. The image should also appear slightly double humped. These conditions indicate proper broadening of the band width of the i-f amplifier. Turn range selector to "Medium wave" (B) band and note increase of amplitude. The amplitude should increase several times. It may be necessary to decrease output of test oscillator to keep image on screen. Turn receiver fidelity control to extreme counter-clockwise position and proceed to "R-F Adjustments."

R-F Adjustments

Make receiver dial adjustments as outlined by "Selector dial," figure 14. Alignment must be made in sequence of "Wave-trap," "Ultra short wave" band, "Short wave" band, "Medium wave" band, "Standard broadcast" band, and "Long wave" band.

"Wave-Trap" Adjustment

(a) Connect the "Ant." output of the test oscillator to the antenna terminal "A1" through a 200-mmfd. (important) capacitor. Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn test-oscillator modulation switch to "On." Shift the oscillograph "Timing" switch to "Int." Place receiver range selector in "Standard broadcast" position. Set the receiver dial to a position of no extraneous signals near 600 kc. Tune the test oscillator to 460 kc. Adjust the wave-trap magnetite core screw L1 to the point which causes minimum amplitude of output (maximum suppression of signal) as shown

RCA MFG. CO., INC.

by the waves on the oscillograph. An increase of the test-oscillator output may be necessary before this point of minimum amplitude, obtained by correct adjustment of wave-trap screw, becomes apparent on oscillograph screen.

"Ultra Short Wave" Band

(b) Connect the "Ant." output of the test oscillator to the antenna terminal "A1" of the receiver through a 300-ohm resistor. Set the receiver range selector to its "Ultra short wave" position and its dial pointer to 57,000 kc. Adjust the test oscillator to 19,000 kc. The third harmonic of 19,000 kc is used for this adjustment.

Adjust oscillator air-trimmer C23 for maximum (peak) output. Two positions, each producing maximum output, may be found. The position of minimum capacitance (plunger near out) should be used. This places the receiver heterodyne oscillator 460 kc higher in frequency than the incoming signal. Tighten lock nut. Adjust the detector air-trimmer C39, while slightly rocking the gang tuning condenser back and forth through the signal, for maximum (peak) output. Two peaks may be found on this trimmer. The peak of maximum capacitance (plunger near in) should be used. Tighten lock nut. Adjust the antenna air-trimmer C10 for maximum (peak) output while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found on this trimmer which produce maximum output. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Check the image frequency by changing the receiver dial setting to 56,080 kc. If the image signal is received at this position, the adjustment of the oscillator air-trimmer C23 has been correctly made. No adjustments should be made while checking for the image signal.

(c) Re-tune receiver for maximum response to 57,000 kc (not image response) without disturbing test-oscillator adjustments. Change test oscillator to 6,800—14,000 kc range. Tune test oscillator until signal is heard in speaker (should occur at approximately 14,250 kc, fourth harmonic of test oscillator used). Two test-oscillator settings (230 kc apart) will produce a signal at this point. The lower frequency test-oscillator setting should be used, as this places the test oscillator harmonic 460 kc below the frequency of the receiver heterodyne oscillator. Tune receiver for maximum response at a dial setting of approximately 28,500 kc (image should tune in at a dial setting approximately 27,580 kc) without altering test-oscillator adjustment. Test-oscillator second harmonic of 14,250 kc is used for the following check. Check calibration of receiver dial. A receiver-dial reading of less than 28,500 kc indicates that the inductance of the oscillator secondary coil L11 is too low and should be increased. If the receiver dial reading is greater than 28,500 kc, the inductance of L11 is too high and should be decreased. If it is necessary to change the inductance of L11, first remove bottom cover of "Magic Brain" and then set receiver dial pointer to 28,500 kc. To decrease inductance, move the grounded ends (straps) of L11 and L12 (see figure 4) nearer chassis. Do not allow straps to touch chassis except where connected. To increase inductance, move the straps farther away from chassis. Adjust position of straps until maximum (peak) output results. The alignment of the detector tuned circuit should next be checked at 28,500 kc without changing either the receiver or test oscillator adjustments. An increase of output when the brass end of a tuning wand is brought near L22 indicates that L22 is too high in inductance, while an increase when the iron end is brought near the coil indicates that the inductance is too low. The inductance of L22 may be varied by changing the spacing between the grounded end (strap) of L22 and the strap connected from C41 to contact on S2 (figure 4). An increase of spacing will increase the inductance, while a decrease of spacing will decrease the inductance. Adjust the spacing until maximum (peak) output results. Replace "Magic Brain" bottom cover and repeat adjustments in (b) prior to those of "Short wave" band.

"Short Wave" Band

(d) Set the receiver range selector to its "Short wave" position and its dial pointer to 20,000 kc. Adjust the test oscillator to 20,000 kc. Adjust oscillator air-trimmer C13 until maximum (peak) output is reached. Two peaks may be found with this circuit. The peak with minimum capacitance (plunger near out) should be used. Tighten lock nut. Adjust detector air-trimmer C35 until maximum (peak) output is reached, while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Adjust antenna air-trimmer C3 until maximum (peak) output is reached while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Check the image frequency by changing the receiver dial setting to 19,080 kc. The image signal should be received at this position indicating that the adjustment of C13 has been correctly made. No adjustments should be made while checking for the image signal.

"Medium Wave" Band

(e) Place receiver range selector to its "Medium wave" position with its dial pointer set to 6,000 kc. Tune the test oscillator to 6,000 kc. Adjust oscillator air-trimmer C14 to produce maximum (peak) output as shown by the waves on the oscillograph. Two peaks may be found with this circuit. The peak with minimum capacitance (plunger near out) should be used. Tighten lock nut. Adjust the detector air-trimmer C36 for maximum (peak) output while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacitance (plunger near in) should be used. Tighten lock nut. Adjust antenna air-trimmer C4 to produce maximum (peak) output. Tighten lock nut.

"Standard Broadcast" Band

(f) Remove the 300-ohm resistor from between the test-oscillator "Ant." post and receiver antenna terminal "A1" and insert a 200-mmfd. capacitor in its place. Place receiver range selector to "Standard broadcast" position with receiver dial pointer set to 600 kc. Tune the test oscillator to 600 kc. Adjust oscillator magnetite core screw L9 (top of large oscillator coil can) for maximum (peak) output as shown by the waves on the oscillograph screen.

(g) Set receiver dial pointer to 1,500 kc. Tune test oscillator to 1,500 kc (1,500–3,100-kc range) and increase its output to produce a registration on the oscillograph screen. Carefully adjust the oscillator, detector, and antenna air-trimmers C16, C37, and C5, respectively, to produce maximum (peak) output as shown by the waves on the oscillograph screen. Shift the oscillograph "Timing" switch to "Ext." Place the frequency modulator sweep-range switch to its "Lo" position and insert plug of the frequency-modulator cable in test-oscillator jack. Turn test-oscillator modulation switch to "Off." Re-tune the test oscillator (increase frequency) until the forward and reverse waves show on the oscillograph screen and become coincident at their highest points. This will occur at a test-oscillator setting of approximately 1,680 kc. Adjust trimmers C16, C37, and C5 again, setting each to the point which produces the best coincidence and maximum amplitude of the images.

(h) Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn test-oscillator modulation switch to "On." Set oscillograph "Timing" switch to "Int." Tune test oscillator to 200 kc (200–400-kc range). Tune receiver for maximum response to this signal at a dial reading of approximately 600 kc. The third harmonic of the 200-kc signal is used for this adjustment. Shift oscillograph "Timing" switch to "Ext." Insert the plug of the frequency modulator cable in test-oscillator jack. Turn test-oscillator modulation switch to "Off." Re-tune the test oscillator (increased frequency) until the forward and reverse waves show on the oscillograph screen. This will occur at a test-oscillator setting of approximately 230 kc. Disregarding the fact that the two images may or may not come together, adjust the oscillator magnetite core screw L9 (top of large oscillator coil can) to produce maximum (peak) amplitude of the images. Shift the oscillograph "Timing" switch to "Int." Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn the test-oscillator modulation switch to "On." Repeat adjustments in (g) above to compensate for any changes caused by the adjustment of L9 core, tightening lock nuts on C16, C37, and C5, respectively, after each is adjusted.

"Long Wave" Band

(i) Shift the oscillograph "Timing" switch to "Int." Remove the plug of the frequency-modulator cable from the test-oscillator jack. Turn the test-oscillator modulation switch to "On." Place receiver range selector to its "Long wave" position. Set the receiver dial pointer to 175 kc. Tune the test oscillator to 175 kc and increase its output until a deflection is noticeable on the oscillograph screen. Adjust oscillator magnetite core screw L10 (located on top of small oscillator coil can) so that maximum (peak) amplitude of output is shown on the oscillograph screen.

(j) Set receiver dial pointer to 350 kc. Tune test oscillator to 350 kc. Adjust the oscillator, detector, and antenna air-trimmers C18, C38, and C6 to produce maximum (peak) output as shown by the waves on the oscillograph screen. Without disturbing the connections, shift the oscillograph "Timing" switch to "Ext." Place the frequency-modulator sweep-range switch to its "Hi" position and insert plug of frequency-modulator cable in test-oscillator jack. Turn test-oscillator modulation switch to "Off." Re-tune the test oscillator (decrease frequency) until the forward and reverse waves show on the oscillograph screen and become coincident at their highest points. This will occur at a test-oscillator setting of approximately 198 kc. This setting places the test-oscillator frequency to 175 kc. The second harmonic is now used for the 350 kc adjustment. Adjust air-trimmers C18, C38, and C6, again, to produce maximum amplitude of the images and best coincident throughout their lengths.

(k) Re-tune the receiver to approximately 175 kc so that the forward and reverse waves appear on the oscillograph screen. Adjust the oscillator magnetite core screw L10 to produce maximum (peak) amplitude of the waves, disregarding the fact that the two images may or may not come together.

(l) Shift the receiver dial setting to 350 kc without altering any other adjustments (frequency modulator still in operation). Adjust air-trimmers C18, C38, and C6, respectively, to produce maximum amplitude and best coincidence of the waves. These adjustments compensate for any changes caused by the adjustment of the magnetite core screw L10. Tighten lock nuts on C18, C38, and C6, respectively, after each is adjusted.

Dynamic Amplifier Adjustments

It is essential that correct voltages and currents exist at the RCA-6L7 audio expander stage in order that the expanding function may take place in the proper manner. A screw-driver adjustment is accordingly provided to regulate the RCA-6L7 control grid No. 3 bias to the correct operating value. Two methods of adjustment are applicable. Either method requires a normal voltage of 300 volts across the filter output. The one to be preferred (a) requires the use of an RCA Stock No. 9633 Beat-Frequency Oscillator or the equivalent, a 100-ohm resistor, a 200-ohm resistor, and a 1,000-ohm-per-volt a-c voltmeter (rectifier-type) having a "low" range of 1.0 volt and a "high" range of 250 volts or greater. The less accurate method (b) requires the use of an RCA Stock No. 12353 Split-Plate Adapter, and a suitable d-c milliammeter. Both of these procedures are outlined below. **CAUTION: Before using either method, be sure that power-supply fuse is in proper position for the line voltage.**

(a) Preferred Method

Turn power switch off. Connect the 200-ohm and the 100-ohm resistors in series between the beat-frequency oscillator terminals (upper "250" and "CT") with the 100-ohm resistor connected to "CT." Calibrate the beat-frequency oscillator, adjust it to 1,000 cycles, and reduce its output. Connect the 1,000-ohm-per-volt a-c voltmeter (1-volt range) to the beat-frequency oscillator terminals (upper "250" and "CT"). Remove the male plug from the receptacle on the shielded cable running be-

MODEL 15U
Alignment, Page 3
Notes, Oscillograms

RCA MFG. CO., INC.

tween the input transformer T2 and the compensator pack (see figure 12). Connect beat-frequency oscillator terminal "CT" to the large pin on the male plug. Connect the junction of the 200-ohm and the 100-ohm resistors to the small pin on the male plug.

Adjust beat-frequency oscillator output until the voltmeter reads exactly 1.0 volt. Remove the voltmeter leads from beat-frequency oscillator terminals without disturbing any of the oscillator adjustments. Place the voltmeter to its 250-volt or greater range and connect it between the plate prongs of the two RCA-2A3 power-output tubes. Connections to the tube prongs may be made by stripping approximately ½ inch of insulation from the ends of two short leads of rubber-covered wire, wrapping one bare end around each plate prong (being careful not to allow the bare ends to short on the chassis when the tubes are placed in their sockets), and connecting the voltmeter to these leads. CAUTION: Do not touch these plate connections after the power is turned on since the potential at these points is rather high and carelessness might result in a serious shock.

Set the "Dynamic amplifier" and "Fidelity control" to their extreme counter-clockwise positions. Set the "Phonograph volume" control to its extreme clockwise position. Turn on power switch and allow a few minutes for the instrument to become stabilized. Adjust the expander-bias control R46, on rear apron of amplifier (see figure 3), until the voltmeter reads 195 volts. Turn "Phonograph volume" control to extreme counter-clockwise position. Transfer lead from the junction of the 200-ohm and the 100-ohm resistors to the beat-frequency oscillator (upper "250") terminal without disturbing any of the oscillator adjustments. Adjust "Phonograph volume" control until the voltmeter reads 50 volts. Turn the "Dynamic amplifier" control to its extreme clockwise position allowing maximum expansion to take place. The voltmeter should now read not less than 150 volts if the expander circuit is operating correctly. Failure to do so indicates a defect in the system and the usual service procedure should be followed.

(b) Alternate Method

Turn power switch off. Place RCA Stock No. 12353 Split-Plate Adapter under the RCA-6L7 audio-volume expander. Connect a suitable d-c milliammeter to the adapter. Turn both the "Phonograph volume" and the "Dynamic amplifier" controls to their extreme counter-clockwise positions. Turn on power switch and allow a few minutes for the instrument to become stabilized. Adjust expander bias control R46, on rear apron of amplifier (see figure 3), to give 1.0 milliampere of plate current with no signal input to the dynamic amplifier.

Loudspeaker

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed by softening its cement with a very light application of acetone using care not to allow the acetone to flow down into the air gap. The dust cover may be cemented back in place with ambroid upon completion of adjustment.

Antenna and Ground Terminals

These receivers are equipped with an antenna-ground terminal board having three terminals. These terminals are marked "A2," "A1," and "G," the latter being the ground terminal and should always be connected to a good external ground. The transmission-line leads of the RCA RK-40A antenna system should be connected to terminals "A2" and "A1." The receiver coupling units of the RCA RK-40 and the RCA Spider-Web antenna systems should be connected to terminals "A1" and "G." Connect a single-wire antenna to terminal "A1."

Selector Dial

Figure 14 illustrates the relation of the various parts of the dial mechanism when in its "Standard broadcast" position with the range switch likewise turned to its "Standard broadcast" position. In re-assembling the dial after repairs, see that the gears are meshed in accordance with the diagram, at the same time noting that the range switch is in its "Standard broadcast" position and the lever attached to the range-switch shaft placed in the position shown.

To adjust the dial mechanism, set the range switch to its "Standard broadcast" position. Place a straight-edge across the center of the dial so that its edge is even with the lower (end) marking at both the low-frequency and high-frequency ends of the dial. Under such conditions the straight-edge should be parallel with the top of the chassis base. If the straight-edge is not parallel with the top of the chassis base, loosen the nut on the rear of the roller link pivot stud and move the stud up or down until the link roller moves the dial to the desired position so that the end calibration marks obtain the position mentioned above. Tighten the nut on the roller link pivot stud.

Set the gang tuning condenser to its maximum capacity position. Adjust the dial pointer to the low-frequency (end) mark on "Standard broadcast" scale. This is a friction adjustment.

With the gang tuning condenser plates still in full mesh, loosen the two set screws on the vernier-dial hub. Rotate the vernier dial until the "0" marking is in a vertical plane above the center of the shaft. Tighten set screws

Magnetic Pickup

The pickup used in the phonograph unit is of an improved design. The horseshoe magnet is rigidly welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. The frequency response is substantially uniform over a wide range. Service operations which may be necessary on the pickup are as follows.

Centering Armature

Refer to figure 15 showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces, i.e., exactly centered. Whenever this centering adjustment has been disturbed, the screws A, B, and C should be loosened and the armature clamp adjusted to the point where the vertical axis of the armature is at right angles to the horizontal axis of the pole pieces, and centered between them. This centering operation may be facilitated by inserting a small rod or nail into the armature needle hole, using it as a lever to test the angular movement of the armature. The limitations of the movement in each direction will be caused by the armature striking the pole pieces. The proper adjustment is obtained when there is equal angular displacement of the armature and adjustment rod or nail to each side of the vertical axis of the magnet and coil assembly. The screws A and B should then be secured, observing care not to disturb the adjustment of the armature clamp. Then place the pickup in a vise and secure the centering spring-clamp by means of the screw C, allowing the centering spring to remain in the position at which the armature is exactly centered between the pole pieces. With a little practice, the correct adjustment of the armature may be readily obtained. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other such foreign materials which would obstruct the movement of the pickup armature.

Damping Block

The viscoloid block which is attached to the back end of the armature shank serves as a mechanical filter to eliminate undesirable resonances and to cause the frequency response to be uniform. Should it be necessary to replace this damping block, it may be done by removing screw D and the cover support bracket from the mechanism and taking off the old viscoloid block. The surface of the armature which is in contact with the viscoloid should be thoroughly cleaned with fine emery cloth. Then insert the new block so that it occupies the same position at it did originally. Make certain that the block is in correct vertical alignment with the armature. The hole in the new viscoloid block is somewhat smaller than the diameter of the armature in order to permit a snug fit. With the viscoloid aligned on the armature, screw D and the cover support bracket should then be replaced. Heat should be applied to the armature (viscoloid side) so that the viscoloid block will fuse at the point of contact and become rigidly attached to the armature. A special-tip soldering iron constructed as shown in figure 16 will be found very useful in performing this operation. The iron should be applied only long enough to slightly melt the block and cause a small bulge on both sides.

Replacing Coil

Whenever there is defective operation due to an open or shorted pickup coil, this coil should be replaced. The method of replacement will be obvious upon inspection of the pickup assembly and by study of the cut-a-way illustrations. Make sure that the new coil is properly centered with the hole in the support strip and glued securely in that position. It is important to re-adjust the armature as previously explained after re-assembly of the mechanism. Only rosin core solder should be used for soldering the coil leads in the pickup. This same type of solder should be used when necessary for soldering the centering spring to the armature.

Magnetizing

Loss of magnetization will not usually occur when the pickup has received normal care because the magnet and pole pieces are one unit and the magnetic circuit remains practically closed at all times. When the pickup has been mishandled, subjected to a strong a-c field, jolted, or dropped, there may be an appreciable loss of magnetic strength, in which case it will be necessary to re-magnetize the entire structure. To do this, it will be necessary to first remove the pickup mechanism from the tone arm, and then remove the magnet assembly. Place the magnet assembly on the poles of a standard pickup magnetizer such as the RCA Stock No. 9549 Pickup Magnetizer and charging the magnet in accordance with the instructions accompanying the magnetizer. It is preferable to check the polarity of the pickup magnet and to re-magnetize it so that the same polarity is maintained.

Automatic Record Ejector

The record changing mechanism is designed to be simple and fool-proof. Under normal operating conditions, service difficulties should be negligible. Occasionally, however, certain adjustments may be required. These adjustments are illustrated and explained in figure 13.

It is important when servicing the automatic mechanism, to have it placed on a level support. It is also important to refrain from forcing the mechanism if there is a tendency to bind or jam, since bent levers and possibly broken parts may result.

The tip of the record ejector is adjustable in relation to the turntable spindle, the two being exactly coaxial when properly adjusted. To align the tip, remove the rubber silencer of the ejector assembly, loosen ejector tip retaining nut and slide the tip assembly to the position where it is in true-line with the axis of the turntable spindle. This adjustment may be simplified by placing several records on the turntable, depressing the spindle through the top record hole and lining up the ejector tip in the spindle hole of the record.

To insure that the ejector tip rotates freely, apply a slight amount of oil to the shank of the tip at the point where it is in contact with the ball bearing.

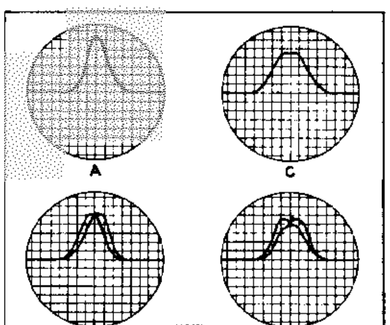


Figure 7—I-F Alignment Oscillograph Curves

A—Correct curve showing proper i-f alignment as obtained with fidelity control counter-clockwise.

B—Incorrect curve similar to A showing improper alignment of i-f system caused by one or more circuits being slightly detuned.

C—Correct showing broadening of curve A obtained when fidelity control is rotated fully clockwise.

D—Incorrect curve showing broadening of curve B obtained when fidelity control is rotated fully clockwise.

RCA MFG. CO., INC.

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4427	Bracket—Volume control mounting bracket	$0.18
12987	Bracket—Band changeover switch bracket	.15
12511	Cap—Grid contact cap—Package of 5	.15
12948	Capacitor—33 Mmfd. (C57)	.20
12629	Capacitor—56 Mmfd. (C62)	.20
12404	Capacitor—120 Mmfd. (C60, C61)	.26
13022	Capacitor—390 Mmfd. (C46, C47, C50, C51)	.25
12898	Capacitor—1500 Mmfd. (C66)	.20
13608	Capacitor—.0025 Mfd. (C63)	.30
4868	Capacitor—.005 Mfd. (C71)	.20
13138	Capacitor—.01 Mfd. (C45, C49, C59, C102)	.25
4836	Capacitor—.05 Mfd. (C64)	.30
4841	Capacitor—0.1 Mfd. (C52, C99)	.22
4840	Capacitor—0.25 Mfd. (C53)	.30
13610	Capacitor—8 Mfd. (C72)	1.00
5212	Capacitor—18 Mfd. (C54, C73)	1.16
13611	Capacitor—20 Mfd. (C65)	.85
13613	Compensator Pack—Comprising two .015 Mfd., one .05 Mfd. capacitors and one 27,000 ohms, one 22,000 ohms, one 12,000 ohms resistors (C55, C56, C58, R15, R16, R17)	1.20
12006	Core—Core and stud assembly for intermediate frequency transformers	.22
13612	Filter Pack—Comprising two .453 Henry Chokes, two 560 Mmfd., one 1,000 Mmfd. and one 2,200 Mmfd. capacitors (L30, L31, C67, C68, C69, C70)	2.95
12866	Foot—Chassis foot assembly—Package of 2	.75
4340	Lamp—Pilot lamp—Package of 5	.60
12868	Link—Link mechanism on band indicator operating arm	.45
13609	Resistor—Voltage divider—Comprising one 600 ohms, one 5,000 ohms, one 3,950 ohms, one 25 ohms and one 19 ohms sections (R27, R28, R29, R30, R31)	.95
12311	Resistor—1,000 ohms—insulated, 1/4 watt (R12)—Package of 5	1.00
5112	Resistor—1,000 ohms—carbon type, 1/4 watt (R10, R14)—Package of 5	1.00
5147	Resistor—3,300 ohms—carbon type, 1 watt (R55)	.22
12312	Resistor—3,300 ohms—insulated, 1/4 watt (R25)—Package of 5	1.00
5114	Resistor—15,000 ohms—carbon type, 1 watt (R26)	.22
11282	Resistor—56,000 ohms—carbon type, 1/10 watt (R19)—Package of 5	.75
11365	Resistor—82,000 ohms—carbon type, 1/4 watt (R13)—Package of 5	1.00
11281	Resistor—100,000 ohms—carbon type, 1/10 watt (R11)—Package of 5	.75
5158	Resistor—220,000 ohms—carbon type, 1/4 watt (R54)—Package of 5	1.00
11398	Resistor—220,000 ohms—carbon type, 1/10 watt (R20)—Package of 5	.75
12013	Resistor—1.0 megohm—carbon type, 1/10 watt—located in tuning tube socket (R24)—Package of 5	.75
12679	Resistor—2.2 megohm—insulated, 1/4 watt (R21)—Package of 5	1.00
12874	Resistor—3.3 megohm—carbon type, 1/4 watt (R22, R23)—Package of 5	1.00
12870	Scale—Vernier dial scale	.65
12008	Shield—Intermediate frequency transformer shield	.28
12607	Shield—1st or 2nd I.F. transformer shield top	.30
12581	Shield—3rd I.F. transformer shield top	.36
11197	Socket—6-contact 6C5 Radiotron socket	.14
11198	Socket—7-contact 6K7 or 6H6 Radiotron socket	.15
13095	Socket—Upper left or lower right-hand dial lamp socket	.25
11222	Socket—Upper right or lower left-hand dial lamp socket	.18
11381	Socket—Tuning tube socket and cover	.45
11196	Socket—8-contact R.F. unit voltage supply socket	.15
12007	Spring—Retaining spring for core in I.F. transformer—Package of 10	.36
12986	Stud—Band indicator operating arm stud—Package of 2	.65

Stock No.	Description	List Price
12860	Switch—Low frequency tone and power switch (S5, S7)	1.50
12988	Switch—Bias switch (S10)	.65
13616	Tone control—High frequency tone and fidelity control (R52, S4)	1.40
12981	Transformer—First intermediate frequency transformer (L24, L25, L40, C46, C47)	2.15
12990	Transformer—Second intermediate frequency transformer (L26, L27, C50, C51)	1.85
12982	Transformer—Third intermediate frequency transformer (L28, L29, C60, C61, C62, R19, R20)	2.25
12861	Volume Control (R18)	1.00
	MAGIC BRAIN UNIT ASSEMBLIES	
12806	Board—3-contact antenna and ground terminal board	.25
5237	Bushing—Variable condenser mounting bushing assembly—Package of 3	.43
12886	Cable—Shielded power cable, approximately 4 inches long, complete with 8-contact male plug	1.50
12511	Cap—Grid contact cap—Package of 5	.15
12714	Capacitor—Adjustable trimmer capacitor (C3, C4, C5, C6, C14, C16)	.38
12884	Capacitor—Adjustable trimmer capacitor (C10, C18, C23, C38, C39)	.40
12807	Capacitor—Adjustable trimmer capacitor (C13, C35, C36, C37)	.35
12896	Capacitor—15 Mmfd. (C34)	.20
12722	Capacitor—18 Mmfd. (C15)	.20
12891	Capacitor—36 Mmfd. (C40)	.20
12629	Capacitor—56 Mmfd. (C24)	.20
12895	Capacitor—56 Mmfd. (C17)	.20
12723	Capacitor—56 Mmfd. (C2, C44)	.20
13307	Capacitor—62 Mmfd. (C11)	.20
12724	Capacitor—120 Mmfd. (C25, C28, C29)	.28
12725	Capacitor—150 Mmfd. (C1)	.28
12894	Capacitor—180 Mmfd. (C22)	.20
12727	Capacitor—555 Mmfd. (C21)	.20
12537	Capacitor—560 Mmfd. (C7, C26, C33, C42)	.20
12898	Capacitor—1,500 Mmfd. (C12)	.20
12729	Capacitor—1,550 Mmfd. (C20)	.26
12728	Capacitor—4,500 Mmfd. (C19)	.36
12897	Capacitor—4,700 Mmfd. (C43)	.40
4858	Capacitor—.01 Mfd. (C8, C30, C31, C32)	.25
12879	Coil—Antenna coil and shield, XABC bands (L2, L3, L4, L5, L6)	1.90
12888	Coil—Antenna coil, "D" band (L13, L14)	.60
12880	Coil—Detector coil and shield, XABC bands (L15, L16, L17, L18, L19, L20)	2.05
12709	Coil—Oscillator coil and shield, ABC bands (L7, L8, L9)	2.02
12881	Coil—Oscillator coil and shield, X band only (L10)	.80
12890	Coil—Oscillator coil, "D" band (L11, L12, L23)	.70
12889	Coil—R.F. coil, "D" band (L21, L22)	.65
12877	Condenser—3-gang variable tuning condenser (C9, C27, C41)	5.10
12887	Connector—8-contact male connector and cover for power cable, Stock No. 12886	.40
12664	Core—Adjustable core and stud for Stock No. 12654	.22
12800	Core—Adjustable core and stud for Stock No. 12709	.20
12882	Core—Adjustable core and stud for Stock No. 12881	.20
11324	Resistor—560 ohms—carbon type, 1/4 watt (R2)—Package of 5	1.00
5112	Resistor—1,000 ohms—carbon type, 1/4 watt (R3)—Package of 5	1.00
11298	Resistor—5,600 ohms—carbon type, 1 watt (R6)	.22
3998	Resistor—15,000 ohms—carbon type, 1/4 watt (R5)—Package of 5	1.00
11282	Resistor—56,000 ohms—carbon type, 1/10 watt (R4, R9)—Package of 5	.75
8064	Resistor—82,000 ohms—carbon type, 1/2 watt (R8)—Package of 5	1.00
11397	Resistor—560,000 ohms—carbon type, 1/10 watt (R1, R7)—Package of 5	.75
12651	Shield—Coil shield for Stock Nos. 12879, 12880	.22
12710	Shield—Coil shield for Stock No. 12709	.28

Stock No.	Description	List Price
12883	Shield—Coil shield for Stock No. 12881	.20
11198	Socket—7-contact 6K7 Radiotron socket	.15
11279	Socket—7-contact 6L7 Radiotron socket	.20
12885	Socket—8-contact 6J7 Radiotron socket	.20
12007	Spring—Retaining spring for core, Stock Nos. 12664, 12800, 12882—Package of 10	.36
12878	Switch—Range switch and mounting nut (S1, S2, S3)	3.60
12654	Trap—Wave-trap, complete (L1)	.75
	DRIVE ASSEMBLIES	
10705	Ball—5/32-inch diameter steel ball for planetary drive—Package of 20	.25
10941	Ball—1/8-inch diameter steel ball for planetary drive bearing—Package of 20	.25
12904	Bushing—Plate and bushing assembly for planetary drive mounting	.20
12905	Coupling—Flexible coupling and shaft assembly, complete	.50
12909	Dial—Band indicating dial and cam assembly	1.05
12899	Drive—Variable tuning condenser drive, complete, including mounting bracket drive, dial scale and indicator, less vernier dial, Stock No. 12870 and link, Stock No. 12868	4.40
12906	Gear—Anti-lash drive gear, complete	.75
12910	Gear—Sector gear and link assembly for band selector	.20
12908	Indicator—Station selector indicator pointer	.20
8051	Link—Link and roller assembly, complete with spring	.30
12911	Screen—Dial lamp screen and light diffuser	.20
4669	Screw—Set screw for flexible coupling or gear, Stock Nos. 12905 and 12906—Package of 10	.25
12901	Shaft—Direct drive shaft and pinion gear for planetary drive	.75
12900	Shaft—Vernier drive shaft for planetary drive	.25
12903	Spring—Tension spring for planetary drive bearing—Package of 10	.20
12907	Spring—Tension spring for gear, Stock No 12906—Package of 10	.20
8052	Spring—Tension spring for link, Stock No. 8051—Package of 5	.32
	AMPLIFIER ASSEMBLIES	
12511	Cap—Grid contact cap—Package of 5	.15
12110	Cap—Top shield cap for 6L7 Radiotron	.14
12488	Capacitor—270 Mmfd (C90, C91)	.14
5107	Capacitor—.0025 Mfd. (C88)	.16
4838	Capacitor—.005 Mfd. (C93, C94)	.20
4868	Capacitor—.005 Mfd. (C92)	.20
5196	Capacitor—.035 Mfd. (C79)	.18
4886	Capacitor—.05 Mfd. (C85)	.20
4518	Capacitor—.05 Mfd. (C81)	.52
4839	Capacitor—0.1 Mfd. (C89, C100)	.52
5170	Capacitor—.25 Mfd. (C87)	.25
4840	Capacitor—.25 Mfd. (C101)	.30
11240	Capacitor—10 Mfd. (C97)	1.08
12472	Capacitor—10 Mfd. (C86)	1.00
5211	Capacitor—18 Mfd. (C84, C95)	1.16
11496	Capacitor—18 Mfd. (C98)	1.15
12740	Capacitor—20 Mfd. (C83)	1.10
12467	Capacitor—30 Mfd. (C96)	1.40
12465	Capacitor—Capacitor pack, comprising 3 sections, each 0.5 Mfd. (C78, C80, C82)	1.50
11272	Clamp—Volume control or speaker cable clamp	.10
5240	Cover—Fuse cover	.24
12468	Expander—Control (R46)	1.00
10907	Fuse—3-ampere fuse (F1)—Package of 5	.40
5239	Mounting—Fuse mounting	.36
12471	Plate—6L7 socket mounting plate assembly, less socket	.15
12466	Reactor—Filter reactor (L37)	2.35
13454	Resistor—270 ohms—insulated, 1/4 watt (R39)—Package of 5	1.00
12195	Resistor—2,200 ohms—insulated, 1/4 watt (R41, R50)—Package of 5	1.00
11298	Resistor—5,600 ohms—carbon type, 1 watt (R47)	.22
11332	Resistor—22,000 ohms—carbon type, 1 watt (R48)—Package of 5	1.10
12487	Resistor—33,000 ohms—carbon type, 2 watt (R40)	.25

Stock No.	Description	List Price
12286	Resistor—56,000 ohms—insulated, 1/4 watt (R53)—Package of 5	1.00
12263	Resistor—100,000 ohms—insulated, 1/4 watt (R42, R43, R45, R51)—Package of 5	1.00
12452	Resistor—330,000 ohms—insulated, 1/4 watt (R37)—Package of 5	1.00
12285	Resistor—470,000 ohms—insulated, 1/4 watt (R44)—Package of 5	1.00
12486	Resistor—560,000 ohms—insulated, 1/4 watt (R38, R49)—Package of 5	1.00
4794	Socket—4-contact 5Z3 or 2A3 Radiotron socket	.15
11197	Socket—6-contact 6C5 Radiotron socket	.14
11198	Socket—7-contact 6H6 or 6L7 Radiotron socket	.15
12464	Transformer—Interstage transformer (T3, L35)	5.95
12463	Transformer—Power transformer, 105-125 volt, 50-60 cycle (T1)	8.58
	EJECT ARM ASSEMBLIES	
11541	Arm—Eject arm, complete	8.15
11533	Ball—1/16-inch diameter steel ball—Package of 10	.20
10129	Ball—3/16-inch diameter steel ball—Package of 20	.25
11529	Bearing—Ejector tip bearing and nut	.32
11538	Bracket—Eject arm bracket	1.72
11537	Collar—Eject arm shaft collar and set screw	.24
11540	Cover—Eject arm cover	1.52
11536	Cushion—Counter balance roller cushion located inside of eject arm	.14
4055	Post—Vertical adjustment post—located on eject arm bracket	.30
3729	Roller—Eject arm counter balance roller—located inside of eject arm	.45
4580	Screw—No. 6—32-3/16-inch square head set screw for eject arm collar—Package of 10	.25
11534	Screw—No. 8—36-7/32-inch special screw for eject arm tip center adjustment—Package of 10	.14
11535	Shaft and Collar—Eject arm vertical action shaft and collar assembly	.15
11528	Silencer—Ejector tip silencer	.14
4067	Spring—Ejector arm bracket spring—Package of 10	.30
11531	Spring—Ejector tip spring—Package of 10	.42
11530	Tip—Ejector tip with tip center, adjusting screw and cap	.32
11539	Yoke—Eject arm yoke assembly	.94
	PICKUP AND ARM ASSEMBLIES	
13627	Arm—Pickup arm, complete less pickup unit	8.45
11548	Back—Pickup back	.52
10941	Ball—Pickup arm pivot shaft ball bearing—Package of 20	.25
12543	Bracket—Pickup arm spring, adjusting bracket and screw	.12
13629	Cable—Pickup arm operating cable—Package of 5	1.20
12541	Coil—Pickup coil (L41)	.64
13630	Connector—Shielded pickup cable and connector assembly—approximately 43 inches long—less female connector	.45
11545	Cover—Pickup front cover	.22
11546	Cover—Pickup back cover with mounting screws	.14
12850	Damper—Damper assembly for pickup arm base—comprising one upper damper and bushing, one lower bushing and one lower bearing	.25
11723	Escutcheon—Pickup arm escutcheon	.62
14115	Mechanism—Comprising one armature and spring assembly, one armature clamp and one damper	1.35
13628	Pickup—Pickup unit, complete	7.00
12546	Plug—Pivot shaft bearing plug—Package of 2	.14
13631	Rod—Pickup arm trip rod and nut—Package of 5	.30
11549	Screw—Pickup front cover screw—Package of 10	.42
3387	Screw—Nut and washer for mounting pickup to arm—Package of 10	.50

The prices quoted above are subject to change without notice.

MODEL 15U
Parts, Page 2
Dial Change Mechanism

RCA MFG. CO., INC.

Stock No.	Description	List Price
12539	Screw—Pickup needle screw—Package of 10	.20
12544	Spring—Pickup arm adjusting spring—Package of 10	.25
	OPERATING MECHANISM	
13632	Cam—Cam and gear assembly	2.60
6808	Clutch—Trip lever friction clutch	.30
11558	Cover—Metal cover for trip lever and friction finger assembly	.36
6809	Finger—Manual index lever finger assembly	.25
3670	Finger—Friction finger assembly	.32
11554	Lever—Manual index lever—less pin	.62
13633	Lever—Main lever and link assembly	1.75
11537	Lever—Main spring lever	.42
11555	Lever—Trip lever and friction clutch assembly	.94
6503	Pawl—Trip pawl assembly	.40
3672	Pin—Manual index lever pin	.42
13635	Plate—Eject arm actuating plate assembly	.75
4364	Screw—Manual index lever finger set screw Package of 10	.20
4059	Screw—Trip lever clutch tension adjustment screw—Package of 10	.22
4366	Screw—Special screw used to fasten main lever and link assembly bushing—Package of 10	.30
13637	Spacer—Pickup arm mounting spacer	.60
13638	Spring—Actuating spring—Package of 10	.40
4365	Spring—Manual index lever finger tension spring—Package of 10	.30
4061	Spring—Main spring lever tension spring—Package of 10	.38
2893	Spring—Trip lever latch plate tension—Package of 10	.30
13634	Spring—Pickup arm cable tension spring—Package of 10	.35
3676	Spring—Cam and gear pawl tension spring—Package of 10	.52
13639	Spring—Cam and gear arm tension spring—Package of 10	.40
4125	Spring—Eject arm horizontal action tension spring—Package of 10	.42
13636	Stud—Pickup arm lift cable stud and nut—Package of 10	.40
2917	Washer—Spring washer—"U" type—Package of 10	.25
	MOTOR ASSEMBLIES	
9735	Motor—105-125 volts—25 cycles (M1)	49.50
9651	Motor—105-125 volts—50 cycles (M1)	35.35
9650	Motor—105-125 volts—60 cycles (M1)	35.35
12050	Suspension Spring—Motor mounting spring, washer, and stud assembly—Comprising six springs, six cup washers, three spring washers and three studs	.60
	AUTOMATIC SWITCH ASSEMBLIES	
3994	Cover—Motor switch cover	.26
10184	Plate—Automatic brake latch plate—Package of 5	.40
10174	Springs—Automatic brake springs—Package of 2 sets	.50
6805	Switch Assembly—Automatic switch, complete	1.90
3322	Switch—Motor switch (S9)	.75
	MOTOR BOARD ASSEMBLIES	
11881	Base—Phonograph compartment lamp socket and base	.55
12051	Capacitor—2 Mfd., complete with 2-contact male connector for use with motor, Stock No. 9650 or No. 9651 only (C74)	4.18
13101	Capacitor—4 Mfd., complete with 2-contact male connector for use with motor, Stock No. 9735 only (C74)	5.05
4674	Connector—2-contact male connector for Stock Nos. 12051, 13101 or phono compartment lamp leads	.25
4577	Connector—2-contact male connector for motor cable	.30
11488	Connector—2-contact female connector for motor leads	.14
11542	Cover—Turntable cover	.88
11553	Escutcheon—Index escutcheon engraved "Manual—12—10"	.44
4340	Lamp—Phonograph compartment lamp—6.3 volts—Package of 5	.60

Stock No.	Description	List Price
3764	Nut—Cap nut for motor board suspension assembly—Package of 4	.40
11551	Rest—Pickup rest	.14
3654	Roller—Pickup arm cable guide roller—Comprising bracket, roller and guide pin	.34
11711	Shade—Phonograph compartment lamp shade	.16
3763	Suspension Spring—Suspension spring, washer and bolt assembly for motor board—Comprising one bolt, two cup washers, two springs, two "C" washers and one cap nut	.42
4671	Switch—Operating switch—toggle type (S8)	.72
11599	Turntable—Complete	2.90
	REPRODUCER ASSEMBLIES	
13614	Coil—Field coil and magnet assembly (L38)	13.20
12474	Cone—Reproducer cone (L36)	1.35
12567	Plug—5-contact male reproducer plug	.22
9767	Reproducer—Complete	21.75
12568	Transformer—Output transformer (T4)	1.30
	MISCELLANEOUS CABLES AND PLUGS	
13644	Cable—3-conductor shielded compensation cable, approximately 33" long, complete with 4-contact male connector—connects compensator pack to phonograph volume control	2.20
12991	Cable—3-conductor shielded fidelity control cable, approximately 7¼" long—connects fidelity control to receiver	.50
13645	Cable—2-conductor shielded grid switching cable, approximately 18" long, complete with 4-contact female connector—connects radio-record switch to amplifier	1.25
13625	Cable—Shielded input cable, approximately 14" long, complete with 4-contact male connector—connects amplifier to radio-record switch	.50
13621	Cable—2-conductor pilot and compartment lamp cable, approximately 13" long, complete with two 2-contact female connectors	1.00
13626	Cable—3-conductor motor and power switch cable, approximately 7½" long, complete with two female connectors—connects amplifier to phonograph motor and receiver power switch	1.65
13642	Cable—2-conductor motor power cable, approximately 35" long, complete with one 2-contact male and one 2-contact female connectors—connects cable stock No. 13626 to motor leads	1.90
13623	Cable—Single conductor shielded output cable, approximately 5" long, complete with 2-contact female connector—connects receiver to radio-record switch	.55
13641	Cable—Single conductor shielded output cable, approximately 10½" long, complete with 2-contact male connector—connects radio-record switch to radio receiver	.60
13620	Cable—4-conductor plate and filament supply cable, approximately 9" long, complete with 4-contact male connector—connects receiver to amplifier power supply	1.05
13619	Cable—2-conductor power cable, approximately 27" long, complete with 2-contact male connector—connects power switch to amplifier	.60
13624	Cable—4-conductor plate and filament supply cable, approximately 6" long, complete with 4-contact female connector—connects amplifier power supply to receiver	1.25
13622	Cable—2-conductor shielded tone control cable, approximately 28" long, complete with 4-contact male connector—connects receiver tone control to amplifier	.75
12490	Cable—2-conductor shielded tone control cable, approximately 10" long, complete with female connector—connects amplifier to receiver tone control	.58
12985	Cable—Tuning lamp cable and socket	1.70

Stock No.	Description	List Price
12491	Cable—2-conductor shielded volume control cable, approximately 7½" long, complete with 2 female connectors—connects amplifier to phonograph volume control and expander control	.68
13643	Cable—2-conductor shielded volume control cable, approximately 37½" long, complete with two 2-contact male connectors—connects phonograph volume control and expander control to amplifier	2.00
4674	Connector—2-contact male connector for cable stock Nos. 13619, 13641, 13643, pilot lamp socket leads, compensator pack or input transformer cables	.25
11488	Connector—2-contact female connector for cable stock Nos. 12491, 13621, 13623, 13626 or input transformer cable	.14
4577	Connector—2-contact male connector for cable stock No. 13642	.30
12565	Connector—4-contact male connector for cable stock Nos. 13622, 13625 or 13644	.20
4573	Connector—2-contact female connector with oblong openings for cable stock Nos. 13626 or 13642	.30
12493	Connector—Speaker cable 5-contact female connector	.20
12494	Connector—4-contact female connector for cable stock Nos. 12490, 13645 or compensator pack cable	.18
11570	Connector—4-contact male connector for cable stock No. 13620	.32
11971	Connector—4-contact female connector for cable stock No. 13624	.55
	MISCELLANEOUS ASSEMBLIES	
5211	Bolt—Speaker mounting bolt assembly—Package of 2	.24
4391	Box—Used needle box	.70
13615	Bracket—Tuning lamp mounting bracket and clamp	.25
13103	Cap—Pilot lamp cap and bull's-eye—Package of 5	.65
12560	Compensator Pack—Phonograph compensator pack complete with two shielded cables and connectors (L32, L33, L34, L39, C75, C76, C77, R33, R34, R35)	3.74
12915	Crystal—Station selector escutcheon and crystal	1.30
11580	Cover—Pilot lamp cover	.12
12742	Escutcheon—Tuning lamp escutcheon	.22
12552	Expander Control (R32)	1.06
4340	Lamp—Pilot lamp—6.3 volts—Package of 5	.60
12699	Knob—Large station selector knob—Package of 5	.68
12700	Knob—Small vernier station selector knob—Package of 5	.58
11347	Knob—Low frequency tone control and power switch, radio-record switch, radio volume control, range switch, or high frequency tone control knob—Package of 5	.75
11582	Knob—Phonograph volume control or expander control knob—Package of 5	.50
11607	Receptacle—Needle card holder	.38
11829	Roller—Record pocket slide roller—Package of 2	.55
4560	Screw—Chassis mounting screw assembly (front)—Comprising one screw, one washer and one lock washer—Package of 10	.30
13102	Screw—Chassis mounting screw assembly (bottom)—Comprising one screw, two cushions, one spacer, one washer and one lock washer—Package of 2	.30
11573	Socket—Pilot lamp socket	.28
11349	Spring—Retaining spring for knob, Stock Nos. 11347, 11582 and 12700—Package of 5	.25
4982	Spring—Retaining spring for knob, Stock No. 12699—Package of 10	.50
12824	Switch—Radio-record switch (S6)	1.00
12555	Transformer—Phonograph input transformer (T2)	6.00
7217	Transformer—Step-down transformer for 220 volts, 50-60 cycle operation	17.40
12554	Volume Control—Phonograph volume control (R36)	1.52

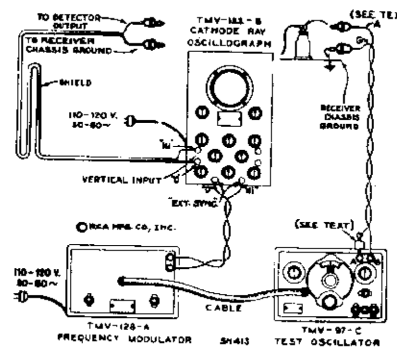


Figure 6—Alignment Apparatus Connections

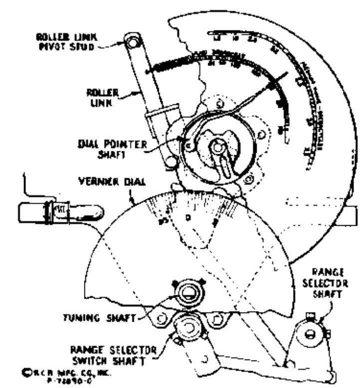


Figure 14—Selector Dial Change Mechanism

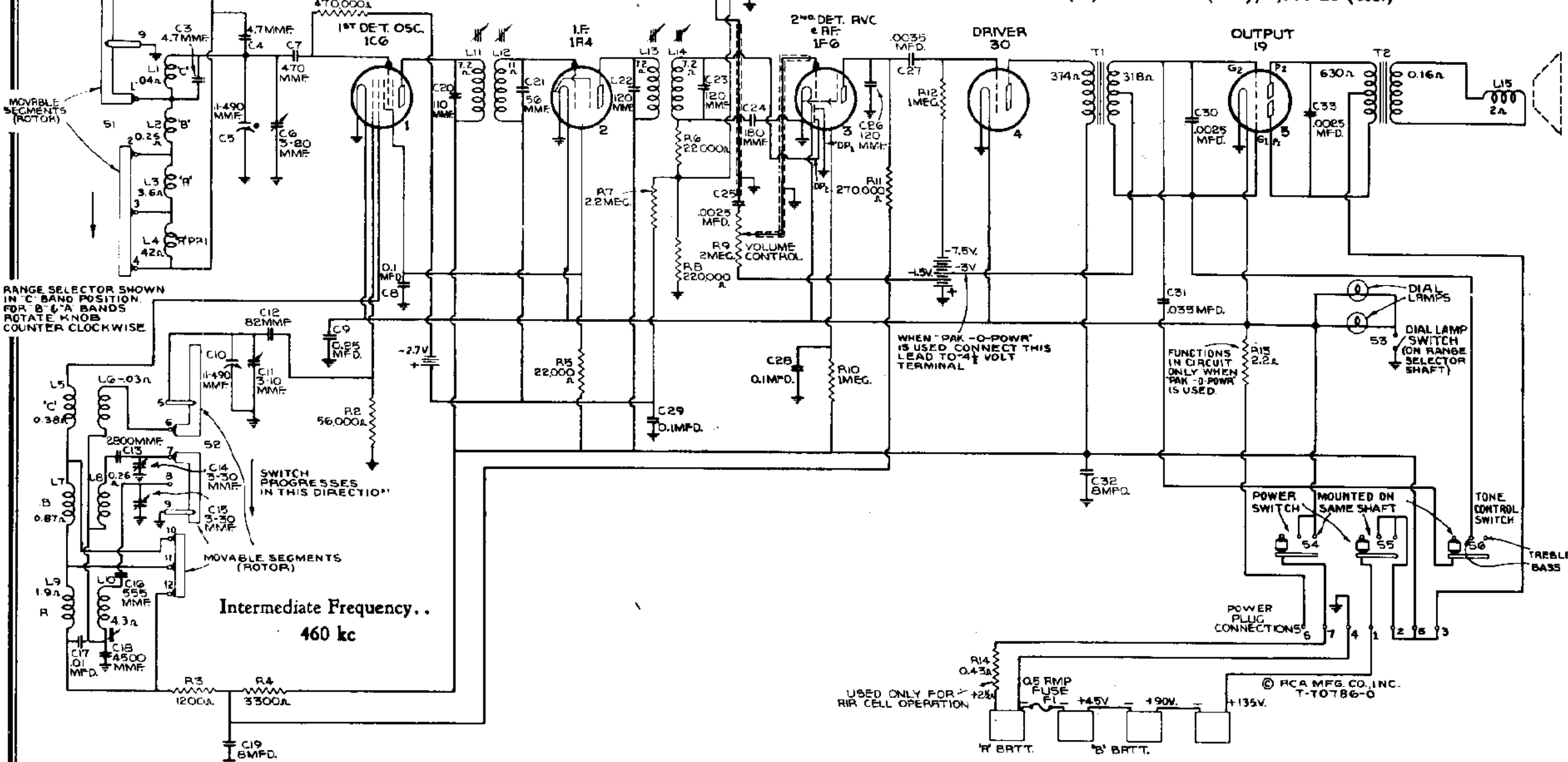
RCA MFG. CO., INC.

Frequency Ranges

"Standard Broadcast" (A)... 530—1,720 kc
"Medium Wave" (B)..... 2,100—6,800 kc
"Short Wave" (C)...... 6,800—22,000 kc

R-F Alignment Frequencies

"Short Wave" (C).................... 20,000 kc (osc.)
"Medium Wave" (B).............. 6,000 kc (osc., ant.)
"Standard Broadcast" (A)... 600 kc (osc.), 1,500 kc (osc.)



Pilot Lamps (2).. Mazda 2.0 volts, .06 ampere

Batteries Required

"A," one plug-in, 2½-volt Air Cell, or one 2-volt storage battery; "B," three 45-volt, heavy-duty, plug-in type B batteries; "C," one 7½-volt C battery tapped at —1½, —3, and —4½ volts, and three bias cells (Stock No. 12681).

Current Consumption

"A" at 2 volts (pilot lamps off).................................... 0.56 ampere
"A" at 2 volts (pilot lamps on).................................... 0.68 ampere
"B" at 135 volts.. 19 milliamperes
Fuse Rating.. ½ ampere

Power Output

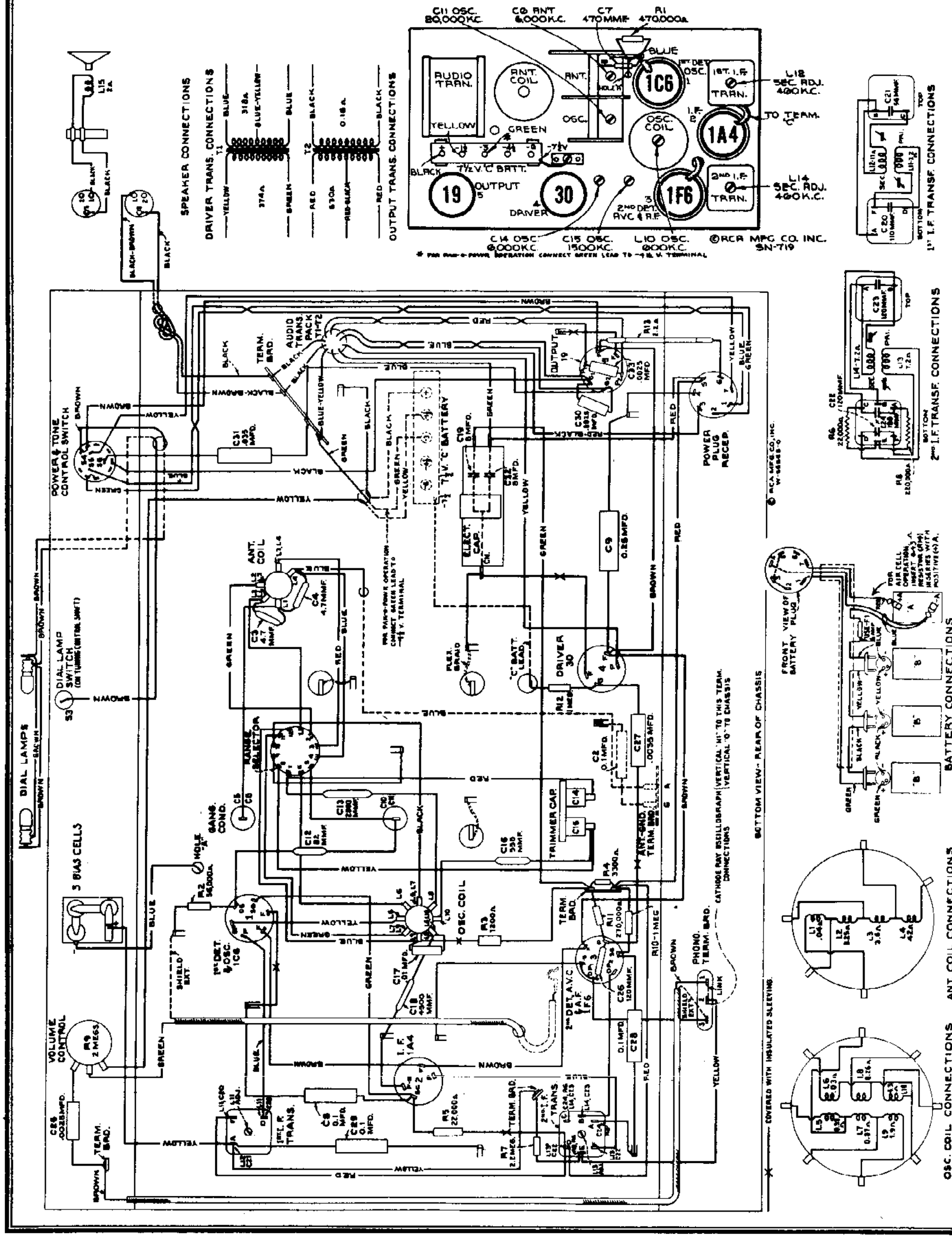
Undistorted .... 1.2 watts
Maximum .... 2.2 watts

Loudspeaker

Type...................... Permanent-Magnet Dynamic
Voice Coil Impedance............ 2.2 ohms at 400 cycles

MODELS 85BK,85BT
Chassis Wiring
Socket,Trimmers

RCA MFG. CO., INC.



RCA MFG. CO., INC.

Calibrate the tuning dial by adjusting main dial pointer to the low-frequency (end) calibration mark on dial with the gang tuning-condenser plates in full-mesh position; then adjust the small (vernier) pointer to "O." These are friction adjustments.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 1 and 4.

Cathode-ray alignment is highly preferable; the connections to the chassis are shown on figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver "G" (ground) terminal for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No-signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator			Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting				
1	1A4 I-F Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	2nd I-F Trans.	L13 & L14	Max. (peak)
2	1C6 Det. Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	1st I-F Trans.	L11 & L12	Max. (peak)
3	Ant. Term.	300 Ohms	20,000 kc	20,000 kc	"C" Osc.	C11	Max. (peak)*‡
4	Ant. Term.	300 Ohms	6,000 kc	6,000 kc	"B" Osc.	C14	Max. (peak)*
5	Ant. Term.	300 Ohms	6,000 kc	6,000 kc	"B" Ant.	C6	Max. (peak)
6	Ant. Term.	200 Mmfd.	600 kc	600 kc	"A" L-F Osc.	L10	Max. (peak)
7	Ant. Term.	200 Mmfd.	1,500 kc	1,500 kc	"A" H-F Osc.	C15	Max. (peak)
8	Ant. Term.	200 Mmfd.	600 kc	Rock thru 600 kc	"A" L-F Osc.	L10	Max. (peak)
9	Ant. Term.	200 Mmfd.	1,500 kc	Rock thru 1,500 kc	"A" H-F Osc.	C15	Max. (peak)

*** Use minimum capacity peak if two peaks can be obtained.**
‡ After this adjustment, check for image signal by shifting receiver dial to 19,080 kc.

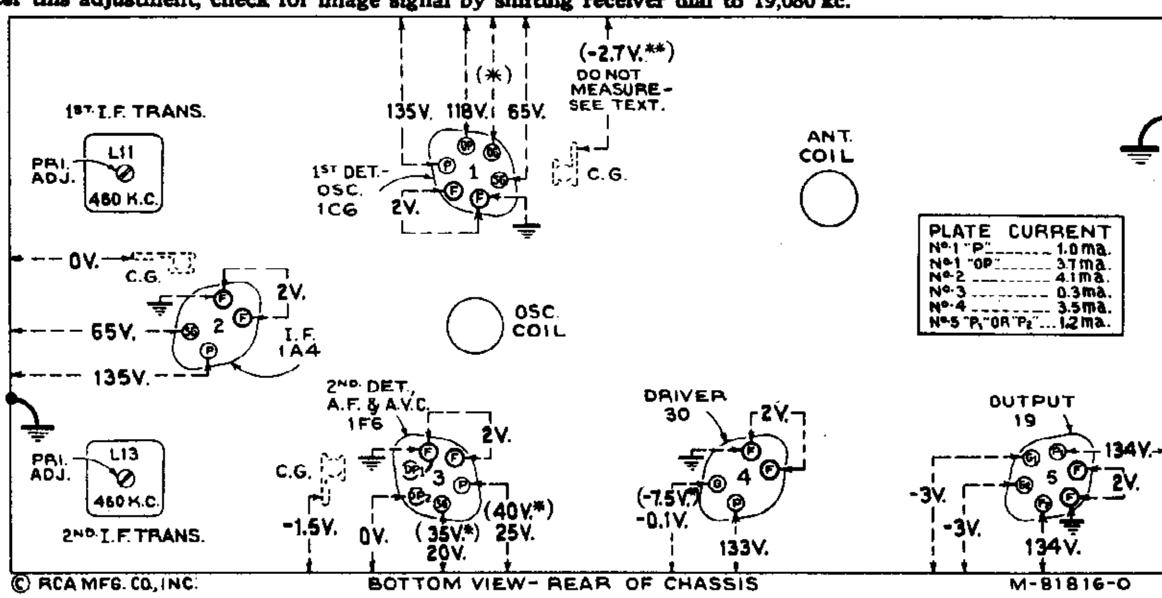


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured with all batteries at normal voltage—Tuned to approximately 1,000 kc—
No signal being received—Volume control minimum

*****CAUTION: Do not attempt to measure voltage on control grid of the 1C6 with any conventional voltmeter due to presence of bias cells.***

Note: Two voltage values are shown for some readings. The higher value shown in parenthesis with asterisk (*) indicates operating conditions without voltmeter loading. The lower value is the actual measured voltage and differs from the higher value because of the additional loading of the voltmeter through the high series circuit resistance.

MODELS 85BK, 85BT
Notes, Parts

RCA MFG. CO., INC.

Precautionary Lead Dress.—(1) Twisted leads from filament switch to power plug must be dressed against bottom of end shield and fastened with tape. (2) Keep leads of C18 as short as possible. (3) Lead from L1 to C5-C6 should be 3¼ inches long. (4) Lead from L1-L2 to range switch should be 1⅞ inches long. (5) Keep lead from range switch to C10-C11 as short as possible. (6) Keep lead from range switch to L6 as short as possible. (7) Yellow lead from 2nd i-f transformer to phonograph terminal board must be dressed away from other wiring.

Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio amplifying circuit. RCA Victor Model R-93-S Record Player should be connected as follows: Remove link between terminals 1 and 2 on terminal board. Connect green wire in Radio-Record switch cable to terminal 1, yellow to terminal 2, and shield extension to terminal 3. Tape unused red and blue leads separately. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch.

Bias Cells.—Three bias cells are used only for the purpose of supplying bias potential to the 1C6 first-detector—oscillator tube. These cells should never be measured with an ordinary voltmeter or other device which draws any current. A simple check on these cells may be made by connecting a milliammeter in the plate circuit of the 1C6 tube and noting the plate current reading. Then carefully remove the cells and substitute a battery potential of 2.7 volts in their place and note the new reading on the milliammeter. If the first reading obtained (with bias cells) is more than 40% from the latter reading (with 2.7-volt battery), the bias cells should be replaced. This 40% difference is equivalent to a change of approximately 25% battery voltage.

Operation With CV-8 Pak-O-Powr.—These receivers may readily be operated from an RCA CV-8 Pak-O-Powr, in which case, a six-volt storage battery replaces the "A" and "B" batteries listed under "Batteries required." When using the CV-8, one cell (2 volts) of the storage battery supplies filament voltage to the tubes, while the other two cells (4 volts) supplies power for the CV-8. When installing, the seven prong CV-8 receptacle plugs into the seven prong plug on the rear apron of the receiver chassis and the four battery leads clip on terminals of the storage battery as follows: Red to +6 V.; Blue to + 4 V.; Yellow to + 4 V.; and brown (fused lead) to —V. The two four-volt leads (Blue and Yellow) should make separate connections to the same battery strap to avoid vibrator buzz which might otherwise result if these two leads are joined together or touch each other. Observe extreme care that proper connections are made to the battery, as a wrong connection will burn out the tubes. The green lead (originally connected to — 3 v. on the "C" battery) should be shifted to the — 4.5 volt tap. The other "C" battery connections remain unchanged.

The following changes under "Electrical specifications" become effective when employing the CV-8; "A" battery current drain at 6 volts, 1.65 amperes. Fuse rating, 5 amperes. Undistorted output, 1.3 watts. Maximum output, 1.8 watts. Under "Service data," the following voltages apply to the RCA-19 power-output tube. Either plate to chassis, 180 volts. Either grid to chassis, —4½ volts. Plate current (either plate), 1.6 ma.

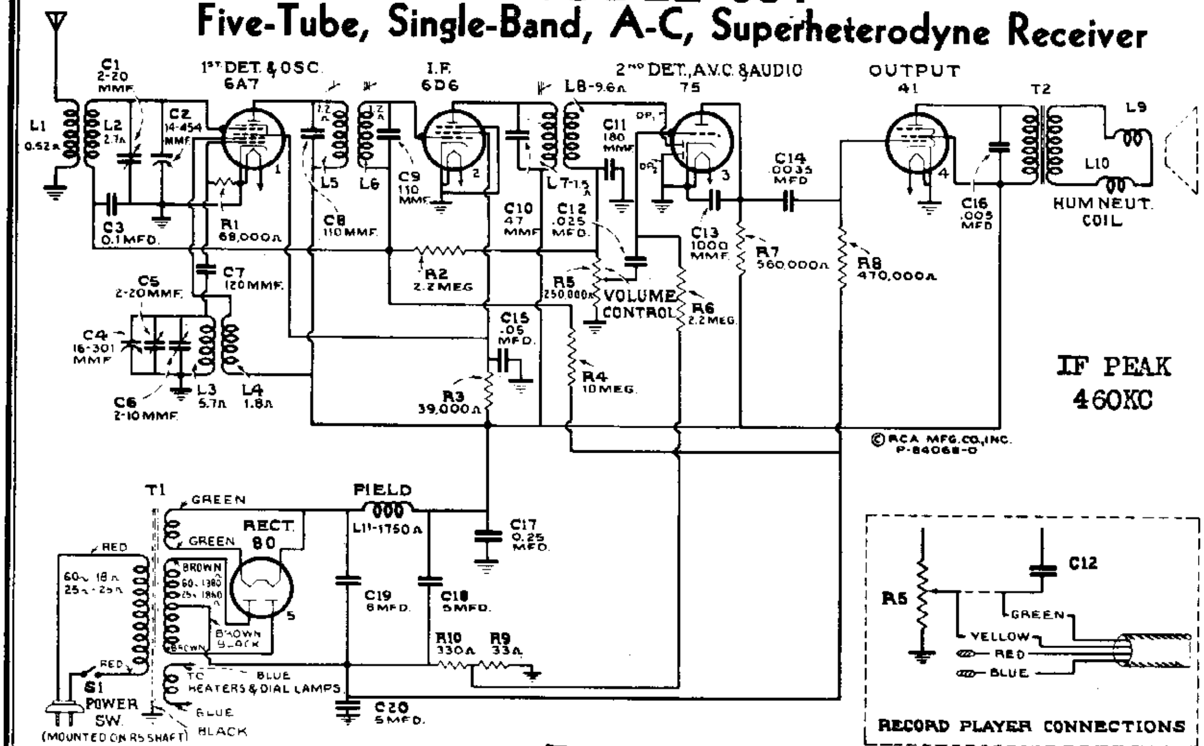
When servicing, the CV-8 chassis should be insulated from the receiver chassis to avoid vibrator buzz.

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14388	Belt—Variable condenser drive belt
13216	Board—Antenna and ground terminal board
12717	Board—Phonograph terminal board
14338	Bushing—Variable condenser mounting bushing and screw assembly
12607	Cap—First I.F. transformer shield top
12581	Cap—Second I.F. transformer shield top
12118	Cap—Grid contact cap
14383	Capacitor—Adjustable dual trimmer (C14, C15)
14392	Capacitor—4.7 Mmfd. (C3, C4)
12629	Capacitor—56 Mmfd. (C21)
12813	Capacitor—82 Mmfd. (C12)
14262	Capacitor—110 Mmfd. (C20)
12404	Capacitor—120 Mmfd. (C22, C23)
12724	Capacitor—120 Mmfd. (C26)
12406	Capacitor—180 Mmfd. (C24)
13052	Capacitor—470 Mmfd. (C7)
12727	Capacitor—555 Mmfd. (C6)
14407	Capacitor—2,800 Mmfd. (C13)
12728	Capacitor—4,500 Mmfd. (C18)
5107	Capacitor—.0025 Mfd. (C25, C30, C33)
5005	Capacitor—.0035 Mfd. (C27)
13138	Capacitor—.01 Mfd. (C17)
5196	Capacitor—.035 Mfd. (C31)
4841	Capacitor—0.1 Mfd. (C2, C8, C28, C29)
4840	Capacitor—0.25 Mfd. (C9)
5170	Capacitor—0.25 Mfd. (C25, C30, C33)
14403	Capacitor Pack—Comprising two sections each 8 Mfd. (C19, C32)
12681	Cell—Bias cell
14372	Coil—Antenna coil and shield (L1, L2, L3, L4)
14373	Coil—Oscillator coil and shield (L5, L6, L7, L8, L9, L10)
14397	Condenser—2-gang variable condenser (C5, C6, C10, C11)
5119	Connector—3-contact female connector for reproducer cable
12800	Core—Adjustable core and stud assembly for coil Stock No. 14373
12006	Core—Adjustable core and stud for I.F. transformer
14399	Dial—Station selector dial scale
14398	Drive—Variable condenser vernier drive pinion gear and shaft
14345	Drum—Variable condenser drive belt drum complete with set screws
30085	Gear—Indicator drive gear and hub assembly and pointer stem and gear assembly
14405	Holder—Bias cell holder
14341	Idler—Station selector drive belt idler
14344	Indicator—Station selector indicator pointer
14382	Indicator—Vernier indicator pointer
4348	Lamp—Dial lamp
14404	Plug—7-contact male plug located on rear apron of chassis for battery cable
14340	Pulley—Station selector drive belt pulley and knob shaft
14361	Reflector—Dial reflector and lamp bracket assembly
14343	Retainer—Drive shaft and pulley retainer—holds tuning knob shaft and pulley on range switch shaft
11283	Resistor—1,200 ohms, carbon type, ¼ watt (R3)
13737	Resistor—3,300 ohms, carbon type, ¼ watt (R4)
14284	Resistor—22,000 ohms, carbon type, 1/10 watt (R6)
11305	Resistor—22,000 ohms, insulated, ¼ watt (R5)
5029	Resistor—56,000 ohms, carbon type, ¼ watt (R2)
11398	Resistor—220,000 ohms, carbon type, 1/10 watt (R8)
11453	Resistor—270,000 ohms, carbon type, 1/10 watt (R11)
11452	Resistor—470,000 ohms, carbon type, 1/10 watt (R1)
12200	Resistor—1 megohm, insulated, ¼ watt (R12)
13730	Resistor—1 megohm, carbon type, ¼ watt (R10)
12679	Resistor—2.2 megohm, insulated, ¼ watt (R7)
14406	Resistor—2.2 ohms, flexible type, 3 watts (R13)
14350	Screw—No. 8-32x3/16 square head set screw for gear Stock No. 30085 and drum Stock No. 14345
14374	Shield—Antenna coil shield
13311	Shield—Chassis end shield and rubber mounting foot assembly
12008	Shield—I.F. transformer shield
14375	Shield—Oscillator coil shield
3682	Shield—Radiotron shield
14171	Socket—Dial lamp socket
4794	Socket—4-contact 1A4 or 30 Radiotron socket
4786	Socket—6-contact 1C6, 1F6 or 19 Radiotron socket
12007	Spring—Retaining spring for core Stock No. 12006
12907	Spring—Tension spring for indicator drive gear Stock No. 30085
14342	Spring—Tension spring for idler Stock No. 14341
14402	Switch—Range switch (S1, S2)
14401	Switch—Tone control switch and power switch (S3, S4, S5, S6)
12803	Transformer—Audio transformer pack (T1, T2)
14261	Transformer—First I.F. transformer (L11, L12, C20, C21)
14283	Transformer—Second I.F. transformer (L13, L14, C22, C23, C24, R6, R8)
14400	Volume Control (R9)
14379	Washer—Felt washer for indicator pointer
	REPRODUCER ASSEMBLIES (RL-73-1)
12642	Cone—Reproducer cone and dust cap (L15)
5118	Plug—3-contact male connector for reproducer
9712	Reproducer complete
	MISCELLANEOUS ASSEMBLIES
4289	Body—Fuse holder female body
4286	Bushing—Fuse holder bushing and ferrule
14408	Cable—Battery cable complete with fuse, fuse holder, one 7-contact female connector, three 2-contact male connectors and two battery clips
4288	Cap—Fuse holder male cap
14289	Clip—Battery clips, one marked "+" and one unmarked
12827	Connector—2-contact male connector for battery cable
14409	Connector—7-contact connector for battery cable
14396	Escutcheon—Station selector escutcheon and crystal
3748	Fuse—¼ ampere (F1)
4290	Insulator—Fuse holder insulating sleeve
14359	Knob—Station selector knob
14269	Knob—Volume control, tone control or range switch knob
14410	Resistor—0.43 ohms, flexible resistor, ¼ watt complete with clip (R14)
11210	Screw—Chassis mounting screw and washer assembly—for Model 85BK
11377	Screw—Chassis mounting screw and washer assembly—for Model 85BT
4284	Spring—Fuse holder tension spring
4982	Spring—Retaining spring for knob Stock No. 14359
14270	Spring—Retaining spring for knob Stock No. 14269
4285	Washer—Fuse holder insulating washer

RCA MFG. CO., INC.

MODEL 85T

Five-Tube, Single-Band, A-C, Superheterodyne Receiver



IF PEAK 460KC

Fig. 2.

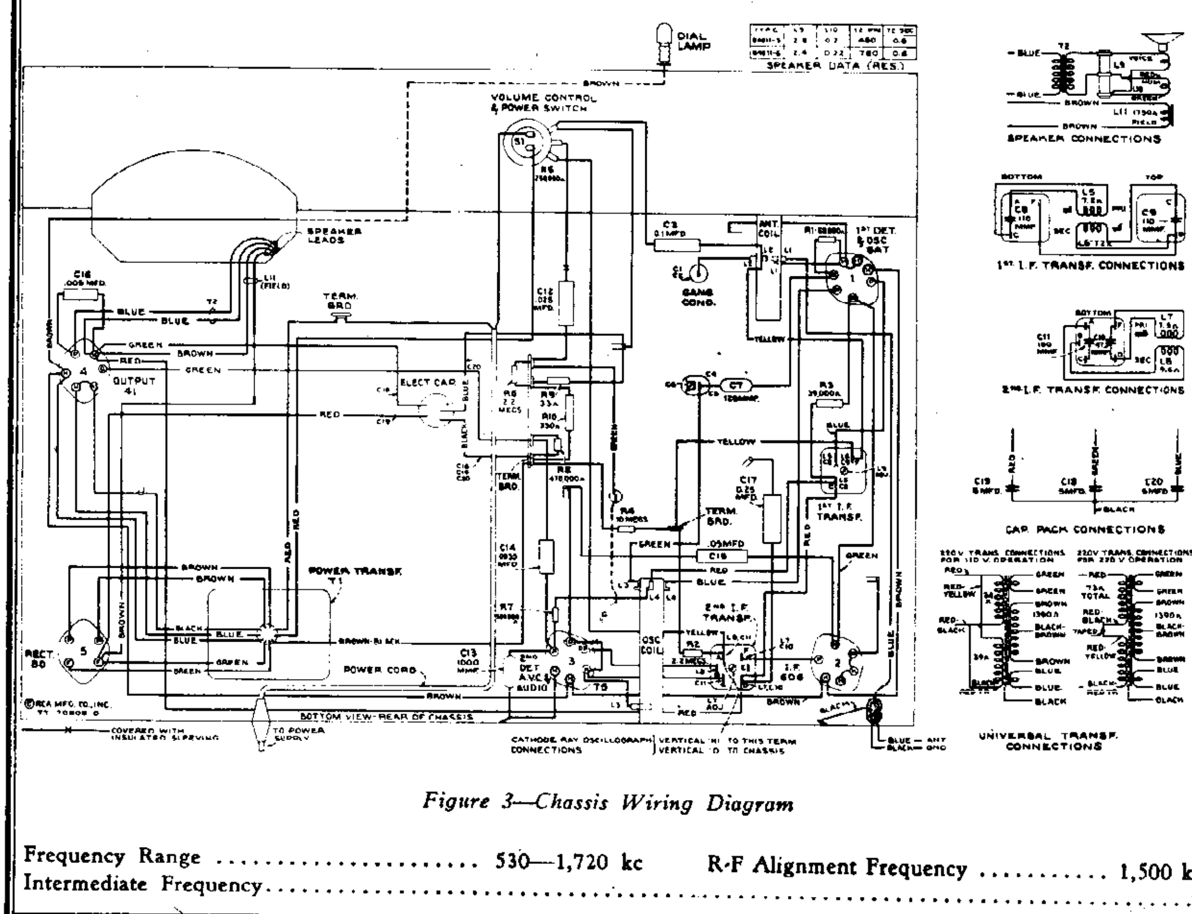


Figure 3—Chassis Wiring Diagram

LOUDSPEAKER
Type .... Electrodynamic
Voice Coil Impedance (84011-3) 3.1— / (84011-6) 2.7— ohms at 400 cycles

POWER OUTPUT RATING
Undistorted .. 1.0 watts
Maximum ... 2.5 watts

POWER SUPPLY RATINGS
Rating A .... 105-125 volts, 50-60 cycles, 55 watts
Rating B .... 105-125 volts, 25-60 cycles, 60 watts
Rating C .. 100-125/200-250 volts, 50-60 cycles, 55 watts
Pilot Lamp (1).... Mazda No. 46, 6.3 volts, 0.25 ampere

Frequency Range .... 530—1,720 kc R-F Alignment Frequency .... 1,500 kc (osc., ant.)
Intermediate Frequency.. 460 kc

MODEL 85T
Alignment, Voltage
Socket, Trimmers

RCA MFG. CO., INC.

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the center horizontal line with the gang tuning-condenser plates in full-mesh position. This is a screw-driver adjustment.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 1 and 4.

Cathode-ray alignment is preferable; the connections to the chassis are shown on figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator			Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting				
1	6D6 Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	2nd I-F Trans.	L7	Max. (peak)
2	6A7 Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	1st I-F Trans.	L5 and L6	Max. (peak)
3	Ant. Lead (blue)	200 Mmfd.	1,500 kc	1,500 kc	"A" Osc.	C5*	Max. (peak)
4	Ant. Lead (blue)	200 Mmfd.	1,500 kc	1,500 kc	"A" Ant.	C1	Max. (peak)

* Tighten capacitor C6 on bottom of gang (under chassis) for maximum capacity before adjusting C5.

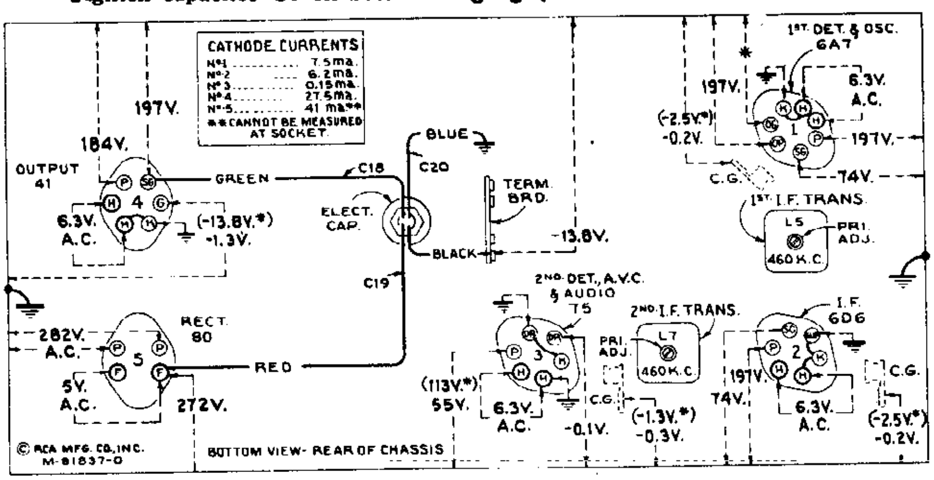


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Broadcast")—No signal being received—Volume control minimum

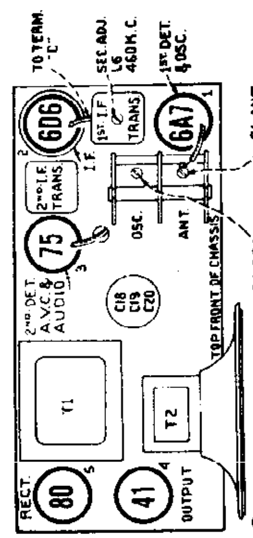


Figure 1—Radiotron, Coil, and Trimmer Locations

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

RCA MFG. CO., INC.

General Description

This receiver employs a superheterodyne circuit, the arrangement of which is shown on figure 2. Its design includes magnetite-core adjusted i-f transformers; automatic volume control; resistance-coupled audio system; and a 5-inch, electrodynamic loudspeaker.

RADIOTRON COMPLEMENT

(1) RCA-6A7 .... First Detector—Oscillator
(2) RCA-6D6 .... Intermediate Amplifier
(3) RCA-75 .... Second Det., A-F Amp. and A.V.C.
(4) RCA-41 .... Audio Power Amplifier
(5) RCA-80 .... Full-Wave Rectifier

Service Data

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation if such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such as R1, L1, C1, etc., provide reference between the illustrations and Replacement Parts List. The coils, transformer windings, and reactors are rated in terms of d-c resistance to permit continuity checks.

Precautionary Lead Dress—(1) The green RCA-75 grid cap lead should be twisted with the yellow lead to the volume control to maintain proper position for prevention of hum pickup. (2) The green lead from oscillator coil L3 to tuning condenser C4 should be kept free from chassis. (3) Keep power cord and red primary leads of power transformer away from the green RCA-41 grid lead to prevent hum pickup. (4) Red lead from electrolytic capacitor C19 to RCA-80 socket should be dressed between power transformer and chassis apron to prevent hum pickup.

Phonograph Attachment—See Schematic Circuit Diagram, figure 2.

Loudspeaker—Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14663	Belt—Variable condenser drive belt
14632	Bracket—Dial mounting bracket
12118	Cap—Grid contact cap
12405	Capacitor—47 Mmfd. (C10)
14262	Capacitor—110 Mmfd. (C8, C9)
12724	Capacitor—120 Mmfd. (C7)
12406	Capacitor—180 Mmfd. (C11)
12635	Capacitor—1,000 Mmfd. (C13)
5005	Capacitor—.0035 Mfd. (C14)
4838	Capacitor—.005 Mfd. (C16)
4870	Capacitor—.025 Mfd. (C12)
4886	Capacitor—.05 Mfd. (C15)
4841	Capacitor—0.1 Mfd. (C3)
12484	Capacitor—0.25 Mfd. (C17)
14669	Capacitor Pack—Comprising one 8-Mfd. and two 5-Mfd. sections (C18, C19, C20)
14670	Coil—Antenna coil (L1, L2)
14257	Coil—Oscillator coil (L3, L4)
14662	Condenser—2-gang variable condenser (C1, C2, C4, C5, C6)
12006	Core—Adjustable core and stud for I. F. transformer
14665	Dial—Station selector dial
14635	Indicator—Station selector indicator pointer
5226	Lamp—Dial lamp
14636	Pulley—Idler pulley—less spring
14664	Pulley—Variable condenser drive pulley—located on condenser shaft
14671	Resistor—33 Ohms—Carbon type, ¼ watt (R9)
11670	Resistor—330 Ohms—Carbon type, 1 watt (R10)
8067	Resistor—39,000 Ohms—Carbon type, ¼ watt (R3)
12333	Resistor—68,000 Ohms—Carbon type, ¼ watt (R1)
11172	Resistor—470,000 Ohms—Carbon type, ¼ watt (R8)
5035	Resistor—560,000 Ohms—Carbon type, ¼ watt (R7)
11626	Resistor—2.2 Megohm—Carbon type, ¼ watt (R2, R6)
13732	Resistor—10 Megohm—Carbon type, ¼ watt (R4)
5129	Ring—Radiotron shield ring
4389	Screw—No. 6—32x3/16 headless set screw for pulley, Stock No. 14639

STOCK No.	DESCRIPTION
14638	Shaft—Station selector knob shaft and pulley
12008	Shield—First I. F. transformer shield
12408	Shield—Second I. F. transformer shield
11265	Shield—Radiotron shield
14658	Socket—Dial lamp socket
4794	Socket—4-contact 80 Radiotron socket
4786	Socket—6-contact 6D6, 41 or 75 Radiotron socket
4787	Socket—7-contact 6A7 Radiotron socket
14637	Spring—Idler pulley tension spring
12007	Spring—Retaining spring for core, Stock No. 12006
14376	Transformer—First I. F. transformer (L5, L6, C8, C9)
14642	Transformer—Second I. F. transformer (L7, L8, C10, C11)
14666	Transformer—Power transformer, 105-125 volts, 50-60 cycle (T1)
14667	Transformer—Power transformer, 105-125 volts, 25-60 cycle (T1)
14668	Transformer—Power transformer, 100-125/200-250 volts, 50-60 cycle (T1)
14645	Volume Control and power switch (R5, S1)
	REPRODUCER ASSEMBLIES
14676	Cone—Reproducer cone (L9) for speaker marked 84011-3
14939	Cone—Reproducer cone (L9) for speaker marked 84011-6
14675	Reproducer complete (84011-3)
14677	Transformer — Output transformer (T2) for speaker marked 84011-3
14940	Transformer — Output transformer (T2) for speaker marked 84011-6
	MISCELLANEOUS ASSEMBLIES
14654	Escutcheon—Station selector escutcheon and crystal
12673	Knob—Station selector or volume control knob
14267	Screw—Chassis mounting screw and washer
4119	Screw—No. 8-32 x ¼ headless set screw for knob, Stock No. 12673

MODEL 85T1
Notes, Parts

RCA MFG. CO., INC.

General Description

This receiver employs a superheterodyne circuit, the arrangement of which is shown on figure 2. Its design includes magnetite-core adjusted i-f transformers; automatic volume control; resistance-coupled audio system; and a 5-inch, electrodynamic loudspeaker.

RADIOTRON COMPLEMENT

(1) RCA-6A7 .... First Detector—Oscillator
(2) RCA-6D6 .... Intermediate Amplifier
(3) RCA-75 .... Second Det., A-F Amp. and A.V.C.
(4) RCA-41 .... Audio Power Amplifier
(5) RCA-80 .... Full-Wave Rectifier

Service Data

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation if such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such as R1, L1, C1, etc., provide reference between the illustrations and Replacement Parts List. The coils, transformer windings, and reactors are rated in terms of d-c resistance to permit continuity checks.

Precautionary Lead Dress—(1) Dress power line leads to the on-off switch away from grid connection terminal on volume control to reduce hum pickup. (2) Keep leads of capacitor C3 as short as possible. (3) Bus lead from range selector (ter. 6) to oscillator coil tap L6L8 should be maintained 3½ inches long for proper alignment. (4) Capacitor C25 should be dressed free of adjacent parts to maintain correct alignment at high-frequency end of "A" band. (5) Bus lead from range selector (ter. 3) to antenna coil L1 should be maintained 2¼ inches long for proper alignment. (6) The RCA-6A7 grid-cap lead (50-ohm resistor R18) to top of tuning capacitor C2 should be dressed properly to prevent shorts and should be maintained flexible to prevent acoustic howl.

Phonograph Attachment—See Schematic Circuit Diagram, figure 2.

Loudspeaker—Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers.

REPLACEMENT PARTS

Insist on genuine factory tested parts which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14634	Belt—Variable condenser drive belt
14632	Bracket—Dial mounting bracket
5237	Bushing—Variable condenser rubber mounting bushing
12118	Cap—Grid contact cap
12896	Capacitor—15 Mmfd. (C25)
12405	Capacitor—47 Mmfd. (C14)
14262	Capacitor—110 Mmfd. (C11, C12)
12724	Capacitor—120 Mmfd. (C7)
12406	Capacitor—180 Mmfd. (C16)
12812	Capacitor—450 Mmfd. (C8)
14724	Capacitor—560 Mmfd. (C17)
30245	Capacitor—.0045 Mfd. (C3)
4858	Capacitor—.01 Mfd. (C20, C22)
13138	Capacitor—.01 Mfd. (C9, C18)
4839	Capacitor—0.1 Mfd. (C4, C13, C19, C21)
12484	Capacitor—0.25 Mfd. (C15)
11203	Capacitor—10 Mfd. (C24)
5212	Capacitor—16 Mfd. (C23)
14377	Capacitor—16 Mfd. (C10)
14646	Coil—Antenna coil (L1, L2, L3)
14647	Coil—Oscillator coil (L6, L7, L8)
14633	Condenser—2-gang variable tuning condenser (C1, C2, C5, C6)
14648	Core—Adjustable core and stud for oscillator coil
12006	Core—Adjustable core and stud for I. F. transformer
14631	Dial—Station selector dial
14651	Drive—Variable condenser vernier drive and pinion gear
14635	Indicator—Station selector indicator pointer
5226	Lamp—Dial lamp
14636	Pulley—Idler pulley—less spring
14639	Pulley—Variable condenser drive pulley—located on condenser shaft
14660	Resistor—18 Ohms—Insulated, ¼ watt (R14)
14653	Resistor—50 Ohms—Flexible type, 1/10 watt (R18)
13819	Resistor—270 Ohms—Wire wound, 1.1 watt (R15)
5175	Resistor—5,600 Ohms—Carbon type, ½ watt (R12)
14659	Resistor—6,800 Ohms—Carbon type, ½ watt (R3)
11305	Resistor—22,000 Ohms—Carbon type, ¼ watt (R16)
5033	Resistor—33,000 Ohms—Carbon type, 1 watt (R4)
13735	Resistor—33,000 Ohms—Carbon type, ¼ watt (R2)
11646	Resistor—47,000 Ohms—Carbon type, ¼ watt (R9)
11323	Resistor—270,000 Ohms—Carbon type, ¼ watt (R7, R8)
13733	Resistor—330,000 Ohms—Carbon type, ¼ watt (R1)
13479	Resistor—390,000 Ohms—Carbon type, ¼ watt (R10)
5035	Resistor—560,000 Ohms—Carbon type, ¼ watt (R6)
12679	Resistor—2.2 Megohm—Insulated, ¼ watt (R11)
14661	Resistor—6.8 Megohm—Insulated, ¼ watt (R13)
5129	Ring—Radiotron shield ring
4389	Screw—No. 6—32 x 3/16 headless set screw for pulley, Stock No. 14639
14638	Shaft—Station selector knob shaft and pulley
12008	Shield—First I. F. transformer shield
12408	Shield—Second I. F. transformer shield
11265	Shield—Radiotron shield
14658	Socket—Dial lamp socket
4794	Socket—4-contact 80 Radiotron socket
4786	Socket—6-contact 6D6, 42 or 75 Radiotron socket
4787	Socket—7-contact 6A7 Radiotron socket
14637	Spring—Idler pulley tension spring
12007	Spring—Retaining spring for core, Stock Nos. 12006 and 14648
14640	Switch—Range switch (S2, S3)
14376	Transformer—First I. F. transformer (L4, L5, C11, C12)
14642	Transformer—Second I. F. transformer (L9, L10, C14, C16)
14655	Transformer—Power transformer, 105-125 volts, 50-60 cycle (T1)
14656	Transformer—Power transformer, 105-125 volts, 25-60 cycle (T1)
14657	Transformer—Power Transformer, 100-125/200-250 volts, 50-60 cycle (T1)
14645	Volume Control and power switch (R5, S1)
	REPRODUCER ASSEMBLIES
14679	Cone—Reproducer cone (L11) for speaker marked 84010-3
14941	Cone—Reproducer cone (L11) for speaker marked 84010-1
14678	Reproducer complete marked 84010-3
14680	Transformer—Output transformer (T2) for speaker marked 84010-3
14942	Transformer—Output transformer (T2) for speaker marked 84010-1
	MISCELLANEOUS ASSEMBLIES
14654	Escutcheon—Station selector escutcheon and crystal
12673	Knob—Station selector, volume control or range switch knob
14267	Screw—Chassis mounting screw and washer
4119	Screw—No. 8—32 x ¼ headless set screw for knob, Stock No. 12673

MODEL 85T1
Schematic
Chassis Wirin

RCA MFG. CO., INC.

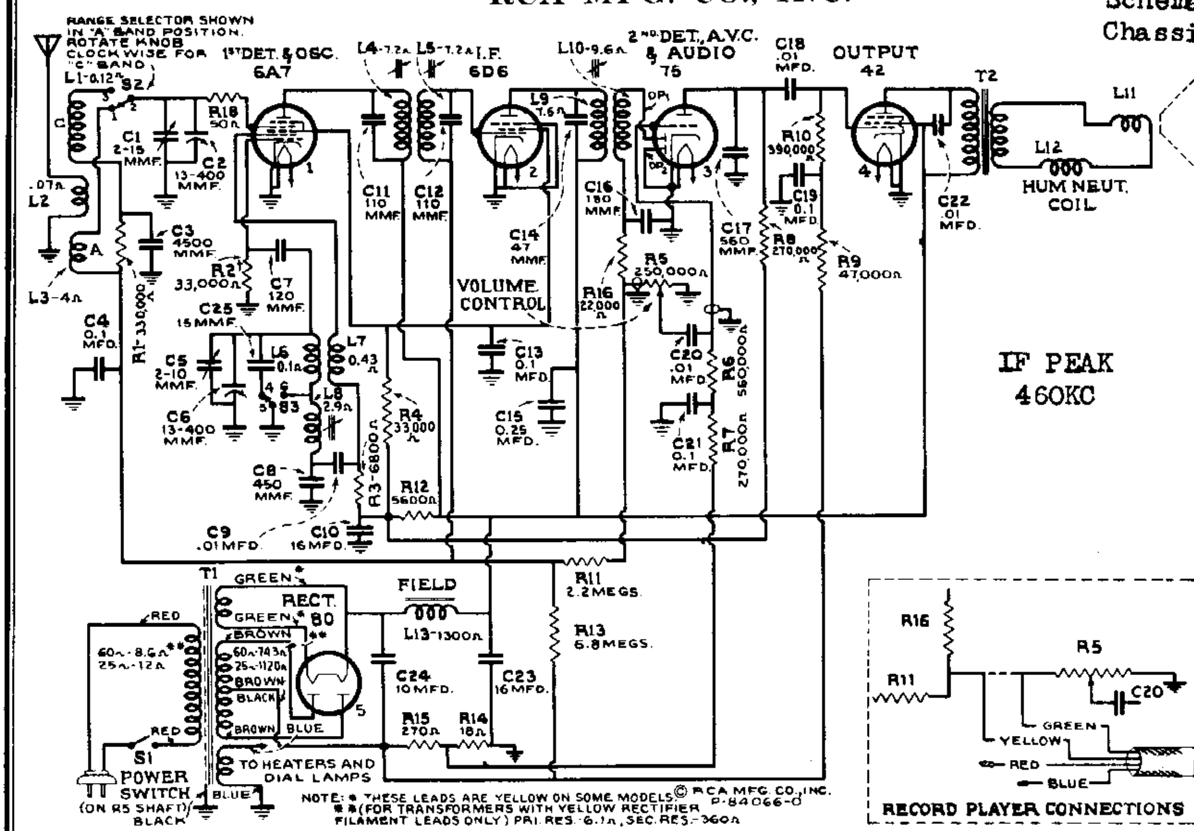
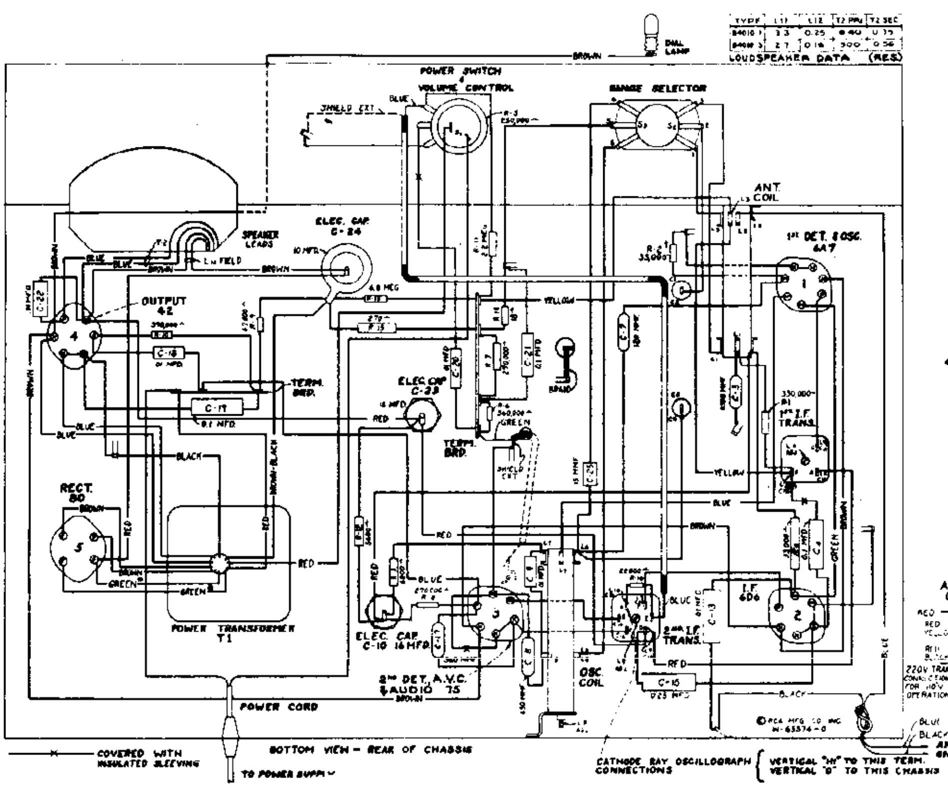
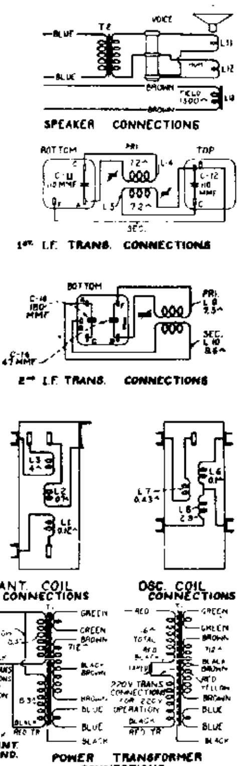


Figure 2—Schematic Circuit Diagram

† Resistor R2 is 56,000 ohms in some instruments. Replace with Stock No. 13735.





Power Output Rating
Undistorted .... 1.0 watts
Maximum .... 2.5 watts

Loudspeaker
Type .... Electrodynamic
Voice Coil Impedance (84011-3) 3.1— / (84011-6) 2.7— ohms at 400 cycles

Power Supply Ratings
Rating A .... 105-125 volts, 50-60 cycles, 55 watts
Rating B .... 105-125 volts, 25-60 cycles, 60 watts
Rating C .... 100-125/200-250 volts, 50-60 cycles, 55 watts

Frequency Ranges
"Broadcast" (A) .... 540-1,720 kc
"Short Wave" (C) .... 5,800-18,000 kc

R-F Alignment Frequencies
"Broadcast" (A) .... 600 kc (osc
"Short Wave" (C) .... 15,000 kc (osc., ant.

Intermediate Frequency .... 460 k

MODEL 85T1
Alignment, Socket
Trimmers, Voltage

RCA MFG. CO., INC.

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the center horizontal line with the gang tuning-condenser plates in full-mesh position. This is a screw-driver adjustment.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 1 and 4.

Cathode-ray alignment is preferable; the connections to the chassis are shown on figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output-terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator			Range-Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting					
1	6D6 I-F Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	2nd I-F Trans.	L9	Max. (peak)
2	6A7 Det. Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	1st I-F Trans.	L4 and L5	Max. (peak)
3	Ant. Lead (blue)	300 Ohms	15,000 kc	"C" Right	15,000 kc	"C" Osc.	C5	Max. (peak)†
4	Ant. Lead (blue)	300 Ohms	15,000 kc	"C" Right	Rock Through 15,000 kc	"C" Ant.	C1	Max. (peak)* ‡
5	Ant. Lead (blue)	200 Mmfd.	600 kc	"A" Left	600 kc	"A" Osc.	L8	Max. (peak)

† Use maximum capacity peak if two peaks can be obtained.
*** Use minimum capacity peak if two peaks can be obtained.**
‡ After this adjustment, check for image signal by shifting receiver dial to 15,920 kc.

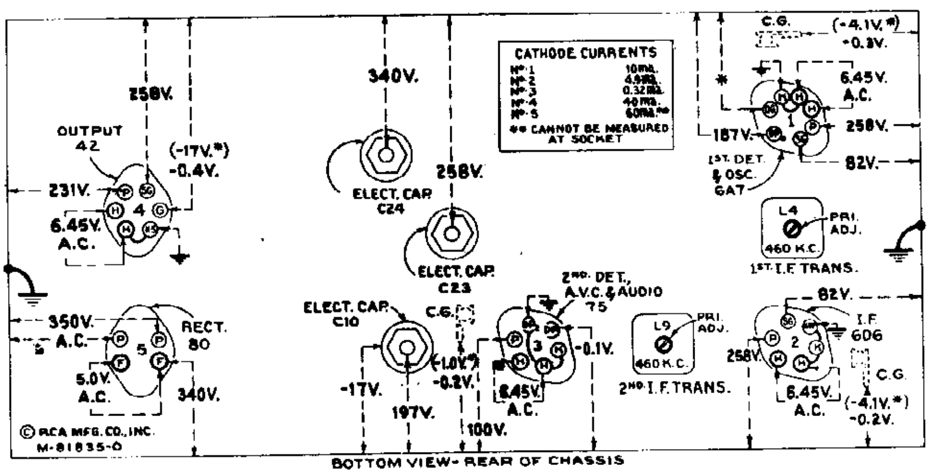


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations
Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Broadcast")—No signal being received—Volume control minimum

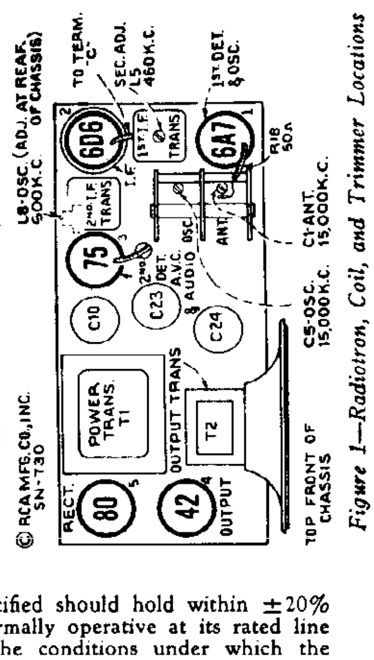


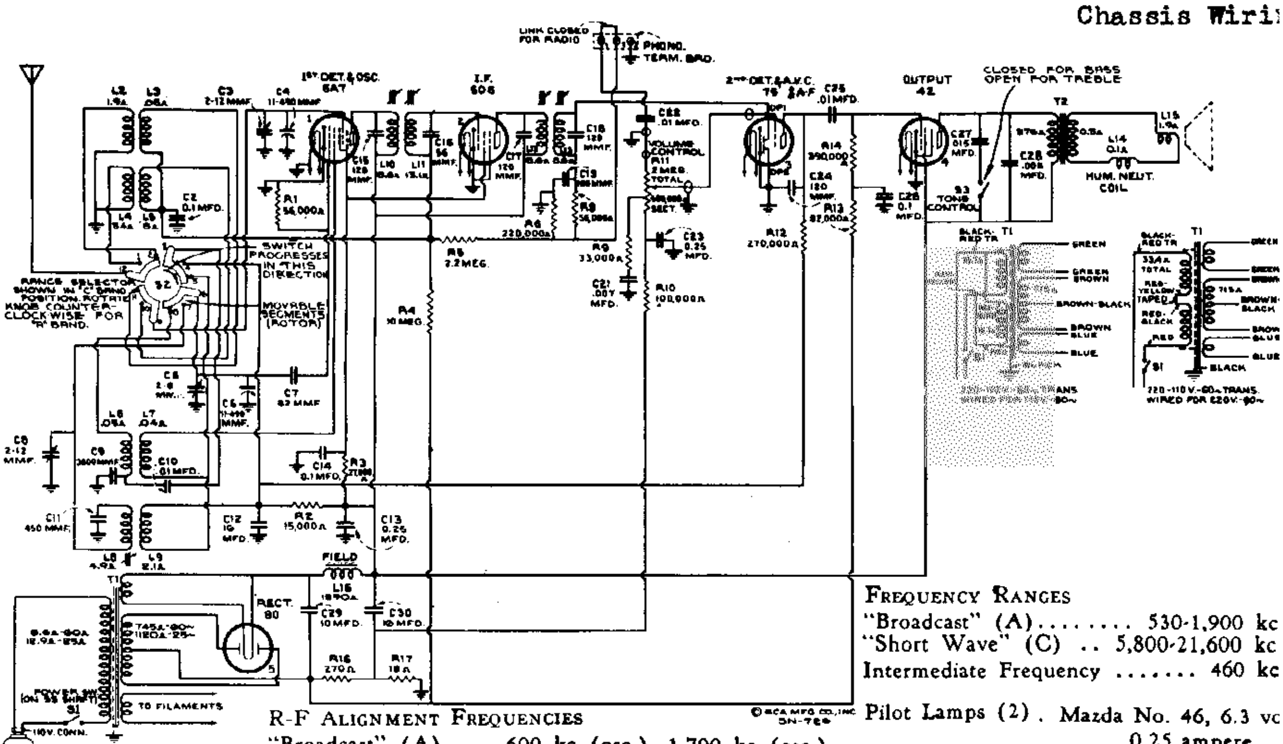
Figure 1—Radiotron, Coil, and Trimmer Locations

***Note:** Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.*

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

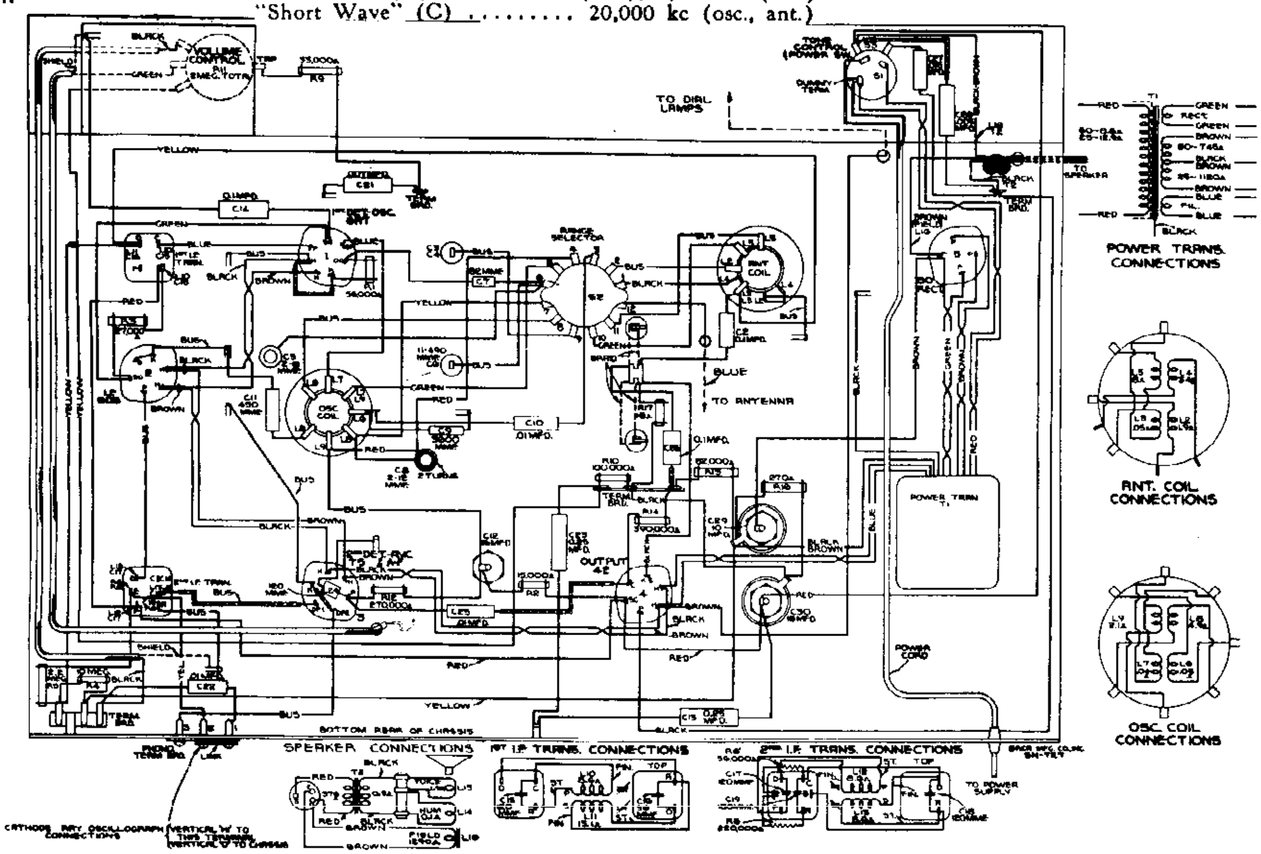
MODEL 85T5
Schematic
Chassis Wiri

RCA MFG. CO., INC.



FREQUENCY RANGES
"Broadcast" (A) .... 530-1,900 kc
"Short Wave" (C) .. 5,800-21,600 kc
Intermediate Frequency .... 460 kc
Pilot Lamps (2) . Mazda No. 46, 6.3 vo
0.25 ampere

R-F ALIGNMENT FREQUENCIES
"Broadcast" (A).... 600 kc (osc.), 1,700 kc (osc.)
"Short Wave" (C) .... 20,000 kc (osc., ant.)



POWER SUPPLY RATINGS
Rating A .... 105-125 volts, 50-60 cycles, 75 wat
Rating B .... 105-125 volts, 25-60 cycles, 75 wat
Rating C .... 100-125/200-250 volts, 50-60 cycles, 75 wat

POWER OUTPUT RATING
Undistorted .... 2.0 watts
Maximum .... 4.5 watts

LOUDSPEAKER
Type .... Electrodynam
Voice Coil Impedance .... 2¼ ohms at 400 cycl

MODEL 85T5
Alignment, Socket
Trimmers

RCA MFG. CO., INC.

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the low-frequency (end) calibration mark on "Broadcast" scale with the gang tuning-condenser plates in full-mesh position. This is a friction adjustment.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 1 and 4.

Cathode-ray alignment is preferable; the connections to the chassis are shown on Figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal, or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator			Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting				
1	6D6 I-F Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	2nd I-F Trans.	L12 and L13	Max. (peak)
2	6A7 Det. Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	1st I-F Trans.	L10 and L11	Max. (peak)
3	Ant. Post	300 Ohms	20,000 kc	20,000 kc	"C" Osc.	C5	Max. (peak)*
4	Ant. Post	300 Ohms	20,000 kc	Rock Thru 20,000 kc	"C" Ant.	C3	Max. (peak)†
5	Ant. Post	200 Mmfd.	600 kc	600 kc	"A" L-F Osc.	L8	Max. (peak)
6	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	"A" H-F Osc.	C8	Max. (peak)
7	Ant. Post	200 Mmfd.	600 kc	Rock Thru 600 kc	"A" L-F Osc.	L8	Max. (peak)
8	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	"A" H-F Osc.	C8	Max. (peak)

* Use minimum capacity peak.
† Use maximum capacity peak.

Precautionary Lead Dress.—(1) Keep leads of C2 and C9 as short as possible. (2) Dress leads from power transformer and a-c switch away from antenna coil and associated wiring. (3) Red lead from range selector "ter 4" to oscillator coil L9 should have two tight turns around trimming capacitor C8.

Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio-amplifying circuit. RCA Victor Models R-93, R-93-A, R-93-2, R-93-S, or

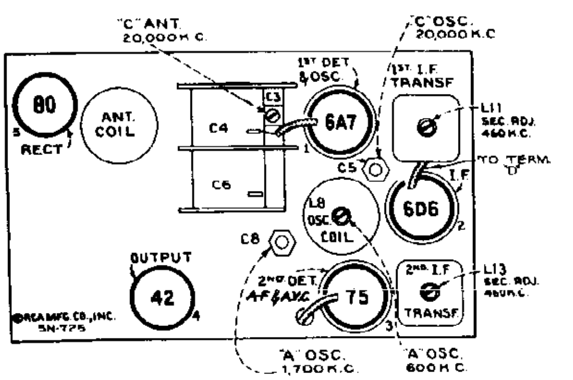
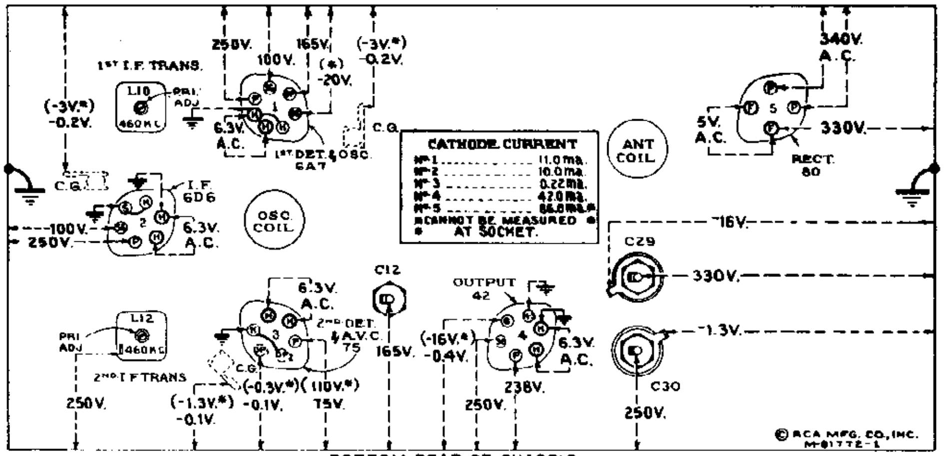


Figure 1—Radiotron, Coil, and Trimmer Locations

R-94 Record Players should be connected as follows: Remove link between terminals 1 and 2 on receiver. Connect green wire in Radio-Record switch cable to terminal 1, yellow to terminal 2; and shield extension to terminal 3. Tape unused red and blue leads separately. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch.

Loudspeaker.—Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

RCA MFG. CO., INC.



BOTTOM REAR OF CHASSIS

Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations
Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Broadcast")—
No signal being received—Volume control minimum

***Note:** Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.*

Voltage values as specified should hold with in ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14352	Belt—Variable condenser drive belt
12717	Board—Phonograph terminal board
14338	Bushing—Variable condenser mounting bushing assembly
12607	Cap—First I.F. transformer shield top
12581	Cap—Second I.F. transformer shield top
12118	Cap—Grid contact cap
12714	Capacitor—Adjustable trimmer (Medium) (C8)
12807	Capacitor—Adjustable trimmer (Short) (C5)
12629	Capacitor—56 Mmfd. (C16)
13394	Capacitor—82 Mmfd. (C7)
12404	Capacitor—120 Mmfd. (C15, C17, C18)
12724	Capacitor—120 Mmfd. (C24)
12406	Capacitor—180 Mmfd. (C19)
12812	Capacitor—450 Mmfd. (C11)
12811	Capacitor—3,600 Mmfd. (C9)
5148	Capacitor—.007 Mfd. (C21)
4868	Capacitor—.005 Mfd. (C28)
11315	Capacitor—.015 Mfd. (C27)
4858	Capacitor—.01 Mfd. (C10, C22, C25)
4841	Capacitor—0.1 Mfd. (C2, C14, C26)
4840	Capacitor—0.25 Mfd. (C23)
5170	Capacitor—0.25 Mfd. (C13)
11240	Capacitor—10 Mfd. (C29)
5212	Capacitor—16 Mfd. (C30)
14377	Capacitor—16 Mfd. (C12)
12797	Coil—Antenna coil and shield (L2, L3, L4, L5)
12798	Coil—Oscillator coil and shield (L6, L7, L8, L9)
14348	Condenser—2-gang variable tuning condenser (C3, C4, C6)
5119	Connector—3-contact female connector for speaker cable
12800	Core—Adjustable core and stud assembly for coil Stock No. 12798
12006	Core—Adjustable core and stud for transformer Stock No. 12801 and No. 12653
14339	Dial—Station dial and mounting bracket assembly
14353	Drive—Variable condenser vernier drive pinion gear and shaft
14345	Drum—Variable condenser drive belt drum complete with set screws
14349	Gear—Indicator drive gear and hub complete with set screws
14351	Gear—Indicator pointer stem and gear complete with tension spring
14341	Idler—Station selector drive belt idler
14344	Indicator—Station selector indicator pointer
5226	Lamp—Dial lamp
14028	Nut—Jamb nut for trimmer capacitors
14340	Pulley—Station selector drive belt pulley and knob shaft
14347	Reflector—Dial reflector and lamp bracket assembly
14343	Retainer—Drive shaft and pulley retainer—holds tuning knob shaft and pulley on range switch shaft
13674	Resistor—18 Ohms, Carbon type, ½ watt (R17)
13819	Resistor—270 Ohms, Insulated wire wound, 1.1 watt (R16)
12759	Resistor—15,000 Ohms, Carbon type, ¼ watt (R2)
13177	Resistor—27,000 Ohms, Carbon type, 1 watt (R3)
13735	Resistor—33,000 Ohms, Carbon type, ¼ watt (R9)
5029	Resistor—56,000 Ohms, Carbon type, ¼ watt (R1)
11282	Resistor—56,000 Ohms, Carbon type, 1/10 watt (R8)
11365	Resistor—82,000 Ohms, Carbon type, ¼ watt (R13)
5145	Resistor—100,000 Ohms, Carbon type, ¼ watt (R10)
11398	Resistor—220,000 Ohms, Carbon type, 1/10 watt (R6)
11323	Resistor—270,000 Ohms, Carbon type, ¼ watt (R12)
13479	Resistor—390,000 Ohms, Carbon type, ¼ watt (R14)
11626	Resistor—2.2 Megohm, Carbon type, ¼ watt (R5)
13732	Resistor—10 Megohm, Carbon type, ¼ watt (R4)
14350	Screw—No. 8-32 x 3/16 Square head set screw for gear Stock No. 14349 and drum Stock No. 14345
12799	Shield—Antenna or oscillator coil shield
13311	Shield—Chassis end shield and mounting bracket assembly
12008	Shield—I. F. transformer shield for Stock No. 12801 and No. 12653
3682	Shield—Shield for 75 Radiotron
3950	Shield—Shield for 6D6 Radiotron
14114	Socket—Dial lamp socket
4794	Socket—4 contact 80 Radiotron socket
4786	Socket—6 contact 6D6, 42 or 75 Radiotron socket
4787	Socket—7 contact 6A7 Radiotron socket
12007	Spring—Retaining spring for core Stock No. 12006
14342	Spring—Tension spring for idler Stock No. 14341
12907	Spring—Tension spring for indicator gear Stock No. 14351
14336	Switch—Range switch (S2)
14337	Switch—Tone control switch and power switch (S1, S3)
12801	Transformer—First I. F. transformer (L10, L11, C15, C16)
12653	Transformer—Second I. F. transformer (L12, L13, C17, C18, R6, R8)
13392	Transformer—Power transformer, 105-125 volts, 50-60 cycle (T1)
13566	Transformer—Power transformer, 105-125 volts, 25-60 cycles (T1)
13393	Transformer—Power transformer, 105-125, 210-250 volts, 50-60 cycle (T1)
14335	Volume Control—(R11)
13192	Washer—Felt washer for indicator pointer
	REPRODUCER ASSEMBLIES (RL-63F-1)
14356	Board—3 contact reproducer terminal board
13866	Cap—Cone center dust cap
12012	Coil—Field coil (L16)
11469	Coil—Hum neutralizing coil (L14)
12842	Cone—Reproducer cone and dust cap (L15)
5118	Plug—3 contact male plug for reproducer
14360	Reproducer—Reproducer complete
14358	Screw—Screw, washer and lockwasher to hold core in yoke
14355	Transformer—Output transformer (T2)
14357	Washer—Spring washer to hold field coil
	MISCELLANEOUS ASSEMBLIES
14479	Escutcheon—Station selector escutcheon and crystal
14269	Knob—Volume control, tone control or range switch knob
14359	Knob—Station selector knob
11377	Screw—Chassis mounting screw and washer assembly
4982	Spring—Retaining spring for knob Stock No. 14359
14270	Spring—Retaining spring for knob Stock No. 14269

MODELS 86BK, 86BT
Notes, Parts

RCA MFG. CO., INC.

Precautionary Lead Dress.—(1) Twisted leads from filament switch to power plug must be dressed against bottom of end shield and fastened with tape. (2) Lead from term. No. 6 of S3 to chassis must be as short as possible and to same chassis lance as C15-C34. (3) Keep lead from term. No. 9 of S3 to L7-L8 as short as possible. (4) Keep lead from L7 to C11 as short as possible. (5) Keep lead from C10 to C11 as short as possible. (6) Keep leads of C41 as short as possible. (7) Keep lead from term. No. 20 of S2 to C13 as short as possible.

Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio amplifying circuit. RCA Victor Model R-93-S Record Player should be connected as follows: Remove link between terminals 1 and 2 on terminal board. Connect green wire in Radio-Record switch cable to terminal 1, yellow to terminal 2, and shield extension to terminal 3. Tape unused red and blue leads separately. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch.

Loudspeaker.—Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

Bias Cells.—Three bias cells are used only for the purpose of supplying bias potential to the 1C6 first-detector—oscillator tube. These cells should never be measured with an ordinary voltmeter or other device which draws any current. A simple check on these cells may be made by connecting a milliammeter in the plate circuit of the 1C6 tube and noting the plate current reading. Then carefully remove the cells and substitute a battery potential of 2.7 volts in their place and note the new reading on the milliammeter. If the first reading obtained (with bias cells) is more than 40% from the latter reading (with 2.7-volt battery), the bias cells should be replaced. This 40% difference is equivalent to a change of approximately 25% battery voltage.

Operation With CV-8 Pak-O-Powr.—These receivers may readily be operated from an RCA CV-8 Pak-O-Powr, in which case, a six-volt storage battery replaces the "A" and "B" batteries listed under "Batteries required." When using the CV-8, one cell (2 volts) of the storage battery supplies filament voltage to the tubes, while the other two cells (4 volts) supplies power for the CV-8. When installing, the seven prong CV-8 receptacle plugs into the seven prong plug on the rear apron of the receiver chassis and the four battery leads clip on terminals of the storage battery as follows: Red to + 6 V.; Blue to + 4 V.; Yellow to + 4 V.; and brown (fused lead) to —V. The two four-volt leads (Blue and Yellow) should make separate connections to the same battery strap to avoid vibrator buzz which might otherwise result if these two leads are joined together or touch each other. Observe extreme care that proper connections are made to the battery, as a wrong connection will burn out the tubes. The green lead (originally connected to — 3 v. on the "C" battery) should be shifted to the — 4.5 volt tap. The other "C" battery connections remain unchanged.

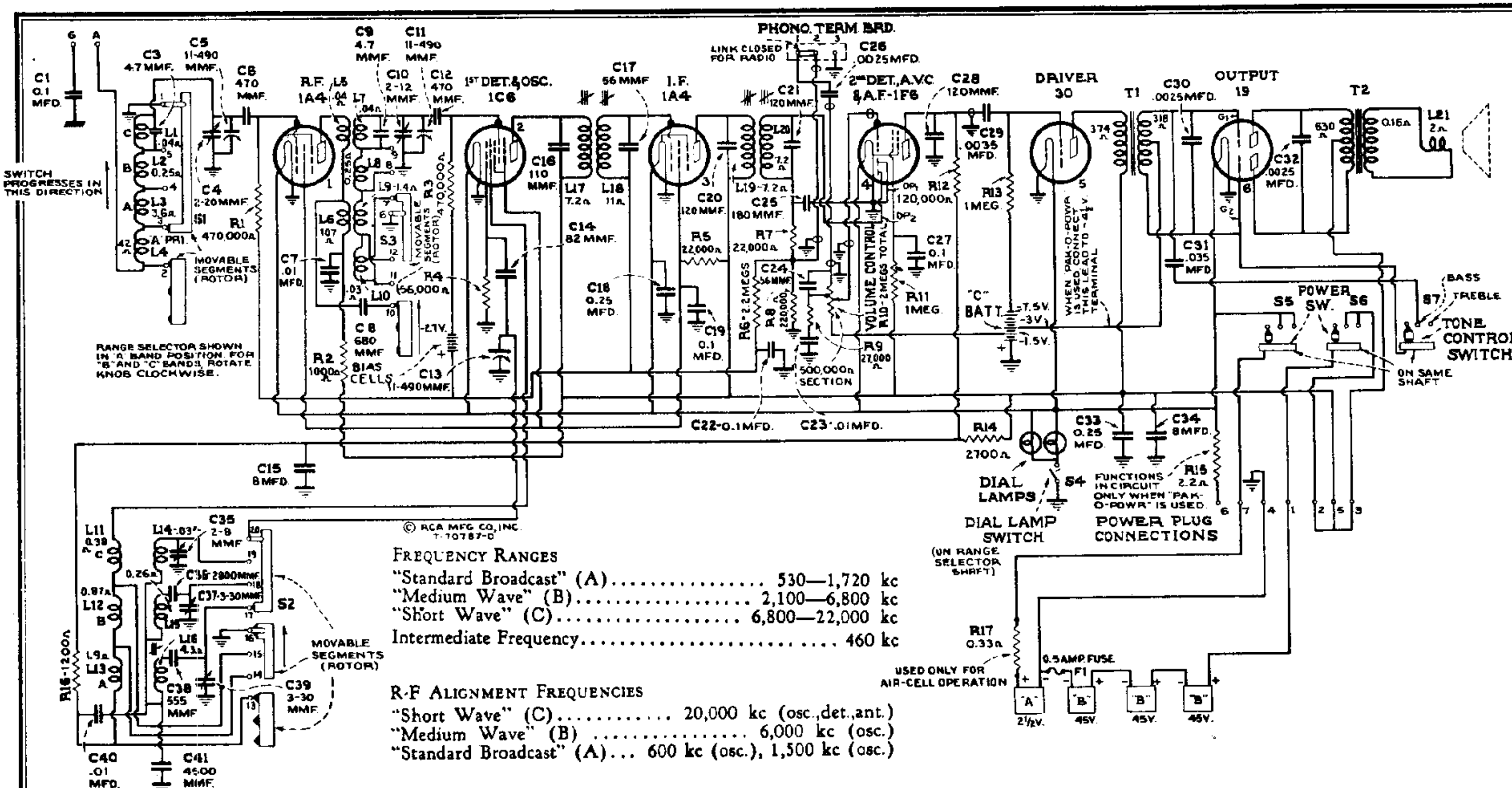
STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14368	Belt—Variable condenser drive belt
12717	Board—Phonograph terminal board
13216	Board—Antenna and ground terminal board
14338	Bushing—Variable condenser mounting bushing and screw assembly
12607	Cap—First I.F. transformer shield top
12581	Cap—Second I.F. transformer shield top
12118	Cap—Grid contact cap
14392	Capacitor—4.7 Mmfd. (C3, C9)
12629	Capacitor—56 Mmfd. (C17)
12723	Capacitor—56 Mmfd. (C24)
12813	Capacitor—82 Mmfd. (C14)
14262	Capacitor—110 Mmfd. (C16)
12724	Capacitor—120 Mmfd. (C28)
12404	Capacitor—120 Mmfd. (C20, C21)
12406	Capacitor—180 Mmfd. (C25)
13052	Capacitor—470 Mmfd. (C6, C12)
12727	Capacitor—555 Mmfd. (C38)
14417	Capacitor—680 Mmfd. (C8)
14407	Capacitor—2,800 Mmfd. (C36)
12728	Capacitor—4,500 Mmfd. (C41)
5005	Capacitor—.0035 Mfd. (C29)
5107	Capacitor—.0025 Mfd. (C26, C30, C32)
5196	Capacitor—.035 Mfd. (C31)
13138	Capacitor—.01 Mfd. (C7, C23, C40)
4841	Capacitor—0.1 Mfd. (C1, C19, C22, C27)
4840	Capacitor—0.25 Mfd. (C18, C33)
14383	Capacitor—Adjustable dual trimmer (C37, C39)
12884	Capacitor—Adjustable trimmer (long) (C4)
12714	Capacitor—Adjustable trimmer (medium) (C10)
12807	Capacitor—Adjustable trimmer (short) (C35)
14403	Capacitor—Pack comprising two sections each 8 Mfd. (C15, C34)
12681	Cell—Bias cell
14372	Coil—Antenna coil and shield (L1, L2, L3, L4)
14373	Coil—Oscillator coil and shield (L11, L12, L13, L14, L15, L16)
14414	Coil—R.F. coil and shield (L5, L6, L7, L8, L9, L10)
14411	Condenser—3-gang variable tuning condenser (C5, C11, C13)
5119	Connector—3-contact female connector for reproducer cable
12006	Core—Adjustable core and stud for I.F. transformers
12800	Core—Adjustable core and stud assembly for oscillator coil
14416	Dial—Station selector dial scale
14412	Drive—Variable condenser vernier drive shaft and pinion gear
14345	Drum—Variable condenser drive belt drum complete with set screws
14415	Foot—Chassis mounting foot and bracket assembly
30085	Gear—Indicator drive gear and hub assembly and pointer stem and gear assembly
14405	Holder—Bias cell holder
14341	Idler—Station selector drive belt idler
14344	Indicator—Station selector indicator pointer
14382	Indicator—Vernier indicator pointer
4348	Lamp—Dial lamp
14028	Nut—Jamb nut for air trimmer capacitors
14404	Plug—7-contact male plug located on rear apron of chassis for battery cable
14340	Pulley—Station selector drive belt pulley and knob shaft
14361	Reflector—Dial reflector and lamp bracket assembly
14406	Resistor—2.2 ohms, flexible type, 3 watt (R15)
5112	Resistor—1,000 ohms, carbon type, ½ watt (R2)
11283	Resistor—1,200 ohms, carbon type, ½ watt (R16)
5144	Resistor—2,700 ohms, carbon type, ½ watt (R14)
11305	Resistor—22,000 ohms, carbon type, ¼ watt (R5)
14284	Resistor—22,000 ohms, carbon type, 1/10 watt (R7)

STOCK No.	DESCRIPTION
14390	Resistor—27,000 ohms, carbon type, 1/10 watt (R9)
12286	Resistor—56,000 ohms, insulated, ¼ watt (R4)
13734	Resistor—120,000 ohms, carbon type, ¼ watt (R12)
11398	Resistor—220,000 ohms, carbon type, 1/10 watt (R8)
11452	Resistor—470,000 ohms, carbon type, 1/10 watt (R1, R3)
13730	Resistor—1 megohm, carbon type, ¼ watt (R11, R13)
11626	Resistor—2.2 megohm, carbon type, ¼ watt (R6)
14343	Retainer—Drive shaft and pulley retainer
14350	Screw—No. 8-32x3/16 square head set screw for gear Stock No. 30085 and drum Stock No. 14345
12008	Shield I.F. transformer shield can
14374	Shield—R.F. or antenna coil shield
14375	Shield—Oscillator coil shield
3682	Shield—Radiotron shield
4794	Socket—4-contact 1A4 or 30 Radiotron socket
4786	Socket—6-contact 1C6, 1F6 or 19 Radiotron socket
14171	Socket—Dial lamp socket
12907	Spring—Tension spring for indicator drive gear Stock No. 30085
14342	Spring—Tension spring for idler Stock No. 14341
12007	Spring—Retaining spring for core Stock No. 12006
14413	Switch—Range switch (S1, S2)
14401	Switch—Tone control switch and power switch (S4, S5, S6, S7)
14261	Transformer—First I.F. transformer (L17, L18, C16, C17)
14283	Transformer—Second I.F. transformer (L19, L20, C20, C21, C25, R7, R8)
12803	Transformer—Audio transformer pack (T1, T2)
14379	Washer—Felt washer for indicator pointer
14335	Volume Control (R10)
	REPRODUCER ASSEMBLIES
	CONSOLE MODEL (Speaker No. RL71-1)
12667	Cone—Reproducer cone and dust cap (L21)
5118	Plug—3-contact male connector for reproducer
9713	Reproducer—Complete
	TABLE MODEL (Speaker No. RL73-1)
12642	Cone—Reproducer cone and dust cap (L21)
5118	Plug—3-contact male connector for reproducer
9712	Reproducer—Complete
	MISCELLANEOUS ASSEMBLIES
4289	Body—Fuse holder female body
4286	Bushing—Fuse holder bushing and ferrule
14408	Cable—Battery cable complete with fuse, fuse holder, one 7-contact female connector, three 2-contact male connectors and two battery clips
4288	Cap—Fuse holder male cap
14289	Clip—Battery clips, one marked "+" and one unmarked
12827	Connector—2-contact male connector for battery cable
14409	Connector—7-contact female connector for battery cable
14396	Escutcheon—Station selector escutcheon and crystal
3748	Fuse—¼ ampere (F1)
14269	Knob—Volume control, tone control or range switch knob
14359	Knob—Station selector knob
4290	Insulator—Fuse holder insulating sleeve
14418	Resistor—0.33 ohms flexible resistor—¼ watt, complete with clip (R17)
11210	Screw—Chassis mounting screw and washer for Model 86BK
11377	Screw—Chassis mounting screw and washer for Model 86BT
4284	Spring—Fuse holder tension spring
4982	Spring—Retaining spring for knob Stock No. 14359
14270	Spring—Retaining spring for knob Stock No. 14269
4285	Washer—Fuse holder insulating washer

The following changes under "Electrical specifications" become effective when employing the CV-8; "A" battery current drain at 6 volts, 1.65 amperes. Fuse rating, 5 amperes. Undistorted output, 1.3 watts. Maximum output, 1.8 watts. Under "Service data," the following voltages apply to the RCA-19 power-output tube. Either plate to chassis, 180 volts. Either grid to chassis, — 4½ volts. Plate current (either plate), 1.6 ma.

When servicing, the CV-8 chassis should be insulated from the receiver chassis to avoid vibrator buzz.

RCA MFG. CO., INC.

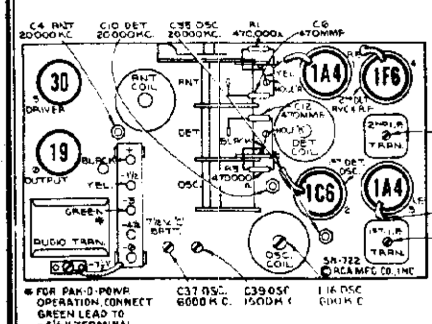


FREQUENCY RANGES

"Standard Broadcast" (A) .... 530—1,720 kc
"Medium Wave" (B) .... 2,100—6,800 kc
"Short Wave" (C) .... 6,800—22,000 kc
Intermediate Frequency .... 460 kc

R-F ALIGNMENT FREQUENCIES

"Short Wave" (C) .... 20,000 kc (osc., det., ant.)
"Medium Wave" (B) .... 6,000 kc (osc.)
"Standard Broadcast" (A) ... 600 kc (osc.), 1,500 kc (osc.)



BATTERIES REQUIRED

"A," one plug-in, 2½-volt Air Cell, or one 2-volt storage battery; "B," three 45-volt, heavy-duty, plug-in type B batteries; "C," one 7½-volt C battery tapped at —1½, —3, and —4½ volts, and three bias cells (Stock No. 12681).

CURRENT CONSUMPTION

"A" at 2 volts (pilot lamps off) .... 0.62 ampere
"A" at 2 volts (pilot lamps on) .... 0.74 ampere
"B" at 135 volts .... 21 milliamperes
Fuse Rating .... ½ ampere

POWER OUTPUT

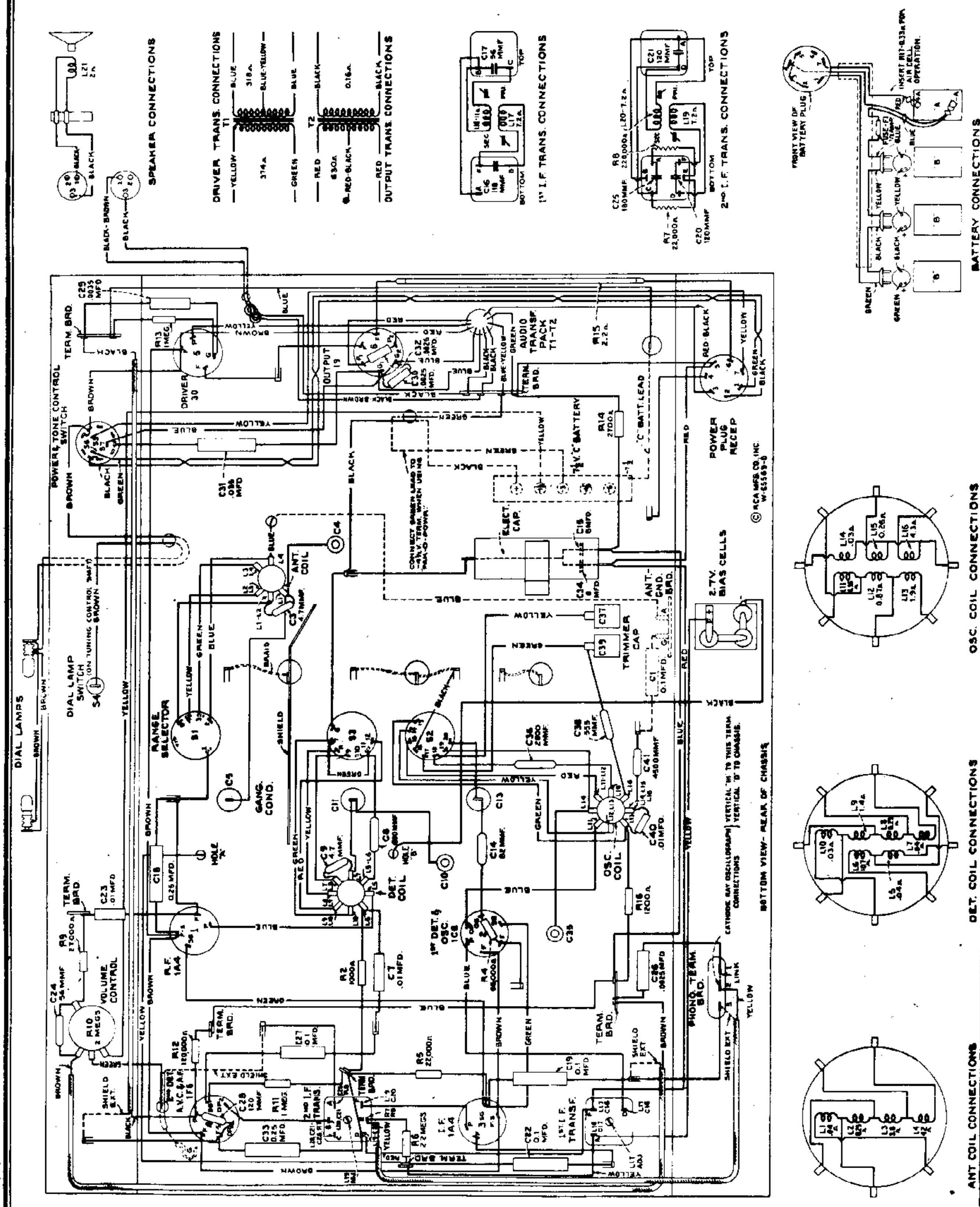
Undistorted .... 1.2 watts
Maximum .... 2.2 watts

LOUDSPEAKER

Type .... Permanent-Magnet Dynamic
Voice Coil Impedance .... 2.2 ohms at 400 cycles

MODELS 86BK,86BT
Chassis Wiring

RCA MFG. CO., INC.



RCA MFG. CO., INC.

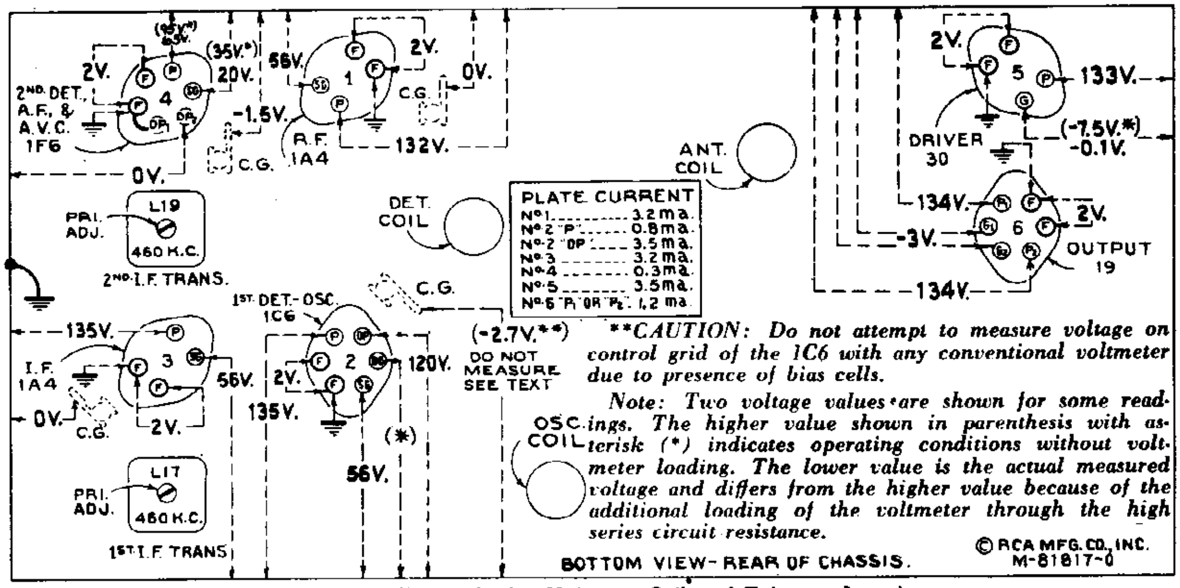


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured with all batteries at normal voltage—Tuned to approximately 1,000 kc—
No signal being received—Volume control minimum

Alignment Procedure

Calibrate the tuning dial by adjusting main dial pointer to the low-frequency (end) calibration mark on dial with the gang tuning-condenser plates in full-mesh position; then adjust the small (vernier) pointer to "O." These are friction adjustments.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 1 and 4.

Cathode-ray alignment is highly preferable; the connections to the chassis are shown on figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver "G" (ground) terminal for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator			Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting				
1	1A4 I-F Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	2nd I-F Trans.	L19 and L20	Max. (peak)
2	1C6 Det. Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc	1st I-F Trans.	L17 and L18	Max. (peak)
3	Ant. Term.	300 Ohms	20,000 kc	20,000 kc	"C" Osc.	C35	Max. (peak) *
4	Ant. Term.	300 Ohms	20,000 kc	20,000 kc	"C" Det.	C10	Max. (peak) †
5	Ant. Term.	300 Ohms	20,000 kc	20,000 kc	"C" Ant.	C4	Max. (peak) ‡
6	Ant. Term.	300 Ohms	6,000 kc	Rock Thru 6,000 kc	"B" Osc.	C37	Max. (peak) *
7	Ant. Term.	200 Mmfd.	600 kc	600 kc	"A" L-F Osc.	L16	Max. (peak)
8	Ant. Term.	200 Mmfd.	1,500 kc	1,500 kc	"A" H-F Osc.	C39	Max. (peak)
9	Ant. Term.	200 Mmfd.	600 kc	Rock Thru 600 kc	"A" L-F Osc.	L16	Max. (peak)
10	Ant. Term.	200 Mmfd.	1,500 kc	Rock Thru 1,500 kc	"A" H-F Osc.	C39	Max. (peak)

* Use minimum capacity peak if two peaks can be obtained.
† Use maximum capacity peak if two peaks can be obtained.
‡ After this adjustment, check for image signal by shifting receiver dial to 19,080 kc.

MODELS 86E, 86K, 86K7, 86T
86T1, 87K, 87T
Notes, Parts

RCA MFG. CO., INC.

General Description

These receivers employ a conventional three-band superheterodyne circuit, the arrangement of which is shown by the Schematic Circuit Diagram. Models 87K, 86K, and 86K7 are console models, each employing a 12-inch electrodynamic loudspeaker. Models 87T, 86T, and 86T1 are ch- -type table models, each employing a 6-inch electrodynamic loudspeaker. Model 86E is an arm-chair model with the chassis mounted vertically to afford operation from the top, and includes a 12-inch electrodynamic loudspeaker. Models 87K and 87T incorporate a "Magic-Eye" tuning indicator.

The extensive tuning range afforded by the three tuning bands includes the "Standard broadcast" band and the important short-wave international broadcast bands of 49, 31, 25, 19, 16, and 13 meters along with channels assigned for police, aviation, and amateur communication.

Features of design include magnetite core i-f transformers and low-frequency oscillator tracking; antenna wave trap; full automatic volume control; phonograph terminal board; aural-compensated audio volume control; two-point, high-frequency tone control; dust-proof electrodynamic loudspeaker; "Magic-Eye" tuning tube on 87K and 87T only; and a new sunburst dial with band indicator and short-wave stations listed by name.

Service Data

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation if such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such R1, L1, C1, etc., provide reference between the illustrations and Replacement Parts List. The coils, transformer windings, and reactors are rated in terms of d-c resistance to permit continuity checks.

Loudspeaker.—Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio amplifying circuit. RCA Victor Models R-93, R-93-A, R-93-2, or R-94 Record Players should be connected as follows: Remove link between terminals 1 and 2 on terminal board. Connect green wire in Radio-Record switch cable to terminal 1, yellow to terminal 2, and shield extension to terminal 3. Tape unused red and blue leads separately. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch.

Precautionary Lead Dress (Models 86E, 86K, 86K7, 87K).—(1) Keep bus lead from term. 9 of S1-S2 to ground lance as short as possible. (2) Bus lead from term. 6 of S1-S2 to L5 should be 4 inches long. (3) Bus lead from term. 5 of S1-S2 to C7-C8 should be 2⅛ inches long. (4) Keep bus lead from term. 1 of S1-S2 to L1-L2 as short as possible. (5) Bus lead from L1 to C3-C4 should be 3¾ inches long (6) Keep C6, C9, C10, and C12 so that broad side is perpendicular to chassis and keep their leads as short as possible. (7) Keep blue lead from "OP" of tube 1 to L6 dressed away from chassis and other leads. (8) Yellow and green leads from terms. 11 and 12 of S1-S2 to oscillator coil must be twisted and dressed under all range switch bus leads. (9) Keep green lead from term. E of 2nd i-f trans. to term. 2 of phono. board as short as possible.

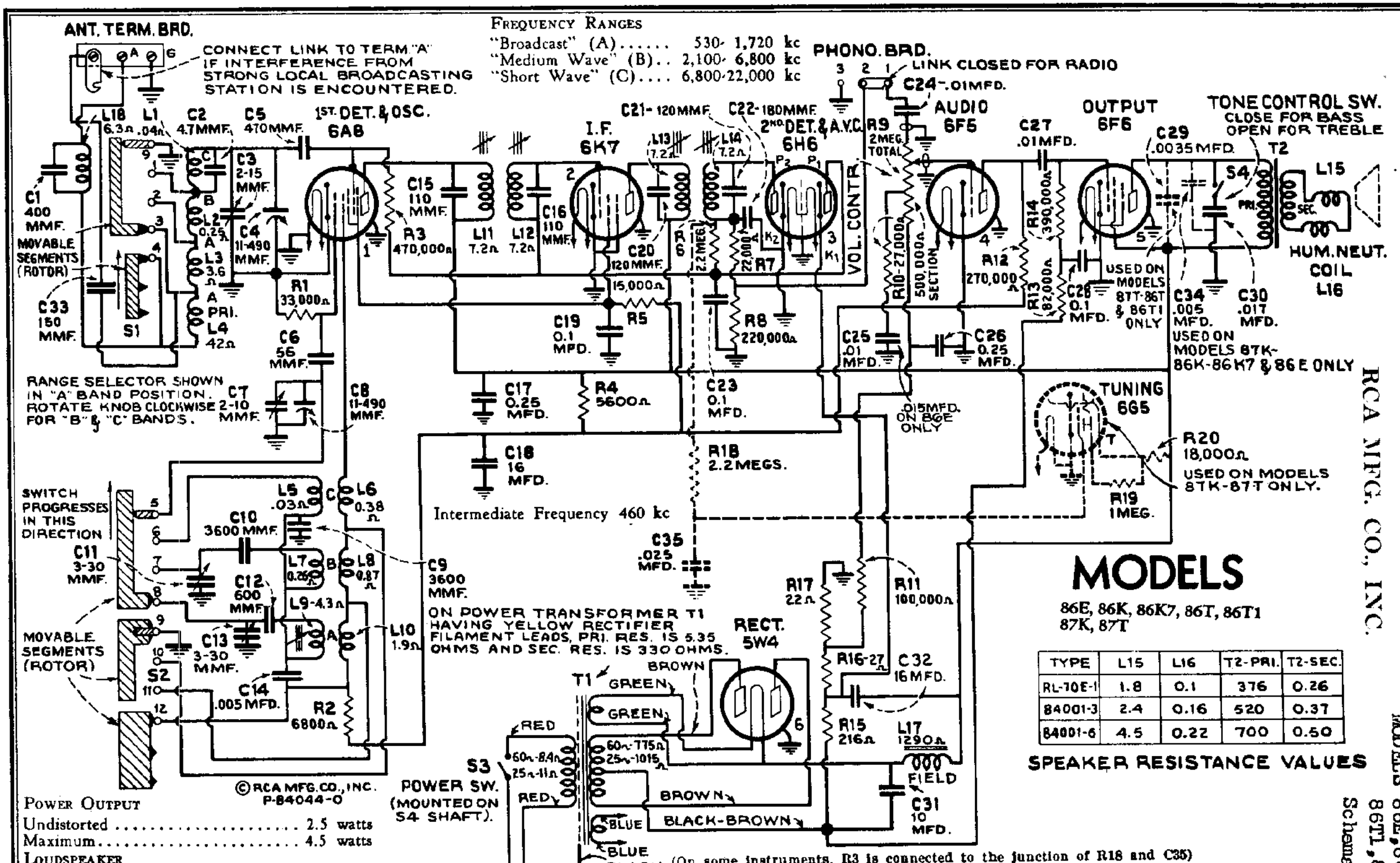
Precautionary Lead Dress (Models 86T, 86T1, 87T).—(1) Keep bus lead from term. 9 of S1-S2 to ground lance as short as possible. (2) Bus lead from term. 6 of S1-S2 to L5 should be 3¼ inches long. (3) Bus lead from term. 5 of S1-S2 to C7-C8 should be 2¼ inches long. (4) Keep bus lead from term. 1 of S1-S2 to L1-L2 as short as possible. (5) Bus lead from L1 to C3-C4 should be 3¼ inches long and dressed above bus lead from antenna coil to range switch. (6) Keep C6, C9, C10, and C12 so that broad side in perpendicular to chassis and keep their leads as short as possible. (7) Power cord should be dressed over C27 and under bus from C32 to "SG" of tube 5. (8) C26 from dummy term. of tube 4 must be grounded to end lug of R-17. (9) Keep green lead from term. E of 2nd i-f trans. to term. 2 of phono. board as short as possible. (10) Keep bus lead from term. 10 of S1-S2 to L6-L8 as short as possible. When necessary to replace bus leads, use only wire having same diameter as original.

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14380	Arm—Band indicator operating arm and hub—less set screw, Stock No. 14350
12038	Band—Rubber band for tuning tube
14384	Belt—Variable condenser drive belt for Models 86E, 86K, 86K7, and 87K only
14388	Belt—Variable condenser drive belt for Models 86T, 86T1, and 87T only
14378	Board—Antenna and ground terminal board
12717	Board—Phonograph terminal board
14338	Bushing—Variable condenser mounting bushing and screw assembly
14394	Cable—Tuning tube cable and socket, complete, for Models 87T and 87K only
12807	Cap—First I.F. transformer shield top
12581	Cap—Second I.F. transformer shield top
11350	Cap—Grid contact cap
14383	Capacitor—Adjustable dual trimmer (C11, C13)
14392	Capacitor—4.7 Mmfd. (C2)
12723	Capacitor—68 Mmfd. (C6)
14262	Capacitor—110 Mmfd. (C15, C16)
12404	Capacitor—120 Mmfd. (C20, C21)
12725	Capacitor—150 Mmfd. (C33)
12406	Capacitor—180 Mmfd. (C22)
13052	Capacitor—470 Mmfd. (C5)
14391	Capacitor—600 Mmfd. (C12)
12811	Capacitor—3,600 Mmfd. (C9, C10)
5005	Capacitor—.0035 Mfd. (C29) (Used in Models 86T, 86T1, and 87T only)
4838	Capacitor—.005 Mfd. (C34) (Used in Models 86E, 86K, 86K7 and 87K only)
4868	Capacitor—.005 Mfd. (C14)
13138	Capacitor—.01 Mfd. (C27)
14393	Capacitor—.01 Mfd. (C24, C25) (C25, .01 Mfd. used in Models 86K, 86K7, 86T, 86T1, 87K, and 87T only)
11315	Capacitor—.015 Mfd. (C25) (for Model 86E only)
11451	Capacitor—.017 Mfd. (C30)
4870	Capacitor—.025 Mfd. (C35) (Used in Models 87K and 87T only)
4841	Capacitor—0.1 Mfd. (C19, C23, C28)
4840	Capacitor—0.25 Mfd. (C26)
5170	Capacitor—0.25 Mfd. (C17)
11240	Capacitor—10 Mfd. (C31)
5212	Capacitor—16 Mfd. (C32)
14377	Capacitor—16 Mfd. (C18) (Models 86K, 86K7, 86T, 86T1, 87K, and 87T only)
30105	Capacitor—16 Mfd. (C18) (Model 86E only)
14372	Coil—Antenna coil and shield (L1, L2, L3, L4)
14373	Coil—Oscillator coil and shield (L5, L6, L7, L8, L9, L10)
14363	Condenser—2-gang variable tuning condenser (C3, C4, C7, C8)
5119	Connector—3-contact female connector for reproducer cable
12800	Core—Adjustable core and stud assembly for coil, Stock No. 14373
12006	Core—Adjustable core and stud for Stock Nos. 14376 and 14283
14385	Dial—Band indicator dial and mounting bracket assembly for Models 86K, 86K7, and 87K only
30106	Dial—Band indicator dial and mounting bracket assembly for Model 86E only
14389	Dial—Band indicator dial and mounting bracket assembly for Models 86T, 86T1, and 87T only
14381	Dial—Station selector dial scale for Models 86E, 86K, 86K7, 86T, and 86T1 only
14386	Dial—Station selector dial, complete, with tuning tube escutcheon assembly for Models 87K and 87T only
14364	Drive—Variable condenser vernier drive pinion gear and shaft
14345	Drum—Variable condenser drive belt drum, complete, with set screws
14387	Escutcheon—Tuning tube escutcheon for Models 87K and 87T only
11982	Fastener—Station selector dial scale fastener
30085	Gear—Indicator drive gear and hub assembly and indicator pointer stem and gear
14341	Idler—Station selector drive belt idler
14344	Indicator—Station selector indicator pointer
14382	Indicator—Vernier indicator pointer
5226	Lamp—Dial lamp
14340	Pulley—Station selector drive belt pulley and knob shaft
14361	Reflector—Dial reflector and lamp bracket assembly for Models 86E, 86K, 86K7, 86T, and 86T1 only
14362	Reflector—Dial reflector, lamp bracket and tuning tube bracket assembly for Models 87K and 87T only
14343	Retainer—Drive shaft and pulley retainer—holds tuning-knob shaft and pulley on range-switch shaft
11298	Resistor—5,600 Ohms, Carbon type, 1 Watt (R4)
11728	Resistor—6,800 Ohms, Carbon type, ½ Watt (R2)
5114	Resistor—15,000 Ohms, Carbon type, 1 Watt (R5)
14078	Resistor—18,000 Ohms, Carbon type, 1 Watt (R20), for Models 87K and 87T only
14284	Resistor—22,000 Ohms, Carbon type, 1/10 watt (R7)
11400	Resistor—27,000 Ohms, Carbon type, ½ Watt (R10), for Models 86E, 86K, 86K7, and 87K only
14390	Resistor—27,000 Ohms, Carbon type, 1/10 Watt (R10), for Models 86T, 86T1, and 87T only
13735	Resistor—33,000 Ohms, Carbon type, ½ Watt (R1)
11365	Resistor—82,000 Ohms, Carbon type, ½ Watt (R13)
5145	Resistor—100,000 Ohms, Carbon type, ½ Watt (R11)
11398	Resistor—220,000 Ohms, Carbon type, 1/10 Watt (R8)
11453	Resistor—270,000 Ohms, Carbon type, 1/10 Watt (R12)
13005	Resistor—390,000 Ohms, Carbon type, 1/10 Watt (R14)
11452	Resistor—470,000 Ohms, Carbon type, 1/10 Watt (R3)
12018	Resistor—1 Megohm, Carbon type, 1/10 Watt (R19), for Models 87K and 87T only
11526	Resistor—2.2 Megohm, Carbon type, ½ Watt (R6, R18) (R18 used in Models 87K and 87T only)
12004	Resistor—Voltage divider resistor—comprising one 215-ohm, one 27-ohm, and one 22-ohm sections (R15, R16, R17)
14350	Screw—No. 8-32 x 3/16 square-head set-screw for gear, Stock No. 30085, and drum, Stock No. 14345, and arm, Stock No. 14380
14374	Shield—Antenna coil shield
12005	Shield—First or Second I-F transformer shield
14375	Shield—Oscillator coil shield
14114	Socket—Dial lamp socket
11195	Socket—5-contact 5W4 Radiotron socket
11196	Socket—8-contact 6A8, 6K7, 6H6, 6F5, or 6F6 Radiotron socket
12007	Spring—Retaining spring for core, Stock Nos. 12006 and 12800
12807	Spring—Tension spring for indicator drive gear, Stock No. 30085
14342	Spring—Tension spring for idler, Stock No. 14341
14370	Switch—Range switch (S1, S2)
14371	Switch—Tone control switch and power switch (S3, S4)
14376	Transformer—First I-F transformer (L11, L12, C15, C16)
14283	Transformer—Second I-F transformer (L13, L14, C20, C21, C22, R7, R8)
14367	Transformer—Power transformer, 105-125 volts, 50-60 cycles (T1)
14368	Transformer—Power transformer, 105-125 volts, 25-60 cycles (T1)
14369	Transformer—Power transformer, 105-125/210-250 volts, 50-60 cycles (T1)
13838	Trap—Wave trap, complete (L18, C1)
14335	Volume Control (R9)
14379	Washer—Felt washer for indicator pointer
	REPRODUCER ASSEMBLIES Models 86T, 86T1, and 87T
14616	Coil—Field coil (L17) (for speaker marked 84001-3)
14614	Cone—Reproducer cone (L15) (for speaker marked 84001-3)
14934	Cone—Reproducer cone (L15) (for speaker marked 84001-6)
5118	Plug—3-contact male plug for reproducer
14613	Reproducer—Complete
14615	Transformer—Output transformer (T2) (for speaker marked 84001-3)
14935	Transformer—Output transformer (T2) (for speaker marked 84001-6)
	REPRODUCER ASSEMBLIES Models 86E, 86K, 86K7, and 87K (RL-70E-1)
13866	Cap—Dust cap for cone center
14354	Coil—Field coil (L17)
11459	Coil—Hum neutralizing coil (L16)
12867	Cone—Reproducer cone and dust cap (L15)
5118	Plug—3-contact male plug for reproducer
14395	Reproducer—Reproducer complete
14358	Screw—Screw, washer, and lockwasher to hold core in yoke
14355	Transformer—Output transformer (T2)
14357	Washer—Spring washer to hold field coil
	MISCELLANEOUS ASSEMBLIES
14396	Escutcheon—Station selector escutcheon and crystal
14359	Knob—Station selector knob
14269	Knob—Volume control, tone control or range switch knob
4560	Screw—Chassis mounting screw and washer assembly—(Model 86E only)
11210	Screw—Chassis mounting screw and washer assembly—(Models 86K, 86K7 and 87K only)
11377	Screw—Chassis mounting screw and washer assembly—(Models 86T, 86T1 or 87T only)
4982	Spring—Retaining spring for knob—Stock No. 14359
14270	Spring—Retaining spring for knob—Stock No. 14269

MODELS 86E,86K,86K7,86T
86T1,87K,87T
Schematic

RCA MFG. CO., INC.



FREQUENCY RANGES

"Broadcast" (A) ...... 530- 1,720 kc
"Medium Wave" (B) .. 2,100- 6,800 kc
"Short Wave" (C) .... 6,800-22,000 kc

MODELS

86E, 86K, 86K7, 86T, 86T1
87K, 87T

TYPE	L15	L16	T2-PRI.	T2-SEC.
RL-70E-1	1.8	0.1	376	0.26
84001-3	2.4	0.16	520	0.37
84001-6	4.5	0.22	700	0.50

SPEAKER RESISTANCE VALUES

(On some instruments, R3 is connected to the junction of R18 and C35)

POWER OUTPUT
Undistorted .... 2.5 watts
Maximum .... 4.5 watts

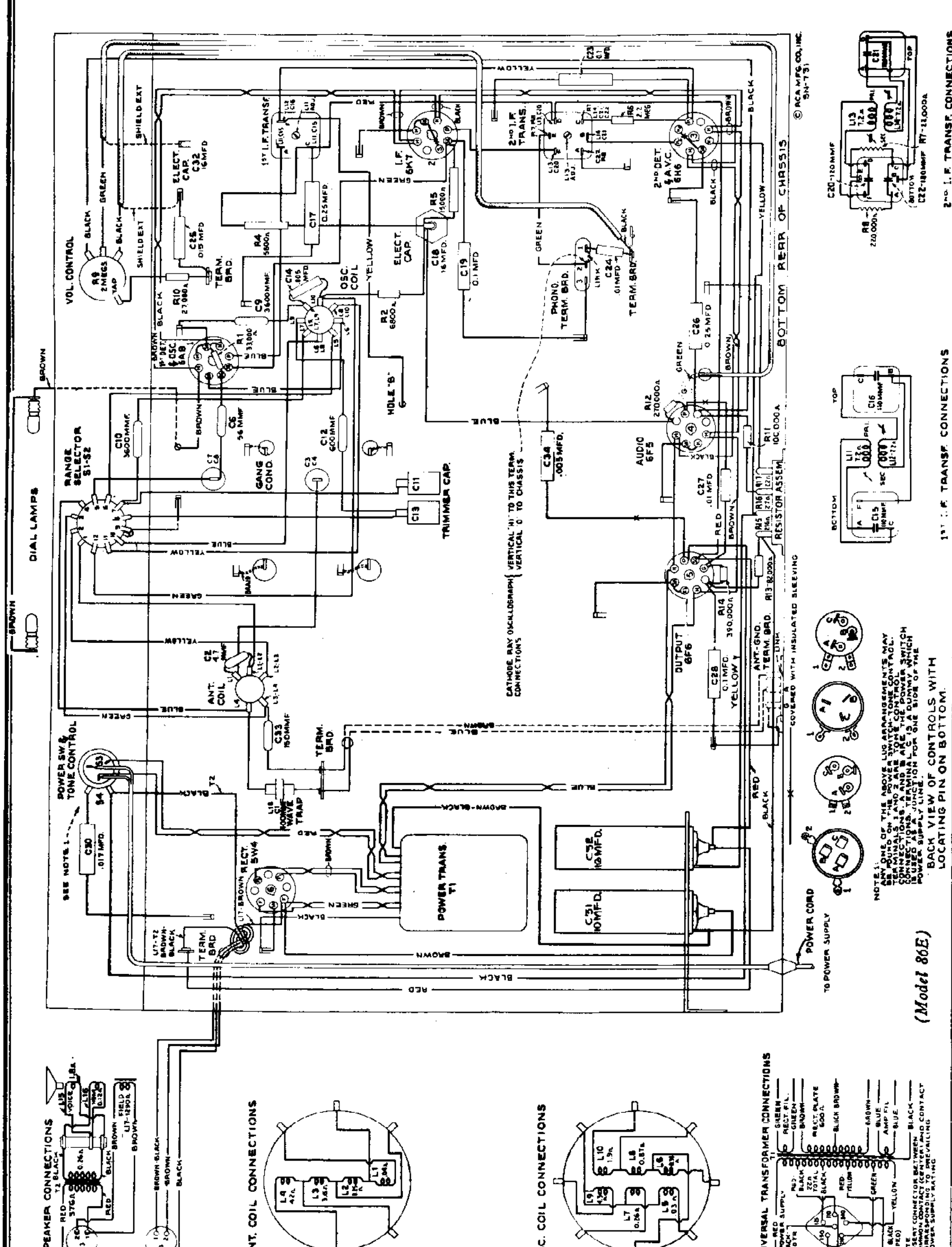
LOUDSPEAKER
Type .... Electrodynamic
Impedance (v.c.) .. (RL-70E-1) 2.2 ohms; (84001-3) 2.6 ohms; (84001-6) 4.7 ohms — at 400 cycles

POWER SUPPLY RATINGS
Rating A .... 105-125 volts, 50-60 cycles, 80 watts
Rating B .... 105-125 volts, 25-60 cycles, 80 watts
Rating C. 100-130/140-160/195-250 volts, 40-60 cycles, 80 watts

Chassis Base Dimensions (86E, 86K, 86K7, 87K) . 14⅞ inches x 9¾ inches x 3¼ inches
Over-all Chassis Height .... 9½ inches
Chassis Base Dimensions (86T, 86T1, 87T) ...... 15¼ inches x 6½ inches x 2¾ inches
Over-all Chassis Height .... 9 inches
Tuning Drive Ratio .... 20 to 1

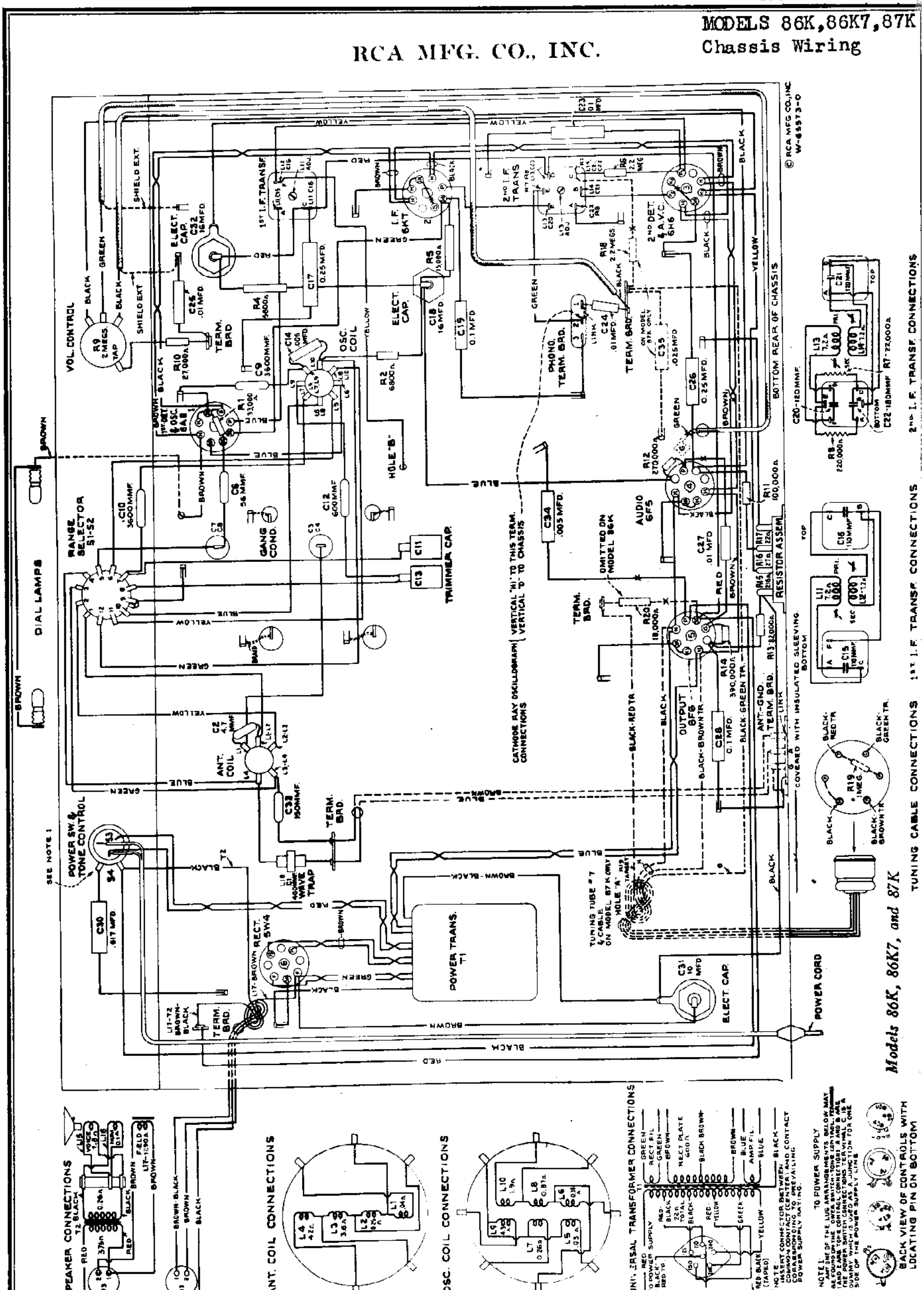
MODEL 86E
Chassis Wiring

RCA MFG. CO., INC.



MODELS 86K,86K7,87K
Chassis Wiring

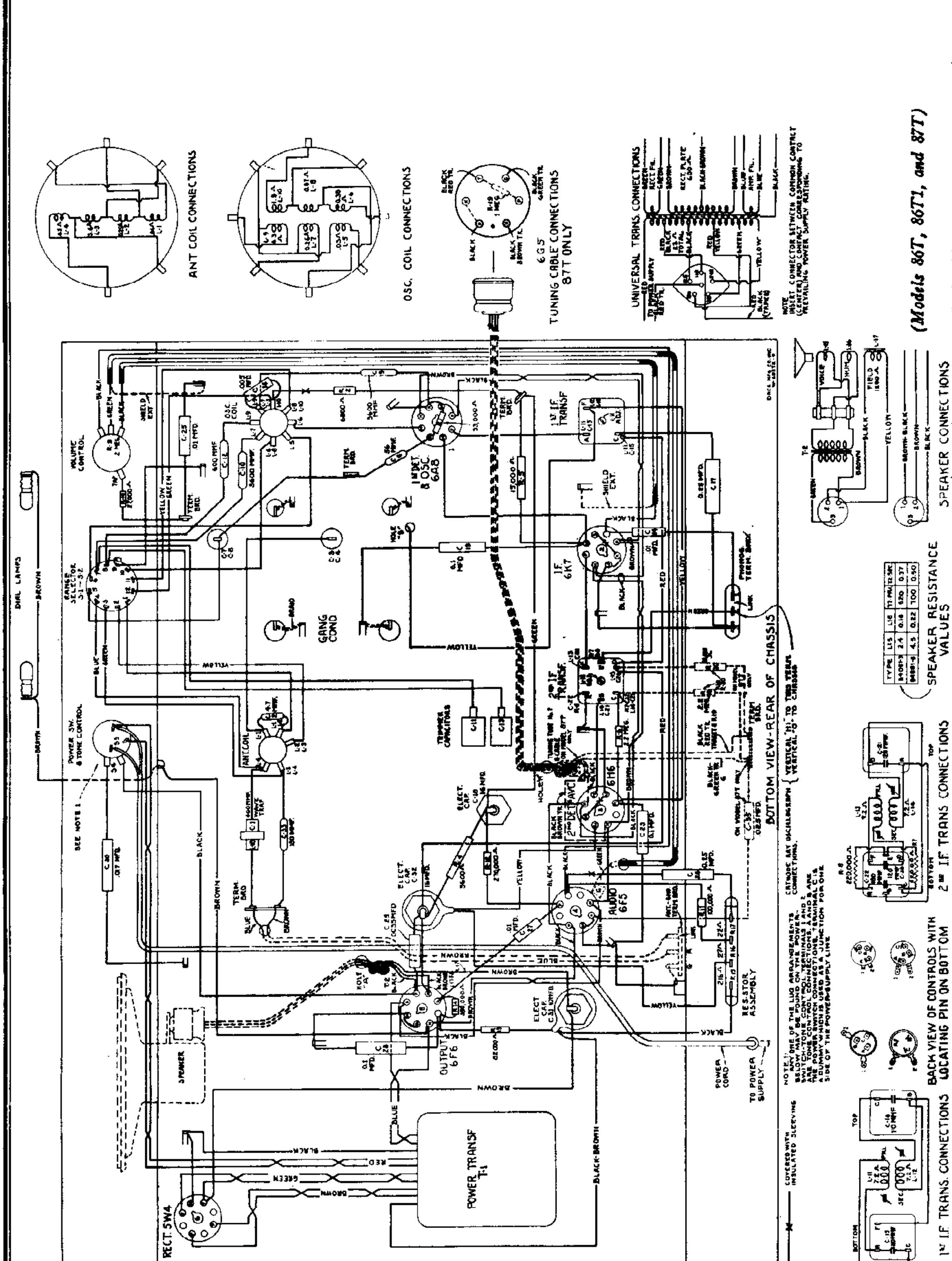
RCA MFG. CO., INC.



MODELS 86T,86T1,87T

Chassis Wiring

RCA MFG. CO., INC.



RCA MFG. CO., INC.

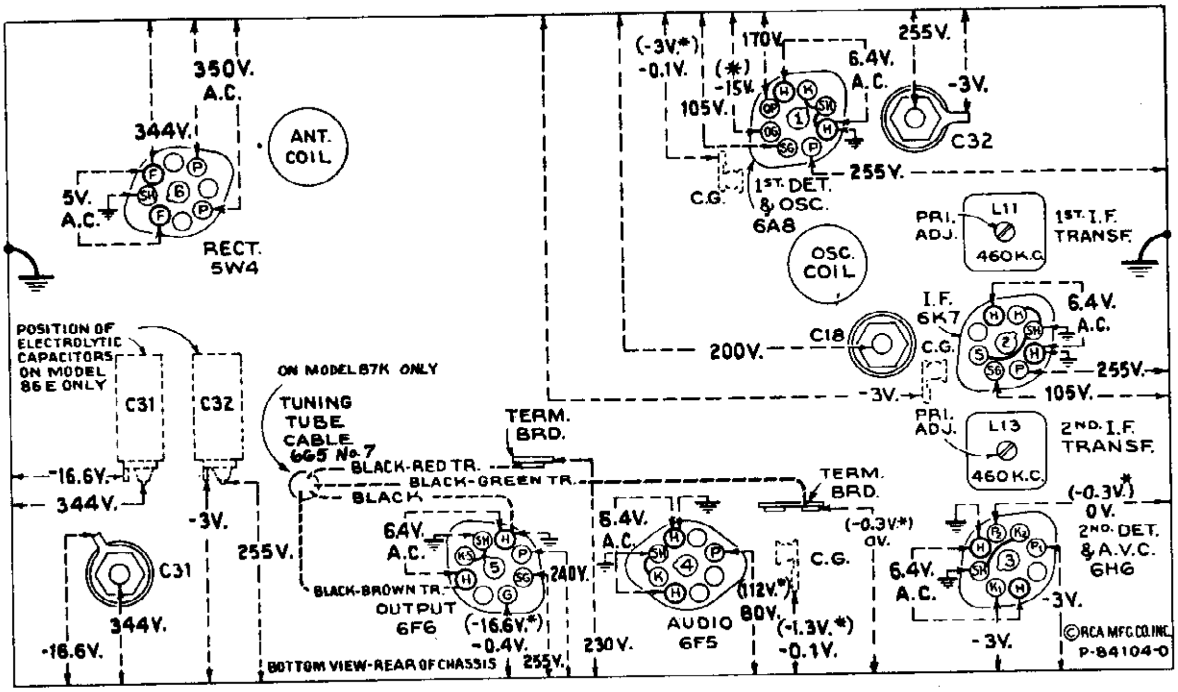


Figure 3—Radiotron Socket Voltages, Coil, and Trimmer Locations (Models 86E, 86K, 86K7, and 87K)

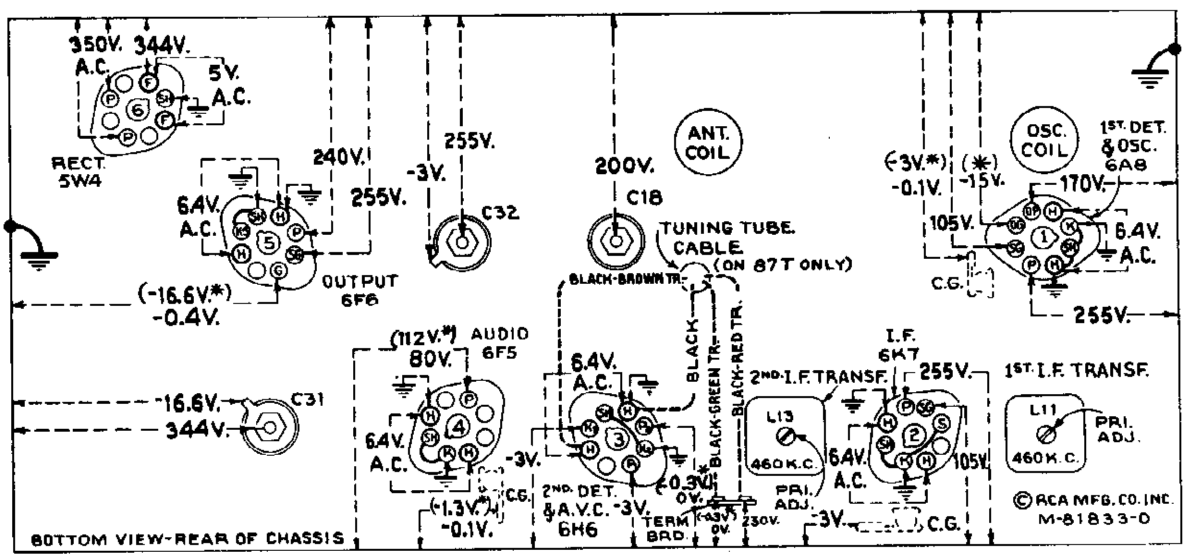


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations (Models 86T, 86T1, and 87T)

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard Broadcast")—No signal being received—Volume control minimum

***Note:** Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.*

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

MODELS 86E, 86K, 86K7, 87K
86T, 86T1, 87T
Socket, Trimmers
Alignment

RCA MFG. CO., INC.

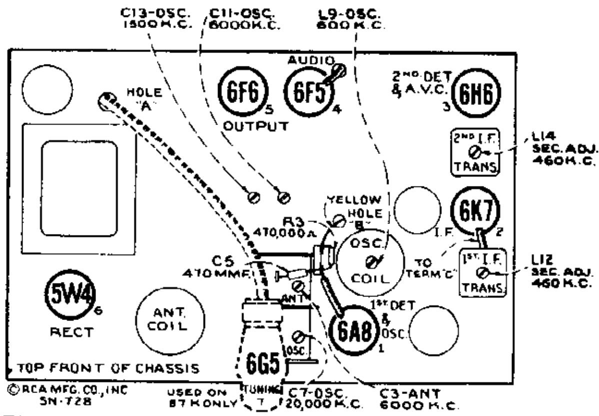


Figure 1—Radiotron, Coil, and Trimmer Locations (Models 86E, 86K, 86K7, and 87K)

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals Under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6A8—1st Det.—Osc.	14. ma.
(2)	RCA-6K7—I-F Amp	8.5 ma.
(3)	RCA-6H6—2nd Det. and A.V.C.	....
(4)	RCA-6F5—Audio Driver	0.26 ma.
(5)	RCA-6F6—Power Amplifier	37. ma.
(6)	RCA-5W4—Rectifier	63. ma.**
(7)	RCA-6G5—Tuning Tube	1.2 ma.

** Cannot be measured at socket.

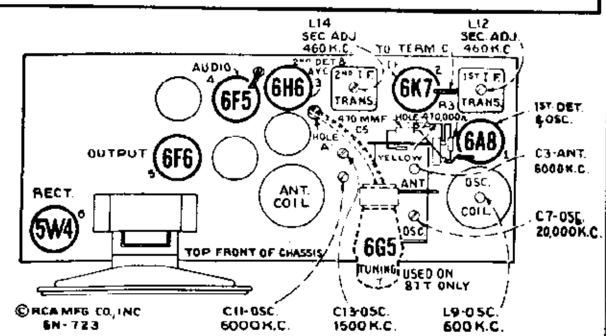


Figure 2—Radiotron, Coil, and Trimmer Locations (Models 86T, 86T1, and 87T)

R-F ALIGNMENT FREQUENCIES
"Short Wave" (C) .... 20,000 kc (osc.)
"Medium Wave" (B) .... 6,000 kc (osc., ant.)
"Broadcast" (A) .... 600 kc (osc.), 1,500 kc (osc.)

Alignment Procedure

Calibrate the tuning dial by adjusting main dial pointer to the low-frequency (end) calibration mark on dial with the gang tuning-condenser plates in full-mesh position; then adjust the small (vernier) pointer to "O." These are friction adjustments.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 1, 2, 3, and 4.

Cathode-ray alignment is highly preferable; the connections to the chassis are shown on figures 6, 7, and 8. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver "G" (ground) terminal for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

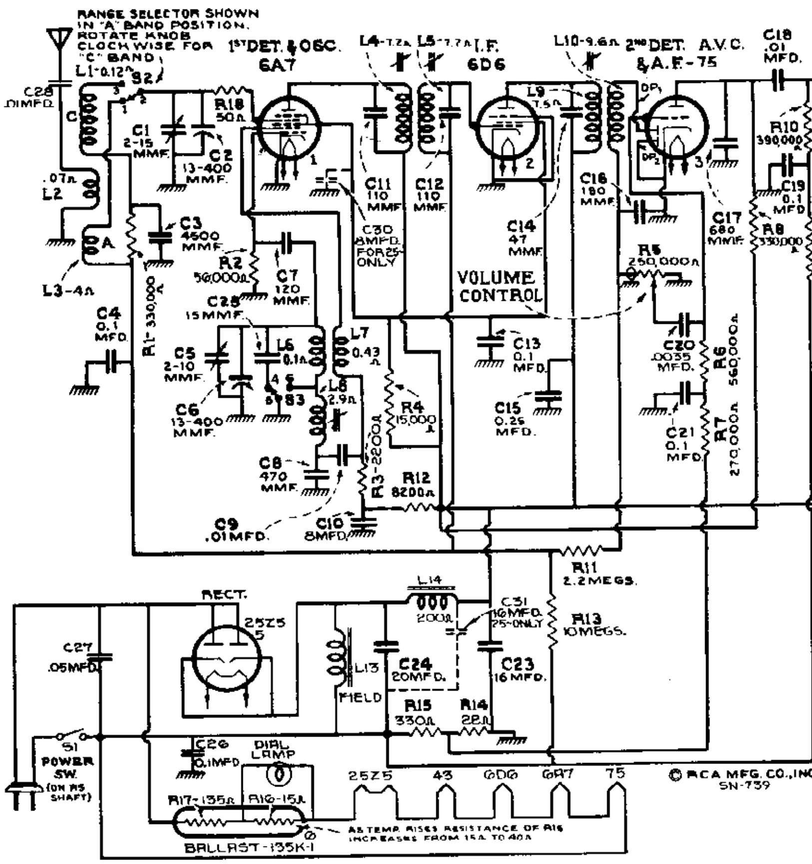
For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator: Connection to Receiver	Test Oscillator: Dummy Antenna	Test Oscillator: Frequency Setting	Range Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
1	6K7 I-F Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	2nd I-F Trans.	L13 and L14	Max. (peak)
2	6A8 Det. Grid Cap	.001 Mfd.	460 kc	"A"	No Signal 550-750 kc	1st I-F Trans.	L11 and L12	Max. (peak)
3	Ant. Term.	300 Ohms	20,000 kc	"C" Right	20,000 kc	"C" Osc.	C7	Max. (peak)*‡
4	Ant. Term.	300 Ohms	6,000 kc	"B" Center	6,000 kc	"B" Osc.	C11	Max. (peak)*
5	Ant. Term.	300 Ohms	6,000 kc	"B"	6,000 kc	"B" Ant.	C3	Max. (peak)
6	Ant. Term.	200 Mmfd.	600 kc	"A" Left	600 kc	"A" L-F Osc.	L9	Max. (peak)
7	Ant. Term.	200 Mmfd.	1,500 kc	"A"	1,500 kc	"A" H-F Osc.	C13	Max. (peak)
8	Ant. Term.	200 Mmfd.	600 kc	"A"	600 kc	"A" L-F Osc.	L9	Max. (peak)
9	Ant. Term.	200 Mmfd.	1,500 kc	"A"	1,500 kc	"A" H-F Osc.	C13	Max. (peak)

* Use minimum capacity peak if two peaks can be obtained.
‡ After this adjustment, check for image signal by shifting receiver dial to 19,080 kc.

MODEL 86X
Schematic, Socket
Chassis Wiring
Trimmers

RCA MFG. CO., INC.



TYPE	L11	L12	T1-PRI	T2-SEC.	L13
94803-3	2.4	0.16	373	0.5	3000
94803-4	2.9	0.17	420	0.5	3000

SPEAKER RESISTANCES

MODEL 86X

R-F Alignment Frequencies
"Broadcast" (A).......... 600 kc (osc.)
"Short Wave" (C).... 15,000 kc (osc., ant.)

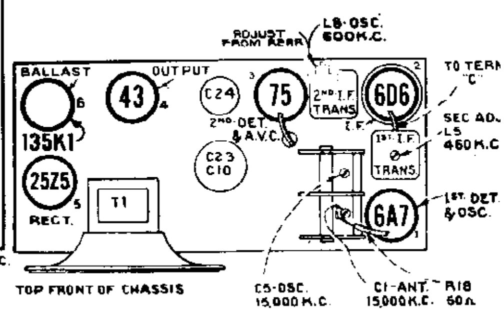
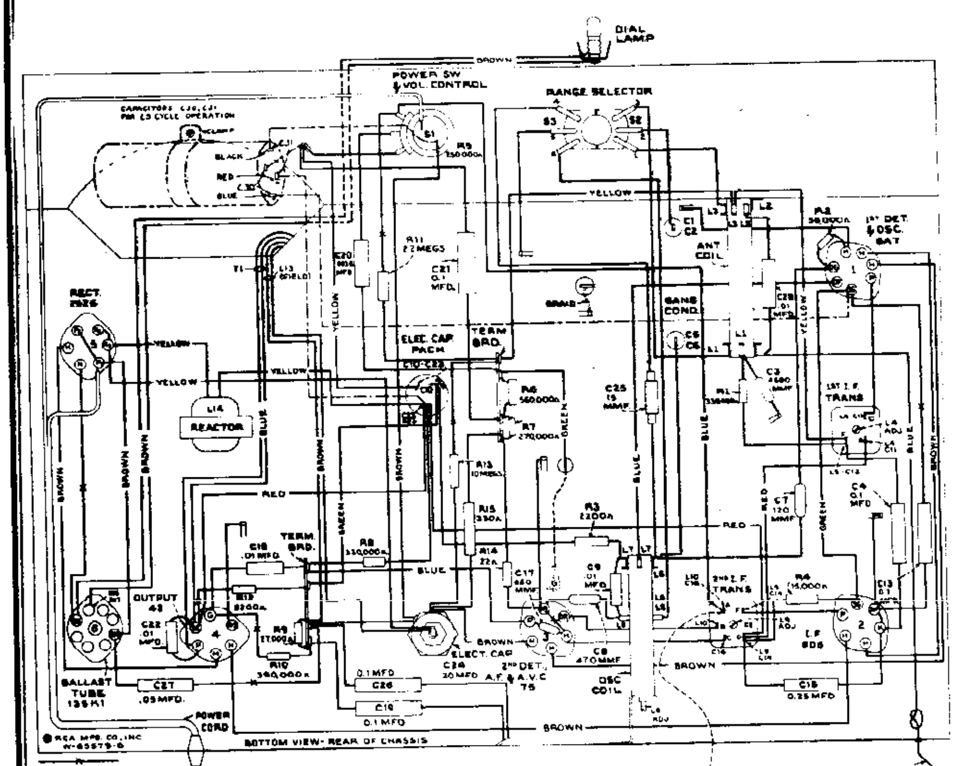
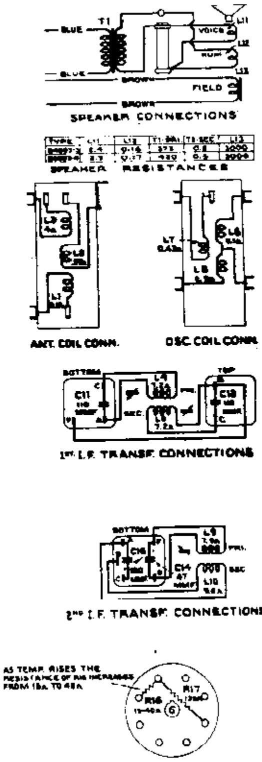


Figure 1—Radiotron, Coil, and Trimmer Location





Frequency Ranges
"Broadcast" (A).................. 540-1,720 kc
"Short Wave" (C).............. 5,800-18,000 kc
Intermediate Frequency.................... 460 kc

MODEL 86X
Alignment
Voltage

RCA MFG. CO., INC.

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the center horizontal line with the gang tuning-condenser plates in full-mesh position. This is a screw-driver adjustment.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 1 and 4.

Cathode-ray alignment is preferable; the connections to the chassis are shown on figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator			Range-Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting					
1	6D6 I-F Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	2nd I-F Trans.	L9	Max. (peak)
2	6A7 Det. Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	1st I-F Trans.	L4 and L5	Max. (peak)
3	Ant. Lead (blue)	300 Ohms	15,000 kc	"C" Right	15,000 kc	"C" Osc.	C5	Max. (peak)†
4	Ant. Lead (blue)	300 Ohms	15,000 kc	"C" Right	Rock Through 15,000 kc	"C" Ant.	C1	Max. (peak)*‡
5	Ant. Lead (blue)	200 Mmfd.	600 kc	"A" Left	600 kc	"A" Osc.	L8	Max. (peak)

† Use maximum capacity peak if two peaks can be obtained.

* Use minimum capacity peak if two peaks can be obtained.

‡ After this adjustment, check for image signal by shifting receiver dial to 15,920 kc.

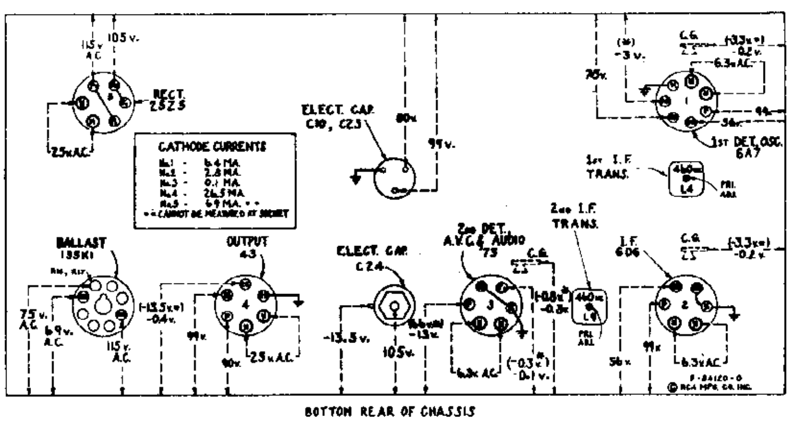


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—For 115-volt d-c supply approximately 10% lower, except heater voltage which remains the same—Tuned to approximately 1,000 kc ("Standard Broadcast") —No signal being received—Volume control minimum.

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250 and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

RCA MFG. CO., INC.

Electrical Specifications

Pilot Lamp (1) .... Mazda No. 40, 6.3 volts, 0.15 ampere

POWER SUPPLY RATINGS

A-C Rating......... 105-125 volts, 50-100 cycles, 58 watts

POWER OUTPUT—(125 volt, A-C supply)

Undistorted.................................... 0.5 watt

Maximum .... 1.2 watts

LOUDSPEAKER

Type.............................. 6-inch Electrodynamic

D-C Rating..................... 105-125 volts, 58 watts

POWER OUTPUT—(125 volt, D-C supply)

Undistorted.. 0.4 watt

Maximum .... 1.0 watt

Impedance (V.C.)...... (84003-3) 2.6 ohms / (84003-4) 3.4 ohms at 400 cycles

Service Data

CAUTION: The chassis is connected to one side of the power supply. Avoid contact of chassis or parts to external ground when servicing.

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation if such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such as R1, L1, C1, etc., provide reference between the illustrations and Replacement Parts List. The coils, transformer windings, and reactors are rated in terms of d-c resistance to permit continuity checks.

Precautionary Lead Dress—(1) Dress power line leads to the on-off switch away from grid connection terminal on volume control to reduce hum pick-up. (2) Keep leads of capacitor C3 as short as possible. (3) Bus lead from range selector (ter. 6) to oscillator coil tap L6L8 should be maintained 3½ inches long for proper alignment. (4) Capacitor C25 should be dressed free of adjacent parts to maintain correct alignment at high-frequency end of "A" band. (5) Bus lead from range selector (ter. 3) to antenna coil L1 should be maintained 2¼ inches long for proper alignment. (6) The RCA-6A7 grid-cap lead (50-ohm resistor R18) to top of tuning capacitor C2 should be dressed properly to prevent shorts and should be maintained flexible to prevent acoustic howl.

Loudspeaker—Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers.

Operation on 25-Cycle A-C Supply—For 25-cycle operation, install RCA Stock No. 14767 capacitor pack and clamp under chassis below speaker and make connections as shown dotted on figure 3. Use a No. 6-32 machine screw for anchoring clamp in hole provided.

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14634	Belt—Variable condenser drive belt
14632	Bracket—Dial mounting bracket
5237	Bushing—Variable condenser rubber mounting bushing
12118	Cap—Grid contact cap
12896	Capacitor—15 Mmfd. (C25)
12405	Capacitor—47 Mmfd. (C14)
14262	Capacitor—110 Mmfd. (C11, C12)
12724	Capacitor—120 Mmfd. (C7)
12406	Capacitor—180 Mmfd. (C16)
30396	Capacitor—470 Mmfd. (C8)
14498	Capacitor—680 Mmfd. (C17)
30245	Capacitor—.0045 Mfd. (C3)
5005	Capacitor—.0035 Mfd. (C20)
4858	Capacitor—.01 Mfd. (C28)
13138	Capacitor—.01 Mfd. (C9, C18, C22)
4836	Capacitor—.05 Mfd. (C27)
4839	Capacitor—0.1 Mfd. (C26)
4841	Capacitor—0.1 Mfd. (C4, C13, C19, C21)
4840	Capacitor—0.25 Mfd. (C15)
14643	Capacitor—20 Mfd. (C24)
14644	Capacitor Pack—Comprising one 16 Mfd. and one 8 Mfd. section (C10, C23)
14767	Capacitor Pack—Comprising one 16 Mfd. and one 8 Mfd. section and one clamp (for 25 cycle operation only) (C30, C31)
14646	Coil—Antenna coil (L1, L2, L3)
14647	Coil—Oscillator coil (L6, L7, L8)
14633	Condenser—2 gang variable tuning condenser (C1, C2, C5, C6)
14648	Core—Adjustable core and stud for Oscillator coil
12006	Core—Adjustable core and stud for I.F. transformer
14631	Dial—Station selector dial
14651	Drive—Variable condenser vernier drive and pinion gear
14635	Indicator—Station selector indicator pointer
4340	Lamp—Dial lamp
14636	Pulley—Idler pulley—less spring
14639	Pulley—Variable condenser drive pulley—located on condenser shaft
14641	Reactor—Filter reactor (L14)
14525	Resistor—22 Ohms—Carbon type, ¼ watt (R14)
14653	Resistor—50 Ohms—Flexible type, 1/10 watt (R18)
14652	Resistor—330 Ohms—Wire wound, 1 watt (R15)
5159	Resistor—2,200 Ohms—Carbon type, ¼ watt (R3)
14296	Resistor—8,200 Ohms—Carbon type, ¼ watt (R12)
12759	Resistor—15,000 Ohms—Carbon type, ¼ watt (R4)
11400	Resistor—27,000 Ohms—Carbon type, ¼ watt (R9)
5029	Resistor—56,000 Ohms—Carbon type, ¼ watt (R2)
11323	Resistor—270,000 Ohms—Carbon type, ¼ watt (R7)
13733	Resistor—330,000 Ohms—Carbon type, ¼ watt (R1, R8)
13479	Resistor—390,000 Ohms—Carbon type, ¼ watt (R10)
5035	Resistor—560,000 Ohms—Carbon type, ¼ watt (R6)
12679	Resistor—2.2 Megohm—Insulated, ¼ watt (R11)
13601	Resistor—10 Megohm—Insulated, ¼ watt (R13)
14649	Resistor—Ballast resistor tube type No. 135K1 (R16, R17)
5129	Ring—Radiotron shield ring
4389	Screw—No. 6—32x3/16 headless set screw for pulley No. 14639
14638	Shaft—Station selector knob shaft and pulley
12008	Shield—First I.F. transformer shield
12408	Shield—Second I.F. transformer shield
11265	Shield—Radiotron shield
14650	Socket—Dial lamp socket
4786	Socket—6-contact 6D6, 25Z5, 43 or 75 Radiotron socket
4787	Socket—7-contact 6A7 Radiotron socket
11196	Socket—8-contact ballast resistor socket
14637	Spring—Idler pulley tension spring
12007	Spring—Retaining spring for core Stock Nos. 12006 and 14648
14640	Switch—Range switch (S2, S3)
14376	Transformer—First I.F. transformer (L4, L5, C11, C12)
14642	Transformer—Second I.F. transformer (L9, L10, C14, C16)
14645	Volume Control and power switch (R5, S1)
	REPRODUCER ASSEMBLIES
14682	Cone—Reproducer cone (L11) for speaker marked 84003-3
14936	Cone—Reproducer cone (L11) for speaker marked 84003-4
14681	~~Reproducer Complete~~
14683	Transformer—Output transformer (T1) for speaker marked 84003-3
14937	Transformer—Output transformer (T1) for speaker marked 84003-4
	MISCELLANEOUS ASSEMBLIES
14654	Escutcheon—Station selector escutcheon and crystal
12673	Knob—Station selector, volume control or range switch knob
14267	Screw—Chassis mounting screw and washer
4119	Screw—No. 8—32x1/4 headless set screw for knob Stock No. 12673

MODEL 88K
Alignment, Parts

RCA MFG. CO., INC.

Calibrate the tuning dial by adjusting main dial pointer to the low-frequency (end) calibration mark on dial with the gang tuning-condenser plates in full-mesh position; then adjust the small (vernier) pointer to "O." These are friction adjustments.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 1 and 2.

Cathode-ray alignment is highly preferable; the connections to the chassis are shown on figure 4. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver "G" (ground) terminal for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator			Range Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting					
1	6K7 I-F Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	2nd I-F Trans.	L16 and L17	Max. (peak)
2	6L7 Det. Grid Cap	.001 Mfd.	460 kc	"A"	No Signal 550-750 kc	1st I-F Trans.	L14 and L15	Max. (peak)
3	Ant. Term.	300 Ohms	20,000 kc	"C" Right	20,000 kc	"C" Osc.	C20	Max. (peak) *
4	Ant. Term.	300 Ohms	20,000 kc	"C"	20,000 kc	"C" Det.	C9	Max. (peak) †
5	Ant. Term.	300 Ohms	20,000 kc	"C"	20,000 kc	"C" Ant.	C2	Max. (peak) ‡
6	Ant. Term.	300 Ohms	6,000 kc	"B" Center	6,000 kc	"B" Osc.	C23	Max. (peak) *
7	Ant. Term.	200 Mmfd.	600 kc	"A" Left	600 kc	"A" L-F Osc.	L13	Max. (peak)
8	Ant. Term.	200 Mmfd.	1,500 kc	"A"	1,500 kc	"A" H-F Osc.	C26	Max. (peak)
9	Ant. Term.	200 Mmfd.	600 kc	"A"	600 kc	"A" L-F Osc.	L13	Max. (peak)
10	Ant. Term.	200 Mmfd.	1,500 kc	"A"	1,500 kc	"A" H-F Osc.	C26	Max. (peak)

* Use minimum capacity peak if two peaks can be obtained.
† Use maximum capacity peak if two peaks can be obtained.
‡ After this adjustment, check for image signal by shifting receiver dial to 19,080 kc.

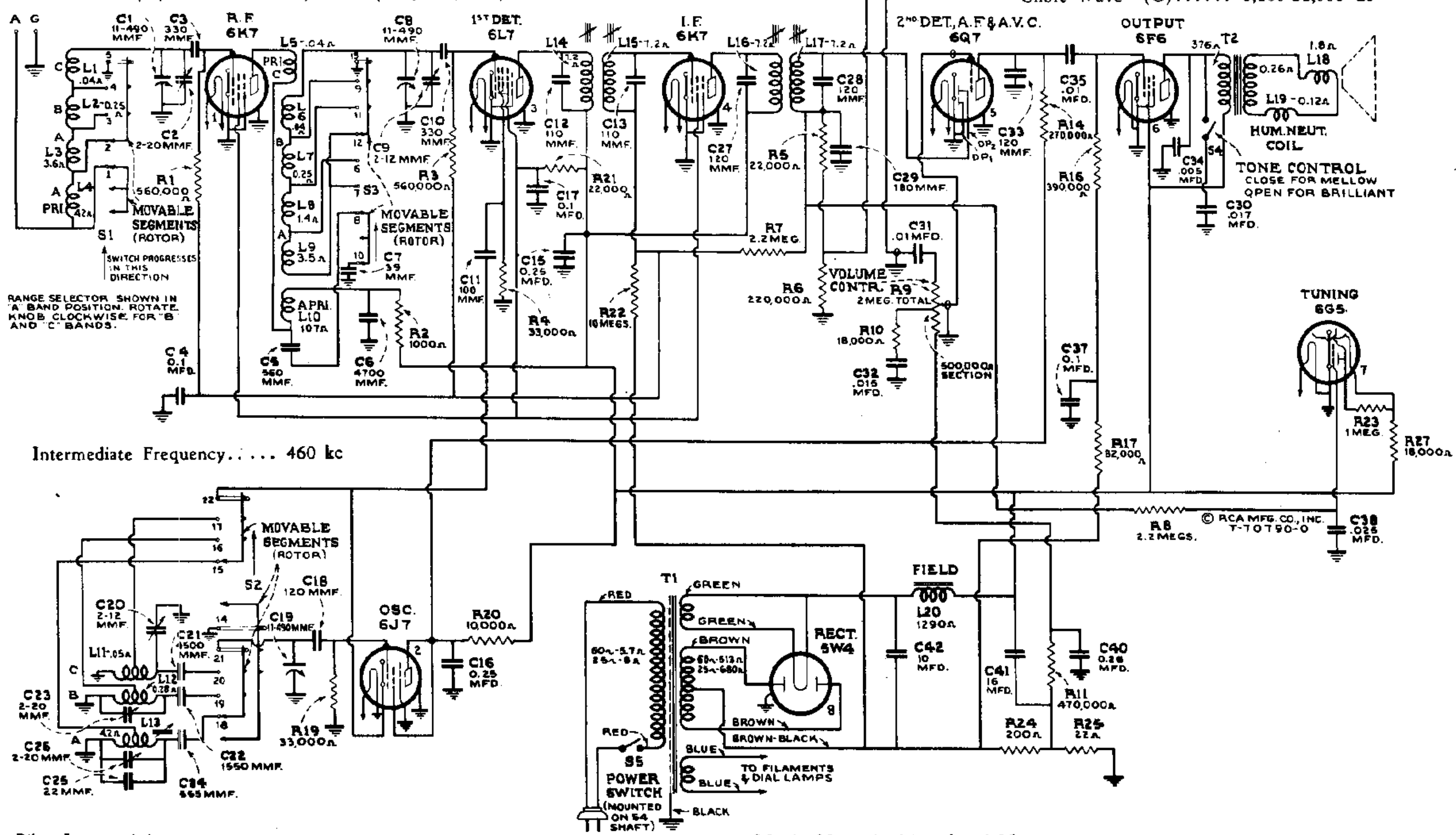
RECEIVER ASSEMBLIES

12038	Band—Rubber band for tuning tube
14384	Belt—Variable condenser drive belt
14517	Board—Antenna and ground terminal board
12717	Board—Phonograph terminal board
14338	Bushing—Variable condenser mounting bushing assembly
14524	Cable—Band indicator cable approx. 6½-in. long
14523	Cable—Tone control indicator cable approx. 3-in. long
14394	Cable—Tuning tube cable and socket
12607	Cap—First I-F transformer shield top
12581	Cap—Second I-F transformer shield top
11350	Cap—Grid contact cap
12884	Capacitor—Adjustable trimmer (long) (C2, C23, C26)
12714	Capacitor—Adjustable trimmer (medium) (C9, C20)
14021	Capacitor—22 Mmfd. (C25)
13546	Capacitor—39 Mmfd. (C7)
12720	Capacitor—100 Mmfd. (C11)
14262	Capacitor—110 Mmfd. (C12, C13)
12404	Capacitor—120 Mmfd. (C27, C28)
12724	Capacitor—120 Mmfd. (C18, C33)
12406	Capacitor—180 Mmfd. (C29)
12952	Capacitor—330 Mmfd. (C3, C10)
12727	Capacitor—555 Mmfd. (C24)
12537	Capacitor—560 Mmfd. (C5)
12729	Capacitor—1,550 Mmfd. (C22)
12728	Capacitor—4,500 Mmfd. (C21)
12897	Capacitor—4,700 Mmfd. (C6)
4838	Capacitor—.005 Mfd. (C34)
13138	Capacitor—.01 Mfd. (C31, C35)
11315	Capacitor—.015 Mfd. (C32)
4752	Capacitor—.017 Mfd. (C30)
4870	Capacitor—.025 Mfd. (C38)
4839	Capacitor—0.1 Mfd. (C4, C17, C37)
5170	Capacitor—0.25 Mfd. (C15)
12484	Capacitor—0.25 Mfd. (C16, C40)
11203	Capacitor—10 Mfd. (C42)
5212	Capacitor—16 Mfd. (C41)
14372	Coil—Antenna coil and shield (L1, L2, L3, L4)
14516	Coil—Oscillator coil and shield (L11, L12, L13)
14414	Coil—R.F. coil and shield (L5, L6, L7, L8, L9, L10)
14513	Condenser—3-gang variable tuning condenser (C1, C8, C19)
5119	Connector—3-contact female connector for speaker cable
12006	Core—Adjustable core and stud for Stock Nos. 14376 and 14283
12800	Core—Adjustable core and stud for coil Stock No. 14516
14518	Dial—Station selector dial scale complete with tuning tube escutcheon
14514	Drive—Variable condenser vernier drive pinion gear and shaft
14345	Drum—Variable condenser drive belt drum complete with set screws
14519	Indicator—Station selector indicator pointer
14520	Indicator—Vernier indicator pointer
5226	Lamp—Dial lamp
14028	Nut—Jamb nut for adjustable trimmer capacitor Stock Nos. 12714 and 12884
12471	Plate—6J7 Radiotron socket mounting plate and rubber cushions—less socket—Stock No. 11196
14340	Pulley—Station selector drive belt pulley and knob shaft
14522	Reflector—Dial reflector and bracket complete with dial lamp brackets, tuning lamp bracket, and tone and band indicators
14525	Resistor—22 Ohms, Carbon type, ½ watt (R25)
14526	Resistor—200 Ohms, Wire wound, 2½ watts (R24)
5112	Resistor—1,000 Ohms, Carbon type, ½ watt (R2)
8043	Resistor—10,000 Ohms, Carbon type, 2 watt (R20)
11175	Resistor—18,000 Ohms, Carbon type, ½ watt (R10)
14078	Resistor—18,000 Ohms, Carbon type, 1 watt (R27)
14284	Resistor—22,000 Ohms, Carbon type, 1/10 watt (R5)
13669	Resistor—22,000 Ohms, Carbon type, 2 watt (R21)
11300	Resistor—33,000 Ohms, Carbon type, 1/10 watt (R19)
13735	Resistor—33,000 Ohms, Carbon type, ½ watt (R4)
11365	Resistor—82,000 Ohms, Carbon type, ½ watt (R17)
11398	Resistor—220,000 Ohms, Carbon type 1/10 watt (R6)
11323	Resistor—270,000 Ohms, Carbon type, ½ watt (R14)
13005	Resistor—390,000 Ohms, Carbon type, 1/10 watt (R16)
11172	Resistor—470,000 Ohms, Carbon type, ½ watt (R11)
11397	Resistor—560,000 Ohms, Carbon type, 1/10 watt (R1, R3)
12013	Resistor—1 Megohm, Carbon type, 1/10 watt (R23)
11628	Resistor—2.2 Megohm, Carbon type, ½ watt (R7, R8)
13732	Resistor—10 Megohm, Carbon type, ½ watt (R22)
14343	Retainer—Station selector knob shaft and pulley retainer
14350	Screw—No. 8—32x3/16 square head set screw for hub and arm on tone or band indicator cable, drum Stock No. 14345, Gear Stock No. 30085
14374	Shield—Antenna or R-F coil shield
14375	Shield—Oscillator coil shield
12008	Shield—First or second I-F transformer shield
11195	Socket—6-contact 5W4 Radiotron socket
11196	Socket—8-contact 6F6, 6K7, 6J7, 6L7, or 6Q7 Radiotron socket
14114	Socket—Dial lamp socket
12007	Spring—Retaining spring for core Stock Nos. 12006 and 12800
12907	Spring—Tension spring for indicator drive gear Stock No. 30085
14342	Spring—Tension spring for idler Stock No. 14341
14371	Switch—Low frequency tone and power switch (S4, S5)
14515	Switch—Range switch (S1, S2, S3)
14376	Transformer—First I-F transformer (L14, L15, C12, C13)
14283	Transformer—Second I-F transformer (L16, L17, C27, C28, C29, R5, R6)
14511	Transformer—Power transformer, 105-125 volts, 50-60 cycles (T1)
14512	Transformer—Power transformer, 105-125 volts, 25-60 cycles (T1)
14335	Volume Control (R9)
14379	Washer—Felt washer for indicator pointer

RCA MFG. CO., INC.

R-F Alignment Frequencies
"Broadcast" (A).......... 600 kc (osc.), 1,500 kc (osc.)
"Medium Wave" (B)................ 6,000 kc (osc.)
"Short Wave" (C)............20,000 kc (osc., det., ant.)

Frequency Ranges
"Broadcast" (A)........... 530-1,720 kc
"Medium Wave" (B)..... 2,100-6,800 kc
"Short Wave" (C)...... 6,800-22,000 kc



Intermediate Frequency..... 460 kc

Pilot Lamps (4).. Mazda No. 46, 6.3 volts, 0.25 amp.

Power Supply Ratings

Rating A....................	105-125 volts, 50-60 cycles, 90 watts
Rating B....................	105-125 volts, 25-60 cycles, 90 watts
Rating C....................	105-125/200-250 volts, 50-60 cycles, 90 watts

Power Output

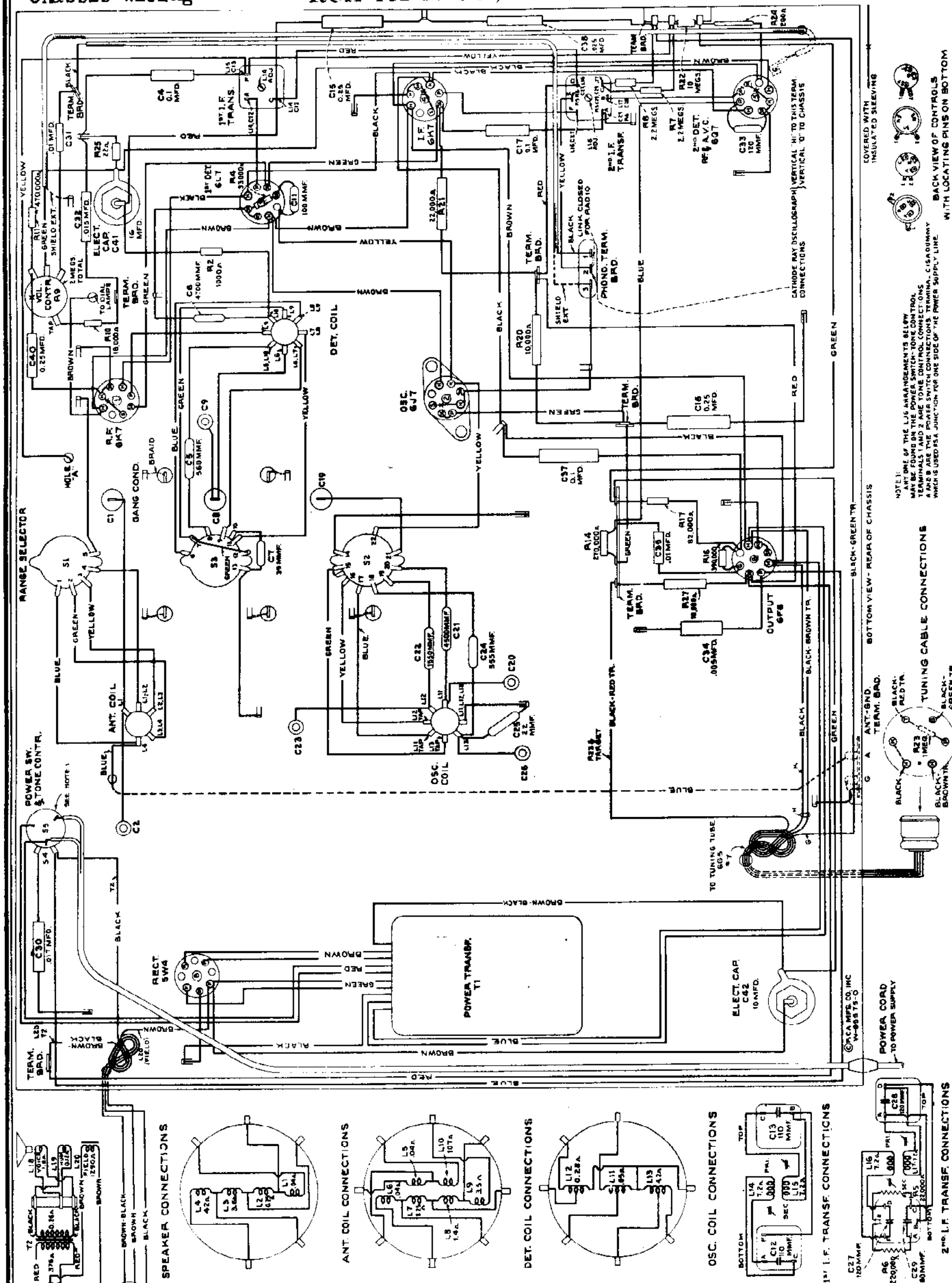
Undistorted..............	2.5 watts
Maximum..................	4.5 watts

Loudspeaker

Type....................	12-inch Electrodynamic
Impedance (v.c.)........	2.2 ohms at 400 cycles

MODEL 88K
Chassis Wiring

RCA MFG. CO., INC.



RCA MFG. CO., INC.

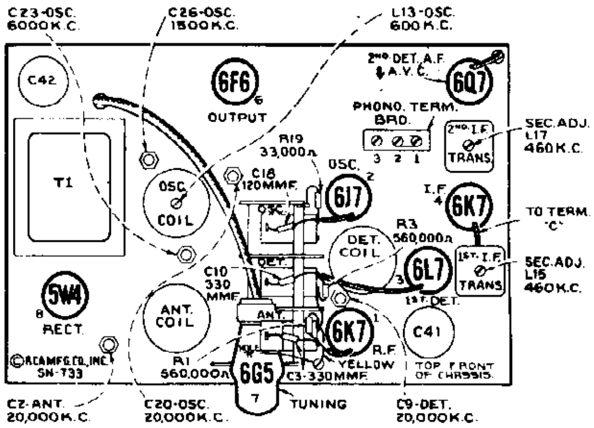


Figure 1—Radiotron, Coil, and Trimmer Locations

Service Data

Loudspeaker.—Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio amplifying circuit. RCA Victor Models R-93, R-93-A, R-93-2, or R-94 Record Players should be connected as follows: Remove link between terminals 1 and 2 on terminal board. Connect green wire in Radio-Record switch cable to terminal 1, yellow to terminal 2, and shield extension to terminal 3. Tape unused red and blue leads separately. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch.

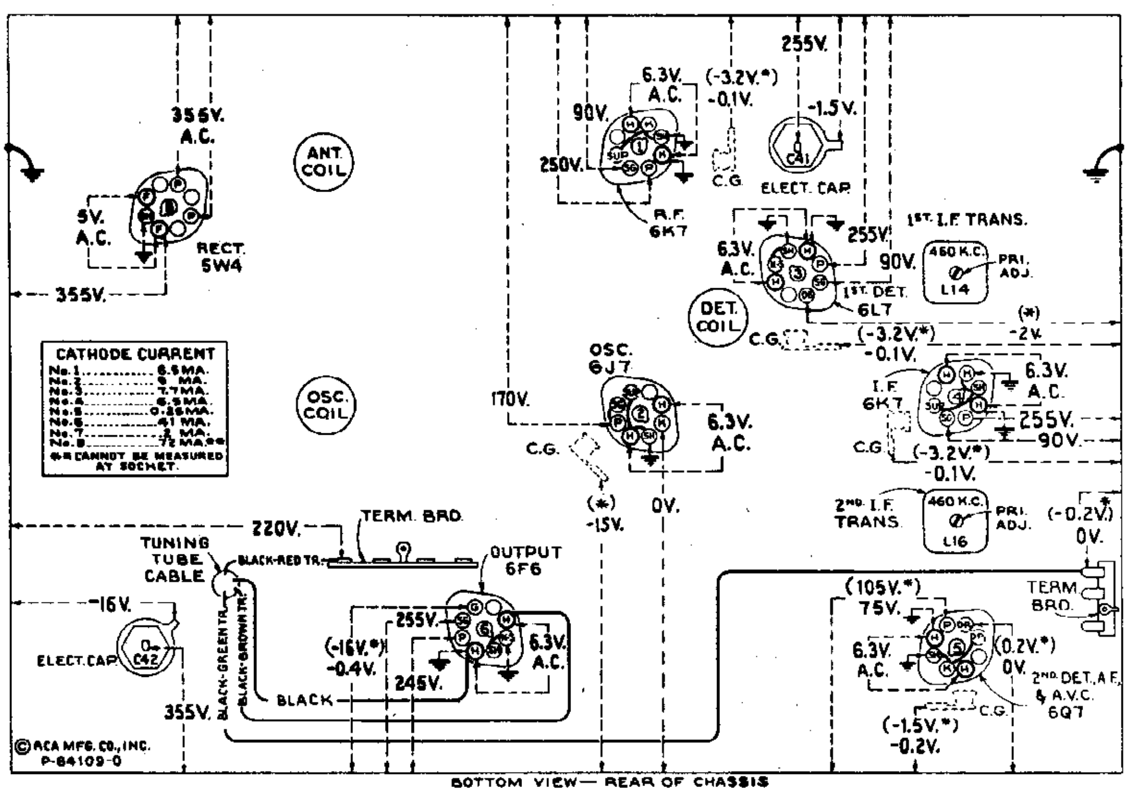


Figure 2—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard Broadcast")—
No signal being received—Volume control minimum

***Note:** Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.*

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

MODELS R-93-A, R-93-2
Motor Details

RCA MFG. CO., INC.

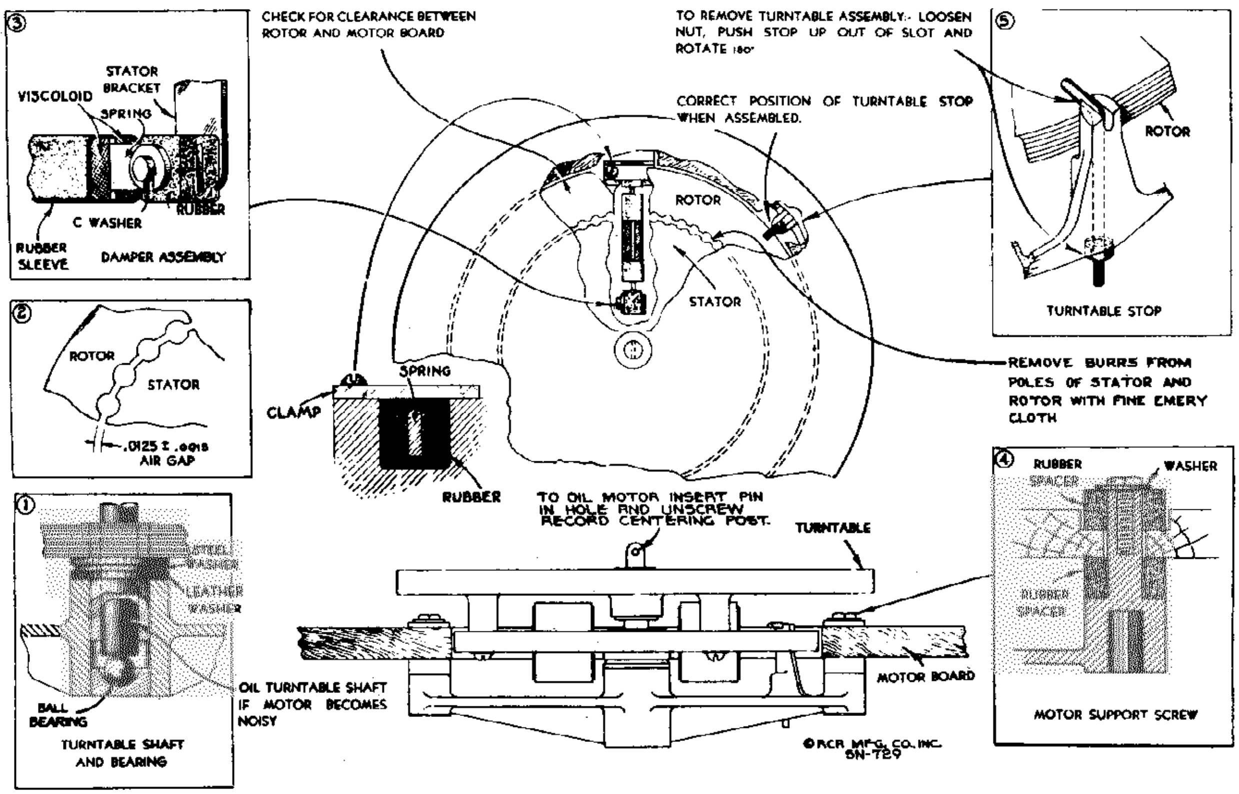


Figure 4—Details of Motor
[Model R-93-A (1st and 2nd prod.)]

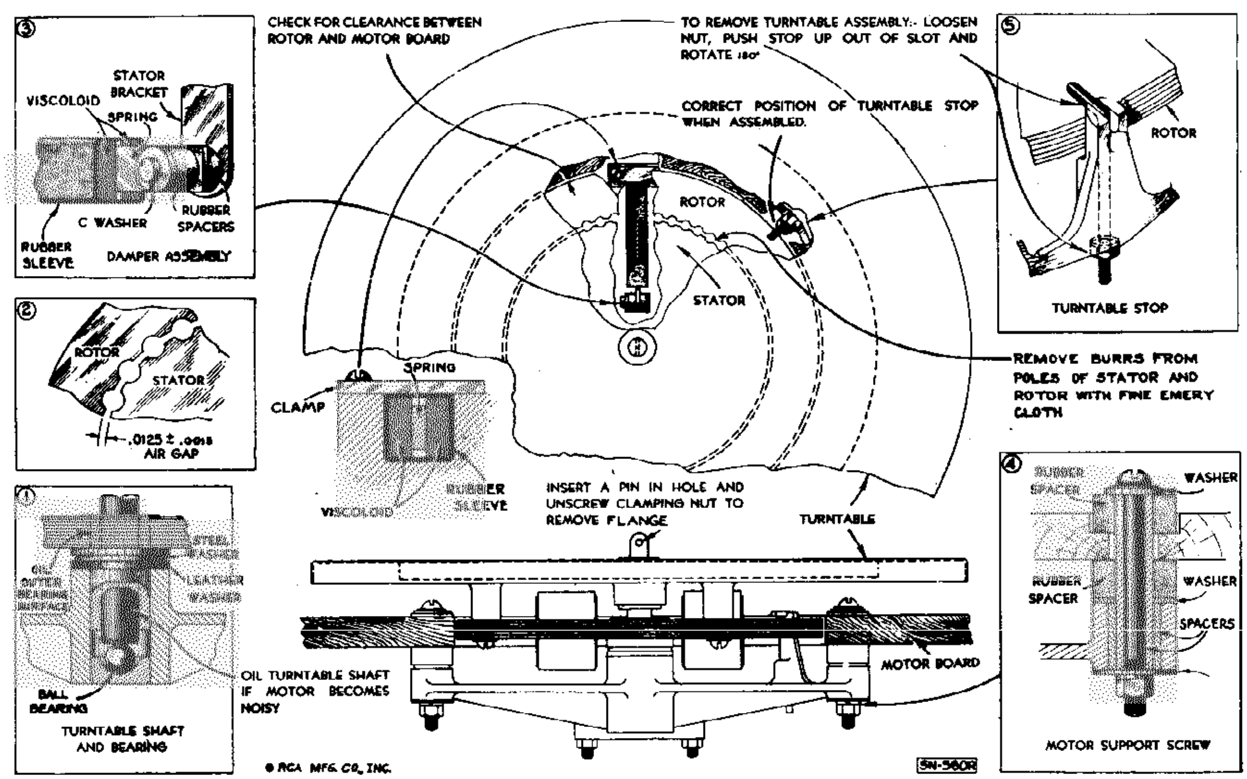


Figure 5—Details of Motor
[Model R-93-2 Deluxe (1st prod.)]

MODELS R-93-S,R-94
Motor Details
MODELS R-93(3rd Prod.)
R-93-A,R-93-S,R-94 R-93-2
Pick-up Details,Schematics

RCA MFG. CO., INC.

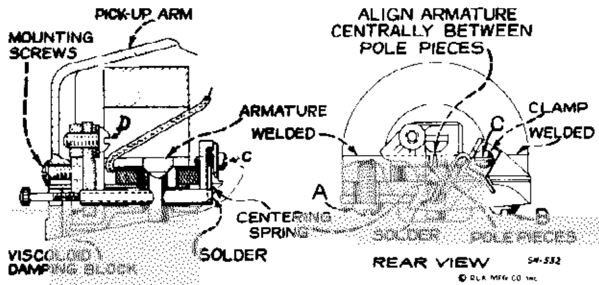


Figure 1—Details of Pickup
[Models R-93 (3rd prod.), R-93-A (1st prod.), R-93 2 Deluxe (1st prod.), and R-93-S (1st prod.)]

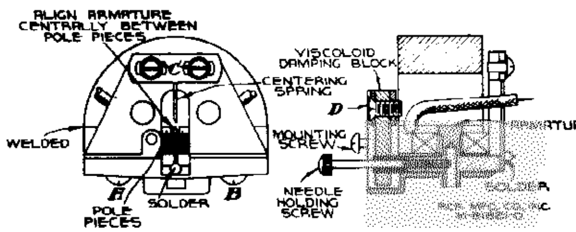


Figure 2—Details of Pickup
[Models R-93-A (2nd prod.) and R-94 Deluxe (1st prod.)]

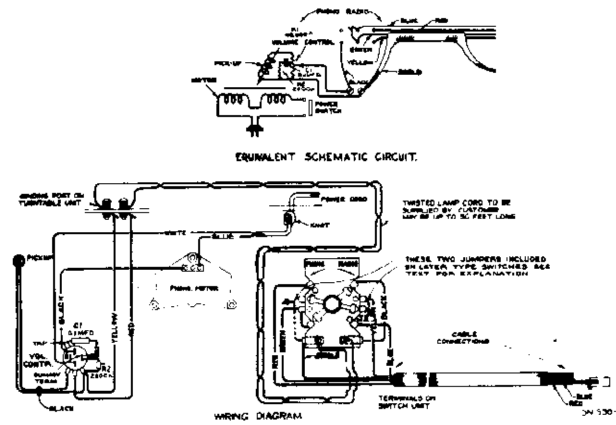


Figure 3—Wiring Diagram and Equivalent Schematic Circuit
[Models R-93-A (1st and 2nd prod.) and R-94 Deluxe (1st prod.)]

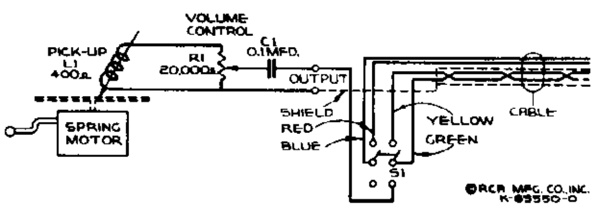


Figure 6—Schematic Circuit Diagram
[Model R-93-S (1st prod.)]

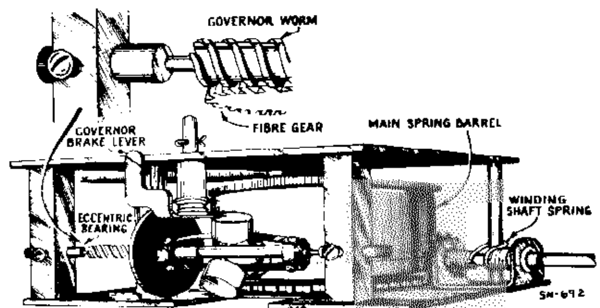


Figure 7—Details of Motor
[Model R-93-S (1st prod.)]

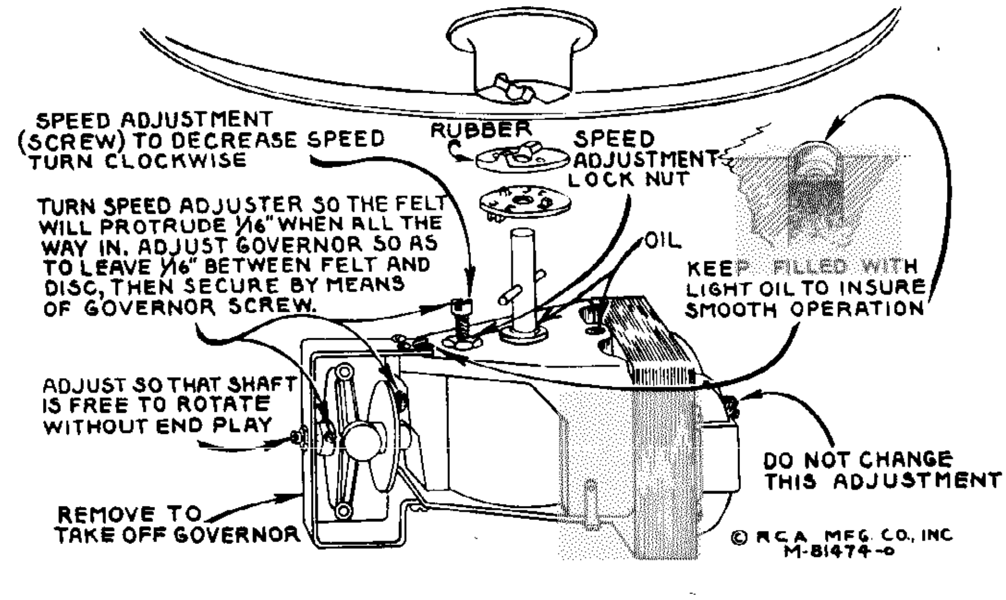


Figure 8—Details of Motor
[Model R-94 Deluxe (1st prod.)]

Introduction

The RCA Victor Record Players Models R-93 (third production), R-93-A (first and second production), R-93-2 Deluxe, R-93-S, and R-94 Deluxe are designed to provide record reproduction to the owner of a radio receiver by utilizing the audio amplifier system and loudspeaker of the radio receiver. Methods of connecting these record players to the radio receiver are outlined in the Model R-93 Service Notes (third edition) and in this booklet. Model R-93 (first and second production) is listed in the "Specifications" tabulation of this booklet, for convenient reference.

Note

1. (Applies to Model R-93-S only). It is necessary to short the 0.1 mfd. blocking capacitor C1 in Model R-93-S (see figure 6) for cases in which the control grid d-c bias, or cathode current flow, would be removed or prevented by this capacitor when the record player switch is thrown to "Phono" position. C1 is provided to permit operation on battery receivers without shorting bias batteries, etc. Cases in which it is necessary to short C1 are indicated in "RCA Victor Receivers—Details of Lead Connections" of this booklet.

2. (Record Player Switch Jumpers) — Some record player switches do not have jumpers J1 and J2 (see figure 3) attached. When the switch is so connected and turned to phonograph position, the voltage developed by the pickup is fed into the radio receiver through the green wire and shield, and at the same time the yellow wire is connected to shield. The jumpers J1 and J2 permit the yellow lead to kill radio by connection to shield. The jumpers should be removed where the yellow lead connects in such a position as to short bias batteries, etc. Check the switch to be used for the method chosen and use the jumpers accordingly. Correct jumper connections are indicated in "RCA Victor Receivers—Details of Lead Connections" of this booklet.

To prevent confusion, replacement parts lists are provided separately in this booklet for Models R-93 (third production), R-93-A (first and second production), R-93-2 Deluxe (first production), R-93-S (first production), and R-94 Deluxe (first production), respectively, and should be consulted whenever making replacements to these various models.

Description and Service Data

MODEL R-93

(Third Production)

(Walnut, Red, White, Black)

The Model R-93 (third production) in colors of Walnut, Red, White, or Black are similar electrically to the original R-93 (first and second production) but may be identified mechanically by the curved tone arm. The original Model R-93 had a straight tone arm. Refer to Model R-93 Service Notes (third edition) Phonograph Motor Service Data (second production motors) for motor details and adjustments.

MAGNETIC PICKUP

The pickup used in the phonograph unit is of an improved design. The horseshoe magnet is rigidly welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. The frequency response is substantially uniform over a wide range. Service operations which may be necessary on the pickup are as follows:

CENTERING ARMATURE

Refer to figure 1 showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces, i. e., exactly centered. Whenever this centering adjustment has been disturbed it will be necessary to remove the pickup mechanism from the tone arm by removing the needle holding screw and the two mounting screws from the front of the tone arm, holding the pickup assembly to keep it from dropping. Unsolder the two leads from the lugs on the terminal board at the rear of the pickup. Insert a small rod or nail into the armature needle hole and replace the needle holding screw, tightening it to hold the rod securely. If the armature clamping screws A and B have not been disturbed, screw or screws C should be loosened which will permit the armature to be moved from side to side, the rod acting as a lever to perform this operation. The proper adjustment is obtained when the armature is moved to the extreme position on each side (the movement being limited by the armature striking the pole pieces) and then brought to the mid position between these two extremes. Screw or screws C should then be tightened. The armature position should then be central between the pole pieces and at right angles to them. With a little practice, the correct adjustment of the armature will be obtained. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other foreign material which would obstruct the movement of the pickup armature.

DAMPING BLOCK

The viscoloid damping block which is attached to the front end of the armature shank serves as a mechanical filter to eliminate undesirable resonances and to cause the frequency response to be uniform. Should it be necessary to replace this damping block, the pickup mechanism should be removed from the tone arm as explained above. Remove screw D and the damping block from the pickup assembly. Make sure that the shaft of the armature which contacts the viscoloid is clean. Then insert the new damping block so that it occupies the same position as that of the original block, and is in correct vertical alignment with the armature. The hole in the block is somewhat smaller than the diameter of the armature in order to permit a snug fit. With the damping block properly aligned on the armature, screw D with its washer should then be replaced. Heat should be applied to the armature (viscoloid side) so that the damping block will fuse at the point of contact and become rigidly attached to the armature. A special-tip soldering iron, constructed as shown in Model R-93 Service Notes (third edition) figure 8, will be found very useful in performing this operation. The iron should be applied only long enough to slightly melt the block, causing a small bulge on both sides.

REPLACING COIL

Whenever there is defective operation due to an open or shorted pickup coil, this coil should be replaced. Remove the pickup mechanism and terminal board as described above. Remove screws A and B and the magnet assembly. Remove the bakelite coil support (with coil attached) and insert the new coil support assembly in its place, after which replace the magnet assembly and center the armature as described above, then re-assemble the remainder of the unit. Only rosin core solder should be used for soldering the coil leads and pickup leads to the pickup terminal board. This same type of solder should be used when necessary for soldering the centering spring to the armature.

MAGNETIZING

Loss of magnetization will not usually occur when the pickup has received normal care because the magnet and pole pieces are one unit and the magnetic circuit remains practically closed at all times. When the pickup has been mishandled, subjected to a strong a-c field, jolted, or dropped, there may be an appreciable loss of magnetic strength, in which case it will be necessary to remagnetize the entire structure. To do this, it will be necessary to first remove the pickup mechanism from the tone arm, and then remove the magnet assembly. Place the magnet assembly on the poles of a standard pickup magnetizer such as the RCA Stock No. 9549 Pickup Magnetizer and charging the magnet in accordance with the instructions accompanying the magnetizer. It is preferable to check the polarity of the pickup magnet and to remagnetize it so that the same polarity is maintained.

MODEL R-93-A

(First and Second Production)

(Walnut)

The cabinet of the Model R-93-A is similar to that of the Model R-93 Walnut finish. This model incorporates an acoustic compensated volume control, see figure 3. Model R-93-A (first production) and Model R-93-A (second production) differ only in the pickup construction, the essential difference being in the armature centering spring and spring clamps. Reference to pickup details, figures 1 and 2 will reveal the fact that the armature centering spring is respectively "V" and "T" shaped for the Model R-93-A (first and second productions). Refer to "Model R-93 (third production)" and figures 1 and 2 for pickup adjustments.

The motor differs slightly in construction and mounting details from that used in the Model R-93 (second production). Refer to figure 4 for motor details. Refer to Model R-93 Service Notes (third edition) for motor coil connections.

MODEL R-93-2 DE LUXE

(Walnut)

Model R-93-2 Deluxe is finished in walnut and is electrically identical to Model R-93 (third production), however, the cabinet is larger in size and has a hinged lid which may be closed while playing the records. The turntable is 10 inches in diameter. The motor differs slightly in construction from that used in the Model R-93 (second production). Refer to figure 5 for motor details and to Model R-93 Service Notes (third edition) for motor coil connections.

RCA MFG. CO., INC.

MODEL R-93-S

(Walnut)

Model R-93-S has a spring wound motor and is primarily intended for use with battery receivers. The pickup and tonearm are identical to those described in "Model R-93 (third production)," therefore the adjustments will be the same. Reference to the Schematic diagram figure 6 will show a capacitor C1 in series with one of the leads to the binding posts. The purpose of C1 is to permit operation on battery receivers without shorting bias batteries, etc. Observe Note 1 under "Introduction" when making connections to radio receivers.

MOTOR

The drive motor is of simple design and substantial construction. It should require little or no service if properly maintained. Attention to lubrication of the moving parts and occasional cleaning of the mechanism will go far to prevent faulty operation. Should it become necessary to repair the motor, the following procedure should be applied referring to figure 7:

REMOVING MOTOR FROM CABINET—Remove the winding key. To dismount the motor, unscrew the spindle cap with a screwdriver and remove turntable, slightly tapping the spindle while exerting an upward lift on the turntable. Remove the bottom cover from the cabinet. Loosen the screw holding the speed regulating lever and remove the latter. The four nuts holding motor to motor board should then be loosened to permit removal of motor assembly.

Caution—Allow the motor mechanism to run down completely before attempting adjustment, repairs, or replacement.

REPLACING MAIN SPRING—In case of main spring failure the entire spring barrel and gear should be replaced. Remove spring barrel spindle screw by unscrewing to right. Remove the "C" washer and two pillar screws holding bottom plate. Remove plate and intermediate spindle shaft. Replace main spring barrel, intermediate spindle shaft, and bottom plates.

WINDING SHAFT SPRING—This spring functions as a friction rachet. It may be removed by first removing pin holding winding gear on shaft, removing shaft, and then the screw holding the spring.

GOVERNOR ADJUSTMENTS—The mesh of the worm and fibre gears is adjusted by rotation of the eccentric spindle bearings. The adjustments should be made so that the worm meshes properly with the fibre gear and rotates freely without binding. The bearings should be accurately aligned with each other. The minimum of spindle end play which permits smooth operation should be used.

SPEED REGULATOR LEVEL—After assembly, adjust the speed regulator until the turntable rotates at 78 r.p.m.; then loosen the speed regulator screw and set pointer to center of speed indicator scale; tighten screw and re-check turntable speed.

LUBRICATION—All moving parts of the motor should be thoroughly cleaned and lubricated every six months to prevent excess wear and improper operation. A small amount of grease should be applied to the worm gear of the governor, the gear of the winding shaft, and on the small pinion gear. All other points should be lubricated with a drop of light oil. All motor parts should be covered with a light film of oil to prevent rusting.

MODEL R-94 DE LUXE

(Walnut)

The Model R-94 Deluxe cabinet is finished in walnut and has a hinged lid which may be closed while playing the records. This model incorporates an acoustic compensated volume control, see figure 3. An improved type of pickup is used, the construction of which is illustrated in figure 2. Refer to "Model R-93 (third production)" and figure 2 for pickup adjustments.

MOTOR—The phonograph motor is of the governor induction type and is designed to be simple and foolproof. Occasionally, however, certain adjustments may be required. These adjustments are illustrated and explained in figure 8. Application of oil to the felt pad which rubs against the governor disc will insure smooth operation.

RCA VICTOR RECEIVERS—DETAILS OF LEAD CONNECTIONS

MODEL	METHOD OF CONNECTION	GREEN	YELLOW	RED	BLUE	SHIELD	SWITCH
5BT, 5T, 5T1, 5T4, 5T5, 5T6, 5T7, 5T8, 6K, 6K1, 6T, 6T5, 8BK, 8BK6, 8BT, 8BT6, 8K11, 8T2, 8T11	2. Term. Board	1	2	Tape	Tape	3	†
6BK, 6BK6, 6BT, 6BT6	2. Term. Board	1	2	Tape	Tape	3	††
7K, 7T, 7X, 7X1, 8K, 8K1, 8T, 8T10	2. Term. Board	1	2	Tape	Tape	3	†§
6K2, 6K3, 6K10, 6T2, 6T10, 7K1, 7X1	2. Term. Board	2	1	Tape	Tape	3	†
T9-7, T9-8	2. Term. Board	2	3	Tape	Tape	1	†
9K, 9K1, 9K2, 9K3, 9K10, 9T, 10K, 10K1, 10K11, 10T, 10T11, 13K, 15K	2. Term. Board	2	1	4	3	3	††
C6-12, C7-14, C8-19, C8-20, T6-11, T7-12, T8-18, T9-10	4. Grid Clip	Grid Cap Tube	Grid Clip	Tape	Tape	Chassis	†§
C11-3, C13-3, C15-4	5. Adapter	1st Audio Cathode	Cathode Socket Contact	I-F Cathode *	I-F Cathode Socket Contact	Chassis	††§
C6-8, T6-7	5. Adapter	Grid Cap Tube	Grid Clip	Tape	Tape	Both Adapter Cathode Terms.	†§

† Add Jumpers J1 and J2 to Phono-Radio Switch if not present. § Short 0.1 Mfd. Capacitor (C1) in R-93-S Record-Player
†† Remove Jumpers J1 and J2 to Phono-Radio Switch if present. * Use a second adapter.

MODELS R-93 (3rd Prod.)
R-93-S, R-94, R-93A, R-93-2 RCA MFG. CO., INC.
Specifications, Parts, Page 1

Specifications

Model	Cabinet Finish	Production	Tone Arm Style	Voltage	Freq. Cyc.	Power Consumption Watts	Motor Coil Res. Ohms Total	Type of Motor	Turntable Speed R.P.M.	Pickup Impedance 1000 cycles	Volume Control Resistance Ohms	Dimensions Inches: Height	Dimensions Inches: Width	Dimensions Inches: Depth	Turntable Dia. Inches	Weights: Net	Weights: Shipping
R-93	Walnut	Third	Curved	105—125	60	5	200	Synchronous (Manual Starting)	78	1,400	20,000	5	11	8	7	8½	10
					50	5	200										
R-93	Red White Black	Third	Curved	105—125	60	5	200	Synchronous (Manual Starting)	78	1,400	20,000	5	11	8	7	8½	10
				105—125	50	5	200										
				105—125	25	5	660										
				200—250	50	5	1,040										
R-93	Walnut	Second	Straight	105—125	60	5	200	Synchronous (Manual Starting)	78	1,400	20,000	5	11	8	7	8½	10
				105—125	50	5	200										
				105—125	25	5	660										
R-93	Walnut	First	Straight	105—125	60	5	218	Synchronous (Manual Starting)	78	1,400	20,000	5	11	8	7	8½	10
				105—125	50	5	218										
				105—125	25	5	980										
				200—250	50	5	1,270										
R-93-A	Walnut	First and Second	Curved	105—125	60	5	160	Synchronous (Manual Starting)	78	1,400	40,000 Tapped for Compensation	5¾	11¼	9	7	10	12
				105—125	50	5	160										
				105—125	25	5	420										
				200—250	50	5	700										
R-93-2 Deluxe	Walnut	First	Curved	105—125	60	5	200	Synchronous (Manual Starting)	78	1,400	20,000	5¼	13 7/16	13¼	10	14	18
				105—125	50	5	200										
				105—125	25	5	660										
				200—250	50	5	1,040										
R-93-S	Walnut	First	Curved	—	—	—	—	Spring Wound	78 Adjustable	1,400	20,000	5¼	12 9/16	10¼	9	10	13
R-94 Deluxe	Walnut	First	Curved	105—125	60	25	100	Governor Induction (Self-Starting)	78 Adjustable	1,400	40,000 Tapped for Compensation	7¼	15¼	13¼	9	14	18
				105—125	50—60	25	70										
				200—250	50—60	25	290										

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	MOTOR ASSEMBLIES [Model R-93 (third production) Walnut]
10194	Ball—Steel ball bearing
11740	Base—Motor base and bearing assembly
11733	Coil—Stator assembly—comprising coil and laminations—105-125 volt, 60 cycle operation
11734	Coil—Stator assembly—comprising coil and laminations—105-125 volt, 50 cycle operation
11748	Damper—Motor damper assembly—comprising one damper, one damper plate, one screw, two rubber washers, and one "C" washer
11873	Motor—105-125 volts—60 cycle motor (M1)
11874	Motor—105-125 volts—50 cycle motor (M1)
4456	Motor Accessories—comprising three nuts, one shield and one screw
11876	Turntable — Turntable assembly complete — with rotor laminations—60 cycle operation
11875	Turntable — Turntable assembly complete — with rotor laminations—50-cycle operation
4083	Washer—Leather washer
4084	Washer—Metal washer
	MOTOR ASSEMBLIES [Model R-93 (third production) Red-White-Black]
10194	Ball—Steel ball bearing
11740	Base—Motor base and bearing assembly
11733	Coil—Stator assembly—comprising coil and lamination—110 volts, 60 cycle
11734	Coil—Stator assembly—comprising coil and lamination—110 volts, 50 cycle
11735	Coil—Stator assembly—comprising coil and lamination—110 volts, 25 cycle
13081	Coil—Stator assembly—comprising coil and lamination—220 volts, 50 cycle
11748	Damper—Motor damper assembly—comprising one damper, one damper plate, one screw, two rubber washers and one "C" washer
9721	Motor—110 volts, 60 cycle motor with red turntable (M1)
9725	Motor—110 volts, 60 cycle motor with white turntable (M1)
9729	Motor—110 volts, 60 cycle motor with black turntable (M1)
9722	Motor—110 volts, 50 cycle motor with red turntable (M1)
9726	Motor—110 volts, 50 cycle motor with white turntable (M1)
9730	Motor—110 volts, 50 cycle motor with black turntable (M1)
9723	Motor—110 volts, 25 cycle motor with red turntable (M1)
9727	Motor—110 volts, 25 cycle motor with white turntable (M1)
9731	Motor—110 volts, 25 cycle motor with black turntable (M1)

RCA MFG. CO., INC.

REPLACEMENT PARTS—(Continued)

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION
9724	Motor—220 volts, 50 cycle motor with red turntable (M1)
9728	Motor—220 volts, 50 cycle motor with white turntable (M1)
9732	Motor—220 volts, 50 cycle motor with black turntable (M1)
13072	Turntable—Red turntable—complete with rotor lamination—60 cycle operation
13075	Turntable—White turntable—complete with rotor lamination—60 cycle operation
13078	Turntable—Black turntable—complete with rotor lamination—60 cycle operation
13073	Turntable—Red turntable—complete with rotor lamination—50 cycle operation
13076	Turntable—White turntable—complete with rotor lamination—50 cycle operation
13079	Turntable—Black turntable assembly—complete with rotor lamination—50 cycle operation
13074	Turntable—Red turntable assembly—complete with rotor lamination—25 cycle operation
13077	Turntable—White turntable assembly—complete with rotor lamination—25 cycle operation
13080	Turntable—Black turntable assembly—complete with rotor lamination—25 cycle operation
4083	Washer—Leather spacing washer
4084	Washer—Metal spacing washer

MOTOR ASSEMBLIES
[Model R-93-A (first and second production) Walnut]

STOCK No.	DESCRIPTION
10194	Ball—Steel ball bearing
14233	Base—Motor base and bearing assembly
14232	Cap—Turntable spindle cap
14223	Coil—Stator assembly—comprising coils and laminations—105-125 volts, 60 cycle
14224	Coil—Stator assembly—comprising coils and laminations—105-125 volts, 50 cycle
14225	Coil—Stator assembly—comprising coils and laminations—105-125 volts, 25 cycle
14226	Coil—Stator assembly—comprising coils and laminations—220 volts, 50 cycle
14928	Damper—Motor damper assembly—comprising one damper, one damper plate, one screw and one "C" washer
14216	Motor—105-125 volts—60 cycle (MI)
14217	Motor—105-125 volts—50 cycle (MI)
14218	Motor—105-125 volts—25 cycle (MI)
14219	Motor—220 volt—50 cycle (MI)
14227	Shield—Terminal board shield and nuts
14229	Stop—Turntable stop, lockwasher and nut—prevents removal of turntable
14220	Turntable—Turntable assembly—complete with rotor laminations—60 cycle operation
14221	Turntable—Turntable assembly—complete with rotor laminations—50 cycle operation
14222	Turntable—Turntable assembly—complete with rotor laminations—25 cycle operation
4083	Washer—Leather washer for turntable bearing
14230	Washer—Metal washer for turntable bearing
14231	Washer—Metal shim washer for turntable bearing

MOTOR ASSEMBLIES
[Model R-93-2 Deluxe (first production) Walnut]

STOCK No.	DESCRIPTION
10194	Ball—Steel ball bearing
11740	Base—Motor base and bearing assembly
11735	Coil—Stator assembly—Comprising coils and laminations—110 volts, 25 cycles
11734	Coil—Stator assembly—comprising coils and laminations—110 volts, 50 cycles
11733	Coil—Stator assembly—comprising coils and laminations—110 volts, 60 cycles
13081	Coil—Stator assembly—comprising coils and laminations 220 volts, 50 cycles
11748	Damper—Motor damper assembly—comprising one damper, one damper plate, one screw, two rubber washers and one "C" washer
9733	Motor—110 volts—25 cycles (MI)
12083	Motor—110 volts—50 cycles (MI)
12082	Motor—110 volts—60 cycles (MI)
9734	Motor—220 volts—50 cycles (MI)
13084	Turntable—Turntable assembly—complete with rotor laminations—25 cycle operation
12049	Turntable—Turntable assembly—complete with rotor laminations—50 cycle operation
12046	Turntable—Turntable assembly—complete with rotor laminations—60 cycle operation
4083	Washer—Leather spacing washer
4084	Washer—Metal spacing washer

MOTOR ASSEMBLIES
[Model R-93-S (first production) Walnut]

STOCK No.	DESCRIPTION
7937	Ball and Spring—Governor ball and spring assembly
7943	Barrel—Spring barrel—complete with winding gear and drive gear
7946	Gear—Intermediate gear, pinion and shaft
7935	Gear—Winding gear, sleeve and shaft
7940	Governor Assembly—Comprising governor, spindle, disc, collar, governor balls and springs assembled
7226	Grease—Motor grease—1 pint can
7228	Lubricant—Spring lubricant—1 pint can
7931	Motor—Motor complete with spindle cap
7227	Oil—Motor oil—1 pint can
7941	Plate—Motor top plate assembly
7944	Shaft—Regulator shaft—complete with friction lever and pad with cotter pin
7939	Spindle—Turntable spindle—complete with two gears
7957	Spring—Main spring for motor
7942	Spring—Winding shaft spring

MOTOR ASSEMBLIES
[Model R-94 Deluxe (first production) Walnut]

STOCK No.	DESCRIPTION
14328	Governor—Complete motor governor assembly
14325	Motor—105-125 volts—50 cycle (M1)
14326	Motor—105-125 volts—50-60 cycle (M1)
14327	Motor—200-250 volts—50-60 cycle (M1)

PICKUP AND ARM ASSEMBLIES
[Model R-93 (third production) Walnut]

STOCK No.	DESCRIPTION
3812	Armature—Pickup armature
4462	Cable—Pickup cable
11732	Coil—Pickup coil and support (L1)
5091	Cushion—Pickup armature cushion
4543	Damper—Pickup damper block complete—with damper plate, washer and screw
12329	Pickup and arm assembly complete
4387	Screw—Pickup arm set screw—used to fasten arm to pivot shaft
11951	Screw—Pickup needle holding screw

PICKUP AND ARM ASSEMBLIES
[Model R-93 (third production) Red-White-Black]

STOCK No.	DESCRIPTION
3812	Armature—Pickup armature
4462	Cable—Pickup cable
11732	Coil—Pickup coil and support (L1)
5091	Cushion—Pickup armature cushion
4543	Damper—Pickup damper block—complete with damper plate, washer and screw
12329	Pickup and arm assembly—complete
4387	Screw—Pickup arm set screw—used to fasten arm to pivot shaft
11951	Screw—Pickup needle holding screw

PICKUP AND ARM ASSEMBLIES
[Model R-93-A (first and second production) Walnut]

STOCK No.	DESCRIPTION
3812	Armature—Pickup armature (first production)
14894	Armature—Pickup armature (second production)
4462	Cable—Pickup cable
11732	Coil—Pickup coil and support (L1)
5091	Cushions—Pickup armature cushion
4543	Damper—Pickup damper block—complete with damper plate and washer
14928	Pickup and Assembly—Complete
4387	Screw—Pickup arm set screw—used to fasten arm to pivot shaft
11951	Screw—Pickup needle holding screw

PICKUP AND ARM ASSEMBLIES
[Model R-93-2 Deluxe (first production) Walnut]

STOCK No.	DESCRIPTION
11731	Armature—Pickup armature—complete with spacer cushions
11732	Coil—Pickup coil (L1)
4543	Damper—Pickup damper block—complete with damper plate and screw
11950	Pickup and Arm Assembly—Complete
5061	Spacer Cushions—Pickup armature spacer cushions
11951	Screw—Needle holding screw

PICKUP AND ARM ASSEMBLIES
[Model R-93-S (first production) Walnut]

STOCK No.	DESCRIPTION
3812	Armature—Pickup armature
4462	Cable—Pickup cable
11732	Coil—Pickup coil and support (L1)
5091	Cushion—Pickup armature cushion
4543	Damper—Pickup damper block—complete with damper plate, washer and screw
12329	Pickup and Arm Assembly—Complete
4387	Screw—Pickup arm set screw—used to fasten arm to pivot shaft
11951	Screw—Pickup needle holding screw

PICKUP AND ARM ASSEMBLIES
[Model R-94 Deluxe (first production) Walnut]

STOCK No.	DESCRIPTION
14291	Armature—Pickup armature assembly
11732	Coil—Pickup coil (L1)
14292	Damper—Pickup damper block—complete with clamp and screw
14329	Pickup and Arm—Complete
4387	Screw—No. 6-32x¼-in. headless set screw for pickup arm pivot shaft
3811	Screw—Needle holding screw
14213	Washer—Pickup arm stop washer

CABINET ASSEMBLIES
[Model R-93 (third production) Walnut]

STOCK No.	DESCRIPTION
X325	Bottom—Lower section of wood cabinet
X324	Cover—Upper section of wood cabinet

CABINET ASSEMBLIES
[Model R-93 (third production) Red-White-Black]

STOCK No.	DESCRIPTION
X314	Bottom—Lower section of red cabinet
X316	Bottom—Lower section of white cabinet
X318	Bottom—Lower section of black cabinet
X315	Cover—Top section of red cabinet
X317	Cover—Top section of white cabinet
X319	Cover—Top section of black cabinet

CABINET ASSEMBLIES
[Model R-93-A (first and second production) Walnut]

STOCK No.	DESCRIPTION
X356	Bottom—Lower section of wood cabinet
X357	Cover—Upper section of wood cabinet

CABINET ASSEMBLIES
[Model R-93-2 Deluxe (first production) Walnut]

STOCK No.	DESCRIPTION
X321	Bottom—Lower section of cabinet—less hinges and lid support
X320	Cover—Lid section of cabinet—less hinges and lid support
13085	Hinge—Cabinet hinge and screws
13086	Support—Cabinet lid support and screws

CABINET ASSEMBLIES
[Model R-93-S (first production) Walnut]

STOCK No.	DESCRIPTION
X322	Bottom—Lower section of wood cabinet
X323	Cover—Top section of wood cabinet

CABINET ASSEMBLIES
[Model R-94 Deluxe (first production) Walnut]

STOCK No.	DESCRIPTION
X370	Bottom—Lower section of cabinet—less hinges and lid support
X371	Cover—Lid section of cabinet—less hinges and lid support
13085	Hinge—Cabinet lid hinge and screws
13086	Support—Cabinet lid support and screws

MISCELLANEOUS ASSEMBLIES
[Model R-93 (third production) Walnut]

STOCK No.	DESCRIPTION
4459	Bracket—Volume control mounting bracket
4461	Cable—5-conductor Radio-Record switch cable
3829	Knob—Radio-Record switch knob
3961	Knob—Volume control knob
4458	Post—Binding post
3261	Rest—Pickup rest
11869	Screw—Motor mounting screw assembly—comprising one screw, three metal washers, two rubber washers, one lockwasher, one nut and two spacers
4119	Screw—No. 8-32 x ¼-in. headless set screw for knob, Stock No. 3829
4460	Switch—Radio-Record switch (S2)
4502	Volume Control and switch (R1, S1)

MISCELLANEOUS ASSEMBLIES
[Model R-93 (third production) Red-White-Black]

STOCK No.	DESCRIPTION
4459	Bracket—Volume control mounting bracket
4461	Cable—5-conductor Radio-Record switch cable
3829	Knob—Radio-Record switch knob
4333	Knob—Volume control knob—for black finish models
13083	Knob—Volume control knob—for red finish models
13082	Knob—Volume control knob—for white finish models
4458	Post—Binding post
3261	Rest—Pickup rest
11869	Screw—Motor mounting screw assembly—comprising one screw, one upper spacer, one lower spacer, two rubber washers, three metal washers, one lockwasher and one nut
4119	Screw—No. 8-32 x ¼-inch headless set screw for knob, Stock No. 3829
4460	Switch—Radio-Record switch (S2)
4502	Volume Control and switch (R1, S1)

MISCELLANEOUS ASSEMBLIES
[Model R-93-A (first and second production) Walnut]

STOCK No.	DESCRIPTION
4461	Cable—5-conductor Radio-Record switch cable
4841	Capacitor—0.1 Mfd. (C1)
3829	Knob—Radio-Record switch knob
3961	Knob—Volume control knob
4458	Post—Binding post
3261	Rest—Pickup rest
12195	Resistor—2,200 Ohms, insulated, ¼ watt (R2)
14235	Screw—Motor mounting screw assembly—comprising one screw, one metal washer and two rubber washers
4119	Screw—No. 8-32x¼-in. headless screw for knob Stock No. 3829
4460	Switch—Radio-Record switch (S2)
14234	Volume Control and Switch (R1, S1)

MISCELLANEOUS ASSEMBLIES
[Model R-93-2 Deluxe (first production) Walnut]

STOCK No.	DESCRIPTION
4459	Bracket—Volume control mounting bracket
4461	Cable—6-conductor Radio-Record switch cable
3829	Knob—Radio-Record switch knob
3961	Knob—Volume control knob
4458	Post—Binding post
3261	Rest—Pickup rest
11869	Screw—Motor mounting screw assembly—comprising one screw, three metal washers, two rubber washers, one lockwasher, one nut and two spacers
4119	Screw—No. 8-32x¼-in. headless set screw for knob Stock No. 3829
4460	Switch—Radio-Record switch (S2)
4502	Volume Control and switch (R1, S1)

MISCELLANEOUS ASSEMBLIES
[Model R-93-S (first production) Walnut]

STOCK No.	DESCRIPTION
4459	Bracket—Mounting bracket for volume control
13089	Brake—Turntable brake assembly
4461	Cable—5-conductor Radio-Record switch cable
13087	Cap—Turntable spindle cap
4841	Capacitor—0.1 Mfd. (C1)
13093	Escutcheon—Winding key escutcheon and bushing
13091	Key—Motor winding key
3829	Knob—Radio-Record switch knob
3961	Knob—Volume control knob
7925	Leather—Friction leather for turntable brake
7926	Nut—Motor mounting nut assembly—comprising one nut, two washers, one lockwasher, one rubber cushion
4458	Post—Binding post
13090	Regulator—Motor speed regulator and plate
3261	Rest—Pickup rest
4119	Screw—No. 8-32x¼-in. headless set screw for knob Stock No. 3829
7934	Spring—Coil spring for turntable brake
4460	Switch—Radio-Record switch (S1)
13088	Turntable—Complete
13092	Volume Control (R1)

MISCELLANEOUS ASSEMBLIES
[Model R-94 Deluxe (first production) Walnut]

STOCK No.	DESCRIPTION
4461	5-conductor switch cable
4841	Capacitor—0.1 Mfd. (C1)
11704	Damper—Turntable damper and damper plate
3961	Knob—Volume control and switch knob
3829	Knob—Radio-Record switch knob
4458	Post—Binding post
3261	Rest—Pickup rest
13716	Resistor—2,200 Ohms, insulated, ¼ watt (R2)
13873	Screw—Motor mounting screw assembly—comprising one screw, one spacer, one washer and one lockwasher
4119	Screw—No. 8-32x¼-in. headless set screw for knob Stock No. 3829
4460	Switch—Radio-Record switch (S2)
14204	Turntable—Complete
14234	Volume Control and Power Switch (R1, S1)

MODELS R-96, R-97
Parts

RCA MFG. CO., INC.

LOUDSPEAKER

Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION
	AMPLIFIER ASSEMBLIES
12118	Cap—Grid contact cap
5005	Capacitor—.0035 Mfd. (C3)
4838	Capacitor—.005 Mfd. (C10)
13138	Capacitor—.01 Mfd. (C4, C8)
12670	Capacitor—.035 Mfd. (C9)
4839	Capacitor—0.1 Mfd. (C1, C2, C6)
5170	Capacitor—0.25 Mfd. (C7)
12484	Capacitor—0.25 Mfd. (C5)
11203	Capacitor—10 Mfd. (C11)
5212	Capacitor—16 Mfd. (C12)
14783	Connector—2-contact female connector for motor power cable
5119	Connector—3-contact female connector for reproducer cable
11955	Resistor—27 Ohms—Carbon type, ½ watt (R13)
11670	Resistor—330 Ohms—Carbon type, 1 watt (R12)
5159	Resistor—2,200 Ohms—Carbon type, ½ watt (R1, R2, R3)
5029	Resistor—56,000 Ohms—Carbon type, ½ watt (R9)
14943	Resistor—180,000 Ohms—Carbon type, ½ watt (R8)
11172	Resistor—470,000 Ohms—Carbon type, ½ watt (R6, R10)
13730	Resistor—1 Meg.—Carbon type, ½ watt (R5)
4241	Resistor—1.5 Meg.—Carbon type, ½ watt (R7)
4233	Shield—6C6 Radiotron shield
14278	Socket—Single contact female pickup cable socket
4794	Socket—4-contact 80 Radiotron socket
4786	Socket—6-contact 6C6 or 42 Radiotron socket
14797	Tone Control and power switch (R11, S1)
14796	Transformer—Power transformer—105-125 volts, 50-60 cycles (T1)
14843	Transformer—Power transformer—105-125 volts, 25-60 cycles (T1) (Model R97 only)
14798	Volume Control (R4)
	MOTORBOARD ASSEMBLIES (Model R-96)
14803	Brake—Turntable brake and motor switch
3261	Rest—Pickup rest
30248	Screw—Motor mounting screw, washer, rubber washers, clamp plate and spacer assembly
30100	Springs—Tension springs for brake Stock No. 14803 comprising 1 long and 1 short spring
14804	Switch—Motor switch (S2)—located on turntable brake Stock No. 14803
	MOTOR ASSEMBLIES (Model R-96)
11703	Governor—Complete motor governor, governor shaft and gear assembly
14800	Motor—105-125 volts, 60 cycle (MI)
	OPERATING MECHANISM ASSEMBLIES (Model R-97)
14199	Bushing—Record separator rotating shaft bushing
14183	Cam—Cam and gear assembly
6808	Clutch—Trip lever friction clutch
14197	Finger—Friction finger assembly
14186	Hub—Rotating hub and record separator complete with set screw
14189	Lever—Locating lever assembly
14201	Lever—Manual index lever assembly
14184	Lever—Main lever and link assembly
14194	Lever—Pickup arm lever complete with set screws
14193	Lever—Pickup lift cable lever
14198	Lever—Reject lever assembly
14185	Lever—Trip lever and friction clutch assembly
14196	Pawl—Trip pawl assembly
4563	Screw—Cable lever screw and two locknuts
4059	Screw—Trip lever clutch tension adjustment screw
14200	Screw—No. 8-32 special hex head screw and lockwasher for record separator shaft mounting
14188	Screw—No. 10-32x7/16 fillister-head cone-pointed set screw for rotating hub
14195	Screw—No. 10-32x5/16 fillister-head cone-pointed set screw for pickup arm lever
14187	Shaft—Rotating shaft for record separator
3676	Spring—Cam pawl tension spring
3666	Spring—Lift cable tension spring
14190	Spring—Locating lever pawl tension spring
14191	Spring—Locating lever or reject lever tension spring
14192	Spring—Main lever tension spring
	MOTORBOARD ASSEMBLIES (Model R-97)
14208	Bracket—Bumper bracket and bumper complete
14209	Bumper—Rubber bumper
14830	Cable—Shielded cable 13" long complete with single contact male connector—connects pickup shorting switch to input transformer or compensator
14212	Escutcheon—Manual index lever and switch escutcheon
14203	Post—Record post—located on front left hand corner of motorboard
14210	Rest—Pickup arm rest
14207	Roller—Pickup lift cable roller and bracket
14211	Socket—Motorboard socket and shell
14205	Support—Pickup arm mounting spacer, washers and nut
14206	Switch—Motor toggle switch (S2)
14629	Switch—Pickup shorting switch (S3)
14204	Turntable—Complete
14213	Washer—Pickup arm stop washer and spacing washer
	MOTOR ASSEMBLIES (Model R-97)
14215	Governor—Governor complete with motor Stock Nos. 9799, 14465 and 14466
14466	Motor—105-125 volts, 25 cycle (M1)
14465	Motor—105-125 volts, 50-60 cycle (M1)
9799	Motor—105-125 volts, 60 cycle (M1)
14214	Screw—Motor mounting screw and spacer assembly
	PICKUP AND ARM ASSEMBLIES (For Model R-96 only)
14291	Armature—Pickup armature
11732	Coil—Pickup coil (L1)
14292	Damper—Pickup damper assembly—comprising one damper, one clamp and one screw
14931	Pickup and Arm Complete
3811	Screw—Needle holding screw
	PICKUP AND ARM ASSEMBLIES (For Model R-97 only)
14291	Armature—Pickup armature assembly
4064	Cable—Pickup lift cable
11732	Coil—Pickup coil (L1)
14292	Damper—Pickup damper block complete with clamp and screw
14290	Pickup and Arm Complete
3811	Screw—Needle holding screw
4387	Screw—No. 6-32x¼" headless set screw for pickup arm pivot shaft
	REPRODUCER ASSEMBLIES (RL-63-F1)
14356	Board—3-contact reproducer terminal board
13866	Cap—Cone center dust cap
12012	Coil—Field coil (L4)
11469	Coil—Hum coil (L2)
12642	Cone—Reproducer cone and dust cap (L3)
5118	Plug—3-contact male plug for reproducer
14360	Reproducer—Reproducer complete
14358	Screw—Screw, washer and lockwasher to hold core in yoke
14355	Transformer—Output transformer (T2)
14357	Washer—Spring washer to hold field coil
	MISCELLANEOUS ASSEMBLIES
4391	Box—Needle box for Model R-97 only
11762	Box—Needle box for Model R-96 only
11704	Damper—Turntable damper and damper plate
12673	Knob—Volume control or tone control and power switch knob
14267	Screw—Amplifier chassis mounting screw and washer
30249	Screw—Motorboard mounting screw, spring, spacer, washer, lockwasher, and rubber washer assembly for Model R-96 only
30250	Screw—Motorboard mounting screw, spring, washers and rubber washer assembly for Model R-97 only
4119	Screw—No. 8-32 headless set screw for knob Stock No. 12673
14801	Turntable—Complete for Model R-96 only

RCA MFG. CO., INC.

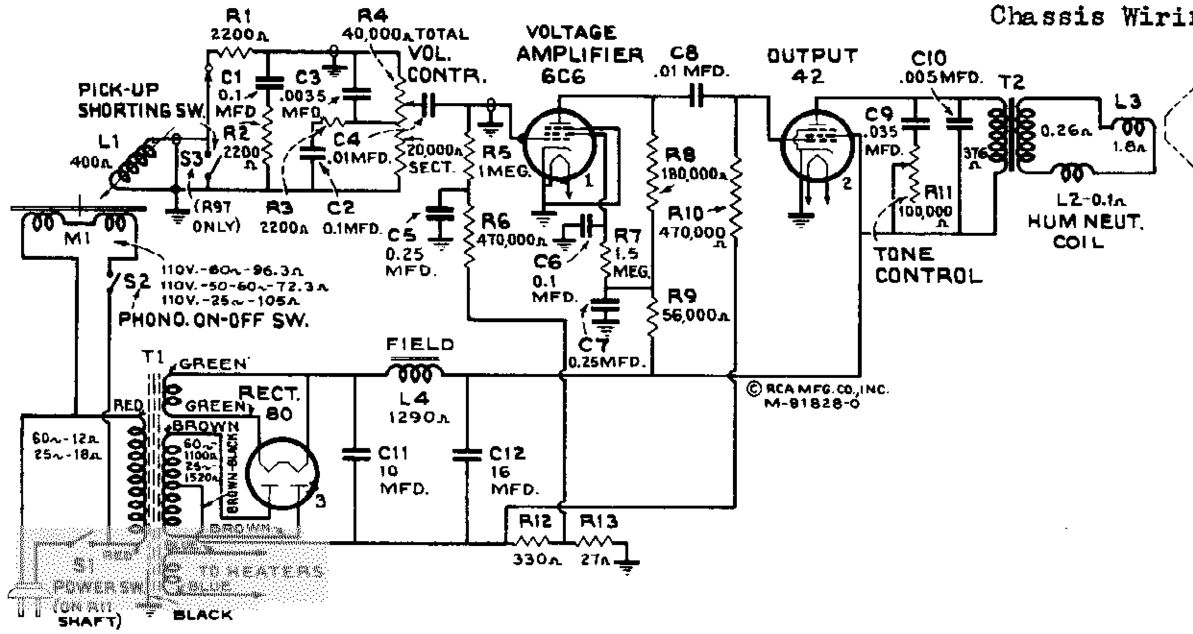


Figure 8—Schematic Circuit Diagram

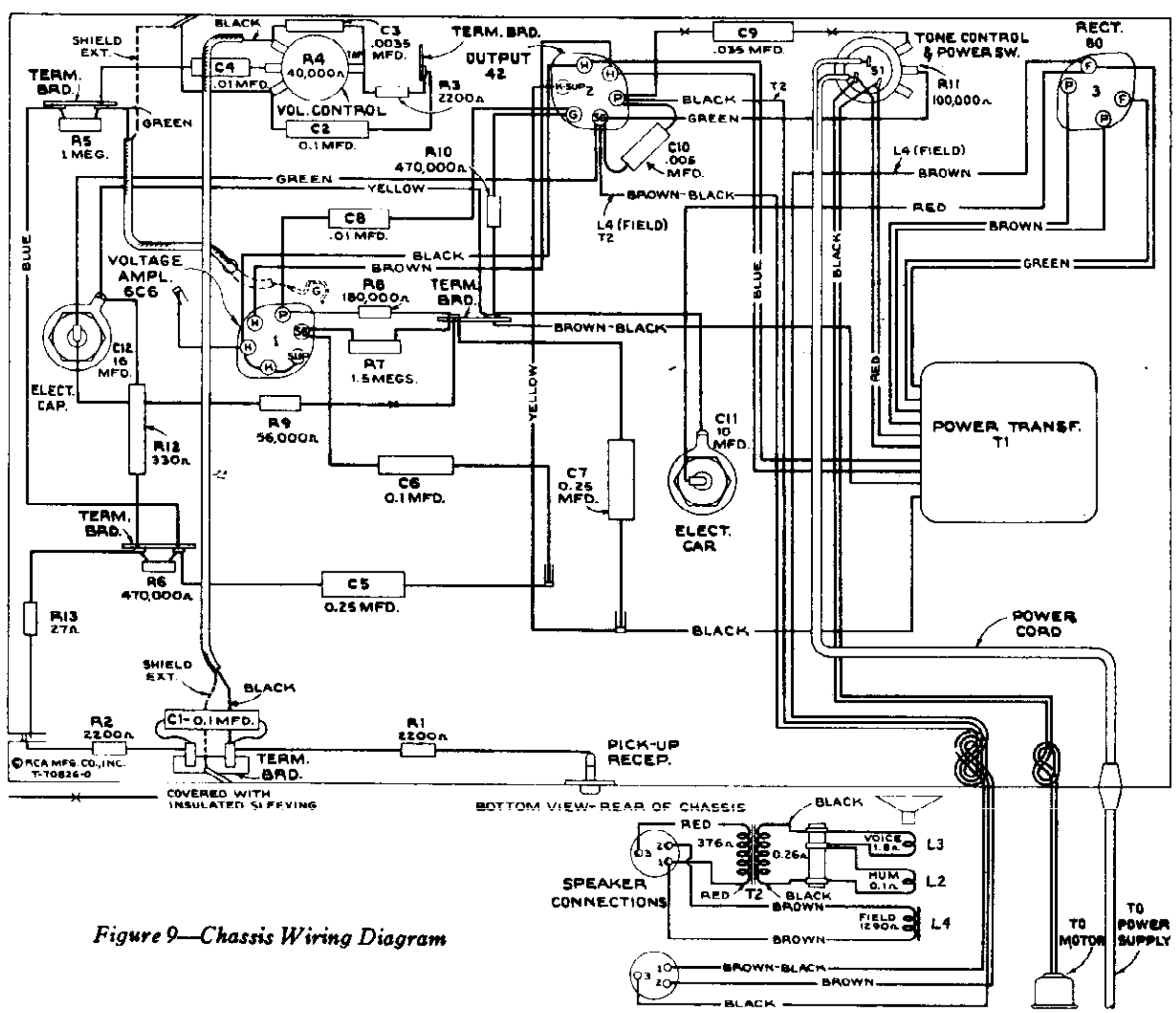


Figure 9—Chassis Wiring Diagram

MODELS R-96,R-97

RCA MFG. CO., INC.

Automatic Record Changer
Adjustment,Assembly

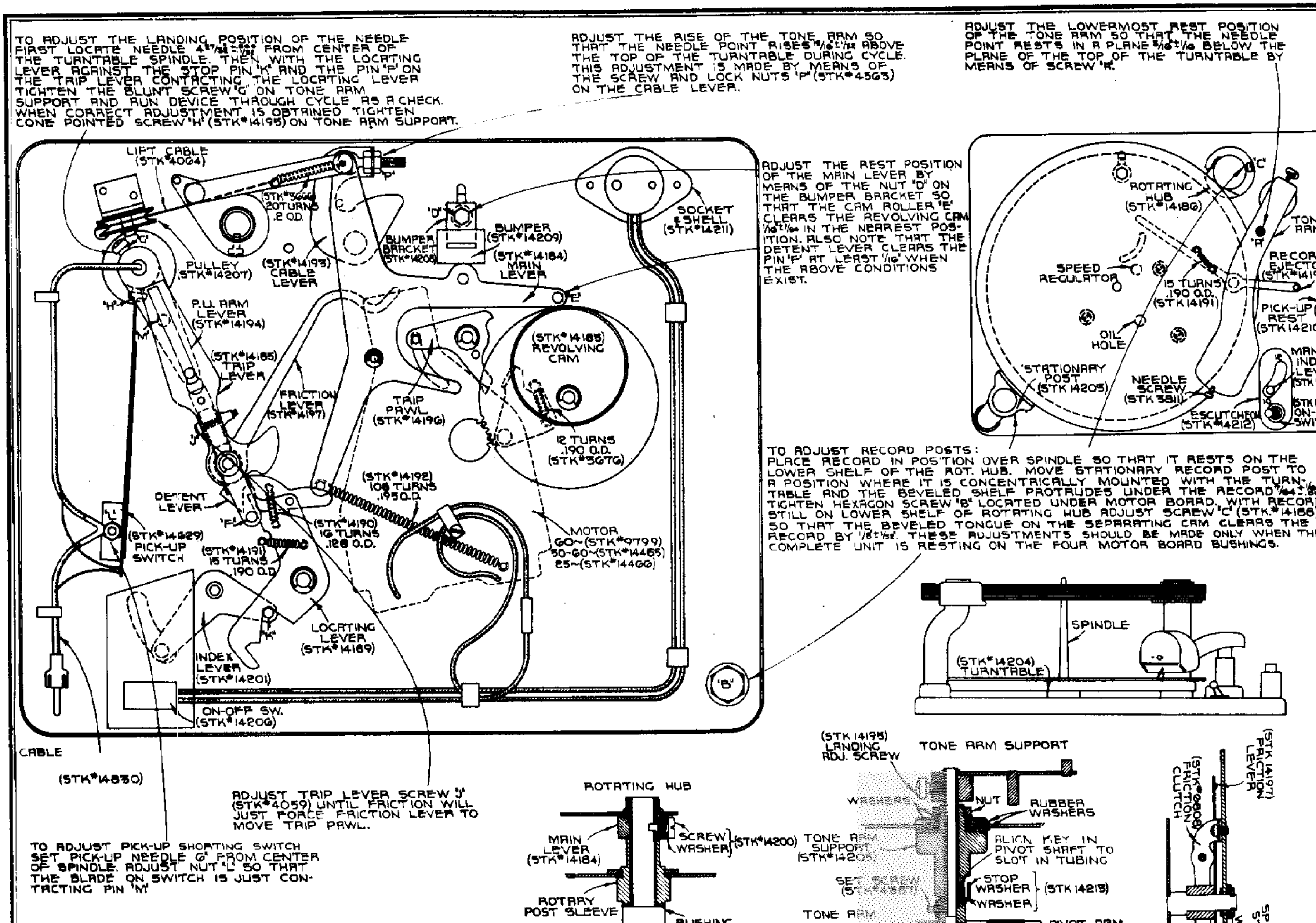


Figure 7—Automatic Record Changer Adjustments

(Model R-97)

©RCA MFG. CO. INC. T-70827-0

MODEL R-96, R-97
Pick-up & Motor Details
Voltage, Notes, Socket
Adjustments

RCA MFG. CO., INC.

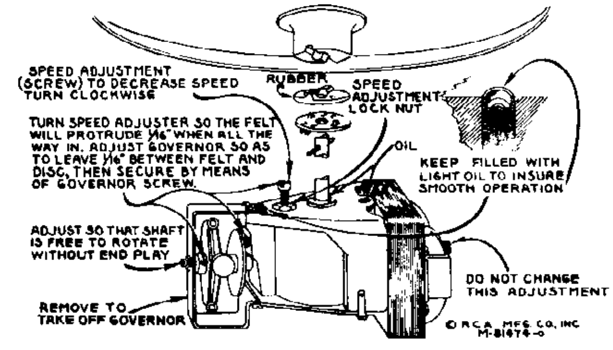


Figure 1—Details of Motor

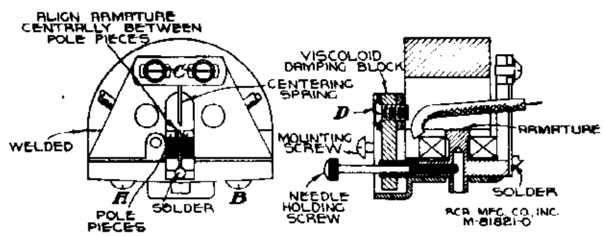


Figure 2—Details of Pickup

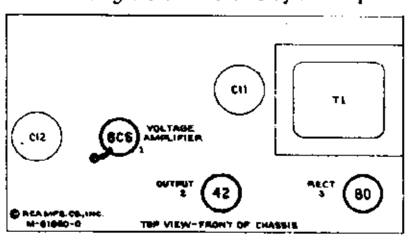


Figure 4—Radiotron Locations

Replacing Coil.—Whenever there is defective operation due to an open or shorted pickup coil, this coil should be replaced. Remove the pickup mechanism and terminal board as described above. Remove screws A and B and the magnet assembly. Remove the bakelite coil support (with coil attached) and insert the new coil support assembly in its place, after which replace the magnet assembly and center the armature as described above, then re-assemble the remainder of the unit. Only rosin core solder should be used for soldering the coil leads and pickup leads to the pickup terminal board. This same type of solder should be used when necessary for soldering the centering spring to the armature.

Magnetizing.—Loss of magnetization will not usually occur when the pickup has received normal care because the magnet and pole pieces are one unit and the magnetic circuit remains practically closed at all times. When the pickup has been mishandled, subjected to a strong a-c field, jolted, or

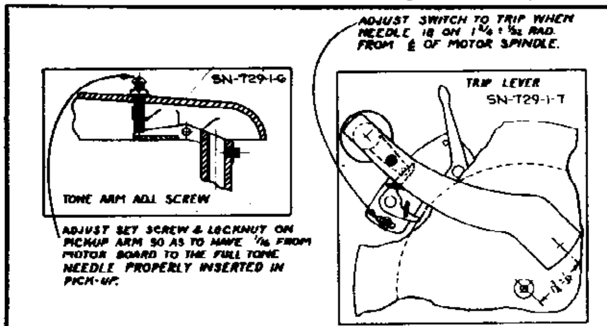


Figure 5—Tone Arm and Motor Switch Adjustments
(Model R-96)

dropped, there may be an appreciable loss of magnetic strength, in which case it will be necessary to remagnetize the entire structure. To do this, it will be necessary to first remove the pickup mechanism from the tone arm, and then remove the magnet assembly. Place the magnet assembly on the poles of a standard pickup magnetizer such as the RCA Stock No. 9549 Pickup Magnetizer and charge the magnet in accordance with the instructions accompanying the magnetizer. It is preferable to check the polarity of the pickup magnet and to remagnetize it so that the same polarity is maintained.

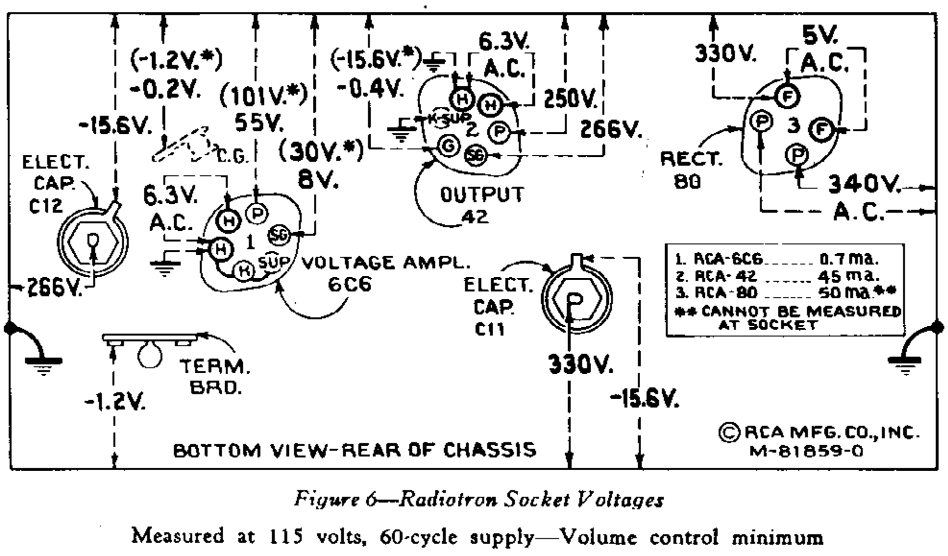


Figure 6—Radiotron Socket Voltages

Measured at 115 volts, 60-cycle supply—Volume control minimum

***Note:** Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter.*

Voltage values as specified should hold within ±20% when instrument is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

MODELS R-96,R-97
Notes

RCA MFG. CO., INC.

General Description

The Model R-97 Electric Phonograph consists of a three-tube audio amplifier, an eight-inch dust-proof electrodynamic loudspeaker, and an automatic record changer combined in a hinged-top table-type cabinet. Its design includes a phonograph compensation pack, resistance-coupled audio system, self-starting constant-speed motor, improved magnetic pickup, and a tone control. The phonograph mechanism will play a series of eight 10-inch records (changes seven) or repeat 12-inch records. It may be operated manually if desired.

The Model R-96 Electric Phonograph is identical to Model R-97 electrically, has a manually operated turntable, and a slightly different cabinet design.

The circuit arrangement of either instrument is shown on figure 8.

Radiotron Complement

(1) RCA-6C6 .... Audio Voltage Amplifier
(2) RCA-42 .... Power Output
(3) RCA-80 .... Rectifier

Power Supply Ratings

Rating A-6 .... 105-125 volts, 60 cycles, 90 watts
Rating A .... 105-125 volts, 50-60 cycles, 90 watts
Rating B-2 .... 105-125 volts, 25 cycles, 90 watts
Rating C-6 .... 105-125/200-250 volts, 60 cycles, 90 watts
Rating C-5 .... 105-125/200-250 volts, 50-60 cycles, 90 watts

Power Output

Undistorted .... 2.5 watts
Maximum .... 4.5 watts

Loudspeaker

Type .... 8-inch Electrodynamic
Impedance (V.C.) .... 2.2 ohms at 400 cycles

Motor-Board

	R-96	R-97
Type	Manual	Automatic-Manual
Turntable Speed (adjustable)	78 r.p.m.	78 r.p.m.
Pickup	High-impedance Magnetic	
Pickup Impedance	1,400 ohms at 1,000 cycles	

AUTOMATIC RECORD CHANGER
(Model R-97)

The record changing mechanism is designed to be simple and fool-proof. Certain adjustments may be required occasionally. The adjustments are illustrated and explained in figures 1 and 7.

It is important when servicing the automatic mechanism, to have it placed on a level support. It is also important to refrain from forcing the mechanism if there is a tendency to bind or jam, since bent levers and possible broken parts may result.

CAUTION.—Do not leave records stacked on the record holder posts, when not in use, as they are liable to warp, particularly so in warm climates.

MOTOR ADJUSTMENTS

The phonograph motors are of the governor induction type and are designed to be simple and foolproof. Occasionally, however, certain adjustments may be required. These adjustments are illustrated and explained in figure 1. Application of oil to the felt pad which rubs against the governor disc will insure smooth operation.

MAGNETIC PICKUP

The pickup used is of an improved design. The horseshoe magnet is rigidly welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. The frequency response is substantially uniform over a wide range. Service operations which may be necessary on the pickup are as follows:

Centering Armature.—Refer to figure 2 showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces, i. e., exactly centered. Whenever this centering adjustment has been disturbed it will be necessary to remove the pickup mechanism from the tone arm by removing the needle holding screw and the two mounting screws from the front of the tone arm, holding the pickup assembly to keep it from dropping. Unsolder the two leads from the lugs on the terminal board at the rear of the pickup. Insert a small rod or nail into the armature needle hole and replace the needle holding screw, tightening it to hold the rod securely. If the armature clamping screws A and B have not been disturbed, screws C should be loosened which will permit the armature to be moved from side to side, the rod acting as a lever to perform this operation. The proper adjustment is obtained when the armature is moved to the extreme position on each side (the movement being limited by the armature striking the pole pieces) and then brought to the mid position between these two extremes. Screws C should then be tightened. The armature position should then be central between the pole pieces and at right angles to them. With a little practice, the correct adjustment of the armature will be obtained. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other foreign material which would obstruct the movement of the pickup armature.

Damping Block.—The viscoloid damping block which is attached to the front end of the armature shank serves as a mechanical filter to eliminate undesirable resonances and to cause the frequency response to be uniform. Should it be necessary to replace this damping block, the pickup mechanism should be removed from the tone arm as explained above. Remove screw D and the damping block from the pickup assembly. Make sure that the shaft of the armature

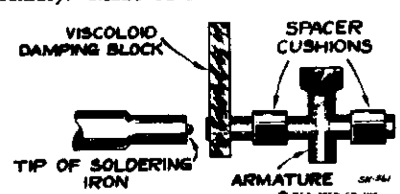


Figure 3—Special Soldering-Iron Tip

which contacts the viscoloid is clean. Then insert the new damping block so that it occupies the same position as that of the original block, and is in correct vertical alignment with the armature. The hole in the block is somewhat smaller than the diameter of the armature in order to permit a snug fit. With the damping block properly aligned on the armature, screw D with its washer should then be replaced. Heat should be applied to the armature (viscoloid side) so that the damping block will fuse at the point of contact and become rigidly attached to the armature. A special-tip soldering iron, constructed as shown in figure 3, will be found very useful in performing this operation. The iron should be applied only long enough to slightly melt the block, causing a small bulge on both sides.

MODEL U-101, U-103
Schematic
MODEL U-101
Chassis Wiring

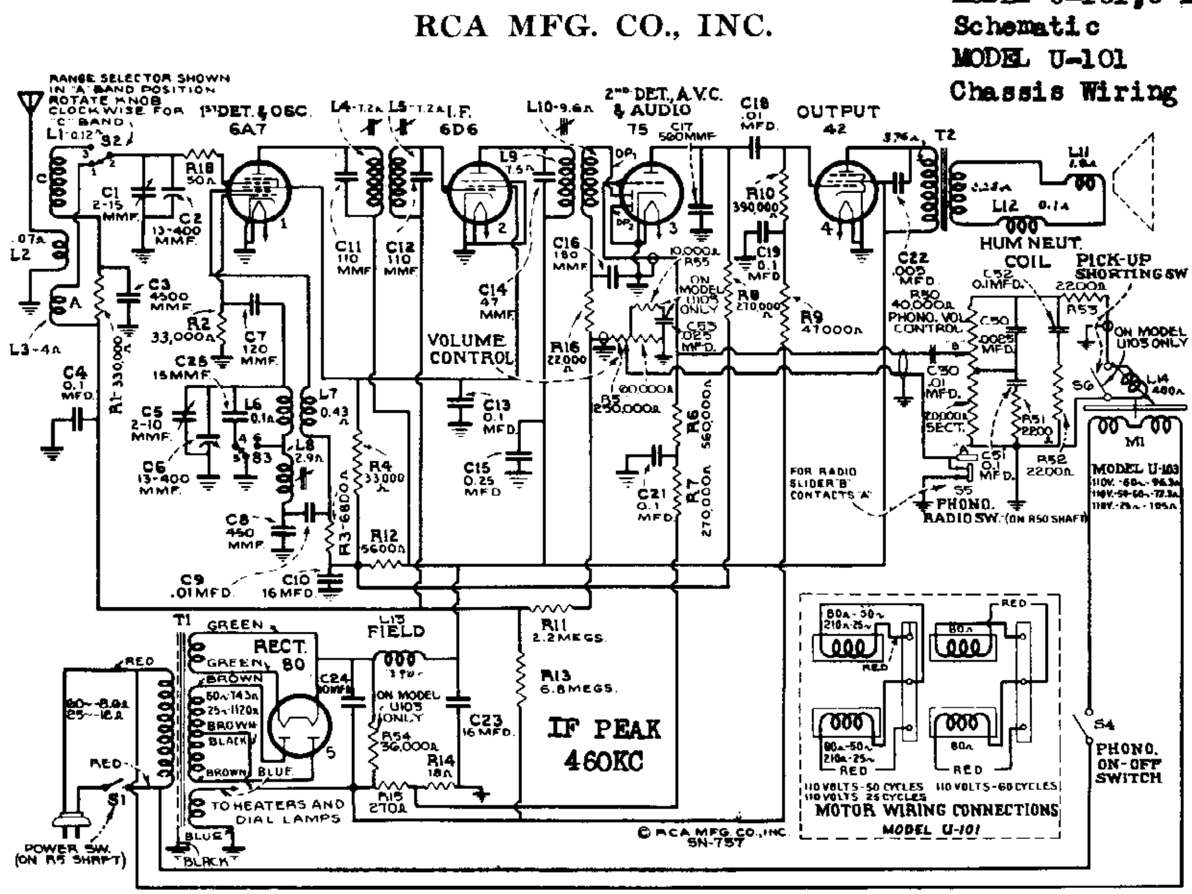


Figure 1—Schematic Circuit Diagram

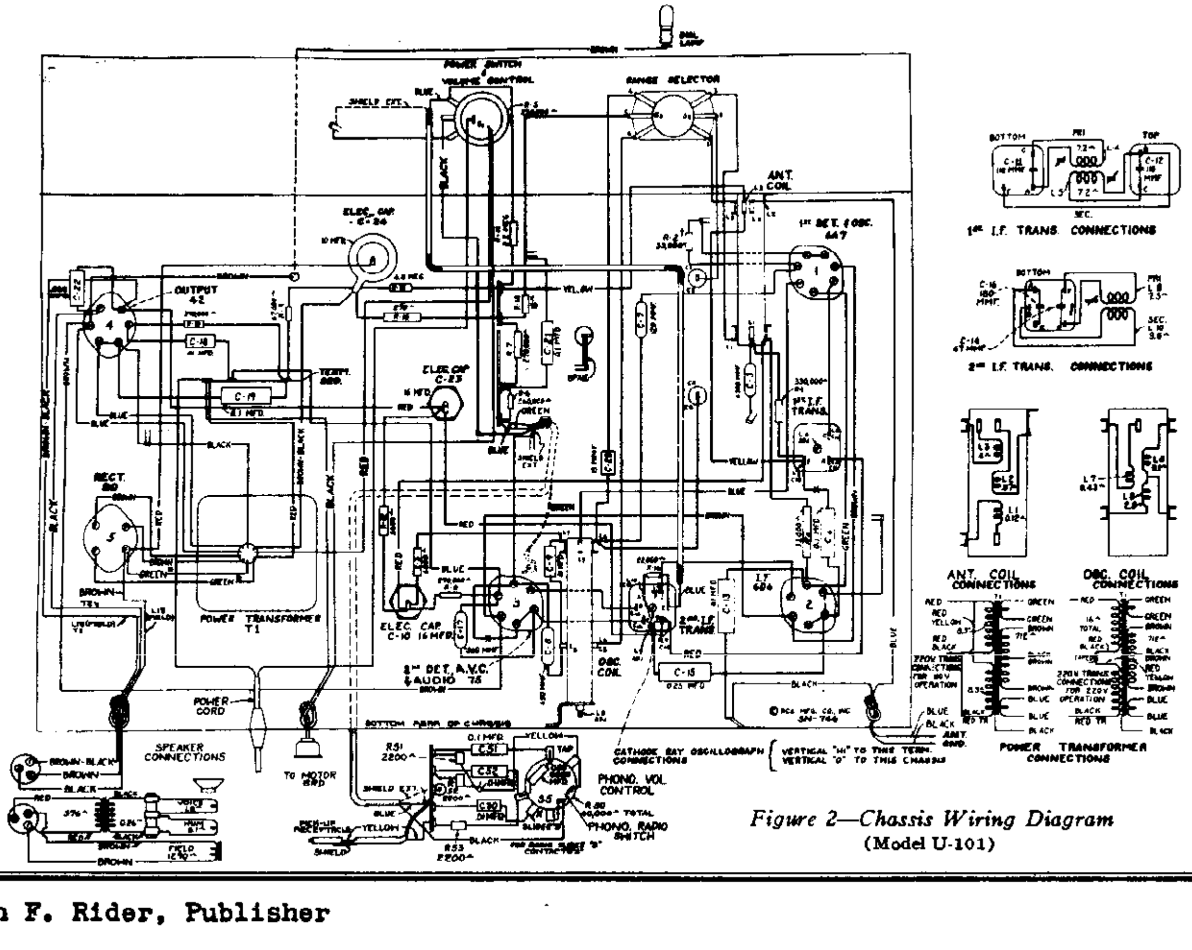
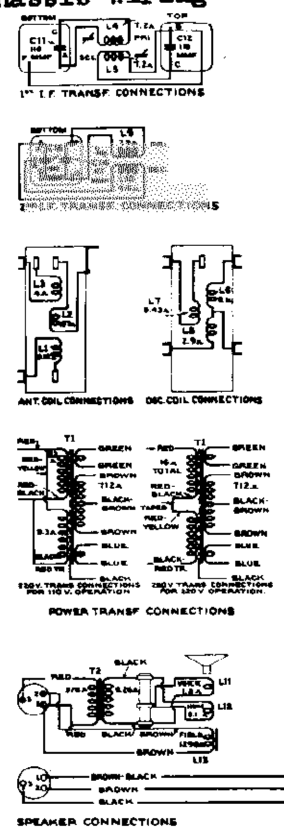


Figure 2—Chassis Wiring Diagram
(Model U-101)

MODEL U-103
Chassis Wiring

RCA MFG. CO., INC.

MODELS U-101, U-103
Alignment, Socket Trimmers



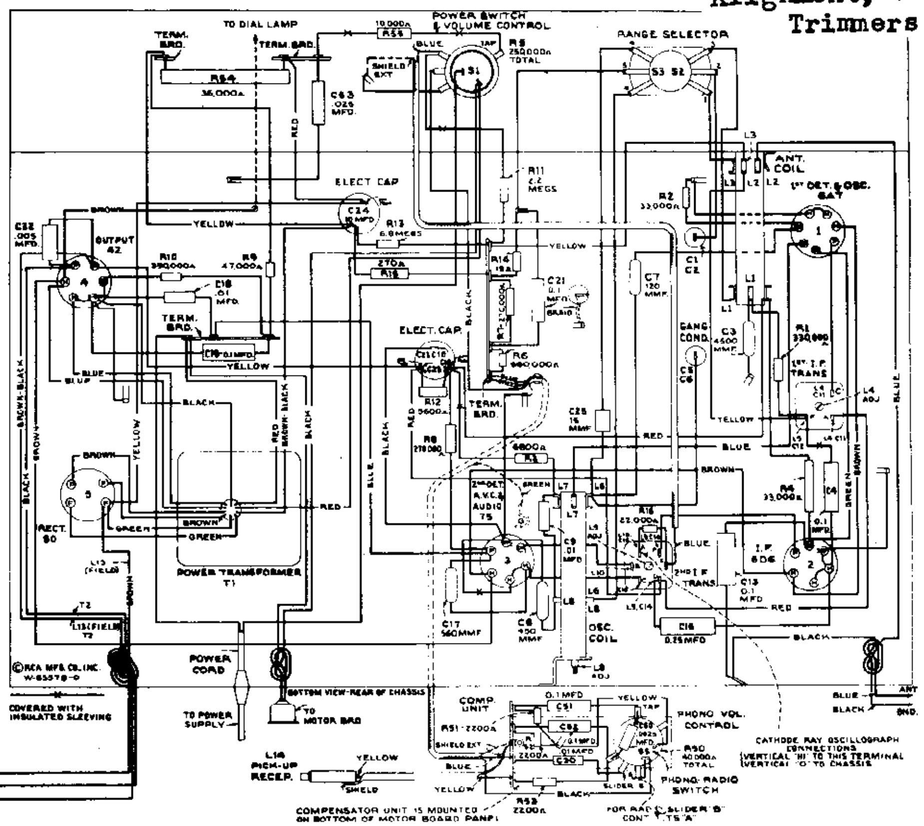
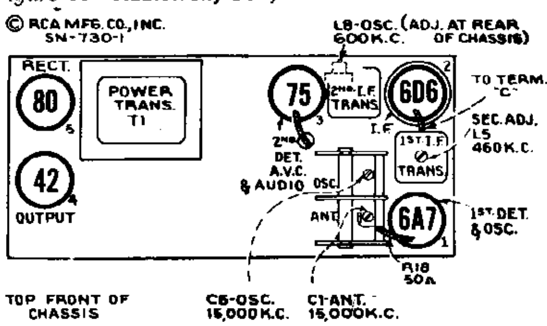


Figure 3—Chassis Wiring Diagram (Model U-103)

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the center horizontal line with the gang tuning-condenser plates in full-mesh position. This is a screw-driver adjustment.

Figure 11—Radiotron, Coil, and Trimmer Locations



Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 9, 10, and 11.

Cathode-ray alignment is preferable; the connections to the chassis are shown on figures 2 and 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

Order of Alignment	Test Oscillator: Connection to Receiver	Test Oscillator: Dummy Antenna	Test Oscillator: Frequency Setting	Range-Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
1	6D6 I-F Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	2nd I-F Trans.	L9	Max. (peak)
2	6A7 Det. Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	1st I-F Trans.	L4 and L5	Max. (peak)
3	Ant. Lead (blue)	300 Ohms	15,000 kc	"C" Right	15,000 kc	"C" Osc.	C5	Max. (peak)†
4	Ant. Lead (blue)	300 Ohms	15,000 kc	"C" Right	Rock Through 15,000 kc	"C" Ant.	C1	Max. (peak)*‡
5	Ant. Lead (blue)	200 Mmfd.	600 kc	"A" Left	600 kc	"A" Osc.	L8	Max. (peak)

* Use minimum capacity peak if two peaks can be obtained. † Use maximum capacity peak if two peaks can be obtained.
‡ After this adjustment, check for image signal by shifting receiver dial to 15,920 kc.

RCA MFG. CO., INC.

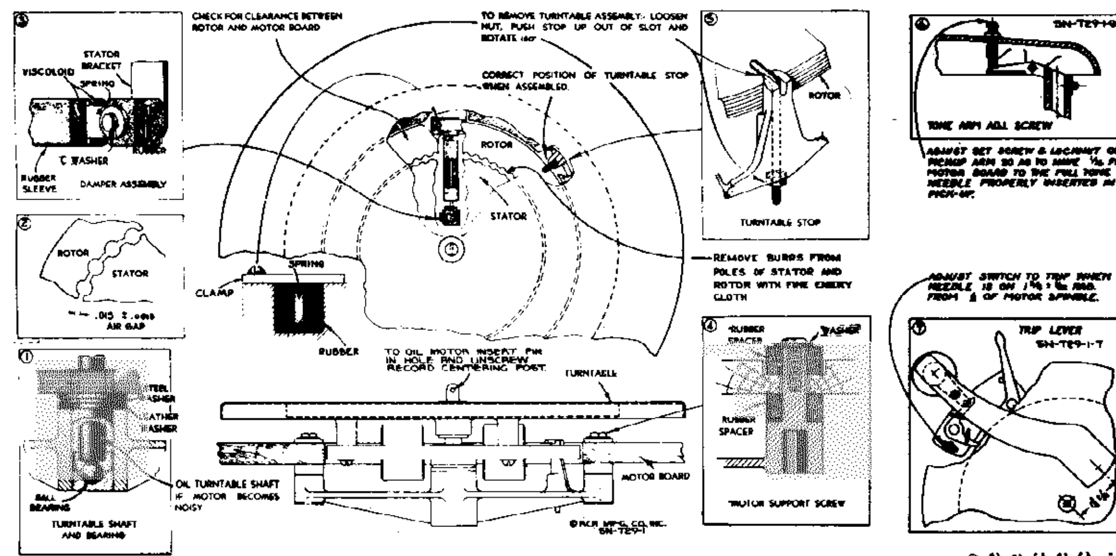


Figure 7—Details of Motor
(Model U-101)

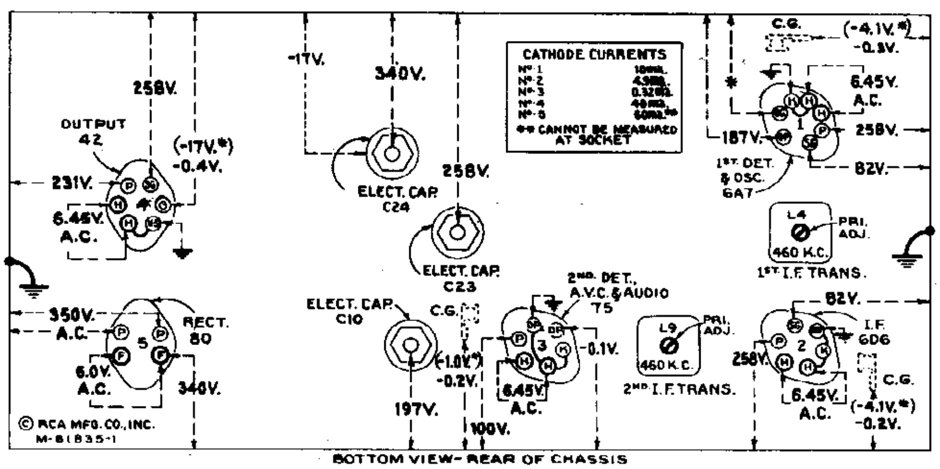


Figure 9—Radiotron Socket Voltages, Coil, and Trimmer Locations
(Model U-101)

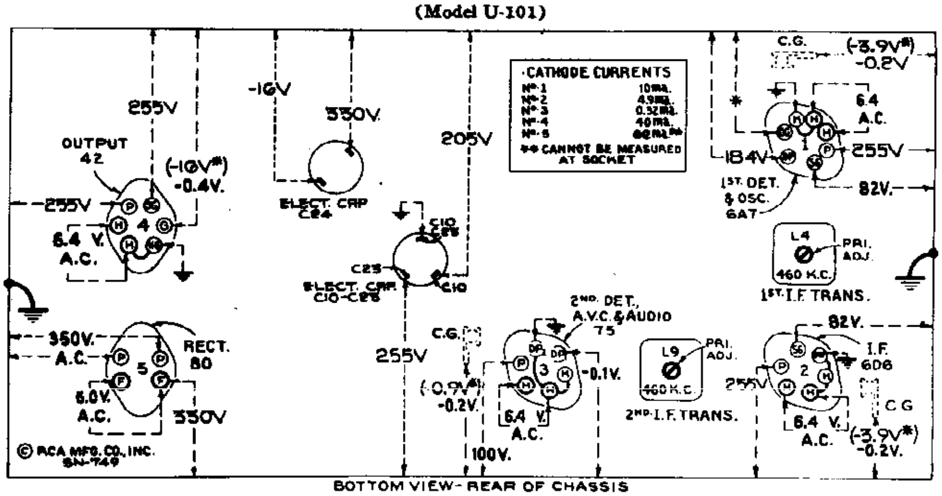


Figure 10—Radiotron Socket Voltages, Coil, and Trimmer Locations
(Model U-103)

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Broadcast")—No signal being received—Volume control minimum

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.

MODEL U-103

RCA MFG. CO., INC.

Automatic Record Changer Adjustments, Details

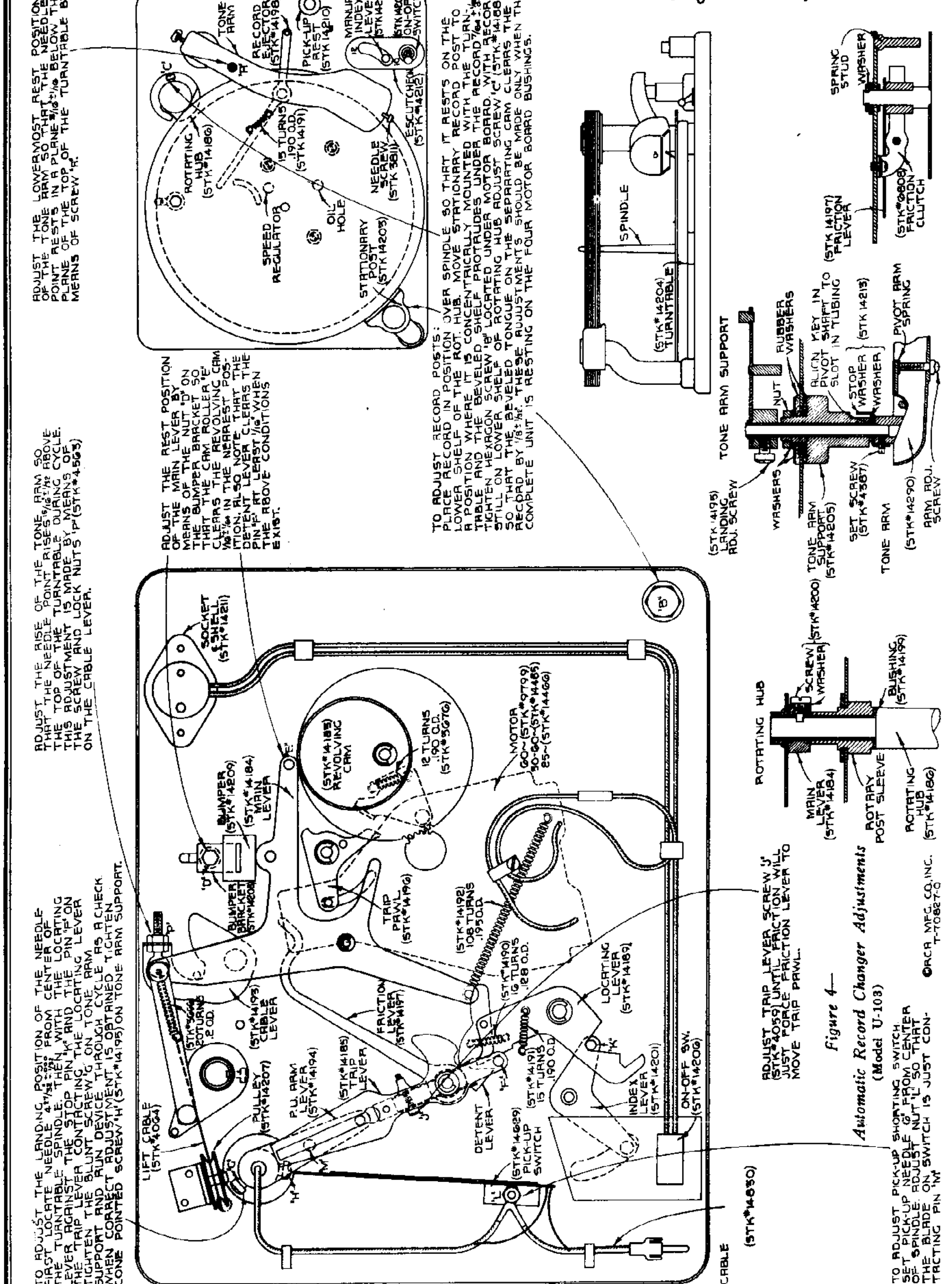


Figure 4—

Automatic Record Changer Adjustments

(Model U-103)

RCA MFG. CO., INC.

POWER SUPPLY RATINGS

Model U-101	Radio Only	Total
A-6.. 105-125 volts, 60 cycles.........	75 watts..	80 watts
A-5.. 105-125 volts, 50 cycles.........	75 watts..	80 watts
B-2.. 105-125 volts, 25 cycles.........	80 watts..	85 watts
C-6.. 105-125/200-250 volts, 60 cycles..	75 watts..	80 watts
C-5.. 105-125/200-250 volts, 50 cycles..	75 watts..	80 watts

POWER OUTPUT RATING

Undistorted	2.5 watts
Maximum	4.5 watts

	Model U-101	Model U-103
Type..................	Manual.....	Automatic-Manual
Turntable Speed........	78 r.p.m....	78 r.p.m.

Type of Pickup............... High-impedance magnetic
Pickup Impedance............ 1,400 ohms at 1,000 cycles

Automatic Record Mechanism
(Model U-103)

The record changing mechanism is designed to be simple and fool-proof. Certain adjustments may be required occasionally. The adjustments are illustrated and explained in figures 4 and 5.

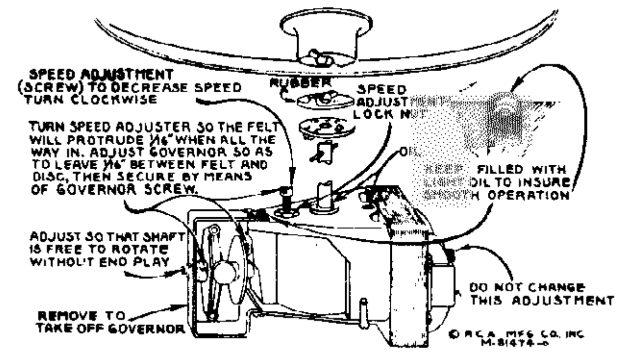


Figure 5—Details of Motor
(Model U-103)

It is important when servicing the automatic mechanism, to have it placed on a level support. It is also important to refrain from forcing the mechanism if there is a tendency to bind or jam, since bent levers and possible broken parts may result.

CAUTION.—Do not leave records stacked on the record holder posts, when not in use, as they are liable to warp, particularly so in warm climates.

MAGNETIC PICKUP

The pickup used in the phonograph unit is of an improved design. The horseshoe magnet is rigidly welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. The frequency response is substantially uniform over a wide range. Service operations which may be necessary on the pickup are as follows:

Centering Armature.—Refer to figure 6 showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces, i. e., exactly centered. Whenever this centering adjustment has been disturbed it will be necessary to remove the pickup mechanism from the tone arm by removing the needle holding screw and the two mounting screws from the front of the tone arm, holding the pickup assembly to keep it from dropping. Unsolder the two leads from the lugs on the terminal board at the rear of the pickup. Insert a small rod or nail into the armature needle hole and replace the needle holding screw, tightening it to hold the rod securely. If the armature clamping screws A and B have not been disturbed, screws C should be loosened which will permit the armature to be moved from side to side, the rod acting as a lever to perform this operation. The proper adjustment is obtained when the armature is moved to the extreme position on each side (the movement being

Model U-103	Radio Only	Tot
A-6.. 105-125 volts, 60 cycles........	75 watts..	100
A .. 105-125 volts, 50-60 cycles......	75 watts..	105
B-2.. 105-125 volts, 25 cycles........	80 watts..	105
C-6.. 105-125/200-250 volts, 60 cycles.	75 watts..	100
C ..105-125/200-250 volts, 50-60 cycles	75 watts..	105

LOUDSPEAKER

Type .... Electrodyna
V.C. Impedance.................. 2.2 ohms at 400 cy

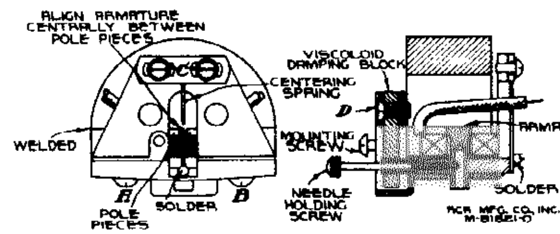


Figure 6—Details of Pickup

limited by the armature striking the pole pieces) and the brought to the mid position between these two extreme Screws C should then be tightened. The armature positic should then be central between the pole pieces and at rig angles to them. With a little practice, the correct adjustme of the armature will be obtained. The air gap between t pole pieces and the armature should be kept free from du filings, and other foreign material which would obstruct t movement of the pickup armature.

Damping Block.—The viscoloid damping block which attached to the front end of the armature shank serves as mechanical filter to eliminate undesirable resonances and cause the frequency response to be uniform. Should it necessary to replace this damping block, the pickup mechanis should be removed from the tone arm as explained abov Remove screw D and the damping block from the pick assembly. Make sure that the shaft of the armature whi contacts the viscoloid is clean. Then insert the new dampi block so that it occupies the same position as that of the ori nal block, and is in correct vertical alignment with the arm ture. The hole in the block is somewhat smaller than the ameter of the armature in order to permit a snug fit. Wi the damping block properly aligned on the armature, scre D with its washer should then be replaced. Heat should applied to the armature (viscoloid side) so that the dampi block will fuse at the point of contact and become rigid attached to the armature. A special-tip soldering iron, co structed as shown in figure 8 will be found very useful performing this operation. The iron should be applied on long enough to slightly melt the block, causing a small bul on both sides.

Replacing Coil.—Whenever there is defective operati due to an open or shorted pickup coil, this coil should be placed. Remove the pickup mechanism and terminal board described above. Remove screws A and B and the magn assembly. Remove the bakelite coil support (with coil tached) and insert the new coil support assembly in its plac after which replace the magnet assembly and center the arm ture as described above, then re-assemble the remainder the unit.

Magnetizing.—In case it becomes necessary to re-magneti the unit, first remove the pickup mechanism from the to arm, and then remove the magnet assembly. Place the ma

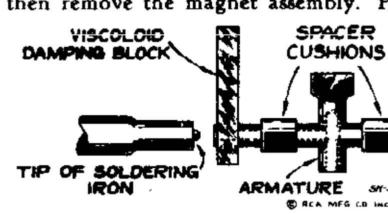


Figure 8—Special Soldering-Iron Tip

MODELS U-101, U-103
Parts

RCA MFG. CO., INC.

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14634	Belt—Variable condenser drive belt
14632	Bracket—Dial mounting bracket
5237	Bushing—Variable condenser rubber mounting bushing
14802	Cable—2-conductor shielded compensation cable complete with grid contact cap
12118	Cap—Grid contact cap
12896	Capacitor—15 Mmfd. (C25)
12405	Capacitor—47 Mmfd. (C14)
14262	Capacitor—110 Mmfd. (C11, C12)
12724	Capacitor—120 Mmfd. (C7)
12406	Capacitor—180 Mmfd. (C16)
12812	Capacitor—450 Mmfd. (C8)
14724	Capacitor—560 Mmfd. (C17)
12728	Capacitor—4,500 Mmfd. (C3)
4868	Capacitor—.005 Mfd. (C22)
13138	Capacitor—.01 Mfd. (C9, C18)
4870	Capacitor—.025 Mfd. (C53)
4839	Capacitor—0.1 Mfd. (C4, C13, C19, C21)
12484	Capacitor—0.25 Mfd. (C15)
14814	Capacitor—10 Mfd. (C24)
5212	Capacitor—16 Mfd. (C23)—Model U101 only
14377	Capacitor—16 Mfd. (C10)—Model U101 only
14813	Capacitor Pack—Comprising two 16 Mfd. sections (C10, C23)—Model U103 only
14646	Coil—Antenna coil (L1, L2, L3)
14647	Coil—Oscillator coil (L6, L7, L8)
14633	Condenser—2-gang variable tuning condenser (C1, C2, C5, C6)
14783	Connector—2-contact female for motor power cable
5119	Connector—3-contact female for speaker cable
14648	Core—Adjustable core and stud for oscillator coil
12006	Core—Adjustable core and stud for I.F. transformer
14631	Dial—Station selector dial
14651	Drive—Variable condenser vernier drive and pinion gear
14635	Indicator—Station selector indicator pointer
5226	Lamp—Dial lamp
14636	Pulley—Idler pulley—less spring
14639	Pulley — Variable condenser drive pulley — located on condenser shaft
14660	Resistor—18 ohms, insulated, ½ watt (R14)
14653	Resistor—50 ohms, flexible type, 1/10 watt (R18)
13819	Resistor—270 ohms, wire wound, 1.1 watt (R15)
5175	Resistor—5,600 ohms, carbon type, ½ watt (R12)
14659	Resistor—6,800 ohms, carbon type, ½ watt (R3)
14559	Resistor—10,000 ohms, insulated, ½ watt (R55)—Model U103 only
11305	Resistor—22,000 ohms, carbon type, ½ watt (R16)
13735	Resistor—33,000 ohms, carbon type, ½ watt (R2)
5033	Resistor—33,000 ohms, carbon type, 1 watt (R4)
5206	Resistor—36,000 ohms, wire wound, 20 watt (R54)—Model U103 only
11646	Resistor—47,000 ohms, carbon type, ½ watt (R9)
11323	Resistor—270,000 ohms, carbon type, ½ watt (R7, R8)
13733	Resistor—330,000 ohms, carbon type, ½ watt (R1)
13479	Resistor—390,000 ohms, carbon type, ½ watt (R10)
5035	Resistor—560,000 ohms, carbon type, ½ watt (R6)
12679	Resistor—2.2 meg., insulated, ½ watt (R11)
14661	Resistor—6.8 meg., insulated, ½ watt (R13)
5129	Ring—Radiotron shield ring
4389	Screw—No. 6-32x3/16 headless set screw for pulley No. 14639
14638	Shaft—Station selector knob shaft and pulley
12008	Shield—First I.F. transformer shield
12408	Shield—Second I.F. transformer shield
11265	Shield—Radiotron shield
14658	Socket—Dial lamp socket
4794	Socket—4-contact 80 Radiotron socket
4786	Socket—6-contact 6D6, or 42 or 75 Radiotron socket
4787	Socket—7-contact 6A7 Radiotron socket
14637	Spring—Idler pulley tension spring
12007	Spring—Retaining spring for core stock No. 12006 and No. 14648
14640	Switch—Range switch (S2, S3)
14376	Transformer—First I.F. transformer (L4, L5, C11, C12)
14642	Transformer—Second I.F. transformer (L9, L10, C14, C16)
14655	Transformer—Power transformer, 105-125 volts, 50-60 cycle (T1)
14656	Transformer—Power transformer, 105-125 volts, 25-60 cycle (T1)
14657	Transformer—Power transformer, 100-125/200-250 volts, 50-60 cycle (T1)
14826	Volume Control—and power switch (R5, S1)
	OPERATING MECHANISM ASSEMBLIES MODEL U-103
14199	Bushing—Record separator rotating shaft bushing
14183	Cam—Cam and gear assembly
6808	Clutch—Trip lever friction clutch
14197	Finger—Friction finger assembly
14186	Hub—Rotating hub and record separator complete with set screw
14189	Lever—Locating lever assembly
14184	Lever—Main lever and link assembly
14201	Lever—Manual index lever assembly
14193	Lever—Pickup lift cable lever
14194	Lever—Pickup arm lever complete with set screws
14198	Lever—Reject lever assembly
14185	Lever—Trip lever and friction clutch assembly
14196	Pawl—Trip pawl assembly
4563	Screw—Cable lever screw and two locknuts
4059	Screw—Trip lever clutch tension adjustment screw
14200	Screw—No. 8-32 special hex head screw and lockwasher for record separator shaft mounting
14195	Screw—No. 10-32x5/16 fillister-head, cone-pointed set screw for pickup arm lever
14188	Screw—No. 10-32x7/16 fillister-head, cone-pointed set screw for rotating hub
14187	Shaft—Rotating shaft for record separator
3676	Spring—Cam pawl tension spring
3666	Spring—Lift cable tension spring
14190	Spring—Locating lever pawl tension spring
14191	Spring—Locating lever or reject lever tension spring
14192	Spring—Main lever tension spring

STOCK No.	DESCRIPTION
	MOTORBOARD ASSEMBLIES MODEL U-101
14803	Brake—Turntable brake and motor switch
14805	Connector—2-contact male connector for motor and switch leads
3261	Rest—Pickup rest
14235	Screw—Motor mounting screw and washer
30100	Springs—Tension springs for brake Stock No. 14803—comprising 1 long and 1 short spring
14804	Switch—Motor switch (S4)—located on turntable brake Stock No. 14803
	MOTORBOARD ASSEMBLIES MODEL U-103
14208	Bracket—Bumper bracket and bumper complete
14209	Bumper—Rubber bumper
14830	Cable—Shielded cable 13-in. long complete with single contact male connector — connects pickup shorting switch to input transformer or compensator
11704	Damper—Turntable damper and damper plate
14212	Escutcheon—Manual index lever and switch escutcheon
14203	Post—Record post—located on front left hand corner of motorboard
14210	Rest—Pickup arm rest
14207	Roller—Pickup lift cable roller and bracket
14211	Socket—Motorboard socket and shell
14205	Support—Pickup arm mounting spacer, washers and nut
14206	Switch—Motor toggle switch (S4)
14629	Switch—Pickup shorting switch (S6)
14204	Turntable Complete
14213	Washer—Pickup arm stop washer and spacing washer
	MOTOR ASSEMBLIES MODEL U-101
10194	Ball—Steel ball bearing
14233	Base—Motor base and bearing assembly
14232	Cap—Turntable spindle cap
14223	Coil—Stator assembly—comprising coils and laminations—105-125 volts, 60 cycle
14224	Coil—Stator assembly—comprising coils and laminations—105-125 volts, 50 cycle
14225	Coil—Stator assembly—comprising coils and laminations—105-125 volts, 25 cycle
14228	Damper—Motor damper assembly comprising one damper, one damper plate, one screw and one "C" washer
14806	Motor—105-125 volts, 60 cycle (M1)
14807	Motor—105-125 volts, 50 cycle (M1)
14808	Motor—105-125 volts, 25 cycle (M1)
14227	Shield—Terminal board shield and nuts
14229	Stop—Turntable stop, lockwasher and nut—prevents removal of turntable
14809	Turntable—Turntable assembly complete with rotor laminations—60 cycle operation
14810	Turntable—Turntable assembly complete with rotor laminations—50 cycle operation
14811	Turntable—Turntable assembly complete with rotor laminations—25 cycle operation
14812	Turntable—10-in. turntable plate only
4083	Washer—Leather washer for turntable bearing
14230	Washer—Metal washer for turntable bearing
14231	Washer—Metal shim washer for turntable bearing
	MOTOR ASSEMBLIES MODEL U-103
14215	Governor—Governor complete for motor Stock No. 9799, No. 14465 and No. 14466
14466	Motor—105-125 volts, 25 cycle (M1)
14465	Motor—105-125 volts, 50-60 cycle (M1)
9799	Motor—105-125 volts, 60 cycle (M1)
14214	Screw—Motor mounting screw and spacer assembly
	PICKUP AND ARM ASSEMBLIES - MODEL U-101
14291	Armature—Pickup armature
11732	Coil—Pickup coil (L14)
14292	Damper—Pickup damper assembly — comprising one damper, one clamp and one screw
14933	Pickup and Arm complete
3811	Screw—Needle holding screw
	PICKUP AND ARM ASSEMBLIES MODEL U-103
14291	Armature—Pickup armature assembly
4064	Cable—Pickup lift cable
11732	Coil—Pickup coil (L14)
14292	Damper—Pickup damper block complete with clamp and screw
14290	Pickup and Arm complete
3811	Screw—Needle holding screw
4387	Screw—No. 6-32x¼-in. headless set screw for pickup arm pivot shaft
	REPRODUCER ASSEMBLIES (RL63F-1) MODEL U-101
14356	Board—3-contact reproducer terminal board
13866	Cap—Cone center dust cap
12012	Coil—Field coil (L13)
11469	Coil—Hum neutralizing coil (L12)
12642	Cone—Reproducer cone and dust cap (L11)
5118	Plug—3-contact male plug for reproducer
14360	Reproducer—Complete
14358	Screw—Screw, washer and lockwasher to hold core in yoke
14355	Transformer—Output transformer (T2)
14357	Washer—Spring washer to hold field coil
	REPRODUCER ASSEMBLIES (RL70E-1) MODEL U-103
13866	Cap—Dust cap for cone center
14354	Coil—Field coil (L13)
11469	Coil—Hum neutralizing coil (L12)
12667	Cone—Reproducer cone and dust cap (L11)
5118	Plug—3-contact male plug for reproducer
14395	Reproducer—Complete
14358	Screw—Screw, washer and lockwasher to hold core in yoke
14355	Transformer—Output transformer (T2)
14357	Washer—Spring washer to hold field coil

STOCK No.	DESCRIPTION
	MISCELLANEOUS ASSEMBLIES
11762	Box—Needle box—for Model U-101 only
4391	Box—Needle box—for Model U-103 only
14817	Cable—Shielded pickup cable complete with female connector—compensator end
5107	Capacitor—.0025 Mfd. (C50)
13138	Capacitor—.01 Mfd. (C30)
4841	Capacitor—0.1 Mfd. (C51, C52)
14654	Escutcheon—Station selector escutcheon and crystal
12673	Knob—Station selector, range switch, radio volume control or phonograph volume control knob
13716	Resistor—2,200 ohms, insulated, ½ watt (R51, R52, R53)
14267	Screw—Chassis mounting screw and washer—for Model U101 only
13573	Screw—Chassis mounting screw and washer—for Model U103 only
14816	Screw—Motorboard mounting screw and spacer—for Model U103 only
4119	Screw—No. 8-32 headless set screw for knob Stock No. 12673
14815	Volume Control—Phonograph volume control and radio-record switch (R50, S5)

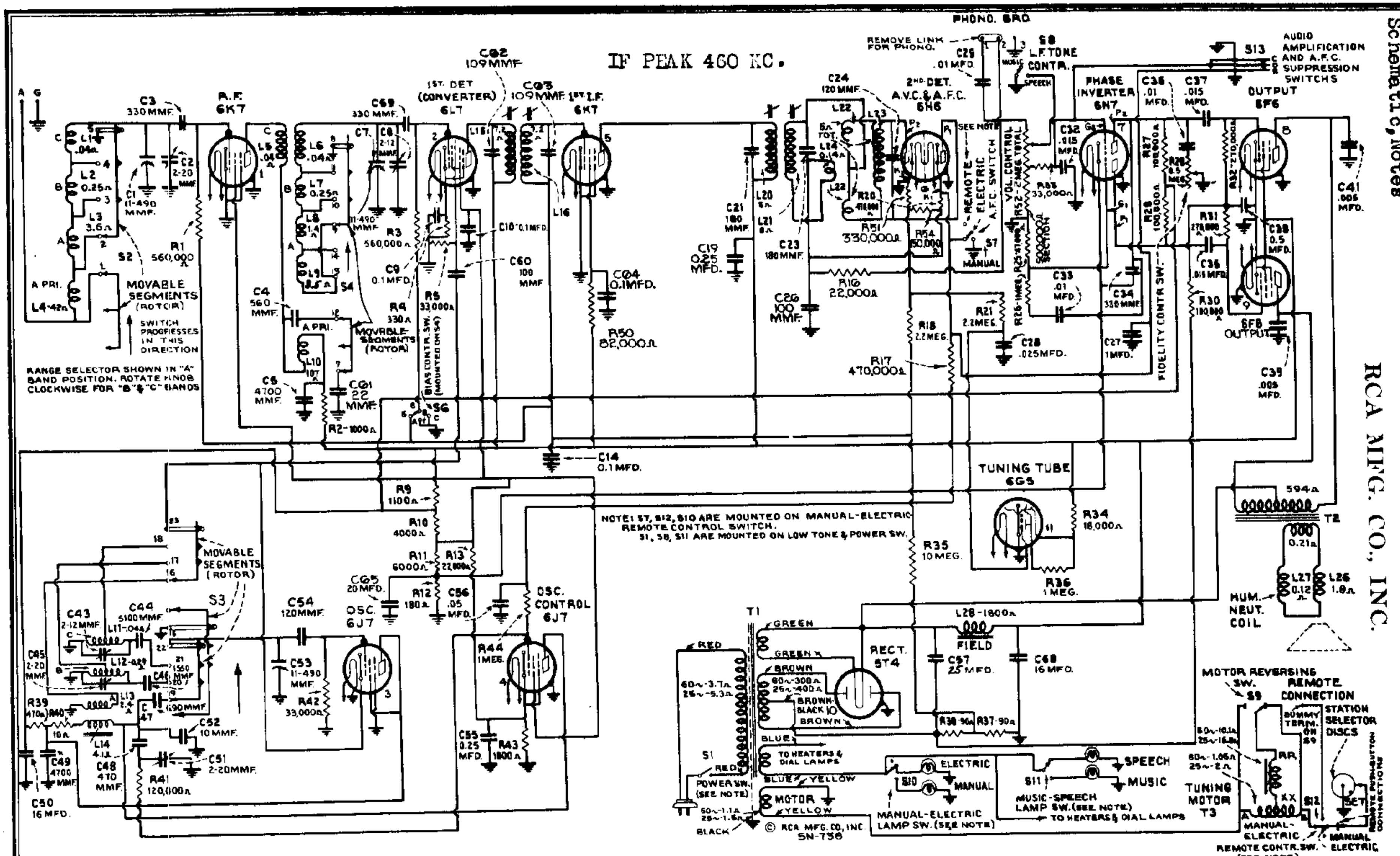


Figure 1—Schematic Circuit Diagram

This receiver employs an eleven-tube, three-band, "Magic Brain" superheterodyne circuit. Features of design include "Electric Tuning" with push-button operation; automatic frequency control; "qumulative-wound" antenna and detector coils; tuned r-f amplifier; magnetite-core adjusted i-f transformers and low-frequency "A" oscillator tracking; straight-line dial; ... volume control; phonograph terminal board; "Magic Eye" tuning tube; twelve-inch electrodynamic loudspeaker; plunger-type, air-dielectric trimming capacitors; aural-compensated volume control; tone control; "Music-Speech" switch; audio phase inverter; and push-pull power output stage. In addition, this model has a cabinet incorporating the "Sonic Arc" Magic Voice.

MODEL 811K
Chassis Wiring

RCA MFG. CO., INC.

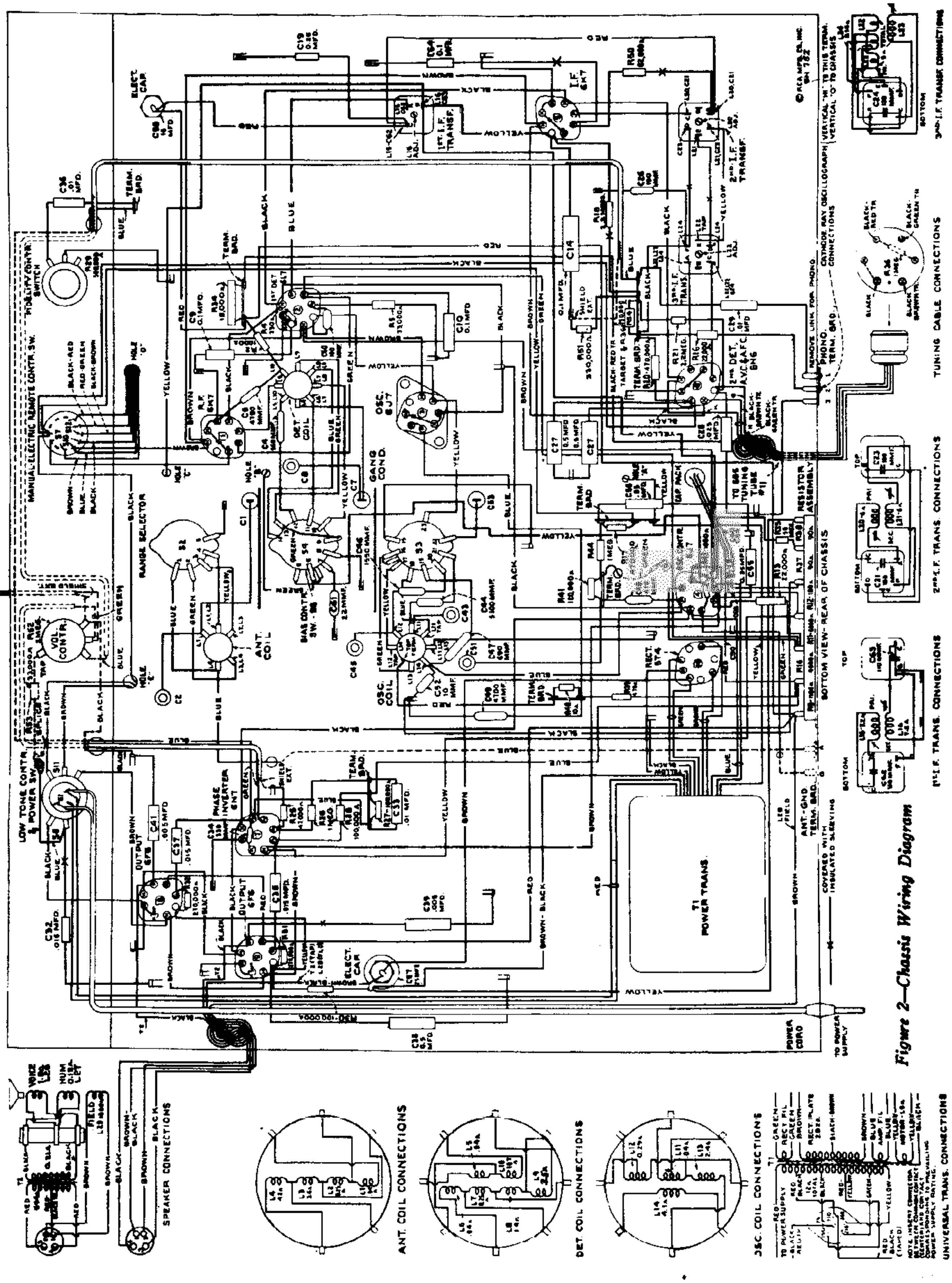


Figure 2—Chassis Wiring Diagram

RCA MFG. CO., INC.

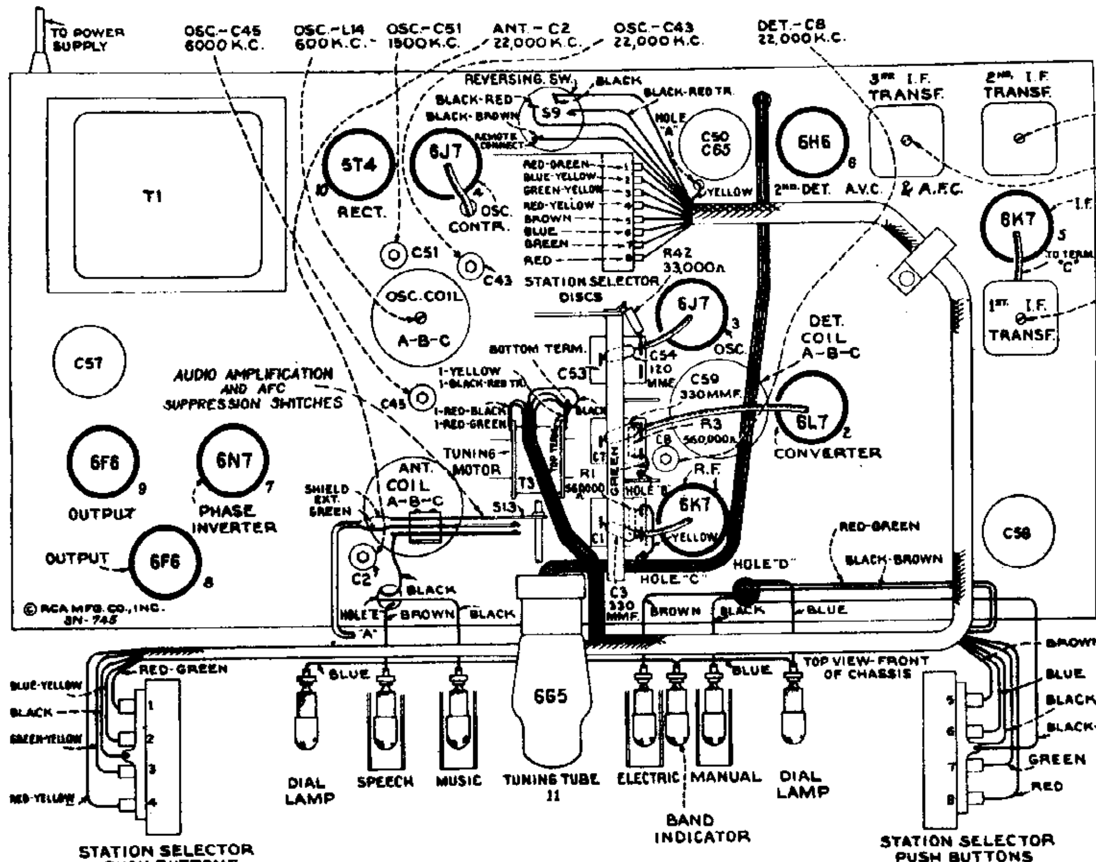


Figure 3—Radiotron, Coil, and Trimmer Locations

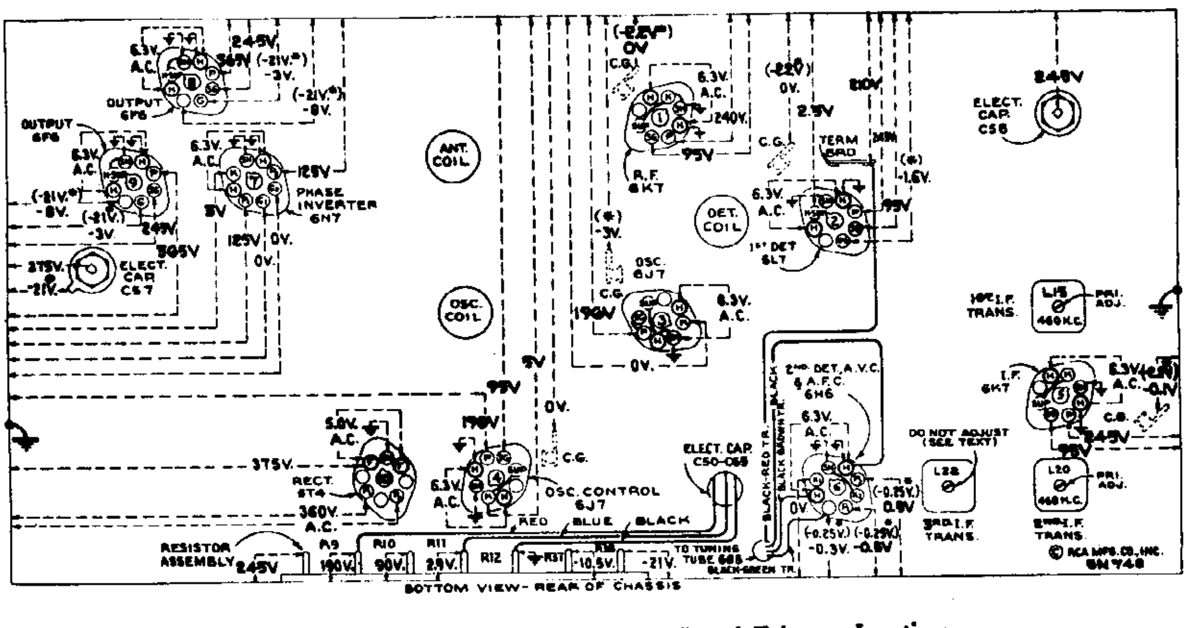


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Broadcast")—"Manual" control—No signal being received—Volume control minimum—Tone control optional

***Note:** Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter.*

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

MODEL 811K
Specifications
"Electric Tuning" Wiring

RCA MFG. CO., INC.

Electrical Specifications

Frequency Ranges

"Broadcast" (A) .... 530-1,720 kc
"Medium Wave" (B) .... 2,100-6,800 kc
"Short Wave" (C) .... 6,800-23,500 kc

R-F Alignment Frequencies

"Short Wave" (C) .... 20,000 kc (osc., det., ant.)
"Medium Wave" (B) .... 6,000 kc (osc.)
"Broadcast" (A) .... 600 kc (osc.), 1,500 kc (osc.)

Intermediate Frequency .... 460 kc

Radiotron Complement

(1) RCA-6K7 .... R-F Amplifier
(2) RCA-6L7 .... First Detector
(3) RCA-6J7 .... Heterodyne Oscillator
(4) RCA-6J7 .... Oscillator Control
(5) RCA-6K7 .... I-F Amplifier
(6) RCA-6H6 .... Second Detector, A.V.C., and A.F.C.
(7) RCA-6N7 .... Audio Phase Inverter
(8) RCA-6F6 .... Power Output
(9) RCA-6F6 .... Power Output
(10) RCA-5T4 .... Full-Wave Rectifier
(11) RCA-6G5 .... "Magic Eye" Tuning Tube

Pilot Lamps (6) .... Mazda No. 46, 6.3 volts, 0.25 amp.

Power Supply Ratings

Rating A .... 105-125 volts, 50-60 cycles, 140 watts
Rating B .... 105-125 volts, 25 cycles, 140 watts
Rating C .... 105-125/140-160/195-250 volts, 50-60 cycles, 140 watts

Power Output

Undistorted .... 10 watts
Maximum .... 12½ watts

Loudspeaker

Type .... 12-inch Electrodynamic
Impedance (v.c.) .... 2.2 ohms at 400 cycles

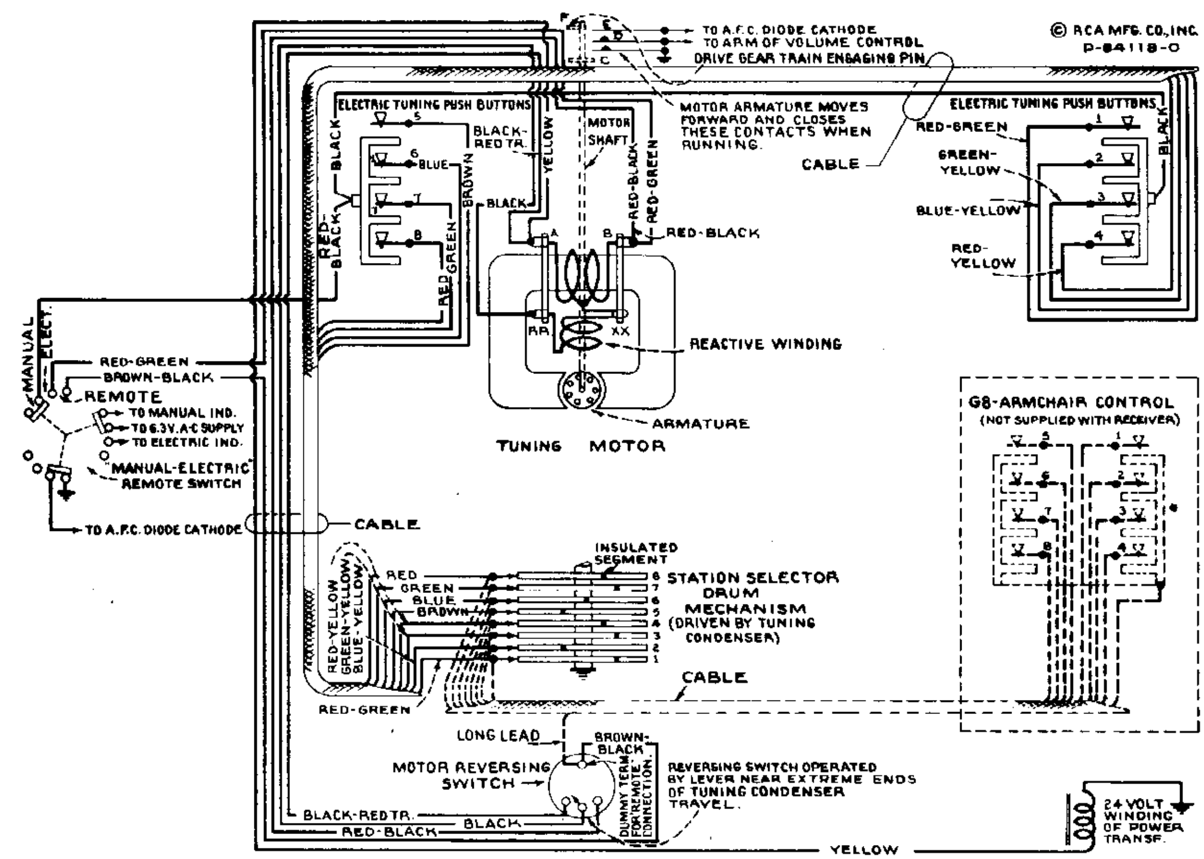


Figure 6—"Electric Tuning" Wiring Diagram
(Viewed from rear of chassis)

MODEL 811K
"Electric Tuning"
Adjustments,Assemb

RCA MFG. CO., INC.

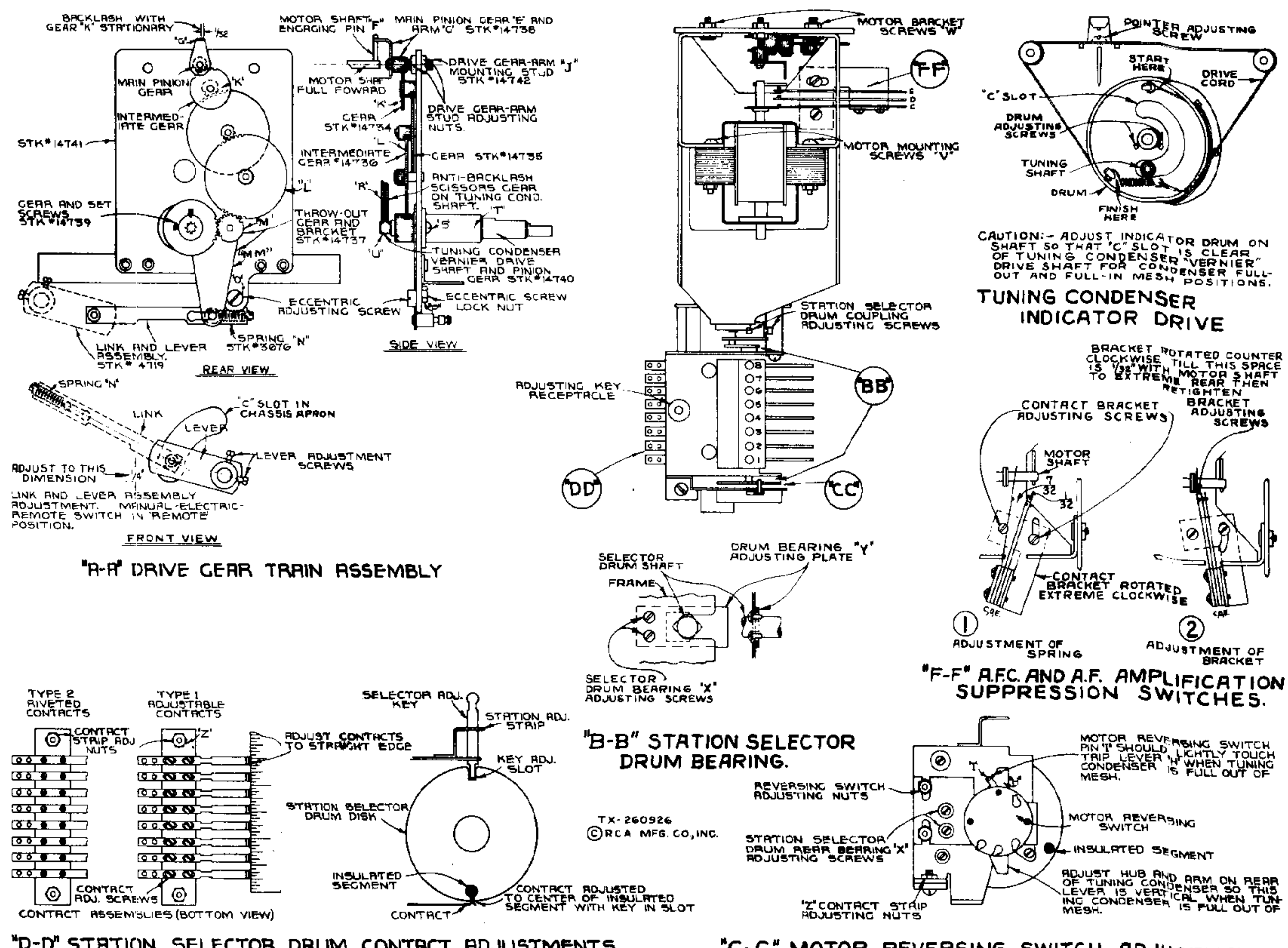


Figure 5—"Electric Tuning" Mechanism Adjustments

MODEL 811K
Alignment
"Electric Tuning" Notes

RCA MFG. CO., INC.

ALIGNMENT PROCEDURE

Calibrate the tuning dial by adjusting dial pointer to the left ends of horizontal calibration lines with the gang tuning-condenser plates in full-mesh position. This is a screw-driver adjustment.

The "Manual-Electric-Remote" switch should be turned to "Manual" (right) during alignment unless otherwise specified.

CAUTION.—The magnetite core screw L21 on the bottom of the 3rd i-f transformer has been accurately adjusted, for an exact electrical balance of coil L22 to center tap, during manufacture and should not be disturbed. However, if for any reason the adjustment has been moved from its original position, it will be necessary to mechanically adjust this screw until the end of the stud protrudes exactly 3/16 of an inch (six threads exposed) above the brass bushing prior to any alignment operations.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. A-f-c discriminator adjustments should follow r-f and i-f adjustments tabulated below. Adjustment locations are shown on figures 3 and 4.

Cathode-ray alignment is preferable; the connections to the chassis are shown on figure 2. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

Order of Alignment	Test Oscillator: Connection to Receiver	Test Oscillator: Dummy Antenna	Test Oscillator: Frequency Setting	Range Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
1	—	—	—	—	—	3rd I-F Trans.	L22	Turn Extreme Counter-clockwise
2	6K7 I-F Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	2nd I-F Trans.	L20 and L21	Max. (peak)
3	6L7 Det. Grid Cap	.001 Mfd.	460 kc	"A"	No Signal 550-750 kc	1st I-F Trans.	L15 and L16	Max. (peak)
4	Ant.	300 Ohms	20,000 kc	"C" Right	20,000 kc	"C" Osc.	C45	Max. (peak)*
5	Ant.	300 Ohms	20,000 kc	"C"	Rock thru 20,000 kc	"C" Det.	C8	Max. (peak)†
6	Ant.	300 Ohms	20,000 kc	"C"	20,000 kc	"C" Ant.	C2	Max. (peak)‡
7	Ant.	300 Ohms	6,000 kc	"B" Center	6,000 kc	"B" Osc.	C46	Max. (peak)*
8	Ant.	200 Mmfd.	600 kc	"A" Left	600 kc	"A" Osc.	L14	Max. (peak)
9	Ant.	200 Mmfd.	1,500 kc	"A"	1,500 kc	"A" Osc.	C31	Max. (peak)
10	Ant.	200 Mmfd.	600 kc	"A"	600 kc	"A" Osc.	L14	Max. (peak)
11	Ant.	200 Mmfd.	1,500 kc	"A"	1,500 kc	"A" Osc.	C31	Max. (peak)
12	Proceed to A-F-C Discriminator Adjustments Outlined Below							

* Use minimum capacity peak if two peaks can be obtained.
† Use maximum capacity peak if two peaks can be obtained.
‡ After this adjustment, check for image signal by shifting receiver dial to 19,080 kc.

A-F-C Discriminator Adjustments.—These adjustments are rather critical and should be performed with extreme care. Improper adjustment may result in complete failure of the oscillator control tube to function or else may cause it to detune the oscillator instead of tuning it to the signal. It is assumed that the magnetite core adjusting screw L23 (top of 3rd i-f transformer) has been turned all the way out (extreme counter-clockwise) prior to the preceding tabulated adjustments. Adjustments are as follows: Remove spring "N" on link and arm assembly which connects the "Manual-Electric-Remote" switch shaft to the throw-out gear bracket. Connect antenna to receiver antenna "A" terminal. With the "Manual-Electric-Remote" switch in "Manual" (right) position, tune in a strong local station near 600 kc or the low-frequency end of the "A" band as accurately as possible by means of the tuning tube "Magic Eye." The most accurate adjustment will be obtained by adjusting the "vernier" tuning knob mid-way between the two points where the eye just appears to start to open. This will place the generated i-f carrier signal frequency exactly in the center of the i-f amplifier response curve (should be 460 kc if i-f amplifier was properly aligned) and is the frequency to which the a-f-c discriminator (3rd i-f transformer) should be tuned to resonance. Without disturbing any of the receiver adjustments, place the "high" test-oscillator lead about ¼ of an inch from the grid cap lead of the RCA-6K7 i-f amplifier tube, adjust the test-oscillator output to maximum, turn test-oscillator "Modulation" off, and carefully zero-beat the test-oscillator frequency (approximately 460 kc) with the i-f carrier signal. Avoid placing the test-oscillator lead nearer to the grid cap lead than specified above, as doing so will tend to detune the i-f amplifier. It may be necessary to reduce the local station signal, during this operation, by shortening antenna lead or grounding antenna "A" terminal to chassis in order to increase the loudness of the beat note sufficiently for accurate zero-beat adjustment.

Throw "Manual-Electric-Remote" switch to "Electric" (center) position. A high whistle or beat note will now be heard. Turn the magnetite core screw L23 (top of 3rd i-f transformer) slowly clockwise. As this screw is turned, the beat note will first increase to a high audio frequency and will then decrease to a zero-beat and then increase in frequency again. The point of exact zero-beat is the position for correct adjustment of the discriminator. Zero-beat should also still exist when the "Manual-Electric-Remote" switch is thrown back to "Manual" position. The adjustment is now complete and may be checked by slightly detuning the receiver above and below the local station frequency with the "Manual-Electric-Remote" in "Manual" position, switching to "Electric" position, and noting the oscillator pull-in. Replace spring "N."

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals Under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6K7—R-F Amp.	8.5 ma.
(2)	RCA-6L7—1st Det.	7 ma.
(3)	RCA-6J7—Osc.	10 ma.
(4)	RCA-6J7—Osc. Control	1.2 ma.
(5)	RCA-6K7—I-F Amp.	8.5 ma.
(6)	RCA-6H6—2nd Det., A.V.C. and A.F.C.	—
(7)	RCA-6N7—Phase Inverter	1.8 ma.
(8)	RCA-6F6—Output	26 ma.
(9)	RCA-6F6—Output	26 ma.
(10)	RCA-5T4—Rectifier	112 ma.*
(11)	RCA-6G5—Tuning Tube	2.5 ma.

(*Cannot be measured at socket)

ELECTRIC TUNING

Mechanism Adjustments

The electric tuning mechanism is designed to be as simple in construction and as fool proof in operation as is possible. In order to maintain the accurate results possible with this device care must be taken in effecting any repairs or adjustments. Reference should be made to figure 5 and the following:

A-F-C and A-F Amplification Suppression Switches.—This switch assembly is located on the motor bracket and closes due to solenoid action of motor armature. The tension of the long contact spring "C" is important in bringing about quick dis-engagement of the motor and in permitting the motor to pull into mesh with the drive mechanism. Normal adjustment is attained when the short springs "D" and "E" are aligned exactly straight with contact points separated approximately 1/32 of an inch and with the spring "C" spaced approximately 7/32 of an inch from spring "D" at the point of contact. If necessary, in order to obtain positive pull-in and quick dis-engagement of the motor, the tension of spring "C" should be increased or decreased by bending. This action should be checked with the front apron of the chassis raised two inches higher than the rear. Contacts of the switch must be kept clean. Crocus cloth or a relay burnisher may be used for this purpose.

Motor Reversing Switch.—It is necessary to automatically stop and reverse the drive motor before the tuning condenser reaches the ends of its travel. Approximately 175 degrees of sweep is required, and the reversal must take place above 1,700 kc and below 540 kc but not too near the limits of the scale. The coupling between the station selector drum and the tuning condenser shaft should be attached so that the reversing switch trip lever "H" is exactly vertical when the condenser is full-out of mesh. There should be 1/32 of an inch clearance between the end of the condenser shaft and the selector drum shaft. While the trip lever is in this position the reversing switch bracket should be adjusted by means of its elongated mounting holes until the switch pin "I" just lightly touches trip lever "H."

Main Pinion Gear.—Clearance between the small high-speed pinion gear "E" and the intermediate gear "K" determines the amount of mechanical noise produced. Correct adjustment will give approximately 1/32 of an inch movement of back lash at the end of pinion arm "G" when gear "K" is held stationary. Arm "G" must also be adjusted for correct mesh with motor shaft drive pin "F." With the motor shaft completely forward and pinion "E" tight against its front bearing, the pinion mounting stud "J" should be adjusted so that pin "F" reaches its full thickness with the rotating arm "G." An increase of this mesh will increase over travel on tuning while a decrease of mesh will decrease the over travel. The elongated hole in the front bracket allows sufficient movement of the mounting stud "J" to permit above mentioned gear mesh adjustment.

"Manual-Electric-Remote" Changeover.—(1) Link and lever adjustment—To properly line up the mechanical link between the switch shaft and throw-out gear bracket "MM," the set screws holding the link lever on the switch shaft must be loosened, the switch turned to the "Remote" position (extreme left) and the link lever revolved until the distance between the bottom of its link-connecting pin (extends through chassis apron) and the bottom of the "C" slot, in front apron of chassis, is exactly ¼ of an inch. If this adjustment is not properly made, correct operation of "Electric" or "Remote" tuning will not result. (2) Throw-out Gear Adjustment—To obtain smooth operation on "Electric" or "Remote" positions it is important that the proper clearance is maintained between the throw-out gear "M" and the intermediate gear "L." With the "Manual-Electric-Remote" control thrown to "Remote" position (extreme left) adjust the mesh between these gears by means of the eccentric screw "O" and lock nut "P" on the throw-out gear bracket "MM" until there is approximately 1/64 of an inch backlash of gear "L" when gear "M" is held stationary.

Vernier Tuning.—In case it becomes necessary to remove tuning condenser drive shaft "T," it should be replaced by sliding anti-backlash gear "R" on condenser shaft apart so that compression amounting to one tooth on the gear is obtained in the springs. Adjust mesh of gear "R" with pinion gear "U" on vernier shaft before tightening screws "S" so that smooth tuning is obtained throughout the range.

Motor Alignment.—The motor shaft must be exactly aligned with the axis of the pinion gear with which it engages. This may be adjusted by loosening the mounting screws "V" of the motor and aligning shaft by sight. Correct alignment may be tested by slowly rotating motor and observing the relation between the pin "F" of the motor shaft and the arm "G" on the pinion. The relation of the two should remain the same throughout the revolution. Additional movement for adjustment may be obtained by the motor bracket screws "W" if necessary.

Station Selector Drum.—(1) Bearing Adjustment—The selector drum may be removed by unscrewing the two bearing adjusting screws "X" on the front and rear bearings and sliding shaft out of slots on frame. To replace drum, the reverse procedure should be followed holding bearing adjusting plates "Y" firmly against the shaft and tightening adjusting screws. (2) Contact adjustment—Two types of contact strips are used. They are designated on figure 5, as types 1 and 2, on which the individual contacts are respectively adjustable and fixed. On type 1, the individual contacts should be adjusted by setting the end contact springs near the mid-position of their travel and aligning the remaining springs to them by means of a straight edge. Either type of contact strip should be adjusted to the selector drum by placing two selector adjusting keys in the station adjustment strip, positions 1 and 8, loosening contact strip adjusting nuts "Z" and shifting the contact strip until the end contacts are exactly centered on the respective disc insulating segments. More accurate adjustment may be made by silhouetting the point of contact with a piece of white paper held behind the contact. Adjustment will be facilitated by removing complete assembly from rear of tuning condenser by unscrewing the three mounting screws. Contacts and discs must be kept free of dirt, filings, and other extraneous matter.

Lubrication.—The dial pointer slide should be greased with petrolatum. This same lubrication should be applied lightly to all gear faces of the drive mechanism and sparingly with a cloth to the station selector discs. Any good household oil, such as "3-IN-ONE," is suitable for the motor shaft bearings. A light grade of engine oil should be used for all gear bearings. Medium viscosity engine oil, similar to "PYROIL" (B), should be applied between the thrust washers on the motor shaft. "CASTORDAG," a mixture of graphite and castor oil, is recommended for use at the selector drum end-bearing slots and at the bearings of cable pulleys.

Station Adjustment

Any eight stations may be chosen for "Electric" tuning. Remove the two escutcheon plates from the side of the dial, place proper call letter labels in the celluloid windows, and replace escutcheons. Turn the power on and proceed to set up the "Electric" tuning as follows:

1. Set Range Selector to "Broadcast."
2. Turn "Manual-Electric-Remote" control to "Electric."
3. Press push button No. 1 and wait until station pointer comes to rest.
4. Turn the "Manual-Electric-Remote" control to "Manual."
5. Remove adjusting key from receptacle on top of station selector drum mechanism.
6. Insert key in position marked, "1" in station adjustment strip and push the key all the way down to properly fit in slot in disc.
7. Tune the receiver very carefully by means of the manual tuning knob and the "Magic Eye," to station chosen for No. 1.
8. Remove key.
9. Turn the "Manual-Electric-Remote" control to "Electric."

Button No. 1 is now properly set for "Electric" tuning. Proceed similarly for the other seven push buttons, matching each station on the dial with the same number on the station adjustment strip. Repeat the above steps but place the key respectively in positions 2, 3, 4, etc., and in each case tune to the proper station. Now when you press a button the desired station will be tuned in electrically.

Note.—In the event that all the push-button switches are locked "in" at once, they may be released by pressing either the upper left-hand or the lower right-hand push buttons (Nos. 1 or 8) in farther than would ordinarily be required.

Armchair Control

When a Model G-8 armchair control is attached to the receiver as shown in figure 6 it duplicates the action of the push buttons on the front panel when the "Manual-Electric-Remote" control is turned to "Remote" position.

RCA MFG. CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14701	Arm—Hub and arm for operating band indicator shutter—located on range switch shaft
14726	Arm—Hub and arm complete with set screws—connects station selector drum to rear of tuning condenser shaft
14517	Board—Antenna and ground terminal board
12717	Board—Phonograph terminal board
5237	Bushing—Variable condenser rubber mounting bushing
13656	Button—Plug button for detector coil shield
14725	Cable—Tuning tube cable and socket
13607	Cap—Shield cap for first or second I.F. transformer
12581	Cap—Shield cap for third I.F. transformer
11350	Cap—Grid contact cap
12884	Capacitor—Adjustable trimmer (long) (C2, C45, C51)
12714	Capacitor—Adjustable trimmer (med.) (C8, C45)
13200	Capacitor—10 Mmfd. (C52)
14021	Capacitor—22 Mmfd. (C61)
12720	Capacitor—100 Mmfd. (C26, C60)
14262	Capacitor—109 Mfd. (C62, C63)
12404	Capacitor—120 Mmfd. (C24)
12724	Capacitor—120 Mmfd. (C54)
14712	Capacitor—180 Mmfd. (C21, C23)
12962	Capacitor—330 Mmfd. (C3, C34, C59)
13052	Capacitor—470 Mmfd. (C48)
14724	Capacitor—560 Mmfd. (C4)
14723	Capacitor—680 Mmfd. (C47)
12729	Capacitor—1,550 Mmfd. (C46)
12897	Capacitor—4,700 Mmfd. (C5, C49)
14722	Capacitor—5,100 Mmfd. (C44)
4838	Capacitor—.005 Mfd. (C39, C41)
13136	Capacitor—.01 Mfd. (C29, C33)
14393	Capacitor—.01 Mfd. (C36)
11315	Capacitor—.015 Mfd. (C32, C35, C37)
4870	Capacitor—.035 Mfd. (C28)
4886	Capacitor—.05 Mfd. (C56)
4841	Capacitor—0.1 Mfd. (C9, C10, C14, C64)
5170	Capacitor—0.25 Mfd. (C19)
4840	Capacitor—0.25 Mfd. (C55)
12741	Capacitor—0.5 Mfd. (C27 two in parallel, C38)
5212	Capacitor—10 Mfd. (C58)
14631	Capacitor—25 Mfd. (C57)
14829	Capacitor Pack—Comprising one 16 Mfd. and one 20 Mfd. sections (C50, C65)
14372	Coil—Antenna coil and shield (L1, L2, L3, L4)
14414	Coil—Detector coil and shield (L5, L6, L7, L8, L9, L10)
14713	Coil—Oscillator coil and shield (L11, L12, L13, L14)
14727	Condenser—3-gang variable tuning condenser, complete with gear train (C1, C7, C53)
5040	Connector—4-contact female connector for reproducer cable
14733	Contact—Spring contact for engaging discs in station selector drum for type 1 contact assembly
30565	Contact—Comprising 8 spring contacts assembled on insulating strip for engaging discs in station selector drum (type 2 contact assembly)
14699	Cord—Indicator pointer drive cord
12006	Core—Adjustable core and stud for I.F. transformer
12900	Core—Adjustable core and stud assembly for oscillator coil
14717	Dial—Station selector dial scale
14740	Drive—Tuning condenser vernier drive shaft and pinion gear
14698	Drum—Drum for indicator drive cord—fastens on tuning condenser shaft
14731	Drum—Station selector drum rotor—comprising 8 station selector contactor discs assembled on shaft
14738	Gear—Drive pinion gear and arm
14739	Gear—Drive gear and set screws—located on tuning condenser knob shaft

STOCK No.	DESCRIPTION
14734	Gear—Intermediate gear assembly—comprising one .748" O.D.—54 tooth—gear and one .281" O.D.—18 tooth pinion assembled
14735	Gear—Intermediate gear assembly—comprising one 1.561" O.D.—72 tooth gear and one .281" O.D.—12 tooth pinion assembled
14736	Gear—Intermediate gear assembly—comprising one 1.561" O.D.—72 tooth gear and one hub assembled
14737	Gear—Throw-out gear and bracket
14716	Holder—Dial scale holder and reflector, complete with holding springs for band indicating shutter
14715	Indicator—Station selector indicator pointer and support
5226	Lamp—Dial or indicating lamp
14719	Link—Link and lever assembly
14730	Motor—Tuning drive motor for 25-cycle models only (T2)
14729	Motor—Tuning drive motor for 60-cycle models only (T2)
14038	Nut—Jamb nut for trimmer, Stock Nos. 12714 and 12884
12471	Plate—Mounting plate for cushion socket—less socket
14741	Plate—Tuning condenser front plate and studs assembled for mounting drive gears
14697	Pulley—Indicator pointer cable pulley
13988	Resistor—10 ohms—carbon type, ½ watt (R40)
11932	Resistor—330 ohms—carbon type, 1/10 watt (R4)
5030	Resistor—470 ohms—carbon type, ½ watt (R59)
14720	Resistor—1,000 ohms—carbon type, ½ watt (R2, R45)
14078	Resistor—18,000 ohms—carbon type, 1 watt (R34)
11306	Resistor—22,000 ohms—carbon type, ½ watt (R16)
14721	Resistor—22,000 ohms—carbon type, ½ watt (R13)
11300	Resistor—33,000 ohms—carbon type, 1/10 watt (R48)
13735	Resistor—33,000 ohms—carbon type, ½ watt (R5)
12454	Resistor—33,000 ohms—insulated ½ watt (R53)
11646	Resistor—47,000 ohms—carbon type, ½ watt (R25)
11365	Resistor—82,000 ohms—carbon type, ½ watt (R50)
14680	Resistor—100,000 ohms—insulated, ½ watt (R27)
5146	Resistor—100,000 ohms—carbon type, ½ watt (R26, R30)
12734	Resistor—120,000 ohms—carbon type, ½ watt (R41)
12478	Resistor—150,000 ohms—carbon type, 1/10 watt (R54)
11453	Resistor—270,000 ohms—carbon type, 1/10 watt (R31, R32)
11297	Resistor—330,000 ohms—carbon type, 1/10 watt (R51)
11172	Resistor—470,000 ohms—carbon type, ½ watt (R17)
11452	Resistor—470,000 ohms—carbon type, 1/10 watt (R20)
11297	Resistor—560,000 ohms—carbon type, 1/10 watt (R1, R3)
12013	Resistor—1 meg.—carbon type, 1/10 watt (R36)
13730	Resistor—1 meg.—carbon type, ½ watt (R28, R44)
11626	Resistor—2.2 meg.—carbon type, ½ watt (R18, R21)
13732	Resistor—10 meg.—carbon type, ½ watt (R35)
14692	Resistor—Voltage divider—comprising one 1,100 ohm, one 4,000 ohm, one 6,000 ohm, one 150 ohm and two 90 ohm sections (R9, R10, R11, R12, R37, R38)
14695	Rod—Tie rod for joining lockplate pawls on station selector push-button switches
4469	Screw—No. 8-32 x 5/32 square head set screw for arm, Stock No. 14701, or link, Stock No. 14719, or drum, Stock No. 14698
12418	Screw—No. 8-32 x 5/16 milled head set screw for gear, Stock No. 14739
14948	Selector—Station selector drum mechanism—comprising selector contactor discs, spring contacts, and motor reversing switch assembled in metal frame
14874	Shield—Antenna or detector coil shield
14875	Shield—Oscillator coil shield
12008	Shield—I.F. transformer shield
14718	Shutter—Band indicating shutter and arm assembly

STOCK No.	DESCRIPTION
14696	Slider—Indicator pointer holder and spring
11195	Socket—5-contact 5Y4 Radiotron socket
11198	Socket—8-contact 6K7, 6L7, 6J7, 6H6, 6F6 or 6N7 Radiotron socket
14114	Socket—Dial or indicating lamp socket
12007	Spring—Retaining spring for cores, Stock No. 12006
3676	Spring—Tension spring for link and lever, Stock No. 14719
12639	Spring—Tension spring for cord, Stock No. 14699
14694	Spring—Tension spring for lockplate pawl on station selector push-button switches
14742	Stud—Mounting stud for gear and arm, Stock No. 14735
14702	Switch—"Manual-Electric-Remote" switch (S7, S10, S12)
14705	Switch—L.F. tone and power switch (S1, S9, S11)
14732	Switch—Motor reversing switch and mounting plate for station selector (S8)
14704	Switch—Range switch (S2, S3, S4, S6)
14723	Switch—A-F-C and A-F amplication suppression switch (S13)
14693	Switch—Station selector button switch—comprising four contacts and corresponding lockplates, completely assembled on insulating strips
14764	Tone Control—H.F. tone control (R29)
14828	Transformer—First I.F. transformer (L15, L16, C62, C63)
14765	Transformer—Second I.F. transformer (L20, L21, C21, C23)
14709	Transformer—Third I.F. transformer (L22, L23, L24, C24)
14689	Transformer—Power transformer, 105-125 volts, 50-60 cycle (T1)
14690	Transformer—Power transformer, 105-125 volts, 25-60 cycle (T1)
14691	Transformer—Power transformer, 105-240 volts, 50-60 cycle (T1)
13144	Volume Control (R62)

STOCK No.	DESCRIPTION
	REPRODUCER ASSEMBLIES (Speaker No. RL-70E2)
13866	Cap—Dust cap for cone center
11234	Coil—Field coil (L25)
11460	Coil—Neutralizing coil (L27)
12067	Cone—Reproducer cone, voice coil, center suspension and dust cap (L26)
5939	Plug—4-contact male plug for reproducer
14535	Reproducer, complete
14534	Transformer—Output transformer (T3)
14357	Washer—Spring washer to hold field coil securely
	MISCELLANEOUS ASSEMBLIES
12835	Band—Rubber band for tuning tube
14744	Bracket—Tuning tube mounting bracket and clamp
14745	Button—Automatic station selector push button
14747	Card—Call letter cards for station selector
14750	Escutcheon—Station selector and tuning tube escutcheon and crystal—less buttons and station call letter cards
14743	Escutcheon—Station selector and tuning tube escutcheon—complete with crystal, indicating cards, and buttons—less station indicating cards
14749	Indicator—"Electric-Manual" indicator screen
14748	Indicator—"Music-Speech" indicator screen
14751	Key—Key for use in setting "Electric Tuning" mechanism
14359	Knob—Large station selector knob
14683	Knob—Range switch knob
14269	Knob—Volume control, "Manual-Electric-Remote" switch, H.F. tone control, L.F. tone control or small station selector knob
5219	Screw—Chassis mounting screw and washer assembly
14746	Shield—Celluloid shield for station call letter cards
4982	Spring—Retaining spring for knob, Stock No. 14359
14270	Spring—Retaining spring for knob, Stock Nos. 14269 and 14683

Loudspeaker.—Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

Service Data

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation if such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such as R1, L1, C1, etc., provide reference between the illustrations and Replacement Parts List. The coils, transformer windings, and reactors are rated in terms of d-c resistance to permit continuity checks.

Precautionary Lead Dress.—(1) Bus lead from oscillator coil directly to ground must be as short as possible for correct alignment, (2) bus lead from range switch S3 to oscillator section C53 of variable condenser should be 1½ inches long for correct alignment, (3) bus lead from detector coil to range switch S4 must be as short as possible for correct alignment, (4) bus lead from detector coil to detector section C7 of variable condenser should be 2½ inches long for correct alignment, (5) detector trimming capacitor C8 lead should connect directly to variable condenser C7, (6) bus lead from antenna section of range switch S2 to chassis ground lance must be as short as possible, (7) bus lead from antenna coil to range switch S2 should be 2¼ inches for correct alignment, (8) bus lead from antenna coil to antenna section C1 of variable condenser must be 3⅞ inches over-all with ½ inch bend at coil end for correct alignment, (9) filament leads should be dressed away from RCA-6N7 grids, pins Nos. 4 and 5, to reduce hum pickup, (10) resistors R41, R43, and R44 in the oscillator control tube circuit must be kept free of other component parts for satisfactory operation of the a-f-c circuit, (11) capacitor C29 and resistor R16 leads from terminal board to the phonograph terminal board should be as short as possible and dressed away from other parts to reduce hum pickup, (12) filament leads should all be twisted to reduce hum pickup, (13) filament leads should be dressed away from the terminal board near the 3rd i-f transformer. (14) Lead from the range switch S3 to the oscillator cathode socket terminal should be dressed under bus wire on socket to hold this lead down close to chassis.

Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio-amplifying circuit. RCA Victor Models R-93, R-93-A, R-93-2, or R-94 Record Players should be connected as follows: Remove the link from the phonograph terminal board. Connect green wire in Radio-Record switch cable to terminal 1; yellow to terminal 2; shield to terminal 3; and tape up the red and blue. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw-terminals on Radio-Record switch. If additional volume is desired, connect an RCA Stock No. 9632 transformer between the 2-conductor twisted cable and the screw-terminals on Radio-Record switch as follows: Yellow and brown transformer leads and one side of twisted cable to ground screw-terminal on switch; black transformer lead to other side of twisted cable; and blue transformer lead to other screw-terminal on switch.

MODEL 812K
Parts, Notes

RCA MFG. CO., INC.

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14701	Arm—Hub and arm for operating band indicator shutter—located on range switch shaft
14726	Arm—Hub and arm complete with set screws—connects station selector drum to rear of tuning condenser shaft
14517	Board—Antenna and ground terminal board
12717	Board—Phonograph terminal board
5237	Bushing—Variable condenser rubber mounting bushing
13656	Button—Plug button for detector coil shield
14725	Cable—Tuning tube cable and socket
12607	Cap—Shield cap for first or second I.F. transformer
12581	Cap—Shield cap for third or fourth I.F. transformer
11350	Cap—Grid contact cap
12884	Capacitor—Adjustable trimmer (long) (C2, C45, C51)
12714	Capacitor—Adjustable trimmer (med.) (C8, C43)
13200	Capacitor—10 Mmfd. (C52)
14021	Capacitor—22 Mmfd. (C30)
12813	Capacitor—82 Mmfd. (C6)
12720	Capacitor—100 Mmfd. (C26, C60)
12404	Capacitor—120 Mmfd. (C24)
12724	Capacitor—120 Mmfd. (C54)
14712	Capacitor—180 Mmfd. (C21, C23)
14711	Capacitor—220 Mmfd. (C17, C18)
12952	Capacitor—330 Mmfd. (C3, C34, C59)
14710	Capacitor—430 Mmfd. (C11, C15)
13052	Capacitor—470 Mmfd. (C48)
14724	Capacitor—560 Mmfd. (C4)
14723	Capacitor—690 Mmfd. (C47)
12729	Capacitor—1,550 Mmfd. (C46)
12697	Capacitor—4,700 Mmfd. (C5, C49)
14722	Capacitor—5,100 Mmfd. (C44)
4836	Capacitor—.005 Mfd. (C39, C40, C41)
13138	Capacitor—.01 Mfd. (C12, C13, C22, C29, C33)
14393	Capacitor—.01 Mfd. (C36)
11315	Capacitor—.015 Mfd. (C35, C37)
4870	Capacitor—.025 Mfd. (C28)
4886	Capacitor—.05 Mfd. (C20, C56)
4839	Capacitor—0.1 Mfd. (C9, C10, C14)
12464	Capacitor—0.25 Mfd. (C16, C19, C55)
12741	Capacitor—0.5 Mfd. (C27 two in parallel, C38)
5212	Capacitor—16 Mfd. (C58)
14531	Capacitor—25 Mfd. (C57)
14714	Capacitor Pack—Comprising one .015 Mfd. and one .010 Mfd. capacitor, one 27,000 ohm and one 39,000 ohm resistors (C31, C32, R23, R24)
14829	Capacitor Pack—Comprising one 16 Mfd. and one 20 Mfd. sections (C50, C61)
14372	Coil—Antenna coil and shield (L1, L2, L3, L4)
14424	Coil—Detector coil and shield (L5, L6, L7, L8, L9, L10)
14713	Coil—Oscillator coil and shield (L11, L12, L13, L14)
14727	Condenser—3-gang variable tuning condenser, complete with gear train (C1, C7, C53)
5040	Connector—4-contact female connector for reproducer cable
14733	Contact—Spring contact for engaging discs in station selector drum for type 1 contact assembly
30365	Contact—Comprising 8 spring contacts assembled on insulating strip for engaging discs in station selector drum (type 2 contact assembly)
14699	Cord—Indicator pointer drive cord
12006	Core—Adjustable core and stud for I.F. transformer
12800	Core—Adjustable core and stud assembly for oscillator coil
14717	Dial—Station selector dial scale
14740	Drive—Tuning condenser vernier drive shaft and pinion gear
14698	Drum—Drum for indicator drive cord—fastens on tuning condenser shaft
14731	Drum—Station selector drum rotor—comprising 8 station selector contactor discs assembled on shaft
14738	Gear—Drive pinion gear and arm
14739	Gear—Drive gear and set screws—located on tuning condenser knob shaft
14734	Gear—Intermediate gear assembly—comprising one .749" O.D.—34 tooth—gear and one .291" O.D.—12 tooth pinion assembled
14735	Gear—Intermediate gear assembly—comprising one 1.541" O.D.—72 tooth gear and one .291" O.D.—12 tooth pinion assembled
14736	Gear—Intermediate gear assembly—comprising one 1.541" O.D.—72 tooth gear and one hub assembled
14737	Gear—Throw-out gear and bracket
14716	Holder—Dial scale holder and reflector, complete with holding springs for band indicating shutter
14715	Indicator—Station selector indicator pointer and support
5226	Lamp—Dial or indicating lamp
14719	Link—Link and lever assembly
14730	Motor—Tuning drive motor for 25-cycle models only (T3)
14729	Motor—Tuning drive motor for 60-cycle models only (T3)
14028	Nut—Jamb nut for trimmer, Stock Nos. 12714 and 12884
12471	Plate—Mounting plate for cushion socket—less socket
14741	Plate—Tuning condenser front plate and studs assembled for mounting drive gears
14697	Pulley—Indicator pointer cable pulley
13988	Resistor—10 ohms—carbon type, ¼ watt (R40)
11932	Resistor—330 ohms—carbon type, 1/10 watt (R4)
13250	Resistor—330 ohms—carbon type, ¼ watt (R14)
5030	Resistor—470 ohms—carbon type, ¼ watt (R39)
14720	Resistor—1,000 ohms—carbon type, ¼ watt (R2, R8, R43)
14557	Resistor—1,000 ohms—carbon type, 1/10 watt (R6, R15)
14078	Resistor—18,000 ohms—carbon type, 1 watt (R34)
11305	Resistor—22,000 ohms—carbon type, ¼ watt (R16)
14721	Resistor—22,000 ohms—carbon type, ¼ watt (R13)
5033	Resistor—33,000 ohms—carbon type, 1 watt (R33)
11300	Resistor—33,000 ohms—carbon type, 1/10 watt (R42)
13735	Resistor—33,000 ohms—carbon type, ¼ watt (R5)
11646	Resistor—47,000 ohms—carbon type, ¼ watt (R25)
14580	Resistor—100,000 ohms—insulated, ¼ watt (R27)
5145	Resistor—100,000 ohms—carbon type, ¼ watt (R7, R28, R30)
13734	Resistor—120,000 ohms—carbon type, ¼ watt (R41)
11453	Resistor—270,000 ohms—carbon type, 1/10 watt (R31, R32)
11172	Resistor—470,000 ohms—carbon type, ¼ watt (R17)
11452	Resistor—470,000 ohms—carbon type, 1/10 watt (R19, R20)
11397	Resistor—560,000 ohms—carbon type, 1/10 watt (R1, R3)
12013	Resistor—1 meg.—carbon type, 1/10 watt (R36)
13730	Resistor—1 meg.—carbon type, ¼ watt (R26, R44)
11626	Resistor—2.2 meg.—carbon type, ¼ watt (R18, R21)
13732	Resistor—10 meg.—carbon type, ¼ watt (R35)
14692	Resistor—Voltage divider—comprising one 1,100 ohm, one 4,000 ohm, one 8,000 ohm, one 180 ohm and two 90 ohm sections (R9, R10, R11, R12, R37, R38)
14695	Rod—Tie rod for joining lockplate pawls on station selector push-button switches
4449	Screw—No. 8-32 x 5/32 square head set screw for arm, Stock No. 14701, or link, Stock No. 14719, or drum, Stock No. 14698
12418	Screw—No. 8-32 x 3/16 milled head set screw for gear, Stock No. 14739
14848	Selector—Station selector drum mechanism—comprising selector contactor discs, spring contacts, and motor reversing switch assembled in metal frame
14374	Shield—Antenna or detector coil shield
14375	Shield—Oscillator coil shield
12008	Shield—I.F. transformer shield
14718	Shutter—Band indicating shutter and arm assembly
14696	Slider—Indicator pointer holder and spring
11195	Socket—5-contact 5T4 Radiotron socket
11196	Socket—8-contact 6K7, 6L7, 6J7, 6H6, 6F6 or 6N7 Radiotron socket
14114	Socket—Dial or indicating lamp socket
12007	Spring—Retaining spring for core, Stock No. 12006
3676	Spring—Tension spring for link and lever, Stock No. 14719
13658	Spring—Tension spring for cord, Stock No. 14699
14694	Spring—Tension spring for lockplate pawl on station selector push-button switches
14742	Stud—Mounting stud for gear and arm, Stock No. 14738
14702	Switch—"Manual-Electric-Remote" switch (S7, S10, S12)
14705	Switch—L.F. tone and power switch (S1, S8, S11)
14732	Switch—Motor reversing switch and mounting plate for station selector (S9)
14704	Switch—Range switch (S2, S3, S4, S6)
14728	Switch—A-F-C and A-F amplication suppression switch (S13)
14693	Switch—Station selector button switch—comprising four contacts and corresponding lockplates, completely assembled on insulating strips
14703	Tone Control—H.F. tone control (R29, S5)
14706	Transformer—First I.F. transformer (L15, L16, L17, C11, C16)
14707	Transformer—Second I.F. transformer (L18, L19, L29, C17, C18)
14708	Transformer—Third I.F. transformer (L20, L21, C21, C23)
14709	Transformer—Fourth I.F. transformer (L22, L23, L24, C24)
14689	Transformer—Power transformer, 105-125 volts, 50-60 cycle (T1)
14690	Transformer—Power transformer, 105-125 volts, 25-60 cycle (T1)
14691	Transformer—Power transformer, 105-240 volts, 50-60 cycle (T1)
12861	Volume Control (R22)

STOCK No.	DESCRIPTION
	REPRODUCER ASSEMBLIES (Speaker No. RL76-1)
14606	Cap—Dust cap for cone center
14603	Coil—Field coil (L28)
14604	Coil—Neutralizing coil (L27)
14602	Cone—Reproducer cone, voice coil, center suspension and dust cap (L26)
5039	Plug—4-contact male plug for reproducer
14600	Reproducer, complete
14601	Transformer—Output transformer (T2, C42)
14357	Washer—Spring washer to hold field coil securely
	MISCELLANEOUS ASSEMBLIES
12038	Band—Rubber band for tuning tube
14744	Bracket—Tuning tube mounting bracket and clamp
14745	Button—Automatic station selector push button
14747	Card—Call letter cards for station selector
14750	Escutcheon—Station selector and tuning tube escutcheon and crystal—less buttons and station call letter cards
14743	Escutcheon—Station selector and tuning tube escutcheon—complete with crystal, indicating cards, and buttons—less station indicating cards
14749	Indicator—"Electric-Manual" indicator screen
14748	Indicator—"Music-Speech" indicator screen
14751	Key—Key for use in setting "Electric Tuning" mechanism
14359	Knob—Large station selector knob
14688	Knob—Range switch knob
14269	Knob—Volume control, "Manual-Electric-Remote" switch, H.F. tone control, L.F. tone control or small station selector knob
5210	Screw—Chassis mounting screw and washer assembly
14746	Shield—Celluloid shield for station call letter cards
4982	Spring—Retaining spring for knob, Stock No. 14359
14270	Spring—Retaining spring for knob, Stock Nos. 14269 and 14688

Loudspeaker.—Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

Electrical Specifications

FREQUENCY RANGES
"Broadcast" (A) .... 530-1,720 kc
"Medium Wave" (B) .... 2,100-6,800 kc
"Short Wave" (C) .... 6,800-23,500 kc

R-F ALIGNMENT FREQUENCIES
"Short Wave" (C) .... 20,000 kc (osc., det., ant.)
"Medium Wave" (B) .... 6,000 kc (osc.)
"Broadcast" (A) .... 600 kc (osc.), 1,500 kc (osc.)

Intermediate Frequency .... 460 kc

RADIOTRON COMPLEMENT
(1) RCA-6K7 .... R-F Amplifier
(2) RCA-6L7 .... First Detector
(3) RCA-6J7 .... Heterodyne Oscillator
(4) RCA-6J7 .... Oscillator Control
(5) RCA-6K7 .... First I-F Amplifier
(6) RCA-6K7 .... Second I-F Amplifier
(7) RCA-6H6 .... Second Detector, A.V.C., and A.F.C.
(8) RCA-6N7 .... Audio Phase Inverter
(9) RCA-6F6 .... Power Output
(10) RCA-6F6 .... Power Output
(11) RCA-5T4 .... Full-Wave Rectifier
(12) RCA-6G5 .... "Magic Eye" Tuning Tube

Pilot Lamps (6) .... Mazda No. 46, 6.3 volts, 0.25 amp.

POWER SUPPLY RATINGS
Rating A .... 105-125 volts, 50-60 cycles, 145 watts
Rating B .... 105-125 volts, 25 cycles, 145 watts
Rating C .... 105-125/140-160/195-250 volts, 50-60 cycles, 145 watts

POWER OUTPUT
Undistorted .... 10 watts
Maximum .... 12½ watts

LOUDSPEAKER
Type .... 12-inch Electrodynamic
Impedance (v.c.) .... 11½ ohms at 400 cycles

Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio-amplifying circuit. RCA Victor Models R-93, R-93-A, R-93-2, or R-94 Record Players should be connected as follows: Remove the link from the phonograph terminal board. Connect green wire in Radio-Record switch cable to terminal 1; yellow to terminal 2; shield to terminal 3; and tape up the red and blue. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw-terminals on Radio-Record switch. If additional volume is desired, connect an RCA Stock No. 9632 transformer between the 2-conductor twisted cable and the screw-terminals on Radio-Record switch as follows: Yellow and brown transformer leads and one side of twisted cable to ground screw-terminal on switch; black transformer lead to other side of twisted cable; and blue transformer lead to other screw-terminal on switch.

RCA MFG. CO., INC.

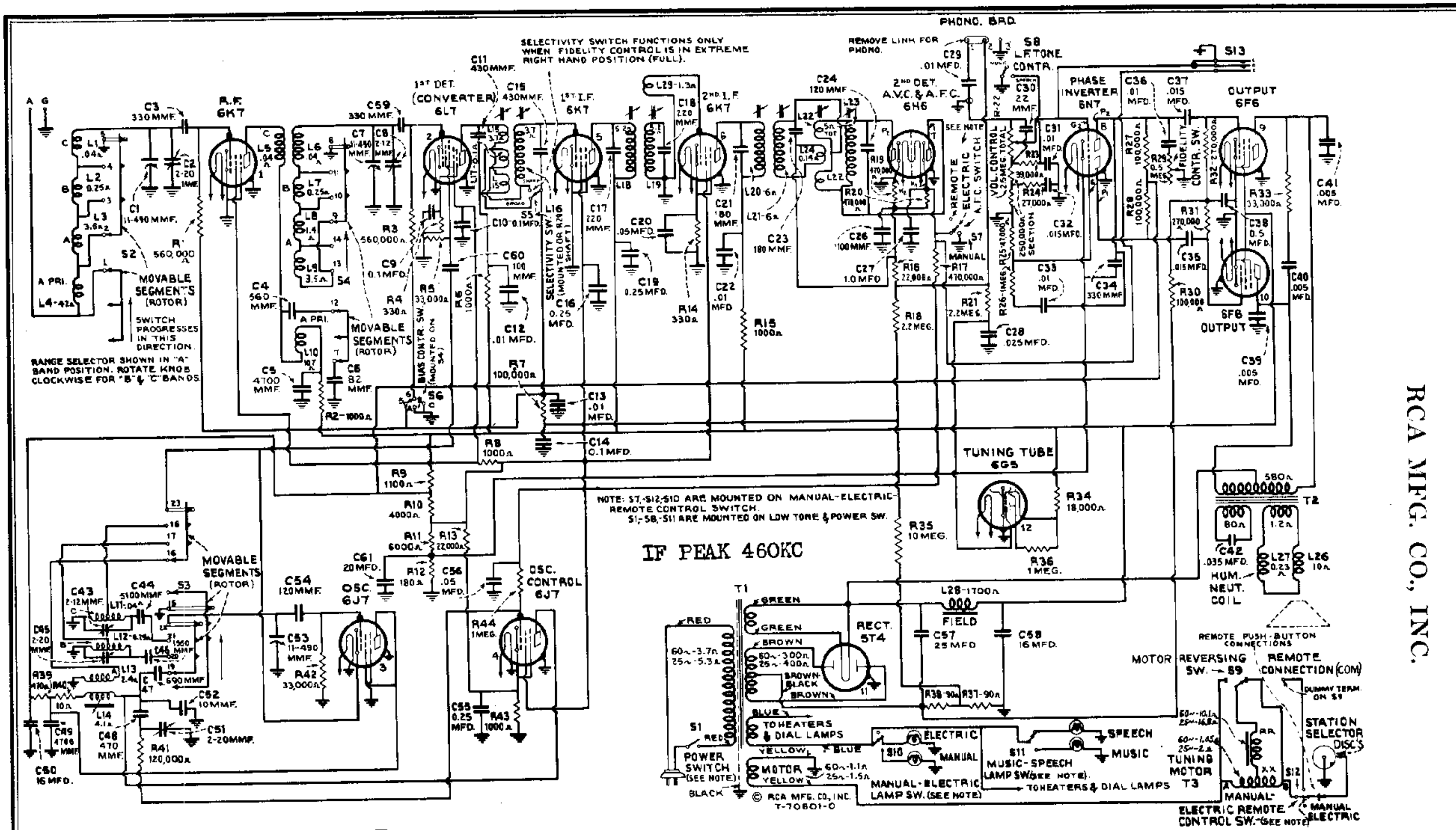


Figure 1—Schematic Circuit Diagram

General Description

This receiver employs a twelve-tube, three-band, "Magic Brain" superheterodyne circuit. Features of design include "Electric Tuning" with push-button operation; automatic frequency control; "qumulative-wound" antenna and detector coils; tuned r-f amplifier; magnetite-core adjusted i-f transformers and low-frequency "A" oscillator tracking; two-stage i-f amplifier; automatic volume control; phonograph terminal board; "Magic Eye" tuning tube; twelve-inch electrodynamic loudspeaker; plunger-type, air-dielectric trimming capacitors; two-point aural-compensated volume control; fidelity control; low-frequency tone control; audio phase inverter; and push-pull power output stage. In addition, this model has a cabinet incorporating the "Sonic Arc" Magic Voice.

MODEL 812K
Chassis Wiring

RCA MFG. CO., INC.

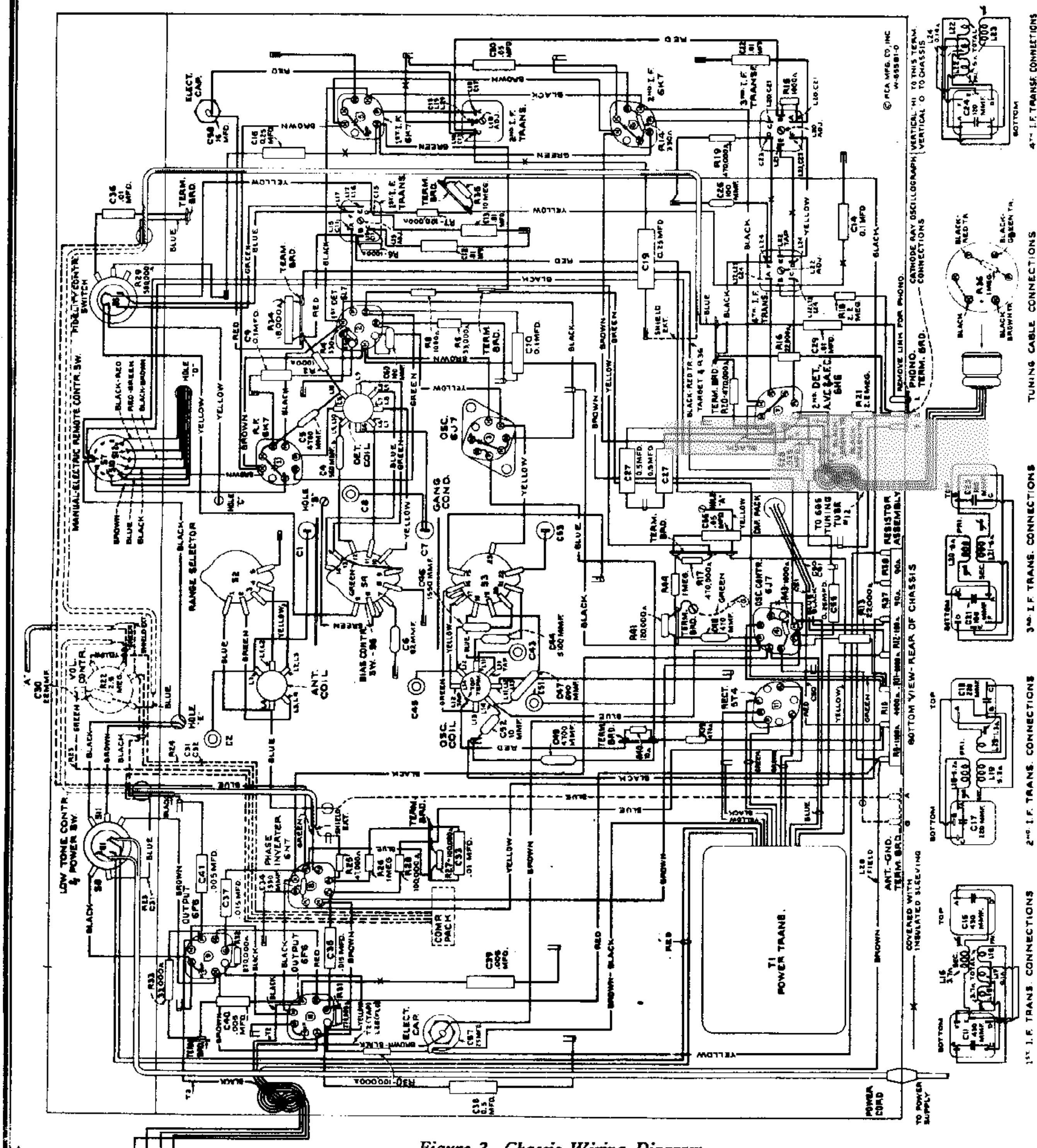


Figure 2—Chassis Wiring Diagram

MODEL 812K
Socket, Trimmers
Voltage

RCA MFG. CO., INC.

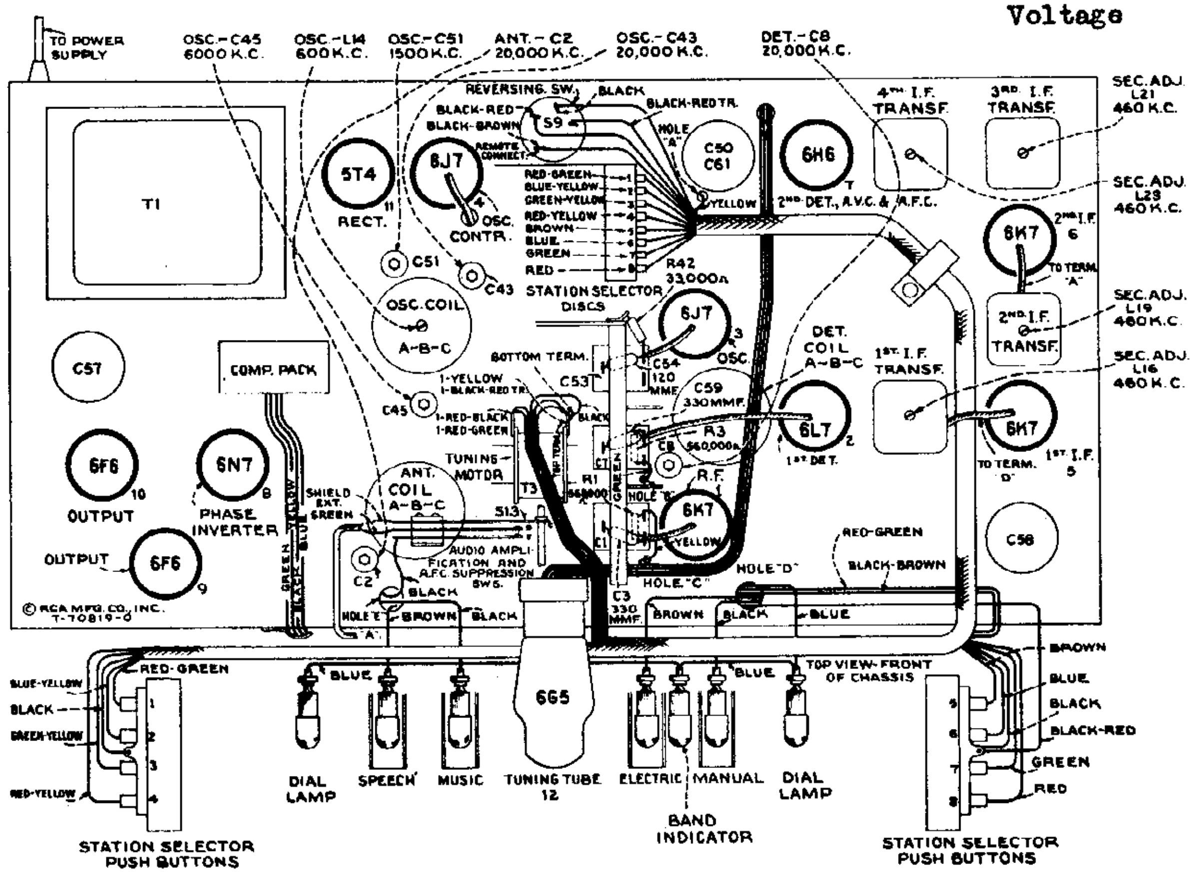


Figure 3—Radiotron, Coil, and Trimmer Locations

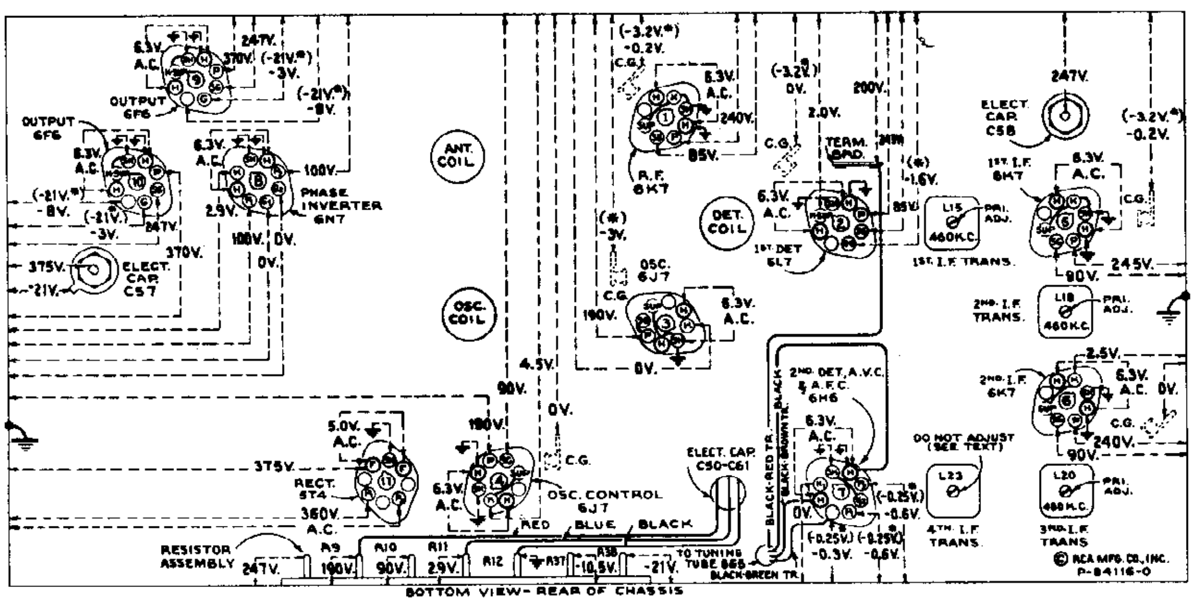


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Broadcast")—"Manual" control—No signal being received—Volume control minimum—Fidelity control optional

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter.

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

MODEL 812K
"Electric Tuning"
Assembly, Details
Adjustments

RCA MFG. CO., INC.

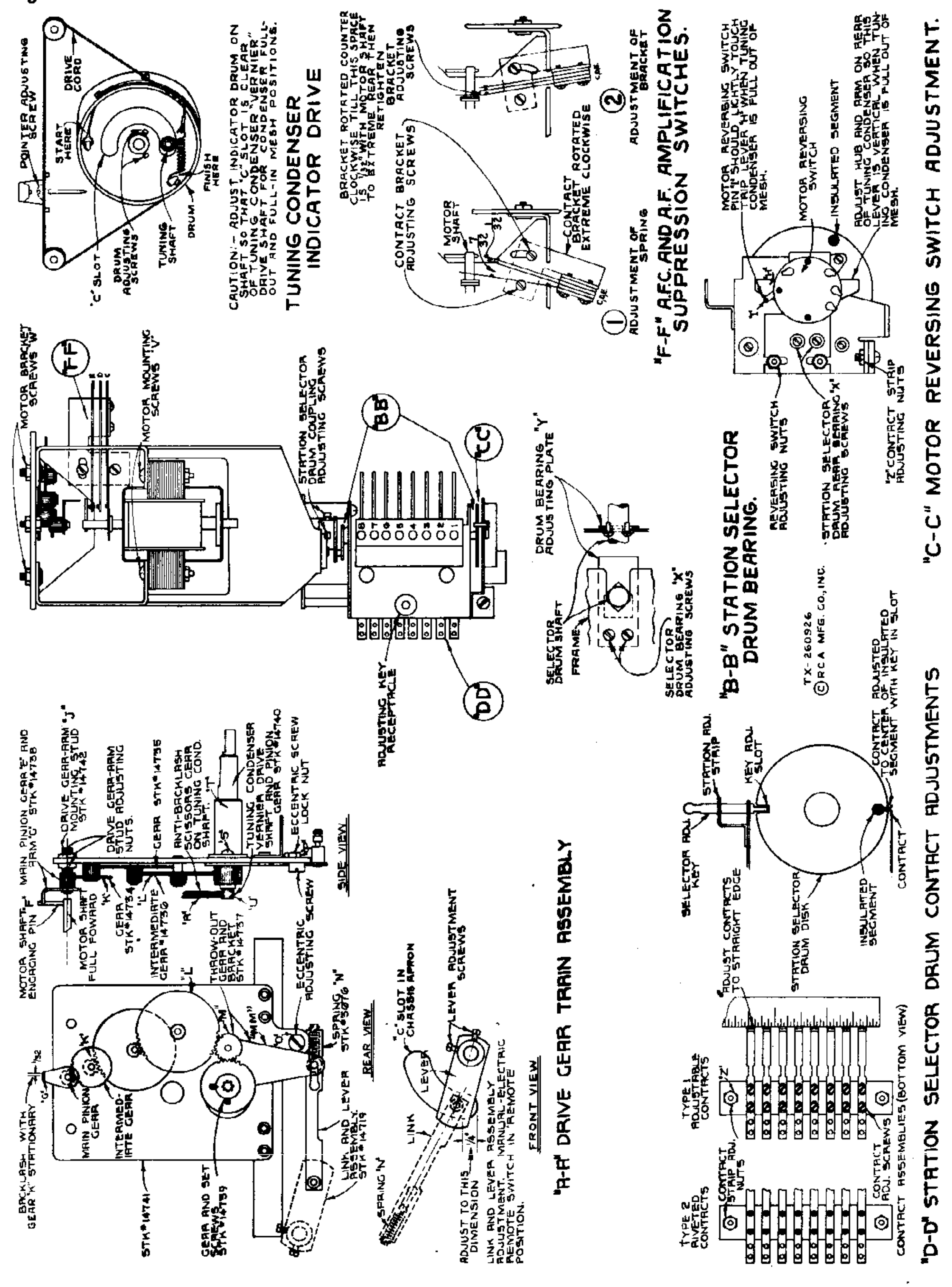


Figure 5—"Electric Tuning" Mechanism Adjustments

RCA MFG. CO., INC.

ALIGNMENT PROCEDURE

Calibrate the tuning dial by adjusting dial pointer to the left ends of horizontal calibration lines with the gang tuning-condenser plates in full-mesh position. This is a screw-driver adjustment.

The "Fidelity" control should be turned counter-clockwise during all alignment operations. The "Manual-Electric-Remote" switch should be turned to "Manual" (right) during alignment unless otherwise specified.

CAUTION.—The magnetite core screw L22 on the bottom of the 4th i-f transformer has been accurately adjusted, for an exact electral balance of coil L22 to center tap, during manufacture and should not be disturbed. However, if for any reason the adjustment has been moved from its original position, it will be necessary to mechanically adjust this screw until the end of the stud protrudes exactly 3/16 of an inch (six threads exposed) above the brass bushing prior to any alignment operations.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. A-f-c discriminator adjustments should follow r-f and i-f adjustments tabulated below. Adjustment locations are shown on figures 3 and 4.

Cathode-ray alignment is preferable; the connections to the chassis are shown on figure 2. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator			Range-Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting					
1	—	—	—	—	—	4th I-F Trans.	L23	Turn Extreme Counter-clockwise
2	6K7 2nd I-F Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	3rd I-F Trans.	L20 and L21	Max. (peak)
3	6K7 1st I-F Grid Cap	.001 Mfd.	460 kc	"A"	No Signal 550-750 kc	2nd I-F Trans.	L18 and L19	Max. (peak)
4	6L7 Det. Grid Cap	.001 Mfd.	460 kc	"A"	No Signal 550-750 kc	1st I-F Trans.	L15 and L16	Max. (peak)
5	Ant.	300 Ohms	20,000 kc	"C" Right	20,000 kc	"C" Osc.	C43	Max. (peak)*
6	Ant.	300 Ohms	20,000 kc	"C"	Rock thru 20,000 kc	"C" Det.	C8	Max. (peak)†
7	Ant.	300 Ohms	20,000 kc	"C"	20,000 kc	"C" Ant.	C2	Max. (peak)‡
8	Ant.	300 Ohms	6,000 kc	"B" Center	6,000 kc	"B" Osc.	C45	Max. (peak)*
9	Ant.	200 Mmfd.	600 kc	"A" Left	600 kc	"A" Osc.	L14	Max. (peak)
10	Ant.	200 Mmfd.	1,500 kc	"A"	1,500 kc	"A" Osc.	C51	Max. (peak)
11	Ant.	200 Mmfd.	600 kc	"A"	600 kc	"A" Osc.	L14	Max. (peak)
12	Ant.	200 Mmfd.	1,500 kc	"A"	1,500 kc	"A" Osc.	C51	Max. (peak)
13	Proceed to A-F-C Discriminator Adjustments Outlined Below							

* Use minimum capacity peak if two peaks can be obtained.
† Use maximum capacity peak if two peaks can be obtained.
‡ After this adjustment, check for image signal by shifting receiver dial to 19,080 kc.

A-F-C Discriminator Adjustments.—These adjustments are rather critical and should be performed with extreme care. Improper adjustment may result in complete failure of the oscillator control tube to function or else may cause it to detune the oscillator instead of tuning it to the signal. It is assumed that the magnetite core adjusting screw L23 (top of 4th i-f transformer) has been turned all the way out (extreme counter-clockwise) prior to the preceding tabulated adjustments. Adjustments are as follows: Remove spring "N" on link and arm assembly which connects the "Manual-Electric-Remote" switch shaft to the throw-out gear bracket. Turn "Fidelity" control counter-clockwise. Connect antenna to receiver antenna "A" terminal. With the "Manual-Electric-Remote" switch in "Manual" (right) position, tune in a strong local station near 600 kc or the low-frequency end of the "A" band as accurately as possible by means of the tuning tube "Magic Eye." The most accurate adjustment will be obtained by adjusting the "vernier" tuning knob mid-way between the two points where the eye just appears to start to open. This will place the generated i-f carrier signal frequency exactly in the center of the i-f amplifier response curve (should be 460 kc if i-f amplifier was properly aligned) and is the frequency to which the a-f-c discriminator (4th i-f transformer) should be tuned to resonance. Without disturbing any of the receiver adjustments, place the "high" test-oscillator lead about ¾ of an inch from the grid cap lead of the RCA-6K7, 1st i-f amplifier tube, adjust the test-oscillator output to maximum, turn test-oscillator "Modulation" off, and carefully zero-beat the test-oscillator frequency (approximately 460 kc) with the i-f carrier signal. Avoid placing the test-oscillator lead nearer to the grid cap lead than specified above, as doing so will tend to detune the i-f amplifier. It may be necessary to reduce the local station signal, during this operation, by shortening antenna lead or grounding antenna "A" terminal to chassis in order to increase the loudness of the beat note sufficiently for accurate zero-beat adjustment.

Throw "Manual-Electric-Remote" switch to "Electric" (center) position. A high whistle or beat note will now be heard. Turn the magnetite core screw L23 (top of 4th i-f transformer) slowly clockwise. As this screw is turned, the beat note will first increase to a high audio frequency and will then decrease to a zero-beat and then increase in frequency again. The point of exact zero-beat is the position for correct adjustment of the discriminator. Zero-beat should also still exist when the "Manual-Electric-Remote" switch is thrown back to "Manual" position. The adjustment is now complete and may be checked by slightly detuning the receiver above and below the local station frequency with the "Manual-Electric-Remote" in "Manual" position, switching to "Electric" position, and noting the oscillator pull-in. Replace spring "N."

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals Under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6K7—R-F Amp.	5.0 ma.
(2)	RCA-6L7—1st Det.	6.0 ma.
(3)	RCA-6J7—Osc.	8.5 ma.
(4)	RCA-6J7—Osc. Control	1.2 ma.
(5)	RCA-6K7—1st I-F Amp.	6.0 ma.
(6)	RCA-6K7—2nd I-F Amp.	7.5 ma.
(7)	RCA-6H6—2nd Det., A.V.C. and A.F.C.	— ma.
(8)	RCA-6N7—Phase Inverter	1.8 ma.
(9)	RCA-6F6—Output	26 ma.
(10)	RCA-6F6—Output	26 ma.
(11)	RCA-5T4—Rectifier	118 ma.*
(12)	RCA-6G5—Tuning Tube	2.5 ma.

(*Cannot be measured at socket)

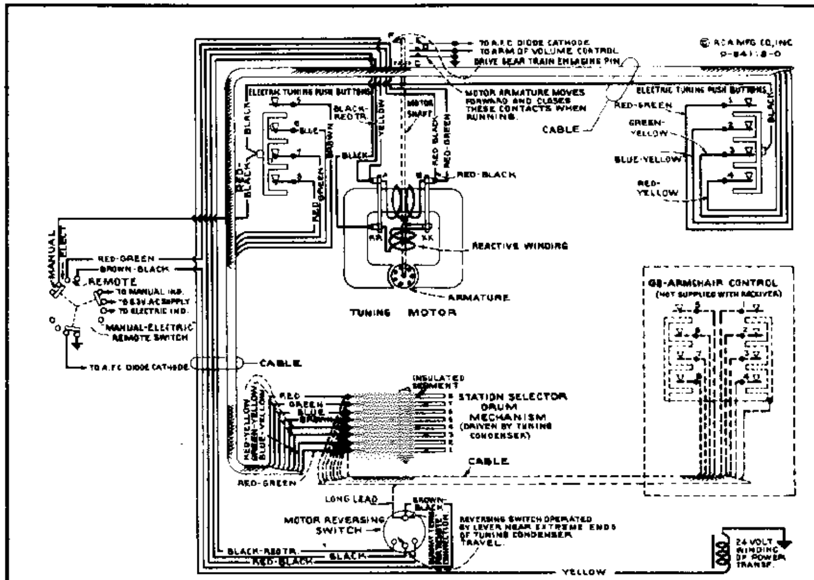


Figure 6—"Electric Tuning" Wiring Diagram (Viewed from rear of chassis)

MODEL 812K
Circuit Data
Adjustment Notes

RCA MFG. CO., INC.

Circuit Arrangement

The circuit consists of an r-f amplifier stage, first-detector (converter) stage, separate heterodyne-oscillator stage, oscillator control stage, two i-f amplifier stages, diode-detector—automatic volume and frequency control stage, audio phase-inverter voltage-amplifier stage, push-pull pentode power-amplifier stage, tuning indicator "Magic Eye," and a full-wave rectifier stage.

The antenna and detector coils are constructed with a special type of winding ("qumulative") to provide increased sensitivity and selectivity on the "A" band. The "A," "B," and "C" sections on both coils are wound on single forms and are series connected. The range selector operates in such a manner that the correct portions are selected for the primary and secondary windings on each band. The "A." "B," and "C" oscillator sections are likewise wound on a single form but are connected so they operate separately. Undesirable interaction of unused windings with the tuned circuits is prevented by shorting out the proper sections with the range selector.

The intermediate-frequency amplifier consists of two RCA-6K7 tubes in a two-stage transformer-coupled circuit. The windings of all i-f transformers are resonated by fixed capacitors and are adjusted by molded magnetite cores to tune to 460 kc. A third winding, L17, in the first i-f transformer, closely coupled to the primary, L15, is placed in series with the main secondary L16 when the fidelity control switch S5 is thrown to "broad" position (see figure 1), thereby increasing the coupling between the primary and secondary circuits with a consequent broadening of the band width of the i-f amplifier, permitting higher fidelity reception.

The function of the automatic-frequency-control circuit is to automatically change the frequency of the heterodyne oscillator so that the correct i-f frequency is formed for the i-f amplifier. The circuit consists essentially of an i-f discriminator which, as the name implies, discriminates or furnishes control voltage of the correct polarity to an oscillator frequency-control tube for generated i-f carrier frequencies slightly above and below 460 kc, or the frequency to which the i-f amplifier is tuned.

The plate circuit of the RCA-6J7 oscillator control tube is caused to act as an apparent variable inductance in parallel with the "A" band oscillator tuned circuit of which coil L14 is a part. The series combination of resistor R41 and the oscillator control-tube grid to cathode capacitance is also in parallel with the oscillator tuned circuit. Since the resistance of R41 is many times greater than the reactance of the grid-cathode capacitance, at the oscillator frequency, the r-f current through the combination will be practically in phase with the r-f voltage across the oscillator tuned circuit. However, the r-f voltage impressed across the grid-cathode capacitance section of the combination will lag the r-f voltage across the combination, or the tuned circuit, approximately 90 degrees. The grid-cathode r-f voltage will be amplified by the control tube but will be shifted an additional 180 degrees (grid and plate voltages of all tubes are always opposite in phase) so that the amplified r-f voltage appearing across the plate circuit will now lead the voltage across the combination or the tuned circuit by 90 degrees, or, in other words, the control tube is acting as an equivalent shunt inductance. The amount of this action is determined by the amplification of the tube, which in turn is governed by the grid-cathode bias voltage. In operation a residual bias is developed across the cathode resistor R43. The d-c control grid voltage is fed to the control grid from the discriminator circuit through resistor R44. If this voltage is negative with respect to ground, the amplification of the control tube will be decreased, the apparent plate circuit inductance of the tube increased, which will lower the frequency of the oscillator tube. The converse will occur when the grid voltage is positive with respect to ground.

The action of the discriminator circuit depends upon the fact that a 90-degree phase difference exists between the primary and secondary potentials of a double-tuned loosely-coupled transformer when the resonant frequency is applied and that this phase difference varies as the applied frequency varies: i.e., the maximum resultant response voltage across the primary and secondary windings connected in series will occur at a frequency either lower or higher in frequency than the frequency to which the individual windings are resonated, respectively depending on whether the windings are connected series aiding or opposing.

The discriminator, or fourth i-f transformer, consists of the primary winding, L24, which is a part of the third i-f transformer secondary tuned circuit (tuned to 460 kc) and the center-tapped secondary, L22. The upper and lower halves of L22 may be considered as two secondary coils, the upper series aiding and the lower series opposing the primary, L24. The magnetite core in L22 is inserted to inductively balance the two halves. The function of coil L23 (magnetite core adjusted), in parallel with L22, is to tune the secondary to 460 kc. Therefore, the maximum voltage will be applied to diode circuit P_2K_2 and R19 when the i-f signal frequency is above 460 kc and to the diode circuit P_1K_1 and R20 when the i-f signal frequency is below 460 kc. Resistors R19 and R20 are connected in series between ground and a point leading to the oscillator control tube grid.

D-c voltages, resulting from diode rectification, across R19 and R20 are always in opposition, consequently the oscillator control-tube grid-bias voltage is a differential amount, depending upon the i-f signal strength and its frequency deviation from the nominal value of 460 kc. The polarity of this differential oscillator control-tube grid-bias, with respect to ground, depends on whether the i-f signal frequency is above or below 460 kc, but is always in the direction which will bring the generated i-f frequency nearer to 460 kc. A-f-c action is automatically eliminated for "manual" tuning by grounding diode cathode K_1 through switch S7. A-v-c voltage and audio signal components are developed across resistor R19.

The RCA-6N7 twin-triode tube is operated as a phase inverter to supply audio signal voltage 180-degrees out-of-phase between the control grids of the two RCA-6F6 power output tubes for push-pull operation. Audio signals applied to the upper triode, control grid through volume control R22 are amplified and shifted 180-degrees in phase. A portion of this amplified signal is applied to the lower triode control grid, through capacitor C33 and resistors R26 and R25, where it is amplified to approximately the same level as that in the plate circuit of the upper triode but approximately 180-degrees out-of-phase.

Principle of Operation

The electric tuning mechanism consists essentially of a quick engaging and dis-engaging reversible electric motor, tuning condenser driving gear train, and eight mechanically interlocked (pushing one button releases all others) station selector push buttons respectively wired to eight adjustable station selector contactor discs (each with a motor stopping insulated segment) mounted on a drum which is direct-coupled to the gang tuning condenser shaft. The arrangement permits any one of eight pre-determined stations to be electrically tuned in by merely touching the correct push button.

The operation may be more readily understood by reference to figures 1, 5, and 6. When the motor is not energized, the armature is pushed to the rear or slightly out of the magnetic center by tension of contact spring "C" and the motor shaft is dis-engaged from the driving gear train. Pressing in any one of the eight push buttons will complete the motor circuit through a station selector contactor disc, assuming that the "Manual-Electric-Remote" switch is in "Electric" position and that the insulated segment in the contactor disc is not opposite its contactor. As the motor starts, the armature will be drawn forward, due to solenoid action, and the pin "F" on the end of its shaft will engage the arm "G" on the small main pinion gear, thereby driving the tuning mechanism. At the same time contact springs "E" and "D" will be grounded, causing suppression of audio amplification and automatic frequency control during the tuning cycle. The motor will continue to operate until the insulated segment in the selector disc breaks the motor circuit, whereupon spring "C" will instantly dis-engage the motor pin "F" from the arm "G" on the small pinion driving gear and open contacts "E" and "D." Pushing another button will cause the above mentioned cycle to be repeated except that the motor will be interrupted by the insulated segment on a corresponding disc. The discs are individually adjustable on a drum mechanism, providing a choice of eight "Electric Tuned" "Broadcast" stations. The arrangement of the motor is such that its rotation will continue in the same direction regardless of the number of "Electric" tuning cycles until the tuning condenser approaches either full-out or full-in of mesh, whereupon lever "H" trips switch S9 which reverses the direction of rotation. A throw-out idler gear is link-coupled to the "Manual-Electric-Remote" control to disconnect the motor drive gear train when the control is thrown to "Manual" position.

Mechanism Adjustments

The electric tuning mechanism is designed to be as simple in construction and as fool proof in operation as is possible. In order to maintain the accurate results possible with this device care must be taken in effecting any repairs or adjustments. Reference should be made to figure 5 and the following:

A-F-C and A-F Amplification Suppression Switches.—This switch assembly is located on the motor bracket and closes due to solenoid action of motor armature. The tension of the long contact spring "C" is important in bringing about quick dis-engagement of the motor and in permitting the motor to pull into mesh with the drive mechanism. Normal adjustment is attained when the short springs "D" and "E" are aligned exactly straight with contact points separated approximately 1/32 of an inch and with the spring "C" spaced approximately 7/32 of an inch from spring "D" at the point of contact. If necessary, in order to obtain positive pull-in and quick dis-engagement of the motor, the tension of spring "C" should be increased or decreased by bending. This action should be checked with the front apron of the chassis raised two inches higher than the rear. Contacts of the switch must be kept clean. Crocus cloth or a relay burnisher may be used for this purpose.

Motor Reversing Switch.—It is necessary to automatically stop and reverse the drive motor before the tuning condenser reaches the ends of its travel. Approximately 175 degrees of sweep is required, and the reversal must take place above 1,700 kc and below 540 kc but not too near the limits of the scale. The coupling between the station selector drum and the tuning condenser shaft should be attached so that the reversing switch trip lever "H" is exactly vertical when the condenser is full-out of mesh. There should be 1/32 of an inch clearance between the end of the condenser shaft and the selector drum shaft. While the trip lever is in this position the reversing switch bracket should be adjusted by means of its elongated mounting holes until the switch pin "I" just lightly touches trip lever "H."

Main Pinion Gear.—Clearance between the small high-speed pinion gear "E" and the intermediate gear "K" determines the amount of mechanical noise produced. Correct adjustment will give approximately 1/32 of an inch movement of back lash at the end of pinion arm "G" when gear "K" is held stationary. Arm "G" must also be adjusted for correct mesh with motor shaft drive pin "F." With the motor shaft completely forward and pinion "E" tight against its front bearing, the pinion mounting stud "J" should be adjusted so that pin "F" meshes its full thickness with the rotating arm "G." An increase of this mesh will increase over travel on tuning while a decrease of mesh will decrease the over travel. The elongated hole in the front bracket allows sufficient movement of the mounting stud "J" to permit above mentioned gear mesh adjustment.

"Manual-Electric-Remote" Changeover. — (1) Link and lever adjustment—To properly line up the mechanical link between the switch shaft and throw-out gear bracket "MM," the set screws holding the link lever on the switch shaft must be loosened, the switch turned to the "Remote" position (extreme left) and the link lever revolved until the distance between the bottom of its link-connecting pin (extends through chassis apron) and the bottom of the "C" slot, in front apron of chassis, is exactly ¼ of an inch. If this adjustment is not properly made, correct operation of "Electric" or "Remote" tuning will not result. (2) Throw-out Gear Adjustment—To obtain smooth operation on "Electric" or "Remote" positions it is important that the proper clearance is maintained between the throw-out gear "M" and the intermediate gear "L." With the "Manual-Electric-Remote" control thrown to "Remote" position (extreme left) adjust the mesh between these gears by means of the eccentric screw "O" and lock nut "P" on the throw-out gear bracket "MM" until there is approximately 1/64 of an inch backlash of gear "L" when gear "M" is held stationary.

Vernier Tuning.—In case it becomes necessary to remove tuning condenser drive shaft "T," it should be replaced by sliding anti-backlash gear "R" on condenser shaft apart so that compression amounting to one tooth on the gear is obtained in the springs. Adjust mesh of gear "R" with pinion gear "U" on vernier shaft before tightening screws "S" so that smooth tuning is obtained throughout the range.

Motor Alignment.—The motor shaft must be exactly aligned with the axis of the pinion gear with which it engages. This may be adjusted by loosening the mounting screws "V" of the motor and aligning shaft by sight. Correct alignment may be tested by slowly rotating motor and observing the relation between the pin "F" of the motor shaft and the arm "G" on the pinion. The relation of the two should remain the same throughout the revolution. Additional movement for adjustment may be obtained by the motor bracket screws "W" if necessary.

Station Selector Drum.—(1) Bearing Adjustment—The selector drum may be removed by unscrewing the two bearing adjusting screws "X" on the front and rear bearings and sliding shaft out of slots on frame. To replace drum, the reverse procedure should be followed holding bearing adjusting plates "Y" firmly against the shaft and tightening adjusting screws. (2) Contact adjustment—Two types of contact strips are used. They are designated on figure 5, as types 1 and 2, on which the individual contacts are respectively adjustable and fixed. On type 1, the individual contacts should be adjusted by setting the end contact springs near the mid-position of their travel and aligning the remaining springs to them by means of a straight edge. Either type of contact strip should be adjusted to the selector drum by placing two selector adjusting keys in the station adjustment strip, positions 1 and 8, loosening contact strip adjusting nuts "Z" and shifting the contact strip until the end contacts are exactly centered on the respective disc insulating segments. More accurate adjustment may be made by silhouetting the point of contact with a piece of white paper held behind the contact. Adjustment will be facilitated by removing complete assembly from rear of tuning condenser by unscrewing the three mounting screws. Contacts and discs must be kept free of dirt, filings, and other extraneous matter.

Lubrication. — The dial pointer slide should be greased with petrolatum. This same lubrication should be applied lightly to all gear faces of the drive mechanism and sparingly with a cloth to the station selector discs. Any good household oil, such as "3-IN-ONE," is suitable for the motor shaft bearings. A light grade of engine oil should be used for all gear bearings. Medium viscosity engine oil, similar to "PYROIL" (B), should be applied between the thrust washers on the motor shaft. "CASTORDAG," a mixture of graphite and castor oil, is recommended for use at the selector drum end-bearing slots and at the bearings of cable pulleys.

Station Adjustment

Any eight stations may be chosen for "Electric" tuning. Remove the two escutcheon plates from the side of the dial, place proper call letter labels in the celluloid windows, and replace escutcheons. Turn the power on and proceed to set up the "Electric" tuning as follows:

1. Set Range Selector to "Broadcast."
2. Turn "Manual-Electric-Remote" control to "Electric."
3. Turn Fidelity control counter-clockwise.
4. Press push button No. 1 and wait until station pointer comes to rest.
5. Turn the "Manual-Electric-Remote" control to "Manual."
6. Remove adjusting key from receptacle on top of station selector drum mechanism.
7. Insert key in position marked, "1" in station adjustment strip and push the key all the way down to properly fit in slot in disc.
8. Tune the receiver very carefully by means of the manual tuning knob and the "Magic Eye," to station chosen for No. 1.
9. Remove key.
10. Turn the "Manual-Electric-Remote" control to "Electric."

Button No. 1 is now properly set for "Electric" tuning. Proceed similarly for the other seven push buttons, matching each station on the dial with the same number on the station adjustment strip. Repeat the above steps but place the key respectively in positions 2, 3, 4, etc., and in each case tune to the proper station. Now when you press a button the desired station will be tuned in electrically.

MODEL RME 69-B Batt.
MODEL RME 69-A AC
or Batt. Schematics

RADIO MFG. ENGINEERS, INC.

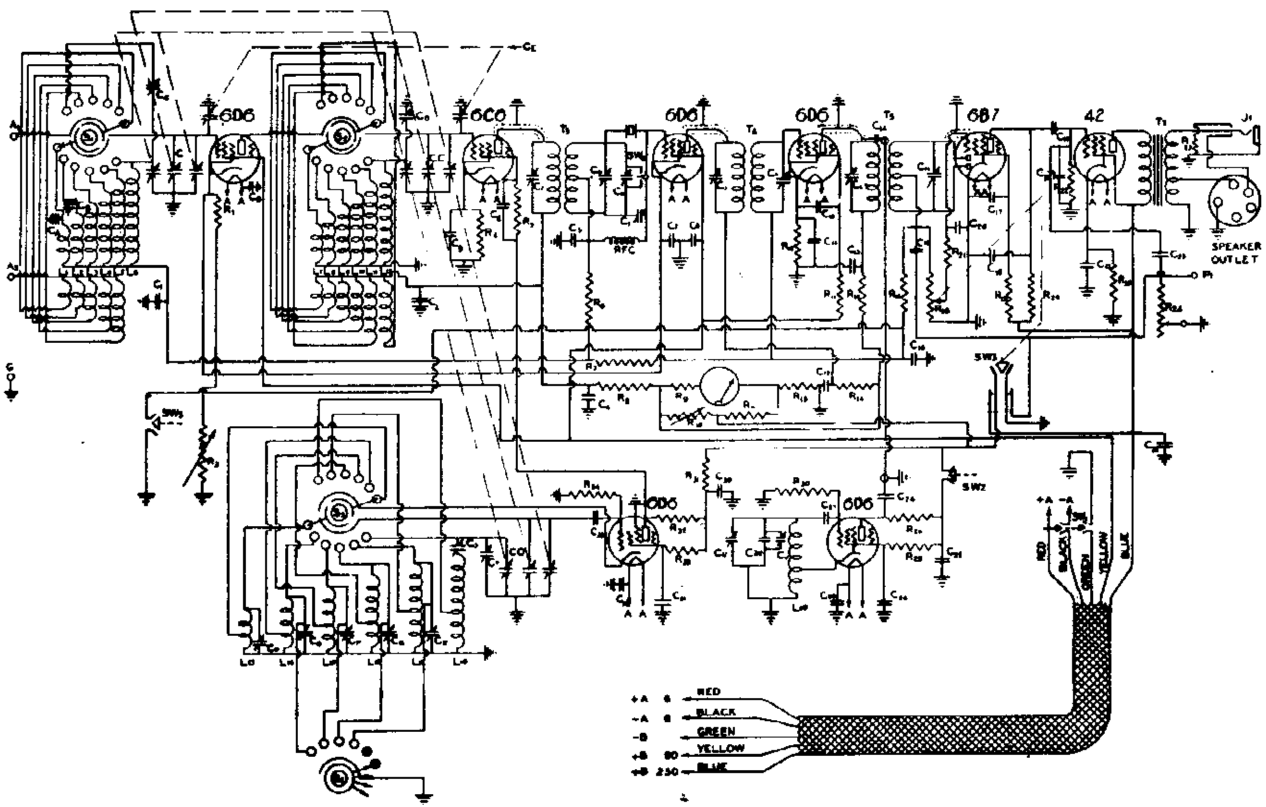


Fig. 16. Schematic Diagram of RME 69-B for Battery Operation

IF PEAK 465 KC

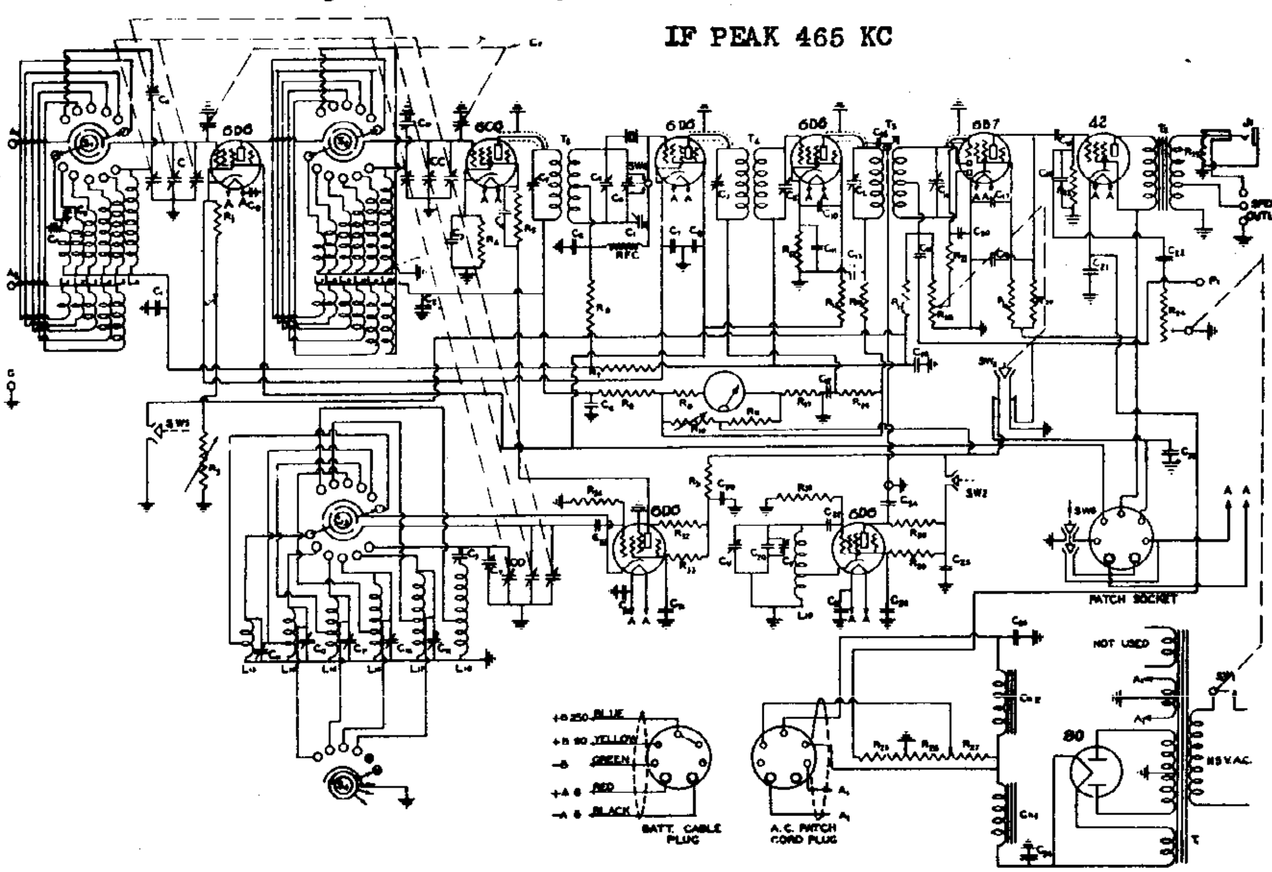


Fig. 17. Schematic Diagram of RME 69-A for AC or Battery Operation

MODEL RME 69-A AC or Batt.
MODEL RME 69-B Batt.
Parts List

RADIO MFG. ENGINEERS, INC.

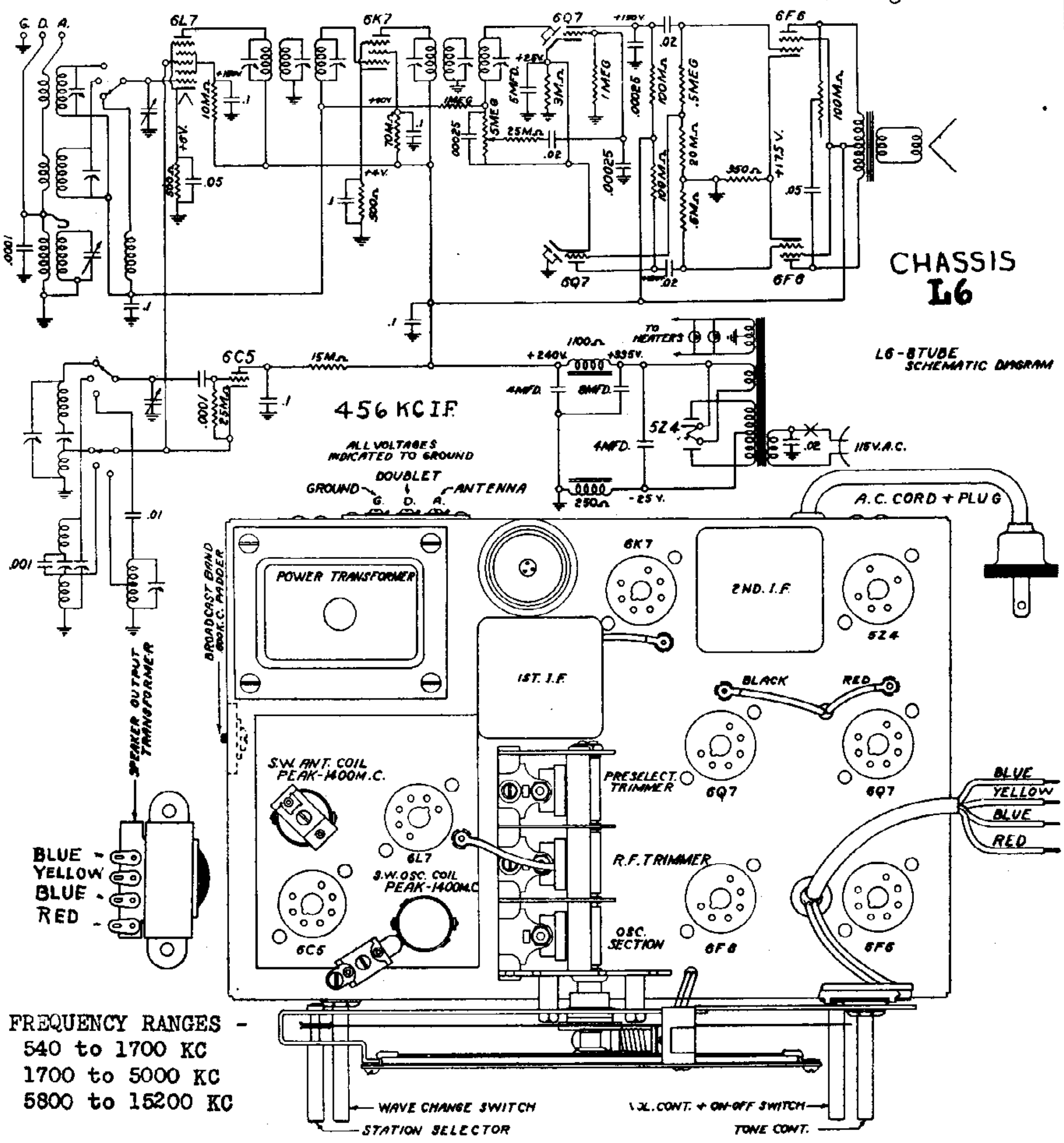
DESIGNATION	SPECIFICATION
C_a and C_b	30 μμfd. adjustable mica padders.
C_c	30 μμfd. mica padder.
C_d	Mica trimming condenser on center section of main tuning condenser. 50 μμfd. max.
C_e	Dual section resonator control. 4 μμfd. minimum, 30 μμfd. maximum.
$C_f, C_g, C_j, C_k, C_l, C_m$.	Adjustable trimming condensers in the intermediate frequency transformers.
C_h	25 μμfd. midget air padder
C_i	30 μμfd. mica adjustable phasing condenser.
C_n, C_o, C_p, C_r	30 μμfd. adjustable padders.
C_q	70 μμfd. adjustable padder.
C_s	.0004 mica condenser shunted by 70 μμfd. mica adjustable trimmer.
C_t	Mica trimmer on the oscillator section of the main tuning condenser.
C_u	70 μμfd. adjustable mica padder.
C_v	25 μμfd. variable air condenser
C_1	.01 μfd. 400 volts.
C_2	.01 μfd. 400 volts.
C_3	.01 μfd. 400 volts.
C_4	.01 μfd. 400 volts.
C_5	.01 μfd. 400 volts.
C_6	.1 μfd. 400 volts.
C_7	.1 μfd. 400 volts.
C_8	.1 μfd. 400 volts.
C_9	.002 moulded mica condenser.
C_{10}	.01 μfd. 400 volts.
C_{11}	.1 μfd. 400 volts.
C_{12}	.1 μfd. 400 volts
C_{13}	.1 μfd. 400 volts.
C_{14}	1" of shielded braid wrapped around plate lead of second intermediate frequency amplifier tube. Approximate capacity 10 μμfds.
C_{15}	.00025 μμfd.
C_{16}	.01 μfd. 400 volts.
C_{17}	.1 μfd. 400 volts.
C_{19}	.01 μfd. 400 volts.
C_{20}	.00025 μfd. moulded mica condenser.
C_{21}	20 μfd. 25 volt electrolytic.
C_{22}	.01 μfd. 400 volts.
C_{23}	12 μfd. 450 volt electrolytic.
C_{24}	.0001 moulded mica condenser
C_{25}	.01 400 volt electrolytic
C_{26}	.01 μfd. 400 volt.
C_{27}	.0001 μfd. moulded mica.
C_{28}	.01 μfd. 400 volt.
C_{29}	.00025 moulded ± 5%
C_{30}	.1 μfd. 400 volts.
C_{31}	.01 μfd. 400 volts.
C_{32}	.01 μfd. 400 volts.
C_{33}	.0001 μfd. moulded ± 5%
C_{34}	8 μfd. 450 volt electrolytic
C_{35}	8 μfd. 450 volt electrolytic.
C_{37}	.00025 μfd. moulded condenser.

DESIGNATION	SPECIFICATION
S_1, S_2, S_3, S_4.	Band change switch.
SW_1	115 volt line switch.
SW_2	Beat oscillator on and off switch.
SW_3	Switch operated by control "H" for connecting monitor circuit and opening B supply to amplifier stages.
SW_4	Crystal switch for series or for parallel control.
SW_5	Cut-off switch for removing AVC action (operated in tandem with R_3)
R_{14}	2,000 ohms, 1/2 watt.
R_{15}	10,000 ohms, 1/2 watt.
R_{16}	2,000 ohms, 1/2 watt.
R_{17}	1 megohm, 1/2 watt.
R_{18}	250,000 ohm potentiometer audio level control.
R_{19}	1 megohm, 1/2 watt.
R_{20}	100,000 ohms, 1/2 watt.
R_{21}	50,000 ohm, 1/2 watt.
R_{22}	250,000 ohms, 1/2 watt.
R_{23}	5,000 ohms, 1/2 watt.
R_{24}	1,000,000 ohms potentiometer.
R_{25}	410 ohms bleeder section.
R_{26}	7200 ohms, bleeder section.
R_{27}	6800 ohms, bleeder section.
R_{28}	10,000 ohms, 1/2 watt.
R_{29}	100,000 ohms, 1/2 watt.
R_{30}	100,000 ohms, 1/2 watt.
R_{31}	2,000 ohms, 1/2 watt.
R_{32}	2,000 ohms, 1/2 watt.
R_{33}	50,000 ohms, 1/2 watt.
R_{34}	50,000 ohms, 1/2 watt.
J_1	Headphone jack.
RFC	16 millhenries.
CH_1	30 henries, 100 ma.
CH_2	30 henries, 50 ma.
T_1	Main power transformer.
T_2	Audio output transformer to 4,000 ohms and 600 ohms.
T_3	First intermediate frequency amplifier transformer.
T_4	Second intermediate frequency amplifier transformer.
T_5	Third intermediate frequency amplifier transformer.
R_1	150 ohms, 1/2 watt.
R_2	20,000 ohms, 1 watt.
R_3	30,000 ohms, variable.
R_4	5,000 ohms, 1/2 watt.
R_5	1 megohm, 1/2 watt.
R_6	250,000 ohms, 1/2 watt.
R_7	100,000 ohms, 1/2 watt.
R_8	2,000 ohms, 1/2 watt.
R_9	500 ohms, 1/2 watt ±5%
R_{10}	200 ohms, wire wound var. R meter balance
R_{11}	1,000 ohms, 1/2 watt.
R_{12}	500 ohms, 1/2 watt
R_{13}	100,000 ohms, 2 watts.

L_1	Band 6 RF grid coil.
L_2	Band 5 RF grid coil.
L_3	Band 4 RF grid coil.
L_4	Band 3 RF grid coil.
L_5	Band 2 RF grid coil.
L_6	Band 1 RF grid coil.
L_7	Band 6 first detector grid coil.
L_8	Band 5 first detector grid coil.
L_9	Band 4 first detector grid coil.
L_{10}	Band 3 first detector grid coil.
L_{11}	Band 2 first detector grid coil.
L_{12}	Band 1 first detector grid coil.
L_{13}	Band 6 oscillator coil.
L_{14}	Band 5 oscillator coil.
L_{15}	Band 4 oscillator coil.
L_{16}	Band 3 oscillator coil.
L_{17}	Band 2 oscillator coil.
L_{18}	Band 1 oscillator coil.

MODEL Chassis L6
Schematic, Socket
Trimmers, Alignment
Voltage

RADIO PRODUCTS CORP.



FREQUENCY RANGES -
540 to 1700 KC
1700 to 5000 KC
5800 to 15200 KC

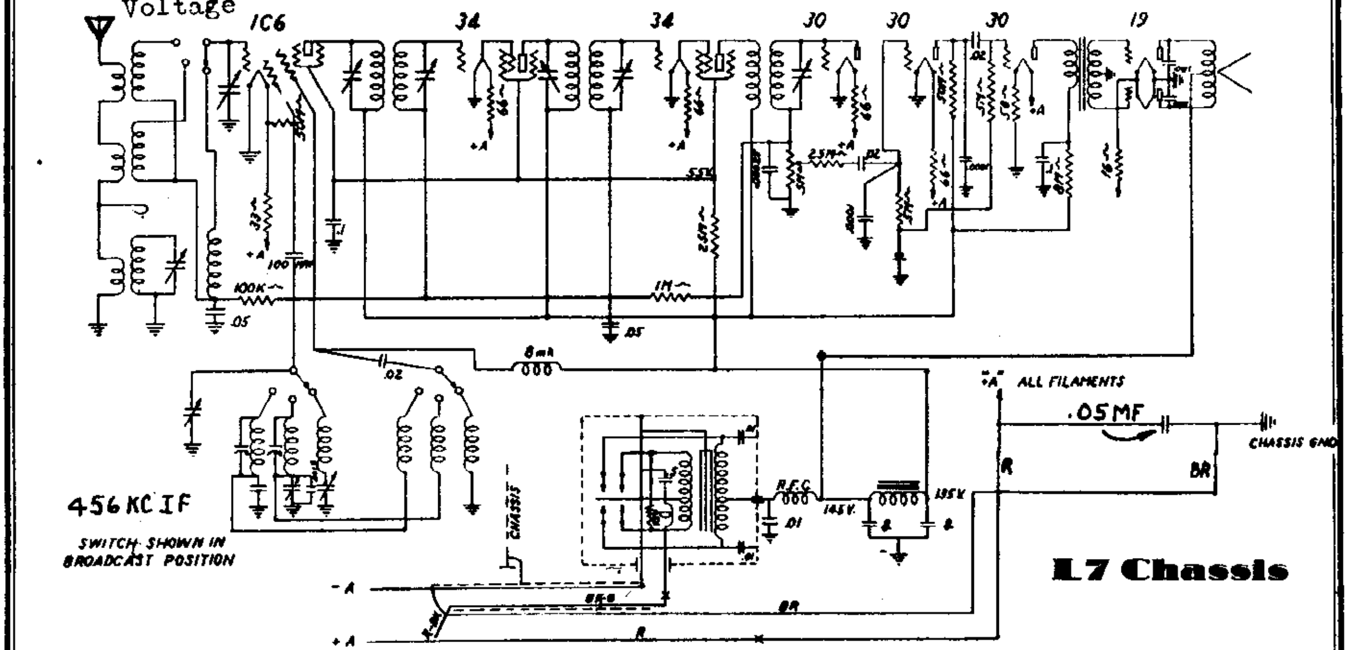
CONVENTIONAL ALIGNMENT - SEE THE SPECIAL SECTION

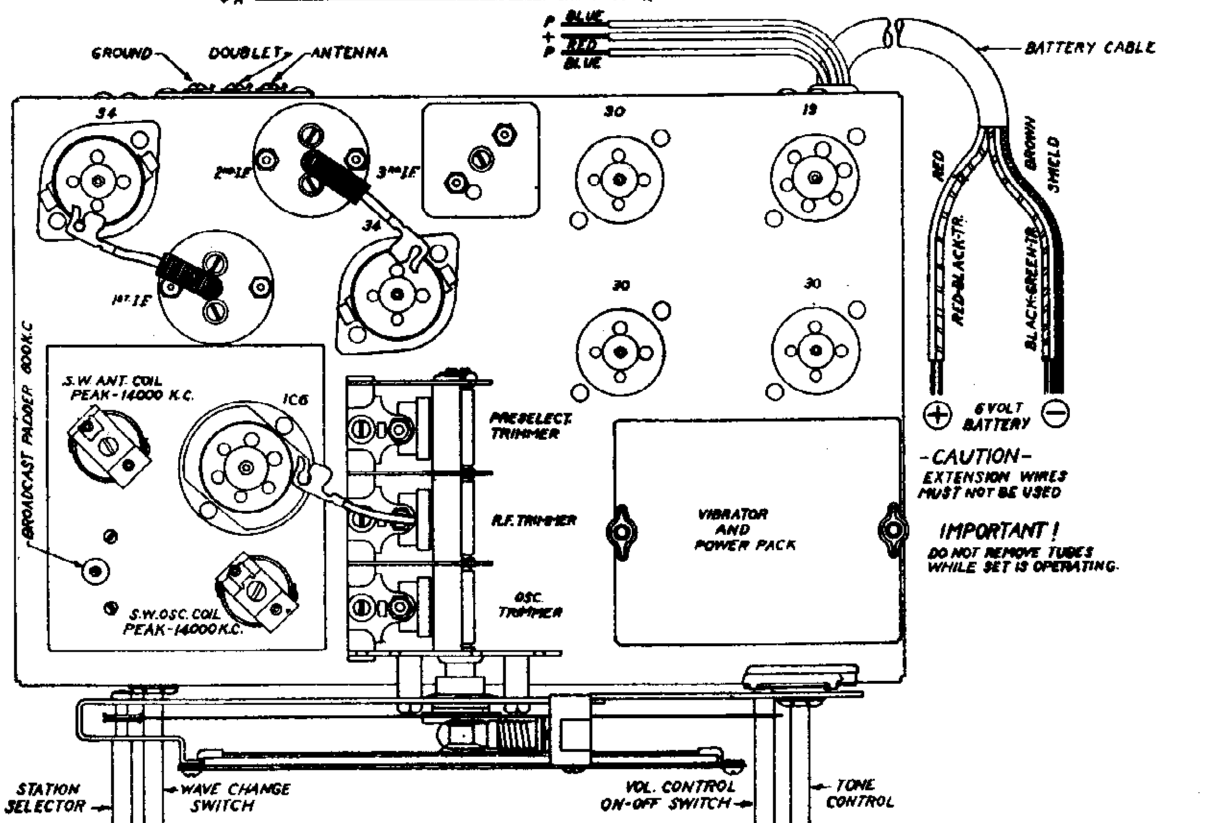
ROCK GANG CONDENSER DURING THE PADDING ADJUSTMENTS.

- BROADCAST - On bottom of chassis adjust OSC coil trimmer to 1400 KC peak. Next adjust gang condenser RF trimmers to the same frequency peak. Reset Generator and pad OSC to 600 KC peak. Rock gang during the padding adjustment.
- SHORTWAVE - Adjust OSC trimmer and then trimmer on ANT coil for 14000 KC peak. Check for weak image at 13100 KC.
- POLICE - Adjust OSC trimmer on coil (under chassis) then the ANT trimmer to 4000 KC peak. Pad POLICE OSC trimmer, under chassis (under gang) for 1800 KC maximum peak.

MODEL Chassis L7
Schematic, Socket
Trimmers, Alignment
Voltage

RADIO PRODUCTS CORP.





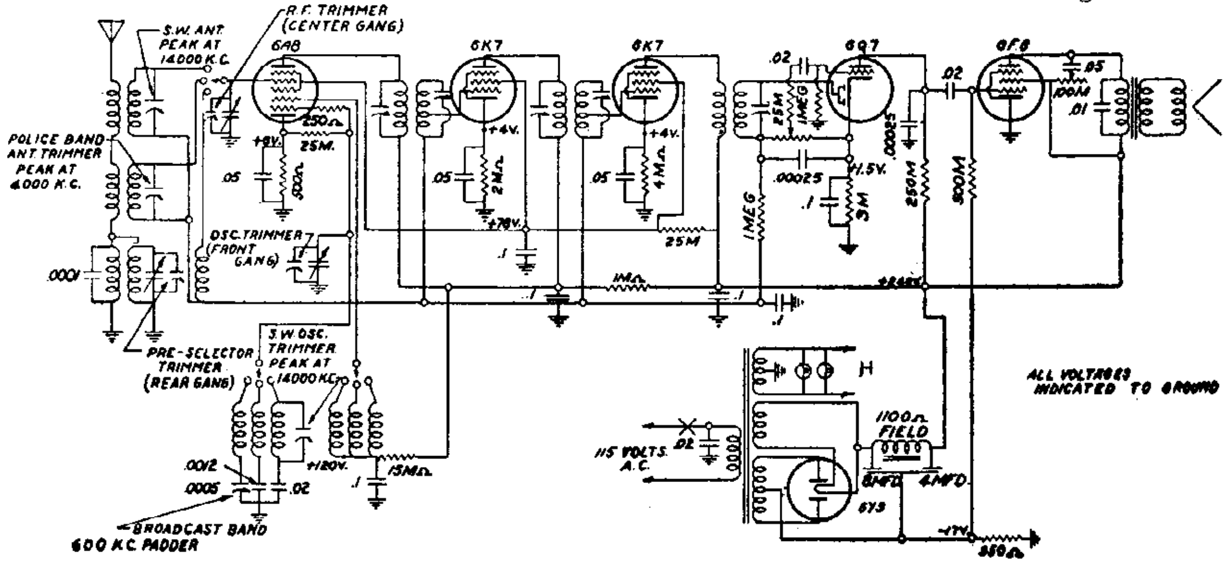
FREQUENCY RANGES

BROADCAST : 540 to 1700 KC - Adjust OSC, RF and then ANT trimmers on gang for max. peak at 1400 KC. Pad OSC circuit at 600 KC to maximum peak while rocking gang.
SHORTWAVE : 5800 to 15200 KC - Adjust OSC and then ANT trimmers on coils for 14000 KC peak, check for weak image frequency at 13100 KC. No padding required.
POLICE : 1700 to 5000 KC - Adjust OSC trimmer (under chassis) on coil and ANT trimmer (under chassis on coil) to 4000 KC peak. Pad the OSC circuit (Under chassis directly under gang) to 1800 KC while rocking gang condenser.

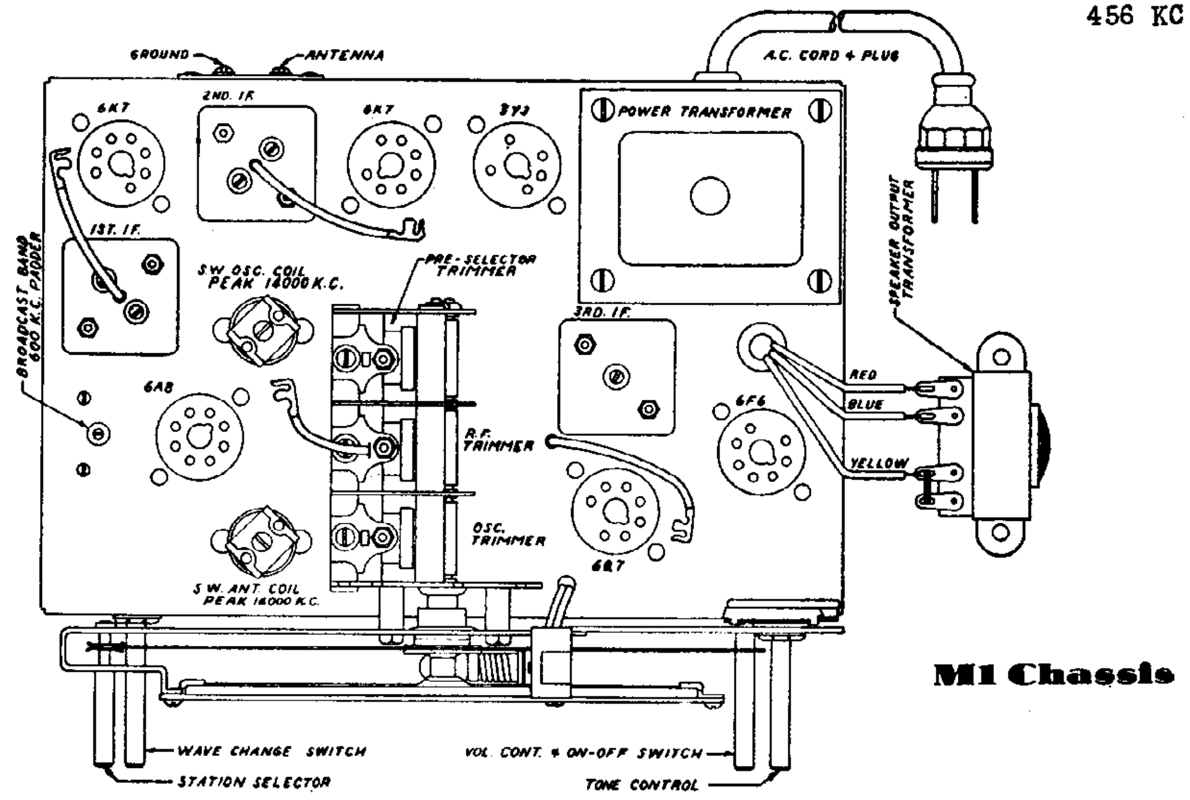
CONVENTIONAL ALIGNMENT - SEE THE SPECIAL SECTION

MODEL Chassis M 1
Schematic, Socket
Trimmers, Alignment
Voltage

RADIO PRODUCTS CORP.



IF PEAK
456 KC



M1 Chassis

CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION

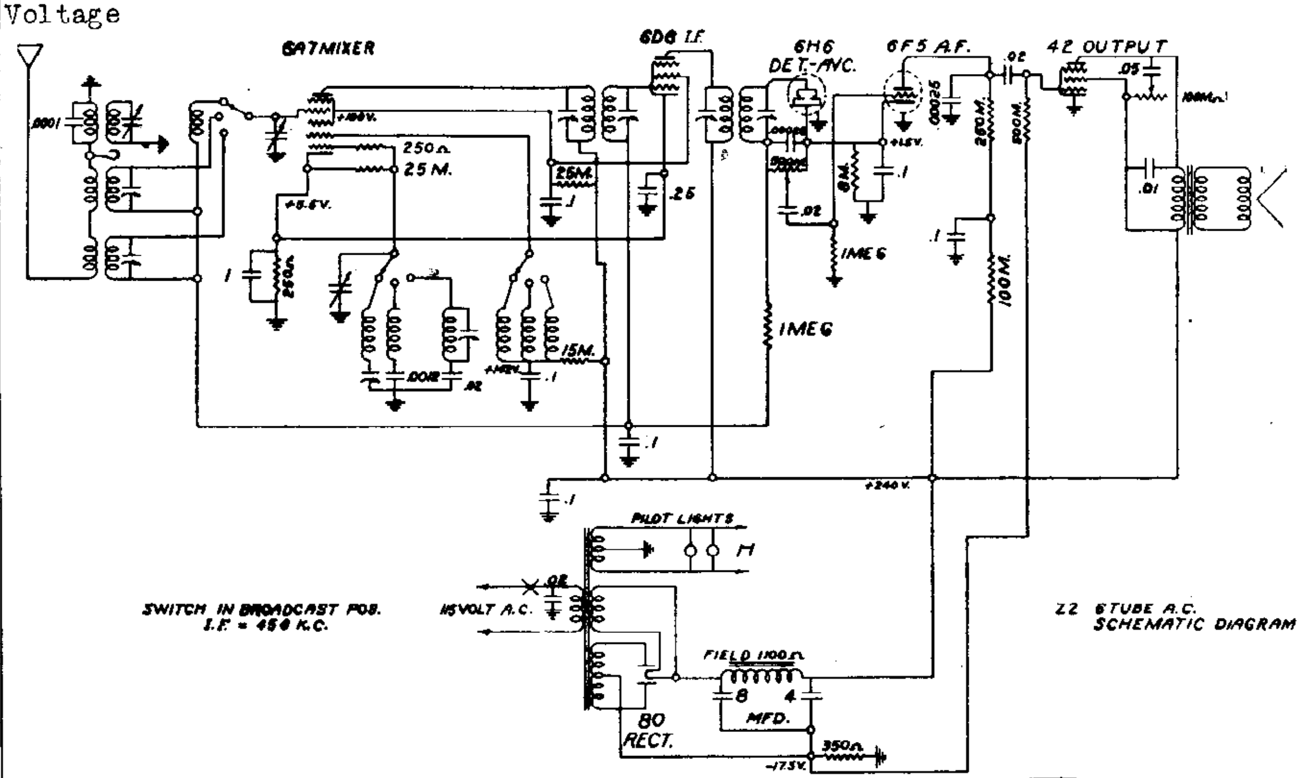
FREQUENCY RANGES - BROADCAST - 540 to 1700 KC - Adjust OSC, RF and ANT trimmers on gang condenser to a maximum peak of 1400 KC. Pad the OSC circuit at 600 KC while rocking gang condenser.

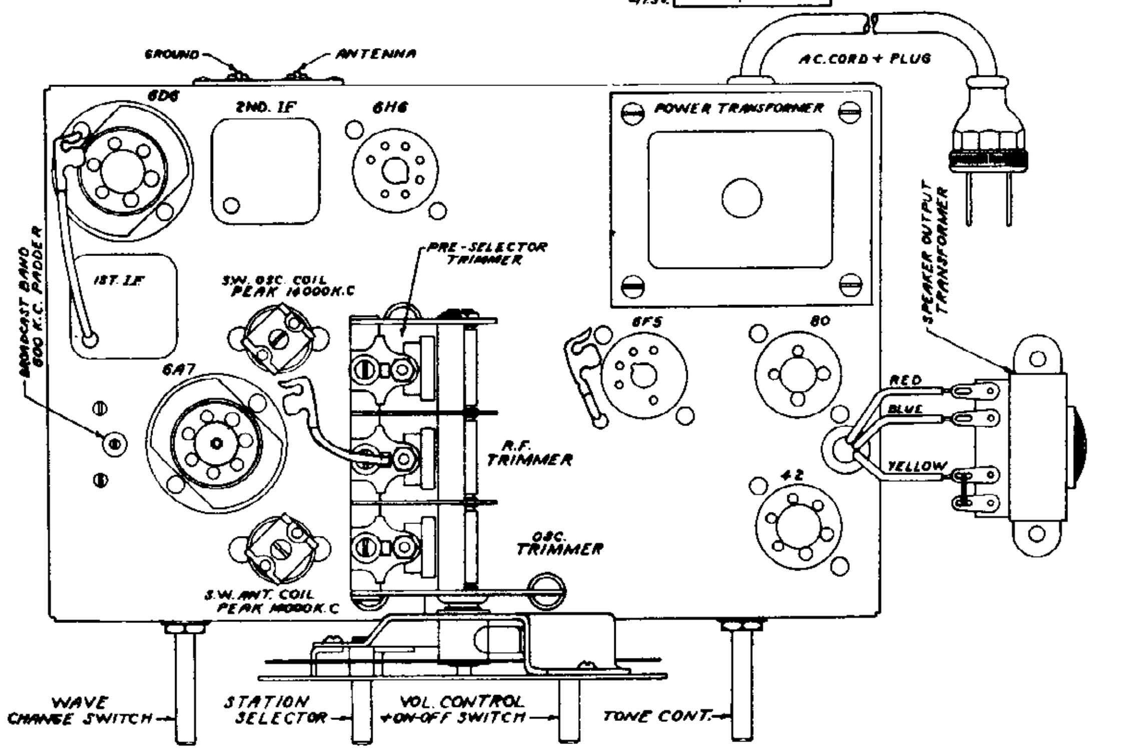
SHORTWAVE - 5800 to 15200 KC - ADJUST OSC and RF trimmers to maximum peak of 14000 KC. No other adjustments required.

POLICE - 1700 to 5000 KC - Adjust the ANT coil trimmer to resonance on 4000 KC signal, no other adjustments required.

MODEL Chassis Z 2
Schematic, Socket
Trimmers, Alignment
Voltage

RADIO PRODUCTS CORP.





CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION

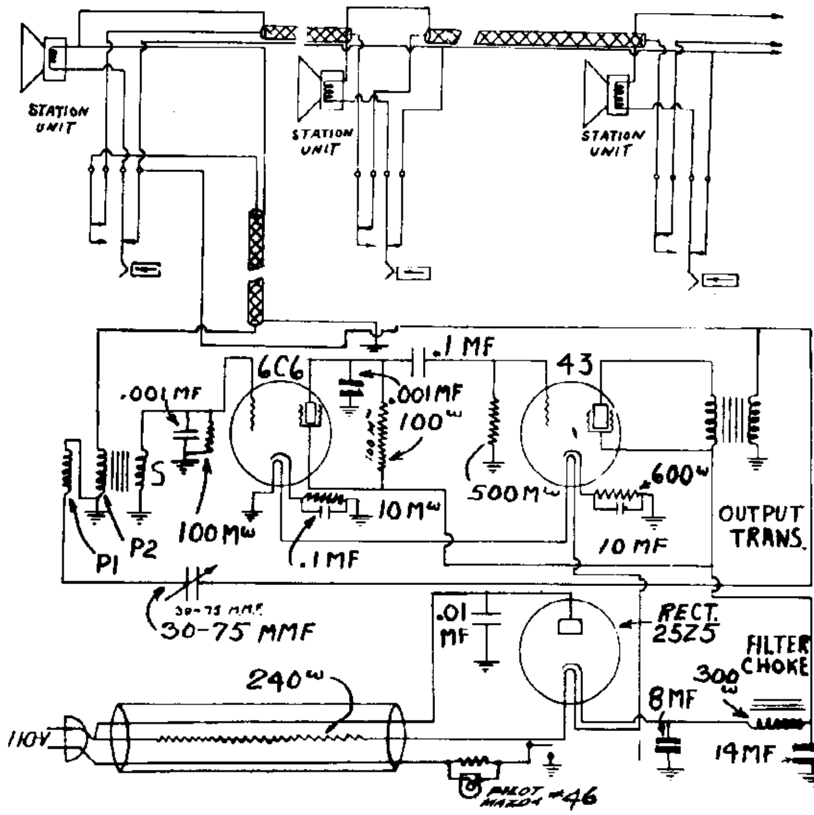
FREQUENCY RANGES - BROADCAST - 540 to 1700 KC - ADJUST OSC, RF AND ANT TRIMMERS ON GANG CONDENSER TO A MAXIMUM PEAK OF 1400 KC. PAD THE OSC CIRCUIT AT 600 KC WHILE ROCKING GANG CONDENSER.

SHORTWAVE - 5800 to 15200 KC - ADJUST OSC AND RF TRIMMERS TO A MAXIMUM PEAK OF 14000 KC. NO OTHER ADJUSTMENTS REQUIRED.

POLICE - 1700 to 5000 KC - ADJUST THE RF ANT COIL TRIMMER TO RESONANCE ON 4000 KC SIGNAL, NO OTHER ADJUSTMENTS REQUIRED.

RADOLEK CO.

MODEL 35 Common Talk Sys.
Schematic, Data
MODEL 45 Selective System
Schematic, Data



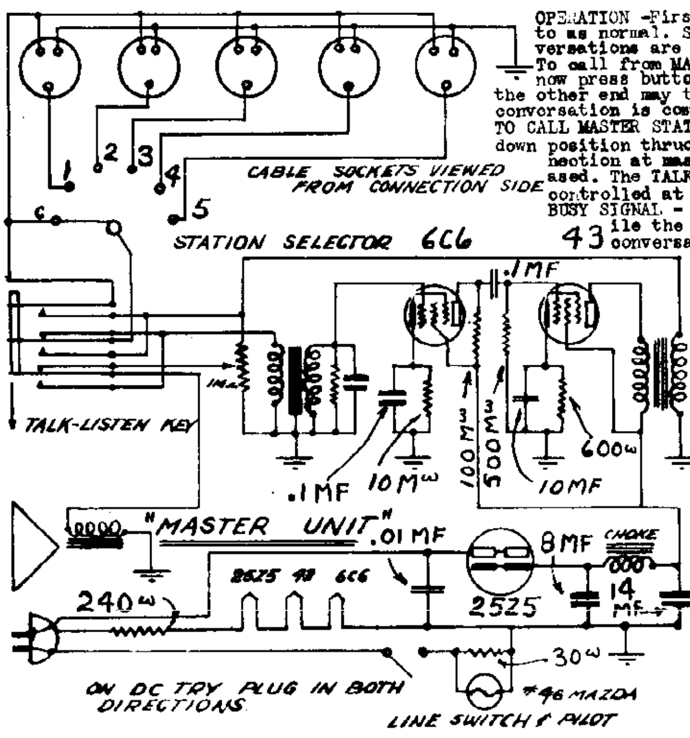
MODEL 35
COMMON TALK SYSTEM

OPERATION - To talk, press the button located on top of either unit or any outlying station unit; to listen, just release the button. When one unit is spoken into, all other stations will respond if buttons are in their normal positions.

To place the system into operation, connect cord to 110-120 volts AC or DC (check polarity for DC operation). To turn current on, operate toggle switch and note that pilot lamp is on. Insert one end of cable in socket located at rear of master station cabinet. Insert the plug on the other end of the cable into the socket marked "IN" of 1st station unit. A second station unit is connected by running the second cable from the "OUT" socket of the first station unit to the "IN" socket of the second. A third and fourth unit may be connected in the same fashion by the use of extra cables and station units.

WARNING - The amplifier chassis or the shields of the cable must not touch any grounded object such as radiators, conduit, water pipes, etc.

For distances over 100 feet use open wire system in stead of the twisted cables to reduce capacity.

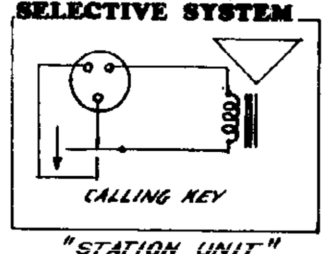


OPERATION -First position "C" of selector switch is referred to as normal. Switch must be returned to "C" after all conversations are completed so that outlying stations may call. To call from MASTER unit operate selector to desired station; now press button to talk and release to listen. The party on the other end may talk or listen without manual effort. When the conversation is completed return "C" to normal selector position.

TO CALL MASTER STATION- The party must HOLD the push button in down position thruout conversation, unless operator switches connection at master unit, in which case the button may be released. The TALK and LISTEN condition is under any condition controlled at MASTER station.

BUSY SIGNAL - When a party at any outlying station calls while the circuit is busy, he hears only that half of conversation originating at the calling station as a busy signal, and is expected to release the button and make his call later. If the busy conversation is on a selected circuit, another party calling will neither get a response nor create interference to the busy parties.

MODEL 45
SELECTIVE SYSTEM

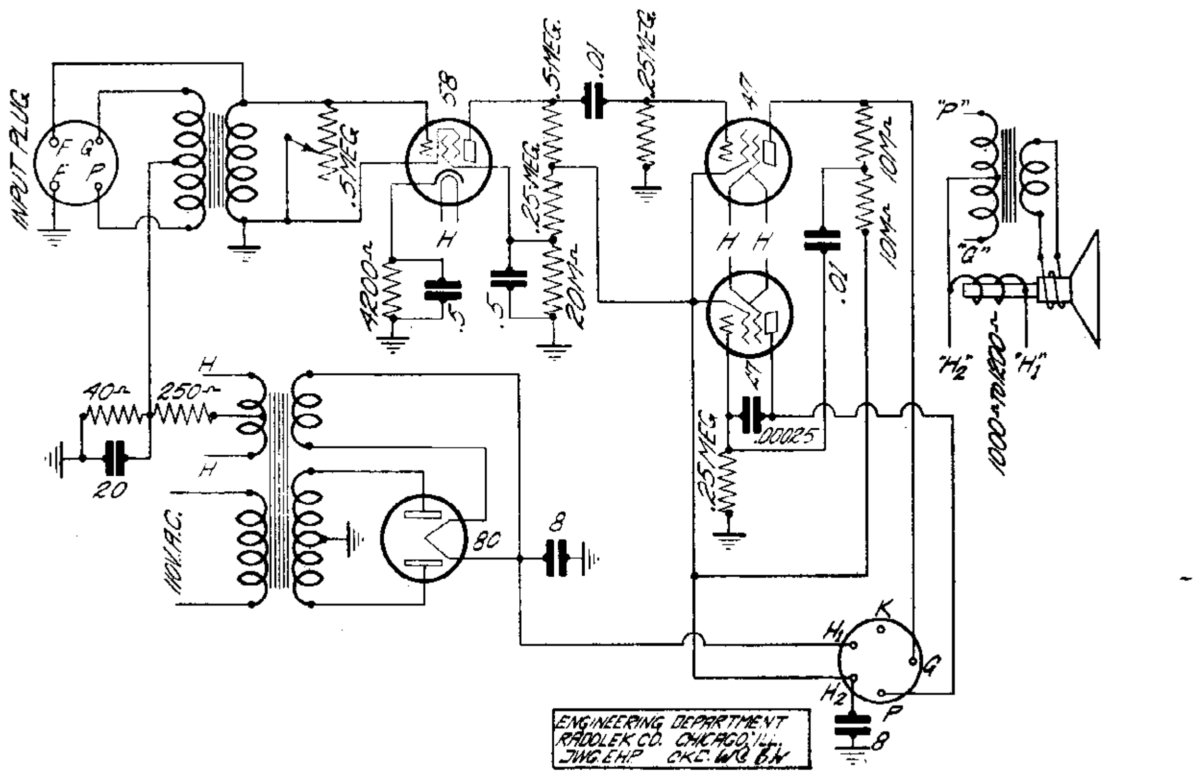


"STATION UNIT"

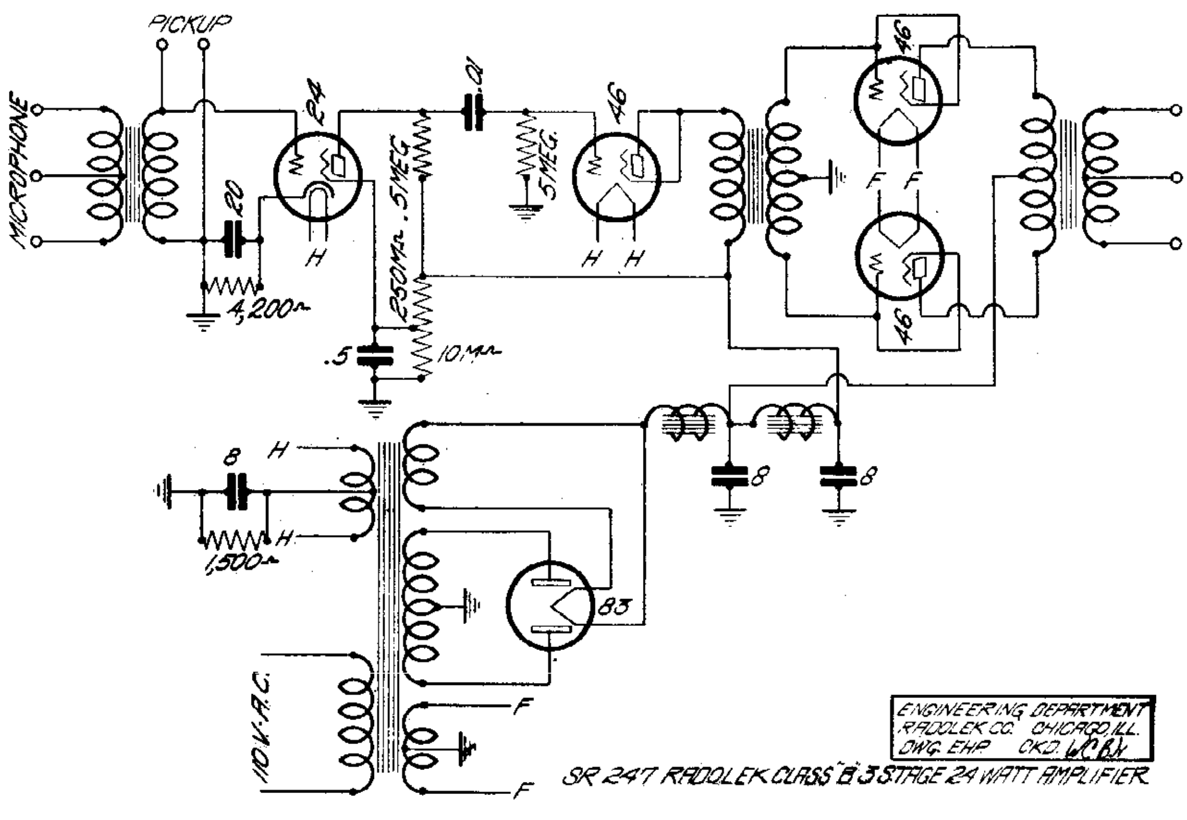
PREFABRICATED STATION CONNECTOR CABLES CONSIST OF TWISTED PAIR #22 STRANDED WIRE IN SHIELD WITH OVERALL COTTON BRAID.

MODEL SR 241 Amplifier
MODEL SR 247 Amplifier
Schematics

RADOLEK CO.



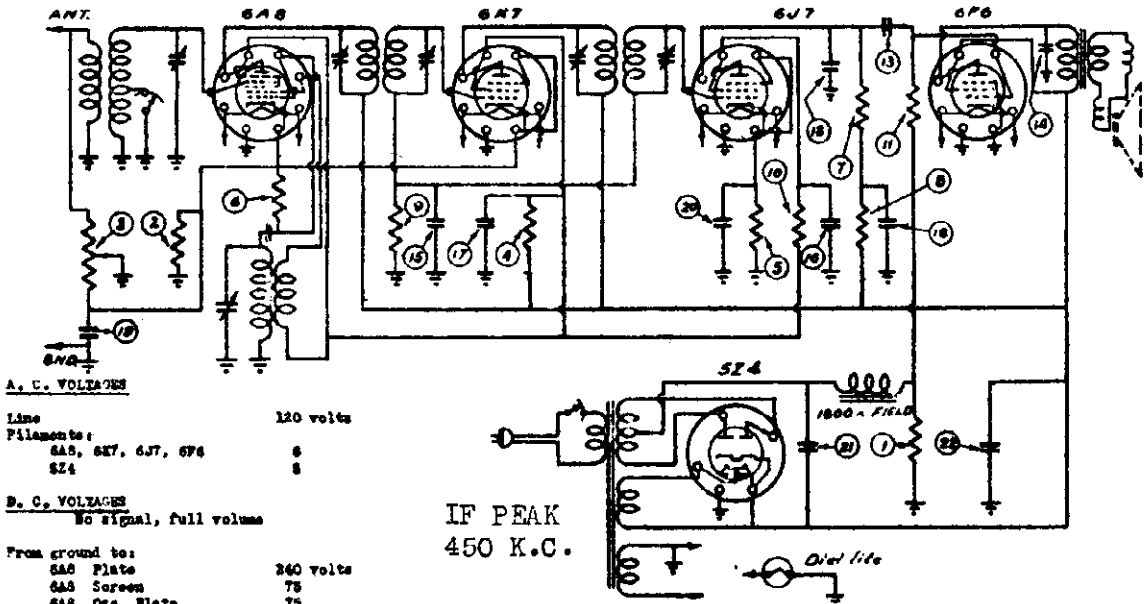
SR241 RADOLEK 2 STAGE P.P. UNIVERSAL INPUT AMPLIFIER



SR 247 RADOLEK CLASS "B" 3 STAGE 24 WATT AMPLIFIER

MODEL 46, Above Ser.#83786
MODEL 52, Above Ser.#78143
Schematics, Voltage, Trimmers
Alignment

REMLER COMPANY, LTD.



A. C. VOLTAGES

Line	120 volts
Filaments:	
6A8, 6K7, 6J7, 6F6	6
5Z4	5

D. C. VOLTAGES
No signal, full volume

From ground to:

6A8	Plate	240 volts
6A8	Screen	75
6A8	Osc. Plate	75
6A8	Cathode	3.3
6K7	Plate	240
6K7	Screen	75
6K7	Cathode	3.8
5J7	Plate	65
6J7	Screen	15
6J7	Cathode	2
6F6	Plate	230
6F6	Screen	240
6F6	Grid Bias	13

Voltages read with 1000-Ohm per volt meter.

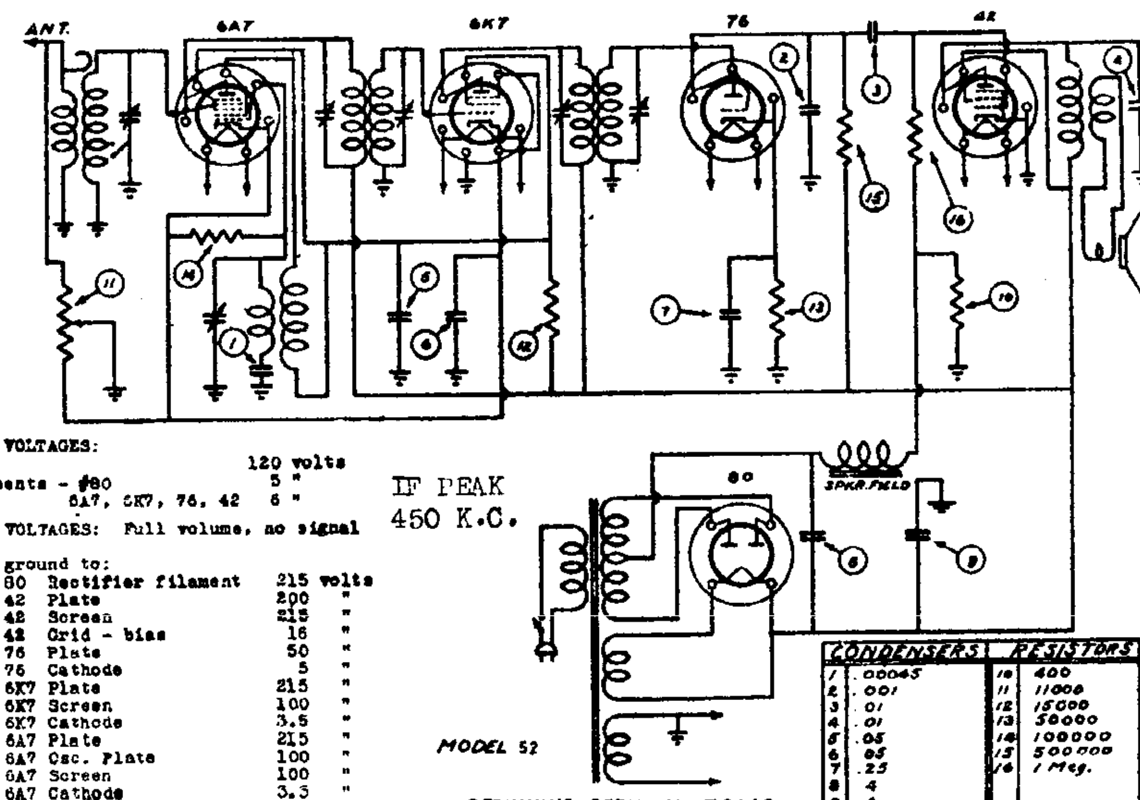
IF PEAK
450 K.C.

MODEL 46

BEGINNING SERIAL No. 83786

RESISTORS		CONDENSERS	
1	400 ohms	12	.001 MFD
2	5000	13	.01
3	11000-stop 200	14	.01
4	15000	15	.05
5	25000	16	.05
6	100000	17	.05 600 V.
7	250000	18	.05 "
8	250000	19	1
9	500000	20	.25
10	1 Meg.	21	4
11	1 Meg.	22	4

The antenna-R.F. coil is located over the variable condenser and is trimmed by the trimmer on the rear section of the variable condenser. The oscillator coil is mounted under the chassis and is trimmed by the front trimmer section. The I.F. transformers and trimmers are mounted under



A.C. VOLTAGES:

Line	120 volts
Filaments - #80	5 "
6A7, 6K7, 76, 42	6 "

D.C. VOLTAGES: Full volume, no signal

IF PEAK
450 K.C.

From ground to:

80	Rectifier filament	215 volts
42	Plate	200 "
42	Screen	215 "
42	Grid - bias	16 "
76	Plate	50 "
76	Cathode	5 "
6K7	Plate	215 "
6K7	Screen	100 "
6K7	Cathode	3.5 "
6A7	Plate	215 "
6A7	Osc. Plate	100 "
6A7	Screen	100 "
6A7	Cathode	3.3 "

Voltages read with 1000-Ohm per volt meter.

MODEL 52

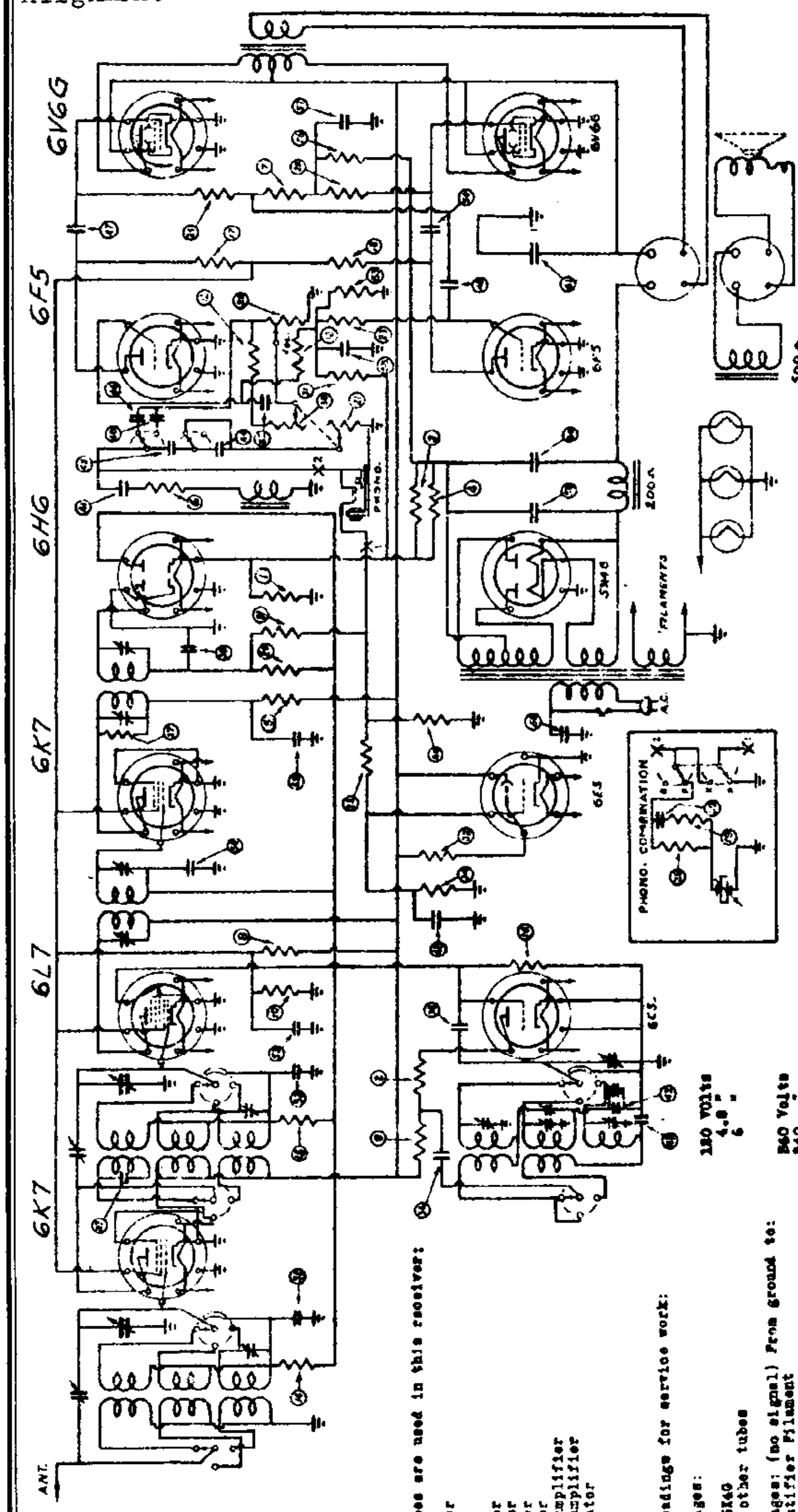
BEGINNING SERIAL No. 78143

CONDENSERS		RESISTORS	
1	.00045	10	400
2	.001	11	11000
3	.01	12	15000
4	.01	13	50000
5	.05	14	100000
6	.05	15	500000
7	.25	16	1 Meg.
8	4		
9	4		

The antenna-R.F. coil is located over the variable condenser and is trimmed by the trimmer on the rear section of the variable condenser. The oscillator coil is mounted under the chassis and is trimmed by the front trimmer section. The I.F. transformers and trimmers are mounted under

MODEL 89, Above Ser. # 92582
Schematic, Voltage, Trimmers
Alignment

REMLER COMPANY, LTD.



Model 89
Beginning Serial No. 92582
450 KC-IF

RESISTORS	Ohms	CONDENSERS	Mfd
1	25	35	.00024
2	150	36	.0003
3	155	37	.0003
4	400	38	.0003
5	2000	39	.0003
6	5000	40	.0005
7	10000	41	.001
8	15000	42	.0013
9	15000	43	.004
10	52000	44	.004
11	50000	45	.02
12	50000	46	.05
13	300000	47	.05
14	100000	48	.05 200V
15	100000	49	.05
16	100000	50	.05
17	100000	51	.1
18	100000	52	.1
19	100000	53	20 250V
20	250000	54	.05
21	500000	55	.05
22	500000	56	.01
23	500000	57	.5
24	500000	58	.5
25	500000	59	10 475V
26	500000	60	10
27	500000	61	10
28	500000	62	.05 200V
29	1 Meg.	63	500000 ohm
30	1 "		
31	1 "		
32	1 "		
33	3 "		
34	3 "		

SERVICE DATA

The following tubes are used in this receiver:

6K7-R.F. Amplifier
6L7-Mixer
6C5-Oscillator
6K7-I.F. Amplifier
6H6-Diode Detector
6F5-A.F. Amplifier
6F5-A.F. Amplifier
6V6G-Beam Power Amplifier
6V6G-Beam Power Amplifier
6E5-Tuning Indicator
5X4G-Rectifier

Voltage readings for service work:

A.C. Voltages:

Line	120 Volts
Heater 5X4G	4.8 "
Heaters other tubes	6 "

D.C. Voltages: (no signal) From ground to:

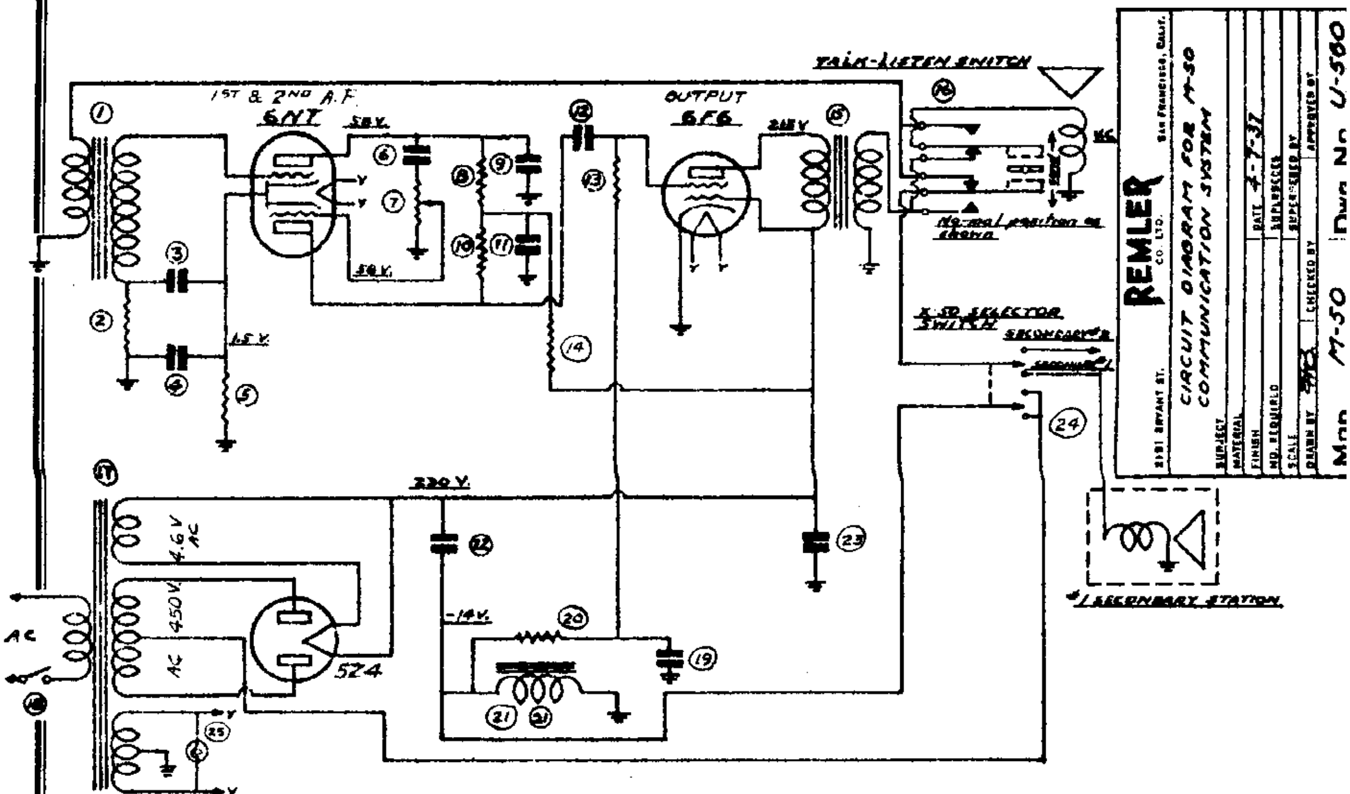
5X4G Rectifier Filament	360 Volts
6V6G Plates	240 "
6V6G Screens	260 "
6V6G Bias	16.5 "
6F5 Plates	80 "
6F5 Bias	1.5 "
6K7 I.F. Plate	250 "
6K7 I.F. Screen	100 "
6K7 I.F. Bias	3 "
6L7 Plate	260 "
6L7 Screen	100 "
6L7 Bias	3 "
6C5 Plate	160 "
6K7 R.F. Plate	250 "
6K7 R.F. Screen	100 "
6K7 R.F. Bias	3 "
6E5 Target Voltage	260 "
Voltage across speaker field	75 "

The R.F., Mixer and oscillator coils are located in the large square shields on the right end of the chassis.
Trimmers for these circuits are mounted along the end of the chassis, beneath the coils in the following order; R.F. short wave, Mixer short wave, Oscillator broadcast, Oscillator medium wave, Oscillator short wave. From front to rear.
The R.F. broadcast and Mixer broadcast trimmers are mounted on the range switch assembly. Oscillator pads are located at the back of the variable condenser. The pad nearest the end of the chassis is for the broadcast band and the medium wave is next.
Trimmers for the I.F. transformers are adjustable thru holes in the I.F. transformer shield cans. The I.F. frequency is 450 K.C.

MODELS SC-50, SWC-50 Call-Back Connections

MODEL M-50 Communication Sys. Schematic, Parts

REMLER COMPANY, LTD.

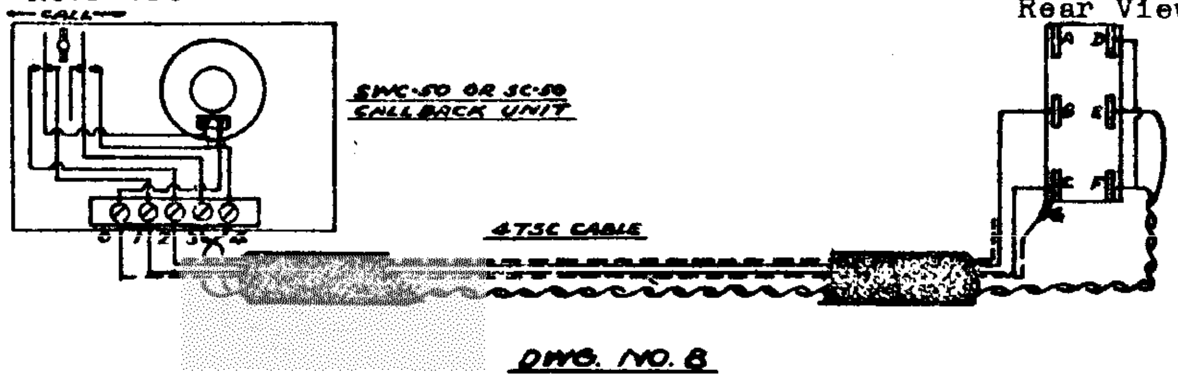


NO.	DESCRIPTION	PART NO.	NO.	DESCRIPTION	PART NO.	NO.	DESCRIPTION	PART NO
1	Input Trans.	N 1539	3	.1MFD. 200V.		2	100M ohms ½watt	
15	Output Trans.	5C 1085	4	.1MFD. 200V.		5	2000M ohms ¼watt	
17	Power Trans.	5C 1663	6	.0006 MFD.		7	500M ohms vol. cont.	
21	Choke	5000	9	.002 MFD. 600V.		8	100M ohms ¼watt	
16	Talk-Listen SW.	ST 522	11	.25 MFD. 400V.		10	100M ohms ¼watt	
18	A.C. Switch	F 11	12	.004 MFD. 800V.		13	250M ohms ¼watt	
24	Selector SW.	X-50	18	.1 MFD. 200V.		14	100M ohm ½watt	
25	Pilot Light		22	4.MFD. 450V.)		20	1 MEG. ¼ watt	
			23	4.MFD. 450V.)		21	Speaker	PMS

SC-50 AND SWC-50 CALL-BACK SECONDARY

C-50 Call Back Switch
Rear View

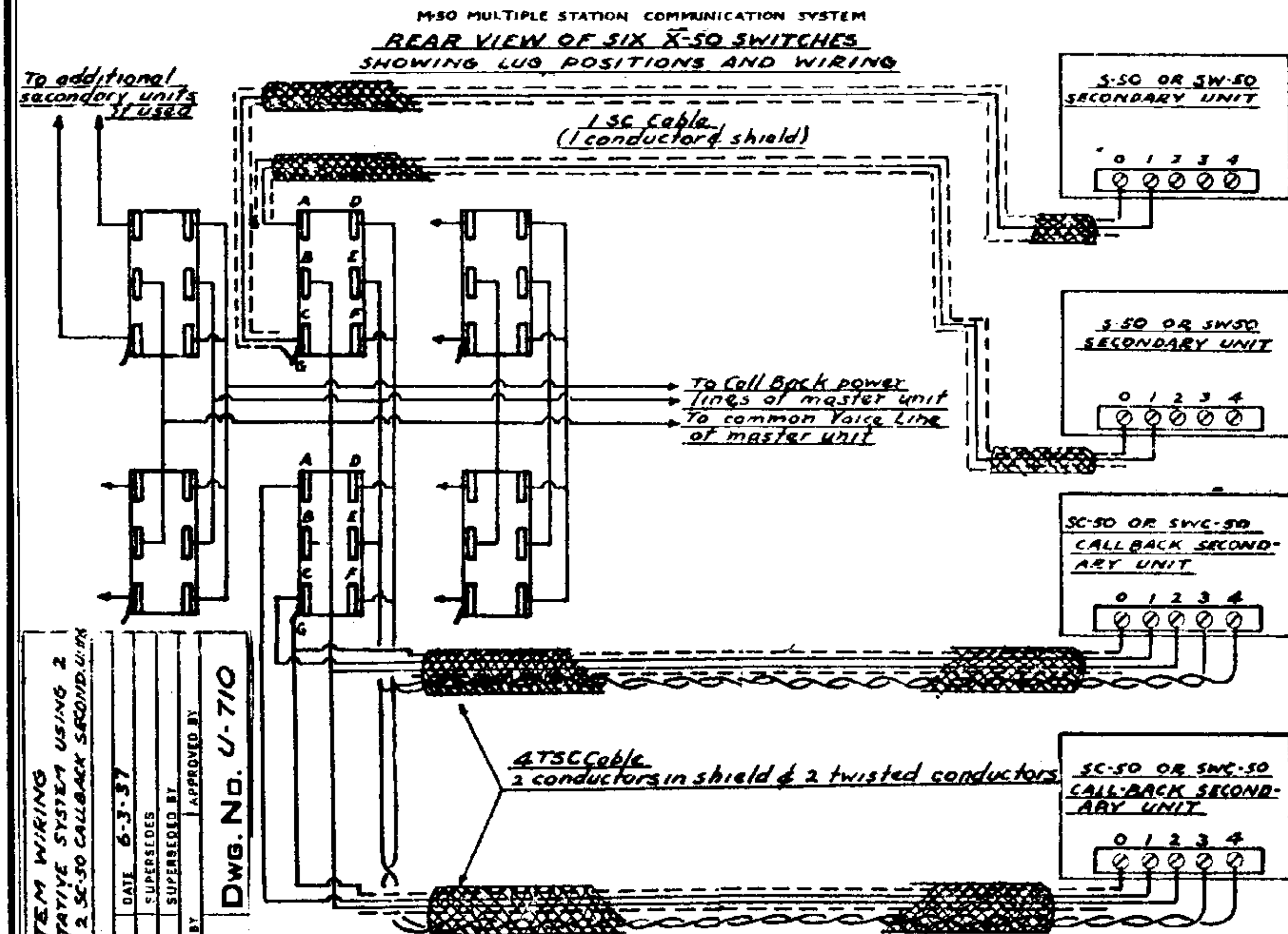
X-50 Selector Key
as mounted in M-50 & M-70 Units
Rear View



DWG. NO. 8

MODEL M-50 Communication Sys.
X-50 Switch Wiring, Data

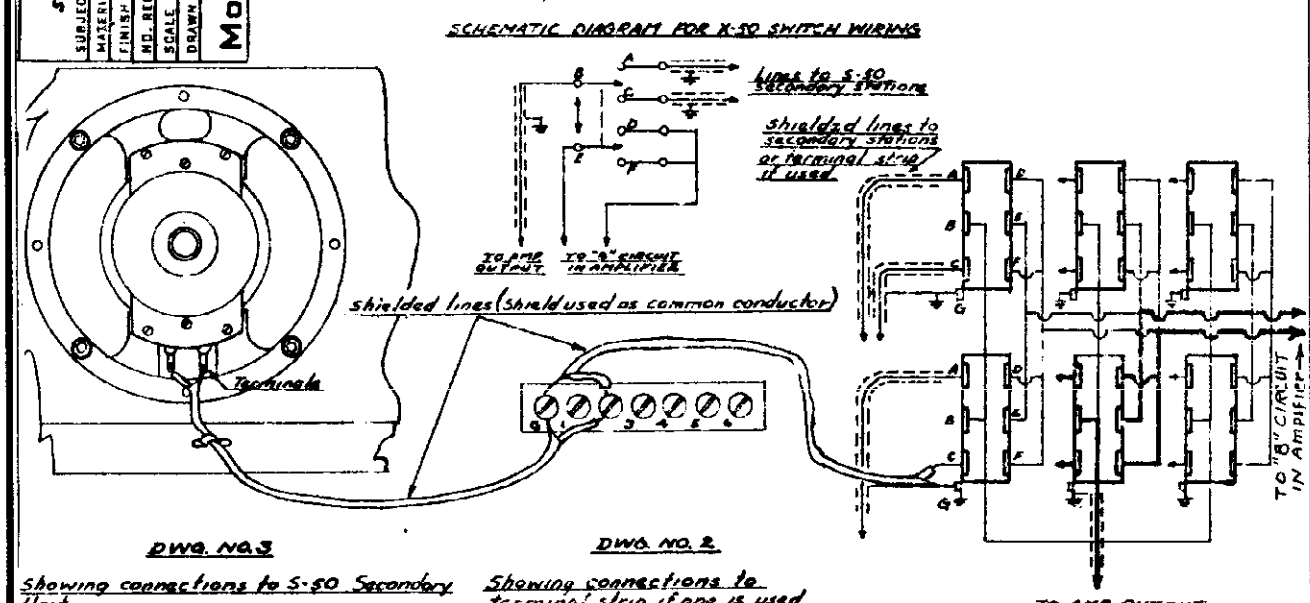
REMLER COMPANY, LTD.



M-50 SYSTEM WIRING SHOWING REPRESENTATIVE SYSTEM USING 2 S-50 SECONDARY & 2 SC-50 CALLBACK SECOND. UNITS

SUBJECT	DATE 6-3-37	DWG. NO. U-710
MATERIAL	SUPERSEDES	
FINISH	SUPERSEDED BY	
NO. REQUIRED	APPROVED BY	
SCALE	CHECKED BY	
DRAWN BY HWS		MOD. M-50

The M-50 master station unit is equipped at the factory with one X-50 two station selector key which permits immediate hookup with two S-50 secondary station units. When more than two S-50 secondary units are used in the system, extra station selector keys, type S-50, are required. Each key will control two stations.



DWG. NO. 3

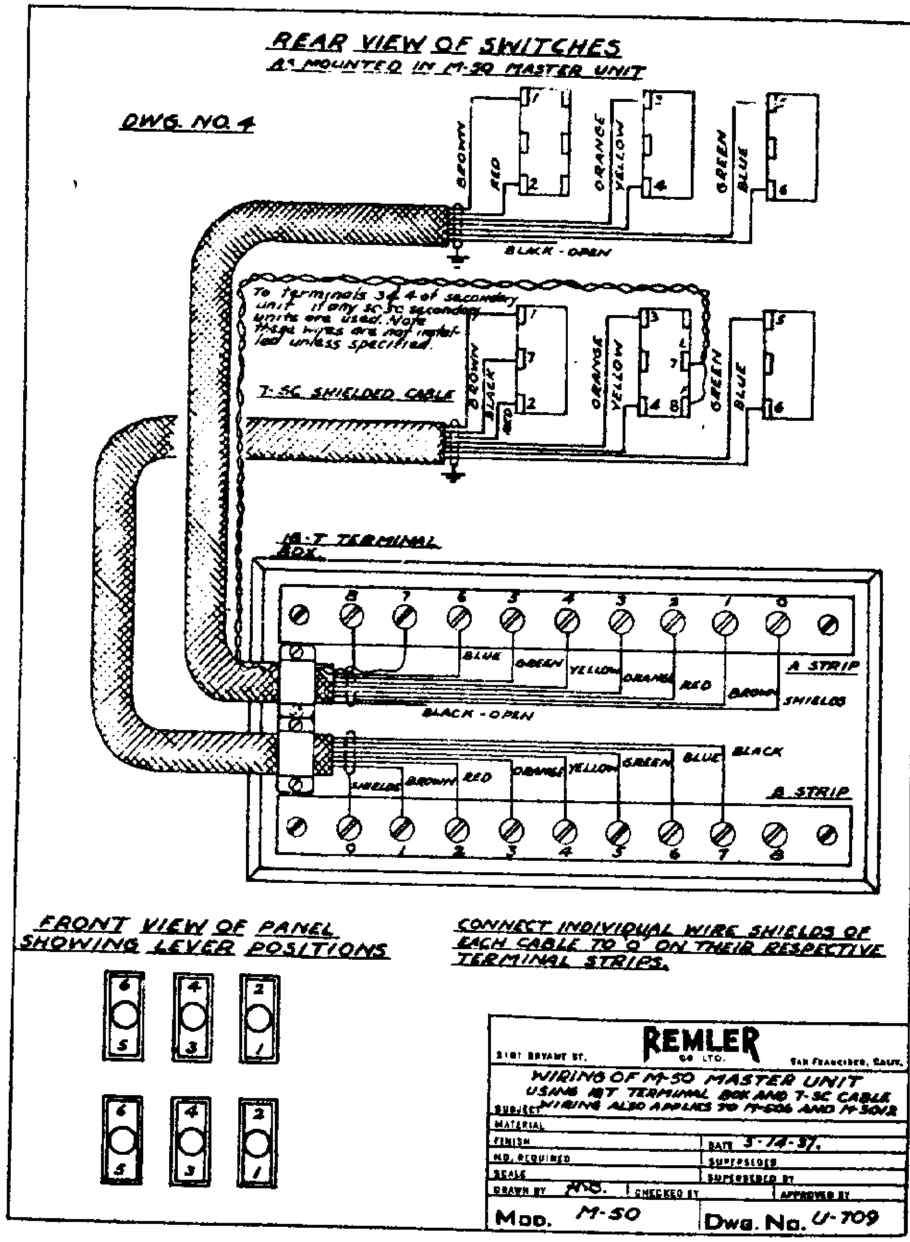
Showing connections to S-50 Secondary Unit

DWG. NO. 2

Showing connections to terminal strip if one is used.

MODEL M-50 Communication Sys.
7-SC Cable & 18T Term. Box
Wiring, Data

REMLER COMPANY, LTD.



WIRING INSTRUCTIONS FOR M-50 TYPE INTER-COMMUNICATION SYSTEM USING 18-T TERMINAL BLOCK AND 7-SC CABLE

The 7-SC cable is a seven conductor cable with each conductor individually shielded. The shields are all bonded together and connected to a ground lug on the M-50 chassis and to "0" terminal on the 18-T block. The shields are used as the common or voice return circuit from the various secondary units. The conductors of the cable are connected to the selector switch "voice" terminals as shown in the upper section of the drawing. The conductors are color coded and are connected so that the brown wire of the upper cable goes to #1 terminal of the upper row of switches and to #1 terminal of the "A" terminal box strip. The brown wire of the lower cable goes to the #1 terminal of the "B" terminal box strip, etc. At the bottom of the drawing is shown the switch lever positions which correspond to the terminal box strip numbers.

The 18-T terminal box provides two strips called "A" strip and "B" strip, of nine terminals numbered from 0 to 8 each, which provide terminating points for all voice and call-back lines for twelve secondary units. The terminals "1" to "6" inclusive on each strip are the voice line terminals, only one secondary being connected to each terminal. The "0" terminals on each strip are the common ground or voice return terminals for all secondary units connected to the strip, as well as common ground for the call-back voice line if a call-back type of secondary is used. The "7" terminal on the "B" strip is the call-back voice line terminal for all call-back type secondaries. The terminals "7" and "8" on the "A" strip may be used for the call-back power terminals for all call-back type secondaries.

NOTE: The call-back power wires from the master unit to terminals "7" and "8" of "A" strip are not installed at the factory.

To illustrate a representative system using 1 - M-50 master unit, 4 - S-50 secondary units and 2 - SC-50 secondary call-back units, the connections are as follows:

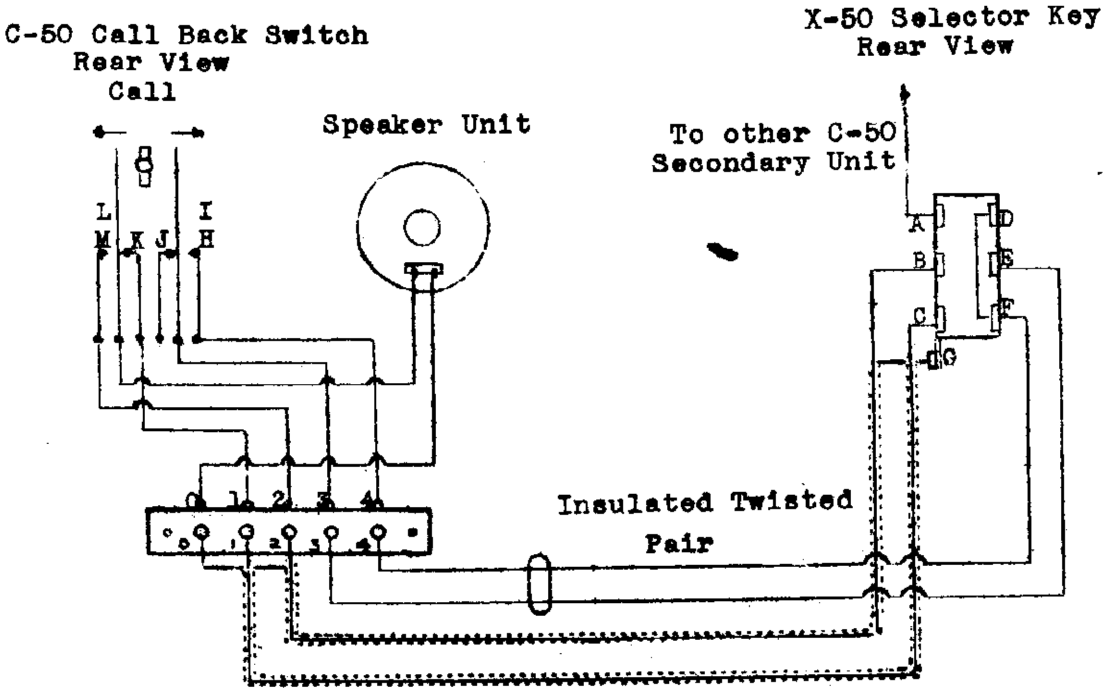
Referring to Dwg. No. 8 of the secondary units, the "0" terminals on all secondaries are connected to "0" on the "A" strip. The "1" terminals on each secondary is connected to "1-2-3-4-5-6" (as required) on the "A" strip, one secondary only to each terminal. Terminals "2" of the SC-50 call-back secondaries are both connected to terminal "7" of "B" strip. Terminals #3 of the two SC-50 secondary units are both connected to terminal "7" of "A" strip and terminal #4 of both secondaries are connected to terminal "8" of "A" strip. The connections for additional secondary units, if used, are carried out in the same respective manner.

MODEL M-50 Communication Sys.
Master Unit
C-50 Call-Back Switch Wiring
Data

REMLER COMPANY, LTD.

C-50 Call Back Switch

DRAWING NO. 4



Shielded Wires

WIRING:

Two single-conductor shielded wires and a well insulated twisted pair are required for connections between the M-50 master unit and each SC-50 call back secondary unit. Referring to drawing No. 4, the insulated twisted pair of wires are connected to terminals E and (D-F) of the master unit selector key and are run to terminals No. 3 and 4 of SC-50 call back unit. One shielded connector is connected to terminal B of the selector key and run to terminal 2 of the secondary unit. The other shielded wire is connected to either terminals A or C of the selector key (as required) and to terminal one of the secondary unit. The shield of both shielded wires is connected to the ground lug G, of the selector key and to the zero terminal of the secondary unit. These connections, it will be noted, provide for turning on the plate supply of the master unit and for bridging around the selector keys in order to effect call back regardless of the position of these selector keys.

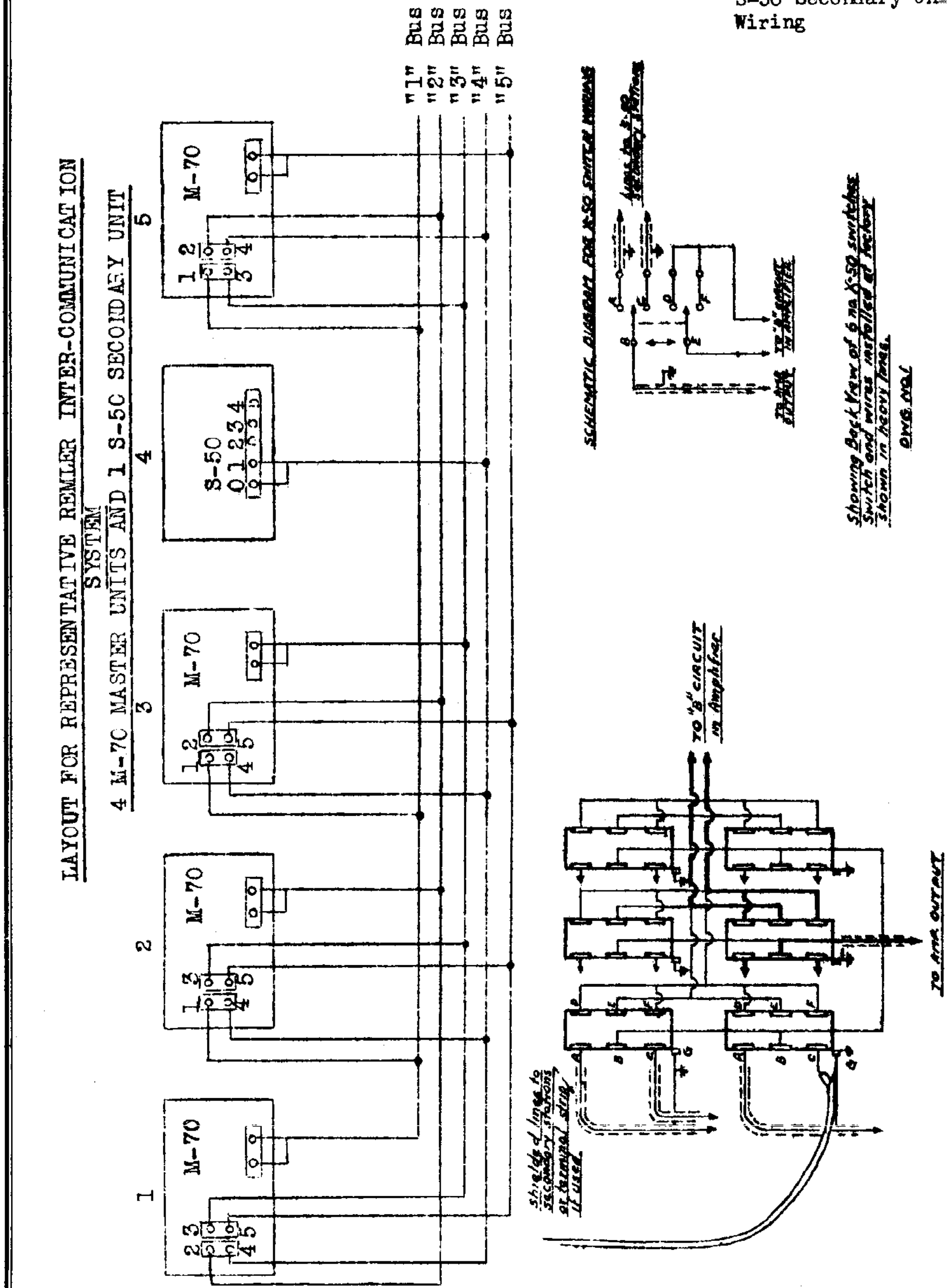
M-50 Master Unit

Additional selector keys may be installed on the M-50 master unit at any time, by removing the front switch cover-plate, cutting out the paper "knock-out" and installing the additional key switch in any of the five openings that are provided in the mounting plate. The key switch is fastened to the rear of the mounting plate with the grounding lug (G) (See drawing No. 1) at the lower left, looking at the rear of the unit. The necessary screws for mounting are furnished with each switch. When extra key switches are installed, certain common circuits must be connected from the original switch to all the additional switches added in multiple. The common leads are the amplifier output, which connects to the left hand center (B) terminal of each switch, and two leads which are used to break the plate circuit return of the amplifier, one lead connecting to the center right (E) terminal of each switch and the other lead connecting both the top and bottom right hand (D and F) terminals of each switch.

A cable clamp is provided on the chassis of the M-50 master unit, under which the leads to the switches should be clamped at the time they are installed.

MODEL M-70 Communication Sy
Master Unit
S-50 Secondary Uni
Wiring

REMLER COMPANY, LTD.



MODEL M-50
MODEL M-70
Installation, Operation

REMLER COMPANY, LTD.

INSTRUCTIONS FOR INSTALLATION AND OPERATION OF REMLER M-50 MULTIPLE STATION INTER-COMMUNICATION SYSTEM

The M-50 master station unit is equipped at the factory with one X-50 two-station selector key which permits immediate hookup with two S-50 or SC-50 secondary units. When more than two secondary stations are used in the system, extra station selector keys, type X-50, are required; each key will control two stations.

NOTE: The station selector key installed at the factory has wired to terminals "A" and "C" (See drawing No. 7), a short length of 1-SC cable. The lines from the secondary units may be spliced to this cable.

The wiring which is required between station units consists of one single-conductor-and shield voice line from the master station to each secondary station. We recommend for this wiring the use of our type 1-SC cable. The shield of the 1-SC cable is connected to terminal zero on the secondary unit (See drawing No. 8). The conductor of the cable is connected to terminal No. 1. The shield acts as one conductor and the insulated wire as the second conductor. These lines are then run to the M-50 master unit selector keys. On the M-50 unit the shields of the cable are soldered to ground lug "G" on the selector key (See drawing No. 7) and the insulated conductors are soldered to lugs "A" or "C". The lugs "A" and "C" are the voice terminals of the selector key and one secondary unit may be connected to each lug; that is, for every X-50 selector key two secondary units may be used.

Additional X-50 selector keys may be installed on the M-50 master unit at any time, by removing the front switch cover-plate, cutting out the paper "knock-out" and installing the additional key switch in any of the five openings that are provided in the mounting plate. The key switch is fastened to the rear of the mounting plate with the grounding lug (G) (See drawing No. 7) at the lower left, looking at the rear of the unit. The necessary screws for mounting are furnished with each switch. When extra key switches are installed, certain common circuits must be connected from the original switch to all the additional switches added in multiple. The common leads are the common voice line which connects to the left hand center (S) terminal of each switch, and two leads which are used to break the plate circuit return of the amplifier, known as the call-back power lines, one lead connecting to the center right (E) terminal of each switch and the other lead connecting both the top and bottom right hand (D and F) terminals of each switch.

If desired, a multiple conductor cable, our type 7-SC may be soldered to the terminals of the selector keys and to the terminals of a connecting block, our type 18-T, as shown on drawing No. 4. The terminal block may be mounted wherever convenient near the master unit. The shielded lines from the secondary stations may then be connected to this terminal block as described on Drawing No. 4.

A cable clamp is provided on the chassis of the M-50 master unit, under which the leads to the switches should be clamped at the time they are installed.

OPERATION:

After the system has been connected it may be placed in operation by turning the small rotary A.C. power switch knob, which is on the front of the M-50 unit, to the clockwise position. The pilot lamp on the front panel will glow, indicating that the power is on. When it is desired to communicate with a secondary station, the selector key should be thrown to that secondary station's position as indicated on the designation plate. After this selection is made, the talk-listen switch, which is operated by the lever on the extreme lower right of the cabinet, is depressed while speaking. When an answer is wanted, release the talk-listen switch lever which will automatically assume the receiving position so that the secondary unit may reply. When the communication is completed, the station selector key should be returned to the center or neutral position. When the key is in the neutral position the plate supply current is disconnected and the unit is silent. Located on the rear of the cabinet is the volume control knob. This knob should be adjusted to the desired volume level at the time of installation and should require no further attention.

NOTE: For installation information on the SC-50 and SWC-50 call-back type secondary units see drawing No. 8.

INSTRUCTIONS FOR INSTALLATION AND OPERATION OF REMLER M-70 MULTIPLE MASTER INTER-COMMUNICATION SYSTEM

The M-70 inter-communication unit is equipped with a relay which automatically arranges the terminal connections of the unit to enable it to operate as either a master station or a secondary station.

Whenever the M-70 station is not in use; that is, when the A.C. switch is turned off or when the selector keys are all in neutral, the station becomes a secondary unit with the secondary unit terminals connecting to two terminals, "M" (marked "zero" and "1") located on the back of the unit. From these two "M" or pickup" terminals, a shielded line must be run to the selector keys of every other M-70 station desiring to call this particular unit.

When the M-70 station is turned on and the selector keys thrown to call a secondary station, the relay converts the unit to a master station, enabling conversation to be held with the unit selected by the selector key; provided the called station is not in use. If the M-70 station called is carrying on a conversation at the time, a busy hum will be heard. If the station called has previously been called by another unit, the noise of this conversation will be heard indicating that the unit is in use.

The M-70 master station unit is equipped at the factory with one X-50 selector key which permits immediate hookup with two other M-70 master stations, two S-50 secondary stations, or one M-70 and one S-50. When more than two secondary stations are used in the system, extra station selector keys, type X-50, are required. Each additional key will accommodate two additional stations, either M-70 or S-50.

For the necessary wiring between units, we recommend the use of a single conductor shielded wire covered by a cloth braid. This wire is known as our type 1-SC. In multiple station systems it is usually preferable to use a multi-conductor cable from the selector keys of the M-70 unit to a conveniently mounted terminal block on the wall or floor near where the unit will be used. This cable (known as type 7-SC) consists of seven individually shielded wires, covered by a cloth braid, and may be purchased in any length desired. A wall mounting terminal block consisting of hardwood base, sufficient screw terminals for a complete thirteen station system and sheet metal protective cover is available completely assembled, or furnished in disassembled kit form at a lower price.

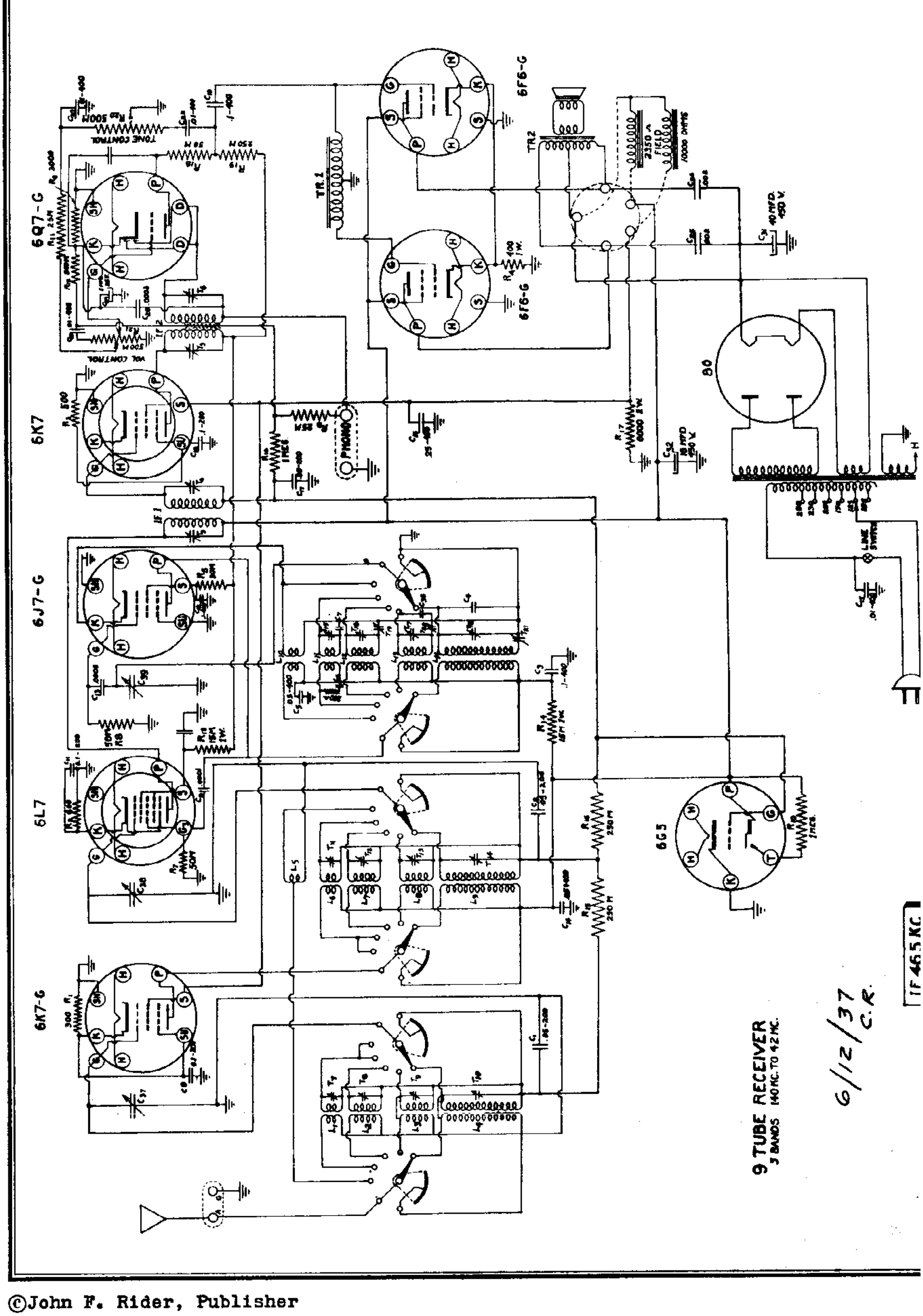
When wiring the M-70 units a shielded line should be connected to the "M" or pickup terminals of the unit, secured under the cable clamp provided, and run to every other station in the system desiring to call this unit. The shield must be connected to the "0" terminal and the hot wire connected to terminal "1". A separate wire need not be run to each other station, the one wire may be run consecutively from one station to the next with individual connecting wires tapped off this line at each unit.

The shielded line from each individual station unit must be soldered to the terminals of the desired selector key of the M-70 master. The shield should be connected to the ground lug "G" (see drawing No. 1) and the insulated or "hot" wire should be connected to the upper left ("A" terminal) or lower left ("C" terminal) of the selector key, when viewed from the back of the unit.

S-50 secondary stations are wired in the same manner, a shielded line being run from this secondary station to the selector key terminals of each M-70 master desiring to call this secondary. The shield is connected to terminal "0" and the hot wire to terminal "1" of the S-50 secondary unit.

MODELS 709, 719 International

SEARS-ROEBUCK & CO.   Schematic



MODELS 709,719
International
Voltage,Trimmers
Alignment

SEARS-ROEBUCK & CO.

SOCKET READINGS FOR MODEL A-9 SERIES

All Voltages taken from ground with line voltage 115 volts.

TUBE	POSITION	PLATE	SCREEN GRID	KATHODE	FILAMENT
6K7-G	1st. R.F.	250 V.	115 V.	2 V.	6 V.
6L7	Mixer	245 V.	172 V.	5.5 V.	6 V.
6J7	Oscillator	135 V.	155 V.	-	6 V.
6K7	I.F.	245 V.	115 V.	3.5 V.	6 V
6Q7-G	Diode Det.	60 V.	-	1 V.	6 V
6F6-G	P.P. Audio	325 V.	250 V.	19 V.	6 V
6F6-G	P.P. Audio	325 V.	250 V.	19 V.	6 V

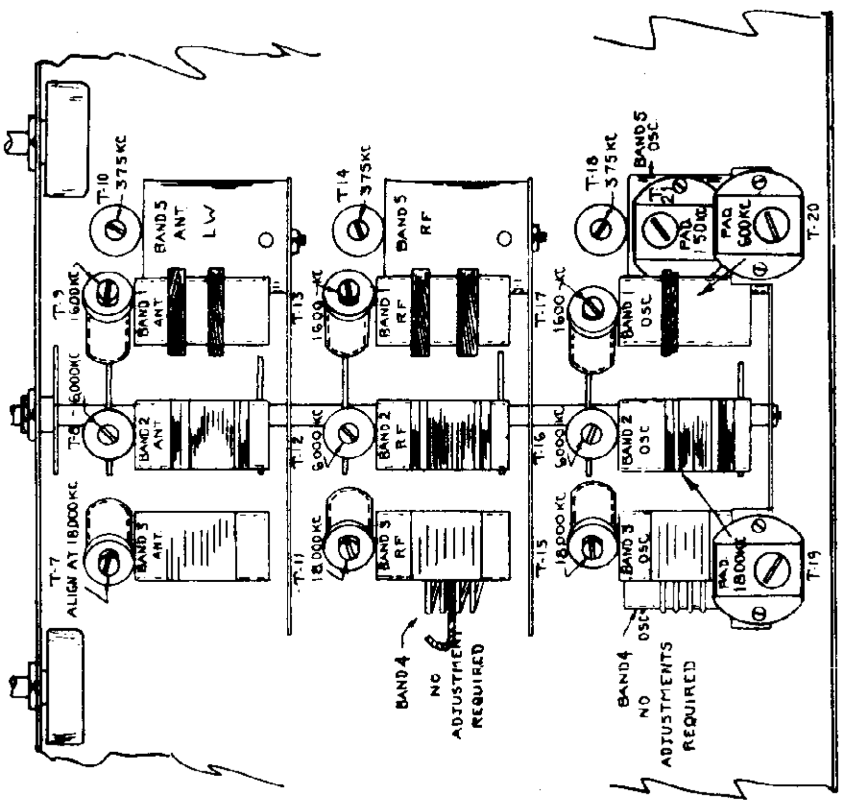
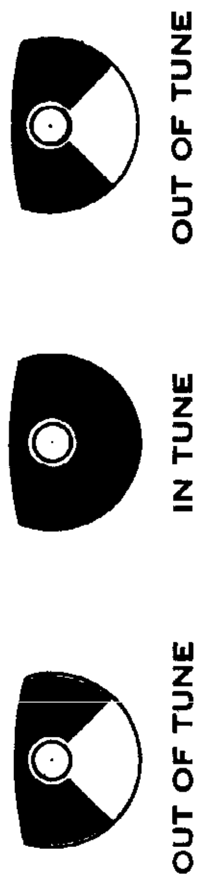


FIG. 5



THE ELECTRIC EYE

The movement of the Electric Eye or resonance indicator is easily understood, as the station is tuned in, the green sections of the eye will draw together or tend to draw together depending upon the strength of the station. Rotate the tuning knob back and forth until the exact resonance point is found.

SEARS-ROEBUCK & CO.

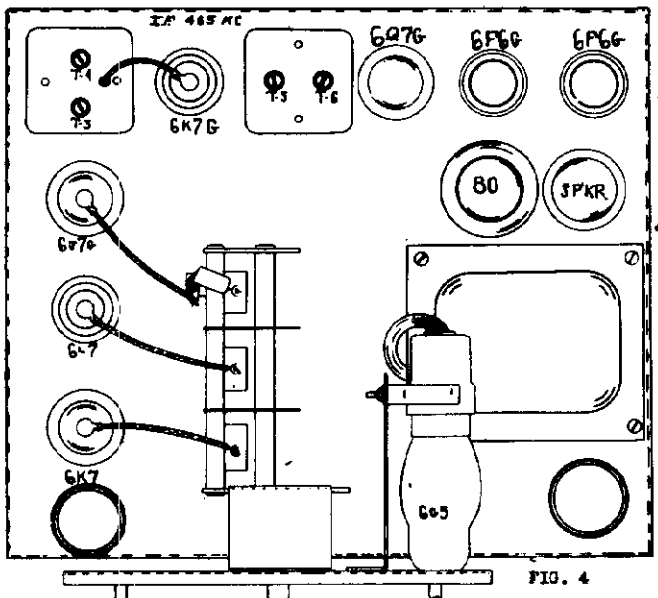


FIG. 4

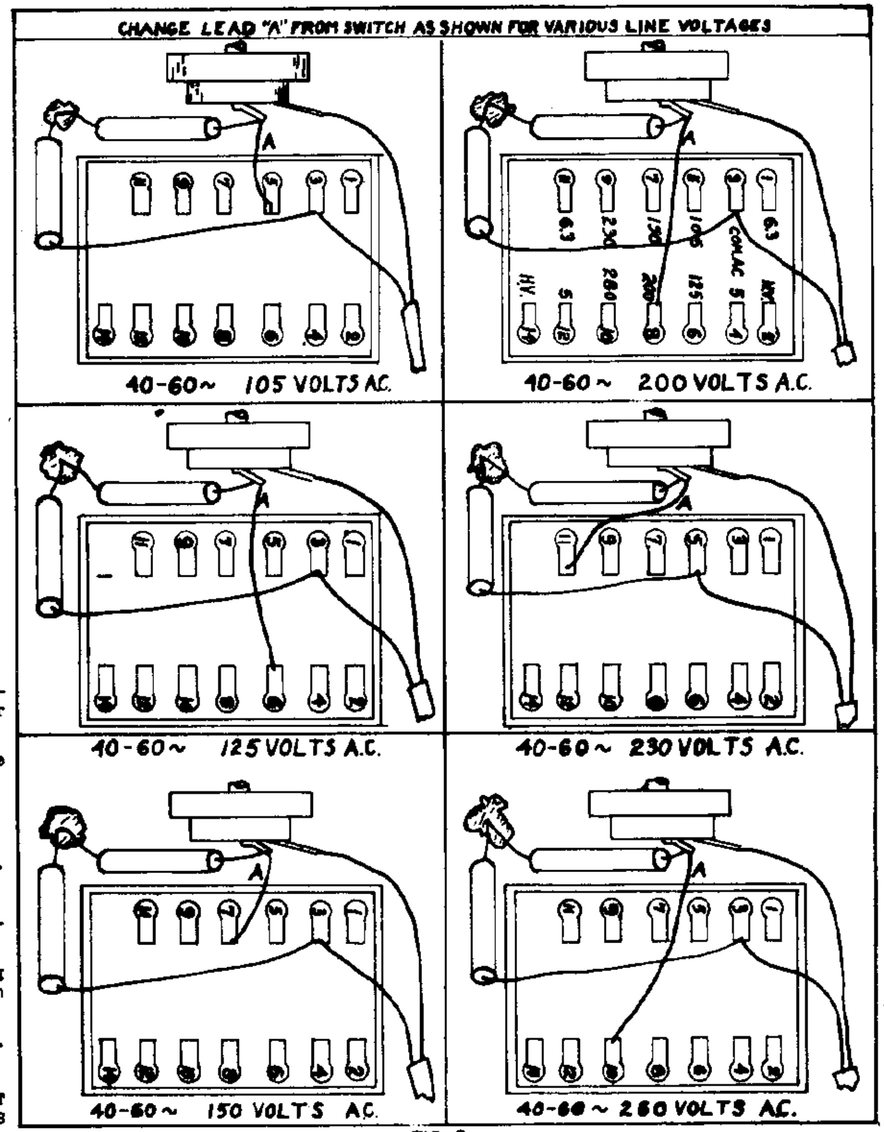


FIG. 3

NOTES ON ALIGNMENT

It is assumed that if an alignment procedure becomes necessary that the service man has an oscillator capable of accurately covering the range of the receiver and that a meter output indicator is used.

The I. F. Stages are aligned in the usual manner by feeding 465 KC into the grid of the 6L7 tube.

Follow Figure 4 and Figure 5 showing trimmer locations and alignment frequency.

Always adjust the oscillator first in any particular band.

Use as low an output as possible from the test oscillator in making the various adjustments.

After trimming at the high frequency end of the dial and adjusting the padding condenser at the other end, always recheck the settings of the trimmer at the high frequency end of the dial.

BE SURE THAT THE ALIGNMENT SIGNAL IS THE TRUE FUNDAMENTAL AND NOT A HARMONIC.

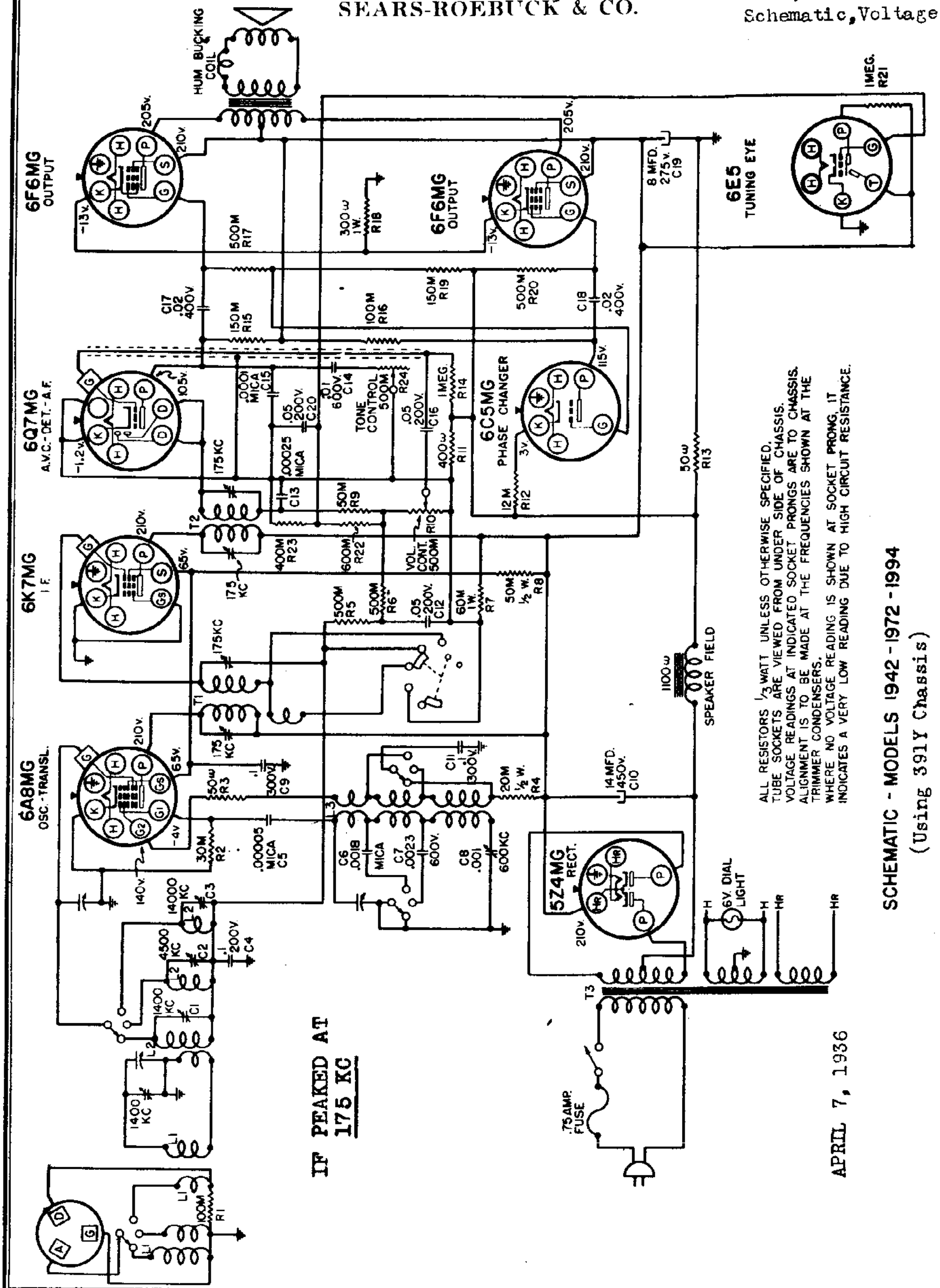
Check for image frequency in the usual manner.

BEFORE STARTING ALIGNMENT CHECK POSITION OF TUNING HAND AND MAKE CERTAIN THAT IT IS EXACTLY STRAIGHT ACROSS ON THE FIRST CALIBRATION LINE WHEN THE CONDENSERS ARE AT MAXIMUM CAPACITY ROTATION.

MODELS 1942,1972,1994

SEARS-ROEBUCK & CO.

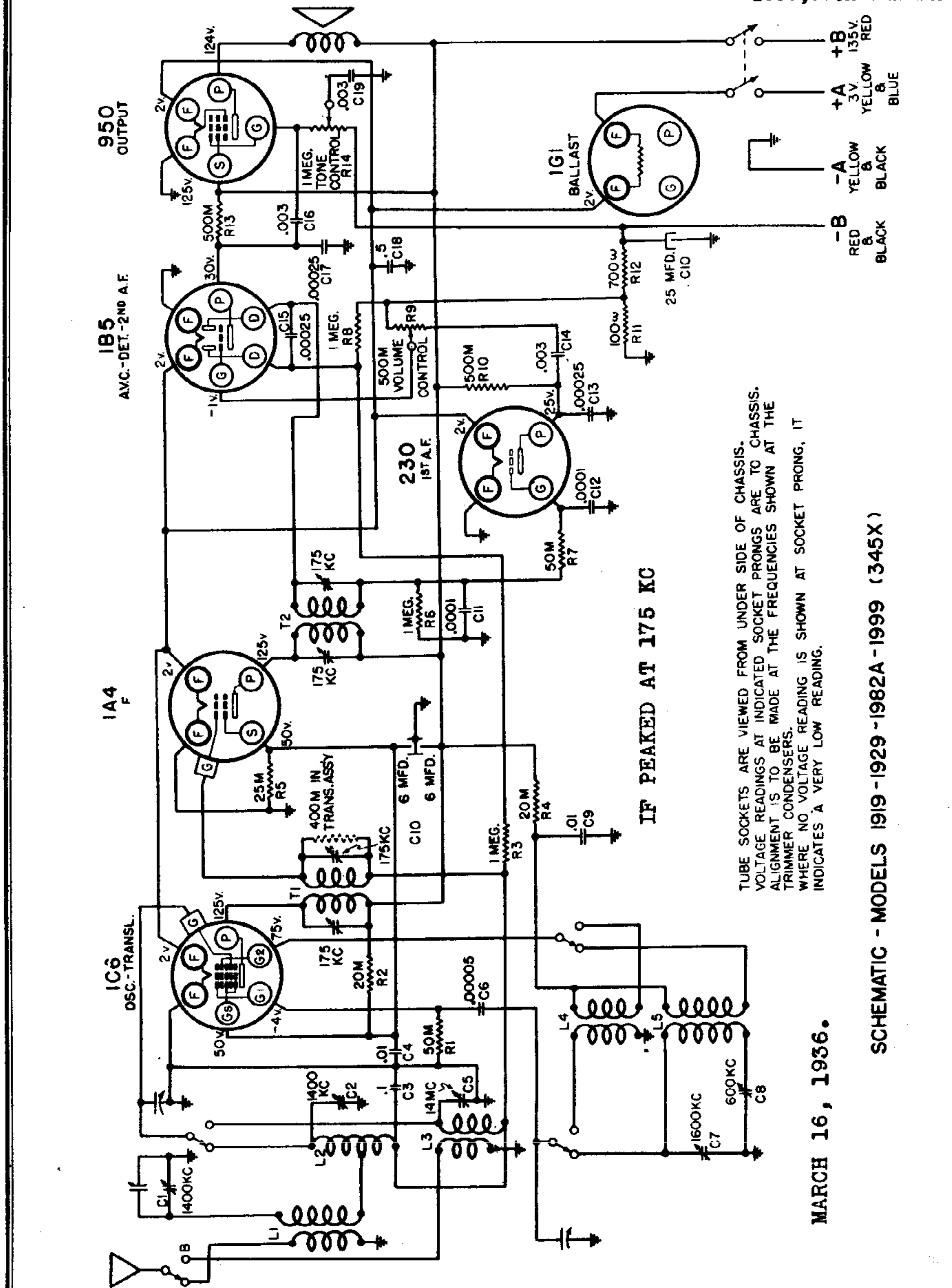
Late, Chassis 391Y
Schematic, Voltage



Schematic,Voltage

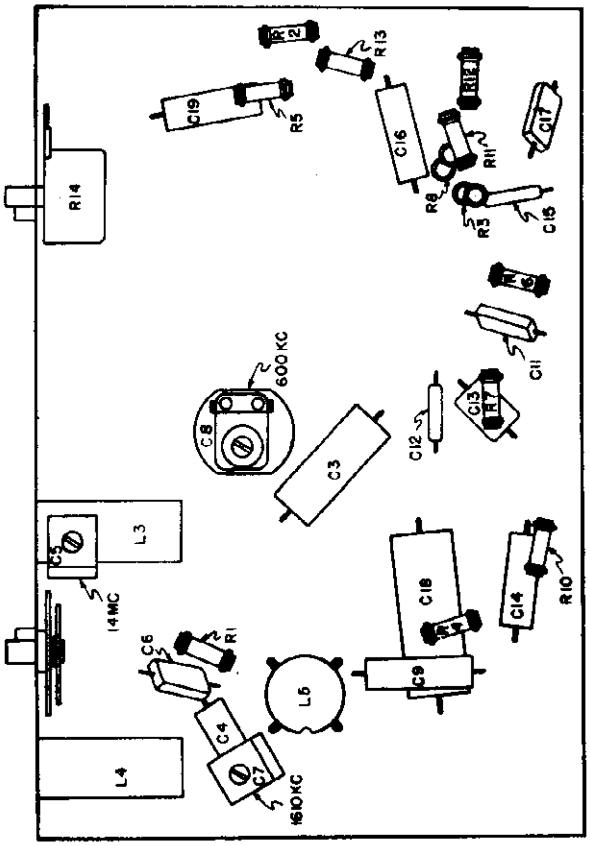
SEARS-ROEBUCK & CO.

MODELS 1919,1929,1982A
1999,345X Chassis



MODELS 1919,1929,1982A
1999,345X Chassis
Chassis,Alignment,Data
Sensitivity

SEARS-ROEBUCK & CO.



C1, C2, C10, L1, L2, T1, T2 ARE MOUNTED ON TOP OF THE CHASSIS

LOCATIONS OF PARTS - MODELS 1919-1929-1982A-1999

ALIGNMENT PROCEDURE
IF Alignment

1. Connections:

Connect the ground lead of the test oscillator to the receiver chassis. Connect the output lead of the test oscillator, in series with a .1 mfd condenser, to the positions mentioned below for alignment. Connect the output meter, in series with a .5 mfd condenser, across the loud speaker terminals.

2. Receiver Settings:

Turn the Wave Band switch to the BROADCAST position and the Station Selector to about 550 kc. Turn the receiver Volume Control all the way on and the Tone Control to its brilliant position (clockwise).

3. Alignment:

(a) Set the test oscillator to 175 kc. Connect its output (through the .1 mfd condenser) to the control grid cap of the 1A4 tube and peak the IF output transformer. The IF output transformer is the one without a grid lead, mounted at the back of the chassis.

(b) Change the test oscillator output connection to the control grid of the 1C6 tube and peak the IF input transformer. This is the transformer with a grid lead, mounted alongside of the Variable Condenser.

(c) Change the test oscillator output connection back to the 1A4 tube and repeat operation "A". Then change the connection back to the 1C6 tube and repeat operation "B". Always keep the receiver Volume Control turned all the way on and the test oscillator output at its lowest possible value.

BROADCAST BAND ALIGNMENT

1. Connections:

The ground lead of the test oscillator is left connected to the receiver chassis as for IF alignment. Disconnect the .1 mfd condenser from the output lead of the test oscillator. In its stead a .0002 mfd mica condenser is to be connected from the antenna lead of the receiver to the output lead of the test oscillator.

2. Receiver Settings:

Turn the Wave Band switch to the BROADCAST position, the Volume Control all the way on, and the Tone Control to its brilliant position (clockwise).

3. Alignment:

(a) Set the test oscillator to 1610 kc. Open the variable condenser all the way and peak the broadcast oscillator trimmer, C7.

(b) Set the test oscillator to 1400 kc and tune in its signal. Then peak the broadcast antenna trimmer, C1, and the broadcast translator trimmer, C2. The antenna trimmer is the one on the variable condenser section nearest the dial. The translator trimmer is accessible through the hole in top of the translator shield can, mounted behind the volume control.

(c) Set the test oscillator to 600 kc and tune in its signal. Then adjust the broadcast oscillator padder, C8. The variable should be rocked a degree or two during the adjustment.

(d) Repeat the 1610 kc adjustment, then the 1400 kc adjustment, and then the 600 kc adjustment for greater accuracy. Always keep the receiver Volume Control all the way on and the test oscillator output at its lowest possible value.

(e) Check the dial calibration by setting the test oscillator to 1000 kc and tuning in its signal. If necessary, turn the dial pointer to 1000 kc, being careful that the variable condenser is not allowed to turn.

SHORT WAVE ALIGNMENT

1. Connections:

Connections remain the same as for Broadcast Band alignment except that the .0002 mfd condenser in series with the test oscillator output lead is disconnected and a 400 ohm resistor connected in its stead.

2. Receiver Settings:

Turn the Wave Band switch to the SHORT WAVE position. The Volume Control is to be left all the way on and the Tone Control in its brilliant position, as for Broadcast Band alignment.

3. Alignment:

(a) Set the test oscillator to 14,000 kc and tune in its signal. Peak the short wave translator trimmer, C5. The variable should be rocked a degree or two during the adjustment. If two peaks can be found at two different settings of the trimmer, use the adjustment in which the trimmer is screwed further out (lesser capacity).

(b) The calibration of this band may be varied by shifting the gray lead that runs from one of the short wave oscillator coil lugs to one of the mounting lugs. If this lead is shifted to change calibration, the 14,000 kc adjustment should be repeated.

SENSITIVITIES

The following figures are given as an indication of the approximate sensitivities that should be had at various points in the receiver. It is necessary to have a test oscillator with an accurately calibrated attenuator so that its power output can be known. The output meter is to be connected, in series with a .5 mfd condenser, across the loud speaker terminals. An output meter reading of 8½ volts should be obtained for each of the input voltages shown for the frequencies listed.

The Volume Control of the receiver must be all the way on and the Tone Control turned all the way to the right. The ground lead of the test oscillator is to be connected to the chassis and the output lead of the test oscillator connected in series with the value of condenser or resistor, shown in the following list for the particular frequency at which the measurement is being made.

INPUT POINT	DUMMY ANTENNA	FREQUENCY	MICROVOLTS
Translator Grid	.1 mfd.	175 kc.	55 *
IF Grid	.1 mfd.	175 kc.	3500 *
Translator Grid	.1 mfd.	1000 kc.	120
Stator, Ant. Cond.	.1 mfd.	1000 kc.	340
Antenna Lead	.00025 mfd.	600 kc.	30
Antenna Lead	.00025 mfd.	1000 kc.	30
Antenna Lead	.00025 mfd.	1400 kc.	45
Antenna Lead	400 ohms	6000 kc.	45
Antenna Lead	400 ohms	10000 kc.	20
Antenna Lead	400 ohms	14000 kc.	20

* With Wave Band Switch in BROADCAST position and dial pointer at 550 KC.

SILVERTONE MODELS 1919, 1929, 1982A, 1999

General Description:

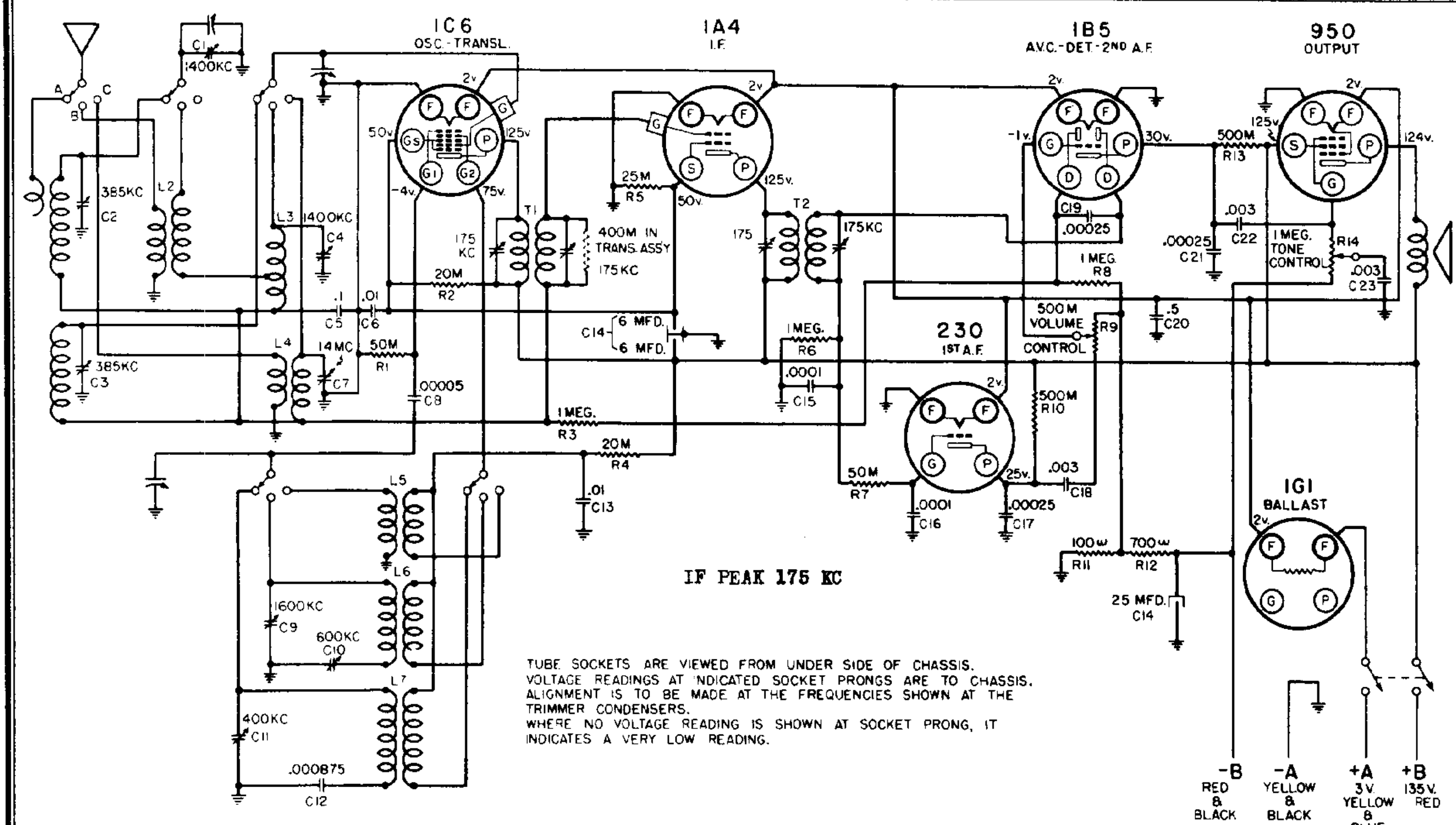
Although these receivers have the same model numbers as the ones described in Service Manual #7, Fall 1935 Series, they use a different chassis and have a different tube complement. The chassis used in the models described in Manual #7 can be identified through the fact that they are rubber stamped "345". The chassis used in the models described in the present Manual are rubber stamped "345X".

The Circuit:

These receivers are six tube battery powered superheterodynes, having a BROADCAST range and a FOREIGN Short Wave range. A filament Ballast tube is used to maintain the filament voltage at its proper value with a three volt dry cell block or an air cell "A" supply. If a two volt storage battery is used for "A" supply, the Ballast tube should be replaced by a Catalog #5022 adapter.

The diode current flowing through the 1 megohm resistor, R8, provides AVC voltage for the 1C6 and 1A4 tubes. The 100 ohm resistor, R11, provides residual bias.

SEARS-ROEBUCK & CO.



IF PEAK 175 KC

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.

Color Code Of The Electrolytic Condenser, C14:

Black - Common, grounded
Brown - Minus 25 mfd.
Red - Plus 6 mfd.
Blue - Plus 6 mfd.

These receivers are six tube battery powered superheterodynes. In addition to the BROADCAST range they incorporate a WEATHER Band and a Foreign SHORT WAVE range.

MODELS 1947,1948
Chassis, Trimmers
Alignment, Sensitivity

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

IF Alignment:

1. Connect the high scale of the output meter, in series with a .5 mfd condenser, across the loud speaker terminals. Connect the ground lead of the test oscillator to the chassis. Turn the Wave Band switch to the BROADCAST position and the Station Selector to about 1000 kc. During all of the alignment procedure the Volume Control of the receiver must be on full, the Tone Control in its brilliant position (fully clockwise) and the output from the test oscillator kept at its lowest possible value.

2. Connect the output lead of the test oscillator, in series with a .1 mfd condenser, to the control grid of the 1A4 tube. Set the test oscillator to 175 kc and peak the IF output transformer. This transformer is the square can unit mounted behind the Variable Condenser.

3. Change the test oscillator output connection to the control grid of the 1C6 tube and peak the IF input transformer. (Leave the .1 mfd condenser connected in series with the test oscillator lead.) The IF input transformer is the square can unit with grid lead, mounted alongside of the Variable Condenser.

4. Change the test oscillator connection back to the 1A4 tube and recheck the IF output transformer adjustment. Then change the test oscillator connection to the 1C6 tube and recheck the IF input transformer adjustment.

RF Alignment; Broadcast Band B:

1. Leave the output meter connected across the loud speaker terminals and the ground lead of the test oscillator connected to the chassis, as for IF alignment. Connect the output lead of the test oscillator, in series with a .00025 mfd mica condenser, to the green antenna lead of the receiver. During all of the alignment the Volume Control must be turned on full, the Tone Control in its brilliant position and the output power from the test oscillator kept at its lowest possible value.

2. Turn the Wave Band switch to the "B" (BROADCAST) position. Open the Variable Condenser plates all the way. Set the test oscillator to 1600 kc and adjust the broadcast oscillator trimmer, C9, for maximum output meter reading.

3. Set the test oscillator to 1400 kc and tune in its signal. Then peak the broadcast antenna and translator trimmers. The antenna trimmer is the one mounted on the variable condenser section nearest the dial. The translator trimmer is accessible through the hole in the top of the round shield can mounted on top of the chassis, next to the IF input transformer. The variable should be rocked back and forth a degree or two while making the adjustments.

4. Set the test oscillator to 600 kc and tune in its signal. Peak the broadcast oscillator padder, C10. The variable should be rocked during the adjustment.

5. Repeat the 1600 kc and then the 1400 and 600 kc adjustments for greater accuracy.

RF Alignment; Long Wave Band A:

1. The Broadcast band must have been aligned before the Long Wave band. The output meter and test oscillator connections are the same as for Broadcast band alignment. Keep the receiver Volume Control on full, the Tone Control brilliant, and the test oscillator output power at the lowest possible value.

2. Turn the Wave Band switch to the "A" position. Set the test oscillator to 400 kc. Open the variable condenser plates all the way and adjust the long wave oscillator trimmer, C11, for maximum output meter reading.

3. Set the test oscillator to 385 kc and tune in its signal. Then peak the preselector trimmers, C2 and C3.

4. Repeat the 400 kc and then the 385 kc adjustments for greater accuracy. Always keep the receiver Volume Control on full, the Tone Control in its brilliant position, and the test oscillator output at the lowest possible value consistent with a satisfactory output meter reading.

Short Wave Band C:

1. Remove the .00025 mfd condenser, used in series with the test oscillator output lead for previous alignment. Replace this condenser with a 400 ohm carbon resistor. Turn the Wave Band switch to the "C" position. All other connections and settings remain the same as for previous alignment.

2. Set the test oscillator to 14,000 kc and tune in its signal. Then peak the short wave translator trimmer, C7. The variable should be rocked a degree or two during the adjustment. If two peaks can be obtained at two different settings of the trimmer, use the one in which the trimmer is screwed further out (lesser capacity).

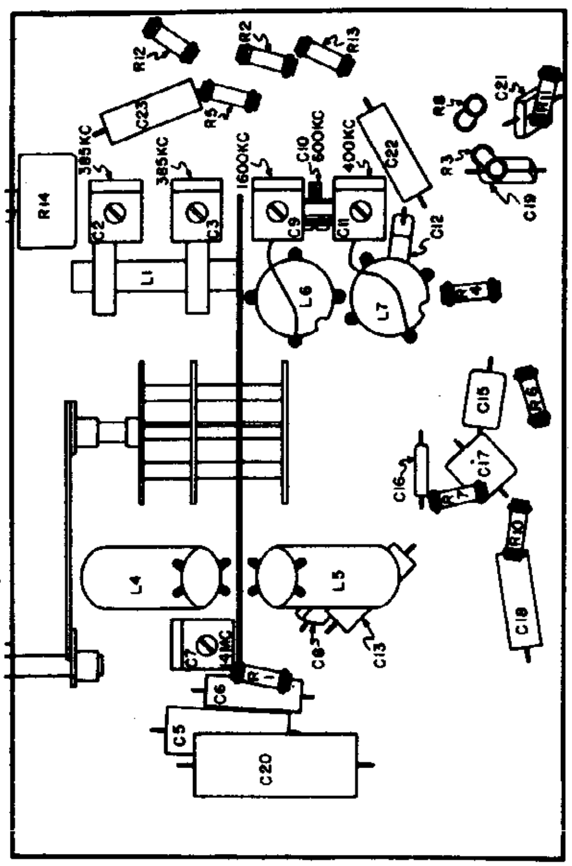
SENSITIVITIES

The following figures are given as an indication of sensitivities that should be had at various points in the receiver. It is necessary to have a test oscillator with an accurately calibrated attenuator so that its power output can be known. The output meter is to be connected, in series with a .5 mfd condenser, across the loud speaker terminals. An output meter reading of 8½ volts should be obtained for each of the input voltages shown for the frequencies listed.

The Volume Control of the receiver must be all the way on and the Tone Control turned all the way to the right. The ground lead of the test oscillator is to be connected to the chassis and the output lead of the test oscillator connected in series with the value of condenser or resistor shown in the list for the particular frequency at which the measurement is being made.

INPUT POINT	DUMMY ANTENNA	FREQUENCY	MICROVOLTS
Translator Grid	.1 mfd	175 kc	55 *
IF Grid	.1 mfd	175 kc	3500 *
Translator Grid	.1 mfd	1000 kc	55
Stator, Ant. Cond.	.1 mfd	1000 kc	150
Antenna Lead	.00025 mfd	1000 kc	25
Antenna Lead	.00025 mfd	600 kc	35
Antenna Lead	.00025 mfd	1000 kc	40
Antenna Lead	.00025 mfd	1400 kc	60
Antenna Lead	.00025 mfd	400 kc	30
Antenna Lead	.00025 mfd	385 kc	35
Antenna Lead	.00025 mfd	225 kc	125
Antenna Lead	400 ohms	6000 kc	55
Antenna Lead	400 ohms	10000 kc	20
Antenna Lead	400 ohms	14000 kc	25

* Wave Switch in BROADCAST position and dial set at 550 kc.

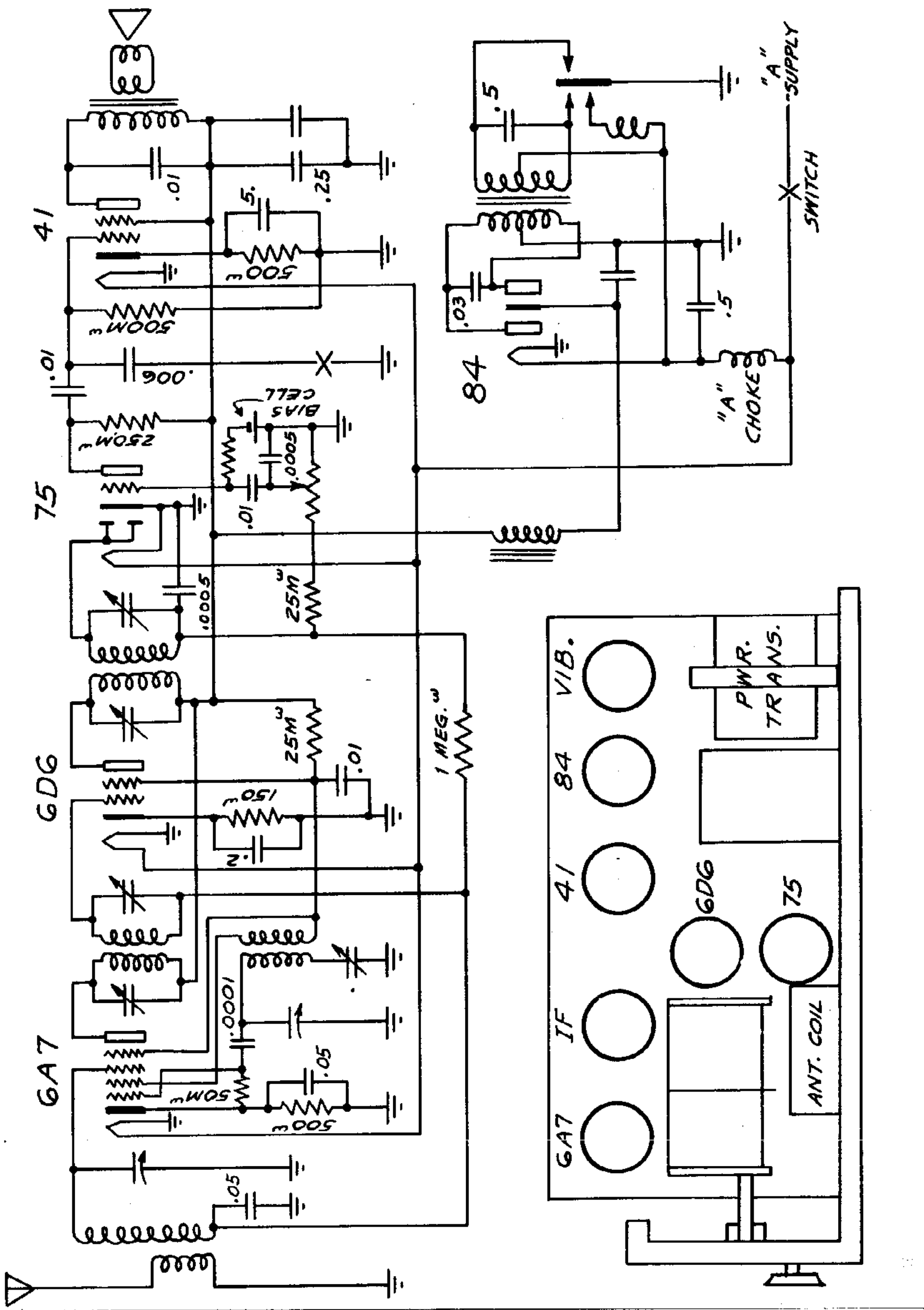


T1, T2, R9, C1, C4, C14, L2 & L3 ARE MOUNTED ON TOP OF THE CHASSIS.

LOCATIONS OF PARTS - MODELS 1947-1948

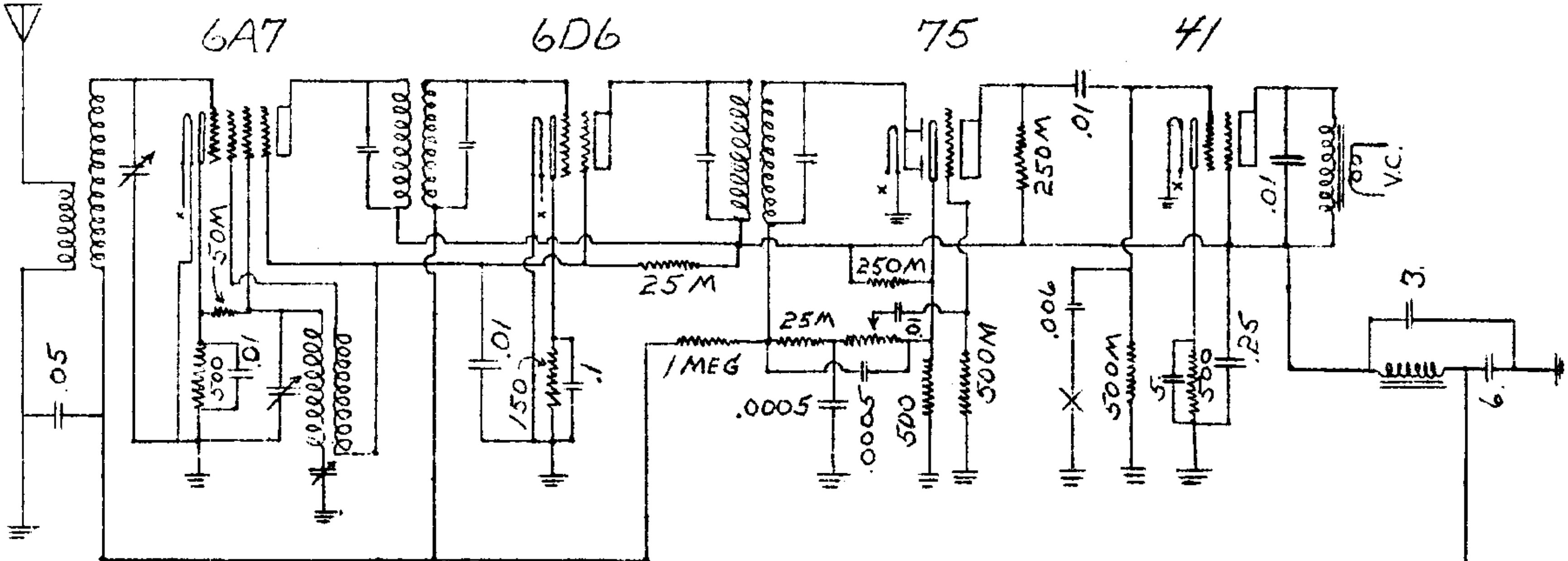
MODEL 1949 Auto
Schematic, Socket

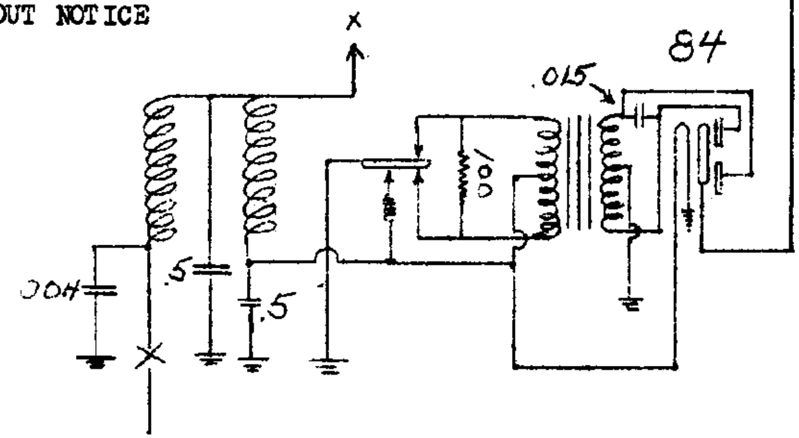
SEARS-ROEBUCK & CO.



MODEL 1949A Auto
Schematic, Parts

SEARS-ROEBUCK & CO.





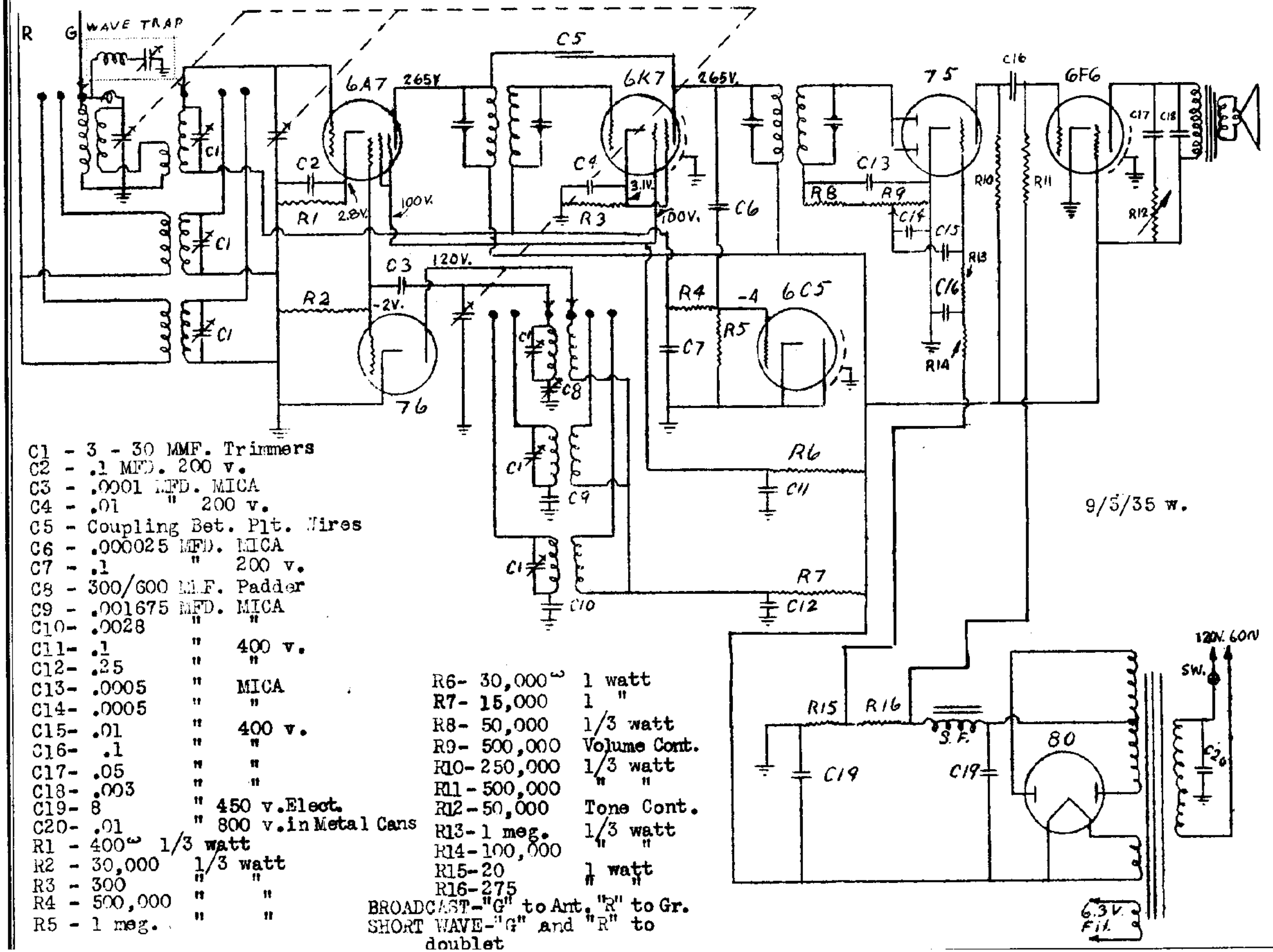
— PARTS - LIST —

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

		LIST
130A	Variable condenser	$2.30
130B	Volume Control w/s	.88
130C	Tone Control	.65
105D	Speaker	3.90
130E	Electrolytic Cond.	1.35
105F3	1st IF & Osc. Coil	1.75
130F4	2nd IF Coil	1.25
105F6	Antenna Coil	1.25
130H	Power Transformer	2.90
130J	Dial	1.65
105N	"B" Choke	.62
105V	Vibrator	4.00
	Any tube socket	.12
	Any carbon resistor	.10
	By pass condensers	.15

MODEL 1970
Schematic

SEARS-ROEBUCK & CO.



C1 - 3 - 30 MMF. Trimmers
C2 - .1 MFD. 200 v.
C3 - .0001 MFD. MICA
C4 - .01 " 200 v.
C5 - Coupling Bet. Plt. Wires
C6 - .000025 MFD. MICA
C7 - .1 " 200 v.
C8 - 300/600 MMF. Padder
C9 - .001675 MFD. MICA
C10 - .0028 " "
C11 - .1 " 400 v.
C12 - .25 " "
C13 - .0005 " MICA
C14 - .0005 " "
C15 - .01 " 400 v.
C16 - .1 " "
C17 - .05 " "
C18 - .003 " "
C19 - 8 " 450 v. Elect.
C20 - .01 " 800 v. in Metal Cans
R1 - 400Ω 1/3 watt
R2 - 30,000 1/3 watt
R3 - 300 " "
R4 - 500,000 " "
R5 - 1 meg. " "
R6 - 30,000Ω 1 watt
R7 - 15,000 1 "
R8 - 50,000 1/3 watt
R9 - 500,000 Volume Cont.
R10 - 250,000 1/3 watt
R11 - 500,000 " "
R12 - 50,000 Tone Cont.
R13 - 1 meg. 1/3 watt
R14 - 100,000 " "
R15 - 20 1 watt
R16 - 275 " "

BROADCAST - "G" to Ant. "R" to Gr.
SHORT WAVE - "G" and "R" to doublet

MODEL 1970
Alignment, Socket
Trimmers, Voltage

SEARS-ROEBUCK & CO.

ALIGNMENT OF RECEIVER

1- Connect the test oscillator through a .1 mfd condenser to the control grid cap of the 6A7 tube, without removing the grid cap and being certain the shield cap is in place. The red and black wires coming from the receiver are connected together and connected to the ground lead of the test oscillator.

2- Connect the output meter to the voice coil of the speaker.

3- Advance volume control all the way on and turn tone control to "high" position.

4- Set the test oscillator to 456 KC and adjust the I F trimmer condensers for maximum output, using the weakest possible signal from the test oscillator in order to make the AVC action of the receiver inoperative. If the signal from the test oscillator is strong enough to produce more than a readable indication on the output meter then incorrect results may be obtained.

5- If, for any reason, the test oscillator cannot be controlled to give the desired low indication on the output meter, then it is permissable to slightly retard the volume control.

6- Set band switch of the receiver to position "B" (all the way to the right). Remove the test oscillator output lead from the grid of the 6A7 tube and connect it through a .00025 mfd condenser (instead of the .1mfd condenser) to the green antenna lead of the receiver. Tune the receiver to read 1400 KC on the dial and adjust the test oscillator to 1400 KC. When the signal is tuned in adjust the broadcast oscillator trimmer (see Fig.) for maximum response. Then adjust the broadcast preselector trimmer for maximum response. Then adjust the one trimmer located on the top of the center section of the variable condenser, in the same manner.

7- Apply a 600 KC signal to the antenna and tune this signal on the receiver. Adjust the padder condenser for maximum response. To make this adjustment it is necessary to tune the receiver back and forth past the signal at the same time that the padder is being carefully adjusted.

8- Apply a strong 456 KC signal to the antenna. Adjust the wave trap for minimum signal. (if the code interference is experienced with the receiver after all alignment adjustments have been made, then the wave trap should be adjusted to reduce the code interference to a minimum).

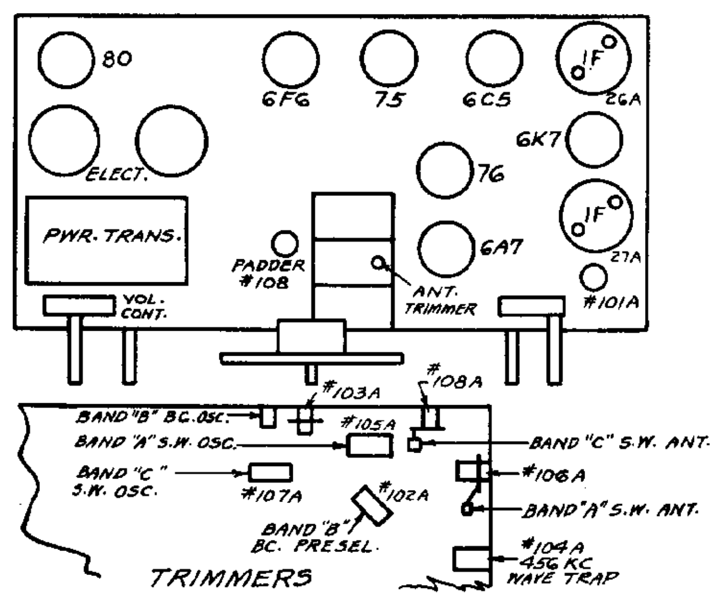
9- Set band switch on position "A" (center position). Connect a 400-ohm resistor between the test oscillator and receiver antenna lead, in place of the .00025 mfd condenser. Apply a 4 MC signal and tune in this signal for maximum response. Adjust antenna trimmer (see Fig. to identify "Band 'A' - SW - Antenna trimmer) for maximum response.
(Note: Maximum response may be had with the trimmer either practically open or practically closed. The closed position is the correct one.)

10- Set band switch on position "C" (all the way to the left.) Still using 400 ohms in series with the antenna, apply a 14 MC signal. Adjust dial to 14 MC. Adjust Band "C" oscillator trimmer for maximum response. If two points of response are noted, the correct adjustment is the one obtained when the least capacity is used (condenser open.) Adjust Band "C" antenna trimmer for maximum response, remembering that the point obtained with the antenna trimmer practically closed is the correct one.

VOLTAGES MEASURED FROM POINT TO CHASSIS, USING A 1000-ohm-per-volt meter.
(Line: 120 volts A.C.)

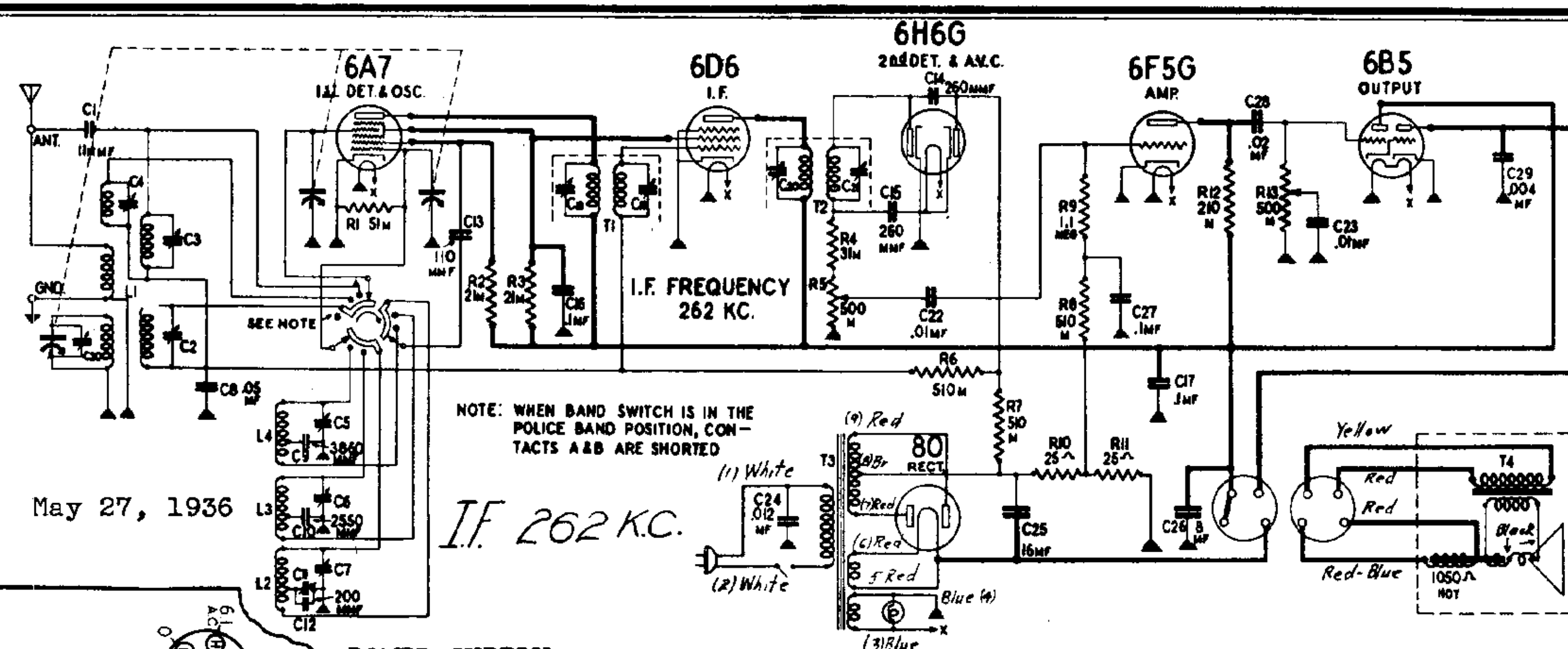
	750 volt scale	10 volt scale			
	PLATE	SCREEN GRID	CATHODE	GRID	FILAMENT
6A7	265 V	100 V	2.8 V		6.1 V AC
76	120 V			-2 V	6.1 V AC
6K6	265 V	100 V	3.1 V		6.1 V AC
6C5				-.4 V	6.1 V AC
75	190 V			-.4 V	6.1 V AC
6F6	250 V	265 V		* -.7 V	6.1 V AC
80	265 V	Filament to chassis			

* Does not indicate true grid voltage due to high resistance of grid circuit.



SEARS-ROEBUCK & CO.

MODELS 1986,1987,4403,4463
4464,4484,4563,4564,4584
Chassis 100150
Schematic,Socket,Voltage



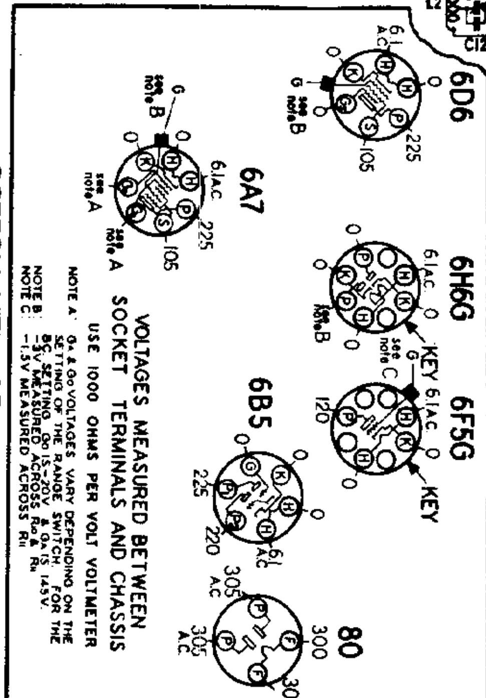
POWER SUPPLY
All models available..............105-135 volts, 50-60 cycle, 50 watts

FREQUENCY RANGES	ALIGNMENT FREQUENCIES
Band A.............525 to 1800 KC.	1400 KC.; 600 KC. (osc. padder)
Band P............1760 to 6000 KC.	5000 KC.
Band F..........5800 to 18,100 KC.	16,000 KC.

INTERMEDIATE FREQUENCY.....................................262 KC

POWER OUTPUT	LOUD SPEAKER
Type.......................Class A	Type......................Dynamic
Undistorted......................2.5	Size.....................6" or 8"
Maximum.................3.3 Watts	Field Coil Res.....1050 ohms (Hot)
	Field Coil Voltage........75 volts

OPERATING FEATURES	CHASSIS FEATURES
Fidelity Range......50-5000 cycles	Preselector on Bc. Band
Tone Control..............Variable	Number of I.F. Stages...........1
Automatic Volume Control	Antenna..............Conventional

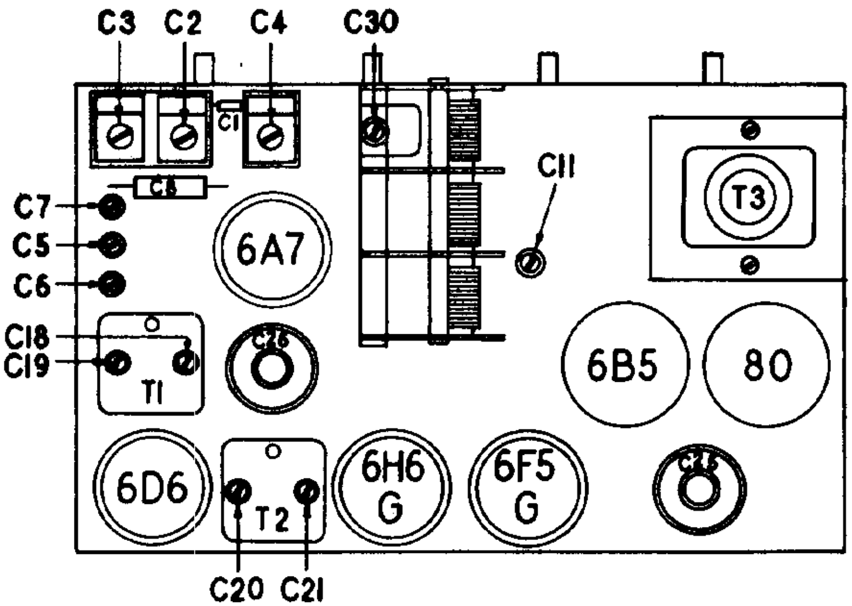


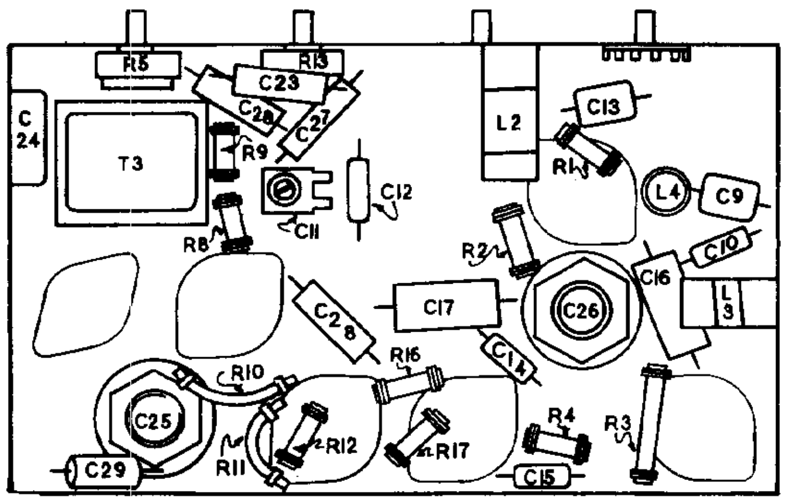
BOTTOM VIEW OF CHASSIS

MODELS 1986,1987,4403,4463
4464,4484,4563,4564,4584
Chassis 100150

Socket,Trimmers,Chassis
Alignment

SEARS-ROEBUCK & CO.





ALIGNMENT PROCEDURE

RELIMINARY

Output meter connections..........................Across voice coil leads
Output meter reading to indicate 1 watt output....................2 volts
Average sensitivity in microvolts for 1 watt output........See chart below

Dummy antenna value to be in series with generator output..See chart below
Connection of generator output lead.......................See chart below
Generator modulation.....................................30%, 400 cycles

Position of volume control...............................full clockwise
Position of tone control.................................full clockwise

BAND SWITCH	POSITION OF * DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (In order shown)	MICRO VOLTS
Band A I.F.	1000 KC.	262 KC.	.1 Mfd.	6A7 Grid	C18, C19, C20, C21	125
	1500	1500	.00025	Ant. Lead	C7,C30,C2	50
	600(Rock)**	600	.00025	Ant. Lead	C11	50
Band P	5000 KC.	5000 KC.	400 Ohm	Ant. Lead	*** C6, C4	85
Band F	16000 KC.	16000 KC.	400 Ohm	Ant. Lead	*** C5, C3	50

IMPORTANT ALIGNMENT NOTES

* Before attempting to align the receiver check to see that the dial pointer coincides with the horizontal dividing line of the scale when the gang condenser is in full mesh, and adjust if necessary.

After adjusting the I.F. trimmers C18, C19, C20 and C21, go back and repeat the adjustment, since the setting of each trimmer will have some effect on the others.

** When aligning the broadcast band at 600 KC. it is necessary to adjust trimmer C11 while slowly rocking the gang condenser through a small distance. Rocking the gang is essential if maximum sensitivity is to be obtained.

*** When aligning the short wave bands, care should be observed in adjusting trimmers C6 and C5, since, two possible adjustments of these trimmers will result in signal peaks. The proper peak is that which occurs with the trimmer screw farthest out.

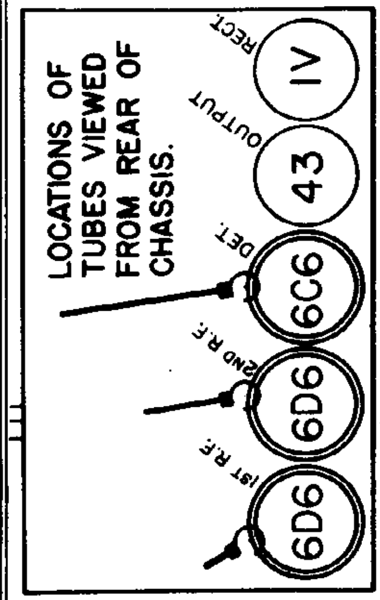
SEARS-ROEBUCK & CO.

MODELS 4414, 4415, 4500
4505, 4506
Schematic, Socket, Chassis
Alignment

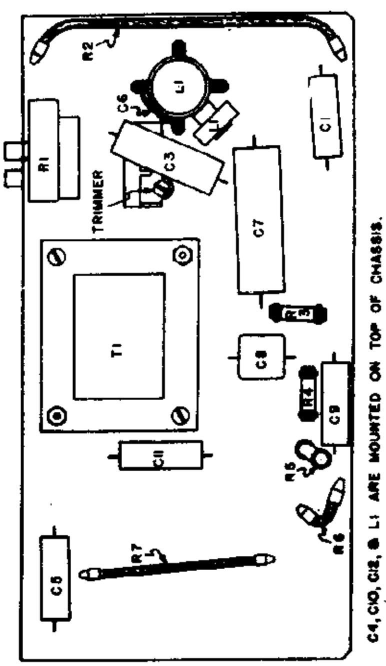
May 15, 1936

LOUD SPEAKER:
Type - - - - - - - - - - - - Dynamic
Size - - - - - - - - - - - - - - - 5"
Field Coil Resistance - - 1750 ohms
Field Coil Voltage Drop App. 120 volts

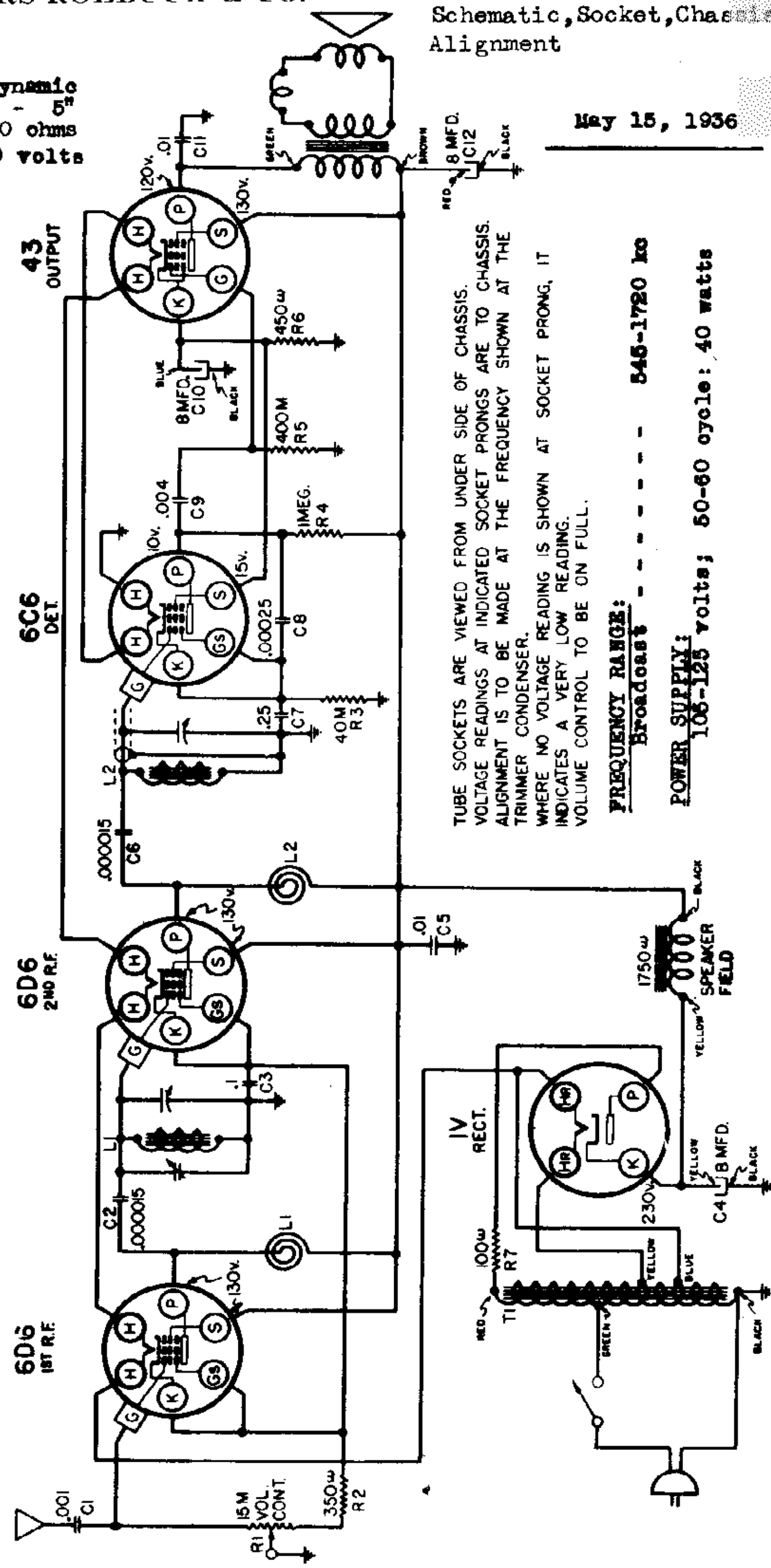
POWER OUTPUT:
Type - - - - - - - Single Pentode
Undistorted - - - - .98 watts
Maximum - - - - - - - 1.64 watts



ARRANGEMENT OF TUBES



LOCATIONS OF PARTS UNDER CHASSIS

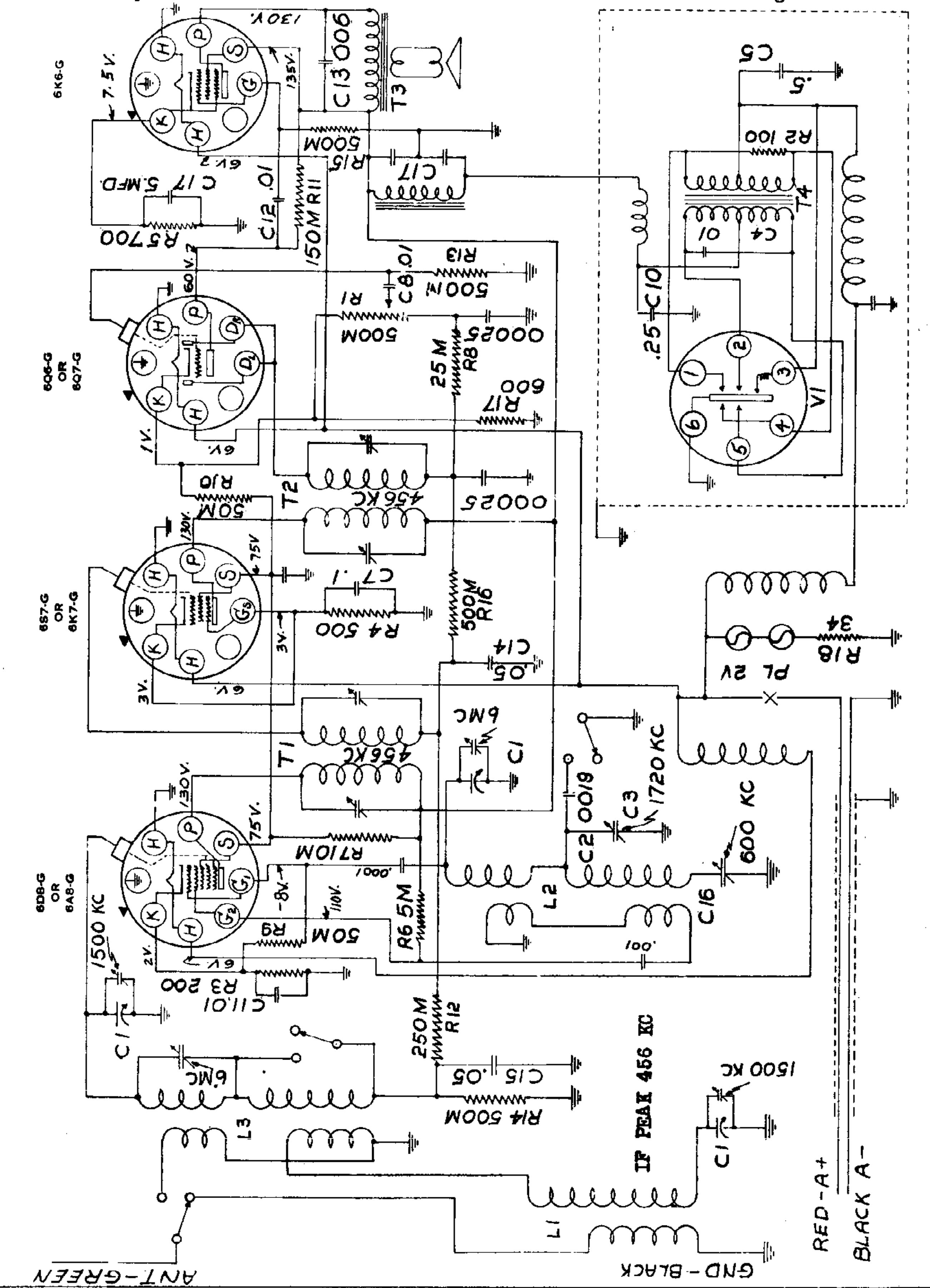


ALIGNMENT: Tune in a 1400 kc sig. & adjust trimmer for Max. response. Vol. Cont. setting is reduced to give a low vol. level. Rock var. cond. a degree or two during adjustment. Trimmer is accessible when chassis is in cabinet, thru a hole in plate at bottom of cab. An insulated screw driver should be used. CAUTION: An auto-transf. is used instead of the usual power transf. having separate primary & secondary windings. The chassis may be above gnd. potential and care must thus be taken NOT to allow any grounded object to come in contact with the chassis while it is plugged into the line. The chassis is insulated from cabinet metal bottom cover with rubber grommets.

MODELS 4418, 4421, 4430
4434, 4521

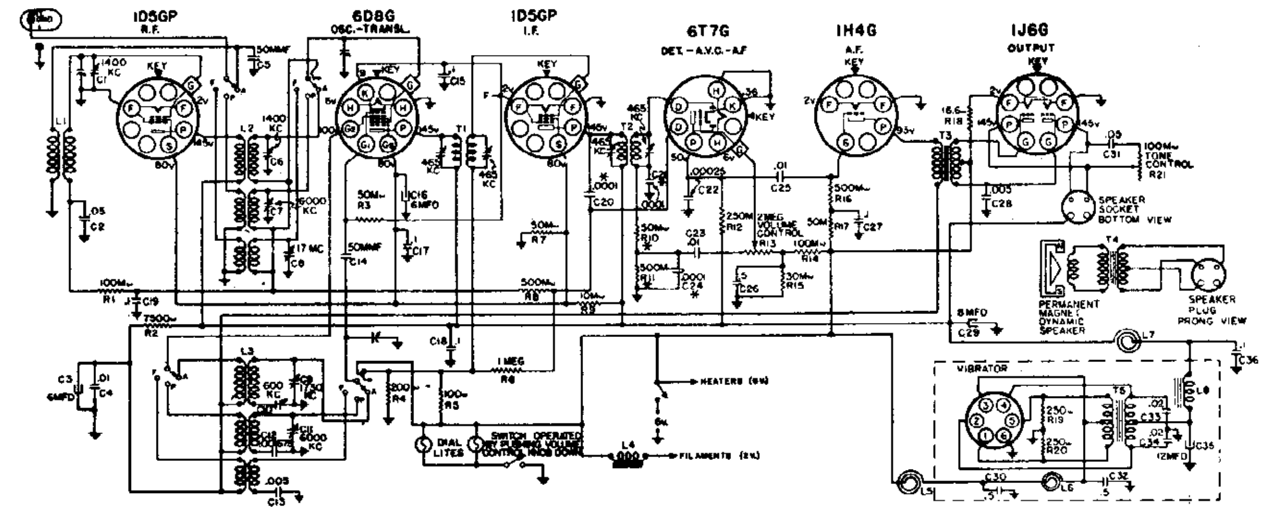
SEARS-ROEBUCK & CO.

Schematic, Voltage
Alignment



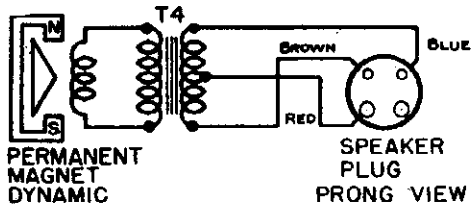
SEARS-ROEBUCK & CO.

MODELS 4419,4459,4519,4559
Schematic,Spkr.Wiring
Interference Elimination



January 27, 1937

IF PEAK 465 KC



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING
FIGURES AT CATHODES INDICATE CATHODE CURRENT IN MILLIAMPERES

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

SET DEAD AT 2 MC ON BAND "P":

In original production receivers the 50M ohm resistor, R3, was connected to ground. In later production chassis, rubber stamped with the letter, "A", or a subsequent letter, the resistor connection was made to the cathode of the 6D8G tube. This prevents failure to oscillate at 2 mc on the Police Band with certain 6D8G tubes. Trouble of this sort in the field with earlier production receivers can be corrected by changing the oscillator tube or preferably by changing the connection of R3 to the cathode of the 6D8G tube.

WAVE-TRAP TO ELIMINATE INTERFERENCE FROM SHIP OR AIRPORT TRANSMITTERS:

In locations near ship transmitters or airports or air beacon stations, code interference may be experienced. Part #1013114256 wave-trap is designed to eliminate such interference.

Mount the trap, by means of two wood screws, at any convenient place on the chassis shelf or cabinet where it will be near the antenna terminal of the receiver. Connect the yellow lead of the wave-trap to the antenna downlead. Connect the green lead of the wave-trap to the antenna terminal of the receiver. Cut off any excess length of green wire from the trap so that the green lead from the wave-trap to the chassis is as short as possible. The yellow lead from the wave-trap should be run so that it is as far as possible from the green lead. Connect one of the black leads from the wave-trap to the ground terminal of the receiver. Connect the other wave-trap black lead to the ground used for the installation.

The trap is pre-tuned to the IF frequency so that normally no further adjustment is necessary. However, should interference still be experienced, tune the receiver between approximately 550 and 600 kc. Then adjust the wave-trap, by means of the trimmer screw at the bottom of the container, until the interference is eliminated. Addition of the trap will reduce the sensitivity of the receiver around 600 kc by approximately 50%. The customer should be forewarned of this to avoid complaints of reduced sensitivity.

MODELS 4419,4459,4519,4559
Socket,Trimmers,Chassis
Alignment,Sensitivity

SEARS-ROEBUCK & CO.

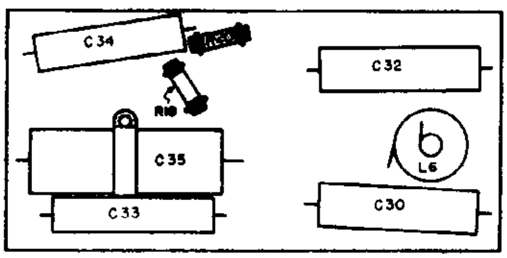
POWER OUTPUT:
Type . . . . Class "B"
Undistorted . . . . 0.8 watts
Maximum . . . . 1.25 watts

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"A"	Closed	465 kc	.1 mfd.	6D8G Grid	T2,T1	IF	6300
"A"	Open	1730 kc	.0002 mfd.	Ant. Term.	C9	Oscillator	30
"A"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C6,C1	Transl., Ant.	8
"A"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C10	Padder	15
"P"	6 mc	6 mc	400 ohms	Ant. Term.	C11,C7 *	Osc., Transl.	30
"P"	2.2 mc	2.2 mc	400 ohms	Ant. Term.	-	-	150
"F"	17 mc	17 mc	400 ohms	Ant. Term.	**	-	-
"F"	17 mc (rock)	17 mc	400 ohms	Ant. Term.	C8	Translator	30
"F"	7 mc	7 mc	400 ohms	Ant. Term.	-	-	200

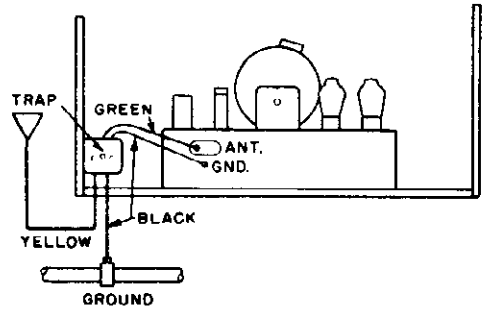
IMPORTANT ALIGNMENT NOTES

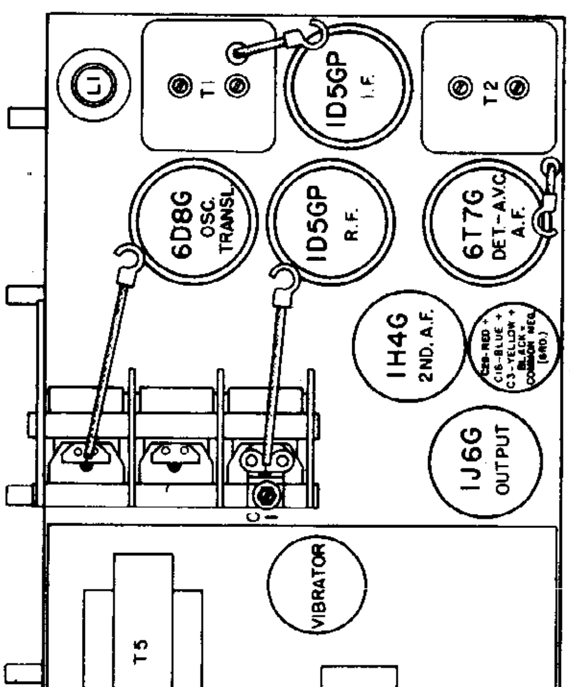
*- When adjusting C11 two peaks may be found. The one in which the trimmer is screwed further out (lesser capacity) is the correct one.

** Twist or untwist the twisted leads on the wave switch until the 17 mc calibration is correct.

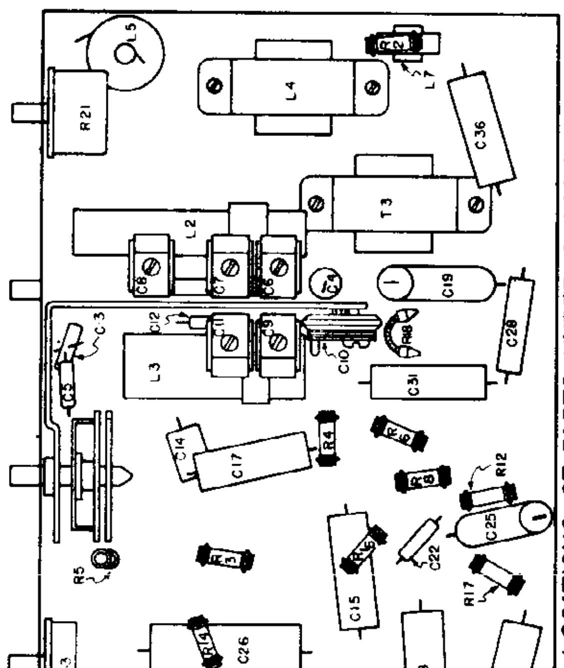


LOCATIONS OF PARTS IN BOTTOM OF POWER SUPPLY HOUSING





LOCATIONS OF PARTS ON TOP OF CHASSIS

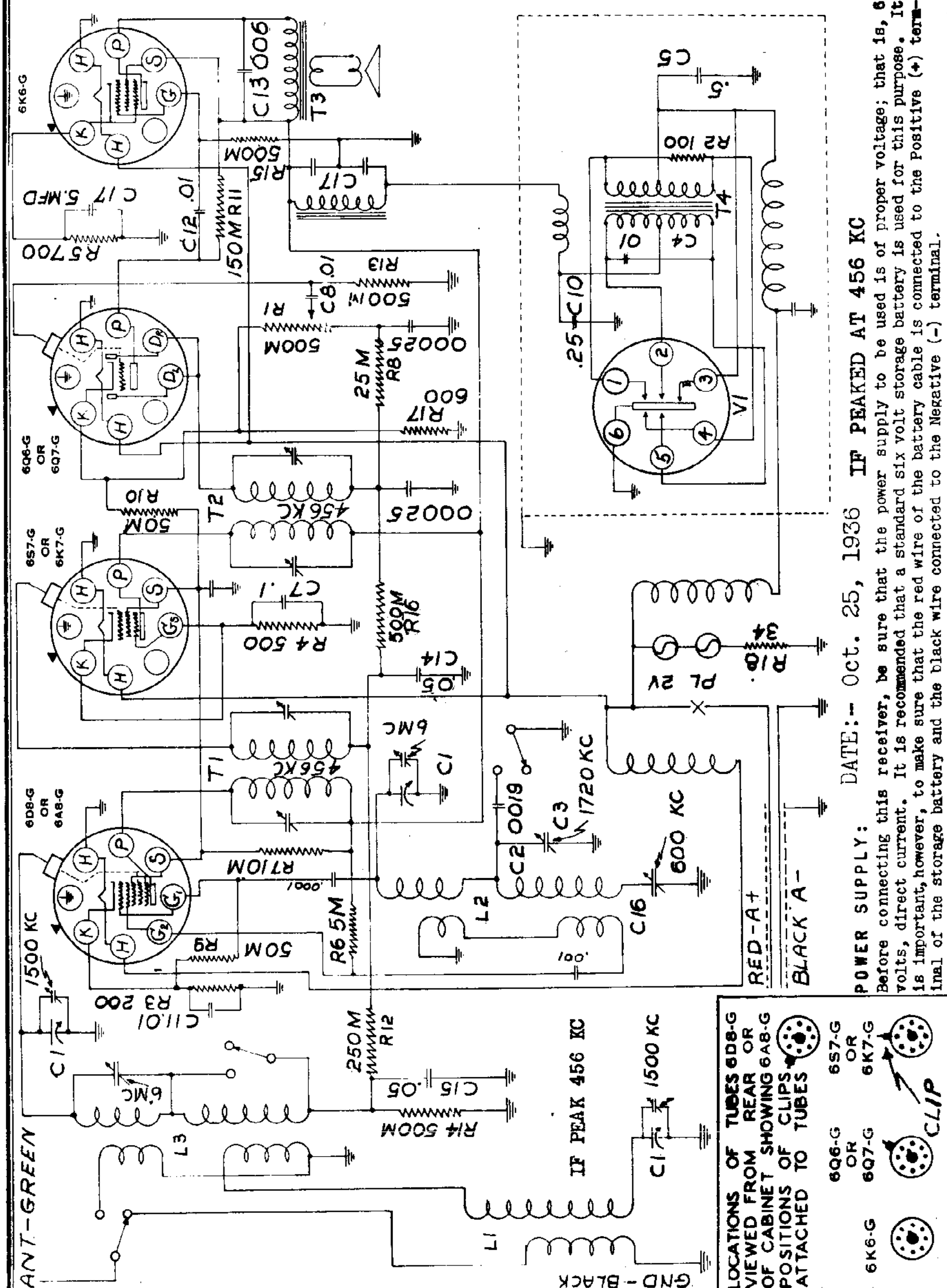


LOCATIONS OF PARTS UNDER CHASSIS

Schematic, Socket

SEARS-ROEBUCK & CO.

MODELS 4421, 4434, 4521
Chassis 104127



DATE:- Oct. 25, 1936 IF PEAKED AT 456 KC

POWER SUPPLY: Before connecting this receiver, be sure that the power supply to be used is of proper voltage; that is, 6 volts, direct current. It is recommended that a standard six volt storage battery is used for this purpose. It is important, however, to make sure that the red wire of the battery cable is connected to the Positive (+) terminal of the storage battery and the black wire connected to the Negative (-) terminal.

MODELS 4421,4434,4521
Alignment,Voltage

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY

Output meter connections .... Across voice coil leads
Output meter to indicate 50 MW. .... 7.5 Volt
Average sensitivity in microvolts for 50 MW. output ....See chart below

Generator ground connection .... Receiver Chassis
Dummy ant. in series with generator output .... See chart below
Connection of generator output lead .... See chart below
Generator modulation .... 30%; 400 cycles

Position of volume control .... Maximum

BAND SWITCH	POSITION OF DIAL	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED IN ORDER SHOWN	MV
BAND A	540 KC	456 KC	.1 MFD	6D8-G GRID		60
BAND PF	6 MC	6 MC	.400 ohm	Ant. LEAD	Trimmer on Var.Osc.Sec.	
BAND PF	6 MC	6 MC	.400 ohm	Ant. LEAD	Trimmer on Coil L2	40
BAND A	1720 KC	1720 KC	.00025	Ant. LEAD	C3	
BAND A	600 KC ROCKGANG	600 KC	.00025	Ant. LEAD	C-16	25
BAND A	1500 KC	1500 KC	.00025	Ant. LEAD	Trimmer on variable Trimmer on variable	25

Align Short Wave Before Broadcast band as indicated in chart.

IMPORTANT ALIGNMENT NOTES

Before attempting to align the receiver, check to see that the dial pointer coincides with the horizontal dividing line of the scale when the gang condenser is in full mesh.

After adjusting the I.F. trimmers, go back and repeat the adjustment, since the setting of each trimmer will have some effect on the others.

When aligning the broadcast band at 600 KC. it is necessary to adjust trimmer C-16 while slowly rocking the gang condenser through a small distance. Rocking the gang is essential if max. sensitivity is to be obtained.

When aligning the short wave band, care should be taken in adjusting the oscillator trimmer on the variable condenser, since two possible adjustments of these trimmers will result in signal peaks. The proper peak is that which occurs with the trimmer screw farthest out.

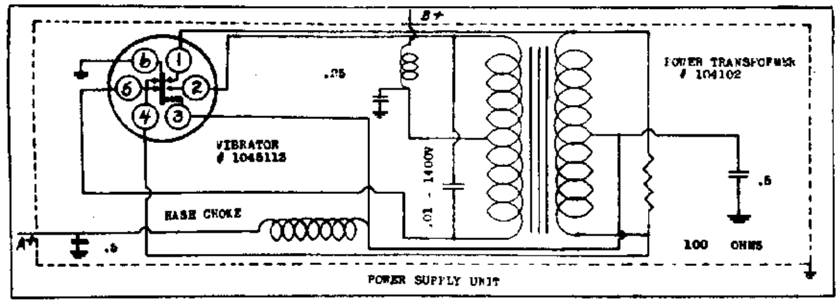


Fig. 3.

ELECTRICAL SPECIFICATIONS

TUBE COMPLEMENT
1 6D8G (6A8G) ..... 1st Det. & Osc.   1 6Q6G (6Q7G) 2nd Det.-AVC-Audio
1 6S7G (6K7G) .... I.F. Amp.   1 6K6G .... PWR Output

POWER SUPPLY
Standard Six Volt Storage Battery

FREQUENCY RANGES
Band A .... 540-1720 KC.
Band PF .... 2.1-7 MC.

ALIGNMENT FREQUENCIES
1720-1500 .... 600 KC.
6 MC.

INTERMEDIATE FREQUENCY .... 456 KC.

POWER OUTPUT
Type .... Class A
Maximum .... 1.06 Watts

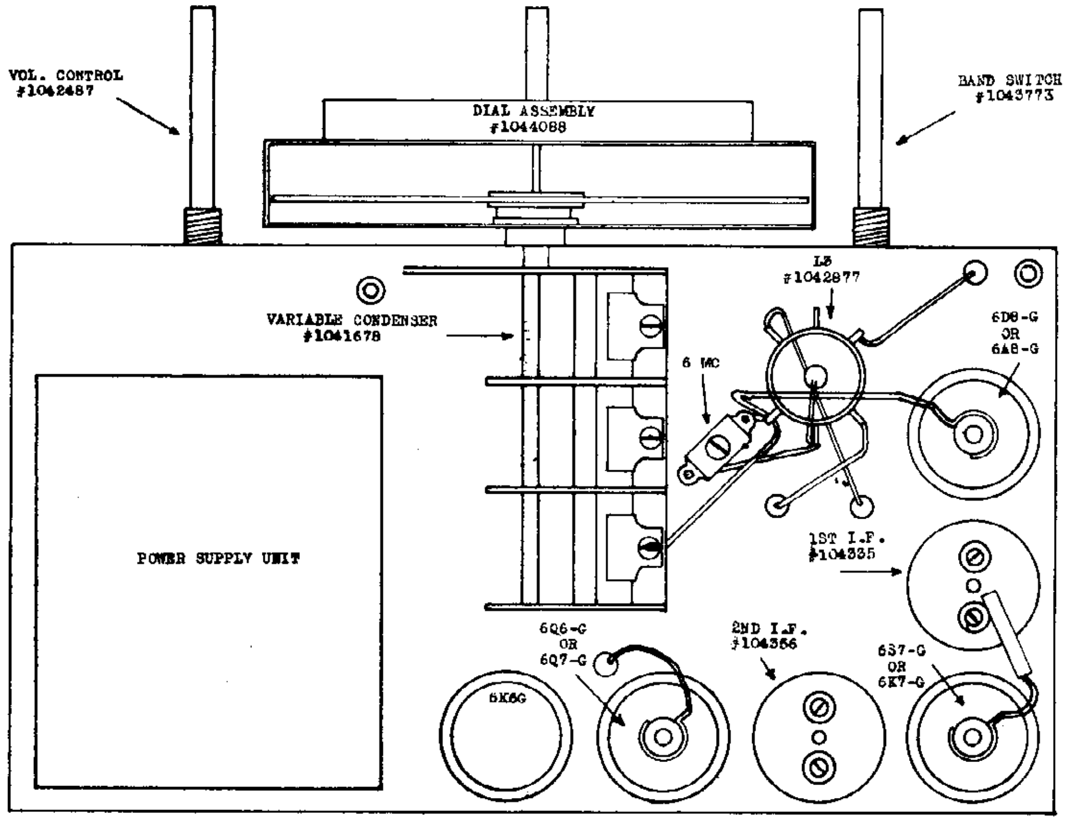
SPEAKER
Type .... P.M. Dynamic
Size .... 6 inch

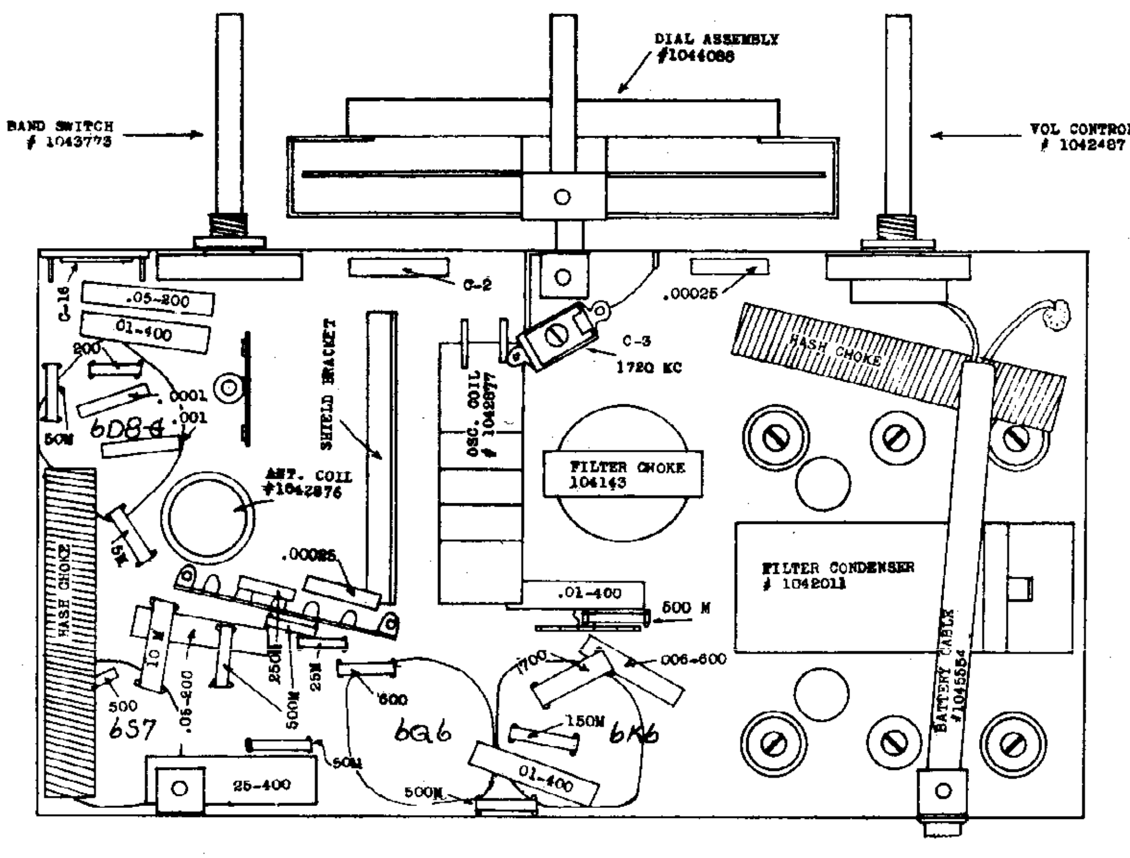
VOLTAGE CHART

All voltages measured from chassis to socket terminals. Use 1000 ohm per volt voltmeters.

TUBE	PROG #1	#2	#3	#4	#5	#6	#7	#8	
6D8-G	0	0	130	75	-.8	110	5	2	
6S7-G	0	0	130	75	3		6	3	
6Q6-G	0	0	60				6	1	
6K6-G	0	0	130	135	0		6	7.5	

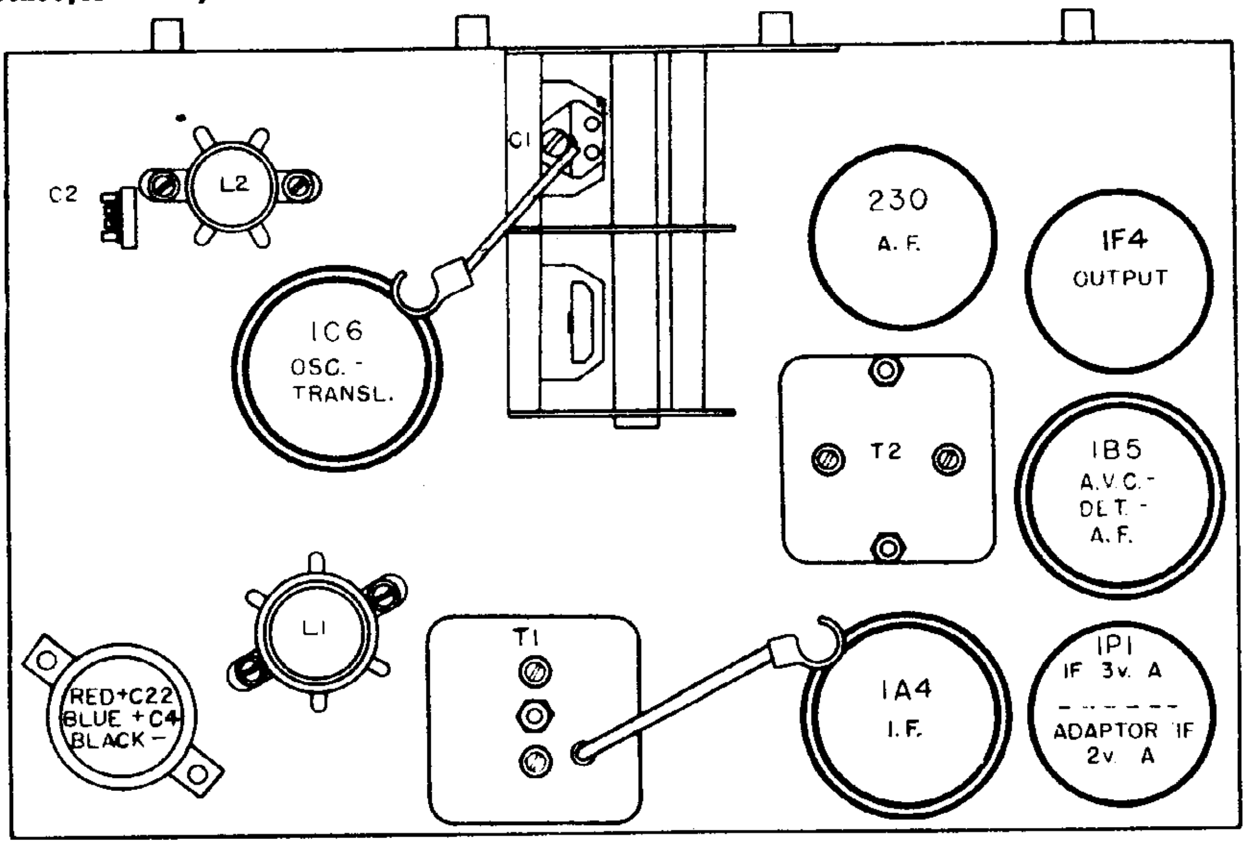
SEARS-ROEBUCK & CO.



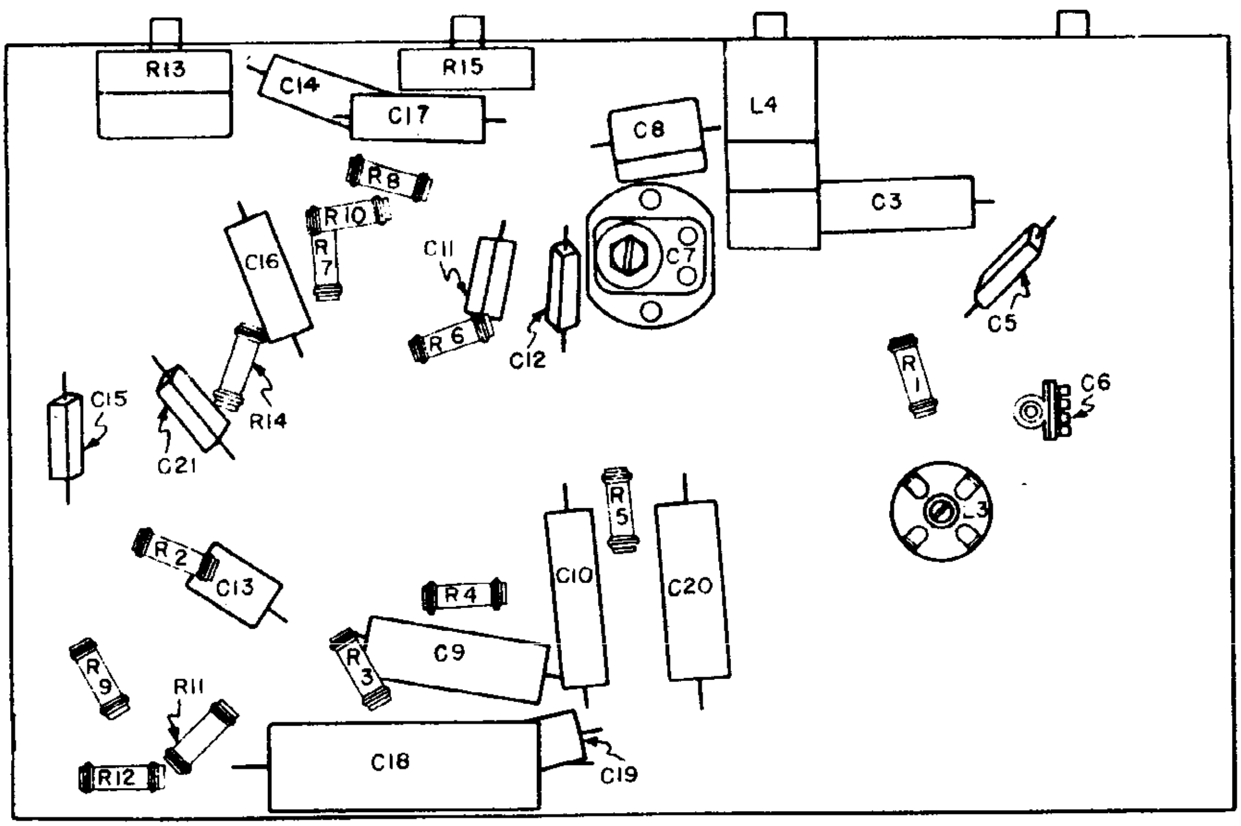


MODELS 4422, 4423, 4524A
4532, 4542A
Socket, Trimmers, Chassis

SEARS-ROEBUCK & CO.



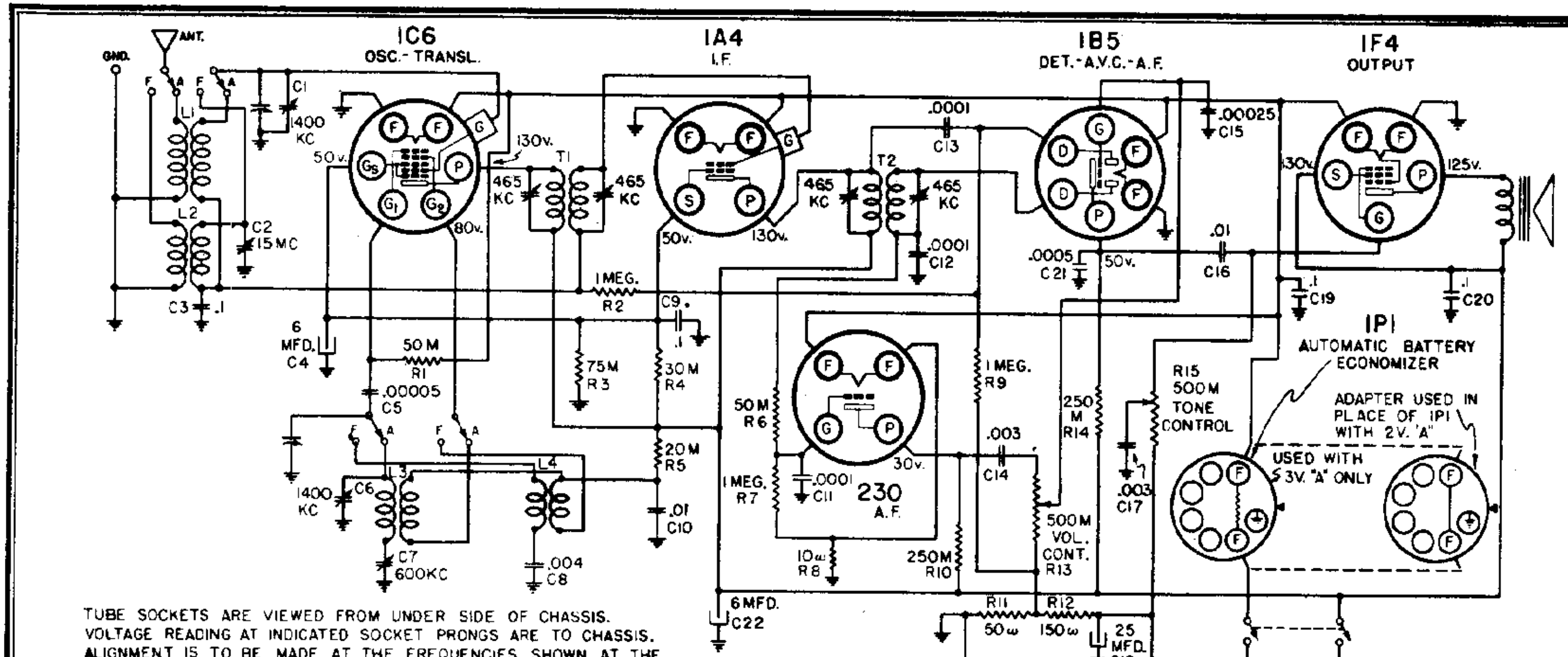
LOCATIONS OF PARTS ON TOP OF CHASSIS



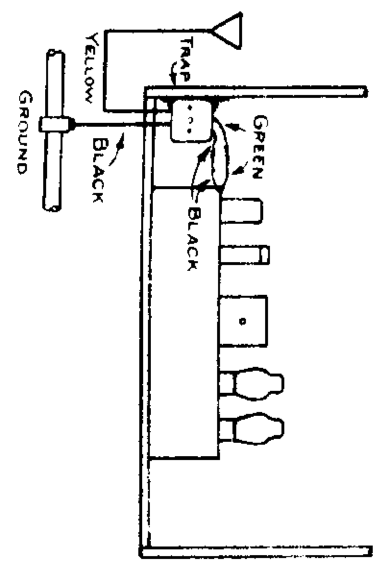
LOCATIONS OF PARTS UNDER CHASSIS

SEARS-ROEBUCK & CO.

57RL 15
August 14, 1936



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READING AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG INDICATES A VERY LOW READING.



POWER SUPPLY:
"A" Battery (three volt) - 1 - #5500P
or #5023P
"A" Battery (two volt) - - - 1 - #734

"B" Batteries - - - - 3 - #5503P
"A" Drain - - - - - - - - - .42 amperes
"B" Drain - - - - - - - - - - 20 ma

FREQUENCY RANGES:
Band "A" - - - - - - - - 540-1740 kc
Band "F" - - - - - - - 5450-16500 kc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Padder
Band "A"	1400 kc	1400 kc	600 kc
Band "F"	-	15 mc	Fixed

INTERMEDIATE FREQUENCY - 465 kc

POWER OUTPUT:
Type - - - - - - - - - Single Pentode
Undistorted - - - - - - - - .325 watts
Maximum - - - - - - - - - .65 watts

LOUD SPEAKER:
Type - - - - - - - - - - - - Magnetic
Size - - - - - - - - - - - - - - - - 6"
DC resistance - - - - - 1000 ohms

OPERATING FEATURES:
Fidelity Range - - 50 - 5000 cycles
Tone Control - - - - - - - Variable
Automatic Volume Control
"On-Off" Indicator

CHASSIS FEATURES:
Number IF stages - - - - - - - - One
Antenna - - - - - - - - - - - Marconi
Automatic Battery Economizer - - Automatically compensates for decreased voltage from ageing "A" battery. (Three volt models only. Replaced by plug adapter with two volt stor-

MODELS 4422,4423,4524A
4532,4542A

SEARS-ROEBUCK & CO.

Alignment,Sensitivity
Interference Elimination

PRELIMINARY:

Output meter connection - - - - - - - - - - - - - 4000 ohm meter, in series with a .5 mfd. condenser, across speaker terminals.

Output meter reading to indicate 50 milliwatts - - - - - - - - - - - - - - - - - 8.5 volts

Generator ground lead connection - Receiver chassis

Dummy antenna value to be in series with generator output - - - - - - - - - - See chart below

Connection of generator output lead - See chart below

Generator modulation - 30%, 400 cycles

Approximate average sensitivity in microvolts for 50 milliwatts output - - - See chart below

Position of volume control - Fully clockwise

Position of tone control - Fully clockwise

Position of dial pointer - - - - - - Along center line of dial with variable fully meshed.

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTED (IN ORDER SHOWN)	MICROVOLTS
"A"	1000 kc	465 kc	.1 mfd.	1A4 Grid	T2	-
"A"	1000 kc	465 kc	.1 mfd.	1C6 Grid	T1	-
"A"	1400 kc	1400 kc	.0002 mfd.	Antenna Lead	C6,C1	15
"A"	600 kc (rock)	600 kc	.0002 mfd.	Antenna Lead	C7	15
"F"	15 mc (rock)	15 mc	400 ohms	Antenna Lead	C2	15
"F"	6 mc	6 mc	400 ohms	Antenna Lead	-	80

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The figures given in the "Microvolts" column are only approximate.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

After the alignment procedure has been completed, tune in a broadcast station at about 900 kc and, if necessary, shift the dial pointer to the station's frequency marking on the dial.

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF,and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

WAVE-TRAP TO ELIMINATE INTERFERENCE FROM SHIP OR AIRPORT TRANSMITTERS:

In locations near ship transmitters or airports or air beacon stations, code interference may be experienced. Part #1013114256 wave-trap is designed to eliminate such interference.

Mount the trap, by means of two wood screws, at any convenient place on the chassis shelf or cabinet where it will be near the antenna terminal of the receiver. Connect the yellow lead of the wave-trap to the antenna download. Splice the green lead of the wave-trap to the green antenna lead of the receiver. Cut off any excess length of wire from the trap and from the chassis antenna lead so that the green lead from the wave-trap to the chassis is as short as possible. The yellow lead from the wave-trap should be run so that it is as far as possible from the green lead. Splice one of the black leads from the wave-trap to the black ground lead of the receiver. Connect the other wave-trap black lead to the ground used for the installation.

The trap is pre-tuned to the IF frequency so that normally no further adjustment is necessary. However, should interference still be experienced, tune the receiver between approximately 550 and 600 kc. Then adjust the wave-trap, by means of the trimmer screw at the bottom of the container, until the interference is eliminated. Addition of the trap will reduce the sensitivity of the receiver around 600 kc by approximately 50%. The customer should be forewarned of this to avoid complaints of reduced sensitivity.

MODELS 4426,4427,4446
4447,4526,4546

SEARS-ROEBUCK & CO

MODELS 4426A,4526A,454
Schematics,Voltage

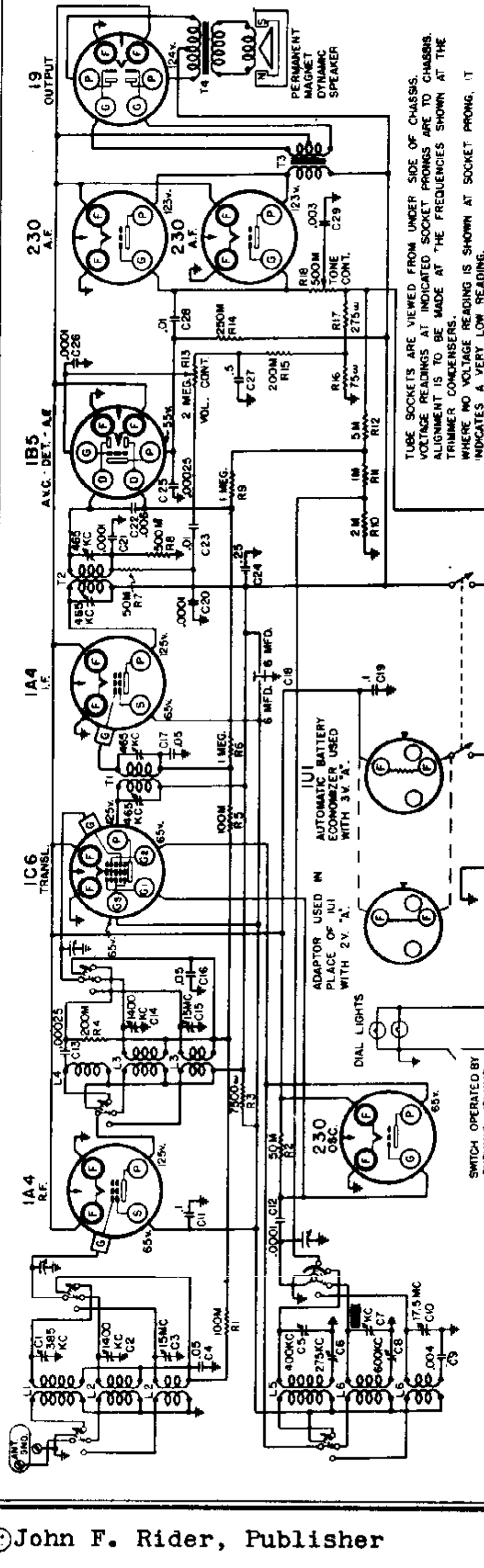
POWER SUPPLY:
"A" Battery (three volt) - 1 - #5502P
"A" Battery (two volt) - - - 1 - #5011
"B" Batteries - - - - - - - - 3 - #5131P

"A" Drain - - - - - - - - - 74 amperes
"B" Drain - - - - - - - - - - - 31 ma

INTERMEDIATE FREQUENCY - 465 kc

POWER OUTPUT:
Type - - - - - - - - - - - - Class "B"
Undistorted - - - - - - - - - - 1 watt
Maximum - - - - - - - - - - - - 1.9 watt

LOUD SPEAKER:
Type - - - Permanent Magnet Dynamic
Size - - - - - - - 6½", table models;
8", console models

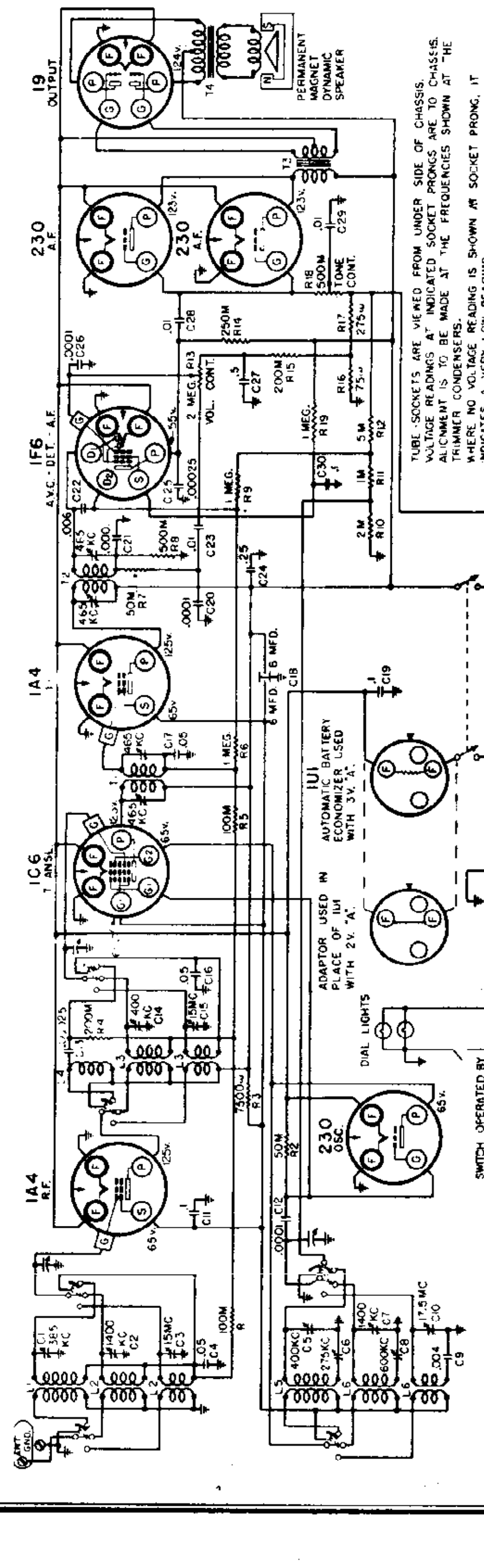


TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS. WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.

FREQUENCY RANGES:
Band "AM" - - - 540-1750 kc
Band "WEA" - - - 225-400 kc
Band "POR" - - - 5.7-17.5 mc

IF PEAK 465 KC

Models 4426, 4427, 4446, 4447, 4526, 4546



ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl Trimmer	Padder
Band "AM"	1400 kc	1400 kc	600 kc
Band "WEA"	400 kc	385 kc	275 kc

IF PEAK 465 KC

Models 4426A, 4526A, 4546A

57RL 14

August 4, 1936

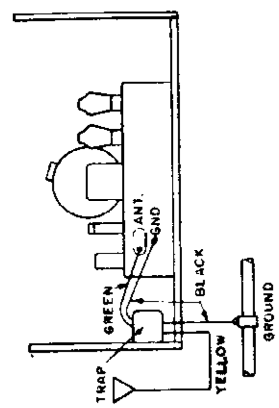
MODELS 4426,4427,4446
4447,4526,4546
MODELS 4426A,4526A,4546A.
Alignment,Sensitivity
Interference Elimination

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection	Across speaker voice coil
Output meter reading to indicate 50 milliwatts	.34 volts
Average sensitivity in microvolts for 50 milliwatts output	See chart below
Generator ground lead connection	Receiver chassis
Dummy antenna value to be in series with generator output	See chart below
Connection of generator output lead	See chart below
Generator modulation	30%, 400 cycles
Position of volume control	Fully on
Position of tone control	Fully clockwise
Position of dial pointer	To fall on second line from left, of ornamental lines running from the center of the dial to the band markings, when variable is fully meshed.



WAVE BAND SWITCH	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	MICROVOLTS
"A"	600 kc	465 kc	.1 mfd.	1A4 IF Grid	T2	-
"A"	600 kc	465 kc	.1 mfd.	1C6 Grid	T1	-
"A"	1400 kc	1400 kc	.0002 mfd.	Antenna Terminal	C7,C2,C14	6
"A"	600 kc (rock)	600 kc	.0002 mfd.	Antenna Terminal	C8	15
"W"	400 kc	400 kc	.0002 mfd.	Antenna Terminal	C5	30
"W"	385 kc	385 kc	.0002 mfd.	Antenna Terminal	C1	30
"W"	275 kc (rock)	275 kc	.0002 mfd.	Antenna Terminal	C6	60
"P"	17.5 mc	17.5 mc	400 ohms	Antenna Terminal	C10	10
"P"	15 mc	15 mc	400 ohms	Antenna Terminal	C3, C16	5
"P"	6 mc	6 mc	400 ohms	Antenna Terminal	None	60

IMPORTANT ALIGNMENT NOTES

Values shown under, "Microvolts" are approximate.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two during the adjustment.

The alignment procedure should be repeated band by band to secure greater accuracy. In particular, the WEATHER band alignment may have to be repeated several times since the adjustments have an effect on each other.

After the alignment has been completed, check the calibration by tuning in a broadcast station at about 900 kc. Adjust the dial pointer to the station's frequency, if necessary.

Always keep the output from the signal generator at its lowest possible value.

WAVE-TRAP TO ELIMINATE INTERFERENCE FROM SHIP OR AIRPORT TRANSMITTERS:

In locations near ship transmitters or airports or air beacon stations, code interference may be experienced. Part #101511-256 wave-trap is designed to eliminate such interference.

Mount the trap, by means of two wood screws, at any convenient place on the chassis shelf or cabinet where it will be near the antenna terminal of the receiver. Connect the yellow lead of the wave-trap to the antenna downlead. Connect the green lead of the wave-trap to the antenna terminal of the receiver. Cut off any excess length of green wire from the trap so that the green lead from the wave-trap to the chassis is as short as possible. The yellow lead from the wave-trap should be run so that it is as far as possible from the green lead. Splice one of the black leads from the wave-trap to the black ground lead of the receiver. Connect the other wave-trap black lead to the ground used for the installation.

The trap is pre-tuned to the IF frequency so that normally no further adjustment is necessary. However, should interference still be experienced, tune the receiver between approximately 550 and 600 kc. Then adjust the wave-trap, by means of the trimmer screw at the bottom of the container, until the interference is eliminated. Addition of the trap will reduce the sensitivity of the receiver around 600 kc by approximately 50%. The customer should be forewarned of this to avoid complaints of reduced sensitivity.

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc)of the 465 kc IF,and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

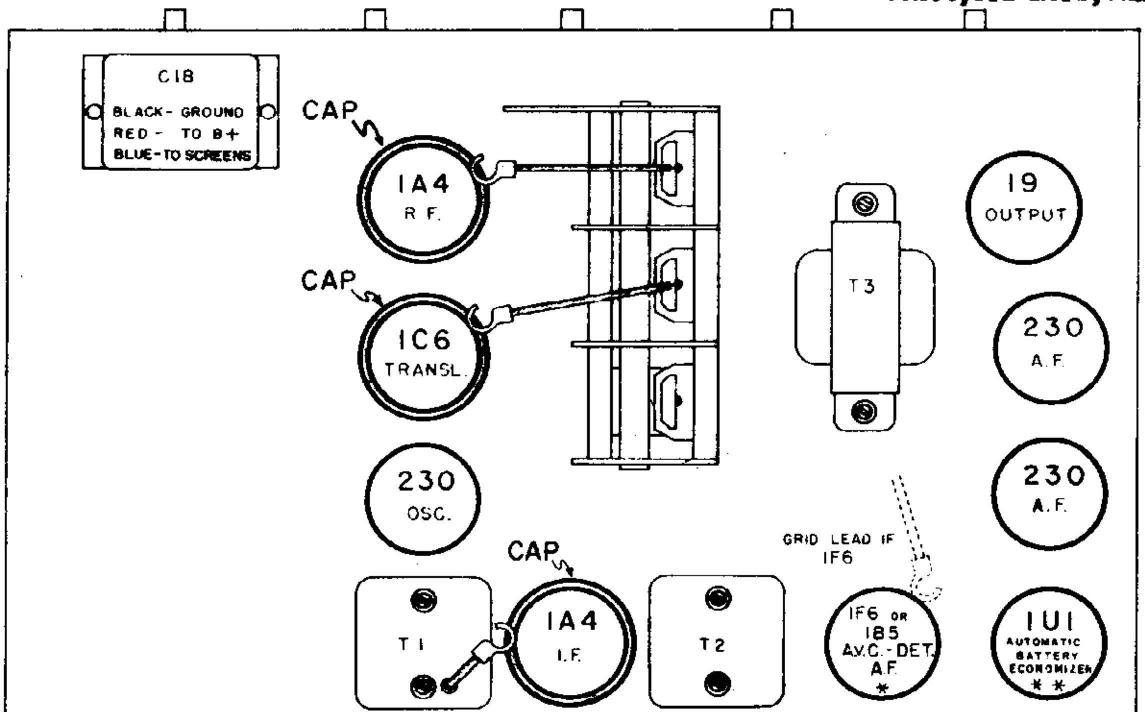
Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

BATTERY REPLACEMENT:

The dry "A" battery should be replaced when its voltage drops to 1.8 volts, under load. The "B" batteries should be replaced when the voltage of the 45 volt block has dropped to 34 volts, under load.

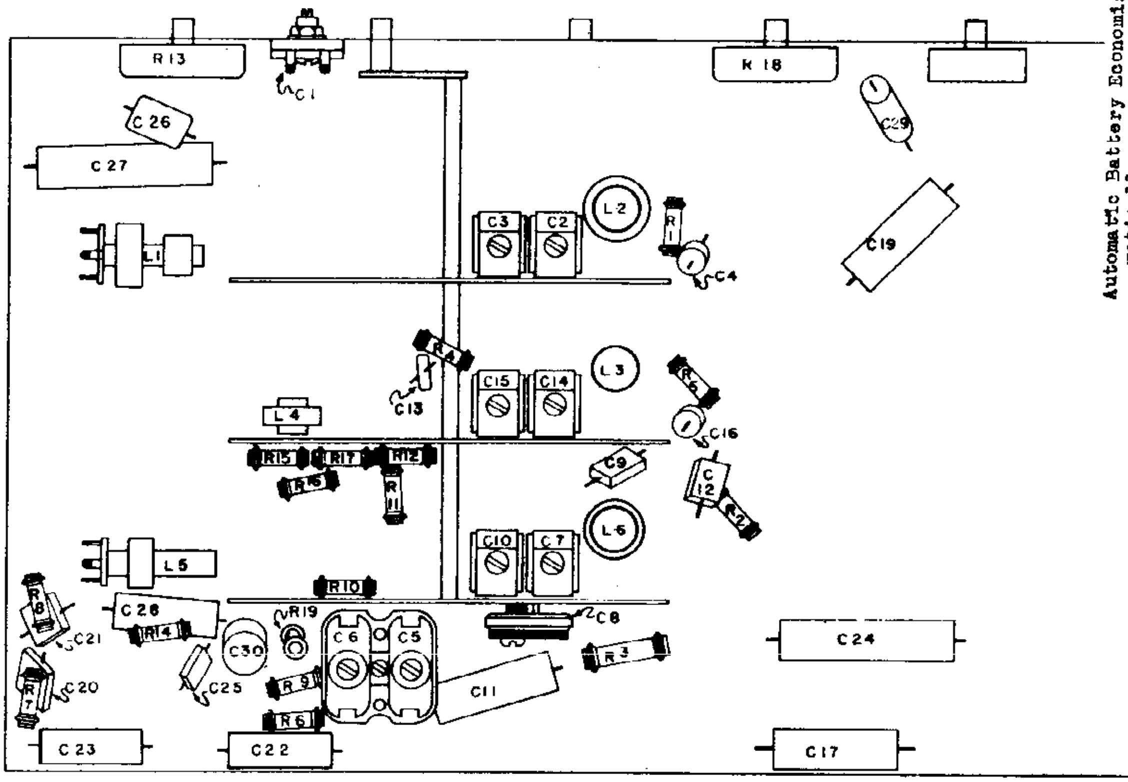
SEARS-ROEBUCK & CO.



* 1B5 used on Models 4426, 4427, 4446, 4447, 4526, 4546
1F6 used on Models 4426A, 4526A, 4546A
** 1U1 used only with 3 volt dry A battery
Replaced by adapter for 2 volt storage A

LOCATIONS OF PARTS ON TOP OF CHASSIS

Automatic Battery Economizer - - Automatically compensates for decreased voltage from ageing "A" battery. (Three volt models only. Replaced by plug adapter with two volt stor-



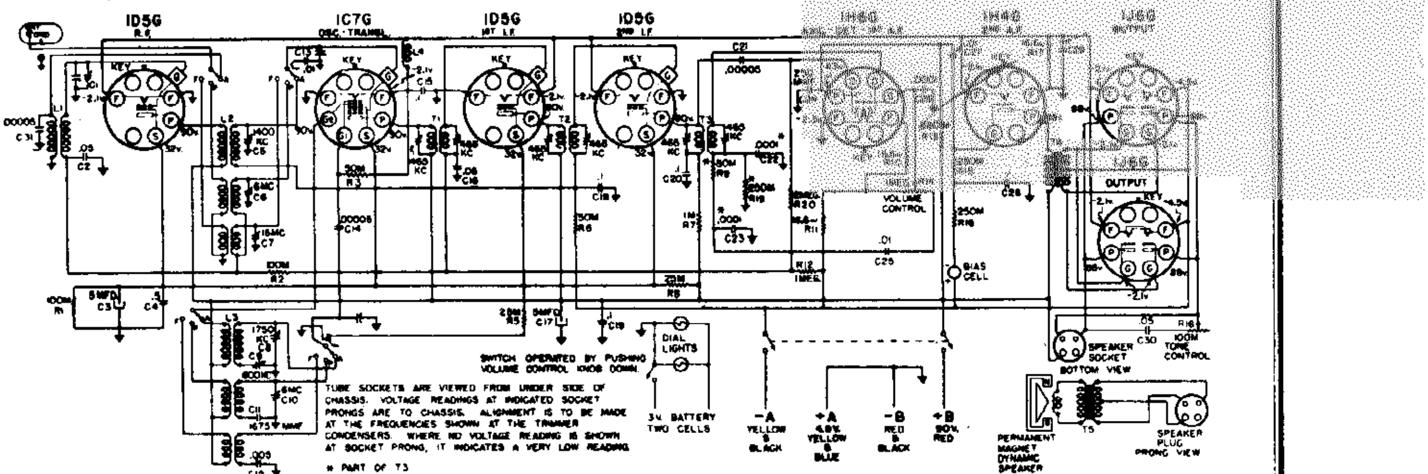
* Only for Models 4526A, 4426A, 4546A

LOCATIONS OF PARTS UNDER CHASSIS

MODELS 4439,4440,4455
4456,4539

SEARS-ROEBUCK & CO.

Schematic, Voltage, Data

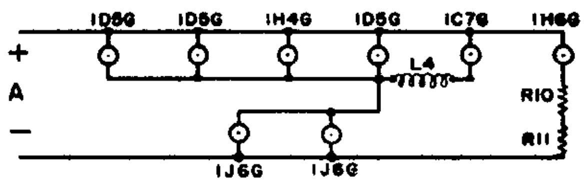


THE FILAMENT CIRCUIT:

These models may be used with either a 4½ volt dry "A" battery or a 4 volt storage battery without requiring any changes in connections.

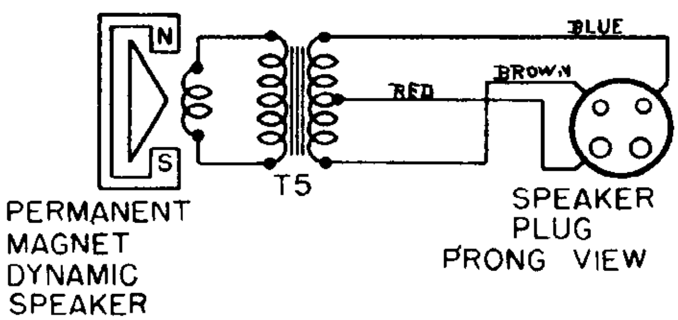
Since the tubes have two volt filaments and the "A" supply is four volts, the filaments are connected in a series parallel arrangement. The two 1J6G tubes are connected in parallel with each other to form one group. All of the other tubes except the 1H6G are connected in parallel to form a second group. These two groups are then connected in series across the "A" supply. The 1H6G tube is connected in series with the two resistors, R10 and R11, of 16.6 ohms each, across the "A" supply. A simplifed diagram of the filament circuit is shown below.

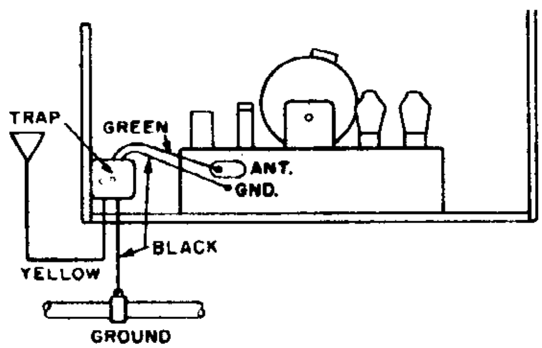
IF PEAK 465 KC



57RL 34

January 7, 1937





POWER SUPPLY:
- "A" Battery (4½ volt dry) . 1 - #5032P
- "A" Battery (4 volt storage) 1 - #5049
- "B" Batteries . . . . . . 2 - #5138P

"A" Drain . . . . 0.54 amperes
"B" Drain (no signal). . . . . 23 ma

FREQUENCY RANGES:
- Band "A" . . . . 540-1750 kc
- Band "P" . . . . 2-6.2 mc
- Band "F" . . . . 6-18 mc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant.-Transl. Trimmer	Padder
Band "A"	1750 kc	1400 kc	600 kc
Band "P"	6 mc	6 mc	Fixed
Band "F"	-	17 mc	Fixed

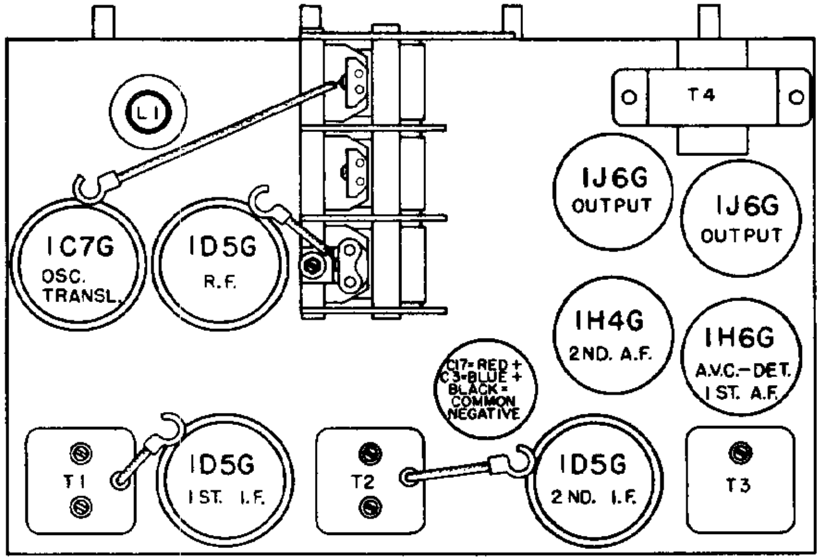
INTERMEDIATE FREQUENCY . . . . 465 kc

POWER OUTPUT:
- Type . . . . Parallel Class "B"
- Undistorted . . . . 0.4 watt
- Maximum . . . . 1 watt

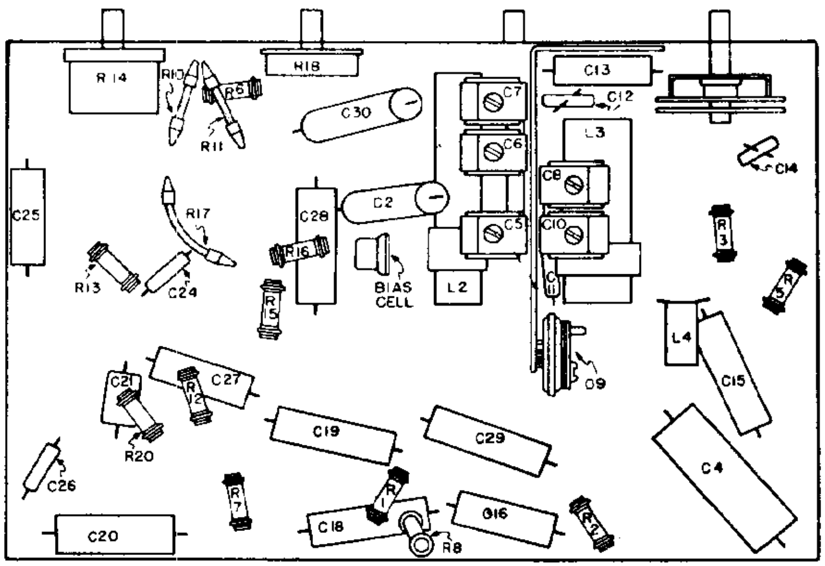
LOUD SPEAKER:
- Type . . . . PM Dynamic
- Size . . . . 6½"

MODELS 4439,4440,4455
4456,4539
Socket,Trimmers,Chassi
Alignment,Sensitivity

SEARS-ROEBUCK & CO.



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . Across speaker voice coil
Output meter reading to indicate 50 milliwatts . . . . 0.35 volts
Average sensitivity in microvolts for 50 milliwatts output . . . . See chart below
Generator ground lead connection . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . See chart below
Connection of generator output lead . . . . See chart below
Generator modulation . . . . 30%, 400 cycles
Position of Volume Control . . . . Fully on
Position of Tone Control . . . . Fully clockwise
Position of Dial Pointer . . . . To fall on left edge of band indicator blocks when variable is fully meshed.

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"A"	550 kc	465 kc	.1 mfd.	1C7G Translator Grid	T3,T2,T1	IF Output, Interstage, Input	130
"A"	Variable Fully Open	1750 kc	.0002 mfd.	Ant. Term.	C8	Oscillator	30
"A"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C5,C1	RF, Antenna	13
"A"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C9	Osc. Pad.	13
"A"	540 kc	540 kc	.0002 mfd.	Ant. Term.	-	-	30
"P"	6 mc	6 mc	400 ohms	Ant. Term.	C10 *	Oscillator	-
"P"	6 mc	6 mc	400 ohms	Ant. Term.	C6	Translator	5
"P"	2 mc	2 mc	400 ohms	Ant. Term.	-	-	20
"F"	18 mc	18 mc	400 ohms	Ant. Term.	**	-	15
"F"	17 mc (rock)	17 mc	400 ohms	Ant. Term.	C7	Translator	6
"F"	6 mc	6 mc	400 ohms	Ant. Term.	-	-	25

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

(*) Two peaks will be found at two different settings of the trimmer. The correct one is the one in which the trimmer is screwed further out (lesser capacity).

(**) Adjust the calibration at 18 mc by pushing the yellow lead that comes from the center section of the variable either nearer to or away from the variable.

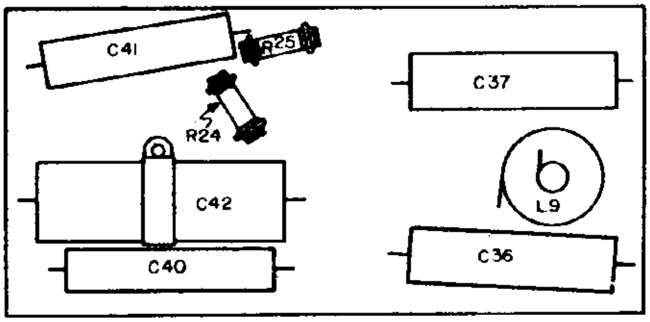
It is advisable to repeat the entire alignment procedure band by band and in the original order to insure greater accuracy.

Always keep the output power from the test oscillator at its lowest possible value. This will prevent the AVC action of the receiver from interfering with accurate alignment. As the sensitivity is increased by alignment, the generator output power should be reduced correspondingly.

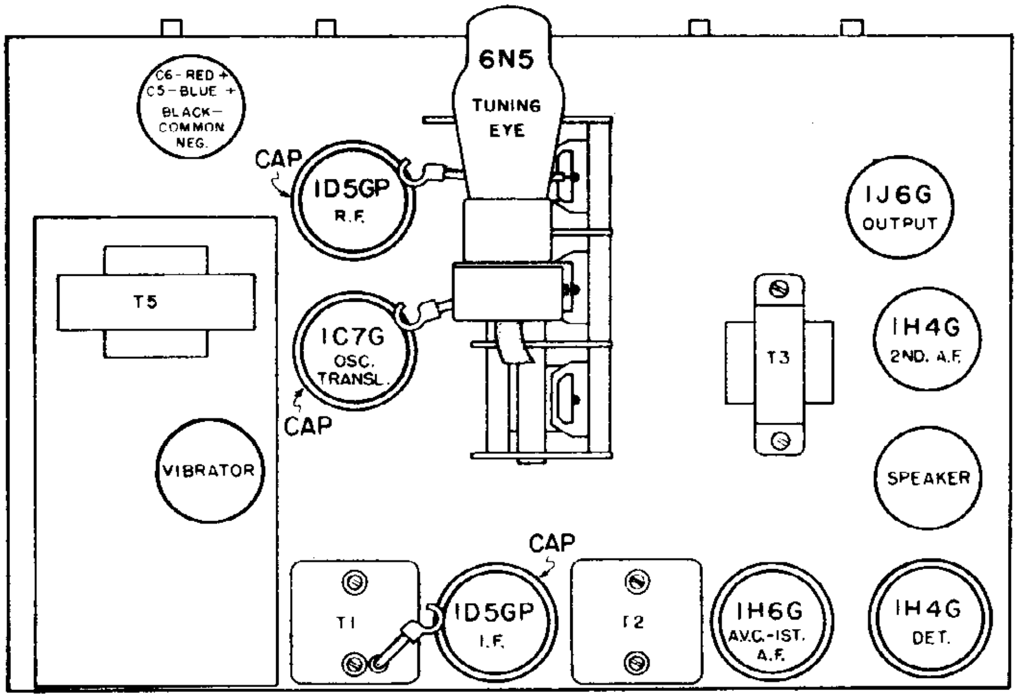
Values shown under, "Microvolts", are only approximate.

MODELS 4441, 4451
Socket, Trimmers
Chassis, Notes

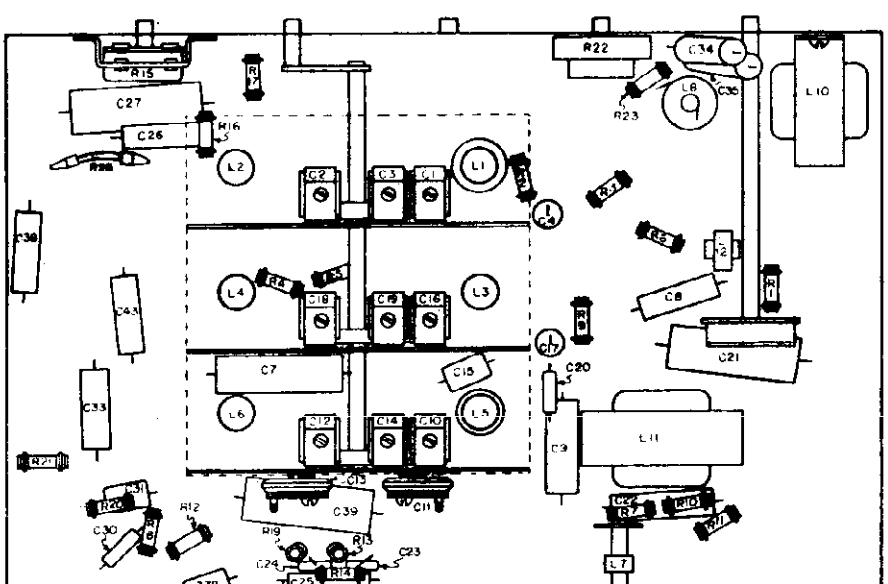
SEARS-ROEBUCK & CO.



LOCATIONS OF PARTS UNDER POWER SUPPLY UNIT



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS.

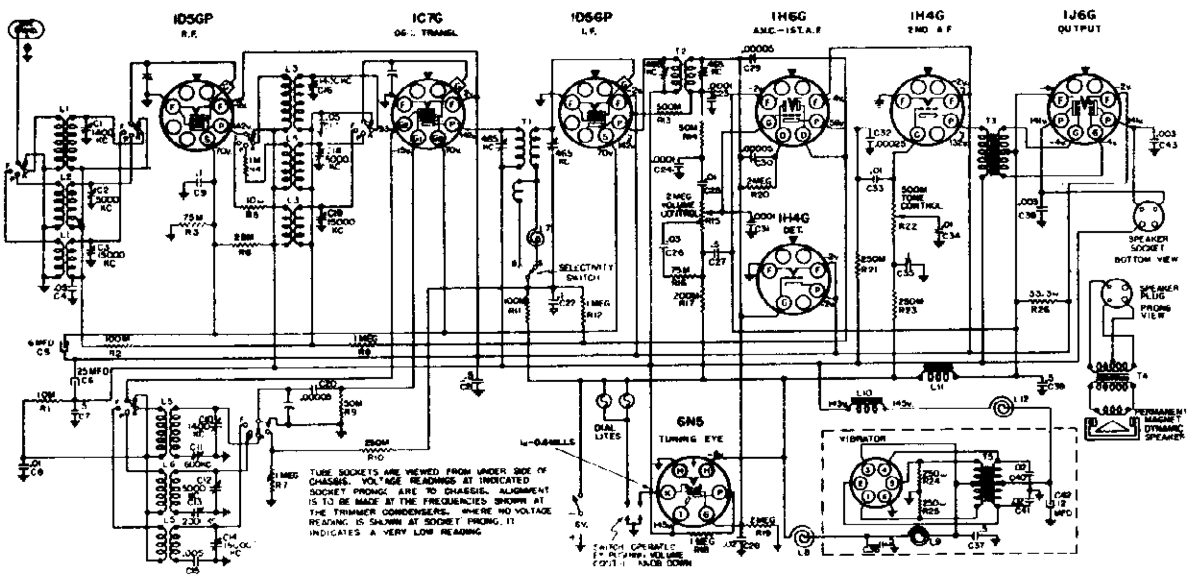
MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:
1. Left knob . . . Volume Control, Dial Light Switch, Tuning Eye Switch
2. Next to left knob. Wave Band Switch
3. Center knob . . . Station Selector
4. Next to right knob. "On-Off" Switch and Tone Control
5. Right knob . . . Selectivity Switch

CONTROL OPERATION:
Turning right: Volume increase. Pushing down: Dial Light on; Tuning Eye on.
Turning right: "AM", "POL", "FOR"
Dual ratio: 10 to 1; 50 to 1
Turning right: Power on; Bass to treble
Right: sharp. Left: broad.

CHASSIS FEATURES:
Number RF stages . . . One on Broadcast band
Number IF stages . . . One
Number condensers in gang . . . Three
Antenna . . . Conventional
Synchronous Vibrator - Rectifier

January 28, 1937



WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	Closed	465 kc	.1 mfd.	1C7G Grid	T2, T1	IF	350
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C10, C16, C1	Osc., Transl., RF	40
"AM"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C11	Padder	40
"POL"	5 mc	5 mc	400 ohms	Ant. Term.	C12, C18, C2	Osc., Transl., RF	45
"POL"	2 mc (rock)	2 mc	400 ohms	Ant. Term.	C13	Padder	55
"FOR"	15 mc	15 mc	400 ohms	Ant. Term.	C14, C19, C3	Osc., Transl. RF	20
"FOR"	18 mc	18 mc	400 ohms	Ant. Term.	-	-	250
"FOR"	6 mc	6 mc	400 ohms	Ant. Term.	-	-	175

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

Always keep the output from the signal generator at its lowest possible value to prevent the AVC action of the receiver from interfering with accurate alignment. As the receiver sensitivity is increased through alignment, the output from the generator should be decreased to compensate.

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

WAVE-TRAP TO ELIMINATE INTERFERENCE FROM SHIP OR AIRPORT TRANSMITTERS:

The trap is pre-tuned to the IF frequency so that normally no further adjustment is necessary. However, should interference still be experienced, tune the receiver between approximately 550 and 600 kc. Then adjust the wave-trap, by means of the trimmer screw at the bottom of the container, until the interference is eliminated. Addition of the trap will reduce the sensitivity of the receiver around 600 kc by approximately 50%. The customer should be forewarned of this to avoid complaints of reduced sensitivity.

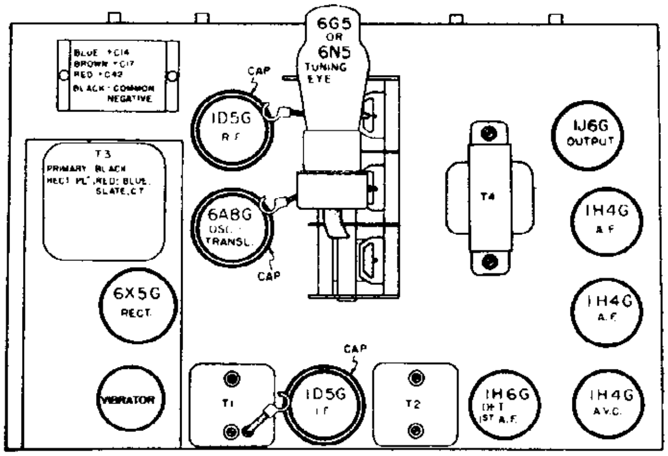
MODELS 4450,4550
Socket,Trimmers,Chassis
Sensitivity Notes, Data

SEARS-ROEBUCK & CO.

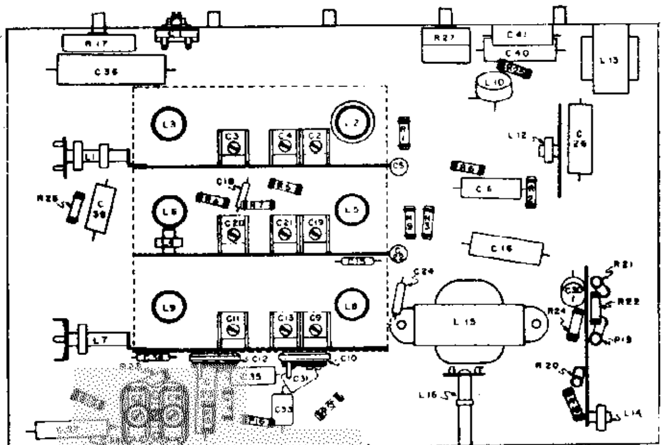
OPERATION OF THE 6G5 OR 6N5 TUNING EYE TUBE:

The type 6G5 or 6N5 tuning eye tube, used in this receiver, operates over a signal input range about three times greater than can be handled by the 6E5 tube,used in some of last years receivers. With the 6E5 tube, if the circuits are designed so that the tube responds to a moderately weak signal, it will overlap with strong signals. Any signal stronger than that required to close the eye cannot be tuned accurately by the eye. The 6G5 or 6N5 tube provides an even more sensitive indication for weak signals than the 6E5 and will not overlap except under extreme local conditions.

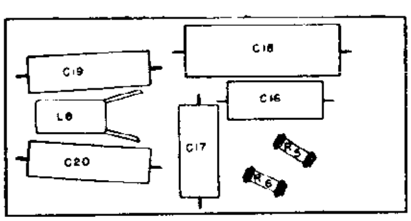
However, the range of signal input over which the receiver must work is so great that even this 6G5 or 6N5 variable mu tube cannot completely satisfy all conditions. In addition to the limitations of the tube itself, there are variations between receivers, even though they be of the same model, that affect the signal required to close the eye. If several tubes are available to choose from, it may be possible to select one that will operate more satisfactorily in a particular location.



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS



LOCATIONS OF PARTS UNDER POWER SUPPLY UNIT

OPERATING FEATURES:
- Fidelity Range - - 50 - 5000 cycles
- Tone Control - - - - - - - - Variable
- Selectivity Control - - Two position
- Automatic Volume Control

CONTROL OPERATION:
- Turning right: sharp. Left: broad
- Turning right: Power on; bass to treble

- Tuning ratio: 10:1; 50:1
- Turning right: "WEA", "AM", "POL", "FOR"
- Turning right: volume increase. Pushing down, illuminate dial and actuate tuning eye.

FREQUENCY RANGES:

Band "WEA" - - - - - - - - -	220-400 kc
Band "AM" - - - - - - - -	540-1750 kc
Band "POL" - - - - - - - -	1750-5850 kc
Band "FOR" - - - - - - - -	5.8-17.5 mc

OPERATING CONTROLS:
1. Right knob - - Selectivity Control
2. Next to right knob-"On-Off" Switch and Tone Control
3. Middle knob - - Station Selector
4. Next to left knob-Wave Band Switch
5. Left knob - - - - - - - - - Volume

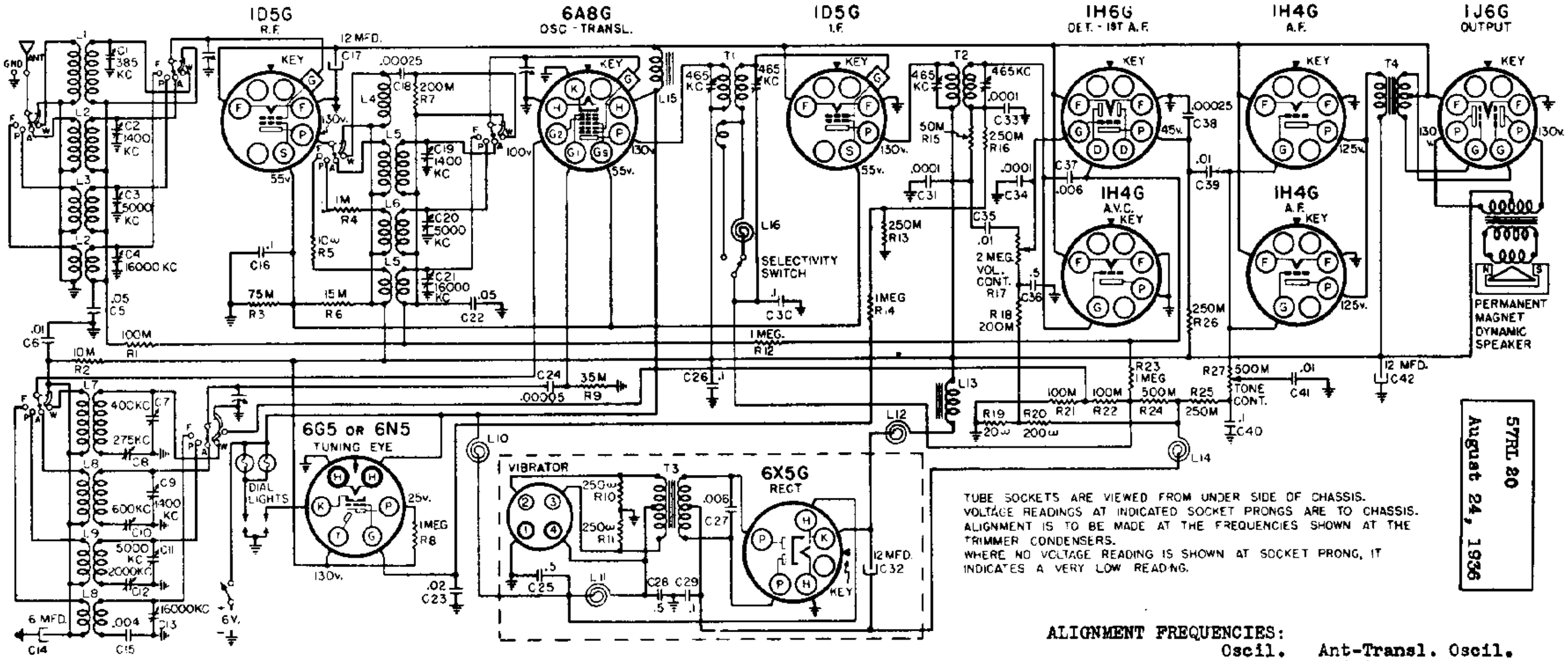
CHASSIS FEATURES:
- Number RF stages - - - - - - - - - - One
- Number IF stages - - - - - - - - - - One
- Antenna - - - - - - - - Conventional

VARIABLE SELECTIVITY:

Variable Selectivity is obtained by a two position switch. It changes the selectivity of the IF input transformer, T1, by connecting or disconnecting coupling turns between primary and secondary. The coil, L16, compensates for the loss of inductance when the coupling turns are disconnected, thereby keeping the transformer tuned to 465 kc.

SEARS-ROEBUCK & CO.

57RL 20
August 24, 1936

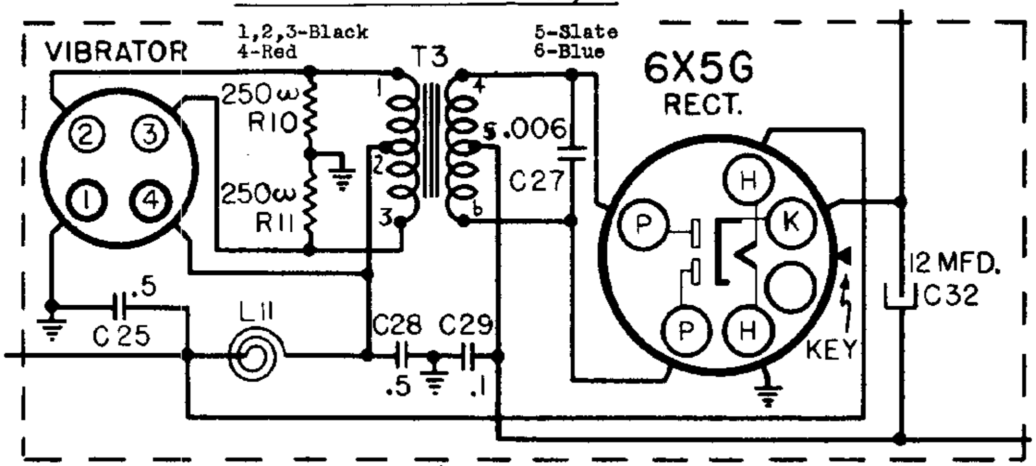


TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS. WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.

POWER TRANSFORMER COLOR CODE, T3

1,2,3-Black
4-Red

5-Slate
6-Blue



ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Oscil. Padder
Band "WEA"	400 kc	385 kc	275 kc
Band "AM"	1400 kc	1400 kc	600 kc
Band "POL"	5 mc	5 mc	2 mc
Band "FOR"	16 mc	16 mc	Fixed

POWER SUPPLY:
All models available

6 volt storage battery; 3 ampere drain

INTERMEDIATE FREQUENCY - - - - - - - 465 kc

POWER OUTPUT:
Type - - - - - - - - - - - - Class "B"
Undistorted - - - - - - - - 1.15 watts
Maximum - - - - - - - - - - 1.8 watts

LOUD SPEAKER
Type - - - Permanent Magnet Dynamic
Size - - - - - - - - - - - - - - - 10"

MODELS 4450,4550
Alignment, Sensitivity
Whistle Elimination

SEARS-ROEBUCK & CO.

TEN TUBE, FOUR BAND, SIX VOLT STORAGE BATTERY OPERATED SUPERHETERODYNE

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections - - - - - - - - - - - - - - - - - Across speaker voice coil leads

Output meter reading to indicate .5 watts output - - - - - - - - - - - - - - - - 1.05 volts

Dummy antenna value to be in series with generator output - - - - - - - - See chart below

Connection of generator output lead - See chart below

Connection of generator ground lead - Receiver chassis

Generator modulation - 30%, 400 cycles

Position of volume control - Fully clockwise

Position of tone control - Fully clockwise

Position of selectivity control - Fully clockwise

Position of dial pointer - - To fall on second line from right, of ornamental lines running from tuning eye toward dial center, when variable is fully meshed.

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	APPROXIMATE MICROVOLTS
"AM"	550 kc	465 kc	.1 mfd.	6A8G Grid	T2,T1	-
"AM"	1400 kc	1400 kc	.0002 mfd.	Antenna Terminal	C9,C2,C19	15
"AM"	600 kc (rock)	600 kc	.0002 mfd.	Antenna Terminal	C10	30
"WEA"	Fully clockwise	400 kc	.0002 mfd.	Antenna Terminal	C7	50
"WEA"	385 kc	385 kc	.0002 mfd.	Antenna Terminal	C1	80
"WEA"	275 kc (rock)	275 kc	.0002 mfd.	Antenna Terminal	C8	175
"POL"	5 mc	5 mc	400 ohms	Antenna Terminal	C11,C3,C20	40
"POL"	2 mc (rock)	2 mc	400 ohms	Antenna Terminal	C12	65
"FOR"	16 mc	16 mc	400 ohms	Antenna Terminal	C13,C4,C21	30
"FOR"	6 mc	6 mc	400 ohms	Antenna Terminal	-	125

These models use a six volt storage battery for the "A" supply. A plug-in vibrator used with a step-up transformer and 6X5G rectifier tube furnishes the plate and screen voltage.

THE DIAL LIGHT AND TUNING EYE SWITCH:

Pushing down on the Volume Control knob actuates a switch to illuminate the dial. Pushing further down on the knob actuates another switch to cause the Tuning Eye to function. When the knob is released, both the dial light and the Tuning Eye become disconnected.

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

After completing the alignment for each band repeat it in the original order, for greater accuracy. This is particularly necessary for the Weather Band as the adjustments affect each other. Always keep the output power from the generator at its lowest possible value to prevent the AVC action of the set from interfering with accurate alignment.

After the alignment procedure has been completed, tune in a station at about 900 kc. If necessary, shift the dial pointer so that it indicates the station's frequency on the dial.

Values shown under, "Microvolts", are only approximate.

ELIMINATING WHISTLE AT 930 KC:

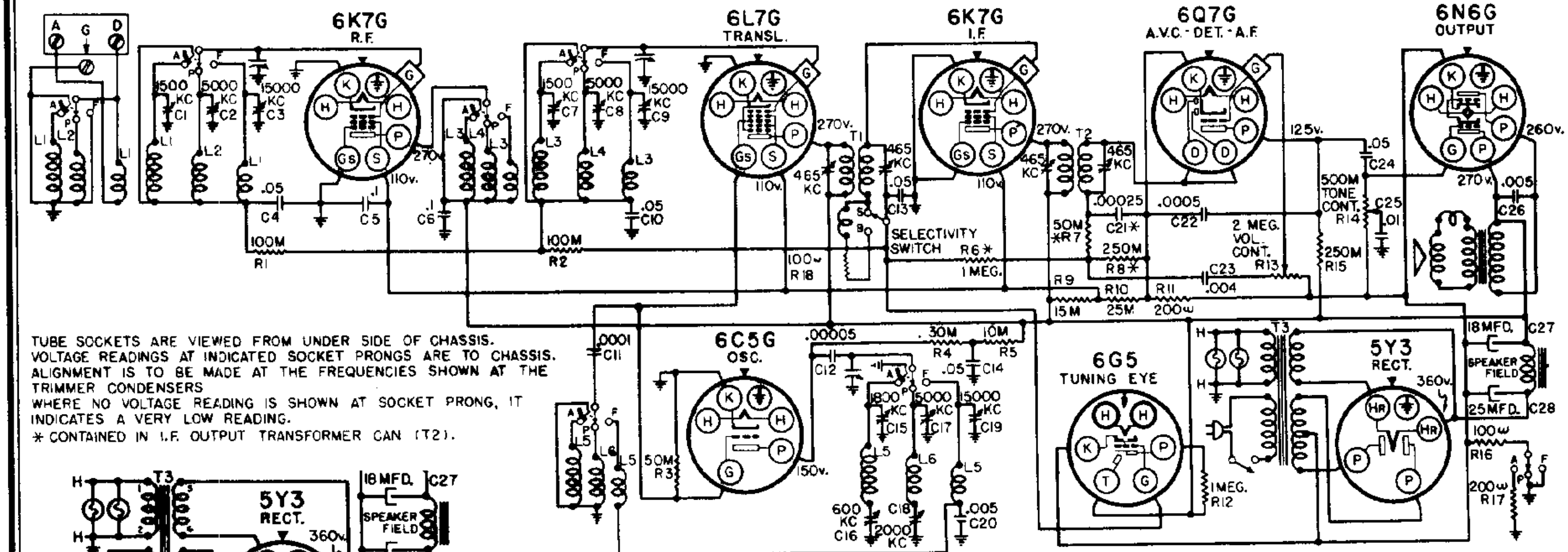
A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc.

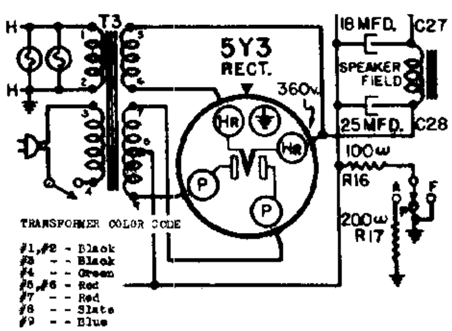
Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

SEARS-ROEBUCK & CO.

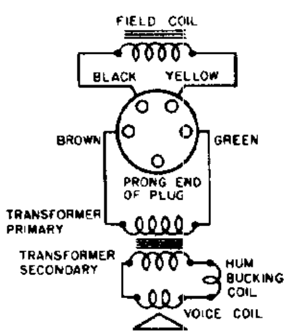
MODELS 4465,4485,4565,4585
Chassis 101410
Schematic,Voltage,Notes



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.
* CONTAINED IN I.F. OUTPUT TRANSFORMER CAN (T2).



POWER TRANSFORMER COLOR CODE AND CONNECTIONS



SPEAKER CONNECTIONS

57RL -2
June 24, 1936

POWER SUPPLY:

All models available	105-125 volts, 50-60 cycle, 85 watts
All models available	105-125 volts, 25 cycle, 85 watts

FREQUENCY RANGES:

Band "A"	540-1800 kc
Band "P"	1800-6000 kc
Band "F"	6-18 mc

ALIGNMENT FREQUENCIES:

	Osc Trimmer	Ant-Transl Trimmer	Padder
Band "A"	1800 kc	1500 kc	600 kc
Band "P"	5000 kc	5000 kc	2000 kc
Band "F"	15 mc	15 mc	Fixed

INTERMEDIATE FREQUENCY - - - 465 kc

POWER OUTPUT:

Type	Single Pentode
Undistorted	3 watts
Maximum	9.3 watts

LOUD SPEAKER:

Type	Dynamic
Size	6" and 8"
Field coil resistance	1300 ohms
Field coil voltage drop	90 volts

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc.

MODELS 4465,4485,4565,4585
Distortion Elimination
Sensitivity, Data

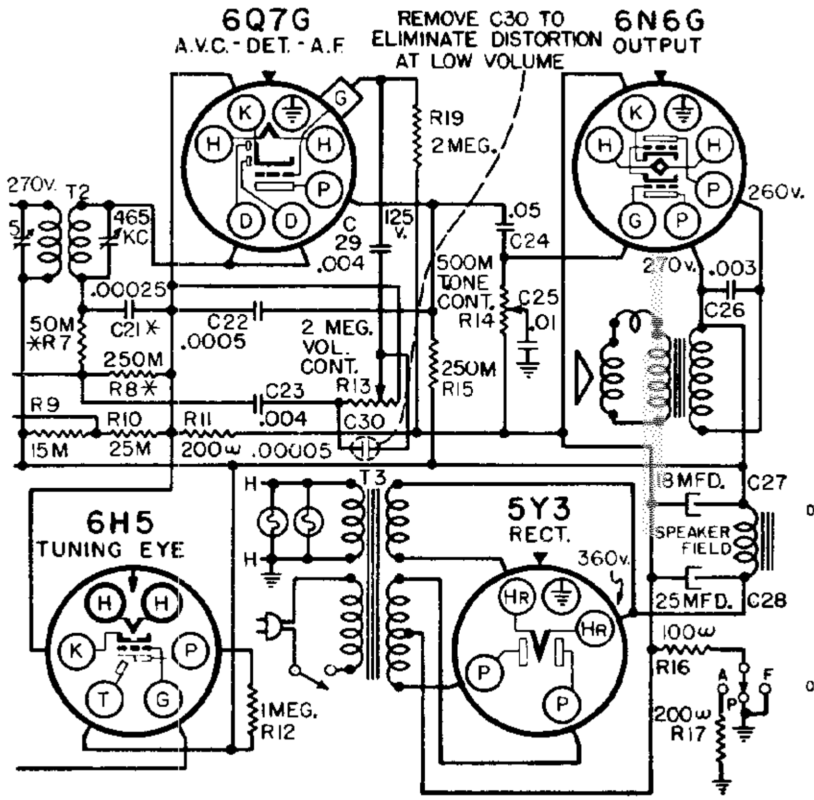
SEARS-ROEBUCK & CO.

SUBJECT: ELIMINATING DISTORTION AT LOW VOLUME

Chassis In Which This Change May Be Necessary:

Chassis which are rubber stamped with the letter "H" after the number 101.410, on the Chassis Identification Sticker, are the only ones in which this change may be necessary. Chassis with any other rubber stamped letter or with no letter are not affected.

Chassis with the rubber stamped letter "H" have a 50 mmf. condenser, C30, connected from the high side of the Volume Control to the movable arm. If distortion, occurring only at low volume levels, is encountered, this 50 mmf. condenser should be removed from the circuit.



SUBJECT: APPROXIMATE AVERAGE SENSITIVITY IN MICROVOLTS FOR .5 WATTS OUTPUT

SUBJECT: PREVENTION OF MOTORBOATING

APPROXIMATE AVERAGE SENSITIVITY IN MICROVOLTS FOR .5 WATTS OUTPUT:

The generator connections and the receiver settings are to be as described in Service Instructions #57RL 12, for this model. The generator modulation is to be 30% at 400 cycles.

Band	Frequency	Microvolts
"A"	600 kc	25
"A"	1000 kc	15
"A"	1500 kc	12
"A"	1600 kc	30
"A"	1800 kc	100
"P"	2 mc	20
"P"	3 mc	8
"P"	5 mc	2
"P"	6 mc	8
"F"	6 mc	50
"F"	10 mc	8
"F"	12 mc	4
"F"	15 mc	2

PREVENTION OF MOTORBOATING:

If the two grid leads from the variable condenser, to the 6K7G RF tube and 6L7G translator tube, are too close together motorboating may occur. If necessary, separate the leads to prevent this possibility.

OPERATING FEATURES:
- Fidelity Range - - - 50 - 5000 cycles
- Tone Control - - - - - - - - Variable
- Selectivity Control - - Two position
- Resonance Indicator - - - Tuning Eye
- Sensitivity Control - - - Automatic
- Automatic Volume Control
- Dual Ratio Tuning

CHASSIS FEATURES:
- Number Tuned RF stages - - - - - One
- Number IF stages - - - - - - - - One
- Number condensers in gang - - - Three
- Antenna - - Doublet or Conventional

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:
1. Left knob - - "On-Off" switch and volume
2. Next to left knob-Wave Band Switch
3. Middle knob - - - Station Selector
4. Next to right knob - Tone Control
5. Right knob - - Selectivity Control

CONTROL OPERATION:
- Turning right; Power on; volume increase
- Turning right: "AM", "POL", "FOR"
- Tuning ratio: 10:1; 50:1
- Turning left: bass; right: treble
- Turning right: sharp; turning left: broad

SEARS-ROEBUCK & CO.

MODELS 4465,4485,4565,4585
Alignment,Socket,Trimmers
Chassis

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections - Across voice coil leads
Output meter reading to indicate .5 watts output - - - - - - - - - - - - - - - 1.1 volts
Dummy antenna value to be in series with generator output - - - - - - - - See chart below
Connection of generator output lead - - - - - - - - - - - - - - - - - - See chart below
Connection of generator ground lead - - - - - - - - - - - - - - - - - - Receiver chassis
Position of volume control - Fully on
Position of tone control - Fully clockwise
Position of selectivity control - Fully clockwise
Position of dial pointer - - To fall on second line from right, of ornamental lines running from tuning eye toward dial center, when variable is fully meshed.

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)
"A"	-	465 kc	.1 mfd.	6L7G Grid	T2,T1
"A"	1800 kc	1800 kc	.0002 mfd.	Antenna Terminal	C15
"A"	1500 kc	1500 kc	.0002 mfd.	Antenna Terminal	C1,C7
"A"	600 kc (Rock)	600 kc	.0002 mfd.	Antenna Terminal	C16
"P"	5000 kc	5000 kc	400 ohms	Antenna Terminal	C17 *
"P"	5000 kc	5000 kc	400 ohms	Antenna Terminal	C2,C8
"P"	2000 kc (Rock)	2000 kc	400 ohms	Antenna Terminal	C18
"P"	15 mc	15 mc	400 ohms	Antenna Terminal	C19 *
"P"	15 mc	15 mc	400 ohms	Antenna Terminal	C3,C9

IMPORTANT ALIGNMENT NOTES

* - Care must be taken in making this adjustment since two peaks may be obtained at two different settings of the trimmer. The proper peak is the one that is had when the trimmer is screwed furthest out (least capacity).

After completing the alignment for each band repeat it in the original order, for greater accuracy. Always keep the output power from the generator at its lowest possible value, to render the AVC action of the receiver inoperative.

Only the dummy antenna indicated in the chart for any particular band should be used. Disconnect the dummy antenna used for alignment of any other band.

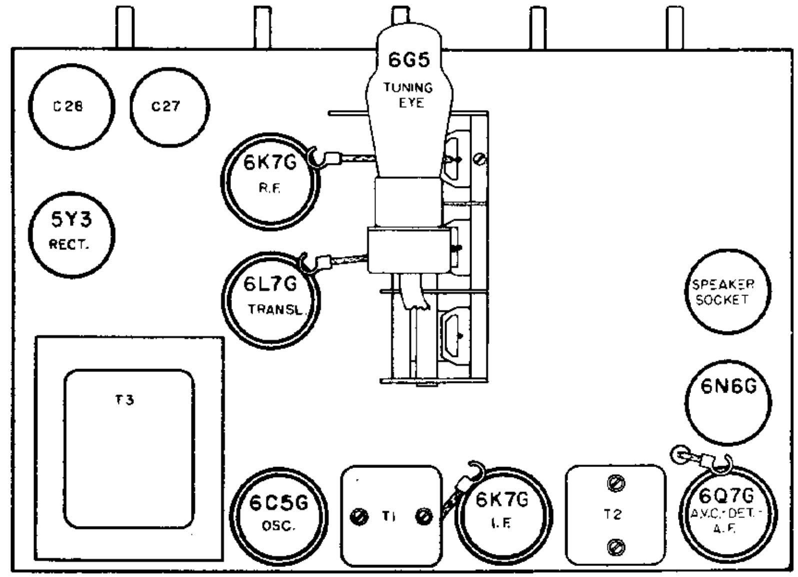
After the alignment procedure has been completed, tune in a station at about 1000 kc. If necessary, set the dial pointer to the exact frequency of the station

GENERAL INFORMATION

There is a terminal board at the rear of the chassis marked, "ANT", "DBL", "GND", indicating antenna, doublet, and ground, respectively. The "DBL" terminal is left unconnected when a conventional antenna is used. When a doublet is used, one wire of the twisted downlead is connected to the "ANT" terminal and the other downlead wire is connected to the "DBL" terminal.

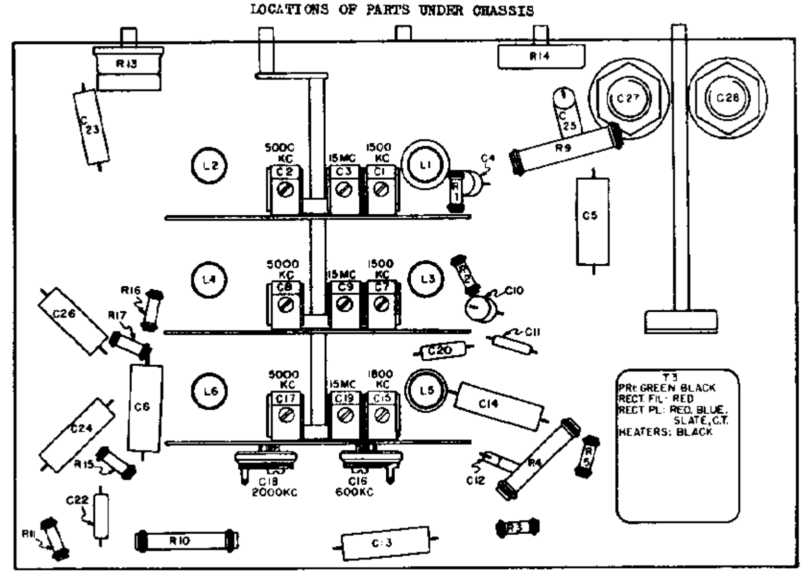
The sensitivity is automatically increased on bands "P" and "P" by removal of the residual bias furnished by the resistor, R17. This resistor is connected in the circuit only when the Wave Band switch is in position "A". Contacts on the Wave Band switch automatically perform this switching.

Variable selectivity is obtained by a two position switch. It changes the selectivity of the IF input transformer by connecting or disconnecting coupling turns between primary and secondary.



TOP OF CHASSIS

LOCATIONS OF PARTS UNDER CHASSIS



MODELS 4465, 4485, 4565, 4585
Phono. Jack Connections
Interference Elimination
Notes

SEARS-ROEBUCK & CO.

CONDENSER DRIVE:

A front bearing bracket was provided for the condenser drive shaft in later production to correct trouble due to slippage of the condenser drive. This slippage occurs because the rear bearing alone does not provide sufficiently rigid mounting for the drive shaft. This bracket, part #1014615095, can be added when necessary to sets not having it originally. It is mounted between the dial and the dial mounting bracket by means of the lower two dial mounting screws.

REPLACEMENT OF THE OSCILLATOR TUBE:

There are two types of 6C5G tubes, one shielded and the other unshielded. They can be told apart easily by appearance. The shielded type has a perforated mesh screen surrounding the other elements. This screen is about an inch in diameter and comes very close to the inside of the bulb. The unshielded type does not have this perforated mesh screen. The plate of the tube, of solid metal and about 3/8" diameter, is visible. It is important that only the unshielded type 6C5G, without the perforated mesh screen, be used in the oscillator socket. Use of the shielded type will upset band "F" calibration and interfere with proper performance.

THE WAVE SWITCH:

Two different types of Wave Switches have been used. They can be told apart by the construction of the index plate and indexing arm. In one type, part #1013714389, the indexing arm has two ball bearings that contact against the stops of the index plate. In the other type, part #1013715063, the index arm is in the shape of a flat "S" spring with a small roller and shaft at each end of the arm, to contact the stops of the index plate. Individual parts for the Wave Switches may be bought separately and are so listed in the Parts List. #1 contact plate is the one nearest the knob end of the shaft. #2 plate is the next one and #3 plate is the one farthest from the knob end of the shaft.

CONNECTION OF THE 6G5 CATHODE:

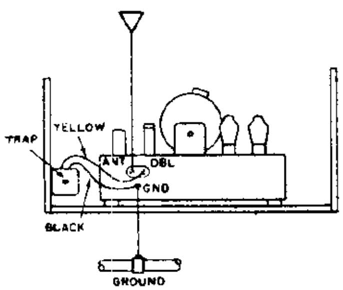
Examine the slate colored cathode lead of the 6G5 tuning eye tube. If it is connected to the cathode of the 6N6G it should be removed from there and connected instead to the cathode of the 6Q7G. The latter connection is the correct one and is shown in the portion of the schematic on the other side of this page. An indication of the incorrect connection is that the volume will increase if the 6G5 tube is removed from its socket.

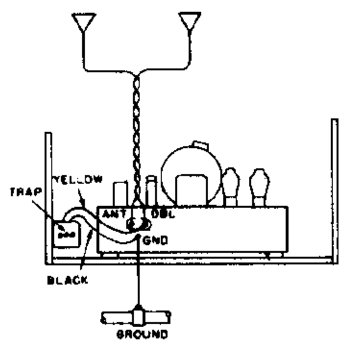
WAVE-TRAP TO ELIMINATE INTERFERENCE FROM SHIP OR AIRPORT TRANSMITTERS:

In locations near ship transmitters or airports or air beacon stations, code interference may be experienced. Part #1013115433 wave-trap is designed to eliminate such interference. It can be ordered from Colonial Radio Corporation, 254 Rano Street, Buffalo, N. Y. Use Purchase Order blank, form F5284. The retail selling price is $1.00.

Mount the trap, by means of two wood screws, at any place on the chassis shelf or cabinet where it will be near the antenna terminals of the receiver. Connect the yellow lead of the trap to the terminal marked, "DBL", on the terminal block at the rear of the chassis. Connect the black lead of the trap to the ground terminal on the chassis. Any excess length should be cut off the wave-trap leads so that they are as short as possible. The antenna or doublet connections to the receiver are not to be changed in any way.

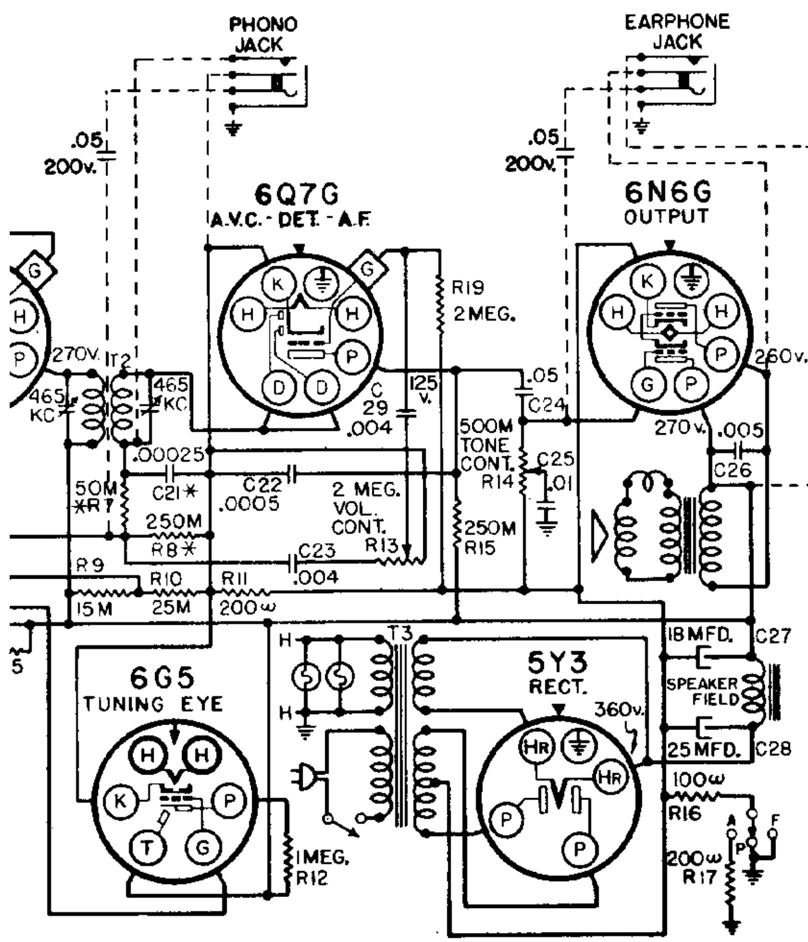
The trap is pre-tuned to the IF frequency so that normally no further adjustment is necessary. However, should interference still be experienced, tune the receiver between approximately 550 and 600 kc. Then adjust the wave-trap, by means of the trimmer screw at the bottom of the container, until the interference is eliminated. Addition of the trap will reduce the sensitivity of the receiver around 600 kc by approximately 50%. The customer should be forewarned of this to avoid complaints of reduced sensitivity.





CONNECTING A PHONOGRAPH PICK-UP JACK OR AN EARPHONE JACK:

A hole, plugged with a brass insert, will be found at the rear of the chassis. This hole is provided for the installation of either a phonograph pick-up jack or an earphone jack. The circuits are shown in the illustration below. The additional condensers are .05 mfd. 200 volts. The part number of the jack is 1011813585.

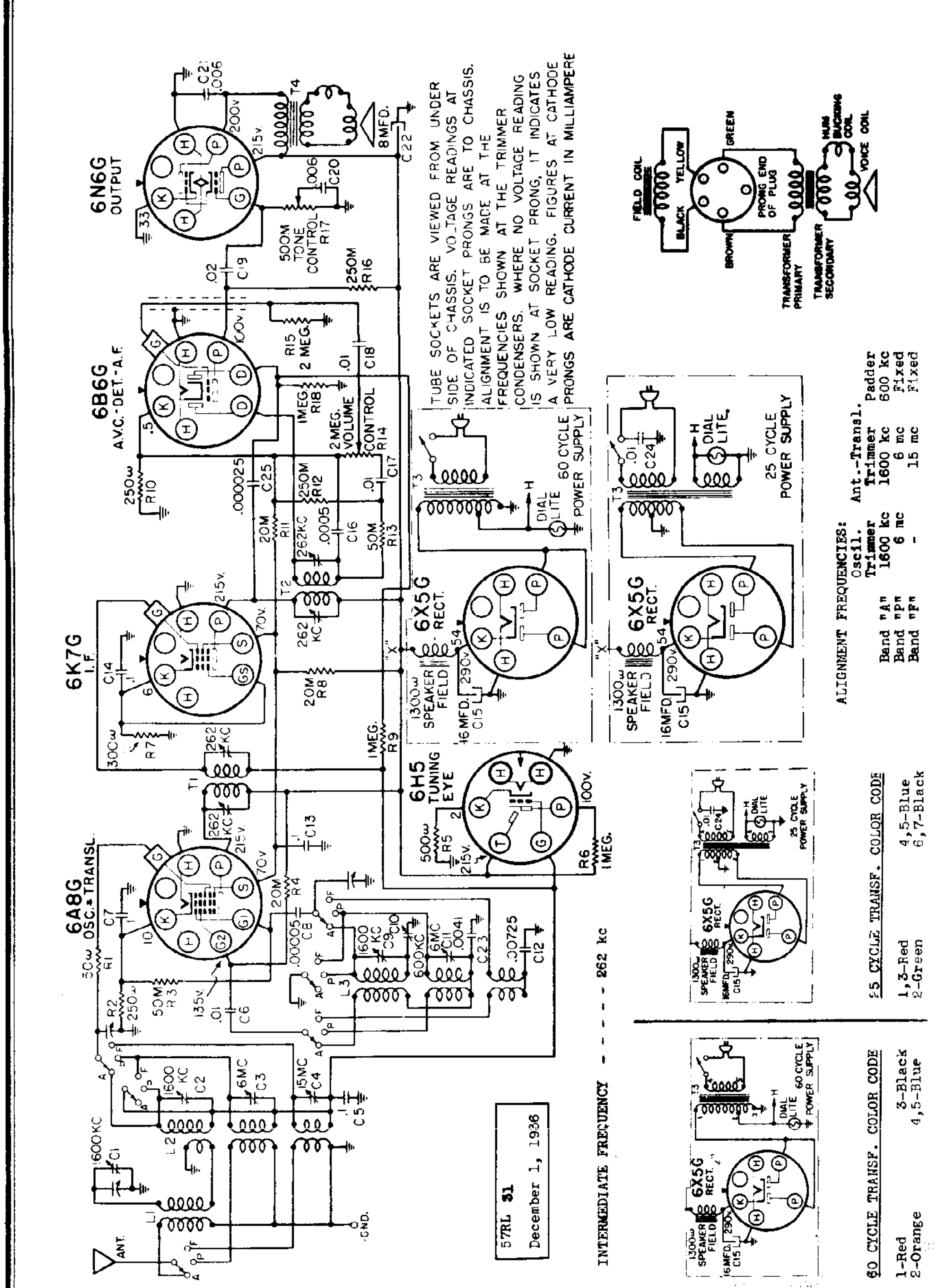


CONSOLE SPEAKERS:

In later production, the speaker of Console Models was mounted on felt cushions instead of being screwed directly to the baffle. For shipping purposes this cushion mounting is made rigid by screwing the two wooden strips, that hold the felt cushions, tightly to the baffle. To secure the advantage of the felt cushions and to insure best tone, the screw at each end of the two wooden strips should be loosened about one turn, thereby allowing the speaker to have a non-rigid mounting.

SEARS-ROEBUCK & CO.

MODELS 4468, 4470, 4490
Schematic, Voltage, Data



MODELS 4468,4470,4490
Alignment,Sensitivity
Notes

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections - Across voice coil leads
Output meter reading to indicate .5 watts output - - - - - - - - - - - - - - - - - 1.3 volts
Average sensitivity in microvolts for .5 watts output - - - - - - - - - - - See chart below
Dummy antenna value to be in series with generator output - - - - - - - - - See chart below
Connection of generator output lead - See chart below
Generator modulation - 30%, 400 cycles
Position of Volume Control - Fully clockwise
Position of Tone Control - Fully clockwise
Position of Dial Pointer - - - To fall on center line of dial when variable is fully meshed.

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"A"	550 kc	262 kc	.1 mfd.	6A8G Grid	T2,T1	IF Output IF Input	-
"A"	1600 kc	1600 kc	.0002 mfd.	Ant. Term.	C9,C2,C1	Osc., transl., antenna	65
"A"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C10	Osc. Pad.	50
"P"	6 mc	6 mc	400 ohms	Ant. Term.	C11	Oscillator	-
"P"	6 mc (rock)	6 mc	400 ohms	Ant. Term.	C3	Translator	50
"F"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C4	Translator	45
"F"	7 mc	7 mc	400 ohms	Ant. Term.	Loop at bracket end of L3	-	80

IMAGE ADJUSTMENT

Set the generator to 1524 kc and tune in the signal image at about 1000 kc on the receiver. The generator should be adjusted for high output (.1 volts). There is a lead running from L1 through a hole in the chassis to the wave switch. Adjust the position of this lead under the chassis for minimum image response.

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

It is advisable to repeat the entire alignment procedure band by band and in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

After the alignment procedure has been completed, tune in a broadcast signal at about 1000 kc. If necessary, shift the dial pointer so that it indicates this frequency.

Values shown under, "Microvolts", are only approximate.

DIFFERENCES BETWEEN 25 CYCLE AND 60 CYCLE POWER SUPPLY:

The 6X5G rectifier tube is used as a half wave rectifier for 60 cycle supply. Full wave rectification is used for 25 cycle supply.

OPERATION OF THE 6H5 TUNING EYE TUBE:

The type 6H5 tuning eye tube, used in this receiver, operates over a signal input range about three times greater than can be handled by the 6E5 tube, used in some of last years receivers. With the 6E5 tube, if the circuits are designed so that the tube responds to a moderately weak signal, it will overlap with strong signals. Any signal stronger than that required to close the eye cannot be tuned accurately by the eye. The 6H5 tube provides an even more sensitive indication for weak signals than the 6E5 and will not overlap except under extreme local conditions.

However, the range of signal input over which the receiver must work is so great that even this 6H5 variable mu tube cannot completely satisfy all conditions. In addition to the limitations of the tube itself, there are variations between receivers, even though they be of the same model, that affect the signal required to close the eye. If several tubes are available to choose from, it may be possible to select one that will operate more satisfactorily in a particular location.

INSTALLING A WAVE-TRAP:

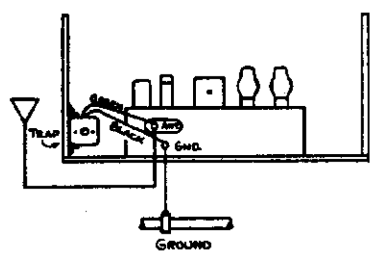
In locations near ship transmitters or airports or air beacon stations, code interference may be experienced. Part #1013114477 wave-trap is designed to eliminate this type of interference. These traps may be ordered from Colonial Radio Corporation, 254 Rano Street, Buffalo, N. Y., using Purchase Order blank, form F5284. The retail selling price of the #1013114477 wave-trap is $1.00. Be sure to mention the part number when ordering the wave-trap.

Mount the trap, by means of two wood screws, at any convenient place on the chassis shelf or cabinet where it will be near the antenna terminal of the receiver. Connect the green lead of the trap to the antenna terminal of the receiver. (The leadin from the antenna will also remain connected to the antenna terminal of the receiver.) Connect the black lead of the trap to ground.

The traps act as a series resonant circuit across antenna and ground. The traps are pre-tuned to the IF frequency so that ordinarily no further adjustment will be necessary. However, if interference still is experienced, tune the trap by means of the trimmer screw at the bottom of the container, until the interfering signal is eliminated.

POWER SUPPLY:
All models available - - - - - - - - - - - - - - - 105-125 volts, 50-60 cycle, 55 watts
All models available - - - - - - - - - - - - - - - 105-125 volts, 25 cycle, 45 watts

FREQUENCY RANGES:
Band "A" - - - - - - - - - - 540-1800 kc
Band "P" - - - - - - - - - - 2.2-6.5 mc
Band "F" - - - - - - - - - - 6.2-18 mc



POWER OUTPUT:
Type - - - - - - - - - - Triple Twin
Undistorted - - - - - - - - 2 watts
Maximum - - - - - - - - - - - 4 watts

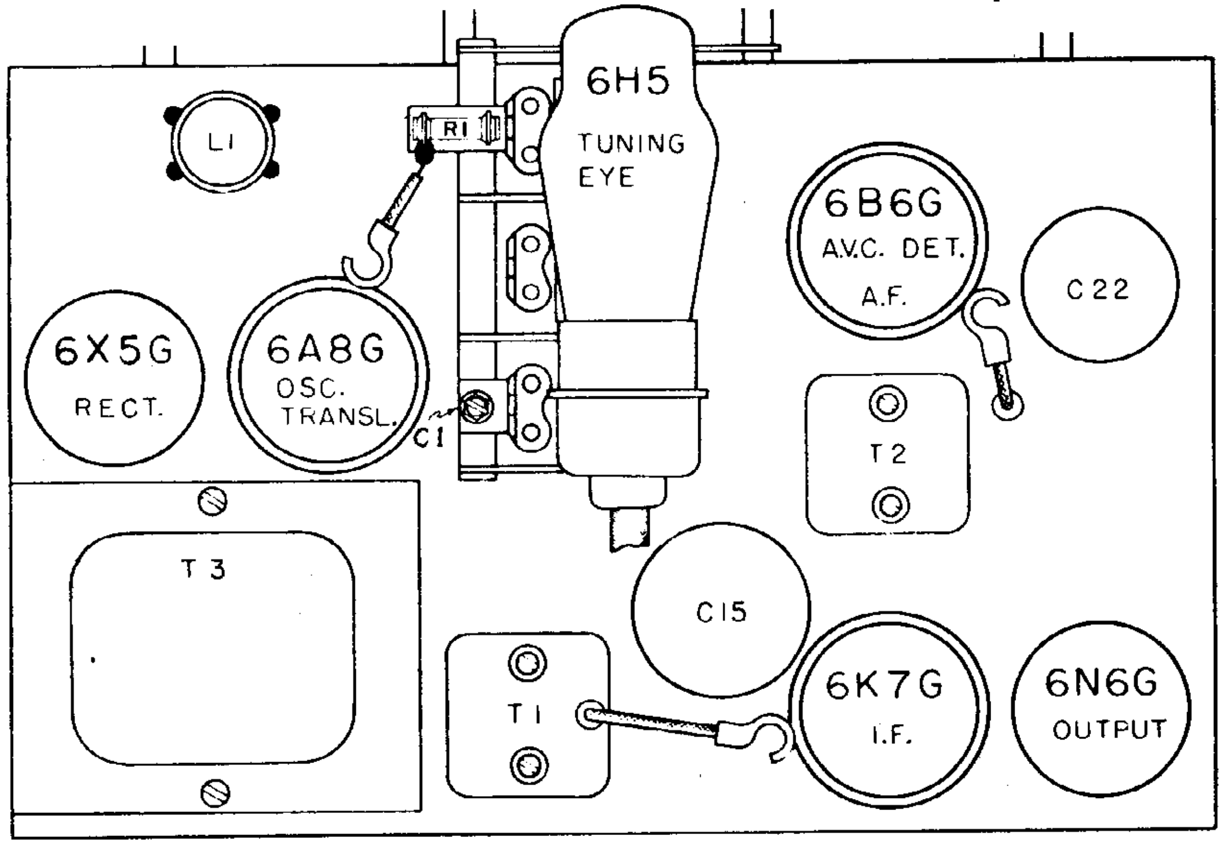
OPERATING FEATURES:
Fidelity Range - - 50 - 5000 cycles
Tone Control - - - - - - - - - Variable
Automatic Volume Control

LOUD SPEAKER:
Type - - - - - - - - - - - - Dynamic
Size - - - - - - - - - - - 6" and 8"
Field coil resistance - - 1300 ohms
Field coil voltage drop - - 75 volts

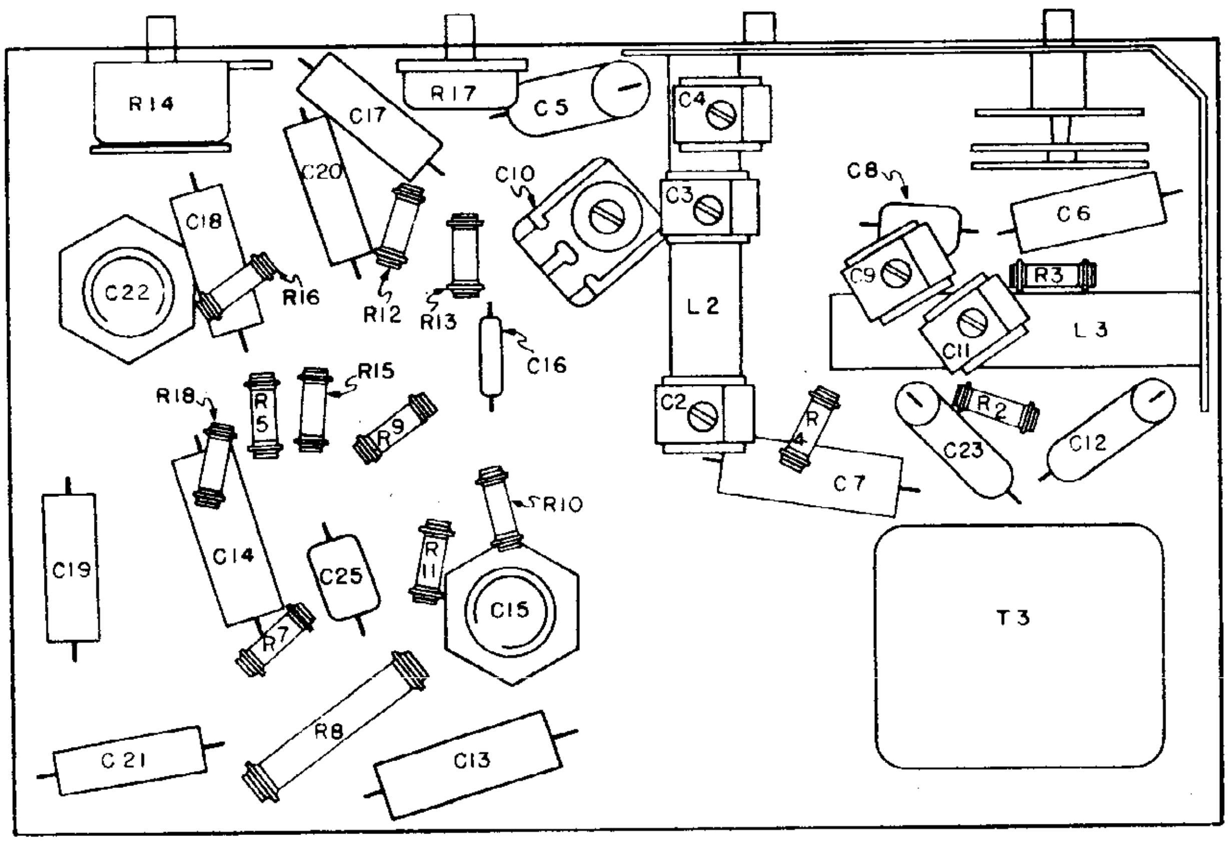
CHASSIS FEATURES:
Preselector on band "A"
Antenna - - - - - - - Conventional
Tuning Eye

MODELS 4468,4470,4490
Socket,Trimmers,Chassis

SEARS-ROEBUCK & CO.



LOCATIONS OF PARTS TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

MODELS 4486,4586,4586A
Whistle Elimination
Data

SEARS-ROEBUCK & CO.

GENERAL INFORMATION

The sensitivity is automatically increased on bands "P" and "F" by removal of the residual bias furnished by the resistor, R14. This resistor is connected in the circuit only when the Wave Band switch is in position "A". Contacts on the Wave Band switch automatically perform this switching.

Variable selectivity is obtained by a two position switch. It changes the selectivity of the IF input transformer by connecting or disconnecting coupling turns between primary and secondary.

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc)of the 465 kc IF,and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc.

Align the IF at the new frequency and then realign the receiver as described under, "ALIGNMENT PROCEDURE".

POWER SUPPLY:
All models available - - - - - - - - - - - - - - - - 105-125 volts, 50-60 cycle, 85 watts
All models available - - - - - - - - - - - - - - - - - - 105-125 volts, 25 cycle, 90 watts

FREQUENCY RANGES:

Band "A"	540-1800 kc
Band "P"	1800-6000 kc
Band "F"	6-18 mc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Oscil. Padder
Band "A"	1800 kc	1500 kc	600 kc
Band "P"	5 mc	5 mc	2 mc
Band "F"	15 mc	15 mc	Fixed

INTERMEDIATE FREQUENCY - 465 kc

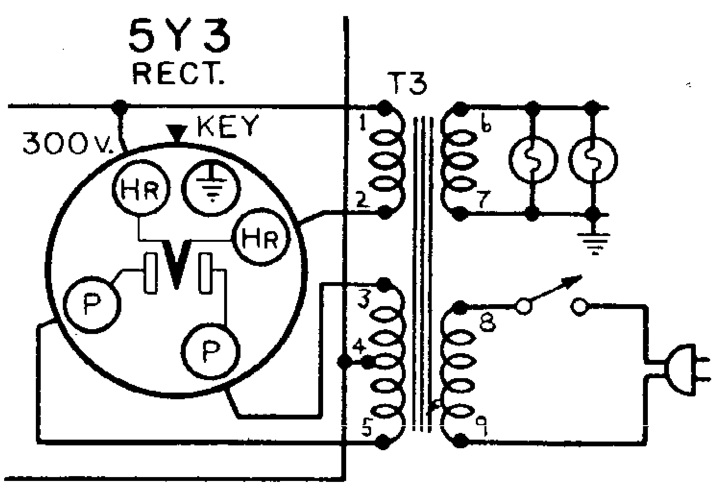
POWER OUTPUT:
Type - - - - - - - Push-Pull Pentode
Undistorted - - - - - - - - - - 6 watts
Maximum - - - - - - - - - - - 10 watts

LOUD SPEAKER:
Type - - - - - - - - - - - - - Dynamic
Size - - - - - - - - - - - - - - - 10"
Field coil resistance - 650 ohms, hot
Speaker field coil voltage drop - - 60 volts

ELIMINATING HUM

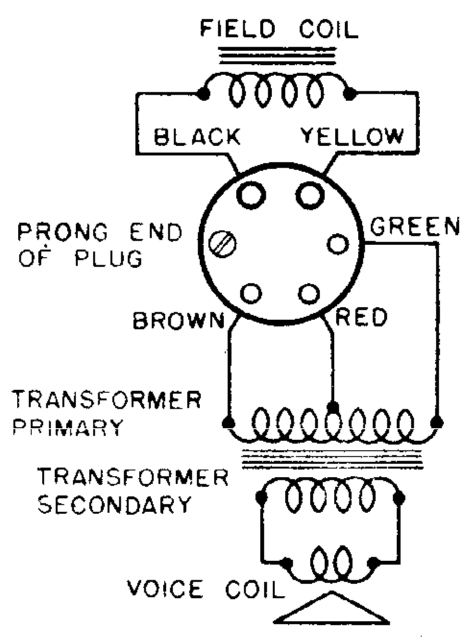
Excessive hum may be caused by a faulty 6C5G phase changer tube. Such tubes may test O.K. in a tube tester but cause hum due to leakage between the heater and cathode. If excessive hum is encountered, try changing the 6C5G phase changer tube.

Under certain conditions reversing the line plug will eliminate hum.



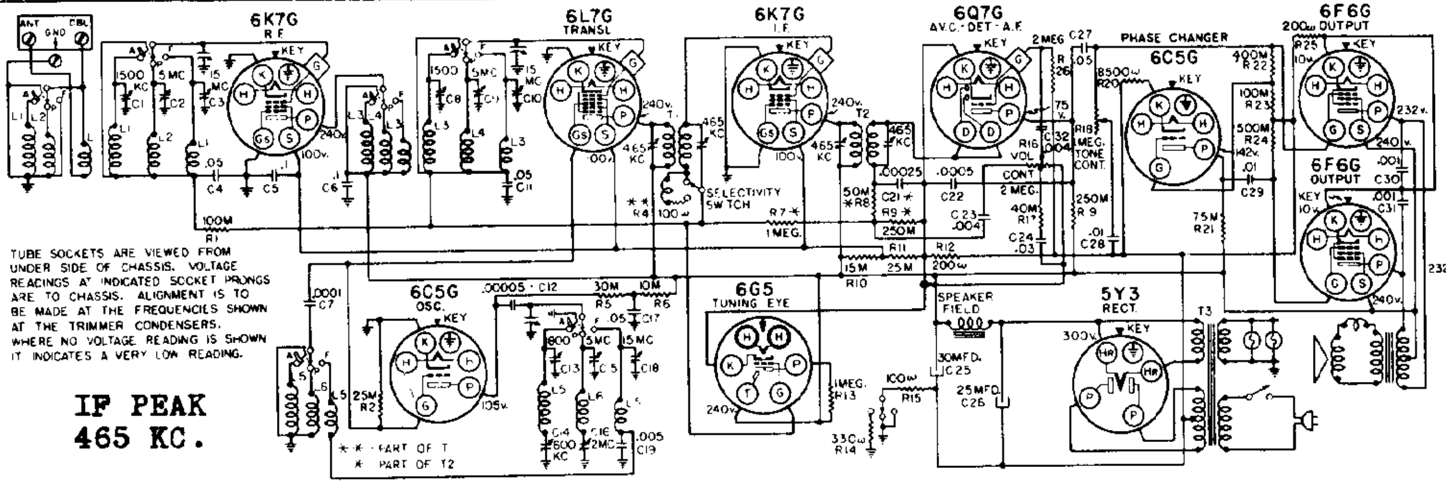
POWER TRANSFORMER COLOR CODE

1-Red	4-Slate	7-Black
2-Red	5-Blue	8-Green
3-Red	6-Black	9-Black



SEARS-ROEBUCK & CO.

MODELS 4486,4586,4586A
Schematic,Voltage
Phono.Pick-up Jack Data
Interference Elimination



IF PEAK 465 KC.

57RL 18

August 20, 1936

WAVE-TRAP TO ELIMINATE INTERFERENCE FROM SHIP OR AIRPORT TRANSMITTERS:

In locations near ship transmitters or airports or air beacon stations, code interference may be experienced. Part #1013115433 wave-trap is designed to eliminate such interference. It can be ordered from Colonial Radio Corporation, 254 Rano Street, Buffalo, N. Y. Use Purchase Order blank, form F5284. The retail selling price is $1,00.

Mount the trap, by means of two wood screws, at any place on the chassis shelf or cabinet where it will be near the antenna terminals of the receiver. Connect the yellow lead of the trap to the terminal marked, "DBL", on the terminal block at the rear of the chassis. Connect the black lead of the trap to the ground terminal on the chassis. Any excess length should be cut off the wave-trap leads so that they are as short as possible. The antenna or doublet connections to the receiver are not to be changed in any way

The trap is pre-tuned to the IF frequency so that normally no further adjustment is necessary. However, should interference still be experienced, tune the receiver between approximately 550 and 600 kc. Then adjust the wave-trap, by means of the trimmer screw at the bottom of the container, until the interference is eliminated. Addition of the trap will reduce the sensitivity of the receiver around 600 kc by approximately 50%. The customer should be forewarned of this to avoid complaints of reduced sensitivity.

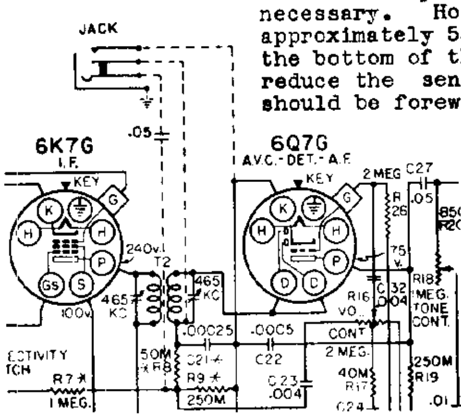


FIG. 2

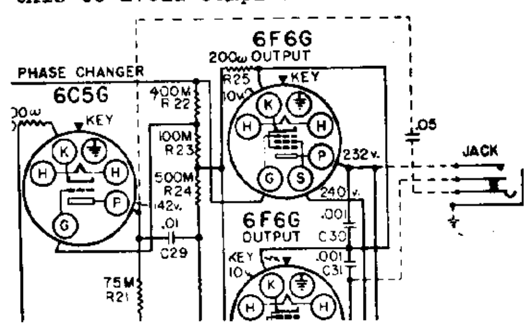
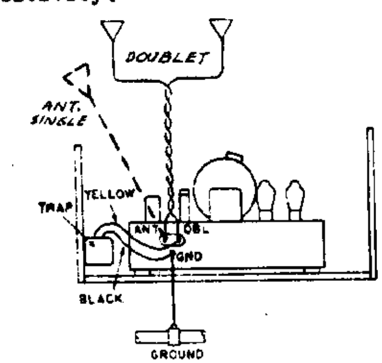


FIG. 1

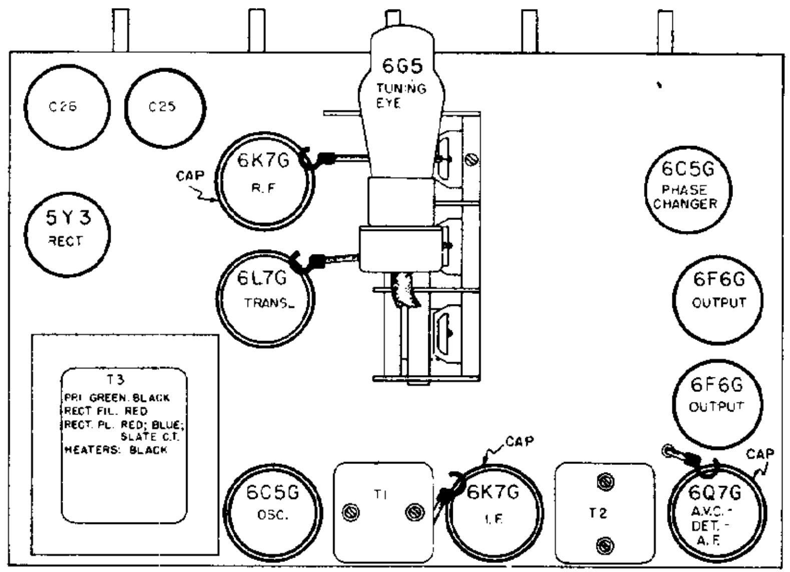


CONNECTING A PHONOGRAPH PICK-UP JACK OR AN EARPHONE JACK:

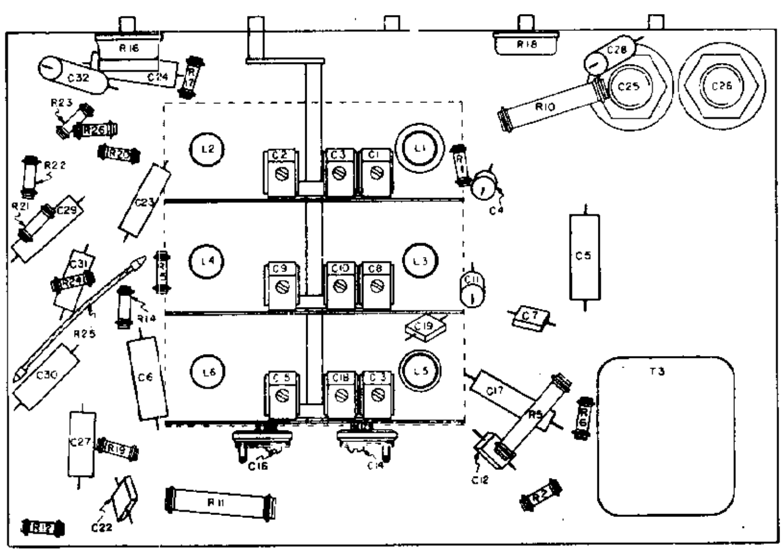
A hole, plugged with a brass insert, will be found at the rear of the chassis. This hole is provided for the installation of either a phonograph pick-up jack or an earphone jack. The circuit for the earphone jack connection is shown in Fig. 1. The circuit for the phonograph pick-up jack connection is shown in Fig. 2. The condenser shown is .05 mfd. 200 volt. The part number of the jack is 1011813585. It can be ordered directly from Colonial Radio Corporation, 254 Rano Street, Buffalo, N. Y. The retail selling price is $.60.

MODELS 4486,4586,4586A
Socket,Trimmers,Chassis
Alignment,Sensitivity

SEARS-ROEBUCK & CO.



LOCATIONS OF PARTS ON TOP OF CHASSIS -



LOCATIONS OF PARTS UNDER CHASSIS -

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections - Across speaker voice coil

Output meter reading to indicate .5 watts output - - - - - - - - - - - - - - - - .85 volts

Approximate average sensitivity in microvolts for .5 watts output - - - - - See chart below

Dummy antenna value to be in series with generator output - - - - - - - - - See chart below

Connection of generator output lead - See chart below

Generator modulation - 30%, 400 cycles

Position of volume control - Fully clockwise

Position of tone control - Fully clockwise

Position of selectivity control - Fully clockwise

Position of dial pointer - - To fall on second line from right, of ornamental lines running from tuning eye toward center of dial, when variable is fully meshed.

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	APPROXIMATE MICROVOLTS
"AM"	550 kc	465 kc	.1 mfd.	6L7 Grid	T2, T1	-
"AM"	1800 kc	1800 kc	.0002 mfd.	Antenna Terminal	C13	90
"AM"	1500 kc	1500 kc	.0002 mfd.	Antenna Terminal	C1, C8	20
"AM"	600 kc (rock)	600 kc	.0002 mfd.	Antenna Terminal	C14	32
"POL"	5000 kc	5000 kc	400 ohms	Antenna Terminal	C15 (*)	-
"POL"	5000 kc	5000 kc	400 ohms	Antenna Terminal	C2, C9	2
"POL"	2000 kc (rock)	2000 kc	400 ohms	Antenna Terminal	C16	18
"FOR"	15 mc	15 mc	400 ohms	Antenna Terminal	C18 (*)	-
"FOR"	15 mc	15 mc	400 ohms	Antenna Terminal	C3, C10	2
"FOR"	6 mc	6 mc	400 ohms	Antenna Terminal	-	40

IMPORTANT ALIGNMENT NOTES

(*) If two peaks can be obtained at two different settings of the trimmer adjusting screw, use the adjustment in which the trimmer is screwed further out (lesser capacity).

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the AVC action of the set from interfering with accurate alignment.

The shield plate that covers the coil assembly should be left in place while making the alignment adjustments. The trimmer screws are accessible through the holes in the shield.

Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy antenna used for alignment of any other band.

After the alignment procedure has been completed, tune in a station at about 900 kc. If necessary, shift the dial pointer to the station's frequency on the dial.

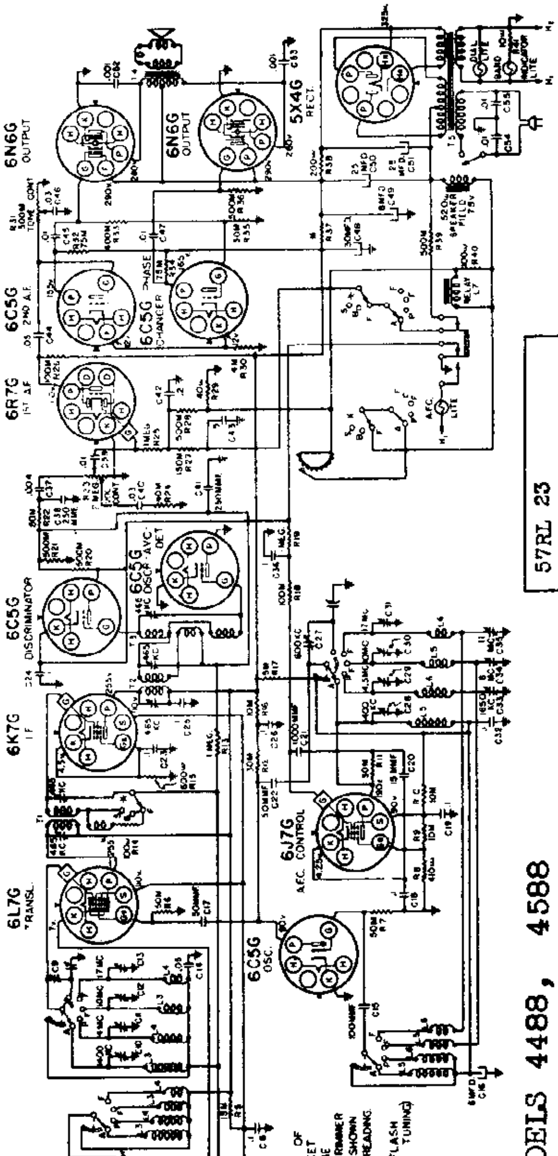
SEARS-ROEBUCK & CO.

POWER SUPPLY:
All models available - - - - - - - - - - - - - - 105-125 volts, 50-60 cycle, 135 watts
All models available - - - - - - - - - - - - - - 105-125 volts, 25 cycle, 135 watts

INTERMEDIATE FREQUENCY - 465 kc

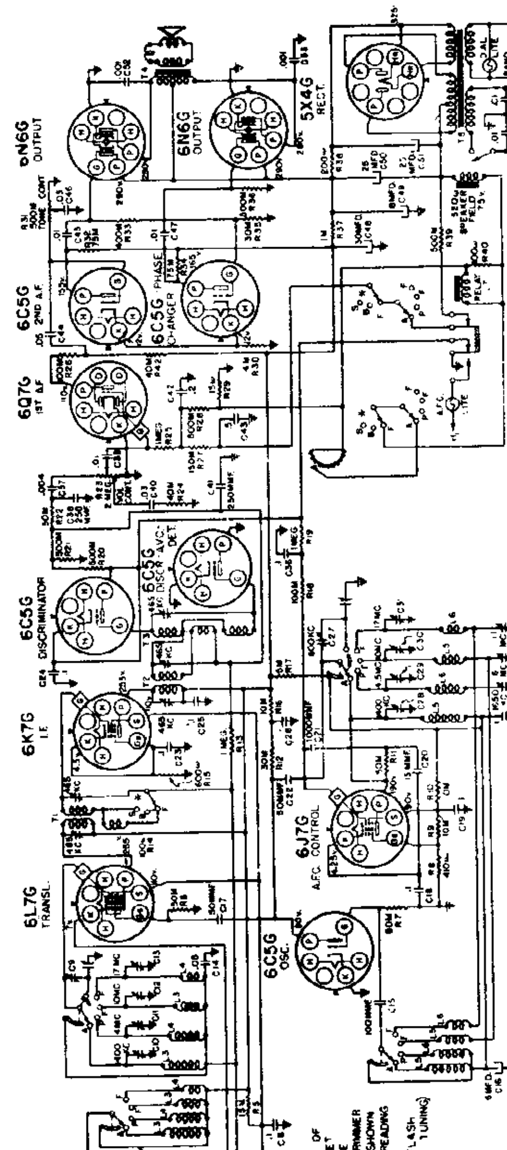
POWER OUTPUT:
Type - - - - - - - - Push-Pull
Undistorted - - - - - - - - 12.8 watts
Maximum - - - - - - - - - - 18.9 watts

LOUD SPEAKER:
Type - - - - - - - - - - - - - Dynamic
Size - - - - - - - - - - - - - - - 12"
Field coil resistance - - - 520 ohms
Field coil voltage drop - - - 75 volts



MODELS 4488, 4588

57RL 23
September 4, 1936



MODELS 4488A, 4588A

FREQUENCY RANGES:
AMERICAN Band - - - - - - - - 540-1500 kc
POLICE Band - - - - - - - - 1.5-4.5 mc
FOREIGN Band - - - - - - - - 6-11 mc
FOREIGN Band - - - - - - - - 10-18 mc

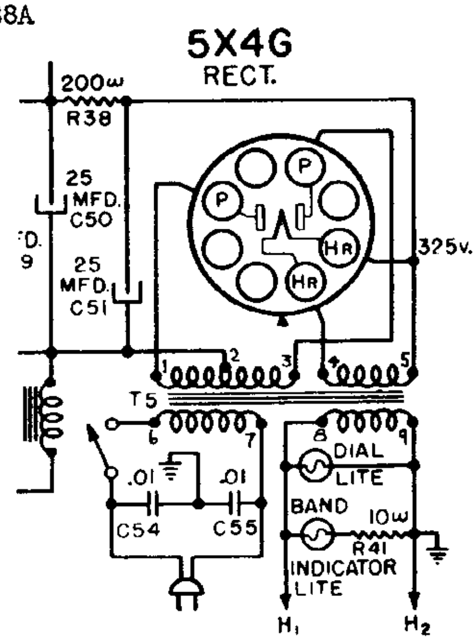
ALIGNMENT FREQUENCIES:

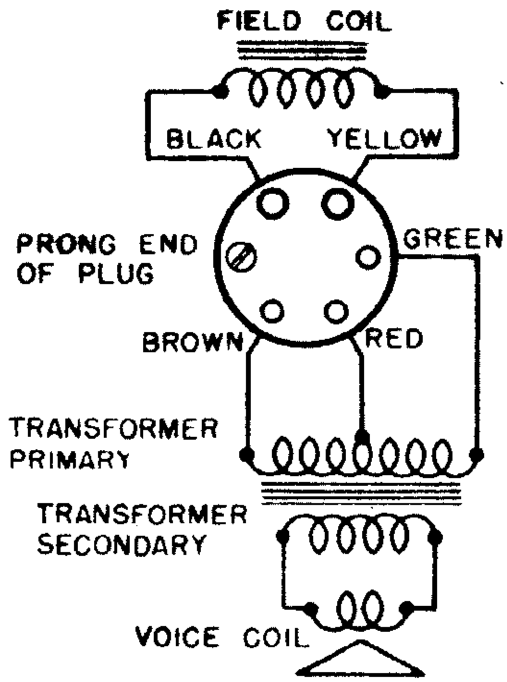
	Osc. Trimmer	Ant-Transl Trimmer	Osc. Padder
Band "AM"	1400 kc	1400 kc	600 kc
Band "POL"	4 mc	4 mc	1650 kc
Band "FOR"	10 mc	10 mc	6 mc
Band "FOR"	17 mc	17 mc	11 mc

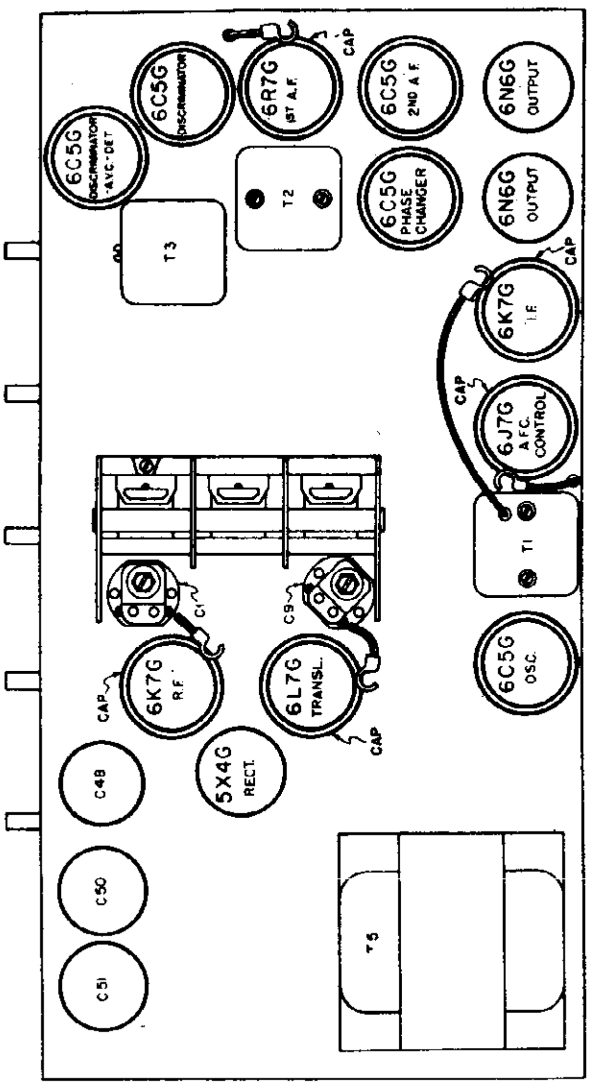
MODELS 4488,4588
Socket,Trimmers
Chassis,Color Code
MODELS 4488A,4588A
Color Code

SEARS-ROEBUCK & CO.

POWER TRANSFORMER, T5, COLOR CODE
1-Red
2-Slate
3-Blue
4&5-Red
6-Black
7-Green
8&9-Black

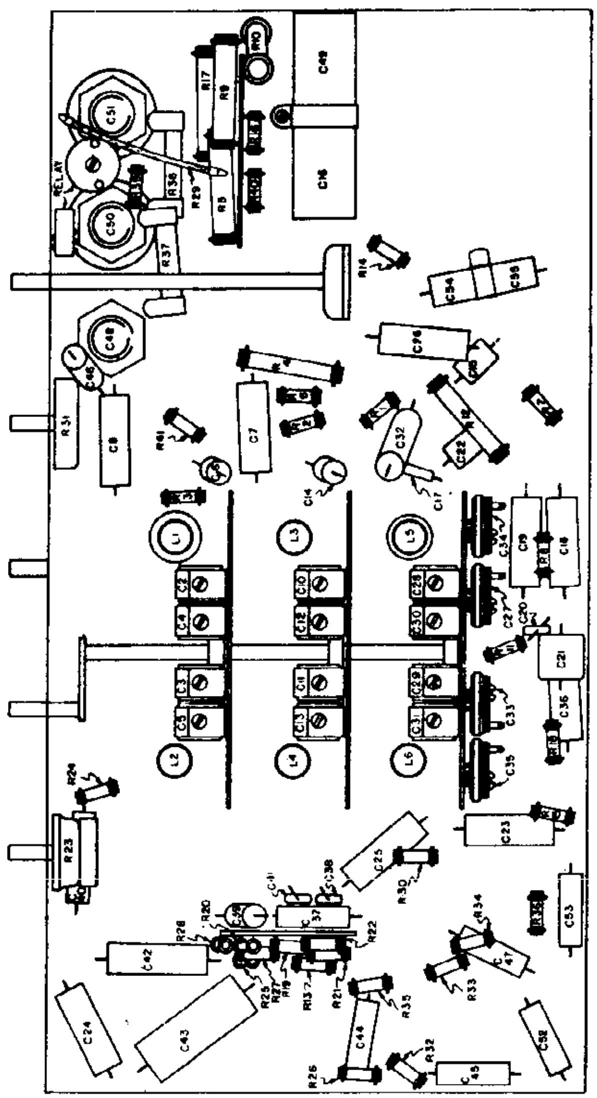






LOCATIONS OF PARTS ON TOP OF CHASSIS

MODELS 4488, 4588



LOCATIONS OF PARTS UNDER CHASSIS

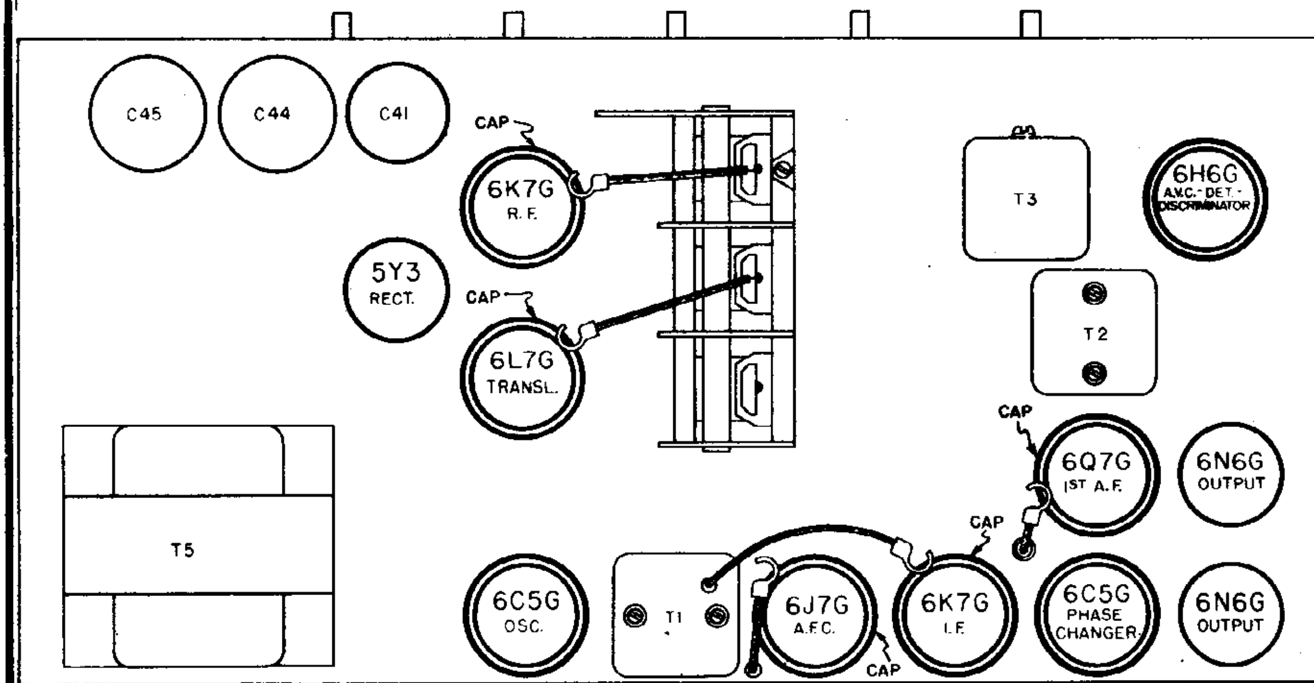
MODELS 4488, 4588

MODELS 4488A, 4588A
Socket, Trimmers
Chassis

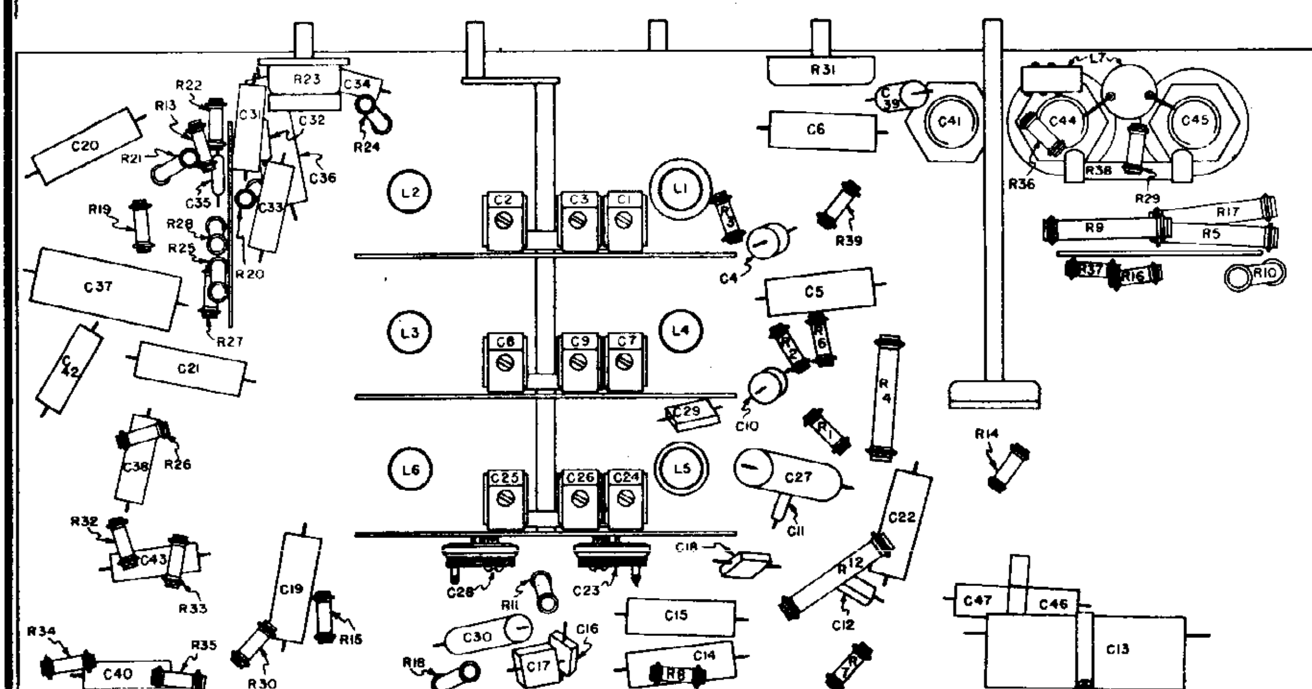
SEARS-ROEBUCK & CO.

OPERATING FEATURES:
- Fidelity Range - - - 30 - 8000 cycles
- Tone Control - - - - - - - Variable
- Selectivity Control - - Two position
- Automatic Frequency Control (Flash Tuning)
- Automatic Volume Control
- Illuminated Visual Band Indicator

CHASSIS FEATURES:
- Number RF stages - - - - - - - - One
- Number IF stages - - - - - - - - One
- Antenna - - Doublet or Conventional



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

MODELS 4486,4588
MODELS 4488A,4588A
Alignment, Sensitivity
Dial Drive Parts

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections	Across speaker voice coil
Output meter reading to indicate .5 watts output	2.5 volts
Dummy antenna value to be in series with generator output	See chart below
Connection of generator output lead	See chart below
Generator modulation	30%, 400 cycles
Approximate average sensitivity in microvolts for .5 watts output	See chart below
Position of Volume Control	Fully on
Position of Tone Control	Fully clockwise
Position of Flash Tuning and Selectivity Switch knob	Sharp, fully counter clockwise
Position of Dial pointer	To fall on 10 mc mark when variable is fully meshed

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	APPROXIMATE MICROVOLTS
"AM"	550 kc	465 kc	.1 mfd.	6L7G Grid	T2,T1	-
"AM"	1400 kc	1400 kc	.0002 mfd.	Antenna Terminal	C28,C2,C10	15
"AM"	600 kc (Rock)	600 kc	.0002 mfd.	Antenna Terminal	C27	12
"POL"	4 mc	4 mc	400 ohms	Antenna Terminal	C29,C3,C11	2
"POL"	1650 kc (Rock)	1650 kc	400 ohms	Antenna Terminal	C33	30
"FOR" (Next to "POL")	10 mc	10 mc	400 ohms	Antenna Terminal	C30 *	-
"FOR" (Next to "POL")	6 mc (Rock)	6 mc	400 ohms	Antenna Terminal	C34	12
"FOR" (Next to "POL")	10 mc	10 mc	400 ohms	Antenna Terminal	C4,C12	2
"FOR" (Next to "POL")	6300 kc	6300 kc	400 ohms	Antenna Terminal	C1,C9 **	12
"FOR"	17 mc	17 mc	400 ohms	Antenna Terminal	C31 *	-
"FOR"	17 mc	17 mc	400 ohms	Antenna Terminal	C5,C13	2
"FOR"	11 mc (Rock)	11 mc	400 ohms	Antenna Terminal	C35	50

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

* Two peaks will be found at two different settings of the trimmer. Use the one in which the trimmer is screwed further in (greater capacity).

** Use a bakelite screw-driver in making these two adjustments. These adjustments should not be touched after this band has been lined up.

Repeat the entire alignment step by step in the original order for greater accuracy. Always keep the generator output power at its lowest possible value. This will prevent the AVC action of the receiver from interfering with accurate alignment.

The shield covering the coils at the bottom of the chassis should be left in place during the alignment. The trimmer condensers are accessible through the holes in the shield.

Only the dummy antenna indicated in the chart for any particular band should be used. Disconnect the dummy antenna used for alignment of any other band.

After the alignment procedure has been completed, tune in a station at about 900 kc. If necessary, shift the dial pointer to the exact frequency of the station.

After the alignment has been completed, the A.F.C. adjustment should be made as follows:

A.F.C. ADJUSTMENT

CAUTION: The right hand knob must be in the "B" (broad) position for operations 1 through 5. Two signal generators are necessary to make the adjustments. The Volume and Tone Controls must be turned all the way to the right. The generator ground connection is to be made to the chassis.

1. Set one signal generator to 1050 kc and 5000 microvolts output. Connect its output to the "ANT" terminal of the set, through a .0002 mfd. condenser.

2. Tune the receiver for maximum output (at 1050 kc). Then switch the signal generator modulation switch to the "off" position.

3. Short the movable arm to the toothed disc with a piece of wire. The Flash Tuning light should become illuminated.

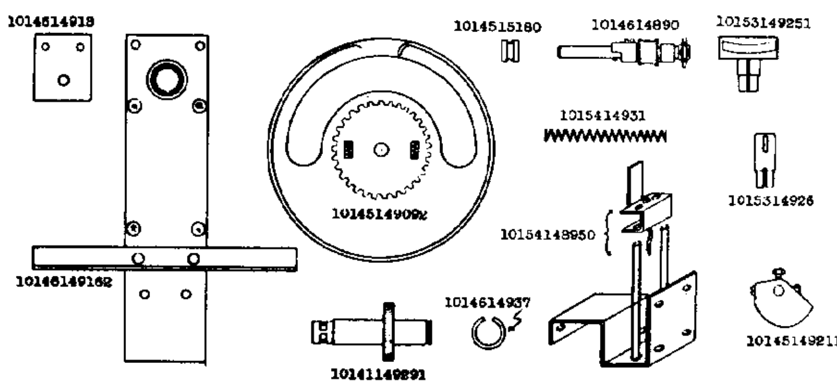
4. Set the second signal generator to 465 kc and 10,000 microvolts output. Connect its output, in series with a .000015 mfd. condenser to the control grid of the 6L7G tube.

5. Carefully turn the variable condenser until "zero beat" note is had (with right hand knob in "BROAD" position).

6. Turn the right hand knob to the "FLASH" position (fully clockwise). Then adjust the discriminator unit, T3, for "zero beat". The correct setting will be obtained at about the center of T3 trimmer range. The adjustment is a very sharp one.

7. Turn the right hand knob to the "SHARP" and then to the "BROAD" positions. The receiver still should give zero beat in the "SHARP" and "BROAD" positions if the A.F.C. is properly adjusted. If it does not, carefully repeat operation #6.

8. The A.F.C. can be checked for "pull in" in the following manner. Remove the signal generator connection from the 6L7G grid. Switch on the modulation of the 1050 kc generator and set the generator to give 5000 microvolts output. Reduce the Volume Control setting of the receiver to give 1.5 volts reading on the output meter. Increase the signal generator frequency until the output meter reads .5 volt. Note the frequency of the signal generator at this output meter reading. Then decrease the signal generator frequency from 1050 kc until the output meter again reads .5 volt and note the signal generator frequency. If the A.F.C. is operating properly, the signal generator can be shifted 15 to 20 kc either side of 1050 kc before the output meter reading is reduced from 1.5 volts to .5 volt.



DIAL DRIVE REPLACEMENT PARTS

SEARS-ROEBUCK & CO.

THE AUTOMATIC FREQUENCY CONTROL - FLASH TUNING:

These models incorporate a completely new feature, Automatic Frequency Control - Flash Tuning. This double feature, which is designed to operate only on the AMERICAN band, does several things. The Automatic Frequency Control removes the necessity for accurate tuning. Depending upon the strength of the station, it is necessary to tune only to within 15 kc or less of the station's frequency. The Automatic Frequency Control then will "take hold" and tune the station far more accurately than can be done manually. This is done entirely with radio circuits, no moving parts being involved.

The Flash Tuning mechanism greatly simplifies tuning. It is necessary merely to turn the dial pointer to the station's call letters. The call letters then will become illuminated and, by virtue of the A.F.C., the station will automatically be tuned in exactly. Until the station's position is reached, the receiver is completely silent. A description of how the circuits of the A.F.C. - Flash Tuning feature work is given after the following instructions for setting up the Flash Tuning feature.

SETTING UP:

1. The glass in the cabinet front panel must be removed to allow insertion of the station call letters, as described later. This glass is held in place by a split ring (the split is at the top). See Fig. 1. The tool illustrated is furnished in the same envelope with the Instructions. Use the screw-driver end of this tool to remove the split ring by prying out one of its ends, as indicated in Fig. 1. Be very careful not to insert the tool so deep that it touches the glass, else the glass may become chipped.

The glass can be removed by placing the hand on it and tipping the cabinet forward. Take care during the operation not to allow the split ring to fly out or the glass to drop and break.

2. Make a list of the broadcasting stations to which you desire to have the FLASH TUNING mechanism respond. These stations must be local stations or strong stations at medium distance that give reliable daylight reception. A sheet containing the call letters of broadcasting stations is furnished in the same envelope with the Instruction Leaflet. Cut out the call letters of the selected stations. The short vertical lines before and after the station's call letters and the long horizontal lines will serve as a guide along which to cut. When properly done, these cut slips will be a trifle over 1¼" long and 1/4" wide.

3. Turn the Flash Tuning and Selectivity Switch knob to the "SHARP" position. Then tune in the first station on your list of selected stations.

4. Leaving your station tuned in, go to the rear of the radio. You will see a semi circular toothed disc, as illustrated in Fig. 2. There is also a flat spring arm, with a small rounded projection near its end, that moves over the teeth of this semi circular disc as the Station Selector knob is turned. Still leaving your station tuned in, carefully note which tooth on the semi circular disc is directly under the rounded projection of the spring arm. Mark this tooth with a pencil. Note that there is a double row of teeth and either the tooth that faces you or the tooth that faces the front of the radio may be bent up, depending upon which one is nearer the rounded projection of the spring arm. After you have marked the tooth, turn off the radio. Then tune away from the station (with the Station Selector knob, not the movable arm) and bend this marked tooth straight up, using the slotted end of the tool provided. See Fig. 2. It is important that the slot of the tool fit as far down as possible on the tooth before bending. This is necessary so that the complete tooth will be bent up instead of just part of the tooth. When this is properly done, the projection of the spring arm will touch the bent up tooth when the toothed disc is rotated by turning the Station Selector knob.

5. Turn the radio on again and tune in the next station on your list of selected stations. Mark the tooth that now is under the projection of the spring arm when this station is tuned in. Turn off the radio, tune away from the station so that the spring arm will not be in the way and bend up this marked tooth, using the tool provided. Proceed in the same manner for each of the other stations on your selected list. Turn off the radio each time before bending up the tooth. Otherwise a slight spark may occur, although there is no danger of shock. When properly done, the spring arm will touch each of the teeth that has been bent up but will not touch any of the other teeth, as the Station Selector knob is turned.

6. Turn the Flash Tuning and Selectivity Switch knob to the "FLASH" position. Now again tune in the first station on your selected list. As its position is reached, the bent up tooth will touch the spring arm and a light will flash on the dial at a position opposite the end of the dial pointer.

7. A small envelope containing celluloid tabs is furnished in the same large envelope with the Instructions. Select the cut out slip bearing the call letters of your chosen station. Bend the end of the slip, opposite the call letters, over one of the celluloid tabs so that the call letters will be under the celluloid. See Fig. 3. Then place the tab and call letter slip under the holder at the outside edge of the dial at a point opposite the end of the dial pointer. The call letters will then be illuminated whenever the dial pointer is opposite them (and the radio is switched to the AMERICAN band and the right hand knob is in the "FLASH" position).

8. In the same manner, insert the proper call letter slip and a celluloid tab for each of the other stations selected. (These tabs can be pulled out and the call letters of other stations inserted at any time should you wish to change the selection of stations.)

9. Replace the glass in the cabinet front panel. Hold it centered in the escutcheon with one hand, insert one end of the split ring in place as shown in Fig. 4 and continue pressing the remainder of the ring into place until it is completely seated. It may be helpful to tip the cabinet back against the wall to prevent the possibility of the glass falling out during the operation.

10. If two of the selected stations are powerful ones and close together in frequency (10 to 20 kc) the receiver may go from one to the other if the stations are "fading", or if their relative strength varies with the time of day. To correct this, bend down the teeth originally bent up for the two stations and instead bend up the two adjacent teeth which are further apart.

HOW THE A.F.C. - FLASH TUNING CIRCUITS OPERATE:

The I.F. frequency of the receiver is 465 kc. If a station is tuned in exactly, then the oscillator frequency is 465 kc higher than the station's frequency, creating an I.F. of 465 kc. However, if the receiver is tuned, for example, 5 kc lower than the station's frequency, the oscillator frequency will be 5 kc lower and the resultant I.F. will be 460 kc. Similarly, if the receiver is tuned 5 kc higher than the station's frequency, the resultant I.F. will be 470 kc. The I.F. is fed to the discriminator transformer, T3. By means of the tuned circuits of the discriminator transformer, I.F. higher than 465 kc is fed through one of the 6C5G discriminator tubes, and frequencies lower than 465 kc are fed through the other 6C5G discriminator tube. These tubes act as rectifiers, creating voltage drops across the 500M ohm resistors, R20 and R21. The polarity and value of the voltage drops, with respect to ground, across these two resistors depend upon the extent to which the I.F. is higher or lower than 465 kc. This voltage, developed by the discriminator circuit, is fed to the control grid of the 6J7G Automatic Frequency Control tube to control the oscillator frequency, as described in the following paragraph.

The oscillator coil inductance, L5, determines the oscillator frequency for any given position of the variable condenser. If another inductance were connected in parallel to it, the total inductance would be lessened and the oscillator frequency would increase. The combination of the 6J7G A.F.C. tube together with the condensers, C20, C21 and the resistor, R11, have the effect of an inductance in parallel with the inductance, L5. This is so for the following reason:

In an inductance the phase relations between the voltage across it and the current through it are such that the voltage leads the current by 90 degrees. The phase relations of the voltage and current in the plate circuit of the 6J7G tube are such that the voltage leads the current by 90 degrees. Therefore, this combination acts as an inductance in parallel to the inductance L5. The extent to which it does so is determined by the value of the voltage impressed on the control grid of the 6J7G tube. This voltage is obtained from the discriminator circuit as previously described. The effect of this equivalent parallel inductance is to change the AMERICAN band oscillator frequency. By properly choosing constants, this oscillator frequency change can be made to compensate almost exactly for the oscillator frequency error due to inexact tuning. In this way, the I.F. is always 465 kc, which is equivalent to perfect tuning, provided the station is approached nearly enough so that the A.F.C. can take hold. As mentioned previously, this is within 15 kc of the station for strong stations, but decreases for weaker stations.

The A.F.C. tube is connected in the circuit all the time and on all bands. However, the voltage from the discriminator circuit is fed to its control grid only on the AMERICAN band and when the Variable Selectivity - Flash Tuning knob is turned to the "FLASH" position. On all other bands and positions of the Selectivity - Flash Tuning knob the control grid bias of the 6J7G tube is fixed. Therefore, it corrects the I.F. frequency only on the AMERICAN band.

The Flash Tuning mechanism consists essentially of the toothed disc at the rear of the variable condenser and the relay, L7. The function of the toothed disc is to operate the relay when the variable condenser is turned to the various pre-selected stations. The relay contacts close the Flash Tuning light circuit, illuminating the station's call letters. At the same time they remove the high negative bias which blocks off the audio, keeping the receiver silent until the pre-selected station is tuned in.

The relay coil normally is energized. It is short circuited by the bent up tooth of the disc contacting the movable arm. This is why the Flash Tuning light flashes for a second or so when the receiver is first turned on -- the rectifier has not heated sufficiently to furnish current to energize the relay.

MODELS 4488,4588
MODELS 4488A,4588A
AFC Notes,Part 2
Dial Lamp Data

SEARS-ROEBUCK & CO.

IF THE A.F.C. - FLASH TUNING MECHANISM DOES NOT OPERATE PROPERLY:

If the A.F.C. Flash Tuning mechanism does not operate properly, first check the toothed disc and spring arm. The spring arm should touch each of the teeth that have been bent up and should not touch any of the other teeth, as the Station Selector knob is turned. To adjust the spring arm, so that it does touch only the bent up teeth, proceed as follows. Loosen the screw marked, "Adjusting Screw", in Fig. 2, which will permit the spring arm to be tipped so that it does make contact only with the bent up teeth. Then tighten the adjusting screw.

Another likely cause of improper A.F.C. - Flash Tuning operation is the relay. A small amount of dust may interfere with proper closing of the contacts. Blow out the contacts or pass a strip of plain paper back and forth between them. Two types of relay have been used. The earlier type is part #1013814997. It can be identified through the fact that the relay coil leads are black. The later type relay is part #1013815558. Its leads are colored. This later type will be supplied for replacement. The earlier type relay is shown schematically in Fig. 5. The later type, in Fig. 6. The proper sequence of operation for the contacts is indicated under each illustration. If necessary, slightly bend the contacts so that they do operate in the sequence indicated. The tension of the springs should be such that the relay closes with a current of 60 milliamperes. This can be tested by connecting the relay in series with a six volt storage battery, a 100 ohm rheostat, and a milliammeter of the proper range.

WHEN FLASH TUNING LIGHT STAYS ON, OR LIGHT COMES ON BUT RADIO IS INOPERATIVE IN FLASH TUNING POSITION CHECK THE RELAY CONTACTS AS OUTLINED BELOW:

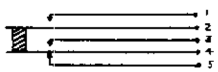


Fig. 5

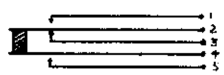


Fig. 6

WITH RELAY NOT EXCITED - CIRCUIT 1-2 OPEN
3-4 OPEN
4-5 CLOSED

WITH RELAY NOT EXCITED - CIRCUIT 1-2 OPEN
2-3 CLOSED
4-5 OPEN

WITH RELAY EXCITED - CIRCUIT 1-2 CLOSED
3-4 CLOSED
4-5 OPEN

WITH RELAY EXCITED - CIRCUIT 1-2 CLOSED
2-3 OPEN
4-5 CLOSED

If the later type relay is used to replace the earlier type, the connections to the relay must be changed. The following tabulation shows to what lugs of the newer type relay the connections should be made after removing them from the lugs of the old relay.

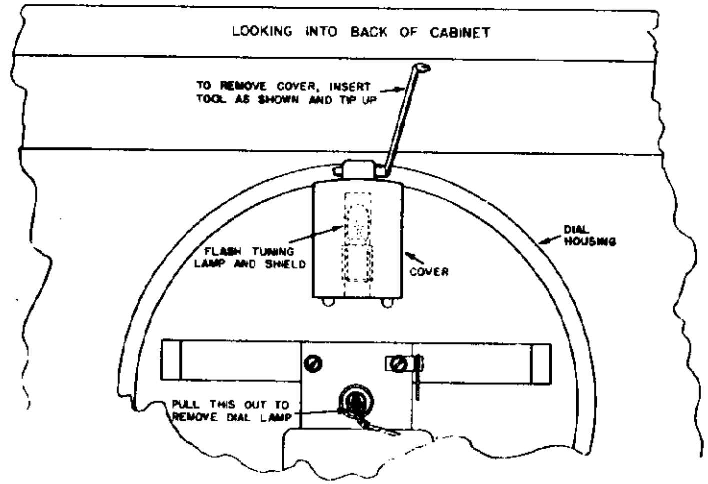
ORIGINAL RELAY	NEW TYPE RELAY
Wire from lug #1	To lug #5
Wire from lug #2	To lug #4
Wire from lug #3	To lug #1
Wire from lug #4	To lug #2
Wire from lug #5	To lug #3

REPLACING THE DIAL LAMPS:

There are three lamps in the dial mechanism. The lamp that illuminates the dial is in the center of the dial. It can be removed for replacement by pulling the small handle that projects from the rear center of the dial housing. (Accessible from the back of the radio.) When putting the lamp holder back into place be careful that it is not pushed in too far lest the dial pointer be pushed off of its shaft. Position the lamp so that the dial is illuminated to the best advantage.

The FLASH TUNING lamp (the one that moves around the outer edge of the dial and flashes on for the station call letters) is accessible for replacement through a small removable cover at the top of the dial housing. (Accessible from the rear of the radio.) This cover snaps on the top of the dial housing and can be removed with the fingers or by means of the tool, as shown in Fig. 7. Turn the Station Selector knob so that the dial pointer is straight up. The lamp shade can then be removed by grasping the end of it and pulling it up through the opening in the dial housing. The lamp can then be removed and replaced. When putting the lamp shade back the narrow slit in it must face the front of the dial so that the light will fall on the dial. The arm that carries the Flash Tuning lamp must coincide in position with the dial pointer. If it has shifted on its shaft, it can be moved to coincide with the dial pointer and its set screws tightened. This can be done either by removing the cover at the top of the dial housing (with the chassis out of the cabinet) or the dial can be removed from the housing as described in the paragraph that follows the next one. If the light is only slightly out of line with the pointer, it can be made to coincide by turning the lamp shade slightly.

The BAND INDICATOR lamp (the one that lights up the three Wave Band designations) circuit contains a special resistor that reduces the voltage to this lamp so that it probably never will burn out. Should replacement of the BAND INDICATOR lamp ever be necessary, the chassis must be taken out of the cabinet and the dial removed in order to gain access to the lamp. This procedure is described in the following paragraph. For replacement of any of the lamps use only the same type as supplied originally.



Loosen the set screws in the knobs at the front of the radio and remove the knobs. Remove the four screws that are under the shelf on which the chassis rests. Remove the single screw that is in the speaker plug and pull out the speaker plug from the back of the radio. The chassis then can be taken out of the cabinet. Rotate the Station Selector shaft (the middle one) to the right until the dial pointer goes as far as it can go. Carefully note the exact position of the dial pointer on the dial. Then pull the pointer off of its shaft. Now carefully bend up the metal tabs that hold the dial in the dial housing. Bend the tabs only far enough to permit removal of the dial. If the tabs are bent too far up, they may break off when bent down again. The complete dial assembly together with the station call letter tab holder can then be removed from the housing. When this is done, the BAND INDICATOR lamp and shield will be accessible. Pull the shield off the lamp socket and replace the lamp. The shield must be put back on so that the band designations are evenly illuminated. When re-assembling, leave the Station Selector shaft turned all the way to the right, as was done before pulling the dial pointer off of its shaft. Then push the dial pointer back on its shaft so that it comes to the same position on the dial as was noted for it before it was pulled off its shaft.

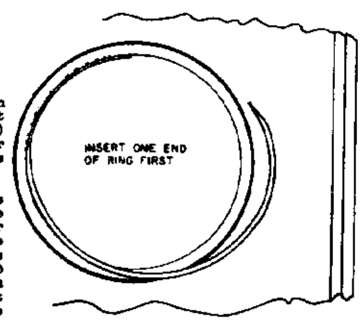


Fig. 1

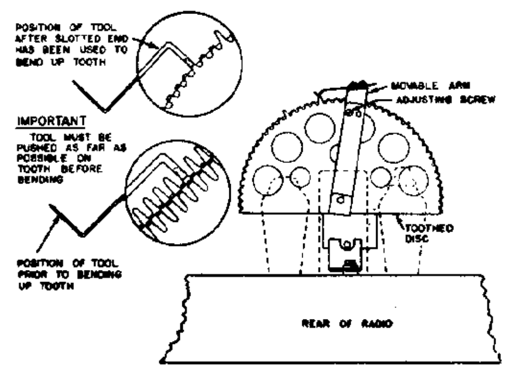


Fig. 2

MODELS 4488, 4588
MODELS 4488A, 4588A
Interference Elimination
Phono.Pickup Jack Data

SEARS-ROEBUCK & CO.

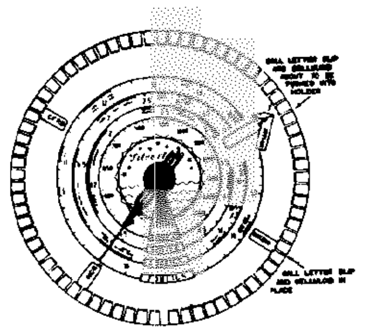


Fig. 3

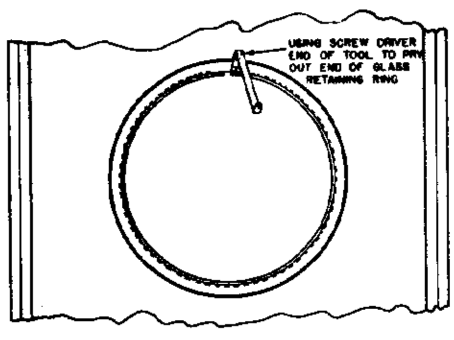
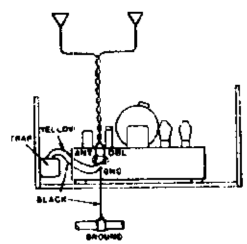


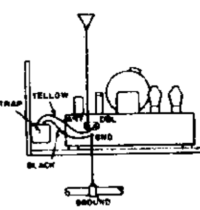
Fig. 4

WAVE-TRAP TO ELIMINATE INTERFERENCE FROM SHIP OR AIRPORT TRANSMITTERS:

In locations near ship transmitters or airports or air beacon stations, code interference may be experienced. Part #1013115433 wave-trap is designed to eliminate such interference. It can be ordered from Colonial Radio Corporation, 254 Rano Street, Buffalo, N. Y. Use Purchase Order blank, form F5284. The retail selling price is $1.00.

Mount the trap, by means of two wood screws, at any place on the chassis shelf or cabinet where it will be near the antenna terminals of the receiver. Connect the yellow lead of the trap to the terminal marked, "DBL", on the terminal block at the rear of the chassis. Connect the black lead of the trap to the ground terminal of the chassis. Any excess length should be cut off the leads so that they are as short as possible. The antenna or doublet connections to the receiver are not to be changed in any way.





The trap is pre-tuned to the IF frequency so that normally no further adjustment is necessary. However, should interference still be experienced, tune the receiver between approximately 550 and 600 kc. Then adjust the wave-trap, by means of the trimmer screw at the bottom of the container, until the interference is eliminated. Addition of the trap will reduce the sensitivity of the receiver around 600 kc by approximately 50%. The customer should be forewarned of this to avoid complaints of reduced sensitivity.

ELIMINATING WHISTLE AT 930 KC:

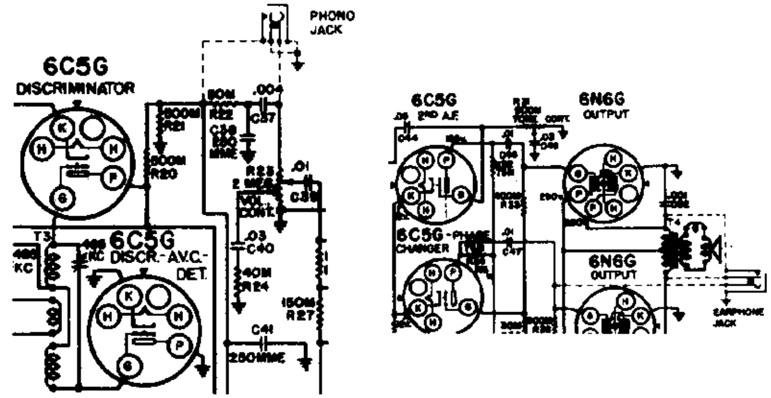
A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to keep the new IF frequency as near 465 kc as possible.

Align the IF at the new frequency and then realign the antenna, translator, and oscillator stages. Then re-adjust the A.F.C. according to the procedure described in this Manual, but setting the signal generator to the new IF frequency instead of 465 kc.

INSTALLING A JACK FOR THE USE OF EARPHONES AND PHONOGRAPH PICK-UP:

There is a hole, plugged with a brass insert, at the rear of the chassis. This hole is provided so that a jack can be installed for earphone or phonograph pick-up connections. The Schematic section shows the connections. With the connections as shown, the loud speaker will not operate when the earphones are plugged in. If it is desired to have the loud speaker operate at the same time the earphones are plugged in, the connections to the two lugs furthest from the frame of the jack should be omitted. Otherwise the earphone plug must be removed from its jack when loud speaker reception is wanted. If the jack is wired as a phonograph pick-up jack, the right hand knob of the receiver must not be in the "FLASH" position when phonograph operation is wanted. It may be put in either the "B" or "SHARP" position. The Volume and Tone Controls of the receiver will function for phonograph reproduction.



ANTENNA CONNECTIONS:

There is a terminal board at the rear of the chassis marked "ANT", "DBL", "GND", indicating antenna, doublet, and ground, respectively. The "DBL" terminal is left unconnected when a conventional antenna is used. When a doublet is used, one wire of the twisted downlead is connected to the "ANT" terminal and the other downlead wire is connected to the "DBL" terminal.

VARIABLE SELECTIVITY:

Variable Selectivity is obtained by connecting or disconnecting coupling turns between primary and secondary of the IF input transformer, T1. In the "SHARP" position of the right hand control knob, the coupling turns are disconnected and the Selectivity becomes sharp. In the "B" position (broad) the coupling turns are connected and Selectivity is broadened, thereby increasing the high frequency audio response of the receiver.

REPLACEMENT OF THE OSCILLATOR TUBE:

There are two types of 6C5G tubes, one shielded and the other unshielded. They can be told apart easily by appearance. The shielded type has a perforated mesh screen surrounding the other elements. This screen is about an inch in diameter and comes very close to the inside of the bulb. The unshielded type does not have this perforated mesh screen. The plate of the tube, of solid metal and about 3/8" diameter, is visible. It is important that only the unshielded type 6C5G, without the perforated mesh screen, be used in the oscillator socket. Use of the shielded type will upset the calibration of the Foreign bands and interfere with proper performance.

THE AVC CIRCUIT:

The voltage drop across the 500M ohm resistor, R21, is fed to the control grids of the 6K7G and 6L7G tubes to provide AVC. The drop across this resistor is also used in the discriminator circuit as described previously. The audio voltage across the resistor is coupled to the AF stages through the condenser, C37.

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:
1. Left knob - - "On-Off" Switch and Volume
2. Next to left knob-Wave Band Switch
3. Middle knob - - - Station Selector
4. Next to right knob - Tone Control
5. Right knob - - - Flash Tuning and Selectivity Control

CONTROL OPERATION:
Turning right: Power on; volume increase
Turning right: "AM", "POL", "FOR", "FOR"
Tuning ratio: 10:1; 50:1
Turning right: bass to treble
Turning right: sharp; broad; Flash Tuning

MODELS 4488,4588,4588A
Changes Notes

SEARS-ROEBUCK & CO.

4

CHASSIS DESIGNATION IF THE CHANGES MENTIONED IN THIS SUPPLEMENT HAVE ALREADY BEEN MADE:

Chassis in which all the changes mentioned in this Supplement have been made at the factory will be indicated by the letter, "D", or a subsequent letter rubber stamped on the Chassis Identification Sticker at the rear of the chassis. Accordingly, do not attempt to make any of these changes on chassis marked with the letter, "D", or subsequent letter.

To Correct Relay Trouble	(1 - type #3 relay (1 - 1M ohm, 1/3 watt resistor (1 - .05 mfd. 200 volt condenser (1 - .1 mfd. 200 volt condenser
To Correct Faulty A.F.C. Muting	(1 - 500M ohm, 1/3 watt resistor (1 - .1 mfd. 200 volt condenser
To Correct Too High Minimum Volume	1 - .05 mfd. 200 volt condenser
To Replace 6R7G Tube With 6Q7G Tube	(1 - 500M ohm, 1/3 watt resistor (1 - .1 mfd. 200 volt condenser

CORRECTING RELAY TROUBLE:

Relay trouble usually is indicated by one or more of the following symptoms:

1. Flash Tuning light stays on at all times.
2. Receiver does not operate in "Flash" position.
3. Flash Tuning light does not light (although this may be due to a burnt out bulb).
4. Radio remains muted even though not in Flash position.

The Service Instructions, 57RL 23, for this Model describe two types of relay and mention that the second type should be used to correct these difficulties. The method of identifying these two types of relay by the color of their coil leads, as described in the manual, has been discontinued. A third type of relay, part #101381556Q, has been developed and will be the one supplied for replacement purposes even though the original one was type #1 or type #2. The tabulation below shows how the three types of relay can be identified.

Relay Type Number	Identification
#1	No shield cover. Shield cover but no paint spot on shield cover. Yellow paint spot on shield cover.
#2	Red paint spot on cover. Red and green paint spot on cover.
#3	Blue paint spot on cover.

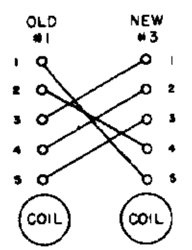
Relay type #1 was the first one used and most of the relay trouble probably will be experienced with this type. Relay type #2 is considerably improved and should give very much less trouble than type #1. It has the same coil construction as type #1 but has a different contact arrangement. Relay type #3 has the same contact arrangement as type #2 but has considerably stiffer springs and heavier contact pressure. It also has a higher resistance coil requiring 85 milliamperes to actuate the relay instead of the 60 milliamperes minimum required for type #1 and #2.

THE TYPE #3 RELAY SHOULD BE INSTALLED IN THE EVENT OF ANY RELAY TROUBLE WITH EITHER TYPE #1 OR TYPE #2 RELAY.

Replacing Relay Types #1 Or #2 With Type #3:

The connections to the terminals of the type #2 relay remain the same for the new type #3. The changes in connections from type #1 to #3 are: Consider the terminal to be numbered from 1 to 5 with terminal 5 the one nearest the coil. The lead that originally connected to terminal 1 of the type #1 relay is to be connected to terminal 5 of the type #3 relay. The original terminal 2 connection is to be changed to terminal 4. The original terminal 3 connection, to terminal 1. The original terminal 4 connection, to terminal 2. The original terminal 5 connection to terminal 3.

CHANGING TERMINAL CONNECTIONS FROM TYPE #1 RELAY TO TYPE #3 RELAY:



In addition, certain circuit changes are required when relay type #3 is installed. The resistor, R40, across the relay coil must be changed to 1000 ohms, 1/3 watt. In addition, a .05 mfd. 200 volt condenser is connected from the spring arm that contacts the teeth of the semi circular toothed disc to the movable arm. A .1 mfd. 200 volt condenser is connected from the toothed comb to ground. These condensers are C56 and C57 in the Schematic Section, Fig. 1. Fig. 2 shows how the condensers should be mounted.

CORRECTING DIAL DRIVE SLIPPAGE:

Dial drive slippage may be due to the movable arm being set too close to the toothed disc. The arm will then press unnecessarily hard against the bent up teeth, making the condenser too hard to turn. If this appears to be the case, the adjusting screw on the movable arm should be loosened and the arm re-set so that it does not press too hard against the teeth.

ELIMINATING RECEPTION OF STATION OTHER THAN CHOSEN A.F.C. STATION:

The following condition sometimes occurs. Normally, a station that has been set up on the toothed disc will be heard whenever the dial pointer is turned to its call letters. It sometimes happens though that the station will only be heard if it is approached from one end of the dial but an adjacent station will be heard if approached from the other end of the dial. This is due to the fact that the proper tooth was not selected carefully enough for the station, and an adjacent tooth was bent up instead. The remedy is to put the receiver in the "SHARP" position, tune in the desired station very carefully, and to be sure to bend up the tooth that is under the projection of the contacting arm.

CORRECTING FAULTY A.F.C. MUTING:

Normally, when the receiver is in the Flash Tuning position, a station will not be heard until the Flash Tuning light operates. If the muting is faulty, the station may be heard before its call letters become illuminated and may continue to be heard after the pointer has been turned past the station's position and the Flash Tuning light has gone out. If this type of trouble is encountered, it can be corrected by making the circuit changes shown in Fig. 3. The dotted lines indicate the new connections. "X"'s indicate old connections to be broken. As will be seen, the original suppressor to cathode connections of both 6K7G tubes are to be broken. The cathode connections of the tubes remain as they were. The suppressors of the two tubes are to be connected together by a 500M ohm resistor, R43. A .1 mfd. 200 volt condenser, C58, is to be connected directly from the suppressor terminal of the 6K7G RF tube socket to ground. The suppressor of the 6K7G IF tube is to be connected to the junction of R27 and C43, as shown in Fig. 3. These changes increase the muting action by putting a negative biasing voltage on the suppressors of the RF and IF tubes.

NOTE: In extreme cases, that is if the receiver is located near a very powerful station, muting may be still unsatisfactory on that station even after the changes mentioned in the preceding paragraph have been made. If desired, in such extreme cases, the muting can be further improved by changing the value of R39 from 500M ohms (750M ohms in some sets) to 100M ohms. However, doing so will increase the amount of "thump" or "click" that occurs when tuning stations in or out. Since this change is only for extreme cases the 100M ohm resistor is not included in the kits.

CORRECTING TOO HIGH MINIMUM VOLUME:

Sometimes, with the Volume Control set to its lowest position, the volume still is too high. This will occur in either the Flash Tuning positions or the conventional "Broad" and "Sharp" positions. To correct this, examine the lead that runs from the plate of the IF tube to the IF transformer. This lead must not be permitted to come close to the grid terminal of the 6C5G phase changer tube socket. There should be at least 1/2" clearance between the lead and the 6C5G grid terminal. In later production, this lead was covered with copper shielding braid and it may be desirable to add such shielding. This shielding also prevents regeneration which may occur under certain conditions. If shielding is added, the IF output transformer, T2, must be realigned. In addition, the condenser, C39, connected to the movable arm of the Volume Control, should be changed from .01 mfd. to .05 mfd. to help reduce minimum volume. It is advisable to cover the shielding with insulating tubing.

If the center tap lug of the Volume Control is grounding to the chassis, it will prevent the volume from going to a low value. Examine this lug to be sure that it is not grounding to the chassis.

There have been instances of defective Volume Controls caused by arcing of the switch, turning the resistance element. Controls have been improved, eliminating this condition and it will not occur in replacement controls.

CORRECTING MICROPHONICS:

Trouble may be experienced in the Model 101412 (not the 101412A) due to a microphonic 6R7G tube. This is particularly true of 6R7G tubes having a yellow colored Silvertone label. Tubes with a gray label are of different manufacture and are less microphonic. However, changing the circuit to use a 6Q7G tube instead of a 6R7G tube will correct microphonics. 6Q7G tubes having either a yellow or a gray label are satisfactory. The circuit changes, converting the 101412 into a 101412A, are described in the following paragraph.

As shown in the Schematic Section, Fig. 4, the connection of C44 is changed to the other side of R26. The 40M ohm, 1/3 watt resistor, R42, is added. The value of R29 is changed from 40 ohms to 15 ohms. In the illustration, the solid lines indicate the original 101412 connections. "X"'s indicate original connections to be broken. Dotted lines show new 101412A connections.

SEARS-ROEBUCK & CO.

MODELS 4488,4588,4588A
Changes Schematics

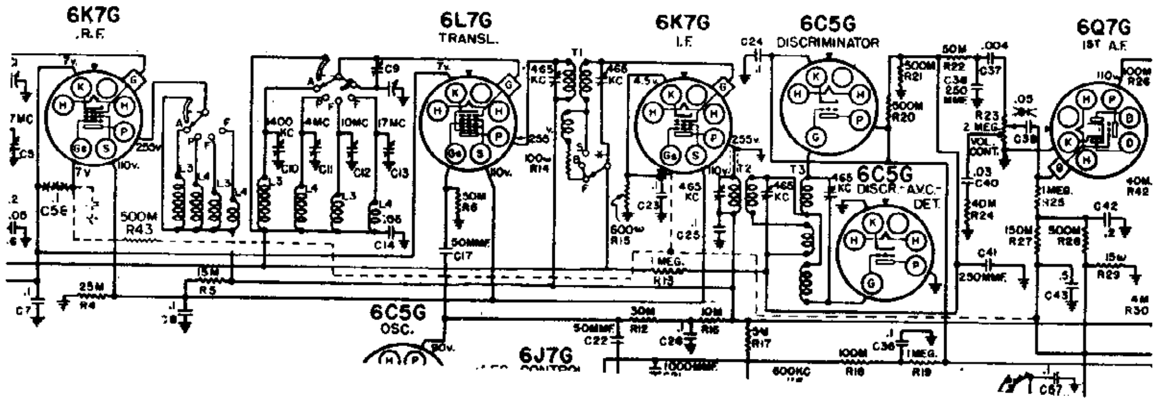


FIG. 3

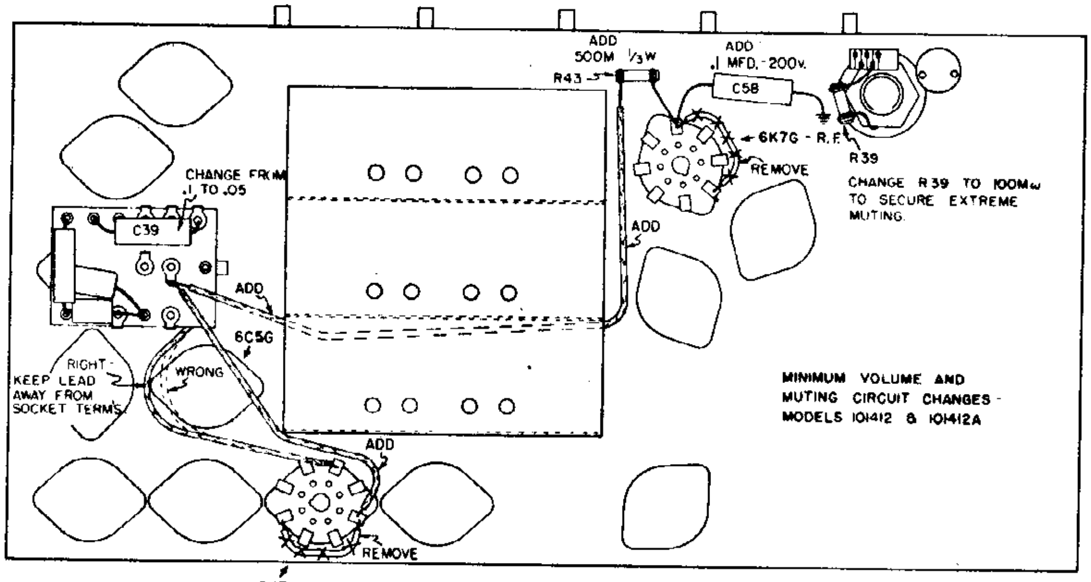
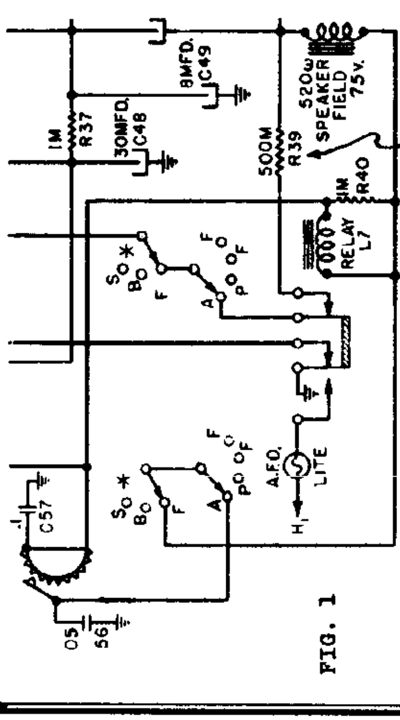


FIG. 3A



CHANGE R39 TO 100Mω TO SECURE EXTREME MUTING.

FIG. 1

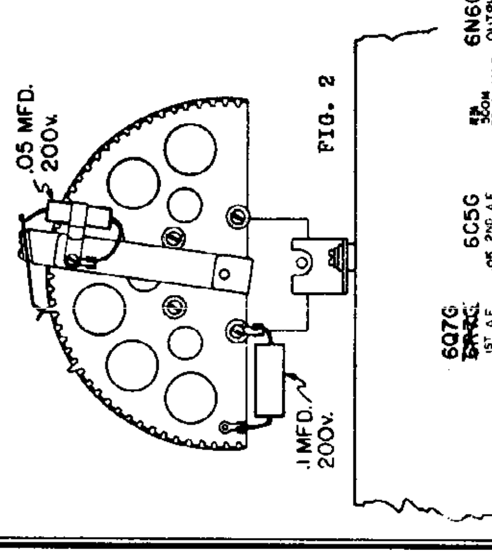


FIG. 2

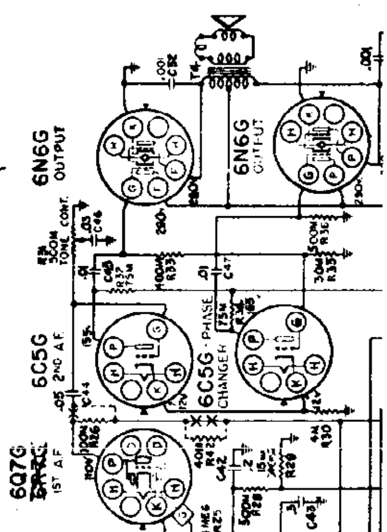
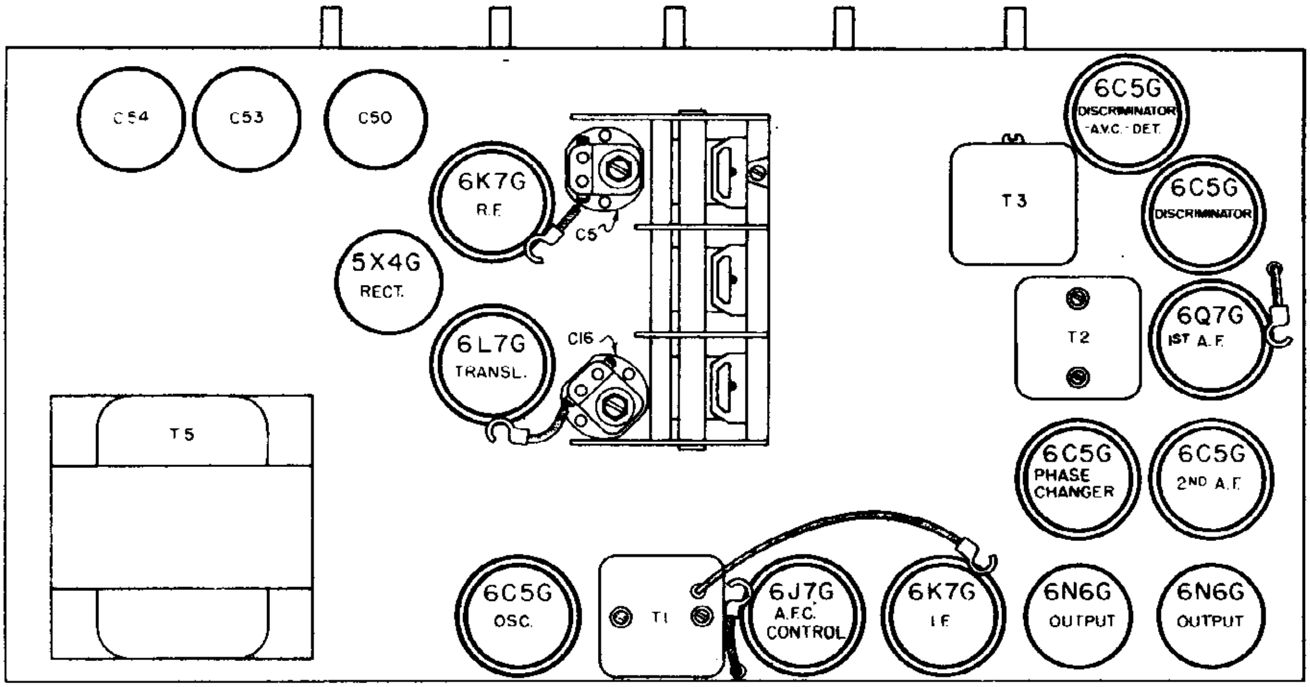


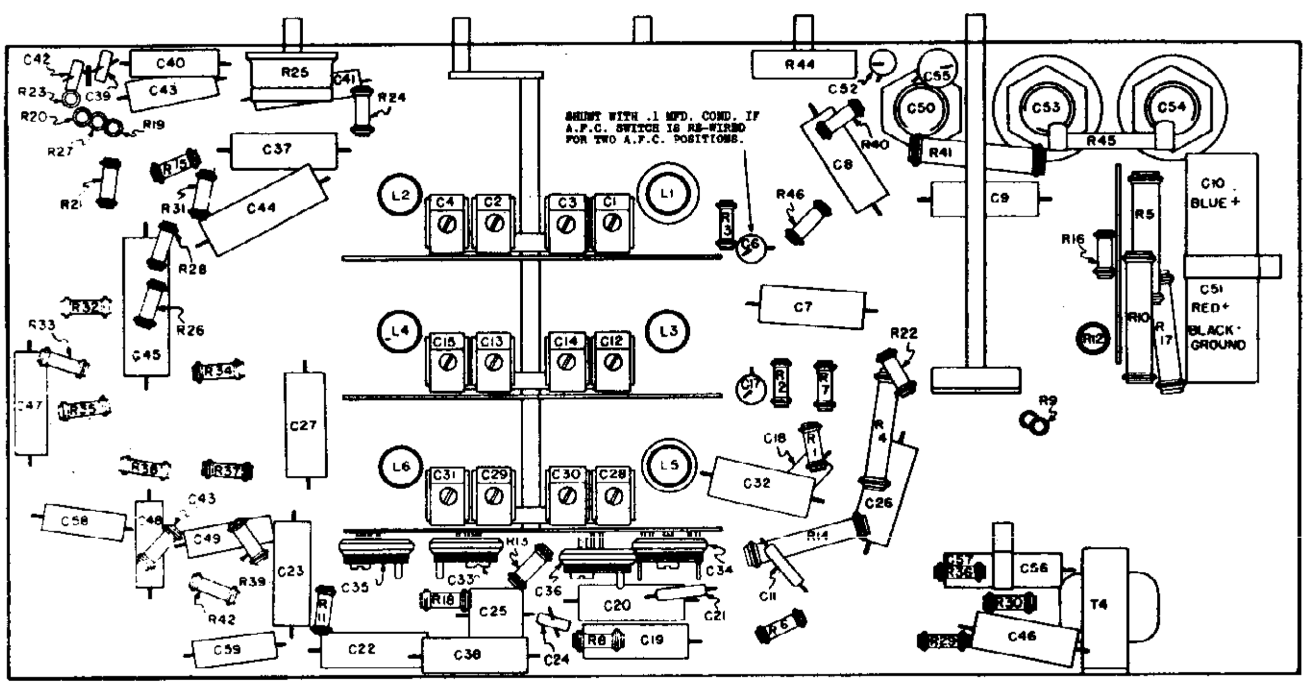
FIG. 4

MODELS 4488B, 4588B
Socket, Trimmers
Chassis

SEARS-ROEBUCK & CO.



LOCATIONS OF PARTS ON TOP OF CHASSIS - 101412B

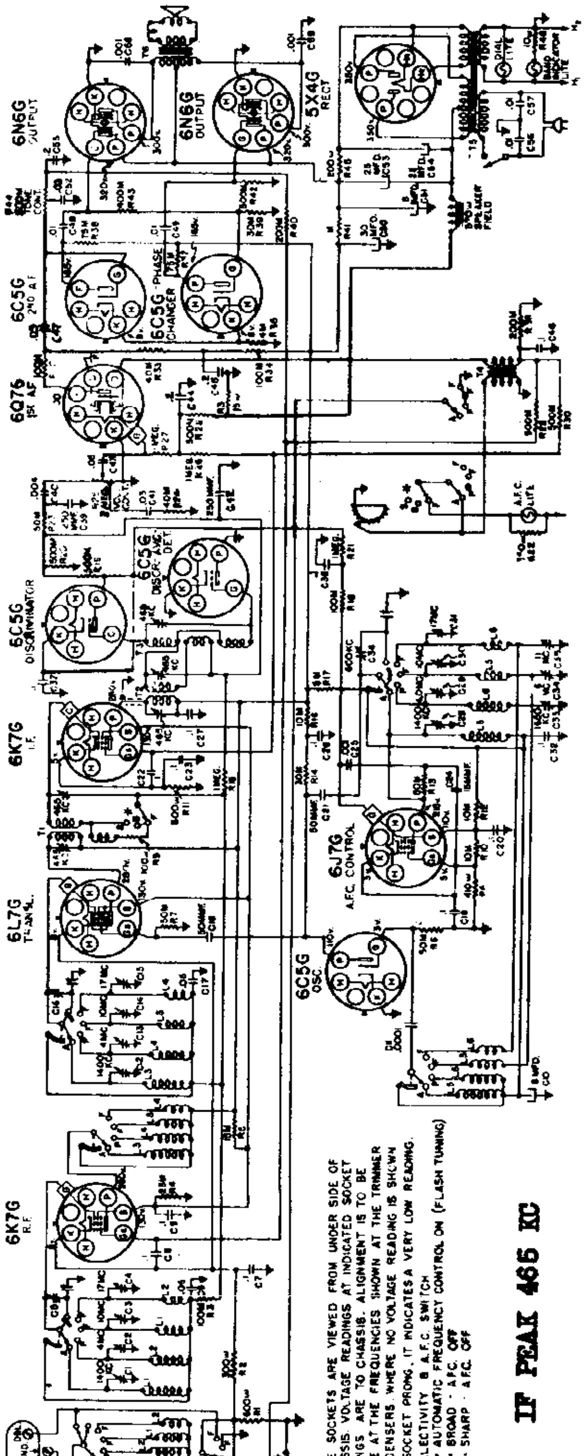


LOCATIONS OF PARTS UNDER CHASSIS - 101412B

THIRTEEN TUBE, FOUR BAND SUPERHETERODYNE

MODELS 4488B, 4588B

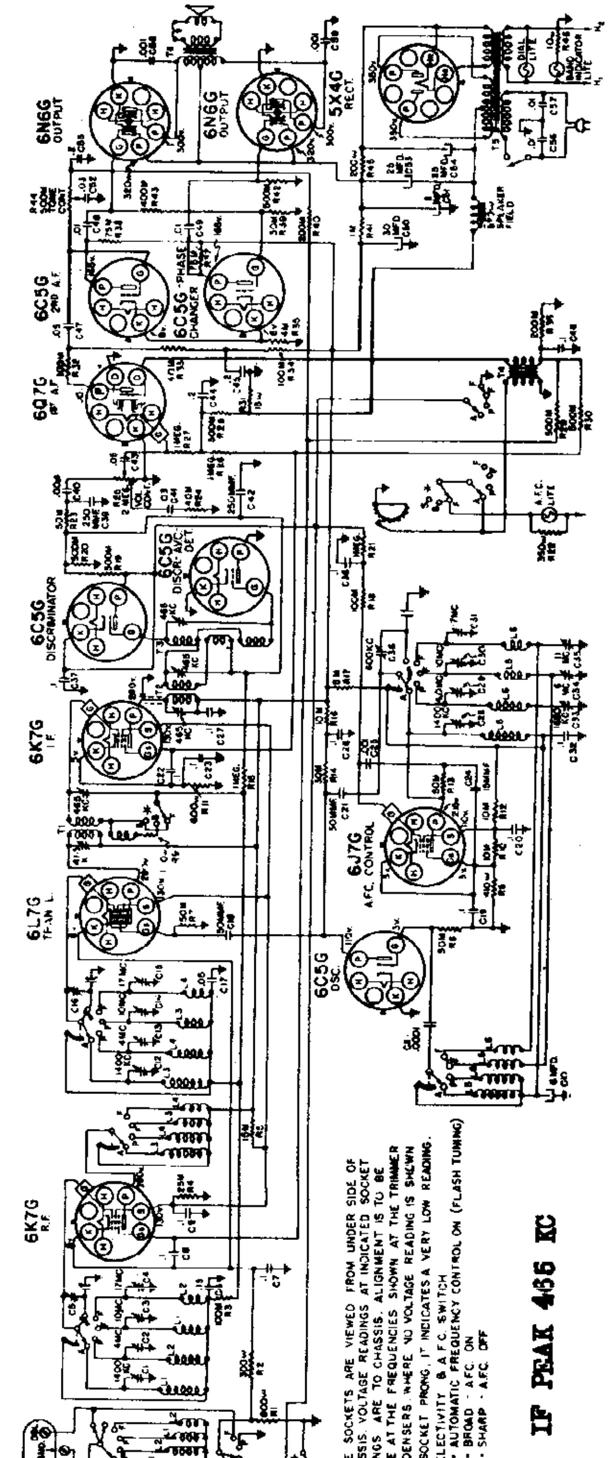
57RL 23
Supplement No. 8
October 30, 1936



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS. WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.
* SELECTIVITY & A.F.C. SWITCH
F - AUTOMATIC FREQUENCY CONTROL ON (FLASH TUNING)
B - BROAD - A.F.C. OFF
S - SHARP - A.F.C. OFF

IF PEAK 465 KC

WIRING DIAGRAM - 101412B - ONE A.F.C. POSITION



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS. WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.
* SELECTIVITY & A.F.C. SWITCH
F - AUTOMATIC FREQUENCY CONTROL ON (FLASH TUNING)
B - BROAD - A.F.C. ON
S - SHARP - A.F.C. OFF

IF PEAK 465 KC

WIRING DIAGRAM - 101412B TWO A.F.C. POSITIONS

MODELS 4488, 4588, 4488A
4588A, 4488B, 4588B
Changes

SEARS-ROEBUCK & CO.

MODELS 4488, 4488B, 4588, 4588A, 4588B

SUBJECT: A.F.C. INACCURACY DUE TO DIFFERENCE IN LINE VOLTAGE

The setting of the teeth for A.F.C. stations is affected by the voltage of the power supply line. For example, suppose the stations to be set up at the Retail Store on a 120 volt line. If the radio is then delivered to the customer's home and the voltage there is considerably lower, say 105 volts, the A.F.C. settings will not be correct. The shift may amount to three or four kilocycles.

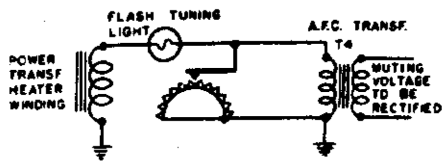
Accordingly, if the A.F.C. stations are not set up at the customer's home, care must be taken to see that the line voltage at the time the stations are set up is the same as the average line voltage at the customer's home. It may be necessary to use a series resistor or a booster transformer to duplicate the line voltage conditions that exist at the customer's home.

SUBJECT: CIRCUIT CHANGES TO ELIMINATE ADJACENT CHANNEL INTERFERENCE IN MODELS 4488-4588-4488A-4588A-4488B-4588B

ELIMINATION OF THE RELAY:

The 101412 and 101412A chassis, described in Service Instructions 57RL 23 and in Supplement #1, use a relay to accomplish the various switching required by the Automatic Frequency Control - Flash Tuning feature. In later production of this Model the circuit was changed, eliminating the relay. A transformer is used in place of the relay to accomplish the same results. Such chassis are identified by the number, 101412B.

The simplified diagram below shows how the transformer is used to mute the receiver and to operate the Flash Tuning light.



The A.F.C. transformer is a step-up transformer. Its primary is connected, in series with the Flash Tuning light bulb, across the heater winding of the power transformer. The toothed disc and contacting arm is connected across the primary of the A.F.C. transformer, as shown. The operation then is as follows: When the contacting arm is not engaging a bent-up tooth on the disc, the power transformer heater voltage is impressed, in series with the Flash Tuning light bulb, upon the primary of the A.F.C. transformer. Although current flows through the primary, its impedance is too high to pass sufficient current to light the Flash Tuning light bulb. The voltage impressed on the A.F.C. transformer primary is stepped up in the secondary and rectified by one of the diode plates of the 6Q7G tube. This diode voltage (approximately 60 volts) is applied to the suppressors of the RF and IF tubes and to the control grid of the second AF tube, to provide muting. These are the conditions that exist when the right hand knob is turned to a Flash position and the receiver is tuned between Flash stations.

When the receiver is tuned to a Flash station, the contacting arm touches the tooth bent up for the station. This short circuits the primary of the A.F.C. transformer. With the impedance of this primary removed from the circuit the full voltage of the heater winding is impressed across the Flash Tuning light bulb causing it to light. Since the A.F.C. primary is short circuited, no voltage is developed across its secondary, thereby removing the muting bias. The receiver then is in operating condition and receives the station selected for Flash Tuning.

In the original sets using a relay, one set of contacts on the relay was used to prevent the A.F.C. from operating until the bent up tooth contacted the movable arm. This was necessary to prevent a strong station from being "pulled over" from an adjacent channel as the receiver was tuned through it, since the receiver was alive up to the audio stage. When the A.F.C. transformer is used in place of the relay, this "pull over" cannot occur because the receiver is made inoperative right at its input by muting of the RF tube.

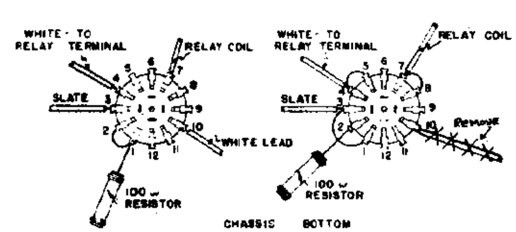
IMPORTANT NOTE IN SETTING UP A.F.C. STATIONS:

IT IS VERY IMPORTANT THAT THE RECEIVER BE TURNED ON FOR TWENTY MINUTES BEFORE SETTING UP A.F.C. STATIONS ON THE TOOTHED DISC. IF STATIONS ARE SET UP WITH THE RECEIVER "COLD", **FREQUENCY DRIFT MAY CHANGE THE** ACCURACY AND RELIABILITY OF THE SETTING **WHEN THE RECEIVER WARMS** UP.

CHANGE IN CONNECTIONS AND OPERATION OF THE FLASH TUNING - SELECTIVITY SWITCH (RIGHT HAND KNOB):

The right hand knob has three positions marked, "SHARP"; "B" (BROAD); "FLASH". In all of the sets using a relay and in the first production of those using a transformer the receiver operated in the conventional manner in the "SHARP" and "B" positions. In the "FLASH" position, the A.F.C. and Flash Tuning circuits were connected. In later production sets using the transformer, the operation and connections of the A.F.C. - Selectivity Switch have been changed so that the radio operates in the conventional manner only in the "SHARP" position. In the "B" position, the A.F.C. is connected and Selectivity is broad. In the "FLASH" position, the A.F.C. also is connected and Selectivity is sharp. In other words, in latest production there are two A.F.C. positions with a choice of broad or sharp selectivity. There is one non-A.F.C. position with sharp selectivity.

With the original connection of the A.F.C. switch, providing only broad selectivity in the "FLASH" position, difficulty may be encountered in some locations due to adjacent channel interference or heterodyne whistles. If such difficulty is encountered in sets having the original connection, the circuit may be changed to provide the two selectivity positions for A.F.C. - Flash Tuning. Fig. 1 shows the switch connection changes for sets using the relay. Fig. 2 shows the switch connection changes for sets having an A.F.C. transformer. Note that in relay sets the original lug #10 connection is removed entirely from the switch. In transformer sets the original #11 connection is removed entirely. In addition, in sets of all types (101412, 101412A, 101412B), a .1 mfd. condenser must be shunted across the .05 mfd. condenser, C6. See the Locations of Parts diagram. In later production of Model 101412B, embodying the two A.F.C. - Selectivity positions, a .15 mfd. condenser is used for C6.

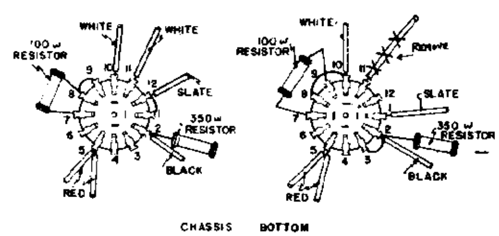


FLASH TUNING - SELECTIVITY SWITCH CIRCUIT CHANGE, SETS WITH RELAY.

FIG. 1

FLASH TUNING SWITCH
VIEWED FROM REAR

MODELS 4488, 4588,
4488A, 4588A,
4488B, 4588B



FLASH TUNING - SELECTIVITY SWITCH CIRCUIT CHANGE, SETS WITH TRANSFORMER.

FIG. 2

FLASH TUNING SWITCH
VIEWED FROM REAR

SEARS-ROEBUCK & CO.

MODELS 4488, 4588, 4488A
4588A, 4488B, 458

Revised Alignment
AFC Adjustment

IMPORTANT NOTE ABOUT SETTING UP A.F.C. STATIONS ON ADJACENT CHANNELS:

In paragraph #10 under, "SETTING UP THE AUTOMATIC FREQUENCY CONTROL", in the Service Instructions, the suggestion is made that if adjacent channel stations are selected the two teeth further apart be used instead of the correct ones for the stations. For example, suppose a 700 kc and a 710 kc station is to be selected. Instead of bending up the teeth corresponding to 700 kc and 710 kc, the teeth corresponding to approximately 697 kc and 713 kc would be bent up instead. The purpose of this is to prevent the receiver from jumping from one station to the other as their signal strengths vary. This suggestion will be helpful only if the station is sufficiently strong. Otherwise the mistuning will affect the tone quality. It is best to select, for A.F.C. tuning, stations at least 20 kc apart in frequency.

CHANGE IN PROCEDURE FOR REMOVING DIAL GLASS FOR SETTING UP FLASH TUNING STATION CALL LETTERS:

The Service Instructions for this model describe how to remove the dial glass by taking off the split retaining ring that holds it. In receivers using the 101412B chassis this procedure has been simplified by using an escutcheon with the dial glass moulded into it. It is held in place in the front of the cabinet by four screws. Accordingly, it is necessary merely to remove these four screws in order to take off the moulded escutcheon and dial glass

CHANGE IN PHONOGRAPH PICK-UP JACK OPERATION:

The Service Instructions for this model state that if a phonograph pick-up jack is used the right hand knob must be in either the "B" or "SHARP" position. This is true only for those receivers that are wired to have the one A.F.C. position ("Flash"). In later production receivers having the two A.F.C. positions ("B" and "FLASH") or in receivers that are changed to provide these two positions, the right hand knob must be in the "SHARP" position for phonograph operation. This must be done, of course, to remove the muting from the audio tube, permitting phonograph reproduction.

REVISED ALIGNMENT PROCEDURE:

PRELIMINARY:

Output meter connections - Across speaker voice coil

Output meter reading to indicate .5 watts output - - - - - - - - - - - - - - - - - - 2.5 volts

Dummy antenna value to be in series with generator output - - - - - - - - - - See chart below

Connection of generator output lead - See chart below

Generator modulation - 30%, 400 cycles

Approximate average sensitivity in microvolts for .5 watts output - - - - - - See chart below

Position of Volume Control - Fully on

Position of Tone Control - Fully clockwise

Position of Flash Tuning and Selectivity Switch knob - - - - Sharp, fully counter clockwise

Position of Dial Pointer - - - - - - - - To fall on 10 mc mark when variable is fully meshed

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	550 kc	465 kc	.1 mfd.	6L7G Grid	T2,T1	IF Output IF Input	-
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C28,C1, C12	Osc., Ant., Translator	30
"AM"	600 kc (!)	600 kc	.0002 mfd.	Ant. Term.	C36	Osc. Pad.	12
"POL"	4 mc	4 mc	400 ohms	Ant. Term.	C29,C2, C13	Osc., Ant., Translator	4
"POL"	1650 kc (!)	1650 kc	400 ohms	Ant. Term.	C33	Osc. Pad.	30
"FOR" (Next to "POL")	10 mc	10 mc	400 ohms	Ant. Term.	C30 *	Oscillator	-
"FOR" (Next to "POL")	6 mc (!)	6 mc	400 ohms	Ant. Term.	C34	Osc. Pad.	20

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"FOR" (Next to "POL")	10 mc	10 mc	400 ohms	Ant. Term.	C3,C14	Ant., Transl.	4
"FOR" (Next to "POL")	6300 kc	6300 kc	400 ohms	Ant. Term.	C5,C16 **	Ant. Pad., Transl. Pad.	20
"FOR"	17 mc	17 mc	400 ohms	Ant. Term.	C31 *	Oscillator	-
"FOR"	17 mc	17 mc	400 ohms	Ant. Term.	C4,C15	Ant., Transl.	6
"FOR"	11 mc (!)	11 mc	400 ohms	Ant. Term.	C35	Osc. Pad.	60

IMPORTANT ALIGNMENT NOTES

Where indicated by (!) the variable should be rocked back and forth a degree or two while making the adjustment.

* Two peaks will be found at two different settings of the trimmer. Use the one in which the trimmer is screwed further in (greater capacity).

** Use a bakelite screw-driver in making these two adjustments. These adjustments should not be touched after this band has been lined up.

Repeat the entire alignment step by step in the original order for greater accuracy. Always keep the generator output power at its lowest possible value. This will prevent the AVC action of the receiver from interfering with accurate alignment.

The shield covering the coils at the bottom of the chassis should be left in place during the alignment. The trimmer condensers are accessible through the holes in the shield.

Only the dummy antenna indicated in the chart for any particular band should be used. Disconnect the dummy antenna used for alignment of any other band. No connection is to be made to the doublet terminal.

After the alignment has been completed, the A.F.C. adjustment should be made as follows:

A.F.C. ADJUSTMENT

CAUTION: The right hand knob must be in the "SHARP" position for operations 1 through 5. It is preferable to have two signal generators to make the adjustments. However, if two generators are not available, a broadcast station of approximately 1000 kc can be used for one of the generators. However, the station chosen must be of medium strength. That is, one just capable of giving satisfactory reception without back ground noise. Do not use a strong station. The Volume and Tone Controls must be turned all the way to the right. The generator ground connection is to be made to the chassis.

1. Set one signal generator (or the broadcast station) to 1000 kc and 5000 microvolts output. Connect its output to the "ANT" terminal of the set, through a .0002 mfd. condenser.

2. Tune the receiver for maximum output (at 1000 kc). Then switch the signal generator modulation switch to the "Off" position.

3. Short the movable arm to the toothed disc with a piece of wire. The Flash Tuning light should become illuminated.

4. Set the second signal generator to 465 kc and 10,000 microvolts output. Connect its output, in series with a .000015 mfd. condenser to the control grid of the 6L7G tube. Turn the modulation switch to the "Off" position.

5. Carefully turn the variable condenser until "zero beat" note is had (with right hand knob in "SHARP" position).

6. Turn the right hand knob to the "FLASH" position (fully clockwise). Then adjust the discriminator unit, T3, for "zero beat". The correct setting will be obtained at about the center of T3 trimmer range. The adjustment is a very sharp one.

7. Turn the right hand knob to the "SHARP" and then to the "BROAD" positions. The receiver still should give zero beat in the "SHARP" and "BROAD" positions if the A.F.C. is properly adjusted. If it does not, carefully repeat operation #6.

8. The A.F.C. can be checked for "pull in" in the following manner. Remove the signal generator connection from the 6L7G grid. (Two generators must be used.) Switch on the modulation of the 1000 kc generator and set the generator to give 5000 microvolts output. Reduce the Volume Control setting of the receiver to give 1.5 volts reading on the output meter. Increase the signal generator frequency until the output meter reads .5 volt. Note the frequency of the signal generator at this output meter reading. Then decrease the signal generator frequency from 1000 kc until the output meter again reads .5 volt and note the signal generator frequency. If the A.F.C. is operating properly, the signal generator can be shifted 15 to 20 kc either side of 1000 kc before the output meter reading is reduced from 1.5 volts to .5 volt.

MODELS 4502,4504,4508
Schematic,Voltage
Notes

SEARS-ROEBUCK & CO.

POWER SUPPLY:
All models available - - - - - - - - - - - - - - - - - - 25-60 cycle or DC, 48 watts

FREQUENCY RANGE:
Broadcast - - - - - - - - - 545-1720 kc

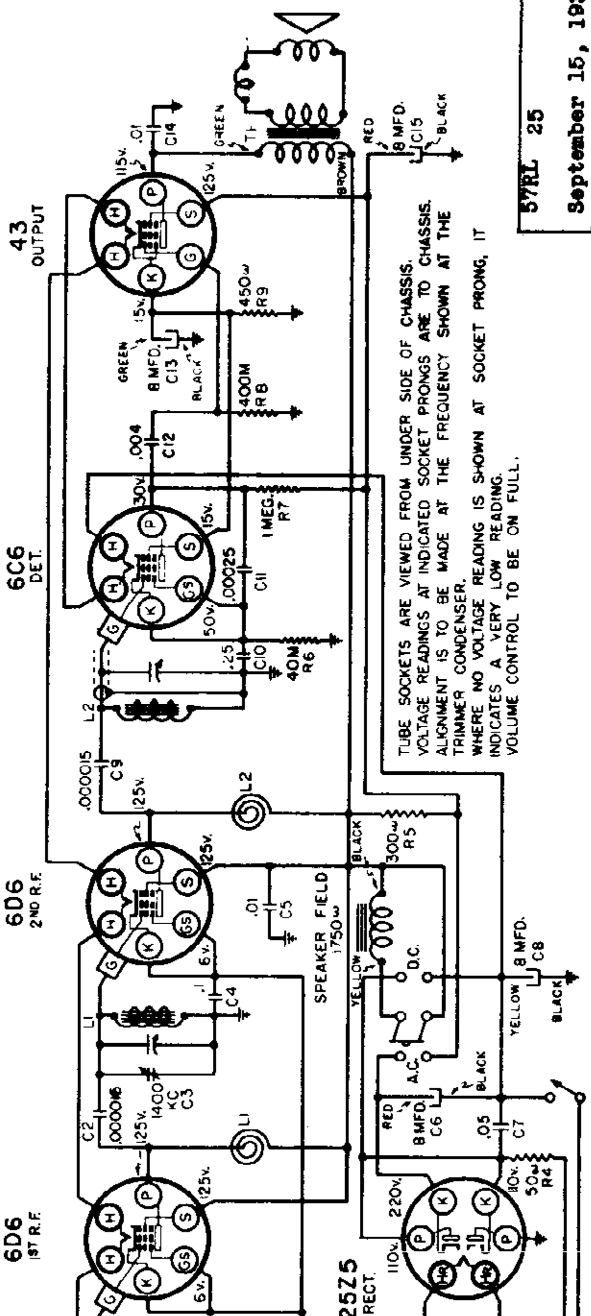
POWER OUTPUT:
Type - - - - - - - - - - Single Pentode
Undistorted - - - - - - - - - - 1 watt
Maximum - - - - - - - - - - - 1.85 watts

ALIGNMENT FREQUENCY:
1400 kc

LOUD SPEAKER:
Type - - - - - - - - - - - - - - Dynamic
Size - - - - - - - - - - - - - - - - 5"
Field Coil Resistance - - - 1750 ohms
Field Coil Voltage Drop (Approximate)- 120 volts

57RL 25
September 15, 1936

OPERATING FEATURES:
Fidelity Range - - - 100 - 3000 cycles
Tone Control - - - - - - - - - - None
Sensitivity Control - - - - - - None
Automatic Volume Control - - - - None



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT THE TRIMMER CONDENSER.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.
VOLUME CONTROL TO BE ON FULL.

THE ANTENNA:

An attached antenna wire is supplied with the receiver. It should be uncoiled and extended as far from the radio as possible. If interference between stations is encountered, uncoil the antenna only far enough to obtain satisfactory reception, free of interference. In locations remote from broadcasting stations additional pick-up can be had by connecting the end of the antenna to a conventional outdoor antenna leadin.

THE FILAMENT CIRCUIT AND POWER SUPPLY:

The filaments of all of the tubes are connected in series. Accordingly, if any one tube burns out the others will not light. It is necessary to replace only the burned out tube; the others then will light. A resistor, built into the line cord, reduces the line voltage to the value required by the tube filaments.

There is an AC-DC switch, accessible from the bottom of the cabinet and operated with a screw-driver. This switch must be in the proper position for AC or DC operation, as shown on the label at the bottom of the cabinet. If the receiver is operated from DC, the polarity of the line cord plug must be correct. If the receiver fails to operate after allowing a minute or two for the tubes to become heated, turn the plug half way around and re-insert it in its receptacle.

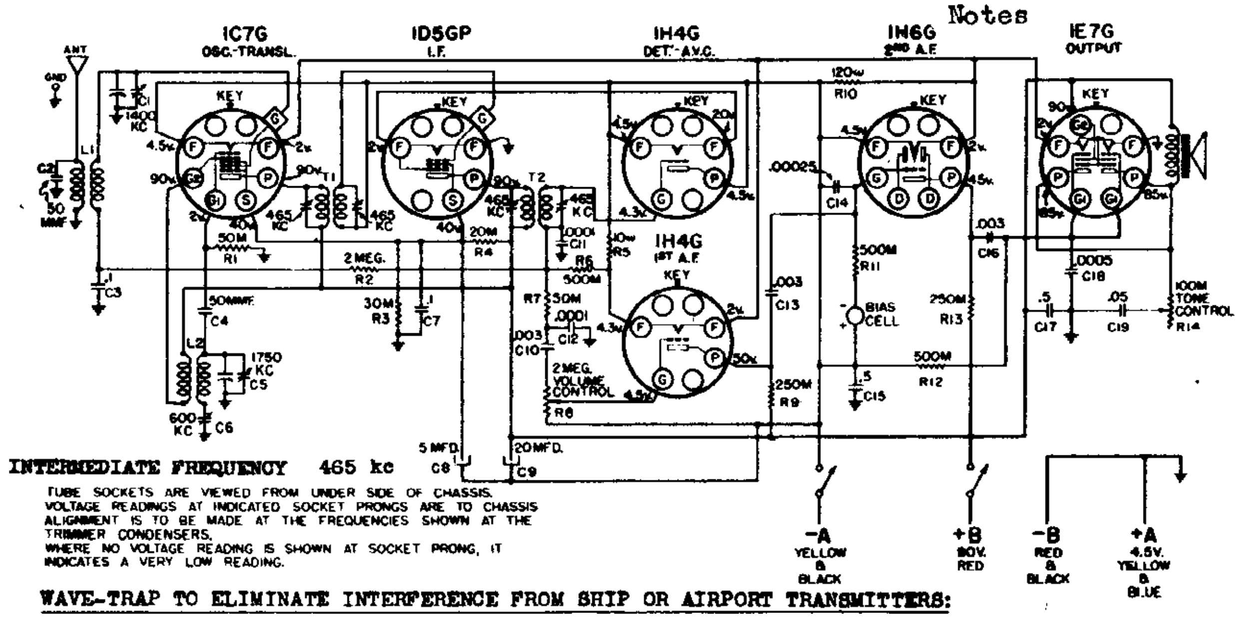
The line cord must not be shortened or altered in any way. To do so would affect the value of resistance built into it.

CAUTION:

Under certain conditions, the chassis may be above ground potential by a value equal to the line voltage. For this reason, care must be taken not to allow any grounded object to come in contact with the chassis while the power cord is plugged into the line. The chassis is insulated from the metal bottom cover of the cabinet by means of rubber grommets.

MODELS 4498, 4499, 45
Schematic, Voltage
Notes

SEARS-ROEBUCK & CO.



INTERMEDIATE FREQUENCY 465 kc

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.

WAVE-TRAP TO ELIMINATE INTERFERENCE FROM SHIP OR AIRPORT TRANSMITTERS:

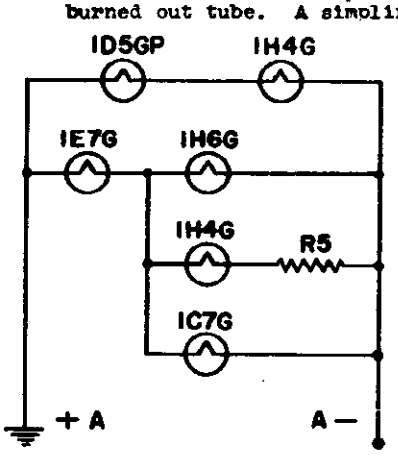
In locations near ship transmitters or airports or air beacon stations, code interference may be experienced. Part #1013114256 wave-trap is designed to eliminate such interference.

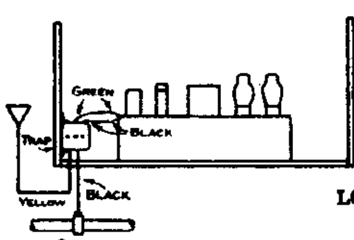
Mount the trap, by means of two wood screws, at any convenient place on the chassis shelf or cabinet where it will be near the antenna terminal of the receiver. Connect the yellow lead of the wave-trap to the antenna downlead. Splice the green lead of the wave-trap to the green antenna lead of the receiver. Cut off any excess length of wire from the trap and from the chassis antenna lead so that the green lead from the wave-trap to the chassis is as short as possible. The yellow lead from the wave-trap should be run so that it is as far as possible from the green lead. Splice one of the black leads from the wave-trap to the black ground lead of the receiver. Connect the other wave-trap black lead to the ground used for the installation.

The trap is pre-tuned to the IF frequency so that normally no further adjustment is necessary. However, should interference still be experienced, tune the receiver between approximately 550 and 600 kc. Then adjust the wave-trap, by means of the trimmer screw at the bottom of the container, until the interference is eliminated. Addition of the trap will reduce the sensitivity of the receiver around 600 kc by approximately 50%. The customer should be forewarned of this to avoid complaints of reduced sensitivity.

THE FILAMENT CIRCUIT:

Since the tube filaments are rated at two volts and the "A" supply is four volts, a series parallel arrangement is used for the tube filament circuit. Accordingly, if any one tube burns out its companion tube will also be affected. It is necessary to replace only the burned out tube. A simplified circuit of the filament connections is shown below.





POWER OUTPUT:
Type . . . . Twin Pentode
Undistorted . . . . 0.25 watts
Maximum . . . . 0.6 watts

57RL 38
January 25, 1937

LOUD SPEAKER:
Type . . . . Magnetic
Size . . . . 6"
Approximate DC resistance. . 1000 ohms

POWER SUPPLY:
"A" Battery (4½ volt dry). . 1 - #5031P
"A" Battery (4 volt storage) 1 - #5049
"B" Batteries . . . . 2 - #5131P

"A" Drain . . . . 0.3 amperes
"B" Drain . . . . 22 ma

FREQUENCY RANGE:
Broadcast . . . . 540-1750 kc

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Translator Trimmer	Padder
1750 kc	1400 kc	600 kc

MODELS 4498,4499,4598
Socket,Trimmers,Notes
Alignment,Sensitivity

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections . . . . 4000 ohm meter, in series with a .5 mfd. condenser, across speaker terminals.

Output meter reading to indicate 50 milliwatts . . . . 8.5 volts

Average sensitivity in microvolts for 50 milliwatts output . . . . See chart below

Generator ground lead connection . . . . Receiver chassis

Dummy antenna value to be in series with generator output . . . . See chart below

Connection of generator output lead . . . . See chart below

Generator modulation . . . . 30%, 400 cycles

Position of Volume Control . . . . Fully on

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	465 kc	.1 mfd.	1C7G Transl. Grid	T2,T1	IF	50
Fully Open	1750 kc	.0002 mfd.	Antenna Lead	C5	Osc. Trim.	90
1400 kc	1400 kc	.0002 mfd.	Antenna Lead	C1	Transl. Trimmer	20
600 kc (rock)	600 kc	.0002 mfd.	Antenna Lead	C8	Osc. Pad.	15

IMPORTANT ALIGNMENT NOTES

The variable should be rocked back and forth a degree or two while making the 600 kc adjustment.

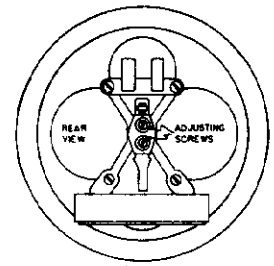
The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

After the alignment has been completed, check the calibration by tuning in a broadcast station at about 900 kc. Adjust the dial pointer to the station's frequency, if necessary.

BATTERY CONNECTIONS:

A-	Black and yellow
A+	Yellow and blue
B-	Red and black
B+ 90B	Red



SPEAKER ADJUSTMENT:

There are two adjusting screws at the rear of the speaker, as shown in the illustration. Speaker rattle can be corrected by turning these screws. Tighten one and loosen the other slightly until the rattle is eliminated.

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc.

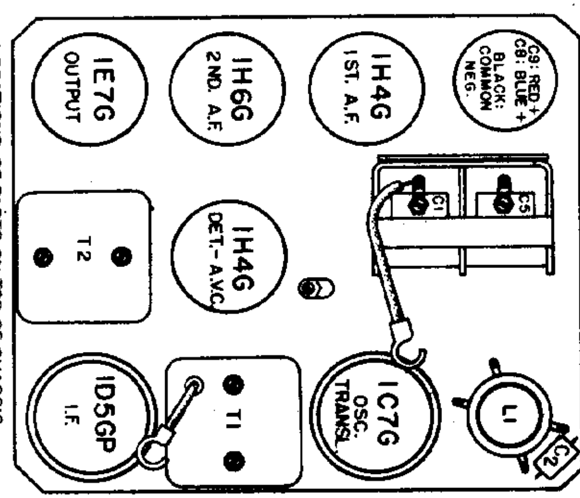
Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

BATTERY REPLACEMENT:

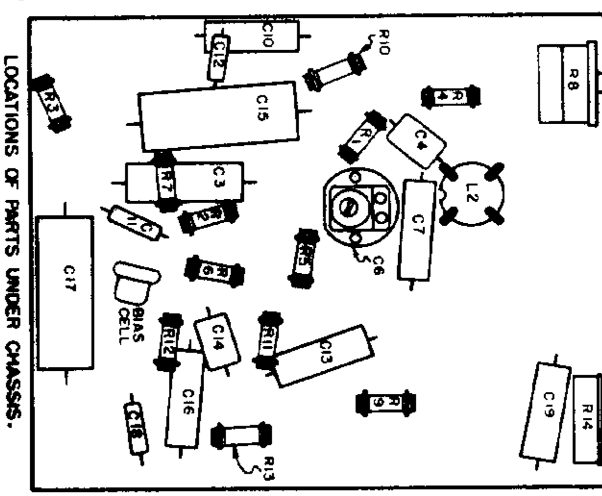
The dry "A" battery should be replaced when its voltage drops to 3.4 volts, under load. The "B" batteries should be replaced when the total voltage has dropped to 68 volts, under load.

THE BIAS CELL:

The bias cell is filled with thick liquid. When the receiver is in its normal position the bias cell will be mounted on its side, which is the correct position, so that the liquid will come into contact with the carbon block and the inside of the metal container. However, the receiver may be stood on its end when working on it on the service bench. In this position the bias cell may be upright and the liquid may not touch the carbon block. If this happens, it will cause severe distortion. Accordingly, the necessary precaution should be observed when working on the receiver on the service bench.



LOCATIONS OF PARTS ON TOP OF CHASSIS.



LOCATIONS OF PARTS UNDER CHASSIS.

OPERATING FEATURES:
Fidelity Range . . . 50 - 3000 cycles
Automatic Volume Control

CHASSIS FEATURES:

Number RF stages	None
Number IF stages	One
Number condensers in gang . . .	Two
Antenna	Conventional
Dial calibrated in kilocycles and meters	

SEARS-ROEBUCK & CO.

MODELS 4501,4503,4507
Schematic,Voltage,Not

POWER SUPPLY:
All models available - - - - - - - - - - 105-125 volts; 50-60 cycle AC only, 40 watts

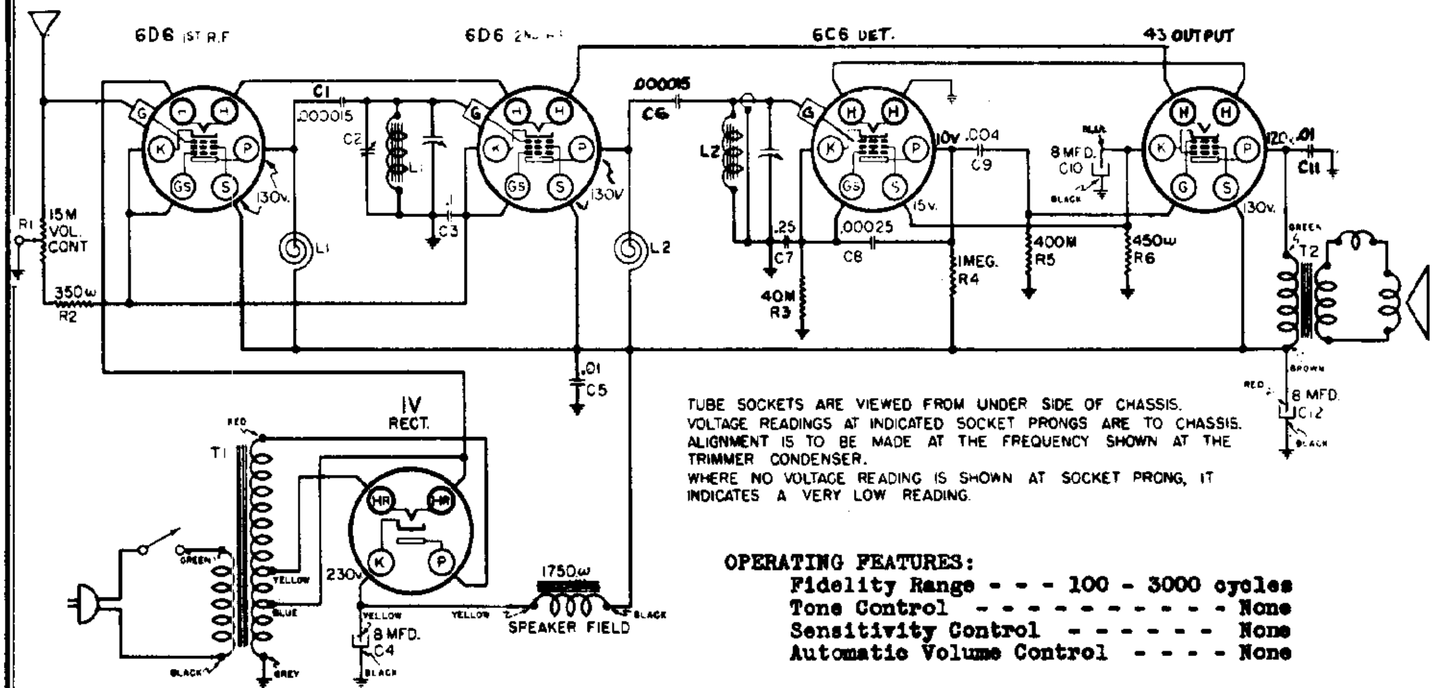
FREQUENCY RANGE:
Broadcast - - - - - - - - 545-1720 kc

ALIGNMENT FREQUENCY:
1400 kc

POWER OUTPUT:
Type - - - - - - - - - - Single Pentode
Undistorted - - - - - - - - - .98 watts
Maximum - - - - - - - - - - 1.64 watts

LOUD SPEAKER:
Type - - - - - - - - - - - - - Dynamic
Size - - - - - - - - - - - - - - - - 5"
Field coil resistance - - 1750 ohms
Field coil voltage drop (approximate)- 120 volts

CHASSIS FEATURES:
Number of tuned RF stages - - - - Two
Number of condensers in gang - - - Two
Antenna - - - - - - - - Self-contained
Dial - KC calibration on large tuning knob.



OPERATING FEATURES:
Fidelity Range - - - 100 - 3000 cycles
Tone Control - - - - - - - - - - - None
Sensitivity Control - - - - - - - None
Automatic Volume Control - - - - None

57RL 24

September 15, 1936

GENERAL INFORMATION

THE ANTENNA:

An attached antenna wire is supplied with the receiver. It should be uncoiled and extended as far from the radio as possible. If interference between stations is encountered, uncoil the antenna only far enough to obtain satisfactory reception, free of interference. In locations remote from broadcasting stations additional pick-up can be had by connecting the end of the antenna to a conventional outdoor antenna leadin.

THE FILAMENT CIRCUIT:

All of the tubes, except the 1V, are connected in series. Accordingly, if any one tube burns out the others will not light. It is necessary to replace only the burned out tube; the others then will light.

THE POWER TRANSFORMER:

The Model 101426 is identical to the Model 101393 except that the 101426 uses a power transformer with separate primary and secondary. (The 101393 uses an auto-transformer.) Accordingly, the chassis of the 101426 is at ground potential. (The 101393 chassis under

MODELS 4501, 4503, 4507
Socket, Trimmers, Parts
Notes

SEARS-ROEBUCK & CO.

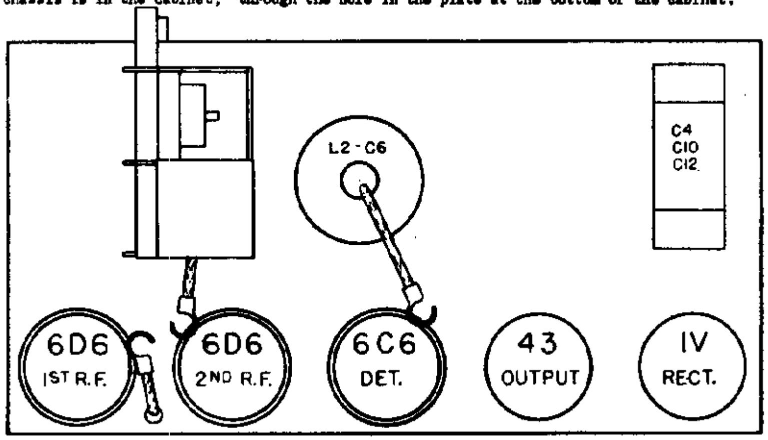
Alignment

ALIGNMENT PROCEDURE

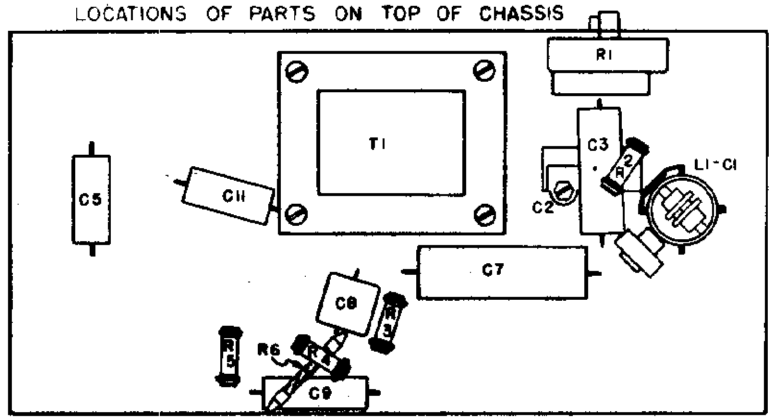
The receiver need not be taken out of the cabinet for alignment.

Either a broadcast signal of about 1400 kc or a test oscillator signal may be used. If a broadcast signal is used, the antenna of the receiver should be extended as in a normal installation. If a test oscillator signal is used, a wire should be connected to the test oscillator output and run parallel to but insulated from the receiver's antenna wire. The generator ground connection should be connected to ground.

Tune in the 1400 kc signal and adjust the trimmer for maximum loud speaker response. This can be done most accurately if the Volume Control setting is reduced to give a low volume level. The variable should be rocked a degree or two during the adjustment. The location of this trimmer is shown in the Location of Parts Diagram. It is accessible, when the chassis is in the cabinet, through the hole in the plate at the bottom of the cabinet.



LOCATIONS OF PARTS ON TOP OF CHASSIS

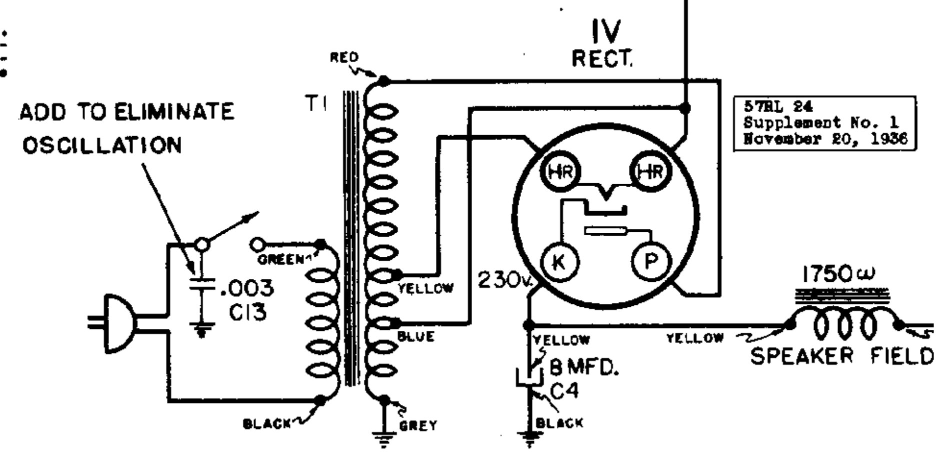


LOCATIONS OF PARTS UNDER CHASSIS

SUBJECT: ELIMINATING OSCILLATION

Oscillation may occur due to variations in tubes. To overcome such oscillation, connect a .003 condenser from the line side of the switch to the chassis. This condenser must be of at least 600 volts rating, or higher, preferably 800 volts. This condenser is C13 in the Schematic Section below, and has been added in later production sets.

57RL 24
Supplement No. 1
November 20, 1936



SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
C5, C11		Condenser - .01 mfd. 400 V.
C9		Condenser - .004 mfd. 400 V.
C8		Condenser - .00025 " mica
R1	1012414034	Control - Volume, with "On-Off" switch
	1015514739	Cord - Line, white
	1015514061	Cord - Line, black
	1015514721	Cord - Line, brown
	10160140511	Cover - Cabinet bottom
	1015414052	Grommet - Chassis mounting
	1013914735	Knob - Tuning, ivory, black lettered calibration
	1013914736	Knob - Tuning, ivory, gold lettered calibration
	1013914538	Knob - Tuning, ivory, brown lettered calibration
	1013914322	Knob - Volume control, ivory
	1013914039	Knob - Volume control, black
	1013914537	Knob - Volume control, brown
R4		Resistor - 1 megohm, 1/3 watt
R5		Resistor - 400M ohms, 1/3 watt
R3		Resistor - 40M ohms, 1/3 watt
R6		Resistor - 450 ohms, 1 watt, flexible
R2		Resistor - 350 ohms, 1/3 watt
	[illegible]	Shield - Tube
	[illegible]	Socket - 4 prong
	[illegible]	Socket - 6 prong
	[illegible]	Speaker - 5", Dynamic
	[illegible]	Cone and voice coil
	[illegible]	Field coil
T2	1011314873	Transformer
T1	1011014063	Transformer - Power

WHEN NO PART NUMBER IS ASSIGNED ORDER BY DESCRIPTION AND RATING

POWER TRANSFORMER COLOR CODE

1-Green	4-Yellow
2-Black	5-Blue
3-Red	6-Grey

REPLACEMENT PARTS AND PRICE LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	1015514737	Antenna Cord - White
	1015514030	Antenna Cord - Black
	1015514783	Antenna Cord - Brown
	1015414200	Button - Snap, variable condenser shield mounting
	10160143181	Cabinet - Ivory (With grille cloths)
	10160140281	Cabinet - Black (With grille cloths)
	10160145341	Cabinet - Brown (With grille cloths)
	1015414479	Clip - Grid
	10160145351	Cloth - Grille, front, ivory, with paper baffle
	10160147401	Cloth - Grille, front, gold, with paper baffle
	1016014536	Cloth - Grille, rear, ivory
	1016014741	Cloth - Grille, rear, gold
L1-C1, L2-C6	1012814032	Coil - RF
	1011614035	Condenser - Variable
C4, C10, C12	1012015401	Condenser - Electrolytic, triple, dry
C7		Condenser - .25 mfd. 200 V.
C3		Condenser - .1 mfd. 200 V.

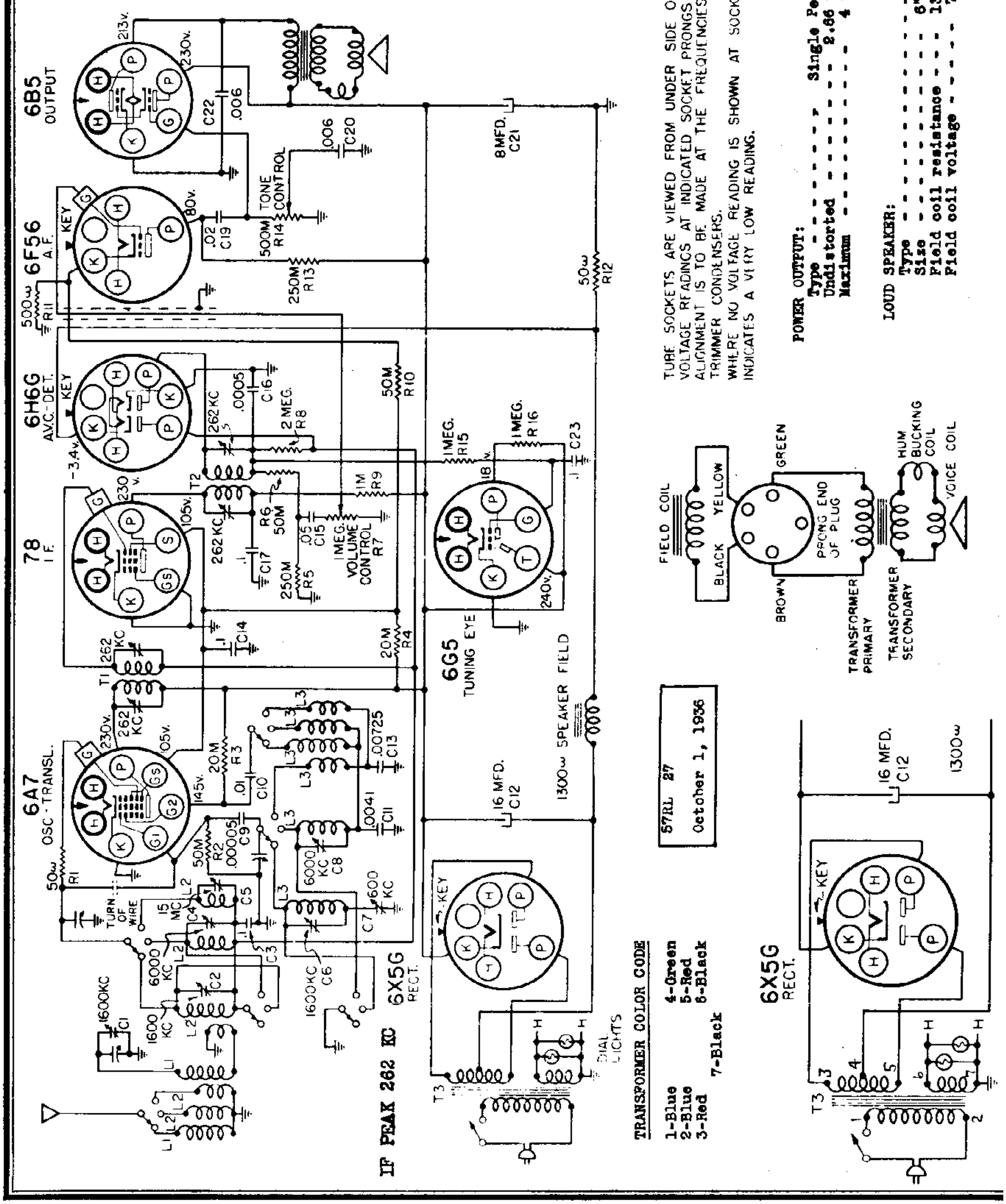
MODELS 4569,4589
Schematic,Voltage

SEARS-ROEBUCK & CO.

POWER SUPPLY:
All models available - 105-125 volts, 50-60 cycle, 48 watts
All models available - - - 105-125 volts, 25 cycle, 50 watts

FREQUENCY RANGES:
Band "A" - - - - - - - - - 545-1825 kc
Band "P" - - - - - - - - - - 2.1-6.5 mc
Band "F" - - - - - - - - - - 6.2-19 mc

INTERMEDIATE FREQUENCY - - - - - - - - - - - - - 262 kc



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.

POWER OUTPUT:
Type - - - - - - - - - - Single Pentode
Undistorted - - - - - - - 2.66 watts
Maximum - - - - - - - - - 4 watts

LOUD SPEAKER:
Type - - - - - - - - - - - - - -Dynamic
Size - - - - - - - - - - - - 6" and 8"
Field coil resistance - - - - 1300 ohms
Field coil voltage - - - - - - 75 volts

57RL 27
October 1, 1936

IF PEAK 262 KC

TRANSFORMER COLOR CODE
1-Blue
2-Blue
3-Red
4-Green
5-Red
6-Black
7-Black

MODELS 4569,4589
Socket, Trimmers
Alignment, Sensitivity

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections - Across voice coil leads
Output meter reading to indicate .5 watts output - - - - - - - - - - - - - - - - - -1.3 volts
Average sensitivity in microvolts for .5 watts output - - - - - - - - - - - See chart below
Dummy antenna value to be in series with generator output - - - - - - - - - See chart below
Connection of generator output lead - See chart below
Generator modulation - 30%, 400 cycles
Position of volume control - Fully clockwise
Position of tone control - Fully clockwise

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	APPROXIMATE MICROVOLTS
"A"	-	262 kc	.1 mfd.	6A7 Grid	T2,T1	150
-	To fall on first short line on dial between 550 and Tuning Eye when variable is fully meshed.	-	-	-	-	-
"A"	1600 kc	1600 kc	.0002 mfd.	Antenna Terminal	C6,C2,C1	40
"A"	600 kc (rock)	600 kc	.0002 mfd.	Antenna Terminal	C7	40
"P"	6 mc	6 mc	400 ohms	Antenna Terminal	C8	-
"P"	6 mc (rock)	6 mc	400 ohms	Antenna Terminal	C4	25
"P"	15 mc (rock)	15 mc	400 ohms	Antenna Terminal	C5	25
"P"	7 mc	7 mc	400 ohms	Antenna Terminal	Loop at bracket end of L3	80

IMAGE ADJUSTMENT

Set the generator to 1524 kc and tune in the signal image at about 1000 kc on the receiver. The generator should be adjusted for high output (.1 volts). There is a lead running from L1 through a hole in the chassis to the wave switch. Adjust the position of this lead under the chassis for minimum image response.

IMPORTANT ALIGNMENT NOTES

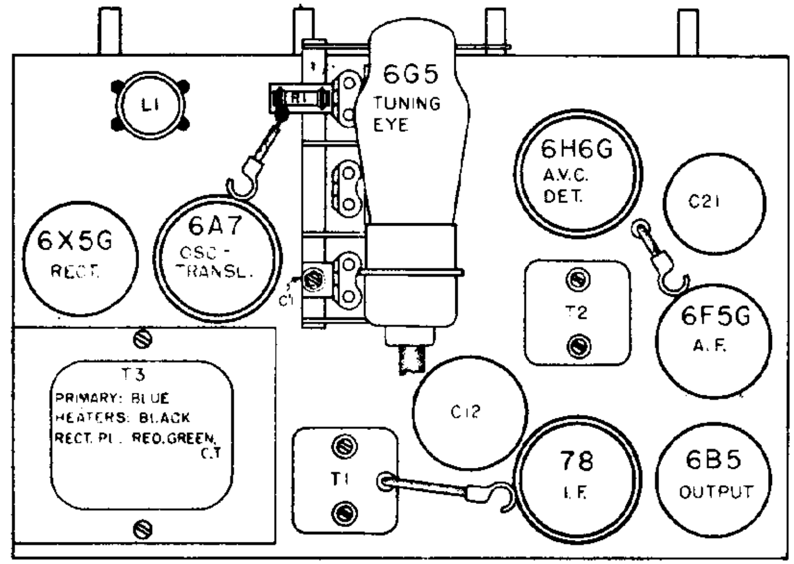
Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

It is advisable to repeat the entire alignment procedure band by band and in the original order to insure greater accuracy.

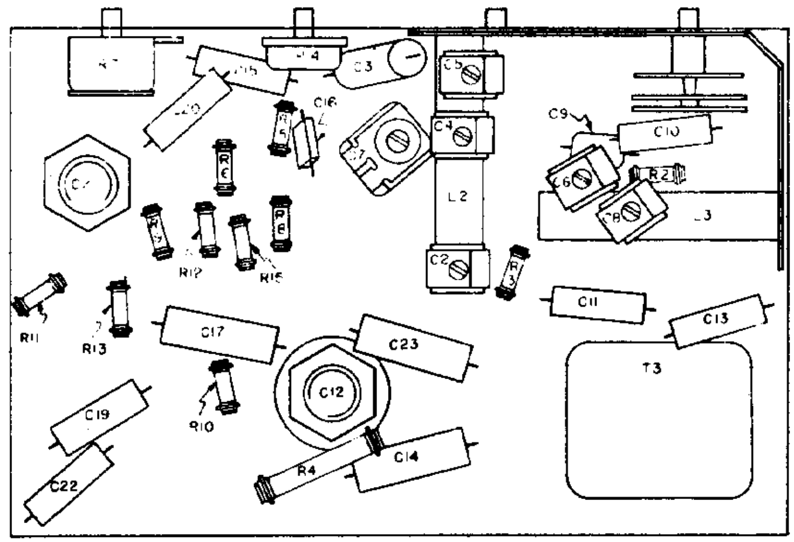
Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly. This will prevent the AVC from interfering with accurate alignment.

After the alignment procedure has been completed, tune in a broadcast signal at about 900 kc. If necessary, shift the dial pointer so that it indicates this frequency.

Values shown under, "Microvolts", are only approximate.



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

MODEL 4587
Schematic, Voltage Data

SEARS-ROEBUCK & CO.

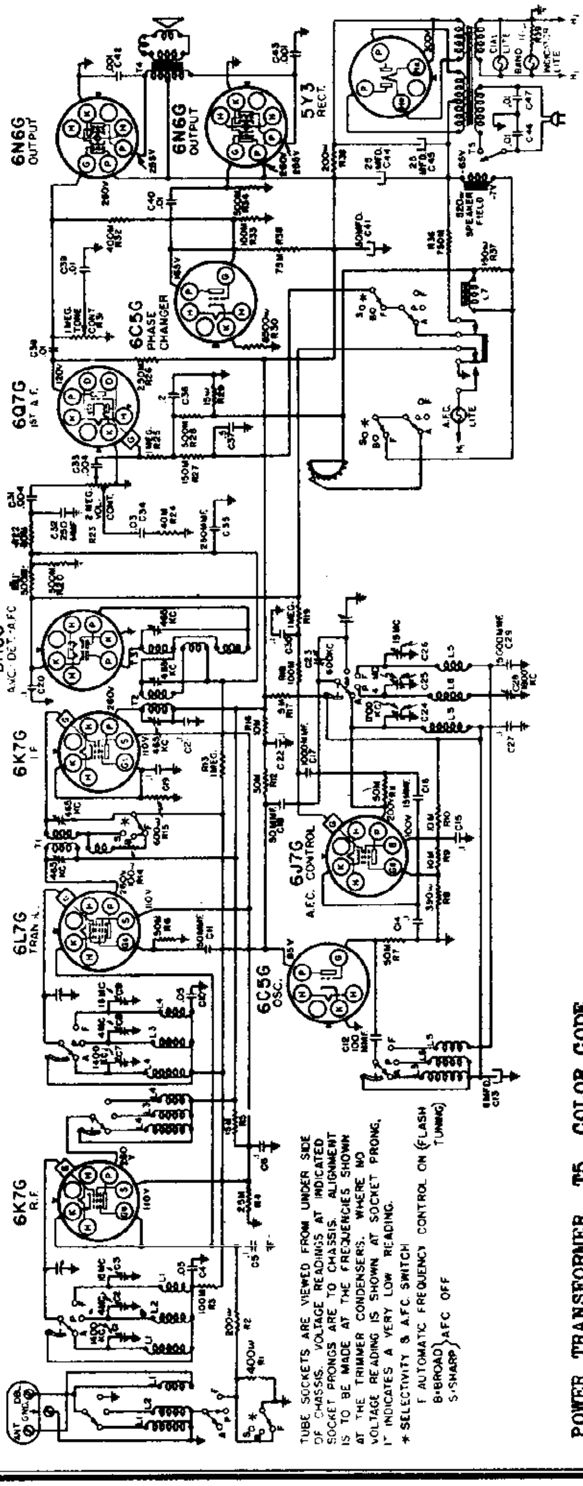
POWER SUPPLY:
All models available - - - - - - - - - - - - - - - - 105-125 volts, 50-60 cycle, 110 watts
All models available - - - - - - - - - - - - - - - - - - 105-125 volts, 25 cycle, 110 watts

FREQUENCY RANGES:
AMERICAN Band - - - - - - - 540-1550 kc
POLICE Band - - - - - - - -1550-5400 kc
FOREIGN Band - - - - - - - 5.9-17 mc

ALIGNMENT FREQUENCIES:

	Osc. Trimmer	Ant-Transl. Trimmer	Osc. Padder
Band "AM"	1400 kc	1400 kc	600 kc
Band "POL"	4 mc	4 mc	1.8 mc
Band "FOR"	15 mc	15 mc	Fixed

57RL 22
September 10, 1936

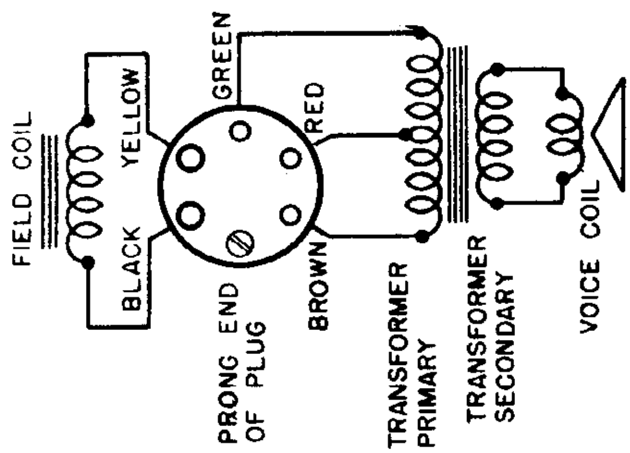


INTERMEDIATE FREQUENCY - - - - - - - - - - - 465 kc

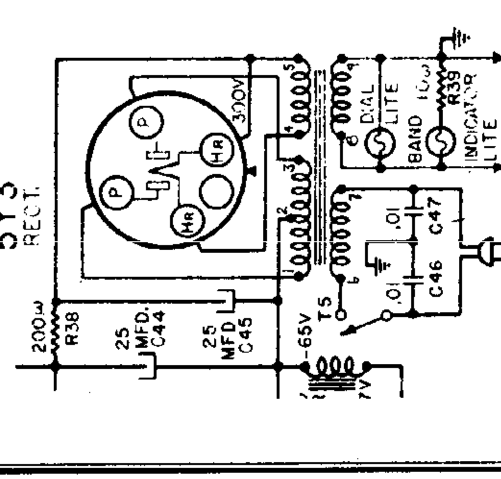
POWER OUTPUT:
Type - - - - - - - - Push-Pull
Undistored - - - - - - - - - - 9 watts
Maximum - - - - - - - - - - 11.4 watts

LOUD SPEAKER:
Type - - - - - - - - - - - - - Dynamic
Size - - - - - - - - - - - - - - - 10"
Field coil resistance - - - 520 ohms
Field coil voltage drop - - -60 volts

CHASSIS FEATURES:
Number RF stages - - - - - - - - - One
Number IF stages - - - - - - - - - One
Antenna - - Doublet or Conventional



POWER TRANSFORMER, T5, COLOR CODE
1-Red
2-Slate
3-Blue
4&5-Red
6-Black
7-Green
8&9-Black



MODEL 4587
Socket, Trimmers

SEARS-ROEBUCK & CO.

Chassis, Notes

WAVE-TRAP TO ELIMINATE INTERFERENCE FROM SHIP OR AIRPORT TRANSMITTERS:

Mount the trap, by means of two wood screws, at any place on the chassis shelf or cabinet where it will be near the antenna terminals of the receiver. Connect the yellow lead of the trap to the terminal marked, "DBL", on the terminal block at the rear of the chassis. Connect the black lead of the trap to the ground terminal of the chassis. Any excess length should be cut off the leads so that they are as short as possible. The antenna or doublet connections to the receiver are not to be changed in any way.

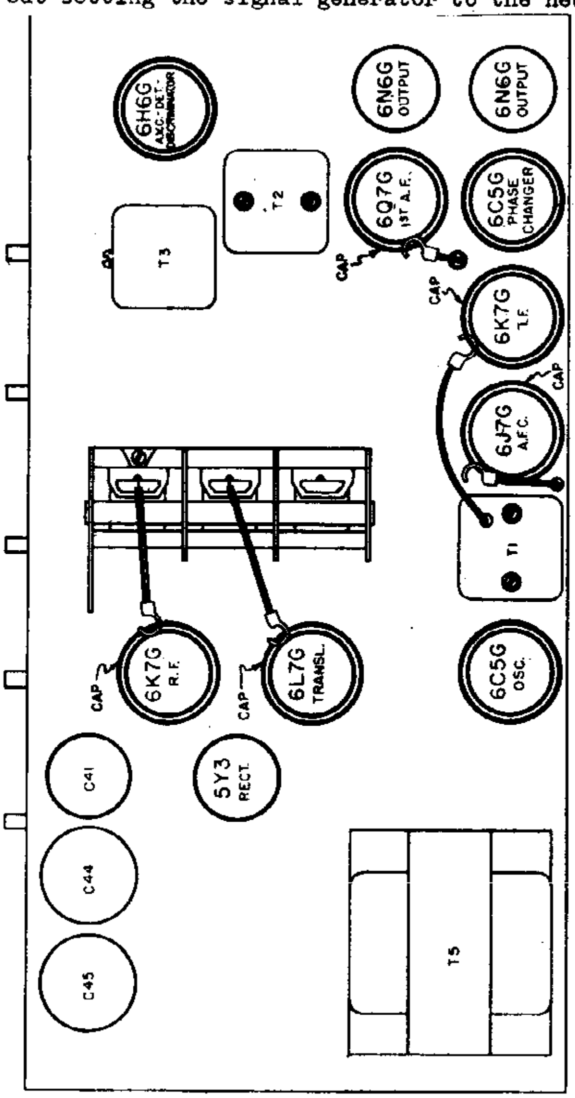
The trap is pre-tuned to the IF frequency so that normally no further adjustment is necessary. However, should interference still be experienced, tune the receiver between approximately 550 and 600 kc. Then adjust the wave-trap, by means of the trimmer screw at the bottom of the container, until the interference is eliminated. Addition of the trap will reduce the sensitivity of the receiver around 600 kc by approximately 50%. The customer should be forewarned of this to avoid complaints of reduced sensitivity. See DW65.

ELIMINATING WHISTLE AT 930 KC:

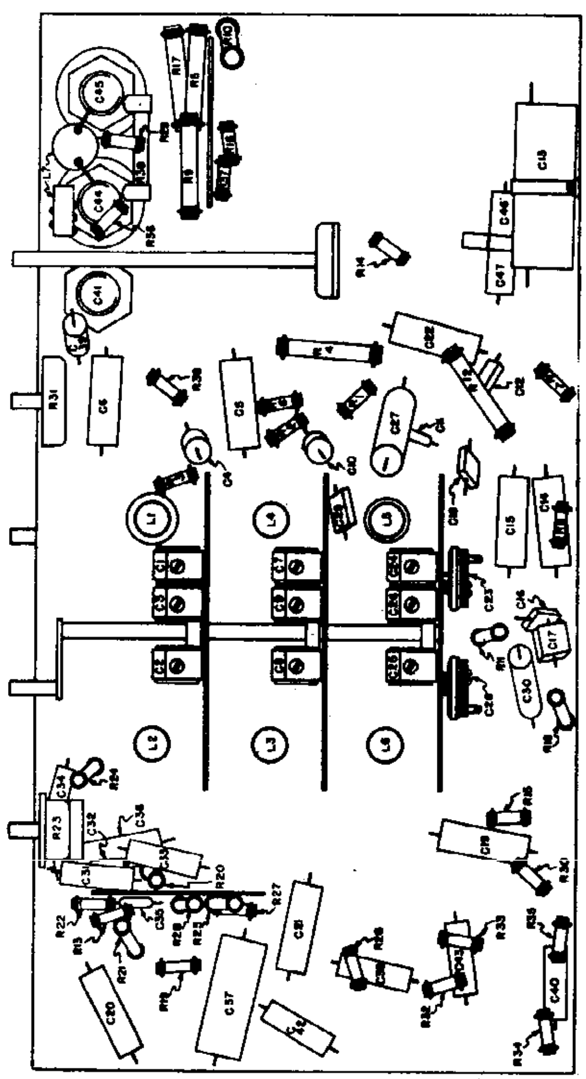
A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to keep the new IF frequency as near 465 kc as possible.

Align the IF at the new frequency and then realign the antenna, translator, and oscillator stages. Then re-adjust the A.F.C. according to the procedure described in this Manual, but setting the signal generator to the new IF frequency instead of 465 kc.



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

SEARS-ROEBUCK & CO.

MODEL 4587
Alignment, Sensitivity
Jack Installation

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections - - - - - - - - - - - - - - - - - - - Across speaker voice coil

Output meter reading to indicate .5 watts output - - - - - - - - - - - - - - - - -1.1 volts

Dummy antenna value to be in series with generator output - - - - - - - - - See chart below

Connection of generator output lead - See chart below

Generator modulation - 30%, 400 cycles

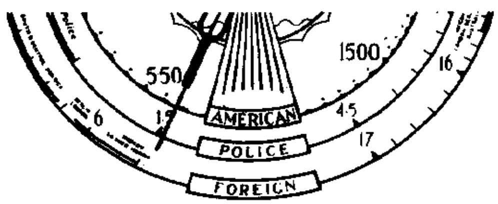
Approximate average sensitivity in microvolts for .5 watts output - - - - - See chart below

Position of Volume Control - Fully on

Position of Tone Control - Fully clockwise

Position of Flash Tuning and Selectivity Switch knob - - - - Sharp, fully counter clockwise

Position of Dial Pointer when variable is fully meshed - - - - - - - - As illustrated below



WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	APPROXIMATE MICROVOLTS
"AM"	550 kc	465 kc	.1 mfd.	6L7G Grid	T2,T1	-
"AM"	1400 kc	1400 kc	.0002 mfd.	Antenna Terminal	C24,C1,C7	15
"AM"	600 kc (rock)	600 kc	.0002 mfd.	Antenna Terminal	C23	20
"POL"	4 mc	4 mc	400 ohms	Antenna Terminal	C25,C2,C8	5
"POL"	1.8 mc (rock)	1.8 mc	400 ohms	Antenna Terminal	C28	40
"FOR"	15 mc	15 mc	400 ohms	Antenna Terminal	C26,C3,C9	5
"FOR"	6 mc	6 mc	400 ohms	Antenna Terminal	-	60

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

Repeat the entire alignment step by step in the original order for greater accuracy. Always keep the generator output power at its lowest possible value. This will prevent the AVC action of the receiver from interfering with accurate alignment.

The shield covering the coils at the bottom of the chassis should be left in place during the alignment. The trimmer condensers are accessible through the holes in the shield.

Only the dummy antenna indicated in the chart for any particular band should be used. Disconnect the dummy antenna used for alignment of any other band.

After the alignment has been completed, the A.F.C. adjustment should be made as follows:

A.F.C. ADJUSTMENT

CAUTION: The right hand knob must be in the "B" (broad) position for operations 1 through 5. Two signal generators are necessary to make the adjustments. The Volume and Tone Controls must be turned all the way to the right. The generator ground connection is to be made to the chassis.

1. Set one signal generator to 1050 kc and 5000 microvolts output. Connect its output to the "ANT" terminal of the set, through a .0002 mfd. condenser.

2. Tune the receiver for maximum output (at 1050 kc). Then switch the signal generator modulation switch to the "off" position.

3. Short the movable arm to the toothed disc with a piece of wire. The Flash Tuning light should become illuminated.

4. Set the second signal generator to 465 kc and 10,000 microvolts output. Connect its output, in series with a .000015 mfd. condenser to the control grid of the 6L7G tube.

5. Carefully turn the variable condenser until "zero beat" note is had (with right hand knob in "BROAD" position).

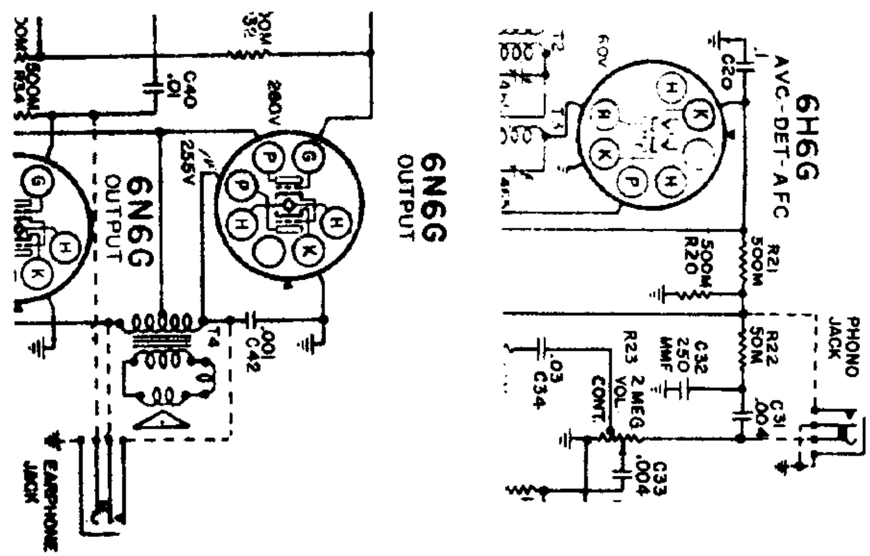
6. Turn the right hand knob to the "FLASH" position (fully clockwise). Then adjust the discriminator unit, T3, for "zero beat". The correct setting will be obtained at about the center of T3 trimmer range. The adjustment is a very sharp one.

7. Turn the right hand knob to the "SHARP" and then to the "BROAD" positions. The receiver still should give zero beat in the "SHARP" and "BROAD" positions if the A.F.C. is properly adjusted. If it does not, carefully repeat operation #6.

8. The A.F.C. can be checked for "pull in" in the following manner. Remove the signal generator connection from the 6L7G grid. Switch on the modulation of the 1050 kc generator and set the generator to give 5000 microvolts output. Reduce the Volume Control setting of the receiver to give 1.5 volts reading on the output meter. Increase the signal generator frequency until the output meter reads .5 volt. Note the frequency of the signal generator at this output meter reading. Then decrease the signal generator frequency from 1050 kc until the output meter again reads .5 volt and note the signal generator frequency. If the A.F.C. is operating properly, the signal generator can be shifted 15 to 20 kc either side of 1050 kc before the output meter reading is reduced from 1.5 volts to .5 volt.

INSTALLING A JACK FOR THE USE OF EARPHONES AND PHONOGRAPH PICK-UP:

There is a hole, plugged with a brass insert, at the rear of the chassis. This hole is provided so that a jack can be installed for earphone or phonograph pick-up connections. The Schematic section shows the connections. With the connections as shown, the loud speaker will not operate when the earphones are plugged in. If it is desired to have the loud speaker operate at the same time the earphones are plugged in, the connections to the two lugs furthest from the frame of the jack should be omitted. Otherwise the earphone plug must be removed from its jack when loud speaker reception is wanted. If the jack is wired as a phonograph pick-up jack, the right hand knob of the receiver must not be in the "FLASH" position when phonograph operation is wanted. It may be put in either the "B" or "SHARP" position. The Volume and Tone Controls of the receiver will function for phonograph reproduction.



MODEL 4587
Dial Data

SEARS-ROEBUCK & CO.

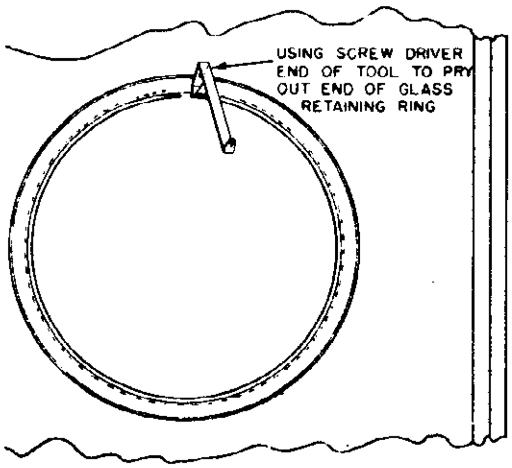


FIG. 1

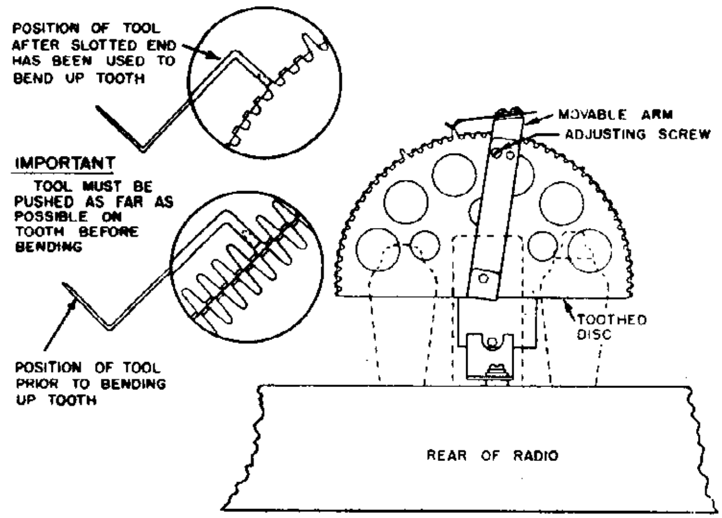


FIG. 2

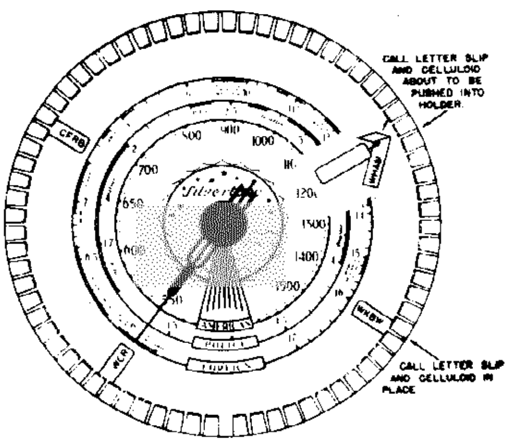


FIG. 3

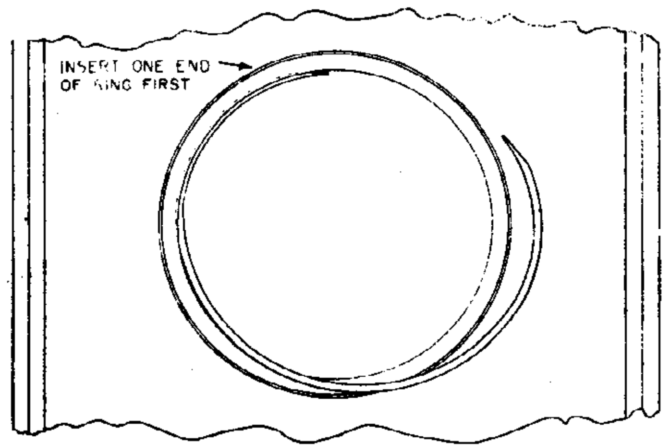


FIG. 4

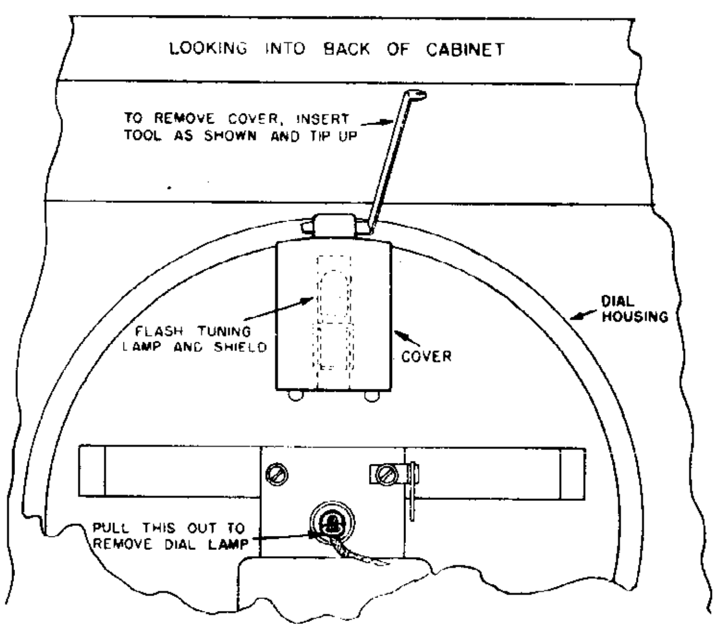
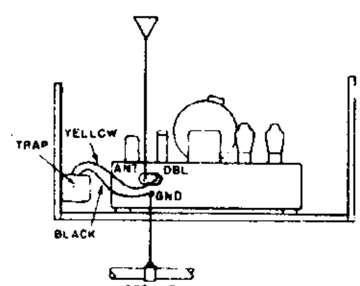
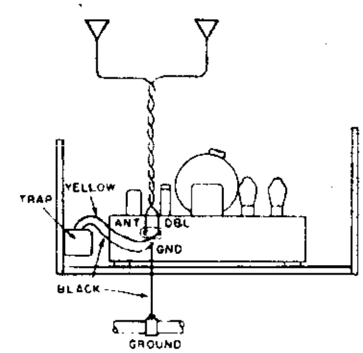


FIG. 7





SEARS-ROEBUCK & CO.

GENERAL INFORMATION

THE AUTOMATIC FREQUENCY CONTROL - FLASH TUNING:

These models incorporate a completely new feature, Automatic Frequency Control - Flash Tuning. This double feature, which is designed to operate only on the AMERICAN band, does several things. The Automatic Frequency Control removes the necessity for accurate tuning. Depending upon the strength of the station, it is necessary to tune only to within 15 kc or less of the station's frequency. The Automatic Frequency Control then will "take hold" and tune the station far more accurately than can be done manually. This is done entirely with radio circuits, no moving parts being involved.

The Flash Tuning mechanism greatly simplifies tuning. It is necessary merely to turn the dial pointer to the station's call letters. The call letters then will become illuminated and, by virtue of the A.F.C., the station will automatically be tuned in exactly. Until the station's position is reached, the receiver is completely silent. A description of how the circuits of the A.F.C. - Flash Tuning feature work is given after the following instructions for setting up the Flash Tuning feature.

SETTING UP:

1. The glass in the cabinet front panel must be removed to allow insertion of the station call letters, as described later. This glass is held in place by a split ring (the split is at the top). See Fig. 1. The tool illustrated is furnished in the same envelope with the Instructions. Use the screw-driver end of this tool to remove the split ring by prying out one of its ends, as indicated in Fig. 1. Be very careful not to insert the tool so deep that it touches the glass, else the glass may become chipped.

The glass can be removed by placing the hand on it and tipping the cabinet forward. Take care during the operation not to allow the split ring to fly out or the glass to drop and break.

2. Make a list of the broadcasting stations to which you desire to have the FLASH TUNING mechanism respond. These stations must be local stations or strong stations at medium distance that give reliable daylight reception. A sheet containing the call letters of broadcasting stations is furnished in the same envelope with the Instruction Leaflet. Cut out the call letters of the selected stations. The short vertical lines before and after the station's call letters and the long horizontal lines will serve as a guide along which to cut. When properly done, these cut slips will be a trifle over 1½" long and 1/4" wide.

3. Turn the Flash Tuning and Selectivity Switch knob to the "SHARP" position. Then tune in the first station on your list of selected stations.

4. Leaving your station tuned in, go to the rear of the radio. You will see a semi circular toothed disc, as illustrated in Fig. 2. There is also a flat spring arm, with a small rounded projection near its end, that moves over the teeth of this semi circular disc as the Station Selector knob is turned. Still leaving your station tuned in, carefully note which tooth on the semi circular disc is directly under the rounded projection of the spring arm. Mark this tooth with a pencil. Note that there is a double row of teeth and either the tooth that faces you or the tooth that faces the front of the radio may be bent up, depending upon which one is nearer the rounded projection of the spring arm. After you have marked the tooth, turn off the radio. Then tune away from the station (with the Station Selector knob, not the movable arm) and bend this marked tooth straight up, using the slotted end of the tool provided. See Fig. 2. It is important that the slot of the tool fit as far down as possible on the tooth before bending. This is necessary so that the complete tooth will be bent up instead of just part of the tooth. When this is properly done, the projection of the spring arm will touch the bent up tooth when the toothed disc is rotated by turning the Station Selector knob.

5. Turn the radio on again and tune in the next station on your list of selected stations. Mark the tooth that now is under the projection of the spring arm when this station is tuned in. Turn off the radio, tune away from the station so that the spring arm will not be in the way and bend up this marked tooth, using the tool provided. Proceed in the same manner for each of the other stations on your selected list. Turn off the radio each time before bending up the tooth. Otherwise a slight spark may occur, although there is no danger of shock. When properly done, the spring arm will touch each of the teeth that has been bent up but will not touch any of the other teeth, as the Station Selector knob is turned.

6. Turn the Flash Tuning and Selectivity Switch knob to the "FLASH" position. Now again tune in the first station on your selected list. As its position is reached, the bent up tooth will touch the spring arm and a light will flash on the dial at a position opposite the end of the dial pointer.

7. A small envelope containing celluloid tabs is furnished in the same large envelope with the Instructions. Select the cut out slip bearing the call letters of your chosen station. Bend the end of the slip, opposite the call letters, over one of the celluloid tabs so that the call letters will be under the celluloid. See Fig. 3. Then place the tab and call letter slip under the holder at the outside edge of the dial at a point opposite the end of the dial pointer. The call letters will then be illuminated whenever the dial pointer is opposite them (and the radio is switched to the AMERICAN band and the right hand knob is in the "FLASH" position).

8. In the same manner, insert the proper call letter slip and a celluloid tab for each of the other stations selected. (These tabs can be pulled out and the call letters of other stations inserted at any time should you wish to change the selection of stations.)

9. Replace the glass in the cabinet front panel. Hold it centered in the escutcheon with one hand, insert one end of the split ring in place as shown in Fig. 4 and continue pressing the remainder of the ring into place until it is completely seated. It may be helpful to tip the cabinet back against the wall to prevent the possibility of the glass falling out during the operation.

10. If two of the selected stations are powerful ones and close together in frequency (10 to 20 kc) the receiver may go from one to the other if the stations are "fading", or if their relative strength varies with the time of day. To correct this, bend down the teeth originally bent up for the two stations and instead bend up the two adjacent teeth which are further apart.

HOW THE A.F.C. - FLASH TUNING CIRCUITS OPERATE:

The I.F. frequency of the receiver is 465 kc. If a station is tuned in exactly, then the oscillator frequency is 465 kc higher than the station's frequency, creating an I.F. of 465 kc. However, if the receiver is tuned, for example, 5 kc lower than the station's frequency, the oscillator frequency will be 5 kc lower and the resultant I.F. will be 460 kc. Similarly, if the receiver is tuned 5 kc higher than the station's frequency, the resultant I.F. will be 470 kc. The I.F. is fed to the discriminator transformer, T3. By means of the tuned circuits of the discriminator transformer, I.F. higher than 465 kc is fed through one of the diode plates of the 6H6G tube and frequencies lower than 465 kc are fed through the other diode plate of the 6H6G tube. The resultant diode current creates voltage drops across the 500M ohm resistors, R20 and R21. The polarity and value of the voltage drops, with respect to ground, across these two resistors depend upon the extent to which the I.F. is higher or lower than 465 kc. This voltage, developed by the discriminator circuit, is fed to the control grid of the 6J7G Automatic Frequency Control tube to control the oscillator frequency, as described in the following paragraph.

The oscillator coil inductance, L5, determines the oscillator frequency for any given position of the variable condenser. If another inductance were connected in parallel to it, the total inductance would be lessened and the oscillator frequency would increase. The combination of the 6J7G A.F.C. tube together with the condensers, C16, C17 and the resistor, R11, have the effect of an inductance in parallel with the inductance, L5. This is so for the following reason:

In an inductance the phase relations between the voltage across it and the current through it are such that the voltage leads the current by 90 degrees. The phase relations of the voltage and current in the plate circuit of the 6J7G tube are such that the voltage leads the current by 90 degrees. Therefore, this combination acts as an inductance in parallel to the inductance L5. The extent to which it does so is determined by the value of the voltage impressed on the control grid of the 6J7G tube. This voltage is obtained from the discriminator circuit as previously described. The effect of this equivalent parallel inductance is to change the AMERICAN band oscillator frequency. By properly choosing constants, this oscillator frequency change can be made to compensate almost exactly for the oscillator frequency error due to inexact tuning. In this way, the I.F. is always 465 kc, which is equivalent to perfect tuning, provided the station is approached nearly enough so that the A.F.C. can take hold. As mentioned previously, this is within 15 kc of the station for strong stations, but decreases for weaker stations.

The A.F.C. tube is connected in the circuit all the time and on all bands. However, the voltage from the discriminator circuit is fed to its control grid only on the AMERICAN band and when the Variable Selectivity - Flash Tuning knob is turned to the "FLASH" position. On all other bands and positions of the Selectivity - Flash Tuning knob the control grid bias of the 6J7G tube is fixed. Therefore, it corrects the I.F. frequency only on the AMERICAN band.

The Flash Tuning mechanism consists essentially of the toothed disc at the rear of the variable condenser and the relay, L7. The function of the toothed disc is to operate the relay when the variable condenser is turned to the various pre-selected stations. The relay contacts close the Flash Tuning light circuit, illuminating the station's call letters. At the same time they remove the high negative bias which blocks off the audio, keeping the receiver silent until the pre-selected station is tuned in.

The relay coil normally is energized. It is short circuited by the bent up tooth of the disc contacting the movable arm. This is why the Flash Tuning light flashes for a second or so when the receiver is first turned on -- the rectifier has not heated sufficiently to furnish current to energize the relay.

MODEL 4587
Dial Data, Flash Tuning
Notes

SEARS-ROEBUCK & CO.

IF THE A.F.C. - FLASH TUNING MECHANISM DOES NOT OPERATE PROPERLY:

If the A.F.C. Flash Tuning mechanism does not operate properly, first check the toothed disc and spring arm. The spring arm should touch each of the teeth that have been bent up and should not touch any of the other teeth, as the Station Selector knob is turned. To adjust the spring arm, so that it does touch only the bent up teeth, proceed as follows. Loosen the screw marked, "Adjusting Screw", in Fig. 2, which will permit the spring arm to be tipped so that it does make contact only with the bent up teeth. Then tighten the adjusting screw.

Another likely cause of improper A.F.C. - Flash Tuning operation is the relay. A small amount of dust may interfere with proper closing of the contacts. Blow out the contacts or pass a strip of plain paper back and forth between them. Two types of relay have been used. The earlier type is part #1013814997. It can be identified through the fact that the relay coil leads are black. The later type relay is part #1013815558. Its leads are colored. This later type will be supplied for replacement. The earlier type relay is shown schematically in Fig. 5. The later type, in Fig. 6. The proper sequence of operation for the contacts is indicated under each illustration. If necessary, slightly bend the contacts so that they do operate in the sequence indicated. The tension of the springs should be such that the relay closes with a current of 50 milliamperes. This can be tested by connecting the relay in series with a six volt storage battery, a 100 ohm rheostat, and a milliammeter of the proper range.

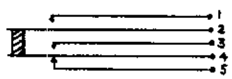


FIG. 5

WITH RELAY NOT EXCITED - CIRCUIT 1-2 OPEN
3-4 OPEN
4-5 CLOSED

WITH RELAY EXCITED - CIRCUIT 1-2 CLOSED
3-4 CLOSED
4-5 OPEN

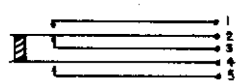


FIG. 6

WITH RELAY NOT EXCITED - CIRCUIT 1-2 OPEN
2-3 CLOSED
4-5 OPEN

WITH RELAY EXCITED - CIRCUIT 1-2 CLOSED
2-3 OPEN
4-5 CLOSED

WHEN FLASH TUNING LIGHT STAYS ON, OR LIGHT COMES ON BUT RADIO IS INOPERATIVE IN FLASH TUNING POSITION CHECK THE RELAY CONTACTS AS OUTLINED ABOVE.

If the later type relay is used to replace the earlier type, the connections to the relay must be changed. The following tabulation shows to what lugs of the newer type relay the connections should be made after removing them from the lugs of the old relay.

ORIGINAL RELAY	NEW TYPE RELAY
Wire from lug #1	To lug #5
Wire from lug #2	To lug #4
Wire from lug #3	To lug #1
Wire from lug #4	To lug #2
Wire from lug #5	To lug #3

REPLACING THE DIAL LAMPS:

There are three lamps in the dial mechanism. The lamp that illuminates the dial is in the center of the dial. It can be removed for replacement by pulling the small handle that projects from the rear center of the dial housing. (Accessible from the back of the radio.) When putting the lamp holder back into place be careful that it is not pushed in too far lest the dial pointer be pushed off of its shaft. Position the lamp so that the dial is illuminated to the best advantage.

The FLASH TUNING lamp (the one that moves around the outer edge of the dial and flashes on for the station call letters) is accessible for replacement through a small removable cover at the top of the dial housing. (Accessible from the rear of the radio.) This cover snaps on the top of the dial housing and can be removed with the fingers or by means of the tool, as shown in Fig. 7. Turn the Station Selector knob so that the dial pointer is straight up. The lamp shade can then be removed by grasping the end of it and pulling it up through the opening in the dial housing. The lamp can then be removed and replaced. When putting the lamp shade back the narrow slit in it must face the front of the dial so that the light will fall on the dial. The arm that carries the Flash Tuning lamp must coincide in position with the dial pointer. If it has shifted on its shaft, it can be moved to coincide with the dial pointer and its set screws tightened. This can be done either by removing the cover at the top of the dial housing (with the chassis out of the cabinet) or the dial can be removed from the housing as described in the paragraph that follows the next one. If the light is only slightly out of line with the pointer, it can be made to coincide by turning the lamp shade slightly.

The BAND INDICATOR lamp (the one that lights up the three Wave Band designations) circuit contains a special resistor that reduces the voltage to this lamp so that it probably never will burn out. Should replacement of the BAND INDICATOR lamp ever be necessary, the chassis must be taken out of the cabinet and the dial removed in order to gain access to the lamp. This procedure is described in the following paragraph. For replacement of any of the lamps use only the same type as supplied originally.

Loosen the set screws in the knobs at the front of the radio and remove the knobs. Remove the four screws that are under the shelf on which the chassis rests. Remove the single screw that is in the speaker plug and pull out the speaker plug from the back of the radio. The chassis then can be taken out of the cabinet. Rotate the Station Selector shaft (the middle one) to the right until the dial pointer goes as far as it can go. Carefully note the exact position of the dial pointer on the dial. Then pull the pointer off of its shaft. Now carefully bend up the metal tabs that hold the dial in the dial housing. Bend the tabs only far enough to permit removal of the dial. If the tabs are bent too far up, they may break off when bent down again. The complete dial assembly together with the station call letter tab holder can then be removed from the housing. When this is done, the BAND INDICATOR lamp and shield will be assessible. Pull the shield off the lamp socket and replace the lamp. The shield must be put back on so that the band designations are evenly illuminated. When re-assembling, leave the Station Selector shaft turned all the way to the right, as was done before pulling the dial pointer off of its shaft. Then push the dial pointer back on its shaft so that it comes to the same position on the dial as was noted for it before it was pulled off its shaft.

ANTENNA CONNECTIONS:

There is a terminal board at the rear of the chassis marked "ANT", "DBL", "GND", indicating antenna, doublet, and ground, respectively. The "DBL" terminal is left unconnected when a conventional antenna is used. When a doublet is used, one wire of the twisted downlead is connected to the "ANT" terminal and the other downlead wire is connected to the "DBL" terminal.

VARIABLE SELECTIVITY:

Variable Selectivity is obtained by connecting or disconnecting coupling turns between primary and secondary of the IF input transformer, T1. In the "SHARP" position of the right hand control knob, the coupling turns are disconnected and the Selectivity becomes sharp. In the "B" position (broad) the coupling turns are connected and Selectivity is broadened, thereby increasing the high frequency audio response of the receiver.

REPLACEMENT OF THE OSCILLATOR TUBE:

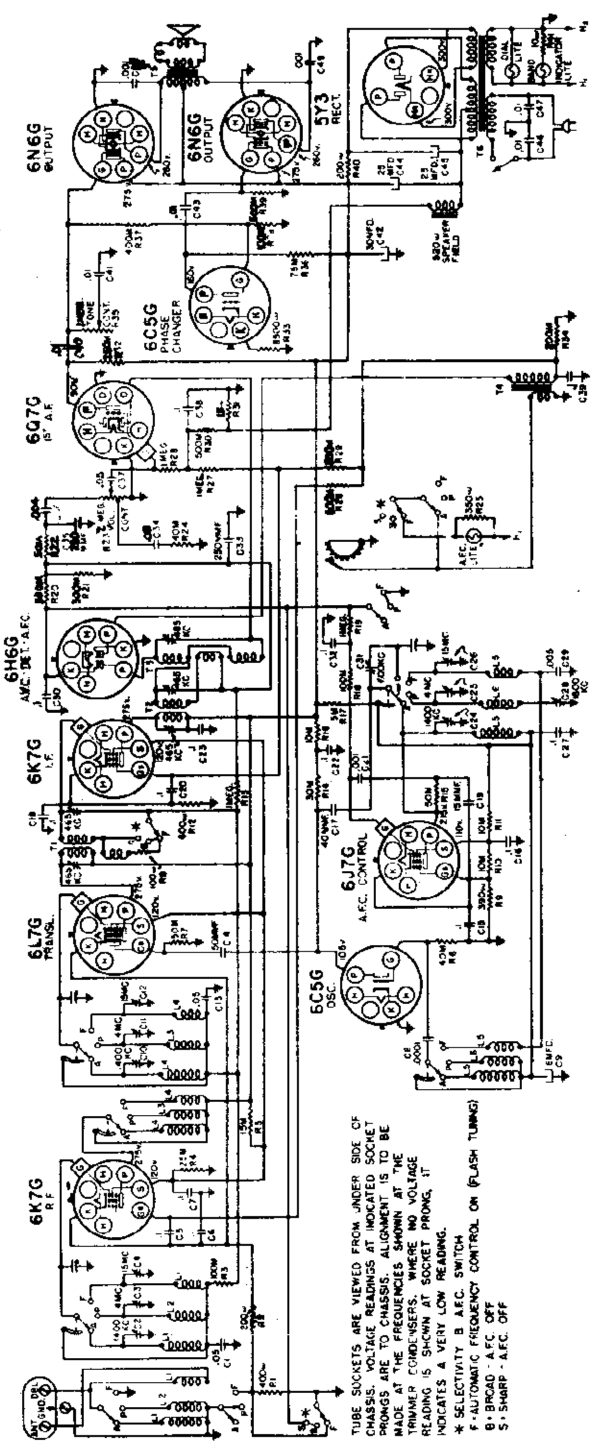
There are two types of 6C5G tubes, one shielded and the other unshielded. They can be told apart easily by appearance. The shielded type has a perforated mesh screen surrounding the other elements. This screen is about an inch in diameter and comes very close to the inside of the bulb. The unshielded type does not have this perforated mesh screen. The plate of the tube, of solid metal and about 3/8" diameter, is visible. It is important that only the unshielded type 6C5G, without the perforated mesh screen, be used in the oscillator socket. Use of the shielded type will upset the calibration of the Foreign band and interfere with proper performance.

THE AVC CIRCUIT:

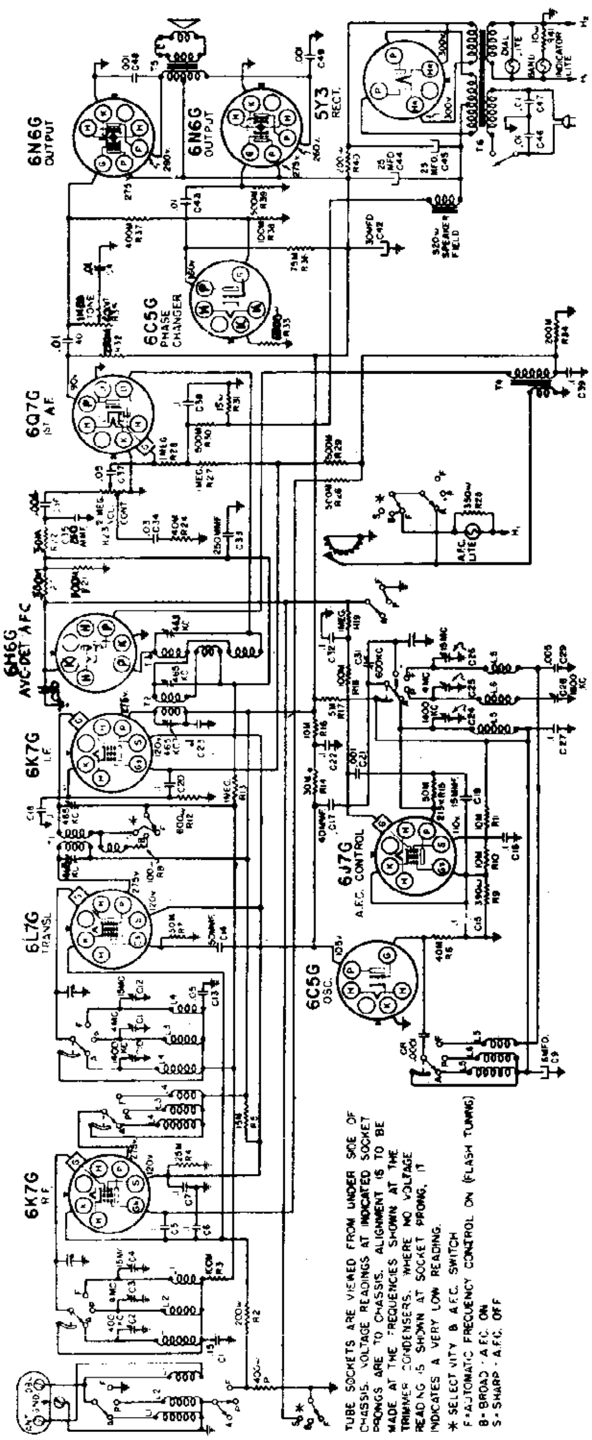
The voltage drop across the 500M ohm resistor, R21, is fed to the control grids of the 6K7G and 6L7G tubes to provide AVC. The drop across this resistor is also used in the discriminator circuit as described previously. The audio voltage across the resistor is coupled to the AF stages through the condenser, C31.

SEARS-ROEBUCK & CO.

57RL 22
Supplement No. 8
October 28, 1936



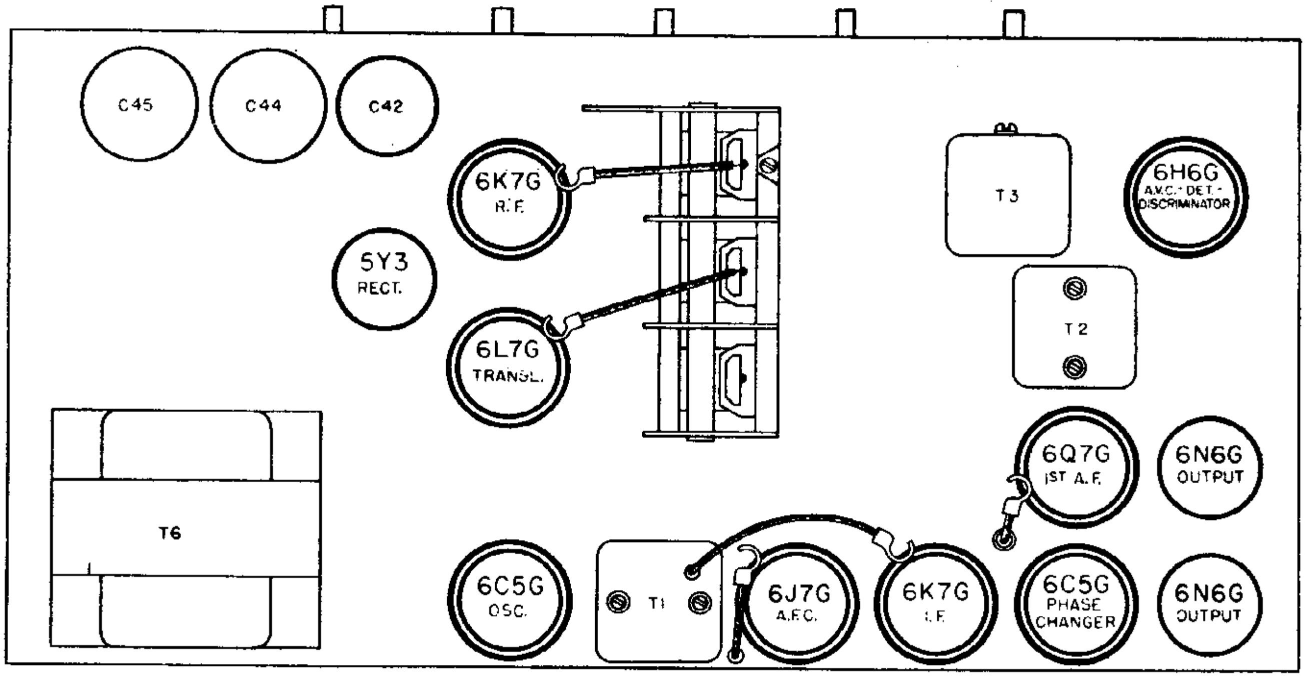
ONE A.F.C. POSITION



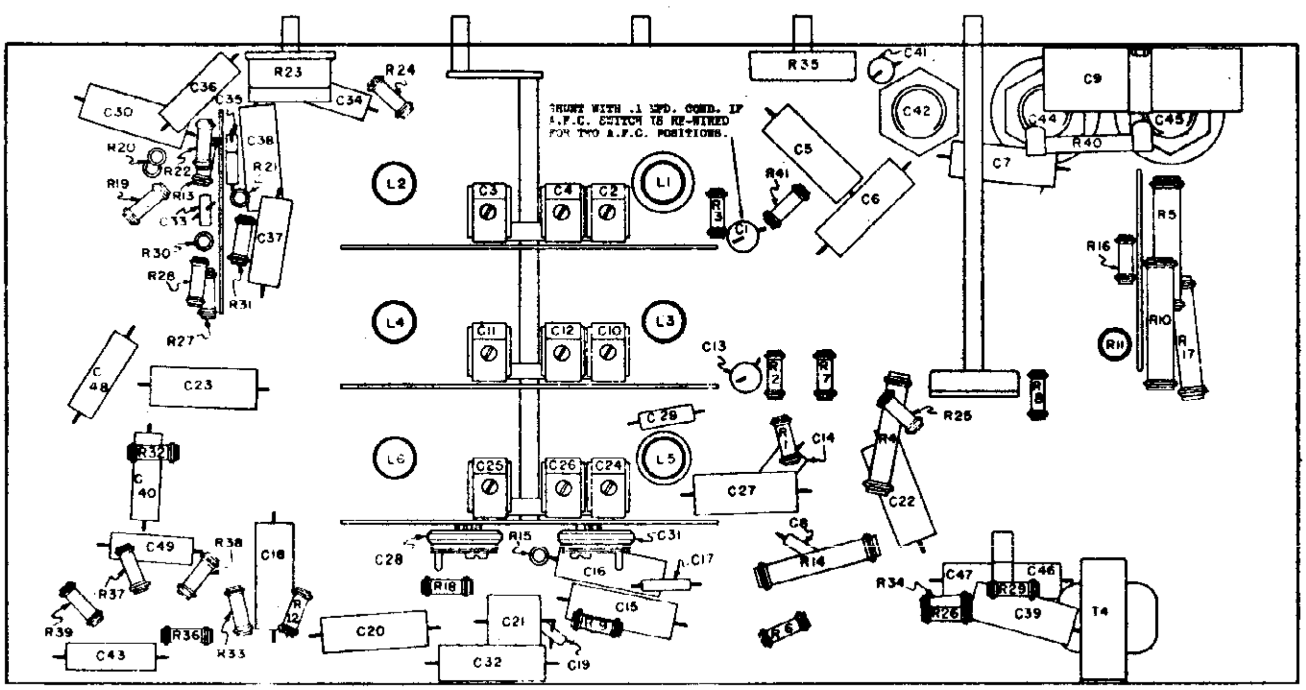
TWO A.F.C. POSITIONS

MODEL 4587A
Socket, Trimmers
Chassis

SEARS-ROEBUCK & CO.



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

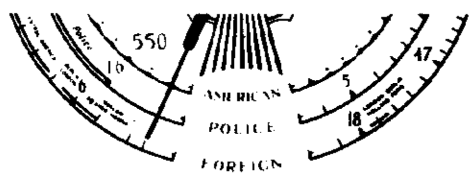
MODEL 4587A
Alignment, Sensitivity Notes

SEARS-ROEBUCK & CO.

REVISED ALIGNMENT PROCEDURE:

PRELIMINARY:

Output meter connections - Across speaker voice coil
Output meter reading to indicate .5 watts output - - - - - - - - - - - - - - - - 1.1 volts
Dummy antenna value to be in series with generator output - - - - - - - - - See chart below
Connection of generator output lead - - - - - - - - - - - - - - - - - - - See chart below
Generator modulation - 30%, 400 cycles
Approximate average sensitivity in microvolts for .5 watts output - - - - - See chart below
Position of Volume Control - Fully on
Position of Tone Control - Fully clockwise
Position of Flash Tuning and Selectivity Switch Knob - - - - Sharp, fully counter clockwise
Position of Dial Pointer when variable is fully meshed - - - - - - - - As illustrated below



WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	550 kc	465 kc	.1 mfd.	6L7G Grid	T2,T1	IF Output IF Input	-
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C24,C2, C10	Osc., Ant., Translator	20
"AM"	600 kc *	600 kc	.0002 mfd.	Ant. Term.	C31	Osc. Pad.	20
"POL"	4 mc	4 mc	400 ohms	Ant. Term.	C25,C5, C11	Osc., Ant., Translator	6
"POL"	1.8 mc *	1.8 mc	400 ohms	Ant. Term.	C28	Osc. Pad.	40
"FOR"	Var. Fully Open	18 mc	400 ohms	Ant. Term.	C26	Osc.	-
"FOR"	15 mc	15 mc	400 ohms	Ant. Term.	C4,C12	Ant.,Transl.	5
"FOR"	6 mc	6 mc	400 ohms	Ant. Term.	-	-	60

IMPORTANT ALIGNMENT NOTES

* Where indicated by (*) the variable should be rocked back and forth a degree or two while making the adjustment.

Repeat the entire alignment step by step in the original order for greater accuracy. Always keep the generator output power at its lowest possible value. This will prevent the AVC action of the receiver from interfering with accurate alignment.

The shield covering the coils at the bottom of the chassis should be left in place during the alignment. The trimmer condensers are accessible through the holes in the shield.

Only the dummy antenna indicated in the chart for any particular band should be used. Disconnect the dummy antenna used for alignment of any other band.

After the alignment has been completed, the A.F.C. adjustment should be made as follows:

A.F.C. ADJUSTMENT

CAUTION: The right hand knob must be in the "SHARP" position for operations 1 through 5. It is preferable to have two signal generators to make the adjustments. However, if two generators are not available, a broadcast station of approximately 1050 kc can be used for one of the generators. However, the station chosen must be of medium strength. That is, one just capable of giving satisfactory reception without back ground noise. Do not use a strong station. The Volume and Tone Controls must be turned all the way to the right. The generator ground connection is to be made to the chassis.

1. Set one signal generator (or the broadcast station) to 1050 kc and 5000 microvolts output. Connect its output to the "ANT" terminal of the set, through a .0002 mfd. condenser.

2. Tune the receiver for maximum output (at 1050 kc). Then switch the signal generator modulation switch to the "Off" position.

3. Short the movable arm to the toothed disc with a piece of wire. The Flash Tuning light should become illuminated.

4. Set the second signal generator to 465 kc and 10,000 microvolts output. Connect its output, in series with a .000015 mfd. condenser to the control grid of the 6L7G tube. Turn the modulation switch to the "Off" position.

5. Carefully turn the variable condenser until "zero beat" note is had (with right hand knob in "SHARP" position).

6. Turn the right hand knob to the "FLASH" position (fully clockwise). Then adjust the discriminator unit, T3, for "zero beat". The correct setting will be obtained at about the center of T3 trimmer range. The adjustment is a very sharp one.

7. Turn the right hand knob to the "SHARP" and then to the "BROAD" positions. The receiver still should give zero beat in the "SHARP" and "BROAD" positions if the A.F.C. is properly adjusted. If it does not, carefully repeat operation #6.

8. The A.F.C. can be checked for "pull in" in the following manner. Remove the signal generator connection from the 6L7G grid. (Two generators must be used.) Switch on the modulation of the 1050 kc generator and set the generator to give 5000 microvolts output. Reduce the Volume Control setting of the receiver to give 1.5 volts reading on the output meter. Increase the signal generator frequency until the output meter reads .5 volt. Note the frequency of the signal generator at this output meter reading. Then decrease the signal generator frequency from 1050 kc until the output meter again reads .5 volt and note the signal generator frequency. If the A.F.C. is operating properly, the signal generator can be shifted 15 to 20 kc either side of 1050 kc before the output meter reading is reduced from 1.5 volts to .5 volt.

INCREASED FREQUENCY RANGE:

It will be noticed that the frequency range of the Police band of the Model 101411A has been extended to approximately 5 megacycles and the frequency range of the Foreign band to approximately 18 megacycles.

CHANGE IN PROCEDURE FOR REMOVING DIAL GLASS FOR SETTING UP FLASH TUNING STATION CALL LETTERS

The Service Instructions for this model describe how to remove the dial glass by taking off the split retaining ring that holds it. In receivers using the 101411A chassis this procedure has been simplified by using an escutcheon with the dial glass moulded into it. It is held in place in the front of the cabinet by four screws. Accordingly, it is necessary merely to remove these four screws in order to take off the moulded escutcheon and dial glass.

CHANGE IN PHONOGRAPH PICK-UP JACK OPERATION:

The Service Instructions for this model state that if a phonograph pick-up jack is used the right hand knob must be in either the "B" or "SHARP" position. This is true only for those receivers that are wired to have the one A.F.C. position ("FLASH"). In later production receivers having the two A.F.C. positions ("B" and "FLASH") or in receivers that are changed to provide these two positions, the right hand knob must be in the "SHARP" position for phonograph operation. This must be done, of course, to remove the muting from the first audio tube, permitting phonograph reproduction.

MODELS 4587, 4587A
Changes

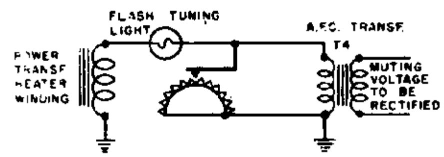
SEARS-ROEBUCK & CO.

SUBJECT: CIRCUIT CHANGE TO ELIMINATE ADJACENT CHANNEL INTERFERENCE IN MODELS 4587-4587A

ELIMINATION OF THE RELAY:

The 101411 chassis (Model 4587), described in Service Instructions 57RL 22 and in Supplement #1, uses a relay to accomplish the various switching required by the Automatic Frequency Control - Flash Tuning feature. In later production of this Model the circuit was changed, eliminating the relay. A transformer is used in place of the relay to accomplish the same results. Such chassis are identified by the number, 101411A (Model 4587A).

The simplified diagram below shows how the transformer is used to mute the receiver and to operate the Flash Tuning light.



The A.F.C. transformer is a step-up transformer. Its primary is connected, in series with the Flash Tuning light bulb, across the heater winding of the power transformer. The toothed disc and contacting arm is connected across the primary of the A.F.C. transformer, as shown. The operation then is as follows: When the contacting arm is not engaging a bent-up tooth on the disc, the power transformer heater voltage is impressed, in series with the Flash Tuning light bulb, upon the primary of the A.F.C. transformer. Although current flows through the primary, its impedence is too high to pass sufficient current to light the Flash Tuning light bulb. The voltage impressed on the A.F.C. transformer primary is stepped up in the secondary and rectified by one of the diode plates of the 6H6G tube. This diode voltage (approximately 60 volts) is applied to the suppressors of the RF and IF tubes and to the control grid of the first AF tube, to provide muting. These are the conditions that exist when the right hand knob is turned to a Flash position and the receiver is tuned between Flash stations.

When the receiver is tuned to a Flash station, the contacting arm touches the tooth bent up for the station. This short circuits the primary of the A.F.C. transformer. With the impedance of this primary removed from the circuit the full voltage of the heater winding is impressed across the Flash Tuning light bulb causing it to light. Since the A.F.C. primary is short circuited, no voltage is developed across its secondary, thereby removing the muting bias. The receiver then is in operating condition and receives the station selected for Flash Tuning.

In the original sets using a relay, one set of contacts on the relay was used to prevent the A.F.C. from operating until the bent up tooth contacted the movable arm. This was necessary to prevent a strong station from being "pulled over" from an adjacent channel as the receiver was tuned through it, since the receiver was alive up to the audio stage. When the A.F.C. transformer is used in place of the relay, this "pull over" cannot occur because the receiver is made inoperative right at its input by muting of the RF tube.

IMPORTANT NOTE IN SETTING UP A.F.C. STATIONS:

IT IS VERY IMPORTANT THAT THE RECEIVER BE TURNED ON FOR TWENTY MINUTES BEFORE SETTING UP A.F.C. STATIONS ON THE TOOTHED DISC. IF STATIONS ARE SET UP WITH THE RECEIVER "COLD", FREQUENCY DRIFT MAY CHANGE THE ACCURACY AND RELIABILITY OF THE SETTING WHEN THE RECEIVER WARMS UP.

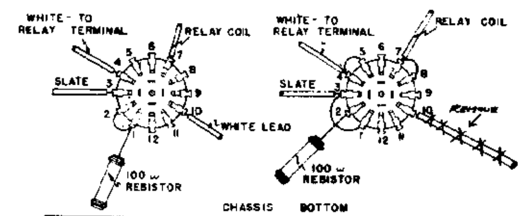
CHANGE IN CONNECTIONS AND OPERATION OF THE FLASH TUNING - SELECTIVITY SWITCH (RIGHT HAND KNOB):

The right hand knob has three positions marked, "SHARP"; "B" (BROAD); "FLASH". In all of the sets using a relay and in the first production of those using a transformer the receiver operated in the conventional manner in the "SHARP" and "B" positions. In the "FLASH" position, the A.F.C. and Flash Tuning circuits were connected. In later production sets using the transformer, the operation and connections of the A.F.C. - Selectivity Switch have been changed so that the radio operates in the conventional manner only in the "SHARP" position. In the "B" position, the A.F.C. is connected and Selectivity is broad. In the "FLASH" position, the A.F.C. also is connected and Selectivity is sharp. In other words, in latest production there are two A.F.C. positions with a choice of broad or sharp selectivity. There is one non-A.F.C. position with sharp selectivity.

With the original connection of the A.F.C. switch, providing only broad selectivity in the "FLASH" position, difficulty may be encountered in some locations due to adjacent channel interference or heterodyne whistles. If such difficulty is encountered in sets having the original connection, the circuit may be changed to provide the two selectivity positions for A.F.C. - Flash Tuning. Fig. 1 shows the switch connection changes for sets using the relay. Fig. 2 shows the switch connection changes for sets having an A.F.C. transformer. Note that in relay sets the original lug #10 connection is removed entirely from the switch. In transformer sets the original #11 connection is removed entirely. In addition, in relay sets (101411), a .1 mfd. condenser must be shunted across the .05 mfd. condenser, C4. In transformer sets (101411A), the .05 mfd. condenser that must be shunted is C1. See the Locations of Parts diagram. In later production of Model 101411A, embodying the two A.F.C. - Selectivity positions, a .15 mfd. condenser is used for C4.

FLASH TUNING SWITCH
VIEWED FROM REAR

ORIGINAL CHANGED

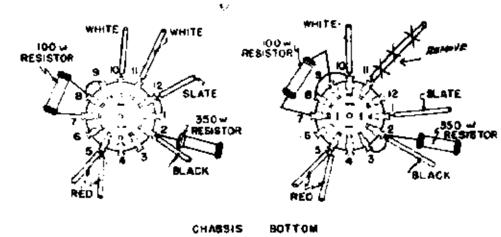


FLASH TUNING - SELECTIVITY SWITCH CIRCUIT CHANGE. SETS WITH RELAY.

FIG. 1

FLASH TUNING SWITCH
VIEWED FROM REAR

ORIGINAL CHANGED



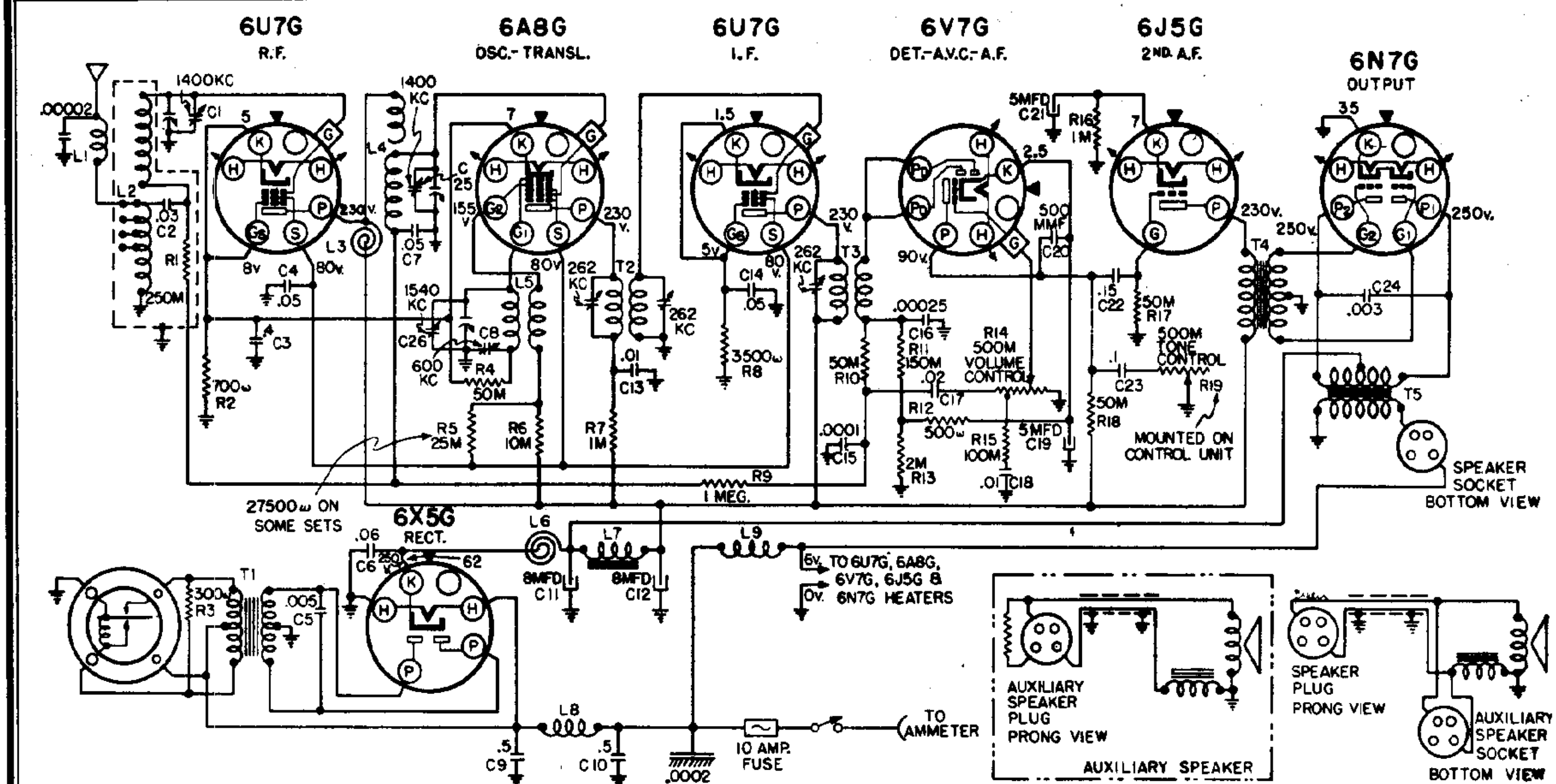
FLASH TUNING - SELECTIVITY SWITCH CIRCUIT CHANGE. SETS WITH TRANSFORMER.

FIG. 2

IMPORTANT NOTE ABOUT SETTING UP A.F.C. STATIONS ON ADJACENT CHANNELS:

In paragraph #10 under, "SETTING UP THE AUTOMATIC FREQUENCY CONTROL", in the Service Instructions, the suggestion is made that if adjacent channel stations are selected the two teeth further apart be used instead of the correct ones for the stations. For example, suppose a 700 kc and a 710 kc station is to be selected. Instead of bending up the teeth corresponding to 700 kc and 710 kc, the teeth corresponding to approximately 697 kc and 713 kc would be bent up instead. The purpose of this is to prevent the receiver from jumping from one station to the other as their signal strengths vary. This suggestion will be helpful only if the station is sufficiently strong. Otherwise the mistuning will affect the tone quality. It is best to select, for A.F.C. tuning, stations at least 20 kc apart in frequency.

SEARS-ROEBUCK & CO.



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.
FIGURES AT CATHODES INDICATE CATHODE CURRENT IN MILLIAMPERES.

"A" Drain . . . . 8.35 amperes
"B" Drain . . . . 55 ma

POWER SUPPLY:
"A" . . . 6 volt, Automobile storage battery.
"B" . . . Vibrator-Rectifier

FREQUENCY RANGE:
Broadcast . . . . 540-1540 kc

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Ant.-Translator Trimmer	Padder
1540 kc	1400 kc	600 kc

INTERMEDIATE FREQUENCY . . . . 262 kc

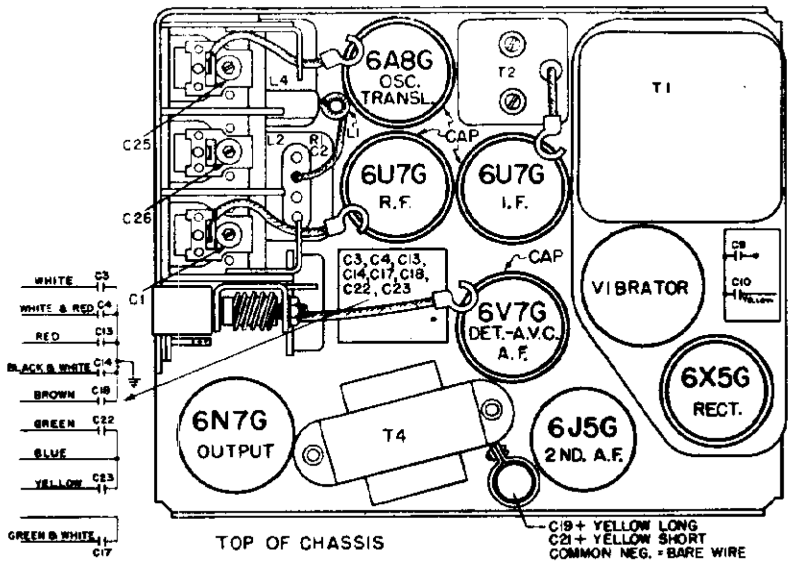
57RL41
March 4, 1937

POWER OUTPUT:
Type . . . . Class "B"
Undistorted . . . . 8 watts
Maximum . . . . 11 watts

LOUD SPEAKER:
Type . . . . Dynamic
Size . . . . 8"
Approximate field resistance. . 4 ohms

MODEL 4601
Socket, Trimmers
Alignment, Sensitivity

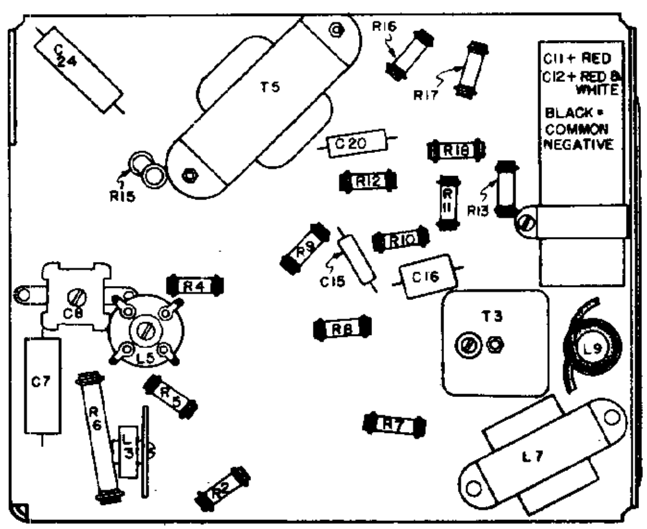
SEARS-ROEBUCK & CO.



TOP OF CHASSIS

LOCATIONS OF PARTS

UNDER CHASSIS



ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections . . . . Across loud speaker voice coil
Output meter reading to indicate 1 watt . . . . 1.05 volts
Average sensitivity in microvolts for 1 watt output . . . . See chart below
Generator ground lead connection . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . See chart below
Connection of generator output lead . . . . See chart below
Generator modulation . . . . 30%, 400 cycles
Position of Volume Control . . . . Fully on
Position of Tone Control . . . . Fully clockwise (treble)
Position of Antenna Tap . . . . #2 hole
The Chassis must be in its case although the covers may be removed during the alignment procedure.

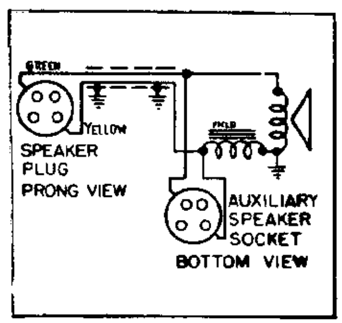
POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	262 kc	.1 mfd.	6A8G Grid	T5,T2	IF	600
Fully Open	1540 kc	.0002 mfd.	Antenna Conn.	C36	Osc. Trim.	1
1400 kc	1400 kc	.0002 mfd.	Antenna Conn.	C1,C35	Ant. Transl.	1
600 kc (rock)	600 kc	.0002 mfd.	Antenna Conn.	C8	Padder	2

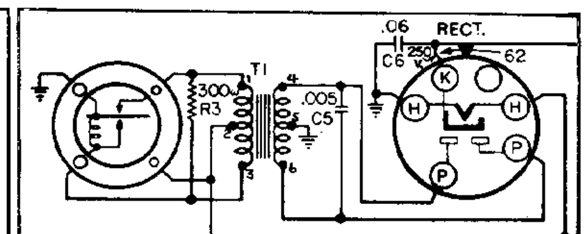
IMPORTANT ALIGNMENT NOTES

The variable should be rocked back and forth a degree or two while making the 600 kc adjustment.

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.





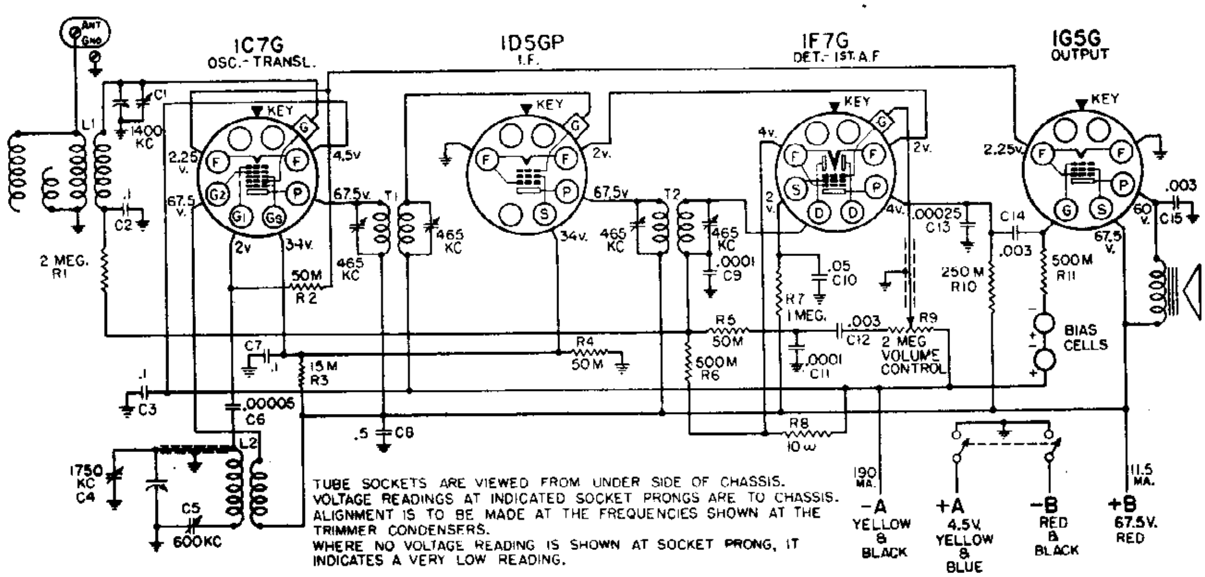
POWER TRANSFORMER COLOR CODE

1,2,3-Solid Conductor   5-Slate
4-Red   6-Blue

Trimmers, Chassis, Alignment
Sensitivity, Notes

SEARS-ROEBUCK & CO.

MODELS 4602-3, 4620-1, 4630-1
4720, 4730
Schematic, Voltage, Socket



JUNE 3, 1937

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections . . . . 4000 ohm Weston meter, across speaker terminals
Output meter reading to indicate 50 milliwatts . . . . 9.4 volts
Average sensitivity in microvolts for 50 milliwatts output . . . . See chart below
Generator ground lead connection . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . See chart below
Connection of generator output lead . . . . See chart below
Generator modulation . . . . 30%, 400 cycles
Position of Volume Control . . . . Fully on

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	465 kc	.1 mfd.	1C7G Transl. Grid	T2, T1	IF	325
1400 kc *	1400 kc	.0002 mfd.	Antenna Term.	C1, C4	Translator Oscillator	85
600 kc (rock)	600 kc	.0002 mfd.	Antenna Term.	C5	Padder	60

IMPORTANT ALIGNMENT NOTES

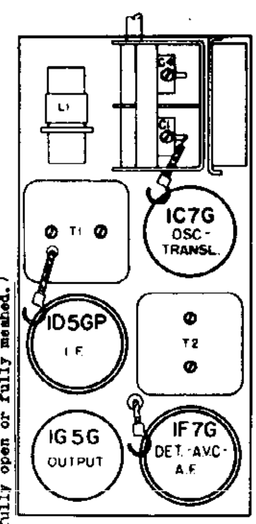
* Using the dial as a template make a dummy dial of cardboard with only the 1400 kc calibration on it. Slip this dummy dial over the shaft, hold it horizontal so that the 1400 mark will come at the same position as the 1400 mark of the actual dial and turn the dial pointer to the 1400 kc mark. (The dial pointer should be horizontal when the condenser is fully open or fully meshed.)

INTERMEDIATE FREQUENCY . . . . . . 465 kc

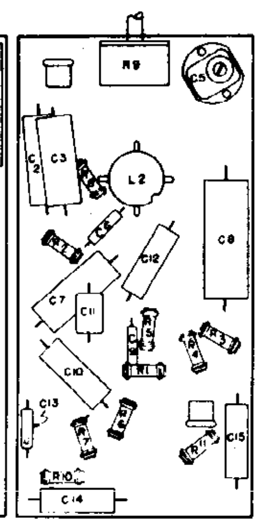
POWER OUTPUT:
Type . . . . Single Pentode
Undistorted . . . . 0.125 watts
Maximum . . . . 0.2 watts

POWER SUPPLY:
"A" Battery (4½ volt dry). . 1 - #6030
"A" Battery (4 volt storage) 1 - #5049
"B" Battery (67½ volts). . . 1 - #6040
"A" Drain . . . . 0.18 amperes
"B" Drain . . . . 15 ma

LOUD SPEAKER:
Type . . . . Magnetic
Size . . . . 6 inch
DC resistance . . . . . App. 1500 ohms



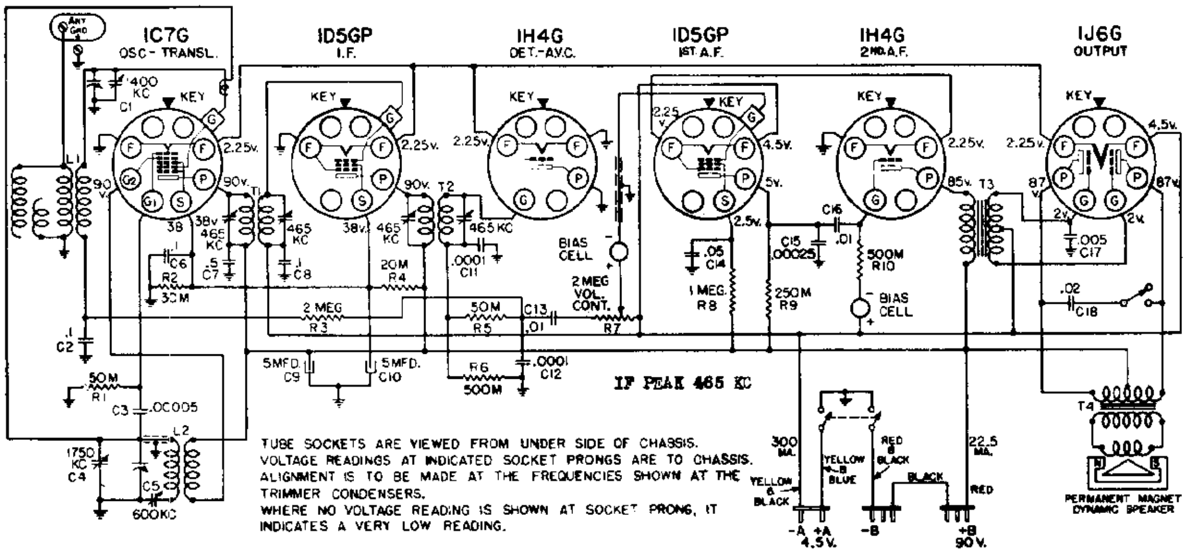
LOCATIONS OF PARTS ON TOP OF CHASSIS.



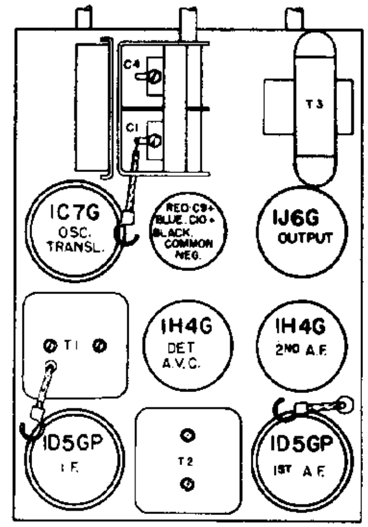
LOCATIONS OF PARTS UNDER CHASSIS.

MODELS 4604-5, 4624-5, 4634-5
4724
Schematic, Voltage, Socket
Trimmers, Chassis, Alignment

SEARS-ROEBUCK & CO.

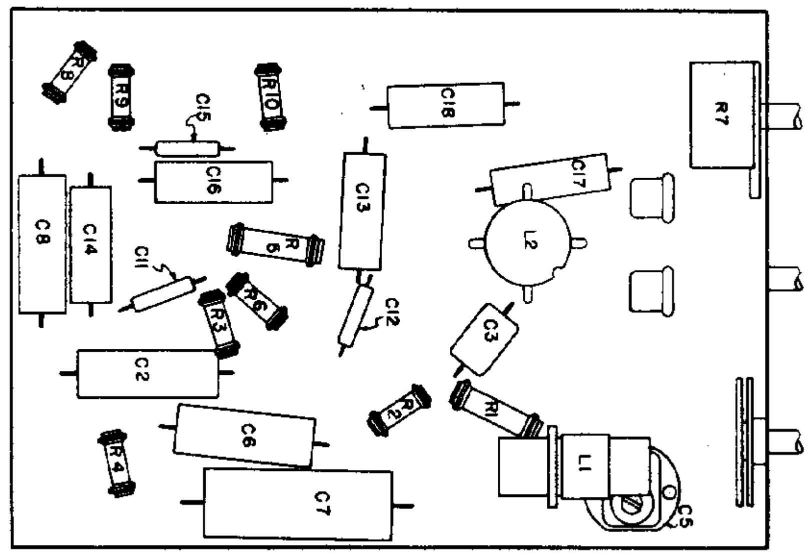


TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.



LOCATIONS OF PARTS ON TOP OF CHASSIS.

JUNE 4, 1937



LOCATIONS OF PARTS UNDER CHASSIS.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . Across loud speaker voice coil
Output meter reading to indicate 50 milliwatts . . . . 0.37 volts
Generator ground lead connection . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . . . See chart below
Connection of generator output lead . . . . See chart below
Generator modulation . . . . 30%, 400 cycles
Approximate average sensitivity in microvolts for 50 milliwatts output . . . See chart below
Position of Volume Control . . . . Fully clockwise
Position of Tone Control . . . . Fully clockwise

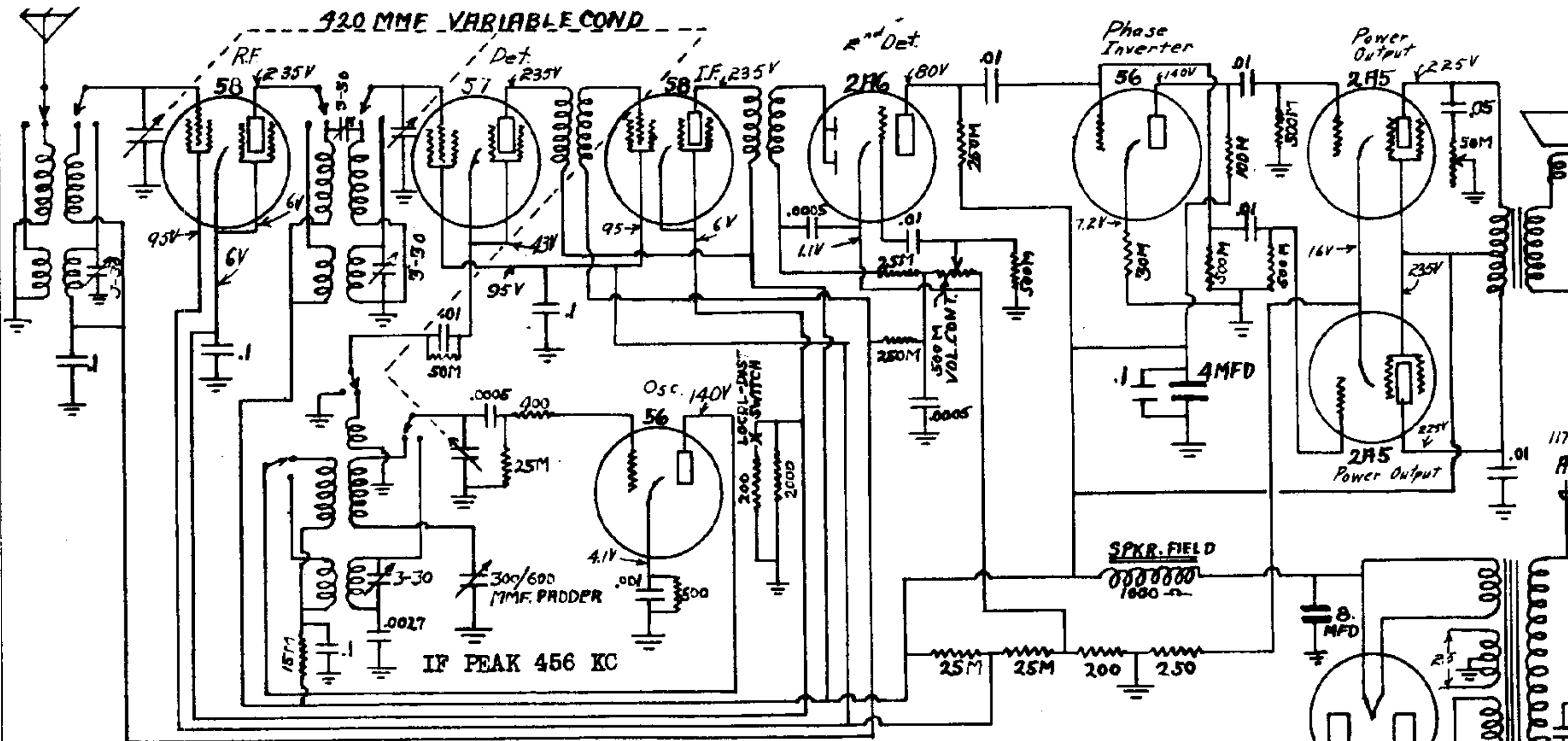
POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	465 kc	.1 mfd.	1C7G Transl. Grid	T3, T1	IF	160
1400 kc *	1400 kc	.0002 mfd.	Antenna Term.	C4, C1	Oscillator Translator	50
600 kc (rock)	600 kc	.0002 mfd.	Antenna Term.	C5	Padder	35

IMPORTANT ALIGNMENT NOTES

* Using the dial as a template make a dummy dial of cardboard with only the 1400 kc calibration on it. Slip this dummy dial over the shaft, hold it horizontal so that the 1400 mark will come at the same position as the 1400 mark of the actual dial and turn the dial pointer to the 1400 kc mark. (The dial pointer should be horizontal when the condenser is fully open or fully meshed.)

MODEL 7143
Schematic, Voltage
Socket, Trimmers,
Alignment

SEARS-ROEBUCK & CO.



To align or rebalance set, proceed as follows;

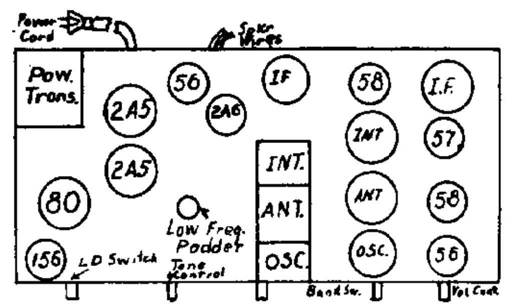
1 - Remove 56 oscillator tube and peak I.F. transformers at 456 KC, which note may be applied at the 57 control grid.

2 - Replace 56 tube, and with variable condenser all the way open, adjust the oscillator trimmer to 1712 KC, then balance inter-stage and antenna trimmers to maximum output.

3 - Apply a 600 KC signal at the antenna and rock variable condenser back and forth across signal, adjusting low frequency padder to maximum output.

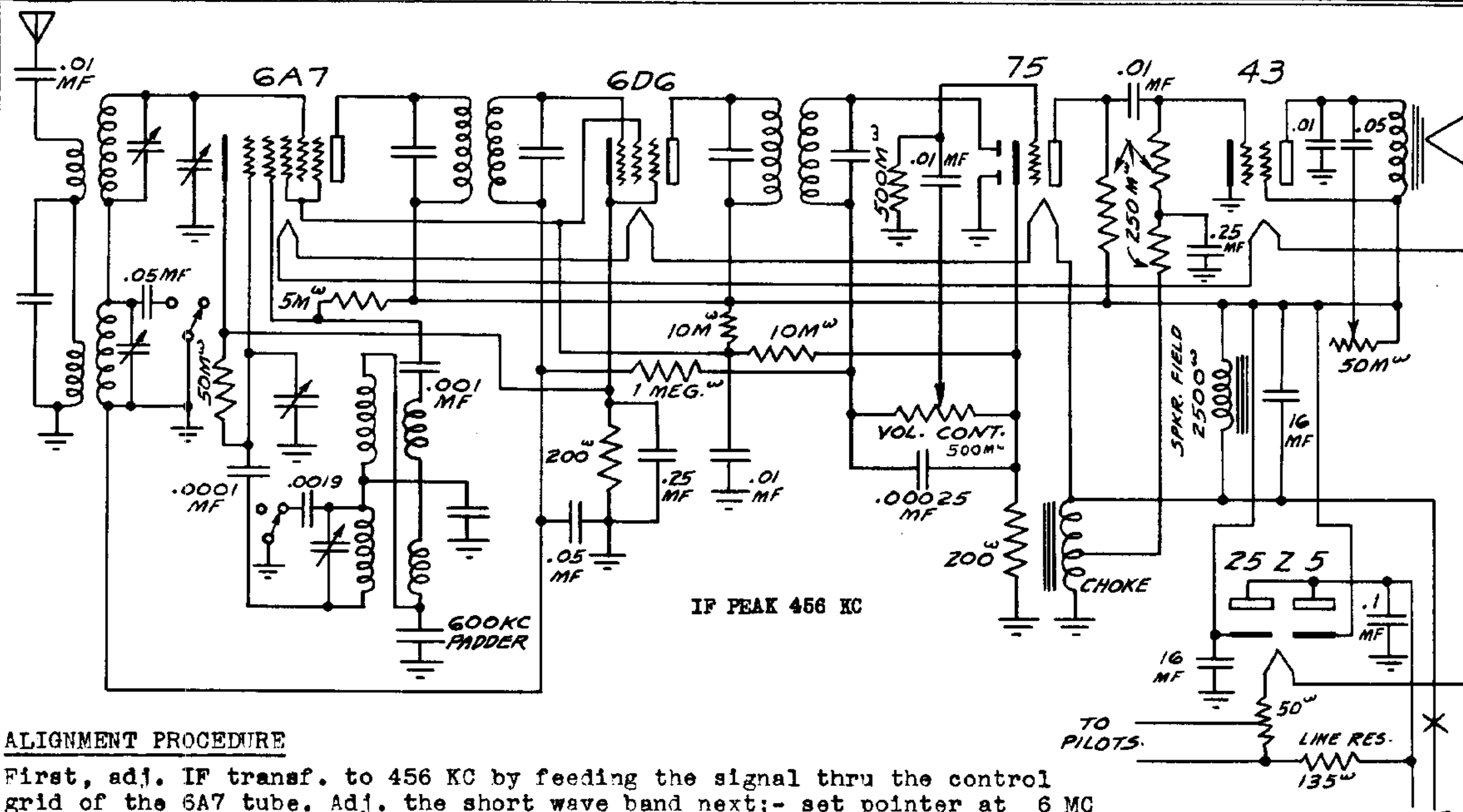
4 - Go back and recheck at 1712 KC.

5 - Change band switch to short wave and tune gang condenser to 31 meters and adjust antenna and RF trimmer condensers found underneath chassis to maximum noise level. Check oscillator short wave trimmer with gang condenser tuned at different frequencies.



MODEL 7172X
Schematic
Alignment

SEARS-ROEBUCK & CO.



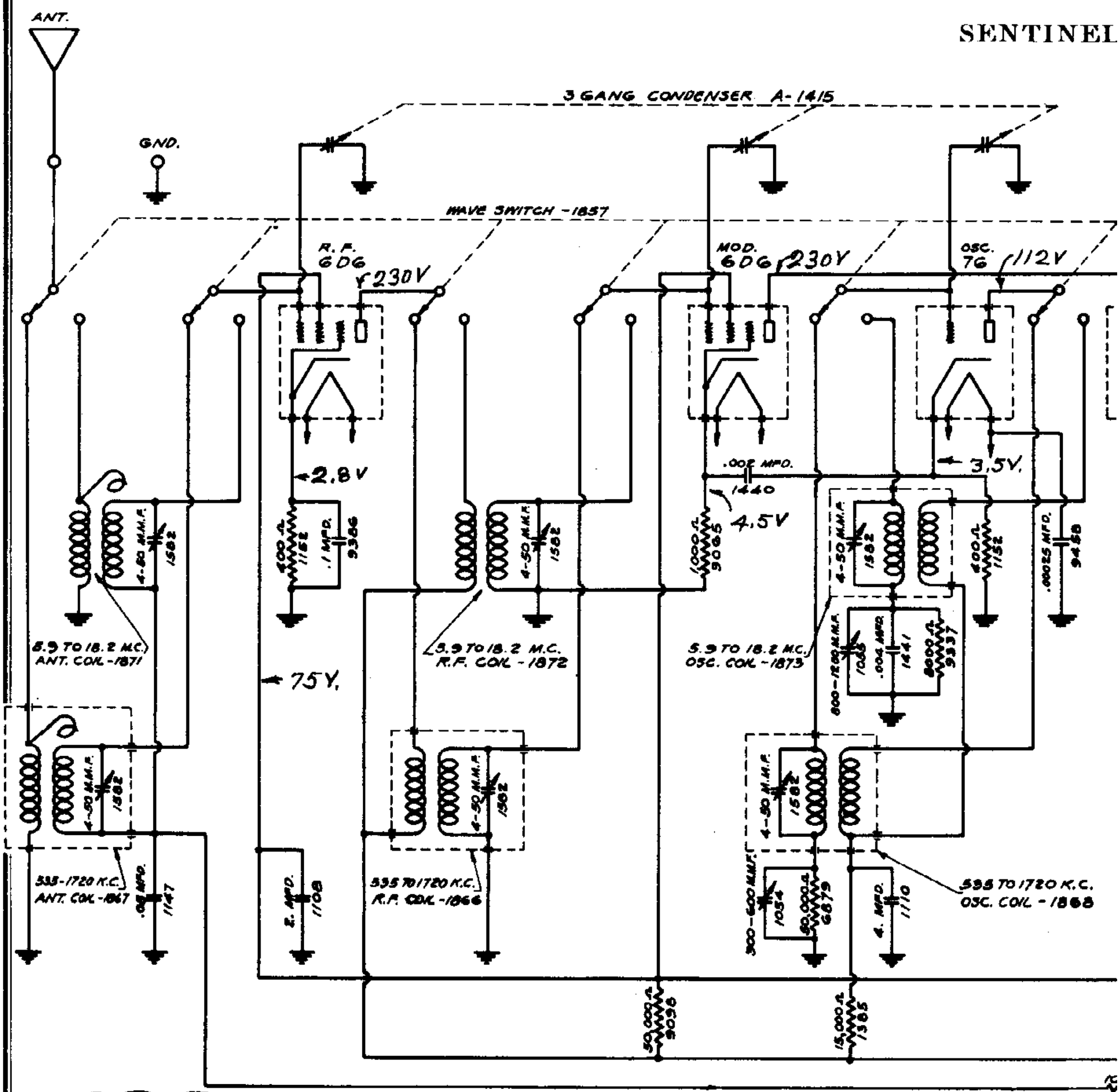
ALIGNMENT PROCEDURE

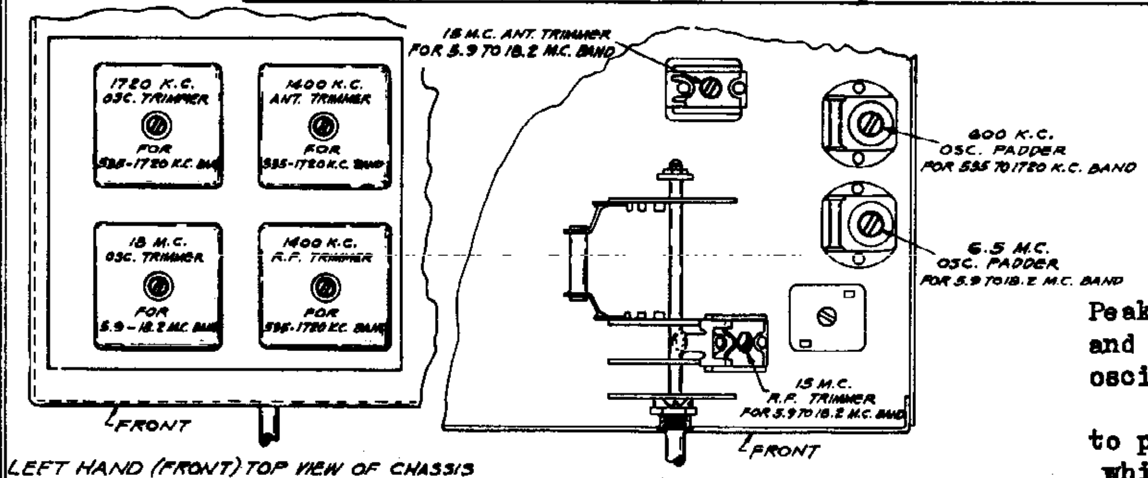
First, adj. IF transf. to 456 KC by feeding the signal thru the control grid of the 6A7 tube. Adj. the short wave band next;- set pointer at 6 MC & adj. osc. trimmer, located under chassis near filter conds. carefully to the fundamental rather than image(fund. is second peak as you adj. from max. cap.); then adj. the short wave ant. trimmer, located on top of chassis near var. cond., for max. signal; next dial across short wave band checking it at 2.5 and 4 MC to see that it does not stop oscillating. If this should occur, try changing 6A7 tubes to find one that will oscillate at 2.2 MC. If you experience any difficulty in finding a satisfactory tube, it may be necessary to use separate bias on 6A7(200 ohm res. and .1/4 mfd cond.) in order to use the tubes available.

Now, set band switch to broadcast position and adj. padder at about 600 Kc for max. gain, rocking the var. cond. with each adj. of the padder - then with gang all the way open, adj. B.C. osc. trimmer located under chassis near outer edge, to 1717 KC and set B.C. ant. trimmer located on top of chassis near outer edge, for maximum gain.

This set is designed to operate on 105-125 volts AC-DC

DO NOT CONNECT A GROUND TO THIS SET.





LEFT HAND (FRONT) TOP VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS

RIGHT HAND (FRONT) BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS & PADDERS

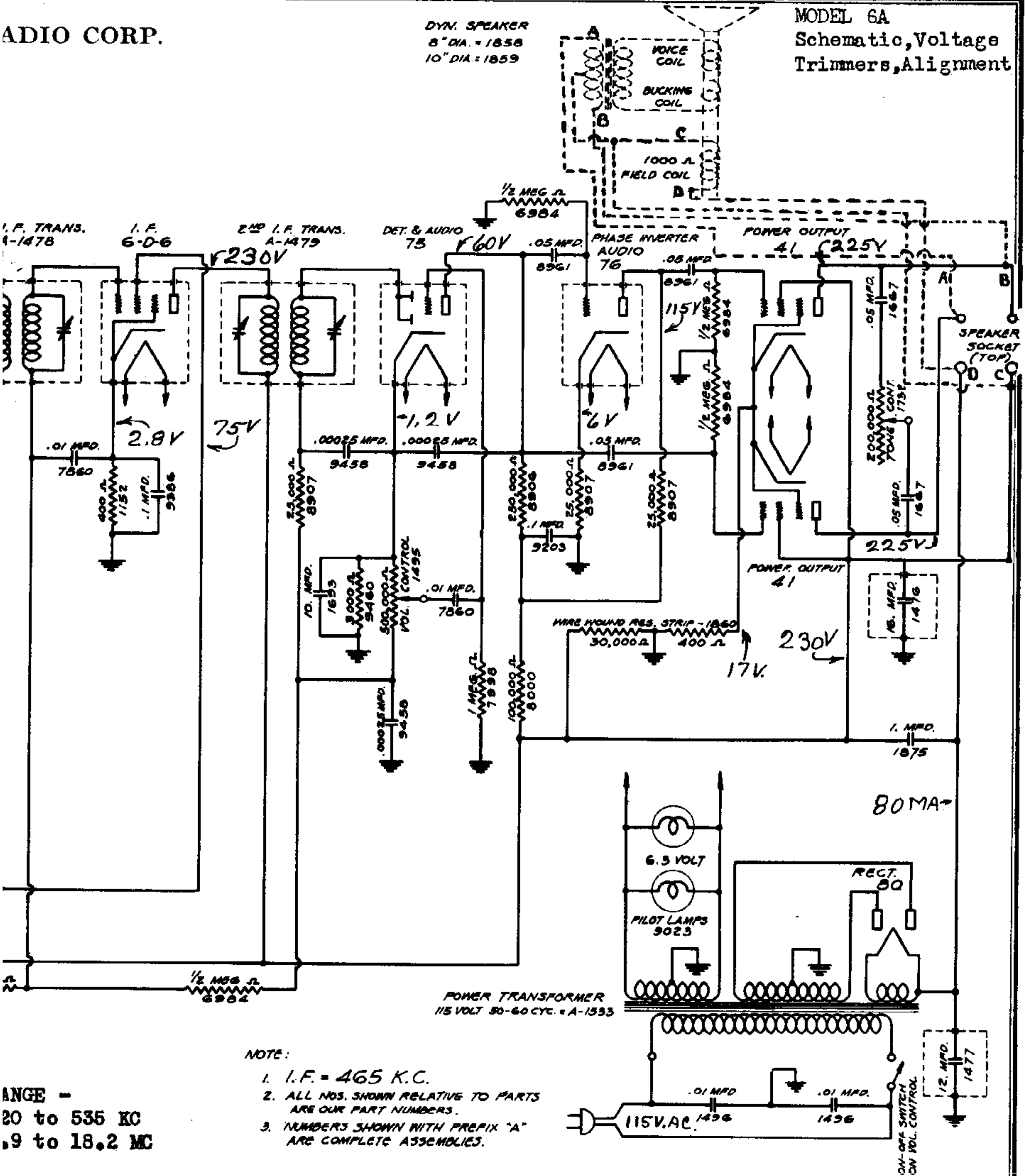
FREQUENC

CONVENTIONAL
Peak I-F trimmers
and generator to
oscillator circui

to peak. Dial and
while rocking th
FOREIGN band osci

ADIO CORP.

MODEL 6A
Schematic, Voltage
Trimmers, Alignment

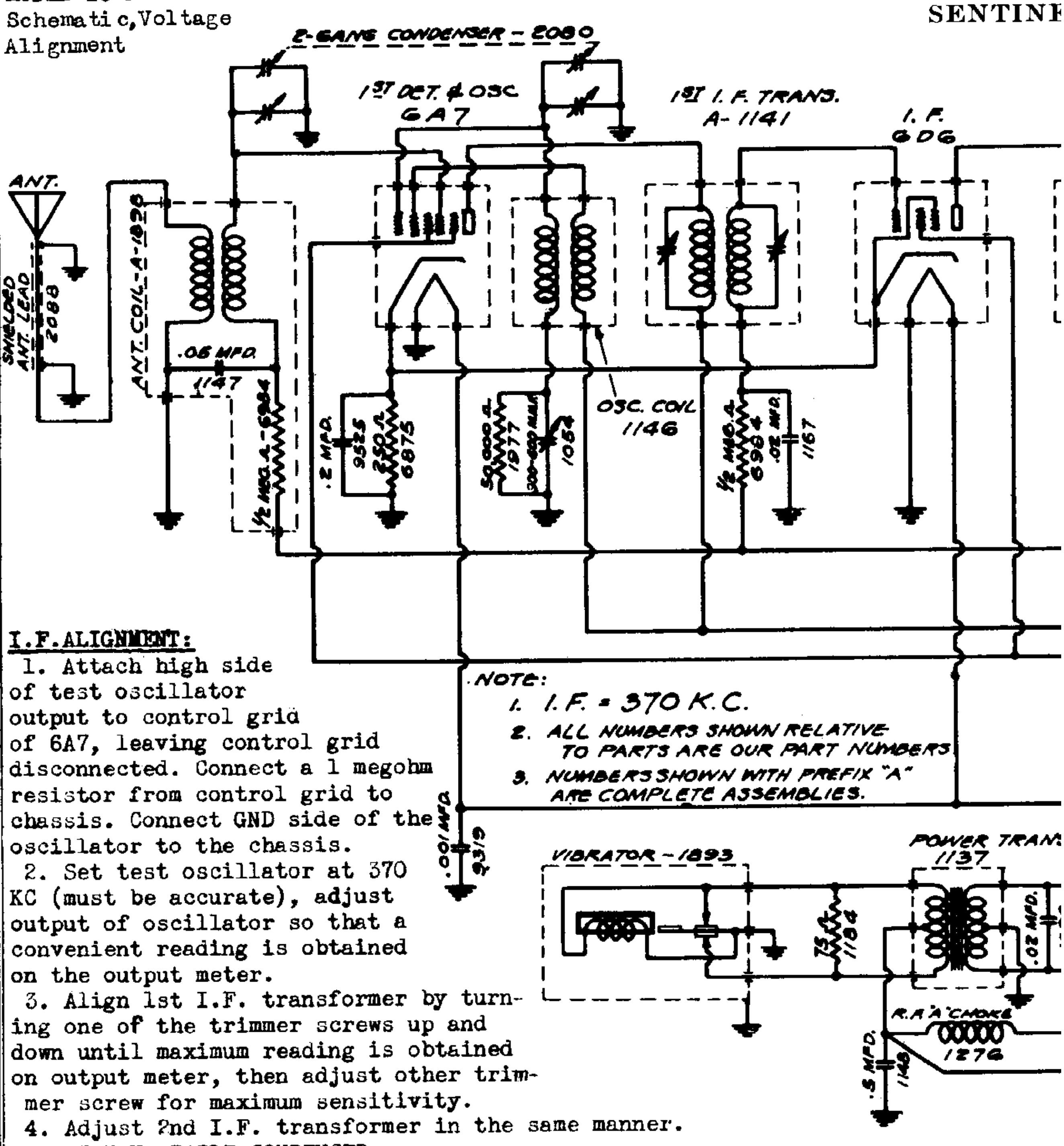


NOTE:
1. I.F. = 465 K.C.
2. ALL NOS. SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.

ANGE -
20 to 535 KC
.9 to 18.2 MC

IGNMENT - SEE SPECIAL SECTION.
465 KC. BROADCAST - Dial and trimmer to 1720 KC, peak oscillator trimmer. Dial
) KC, peak antenna and R-F trimmers. Dial and generator at 600 KC, pad the
or maximum peak, while rocking the variable gang condenser.
FOREIGN - Dial and generator at 18 MC, adjust the oscillator trimmer
nerator to 15 MC, adjust the R-F and antenna trimmers to maximum sensitivity
riable condenser across the signal. Dial and generator at 6.5 MC, pad the
tor circuit to maximum peak while rocking the variable condenser

MODEL 10MF
Schematic,Voltage
Alignment



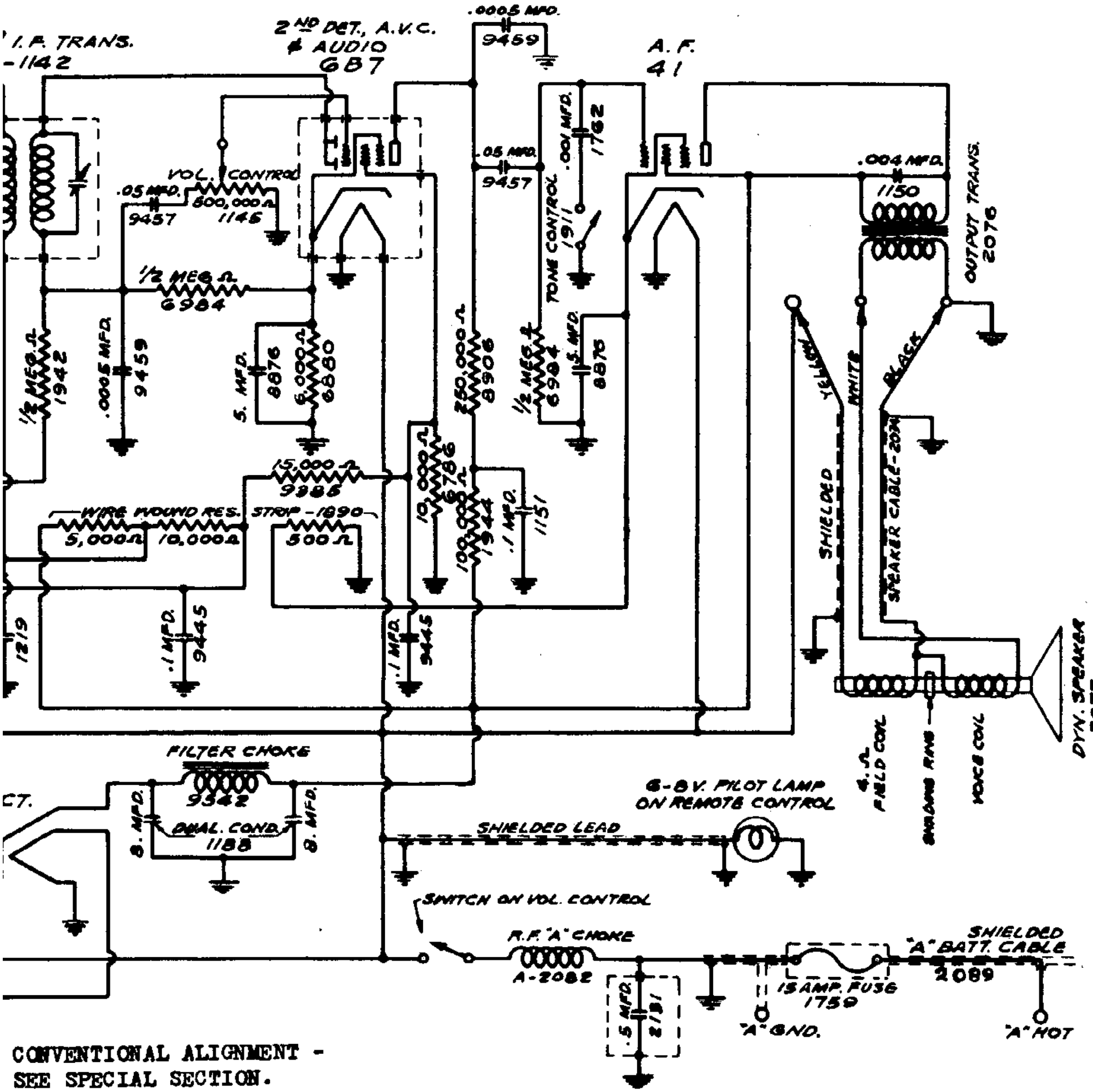
I.F.ALIGNMENT:

1. Attach high side of test oscillator output to control grid of 6A7, leaving control grid disconnected. Connect a 1 megohm resistor from control grid to chassis. Connect GND side of the oscillator to the chassis.
2. Set test oscillator at 370 KC (must be accurate), adjust output of oscillator so that a convenient reading is obtained on the output meter.
3. Align 1st I.F. transformer by turning one of the trimmer screws up and down until maximum reading is obtained on output meter, then adjust other trimmer screw for maximum sensitivity.
4. Adjust 2nd I.F. transformer in the same manner.

TO ALIGN VARIABLE CONDENSER:

It is necessary to remove receiver chassis from set housing to align variable gang and padding condensers.

1. Properly connect the remote control head,shafts,and adjust the dial needle on the dial face from the back so that the dial calibration is correct.
2. Connect the high output side of test oscillator to ANT. and GND. to chassis.
3. Tune the receiver dial and set the test oscillator frequency to 1400 KC. Bring the 1400 KC signal to maximum output by adjusting trimmer located on top of oscillator section (front section) of gang condenser. Next adjust the antenn section (rear section) for maximum 1400 KC signal sensitivity.
4. Tune receiver dial and set test oscillator to approximately 600 KC and whil rocking gang condenser adjust the 600 KC padding condenser, which is located an accessible thru the hole in the left hand side of chassis, for maximum output.



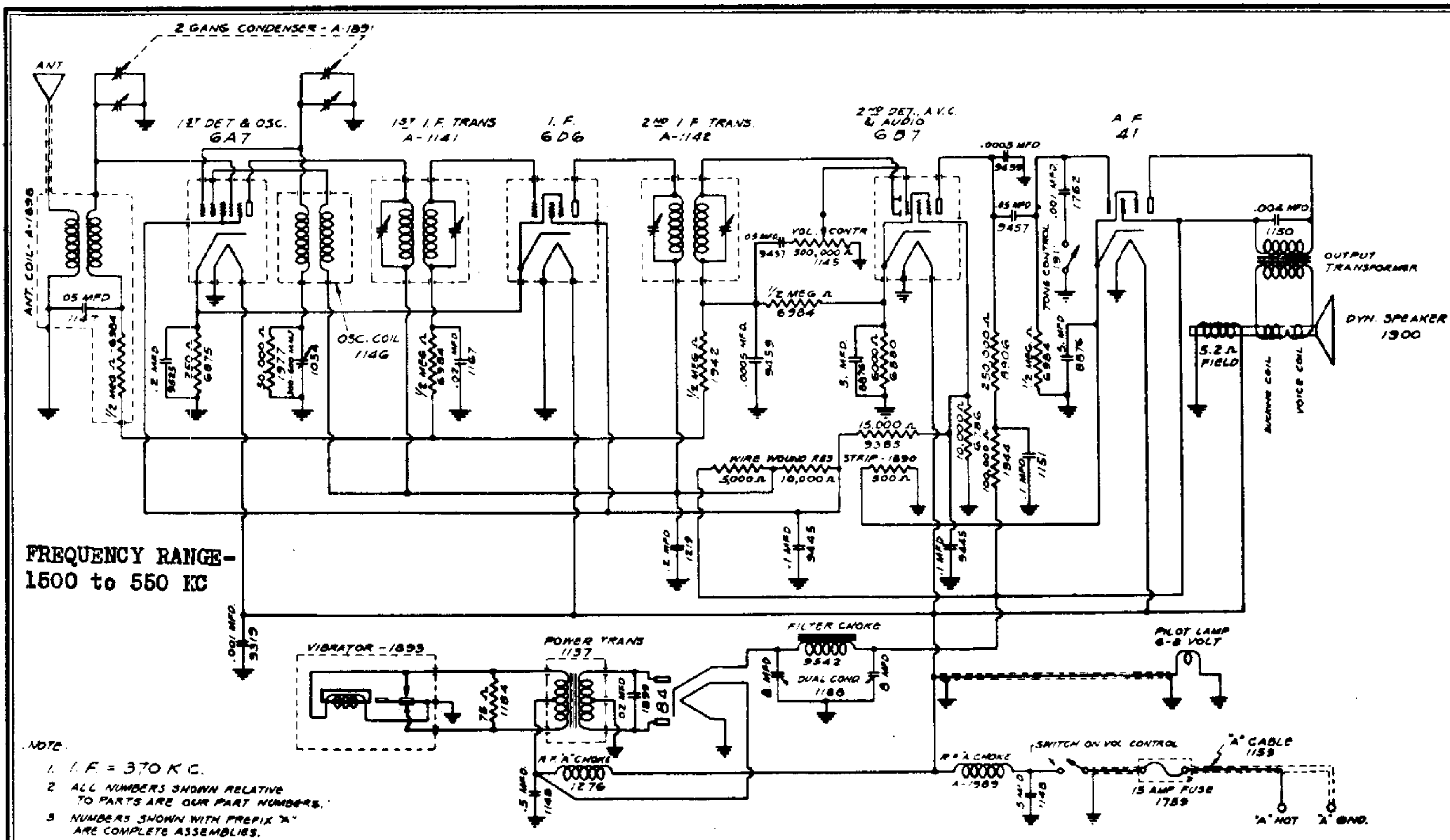
CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION.

VOLTAGE TABLE

YPE TUBE	POSITION OF TUBE	FILAMENT VOLTS	PLATE VOLTS	CATHODE VOLTS	SCREEN VOLTS	GRID NO. 1	GRID NO. 3 & 5
7	OSCILLATOR AND MODULATOR	6	180	3.6		180	75
6	INTERMEDIATE FREQUENCY	6	180	3.6	75		
7	2ND DETECTOR DIODE & AVC	6	32*	1.9	30*		
1	OUTPUT	6	220	15	230		
4	RECTIFIER	6		230			

*COMPARATIVE VOLTAGE ONLY. READ ALL VOLTAGES FROM SOCKET TO CHASSIS. TOTAL "A" CURRENT 5.9 AMPERES.

SENTINEL RADIO CORP.



FREQUENCY RANGE-
1500 to 550 KC

NOTE.
1. I.F. = 370 K.C.
2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.

CONVENTIONAL ALIGNMENT
(see special section)
ALSO, the alignment frequencies and procedure is the same as for MODEL 10 MF.
(See The Index.)

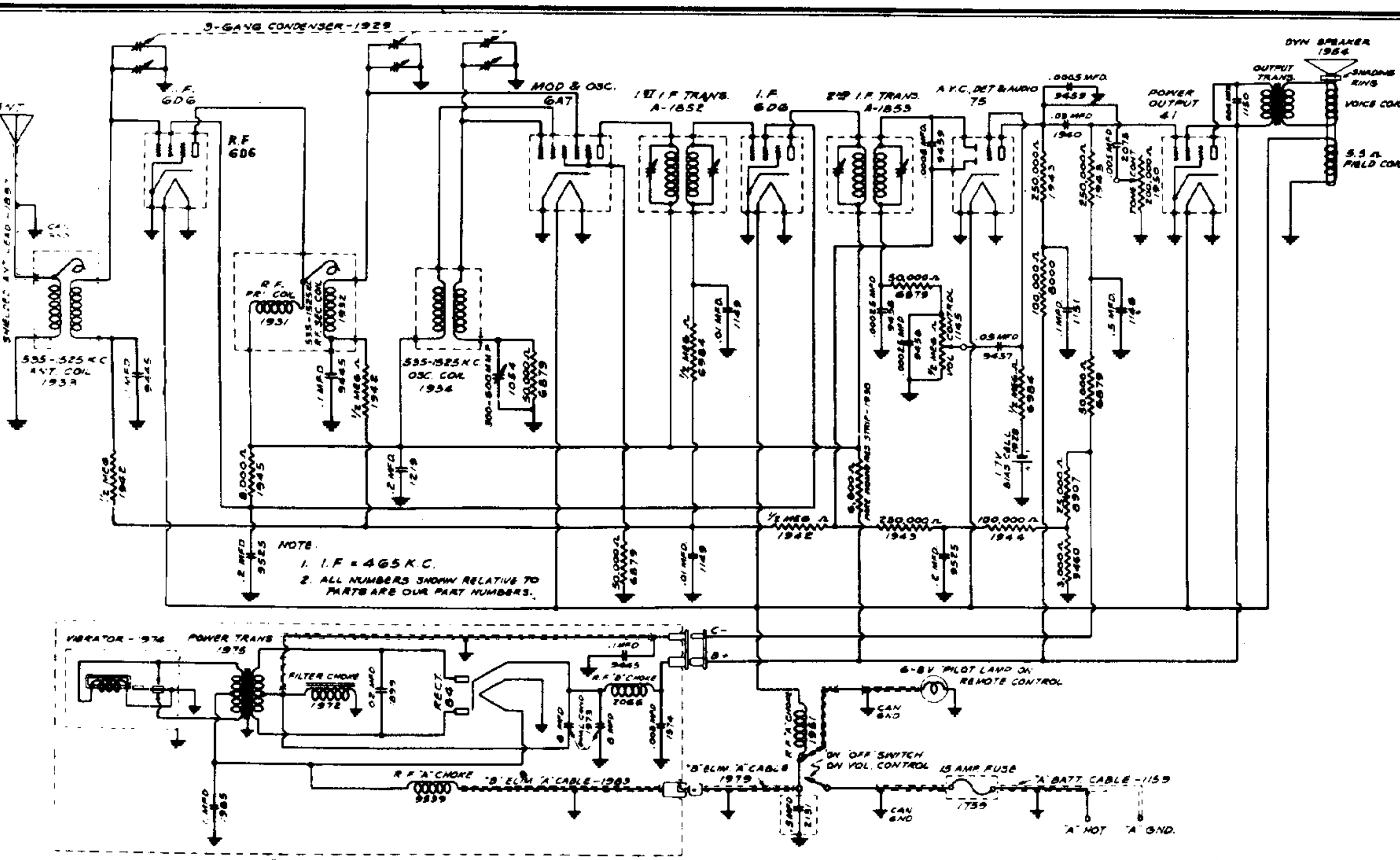
TUBE TYPE	TUBE POSITION	FILAMENT VOLTS	PLATE VOLTS	CATHODE VOLTS	SCREEN VOLTS	GRID No.1	GRIDS No. 3&5
6A7	OSC. & MOD.	6	180	3.6	-	180	75
6D6	I-F	6	180	3.6	75	-	-
6B7	2nd Det & AVC	6	32 *	1.9	30*	-	-
41	OUTPUT	6	220	15	230	-	-
84	RECTIFIER	6	-	230	-	-	-

* Comparative voltage only.

TOTAL "A" VOLTAGE   TOTAL "A" CURRENT 5.9 AMP

MODEL 11M
Schematic, Voltage
Alignment

SENTINEL RADIO CORP.



NOTE.
1. I.F. = 465 K.C.
2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.

TUBE TYPE	POSITION	FIL. VOLTS	PLATE VOLTS	SCREEN VOLTS	GRID NO.1	GRIDS NOS. 3 & 5
6D6	RF	6	125	100	2	100
6A7	OSC. MOD.	6	125	60	2	100
6D6	IF	6	125	60	-	-
75	2nd Det.AVC	6	75*		-	-
41	OUTPUT	6	200	210	-	-
84	RECTIFIER	6	- - - -	210 Volts on cathode.		

READ ALL VOLTages from socket prong to the chassis.

* Triode plate comparative only.

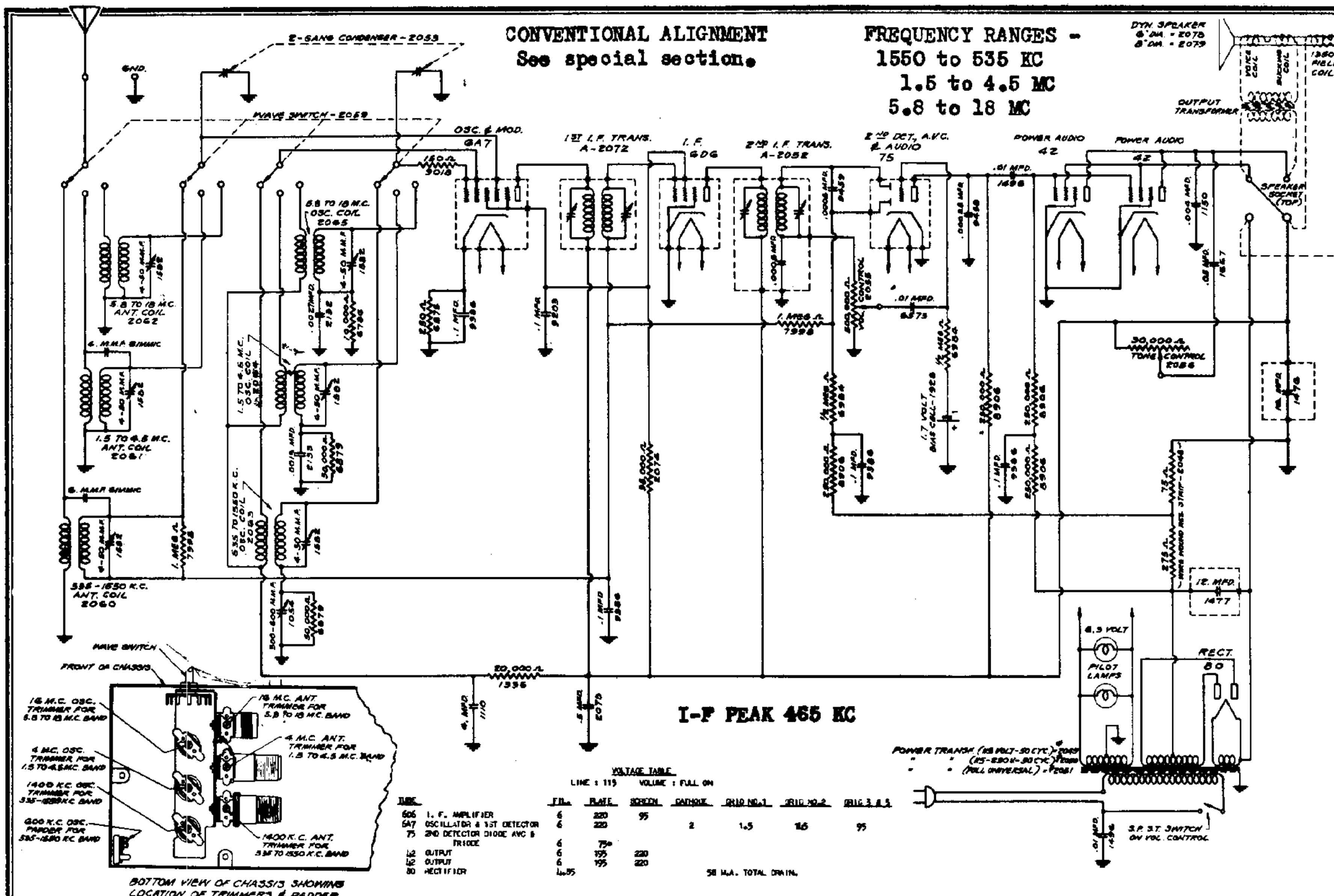
CONVENTIONAL ALIGNMENT-
(see special section)
ALSO SAME AS THE MODEL 10-MF.
(SEE INDEX)

MODEL 19A
Schematic, Voltage
Alignment, Trimmers

SENTINEL RADIO CORP.

CONVENTIONAL ALIGNMENT
See special section.

FREQUENCY RANGES -
1550 to 535 KC
1.5 to 4.5 MC
5.8 to 18 MC



I-F PEAK 465 KC

VOLTAGE TABLE

LINE : 115 VOLUME : FULL ON

TUBE		FIL.	PLATE	SCREEN	CATHODE	GRID NO.1	GRID NO.2	GRID 3 & 5
6D6	I. F. AMPLIFIER	6	220	95				
6A7	OSCILLATOR & 1ST DETECTOR	6	220		2	1.5	116	95
75	2ND DETECTOR DIODE AVC & TRIODE	6	75*					
42	OUTPUT	6	195	220				
42	OUTPUT	6	195	220				
80	RECTIFIER	4.85						

58 M.A. TOTAL DRAIN.

Align I-F transformer trimmers to 465 KC. BROADCAST - Dial and generator to 1400 KC, peak the oscillator and antenna trimmers. Dial and generator to 600 KC, pad the oscillator circuit to maximum peak while rocking variable condenser. POLICE - Dial and generator to 4 MC, peak oscillator trimmer and antenna trimmer. SHORTWAVE - Dial and generator to 16 MC, peak oscillator and antenna trimmers.

MODEL 30A
Schematic, Parts
Alignment, Voltage

SENTINEL RADIO CORP.

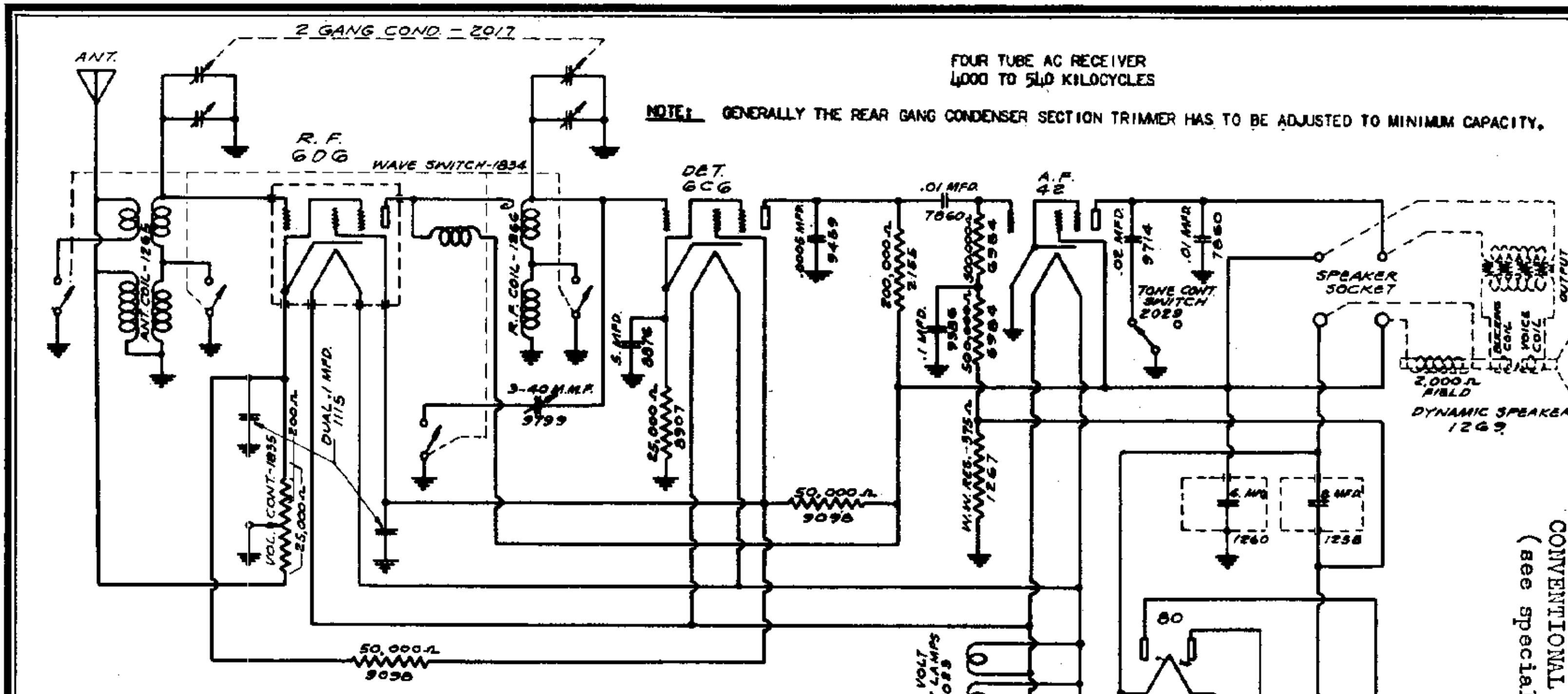
BAND SELECTOR SWITCH

THIS RECEIVER IS DESIGNED FOR TWO FREQUENCY BANDS. BROADCAST BAND FROM 1720 to 540 KC. POLICE, AIRCRAFT AND AMATEUR BAND 1.5 MC. to 4 MC. SWITCH TO LEFT POSITION FOR SHORT WAVE AND TO THE RIGHT FOR THE BROADCAST BAND.

CONVENTIONAL ALIGNMENT
(see special section)

FOUR TUBE AC RECEIVER
4000 TO 540 KILOCYCLES

NOTE: GENERALLY THE REAR GANG CONDENSER SECTION TRIMMER HAS TO BE ADJUSTED TO MINIMUM CAPACITY.



NOTE:
1. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
2. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.

PART NUMBER		LIST PRICE
1267	WIRE WOUND RESISTOR STRIP	$ .24
6984	500,000 OHM 1/3 WATT RESISTOR	.19
8906	250,000 OHM 1/3 WATT RESISTOR	.19
9098	50,000 OHM 1/3 WATT RESISTOR	.19
8907	25,000 OHM 1/3 WATT RESISTOR	.19
9459	.0005 MFD. MICA MOULDED CONDENSER	.21
1155	DUAL .1 MFD. 200 VOLT CONDENSER	.35
9386	.1 MFD. 200 VOLT CONDENSER	.19
7860	.01 MFD. 400 VOLT CONDENSER	.17
9714	.02 MFD. 400 VOLT CONDENSER	.18
1740	15/16" KNOB	.22
1739	13/16" KNOB	.22
1269	DYNAMIC SPEAKER	5.25
1265	ANTENNA COIL	$1.27
1266	R. F. COIL	1.27
2017	TWO GANG CONDENSER	2.25
9799	TRIMMER CONDENSER	.15
2105	DIAL ASSEMBLY (SPECIFY REQUIRED NAME)	2.00
1834	WAVE SWITCH	.47
9023	PILOT LIGHT LAMP BULB 6.3 VOLTS	.19
1251	POWER TRANSFORMER	3.20
1258	8 MFD. WET ELECTROLYTIC CONDENSER	1.16
1260	4 MFD. WET ELECTROLYTIC CONDENSER	1.02
8876	5 MFD. DRY ELECTROLYTIC CONDENSER	.85
1835	VOLUME CONTROL	1.15
2029	TONE CONTROL	.36

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

VOLTAGE TABLE

LINE VOLTAGE : 115
VOLUME CONTROL : FULL ON
WAVE BAND : BROADCAST

TUBE		FILAMENT	PLATE	SCREEN	CATHODE
6D6	RADIO FREQUENCY	6	225	85	2
6D6	DETECTOR	6	105*	85	3.5
42	OUTPUT	6	200	225	15**
80	RECTIFIER	4.9			

READ ALL VOLTAGES FROM SOCKET PRONG TO GROUND UNLESS OTHERWISE SPECIFIED. (EXCEPT FILAMENT)

** READ FROM 375 OHM RESISTOR #1267 TO GROUND.

* COMPARATIVE VOLTAGE IS NOT TRUE VOLTAGE APPLIED.

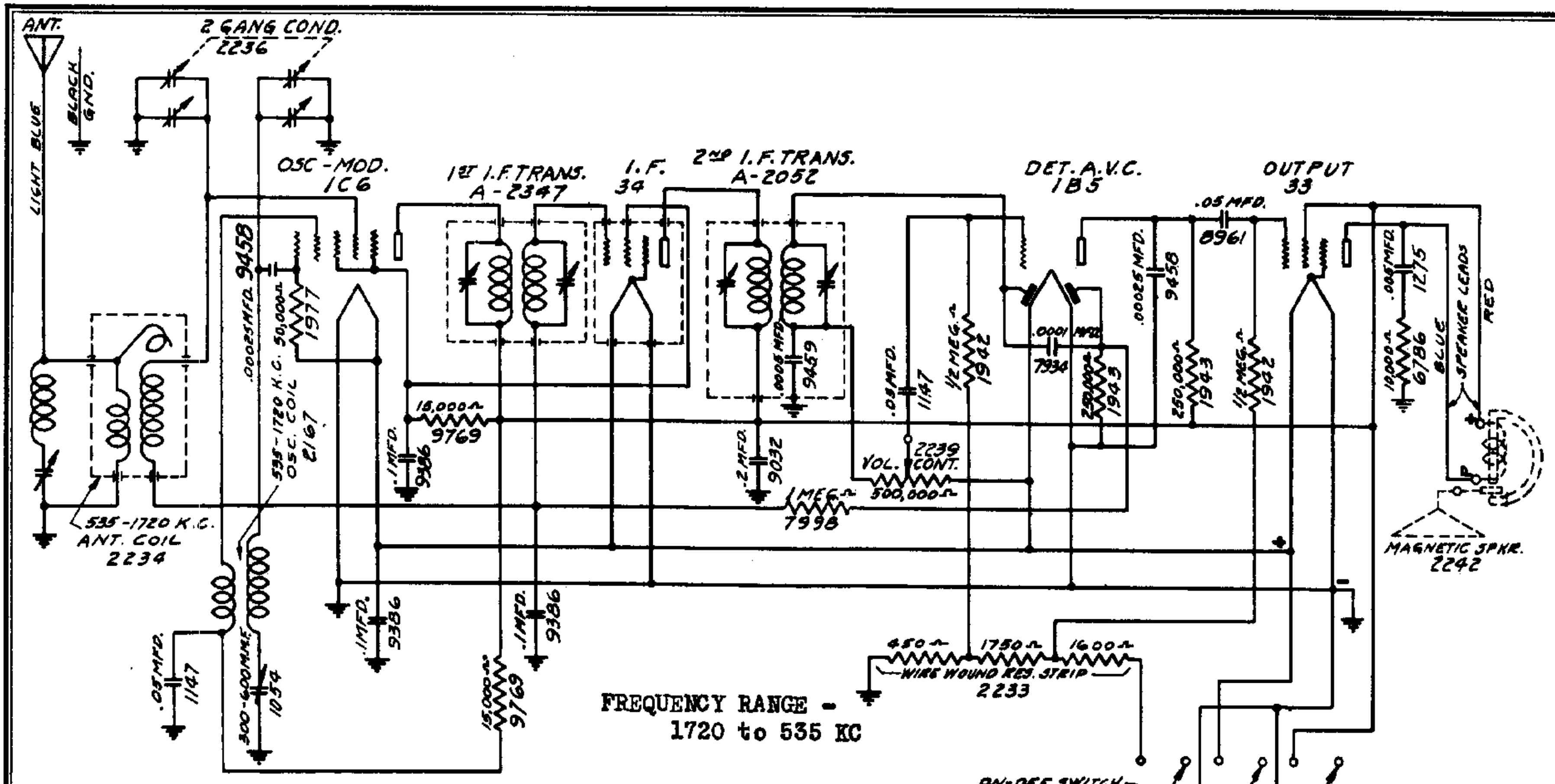
TO ALIGN THE VARIABLE CONDENSER: IT IS IMPORTANT WHEN ALIGNING TO FOLLOW THE PROCEDURE CAREFULLY, OTHERWISE THE RECEIVER WILL LACK SENSITIVITY AND THE DIAL CALIBRATION WILL BE INCORRECT.

1. CONNECT THE HIGH OUTPUT SIDE OF THE OSCILLATOR TO THE RECEIVER ANTENNA LEAD AND THE GROUND TO THE CHASSIS.

2. PLACE THE BAND SELECTOR SWITCH FOR OPERATION ON THE BROADCAST BAND, TUNE THE RECEIVER TO EXACTLY 1400 KILOCYCLES ON THE DIAL AND SET THE TEST OSCILLATOR FREQUENCY TO 1400 KILOCYCLES. THEN BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER CONDENSERS LOCATED ON TOP OF THE GANG CONDENSER.

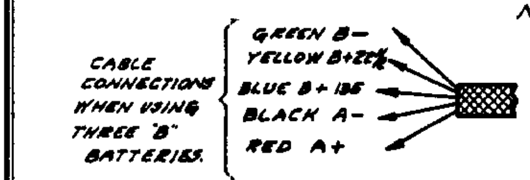
3. SET THE BAND SELECTOR SWITCH FOR OPERATION ON THE SHORT WAVE BAND, TUNE THE RECEIVER DIAL TO EXACTLY 4 MEGACYCLES AND SET THE TEST OSCILLATOR TO THIS FREQUENCY. THEN ADJUST THE TRIMMER CONDENSER MOUNTED ON THE COIL LOCATED UNDERNEATH THE CHASSIS FOR MAXIMUM SENSITIVITY. ROCK GANG CONDENSER WHEN MAKING THIS ADJUSTMENT.

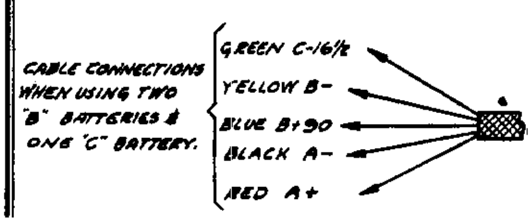
SENTINEL RADIO CORP.



FREQUENCY RANGE - 1720 to 535 KC

NOTE:
1. I.F. = 465 K.C.
2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
3. NUMBER SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.



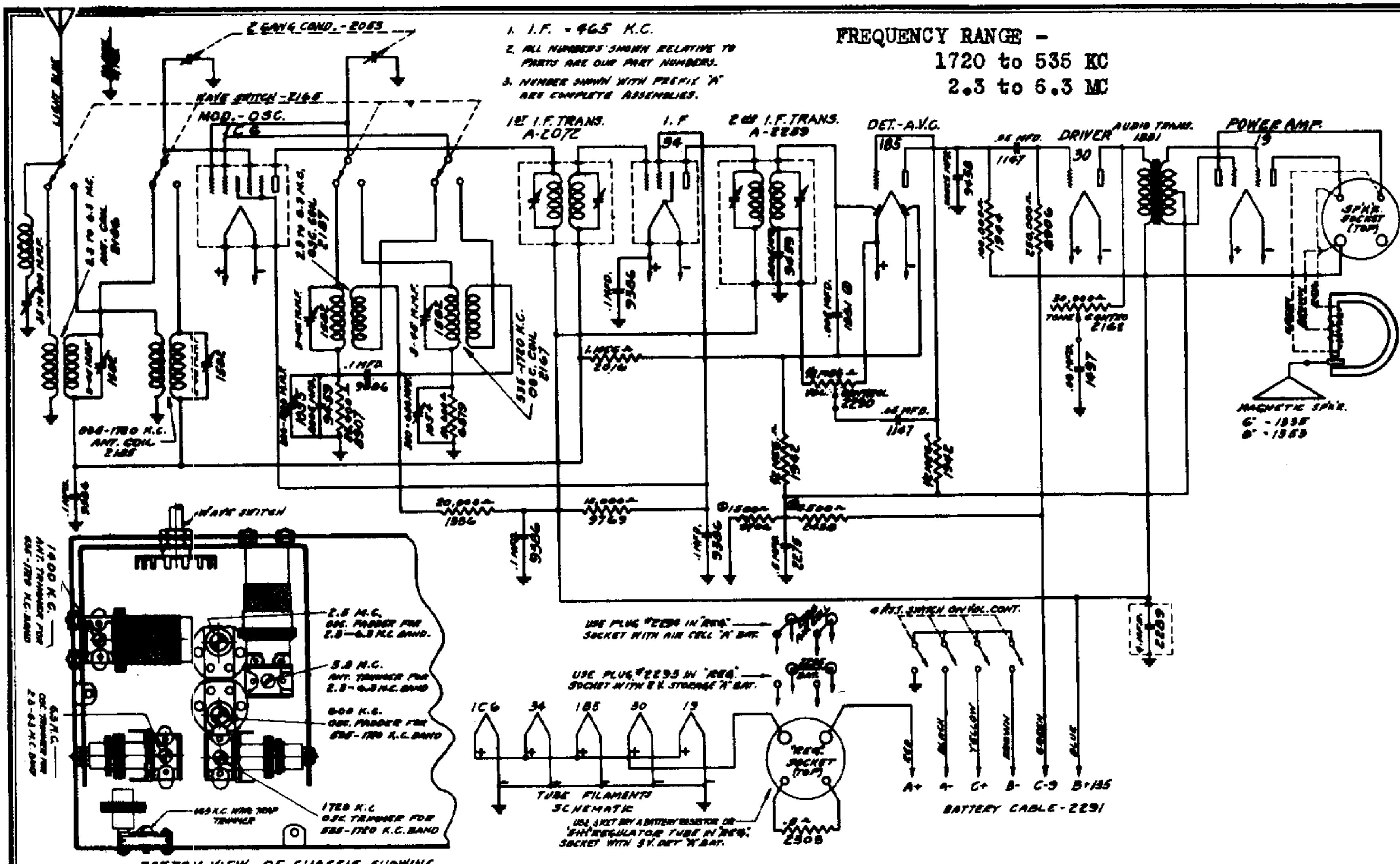


CONVENTIONAL ALIGNMENT- See special section.
Align I-F trimmers at 465 KC. Dial and generator at 1720 KC, peak oscillator trimmer. Dial and generator at 1400 KC, peak antenna trimmer. Dial and generator to 600 KC, pad the oscillator trimmer to peak.

MODEL 33B
Schematic, Parts
Alignment, Trimmers

SENTINEL RADIO CORP

FREQUENCY RANGE -
1720 to 535 KC
2.3 to 6.3 MC

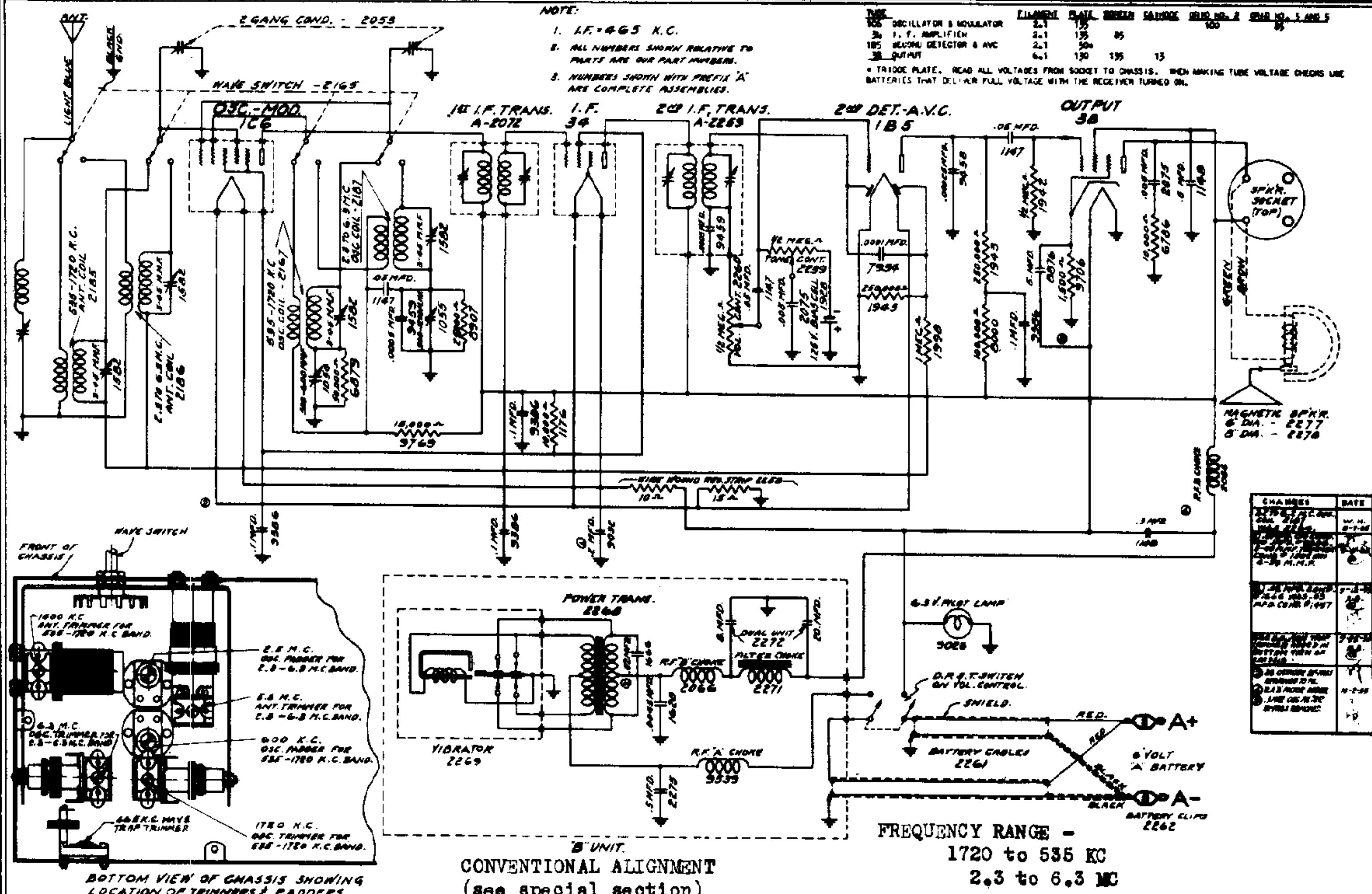


CONVENTIONAL ALIGNMENT - (see special section)

ALIGNMENT - Peak IF trimmers at 465 KC. BROADCAST BAND-Dial and Generator at 1720 KC, adjust OSC trimmer to peak, shift generator to 1400 KC, then adjust antenna trimmer to peak. Dial and generator to 600 KC, pad oscillator circuit to maximum peak. SHORTWAVE BAND - Dial and generator 6.3 MC, peak oscillator trimmer, then dial and generator to 5.8 MC, adjust antenna trimmer to peak. Dial and generator to 2.5 MC, pad oscillator circuit to peak. Peak the wave trap to 465 KC. Rock variable condenser during the padding adjustments. Repeat adjustments.

SENTINEL RADIO CORP.

MODEL 34B
Schematic, Trimmers
Alignment, Parts
Changes



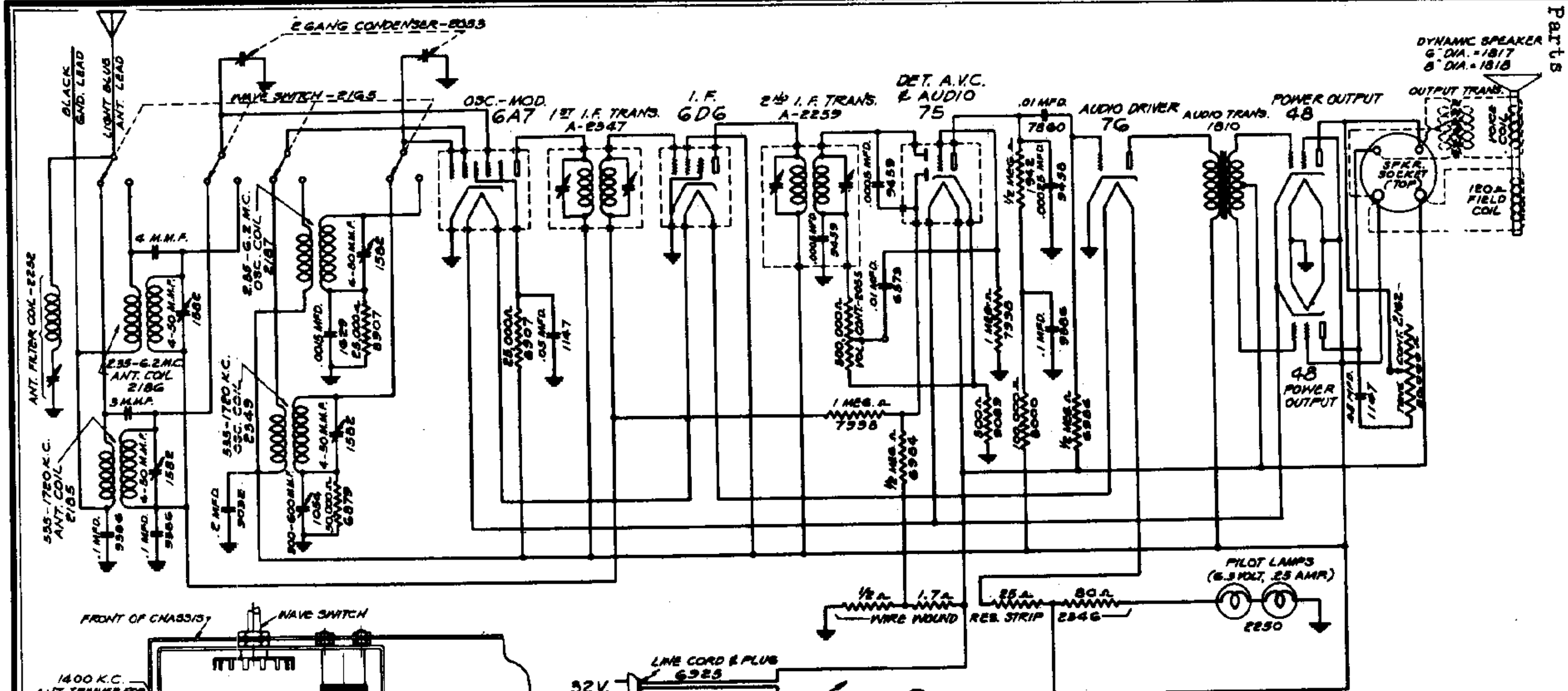
CONVENTIONAL ALIGNMENT
(see special section)

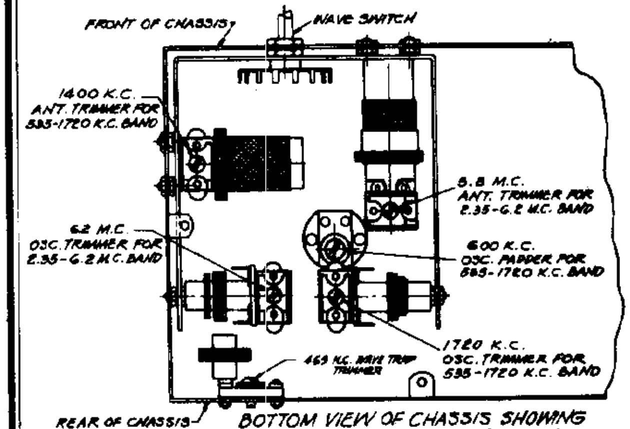
FREQUENCY RANGE -
1720 to 535 KC
2.3 to 6.3 MC

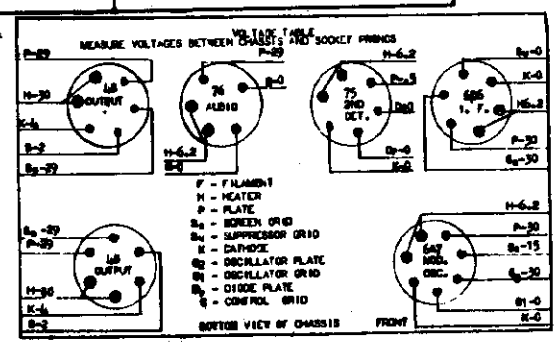
ALIGNMENT - Peak IF trimmers at 465 KC. BROADCAST BAND - Dial and generator to 1720 KC, adjust oscillator trimmer to peak, dial and generator to 1400 KC, then adjust antenna trimmer to peak. Dial and generator to 600 KC, pad oscillator circuit to maximum peak. SHORTWAVE BAND - Dial and generator to 6.3 MC, peak oscillator trimmer. Dial and generator to 5.8 MC, adjust antenna trimmer to peak. Dial and generator to 2.5 MC, pad oscillator circuit to peak. Rock variable condenser during padding adjustments. Repeat adjustments for maximum response. Peak wave trap at 465 KC.

MODEL 36L
Schematic, Voltage
Alignment, Trimmers
Parts

SENTINEL RADIO CORP.







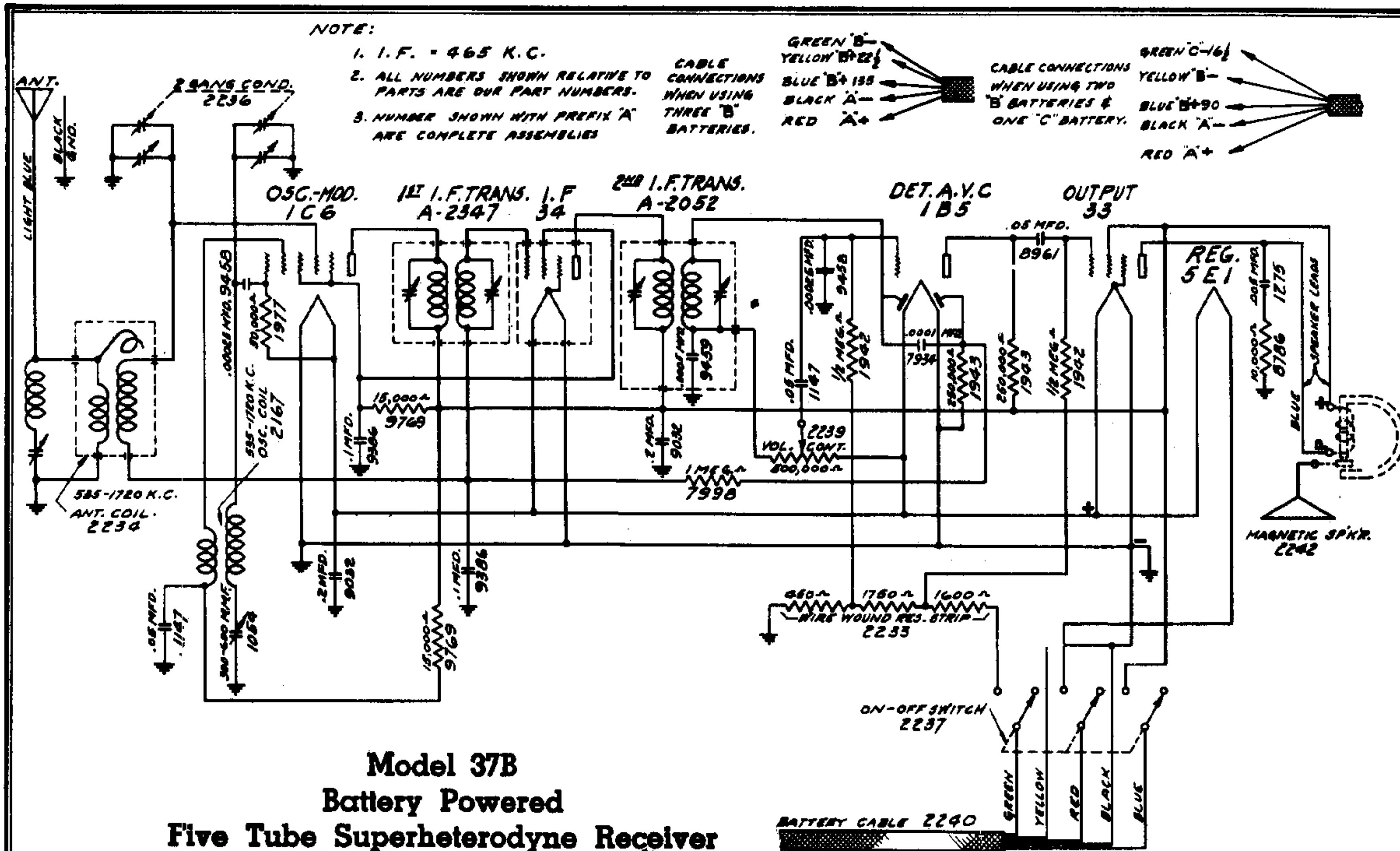
IF-465

FREQUENCY RANGE -
1720 to 535 KC
2.3 to 6.3 MC

CONVENTIONAL ALIGNMENT
(see special section)

ALIGNMENT - Peak IF trimmers at 465 KC, and after trimming adjustments peak wave trap at 465 KC. BROADCAST BAND - Dial and generator to 1720 KC, adjust oscillator trimmer to peak. Dial and oscillator to 1400 KC, adjust antenna trimmer to peak. Dial and generator to 600 KC, pad oscillator circuit to peak. SHORTWAVE BAND - Dial and generator to 6.3 MC, peak oscillator trimmer. Dial and generator to 5.8 MC, adjust antenna to peak. Dial and generator to 2.5 MC, pad oscillator circuit to maximum peak. Repeat all adjustments for maximum response of receiver. Rock variable condenser while padding.

SENTINEL RADIO CORP.



Model 37B
Battery Powered
Five Tube Superheterodyne Receiver

FREQUENCY RANGE - 1720 to 535 KC.

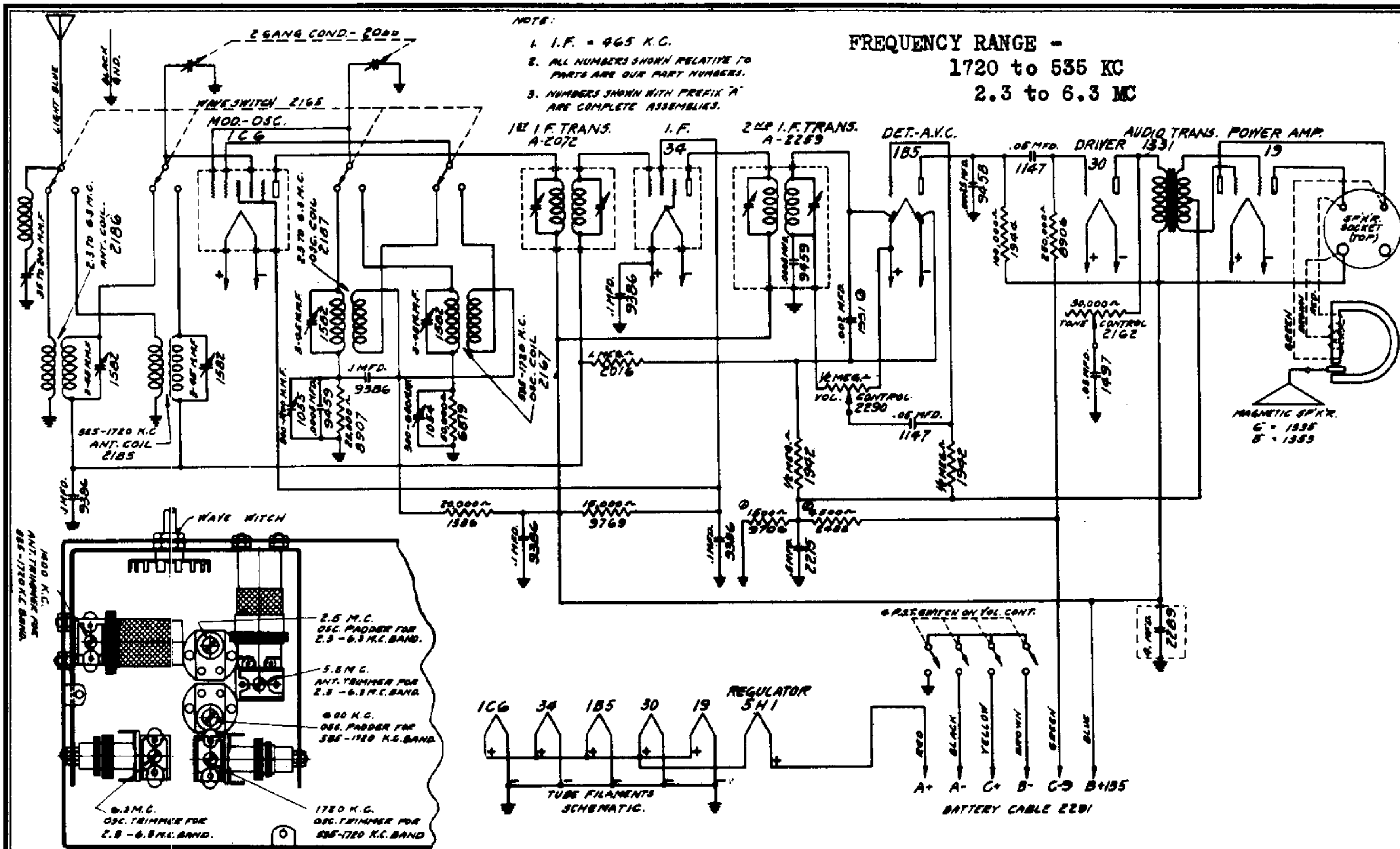
CONVENTIONAL ALIGNMENT - see special section.

Peak IF transformers at 465 KC. BROADCAST BAND - Dial and generator to 1720 KC, trim oscillator to maximum peak. Dial and generator to 1400 KC, adjust antenna trimmer to maximum peak. Dial and generator to 600 KC, pad oscillator circuit to maximum peak.

MODEL 38B
Schematic, Trimmers
Alignment, Parts

SENTINEL RADIO CORP.

FREQUENCY RANGE -
1720 to 535 KC
2.3 to 6.3 MC



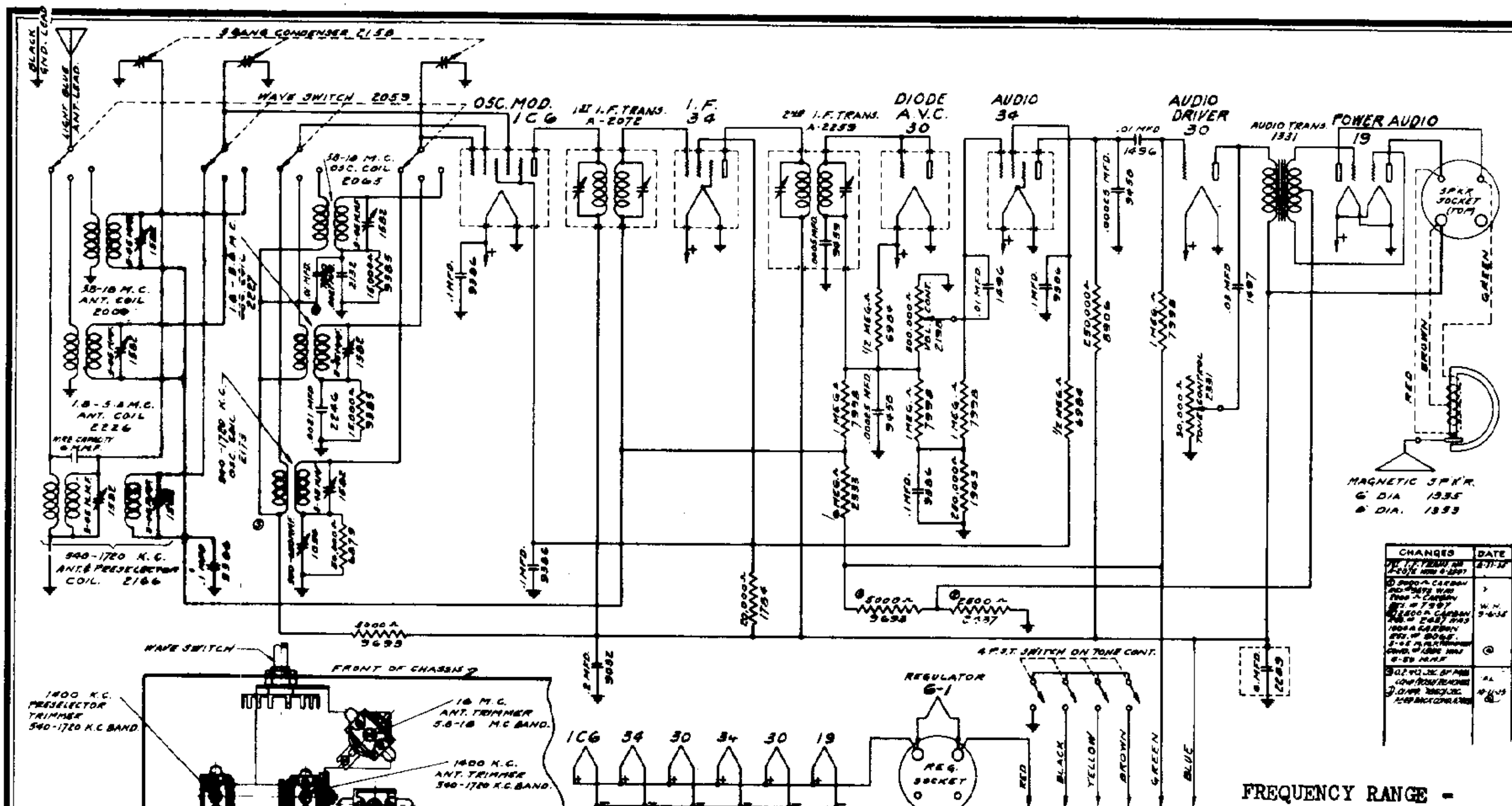
BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS & PADDERS.

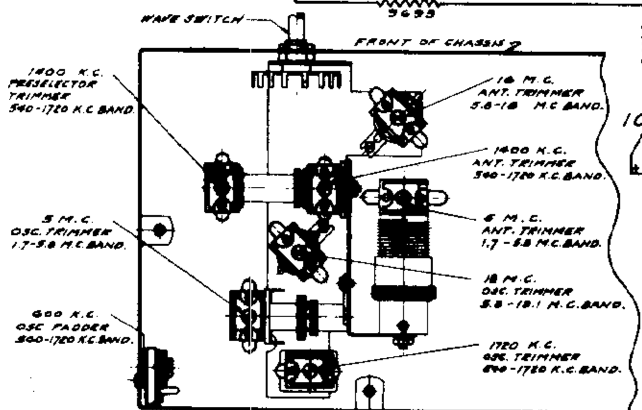
CONVENTIONAL ALIGNMENT - see special section

ALIGNMENT - Peak I-F transformer trimmers at 465 KC. After R-F adjustments, peak the wave trap at 465 KC.
BROADCAST BAND - Dial and generator at 1720 KC, peak oscillator trimmer. Dial and generator at 1400 KC, adjust antenna trimmer to peak. Dial and generator at 600 KC, pad oscillator circuit to maximum peak.
SHORTWAVE BAND - Dial and generator at 6.3 MC, adjust oscillator trimmer to maximum peak. Dial and generator to 5.8 MC, adjust antenna trimmer to maximum peak. The short wave oscillator circuit is then padded at 2.5 MC. While making padding adjustments, rock the variable condenser.

MODEL 39B
Schematic, Trimmers
Alignment, Changes, Par

SENTINEL RADIO CORP.





BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS & PADDERS.

NOTE
1. I.F. = 465 K.C.
2. NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.

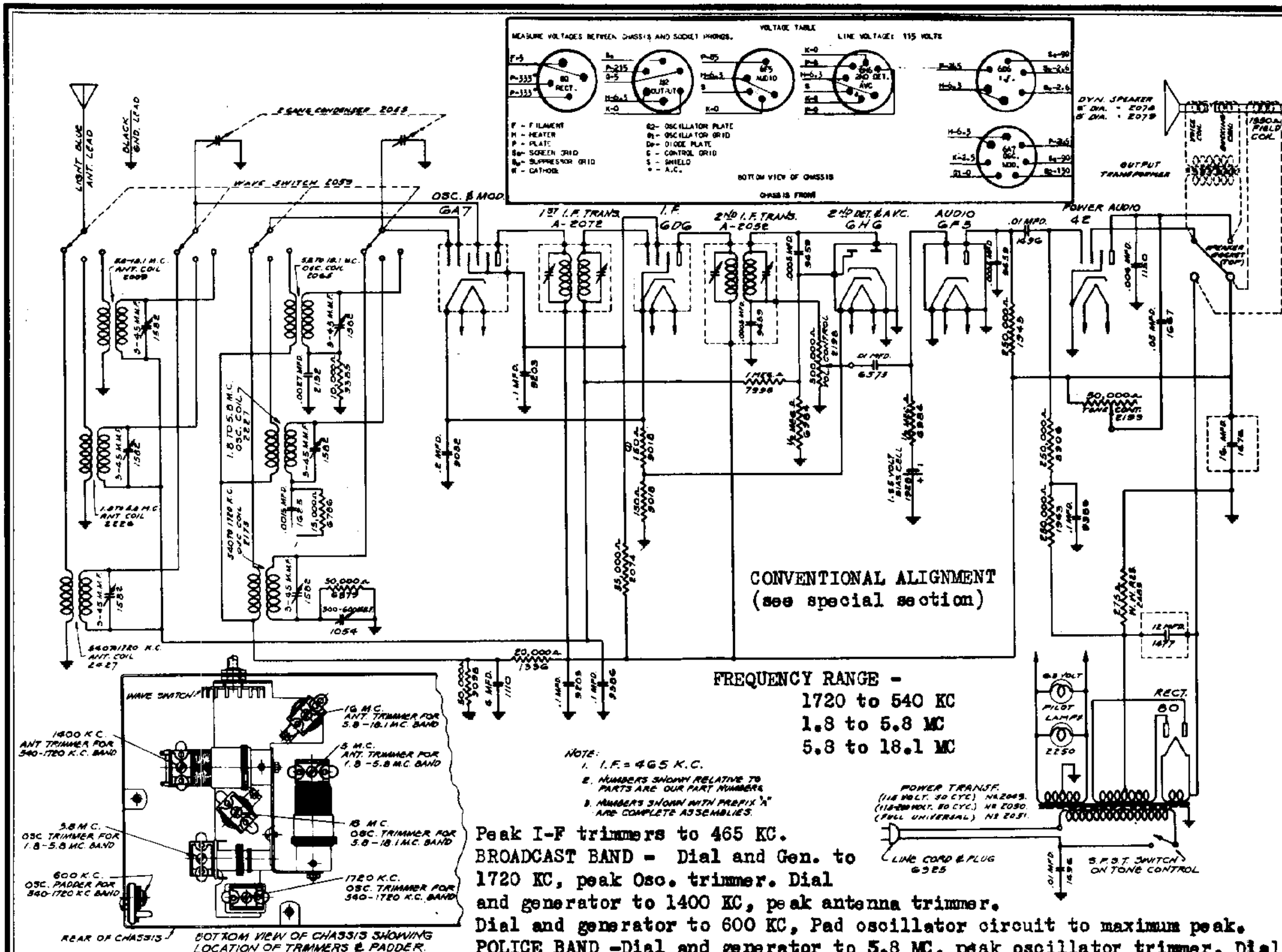
FREQUENCY RANGE -
1720 to 540 KC
1.7 to 5.8 MC
5.8 to 18.1 MC

CONVENTIONAL ALIGNMENT
see special section

ALIGNMENT - Peak I-F trimmers at 465 KC. After all adjustments have been made on receiver, adjust wave trap to 465 KC peak. BROADCAST - Dial and generator to 1720 KC, adjust oscillator trimmer to peak. Dial and generator to 1400 KC, adjust antenna trimmer to peak. Dial and generator to 600 KC, pad oscillator circuit to maximum peak. SHORT WAVE POLICE BAND - Dial and generator to 5 MC, peak oscillator trimmer, adjust antenna trimmer to maximum peak. SHORTWAVE FOREIGN BAND - Dial and generator to 18 MC, peak the oscillator trimmer, then shift dial and generator to 16 MC and peak the antenna trimmer. NOTE - Rock the variable condenser during padding adjustment on broadcast band.

MODEL 40B
Schematic, Trimmers
Alignment, Parts
Voltage

SENTINEL RADIO CORP.



CONVENTIONAL ALIGNMENT
(see special section)

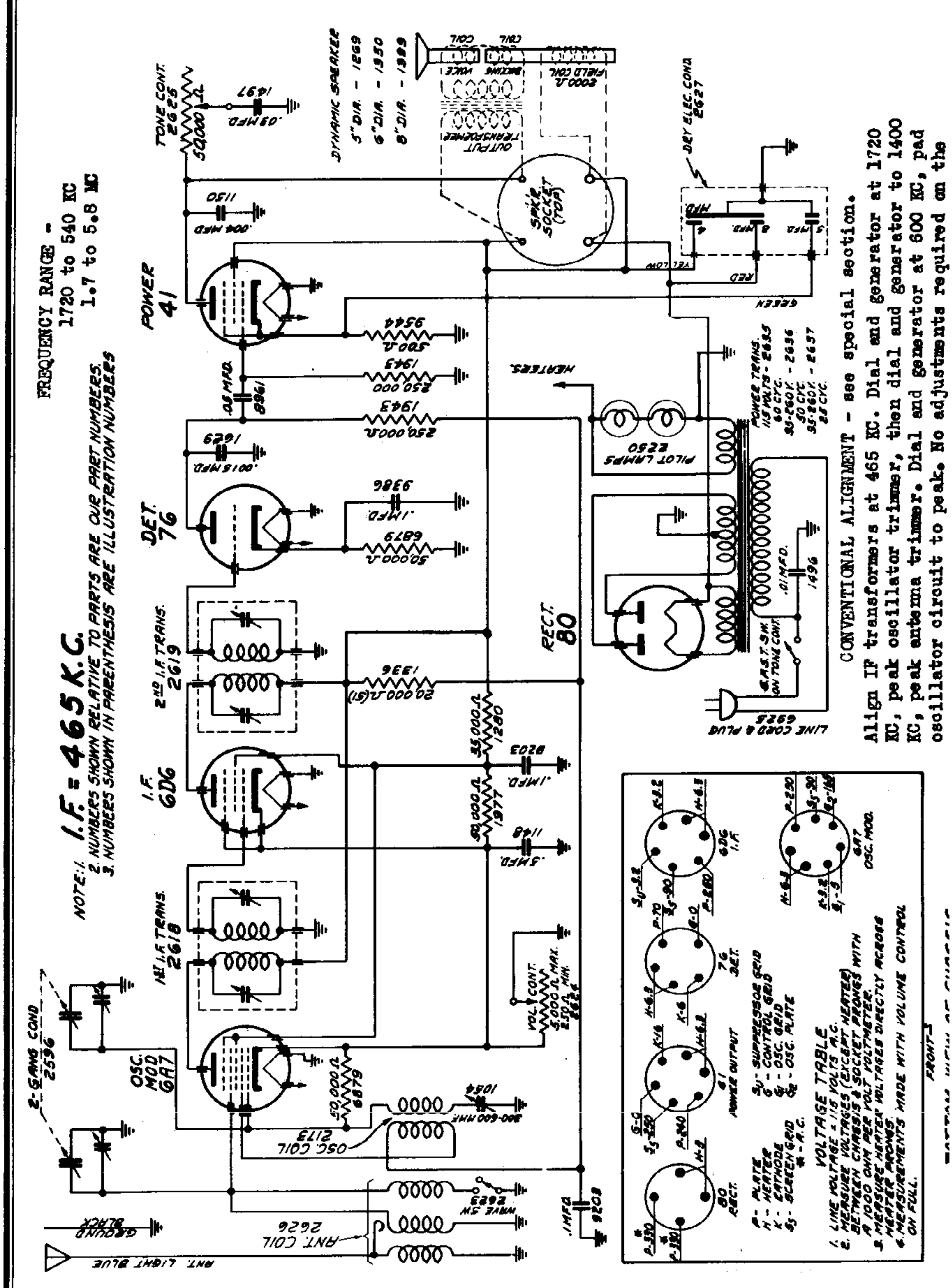
FREQUENCY RANGE -
1720 to 540 KC
1.8 to 5.8 MC
5.8 to 18.1 MC

NOTE:
1. I.F. = 465 K.C.
2. NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.

Peak I-F trimmers to 465 KC.
BROADCAST BAND - Dial and Gen. to 1720 KC, peak Osc. trimmer. Dial and generator to 1400 KC, peak antenna trimmer. Dial and generator to 600 KC, Pad oscillator circuit to maximum peak.
POLICE BAND -Dial and generator to 5.8 MC, peak oscillator trimmer. Dial and generator to 5 MC, peak antenna trimmer. SHORTWAVE BAND - Generator and dial to 18 MC, peak oscillator trimmer. Dial and generator to 16 MC, adjust antenna trimmer to maximum peak. Rock variable condenser during the BROADCAST BAND oscillator padding adjustment. No padding required on high frequency bands.

MODEL 48A
Schematic, Volta
Alignment, Parts

SENTINEL RADIO CORP.

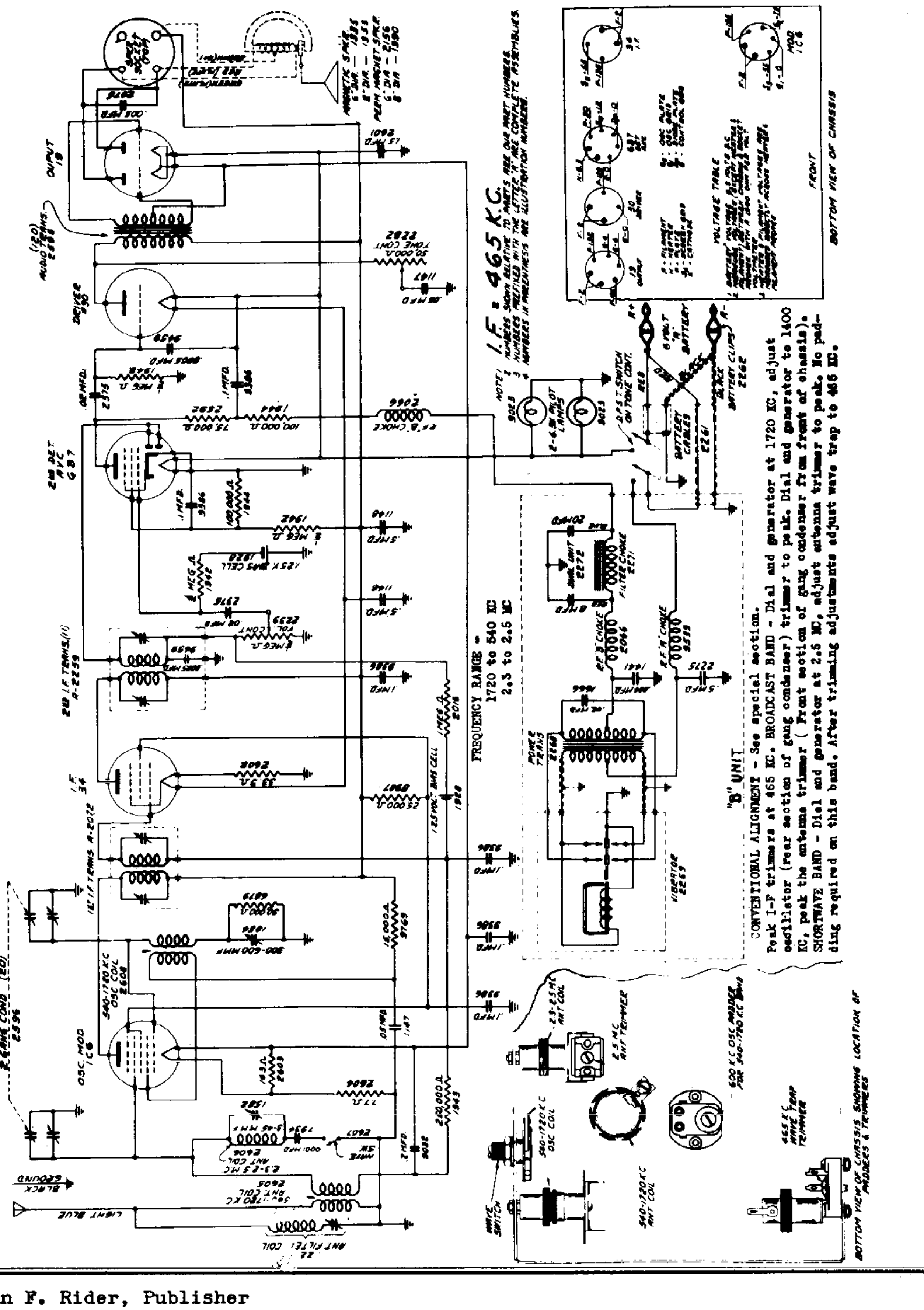


CONVENTIONAL ALIGNMENT - see special section.

Align IF transformers at 465 KC. Dial and generator at 1720 KC, peak oscillator trimmer, then dial and generator to 1400 KC, peak antenna trimmer. Dial and generator at 600 KC, pad oscillator circuit to peak. No adjustments required on the

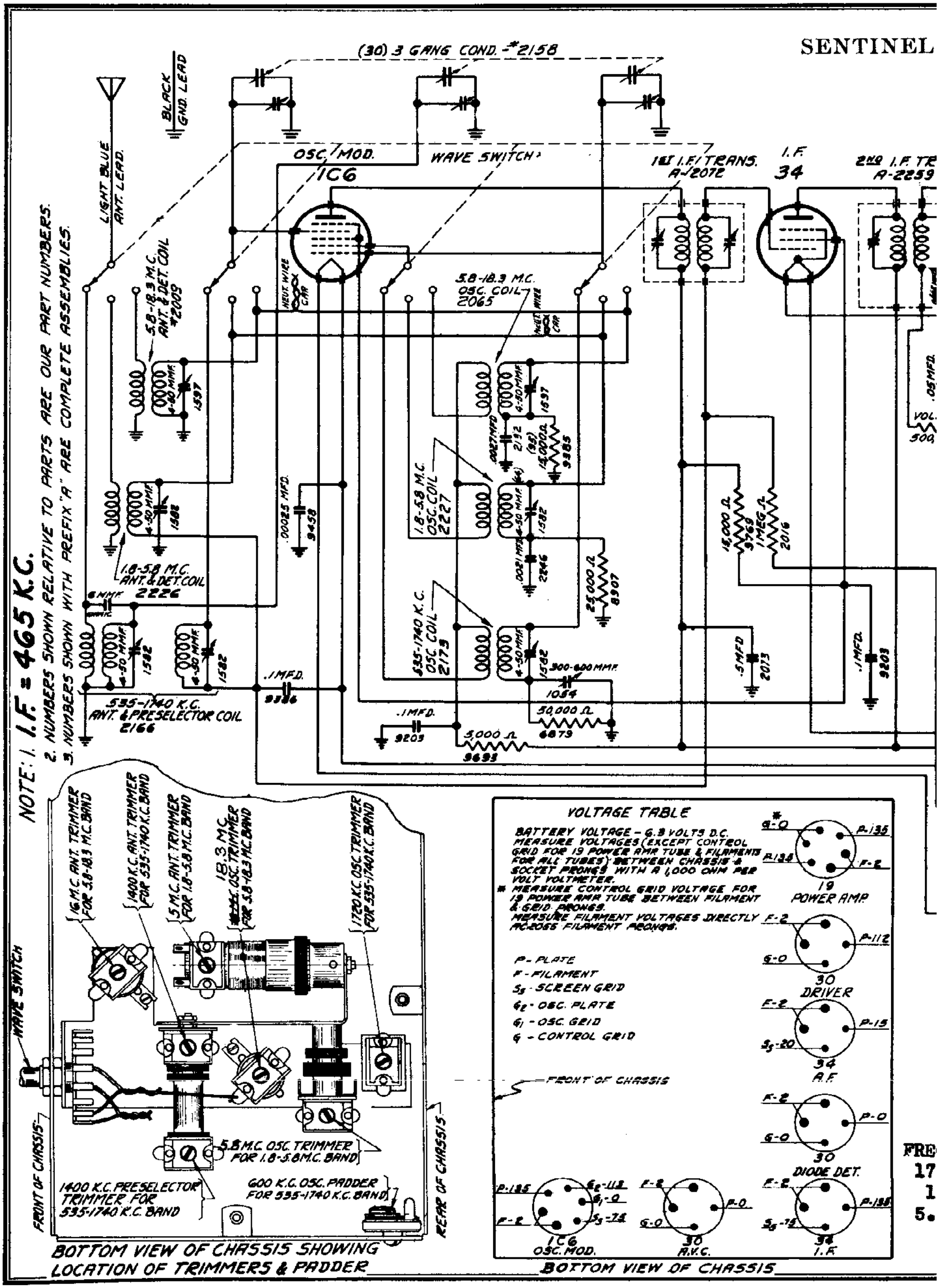
MODEL 49B
Schematic, Voltage
Trimmers, Alignment
Parts

SENTINEL RADIO CORP.



CONVENTIONAL ALIGNMENT - See special section.
Peak I-F trimmers at 465 KC. BROADCAST BAND - Dial and generator at 1720 KC, adjust oscillator (rear section of gang condenser) trimmer to peak. Dial and generator to 1400 KC, peak the antenna trimmer (Front section of gang condenser from front of chassis). SHORTWAVE BAND - Dial and generator at 2.5 MC, adjust antenna trimmer to peak. No padding required on this band. After trimming adjustments adjust wave trap to 465 KC.

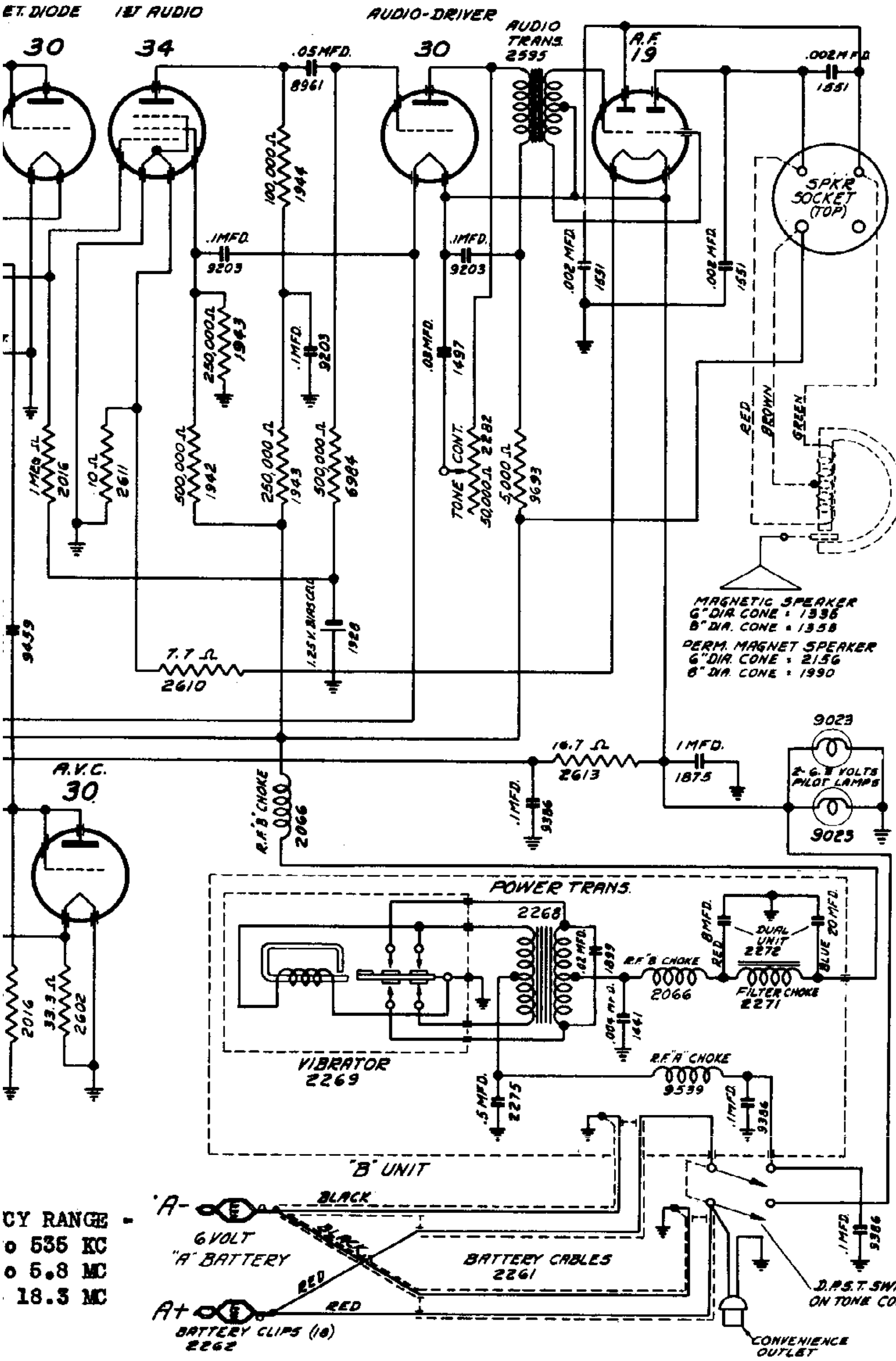
SENTINEL



FRE
17
1
5.

…DIO CORP.

MODEL 50B
Schematic, Voltage
Alignment, Trimmers
Parts



…CY RANGE -
…o 535 KC
…o 5.8 MC
… 18.3 MC

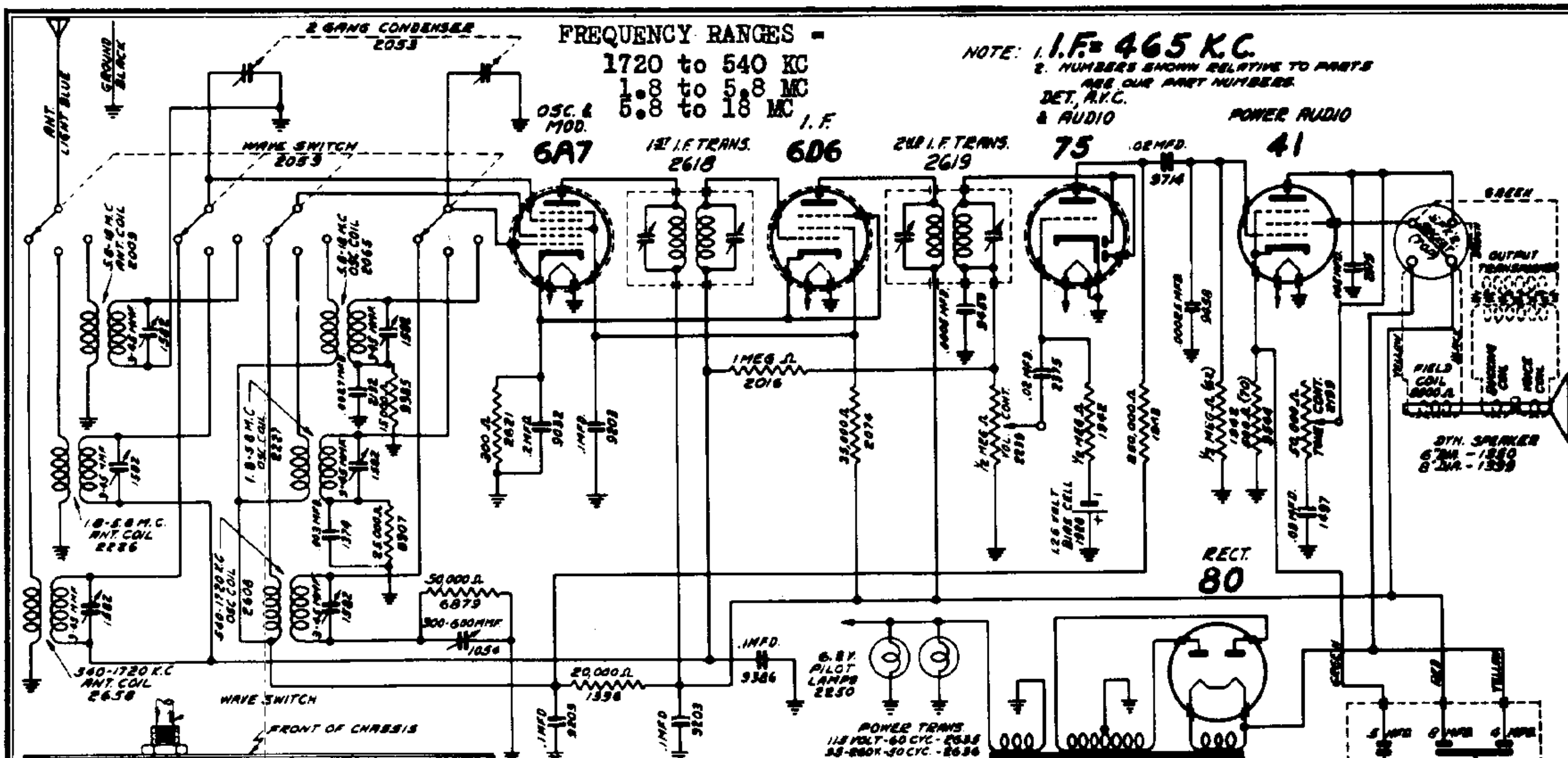
CONVENTIONAL ALIGNMENT - see special section.

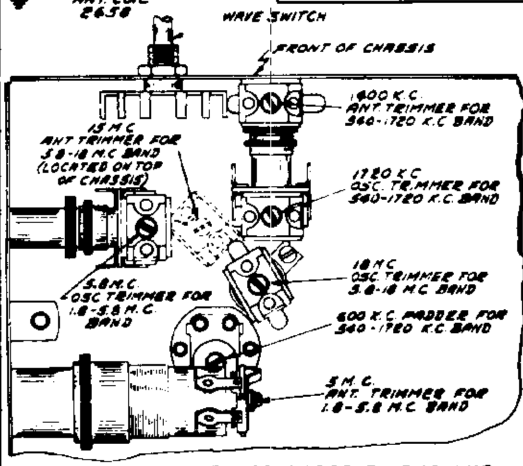
Peak I-F trimmers at 465 KC. BROADCAST BAND Dial and generator at 1720 KC, peak oscillator trimmer. Dial and generator at 14000 KC, pre-selector and antenna trimmers peaked. Dial and generator at 600 KC, pad oscillator circuit to peak. POLICE - Dial and generator to 5.8 MC, peak oscillator trimmer. Dial and generator to 5 MC, peak antenna trimmer. FOREIGN - Dial and generator to 18.3 MC, peak oscillator trimmer. Dial and generator to 16 MC, adjust antenna trimmer to peak. NOTE - No padding adjustments required on shortwave bands.

… at 16 MC. Rock variable condenser during padding adjustments. No padding on shortwave bands.

SENTINEL RADIO CORP.

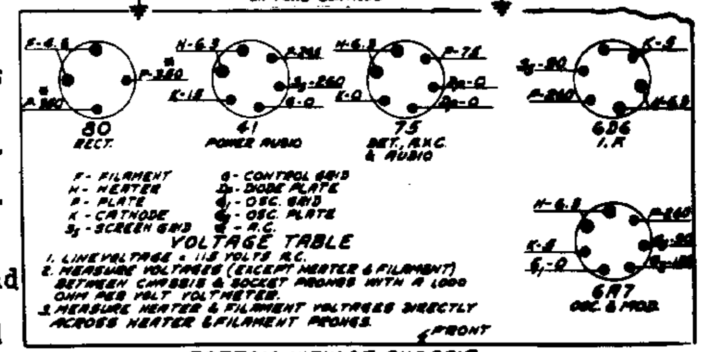
MODEL 52A
Schematic, Voltag
Alignment, Trimme
Parts





BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF PADDERS & TRIMMERS.

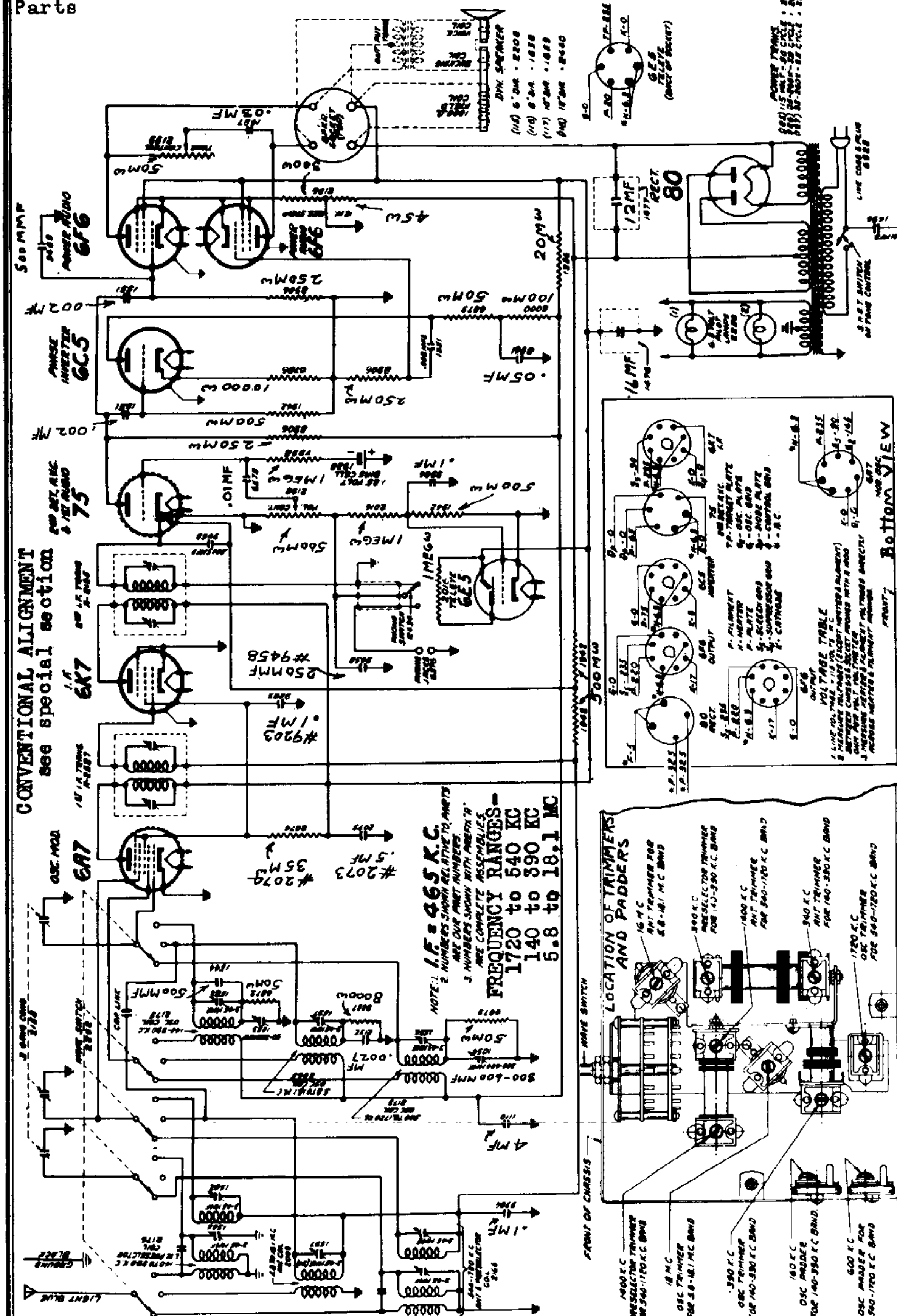
CONVENTIONAL ALIGNMENT - see special section. BROADCAST - Dial and generator at 1720 KC, peak OSC trimmers. Dial and generator at 1400 KC, peak antenna trimmer. Dial and generator at 600 KC, pad OSC circuit to peak. POLICE- Dial and generator at 5.8 MC, peak OSC trimmer. Dial and generator at 5 MC, peak antenna trimmer. No padding adjustment on this band. FOREIGN - Dial and generator at 18 MC, peak OSC trimmer, then set generator and dial to 15 MC, and peak the antenna trimmer for maximum peak. No padding adjustment is required on this band. While adjusting the padding circuit of the



BOTTOM VIEW OF CHASSIS

MODEL 53A
Schematic, Voltage
Alignment, Trimmers
Parts

SENTINEL RADIO CORP.

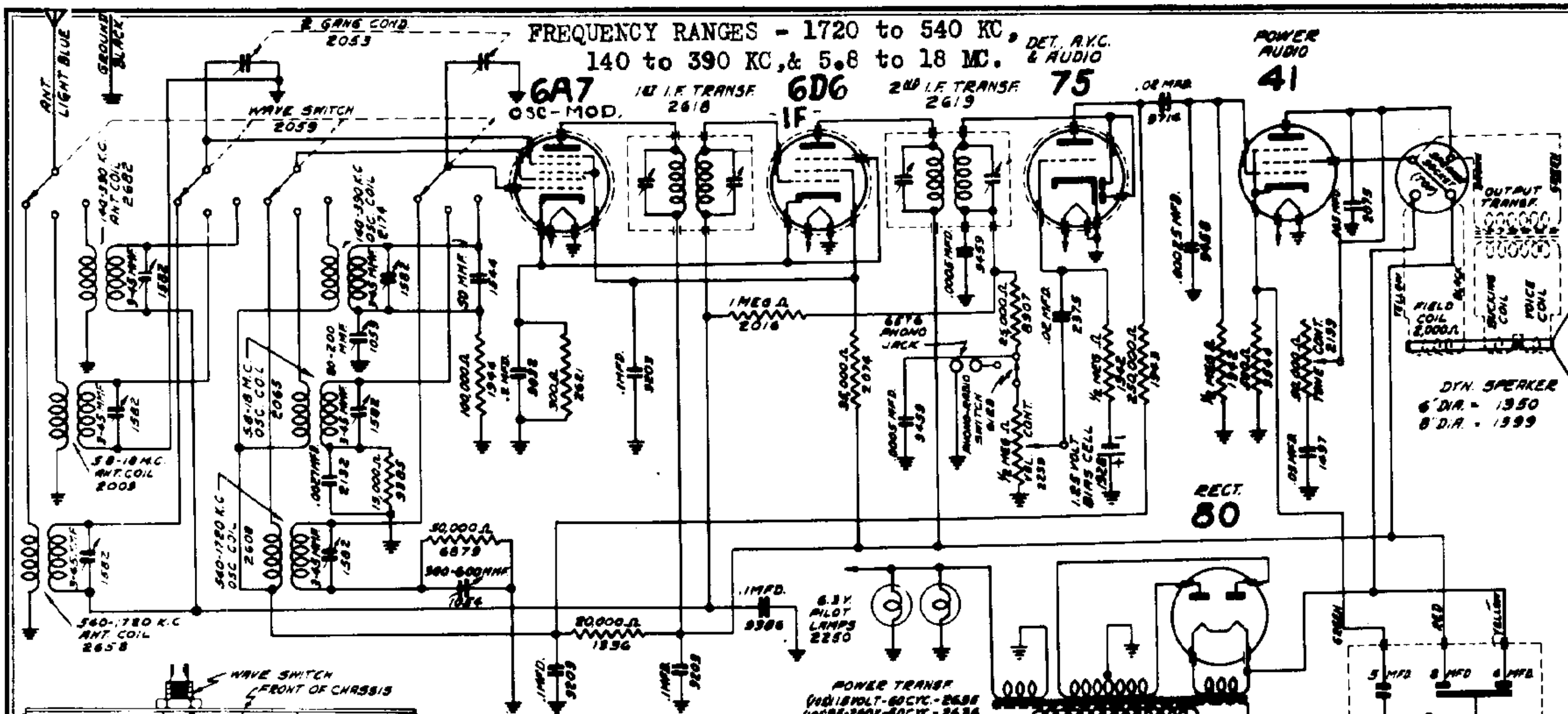


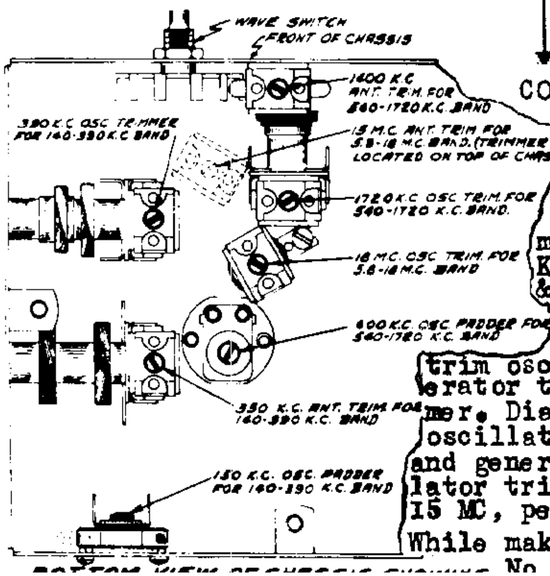
Align I-F trimmers. BROADCAST- Dial and generator at 1720 KC, peak OSC trimmer. Dial and generator at 1400 KC, peak PRE-SEL. & ANT trimmers. Dial and generator at 600 KC, peak oscillator padder. LONGWAVE- Dial and generator at 390 KC, peak oscillator trimmer. Dial and generator at 340, peak PRE-SEL. & ANT trimmers. Pad OSC at 160 KC. FOREIGN -Dial and GEN. at 18 MC, peak OSC trimmer, then peak ANT trimmer at 16 MC. Rock variable condenser during padding adjustments. No padding on shortwave band.

MODEL 54A
Schematic, Trimm
Voltage, Alignme
Parts

SENTINEL RADIO CORP.

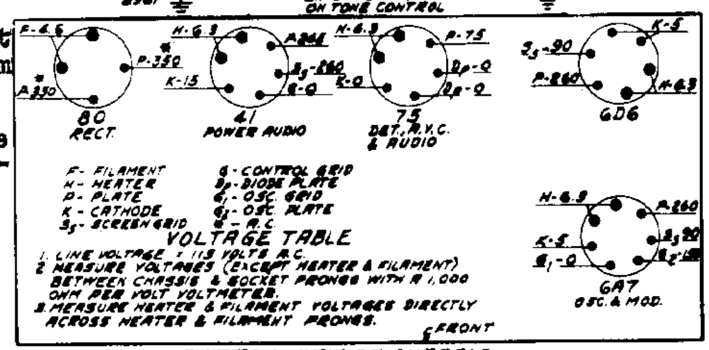
FREQUENCY RANGES - 1720 to 540 KC, 140 to 390 KC, & 5.8 to 18 MC.





CONVENTIONAL ALIGNMENT- See special section. IF PEAK 465 KC BROADCAST-Dial & generator at 1720 KC, peak oscillator trimmer. Dial & generator at 1400 KC, peak antenna trimmer. Dial & generator at 600 KC, pad the oscillator to peak. LONGWAVE-Dial & generator at 390 KC, trim oscillator to peak. Dial & Generator to 350 KC, peak antenna trimmer. Dial & generator at 150 KC, pad oscillator to peak. SHORTWAVE -Dial and generator to 18 MC, peak oscillator trimmer. Dial and generator to 15 MC, peak the antenna trimmer.

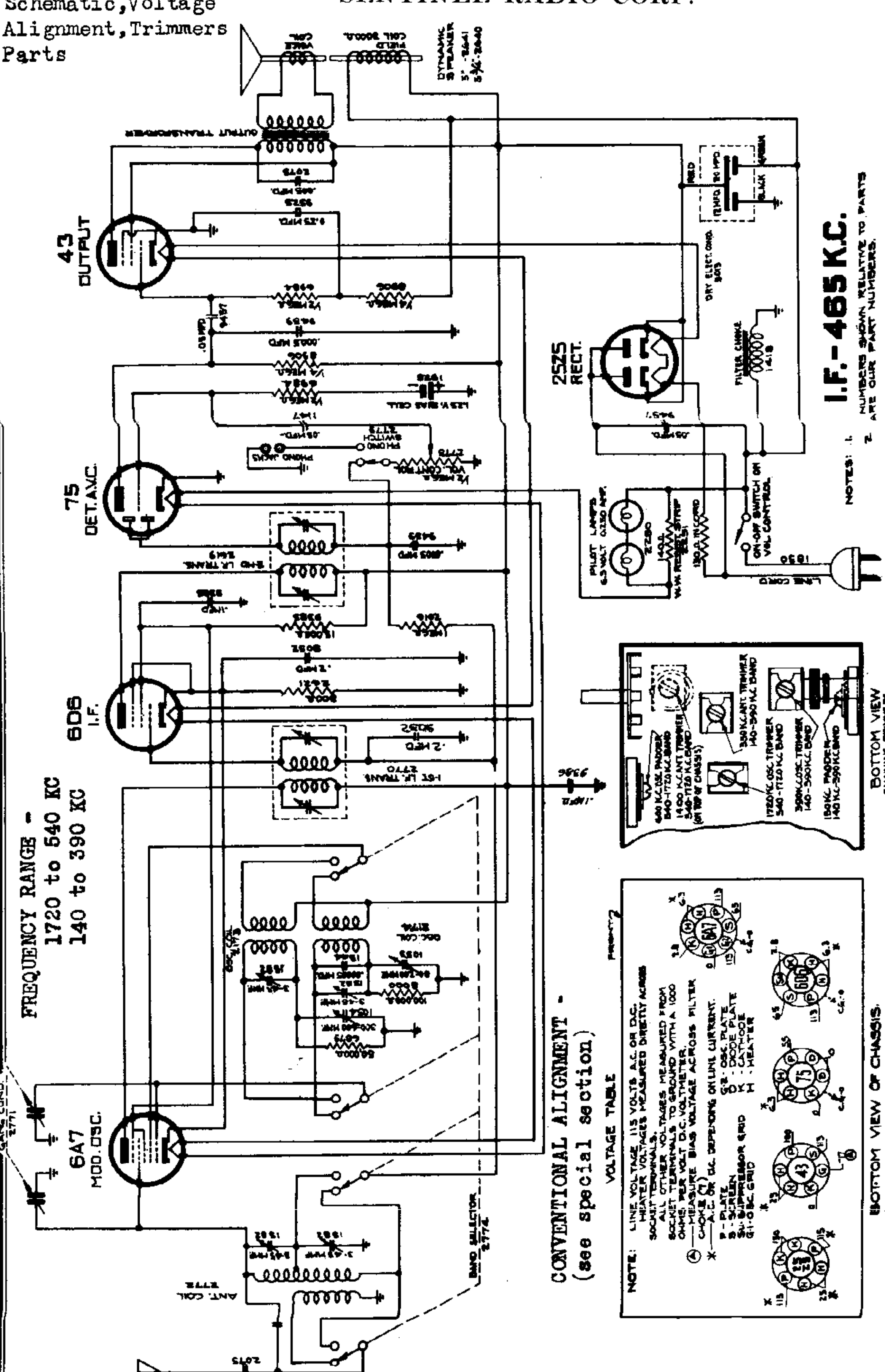
While making the padding adjustments the variable condenser should be rocked. No padding adjustment is required on the short wave band. All the adj-



BOTTOM VIEW OF CHASSIS

MODEL 55U
Schematic, Voltage
Alignment, Trimmers
Parts

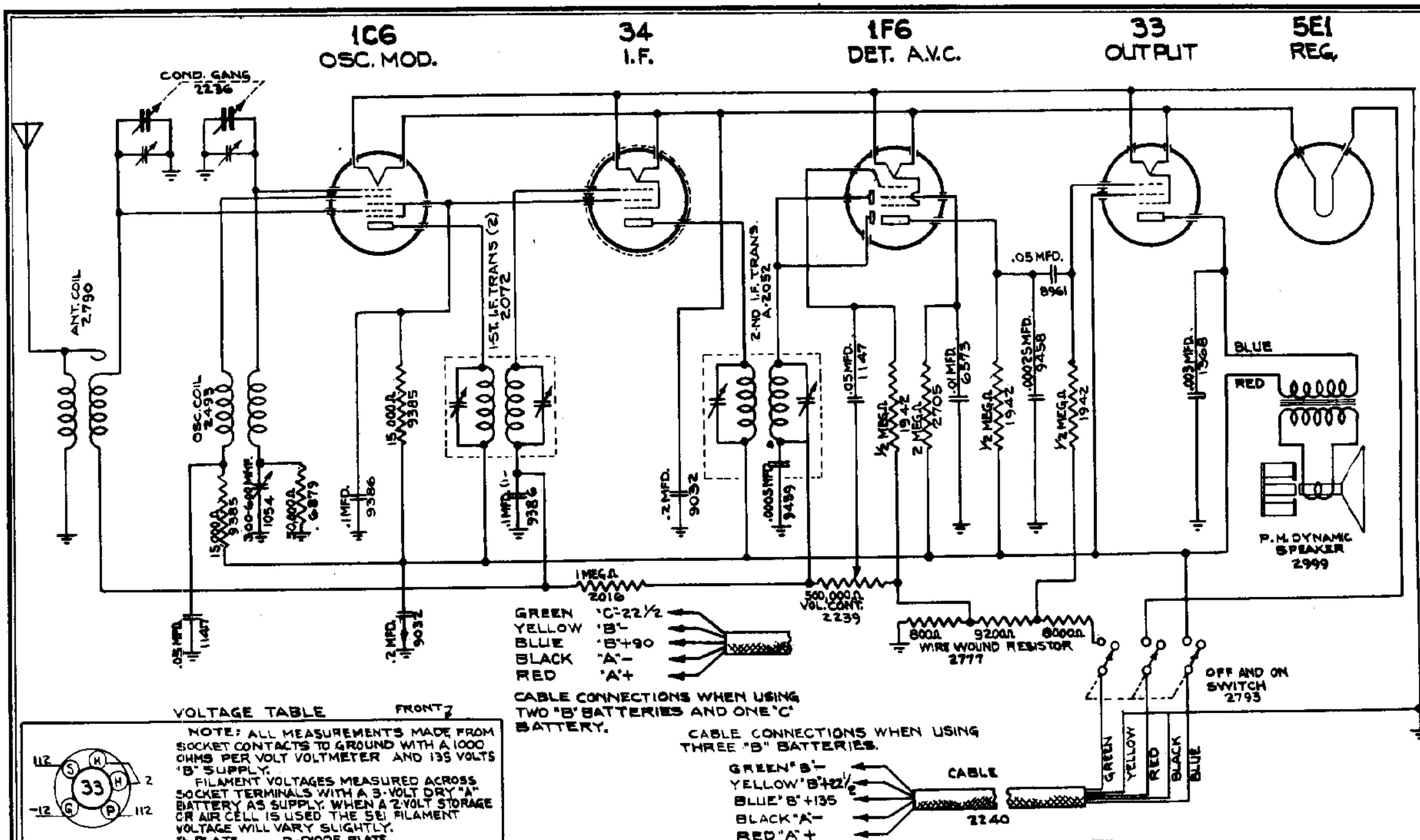
SENTINEL RADIO CORP.

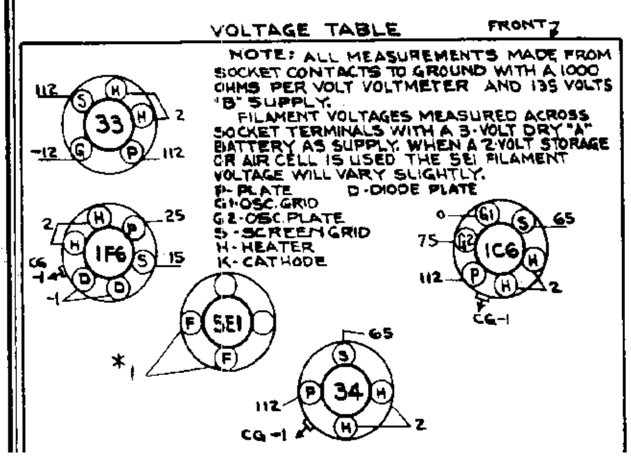


PEAK IF trimmers at 465 KC. BROADCAST BAND - Dial and generator to 1720 KC, adjust oscillator trimmer to peak, then dial and generator to 1400 KC, peak antenna trimmer. Dial and generator to 600 KC, pad oscillator circuit to peak, while rocking variable condenser. LONG WAVE BAND - Dial and generator to 390 KC, peak oscillator trimmer. Dial and generator to 350 KC, peak antenna trimmer. Pad the oscillator circuit at 150 KC. while rocking variable condenser.

MODEL 60B
Schematic, Voltag
Alignment, Parts

SENTINEL RADIO CORP.





I.F. - 465 K.C.

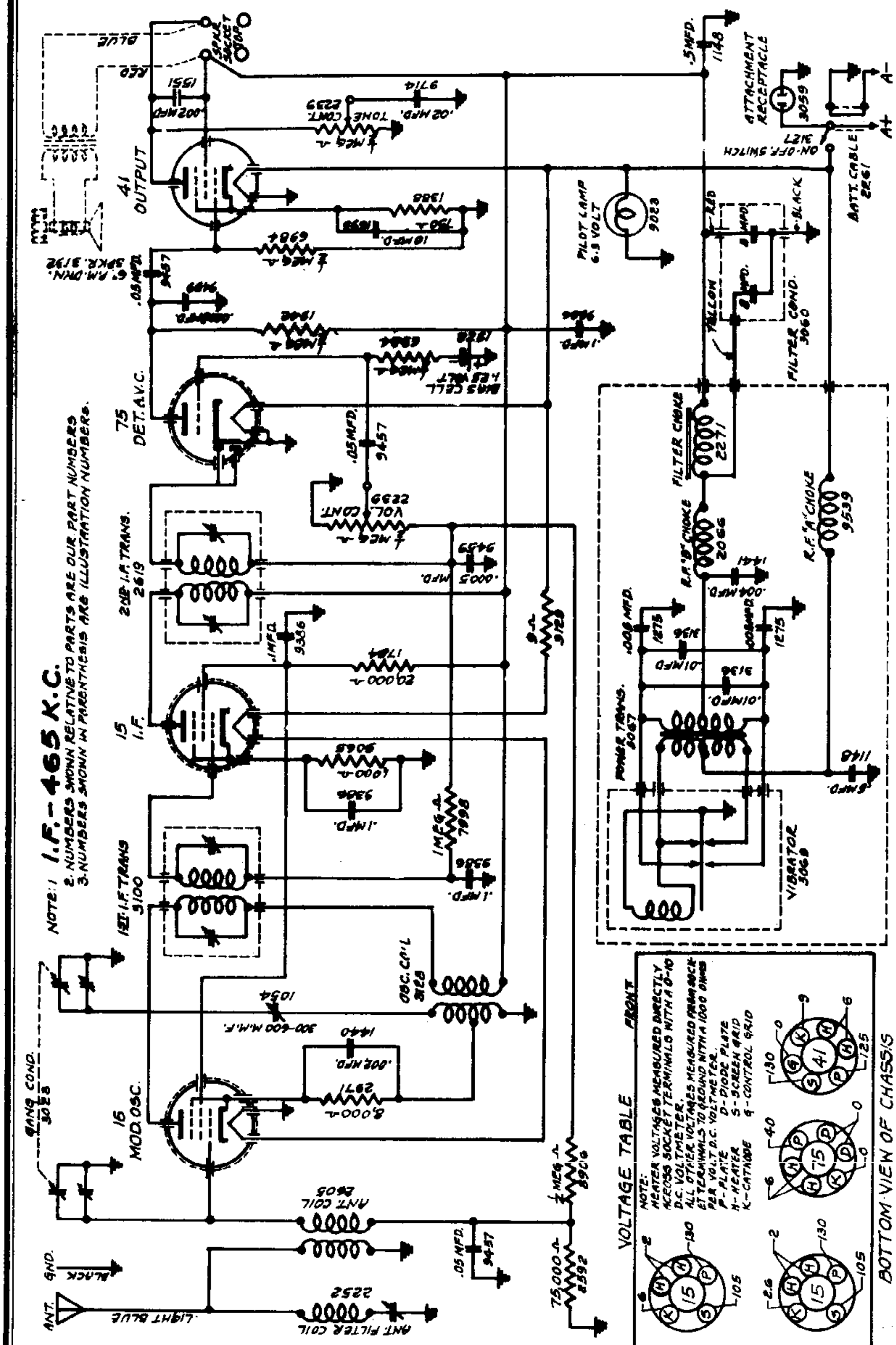
FREQUENCY RANGE -
1720 to 535 KC

CONVENTIONAL ALIGNMENT - see special section.

Align I-F trimmers at 465 KC. Dial and generator at 1720 KC, peak oscillator trimmer. Dial and generator to 1400 KC, peak antenna trimmer. Dial and generator at 600 KC, pad oscillator circuit to peak.

MODEL 63B
Schematic, Voltage
Alignment, Parts

SENTINEL RADIO CORP.



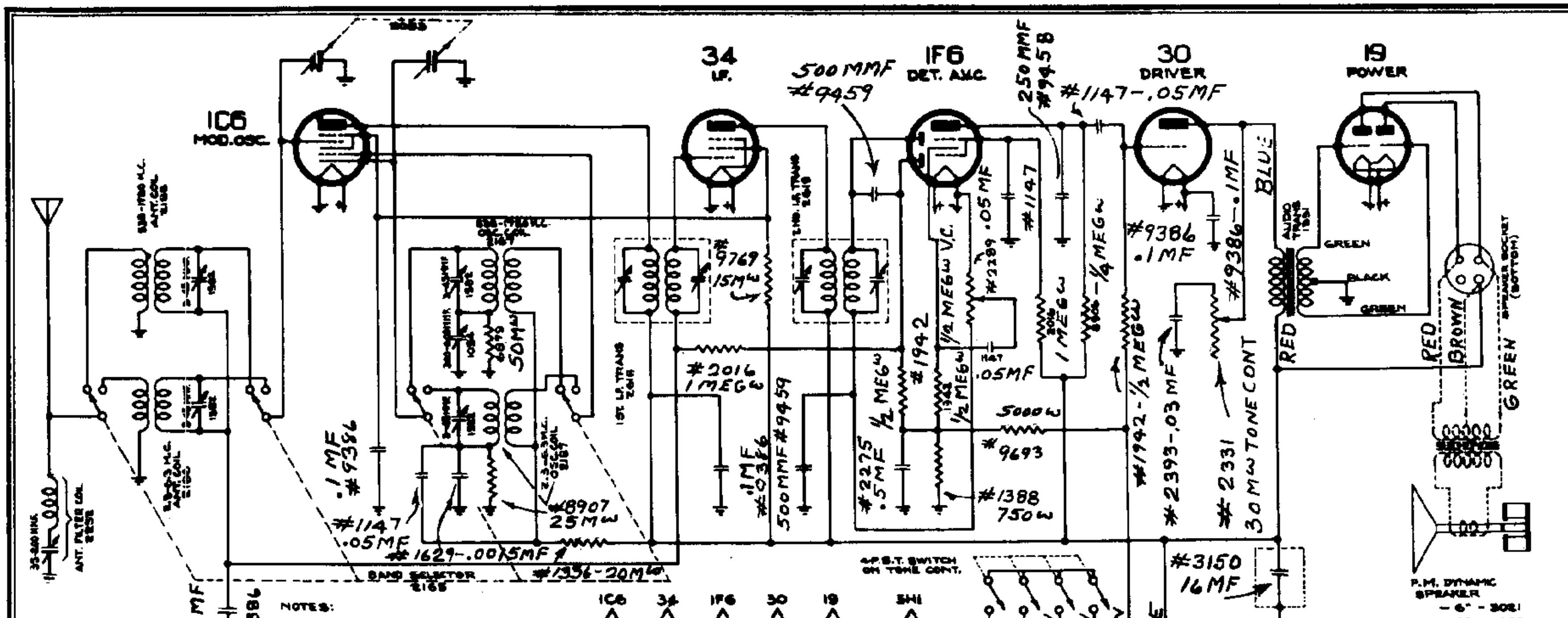
CONVENTIONAL ALIGNMENT - see special section.

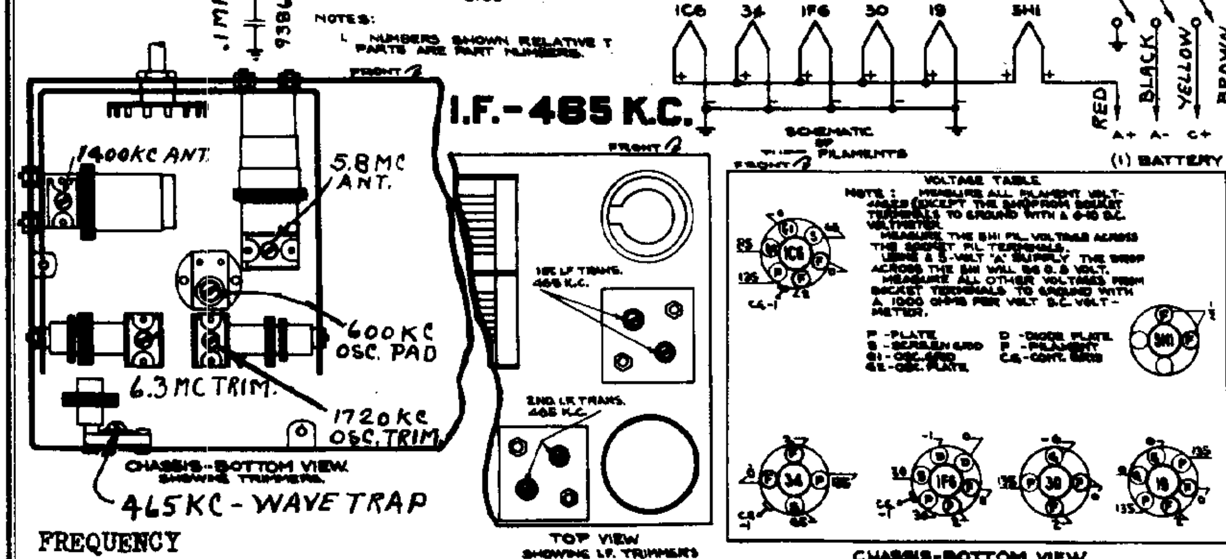
Align I-F transformer trimmers at 465 KC. Dial and generator set at 1720 KC, then peak the oscillator trimmer. Dial and generator at 1400 KC, then peak the antenna trimmer. Dial and generator at 600 KC, then while rocking the variable condenser, pad the oscillator circuit to maximum peak. Repeat adjustments for maximum performance.

FREQUENCY RANGE
1720 to 535 KC

MODEL 65B
Schematic, Trimmers
Voltage, Alignment
Parts

SENTINEL RADIO CORP.



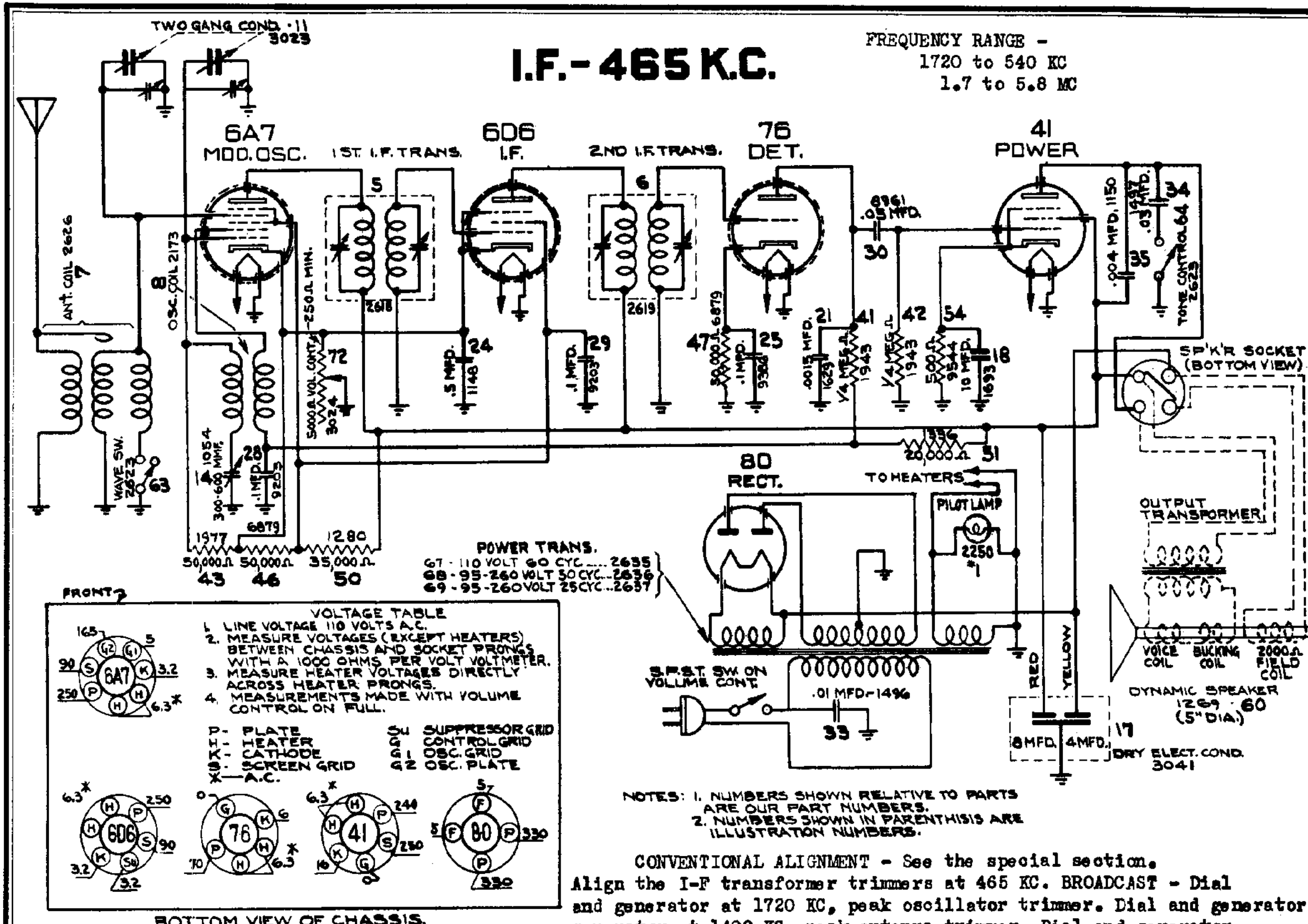


FREQUENCY
RANGES -
1720 to 535 KC
2.3 to 6.3 MC

Align I-F trimmers at 465 KC. BROADCAST - The dial and generator set at 1720 KC, peak oscillator trimmer, then shift dial and generator to 1400 KC, peak antenna trimmer. Dial and generator at 600 KC, pad oscillator circuit to peak. SHORTWAVE - Dial and generator to 6.3 MC, peak Oscillator trimmer. Dial and generator to 5.8 MC, peak antenna trimmer. No padding of oscillator circuit is required on the short wave band. When padding the BROADCAST oscillator rock variable condenser. Adjust wavetrap to 465 KC. Repeat all adjustments.

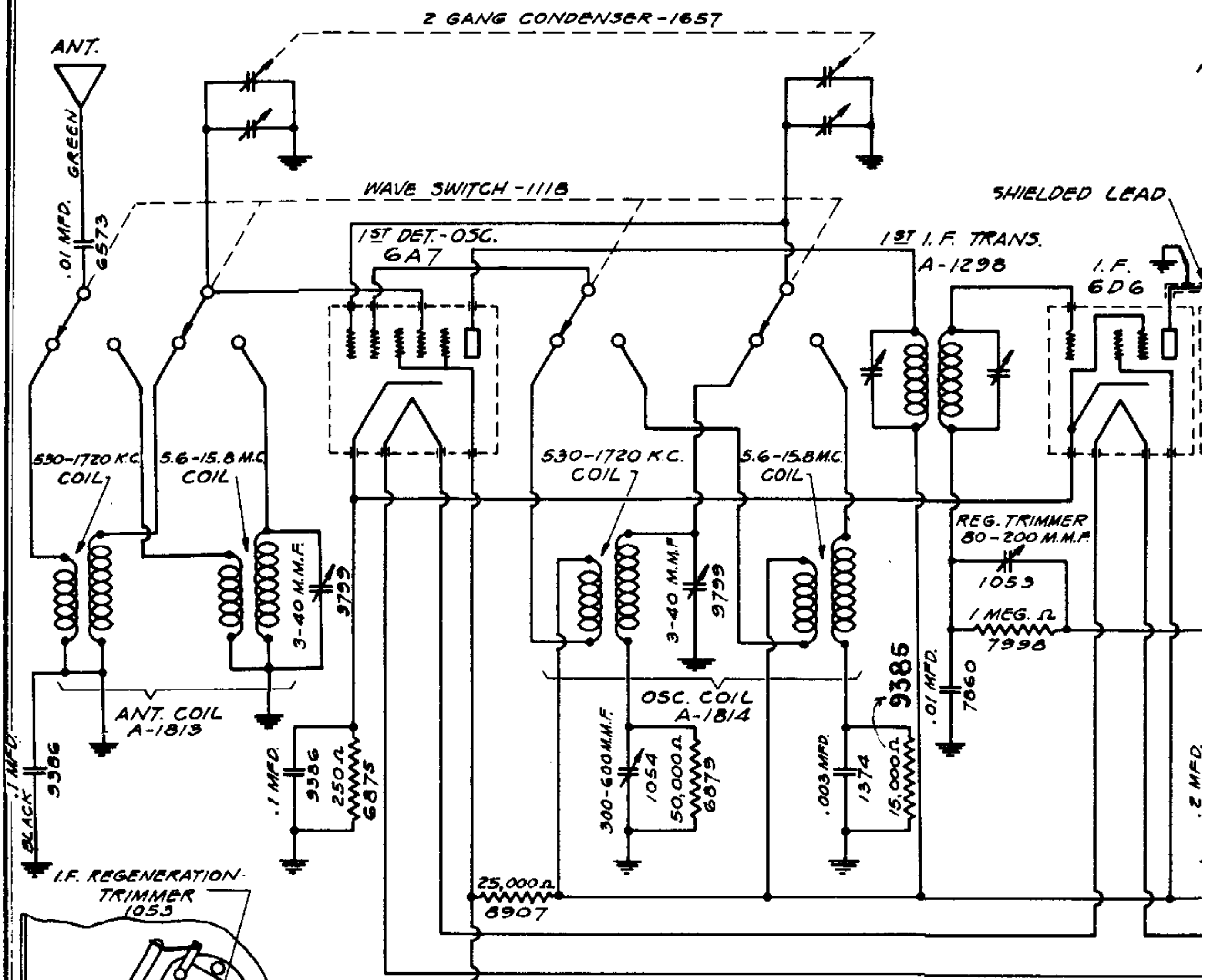
MODEL 70A
Schematic, Voltage
Alignment, Parts

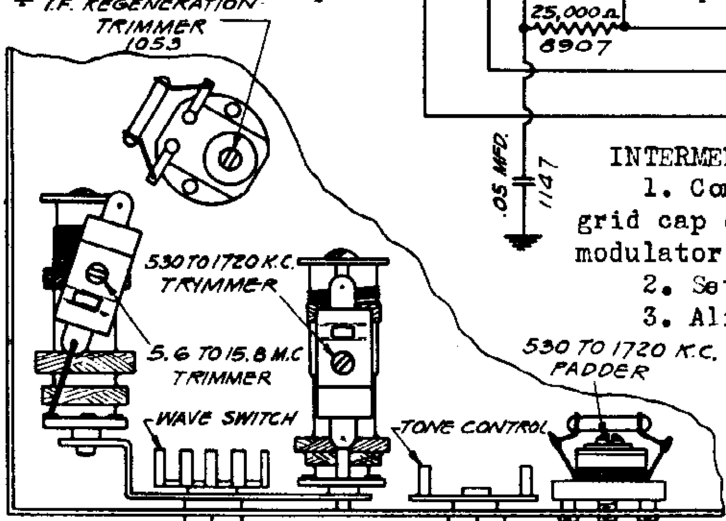
SENTINEL RADIO CORP.



NOTES: 1. NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
2. NUMBERS SHOWN IN PARENTHISIS ARE ILLUSTRATION NUMBERS.

CONVENTIONAL ALIGNMENT - See the special section.
Align the I-F transformer trimmers at 465 KC. BROADCAST - Dial and generator at 1720 KC, peak oscillator trimmer. Dial and generator generator at 1400 KC, peak antenna trimmer. Dial and generator at 600 KC, pad oscillator circuit to peak while rocking the variable condenser. POLICE - No adjustments required.





LOCATION OF PADDERS & TRIMMERS IN LEFT HAND (FRONT) BOTTOM OF CHASSIS

INTERMEDIATE ALIGNMENT -

1. Connect generator output to control grid grid cap disconnected, then connect a 1 megohm r modulator grid to chassis ground.

2. Set generator frequency to 465 KC 9 must

3. Align 1st I-F transformer by adjusting ea

4. Adjust 2nd I-F transformer in the

5. Adjust the I-F regeneration trimme chassis for maximum 465 KC signal. If this trimmer causes receiver to oscil ust to point where oscillation just s 1/8 turn. ALIGNMENT OF VARIABLE CON

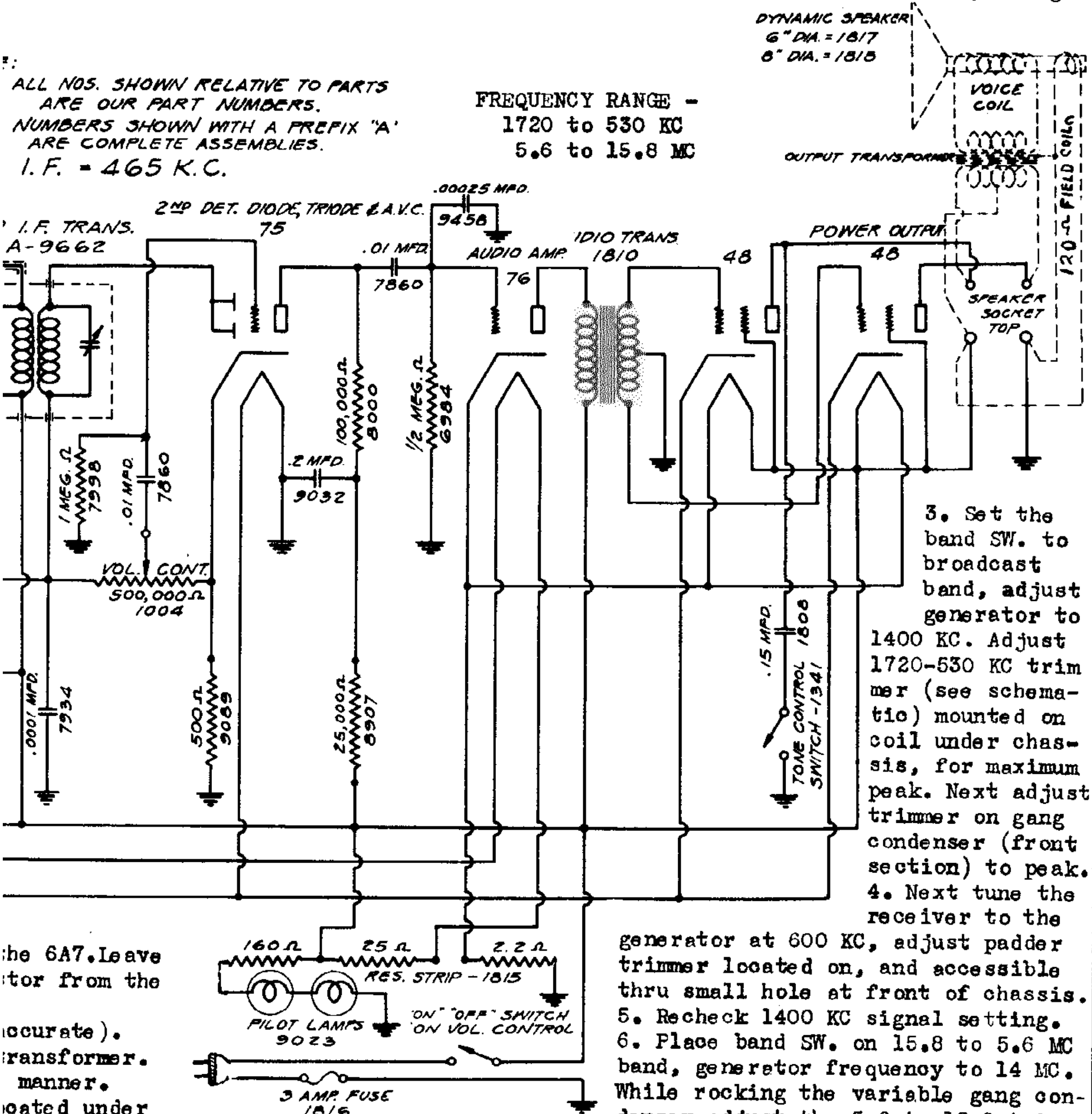
1. Connect generator thru 250 MMF condense lead and the ground to chassis.

2. Place band selector SW. on 15.8 to 5.6 receiver to exactly 14 MC. Then bring receiver to maximum output by adjusting trimm located on top of gang condenser (OSC section). When adjusting this trimmer, two p mental and image peak will be noticed. Care must be taken that the fundamental is u ustment. Back trimmer to minimum capacity, next screw down until 1st peak (fundamen When fundamental peak is obtained adjust trimmer to maximum output at 14 MC.

DIO CORP.

Trimmers, Alignment Parts

MODEL 6900 Schematic, Voltage



3. Set the band SW. to broadcast band, adjust generator to 1400 KC. Adjust 1720-530 KC trimmer (see schematic) mounted on coil under chassis, for maximum peak. Next adjust trimmer on gang condenser (front section) to peak.
4. Next tune the receiver to the generator at 600 KC, adjust padder trimmer located on, and accessible thru small hole at front of chassis.
5. Recheck 1400 KC signal setting.
6. Place band SW. on 15.8 to 5.6 MC band, generator frequency to 14 MC. While rocking the variable gang condenser adjust the 5.6 to 15.8 trimmer, mounted one one of the coils underneath the chassis.

:he 6A7. Leave
tor from the

ccurate).
ransformer.
manner.
ocated under
justment of
, always adj-
, then back
ER
set antenna

and, tune the
ondenser
, the funda-
for the adj-
is obtained.

CONVENTIONAL ALIGNMENT
(see special section)

VOLTAGE TABLE
Battery Voltage - 32 Volts
Wave Band - Broadcast

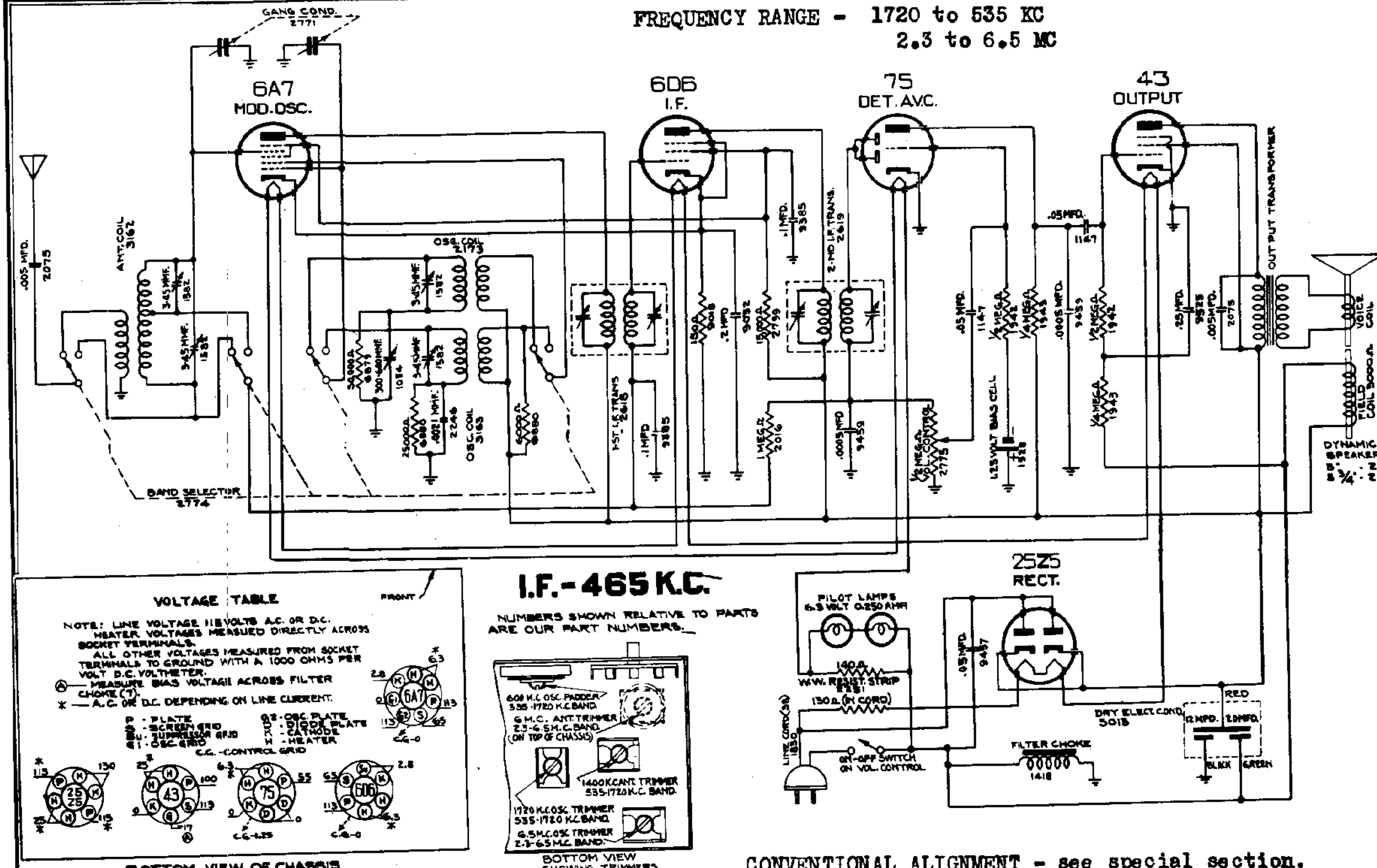
TUBE		FILAMENT	PLATE	SCREEN	CATHODE	GRID NO.2	GRID NO. 3 & 5
6A7	1st Detector & Oscillator	6	32		.5	32	15
6D6	I. F. Amplifier	6	32	32	.6		
75	2nd Detector & A.V.C	6	5*				
76	1st Audio	6	30				
48	Output	6	30	32	5		
48	Output	6	30	32	5		

Triode plate comparative voltage only
Read all voltages from socket to chassis.

MODEL 71U
Schematic, Voltage
Alignment, Trimmers
Parts

SENTINEL RADIO CORP.

FREQUENCY RANGE - 1720 to 535 KC
2.3 to 6.5 MC



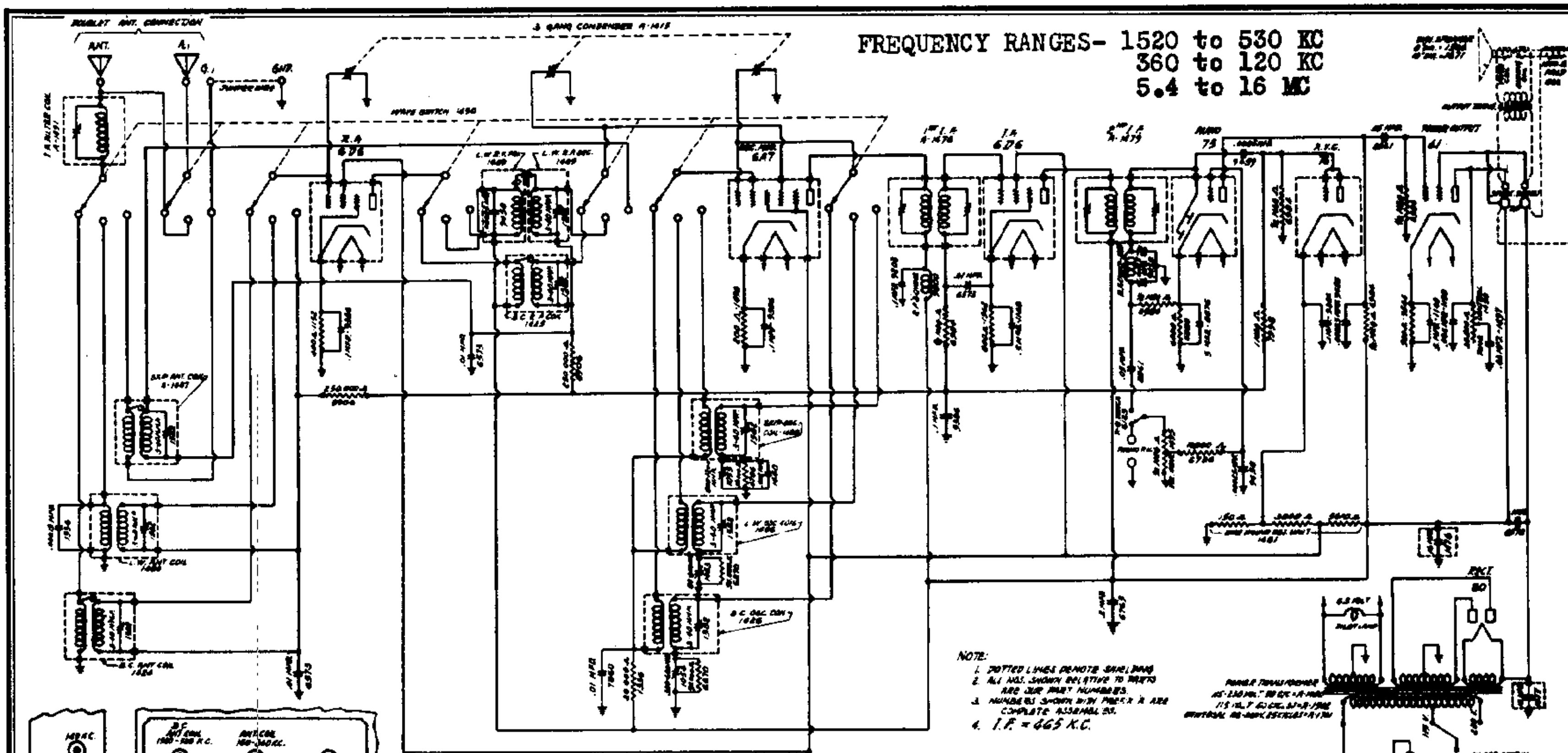
CONVENTIONAL ALIGNMENT - see special section.

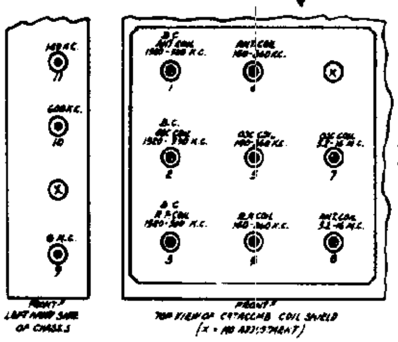
Align I-F trimmers at 465 KC. BROADCAST - Dial and generator at 1720 KC, peak oscillator trimmer. Dial and generator at 1400 KC, peak the antenna trimmer. Dial and generator at 600 KC, pad the oscillator circuit while rocking the variable condenser. SHORTWAVE - Dial and generator at 6.5 MC, peak the oscillator trimmer to maximum, then dial and generator to 6 MC, peak the antenna trimmer. No padding adjustment required on this band.

MODEL 7200
Schematic, Voltage
Trimmers, Alignment
Parts

SENTINEL RADIO CORP.

FREQUENCY RANGES- 1520 to 530 KC
360 to 120 KC
5.4 to 16 MC





Line Voltage	:	115 volt 60 cycle
Volume Control	:	Full on
Wave Band	:	Broadcast

TUBE		FIL.	PLATE	SCREEN	CATHODE	GRID NO.1	GRID NO.2	GRID NO. 3 & 5
6A7	Oscillator & 1st Detector	6.2	250	94	2.5	4.5	175	94
6D6	R. F.	6.2	250	94	3.4			
6D6	I. F.	6.2	250	94	3.2			
75	2nd Det. & 1st Audio	6.2	70#		1.2			
76	A. V. C.	6.2			3.4			
41	Output	6.2	250	94	15			
80	Rectifier	4.9		80 M. A. Total Drain				

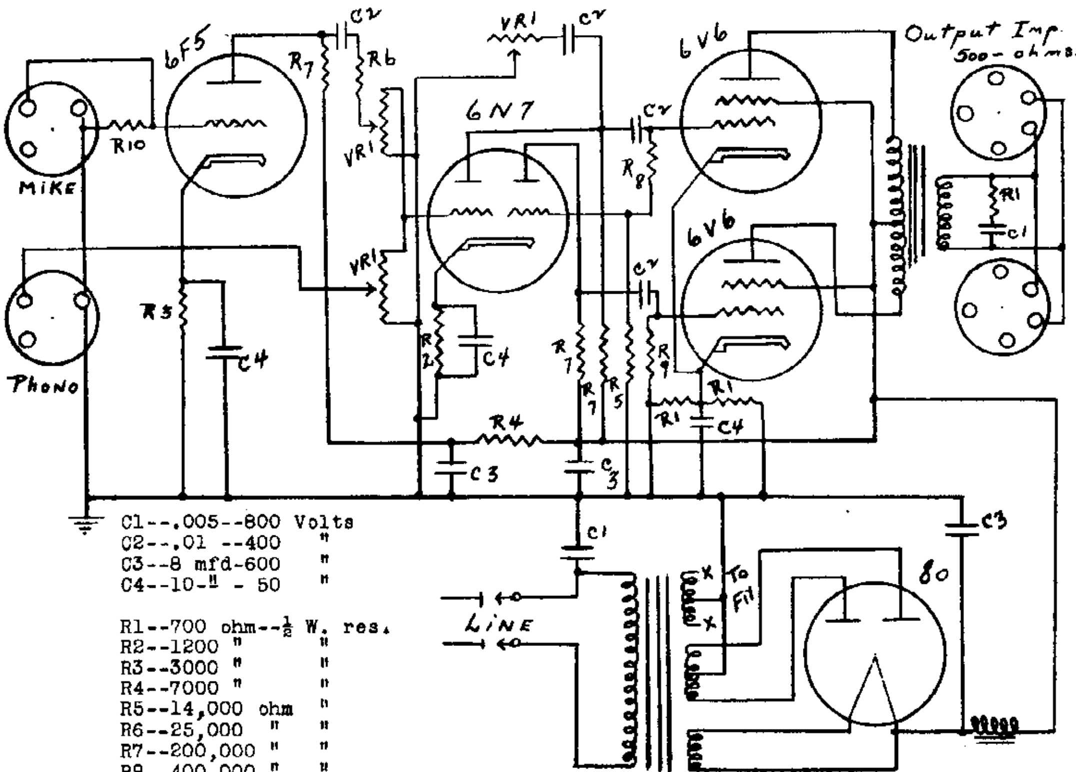
\# - Triode Plate
Read all voltages from socket to chassis with 1000 ohm per volt meter.

CONVENTIONAL ALIGNMENT
(see special section)

Align I-F transformer trimmers at 465 KC. BROADCAST - Dial and generator at 1400 KC, peak trimmers No. 2, then Nos. 1 and 3. Dial and generator at 600 KC, adjust trimmer No. 10 to maximum peak. LONG-WAVE- Dial and generator at 350 KC, adjust trimmers No.5, then 4 and 6, to peak. Dial and generator at 150 KC, peak trimmer No. 11. SHORTWAVE - Dial and generator at 15 MC, peak trimmer No. 6, then trimmers Nos. 7 and 8. (Note- on first node from minimum). Dial and generator at 6 MC, peak trimmer No. 9. Adjust wave trap for minimum signal on 465 KC. Rock variable condenser during padding.

SETCHELL CARLSON, INC.

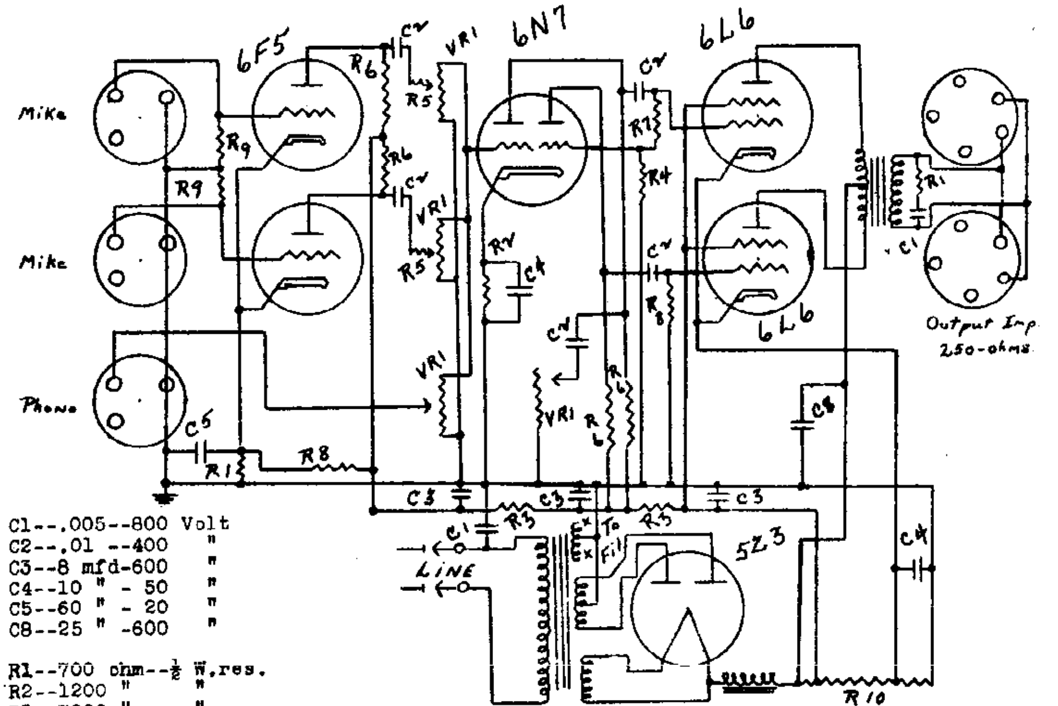
MODEL PA 13 Amplifie
MODEL PA 25 Amplifie
Schematics



C1--.005--800 Volts
C2--.01 --400 "
C3--8 mfd-600 "
C4--10-" - 50 "

R1--700 ohm--½ W. res.
R2--1200 " "
R3--3000 " "
R4--7000 " "
R5--14,000 ohm "
R6--25,000 " "
R7--200,000 " "
R8--400,000 " "
R9--500,000 " "
R10--1 meg. " "
VR1--1½ meg." Potentiometer

MODEL P.A. 13



C1--.005--800 Volt
C2--.01 --400 "
C3--8 mfd-600 "
C4--10 " - 50 "
C5--60 " - 20 "
C8--25 " -600 "

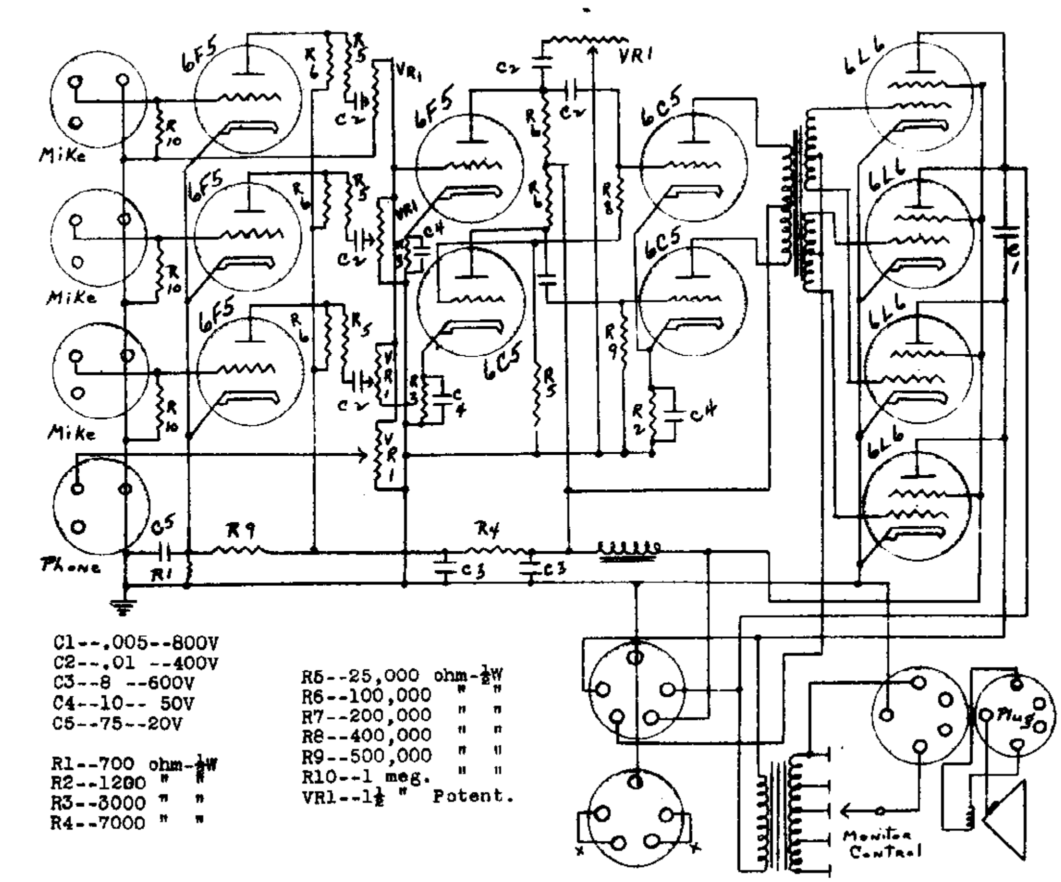
R1--700 ohm--½ W.res.
R2--1200 " "
R3--7000 " "
R4--14,000 ohm "
R5--25,000 " "
R6--200,000 " "
R7--400,000 " "
R8--500,000 " "
R9--1 meg. " "

R10--6635 Ohm tapped 100 W.
VR1--1½ meg." Potentiometer

MODEL P.A. 25

MODEL PA 115 Amplifier
Schematic

SETCHELL CARLSON, INC.

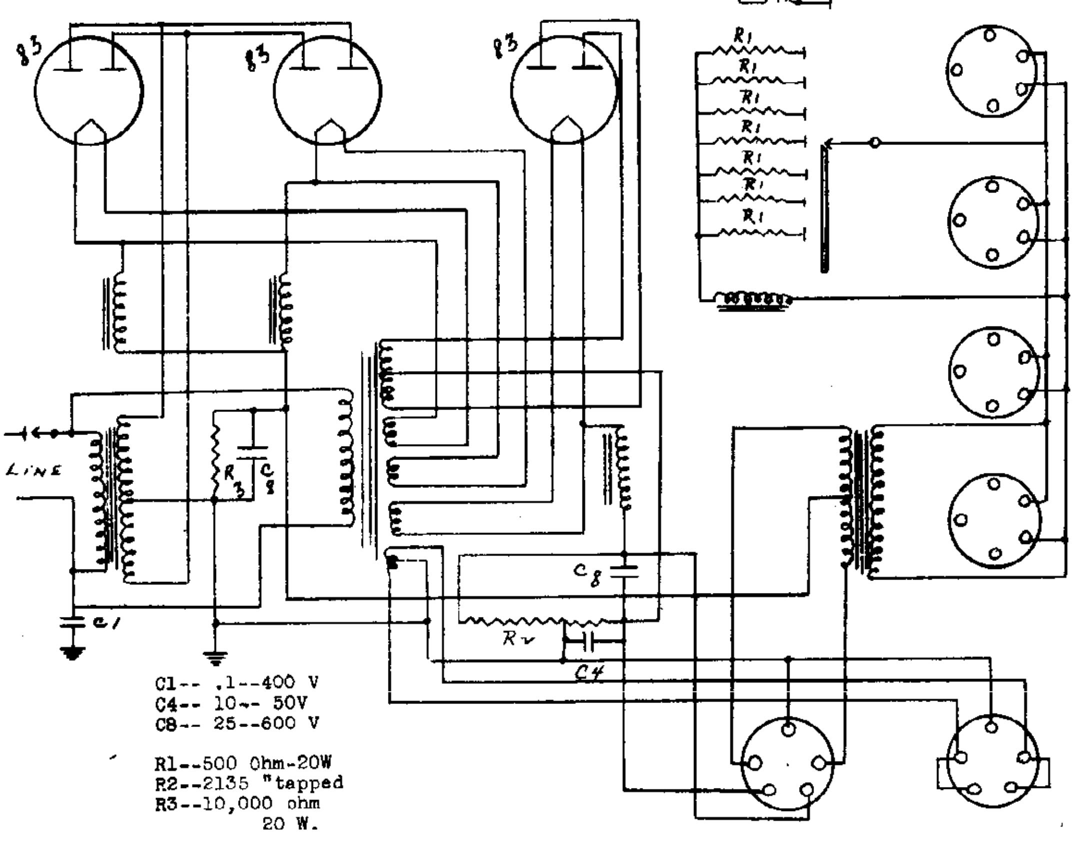


C1--.005--800V
C2--.01 --400V
C3--8 --600V
C4--10-- 50V
C5--75--20V

R1--700 ohm-½W
R2--1200 " "
R3--3000 " "
R4--7000 " "

R5--25,000 ohm-½W
R6--100,000 " "
R7--200,000 " "
R8--400,000 " "
R9--500,000 " "
R10--1 meg. " "
VR1--1½ " Potent.

MODEL P.A. 115
MIXER AND AMPLIFIER CIRCUIT



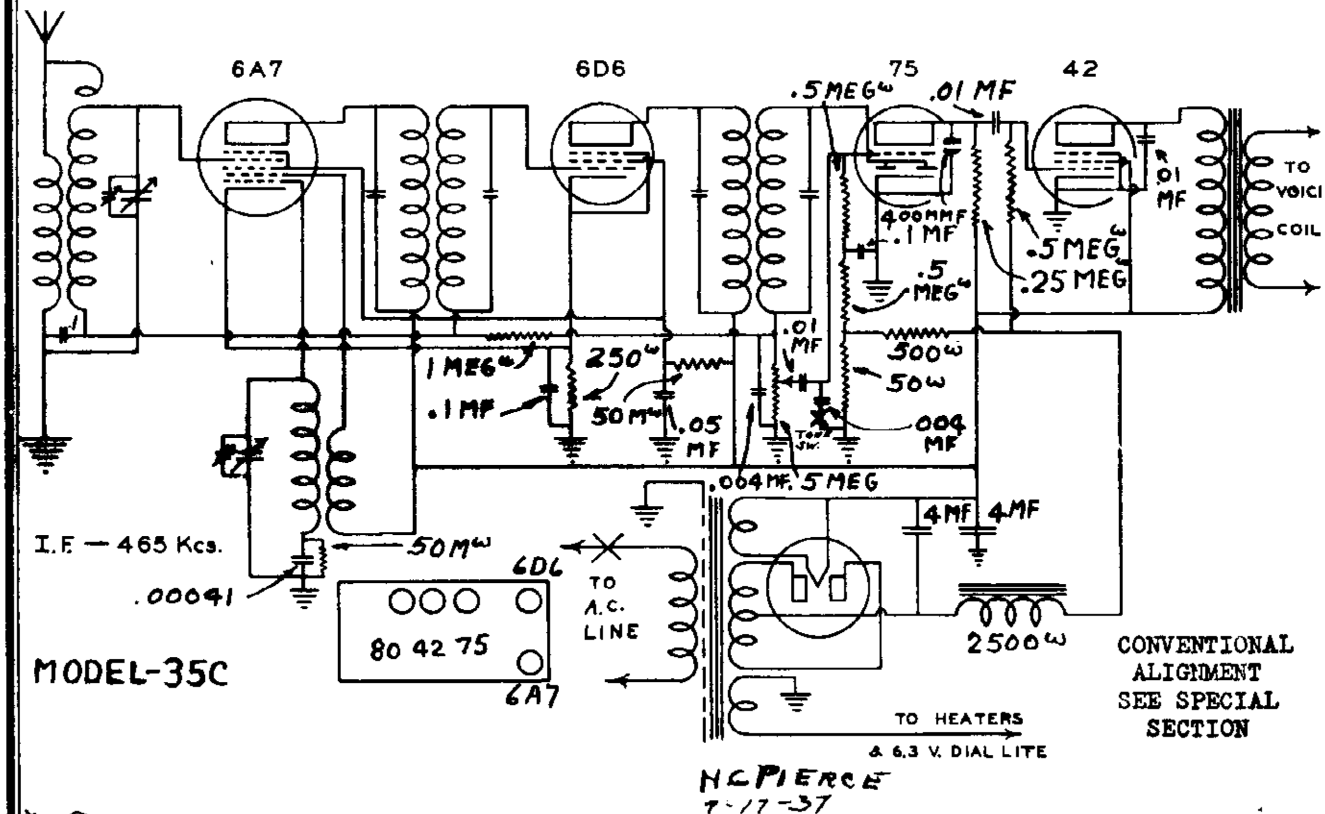
C1-- .1--400 V
C4-- 10-- 50V
C8-- 25--600 V

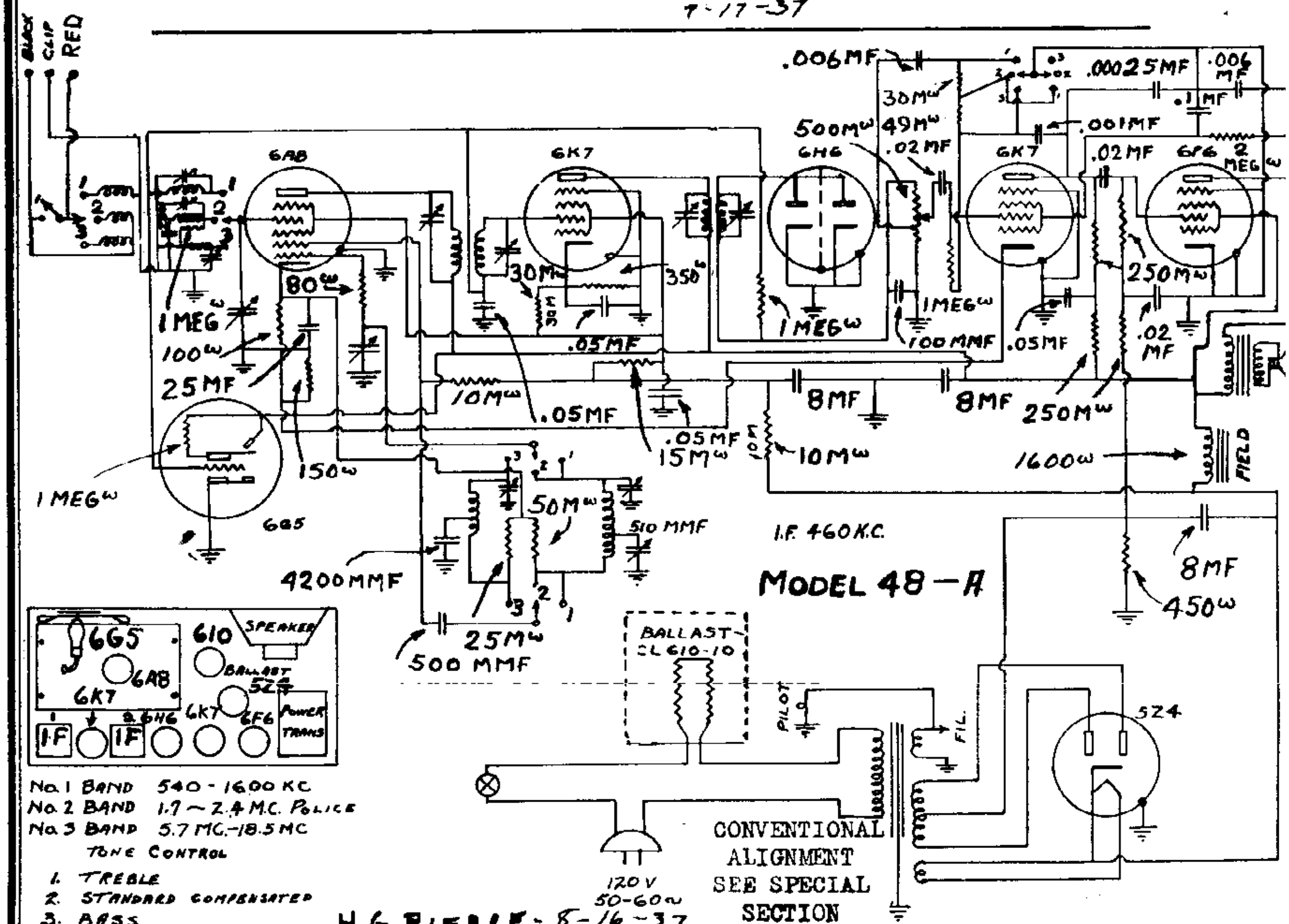
R1--500 Ohm-20W
R2--2135 "tapped
R3--10,000 ohm
20 W.

MODEL P.A. 115
POWER AND OUTPUT CIRCUIT

MODEL 35-C
MODEL 48-A
Schematics
Socket

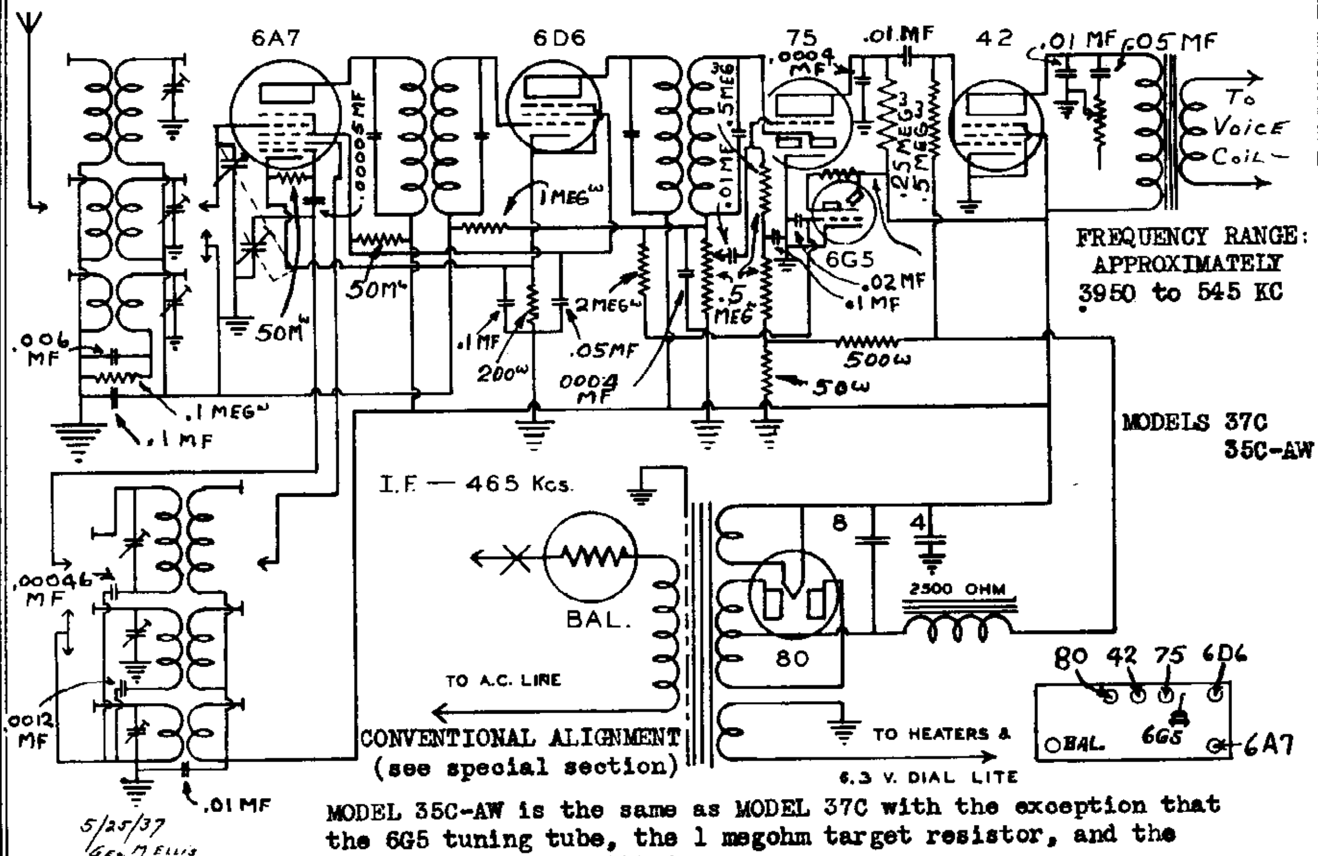
SHELLEY RADIO CO.





MODELS 35C-AW, 37-C
MODEL 75 Auto
Schematics, Socket
Alignment

SHELLEY RADIO CO.

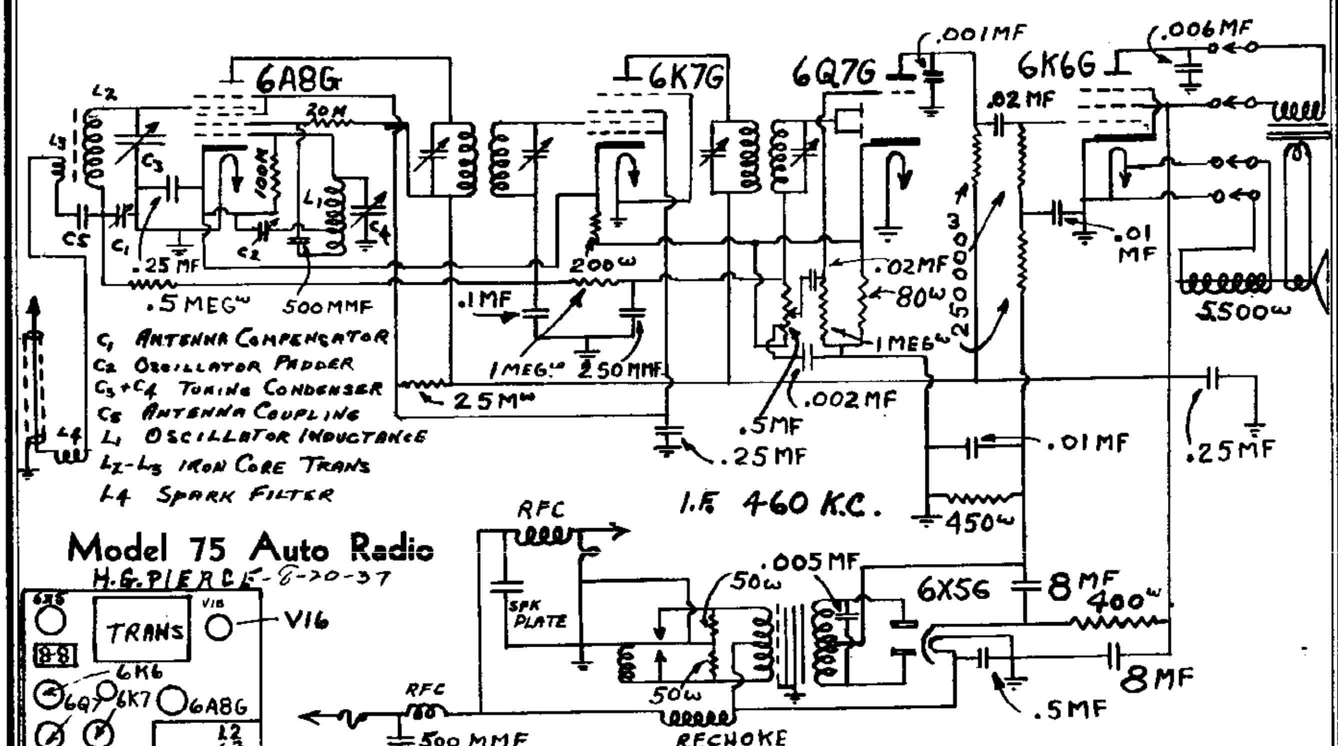


FREQUENCY RANGE: APPROXIMATELY 3950 to 545 KC

MODELS 37C 35C-AW

CONVENTIONAL ALIGNMENT (see special section)

MODEL 35C-AW is the same as MODEL 37C with the exception that the 6G5 tuning tube, the 1 megohm target resistor, and the ballast tube are omitted.

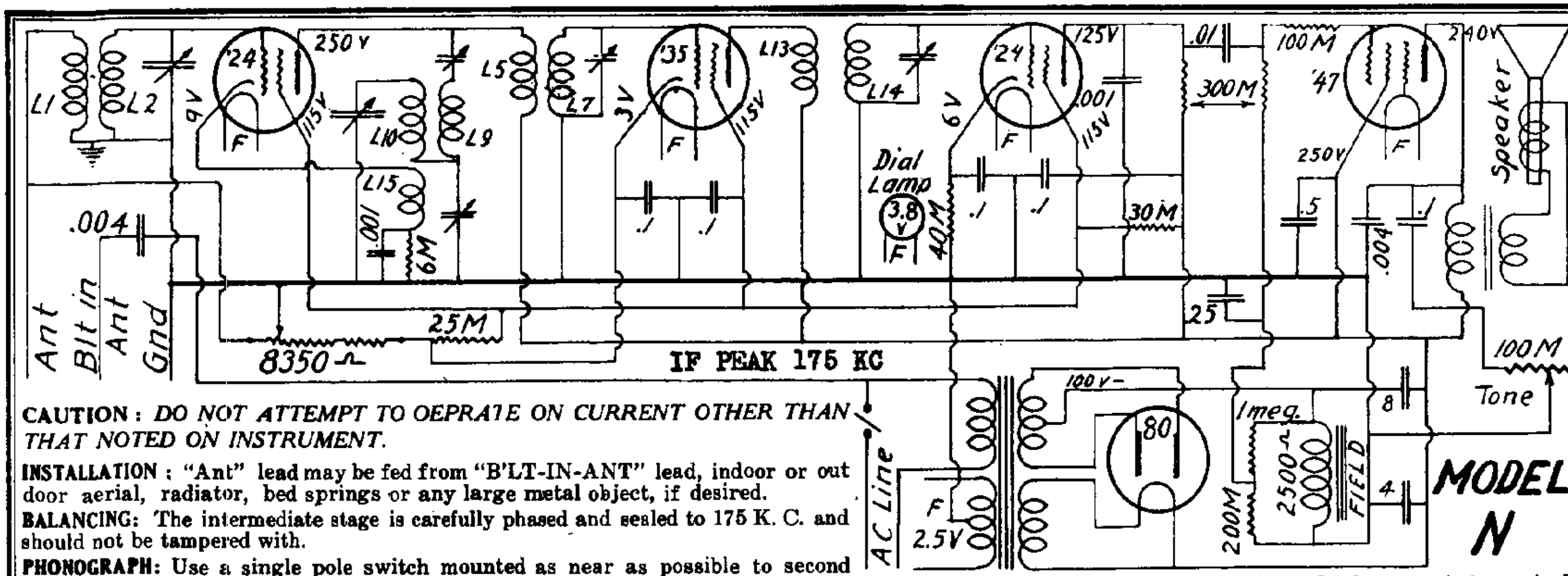


Model 75 Auto Radio
H.G. PIERCE - 8-20-37

CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION

SIMPLEX RADIO CO.

MODEL N (A.C.)
MODEL P Ser.#161001 & up (AC)
MODEL P Ser.#165200 & up (AC)
Schematics, Alignment, Voltage



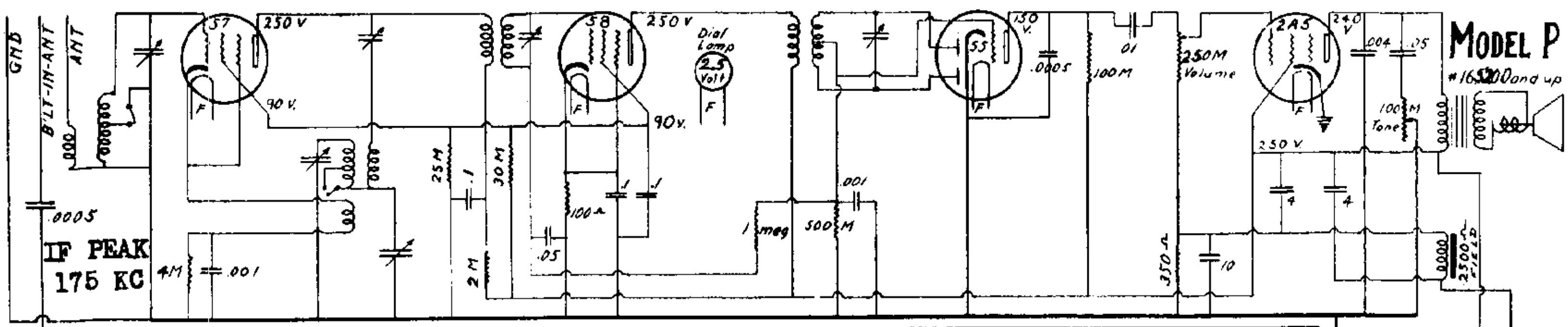
CAUTION: *DO NOT ATTEMPT TO OEPRATE ON CURRENT OTHER THAN THAT NOTED ON INSTRUMENT.*

INSTALLATION: "Ant" lead may be fed from "B'LT-IN-ANT" lead, indoor or out door aerial, radiator, bed springs or any large metal object, if desired.

BALANCING: The intermediate stage is carefully phased and sealed to 175 K. C. and should not be tampered with.

PHONOGRAPH: Use a single pole switch mounted as near as possible to second detector socket, connect in series with lead from ground end of grid coil of second detector tube. Solder phonograph pickup leads to switch terminals

CONVENTIONAL ALIGNMENT - See the special section.



CAUTION: *Do not attempt to operate on current other than that noted on instrument.*

INSTALLATION: "Ant" lead may be fed from "B'LT-IN-ANT" lead, indoor or out door aerial, radiator, bed springs or any large metal object, if desired.

BALANCING: The intermediate stage is carefully phased and sealed to 175 K. C. and should not be tampered with.

THE TONE CONTROL: is on short wave when turned to extreme left. A slight turn to right is regular broadcast. Further movement is tone control.

PHONOGRAPH: Use a single pole switch mounted as near as possible to socket marked "55"; connect one side to green resistor with yellow dot at end attached to yellow wire; connect other side. in series with phonograph pickup leads, to chassis.

Receivers of SERIAL # 161001 to 165200 use 500000 ohm volume control, those of SERIAL # 165200 & up use 250000 ohm volume control.

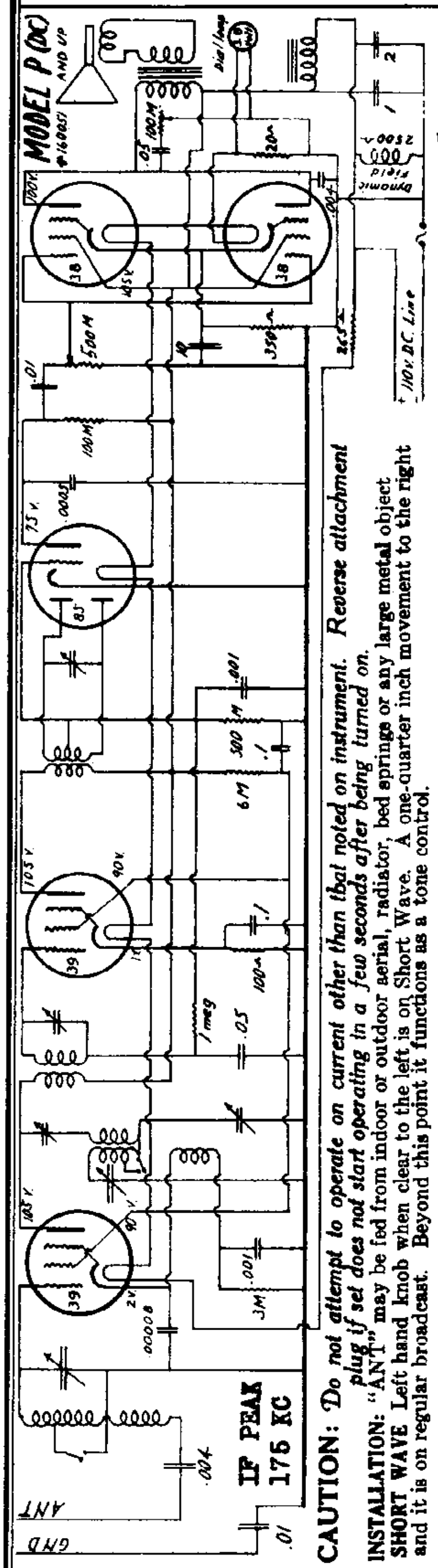
CONVENTIONAL ALIGNMENT - See the special section.

MODEL P(DC) Ser.#160051 & up
MODEL R(DC) Ser.#150804 & up
MODEL R(AC) Ser.#175001 & up
Schematics, Voltage, Alignment

SIMPLEX RADIO CO.

THE ALIGNMENT OF THESE RECEIVERS IS CONVENTIONAL
(SEE THE SPECIAL SECTION)

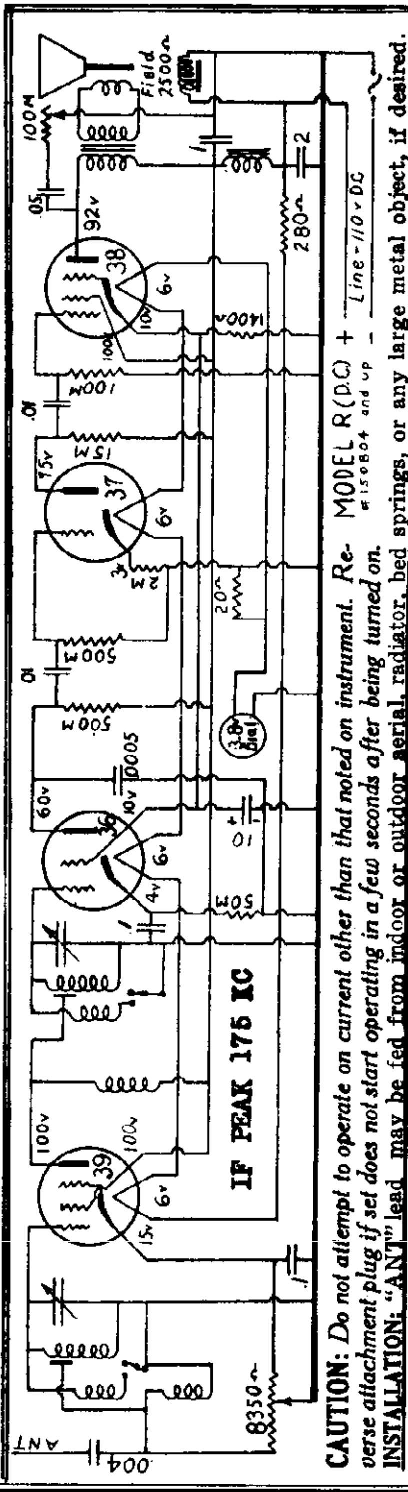
PHONOGRAPH: Use a single pole switch mounted as near as possible to the socket, marked "35"; connect one side to green resistor with yellow dot at end attached to yellow wire; connect other side, in series with phonograph pick-up leads, to chassis.



CAUTION: *Do not attempt to operate on current other than that noted on instrument. Reverse attachment plug if set does not start operating in a few seconds after being turned on.*

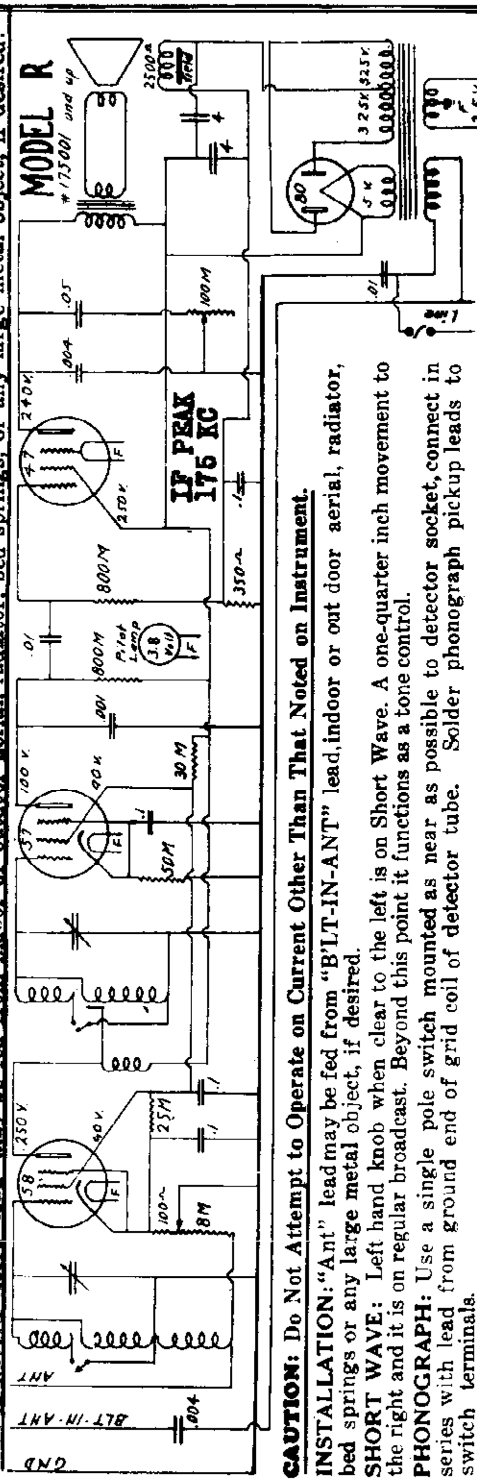
INSTALLATION: "ANT" may be fed from indoor or outdoor aerial, radiator, bed springs or any large metal object.

SHORT WAVE Left hand knob when clear to the left is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.



CAUTION: *Do not attempt to operate on current other than that noted on instrument. Reverse attachment plug if set does not start operating in a few seconds after being turned on.*

INSTALLATION: "ANT" lead may be fed from indoor or outdoor aerial, radiator, bed springs, or any large metal object, if desired.



CAUTION: Do Not Attempt to Operate on Current Other Than That Noted on Instrument.

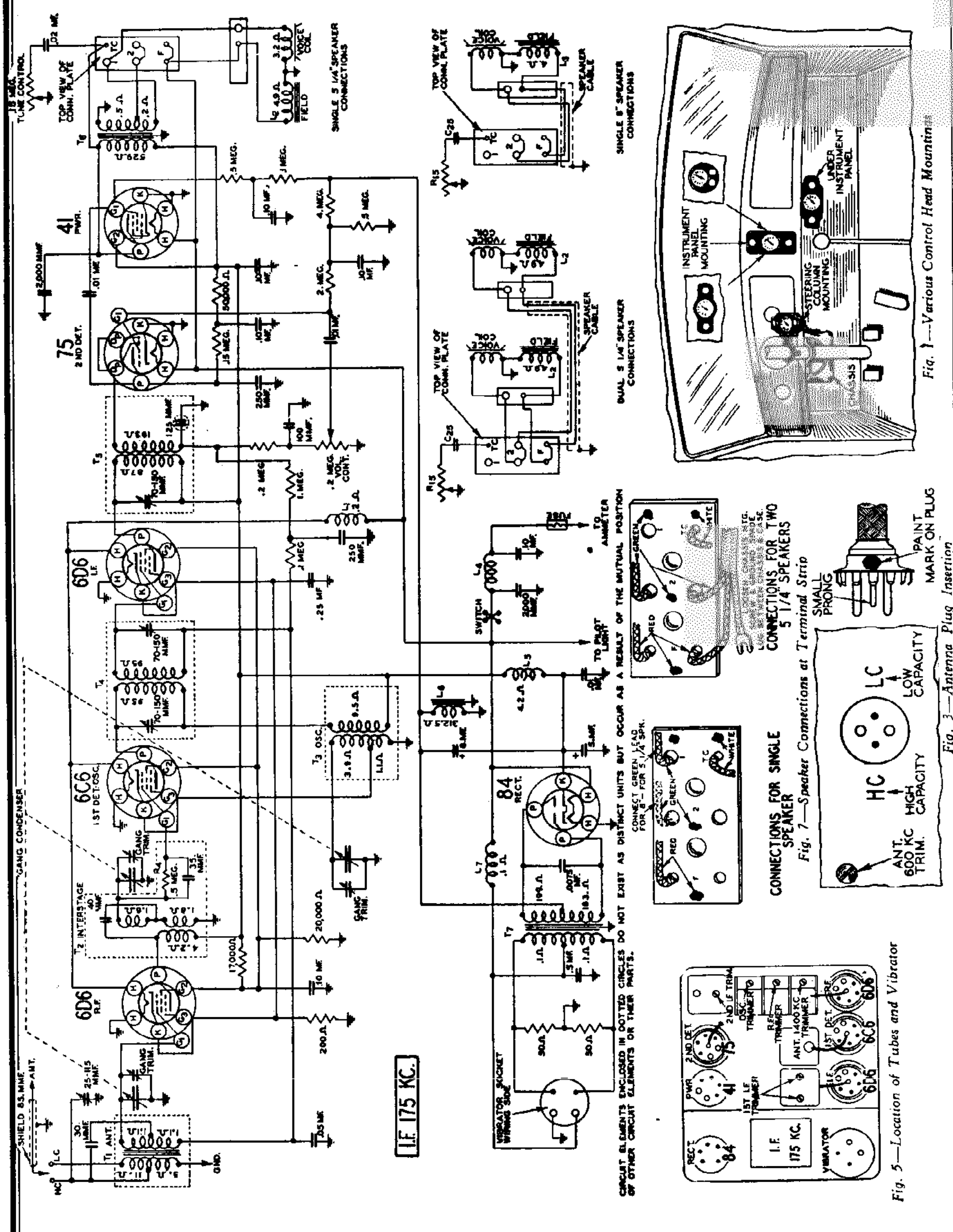
INSTALLATION: "Ant" lead may be fed from "B'LT-IN-ANT" lead, indoor or out door aerial, radiator, bed springs or any large metal object, if desired.

SHORT WAVE: Left hand knob when clear to the left is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use a single pole switch mounted as near as possible to detector socket, connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pickup leads to switch terminals.

SOBOL BROS.

Series 6C1 6 TUBE AUTOMOBILE RADIO



MODEL 6C1 Auto
Alignment, Data

SOBOL BROS.

Panel Mtg. Kits

Set the signal generator for 175 KC and connect the output of the signal generator through a .05 mf. condenser to the stator of the R.F. interstage section of the tuning condenser. Set the volume control at maximum. The chassis should be in the case. Connect the ground lead of the signal generator to the chassis. Attenuate the signal from the signal generator to prevent the levelling off action of the AVC. Then adjust the three IF trimmers until maximum output is obtained—See Fig. 5.

Set the signal generator for 1581 KC. Turn the rotor of the tuning condenser to the full open position. Insert the antenna plug with the mark on the high capacity (HC) side. Connect the shielded antenna lead from the chassis through a 120 mmf. condenser to the antenna post of the signal generator. Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained.

Set the signal generator for 1400 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained. Adjust the R.F. interstage and antenna 1400 KC trimmers for maximum output. Do not change the setting of the oscillator trimmer.

Then set the signal generator for 600 KC. Tune in this signal and adjust the 600 KC antenna trimmer to maximum (See Fig. 3 for location of this trimmer).

After the alignment procedure is completed, the antenna plug may be withdrawn and reinserted on the LC side if a low capacity (70 mmf.) car antenna is used.

Adjusting Antenna 600 KC Trimmer

Tune in a weak signal at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained. See Fig. 3 for location of this trimmer.

If the total capacity of the antenna and shielded lead is approximately 200 mmf., which would be the case in a running board or ordinary roof antenna (not metal roof), insert the antenna plug with the mark on the HC side—See Fig. 3.

If the total capacity of the antenna and shielded lead is approximately 70 mmf., such as may be the case if a "fish pole" antenna is used, insert the antenna plug with the mark on the LC side.

Distributor Suppressor—Remove the high tension lead to the distributor. Insert a distributor suppressor and connect the wire to the other end of the suppressor (See Fig. 6). If this is not practical, cut the high tension lead *close to the distributor* and use a wood screw end type distributor suppressor in this line.

Generator Condenser—The generator condenser is installed at the cut-out as shown in Fig. 6. The lead from the condenser goes to the terminal on the cut-out.

In some of the new cars the cut-out relay is on the front of the dash or in some other location. It will be most convenient to mount this generator condenser at the relay.

Withdraw Antenna Cable Plug

Turn on the radio and start the engine.

If motor noise is heard, proceed as follows:

Shielding High Tension Lead—In some cars, when the coil is mounted on the dash, the high tension lead from the coil must be covered with braided shielding to within about four inches of the distributor and the shield grounded to the motor block or frame.

Bypass Condenser—Try a .25 or .5 mfd. condenser from the ammeter to ground. Try a condenser from the car fuse to ground, switch to ground, windshield wiper connections and various other 6 volt connections to ground, noting what effect these condensers have on the noise pick-up.

Try a .25 or .5 mfd. condenser from the "Hot" side of the coil primary to ground. In some cases this condenser may not help. It can be tried out, however, experimentally.

Spark Plug Suppressors—If motor noise persists, spark plug suppressors must be installed. One suppressor is put on each plug as shown in Fig. 6. These are not regularly supplied with the radio and must be purchased extra. Seventy percent of all cars will not require spark plug suppressors.

Care should be taken that a good mechanical and electrical connection is made between the spark plugs, suppressors and plug wires.

Instrument Panel Mounting Kits

Car	Year & Model		Kit No.
Buick	1937	40-60 Series	21A68
		80-90 Series	21A69
	1936		21A16
Cadillac	1937		21A70
	1936		21A39
Chevrolet	1937	All Models	21A58
	1936-35	Standard & Master	21A11
Chrysler	1937	Royal	21A59
		Imperial	21A71
		Airflow	21A72
	1936	Six	21A19
		Eight	21A30
		Airflow	21A31
	1935-34	Except Imperial	21A47
DeSoto	1937		21A60
	1936	Airflow & Airstream Custom	21A22
		Airstream DeLuxe	21A26
	1935	DeLuxe	21A46
	1934		21A47
Dodge	1937		21A61
	1936	DeLuxe	21A13
	1935		21A45
	1934		21A49

Car	Year & Model		Kit No.
Ford	1937	DeLuxe	21A74
		Standard	21A73
	1936	Std. & DeLuxe	21A10
	1935	DeLuxe	
		Standard	21A32
	1934		21A38
Hudson	1937		21A75
	1936		21A17
	1935		21A48
	1934		21A35
LaFayette	1936-35		21A50
LaSalle	1937		21A70
	1936		21A40
Lincoln	Zephyr 1937		21A76
	Zephyr 1936		21A10
Nash	1937 Ambassador		21A63
	1936-35		21A36
Nash Laf. 400	1937		21A62
Oldsmobile	1936		21A14
	1935		21A34
Packard	1937	Six	21A56
		120-C	21A57
		Super 8 & 12	21A77
	1936	120-B	21A21
	1935	120	21A41

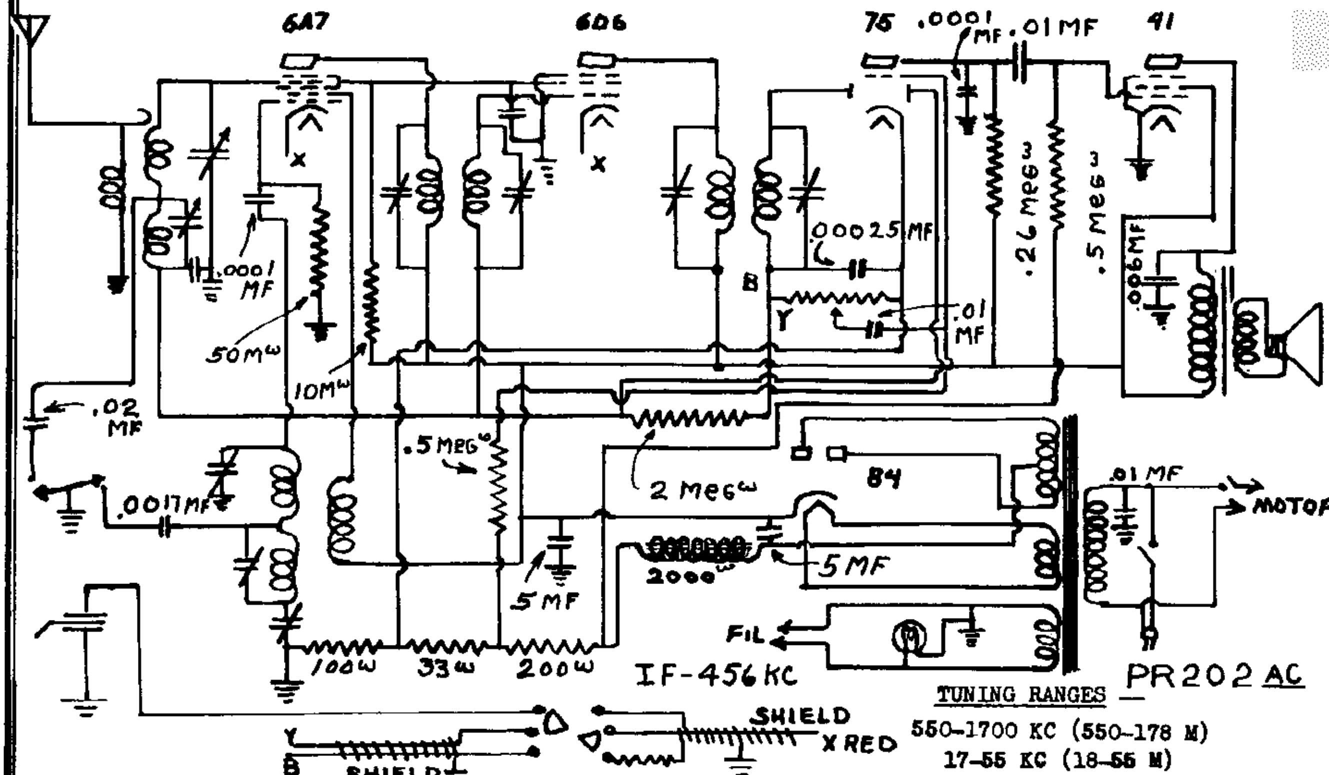
Car	Year & Model		Kit No.
Plymouth	1937	DeLuxe	21A78
		Standard	21A64
	1936	DeLuxe	21A12
	1936-35	Standard	21A37
	1935	DeLuxe	21A33
	1934		21A49
Pontiac	1937		21A79
	1936-35	Standard-DeLuxe 6 & 8	21A15
Studebaker	1937	Dictator Coupe	21A65
		Dictator	21A54
		President	21A55
	1936	Dictator	21A20
		President	21A24
Terraplane	1937		21A80
	1936		21A18
	1935		21A48
	1934		21A35
Steering column and under panel kit.	Chromium		21A66
	Black		21A67

The mounting kit includes escutcheon plate, knobs, special mounting brackets and small items such as screws. The other items are shipped with the radio.

SONORA

MODELS PR-101, PR-202
MODELS PR-101 AC-DC
PR-300 AC-DC
PR-400 AC-DC
Schematics

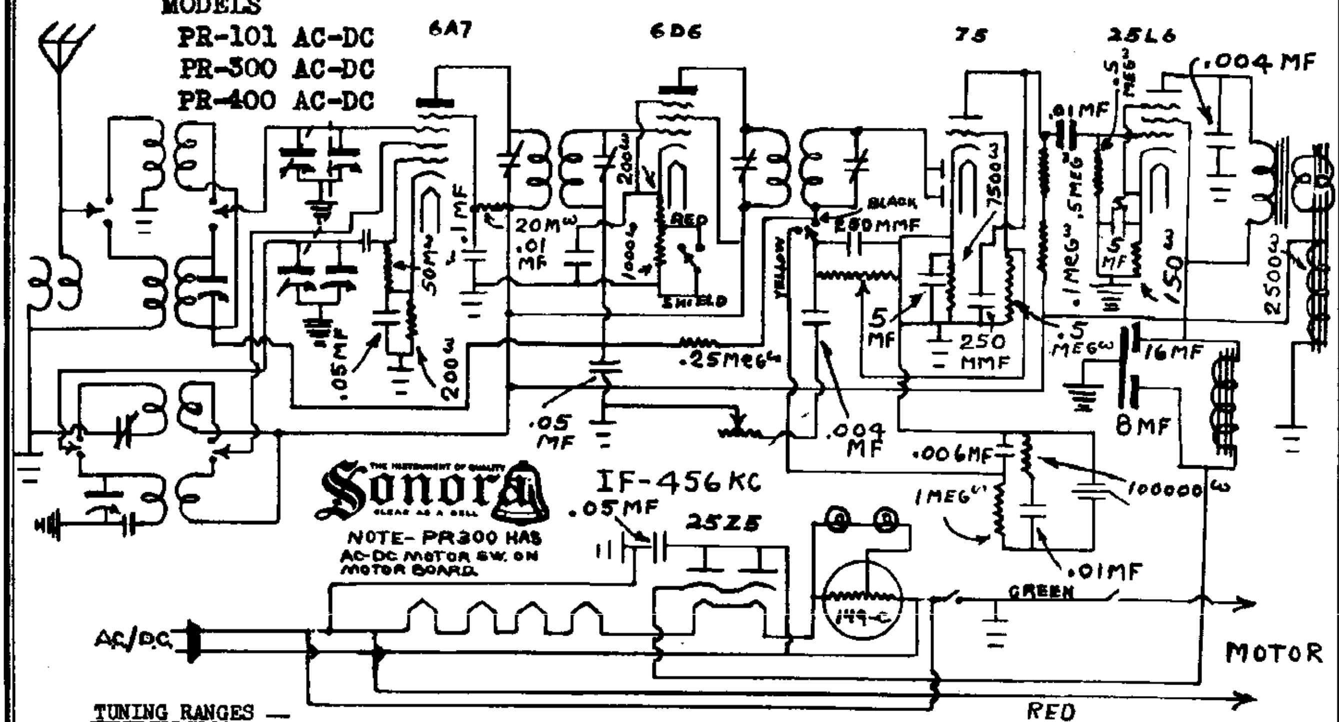
MODELS PR-101 and PR-202



TUNING RANGES —
550-1700 KC (550-178 M)
17-55 KC (18-55 M)

CONVENTIONAL ALIGNMENT (see special section)

MODELS
PR-101 AC-DC
PR-300 AC-DC
PR-400 AC-DC



TUNING RANGES —
550-1700 KC (550-178 M)
17-55 KC (18-55 M)

CONVENTIONAL ALIGNMENT (see special section)

MODEL Playette, Data
MODEL P-101 Amplifier
MODEL P-300 Amplifier
Schematics

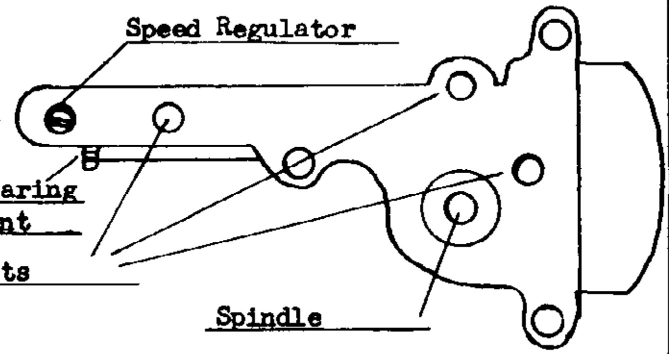
SONORA

INSTRUCTIONS FOR SONORA PLAYETTE

Note - If a corrective load for records recorded at constant velocity above 250 CPS and constant amplitude below 250 cycles is desired, connect .1 meg ohm resistor and a .01 MFD condenser in series across pickup leads. The volume control on the PLAYETTE must be in the full-on position. The volume control of the radio set or amplifier should be used in this case.

Oil motor regularly, once a month. To oil motor lift turn table so that oil cups are exposed.

Use SAE10 automobile oil. Do not use the oils of the 3-in-1 variety or type, or else life of the bearing will be impaired.



PLAYETTE AC 60-CYCLE MOTOR

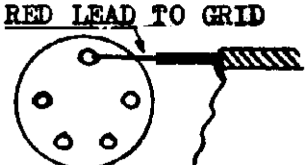
PICKUP CONNECTIONS
1. Locate 1st AF tube
2. Locate grid connections in tube manuals or by reference to set manufacturers data.

CONNECT -
RED LEAD TO CAP OF TUBE

Shield wire to the chassis

CONNECT -
RED LEAD TO GRID

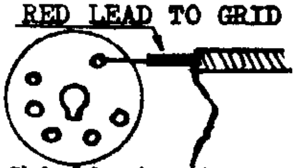
GLASS



Shield wire to chassis.

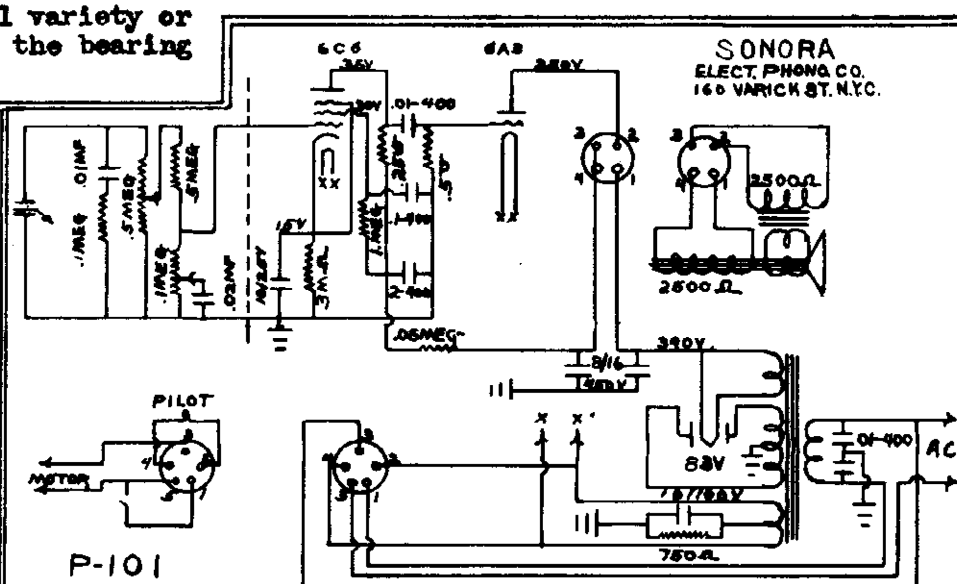
CONNECT *
CONNECT-
RED LEAD TO GRID

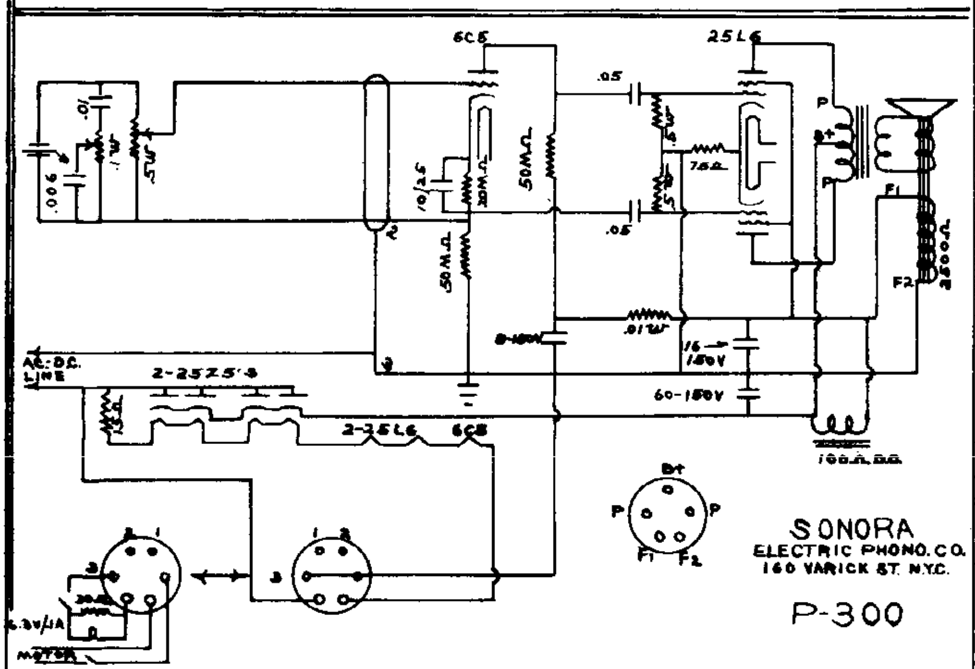
METAL TUBES



Shield wire to chassis

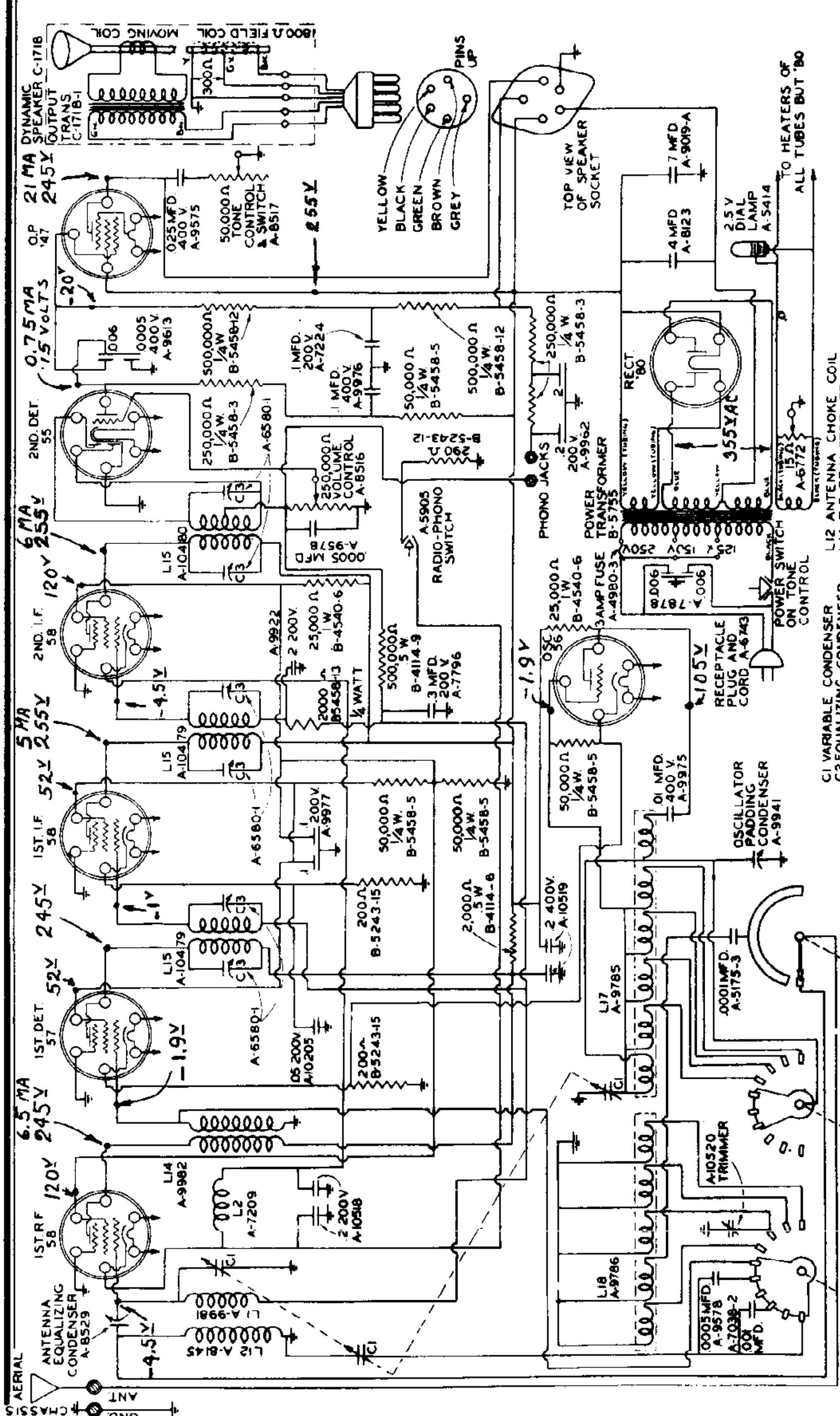
Be sure to connect radio antenna to ground so that radio signals will not mar phonograph reproductions





MODELS 75AX, 475AX, 478AX
Schematic, Voltage, Socket
Trimmers, Changes, Parts

SPARKS WITHINGTON CO.



C1 VARIABLE CONDENSER
C2 EQUALIZING CONDENSER
C3 ADJUSTING CONDENSER
L1 TUNING COIL
L2 CATHODE CHOKE COIL
L12 ANTENNA CHOKE COIL
L14 R.F. TRANSFORMER
L15 I.F. TRANSFORMER 456 K.C.
L17 OSCILLATOR COIL
L18 SHORT WAVE R.F. COIL

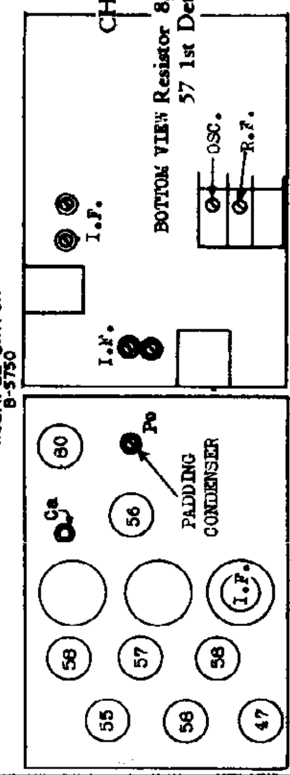
INTERMEDIATE FREQUENCY 456 KC

CHANGES IN MODEL 75-AX, 475-AX and 478-AX SCHEMATIC DIAGRAM

Effective March 27, 1934

Resistor 8,000 ohms, B-5458-23 and condenser .006 mfd., A-9916, added to cathode circuit of Type 57 1st Detector tube. See diagram under Voltage Analysis and Continuity Chart.

BOTTOM VIEW



SPARTON MODELS 75AX-475AX-478AX

JUNE 1, 1936

MODELS 75A, 475A, 478A
MODELS 75AX, 475AX, 478AX
Alignment

SPARKS WITHINGTON CO.

A. ADJUSTMENT OF INTERMEDIATE FREQUENCY CONDENSERS.

1. Connect test oscillator leads to grid cap of 1st detector type 57 tube and ground. Adjust oscillator to 456 kc.
2. Allow to operate 15 minutes before making any adjustments.
3. Turn Band Selector Switch to Broadcast Band, and rotate volume control, tone control and inter-station noise suppressor clockwise as far as they will go.
4. Turn on test oscillator and adjust attenuator for one-half to three-quarter scale deflection of the output meter.
5. Adjust each pair of intermediate-frequency condensers (three pairs) until maximum deflection of the output meter is obtained with a minimum of signal energy from the test oscillator.

NOTE: If the minimum signal of the oscillator is so great that accurate adjustment of the condensers becomes difficult, it is necessary to decrease the sensitivity of the receiver by turning the inter-station noise suppressor counter-clockwise. Do not turn the volume control knob.

In order to adjust the 1st stage intermediate-frequency condensers on Models 75-A, 475-A, 478-A, 75-AX, 475-AX, 478-AX, it is necessary to remove the copper shield over the I-F transformer (located nearest the Antenna Post) and replace it with a specially prepared shield (SPARTON Part A-7506), which has two holes drilled in the top. A bakelite or insulated screw driver may then be inserted through the holes to reach the condensers. Never attempt to adjust these condensers without this shield in place.

B. ADJUSTMENT OF THE OSCILLATOR TRIMMER AND PADDING CONDENSER.

1. Turn the Station Selector until the variable condenser rotor plates are fully meshed (up against the stop). The dial should now read exactly 540 kc. If it does not, loosen set screws on the rotor shaft and, keeping the rotor plates tight against the stop, turn the dial until the hair-line is exactly on the 540 kc. calibration mark.
2. With the test oscillator leads connected to the Antenna and Ground Posts of the receiver, adjust the oscillator frequency to 172.5 kc. Then turn the Station Selector so that the hair-line is exactly on 1380 kc.
3. Turn the oscillator trimmer condenser, CO, to the right or left until the output meter deflection is greatest.

CAUTION: Do not move the Station Selector after it has been set at 1380 kc.

4. Turn the Station Selector so that the hair-line is exactly on 690 kc. This dial setting should bring in the fourth harmonic of the test oscillator. However, if the padding condenser is very much out of adjustment no signal will be heard.

CAUTION: Do not disturb the dial setting of 690 kc.

5. Adjust the padding condenser, PO, by turning to the right or left until the test oscillator harmonic is heard, and readjust for maximum deflection on the output meter.
6. It may be necessary to repeat the entire alignment procedure in order to be sure the adjustments are correct.

NOTE: Exercise great care in making all adjustments. The foregoing adjustments are made on Broadcast Band frequencies and the performance of the Models 75-A, 475-A, 478-A, 75-AX, 475-AX, 478-AX, especially the sensitivity and calibration on short-waves, depends entirely on the accuracy with which they are made.

C. ADJUSTMENT OF THE RADIO-FREQUENCY ADJUSTABLE CONDENSERS.

1. Connect test oscillator leads to Antenna and Ground Posts and adjust oscillator for 172.5 kc. Do not disturb position of control knobs.
2. Turn station selector to 1380 kc., where the eighth harmonic of the oscillator should be heard.
3. Adjust the Antenna compensator by turning to the right or left until maximum deflection is obtained on the output meter.
4. Adjust R.F. Trimmer condenser for maximum signal response.

D. ADJUSTMENT OF THE RADIO-FREQUENCY TRIMMING CONDENSERS, OSCILLATOR TRIMMING CONDENSER AND PADDING CONDENSERS FOR SHORT WAVE BANDS ON MODELS 76, 154, 136.

NOTE: In the following procedure the Broadcast Band (Green) will be considered as No. 1 Band, the 1.5 to 3.4 Megacycle Band (Red) as No. 2 Band, the 3.4 to 6.8 Megacycle Band (Yellow) as No. 3 Band, the 6.8 to 12.5 Megacycle Band (Orange) as No. 4 Band and the 12.5 to 24 Megacycle Band (Lavender) as No. 5 Band.

1. Set Band Selector Switch on No. 2 Band (Red) and turn dial to 1.72 mc. If test oscillator harmonic cannot be heard, disconnect leads and attach antenna and ground and tune in short-wave signal of approximately this frequency.
2. Adjust No. 2 padding condenser (Cp_2). (There is no R-F trimmer for this band.)
3. Set Band Selector Switch on No. 3 Band (Yellow) and turn dial to a short-wave signal between 6.0 mc. and 6.8 mc.
4. Adjust No. 3 R-F Trimming Condenser (C_3).
5. Turn dial to receive a signal between 5.4 mc. and 4.2 mc.
6. Adjust No. 3 Padding Condenser (Cp_3).
7. Set Band Selector Switch on No. 4 Band (Orange) and turn dial to receive a signal between 11 mc. and 12.5 mc.
8. Adjust No. 4 R-F Trimming Condenser (C_4).
9. Turn dial to receive a signal between 6.8 and 8.0 mc.
10. Adjust No. 4 Padding Condenser (Cp_4).
11. Set Band Selector Switch on No. 5 Band (Lavender) and turn dial to receive a signal between 12.5 mc. and 14 mc.
12. Adjust No. 5 Padding Condenser (Cp_5).
13. Turn dial to receive a signal between 16 mc. and 24 mc.
14. Adjust No. 5 R-F Trimming Condenser (C_5).
15. Re-check all adjustments in order given above.

E. ALIGNING THE ANTENNA EQUALIZING CONDENSER, CA.

The antenna equalizing condenser should always be adjusted when the receiver is installed and with the regular aerial and ground connected. It is the purpose of this condenser to resonate the first tuned circuit with the antenna system to which the receiver is connected, thereby providing a maximum transfer of energy. The procedure of adjustment is as follows:

Tune in a weak distant station or oscillator signal between 1300 and 1400 kilocycles, turn the volume control on full, and rotate the inter-station noise suppressor control knob clockwise as far as it will go. Next, with a hex-socket insulated wrench, turn the hex-nut on the condenser to the position where the volume from the station "tuned-in" or the oscillator signal is the loudest. Once made, this adjustment need not be changed unless the antenna system is altered, the receiver is moved from one location to another, or the other condensers are re-adjusted.

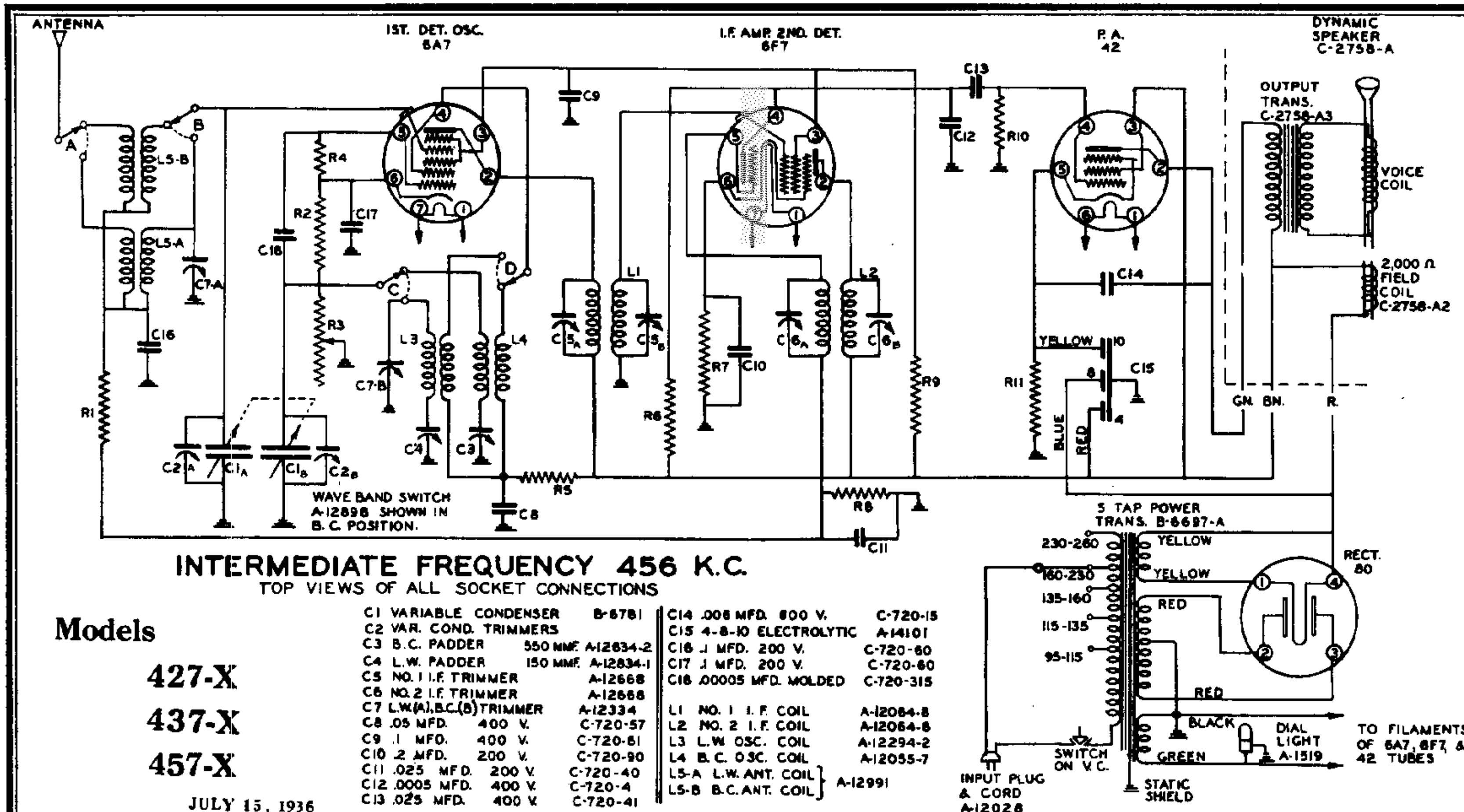
NOTE: When antenna equalizing condenser is adjusted on oscillator signal, adjustment will not hold true when receiver is connected to aerial; this condenser must be aligned to antenna system.

F. INSTRUCTIONS FOR REPLACING DIAL LIGHTS IN MODEL 76, 154, 136.

NOTE: Dial Lights may be changed without removing the chassis.

1. Turn dial to 1500 kc.
2. Loosen set screw located directly over dial light shaft in front of the bevel gear parallel with the variable condenser plates.
3. Turn dial to 1200 kc.
4. Tighten set screw.
5. Turn dial to 1450 kc.
6. Hold dial drum to prevent turning and slide back the dial light ventilation cover.
7. Use a short length of 1/4 inch inside diameter rubber tubing slipped down over the bulb to remove or replace any dial lights.
8. Place dial light ventilation cover in original position.
9. Turn dial to 1200 kc.
10. Loosen set screw.
11. Turn to 1500 kc.
12. Tighten set screw.

SPARKS-WITHINGTON CO.



INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEWS OF ALL SOCKET CONNECTIONS

Models

427-X
437-X
457-X

JULY 15, 1936

C1	VARIABLE CONDENSER		B-6781
C2	VAR. COND. TRIMMERS		
C3	B.C. PADDER	550 MMF.	A-12834-2
C4	L.W. PADDER	150 MMF.	A-12834-1
C5	NO. 1 I.F. TRIMMER		A-12668
C6	NO. 2 I.F. TRIMMER		A-12668
C7	L.W.(A), B.C.(B) TRIMMER		A-12334
C8	.05 MFD.	400 V.	C-720-57
C9	.1 MFD.	400 V.	C-720-61
C10	.2 MFD.	200 V.	C-720-90
C11	.025 MFD.	200 V.	C-720-40
C12	.0005 MFD.	400 V.	C-720-4
C13	.025 MFD.	400 V.	C-720-41
C14	.008 MFD.	800 V.	C-720-15
C15	4-8-10 ELECTROLYTIC		A-14101
C16	.1 MFD.	200 V.	C-720-60
C17	.1 MFD.	200 V.	C-720-60
C18	.00005 MFD. MOLDED		C-720-315

L1	NO. 1 I.F. COIL	A-12064-8
L2	NO. 2 I.F. COIL	A-12064-8
L3	L.W. OSC. COIL	A-12294-2
L4	B.C. OSC. COIL	A-12055-7
L5-A	L.W. ANT. COIL	A-12991
L5-B	B.C. ANT. COIL	A-12991

R1	100,000 Ω	.25 W.	C-2795-25B
R2	390 Ω	.25 W.	C-2795-57B
R3	7,500 Ω V.C. & SWITCH		A-12708
R4	47,000 Ω	.25 W.	C-2795-82B
R5	22,000 Ω	.5 W.	C-2796-21A
R6	470,000 Ω	.25 W.	C-2795-29B
R7	330 Ω	.25 W.	C-2795-56B
R8	220,000 Ω	.25 W.	C-2795-27B
R9	22,000 Ω	1 W.	C-2797-21A
R10	1 MEGOHM	.25 W.	C-2795-31B
R11	470 Ω	1 W.	C-2797-11A

VOLTAGE-RESISTANCE CHART

Position of Band Selector Switch: Broadcast
Line Voltage: 118 volts

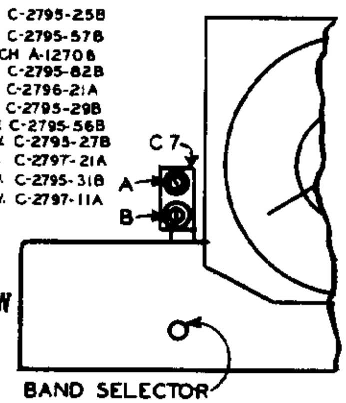
Position of Volume Control: Full with Antenna Disconnected

Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)

Tube	Function	Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Grid Cap
6A7	1st. Detector-Oscillator	Volts	0	250	165	235	0	0	0	0
		Ohms	0	100000	120000	120000	53000	6000	0	300000
6F7	I-F Amp., 2nd. Det.	Volts	0	250	140	180	0	0	0	0
		Ohms	0	48000	80000	750000	200000	300	0	0
42	Power Amplifier	Volts	0	325	325	0	0	0	-	-
		Ohms	0	50000	50000	750000	400	0	-	-
80	Rectifier	Volts	0	350	350	0	-	-	-	-
		Ohms	390	390	390	0	-	-	-	-

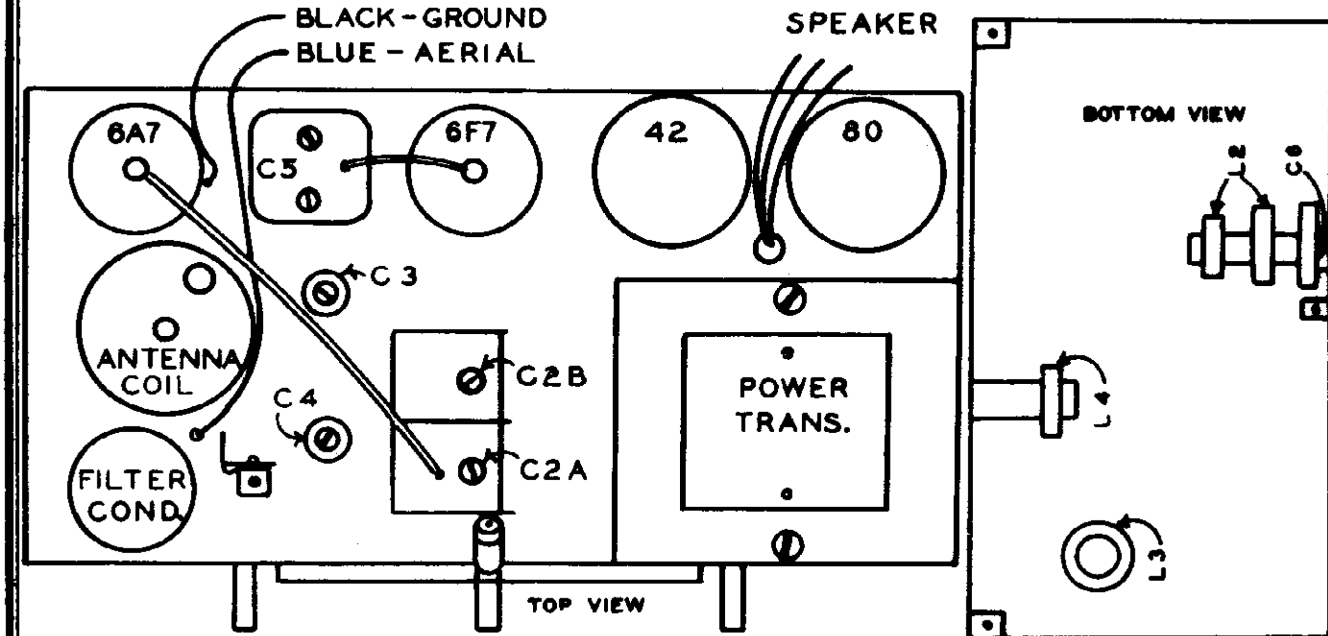
Notes: Voltage and resistance readings are for schematic diagram shown on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 2.

PARTIAL FRONT VIEW OF CHASSIS



MODELS 427X, 437X, 457X
Socket, Trimmers
Alignment

SPARKS WITHINGTON CO.



FOREWORD: The SPARTON Models 427-X, 457-X and 457-X (Export) are equipped with an adjustable power transformer for operation on various line voltages as indicated under the transformer terminal cover plate.

Before attempting to realign the circuits, be sure that the transformer tap is correctly adjusted for the line voltage to be used. Unless otherwise specified, the adjusting of any condenser consists of turning the adjusting screw or nut to the right or left until the output meter registers the greatest deflection.

Note: For proper alignment of these chasses, the procedure should be followed in the same order as given.

The dial pointer should be exactly parallel with the horizontal line of the dial scale when the condenser plates are fully meshed. If the pointer does not read correctly, remove the dial cover and move the pointer until it shows a correct reading.

A. Alignment of Intermediate-Frequency

1. Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condenser.

2. Turn the band selector switch to the "Broadcast" position and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

3. Connect antenna of test oscillator to grid cap of Type 6A7 1st detector-oscillator tube and ground of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate terminal of Type 42 tube to ground.

Note: It is advisable to read carefully the operating instructions included with the test oscillator.

4. Tune test oscillator to obtain a signal of 456 kilocycles.

5. Turn the volume control of receiver on full and adjust I-F condensers C5 and C6.

B. Alignment of Broadcast Band

1. Disconnect "antenna" lead of test oscillator from grid cap of Type 6A7 tube and connect it in series with a 150 mmf. condenser dummy antenna to the antenna terminal of the chassis.

2. Tune test oscillator and receiver to a wave length of 200 meters (1500 kilocycles) and adjust condenser C2-B (oscillator trimmer) and condenser C2-A (antenna trimmer).

3. Tune test oscillator and receiver to 500 meters (600 kilocycles) and adjust condenser C4 (oscillator padder).

4. Retune test oscillator and receiver to 200 meters and check the adjustments of condensers C2B and C2A.

5. Calibration of the broadcast band should also be checked at 330 meters (900 kilocycles).

C. Alignment of Long-Wave Band

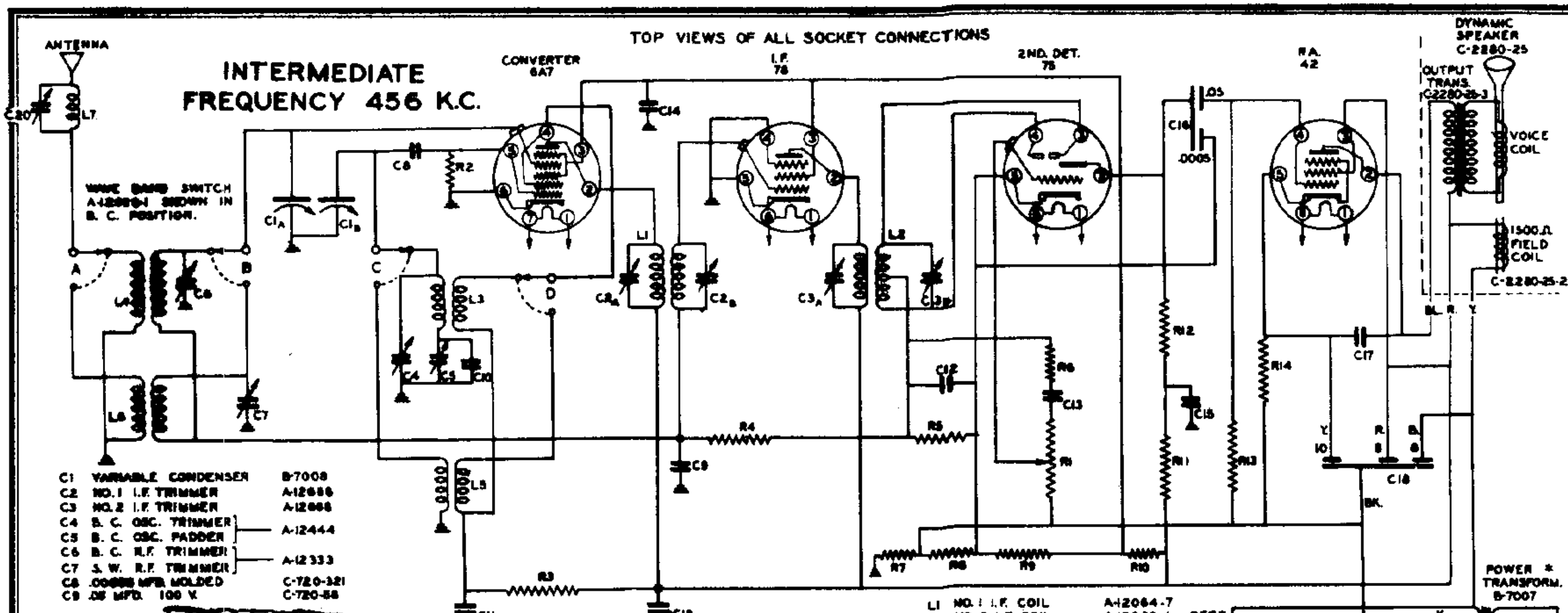
1. Turn the band selector switch to the "long-wave" band, tune test oscillator and receiver to a wave length of 870 meters (345 kilocycles) and adjust condenser C7-B (long-wave oscillator trimmer) and condenser C7-A (long-wave antenna trimmer).

2. Tune test oscillator and receiver to a wave length of 2000 meters (150 kilocycles) and adjust condenser C5 (long-wave oscillator padder).

3. Retune test oscillator and receiver to 870 meters (345 kilocycles) and check the adjustment of condensers C7-B and C7-A.

Caution: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.

SPARKS WITHINGTON CO.



C1 VARIABLE CONDENSER B-7008
C2 NO. 1 I.F. TRIMMER A-12686
C3 NO. 2 I.F. TRIMMER A-12686
C4 B. C. OSC. TRIMMER, C5 B. C. OSC. PADDER A-12444
C6 B. C. R.F. TRIMMER, C7 S. W. R.F. TRIMMER A-12333
C8 .00005 MFD. MOLDED C-720-321
C9 .05 MFD. 100 V. C-720-56

C10 .00025 MFD. MOLDED C-720-327
C11 .1 MFD. 400 V. C-720-61
C12 .00025 MFD. MOLDED C-720-327
C13 .02 MFD. 200 V. C-720-16
C14 .1 MFD. 200 V. C-720-60
C15 .1 MFD. 400 V. C-720-61
C16 .05-.0005 MFD. 400 V. C-720-134
C17 .0035 MFD. 600 V. C-720-8
C18 8-8-10 MFD. ELECTROLYTIC A-14102
C19 .1 MFD. 400 V. C-720-61
C20 I. F. REJECTOR TRIM. A-12634-1
R1 1 MEGOHM V.C. & SWITCH A-12986-1
R2 47,000 Ω .25 W. C-2795-82B
R3 22,000 Ω .5 W. C-2796-78A
R4 1 MEGOHM .25 W. C-2795-31B

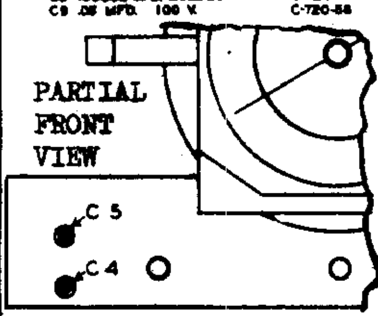
R5 470,000 Ω .25 W. C-2795-29B
R6 22,000 Ω .25 W. C-2795-78B
R7 270 Ω .25 W. C-2795-85B
R8 330 Ω .25 W. C-2795-56B
R9 27,000 Ω 1 W. C-2797-79A
R10 22,000 Ω 2 W. C-2796-78B
R11 100,000 Ω .25 W. C-2795-25B
R12 220,000 Ω .25 W. C-2795-27B
R13 330,000 Ω .25 W. C-2795-28B
R14 470 Ω 1 W. C-2797-58A

L1 NO. 1 I.F. COIL A-12064-7
L2 NO. 2 I.F. COIL A-12989-1
L3 B. C. OSC. COIL A-12055-7
L4 B. C. R.F. COIL A-12056-4
L5 S.W. OSC. COIL A-12062-11
L6 S.W. R.F. COIL A-12061-5
L7 I.F. REJECTOR COIL A-12666-3

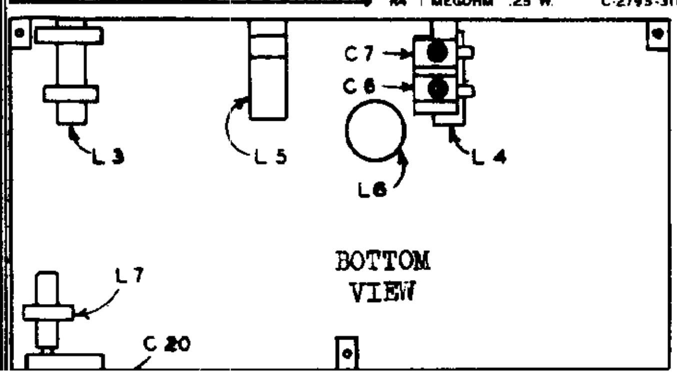
MODELS 517, 557, 567

JULY 15, 1936

(SEE INDEX FOR ALIGNMENT)



PARTIAL FRONT VIEW



BOTTOM VIEW

* EXPORT MODELS USE 5-TAP PRIMARY POWER TRANSFORMER B-6775-1

VOLTAGE-RESISTANCE CHART

Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast

Line Voltage: 118 volts

Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)

Tube	Function	Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Grid Cap
6A7	Converter	Volts	0	280	115	270	*	0 *	0	0
		Ohms	0	40000	24000	60000	47000	0	0	**
78	I-F Amp.	Volts	0	275	118	0	0	0	-	0
		Ohms	0	40000	24000	0	0	0	-	**
75	Detector-	Volts	0	110	0	0	0	0	-	0
		Ohms	0	350000	460000	460000	550	0	-	**
42	Power	Volts	0	350	355	0	6	0	-	-
		Ohms	0	40000	40000	300000	600	0	-	-
80	Rectifier	Volts	0	350	350	0				

* Cannot be measured with

MODELS 517, 557, 567
Socket, Trimmers, Alignment SPARKS-WITHINGTON CO.
MODELS 537, 577
Alignment

ALIGNMENT FOR MODELS 517, 557, and 567

A. Alignment of Intermediate-Frequency Stages

1. Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.
2. Turn the band selector switch to the broadcast position and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.
3. Connect "antenna" of test oscillator to grid cap of Type 6A7 1st detector-oscillator tube and "ground" of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate of Type 42 tube to ground.

Note: It is advisable to read carefully the operating instructions included with the test oscillator being used in the alignment procedure.

4. Tune test oscillator to obtain a signal of 456 kilocycles.

5. Turn the volume control of receiver on full and adjust I-F condensers C2 and C5 which are reached from the top of the chassis.

Note: Care should be taken when adjusting the I-F stages in order to insure proper and accurate adjustment.

B. Alignment of Broadcast Band

1. Disconnect "antenna" lead of test oscillator from grid cap of 1st detector-oscillator tube Type 6A7 and connect it in series with a 150 mmf. condenser dummy antenna to the antenna terminal of the chassis.

2. Tune test oscillator to a frequency of 456 kilocycles and adjust condenser C20 (reached from back of the chassis) to a point where the output of the receiver is at an absolute minimum.

Note: This condenser is the adjustment for the code rejector circuit and must be very carefully adjusted if best performance of the receiver is to be expected.

3. Tune test oscillator and receiver to a frequency of 1500 kilocycles and adjust condensers C4 (broadcast band oscillator trimmer) and C6 (broadcast antenna trimmer) reached from the bottom of the chassis.

4. Tune test oscillator and receiver to 600 kilocycles and adjust condenser C5 (broadcast oscillator padder) reached from the front of the chassis.

5. Retune test oscillator and receiver to 1500 kilocycles and check adjustments of condenser C4 and condenser C6. Calibration of the broadcast band should also be checked at 900 kilocycles and 600 kilocycles.

C. Alignment of Short-Wave Band

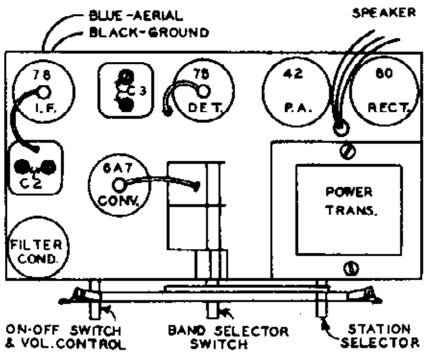
1. Turn the band selector switch to the short wave or "foreign" band.

2. Remove the 150 mmf. condenser from the test oscillator "antenna" lead and replace with a 400 ohm non-inductive resistor dummy antenna.

3. Tune test oscillator and receiver to a frequency of 15,000 kilocycles (15 megacycles) and adjust condenser C7 (short-wave antenna trimmer) reached from the bottom of the chassis.

Caution: On this band care must be taken to adjust this condenser to the fundamental of the 15 megacycle signal and not to the image. The image signal is equal to the fundamental minus twice the intermediate frequency of the receiver.

A set that is adjusted to the image frequency instead of to the fundamental may be



detected by tuning over the band and checking the sensitivity at various points. If a dead spot appears near the center of the band, the adjustable condenser for that band has probably been adjusted to the image instead of to the fundamental.

This type of mis-alignment may also be detected by tuning the test oscillator to a frequency of 15 megacycles and the station selector of the receiver to approximately 15,900 kilocycles. If a strong signal is found approximately at this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 15,000 kilocycles would be 15,000 kilocycles minus twice 456 kilocycles or approximately 14,100 kilocycles. Therefore, a signal of this frequency may be found with the test oscillator generating a 15,000 kilocycle.

Note: There are no other trimmers for the short-wave or foreign band. However, it is advisable to check the receiver for sensitivity and calibration at both 15,000 kilocycles and 7,500 kilocycles.

Important: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.

ALIGNMENT FOR MODELS 537 and 577

A. Alignment of Intermediate-Frequency Stages

(1) Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

(2) Turn the band selector switch to the broadcast "B" position and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

(3) Connect "antenna" of test oscillator to grid cap of Type 6A8G 1st detector-oscillator tube and "ground" of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate of Type 6F6G tube to ground. NOTE: It is advisable to read carefully the operating instructions included with the test oscillator.

(4) Tune test oscillator to obtain a signal of 456 KC.

(5) Turn the volume control of receiver on full and adjust I.F. condensers C3 and C2. NOTE: The intermediate frequency circuits are quite selective and care must be taken to insure proper adjustment.

(6) Connect "antenna" of test oscillator to "A" post on chassis and "ground" of test oscillator to "G" post.

(7) Tune test oscillator to 456 KC. and adjust condenser C4 for minimum output.

NOTE: This adjustment is in the code rejector circuit and proper adjustment of this condenser is essential to satisfactory operation of the receiver.

B. Alignment of Broadcast Band

(1) Disconnect "antenna" lead of test oscillator from grid cap of first detector-oscillator tube and connect in series with a 150 mmf. condenser dummy antenna to the antenna terminal of the chassis.

(2) Tune test oscillator and receiver to a frequency of 1500 KC., and without disturbing the setting of the test oscillator or the station selector, adjust condensers C8 and C5 in the order given.

(3) Tune test oscillator and receiver to 600 KC. and adjust condenser C9.

(4) Retune test oscillator and receiver to 1500 KC. and check the adjustments of condensers C8 and C5.

(5) Calibration of the broadcast band should also be checked at 900 kilocycles and 600 kilocycles.

C. Alignment of Police Band

(1) Turn the band selector switch to the Police Band "P".
(2) Remove the 150 mmf. condenser from the "antenna" lead of test oscillator and replace with a 400 ohm non-inductive resistor dummy antenna.

(3) Tune test oscillator and receiver to 4.5 MC. and adjust condenser C7.

NOTE: There are no other adjustments in this band.

D. Alignment of Foreign Band

(1) Turn the band selector switch to the Foreign Band "F".

(2) Tune test oscillator and receiver to 15 MC. and adjust condenser C6.

CAUTION: On this band care must be taken to adjust the condenser to the fundamental of the signal and not to the image. The image signal is equal to the fundamental minus twice the intermediate frequency of the receiver.

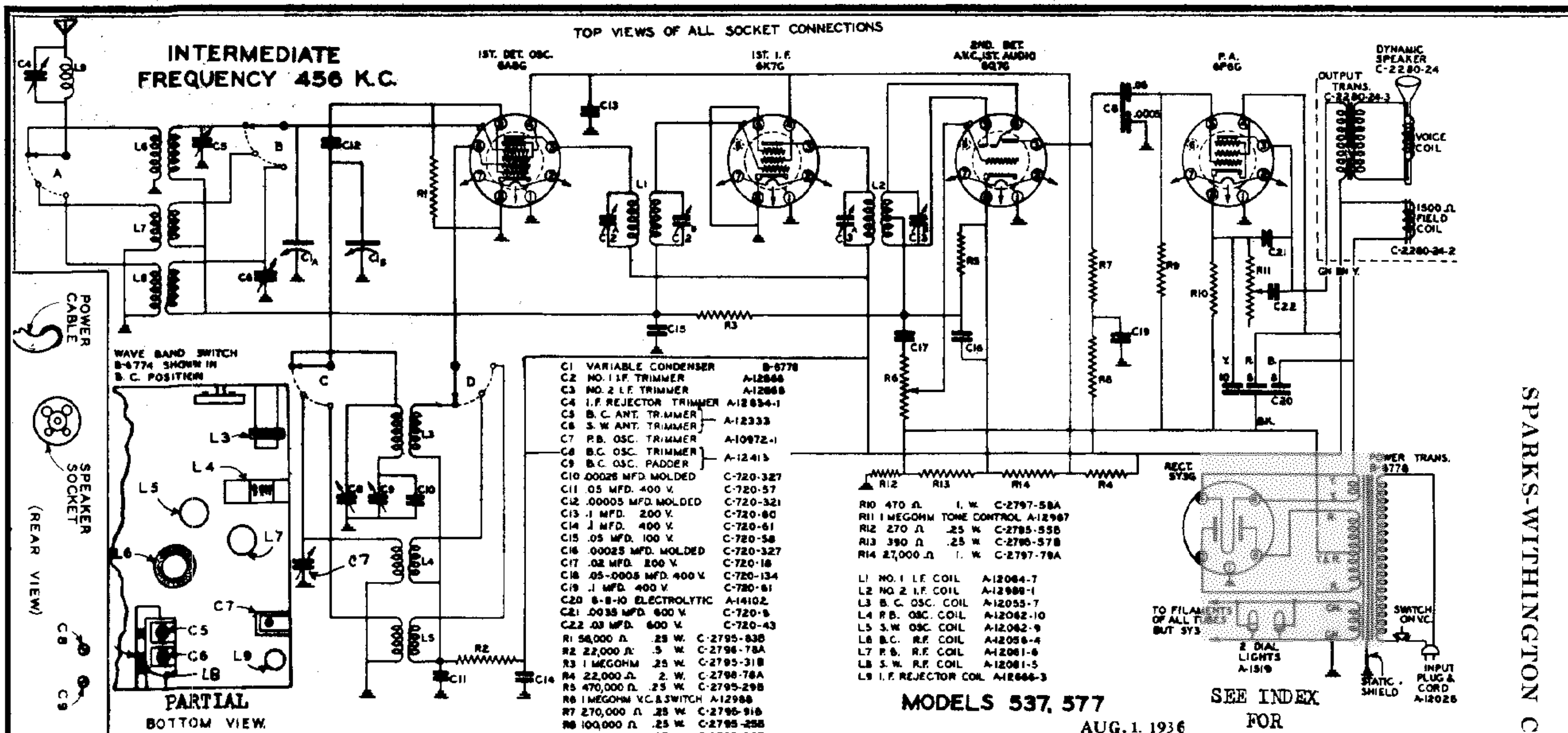
A set that is adjusted to the image frequency instead of to the fundamental may be detected by tuning over the band and checking the sensitivity at various points. If a dead spot appears near the center of the band, the adjustable condensers for that band have probably been adjusted to the image instead of the fundamental.

This type of mis-alignment may also be detected by tuning the test oscillator to a frequency of 15 megacycles and the station selector to approximately 15,900 KC. If a strong signal is found approximately at this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 15,000 kilocycles would be 15,000 KC. minus twice 456 KC. or approximately 14,100 KC. Therefore a signal of this frequency may be found with the test oscillator generating a 15,000 KC. signal.

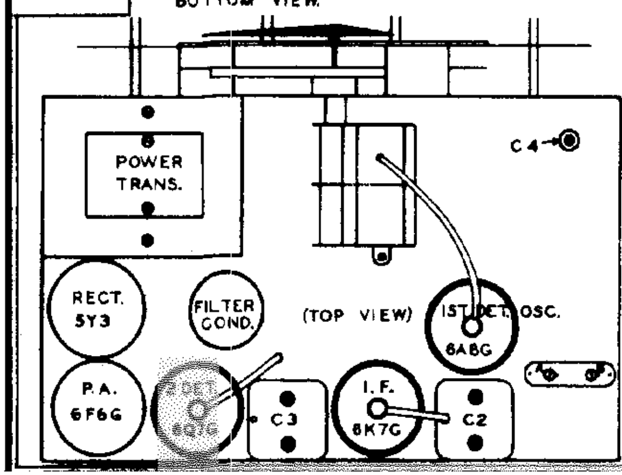
(3) Retune the test oscillator and receiver to 7.5 MC. and check sensitivity and calibration. (There are no other adjustments for this band.)

CAUTION: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.

SPARKS-WITHINGTON CO.



C1	VARIABLE CONDENSER		B-6778
C2	NO. 1 I.F. TRIMMER		A-12866
C3	NO. 2 I.F. TRIMMER		A-12868
C4	I.F. REJECTOR TRIMMER		A-12834-1
C5	B.C. ANT. TRIMMER		A-12333
C6	S.W. ANT. TRIMMER		A-12333
C7	P.B. OSC. TRIMMER		A-10972-1
C8	B.C. OSC. TRIMMER		A-12413
C9	B.C. OSC. PADDER		A-12413
C10	.00025 MFD. MOLDED		C-720-327
C11	.05 MFD. 400 V.		C-720-57
C12	.00005 MFD. MOLDED		C-720-321
C13	.1 MFD. 200 V.		C-720-60
C14	.1 MFD. 400 V.		C-720-61
C15	.05 MFD. 100 V.		C-720-58
C16	.00025 MFD. MOLDED		C-720-327
C17	.02 MFD. 200 V.		C-720-18
C18	.05-.0005 MFD. 400 V.		C-720-134
C19	.1 MFD. 400 V.		C-720-61
C20	8-8-10 ELECTROLYTIC		A-14102
C21	.0035 MFD. 600 V.		C-720-5
C22	.03 MFD. 600 V.		C-720-43
R1	56,000 Ω	.25 W.	C-2795-83B
R2	22,000 Ω	.5 W.	C-2796-78A
R3	1 MEGOHM	.25 W.	C-2795-31B
R4	22,000 Ω	2. W.	C-2798-78A
R5	470,000 Ω	.25 W.	C-2795-29B
R6	1 MEGOHM V.C. & SWITCH		A-12988
R7	270,000 Ω	.25 W.	C-2795-91B
R8	100,000 Ω	.25 W.	C-2795-25B
R9	330,000 Ω	.25 W.	C-2795-28B
R10	470 Ω	1. W.	C-2797-58A
R11	1 MEGOHM TONE CONTROL		A-12987
R12	270 Ω	.25 W.	C-2795-55B
R13	390 Ω	.25 W.	C-2795-57B
R14	27,000 Ω	1. W.	C-2797-79A
L1	NO. 1 I.F. COIL		A-12064-7
L2	NO. 2 I.F. COIL		A-12988-1
L3	B.C. OSC. COIL		A-12055-7
L4	P.B. OSC. COIL		A-12062-10
L5	S.W. OSC. COIL		A-12062-9
L6	B.C. R.F. COIL		A-12058-4
L7	P.B. R.F. COIL		A-12061-6
L8	S.W. R.F. COIL		A-12061-5
L9	I.F. REJECTOR COIL		A-12666-3



MODELS 537, 577

AUG. 1. 1936

SEE INDEX FOR ALIGNMENT

VOLTAGE-RESISTANCE CHART

Line Voltage: 115 volts

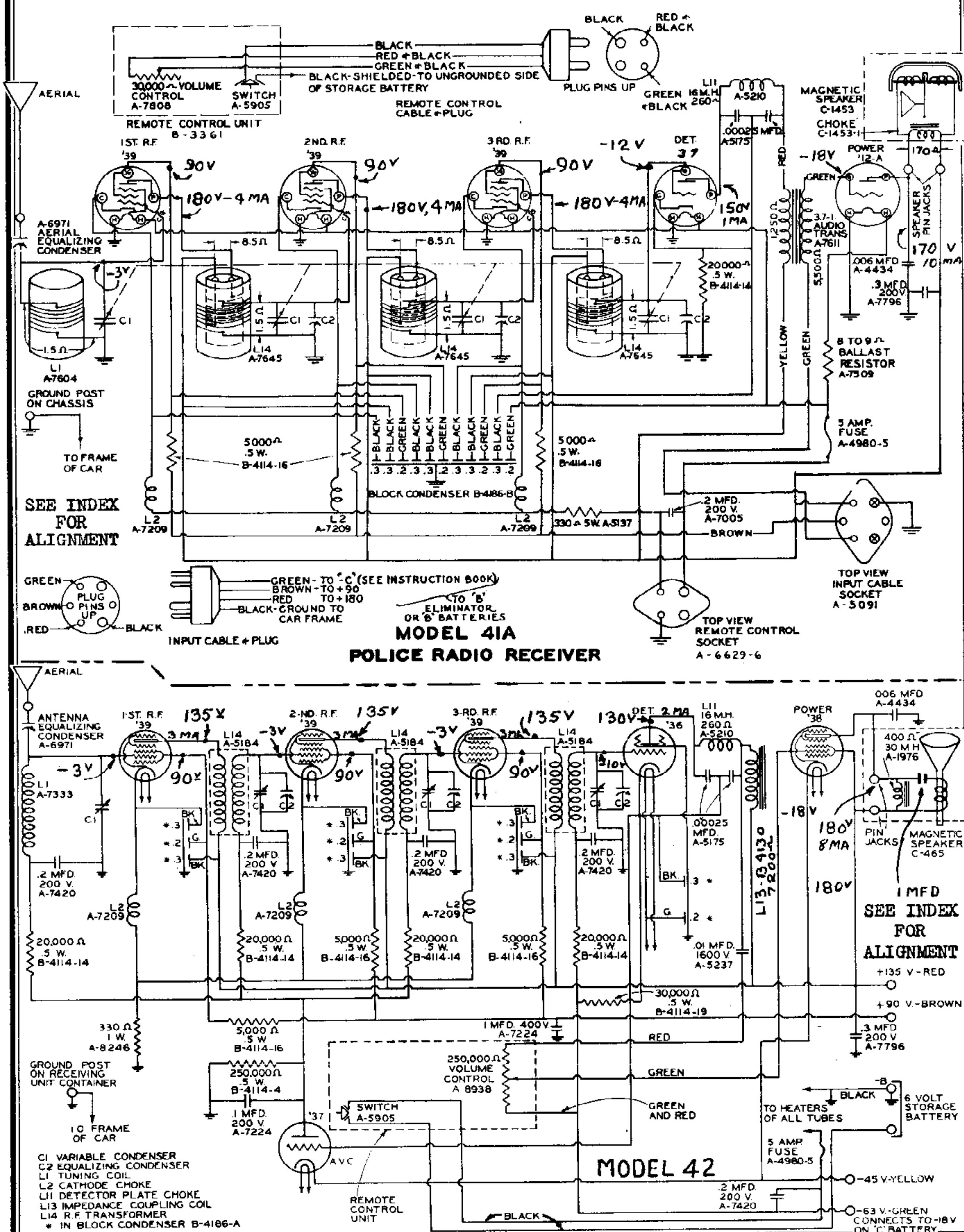
Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast "B"

Tube	Function	Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8	Grid Cap
		Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)									
6A8G	1st. Det-Osc	Volts	0	0	290	240	0	275	0	0	.2
		Ohms	0	0	49000	28000	55000	70000	0	0	1 meg.
6K7G	I-F Amp	Volts	0	0	290	245	0	-	0	0	.1
		Ohms	0	0	49000	28000	0	-	0	0	1 meg.
6Q7G	2nd. Det-AVC-1st A.F.	Volts	0	0	225	0	0	-	0	0	*
		Ohms	0	0	400000	470000	470000	-	0	600	1 meg.
6F6G	Power Amp	Volts	0	0	370	370	*	-	0	5.9	-
		Ohms	0	0	49000	49000	350000	-	0	680	-
5Y3	Rectifier	Volts	-	5.1	-	370	-	370	-	0	-
		Ohms	-	49000	-	0	-	0	-	49000	-

* Cannot be measured with Analyzer

MODEL 41A
MODEL 42
Schematic
Voltage

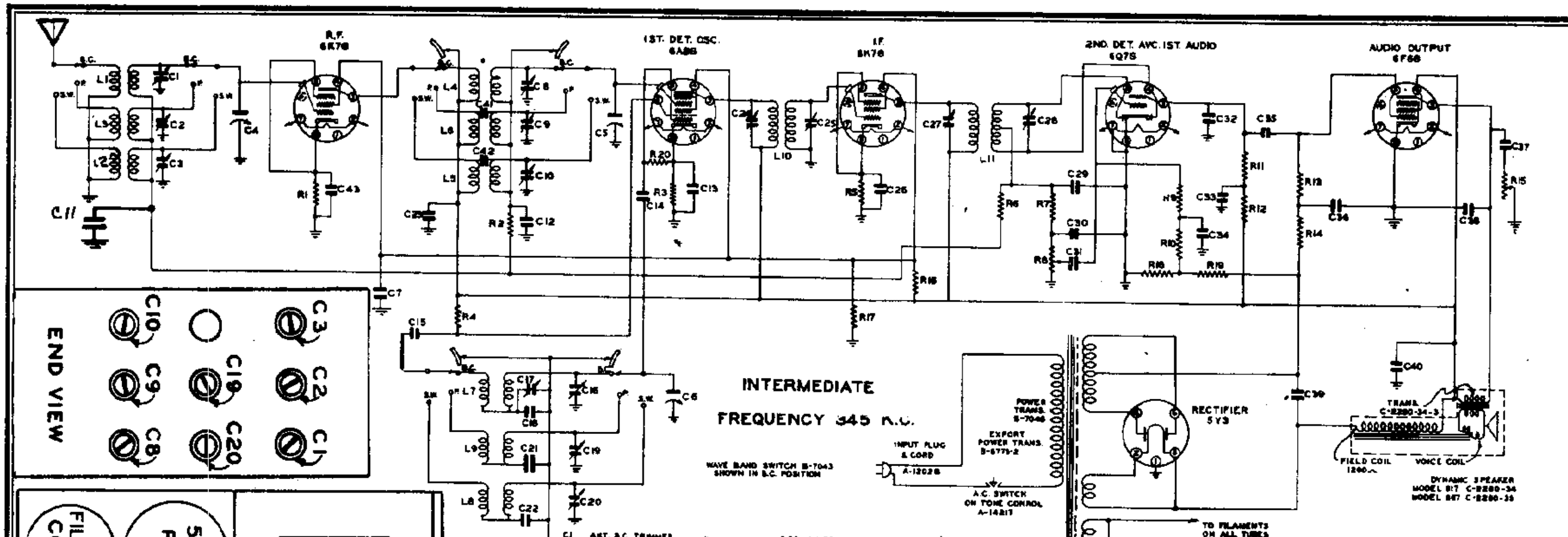
SPARKS WITHINGTON CO.

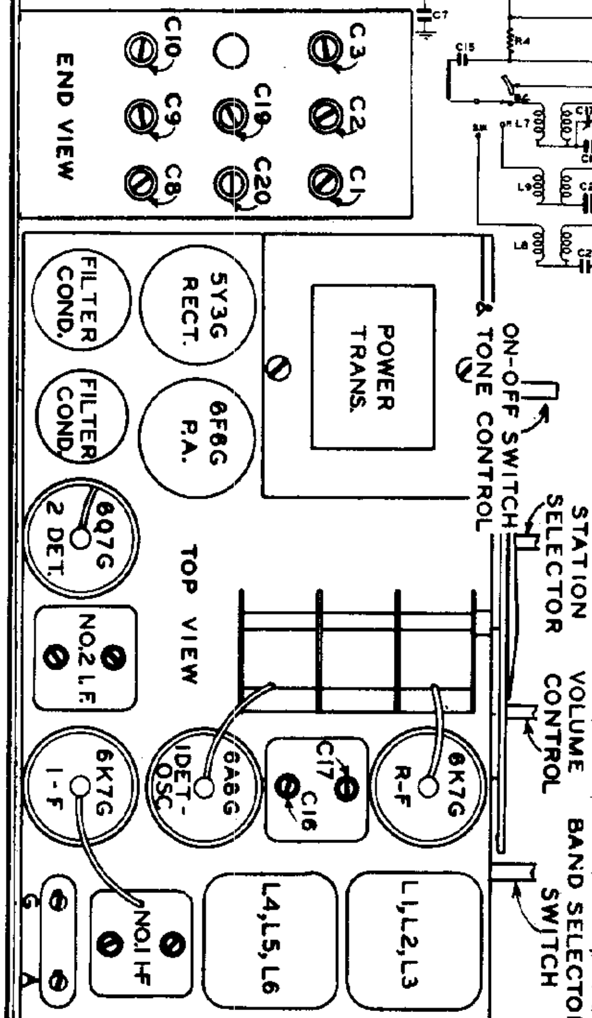


MODELS 617,667,617X,667X

SPARKS WITHINGTON CO.

Schematic,Socket,Voltage
Trimmers,Parts





C1	ANT. B.C. TRIMMER	A-14199
C2	ANT. POL. TRIMMER	A-14199
C3	ANT. S.W. TRIMMER	A-14199
C4	VARIABLE CONDENSER	B-7044
C5	VARIABLE CONDENSER	B-7044
C6	VARIABLE CONDENSER	B-7044
C7	.1 MFD. 200 V.	C-720-60
C8	R.F. B.C. TRIMMER	A-14199-1
C9	R.F. POL. TRIMMER	A-14199-1
C10	R.F. S.W. TRIMMER	A-14199-1
C11	.05 MFD. 200 V.	C-720-52
C12	.05 MFD. 200 V.	C-720-52
C13	.05 MFD. 200 V.	C-720-52
C14	.00008 MFD. MOLDED	C-720-329
C15	.006 MFD. 600 V.	C-720-17
C16	OSC. B.C. TRIMMER	A-12444
C17	OSC. B.C. PADDER	A-12444
C18	.00036 MFD. MOLDED	C-720-329
C19	OSC. POL. TRIMMER	A-14800
C20	OSC. S.W. TRIMMER	A-14800
C21	.00165 MFD. MOLDED	C-720-335
C22	.0045 MFD. MOLDED	C-720-336
C23	.1 MFD. 400 V.	C-720-61
C24	NO.1 I.F. TRIMMER	A-14805
C25	NO.1 I.F. TRIMMER	A-14805
C26	.05 MFD. 200 V.	C-720-52
C27	NO.2 I.F. TRIMMER	A-14805
C28	NO.2 I.F. TRIMMER	A-14805
C29	.0001 MFD. MOLDED	C-720-323
C30	.0001 MFD. MOLDED	C-720-323
C31	.02 MFD. 200 V.	C-720-145
C32	.00025 MFD. MOLDED	C-720-319
C33	.1 MFD. 400 V.	C-720-61
C34	.1 MFD. 200 V.	C-720-60
C35	.05 MFD. 400 V.	C-720-57
C36	.1 MFD. 200 V.	C-720-60
C37	.02 MFD. 600 V.	C-720-12
C38	.005 MFD. 600 V.	C-720-7
C39	16 MFD. ELECT.	A-14073
C40	10 MFD. ELECT.	A-14072
C41	WIRE WOUND COND.	A-11094-3
C42	12 MMFD. COUPLER	A-10695
C43	.05 MFD. 200 V.	C-720-52

R1	350 Ω .25 W.	C-2795-30 B
R2	100,000 Ω .25 W.	C-2795-96 B
R3	300 Ω .25 W.	C-2795-27 B
R4	22,000 Ω .5 W.	C-2795-75 A
R5	500 Ω .25 W.	C-2795-30 B
R6	1 MEGOHM .25 W.	C-2795-98 B
R7	36,000 Ω .25 W.	C-2795-83 B
R8	500,000 Ω VOLUME CONTROL	A-14219
R9	350,000 Ω .25 W.	C-2795-86 B
R10	1 MEGOHM .25 W.	C-2795-98 B
R11	270,000 Ω .25 W.	C-2795-91 B
R12	100,000 Ω .25 W.	C-2795-96 B
R13	270,000 Ω .25 W.	C-2795-91 B
R14	270,000 Ω .25 W.	C-2795-91 B
R15	TONE CONTROL & A.C. SWITCH A-14817	
R16	15,000 Ω 2 W.	C-2786-76A
R17	27,000 Ω 1 W.	C-2787-78A
R18	38 Ω CANDOHM	A-14188
R19	210 Ω CANDOHM	A-14188
R20	14,000 Ω .25 W.	C-2795-839
L1	B.C. ANT. COIL	A-14209
L2	S.W. ANT. COIL	A-14209
L3	POL. ANT. COIL	A-12060-6
L4	B.C. R.F. COIL	A-14210
L5	S.W. R.F. COIL	A-14210
L6	POL. R.F. COIL	A-12061-7
L7	B.C. OSC. COIL	A-14213
L8	S.W. OSC. COIL	A-14213
L9	POL. OSC. COIL	A-12089-3
L10	NO. 1 I.F. COIL	A-12064-6
L11	NO. 2 I.F. COIL	A-12066-3

SEE INDEX FOR ALIGNMENT DATA

VOLTAGE CHART

Line Voltage: 118 volts

Position of Volume Control: Full with Antenna Disconnected

Position of Band Selector Switch: Broadcast

Tube	Function	Voltage of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram) Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8	Grid Cap
6K7G	R-F Amplifier	0	*	260	120	0	-	*	0	0
6A8G	1st. Detector- Oscillator	0	*	260	125	0	245	*	0	0
6K7G	I-F Amplifier	0	*	255	115	0	-	*	0	0
6Q7G	2nd. Det-AVC-1st.A-F Amplifier	0	*	105	0	0	-	*	0	0
6F6G	Power Amplifier	0	*	320	320	-	2**	*	0	-
5Y3G	Rectifier	0	***	-	380	-	380	-	0	-

* Zero or 6.3 volts depending on twist of heater hookup wire.
** 25 volt scale
*** 5 volt filament

MODEL 617,667,617X & 667X

SEPT 28,1936

MODELS 617, 667, 617X, 667X
Alignment

SPARKS-WITHINGTON CO.

Foreword: The SPARTON Models 617-X and 667-X are equipped with an adjustable power transformer for operation on various line voltages as indicated under the transformer terminal cover plate.

1. EQUIPMENT REQUIRED

A. Modulated test oscillator (crystal controlled or accurately calibrated) capable of generating frequencies from 345 to 18,000 kilocycles.

B. Output meter.

C. Part A-5732 adjusting wrench.

D. Dummy antennas, consisting of a 200 mmf. condenser and a 100 ohm non-inductive resistor.

2. STEP BY STEP PROCEDURE

NOTE: For proper alignment of these chassis, the procedure should be followed in the same order as given.

With the condenser plates fully meshed, the dial pointer should point to the first calibration marks immediately to the right of the band identification letters "P", "B" and "F". Any necessary correction may be made simply by moving the pointer on the shaft.

A. Alignment of Intermediate-Frequency Stages

(1) Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

(2) Turn the band selector switch to the broadcast "B" position and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

(3) Connect "antenna" of test oscillator to grid cap of Type 6A8G 1st detector-oscillator tube and "ground" of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate of Type 6F6G tube to ground. NOTE: It is advisable to read carefully the operating instructions included with the test oscillator.

(4) Tune test oscillator to obtain a signal of 345 KC.

(5) Turn the volume control of receiver on full and adjust I.F. condensers. NOTE: The intermediate frequency circuits are quite selective and care must be taken to insure proper adjustment. (See diagram for I.F. transformer and trimmer locations.)

(6) Connect "antenna" of test oscillator to "A" post on chassis and "ground" of test oscillator to "G" post.

B. Alignment of Broadcast Band

(1) Disconnect "antenna" lead of test oscillator from grid cap of first detector-oscillator tube and connect in series with a 200 mmf. condenser dummy antenna to the antenna terminal of the chassis.

(2) Tune test oscillator and receiver to a frequency of 1500 KC., and without disturbing the setting of the test oscillator or the station selector, adjust condensers C16, C8 and C1 in the order given.

(3) Tune test oscillator and receiver to 600 KC. and adjust condenser C17.

(4) Retune test oscillator and receiver to 1500 KC. and check the adjustments of condensers C16, C8 and C1.

(5) Calibration of the broadcast band should also be checked at 900 kilocycles and 600 kilocycles.

C. Alignment of Police Band

(1) Turn the band selector switch to the Police Band "P".

(2) Remove the 200 mmf. condenser from the "antenna" lead of test oscillator and replace with a 100 ohm non-inductive resistor dummy antenna.

(3) Tune test oscillator and receiver to 4.5 MC. and adjust condensers C19, C9 and C2.

NOTE: There are no other adjustments in this band.

D. Alignment of Foreign Band

(1) Turn the band selector switch to the Foreign Band "F".

(2) Tune test oscillator and receiver to 18 MC. and adjust condensers C20, C10 and C3.

(3) When making these adjustments, the station selector should be moved slightly back and forth in order to obtain maximum gain.

CAUTION: On this band care must be taken to adjust the condensers to the fundamental of the signal and not to the image. The image signal is equal to the fundamental minus twice the intermediate frequency of the receiver.

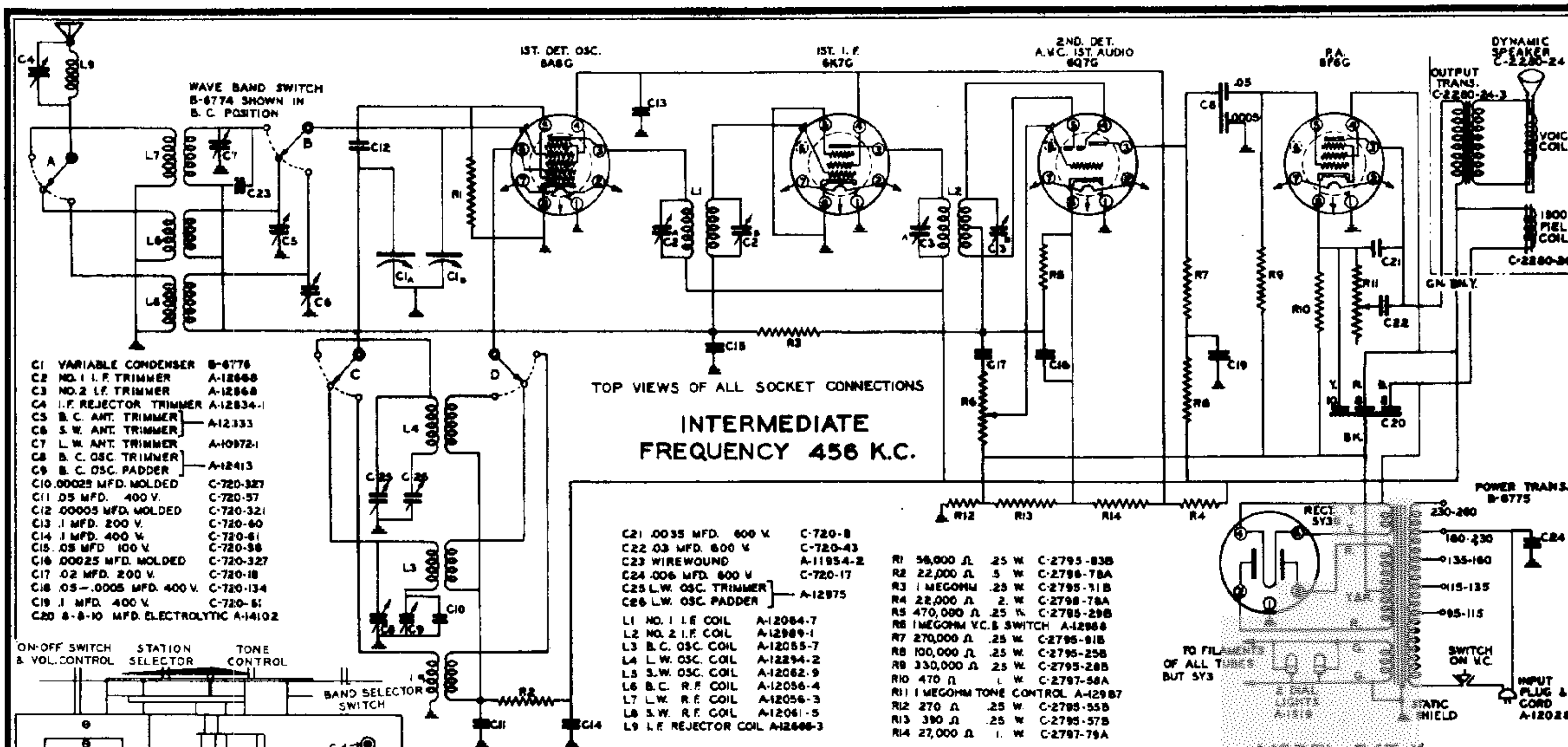
A set that is adjusted to the image frequency instead of to the fundamental may be detected by tuning over the band and checking the sensitivity at various points. If a dead spot appears near the center of the band, the adjustable condensers for that band have probably been adjusted to the image instead of the fundamental.

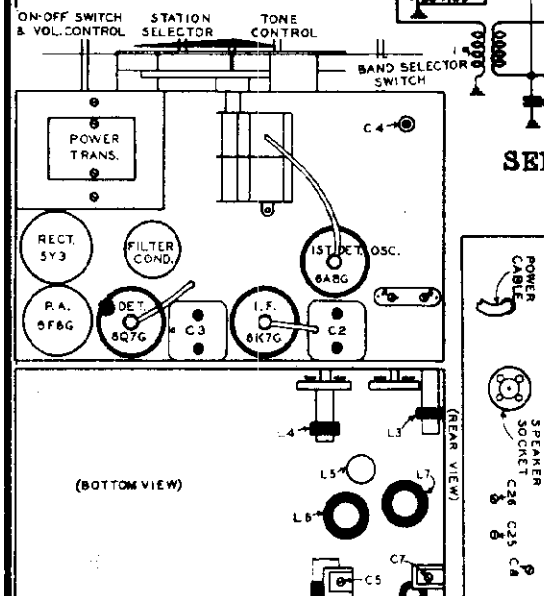
This type of mis-alignment may also be detected by tuning the test oscillator to a frequency of 15 megacycles and the station selector to approximately 15,700 KC. If a strong signal is found approximately at this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 15,000 kilocycles would be 15,000 KC. minus twice 345 KC. or approximately 15,300 KC. Therefore a signal of this frequency may be found with the test oscillator generating a 15,000 KC. signal.

CAUTION: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.

MODEL 547X
Schematic, Voltage, Socket
Trimmers, Resistance, Par

SPARKS WITHINGTON CO.





SEE INDEX FOR ALIGNMENT

AUG. 1, 1936

VOLTAGE-RESISTANCE CHART

Line Voltage: 115 volts

Position of Volume Control: Full with Antenna Disconnected

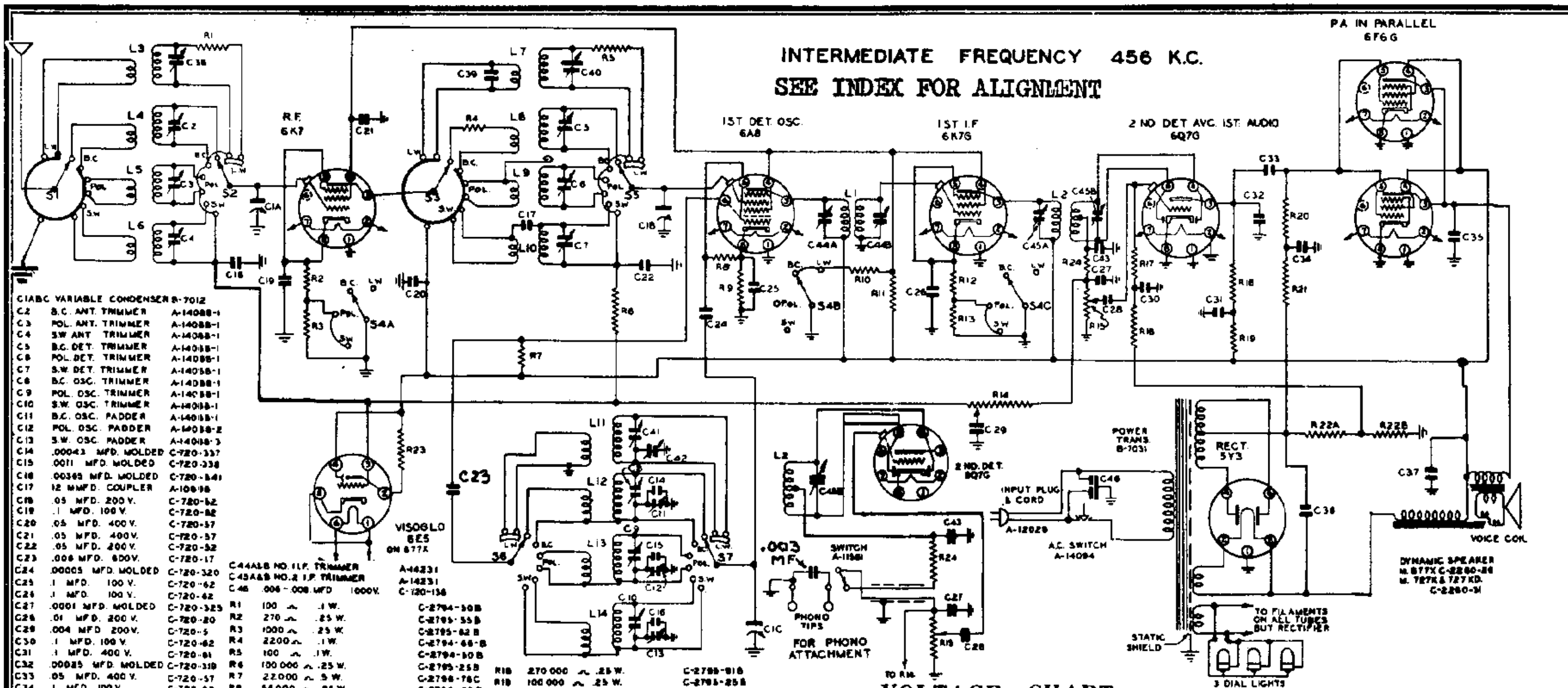
Position of Band Selector Switch: Broadcast "B"

Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)

Tube	Function	Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8	Grid Cap
6A8G	1st. Det-Oscillator	Volts	0	0	290	240	0	275	0	0	.2
		Ohms	0	0	49000	28000	55000	70000	0	0	1 meg.
6K7G	I-F Amplifier	Volts	0	0	290	245	0	-	0	0	.1
		Ohms	0	0	49000	28000	0	-	0	0	1 meg.
6Q7G	2nd. Det-AVC-1st.A-F	Volts	0	0	225	0	0	-	0	0	*
		Ohms	0	0	400000	470000	470000	-	0	600	1 meg.
6F6G	Power Amplifier	Volts	0	0	370	370	*	-	0	5.9	-
		Ohms	0	0	49000	49000	350000	-	0	650	-
		Volts	-	5.1	-	370	-	370	-	0	-

MODELS 727X, 727XD, 877X
Schematic, Voltage, Parts
Socket, Trimmers

SPARKS-WITHINGTON CO.



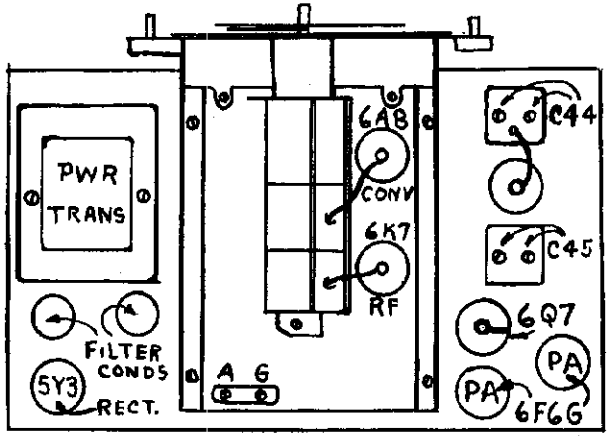
C1ABC	VARIABLE CONDENSER	B-7012
C2	B.C. ANT. TRIMMER	A-14088-1
C3	POL. ANT. TRIMMER	A-14088-1
C4	S.W. ANT. TRIMMER	A-14088-1
C5	B.C. DET. TRIMMER	A-14088-1
C6	POL. DET. TRIMMER	A-14088-1
C7	S.W. DET. TRIMMER	A-14088-1
C8	B.C. OSC. TRIMMER	A-14088-1
C9	POL. OSC. TRIMMER	A-14088-1
C10	S.W. OSC. TRIMMER	A-14088-1
C11	B.C. OSC. PADDER	A-14088-1
C12	POL. OSC. PADDER	A-14088-2
C13	S.W. OSC. PADDER	A-14088-3
C14	.00043 MFD. MOLDED	C-720-337
C15	.0011 MFD. MOLDED	C-720-338
C16	.00365 MFD. MOLDED	C-720-341
C17	12 MMFD. COUPLER	A-10698
C18	.05 MFD. 200 V.	C-720-52
C19	.1 MFD. 100 V.	C-720-82
C20	.05 MFD. 400 V.	C-720-57
C21	.05 MFD. 400 V.	C-720-57
C22	.05 MFD. 200 V.	C-720-52
C23	.006 MFD. 600 V.	C-720-17
C24	.00005 MFD. MOLDED	C-720-320
C25	.1 MFD. 100 V.	C-720-62
C26	.1 MFD. 100 V.	C-720-62
C27	.0001 MFD. MOLDED	C-720-325
C28	.01 MFD. 200 V.	C-720-20
C29	.004 MFD. 200 V.	C-720-5
C30	.1 MFD. 100 V.	C-720-62
C31	.1 MFD. 400 V.	C-720-61
C32	.00025 MFD. MOLDED	C-720-319
C33	.05 MFD. 400 V.	C-720-57
C34	.1 MFD. 100 V.	C-720-62
C35	.008 MFD. 600 V.	C-720-15
C36	18 MFD. ELECT.	A-14073
C37	30 MFD. ELECT.	A-14072
C38	L.W. ANT. TRIMMER	A-14088-1
C39	.00025 MFD. MOLDED	C-720-319
C40	L.W. DET. TRIMMER	A-14088-1
C41	L.W. OSC. TRIMMER	A-14088-1
C42	L.W. OSC. PADDER	A-14088-3
C43	.0001 MFD. MOLDED	C-720-325
C44A&B	NO. 1 I.F. TRIMMER	A-14231
C45A&B	NO. 2 I.F. TRIMMER	A-14231
C46	.006 - .008 MFD 1000V.	C-720-136

R1	100 Ω .1 W.	C-2794-30B
R2	270 Ω .25 W.	C-2795-35B
R3	1000 Ω .25 W.	C-2795-62B
R4	2200 Ω .1 W.	C-2794-66-B
R5	100 Ω .1 W.	C-2794-30B
R6	100 000 Ω .25 W.	C-2795-25B
R7	22000 Ω .5 W.	C-2796-76C
R8	56000 Ω .25 W.	C-2795-83B
R9	330 Ω .25 W.	C-2795-36-B
R10	22000 Ω .5 W.	C-2796-76C
R11	15000 Ω 2 W.	C-2798-187A
R12	270 Ω .25 W.	C-2795-35B
R13	470 Ω .25 W.	C-2795-56B
R14	500 000 Ω TONE CONTROL	A-14089
R15	250 000 Ω VOLUME CONTROL	A-14075
R16	1 MEGOHM .25 W.	C-2795-96B
R17	560 000 Ω .25 W.	C-2795-95B
R18	270 000 Ω .25 W.	C-2795-91B
R19	100 000 Ω .25 W.	C-2795-25B
R20	270 000 Ω .25 W.	C-2795-91B
R21	270 000 Ω .25 W.	C-2795-91B
R22	CANDOHM R22A 170 Ω / CANDOHM R22B 28 Ω	A-14061
R23	1 MEGOHM .25 W. (877X ONLY)	C-2795-96B
R24	68 000 Ω .25 W.	C-2795-83B

L1	NO. 1 I.F. COIL	A-12064-18
L2	NO. 2 I.F. COIL	A-12969-2
L3	L.W. ANT. COIL	A-14243-4
L4	B.C. ANT. COIL	A-14243-1
L5	POL. ANT. COIL	A-14243-2
L6	S.W. ANT. COIL	A-14243-3
L7	L.W. DET. COIL	A-14242-4
L8	B.C. DET. COIL	A-14242-1
L9	POL. DET. COIL	A-14242-2
L10	S.W. DET. COIL	A-14242-3
L11	L.W. OSC. COIL	A-14241-4
L12	B.C. OSC. COIL	A-14241-1
L13	POL. OSC. COIL	A-14241-2
L14	S.W. OSC. COIL	A-14241-3

NO. FROM BACK OF SET

S1	ANT. PRI. SECTION
S2	ANT. SEC. SECTION
S3	DET. PRI. SECTION
S4A, S4B, S4C	BAIS & SCREEN VOLTAGE SECTION
S5	DET. SEC. SECTION
S6	OSC. PRI. SECTION
S7	OSC. SEC. SECTION



MODEL-877X,
727X & 727XD
SEPT 8, 1936

VOLTAGE CHART

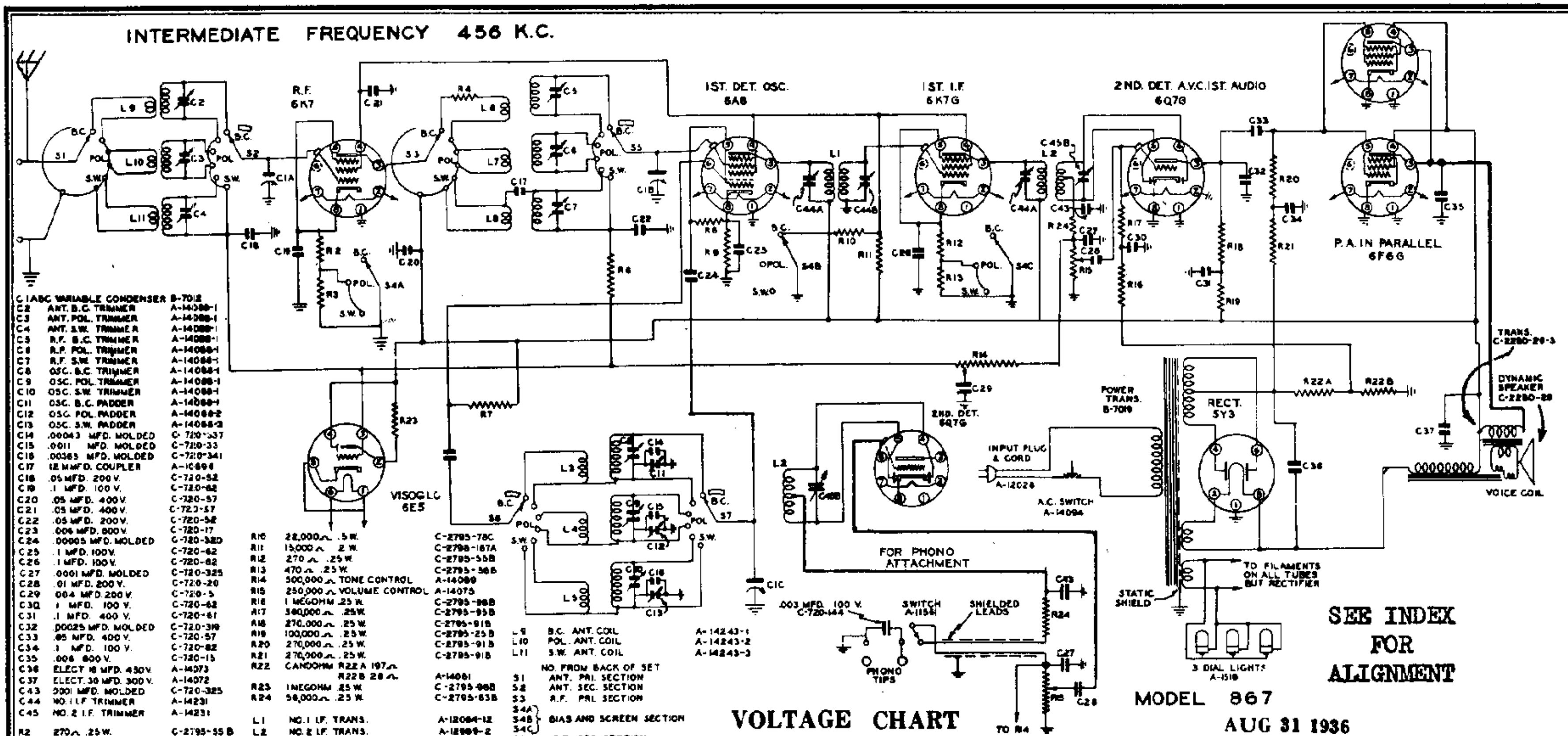
Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast Band

Tube	Function	Voltage of Each Socket Prong to Ground								
Line	Voltage: 112 volts	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8	Grid Cap
6K7	R-F Amplifier	0	6.2	250	105	0	-	0	0	0
6A8	1st Det-Oscillator	0	6.2	250	105	0	235	0	0	0
6K7G	I-F Amplifier	0	6.2	250	130	0	-	0	0	0
6Q7G	2nd Det-AVC-1st A-F	0	6.2	30*	0	0	-	0	0	0
6F6G	Power Amplifier	0	6.2	260	260	5**	-	0	0	-
6F6G	Power Amplifier	0	6.2	260	260	5**	-	0	0	-
5Y3G	Rectifier	0	5.0	-	400	-	400	-	0	-
6E5 †	Viso-Glo	6.2	20***	0	250	0	0	-	-	-

* 50 volt scale ** 250 volt scale *** 100 volt scale

MODEL 867
Schematic, Voltage
Socket, Trimmers, Par

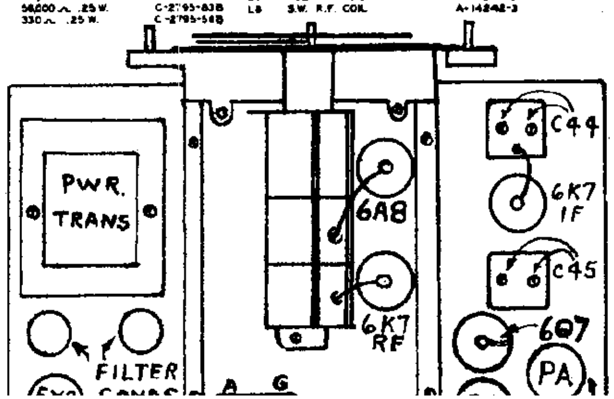
SPARKS WITHINGTON CO.



SEE INDEX FOR ALIGNMENT

MODEL 867

AUG 31 1936



VOLTAGE CHART

Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast

Line Voltage: 112 volts

Tube	Function	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8	Grid Cap
		Voltage of Each Socket Prong to Ground								
6K7	R-F Amplifier	0	6.2	250	105	0	-	0	0	0
6A8	Converter	0	6.2	250	105	0	235	0	0	0
6K7G	I-F Amplifier	0	6.2	250	130	0	-	0	0	0
6Q7G	Det-AVC-1st. A-F	0	6.2	30*	0	0	-	0	0	0
6F6G	Power Amplifier	0	6.2	260	260	5**	-	0	0	-
6F6G	Power Amplifier	0	6.2	260	260	5**	-	0	0	-
5Y3G	Rectifier	0	#	-	400	-	400	-	#	-
6E5	Visco-Glo	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			

MODEL 547X
MODELS 727X,727XD,877X
MODELS 867

SPARKS-WITHINGTON CO

MODELS 827X,827XD,997X
MODEL 987
MODEL 1167
Alignment

ALIGNMENT MODEL 547X

A. Alignment of Intermediate-Frequency Stages.

(1) Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

(2) Turn the band selector switch to the Broadcast Band "B" position and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

(3) Connect "antenna" of test oscillator in series with 150 mmf. condenser dummy antenna to grid cap of Type 6A8G 1st detector-oscillator tube and "ground" of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate of Type 6F6G tube to ground. NOTE: It is advisable to read carefully the operating instructions included with the test oscillator.

(4) Tune test oscillator to obtain a signal of 456 kilocycles.

(5) Turn the volume control of receiver on full and adjust IF condensers C3 and C2. NOTE: The intermediate frequency circuits are quite selective and care must be taken to insure proper adjustment.

(6) Disconnect test oscillator "antenna" and 150 mmf. condenser from grid cap of 6A8G tube, and connect oscillator "antenna" to antenna post of chassis.

(7) With the test oscillator generating a 456 KC. signal, adjust condenser C4 until a minimum of output is obtained. NOTE: This adjustment is in the code rejector circuit, and care should be taken to see that proper adjustment is made, otherwise the receiver will not operate with maximum efficiency.

B. Alignment of Long-Wave Band

(1) Insert the 150 mmf. condenser in series with the "antenna" lead of test oscillator and the antenna terminal of the chassis.

(2) Turn the band selector switch to the long wave "L" position, tune test oscillator and receiver to a wave length of 870 meters (345 KC.) and without disturbing the setting of the test oscillator or the station selector, adjust condensers C25 and C7 in the order given.

(3) Tune test oscillator and receiver to 2000 meters (150 KC.) and adjust condenser C26.

(4) Retune test oscillator and receiver to 345 kilocycles and check the adjustments of condensers C25 and C7.

C. Alignment of Broadcast Band

(1) Turn band selector switch to the broadcast band "B" position.

(2) Tune test oscillator and receiver to a wave length of 200 meters (1500 kilocycles) and adjust condenser C8 (oscillator trimmer) and condenser C5 (antenna trimmer).

(3) Tune test oscillator and receiver to 500 meters (600 kilocycles) and adjust condenser C9 (oscillator padder).

(4) Retune test oscillator and receiver to 200 meters and check the adjustments of condensers C8 and C5.

D. Alignment of Short-Wave Band.

(1) Turn the band selector switch to the short wave band "S" position.

(2) Remove the 150 mmf. condenser from "antenna" lead of test oscillator and replace with a 400 ohm non-inductive resistor dummy antenna.

(3) Tune test oscillator and receiver to 20 meters (15 megacycles) and adjust condenser C6.

CAUTION: On this band care must be taken to adjust the condenser to the fundamental of the signal and not to the image. The image signal is equal to the fundamental minus twice the intermediate frequency of the receiver.

A set that is adjusted to the image frequency instead of to the fundamental may be detected by tuning over the band and checking the sensitivity at various points. If a dead spot appears near the center of the band, the adjustable condensers for that band have probably been adjusted to the image instead of the fundamental.

This type of mis-alignment may also be detected by tuning the test oscillator to a frequency of 15 megacycles and the station selector to approximately 15,900 kilocycles. If a strong signal is found approximately at this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 15,000 kilocycles would be 15,000 kilocycles minus twice 456 kilocycles or approximately 14,100 kilocycles. Therefore a signal of this frequency may be found with the test oscillator generating a 15,000 kilocycle signal.

ALIGNMENT MODELS 727X,727XD,827X,827XD, 867,877X,987,997X, and 1167.

A. Alignment of Intermediate-Frequency Stages

NOTE: All of the above models except the Model 1167 employ I-F transformers with two trimmers. The first I-F transformer of the Model 1167 is equipped with a third tuned circuit which results in three trimmers for this I-F stage.

(1) Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

(2) Turn the band selector switch to the Broadcast position (with white diamond illuminated) and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

(3) Connect "antenna" of test oscillator to the grid cap of a Type 6A8 converter tube and "ground" of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate of power output tube to ground. Note: It is advisable to read carefully the operating instructions included with the test oscillator.

(4) Tune test oscillator to obtain a signal of 456 kilocycles.

(5) Turn the volume control of receiver on full and adjust I-F trimmers C44, C45 (C41, C42 on Model 987; C59, C60 on Model 1167) which are reached from the top of the chassis. NOTE: The intermediate frequency circuits are quite selective and care must be taken to insure proper adjustment.

B. Alignment of Broadcast Band

(1) Disconnect "antenna" lead of test oscillator from grid cap of converter tube and connect in series with a 200 mmf. condenser dummy antenna to the antenna terminal of the chassis.

(2) Tune receiver and test oscillator to a frequency of 1500 kilocycles and adjust condensers C8, C5 and C2 in the order given.

(3) Tune test oscillator and receiver to 600 kilocycles and adjust condenser C11.

(4) Retune test oscillator and receiver to 1500 kilocycles and check the adjustments of condensers C8, C5 and C2.

(5) Calibration of the broadcast band should also be checked at 900 kilocycles and 600 kilocycles.

C. Alignment of Long-Wave Band
(Except Models 867 and 987)

(1) Turn the band selector switch to the long-wave position (yellow diamond illuminated).

(2) Tune test oscillator and receiver to 345 kilocycles and adjust condensers C41, C40 and C38.

(3) Tune test oscillator and receiver to 150 kilocycles and adjust condenser C42.

(4) Retune test oscillator and receiver to 345 kilocycles and check the adjustments of condensers C41, C40 and C38.

D. Alignment of 1st. Short-Wave Band

(1) Turn band selector switch to the 1st short-wave band (red diamond illuminated).

(2) Tune test oscillator and receiver to 6 megacycles and adjust condensers, C9, C6 and C5.

(3) Tune test oscillator and receiver to 1.95 megacycles and adjust condenser C12.

(4) Retune test oscillator and receiver to 6 megacycles and check the adjustments of condensers C9, C6 and C5.

E. Alignment of 2nd. Short-Wave Band

(1) Connect the 100 ohm non-inductive dummy antenna resistor in series with the 200 mmf. condenser connected between the test oscillator "antenna" lead and the grid cap of the 6A8 converter tube.

(2) Turn the band selector switch to the 2nd short-wave band (blue diamond illuminated).

(3) Tune test oscillator and receiver to 18 megacycles and adjust condensers C10, C7 and C4.

(4) Tune test oscillator and receiver to 6 megacycles and adjust condenser C13.

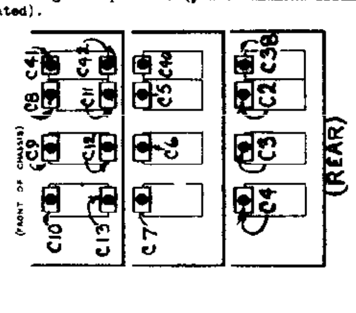
(5) Retune test oscillator and receiver to 18 megacycles and check adjustments of condensers C10, C7 and C4.

IMPORTANT: To obtain the best sensitivity at 18 megacycles on this band, the dial should be turned back and forth slightly while adjusting the antenna and R.F. trimmers.

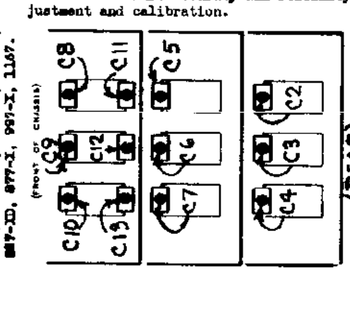
CAUTION: On this band care must be taken to adjust the various condensers to the fundamental of the signal and not to the image. The image signal is equal to the fundamental minus twice the intermediate frequency of the receiver. A set that is adjusted to the image frequency instead of to the fundamental may be detected by tuning over the band and checking the sensitivity at various points. If a dead spot appears near the center of the band, the adjustable condensers for that band have probably been adjusted to the image instead of the fundamental.

This type of mis-alignment may also be detected by tuning the test oscillator to a frequency of 15 megacycles and the station selector to approximately 15,900 kilocycles. If a strong signal is found approximately at this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 15 megacycles or 15,000 kilocycles would be 15,000 kilocycles minus twice 456 kilocycles or approximately 14,100 kilocycles. Therefore a signal of this frequency may be found with the test oscillator generating a 15 megacycle signal.

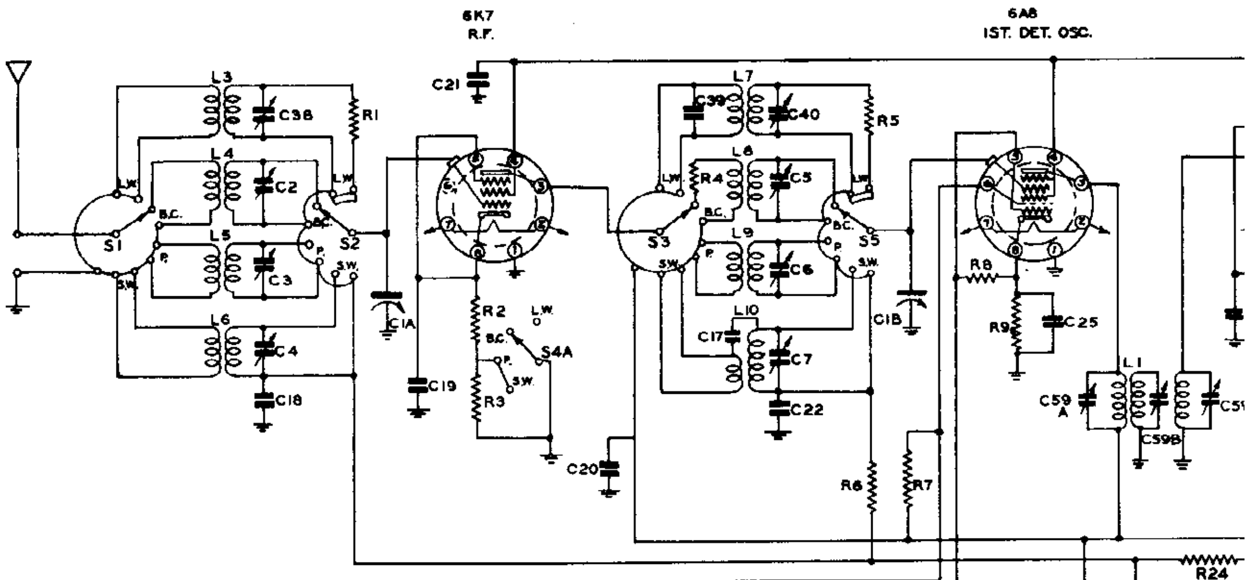
CAUTION: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.

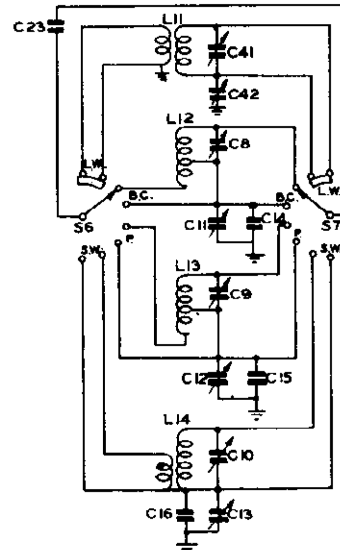


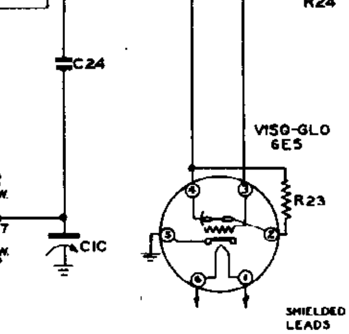
TRIMMER LOCATIONS
Models 727-X, 727-XD, 827-X, 827-XD, 877-X, 997-X, 1167.



TRIMMER LOCATIONS
Models 867 and 987







C1A,B&C	VARIABLE CONDENSER	B-7012
C2	ANT. B.C. TRIMMER	A-14088-1
C3	ANT. POL. TRIMMER	A-14088-1
C4	ANT. S.W. TRIMMER	A-14088-1
C5	R.F. B.C. TRIMMER	A-14088-1
C6	R.F. POL. TRIMMER	A-14088-1
C7	R.F. S.W. TRIMMER	A-14088-1
C8	OSC. B.C. TRIMMER	A-14088-1
C9	OSC. POL. TRIMMER	A-14088-1
C10	OSC. S.W. TRIMMER	A-14088-1
C11	OSC. B.C. PADDER	A-14088-1
C12	OSC. POL. PADDER	A-14088-2
C13	OSC. S.W. PADDER	A-14088-3
C14	.00045 MFD. MOLDED	C-720-344
C15	.0011 MFD. MOLDED	C-720-338
C16	.00365 MFD. MOLDED	C-720-341
C17	COUPLER CONDENSER	A-10898
C18	.05 MFD. 200 V.	C-720-52
C19	.1 MFD. 100 V.	C-720-62
C20	.05 MFD. 400 V.	C-720-57
C21	.05 MFD. 400 V.	C-720-57
C22	.05 MFD. 200 V.	C-720-52
C23	.006 MFD. 600 V.	C-720-17
C24	.00005 MFD. MOLDED	C-720-320
C25	.1 MFD. 100 V.	C-720-62
C26	.1 MFD. 100 V.	C-720-62
C27	.0001 MFD. MOLDED	C-720-325
C28	.05 MFD. 400 V.	C-720-57
C29	.00025 MFD. MOLDED	C-720-319
C30	.1 MFD. 100 V.	C-720-62
C31	.1 MFD. 400 V.	C-720-61
C32	.00025 MFD. MOLDED	C-720-319
C33	.05 MFD. 400 V.	C-720-57
C34	.1 MFD. 100 V.	C-720-62
C35	16 MFD. 400 V. ELECT.	A-14136
C36	16 MFD. 450 V. ELECT.	A-14073
C37	16 MFD. 350 V. ELECT.	A-14139
C38	ANT. L.W. TRIMMER	A-14088-1
C39	.00025 MFD. MOLDED	C-720-319
C40	R.F. L.W. TRIMMER	A-14088-1
C41	OSC. L.W. TRIMMER	A-14088-1
C42	OSC. L.W. PADDER	A-14088-3
C43	.05 MFD. 200 V.	C-720-52
C44	.006 MFD. 600 V.	C-720-17
C45	.3 MFD. 200 V.	C-720-91
C46	.2 MFD. 200 V.	C-720-87
C47	.5 MFD. 200 V.	C-720-104
C48	.001 MFD. 400 V.	C-720-138
C49	.01 MFD. 400 V.	C-720-25
C50	.01 MFD. 200 V.	C-720-20
C51	.2 MFD. 400 V.	C-720-88
C52	.3 MFD. 200 V.	C-720-91
C53	.006 .006. MFD. 600 V.	C-720-150
C55	.01 MFD. 600 V.	C-720-105
C56	.00025 MFD. MOLDED	C-720-319
C57	25 MFD. 325 V. ELECT.	A-14184
C58	.1 MFD. 400 V.	C-720-61
C59A,B&C	NO. 1 I.F. TRIMMER	A-14152
C60A&B	NO. 2 I.F. TRIMMER	A-14375

R1	100 Ω	.1 W.	C-2794-50B
R2	270 Ω	.25 W.	C-2795-55B
R3	1000 Ω	.25 W.	C-2795-62B
R4	2200 Ω	.1 W.	C-2794-66B
R5	100 Ω	.1 W.	C-2794-50B
R6	100 000 Ω	.25 W	C-2795-25B
R7	22 000 Ω	.5 W.	C-2796-78C
R8	56 000 Ω	.25 W.	C-2795-83B
R9	330 Ω	.25 W.	C-2795-56B
R10	22 000 Ω	.5 W.	C-2796-78C
R11	15 000 Ω	2 W.	C-2798-187A
R12	270 Ω	.25 W.	C-2795-55B
R13	470 Ω	.25 W.	C-2795-38B
R14	TONE CONTROL & A.C. SWITCH		A-14137
R15	VOLUME CONTROL		A-14110
R16	56 000 Ω	.25 W.	C-2795-83B
R17	. MEGOHM	.25 W.	C-2795-98B
R18	270 000 Ω	.25 W.	C-2795-91B
R19	100 000 Ω	.25 W.	C-2795-25B
R20	1 MEGOHM	.25 W.	C-2795-98B
R21	270 000 Ω	.25 W.	C-2795-91B

R22	470 000 Ω	.25 W.	C-2795-94B
R23	1 MEGOHM	.25 W.	C-2795-98B
R24	1 MEGOHM	.25 W.	C-2795-98B
R25	470 000 Ω	.25 W.	C-2795-94B
R26	56 000 Ω	.25 W.	C-2795-83B
R-27	680 000 Ω	.25 W.	C-2795-96B
R-28	120 000 Ω	.25 W.	C-2795-87B
R29	8200 Ω	1 W.	C-2797-181A
R30	2400 Ω	.5 W.	C-2796-168A
R31	27 OHMS	.25 W.	C-2795-121B
R32	27 OHMS	.25 W.	C-2795-121B
R33	100 000 Ω	.25 W.	C-2795-25B
R-34	470 000 Ω	.25 W.	C-2795-94B
R35	56 000 Ω	.25 W.	C-2795-83B
R36	27 000 Ω	1 W.	C-2797-79A
R37	750 OHMS	.25 W.	C-2795-156B
R38	27000 Ω	2 W.	C-2798-193A
R-39	27000 Ω	.25 W.	C-2795-79B
R-40	470 000 Ω	.25 W.	C-2795-94B
R41	1 MEGOHM	.25 W.	C-2795-98B
R42	910 OHM	2 W.	C-2796-158A

L1	NO. 1 IF COIL	A-14149
L2	NO. 2 IF COIL	A-12989-2
L3	ANT. L.W. COIL	A-14243-4
L4	ANT. B.C. COIL	A-14243-1
L5	ANT. POL. COIL	A-14243-2
L6	ANT. S.W. COIL	A-14243-3
L7	R.F. L.W. COIL	A-14242-4
L8	R.F. B.C. COIL	A-14242-1
L9	R.F. POL. COIL	A-14242-2
L10	R.F. S.W. COIL	A-14242-3
L11	OSC. L.W. COIL	A-14241-4
L12	OSC. B.C. COIL	A-14241-1
L13	OSC. POL. COIL	A-14241-2
L14	OSC. S.W. COIL	A-14241-3

NO. FROM BACK OF SET

S1	ANT. PRI. SECTION
S2	ANT. SEC. SECTION
S3	R.F. PRI. SECTION
S4A	R.F. BAIS SECTION
S4B	SCREEN SECTION
S4C	I.F. BAIS SECTION
S5	R.F. SEC. SECTION
S6	OSC. PRI. SECTION
S7	OSC. SEC. SECTION

SEE INDEX FOR ALI

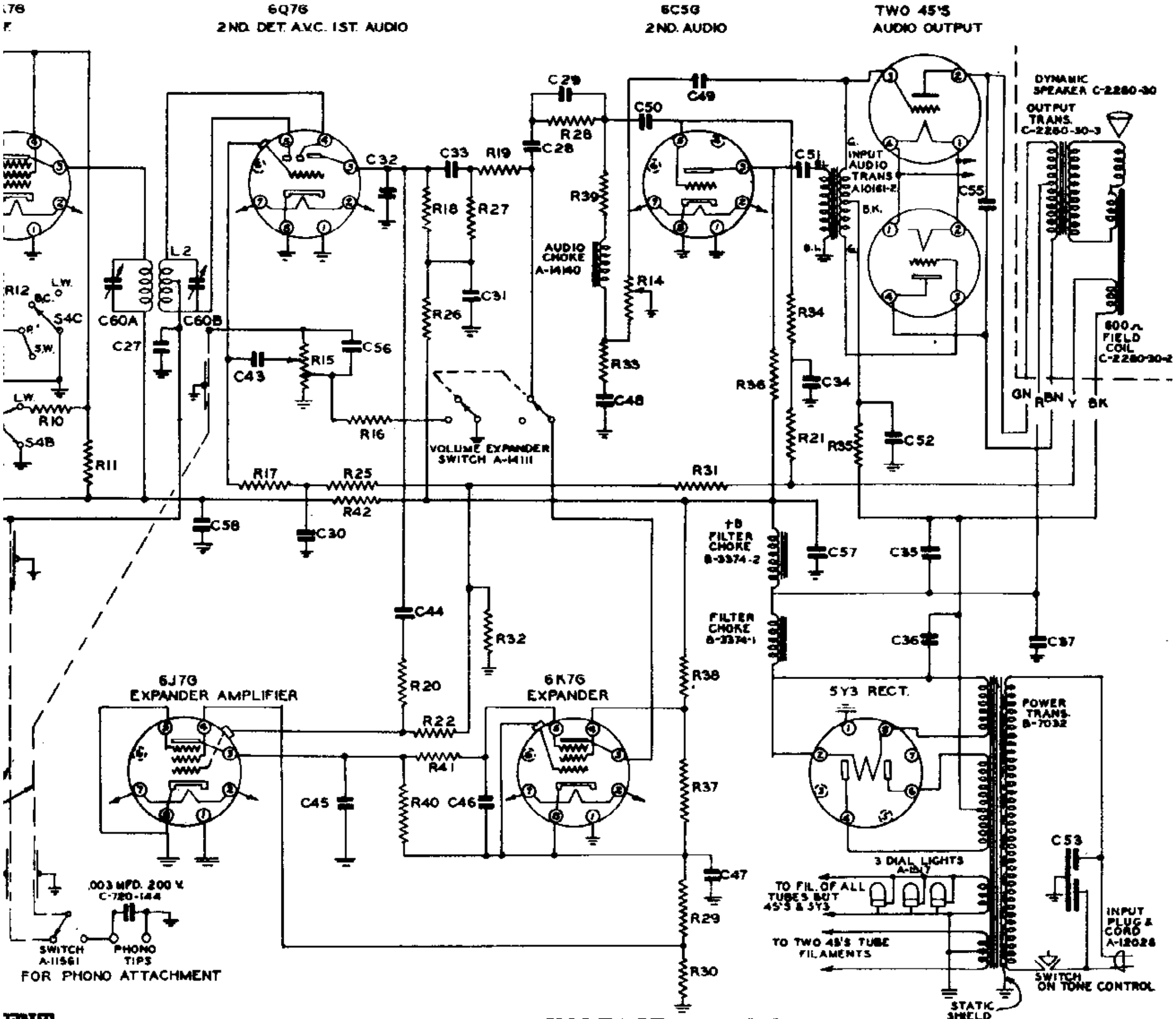
SCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MOD
INTERMEDIATE FREQUENCY 45

* 250 volt
** 25 volt
*** Cannot b

† 100 vol
†† 50 vol
††† 5 vol

HINGTON CO.

MODEL 1167
Schematic, Voltage
Parts



ENT

VOLTAGE CHART

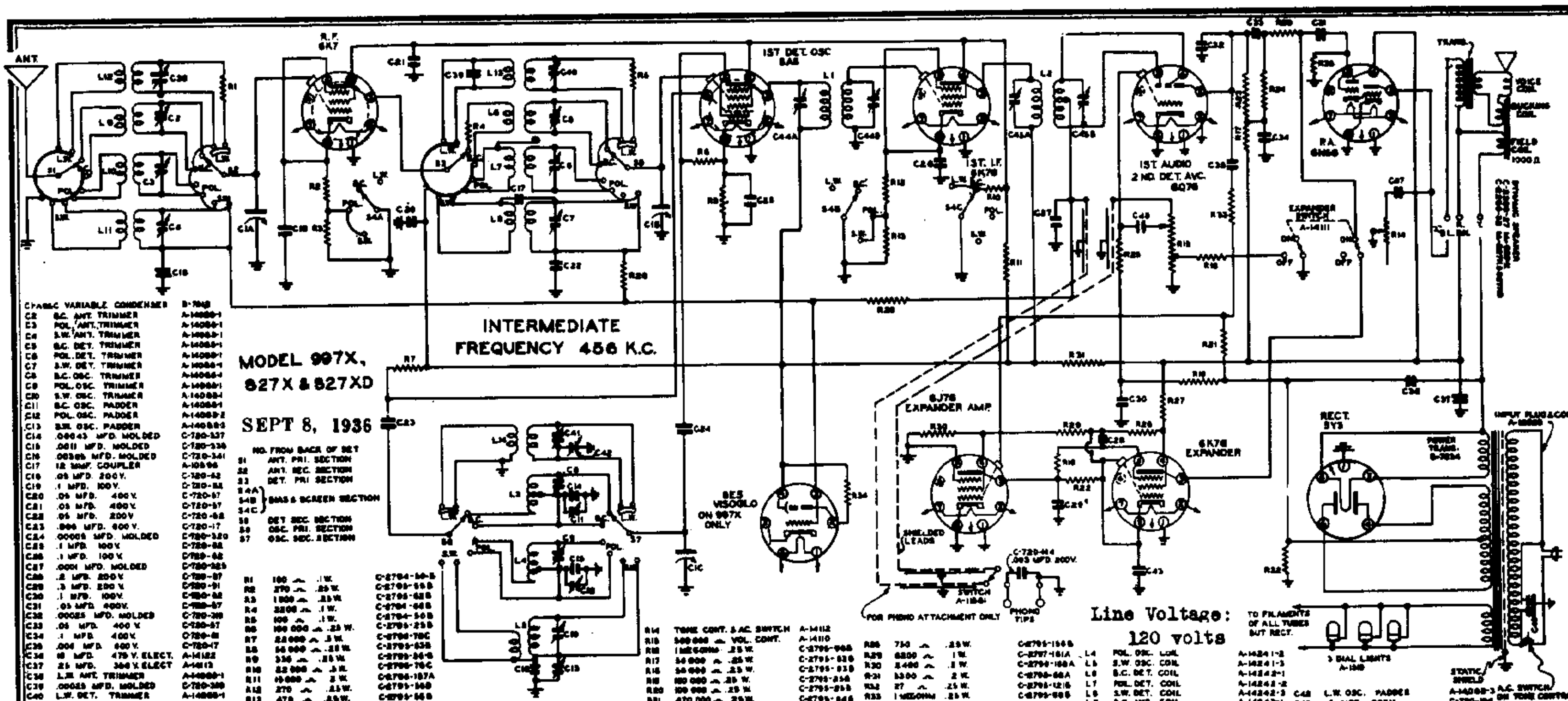
Line Voltage: 118 volts
Symphonic Expander Control: Off
Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast Band

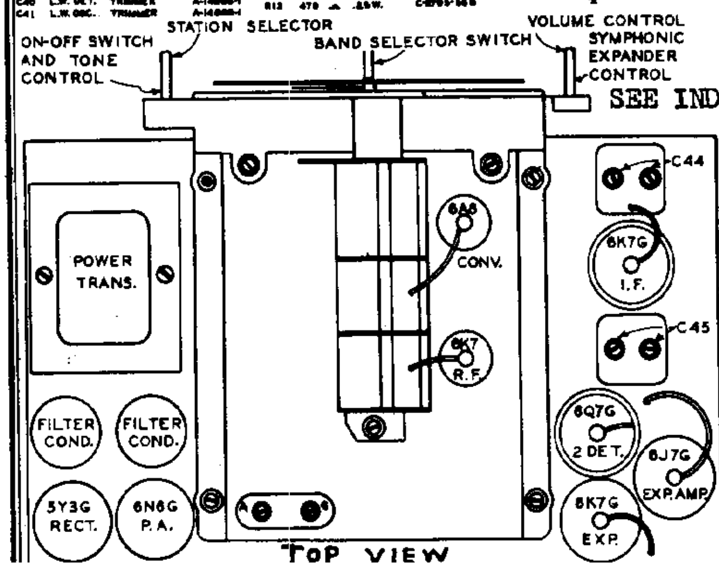
Tube	Function	Voltage of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8	Grid Cap
6K7	R-F Amplifier	0	0	240	100	0	-	6.1	0	0
6A8	1st. Det-Oscillator	0	0	250	115	0	225	6.1	0	0
6K7G	I-F Amplifier	0	6.1	245	100	0	-	0	0	0
6Q7G	2 Det-AVC-1st A-F Amplifier	0	0	105	0	0	0	6.1	0	0
6J7G	Expander Amplifier	0	0	25*	15**	0	-	6.1	0	0
6K7G	Symphonic Expander	0	0	0	74	4†	68	6.1	68	68
6C5G	2nd. A-F Amplifier	0	0	240	-	***	***	6.1	0	-
45	Power Amplifier	1.1	280	32††	1.1	-	-	-	-	-
45	Power Amplifier	1.1	280	32††	1.1	-	-	-	-	-
5Y3G	Rectifier	-	†††	-	370	-	370	-	†††	-
6E5	Viso-Glo	6.1	20†	0	250	0	0	-	-	-

Notes: Voltage readings are for schematic diagram. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits except as noted below. All measurements made with Weston Selective Analyzer No. 665, Type 2.

SPARKS-WITHINGTON CO.

MODELS 827X, 827XD, 997X
Schematic, Socket, Parts Voltage, Trimmers





SEE INDEX FOR ALIGNMENT

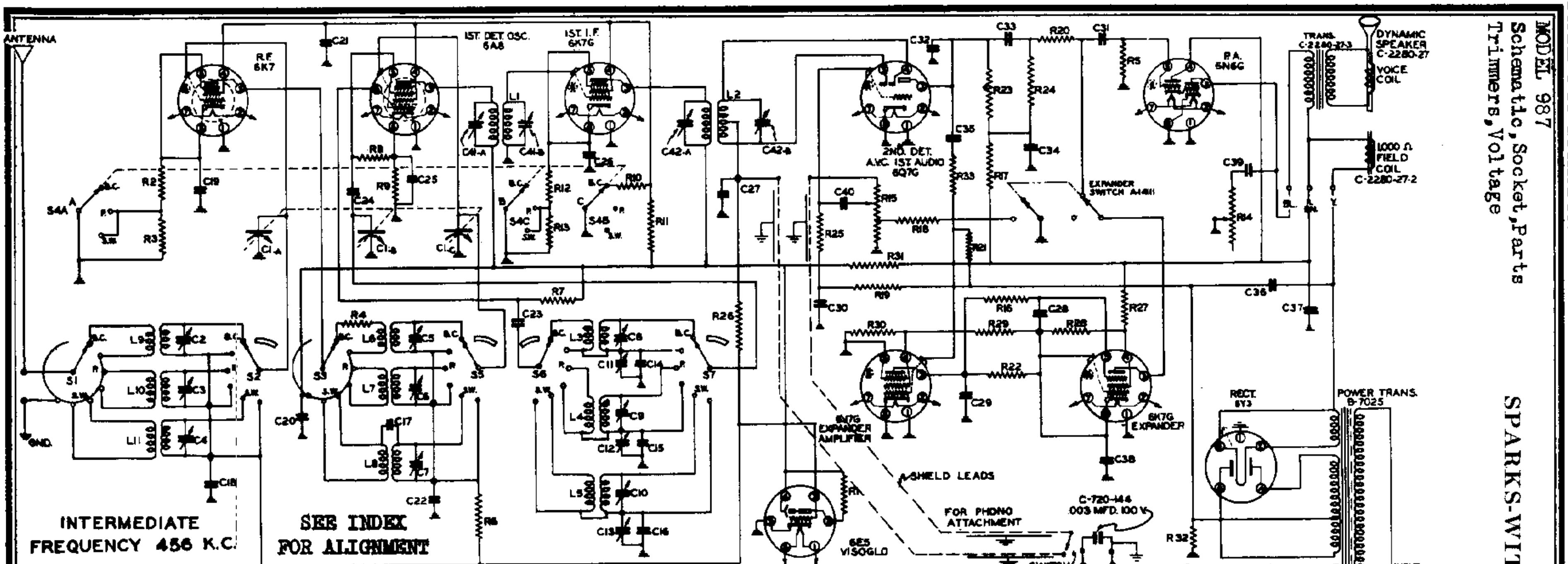
VOLTAGE CHART

Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast Band

Tube	Function	#1	#2	#3	#4	#5	#6	#7	#8	CG
		Voltage of Each Socket Prong to Ground								
6K7	RF Amp	0	6.2	250	115	0	-	0	0	0
6A8	Conv.	0	6.2	230	145	0	205	00	00	0
6K7	IF Amp	0	6.2	240	115	0	-	0	0	0
6Q7	2nd Det AVC.AF	0	6.2	150	0	0	-	0	0	0
6J7	Exp Amp	0	6.2	0	0	0	-	0	0	0
6K7	Expand.	0	6.2	0	95	0	-	0	80	85
6N6	Pwr Amp	0	6.2	410	410	0	-	0	0	0
5Y3	Rect	0	5.2	-	410	-	410	-	0	-
6E5	Visoglo	6.2	25	0	225	0	0	-	-	-

MODEL 987
Schematic, Socket, Parts
Trimmers, Voltage

SPARKS-WITHINGTON CO.

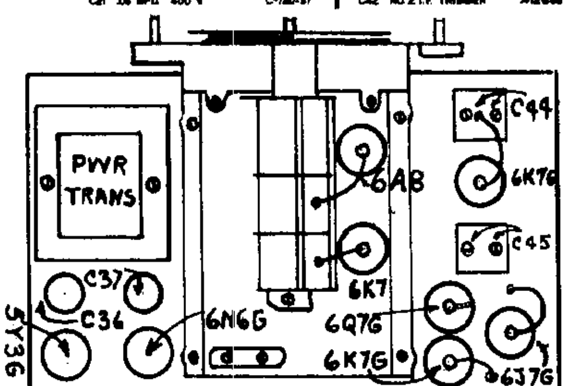


C1-A,B,C,	VARIABLE CONDENSER	B-7012
C2	B.C. ANT. TRIMMER	A-14088-1
C3	POL. ANT. TRIMMER	A-14088-1
C4	S.W. ANT. TRIMMER	A-14088-1
C5	B.C. R.F. TRIMMER	A-14088-1
C6	POL. R.F. TRIMMER	A-14088-1
C7	S.W. R.F. TRIMMER	A-14088-1
C8	B.C. OSC. TRIMMER	A-14088-1
C9	POL. OSC. TRIMMER	A-14088-1
C10	S.W. OSC. TRIMMER	A-14088-1
C11	B.C. OSC. PADDER	A-14088-1
C12	POL. OSC. PADDER	A-14088-2
C13	S.W. OSC. PADDER	A-14088-3
C14	.00043 MFD. MOLDED	C-720-337
C15	.0011 MFD. MOLDED	C-720-338
C16	.00376 MFD. MOLDED	C-720-334
C17	12 MMF COUPLER	A-10896
C18	.05 MFD. 200 V.	C-720-82
C19	.1 MFD. 100 V.	C-720-62
C20	.05 MFD. 400 V.	C-720-57
C21	.05 MFD. 400 V.	C-720-57
C22	.05 MFD. 200 V.	C-720-82
C23	.006 MFD. 600 V.	C-720-17
C24	.00005 MFD. MOLDED	C-720-321
C25	.1 MFD. 100 V.	C-720-62
C26	.1 MFD. 100 V.	C-720-62
C27	.0001 MFD. MOLDED	C-720-323
C28	.2 MFD. 200 V.	C-720-87
C29	.3 MFD. 200 V.	C-720-91
C30	.1 MFD. 100 V.	C-720-62
C31	.05 MFD. 400 V.	C-720-57
C32	.00025 MFD. MOLDED	C-720-319
C33	.05 MFD. 400 V.	C-720-57
C34	.1 MFD. 400 V.	C-720-61
C35	.006 MFD. 600 V.	C-720-17
C36	16 MFD. 475 V. ELECT.	A-14122
C37	25 MFD. 380 V. ELECT.	A-14113
C38	.5 MFD. 200 V.	C-720-104
C39	.03 MFD. 600 V.	C-720-12
C40	.05 MFD. 200 V.	C-720-82
C41	NO. 1 I.F. TRIMMER	A-12646
C42	NO. 2 I.F. TRIMMER	A-12646

R1	1 MEGOHM	.25 W.	C-2795-988
R2	270 Ω	.25 W.	C-2795-558
R3	1,000 Ω	.25 W.	C-2795-628
R4	2,200 Ω	.1 W.	C-2794-668
R5	1 MEGOHM	.25 W.	C-2795-988
R6	100,000 Ω	.25 W.	C-2795-258
R7	22,000 Ω	.5 W.	C-2796-78C
R8	56,000 Ω	.25 W.	C-2795-838
R9	330 Ω	.25 W.	C-2795-568
R10	22,000 Ω	.5 W.	C-2796-78C
R11	15,000 Ω	2 W.	C-2798-187A
R12	270 Ω	.25 W.	C-2795-558
R13	470 Ω	.25 W.	C-2795-588
R14	TONE CON. & SWITCH		A-14112
R15	800,000 Ω VOL. CON.		A-14110
R16	1 MEGOHM	.25 W.	C-2795-988
R17	56,000 Ω	.25 W.	C-2795-838
R18	56,000 Ω	.25 W.	C-2795-838
R19	100,000 Ω	.25 W.	C-2795-258
R20	100,000 Ω	.25 W.	C-2795-258
R21	470,000 Ω	.25 W.	C-2795-948
R22	470,000 Ω	.25 W.	C-2795-948
R23	220,000 Ω	.25 W.	C-2795-908
R24	680,000 Ω	.25 W.	C-2795-968
R25	1 MEGOHM	.25 W.	C-2795-988
R26	1 MEGOHM	.25 W.	C-2795-988
R27	27,000 Ω	2 W.	C-2798-181A
R28	750 Ω	.25 W.	C-2795-1568
R29	5,600 Ω	1 W.	C-2797-181A
R30	2,400 Ω	.5 W.	C-2796-166A
R31	3,300 Ω	2 W.	C-2798-98A
R32	27 Ω	.25 W.	C-2795-1218
R33	1 MEGOHM	.25 W.	C-2795-988

L1	NO. 1 I.F. TRANS.	A-12064-12
L2	NO. 2 I.F. TRANS.	A-12989-2
L3	B.C. OSC. COIL	A-14841-1
L4	POL. OSC. COIL	A-14841-2
L5	S.W. OSC. COIL	A-14841-3
L6	B.C. R.F. COIL	A-14842-1
L7	POL. R.F. COIL	A-14842-2
L8	S.W. R.F. COIL	A-14842-3
L9	B.C. ANT. COIL	A-14843-1
L10	POL. ANT. COIL	A-14843-2
L11	S.W. ANT. COIL	A-14843-3

NO. FROM BACK OF SET
S1 ANT. PRI. SECTION
S2 ANT. SEC. SECTION
S3 R.F. PRI. SECTION
S4A, S4B, S4C } BIAS AND SCREEN SECTION
S5 R.F. SEC. SECTION
S6 OSC. PLATE SECTION
S7 OSC. GRID SECTION



Model 987

Aug 28 1936

VOLTAGE CHART

Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast
Line Voltage: 115 volts

Voltage of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)

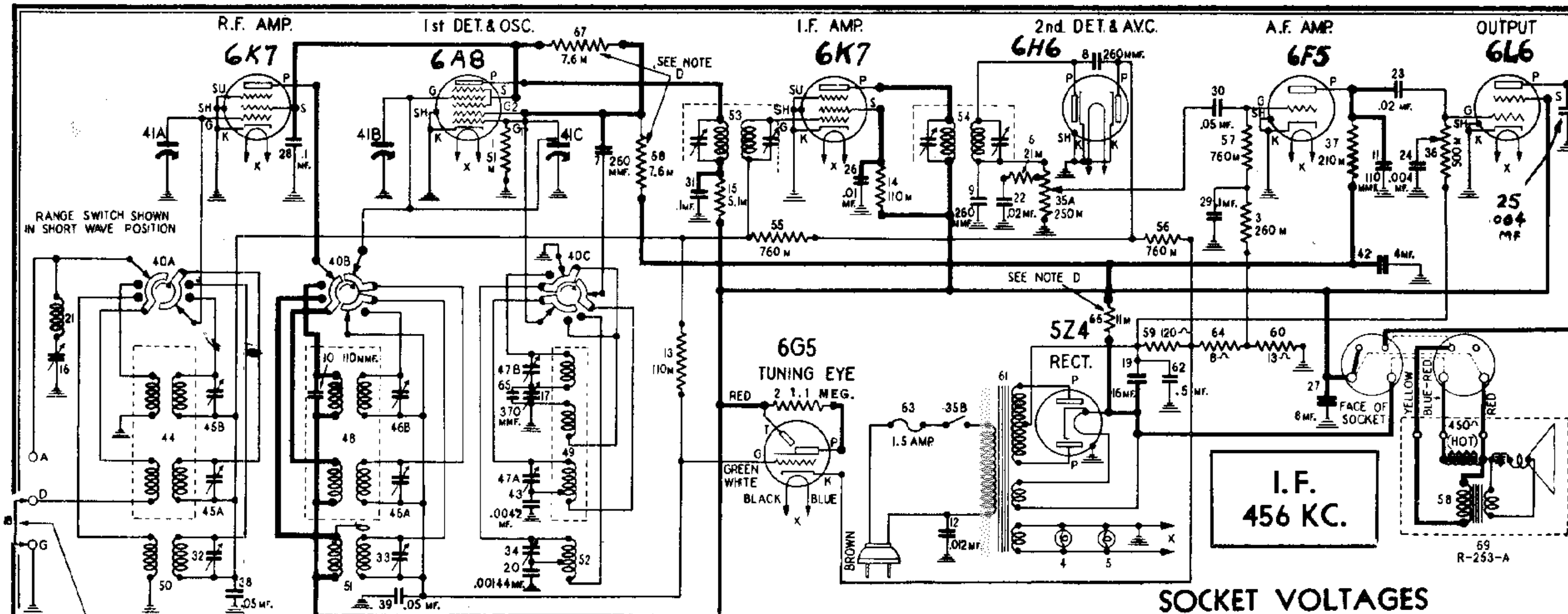
Tube	Function	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8	Grid Cap
6K7	R-F Amplifier	0	6.2	250	115	0	-	0	0	0
6A8	Converter	0	6.2	230	145	0	205	0	0	0
6K7G	I-F Amplifier	0	6.2	240	115	0	-	0	0	0
6Q7G	Det-AVC-1st.A-F Amp.	0	6.2	150	0	0	-	0	0	0
6J7G	Expander Amplifier	0	6.2	*	*	*	-	0	0	0
6K7G	Expander	0	6.2	0	95	*	-	0	85	85
6N6G	Power Amplifier	0	6.2	410	410	0	-	0	0	-
5Y3G	Rectifier	0	5.0	-	410	-	410	-	0	-
6E5	Viso-Glo	6.2	25	0	225	0	0	-	-	-

* Cannot be measured with Weston Selective Analyzer No. 665, Type 2.
** 100 volt scale.

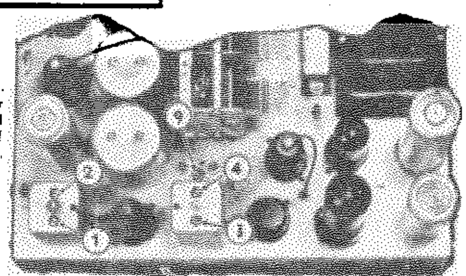
Trimmers, Voltage Change

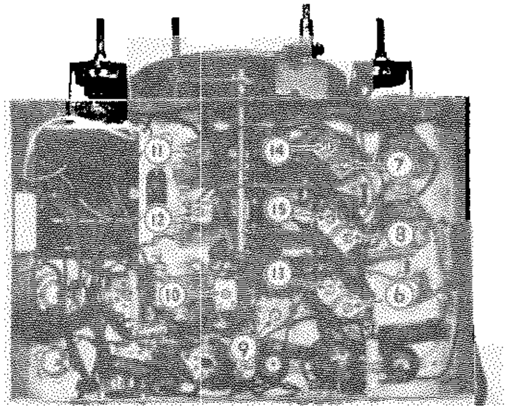
STEWART-WARNER CORP.

MODELS 1471 to 14
Chassis R-147
Schematic, Socket



NOTE D:
In receivers having serial numbers below 351,736, resistor 67 is omitted, and the screen grids of the 6K7, R.F. amplifier and the 6A8 receive their current through a 31,000 ohm, 1 watt carbon resistor which is connected to the screen grid of the 6L6. In addition, resistor 66 has a rating of 30,000 ohms, 1 watt and resistor 68 has a rating of 16,000 ohms, 1/4 watt.



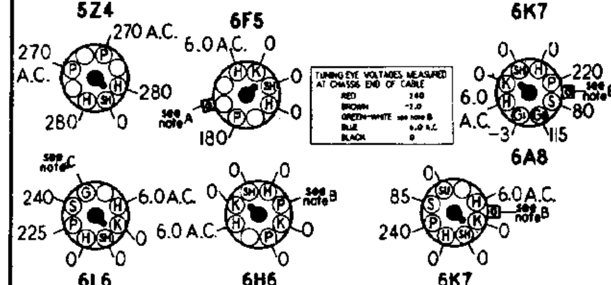


SOCKET VOLTAGES

RANGE SWITCH ON BROADCAST POSITION — DIAL TUNED TO 525 KC.
VOLUME CONTROL ON FULL — ANTENNA GROUNDED

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS
A.C. LINE VOLTAGE 115 VOLTS



ALIGNMENT

Trimmer Number		Alignment Frequency
1	1st I.F. transformer trimmer	456 KC.
2	1st I.F. transformer trimmer	456 KC.
3	2nd I.F. tranformer trimmer	456 KC.
4	2nd I.F. tranformer trimmer	456 KC.
5	Wave trap trimmer	456 KC.
6	Broadcast oscillator shunt trimmer	1500 KC.
7	Broadcast antenna shunt trimmer	1500 KC.
8	Broadcast detector shunt trimmer	1500 KC.
9	Broadcast oscillator series padder	600 KC.
10	Police oscillator shunt trimmer	5 MC.
11	Police antenna shunt trimmer	5 MC.
12	Police detector shunt trimmer	5 MC.

IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.
NOTE A: The grid bias for the 6F5 is −1.3 volts measured across resistor 60.
NOTE B: The grid bias for the 6A8, 6K7's, and the anode voltage of the A.V.C.

MODELS 1471 to 1479
Chassis R-147
Alignment, Parts

STEWART-WARNER CORP.

MODEL R-147

ALIGNING THE I. F. AMPLIFIER: Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (fully clockwise).

Connect the test oscillator output leads to the 6A8 control grid and chassis with a **.1 mfd. condenser in series with the oscillator output.** Set the oscillator to exactly 456 KC. Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

Adjust the four I.F. trimmers, Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.

WAVE-TRAP ADJUSTMENT: The wave-trap adjusting trimmer, No. 5, is located on the back of the chassis. Leave the test oscillator at 456 KC. Connect the oscillator output to the A and G terminals with a 400 ohm resistor in series with the A terminal and oscillator output. Then adjust the wave-trap trimmer No. 5 for **minimum** output. If some particular station with a frequency near 456 KC. causes code interference, it may be desirable to adjust the wave-trap on the actual frequency of the interfering station.

BROADCAST BAND CALIBRATION AND ALIGNMENT: With the gang condenser in full mesh, the dial pointer should be on the white horizontal line below 530 KC. on the dial scale. Leave the range switch in the extreme clockwise position, and leave the test oscillator connected to the A and G terminals of the receiver through a 400 ohm resistor.

Adjust the test oscillator to exactly 1500 KC. and turn the receiver dial pointer to 1500 KC. on the tuning dial. To calibrate the dial, adjust trimmer No. 6 for maximum output.

Carefully tune the receiver to the signal and adjust trimmers Nos. 7 and 8 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 9 for maximum output. Then try to increase the output meter reading by detuning No. 9 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though the dial may be slightly off calibration at 600 KC.

BAND NO. 2 CALIBRATION AND ALIGNMENT: Turn the range switch to the center position.

Adjust the test oscillator to exactly 5.0 MC. and turn the receiver dial pointer to exactly 5.0 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 10 for maximum output. If two peaks are found, the proper one is that with the trimmer screw farthest **out.**

Carefully tune the receiver to the signal and adjust trimmers Nos. 11 and 12 for maximum output. Then try to increase the output by detuning No. 12 slightly and retuning the receiver dial. Continue detuning No. 12 and retuning the dial until the output meter deflection is a maximum. Then readjust No. 11 for maximum output.

BAND NO. 3 CALIBRATION AND ALIGNMENT: Turn the range switch to the extreme counter-clockwise position. Be sure the D and G terminals on the antenna terminal strip are connected together.

Set the test oscillator to 16 MC. and turn the receiver dial pointer to exactly 16 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 13 for maximum output. Check to see that it has been adjusted to the proper peak by tuning the receiver to approximately 15.1 MC. A repeat signal should be heard at this point. If none is present, even with greatly increased oscillator output, retune the receiver to 16 MC. and adjust trimmer No. 13 to the proper peak with the trimmer screw farther **out.**

Carefully tune the receiver to the signal and adjust trimmers Nos. 14 and 15 to a peak. Then try to increase the output by detuning No. 15 slightly and retuning the dial until a maximum output meter deflection is secured. Then readjust No. 14 for maximum output. Check the adjustment by tuning the receiver to the image at about 15.1 MC. The image should be much weaker than the 16 MC. signal. If the signal at 15.1 MC. dial setting is equal to or stronger than the 16 MC. signal, trimmer No. 15 is not set to the proper peak. Turn the trimmer in a turn or so, then readjust as above.

MODEL R-147 PARTS LIST

Diagram Number	Part Number	Description	List Price
1	83080	51,000 ohm 1/4 watt carbon resistor	$ .20
2	84235	1.1 megohm 1/4 watt carbon resistor	.12
3	83082	260,000 ohm 1/4 watt carbon resistor	.20
4-5	83278	Pilot lamp No. 40, 6-8 volts	.15
6	83286	21,000 ohm 1/4 watt carbon resistor	.20
7-8-9	83539	260 mmfd. mica condenser	.15
10-11	83783	110 mmfd. mica condenser	.20
12	83976	.012 mfd. 1000 V. shielded condenser	.35
13-14	84198	110,000 ohms 1/4 watt carbon resistor	.30
15	84720	5100 ohms 1/4 watt carbon resistor	.12
16	85285	Wave trap condenser	.40
17	85285	Padding condenser	.40
18	85321	Ground connector	.01
19	85431	16 mfd. 400 V. Electrolytic condenser	1.25
20	85562	.00144 mfd. mica condenser	.30
21	88014	Antenna trap coil	.50
22-23	88026	.02 mfd. 400 V. paper condenser	.30
24-25	88029	.004 mfd. 400 V. paper condenser	.30
26	88030	.01 mfd. 400 V. paper condenser	.30
27	88033	8 mfd. 350 V. electrolytic condenser	1.10
28-29	88046	.1 mfd. 150 V. paper condenser	.30
30	88189	.05 mfd. 200 V. paper condenser	.35
31	88191	.1 mfd. 300 V. paper condenser	.35
32-33-34	88477	Trimmer condenser	.12
35A 35B	88487	Volume control (250,000 ohms) A. C. line switch	1.25
36	88488	Tone control (500,000 ohms)	.80
37	88532	210,000 ohms 1/4 watt carbon resistor	.12
38-39	88534	.05 mfd. 150 V. condenser (low loss)	.24
40A to C	88573	Range switch	2.50
41A to C	88574	Three gang condenser	5.00
42	88576	4 mfd. 250 V. electrolytic condenser	.80
43	88587	.0042 mfd. mica condenser	.35
44	88592	Antenna coil and shield assem. (B.C.& S.W.) with trimmer	2.20
45A-45B 46A-46B 47A-47B	88596	Trimmer condenser	.25
48	88597	R. F. coil and shield assem. (B.C.&S.W.) with trimmer	2.40
49	88599	Oscillator coil and shield assem. (B.C.&S.W.) with trimmer	2.20
50	88602	Antenna coil assem. (Police) with trimmer	.85
51	88604	R. F. coil assem. (Police) with trimmer	1.00
52	88605	Oscil. coil assem. (Police) with trimmer	.70
53	88606	1st I.F. transformer	2.50
54	88607	2nd I.F. transformer	2.50
55-56-57	88854	760,000 ohms 1/4 watt carbon resistor	.12
58	88870	Output transformer (on R-253 speaker)	2.50
59	88896	120 ohms 2 watt carbon resistor	.18
60	88897	13 ohms 1/2 watt carbon resistor	.12
61	88898	Power transformer, 115 volts—60 cycles	6.00
62	88990	.5 mfd. 150 V. paper condenser	.35
63	89002	Fuse, 1.5 amperes	.10
64	89004	8 ohms 1/2 watt wire wound resistor	.15
65	89525	370 mmfd. mica condenser	.32
66	89751	11,000 ohm 1 watt carbon resistor	.12
67	89752	7,600 ohm 1/2 watt carbon resistor	.12
68	89754	7,600 ohm 1 watt carbon resistor	.12
69	R-253-A	12 inch dynamic speaker	11.50

MISCELLANEOUS PARTS

Part No.	DESCRIPTION	
67977	#14 x 1¼ chassis mtg. screw	$0.03
77381	Flat steel washer	.01
84428	Rubber chassis mtg. bushing	.08
85066	C.D.A. terminal strip	.20
85321	Ground connector	.01
88056	Fuse strip	.16
88057	Fuse cover	.06
88675	Speaker socket	.12
88831	Bracket for range selector shaft	.02
88832	Shaft for range selector knob	.10
88956	Escutcheon with glass	1.65
88975	Link and lever assembly	.14
88982	Compression spring	.01
88985	Tuning knob, front section	.20
88986	Tuning knob, rear section	.25
88995	Escutcheon for tuning eye	.30
88996	Knob, range switch	.15
89027	Spring washer (for planetary drive)	.01
89038	Knob; tone and volume controls	.20
89119	Tuning indicator cable and plug	1.50

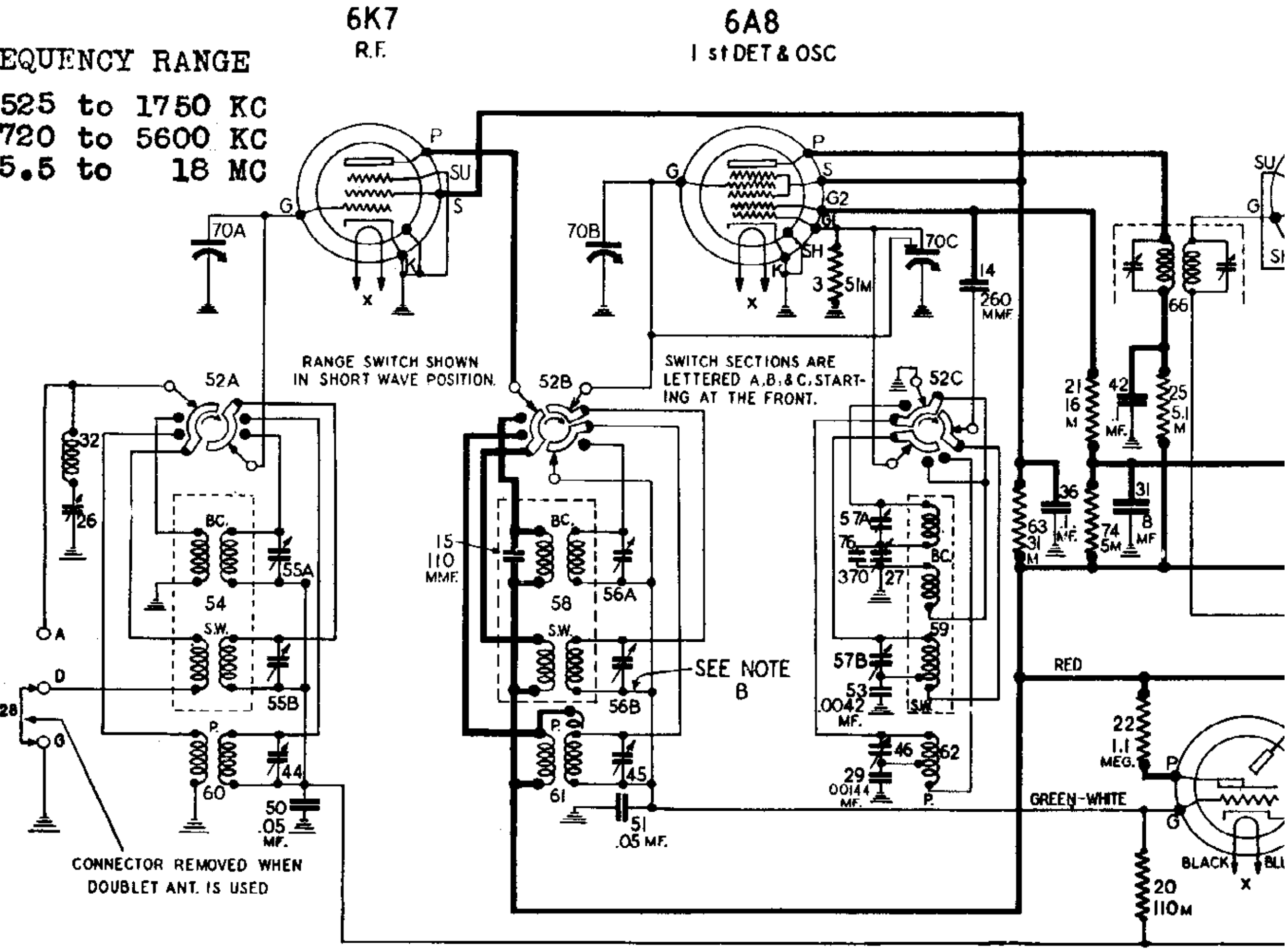
TUNING DRIVE AND DIAL PARTS

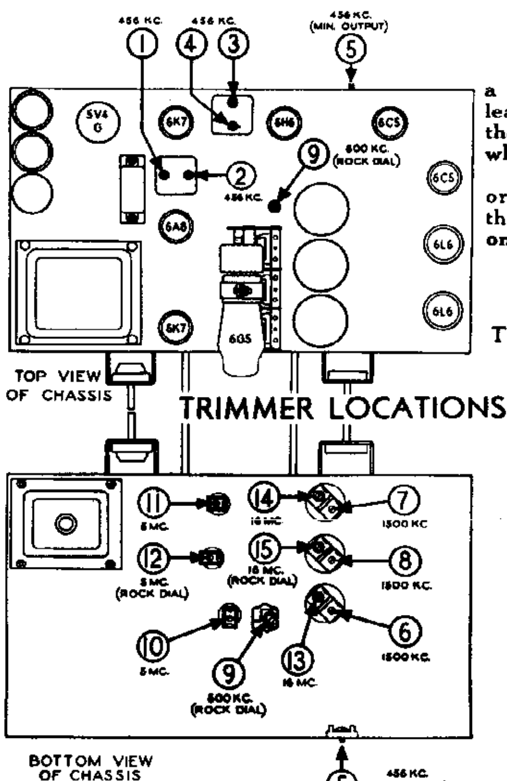
Part No.	DESCRIPTION	
83278	Pilot lamp #40 6-8 volts	$0.15
85902	Dual ratio planetary dial drive	.90
88835	Idler gear and pinion assembly	.25
88839	Tension spring (for idler gear)	.10
88840	Dial disc and bushing assembly	.40
88844	Dial ring bracket and shaft assembly (for edge lighting)	1.00
88900	Dial scale (for rear lighting)	2.00
88977	Band indicator and link assembly	.60
88998	Second pointer	.05
89001	Main pointer and stud assembly	.10
89144	Tension spring (for idler gear)	.10
89283	Pilot lamp socket	.10
89284	Pilot lamp shield	.02
89287	Dial scale (for edge lighting)	1.75
89288	Dial background (with edge lighting)	.12
89297	Bracket and light bracket assembly (for idler gear)	.20
89484	Dial ring bracket and shaft assembly (for rear lighting)	1.10

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

FREQUENCY RANGE

525 to 1750 KC
1720 to 5600 KC
5.5 to 18 MC





IMPORTANT

In aligning this chassis it is absolutely essential to connect a .1 to .25 mfd. condenser in series with the oscillator output lead when aligning the I.F. trimmers. If no condenser is used, the oscillator may short out all bias on the 6A8 and 6K7 tubes which results in improper alignment.

In aligning all other trimmers but the I.F. trimmers, a 400 or 500 ohm carbon resistor must be connected in series with the oscillator output and receiver antenna terminal. Do not omit this resistor or the alignment will be incorrect.

ALIGNMENT

I.F. AMPLIFIER

Trimmer No.

1, 2 — First I.F. transformer trimmers
3, 4 — Second I.F. transformer trimmers

WAVE TRAP

5 456 KC. wavetrap trimmer

BAND No. 1 (BROADCAST) (527 to 1750 KC.)

6 Broadcast band oscillator shunt trimmer
7 Broadcast band antenna shunt trimmer
8 Broadcast band detector shunt trimmer
9 Broadcast band oscillator series padder

BAND No. 2 (1720 to 5600 KC.)

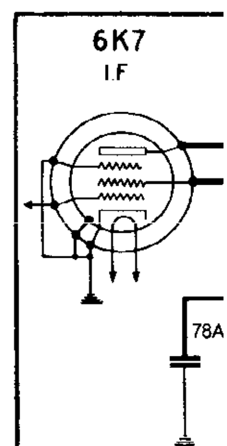
10 Band No. 2 oscillator shunt trimmer
11 Band No. 2 antenna shunt trimmer
12 Band No. 2 detector shunt trimmer

BAND No. 3 (5.5 to 18 MC.)

13 Band No. 3 oscillator shunt trimmer
14 Band No. 3 antenna shunt trimmer
15 Band No. 3 detector shunt trimmer

NOTE B: I
dicated doe
through an
110,000 oh
Negative en

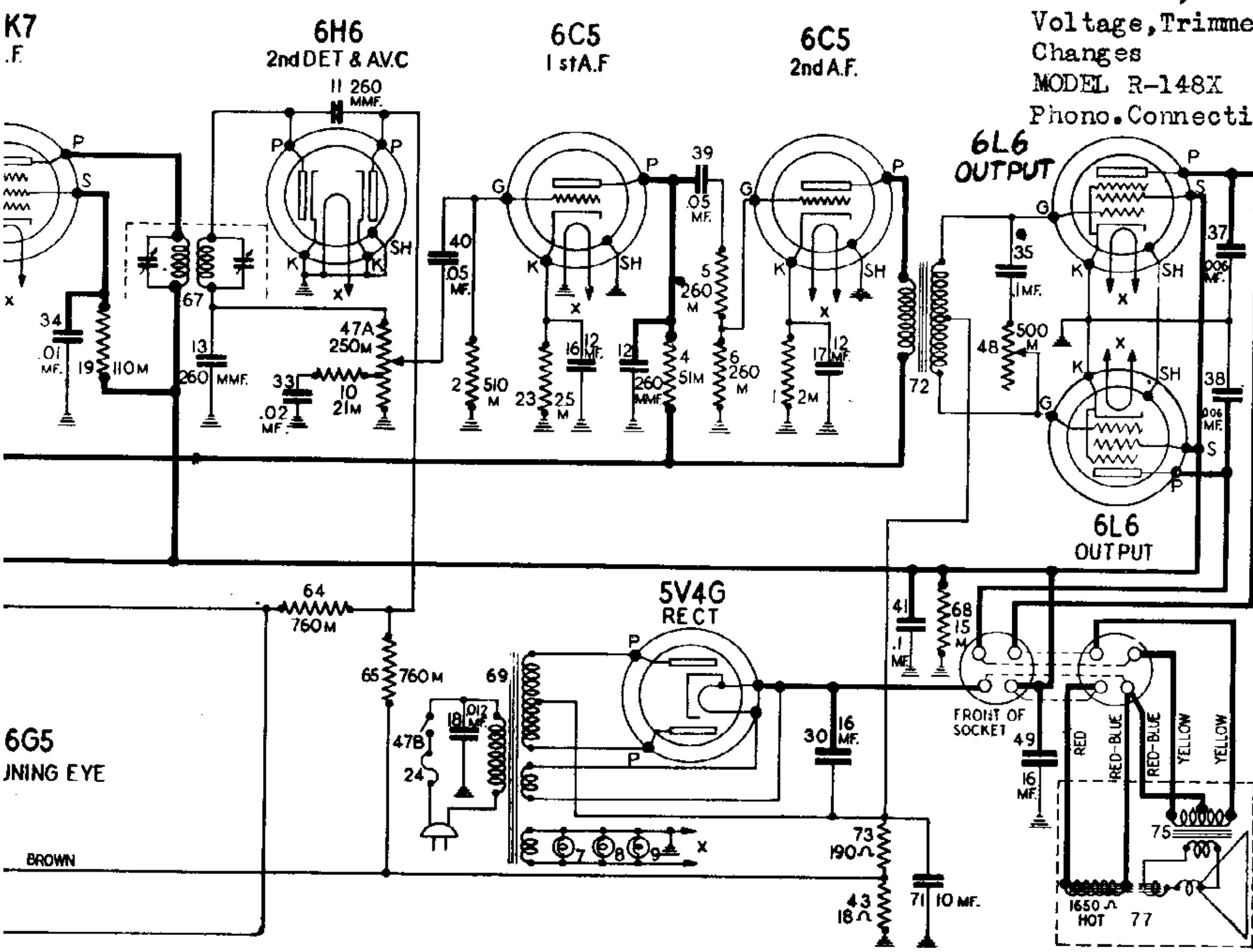
I.I



MODEL R 148 X

RNER CORP.

MODELS 1481 to 1489
Chassis R-148
Schematic, Socket
Voltage, Trimmers
Changes
MODEL R-148X
Phono. Connections

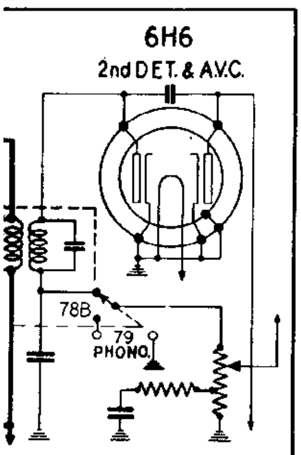


...ssis stamped with the letter "H," the lead in... connect to A.V.C. but is by-passed to ground ... mfd. condenser and is connected through a ...sistor to a permanent bias of 1.8 volts at the ...esistor No. 43.

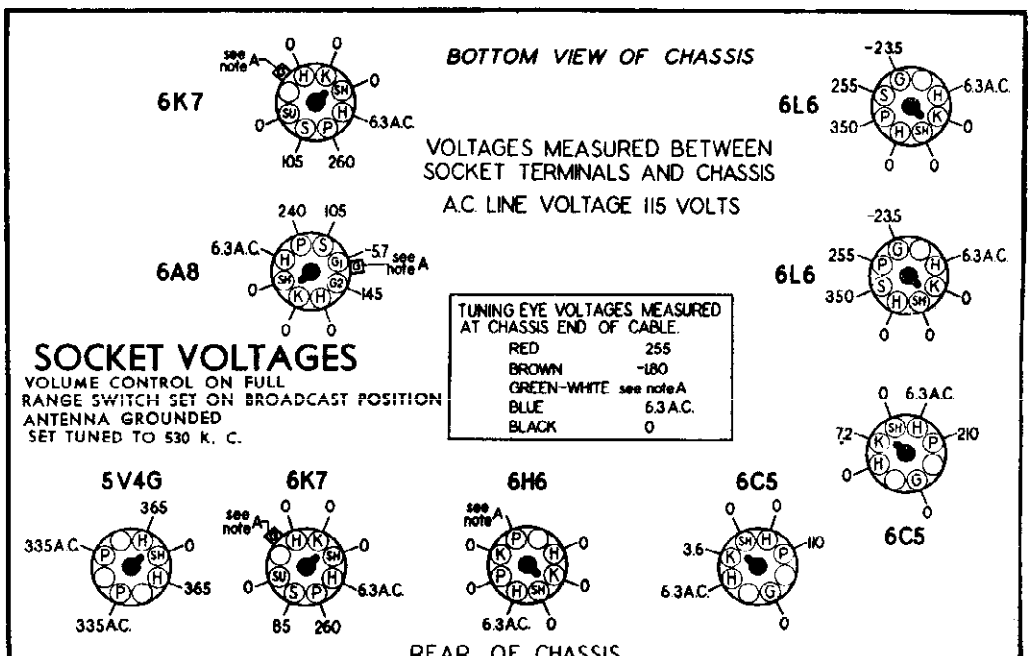
IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: —1.8 volts measured across resistor 43.

REQUENCY
456 KC.



...OGRAPH CONNECTIONS



STEWART WARNER CORP.

ALIGNMENT OF THE I.F. AMPLIFIER

1. (a) Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure.

(b) Connect the test oscillator output leads to the 6A8 control grid and the chassis with a .1 or .25 mfd. condenser in series with the oscillator lead to the 6A8 grid.

(c) Set the test oscillator to exactly 456 KC. Adjust the output of the test oscillator to give about half scale deflection on the output meter.

(d) Turn the range switch to the extreme clockwise position and set the tuning dial to any point where there is no tuning effect on the oscillator signal.

(e) Adjust the four I.F. transformer trimmers (trimmers No. 1, 2, 3, and 4) for maximum output meter deflection.

(f) Repeat the four trimmer adjustments, since the adjustment of each trimmer has some effect on the others.

2. (a) Leave the test oscillator at 456 KC. but connect the oscillator output to the A and G terminals of the receiver with a 400 or 500 ohm carbon resistor in series with the oscillator output and the A terminal.

(b) Adjust trimmer No. 5 for minimum output. Increase the oscillator output as necessary to obtain a clearly defined point of minimum output. If some particular station with a frequency slightly different than 456 KC. causes code interference, it may be advisable to adjust trimmer No. 5 on the actual frequency of the interfering station.

BAND NO. 1 (BROADCAST) CALIBRATION

3. (a) Check the position of the dial pointer on its shaft by turning the tuning knob until the rotor plates of the gang condenser are in full mesh. The slow-moving dial pointer should then coincide with the low frequency end of the dial scale. If it does not, hold the dial gear and turn the pointer to the correct position.

(b) Turn the range switch control to the extreme right position. (Clockwise.)

(c) Connect a 400 or 500 ohm carbon resistor in series with the test oscillator output and the receiver antenna terminal. (Note: This resistor should remain connected for all subsequent adjustments.

(d) Ground the receiver.

(e) Adjust the test oscillator to exactly 1500 KC.

(f) Tune in the 1500 KC. oscillator signal or a station above 1300 KC. on the dial and determine whether the dial calibration is correct at the high frequency end of the dial. If it is not correct, adjust trimmer No. 6 to give proper calibration. Do not adjust this trimmer if the dial calibration is correct at the high frequency end of the dial.

BAND NO. 1 (BROADCAST) ALIGNMENT

4. (a) With the test oscillator set at 1500 KC. tune the receiver to the signal for maximum output.

(b) Adjust trimmers No. 7 and 8 for maximum output. Do not touch trimmer No. 6 as this will change the calibration.

(c) Adjust the test oscillator to exactly 600 KC. and tune the receiver to the signal. Adjust trimmer No. 9 for maximum output. Then try to increase the output by detuning the trimmer and retuning the receiver dial. If this reduces the output, detune the trimmer on the opposite direction. Continue detuning the trimmer and retuning the dial until a maximum output meter deflection is secured. This operation is commonly known as "rocking." The object of this adjustment is to find the combination of trimmer adjustment and tuning condenser position which gives the maximum output. This adjustment should not be changed regardless of whether the dial reads exactly 600 KC. or slightly off 600 KC. for maximum output.

(d) Check the adjustment of trimmers Nos. 6, 7 and 8 at 1500 KC.

BAND NO. 2 CALIBRATION

5. (a) Turn the range switch to the center position.

(b) Adjust the test oscillator to exactly 5.0 MC.

(c) Tune in the 5 MC. oscillator signal at or near 5 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 5 MC. If it is, do not adjust trimmer No. 10. If the calibration is incorrect, set the dial pointer at 5 MC. on the dial, and adjust trimmer No. 10 until the oscillator signal comes in at this point. If there are two peaks, the proper one is that with the trimmer screw farthest out.

BAND NO. 2 ALIGNMENT

6. (a) With the test oscillator set at 5.0 MC., tune the receiver for maximum output.

(b) Adjust trimmer No. 11 and 12 for maximum output. After this is done try to increase the output meter reading by detuning No. 12 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning No. 12 and retuning the set until maximum output meter deflection is secured. Then readjust No. 11.

BAND NO. 3 CALIBRATION

7. (a) Turn the range switch to the extreme left (counter clockwise.)

(b) Be sure that the D and G terminals on the antenna terminal strip are connected together.

(c) Adjust the test oscillator to exactly 16 megacycles.

(d) Tune in the 16 MC. oscillator signal at or near 16 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 16 MC. If it is, do not adjust trimmer No. 13. If the calibration is incorrect, set the receiver dial pointer exactly at 16 MC. and adjust trimmer No. 13 until the oscillator signal comes in at this point.

(e) Check to see that trimmer No. 13 is adjusted to the proper peak by tuning the receiver to approximately 15.1 MC. If a repeat signal is not heard at this point, even with greatly increased oscillator output, retune the receiver to 16.0 MC. and adjust trimmer No. 13 to the proper peak with the trimmer screw farther out.

BAND NO. 3 ALIGNMENT

8. (a) With the test oscillator set at 16 MC. tune the receiver for maximum output.

(b) Adjust trimmer No. 14 and 15 for maximum output. After this is done, try to increase the output meter deflection by detuning No. 15 slightly and retuning the receiver dial. If this causes the output to drop, detune the trimmer in the opposite direction. Continue detuning No. 15 and retuning the set until the output is at a maximum. Then readjust No. 14.

(c) Check the adjustment of No. 15 by tuning the receiver to the image at 15.1 MC. and noting if the image is much weaker than the 16 MC. signal. If the signal at 15.1 MC. dial setting is equal to or stronger than the 16 MC. signal, trimmer No. 15 is not set to the proper peak. Turn the trimmer in a turn or so, then readjust as in 8 (b).

Diag. No.	Part No.	DESCRIPTION	List Price
1	67303	2000 ohm 1/4 watt carbon resistor	$0.15
2	83072	510,000 ohm 1/4 watt carbon resistor	.12
3-4	83080	51,000 ohm 1/4 watt carbon resistor	.12
5-6	83082	260,000 ohm 1/4 watt carbon resistor	.12
7-8-9	83278	Pilot lamp (6-8 volt)	.15
10	83286	21,000 ohm 1/4 watt carbon resistor	.12
11-12, 13-14	83539	260 mmfd. mica condenser	.20
15	83783	110 mmfd. mica condenser	.20
16-17	83803	12 mfd. 15V. electrolytic condenser	.80
18	83976	.012 mfd. 1000 V. shielded condenser	.40
19-20	84198	110,000 ohm 1/4 watt carbon resistor	.12
21	84199	16,000 ohm 1/4 watt carbon resistor	.12
22	84235	1.1 megohm 1/4 watt carbon resistor	.12
23	84286	2,500 ohm 1/4 watt carbon resistor	.12
24	84672	Fuse, 2 amperes	.10
25	84720	5,100 ohm 1/4 watt carbon resistor	.12
26	85285	Antenna trap condenser	.40
27	85288	Padding trimmer	.40
28	85321	Ground connector (on terminal strip)	.01
29	85562	.001440 mfd. mica condenser	.25
30	85583	16 mfd. 450 V. electrolytic condenser	2.50
31	88007	8 mfd. 250 V. electrolytic condenser	1.00
32	88014	Antenna trap coil	.50
33	88026	.02 mfd. 400 V. paper condenser	.25
34	88030	.01 mfd. 400 V. paper condenser	.25
35-36	88046	.1 mfd. 150 V. paper condenser	.25
37-38	88185	.006 mfd. 600 V. paper condenser	.25
39-40	88189	.05 mfd. 200 V. paper condenser	.25
41-42	88191	.1 mfd. 300 V. paper condenser	.25
43	88584	18 ohm 1/2 watt wire wound resistor	.15
44, 45, 46	88477	Trimmer condenser	.15
47A, 47B	88487	Vol. control (250,000 ohm) Tap 50,000 ohms from ground and A.C. line switch	1.25
48	88488	Tone control (500,000 ohms)	.80
49	88511	16 mfd. 300 V. electrolytic condenser	1.10
50-51	88534	.05 mfd. 150 V. condenser (low loss)	.25
52A, 52B, 52C	88573	Range switch	2.50
53	88587	.0042 mfd. mica condenser	$0.35
54	88592	Ant. coil & shield (B.C. & S.W.) with trimmer	2.70
55A-55B, 56A-56B, 57A-57B	88596	Trimmer condenser	.30
58	88597	R.F. coil & shield (B.C. & S.W.) with trimmer	3.10
59	88599	Oscillator coil & shield (B.C. & S.W.) with trimmer	2.50
60	88602	Antenna coil assembly (Police) with trimmer	.85
61	88604	R.F. coil assembly (Police) with trimmer	.90
62	88605	Oscillator coil assembly (Police) with trimmer	.70
~~63~~	~~88852~~	~~31,000 ohm 1/4 watt carbon resistor~~	.15
64-65	88854	760,000 ohm 1/4 watt carbon resistor	.12
66	89005	1st I.F. transformer	2.50
67	89006	2nd I.F. transformer	2.40
68	89032	15,000 ohm bleeder resistor	.50
69	89035	Power transformer 115 V.—60 cycles (See Part No. 89473 for other voltages)	7.50
70A, 70B, 70C	89044	Variable gang condenser	5.20
71	89053	10 mfd. 25 V. electrolytic condenser	.92
72	89062	Push-pull input transformer	3.00
73	89065	190 ohm 3 watt wire wound resistor	.50
74	89255	5000 ohm 1 watt carbon resistor	.15
75	89293	Output transformer (R-254-A spkr.)	3.25
76	89525	370 mmfd. mica condenser	.30
77	R-254-A	12" dynamic speaker	12.75

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODELS 1301 to 1309
Chassis R-130
Trimmers, Alignment, Parts

STEWART WARNER CORP.

MODEL R-130 CHASSIS (Receiver Models 1301 to 1309)

ALIGNING EQUIPMENT

Experience has definitely shown that a selective radio chassis such as the Stewart-Warner Model R130 cannot be properly aligned by ear or "on the air". **An output meter and a high grade modulated service oscillator are absolutely essential.**

The oscillator should be capable of generating the frequencies of 456 KC., 600 KC., 1400 KC., and a short wave range extending to 4000 K.C. or more.

When using your oscillator do not rely on calibration curves for frequency determination but check the frequencies by comparison with broadcast station signals.

PRELIMINARY STEPS

To align the R130 chassis proceed as follows:

1. Remove the chassis from the cabinet.
2. Connect the output meter across the primary of the output transformer on the dynamic speaker (red and yellow wires on terminal strip.)
3. Turn the volume control to maximum volume position.

ALIGNMENT OF THE I. F. AMPLIFIER

1. (a) Set the test oscillator to exactly 456 KC.

(b) Connect the output leads of the oscillator to the 6A7 control grid and ground.

(c) Set the range switch (right hand knob) to the broadcast position (fully clockwise). Make certain that no station is tuned in.

(d) Carefully adjust the I.F. transformer trimmers Nos. 1, 2, 3, and 4 for maximum output meter deflection.

(e) Repeat the four trimmer adjustments since the adjustment of each trimmer has some effect on the others.

BROADCAST RANGE CALIBRATION

1. Check the position of the pointer on the condenser shaft by turning the rotor plates of the gang condenser to full mesh by means of the tuning knob. The pointer should then coincide with the heavy horizontal line separating the broadcast and short-wave dial scales. If it does not, remove the dial glass and turn the pointer to the proper position, being careful not to break or bend the pointer.

2. Turn the range switch (right hand knob) to the maximum clockwise position, which is the broadcast setting.

3. To calibrate the set at the high frequency end, use a broadcast station signal between 1300 and 1420 KC. If no such station can be heard, you can use a 1400 KC. signal from your oscillator provided its calibration is accurately known.

(a) Turn the set dial to the exact frequency setting of the signal (either a station or the oscillator).

(b) Carefully adjust trimmer No. 5 (broadcast oscillator calibration trimmer) until the signal may be tuned in with maximum volume at its correct frequency setting.

BROADCAST RANGE ALIGNMENT

IMPORTANT

4. Connect a .0001 MICA CONDENSER in series with the test oscillator output and the blue receiver antenna lead. IT IS ABSOLUTELY ESSENTIAL THAT THIS CONDENSER REMAIN CONNECTED FOR ALL BROADCAST AND SHORT WAVE ADJUSTMENTS in order to secure proper alignment of the antenna stage. Do not connect any resistor in series with the .0001 mfd. condenser.

Ground the receiver chassis and connect the oscillator ground lead to the chassis.

5. (a) Set the test oscillator to approximately 1400 KC. and carefully tune the receiver to the signal.

(b) Adjust trimmers No. 6 and No. 7 (broadcast detector shunt trimmer and broadcast pre-selector shunt trimmer respectively) for maximum output meter reading.

(c) Retune the receiver and check the adjustments of trimmers No. 6 and No. 7. Do not touch trimmer No. 5 since this will change the calibration.

6. (a) Set the test oscillator to approximately 600 KC. and tune the receiver to the signal.

(b) Adjust trimmer No. 8 (broadcast oscillator padding trimmer) to get maximum output meter deflection.

(c) Retune the receiver dial to a peak and readjust trimmer No. 8.

(d) Continue this procedure of adjusting the trimmer and retuning the set until the output meter reading cannot be increased. **This procedure must be followed or the receiver will not be properly aligned.**

7. Repeat 5 a, 5 b, and 5 c.

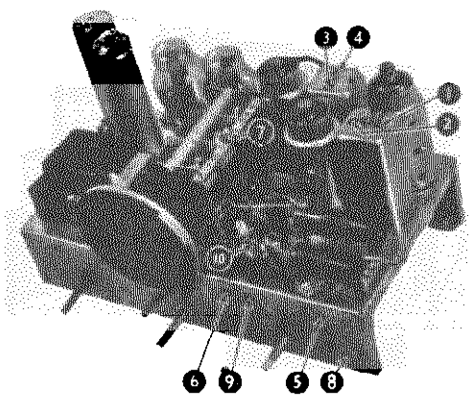
SHORT WAVE RANGE CALIBRATION

1. Turn the receiver range switch to the short wave band position (counter-clockwise).

2. Adjust the test oscillator to exactly 16,000 KC. If you cannot obtain this frequency on your oscillator, you may use the second harmonic of 8000 KC., or the fourth harmonic of 4000 KC., either of which will give a 16,000 KC. signal.

3. (a) Set the receiver dial at 16.0 MC. on the dial scale and adjust trimmer No. 9 (shortwave oscillator calibration trimmer) until the signal may be tuned in at the correct dial setting with maximum volume. There will be two peaks. The proper one is that with the trimmer screw farthest out.

(b) To be sure you have not adjusted trimmer No. 9 to the image frequency, check this point by setting the receiver dial to the image frequency, approximately 15.1 MC., and see if the image signal can be heard. (The **image frequency is always the signal frequency minus twice the I.F. frequency or in this case 16,000 — 912 = 15,088 KC. or approximately 15.1 MC.**) If no signal can be heard at 15.1 MC. dial setting even with greatly increased test oscillator output, but can be heard at 16.9 MC dial setting, trimmer No. 9 is evidently improperly adjusted to the image frequency and so must be reset to the proper peak with the screw farther out. After readjusting trimmer No. 9, again check to see that the image comes in at 15.1 MC. dial setting and not at 16.9 MC dial setting.



SHORT WAVE RANGE ALIGNMENT

4. (a) Tune the set very carefully to the oscillator frequency, 16.0 MC for maximum output meter reading.

(b) Adjust trimmer No. 10 (shortwave range detector shunt trimmer) to a peak. After this is done try to increase the output meter reading by detuning trimmer No. 10 slightly and retuning the receiver dial. Continue detuning trimmer No. 10 and retuning the set until maximum output meter deflection is secured.

NOTE: In some cases, the receiver will oscillate when trimmer No. 10 is set with the trimmer screw too far out. This oscillation which can be eliminated by correct adjustment, is normal when the detector circuit is tuned to the receiver oscillator frequency instead of to the correct signal frequency.

If the set seems to motorboat when making the short wave adjustments, reduce the output of the oscillator. This motorboating will stop when an antenna is connected to the set.

(c) Check the adjustment of trimmer No. 10 by tuning the receiver to about 15.1 MC. and noting if the image signal at this point is much weaker than the 16 MC. signal. If the signal at the 15.1 MC. dial setting is equal to or stronger than the 16 MC. signal, trimmer No. 10 is not properly adjusted and must be readjusted in accordance with 4 (b) with the trimmer screw **FARTHER IN.**

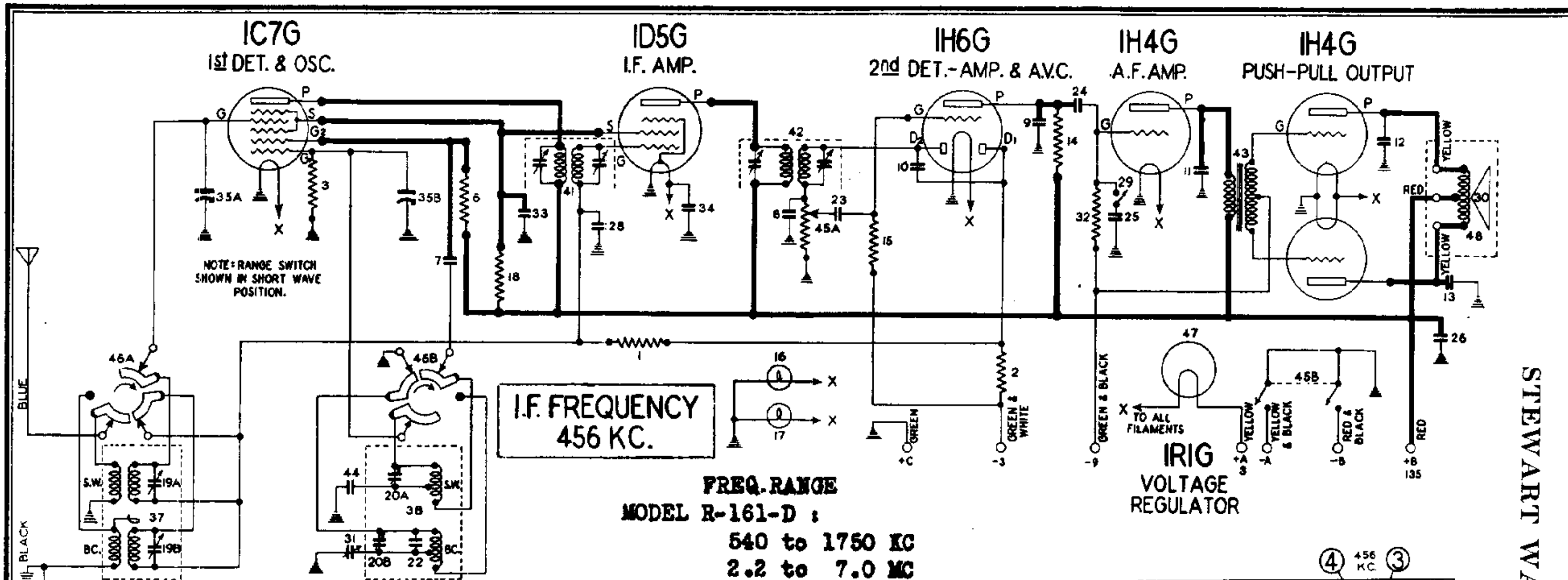
MISCELLANEOUS PARTS NOT SHOWN ON DIAGRAM

67568	Embossed insulating washer for mtg. elect. condenser	.05
83560	Tube shield	.15
83668	Electrolytic condenser mtg. nut	.03
83718	Gang condenser mtg. cup washer	.01
84428	Rubber chassis mtg. washer	.03
84493	Chassis mounting screw (No. 10x1¼ self tapping)	.03
84751	Dial mechanism	3.00
84752	Dial drive disc	.35
84753	Dial (Celluloid)	.65
84754	Dial pointer	.30
84755	Dial gasket	.04
84756	Dial glass	.20
84757	Dial glass retainer ring	.04
84758	Dial light socket	.15
84794	Dial escutcheon	.50
84797	Knobs (R-1301 and R-1302)	.15
84805	Felt knob washer	.01
84924	Dial escutcheon mtg. screw No. 1 x ⅝" oval H.W.S.	.01
84935	Knobs (R-1305 only)	.15

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STEWART WARNER CORP.

Chassis R-161-D
Schematic, Socket, Trimm
Voltage



FREQ. RANGE
MODEL R-161-D :
540 to 1750 KC
2.2 to 7.0 MC
MODEL R-162-D
140 to 400 KC
540 to 1750 KC

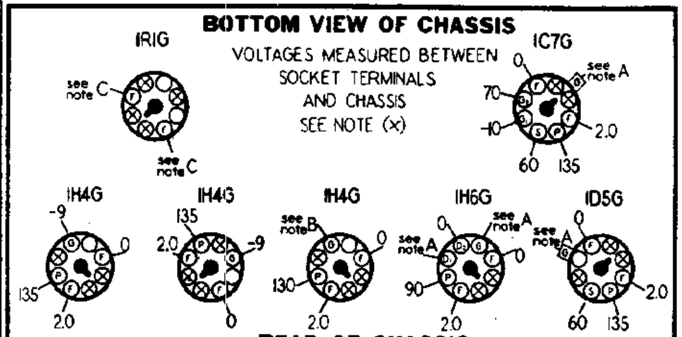
SOCKET VOLTAGES

NEW BATTERIES

DIAL TUNED TO 530 KC.

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS SEE NOTE (x)



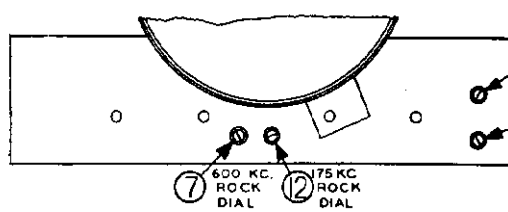
REAR OF CHASSIS

IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

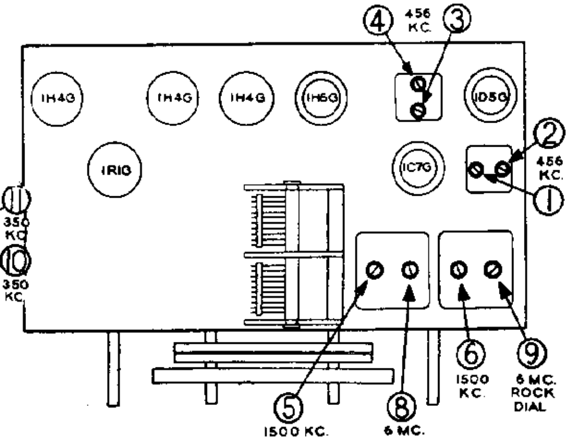
NOTE A: The grid bias for the 1C7G, 1D5G, 1H6G, and the delay voltage of the A.V.C. diode of the 1H6G is —3.0 volts measured between chassis ground and the green and white battery cable wire.

NOTE B: The grid bias of the 1H4G audio amplifier is —9.0 volts measured between chassis ground and the green and black battery cable wire.

NOTE C: This voltage will vary between 2.0 and 3.0 volts, depending



MODEL R-161-D CHASSIS (Receiver Models 1611-D to 1619-D)



TRIMMER LOCATIONS

Trimmer Number		Alignment Frequency
1-2-3-4	1st and 2nd I.F. transformer trimmers	456 KC.
5	Broadcast oscillator shunt trimmer	1500 KC.
6	Broadcast antenna shunt trimmer	1500 KC.
7	Broadcast oscillator series padder	600 KC.
8	Short wave oscillator shunt trimmer	6 MC.
9	Short wave antenna shunt trimmer	6 MC.

November 6, 1936

MODELS 1611-D to 1619-D
Chassis R-161-D
Alignment, Parts, Notes

STEWART-WARNER CORP.

CALIBRATION AND ALIGNMENT

ALIGNING EQUIPMENT: For proper alignment, an output meter and an accurately calibrated oscillator with a tuning range from 175 KC. to 6 MC. are required.

Connect the output meter across the plates of the output tubes. Convenient points to make the plate connections are the yellow wires on the speaker terminal strip.

ALIGNING THE I.F. AMPLIFIER: Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (center position).

Connect the test oscillator output leads to the 1C7G control grid and chassis with a .1 mfd. condenser in series with the oscillator output. Set the oscillator to exactly 456 KC. Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

Adjust the four I.F. trimmers, Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.

BROADCAST BAND CALIBRATION AND ALIGNMENT: With the gang condenser in full mesh, the dial pointer should be on the yellow horizontal line below 530 KC. on the dial scale.

Leave the range switch in the center position. Connect a 400 or 500 ohm carbon resistor in series with the oscillator output and the receiver antenna lead (blue wire in the back of the chassis). Connect the grounded oscillator output wire to the receiver ground lead (black wire in back of chassis).

Adjust the test oscillator to exactly 1500 KC. Tune in the 1500 KC. oscillator signal or a station above 1300 KC. on the dial and determine whether the dial calibration is correct at the high frequency end of the dial. If the calibration is correct, do not adjust the broadcast oscillator shunt trimmer No 5. If the calibration is incorrect, adjust trimmer No. 5 to give proper calibration.

Carefully tune the receiver to the 1500 KC. oscillator signal and adjust trimmer No. 6 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 7 for maximum output. Then try to increase the output meter reading by detuning No. 7 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though the dial may be slightly off calibration at 600 KC.

Repeat the adjustment of Nos. 5 and 6 at 1500 KC.

SHORT WAVE BAND CALIBRATION AND ALIGNMENT: Turn the range switch to the short wave band (maximum counter-clockwise position).

Adjust the test oscillator to exactly 6.0 MC.

Tune in the 6 MC. oscillator signal at or near 6 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 6 MC. If it is, do not adjust the short wave band oscillator shunt trimmer No. 8. If the calibration is incorrect, set the dial pointer to 6 MC. on the dial, and adjust the oscillator shunt trimmer No. 8 until the oscillator signal comes in at this point. If there are two peaks, the proper one is that with the trimmer screw farthest out.

Carefully tune the receiver to the signal and adjust trimmer No. 9 for maximum output. Then try to increase the output by detuning No. 9 slightly and retuning the receiver. Continue detuning No. 9 and retuning the receiver until the output meter deflection is a maximum.

LONG WAVE BAND CALIBRATION AND ALIGNMENT: Turn the range switch to the long wave band position (maximum clockwise position) and adjust the test oscillator to exactly 350 KC.

Tune in the oscillator signal at or near 350 KC. on the receiver dial to determine whether the dial calibration is correct at this point. If it is, do not adjust trimmer No. 10. If the calibration is incorrect, set the receiver dial pointer to 350 KC. and adjust trimmer No. 10 for maximum output.

Carefully tune the receiver to the signal, then adjust trimmer No. 11 for maximum output.

Adjust the test oscillator to 175 KC. and tune in the signal at or near 175 KC. on the receiver dial. Adjust padder No. 12 for maximum output, then try to increase the output by detuning padder No. 12 and retuning the receiver dial.

Repeat the adjustment of trimmers Nos. 10 and 11 at 350 KC.

USE OF BALLAST PLUG

The Model R-162-D radio chassis is designed to operate with either a large 3 volt dry cell or a 2¼ volt Eveready Air Cell. This is possible because the 1R1G tube maintains the proper filament voltage for any battery voltage between 2 and 3 volts. The receiver is also designed to operate from a 2 volt storage cell. However, if this is done it is desirable to omit the 1R1G voltage regulator and insert a special plug in the 1R1G socket which carries our part number 89588 and has a list price of $0.30.

USE OF B AND C BATTERY PACK

To convert the R-162-D chassis for operation with a plug-in B and C battery unit such as the Burgess No. G90 D6, a special cable terminating in a plug that fits the socket of the B and C pack must be substituted for the regular cable. This special cable carries our part number 89487 and has a list price of $1.40. The color codes of the old and new cables are identical. There is no green C plus wire on the new cable since the connection is made in the B and C unit.

Diagram Number	Part Number	Description	List Price
1, 2	83072	510,000 ohm ¼ watt carbon resistor	$0.12
3	83080	51,000 ohm ¼ watt carbon resistor	.12
6	83286	21,000 ohm ¼ watt carbon resistor	.12
7, 8, 9	83539	260 mmfd. mica condenser	.20
10	83783	110 mmfd. mica condenser	.20
11, 12, 13	83784	.0011 mfd. mica condenser	.25
14	84198	110,000 ohm ¼ watt carbon resistor	.12
15, 32	84235	1.1 megohm ¼ watt carbon resistor	.12
16, 17	84515	Dial lamps 2 volt .06 ampere	.28
18	84553	26,000 ohm ¼ watt carbon resistor	.20
19A, 19B, 20A, 20B	85087	Dual trimmer condenser	.85
22	85454	11 mmfd. Mica Condenser	.15
23, 24	88026	.02 mfd. 400 volt paper condenser	.25
25	88029	.004 mfd. 400 volt paper condenser	.25
26	88046	.1 mfd. 150 volt paper condenser	.25
28	88189	.05 mfd. 200 volt paper condenser	.25
29	89331	Tone control switch	.75
30	88437	Diaphragm for R-234D Speaker	$1.00
31	88478	Variable padding condenser	.38
33, 34	88990	.5 mfd. 150 volt paper condenser	.35
35A, 35B	89205	Gang Condenser	4.00
37	89207	Antenna coil & shield (B.C. & S.W.) with trimmers	1.90
38	89209	Oscillator coil & shield (B.C. & S.W.) with trimmers	3.00
41	89226	1st I.F. transformer & shield	2.50
42	89227	2nd I.F. transformer & shield	2.50
43	89228	Push pull input audio transformer	3.50
44	89275	.002 mfd. mica condenser	.40
45A, 45B	89330	Volume control 500,000 ohm / Off-on switch	1.20
29	89331	Tone control switch	.75
46A, 46B	89334	Range switch	1.40
47		1R1G Voltage regulator tube	1.50
48	R-234-D	6 inch Magnetic speaker	5.75

TUNING DRIVE AND DIAL PARTS

Part Number	Description	List Price
13923	Spring washer for tuning drive shaft	$0.05
81068	Dial drive cord—per ft.	.05
81069	Dial cord tension spring	.10
88564	Dial pointer & stud assembly	.12
88956	Dial escutcheon with glass	1.65
89174	Dial bracket and ring assembly	1.20
89175	Drive shaft	.10
89176	Retaining ring for tuning drive shaft	.02
89283	Dial lamp socket	.10
89285	Dial background	.12
89298	Dial drum and bushing assembly	.60
89353	Dial scale	1.80
89489	Dial lamp shield	.12
89799	Dial scale retaining clip	.02

MISCELLANEOUS PARTS

Part Number	Description	List Price
67032	Felt washer for knob, per C.	$0.35
67590	Flat steel mounting washer	.01
84428	Chassis mounting bushing (rubber)	.03
84493	No. 10 x 1¼ chassis mounting screw	.02
84805	Felt washer (used with chassis mtg. screw)	.01
88161	Tube shield	.08
88164	Tube shield cap—slotted	.06
88165	Tube shield cap—plain	.06
88436	Diaphragm gasket for R-234-D speaker	.15
88958	No. 2 x ⅜ R.H.W. Screw for escutcheon	.01
89347	Battery cable (for R-1621-D)	.90
89460	Knob—for range switch	.30
89461	Knob—for range, tone, tuning & volume control	.25
89487	B & C battery cable and plug, complete (special used with B & C battery pack)	1.40
89504	Battery cable (for R-1625-D)	.80
89588	Ballast tube plug (used in place of 1R1G tube with 2 volt battery)	.30

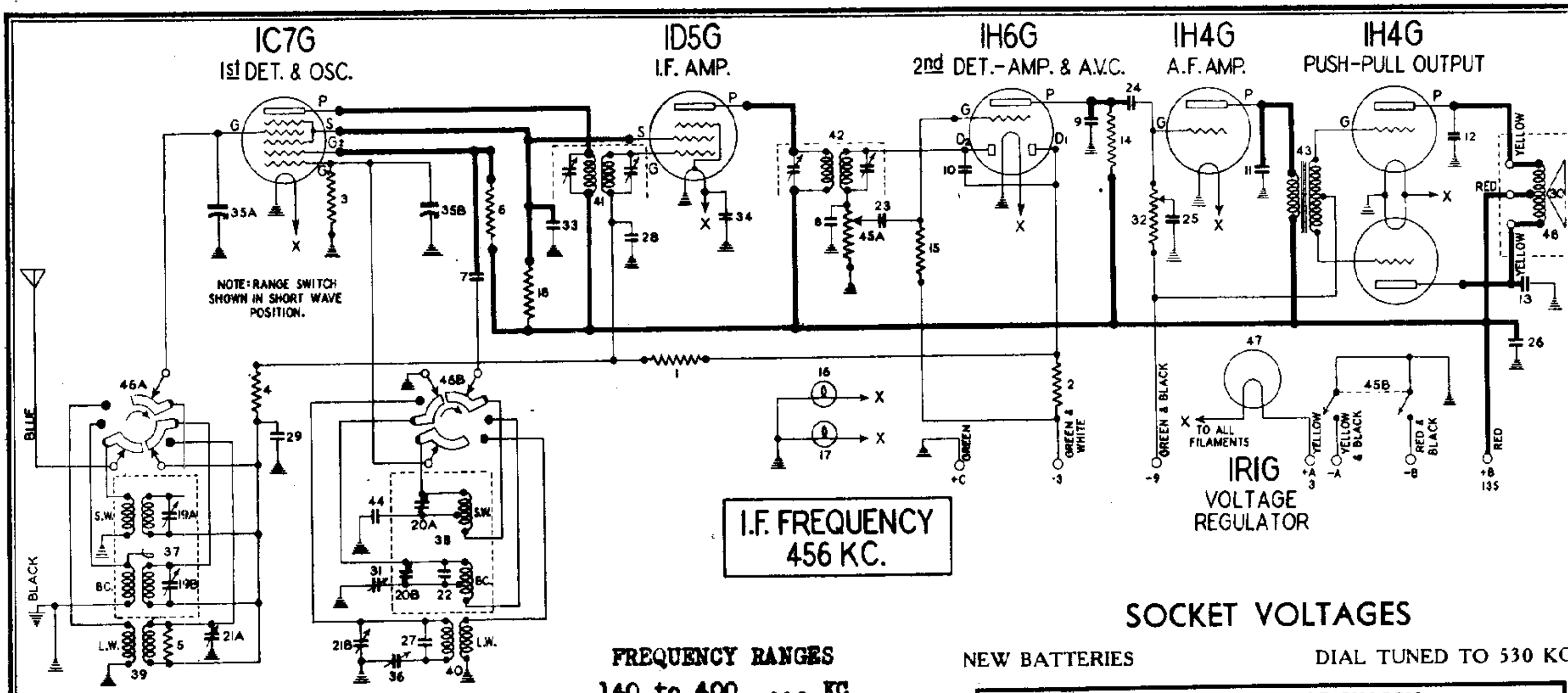
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

In order to keep battery drain at a minimum, 60 milliampere dial light bulbs are used. In replacing these, be sure to use the correct type. Do not use ordinary 2.5 volt dial light bulbs as they will cause short life of the "A" battery.

Schematic, Socket, Trimmers
Voltage

STEWART-WARNER CORP.

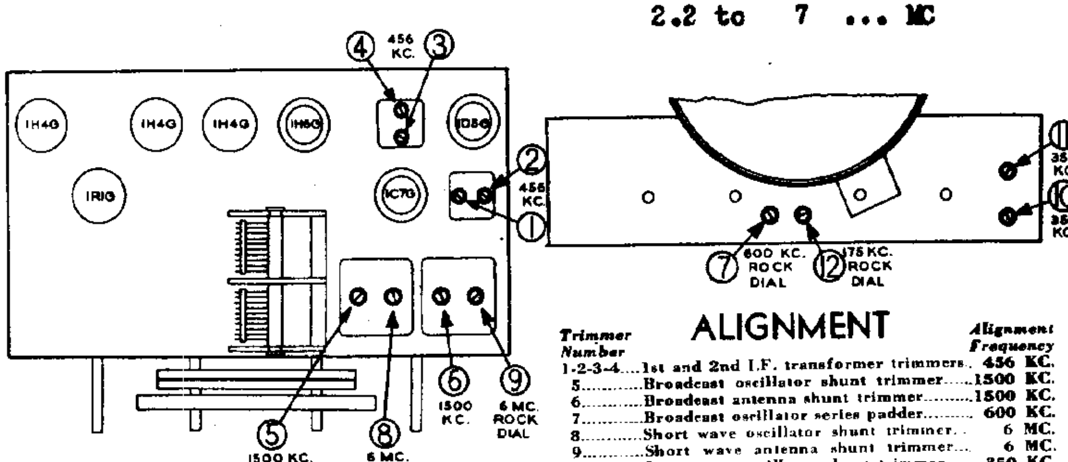
MODELS 1621-D to 1629
Chassis R-162-D



I.F. FREQUENCY
456 KC.

FREQUENCY RANGES

140 to 400 ... KC
540 to 1750 ... KC
2.2 to 7 ... MC

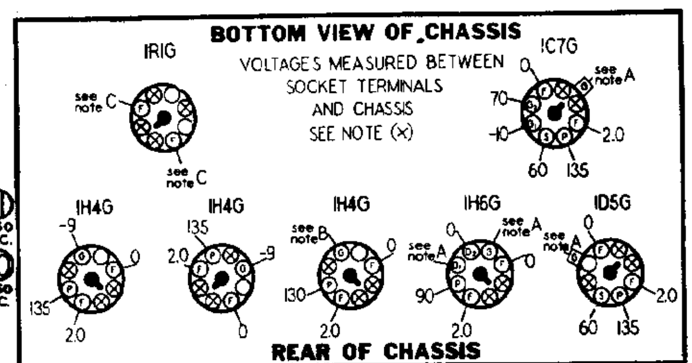


ALIGNMENT

Trimmer Number		Alignment Frequency
1-2-3-4	1st and 2nd I.F. transformer trimmers	456 KC.
5	Broadcast oscillator shunt trimmer	1500 KC.
6	Broadcast antenna shunt trimmer	1500 KC.
7	Broadcast oscillator series padder	600 KC.
8	Short wave oscillator shunt trimmer	6 MC.
9	Short wave antenna shunt trimmer	6 MC.
10	Long wave oscillator shunt trimmer	350 KC.

SOCKET VOLTAGES

NEW BATTERIES — DIAL TUNED TO 530 KC.



IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The grid bias for the 1C7G, 1D5G, 1H6G, and the delay voltage of the A.V.C. diode of the 1H6G is —3.0 volts measured between chassis ground and the green and white battery cable wire.

NOTE B: The grid bias of the 1H4G audio amplifier is —9.0 volts measured between chassis ground and the green and black battery cable wire.

NOTE C: This voltage will vary between 2.0 and 3.0 volts, depending upon the terminal voltage of the A battery.

MODELS 1621-D to 1629-D
Chassis R-162-D
Alignment,Parts,Notes

STEWART WARNER CORP

ALIGNING THE I.F. AMPLIFIER: Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (center position).

Connect the test oscillator output leads to the 1C7G control grid and chassis with a .1 mfd. condenser in series with the oscillator output. Set the oscillator to exactly 456 KC. Set the receiver dial at any point where it has no tuning effect or the oscillator signal.

Adjust the four I.F. trimmers, Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.

BROADCAST BAND CALIBRATION AND ALIGNMENT: With the gang condenser in full mesh, the dial pointer should be on the yellow horizontal line below 530 KC. on the dial scale.

Leave the range switch in the center position. Connect a 400 or 500 ohm carbon resistor in series with the oscillator output and the receiver antenna lead (blue wire in the back of the chassis). Connect the grounded oscillator output wire to the receiver ground lead (black wire in back of chassis).

Adjust the test oscillator to exactly 1500 KC. Tune in the 1500 KC. oscillator signal or a station above 1300 KC. on the dial and determine whether the dial calibration is correct at the high frequency end of the dial. If the calibration is correct, do not adjust the broadcast oscillator shunt trimmer No. 5. If the calibration is incorrect, adjust trimmer No. 5 to give proper calibration.

Carefully tune the receiver to the 1500 KC. oscillator signal and adjust trimmer No. 6 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 7 for maximum output. Then try to increase the output meter reading by detuning No. 7 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though the dial may be slightly off calibration at 600 KC.

Repeat the adjustment of Nos. 5 and 6 at 1500 KC.

SHORT WAVE BAND CALIBRATION AND ALIGNMENT: Turn the range switch to the short wave band (maximum counter-clockwise position).

Adjust the test oscillator to exactly 6.0 MC.

Tune in the 6 MC. oscillator signal at or near 6 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 6 MC. If it is, do not adjust the short wave band oscillator shunt trimmer No. 8. If the calibration is incorrect, set the dial pointer to 6 MC. on the dial, and adjust the oscillator shunt trimmer No. 8 until the oscillator signal comes in at this point. If there are two peaks, the proper one is that with the trimmer screw farthest out.

Carefully tune the receiver to the signal and adjust trimmer No. 9 for maximum output. Then try to increase the output by detuning No. 9 slightly and retuning the receiver. Continue detuning No. 9 and retuning the receiver until the output meter deflection is a maximum.

LONG WAVE BAND CALIBRATION AND ALIGNMENT: Turn the range switch to the long wave band position (maximum clockwise position) and adjust the test oscillator to exactly 350 KC.

Tune in the oscillator signal at or near 350 KC. on the receiver dial to determine whether the dial calibration is correct at this point. If it is, do not adjust trimmer No. 10. If the calibration is incorrect, set the receiver dial pointer to 350 KC. and adjust trimmer No. 10 for maximum output.

Carefully tune the receiver to the signal, then adjust trimmer No. 11 for maximum output.

Adjust the test oscillator to 175 KC. and tune in the signal at or near 175 KC. on the receiver dial. Adjust padder No. 12 for maximum output, then try to increase the output by detuning padder No. 12 and retuning the receiver dial.

Repeat the adjustment of trimmers Nos. 10 and 11 at 350 KC.

USE OF BALLAST PLUG

The Model R-162-D radio chassis is designed to operate with either a large 3 volt dry cell or a 2¼ volt Eveready Air Cell. This is possible because the 1R1G tube maintains the proper filament voltage for any battery voltage between 2 and 3 volts. The receiver is also designed to operate from a 2 volt storage cell. However, if this is done it is desirable to omit the 1R1G voltage regulator and insert a special plug in the 1R1G socket which carries our part number 89588 and has a list price of $0.30.

USE OF B AND C BATTERY PACK

To convert the R-162-D chassis for operation with a plug-in B and C battery unit such as the Burgess No. G90 D6, a special cable terminating in a plug that fits the socket of the B and C pack must be substituted for the regular cable. This special cable carries our part number 89487 and has a list price of $1.40. The color codes of the old and new cables are identical. There is no green C plus wire on the new cable since the connection is made in the B and C unit.

Model R-162-D

PARTS LIST

Diagram Number	Part Number	Description	List Price
1, 2	83072	510,000 ohm ¼ watt carbon resistor	$0.12
3	83080	51,000 ohm ¼ watt carbon resistor	.12
4, 5	83082	260,000 ohm ¼ watt carbon resistor	.12
6	83286	21,000 ohm ¼ watt carbon resistor	.12
7, 8, 9	83539	260 mmfd. mica condenser	.20
10	83783	110 mmfd. mica condenser	.20
11, 12, 13	83784	.0011 mfd. mica condenser	.25
14	84198	110,000 ohm ¼ watt carbon resistor	.12
15	84235	1.1 megohm ¼ watt carbon resistor	.12
16, 17	84515	Dial lamp 2 volt .06 ampere	.25
19A, 19B; 20A, 20B; 21A, 21B	85087	Dual trimmer condenser	.35
22	85454	11 mmfd. Mica Condenser	.15
23, 24	88026	.02 mfd. 400 volt paper condenser	.25
25	88030	.01 mfd. 400 volt paper condenser	.25
26	88046	.1 mfd. 150 volt paper condenser	.25
27	88173	50 mmfd. Mica Condenser	.20
28, 29	88189	.05 mfd. 200 volt paper condenser	.25
30	88437	Speaker diaphragm for R-234-D Speaker	1.00
	88459	Speaker diaphragm for R-235-D speaker	1.20
31	88478	Variable padding condenser	$0.38
32	88488	Tone control—500,000 ohm	.80
33, 34	88990	.5 mfd. 150 volt paper condenser	.35
35A, 35B	89205	Gang Condenser	4.00
36	89206	Variable padding condenser	.45
37	89207	Antenna coil & shield (B.C. & S.W.) with trimmers	1.90
38	89209	Oscillator coil & shield (B.C. & S.W.) with trimmers	3.00
39	89211	Antenna coil (L.W.)	1.40
40	89212	Oscillator coil (L.W.)	1.00
41	89226	1st I.F. transformer & shield	2.50
42	89227	2nd I.F. transformer & sheild	2.50
43	89228	Push pull input audio transformer	3.50
44	89275	.002 mfd. mica condenser	.10
45A, 45B	89330	Volume control 500,000 ohm; Off-on line switch	1.20
46A, 46B	89357	Range Switch	1.50
47		1R1G Voltage regulator tube	1.50
48	R-234-D	6 inch Magnetic speaker	5.75
	R-235-D	8 inch Magnetic speaker	6.50

TUNING DRIVE AND DIAL PARTS

Part Number	Description	List Price
13923	Spring washer for tuning drive shaft	$0.05
81068	Dial drive cord—per ft.	.05
81069	Dial cord tension spring	.10
88564	Dial pointer & stud assembly	.12
88956	Dial escutcheon with glass	1.65
89174	Dial bracket and ring assembly	1.20
89175	Drive shaft	.10
89176	Retaining ring for tuning drive shaft	.02
89283	Dial lamp socket	.10
89285	Dial background	.12
89298	Dial drum and bushing assembly	.60
89353	Dial scale	1.80
89489	Dial lamp shield	.12
89799	Dial scale retaining clip	.02

MISCELLANEOUS PARTS

Part Number	Description	List Price
67032	Felt washer for knob, per C	$0.35
67590	Flat steel mounting washer	.01
84128	Chassis mounting bushing (rubber)	.03
84493	No. 10 x 1¼ chassis mounting screw	.02
84805	Felt washer (used with chassis mtg. screw)	.01
88161	Tube shield	.08
88164	Tube shield cap—slotted	.06
88165	Tube shield cap—plain	.06
88436	Diaphragm gasket for R-234-D speaker	.15
88958	No. 2 x ¾ R.H.W. Screw for escutcheon	.01
89347	Battery cable (for R-1621-D)	.90
89460	Knob—for range switch	.30
89461	Knob—for range, tone, tuning & volume control	.25
89487	B & C battery cable and plug, complete (special used with B & C battery pack)	1.10
89504	Battery cable (for R-1625-D)	.80
89588	Ballast tube plug (used in place of 1R1G tube with 2 volt battery)	.30

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

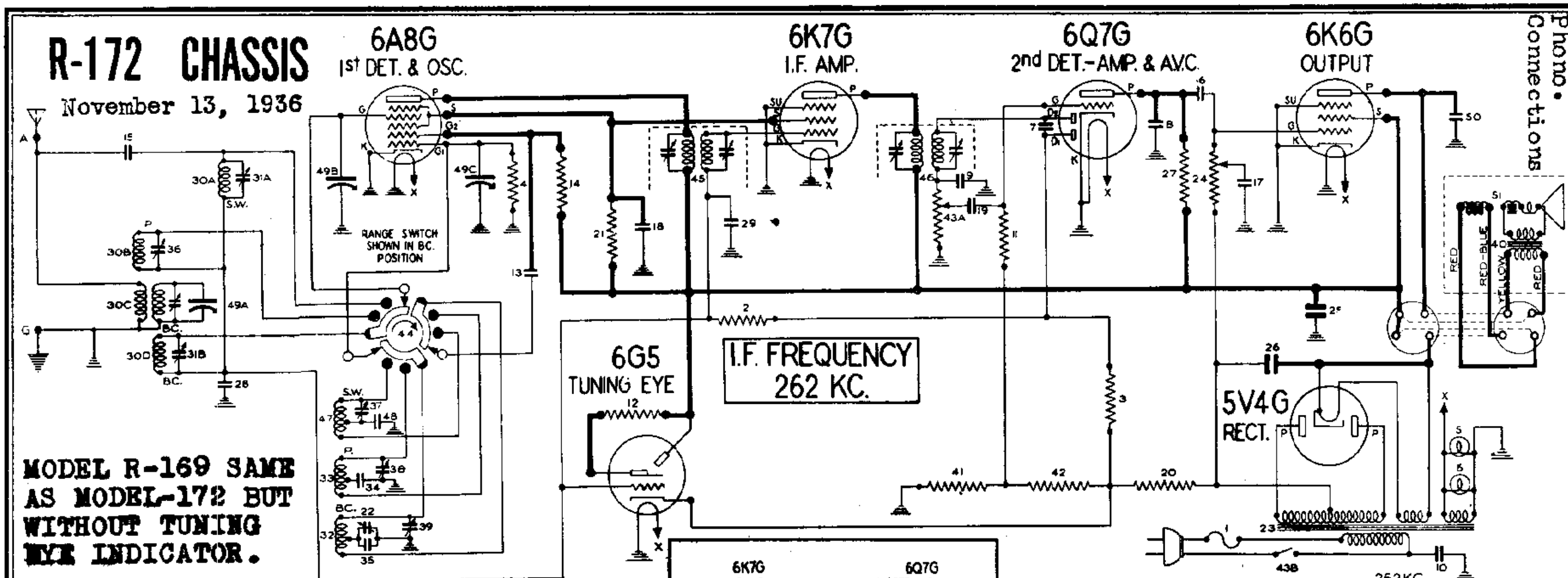
MODELS 1691 to 1595
Chassis R-169
MODELS 1721 to 1729
Chassis R-172

Schematic, Socket, Trimmers
Voltage, Notes
MODEL R-172-X
Phono. Connections

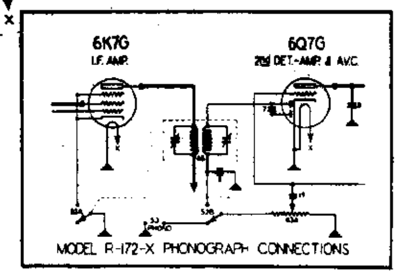
STEWART-WARNER CORP.

R-172 CHASSIS

November 13, 1936



MODEL R-169 SAME AS MODEL-172 BUT WITHOUT TUNING EYE INDICATOR.



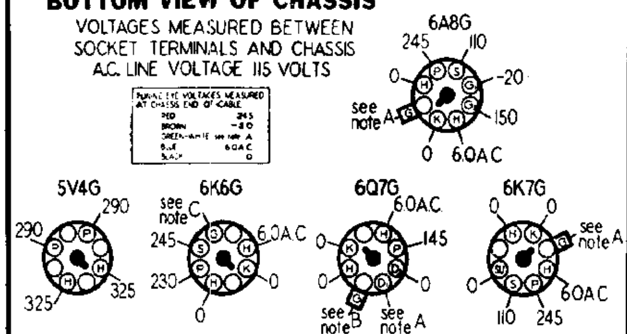
SOCKET VOLTAGES

VOLUME CONTROL ON FULL
RANGE SWITCH SET ON BROADCAST POSITION

ANTENNA GROUNDED
DIAL TUNED TO 530 KC.

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS
A.C. LINE VOLTAGE 115 VOLTS



REAR OF CHASSIS

TUNING RANGE
525 KC to 18.1 MC

ALIGNMENT

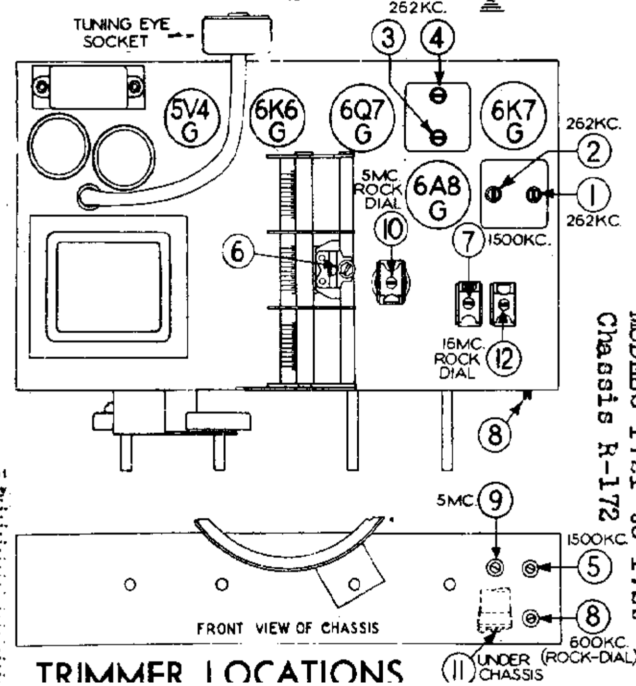
Trimmer Number		Alignment Frequency
1.	2nd I.F. transformer trimmer	262 KC.
2.	2nd I.F. transformer trimmer	262 KC.
3.	1st I.F. transformer trimmer	262 KC.
4.	1st I.F. transformer trimmer	262 KC.
5.	Broadcast oscillator shunt trimmer	1500 KC.
6.	Broadcast antenna shunt trimmer	1500 KC.
7.	Broadcast detector shunt trimmer	1500 KC.
8.	Broadcast oscillator series padder	600 KC.
9.	Police oscillator shunt trimmer	5 MC.
10.	Police antenna shunt trimmer	5 MC.
11.	Short wave oscillator shunt trimmer	16 MC.

IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The grid bias for the 6A8G, 6K7G, and the anode voltage of the A.V.C. section of the 6Q7G is —3 volts measured across resistors 41 and 42.

NOTE B: The grid bias for the audio section of the 6Q7G is —2 volts measured across resistor 41.

NOTE C: The grid bias for the 6K6G output tube is —18 volts meas



TRIMMER LOCATIONS

MODELS 1691 to 1695
Chassis R-169
MODELS 1721 to 1729
Chassis R-172
Alignment, Parts

STEWART-WARNER CORP.

CALIBRATION AND ALIGNMENT

ALIGNING EQUIPMENT: For proper alignment, an output meter and an accurately calibrated oscillator with a tuning range from 262 KC. to 16 MC. are required.

Connect the output meter from the plate of the output tube to chassis. A convenient point to make the plate connection is to the yellow wire on the speaker socket.

ALIGNING THE I. F. AMPLIFIER: Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (fully clockwise).

Connect the test oscillator output leads to the 6A8 control grid and chassis with a .1 mfd. condenser in series with the oscillator output. Set the oscillator to exactly 262 KC. Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

Adjust the four I.F. trimmers, Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.

BROADCAST BAND CALIBRATION AND ALIGNMENT

With the gang condenser in full mesh, the dial pointer should be on the white horizontal line below 530 KC. on the dial scale. If it does not, hold the dial gear and turn the pointer to the correct position.

Turn the range switch to the extreme clockwise position and connect the test oscillator output to the A and G terminals of the receiver with a 400 ohm carbon resistor in series with the A terminal and the oscillator output.

Adjust the test oscillator to exactly 1500 KC.

Tune in the 1500 KC. oscillator signal or a station above 1300 KC. on the dial and determine whether the dial calibration is correct at the high frequency end of the dial. If the calibration is correct, do not adjust the broadcast oscillator shunt trimmer No. 5. If the calibration is incorrect, adjust trimmer No. 5 to give proper calibration.

Carefully tune the receiver to the signal and adjust trimmers Nos. 6 and 7 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 8 for maximum output. Then try to increase the output meter reading by detuning No. 8 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though the dial may be slightly off calibration at 600 KC.

POLICE BAND CALIBRATION AND ALIGNMENT

Turn the range switch to the center position. Adjust the test oscillator to exactly 5.0 MC. Tune in the 5 MC. oscillator signal at or near 5 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 5 MC. If it is, do not adjust police band oscillator shunt trimmer No. 9. If the calibration is incorrect, set the dial pointer to 5 MC. on the dial, and adjust the oscillator shunt trimmer No. 9 until the oscillator signal comes in at this point. If there are two peaks, the proper one is that with the trimmer screw farthest out.

Carefully tune the receiver to the signal and adjust trimmer No. 10 for maximum output. Then try to increase the output by detuning No. 10 slightly and retuning the receiver dial. Continue detuning No. 10 and retuning the dial until the output meter deflection is a maximum.

SHORT WAVE BAND CALIBRATION AND ALIGNMENT

Turn the range switch to the extreme counter-clockwise position. Set the test oscillator to 16 MC. Tune in the 16 MC. oscillator signal at 16 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 16 MC. If it is, do not adjust the short wave band oscillator shunt trimmer No. 11. If the calibration is incorrect, set the receiver dial pointer exactly at 16 MC. and adjust the oscillator shunt trimmer No. 11 until the oscillator signal comes in at this point.

Check to see that it has been adjusted to the proper peak by tuning the receiver to approximately 15.5 MC. A repeat signal should be heard at this point. If none is present, even with greatly increased oscillator output, retune the receiver to 16 MC. and adjust trimmer No. 11 to the proper peak with the trimmer screw farther out.

Carefully tune the receiver to the signal and adjust trimmer No. 12 to a peak. Then try to increase the output by detuning the trimmer slightly and retuning the dial until a maximum output meter deflection is secured. Check the adjustment by tuning the receiver to the image at about 15.5 MC. The image should be much weaker than the 16 MC. signal. If the signal at 15.5 MC. dial setting is equal to or stronger than the 16 MC. signal, trimmer No. 12 is not set to the proper peak. Turn the trimmer in a turn or so, then readjust as above.

Diagram Number	Part Number	Description	List Price
1	38841	Fuse, 1 amp., 250 volt	$0.10
2-3	83072	510,000 ohm ¼ watt carbon resistor	.12
4	83080	51,000 ohm ¼ watt carbon resistor	.12
5-6	83278	Dial lamps	.15
7-8	83539	260 mmfd. mica condenser	.20
9	83783	110 mmfd. mica condenser	.20
10	83976	.012 mfd. 1000 volt shielded condenser	.40
11-12	84235	1.1 megohm ¼ watt carbon resistor	.12
13	85061	51 mmfd. mica condenser	.15
14	85442	21,000 ohm ⅓ watt carbon resistor	.15
15	85454	11 mmfd. mica condenser	.15
16	88026	.02 mfd. 400 volt paper condenser	.25
17	88030	.01 mfd. 400 volt paper condenser	.25
18	88046	.1 mfd. 150 volt paper condenser	.25
19	88189	.05 mfd. 200 volt paper condenser	.25
20	88463	270 ohm 1 watt carbon resistor	.15
21	88464	26,000 ohm 1 watt carbon resistor	.15
22	88478	Padding condenser	.39
23	88481	Power transformer (115 volt—60 cycle)	5.00
24	88488	Tone control—500,000 ohm	.80
25	88511	16 mfd. 300 volt electrolytic condenser	1.10
26	88512	16 mfd. 400 volt electrolytic condenser	1.10
27	88532	210,000 ohm ¼ watt carbon resistor	.12
28, 29	88534	.05 mfd. 150 volt condenser (low loss)	.25
30A to D	88648	Antenna and preselector coil assembly	2.30
31A-31B	88654	Dual trimmer condenser	.30
32	88660	Oscillator coil (BC.)	.60
33	88665	Oscillator coil (Police)	.58
34	88681	.00255 mfd. mica condenser	.30
35	88686	200 mmfd. mica condenser	$0.14
36-37, 38-39	88688	Trimmer condenser	.12
40	88796	Output transformer for R-248A spkr.	2.50
40	88912	Output transformer for R-247-A spkr.	2.00
41	88920	35 ohm ½ watt wire wound resistor	.12
42	89116	20 ohm ½ watt wire wound resistor	.12
43A, 43B	89606	Volume control—250,000 ohm, A.C. line switch	1.20
44	89607	Range switch	1.25
45	89608	1st I.F. transformer	2.40
46	89609	2nd I.F. transformer	2.25
47	89615	Oscillator coil (S.W.)	.75
48	89635	.00495 mfd. mica condenser	.50
49A to C	89649	Gang condenser	5.00
	89653	262 KC. wave trap (spl. for service only)	1.50
50	89826	.004 mfd. 750 volt paper condenser	.24
51	R-247-A	8 inch dynamic speaker	9.00
51	R-248-A	12 inch dynamic speaker	11.50

MODEL R-172-X PARTS

52A & 52B	84404	Phonograph toggle switch	$1.10
1	88055	Fuse, ¾ amp., used for line voltages of 200 to 240 volts	.12
23	89216	Power transformer (100-240 volts, 25-133 cycles)	11.50
53	89709	Phonograph terminal strip	.15

TUNING DRIVE AND DIAL PARTS

Part Number	Description	List Price
88564	Pointer and stud assembly	$0.12
88743	Dial drive shaft	.16
88744	Dial drive shaft retainer spring	.05
88745	Dial ring and bracket assembly (for edge lighting)	.90
88748	Dial disc and bushing assembly	.30
88956	Escutcheon with glass	1.65
89283	Dial lamp socket	.10
89284	Dial lamp shield	.02
89285	Dial background	.12
89600	Dial scale	1.90
89799	Dial scale retaining clip	.02

MISCELLANEOUS PARTS

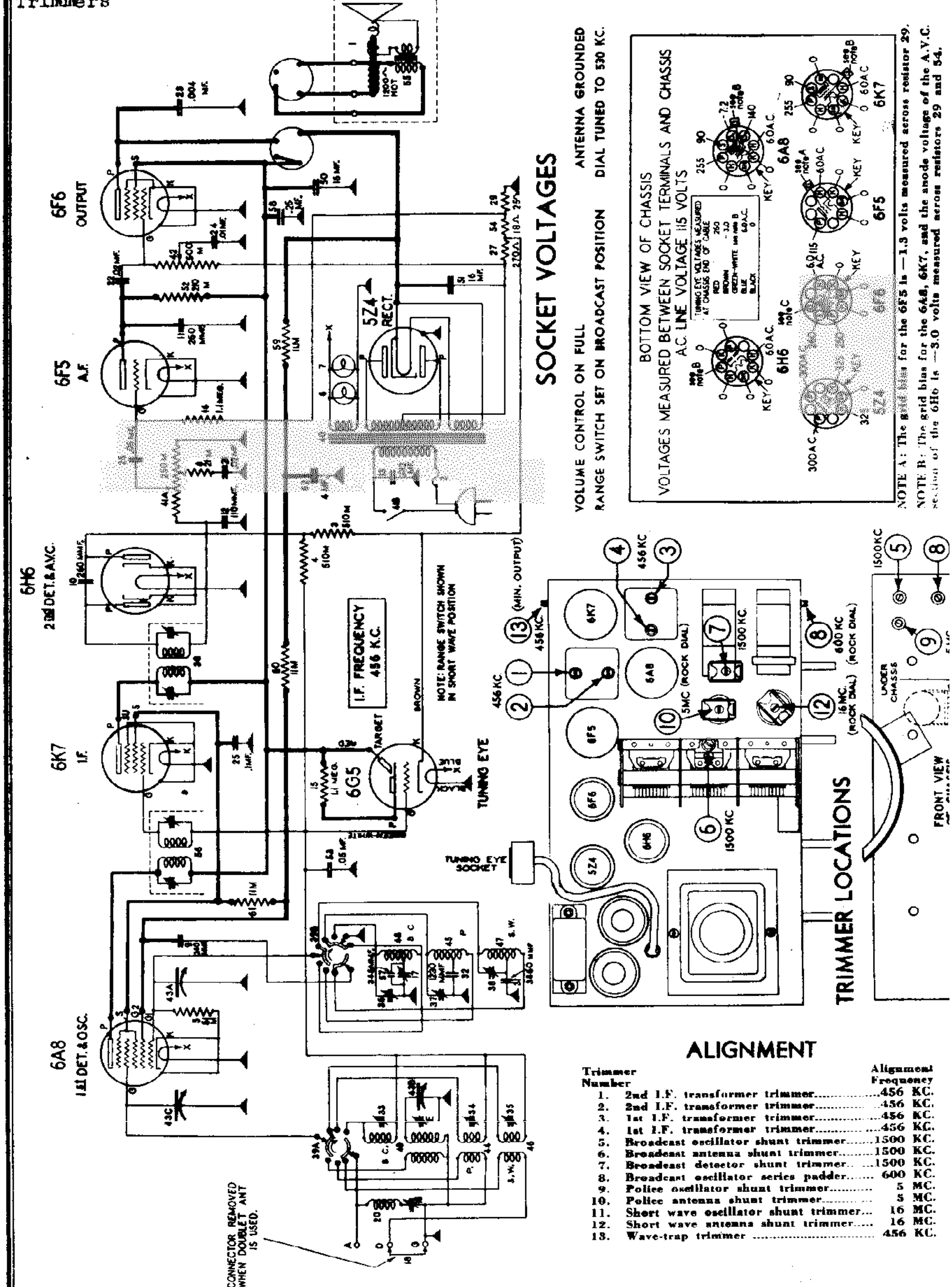
Part Number	Description	List Price
67032	Felt washer for back of knob—per C	$0.35
67568	Embossed washer for 88512 electrolytic condenser	.05
67590	Flat steel mounting washer	.01
84428	Rubber mounting bushing for chassis	.03
84493	No. 10 x 1¼ chassis mounting screw	.02
84805	Felt washer (used with mounting screw)	.01
84981	Tube shield (plain section)	.08
84982	Tube shield (slotted section)	.08
84983	Spring ring for tube shields	.03
85785	Terminal strip (antenna and ground)	.15
88056	Fuse mounting strip	.08
88057	Fuse cover	.06
88631	Speaker cable plug	.06
88675	Speaker socket	.15
88822	Speaker mounting screw for 1691A (ornamental head)	.02
88958	No. 2 x ⅜ R.H.W. escutcheon screw	.01
88983	Knob (for tone, tuning and volume control)	.15
88984	Knob (for range switch)	.20

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Schematic, Socket Voltage Trimmers

STEWART-WARNER CORP.

MODELS 1731 to 17
Chassis R-173



ALIGNMENT

Trimmer Number		Alignment Frequency
1.	2nd I.F. transformer trimmer	456 KC.
2.	2nd I.F. transformer trimmer	456 KC.
3.	1st I.F. transformer trimmer	456 KC.
4.	1st I.F. transformer trimmer	456 KC.
5.	Broadcast oscillator shunt trimmer	1500 KC.
6.	Broadcast antenna shunt trimmer	1500 KC.
7.	Broadcast detector shunt trimmer	1500 KC.
8.	Broadcast oscillator series padder	600 KC.
9.	Police oscillator shunt trimmer	5 MC.
10.	Police antenna shunt trimmer	5 MC.
11.	Short wave oscillator shunt trimmer	16 MC.
12.	Short wave antenna shunt trimmer	16 MC.
13.	Wave-trap trimmer	456 KC.

MODELS 1731 to 1739
Chassis R-173
Alignment, Parts

STEWART-WARNER CORP.

MODEL R-173-X
Phono. Connections, Parts

ALIGNING THE I. F. AMPLIFIER: Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (fully clockwise).

Connect the test oscillator output leads to the 6A8 control grid and chassis with a .1 mfd. condenser in series with the oscillator output. Set the oscillator to exactly 456 KC. Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

Adjust the four I.F. trimmers Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.

BROADCAST BAND CALIBRATION AND ALIGNMENT: With the gang condenser in full mesh, the dial pointer should be on the white horizontal line below 530 KC. on the dial scale.

Turn the range switch to the extreme clockwise position and connect the test oscillator output to the A and G terminals of the receiver with a 400 ohm carbon resistor in series with the A terminal and the oscillator output.

Adjust the test oscillator to exactly 1500 KC. and turn the receiver dial pointer to 1500 KC. on the tuning dial. To calibrate the dial, adjust trimmer No. 5 for maximum output.

Carefully tune the receiver to the signal and adjust trimmers Nos. 6 and 7 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 8 for maximum output. Then try to increase the output meter reading by detuning No. 8 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though the dial may be slightly off calibration at 600 KC.

WAVE-TRAP ADJUSTMENT: The wave-trap adjusting trimmer, No. 13, is located on the back of the chassis. Leave the test oscillator connected to the A and G terminals through a 400 ohm resistor and set the oscillator at 456 KC. Then adjust the wave-trap trimmer No. 13 for minimum output. If some particular station with a frequency near 456 KC. causes code interference, it may be desirable to adjust the wave-trap on the actual frequency of the interfering station.

Check the adjustment of trimmers 5, 6, and 7 at 1500 KC.

BAND NO. 2 CALIBRATION AND ALIGNMENT: Turn the range switch to the center position.

Adjust the test oscillator to exactly 5.0 MC. and turn the receiver dial pointer to exactly 5.0 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 9 for maximum output. If two peaks are found, the proper one is that with the trimmer screw farthest out.

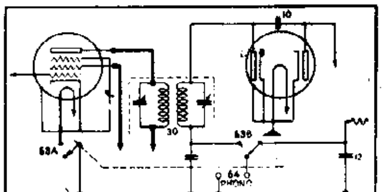
Carefully tune the receiver to the signal and adjust trimmer No. 10 for maximum output. Then try to increase the output by detuning No. 10 slightly and retuning the receiver dial. Continue detuning No. 10 and retuning the dial until the output meter deflection is a maximum.

BAND NO. 3 CALIBRATION AND ALIGNMENT: Turn the range switch to the extreme counter-clockwise position. Be sure the D and G terminals on the antenna terminal strip are connected together.

Set the test oscillator to 16 MC. and turn the receiver dial pointer to exactly 16 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 11 for maximum output. Check to see that it has been adjusted to the proper peak by tuning the receiver to approximately 15.1 MC. A repeat signal should be heard at this point. If none is present, even with greatly increased oscillator output, retune the receiver to 16 MC. and adjust trimmer No. 11 to the proper peak with the trimmer screw farther out.

Carefully tune the receiver to the signal and adjust trimmer No. 12 to a peak. Then try to increase the output by detuning the trimmer slightly and retuning the dial until a maximum output meter deflection is secured. Check the adjustment by tuning the receiver to the image at about 15.1 MC. The image should be much weaker than the 16 MC. signal. If the signal at 15.1 MC. dial setting is equal to or stronger than the 16 MC. signal, trimmer No. 12 is not set to the proper peak. Turn the trimmer in a turn or so, then readjust as above.



MODEL R-173 X PHONOGRAPH CONNECTIONS

MODEL R-173 PARTS LIST

Diagram Number	Part Number	DESCRIPTION	List Price
1	R-247-A	8" Dynamic Speaker	$9.00
1	R-248-A	12" Dynamic Speaker	11.50
2	38811	Fuse. 1 ampere	.10
3-4	83072	510,000 ohm ¼ watt carbon resistor	.12
5	83080	51,000 ohm ¼ watt carbon resistor	.12
6-7	83278	Pilot lamp, 6-0 volt	.15
8	83286	21,000 ohm ¼ watt carbon resistor	.12
9-10-11	83539	260 mmfd. mica condenser	.20
12	83783	110 mmfd. mica condenser	.20
13	83976	.012 mfd. 1000 v. shielded condenser	.40
14-15	84235	1.1 megohm ¼ watt carbon resistor	.12
16	85285	Wave trap trimmer	.40
17	85285	Padding trimmer	.40
18	85321	Ground connector	.01
20	88014	Wave trap coil	.50
21-22	88026	.02 mfd. 400 v. paper condenser	.30
23	89826	.004 mfd. 750 v. paper condenser	.24
24	88030	.01 mfd. 400 v. paper condenser	.30
25	88046	.1 mfd. 150 v. paper condenser	.30
26	88189	.05 mfd. 200 v. paper condenser	.25
27	88463	270 ohm 1 watt carbon resistor	.15
29	88465	25 ohm ½ watt wire wound resistor	.15
56	88466	1st I.F. Transformer	2.40
30	88468	2nd I.F. transformer	2.40
31	88472	3860 mmfd. mica condenser	.50
32	88473	1230 mmfd. mica condenser	.25
33-34-35 36-37-38	88477	Trimmer condenser	.12
39A & B	88480	Range switch	1.90
40	88481	Power transformer, 115 v. 60 cycle	5.00
41-A 41-B	88487	Volume control (250,000 ohm) A. C. line switch	1.25
42	88488	Tone control (500,000 ohm)	.80
43A to C	89619	Three gang condenser	5.00
44	88499	Antenna coil (Police)	.85
45	88501	Oscillator coil (Police)	.65
46	88502	Antenna coil (S.W.)	.80
47	88504	Oscillator coil (S.W.)	$ .80
48	88506	Oscillator coil (B.C.)	.55
49	88507	Antenna coil (B.C.)	1.60
50	88511	16 mfd. 300 v. electrolytic condenser	1.10
51	88512	16 mfd. 400 v. electrolytic condenser	1.10
52	88532	210,000 ohm ¼ watt carbon resistor	.12
53	88534	.05 mfd. 150 v. condenser (low loss)	.25
54	88584	18 ohm ½ watt wire wound resistor	.15
55	88796	Output transformer (on R-248-A speaker)	2.50
55	88912	Output transformer (on R-247-A speaker)	2.00
57	89564	345 mmfd. mica condenser	.40
58	89643	.25 mfd. 300 volt paper condenser	.50
43A to C	89649	Three gang condenser	5.00
59-60	89751	11,000 ohm 1 watt carbon resistor	.12
61	89753	11,000 ohm ½ watt carbon resistor	.15
62	89755	4 mfd. 250 volt electrolytic condenser	1.00
23	89826	.004 mfd. 750 v. paper condenser	.24

R-173-X PARTS

63A & B	84404	Phonograph toggle switch	$1.10
2	8..055	Fuse. ¾ amp. (Use on line voltages of 200 to 240)	.12
40	89216	Power transformer 100 to 240 volt. 25 to 133 cycles	11.50
64	89709	Phonograph terminal strip	.15

MISCELLANEOUS PARTS NOT SHOWN IN CIRCUIT DIAGRAM

Part Number	DESCRIPTION	List Price
67590	Flat steel mtg. washer	$ .01
67568	Embossed washer for 88512 electrolytic condenser	.05
84428	Rubber chassis mtg. bushing	.03
84493	No. 10 x 1¼ chassis mtg. screw	.02
84805	Felt washer (Used with chassis mtg. screw)	.01
85066	G.D.A. terminal strip	.20
88056	Fuse mounting	.08
88057	Fuse cover	.08
88675	Speaker socket	.15
88958	No. 2 x ⅜ wood screw for escutcheon (each)	.01
89038	Knob, volume, tune & tuning control	.20
89119	Tuning eye cable and plug	1.50
89749	Knob, range switch	.20

TUNING DRIVE AND DIAL PARTS

Part Number	DESCRIPTION	List Price
81068	Dial drive cord (per ft.)	$ .05
81069	Tension spring for drive cord	.10
81145	Spring clip for pointer shaft	.10
88956	Escutcheon with glass	1.65
88998	Second pointer	.05
89283	Pilot lamp socket	.10
89284	Pilot lamp shield	.02
89514	Dial drum bushing and gear	1.25
89660	Dial scale	1.80
89666	Dial ring bracket and shaft assembly	2.30
89675	Dial background	.12
89693	Main pointer and second pointer shaft assembly	.50
89698	Pointer and stud	.14

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL Firestone R-1431 Auto
Alignment, Parts

STEWART-WARNER CORP.

The signal picked up by the antenna is carried to the receiver from the lead-in by means of a specially designed transmission line (No. 46 in the diagram). The effect of this transmission line when properly installed is to reduce ignition interference. It accomplishes this result by eliminating a large part of the car chassis from the receiver antenna circuit. **NOTE:** This antenna lead must not be cut, since cutting would destroy its effectiveness in minimizing ignition noise pickup in the antenna circuit.

The signal is fed through an antenna filter to the primary of the antenna transformer. The filter cut-off occurs at a frequency slightly above the broadcast band where it is most effective in removing any ignition interference picked up by the antenna.

The antenna transformer is wound on a special iron core, the effect of which is to diminish noise by increasing the signal to-noise ratio.

The signal is then tuned and amplified in an R. F. stage using a 6D6 tube. Further amplification and frequency conversion to 177.5 KC. take place in the 77 combination first detector and oscillator tube. The 177.5 KC. signal is amplified in the I.F. stage which uses a 6D6 tube and is then rectified in the diode section of the 75 second detector tube.

The rectified current produces a modulated D.C. voltage across the diode load resistor. (No. 4 in the circuit diagram). In order to obtain more quiet tuning between stations, a small detection delay or "squelch" is provided by returning the diode load resistor to the midpoint of the second detector bias resistance. This point is approximately ¾ volt lower in potential than the cathode.

The audio component of the rectified voltage appears across the 500,000 ohm volume control resistor. Any part or all of this signal may be impressed on the triode section of the 75 tube where audio amplification takes place. The triode section of the 75 is resistance coupled to the 41 output tube. Bias for the 41 tube is obtained by grid return connection to the ungrounded end of the filter choke which is connected in the B— lead.

The modulated drop across resistor No. 4 is filtered and applied to the grid returns of the 6D6 R.F. and I.F. tubes to provide A.V.C.

CALIBRATION AND ALIGNMENT

A good modulated oscillator and a sensitive output meter are necessary for proper calibration and alignment of the R.F. and I.F. stages of this receiver. The output of the test oscillator must be adjustable to give a very weak signal which will not actuate the A.V.C. of the receiver. The output meter must be sensitive enough to give sufficient reading with such a weak signal.

The output meter may be conveniently connected between the chassis and the yellow lead terminal on pilot light and tone control lead socket. You will find that the yellow lead is connected through an .02 mfd. condenser to the plate of the 41 output tube. However, if the output meter is suitable, it should be connected across the speaker voice coil.

During all calibration and alignment adjustments, keep the volume control full on.

I. F. ALIGNMENT

The I.F. trimmers are located on top of the I.F. transformers which may be reached by removing the receiver top cover. Pull out the antenna plug. The test oscillator should be set to exactly 177.5 KC. and connected from the control grid of the 77 to ground. Adjust the test oscillator output to give about half-scale reading of the output meter. Tune the set to make certain that no station signal is tuned in, since this would affect the output meter reading. Adjust all three I.F. trimmers to give maximum output reading.

In adjusting the I.F. transformer trimmers, it is desirable to use a bakelite screw driver or one having only a small metal tip. After the I.F. trimmers have been aligned once, go back and repeat the procedure, since any adjustment of one will affect the others to some extent.

DIAL CALIBRATION

The dial of the control head is calibrated in kilocycles except that one zero is omitted. Sets using the steering column control head or the Ford dash control head are calibrated as follows:

Tune in a station of known frequency between 800 and 1100 KC. Loosen the set screw in the right hand knob and remove the knob. Loosen the set screw in the knob shaft, and by rotating the knob shaft, turn the pointer until it indicates the frequency of the station which has been tuned in. Then re-tighten the set screw and replace the knob.

If the set is used with a dash control head other than that for the Ford, calibrate as follows:

Turn the knob to the right as far as it will go, and then turn it to the end in the other direction. It is necessary to continue to turn the knob after the dial pointer reaches the end stop, until the knob will turn no farther.

If the set is badly out of calibration, so that when the dial reads correctly at the low frequency end, it is off at the high frequency end, it will be necessary to adjust the oscillator shunt trimmer as explained below. The oscillator shunt trimmer is located on the oscillator section of the gang condenser which can be reached when the receiver bottom cover is removed. Connect a .00025 mfd. mica condenser in series with the output of the test oscillator and the antenna lead of the receiver. This condenser is essential to the proper adjustment of the antenna stage. Set the test oscillator to exactly 600 KC. Tune the receiver to maximum output. If the control head is of the steering column or Ford dash control type, calibrate at the low end of the dial by setting the pointer to read exactly 60 (600 KC.).

Set the test oscillator to exactly 1400 KC. Turn the gang condenser by means of the tuning knob until the dial pointer indicates 140 (1400 KC.). Adjust the oscillator shunt trimmer (on gang condenser section third from shaft end) for maximum output. Adjust the two trimmers nearest the shaft end as explained under R.F. alignment.

R. F. ALIGNMENT

With the test oscillator set to approximately 1400 KC., tune the set very carefully for maximum output.

Adjust the output of the test oscillator to the minimum value which will give sufficient output meter deflection. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading.

R-1431 PARTS LIST

Diag. No.	Part No.	DESCRIPTION	List Price
1	66023	60,000 ohm 1 watt carbon resistor	$0.25
2	67303	2,000 ohm ¼ watt carbon resistor	.25
3	83060	51,000 ohm ¼ watt carbon resistor	.30
4	83082	260,000 ohm ¼ watt carbon resistor	.20
5	83539	260 mmfd. mica condenser	.25
6	84198	110,000 ohm ¼ watt carbon resistor	.30
7	84235	1.1 megohm ¼ watt carbon resistor	.20
8	84238	11,000 ohm ¼ watt carbon resistor	.20
9	84282	.001 mfd. mica condenser	.25
10	84835	70 mmfd. mica condenser	.20
11	85296	Pilot lamp 6-8 volt (bayonet base)	.18
12	88026	.02 mfd. 400 volt paper condenser	.80
13	88156	Vibrator	3.50
14	88170	10 mfd. 25 volt electrolytic condenser	.80
15A, 15B	88171	Volume control 500,00 ohm; Line switch	1.20
16	88172	Antenna Filter	1.20
17	88173	50 mmfd. mica condenser	.20
18	88181	R. F. choke coil	.40
19	88183	R. F. choke coil (to vibrator)	.25
20	88185	.006 mfd. 600 volt paper condenser	.33
21	88187	.01 mfd. 1500 volt paper condenser	.40
22	88189	.05 mfd. 200 volt paper condenser	.33
23	88191	.1 mfd. 300 volt paper condenser	.35
24	88193	.25 mfd. 150 volt paper condenser	.35
25	88195	.5 mfd. 150 volt paper condenser	.50
26	88203	600 ohm ¼ watt carbon resistor	.15
27	88204	210 ohm ½ watt carbon resistor	.15
28	88205	.0021 mfd. mica condenser	$0.35
29	88210	Filter choke	1.25
30	88213	Power transformer	3.50
31	88222	1st I.F. transformer	2.75
32	88223	2nd I.F. transformer	2.60
33	88233	110 mmfd. mica condenser	.25
34	88234	Oscillator coil and shield assembly	1.50
35	88239	"A" filter	1.00
36	88250	R.F. coil and shield assembly	1.50
37A, 37B	88256	Electrolytic condenser 4 mfd. 350 volt; Electrolytic condenser 8 mfd. 350 volt	2.40
38	88257	9,500 ohm ¼ watt carbon resistor	.15
39A to C	88258	Three gang variable condenser	6.00
40	88274	Field coil and housing (for R-245-A spkr.)	2.50
41	88276	Output transformer	2.00
42	88285	1.25 mfd. 150 volt paper condenser	.80
43	88289	R.F. choke (to filaments)	.20
44	88298	.25 mfd. 150 volt paper condenser (low reactance)	.40
45	88312	Antenna coil and shield assem. (iron core)	2.00
46	88327	Antenna cable and plug	1.10
47	88328	Diaphragm and shell assem. (R-245-A spkr.)	2.10
48	88339	Pilot light and tone control cable with plug	.90
49	88364	Control head less shell, knobs and shafts	3.50
50	88365	Fuse, 10 amperes	.05
	83777	Battery lead and fuse housing	.50

Part No.	DESCRIPTION	List Price
12412	Split lockwasher for receiver mounting	$0.02
17166	Hex nut for receiver mounting ½" - 13	.05
84990	Receiver mounting plate	.60
85012	Receiver mounting bolt, ½" - 13 x 2"	.06
88326	Complete accessories for installation	3.28
88335	Shakeproof lockwasher for receiver mounting	.04
88336	Large flat washer for receiver mounting	.04
88319	Fuse insulator tube	.02
83777	Battery lead and fuse housing	.50
88159	Vibrator shield	.35
88161	Tube shield half section (short)	.08
88162	Tube shield half section (long)	.08
88164	Tube shield cap (long)	.06
88165	Tube shield cap (short)	.06
88297	Speaker mounting screw #8 - 32 special head	.02
88319	Self tapping screw #8 x ¼" for receiver cover mtg.	.02
88321	Receiver case assembly (less covers)	5.00
88327	Antenna cable	1.10
88330	Receiver case cover with tube location label	1.00
88350	Interference filter condenser with bracket, .5 mfd., 150 V.	.70

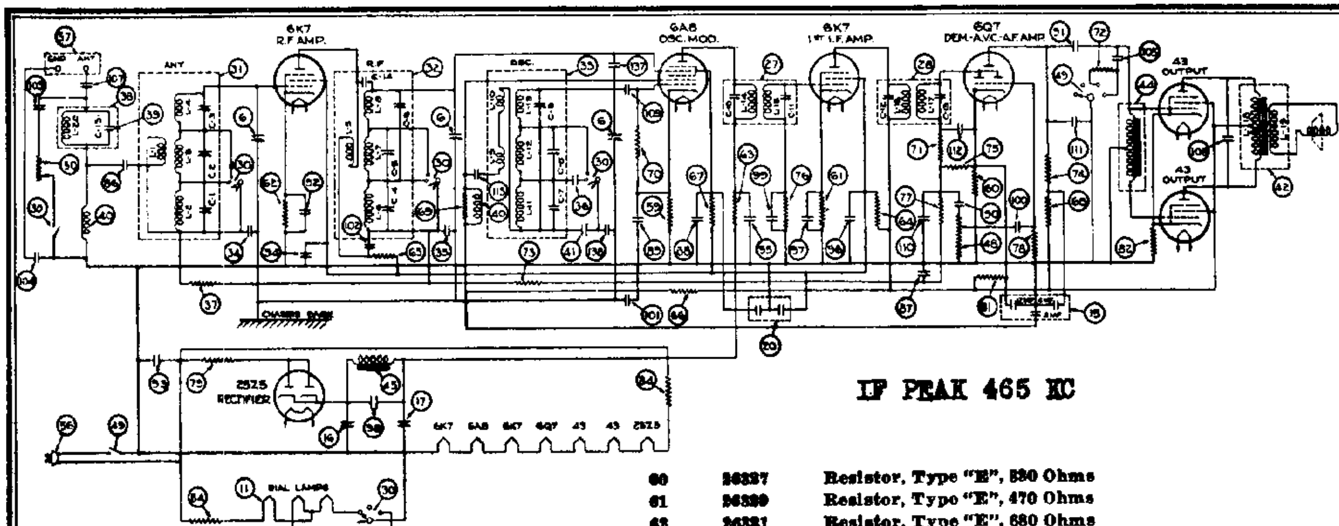
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODELS 126H, 126L
Schematic, Parts

STROMBERG-CARLSON TEL. MFG. CO.

Tuning Ranges——A—540 to 1500 Kc.; B—1450 to 3500 Kc.; C—5600 to 18,000 Kc.
Number and Types of Tubes——2 No. 6K7, 1 No. 6A8, 1 No. 6Q7, 2 No. 43, 1 No. 25Z5
Power Supply Voltage——105 to 125 Volts
Power Supply Frequency (For AC Operation)——50 to 60 Cycles
Input Power Rating——55 Watts
Frequency of Intermediate Amplifier——465 Kilocycles

No. 126-H —50 to 60 Cycles; P-26844 Chassis Assembly; P-26886 Loud Speaker
No. 126-L —50 to 60 Cycles; P-26844 Chassis Assembly; P-26887 Loud Speaker



IF PEAK 465 KC

Item Number	Piece Number	Part
5	26843	Dial Assembly
6	26414	Gang Tuning Capacitor Assembly
8	26353	Lamp Socket Assembly
9	26069	Bracket (Chassis Spacer)
11	25958	Pilot Lamp
15	26164	Electrolytic Capacitor Assembly, 4 Mf., 150 Volts; 4 Mf., 150 Volts; 12 Mf., 25 Volts
16	26163	Electrolytic Capacitor, 40 Mf.
17	26162	Electrolytic Capacitor, 40 Mf.
20	26378	Electrolytic Capacitor Assembly (Two 4 Mf.)
27	26141	1st I. F. Transformer
28	25506	2nd I. F. Transformer
30	26364	Range Switch
31	25510	Coil Assembly, Antenna
32	25511	Coil Assembly, R. F.
33	25512	Coil Assembly, Oscillator
34	25486	Capacitor, .002 Mf.
35	25537	Capacitor, .0027 Mf.
36	25490	Capacitor, .0033 Mf.
37	26383	Resistor, Type "EI", .1 Megohm
38	25513	Coil Assembly (Wave Trap)
39	25488	Capacitor .002 Mf.
40	25814	Coil Assembly, R. F. Choke, 5 Millihenrys
41	26047	Capacitor, Oscillator Series Aligner
42	26355	Transformer, Audio Output
44	26365	Transformer, Audio Input
45	25936	Choke Assembly (Filter of Rectifier)
46	26114	Potentiometer (Volume Control)
49	26371	Switch ("Off-On" and Tone Control)
50	26095	Potentiometer (Sensitivity Control)
51	26429	Knob (For Sensitivity Control)
53	19974	Socket, 6 Prong
54	25539	Socket, 8 Prong
56	24968	Cord, Power Supply
59	26336	Resistor, Type "E", 270 Ohms
60	26327	Resistor, Type "E", 330 Ohms
61	26329	Resistor, Type "E", 470 Ohms
62	26331	Resistor, Type "E", 680 Ohms
63	26333	Resistor, Type "E", 1000 Ohms
64	26333	Resistor, Type "E", 1000 Ohms
65	26345	Resistor, Type "E", 10,000 Ohms
66	26333	Resistor, Type "E", 1000 Ohms
67	26345	Resistor, Type "E", 10,000 Ohms
69	26350	Resistor, Type "E", 27,000 Ohms
70	26353	Resistor, Type "E", 47,000 Ohms
71	26353	Resistor, Type "E", 47,000 Ohms
72	26353	Resistor, Type "E", 47,000 Ohms
73	26357	Resistor, Type "E", .1 Megohm
74	26362	Resistor, Type "E", .27 Megohm
75	26365	Resistor, Type "E", .47 Megohm
76	26365	Resistor, Type "E", .47 Megohm
77	26369	Resistor, Type "E", 1 Megohm
78	26373	Resistor, Type "E", 2.2 Megohms
79	25911	Resistor, Type "B", 50 Ohms
81	26406	Resistor, Type "C", 27,000 Ohms
82	26369	Resistor, Type "B", 310 Ohms
84	25914	Resistor, Voltage Divider
86	25150	Capacitor Assembly, .02 Mf.
87	25150	Capacitor Assembly, .02 Mf.
88	25150	Capacitor Assembly, .02 Mf.
89	25150	Capacitor Assembly, .02 Mf.
90	25150	Capacitor Assembly, .02 Mf.
91	25150	Capacitor Assembly, .02 Mf.
92	25150	Capacitor Assembly, .02 Mf.
94	24402	Capacitor Assembly, .1 Mf.
95	24402	Capacitor Assembly, .1 Mf.
96	24402	Capacitor Assembly, .1 Mf.
97	24402	Capacitor Assembly, .1 Mf.
98	26390	Capacitor Assembly, .3 Mf.
99	24405	Capacitor Assembly, .04 Mf.
100	24405	Capacitor Assembly, .04 Mf.
101	25389	Capacitor Assembly, .2 Mf.
102	25481	Capacitor Assembly, .002 Mf.
103	25149	Capacitor Assembly, .01 Mf.
104	25149	Capacitor Assembly, .01 Mf.
105	26151	Capacitor Assembly, .005 Mf.
107	25533	Capacitor Assembly, .006 Mf.
108	26151	Capacitor Assembly, .005 Mf.
109	24559	Capacitor, Type "O", 100 Mmf.
110	24559	Capacitor, Type "O", 100 Mmf.
111	24559	Capacitor, Type "O", 100 Mmf.
112	24559	Capacitor, Type "O", 100 Mmf.
113	25487	Capacitor, Type "W", .001 Mf.
137	26417	Capacitor (Gimmick)
138	25489	Capacitor, .00125 Mf.

MISCELLANEOUS PARTS

Piece Number	Part
26302	Knob (For Volume Control)
26385	Knob (For Range Switch)
26384	Knob (For Off-On-Switch and Tone Control)
26305	Knob (For Large Portion of Tuning Shaft)
26306	Knob (For Vernier Portion of Tuning Shaft)

STROMBERG-CARLSON TEL. MFG. CO.

Intermediate Frequency Amplifier Adjustments

The intermediate frequency used in these receivers is 465 kilocycles. In making these I. F. circuit adjustments always align in the following order:

1. Secondary of 2nd I. F. Transformer (Capacitor C-13).
2. Primary of 2nd I. F. Transformer (Capacitor C-12).
3. Secondary of 1st I. F. Transformer (Capacitor C-11).
4. Primary of 1st I. F. Transformer (Capacitor C-10).

Radio Frequency Adjustments

The adjustments of the aligning capacitors used in the radio frequency circuits in this receiver should be very carefully made in the following order and at the frequencies specified below:

1. Oscillator's "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-9).
2. R. F. Interstage "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-6).
3. Antenna "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-3).
4. Oscillator's "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-8).
5. R. F. Interstage "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-5).
6. Antenna "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-2).
7. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-7).
8. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
9. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).
10. Oscillator's "A" Band Series Aligner at 0.6 Megacycles (Capacitor, Item No. 41).
11. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-7).
12. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
13. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).

NORMAL VOLTAGE READINGS

These voltage readings are obtained by measuring between the various tube socket contacts and the heavy bus wire with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. The heavy bus wire, which is the negative side of the grid and plate voltages, is plainly marked on the schematic and wiring diagram shown on pages three and four. Figure 2 shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, A. C. Allowance should be made for the difference when the line voltage is higher or lower.

IMPORTANT—If the receiver is operated from a direct current power supply circuit, the various voltages measured will be slightly lower than those listed in the table for A. C. operation. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 1000 volt scale was used.

When the receiver is being operated from an alternating current power supply circuit, it will be necessary to have a high resistance A. C. voltmeter for checking the A. C. voltages.

Tube	Circuit	Cap	Terminals of Sockets								Heater Voltages Between Heater Terminals	
			1	2	3	4	5	6	7	8	Socket Terminal Numbers	Volts
6K7	R. F. Amp.	0	0	*12.8*	+42	+93	+3.7	0	*6.4*	+3.7	2-7	*6.4*
6A8	Mod.—Osc.	0	0	*12.8*	+100	+64	—4.8	+100	*19.2*	+1.6	2-7	*6.4*
6K7	I. F. Amp.	0	0	*26*	+102	+93	+3.1	0	*19.6*	+3.1	2-7	*6.4*
6Q7	Dem.—A.V.C.—Audio	0	0	*0*	+61*	0	0	+93	*6.4*	+1.1	2-7	*6.4*
43	Audio Output	—	*26*	+100	+103	0	+14.5	*53*			1-6	*27*
43	Audio Output	—	*53.2*	+100	+103	0	+14.5	*80.2*			1-6	*27*
25Z5	Rectifier	—	*80*	*116*	+108	+108	*116*	*105*			1-6	*25*

Voltage across pilot lamps—*28.7* volts.

A. C. voltages are indicated by italics; when the receiver is operated from a D. C. power supply, D. C. voltages will be obtained in place of the A. C. voltages.
Receiver tuned to 1000 kc., no signal.

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 126H, 126L
Socket, Trimmers
Chassis

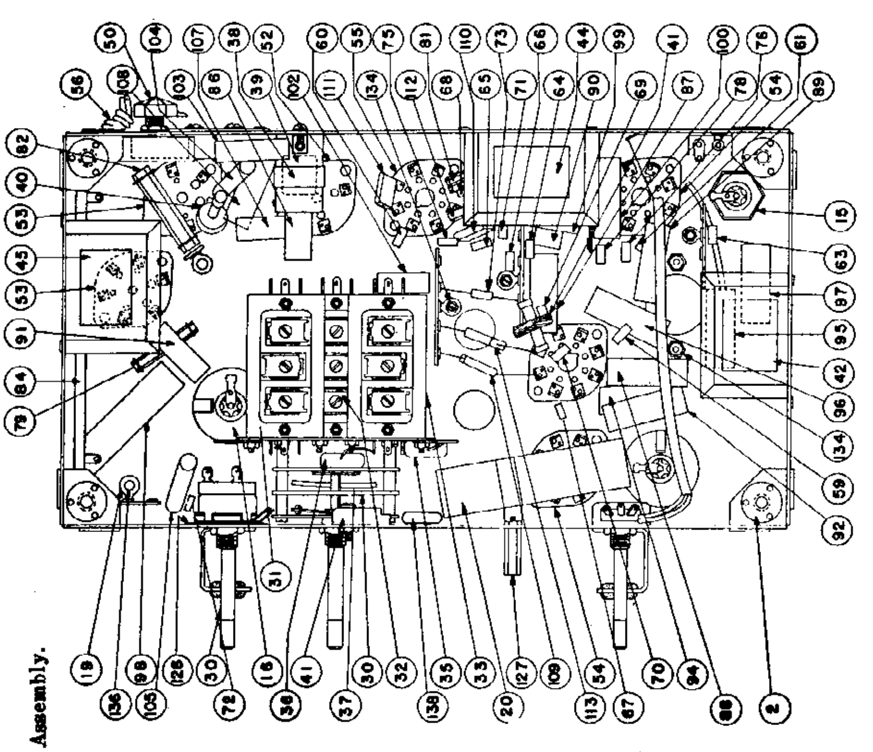


Figure 5. Chassis Assembly.

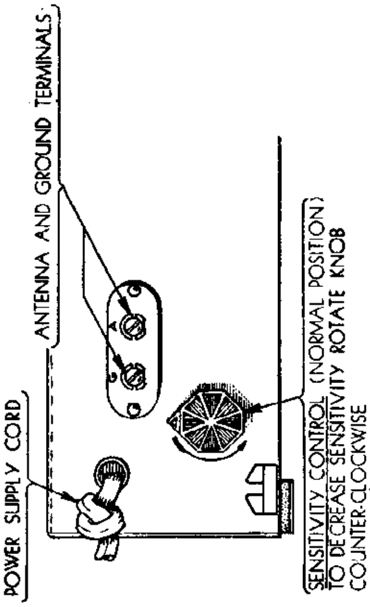
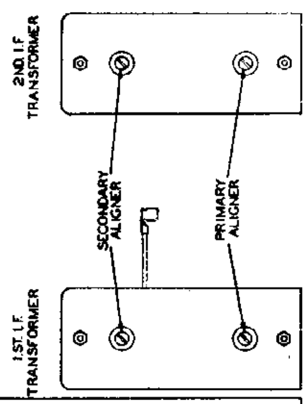
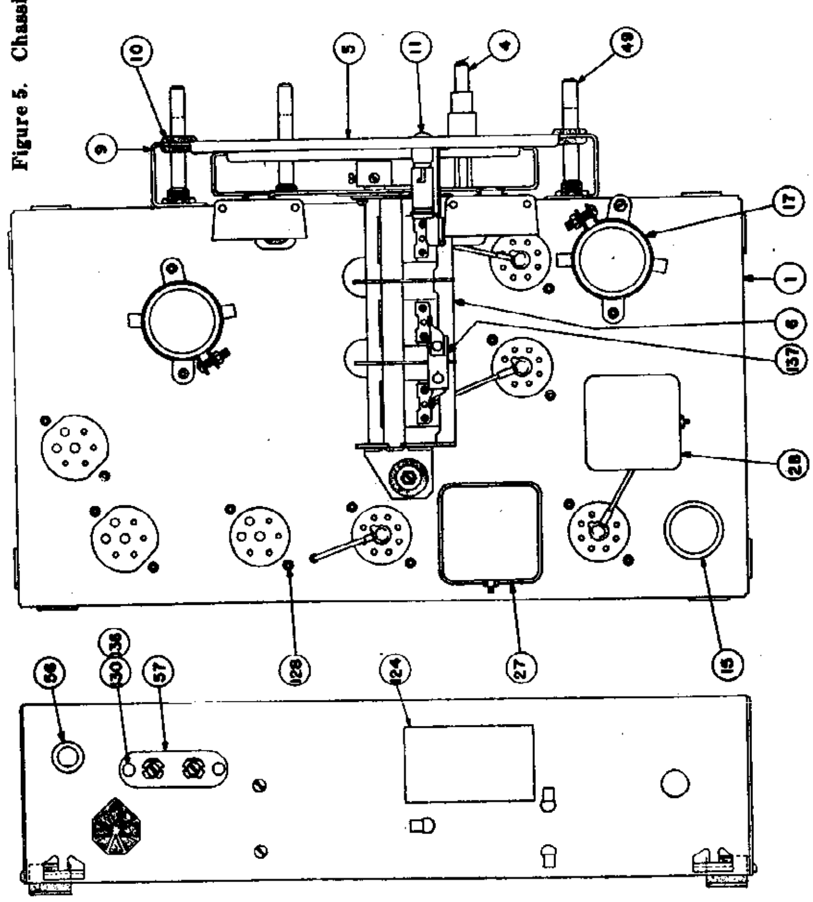


Fig. 1. Location and Operation of Sensitivity Control.





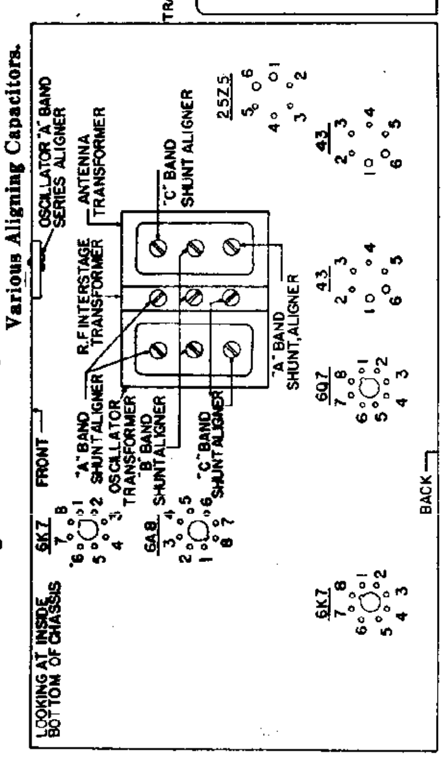
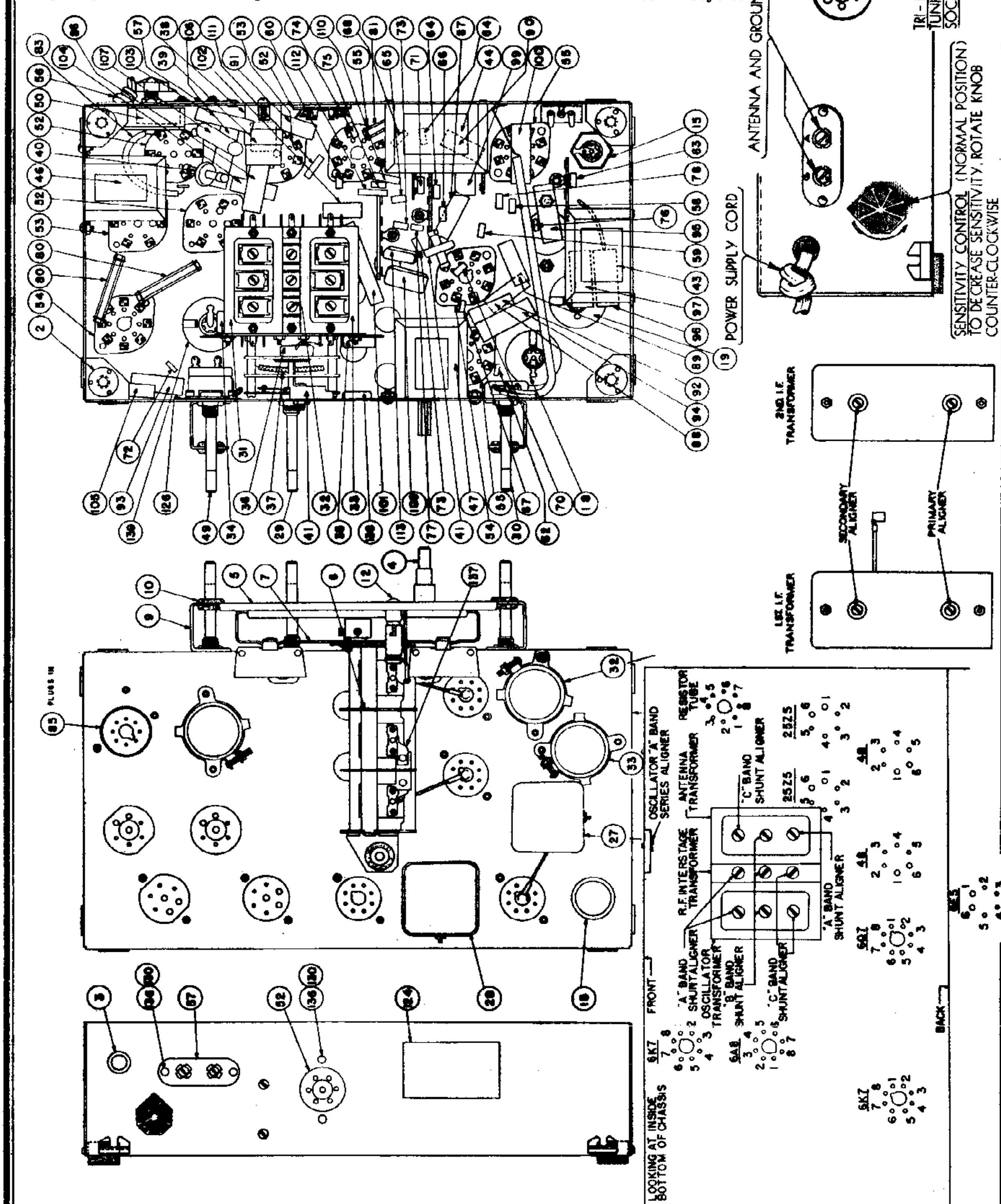


Fig. 2. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

MODELS 127H, 127M
Socket, Trimmers
Chassis

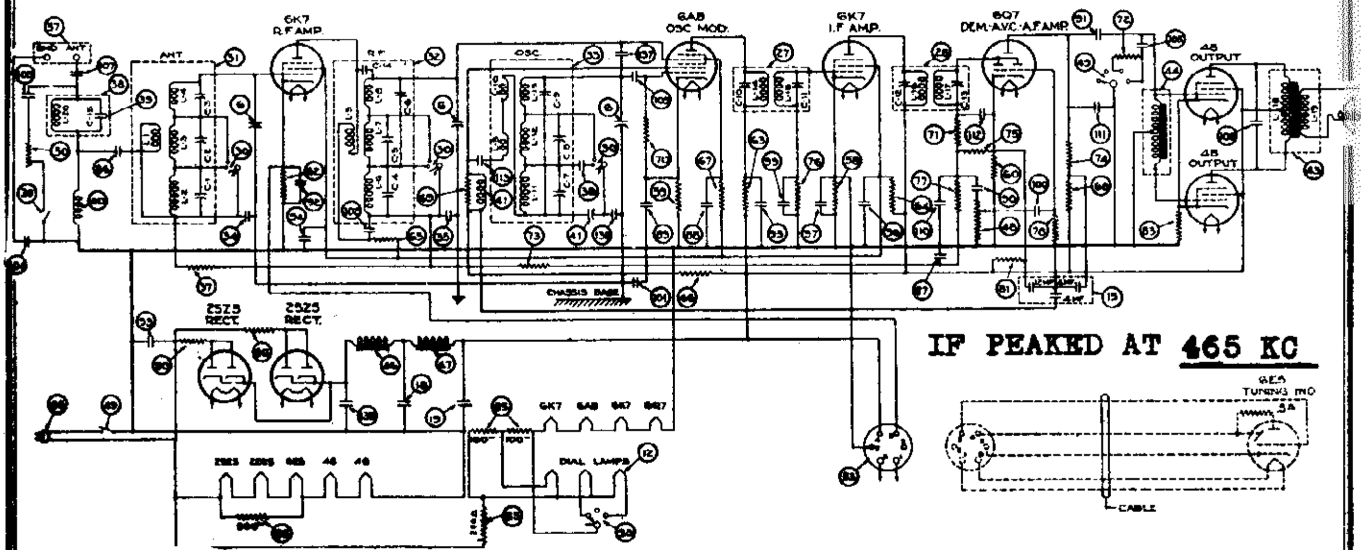
STROMBERG-CARLSON TEL. MFG. CO.

Tuning Ranges .... A—540 to 1500 Kc.; B—1450 to 3500 Kc.; C—5600 to 18,000 Kc.
Number and Types of Tubes ... 2 No. 6K7, 1 No. 6A8, 1 No. 6Q7, 2 No. 48, 1 No. 6E5, 2 No. 25Z5
Power Supply Voltage .... 105 to 125 Volts
Power Supply Frequency (For A. C. operation) .... 50 to 60 Cycles
Input Power Rating .... 98 Watts
Frequency of Intermediate Amplifier .... 465 Kilocycles



MODELS 127H, 127M
Schematic, Parts

STROMBERG-CARLSON TEL. MFG. CO.



IF PEAKED AT **465 KC**

REPLACEMENT PARTS

Item Number	Piece Number	Part
5	26348	Dial Assembly
6	26414	Gang Tuning Capacitor Assembly
7	26090	Lamp Socket Assembly
9	26050	Bracket (Chassis Spacer)
12	26267	Pilot Lamp
15	26164	Electrolytic Capacitor Assembly, 4 Mf., 150 Volts; 4 Mf., 150 Volts; 12 Mf., 25 Volts
18	26162	Electrolytic Capacitor, 25 Mf.
19	26162	Electrolytic Capacitor, 25 Mf.
27	26141	1st I. F. Transformer
28	25506	2nd I. F. Transformer
30	26604	Range Switch
31	25510	Coil Assembly, Antenna
32	25511	Coil Assembly, R. F.
33	25512	Coil Assembly, Oscillator
34	25488	Capacitor, .002 Mf.
35	25527	Capacitor, .0027 Mf.
36	25490	Capacitor, .0058 Mf.
37	26363	Resistor, Type "EI", .1 Megohm
38	25513	Coil Assembly (Wave Trap)
39	25488	Capacitor, .002 Mf.
40	25514	Coil Assembly, R. F. Choke, 5 Millihenrys
41	26047	Capacitor, Oscillator Series Aligner
43	26657	Transformer, Audio Output
44	26665	Transformer, Audio Input
46	26650	Choke Assembly (Filter of Rectifier)
47	26661	Choke Assembly (Filter of Rectifier)
48	26114	Potentiometer (Volume Control)
49	26671	Switch ("Off-On" and Tone Control)
50	26066	Potentiometer, Sensitivity Control
51	26490	Knob (For Sensitivity Control)
53	25074	Socket, 6 Prong
55	25500	Socket, 5 Prong
56	24266	Cord, Power Supply
58	26234	Resistor, Type "E", 180 Ohms
59	26236	Resistor, Type "E", 270 Ohms
60	26237	Resistor, Type "E", 330 Ohms
62	26231	Resistor, Type "E", 680 Ohms
63	26233	Resistor, Type "E", 1000 Ohms
64	26233	Resistor, Type "E", 1000 Ohms
65	26245	Resistor, Type "E", 10,000 Ohms
66	26233	Resistor, Type "E", 1000 Ohms
67	26245	Resistor, Type "E", 10,000 Ohms
68	26245	Resistor, Type "E", 10,000 Ohms
69	26250	Resistor, Type "E", 27,000 Ohms
70	26253	Resistor, Type "E", 47,000 Ohms
71	26253	Resistor, Type "E", 47,000 Ohms
72	26253	Resistor, Type "E", 47,000 Ohms
73	26257	Resistor, Type "E", .1 Megohm
75	26265	Resistor, Type "E", .47 Megohm
76	26365	Resistor, Type "E", .47 Megohm
77	26360	Resistor, Type "E", 1 Megohm
78	26373	Resistor, Type "E", 2.2 Megohms
80	25011	Resistor, Type "B", 50 Ohms
81	26406	Resistor, Type "C", 27,000 Ohms
83	26670	Resistor, Flexible, 155 Ohms
85	26671	Resistor, "B" Voltage Divider
86	25150	Capacitor Assembly, .02 Mf.
87	25150	Capacitor Assembly, .02 Mf.
88	25150	Capacitor Assembly, .02 Mf.
89	25150	Capacitor Assembly, .02 Mf.
90	25150	Capacitor Assembly, .02 Mf.
91	25150	Capacitor Assembly, .02 Mf.
92	25150	Capacitor Assembly, .02 Mf.
93	25150	Capacitor Assembly, .02 Mf.
94	24402	Capacitor Assembly, .1 Mf.
95	24402	Capacitor Assembly, .1 Mf.
96	24402	Capacitor Assembly, .1 Mf.
97	24402	Capacitor Assembly, .1 Mf.
99	24405	Capacitor Assembly, .04 Mf.
100	24405	Capacitor Assembly, .04 Mf.
101	25380	Capacitor Assembly, .2 Mf.
102	25481	Capacitor Assembly, .002 Mf.
103	25149	Capacitor Assembly, .01 Mf.
104	25149	Capacitor Assembly, .01 Mf.
105	25151	Capacitor Assembly, .005 Mf.
106	25149	Capacitor Assembly, .01 Mf.
107	25538	Capacitor Assembly, .006 Mf.
109	24550	Capacitor, Type "O", 100 Mmf.
110	24550	Capacitor, Type "O", 100 Mmf.
111	24550	Capacitor, Type "O", 100 Mmf.
112	24550	Capacitor, Type "O", 100 Mmf.
113	26487	Capacitor, Type "W", .001 Mf.
137	26417	Capacitor (Gimmick)
138	25480	Capacitor, .00125 Mf.
139	27014	Electrolytic Capacitor, 40 Mf.

MISCELLANEOUS PARTS

Piece Number	Part
26491	Plug (For Tri-Focal Tuning Unit Cable)
26365	Resistor, Type "E", .47 Megohm (Used at Socket of No. 6E5 Tube)
26362	Knob (For Volume Control).
26385	Knob (For Range Switch)
26384	Knob (For Off-On-Tone Control)
26365	Knob (For Large Portion of Tuning Shaft)
26366	Knob (For Vernier Portion of Tuning Shaft)

STROMBERG-CARLSON TEL. MFG. CO.

Intermediate Frequency Amplifier Adjustments

The intermediate frequency used in these receivers is 465 kilocycles. In making these I. F. circuit adjustments always align in the following order:

1. Secondary of 2nd I. F. Transformer (Capacitor C-13).
2. Primary of 2nd I. F. Transformer (Capacitor C-12).
3. Secondary of 1st I. F. Transformer (Capacitor C-11).
4. Primary of 1st I. F. Transformer (Capacitor C-10).

Radio Frequency Adjustments

The adjustments of the aligning capacitors used in the radio frequency circuits in this receiver should be very carefully made in the following order and at the frequencies specified below:

1. Oscillator's "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-9).
2. R. F. Interstage "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-6).
3. Antenna "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-3).
4. Oscillator's "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-8).
5. R. F. Interstage "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-5).
6. Antenna "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-2).
7. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-7).
8. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
9. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).
10. Oscillator's "A" Band Series Aligner at 0.6 Megacycles (Capacitor, Item No. 41).
11. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-7).
12. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
13. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).

NORMAL VOLTAGE READINGS

These voltage readings are obtained by measuring between the various tube socket contacts and the heavy bus wire with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. The heavy bus wire, which is the negative side of the grid and plate voltages, is plainly marked on the schematic and wiring diagram shown on pages three and five. Figure 2 shows the terminal layout of the sockets with the proper terminal numbers.

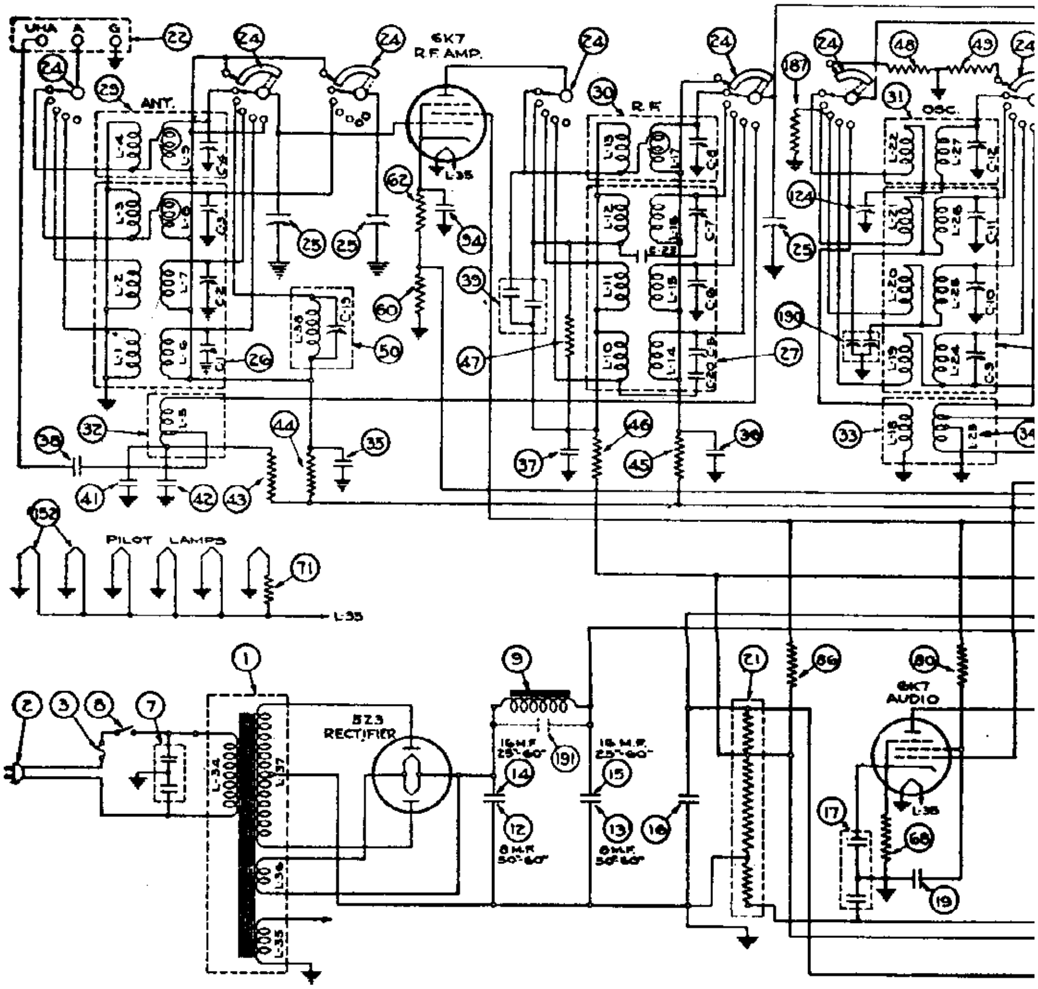
Voltages are given for a line voltage of 120 volts, A. C. Allowance should be made for the difference when the line voltage is higher or lower.

IMPORTANT—If the receiver is operated from a direct current power supply circuit, the various voltages measured will be slightly lower than those listed in the table for A. C. operation. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: O-2.5, O-10, O-100, O-250, O-500, O-1000 volts except when an asterisk appears after any given voltage value in which case the 1000 volt scale was used.

When the receiver is being operated from an alternating current power supply circuit, it will be necessary to have a high resistance A. C. voltmeter for checking the A. C. voltages.

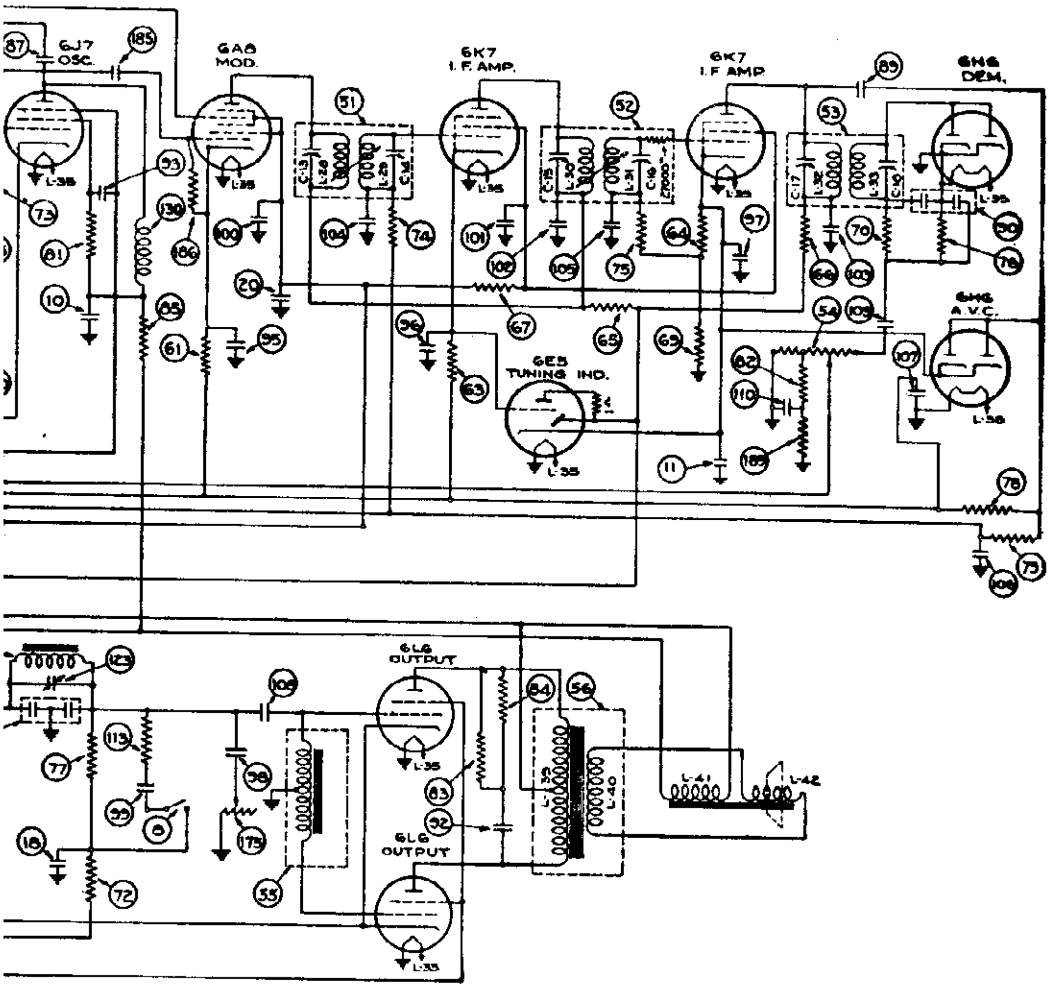
Tube	Circuit	Cap	*Terminals of Sockets* 1	2	3	4	5	6	7	8	*Heater Voltages Between Heater Terminals* *Socket Terminal Numbers*	*Volts*
6K7	R. F. Amp.	0	0	*18*	+33	+88	+4	0	*24*	+4	2-7	*6*
6A8	Mod.—Osc.	0	0	*18*	+95	+60	—7	+95	*12*	+1.5	2-7	*6*
6K7	I. F. Amp.	0	0	*6*	+99	+88	+2	0	*12*	+2.2	2-7	*6*
6Q7	Dem.—A.V.C.—Audio Amp.	0	0	0	+50*	0	0	+88	*6*	+1	2-7	*6*
48	Audio Output	—	*61*	+106	+106	0	+17	*31*	—	—	1-6	*30*
48	Audio Output	—	*0*	+106	+106	0	+17	*30*	—	—	1-6	*30*
6E5	Tuning Ind.	—	*61*	+0.5	+3.9	+99	+2.2	*67*	—	—	1-6	*6*
25Z5	Rectifier	—	*95*	*116*	+112	+116	*114*	*70*	—	—	1-6	*25*
25Z5	Rectifier	—	*120*	*116*	+112	+112	*116*	*95*	—	—	1-6	*25*
Resistor	Voltage Divider	—	*37*	*65*	*37*	—	*120*	—	*25*	*32*	—	—
Voltage across pilot lamps—*12* volts.												

A. C. voltages are indicated by italics; when the receiver is operated from a D.C. power supply, D.C. voltages will be obtained in place of the A.C. voltages.
Receiver tuned to 1000 kc., no signal.



Item Number	Piece Number	Part
1	26685	Power Transformer (50 to 60 Cycles Chassis)
1	26686	Power Transformer (25 to 60 Cycles Chassis)
2	24268	Cord (Power Supply)
3	23234	Fuse, 2½ Amperes
7	21535	Capacitor Assembly (2—.01 Mf. Capacitors)
8	26061	Switch ("Off-On" and Bass Control)
9	26704	Choke Assembly (Filter of Rectifier)
10	25788	Electrolytic Capacitor, 1 Mf., 450 Volts
11	24207	Electrolytic Capacitor, 12 Mf., 25 Volts
12	22757	Electrolytic Capacitor, 8 Mf., 500 Volts
13	22757	Electrolytic Capacitor, 8 Mf., 500 Volts
14	26510	Electrolytic Capacitor, 16 Mf., 500 Volts
15	26510	Electrolytic Capacitor, 16 Mf., 500 Volts
16	26773	Electrolytic Capacitor, 16 Mf., 350 Volts
17	25498	Electrolytic Capacitor (2—10 Mf.), 25 Volts
18	24580	Electrolytic Capacitor, 4 Mf., 450 Volts
19	26693	Electrolytic Capacitor, 4 Mf., 350 Volts
20	26693	Electrolytic Capacitor, 4 Mf., 350 Volts
21	26736	Resistor, "B" Voltage Divider
24	26746	Range Switch Assembly
25	26444	Gang Tuning Capacitor Assembly
26	26446	Coil Assembly, Antenna ("A", "B" and "C" Ranges)
27	26447	Coil Assembly, R. F. ("A", "B" and "C" Ranges)
28	26448	Coil Assembly, Oscillator ("A", "B" and "C" Ranges)
29	26507	Coil Assembly, Antenna ("X" Range)
30	26508	Coil Assembly, R. F. ("X" Range)
31	26509	Coil Assembly, Oscillator ("X" Range)
32	26758	Coil Assembly, Antenna ("D" Range)
33	26787	Oscillator Primary Coil ("D" Range)
34	26765	Oscillator Secondary Coil ("D" Range)
35	24405	Capacitor Assembly, .04 Mf.
36	24405	Capacitor Assembly, .04 Mf.
37	24904	Capacitor Assembly, .05 Mf.
39	26513	Capacitor (2—200 Mmf.)
40	26944	Capacitor, .004 Mf.
41	24637	Capacitor, .0017 Mf.
42	24637	Capacitor, .0017 Mf.
43	26357	Resistor, Type "E", .1 Megohm
44	26357	Resistor, Type "E", .1 Megohm
45	26357	Resistor, Type "E", .1 Megohm
46	26333	Resistor, Type "E", 1000 Ohms
47	26353	Resistor, Type "E", 47,000 Ohms
48	26321	Resistor, Type "E", 100 Ohms
49	26321	Resistor, Type "E", 100 Ohms
50	26474	Coil Assembly (Bi-Resonator)
51	26481	1st I. F. Transformer
52	26482	2nd I. F. Transformer
53	26243	3rd I. F. Transformer
54	26077	Potentiometer (Volume Control)
55	26700	Transformer Assembly, Audio Input
56	26702	Transformer Assembly, Audio Output
57	22988	Socket, 4 Prong
58	23517	Socket, 7 Prong
59	25539	Socket, 8 Prong
60	26324	Resistor, Type "E", 180 Ohms
61	26326	Resistor, Type "E", 270 Ohms
62	26328	Resistor, Type "E", 390 Ohms
63	26330	Resistor, Type "E", 560 Ohms
64	26330	Resistor, Type "E", 560 Ohms
65	26330	Resistor, Type "E", 560 Ohms
66	26333	Resistor, Type "E", 1000 Ohms
67	26333	Resistor, Type "E", 1000 Ohms
68	26338	Resistor, Type "E", 2700 Ohms
69	26328	Resistor, Type "E", 390 Ohms
70	26345	Resistor, Type "E", 10,000 Ohms
71	26780	Resistor, Flexible, 3.5 Ohms (Pilot Lamp)
72	26353	Resistor, Type "E", 47,000 Ohms
73	26853	Resistor, Type "E", 47,000 Ohms
74	20357	Resistor, Type "E", .1 Megohm
75	26357	Resistor, Type "E", .1 Megohm
76	26857	Resistor, Type "E", .1 Megohm
77	26357	Resistor, Type "E", .1 Megohm
78	26369	Resistor, Type "E", 1 Megohm
79	26369	Resistor, Type "E", 1 Megohm
80	26369	Resistor, Type "E", 1 Megohm
81	26349	Resistor, Type "E", 22,000 Ohms
82	26341	Resistor, Type "E", 4700 Ohms
83	26775	Resistor, Type "F", 20,000 Ohms
84	26775	Resistor, Type "F", 20,000 Ohms
85	26776	Resistor, Type "F", 12,000 Ohms
86	25526	Resistor, Type "F", 15,000 Ohms

SON TEL. MFG. CO.



IF PEAK 465 KC

87	25487	Capacitor, Type "W", .001 Mf.
88	24560	Capacitor, Type "O", 50 Mmf.
89	24560	Capacitor, Type "O", 50 Mmf.
90	26512	Capacitor, Type "W", 2—100 Mmf.
91	26512	Capacitor, Type "W", 2—100 Mmf.
92	25535	Capacitor, Type 3L, .008 Mf.
93	25535	Capacitor, Type 3L, .008 Mf.
94	24402	Capacitor Assembly, .1 Mf.
95	24402	Capacitor Assembly, .1 Mf.
96	24402	Capacitor Assembly, .1 Mf.
97	24402	Capacitor Assembly, .1 Mf.
98	25149	Capacitor Assembly, .01 Mf.
99	25149	Capacitor Assembly, .01 Mf.
100	24994	Capacitor Assembly, .05 Mf.
101	24994	Capacitor Assembly, .05 Mf.
102	24994	Capacitor Assembly, .05 Mf.
103	24994	Capacitor Assembly, .05 Mf.
104	24405	Capacitor Assembly, .04 Mf.
105	24405	Capacitor Assembly, .04 Mf.
106	24405	Capacitor Assembly, .04 Mf.
107	24405	Capacitor Assembly, .04 Mf.
108	24405	Capacitor Assembly, .04 Mf.
109	24405	Capacitor Assembly, .04 Mf.
110	24405	Capacitor Assembly, .04 Mf.
113	26349	Resistor, Type "E", 22,000 Ohms
123	26568	Adjustable Capacitor (High Frequency Cut-Off Filter)
124	26569	Capacitor (Oscillator Series Aligner, "X" Range)
125	26485	Potentiometer and Bracket Assembly (Tone Control and High Fidelity)
128	26515	Coil Assembly (High Frequency Cut Off Filter)
130	25814	Choke Assembly, 5 Millihenrys
132	26519	Drive Disc Assembly
133	26570	Dial Bracket Assembly
134	26584	Bar Assembly (Pulley)
135	26211	Pulley
136	26518	Gear Assembly
137	26220	Drive Shaft Assembly
138	26520	Dial Assembly (Secondary)
139	26694	Dial Assembly (Main)
140	26672	Drive Cord Assembly (Volume Indicator Disc)
141	26683	Cord Assembly (Dial Elevator)
142	26226	Spring
143	26555	Volume Indicator Disc Assembly
144	26698	Fidelity Indicator Disc Assembly
145	26572	Bracket Assembly
146	26652	Reel Assembly (Range Switch)
147	26667	Reel Assembly (Tone-Fidelity Control)
148	26666	Reel Assembly (Volume Control)
149	26580	Front Dial Plate Assembly
150	26147	Lamp Socket
151	26257	Lamp Shades
152	26287	Pilot Lamp
155	26497	Cable Assembly, Tri-Focal Indicator
156	26692	Lamp Socket Assembly
175	26439	Potentiometer
176	26673	Drive Cord Assembly (Fidelity Indicator Disc)
185	24560	Capacitor, Type "O", 50 Mmf.
186	26357	Resistor, Type "E", .1 Megohm
187	26341	Resistor, Type "E", 4700 Ohms
189	26345	Resistor, Type "E", 10,000 Ohms
190	26564	Capacitor Assembly, Oscillator Series Aligners ("A" and "B" Ranges)
191	22775	Capacitor Assembly, .3 Mf.

MISCELLANEOUS PARTS

Piece Number	Part
26250	Cone Assembly (For P-26170 Speaker)
26048	Plug (For Loud Speaker Cable)
26369	Resistor, Type "E", 1 Megohm (Used at Socket of No. 6E5 Tube)
26302	Knob (For "Volume" Control)
26299	Knob (For "Tone-Fidelity" Control)
26305	Knob (For "Stations" Selector Control Shaft)
26306	Knob (For "Vernier" Stations Selector Control Shaft)
26301	Knob (For "Range" Switch)
26300	Knob (For "Off-On-Bass" Control)

STROMBERG-CARLSON TEL. MFG. CO.

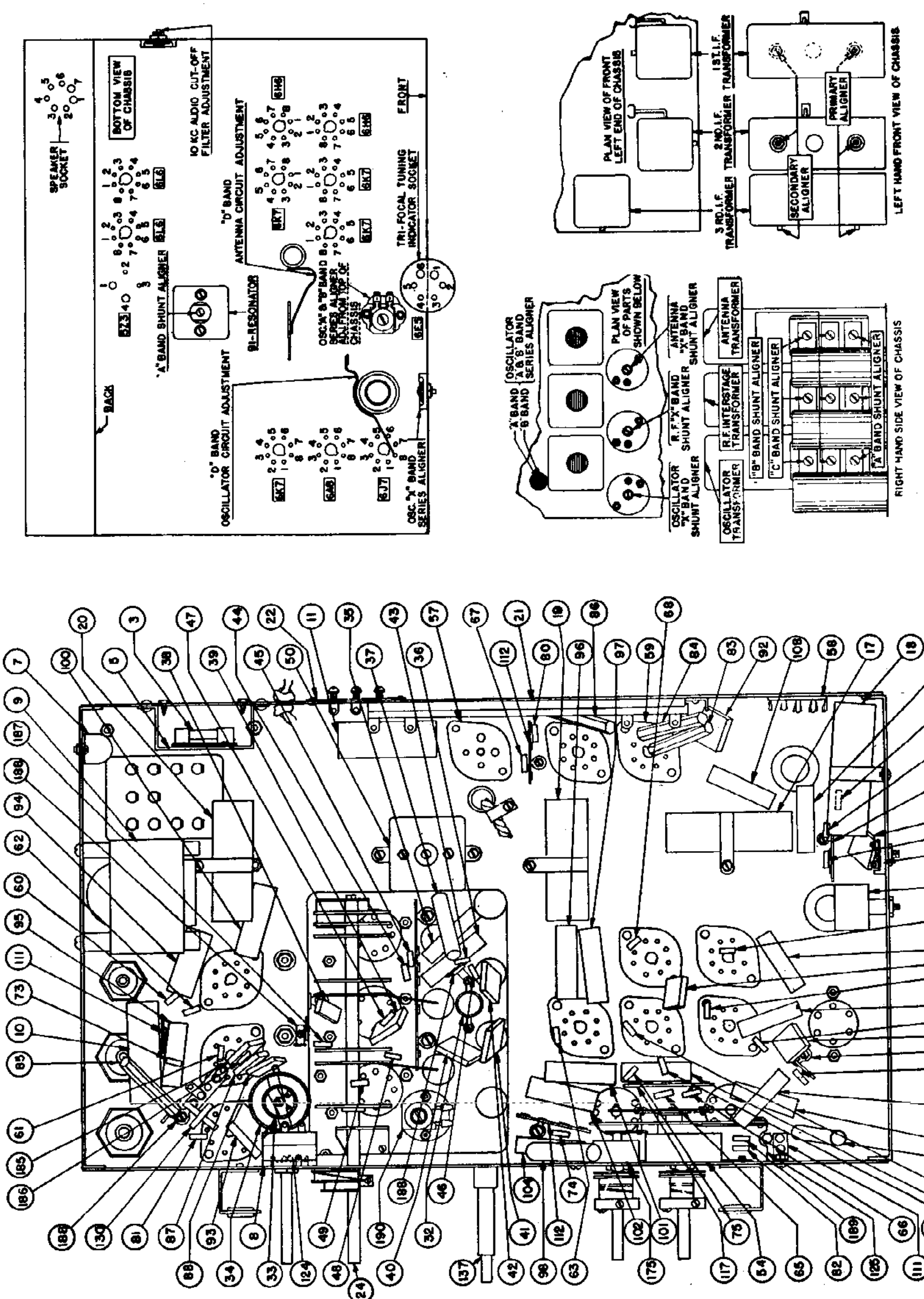


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

MODELS 150L, 150LB
Alignment, Voltage
MODELS 160L, 160LB
160P, 160PB
Alignment

STROMBERG-CARLSON TEL. MFG. CO.

ALIGNMENT DATA FOR MODELS 150 AND 160

All alignment adjustments are accurately made at the factory on this receiver, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, this alignment procedure should be carefully followed.

In making any alignment adjustments always adjust the signal generator's output to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal.

Figure 1 shows the location of all the aligning capacitors used in this receiver.

Intermediate Frequency Amplifier Adjustments

Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed.

Operate the range switch of the receiver to the "A" range position. Set the tuning dial at its extreme low frequency position, and operate the "Tone-Fidelity" control knob so that the receiver is adjusted for the standard fidelity position as indicated by the fidelity indicator located on the front panel of the receiver. Never attempt to align the I. F. circuits of this receiver with the "Tone-Fidelity" control set at any position other than the standard fidelity. The I. F. circuits may then be checked for alignment by adjusting the aligning capacitors in the exact order as follows:

1. Secondary of 3rd I. F. Trans. (Capacitor C-18).
2. Primary of 3rd I. F. Trans. (Capacitor C-17).
3. Secondary of 2nd I. F. Trans. (Capacitor C-16).
4. Primary of 2nd I. F. Trans. (Capacitor C-15).
5. Secondary of 1st I. F. Trans. (Capacitor C-14).
6. Primary of 1st I. F. Trans. (Capacitor C-13).

Radio Frequency Adjustments

The alignment of the radio frequency circuits for the various ranges in this receiver should be very carefully made in the order and at the frequencies specified.

It will be noted that no instructions are given for aligning the receiver at other than two frequencies for any range. Each receiver is given an exacting check for "tracking" at various frequencies in each range before leaving the factory. It is felt by the manufacturers that should any receiver through accident require a check on the "tracking", it should be returned to the factory, where this may be easily and accurately done.

Alignment of Long-Wave-Weather Range (Also Referred to as "X" Band) Circuits

1. Oscillator's "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-12).
2. R. F. Interstage "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-8). Item 133 in Model 160
3. Antenna "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-4).
4. Oscillator "X" Band Series Aligning Capacitor at 150 Kilocycles (Capacitor Item 124). When operation No. 4 has been completed repeat operations 1, 2, and 3 again and in the exact order given.

Alignment of Standard Broadcast Range (Also Referred to as "A" Band) Circuits

1. Oscillator's "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-11).
2. R. F. Interstage "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-7). Item 200 in Model 160
3. Antenna "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-3).
4. "A" Band, R. F. Bi-resonator Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-19).
5. Oscillator "A" Band Series Aligning Capacitor at 600 Kilocycles (Capacitor with screw adjustment. Item 190). When operation No. 5 has been completed repeat operations 1, 2, 3, and 4 again and in the exact order given.

Alignment of Amateur, Police, and Aircraft Range (Also Referred to as "B" Band) Circuits

1. Oscillator's "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-10). Item 200 in Model 160
2. R. F. Interstage "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-6).
3. Antenna "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-2).
4. Oscillator "B" Band Series Aligning Capacitor at 1.8 Megacycles (Capacitor with nut adjustment. Item 190). When operation No. 4 has been completed repeat operations 1, 2, and 3 again and in the exact order given.

Alignment of Short-Wave-Foreign Range (Also Referred to as "C" Band) Circuits

1. Oscillator's "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-9).
2. R. F. Interstage "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-5).
3. Antenna "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-1).

Alignment of Ultra Short-Wave Range (Also Referred to as "D" Band) Circuits

1. The only adjustment which it is necessary to make for bringing the "D" Band Oscillator's circuit into alignment is accomplished by bending the ground loop (shown in Figure 1 as "D" Band Oscillator Circuit Adjustment) either closer to the coil or farther away from the coil. This adjustment should be made with the signal generator set to a frequency of 20 megacycles.
2. The only adjustment which it is necessary to make for bringing the "D" Band Antenna's Circuit into alignment is accomplished by bending the grid lead loop (shown in Figure 1 as "D" Band Antenna Circuit Adjustment) so as to form either a smaller or larger loop. This adjustment should also be made with the signal generator set to a frequency of 20 megacycles.

Adjustment of 10 Kilocycle Audio Cut-Off Filter

The adjustment of this filter is correctly made at the factory and no additional adjustment is required.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1 shows the terminal layout of the sockets with the proper terminal numbers.

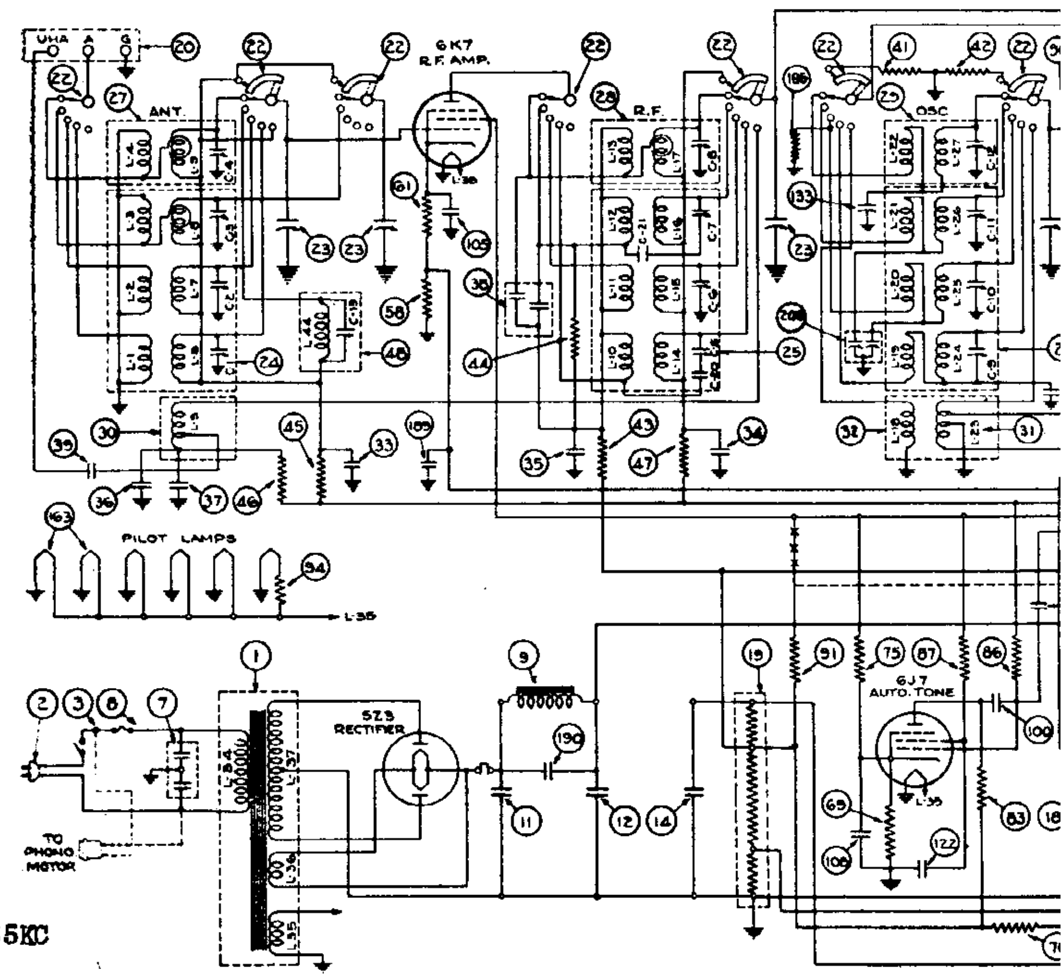
Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: O-2.5, O-10, O-100, O-250, O-500, O-1000 volts except when an asterisk appears after any given voltage value in which case the 1000 volt scale was used.

Tube	*Circuit*	*Cap*	*Terminals of Sockets*								*Heater Voltages Between Heater Terminals*	
			1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6K7	R. F. Amp.	0	0	0	+210	+ 95	+6.5	—	*6.3*	+6.5	2-7	*6.3*
6A8	Modulator	0	0	0	+210	+ 95	— 35	+ 95	*6.3*	+5.5	2-7	*6.3*
6J7	Oscillator	— 65	0	0	+200	+125	0	—	*6.3*	0	2-7	*6.3*
6K7	1st I. F. Amp.	0	0	0	+210	+ 95	+ 7	+ 4	*6.3*	+ 7	2-7	*6.3*
6K7	2nd I. F. Amp.	0	0	0	+210	+ 95	+ 6	+2.5	*6.3*	+ 6	2-7	*6.3*
6H6	Demodulator	—	0	0	— .3	0	— .3	+ 4	*6.3*	0	2-7	*6.3*
6H6	A. V. C.	—	0	0	0	+ 6	0	0	*6.3*	+ 6	2-7	*6.3*
6K7	Audio Amp.	0	0	0	+135*	+ .2	+ .7	—	*6.3*	+ .7	2-7	*6.3*
6L6's	Audio Output	—	0	0	+360	+235	0	—	*6.3*	+ 15	2-7	*6.3*
6E5	Tuning Ind.	—	*6.3*	+.6	+6.6	+215	+ 6	*0*	—	—	1-6	*6.3*
5Z3	Rectifier	—	+380	*390*	*390*	+380	—	—	—	—	1-4	*4.8*
Speaker		—	+365	0	0	+375	+375	—	+235	—		

Voltage across vernier dial pilot lamp—5.3 volts
Receiver tuned to 1000 Kc., no signal. A. C. voltages are indicated by italics.

IMPORTANT—The knob marked "Stations" comes in two parts; the large knurled portion which is used for rapid tuning, and a small knob which is used for the vernier adjustment of the tuning system. The large knob marked "Stations" should be placed on the large portion of the tuning shaft so that when the "set" screw of this knob is tightened it will rest on the flat portion of the shaft. Also, do not place this large portion of the knob too tightly against the felt washer and cabinet; place it on the shaft so that there is some degree of freedom between the knob and felt washer and the cabinet. The small (or vernier) portion of this knob should then be pushed on the shaft in the same manner as the other four control knobs. Care should again be taken that this small knob is not forced too tightly against the large tuning knob, as this will cause improper action of the tuning mechanism.

Replacing Fuses If at any time the radio receiver **fails to operate** (dial lamps fail to light when the "Off-On" switch is turned to the "On" position), first, make sure that the power supply cord has not been removed from the power outlet. Then, if the plug has not been removed, the fuse located in the chassis should be examined. The chassis fuse is located in the inside, rear portion of the base. It is readily accessible by simply removing the rectangular metal cover located on the outside rear of the base. **Caution: Before removing the "fuse cover" make sure that the "Power Supply Plug" is disconnected from the house current supply.** In replacing this fuse see that a fuse of the correct amperage rating is used. The No. 150 Receivers use the Stromberg-Carlson, Pc. 23234 fuse, having a rating of 2½ amperes.

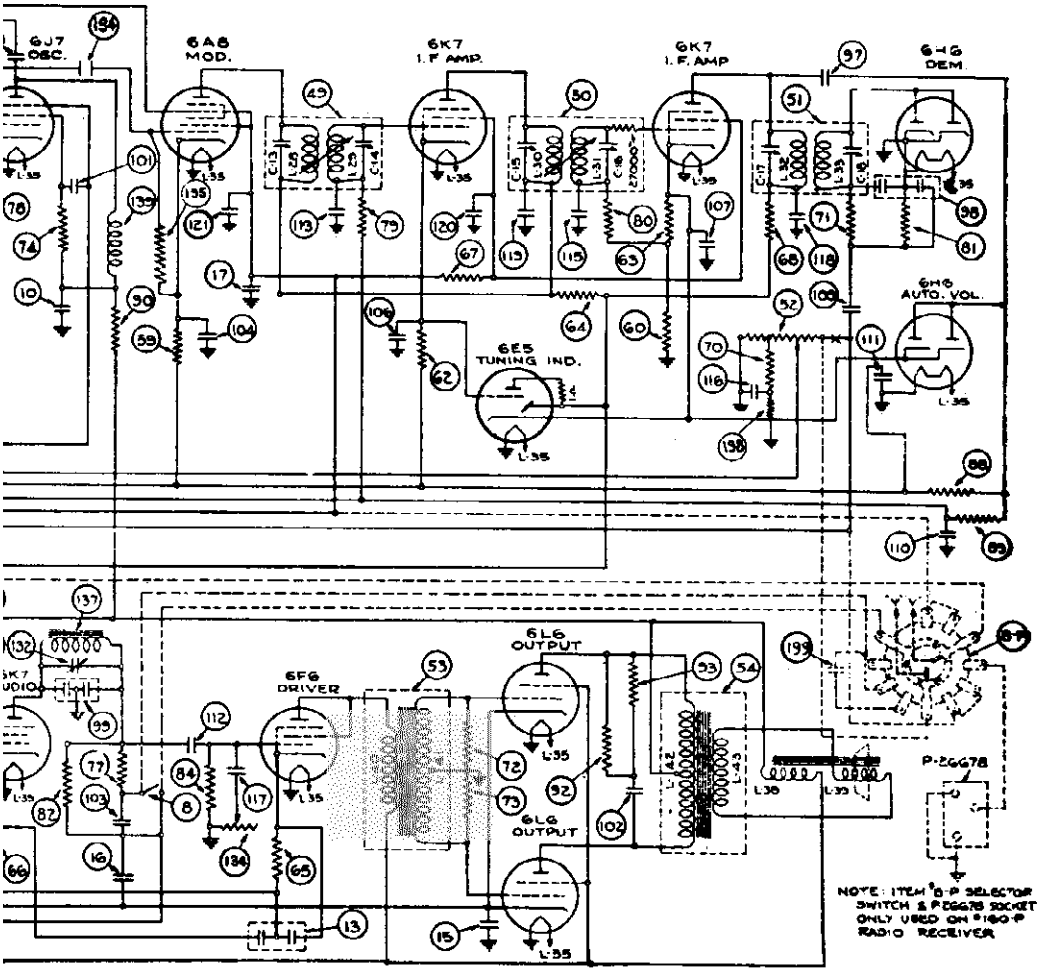


IF PEAK 465KC

Item Number	Piece Number	Part
1	26687	Power Transformer (50 to 60 Cycles Chassis)
1	26688	Power Transformer (25 to 60 Cycles Chassis)
2	24268	Cord (Power Supply)
3	23234	Fuse, 2½ Amperes
7	21535	Capacitor Assembly (2—.01 Mf. Capacitors)
8	26061	Switch ("Off-On" and Bass Control)
9	26704	Choke Assembly (Filter of Rectifier)
10	25788	Electrolytic Capacitor, 1 Mf., 450 Volts
11	22757	Electrolytic Capacitor, 8Mf., 500 Volts (50 to 60 Cycles Chassis)
11	26510	Electrolytic Capacitor, 16 Mf., 500 Volts (25 to 60 Cycles Chassis)
12	22757	Electrolytic Capacitor, 8 Mf., 500 Volts (50 to 60 Cycles Chassis)
12	26510	Electrolytic Capacitor, 16 Mf., 500 Volts (25 to 60 Cycles Chassis)
13	25498	Electrolytic Capacitor, (2—10 Mf.) 25 Volts
14	26773	Electrolytic Capacitor, 16 Mf., 350 Volts
15	26772	Electrolytic Capacitor, 12 Mf., 35 Volts
16	24580	Electrolytic Capacitor, 4 Mf., 450 Volts
17	26693	Electrolyt'c Capacitor, 4 Mf., 350 Volts
18	26693	Electrolytic Capacitor, 4 Mf., 350 Volts
19	26737	Resistor, "B" Voltage Divider
22	26746	Range Switch Assembly
23	26444	Gang Tuning Capacitor Assembly
24	26446	Coil Assembly, Antenna ("A", "B" and "C" Ranges)
25	26447	Coil Assembly, R. F. ("A", "B" and "C" Ranges)
26	26448	Coil Assembly, Oscillator ("A", "B" and "C" Ranges)
27	26507	Coil Assembly, Antenna ("X" Range)
28	26508	Coil Assembly, R. F. ("X" Range)
29	26509	Coil Assembly, Oscillator ("X" Range)
30	26758	Coil Assembly, Antenna ("D" Range)
31	26765	Oscillator Secondary Coil ("D" Range)
32	26787	Oscillator Primary Coil ("D" Range)
33	24405	Capacitor Assembly, .04 Mf.
34	24405	Capacitor Assembly, .04 Mf.
35	24994	Capacitor Assembly, .05 Mf.
36	24637	Capacitor, Type "W", .0017 Mf.
37	24637	Capacitor, Type "W", .0017 Mf.
38	26518	Capacitor (2—200 Mmf.)
39	24559	Capacitor, Type "O", 100 Mmf.
40	26944	Capacitor, Type "W", .004 Mf.
41	26321	Resistor, Type "E", 100 Ohms
42	26321	Resistor, Type "E", 100 Ohms
43	26333	Resistor, Type "E", 1000 Ohms
44	26353	Resistor, Type "E", 47,000 Ohms
45	26357	Resistor, Type 'E", .1 Megohm
46	26357	Resistor, Type "E", .1 Megohm
47	26357	Resistor, Type "E", .1 Megohm
48	26474	Coil Assembly (Bi-Resonator)
49	26451	1st I. F. Transformer
50	26452	2nd I. F. Transformer
51	26243	3rd I. F. Transformer
52	26077	Potentiometer (Volume Control)
53	26706	Transformer Assembly, Audio Input
54	26708	Transformer Assembly, Audio Output
55	22968	Socket, 4 Prong
56	23517	Socket, 5 Prong
57	25539	Socket, 8 Prong
58	26324	Resistor, Type "E", 180 Ohms
59	26326	Resistor, Type "E", 270 Ohms
60	26328	Resistor, Type "E", 390 Ohms
61	26328	Resistor, Type "E", 390 Ohms
62	26330	Resistor, Type "E", 560 Ohms
63	26330	Resistor, Type "E", 560 Ohms
64	26330	Resistor, Type "E", 560 Ohms
65	26333	Resistor, Type "E", 1000 Ohms
66	26338	Resistor, Type "E", 2700 Ohms
67	26333	Resistor, Type "E", 1000 Ohms
68	26333	Resistor, Type "E", 1000 Ohms
69	26331	Resistor, Type "E", 680 Ohms
70	26341	Resistor, Type "E", 4700 Ohms
71	26345	Resistor, Type "E", 10,000 Ohms
72	26345	Resistor, Type "E", 10,000 Ohms
73	26345	Resistor, Type "E", 10,000 Ohms
74	26349	Resistor, Type "E", 22,000 Ohms
75	26350	Resistor, Type "E", 27,000 Ohms
76	26353	Resistor, Type "E", 47,000 Ohms
77	26356	Resistor, Type "E", 82,000 Ohms
78	26353	Resistor, Type "E", 47,000 Ohms
79	26357	Resistor, Type "E", .1 Megohm
80	26357	Resistor, Type "E", .1 Megohm
81	26357	Resistor, Type "E", .1 Megohm
82	26362	Resistor, Type "E", .27 Megohm
83	26365	Resistor, Type "E", .47 Megohm
84	26365	Resistor, Type "E", .47 Megohm
85	26369	Resistor, Type "E", 1 Megohm
86	26369	Resistor, Type "E", 1 Megohm
87	26369	Resistor, Type "E", 1 Megohm
88	26369	Resistor, Type "E", 1 Megohm

MODELS 160L, 160LB
160P, 160PB
Schematic, Parts

)N TEL. MFG. CO.



89	26369	Resistor, Type "E", 1 Megohm
90	26776	Resistor, Type "F", 12,000 Ohms
91	25526	Resistor, Type "F", 15,000 Ohms
92	26775	Resistor, Type "F", 20,000 Ohms
93	26775	Resistor, Type "F", 20,000 Ohms
94	26780	Resistor, Flexible, 3.5 Ohms (Pilot Lamp)
95	25487	Capacitor, Type "W", .001 Mf.
96	24560	Capacitor, Type "O", 50 Mmf.
97	24560	Capacitor, Type "O", 50 Mmf.
98	26512	Capacitor, Type "W", 2—100 Mmf.
99	26512	Capacitor, Type "W", 2—100 Mmf.
100	24559	Capacitor, Type "O", 100 Mmf.
101	25585	Capacitor, Type 3L, .008 Mf.
102	26932	Capacitor Assembly, .008 Mf.
103	24461	Capacitor, Type "J", .004 Mf.
104	24402	Capacitor Assembly, .1 Mf.
105	24402	Capacitor Assembly, .1 Mf.
106	24402	Capacitor Assembly, .1 Mf.
107	24402	Capacitor Assembly, .1 Mf.
108	24402	Capacitor Assembly, .1 Mf.
109	24405	Capacitor Assembly, .04 Mf.
110	24405	Capacitor Assembly, .04 Mf.
111	24405	Capacitor Assembly, .04 Mf.
112	24405	Capacitor Assembly, .04 Mf.
113	24405	Capacitor Assembly, .04 Mf.
114	24405	Capacitor Assembly, .04 Mf.
115	24405	Capacitor Assembly, .04 Mf.
116	25149	Capacitor Assembly, .01 Mf.
117	25149	Capacitor Assembly, .01 Mf.
118	24994	Capacitor Assembly, .05 Mf.
119	24994	Capacitor Assembly, .05 Mf.
120	24994	Capacitor Assembly, .05 Mf.
121	24994	Capacitor Assembly, .05 Mf.
122	24994	Capacitor Assembly, .05 Mf.
132	26568	Adjustable Capacitor (High Frequency Cut-Off Filter)
133	26569	Capacitor (Oscillator Series Aligner, "X" Range)
134	26485	Potentiometer and Bracket Assembly (Tone Control and High Fidelity)
137	26515	Coil Assembly (High Frequency Cut-Off Filter)
138	26497	Cable Assembly, Tri-Focal Indicator
139	25814	Choke Assembly, 5 Millihenrys
140	26519	Drive Disc Assembly
141	26570	Dial Bracket Assembly
142	26534	Bar Assembly (Pulley)
143	26211	Pulley
144	26518	Gear Assembly
145	26220	Drive Shaft Assembly
146	26520	Dial Assembly (Vernier)
147	26694	Dial Assembly (Main)
148	26672	Drive Cord Assembly (Volume Indicator Disc)
149	26673	Drive Cord Assembly (Fidelity Indicator Disc)
150	26683	Cord Assembly (Dial Elevator)
151	26226	Spring
152	26555	Volume Indicator Disc Assembly
153	26698	Fidelity Indicator Disc Assembly
154	26572	Bracket Assembly
155	26682	Reel Assembly (Range Switch)
156	26667	Reel Assembly (Tone-Fidelity Control)
157	26666	Reel Assembly (Volume Control)
160	26580	Front Dial Plate Assembly
161	26147	Lamp Socket
162	26257	Lamp Shades
163	26287	Pilot Lamp
166	26692	Lamp Socket Assembly
180	24207	Electrolytic Capacitor, 12 Mf., 25 Volts
194	24560	Capacitor, Type "O", 50 Mmf.
195	26357	Resistor, Type "E", .1 Megohm
196	26341	Resistor, Type "E", 4700 Ohms
198	26345	Resistor, Type "E", 10,000 Ohms
199	27020	Capacitor Assembly, .015 Mf.
200	26564	Capacitor Assembly, Series Aligners ("A" and "B" Ranges)

MISCELLANEOUS PARTS

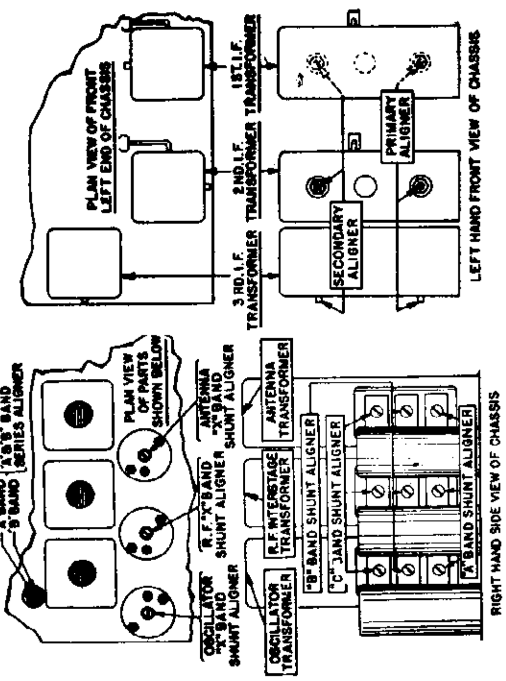
Piece Number	Part
26350	Cone Assembly (For P-26170 Speaker)
26043	Plug (For Loud Speaker Cable)
26369	Resistor, Type "E", 1 Megohm (Used at Socket of No. 6E5 Tube)
26298	Knob (For "Volume" Control)
26299	Knob (For "Tone Fidelity" Control)
26305	Knob (For "Stations" Selector Control Shaft)
26306	Knob (For "Vernier" Stations Selector Control Shaft)
26301	Knob (For "Range" Switch)
26300	Knob (For "Off-On-Bass" Control)
26391	Knob (For "Off-On-Bass-Phono" Control. Used only on No. 160-P Receivers)

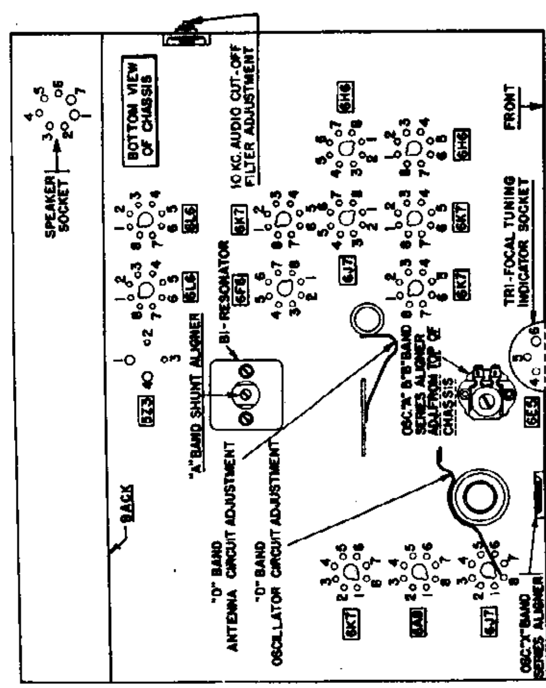
Chassis

STROMBERG-CARLSON TEL. MFG. CO.

No. 160-L ....50 to 60 Cycles; P-26637 Chassis Assembly; P-26170 Loud Speaker
No. 160-LB...........................25 to 60 Cycles; P-26638 Chassis Assembly; P-26170 Loud Speaker
No. 160-P ...60 Cycles Only; P-26639 Chassis Assembly; P-26170 Loud Speaker; P-26728 Phonograph Unit
No. 160-PB .25 Cycles Only; P-26640 Chassis Assembly; P-26170 Loud Speaker; P-26729 Phonograph Unit

For Alignment, see Index





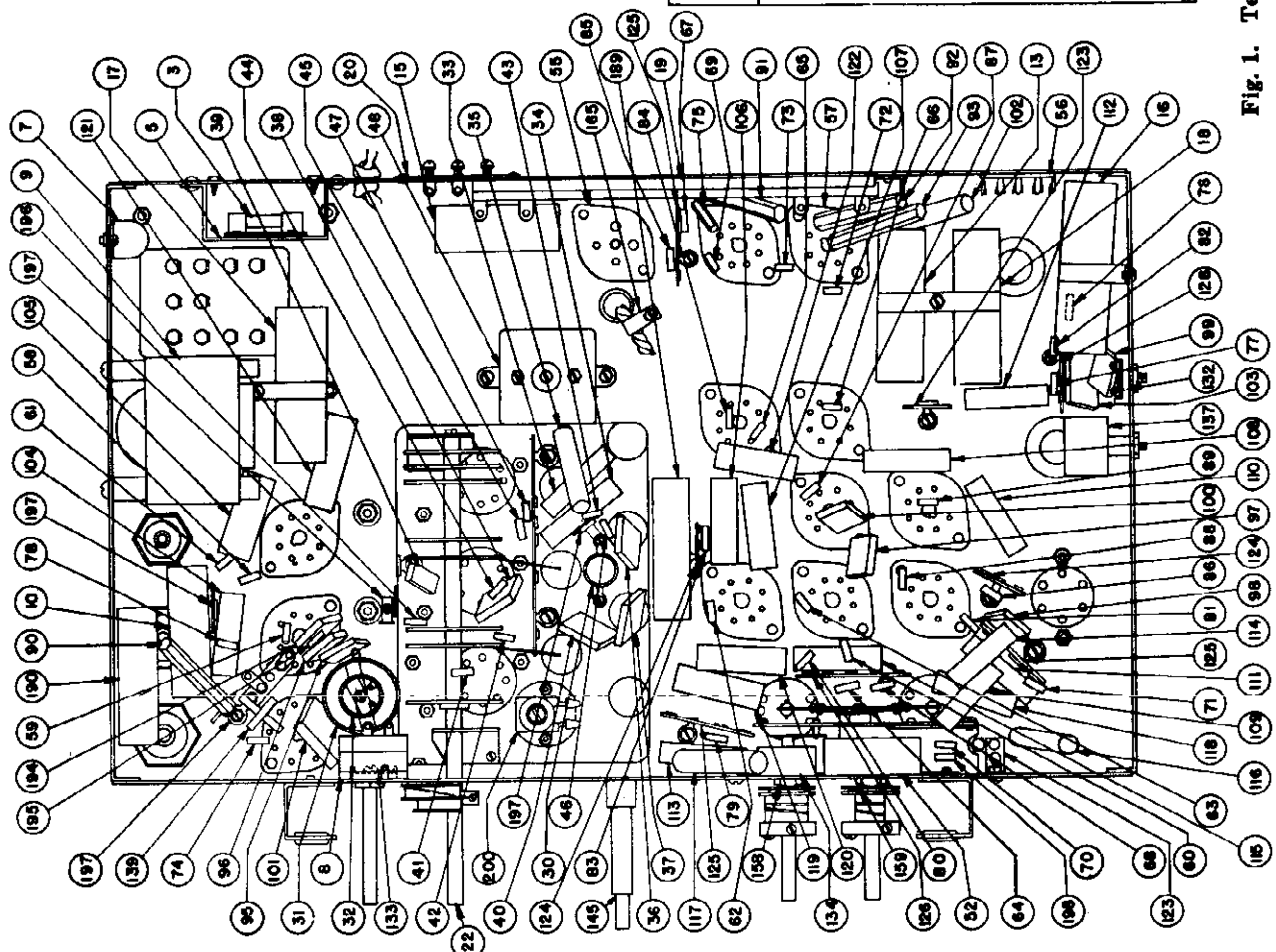
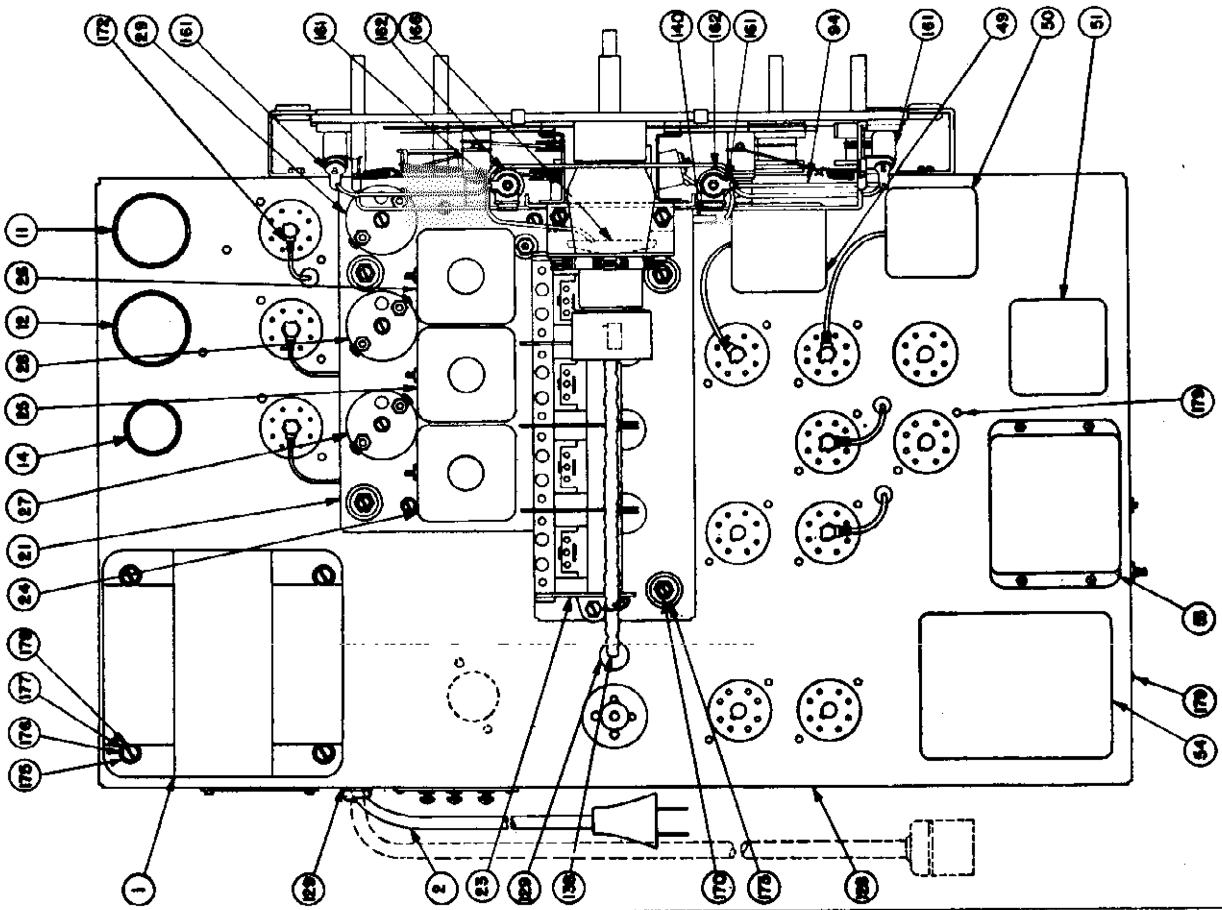


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

MODELS 160L, 160LB
160P, 160PB STROMBERG-CARLSON TEL. MFG. CO.
Voltage, Chassis

TUBE	CIRCUIT	CAP	TERMINALS OF SOCKETS 1	2	3	4	5	6	7	8	Heater Voltages Between Heater Terminals: Socket Terminal Numbers	Volts
6K7	R. F. Amp.	0	0	0	+230	+82	+5.2	—	*6.2*	+5.2	2-7	*6.2*
6A8	Modulator	0	0	0	+230	+82	—40	+80	*6.2*	0	2-7	*6.2*
6J7	Oscillator	—75	0	0	+225	+125	0	0	*6.2*	0	2-7	*6.2*
6K7	1st I. F. Amp.	0	0	0	+230	+76	+5.3	+3	*6.2*	+5.3	2-7	*6.2*
6K7	2nd I. F. Amp.	0	0	0	+230	+76	+5.2	+2.2	*6.2*	+5.2	2-7	*6.2*
6H6	Demodulator	—	0	0	—.25	0	—.25	+3	*6.2*	0	2-7	*6.2*
6H6	A. V. C.	—	0	0	0	+5	0	0	*6.2*	+5	2-7	*6.2*
6J7	Auto. Tone Cont.	0	0	0	+40*	+20	+2.3	0	*6.2*	+2.3	2-7	*6.2*
6K7	1st Audio Amp.	0	0	0	+170*	+15*	+0.6	+78	*6.2*	+0.6	2-7	*6.2*
6F6	2nd Audio Amp.	—	0	0	+235	+235	0	—	*6.2*	+19	2-7	*6.2*
6L6's	Audio Output	—	0	0	+400	+250	0	0	*6.2*	+20	2-7	*6.2*
6E5	Tuning Ind.	—	*6.2*	+10*	+5	+230	+4.8	0			1-6	*6.2*
5Z3	Rectifier	—	+410	*400*	*400*	+410					1-4	*4.8*

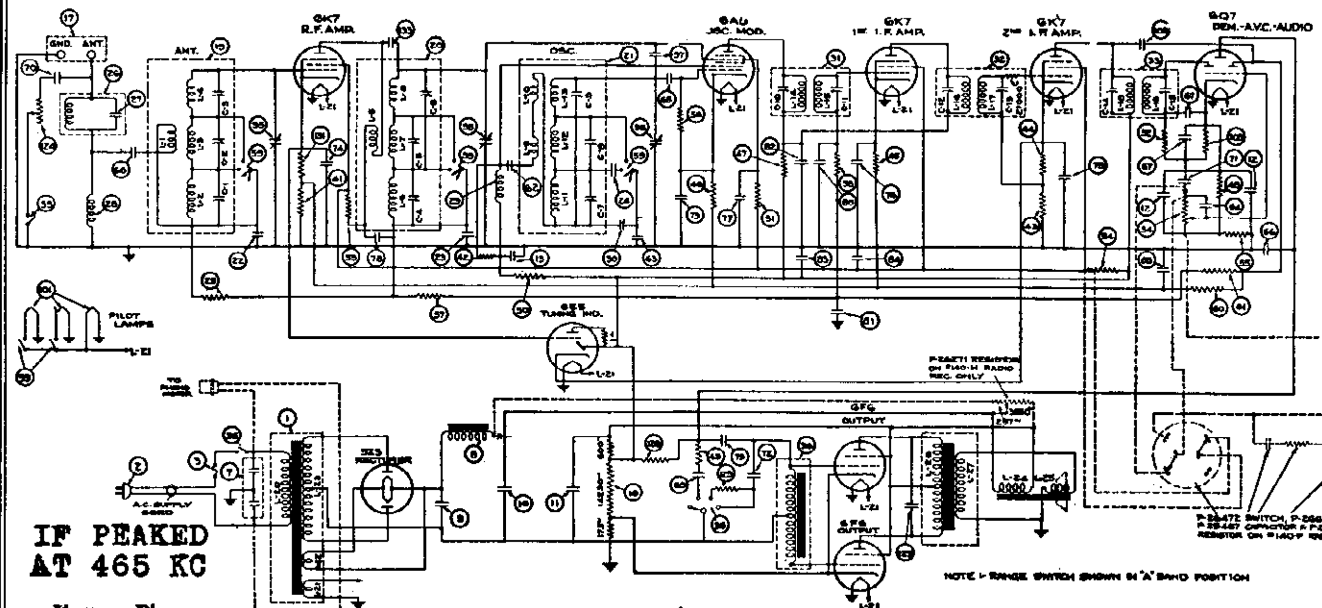
Voltage across vernier dial pilot lamp *5.3* volts. Receiver tuned to 1000 Kc., no signal.
A. C. voltages are indicated by italics.



140LB, 140P, 140PB
Schematic, Parts

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 140H, 140HB
140K, 140L, 140KB



IF PEAKED AT 465 KC

Item Number	Piece Number	Part
1	25434	Power Transformer (50 to 60 Cycles Chassis)
1	25435	Power Transformer (25 to 60 Cycles Chassis)
2	24268	Cord (A. C. Power Supply)
3	23150	Fuse (2 Amperes)
7	21535	Capacitor Assembly (2—.01 Capacitors)
8	26260	Choke Assembly (Rectifier Filter)
9	22757	Electrolytic Capacitor (50 to 60 Cycles Chassis)
9	26510	Electrolytic Capacitor (25 to 60 Cycles Chassis)
10	22759	Electrolytic Capacitor (50 to 60 Cycles Chassis)
10	26511	Electrolytic Capacitor (25 to 60 Cycles Chassis)
11	25458	Electrolytic Capacitor, 16 Mf.
12	26048	Electrolytic Capacitor, Dual, 10 Mf.
13	25788	Electrolytic Capacitor, 1 Mf.
14	26059	Bracket (Chassis Spacer)
16	25437	Resistor, "B" Voltage Divider
19	25510	Coil Assembly, Antenna
20	25511	Coil Assembly, R. F.
21	25512	Coil Assembly, Oscillator
22	25488	Capacitor, .002 Mf.
23	25527	Capacitor, .0027 Mf.
24	25490	Capacitor, .0038 Mf.
25	26383	Resistor, Type "EI", .1 Megohm
26	25513	Coil Assembly, Wave Trap
27	25488	Capacitor, .002 Mf.
28	25814	Coil Assembly, R. F. Choke Coil
29	25814	Coil Assembly, R. F. Choke Coil
30	26047	Oscillator Series Aligning Capacitor
31	26266	1st I. F. Transformer Assembly
32	26269	2nd I. F. Transformer Assembly
33	26270	3rd I. F. Transformer Assembly
34	26114	Potentiometer (Volume Control)
35	26404	Switch ("Off-On" and Tone Control)
36	26272	Transformer Assembly, Audio
37	26274	Transformer Assembly, Output
38	22988	Socket, 4 Prong
39	23517	Socket, 7 Prong
40	25539	Socket, 8 Prong
41	26324	Resistor, Type "E", 180 Ohms
42	26350	Resistor, Type "E", 27,000 Ohms
43	26328	Resistor, Type "E", 390 Ohms
44	26329	Resistor, Type "E", 470 Ohms
45	26329	Resistor, Type "E", 470 Ohms
46	26330	Resistor, Type "E", 560 Ohms
47	26330	Resistor, Type "E", 560 Ohms
48	26340	Resistor, Type "E", 3,900 Ohms
49	26350	Resistor, Type "E", 27,000 Ohms
50	26350	Resistor, Type "E", 27,000 Ohms
51	26345	Resistor, Type "E", 10,000 Ohms
52	26345	Resistor, Type "E", 10,000 Ohms
53	26345	Resistor, Type "E", 10,000 Ohms
54	25526	Resistor, Type "E", 15,000 Ohms
55	26353	Resistor, Type "E", 47,000 Ohms
56	26353	Resistor, Type "E", 47,000 Ohms
57	26357	Resistor, Type "E", .1 Megohm
58	26357	Resistor, Type "E", .1 Megohm
59	26264	Range Switch
60	26369	Resistor, Type "E", 1 Megohm
61	26369	Resistor, Type "E", 1 Megohm
62	25487	Capacitor, .001 Mf.
63	25489	Capacitor, .00125 Mf.
64	24166	Capacitor, 25 Mmf.
65	24559	Capacitor, 100 Mmf.
66	24559	Capacitor, 100 Mmf.
67	26512	Capacitor, 2—100 Mmf.
68	25150	Capacitor Assembly, .02 Mf.
69	25149	Capacitor Assembly, .01 Mf.
70	25149	Capacitor Assembly, .01 Mf.
71	25150	Capacitor Assembly, .02 Mf.
72	25150	Capacitor Assembly, .02 Mf.
73	25150	Capacitor Assembly, .02 Mf.
74	25150	Capacitor Assembly, .02 Mf.
75	25483	Capacitor Assembly, .1 Mf.
76	25483	Capacitor Assembly, .1 Mf.
77	25483	Capacitor Assembly, .1 Mf.
78	25481	Capacitor Assembly, .002 Mf.
79	24405	Capacitor Assembly, .04 Mf.
80	24405	Capacitor Assembly, .04 Mf.
81	24405	Capacitor Assembly, .04 Mf.
82	24994	Capacitor Assembly, .05 Mf.
83	24994	Capacitor Assembly, .05 Mf.
84	24994	Capacitor Assembly, .05 Mf.
85	24994	Capacitor Assembly, .05 Mf.
95	26276	Gang Tuning Capacitor
97	26417	Capacitor Assembly (Gimmick)
101	26287	Pilot Lamp
108	24560	Capacitor, 50 Mmf.
109	26362	Resistor, Type "E", 270,000 Ohms
124	26095	Potentiometer (Sensitivity Control)
126	26499	Knob (For Sensitivity Control)
127	24461	Capacitor, .004 Mf.
128	26357	Resistor, Type "E", .1 Megohm
129	26341	Resistor, Type "E", 4700 Ohms
131	26329	Resistor, Type "E", 470 Ohms

MISCELLANEOUS PARTS

Piece Number	Part
26250	Cone Assembly (For P-26170 Speaker)
25492	Cone Assembly (For P-26171 Speaker)
26043	Plug (For Loud Speaker Cable)
26369	Resistor, Type "E", 1 Megohm (Used at Socket of No. 6E5 Tube)

MODELS 140H,140HB
140K,140KB,140L
140LB,140P,140PB

STROMBERG-CARLSON TEL. MFG. CO.

Voltage,Alignment
Trimmers

			Terminals of Sockets								*Heater Voltages Between Heater Terminals*	
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6K7	R. F. Amp.	0	0	0	+ 52	+ 93	+ 6	—	*6.3*	+ 6	2-7	*6.3*
6A8	Mod.-Osc.	0	0	0	+242	+ 69	—0.7	+150	*6.3*	+6.9	2-7	*6.3*
6K7	1st I. F. Amp.	0	0	0	+242	+ 90	+6.2	+3.5	*6.3*	+6.2	2-7	*6.3*
6K7	2nd I. F. Amp.	0	0	0	+242	+ 90	+5.6	+2.6	*6.3*	+5.6	2-7	*6.3*
6Q7	Dem.—A. V. C.—Audio Amp.	0	0	0	+148	0	+20*	+3.5	*6.3*	+ 23	2-7	*6.3*
6F6	Audio Output		0	0	+258	+265	0	—	*6.3*	+ 17	2-7	*6.3*
5Z3	Rectifier		+445	*400*	*400*	+445	—	—	—	—	1-4	*4.8*
6E5	Tuning Indicator		*6.3*	+0.6	+ 6	+240	+5.6	0	—	—	1-6	*6.3*
Speaker Socket			+262	0	0	+445	+445	—	+425			

Receiver tuned to 1000 Kc., no signal. A. C. voltages are indicated by italics.

Intermediate Frequency Amplifier Adjustments

The intermediate frequency used in these receivers is **465 kilocycles.** In making these I. F. circuit adjustments always align in the following order:

1. Secondary of 3rd I. F. Transformer (Capacitor C-15).
2. Primary of 3rd I. F. Transformer (Capacitor C-14).
3. Secondary of 2nd I. F. Transformer (Capacitor C-13).
4. Primary of 2nd I. F. Transformer (Capacitor C-12).
5. Secondary of 1st I. F. Transformer (Capacitor C-11).
6. Primary of 1st I. F. Transformer (Capacitor C-10).

Radio Frequency Adjustments

The adjustments of the aligning capacitors used in the radio frequency circuits in this receiver should be very carefully made in the following order and at the frequencies specified below:

1. Oscillator's "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-9).
2. R. F. Interstage "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-6).
3. Antenna "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-3).
4. Oscillator's "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-8).
5. R. F. Interstage "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-5).
6. Antenna "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-2).
7. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-7).
8. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
9. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).
10. Oscillator's "A" Band Series Aligner at 0.6 Megacycles (Capacitor (30)).
11. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-7).
12. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
13. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).

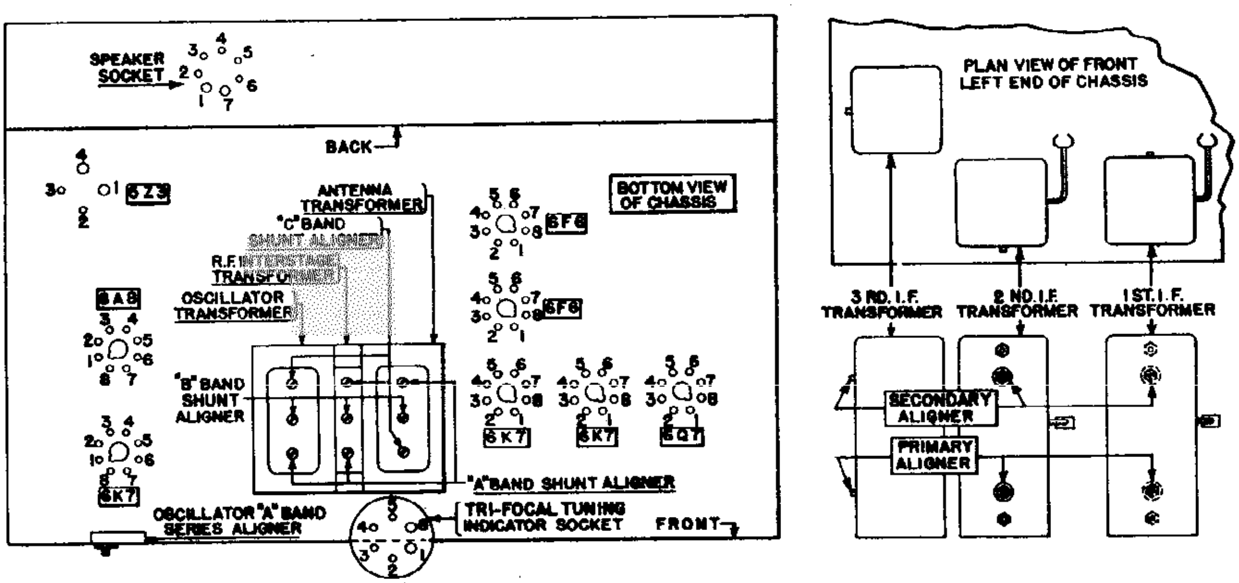


Fig. 2. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

Socket, Trimmers
Chassis, Notes

STROMBERG-CARLSON TEL. MFG. CO.

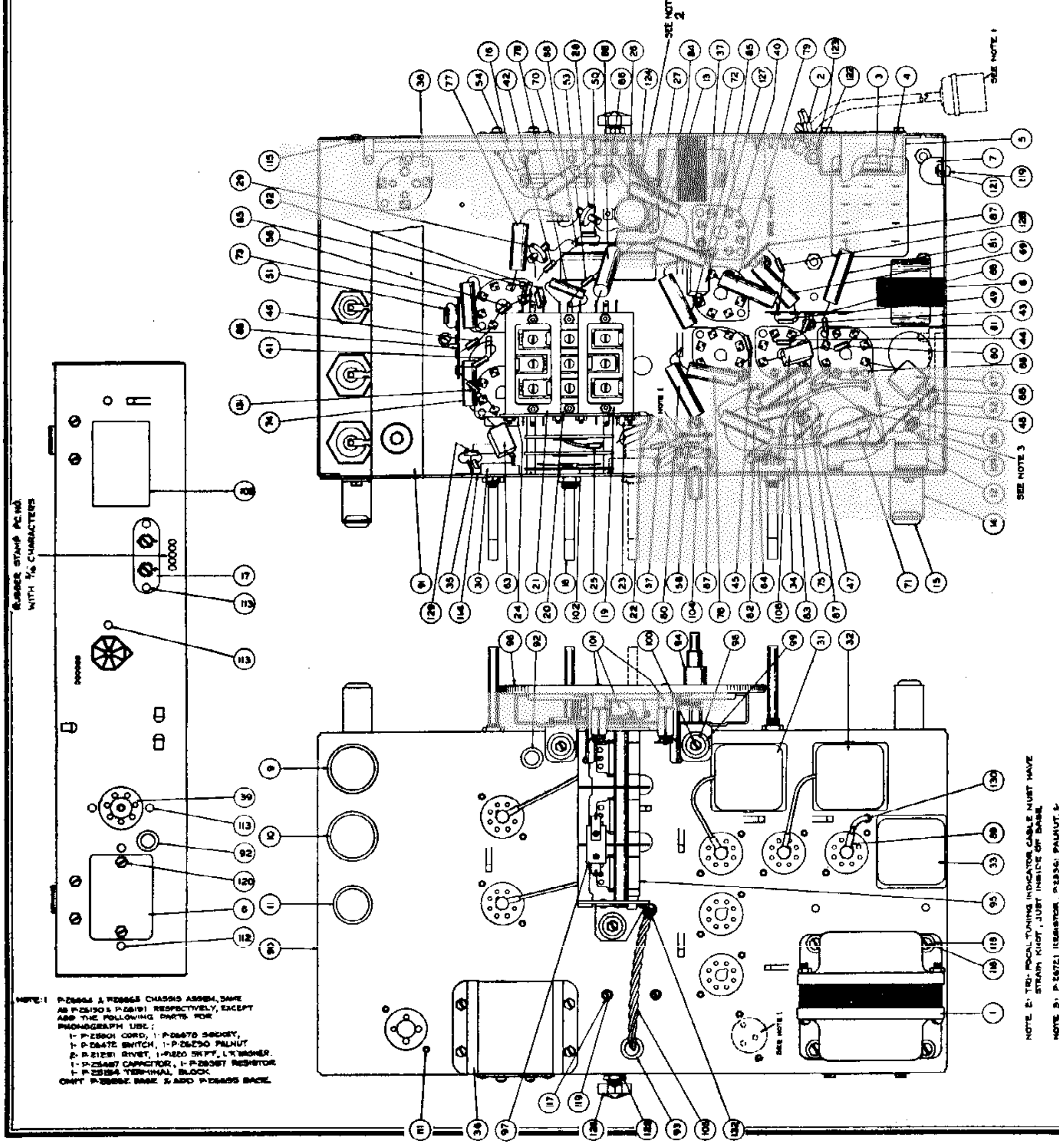
MODELS 140H, 140HB, 140K, 140KB, 140L, 140LB, 140P, 140PB

The No. 140-H Receiver is furnished with a highly efficient Stromberg-Carlson dynamic speaker and the exclusive "Patent Applied For" Stromberg-Carlson "Tri-Focal Tuning System."

The Nos. 140-K, 140-L, and 140-P Receivers differ from the No. 140-H Receiver in that they are of a fixed high fidelity type. In these receivers the same chassis is used as in the No. 140-H Receiver, including the "Tri-Focal Tuning System" and Selectorlite dial arrangement. In addition to these features the Nos. 140-K, 140-L, and 140-P Receivers are equipped with a Carpinchoe high fidelity dynamic speaker in place of the standard broadcast speaker which is furnished in the No. 140-H Receiver. Audio reproduction is further improved in these three models by employing sound diffusing vanes in front of the loud speaker opening, which distribute the higher pitched tones, thereby providing excellent reproduction in all parts of the room by spreading out these directional frequencies.

In the Nos. 140-L and 140-P Receivers inclusion is made of the exclusive Stromberg-Carlson Acoustical Laboratories' revolutionary new development, the Acoustical Labyrinth. This new device extends the bass response, provides reproduction only from the front of the cabinet, and eliminates all cabinet resonance.

In addition to all of the above features, the No. 140-P Receiver is equipped with a highly efficient single record playing phonograph unit which has an entirely new type of pick-up suspension device.



MODELS 180L, 180LB
Socket, Trimmers
Chassis

STROMBERG-CARLSON TEL. MFG. CO.

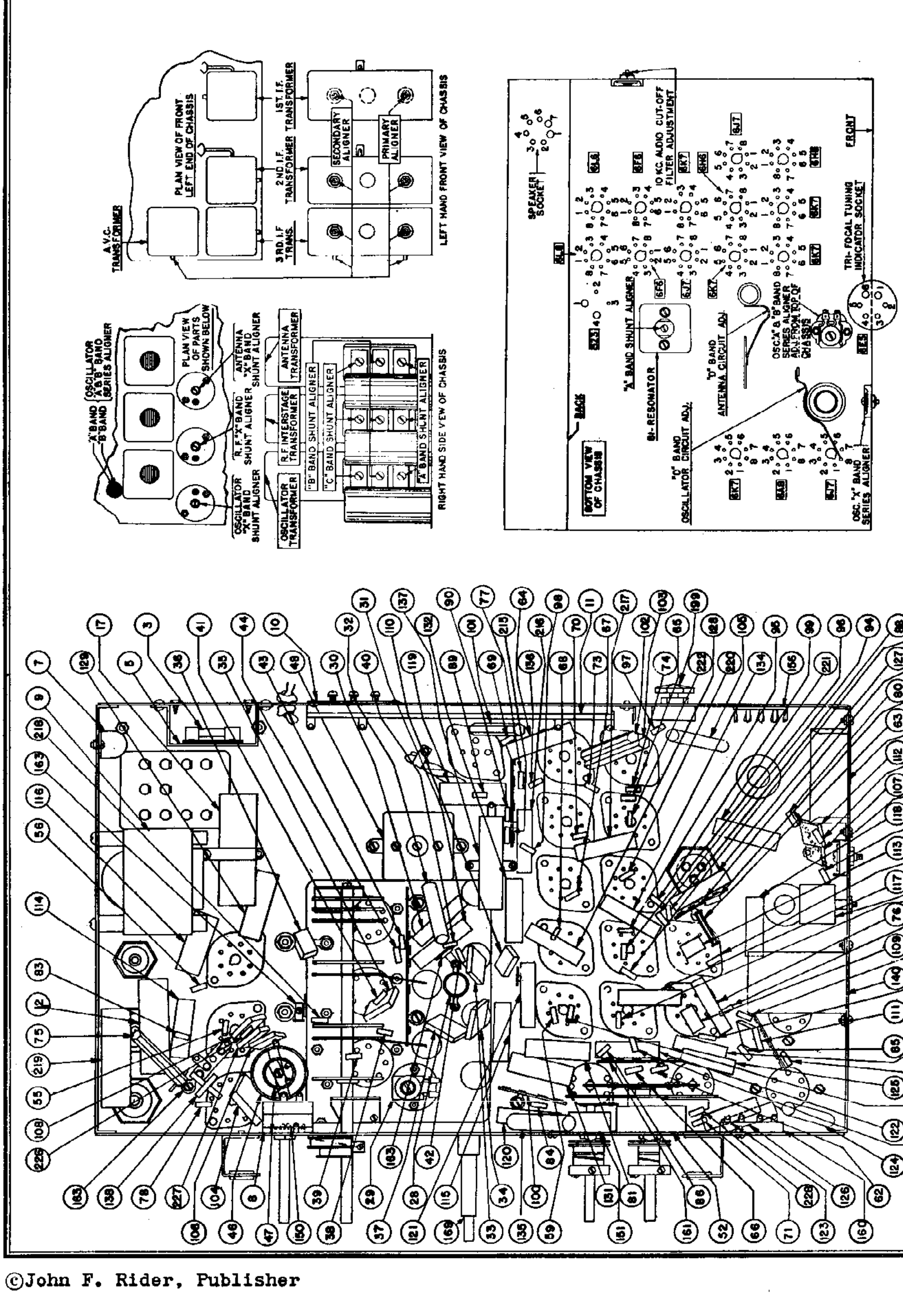
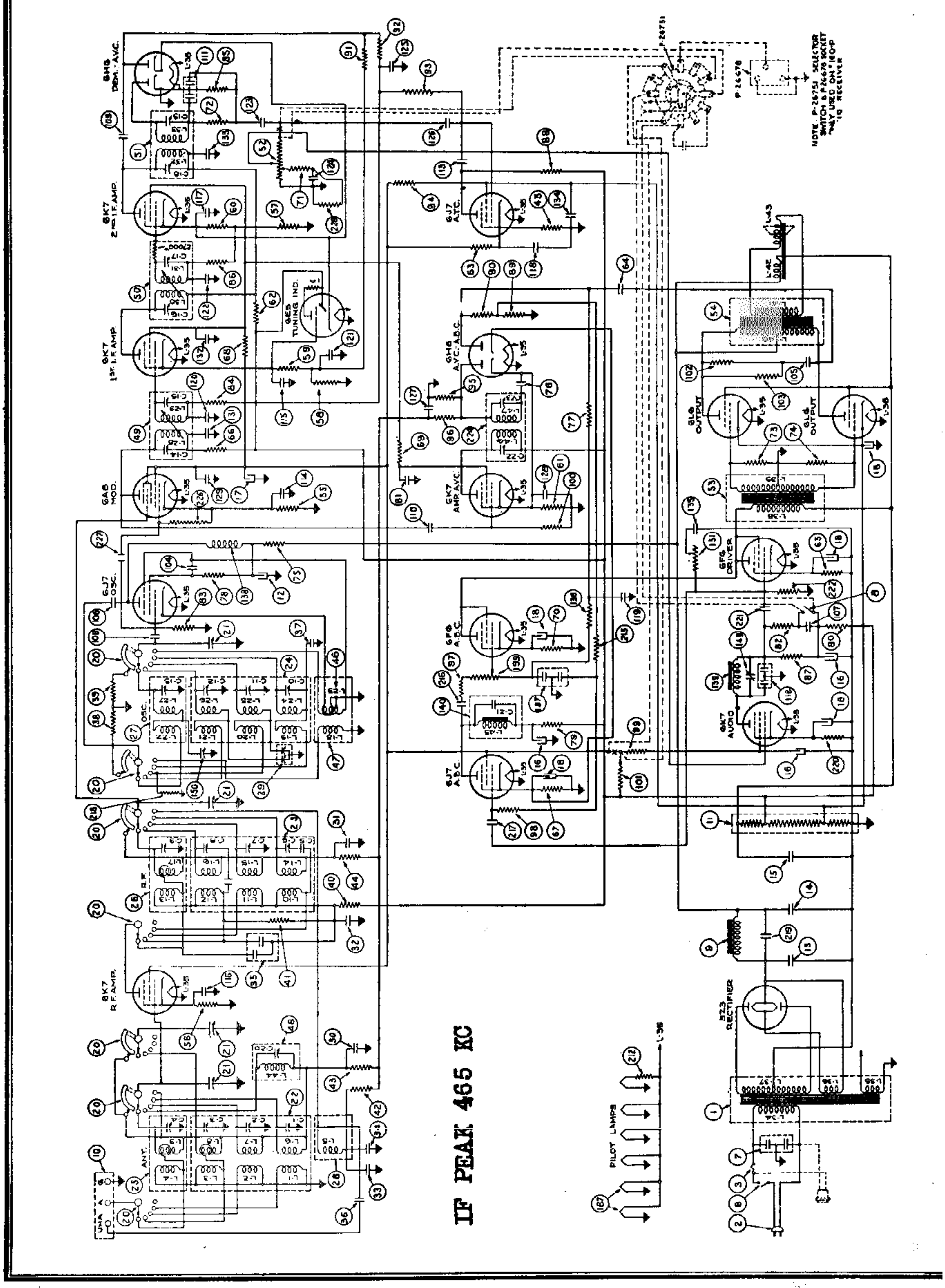


Fig. 2. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

STROMBERG-CARLSON TEL. MFG. CO. Schematic



MODELS 180L,180LB
Alignment,Voltage

STROMBERG-CARLSON TEL. MFG. CO.

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on this receiver, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, this alignment procedure should be carefully followed.

In making any alignment adjustments always adjust the signal generator's output to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal.

Figure 2 shows the location of all the aligning capacitors used in this receiver.

Intermediate Frequency Amplifier Adjustments

Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed.

Operate the range switch of the receiver to the "A" range position. Set the tuning dial at its extreme low frequency position, and operate the "Tone-Fidelity" control knob so that the receiver is adjusted for the standard fidelity position as indicated by the fidelity indicator located on the front panel of the receiver. Never attempt to align the I. F. circuits of this receiver with the "Tone-Fidelity" control set at any position other than the standard fidelity. The I. F. circuits may then be checked for alignment by adjusting the aligning capacitors in the exact order as follows:

1. Secondary of 3rd I. F. Trans. (Capacitor C-19).
2. Primary of 3rd I. F. Trans. (Capacitor C-18).
3. Secondary of 2nd I. F. Trans. (Capacitor C-17).
4. Primary of 2nd I. F. Trans. (Capacitor C-16).
5. Secondary of 1st I. F. Trans. (Capacitor C-15).
6. Primary of 1st I. F. Trans. (Capacitor C-14).

Radio Frequency Adjustments

The alignment of the radio frequency circuits for the various ranges in this receiver should be very carefully made in the order and at the frequencies specified.

It will be noted that no instructions are given for aligning the receiver at other than two frequencies for any range. Each receiver is given an exacting check for "tracking" at various frequencies in each range before leaving the factory. It is felt by the manufacturers that should any receiver through accident require a check on the "tracking", it should be returned to the factory, where this may be easily and accurately done.

ALIGNMENT OF LONG-WAVE-WEATHER RANGE (ALSO REFERRED TO AS "X" BAND) CIRCUITS

1. Oscillator's "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-13).
2. R. F. Interstage "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-9).
3. Antenna "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-4).
4. Oscillator "X" Band Series Aligning Capacitor at 150 Kilocycles (Capacitor Item 150). When operation No. 4 has been completed repeat operations 1, 2, and 3 again and in the exact order given.

ALIGNMENT OF STANDARD BROADCAST RANGE (ALSO REFERRED TO AS "A" BAND) CIRCUITS

1. Oscillator's "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-12).
2. R. F. Interstage "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-8).
3. Antenna "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-3).
4. "A" Band, R. F. Bi-resonator Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-30).
5. Oscillator "A" Band Series Aligning Capacitor at 600 Kilocycles (Capacitor with screw adjustment. Item 29). When operation No. 5 has been completed repeat operations 1, 2, 3, and 4 again and in the exact order given.

ALIGNMENT OF AMATEUR, POLICE, AND AIRCRAFT RANGE (ALSO REFERRED TO AS "B" BAND) CIRCUITS

1. Oscillator's "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-11).
2. R. F. Interstage "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-7).
3. Antenna "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-2).
4. Oscillator "B" Band Series Aligning Capacitor at 1.8 Megacycles (Capacitor with nut adjustment. Item 29). When operation No. 4 has been completed repeat operations 1, 2, and 3 again and in the exact order given.

ALIGNMENT OF SHORT-WAVE-FOREIGN RANGE (ALSO REFERRED TO AS "C" BAND) CIRCUITS

1. Oscillator's "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-10).
2. R. F. Interstage "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-6).
3. Antenna "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-1).

ALIGNMENT OF ULTRA SHORT-WAVE RANGE (ALSO REFERRED TO AS "D" BAND) CIRCUITS

1. The only adjustment which it is necessary to make for bringing the "D" Band Oscillator's circuit into alignment is accomplished by bending the ground loop (shown in Figure 2 as "D" Band Oscillator Circuit Adjustment) either closer to the coil or farther away from the coil. This adjustment should be made with the signal generator set to a frequency of 20 megacycles.
2. The only adjustment which it is necessary to make for bringing the "D" Band Antenna's Circuit into alignment is accomplished by bending the grid lead loop (shown in Figure 2 as "D" Band Antenna Circuit Adjustment) so as to form either a smaller or larger loop. This adjustment should also be made with the signal generator set to a frequency of 20 megacycles.

ALIGNMENT OF THE AMPLIFIED AUTOMATIC VOLUME CONTROL CIRCUIT

The alignment adjustments for this circuit should only be made after the circuits of the intermediate and radio frequency amplifiers have been aligned. Never align the amplified automatic volume control circuits until the intermediate and radio frequency circuits have been aligned. In making the alignment adjustment of this circuit, a strong signal, preferably obtained from a standard signal generator, should be tuned in on the receiver. The strength of this signal should be on the order of approximately 2000 microvolts. When this signal is accurately tuned in, the aligning capacitor C-23 and C-22 should be adjusted to the position where a minimum value of signal is obtained from the output of the receiver. These two adjustments should be made in the order given.

Adjustment of 10 Kilocycle Audio Cut-Off Filter

The adjustment of this filter is correctly made at the factory and no additional adjustment is required.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 2 shows the terminal layouts of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 1000 volt scale was used.

			Terminals of Sockets								Heater Voltages Between Heater Terminals	
Tube	Circuit	Cap	1	2	3	4	5	6	7	8	Socket Terminal Numbers	Volts
6K7	R. F. Amp.	0	0	0	+237	+96	+2.7	—	*6.2*	+2.7	2-7	*6.2*
6A8	Modulator	0	0	0	+242	+96	—42	+1.6	*6.2*	+1.6	2-7	*6.2*
6J7	Oscillator	—73	0	0	+212	+120	0	0	*6.2*	0	2-7	*6.2*
6K7	1st I. F. Amp.	0	0	0	+240	+90	+6.5	+4	*6.2*	+6.5	2-7	*6.2*
6K7	2nd I. F. Amp.	0	0	0	+237	+90	+5.5	+2.1	*6.2*	+5.5	2-7	*6.2*
6H6	Dem.—A. V. C.	—	0	0	0	0	0	0	*6.2*	+5.5	2-7	*6.2*
6H6	Amp. A. V. C. and Auto. Bass Control	—	0	0	0	+2.6	0	0	*6.2*	+2.8	2-7	*6.2*
6K7	Amp. A. V. C.	0	0	0	+242	+88	+2.8	+90	*6.2*	+2.8	2-7	*6.2*
6J7	Auto. Bass Control	0	0	0	+93	+93	+2.6	0	*6.2*	+2.6	2-7	*6.2*
6J7	Auto Tone Control	0	0	0	+65*	+15*	+2.3	0	*6.2*	+2.3	2-7	*6.2*
6F6	Auto Bass Control	—	0	0	+235	+235	0	—	*6.2*	+19	2-7	*6.2*
6K7	1st Audio Amp.	0	0	0	+130	+15*	+.7	—	*6.2*	+.7	2-7	*6.2*
6F6	Audio Driver	—	0	0	+232	+232	0	0	*6.2*	+22	2-7	*6.2*
6L6's	Audio Output	—	0	0	+405	+255	0	0	*6.2*	+21	2-7	*6.2*
6E5	Tuning Ind.	—	*6.2*	+.6	+6.5	+242	+5.5	0	—	—	1-6	*6.2*
5Z3	Rectifier	—	+415	*400*	*400*	+415	—	—	—	—	1-4	*4.7*
Speaker		—	+405	0	0	+415	+415	0	+255			

Voltage across vernier dial pilot lamp—*5.3 volts.*
Receiver tuned to 1000 Kc., no signal. A. C. voltages are indicated by italics.

MODELS 180L, 180LI

STROMBERG-CARLSON TEL. MFG. CO. Parts List

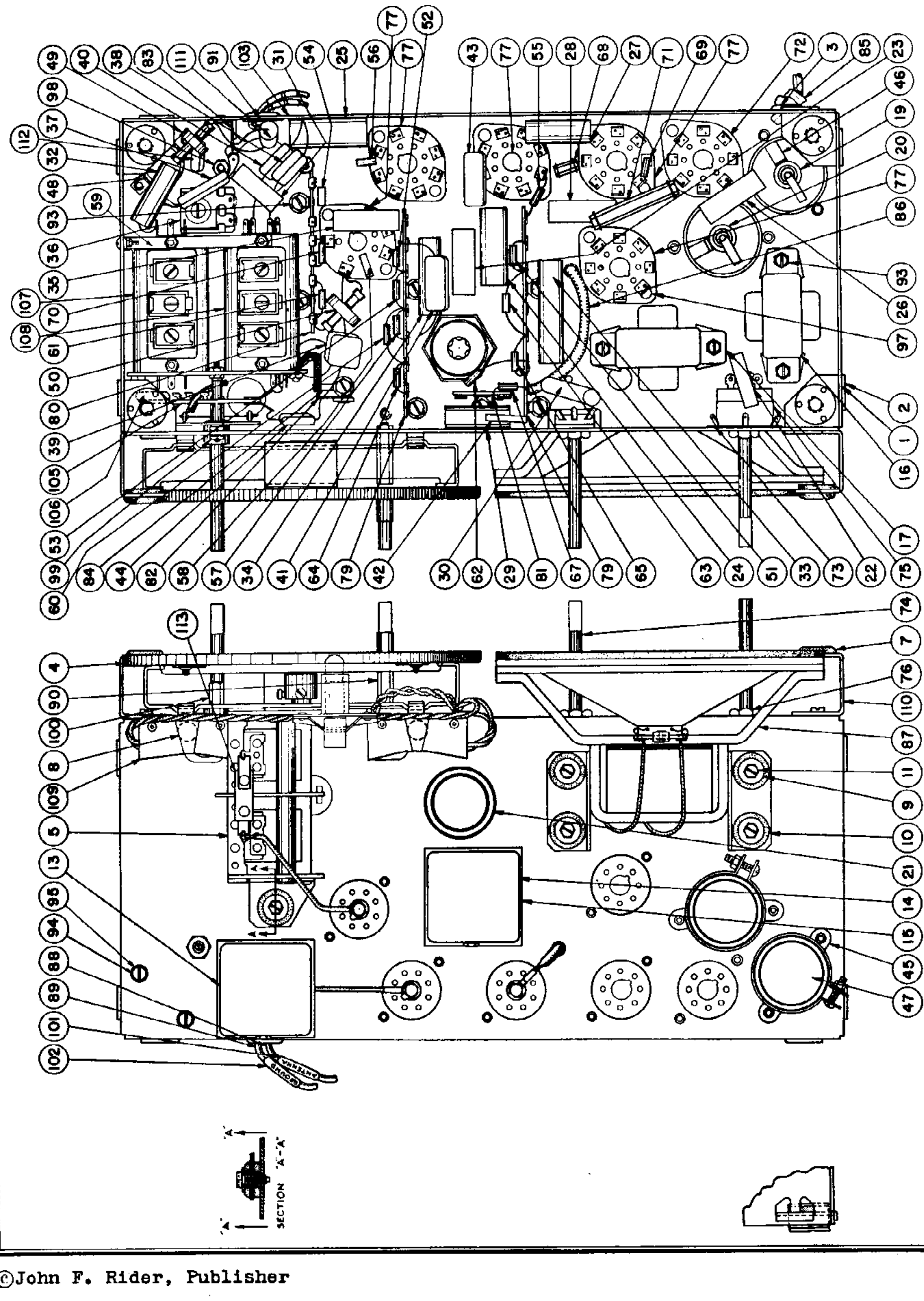
Item Number	Piece Number	Part
1	26782	Power Transformer (50 to 60 Cycles Chassis)
1	26783	Power Transformer (25 to 60 Cycles Chassis)
3	23234	Fuse, 2½ Amperes
4	21984	Fuse Block Assembly
7	21535	Capacitor Assembly (2—.01 Mf. Capacitors)
8	26061	Switch ("Off-On" and Bass Control)
9	26704	Choke Assembly (Filter of Rectifier)
11	26792	Resistor, "B" Voltage Divider
12	25788	Electrolytic Capacitor, 1 Mf., 450 Volts
13	22757	Electrolytic Capacitor, 8 Mf., 500 Volts (50 to 60 Cycles Chassis)
13	26510	Electrolytic Capacitor, 16 Mf., 500 Volts (25 to 60 Cycles Chassis)
14	22757	Electrolytic Capacitor, 8 Mf., 500 Volts (50 to 60 Cycles Chassis)
14	26510	Electrolytic Capacitor, 16 Mf., 500 Volts (25 to 60 Cycles Chassis)
15	26773	Electrolytic Capacitor, 16 Mf., 350 Volts
16	22759	Capacitor Assembly, (3—4 Mf.)
17	26693	Electrolytic Capacitor, 4 Mf., 350 Volts
18	26797	Capacitor Assembly, 2—12 Mf., 2—10 Mf. 1—30 Mf.
20	26746	Range Switch Assembly
21	26144	Gang Tuning Capacitor Assembly
22	26446	Coil Assembly, Antenna ("A", "B" and "C" Ranges)
23	26447	Coil Assembly, R. F. ("A", "B", and "C" Ranges)
24	26448	Coil Assembly, Oscillator ("A", "B" and "C" Ranges)
25	26507	Coil Assembly, Antenna ("X" Range)
26	26508	Coil Assembly, R. F. ("X" Range)
27	26509	Coil Assembly, Oscillator ("X" Range)
28	26758	Coil Assembly, Antenna ("D" Range)
29	26564	Capacitor Assembly, Series Aligners ("A" and "B" Ranges)
30	24405	Capacitor Assembly, .04 Mf.
31	24405	Capacitor Assembly, .04 Mf.
32	24994	Capacitor Assembly, .05 Mf.
33	24637	Capacitor, Type "W", .0017 Mf.
34	24637	Capacitor, Type "W", .0017 Mf.
35	26513	Capacitor Assembly, (2—200 Mmf.)
36	24559	Capacitor, Type "O", 100 Mmf.
37	26944	Capacitor, Type "W", .004 Mf.
38	26321	Resistor, Type "E", 100 Ohms
39	26321	Resistor, Type "E", 100 Ohms
40	26333	Resistor, Type "E", 1000 Ohms
41	26353	Resistor, Type "E", 47,000 Ohms
42	26357	Resistor, Type "E", .1 Megohm
43	26357	Resistor, Type "E", .1 Megohm
44	26357	Resistor, Type "E", .1 Megohm
45	26331	Resistor, Type "E", 680 Ohms
46	26765	Oscillator Secondary Coil ("D" Range)
47	26787	Oscillator Primary Coil ("D" Range)
48	26474	Coil Assembly (Bi-Resonator)
49	26481	1st I. F. Transformer
50	26482	2nd I. F. Transformer
51	26243	3rd I. F. Transformer
52	26077	Potentiometer (Volume Control)
53	26706	Transformer Assembly, Audio Input
54	26708	Transformer Assembly, Audio Output
55	26326	Resistor, Type "E", 270 Ohms
56	26328	Resistor, Type "E", 390 Ohms
57	26328	Resistor, Type "E", 390 Ohms
58	26332	Resistor, Type "E", 820 Ohms
59	26330	Resistor, Type "E", 560 Ohms
60	26330	Resistor, Type "E", 560 Ohms
61	26330	Resistor, Type "E", 560 Ohms
62	26330	Resistor, Type "E", 560 Ohms
63	21593	Resistor, Type "C", 20,000 Ohms
64	26932	Capacitor Assembly, .008 Mf.
65	26332	Resistor, Type "E", 820 Ohms
66	26333	Resistor, Type "E", 1000 Ohms
67	26333	Resistor, Type "E", 1000 Ohms
68	26333	Resistor, Type "E", 1000 Ohms
69	26333	Resistor, Type "E", 1000 Ohms
70	26337	Resistor, Type "E", 2200 Ohms
71	26341	Resistor, Type "E", 4700 Ohms
72	26345	Resistor, Type "E", 10,000 Ohms
73	26345	Resistor, Type "E", 10,000 Ohms
74	26345	Resistor, Type "E", 10,000 Ohms
75	26776	Resistor, Type "F", 12,000 Ohms
76	25150	Capacitor, .02 Mf.
77	26365	Resistor, Type "E", 470,000 Ohms
78	26349	Resistor, Type "E", 22,000 Ohms
79	26353	Resistor, Type "E", 47,000 Ohms
80	26353	Resistor, Type "E", 47,000 Ohms
81	24994	Capacitor Assembly, .05 Mf.
82	26356	Resistor, Type "E", 82,000 Ohms
83	26353	Resistor, Type "E", 47,000 Ohms
84	26357	Resistor, Type "E", .1 Megohm
85	26357	Resistor, Type "E", .1 Megohm
86	26357	Resistor, Type "E", .1 Megohm
87	26362	Resistor, Type "E" .27 Megohm
88	26365	Resistor, Type "E", .47 Megohm
89	26365	Resistor, Type "E", .47 Megohm
90	26365	Resistor, Type "E", .47 Megohm
91	26369	Resistor, Type "E", 1 Megohm
92	26369	Resistor, Type "E", 1 Megohm
93	26369	Resistor, Type "E", 1 Megohm
94	26369	Resistor, Type "E", 1 Megohm
95	26369	Resistor, Type "E", 1 Megohm
96	26369	Resistor, Type "E", 1 Megohm
97	26369	Resistor, Type "E", 1 Megohm
98	26369	Resistor, Type "E", 1 Megohm
99	26369	Resistor, Type "E", 1 Megohm
100	26373	Resistor, Type "E", 2.2 Megohm
101	26062	Resistor, Type "F", 10,000 Ohms
102	26775	Resistor, Type "F", 20,000 Ohms
103	26775	Resistor, Type "F", 20,000 Ohms
104	25535	Capacitor, Type 3L, .008 Mf.
105	26932	Capacitor Assembly, .008 Mf.
106	25487	Capacitor, Type "W", .001 Mf.
107	25487	Capacitor, Type "W", .001 Mf.
108	24560	Capacitor, Type "O", 50 Mmf.
109	24560	Capacitor, Type "O", 50 Mmf.
110	24560	Capacitor, Type "O", 50 Mmf.
111	26512	Capacitor, Type "W", 2—100 Mmf.
112	26512	Capacitor, Type "W", 2—100 Mmf.
113	24559	Capacitor, Type "O", 100 Mmf.
114	24402	Capacitor Assembly, .1 Mf.
115	24402	Capacitor Assembly, .1 Mf.
116	24402	Capacitor Assembly, .1 Mf.
117	24402	Capacitor Assembly, .1 Mf.
118	24402	Capacitor Assembly, .1 Mf.
119	24402	Capacitor Assembly, .1 Mf.
120	24405	Capacitor Assembly, .04 Mf.
121	24405	Capacitor Assembly, .04 Mf.
122	24405	Capacitor Assembly, .04 Mf.
123	24405	Capacitor Assembly, .04 Mf.
124	24405	Capacitor Assembly, .04 Mf.
125	24405	Capacitor Assembly, .04 Mf.
126	24405	Capacitor Assembly, .04 Mf.
127	24405	Capacitor Assembly, .04 Mf.
128	24405	Capacitor Assembly, .04 Mf.
129	24994	Capacitor Assembly, .05 Mf.
131	24994	Capacitor Assembly, .05 Mf.
132	24994	Capacitor Assembly, .05 Mf.
133	24994	Capacitor Assembly, .05 Mf.
134	24994	Capacitor Assembly, .05 Mf.
135	25149	Capacitor Assembly, .01 Mf.
136	26365	Resistor, Type "E", 470,000 Ohms
137	23101	Capacitor Assembly, 2—.5 Mf.
138	25814	Choke Assembly, 5 Millihenrys
139	26515	Coil Assembly (High Frequency Cut-Off Filter)
140	26794	Filter Assembly (Auto. Bass Control)
149	26568	Adjustable Capacitor (High Frequency Cut-Off Filter)
150	26569	Capacitor (Oscillator Series Aligner, "X" Range)
151	26485	Potentiometer and Bracket Assembly (Tone Control and High Fidelity)
154	26497	Cable Assembly, Tri-Focal Tuning Indicator
155	22988	Socket, 4 Prong
156	23517	Socket, 5 Prong
157	25539	Socket, 8 Prong
164	26519	Drive Disc Assembly
165	26570	Dial Bracket Assembly
167	26211	Pulley
168	26518	Gear Assembly
169	26220	Drive Shaft Assembly
170	26520	Dial Assembly (Vernier)
171	26694	Dial Assembly (Main)
172	26672	Drive Cord Assembly (Volume Indicator Disc)
173	26673	Drive Cord Assembly (Fidelity Indicator Disc)
174	26683	Cord Assembly (Dial Elevator)
175	26226	Spring
176	26555	Volume Indicator Disc Assembly
177	26698	Fidelity Indicator Disc Assembly
178	26572	Bracket Assembly (Tri-Focal Tuning Indicator)
179	26682	Reel Assembly (Range Switch)
180	26667	Reel Assembly (Tone-Fidelity Control)
181	26666	Reel Assembly (Volume Control)
185	26147	Lamp Socket
186	26257	Lamp Shades
187	26287	Pilot Lamp
190	26692	Lamp Socket Assembly
199	26798	Potentiometer (Automatic Bass Control)
200	26499	Knob (For Automatic Bass Control Potentiometer)
212	26780	Resistor, Flexible, 3.5 Ohms (Pilot Lamp)
215	26365	Resistor, Type "E", 470,000 Ohms
216	24405	Capacitor Assembly, .04 Mf.
217	24405	Capacitor Assembly, .04 Mf.
218	26341	Resistor, Type "E", 4700 Ohms
219	22775	Capacitor, .4 Mf.
220	26338	Resistor, Type "E", 2700 Ohms
221	24405	Capacitor Assembly, .04 Mf.
222	26365	Resistor, Type "E", 470,000 Ohms
224	26958	Amp. A. V. C. Transformer
226	26357	Resistor, Type "E", .1 Megohm
227	24560	Capacitor, Type "O", 50 Mmf.
228	26345	Resistor, Type "E", 10,000 Ohms

MISCELLANEOUS PARTS

Piece Number	Part
26250	Cone Assembly (For P-26170 Speaker)
26043	Plug (For Loud Speaker Cable)
26369	Resistor, Type "E", 1 Megohm (Used at Socket of No. 6E5 Tube)
26302	Knob (For "Volume" Control)
26299	Knob (For "Tone-Fidelity" Control)
26305	Knob (For "Stations" Selector Control Shaft)
26306	Knob (For "Vernier" Stations Selector Control Shaft)
26301	Knob (For "Range" Switch)
26300	Knob (For "Off-On" Switch and Bass Control)

MODEL 225 AC-DC
Socket, Chassis

STROMBERG-CARLSON TEL. MFG. CO.



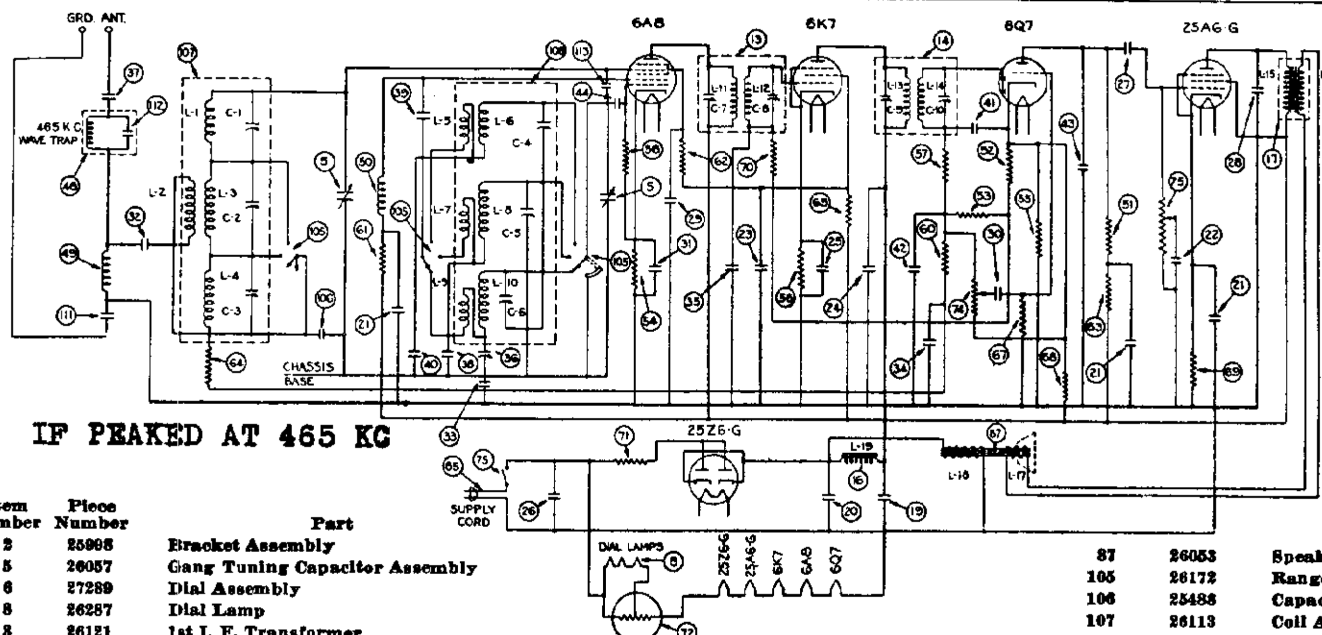
STROMBERG-CARLSON TEL. MFG. CO.

MODEL 225 AC-D
Schematic, Part

No. 225 Receiver................50 to 60 Cycles (For AC Operation)................P-27285 Chassis Assembl

CIRCUIT DESCRIPTION

This triple range, superheterodyne receiver has five tubes and may be operated on a power supply circu of either alternating or direct current at the voltages and frequency (for A. C. operation) specified above.



IF PEAKED AT 465 KC

Item Number	Piece Number	Part
2	25998	Bracket Assembly
5	26057	Gang Tuning Capacitor Assembly
6	27289	Dial Assembly
8	26287	Dial Lamp
13	26121	1st I. F. Transformer
14	25506	2nd I. F. Transformer
16	26133	Choke Assembly (Filter of Rectifier)
17	26135	Transformer, Audio Output
19	26162	Electrolytic Capacitor, 25 Mf.
20	27014	Electrolytic Capacitor, 40 Mf.
21	26164	Electrolytic Capacitor Assembly, 4 Mf., 150 Volts; 4 Mf., 150 Volts; 12 Mf., 25 Volts
22	26151	Capacitor Assembly, .005 Mf.
23	25483	Capacitor Assembly, .1 Mf.
24	25483	Capacitor Assembly, .1 Mf.
25	25483	Capacitor Assembly, .1 Mf.
26	25150	Capacitor Assembly, .02 Mf.
27	25150	Capacitor Assembly, .02 Mf.
28	25150	Capacitor Assembly, .02 Mf.
29	25150	Capacitor Assembly, .02 Mf.
30	25150	Capacitor Assembly, .02 Mf.
31	25150	Capacitor Assembly, .02 Mf.
32	25150	Capacitor Assembly, .02 Mf.
33	25389	Capacitor Assembly, .2 Mf.
34	24405	Capacitor Assembly, .04 Mf.
35	24405	Capacitor Assembly, .04 Mf.
36	26747	Capacitor, Oscillator Series Aligner
37	26778	Capacitor, Type "W", .005 Mf.
38	26727	Capacitor, Type "W", .001 Mf.
39	25487	Capacitor, Type "W", .001 Mf.
40	25489	Capacitor, Type "W", .00125 Mf.
41	25504	Capacitor, Type "2", 100 Mmf.
42	25504	Capacitor, Type "2", 100 Mmf.
43	25504	Capacitor, Type "2", 100 Mmf.
44	24559	Capacitor, Type "O", 100 Mmf.

Item Number	Piece Number	Part
48	25513	Coil Assembly, Wave Trap
49	25814	Coil Assembly, R. F. Choke, 5 Millihenrys
50	25814	Coil Assembly, R. F. Choke, 5 Millihenrys
51	26362	Resistor, Type "E", .27 Megohm
52	26362	Resistor, Type "E", .27 Megohm
53	26362	Resistor, Type "E", .27 Megohm
54	26326	Resistor, Type "E", 270 Ohms
55	26327	Resistor, Type "E", 330 Ohms
56	26327	Resistor, Type "E", 330 Ohms
57	26353	Resistor, Type "E", 47,000 Ohms
58	26353	Resistor, Type "E", 47,000 Ohms
60	26369	Resistor, Type "E", 1 Megohm
61	26345	Resistor, Type "E", 10,000 Ohms
62	26345	Resistor, Type "E", 10,000 Ohms
63	26345	Resistor, Type "E", 10,000 Ohms
64	26357	Resistor, Type "E", .1 Megohm
65	26333	Resistor, Type "E", 1,000 Ohms
67	26373	Resistor, Type "E", 2.2 Megohms
68	26408	Resistor, Type "C", 27,000 Ohms
69	26330	Resistor, Type "E", 560 Ohms
70	26365	Resistor, Type "E", .47 Megohm
71	25911	Resistor, Type "B", 50 Ohms
72	27287	Resistor (Tube Type), 120 Plus 106 Ohms, Voltage Divider
74	26114	Potentiometer (Volume Control)
75	27511	Potentiometer (Off-On-Switch and Tone Control)
77	25539	Tube Socket, 8 Prong

Item Number	Piece Number	Part
87	26053	Speaker Assembly
105	26172	Range Switch
106	25488	Capacitor, .002 Mf.
107	26113	Coil Assembly, Antenna
108	26157	Coil Assembly, Oscillator
109	27310	Dial Lamp Socket Assembly
111	25149	Capacitor Assembly, .01 Mf.
112	25488	Capacitor, .002 Mf.
113	26417	Capacitor (Gimmick)

MISCELLANEOUS PARTS

Piece Number	Part
26096	Cone Assembly (For P-26053 Speaker)
26296	Knob (Used on Volume, "Off-on-Tone" and Station Selector Controls) 3 Required for Each Receiver
27351	Knob (For Range Switch) 1 Required

MODEL 225 AC-DC
Voltage, Alignment
Trimmers, Notes

STROMBERG-CARLSON TEL. MFG. CO.

Voltages are given for a line voltage of 120 volts, A. C. Allowance should be made for the difference when the line voltage is higher or lower.

IMPORTANT—If the receiver is operated from a direct current power supply circuit, the various voltages measured will be slightly lower than those listed in the table for A. C. operation. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 1000 volt scale was used.

When the receiver is being operated from an alternating current power supply circuit, it will be necessary to have a high resistance A. C. voltmeter for checking the A. C. voltages.

Tube	*Circuit*	*Cap*	*Terminals of Sockets* 1	2	3	4	5	6	7	8	*Heater Voltages Between Heater Terminals* *Socket Terminal Numbers*	*Volts*
6A8	Mod.—Osc.	0	0	*13*	+97	+65	—7	+59	*6*	+1.5	2–7	*6.4*
6K7	I. F. Amp.	0	0	*12.8*	+94	+85	+2.5	—	*19*	+2.5	2–7	*6.4*
6Q7	Dem.—A.V.C.—Audio	0	0	0	+40	0	0	—	*6*	+1	2–7	*6*
25A6-G	Audio Output	—	0	*45*	+93	+99	0	—	*19*	+14	2–7	*26*
25Z6-G	Rectifier	—	0	*73*	*115*	+105	*115*	—	*47*	+105	2–7	*26*
Resistor	Voltage Divider	—	—	—	*73*	*120*	—	—	*120*	*107*		

Voltage across pilot lamps—*13* volts

A. C. voltages are indicated by italics; when the receiver is operated from a D. C. power supply, D. C. voltages will be obtained in place of the A. C. voltages.
Receiver tuned to 1000 kc., no signal.

Intermediate Frequency Adjustments

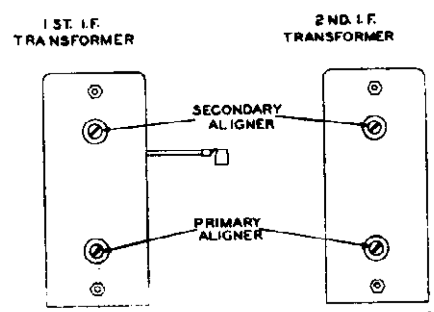
The intermediate frequency used in these receivers is 465 kilocycles. In making these I. F. circuit adjustments always align in the following order:

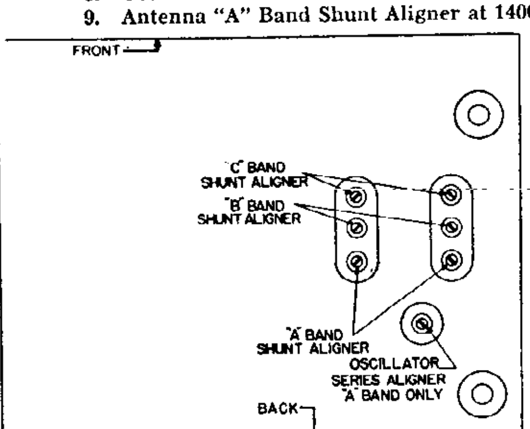
1. Secondary of 2nd I. F. Transformer (Capacitor C-10).
2. Primary of 2nd I. F. Transformer (Capacitor C-9).
3. Secondary of 1st I. F. Transformer (Capacitor C-8).
4. Primary of 1st I. F. Transformer (Capacitor C-7).

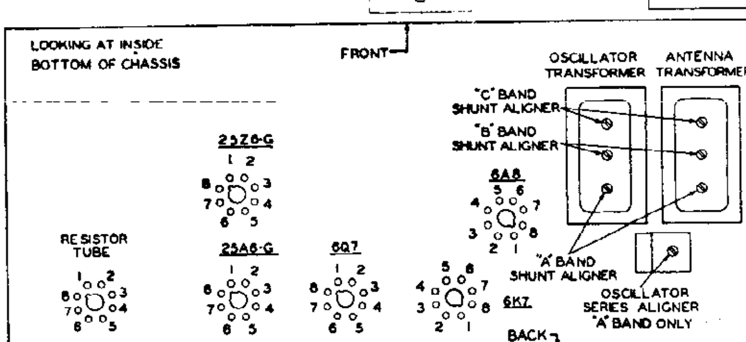
Radio Frequency Adjustments

The adjustments of the aligning capacitors used in the radio frequency circuits in this receiver should be very carefully made in the following order and at the frequencies specified below:

1. Oscillator's "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-4).
2. Antenna "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-1).
3. Oscillator's "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-5).
4. Antenna "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-2).
5. Oscillator's "A" Band Shunt Aligner at 1400 Kilocycles (Capacitor C-6).
6. Antenna "A" Band Shunt Aligner at 1400 Kilocycles (Capacitor C-3).
7. Oscillator's "A" Band Series Aligner at 600 Kilocycles (Capacitor (36)).
8. Oscillator's "A" Band Shunt Aligner at 1400 Kilocycles (Capacitor C-6).
9. Antenna "A" Band Shunt Aligner at 1400 Kilocycles (Capacitor C-3).

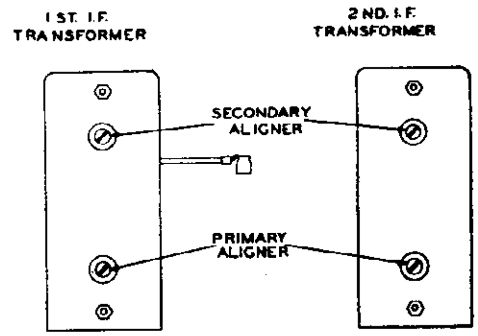






MODELS 228L,228L
228H,228H
Schematic,Socket
Trimmers

STROMBERG-CARLSON TEL. MFG. CO.



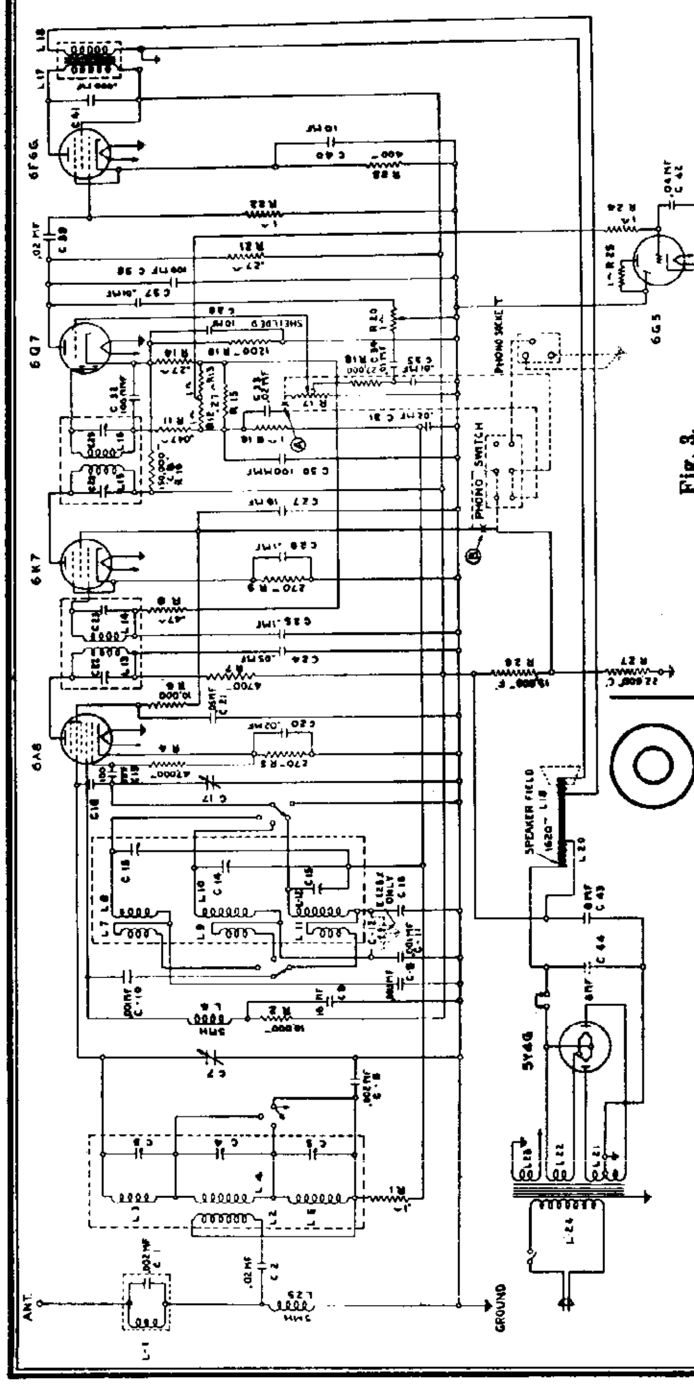


Fig. 3.

IF PEAK 465 KC

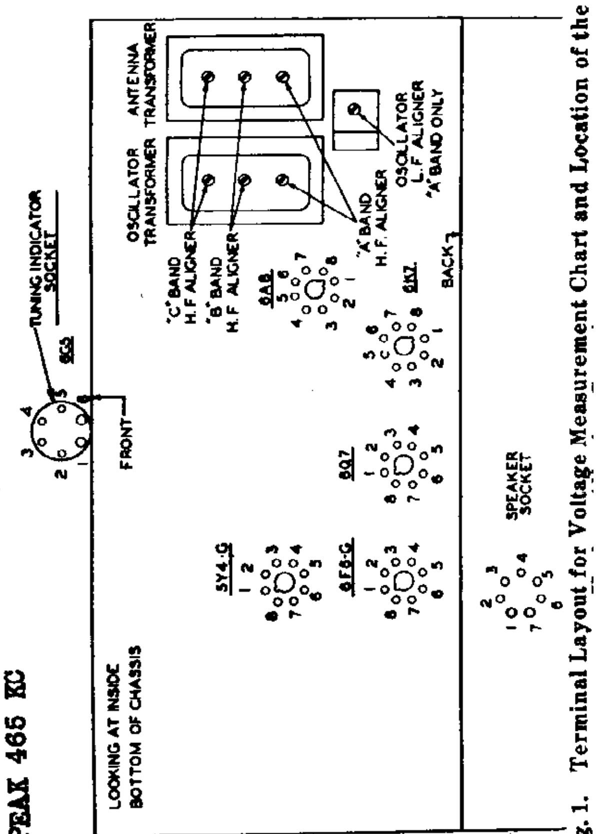


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the

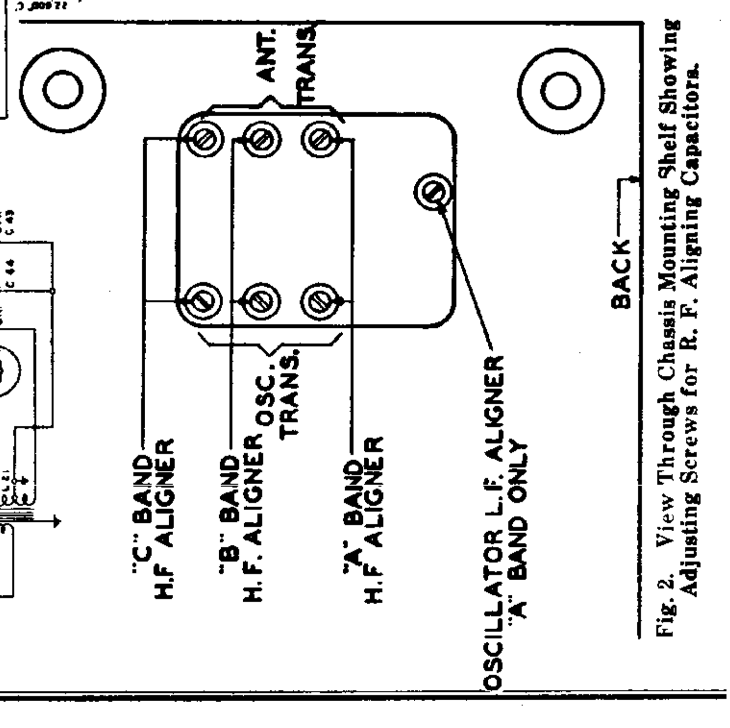


Fig. 2. View Through Chassis Mounting Shelf Showing Adjusting Screws for R. F. Aligning Capacitors.

MODELS 228L, 228LB
228H, 228HB
Voltage, Alignment
Parts

STROMBERG-CARLSON TEL. MFG. CO.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: O-2.5, O-10, O-100, O-250, O-500, O-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

Tube	Circuit	Cap	Terminals of Sockets 1	2	3	4	5	6	7	8	Heater Voltages Between Heater Terminals: Socket Terminal Numbers	Volts
6A8	Mod.—Osc.	0	0	0	+210	+65	—20	+180	*6.1*	+1.6	2–7	*6.1*
6K7	I. F. Amp.	0	0	0	+220	+90	+2.5	—	*6.1*	+2.5	2–7	*6.1*
6Q7	Dem.—A. V. C. —Audio	0	0	0	+100	0	0	+100	*6.1*	+1.6	2–7	*6.1*
6F6G	Audio Output	—	0	0	+210	+220	0	0	*6.1*	+13	2–7	*6.1*
6G5	Tuning Ind.	—	0	+2.4*	0	+220	—	*6.1*			1–6	*6.1*
5Y4G	Rectifier	—	0	0	*335*	—	*335*	—	+340	+344	7–8	*4.9*
Speaker Socket		—	+340	0	0	+340	+340	—	+220			

Receiver tuned to 1000 Kc., no signal. A. C. voltages are indicated by italics.

In making any alignment adjustments, always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal. Before proceeding with the alignment of any circuits in these receivers be sure that the "Off-On-Tone" control knob is set for maximum treble response (position where knob is rotated from its maximum counter-clockwise position, slightly clockwise to position where set turns "on"). Figure 1, shows the location of all the aligning capacitors in these receivers.

In making any alignment adjustments on these receivers, it will not be necessary to remove the chassis from the cabinet. The aligning capacitors for the intermediate frequency circuits of these receivers are easily accessible from the rear of the receiver, and the aligning capacitors for the radio frequency circuits are accessible through the aperture located in the bottom metal base plate of the chassis. These apertures are easily accessible either through the bottom of the cabinet or through the bottom of the cabinet shelf depending upon the style of cabinet. See Figure 2.

Dial Adjustment

Before aligning the circuits of any of these receivers, the tuning dial must be properly aligned to track with the gang tuning capacitors. To check whether the dial is set correctly with respect to the gang tuning capacitor, rotate the "Station Selector" knob in a clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the gang tuning capacitor in this position, the dial pointer should center over the middle vertical line of the three vertical lines located on the glass dial and the vertical lines located on the metal pan of the dial frame. Now, rotate the "Station Selector" knob so that the dial pointer lines up with the horizontal lines located on the metal pan of the dial frame; with the pointer in this position the two horizontal center marks of the glass dial (located at approximately 9.3 megacycles on the right hand scale and 2.16 megacycles on the left hand scale) should also be in alignment with the dial pointer. If the above conditions are not obtained, loosen the four clamps which hold the glass dial to the dial pan by slightly loosening the four screws, and shift the glass dial so that a good alignment between the dial pointer, the glass dial, and alignment marks located on the metal pan of the dial frame is obtained for both the horizontal and vertical position of the dial pointer.

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 465 kilocycles. In making these circuit adjustments always align the circuits in the order given in these instructions.

1. Operate the "Range" switch of the receiver to the "A" range position. Set the receiver's tuning dial at its extreme low frequency position, and operate the Tone Control knob to the "Normal" position. Rotate the Volume Control knob to its maximum clockwise position (maximum volume).
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator-oscillator tube, a modulated signal of 465 kilocycles from the test oscillator, using a 0.1 microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal.
3. Now, noting from Figure 1, the aligning capacitors for the first and second I. F. transformers, align the I. F. circuits in the following manner:
   Secondary of second I. F. transformer.
   Primary of second I. F. transformer.
   Secondary of first I. F. transformer.
   Primary of first I. F. transformer.
   Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

Radio Frequency Adjustments

The alignment of the radio frequency circuits of the various ranges in these receivers should be very carefully made and in the order specified.

Alignment of Short Wave Range (Also Referred to as "C" Band)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the "C" range position, and set the test oscillator's frequency and the receiver's tuning dial to 17 megacycles.
2. Adjust the oscillator's "C" band high frequency aligner for maximum output.
3. Adjust the antenna's "C" band high frequency aligner for maximum output, at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Aircraft, Amateur, and Police Range (Also Referred to as "B" Band)

In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short-wave range.

1. Operate the Range Switch on the receiver chassis to the "B" range position, and set the test oscillator's frequency and the receiver's tuning dial to 3.4 megacycles.
2. Adjust the oscillator's "B" band high frequency aligner for maximum output.
3. Adjust the antenna's "B" band high frequency aligner for maximum output, and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Standard Broadcast Range (Also Referred to as "A" Band)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Operate the Range Switch to the "A" range position and set the test oscillator's frequency and the receiver's tuning dial to 1.4 megacycles.
2. Adjust the oscillator's "A" band high frequency aligner for maximum output.
3. Adjust the antenna's "A" band high frequency aligner for maximum output.
4. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
5. Adjust the oscillator's "A" band low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
6. Reset both the test oscillator's frequency and receiver's tuning dial to 1.4 megacycles and repeat operations Nos. 2 and 3.

REPLACEMENT PARTS

Piece Number	Schematic Circuit Designation	Part
[illegible]	R27	Resistor, Type "C", 22,000 Ohms
[illegible]		Tube Socket, 7 Prong
[illegible]		Cord, Power Supply
[illegible]	C35, C36	Capacitor, .1 Mfd.
[illegible]	C62	Capacitor, .04 Mfd.
[illegible]	C30, C32	Capacitor, Type "O", 100 Mmfd.
[illegible]	C21, C34	Capacitor, .05 Mfd.
[illegible]	C34, C35, C37	Capacitor, .01 Mfd.
[illegible]	C2, C26, C31, C33, C39	Capacitor, .05 Mfd.
[illegible]	C10	Capacitor, Type "W", .001 Mfd.
[illegible]	C1, C8	Capacitor, Type "W", [illegible] Mfd.
[illegible]	C9	Capacitor, Type "W", .00125 Mfd.
[illegible]	R33	Resistor, Flexible Type, 400 Ohms
[illegible]	C19, C38	Capacitor, Type "Y", 100 Mmfd.
[illegible]	L15, L16	2nd I. F. Transformer
[illegible]	L1	Coil Assembly, Wave Trap
[illegible]	R26	Resistor, Type "F", 15,000 Ohms
[illegible]	C41	Capacitor, [illegible] Mfd.
[illegible]		Tube Socket, 8 Prong
[illegible]	L4, L23	Coil Assembly, R. F. Choke
[illegible]	C23, C25, C26, C29	Aligning Capacitors, I. F. Transformers
[illegible]	C3, C4, C6	Aligning Capacitors, Antenna Transformer Assembly
[illegible]	C7, C17	Gang Tuning Capacitors
[illegible]	L2, L3, L4, L5	Coil Assembly, Antenna Transformer
[illegible]	L13, L14	1st I. F. Transformer
[illegible]	L7, L8, L9, L10, L11, L12	Coil Assembly, Oscillator Transformer
[illegible]	C13, C14, C15	Aligning Capacitors, Oscillator Transformer Assembly
[illegible]		Range Switch
[illegible]		Dial Lamp
[illegible]	R5, R9	Resistor, Type "E", 270 Ohms
[illegible]	R19	Resistor, Type "E", 1200 Ohms
[illegible]	R7	Resistor, Type "E", 4700 Ohms
[illegible]	R3, R6	Resistor, Type "E", 10,000 Ohms
[illegible]	R4, R11	Resistor, Type "E", 47,000 Ohms
[illegible]	R1	Resistor, Type "E", .1 Megohm
[illegible]	R14, R15, R21	Resistor, Type "E", .27 Megohm
[illegible]	R8	Resistor, Type "E", .47 Megohm
[illegible]	R12, R13, R16, R22, R24, R23	Resistor, Type "E", 1 Megohm
[illegible]	C18	Capacitor, Neutralizing
[illegible]	C11	Capacitor, Type "W", .001 Mfd., Oscillator "B" Range L. F. Padder
[illegible]	C16	Capacitor, Oscillator "A" Range L. F. Aligner
[illegible]		Pilot Lamp Socket
[illegible]		Dial Assembly
[illegible]		Tuning Indicator Socket and Cable
[illegible]	L17, L18	Transformer Assembly, Audio Output
[illegible]	C42, C44	Electrolytic Capacitor; 8 Mfd., 350 Volts, and 8 Mfd., 400 Volts
[illegible]	C8	Electrolytic Capacitor; 16 Mfd., 400 Volts
[illegible]	C37	Electrolytic Capacitor; 16 Mfd., 100 Volts
[illegible]	L21, L22, L23, L24	Power Transformer (50 to 60 Cycles Chassis)
[illegible]	L21, L22, L23, L24	Power Transformer (25 to 40 Cycles Chassis)
[illegible]	R17	Volume Control
[illegible]	R18	Resistor, Type "EI", 27,000 Ohms
[illegible]	C36, C40	Electrolytic Capacitors; 10 Mfd., 25 Volts and 10 Mfd., 25 Volts
[illegible]		Pilot Lamp Socket
[illegible]	R20	Off-On-Switch and Tone Control
[illegible]	R10	Resistor, Type "CB", 150,000 Ohms

MODEL 229P
Schematic, Sock
Trimmer

STROMBERG-CARLSON TEL. MFG. CO.

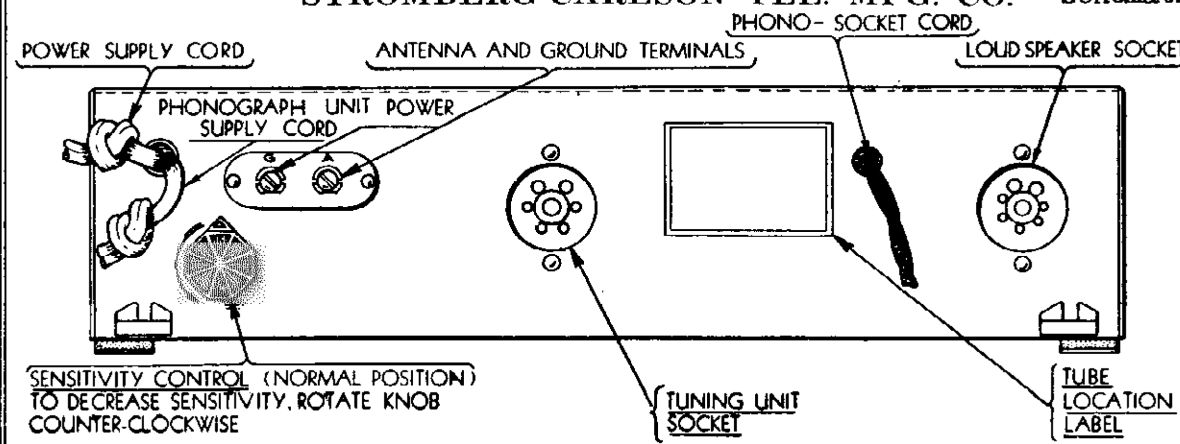


Fig. 1. Location and Operation of Sensitivity Control.

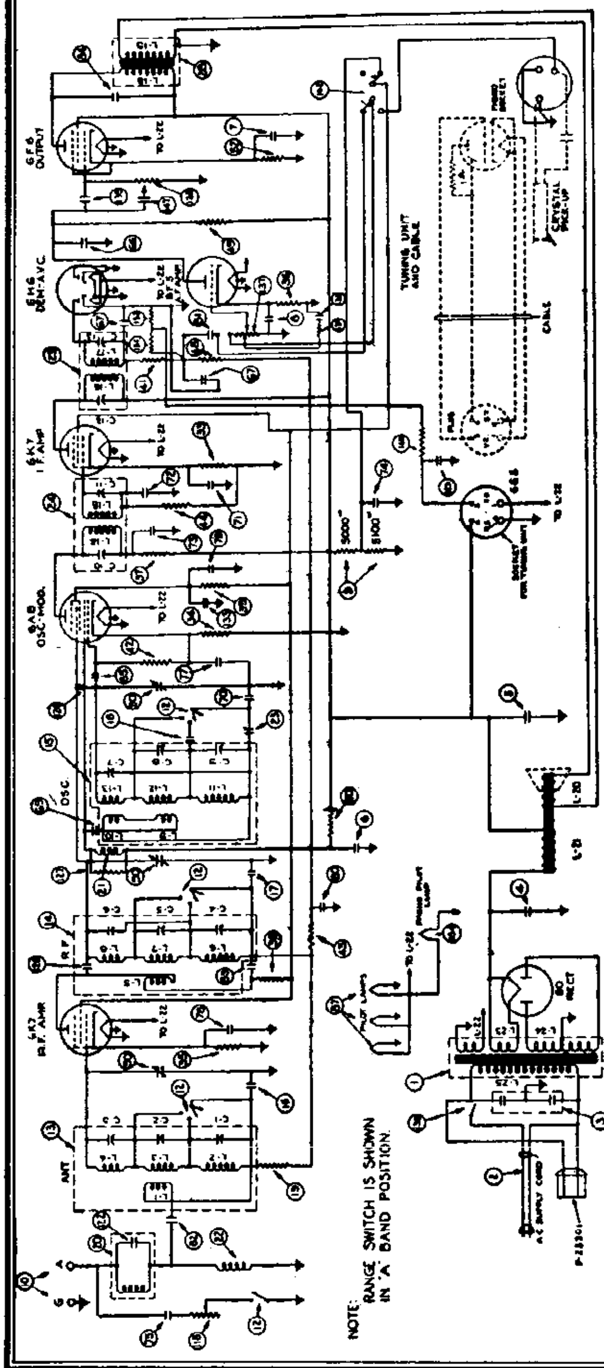
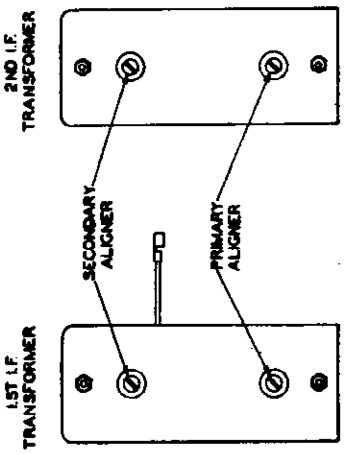


Fig. 3. Schematic Circuit of Receiver.

IF PEAK 465 KC



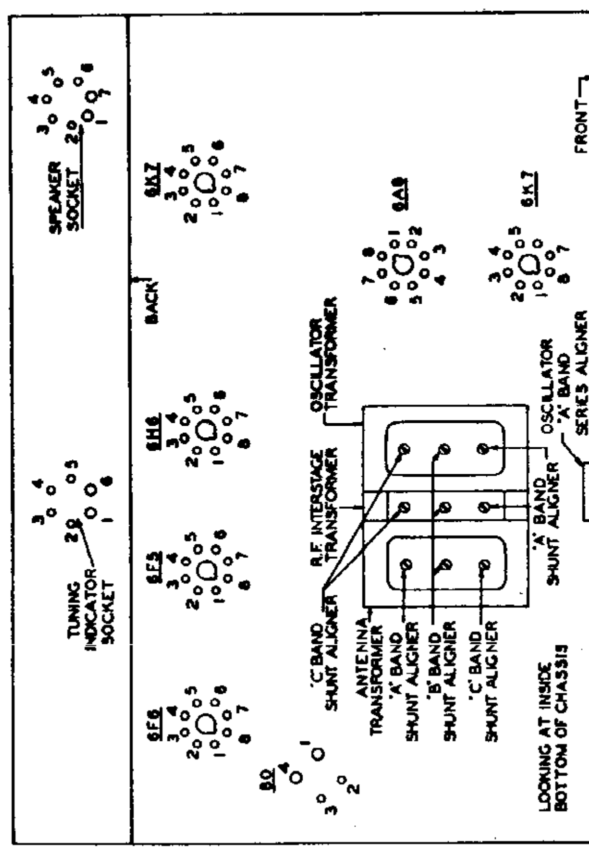


Fig. 2. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors

STROMBERG-CARLSON TEL. MFG. CO.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 2 shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: O-2.5, O-10, O-100, O-250, O-500, O-1000 volts except when an asterisk appears after any given voltage value in which case the 1000 volt scale was used.

Tube	Circuit	Cap	*Terminals of Sockets*								*Heater Voltages Between Heater Terminals*	
			1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6K7	R. F. Amp.	0	0	0	+54	+96	+7.6	+4.5	*6.3*	+7.6	2–7	*6.3*
6A8	Osc.-Mod.	0	0	0	+222	+72	—1.0	+143	*6.3*	+6.1	2–7	*6.3*
6K7	I. F. Amp.	0	0	0	+240	+96	+7.4	+4.5	*6.3*	+7.4	2–7	*6.3*
6H6	Dem.—A.V.C.	—	0	0	0	0	0	—	*6.3*	+4.5	2–7	*6.3*
6F5	Audio Amp.	0	0	0	—	+122*	—	—	*6.3*	+.75	2–7	*6.3*
6F6	Audio Output	—	0	0	+226	+237	0	0	*6.3*	+15	2–7	*6.3*
80	Rectifier	—	+330	*325*	*325*	+330	—	—	—	—	1–4	*4.8*
Tuning Indicator Plug's Socket			*6.3*	0	+7.6	+235	+7.8	0	—	—	1–6	*6.3*
Speaker Socket			+327	0	0	+327	+327	0	+237	—	—	—

Receiver tuned to 1000 Kc., no signal. A. C. voltages are indicated by italics.

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, this alignment procedure should be carefully followed.

In making any alignment adjustments always adjust the signal generator's output to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal.

Figure 2 shows the location of all the aligning capacitors used in this receiver.

Intermediate Frequency Amplifier Adjustments

The intermediate frequency used in these receivers is 465 kilocycles. In making these I. F. circuit adjustments always align in the following order:

1. Secondary of 2nd I. F. Transformer (Capacitor C-13).
2. Primary of 2nd I. F. Transformer (Capacitor C-12).
3. Secondary of 1st I. F. Transformer (Capacitor C-11).
4. Primary of 1st I. F. Transformer (Capacitor C-10).

Radio Frequency Adjustments

The adjustments of the aligning capacitors used in the radio frequency circuits in this receiver should be very carefully made in the following order and at the frequencies specified below:

1. Oscillator's "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-7).
2. R. F. Interstage "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-6).
3. Antenna "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-3).
4. Oscillator's "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-8).
5. R. F. Interstage "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-5).
6. Antenna "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-2).
7. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-9).
8. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
9. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).
10. Oscillator's "A" Band Series Aligner at 0.6 Megacycles (Capacitor-23).
11. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-9).
12. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
13. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).

STROMBERG-CARLSON TEL. MFG. CO.

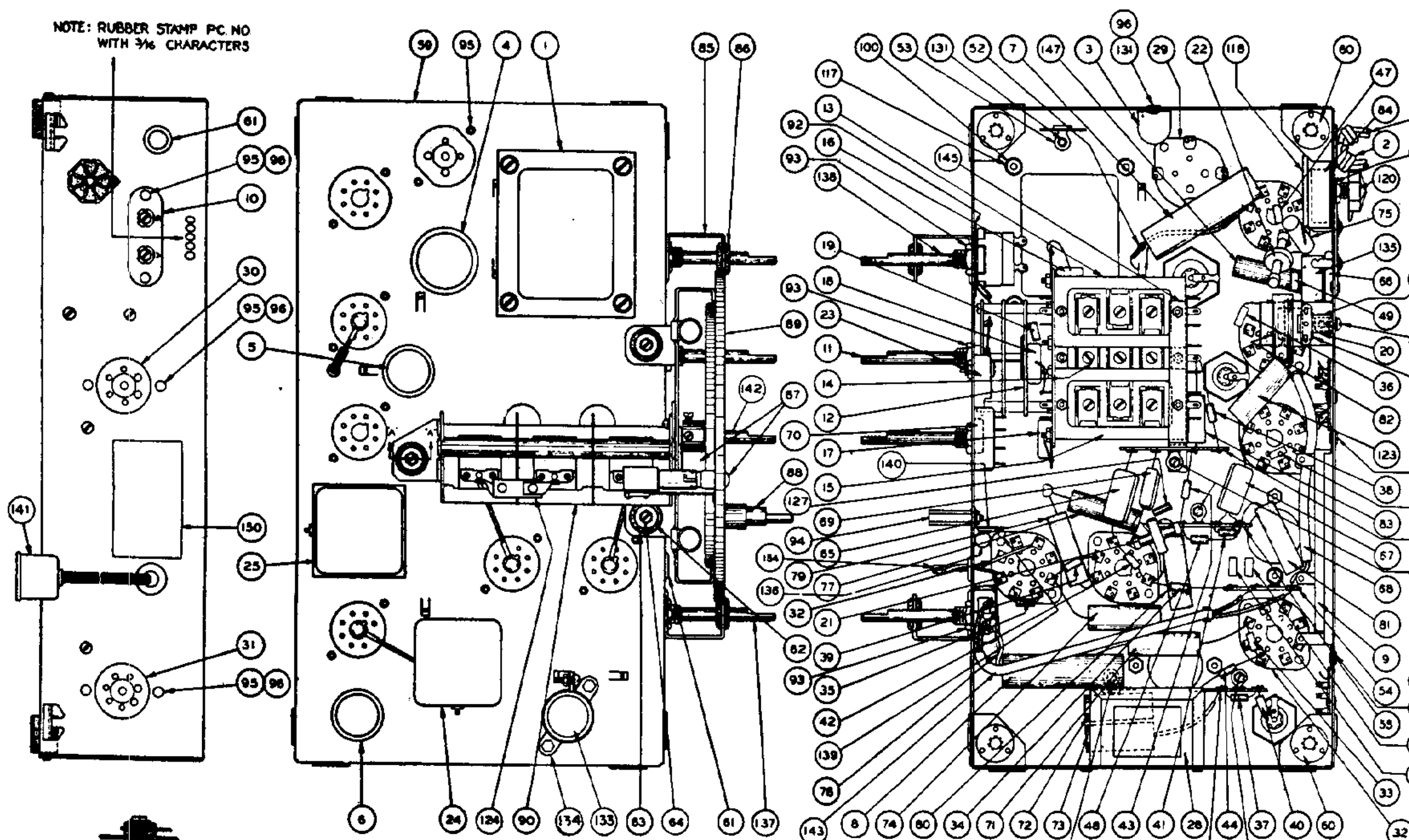


Fig. 5. Chassis Assembly.

CIRCUIT DESCRIPTION

The Stromberg-Carlson No. 229-P Radio Receivers are eight tube, superheterodyne receivers employing metal tubes and a highly efficient dynamic speaker. These receivers have three tuning ranges which are quickly interchangeable by means of a rotary switch, the control knob of which is located on the control panel. Ease and convenience of operation are assured by the vernier drive with its associated double knob. Resonance with a signal is indicated by means of the tuning indicator tube which operates on the cathode-ray principle. The strength of a received signal may be determined by observing the size of the aperture appearing on the target of the tuning indicator tube, the stronger a received signal the greater the reduction in the size of the aperture. A low level bass frequency compensating circuit is also provided in the volume control circuit of these receivers, which operates to give balanced reproduction at any setting of the volume control.

These receivers are also equipped with a single record playing phonograph unit which uses a crystal type

MODEL 229P
Parts

STROMBERG-CARLSON TEL. MFG. CO.

REPLACEMENT PARTS

Item Number	Piece Number	Part
1	26248	Power Transformer (50 to 60 Cycles)
1	26249	Power Transformer (25 to 60 Cycles)
2	24268	Cord, A. C. Supply
3	21535	Capacitor Assembly (2-.01 Mf. Capacitors)
4	26403	Capacitor, Electrolytic, 25 Mf.
5	25458	Capacitor, Electrolytic, 16 Mf.
6	26880	Capacitor, Electrolytic, 16 Mf.
7	24207	Capacitor, Electrolytic, 10 Mf., 25 Volts
8	24207	Capacitor, Electrolytic, 10 Mf., 25 Volts
9	26405	Resistor, "B" Voltage Divider
12	26402	Range Switch
13	25510	Coil Assembly, Antenna
14	25511	Coil Assembly, R. F.
15	25512	Coil Assembly, Oscillator
16	25488	Capacitor, .002 Mf.
17	25527	Capacitor, .0027 Mf.
18	25490	Capacitor, .0038 Mf.
19	26353	Resistor, Type "E1", .1 Megohm
20	25513	Coil Assembly, Wave Trap
21	25814	Coil Assembly, R. F. Choke
22	25814	Coil Assembly, R. F. Choke
23	26047	Capacitor, Osc. Series Aligner
24	26406	1st I. F. Transformer
25	25506	2nd I. F. Transformer
28	26411	Transformer, Audio Output
29	22968	Socket, 4 Prong
30	22974	Socket, 6 Prong
31	23517	Socket, 7 Prong
32	25539	Socket, 8 Prong
33	26327	Resistor, Type "E", 330 Ohms
34	26326	Resistor, Type "E", 270 Ohms
35	26331	Resistor, Type "E", 680 Ohms
36	26340	Resistor, Type "E", 3,900 Ohms
37	26341	Resistor, Type "E", 4,700 Ohms
38	26345	Resistor, Type "E", 10,000 Ohms
39	26345	Resistor, Type "E", 10,000 Ohms
40	26350	Resistor, Type "E", 27,000 Ohms
41	26353	Resistor, Type "E", 47,000 Ohms
42	26353	Resistor, Type "E", 47,000 Ohms
43	26357	Resistor, Type "E", .1 Megohm
44	26357	Resistor, Type "E", .1 Megohm
47	26365	Resistor, Type "E", .47 Megohm
48	26369	Resistor, Type "E", 1 Megohm
49	26362	Resistor, Type "E", .27 Megohm
52	25490	Resistor, 400 Ohms, 1 Watt
60	25906	Bracket Assembly
65	25504	Capacitor, 100 Mmf.
66	25504	Capacitor, 100 Mmf.
67	26512	Capacitor Assembly, 2—100 Mmf.
69	25487	Capacitor, .001 Mf.
70	25489	Capacitor, .00125 Mf.
71	24402	Capacitor Assembly, .1 Mf.
72	24402	Capacitor Assembly, .1 Mf.
73	25483	Capacitor Assembly, .1 Mf., 400 Volts
74	25483	Capacitor Assembly, .1 Mf., 400 Volts

Item Number	Piece Number	Part
75	25149	Capacitor Assembly, .01 Mf.
77	25150	Capacitor Assembly, .02 Mf.
78	25150	Capacitor Assembly, .02 Mf.
79	25150	Capacitor Assembly, .02 Mf.
80	25150	Capacitor Assembly, .02 Mf.
81	25150	Capacitor Assembly, .02 Mf.
82	25150	Capacitor Assembly, .02 Mf.
83	25481	Capacitor Assembly, .002 Mf.
84	25533	Capacitor Assembly, .006 Mf.
87	26287	Pilot Lamp
89	26285	Dial Assembly
90	26414	Gang Tuning Capacitor
118	26095	Potentiometer (Sensitivity Control)
120	26499	Knob (For Sensitivity Control)
122	25488	Capacitor, .002 Mf.
123	24402	Capacitor Assembly, .01 Mf.
124	26417	Capacitor, Gimmick
127	26350	Resistor, Type "E", 27,000 Ohms
133	27554	Electrolytic Capacitor, 16 Mfd., 100 Volts
135	25487	Capacitor, .001 Mfd.
136	27782	Capacitor, .03 Mfd.
137	27610	Potentiometer (Volume Control)
138	27311	Potentiometer, "Off-On" Switch and Tone Control
139	26350	Resistor, Type "E", 27,000 Ohms
141	27968	Shielded Cord and Receptacle Assembly, Phono. Pick-up Circuit
142	26472	Switch, Phono.
143	27060	Shielded Cable Assembly
144	27820	Lamp Socket Assembly
146	25301	Power Supply Cord Assembly for Phono. Unit
147	25149	Capacitor, .01 Mfd.
151	26362	Resistor, Type "E", .27 Megohm
152	26362	Resistor, Type "E", .27 Megohm
153	26369	Resistor, Type "E", 1 Megohm
154	28118	Lamp Socket Assembly for Phono. Unit Compartment

MISCELLANEOUS PARTS

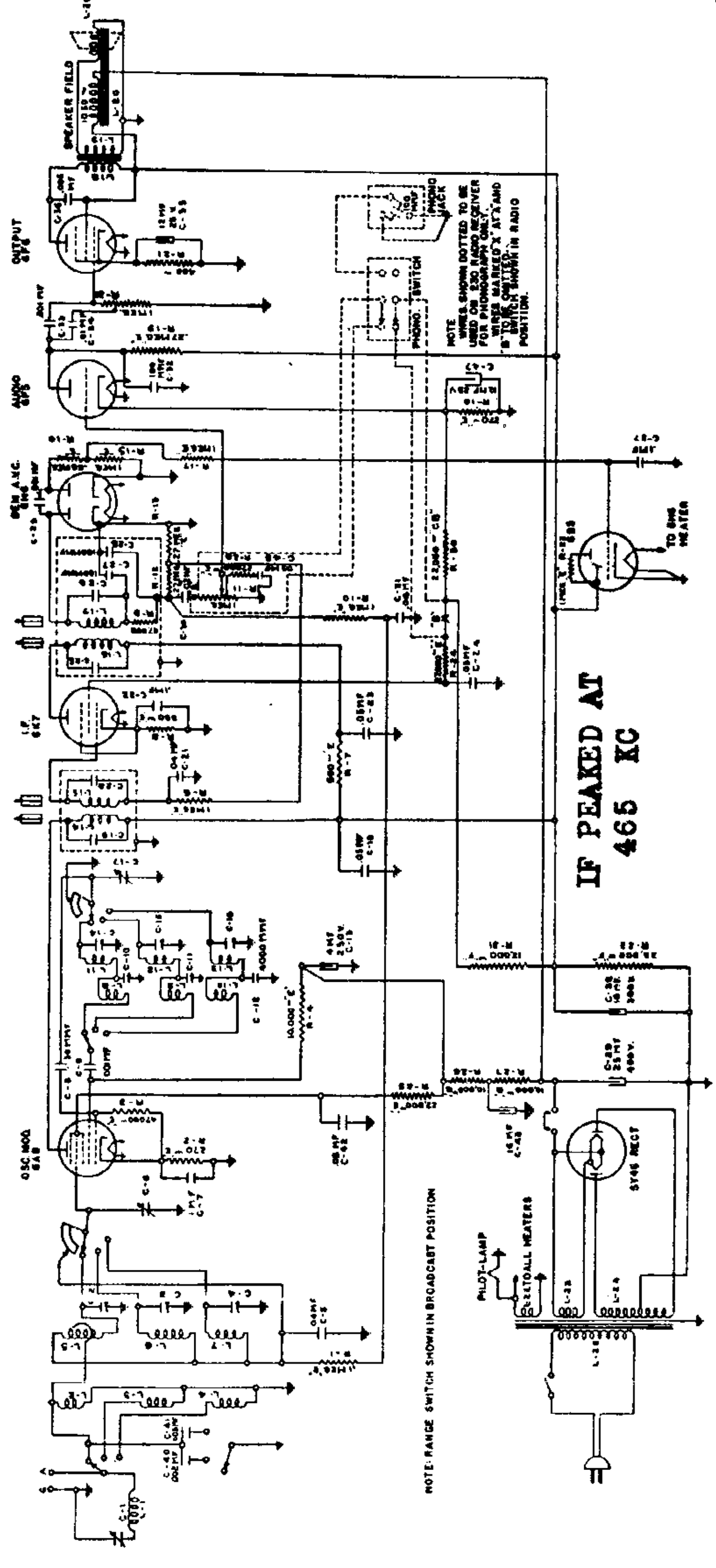
Piece Number	Part
26043	Plug (For Loud Speaker Cable)
26491	Plug (For Tuning Unit Cable)
26369	Resistor, Type "E", 1 Megohm (Used at Socket of No. 6G5 Tube)
26147	Pilot Lamp Socket
26302	Knob (For Volume Control)
26385	Knob (For Range Switch)
26384	Knob (For Off-On-Tone Control)
26305	Knob (For Large Portion of Tuning Shaft)
26306	Knob (For Vernier Portion of Tuning Shaft)
26697	Knob (For Radio-Phono. Control)
26071	Felt Washer (Used on "Volume", "Radio-Phono.," "Range Switch" and "Off-On-Tone" Controls' Shafts)
26073	Felt Washer (Used on "Station Selector" Control Shaft)

In order to obtain maximum performance from these receivers, a sensitivity control is provided for use on the standard broadcast range only. Its control knob is located on the rear of the chassis base. When either the "B" or "C" ranges are in operation, this sensitivity control is automatically cut out of the circuit so that the receiver will function at its maximum sensitivity on these two ranges. In some localities it will be found that without the use of this control, it will be impossible to eliminate adjacent channel interference. When this condition is obtained, the receiver should be tuned accurately to the desired station, and this sensitivity control adjusted so that minimum interference is obtained from the interfering station. See Figure 1.

The various tubes are used in these receivers as follows: One No. 6K7 tube is used in the R. F. Amplifier, and the other No. 6K7 tube is used in the I. F. Amplifier. The No. 6A8 tube functions as both Oscillator and Modulator tube. The No. 6H6 tube is used as a Demodulator and Automatic Volume Control tube. The No. 6F5 tube is used in the Audio Frequency Amplifier Stage (Driver), and the No. 6F6 tube is used in the Audio Power Output Stage. The No. 80 tube is the Rectifier tube of the power supply unit, and the No. 6G5 tube is used for indicating resonance in the Tuning Indicator System.

MODELS 230H,230H
230L,230LB,231F
231FB,231R,231RB
231P,231PB
Schematic

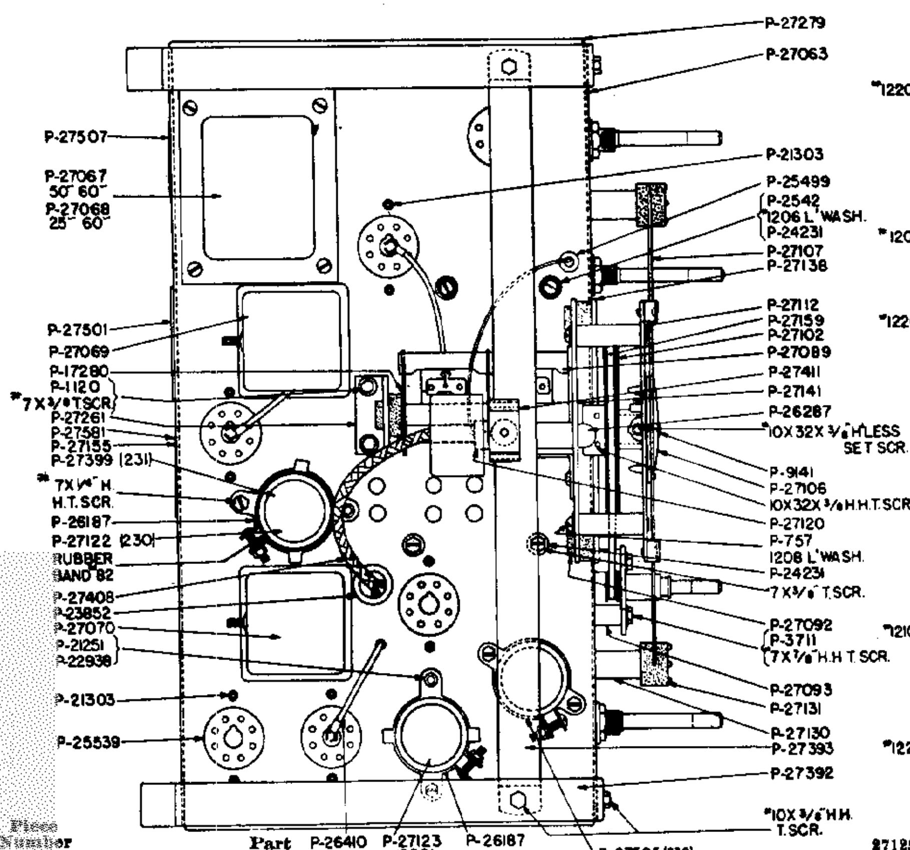
STROMBERG-CARLSON TEL. MFG. CO.

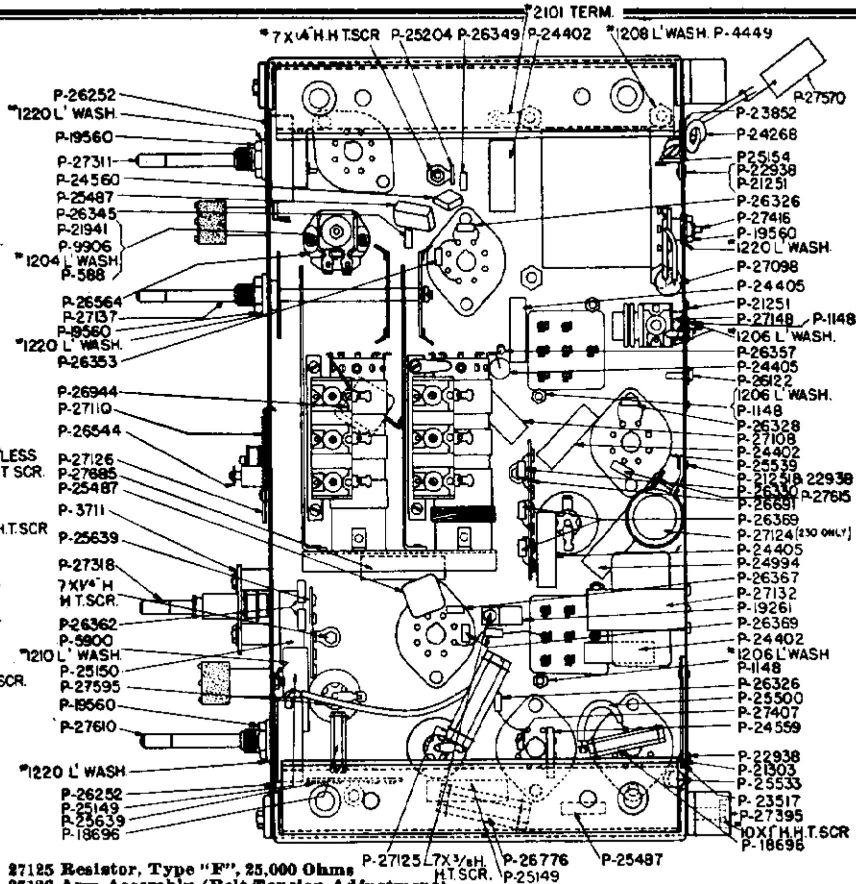


MODELS 230H, 230HB
230L, 230LB, 231F
231FB, 231R, 231RB
231P, 231PB

STROMBERG-CARLSON TEL. MFG. CO.

Socket, Chassis
Parts





Piece Number	Part
18696	Resistor, Type "B", 10,000 Ohms
23517	Socket, 7 Prong
24268	Cord (Power Supply)
24402	Capacitor, .1 Mf.
24405	Capacitor, .04 Mf.
24559	Capacitor, Type "O", 100 Mmf.
24560	Capacitor, Type "O", 50 Mmf.
24994	Capacitor, .05 Mf.
25149	Capacitor, .01 Mf.
25150	Capacitor, .02 Mf.
25487	Capacitor, Type "W", .001 Mf.
25500	Resistor, Flexible, 400 Ohms.
25533	Capacitor, .01 Mf.
25539	Socket, 8 Prong.
26114	Potentiometer (Volume Control)
26287	Pilot Lamp
26326	Resistor, Type "E", 270 Ohms
26328	Resistor, Type "E", 390 Ohms
26330	Resistor, Type "E", 560 Ohms
26345	Resistor, Type "E", 10,000 Ohms
26349	Resistor, Type "E", 22,000 Ohms
26350	Resistor, Type "E", 27,000 Ohms
26353	Resistor, Type "E", 47,000 Ohms
26357	Resistor, Type "E", .1 Megohm
26362	Resistor, Type "E", .27 Megohm
26367	Resistor, Type "E", .68 Megohm
26369	Resistor, Type "E", 1 Megohm
26544	Retainer
26564	Capacitor Assembly, L. F. Aligners ("A" and "B" Ranges)
26776	Resistor, Type "F", 12,000 Ohms
26944	Capacitor, Type "W", .004 Mf.
27067	Power Transformer (50 to 60 Cycles Chassis)
27068	Power Transformer (25 to 60 Cycles Chassis)
27069	1st I. F. Transformer
27070	2nd I. F. Transformer
27073	Capacitor, Fixed Tuning, 100 Mmf.
27081	Tuning Capacitor, Wave Trap
27090	Gang Tuning Capacitor
27098	Capacitor Assembly, 1—.002 Mf.; 1—.005 Mf., (Signal Control)
27102	Pulley Assembly, Gang Tuning Capacitor
27107	Dial (Tuning)
27108	Capacitor Assembly (2—.05 Mf.)
27110	Spring (Belt Tension Adjustment)
27112	Dial Indicator Frame
27120	Pilot Lamp Socket Assembly
27122	Electrolytic Capacitor, 25 Mf., 400 Volts (Used only on No. 230 Receivers' Chassis)
27123	Electrolytic Capacitor, 16 Mf., 300 Volts (Used only on No. 230 Receivers' Chassis)
27124	Electrolytic Capacitor Assembly, 4 Mf., 250 Volts; 12 Mf., 20 Volts (Used only on No. 230 Receivers' Chassis)
27125	Resistor, Type "F", 25,000 Ohms
27126	Arm Assembly (Belt Tension Adjustment)
27132	Transformer Assembly, Audio Output
27137	Range Switch
27144	Coil Assembly, Antenna
27145	Coil Assembly, Oscillator
27148	Coil Assembly, Wave Trap
27159	Belt (Tuning Drive)
27311	Switch, "Off-On" Switch and Tone Control
27318	Drive Shaft Assembly
27396	Thumb Screw
27398	Dry Electrolytic Capacitor, 4 Mf., and 16 Mf., 300 Volts (Used only on No. 231 Receivers' Chassis)
27399	Dry Electrolytic Capacitor, 12 Mf., 20 Volts, and 25 Mf., 400 Volts (Used only on No. 231 Receivers' Chassis)
27407	Resistor, Type "CB", 22,000 Ohms
27408	Tuning Indicator Socket and Cable
27409	Cable
27412	Clamp
27416	Switch (Signal Admission Control)
27585	Electrolytic Capacitor, 16 Mf., 250 Volts (Used only on No. 230 Receivers' Chassis)
27610	Volume Control
27611	Dry Electrolytic Capacitor, 16 Mf., 300 Volts (Used only on No. 231 Receivers' Chassis)
27615	Resistor, Type "EI", 27,000 Ohms
27685	Dry Electrolytic Capacitor, 12 Mf., 25 Volts
27782	Capacitor, .03 Mf.

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 230H, 230
230L, 230
Chassis Wiring

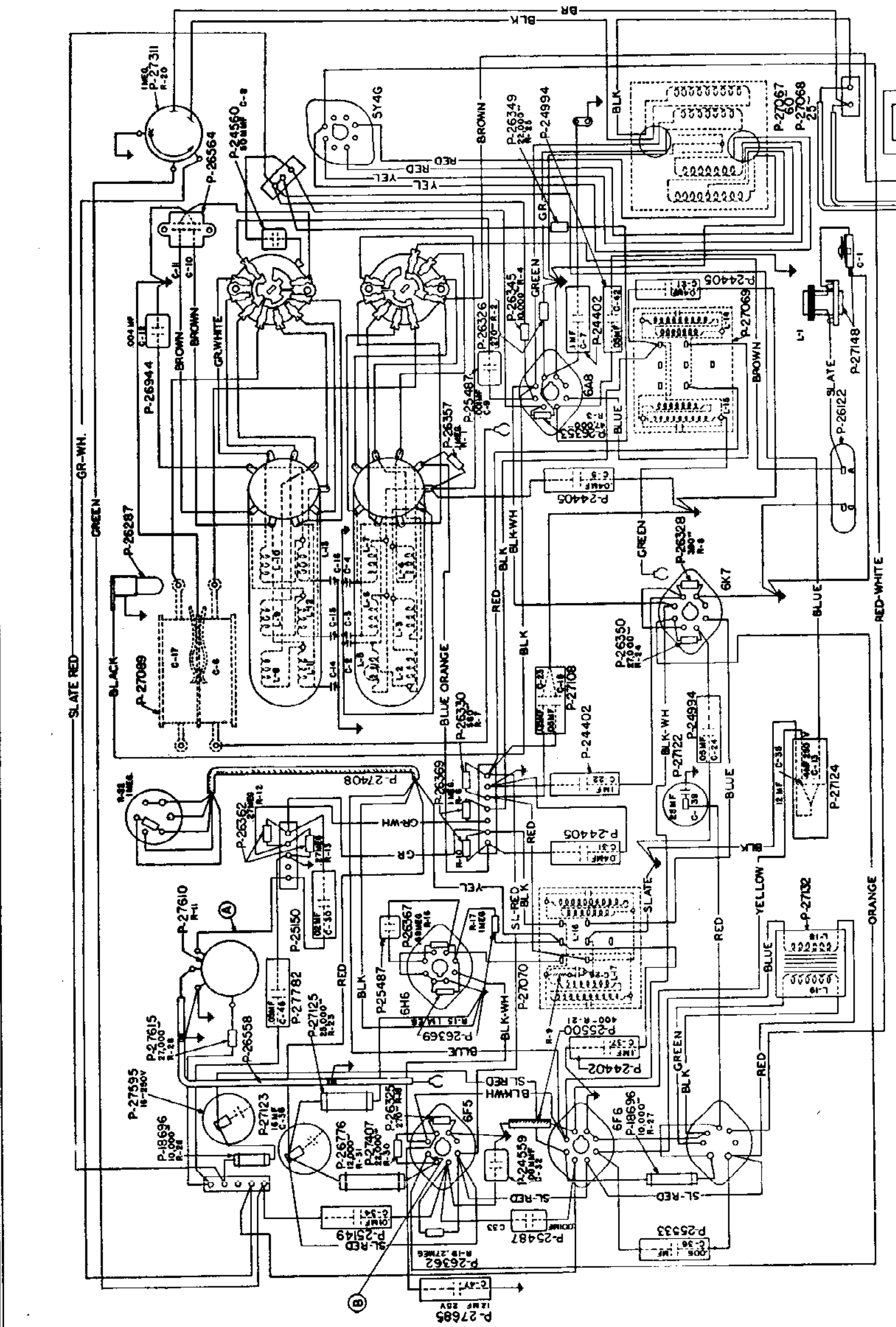
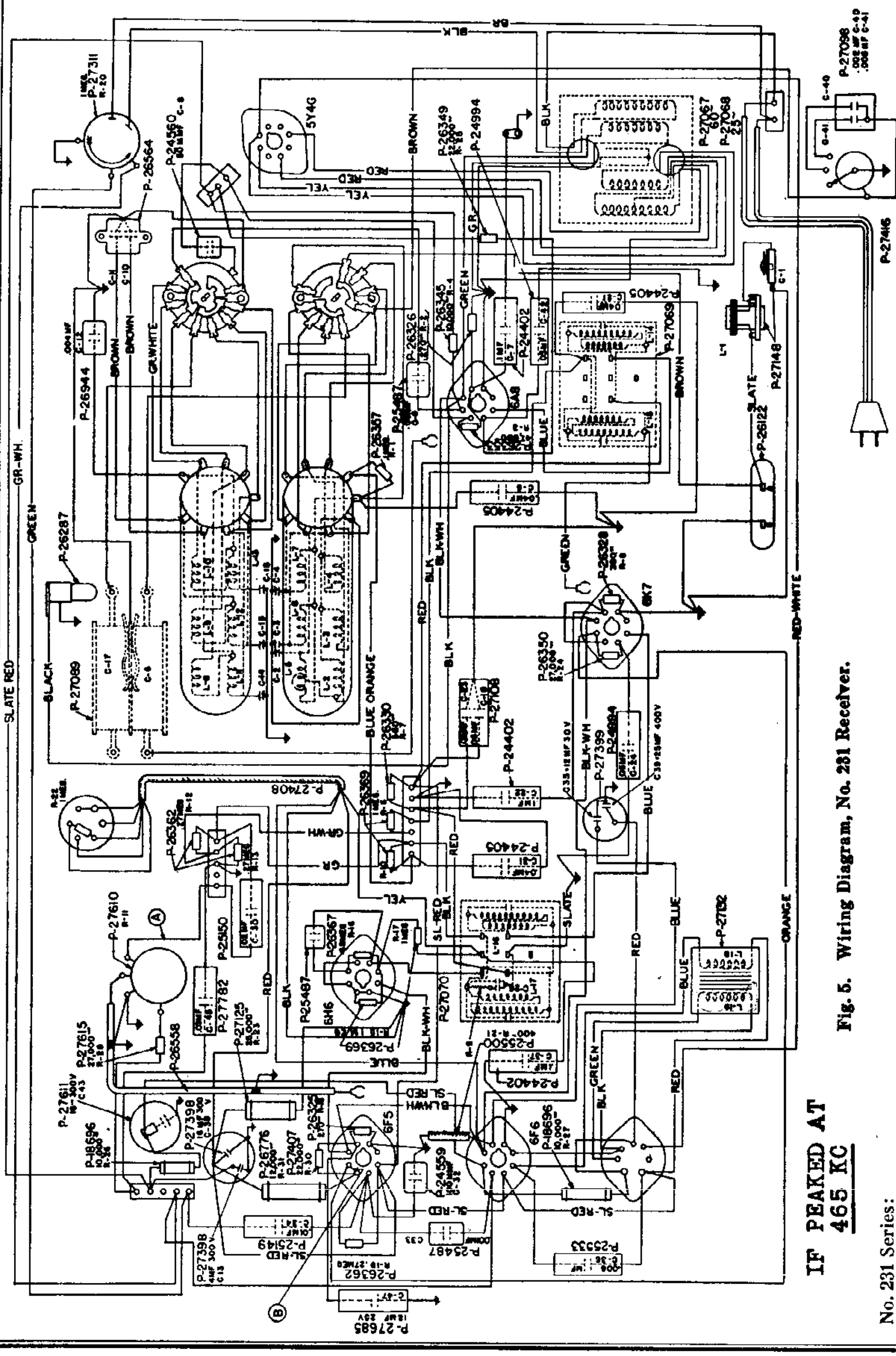


Fig. 4. Wiring Diagram, No. 230 Receiver.

No. 230 Series:
No. 230-H Receiver ---- 50 to 60 Cycles; P-27061 Chassis; P-26171 Loud Speaker
No. 230-HB Receiver ---- 25 to 60 Cycles; P-27062 Chassis; P-26171 Loud Speaker

MODELS 231F,231FB
231R,231RB,231P STROMBERG-CARLSON TEL. MFG. CO.
231PB,Chassis Wiring



IF PEAKED AT 465 KC

Fig. 5. Wiring Diagram, No. 231 Receiver.

No. 231 Series:

No. 231-F Receiver ---------- 50 to 60 Cycles; P-27372 Chassis; P-26170 Loud Speaker
No. 231-FB Receiver --------- 25 to 60 Cycles; P-27373 Chassis; P-26170 Loud Speaker
No. 231-R Receiver ---------- 50 to 60 Cycles; P-27372 Chassis; P-26170 Loud Speaker
No. 231-RB Receiver --------- 25 to 60 Cycles; P-27373 Chassis; P-26170 Loud Speaker

No. 231-P Receiver ---------- 60 Cycles only; P-27829 Chassis; P-27375 Loud Speaker; P-27835 Phonograph Unit
No. 231-PB Receiver --------- 25 Cycles only; P-27830 Chassis; P-27375 Loud Speaker; P-27836 Phonograph Unit

MODELS 230H,230H
230L,230LB,231F
231FB,231R,231RB
231P,231PB
Trimmers

STROMBERG-CARLSON TEL. MFG. CO.

ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyn
Tuning Ranges	A—530 to 1700 Kc.; B—1700 to 5600 Kc.; C—5600 to 18,000 K
Number and Type of Tubes	1 No. 6A8, 1 No. 6K7, 1 No. 6H6, 1 No. 6F5, 1 No. 6F6, 1 No. 6G5, 1 No. 5Y4
Voltage Rating	105 to 125 Vol
Frequency Rating	25 to 60 Cycles and 50 to 60 Cycle
Input Power Rating	65 Wat
Frequency of Intermediate Amplifier	465 Kilocycle

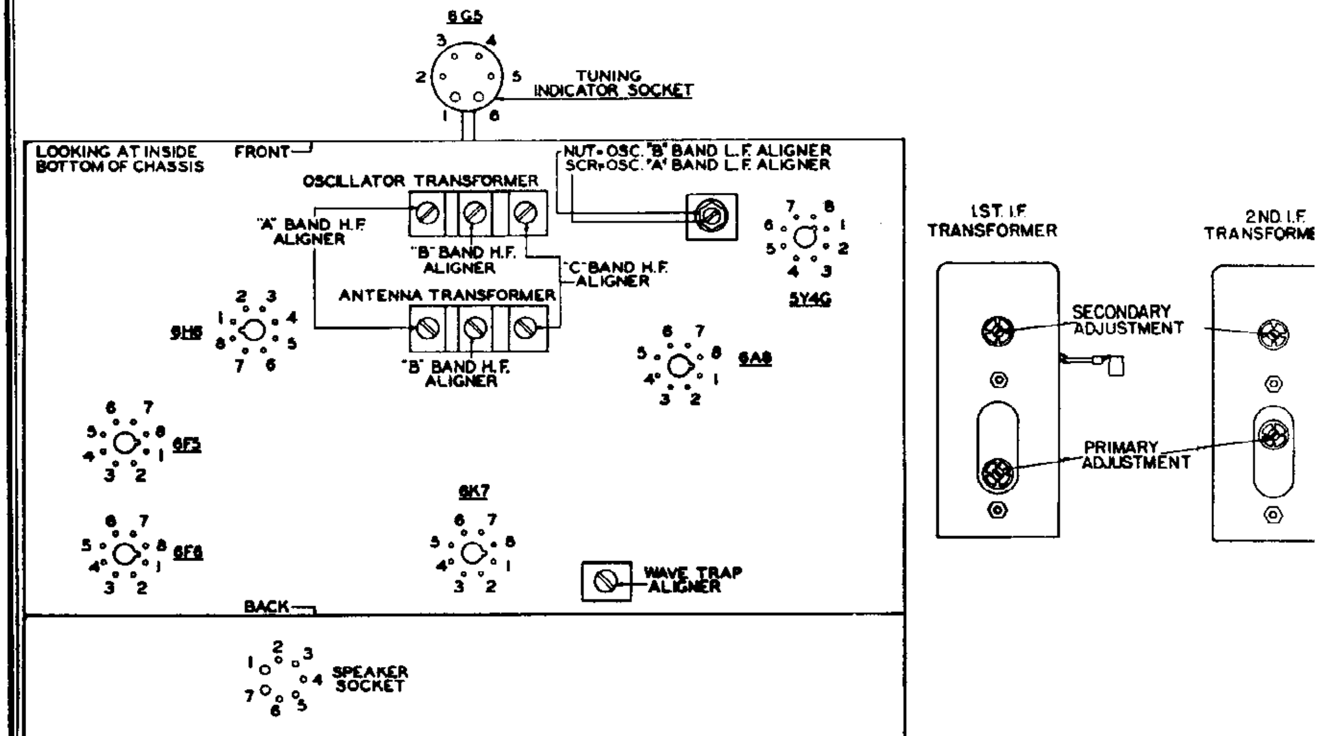


Fig. 1.—Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

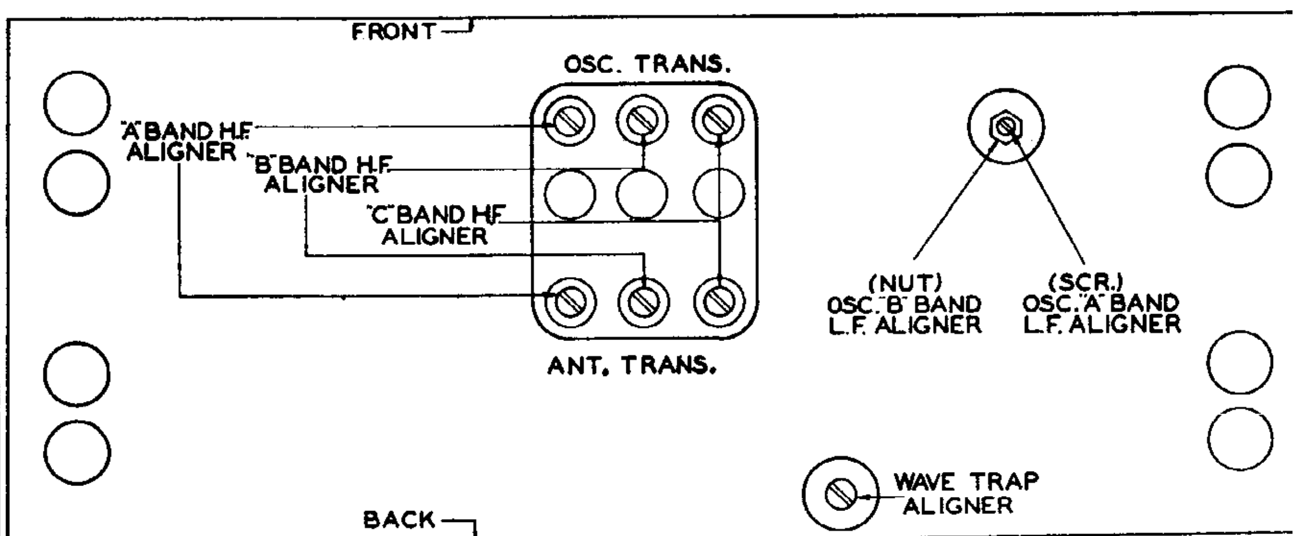


Fig. 2. View Through Chassis Mounting Shelf Showing Adjusting Screws for R. F. Aligning Capacitors.

MODELS 230H, 230HB
230L, 230LB, 231F
231FB, 231R, 231RB
231P, 231PB
Alignment, Voltage

STROMBERG-CARLSON TEL. MFG. CO.

In order to obtain maximum performance on the Standard Broadcast Range ("A" Range) of these receivers, a "signal admission control switch" is provided. This control is located on the inside rear flange of the chassis base, and has a slotted shaft which protrudes through the base so that it may be adjusted by the use of a screwdriver. When either the "B" or "C" ranges are in operation, this signal admission control is automatically cut out of the circuit, allowing the receiver to function at its maximum sensitivity on these two ranges. When operating in the Standard Broadcast Range, maximum sensitivity is obtained when the slotted shaft of this control is rotated to its maximum counter-clockwise position. To properly set this signal admission control, place the receiver in operation and then adjust this control so that clearest reception is obtained. The control should remain in this position. Do not readjust this control for each frequency. The above adjustment should be made in the evening if best results are to be obtained.

The volume control circuit in these receivers is arranged to give balanced reproduction at any setting of the volume control by means of a low level bass frequency compensating network.

A metal guard frame is furnished on these receivers to prevent damage to the chassis components and also to facilitate case of servicing should this become necessary. Do not turn the chassis over on its guard frame without first removing the tuning indicator unit which is secured to the metal guard frame. To remove the tuning indicator unit from the guard frame, first unscrew the knurled screw which holds the tuning indicator's clamp to the metal guard frame, which will then allow the tuning indicator unit to be removed from the guard frame.

The chassis used in the No. 230 Receivers differ from the chassis used in the No. 231 Receivers only in the type of electrolytic filter capacitors which are used. Two wiring diagrams are, therefore, shown in this book, one for the No. 230 Receiver Chassis, and one for the No. 231 Receiver Chassis.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1 shows the terminal layouts of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and an allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts.

			Terminals of Sockets								*Heater Voltages Between Heater Terminals*	
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6A8	Mod.—Osc.	0	0	0	−245	+100	−8	+155	*6.1*	+2.5	2–7	*6.1*
6K7	I. F. Amp.	0	0	0	−245	+100	+3	+160	*6.1*	+3	2–7	*6.1*
6H6	Dem.—A. V. C.	—	0	0	0	0	0	0	*6.1*	0	2–7	*6.1*
6F5	Audio Amp.	0	0	0	−250	+115	+150	+150	*6.1*	+1.7	2–7	*6.1*
6F6	Audio Output	—	0	0	+250	+255	0	0	*6.1*	+16	2–7	*6.1*
6G5	Tuning Ind.	—	0	+2.4	0	+250	0	*6.1*			1–6	*6.1*
5Y4G	Rectifier	—	0	0	*350*	0	*350*	0	+330	+330	7–8	*4.8*
Speaker Socket		—	+330	0	0	+330	+330	—	+255			

A. C. voltages are indicated by italics. Receiver tuned to 1000 kc., no signal.

In making any alignment adjustments, always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal. Before proceeding with the alignment of any circuits in these receivers be sure that the "Signal Admission Control" is set for the maximum sensitivity position and that the "Off-On-Tone" control knob is set for maximum treble response (position where knob is rotated from its maximum counter-clockwise position, slightly clockwise to position where set turns "on"). Figure 1 shows the location of all the aligning capacitors or adjustments for this receiver.

Except in the case of making any aligning adjustments of the radio frequency circuits in the No. 231-P Receivers, it will not be necessary to remove the chassis in these receivers from their cabinets in order to make any alignment adjustments. If it is necessary to make any alignment adjustments of the radio frequency circuits in the No. 231-P Receivers, it will be necessary to remove the chassis from the cabinet. To remove the chassis in these receivers, it is only necessary to remove the two bolts which hold the chassis shelf to the cabinet. In making any radio frequency circuit alignment adjustments in the No. 231-P Receivers, the chassis should be set at approximately the same position which it occupies when in the cabinet. With the exception of the Nos. 231-F and 231-R Receivers, the alignment adjustments for the intermediate frequency circuits are accessible from the rear of the receiver, and the adjustments for the radio frequency circuits are accessible through the apertures located in the bottom metal base plate of the chassis; these apertures are easily accessible either through the bottom of the cabinet or through the bottom of the cabinet shelf, depending upon the particular style of cabinet. In the Nos. 231-F and 231-R Receivers, the adjustments for the intermediate frequency circuits are accessible through the bottom of the cabinet, while the adjustments for the radio frequency circuits are not accessible until the backs of the cabinets are removed. See Figure 2. Never align any of these receivers without having the metal base plate fastened to the chassis base. In the Nos. 231-F and 231-R Receivers, it is important that the final alignment be made with the chassis mounted in the cabinet.

Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the gang tuning capacitor. To check whether the dial is set correctly with respect to the gang tuning capacitor, rotate the "Rapid Station Selector" knob in a clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the receiver turned "on", the illuminated dial indicator line should be exactly centered over the dial alignment lines (black lines) which are located at the extreme low frequency end of each scale on the dial. If these lines do not center over the illuminated dial indicator line, loosen the two set screws located on the hub of the dial. Then, rotate the dial so that these alignment lines are centered over the illuminated dial indicator line. The two set screws of the dial hub should then be securely tightened.

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 465 kilocycles. In making these circuit adjustments always align the circuits in the order given in these instructions.

1. Operate the "Range" switch of the receiver to the "A" range position. Set the receiver's tuning dial at its extreme low frequency position, and operate the Tone Control knob to the "Normal" position. Rotate the Volume Control knob to its maximum clockwise position (maximum volume).
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator-oscillator tube, a modulated signal of 465 kilocycles from the test oscillator, using a 0.1-microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal.
3. Now, noting from Figure 1 the aligning adjustments for the first and second I. F. transformers, align the I. F. circuits in the following manner:
   Secondary of second I. F. transformer.
   Primary of second I. F. transformer.
   Secondary of first I. F. transformer.
   Primary of first I. F. transformer.
   Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

Radio Frequency Adjustments

The alignment of the radio frequency circuits of the various ranges in these receivers should be very carefully made and in the order specified.

Alignment of Short Wave Range (Also Referred to as "C" Band)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the "C" range position, and set the test oscillator's frequency and the receiver's tuning dial to 17 megacycles.
2. Adjust the oscillator's "C" band high frequency aligner for maximum output.
3. Adjust the antenna's "C" band high frequency aligner for maximum output, at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Aircraft, Amateur, and Police Range (Also Referred to as "B" Band)

In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short-wave range.

1. Operate the Range Switch on the receiver chassis to the "B" range position, and set the test oscillator's frequency and the receiver's tuning dial to five megacycles.
2. Adjust the oscillator's "B" band high frequency aligner for maximum output.
3. Adjust the antenna's "B" band high frequency aligner for maximum output, and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
4. Set the test oscillator's frequency and the receiver's tuning dial to 1.8 megacycles.
5. Adjust the oscillator's "B" band low frequency aligner (series aligner), and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
6. Reset both the test oscillator's frequency and the receiver's tuning dial to 5 megacycles and repeat operations Nos. 2 and 3.

Alignment of Standard Broadcast Range (Also Referred to as "A" Band)

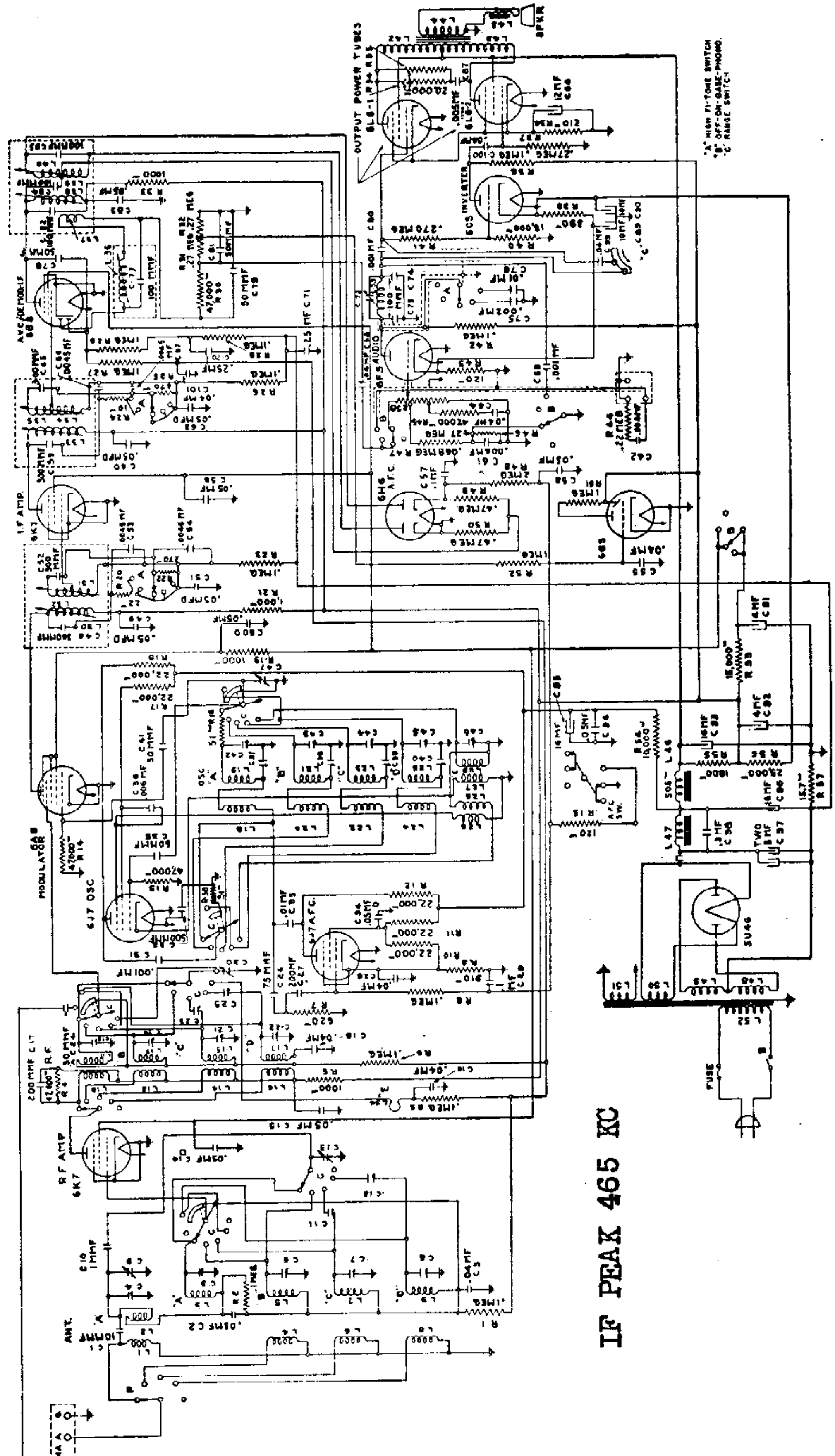
In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Operate the Range Switch to the "A" range position and set the test oscillator's frequency and the receiver's tuning dial to 1.4 megacycles.
2. Adjust the oscillator's "A" band high frequency aligner for maximum output.
3. Adjust the antenna's "A" band high frequency aligner for maximum output.
4. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
5. Adjust the oscillator's "A" band low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
6. Reset both the test oscillator's frequency and receiver's tuning dial to 1.4 megacycles and repeat operations Nos. 2 and 3.

Wave Trap Adjustment

In adjusting the wave trap circuit, the "Signal Admission Control" should be set for the most sensitive position (shaft rotated in the most counter-clockwise direction). Set the Range Switch of the receiver to the "A" range position and the tuning dial to 1000 kilocycles. Connect a 200-micro-microfarad capacitor in series with the output terminal of the modulated test oscillator and the antenna binding post on the receiver, and the ground terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 465 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a minimum indication is obtained on the output meter.

STROMBERG-CARLSON TEL. MFG. CO. Schematic



MODELS 250L, 250LB
Voltage, Trimmers
Phono. Data

STROMBERG-CARLSON TEL. MFG. CO.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

			Terminals of Sockets								Heater Voltages Between Heater Terminals	
Tube	Circuit	Cap	1	2	3	4	5	6	7	8	Socket Terminal Numbers	Volts
6K7	R. F. Amp.	0	0	0	+230	+90	0	+80	*6.1*	0	2–7	*6.1*
6A8	Modulator	0	0	0	+230	+80	−2.0	+80	*6.1*	0	2–7	*6.1*
6J7	Oscillator	0	0	*6.1*	+60	+180	0	0	0	0	2–7	*6.1*
6J7	Oscillator Control	0	0	0	+190	+110	+5.8	0	*6.1*	+5.8	2–7	*6.1*
6K7	I. F. Amp.	0	0	0	+235	+90	0	0	*6.1*	0	2–7	*6.1*
6B8	I. F. Amp.—Dem.—A. V. C.	0	0	*6.1*	+225	−0.1	−0.1	+90	0	0	2–7	*6.1*
6H6	A. F. C. Discriminator	—	0	0	−0.25	0	−0.2	−0.2	*6.1*	0	2–7	*6.1*
6F5	Audio Amp.	0	0	0	+135	+135	0	0	*6.1*	+1.3	2–7	*6.1*
6C5	Audio Amp.	—	0	0	+100	+135	0	+1.3	*6.1*	+5.2	2–7	*6.1*
6L6 No. 1	Audio Output	—	0	0	+300	+305	0	0	*6.1*	+22	2–7	*6.1*
6L6 No. 2	Audio Output	—	0	0	+300	+305	0	0	*6.1*	+22	2–7	*6.1*
6G5	Tuning Indicator	—	*6.1*	+0.5	−0.2*	+245	0	0	—	—	1–6	*6.1*
5U4G	Rectifier	—	0	+430	—	*395*	—	*395*	—	+430	2–8	*4.8*
Speaker Socket		—	+420	0	0	+430	+430	0	+320	—		

A. C. voltages are indicated by italics. Receiver tuned to 1000 kc., no signal.

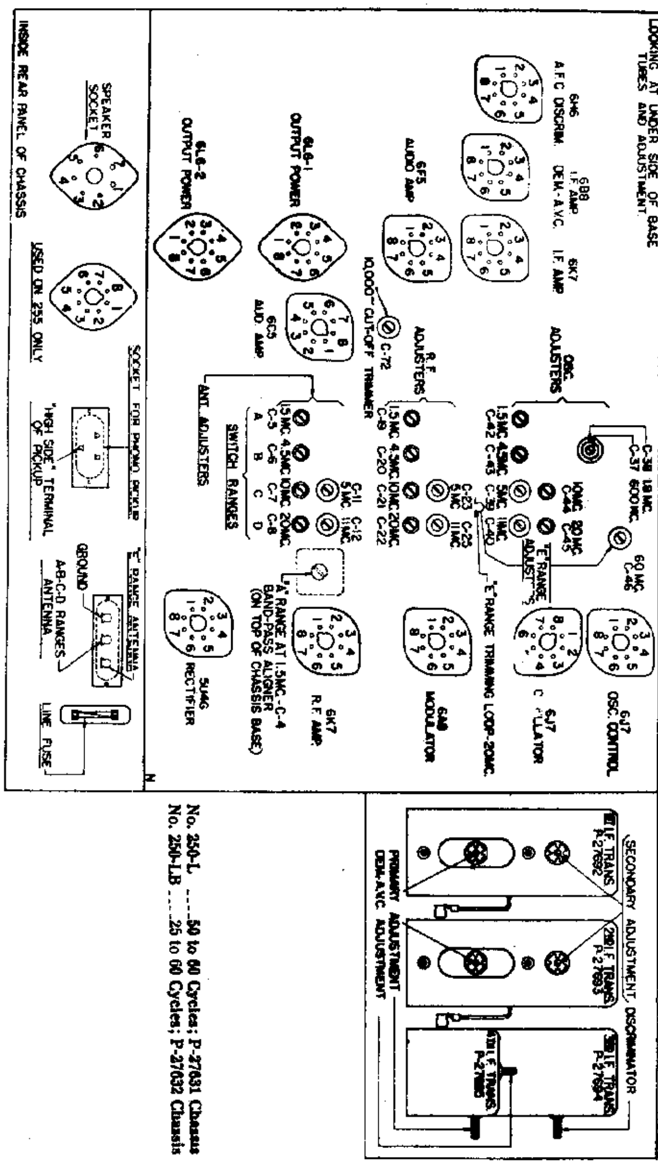
PROCEDURE FOR OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

A socket having three contacts is provided on the rear of the chassis base, and is wired to the "Off-On-Bass-Phonograph" switch assembly located on the front of the receiver. A three prong plug is also inserted in the socket so that if at any time it is desired to use an electric pick-up and phonograph unit in conjunction with this receiver, it may readily be accomplished.

In order to obtain the best quality of phonograph reproduction from this receiver, a Stromberg-Carlson No. 10 Record Player is recommended. This record player is equipped with a correctly designed single record playing motor unit, and uses a crystal type pick-up in conjunction with a specially equalized circuit. To attach this instrument to a No. 250 Receiver, it is only necessary to remove the three-prong plug furnished with the receiver and insert the three-prong plug which comes with the unit into the three-prong socket located on the rear of the chassis base. Then, the power supply plug of the phonograph unit should be inserted into a suitable power supply receptacle, and the unit will be ready for use.

If the Stromberg-Carlson No. 10 Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to connect a low capacity shielded cable between the three-prong plug furnished with the receiver and the pick-up. This shielded cable should be of the low capacity type, in order to prevent the excessive cutting of high frequencies which is caused when a shielded cable having high capacity is used. The length of the shielded cable used should be kept as short as possible.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong plug and the pick-up. The transformer should be located as near to the receiver as possible, in which case it will not be necessary to use a shielded cable.



No. 250-L ....50 to 60 Cycles; P-27631 Chassis
No. 250-LB ....25 to 60 Cycles; P-27632 Chassis

Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Adjustments.

Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the gang tuning capacitor. To check whether the dial is set correctly with respect to the gang tuning capacitor, rotate the "Rapid Station Selector" knob in a counter-clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the receiver turned "on", the illuminated dial indicator line should be exactly centered over the dial alignment lines (black lines) which are located at the extreme low frequency end of each scale on the dial. If these lines do not center over the illuminated dial indicator line, loosen the two set screws located on the hub of the dial. Then, rotate the dial so that these alignment lines are centered over the illuminated dial indicator line. The two set screws of the dial hub should then be securely tightened.

Intermediate Frequency and A. F. C. Circuit Adjustments

The intermediate frequency system employed in this receiver is a complex circuit. The first I. F. amplifier is coupled to the second I. F. amplifier through the No. 6K7 tube. The second and third I. F. transformers are coupled through the pentode section of the No. 6B8 tube. The third I. F. transformer is in effect a distributing network rather than a transformer only; it contains a primary winding coupled to two other networks. One of these networks links the diode stage (Demodulator-A. V. C.) with the I. F. signal, while the other network resembles the secondary of a push-pull transformer and constitutes the tuned "Discriminator" circuit. This "Discriminator" network operating into the No. 6H6 tube supplies the characteristic voltage demanded by the oscillator control tube. The fourth I. F. transformer feeds the diode plates of the No. 6B8 tube.

The intermediate frequency used in these receivers is 465 kilocycles. Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed:

1. Operate the Range Switch of the receiver to the "A" range position, and set the tuning dial to its extreme low frequency position. Set the Fidelity Control to its "Normal" position, the Automatic Frequency Control knob to the "Off" position and the "Off-On-Bass" Control knob to its "Normal" position. **Never attempt to align the R. F. or I. F. circuits of this receiver with the Fidelity Control knob set at any position other than the "Normal Fidelity" position, and the Automatic Frequency Control knob set at the "On" position unless specifically directed in the following paragraphs.**
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator tube, a modulated signal of 465 kilocycyes from the signal generator, using a 0.1 Mfd. capacitor in series with the connection between the output terminal of the signal generator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the signal generator should be connected to either the chassis base or the ground binding post terminal.
3. Now noting from Figure 1, the alignment adjustments for the First, Second, Third, and Fourth I. F. Transformers, align the I. F. circuits in the following manner:

   Adjust the third I. F. transformer primary circuit for maximum output.

   Adjust the fourth I. F. transformer circuit for maximum output.

   Adjust the third I. F. transformer "Discriminator" circuit midway between the peaks where maximum output is obtained.

   Adjust the second I. F. transformer secondary circuit for maximum output.

   Adjust the second I. F. primary circuit for maximum output.

   Adjust the first I. F. secondary circuit for maximum output.

   Adjust the first I. F. primary circuit for maximum output.

Carefully make all the above adjustments, watching carefully the output meter and reduce the output of the test oscillator as required.

To make the final adjustment of the "Discriminator" circuit proceed as follows:

Check the position of the A. F. C. control knob which should be set to the "off" position. **Before making this circuit adjustment be sure that the I. F. Amplifier is tuned exactly to 465 kilocycles.** With the signal generator still set at a frequency of 465 kilocycles, adjust the signal generator's output control so that a signal of 50,000 to 100,000 microvolts is fed into the No. 6A8 Modulator tube. Now observe the reading of the milliammeter which is connected in series with the cathode of the No. 6J7 oscillator control tube. Rotate the A. F. C. Control knob to the "on" position, and observe whether there is any difference in the reading of the milliammeter. When this circuit is correctly adjusted, there should be no difference in the reading of the milliammeter when the A. F. C. Control knob is rotated from the "off" to the "on" position. If there is any difference in the milliammeter reading while rotating the Automatic Frequency Control knob to the "off" and "on" position, at a rate of about two cycles per second, adjust the "Discriminator" circuit by means of the screw adjustment located on the third I. F. transformer until the meter reading has the same value regardless of whether the A. F. C. Control knob is rotated to the "on" or "off" position. When this condition is obtained the "Discriminator" circuit of these receivers is properly adjusted.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

When making any aligning adjustments of these circuits, the A. F. C. Control knob should be rotated to the "off" position, the Fidelity Control knob should be set for "Normal" operation, and the "Off-On-Bass-Phonograph" Control knob should also be set for "Normal" operation.

Alignment of Ultra-Short Wave Range (Also referred to as "E" Band)

In order to align the circuits of this range, it is desirable to have a signal generator whose high frequency range will go to 60 megacycles. Such equipment, however, is rare and costly, and in most cases it will be necessary to make use of a signal generator whose high frequency range does not extend beyond 20 megacycles, using harmonics of 20 megacycles for aligning this range on 60 megacycles.

In aligning the radio frequency circuits for this range, replace the 0.1 mfd. capacitor which was placed in series with the signal generator's output lead for the I. F. alignment with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post marked "U. H. A." located on the rear of the receiver chassis. The ground terminal (or low side) of the signal generator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the "E" range position and set the signal generator's frequency and the receiver's tuning dial to 60 megacycles.
2. Adjust the aligning capacitor C-46 until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 20 megacycles and adjust the "E" range trimming loop, L-54, until maximum voltage output is obtained on the output meter. The adjustment of this loop is obtained by distorting its normally circular shape until it offers the correct inductive effect. If the oscillator does not track with the tuning dial scale at this frequency, it will be necessary to also adjust the oscillator's tuning loop.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 60 megacycles and repeat operation No. 2.

Alignment of Short-Wave Range (Also referred to as "D" Band)

In aligning the radio frequency circuits for this range use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the signal generator as was used for aligning the Ultra-Short Wave Range. Connect this lead to the antenna binding post marked "A" located on the rear of the receiver chassis, and align as follows:

1. Operate the Range Switch on the receiver chassis to the "D" range position and set the signal generator's frequency and the receiver's tuning dial to 20 megacycles.
2. Adjust aligning capacitors C-45, C-22, and C-8 respectively; and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 11 megacycles and adjust aligning capacitors C-40, C-25, and C-12 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 20 megacycles and repeat operation No. 2.

Alignment of Short-Wave Range (Also referred to as "C" Band)

In aligning the radio frequency circuits for this range use the same artificial antenna and binding post on the receiver chassis as was used for aligning the "D" range.

1. Operate the Range Switch on the receiver chassis to the "C" range position and set the signal generator's frequency and the receiver's tuning dial to 10 megacycles.
2. Adjust the aligning capacitors C-44, C-21, and C-7 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 5 megacycles and adjust the aligning capacitors C-39, C-23, and C-11 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 10 megacycles and repeat operation No. 2.

Alignment of Aircraft Range (Also referred to as "B" Band)

In aligning the radio frequency circuits for this range, use the same artificial antenna and antenna binding post as was used for aligning the "C" range, and align this range as follows:

1. Operate the Range Switch on the receiver chassis to the "B" range position and set the signal generator's frequency and the receiver's tuning dial to 4.5 megacycles.
2. Adjust the aligning capacitors C-43, C-20, and C-6 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 1.8 megacycles and adjust the aligning capacitor C-38 and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 4.5 megacycles and repeat operation No. 2.

Alignment of Standard Broadcast Range (Also referred to as "A" Band)

In aligning the radio frequency circuits for this range, replace the 400-ohm resistor in series with the signal generator's output with a 200-micro-microfarad capacitor and align this range as follows:

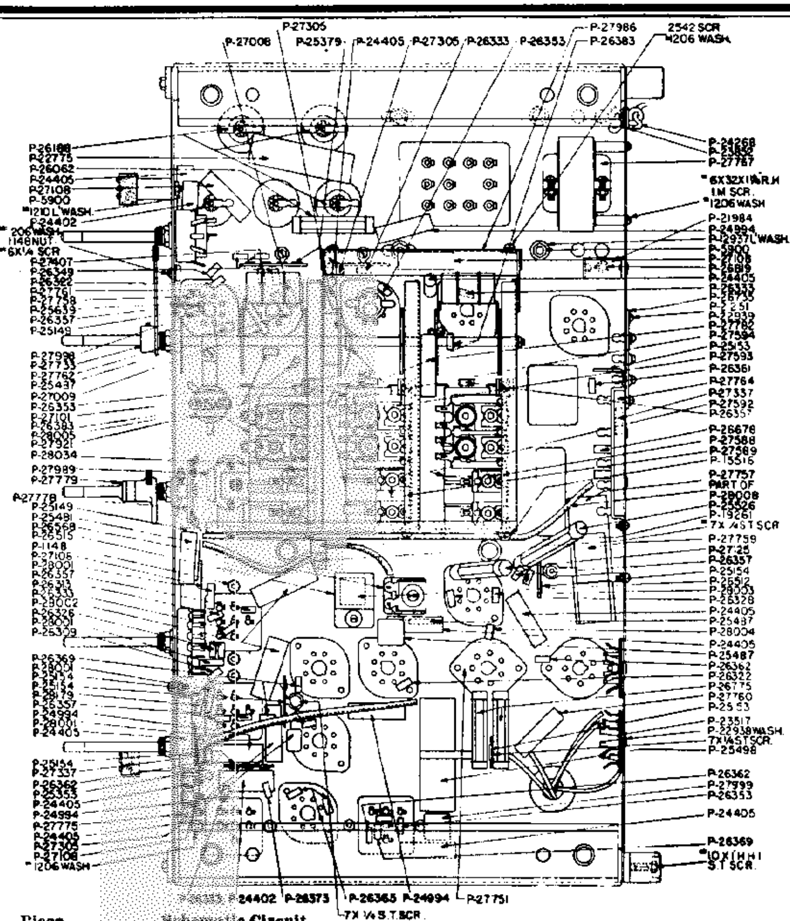
1. Operate the Range Switch to the "A" range position and set the signal generator's frequency and the receiver's tuning dial to 1.5 megacycles (1500 kilocycles).
2. Adjust the aligning capacitors C-42, C-19, C4, and C-5 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 0.6 megacycles (600 kilocycles) and adjust the aligning capacitor C-37; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 1.5 megacycles and repeat operation No. 2.

Adjustment of 10 Kilocycle Audio Cut-Off Filter

The adjustment of this filter is correctly made at the factory and no additional adjustment is required.

MODELS 250L, 250LB
Chassis, Parts

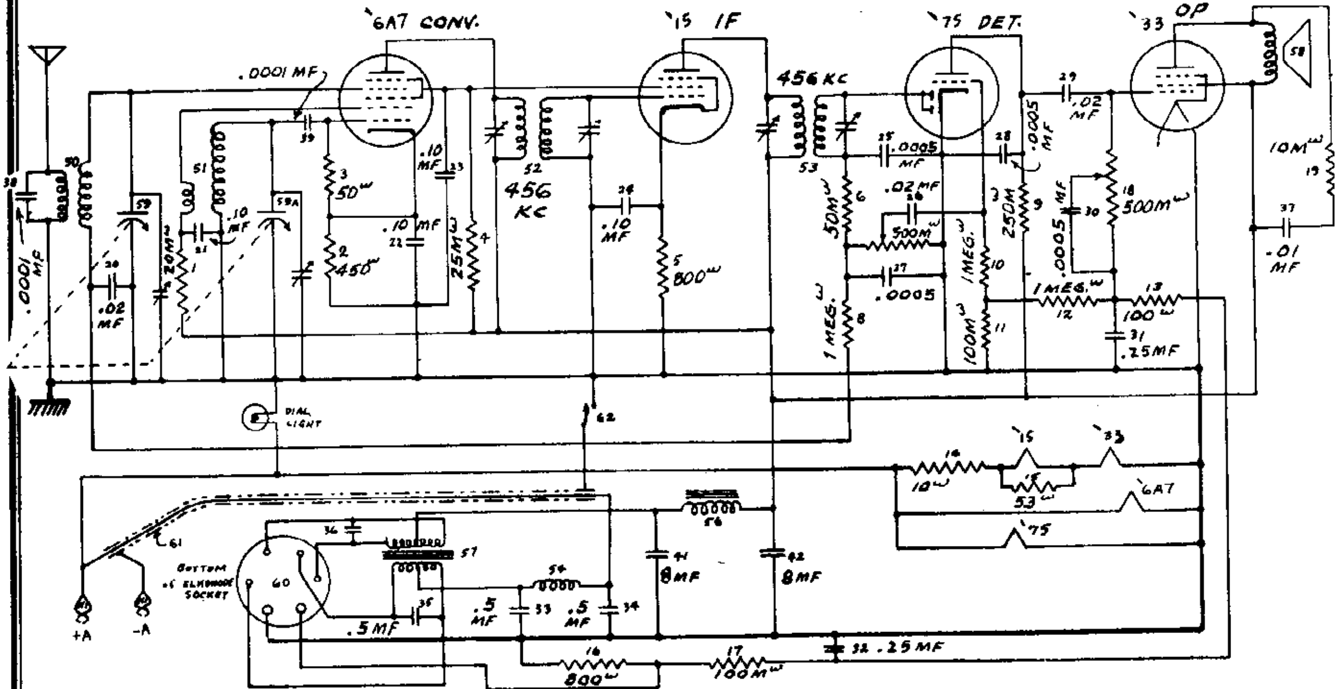
STROMBERG-CARLSON TEL. MFG. CO.



Piece Number	Schematic Circuit Designation	Part
21984	.	Fuse Block Assembly
22775	C98	Capacitor, .4 Mfd.
23517	.	Tube Socket, 7 Prong
24268	.	Cord, Power Supply
24314	C1	Capacitor, Type "O", 10 Mmfd.
24402	C29, C57	Capacitor, .1 Mfd.
24405	C3, C16, C18, C28, C55, C64, C68, C99, C100, C101	Capacitor, .04 Mfd.
24559	C84	Capacitor, Type "O", 100 Mmfd.
24994	C15, C36, C28, C83	Capacitor, .05 Mfd.
25149	C33, C76	Capacitor, .01 Mfd.
25481	C75	Capacitor, .002 Mfd.
25487	C31, C62, C80	Capacitor, Type "W", .001 Mfd.
25498	C89, C90	Electrolytic Capacitor, 10 Mfd., 25 Volts; 10 Mfd., 25 V
25526	R53	Resistor, Type "F", 15,000 Ohms
25539	.	Tube Socket, 8 Prong
26062	R54	Resistor, Type "F", 10,000 Ohms
26287	.	Pilot Lamp
26309	R24	Resistor, Type "E", 10 Ohms
26313	R20	Resistor, Type "E", 22 Ohms
26322	R15, R43	Resistor, Type "E", 120 Ohms
26326	R22, R25	Resistor, Type "E", 270 Ohms
26328	R39	Resistor, Type "E", 390 Ohms
26339	R5, R19, R21, R33	Resistor, Type "E", 1,000 Ohms
26349	R10, R11, R12, R17	Resistor, Type "E", 22,000 Ohms
26353	R4, R13, R14, R30, R45	Resistor, Type "E", 47,000 Ohms
26357	R2, R8, R23, R26, R29, R38, R42	Resistor, Type "E", .1 Megohm
26361	R44	Resistor, Type "E" .22 Megohm
26362	R31, R32, R37, R46	Resistor, Type "E", .27 Megohm
26365	R49, R50	Resistor, Type "E", .47 Megohm
26369	R27, R28, R51, R52	Resistor, Type "E", 1 Megohm
26373	R48	Resistor, Type "E", 2.2 Megohms
26383	R1, R3, R6	Resistor, Type "EI", .1 Megohm
26410	.	Grid Clip Assembly
26417	C10	Capacitor (Gimmick)
26512	C73, C74	Capacitor, Two, Type "W", 100 Mmfd.
26515	L53	Coil Assembly (High Frequency Cut-Off Filter)
26531	.	Socket (Tuning Indicator Tube)
26568	C72	Capacitor (High Frequency Cut-Off Filter)
26678	.	Socket, Phonograph Unit
26735	.	Antennas and Ground Binding Posts
26751	.	Switch Assembly, "Off-On-Bass-Phono" Control
26775	R34, R35	Resistor, Type "F", 20,000 Ohms
26819	.	Fuse, 5 Amperes
27008	C36	Capacitor, Type "W", .006 Mfd.
27009	C32	Capacitor, Type "Z", 500 Mmfd.
27073	C77, C82, C85	Capacitor, 100 Mmfd.
27092	.	Rubber Bushing
27101	C17	Capacitor, Type "O", 200 Mmfd.
27105	.	Washer, Felt
27106	.	Washer, Dial Clamp
27108	C14, C34, C49, C50, C51, C60, C63, C94	Capacitor, Two, .05 Mfd.
27121	.	Insulating Tube
27125	R56	Resistor, Type "F", 25,000 Ohms
27305	C24, C35, C41, C78	Capacitor, Type "O", 50 Mmfd.
27309	C48, C52, C59, C65	Fixed Capacitor, First I. F. Transformer
27337	C61, C62	Capacitor, Type "W", .004 Mfd.
27407	R18	Resistor, Type "EB", 22,000 Ohms
27411	.	Clamp Assembly
27504	L45, L46	Loud Speaker
27569	R60	Potentiometer, Volume Control
27588	C5, C6, C7, C8, C11, C12	Capacitors, Aligning
27589	C19, C20, C21, C22, C23, C25	Capacitors, Aligning
27592	L3, L4, L5, L6, L7	Bi-Resonator Coil "A" Range, Antenna Transformer "B" and "C" Ranges
27593	L10, L11, L12, L13, L14, L15	R. F. Transformer, "A", "B", and "C" Ranges.
27594	L18, L19, L20, L21, L22, L23	Oscillator Transformer, "A", "B", and "C" Ranges
27606	.	Range Switch Assembly
27635	L48, L49, L50, L51, L52	Power Transformer (50 to 60 Cycles Chassis)
27636	L48, L49, L50, L51, L52	Power Transformer (25 to 60 Cycles Chassis)
27643	L8, L9	Antenna Transformer, "D" Range
27644	L16, L17	R. F. Transformer, "D" Range
27645	L24, L25	Oscillator Transformer, "D" Range
27692	L30, L31, L32	First I. F. Transformer
27693	L33, L34, L35	Second I. F. Transformer
27694	L37, L38, L39, L40	Third I. F. Transformer
27695	L36	Fourth I. F. Transformer
27710	C9, C13, C30, C47	Gang Tuning Capacitor
27753	C97	Electrolytic Capacitor, 8 Mfd., 500 Volts
27754	C96	Electrolytic Capacitor, 16 Mfd., 480 Volts
27755	C93	Electrolytic Capacitor, 16 Mfd., 350 Volts
27756	C95	Electrolytic Capacitor, 16 Mfd., 300 Volts
27757	C91, C92	Electrolytic Capacitor, 4 Mfd., 250 Volts; 4 Mfd., 100 Volts
27758	C26	Capacitor, Type "O", 75 Mmfd.
27759	C58	Capacitor, 12 Mfd., 30 Volts
27760	C87	Capacitor, .005 Mfd., 1,000 Volts
27761	R7	Resistor, Type "E", 620 Ohms
27763	R9	Resistor, Type "EB", 910 Ohms
27764	R36, R55, R57	Resistor, "B" Voltage Divider
27765	L42, L43, L44	Output Transformer
27767	L47	Choke Assembly
27769	L1, L2	Antenna Transformer, "A" Range
27773	.	Switch Assembly, High Fidelity-Tone Control
27778	.	Switch, A. F. C.
27779	.	Crank Arm
27782	C2	Capacitor, .03 Mfd.
27863	C4	Capacitor, H. F. Aligner for "A" Range Antenna Transformer
27916	L26, L27, L28, L29	Oscillator Transformer, "E" Range
27931	C46	Capacitor, Aligner, "E" Range
27966	.	Shield, "D" and "E" Range Coils
27968	L54	Antenna Transformer Tuning Loop, "E" Range
27989	C37, C38	L. F. Aligners for "A" and "B" Range Oscillators
27994	.	Pilot Lamp Socket Assembly
27996	.	Cable Assembly (Tuning Indicator Unit)
27998	C27	Capacitor, Type "O", 200 Mmfd.
27999	C79, C81	Capacitor, Type "WD", 50 Mmfd.
28001	C53, C54, C66, C67	Capacitor, Type "W", .0045 Mfd.
28002	C70, C71	Capacitor, .25 Mfd., 150 Volts
28003	R40	Resistor, Type "E", 15,000 Ohms
28004	R41	Resistor, Type "E", .27 Megohm
28005	R16, R58	Resistor, Type "E", 51 Ohms
28008	.	Cable Assembly, Phonograph Switch to Phonograph Socket
28034	C39, C40, C42, C43, C44, C45	Capacitors, Aligning
28179	R47	Resistor, Type "EB", 68,000 Ohms

L. TATRO PRODUCTS CO.

MODEL M-4616
Schematic, Voltage
Alignment



Normal voltage readings from points indicated to chassis:

TUBE	USE	(a) CATHODE	(b) SCREEN	(b) PLATE
6A7	Convertor	2.25 V.	60 V.	115 V. *80 V.
15	I.F. Ampl.	1.75 V.	60 V.	115 V.
75	Detector	0		52.5 V.
33	Output Tube		115 V.	110 V.

(a) Measured with a voltmeter having a resistance of 30M ohms.
(b) Measured with a voltmeter having a resistance of 300M ohms.
(*) 6A7 anode grid volts.

All readings taken with volume control full open and, zero signal input to receiver.

"L'TATRO" MODEL M-4616 ALIGNMENT PROCEDURE

ALIGNMENT MUST BE DONE WITH THE AID OF A CORRECTLY CALIBRATED SIGNAL GENERATOR OF RELIABLE MAKE USED IN CONJUNCTION WITH A HIGH RESISTANCE OUTPUT METER. THE LATTER IN SERIES WITH A LARGE PAPER DIELECTRIC CONDENSER SHALL BE CONNECTED FROM PLATE TO SCREEN OF THE OUTPUT TUBE.

I. F. ADJUSTMENT: Connect the ground side of the signal generator to the receiver chassis and the other side through a .005 mfd. condenser to the I.F. tube grid clip. Set the generator at 456 K.C. Using as low an input as possible adjust the trimme screws on item 53 for maximum response. Next connect the .005 condenser to the 6A7 gri clip and adjust the trimmers on item 52 for maximum output. If double peaks or high output and overloading occur reduce the signal input. SLIGHTLY HIGHER GAIN MAY BE OBTAINE BY NOW READJUSTING THE TRIMMERS ON ITEM 53. THIS SHOULD NOT BE DONE UNLESS ABSOLUTELY NECESSARY AS SOME REGENERATION IS INTRODUCED AND MAY CAUSE EXCESSIVE HISS WHEN A CARRIE IS TUNED IN.

R.F. ADJUSTMENT: Connect the ground side of the signal generator to the receive chassis and the other side through a .0002 mfd. condenser to the antenna lead. Set receiver dial and signal generator at 1400 K.C. and adjust the trimmer screws on item 5 and 59A for maximum response.

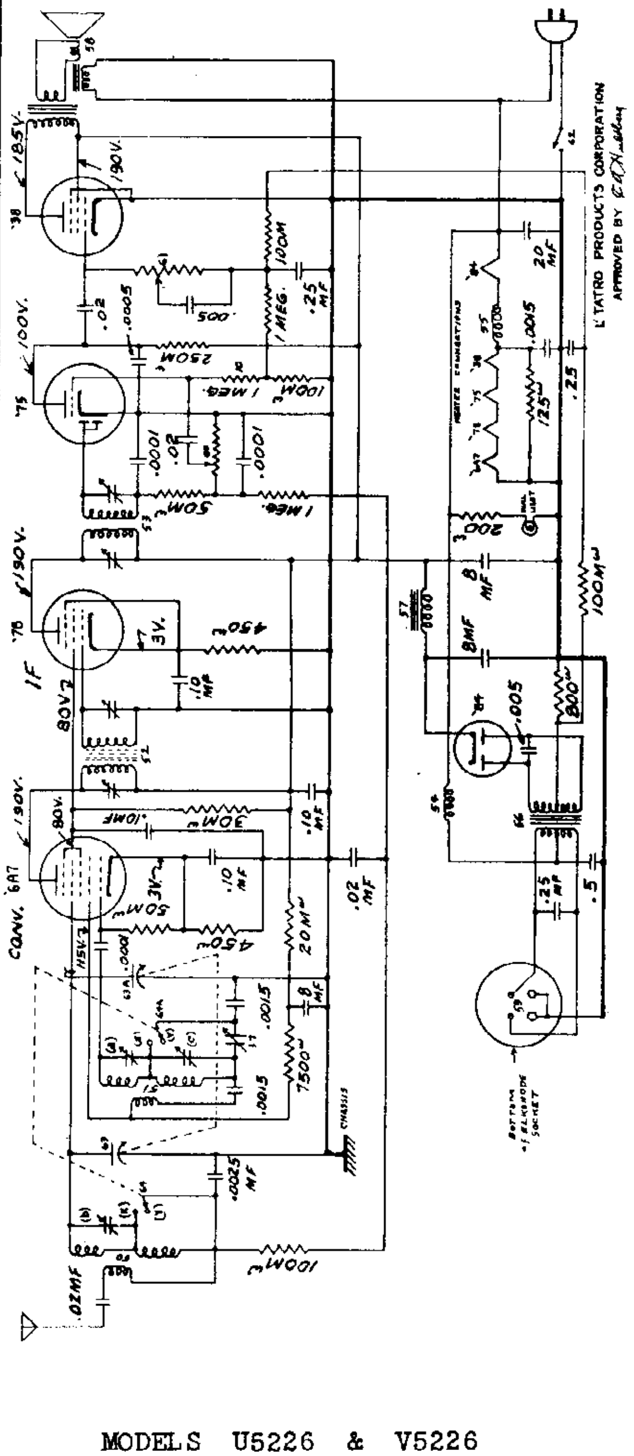
When the above procedure is completed the receiver is correctly aligned and sho operate satisfactorily on the air.

Under normal circumstances the use of a single wire antenna 100 feet long, with lead-in at one end is recommended.

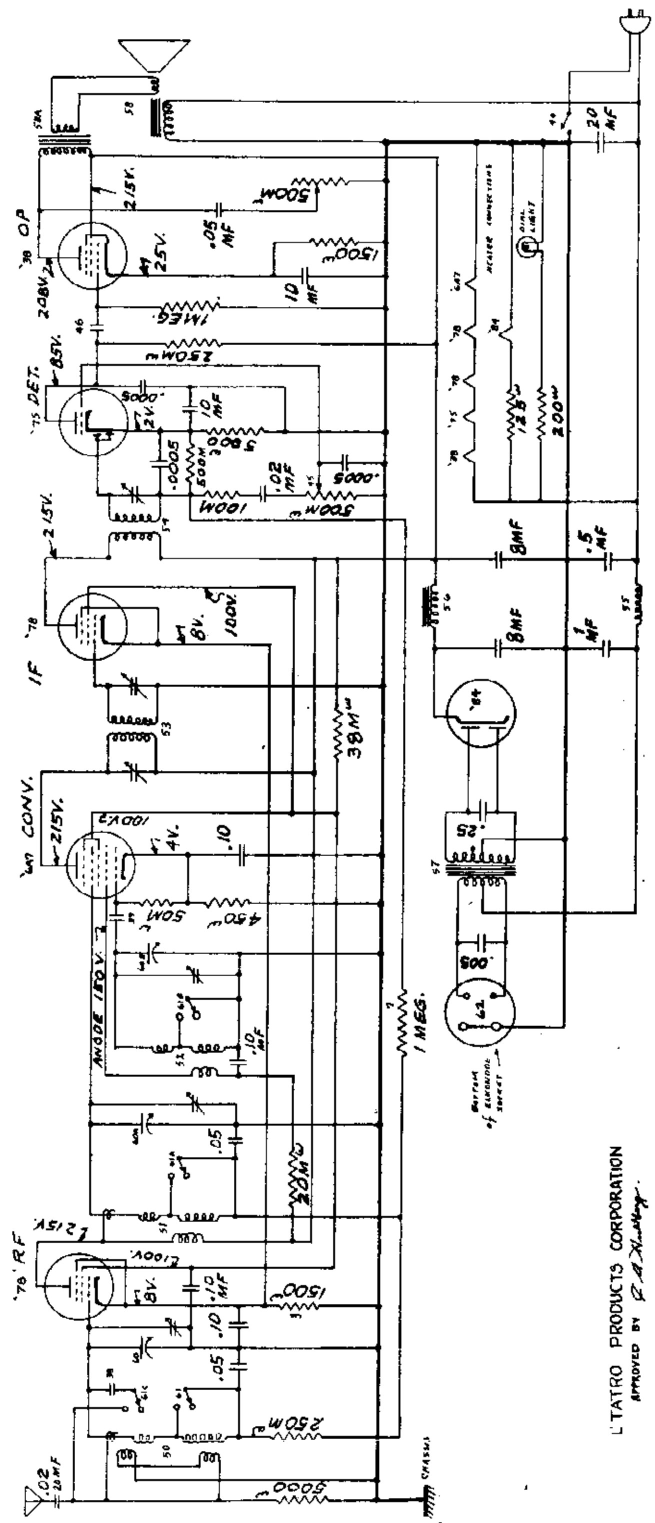
IN ALL ABOVE ALIGNMENT PROCEDURE THE VOLUME AND TONE CONTROLS MUST BE AT MAXIMU POSITION.

MODELS U-5226, V-5226
MODEL T-6216
Schematics, Voltage

L. TATRO PRODUCTS CO.



MODELS U5226 & V5226

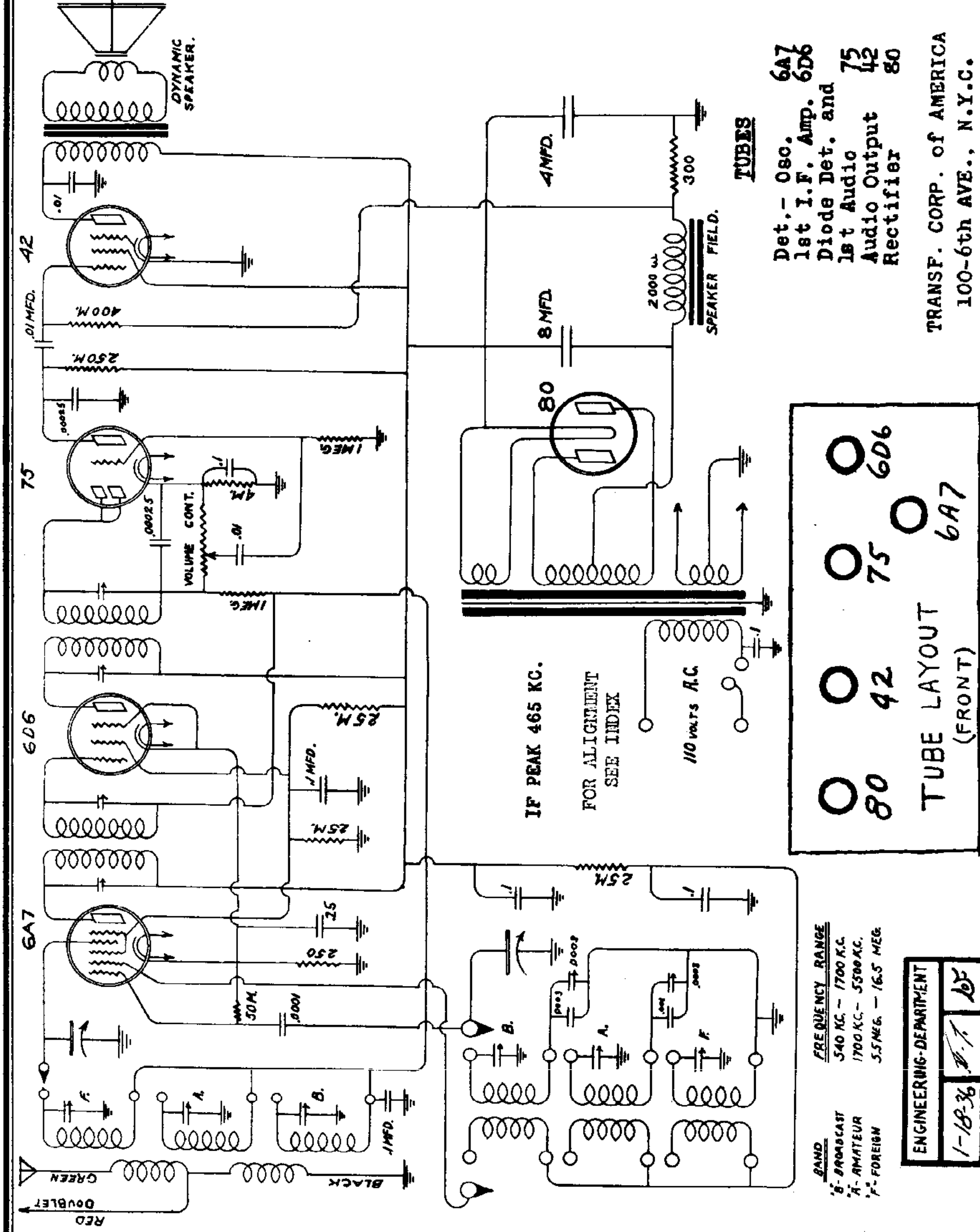


MODEL T6216

MODEL TC-6
Schematic, Socket

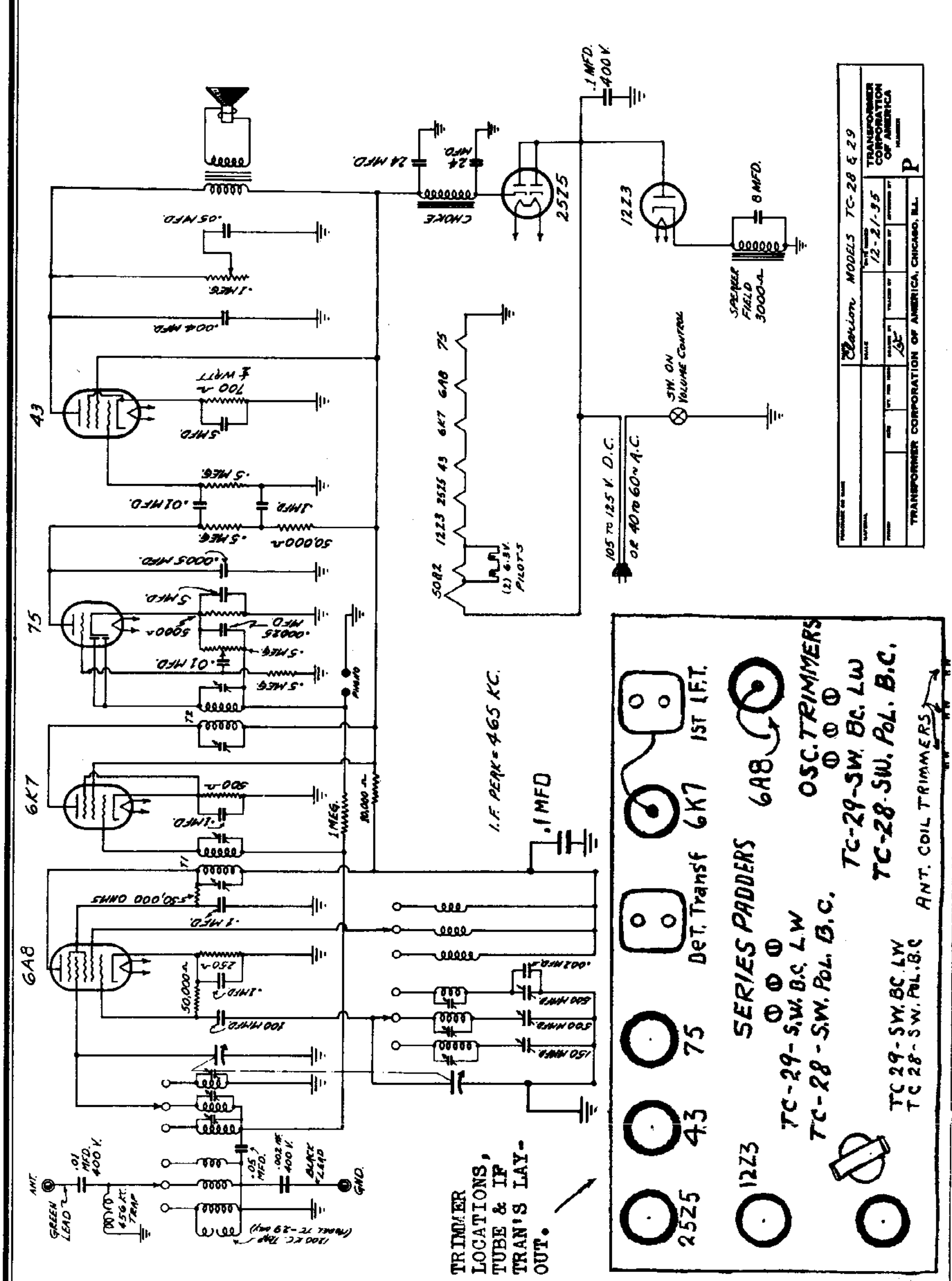
TRANSFORMER CORP. OF AMER.

CLARION MODEL TC - 6
5 TUBE 3 BAND A.C. SUPERHETERODYNE RECEIVER



MODELS TC-28, TC-29
Schematic, Socket
Trimmers

TRANSFORMER CORP. OF AMER.



TRANSFORMER CORP. OF AMER.

SERVICE NOTES FOR THE CLARION MODEL TC-6
FIVE TUBE THREE BAND A.C. SUPERHETERODYNE RECEIVER

ALIGNMENT PROCEDURE

Realignment of this receiver should not be attempted unless all other possible causes of faulty operation have been thoroughly investigated, and then only by an experienced service man. An accurately calibrated signal generator which will cover the necessary wave-bands and an output meter for indicating the effect of adjustments are required.

It is essential that in all the following tests the signal generator output be attenuated as much as possible at all times and that the receiver volume control be always set at maximum.

I.F. ALIGNMENT - The signal generator is set at 456 kc. and is connected to the grid of the first detector (6A7) tube. With the oscillator section of the tuning condenser short-circuited the i.f. trimmers are adjusted for maximum output. These may be found on top of the i.f. transformer shield cans in the right hand rear corner of the chassis.

FOREIGN BAND ADJUSTMENT - The high side of the signal generator is connected to the antenna post of the receiver and the low side of the signal generator is connected to the ground post. The receiver and the signal are both tuned to a frequency of 16 mc. with the selector switch in position for this band. The oscillator trimmer is adjusted for maximum receiver output. This trimmer is located on the oscillator coil on the under side of the chassis. It is the right hand one of the three trimmers found here. The antenna preselector for this band is then adjusted in the same manner. This is found on the preselector coil on the top side of the chassis and is the right hand one of the three found here.

AMATEUR BAND ADJUSTMENT - With the band selector switch in position for operation on this band, and the receiver and signal generator both set at 5.4 mc., the procedure outlined above is repeated. The oscillator trimmer for this band is found on the oscillator coil on the under side of the chassis and is the center one of the three. The preselector trimmer is found on the preselector coil on top of the chassis and is the center one of the three.

The signal generator should then be set at 1.7 mc. and the signal tuned in on thedial. The series padder for this band should be adjusted for maximum output while the receiver dial is rocked slightly back and forth. The 5.4 mc. setting should then be rechecked. The padder is located on the right side of the front chassis skirt and is the left hand one of the two located here.

BROADCAST BAND ADJUSTMENT - With the band selector switch in position for operation on this band and the receiver and signal generator both set at 1400 kc. the procedure outlined above is repeated. The oscillator and preselector trimmers are found on the tops of their respective coils and are on the extreme left in each case.

The signal generator should then be set at 600 kc. and the signal tuned in on the dial. The series padder for this band should be adjusted for maximum output while the receiver dial is rocked slightly back and forth. The 1400 kc. adjustment should then be rechecked as the subsequent adjustments have a detuning effect on this circuit. This padder is located on the right hand side of the front chassis skirt and is the right hand one of the two located here.

SERVICE NOTES FOR THE CLARION MODELS TC-28 & TC-29
SEVEN TUBE THREE BAND A.C.-D.C. SUPERHETERODYNE RECEIVERS

ALIGNMENT PROCEDURE

Realignment of this receiver should not be attempted except by an experienced service man, and then only after all possible causes of faulty operation have been thoroughly investigated. An accurately calibrayed signal generator which will cover the various bands and a suitable output meter for indicating the effects of adjustments are required.

I.F. ADJUSTMENT - The signal generator is set at 465 kc. and its output connected between the control grid of the first detector (6A8) tube and the ground post of the receiver. The oscillator (rear) section of the tuning condenser is short-circuited and the volume control set at maximum. The signal generator output is attenuated as much as possible and the i.f. trimmers adjusted for maximum gain. These trimmers are found in the right hand rear corner of the chassis., on top of the i.f.t. shield cans.

1400 KC. ADJUSTMENT - The signal generator is set at 1400 kc. and its output connected between the aerial and ground posts of the receiver. It is extrimely important that a weak signal be used in order to prevent the a.v.c. action from nullifying the effect of adjustments. The receiver dial is set at the same frequency and with the volume control at maximum, the 1400 kc. trimmer is adjusted for greatest gain. The series padder for this band should now be adjusted by setting the signal generator at 600 kc. and tuning the signal in on the receiver dial. This padder should be adjusted for maximum response while the tuning condenser is rocked slightly back and forth. The 1400 kc. adjustment should then be rechecked.

The location of all the r.f. trimmers are shown on the accompanying sketch.

SHORT WAVE BAND ADJUSTMENT - For this band the oscillator and antenna coil trimmers should be adjusted at 16 megacycles in the manner described above and the series padder adjustment made at 5.7 megacycles.

LONG WAVE BAND ADJUSTMENT - This adjustment is for the model TC-29 only. The oscillator and antenna coil trimmers should be adjusted at 375 kc. as outlined above, and the series padder at 150 kc.

POLICE BAND ADJUSTMENT - This adjustment is for the model TC-28 only. The oscillator and antenna coil trimmers should be adjusted at 3500 kc. and the series padders at 1600 kc.

VOLTAGE TABLE

All voltages are measured between socket terminals and chassis; set in operation; volume control "full on"; antenna disconnected. Voltmeter sensitivity - 1000-ohms-per-volt. Line voltage measured:- 115.0

TUBE	FUNCTION	H'T'R	PLATE	SCR.GR.	SUPPR.GR.	CATH.	OSC.PL.
6A8	det -osc.	5.0	90.8	50.0	----	1.0	98.0
6K7	i.f. amplif.	5.0	120.0	120.0	4.2	4.2	----
75	2nd det.	5.2	60.0	----	----	----	----
43	audio output	2P.5	120.0	120.0	----	18.0	----
25Z5	rectifier	22.5	120.0	----	----	120.0	----
12Z3	spkr.rect.	10.1	120.0	----	----	120.0	----

MODELS TC-42, TC-43, TC-44
Alignment
MODEL TC-65
Voltage, Alignment

TRANSFORMER CORP. OF AMER.

SERVICE NOTES FOR THE CLARION MODEL TC-65
10 TUBE 4 BAND A.C.-D.C. SUPERHETERODYNE RECEIVER

ALIGNMENT PROCEDURE

I.F. ADJUSTMENT - The signal generator is set at 456 kc. and is connected to the grid of the first detector (6A7). With the oscillator section of the tuning condenser short-circuited and the receiver volume control at its maximum position, the i.f. trimmers are adjusted for maximum output. These trimmers may be found on the i.f. transformer shield cans in the rear of the chassis.

18 MEGACYCLE ADJUSTMENT - The high side of the signal generator is connected to the antenna post of the receiver and the low side to the ground post. The receiver and the signal are both tuned to a frequency of 18 mc. with the selector switch in position for band no.1. The oscillator trimmer condenser is adjusted for maximum receiver output, with the volume control on full and the signal generator adjusted for minimum input. The antenna preselector and first detector trimmers are then adjusted in the order named. These trimmers are located on the tops of the shield cans at the left side of the chassis; reading from front to back, these coils are as follows: - 1. antenna preselector; 2. first detector; 3. oscillator. It will be noted that there are four trimmers on each of these coils. The adjustment screw for the trimmer in the front left hand corner of each is painted red. This denote the trimmer for the no. 1 band.

5.2 MC. ADJUSTMENT - With the band selector switch in position for operation on band no. 2. and the receiver and signal generator both set at 5.2 mc. the procedure outlined above is repeated. The oscillator trimmer is found on the rear coil can, and is located to the right of the red painted trimmer. The antenna preselector and interstage coil trimmers are located in the same positions on the corresponding shield cans.

The signal generator is set at 1.7 mc. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left. The 5.2 mc. adjustment should then be rechecked. The 1.7 mc. padder is located on the sub-base on which the gang tuning condenser is mounted and is the left hand one of the group of three found here.

1400 KC. ADJUSTMENT - The band selector switch is set in position for operation on the no. 3 band. The receiver and signal generator are both set at 1400 kc. and the procedure outlined above is repeated. The oscillator trimmer is found on the rear coil can, and is located diagonally opposite the red painted trimmer. The other trimmers for this band are located similar positions on the corresponding coil cans.

The signal generator is set at 600 kc. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 1400 kc. adjustment should then be rechecked. The 600 kc. padder is located on the sub-panel on which the gang tuning condenser is mounted and is the center of the three located at this point.

340 KC. ADJUSTMENT - The band selector switch is set in position for operation on band no. 4 The receiver and generator are both tuned to 340 kc. and the procedure outlined above is repeated. The oscillator trimmer is located on the rear coil can. It is the one directly behind the trimmer marked in red. The other trimmers for this band are located in similar positions on the corresponding shield cans.

The signal generator is set at 140 kc. and the signal is tuned in on the dial. The padder condenser for this band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 340 kc. adjustment should then be rechecked. The 140 kc. padder is located on the sub-panel on which the tuning condenser is mounted and is the right hand one of this group.

SERVICE NOTES FOR THE CLARION MODEL TC-42,43,44
10 TUBE 4 BAND A.C. SUPERHETERODYNE RECEIVER

ALIGNMENT PROCEDURE

I.F. ADJUSTMENT - The signal generator is set at 456 kc. and is connected to the grid of the first detector (6A8). With the oscillator section of the tuning condenser short-circuited and the receiver volume control at its maximum position, the i.f. trimmers are adjusted for maximum output. These trimmers may be found on the i.f. transformer shield cans in the rear of the chassis.

18 MEGACYCLE ADJUSTMENT - The high side of the signal generator is connected to the antenna post of the receiver and the low side to the ground post. The receiver and the signal are both tuned to a frequency of 18 mc. with the selector switch in position for band no.1. The oscillator trimmer condenser is adjusted for maximum receiver output, with the volume control on full and the signal generator adjusted for minimum input. The antenna preselector and first detector trimmers are then adjusted in the order named. These trimmers are located on the tops of the shield cans at the left side of the chassis; reading from front to back, these coils are as follows: - 1. antenna preselector; 2. first detector; 3. oscillator. It will be noted that there are four trimmers on each of these coils. The adjustment screw for the trimmer in the front left hand corner of each is painted red. This denote the trimmer for the no. 1 band.

5.2 MC. ADJUSTMENT - With the band selector switch in position for operation on band no. 2. and the receiver and signal generator both set at 5.2 mc. the procedure outlined above is repeated. The oscillator trimmer is found on the rear coil can, and is located to the right of the red painted trimmer. The antenna preselector and interstage coil trimmers are located in the same positions on the corresponding shield cans.
The signal generator is set at 1.7 mc. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left. The 5.2 mc. adjustment should then be rechecked. The 1.7 mc. padder is located on the sub-base on which the gang tuning condenser is mounted and is the left hand one of the group of three found here.

1400 KC. ADJUSTMENT - The band selector switch is set in position for operation on the no. 3 band. The receiver and signal generator are both set at 1400 kc. and the procedure outlined above is repeated. The oscillator trimmer is found on the rear coil can, and is located diagonally opposite the red painted trimmer. The other trimmers for this band are located similar positions on the corresponding coil cans.

The signal generator is set at 600 kc. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 1400 kc. adjustment should then be rechecked. The 600 kc. padder is located on the sub-panel on which the gang tuning condenser is mounted and is the center of the three located at this point.

340 KC. ADJUSTMENT - The band selector switch is set in position for operation on band no. 4. The receiver and generator are both tuned to 340 kc. and the procedure outlined above is repeated. The oscillator trimmer is located on the rear coil can. It is the one directly behind the trimmer marked in red. The other trimmers for this band are located in similar positions on the corresponding shield cans.

The signal generator is set at 140 kc. and the signal is tuned in on the dial. The padder condenser for this band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 340 kc. adjustment should then be rechecked. The 140 kc. padder is located on the sub-panel on which the tuning condenser is mounted and is the right hand one of this group.

VOLTAGE TABLE OF MODEL TC-65

TUBE	FUNCTION	HEATER	SCR.	SUPPR.	OSC.PL.	CATH.	PLATE
6K7	Preselector	5.1	98.0	1.2		1.2	98.0
6A7	det.-osc.	4.8		100.0	78.0	1.2	196.0
6K7	1st. i.f.	5.0	187.0	8.0		8.0	187.0
85	det. audio	5.2				1.2	35.0
43) 43) 43) 43)	audio output	21.0	98.0	14.0		14.0	120.0
25Z5) 25Z5)	rectifiers	24.0					112.0

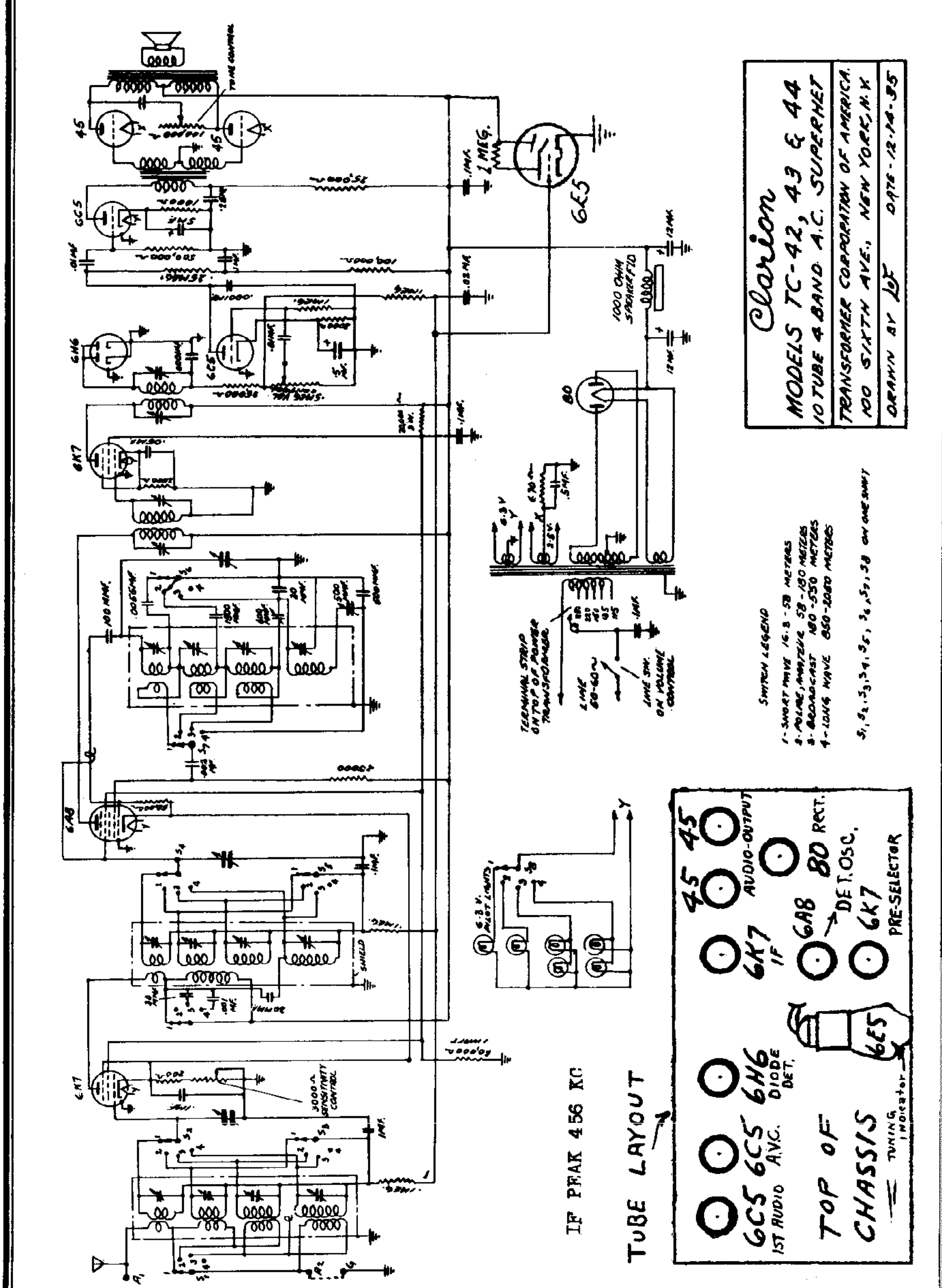
ALL VOLTAGES ARE MEASURED FROM THE SOCKET TERMINALS TO THE CHASSIS, WHILE SET IS IN OPERATION, AND WITH THE VOLUME CONTROL FULL ON.

FREQUENCY BANDS

BAND 1- SH.WAVE.AIRCRAFT	-5.2 to 18 MC
BAND 2- POLICE, AMATEUR, AIRCRAFT	-1.6 to 5.2 MC
BAND 3- BROADCAST	-540 to 1600 KC
BAND 4- LONG WAVE	-343 to 142 KC

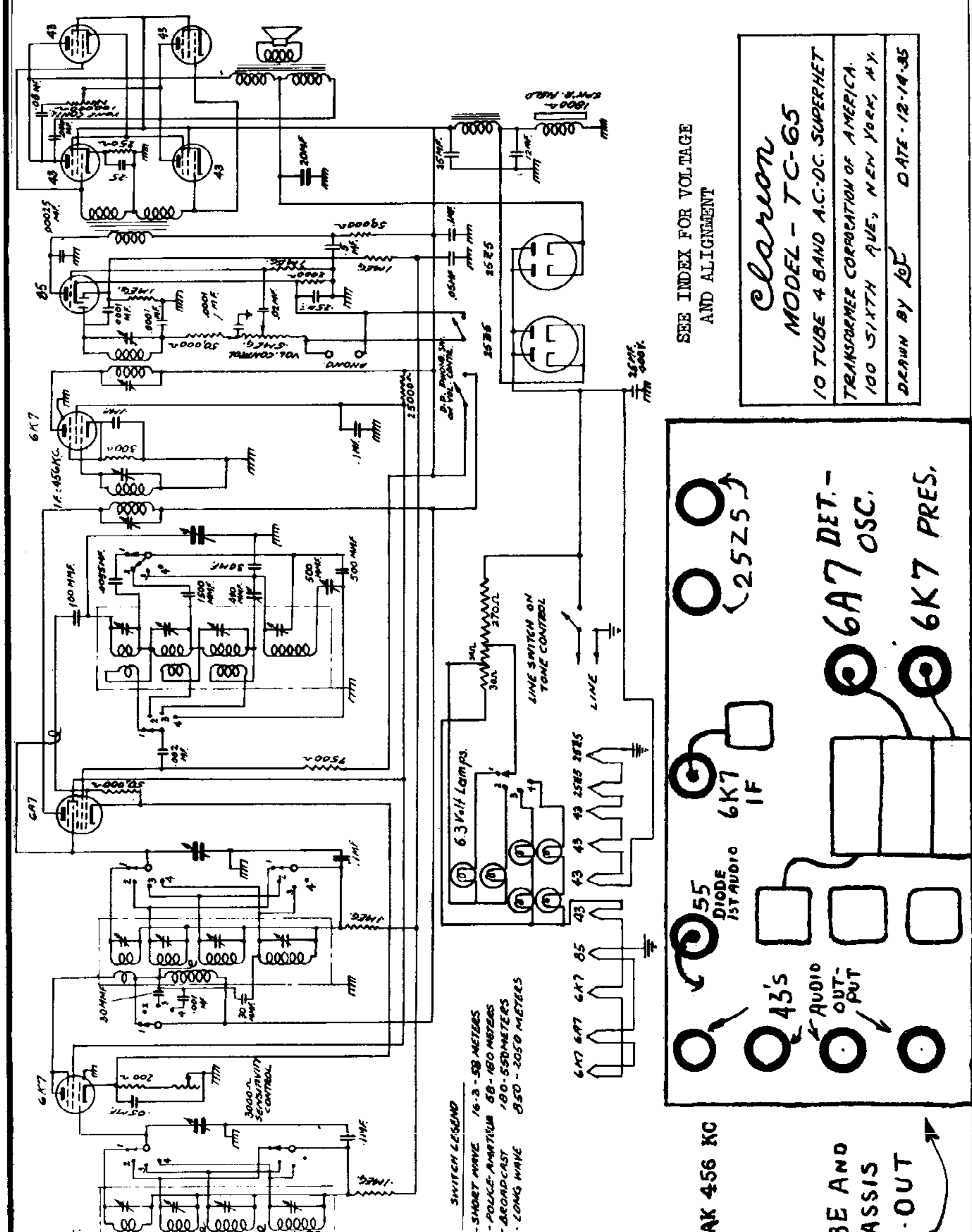
MODELS TC-42, TC-43, TC-44

TRANSFORMER CORP. OF AMER. Schematic, Socket



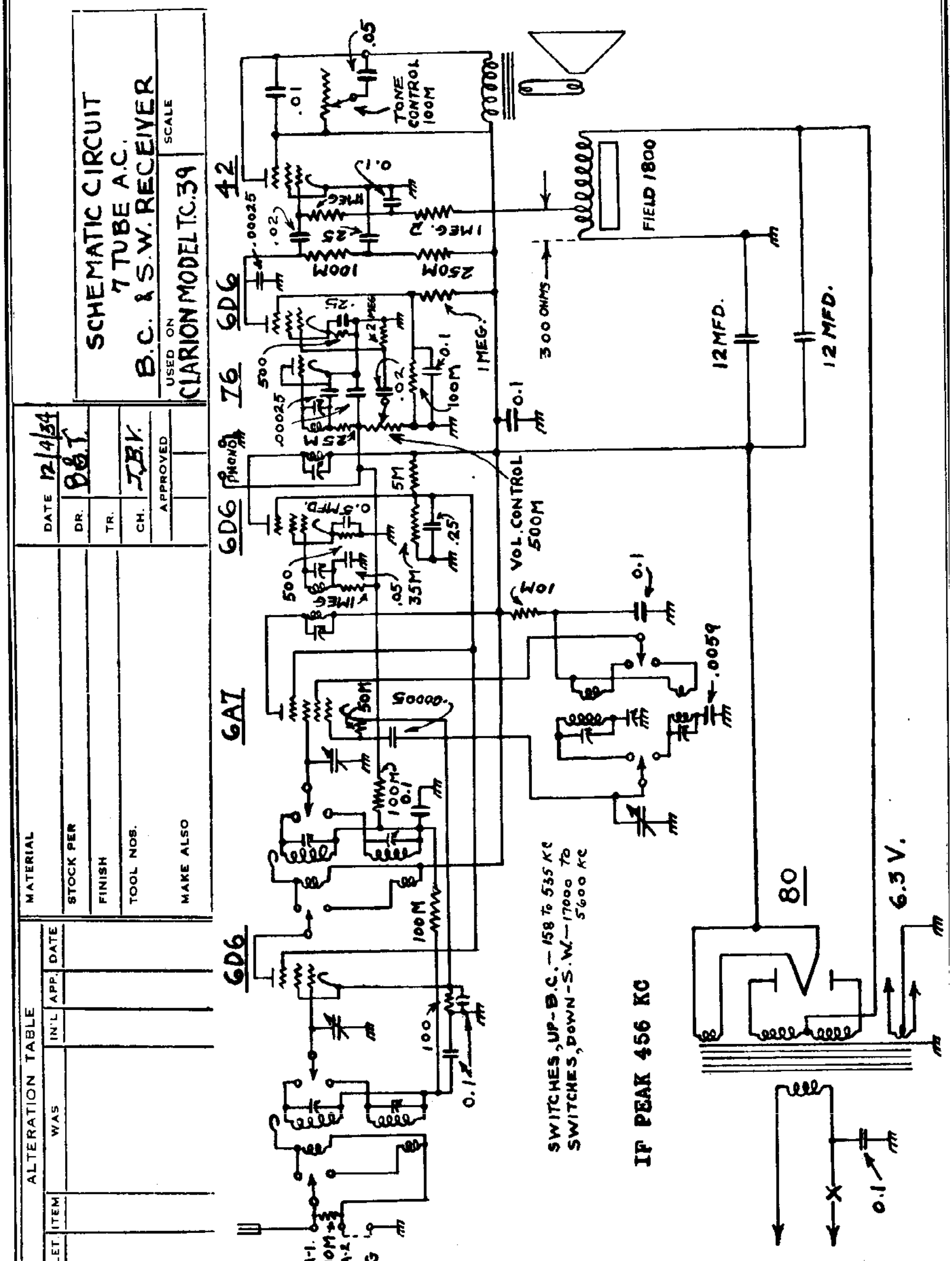
MODEL TC-65
Schematic
Socket

TRANSFORMER CORP. OF AMER.



MODEL TC-39
Schematic

TRANSFORMER CORP. OF AMER.



TRANSFORMER CORP. OF AMER.

Clarion MODEL T C 39

Seven Tube Superheterodyne Receiver

A.C. 105 to 240 Volts, 40 to 60 Cycles *

Short Wave	Broadcast Wave
17.5 - 53 Meters	190 - 560 Meters
17000 - 5600 Kilocycles	1580 - 535 Kilocycles

DESCRIPTION:

The Clarion 7 Tube Short Wave and Broadcast A.C. Receiver is adapted for use on A.C. 105 to 240 Volts, 40 to 60 Cycles.

*THIS RECEIVER IS PROVIDED WITH A TAPPED-PRIMARY POWER TRANSFORMER FOR USE ON EITHER 105 to 125 OR 220 to 240 VOLTS. BEFORE OPERATING THIS RECEIVER MAKE CERTAIN THAT THE FLEXIBLE LEAD, EXTENDING FROM THE TOP OF THE POWER TRANSFORMER, IS CONNECTED TO THE CORRECT BINDING POST. IF THIS PRECAUTION IS NOT TAKEN POSSIBLE DAMAGE TO THE TRANSFORMER MAY RESULT.

The tube complement included: 1 - 6D6 as R.F. Amplifier, 1 - 6A7 as First Detector and Oscillator, 1 - 6D6 as I.F. Amplifier, 1 - 76 as Diode Detector and AVC, 1 - 6D6 as A.F. Amplifier, 1 - 42 as Power Output Tube and 1 - 80 Rectifier.

VOLTAGE READINGS:

Readings should be taken with the Volume Control fully on. Use a D.C. Voltmeter having a resistance of 1000 ohms per volt.

	Plate to Ground	Screen to Ground	Cathode to Ground	Suppressor to Ground
6D6 RF Amp.	235	155	3	3
6A7 Det. Osc.	230	155	3	
6D6 IF Amp.	250	155	6	6
76 Second Det.				
6D6 AF Amp.	50	12	0.2	0.2
42 Output	228	234	23	
80 Rectifier	Filament to Ground 250 volts.			

Power Drawn by Receiver 57 Watts.

ALIGNMENT OF T C 39

With the wave band switch in the broadcast position (right) connect the oscillator, set at 456 k.c. to the grid of the 6A7 tube (with the grid cap in place) and to the chassis. The volume control should be set at maximum and the oscillator output reduced so as to obtain about 15 volts reading on an output meter (4000 to 8000 ohms) connected across the loud speaker transformer primary (plate and screen prongs of the 42 tube).

Carefully rotate the screws on the tops of the IF transformers (square cans) until the maximum reading is obtained on the output meter. If the output is considerably in excess of 15 volts reduce the oscillator output further.

The object of this is to operate at such a low level that the automatic volume control; the purpose of which is to maintain the signal level constant, does not operate; otherwise this adjustment will appear very broad and it will be impossible to obtain a true alignment of the IF transformers.

Now, remove the oscillator clip from the 6A7 grid and connect it to the antenna terminal marked A_1. Terminals A_2 and G must be connected together by jumper. Set the oscillator to 1400 k.c. (Three tall round cans located to the right of the tuning condenser are as follows: antenna coil, interstage RF, and Oscillator coil looking from front to rear of chassis.) If the received signal does not come in exactly at this frequency adjust the broadcast oscillator trimmer (trimmer projects through the upper hole in the side of the oscillator can) so that it does. Next adjust the trimmers on the antenna coil and the interstage RF coil (trimmers project through upper hole on right hand side of the antenna and RF coil cans) for maximum output as before. Now set the oscillator to 600 k.c., and tune this in on the receiver. Check for alignment by rotating the padding condenser screw (screw projects through the chassis directly to the left of the oscillator coil can) at the same time rocking the tuning condenser so as to obtain maximum output. Leave this padder set for maximum signal.

SHORT WAVE BAND: Turn the wave band switch to the left. If a short wave oscillator is not available, set the regular broadcast oscillator to 1000 k.c. If the harmonics are sufficiently powerful it should be possible to pick up a signal at points all along the dial one megacycle apart, as for example 6 m.c., 7 m.c., 8 m.c. and 9 m.c.

Tune in signal at approximately 14 m.c. and very carefully adjust the short wave trimmers on the antenna and RF coils (lower openings on right side of front and middle cans) for maximum output. Carefully retune the signal as a re-adjustment of the trimmers may shift the signal slightly on the dial.

NOTE: In all the above adjustments it is imperative that the volume control be set near maximum and that the oscillator be reduced sufficiently so that no more than 15 volts output is obtained. If necessary set the oscillator some distance away and pick up the signal by means of a wire placed near it and connected to the receiver.

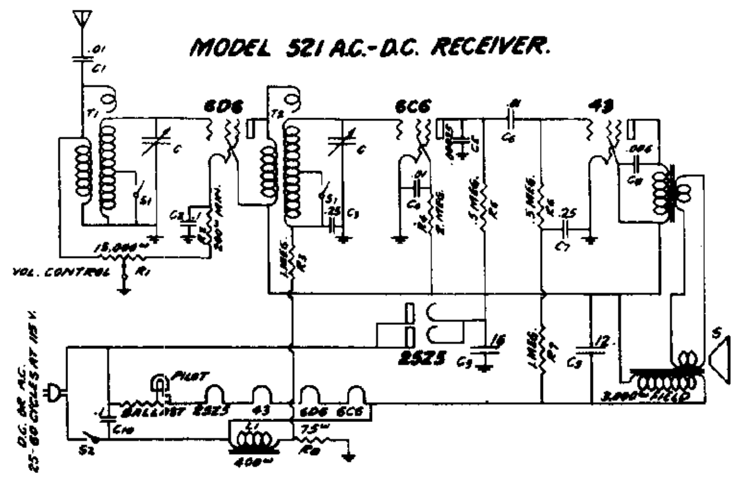
REPLACEMENT PART LIST

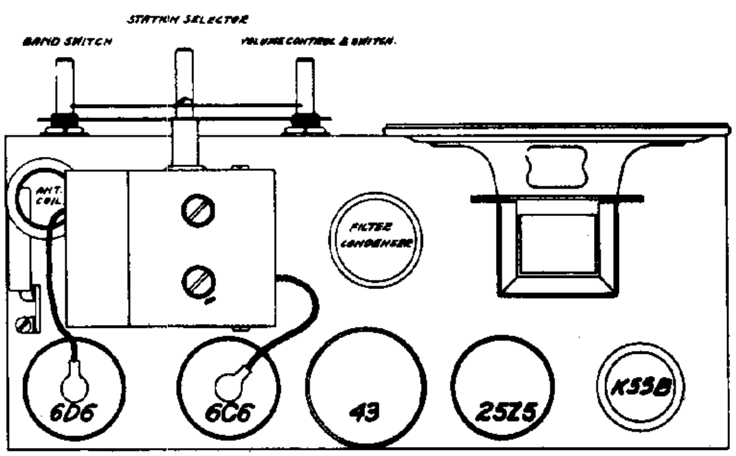
Description	Each List Price
Antenna Coupling Transformer	$2.12
RF Transformer	2.12
Oscillator	2.12
IF Transformer First or Second	2.08
12 Mfd. Wet Electrolytic Filter Condenser	1.52
Three Gang Tuning Condenser	4.28
Combination Volume Control and Switch	1.76
Tone Control	1.18
Power Transformer	7.52
Any Socket - Give tube Number	.10
Any Tubular Condenser - Give Value	.40
Any Moulded Condenser - Give Value	.18
Any Carbon Resistor - Give Value	.14
Band Selector Switch - Three gang	2.12
Dynamic Speaker	8.25
Padding Condenser - Single	.44

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

TRAV-LER RADIO & TELEV. CORP.

MODEL 521 A.C.-D.C. RECEIVER.





TUBE LAYOUT.

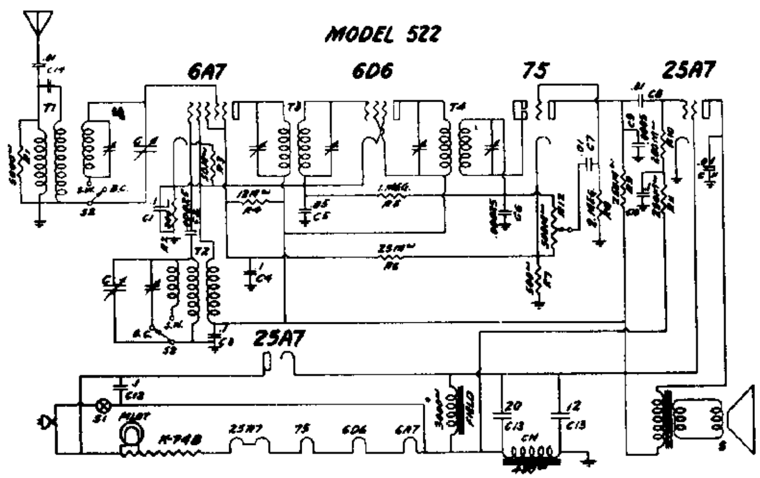
OPERATING INSTRUCTIONS

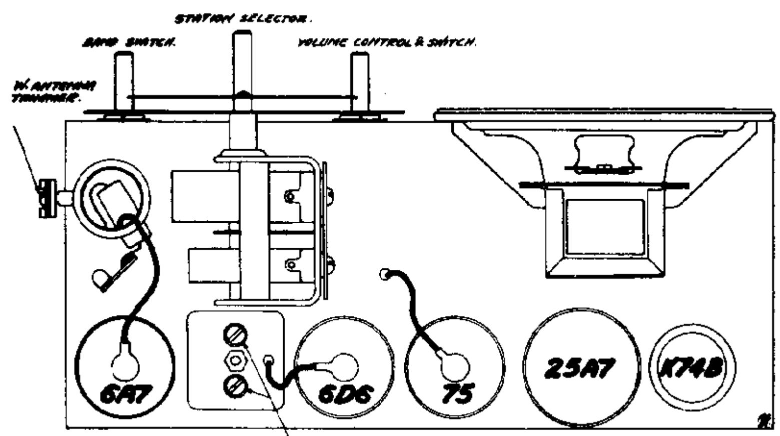
5-TUBE AC-DC RECEIVER

For Use on 110-115 Volts AC or DC Current Only

This receiver is a five tube tuned-radio-frequency type which operates on either AC or DC current. It will provide very satisfactory entertainment for those who desire a small set.

MODEL 522





MODEL 522 TUBE LAYOUT

OPERATING INSTRUCTIONS

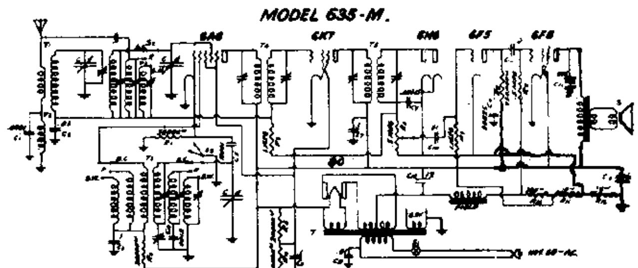
5-tube AC-DC Superheterodyne Receiver

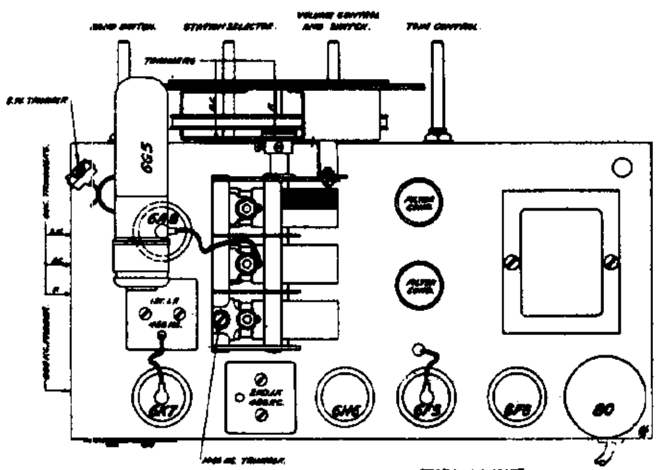
This radio is a five-tube Superheterodyne type which operates on AC or DC at 110 volts. It covers two wave bands, as follows:

Standard broadcast and police band -- 540-1750 kc.
Police, Amateur, American and Foreign
short wave band ---------------2400-6300 kc.

MODEL 635M
MODEL 5-Tube Batt.
Schematics, Socket

TRAV-LER RADIO & TELEV. CORP.





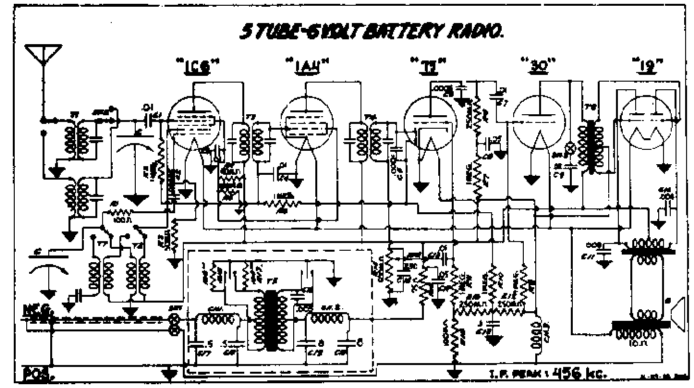
TUBE LAYOUT.

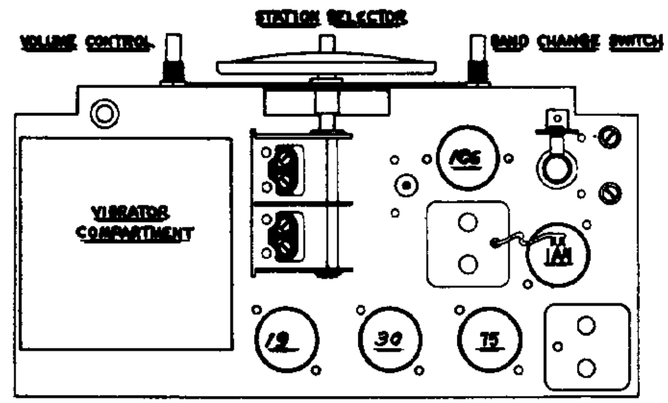
OPERATING INSTRUCTIONS

6-Tube Superheterodyne AC Receiver
For use on 110 volts AC only

This radio is a six-tube Superheterodyne type which operates ON AC CURRENT ONLY at a frequency of 60 cycles and at 110 volts.
It covers three wave bands, as follows:

Standard Broadcast band - 540-1750 kc.
Police and Amateur band - 1650-5500 kc.
Short wave, American & Foreign - 18-5.5 meg.





TUBE LAYOUT

6-Volt Storage Battery Receiver

This radio is designed to operate from a 6-volt storage battery. No "B" or "C" batteries are required.

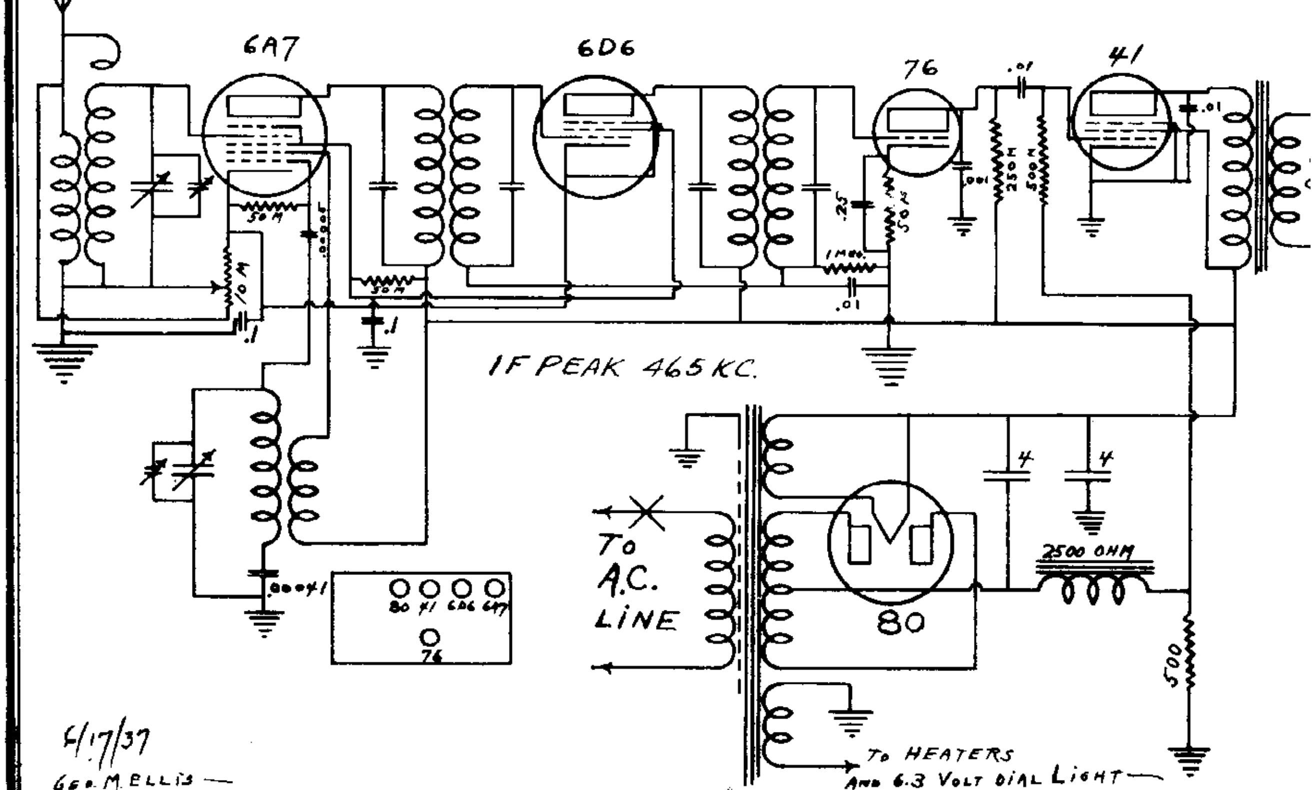
It has two wave bands, having the following coverage:

Standard broadcast - 540 to 1750 kilocycles
Foreign short wave - 5.7 to 17 megacycles

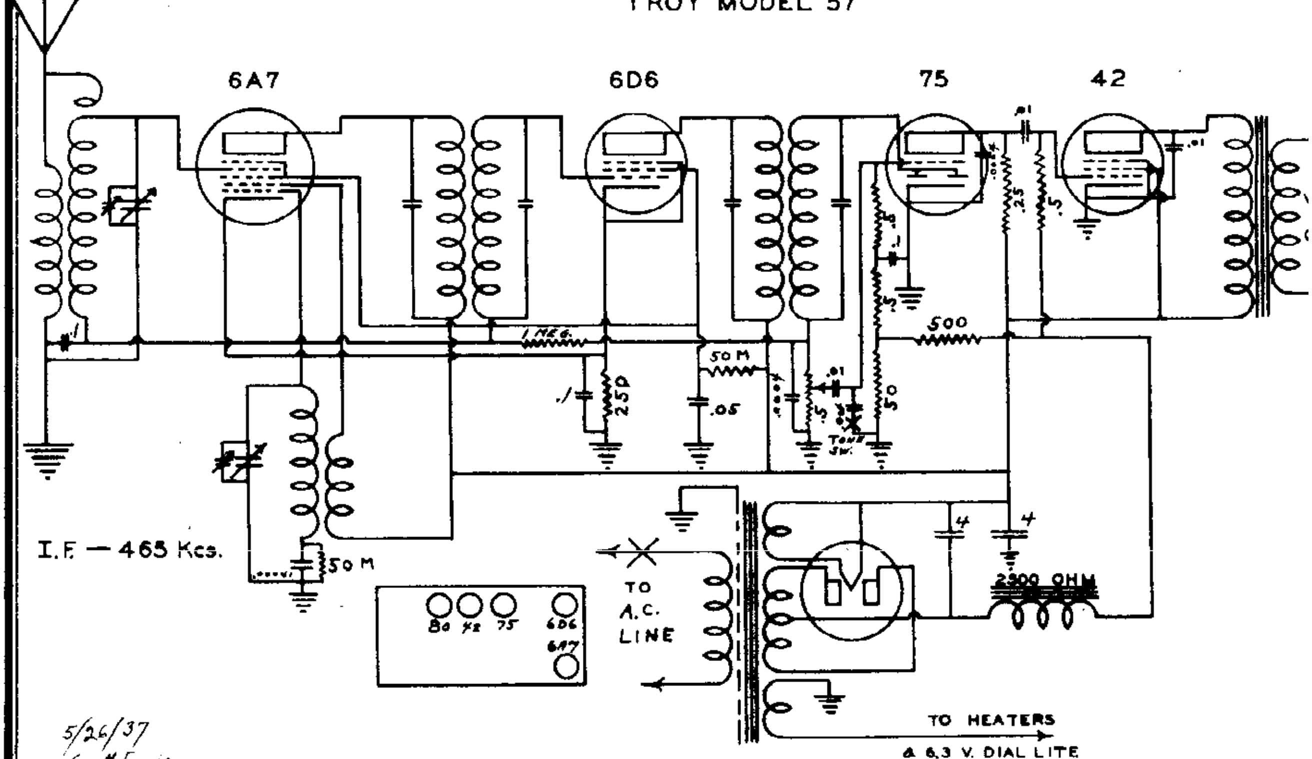
MODEL 55
MODEL 57
Schematics, Socket

TROY RADIO & TELEV. CO.

TROY MODEL 55



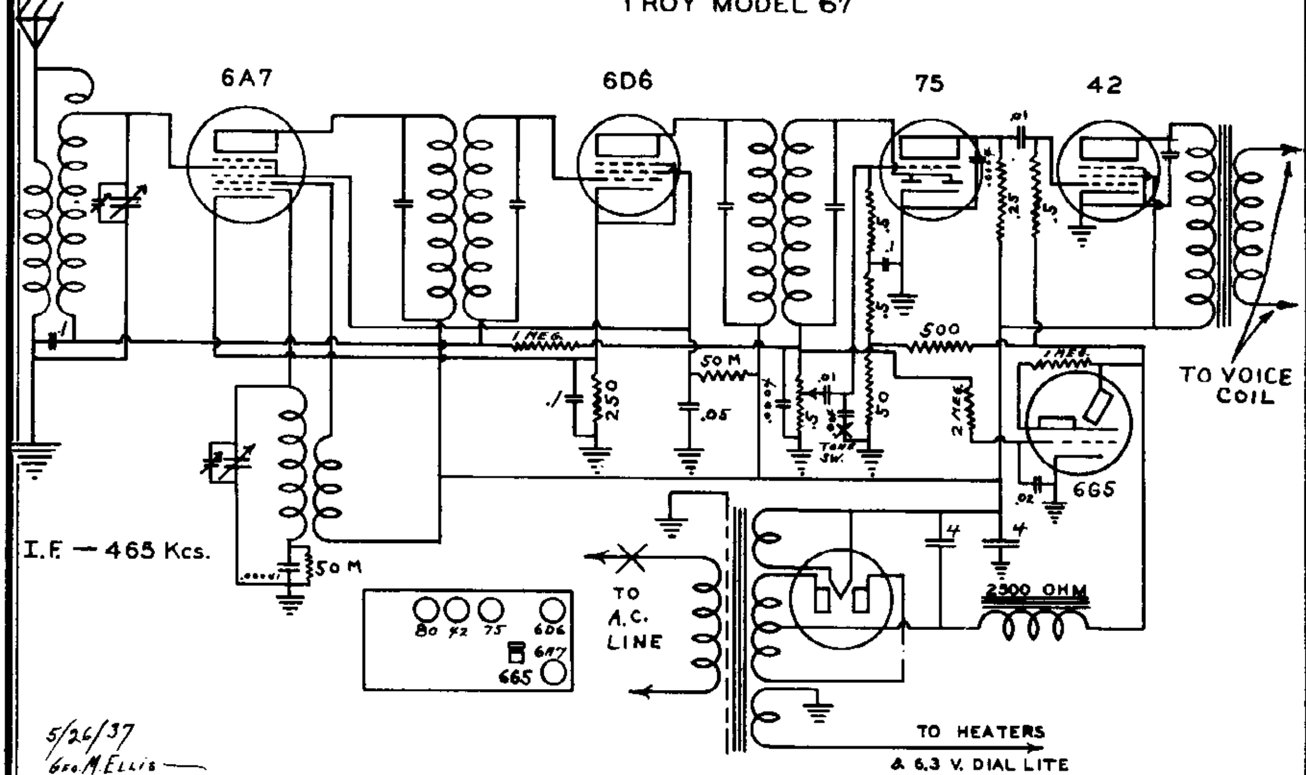
TROY MODEL 57

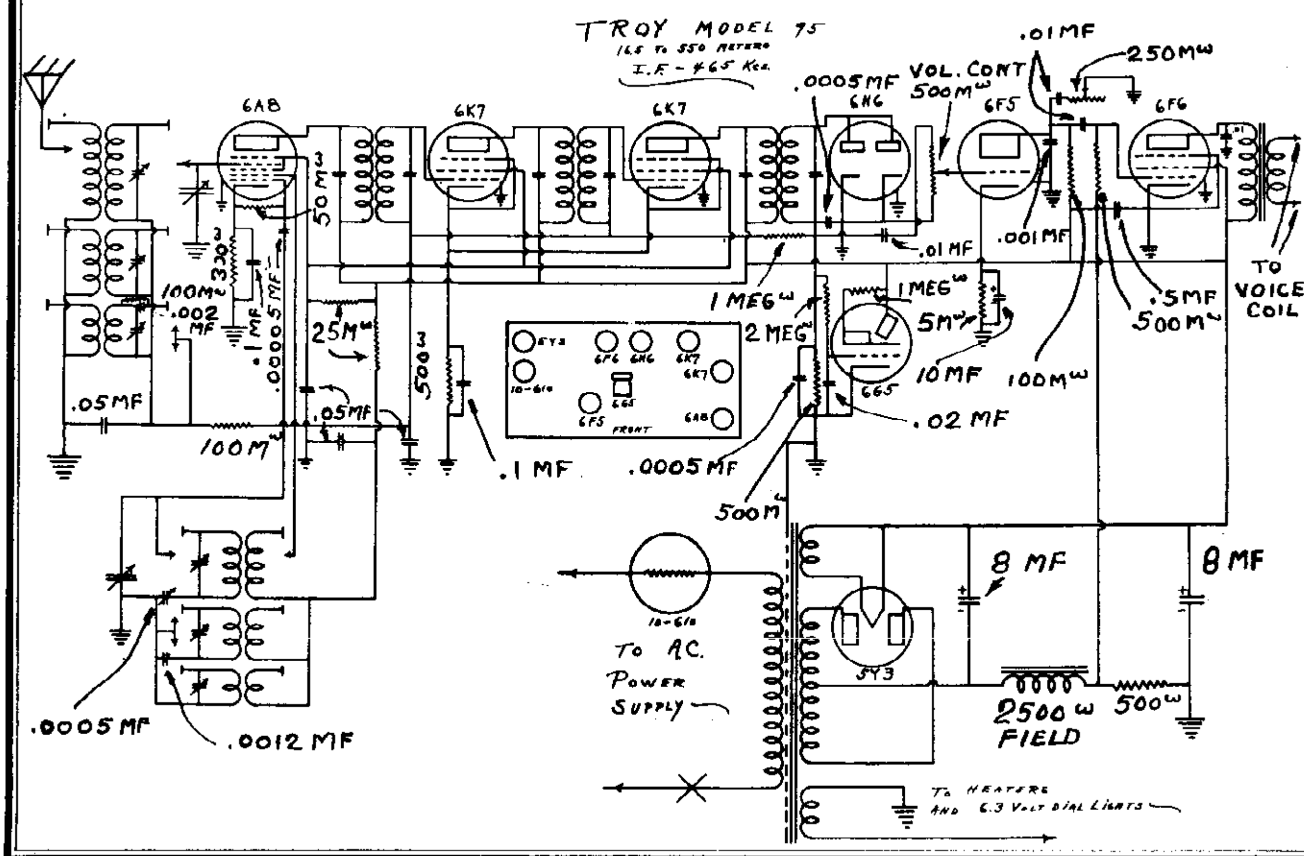


MODEL 67
MODEL 95
Schematics
Socket

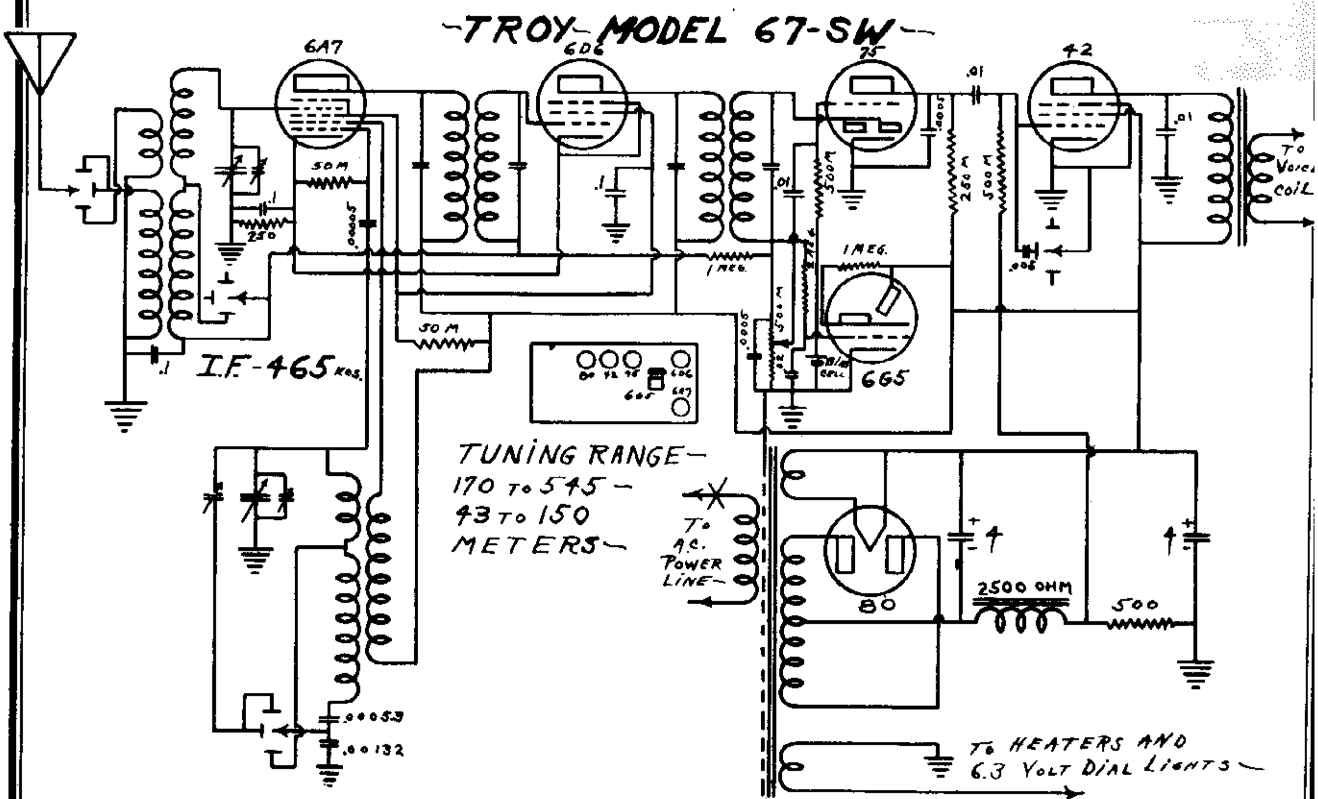
TROY RADIO & TELEV. CO.

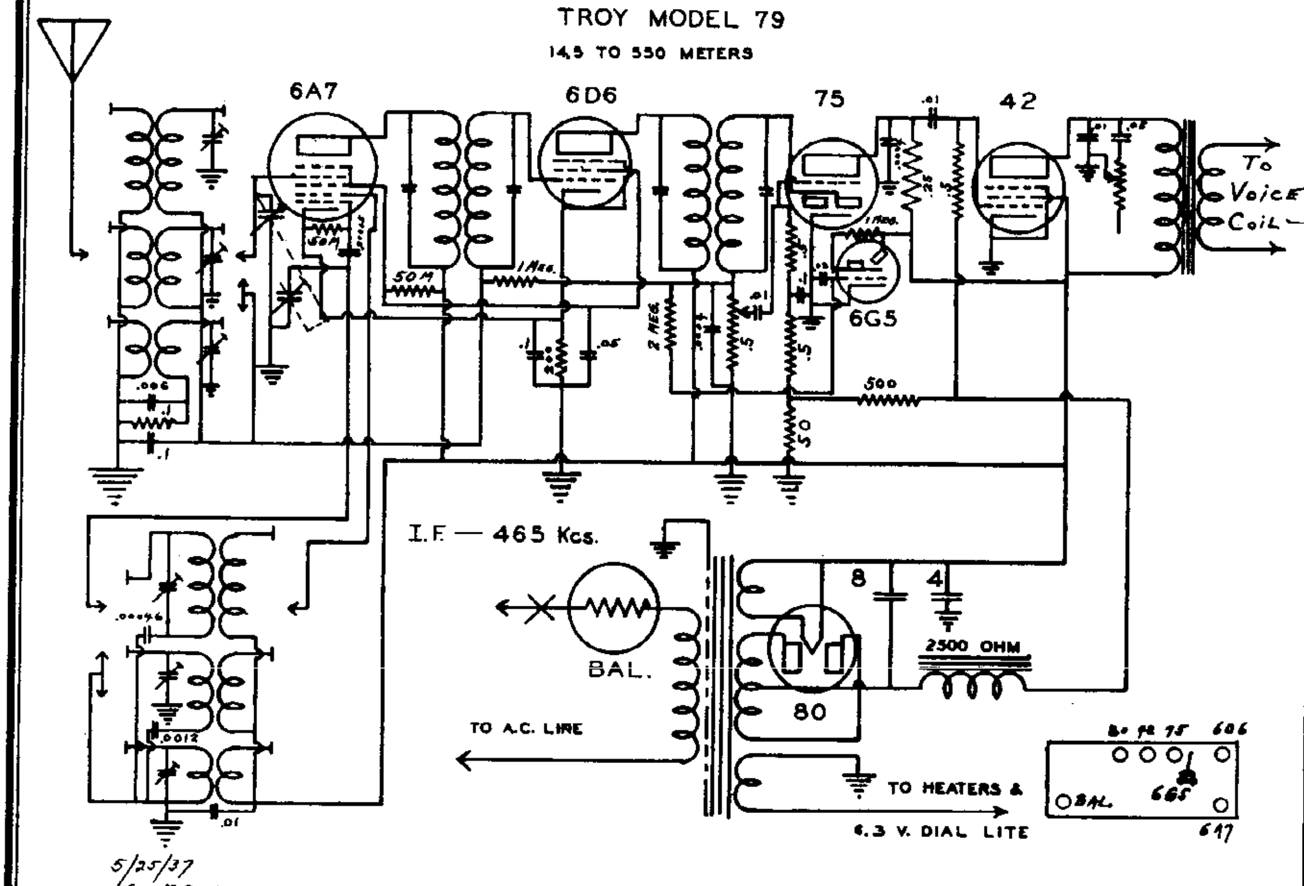
TROY MODEL 67





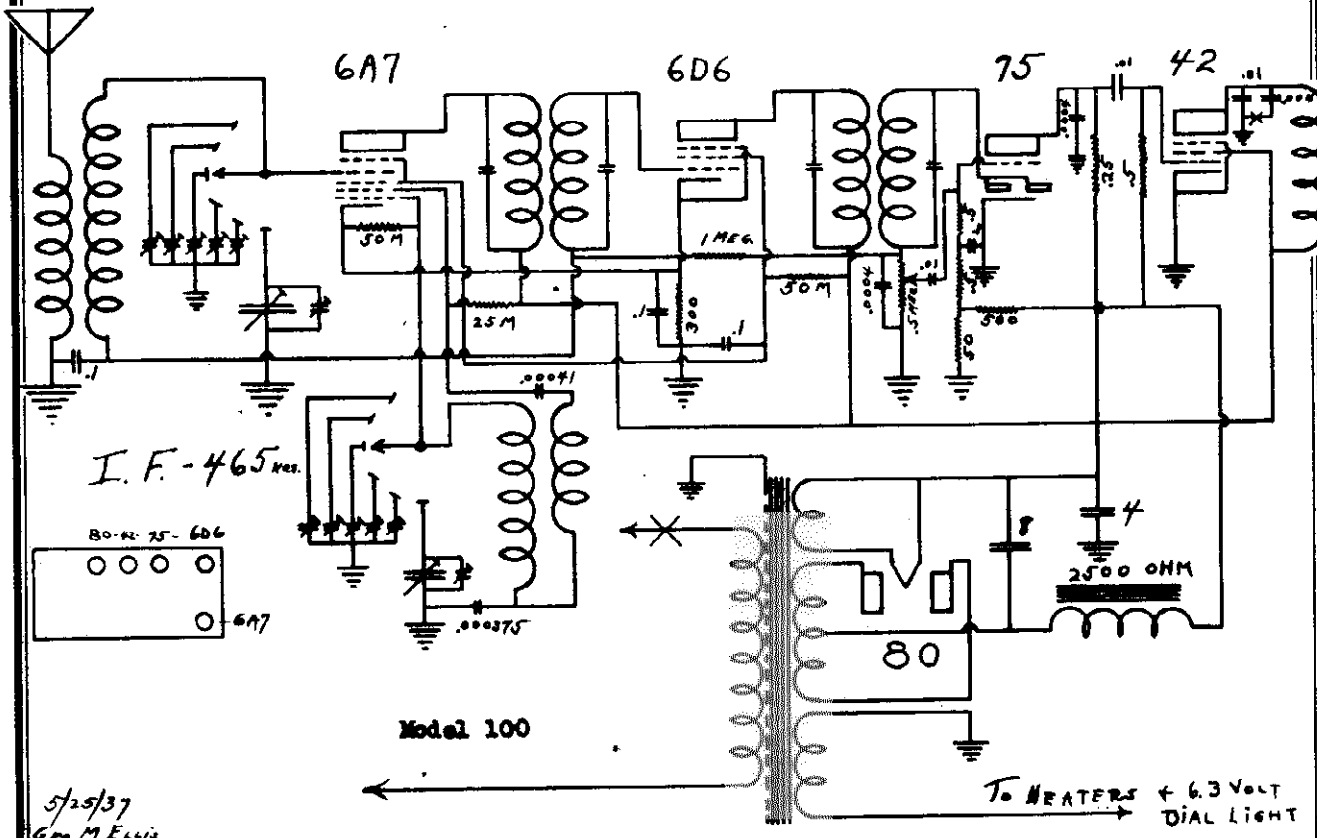
TROY RADIO & TELEV. CO.





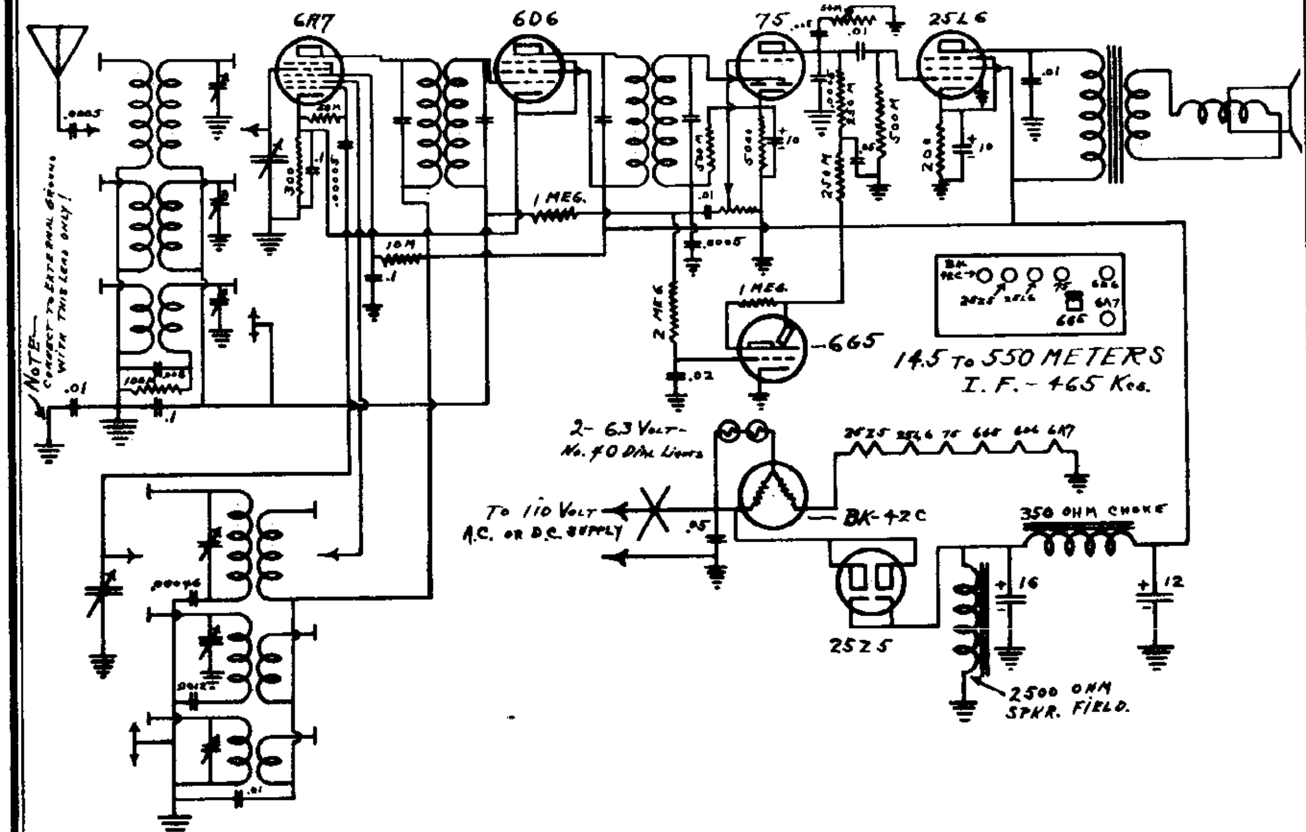
MODEL 100
MODEL 179
Schematics Socket

TROY RADIO & TELEV. CO.



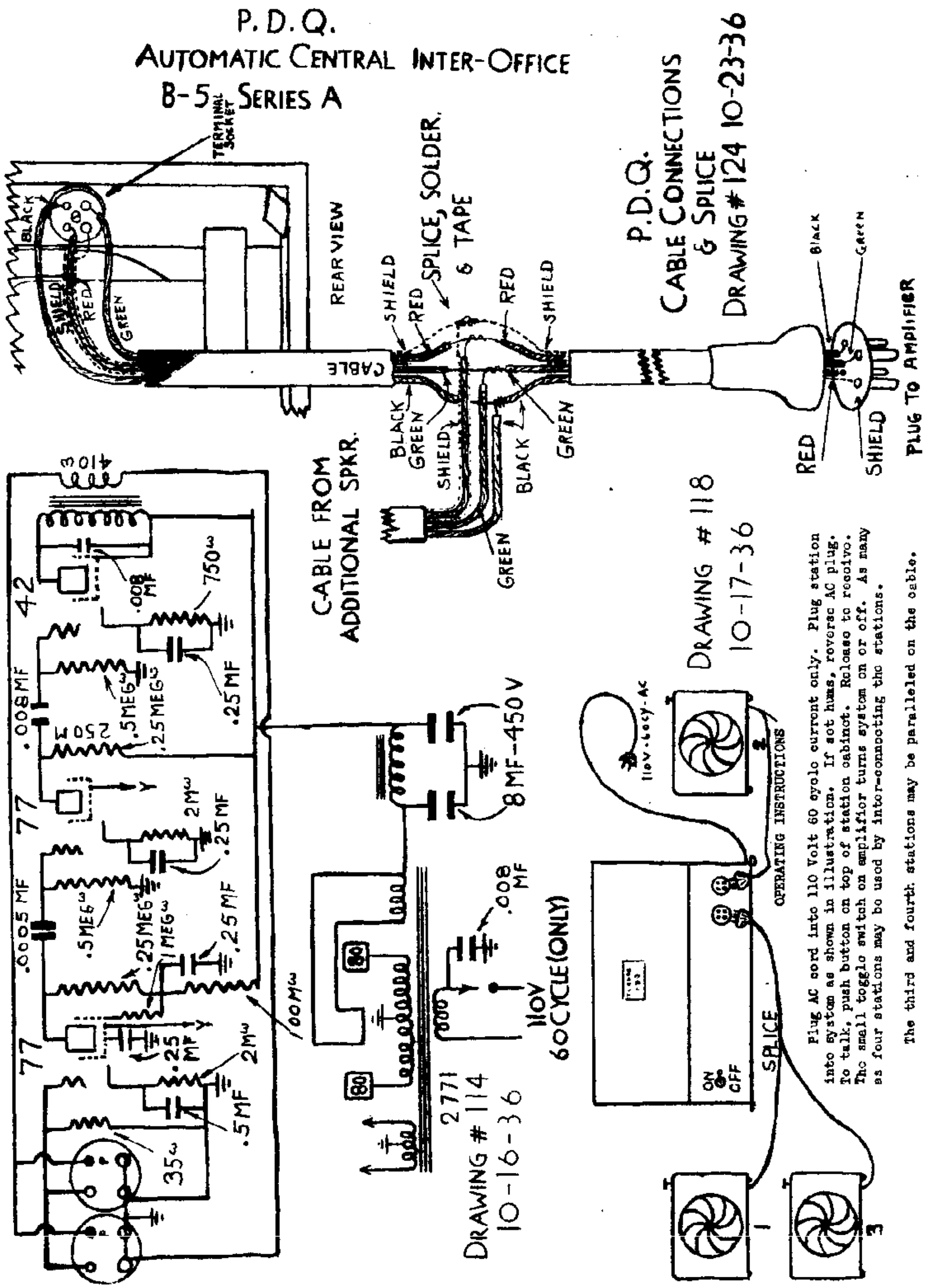
Model 100

TROY MODEL 179



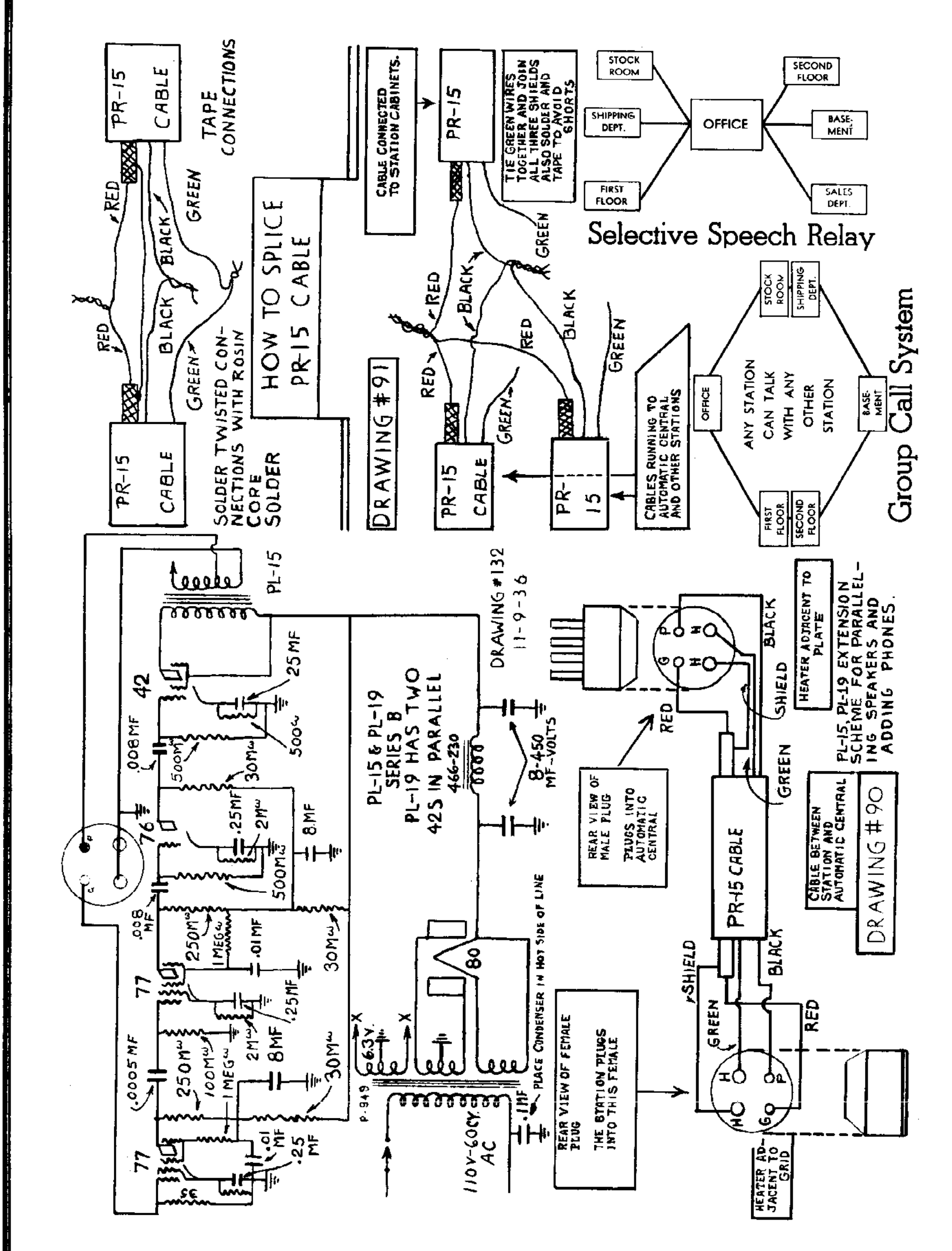
TURNER CO.

MODEL PDQ, B5-Series A
Schematic, Cable Conn.
Data



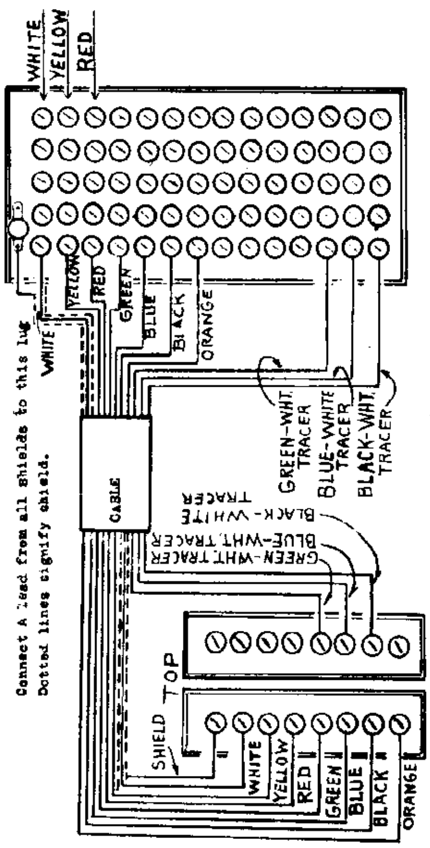
MODELS PR15,PR19
Schematic
Stations Conn.

TURNER CO.

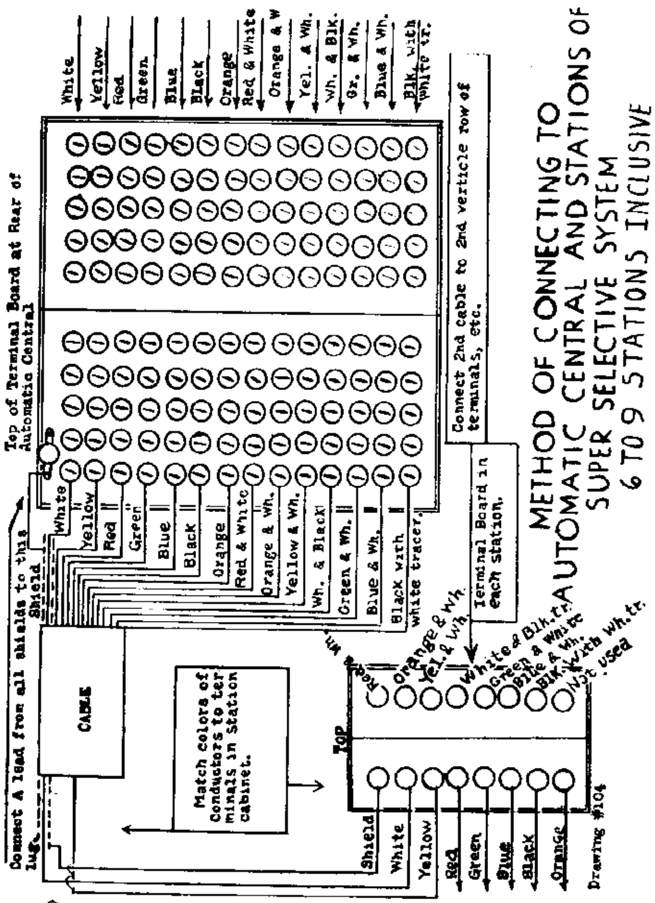


TURNER CO.

MODELS 3S5, 3S9
Automatic Central
Connections, Schema
Installation Data

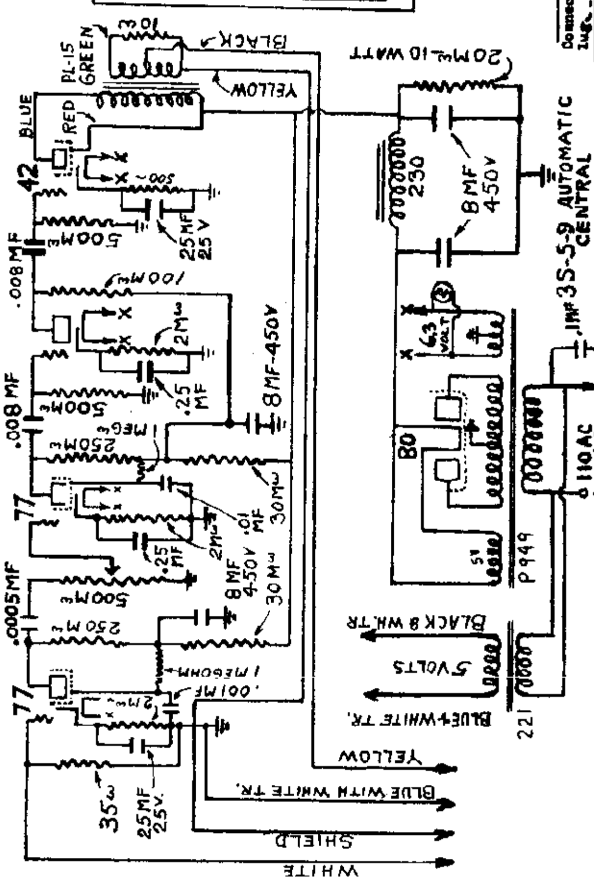


METHOD OF CONNECTING TO AUTOMATIC CENTRAL AND STATIONS OF SUPER SELECTIVE SYSTEM – 2 TO 5 STATIONS INCLUSIVE



METHOD OF CONNECTING TO AUTOMATIC CENTRAL AND STATIONS OF SUPER SELECTIVE SYSTEM 6 TO 9 STATIONS INCLUSIVE

Drawing #104



3S-5-9 AUTOMATIC CENTRAL
12-14-36 #139 REVISED

INSTRUCTIONS FOR INSTALLING THE TURNER 3S5 AND 3S9

On the automatic central, the top and the side that is partly open to view are of one piece. This piece is removable. This is to be taken off by removing the screws that hold it in place. Then it will be noted there is a terminal strip with fourteen different colors or color combinations on the screw heads with silver colored lugs at the top. The cable to the various stations is laid, and the Automatic Central ends of each cable are fastened to the terminal strip screws by soldering the ends of each individual wire to a lug that is furnished. The shields around the white wires are to be connected to the silver colored lugs at the top of the terminal strip. The other wires are connected to the screw (with a lug) such as white wire to white screw, yellow wire to yellow screw, etc. The wires with tracers or stripes in them are connected similarly, such as red wire with white tracer to red screw with white dot, etc. This is shown on one of the sheets enclosed.

The back of each station is to be taken off and the cable from the Automatic Central is to be attached to the terminal strip inside (with lugs) with like colored wire to like colored screw. (Shield goes to silver colored screw.)

The Automatic Central is then plugged into the socket and turned on. It will be noted that there is a volume (or gain) control on the Automatic Central which is to be turned on full first, and may be turned back later as the customer becomes acquainted with the system.

Each station has a volume control in the lower left hand corner and can be set to suit the individual listener by turning clockwise to lower the volume. In the upper left hand corner of the system is a pilot light which shows when on, that someone is using the system.

The buttons to the right hand edge of the station are to call the other stations on the system. Each station has a number painted on the bottom and the switches are numbered so that when a person wishes to call any one of the other stations he has but to push the correct button with the number corresponding to the number on the station being called, and pull the button out when he has finished speaking so that the other station may speak back to him, or with someone else. The buttons should always be in an "out" position when not in use.

If earphones are with the system a two way conversation may be had by leaving the button pushed in and speaking into the station itself, using the earphones to listen.

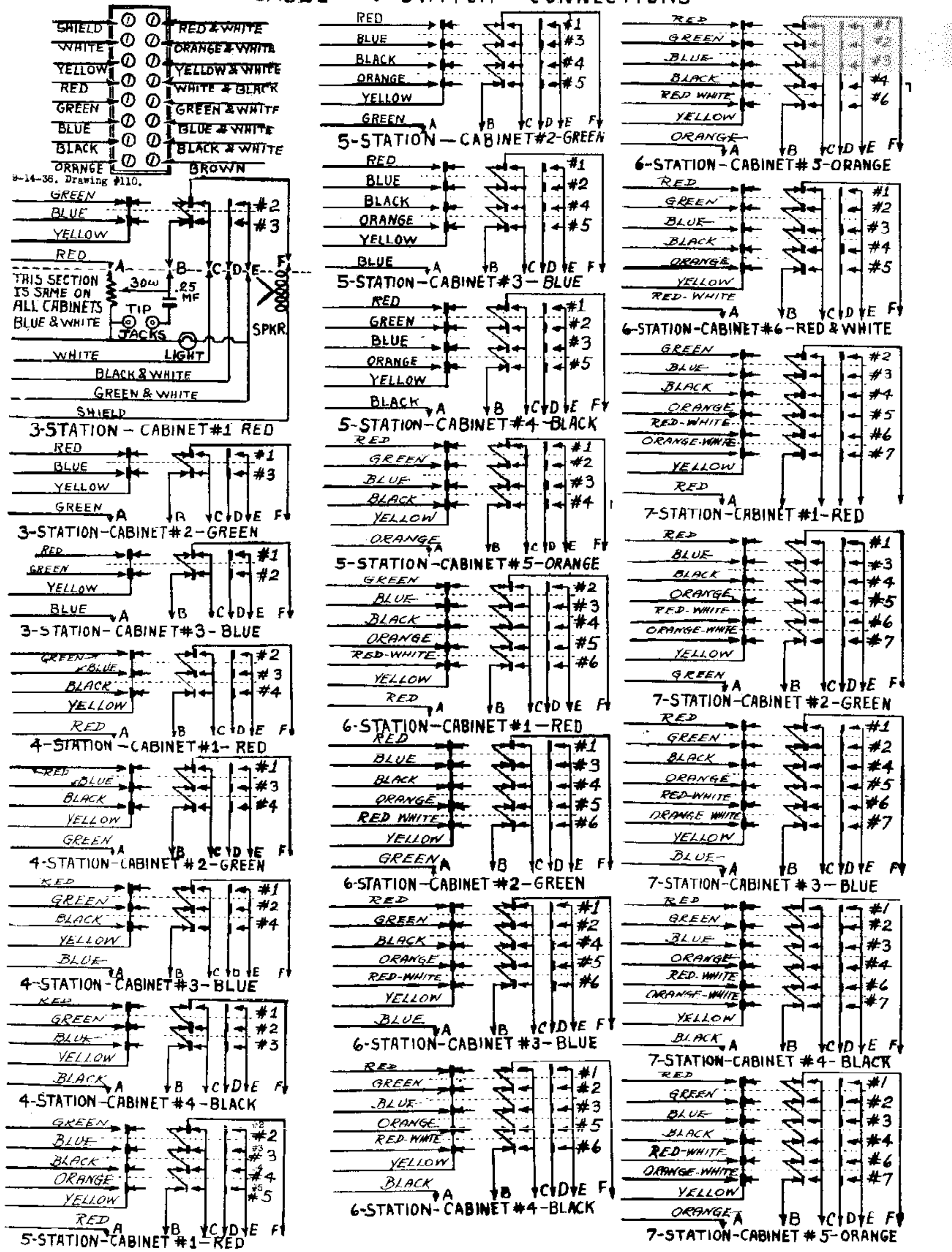
It must be remembered when installing the system that a station will not work properly without a separate line to the Automatic Central. If feedback or howl is encountered when one station is speaking to a very nearby station, it can be eliminated by turning down the volume on the listening station.

MODELS 3S5, 3S9
Automatic Central

TURNER CO.

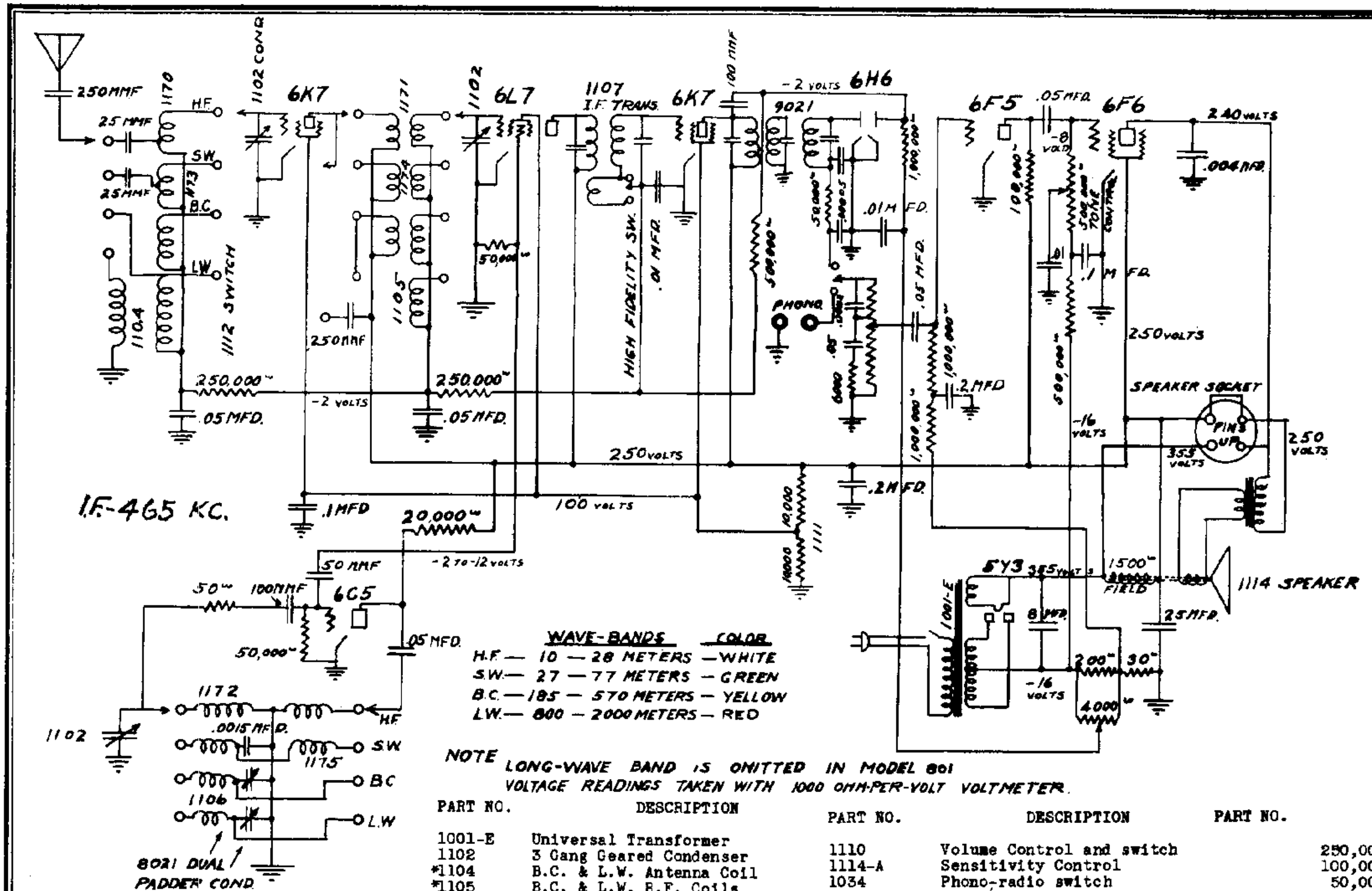
Station Cable & Switch Connections & Color Code

CABLE & SWITCH CONNECTIONS



MODELS 801,802
Schematic, Voltage
Parts

ULTRAMAR MFG. CORP.



NOTE LONG-WAVE BAND IS OMITTED IN MODEL 801
VOLTAGE READINGS TAKEN WITH 1000 OHM-PER-VOLT VOLTMETER.

FOR MODEL 801 ONLY

1183	B.C. Antenna Coil
1184	B.C. R.F. Coil
1185	B.C. Oscillator Coil
1038-C	300-600 M.M.F. padder condenser
801-3	3-band translucent scale

PART NO.	DESCRIPTION
1001-E	Universal Transformer
1102	3 Gang Geared Condenser
*1104	B.C. & L.W. Antenna Coil
*1105	B.C. & L.W. R.F. Coils
*1106	B.C. & L.W. Oscillator Coils
1107	Iron Core Expanded I.F.
9021	Triple Tuned Output I.F.
1108	6-1/2 inch dial assembly
*802-4	4 Band Translucent Scale
*8021	Dual Padder Condenser
1064	Isolantite Trimmer
1170	H.F. Antenna Coil (10 to 28 meters)
1171	H.F. R.F. Coil (10-28 meters)
1172	H.F. Oscillator Coil (10-28 meters)
1173	S.W. Antenna Coil (27-77 meters)
1174	S.W. R.F. Coil (27-77 meters)
1175	S.W. Oscillator Coil (27-77 meters)
1109	Tone Control and S.P. D.T. Swtich

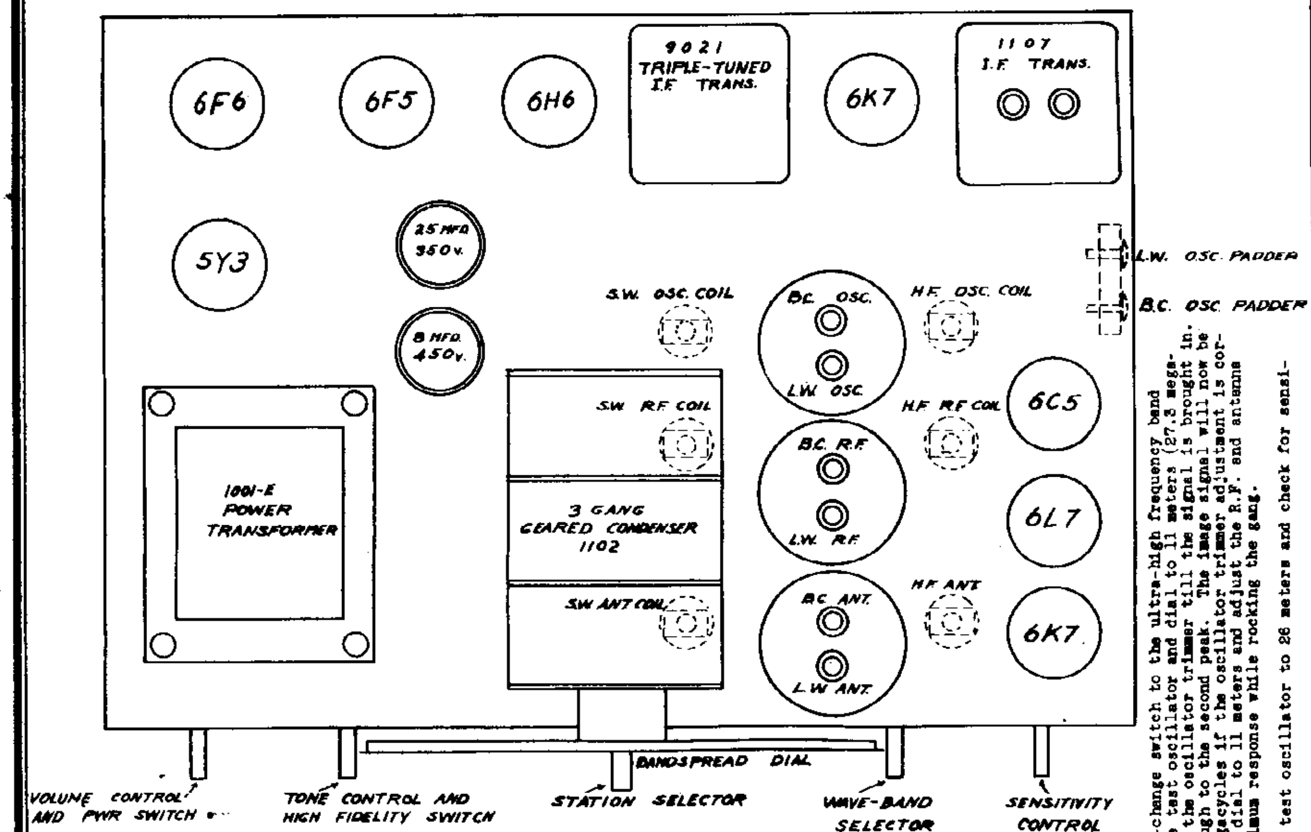
*Used only on Model 802

PART NO.	DESCRIPTION
1110	Volume Control and switch
1114-A	Sensitivity Control
1034	Phono-radio switch
1111	Candohm Resistor
1112	3 Gang Switch
1113	Band Indicator
1114	8-1/2 inch Dynamic Speaker
Condensers	25 MFD 350V wet electrolytic condenser
	8 MFD 450V wet electrolytic condenser
	2/10 400V Cub Condenser
	2/10 200V Cub Condenser
	1/10 400V Cub Condenser
	1/10 200V Cub Condenser
	.05 400V Cub Condenser
	.01 400V Cub Condenser
	.004 800V Cub Condenser
Resistors	1 megohm 1/3 watt
	500,000 ohm 1/3 watt

PART NO.	DESCRIPTION
	250,000 ohm 1/3 watt
	100,000 ohms 1/3 watt
	50,000 ohms 1/3 watt
	6,000 ohms 1/3 watt
	50 ohms 1/3 watt
	20,000 ohms 1 watt
Mica Condensers	25 M.M.F.
	50 M.M.F.
	100 M.M.F.
	250 M.M.F.
	.0015 M.F.D.

MODELS 801,802
Socket, Trimmers
Alignment

ULTRAMAR MFG. CORP.



TOP VIEW
OF CHASSIS
MODELS 801-802

ALIGNMENT PROCEDURE

Realignment of this receiver should never be necessary unless one of the coils has been changed. Lack of sensitivity, selectivity, and poor tone quality may be due to defective tubes, speaker or condensers, insufficient or excessive antenna, open or grounded resistors, etc. If an I.F. tube is replaced, it is necessary to realign the I.F. transformers.

A calibrated oscillator such as Model 180, covering the ranges from 20 to 2,000 meters and an output meter (connected between plate and screen prongs of the 6F6 tube) will be required. Use low values of output to prevent false readings due to the operation of the automatic volume control while aligning.

The output meter may also be connected across the two small prongs of the speaker plug.

INTERMEDIATE STAGE ALIGNMENT

1. Connect the output of the test oscillator to the grid of the 6L7 converter tube and connect a 1 megohm resistor from this grid to the chassis. Connect the ground side of the oscillator (the shielding) to the receiver chassis.

2. Set the test oscillator to 465 K.C. Refer to Curve B on the Calibration chart to obtain the proper setting of the test oscillator.

3. Set the tone control to the left. Align the output intermediate frequency transformer by turning the top screw at the rear of the output I.F. transformer until maximum response is obtained on the output meter. Adjust the other trimmer screws in the same manner.

4. Adjust the input intermediate frequecy transformer in the same manner.

ALIGNMENT OF TUNING CIRCUITS

5. Connect the output of the test oscillator to the antenna lead of the receiver through a .00025 M.F.D. condenser and connect the ground side (shielding) to the chassis.

6. Set the wave change switch to the long-wave position (Red). Set the dial and test oscillator to 900 meters. Adjust the long-wave oscillator trimmer until the signal is brought in. If no signal is heard, then adjust the long-wave padder. See diagram of chassis for location of trimmer and padder condensers.

7. Then adjust the long-wave antenna and R.F. trimmers for maximum response. Set the dial and test oscillator to 1800 meters and adjust the long-wave padder for maximum response while rocking the gang condenser. By rocking the gang is meant tuning to a point just above and just below the test oscillator frequency while making some other adjustment. Return to 900 meters and repeat the entire procedure.

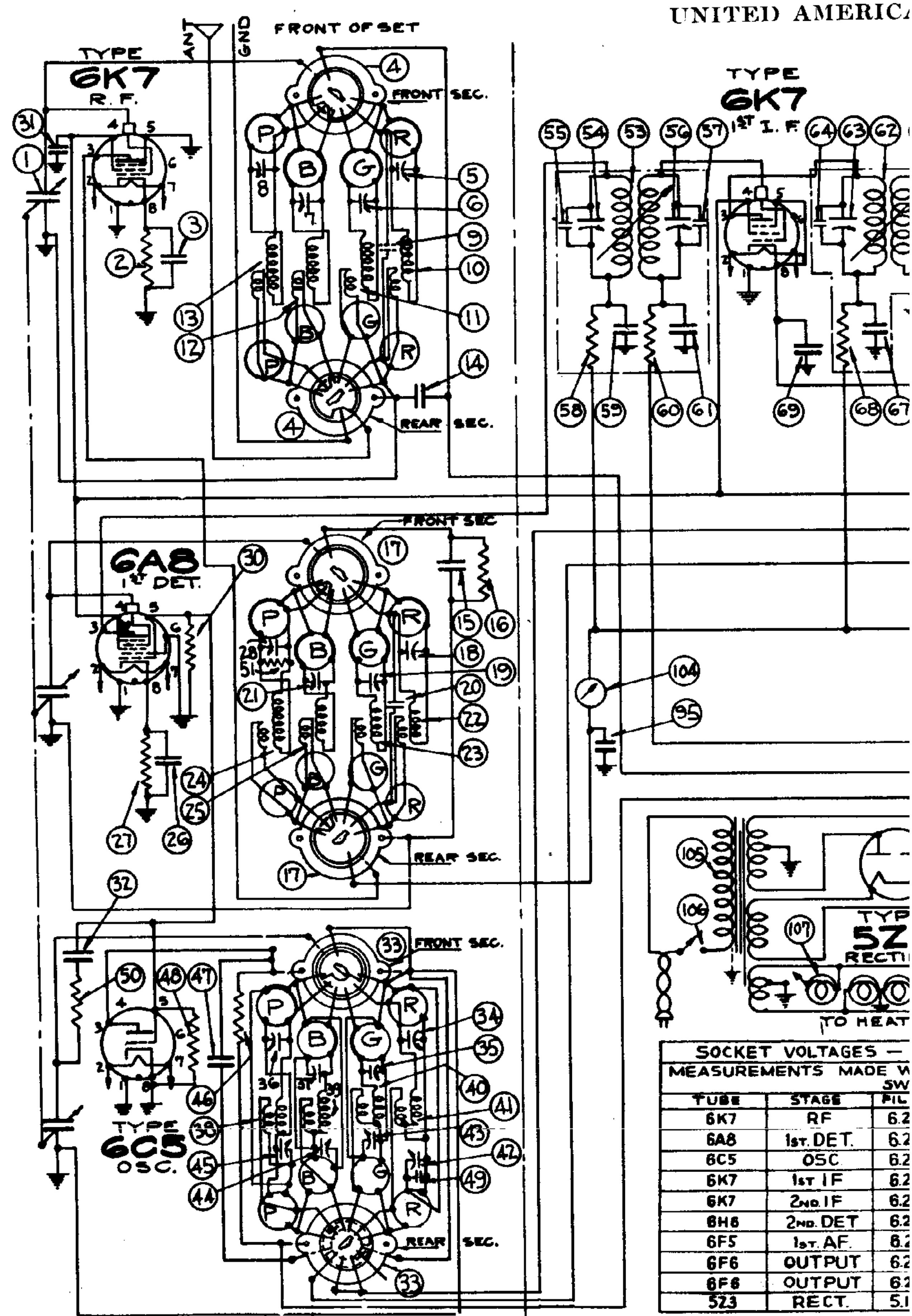
8. Set the wave change switch to the broadcast position (Yellow). Set the dial and test oscillator to 214 meters (1400 K.C.) and adjust the B.C. oscillator, R.F. and antenna trimmers till maximum response is obtained. Set the dial and test oscillator to 600 K.C. and adjust the B.C. padder condenser while rocking the gang till maximum response is obtained.

9. Set the wave change switch to the high frequency band (Short-wave Green). Substitute a 400 ohm resistor for the .00025 M.F.D. condenser in the antenna circuit. Set the dial and test oscillator to 30 meters (10 megacycles). Stand the receiver on end and adjust the 30 meter oscillator coil (located to the right of switch when viewed from bottom) till the signal is brought in. Stop at the first peak. Screwing the trimmer down still more will give another peak which is the image and must not be used. To make certain the set is not tuned to the image, set the test oscillator to 11 megacycles and if another signal is received, then the set is correctly tuned. Reset the test oscillator to 30 meters and adjust the R.F. and antenna trimmers for maximum response, while rocking the gang. Set the dial and test oscillator to 75 meters and check for sensitivity.

10. Set the wave-change switch to the ultra-high frequency band (White). Set the test oscillator and dial to 11 meters (27.3 megacycles). Adjust the oscillator trimmer till the signal is brought in. Continue on through to the second peak. The image signal will now be found at 26.3 megacycles if the oscillator trimmer adjustment is correct. Reset the dial to 11 meters and adjust the R.F. and antenna trimmers for maximum response while rocking the gang.

Set the dial and test oscillator to 26 meters and check for sensitivity.

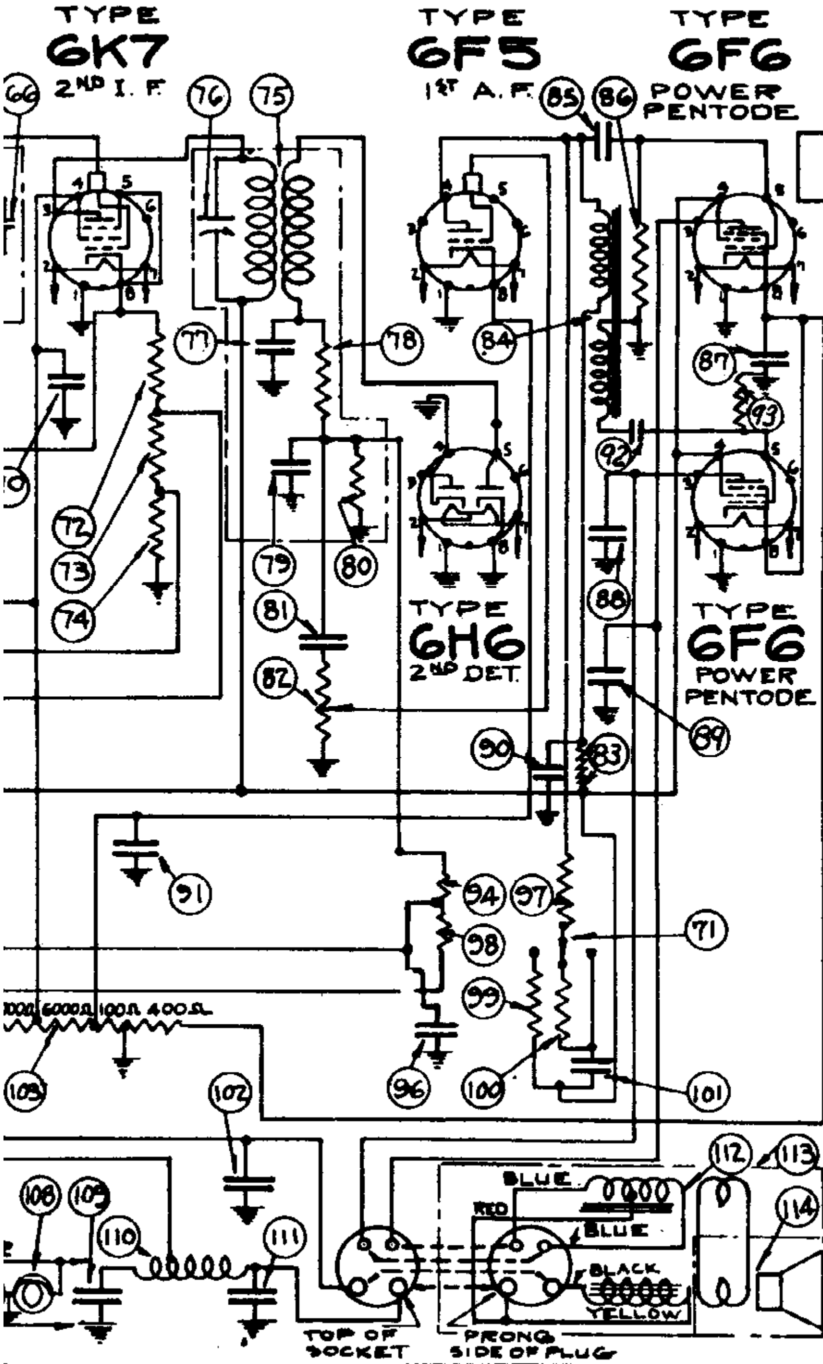
UNITED AMERICA



SOCKET VOLTAGES —		
MEASUREMENTS MADE W		
SW		
TUBE	STAGE	FIL
6K7	RF	6.2
6A8	1st. DET.	6.2
6C5	OSC	6.2
6K7	1st IF	6.2
6K7	2nd IF	6.2
6H6	2nd DET	6.2
6F5	1st AF	6.2
6F6	OUTPUT	6.2
6F6	OUTPUT	6.2
5Z3	RECT.	5.1

BOSCH CORP.

MODEL 306
Schematic, Voltage
Resistance



INT. FREQ. 465 K.C.

D.C. RESISTANCE MEASURED WITH WAVE-CHANGE SWITCH IN CORRESPONDING BAND POSITION			
COIL	DIA. No	PRIM.	SEC.
P-ANT.	13	130 ohms	25 ohms
P-RF.	24	38 "	25 "
P-OSC.	38	8.0 "	13.5 "
B-ANT.	12	22 "	4 "
B-RF.	25	.5 "	4.5 "
B-OSC.	39	1.5 "	3 "
G-ANT.	11	3.2 "	1 "
G-RF.	23	1.5 "	1 "
G-OSC.	40	.5 "	1 "
R-ANT.	10	1 "	.4 "
R-RF.	22	2 "	.4 "
R-OSC.	41	.5 "	.4 "
1st. IF.	53	3.5 "	3.5 "
2nd. IF.	82	3.5 "	3.5 "
3rd. IF.	75	11.5 "	11.5 "
CHOKE	110	350 "	
1st. AF.			
TRANS.	84	3200 "	3800 "
OUTPUT		265 "	
TRANS.	112	312 "	.03 "
SPKR.			
FIELD		1900 "	
VOICE			
COIL	114	2.6 "	

= 115 VOLTS TAKEN FROM BOTTOM OF SOCKETS
A 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE-CHANGE IN BROADCAST BAND POSITION

PIN NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.	CATHODE	PIN NOS.
2 - 7	245	3 - 1	100	4 - 1	2.5	1 - 8
2 - 7	240	3 - 1	100	4 - 1	2.2	1 - 8
2 - 7	200	3 - 1				
2 - 7	240	3 - 1	100	4 - 1	8.0	1 - 8
2 - 7	255	3 - 1	100	4 - 1	8.0	1 - 8
2 - 7						
2 - 7	250	4 - 1			1.75	1 - 8
2 - 7	350	3 - 1	255	4 - 1	19.5	1 - 8
2 - 7	350	3 - 1	255	4 - 1	19.5	1 - 8
	720					

UNITED AMERICAN BOSCH CORP.

MODEL 306
Circuit Data, Socket Trimmers Chassis

GENERAL DESCRIPTION

This model is a ten tube, four band superheterodyne receiver designed for world wide reception including the U.S. Weather Band and employs the new all-metal tubes.

The circuit employs a high frequency amplifier using the new type 6K7 tube. This is followed by the first detector circuit employing a 6A8 tube and a separate oscillator (type 6C5). These tubes with their associated circuits (coils, variable condensers, trim condensers for R.F. and detector stages, and trim and lag condensers for the oscillators) comprise a complete assembly in compact form separately cushioned from the main chassis. This assembly is known as the "Precision Tuner". In addition the set includes a new and novel development of intermediate frequency circuits which allows the adjustment of the band width of the amplifier to be varied over a wide range. At one end of the range is the most selective condition which allows single channel reception even under the influence of powerful nearby stations. At the other end the transmission characteristic of the amplifier is so changed as to allow transmission without attenuation of frequencies up to 7000 cycles on either side of the carrier. As a matter of fact, the amplifier is overcoupled to such a degree that frequencies in the neighborhood of five thousand cycles on either side of the carrier are transmitted at greater efficiency than frequencies close to the carrier. This design is necessary since radio frequency circuits give rise to some side band attenuation, which must be compensated for in the I.F. amplifier. The net result is a smooth transmission curve over the entire band.

From the oscillator the energy passes thru a variable selector I.F. transformer and to a 6K7 amplifier tube. Then thru another variable selector I.F. transformer and to an additional 6K7 amplifier tube. From here further selection takes place in the 3rd I.F. transformer where the energy is passed on to the 2nd detector and A.V.C. diode (type 6H6). After detection there follows a first audio amplifier (type 6F5) and by means of an audio transformer the energy is sent to the power output stage comprising two 6F6 pentods in push-pull. A 5Z3 rectifier supplies the necessary direct current for the tubes.

REMOVING INDIVIDUAL COIL AND SWITCH SECTIONS OF "PRECISION TUNER"

If a component part located underneath the switch and coil assemblies of the "Precision Tuner" has to be replaced or a section of the unit has to be removed for inspection, each section can easily be removed separately. To do this proceed with care as follows:

1. Remove the three coil shields.
2. Remove the two self-tapping screws which fasten the mounting plate of the wave-change switch shaft to the chassis frame. Pull switch shaft straight out.
3. Unsolder the stator and rotor leads from the gang condenser.
4. The fastening screws for the switch sections are located on top of the "Precision Tuner" and are indicated by X,Y, and Z in Figure #3. Remove the corresponding screw.
5. Each individual section can then be pulled out straight.

Note: On the R.F. section, the plate lead from the 6K7 socket will have to be unsoldered from the switch terminal before the section can be removed.

On the oscillator section, the plate lead will have to be unsoldered from the 6C5 socket.

6. After repairs have been made resolder the plate leads mentioned above and replace the section being careful to observe that the slotted holes in the switch bracket line up with the round guide pins on the base plate of the "Precision Tuner". This is IMPORTANT as the switch shaft cannot be inserted if the switch brackets do not line up.
7. Replace the section fastening screw.
8. Resolder the stator and rotor leads on gang condenser.
9. Replace the switch shaft and the mounting fastening screws. When inserting the switch shaft, be careful that all the switch discs are in the same position. Otherwise the switch shaft will not slide in. NEVER force the shaft into the switch discs. If shaft does not slide in freely, examine the position of the slot in each switch disc.
10. Before replacing the coil shields, it might be adviseable to bend the shields slightly to assure that positive contact is made. To do this hold the shield with your two hands using the thumbs and first two fingers as shown in figure #1. Pull out the ends of the shield slightly and at the same time apply a little pressure on the sides of the shield as indicated by the arrows in the drawing. Then replace the shields and observe that they fit tightly. In addition to assuring positive contacts, this will also prevent the shields from rattling.

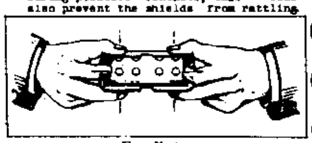
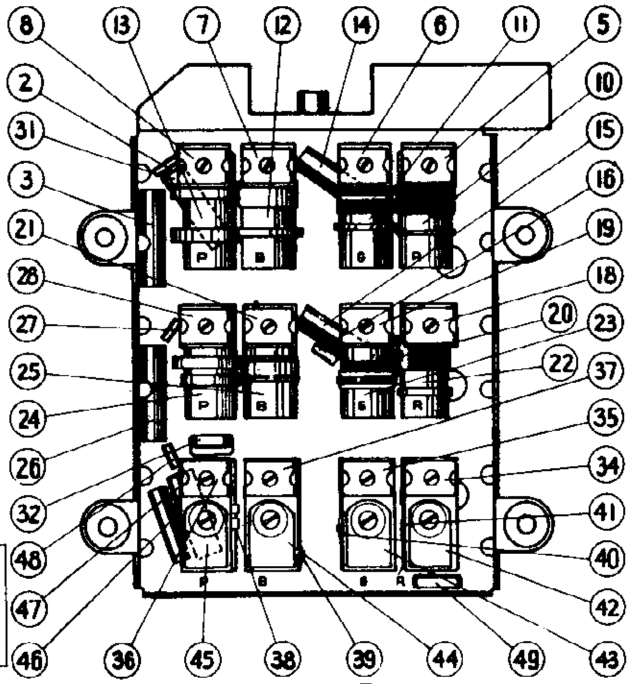
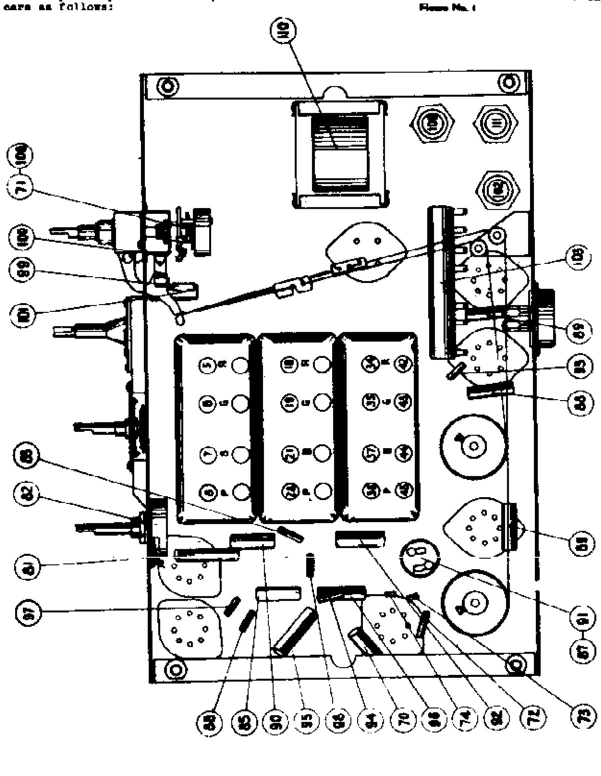


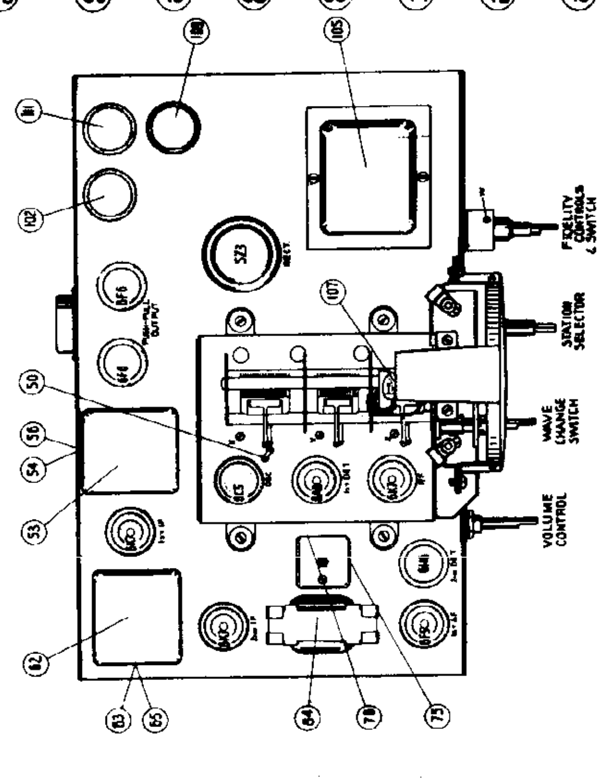
Figure No. 1

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes --- 3#6K7, 1#6A8, 1#6C5, 1#6H6, 1#6F5, 2#6F6, 1#5Z3 - Total 10
Power Supply ---------- 105 to 125 volts, 50 to 60 cycles
Power Consumption ---------- 90 Watts
Maximum Undistorted Output ---------- 8 Watts
Maximum Output ---------- 10 Watts
Tuning Ranges ---------- Purple Band 120 K.C. to 350 K.C.; White Band 540 K.C. to 1800 K.C.; Green Band 1800 K.C. to 6000 K.C.; Red Band 6000 K.C. to 19500 K.C.
Line-Up Frequencies ------- I.F. 465K.C., 350K.C., 120K.C., 1600K.C., 570K.C., 5500 K.C., 1900K.C., 17000K.C. and 6000 K.C.







MODEL 306
Alignment
Parts

UNITED AMERICAN BOSCH CORP.

MODEL -306

LINE-UP CAPACITOR ADJUSTMENTS

CAUTION: DO NOT INTERFERE WITH THE I.F. ALIGNMENT OF THIS RECEIVER EXCEPT WHEN IT HAS BEEN ABSOLUTELY DETERMINED THAT THIS IS THE CAUSE OF THE TROUBLE AND ONLY WHEN HIGH GRADE TESTING EQUIPMENT IS TO BE USED.

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment. A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in figures #2, #3, and #4 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (445 K.C.)

NOTE: BECAUSE OF THE VARIABLE SELECTIVITY INCORPORATED IN THIS RECEIVER, IT IS IMPORTANT THAT THE PROCEDURE OUTLINED BELOW BE FOLLOWED IN ORDER TO OBTAIN ACCURATE ALIGNMENT.

THE I.F. TRIMMERS ARE ADJUSTED ONLY WHEN THE VARIABLE SELECTOR COILS ARE PLACED IN A PARTICULAR MECHANICAL POSITION.

TO PROPERLY SET THE I.F. TRANSFORMERS, TURN THE FIDELITY CONTROL TO THE EXTREME RIGHT OR CLOCKWISE POSITION. ADJUST THE PULLEY WHEELS ON THE BOTTOM OF THE TWO VARIABLE COILS IN A COUNTER-CLOCKWISE DIRECTION UNTIL THEY ARE AGAINST THE STOPS. THIS IS DONE BY TIGHTENING UP THE SCREWS WHICH OPERATE THE PULLEYS.

THE CIRCUITS ARE SO DESIGNED THAT THE SELECTIVITY OF THE RECEIVER CHANGES VERY LITTLE FROM MAXIMUM SELECTIVITY TO MAXIMUM FIDELITY. IN ORDER TO ALIGN THE CIRCUITS PROPERLY, IT IS NECESSARY TO HAVE LESS COUPLING IN THE INDIVIDUAL I.F. TRANSFORMER THAN THAT PROVIDED BY THE MAXIMUM SELECTIVITY SETTING.

TO OBTAIN THIS LESSER COUPLING MERELY TURN THE SCREW [INDICATED BY "S" IN FIGURE #3], WHICH ACTS AS A STOP TO LIMIT SELECTIVITY, OUT ABOUT 1/4 INCH FROM ITS ORIGINAL POSITION. THIS ALLOWS A MOVEMENT OF THE VARIABLE COILS WHICH PUTS THE RECEIVER IN A VERY SELECTIVE BUT LESS SENSITIVE CONDITION. WITH THE CONTROL IN THIS POSITION ALIGN THE I.F. STAGES AS FOLLOWS:

1. Set volume control on full and connect output meter across voice coil of speaker.
2. Set test oscillator to 445 K.C. and adjust its output to produce a measurable reading on output meter when test signal is applied to the grid of the 2nd I.F. tube (6K7) thru a .1 mfd. blocking condenser.
3. Adjust trimmer #76 to maximum output, reducing output of test oscillator as required.
4. Apply test signal to grid of 1st I.F. tube (6K7) and adjust #63 and #65 to maximum output.
5. Apply test signal to grid of 1st detector (6A8) and adjust #54 and #56 to maximum output.
6. After the above I.F. adjustments have been made, replace the stop-screw to original position.

ADJUSTMENT OF PURPLE BAND

Note: During all of the subsequent adjustments, the selectivity control should be turned to the left or counter-clockwise direction.

1. Set wave-change switch to the purple band position.
2. Set test oscillator and dial indicator to 380 K.C. and apply test signal to antenna terminal of the chassis thru a .0002 mfd. series condenser and adjust #36, #28 and #8 to maximum output.
3. Set test oscillator and dial indicator to 130 K.C. and adjust #45 to maximum output.
4. Return to 380 K.C. setting with both test oscillator and dial indicator and repeat adjustment of #36, #28 and #8 for accuracy.

ADJUSTMENT OF BROADCAST BAND

1. Set wave-change switch to White or Broadcast Band position.
2. Set test oscillator and dial indicator to 1600 K.C. and adjust #37, #21 and #7 to maximum output.
3. Set test oscillator and dial indicator to 570 K.C. and adjust #44 to maximum output.
4. Return to 1600 K.C. setting and make readjustment of #37, #21 and #7.

ADJUSTMENT OF GREEN BAND

Note: In adjusting the Green and Red Bands, a .0008 mfd. condenser and a 400 ohms resistor connected in series should be inserted in the high side of the test oscillator leads. This condenser-resistor combination is the approximate equivalent of a short wave antenna.

1. Set wave-change switch to the Green Band position.
2. Set test oscillator and dial indicator to 5800 K.C. and adjust #35, #19 and #6 to maximum output.
3. Set test oscillator and dial indicator to 1900 K.C. and adjust #43 to maximum output.
4. Return to 5800 K.C. setting and make readjustment of #35, #19 and #6.

ADJUSTMENT OF RED BAND

1. Set wave-change switch to Red Band position.
2. Set test oscillator and dial indicator to 17000 K.C. and adjust #34, #18 and #5 to maximum output.
3. Set test oscillator and dial indicator to 6000 K.C. and adjust #42 to maximum output.
4. Return to 17000 K.C. setting and make readjustment of #34, #18 and #5.

Note: The adjustment of the two short-wave oscillator lag condensers (#42 and #43) is best made by the max-max. method. This is done as follows:

Tune the receiver with the left hand by means of the tuning knob and adjust the lag condenser in either direction and then without changing it, tune the receiver thru a maximum, noting reading of the output meter. Change the lag condenser further in the same direction, return receiver and note reading. If output drops with second adjustment, reverse direction of the adjustment of lag condenser. Continue this type of trial and error adjustment until no further improvement can be made when either the tuning control or the lag condenser are changed. While this procedure may appear difficult, facility can be easily acquired by practice and the operation requires only a few minutes.

IMPORTANT: WHILE TESTING OR MAKING REPAIRS ON THIS RECEIVER, THE CHASSIS SHOULD NOT BE TURNED UPSIDE DOWN OR ON ITS SIDE FOR ANY LONG PERIOD OF TIME WHILE THE SET IS TURNED ON AS THE CHEMICALS IN THE ELECTROLYTIC FILTER CONDENSER WILL COME OUT THRU THE AIR VENTS MAKING THE CONDENSER APPEAR TO BE DEFECTIVE. IF LEFT IN THIS POSITION TOO LONG THE CONDENSER MAY BE INJURED.

SERVICE PARTS LIST

Dia. #	Part #	Description of Parts	List Price
1	CO 9589	Variable condenser assembly	$ 4.85
2	RE 9689	300 ohms ¼ W. resistor	.10
3	SA 108366	.05 mfd. 200 V. condenser	.25
4	SN 9684	Antenna section "Precision Tuner" assembly complete with switch, coils and trimmers	4.75
5	CS 9611	4 to 35 mmf. antenna trim condenser (Red Band)	.20
6	CS 9611	4 to 35 mmf. antenna trim condenser (Green Band)	.20
7	CS 9611	4 to 35 mmf. antenna trim condenser (White Band)	.20
8	CS 9611	4 to 35 mmf. antenna trim condenser (Purple Band)	.20
9		Twisted pair of wires-part of RC 9671	
10	RC 9671	Antenna coil assembly (Red Band)	.70
11	RC 9674	Antenna coil assembly (Green Band)	.65
12	RC 9677	Antenna coil assembly (White Band)	1.10
13	RC 9680	Antenna coil assembly (Purple Band)	1.25
14	CW 9613	.05 mfd. 200 V. condenser	.25
15	CW 9613	.05 mfd. 200 V. condenser	.25
16	RE 9687	5000 ohms ¼ W. resistor	.10
17	SN 9686	R.F. section "Precision Tuner" assembly complete with switch, coils and trimmers	6.00
18	CS 9611	4. to 35 mmf. R.F. trim condenser (Red Band)	.20
19	CS 9612	1.5 to 10 mmf. R.F. trim condenser (Green Band)	.20
20	CM 9612	6. mmf. mica condenser	.15
21	CS 9612	1.5 to 10 mmf. R.F. trim condenser (White Band)	.20
22	RC 9672	R.F. coil assembly (Red Band)	.70
23	RC 9675	R.F. coil assembly (Green Band)	.65
24	RC 9681	R.F. coil assembly (Purple Band)	1.10
25	RC 9678	R.F. coil assembly (White Band)	1.15
26	SA 108366	.05 mfd. 200 V. condenser	.25
27	RE 9689	300 ohms 1/4 W. resistor	.10
28	CS 9612	1.5 to 10 mmf. R.F. trim condenser (Purple Band)	.20
30	RE 9634	100,000 ohms ¼ W. resistor	.10
31	SA 108366	.05 mfd. 200 V. condenser	.25
32	CM 9611	.000065 mfd. mica condenser	.20
33	SN 9685	Oscillator section "Precision Tuner" assembly complete with switch, coils and trimmers	9.75
34		1.5 to 10 mmf. trim condenser (Red Band) part of CS 9619	
35		3. to 15. mmf. trim condenser-part of CS 9620 (Green Band)	
36		10 to 35 mmf. trim condenser-part of CS 9618 (Purple Band)	
37		3 to 35 mmf. trim condenser-part of CS 9617 (White Band)	
38	RC 9682	Oscillator coil assembly (Purple Band)	1.40
39	RC 9679	Oscillator coil assembly (White Band)	1.50
40	RC 9676	Oscillator coil assembly (Green Band)	1.50
41	RC 9673	Oscillator coil assembly (Red Band)	1.25
42		600 to 1600 mmf. lag condenser-part of CS 9619 (Red Band)	
43		600 to 1600 mmf. lag condenser-part of CS 9620 (Green Band)	
44		300 to 600 mmf. lag condenser-part of CS 9617 (White Band)	
45		60 to 130 mmf. lag condenser-part of CS 9618 (Purple Band)	
46	RE 9586	5000 ohms 1 W. resistor	.20
47	CW 9613	.05 mfd. 200 V. condenser	.25
48	RE 9584	50,000 ohms ¼ W. resistor	.10
49	CM 959	.002 mfd. mica condenser	.25
50	RE 9687	50 ohms ¼ W. resistor	.10
51	RE 9584	100,000 ohms ¼ W. resistor	.10
52	IC 9529	1st I.F. transformer assembly	5.56
54		230 to 350 mmf. I.F. trim condenser-part of IC 9529	
55	SA 108417	.0001 mfd. mica condenser	
56		250 to 350 mmf. I.F. trim condenser-part of IC 9529	
57	SA 108417	.0001 mfd. mica condenser	.20
58	RE 9687	5000 ohms ¼ W. resistor	.10
59	SA 103659	.005 mfd. 400 V. condenser	.30
60	RE 9584	100,000 ohms ¼ W. resistor	.10
61	SA 103659	.005 mfd. 400 V. condenser	.30
62	IC 9530	2nd I.F. transformer assembly	5.46
63		250 to 350 mmf. I.F. trim condenser-part of IC 9530	
64	SA 108417	.0001 mfd. mica condenser	.20
65		250 to 350 mmf. I.F. trim condenser-part of IC 9530	
66	SA 108417	.0001 mfd. mica condenser	.20
67	SA 103659	.005 mfd. 400 V. condenser	.30
68	RE 9687	5000 ohms ¼ W. resistor	.10
69	SA 108366	.05 mfd. 200 V. condenser	.25
70	SA 108366	.05 mfd. 200 V. condenser	.25
71	VR 9611	Tone control switch	1.95
72	SA 105267	1000 ohms ¼ W. resistor	.20
73	RE 9595	1000 ohms ¼ W. resistor	.10
74	RE 9539	4000 ohms ¼ W. resistor	.10
75	IC 9586	3rd I.F. transformer	.90
76		25 to 100 mmf. I.F. trim condenser-part of IC 9586	
77		.00005 mfd. mica condenser-part of IC 9586	
78		100,000 ohms ¼ W. resistor-part of IC 9586	
79		.0001 mfd. mica condenser-part of IC 9586	
80		250,000 ohms ¼ W. resistor-part of IC 9586	
81	SA 108504	.02 mfd. 200 V. condenser	.20
82	VR 9610	Volume control (1 meg.)	1.00
83	SA 105640	5000 ohms ¼ W. resistor	.20
84	TR 9616	Input transformer	4.25
85	CW 9612	.02 mfd. 400 V. condenser	.20
86	SA 105646	½ meg. ¼ W. resistor	.20
87		10 mfd. 25 V. elect. condenser-part of SA 107612	
88	SA 103669	.002 mfd. 600 V. condenser	.25
89	SA 103669	.002 mfd. 600 V. condenser	.25
90	CW 9612	.02 mfd. 400 V. condenser	.20
91		10 mfd. 25 V. elect. condenser-part of SA 107612	
92	CW 9612	.02 mfd. 400 V. condenser	.20
93	SA 105646	½ meg. ¼ W. resistor	.20
94	SA 105661	1 meg. ¼ W. resistor	.20
95	SA 108402	.05 mfd. 400 V. condenser	.25
96	SA 108366	.05 mfd. 200 V. condenser	.25
97	SA 105274	20,000 ohms ¼ W. resistor	.20
98	SA 105279	250,000 ohms ¼ W. resistor	.20
99	SA 105277	75,000 ohms ¼ W. resistor	.20
100	RE 9686	20,000 ohms ¼ W. resistor	.15
101	CW 9612	.02 mfd. 400 V. condenser	.20
102	CE 9617	16. mfd. 300 V. electrolytic condenser	1.10
103	RE 9621	Voltage divider resistor 13,200 ohm tapped	1.00
104	SI 9529	Tuning meter assembly	2.50
105	TR 9617	Power transformer	5.35
106		Line switch-part of VR 9611	
107	LP 962	Tuning meter light (3.2 volts)	.15
108	LP 962	Dial lights (4 used) (3.2 volts)	.15
109	CE 9618	8. mfd. 450 V. electrolytic condenser	1.10
110	SA 101606	Choke coil assembly	2.25
111	CE 9616	8. mfd. 450 V. electrolytic condenser	1.10
112	TR 9615	Speaker output transformer	2.00
113	SK 957	Speaker	10.75
114	DM 956	Diaphragm and voice coil assembly	1.25

MAIN ASSEMBLIES

Part #	Description of Parts	List Price
CH 9540	Chassis assembly	
CH 9537	Chassis assembly - "Precision Tuner" unit	

MAIN ASSEMBLIES (cont'd)

Part #	Description of Parts	List Price
KA 9529	Cabinet	$
SK 959	Speaker	10.75

BRACKETS AND CLIPS

Part #	Description of Parts	List Price
KP 959	Tension clip for expander cable	.05
BK 96125	Bracket and switch assembly (tone control)	.35
BK 96120	Bracket assembly dial scale	.30

CABLE AND CABLE ASSEMBLIES

Part #	Description of Parts	List Price
CB 9612	Line cable with plug	.50
PR 97160	Expander and dial drive cord - 21" long	.05

DUAL OSCILLATOR TRIM CONDENSERS

Part #	Description of Parts	List Price
CS 9617	Dual trim condenser (Black Band)	.65
CS 9618	Dual trim condenser (Purple Band)	.60
CS 9619	Dual trim condenser (Red Band)	.75
CS 9620	Dual trim condenser (Green Band)	.75

TUBE SOCKETS

Part #	Description of Parts	List Price
SO 956	Tube socket - 8 prong	.20
SA 104018	Tube socket - 4 prong	.15
SA 107287	Speaker socket	.10

SCREWS AND WASHERS

Part #	Description of Parts	List Price
SC 101788	Screws - chassis mounting	.05
SC 103709	Self tapping screws #10 x 3/8"	.05
SC 108442	Self tapping screws # 7 x 1/4"	.05
SC 1047CA	Self tapping screws # 6 x 1/4"	.05
WA 99740	Plain washer for chassis mounting screw	.05
WA 106019	Lock washer for chassis mounting screw	.05

SPEAKER PARTS

Part #	Description of Parts	List Price
DM 956	Diaphragm and coil assembly	1.25
FP 101740	Copper ring	.20
FP 102270	Steel plate	.40
FP 101742	Paper washer	.05
CL 9537	Speaker field coil	1.60
SA 101733	Core and frame assembly	.65
SC 102138	Fastening screw - core and frame	.05
FP 79281	Cable clamp	.05
FP 101868	Diaphragm fastening screw	.05
TR 9615	Speaker output transformer	2.00
SC 101864	Fastening screw - output transformer	.05
SA 107278	Speaker plug - 4 prong	.10
SA 107279	Speaker plug cover	.10
RG 955	Baffle ring (metal)	1.25
RG 956	Steel ring	.65

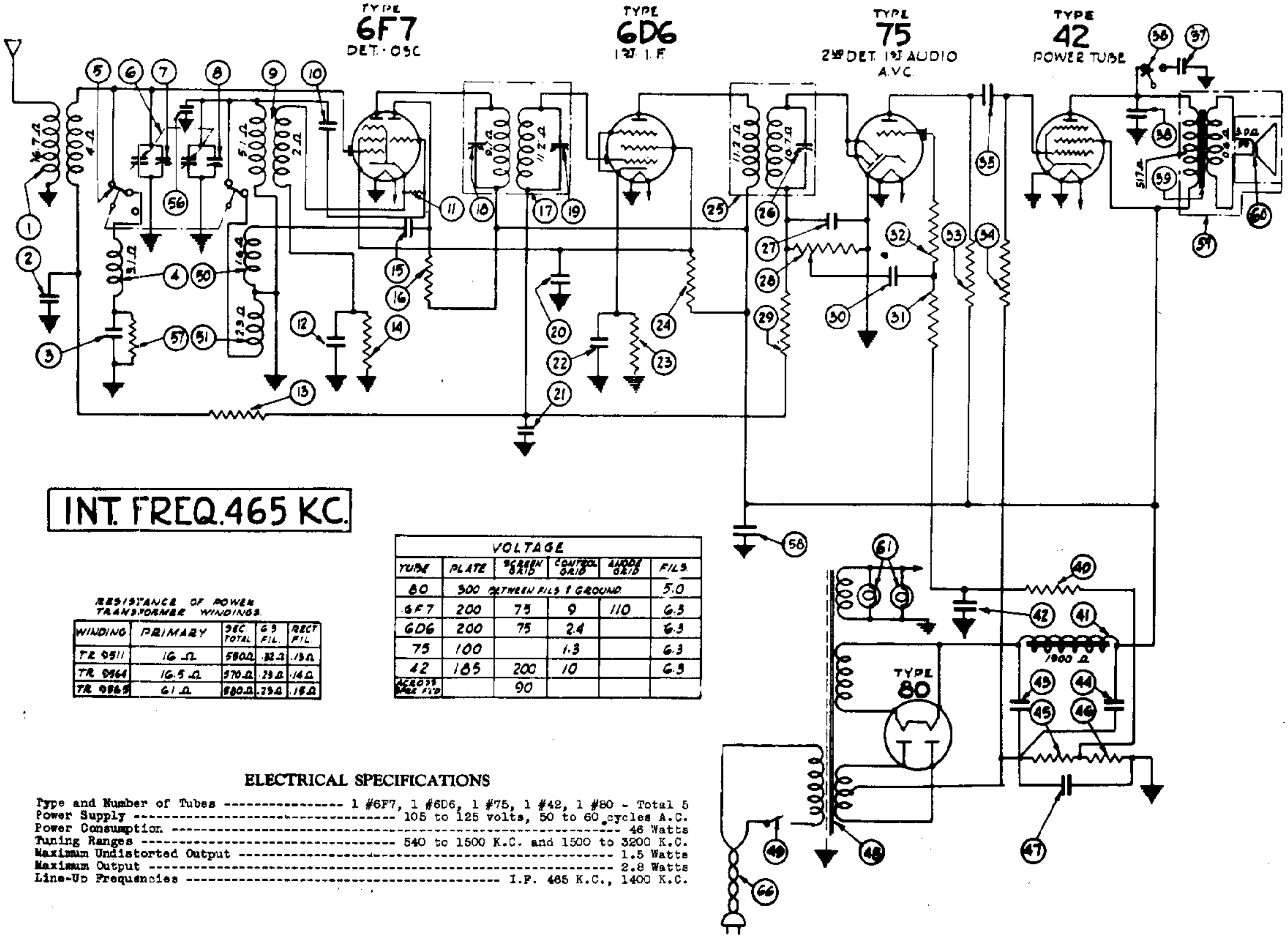
MISCELLANEOUS

Part #	Description of Parts	List Price
KP 9522	Knob - tuning large	.20
SA 107363	Knob - tuning small	.20
KP 9521	Knob - volume control and wave change switch	.20
GA 959	Rubber gasket for dial	.25
SI 9527	Celluloid for tuning meter	.05
IS 9593	Terminal strip - antenna and ground	.20
SH 9524	Vernier drive shaft assembly	.70
SH 9520	Wave change switch shaft assembly	.65

MISCELLANEOUS (cont'd)

Part #	Description of Parts	List Price
DI 9612	Dial indicator	$ .25
LP 962	Dial light	.15
FP 105164	Spring for dial cable	.05
CV 96100	Cover for dial scale	.20
DS 9533	Dial scale	.70
AI 9526	Band indicator assembly	.20
SO 964	Dial lamp socket	.10
SP 9430	Spring clip on I.F. coil assembly	.05
HP 967	Hook - expander cable (2 used)	.05
PU 9510	Large pulley for I.F. expander	.25
SP 9516	Spring hook for expander cable (1 used)	.10
KP 950	Clip for expander cable (2 used)	.05
GR 955	Celluloid gear and pinion assembly (second hand)	.25
SI 9533	Dial indicator (second hand)	.05
GR 956	Small pinion gear (second hand)	.25
IS 96105	Shield for dial lamp	.05
FP 96772	Spring ring used with GR 956	.05
TO 9525	Celluloid "Bull's eye" on cabinet	.05

UNITED AMERICAN BOSCH CORP.



INT. FREQ. 465 KC.

RESISTANCE OF POWER TRANSFORMER WINDINGS.

WINDING	PRIMARY	SEC. TOTAL	6.3 FIL.	RECT FIL.
TR 9511	16 Ω	580Ω	.32Ω	.13Ω
TR 9564	16.5 Ω	570 Ω	.23 Ω	.14Ω
TR 9565	61 Ω	580 Ω	.23Ω	.15Ω

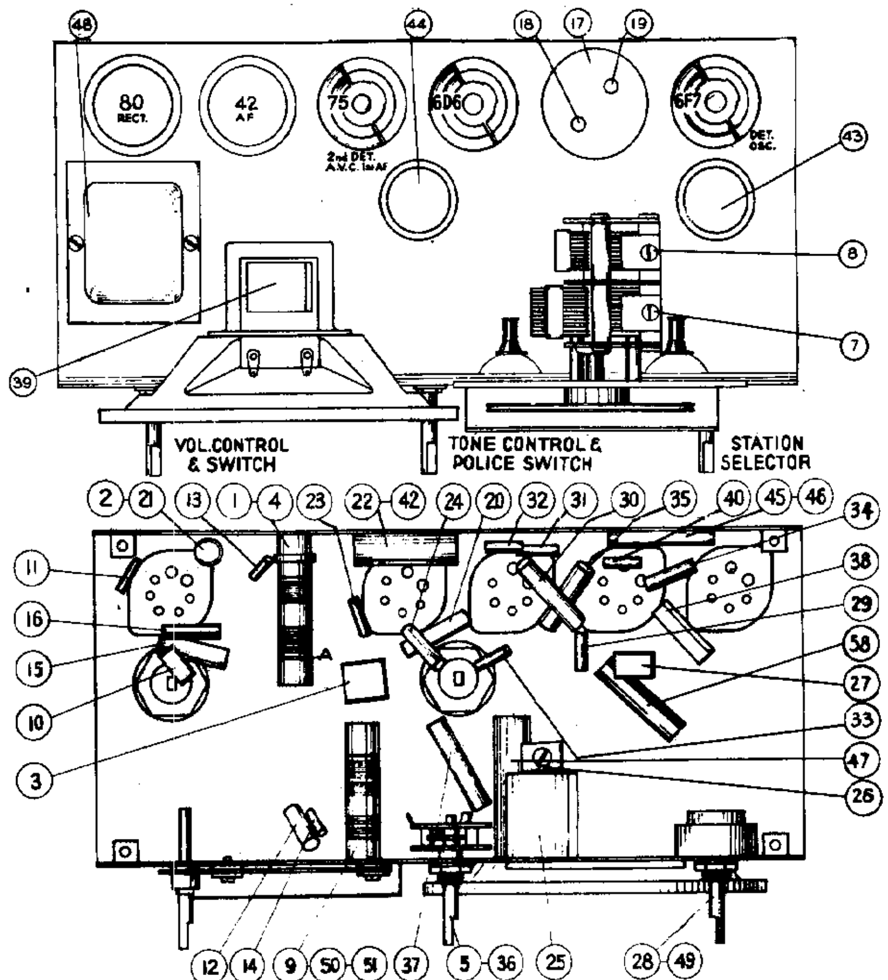
VOLTAGE					
TUBE	PLATE	SCREEN GRID	CONTROL GRID	ANODE GRID	FILS.
80	300 BETWEEN FILS & GROUND				5.0
6F7	200	75	9	110	6.3
6D6	200	75	2.4		6.3
75	100		1.3		6.3
42	185	200	10		6.3
ACROSS SPKR FLD		90			

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ---------------- 1 #6F7, 1 #6D6, 1 #75, 1 #42, 1 #80 - Total 5
Power Supply ------------------------------------ 105 to 125 volts, 50 to 60 cycles A.C.
Power Consumption -- 46 Watts
Tuning Ranges ------------------------------------ 540 to 1500 K.C. and 1500 to 3200 K.C.
Maximum Undistorted Output -- 1.5 Watts
Maximum Output --- 2.8 Watts
Line-Up Frequencies ------------------------------------- I.F. 465 K.C., 1400 K.C.

MODEL 515
Socket, Trimmers
Chassis, Alignment
Notes, Parts

UNITED AMERICAN BOSCH CORP.



GENERAL DESCRIPTION

This model is a five-tube, A.C., two-band superheterodyne receiver whose circuit comprises a combined first detector-oscillator-an intermediate frequency amplifier, a combined second detector, A.V.C. and first audio amplifier, a power pentode output stage and a rectifier with its associated filter circuit and power transformer.

This model is designed to work over two bands, the broadcast band extending from 540 to 1500 K.C. and a police band which extends from 1400 to 3200 K.C.

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment.

A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Fig. #1 and #2 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (465 K.C.)

1. Set volume control on full, turn tone control knob to the right hand position. Set wave-change switch on the broadcast position and the dial indicator at approximately 600 K.C.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 K.C. and adjust its output to produce a measurable reading on output meter when test signal is applied to the grid of the 6D6 I.F. tube thru a .5 mfd. blocking condenser.
4. Adjust #26 (see Fig. #2) to maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 6F7 first detector-oscillator tube and adjust #18 and #19 (Fig. #1) to maximum output.
6. With test signal still on the grid of 6F7 tube, repeat the above adjustments for greatest sensitivity.

ADJUSTMENT OF BROADCAST BAND

1. Leave test signal on grid of 6F7 tube and set the test oscillator to 1400 K.C.
2. Turn the gang condenser to its maximum position. Adjust dial indicator until either end is directly over the long horizontal lines on the dial scale. Then set dial indicator to 1400 K.C.
3. Adjust trimmer #8 to maximum output.
4. Apply test signal to antenna of set thru a .0002 mfd. condenser and adjust trimmer #7 to maximum output.

ADJUSTMENT OF POLICE BAND

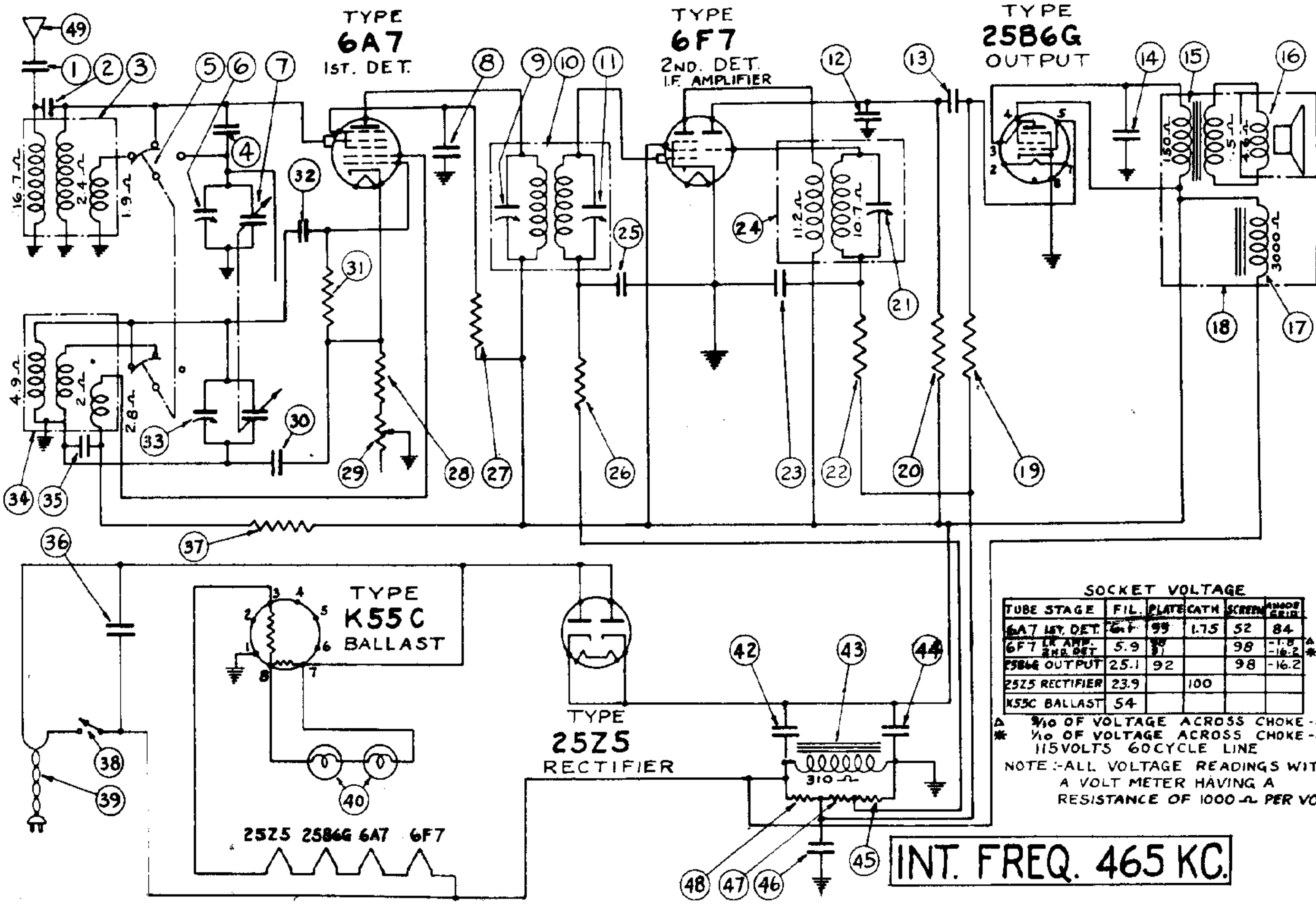
When adjustments as outlined under the broadcast band are completed, the police band requires no adjustment unless the coil had been changed. In this event, set test oscillator and station indicator to 1700 K.C. and apply test signal to antenna lead. The police band winding is indicated by "A" in Fig. #2. Adjust the position of this winding by sliding it back and forth on the core until maximum output is indicated on the output meter. This winding should then be secured in place by applying a thin coat of coil cement.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Dia. #	Part #	Description of Parts	List Price
1	RC 9588	Antenna coil assembly	$ 1.10
2		.05 mfd., 200 V. condenser - part of SA 105327 (dual).	.30
3	CM 958	400 mmfd. mica condenser	.20
4		Police pre-selector coil - part of RC 9588	
5	SW 9519	Switch assembly	.85
6	CG 9522	Variable gang condenser	2.45
7		Trimmer condenser - part of CG 9522	
8		Trimmer condenser - part of CG 9522	
9	RC 9589	Oscillator coil assembly	.95
10	SA 106417	100 mmfd. mica condenser	.20
11	SA 105276	50,000 ohm, 1/4 W. resistor	.15
12	CW 2-05	.05 mfd., 200 V. condenser	.15
13	SA 105279	250,000 ohm, 1/4 W. resistor	.15
14	SA 105269	1800 ohm, 1/4 W. resistor	.15
15	CW 4-01	.01 mfd., 400 V. condenser	.15
16	SA 100197	25,000 ohm, 1/2 W. resistor	.15
17	IC 9532	1st I.F. transformer (465 KC.)	1.75
18		I.F. trimmer condenser - part of IC 9532	
19		I.F. trimmer condenser - part of IC 9532	
20	CW 4-10	.1 mfd., 400 V. condenser	.15
21		.05 mfd., 200 V. condenser - part of SA 105327 (dual).	.30
22		.05 mfd., 200 V. condenser - part of SA 105327 (dual).	.30
23	SA 105264	500 ohm, 1/4 W. resistor	.15
24	SA 101163	75,000 ohm, 1/2 W. resistor	.15
25	IC 9533	2nd I.F. transformer (465 KC.)	1.10
26		I.F. trimmer condenser - part of IC 9533	
27	SA 106417	100 mmfd. mica condenser	.20
28	VR 957	Volume control and line switch - (500,000 ohm)	1.25
29	SA 105281	1 meg., 1/4 W. resistor	.15
30	CW 4-02	.02 mfd. 400 V. condenser	.15
31	SA 105281	1 meg., 1/4 W. resistor	.15
32	SA 105278	100,000 ohm, 1/4 W. resistor	.15
33	SA 105279	250,000 ohm, 1/4 W. resistor	.15
34	SA 100195	250,000 ohm, 1/2 W. resistor	.15
35	CW 4-02	.02 mfd. 400 V. condenser	.15
36	SW 9519	Tone control switch	.85
37	CW 4-02	.02 mfd. 400 V. condenser	.15
38	CW 4-005	.005 mfd. 400 V. condenser	.15
39	SA 107357	Speaker output transformer	1.25
40	SA 105276	50,000 ohm, 1/4 W. resistor	.15
41	SA 107358	Speaker field coil - (1900 ohm)	1.75
42		.05 mfd. 200 V. condenser - part of 105327 (dual)	.30
43	CE 9512	12 mfd. electrolytic condenser (450 V.)	1.25
44	CE 9511	8 mfd. electrolytic condenser (300 V.)	.95
45	RE 9513	320 ohm resistor	.25
46		30 ohm resistor - part of RE 9513	
47	CE 958	10 mfd. electrolytic condenser	.65
48	TR 9511	Power transformer 105-125 V., 50-60 cycles	3.50
49		Line switch - part of VR 957	
50		Oscillator feed back coil - part of RC 9589	
51		Police oscillator coil - part of RC 9589	
56	SA 108043	.00001 mfd. mica condenser	.20
57	SA 105272	10,000 ohm, 1/4 W. resistor	.15
58	CW 4-05	.05 mfd., 400 V. condenser	.15
59	SK 9536	Speaker	6.50
60	SA 106617	Diaphragm and voice coil	1.15
61	LP 951	Dial lamp	.20
66	CB 9512	Line cable and plug	.50

UNITED AMERICAN BOSCH CORP.

AMERICAN-BOSCH RADIO MODEL 604B



SOCKET VOLTAGE

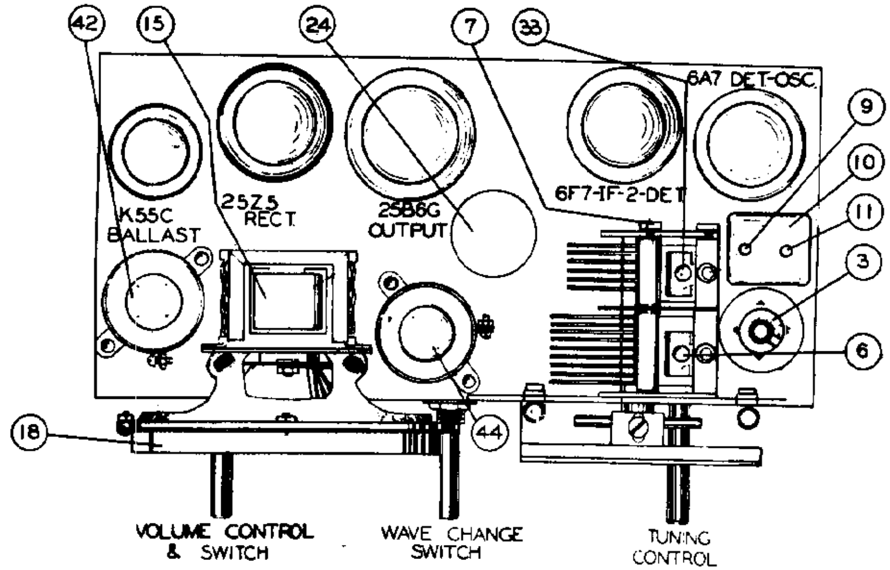
TUBE STAGE	FIL.	PLATE	CATH	SCREEN	ANODE GRID
6A7 1ST. DET.	6.1	99	1.75	52	84
6F7 I.F. AMP. / 2ND. DET.	5.9	90 / 91		98	-1.8 ▲ / -16.2 *
25B6G OUTPUT	25.1	92		98	-16.2
25Z5 RECTIFIER	23.9		100		
K55C BALLAST	54				

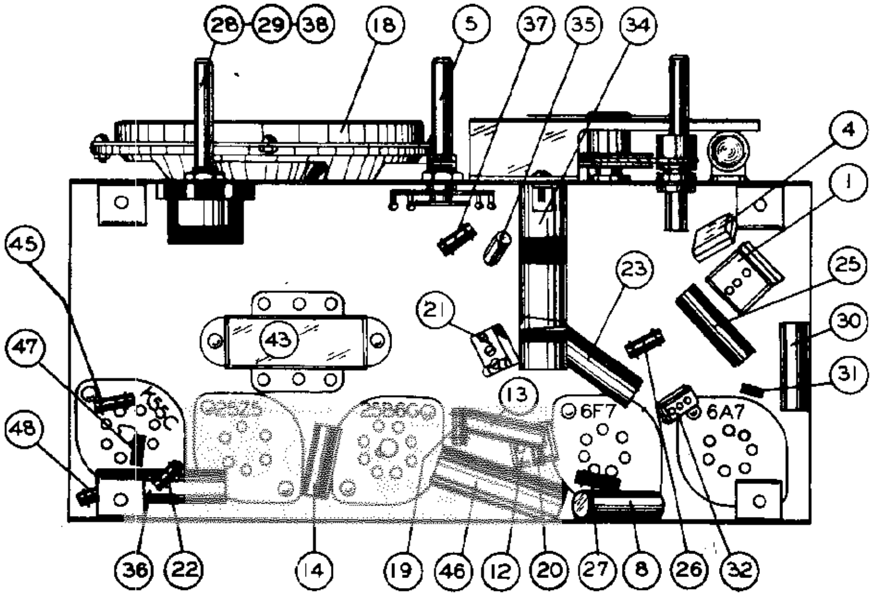
▲ 9/10 OF VOLTAGE ACROSS CHOKE -43
* 1/10 OF VOLTAGE ACROSS CHOKE -43
115 VOLTS 60 CYCLE LINE

NOTE :- ALL VOLTAGE READINGS WITH A VOLT METER HAVING A RESISTANCE OF 1000 Ω PER VOLT

MODEL 604B
Socket, Trimmers
Chassis, Parts
Alignment

UNITED AMERICAN BOSCH CORP.





ELECTRICAL SPECIFICATIONS

Power Supply Characteristics ------------ 105 to 125 volts, 50 to 60 cycle A.C. or D.C.
Power Consumption -- 48 Watts
Tuning Range ---------------------------- 530 to 1525 KC., 1500 to 3000 KC.
Maximum Output -- 1.5 Watts
Maximum Undistorted Output ---------------------------------- 1 Watt

GENERAL DESCRIPTION

This model is a five-tube, A.C.-D.C., superheterodyne receiver whose circuits consist of a combined first detector-oscillator, a stage of intermediate frequency amplification, a second detector, a power output stage and a rectifier.

LINE-UP CAPACITOR ADJUSTMENTS

To align this model, it is essential to use a high grade modulated oscillator and sensitive output meter. The R.F. signal fed into the receiver must be very weak or it will cause the receiver to overload, making correct alignment impossible. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low signal.

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figures #1 and #2 and should be carefully studied before the actual work is started.

I.F. ADJUSTMENT (465 KC.)

NOTE: The signal generator or alignment oscillator should have no external ground connection of the low potential side of its output, either to ground or to the power line and the low potential output terminal may be connected to the frame of the receiver. An external ground of the receiver frame will result in a loud hum making alignment impossible.

1. Connect the output meter across the voice coil of speaker.

2. Set volume control at maximum.

3. Set the test oscillator to 465 KC., and apply test signal to the grid of the 6F7 tube through a 0.5 mfd. condenser.

4. Adjust second I.F. alignment condenser #21 to maximum output.

5. Apply the test signal to the grid of the 6A7 first detector-oscillator tube.

6. Adjust alignment condensers #9 and #11 to maximum output.

OSCILLATOR AND R.F. ADJUSTMENT

1. Set the test oscillator and dial indicator to 1500 KC., and apply the test signal to the antenna of the receiver through an 85 mmf. condenser.

2. Adjust the oscillator and antenna alignment condensers #33 and #6 to maximum output.

3. Check sensitivity over scale.

4. Check sensitivity on short-wave band.

Dia. #	Part #	Description of Parts	List Price
1	SA 103775	.001 mfd. mica condenser	$ .20
2	CS 9546	5 mmf. mica condenser	.20
3	RC 95197	Preselector coil	1.50
4	CM 9520	.00048 mfd. mica condenser	.20
5	SW 9545	Wave-change switch	.45
6		Trimmer condenser - part of CG 9547	
7	CG 9547	2-gang tuning condenser	2.50
8	CW 2-05	.05 mfd., 200 V. condenser	.15
9		35-130 mmf. trimmer condenser - part of IC 9536	
10	IC 9536	1st I.F. coil	2.50
11		35-135 mmf. trimmer condenser - part of IC 9536	
12	SA 103775	.001 mfd. mica condenser	.20
13	CW 4-005	.005 mfd., 400 V. condenser	.15
14	CW 4-005	.005 mfd., 400 V. condenser	.15
15	TR 9588	Output transformer	1.00
16	DM 9512	Diaphragm and voice coil	1.50
17		Field coil - part of SK 9548	
18	SK 9548	Speaker	3.75
19	RE 9545	1/2 meg., 1/8 W. resistor	.10
20	RE 95112	1/4 meg., 1/2 W. resistor	.10
21		30-60 mmf. trimmer condenser - part of IC 9568	
22	RE 9550	1 meg., 1/8 W. resistor	.10
23	CW 2-10	.1 mfd., 200 V. condenser	.15
24	IC 9568	2nd I.F. coil	1.25
25	CW 2-05	.05 mfd., 200 V. condenser	.15
26	RE 9572	1/2 meg., 1/4 W. resistor	.15
27	RE 9589	30,000 ohm, 1/8 W. resistor	.10
28		350 ohm resistance - part of VR 9531	
29	VR 9531	10,000 ohm volume control	.90
30	CW 4-005	.005 mfd., 400 V. condenser	.15
31	RE 9524	50,000 ohm, 1/8 W. resistor	.10
32	CM 9513	.0001 mfd. mica condenser	.10
33		Trimmer condenser - part of CG 9547	
34	RC 95186	Oscillator coil	.70
35	CW 4-005	.005 mfd., 400 V. condenser	.15
36	CW 2-10	.1 mfd., 200 V. condenser	.15
37	RE 9527	5000 ohm, 1/8 W. resistor	.10
38		Switch - part of VR 9531	
39	CB 9512	Line cable	.50
40	LP 9516	Dial light - 6.3 V., .15 amp.	.20
42	CE 9563	40 mfd., 150 V., electrolytic condenser	.80
43	SA 105311	Choke coil assembly	.95
44	CE 9534	16 mfd., 150 V. electrolytic condenser	.70
45	RE 9545	1/2 meg., 1/8 W. resistor	.10
46	CW 2-25	.25 mfd., 200 V. condenser	.20
47	RE 95119	4 meg., 1/2 W. resistor	.10
48	RE 9545	1/2 meg., 1/8 W. resistor	.10
49	KL 105344	Antenna cable	.20

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL 66
Schematic, Voltage

UNITED MOTORS SERVICE

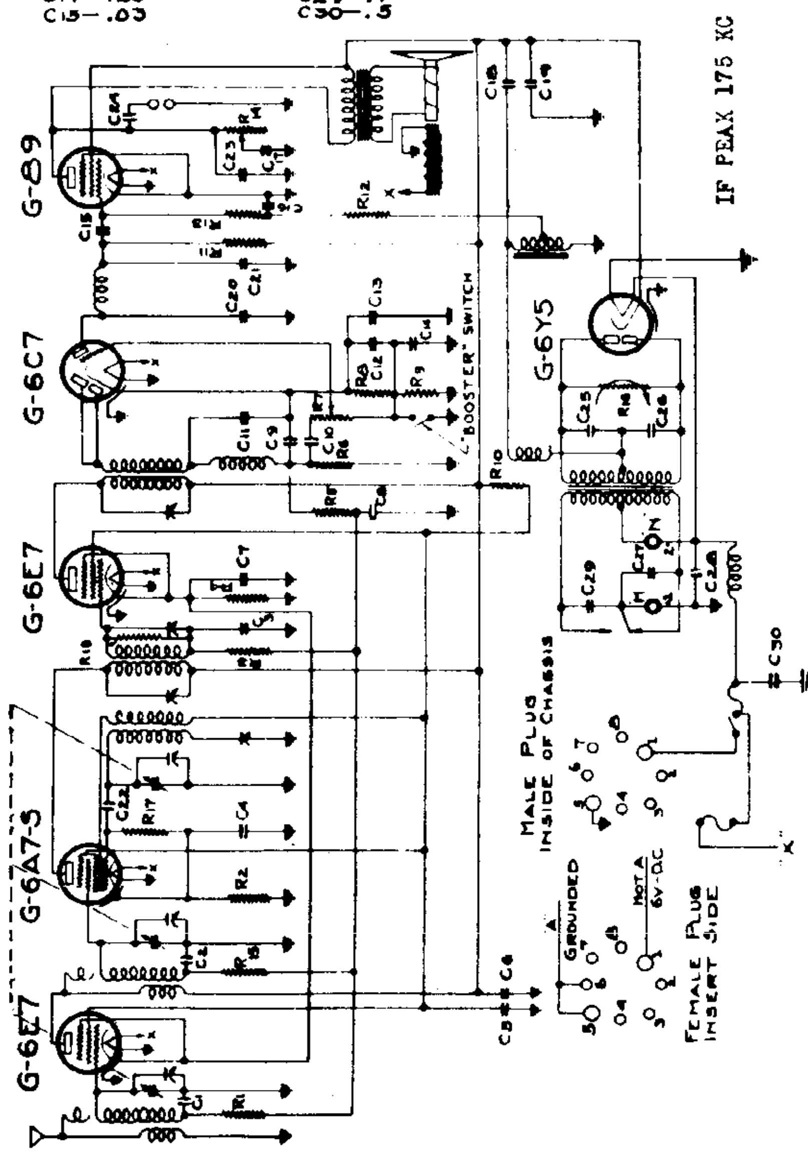
Battery Terminal Volts	5.5	6.3	7.5	* Measured with 300,000 ohm meter.
B+ to B- (Volts)	216	261	322	All voltages measured with no input signal.
B+ to Ground (Volts)	184	218	257	All voltages to ground from socket unless otherwise stated.
Total Battery Drain (Amps)	6.15	7.25	8.50	

CONDENSERS

C1—.03
C2—.03
C3—.01
C4—.1
C5—.25
C6—.25
C7—.25
C8—.03
C9—.0005
C10—.03
C11—.0005
C12—10.
C13—.25
C14—.25
C15—.03
C16—.25
C17—.02
C18—8.0
C19—8.0
C20—.0005
C21—.0005
C22—.00025
C23—.005
C24—.1
C25—.006
C26—.006
C27—.1
C28—.5
C29—.1
C30—.5

RESISTORS

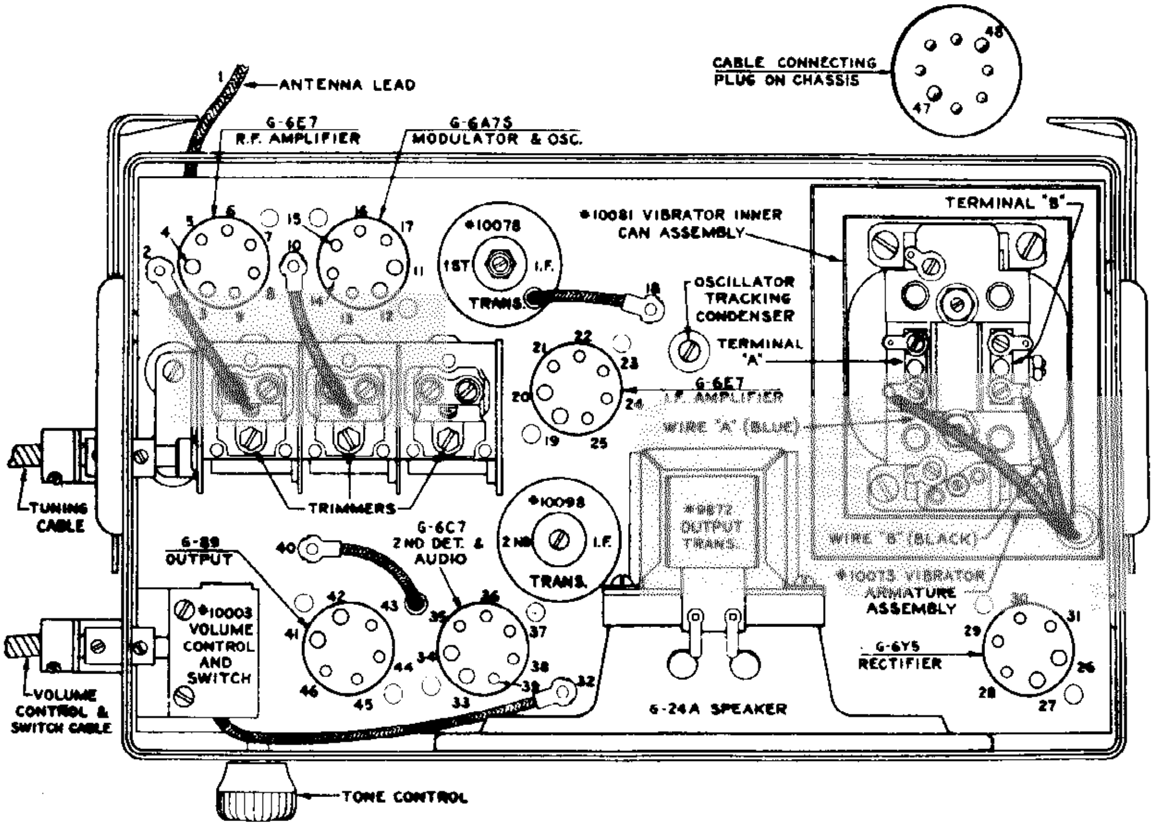
R1—300,000
R2—250
R3—300,000
R4—400
R5—300,000
R6—100,000
R7—200,000
R8—2,500
R9—10,000
R10—10,000
R11—200,000
R12—250,000
R13—250,000
R14—50,000
R15—300,000
R16—500,000 GLOBAR
R17—50,000
R18—1,000,000



Battery Terminal Volts	Plate Volts 5.5	Plate Volts 6.3	Plate Volts 7.5	Screen Volts 5.5	Screen Volts 6.3	Screen Volts 7.5	Cathode Volts 5.5	Cathode Volts 6.3	Cathode Volts 7.5	Grid Volts 5.5	Grid Volts 6.3	Grid Volts 7.5
R. F. (G-6E7)	182	217	256	88	99	109	8.0	9.3	12.5	8.0	9.3	12.5
G-6A7S Det.	182	217	256	88	99	109	2.7	3.4	4.2	2.7	3.4	4.2
G-6A7S Osc.	88	99	109	-	-	-	-	-	-	7.0*	8.0*	8.0*
I. F. (G-6E7)	182	217	256	88	99	109	8.0	9.3	12.5	8.0	9.3	12.5
Audio (G-6C7)	51	60	61	-	-	-	7.5	9.2	9.5	1.8	2.2	2.3
Output (G-89)	177	209	248	184	218	257	-	-	-	23.0	27.0	35.0

MODEL 66
Socket, Trimmers
Resistance

UNITED MOTORS SERVICE



MODEL 66 RESISTANCE CHART

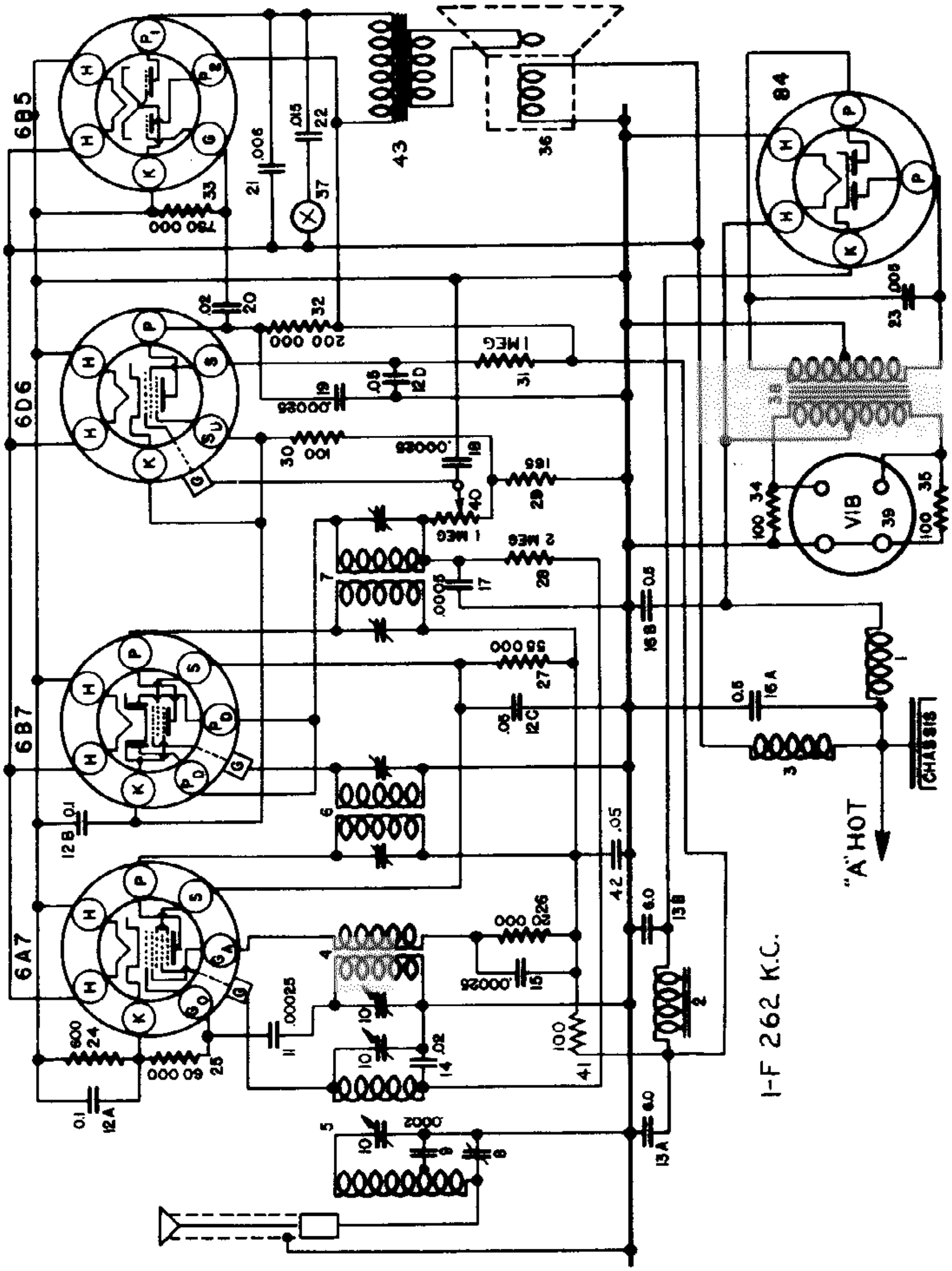
All readings are taken from designated points to ground except those marked with an asterisk (*) which are taken to terminal No. 29, with all tubes removed from their sockets, volume control turned to maximum clockwise position, and the speaker connected in the circuit.

TERMINAL NUMBER	RESISTANCE IN OHMS	IF RESISTANCE DIFFERS GREATLY FROM VALUE SHOWN, CHECK THE FOLLOWING:
1	21	Primary of antenna coil
2	700,000	Secondary of antenna coil, R-1, C-1, R-5, C-8 and R-6
3	0	Ground connection
4	.135	Primary of vibrator trans., Field Coil, C-30, C-28, C-27 and C-29
5	400	R-4 and C-7
6	0	Ground connection
7	Same as #5	
*8	10,000	R-10
9	112	Primary of R.F. transformer
10	700,000	Secondary of R.F. transformer, C-2 and R-15
11	Same as #4	
12	0	Ground connection
13	250	R-2 and C-4
14	50,250	R-17
*15	10,000	Secondary of oscillator coil and R-10
16	Same as #8	
*17	88	Primary of 1st I.F. transformer
18	700,000	Secondary of 1st I.F. transformer, C-3, and R-3
19	Same as #4	
20	0	Ground connection
21	Same as #5	
22	0	Ground connection
23	Same as #5	
24	Same as #8	
*25	165	Primary of 2nd I.F. transformer
26	Same as #4	
27	0	Ground connection
28	1250	Secondary of vibrator trans., C-26, C-25, R.F. buzzer choke, and "B" filter choke
29	0	C-18, C-19, C-5 and C-6
30	Same as #28	
31	0	Ground connection
32	210,000	C-10, R-7, R-9, C-14 and C-13
33	Same as #4	
34	0	Ground connection
35	12,500	R-8, R-9, C-12, C-13, C-14 and C-10
36	100,264	Secondary of 2nd I.F. trans., R.F.C., R-6, C-11, C-9 and C-10
37	Same as #36	
38	0	Ground connection
*39	200,035	C-20, C-21, R.F.C., C-15 and R-11
40	500,450	R-13, R-12, C-16 and "B" filter choke
41	Same as #4	
42	0	Ground connection
43	0	Ground connection
44	Same as #43	
*45	0	Connections
46	430	Primary of output transformer
47	0	Ground connection
48	Same as #4	

Due to manufacturing tolerances on carbon resistors, the values given above may be expected to differ plus or minus 15 per cent.

UNITED MOTORS SERVICE

MODEL 631
Schematic
Voltage



Delco Model 631

Date: 3-11-36

TUBE SOCKET VOLTAGES

Tube	Function	H	P	S	P2	GA	K
6A7	Osc.-Mod.	6	240	90	-	150	6.0
6B7	I-F Amp.	6	240	90	-	-	4.0
6D6	A-F Amp.	6	70	30	-	-	4.0
6B5	Output	6	240	-	220	-	0
84	Rectifier	6	*	-	-	-	240

Above readings taken with a meter having a resistance of 1000 ohms per volt, using the scale on which the largest deflection could be obtained.

Ampere drain--6.5 amperes at 6 volts.

* A.C. voltage measured from plate to plate of 84 tube socket with tube removed should be 550 volts.

MODEL 631
Socket, Trimmers
Chassis, Alignment

UNITED MOTORS SERVICE

CIRCUIT ALIGNMENT

1. Aligning the I-F Stages at 262 K.C.

(a) Feed a test oscillator signal of 262 K.C. into the control grid of the 6B7 tube (leave grid clip in place) through a .25 mfd. condenser and adjust the I-F trimmers on the 2nd I-F coil (Illus. #7 on Fig. 3). Care should be taken to keep the test oscillator leads well away from the grid leads of other tubes in the receiver to avoid inaccurate adjustments.
(b) Remove the test oscillator lead from the grid of the 6B7 tube and connect it to the grid of the 6A7 tube (leaving grid clip in place) and adjust the trimmers on the 1st I-F coil (Illus. #5 Fig. 3) carefully for maximum output.
(c) The preceding adjustments should be repeated as given for test results. Do not align the two stages together by feeding a signal into the grid of the 6A7 tube.

2. Aligning the R-F Stages

(a) Change the test oscillator setting to 1560 K.C. and feed this signal into the antenna connection on the chassis through a .0002 mfd. condenser. Turn the condenser rotor plates until they are completely out of mesh and rest against the high frequency stop. Adjust the parallel trimmer for the oscillator section (middle) of the gang condenser.
(b) Change test oscillator setting to 1400 K.C. and turn condenser rotor plates until this signal is tuned in. Then adjust the trimmers for the other two sections of the condenser gang.
(c) Change test oscillator setting to 600 K.C. and turn condenser rotor plates until this signal is tuned in. Adjust the antenna compensating condenser (Illus. #8, Fig. 4), while rocking the condenser gang plates back and forth through the signal until maximum output is obtained. It will be necessary to readjust this trimmer to the car antenna upon installation.

(d) Recheck alignment of the antenna section of the gang condenser (Illus. #10, Fig. 3) for maximum output at 1400 K.C.

NOTE: Each of the trimmers on the gang condenser should be carefully sealed with Duco Household Cement to prevent any change in adjustment. In using this cement care should be taken to see that it is placed only between the top blade of the trimmer condenser and its adjusting screw.

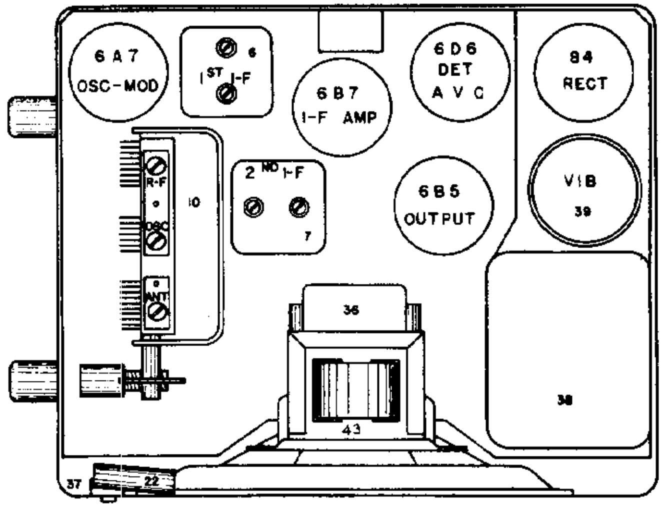


FIG. 3--PARTS LAYOUT--Top View

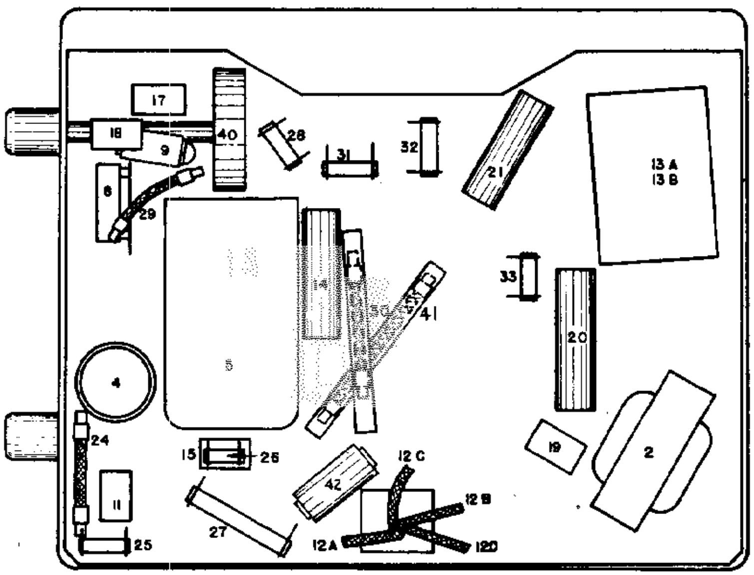


FIG. 4--PARTS LAYOUT--Bottom View

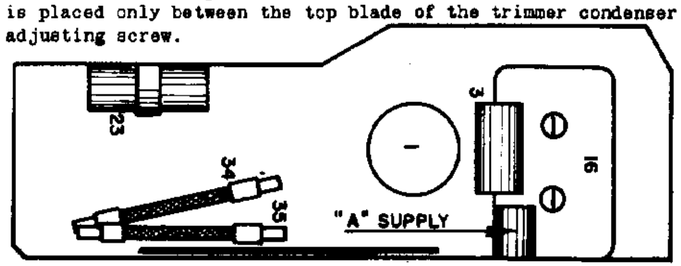
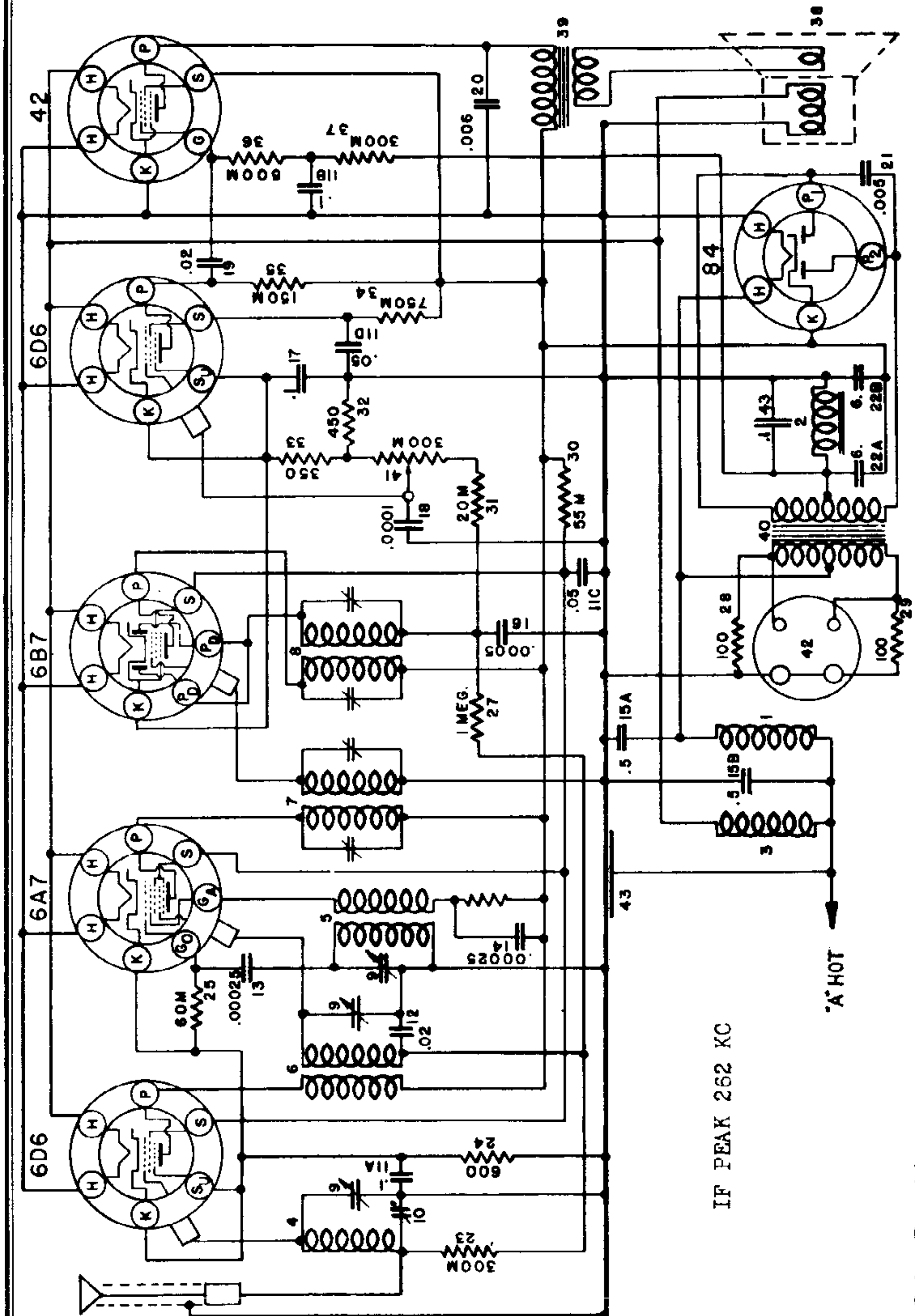


FIG. 1--PARTS LAYOUT--Vibrator Filter

UNITED MOTORS SERVICE

MODEL 631-A
Schematic, Voltage



TUBE SOCKET VOLTAGES

Delco Model 631-A

Date: 5-1-36

Tube Function	H	P	S	SU	GA	G	K
6D6 R-F Amp.	6	240	80	5.5	-	0	5.5
6A7 Osc-Mod.	6	240	80	-	165	0	5.5
6B7 I-F Amp.	6	240	80	-	-	0	3.5
6D6 1st A-F	6	50	35	3.5	-	1.5	3.5
42 Output	6	220	230	-	-	**	0
84 Rectifier	6	*	-	-	-	-	240

Above readings made from tube socket contacts to ground, with a 1000 ohm-per-volt meter, volume control - on full. Ampere drain - - 7 amperes at 6 volts. *A.C. volts plate to plate 550 volts with tube removed. **15 volts measured across "B" filter choke.

MODEL 631-A
Socket, Trimmers
Alignment

UNITED MOTORS SERVICE

CIRCUIT ALIGNMENT

If alignment is found necessary--make all adjustments for maximum output with chassis in its case and use a calibrated test oscillator and output meter.

1. **Aligning I-F Stages at 262 K.C.**

   Feed a test oscillator signal of 262 K.C. into the control grid of the 6A7 tube (leave grid clip in place) through a .25 mfd. condenser and adjust the trimmers on the I-F coils (Illus. 7 & 8, Fig. 4) for maximum output. (Case should be taken to keep the test oscillator leads well away from the grid leads of other tubes to avoid inaccurate adjustments.

2. **Aligning R-F Stages**

   (a) Change the test oscillator setting to 1560 K.C. and feed this signal into the antenna connection on the chassis through a .0002 mfd. (mica) condenser. Turn the condenser rotor plates until they are completely out of mesh and rest against the high frequency stop. Adjust the parallel trimmer for the oscillator section (middle) of the gang condenser. (Illus. #9 Fig. 4)

   (b) Change test oscillator setting to 1400 K.C. and turn condenser rotor plates until this signal is tuned in. Then adjust the trimmers for the other two sections of the condenser gang.

   (c) Change test oscillator setting to 600 K.C. and turn condenser rotor plates until this signal is tuned in. Adjust the antenna compensating condenser, (Illus. #10 Fig. 3) while rocking the condenser plates back and forth through the signal until maximum output is obtained. It will be necessary to readjust this trimmer to the car antenna upon installation.

   (d) Recheck Alignment of the antenna section of the gang condenser (Illus. 9, Fig. 3) for maximum output at 1400 K.C.

NOTE: Each of the trimmers on the gang condenser should be carefully sealed with Duco Household Cement to prevent any change in adjustment. In using this cement care should be taken to see that it is placed only between the top blade of the trimmer condenser and its adjusting screw.

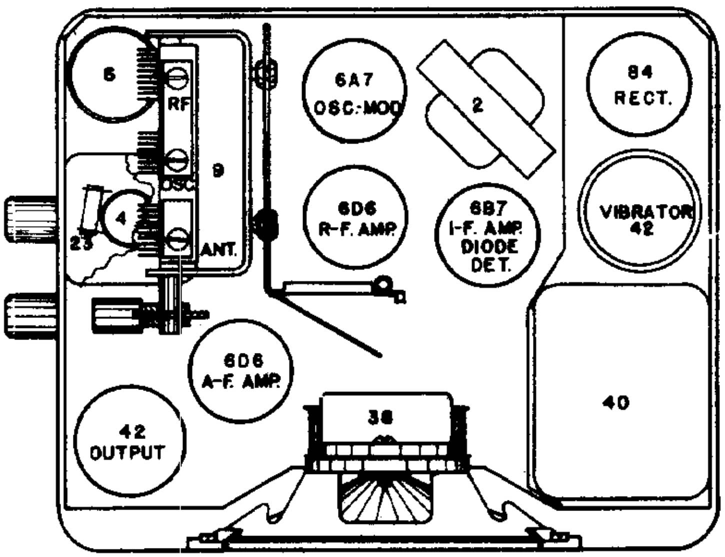


FIG. 3--PARTS LAYOUT--Top View

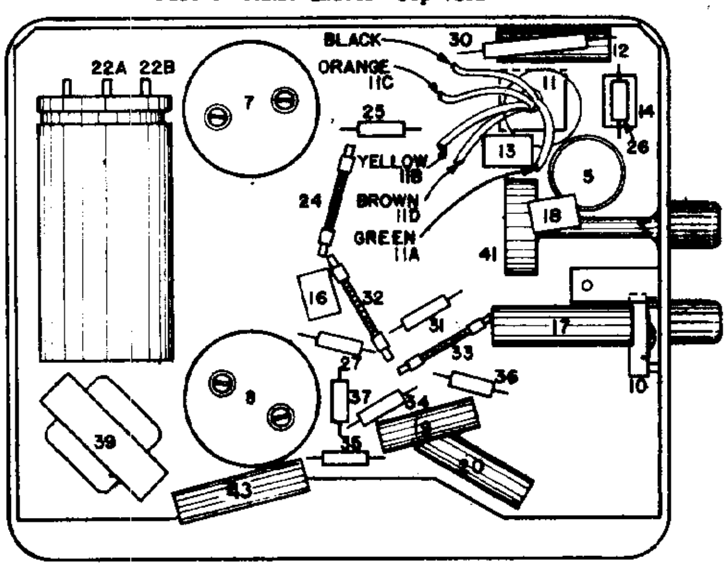


FIG. 4--PARTS LAYOUT--Bottom View

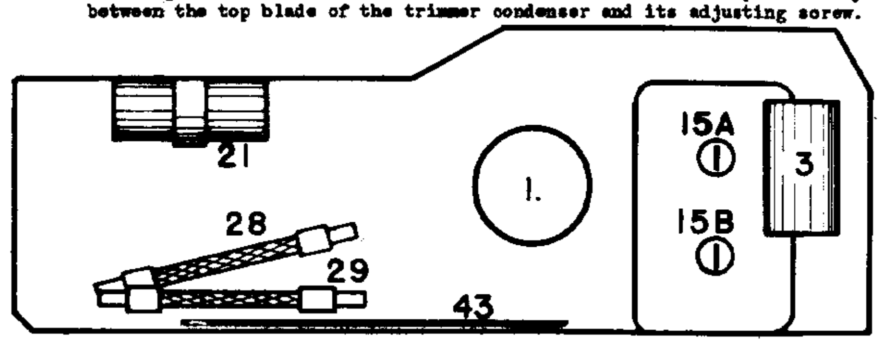
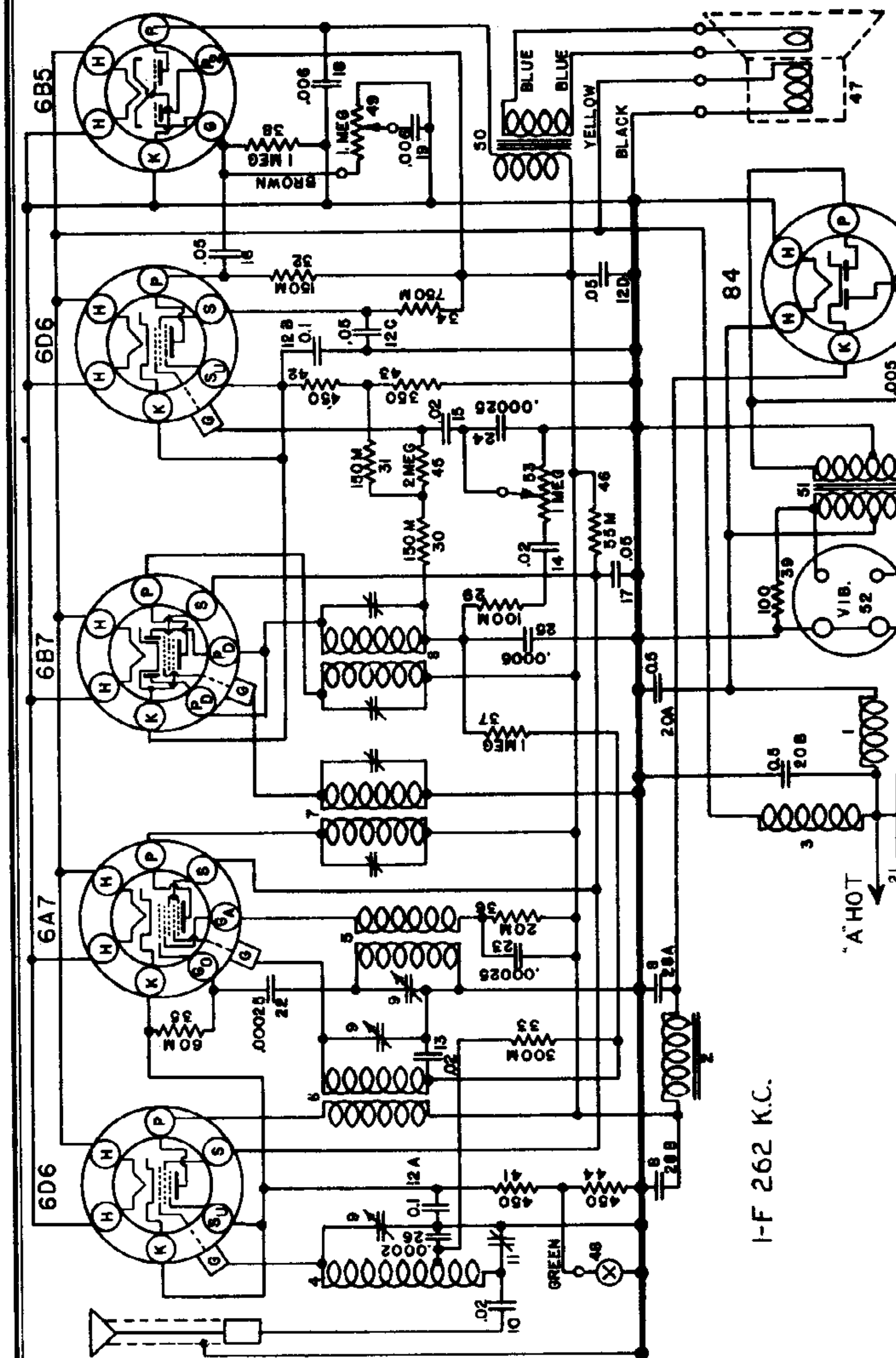


FIG. 1 - - PARTS LAYOUT - - Vibrator filter

UNITED MOTORS SERVICE

MODEL 632
Schematic
Voltage



TUBE SOCKET VOLTAGES

Delco Model 632

Date: 3-2-36

Tube	Function	H	P	S	Ga	P2	K
6D6	R-F Amp.	6	240	80	-	-	5.5
6A7	Osc.-Mod.	6	240	80	165	-	5.5
6B7	I-F Amp.	6	240	80	-	-	3.5
6D6	A-F Amp.	6	50	35	-	-	3.5
6B5	Output	6	240	-	-	220	.0
84	Rectifier	6	*	-	-	-	240

Above readings taken with a meter having a resistance of 1000 ohms per volt, using the scale on which the largest deflection could be obtained.

Ampere drain--7 amperes at 6 volts.

* A.C. voltage measured from plate to plate of 84 tube socket with tube removed should be 550 volts.

MODEL 632
Socket, Trimmers
Alignment

UNITED MOTORS SERVICE

GENERAL: The Delco Model 632 is a six tube, single unit auto radio with tone and sensitivity controls, dust-proof speaker and a primary type vibrator. This receiver is supplied with a wide variety of tuning controls and adapter packages making it possible to obtain "custom built" installation in most any make car.

CIRCUIT ALIGNMENT

If alignment is found necessary--make all adjustments for maximum output with chassis in its case and use a calibrated test oscillator and output meter.

1. Aligning the I-F Stages at 262 K.C.

Feed a test oscillator signal of 262 K.C. into the control grid of the 6A7 tube (leave grid clip in place) through a .25 mfd. condenser and adjust the trimmers on the I-F coils (Illus. 7 & 8, Fig. 4) for maximum output. (Care should be taken to keep the test oscillator leads well away from the grid leads of other tubes to avoid inaccurate adjustments)

2. Aligning the R-F Stages

(a) Change the test oscillator setting to 1560 K.C. and feed this signal into the antenna connection on the chassis through a .002 mfd. condenser. Turn the condenser rotor plates until they are completely out of mesh and rest against the high frequency stop. Adjust the parallel trimmer for the oscillator section (middle) of the gang condenser.

(b) Change test oscillator setting to 1400 K.C. and turn condenser rotor plates until this signal is tuned in. Then adjust the trimmers for the other two sections of the condenser gang.

(c) Change test oscillator setting to 600 K.C. and turn condenser rotor plates until this signal is tuned in. Adjust the antenna compensating condenser, while rocking the condenser plates back and forth through the signal until maximum output was obtained. It will be necessary to readjust this trimmer to the car antenna upon installation.

(d) Recheck alignment of the antenna section of the gang condenser (Illus. 10, Fig. 3) for maximum output at 1400 K.C.

NOTE: Each of the trimmers on the gang condenser should be carefully sealed with Duco Household Cement to prevent any change in adjustment. In using this cement care should be taken to see that it is placed only between the top blade of the trimmer condenser and its adjusting screw.

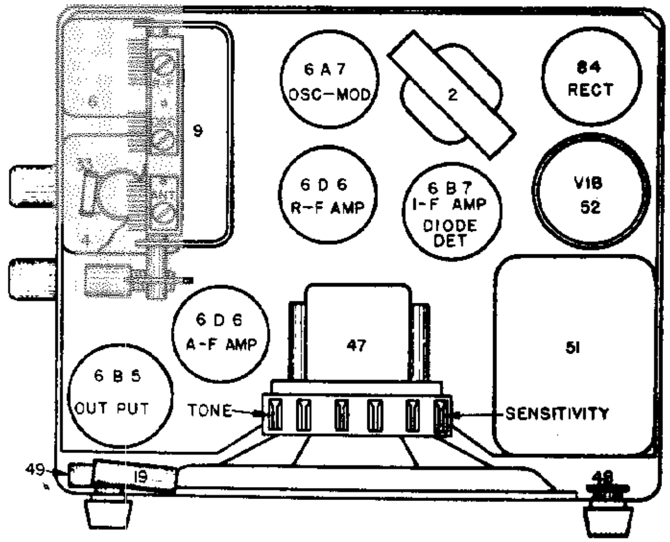


FIG. 3--PARTS LAYOUT--Top View

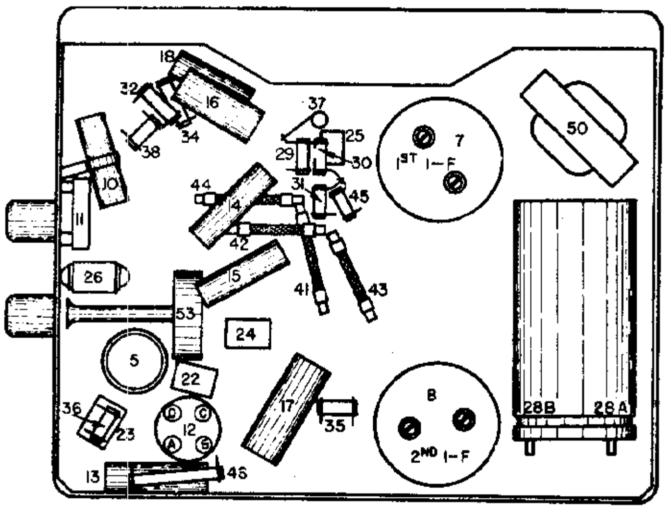


FIG. 4--PARTS LAYOUT--Bottom View

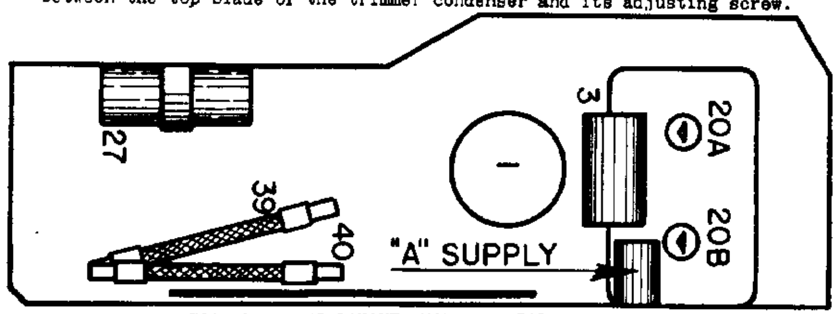
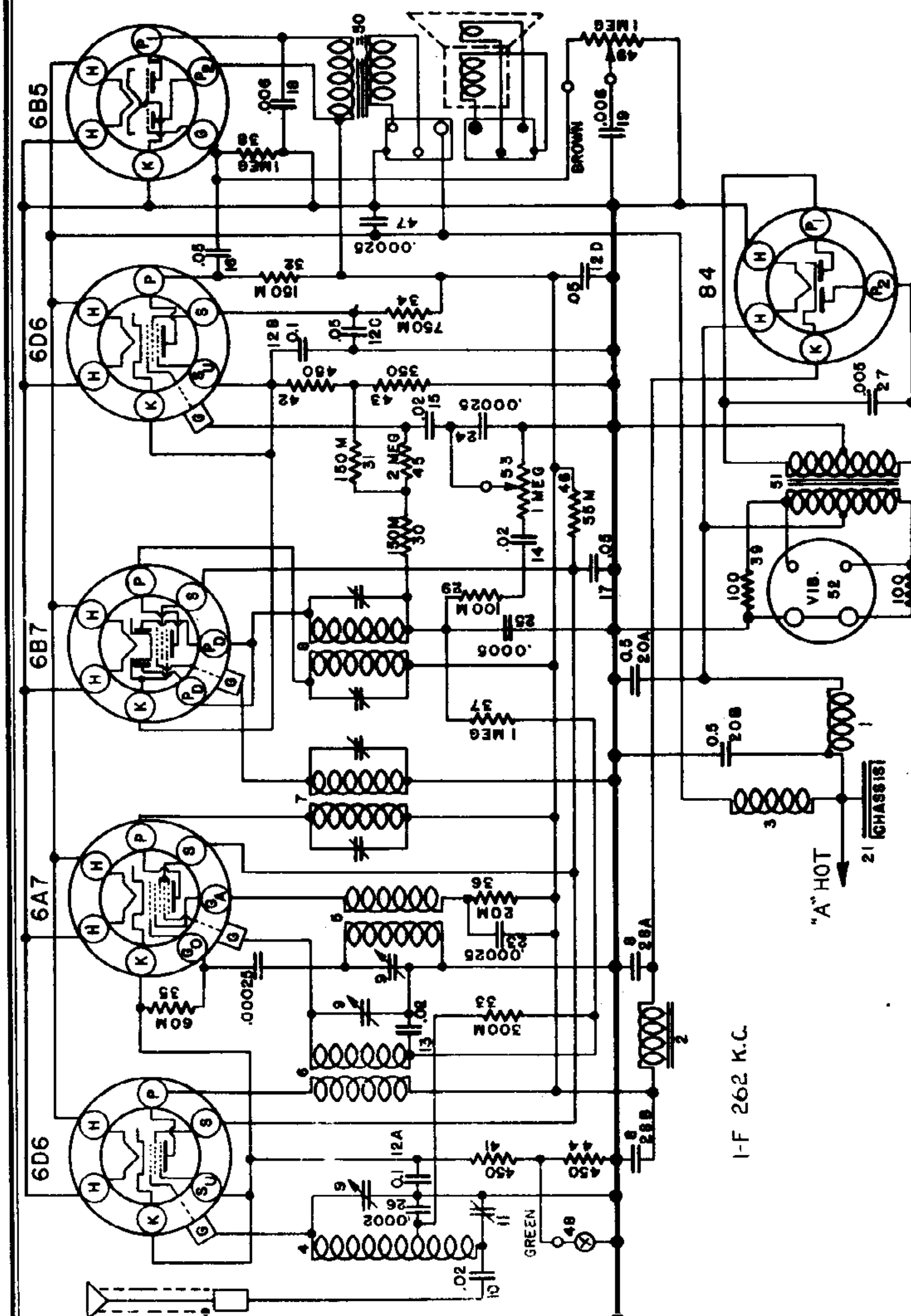


FIG. 1--PARTS LAYOUT--Vibrator Filter

UNITED MOTORS SERVICE

MODEL 633
Schematic
Voltage



TUBE SOCKET VOLTAGES

Tube	Function	H	P	S	Ga	P2	Su	K
6D6	R-F Amp.	6	240	80	-	-	5.5	5.5
6A7	Osc. Mod.	6	240	80	165	-	-	5.5
6B7	I-F Amp.	6	240	80	-	-	-	3.5
6D6	A-F Amp.	6	50	35	-	-	3.5	3.5
6B5	Output	6	220	-	-	240	-	.0
84	Rectifier	6	*	-	-	-	-	240

Delco Model 633

Date: 3-12-36

Above readings taken with a meter having a resistance of 1000 ohms per volt, using the scale on which the largest deflection could be obtained.

Ampere drain--7 amperes at 6 volts.

* A.C. Voltage measured from plate to plate of 84 tube should be 550 volts.

MODEL 633
Socket, Trimmers
Alignment

UNITED MOTORS SERVICE

GENERAL: The Delco Model 633 is a six tube, header speaker auto radio, with tone and sensitivity controls, dust-proof speaker and a primary type vibrator. This receiver is supplied with a wide variety of tuning controls and adapter packages making it possible to obtain "custom built" installation in most any make car.

CIRCUIT ALIGNMENT

1. Aligning the I-F Stages at 262 K.C.

(a) Feed a test oscillator signal of 262 K.C. into the control grid of the 6A7 tube (have grid clip in place) through a .25 mfd. condenser and adjust the trimmers on the I-F coils (Illus. 7 & 8, Fig. 4) for maximum output. Care should be taken to keep the test oscillator leads well away from the grid leads of other tubes to avoid inaccurate adjustments.

(b) Repeat above adjustments until no further increase in output can be obtained.

2. Aligning the R-F Stages

(a) Change the test oscillator setting to 1560 K.C. and feed this signal into the antenna connection on the chassis through a .0002 mfd. condenser. Turn the condenser rotor plates until they are completely out of mesh and rest against the high frequency stop. Adjust the parallel trimmer for the oscillator section (middle) of the gang condenser.

(b) Change test oscillator setting to 1400 K.C. and turn condenser rotor plates until this signal is tuned in. Then adjust the trimmers for the other two sections of the condenser gang.

(c) Change test oscillator setting to 600 K.C. and turn condenser rotor plates until this signal is tuned in. Adjust the antenna compensating condenser, (Illus. #11, Fig. 4) while rocking the condenser plates back and forth through the signal until maximum output is obtained. It will be necessary to readjust this trimmer to the car antenna upon installation.

(d) Recheck alignment of the antenna section of the gang condenser (Illus. #9, Fig. 3).

NOTE: Each of the trimmers on the gang condenser should be carefully sealed with Duco Household Cement to prevent any change in adjustment. In using this cement care should be taken to see that it is placed only between the top blade of the trimmer condenser and its adjusting screw.

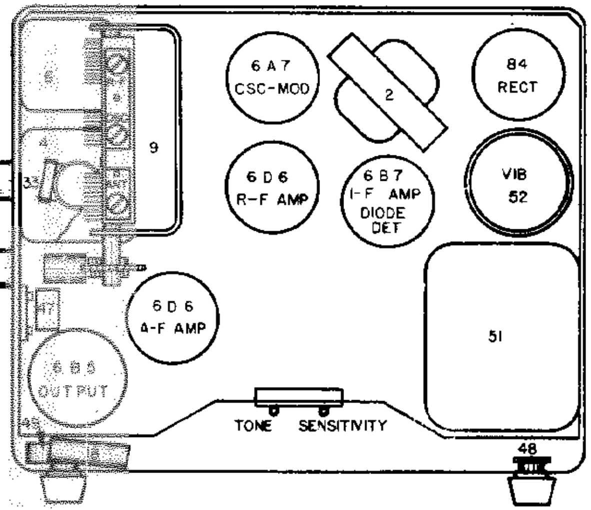


FIG. 3--PARTS LAYOUT--Top View

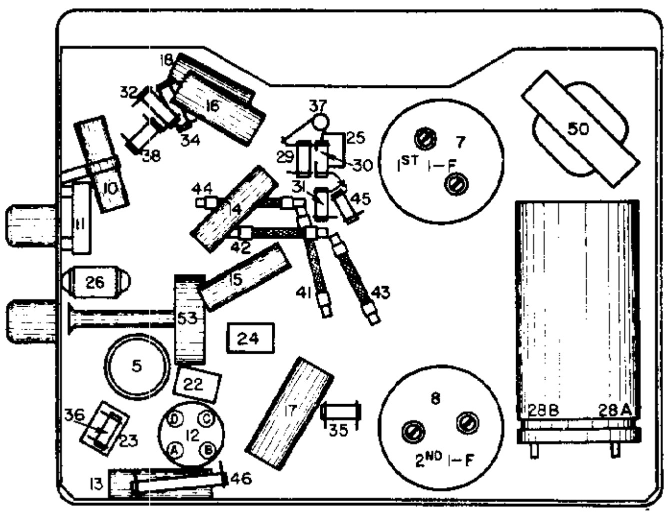


FIG. 4--PARTS LAYOUT--Bottom View

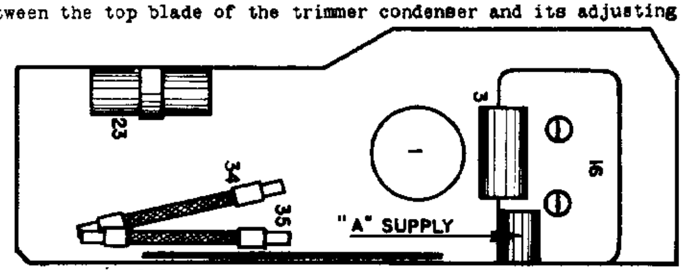
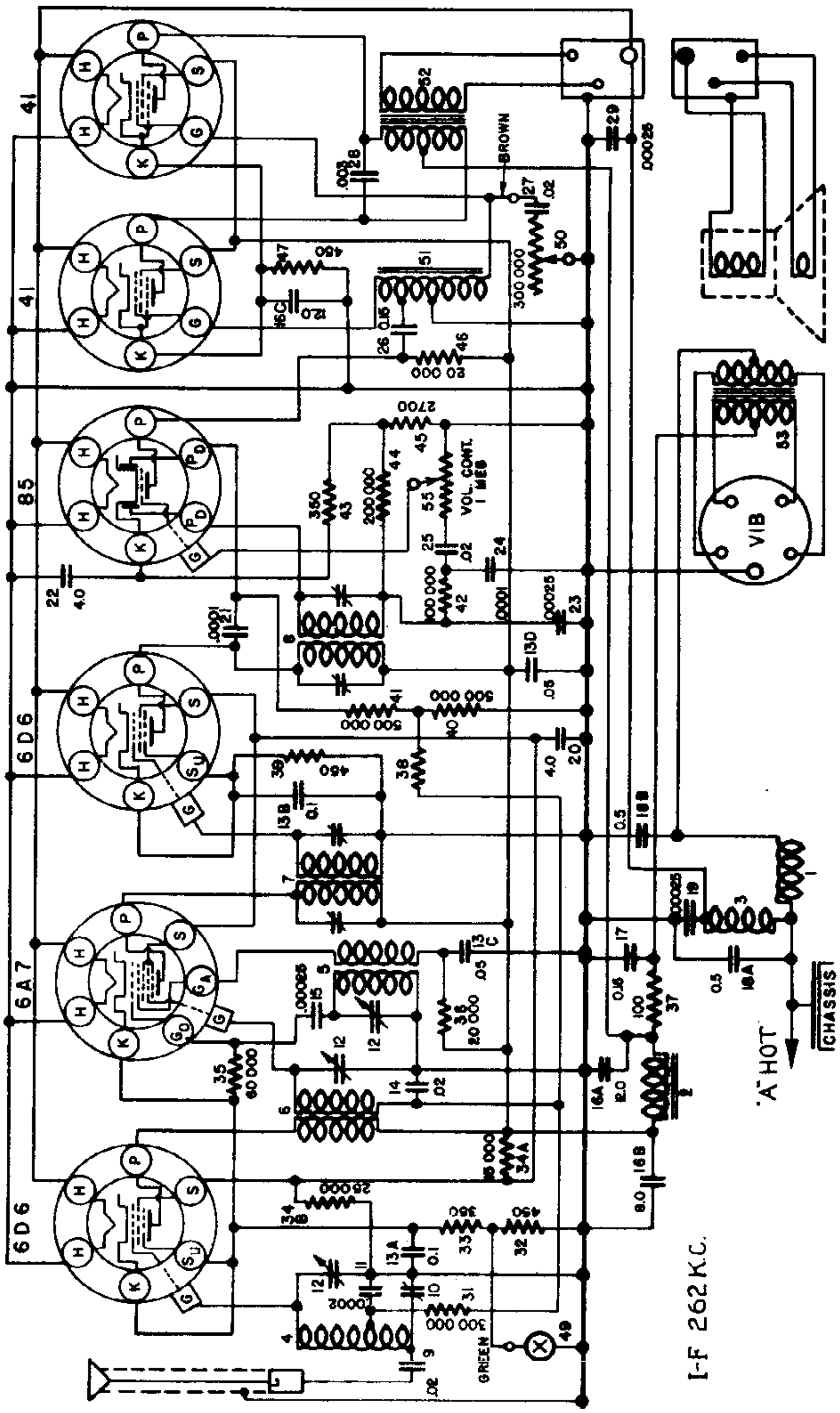


FIG. 1--PARTS LAYOUT--Vibrator Filter

UNITED MOTORS SERVICE

MODEL 634
Schematic
Voltage



Delco Model 634

Date: 3-12-36

TUBE SOCKET VOLTAGES

Tube	Function	H	P	S	SU	GA	K
6D6	R-F Amp.	6	220	90	5.0	--	5.0
6A7	Osc. Mod.	6	220	90	--	140	5.0
6D6	I-F Amp.	6	220	90	5.0	--	3.5
85	Det. A-F	6	150	--	--	--	12
41	Output	6	230	220	--	--	20
41	Output	6	230	220	--	--	20

Above reading taken with a meter having a resistance of 1000 ohms per volt, using the scale on which the largest deflection could be obtained.

Ampere drain--7.25 amperes at 6 volts.

MODEL 634
Socket, Trimmers
Alignment

UNITED MOTORS SERVICE

1. Aligning the I-F Stages at 262 K.C.

(a) Feed a test oscillator signal of 262 K.C. into the control grid of the 6A7 tube (leave grid clip in place) through a .25 mfd. condenser and adjust the trimmers on the I-F coils (Illus. 7 & 8, Fig. 2) for maximum output. Care should be taken to keep the test oscillator leads well away from the grid leads of other tubes to avoid inaccurate adjustments.

(b) Repeat above adjustments until no further increase in output can be obtained.

2. Aligning the R-F Stages

(a) Change the test oscillator setting to 1560 K.C. and feed this signal into the antenna connection on the chassis through a .0002 mfd. condenser. Turn the condenser rotor plates until they are completely out of mesh and rest against the high frequency stop. Adjust the parallel trimmer for the oscillator section (middle) of the gang condenser.

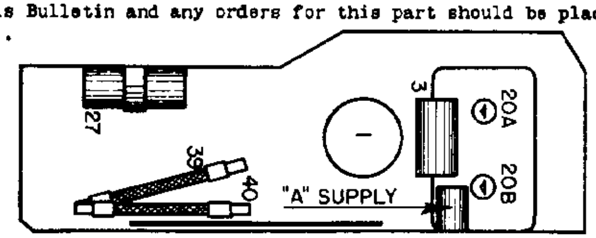
(b) Change test oscillator setting to 1400 K.C. and turn condenser rotor plates until this signal is tuned in. Then adjust the trimmers for the other two sections of the condenser gang.

(c) Change test oscillator setting to 600 K.C. and turn condenser rotor plates until this signal is tuned in. Adjust the antenna compensating condenser, (Illus. #10, Fig. 3) while rocking the condenser plates back and forth through the signal until maximum output is obtained. It will be necessary to readjust this trimmer to the car antenna upon installation.

(d) Recheck alignment of the antenna section of the gang condenser (Illus. #12, Fig. 2) for maximum output at 1400 K.C.

1st I-F COIL PART NUMBER

In certain production series of the Model 634 receiver, the part number applying to the 1st I-F coil assembly was incorrectly stamped on its shield case as #1210699. The correct number is 1210959 as listed in the parts list of this Bulletin and any orders for this part should be placed under this number.



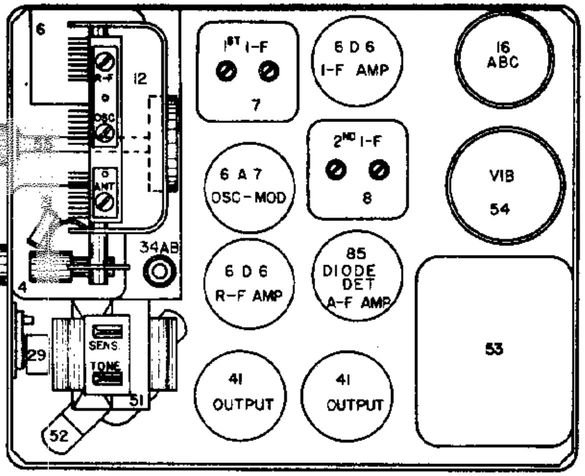


FIG. 2--PARTS LAYOUT--Top View

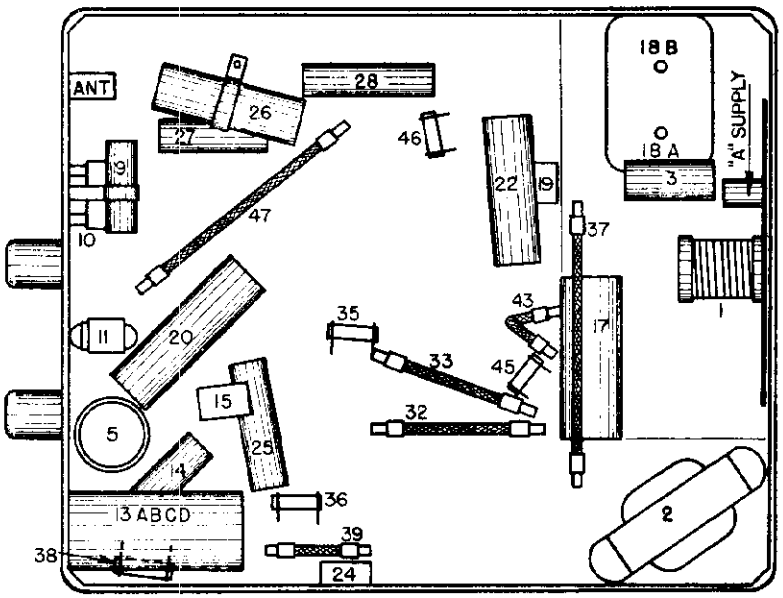
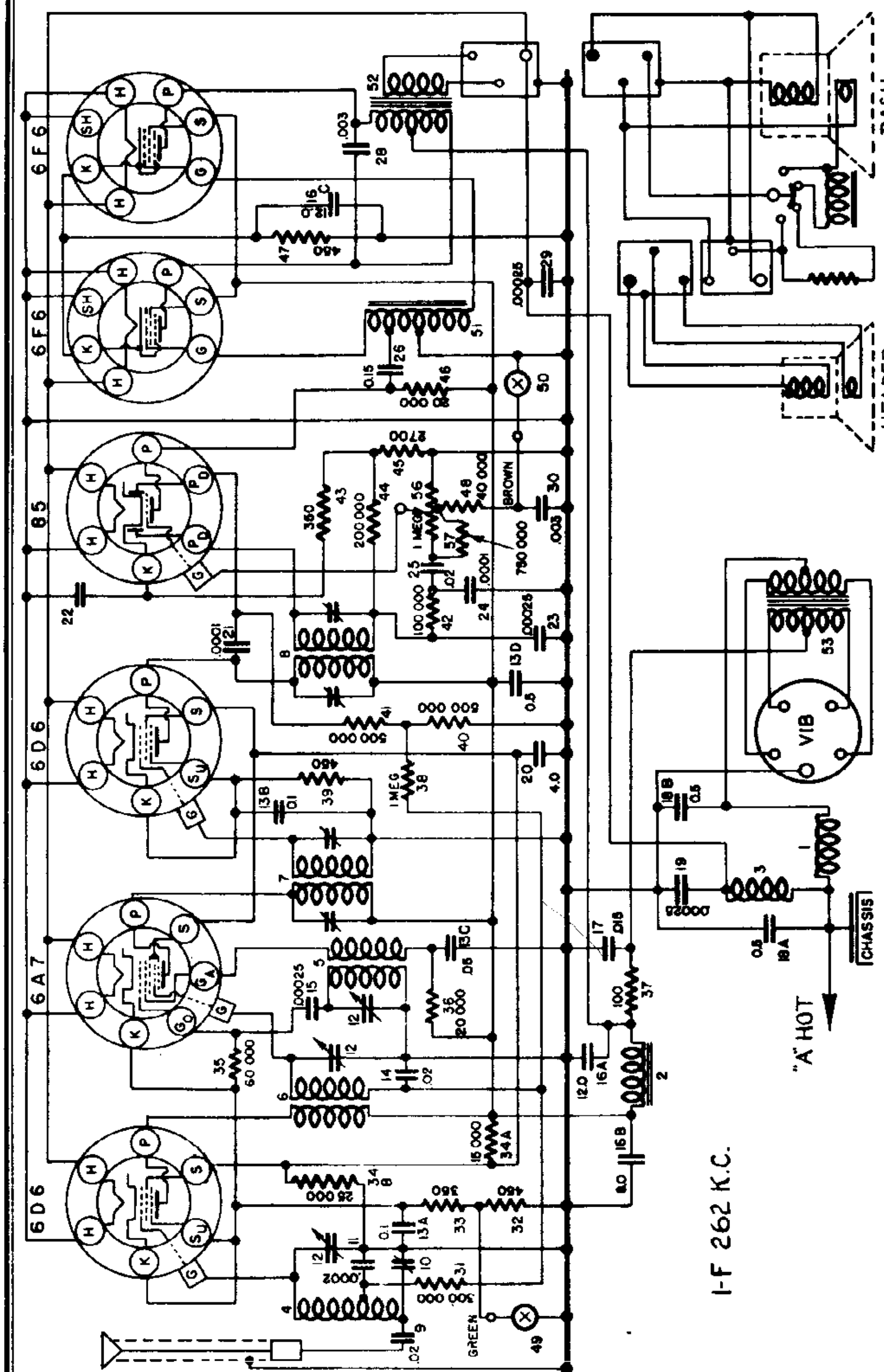


FIG. 3--PARTS LAYOUT--Bottom View

MODEL 635
Schematic
Voltage

UNITED MOTORS SERVICE



Delco Model 635

Date: 3-18-36

TUBE SOCKET VOLTAGES

Tube	Function	H	P	S	Su	Ga	K
6D6	R-F Amp.	6	220	90	5.0	--	5.0
6A7	Osc. Model	6	220	90	--	140	5.0
6D6	I-F Amp.	6	220	90	5.0	--	3.5
85	Det. A-F	6	150	--	--	--	12
6F6	Output	6	230	220	--	--	20
6F6	Output	6	230	220	--	--	20

Above readings taken with a meter having a resistance of 1000 ohms per volt, using the scale on which the largest deflection could be obtained.

Ampere drain 8.2 amperes at 6 volts.

MODEL 635
Socket, Trimmers
Alignment

UNITED MOTORS SERVICE

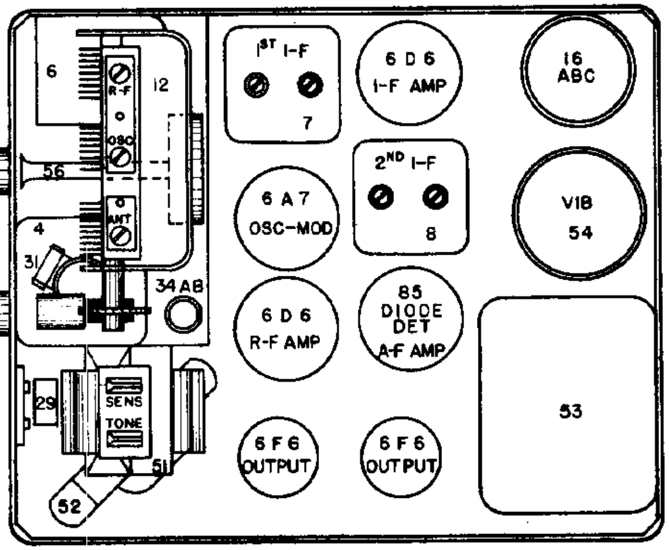


FIG. 2--PARTS LAYOUT--Top View

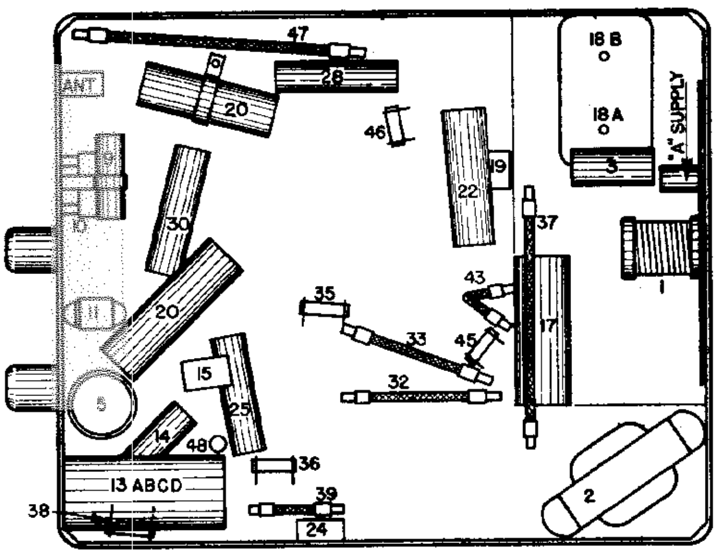


FIG. 3--PARTS LAYOUT--Bottom View

GENERAL: The Delco Model 635 is a six tube, combination "dash" and "header" speaker auto radio, with sensitivity control, bass compensation control, speaker selector switch, synchronous vibrator and metal type (6F6) power tubes. This receiver is supplied with a wide variety of tuning controls and header speaker adapters, making it possible to obtain "custom built" installation in most any car.

CIRCUIT ALIGNMENT

If re-alignment of the receiver circuits is found necessary--make all adjustments for maximum output with the receiver chassis in its case and use a calibrated test oscillator and output meter.

1. Aligning the I-F Stages at 262 K.C.

(a) Feed a test oscillator signal of 262 K.C. into the control grid of the 6A7 tube (leave grid clip in place) through a .25 mfd. condenser and adjust the trimmers on the I-F coils (Illus. #7 and 8, Fig. 2) for maximum output. Care should be taken to keep the test oscillator leads well away from the grid leads of other tubes to avoid inaccurate adjustments.

(b) Repeat above adjustments until no further increase in output can be obtained.

2. Aligning the R-F Stages

(a) Change the test oscillator setting to 1560 K.C. and feed this signal into the antenna connection on the chassis through a .0002 mfd. condenser. Turn the condenser rotor plates until they are completely out of mesh and rest against the high frequency stop. Adjust the parallel trimmer for the oscillator section (middle) of the gang condenser.
(b) Change test oscillator setting to 1400 K.C. and turn condenser rotor plates until this signal is tuned in. Then adjust the trimmers for the other two sections of the condenser gang.

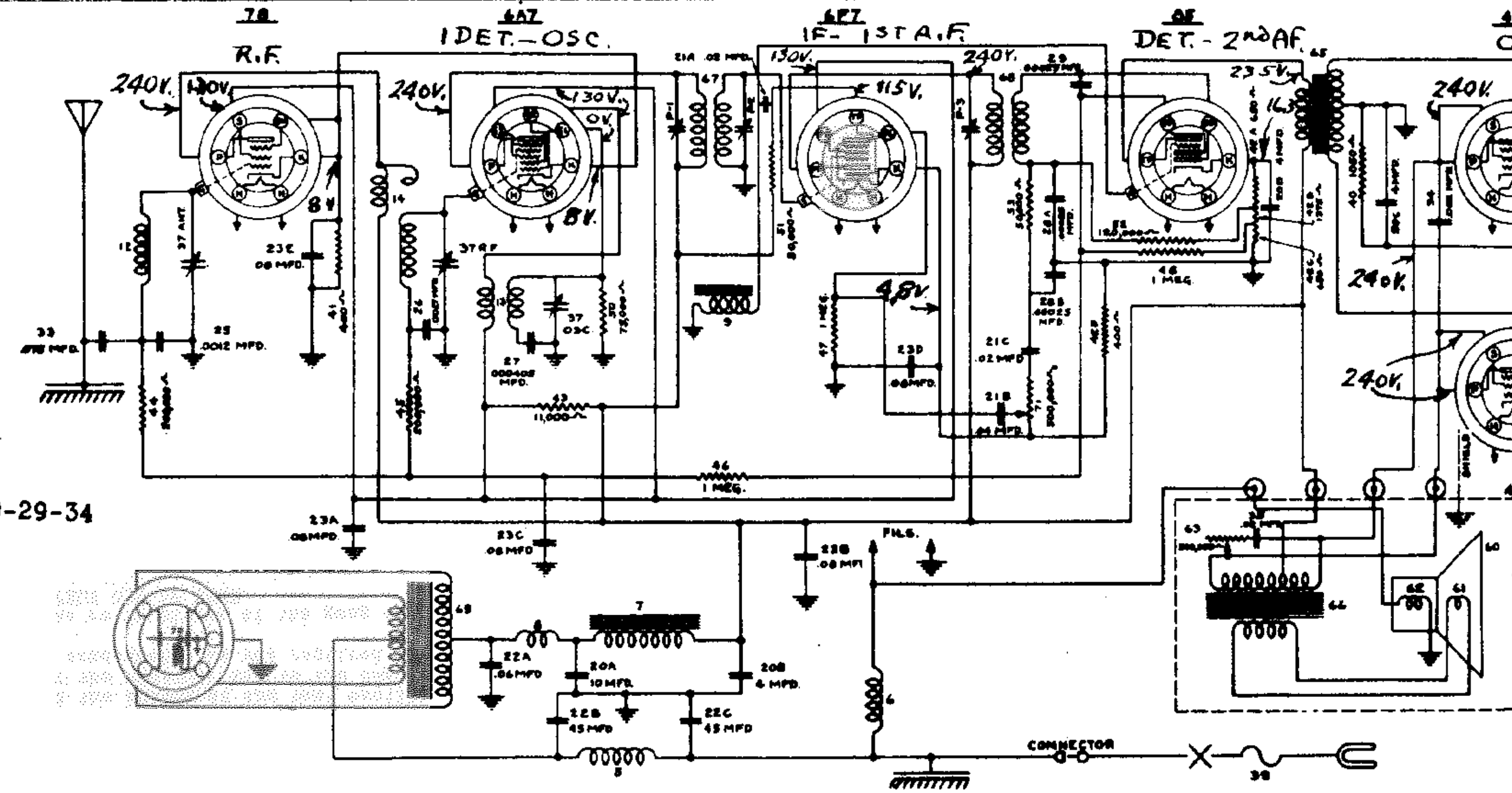
(c) Change test oscillator setting to 600 K.C. and turn condenser rotor plates until this signal is tuned in. Adjust the antenna compensating condenser, (Illus. #10, Fig. 3) while rocking the condenser plates back and forth through the signal until maximum output is obtained.
It will be necessary to readjust this trimmer to the car antenna upon installation.

(d) Recheck alignment of the antenna section of the gang condenser (Illus. 12, Fig. 2) for maximum output at 1400 K.C.

NOTE: Each of the trimmers on the gang condenser should be carefully sealed with Duco Household Cement to prevent any change in adjustment. In using this cement care should be taken to see that it is placed only between the top blade of the trimmer condenser and its adjusting screw.

MODELS 544246 Buick-Pontiac
393885 Olds
1291344 Buick
Schematic, Note
Voltage

UNITED MOTORS SERVICE



10-29-34

IF PEAK 262 KC

GENERAL: The Buick Model 1291344 is a six tube, two unit superheterodyne auto radio. The speaker used with this receiver is a full 8" dynamic housed in a separate case for dash mounting. A tuning control designed for mounting on the bottom flange of the instrument panel is used.

Buick Model 1291344

4-25-35

The Buick Model 1291344 is exactly the same as the Buick and Pontiac Model 544246. In the past, Buick and Pontiac receivers were carried under the same model numbers. However, it has since been found necessary to carry the Buick sets under separate numbers. In this case Buick receivers were previously carried under Buick and Pontiac Model 544246, and are now covered by Model #1291344.

MODELS 544246 Buick-Pontiac
393885 Olds
1291344 Buick

UNITED MOTORS SERVICE

Socket, Trimmers, Changes
Alignment

Peaking I.F. Stages at 262 K.C.

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect a 1 mfd. condenser in series with the other lead and connect this lead to the grid cap of the 6A7 tube leaving the grid clip in place. The 1 mfd. condenser is necessary to prevent the oscillator circuit of the receiver from affecting the I.F. adjustments.

(b) **Set the test oscillator on 262 kilocycles.**

(c) **Turn the volume control of the receiver on full.**

(d) **Peak the I.F. trimmer P-3 located on the 2nd I.F. coil shown on Figure 2.**

(e) **Then peak trimmers P-2 and P-1 located on the first I.F. coil also shown on Figure 2.**

(f) **In order to insure accurate settings of the I.F. trimmers the above adjustments should be repeated using the lowest oscillator output that will give a reasonable deflection of the output meter pointer. Make all adjustments for maximum output.**

Peaking Gang Condenser at 1530 and 1400 K.C.

(a) Connect the output of the test oscillator to the **antenna connection of the receiver and to the chassis ground. Do not use the 1 mfd. condenser that was required in aligning the I.F. stages.**

(b) **Turn the rotor plates of the gang condenser until they are COMPLETELY OUT OF MESH.**

(c) Set the test oscillator on 1530 kilocycles.

(d) Adjust the trimmer condenser for the oscillator section (middle section) of the gang condenser **CAREFULLY for maximum output.** Then adjust the trimmers for the "R.F." and "ANT" sections of the gang condenser.

(e) Set the test oscillator on 1400 kilocycles.

(f) Turn the condenser rotor plates until the 1400 K.C. signal from the test oscillator is turned in with maximum output. (No calibration blocks should be used as the oscillator circuit is adjusted at 1530 K.C. on this set.)

(g) Readjust the parallel trimmers for the "R.F." and "ANT" sections of the gang condenser for maximum output. **DO NOT disturb the oscillator trimmer (middle section) as this is adjusted at 1530 K.C. only and any further adjustments at this point will affect both the tuning range of the receiver and the tracking of its circuits.**

CAUTION: Always use the lowest possible test oscillator output that will give a reasonable deflection of the output meter pointer, in order to prevent the A.V.C. from leveling out the output as the adjustments are made.

CIRCUIT CHANGES

A number of the early receivers have a ½ mfd. tubular condenser mounted above the candohm resistor, illustration #42 on Figure 2 and connected in parallel with the 85 tube cathode by-pass section 20D of the #1209144 electrolytic condenser block. The use of the tubular condenser was necessary in production to reduce the R.F. resistance of the 85 cathode by-pass. A change has been made in the design of the condenser block, making the use of the tubular condenser unnecessary. All of the service parts replacement stock of #1209144 electrolytics are of the new design and it is immaterial whether or not the tubular condenser is left in the receiver when replacing the electrolytic condenser block.

It may be noted on some of the earlier receivers that there is a small condenser in a metal case mounted below the candohm resistor, Illus. #42, Fig. 2, with two terminals that are not connected. This condenser was originally placed in the set to filter vibrator interference, but it was found after production started that two small condensers mounted in the vibrator unit were more effective and the external condenser was simply disconnected.

Fig. 2

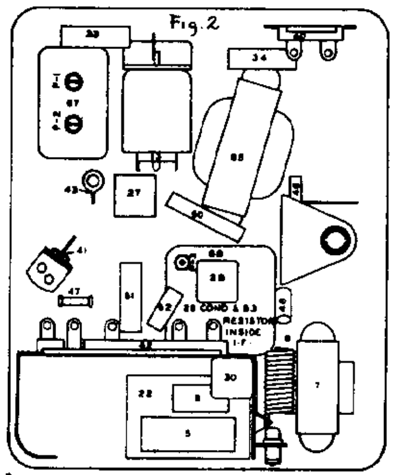
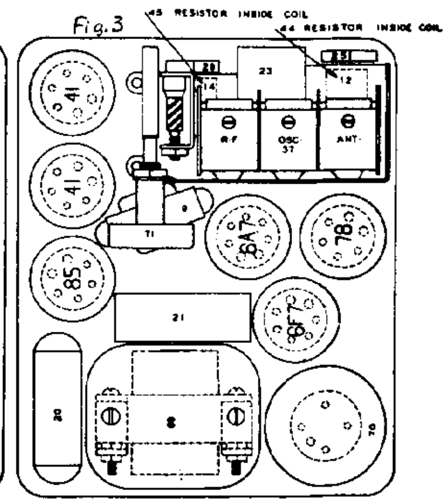
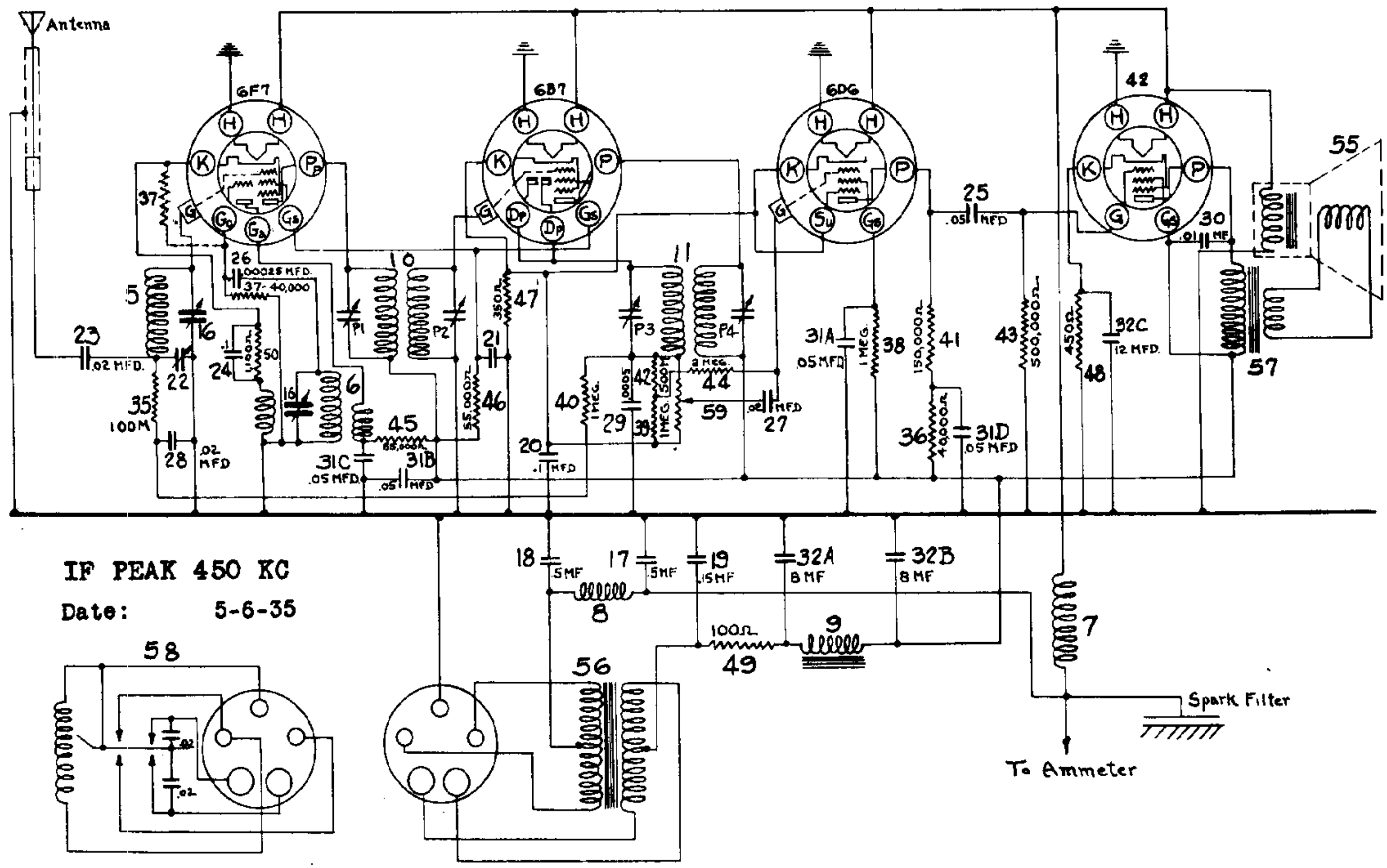


Fig. 3



MODEL 629 Early
Below Ser.#4010[?]
Schematic

UNITED MOTORS SERVICE



IF PEAK 450 KC

Date: 5-6-35

GENERAL: The DELCO model 629 is a four tube, single unit, superheterodyne auto radio. The receiver embodies the "Syncro-Tuning" circuit feature, which results in the highest efficiency possible on any particular type of antenna. Tuning controls are used that can be adapted to any type of mounting making the receiver completely universal.

FIG. 1 DELCO MODEL 629 CIRCUIT DIAGRAM
(For sets below Serial #40100)

MODEL 629 Early
Below Ser.# 40100
Socket, Trimmers
Chassis, Voltage

UNITED MOTORS SERVICE

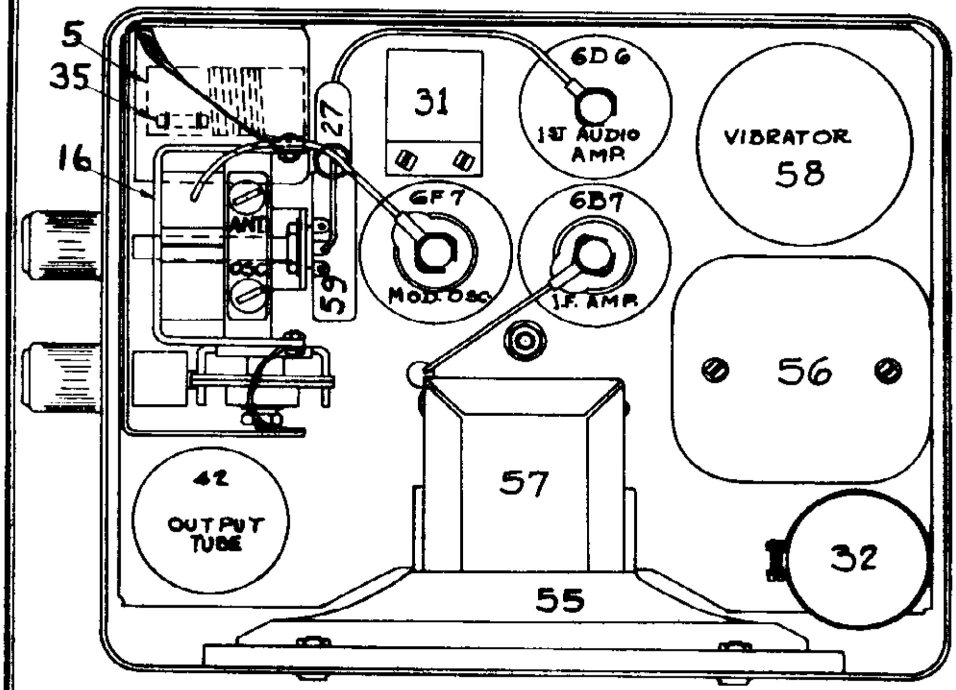


FIG.2 PARTS LAYOUT--Top View
(Below Ser. #40100)

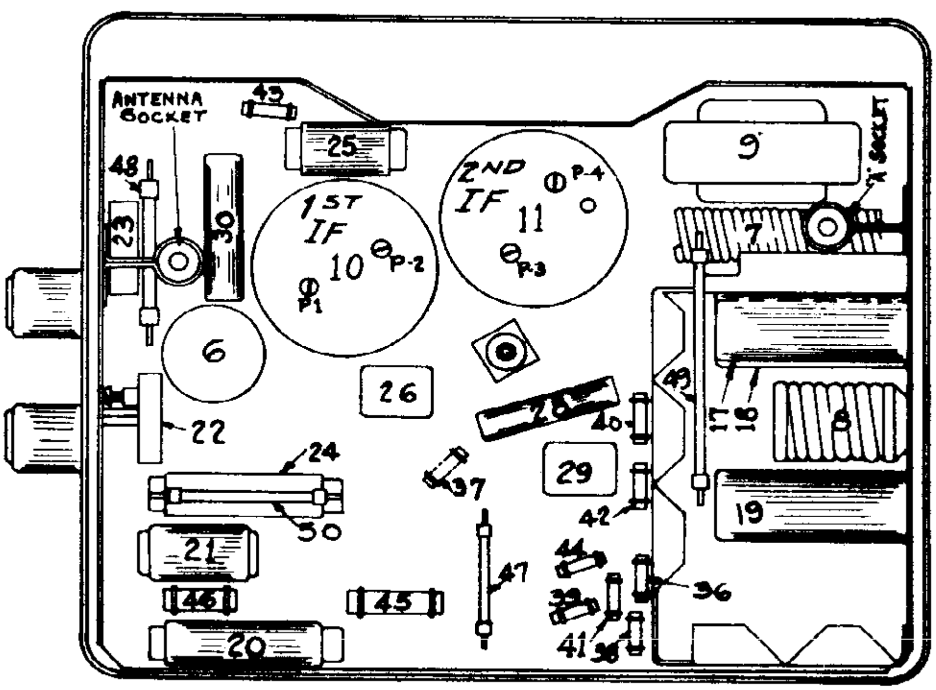


FIG. 3 PARTS LAYOUT--Bottom View
(Below Ser. #40100)

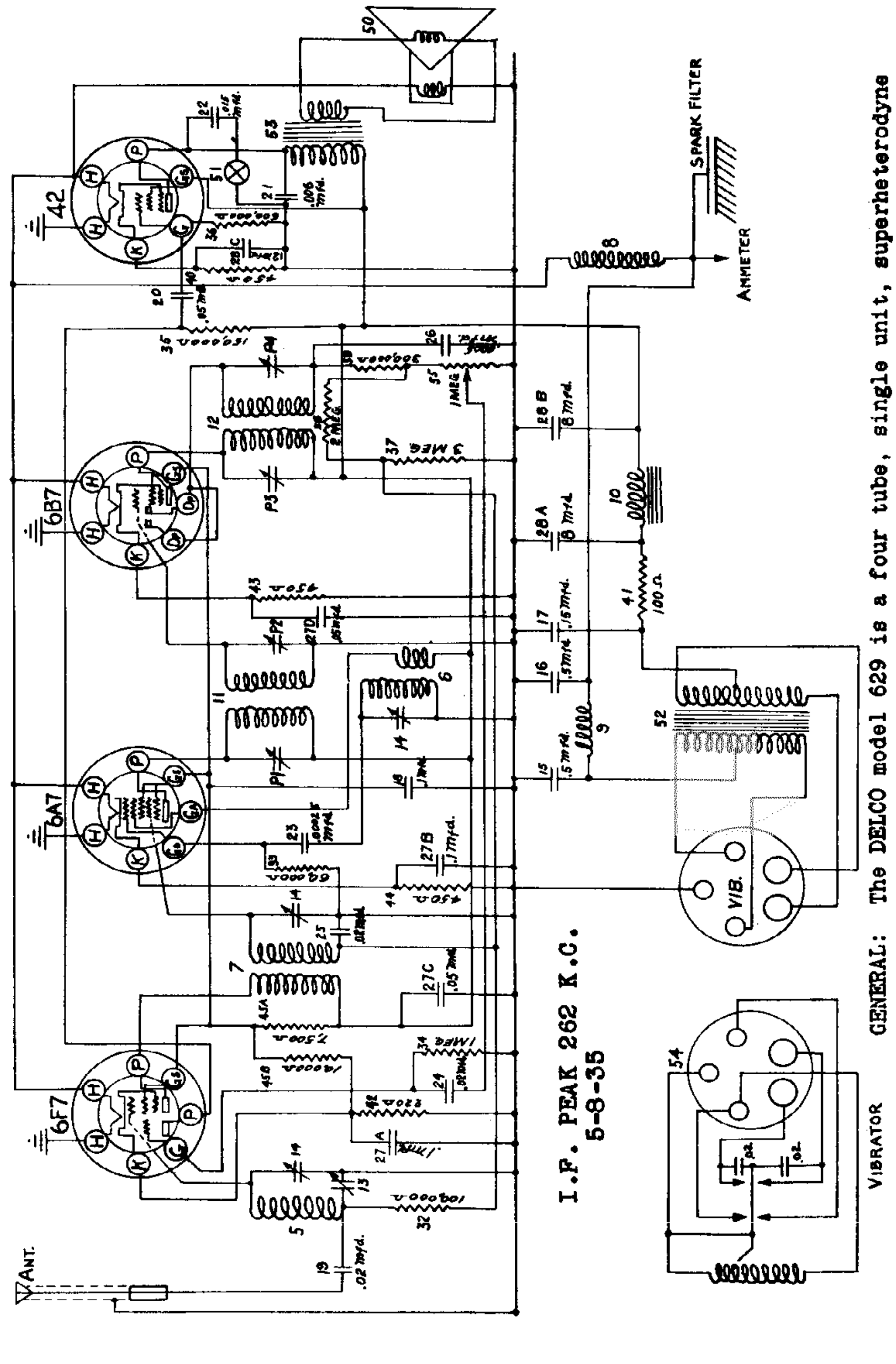
VOLTAGE CHART

Type	Function	H	P	Gs	Ga	Go	Su	K
6F7	Det.--Osc.	6	225	100	60	0	-	8
6B7	I.F. Amp.--Det.--AVC	6	225	100	-	-	-	3.5
6D6	1st Audio	6	55	20	-	-	3.5	3.5
42	Output	6	215	225	-	-	-	15

NOTE: Ampere drain of set at six volts is 5.8 amperes. Milliampere drain from B supply is 55 M. A.

UNITED MOTORS SERVICE

MODEL 629 Late
Above Ser.# 4010(
Schematic

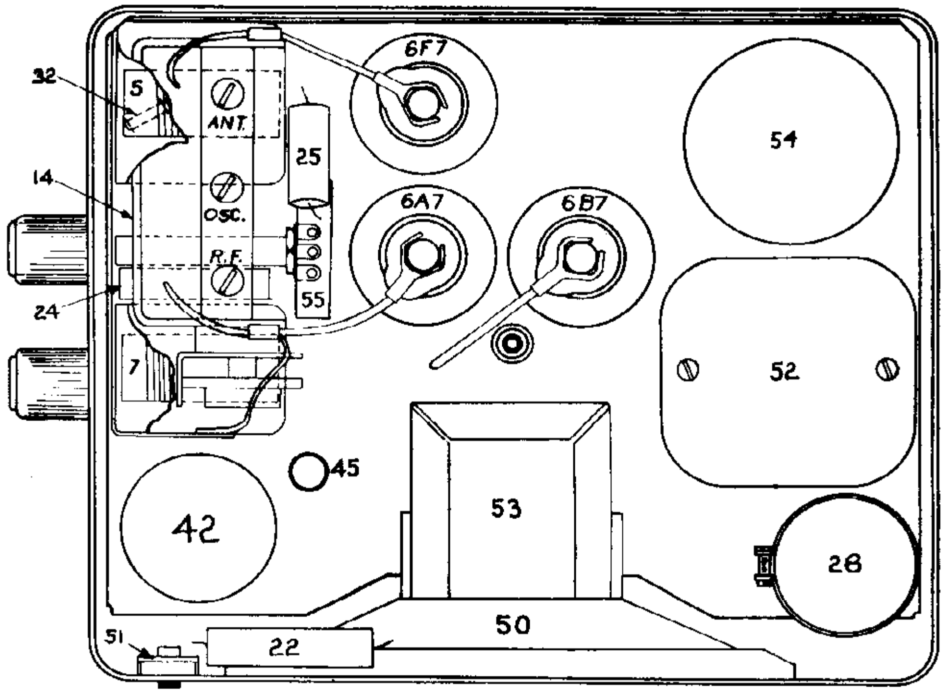


GENERAL: The DELCO model 629 is a four tube, single unit, superheterodyne auto radio with tone control. The receiver embodies the "Syncro-Tuning" circuit feature, which results in the highest efficiency possible on any particular type of antenna. Tuning controls are used that can be adapted to any type of mounting making the receiver completely universal.

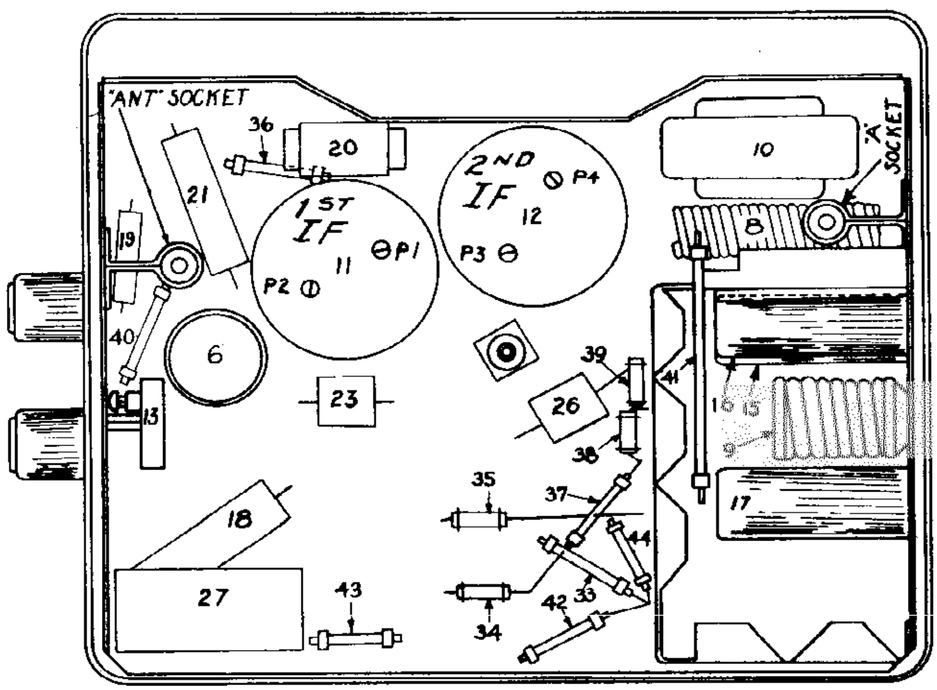
DELCO MODEL 629 CIRCUIT DIAGRAM--ABOVE SERIAL #40100

MODEL 629 Late
Above Ser.# 40100
Socket, Trimmers
Chassis, Voltage

UNITED MOTORS SERVICE



PARTS LAYOUT--Top View
(Above Ser. #40100)



PARTS LAYOUT--Bottom View
(Above Ser. #40100)

VOLTAGE CHART

Type	Function	H	P	Pt	Gs	Ga	Go	G	K
6F7	R.F.--1st Aud.	6	230	72	112	-	-	0	4.0
6A7	Det.--Osc.	6	228	-	112	228	0	0	4.8
6B7	I.F. Amp.--Det.	6	228	-	112	-	-	0	3.1
42	Output	6	226	-	235	-	-	0	15.5

NOTE: Ampere drain of set at six volts is 6.5 amperes.
Milliampere drain from B supply is 55 M. A.

Peaking I.F. Stages at 262 K.C.

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect a .5 mfd. condenser in series with the other lead and connect this lead to the grid cap of the 6F7 tube, leaving the tube's grid clip in place. (The .5 mfd. condenser

Peaking I.F. Stages

is necessary to prevent the oscillator circuit of the receiver from affecting the I.F. adjustments.)

(b) Set the test oscillator

(c) Turn the volume control of the receiver on full.

(d) Peak each of the I.F. trimmers on the 2nd I.F. coil,

(e) Then peak each of the trimmers on the 1st I.F. coil,

(f) In order to insure accurate settings of the I.F. trimmers the above adjustments should be repeated using the lowest oscillator output that will give a reasonable output meter scale deflection. Make all adjustments for maximum output.

2. Peaking Oscillator Section of Gang Condenser at 1540 K.C.

(a) Connect the output of the test oscillator to the antenna connection of the receiver and to the chassis ground. (Do not use the .5 mfd. condenser that was required in aligning the I.F. stages.)

(b) Turn the rotor plates of the gang condenser until they are COMPLETELY OUT OF MESH.

(c) Set the test oscillator on exactly 1540 kilocycles.

(d) Adjust the parallel trimmer for the "OSC." section (middle section) CAREFULLY for maximum output. Then adjust the trimmers for the other two sections of the gang condenser also for maximum output.

3. Tracking "Syncro-Tuning" Circuit

(a) Set the test oscillator on 1400 kilocycles. (Leave test oscillator connected to ant. and gnd. of receiver.)

(b) Turn the condenser rotor plates until the 1400 K.C. signal from the test oscillator is tuned in with maximum output.

Tracking "Syncro-Tuning" Circuit--Cont'd.

(c) Readjust the parallel trimmers for the "ANT." and "R.F." sections of the gang condenser (shown on Fig. 2) for maximum output. DO NOT DISTURB the setting of the oscillator trimmer as this is adjusted at the 1540 K.C. only and adjustment at this point will affect both the tuning range of the receiver and the tracking of its circuits.

NOTE: In order to accurately set the "ANT." trimmer of the condenser gang at 1400 K.C. it will be necessary to make a preliminary adjustment of the "antenna compensating condenser" before installing the receiver on a car.

(d) Then set the test oscillator on 600 kilocycles.

(e) Turn the condenser rotor plates until the 600 K.C. signal from the test oscillator is tuned in with maximum output.

(f) Peak the antenna compensating condenser for maximum output. Re-tune the gang condenser for maximum output. Repeat these operations alternately until no further improvement in output can be obtained.

(g) Reset the test oscillator on 1400 kilocycles.

(h) Turn the condenser rotor plates until the 1400 K.C. signal is tuned in with maximum output.

(i) Adjust the trimmer for the "ANT." section of the gang condenser CAREFULLY for maximum output.

4. Adjusting Compensating Condenser to Car Antenna

After the "ANT." trimmer of the gang condenser has been correctly set according to the preceding information, it will require no further adjustment. It will be necessary, however, to reset the "antenna capacity compensating condenser" to the car antenna when installing the receiver in a car in order to compensate for the wide range of antenna capacities being used. This is done in the following manner:

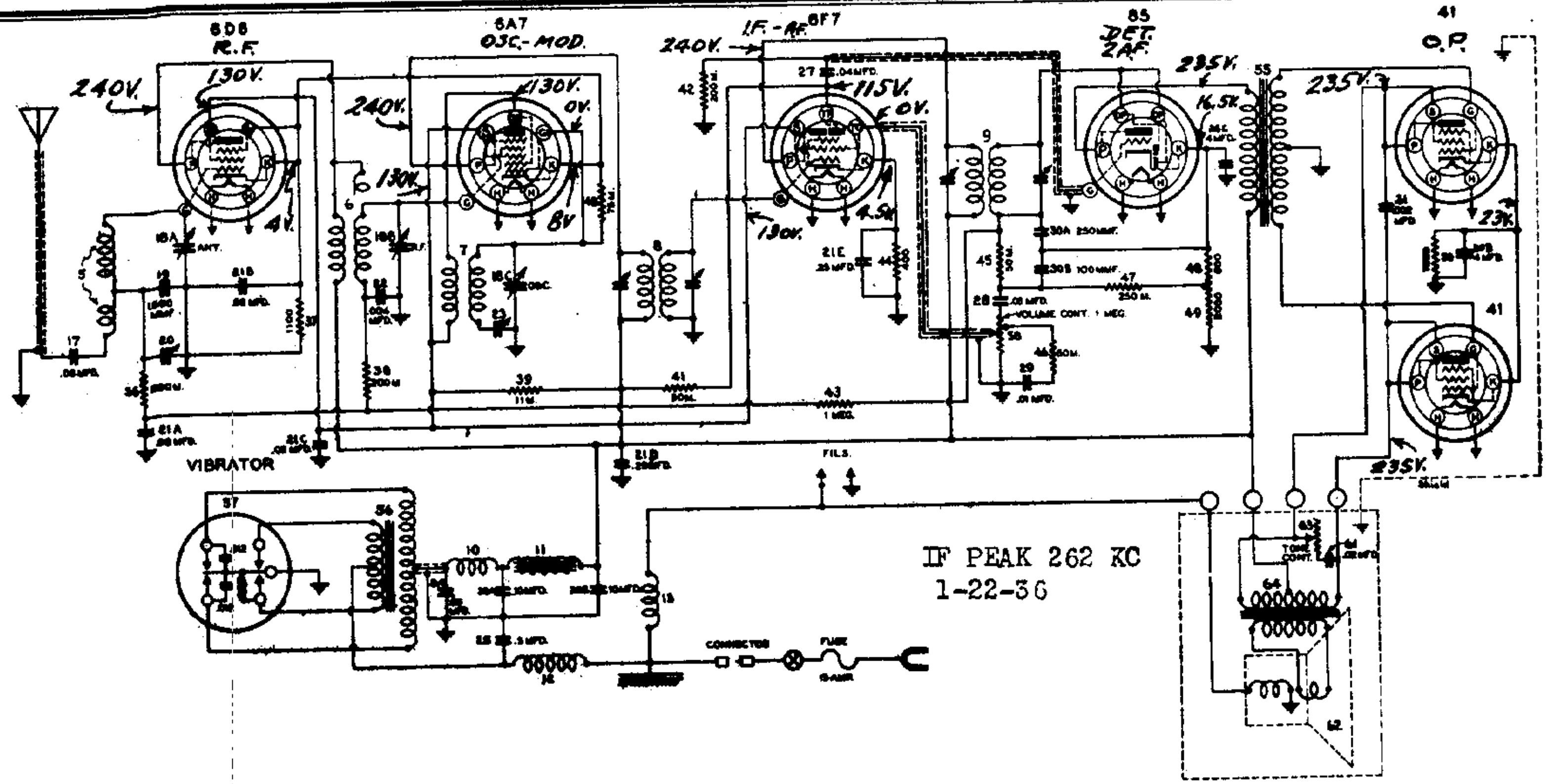
(a) Tune the receiver to a weak broadcast station between 570 to 540 K.C.

(b) Peak the compensating condenser for maximum output, rocking the receiver dial and adjusting the compensating condenser alternately until no further improvement in output can be obtained.

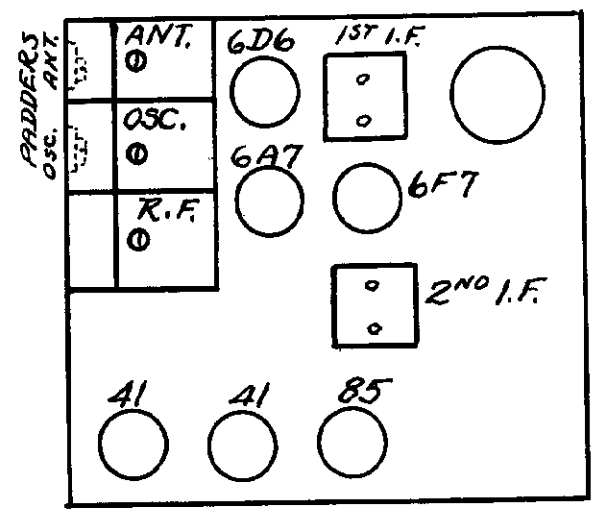
CAUTION: Do not touch the adjustment of the parallel trimmer for the "ANT." section of the gang condenser after the receiver is installed on a car.

MODEL 601814 Chevrolet
Schematic, Voltage
Socket, Trimmers
Alignment

UNITED MOTORS SERVICE



ALIGNMENT:
Set signal generator at 262 kc and connect through a dummy of .1 mf to grid cap of 6A7, leaving grid cap in place. Adjust i-f trimmers for maximum output.
Set signal generator to 1610 kc and connect to antenna post through a .00025 mf dummy. Gang condenser unmeshed. Adjust the trimmers on gang condensers in this order: Oscillator, R-F, and Antenna, for maximum output.
Set signal generator and dial to 1400 kc and adjust R-F and Ant. trimmers for maximum output. Do not disturb Oscillator trimmer adjustment.
Set signal generator and dial to 600 kc and adjust Oscillator and Antenna padders (under side of chassis) for maximum output while rocking the gang condenser.

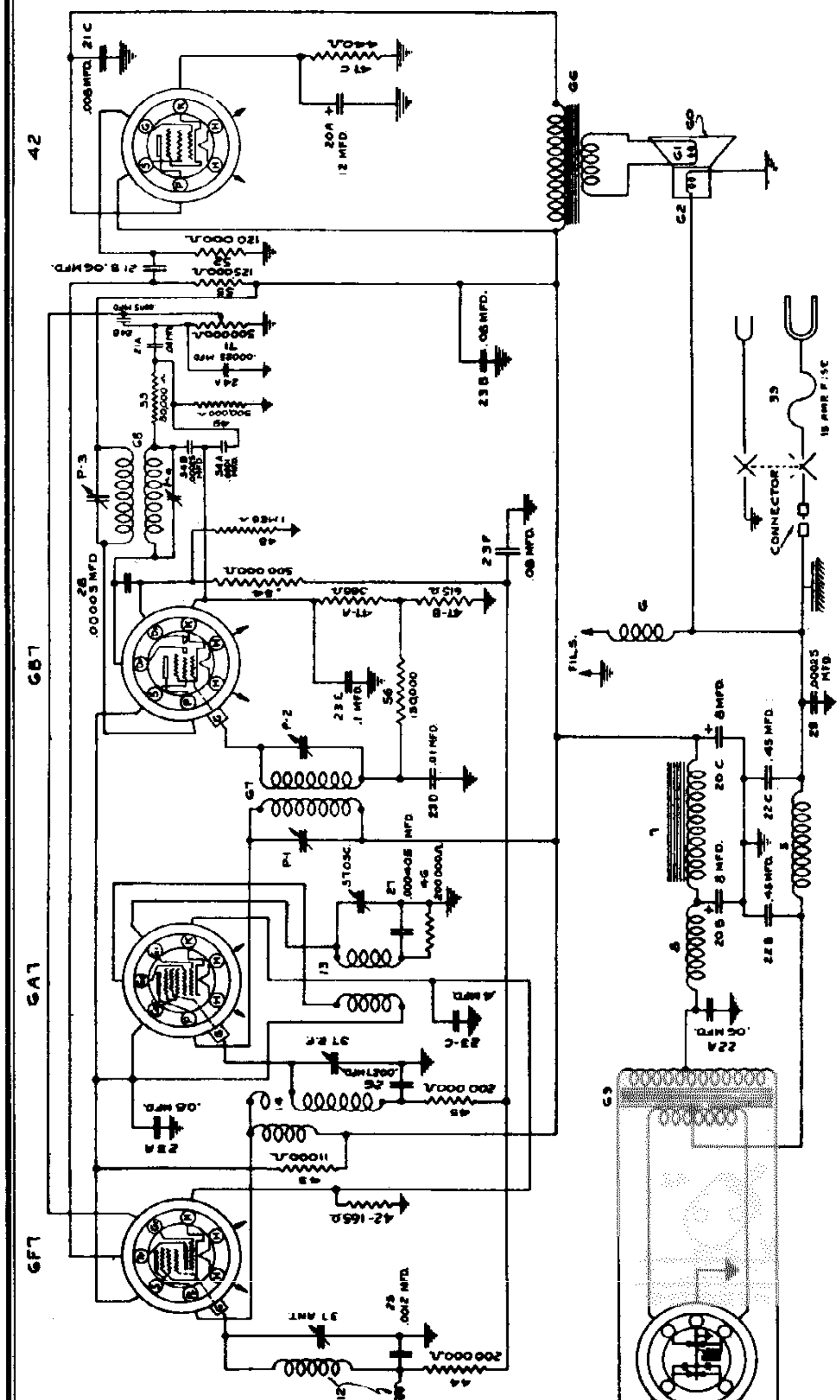


MODEL 601586 Chevrolet
Schematic, Voltage

MODEL 405046 Olds
MODELS 544267, 544289
Pontiac

UNITED MOTORS SERVICE, INC.

FIG. 1 CIRCUIT DIAGRAM--Pontiac Model #544267, Olds Model 405046
Note: These receivers are all above Serial #1791092.



IF PEAK 262 KC
DATE : 1-21-35

Pontiac Model 544289, above
Serial #1750000

VOLTAGE CHART

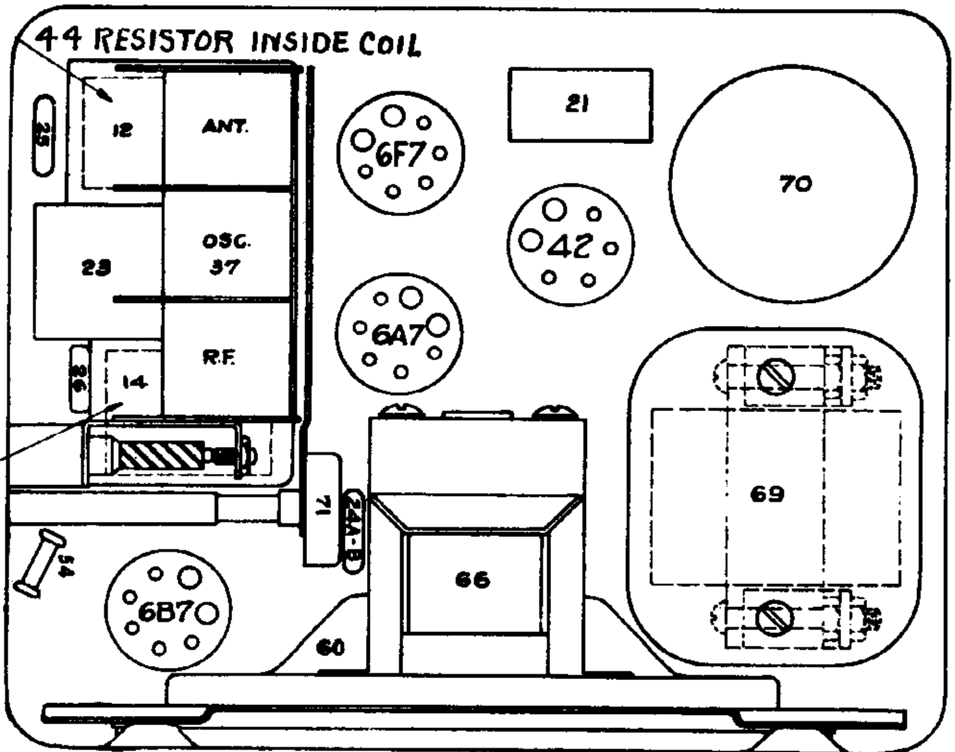
Type	Function	H	Pp	S	Tp	Gt	G	G1	G2	G3,5	K
6F7	R.F.	6	250	135	80	0	0	-	-	-	6.2
6A7	Det-Osc.	6	250	-	-	-	0	0	120	135	6.2
6B7	2nd Det-AVC	6	250	135	-	-	0	-	-	-	8.5
42	Output	6	240	250	-	-	0	-	-	-	16.0

NOTE: Ampere drain of set at 6 volts is 6.2 amperes.

MODEL 405046 Olds
MODELS 544267,544289
Pontiac

UNITED MOTORS SERVICE, INC.

MODEL 601586 Chevrolet
Socket,Trimmers,Chassis
Alignment,Changes



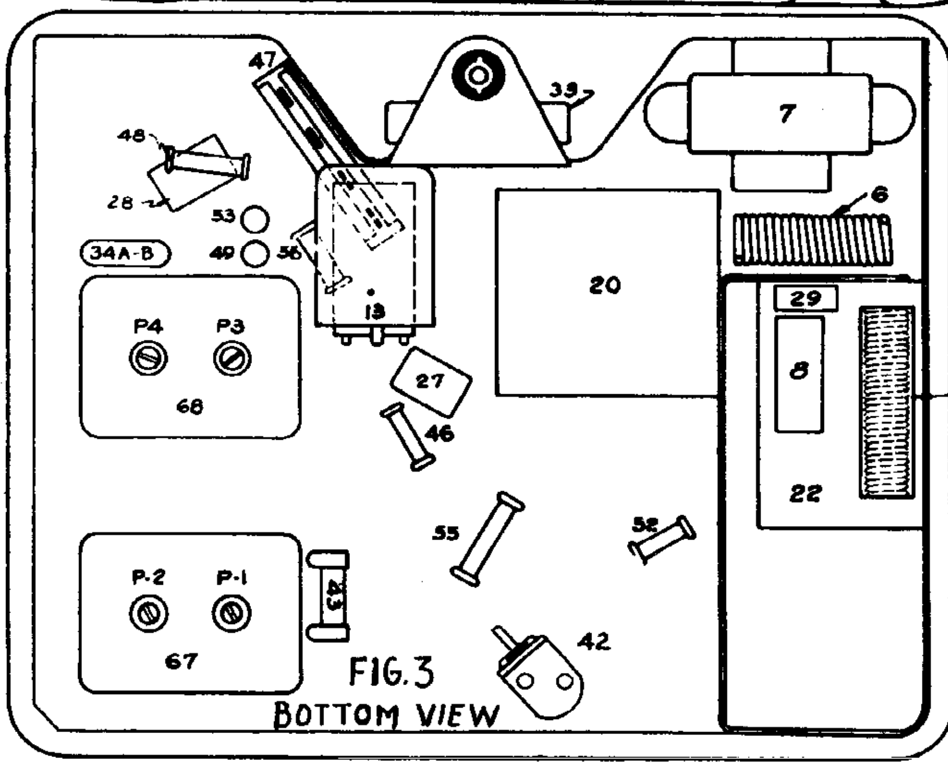


FIG.3
BOTTOM VIEW

CONVENTIONAL ALIGNMENT-SEE SPECIAL SECTION

Generator at 262 KC, connected to grid of 6A7 tube thru .5 MF condenser, grid clip not disturbed. Generator also grounded to chassis. Peak trimmers P3, then P2 and P1.
Generator at 1530 KC, connected direct to antenna lead. Rotor plates completely out of mesh. Peak middle section of variable condenser (OSC) then front and rear sections. Generator then set to 1400 KC, then realign front and rear sections, after having tuned in the signal. Middle section of variable condenser should not be disturbed. No oscillator padding required.
Antenna trimmer should be peaked between 550 to 700 KC, after installation.

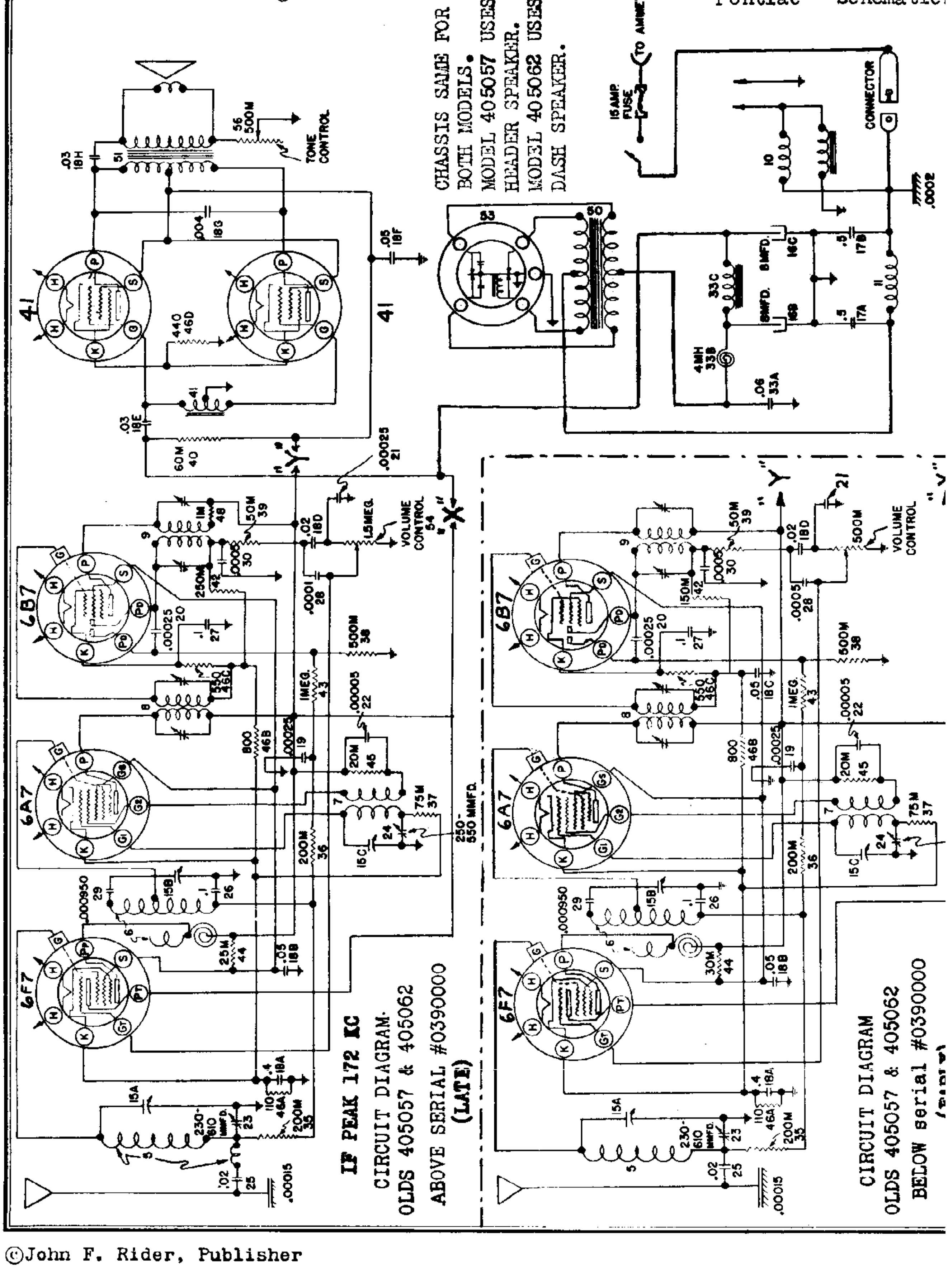
CIRCUIT CHANGES

A number of .05 mfd. tubular condensers were used at the factory in place of the .06 mfd. condenser part #1209213 condenser shown on figure 2 as illustration #33. For Service Replacement purposes of any defective .05 mfd. condensers--use part #1209213 condenser.

UNITED MOTORS SERVICE, INC.

MODELS 405057,40506
Olds (Early & Late)
MODELS 544290,54429
544297,54429
Pontiac Schematic

Pontiac receivers have serial numbers with 0 as the first digit



IF PEAK 172 KC
CIRCUIT DIAGRAM
OLDS 405057 & 405062
ABOVE SERIAL #0390000
(LATE)

CIRCUIT DIAGRAM
OLDS 405057 & 405062
BELOW serial #0390000

MODELS 405057,405062
Olds (Early & Late)

UNITED MOTORS SERVICE, INC.

MODELS 544290,544291
Pontiac544297,544298
Socket,Trimmers
Voltage,Chassis
Alignment

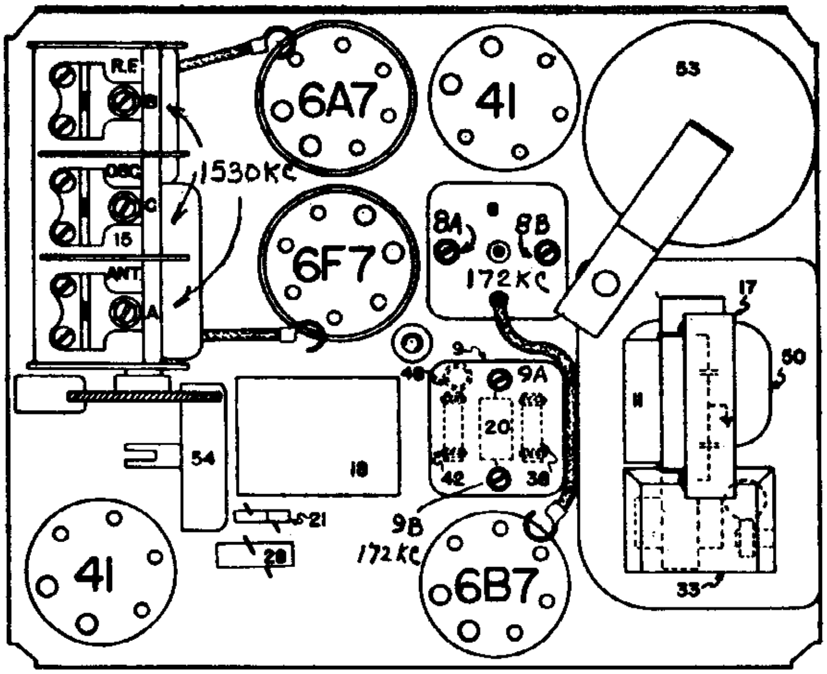


FIG. 2--PARTS LAYOUT--Top View

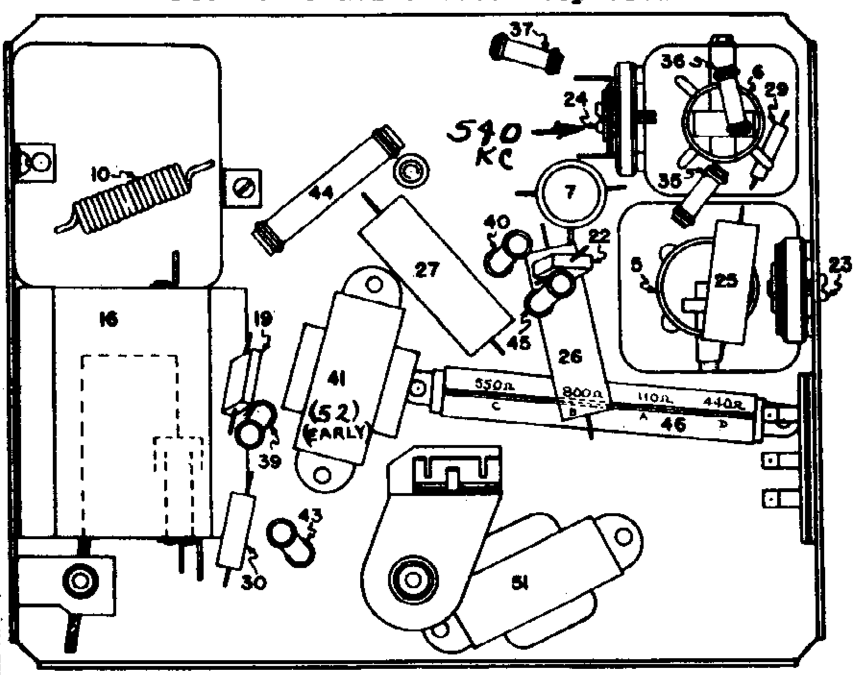


FIG. 3--PARTS LAYOUT-Bottom View

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION

Generator at 172 KC, grounded to chassis, and connected thru .5 MF condenser to grid cap of 6A7, leaving grid clip on tube. Align trimmers 9A,9B,8A and 8B to a maximum peak.
Generator now connected direct to antenna lead, frequency to 1530 KC, rotor plates of variable condenser out of mesh, adjust trimmers 15C,15B & 15A to peak.
Generator at 540 KC, rotor of variable condenser completely in mesh, pad the oscillator circuit to maximum peak with trimmer 24 (Fig. 3)
Generator at 1400 KC, variable condenser rotated until signal is maximum, realign trimmers 15B and 15A to maximum peak.
After installation in car, tune in a station between 550 and 700 KC. Peak the antenna trimmer # 23 (Fig.3)

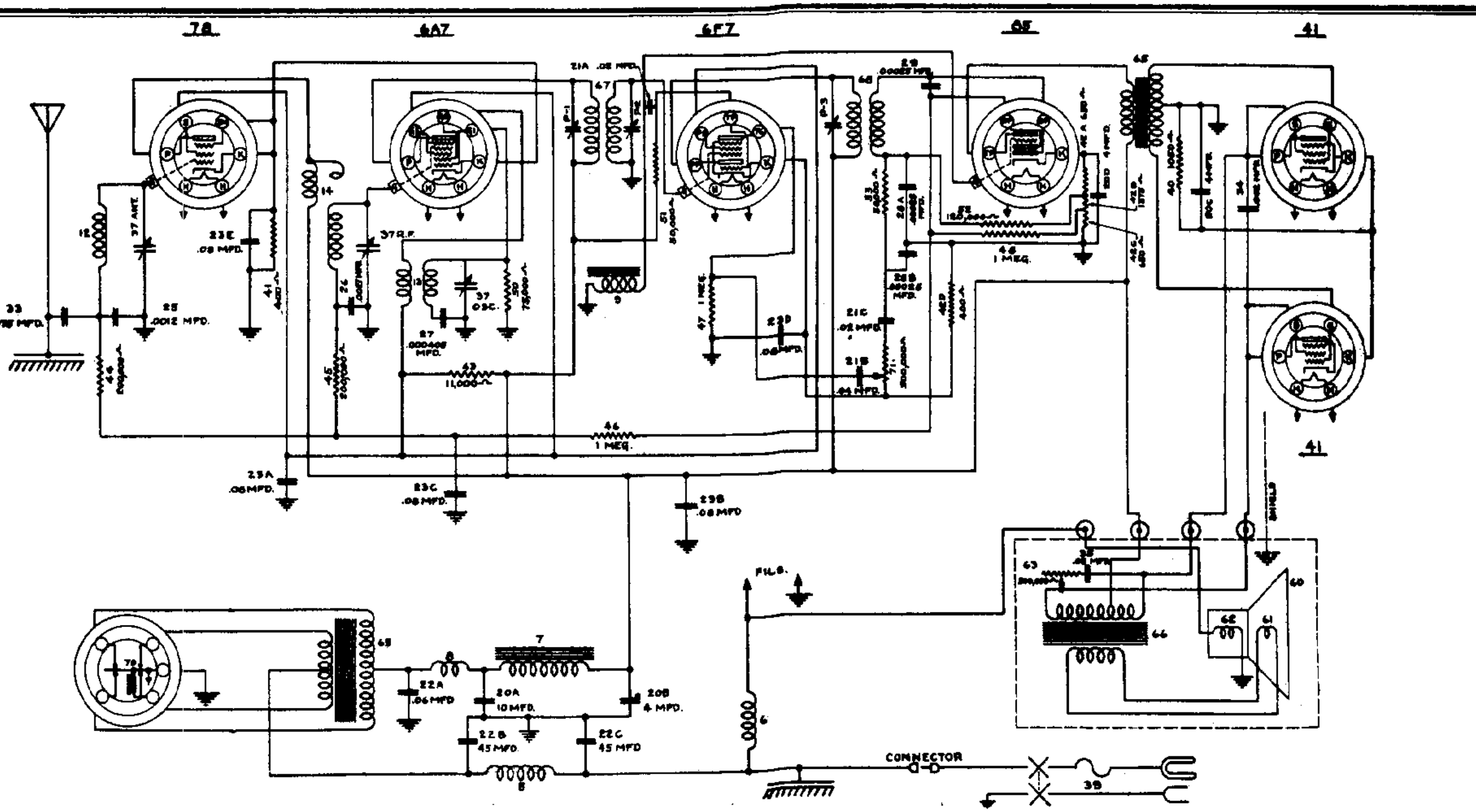
VOLTAGE TABLE

Type	Function	H	P	S	PT	GT	G1	G2	K
6F7	R.F.	6	225	90	85	0	-	-	2.5
6A7	Det-Osc.	6	225	90	-	-	-0	145	2.5
6B7	I.F.--2nd Det-AVC	6	225	90	-	-	-	-	10.0
41	Output	6	220	225	-	-	-	-	16.0
41	Output	6	220	225	-	-	-	-	16.0

NOTE: Ampere drain of set at 6 volts is 5.8 amperes
Milliampere drain from "B" supply is approximately 55 M.A.

MODELS 601525,6011
Chevrolet
Schematic,Voltage

UNITED MOTORS SERVICE, INC.



MODEL 601525 SAME AS MODEL 601176, BUT HAS DIFFERENT TYPE OF VOLUME CONTROL AND VARIBLE GANG CONDENSER

IF PEAK 262 KC

VOLTAGE CHART

TYPE	FUNCTION	H	Pp	S	Tp	Gt	G	G1	G2	G3,5	K
78	R.F.	6	240	130	-	-	0	-	-	-	8.0
6A7	Det-Osc.	6	240	130	-	-	0	0	130	130	8.0
6F7	I.F.-AF	6	240	130	115	0	0	-	-	-	4.5
85	Det-2nd AF	6	-	-	235	0	0	-	-	-	16.5
41	Output	6	240	240	-	-	-	-	-	-	23.0

Date:

MODELS 601525, 601176
Chevrolet

UNITED MOTORS SERVICE, INC.

Socket, Trimmers, Chassis
Alignment, Changes

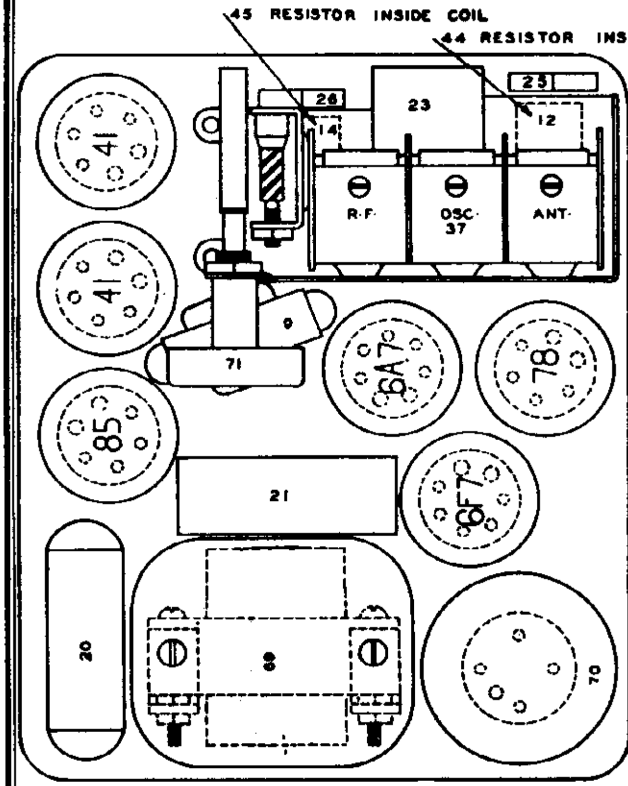


FIG. 3 PARTS LAYOUT (Top View)

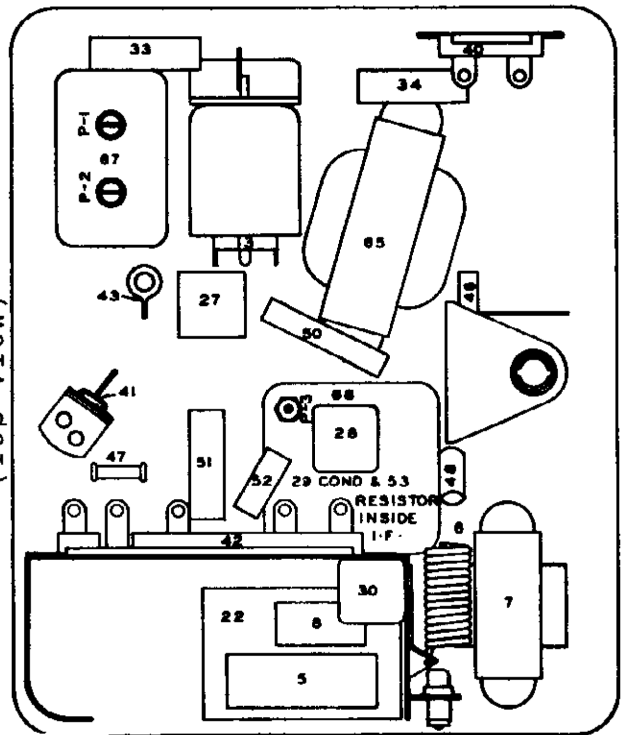


FIG. 2 PARTS LAYOUT (Bottom View)

CIRCUIT CHANGES

A number of the early receivers have ¼ mfd. tubular condenser mounted above the candohm resistor, illustration #42 on Figure 2 and connected in parallel with the 85 tube cathode by-pass section 20D of the #1209144 electrolytic condenser block. The use of the tubular condenser was necessary in production to reduce the R.F. resistance of the 85 cathode by-pass. A change has been made in the design of the condenser block, making the use of the tubular condenser unnecessary. All of the service parts replacement stock of #1209144 electrolytics are of the new design and it is immaterial whether or not the tubular condenser is left in the receiver when replacing the electrolytic condenser block.
It may be noted on some of the earlier receivers that there is a small condenser in a metal case mounted below the candohm resistor, Illus. #42, Fig. 2, with two terminals that are not connected. This condenser was originally placed in the set to filter vibrator interference, but it was found after production started that two small condensers mounted in the vibrator unit were more effective and the external condenser was simply disconnected.

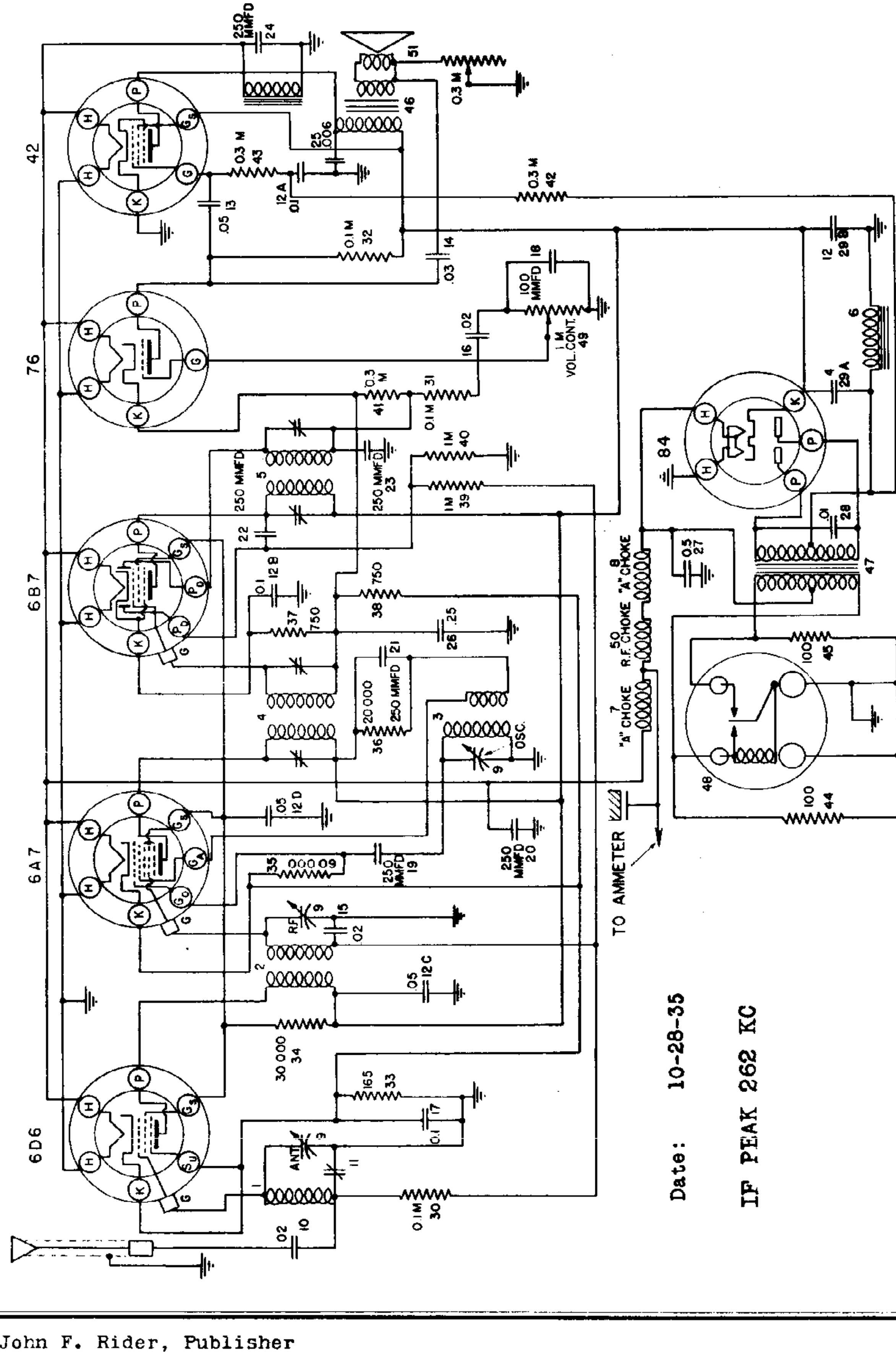
CONVENTIONAL ALIGNMENT-SEE SPECIAL SECTION

Generator frequency at 262 KC, connected thru 1 MFD condenser to the grid of the 6A7 tube. Grid clip is not disturbed. Peak trimmers P3, then P2 and P1.

Generator connected direct to the antenna lead of receiver. Frequency set at 1530 KC. Rotor plates of gang condenser completely out of mesh. Adjust the OSC section parallel trimmer (middle section) to peak. Then adjust the parallel trimmers of the front and rear sections, to maximum peak. Generator then set to 1400 KC. The rotor of variable condenser adjusted until heard. Peak front and rear sections at this frequency. No oscillator padding required.

UNITED MOTORS SERVICE

MODEL 958200 Chevrole
Schematic



Date: 10-28-35

IF PEAK 262 KC

FIG. 1--Chevrolet Model 958200 Circuit Diagram

MODEL 958200 Chevrolet
Alignment, Voltage
Parts

UNITED MOTORS SERVICE

GENERAL: The Chevrolet Model 985200 is a six tube receiver with a "Dome" type speaker, instrument panel tuning control and tone control. This receiver was designed specifically for 1936 Model Chevrolets and for use on the under-car antenna system required.

Antenna System: The antenna system used with this receiver consists of an assembly of two rubberized metal strips for mounting below each running board with special brackets.

TUBE COMPLEMENT

The tubes used in this receiver are: 6D6 R-F Amplifier, 6A7 Oscillator-Modulator, 6B7 I-F Amplifier-Diode Detector-A.V.C., 76 1st A-F Amplifier, 42 Power Output and a type 84 Rectifier.

CIRCUIT ALIGNMENT

If Alignment is found necessary -- make all adjustments with chassis in its case and use a calibrated test oscillator and output meter. To align the I-F stages -- feed a test oscillator signal of 262 K.C. into the grid of the 6A7 tube (leave grid clip in place) through a .25 mfd. condenser and adjust the four trimmers located on top of the I-F coils. To align R-F stages -- change the test oscillator setting to 1560 K.C. and feed this signal into the antenna connection on the receiver through a .0002 mfd. condenser. Turn the condenser plates until they are completely out of mesh and adjust the oscillator parallel trimmer on the middle section of the condenser gang. Change test oscillator setting to 1400 K.C. and turn condenser plates until the signal is tuned in. Then adjust the trimmers for the other two sections of the condenser gang. Change the test oscillator setting to 600 K.C. and adjust the antenna compensating condenser, (located through a small hole in the tuning control side of the chassis case) while rocking the tuning condenser plates back and forth slightly. Recheck alignment of the antenna parallel trimmer on condenser gang at 1400 K.C.

TUBE SOCKET VOLTAGES

Tube	H	P	Gs	Ga	K
6D6	6	240	100	-	3.6
6A7	6	140	100	160	3.6
6B7	6	130	100	-	3.6
76	6	130	-	-	8.0
42	6	220	240	-	0
84	5.6	-	-	-	240

NOTE

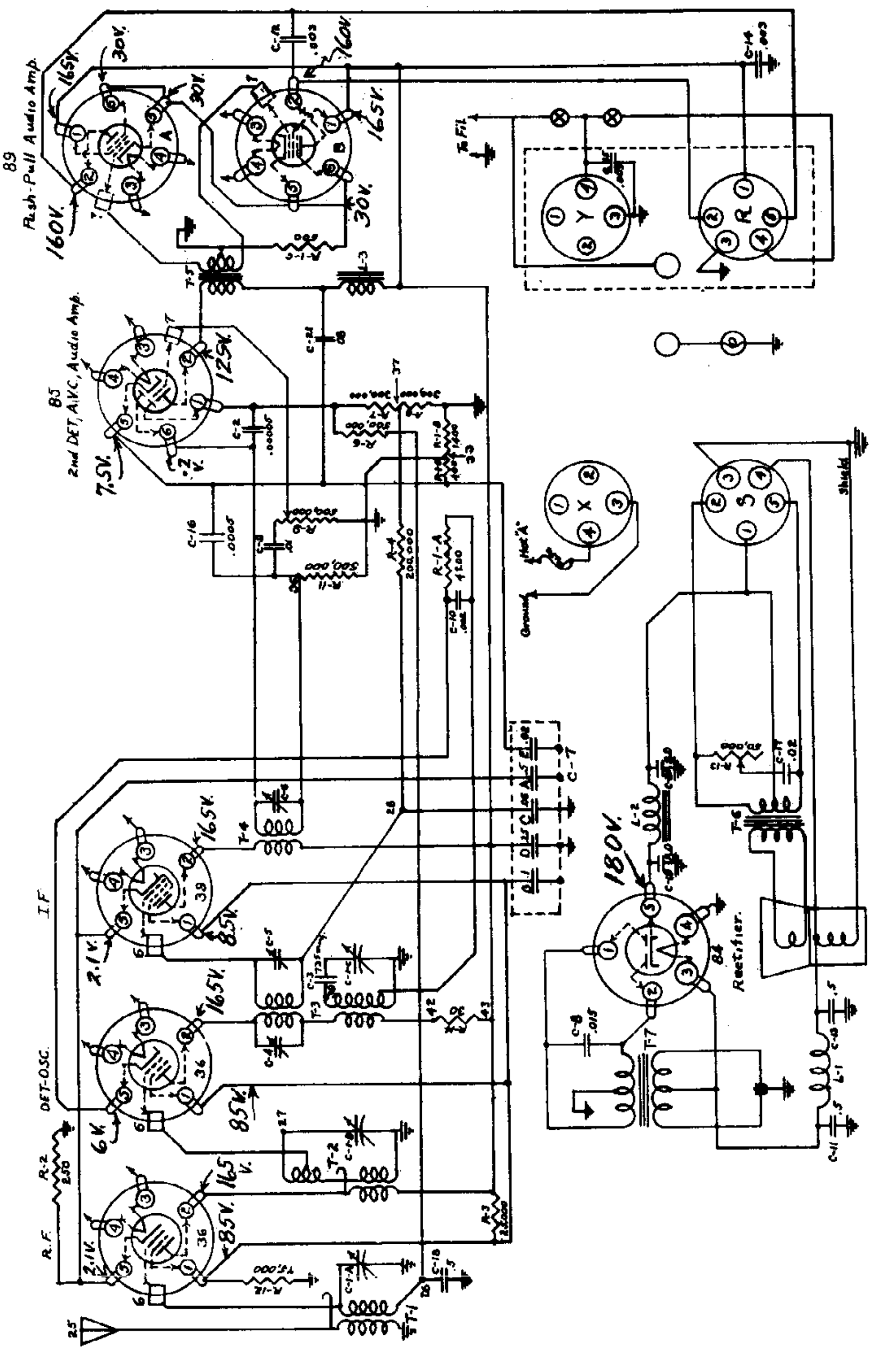
Ken-Rad 6D6 tubes were used in the R-F Stage of some of these receivers -- in using National Union tubes for replacement the alignment of the "Ant" section of the condenser gang should be checked because of a possible difference in internal capacities of the two makes of tubes.

CHASSIS ELECTRICAL PARTS

Illus. No.	Part No.	Part Name	Description
1	1210652	Coil	Antenna
2	1210653	Coil	R-F
3	1209345	Coil	Oscillator
4	1210654	Coil Assy.	1st I-F
5	1210655	Coil Assy.	2nd I-F
6	1209803	Coil	"B" filter choke
7,8	1210656	Coil	"A" filter choke
9	1210657	Condenser	3 gang variable
10	1210658	Condenser	Tubular .02 mfd. 200 V
11	1210659	Condenser	Antenna trimmer
12	1210660	Condenser	By-pass block
13	1209308	Condenser	Tubular .05 mfd. 400 V
14	1209625	Condenser	Tubular .03 mfd. 400 V
15	1209307	Condenser	Tubular .02 mfd. 200 V
16	1209307	Condenser	Tubular .02 mfd. 200 V
17	1209306	Condenser	Tubular .1 mfd. 200 V
18	1210275	Condenser	Molded .0001 mfd.
19,20,21	1209796	Condenser	Molded .00025 mfd.
22,23,24	1209796	Condenser	Molded .00025 mfd.
25	1209314	Condenser	Tubular .006 mfd. 400 V
26	1209817	Condenser	Tubular .25 mfd. 200 V
27	1210661	Condenser	Tubular .5 mfd. 160 V
28	1209805	Condenser	Oil filled .01 mfd. 1000 V
29	1210662	Condenser	Electrolytic block
30,31,32	1209883	Resistor	Carbon 100 M ohms 1/3 watt
33	1208140	Resistor	Flexible 165 ohms 1/2 watt
34	1208652	Resistor	Carbon 30,000 ohms 1 watt
35	1206320	Resistor	Carbon 60,000 ohms 1/3 watt
36	1209405	Resistor	Carbon 20,000 ohms 1/3 watt
37,38	1208800	Resistor	Flexible 750 ohms 1/2 watt
39,40	1209885	Resistor	Carbon 1 megohm 1/3 watt
41,42,43	1209884	Resistor	Carbon 300 M ohms 1/3 watt
44,45	1209015	Resistor	Flexible 100 ohms 1/2 watt
46	1209629	Transformer	Output
47	1210663	Transformer	Power
48	5040000	Vibrator	Non-syschronous
49	1210664	Volume Control	1 megohm
50	1210665	Coil	Motor noise choke

MISCELLANEOUS

Part No.	Part Name	Description
1210669	Cover	Tube lid
1210056	Screw	Chassis to case (P.K. #8x¼")
1209558	Socket	Speaker



IF PEAK 262 KC

I.F. Stages: Set oscillator on 262 KC and impress signal on grid of 36 Detector-Oscillator tube.

R.F. & Osc. Stages: Set oscillator on 1400 KC and feed signal into antenna connection on chassis and

Date: 9-13-34

MODEL 982006 Olds
Alignment, Change

UNITED MOTORS SERVICE

1. Peaking I-F Stages at 262 Kilocycles

IMPORTANT: The "Local-Distance" switch on the tuning control used with this receiver is used to control the alignment of the first I-F coil windings. The capacity existing between the leads and the shielding of the cable connecting to the switch in the tuning control is part of the I-F tuned circuit and must be taken into consideration when aligning the I-F stages.

In order to duplicate this capacity and provide facilities for switching from "Local to Distance" a "TEST AND ALIGNMENT CABLE" (Part #1210201) has been made available. This cable eliminates the necessity of removing the tuning control from the car.

(a) Connect the signal lead of the test oscillator to the grid cap of the 6D6 Translator Tube through a .1 mfd. condenser, leaving the tube's grid clip in place. Connect the ground lead of the test oscillator to the chassis frame.

(b) Insert the four prong plug of the "TEST and ALIGNMENT CABLE" of the tuning control cable into the socket provided on the receiver chassis. Turn switch on test cable or tuning control to "DISTANCE" position. (If the receiver is aligned with the switch in the "local" position, the "Local-Distance" switch will operate backwards.)

(c) Set the test oscillator to exactly 262 K.C.

(d) Adjust the trimmers on the I-F coils (Illus. 5 and 6, Fig. 4) for maximum output. These adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistent with obtaining a readable indication on the output meter.

2. Aligning at 1560 Kilocycles

Leave the test oscillator leads connected the same as for aligning the I-F circuits. Turn the rotor plates of the gang condenser all the way out and against the high frequency stop. Set the test oscillator to 1560 kilocycles. Adjust the parallel trimmer for the oscillator section of the condenser gang (Illus. 9, Fig. 3) for maximum output. (It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the entire high frequency end of the dial.

3. Aligning at 540 Kilocycles

Leave test oscillator leads connected the same as before. Turn the rotor plates of the gang condenser all the way into mesh so that they rest against the low frequency stop. Set the test oscillator to 540 K.C. Adjust the oscillator padding condenser (Illus. #4, Fig. 4) located on the under-side of the receiver sub-panel to maximum output. (This adjustment sets the low frequency tuning range of the receiver to 540 K.C.)

4. Aligning at 1400 Kilocycles

Remove the signal lead of the test oscillator from the grid of the 6D6 Translator tube and connect to the antenna terminal of the receiver THROUGH A .002 MICA CONDENSER connected in place of the .1 mfd. condenser previously used. (It is very important that a .002 mfd. mica condenser be used in aligning the antenna stage of these receivers in order that this circuit can be made to track properly. Some test oscillators have this condenser included and if the capacity is correct, it will not be necessary to use an external series condenser.) Set the test oscillator to 1400 K.C. Turn the condenser rotor plates until the frequency is tuned in with maximum output. Adjust the R-F parallel trimmer on the condenser gang (Illus. #9B, Fig. 3) and the antenna compensating condenser (Illus. #21, Fig. 4) located on the side of the receiver case for maximum output.

5. Aligning at 600 Kilocycles

The oscillator padding condenser was previously adjusted at 540 K.C., however, it is necessary in most cases to repeak the oscillator tracking condenser at 600 K.C. in order to make the receiver track properly and to secure full sensitivity.

Set the test oscillator on 600 K.C. Turn the condenser rotor plates until the signal from the test oscillator is tuned in with maximum output. Maintain a low output signal from the test oscillator and readjust the oscillator tracking condenser (Illus. #4, Fig. 4) while rocking the variable condenser gang tuning shaft back and forth through the signal. This operation should be continued until no further increase in output can be obtained.

SUBJECT--CHANGE IN "CIRCUIT ALIGNMENT" PROCEDURE
OLDS RADIO #982006 Date: 6-25-36

Oldsmobile radios #982006 were shipped from the factory with their oscillator circuits high frequency adjustment made at either 1560 or 1540 K.C.

ADJUSTING OSCILLATOR CIRCUIT

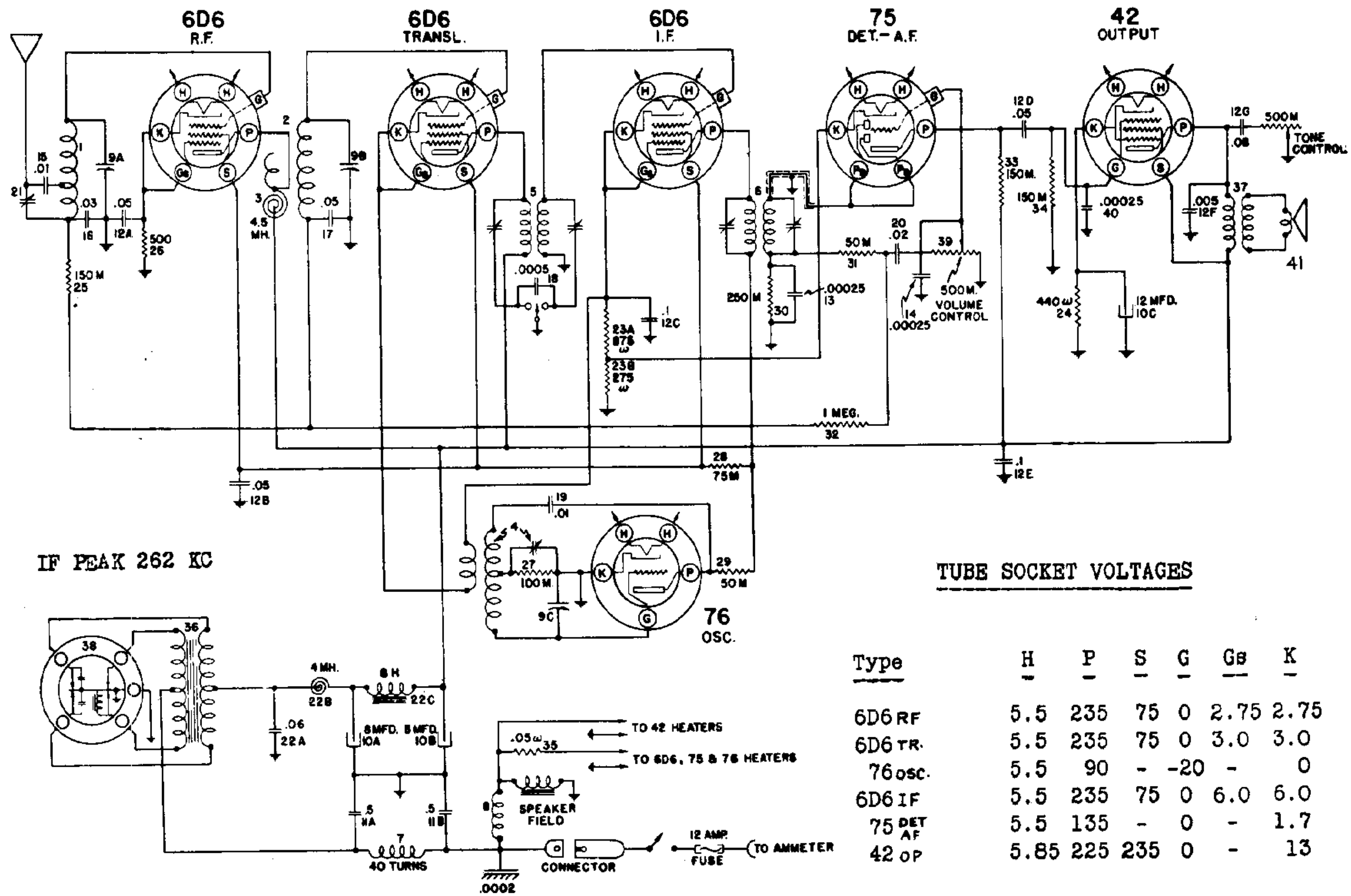
Sets adjusted at 1540 K.C. by the factory will not tune to 1560 K.C. unless the oscillator trimmer is screwed out too far. If re-alignment of any of these radios is found necessary, make the high frequency adjustment of the oscillator section of the condenser gang at 1540 instead of 1560 K.C. as indicated in the "CIRCUIT ALIGNMENT" procedure. All other adjustments of the receiver circuits should be made as indicated under "CIRCUIT ALIGNMENT".

CHECKING ALIGNMENT

If it is found in checking the receiver alignment with a test oscillator that the receiver will tune to 1560 K.C., it will not be necessary to reset the oscillator section of the condenser gang to 1540 K.C. That is, unless the oscillator coil has been replaced, in which case the adjustment should be made at 1540 K.C.

MODEL 982006 Old
Schematic,Voltag

UNITED MOTORS SERVICE



IF PEAK 262 KC

TUBE SOCKET VOLTAGES

Type	H	P	S	G	Gs	K
6D6 RF	5.5	235	75	0	2.75	2.75
6D6 TR.	5.5	235	75	0	3.0	3.0
76 OSC.	5.5	90	-	-20	-	0
6D6 IF	5.5	235	75	0	6.0	6.0
75 DET AF	5.5	135	-	0	-	1.7
42 OP	5.85	225	235	0	-	13

NOTE: Readings taken from tube socket contacts to ground with a D.C. voltmeter having a resistance of 1000 ohms per volt.

Olds Model 982006

Date: 12-6-35

MODEL 982006 Olds
Socket, Trimmers
Chassis, Note

UNITED MOTORS SERVICE

Overall Oscillation:— On some of the first production of these receivers, overall oscillation was noticed in tuning to resonance on a station. On sets having this trouble--examine the receiver chassis to see if a .00025 mfd. condenser is connected between the 42 tube control grid and ground. (This condenser is shown as Illus. #40 on Fig. 4.) If this condenser is not used--connect a part #1209055 condenser from the 42 tube control grid to ground. This condenser was used in the later production of these receivers and should eliminate all trouble from this source.

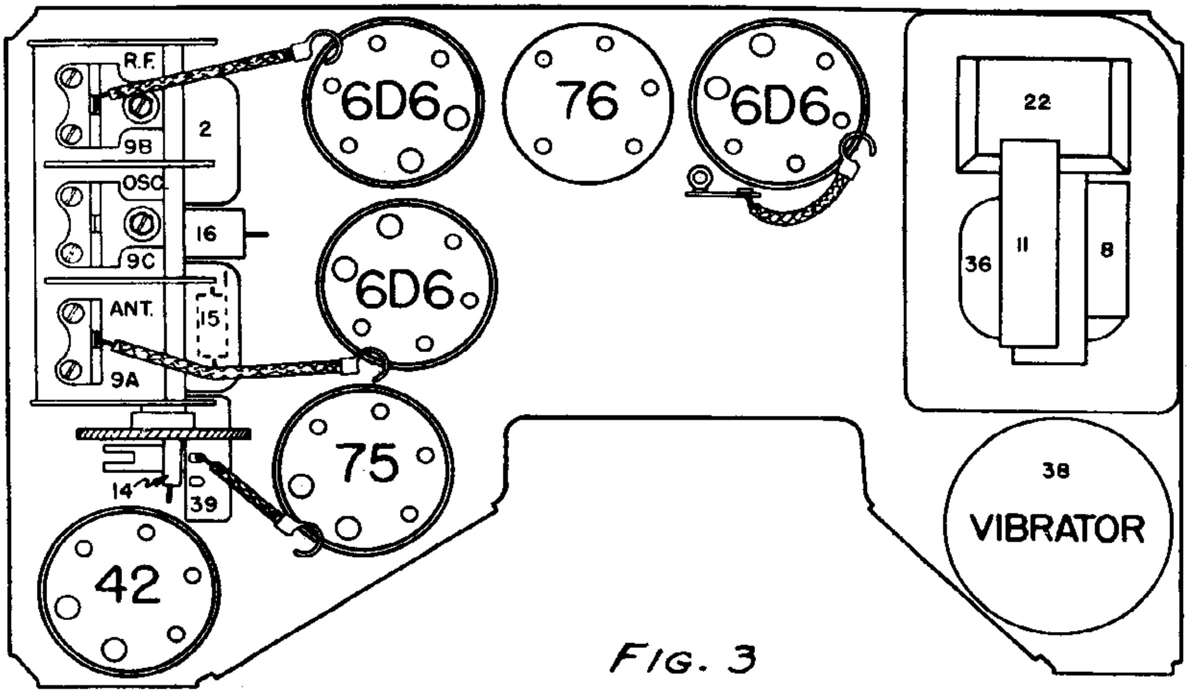


FIG. 3

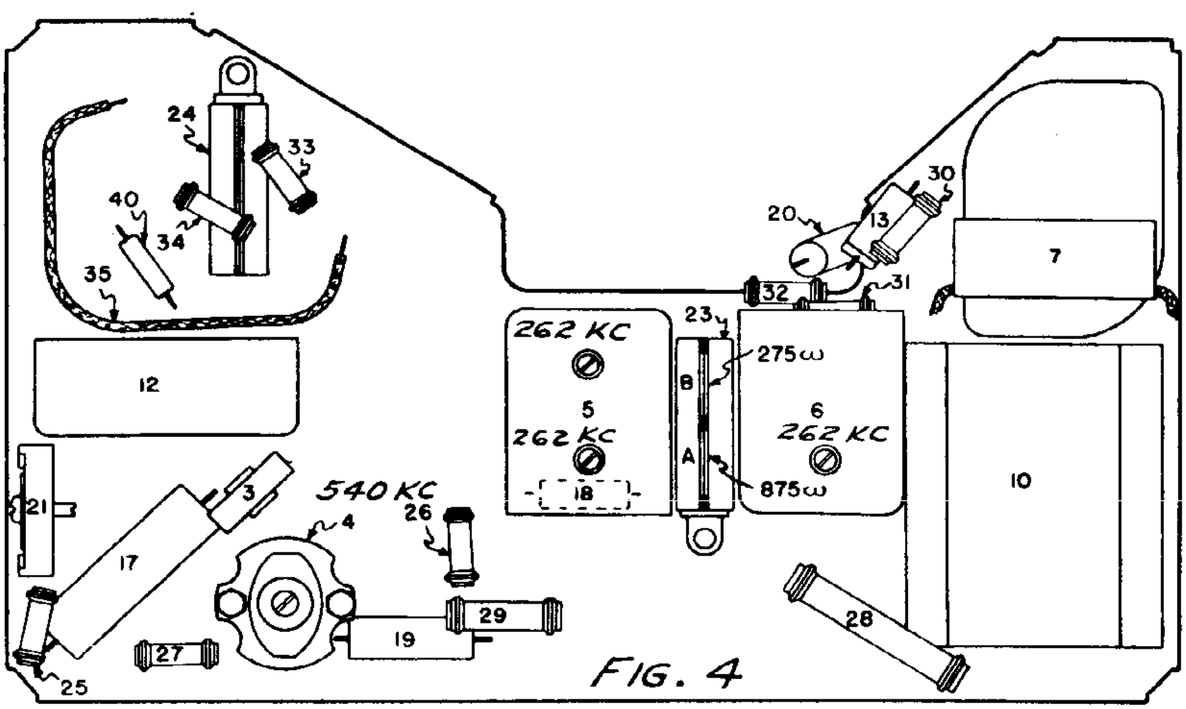
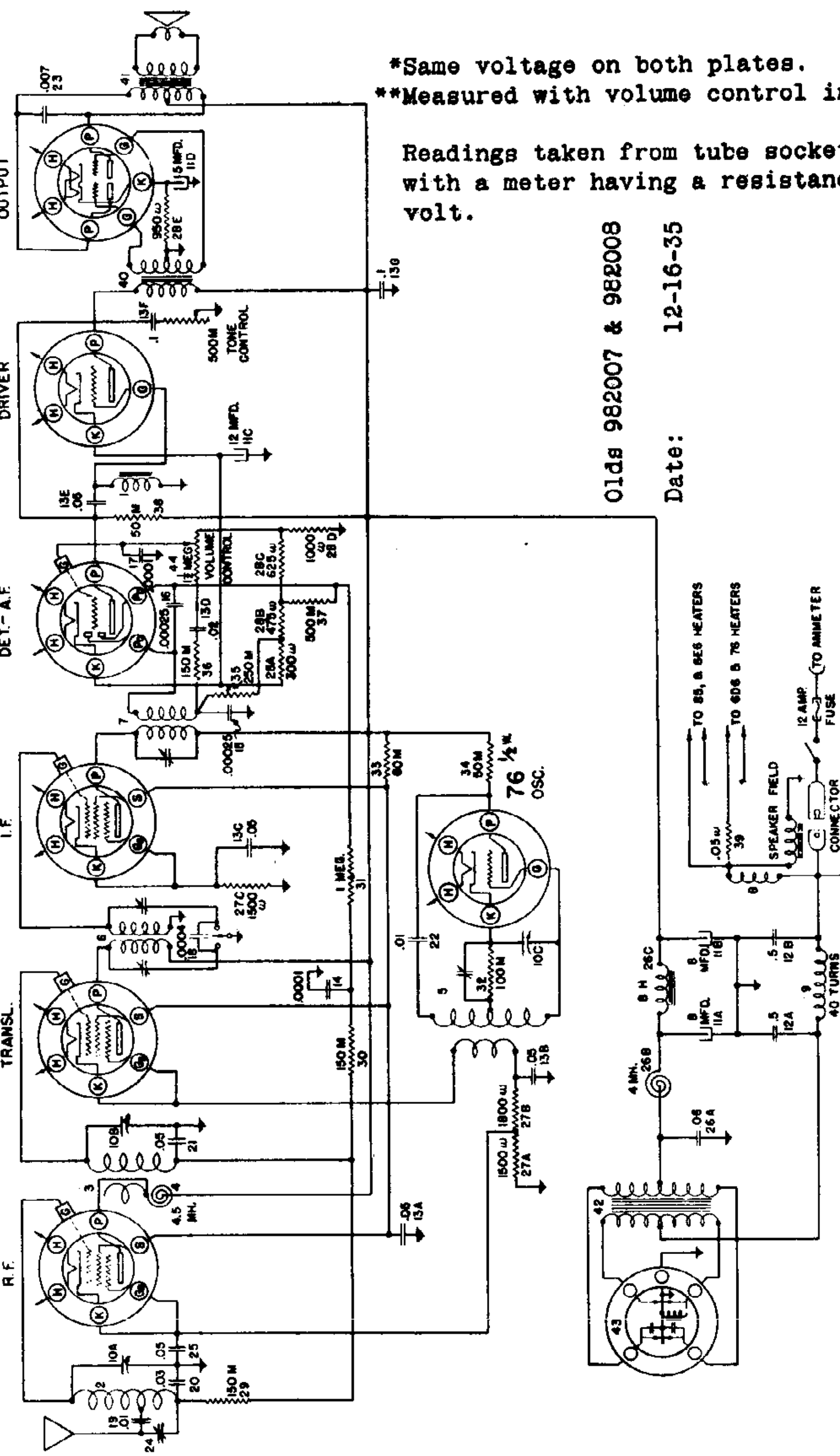


FIG. 4

UNITED MOTORS SERVICE



*Same voltage on both plates.
**Measured with volume control in minimum position.

Readings taken from tube socket contacts to ground with a meter having a resistance of a 1000 ohms per volt.

Olds 982007 & 982008

Date: 12-16-35

IF PEAK 262 KC

TUBE SOCKET VOLTAGES

Type	Function	H	P	S	Gs	G	K
6D6	R-F Amplifier	5.5	235	90	11.5	0	11.5
6D6	Translator	5.5	235	90	16.0	0	16.0
76	Oscillator	5.5	90	-	0	-20	0
6D6	I-F Amplifier	5.5	235	90	5.25	0	5.25
85	Det. 1st A-F	5.85	115	-	-	**5.5	13.0
76	Driver	5.85	225	-	-	0	13.0

MODEL 982007,982008
Olds
Alignment, Change

UNITED MOTORS SERVICE

CIRCUIT ALIGNMENT

1. Peaking I-F Stages at 262 Kilocycles

IMPORTANT: The "Local-Distance" switch on the tuning control used with these receivers is used to control the alignment of the first I-F coil windings. The capacity existing between the leads and the shielding of the cable connecting to the switch in the tuning control is part of the I-F tuned circuit and must be taken into consideration when aligning the I-F stages.

In order to duplicate this capacity and provide facilities for switching from "Local to Distance" a "TEST AND ALIGNMENT CABLE" (Part #1210201) has been made available. This cable eliminates the necessity of removing the tuning control from the car.

(a) Connect the signal lead of the test oscillator to the grid cap of the 6D6 Translator Tube through a .1 mfd. condenser, leaving the tubes grid clip in place. Connect the ground lead of the test oscillator to the chassis frame.

(b) Insert the four prong plug of the "TEST AND ALIGNMENT CABLE" of the tuning control cable into the socket provided on the receiver chassis. Turn switch on test cable or tuning control to "DISTANCE" position. (If the receiver is aligned with the switch in the "Local" position, the "Local-Distance" switch will operate backwards.)

(c) Set the test oscillator to exactly 262 K.C.

(d) Adjust the trimmers on the I-F coils (Illus. 6 and 7, Fig. 3) for maximum output. These adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistant with obtaining readable indication on the output.

2. Aligning at 1560 Kilocycles

Leave the test oscillator leads connected the same as for aligning the I-F circuits. Turn the rotor plates of the gang condenser all the way out and against the high frequency stop. Set the test oscillator to 1560 kilocycles. Adjust the parallel trimmer for the oscillator section of the condenser gang (Illus. 10C, Fig. 2) for maximum output. (It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the entire high frequency end of the dial.)

3. Aligning at 540 Kilocycles

Leave test oscillator leads connected the same as before. Turn the rotor plates of the gang condenser all the way into mesh so that they rest against the low frequency stop. Set the test oscillator to 540 K.C. Adjust the oscillator padding condenser (Illus. #5, Fig. 3) located on the under-side of the receiver sub-panel to maximum output. (This adjustment sets the low freqeuncy tuning range of the receiver to 540 K.C.)

4. Aligning at 1400 Kilocycles

Remove the signal lead of the test oscillator from the grid of the 6D6 Translator tube and connect to the antenna terminal of the receiver THROUGH A .0002 MICA CONDENSER connected in place of the .1 mfd. condenser previously used. It is very important that a .0002 mfd. mica condenser be used in aligning the antenna stage of these receivers in order that this circuit can be made to track properly. Some test oscillators have this condenser included and if the capacity is correct, it will not be necessary to use an external series condenser. Set the test oscillator to 1400 K.C. Turn the condenser rotor plates until the frequency is tuned in with maximum output. Adjust the R-F parallel trimmer on the condenser gang (Illus. #10B, Fig. 2) and the antenna compensating condenser (Illus. #24, Fig. 3) located on the side of the receiver case for maximum output.

5. Aligning at 600 Kilocycles

The oscillator padding condenser was previously adjusted at 540 K.C., however, it is necessary in most cases to repeak the oscillator tracking condenser at 600 K.C. in order to make the receiver track properly and to secure full sensitivity.

Set the test oscillator on 600 K.C. Turn the condenser rotor plates until the signal from the test oscillator is tuned in with maximum output. Maintain a low output signal from the test oscillator and readjust the oscillator tracking condenser (Illus. #5, Fig. 3) while rocking the variable condenser gang tuning shaft back and forth through the signal. This operation should be continued until no further-increase in output can be obtained.

SUBJECT--CHANGE IN "CIRCUIT ALIGNMENT" PROCEDURE
OLDS RADIOS 982007 & 982008

Oldsmobile radios 982007 & 982008 were shipped from the factory with their oscillator circuits high frequency adjustment made at either 1560 or 1540 K.C.

ADJUSTING OSCILLATOR CIRCUIT

Sets adjusted at 1540 K.C. by the factory will not tune to 1560 K.C. unless the oscillator trimmer is screwed out too far. If re-alignment of any of these radios is found necessary, make the high frequency adjustment of the oscillator section of the condenser gang at 1540 instead of 1560 K.C. as indicated in the "CIRCUIT ALIGNMENT" procedure. All other adjustments of the receiver circuits should be made as indicated under "CIRCUIT ALIGNMENT".

CHECKING ALIGNMENT

If it is found in checking the receiver alignment with a test oscillator that the receiver will tune to 1560 K.C., it will not be necessary to reset the oscillator section of the condenser gang to 1540 K.C. That is, unless the oscillator coil has been replaced, in which case the adjustment should be made at 1540 K.C.

Be sure to check your test oscillator for correct calibration against known station frequencies before making any receiver adjustments.

UNITED MOTORS SERVICE

MODELS 982007,98200
Olds
Socket,Trimmers
Chassis

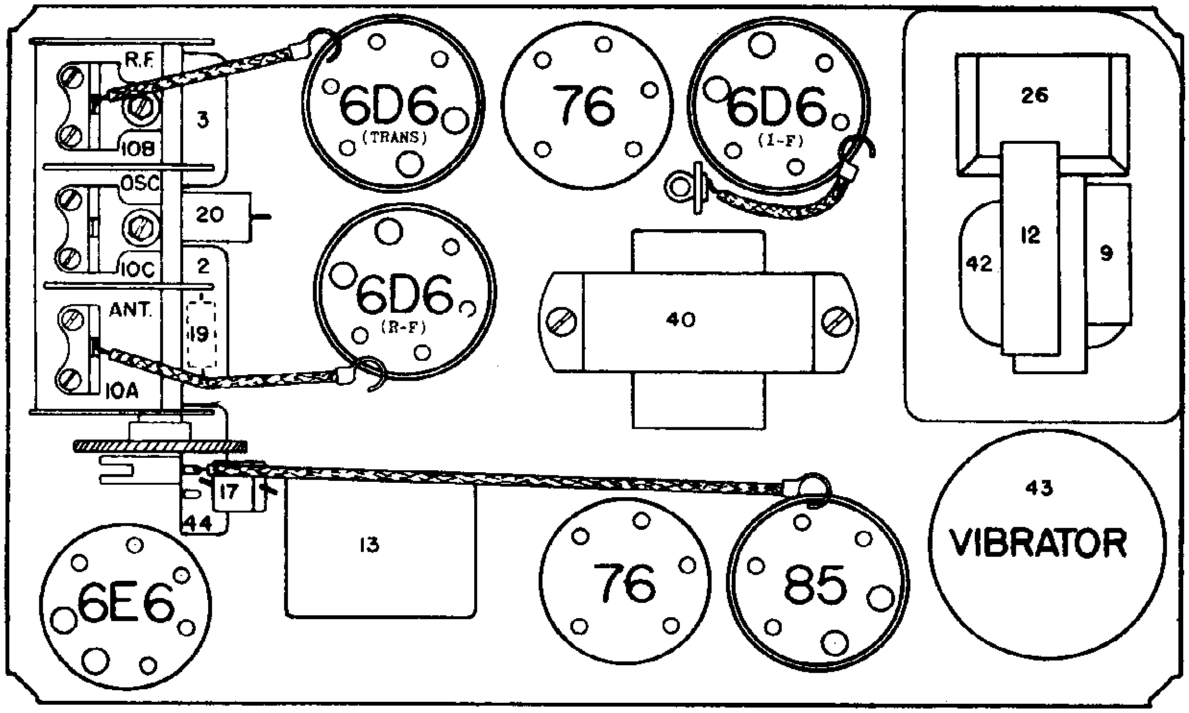
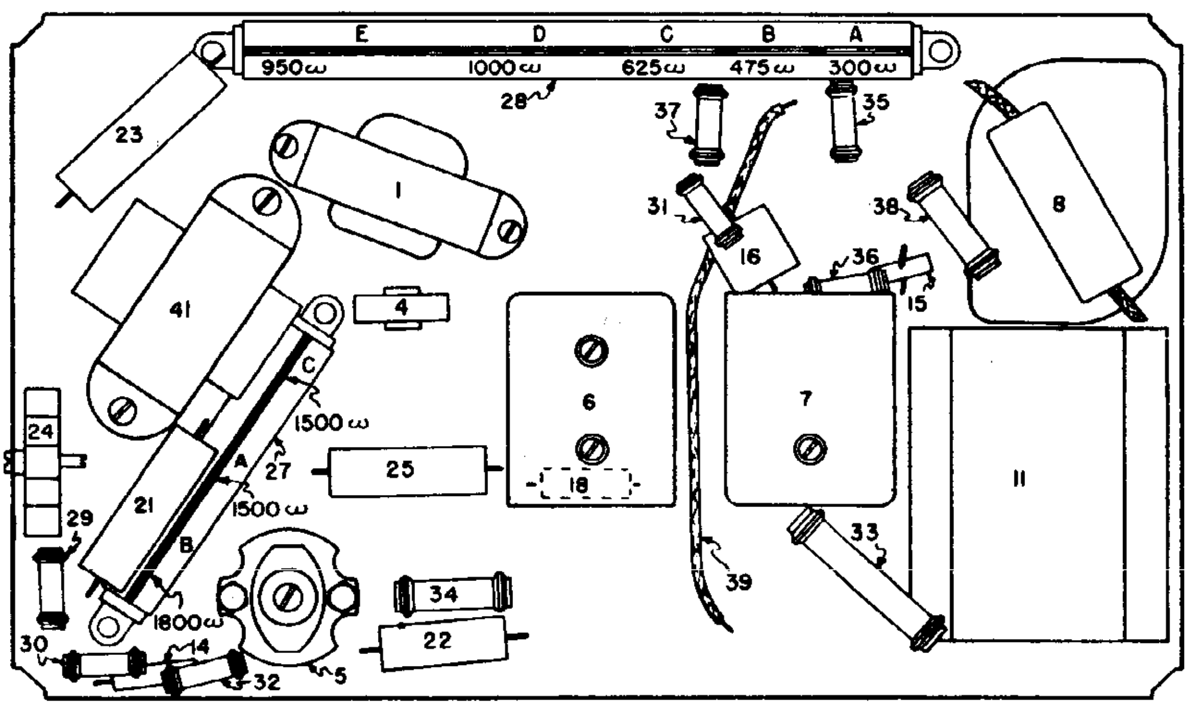
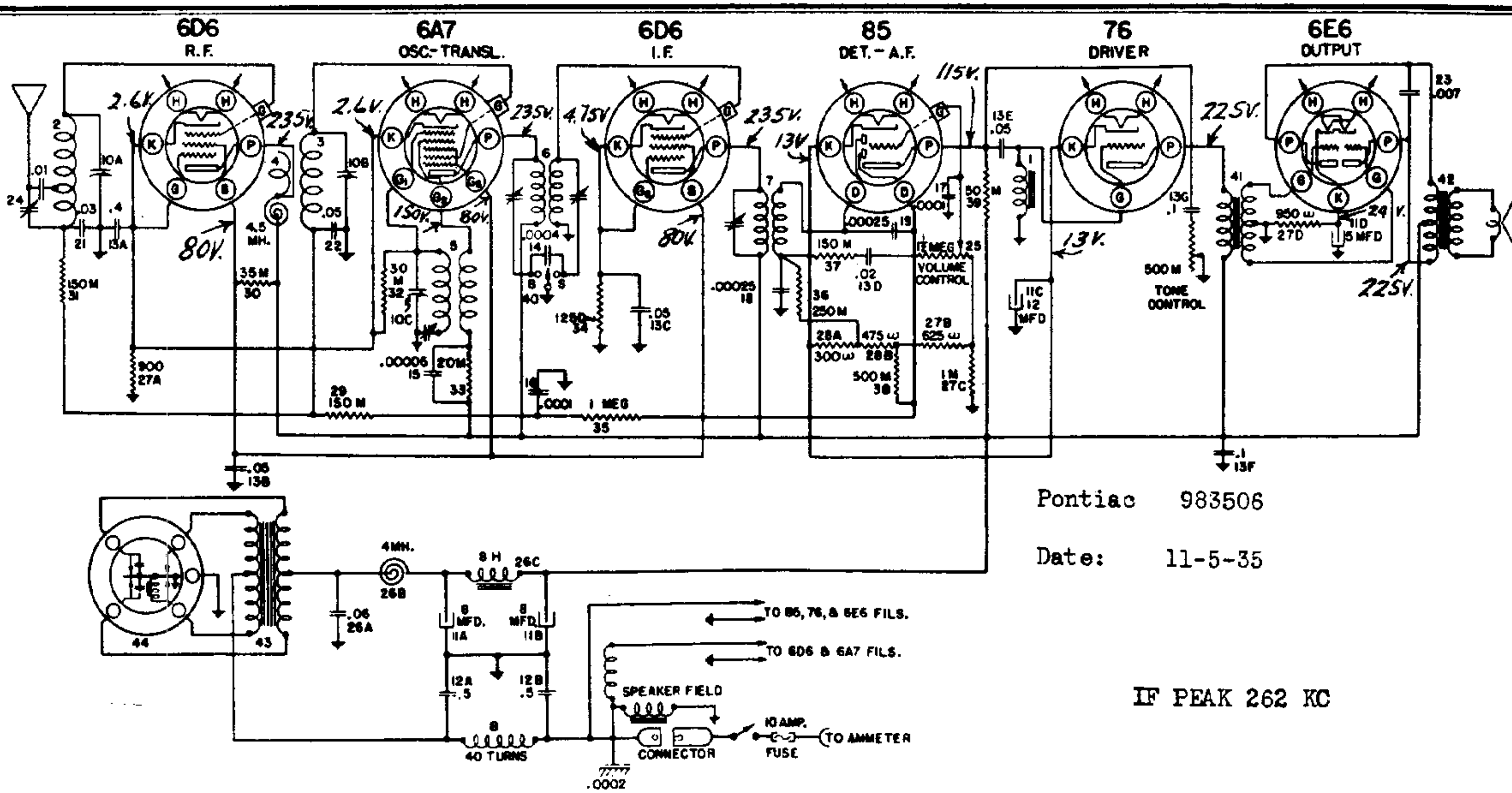


FIG. 2 PARTS LAYOUT--Top View



MODEL 983506 Pontiac
Schematic, Voltage
Alignment

UNITED MOTORS SERVICE



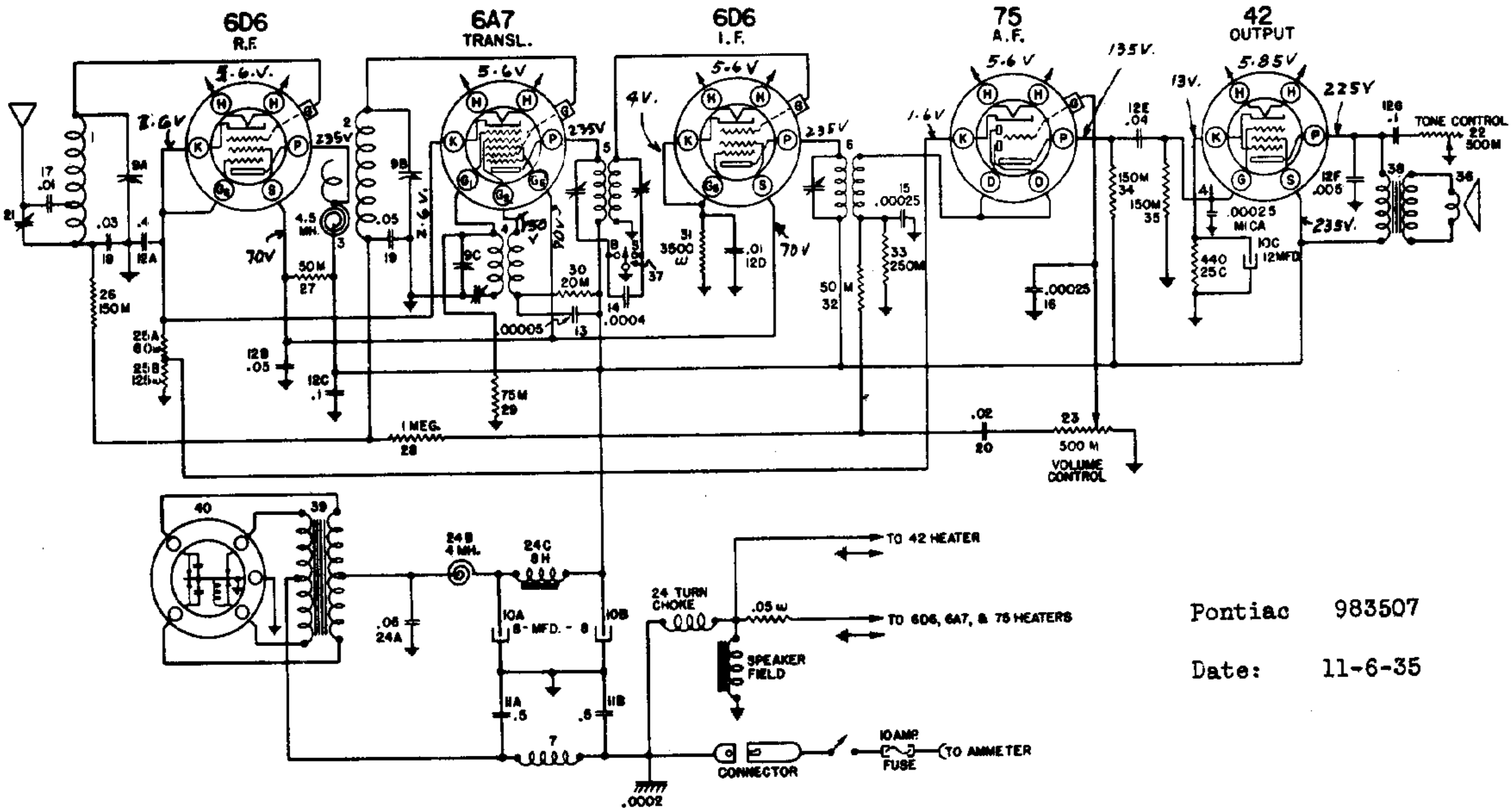
Pontiac 983506

Date: 11-5-35

IF PEAK 262 KC

Feed 262-kc. signal to control grid of 6A7. Use 0.25-mf condenser as dummy antenna. Adjust the three trimmers on top of the i-f coils. (Be sure "Local-Distance" switch is in "Distance" position) Feed signal of 1560 kc to antenna post through a 0.002-mf. condenser dummy. Turn condenser plates completely out of mesh. Adjust Osc. trimmer-- middle section of condenser gang. Set signal generator and dial to 600 kc. Adjust Osc. tracking condenser (on bottom of chassis) while rocking the gang condenser plates. Set signal generator and dial to 1400 kc. Adjust the r-f trimmer on the condenser gang. Recheck Osc. trimmer of condenser gang at 1560 kc.

UNITED MOTORS SERVICE



Pontiac 983507

Date: 11-6-35

ALIGNMENT - To align the I-F stages -- feed a test oscillator signal of 262 K.C. into the control grid of the 6A7 tube through a .25 mfd. condenser and adjust the three trimmers located on top of the I-F coils. (Make sure that the "Local-Distance" switch is in the "Distance" position). To align the R-F circuits - change the test oscillator frequency to 1560 K.C. into antenna connection on receiver through a .0002 mfd. condenser. Turn the condenser plates until they are completely out of mesh and against the high frequency stop. Adjust the oscillator trimmer on the middle section of the condenser gang. Change test oscillator frequency to 540 Kilocycles and turn condenser plates until this signal is tuned in (approximately 600 K.C. position of plates) and adjust the oscillator tracking condenser located on the bottom of the chassis while rocking the condenser gang plates back and forth slightly, until maximum output is obtained. Change test oscillator setting to 1400 K.C. and turn condenser plates until this signal is tuned in. Adjust the R-F trimmer on the condenser gang. Re-check the setting of the osc.

MODELS 985100,985300
985301,985400
Chevrolet
Alignments

UNITED MOTORS SERVICE

CHEVROLET MODEL 985100 - ALIGNMENT

1. Aligning I-F Stages at 262 Kilocycles

(a) Connect the signal lead of the test oscillator to the grid cap of the 6A7 tube, through a .1 mfd. condenser, leaving the tube's grid clip in place.
(b) Connect the ground lead of the test oscillator to the chassis frame.

(c) Set the test oscillator to exactly 262 K.C.

(d) Adjust the trimmers on the I-F coils (Illus. 5 and 6) carefully for maximum output. These adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistent with obtaining readable indication on the output meter.

2. Aligning at 1560 Kilocycles

(a) Leave the test oscillator leads connected the same as for aligning the I-F circuits.

(b) Turn the rotor plates of the gang condenser all the way out and against the high frequency stop.

(c) Set the test oscillator to 1560 kiocycles.

(d) Adjust the parallel trimmer for the oscillator section of the condenser gang (Illus. 9C, Fig. 2) for maximum output. It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the entire high frequency end of the dial.

3. Aligning at 540 Kilocycles

(a) Leave test oscillator leads connected the same as before.

(b) Turn the rotor plates of the gang condenser all the way into mesh so that they rest against the low frequency stop.

(c) Set the test oscillator to 540 K.C.

(d) Adjust the oscillator tracking condenser (Illus. #4, Fig. 3) located on the under-side of the receiver sub-panel to maximum output. (This adjustment sets the low frequency tuning range of the receiver to 540 K.C.)

4. Aligning at 1400 Kilocycles

(a) Remove the signal lead of the test oscillator from the grid of the 6A7 tube and connect to the antenna terminal of the receiver through a .0002 mica condenser connected in place of the .1 mfd. condenser previously used.
(b) Set the test oscillator to 1400 K.C.

(c) Turn the condenser rotor plates until this frequency is tuned in with maximum output.

(d) Adjust the R-F parallel trimmer on the condenser gang (Illus. #9B, Fig. 2) and the antenna compensating condenser (Illus. #16, Fig. 4) located on the side of the receiver case for maximum output.

5. Aligning at 600 Kilocycles

The oscillator padding condenser was previously adjusted at 540 K.C., however, it is necessary in most cases to repeat the oscillator tracking condenser at 600 K.C. in order to make the receiver track properly and to secure full sensitivity.

(a) Set the test oscillator on 600 K.C.

(b) Turn the condenser rotor plates until the signal from the test oscillator is tuned in with maximum output.

(c) Maintain a low output signal from the test oscillator and readjust the oscillator tracking condenser (Illus. #4, Fig. 3) while rocking the variable condenser gang tuning shaft back and forth through the signal. This operation should be continued until no further increase in output can be obtained.

NOTE: If the entire alignment procedure has been accomplished correctly, the receiver should be very nearly uniformly sensitive over the entire frequency range.

CHEVROLET MODEL 985300- ALIGNMENT

CIRCUIT ALIGNMENT

If alignment is found necessary -- make all adjustments with chassis in its case and use a calibrated test oscillator and output meter. To align the I-F stages -- feed a test oscillator signal of 262 K.C. into the grid of the 6A7 tube (leave grid clip in place) through a .25 mfd. condenser and adjust the four I-F trimmers located on top of the I-F coils. This operation should be repeated until no further increase in output can be obtained. To align the R-F circuits -- change the test oscillator setting to 1560 K.C and feed this signal into the antenna connection of the receiver through a .0002 mfd. condenser. Turn the condenser gang plates until they are completely out of mesh. Then adjust the oscillator parallel trimmer on the middle section of the condenser gang. (The parallel trimmers for the condenser gang are accessible through the side of the chassis case by removing the "spring buttons"). Change test oscillator setting to 1400 K.C. and turn condenser plates until this signal is tuned in, then adjust the trimmers of the other two sections of the condenser gang. Change test oscillator setting to 600 K.C. and turn condenser plates until signal is tuned in having the greatest output (600 K.C. position of plates). Adjust the oscillator tracking condenser (accessible through a small hole in the chassis sub-panel between the condenser gang and the 6A7 tube) while rocking the condenser gang plates back and forth slightly until no further increase in output can be obtained. Recheck the alignment of the parallel trimmer for the middle section of the condenser gang at 1560 K.C.

CHEVROLET MODEL 985301— ALIGNMENT

1. Aligning the I-F Stages at 260 K.C.

The I-F Coil assemblies used in this receiver are "iron core" types and adjustment is made by varying the inductance as the capacity tuning the coil windings is fixed. The inductance is varied by changing the relative positions of the iron cores with the adjusting screws provided on the top and bottom of each I-F coil assembly.

(a) Feed a test oscillator signal of 260 K.C. into the control grid of the 6A7 tube (leave grid clip in place) through a .25 mfd. condenser. Keep the test oscillator leads away from the grid leads of other tubes.

(b) Adjust the set screw provided on the top and bottom of each I-F coil assembly. (See Illustration 55 and 56, Figures 2 and 3.) Repeat these adjustments until maximum output is obtained.

2. Aligning the R-F Stages

The antenna coil used in this receiver is also an "iron core" type similar to the I-F's. Extreme care should be exercised in carrying out the following procedure to insure proper alignment of the antenna circuit.

(a) Change the test oscillator setting to 1560 K.C. and feed this signal into the control grid (cap) of the 6D6 R-F tube through a .25 mfd. condenser. Turn the condenser rotor plates until they are completely out of mesh and rest against the high frequency stop. Adjust the parallel trimmer for the oscillator section (center) of the gang condenser.

(b) Change the test oscillator setting to 600 K.C. and tune condenser gang to pick up this signal (at approximately 600 K.C.) and adjust the oscillator series condenser, (Illustration #2, Figure 3) simultaneously rocking the gang condenser back and forth through the signal until maximum output results.

(c) Re-check setting of parallel trimmer for oscillator section (center) of the gang condenser as covered in paragraph (a).

(d) Feed a test oscillator signal of 600 K.C. through a .0002 mfd. (mica) condenser into the antenna connection on the receiver. Tune gang condenser to pick up this signal and adjust the screw of the antenna coil (Illustration #31 on Fig. 3) simultaneously rocking the condenser gang plates back and forth until maximum output is obtained.

(e) Change test oscillator setting to 1400 K.C. and turn condenser gang plates until this signal is heard (at 1400 K.C.). Then adjust the parallel trimmers on the top and bottom sections of the gang condenser.

(f) Repeat paragraph (d) to see if further improvement can be made. If improvement results, repeat paragraph (e).

Bass Compensation--Tone Control: Bass Compensation is obtained at low audio outputs by by-passing some of the higher frequencies to ground, with a series condenser and resistor connected to a tap on the volume control. Tone control action is obtained by by-passing some of the higher frequencies present in the plate circuit of the 76 driver tube to ground, through a series condenser and rheostat. The audio signal voltage present in the 76 tube plate circuit is coupled to one of the voice coil leads in the speaker cable with a small condenser. The higher frequencies are by-passed to ground at the speaker with the tone control.

CHEVROLET MODEL 985400—ALIGNMENT

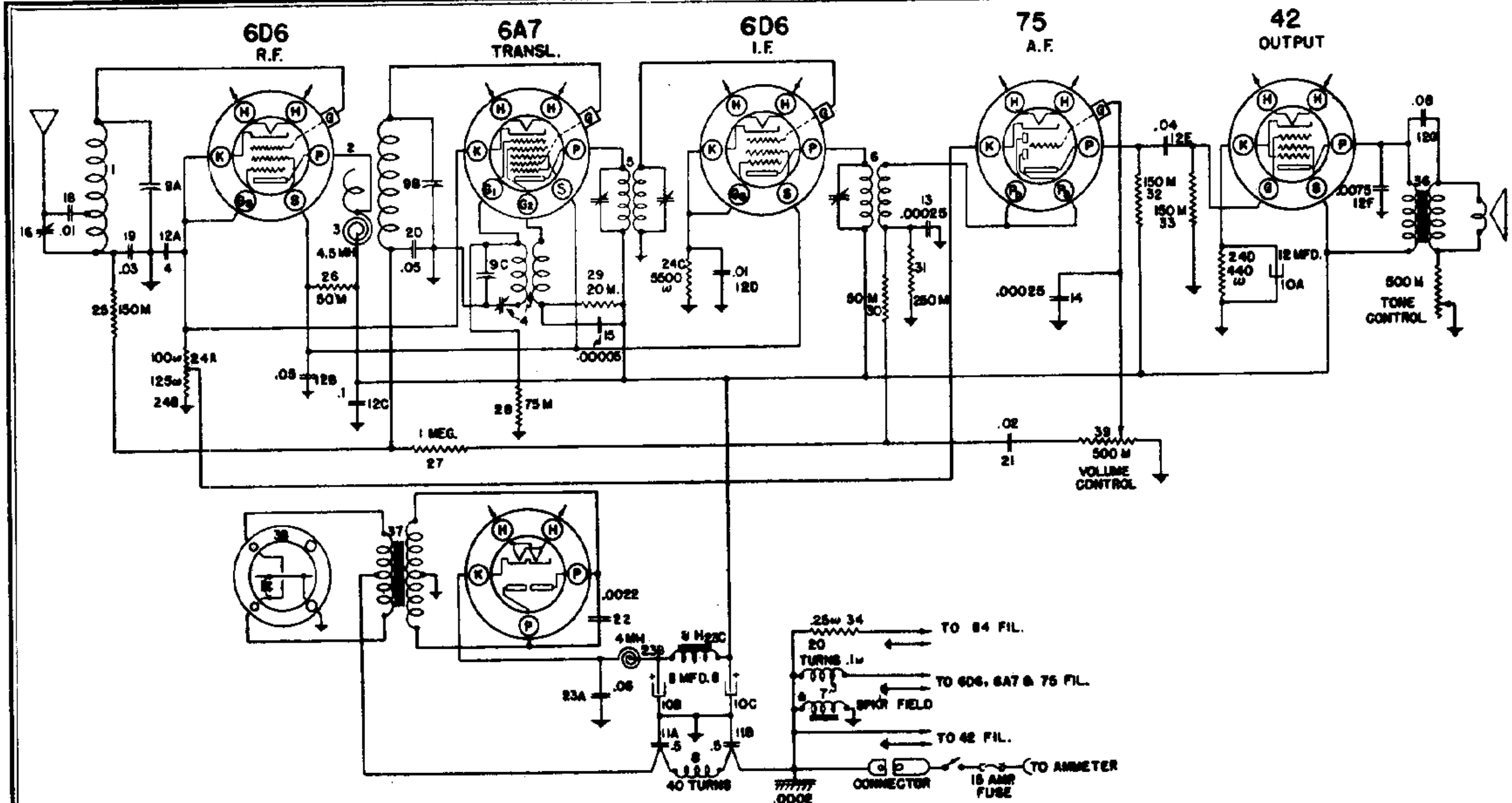
CIRCUIT ALIGNMENT

If alignment is found necessary--make all the adjustments with chassis in its case and use a calibrated test oscillator and output meter. To align the I-F Stages--feed a test oscillator signal of 262 K.C. into the control grid of the 6A7 tube (leave grid clip in place) through a .25 mfd. condenser and adjust the trimmers on the I-F coils for maximum output. Care should be taken to keep the test oscillator leads away from the grid leads of the other tubes in order to avoid inaccurate adjusments.

To align the R-F Stages--change the test oscillator setting to 1560 K.C. and feed this signal into the antenna connection on the chassis through a .0002 mfd. condenser. Turn the condenser rotor plates until they are completely out of mesh and adjust the parallel trimmer for the oscillator section (middle) of the condenser gang. Change the test oscillator setting to 1400 K.C. and turn condenser rotor plates until this signal is tuned in. Then adjust the trimmers for the other two sections of the condenser gang. Change test oscillator setting to 600 K.C. and adjust the antenna compensating condenser (located near the control shaft bushings) while rocking the tuning control plates back and forth slightly. Recheck alignment of the antenna section (see PARTS LAYOUT) of condenser gang for maximum output at 1400 K.C. It will also be necessary to readjust the antenna compensating condenser to the car antenna upon installation.

MODEL 985100 Chevrolet
Schematic, Voltage

UNITED MOTORS SERVICE



IF PEAK 262 KC

CHEVROLET MODEL 985100

Date: 9-27-35

TUBE SOCKET VOLTAGES

Type	Function	H	P	S	Gs	G1	G2	K
6D6	R-F Amplifier	5.7	230	70	2.75	-	-	2.75
6A7	Translator	5.7	230	70	-	20	150	2.75
6D6	I-F Amplifier	5.7	230	70	2.75	-	-	6.6
75	Det.-1st A-F	5.7	135	-	-	-	-	1.6
42	Output	6.0	220	235	-	-	-	13.0
84	Rectifier	5.7	*AC	-	-	-	-	240

NOTE: Above readings taken from tube socket contacts to ground with a D.C. voltmeter having a resistance of 1000 ohms per volt.

MODEL 985100 Chevrolet
Socket, Trimmers, Notes
Chassis

UNITED MOTORS SERVICE

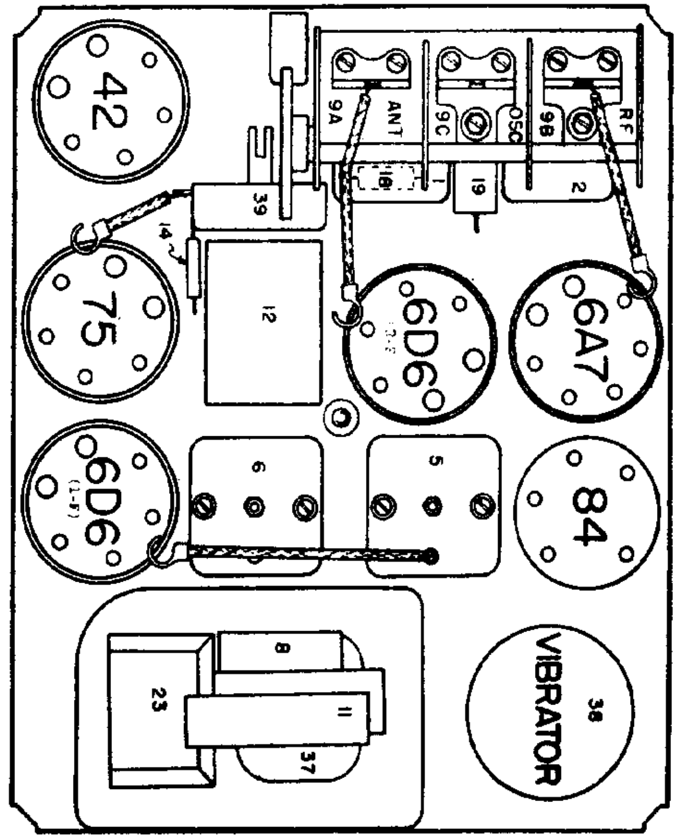


FIG. 2--PARTS LAYOUT--Top View

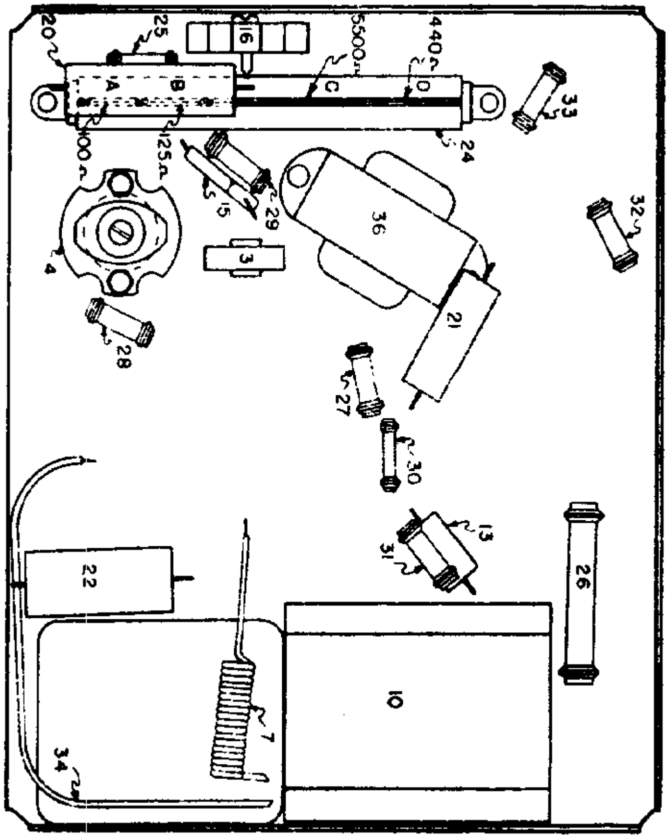


FIG. 3--PARTS LAYOUT--Bottom View

GENERAL: The Chevrolet Model 985100 is a six tube two unit receiver with an instrument panel tuning control, tone control and a "dome" type speaker. This receiver was designed specifically for 1936 Model Chevrolets.

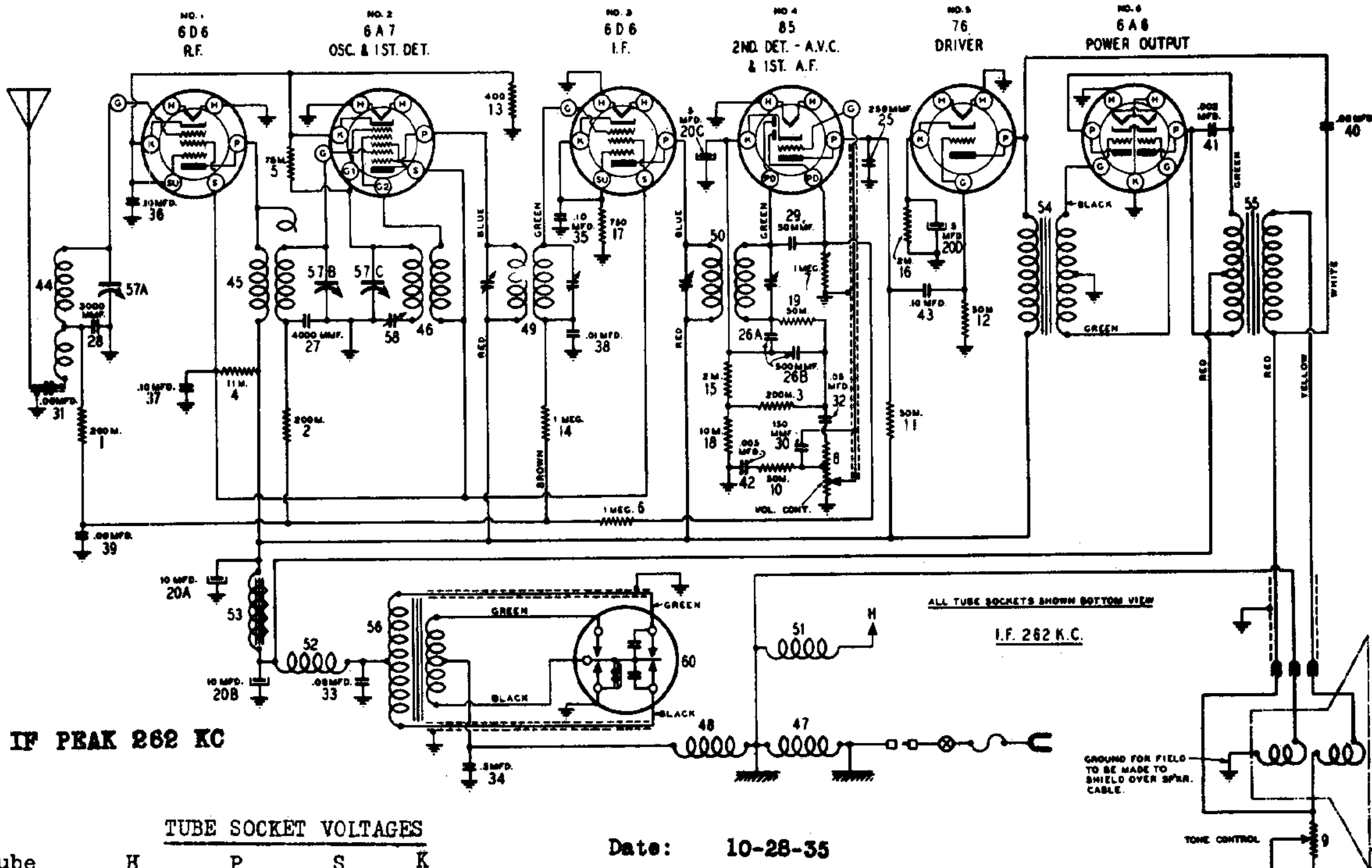
ANTENNA SYSTEM: The antenna system used with this receiver consists of an assembly of three rubberized metal strips mounted beneath each running board with special brackets. The strip assemblies are well insulated having no exposed metal connections thereby reducing the possibility of unsatisfactory reception due to leakage caused by mud, water, etc.

PART #1210760 FILTER ASSEMBLY

The part #1210760 Filter Assembly (Illus. #23) consists of an iron core choke, R-F choke and an .06 mfd. condenser sealed in a separate container. The component parts of this assembly are not serviceable and if any are found to be defective, it will be necessary to replace the complete unit.

MODEL 985300 Chevrolet
Schematic, Voltage

UNITED MOTORS SERVICE



IF PEAK 262 KC

Date: 10-28-35

TUBE SOCKET VOLTAGES

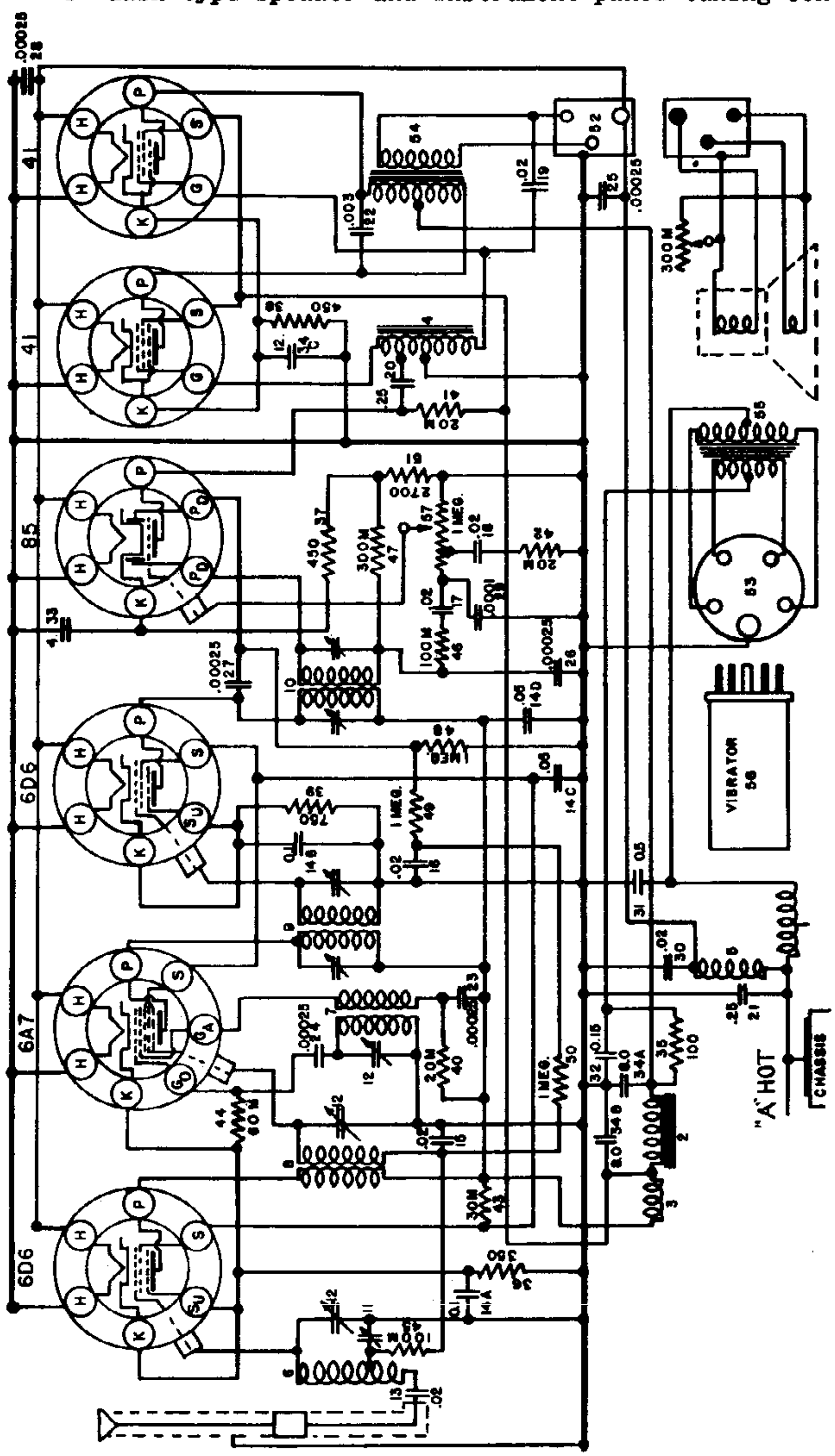
Tube	H	P	S	K
6D6 (R-F)	6	240	125	4.5
6A7	6	240	125	4.5
6D6 (I-F)	6	240	125	9.0
85	6	175	-	12.0
76	6	225	-	10.0
6A6	6	250	-	0

GENERAL: The Chevrolet Model 985300 is a six tube receiver with a full 8" Dash type speaker, instrument panel tuning control and tone control. This receiver was designed specifically for 1936 Model Chevrolets and for use on the under-car antenna system required.
Antenna System. The antenna system used with this receiver consists of an assembly of two rubberized metal strips for mounting below each running board with special brackets

MODEL 985400 Chevrolet
Schematic, Voltage

UNITED MOTORS SERVICE

GENERAL: The Chevrolet Model 985400 is a six tube receiver with a full 8" dash type speaker and instrument panel tuning control.



TUBE SOCKET VOLTAGES

Tube	Function	H	P	S	GA	GO	K
6D6	R-F Amp.	6	220	100	-	-	5.7
6A7	Osc.-Mod.	6	220	100	130	*	5.7
6B7	I-F Amp.	6	220	100	-	-	6.8
76	1st A-F	6	130	-	-	-	8.0
41	Output	6	210	220	-	-	18.0
41	Output	6	210	220	-	-	18.0

* Varies from -5 to -15 as tuning condenser is rotated.

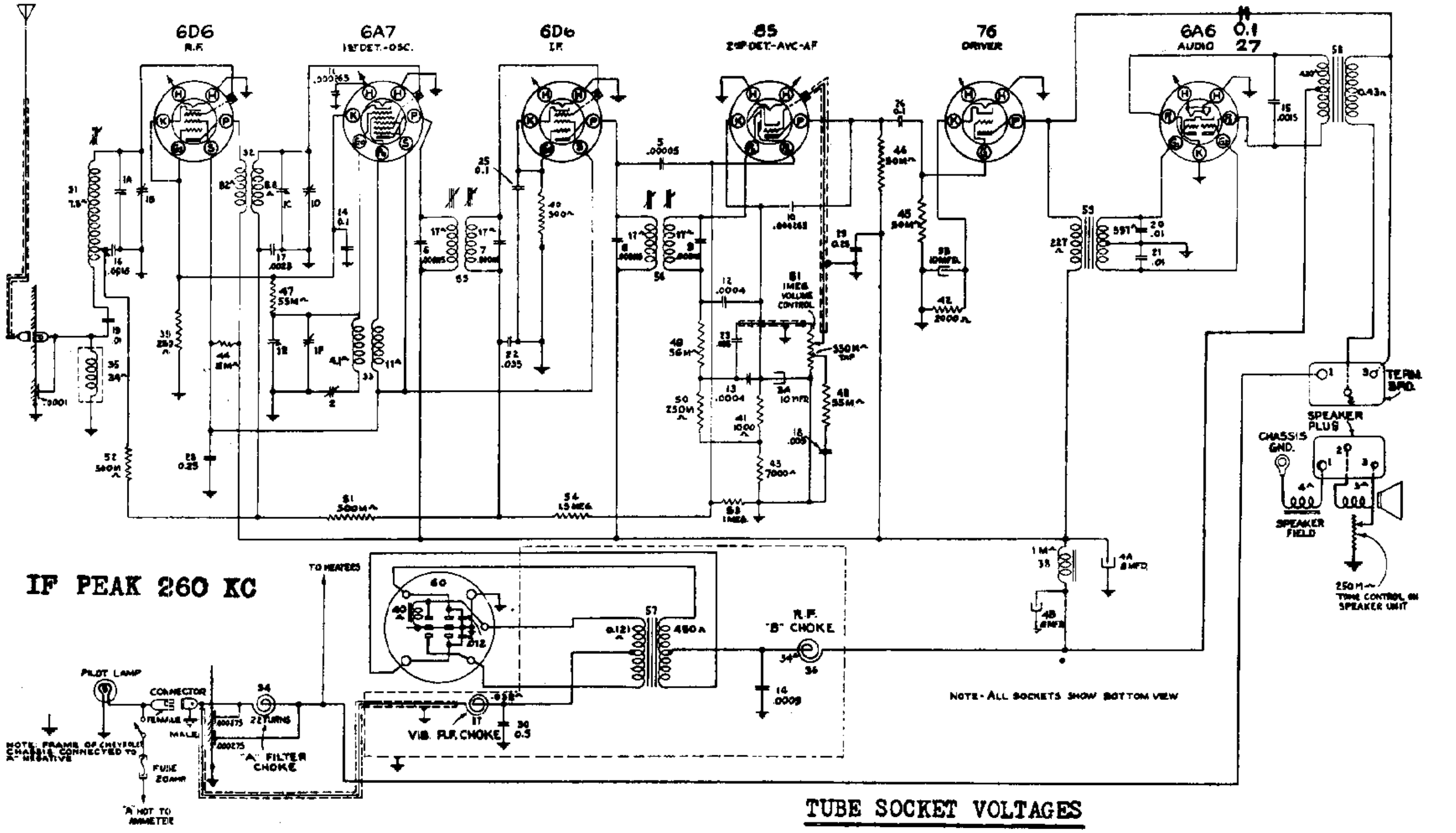
IF PEAK 262 KC

CHEVROLET MODEL 985400

Date: 2-20-36

MODEL 985301 Chevrolet
Schematic, Voltage

UNITED MOTORS SERVICE



IF PEAK 260 KC

TUBE SOCKET VOLTAGES

TUBE	FUNCTION	H	P	S	GS	PO	K
6D6	R-F Amp.	6	235	90	4	-	4
6A7	Det-Osc.	6	235	90	-	90	4
6D6	I-F Amp.	6	235	-	2.6	-	2.6
85	Det-1st A-F	6	145	-	-	-	13
76	Driver	6	230	-	-	-	11
6A6	Output	6	260	-	-	-	0

Above readings taken from tube socket contacts to ground with a 1000 ohm per volt meter, under "no signal" conditions. Volume control setting optional.
Ampere drain 7.8 amperes at 6 volts.

CHEVROLET MODEL 985301

Date: 5-11

MODEL 985301 Chevrolet
Socket, Trimmers, Note
Chassis

UNITED MOTORS SERVICE

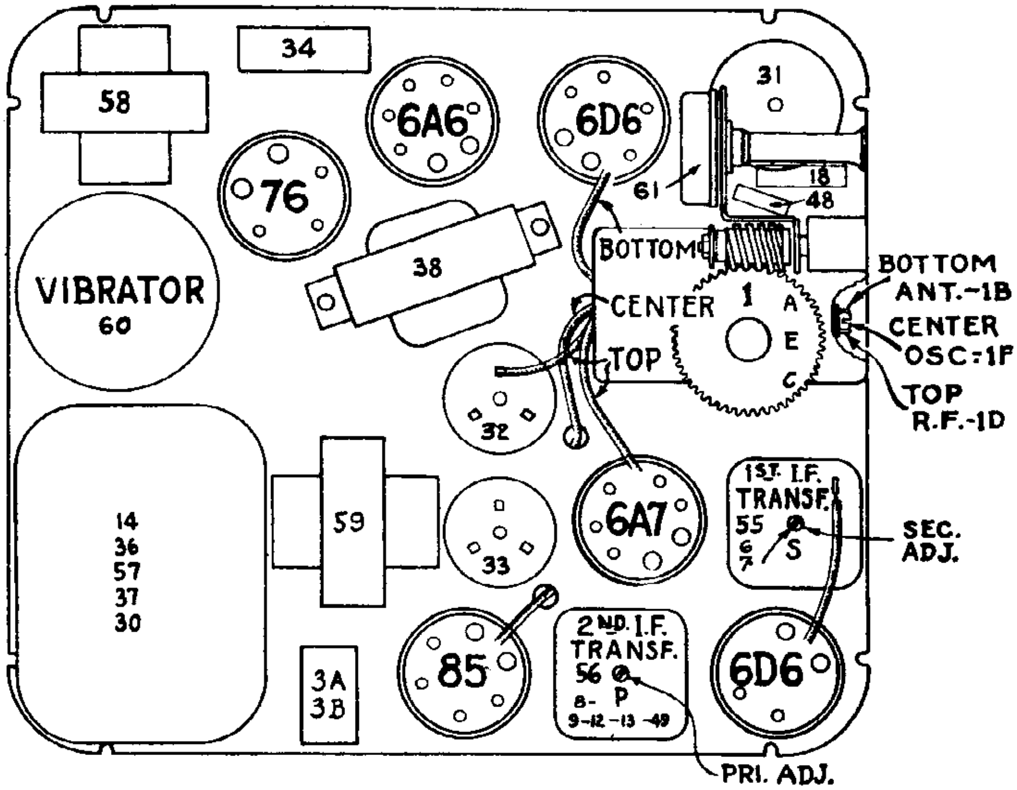


FIG. 2--PARTS LAYOUT--Top View

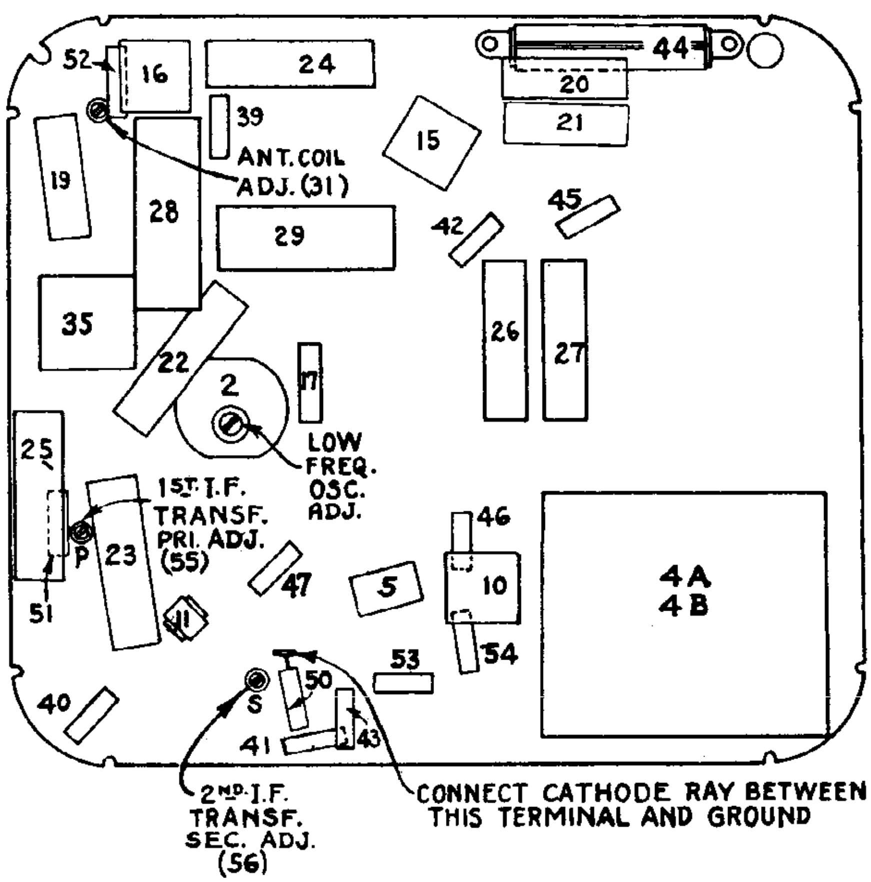


FIG. 3--PARTS LAYOUT--Bottom View

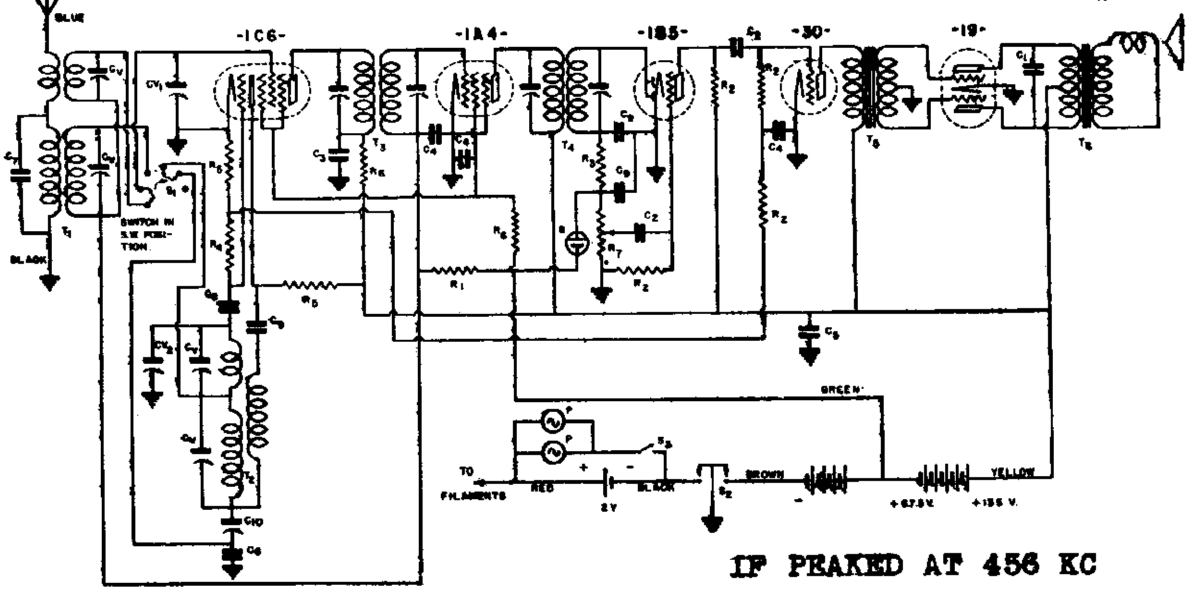
GENERAL: The Chevrolet Model 985301 is a six tube, two unit auto radio with a "dash" type speaker, instrument panel tuning control, bass compensation and tone control.

Antenna System: The antenna system used with this receiver, consists of an assembly of two rubberized metal strips for mounting beneath each running board with brackets provided.

MODEL B25-RS
Schematic, Socket
Trimmers, Alignment,
Parts

THE WALGREEN CO.

5 TUBE 2 VOLT BATTERY OPERATED SKIP-BAND RECEIVER



IF PEAKED AT 456 KC

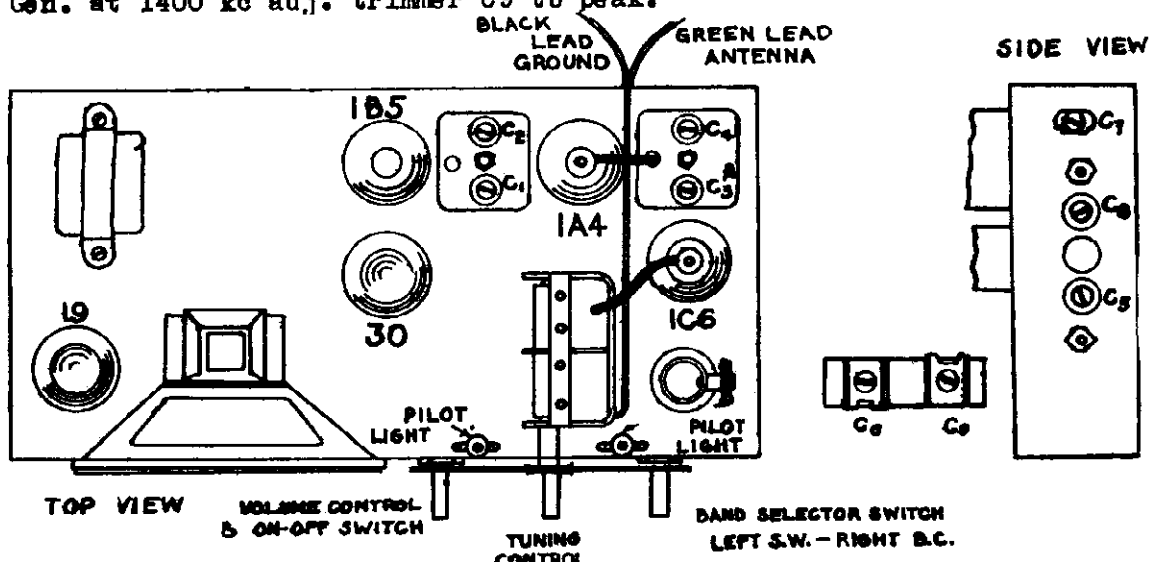
CONVENTIONAL ALIGNMENT - see Index

BROADCAST ALIGNMENT

Gen. at 456 kc mesh condenser and adj. trimmers C1, C2, C3 & C4 to peak.
Gen. and dial at 1400 kc, adj. trimmer C8 and then C6 to peak.
Gen. and dial at 600 kc, adj. trimmer C7, rocking cond., to peak.

SHORT WAVE ALIGNMENT

Gen. and dial at 14 MC adj. trimmer C5 to peak.
Check image at 14.9 Mc.
Gen. at 1400 kc adj. trimmer C9 to peak.



LEGEND	OUR PART NO	DESCRIPTION
C_1	218	.002 MFD 400V TUBULAR CONDENSER
C_2	211	.01 MFD 400 V TUBULAR CONDENSER
C_3	212	.05 MFD. 200 V TUBULAR CONDENSER
C_4	203	1 MFD. 200 V TUBULAR CONDENSER
C_5	204	.25 MFD. 200 V TUBULAR CONDENSER
C_6	410	.0018 MFD. MICA CONDENSER
C_7	412	50 MMFD MICA CONDENSER
C_8	400	100 MMFD. MICA CONDENSER
C_9	401	250 MMFD MICA CONDENSER
C_{10}	507	5 PLATE PADDING CONDENSER

LEGEND	PART NO.	DESCRIPTION
CV_{1-2}	612	2 GANG VARIABLE CONDENSER
CV	500	5-30 MMFD. TRIMMER CONDENSER
R_1	119	1 MEGOHM ½ WATT CARBON RESISTOR
R_2	117	½ MEGOHM ½ WATT CARBON RESISTOR
R_3	113	50,000 OHM ½ WATT CARBON RESISTOR
R_4	111	25,000 OHM ½ WATT CARBON RESISTOR
R_5	109	10,000 OHM ½ WATT CARBON RESISTOR
R_6	134	2,000 OHM ½ WATT CARBON RESISTOR
R_7	2009C	500,000 VOLUME CONTROL
P	2901	MAZDA #40 PILOT LIGHTS

LEGEND	OUR PART NO.	DESCRIPTION
T_1	1225	SKIP-BAND ANTENNA COIL
T_2	1412	SKIP-BAND OSCILLATOR COIL
T_3	1503	INPUT I.F TRANSFORMER
T_4	1507	DIODE I.F TRANSFORMER
T_5	1019	INTERSTAGE TRANSFORMER
T_6	IN B.I.S.	P.M. DYNAMIC SPEAKER TRANSFORMER
S_1	1920	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
S_3	—	PILOT LIGHT ECONOMIZER SWITCH.
B	3000	BIAS BUTTON

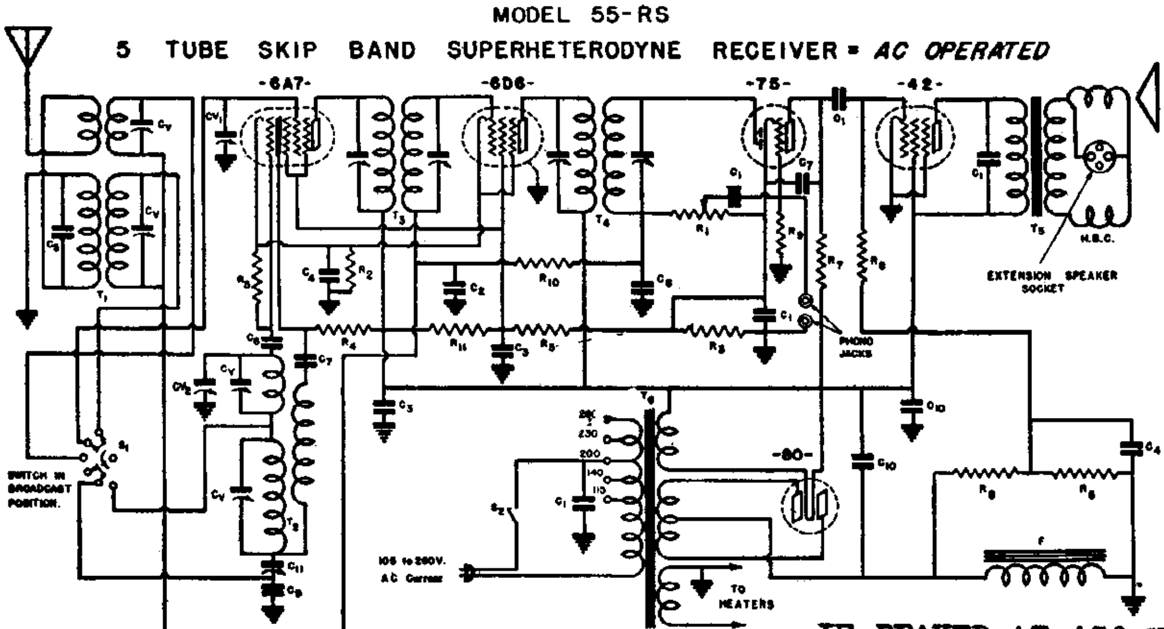
MODEL 55RS
Schematic, Socket

THE WALGREEN CO.

Trimmers, Alignment
Parts

MODEL 55-RS

5 TUBE SKIP BAND SUPERHETERODYNE RECEIVER - *AC OPERATED*



IF PEAKED AT 456 KC

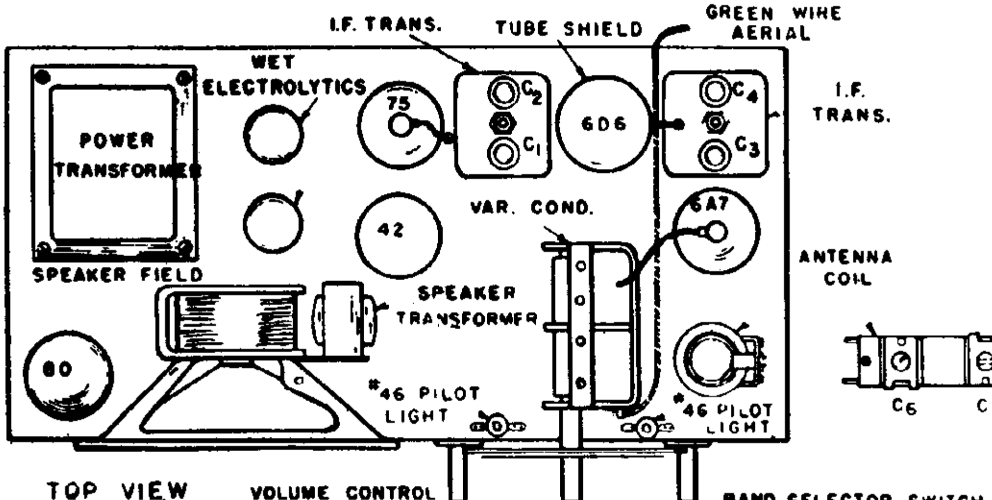
CONVENTIONAL ALIGNMENT - See special section

BROADCAST ALIGNMENT

Gen. at 456 kc mesh condenser & adj. trimmers C1,C2,C3 & C4 to peak.
Gen. & dial at 1400 kc, adj. trimmer C8 and then C6 to peak.
Gen. & dial at 600 kc, adj. trimmer C7, rock cond. and peak.

SHORT WAVE ALIGNMENT

Gen. & dial 14 MC adj. trimmer C5 to peak. Check image at 14.9 Mc.
Adj. trimmer C9 at 14 MC to peak



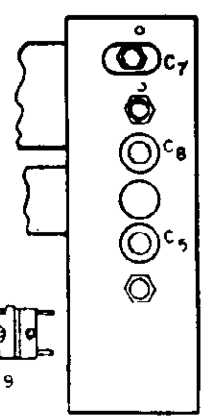
TOP VIEW

VOLUME CONTROL & ON-OFF SWITCH

TUNING CONTROL

BAND SELECTOR SWITCH
LEFT S.W., RIGHT B.C

SIDE VIEW



LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD.-400 V. TUBULAR CONDENSER
C_2	203	.1 MFD.-200 V. TUBULAR CONDENSER
C_3	210	.1 MFD.-400 V. TUBULAR CONDENSER
C_4	204	.25 MFD. 200 V. TUBULAR CONDENSER
C_5	412	.00008 MFD. MICA CONDENSER
C_6	400	.0001 MFD. MICA CONDENSER
C_7	401	.00025 MFD. MICA CONDENSER
C_8	402	.0005 MFD. MICA CONDENSER
C_9	410	.0018 MFD. MICA CONDENSER
C_{10}	317	8 MFD. 450 W.V. WET ELECTROLYTIC COND.
C_{11}	507	5 PLATE PADDING CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
$CV_{1,2}$	612-A	2 GANG VARIABLE CONDENSER
C_V	500	5-30 MMFD. TRIMMER CONDENSER
T_1	1225	B.C. & SKIP BAND ANTENNA COIL
T_2	1412	B.C. & SKIP BAND OSCILLATOR COIL
T_3	1503	INPUT I.F. TRANSFORMER
T_4	1507	DIODE I.F. TRANSFORMER
T_5	811	SPEAKER TRANSFORMER
T_6	1017	POWER TRANSFORMER
F	811	SPEAKER FIELD (1600 OHMS)
S_1	1920	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL.

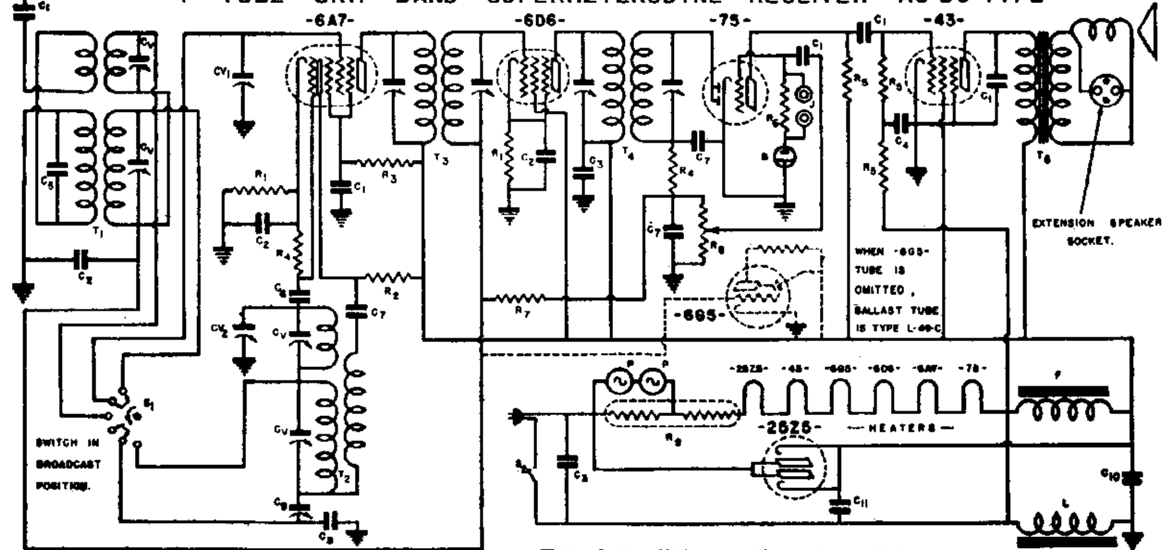
LEGEND	OUR PART NO.	DESCRIPTION
R_1	2005	500,000 OHM VOLUME CONTROL
R_2	103	250 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_3	139	400 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_4	109	10,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_5	113	50,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_6	115	100,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_7	116	250,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_8	145	400,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_9	117	500,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_{10}	119	1 MEGOHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_{11}	146	25,000 OHM 1 WATT CARBON RESIST.

Trimmers, Alignment Parts

MODEL 57RS
Schematic, Socket

THE WALGREEN CO.

7 TUBE SKIP BAND SUPERHETERODYNE RECEIVER = *AC-DC TYPE*



IF PEAKED AT 456 KC

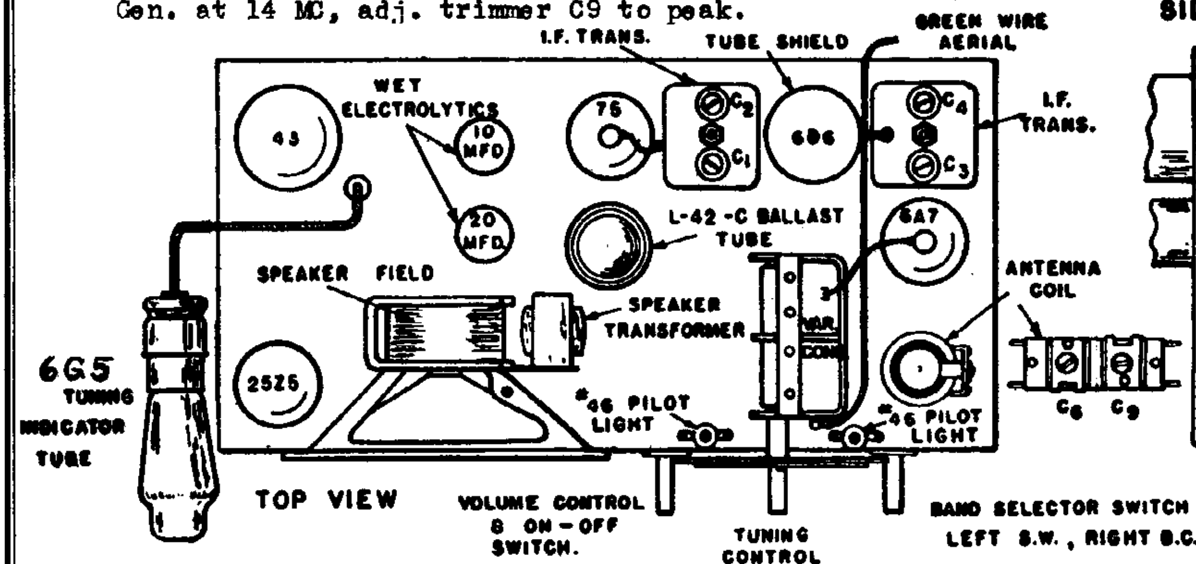
CONVENTIONAL ALIGNMENT - see Index

BROADCAST ALIGNMENT

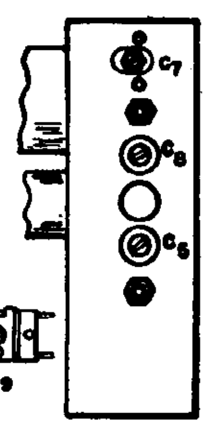
Gen. at 456 kc, mesh var. cond. and adj. trimmers C1,C2,C3 & C4 to peak.
Gen. and dial at 1400 kc, adj. trimmer C8 and then C6 to peak.
Gen. and dial at 600 kc, adj. C7 to peak.

SHORT WAVE ALIGNMENT

Gen. and dial at 14 MC, adj. trimmer: to peak.
Check image at 14.9 MC.
Gen. at 14 MC, adj. trimmer C9 to peak.



SIDE VIEW



LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD. 400V. TUBULAR CONDENSER
C_2	203	.1 MFD. 200V. TUBULAR CONDENSER
C_3	210	.1 MFD. 400V. TUBULAR CONDENSER
C_4	204	.25 MFD 200V. TUBULAR CONDENSER
C_5	412	.00005 MFD. MICA CONDENSER
C_6	400	.0001 MFD. MICA CONDENSER
C_7	401	.00025 MFD. MICA CONDENSER
C_8	410	.0018 MFD. MICA CONDENSER
C_9	507	5 PLATE PADDING CONDENSER
C_{10}	314	10 MFD 150 W.V. WET ELECTROLYTIC COND.
C_{11}	311	20 MFD. 150 W.V. WET ELECTROLYTIC COND.

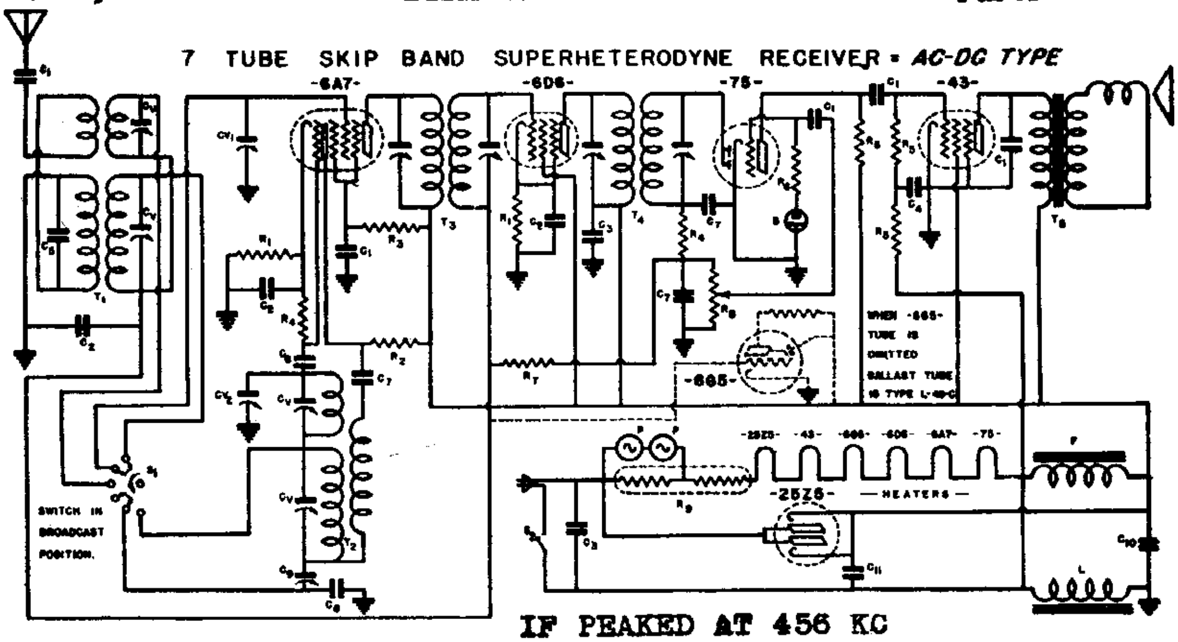
LEGEND	OUR PART NO.	DESCRIPTION
CV_{1-2}	612-A	2 GANG VARIABLE CONDENSER
C_V	500	5-30 MMFD. TRIMMER CONDENSER
R_1	103	250 OHM 1/2 WATT CARBON RESISTOR
R_2	108	5000 OHM 1/2 WATT CARBON RESISTOR
R_3	111	25,000 OHM 1/2 WATT CARBON RESISTOR
R_4	113	50,000 OHM 1/2 WATT CARBON RESISTOR
R_5	116	250,000 OHM 1/2 WATT CARBON RESISTOR
R_6	117	500,000 OHM 1/2 WATT CARBON RESISTOR
R_7	119	1 MEGOHM 1/2 WATT CARBON RESISTOR
R_8	2009	500,000 OHM VOLUME CONTROL
R_9	2906	L-42-C BALLAST TUBE (with 6G5 tube)
R_9	2905	L-49-C BALLAST TUBE (without 6G5 tube)

LEGEND	OUR PART NO.	DESCRIPTION
T_1	1225	ANTENNA COIL
T_2	1412	OSCILLATOR COIL
T_3	1507	OUTPUT I.F. TRANSFORMER
T_4	1503	INPUT I.F. TRANSFORMER
T_5	15/600	SPEAKER TRANSFORMER
L	1100	FILTER CHOKE
S_1	1920	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
P	2902	MAZDA NO. 46 PILOT LIGHT
B	3000	BIAS CELL
F	15/600	SPEAKER FIELD
J	2230	PHONO JACK

MODEL 370 | THE WALGREEN CO. | Trimmers, Alignment
Schematic, Socket | | Parts

THE WALGREEN CO.

7 TUBE SKIP BAND SUPERHETERODYNE RECEIVER - *AC-DC TYPE*



IF PEAKED AT 456 KC

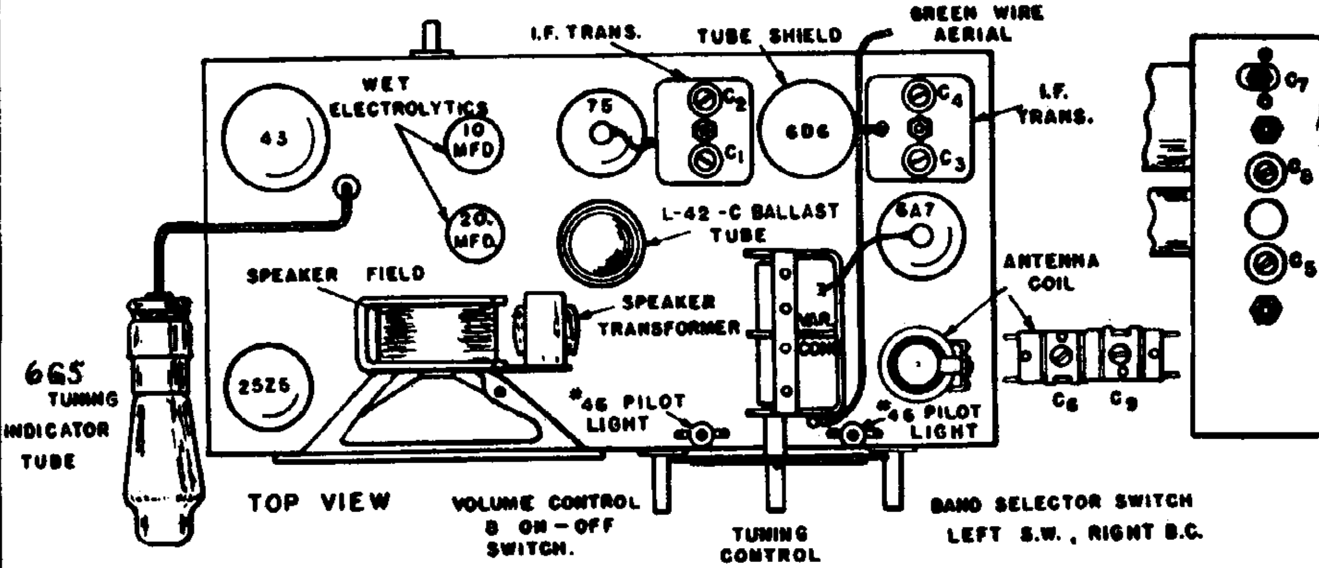
CONVENTIONAL ALIGNMENT - see special section

BROADCAST ALIGNMENT

(1) Adj. trimmers C1,C2,C3 & C4 for max. o.p. at 456 KC. (2) Gen. & dial at 1400 kC adj. trimmers C8 and then C6 to peak. (3) Gen. & dial at 600 kc adj. trimmer C7 to peak.

SHORT WAVE ALIGNMENT

(1) Gen. & dial at 14 MC, adj. trimmer C5 to peak.
(2) Check image at 14.9 MC. (3) Pad Osc. at 14 MC peak by trimmer C9.



LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD. 400V. TUBULAR CONDENSER
C_2	203	.1 MFD. 200V TUBULAR CONDENSER
C_3	210	.1 MFD. 400V. TUBULAR CONDENSER
C_4	204	.25 MFD. 200 V. TUBULAR CONDENSER
C_5	412	.00005 MFD. MICA CONDENSER
C_6	400	.0001 MFD. MICA CONDENSER
C_7	401	.00025 MFD. MICA CONDENSER
C_8	410	.0018 MFD. MICA CONDENSER
C_9	507	3 PLATE PADDING CONDENSER
C_{10}	314	10 MFD. 150 W.V. WET ELECTROLYTIC COND.
C_{11}	311	20 MFD. 150 W.V. WET ELECTROLYTIC COND.

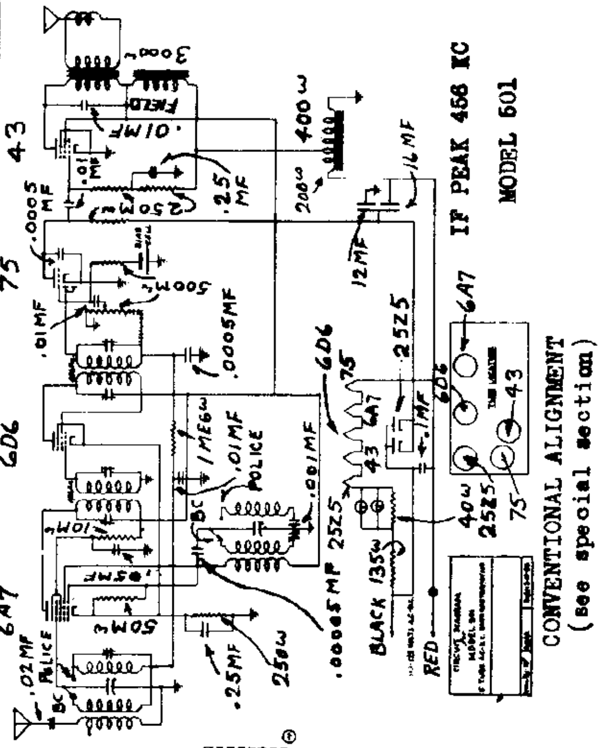
LEGEND	OUR PART NO.	DESCRIPTION
CV_{1-2}	612-A	2 GANG VARIABLE CONDENSER
C_V	500	5-30 MMFD. TRIMMER CONDENSER
R_1	103	250 OHM ½ WATT CARBON RESISTOR
R_2	108	5000 OHM ½ WATT CARBON RESISTOR
R_3	111	25,000 OHM ½ WATT CARBON RESISTOR
R_4	113	50,000 OHM ½ WATT CARBON RESISTOR
R_5	116	250,000 OHM ½ WATT CARBON RESISTOR
R_6	117	500,000 OHM ½ WATT CARBON RESISTOR
R_7	119	1 MEGOHM ½ WATT CARBON RESISTOR
R_8	2006	500,000 OHM VOLUME CONTROL
R_9	2906	L-42-C BALLAST TUBE (with 6G5 tube)
R_9	2905	L-49-C BALLAST TUBE (without 6G5 tube)

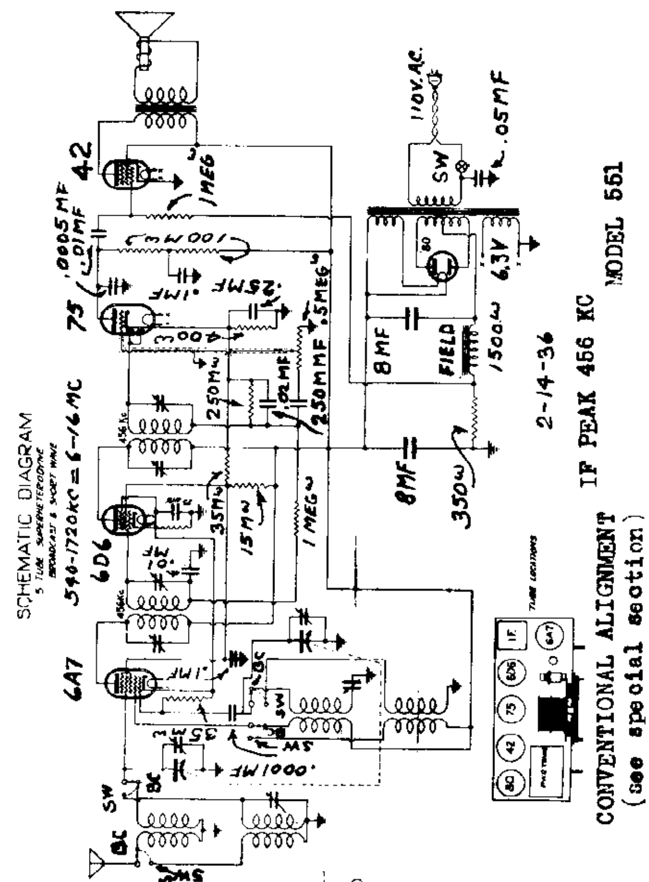
LEGEND	OUR PART NO.	DESCRIPTION
T_1	1226	ANTENNA COIL
T_2	1412	OSCILLATOR COIL
T_3	1507	OUTPUT I.F. TRANSFORMER
T_4	1503	INPUT I.F. TRANSFORMER
T_5	800	SPEAKER TRANSFORMER
L	1100	FILTER CHOKE
S_1	1920	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
P	2902	MAZDA NO. 46 PILOT LIGHT
B	3000	BIAS CELL
F	800	SPEAKER FIELD

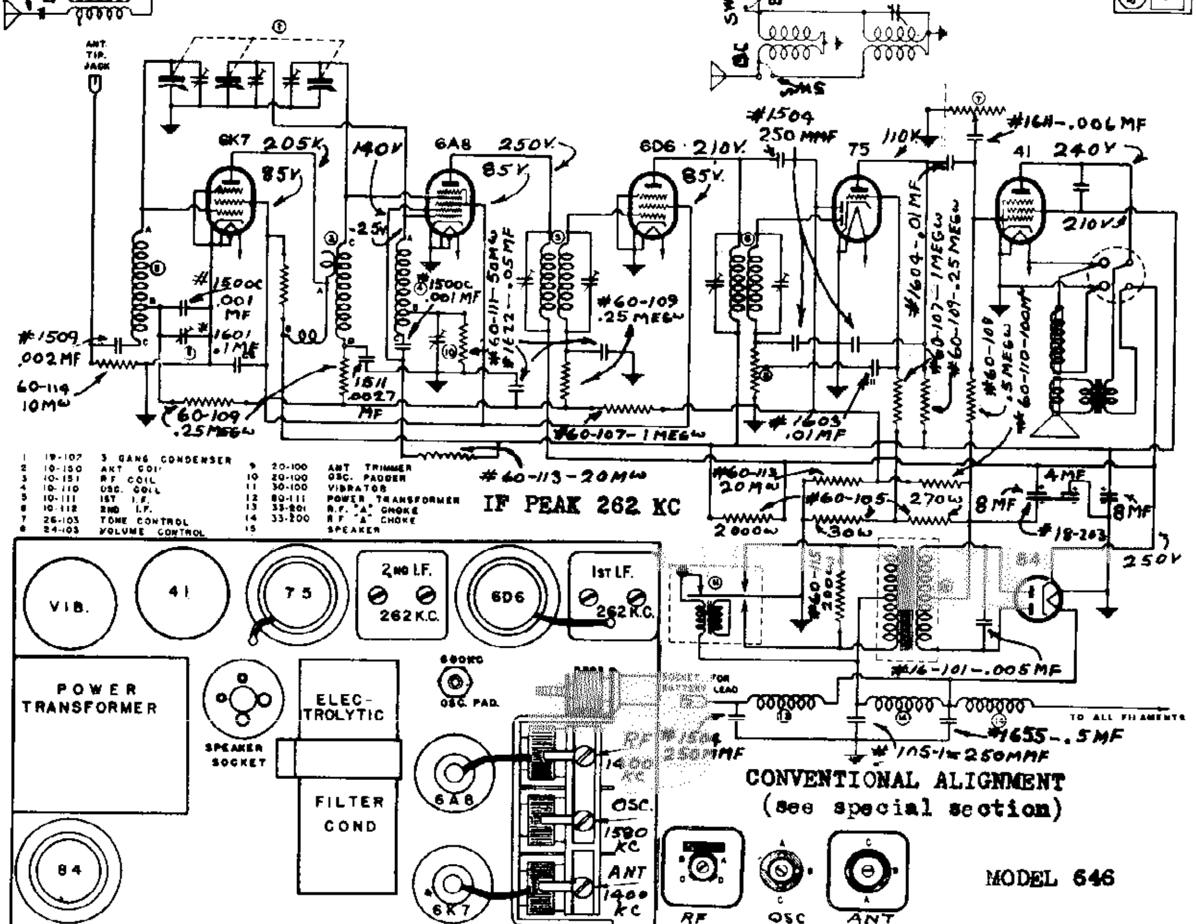
Schematics, Socket Trimmers, Alignment

WARWICK MFG. CO.

MODEL 501
MODEL 551
MODEL 646 Aut







1	19-107	3 GANG CONDENSER	9	20-100	ANT TRIMMER
2	10-150	ANT COIL	10	20-100	OSC. PADDER
3	10-151	R.F. COIL	11	30-100	VIBRATOR
4	10-110	OSC. COIL	12	80-111	POWER TRANSFORMER
5	10-111	1ST I.F.	13	33-201	R.F. "A" CHOKE
6	10-112	2ND I.F.	14	33-200	R.F. "A" CHOKE
7	26-103	TONE CONTROL	15		SPEAKER
8	24-103	VOLUME CONTROL			

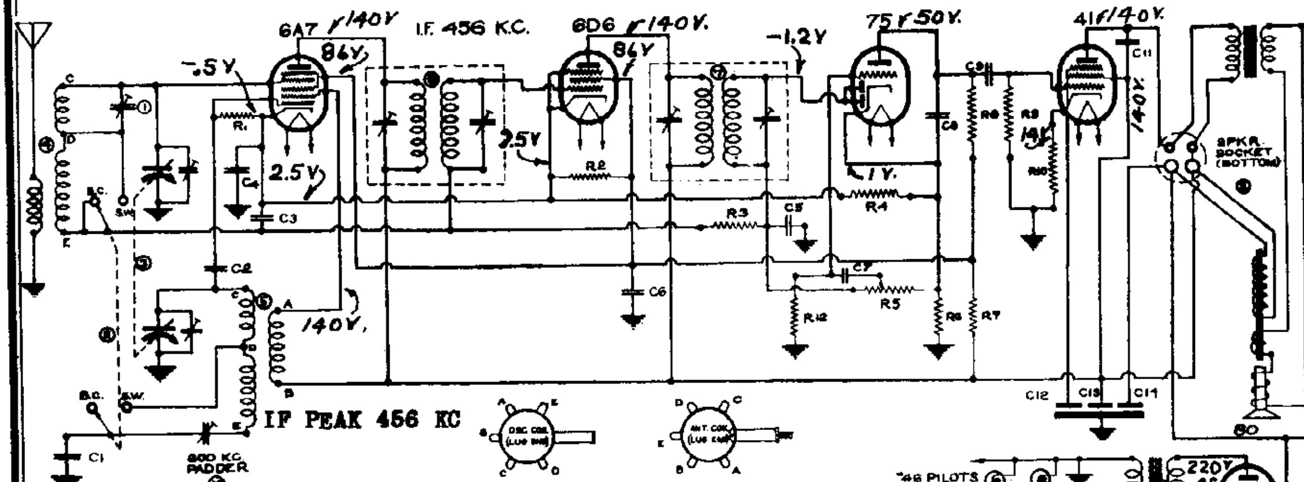
IF PEAK 262 KC

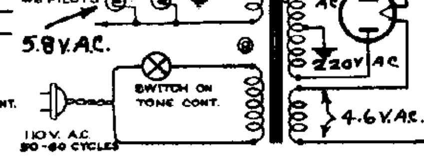
CONVENTIONAL ALIGNMENT
(see special section)

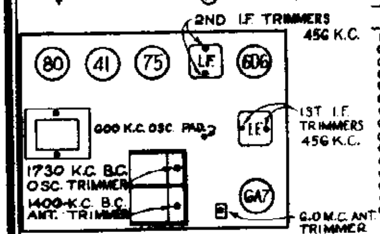
MODEL 646

MODEL 518
MODEL 536
Schematic, Voltage
Socket, Trimmers
Alignment, Parts

WARWICK MFG. CO.





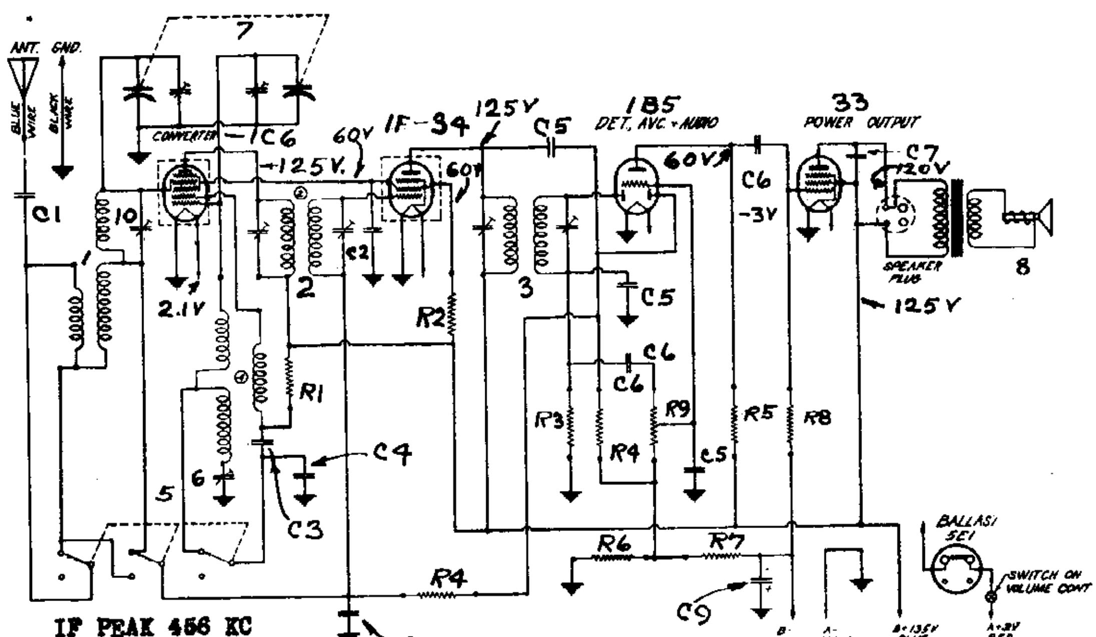


CIRCUIT DATA

PART NO.		DESCRIPTION
C1	15-100	.00157 MFD.
C2	1501	.0001 "
C3	1682	.05 " 200V.
C4	1614	.25 " "
C5	1504	.00025 "
C6	1607	.05 " 400V.
C7	1603	.01 "
C8	1504	.00025 "
C9	1603	.01 "
C10	1651	.004 " 600V
C11	1651	.004 " 600V.
C12	18-102	4 MFD. 25V. YELLOW
C13	18-102	4 " 250V. GREEN
C14	18-102	8 " 250V. RED
1	2084	S.W. ANT. TRIMMER
2	6922	WAVE BAND S.W.
3	19-107	GANG CONDENSER
4	10-125	ANT. COIL

PART NO		DESCRIPTION
R1	6028	40,000 OHMS 1/3 W
R2	6117	25,000 OHMS 1/2 W
R3	6018	500,000 " 1/3 W
R4	6011	100 " "
R5	24-102	500,000 " VOL. CONT.
R6	6009	50 " 1/3 W
R7	6105	10,000 " 1/2 W
R8	6066	200,000 " 1/2 W
R9	6018	500,000 " "
R10	6052	800 " "
R12	6017	1.0 MEG " "
5	10-147	OSC. COIL
6	1123	FIRST I.F. COIL
7	1124	SECOND I.F. "
8		SPEAKER
9	80-104	POWER TRANSFORMER
10	20-100	PADDER

MODEL 518
CONVENTIONAL ALIGNMENT
(see special section)

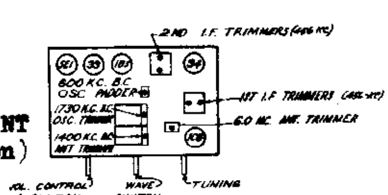


CIRCUIT DATA

PART No.		DESCRIPTION
C1	1628	.01 MFD 200V
C2	1601	.1 400V
C3	1500	.001 " MICA
C4	1509 U	.002 " ± 5% MICA
C5	1504	.00025 MFD. "
C6	1604	.01 MFD 600V
C7	1611	.006 " 600V
C8	1600	.1 " 200V
C9	16-100	10 " 25V ELEC.
R1	6020	15000 OHMS 1/5 W
R2	6027	25000 "
R3	6018	500,000 "
R4	6017	1.0 MEG "
R5	6024	250,000 "
R6	6011	100 "
R7	6052	800 "
R8	6016	300,000 "
R9	24-108	500,000 " VOL. CONT.

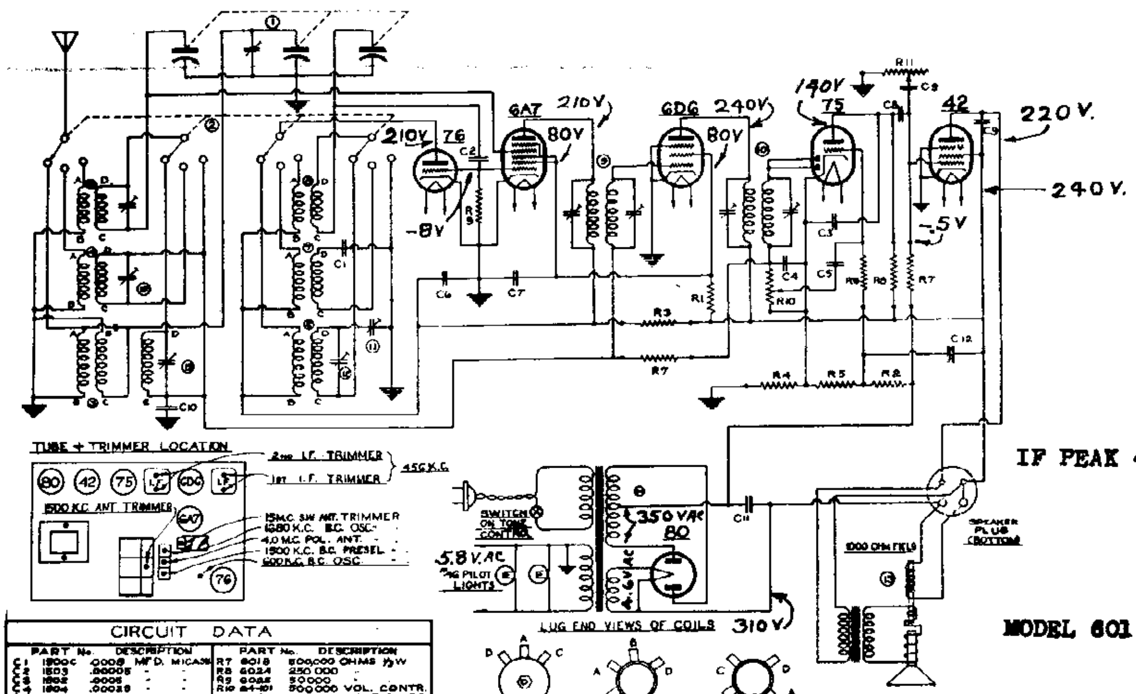
PART No.		DESCRIPTION
1-	10-129	B.C. + S.W. ANT. COIL
2-	1156	1st I.F. TRANSFORMER
3-	1157	2nd I.F. "
4-	10-124	B.C. + S.W. OSC. COIL
5-	80-101	WAVE BAND SWITCH
6-	20-100	OSC. PADDING COND.
7-	19-107	GANG VAR. COND.
8-	79-113	SPEAKER.
10-	2084	S.W. ANT. TRIMMER

MODEL 536
CONVENTIONAL ALIGNMENT
(see special section)



WARWICK MFG. CO.

MODEL 601
MODEL 613
Schematics, Voltage
Socket, Trimmers
Alignment, Parts

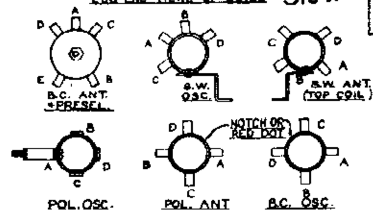


IF PEAK 456 KC

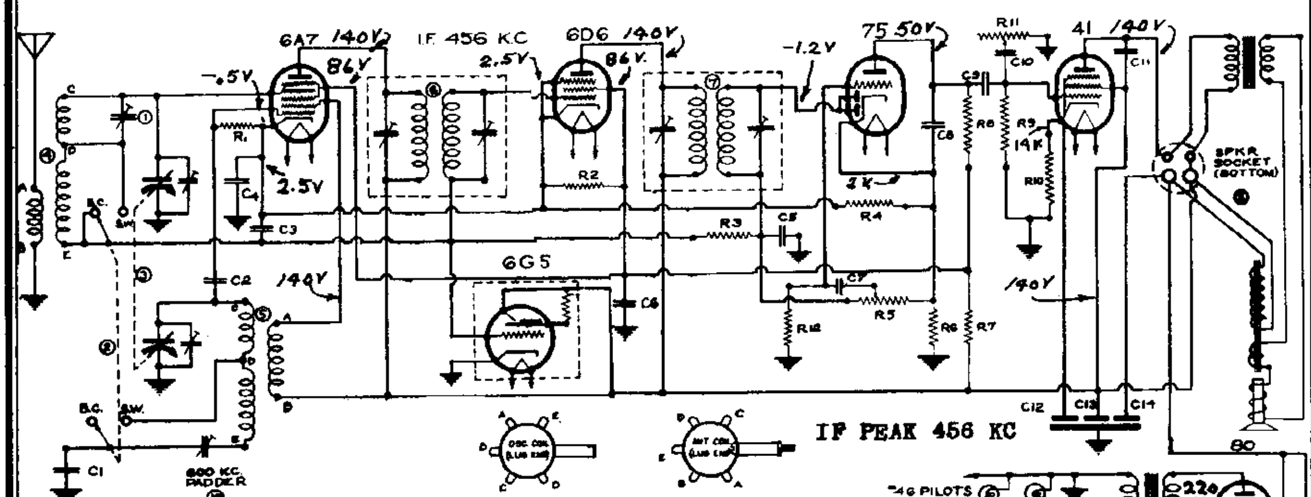
MODEL 601

CIRCUIT DATA

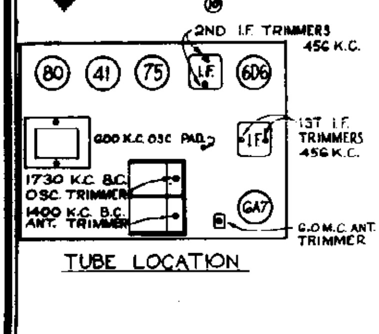
PART No.		DESCRIPTION	PART No.		DESCRIPTION
C1	1500C	.0008 MFD. MICA	R7	6018	500,000 OHMS ½W
C2	1503	.00005 " "	R8	6024	250 000 "
C3	1502	.0005 " "	R9	6025	50000 "
C4	1504	.00025 " "	R10	24-101	500 000 VOL. CONTR.
C5	1605	.02 " 400 v	R11	26-101	500 000 TONE CONTR.
C6	1602	.1 " 200 v	1	19-106	GANG
C7	1901	.1 " 400 v	2	69-103	SWITCH
C8	1648	.05 " 600 v	3	10-137	B.C. ANT+PRESELECTOR
C9	1651	.004 " " v	4	10-135	POL. " COIL
C10	1622	.05 " 200 v	5	10-132	S.W. " "
C11	18-802	10.0 ELECTROLYTIC	6	10-134	B.C. OSC. "
C12	18-801	12.0 "	7	10-139	POL. " "
			8	10-133	S.W. " "
R1	6211	15000 OHMS 1W.	9	1123	1ST I.F.
R2	60-100	200 " 1W.5%	10	1124	2ND I.F.
R3	6115	1000 " ½W.	11	20-100	B.C. OSC. PADDER
R4	60-103	30 " " 5%	12	20-101	TRIMMER GANG
R5	60-104	20 " " "	13		SPEAKER
R6	6020	2.0MEG. " ⅓W	14	80-105	POWER TRANSF.



CONVENTIONAL ALIGNMENT
(see special section)



IF PEAK 456 KC



TUBE LOCATION

CIRCUIT DATA

PART No.		DESCRIPTION	PART No.		DESCRIPTION
C1	15-100	.00157 MFD.	R1	6028	40,000 OHMS ⅓W
C2	1501	.0001 "	R2	6117	25,000 " ½W
C3	1622	.05 " 200v.	R3	6018	500,000 " ⅓W
C4	1614	.25 " "	R4	6011	100 " "
C5	1504	.00025 "	R5	24-101	500,000 " VOL. CONT
C6	1607	.05 " 400v.	R6	6009	50 " ⅓W
C7	1603	.01 "	R7	6105	10,000 " ½W
C8	1504	.00025 "	R8	6056	200,000 " ⅓W
C9	1603	.01 "	R9	6018	500,000 " "
C10	1651	.004 " 600v.	R10	6052	800 " "
C11	1651	.004 " 600v.	R11	26-101	500,000 " TONE CONT
C12	18-102	4 MFD 25v YELLOW	R12	6017	1.0 MEG. " "
C13	18-102	4 " 250v GREEN	5	10-147	OSC. COIL
C14	18-102	8 " 250v RED	6	1123	1ST I.F.
1	2054	S.W. ANT. TRIMMER	7	1124	2ND I.F.
2	6922	WAVE BAND SW.	8	78-204	6 INCH SPEAKER
3	19-107	GANG COND.	9	80-104	POWER TRANSFORMER
4	10-125	ANT. COIL	10	20-100	PADDER
			8	78-206	8 INCH SPEAKER

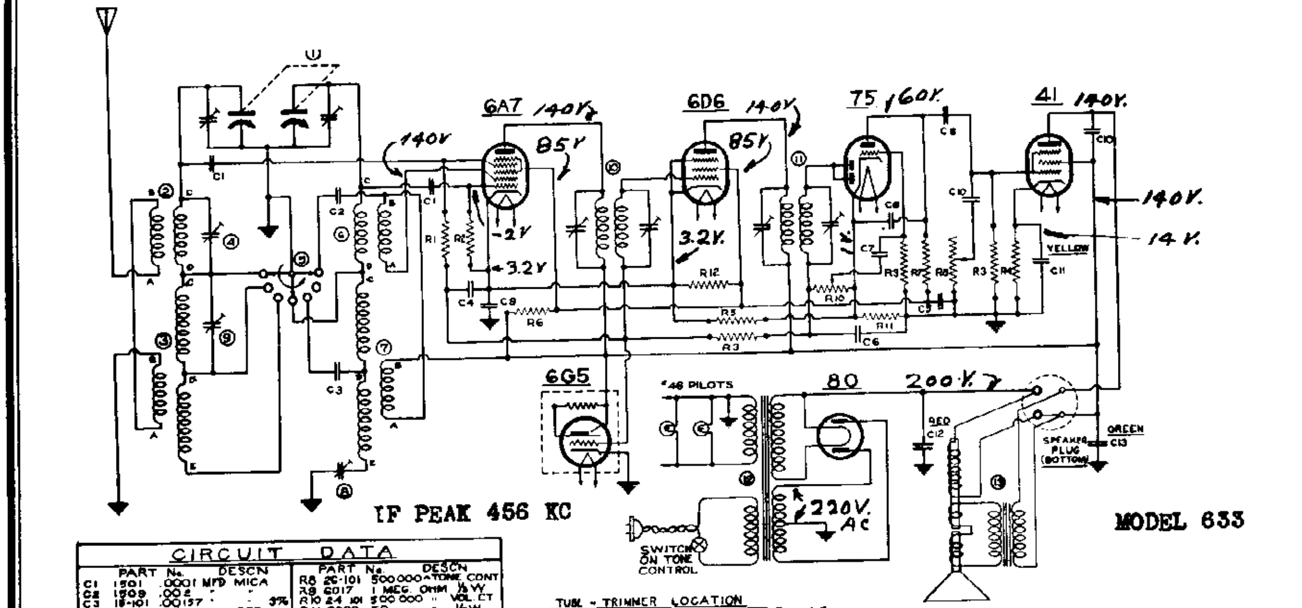
MODEL 613

CONVENTIONAL ALIGNMENT
(see special section)

MODEL 633
MODEL 651
Schematics, Voltage

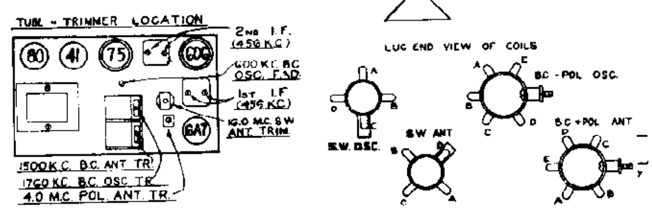
WARWICK MFG. CO.

Socket, Trimmers
Alignment, Parts

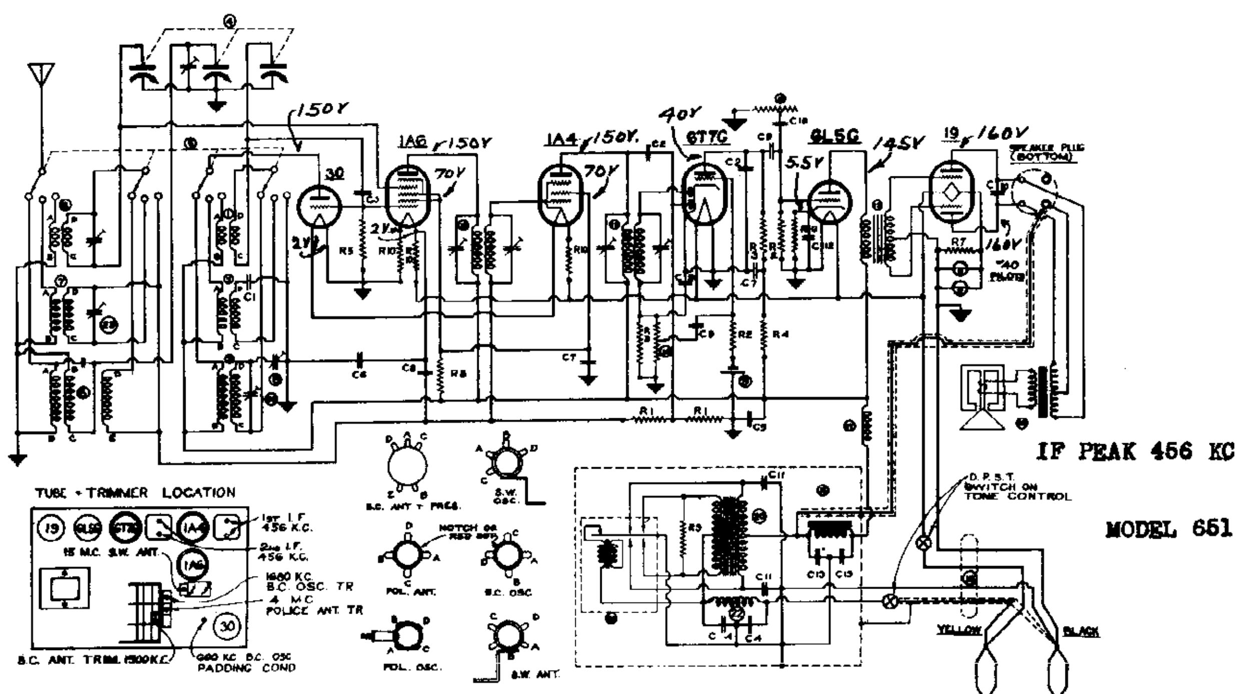


CIRCUIT DATA

PART	No.	DESCN		PART	No.	DESCN
C1	1501	.0001 MFD MICA		R8	26-101	500000 TONE CONT
C2	1509	.002 " "		R9	6017	1 MEG. OHM ½W
C3	18-101	.00157 " " 3%		R10	24-101	500 000 " VOL. CT
C4	1622	.05 " 200v		R11	6009	50 " ½W
C5	1607	.05 " 400v		R12	6117	25,000 " ½W
C6	1504	.00025 " MICA				
C7	1603	.01 " 400v		1	19-107	GANG COND.
C8	1603	.01 " 400v		2	10-126	S.W. ANT COIL
C9	1614	.25 " 200v		3	10-129	POL.+B.C. ANT. "
C10	1651	.004 " 600v		4	2052	S.W ANT TRIMMER
C11	18-102	4 MFD.-25v ELETC		5	69-102	WAVE SWITCH
C12	18-102	8 " 50v "		6	10-127	S.W OSC. COIL
C13	18-102	4 " 250v "		7	10-128	POL.+B.C. OSC COIL
				8	20-100	600 KC B.C. OSC PAD
R1	6020	2 MEG. OHM ⅓W		9	2054	POL. ANT TRIMMER
R2	6028	40,000 " "		10	1123	1st I.F.
R3	6018	500,000 " "		11	1124	2nd I.F.
R4	6052	800 " "		12	80-104	POWER TRANSFMR
R5	6011	100 " "		13		SPEAKER
R6	6105	10,000 " ½W				
R7	6056	200,000 " ⅓W				



CONVENTIONAL ALIGNMENT
(see special section)



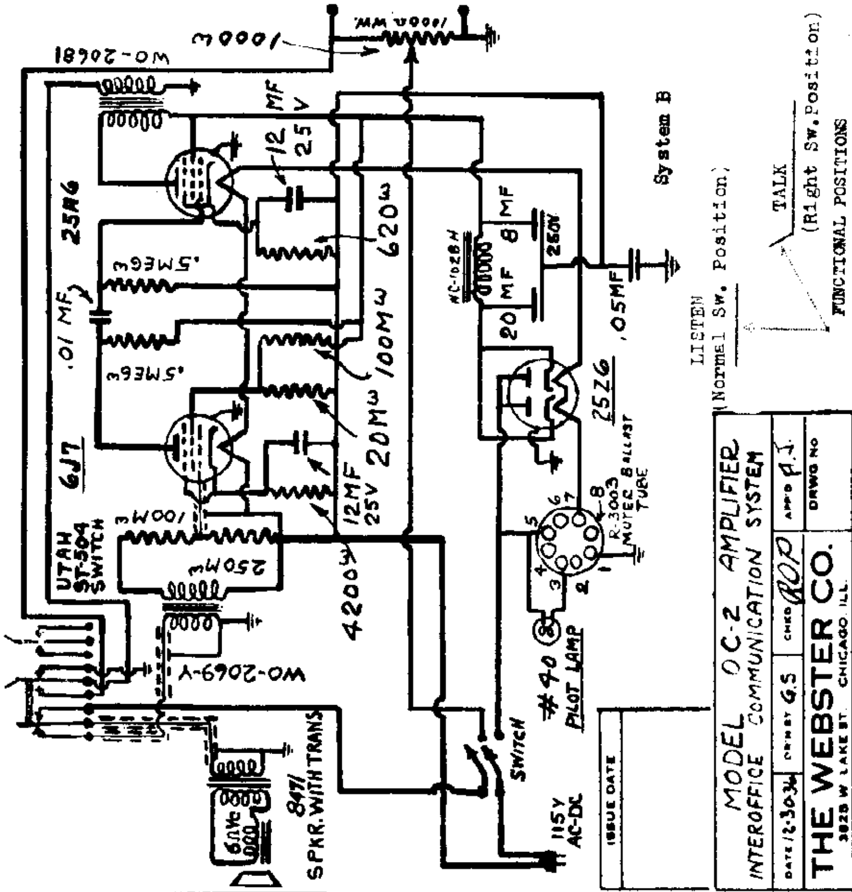
PART NO.		DESCRIPTION			PART NO.		DESCRIPTION		
C1	1500C	.001	MFD.	MICA 5%	R1	6017	1 MEG	OHM	1/3 W.
C2	1504	.00025	"	"	R2	6016	.5	"	"
C3	1510	.000025	"	"	R3	6024	.25 "	"	"
C4	[illegible]	.5	"	150v	R4	[illegible]	100,000	"	"
C5	[illegible]	.25	"	400v	R5	[illegible]	50,000	"	"
C6	1814	.25	"	200v	R6	[illegible]	1500	"	"
C7	1601	.1	"	400v	R7	6007	200	"	"
C8	1600	.1	"	200V	R8	6117	25,000	"	1/2 W.
C9	1603	.01	"	400V	R9	6101	100	"	"
C10	1611	.006	"	600V	R10	60-102	33 1/3	"	WIRE WOUND
C11	1604	.01	"	600V					
C12	18-100	10 M.F.D. 25V.	ELECTROLYTIC						
C13	1846	8 " 150V	"						

PART NO.		DESCRIPTION	PART NO.		DESCRIPTION
1	10-135	S.W. OSC. COIL	14	24-101	VOLUME CONTROL
2	10-130	POLICE OSC. COIL	15	20-100	B.C. OSC. PADDER
3	10-134	B.C. OSC COIL	16		SPEAKER
4	19-106	3 GANG CONDENSER	17	3303	R.F. "B" CHOKE
5	[illegible]	WAVE SWITCH	18	3307	FILTER
6	10-136	S.W. ANT. COIL	19	23-105	BATTERY CABLE
7	10-138	POLICE ANT. COIL	20	9041	POWER TRANFORMER
8	10-137	B.C. ANT. & PRESEL. C'L	21	3407	VIBRATOR
9	4000	BIAS CELL	22	3313	R.F. "A" CHOKE
10	1133	1ST. I.F. TRANSFORMER	23	25-102	TRIMMER STRIP
11	1134	2ND. I.F. TRANSFORMER			
12	[illegible]	TONE CONTROL			
13	[illegible]	PUSH-PULL AUDIO TRANS.			

CONVENTIONAL ALIGNMENT
(see special section)

WEBSTER CO.

MODEL B, Commun. Sys.
MODEL OC-2 Amplifier
MODEL OC-2A Amplifier
Schematics, Notes



System B

LISTEN
(Normal Sw. Position)

TALK
(Right Sw. Position)

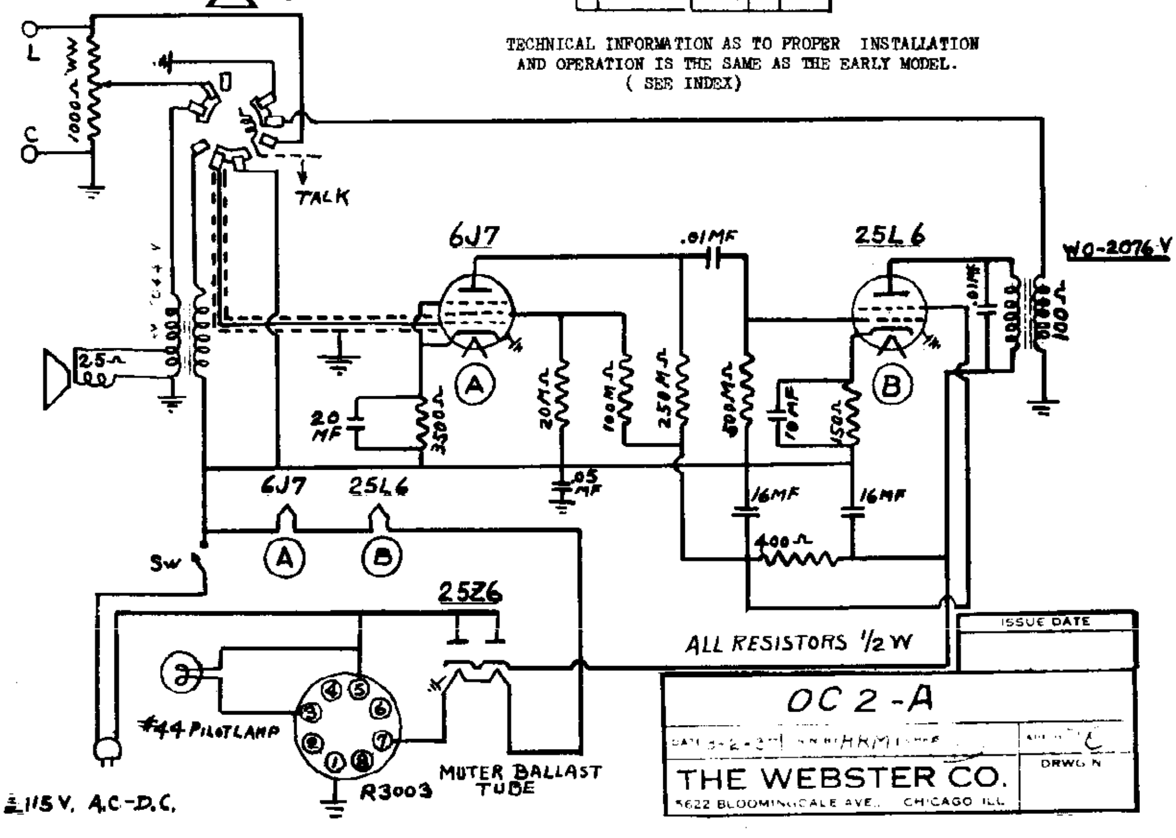
FUNCTIONAL POSITIONS
OF OPERATING SWITCH

This system is built for operation on 115 Volt D.C., and 115 Volt A.C., 25,40,50 and 60 cycles. IF THE SYSTEM FAILS TO OPERATE WHEN CONNECTED TO D.C. LINE REVERSE THE POWER CORD PLUG.

INSTALLATION Each cabinet contains its own amplifier, and its power cord should be inserted into the nearest light receptacle. The two wires of a two conductor unshielded cord should be connected to lugs at the rear of chassis. The right hand terminal is grounded. The other terminal (ungrounded) is indicated by a red dot. Webster two conductor cable is recommended but whatever cable is used should be color coded so that the same wire is connected to ground on both of the amplifiers. A volume control is mounted on the rear side of the chassis controlling the volume of the station. This control is set for the desired volume.

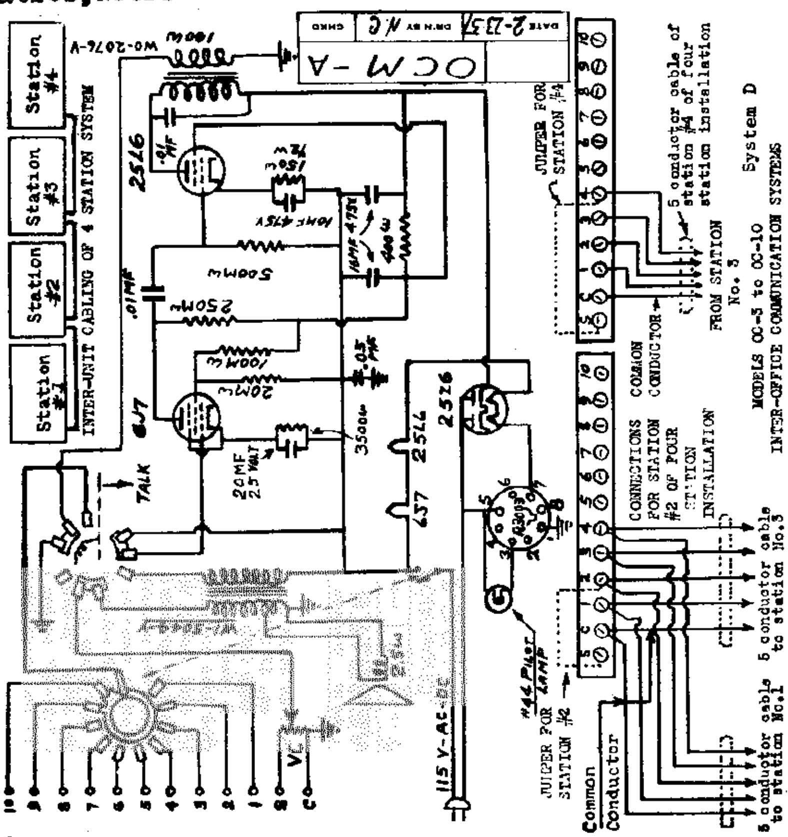
OPERATION- After "ON-OFF" switch is turned on, in 15 seconds station is operative. The "OFF-ON" switch controls the operation of each unit. The only other control is the operation switch, wich, in its normal position, is for listening. Operator turns switch to right hand position to talk, must be held in position while talking, when released it returns to listening position.

TECHNICAL INFORMATION AS TO PROPER INSTALLATION AND OPERATION IS THE SAME AS THE EARLY MODEL.
(SEE INDEX)



MODEL C, Commun. Sys.
MODELS OXC & OXM
MODEL D, Commun. Sys.
MODELS OC-3 to OC-10
Schematics, Notes

WEBSTER CO.



MODELS OC-3 to OC-10
INTER-OFFICE COMMUNICATION SYSTEMS
System D

INSTALLATION - All stations are identical in construction. Each station gains its identity (station number) by wiring a jumper from terminal "S" (located on back of amplifier chassis) to the terminal bearing the number desired for identifying this station. This system is built for operation on 115 Volts D.C. or A.C. 25,40,50 and 60 cycle.

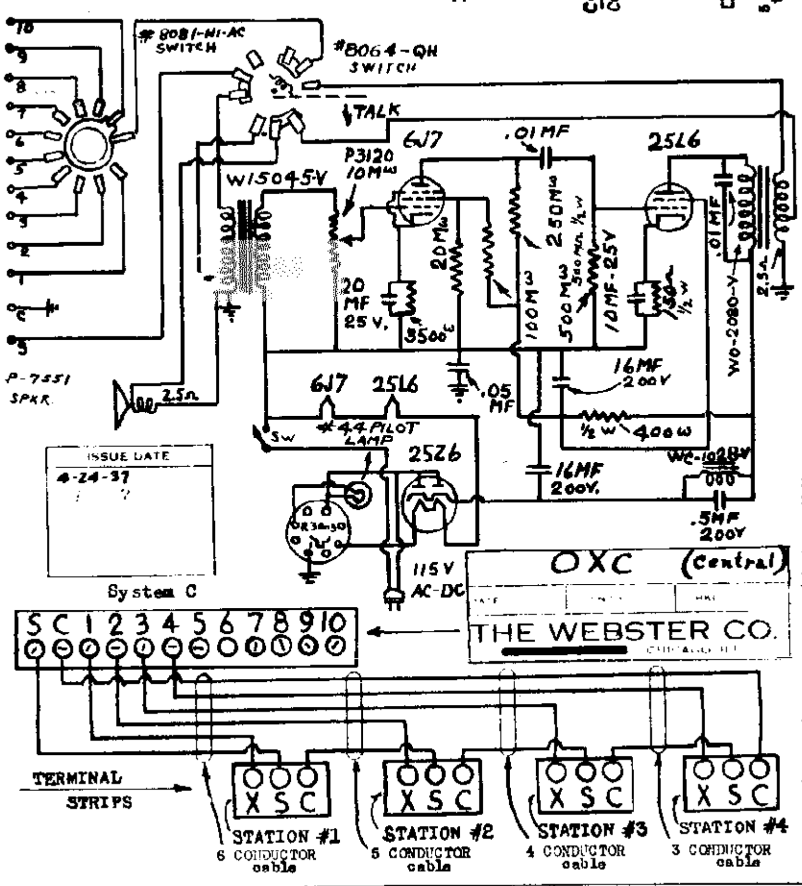
OPERATION - Turn station knob to right (No.1) to turn on amplifier. Operative in 15 seconds. In calling a station the procedure is as follows:

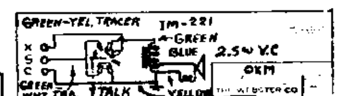
Move the station selector switch to the station number identifying the station which is to be called. Press down "TALK-LISTEN" switch lever to "TALK" position and talk in a normal tone of voice. When released, the lever automatically returns to the LISTEN" position.

It is necessary when a person calls another station that he identify his own station so that operator receiving call may adjust his station selector switch to the proper station number in order that the call may be answered.

IMPORTANT - The system must be well grounded. Connect ground wire to terminal "C" on at least one of the stations. On AC, if a line "SING" is heard while talking, that station from where the talking emanates should have its AC line cord plug reversed, as in the case to obtain correct polarity for operation on DC.

VOLUME CONTROL - With slotted shaft is located on rear of each station. The volume should be adjusted to the desired point on installation.





INSTALLATION-

Terminal "S" of OXC is connected to "S" of OXM, station #1. Terminal "C" station #1 to "S" of station # 2. Other stations may be connected in a similar manner. From the last outlying station, the terminal "C" is connected back to the terminal "C" of OXC central. Terminal "X" on each station is wired to number on OXC terminal strip corresponding to station number on OUTLYING STATION.

OPERATION -

There can be no inter-communication between OXM units. Central may call any station with selector switch, and "TALK-LISTEN" switch in the "TALK" position. Release switch to listen. Outlying stations may call central in the same manner but must be identified to operator for proper selector switching in order that the outlying station may listen.

IMPORTANT -

For AC operation, if buzz is heard, the line cord plug should be reversed (FOR OXC). Buzzes may also be caused by defective tubes. For DC operation, line cord must be plugged in with proper polarity.

VOLUME CONTROL -The volume control, at rear of chassis (reached thru a ventilating hole thru back of cabinet) should be adjusted with a screw driver to desired volume.

Sensitivity

WELLS-GARDNER & CO.

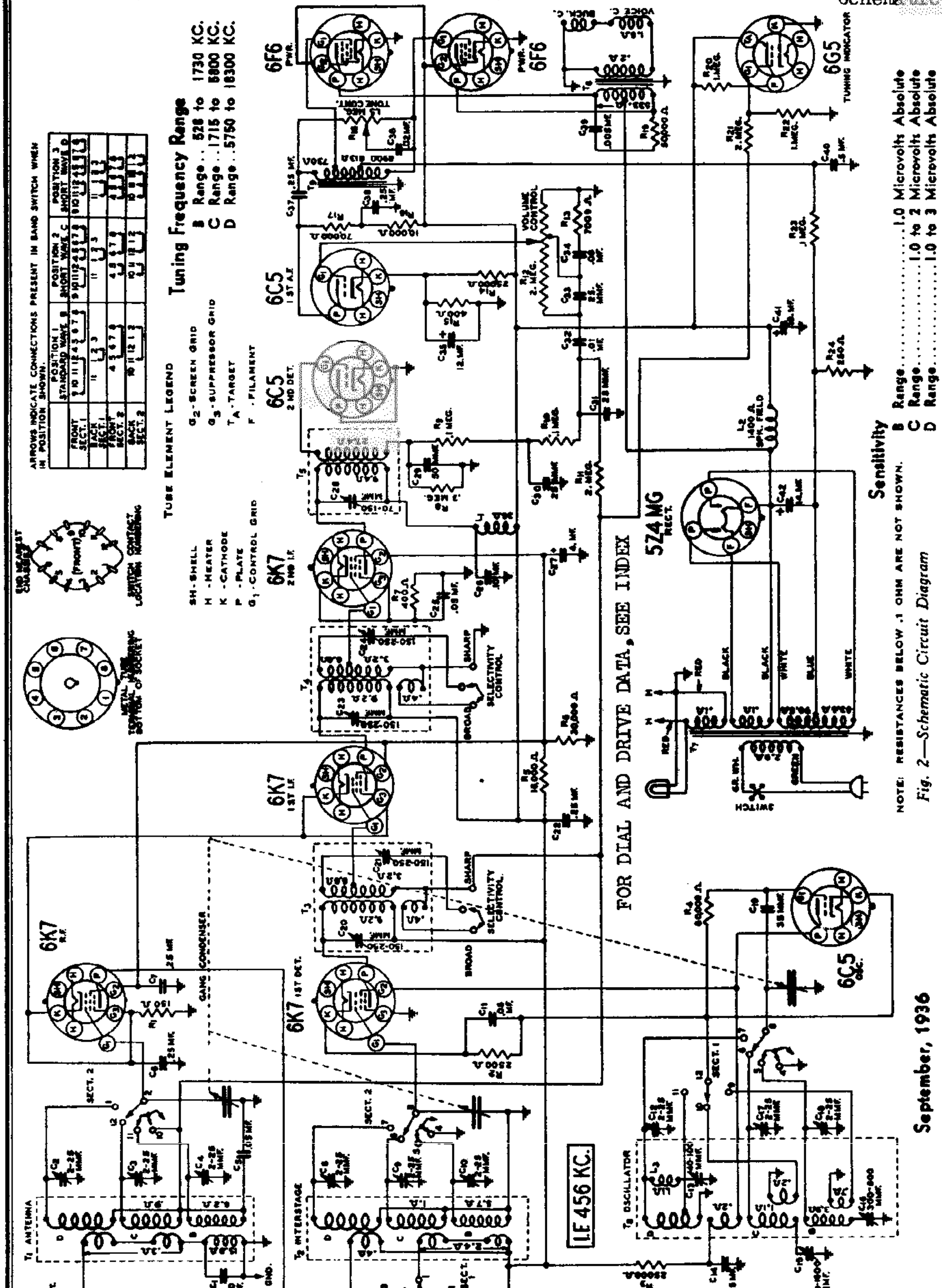


Fig. 2—Schematic Circuit Diagram

MODEL OEL
Socket, Trimmers
Voltage, Coils

WELLS-GARDNER & CO.

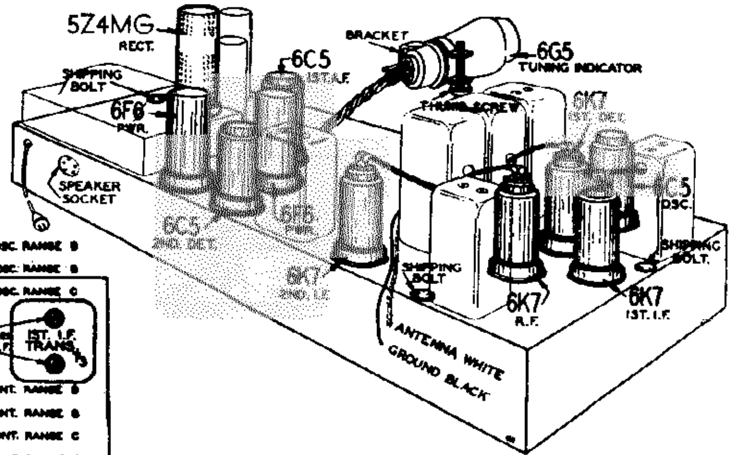


Fig. 6—Location of Tubes

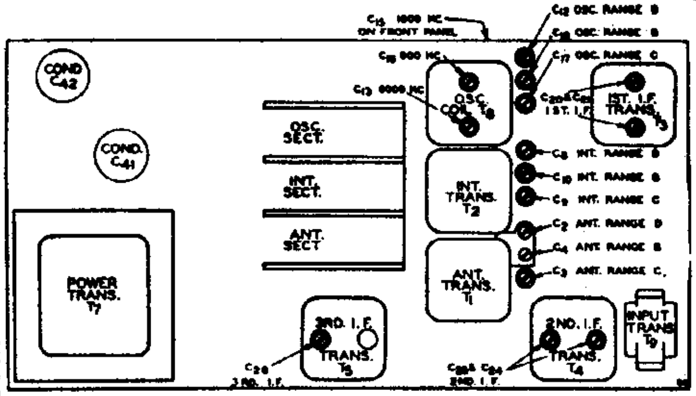


Fig. 3—Location of Trimmers

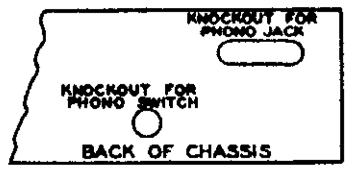


Fig. 8—Location of Phono Knockouts

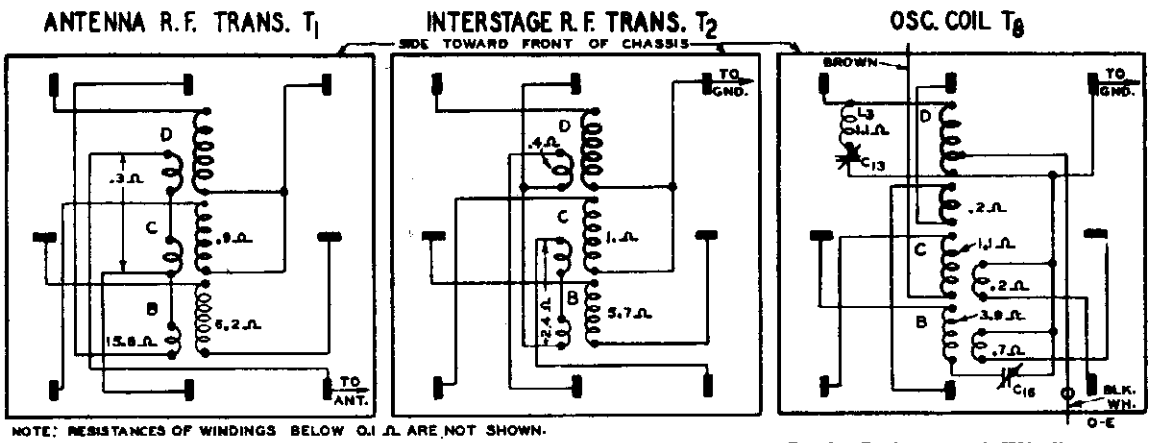


Fig. 4—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

Line Voltage: 115
Volume Control: Maximum

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated) Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	R.F.	0	6.1(1)	250	100	2.5	...	6.1(1)	2.5
6K7	1st Det.	0	6.1(1)	250	120	0	...	6.1(1)	9
6C5	Osc.	0	6.1(1)	120	...	...	...	6.1(1)	0
6K7	1st I.F.	0	6.1(1)	250	100	2.5	...	6.1(1)	2.5
6K7	2nd I.F.	0	6.1(1)	250	100	3	...	6.1(1)	3
6C5	2nd Det.	0	6.1(1)	0	...	...	...	6.1(1)	0
6C5	1st A.F.	0	6.1(1)	110	...	...	...	6.1(1)	4.5
6F6	Power Amp.	0	6.1(1)	330	250	25(2)	...	6.1(1)	0
5Z4MG	Rect.	0	4.8(3)	...	640(4)	...	640(4)	...	4.8(3)

6G5	Tuning Indicator	Plate to Ground	Target to Ground	Cathode to Ground	Across Heater
		20(5)	250	0	6.1 A.C.

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) As read across resistor R24.
(3) A.C. voltage as read across heater terminals 2 and 8.
(4) A.C. voltage as read across terminals 4 and 6.
(5) As read with 500,000 ohm meter.

WELLS-GARDNER & CO.

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C18) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

In sets using pointers, loosen the screw of the large pointer and set the pointer at the 1500 KC mark on the standard wave band scale. Re-tighten the screw.

In sets using the moving beam of light, there is a moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until it is at the 1500 KC mark on the dial. Re-tighten the screw.

Adjust the interstage Range B trimmer (C10) and antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C17) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C9) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 1800 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C12) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C8) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage and antenna Range D trimmers, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Planetary Drive Assembly

The planetary assembly is the unit that is integral with the tuning shaft.

If the nut on the back end of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect.

If this nut is too loose, the drive will slip in slow speed. The remedy in this case, of course, is to tighten the nut.

Should the condenser drive cord slip when the planetary pulley is turning, inspect the tuning condenser, drive drum and gears to see if they are turning properly or if they are being obstructed in some way.

If the drive turns unevenly (rough in spots), this may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch—See Fig. 8.

The phono switch must be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. This is done by removing the white wire connected to the insulated lug of the terminal strip on which one end of condenser C32 is also connected. The terminal strip is located at the back of the volume control. This wire is then connected to the phono switch as shown in Fig. 7. A wire is then connected from the lug on the above mentioned terminal strip to the phono switch, as shown in Fig. 7. Both of the above wires are connected to the switch terminals nearest the chassis base and should be twisted together as far

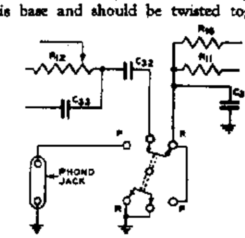


Fig. 7—Phonograph Connections

as possible and run as close to the back of the chassis base as possible.

The lead to condenser C32, after turning away from the back of the chassis base, should be run close to the 6C5 tube sockets.

Complete the other connections as illustrated in Fig. 7, using the lugs in the chassis base, located near the phono switch and jack, for grounding purposes.

The control grid lead of the 6F6 power tube nearest the back of the chassis should be removed and a longer lead substituted. This lead is run from the tone control to the back of the chassis, along the lower edge and is then brought to the grid terminal by being routed between the speaker socket and the tubular condenser next to it.

If a hum is heard when the phono pickup is touched, reverse the two pickup leads.

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 2. In contact locations not used, the number applying to that particular location is not employed.

Voltage Chart

The voltage readings are taken with a voltmeter, having a resistance of 1000 ohms per volt.

The standard metal tube socket terminal numbering system (bottom of socket) is shown in Fig. 5. On the schematic circuit diagram, Fig. 2, is a list giving the complete names of the tube elements and the corresponding symbols as used on the sockets on the schematic.

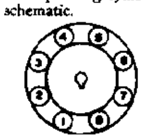


Fig. 5—Metal Tube Terminal numbering (bottom of socket)

MODEL OEL
Notes,Parts

WELLS-GARDNER & CO.

Referring to the 1st and 2nd I.F. transformers T3 and T4 in Fig. 2, it will be noted that there are coupling windings shown below the primaries in the illustration.

When the selectivity control is in the sharp position, the coupling windings are open circuited and the loose coupling which exists between the primary and secondary of these transformers results in high selectivity.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary is connected in series with the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

Across the volume control resistor R12 is a filter composed of condensers C33 and C34 and resistor R13. A tap connection near the low potential end of the volume control is connected between the two condensers. At high volume settings, the filter is not effective. At the low volume settings, as the movable arm approaches the tap, the higher frequencies are by-passed through condenser C34. Very high frequencies are transmitted through condenser C33 to compensate for the reduction of these frequencies. At low volume settings the low frequency amplitudes are increased as a result.

Transformer coupling is used between the first audio stage and the output stage which employs two type 6F6 output pentode tubes in a stage of push-pull amplification. A type 5Z4MG (metal glass tube) full wave rectifier is used in the power unit.

The 6G5 tuning indicator tube is wired as shown in the schematic. This tube contains a triode and cathode ray section in one envelope.

The cathode ray is produced by the attraction of electrons from the upper end of the cathode to the coated target or anode, which is operated at a high positive potential. When this electron stream strikes the target the coating glows. The electron stream is controlled by an additional element, or control electrode, in the tube.

As a signal is tuned in, the control grid of the triode section of the 6G5 cathode ray tube becomes increasingly negative, the negative bias voltage being taken from the AVC line. The AVC voltage is reduced to a suitable value by the potentiometer arrangement of the 1 and 2 megohm resistors. The increased bias voltage reduces the triode plate current. This reduces the voltage drop across the 1 megohm plate resistor and raises the triode plate voltage. The triode plate is connected to the control electrode of the cathode ray section of the tube.

The shape and size of the area on the target struck by the cathode ray is governed by the voltage of the control electrode. When the signal is tuned to resonance, practically no plate current flows and the voltage of the control electrode is the same as that of the target. There is no opposition to the flow of electrons to the target. Tuning off resonance decreases the control electrode voltage and causes the darkened sector of the target to widen, because of the opposition to the flow of electrons in the direction of the control electrode.

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

Prices subject to change without notice

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
P-9A622	T1	Antenna Transformer and Can Assembly	$1.90
P-9A623	T2	R. F. Interstage Transformer and Can Assembly	1.85
P-9A625	T3	1st I. F. Transformer and Can Assembly	1.85
P-9A626	T4	2nd I. F. Transformer and Can Assembly	1.85
P-9A627	T5	3rd I. F. Transformer and Can Assembly	1.50
P-51X41	T6	Output Transformer (Part of Speaker Assembly)	2.45
P-53X113	T7	115 Volt, 60 Cycle, Power Transformer	4.40
P-53X126	T7	115 Volt, 25 Cycle, Power Transformer	7.20
P-53X127	T7	115-230 Volt, 40-60 Cycle Power Transformer	6.20
P-9A624	T8	Oscillator Coil and Can Assembly	2.85
P-50X34	T9	Input Transformer	1.25
P-9A496	L1	2nd I. F. Plate Isolating Reactor	.75

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
P-46X80	C5	.05 mf.	100	$0.15
P-46X117	C6	.25 mf.	100	.25
P-46X104	C7	.25 mf.	240	.25
P-46X80	C11	.05 mf.	100	.15
P-46X119	C14	.05 mf.	360	.20
P-46X121	C22	.25 mf.	360	.30
P-46X80	C25	.05 mf.	100	.15
P-46X105	C26	.10 mf.	360	.20
P-46X120	C32	.01 mf.	360	.15
P-46X176	C34	.08 mf.	100	.15
P-49X10	C36 C37	.25 mf. .25 mf.	360 360	.60
P-46X120	C38	.01 mf.	360	.15
P-46X174	C39	.005 mf.	1000	.20
P-46X191	C40	.5 mf.	100	.30

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage		List Price
P-46X213	C27 C35	4 mf. 12 mf.	180 25	Dry	.95
P-44X11	C41	18 mf.	290	Wet	1.10
P-44X10	C42	14 mf.	400	Wet	1.25

MOLDED

P-47X69	C1	250 mmf.	.15
P-47X53	C19	35 mmf.	.10
P-47X54	C29	50 mmf.	.10
P-47X72	C30	25 mmf.	.10
P-47X72	C31	25 mmf.	.10
P-47X72	C33	25 mmf.	.10

TRIMMER

P-17A46 Trimmer Strip	C2	2-25 mmf. Range "D" Antenna Trimmer	.95
	C3	2-25 mmf. Range "C" Antenna Trimmer	
	C4	2-25 mmf. Range "B" Antenna Trimmer	
	C8	2-25 mmf. Range "D" Interstage Trimmer	
	C9	2-25 mmf. Range "C" Interstage Trimmer	
	C10	2-25 mmf. Range "B" Interstage Trimmer	
	C12	2-25 mmf. Range "D" Oscillator Trimmer	
	C17	2-25 mmf. Range "C" Oscillator Trimmer	
	C18	2-25 mmf. Range "B" Oscillator Trimmer	

See Part Number 17A36 for replacement of any one section.

P-17A35	C13 C16	40-100 mmf. Range "D" Oscillator Padding Condenser 300-600 mmf. Range "B" Oscillator Padding Condenser	.45
P-17A47	C15	1200-1600 mmf. Range "C" Oscillator Padding Condenser	.45
P-17A30	C20 C21	150-250 mmf. 150-250 mmf. 1st I. F. Trimmers	.45
P-17A30	C23 C24	150-250 mmf. 150-250 mmf. 2nd I. F. Trimmers	.45
P-17A40	C28	70-150 mmf. 3rd I. F. Trimmer	.30

MISCELLANEOUS

P-17A36	2-25 mmf. (to be used for replacement of any one section of Trimmer Strip P-17A45)	.10
P-14A52	3 Gang Condenser, Less Dial and Drive Assembly	3.60

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
P-A94151	R1	150 Ohms	0.2	$0.15
P-A95252	R2	2,500 Ohms	0.2	.10
P-C94253	R3	25,000 Ohms	1.0	.16
P-A94803	R4	80,000 Ohms	0.2	.15
P-D93163	R5	16,000 Ohms	2.0	.45
P-C94303	R6	30,000 Ohms	1.0	.15
P-A94401	R7	400 Ohms	0.2	.15
P-A94304	R8	300,000 Ohms	0.2	.15
P-A95104	R9	100,000 Ohms	0.2	.10
P-A95104	R10	100,000 Ohms	0.2	.10
P-A94205	R11	2.0 Megohms	0.2	.15
P-A94702	R13	7,000 Ohms	0.2	.15
P-E94253	R14	25,000 Ohms	3.0	.30
P-A94401	R15	400 Ohms	0.2	.15
P-A95103	R16	10,000 Ohms	0.2	.10
P-B95703	R17	70,000 Ohms	0.5	.10
P-C95503	R19	50,000 Ohms	1.0	.10
P-A95106	R20	1.0 Megohms	0.2	.10
P-A94205	R21	2.0 Megohms	0.2	.15
P-A94106	R22	1.0 Megohms	0.2	.15
P-A95104	R23	100,000 Ohms	0.2	.10

WIRE WOUND

P-43X56	R24	250 Ohms	3.0	.30

VARIABLE

P-36X219	R12	2.0 Megohms	Volume Control and On-Off Switch	1.10
P-40X213	R18	1.5 Megohms	Tone Control and Selectivity Switch	1.30

MODEL OF
Schematic
Sensitivi

WELLS-GARDNER & CO.

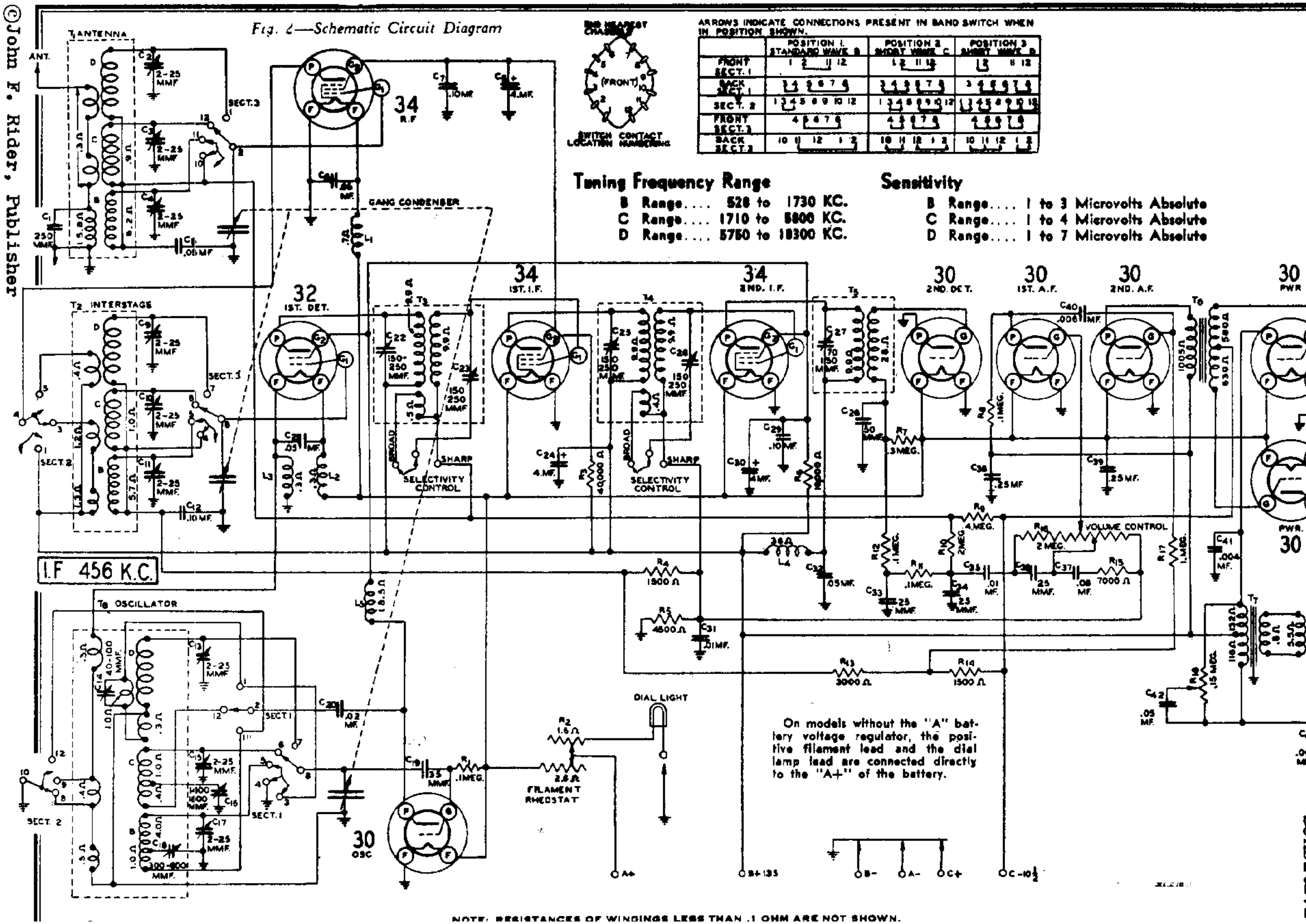


Fig. 2—Schematic Circuit Diagram

MODEL OF
Socket, Trimmers
Voltage, Coils, Notes

WELLS-GARDNER & CO.

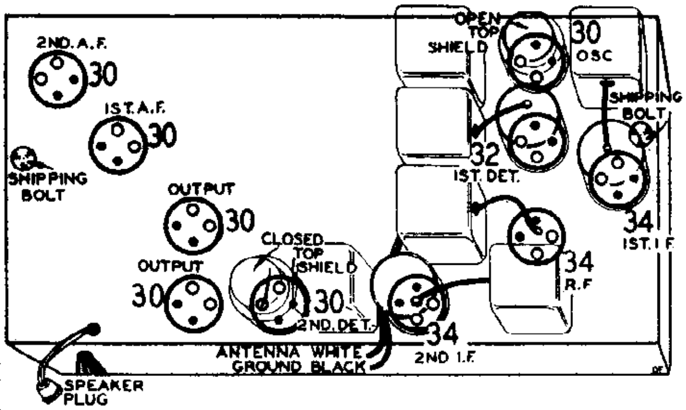


Fig. 7—Location of Tubes

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground — Band Switch in Standard Wave Position

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Control Grid to Ground
34	R. F.	2.0	135	65	
32	1st Det.	2.0	135	90	6
30	Osc.	2.0	90		
34	1st I. F.	2.0	135	65	
34	2nd I. F.	2.0	135	90	4.5
30	2nd Det.	2.0			
30	1st A. F.	2.0	75		4.5 (1)
30	2nd A. F.	2.0	132		9 (2)
30	Power	2.0	135		10.5

(1) Volume control at minimum setting.
(2) As read from connection between R13 and R14, and ground.

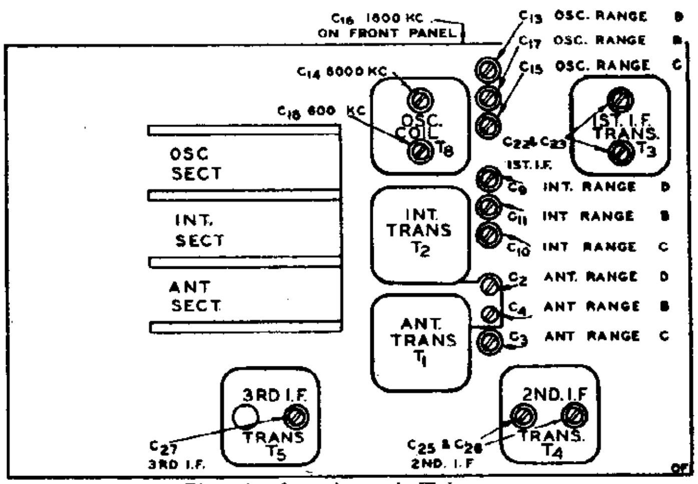


Fig. 6—Location of Trimmers

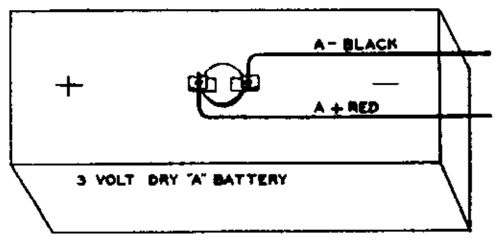


Fig. 4—3 V. Dry "A" Battery Connections

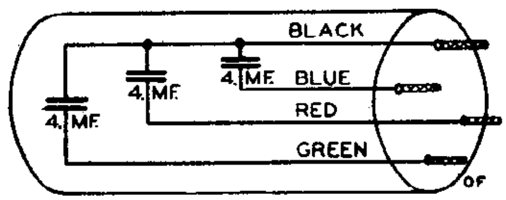


Fig. 9—Electrolytic Condenser Internal Connections

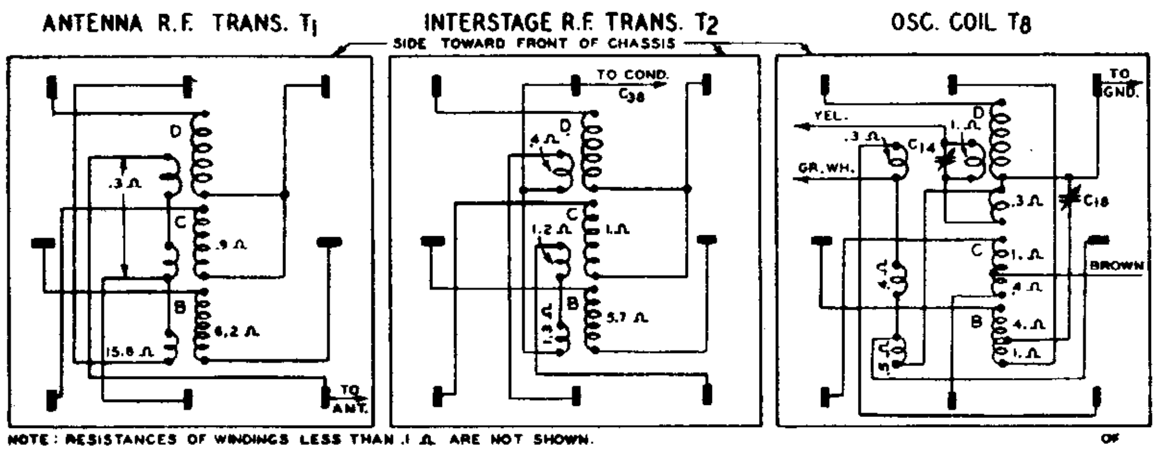


Fig. 8—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

WELLS-GARDNER & CO.

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a 1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 6.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C17) until maximum output is obtained. The location of this trimmer is shown in Fig. 6.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

Adjust the interstage Range B trimmer (C11) and antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 600 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

Range C Alignment

CAUTION: When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 6000 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C15) until maximum output is obtained. See Fig. 6 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C10) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 1800 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C13) until maximum output is obtained. See Fig. 6 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage and antenna Range D trimmers, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

Planetary Drive Assembly

The planetary assembly is the unit that is integral with the tuning shaft.

If the nut on the back end of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect.

If this nut is too loose, the drive will slip in slow speed. The remedy in this case, of course, is to tighten the nut.

Should the condenser drive cord slip when the planetary pulley is turning, inspect the tuning condenser, drive drum and gears to see if they are turning properly or if they are being obstructed in some way.

If the drive turns unevenly (rough in spots), this may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

MISCELLANEOUS

Referring to the 1st and 2nd I. F. transformers T3 and T4 in Fig. 2, it will be noted that there are coupling windings shown below the primaries in the illustration.

When the selectivity control is in the sharp position, the coupling windings are open circuited and the loose coupling which exists between the primary and secondary of these transformers results in high selectivity.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary is connected in series with the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

Across the volume control resistor R16 is a filter composed of condensers C36 and C37 and resistor R15. A tap connection near the low potential end of the volume control is connected between the two condensers. At high volume settings, the filter is not effective. At the low volume settings, as the movable arm approaches the tap, the higher frequencies are by-passed through condenser C37. Very high frequencies are transmitted through condenser C36 to compensate for the reduction of these frequencies. At low volume settings the low frequency amplitudes are increased as a result.

Models with the filament rheostat are connected as shown in Fig. 2. This rheostat permits the use of a 3 volt "A" battery. As shown in Fig. 2, there are two separate variable resistors one of which controls the filament voltage and the other the dial lamp voltage. In models which do not have the filament rheostat the "+A" connection is made directly to the "+A" line and the dial lamps.

Replacement Parts

SOCKETS

Part No.	Description	List Price
P-3A266	4 Prong Tube Socket (All Types)	$0.10

SPEAKERS

Part No.	Description	List Price
P-12A263	8" P.M. Dynamic Speaker complete with Output Trans.	6.80
P-13A268	Speaker Cable and Socket Assembly	.46

KNOBS

Part No.	Description	List Price
Specify Name of Knob and Name and Model of Radio	Tone Control—Small Push-on Type	.15
	Volume Control—Small Push-on Type	.15
	Tuning Control—Large Push-on Type	.15
	Band Switch—Large Set-screw Type	.20

GENERAL

Part No.	Description	List Price
P-3X38	Felt Washers (Used behind Knobs) ea.	.10
P-8X22	Rubber Chassis Mounting Cushions ea.	.10
P-4A38	Terminal Strip (Single Lug Insulated—mounting foot to left of lug)	.10
P-4A42	Terminal Strip (Two Lugs Insulated—mounting hole in center)	.10
P-4A64	Terminal Strip (Five Lugs Insulated—Two Lugs Grounded)	.10
P-2A56	3 Section, 3 Position, Band Change Switch	1.75
P-10X14	Grid Clip Only	.10
P-13X219	"A" "B" and "C" Battery Cable	1.15
P-13X214	Antenna and Ground Lead Assembly	.30
P-32X43	Tube Shield (Large)	.20
P-32X32	Tube Shield (Small—Open Top)	.15
P-32X50	Tube Shield (Small—Closed Top)	.10
P-32X18	Tube Shield Base (Large)	.10
P-32X30	Tube Shield Base (Small)	.10
P-25X231	Chassis Mounting Feet ea.	.10
P-8X43	Rubber Mounting Cushions for Gang Condenser (front) ea.	.10
P-8X64	Rubber Mounting Cushion for Gang Condenser (rear)	.10
P-8X65	Rubber Mounting Cushion for Gang Condenser (rear under chassis base)	.10

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
P-9A628	T1	Antenna Transformer and Can Assembly	$1.95
P-9A629	T2	R. F. Interstage Transformer and Can Assembly	1.95
P-9A631	T3	1st I.F. Transformer and Can Assembly	1.70
P-9A632	T4	2nd I.F. Transformer and Can Assembly	1.70
P-9A633	T5	3rd I.F. Transformer and Can Assembly	1.55
P-80X11	T6	Input Transformer	2.10
P-61X44	T7	Output Transformer (Part of Speaker Assembly)	1.30
P-9A630	T8	Oscillator Coil and Can Assembly	3.25
P-9A599	L1 / L5	Filament Reactor / "B" Reactor — One Assembly	.60
P-9A440	L2 / L3	Double Filament Reactor	.30
P-9A590	L4	2nd I.F. Plate Isolating Reactor	.70

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
P-46X80	C5	.05 mf.	100	$0.15
P-46X80	C6	.05 mf.	100	.15
P-46X98	C7	.1 mf.	100	.20
P-46X196	C12	.1 mf.	100	.15
P-46X107	C20	.02 mf.	100	.15
P-46X80	C21	.05 mf.	100	.15
P-46X98	C29	.1 mf.	100	.20
P-46X126	C31	.01 mf.	100	.15
P-46X80	C32	.05 mf.	100	.15
P-46X120	C35	.01 mf.	360	.15
P-46X175	C37	.08 mf.	100	.15
P-46X117	C38	.25 mf.	100	.25
P-46X117	C39	.25 mf.	100	.25
P-46X181	C40	.006 mf.	400	.15
P-46X114	C41	.004 mf.	400	.15
P-46X119	C42	.05 mf.	360	.20
P-46X114	C43	.004 mf.	400	.15

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage	List Price
P-48X14	C8 / C24 / C30	4 mf. / 4 mf. / 4 mf.	150 Dry	1.16

MOLDED

Part No.	Code	Capacitance	Voltage	List Price
P-47X69	C1	250 mmf.		.15
P-47X63	C19	35 mmf.		.10
P-47X56	C28	80 mmf.		.10
P-47X72	C33	25 mmf.		.10
P-47X72	C34	25 mmf.		.10
P-47X72	C34	25 mmf.		.10

TRIMMER

Part No.	Code	Description	List Price
P-17A45 Trimmer Strip	C2	2-25 mmf. Range "D" Antenna Trimmer	.95
	C3	2-25 mmf. Range "C" Antenna Trimmer	
	C4	2-25 mmf. Range "B" Antenna Trimmer	
	C9	2-25 mmf. Range "D" Interstage Trimmer	
	C10	2-25 mmf. Range "C" Interstage Trimmer	
	C11	2-25 mmf. Range "B" Interstage Trimmer	
	C13	2-25 mmf. Range "D" Oscillator Trimmer	
	C15	2-25 mmf. Range "C" Oscillator Trimmer	
	C17	2-25 mmf. Range "B" Oscillator Trimmer	

See Part Number P-17A36 for replacement of any one section

Part No.	Code	Description	List Price
P-17A26	C14 / C18	40-100 mmf. 6000 KC Oscillator Padding Condenser / 200-680 mmf. 600 KC Oscillator Padding Condenser	.46
P-17A47	C16	1600-1800 mmf. 1800 KC Oscillator Padding Condenser	.45
P-17A30	C22 / C23	60-250 mmf. 1st I.F. Trimmer Condenser / 60-250 mmf. 1st I.F. Trimmer Condenser	.45
P-17A30	C25 / C26	150-250 mmf. 2nd I.F. Trimmer Condenser / 150-250 mmf. 2nd I.F. Trimmer Condenser	.45
P-17A40	C27	70-150 mmf. 3rd I.F. Trimmer Condenser	.30
P-17A36		(To be used for replacement of any one section of Trimmer Strip P-17A45)	.10

MISCELLANEOUS

Part No.	Description	List Price
P-14A82	3 Gang Condenser Only (less Drive Mechanism and Dial Assembly)	3.43

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
P-A94104	R3	.1 Megohm	.2	$0.15
P-A94403	R3	40,000 Ohm	.2	.15
P-A94152	R4	1,500 Ohm	.2	.15
P-A94452	R5	4,500 Ohm	.2	.15
P-B94103	R6	10,000 Ohm	.5	.15
P-A94304	R7	.3 Megohm	.2	.15
P-A95104	R8	.1 Megohm	.2	.10
P-A94405	R9	4 Megohm	.2	.15
P-A94205	R10	2 Megohm	.2	.15
P-A95104	R11	.1 Megohm	.2	.10
P-A95104	R12	.1 Megohm	.2	.10
P-A94302	R13	3,000 Ohm	.2	.15
P-A94152	R14	1,500 Ohm	.2	.15
P-A94702	R15	7,000 Ohm	.2	.15
P-A95105	R17	1 Megohm	.2	.10

VARIABLE

Part No.	Code	Resistance	List Price
P-36X220	R16	2 Megohm Tapped Volume Control and Switch	1.85
P-40X211	R18	.15 Megohm Tone Control and Selectivity Switch	1.70

DIAL AND DRIVE ASSEMBLY

DIAL ASSEMBLY

Part No.	Description	List Price
Specify Name and Model of Radio	Dial Assembly Complete with Dial Glass; Dial Plate, Small Pointers; Reflectors; Small Pointer Cords, Springs, Pulleys and Collars; and Band Indicator Less Large Station Pointer and Micrometer Pointer	3.05
See above	Dial Glass Only	1.45
P-25A126	Dial Assembly Mounting Plate, Includes Small Pointer Shafts and Pulleys, and Band Indicator Assembly	1.45
P-25X297	Dial Assembly Support Brackets (Attached to Gang Condenser) ea.	.10
P-15X59	Large Station Pointer	.25
P-15X60	Micrometer Pointer	.10
P-16X57	Small Volume or Tone Control Pointer ea.	.10
P-9X16	Dial Cardboard	.10
P-11X41	Fibre Strip (At Bottom of Dial Glass)	.40
P-41X2	Dial Lamp Reflectors (At each side of Dial Plate) ea.	.10
P-7A27	Dial Lamp Sockets ea.	.10
P-7A40	Dial Lamps ea.	.10
	10" Black Cord for Small Pointers doz.	.45
P-29X20	Brass Collars with Set Screws for Securing Small Pointer Cords to Shafts ea.	.10
P-28X44	Tension Springs for Small Pointer Cords ea.	.10
P-36X227	Small Pointer Shafts and Pulleys ea.	.10
P-17X15	Glass Dial Crystal	.35
P-28X58	Crystal Retaining Ring	.15
P-2A40	Dial Lamp Push Button Switch Assembly	.40

DRIVE ASSEMBLY

Part No.	Description	List Price
P-6A34	Planetary Assembly Complete with Hex Nut and Lockwasher (This is the unit mounted at the front of the chassis base. It is integral with the tuning shaft)	.75
P-10X14	Black Tuning Drive Cord Only	.30
P-28X69	Tension Spring for Tuning Drive Cord	.10
P-25X269	Drive Assembly Bracket Only (Mounted on Gang Condenser)	.25
P-25X283	Rear Mounting Foot for Gang Condenser	.10
P-24X239	Drive Drum Assembly Complete with Gears, Micrometer and Main Pointer Shaft	.35
P-28X84	Spreader Spring for Rotary Gear (Part of Above Assembly)	.10
P-28X83	Spreader Spring for Stationary Gear (Part of Above Assembly)	.10

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

Prices subject to change without notice

"A" Battery (Models with Voltage Regulator)

Models equipped with the voltage regulator on the back panel of the chassis may use any type of "A" battery delivering from 2 to 3 volts.

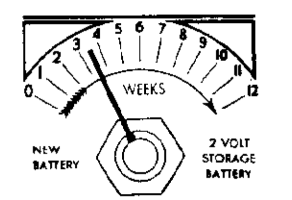


Fig. 5—"A" Battery Voltage Regulator

Batteries

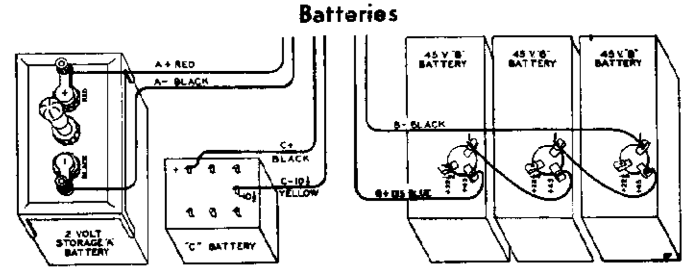


Fig. 3—"A", "B" and "C" Battery Connections

WELLS-GARDNER & CO.

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (medium wave band).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator, and adjust the I.F. wave trap trimmer (C1) for minimum output. The location of this trimmer is shown in Fig. 3.

Range D Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15000 KC. The signal will then be heard at 15000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15000 less 912 KC, or 14088 KC. It may be necessary to increase the input signal to hear the image.

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (short wave band).

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range D trimmer (C8) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the antenna Range D trimmer (C3) to maximum.

When adjusting the antenna Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the medium wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

Adjust the oscillator Range B trimmer (C9) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the screw of the large pointer and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

Adjust the antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer (C12) until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range A Alignment

380 KC Adjustment

Set the signal generator for 380 KC.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range A position (long wave band).

Adjust the oscillator Range A trimmer (C10) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

350 KC Adjustment

Set the signal generator for 350 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the antenna Range A trimmer (C5) to maximum.

Do not change the setting of the oscillator Range A trimmer.

165 KC Adjustment

Set the signal generator for 165 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 165 KC trimmer (C11) until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

General Service Data

The models with the tuning indicator tube are wired as shown in the schematic. The action of this tube is described in the Series 7FL Service Manual as well as in current literature and will not be repeated here.

Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

Prices Subject to Change Without Notice

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A245	Tube Socket, 8 Prong	$0.15
3A242	Tube Socket, 7 Prong	.15
3A243	Tube Socket, 5 Prong	.15
[illegible]	Speaker Socket, 5 Prong	.10
13X255	6G5 Tube Socket and Cable Assembly	.45

SPEAKERS

Part No.	Description	List Price
12A257	6" Dynamic Speaker Compl. with Output Transformer (T6)	5.80
12A258	8" Dynamic Speaker Compl. with Output Transformer (T6)	6.35
12A259	10" Dynamic Speaker Compl. with Output Transformer (T6)	6.85

KNOBS

Part No.	Description	List Price
Specify Name of Knob and Name and Model of Radio	Tuning Control — Set Screw Type	.20
	Volume Control — Push-On Type	.15
	Band Switch — Push-On Type	.15

GENERAL

Part No.	Description	List Price
2X38	Felt Washer (Used behind knobs) ... doz.	.10
10X23	Rubber Chassis Mounting Cushion ... ea.	.10
2A72	Band Change Switch	.90
2A61	Tone Control Switch	.30
30X44	Grid Clip Only ... doz.	.05
4A30	Terminal Strip (2 lugs insulated with mounting hole in center)	.10
32X69	Tube Shield (Tuning Eye)	.15
32X70	Tube Shield Base (Tuning Eye)	.10
11X80	Line Cord and Plug	.30
11X214	Antenna and Ground Lead Assembly	.30
25X122	Chassis Mounting Feet ... ea.	.10
23A61	Gang Condenser Mounting Cushion Assembly. Includes 3—Rubber Cushions, 3—Hex Shoulder Nuts, 3—No. 6 Flat Washers	.15

DIAL AND DRIVE ASSEMBLY

DIAL ASSEMBLY

Part No.	Description	List Price
15A105	Dial Assembly Complete less Dial Lamp, Lamp Socket and Main Pointer	$3.00
28X334	Dial Bracket Only	.25
18X145	Dial Glass	1.15
26X235	Volume Control Pointer Shaft and Pulley	.20
26X240	Band Change Pointer Shaft and Pulley	.20
29X20	Brass Collar for Volume Indicator	.10
29X20	Brass Collar for Band Indicator	.20
15X30	Small Pointers	.10
28X44	Takeup Springs for Small Pointers	.10
15X29	Main Pointer	.10
	Wave Band or Volume Indicator Cord (8") ... doz.	.20
41X12	Lamp Reflector	.10
7A37	Lamp Socket	.10
7A32	Dial Lamp	.30
9X38	Cardboard Dial Background	.10
28X331	Dial Clamping Bracket	.10
4X145	Dial Crystal and Escutcheon Assembly	1.15

DRIVE ASSEMBLY

Part No.	Description	List Price
5A36	Drive Bracket and Bushing Assembly Complete	.35
26X234	Drive Shaft	.30
26X249	Drive Drum and Main Pointer Shaft	.45
	38" Tuning Drive Cord ... doz.	.45
28X27	Tension Spring for Drive Cord	.10

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A706	T1	Antenna Transformer and Can Assembly	$2.25
9A707	T2	Oscillator Coil and Can Assembly	1.46
9A708	T3	1st I.F. Transformer and Can Assembly	1.35
9A709	T4	2nd I.F. Transformer and Can Assembly	1.35
63X134	T5	115-230 Volt, 40-60 Cycle Power Transformer	4.70
61X31	T6	Output Transformer (Part of Speaker Assembly)	2.45
9A714	L1	Wave Trap (456 KC)	.85

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X80	C6	.05 mf.	100	$0.15
46X90	C15	.10 mf.	100	.20
46X117	C16	.25 mf.	100	.25
46X106	C22	.10 mf.	360	.20
46X120	C25	.01 mf.	360	.15
46X120	C27	.01 mf.	360	.15
46X117	C28	.25 mf.	100	.25
46X172	C29	.02 mf.	100	.16
46X205	C30	.02 mf.	600	.16
46X180	C31	.002 mf.	600	.16
46X207	C32	.07 mf.	360	.15

MOLDED

Part No.	Code	Capacitance	List Price
47X69	C2	250 mmf.	.15
47X72	C7	75 mmf.	.10
47X76	C13	4000 mmf.	.35
47X53	C14	35 mmf.	.10
47X87	C21	100 mmf.	.10
47X85	C26	200 mmf.	.15
47X53	C33	35 mmf.	.10

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage	List Price
64X32	C23	16 mf.	200 Wet	.75
64X31	C24	12 mf.	300 Wet	.80

TRIMMERS

Part No.	Code	Capacitance	Description	List Price
17A64	C1	30-90 mmf.	Wave Trap Trimmer	.25
17A59	C3	2-25 mmf.	Range "D" Antenna Trimmer	.60
	C4	2-25 mmf.	Range "B" Antenna Trimmer	
	C5	2-25 mmf.	Range "A" Antenna Trimmer	
	C8	2-25 mmf.	Range "D" Oscillator Trimmer	
	C9	2-25 mmf.	Range "B" Oscillator Trimmer	
	C10	2-25 mmf.	Range "A" Oscillator Trimmer	
17A44	C11	100-230 mmf.		.50
	C12	300-600 mmf.		
17A33	C17	70-150 mmf.	1st I.F. Trimmers	.40
	C18	70-150 mmf.		
17A34	C19	70-150 mmf.	2nd I.F. Trimmers	.40
	C20	100-250 mmf.		

MISCELLANEOUS

Part No.	Description	List Price
14A61	2 Gang Condenser less Dial and Drive Assembly	2.80

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A94104	R1	100,000 Ohm	0.2	$0.10
A95153	R2	15,000 Ohm	0.2	.10
A95205	R3	2 Megohm	0.2	.10
A94151	R4	150 Ohm	0.2	.05
B94503	R5	50,000 Ohm	0.5	.15
C94103	R6	10,000 Ohm	1.0	.15
A95503	R7	50,000 Ohm	0.2	.10
A95104	R9	100,000 Ohm	0.2	.10
A95205	R10	2 Megohm	0.2	.10
A94504	R11	500,000 Ohm	0.2	.15
A94104	R14	100,000 Ohm	0.2	.10
A94504	R15	500,000 Ohm	0.2	.15
A95105	R16	1 Megohm	0.2	.10
A95505	R17	5 Megohm	0.2	.10
A95505	R18	5 Megohm	0.2	.10

WIRE WOUND

Part No.	Code	Resistance	Wattage	List Price
18X69	R12	35 Ohm	.25	.35
	R13	210 Ohm	2.0	

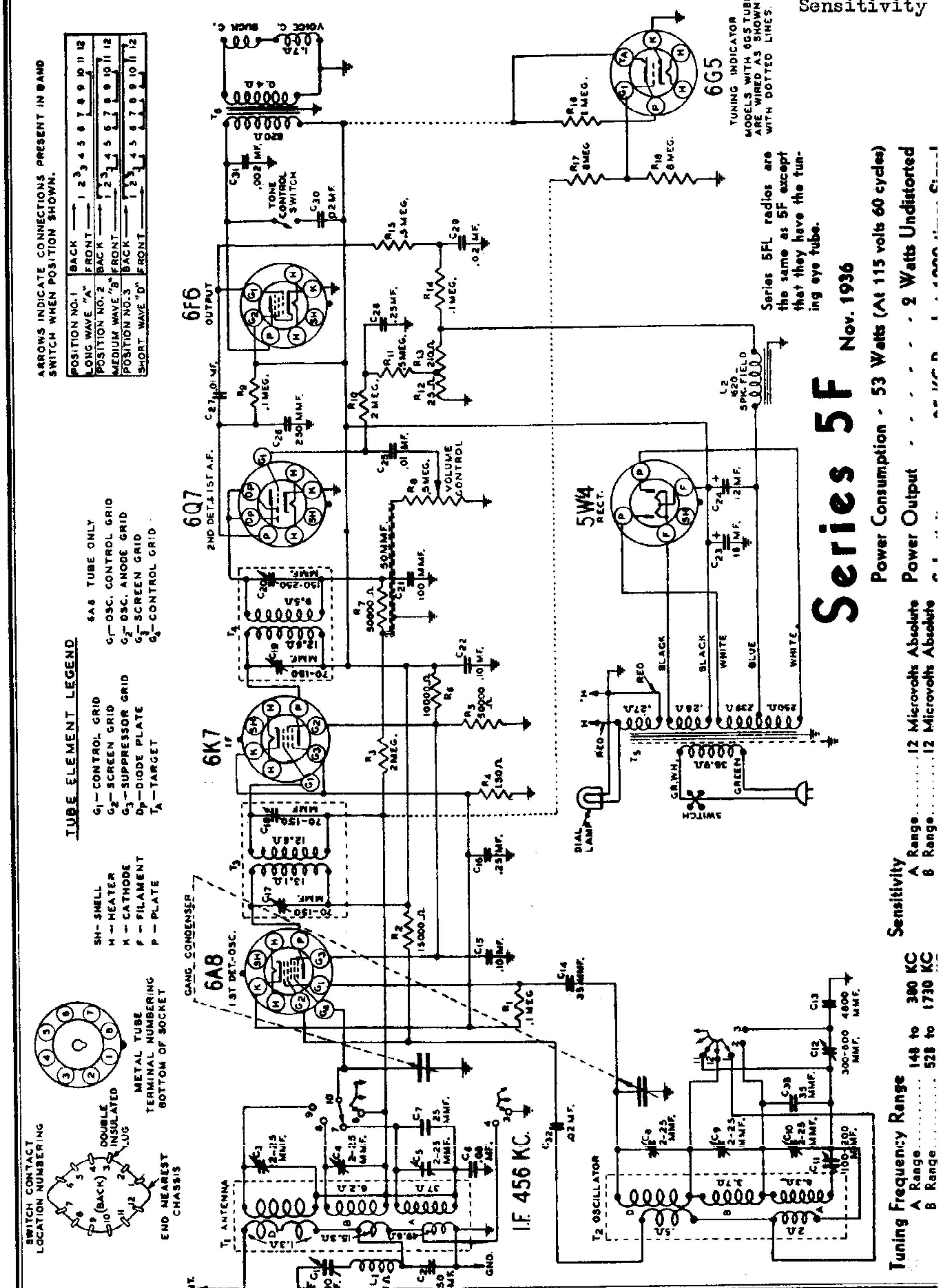
VARIABLE

Part No.	Code	Description	List Price
36X227	R8	0.5 Megohm Volume Control and On-Off Switch	1.00

PHONO ATTACHMENT PARTS

Part No.	Description	List Price
2A31	Phono Switch	$0.60
3A12	Phono Jack	.30
10A36	Knob for Phono Switch	.20

WELLS-GARDNER & CO.



MODELS 5F, 5FL
Socket, Trimmers
Voltage, Coils

WELLS-GARDNER & CO.

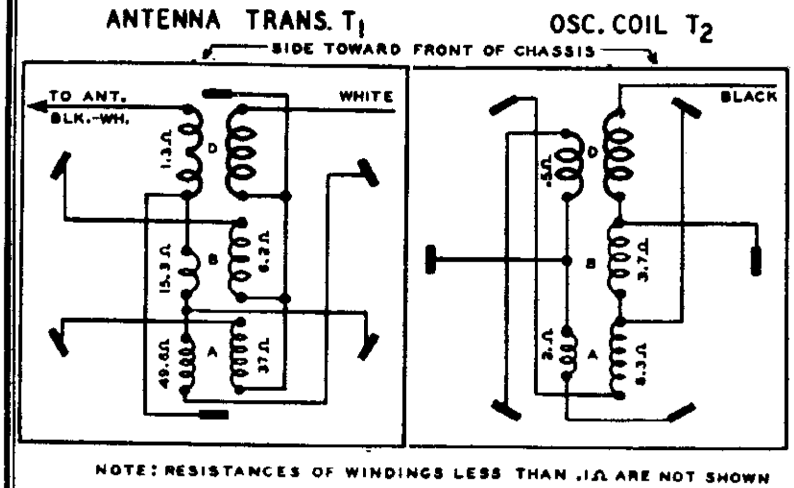


Fig. 4—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

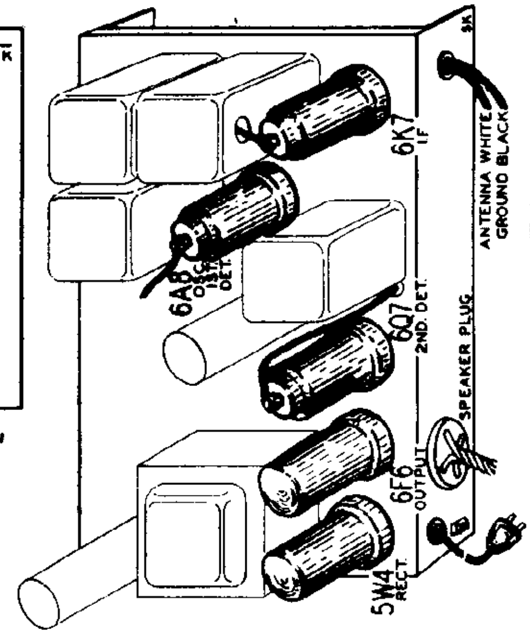


Fig. 5—Location of Tubes

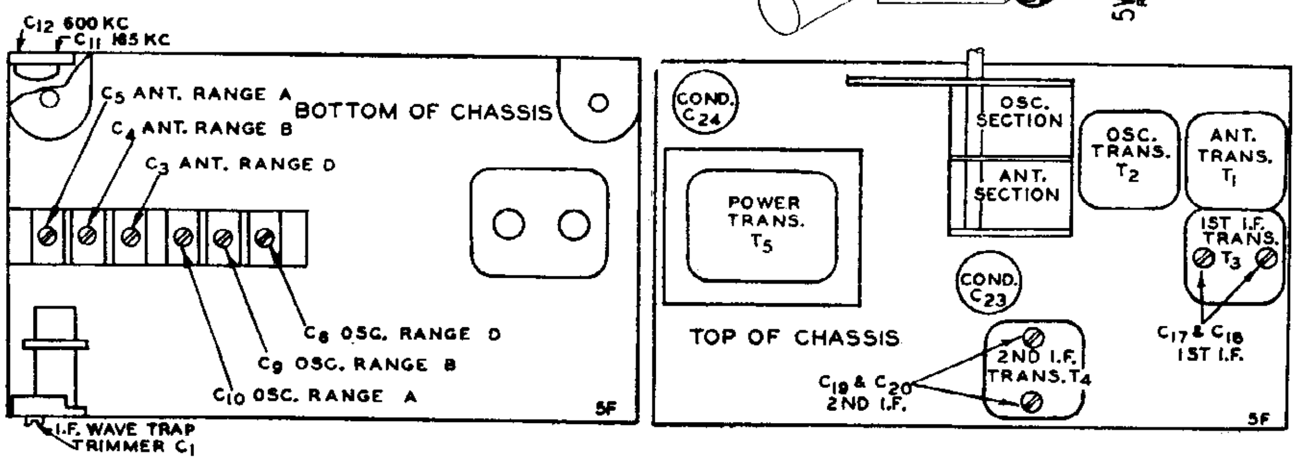


Fig. 3—Location of Trimmers

VOLTAGES AT SOCKETS

Line Voltage: 115 — Volume Control: Maximum — Antenna Shorted to Ground

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6A8	1st Det.-Osc.	0	6.3(1)	200	110		160	6.3(1)	3
6K7	I.F.	0	6.3(1)	200	110	3		6.3(1)	3
6Q7	2nd Det.	0	6.3(1)	110	0	0		6.3(1)	0(2)
6F6	Output	0	6.3(1)	185	200	12.5(3)		6.3(1)	0
5W4	Rectifier	0	5.1(4)		620(5)		620(5)		5.1(4)
6G5	Tuning Indicator	Plate to Ground 25		Target to Ground 200		Cathode to Ground 0		Across Heater 6.3 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Bias (1.5 volts) as read across resistor R12.
(3) Read across resistor R12 and R13.
(4) A.C. voltage as read across heater terminals 2 and 8.
(5) A.C. voltage read across terminals 4 and 6.

MODEL 5H
Schematic
Data

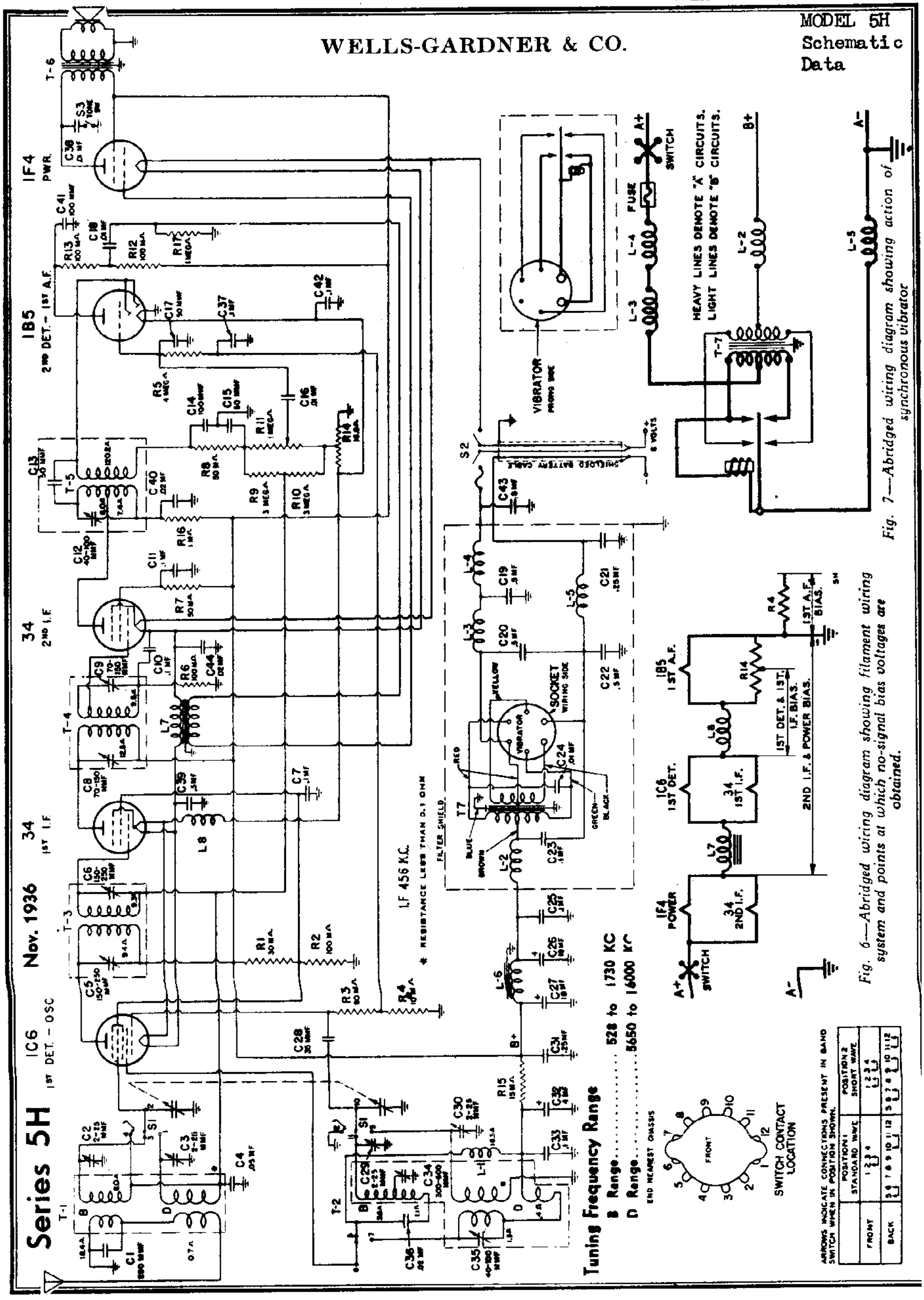


Fig. 6—Abridged wiring diagram showing filament wiring system and points at which no-signal bias voltages are obtained.

Fig. 7—Abridged wiring diagram showing action of synchronous vibrator

MODEL 5H
Socket, Trimmers
Voltage, Coils
Resistance

WELLS-GARDNER & CO.

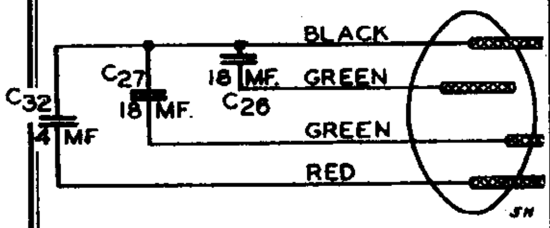
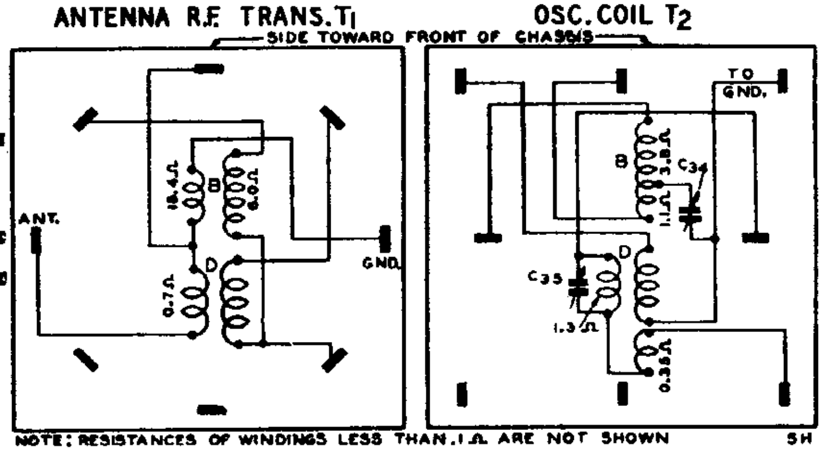


Fig. 4—Electrolytic Condenser Internal Connections



Power Consumption 1.1 Amperes at 6.3 Volts

Power Output - - - 0.35 Watt Undistorted

Fig. 8—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

D. C. Resistances of Audio and Filter Circuit Windings – Other Resistances are Shown in Fig. 2

The values given below will vary slightly in different sets.

Part No.	Winding	Code	D. C. Resistance in Ohms
51X47	Output Transformer	T6	
	Primary Winding		713.
	Secondary Winding		0.4
12A248 & 12A249	Dynamic Speaker 6" and 8"		
	Speaker Voice Coil		5.4
53X132	Power Transformer	T7	
	Primary Winding		
	Center Tap to Inside		0.3
	Center Tap to Outside		0.3
	Secondary Winding		
	Center Tap to Inside		166.
	Center Tap to Outside		185.
9A645	"B" Reactor	L1	18.3
9A647	"B" Reactor	L2	17.7
9A646	Vibrator Reactor	L3	0.1
9A654	"A" Line Reactor	L4	0.1
9A654	"A" Line Reactor	L5	0.1
52X45	"B" Reactor	L6	305.
52X48	Transformer	L7	
	Audio Choke (Primary)		1.3
	Hum Bucking Winding (Secondary)		22.7
9A645	"A" Reactor	L8	0.3

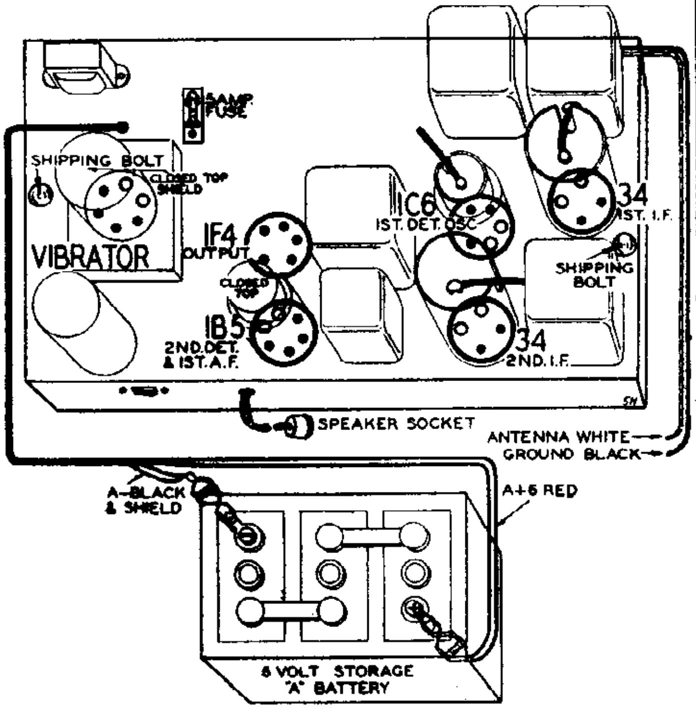


Fig. 5—Tube Arrangement and Battery Connections

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground
Battery—6 Volts — Band Switch in Standard Wave Position

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Bias Voltage
1C6	1st Det.-Osc.	2.0	140 110(1)	55	1.1(2)
34	1st I.F.	2.0	140	55	1.1(2)
34	2nd I.F.	2.0	140	75	4.0
1B5	2nd Det. 1st A.F.	2.0	75		3.0(3)
1F4	Power	2.0	135	140	4.0

(1) Anode Grid to ground.
(2) As read from negative filament leg to center tap of R14.
(3) As read across Resistor R4 (using 100,000 ohm meter). This voltage is subject to considerable variation depending on band and frequency setting.

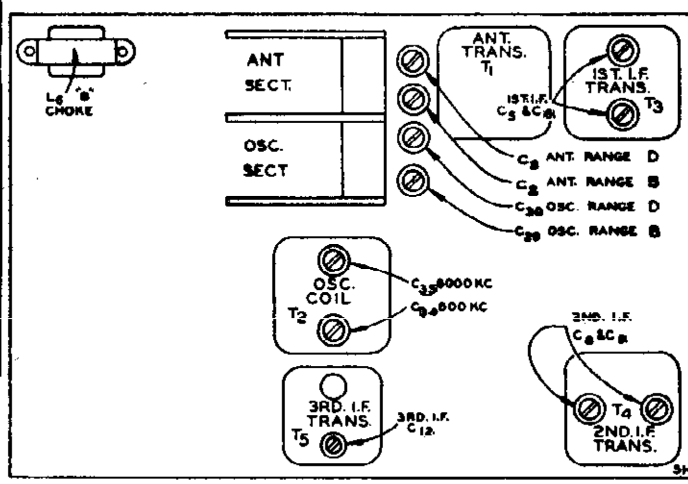


Fig. 3—Location of Trimmers

WELLS-GARDNER & CO.

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the control grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C29) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

Adjust the antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC padder (C34) until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC. It may be necessary to increase the input signal to hear the image.

16,000 KC Adjustment

Set the signal generator for 16,000 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (short wave band).

Adjust the oscillator Range D trimmer (C30) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the antenna Range D trimmer (C3) to maximum. When adjusting this trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC (C35) padder until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Servicing Power Unit

The power unit is that portion of the chassis assembly contained within the large rectangular shield can and the circuit for which is shown within the dotted lines at the lower center of the schematic diagram, Fig. 2.

Continuity Resistance Check—The power transformer, choke coil circuits and condenser shorts may be checked by utilizing the vibrator socket terminals and various points on the "A" or "B" lines, or ground without removal of the shield can. For example: when checking the continuity or resistance of the upper half of the transformer secondary, contact may be made with the test prods at the proper vibrator socket terminal, as shown on the circuit diagram, and at the terminal strip lug to which the 15 mf. electrolytic condenser, C26 is connected.

Removing Transformer and Vibrator Socket Assembly—Take off the filter unit shield can by removing the four self tapping screws at the right side (from front) of the chassis base and the five hex nuts from the bolts at the top of the chassis.

Unsolder the ground connections from the two lugs on the inside of the chassis base (right side from front).

Now unsolder the mounting lug holding the terminal strip to the transformer cover.

Remove the four nuts from the bolts holding the transformer assembly to the chassis. Do not remove these bolts from the transformer core. Then lift the assembly to free it from the chassis so that all parts of the assembly are readily accessible.

Proceed with replacement of the power transformer or with any other necessary service or replacements and then reassemble.

Replacement of Buffer Condenser C24—This condenser is located in the top of the transformer and vibrator assembly just underneath the vibrator socket. To replace, remove the assembly as explained in the preceding article.

In addition, the two screws holding the vibrator socket to the transformer cover assembly should be taken out. The condenser is then easily replaced.

Synchronous Vibrator—The action of the synchronous vibrator used in the power unit is shown in the abridged wiring diagram Fig. 7. When the switch is closed, the armature is drawn up (from the standpoint of diagram) as a result of the current through the vibrator coil. When this occurs, the upper contacts are closed and the vibrator coil is short circuited. The spring action then causes the armature to spring back and the upper contacts are opened. The vibrator coil is again energized, but the inertia of the armature causes it to continue in motion until the two bottom contacts are closed.

The spring action then brings the armature up, opening the bottom contacts. The vibrator coil is again energized and the armature is drawn up to start the next cycle.

The "A" current (heavy lines, Fig. 7) flows first through one side of the power transformer primary and then through the other side in the opposite direction. An AC voltage is induced in the secondary as a result. That portion of the circuit shown in light lines rectifies the secondary current.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer 17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Caution

Do not turn the receiver on unless ALL the tubes are in the sockets. Removal of any of them will result in abnormal voltages on the remaining tubes.

Be sure that the battery clips are connected to the battery with the correct polarity. Reversed connections may damage the receiver.

Do not use any power source other than a 6 volt storage battery.

It the receiver does not operate after being turned on, turn the switch off immediately, examine the battery connections and the fuse and see if all tubes are properly inserted.

The primary of transformer L7 serves as an audio choke in the filament circuit. The secondary of this transformer is in the control grid circuit of the 1F4, and acts as a hum bucking winding.

Filament Wiring—Fig. 6 is an abridged wiring diagram which shows the tube filament wiring system and also indicates the points at which the no-signal bias voltages are obtained.

Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
[illegible]	4 Prong Tube Socket	$0.10
[illegible]	5 Prong Tube Socket	.10
[illegible]	6 Prong Tube Socket	.10
[illegible]	6 Prong Vibrator Socket	.10

SPEAKERS

Part No.	Description	List Price
[illegible]	6" Dynamic Speaker Compl. with Output Transformer (T6)	5.70
[illegible]	8" Dynamic Speaker Compl. with Output Transformer (T6)	6.00
[illegible]	Speaker Cable and Socket Assembly	.40

KNOBS

Part No.	Description	List Price
Specify Name of Knob and Model of Radio	Tuning Control Knob	.15
	Band Switch Knob	.15
	Volume Control Knob	.15

GENERAL

Part No.	Description	List Price
[illegible]	Rubber Chassis Mounting Cushions ea.	.10
[illegible]	Tube Shield (large)	.20
[illegible]	Tube Shield (small—open top)	.15
[illegible]	Tube Shield (small—closed top)	.10
[illegible]	Vibrator Shield	.30
[illegible]	Tube Shield Base (large)	.10
[illegible]	Tube Shield Base (small)	.10
[illegible]	Vibrator Shield Base	.10
[illegible]	Vibrator Spring Clip	.10
[illegible]	Felt Washers (Used behind Knobs) doz.	.10
[illegible]	Terminal Strip (2 Lug Insulated, one extended as mounting foot)	.10
4A44	Terminal Strip (3 Lug Insulated, center lug extended as mounting foot)	.10
4A84	Terminal Strip (5 Lug Insulated, 2 lugs to ground as mounting feet)	.10
30X14	Grid Clip Only doz.	.10
13X214	Antenna and Ground Lead Assembly	.50
13X272	Shielded Battery Cable	1.25
7A58	1 Section, 2 Position Band Change Switch	.50
7A61	Tone Control Switch	.70
19A38	Vibrator Unit	3.90
30X132	Chassis Mounting Feet ea.	.15
25X71	Shield Can for Filter Assembly (Under Vibrator and Transformer Assembly)	.50
23A61	Gang Condenser Mounting Kit Includes 3—Grommets, 3—Shoulder Nuts, 3—No. 6 Flat Washers	.15
16X19	5 Ampere Fuse	.10
16X9	Fuse Clip Assembly	.10

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A84	T1	Antenna Transformer and Can Assembly	$1.15
9A85	T2	Oscillator Coil and Can Assembly	1.45
9A86	T3	1st I.F. Transformer and Can Assembly	1.40
9A87	T4	2nd I.F. Transformer and Can Assembly	1.50
9A44	T5	3rd I.F. Transformer and Can Assembly	1.50
11X07	T6	Output Transformer—Part of Speaker Assembly	1.00
12X48	T7	Power Transformer Only	2.45
25A38		Power Transformer Assembly (Includes Parts marked *)	3.85
9A48	L1, L8	"B" Reactor, "A" Reactor — One Assembly	.40
9A47	L2	"B" Reactor	.35
9A46	L3	Vibrator Choke	.30
9A86	L4, L5	"A" Line Reactor	.35
12X45	L6	"B" Choke	.80
12X46	L7	"A" Choke	1.25

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X60	C4	.05 mf.	100	$0.15
46X78	C7	.10 mf.	100	.20
46X78	C10	.10 mf.	100	.20
46X78	C11	.15 mf.	100	.20
46X134	C16	.01 mf.	100	.15
46X134	C18	.01 mf.	100	.15
46X135	C19	.5 mf.	100	.40
46X135	C20	.5 mf.	100	.40
46X117	C21	.25 mf.	100	.35
46X123	C22	.5 mf.	100	.30
46X79	C23	.15 mf.	100	.20
46X201	C24	.01 mf.	1000	.15
46X78	C26	.10 mf.	100	.20
46X117	C31	.25 mf.	100	.35
46X78	C33	.10 mf.	100	.20
46X107	C36	.02 mf.	100	.15
46X78	C37	.10 mf.	100	.20

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X170	C38	.01 mf.	200	$0.15
46X135	C39	.5 mf.	400	.40
46X107	C40	.02 mf.	100	.15
46X78	C42	.10 mf.	100	.20
46X204	C43	.5 mf.	100	.30
46X107	C44	.02 mf.	100	.20

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage	List Price
46X214	C32, C25, C27	4 mf., 16 mf., 16 mf.	150 Dry	1.85

MOLDED

Part No.	Code	Capacitance	List Price
47X89	C1	250 mmf.	.15
[illegible]	C13	50 mmf.	.10
[illegible]	C14	100 mmf.	.10
[illegible]	C15	50 mmf.	.10
[illegible]	C17	50 mmf.	.10
[illegible]	C28	50 mmf.	.10
47X31	C41	100 mmf.	.10

TRIMMER

Part No.	Code	Capacitance	Description	List Price
17A46 Trimmer Strip	C2	2-25 mmf.	Range "B" Antenna Trimmer	.40
	C3	2-25 mmf.	Range "D" Antenna Trimmer	
	C29	2-25 mmf.	Range "B" Oscillator Trimmer	
	C30	2-25 mmf.	Range "D" Oscillator Trimmer	
			See Part Number 17A36 for replacement of any one section.	
17A30	C5, C6	100-200 mmf.	1st I.F. Trimmers	.40
17A33	C8, C9	75-150 mmf.	2nd I.F. Trimmers	.40
17A38	C12	40-150 mmf.	3rd I.F. Trimmer	.25
17A35	C34, C35	300-600 mmf., 40-150 mmf.	600 KC Trimmer, 6000 KC Trimmer	.45
17A36		2-25 mmf.	(To be used for replacement of any one section of Trimmer Strip 17A46)	.10

MISCELLANEOUS

Part No.	Description	List Price
14A40	2 Gang Condenser less Dial and Drive Assembly	2.85

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A94300	R1	30,000 Ohm	0.2	$0.15
A94104	R2	100,000 Ohm	0.2	.15
A94800	R3	80,000 Ohm	0.2	.15
A94100	R4	10,000 Ohm	0.2	.15
A95005	R5	4 Megohm	0.2	.40
A95104	R6	100,000 Ohm	0.2	.10
A94403	R7	40,000 Ohm	0.2	.15
A95003	R8	50,000 Ohm	0.2	.10
A95305	R9	3 Megohm	0.2	.10
A95205	R10	2 Megohm	0.2	.10
A94104	R12	100,000 Ohm	0.2	.15
A94104	R13	100,000 Ohm	0.2	.15
A94103	R15	10,000 Ohm	0.2	.10
A95102	R16	1,000 Ohm	0.2	.10
A95105	R17	1 Megohm	0.2	.10

WIRE WOUND

Part No.	Code	Resistance	List Price
43X61	R14	11.1 Ohm	.25

VARIABLE

Part No.	Code	Resistance	Description	List Price
36X136	R11	1 Megohm	Volume Control and On-Off Switch	1.00

DIAL AND DRIVE ASSEMBLY

DIAL ASSEMBLY

Part No.	Description	List Price
16A103	Dial Bracket Assembly less Dial Lamp, Dial Lamp Socket and Spring Clip, Pointer and On-Off Indicator Assembly	$0.80
15X60	Pointer	.10
26A77	On-Off Indicator Disc Assembly Only	.15
7A26	Dial Lamp	.08
7A8	Dial Lamp Socket and Spring Clip	.10
2A40	Dial Lamp Push-Button Switch Assembly	.30

DRIVE ASSEMBLY

Part No.	Description	List Price
5A36	Drive Bracket Assembly, less Drive Shaft, and Drive Drum and Pointer Shaft	.35
24X230	Drive Shaft Only	.15
24X226	Drive Drum and Pointer Shaft (mounted on Gang Condenser Shaft)	.45
	30" Black Tuning Drive Cord doz.	.45
28X27	Tension Spring for Tuning Drive Cord	.10
	6" On-Off Indicator Cord doz.	.20
28X44	Tension Spring for Above Indicator Cord	.10
29X2	Brass Collar with Set Screw for Securing Indicator Cord to shaft of Volume Control	.10

PRICES SUBJECT TO CHANGE
WITHOUT NOTICE

MODELS 5K, 5KL
Alignment, Parts

WELLS-GARDNER & CO.

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator, and adjust the I.F. wave trap trimmer (C1) for minimum output. The location of this trimmer is shown in Fig. 3.

Range D Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (2nd short wave band).

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range D trimmer (C8) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the antenna Range D trimmer (C3) to maximum.

When adjusting the antenna Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

Range C Alignment

5800 KC Adjustment

Set the signal generator for 5800 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (1st short wave band).

Adjust the oscillator Range C trimmer (C9) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the antenna Range C trimmer (C4) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

Adjust the oscillator Range B trimmer (C10) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the screw of the large pointer and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

Adjust the antenna Range B trimmer (C5) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer (C11) until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A245	Tube Socket, 8 Prong	$0.15
3A242	Tube Socket, 7 Prong	.15
3A243	Tube Socket, 5 Prong	.15
3A58	Speaker Socket, 6 Prong	.10
13X256	6G5 Tube Socket and Cable Assembly	.66

SPEAKERS

Part No.	Description	List Price
12A257	6" Dynamic Speaker Compl. with Output Transformer (T6)	5.80
12A260	8" Dynamic Speaker Compl. with Output Transformer (T6)	6.35
12A258	10" Dynamic Speaker Compl. with Output Transformer (T6)	6.85

KNOBS

Part No.	Description	List Price
Specify Name of Knob and Name and Model of Radio	Tuning Control — Set Screw Type	.20
	Volume Control — Push-On Type	.15
	Band Switch — Push-On Type	.15

GENERAL

Part No.	Description	List Price
2X38	Felt Washer (Used behind knobs) ... doz.	.10
8X23	Rubber Chassis Mounting Cushion ... ea.	.10
2A67	Band Change Switch	.88
2A61	Tone Control Switch	.20
30X44	Grid Clip Only ... doz.	.10
4A50	Terminal Strip (2 lugs insulated with mounting hole in center)	.10
4A18	Terminal Strip (2 lugs insulated with mounting strap in center)	.10
32X69	Tube Shield (Tuning Eye)	.15
32X78	Tube Shield Base (Tuning Eye)	.10
13X80	Line Cord and Plug	.50
13X214	Antenna and Ground Lead Assembly	.30
20X122	Chassis Mounting Feet ... ea.	.10
23A61	Gang Condenser Mounting Cushion Assembly. Includes 3—Rubber Cushions, 3—Hex Shoulder Nuts, 3—No. 6 Flat Washers	.15

DIAL AND DRIVE ASSEMBLY

DIAL ASSEMBLY

Part No.	Description	List Price
15A104	Dial Assembly Complete less Dial Lamp, Lamp Socket and Main Pointer	$3.00
26X324	Dial Bracket Only	.25
58X149	Dial Glass	1.15
26X235	Volume Control Pointer Shaft and Pulley	.20
26X240	Band Change Pointer Shaft and Pulley	.20
29X20	Brass Collar for Volume Indicator	.10
29X60	Brass Collar for Band Indicator	.25
15X80	Small Pointers	.10
28X44	Takeup Springs for Small Pointers	.10
18X79	Main Pointer	.10
	Wave Band or Volume Indicator Cord (8") ... doz.	.28
41X12	Lamp Reflector	.10
7A37	Lamp Socket	.10
7A32	Dial Lamp	.20
9X38	Cardboard Dial Background	.10
28X331	Dial Clamping Bracket	.10
4X141	Dial Crystal and Escutcheon Assembly	1.15

DRIVE ASSEMBLY

Part No.	Description	List Price
5A36	Drive Bracket and Bushing Assembly Complete	.35
26X234	Drive Shaft	.20
24X249	Drive Drum and Main Pointer Shaft	.46
	20" Tuning Drive Cord ... doz.	.45
28X27	Tension Spring for Drive Cord	.10

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A492	T1	Antenna Transformer and Can Assembly	$1.75
9A493	T2	Oscillator Coil and Can Assembly	1.66
9A494	T3	1st I.F. Transformer and Can Assembly	1.35
9A496	T4	2nd I.F. Transformer and Can Assembly	1.36
53X134	T5	115 Volt, 60 Cycle Power Transformer	3.35
63X134	T5	115-230 Volt, 40-60 Cycle Power Transformer	4.70
61X31	T6	Output Transformer (Part of Speaker Assembly)	2.46
9A714	L1	Wave Trap (456 KC)	.96

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X80	C6	.05 mf.	180	$0.15
46X202	C7	.02 mf.	360	.15
46X98	C15	.10 mf.	180	.20
46X117	C16	.25 mf.	180	.26
46X105	C22	.10 mf.	360	.20
46X120	C25	.01 mf.	360	.15
46X120	C27	.01 mf.	360	.15
46X117	C28	.25 mf.	180	.26
46X172	C29	.02 mf.	180	.15
46X208	C30	.02 mf.	480	.15
46X100	C31	.002 mf.	600	.16

MOLDED

Part No.	Code	Capacitance	List Price
47X69	C2	250 mmf.	.15
47X75	C12	2100 mmf.	.26
47X76	C13	4800 mmf.	.36
47X63	C14	35 mmf.	.10
47X57	C21	100 mmf.	.10
47X65	C26	250 mmf.	.15

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage	List Price
44X32	C23	16 mf.	250 Wet	.75
44X31	C24	12 mf.	340 Wet	.80

TRIMMERS

Part No.	Code	Capacitance	Description	List Price
17A64	C1	30-90 mmf.	Wave Trap Trimmer	.26
17A59	C3	2-25 mmf.	Range "D" Antenna Trimmer	.60
	C4	2-25 mmf.	Range "C" Antenna Trimmer	
	C5	2-25 mmf.	Range "B" Antenna Trimmer	
	C8	2-25 mmf.	Range "D" Oscillator Trimmer	
	C9	2-25 mmf.	Range "C" Oscillator Trimmer	
	C10	2-25 mmf.	Range "B" Oscillator Trimmer	
17A60	C11	450-850 mmf.	600 KC Trimmer	.46
17A33	C17	70-150 mmf.	1st I.F. Trimmers	.40
	C18	70-150 mmf.		
17A34	C19	70-150 mmf.	2nd I.F. Trimmers	.40
	C20	150-250 mmf.		

MISCELLANEOUS

Part No.	Description	List Price
14A61	2 Gang Condenser less Dial and Drive Assembly	2.50

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A94104	R1	100,000 Ohm	0.2	$0.15
A96153	R2	15,000 Ohm	0.2	.10
A96205	R3	2 Megohm	0.2	.10
A94151	R4	150 Ohm	0.2	.15
B94503	R5	50,000 Ohm	0.5	.15
C94103	R6	10,000 Ohm	1.0	.15
A98503	R7	50,000 Ohm	0.2	.10
A95104	R9	100,000 Ohm	0.2	.10
A96205	R10	2 Megohm	0.2	.10
A94504	R11	500,000 Ohm	0.2	.15
A94104	R14	100,000 Ohm	0.2	.15
A94504	R15	500,000 Ohm	0.2	.15
A95105	R16	1 Megohm	0.2	.10
A98805	R17	8 Megohm	0.2	.10
A98805	R18	8 Megohm	0.2	.10

WIRE WOUND

Part No.	Code	Resistance	Wattage	List Price
43X49	R12	25 Ohm	.25	.35
	R13	210 Ohm	2.0	

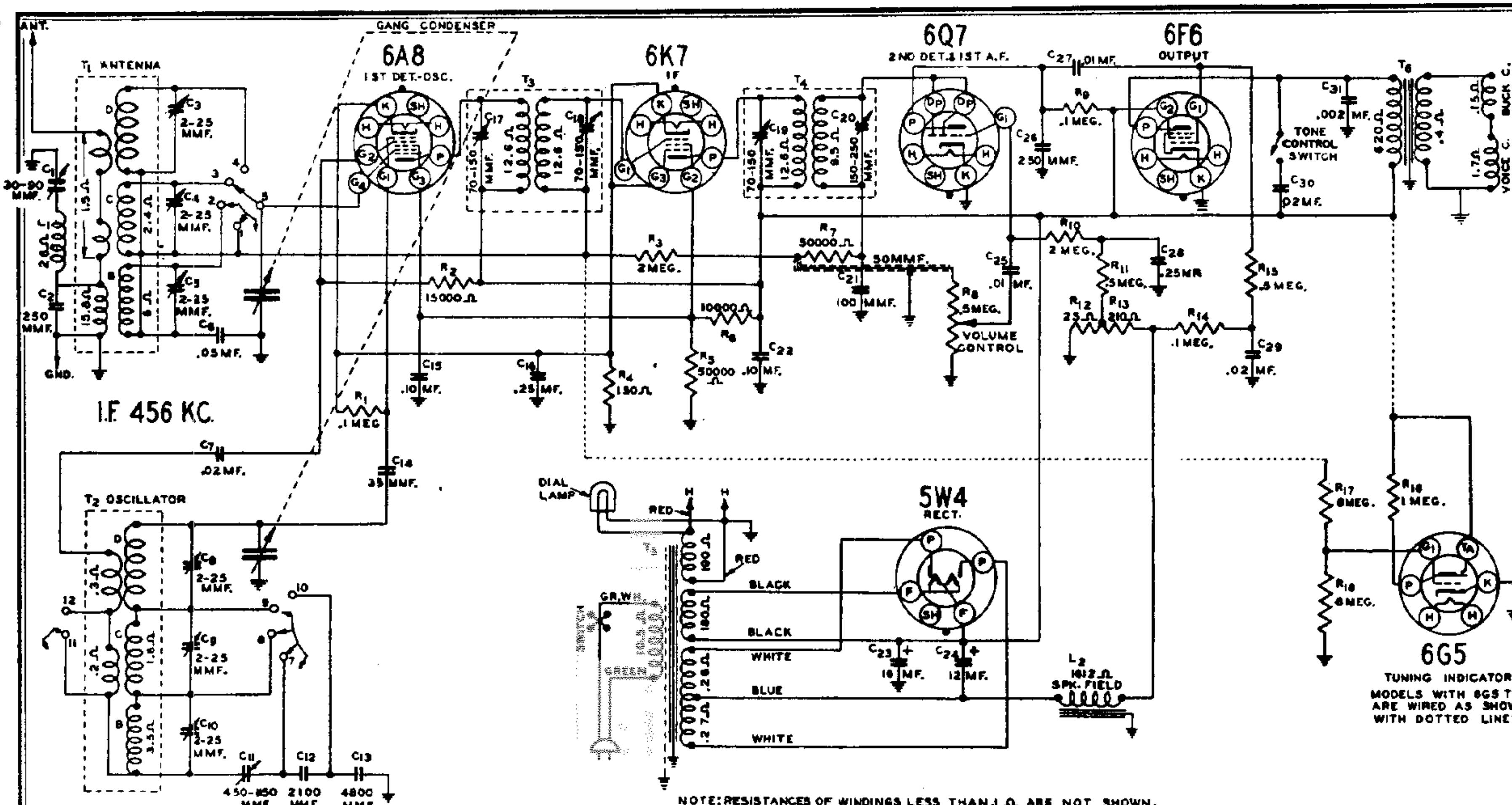
VARIABLE

Part No.	Code	Description	List Price
36X227	R8	0.5 Megohm Volume Control and On-Off Switch	1.00

Prices Subject to Change Without Notice

MODELS 5K,5KL
Schematic
Sensitivity

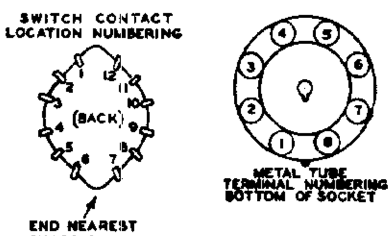
WELLS-GARDNER & CO.



NOTE: RESISTANCES OF WINDINGS LESS THAN .1 Ω. ARE NOT SHOWN.

ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1 STANDARD WAVE B	POSITION 2 SHORT WAVE C	POSITION 3 SHORT WAVE D
SEC. 1	1 2 3 4 5 7 8 9 10 11 12	1 2 3 4 5 7 8 9 10 11 12	1 2 3 4 5 7 8 9 10 11 12



Power Consumption - 53 Watts (At 115 volts 60 cycles)
Power Output - - - - - - 2 Watts Undistorted
Selectivity - - 35 KC Broad at 1000 times Signal
Intermediate Frequency - - - - - - - 456 KC
Speaker - - - - - - 6", 8" or 10" Dynamic

Tuning Frequency Range
B Range............ 528 to 1730 KC
C Range............1710 to 5800 KC
D Range............5750 to 18300 KC

Sensitivity
B Range.........12 Microvolts Absolute
C Range.. 17 to 24 Microvolts Absolute
D Range...28 to 35 Microvolts Absolute

SH—SHELL
H—HEATER
K—CATHODE
F—FILAMENT
P—PLATE

TUBE ELEMENT LEGEND
G_1—CONTROL GRID
G_2—SCREEN GRID
G_3—SUPPRESSOR GRID
D_P—DIODE PLATE
T_A—TARGET

6A8 TUBE ONLY
G_1—OSC. CONTROL GRID
G_2—OSC. ANODE GRID
G_3—SCREEN GRID
G_4—CONTROL GRID

Series 5KL

Series 5K radios are the same as 5KL except that they do not have the tuning eye tube.

Nov. 1936

MODELS 5K, 5KL
Socket, Trimmers
Voltage, Coils

WELLS-GARDNER & CO.

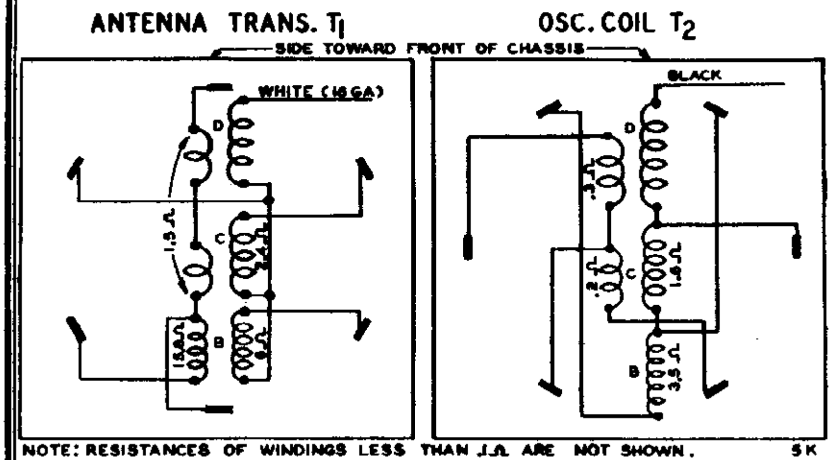


Fig. 4—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

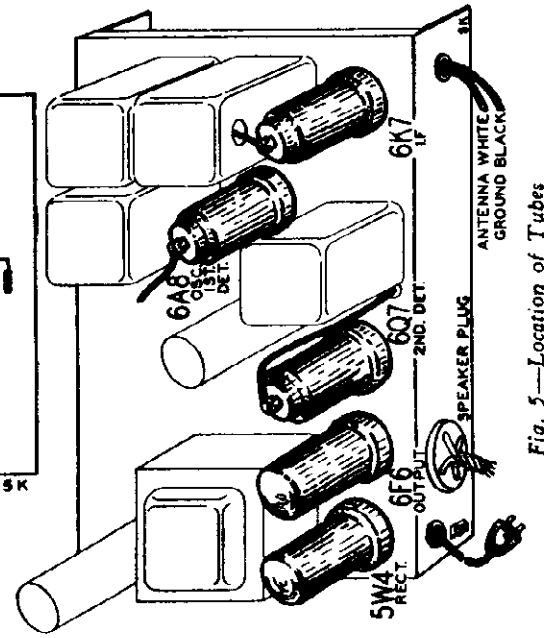


Fig. 5—Location of Tubes

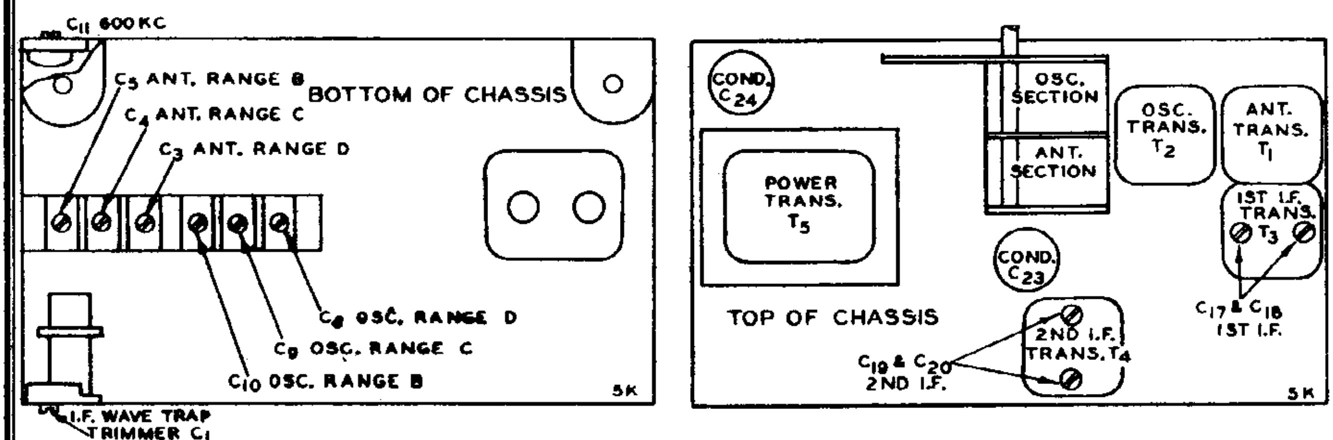


Fig. 3—Location of Trimmers

VOLTAGES AT SOCKETS

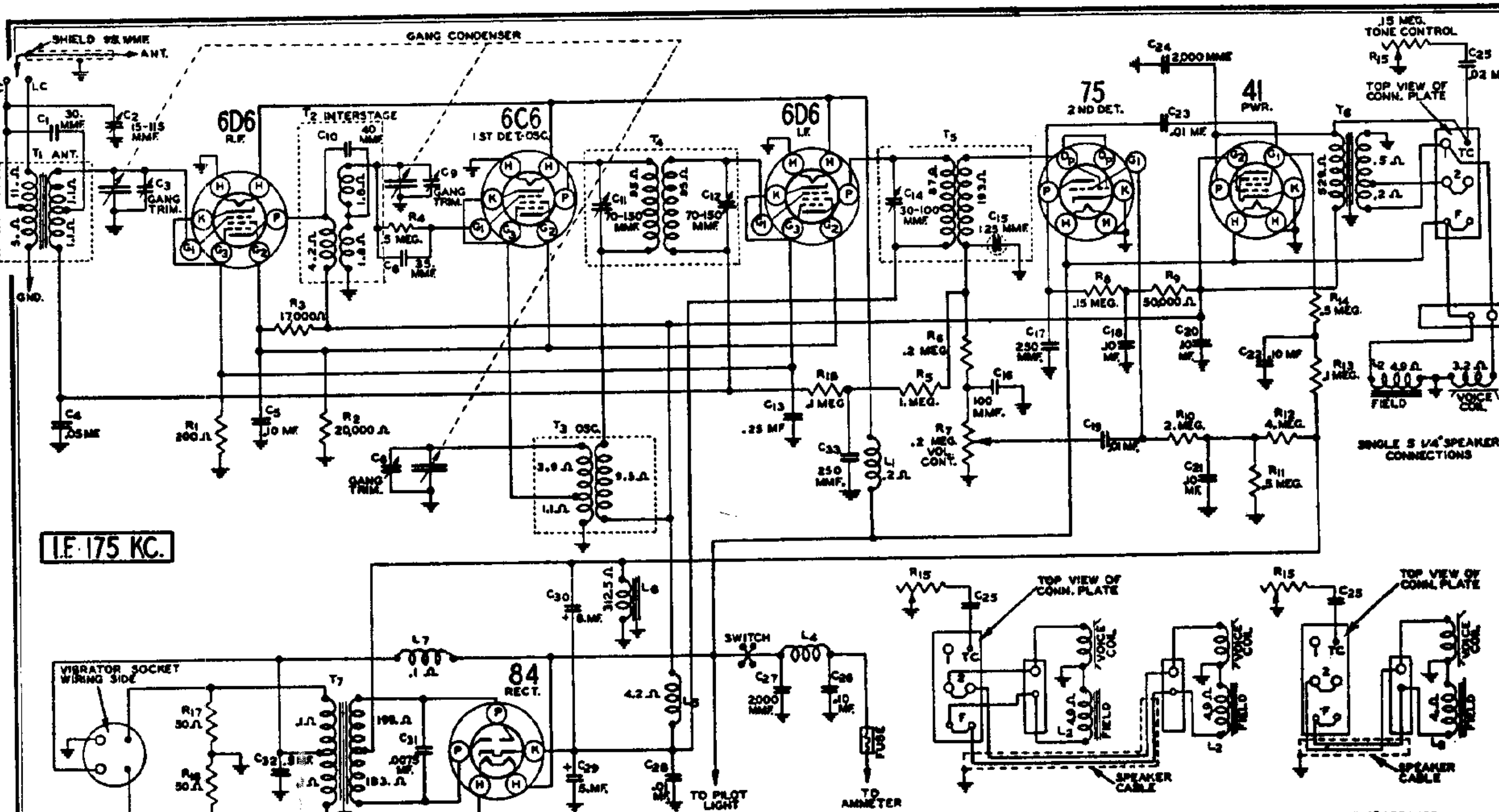
Line Voltage: 115 — Volume Control: Maximum — Antenna Shorted to Ground

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6A8	1st Det.-Osc.	0	6.3(1)	200	110		160	6.3(1)	3
6K7	I.F.	0	6.3(1)	200	110	3		6.3(1)	3
6Q7	2nd Det.	0	6.3(1)	110	0	0		6.3(1)	0(2)
6F6	Output	0	6.3(1)	185	200	12.5(3)		6.3(1)	0
5W4	Rectifier	0	5.1(4)		620(5)		620(5)		5.1(4)
6G5	Tuning Indicator	Plate to Ground 18		Target to Ground 200		Cathode to Ground 0		Across Heater 6.3 A.C.	

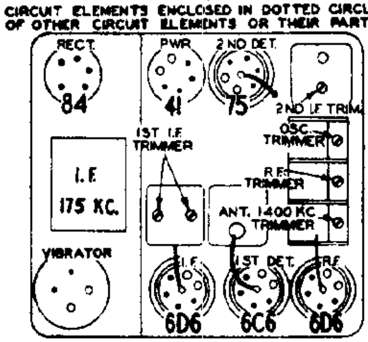
(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Bias (1.5 volts) as read across resistor R12.
(3) Read across resistor R12 and R13.
(4) A.C. voltage as read across heater terminals 2 and 8.
(5) A.C. voltage read across terminals 4 and 6.

MODEL 6C1
Schematic, Socket, Trimmers, Voltage

WELLS-GARDNER & CO.



CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.



Power Consumption	7.3 Amperes at 6.3 Volts
Power Output	2.4 Watts Undistorted
Sensitivity	0.8 Microvolts at 1 Watt Output
Selectivity	42 KC Broad at 1000 Times Signal
Tuning Frequency Range	530 to 1581 KC
Speaker	5¼ Inch Dynamic

Series 6C1

Jan. 1937

VOLTAGES AT SOCKETS

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground
6D6	R.F.	6.0	245	105	3.2
6C6	1st Det. and Osc.	6.0	243	105	
6D6	I.F.	6.0	245	105	3.2
75	2nd Det.	6.1	127		
41	Power	6.1	230	245	17(1)
84	Rectifier	6.1	600(2)		

(1) Grid bias read across filter choke L6

(2) ... Battery 6.3 Volts Under Load

MODEL 6C1
Coils,Mounting Data

WELLS-GARDNER & CO.

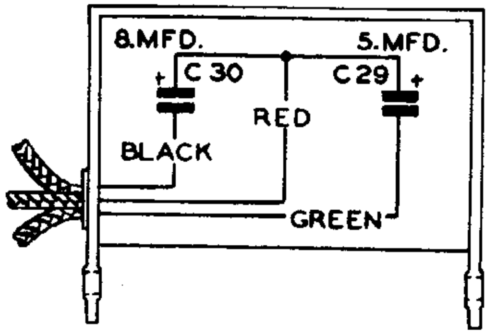


Fig. 5—Condenser Block—Internal Wiring

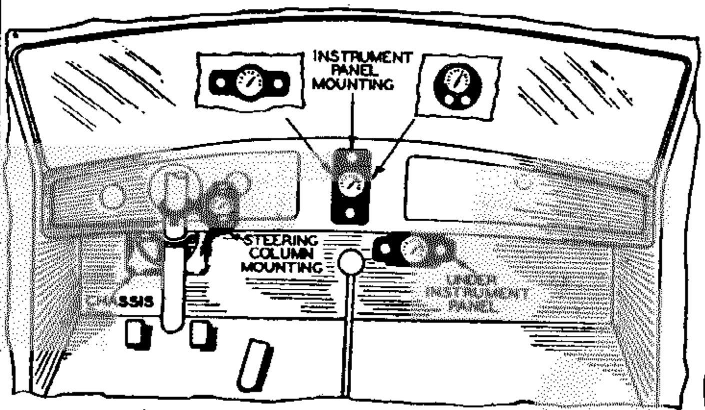


Fig. 6—Various Control Head Mountings

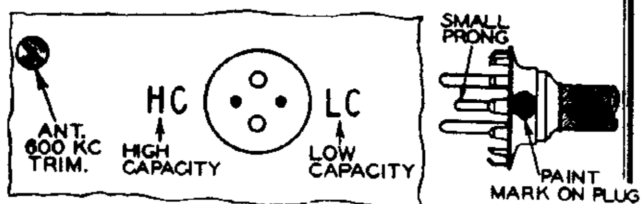


Fig. 3—Antenna Plug Insertion

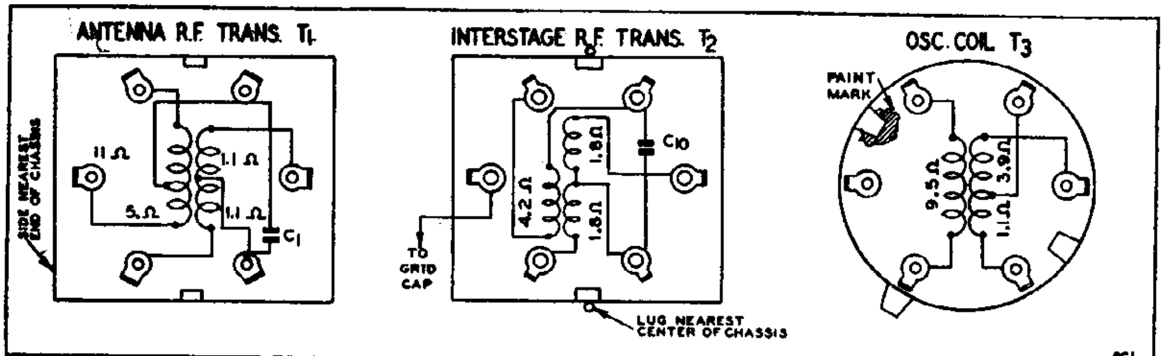


Fig. 4—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

Instrument Panel Mounting Kits

Car	Year & Model	Kit No.
Buick	1937 40-60 Series	21A68
	80-90 Series	21A69
	1936	21A16
Cadillac	1937	21A70
	1936	21A39
Chevrolet	1937 All Models	21A58
	1936-35 Standard & Master	21A11
Chrysler	1937 Royal	21A59
	Imperial	21A71
	Airflow	21A72
	1936 Six	21A19
	Eight	21A30
	Airflow	21A31
	1935-34 Except Imperial	21A47
DeSoto	1937	21A60
	1936 Airflow & Airstream Custom	21A22
	Airstream DeLuxe	21A26
	1935 DeLuxe	21A46
	1934	21A47
Dodge	1937	21A61
	1936 DeLuxe	21A13
	1935	21A45
	1934	21A49

Car	Year & Model	Kit No.
Ford	1937 DeLuxe	21A74
	Standard	21A73
	1936 Std. & DeLuxe	21A10
	1935 DeLuxe	
	Standard	21A32
	1934	21A38
Graham	1937 Cavalier & Supercharger	21A87
	Crusader	21A86
Hudson	1937	21A75
	1936	21A17
	1935	21A48
	1934	21A35
LaFayette	1936-35	21A50
LaSalle	1937	21A89
	1936	21A40
Lincoln	Zephyr 1937	21A76
	Zephyr 1936	21A10
Nash	1937 Ambassador	21A63
	1936-35	21A36
Nash Laf. 400	1937	21A62
Oldsmobile	1937	21A88
	1936	21A14
	1935	21A34

Car	Year & Model	Kit No.
Packard	1937 Six	21A56
	120-C	21A57
	Super 8 & 12	21A77
	1936 120-B	21A21
	1935 120	21A41
Plymouth	1937 DeLuxe	21A78
	Standard	21A64
	1936 DeLuxe	21A12
	1936-35 Standard	21A37
	1935 DeLuxe	21A33
	1934	21A49
Pontiac	1937	21A79
	1936-35 Standard-DeLuxe 6 & 8	21A15
Studebaker	1937 Dictator Coupe	21A65
	Dictator	21A54
	President	21A55
	1936 Dictator	21A20
	President	21A24
Terraplane	1937	21A80
	1936	21A18
	1935	21A48
	1934	21A35
Steering column and under panel kit.	Chromium	21A66
	Black	21A67

1934, 1935, 1936 and No. 21A67 Steering Column Kits............Net Price.............ea. $0.60
1937 and No. 21A66 Steering Column Kits...........Net Price............ea. .75

WELLS-GARDNER & CO.

MODEL 6C1
Alignment, Parts
Notes

I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the output of the signal generator through a .05 mf. condenser to the stator of the R.F. interstage section of the tuning condenser. (See Fig. 2 for location of this section.)

Connect the ground lead of the signal generator to the chassis. The chassis should be in the case.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers is shown in Fig. 2.

1581 KC Adjustment

Set the signal generator for 1581 KC.

Turn the rotor of the tuning condenser to the full open position.

Insert the antenna plug with the mark on the high capacity (HC) side. Connect the shielded antenna lead from the chassis through a 120 mmf. condenser to the antenna post of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—see Fig. 2 for location of this trimmer.

1400 KC Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the R.F. interstage and antenna 1400 KC trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Tune in this signal and adjust the 600 KC antenna trimmer to maximum (See Fig. 3 for location of this trimmer).

After the alignment procedure is completed, the antenna plug may be withdrawn and reinserted on the LC side if a low capacity (70 mmf.) car antenna is used.

Adjusting Antenna 600 KC Trimmer

After the radio is installed and the car antenna is connected, it will be necessary to readjust the antenna trimmer. Tune in a weak signal at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained. See Fig. 3 for location of this trimmer.

Calibrating the Radio

To calibrate the radio, tune in a station of known frequency. At the back of the control head is the calibration screw. Remove the pilot lamp assembly. Hold the tuning knob. Insert a fine blade screwdriver and turn this screw until the pointer on the dial scale is at the frequency of the station being received.

A very short insulated screwdriver will be helpful.

Inserting Antenna Plug

IMPORTANT—The antenna plug can be inserted in two ways depending on whether the antenna is of high or low capacity.

If the total capacity of the antenna and shielded lead is approximately 200 mmf., which would be the case in a running board or ordinary roof antenna (not metal roof), insert the antenna plug with the mark on the HC side—See Fig. 3.

If the total capacity of the antenna and shielded lead is approximately 70 mmf., such as may be the case if a "fish pole" antenna is used, insert the antenna plug with the mark on the LC side.

The 1936 Chrysler Motors cars (except Plymouth—but including Chrysler, Dodge and DeSoto) have a steel roof, separated from the body proper, which is used as an antenna. The capacity of these antennas is about 1300 mmf. If this radio is installed in these cars, it will be necessary to use a running board or "fish pole" antenna.

Most 1937 General Motors cars are equipped with an antenna built into the running board which is insulated from the body proper.

If a running board or under-car antenna is used, it must be one which is covered with a suitable insulation, to prevent short circuiting in wet weather.

Control Head Mounting

This auto radio is supplied with a Universal control head. This head, in conjunction with suitable escutcheon plates and mounting brackets, can be mounted in the instrument panel of practically all widely sold 1936 and 1937 automobiles. If the head cannot be mounted in the instrument panel of the car, it may be mounted under the panel or on the steering column.

The escutcheon plates for the various cars, knobs, special mounting brackets and small items such as screws, are put up in kit form.

The control head, volume control fitting, flexible shafts, pilot lamp assembly, dial scale, retaining ring and pointer disc are packed with each radio.

In Fig. 6 are shown the various locations at which the control head is mounted. The head is intended for installation primarily in the instrument panel of the car. Most 1936 and 1937 cars have a name plate or ash receiver on the instrument panel, the removal of which permits installation of the radio control head.

Complete installation data is contained in the instruction booklet packed with each radio.

Panel Kits

1936 Radios—Series 6N, 6P, 6L, 6K, 6J ("A" Issue)
1937 Radios—Series 6J ("B" or Later Issues), 6C1

The following points must be observed when 1937 radios are used with 1936 or previous panel kits and also when 1936 radios are used with 1937 panel kits.

Dial Scale Kit

The dial scale, pointer disc and retaining ring (for 1937 panel kits) are packed with each 1937 radio and are not included in the panel kit. If a 1937 panel kit is ordered and is to be used with a radio manufactured in 1936, it will be advisable to order the "Dial Scale Kit" consisting of:

1—Dial Scale
1—Retaining Ring
1—Pointer Disc

The net price for this kit is 10c. Specify name and model of radio when ordering the kit.

Pointer Screw and Spacer Washer

A few of the first shipments of 1937 panel kits did not contain the pointer screw and spacer washer. It may, therefore, be necessary to order these items in some instances.

The pointer screws furnished prior to the 1937 radios have a slotted round head and cannot be satisfactorily used with the dial scales furnished with the 1937 radios. The pointer screw for the latter has an oval or flat head and may be used on either type.

If a panel kit purchased prior to 1937 is used with a 1937 radio, it will be necessary to order the new type pointer screw and special spacer washer. When ordering give kit number or name, model and year of car.

Roof Speaker and Dual Speakers (1936 Cars)

The Ford and General Motors 1936 automobiles have provision for mounting a speaker in the car roof (Ford 5¼ inch speaker, General Motors 5¼ or 8 inch speaker). This radio is so designed that roof speaker installations in these cars can readily be made.

Four types of speaker installations can be made as follows:

Single 5¼ inch Speaker on Chassis Case Cover
Single 5¼ inch Roof Speaker
Single 8 inch Roof Speaker
Dual 5¼ inch Roof and 5¼ inch Chassis Speakers

The electrical connections of the different speaker installations are shown in the schematic—Fig. 1.

Replacement Parts List

There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A207	4 Prong Tube Sockets	$0.10
3A204	5 Prong Tube Socket	.10
3A208	Vibrator Socket	.10
3A207	Speaker Socket (In chassis)	.20
3A206	Antenna Cable Socket	.10

SPEAKER

Part No.	Description	List Price
12A204	5¼" Dynamic Speaker	1.95
1[illegible]	Red Chassis Speaker Lead	.10
1[illegible]	Green Chassis Speaker Lead	.10
1[illegible]	White Tone Control Lead	.10

GENERAL

Part No.	Description	List Price
19A35	Vibrator Unit	3.40
[illegible]	Spring Clamp for Vibrator	.10
[illegible]	Chassis Case Only	1.15
[illegible]	Spring Clamp Buttons	Doz. .30
[illegible]	Chassis Case Cover Only	1.95
	8-32 x 3/16" Set Screws to Secure Flexible Shafts in Chassis Anchor Bushings	Doz. .15
16A89	Tone Control Knob	$0.10
[illegible]	Grid Clip Only	Doz. .10
[illegible]	Tube Shield Base	.10
[illegible]	Tube Shield	.10
4A[illegible]	Two Lug Terminal Strip (Both lugs insulated—Center mounting hole not used)	.10
[illegible]	Single Lug Terminal Strip with Mounting Foot	.10
[illegible]	Hex Bracket Nuts for Gang Condenser Mounting	.10
[illegible]	Mounting Bracket for Gang Condenser	.10
[illegible]	Brass Stud for above Bracket	.10
[illegible]	Rubber Grommets for above Bracket and for Gang Condenser Mounting	.10

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A759	T1	Antenna Transformer and Can Assembly	$1.40
9A760	T2	Interstage Transformer and Can Assembly	1.40
9A766	T3	Oscillator Coil and Can Assembly	.80
9A761	T4	1st I.F. Transformer and Can Assembly	1.45
9A762	T5	2nd I.F. Transformer and Can Assembly	1.50
51[illegible]	T6	Output Transformer	1.10
[illegible]	T7	Power Transformer	2.90
9A540	L1 Filament Reactor, L3 R.F. "B" Plate Reactor	One Assembly	.55
9A566	L4	Motor Noise Reactor	.35
[illegible]	L6	Filter Choke	.90
9A775	L7	Vibrator Reactor	.35

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A19201	R1	200 Ohms	0.2	$0.10
[illegible]	R2	30,000 Ohms	0.5	.10
C19173	R3	17,000 Ohms	1.0	.15
A[illegible]	R4	100,000 Ohms	0.2	.15
A19105	R5	1 Megohm	0.2	.10
A[illegible]	R6	200,000 Ohms	0.2	.10
A19114	R8	110,000 Ohms	0.2	.10
A[illegible]	R9	50,000 Ohms	0.2	.10
A[illegible]	R10	2 Megohms	0.2	.10
A[illegible]	R11	500,000 Ohms	0.2	.10
A[illegible]	R12	4 Megohms	0.2	.10
A19104	R13	100,000 Ohms	0.2	.15
A[illegible]	R14	500,000 Ohms	0.2	.10
[illegible]	R16	50 Ohms	0.5	.10
[illegible]	R17	80 Ohms	0.5	.10
A[illegible]	R18	100,000 Ohms	0.2	.10

VARIABLE

Part No.	Code	Description	List Price
3A[illegible]	R7	.2 Megohm Volume Control & On-Off Switch	.75
[illegible]	R15	.75 Megohm Tone Control	.70

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46300	C4	.05 mf.	100	$0.15
[illegible]	C5	.10 mf.	100	.20
46[illegible]177	C13	.25 mf.	100	.25
[illegible]	C18	.10 mf.	200	.20
46[illegible]120	C19	.01 mf.	200	.15
[illegible]	C20	.10 mf.	200	.20
[illegible]	C21, C22	.10 mf., .10 mf.	100	.30
46[illegible]120	C23	.01 mf.	200	.15
[illegible]	C25	.02 mf.	400	.15
46[illegible]	C26	.10 mf.	100	.20
[illegible]	C28	.01 mf.	200	.15
[illegible]177	C31	.0075 mf.	1600	.20
[illegible]	C32	.05 mf.	100	.20

ELECTROLYTIC

Part No.	Code	Capacitance	Description	List Price
48C[illegible]	C29, C30	5.0 mf., 8.0 mf.	Dry Electrolytic Block	1.30

MOLDED

Part No.	Code	Capacitance	List Price
[illegible]	C1	50 mmf.	.10
[illegible]	C8	85 mmf.	.10
[illegible]	C10	60 mmf.	.15
[illegible]	C16	100 mmf.	.10
[illegible]	C17	250 mmf.	.15
[illegible]	C24	2500 mmf.	.20
[illegible]	C27	2000 mmf.	.20
[illegible]	C33	250 mmf.	.15

TRIMMER

Part No.	Code	Description	List Price
17A48	C2	25-115 mmf. Antenna 600 KC Trimmer	.20
	C3	Antenna Trimmer—Part of Gang Condenser	
	C6	Oscillator Trimmer—Part of Gang Condenser	
	C9	Interstage Trimmer—Part of Gang Condenser	
17A31	C11, C12	50-150 mmf., 50-150 mmf. 1st I.F. Trimmers	.35
17A45	C14	50-150 mmf. 2nd I.F. Trimmer	.20

MISCELLANEOUS

Part No.	Code	Description	List Price
	C15	125 mmf. Integral Part of 2nd I.F. Transformer	
14A46		Three Section Gang Condenser Assembly Complete with Drive Gears	4.16

INSTALLATION ITEMS

CABLE AND FLEXIBLE SHAFT ASSEMBLIES

Part No.	Quan. Used	Description	List Price
16A40	2	20" Volume or Tuning Control Flexible Drive Shaft	Ea. $1.10
16A42	2	25" Volume or Tuning Control Flexible Drive Shaft	Ea. 1.30
16A44	2	35" Volume or Tuning Control Flexible Drive Shaft	Ea. 1.65
1[illegible]	1	Pilot Light Cable Assembly less Lamp	.35
1[illegible]	1	40" Antenna Cable and Plug	.90
1[illegible]227	1	Battery Cable (Long Section with Fuse Receptacle)	$0.85
1[illegible]	1	"A" Cable—Short Section Connected to Chassis (Part of Chassis Assembly)	.35

MOUNTING BOLT ASSEMBLY

Part No.	Quan. Used	Description	List Price
[illegible]	3	Double End Hexagon Bolts for Mounting Chassis to Dash	.10
	3	5/16"-18 Spring Locknut for above Mounting Assembly	.10
[illegible]	6	Flat Washers for above Mounting Assembly	Doz. .15
	6	5/16"-18 Hexagon Nuts for above Mounting Assembly	Doz. .15
	1	5/16" Shakeproof Lockwasher to Ground Chassis Case to Metal Dash Surface on Engine Side	Doz. .10

MISCELLANEOUS MOUNTING ITEMS

Part No.	Quan. Used	Description	List Price
7A32	1	Pilot Light Bulb	.20
16X14	1	20 Ampere Fuse	.10
16X3	1	Fuse Shield	.10
21A6	1	Distributor Suppressor	.35
48C37	1	Generator Condenser	.50
21A5	1	Choke-Condenser Unit (Not Shipped With Set)	1.20
21A7		Spark Plug Suppressor (Not Shipped With Set)	.30

CONTROL HEAD AND PLATE ASSEMBLY

Part No.	Description	List Price
*20A37	No. 4 Control Head Only with ⅜" Hex. Nut	$3.00
*20A38	Volume Control Fitting complete with Retaining Spring, ⅜" Hex. Nut and Lockwasher	.35
*	Dial Scale (Specify Name and Model Number)	.40
*16X93	Pointer Disc	.10
*20X117	Retaining Ring	Doz. .30
†	Pointer Screw 3-48 x 5/16"	Doz. .10
?	Control Knobs—Specify Car, Year and Model	
	Molded Type	Ea. .20
	Chromium Type	Ea. .50

Note: Prices of Instrument Panel Plate Kits are shown below the Chart on Page 6.
*Shipped with each set.
†Shipped with Panel Kit.

ROOF SPEAKER MOUNTING KITS

1936 BUICK, CHEVROLET, PONTIAC, OLDSMOBILE

Part No.	Description	List Price
21A27	SPEAKER KIT ASSEMBLY COMPLETE	$5.25
	Includes	
12A204	5¼" Dynamic Speaker	1.95
23A86	Mounting Accessories—Includes Trim Ring, Speaker Housing, Self Tapping Screws and Clamp Springs	2.00
1[illegible]240	Speaker Cable Assembly Complete	1.30
21A42	SINGLE ROOF SPEAKER KIT LESS SPEAKER	3.30
9X19	Cardboard Disc—to replace Speaker removed from Chassis Cover	.10
	For Mounting Accessories and Roof Speaker Cable, see Kit No. 21A27 above.	
21A28	SPEAKER KIT ASSEMBLY COMPLETE	10.50
	Includes	
12A203	8" Dynamic Speaker	7.00
23A87	Mounting Accessories—Includes Trim Ring and Self Tapping Screws	2.00
1[illegible]240	Speaker Cable Assembly Complete	1.50

1936 FORD—STANDARD AND DELUXE

Part No.	Description	List Price
21A29	SPEAKER KIT ASSEMBLY COMPLETE	4.15
	Includes	
12A204	5¼" Dynamic Speaker	1.95
23A88	Mounting Accessories — Includes Hex. Nuts, Lockwashers and Bolts	.40
1[illegible]240	Speaker Cable Assembly Complete	1.85
21A40	SINGLE ROOF SPEAKER KIT LESS SPEAKER	1.10
9X19	Cardboard Disc—to replace Speaker removed from Chassis Cover	.10
	For Mounting Accessories and Roof Speaker Cable, see Kit No. 21A29 above.	

Prices Subject to Change Without Notice.

MODEL 6S
Mounting Data

WELLS-GARDNER & CO.

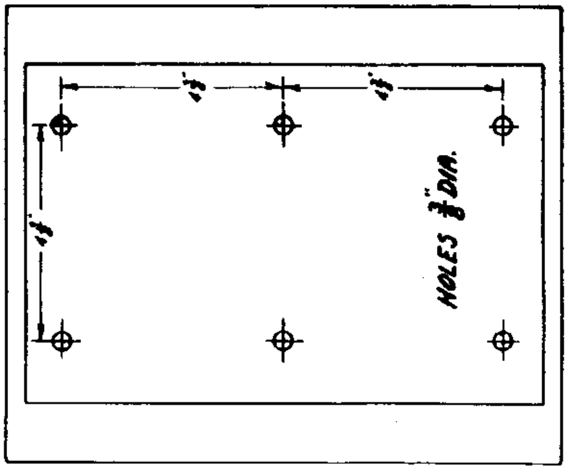


Fig. 2—Location of Mounting Holes

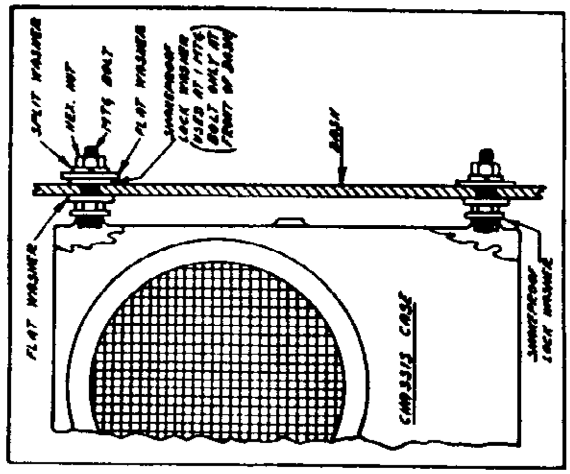


Fig. 3—Details of Chassis Mounting on Dash

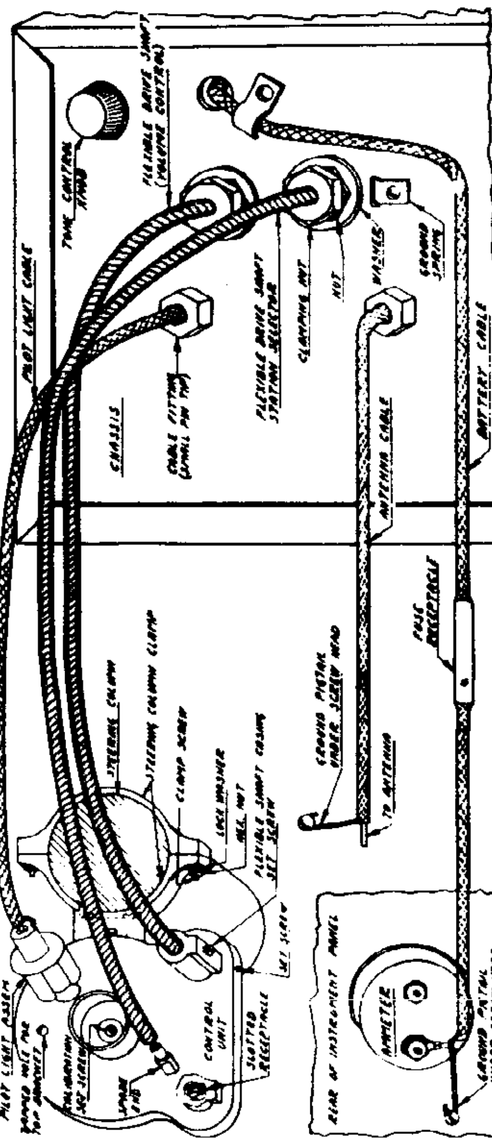


Fig. 4—General Installation View—Control Unit on Steering Column

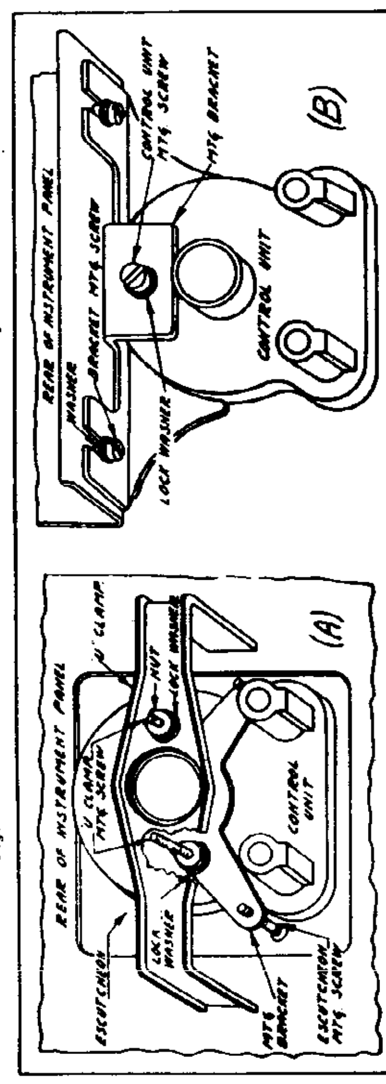


Fig. 5—Mounting Control Unit In and Under the Instrument Panel

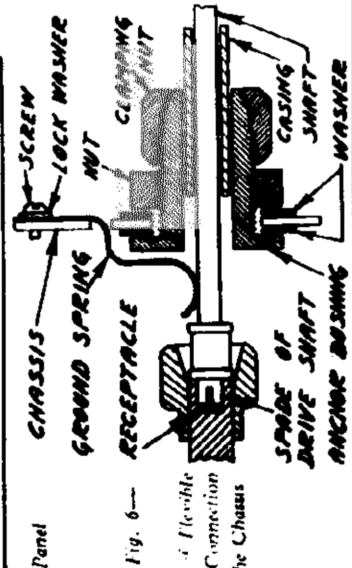


Fig. 6—Details of Flexible Shaft Connection at the Chassis

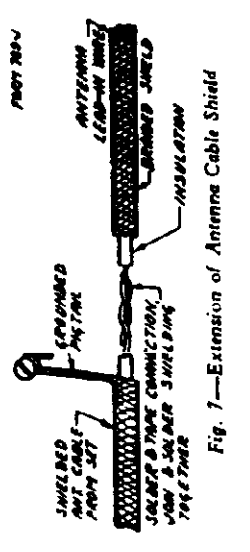
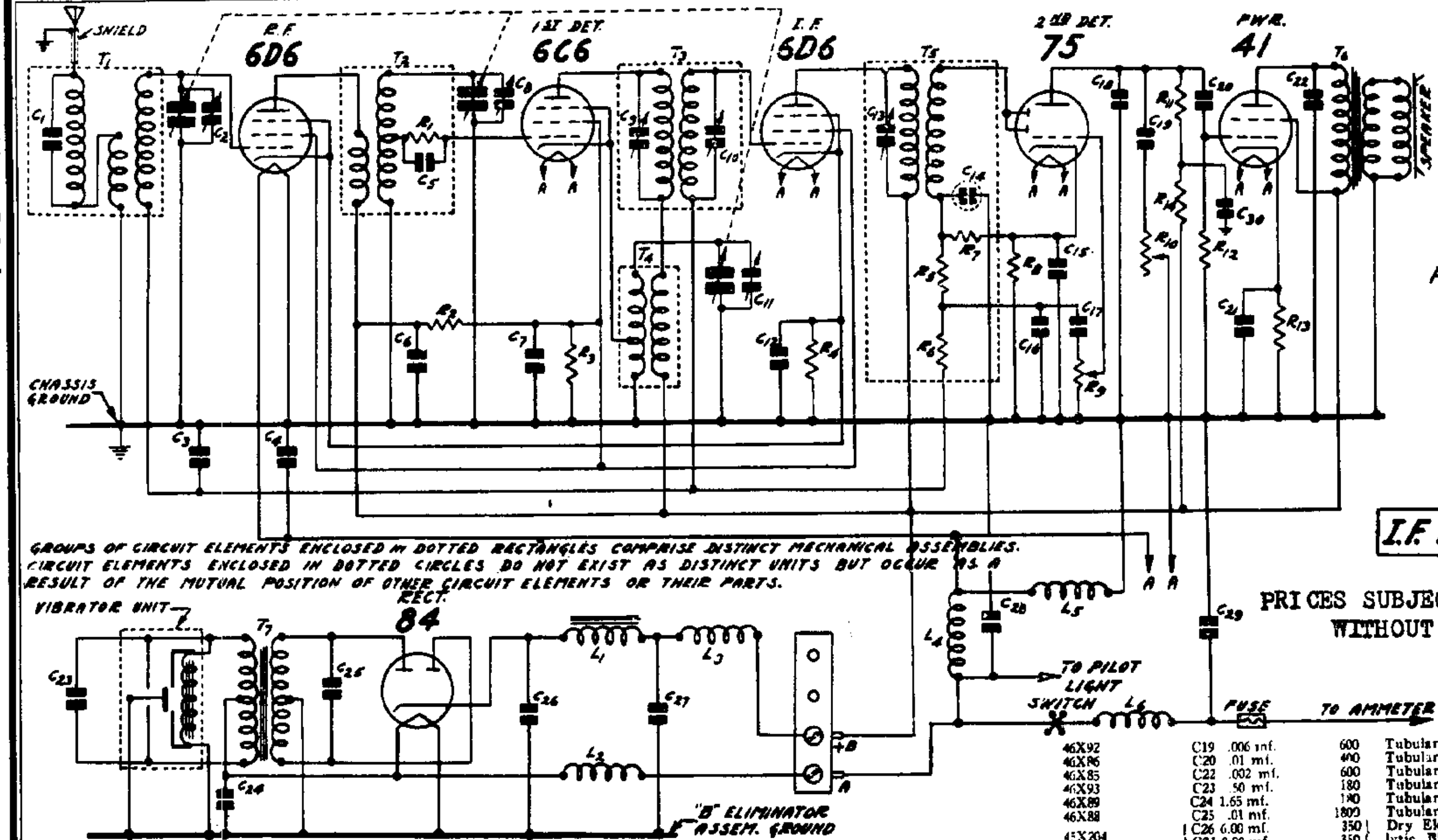


Fig. 7—Extension of Antenna Cable Shield

MODEL 6S
Schematic
Parts

WELLS-GARDNER & CO., INC.

April, 1935



GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES. CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.

PRICES SUBJECT TO CHANGE
WITHOUT NOTICE

TRANSFORMERS AND COILS

New Part No.	Old Part No.	Description	Code	List Price
51X17-6S	50632	Output Transformer	T6	1.65
9A368-6S		Antenna Coil Assembly (Less Can)	T1	.90
9A369-6S		R.F. Interstage Coil Assembly (Less Can)	T2	1.25
1A23-6S		Dual-Coil Can Assembly Only (for above two coils)		.30
9A371-6S		1st I.F. Coil & Can Assembly Complete	T3	1.70
9A370-6S		Oscillator Coil & Can Assembly Complete	T4	.60
9A372-6S		2nd I.F. Coil & Can Assembly Complete	T5	2.05
9A375-6S		Pilot Light Choke Assembly	L4	.15
9A373-6S		Motor Noise Choke	L6	.25
9A268-6S	5174	R.F. "B" Choke Coil Assembly	L3	.10
9A374-6S		Filament Reactor	L2	.30
53X72-6S	50633	Power Transformer	T7	3.30
52X22-6S	50637	Filter Choke	L1	.90

CONDENSERS

New Part No.	Old Part No.	Code	Capacity	Voltage	Type	List Price
47X54		C1	.0005 mf.		Moulded	.15
		C2	Antenna Trimmer-Part of Gang Condenser			
46X80		C3	.05 mf.	180	Tubular	.15
47X50		C4	.003 mf.		Moulded	.25
47X53		C5	.00035 mf.		Moulded	.10
46X81		C6	.10 mf.	400	Tubular	.25
46X83		C7	.10 mf.	180	Tubular	.25
		C8	1st Detector Trimmer-Part of Gang Condenser			
*17A32		C9 / C10	130-300 mmf. / 130-300 mmf.		1st I. F. Trimmer Condensers	.50
†17A33		C9 / C10	70-150 mmf. / 70-150 mmf.		1st I. F. Trimmer Condensers	.50
		C11	Oscillator Trimmer-Part of Gang Condenser			
46X82		C12	.10 mf.	190	Tubular	.25
17A18	1965	C13	70-140 mmf. 2nd I.F. Trimmer Condenser			.35
		C14	.00025 mf. Part of 2nd I.F. Coil Assembly			
45X203		C15 / C21	12.00 mf. / 12.00 mf.	25 / 25	Dry Electrolytic Block	1.05
4 X52		C16	.00025 mf.		Moulded	.15
46X84		C17	.01 mf.	180	Tubular	.15
4?X52		C18	.00025 mf.		Moulded	.15
46X92		C19	.006 mf.	600	Tubular	.20
46X86		C20	.01 mf.	400	Tubular	.20
46X85		C22	.002 mf.	600	Tubular	.20
46X93		C23	.50 mf.	180	Tubular	.35
46X89		C24	1.65 mf.	180	Tubular	.40
46X88		C25	.01 mf.	1800	Tubular	.30
45X204		C26 / C27	6.00 mf. / 8.00 mf.	350 / 350	Dry Electrolytic Block	2.10
46X93		C28	.50 mf.	180	Tubular	.35
4?X50		C29	.003 mf.		Moulded	.25
46X94		C30	.25 mf.	300	Tubular	.30
14A39					3 Section Gang Condenser	4.20

RESISTORS

New Part No.	Code	Resistance	Wattage	Type	List Price
A95504	R1	500,000 Ohm	0.2	Carbon	.10
B94153	R2	15,000 Ohm	0.5	Carbon	.13
B94203	R3	20,000 Ohm	0.5	Carbon	.13
43X41	R4 / R13	450 Ohm / 800 Ohm	0.2 / 0.3	Armored Wire Wound	.30
A95503	R5	50 000 Ohm	0.2	Carbon	.10
A95105	R6	1.0 Megohm	0.2	Carbon	.10
A94504	R7	500,000 Ohm	0.2	Carbon	.10
A95752	R8	7,500 Ohm	0.2	Carbon	.10
36X200	R9	2.0 Megohm		Volume Control & Switch	1.15
40X201	R10	300,000 Ohm		Tone Control	.75
*A95201	R11	200,000 Ohm	0.2	Carbon	.10
†A95154	R11	150,000 Ohm	0.2	Carbon	.10
A95504	R12	500,000 Ohm	0.2	Carbon	.10
†A95503	R14	50,000 Ohm	0.2	Carbon	.10

MODEL 6S
Alignment, Voltage
Socket, Trimmers
Resistance, Notes

WELLS-GARDNER & CO.

Remove chassis from case.

Establish ground connection between chassis and power supply.

Reconnect A and B wires from power supply to chassis.

Set the signal generator for a signal of 175 KC.

Connect the antenna lead of the signal generator thru a .05 mf. condenser to the stator of the 1st detector (middle) section of the tuning condenser. This can be done by pushing a wire or conductor between the stator plates or by extending an insulated wire thru the hole in the shield over the stator and pushing the wire thru the hole in the lug which extends up from the insulated stator assembly.

Connect the ground lead of the signal generator to the chassis ground.

Short out the oscillator section of the tuning condenser.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the levelling off action of the A.V.C.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers are shown in Fig. 2.

1650 KC. Adjustment

Set the signal generator for 1650 KC.

Turn the rotor of the tuning condenser to the full open position.

Connect the shielded antenna lead from the chassis through a 250 mmf. condenser to the antenna post of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A. V. C. action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—see Fig. 2 for location of this trimmer.

1400 K C. Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st detector and antenna trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

Voltages at Sockets
Antenna Disconnected - Voltage at Battery 6.1

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cath. to Ground	Normal Plate M.A.
6D6	R. F.	5.8	218	100	5.2	5.8
6C6	1st Det. and Osc.	5.8	218	100		2.0
6D6	I. F.	5.8	218	100	5.2	5.8
75	2nd Det. & 1st A. F.	5.8	160 (1)		1.4	2.8
41	Output	5.8	210	220	16.0	16.0
84	Rectifier	5.8				20.0 per plate

Speaker Field ..1.15 Amperes "B" Unit ......3.00 Amperes
Chassis ... .. 1.50 Amperes Pilot Lamp ....0.1 Amperes

(1) Measured on 1000 V. Scale (1000 Ohms per volt)

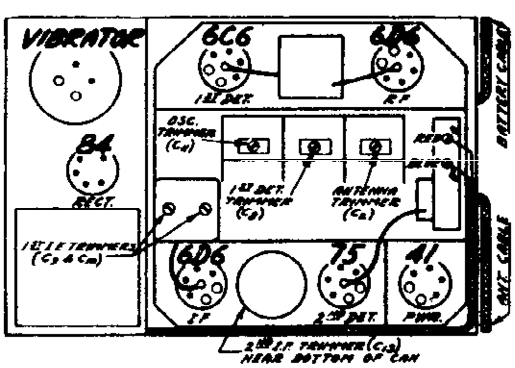


Fig. 2 --Tube Arrangement and Trimmers

Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 KC. with the volume control about three-fourths on. Remove the cover of the chassis case. The antenna trimmer is the trimmer condenser closest to the terminal strip—see Fig. 2. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

Calibrating the Receiver

After installing the receiver in the car, it will be necessary to calibrate the control unit. Tune in a station of known frequency at about the center of the dial. At the back of the control unit is a calibration screw—See Fig. 4 in the installation manual enclosed with each receiver. Remove the pilot light assembly.

The calibration screw will be seen at the bottom of the receptacle from which the pilot light assembly is withdrawn. Insert a screwdriver and turn this screw until the pointer on the dial scale is at the frequency of the station being received. The knob must be held during this adjustment.

Voltages At Sockets

On the voltage chart are given the voltages at the sockets with all tubes in and the set in operating condition. The antenna should be disconnected.

The voltages can be read with the chassis in the case, by means of an analyzer plug.

If the chassis unit is taken out of the case all of the socket terminals can easily be reached under the chassis with test prods.

If the chassis is taken out, a jumper wire must be connected from the chassis base to the metal wall of the "B" power unit, in order to complete the ground circuit.

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis.

New Part No.	ITEM	Code	D. C. Resistance in Ohms
9A368-6S	Antenna Trans. Primaries in Series	T1	6.3
	Antenna Trans. Secondary	T1	2.5
9A369-6S	R.F. Interstage Trans. Pri.	T2	4.5
	R.F. Interstage Trans. Sec.	T2	
	(Center Tap to inside)		1.8
	(Center Tap to ground)		1.3
9A371-6S	1st I.F. Trans. Primary	T3	58.
	1st I.F. Trans. Secondary	T3	58.
9A370-6S	Oscillator Cathode Coil (Total)	T4	3.
	Oscillator Plate Coil	T4	6.
9A372-6S	2nd I.F. Trans. Primary	T5	46.
	2nd I.F. Trans. Secondary	T5	46.
53X17-6S	Output Trans. Primary	T6	440.
	Output Trans. Sec. and Voice coil in paralle	T6	.4
53X72-6S	Power Trans. Primary	T7	.3
	Power Trans. Secondary	T7	500.
52X27-6S	Filter Choke	L1	300.
9A374-6S	Filament Reactor	L2	Small
9A268-6S	R.F. "B" Choke	L3	3.5
9A375-6S	Pilot Light Choke Assembly	L4	Small
12A62A	Speaker Field	L5	5.
9A375-6S	Motor Noise Choke	L6	Small

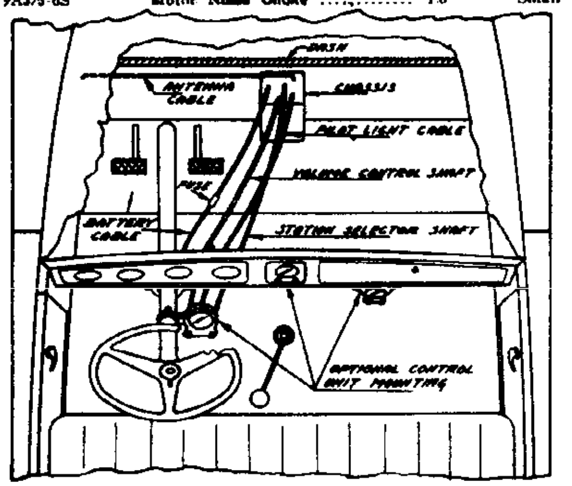


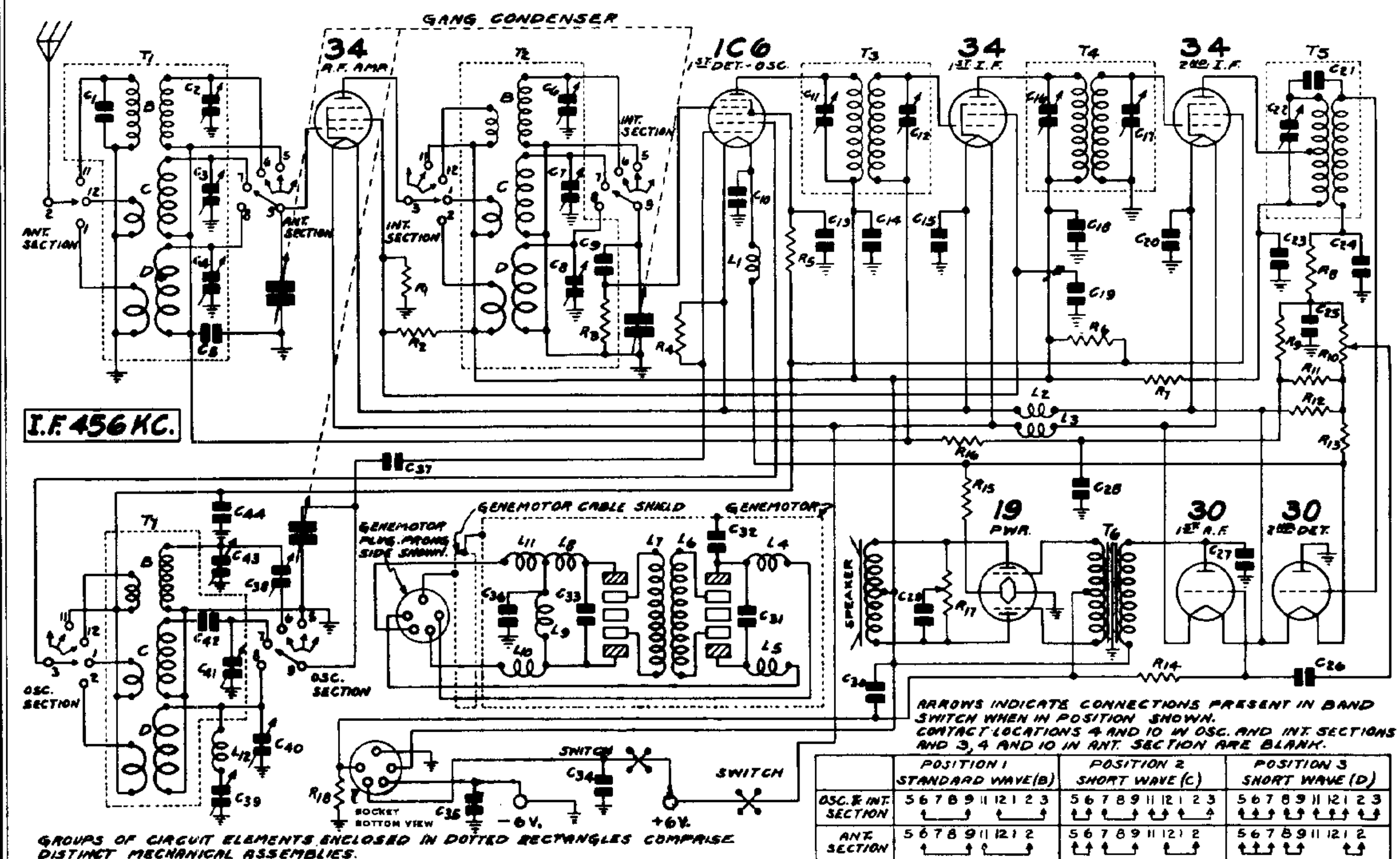
Fig. 1—General Mounting Position

MODEL 7E
Schematic

WELLS - GARDNER & CO.

Power Consumption - 1.8 Amperes at 6.3 Volts
Power Output - - - - - - -1 Watt Undistorted

Tuning Frequency Range
B Range - - - - - - - - - - 535 to 1730 KC.
C Range - - - - - - - - - - 1680 to 4800 KC.
D Range - - - - - - - - - - 5650 to 16000 KC.



C 1 250 mmf.
C 2 2-25 mmf.
C 3 2-25 mmf.
C 4 2-25 mmf.
C 5 .05 mf. 180 V.
C 6 2-25 mmf.
C 7 2-25 mmf.
C 8 2-25 mmf.
C 9 35 mmf.
C10 .25 mf. 180 V.
C11 70-150 mmf. } ONE
C12 70-150 mmf. } UNIT
C13 .05 mf. 180 V.
C14 20.0 mf. 150 V. Electrolytic
C15 .25 mf. 180 V.
C16 70-150 mmf. } ONE
C17 70-150 mmf. } UNIT
C18 .50 mf. 180 V.
C19 .85 mf. 180 V.
C20 .05 mf. 180 V.
C21 50 mmf.
C22 40-100 mmf.
C23 .05 mf. 180 V.
C24 100 mmf.
C25 50 mmf.
C26 .002 mf. 600 V.
C27 250 mmf.
C28 .01 mf. 180 V.
C29 .05 mf. 240 V.
C30 20.0 mf. 150 V. Electrolytic
C31 .25 mf. 180 V.
C32 .05 mf. 180 V.
C33 .25 mf. 180 V.
C34 .25 mf. 180 V.
C35 .25 mf. 180 V.
C36 .50 mf. 180 V.
C37 35 mmf.
C38 300-600 mmf. } ONE
C39 40-100 mmf. } UNIT
C40 2-25 mmf.
C41 2-25 mmf.
C42 1400 mmf.
C43 2-25 mmf.
C44 .25 mf. 18 V.

R 1 100,000 ohm .2 W.
R 2 60,000 ohm .2 W.
R 3 1 megohm .2 W.
R 4 100,000 ohm .2 W.
R 5 5,000 ohm .2 W.
R 6 10,000 ohm .5 W.
R 7 1,000 ohm .2 W.
R 8 60,000 ohm .2 W.
R 9 3 megohm .2 W.
R10 1 megohm Vol. Control
R11 1 megohm .2 W.
R14 3 megohm .2 W.
R16 500,000 ohm .2 W.
R17 150,000 ohm Tone Control
R12 12.5 ohm 1.0 W. }
R13 12.5 ohm 1.0 W. } ARMORED
R15 .70 ohm .50 W. } WIRE-WOUND
R18 150 ohm 2.0 W. } RESISTOR

T 1 Ant. R. F. Trans.
T 2 Interstage R. F. Trans.
T 3 1st I. F. Trans.
T 4 2nd I. F. Trans.
T 5 3rd I. F. Trans.
T 6 Push Pull Input Trans.
T 7 Osc. Inductors

Nov., 1935

L 1 Single Filament Reactor
L 2 } Double Filament
L 3 } Reactor
L 4 "B" Choke
L 5 "B" Choke
L6, L7, L8 & L9 Genemotor Windings
L10 "A" Choke
L11 "A" Choke
L12 Osc. Tracking Coil

MODEL 7E
Socket, Trimmers
Voltage, Data

WELLS - GARDNER & CO.

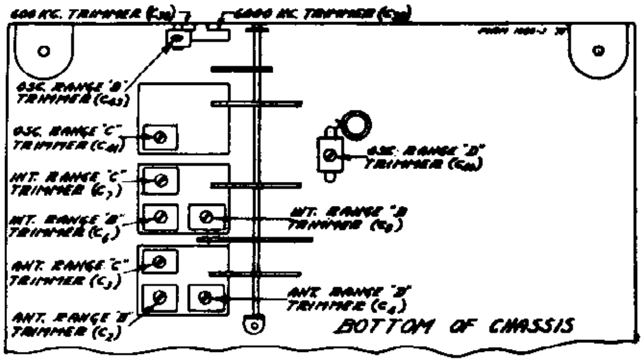


Fig. 3—Arrangement of Trimmers

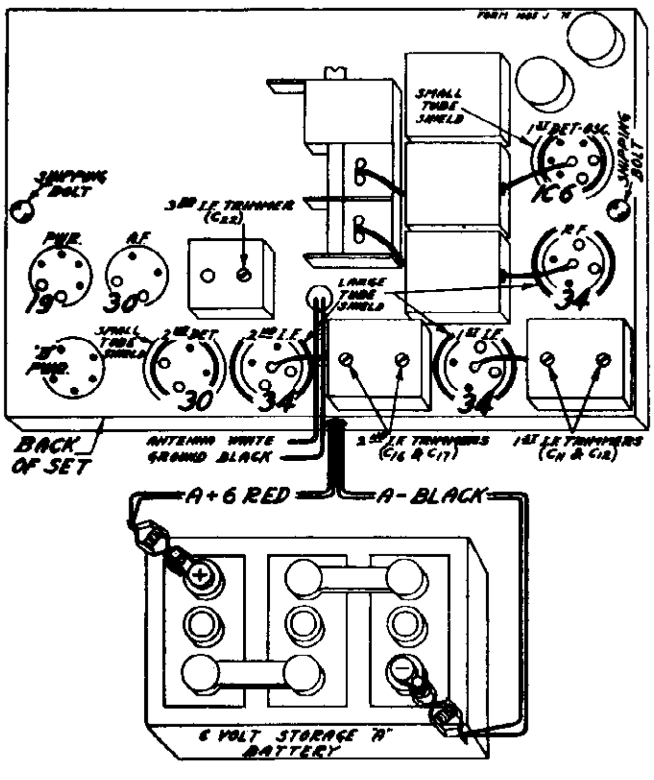


Fig. 4—Tube Arrangement and Battery Connections

VOLTAGES AT SOCKETS
Antenna Shorted to Ground—Battery 6 Volts under load
Volume Control at Maximum

Type of Tube	Function	Across Fila-ment	Plate to Ground	Screen to Ground	Bias Voltage (see Notes)	Normal Plate M. A.
34	R. F.	2.0	135	45	1.5(1)	1.7
1C6	1st Det.	2.0	135 80(2)	70	2.0(3)	3.2 1.7(2)
34	1st I. F.	2.0	135	45	1.5(1)	1.7
34	2nd I. F.	2.0	135	80	4.0(3)	3.2
30	2nd Det.	2.0				
30	1st A. F.	2.0	135		8.0(4)	2.3
19	Power	2.0	135		3.9(5)	2.3 (per plate)

(1) As read from negative filament leg to low potential end of resistor R12.
(2) Anode Grid
(3) As read from negative filament leg to ground.
(4) Total voltage drop from negative filament leg to ground and across R18.
(5) As read across R18.

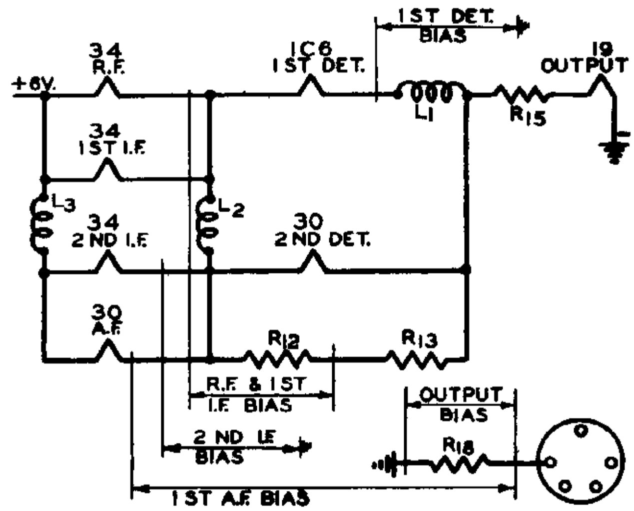


Fig. 6—Abridged Wiring Diagram showing Filament Wiring System and Points at which No-Signal Bias Voltages are obtained.

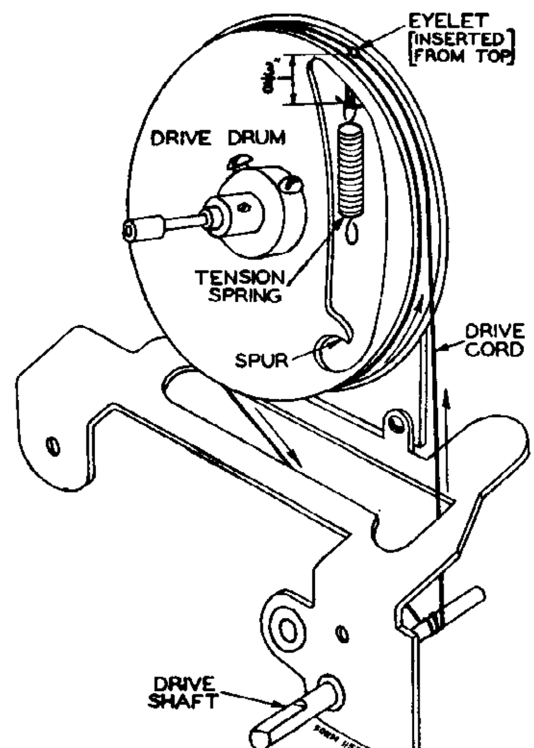


Fig. 7—Drive Cord Replacement

Battery Connections—CAUTION

CAUTION: Do not turn the switch on unless ALL the tubes are in the sockets.

CAUTION: Be sure that the battery clips are properly connected to the battery. If the connections are reversed, the receiver may be damaged.

WELLS - GARDNER & CO.

MODEL 7E
Alignment, Coils
Drive Cord Data

A signal generator that will provide an accurately calibrated signal at 456, 1750, 1500, 600, 4800, 4200, 16,000, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I.F. Adjustment
Set the signal generator for a signal of 456 KC.
Connect the output of the signal generator through a 0.1 mf. condenser to the switch end of condenser C9--see Fig. 2. There is a lead which goes to the lug on the top of the center stator section of the tuning condenser--see Fig. 4. The connection can be made at this lug.
Connect the ground lead of the receiver to the ground post of the signal generator.
Turn the band selector to the Range B position (standard wave band—purple dial color).
Turn the volume control to the maximum position.
Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.
Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 4.

RANGE B ALIGNMENT

1750 KC Adjustment
Set the signal generator for 1750 KC.
Turn the rotor of the tuning condenser to the full open position.
Keep the band selector in the standard wave position.
Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.
For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.
Adjust the oscillator Range B trimmer (C43) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment
Set the signal generator for 1500 KC.
Turn the rotor of the tuning condenser carefully until maximum output is obtained.
Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C6) and antenna Range B trimmer (C2) to maximum.
Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment
Set the signal generator for 600 KC.
Turn the tuning condenser rotor until maximum output is obtained.
Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of the greatest intensity is obtained. See Fig. 3 for location of this trimmer.
Be sure to use a non-metallic screwdriver for this adjustment.

RANGE C ALIGNMENT

4800 KC Adjustment
Set the signal generator for 4800 KC.
Connect the antenna lead of the receiver through a 400-ohm resistor to the output of the signal generator.
Turn the rotor of the tuning condenser to the full open position.
Turn the band selector to the Range C position (1st short wave band — green dial color).
As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.
Adjust the oscillator Range C trimmer (C41) until maximum output is obtained. See Fig. 3 for location of this trimmer.

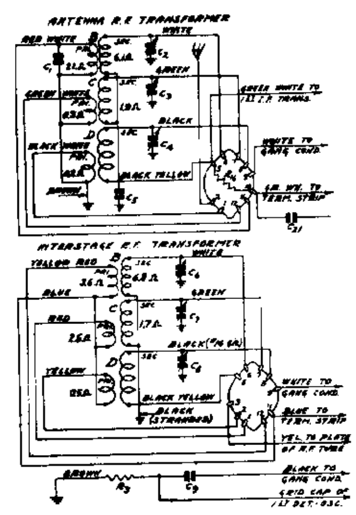
4200 KC Adjustment
Set the signal generator for 4200 KC.
Turn the rotor of the tuning condenser carefully until maximum output is obtained.
Adjust the interstage Range C trimmer (C7) and antenna Range C trimmer (C3) to maximum.
Do not change the setting of the oscillator Range C trimmer.

RANGE D ALIGNMENT

16,000 KC Adjustment
Set the signal generator for 16,000 KC.
Keep the antenna lead of the receiver connected through the 400-ohm resistor to the output of the signal generator.
Turn the rotor of the tuning condenser to the full open position.
Turn the band selector to the Range D position (2nd short wave band—red dial color).
As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.
Adjust the oscillator Range D trimmer (C40) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment
Set the signal generator for 15,000 KC.
Turn the rotor of the tuning condenser carefully until maximum output is obtained.
Adjust the interstage Range D trimmer (C8) and antenna Range D trimmer (C4) to maximum.
When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of the greatest intensity is obtained.
Then go back and repeat the procedure as given for the 16,000 KC adjustment. If it is found necessary to make any appreciable change in the settings of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.
Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment
Set the signal generator for 6000 KC.
Turn the tuning condenser rotor until maximum output is obtained.
Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.



REPLACING DRIVE CORD

Remove the chassis from the cabinet. Take off the station pointer by removing the screw at the center of dial. Loosen the two set screws in the collar on the band selector switch shaft. Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis and one screw at the top which secures this assembly to the bracket. Pull the dial assembly forward until the collar is free of the band selector shaft; and lay the assembly face downward in front of the chassis.

Turn the dial drum until the opening in this drum is approximately vertical and with the hole at the top. Remove the tension spring and the old drive cord. When replacing this drive cord a 30 pound test cord as regularly supplied by the factory should be used .

See that the eyelet is in the hole in the drive drum. Insert one end of the new drive cord from the outside through the hole in the eyelet in the drive drum. Tie the end of the cord, which has been inserted through the hole, to one end of the tension spring. Now wrap the cord in a counter clock-wise direction (facing the front of the chassis) around the drive drum for approximately one and one half turns, progressing towards the front. Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and onehalf times around this shaft, progressing toward the back of the chassis. Wrap the cord on directly in line with the drive drum above. Then bring this cord up to the drive drum until it is up to the eyelet in the drive drum .

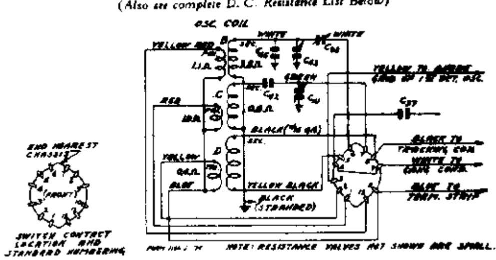
Now insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring when hanging free and with the slack taken out of the drive cord should be three eights or less from the flang of the drum. Cut off the surplus length of the cord after it has been knotted.

Now secure the other end of the tension spring over the spur on the drive drum. Turn the drive shaft back and forth several times.

Replace the dial assembly and pointer.

Replace the chassis in the cabinet.

Fig. 5—Color Coding of Coil Wires and D. C. Resistance of Windings.
(Also see complete D. C. Resistance List Below)



MODEL 7E
Parts, Resistance

WELLS - GARDNER & CO.

Series 7E—Replacement Parts

RESISTORS

New Part No.	Code	Resistance	Wattage	Type	List Price
P-A94104	R1	100,000 Ohms	0.2	Carbon	$ .15
P-A94603	R2	60,000 Ohms	0.2	Carbon	.15
P-A95105	R3	1.0 Megohm	0.2	Carbon	.10
P-A94104	R4	100,000 Ohms	0.2	Carbon	.15
P-A95502	R5	5,000 Ohms	0.2	Carbon	.10
P-B94103	R6	10,000 Ohms	0.5	Carbon	.15
P-A95102	R7	1,000 Ohms	0.2	Carbon	.10
P-A95603	R8	60,000 Ohms	0.2	Carbon	.10
P-A94305	R9	3.0 Megohms	0.2	Carbon	.15
P-36X209	R10	1.0 Megohm	Volume Control and Switch		1.15
P-A94105	R11	1.0 Megohm	0.2	Carbon	.15
P-43X43	R12	12.5 Ohms	1.0	Armored Wire Wound	.65
	R13	12.5 Ohms	1.0		
	R15	0.7 Ohms	0.5		
	R18	150.0 Ohms	2.0		
P-A95305	R14	3.0 Megohms	0.2	Carbon	.10
P-A95504	R16	500,000 Ohms	0.2	Carbon	.10
P-40X203	R17	150,000 Ohms	Tone Control		.75

CONDENSERS

New Part No.	Code	Capacity	Voltage	Type	List Price
P-47X59	C1	250 mmf.		Moulded	$ .15
P-17A36	C2	2-25 mmf.		Antenna Range B Trimmer	.10
P-17A36	C3	2-25 mmf.		Antenna Range C Trimmer	.10
P-17A36	C4	2-25 mmf.		Antenna Range D Trimmer	.10
P-46X80	C5	0.05 mf.	180	Tubular	.15
P-17A36	C6	2-25 mmf.		Interstage Range B Trimmer	.10
P-17A36	C7	2-25 mmf.		Interstage Range C Trimmer	.10
P-17A36	C8	2-25 mmf.		Interstage Range D Trimmer	.10
P-47X53	C9	35 mmf.		Moulded	.10
P-46X117	C10	0.25 mf.	180	Tubular	.25
P-17A33	C11, C12	70-150 mmf., 70-150 mmf.		1st I.F. Trimmer Condensers	.40
P-46X80	C13	0.05 mf.	180	Tubular	.15
P-44X17	C14	20.0 mf.	150	Wet Electrolytic	.95
P-46X117	C15	0.25 mf.	180	Tubular	.25
P-17A33	C16, C17	70-150 mmf., 70-150 mmf.		2nd I.F. Trimmer Condensers	.40
P-46X123	C18	0.50 mf.	180	Tubular	.30
P-46X125	C19	0.85 mf.	180	Tubular	.50
P-46X80	C20	0.05 mf.	180	Tubular	.15
P-47X56	C21	50 mmf.		Moulded	.10
P-17A38	C22	40-100 mmf.		3rd I.F. Primary Trimmer	.25
P-46X80	C23	0.05 mf.	180	Tubular	.15
P-47X57	C24	100 mmf.		Moulded	.10
P-47X56	C25	50 mmf.		Moulded	.10
P-46X100	C26	0.002 mf.	600	Tubular	.15
P-47X53	C27	250 mmf.		Moulded	.15
P-46X124	C28	0.01 mf.	180	Tubular	.15
P-46X103	C29	0.05 mf.	240	Tubular	.15
P-44X17	C30	20.0 mf.	150	Wet Electrolytic (Insulated Mtg.)	.95
P-46X117	C31	0.25 mf.	180	Tubular (In Genemotor)	.25
P-46X80	C32	0.05 mf.	180	Tubular (In Genemotor)	.15
P-46X117	C33	0.25 mf.	180	Tubular (In Genemotor)	.25
P-46X117	C34	0.25 mf.	180	Tubular	.25
P-46X117	C35	0.25 mf.	180	Tubular	.25
P-46X123	C36	0.50 mf.	180	Tubular (In Genemotor)	.30
P-47X53	C37	35 mmf.		Moulded	.10
P-17A35	C38	300-600 mmf.		600 KC Osc. Padding Cond.	.45
	C39	40-100 mmf.		6000 KC Osc. Padding Cond.	
P-17A41	C40	2-25 mmf.		Oscillator Range D Trimmer	.10
P-17A36	C41	2-25 mmf.		Oscillator Range C Trimmer	.10
P-47X60	C42	1400 mmf.		Moulded	.30
P-17A41	C43	2-25 mmf.		Oscillator Range B Trimmer	.10
P-46X117	C44	0.25 mf.	180	Tubular	.25
P-47X64	C45	5 mmf.		Moulded	.15
P-14A41		3 Section Gang Condenser			3.80

DIAL AND DRIVE ASSEMBLY

New Part No.	Old Part No.	Description	List Price
P-5A27		Gang Support and Bearing Assembly	$ .45
P-26X208		Drive Shaft	.15
P-19X21	20953	Horse Shoe Washer	.10
P-26X212		Pointer Shaft	.10
P-24X204		Drive Drum and Hub with Set Screw	.35
P-28X27		Drive Tension Spring	.10
P-10X13		26 inch Black Drive Cord	.10
P-28X34		Pointer Slide Take-Up Spring	.10
P-10X9		4½ Inch Black Indicator Drive Cord	.05
P-29X42		Brass Collar and Set Screw for securing above cords to shaft	.10
		Dial Strip (Specify Name and Series No. of Receiver—also Std. Wave Band Dial Color)	.55
P-30X36		Dial Clamp and Mtg. Screw	.10
P-15X22		Large Double End Pointer	.10

TRANSFORMERS AND COILS

New Part No.	Old Part No.	Code	Description	List Price
P-9A419		T1	Antenna R.F. Transformer and Can Assembly	$3.00
P-9A420		T2	Interstage R.F. Transformer and Can Assembly	3.10
P-9A421		T7	Oscillator Coil and Can Assembly	2.65
P-9A422		T3	1st I.F. Transformer and Can Assembly	1.70
P-9A423		T4	2nd I.F. Transformer and Can Assembly	1.70
P-9A424		T5	3rd I.F. Transformer and Can Assembly	1.70
P-50X11		T6	Audio Input Transformer	2.10
P-9A403		L1	Single Filament Reactor	.20
P-9A404		L2, L3	Double Filament Reactor	.50
P-9A268	5174	L4	"B" R.F. Choke Coil (in Genemotor)	.10
P-9A268	5174	L5	"B" R.F. Choke Coil (in Genemotor)	.10
P-9A402		L10	"A" Choke Coil (in Genemotor)	.55
P-9A402		L11	"A" Choke Coil (in Genemotor)	.55
P-9A391		L12	High Frequency Oscillator Tracking Coil	.25

GENEMOTOR AND PARTS

New Part No.	Old Part No.	Description	List Price
P-22A203		Genemotor Complete with Filter Units, Case and Cover	$18.85
P-22A202		Genemotor in Case with Cover and Condenser (C31 and C33) Less Filter	16.00
P-13X216		Shielded, Four Wire Cable and Plug	.70
P-46X117		0.25 mf. 180 Volt Tubular Condensers (C31 & C33), ea.	.25
P-46X123		0.50 mf. 180 Volt Tubular Condenser (C36)	.30
P-46X80		0.05 mf. 180 Volt Tubular Condenser (C32)	.15
P-9A268	5174	"B" R.F. Choke Coils (L4 and L5), each	.10
P-9A402		"A" Choke Coils (L10 and L11), each	.55

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

D. C. Resistance of Windings

Refer to Figs. 5 & 2

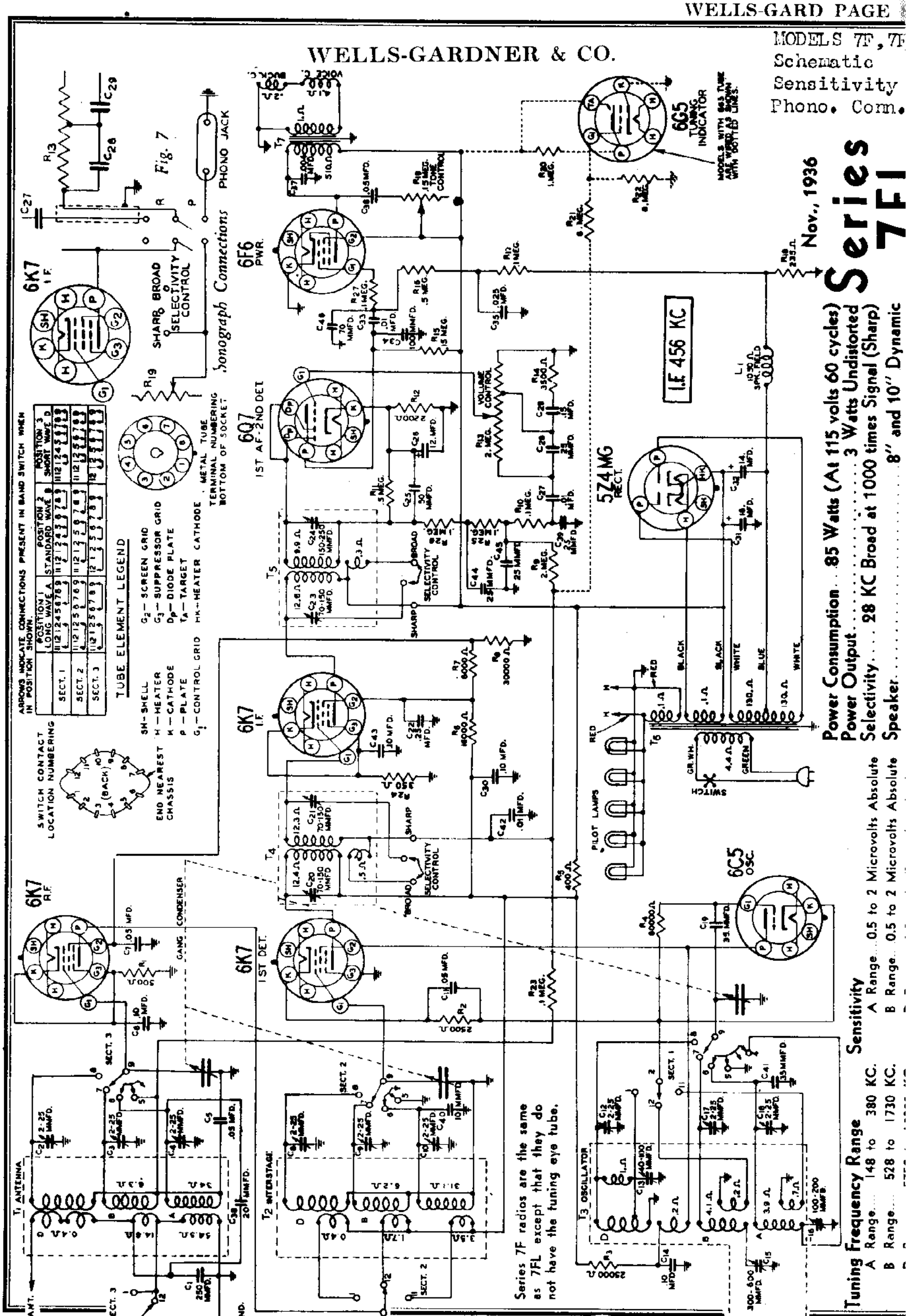
Following are the D. C. resistances of the various coil windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Winding	Code	D. C. Resistance in Ohms
P-9A419	Antenna R. F. Transformer	T1	
	Range B Primary Winding		21.0
	Range C Primary Winding		0.3
	Range D Primary Winding		0.2
	Range B Secondary Winding		6.1
	Range C Secondary Winding		1.9
	Range D Secondary Winding		Small
P-9A420	Interstage R. F. Transformer	T2	
	Range B Primary Winding		3.6
	Range C Primary Winding		2.6
	Range D Primary Winding		0.5
	Range B Secondary Winding		6.8
	Range C Secondary Winding		1.7
	Range D Secondary Winding		Small
P-9A421	Oscillator Coils	T7	
	Range B Plate Coil		1.1
	Range C Plate Coil		1.0
	Range D Plate Coil		0.4
	Range B Grid Coil		3.8
	Range C Grid Coil		0.9
	Range D Grid Coil		Small

Part No.	Winding	Code	D. C. Resistance in Ohms
P-9A422	1st I. F. Transformer	T3	
	Primary Winding		11.4
	Secondary Winding		11.4
P-9A423	2nd I. F. Transformer	T4	
	* Primary Winding		11.4
	Secondary Winding		11.4
P-9A424	3rd I. F. Transformer	T5	
	Primary Winding (either section)		8.4
	Secondary Winding		130.8
P-50X11	Audio Input Transformer	T6	
	Primary Winding		1005.0
	Secondary Winding		
	Center Tap to Inside		580.0
	Center Tap to Outside		630.0
*P-12A218	8 Inch Magnetic Speaker		
	Speaker Coil		
	Center Tap to Inside		275.0
	Center Tap to Outside		300.0
P-9A403	Single Filament Reactor	L1	.65
P-9A404	Double Filament Reactor (either section)	L2 & L3	.65
P-9A391	High Frequency Oscillator Tracking Coil	L12	0.7

*Speakers with other part numbers may have slightly different values of D. C. Resistance.

MODELS 7F, 7F
Schematic
Sensitivity
Phono. Conn.



MODELS 7F, 7FL
Socket, Trimmers

WELLS-GARDNER & CO.

Voltage, Coils

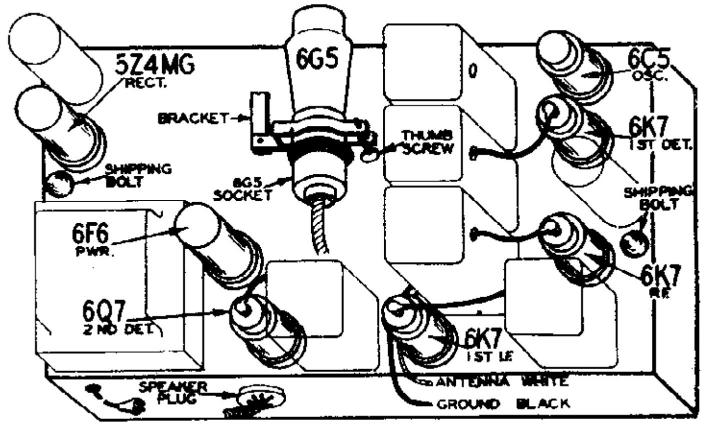


Fig. 6—Location of Tubes

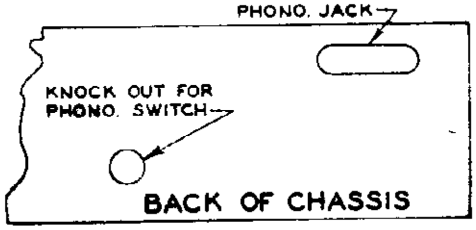


Fig. 8—Location of Phono Knockouts

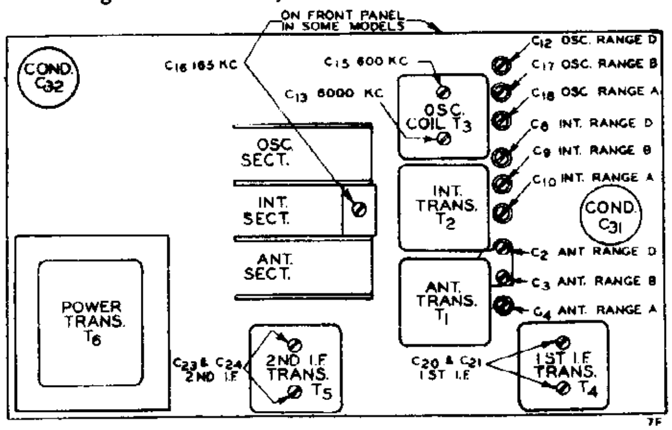
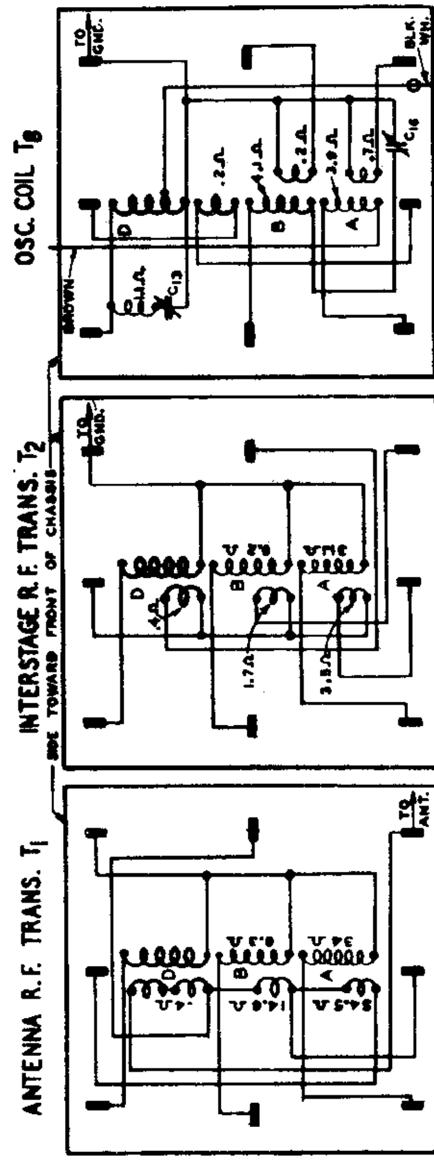


Fig. 3—Location of Trimmers



NOTE: RESISTANCES OF WINDINGS BELOW 0.1 Ω ARE NOT SHOWN.

Fig. 4—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

Line Voltage: 115
Volume Control: Maximum

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	RF..................	0	6.1(1)	260	100	4.0	....	6.1(1)	4.0
6K7	1st Det..............	0	6.1(1)	260	118	0	....	6.1(1)	9.0
6C5	Osc................	0	6.1(1)	120	...	0	....	6.1(1)	0
6K7	I F................	0	6.1(1)	260	138	4.0	....	6.1(1)	4.0
6Q7	1st A.F.—2nd Det....	0	6.1(1)	105	0	0	....	6.1(1)	1.4
6F6	Power Amp..........	0	6.1(1)	238	260	18	....	6.1(1)	0
5Z4MG	Rect...............	0	4.9(2)	...	680(3)	...	680(3)	....	4.9(2)

6G5	Tuning Indicator	Plate to Ground	Target to Ground	Cathode to Ground	Across Heater
		30(4)	270	0	6.1 A.C.

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) A.C. voltage as read across heater terminals 2 and 8.
(3) A.C. voltage as read across terminals 4 and 6.
(4) As read with 500,000 ohm meter.

WELLS-GARDNER & CO.

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the radio to the ground post of the signal generator.

Turn the band switch to the Range B position (medium wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Range A Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

380 KC Adjustment

Set the signal generator for 380 KC.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range A position (long wave band).

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range A trimmer (C18) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

350 KC Adjustment

Set the signal generator for 350 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range A trimmer (C10) and antenna Range A trimmer (C4) to maximum.

Do not change the setting of the oscillator Range A trimmer.

165 KC Adjustment

Set the signal generator for 165 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 165 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range B position (medium wave band).

Keep the antenna lead of the receiver connected through the 200 mmf. condenser to the output of the signal generator.

Adjust the oscillator Range B trimmer (C17) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

In sets using pointers, loosen the screw of the large pointer and set the pointer at the 1500 KC mark on the standard wave band scale. Re-tighten the screw.

In sets using the moving beam of light, there is a moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until it is at the 1500 KC mark on the dial. Re-tighten the screw.

Adjust the interstage Range B trimmer (C9) and antenna Range B trimmer (C3) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 600 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC. It may be necessary to increase the input signal to hear the image.

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Connect the antenna lead of the radio through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (short wave band).

Adjust the oscillator Range D trimmer (C12) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C8) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Phonograph Connections

Switch on Back Panel of Chassis

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch —See Fig 8.

The phono switch must be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. Unsolder the .01 mf. condenser C27 from the volume control.

Strip about 2¾ inches of the shielding from each end of the cable furnished with the phono attachment parts. Connect one lead of the cable to the terminal on the volume control from which condenser C27 was removed. The other end of this lead is connected to the phono switch as shown in Fig. 7. The second cable lead is connected to the open end of condenser C27. Then connect the other end of this lead to the phono switch as shown in Fig. 7. Both of the shielded cable leads connected to the phono switch are connected to the switch terminals nearest the chassis base. Before connecting the cable leads to the phono switch, it will be necessary to slip a piece of varnished tubing over the portion of the cable that passes near the 6K7 1st I.F. tube socket.

Now ground the shielding by soldering it to the lugs on the chassis base. One of these lugs is located just below the planetary drive; the other is near the rear mounting foot of the gang condenser.

Complete the other connections as illustrated in Fig. 7. The lead between the tone control and the .05 mf. tubular condenser C36 mounted on the back of the chassis base, should be covered with a piece of varnished tubing.

The tin plate shield is soldered to the tone control mounting bracket in such a way that when it is bent down toward the bottom and back of the chassis it will shield the lower leads of the phono switch and the lead between the tone control and tubular condenser C36.

After making the phono connections, the I.F. stages should be realigned.

Switch Mounted Externally

The procedure for making the connections for this arrangement is the same as explained previously with the following exceptions: The switch being mounted externally, it is unnecessary to mount it with the terminals in a particular position.

The single unshielded flexible wire is run through a small hole which must be drilled in the back of the chassis base near the phono jack and is then connected to one terminal of this jack. The other end of this wire is connected to the phono switch as shown in Fig. 7.

Important—Instead of connecting the center terminal of the switch to the plate of the 6K7 I.F. tube as shown, this switch terminal is connected to the braided shielding of the cable. The switch terminal shown connected to the tone control R19 in Fig. 7, should be connected to the switch terminal which connects to the .01 condenser C27.

The braided shielding is run through the hole in the chassis base which is provided by the phono switch knockout. The shield is soldered to the base at this point and also to the bottom of the base at the lugs located just beneath the gang condenser. The tin plate mentioned previously is not used.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Across the volume control resistor R13 is a filter composed of condensers C28 and C29 and resistor R14. A tap connection near the low potential end of the volume control is connected between the two condensers. At high volume settings, the filter is not effective. At the low volume settings, as the pointer approaches the tap, the higher frequencies are by-passed through condenser C29. Very high frequencies are transmitted through condenser C28 to compensate for the reduction of these frequencies. At low volume settings the low frequency amplitudes are increased as a result.

Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A282	7 Prong Tube Socket	$0.15
3A283	6 Prong Tube Socket	.15
3A264	7 Prong Octal Base Tube Socket	.15
3A80	5 Prong Speaker Socket	.10
13X786	Tuning Indicator Tube Socket and Cable Assembly	.45

SPEAKERS

Part No.	Description	List Price
12A711	8" Dynamic Speaker Compl. with Output Transformer (T7)	4.95
12A721	10" Dynamic Speaker Compl. with Output Transformer (T7)	6.45
12A747	12" Dynamic Speaker Compl. with Output Transformer (T7)	6.95

KNOBS

Part No.	Description	List Price
Specify Name of Knob and Model of Radio	Tone Control—Small Push-On Type	.15
	Volume Control—Small Push-On Type	.15
	Tuning Control—Large Push-On Type	.15
	Band Switch—Large Set Screw Type	.20

GENERAL

Part No.	Description		List Price
2X34	Felt Washers (Used Behind Knobs)	doz.	.10
8X71	Rubber Chassis Mounting Cushions	ea.	.10
4A18	Terminal Strip—Two Insulated Lugs		.10
4A49	Terminal Strip—Single Lug Insulated (With Mounting Hole at One End)		.10
4A56	Terminal Strip—Two Lugs Insulated (With Mounting Hole in Center)		.10
30X44	Grid Clip Only	doz.	.10
2A64	3 Section, 3 Position, Band Change Switch		1.00
13X81	Line Cord and Plug		.35
13X214	Antenna and Ground Lead Assembly		.30
22X69	Tube Shield (Tuning Eye)		.15
22X70	Tube Shield Base (Tuning Eye)		.10
25X221	Front Chassis Mounting Feet	ea.	.10
25X231	Rear Chassis Mounting Feet	ea.	.10

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A670	T1	Antenna Transformer and Can Assembly	$2.40
9A671	T2	R.F. Interstage Transformer and Can Assembly	2.10
9A672	T3	Oscillator Coil and Can Assembly	2.40
9A673	T4	1st I.F. Transformer and Can Assembly	1.60
9A674	T5	2nd I.F. Transformer and Can Assembly	1.65
6X111	T6	115-230 Volt 40-60 Cycle Power Transformer	4.80
11X31	T7	Output Transformer (Part of Speaker Assembly)	2.45

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X90	C5	.05 mf.	400	$0.15
46X90	C6	.10 mf.	400	.20
46X100	C7	.05 mf.	200	.15
46X88	C11	.05 mf.	400	.15
46X100	C14	.10 mf.	200	.20
44X106	C22	.25 mf.	200	.25
44X120	C27	.01 mf.	200	.15
46X170	C29	.15 mf.	400	.20
46X106	C30	.10 mf.	200	.20
44X120	C33	.01 mf.	200	.15
44X171	C35	.005 mf.	400	.15
44X100	C36	.05 mf.	400	.20
44X114	C37	.004 mf.	400	.15
44X124	C42	.01 mf.	400	.15
46X90	C43	.10 mf.	400	.20

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage		List Price
40X200	C26	12 mf.	25	Dry	.65
40X11	C31	10 mf.	300	Wet	1.10
40X10	C32	16 mf.	400	Wet	1.25

MOLDED

Part No.	Code	Capacitance	List Price
47X89	C1	250 mmf.	.15
47X88	C19	35 mmf.	.10
47X86	C25	50 mmf.	.10
47X71	C28	25 mmf.	.15
47X87	C34	100 mmf.	.10
47X40	C38	20 mmf.	.15
47X73	C39	25 mmf.	.10
47X43	C40	10 mmf.	.15
47X53	C41	35 mmf.	$0.10
47X79	C44	25 mmf.	.10
47X72	C45	25 mmf.	.10
47X62	C46	70 mmf.	.10

TRIMMER

Part No.	Code	Capacitance	Description	List Price
17A48 Trimmer Strip	C2	2-25 mmf.	Range "D" Antenna Trimmer	.96
	C3	2-25 mmf.	Range "B" Antenna Trimmer	
	C4	2-25 mmf.	Range "A" Antenna Trimmer	
	C8	2-25 mmf.	Range "D" Interstage Trimmer	
	C9	2-25 mmf.	Range "B" Interstage Trimmer	
	C10	2-25 mmf.	Range "A" Interstage Trimmer	
	C12	2-25 mmf.	Range "D" Oscillator Trimmer	
	C17	2-25 mmf.	Range "B" Oscillator Trimmer	
	C18	2-25 mmf.	Range "A" Oscillator Trimmer	
See Part Number 17A36 for replacement of any one section				
17A35	C13	40-140 mmf.	Range "D" Oscillator Padding Condenser	.40
	C15	180-480 mmf.	Range "B" Oscillator Padding Condenser	
17A42	C16	100-200 mmf.	Range "A" Oscillator Padding Condenser	.25
17A38	C20	70-100 mmf.	1st I.F. Trimmer Condenser	.40
	C21	70-100 mmf.		
17A34	C23	70-100 mmf.	2nd I.F. Trimmer Condensers	.40
	C24	100-200 mmf.		

MISCELLANEOUS

Part No.	Description	List Price
14A52	3 Gang Condenser less Dial and Drive Assembly	3.40
17A36	2-25 mmf. (To be used for replacement of any one section of Trimmer Strip 17A48)	.10

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A94001	R1	500 Ohm	0.2	$0.15
A94252	R2	2,500 Ohm	0.2	.15
C94253	R3	25,000 Ohm	1.0	.15
A94003	R4	40,000 Ohm	0.2	.15
A95401	R5	400 Ohm	0.2	.15
D93161	R6	6,000 Ohm	2.0	.45
B94002	R7	6,000 Ohm	0.5	.15
B94300	R8	30,000 Ohm	0.5	.15
A95200	R9	2 Megohm	0.2	.10
A95104	R10	100,000 Ohm	0.2	.10
A94004	R11	140,000 Ohm	0.2	.15
A94222	R12	2,200 Ohm	0.2	.15
A94307	R14	5,000 Ohm	0.2	.15
A95104	R15	100,000 Ohm	0.2	.10
A95004	R16	500,000 Ohm	0.2	.10
A95104	R17	100,000 Ohm	0.2	.10
A95100	R20	1 Megohm	0.2	.10
A95800	R21	8 Megohm	0.2	.10
A95800	R22	8 Megohm	0.2	.10
A95104	R23	100,000 Ohm	0.2	.10
A94751	R24	750 Ohm	0.2	.15
A95104	R25	100,000 Ohm	0.2	.10
A95104	R26	100,000 Ohm	0.2	.10
A94104	R27	100,000 Ohm	0.2	.15

WIRE WOUND

Part No.	Code	Resistance	Wattage	List Price
43X42	R18	215 Ohm	2.0	.20

VARIABLE

Part No.	Code	Resistance	Description	List Price
34X215	R13	2.0 Megohm	Tapped Volume Control and On-Off Switch	1.06
40X211	R19	.15 Megohm	Tone Control and Selectivity Switch	1.55

PHONO ATTACHMENT PARTS

WITH SWITCH MOUNTED ON CHASSIS

Part No.	Description	List Price
2A31	Phono Switch (Double Pole Double Throw Switch)	$0.60
3A12	Phono Jack	.10
10A75	Switch Knob	.20
22X77	Shield Plate 2" x 1¼" x .015"	.10
	11½" of No. 740 G Shielded Cable	.10
	3" No. 6 Varnished Tubing	.10
	3" No. 2 Varnished Tubing	.10

WITH SWITCH MOUNTED EXTERNALLY

Part No.	Description	List Price
2A88	Phono Switch	.70
3A12	Phono Jack	.10
10A180	Switch Knob	.10
42119	One Set of "P" and "R" Stickers	.10
	31" 864-B Shielded Sleeving 5-16" Inside Diameter	.45
	37" 799-B No. 22 Solid Wire (Red-White)	.10
	40" 700-B No. 22 Solid Wire (White)	.10
	40" 700-B No. 20 Stranded Wire (Black)	.10

Prices Subject to Change Without Notice

MODEL 7J
Phono. Conn.
Parts

WELLS-GARDNER & CO.

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch—see Fig. 8.

For mounting the 12 mfd. 25 volt dry electrolytic condenser, two No. 27 drill holes should be drilled in the side of the chassis base directly below the wet electrolytic condensers. These holes are 1¼" from the bottom, ⅞" and 3¾" from the front of the chassis.

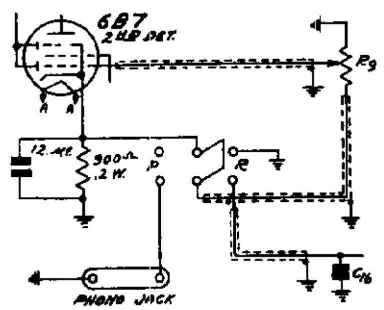


Fig. 7—Phonograph Connections

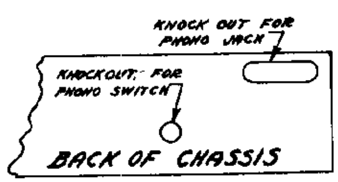


Fig. 8—Location of Phono Knockouts

The ground lug which extends out from the side of the chassis should be bent back into the chassis wall.

The connections are made by opening the diode return circuit at the volume control. Unsolder the shielded lead which runs from the I. F. transformer to the volume control at the lug on the volume control. Cut this lead to length and connect it to the switch as shown in Fig. 7. The extra length of shielded lead which is provided, is connected from the volume control R9 to the phono switch as illustrated.

Remove the ground from the cathode terminal of the 6B7 2nd detector tube by bending the chassis ground lug away from this terminal. Be sure to solder back to this ground lug any leads that were connected to it (not including cathode connection of socket).

Connect one side of the 12 mfd. 25 volt electrolytic condenser to ground and the other side of the condenser to the cathode terminal of the 6B7 2nd detector and the phono switch as shown in Fig. 7. To this same terminal on the phono switch connect the 900 ohm .2 watt resistor. The other side of this resistor goes to ground. Complete the other connections as illustrated.

A high impedance pick-up should be used. If a low impedance pick-up is used a step-up transformer will be required for sufficient volume. The volume control and tone control of the set will regulate the phono volume and tone.

Servicing R. F. Coil Assemblies

The R. F. coil assemblies in this receiver are sold complete with can. This is due to the fact that the trimmers are soldered to the can, and cannot be easily disassembled.

The lead colors and resistances of the various windings in each assembly are shown in Fig. 3.

If it is ever necessary to remove one of coil assemblies from the can, proceed as follows: First remove the nuts from the screws at the top of the can. The outside lug on the trimmer condenser is inserted in a slot in the coil can, and this lug is soldered into position.

Apply a soldering iron to the can at the point of the soldered connection. Then with a screw driver lift up on the outside edge of the trimmer (edge soldered to can) until the trimmer is clear of the can. After the trimmers are all unsoldered, the coil can be taken out.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle chassis can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Replacement Parts List

TRANSFORMERS AND COILS

Part No.	Code	Description	Selling Price
P-9A386	T1	Antenna Trans. and Can Assembly	$1.12
P-9A387	T2	R.F. Interstage Trans. and Can Assembly	.84
P-9A389	T3	1st I.F. Coil and Can Assembly	.72
P-9A390	T4	2nd I.F. Coil and Can Assembly	1.00
P-9A388	T5	Oscillator Coil and Can Assembly	.82
	T6	Power Transformer - 115 Volt; 60 cycles	2.34
	T5	Power Transformer - 115 Volt; 25 cycles	3.84
	T5	Power Transformer - 230 Volt; 50 cycles	2.64
	L1	High Frequency Oscillator Tracking Coil Assembly	.12

RESISTORS

Code	Resistance	Wattage	Type	Selling Price
R1	25,000 ohms	1.0	Carbon	$ .08
R2	30,000 ohms	.5	Carbon	.10
R3	6,000 ohms	.5	Carbon	.08
R4	2,500 ohms	.2	Carbon	.08
R5	16,000 ohms	2.0	Carbon	.20
R6	150 ohms	.2	Carbon	.08
R7	2.0 Megohms	.2	Carbon	.05
R8	300,000 ohms	.5	Carbon	.03
R9	500,000 ohms		Volume Control & Switch	.50
R10	20,000 ohms	.2	Carbon	.08
R11	60,000 ohms	.5	Carbon	.09
R12	80,000 ohms	.2	Carbon	.03
R13	235 ohms	2.0	Armored Wire Wound	.12
R14	100,000 ohms	.2	Carbon	.03
R15	500,000 ohms	.2	Carbon	.06
R16	150,000 ohms		Tone Control	.36

CONDENSERS

Code	Capacity	Voltage	Type	Selling Price
C1	250 mmfd.		Moulded	$ .08
C2	2-25 mmfd.		Antenna Standard Wave Trimmer	.06
C3	2-25 mmfd.		Antenna Short Wave Trimmer	.06
C4	.050 mfd.	180	Tubular	.03
C5	.050 mfd.	240	Tubular	.05
C6	.100 mfd.	360	Tubular	.10
C7	2-25 mmfd.		R.F. Interstage Standard Wave Trimmer	.05
C8	2-25 mmfd.		R.F. Interstage Short Wave Trimmer	.05
C9	.250 mfd.	240	Tubular	.12
C10	.050 mfd.	180	Tubular	.08
C11, C12	70-150 mmfd.; 70-150 mmfd.		1st I.F. Trimmers	.18
C13	.250 mfd.	180	Tubular	.14
C14, C15	70-150 mmfd.; 150-250 mmfd.		2nd I.F. Trimmers	.20
C16	50 mmfd.		Moulded	.06
C17	.250 mfd.	360	Tubular	.14
C18	.250 mfd.	360	Tubular	.16
C19	2-25 mmfd.		Oscillator Standard Wave Trimmer	.05
C20	2-25 mmfd.		Oscillator Short Wave Trimmer	.05
C21	.100	360	Tubular	.10
C22, C23	300-600 mmfd.; 40-100 mmfd.		Oscillator 600 KC Padding Trimmer; Oscillator 600 KC Padding Trimmer	.22
C24	35 mmfd.		Moulded	.06
C25	14.00 mfd.	400	Wet Electrolytic	.60
C26	18.00 mfd.	300	Wet Electrolytic	.52
C27	.050 mfd.	600	Tubular	.10
C28	.002 mfd.	600	Tubular	.08
C29	.030 mfd.	180	Tubular	.06
C30	.010 mfd.	480	Tubular	.06
C31	.002 mfd.	600	Tubular	.08
C32	10 mmfd.		Moulded	.06
	3 Section Gang Condenser			1.84

PHONO ATTACHMENT PARTS

Description	Selling Price
Phono Switch (Double Pole Double Throw Switch)	$ .30
Phono Jack	.06
Switch Knob	.10
12.0 Mf. - 25 Volt - Dry Electrolytic Condenser	.36
900 Ohm - 0.2 Watt Resistor	.08
12 Inches of No. 722G Shielded Hookup Wire	.04

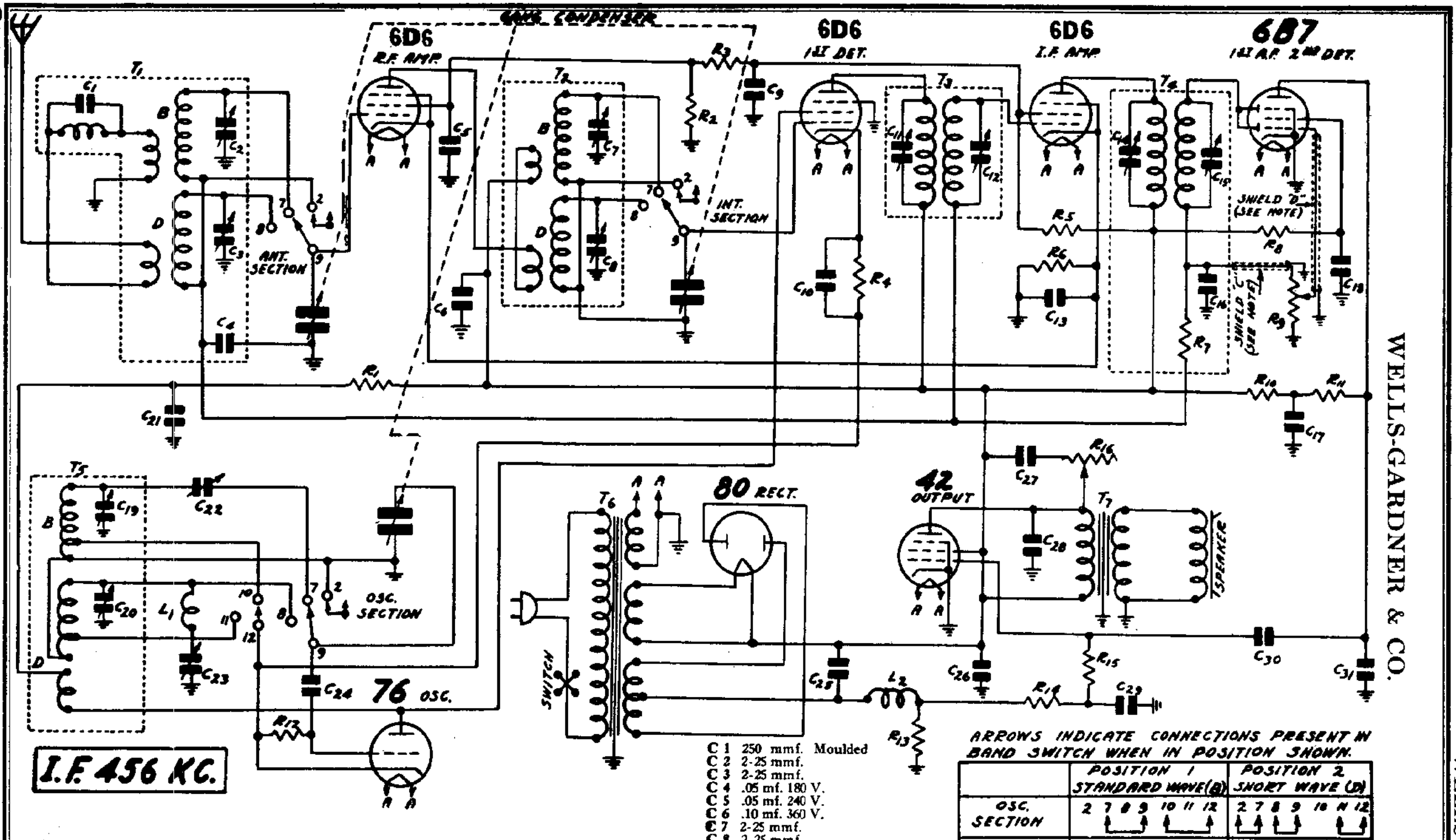
MISCELLANEOUS

Part No.	Description	Selling Price
P-3A129	Type 80 Tube Socket (4 Prong)	$ .06
P-3A112	Type 42 Tube Socket (6 Prong)	.06
P-3A126	Type 76 Tube Socket (5 Prong)	.06
P-3A120	Type 6B7 Tube Socket (7 Prong)	.08
P-3A113	Type 6D6 Tube Socket (6 Prong)	.03
P-3A58	5 Prong Speaker Socket	.05
P-12A222	6" Dynamic Speaker Comp. with Output Trans. T7	2.68
P-12A223	8" Dynamic Speaker Comp. with Output Trans. T7	3.16
P-12A221	10" Dynamic Speaker Comp. with Output Trans. T7	4.18
P-32X32	Tube Shield	.08
P-32X30	Tube Shield Base	.04
P-8X23	Rubber Chassis Mounting Cushions	.04
P-10A32	Knobs, Large, Push-on Type	.10
P-10A13	Knobs, Large, Set Screw Type	.10
P-17X1	Glass Dial Crystal	.08
P-28X25	Crystal Retainer Ring	.04
P-2A41	Two Section Band Change Switch	.80
P-25X221	Chassis Mounting Feet	.04
P-30X14	Grid Clip	.04
P-4A38	Two Lug Terminal Strip (1 Lug Insulated)	.04
P-4A17	Single Lug Terminal Strip	.04
P-4A49	Single Lug Terminal Strip (Mtg. hole used)	.04
P-4A50	Two Lug Terminal Strip (Both Lugs Insulated - Mtg. Foot in Center)	.04
P-7A24	Pilot Light Socket and Spring Clip	.06
P-7A26	Pilot Light Bulb (6-8 Volt)	.08
P-13X214	Antenna and Ground Lead Assembly	.14
P-13X80	Line Cord and Plug	.28
P-15A35	Dial and Drive Assembly	1.14
P-58X71	Dial Strip Only	.26

PRICES SUBJECT TO CHANGE
WITHOUT NOTICE

MODEL 7
Schemat

WELLS-GARDNER & CO.



ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1 STANDARD WAVE (B)	POSITION 2 SHORT WAVE (D)
OSC. SECTION	2 7 8 9 10 11 12	2 7 8 9 10 11 12
ANT. & INT. SECTION	2 7 8 9	2 7 8 9

CONTACT LOCATIONS NOT NUMBERED ARE BLANK.

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
THE CAPACITY OF SHIELD "C" AND "D" IS 50 MMF EACH.

C 1 250 mmf. Moulded
C 2 2-25 mmf.
C 3 2-25 mmf.
C 4 .05 mf. 180 V.
C 5 .05 mf. 240 V.
C 6 .10 mf. 360 V.
C 7 2-25 mmf.
C 8 2-25 mmf.
C 9 .25 mf. 240 V.
C10 .05 mf. 180 V.
C11 70-150 mmf. } One
C12 70-150 mmf. } Assembly
C13 .25 mf. 180 V.
C14 70-150 mmf. } One
C17 .25 mf. 360 V.
C18 .25 mf. 360 V.
C19 2-25 mmf.
C20 2-25 mmf.
C21 .10 mf. 360 V.
C22 300-600 mmf. } One
C25 14 mf. 400 V. Electrolytic
C26 18 mf. 300 V. Electrolytic
C27 .05 mf. 600 V.
C28 .002 mf. 600 V.
C29 .03 mf. 180 V.
C30 .01 mf. 480 V.
C31 .002 mf. 600 V.

R 3 6000 ohm .5 W.
R 4 2500 ohm .2 W.
R 5 16000 ohm 2.0 W.
R 6 150 ohm .2 W.
R 7 2.0 Megohm .2 W.
R 8 300000 ohm .5 W.
R 9 500000 ohm Volume Control
R10 20000 ohm .2 W.
R13 235 ohm Armored Wire Wound
R14 100000 ohm .2 W.
R15 500000 ohm .2 W.
R16 150000 ohm Tone Control

T 1 Antenna R. F. Trans.
T 4 2nd I. F. Trans.
T 5 Osc. Inductors
T 6 Power Trans.
T 7 Output Trans.
L 1 Osc. Tracking Coil

MODEL 7J
Alignment, Socket Trimmers, Voltage Resistance, Coils Changes

WELLS-GARDNER & CO.

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the antenna lead of the signal generator thru a .1 MF condenser to the grid of the 1st detector.

Connect the ground lead of the signal generator to the chassis ground.

Turn the band switch to the standard wave position.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the four I. F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 6.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 250 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator standard wave trimmer (C19) until maximum output is obtained. The location of this trimmer is shown in Fig. 4.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

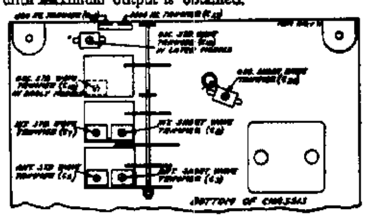


Fig 4—Location of Trimmers

Loosen the pointer set screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage standard wave trimmer (C7) and antenna standard wave trimmer (C2) until maximum output is obtained.

Do not change the setting of the oscillator standard wave trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 4 for location of this trimmer.

Be sure to use a non-metallic screw driver for this adjustment.

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the short wave position.

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator short wave trimmer (C20) until maximum output is obtained. See Fig. 4 for location of this trimmer.

If a maximum output peak cannot be reached, it may be due to the fact that the antenna and interstage short wave trimmers are screwed down too far. Back off these two trimmer screws two or three turns and then adjust the oscillator short wave trimmer for maximum ouptut.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage short wave trimmer (C8) and antenna short wave trimmer (C3) until maximum output is obtained.

When adjusting the interstage short wave trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator short wave trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator short wave trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 4 for location of this trimmer.

Use a non-metallic screw driver for this adjustment.

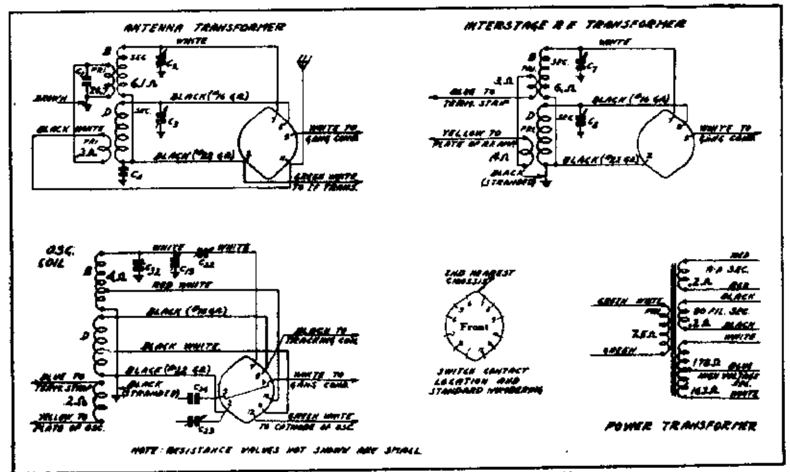


Fig. 3—Color Coding of Coil Wires and D. C. Resistance of Windings

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets. Refer to Fig. 3.

New Part No.	Item	Code	D. C. Resistance in Ohms
9A386	Antenna Transformer		
	Range B Primary Winding	T1	20.7
	Range D Primary Winding	T1	0.3
	Range B Secondary Winding	T1	6.1
	Range D Secondary Winding	T1	Small
9A387	R. F. Interstage Transformer		
	Range B Primary Winding	T2	3.0
	Range D Primary Winding	T2	0.4
	Range B Secondary Winding	T2	6.8
	Range D Secondary Winding	T2	Small
9A388	Oscillator Coils		
	Range B Grid Coil	T5	
	Red White to White		4.0
	Red White to ground		Small
	Range D Grid Coil	T5	
	Black White to Black		Small
	Black White to ground		Small
	Oscillator Plate Coil	T5	0.2
9A389	1st I. F. Transformer		
	Primary Winding	T3	12.0
	Secondary Winding	T3	11.1
9A390	2nd I. F. Transformer		
	Primary Winding	T4	12.0
	Secondary Winding	T4	4.5
	Output Transformer (Part of Speaker Assembly)		
	Primary Winding	T7	310.
	Secondary Winding	T7	1.0
	Dynamic Speaker		
	Speaker Field	L2	1025.
	Speaker Voice Coil		4.1
	Speaker Bucking Coil		0.2
53X91	115 volt 60 cycle Power Transformer		
	Primary Winding	T6	7.5
	Tube Filament Secondary (A-A)	T6	0.2
	80 Filament Secondary	T6	0.2
	High Voltage Secondary Winding	T6	
	Center tap to inside		173.
	Center tap to outside		178.
9A391	High Frequency Oscillator Tracking Coil	L1	1.1

VOLTAGES AT SOCKETS

Line Voltage - 112

Antenna Shorted to Ground

Type of Tube	Function	Heater Volts	Plate to Ground	Screen to Ground	Cathode to Ground	Plate M. A.
6D6	R. F.	6.1	240	95	3	7.
6D6	1st Det.	6.1	240	100	9	3.5
76	Osc.	6.1	100			5.
6D6	I. F.	6.1	240	120	3	7.5
6B7	2nd Det.	6.1	55	40	0	2.3
42	Power	6.1	225	240	17 (1)	38.0
80	Rectifier	4.6				32.0 per plate

Changes in Early Models

In the early models of this receiver the oscillator standard wave trimmer C19 was in the oscillator coil can—see Fig. 4.

In the early models the antenna transformer had two B primary windings as shown in Fig. 5. In later models only one winding was used as shown in Fig. 3.

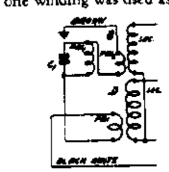


Fig. 5—Antenna Transformer on Early Models

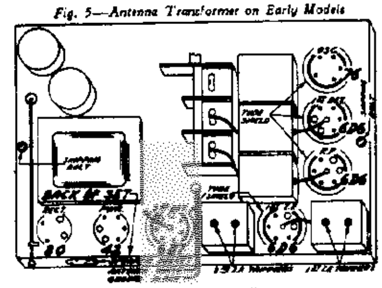


Fig. 6—Location of Tubes

MODEL OEL
MODEL 2DL
MODEL 7L
Dial & Drive Data

WELLS-GARDNER & CO.

Series 7L-OEL-2DL

October, 1936

DIAL AND DRIVE PARTS LIST SUPPLEMENT

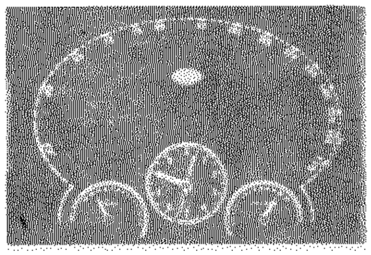
Four distinct types of dials are used in the above series of radios. Each type is supplied in two sizes. When ordering dial parts, specify the items shown to the right to insure getting the correct part.

When ordering parts specify
1—Type of dial.
2—Size of dial.
3—Name on dial or escutcheon.
4—Model or series of radio.

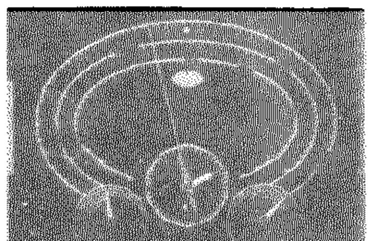
TYPE OF DIAL

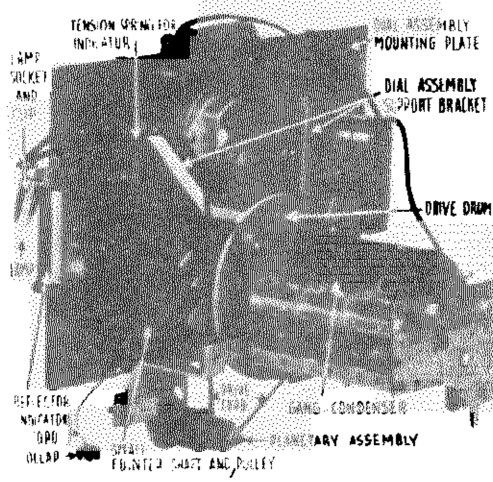
Pointer Dials

No. 2 Dial
External pointers — each dial scale a different color for each band — circular micrometer scale numbered to 10.



No. 4 Dial
External pointers—all dial scales gold etched — ten sided micrometer scale numbered to 100.

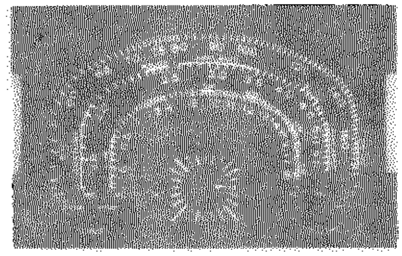




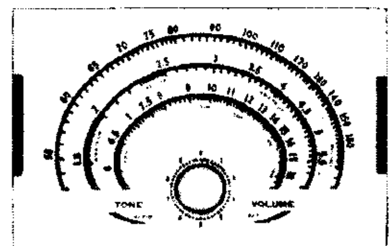
Back View of Pointer Dial

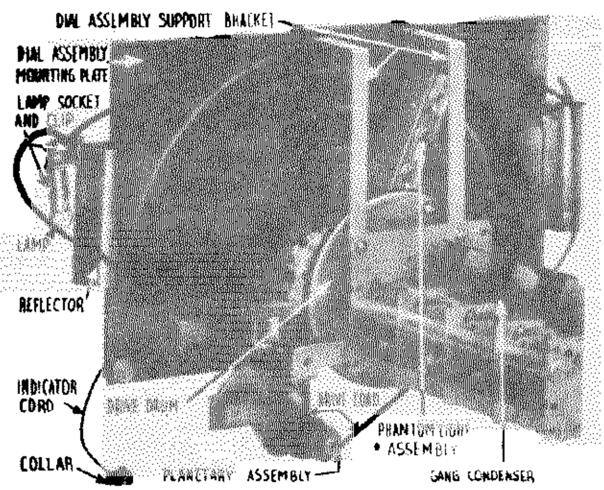
Phantom Light Dials

No. 3 Dial
Moving beam of light indicators — celluloid translucent background.



No. 7 Dial
Moving beam of light indicators — mirror background.

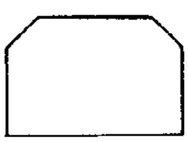




Back View of Phantom Light Dial

SIZE OF DIAL

In each of the above types of dial there are two sizes known as the "7 inch" and "9 inch" size. The size of the dial is determined not by the length of the glass but by the horizontal distance across the opening of the escutcheon.



The "7 inch" dials have the upper corners cut off as shown in the illustration at left, and are approximately 8 inches in length.

The "9 inch" dials are rectangular in shape as shown in the illustration at left, and are approximately 10 inches in length.

MODEL OEL
MODEL 2DL
MODEL 7L

WELLS-GARDNER & CO.

No. 2 and No. 4 POINTER DIALS

Dial & Drive Parts

DIAL ASSEMBLY

	7 INCH		9 INCH	
	PART NO.	LIST PRICE	PART NO.	LIST PRICE
Dial Assembly Complete with Dial Glass; Dial Cardboard; Dial Assembly Mounting Plate; Reflectors; Small Pointers; Cords, Collars, Springs and Pulleys for Small Pointers; and Band Indicator Assembly Less Large Station Pointer and Micrometer Pointer	Specify 4 items listed at top of reverse side—also location of Tun. Eye	$3.85	Specify 4 items listed at top of reverse side—also location of Tun. Eye	$4.30
Dial Glass Only	Same as above	1.75	Same as above	1.75
Dial Cardboard (For Radios with Tuning Eye mounted in Dial)	P-9X21	.10	P-9X22	.10
Dial Cardboard (For Radios without Tuning Eye mounted in Dial)	P-9X16	.10	P-9X23	.10
Dial Assembly Mounting Plate Only (Includes Small Pointer Shafts and Pulleys, and Band Indicator Assembly)	P-25A125	1.20	P-25A126	1.20
Dial Assembly Support Brackets (Attached to Gang Condenser) .. ea.	P-25X297	.10	P-25X297	.10
Large Station Pointer	P-15X59	.20	P-15X72	.20
Micrometer Pointer (No. 2 Dial)	P-15X60	.10	P-15X60	.10
Micrometer Pointer (No. 4 Dial)	P-15X74	.10	P-15X74	.10
Small Volume or Tone Control Pointer (No. 2 Dial) ea.	P-15X57	.10	P-15X57	.10
Small Volume or Tone Control Pointer (No. 4 Dial) ea.	P-15X73	.10	P-15X73	.10
Fibre Strip (At bottom of Dial Glass)	P-11X41	.10	P-11X41	.10
Dial Lamp Reflectors (At each side of Dial Assembly Mounting Plate) ea.	P-41X12	.10	P-41X12	.10
Dial Lamp Sockets and Clips ea.	P-7A37	.10	P-7A37	.10
Dial Lamps—No. 51 Bayonet Type ea.	P-7A32	.20	P-7A32	.20
10" Black Cord for Small Pointers doz.		.25		.25
Brass Collar with Set Screws for Securing Small Pointer Cords to Shafts ea.	P-29X20	.10	P-29X20	.10
Tension Springs for Small Pointer Cords ea.	P-28X44	.10	P-28X44	.10
Small Pointer Shafts and Pulleys ea.	P-26X229	.10	P-26X229	[illegible]
Glass Crystal (Mounted in Escutcheon Plate)	P-17X15	.35	P-17X18	.45
Retaining Ring (For above Crystal)	P-28X58	.15	P-28X82	.15

DRIVE ASSEMBLY

	7 INCH		9 INCH	
	PART NO.	LIST PRICE	PART NO.	LIST PRICE
Planetary Assembly Complete with Hex Nut and Lock Washer (This is the Unit mounted at the front of the Chassis Base. It is integral with the Tuning Shaft)	P-5A34	1.25	P-5A34	1.25
Black Tuning Drive Cord Only	P-10X14	.30	P-10X14	.30
Tension Spring for Tuning Drive Cord	P-28X69	.10	P-28X69	.10
Drive Drum Assembly Complete with Gears and Shafts	P-24X239	1.35	P-24X239	1.35
Spreader Spring for Stationary Gear	P-28X83	.10	P-28X83	.10
Spreader Spring for Rotary Gear	P-28X84	.10	P-28X84	.10
Rubber Cushion (Front) for Gang Condenser	P-8X43	.10	P-8X43	.10
Rubber Cushion (Rear) for Gang Condenser	P-8X44	.10	P-8X44	.10
Rubber Cushion (Rear—under Chassis Base) for Gang Condenser	P-8X45	.10	P-8X45	.10
Rear Mounting Foot for Gang Condenser	P-25X283	.10	P-25X283	.10

No. 3 and No. 7 PHANTOM LIGHT DIALS

DIAL ASSEMBLY

	7 INCH		9 INCH	
	PART NO.	LIST PRICE	PART NO.	LIST PRICE
Dial Assembly Complete with Dial Glass, Dial Assembly Mounting Plate, Reflectors, Micrometer Indicator, Cardboard Reflector, Tone and Volume Indicators, Tension Spring for Tone and Volume Indicators, Indicator Cords, Brass Collars for Indicators, Fibre Dial Strip and Dial Assembly Support Brackets. (This Assembly also includes Celluloid Background for No. 3 Dials only) (No. 3 Dial)	Specify 4 items listed at top of reverse side	$5.60	Specify 4 items listed at top of reverse side	$6.10
Dial Assembly Complete as above (No. 7 Dial)	Same as above	4.85	Same as above	5.30
Dial Glass Only	Same as above	1.75	Same as above	1.75
Celluloid Background for Dial (Used on No. 3 Dial Only)	P-58X141	.60	P-58X142	.70
Dial Assembly Mounting Plate Complete with Tone and Volume Indicators and Indicator Pulleys (No. 3 Dial)	P-25A127	1.45	P-25A128	1.45
Dial Assembly Mounting Plate as above (No. 7 Dial)	P-25A129	1.45	P-25A130	1.45
Dial Assembly Support Brackets (Attached to Gang Condenser) ea.	P-25X321	.10	P-25X322	.10
Tension Spring for Tone and Volume Indicators	P-28X88	.10	P-28X87	.10
10" Black Cord for Tone and Volume Indicators doz.		.25		.25
Brass Collars with Set Screw for Securing Indicator Cords to Shafts ea.	P-29X42	.10	P-29X42	.10
Dial Lamp Reflector (Left from front of Radio)	P-41X14	.10	P-41X14	.10
Dial Lamp Reflector (Right from front of Radio)	P-41X15	.10	P-41X15	.10
Dial Lamp Sockets and Clips (For edge lighting of dial and for Tone and Volume Indicators) ea.	P-7A37	.10	P-7A37	.10
Dial Lamps—No. 51 Bayonet Type (For edge lighting and Phantom Light Assembly) ea.	P-7A32	.20	P-7A32	.20
Phantom Light Assembly Complete with Lamps	P-25A98	1.80	P-25A99	1.90
Springs for Lamps of Phantom Light Assembly ea.	P-28X86	.10	P-28X86	.10
Brass Collars for Lamps of Phantom Light Assembly ea.	P-19X61	.10	P-19X61	.10
Micrometer Indicator (Celluloid and metal disc) (No. 3 Dial)	P-25A131	.35	P-25A131	.35
Micrometer Indicator (Metal disc) (No. 7 Dial)	P-15X85	.10	P-15X85	.10
Cardboard Reflector for Micrometer Indicator (No. 3 Dial)	P-9X28	.10	P-9X28	.10
Cardboard Reflector for Micrometer Indicator (No. 7 Dial)	P-9X31	.10	P-9X31	.10
Fibre Strip (At bottom of Dial Glass)	P-11X48	.10	P-11X49	.10
Switch for Phantom Light Assembly (This switch is not included in any of the above Assemblies)	P-25A134	.75	P-26A134	.75

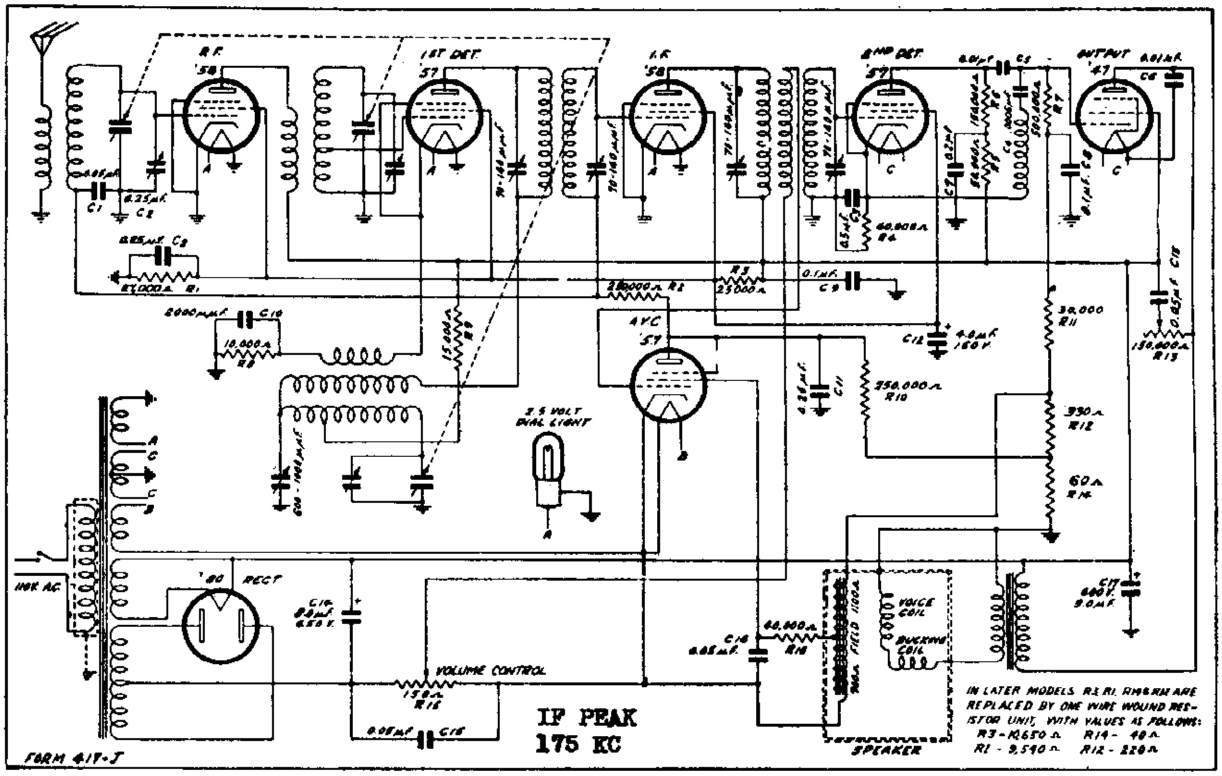
DRIVE ASSEMBLY

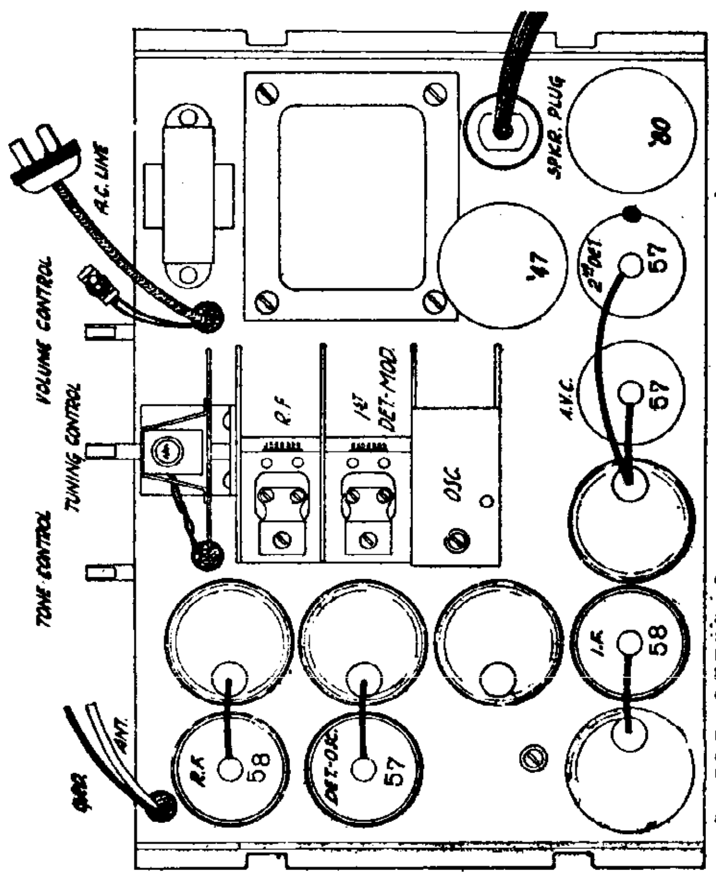
	7 INCH		9 INCH	
	PART NO.	LIST PRICE	PART NO.	LIST PRICE
Planetary Assembly Complete with Hex Nut and Lockwasher (This is the unit mounted at the front of the Chassis Base. It is integral with the Tuning Shaft)	P-5A34	1.25	P-5A34	1.25
Black Tuning Drive Cord Only	P-10X14	.30	P-10X14	.30
Tension Spring for Tuning Drive Cord	P-28X69	.10	P-28X69	.10
Drive Drum Assembly Complete with Gears and Gear Spreader Springs	P-24X247	1.40	P-24X247	1.40
Spreader Spring for Stationary Gear	P-28X83	.10	P-28X83	.10
Spreader Spring for Rotary Gear	P-28X84	.10	P-28X84	.10
Rubber Cushion (Front) for Gang Condenser	P-8X43	.10	P-8X43	.10
Rubber Cushion (Rear) for Gang Condenser	P-8X44	.10	P-8X44	.10
Rubber Cushion (Rear—under Chassis Base) for Gang Condenser	P-8X46	.10	P-8X45	.10
Rear Mounting Foot for Gang Condenser	P-25X283	.10	P-25X283	.10

Prices Subject to Change Without Notice

WESTERN AUTO SUPPLY CO.

MODEL S-721
Schematic, Socket
Trimmers, Change





Change in Later Models

In the first models of this chassis, resistors R-1 and R-3 were carbon resistors of the values as shown in Fig 1 Resistors R-12 and R-14, were in one vitreous enamel unit. The voltages for the sets with these resistors are shown in the voltage chart on Page 4 at the left.

In later models the four above mentioned resistors were replaced by one armored wire wound resistor unit New values are used as follows

Code	Resistance
R-12	220 ohms
R-14	40 ohms
R-1	9,540 ohms
R-3	10,650 ohms

The voltages for the sets with the four-section wire wound resistor are shown in the second voltage chart on Page 4 at the right.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer and an additional filter condenser are used Also, a slight change is made in the power unit wiring In the twenty-five cycle set, condenser C-17 the dry electrolytic unit is put in parallel with condenser C-14 An 8.0 mfd wet electrolytic condenser is put in place of condenser C-17

The twenty-five cycle chassis can be operated satisfactorily from a sixty cycle power supply However, the reverse is not true that is the sixty cycle chassis cannot be operated from a twenty-five cycle power supply

A 110-220 volt 40-60 cycle power transformer is also available for this model

MODEL S-721
Voltage, Parts
Alignment

WESTERN AUTO SUPPLY CO.

REPAIR PARTS LIST FOR 7 TUBE SUPERHETERODYNE RECEIVER

When ordering parts, the part number and the serial number of chassis must be given. If there is a spot of paint on the chassis be sure to give this color. If this information is not available return the old part to insure getting the correct part. PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Part No.	Name	List Price
P-1677	No. 57 Tube Socket	$.15
P-1678	No. 58 Tube Socket	.15
P-1468	No. 47 Tube Socket	.15
P-1474	No. 80 Tube Socket	.15
P-1479	Speaker Socket	.15
P-40430	Aluminum Tube Shield	.20
P-40425	Tube Shield Base	.10
P-40411	Aluminum Coil Shield—R.F. Coils	.20
P-1476	Three-Lug Insulated Terminal Strip	.10
P-1513	Eleven-Lug Insulated Terminal Strip	.15
P-1054	"On-Off" Switch	.80
P-20529	Drive Shaft	.10
P-10224	Rubber Drive Pinion	.10
P-30374	Brass Bushing for Rubber Pinion	.10
P-10191	Rubber Cushions for Channel Brackets	.10
P-1273	Pilot Lamp 2.5 Volt	.25
P-5062	Antenna R.F. Transformer Assembly	.80
P-5057	Interstage R.F. Transformer Assembly	.80
P-5058	Oscillator Coil Assembly	.95
P-5059	1st I.F. Transformer Assembly, complete with can	2.25
P-5060	2nd I.F. Transformer Assembly, complete with can	2.50
P-50541	Output Transformer Assembly	1.75
P-50542	Power Transformer, 60 cycle, 110 volt	5.25
P-50543	Power Transformer, 25 cycle, 110 volt	8.50
P-50545	Power Transformer, 40-60 cycle, 110 volt	8.00
P-1497	Pilot Light Bracket and Drive Gear Assembly	.45
P-1383-C	Drive Bracket and Bearing	.30
P-1684	Celluloid Dial Strip	.20

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	List Price
P-80862-C	C-1	.05 mfd.	200 V.	Tubular	$ .30
P-80888-A	C-2	.25 mfd.	200 V.	Tubular	.40
P-80886-C	C-3 / C-7 / C-11	.5 mfd. / .2 mfd. / .25 mfd.	200 V. / 400 V. / 200 V.	Block	1.60
P-80867	C-4	.0005 mfd.	600 V.	Molded	.25
P-80872-B	C-5	.01 mfd.	600 V.	Tubular	.25
P-80872-B	C-6	.01 mfd.	600 V.	Tubular	.25
P-80864-D	C-8	.1 mfd.	200 V.	Tubular	.25
P-80887-B	C-9	.1 mfd.	400 V.	Tubular	.40
P-80914	C-10	.002 mfd.	600 V.	Tubular	.20
P-80891-B	C-12	4.0 mfd.	150 V.	Electrolytic	.85
P-80890-B	C-13	.05 mfd.	400 V.	Tubular	.20
P-80894-B	C-14 / C-17	8.0 mfd. / 8.0 mfd.	450 V. / 450 V.	Electrolytic Block	2.85
P-80862-C	C-15	.05 mfd.	200 V.	Tubular	.30
P-80862-C	C-16	.05 mfd.	200 V.	Tubular	.30
P-80849		8.0 mfd.	450 V.	Wet Electrolytic (25 Cycle only)	2.20
P-1385-B	600 K.C Trimmer Condenser				.75
P-80882	Three-Gang Condenser				5.70

RESISTORS

Part No.	Code	Resistance	Wattage	Type	List Price
•P-91003	R-1	27,000 ohms	.5 Watts	Carbon	$ .25
P-90954	R-2	250,000 ohms	.2 Watts	Carbon	25
•P-91002	R-3	25,000 ohms	1.0 Watts	Carbon	.25
P-90916	R-4	40,000 ohms	.2 Watts	Carbon	.25
P-90941	R-5	50,000 ohms	.2 Watts	Carbon	.25
P-90963	R-6	150,000 ohms	.2 Watts	Carbon	.25
P-90929	R-7	500,000 ohms	.2 Watts	Carbon	.25
P-90930	R-8	10,000 ohms	.2 Watts	Carbon	.20
P-90905	R-9	15,000 ohms	.2 Watts	Carbon	.25
P-90954	R-10	250,000 ohms	.2 Watts	Carbon	.25
P-90956	R-11	30,000 ohms	.2 Watts	Carbon	.25
P-91040	R-12 / R-14	330 ohms / 60 ohms		Vitreous Enamel	.50
P-90993	R-13	150,000 ohms		Tone Control	.90
P-91041	R-15	150 ohms		Volume Control	.80
P-90916	R-16	40,000 ohms	.2 Watts	Carbon	.25
†P-91048	R12 / R14 / R1 / R3	220 ohm / 40 ohm / 9540 ohm / 10650 ohm	1.0 Watts / .2 Watts / 1.0 Watts / 2.5 Watts	Armored Wire-wound Resistor	1.05

• Used in early models—in later models these resistors are replaced by resistor P-91048.
† See above.

Voltages at Sockets

LINE VOLTAGE 115—ANTENNA LEAD SHORTED TO GROUND—VOLUME CONTROL AT MAXIMUM

			For early Models with 2-section vitreous enamel resistor.				For later Models with 4-section armoured wire-wound resistor.			
Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
'58	R.F.	2.4	282	107	4 (1)	8.	258	106	2.8 (1)	8.0
'57	1st Det.	2.4	270	100	5	.4	250	103	5	.4
'58	I.F. (2)	2.4	282	107	4 (1)	8.	258	106	2.8 (1)	8.0
'57	A.V.C.	2.4	90	40	9.5	0	103	45	10	0
'57	2nd Det.	2.4	207	98	6	.15	190	101	6	.15
'47	Audio	2.4	262	280	24 (3)	31	242	260	17 (3)	30
'80	Rect.	4.8				30 per plate				34 per plate

(1) Read Across R-14.
(2) If I.F. readings are made with a cord and plug, ground the control grid through a condenser to prevent oscillation.
(3) Read Across R12 and R14.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 175 K.C. and accurately calibrated signals over the broadcast band, and an output indicating meter are necessary. The procedure is as follows:

Set the signal generator for 175 K.C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the four intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

Next set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the signal generator, is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K.C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached from the top of the chassis and is between the I.F. and oscillator coil cans.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condensor rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

MODEL S-724
Schematic, Socke[t]
Parts

WESTERN AUTO SUPPLY CO.

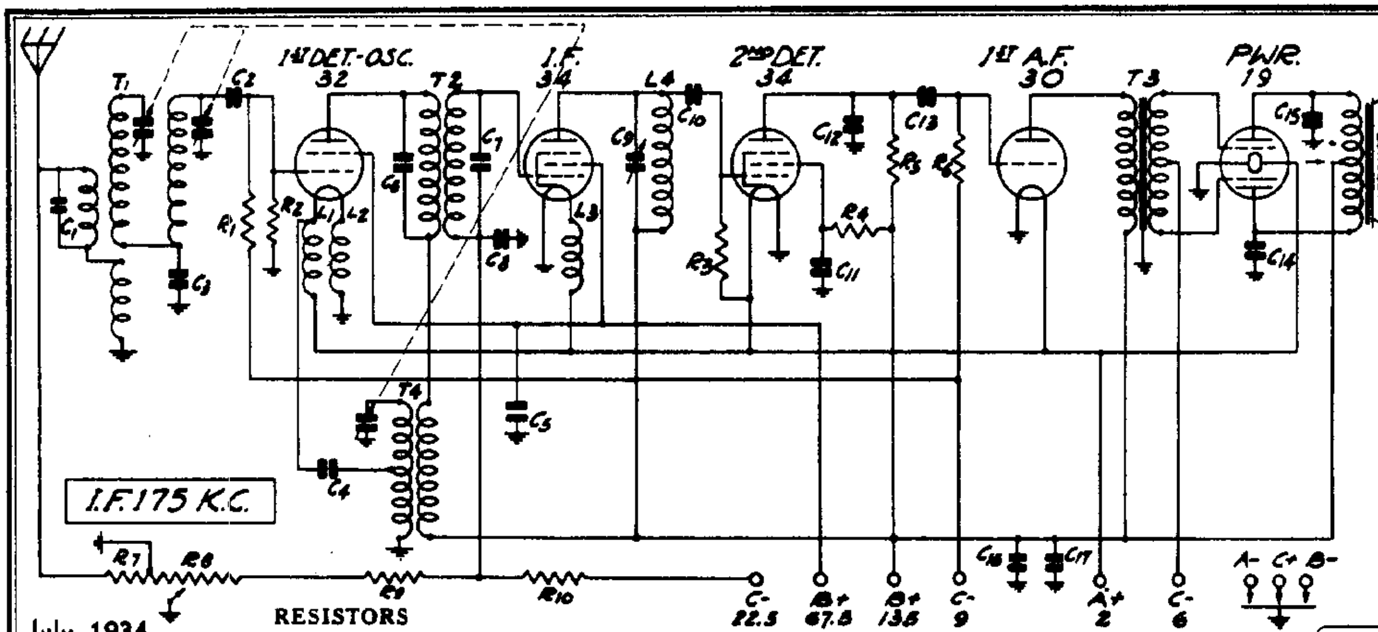


Fig. 1—Schematic Circuit Diagram.

July, 1934

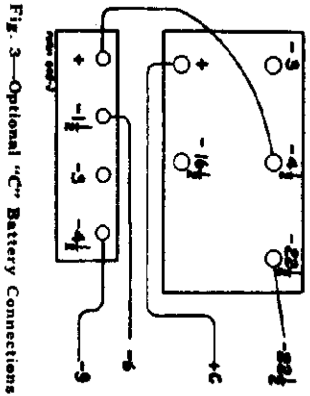


Fig. 3—Optional "C" Battery Connections

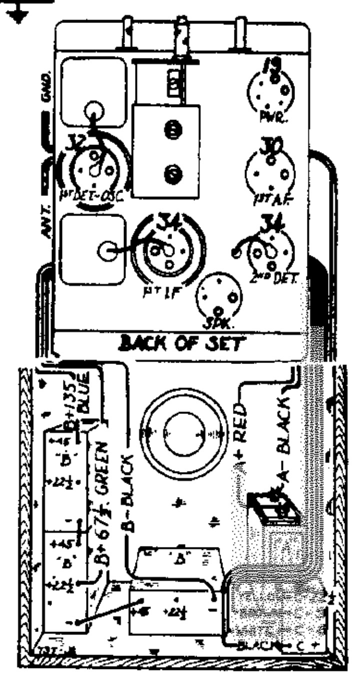


Fig. 2—Tube Arrangement and Battery Connections.

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-A94505	R1	5 Megohm	0.2	Carbon
P-A94105	R2	1 Megohm	0.2	Carbon
P-A94205	R3	2 Megohm	0.2	Carbon
P-B94104	R4	100,000 Ohm	0.5	Carbon
P-B94403	R5	40,000 Ohm	0.5	Carbon
P-A95105	R6	1 Megohm	0.2	Carbon
P-96001	R7 / R8	3,000 Ohm / 60,000 Ohm		Volume Control
P-A94901ww	R9	900 Ohm	0.2	Wire Wound
P-A94652	R10	6,500 Ohm	0.2	Carbon
*P-A94106	R1	10 Megohm	0.2	Carbon
*P-A94205	R2	2 Megohm	0.2	Carbon

*These resistors were used on first models.

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-81812	C1	200 mmf		Wire—Part of Ant. Assem
P-81801	C2	85 mmf		Wire—Part of Ant. Assem.
P-80862	C3	0.05 mf	200V	Tubular
P-80862	C4	0.05 mf	200V	Tubular
P-80862	C5	0.05 mf	200V	Tubular
P-81806	C6	70 mmf		Wire
P-81804	C7	45 mmf		Wire
P-80862	C8	0.05 mf	200V	Tubular
P-1685	C9	70 ± 30 mmf		I. F. Trimmer
P-81800	C10	50 mmf		Wire
P-81045	C11	0.25 mf	200V	Tubular
P-80863	C12	0.004 mf	600V	Tubular
P-80898	C13	0.006 mf	600V	Tubular
P-80969	C14 / C15	0.01 mf / 0.01 mf	400V / 400V	Dual Tubular
P-80864	C16	0.1 mf	200V	Tubular
P-80968	C17	4.0 mf	150V	Electrolytic

MISCELLANEOUS

Part No.	ITEM
P-2181	No. 32 Socket
P-1645	No. 34 Socket
P-1644	No. 30 Socket
P-1833	No. 19 Socket
P-1640	Speaker Socket
P-20406-A	Tube Shield for 34 and 32 Tubes
P-20786	Tube Shield Base
P-50586-D	Audio Input Transformer T3
P-5168	Double Tuned Ant. Trans. Assem. Comp. with resistors and condensers T1 less can
P-40432	Can for above Assem.
P-5199	1st I.F. Coil and Can Assem. T2
P-5187	Oscillator Coil and Can Assem. T4
P-5188	2nd I.F. Coil and Can Assem. L4
P-5172	Double Filament Reactor L1, L2
P-5189	Single Filament Reactor L3
P-30342-A	Grid Cap Only
P-2060	Knob, plain
P-2122	Knob, Arrow Indicator
P-1441-A	Double Insulated Terminal Strip
P-1786	Five Lug Terminal Strip
P-1831	On-Off Switch
P-20711	Gang Condenser Shield
P-10272	Rubber Chassis Cushions
P-70703	Antenna and Ground Wire
P-70749	"B" Battery Wire Assem.
P-70771	"A" Battery Wire Assem.
P-70772	"C" Battery Wire Assem.
P-2124	Speaker 6"
P-2125	Speaker 8"

MODEL S-724
Circuit Data
Alignment, Voltage
Resistance

WESTERN AUTO SUPPLY CO.

Circuit

This receiver is designed to operate from a battery power supply the values of which are shown in Fig. 1. All of the tubes used are of the 2 volt type. The receiver is designed to operate at a very low current drain from the batteries and still have a very satisfactory quality of output.

The circuit has a preselector stage incorporating 2 tuned circuits for image rejection. This couples into the type 32 first detector-oscillator tube through a combination of inductive coupling in T1 and capacitive coupling through C3. In Fig. 1 the two coils to the right of the 32 1st detector tube are the primary and secondary of the 1st I. F. transformer while below this tube are the oscillator coils. The oscillating circuit is tuned by the oscillator section of the gang condenser and is always resonant at a frequency of 175 K. C. above the frequency to which the R. F. circuit is tuned.

One stage of I. F. amplification is employed using a 34 tube. Fixed condensers tune the primary and secondary of the first I. F. transformer. A second I. F. unit of the impedance coupled type is provided in which the inductance L4 is tuned by a trimmer condenser C9. The volume control is of the variable antenna input and I. F. bias type. Referring to Fig 1 it will be noted that one end of the volume control strip is connected to the antenna and the other end is connected to resistor R9. Also note that the volume control strip is tapped. Bias voltage for the 34 I. F. tube is obtained from a potentiometer consisting of resistors R9, R10 and the 60,000 ohm section of the volume control R8 which resistors are connected across the 22½ volt "C" battery.

As the slider of the volume control is moved away from the antenna end, the signal input to the antenna stage is increased. The bias voltage of the I. F. tube is not affected until the tap is reached. As the slider moves from this point to the end of the strip the I. F. bias is decreased, thus increasing the sensitivity. When this happens the plate current goes up and more battery current is used.

A 34 tube is used as the 2nd detector or demodulator. Demodulation takes place in the grid circuit of this tube.

Resistance coupling is used between the 2nd detector and the 1st audio stage which uses a 30 tube. The 1st audio stage is transformer coupled to the output stage. Class "B" amplification is employed in the output stage which uses a type 19 tube. This consists of two output tubes in one envelope. A magnetic reproducer is used.

A 3 pole switch controls all three sources of battery supply.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and at the intermediate frequency, and an output meter are required for indicating the effect of adjustments.

First set the signal generator to a frequency of 175 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector thru a .05 mfd. condenser. The ground lead from the signal generator goes to the ground lead of the receiver. Adjust trimmer condenser C9 on the back panel of the chassis until maximum output is obtained. **A non-metallic screw driver should be used in making this adjustment as the I. F. trimmer is at B+ potential.**

Next set the signal generator for 1730 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Adjust the trimmer of the oscillator section of the 3 gang condenser until maximum output is obtained. The oscillator section is the one with the cut plate rotor.

Then set the signal generator for 1400 K. C. and turn the rotor until maximum output is obtained. Adjust the other two trimmers on the gang condenser for maximum output.

To obtain dial scale calibration tune in an 800 K. C. signal and set the dial pointer at that mark on the dial scale. When calibrated in this manner, the setting will be approximately correct at both ends of the scale.

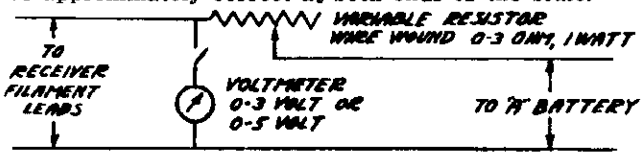


Fig. 4—Using Voltage Regulator with 3 Volt "A" Battery

The use of the cut plate type of condenser eliminates the necessity of a 600 K. C. padder and no adjustment. at this frequency, therefore, is required.

D. C. Resistance of Windings

Following are the D.C. resistances of the various windings in the chassis.

Part No.	Item	Code	D. C. Resistance in Ohms
P-5168	Double Tuned Ant. Coil Pri.	T1	19.2
	Double Tuned Ant. Coil Sec. (Preselector)	T1	3.2
	Double Tuned Ant. Coil Sec. (1st Det.)	T1	3.2
P-5199	1st I.F. Coil Pri.	T2	90.0
	1st I.F. Coil Sec.	T2	116.0
P-50586-D	Audio Input Trans. Pri.	T3	1010.
	Audio Input Trans. Sec. Cent. Tap to outside end	T3	648.
	Audio Input Trans. Sec. Cent. Tap to inside end	T3	588.
P-5187	Oscillator Coil, Grid Winding	T4	4.1
	Oscillator Coil, Plate Winding	T4	10.4
P-5172	Double Filament Reactor Assem.	L1	.61
	Double Filament Reactor Assem.	L2	.61
P-5189	Single Filament Reactor Assem.	L3	.61
P-5188	2nd I.F. Reactor Coil	L4	52.1
P-2124	6" Magnetic Speaker, Center Tap to outside end		272.
	6" Magnetic Speaker, Center Tap to inside end		225.
P-2125	8" Magnetic Speaker (same as P-2124)		

VOLTAGES AT SOCKETS

Volume Control at Maximum—Antenna Shorted to Ground
B+135 Volts
Voltages to Chassis

Type of Tube	Function	Across Filament	Plate to Cath.	Screen to Cath	Grid to Cath.	Normal Plate M. A.
32	1st Det. & Osc.	2.0	135	67.5	7.5 (1) (2)	2.5
34	I. F.	2.0	135	67.5	2.5 (3)	2.8
34	2nd Det.	2.0	50	40 (1)	0	1.8
30	1st Audio	2.0	135		9 (4)	3.0
19	Output	2.0	135		6	1.8 Total

(1) With 250,000 ohm meter.
(2) Subject to variation due to oscillatory current.
(3) With 25,000 ohm meter.
(4) As read at "C" battery.

Voltages

Check the voltages at the sockets to see if correct values are being delivered to the tubes. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together. The volume control should be turned to the right or maximum position.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condition. These voltages are typical of the sets but will vary slightly with variations in individual receivers, tubes, test equipment used and battery voltages.

WESTERN AUTO SUPPLY CO.

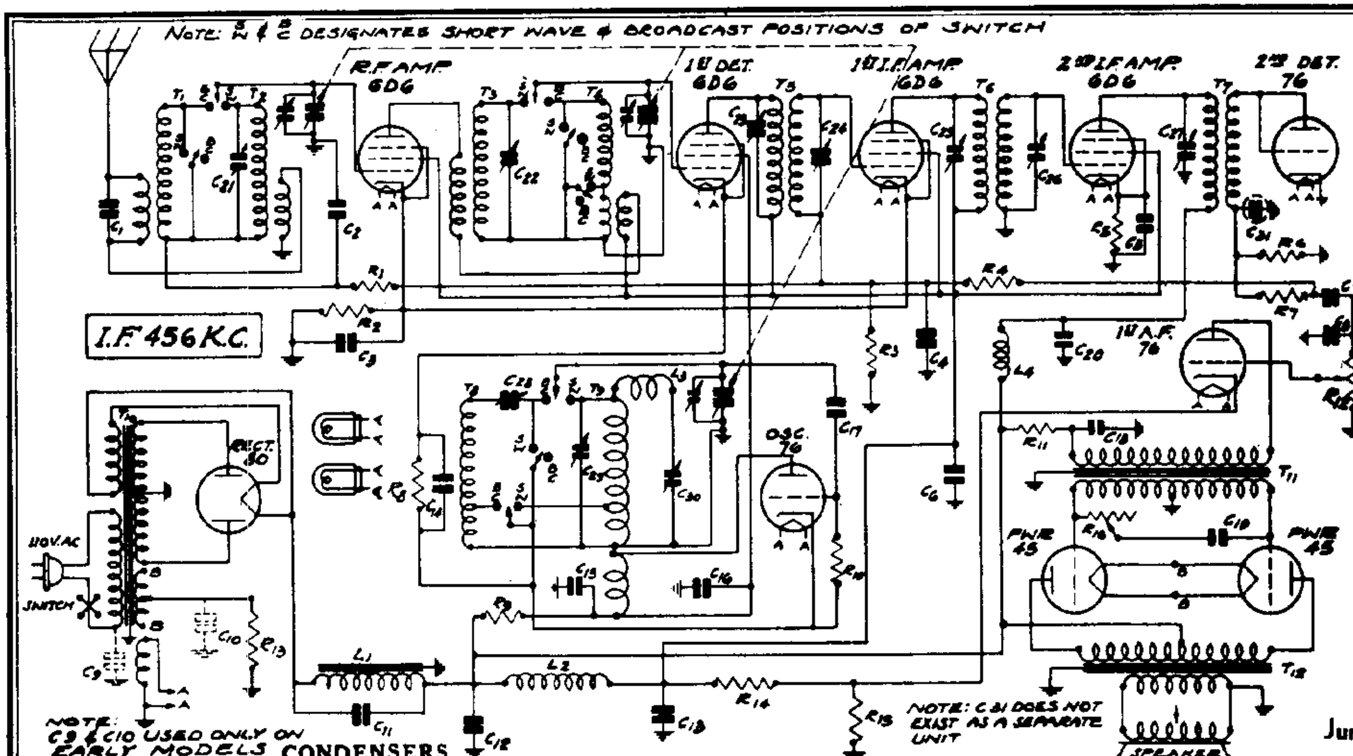


Fig. 1—Schematic Circuit Diagram

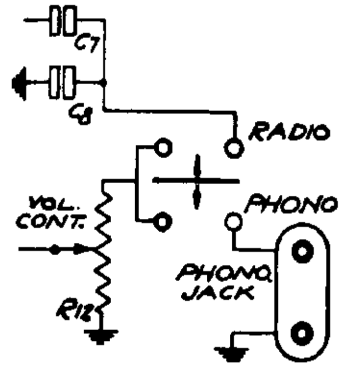


Fig. 5—Phonograph Connections

June, 1934

CONDENSERS

Part No.	Code	Capacity	Volts	Type
P-80919	C1	250 mmfd.		Moulded
P-80862	C2	.05 mfd.	200V.	Tubular
P-80888	C3	.25 mfd.	200V.	Tubular
P-80862	C4	.05 mfd.	200V.	Tubular
P-80862	C5	.05 mfd.	200V.	Tubular
P-80888	C6	.25 mfd.	200V.	Tubular
P-80862	C7	.05 mfd.	200V.	Tubular
P-81005	C8	35 mmfd.	600V.	Moulded
*P-80997	C9	.01 mfd.	600V.	Condenser in metal can
*P-80888	C10	.25 mfd.	200V.	Tubular
P-80985	C11	.15 mfd.	200V.	Tubular
P-81039	C12	16.0 mfd.	400V.	Wet Electrolytic
P-81018	C13	6.0 mfd.	150V.	Dry Electrolytic
	C16	2.0 mfd.	300V.	
	C18	2.0 mfd.	300V.	
P-80862	C14	.05 mfd.	200V.	Tubular
P-80864	C15	.10 mfd.	200V.	Tubular
P-81005	C17	35 mmfd.	600V.	Moulded
P-80863	C19	.004 mfd.	600V.	Tubular
P-81041	C20	.10 mfd.	400V.	Tubular
P-2102	C21	3-40 mmfd.		Ant. S.W. Trimmer
P-2102	C22	3-40 mmfd.		1st Det. S.W. Trimmer
P-2103	C23	200± 50 mmfd.		Dual Trimmer
	C24	200± 50 mmfd.		Part of I.F. Assem.
P-2103	C25	200± 50 mmfd.		Dual Trimmer
	C26	200± 50 mmfd.		Part of I.F. Assem.
P-1665	C27	70± 30 mmfd.		3rd I.F. Coil Trimmer
P-2112	C28	300-500 mmfd.		600 K.C. Trimmer

RESISTORS

Part No.	Code	Resistance	Watts	Type
P-A95204	R1	200,000 ohm	.2	Carbon
P-98023	R2	150 ohm	.5	Flex. Wire Wound
P-A95105	R3	1 megohm	.2	Carbon
P-A95205	R4	2 megohm	.2	Carbon
P-98024	R5	400 ohm	.5	Flex. Wire Wound
P-A94504	R6	300,000 ohm	.2	Carbon
P-A95104	R7	100,000 ohm	.2	Carbon
P-A94252	R8	2,500 ohm	.2	Carbon
P-98022	R9	30,000 ohm	2.0	Carbon
P-A95104	R10	100,000 ohm	.2	Carbon
P-C94303	R11	30,000 ohm	1.0	Carbon
P-96005	R12	2 megohm		Volume Control and Switch
P-98006	R13	780 ohm	3.0	Armored Wire Wound
	R14	6000 ohm	1.4	
	R15	460 ohm	.2	
P-97003	R16	3 megohm		Tone Control

*Used in Early Models only.

Part No.	Item
P-50638	Power Transformer 115V. 60 cycles T 10
P-50639	Power Transformer 115V. 25 cycles T 10
P-50640	Power Transformer 115-230V. 40-60 cycles T 10
P-50641	Power Choke L 1
P-50642	Audio Output Transformer T 12
P-50643	Audio Input Transformer T 11
P-5176	Antenna R.F. Trans. T 1 and T 2 less can
P-5177	Interstage R.F. Trans. T3 and T4 less can
P-40433	Cans for the above coils
P-5184	1st I.F. Coil & Can Assembly T5
P-5185	2nd I.F. Coil & Can Assembly T6
P-5190	H. F. Oscillator Tracking Coil L3
P-5151	I.F. Plate Isolating Reactor L4
P-70702	A.C. Cord & Plug
P-1421	Single Insulated Terminal Strip
P-1441	Double Insulated Terminal Strip
P-2060	Small Knob
P-2062	Large Knob
P-30342A	Grid Cap only
P-30456	Small Pointer
P-20912	Large Double End Pointer
P-2012	Pilot Light Bulb
P-10272	Rubber Mounting Feet
P-10320	Glass Crystal
P-20875	Crystal Retaining Ring
P-2152	8" Dynamic Speaker Mantel L2
P-1968	10" Dynamic Speaker Console L2
P-2101	Three Position Band Change Switch
P-20905	Condenser Shield
	8" Black Drive Cord (V.C. or T.C. Ind.)
	29" Black Drive Cord (Cond. Drive)
P-2126	Pilot Lamp Socket & Clip Assembly
P-20911	Bottom Shield
P-1011A	Phono-Radio Switch*
P-1193	Phono Jack
P-2025	No. 80 Socket
P-1643	No. 45 Socket
P-2022	No. 76 Socket
P-1885	No. 6D6 Socket

MODEL S-727
Voltage, Alignment
Resistance, Socket
Trimmers, Change

WESTERN AUTO SUPPLY CO.

Replacing Drive Cord

Remove chassis from cabinet.

Take off the pilot light assembly by lifting off the two sockets and spring clips.

Detach the large pointer by removing the screw at the center of the dial.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and tone control collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 4.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 4. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 4.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth

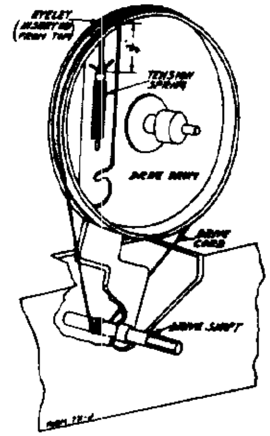


Fig. 4—Drive Cord Replacement

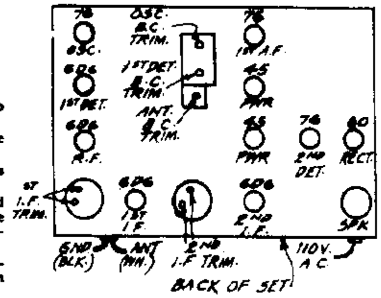
turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¼" from the flange of the drum as shown in Fig. 4. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly after which the chassis may be reinstalled in the cabinet.



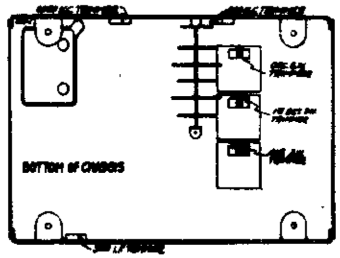


Fig. 1—Tube Arrangement & Location of Trimmers

Voltages at Sockets

LINE VOLTAGE — 115

ANTENNA SHORTED TO GROUND

Type of Tube	Function	Across Fila. or Heater	Plate to Cath.	Screen to Cath.	Cath. to Ground	Normal Plate M.A.
6D6	R.F.	6.3	95	95	2.8	7.0
6D6	1st Det.	6.3	88	95	9.2	2.9
76	Osc.	6.3	110	—	—	5.0
6D6	1st I.F.	6.3	95	95	2.8	7.0
6D6	2nd I.F.	6.3	300	95	3.3	6.0
76	2nd Det.	6.3	—	—	—	—
76	1st Audio	6.3	160	—	9.0	4.0
45	Output	2.5	245	—	48.0	30.0
80	Rectifier	5.0	890 V. A. C. pl. to pl.			58.0 per plate

Phono Connections

Phonograph connections can be made as shown in Fig. 5. A single pole double throw switch and double pin jack are required. These should be mounted on the back panel of the chassis close to the 2nd detector. The connections are made by opening the diode circuit at the point shown in the illustration and completing the connections to the switch and pin jacks as indicated. A high impedance pick-up should be used. If a low impedance pick-up is used a step-up transformer will be required for sufficient volume. The volume control of the set will regulate the phono volume.

Change in Early Models

In the early models of this receiver the side of the trimmer condenser C27 which is shown in Fig. 1 as connected to ground was connected to the B+ side of the 3rd I. F. coil primary.

Condenser Alignment

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 456 K. C. and accurately calibrated signals over the broadcast and short wave bands, 530-1740 K. C. and 5.8-18.3 M. C., is required. An output indicating meter is also necessary. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Reduce the signal so that A. V. C. action is not obtained.

Then adjust the five I. F. trimmer condensers until maximum output is obtained. The adjusting screws for the 1st and 2nd trimmer condensers are reached from the top of the chassis and are in the round I. F. cans - See Fig. 2. The openings to these trimmer condensers are covered over by small cover plates which are held in position by screws. Loosen these screws until the cover plates can be swung around. **CAUTION - Use an insulated screwdriver for adjusting trimmers to prevent short circuiting to ground.** In the 3rd I. F. coil, only the primary has a variable trimmer condenser. This condenser is mounted on the back panel of the chassis as shown in Fig. 2 and the adjustment screw is reached through a hole in the back panel.

Broadcast Band Adjustment

The broadcast short wave switch should be in the broadcast position. Set the signal generator for 1740 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Reduce the signal so that A. V. C. action is not obtained. Adjust the oscillator broadcast trimmer until maximum output is obtained. This trimmer is on the tuning condenser and its location is shown in Fig. 2.

Then set the signal generator for 1500 K. C. Turn the rotor until maximum output is obtained. Loosen the set screw in the pointer hub and set the pointer at the 1500 K. C. mark on the broadcast band scale. Retighten the hub set screw. Then adjust the antenna and 1st detector broadcast trimmers until maximum output is obtained.

Next set the signal generator for 600 K. C. and adjust the 600 K. C. trimmer. The adjusting screw is reached through a hole in the front panel of the chassis as shown in Fig. 2. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

Short Wave Band Adjustment

CAUTION—After the broadcast band alignment as described above has been made, do not change the adjustment of any of the broadcast band trimmers.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K.C. higher in frequency than the signal.

Turn the broadcast short wave switch to the short wave position. Turn the rotor to the full open position. As explained above, the volume control should be at the maximum position and the signal should be reduced to prevent A. V. C. action. Set the signal generator for 18,300 K. C. Then adjust the oscillator short wave trimmer for maximum output. This trimmer is reached from under the chassis and its position is shown in Fig. 2. If a maximum output peak cannot be reached, it may be due to the fact that the antenna and 1st detector short wave trimmers are screwed down too far. Back off these two trimmer screws two or three turns and then adjust the oscillator short wave trimmer for maximum output.

Next set the signal generator for 15,000 K. C. Turn the rotor until maximum output is obtained. Then adjust the antenna and 1st detector short wave trimmers for maximum output.

Next set the signal generator for 6000 K. C. and adjust the 6000 K. C. trimmer. This condenser is mounted on the front panel of the chassis as shown in Fig. 2 and is reached through a hole in the front panel. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained.

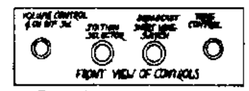


Fig. 2—Arrangement of Controls

D. C. Resistance of Windings

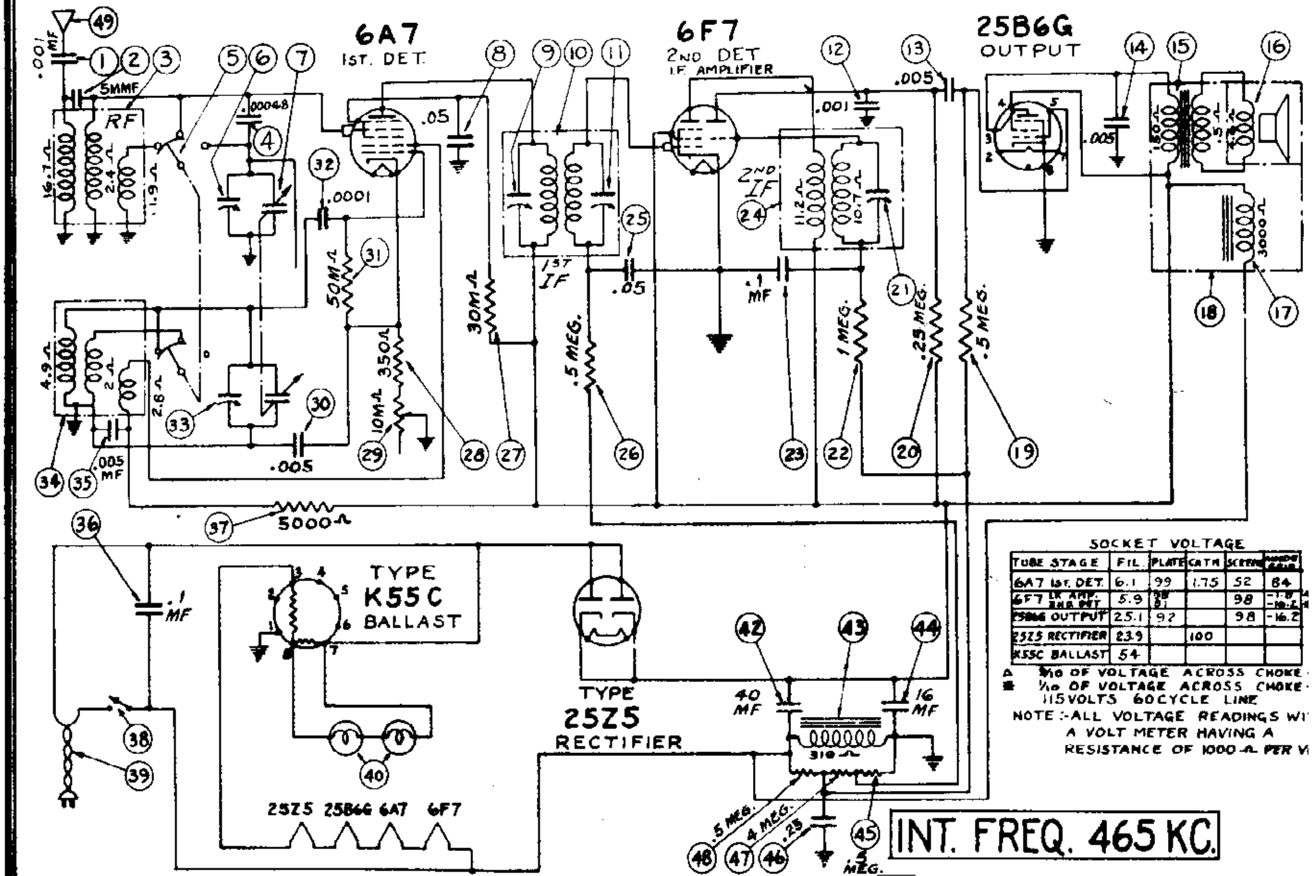
Following are the D.C. resistances of the various windings in the chassis.

Part No.	Item	Code	D.C. Resistance in Ohms
P-5176	S.W. and B.C. Antenna R.F. Transformer Primaries (in series)	T1 T2	27.9
	B.C. Antenna R.F. Transformer Secondary	T1	5.0
	S.W. Antenna R.F. Transformer Secondary	T2	Small
P-5177	S.W. and B.C. Interstage R.F. Transformer Primaries (in series)	T3 T4	2.7
	B.C. Interstage R.F. Transformer Secondary	T4	4.4
	S.W. Interstage R.F. Transformer Secondary	T3	Small
P-5178	S.W. Oscillator Grid Coil	T9	Small
	S.W. Oscillator Plate Coil	T9	.35
	B.C. Oscillator Grid Coil	T8	3.5
P-5190	S.W. Oscillator Tracking Coil	L3	1.27
P-5184	1st I.F. Coil Primary	T5	5.0
	1st I.F. Coil Secondary	T5	5.0
P-5185	2nd I.F. Coil Primary	T6	5.0
	2nd I.F. Coil Secondary	T6	5.0
P-5186	3rd I.F. Coil Primary	T7	9.3
	3rd I.F. Coil Secondary	T7	26.5
P-50640	Audio Input Transformer Primary	T11	2000.
	Audio Input Transformer Secondary Center Tap to Outside	T11	2600.
	Audio Input Transformer Secondary Center Tap to Inside	T11	2000.
P-50642	Audio Output Transformer Primary Center Tap to Outside	T12	340.
	Audio Output Transformer Primary Center Tap to Inside	T12	320.
	Audio Output Transformer Secondary	T12	.44
P-1968	Speaker Voice Coil		3.0
	Speaker Field Coil	L2	5000.
P-50641	Filter Choke	L1	150.
P-50638	Power Transformer 115V. 60 Cycles Pri.	T10	5.3
	Power Transformer 115V. 60 Cycles H.T. Sec. Center Tap to Outside	T10	120.
	Power Transformer 115V. 60 Cycles H.T. Sec. Center Tap to Inside	T10	116.
	Power Transformer 115V. 60 Cycles Sec. (80 Fil.)	T10	Small
	Power Transformer 115V. 60 Cycles Sec. (AA Fil.)	T10	Small
	Power Transformer 115V. 60 Cycles Sec. (BB Fil.)	T10	Small

Trimmers, Voltage
Alignment, Chassis

WESTINGHOUSE ELEC. SUPPLY CO.

MODEL WR-102-A
Schematic, Socke



SOCKET VOLTAGE

TUBE STAGE	FIL.	PLATE	CATH	SCREEN	[illegible]
6A7 1ST. DET.	6.1	99	1.75	52	84
6F7 I.F. AMP. 2ND DET	5.9	98 / 91		98	-1.8 / -16.2
25B6G OUTPUT	25.1	92		98	-16.2
25Z5 RECTIFIER	23.9		100		
K55C BALLAST	54				

A 1/10 OF VOLTAGE ACROSS CHOKE
■ 1/10 OF VOLTAGE ACROSS CHOKE
115 VOLTS 60 CYCLE LINE

NOTE:- ALL VOLTAGE READINGS WI[TH] A VOLT METER HAVING A RESISTANCE OF 1000 Ω PER V[OLT]

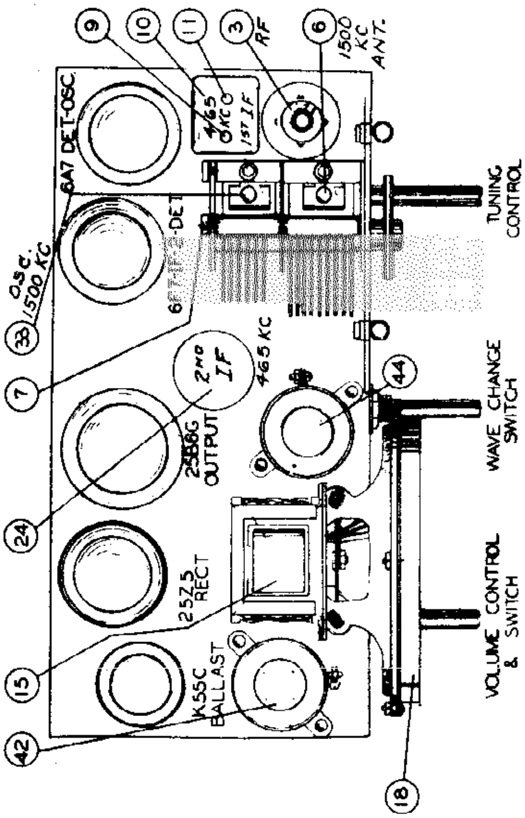


Figure No. 1

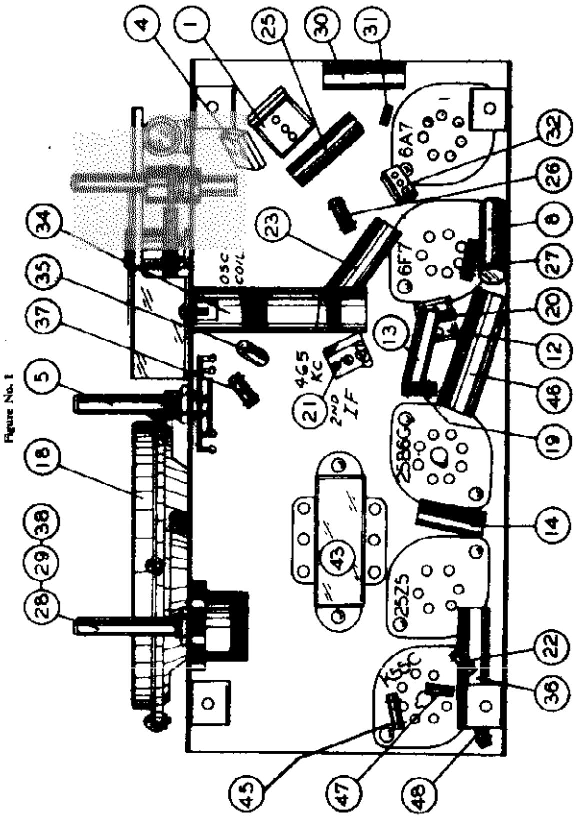
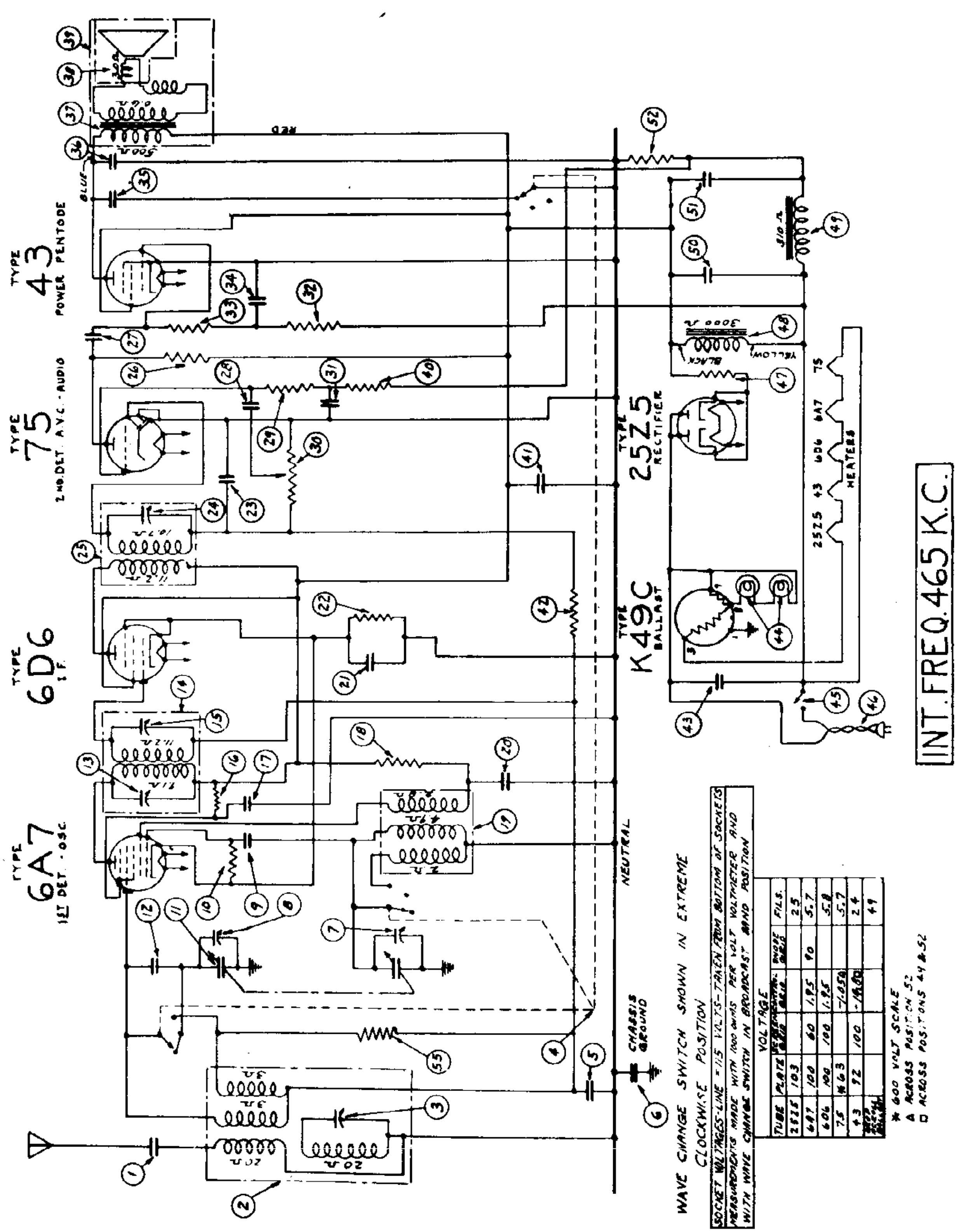


Figure No. 2

MODELS WR-103, WR-103-A
Schematic, Voltage

WESTINGHOUSE ELEC. SUPPLY CO.



WAVE CHANGE SWITCH SHOWN IN EXTREME CLOCKWISE POSITION

SOCKET VOLTAGES-LINE = 115 VOLTS-TAKEN FROM BOTTOM OF SOCKETS

MEASUREMENTS MADE WITH 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION

VOLTAGE

TUBE	PLATE	SCREEN GRID	CONTROL GRID	ANODE GRID	FILS.
25Z5	103				25
6A7	100	60	1.95	90	5.7
6D6	100	100	1.95		5.8
75	*63		-1.05▲		5.7
43	92	100	-14.0□		24
DROP ACROSS BALLAST					49

* 600 VOLT SCALE
▲ ACROSS POSITION 52
□ ACROSS POSITIONS 44 & 52

WESTINGHOUSE ELEC. SUPPLY CO.

MODELS WR-103
WR-103-A
Socket, Trimmers
Chassis

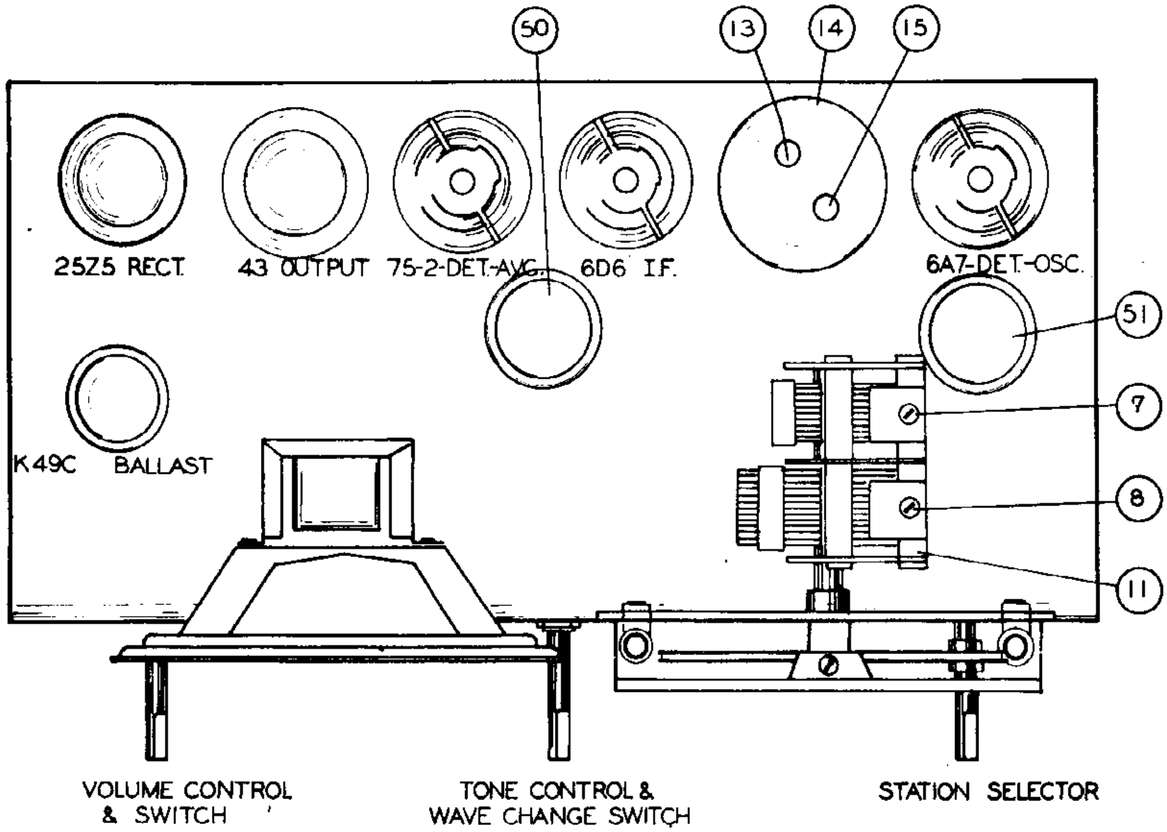


Figure No. 1

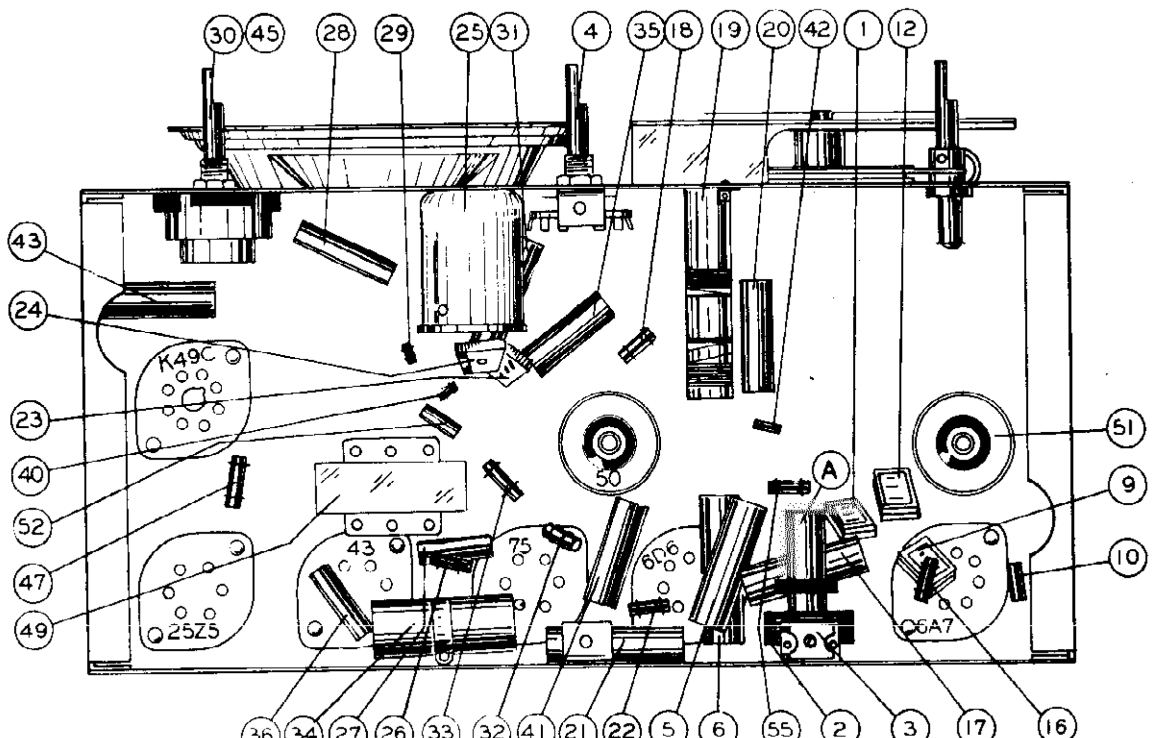


Figure No. 2

MODELS WR-103
WR-103-A

WESTINGHOUSE ELEC. SUPPLY CO.

Alignment, Parts

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ..... 1 #6A7, 1 #6D6, 1 #75, 1 #43, 1 #25Z5, 1 #K49C - Total 6
Power Supply .... 105 to 125 volt, D.C., or 105 to 125 volt, 50 to 60 cycle A.C.
Power Consumption .... 47 Watts
Tuning Ranges .... 540 to 1550 and 1500 to 3200 KC.
Maximum Output .... .75 Watt
Maximum Undistorted Output .... 1 Watt
Line-Up Frequencies .... I.F. 465 KC., 1400 KC.

LINE-UP CAPACITOR ADJUSTMENTS

ADJUSTMENT OF I.F. (465 KC.)

1. Set volume control on full, the wave-change switch on the Broadcast (treble position) and the dial indicator at approximately 600 KC.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 KC., and adjust its output to produce a measurable reading on output meter when test signal is applied to the grid of the 6D6 I.F. tube through a .5 mfd. blocking condenser.
4. Adjust #24 (see Fig. #2) to maximum output, reducing output of test oscillator as required.
5. Apply test signal to grid of 6A7 first detector-oscillator tube and adjust #13 and #15 (Fig. #1) to maximum output.
6. With test signal still on the grid of 6F7 tube, repeat the above adjustments for greatest sensitivity.
7. Apply strong 465 KC. signal to the antenna and adjust trap coil trimmer #3 to a minimum output.

ADJUSTMENT OF BROADCAST BAND

1. Apply test signal on grid of 6A7 tube and set the test oscillator to 1400 KC.
2. Turn the gang condenser to its maximum position. Adjust dial indicator until either end is directly over the long horizontal lines on the dial scale. Then set dial indicator to 1400 KC.
3. Adjust trimmer #7 to maximum output.
4. Apply test signal to antenna of set through a .0002 mfd. condenser and adjust trimmer #8 to maximum output.

ADJUSTMENT OF POLICE BAND

When adjustments as outlined under the Broadcast Band are completed, the Police Band requires no adjustment unless the coil has been changed. In this event, set test oscillator and station indicator to 1700 KC., and apply test signal to antenna lead. The Police Band winding is indicated by "A" in Fig. #2. Adjust the position of this winding by sliding it back and forth on the coil until maximum output is indicated on the output meter. This winding should then be secured in place by applying a thin coat of coil cement.

Dia. #	Part #	Description of Parts	List Price
1	CM 9519	.0005 mfd. mica condenser	$ .20
2	RC 95165	Antenna coil assembly	1.50
3		30-60 mmf. trimmer condenser - part of RC 95165	
4	SW 9562	Wave-change switch	.75
5	CW 2-10	.1 mfd., 200 V. condenser	.15
6	CW 6-10	.1 mfd., 600 V. condenser	.20
7		Trimmer condenser - part of CG 9547	
8		Trimmer condenser - part of CG 9547	
9	SA 106417	.0001 mfd. mica condenser	.20
10	RE 9581	50,000 ohm, 1/4 W. resistor	.15
11	CG 9547	Variable condenser - 2 gang	2.50
12	CM 9522	.00048 mfd. mica condenser	.20
13		35-130 mmf. trimmer condenser - part of IC 9586	
14	IC 9586	First I.F. coil - 465 KC.	2.00
15		35-130 mmf. trimmer condenser - part of IC 9586	
16	RE 9536	20,000 ohm, 1/4 W. resistor	.10
17	CW 2-10	.1 mfd., 200 V. condenser	.15
18	SA 105249	5000 ohm, 1/4 W. resistor	.15
19	RC 95166	Oscillator coil assembly	.70
20	CW 2-10	.1 mfd., 200 V. condenser	.15
21	CW 2-10	.1 mfd., 200 V. condenser	.15
22	RE 9570	180 ohm, 1/8 W. resistor	.10
23	CM 9519	.0005 mfd. mica condenser	.20
24		30-60 mmf. trimmer condenser - part of IC 9595	
25	IC 9595	Second I.F. coil - 465 KC.	1.60
26	SA 105279	.25 meg., 1/4 W. resistor	.15
27	CW 4-005	.005 mfd., 400 V. condenser	.15
28	CW 4-005	.005 mfd., 400 V. condenser	.15
29	RE 9572	500,000 ohm, 1/4 W. resistor	.15
30	VR 957	.5 meg. volume control	1.25
31	CW 2-10	.1 mfd., 200 V. condenser	.15
32	RE 9572	.5 meg., 1/4 W. resistor	.15
33	RE 9572	.5 meg., 1/4 W. resistor	.15
34	CW 9525	.1 mfd., 100 V. condenser	.40
35	CW 2-05	.05 mfd., 200 V. condenser	.15

Part #		Description of Parts	List Price
36	CW 4-005	.005 mfd., 400 V. condenser	.15
37	TR 9583	Output transformer	1.25
38	DM 9514	Diaphragm and voice coil assembly	1.15
39	SK 9544	Speaker	4.50
40	RE 9572	.5 meg., 1/4 W. resistor	.15
41	CW 2-10	.1 mfd., 200 V. condenser	.15
42	RE 9572	.5 meg., 1/4 W. resistor	.15
43	CW 2-10	.1 mfd., 200 V. condenser	.15
44	LP 9516	Dial lamp, 6.3 V., .15 amp.	.20
45		On-off switch - part of VR 957	
46	CB 9512	Line cable	.50
47	RE 9564	25 ohm, 1/2 W. resistor	.20
48		Field coil	
49	SA 105311	Choke coil assembly	.95
50	CE 9545	20 mfd., 150 V. electrolytic condenser	.85
51	CE 9546	12 mfd., 150 V. electrolytic condenser	.85
52	RE 9566	25 ohm, 1/4 W. resistor	.15
55	SA 105277	75,000 ohm, 1/4 W. resistor	.15

MAIN ASSEMBLIES

	CH 95148	Chassis assembly	
SK 9544		Speaker	$ 4.50
KA 9569		Cabinet	

CABLES

CB 95128	Antenna cable	.10
PR 97160	Dial drive cable - 18" ... Per Yard	.05

TUBE SOCKETS & TUBE SHIELDS

CV 9560	Tube shield - plain top	.05
CV 9559	Tube shield - slotted top	.05
FP 105947	Tube shield ring	.05
SA 105461	Tube socket - 7 prong	.20
SA 104617	Tube socket - 6 prong	.20
SO 956	Tube socket - 8 prong	.20
BE 9536	Tube shield base	.05

SCREWS

SC 953	Mounting screw and felt foot	.05
SC 97061	Set screw - dial pulley	.05
SC 102441	Set screw - dial drive pulley	.05
SC 952	Dial indicator screw	.05
SC 958	Escutcheon plate screw	.05

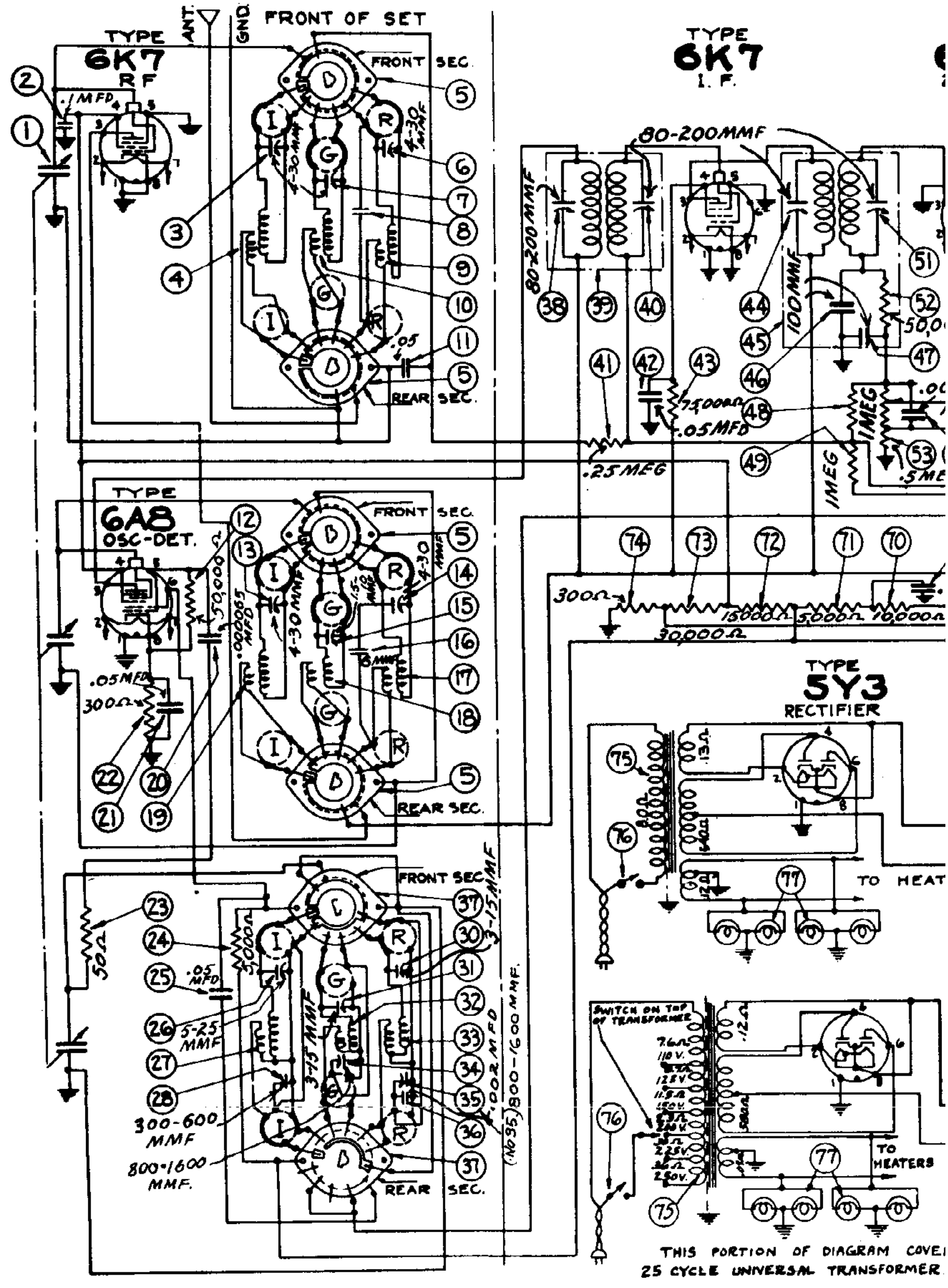
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

The Model WR 103-A is the same as the Model WR 103, except for the following items:

Power Tube 25B6G
Power Consumption .... 48 Watts
Maximum Output .... 1.5 Watts
Maximum Undistorted Output .... 1 Watt

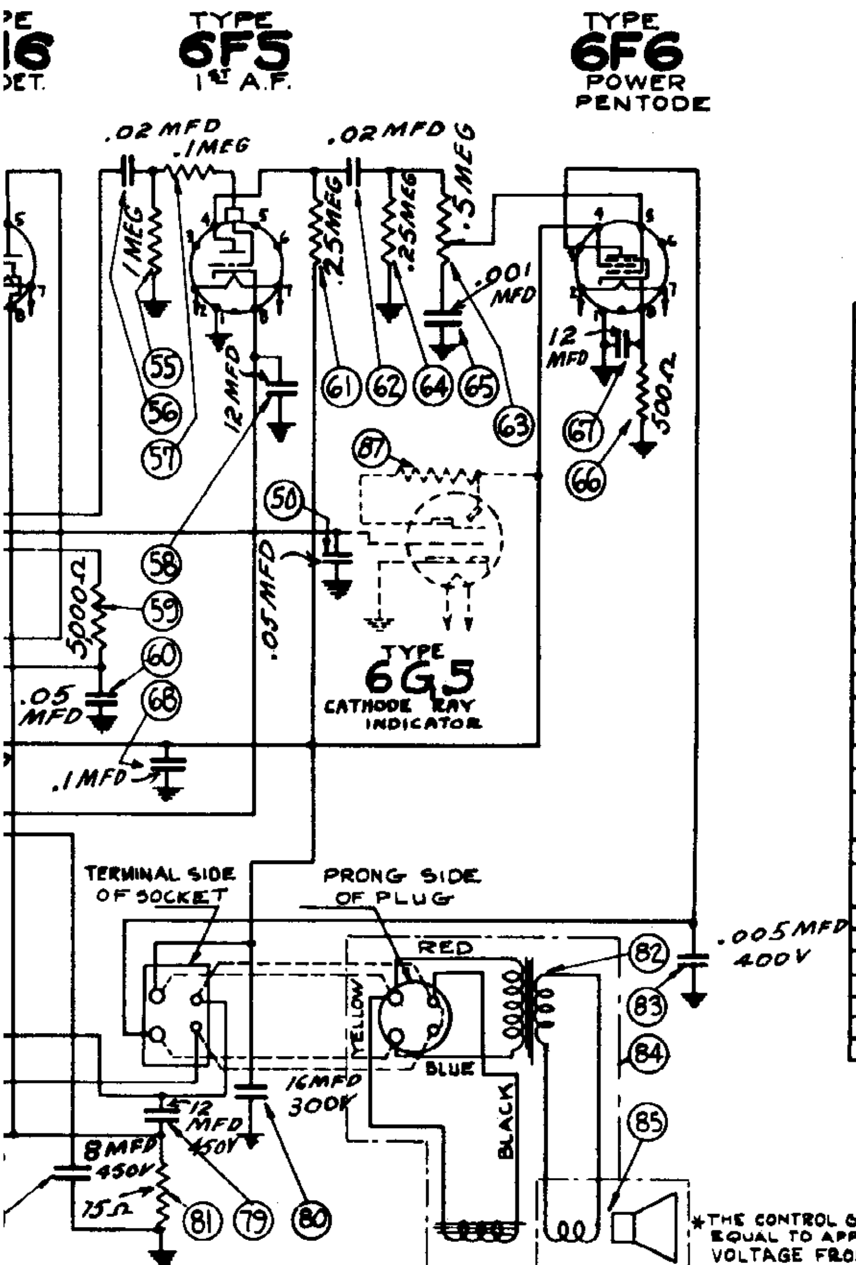
Part #	Description of Parts	List Price
CH 95180	Chassis assembly	
SK 9549	Speaker	$ 4.50

Dia. #	Part #	Description of Parts	List Price
36	CW 2-10	.1 mfd., 200 V. condenser	$ .15
37	TR 9590	Output transformer	1.25
39	SK 9549	Speaker	4.50
47		Omitted	
50	CE 9553	40 mfd., 150 V. electrolytic condenser	.80
55	RE 95121	13 ohm, 1/2 W. resistor	.10
56	CM 952	.00001 mfd. mica condenser	.20
57	RE 95119	4 meg., 1/2 W. resistor	.10


FRONT OF SET
ANT.
GND.
TYPE
6K7
RF
.1 MFD
FRONT SEC.
REAR SEC.
4-30 MMF
.05
TYPE
6K7
I. F.
80-200MMF
100MMF
50,000
.25 MEG
75,000Ω
.05MFD
1MEG
.5MEG
TYPE
6A8
OSC-DET.
50,000 Ω
.00065 MFD
.05MFD
300Ω
300Ω
15,000Ω
5,000Ω
10,000Ω
30,000Ω
TYPE
5Y3
RECTIFIER
TO HEATERS
50Ω
5000Ω
.05 MFD
5-25 MMF
3-15 MMF
.002 MFD
800-1600 MMF
300-600 MMF
800-1600 MMF.
(NO 35)
SWITCH ON TOP OF TRANSFORMER
THIS PORTION OF DIAGRAM COVE
25 CYCLE UNIVERSAL TRANSFORMER

MODELS WR-212, WR-312
Schematic, Voltage
Resistance

. SUPPLY CO.



*THE CONTROL GRID BIAS ON THE 6K7 & 6A8 TUBES EQUAL TO APPROXIMATE SIX-TENTHS THE VOLTAGE FROM PINS 5-1 ON THE 6H6 TUBE SOCKET.

INT. FREQ. 465 KC.

DC RESISTANCE			
MEASURED WITH WAVE-CHANGE SWITCH IN CORRESPONDING BAND POSITION			
COIL	DIA. No	PRIM	SEC.
I-ANT	4	18.5 Ω	5.8 Ω
I-RF	19	0.8	10.7
I-OSC	27	1.4	2.3
G-ANT	10	2.1	1.0
G-RF	18	1.8	1.0
G-OSC	32	0.8	0.8
R-ANT	9	0.7	0.03
R-RF	17	2.0	0.03
R-OSC	33	0.5	0.03
1ST IF	39	8.6	8.6
2ND IF	45	8.6	8.6
OUTPUT TRANS	82	450	0.5
SPKR FIELD		1900	
VOICE COIL	85	3	

SOCKET VOLTAGES-LINE = 115 VOLTS TAKEN FROM BOTTOM OF SOCKETS									
MEASUREMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER & WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION									
TUBE	STAGE	FIL	PIN-NOS	PLATE	PIN-NOS	SCREEN	PIN-NOS	BIAS	PIN-NOS
6K7	R.F.	6.35	2-7	263	3-1	94	4-1	* SEE NOTE	
6A8	DET-OSC	6.35	2-7	263 DET 167 OSC	3-1 6-1	94	4-1	3.7	8-1
6K7	I.F.	6.35	2-7	263	3-1	103	4-1	* SEE NOTE	
6H6	2ND DET. AVC	6.35	2-7					-5.5	8-1
6F5	AUDIO	6.35	2-7	111	4-1			1.1	8-1
6F6	OUTPUT	6.35	2-7	247	3-1	263	4-1	17.5	8-1
5Y3	RECTIFIER	5.15	2-8	380	8-1				
6G5	TUNING INDICATOR	6.35	1-6	263	2-5			* SEE NOTE	

WESTINGHOUSE ELEC. SUPPLY CO. Socket, Trimmers Chassis

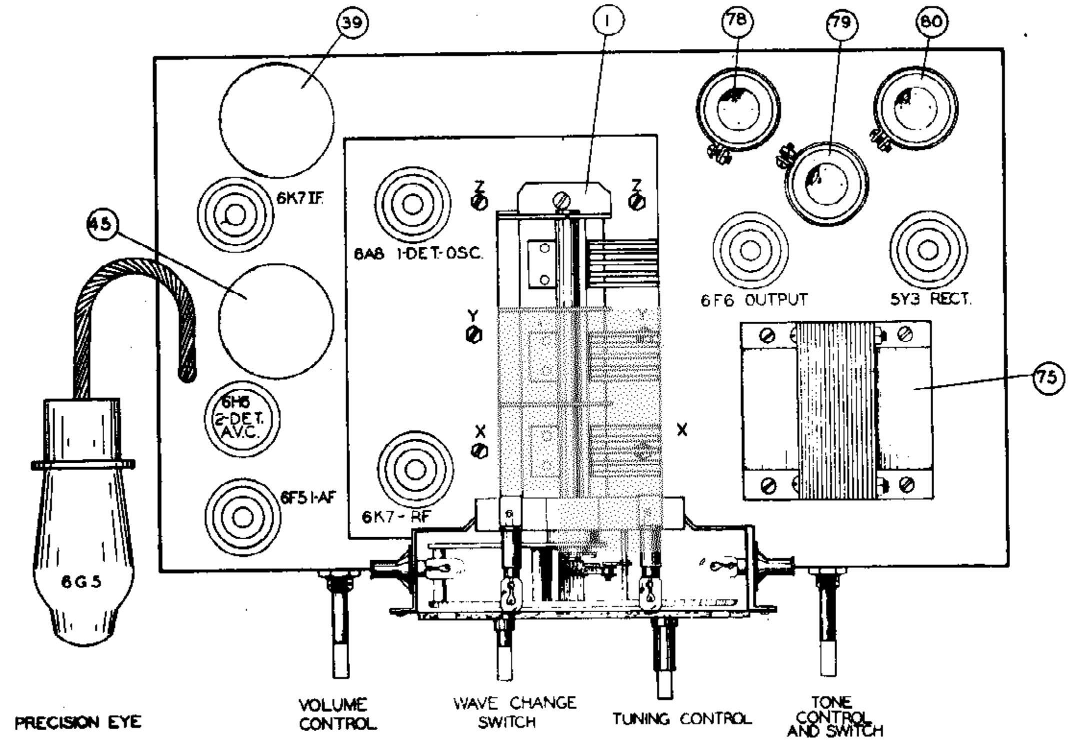


Figure No. 1

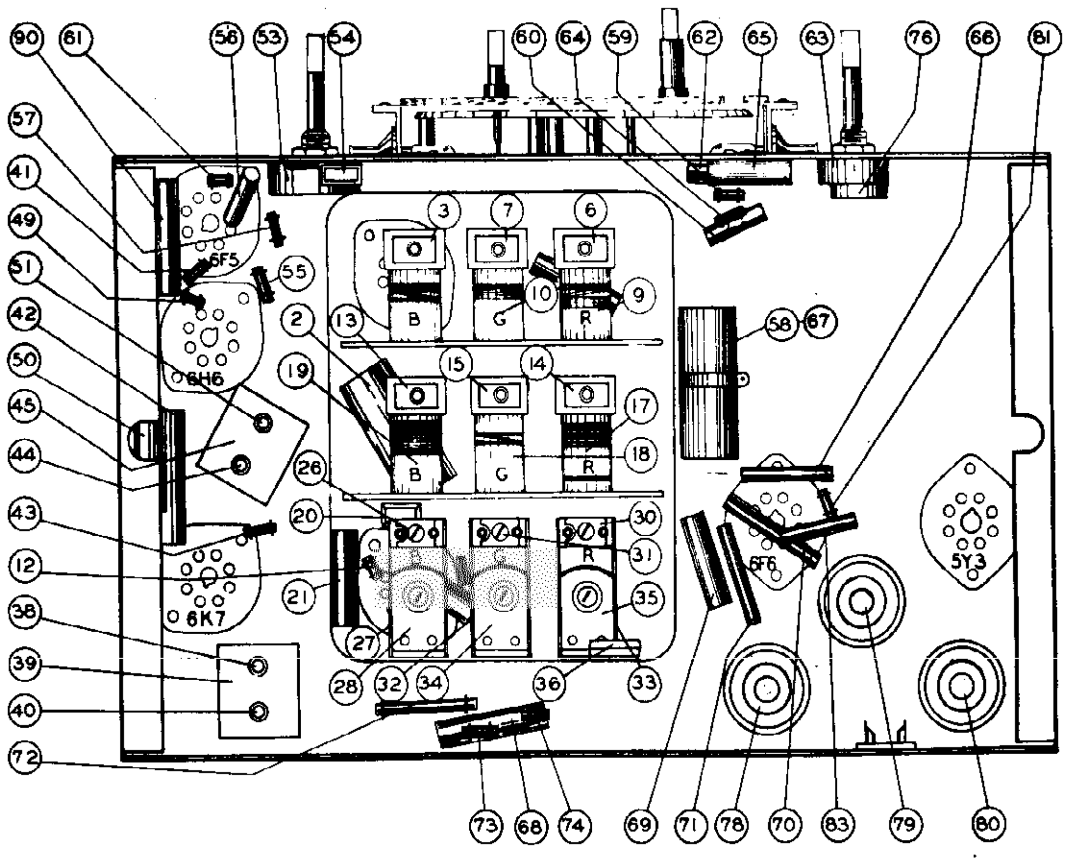


Figure No. 2

MODELS WR-212, WR-312
Alignment, Parts

WESTINGHOUSE ELEC. SUPPLY CO.

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ... 2 #6K7, 1 #6A8, 1 #6H6, 1 #6F5, 1 #6F6, 1 #6G5, 1 #5Y3 - Total 8
Power Supply .... 105 to 125 volts, 50 to 60 cycles A.C.
Power Consumption .... 60 Watts
Maximum Output .... 3.5 Watts
Maximum Undistorted Output .... 2.5 Watts
Tuning Ranges .... (White Band - 525 to 1800 KC. (Green Band - 1750 to 6000 KC. (Red Band - - 5800 to 18500 KC.
Line-Up Frequencies .. I.F. 465 KC., 1600 KC., 570 KC., 5500 KC., 1900 KC., 17000 KC., 6000 KC.

LINE-UP CAPACITOR ADJUSTMENTS

ADJUSTMENT OF I.F. (465 KC.)

1. Set volume control on full; turn tone control to the bass position, the wave change switch on broadcast and the dial indicator at approximately 600 KC.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 KC. and adjust its output to produce a measureable reading on output meter when test signal is applied to the grid of the 6K7 I.F. tube through a .5 mfd. blocking condenser.
4. Adjust trimmers #44 and #51 to maximum output, reducing output of test oscillator as required.
5. Apply test signal to grid of 6A8 detector-oscillator and adjust #38 and #40 to maximum output.

ADJUSTMENT OF BROADCAST BAND

1. Set wave change switch to the White or Broadcast Band position.
2. Set test oscillator and dial indicator to 1600 KC.
3. Apply test signal to antenna terminal of chassis through a .0002 mfd. series condenser and adjust #26, #13 and #3 to maximum output.
4. Set test oscillator and dial indicator to 570 KC. and adjust #28 to maximum output, at the same time rocking the variable tuning condenser.
5. Return to 1600 KC. setting with both test oscillator and dial indicator and readjust #26, #13 and #3 for accuracy.

ADJUSTMENT OF GREEN BAND

NOTE: In adjusting the two short-wave bands (Green and Red) a .0002 mfd. condenser and a 400 ohm resistor connected in series should be inserted in the high side of the test oscillator leads. This condenser-resistor combination is the approximate equivalent of a short-wave antenna.

1. Set wave change switch to the Green Band position.
2. Set test oscillator and dial indicator to 5500 KC. and adjust #31, #15 and #7 to maximum output.
3. Set test oscillator and dial indicator to 1900 KC. and adjust #34 to maximum output, at the same time rocking the variable tuning condenser.
4. Return to 5500 KC. setting and make readjustment of #31, #15 and #7.

ADJUSTMENT OF RED BAND

1. Set wave change switch to the Red Band position.
2. Set test oscillator and dial indicator to 17000 KC. and adjust #30, #14 and #6 to maximum output.
3. Set test oscillator and dial indicator to 6000 KC. and adjust #35 to maximum output, at the same time rocking the variable tuning condenser.
4. Return to 17000 KC. setting and make readjustment of #30, #14 and #6.

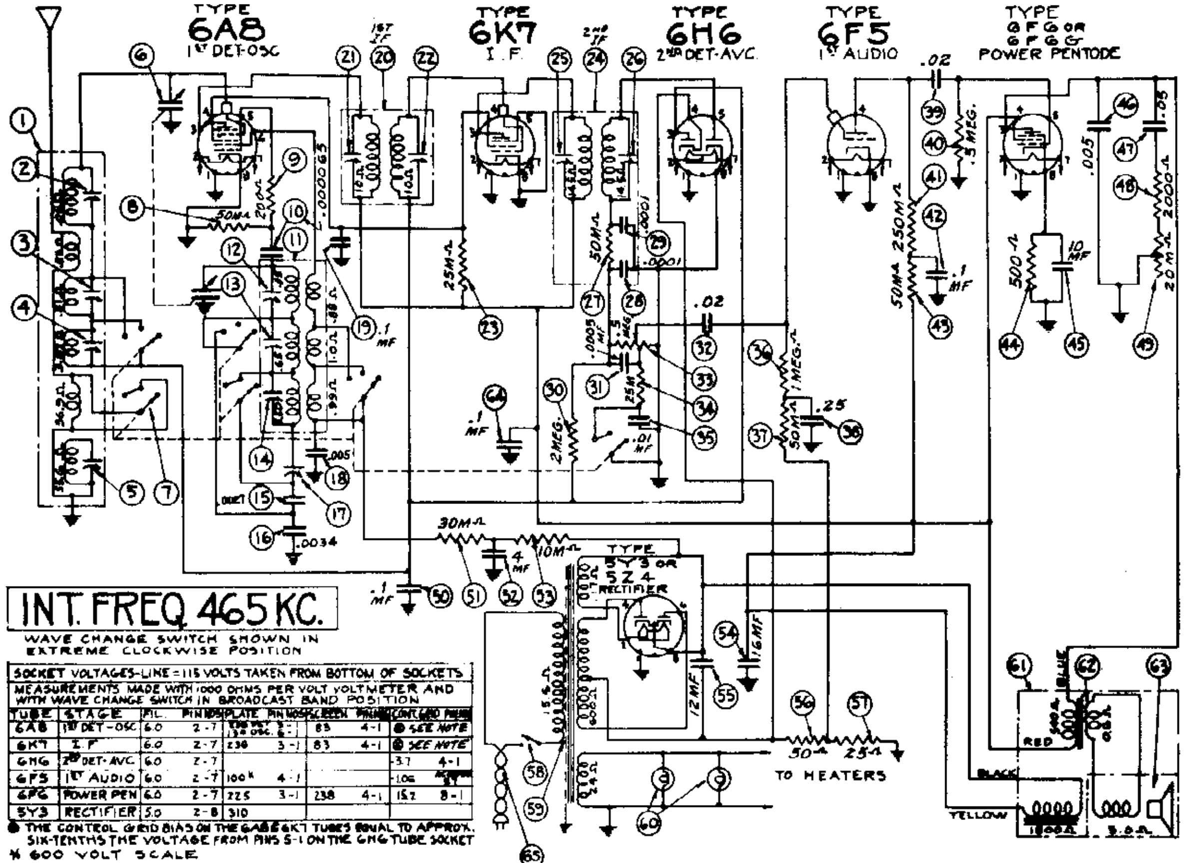
IMPORTANT: While testing or making repairs on this receiver, the chassis should not be turned upside down or on its side for any long period of time while the set is turned on as the chemicals in the electrolytic filter condenser will come out through the air vents making the condenser appear to be defective. If left in this position too long the condenser may be injured.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Dia. #	Part #	Description of Parts	List Price
1	CG 9550	Variable condenser	$ 4.50
2	CW 2-50	.5 mfd., 200 V. condenser	.25
3	CS 9554	4-30 mmf. trimmer condenser	.15
4	RC 95209	Antenna coil (broadcast)	1.00
5	SW 9555	Switch and bracket assembly - Antenna & R.F. Sections	1.40
6	CS 9554	4-30 mmf. trimmer condenser	.15
7	CS 9554	4-30 mmf. trimmer condenser	.15
8		Twisted wire - part of RC 95206	
9	RC 95206	Antenna coil - red band	.95
10	RC 95212	Antenna coil - green band	.80
11	CW 9513	.05 mfd., 200 V. condenser	.25
12	RE 9563	50,000 ohm, 1/4 W. resistor	.10
13	CS 9554	4-30 mmf. trimmer condenser	.15
14	CS 9554	4-30 mmf. trimmer condenser	.15
15	CS 9553	1.5-10 mmf. trimmer condenser	.15
16	CM 9512	6 mmf. mica condenser	.15
17	RC 95207	R.F. coil assembly - red	1.25
18	RC 95214	R.F. coil assembly - green	1.00
19	RC 95210	R.F. coil assembly (broadcast)	1.00
20	CM 9511	.000065 mfd. mica condenser	.15
21	CW 2-05	.05 mfd., 200 V. condenser	.15
22	RE 9529	300 ohm, 1/4 W. resistor	.10
23	RE 9537	50 ohm, 1/4 W. resistor	.10
24	RE 9526	5,000 ohm, 1 W. resistor (1/2 W. size)	.20
25	CW 9513	.05 mfd., 200 V. condenser	.25
26		5-25 mmf. trimmer condenser - part of CS 9540	.60
27	RC 95211	Oscillator coil (broadcast)	1.75
28		300-600 mmf. oscillator series cond. - part of CS 9540	.60
30		3-15 mmf. trimmer condenser - part of CS 9520	.75
31		3-15 mmf. trimmer condenser - part of CS 9520	.75
32	RC 95213	Oscillator coil - green	1.75
33	RC 95208	Oscillator coil - red	2.25
34		800-1600 mmf. oscillator series cond. - part of CS 9520	.75
35		800-1600 mmf. oscillator series cond. - part of CS 9520	.75
36	CM 959	.002 mfd. mica condenser	.25
37	SW 9554	Switch and bracket assembly - oscillator section	1.50
38		80-200 mmf. trimmer condenser - part of IC 9576	
39	IC 9576	First I.F. coil assembly - 465 KC.	1.50
40		80-200 mmf. trimmer condenser - part of IC 9576	
41	RE 9573	.25 meg., 1/8 W. resistor	.10
42	CW 2-25	.25 mfd., 200 V. condenser	.20
43	SA 105277	75,000 ohm, 1/4 W. resistor	.15
44		80-200 mmf. trimmer condenser - part of IC 9577	
45	IC 9577	Second I.F. coil assembly - 465 KC.	1.85
46		100 mmf. mica condenser - part of IC 9577	
47		100 mmf. mica condenser - part of IC 9577	
48	SA 105281	1 meg., 1/4 W. resistor	.15
49	SA 105281	1 meg., 1/4 W. resistor	.15
50	CW 2-05	.05 mfd., 200 V. condenser	.15
51		80-200 mmf. trimmer condenser - part of IC 9577	
52		50,000 ohm, 1/4 W. resistor - part of IC 9577	
53	VR 9536	Volume control - .5 meg.	.85
54	CM 9519	.0005 mfd. mica condenser	.20
55	SA 105281	1 meg., 1/4 W. resistor	.15
56	CW 2-02	.02 mfd., 200 V. condenser	.15
57	RE 9584	.1 meg., 1/4 W. resistor	.15
58		12 mfd., 25 V. condenser - part of CE 9526	.90
59	SA 105249	5,000 ohm, 1/4 W. resistor	.15
60	CW 2-05	.05 mfd., 200 V. condenser	.15
61	RE 9573	.25 meg., 1/8 W. resistor	.10
62	CW 4-02	.02 mfd., 400 V. condenser	.15
63	VR 9512	Tone control - .5 meg.	1.10
64	RE 9585	.25 meg., 1/4 W. resistor	$ .15
65	CW 2-001	.001 mfd., 200 V. condenser	.15
66	SA 107391	500 ohm, 1 W. resistor	.20
67		12 mfd., 25 V. condenser - part of CE 9526	.90
68	CW 4-10	.1 mfd., 400 V. condenser	.15
69	CW 4-10	.1 mfd., 400 V. condenser	.15
70	SA 103835	10,000 ohm, 2 W. resistor	.25
71	SA 107572	5,000 ohm, 1 W. resistor	.20
72	SA 101404	15,000 ohm, 1 W. resistor	.20
73	SA 104966	30,000 ohm, 1/2 W. resistor	.15
74	SA 105260	300 ohm, 1/4 W. resistor	.15
75	TR 9557	Power transformer - 105-125 V., 50-60 cycle	4.00
76		Switch (On & Off) - part of VR 9512	
77	LP 9515	Dial lamp - 3.5 V., .35 amp.	.20
78	CE 9528	8 mfd., 450 V. electrolytic condenser	.80
79	CE 9536	12 mfd., 450 V. electrolytic condenser	.80
80	CE 9535	16 mfd., 300 V. electrolytic condenser	.75
81	RE 95101	37 ohm, 1/4 W. resistor	.15
82	TR 9558	Output transformer	1.25
83	CW 4-005	.005 mfd., 400 V. condenser	.15
84	SK 9511	Speaker	7.50
85	SA 107282	Diaphragm	1.15
87		1 meg., 1/4 W. resistor - part of CB 9598	
88	CB 9512	Line cable assembly	.50
89	CB 9598	"Precision eye" cable assembly	.70
90	CW 2-05	.05 mfd., 200 V. condenser	.15

MODEL WR-211
Schematic, Socket
Trimmers, Chassis
Alignment, Voltage

WESTINGHOUSE ELEC. SUPPLY CO.



INT. FREQ. 465 KC.

WAVE CHANGE SWITCH SHOWN IN EXTREME CLOCKWISE POSITION

SOCKET VOLTAGES-LINE = 115 VOLTS TAKEN FROM BOTTOM OF SOCKETS										
MEASUREMENTS MADE WITH 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION										
TUBE	STAGE	FIL.	PIN NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.	CONT. GRID	PIN NOS.
6A8	1ST DET-OSC	6.0	2-7	[illegible] DET. 134 OSC.	3-1 6-1	83	4-1	● SEE NOTE	
6K7	I.F.	6.0	2-7	230	3-1	83	4-1	● SEE NOTE	
6H6	2ND DET-AVC	6.0	2-7					3.7	4-1
6F5	1ST AUDIO	6.0	2-7	100*	4-1			1.06	[illegible]
6F6	POWER PEN	6.0	2-7	225	3-1	238	4-1	15.2	8-1
5Y3	RECTIFIER	5.0	2-8	310					

● THE CONTROL GRID BIAS ON THE 6A8 & 6K7 TUBES EQUAL TO APPROX. SIX-TENTHS THE VOLTAGE FROM PINS 5-1 ON THE 6H6 TUBE SOCKET

* 600 VOLT SCALE

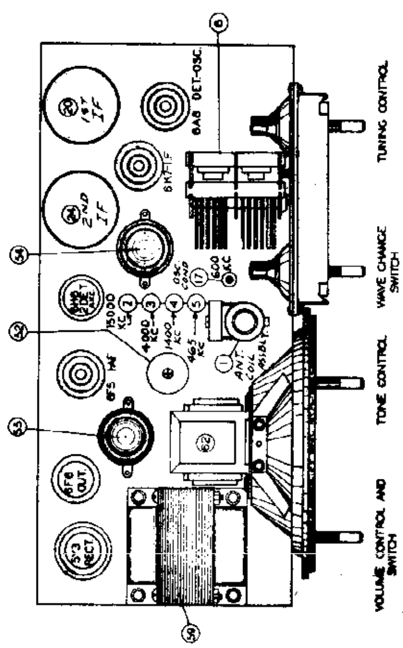


Figure No. 1

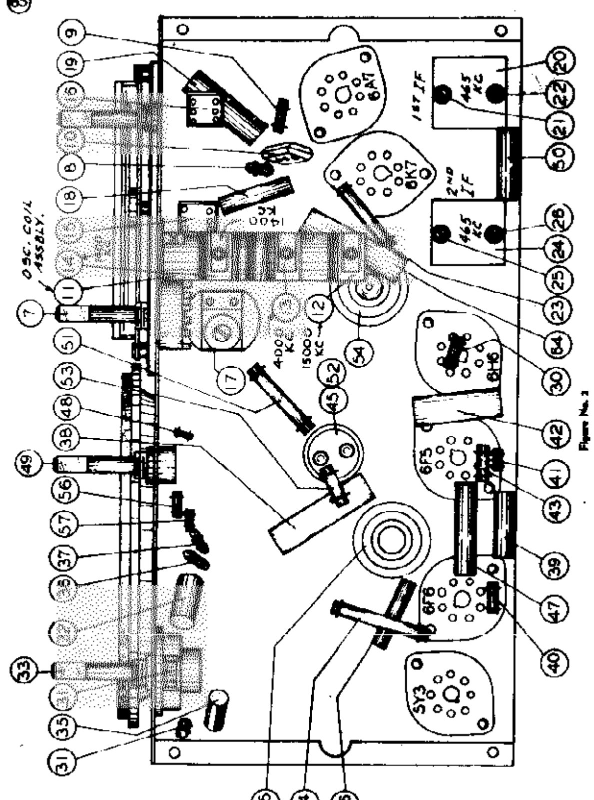


Figure No. 2

MODEL WR-315
Socket, Trimmers
Chassis

WESTINGHOUSE ELEC. SUPPLY CO.

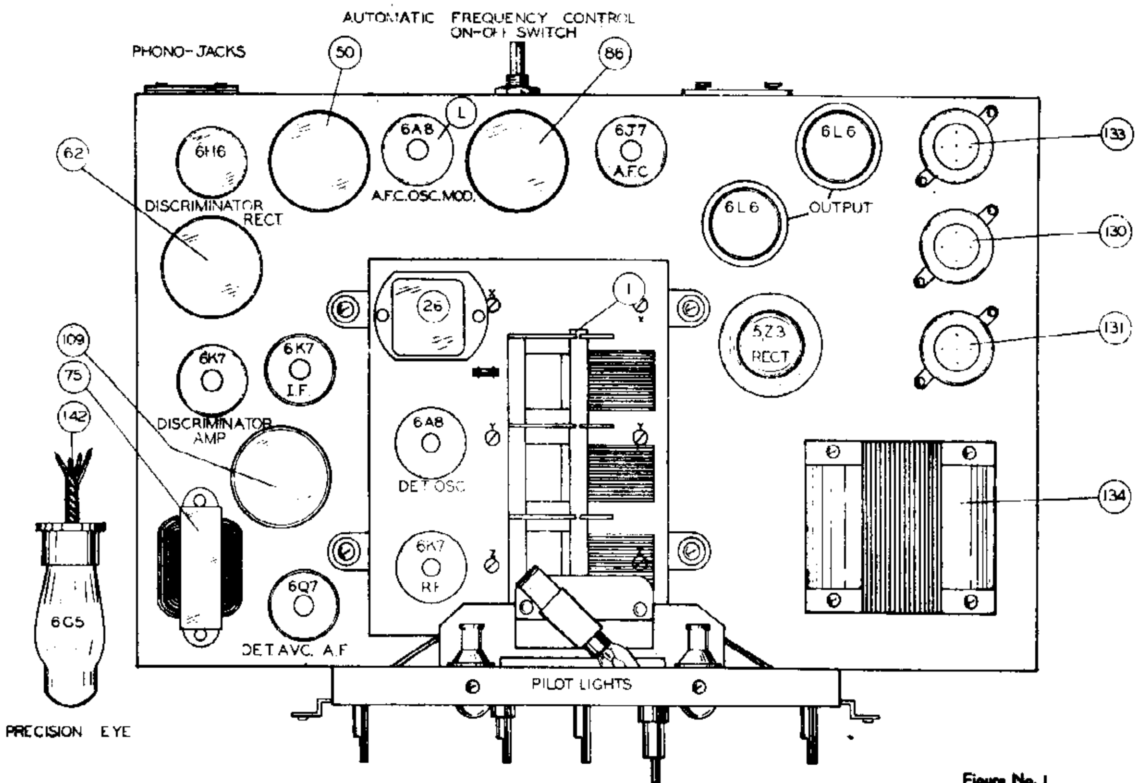


Figure No. 1

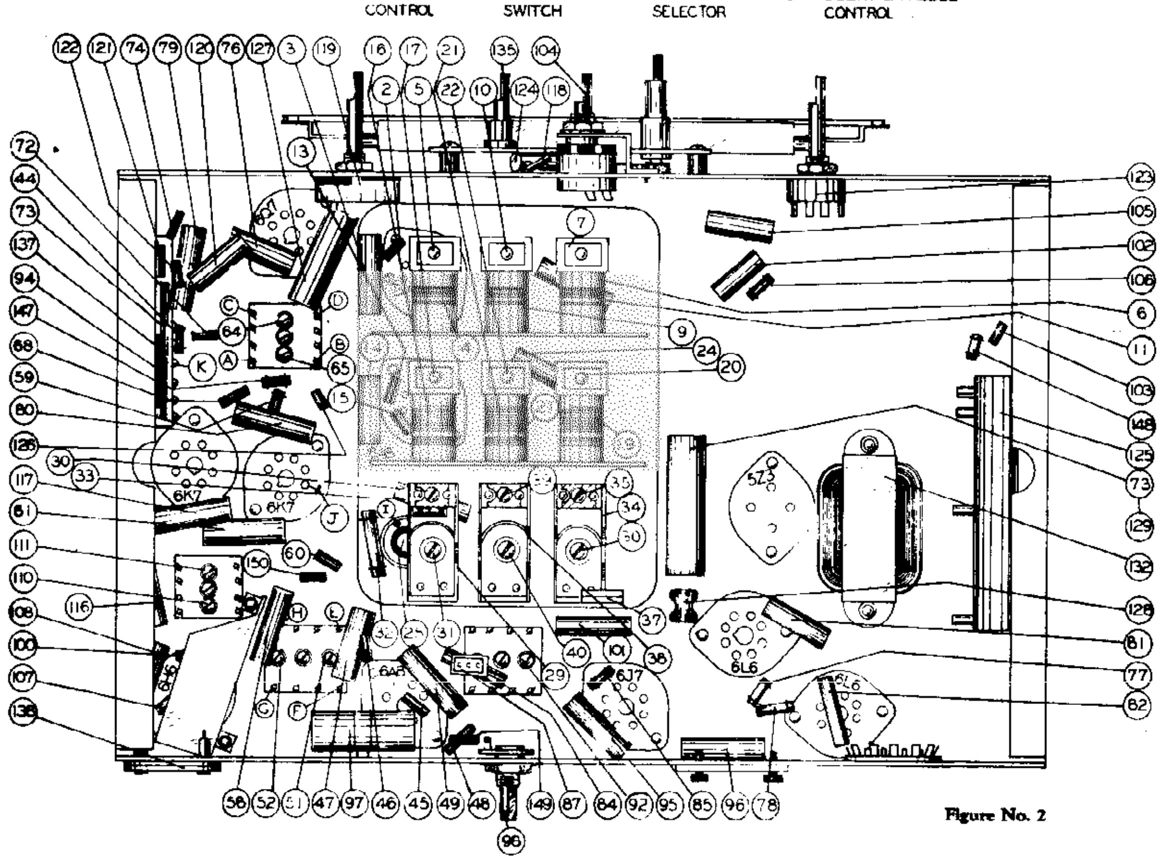
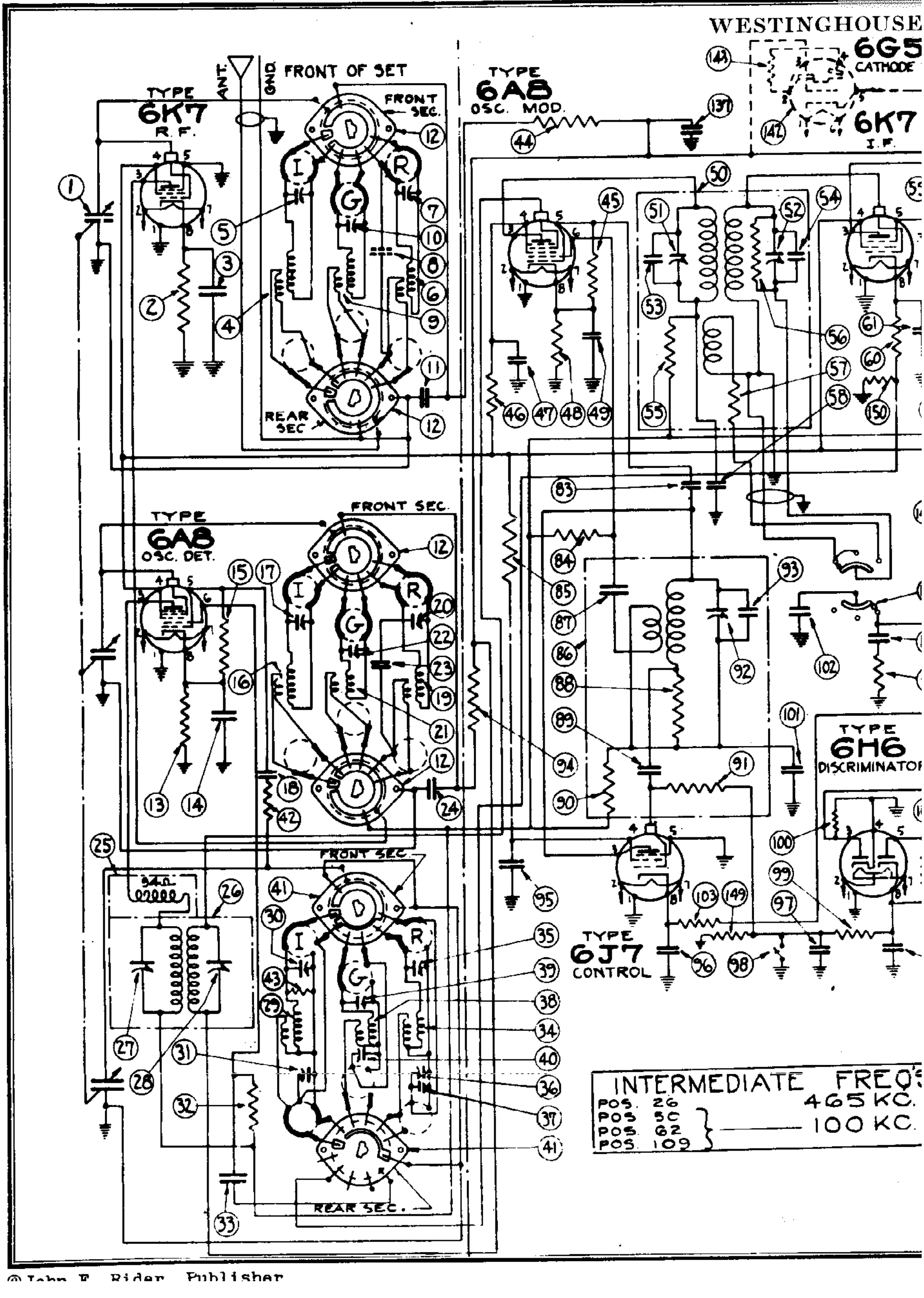
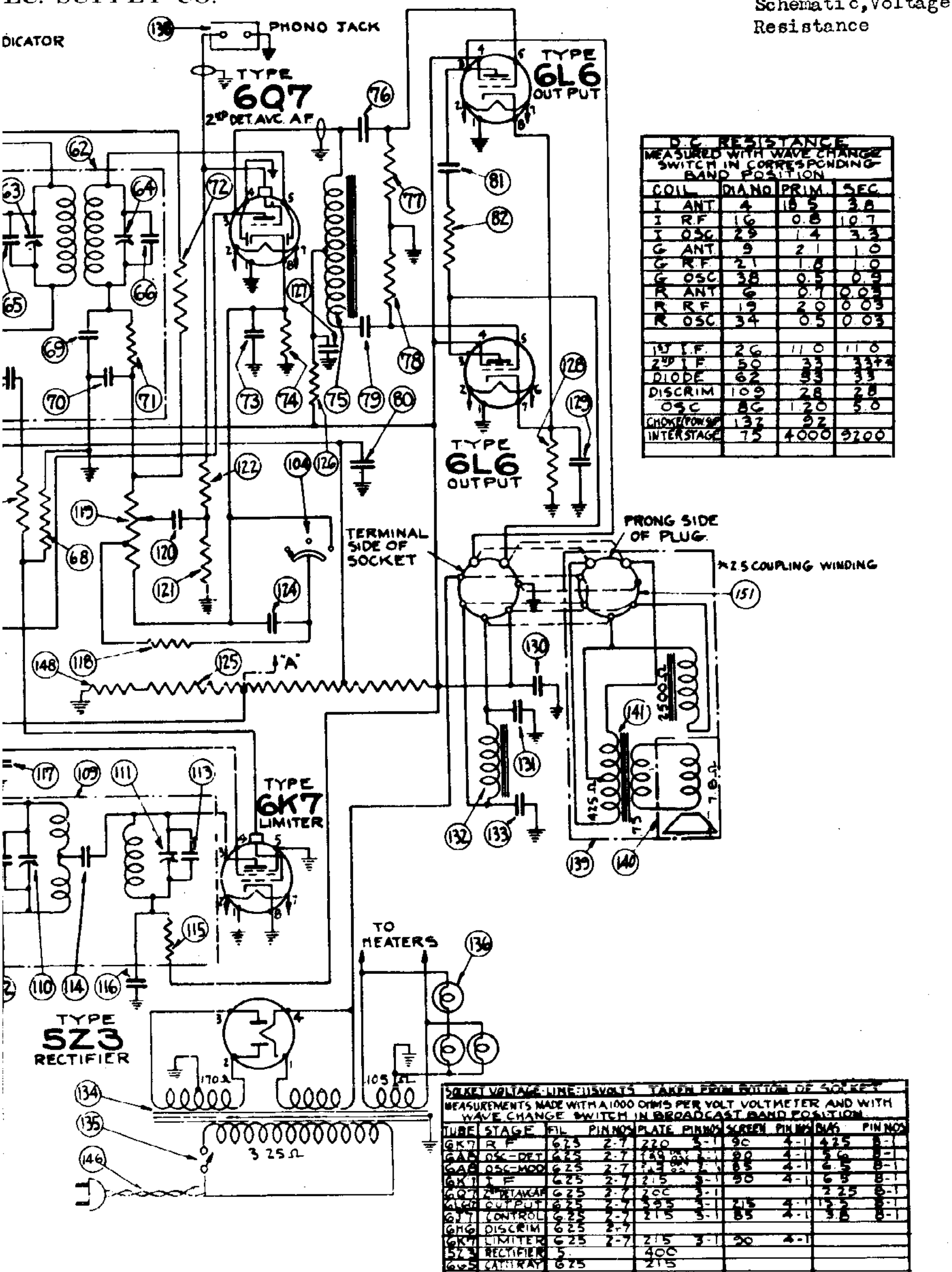


Figure No. 2


WESTINGHOUSE
TYPE 6K7 R.F.
ANT.
GND
FRONT OF SET
FRONT SEC.
REAR SEC
TYPE 6A8 OSC. MOD.
6G5 CATHODE
6K7 I.F.
TYPE 6A8 OSC. DET.
FRONT SEC.
REAR SEC.
TYPE 6J7 CONTROL
TYPE 6H6 DISCRIMINATOR
INTERMEDIATE FREQ'S
POS. 26 465 KC.
POS. 5C
POS. 62
POS. 109
100 KC.

EC. SUPPLY CO.

MODEL WR-315
Schematic, Voltage
Resistance



D.C. RESISTANCE MEASURED WITH WAVE CHANGE SWITCH IN CORRESPONDING BAND POSITION			
COIL	DIA.NO	PRIM.	SEC.
I ANT.	4	18.5	3.8
I R.F.	16	0.8	10.7
I OSC.	29	1.4	3.3
G ANT.	9	2.1	1.0
G R.F.	21	1.6	1.0
G OSC.	38	0.5	0.9
R ANT.	6	0.7	0.03
R R.F.	19	2.0	0.03
R OSC.	34	0.5	0.03
1ST I.F.	26	11.0	11.0
2ND I.F.	50	33	33+[illegible]
DIODE	62	33	33
DISCRIM	109	28	28
OSC	8C	1.20	5.0
CHOKE(POW.SUP)	137	92	
INTERSTAGE	75	4000	9200

SOCKET VOLTAGE-LINE-115VOLTS TAKEN FROM BOTTOM OF SOCKET MEASUREMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION									
TUBE	STAGE	FIL.	PIN NOS	PLATE	PIN NOS	SCREEN	PIN NOS	BIAS	PIN NOS
6K7	R.F.	6.25	2-7	220	3-1	90	4-1	4.25	8-1
6A8	OSC-DET	6.25	2-7	[illegible]	[illegible]	90	4-1	5.6	8-1
6A8	OSC-MOD	6.25	2-7	[illegible]	[illegible]	85	4-1	6.5	8-1
6K7	I.F.	6.25	2-7	215	3-1	90	4-1	6.5	8-1
6Q7	2ND DET.AVC.AF	6.25	2-7	200	3-1			2.25	8-1
6L6	OUTPUT	6.25	2-7	395	3-1	215	4-1	15.5	8-1
6J7	CONTROL	6.25	2-7	215	3-1	85	4-1	3.8	8-1
6H6	DISCRIM	6.25	2-7						
6K7	LIMITER	6.25	2-7	215	3-1	90	4-1		
5Z3	RECTIFIER	5.		400					
6G5	CATH.RAY	6.25		215					

WESTINGHOUSE ELEC. SUPPLY CO.

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes	3 #6K7, 2 #6A8, 1 #6Q7, 2 #6L6, 1 #6H6, 1 #6J7, 1 #5X3, 1 #6G5 - Total 12
Power Supply Characteristics	105 to 125 volt, 50 to 60 cycle A.C.
Power Consumption	125 Watts
Maximum Output	21 Watts
Maximum Undistorted Output	12.5 Watts
Tuning Ranges	White Band - 525 to 1,800 KC. Green Band - 1750 to 6,000 KC. Red Band - 5800 to 18,500 KC.
Line-Up Frequencies	100 KC., 465 KC., 1600 KC., 570 KC., 5500 KC., 1900 KC., 17,000 KC., and 6000 KC.

GENERAL DESCRIPTION

This model is a twelve-tube, three-band, superheterodyne receiver and incorporates a new feature known as automatic frequency control. With this type of circuit, when the receiver is tuned within 7 kilocycles either side of the station being received, the station automatically will be brought into almost perfect tune or in better tune than is usually possible with the eye or ear. This feature will overcome considerable distortion which is caused by the customer's tuning the receiver on one of the side bands.

The receiver is a double superheterodyne and is conventional to the grid of the type 6A8 oscillator-modulator. This tube converts the 465 KC. I.F. to a second I.F. frequency of 100 KC. The automatic frequency control works by automatically changing the frequency of this second oscillator.

From the output of the oscillator-modulator the signal is fed through a conventional I.F. to the A.V.C., detector and audio system.

The signal is also fed from the output of the I.F. to the type 6K7 limiter tube which is so connected as to give fairly even output, regardless of input. This will then give the same amount of control, regardless of the strength of the station being received. The signal is then fed to the discriminator type 6H6 tube which is connected to the grid of the type 6J7 control tube. In the discriminator circuit voltages are developed either positive or negative, depending on which side of resonance the set is tuned. This change of bias on the control tube (6J7) will cause this tube to change the frequency of the oscillator to bring the set into tune.

LINE-UP CAPACITOR ADJUSTMENTS

To properly align the circuits of the receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied when the individual circuits are brought into alignment. A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal. It is also necessary to use an 0-5 microammeter in order to align the discriminator circuits.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figures #1 and #2 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F., CONTROL OSCILLATOR AND DISCRIMINATOR

1. Set the volume control on full and turn the bass control to the bass position (position immediately after set is turned .

2. Connect the output meter across the voice coil of the speaker.

3. Set the test oscillator to 100 KC., and adjust the output to give a readable deflection on the output meter when the signal is applied to the grid of the 6K7 I.F. amplifier tube through a 0.5 mfd. blocking condenser.

4. Connect a 10,000 ohm resistor across the primary winding of the third I.F. coil #62. This should be connected to terminals marked "A" and "B" in Figure #2.

5. Adjust trimmer #64 to maximum output, reducing the output of the test oscillator as required.

6. Remove the 10,000 ohm resistor from the primary side of I.F. coil #62 and connect across the secondary winding from terminals marked "C" and "D".

7. Adjust trimmer #63 to maximum output, reducing the output of the test oscillator as required. Remove 10,000 ohm resistor.

8. Turn switch #98 to the left-hand position (viewed from rear of chassis).

9. Set the output of the test oscillator to a high level.

10. Connect a 0 to 5 microammeter across resistor #149 and adjust trimmer condenser #111 to maximum swing of the microammeter, keeping the output of the signal generator set to apoint which will give a deflection of approximately 5 microamperes when condenser #111 is tuned to maximum deflection. WHEN THE SIGNAL GENERATOR IS SET TO THIS OUTPUT, DO NOT ALTER THE OUTPUT OF THE SIGNAL GENERATOR UNTIL THE ALIGNMENT OF THE DISCRIMINATOR CIRCUIT IS COMPLETED.

11. Adjust trimmer #110 until the microammeter reading is reduced exactly to zero.

12. Turn switch #98 to the right-hand position and proceed with the alignment of the I.F.

13. Apply the test signal to the grid of the 6A8 oscillator-modulator tube.

14. Connect the 10,000 ohm resistor across the primary of I.F. coil #50 by connecting it to the terminals marked "E" and "F" in Figure #2.

15. Adjust trimmer #52 to maximum output, reducing the output of the test oscillator as required.

16. Remove the 10,000 ohm resistor and connect across the secondary of I.F. transformer #50. Connect to terminals marked "G" and "H".

17. Adjust trimmer #51 to maximum output, reducing the output of the test oscillator as required.

18. Remove the 10,000 ohm resistor.

19. Set the test oscillator to 465 KC., and adjust the control oscillator trimmer #92 to maximum output.

20. Apply the test signal to the grid of the type 6A8 oscillator-detector tube.

21. Connect the 10,000 ohm resistor across the primary of I.F. transformer #26 by connecting it to the points marked "J" and "K" in Figure #2.

22. Adjust trimmer #28 to maximum output, reducing the output of the test oscillator as required.

23. Remove the 10,000 ohm resistor and connect across the secondary of the I.F. transformer #26 by connecting it to the points marked "L" and "M" in Figures #1 and #2.

24. Adjust trimmer #27 to maximum output, reducing the output of the test oscillator as required. Remove the 10,000 ohm resistor.

ADJUSTMENT OF BROADCAST BAND

1. Set the wave-change switch to the White or Broadcast Band position.

2. Set the test oscillator and dial indicator to 1500 KC.

3. Apply the test signal to the antenna terminal of the chassis through a .0002 mfd. series condenser and adjust the oscillator trimmer condenser #30 until the signal is received at a maximum.

4. Adjust trimmers #17 and #5 to maximum output.

5. Set the test oscillator and dial indicator to 570 KC., and adjust the oscillator series condenser #31 to maximum output, at the same time rocking the condenser gang.

6. Return both the test oscillator and dial indicator to 1600 KC., and check the adjustment of trimmers #30, #17 and #5 for accuracy.

ADJUSTMENT OF GREEN BAND

NOTE: In adjusting the two short-wave bands (Green and Red) a .0002 mfd. condenser and a 400 ohm resistor connected in series should be inserted in the high side of the test oscillator leads. This condenser-resistor combination is the approximate equivalent of a short-wave antenna.

1. Set the wave-change switch to the Green Band position.

2. Set the test oscillator and dial indicator to 5500 KC., and adjust the oscillator trimmer condenser #39 until the signal is received at a maximum.

3. Adjust trimmer condensers #22 and #10 to maximum output.

4. Set the test oscillator and dial indicator to 1900 KC., and adjust the oscillator series condenser #40 to maximum output, at the same time rocking the condenser gang.

5. Return both the test oscillator and dial indicator to 5500 KC., and check the adjustment of trimmers #39, #22 and #10 for accuracy.

ADJUSTMENT OF RED BAND

1. Set the wave-change switch to the Red Band position.

2. Set the test oscillator and dial indicator to 17000 KC., and adjust the oscillator trimmer condenser #35 until the signal is received.

NOTE: When adjusting the oscillator trimmer condenser #35 it will be possible to secure two peaks. The peak secured with the trimmer screw turned farthest out should be used. When aligned on the correct peak a strong signal will be heard at 17000 KC., and a weaker signal at approximately 16000 KC. No signal should be heard at 18000 KC.

3. Adjust trimmer condensers #20 and #7 to maximum output.

4. Set the test oscillator and dial indicator to 6000 KC., and adjust the oscillator series condenser #36 to maximum output, at the same time rocking the condenser gang.

5. Return both the test oscillator and dial indicator to 17000 KC., and check adjustment of trimmers #35, #20 and #7 for accuracy.

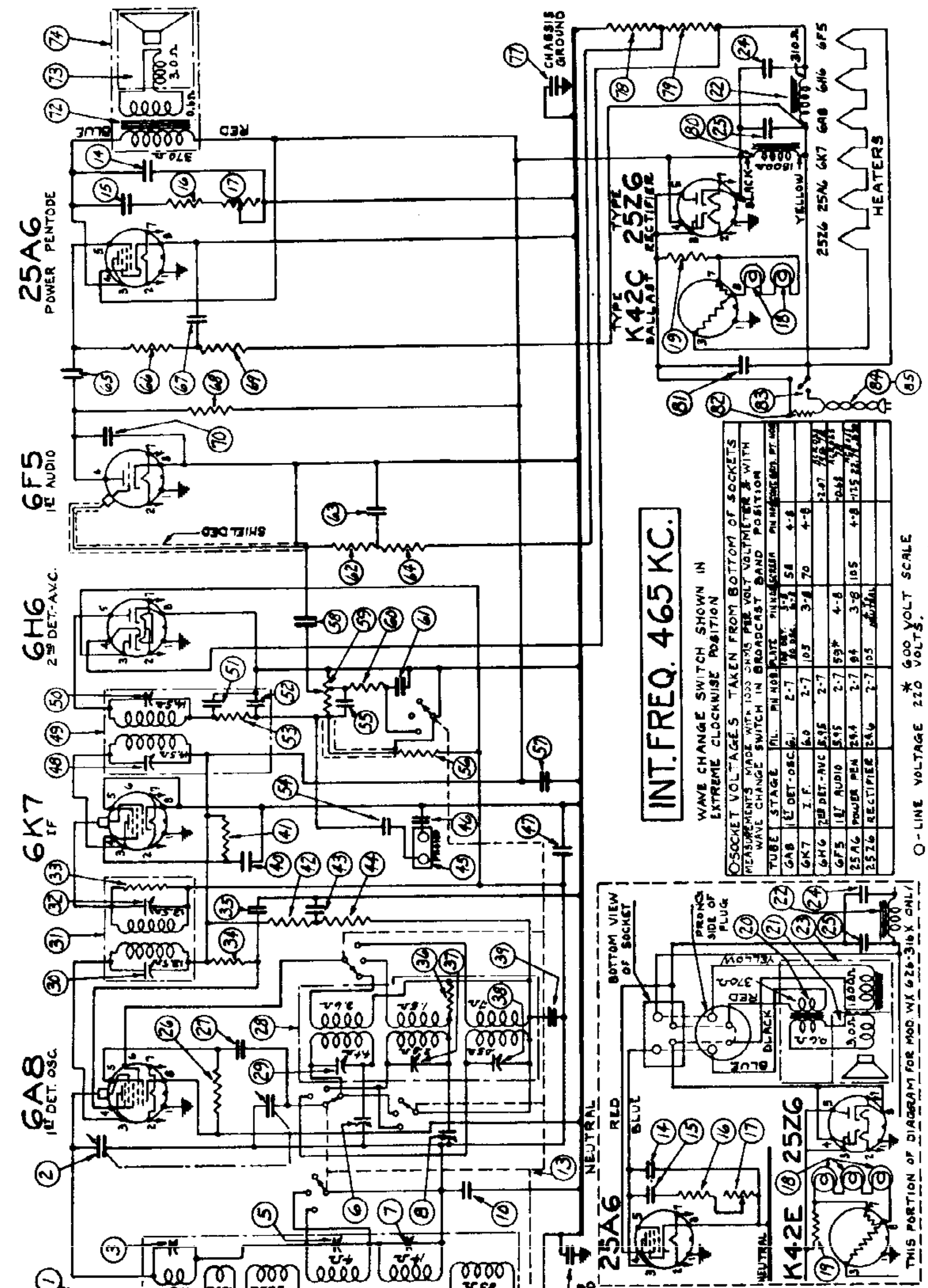
IMPORTANT: While testing or making repairs on this receiver, the chassis should not be turned upside down or on its side for any long period of time while the set is turned on as the chemicals in the electrolytic filter condensers will come out through the air vents, making the condenser appear to be defective. If left in this position too long the condenser may be injured.

MODEL WR-315
Parts List

WESTINGHOUSE ELEC. SUPPLY CO.

Dia. #	Part #	Description of Parts	List Price
1	CS 9551	Variable condenser	$ 4.50
2	RE 95102	600 ohm, 1/4 W. resistor	.15
3	CW 2-05	.05 mfd., 200 V. condenser	.15
4	RC 95209	Antenna coil - Broadcast	1.00
5	CS 9554	4-30 mmf. trimmer condenser	.15
6	RC 95206	Antenna coil - Red Band	.95
7	CS 9554	4-30 mmf. trimmer condenser	.15
8		Twisted wire - part of RC 95206	
9	RC 95212	Antenna coil - Green Band	.80
10	CS 9554	4-30 mmf. trimmer condenser	.15
11	CW 9513	.05 mfd., 200 V. condenser	.25
12	SW 9553	Switch and bracket assembly - antenna and R.F. sections	1.40
13	RE 95102	600 ohm, 1/4 W. resistor	.15
14	CW 2-05	.05 mfd., 200 V. condenser	.15
15	RE 9563	50,000 ohm, 1/2 W. insulated resistor	.15
16	RC 95210	R.F. coil - Broadcast	1.00
17	CS 9554	4-30 mmf. trimmer condenser	.15
18	CM 9511	.000065 mfd. mica condenser	.15
19	RC 95207	R.F. coil - Red Band	1.25
20	CS 9554	4-30 mmf. trimmer condenser	.15
21	RC 95214	R.F. coil - Green Band	1.00
22	CS 9553	1.5-10 mmf. trimmer condenser	.15
23	CM 9512	6 mmf. mica condenser	.15
24	CW 9513	.05 mfd., 200 V. condenser	.25
25	RC 95266	Choke coil assembly	.60
26	IC 9582	1st I.F. coil (465 KC.)	2.35
27		35-130 mmf. trimmer condenser - part of IC 9582	
28		35-130 mmf. trimmer condenser - part of IC 9582	
29	RC 95272	Oscillator coil - Broadcast	2.25
30		5-25 mmf. trimmer condenser - part of CS 9540	.60
31		300-600 mmf. trimmer condenser - part of CS 9540	.60
32	RE 9526	5000 ohm, 1 W. resistor	.20
33	CW 9513	.05 mfd., 200 V. condenser	.25
34	RC 95208	Oscillator coil - Red Band	2.25
35		3-15 mmf. trimmer condenser - part of CS 9520	.75
36		800-1600 mmf. trimmer condenser - part of CS 9520	.75
37	CM 959	.002 mfd. mica condenser	.25
38	RC 95213	Oscillator coil - Green Band	1.75
39		3-15 mmf. trimmer condenser - part of CS 9520	.75
40		800-1600 mmf. trimmer condenser - part of CS 9520	.75
41	SW 9554	Switch and bracket assembly - oscillator section	1.50
42	RE 9557	50 ohm, 1/4 W. resistor	.10
43	RE 95125	20,000 ohm, 1/2 W. insulated resistor	.10
44	RE 95103	100,000 ohm, 1/2 W. insulated resistor	.10
45	RE 9563	50,000 ohm, 1/2 W. insulated resistor	.15
46	RE 95106	1000 ohm, 1/2 W. insulated resistor	.10
47	CW 2-05	.05 mfd., 200 V. condenser	.15
48	RE 9567	600 ohm, 1/2 W. insulated resistor	.15
49	CW 2-05	.05 mfd., 200 V. condenser	.15
50	IC 9584	2nd I.F. coil (100 KC.)	2.60
51		80-200 mmf. trimmer condenser - part of IC 9584	
52		80-200 mmf. trimmer condenser - part of IC 9584	
53	CM 9528	350 mmf. mica condenser	.20
54	CM 9528	350 mmf. mica condenser	.20
55	RE 95106	1000 ohm, 1/2 W. insulated resistor	.10
56	RE 95103	100,000 ohm, 1/2 W. insulated resistor	.10
57	RE 95104	75 ohm, 1/2 W. insulated resistor	.10
58	CW 4-05	.05 mfd., 400 V. condenser	.15
59	RE 95103	100,000 ohm, 1/2 W. insulated resistor	.10
60	RE 9567	600 ohm, 1/2 W. insulated resistor	.15
61	CW 2-05	.05 mfd., 200 V. condenser	$ .15
62	IC 9585	3rd I.F. coil (100 KC.)	2.75
63		80-200 mmf. trimmer condenser - part of IC 9585	
64		80-200 mmf. trimmer condenser - part of IC 9585	
65	CM 9528	350 mmf. mica condenser	.20
66	CM 9528	350 mmf. mica condenser	.20
67	CM 953	50 mmf. mica condenser	.15
68	RE 95105	1 meg., 1/2 W. insulated resistor	.15
69		100 mmf. mica condenser - part of IC 9585	
70		100 mmf. mica condenser - part of IC 9585	
71	RE 9524	50,000 ohm, 1/4 W. resistor	.10
72	RE 95113	1/2 meg., 1/2 W. insulated resistor	.10
73	CE 9515	12 mfd., 25 V. electrolytic condenser	.65
74	RE 95114	2000 ohm, 1/2 W. insulated resistor	.10
75	TR 9579	Interstage transformer	3.00
76	CW 4-02	.02 mfd., 400 V. condenser	.15
77	RE 95112	1/4 meg., 1/2 W. insulated resistor	.10
78	RE 95112	1/4 meg., 1/2 W. insulated resistor	.10
79	CW 4-02	.02 mfd., 400 V. condenser	.15
80	CW 2-05	.05 mfd., 200 V. condenser	.15
81	CW 4-005	.005 mfd., 400 V. condenser	.15
82	RE 95111	20,000 ohm, 1 W. insulated resistor	.15
83	CM 953	50 mmf. mica condenser	.15
84	RE 95110	15,000 ohm, 1 W. insulated resistor	.15
85	RE 95106	1000 ohm, 1/2 W. insulated resistor	.10
86	RC 95265	Oscillator coil (365 KC.)	2.40
87	CM 9519	500 mmf. mica condenser	.20
88	RE 95107	75 ohm, 1/8 W. resistor	.10
89	CM 953	50 mmf. mica condenser	.15
90	RE 95106	1000 ohm, 1/2 W. insulated resistor	.10
91	RE 95105	1 meg., 1/2 W. insulated resistor	.15
92		45-135 mmf. trimmer condenser - part of RC 95265	
93	CM 956	250 mmf. mica condenser	.20
94	RE 95103	100,000 ohm, 1/2 W. insulated resistor	.10
95	CW 2-05	.05 mfd., 200 V. condenser	.15
96	CW 2-05	.05 mfd., 200 V. condenser	.15
97	CW 9525	1 mfd., 100 V. condenser	.40
98	SW 9563	A. F. C. switch	.45
99	RE 95105	1 meg., 1/2 W. insulated resistor	.15
100	RE 95105	1 meg., 1/2 W. insulated resistor	.15
101	CW 4-05	.05 mfd., 400 V. condenser	.15
102	CW 4-01	.01 mfd., 400 V. condenser	.15
103	RE 95126	300 ohm, 1/2 W. insulated resistor	.10
104	VR 9542	Bass control	.70
105	CW 4-02	.02 mfd., 400 V. condenser	.15
106	RE 95103	100,000 ohm, 1/2 W. insulated resistor	.10
107	RE 95105	1 meg., 1/2 W. insulated resistor	.15
108	CW 2-05	.05 mfd., 200 V. condenser	.15
109	IC 9583	Discriminator coil	3.75
110		80-200 mmf. trimmer condenser - part of IC 9583	
111		80-200 mmf. trimmer condenser - part of IC 9583	
112	CM 9528	350 mmf. mica condenser	.20
113	CM 9528	350 mmf. mica condenser	.20
114	CM 9519	500 mmf. mica condenser	.20
115	RE 95106	1000 ohm, 1/2 W. insulated resistor	.10
116	CW 4-05	.05 mfd., 400 V. condenser	.15
117	CW 2-05	.05 mfd., 200 V. condenser	.15
118	RE 95124	5000 ohm, 1/2 W. insulated resistor	.10
119	VR 9536	Volume control - 1/2 meg.	.85
120	CW 4-02	.02 mfd., 400 V. condenser	.15
121	RE 95105	1 meg., 1/2 W. insulated resistor	.15
122	RE 95103	100,000 ohm, 1/2 W. insulated resistor	.10
123	SW 9564	Treble control	.60
124	CW 2-05	.05 mfd., 200 V. condenser	.15
125	RE 9597	140-4500-4500 ohm tapped resister	1.10
126	RE 95124	5000 ohm, 1/2 W. insulated resistor	.10
127	CW 4-25	.25 mfd., 400 V. condenser	.20
128	RE 9598	170 ohm, 4 W. resistor	.35
129	CE 9515	12 mfd., 25 V. electrolytic condenser	.65
130	CE 9535	16 mfd., 300 V. electrolytic condenser	.75
131	CE 9528	8 mfd., 450 V. electrolytic condenser	.80
132	TR 9573	Choke coil	1.65
133	CE 9536	12 mfd., 450 V. electrolytic condenser	.80
134	TR 9580	Power transformer	6.75
135		On-Off switch - part of VR 9542	
136	LP 9515	Dial lamp (3.2 V., - 0.35 amp.)	.20
137	CW 2-05	.05 mfd., 200 V. condenser	.15
138	SA 100050	Phono-jack	.10
139	SK 9546	Speaker	12.50
140	DM 9518	Diaphragm and voice coil	4.75
141	TR 9595	Output transformer	2.25
142	CB 9598	Cable to "precision eye"	.70
143		1 meg., 1/4 W. resistor - part of CB 9598	
146	CB 9512	Line cable	.50
147	RE 95103	100,000 ohm, 1/2 W. insulated resistor	.10
148	RE 9556	25 ohm, 1/4 W. resistor	.15
149	RE 95113	1/2 meg., 1/2 W. insulated resistor	.10
150	RE 95108	3000 ohm, 1/2 W. insulated resistor	.10
151	PG 9567	Speaker plug	.30

MODELS WR-116, WR-116X
WESTINGHOUSE ELEC. INTERNATIONAL CO. WR-316, WR-316X
Schematic, Voltage



WAVE CHANGE SWITCH SHOWN IN EXTREME CLOCKWISE POSITION

○SOCKET VOLTAGES TAKEN FROM BOTTOM OF SOCKETS								
MEASUREMENTS MADE WITH 1000 OHMS PER VOLT VOLTMETER & WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION								
TUBE	STAGE	FIL.	PIN NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.	CONT. GRID. PT. NOS.
6A8	1st DET-OSC.	6.1	2-7	1st DET. [illegible] OSC. [illegible]	3-8 [illegible]	58	4-8	
6K7	I.F.	6.0	2-7	105	3-8	70	4-8	
6H6	2nd DET.-AVC	5.95	2-7					-2.07 [illegible]
6F5	1st AUDIO	5.95	2-7	59*	4-8			-0.68 [illegible]
25A6	POWER PEN	24.4	2-7	94	3-8	105	4-8	-125 [illegible]
25Z6	RECTIFIER	24.6	2-7	105	[illegible] NEUTRAL			

* 600 VOLT SCALE
○-LINE VOLTAGE 220 VOLTS.

MODELS WR-116, WR-116X
WR-316, WR-316X

Alignment, Parts

WESTINGHOUSE ELEC. INTERNATIONAL CO.

LINE-UP CAPACITOR ADJUSTMENTS
MODELS WR-116X and WR-316X

ADJUSTMENT OF I.F. (465 KC.)

1. Set the volume control to maximum position, the tone control to treble position, the wave-change switch on Broadcast and the dial indicator at approximately 600 KC.
2. Connect the output meter to the terminals of the voice coil.
3. Set the test oscillator to 465 KC., and apply the test signal to the grid of the type 6K7 I.F. tube through a .5 mfd. blocking condenser.
4. Adjust trimmer condensers #48 (#36 position on Figure 2 of Form #2563) and #50 (#37 position on Figure 2 of Form #2563) to maximum output.
5. Apply the test signal to the grid of the type 6A8 first detector-oscillator tube and adjust trimmer condensers #30 (#22 position on Figure 2 of Form #2563) and #32 (#23 position on Figure 2 of Form #2563) to maximum output.
6. Connect the test oscillator to the antenna of the receiver and with a strong input signal adjust wave trap trimmer condenser #6 to minimum output.

LONG-WAVE BAND ADJUSTMENT

1. Set the wave-change switch to the long-wave band (White)
2. Set the test oscillator and dial indicator to 350 KC.
3. Apply the test signal to the antenna of the receiver through a .0002 mfd. condenser.
4. Adjust the oscillator trimmer condenser #29 (#14 on Figure 2 of Form #2563) until the signal is received.
5. Adjust the antenna trimmer condenser #7 (#5 on Figure 1 of Form #2563) to maximum output.
6. Set the test oscillator and dial indicator to 165 KC., and adjust the oscillator series condenser #6 (located under chassis in front right-hand corner, viewing the set from the rear) to maximum output, at the same time rocking the variable tuning condenser.
7. Return both the test oscillator and dial indicator to 1400 KC., and check the adjustment of trimmers #29 and #7.

BROADCAST BAND ADJUSTMENT

1. Set the test oscillator and dial indicator to 1400 KC.
2. Apply the test signal to the antenna of the receiver through a .0002 mfd. condenser.
3. Adjust oscillator trimmer condenser #37 (#13 position on Figure 2 of Form #2563) until the signal is received.
4. Adjust the preselector trimmer condenser #5 (#4 position on Figure 1 of Form # 2563) to maximum output.
5. Set test oscillator and dial indicator to 600 KC., and adjust the oscillator series condenser #8 (#16 position on Figure 1 of Form #2563) until the signal is received. Tune the receiver to a slightly lower frequency and readjust trimmer #8 to maximum output. If the sensitivity increases, continue this procedure in the same direction until maximum sensitivity is reached. If the sensitivity decreases, try this procedure at slightly higher frequencies until maximum sensitivity is reached.
6. Return test oscillator and dial indicator to 1400 KC., and check adjustment of the oscillator and preselector trimmer condensers.

RED BAND ADJUSTMENT

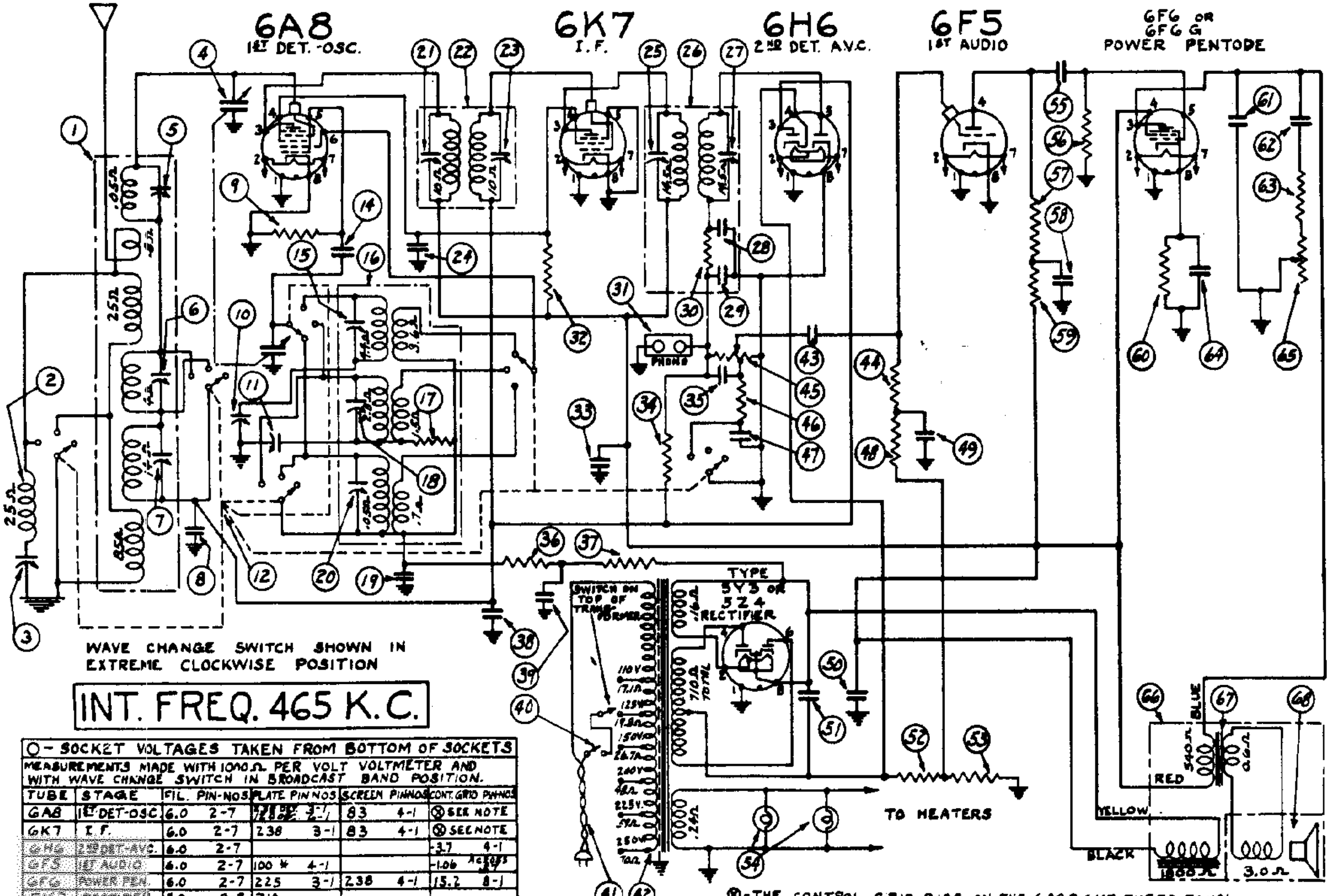
1. Set the wave-change switch to the Red Band position.
2. Set the test oscillator and dial indicator to 15,000 KC., and adjust the oscillator trimmer condenser #38 (#12 position on Figure 2 of For #2563) until the signal is received. Two positions may be found at which the signal may be tuned in. Use the position with the lower capacity trimmer setting or with the alignment screw turned farther out.
3. Adjust the preselector trimmer #3 to maximum output.
4. Check the receiver over scale for calibration and sensitivity.

Dia. #	Part #	Description of Parts	List Price
1	SA 103775	.001 mfd. mica condenser	$ .20
2	CG 9549	Variable condenser	2.50
3		4-25 mmf. trimmer condenser - part of RC 95263	
4	RC 95263	Preselector coil assembly	5.50
5		1.5-10 mmf. trimmer condenser - part of RC 95263	
6	CS 9566	150-300 mmf. trimmer condenser	.30
7		4-25 mmf. trimmer condenser - part of RC 95263	
8	CS 9545	300-600 mmf. trimmer condenser	.40
9	RC 9587	Trap coil assembly	.55
10	CW 4-005	.005 mfd., 400 V. condenser	.15
11		30-60 mmf. trimmer condenser - part of RC 9587	
12	CW 6-10	.1 mfd., 600 V. condenser	.20
13	SW 9548	Wave-change switch	1.00
14	CW 4-01	.01 mfd., 400 V. condenser	.15
15	CW 2-05	.05 mfd., 200 V. condenser	.15
16	RE 9550	2000 ohm, 1/4 W. resistor	.15
17	VR 9534	Tone control - 20,000 ohm	.55
18	LP 9516	Dial lamp - (6.3 V., 0.15 Amp.)	.20
19	RE 9520	130 ohm, 25 W. resistor (220-volt models only)	.70
20	TR 9556	Output transformer (Model WR-316X only)	1.35
21	DM 956	Diaphragm and voice coil assembly (Model WR-316 only)	1.25
22	TR 9553	Choke coil	1.10
23	SK 9538	Speaker (Model WR-316X only)	10.00
24	CE 9538	20 mfd., 150 V. electrolytic condenser	.85
25	CE 9539	30 mfd., 150 V. electrolytic condenser	.90
26	RE 9581	50,000 ohm, 1/4 W. resistor	.15
27	SA 106417	.0001 mfd. mica condenser	.20
28	RC 95264	Oscillator coil assembly	2.75
29		30-60 mmf. trimmer condenser - part of RC 95264	
30		30-100 mmf. trimmer condenser - part of IC 9573	
31	IC 9573	1st I.F. coil	2.00
32		30-100 mmf. trimmer condenser - part of IC 9573	
33	RE 9572	500,000 ohm, 1/4 W. resistor	.15
34	RE 9536	20,000 ohm, 1/4 W. resistor	.10
35	CW 2-05	.05 mfd., 200 V. condenser	.15
36	SA 105249	5000 ohm, 1/4 W. resistor	.15
37		4-25 mmf. trimmer condenser - part of RC 95264	
38		1.5-10 mmf. trimmer condenser - part of RC 95264	
39	CM 9524	.0034 mfd. mica condenser	.35
40	CW 2-05	.05 mfd., 200 V. condenser	.15
41	RE 9568	25,000 ohm, 1/4 W. resistor	.10
42	SA 105249	5000 ohm, 1/4 W. resistor	.15
43	CE 9540	4 mfd., 150 V. condenser	.95
44	SA 105249	5000 ohm, 1/4 W. resistor	.15
45	SA 100050	Phono-jack	.10
46	CW 4-25	.25 mfd., 400 V. condenser	.20
47	CW 2-10	.1 mfd., 200 V. condenser (Model WR-116X, 220 V. only)	.15
48		30-100 mmf. trimmer condenser - part of IC 9574	
49	IC 9574	2nd I.F. coil	1.75
50		30-100 mmf. trimmer condenser - part of IC 9574	
51		100 mmf. mica condenser - part of IC 9574	
52		100 mmf. mica condenser - part of IC 9574	
53	RE 9524	50,000 ohm, 1/4 W. resistor	.10
54	CW 6-01	.01 mfd., 600 V. condenser	.15
55	CM 9519	.0005 mfd. mica condenser	.20
56	RE 9577	2 meg., 1/2 W. resistor	.15
57	CW 2-10	.1 mfd., 200 V. condenser	.15
58	CW 4-005	.005 mfd., 400 V. condenser	.15
59	VR 9533	Volume control, 1/2 meg. (Model WR-116X - for 220-Volt operation only)	1.10
60	RE 9568	25,000 ohm, 1/4 W. resistor (Model WR-116X - for 220-Volt operation only)	.10
61	CW 4-01	.01 mfd., 400 V. condenser (Model WR-116X for 220-Volt operation only)	.15
62	RE 9572	500,000 ohm, 1/4 W. resistor	.15
63	CW 2-10	.1 mfd., 200 V. condenser	.15
64	RE 9572	500,000 ohm, 1/4 W. resistor	.15
65	CW 4-01	.01 mfd., 400 V. condenser	.15
66	RE 9572	500,000 ohm, 1/4 W. resistor	.15
67	CW 9525	1 mfd., 100 V. condenser	.40
68	RE 9531	250,000 ohm, 1/4 W. resistor	.10
69	RE 9534	100,000 ohm, 1/4 W. resistor	.10
70	CM 9519	.0005 mfd. mica condenser	.20
72	TR 9554	Output transformer (Model WR-116X for 220-Volt operation only)	1.25
73	SA 106617	Diaphragm and voice coil assembly (Model WR-116X for 220-Volt operation only)	1.15
74	SK 9532	Speaker assembly (Model WR-116X for 220-Volt operation only)	6.50
77	CW 6-10	.1 mfd., 600 V. condenser	.20
78	RE 9571	15 ohm, 1/4 W. resistor	.15
79	RE 9556	25 ohm, 1/4 W. resistor	.15
80		Field coil - part of SK 9532	
81	CW 2-10	.1 mfd., 200 V. condenser	.15
82		160 ohm resistor - part of CB 9597 (Models WR-116X and WR-316X for 220-Volt operation)	
83		On-off switch - part of VR 9535 (Model WR-316X only)	
84	CB 95113	Line cable (Models WR-116X and WR-316X for 220-Volt operation only)	2.00
83		On-off switch - part of VR 9533 (Model WR-116X for 220-Volt operation only)	
59	VR 9535	Volume control, 1/2 meg. (Model WR-316X only)	1.10
60	RE 9527	5000 ohm, 1/4 W. resistor (Model WR-316X only)	.10
61	CW 2-05	.05 mfd., 200 V. condenser (Model WR-316X only)	.15
47	CW 2-25	.25 mfd., 200 V. condenser (Model WR-316X only)	.20
85	CB 9512	Line cable (Model WR-116X for 110-Volt operation only)	.50

MODELS WR-211, WR-211A, WR-211X

WESTINGHOUSE ELEC. INTERNATIONAL CO.

Schematic, Voltage



WAVE CHANGE SWITCH SHOWN IN EXTREME CLOCKWISE POSITION

INT. FREQ. 465 K.C.

○ - SOCKET VOLTAGES TAKEN FROM BOTTOM OF SOCKETS

MEASUREMENTS MADE WITH 1000 Ω PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION.

TUBE	STAGE	FIL.	PIN-NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.	CONT. GRID	PIN NOS.
6A8	1ST DET-OSC.	6.0	2-7	[illegible]	[illegible]	83	4-1	⊗ SEE NOTE	
6K7	I.F.	6.0	2-7	238	3-1	83	4-1	⊗ SEE NOTE	
6H6	2ND DET-AVC.	6.0	2-7					-3.7	4-1
6F5	1ST AUDIO	6.0	2-7	100 *	4-1			-1.06	ACROSS 3-7
6F6	POWER PEN.	6.0	2-7	225	3-1	238	4-1	15.2	8-1
5Y3	RECTIFIER	5.0	2-8	310					

○ - LINE VOLTAGE IS = TO VOLTAGE STATED ON TRANSFORMER TAP, WHICH IS USED.

⊗ - THE CONTROL GRID BIAS ON THE 6A8 & 6K7 TUBES EQUAL TO APPROX. SIX-TENTHS THE VOLTAGE FROM PINS 5-1 ON THE 6H6 TUBE SOCKET.
* - 600 VOLT SCALE.

MODELS WR-211, WR-211A WR-211X Alignment, Parts

WESTINGHOUSE ELEC. INTERNATIONAL CO.

Type and Number of Tubes ..... 1 #6A8, 1 #6K7, 1 #6H6, 1 #6F5, 1 #6F6, 1 #5Y3 - Total 6

Power Supply Characteristics (Model WR-211 - - - 120-140 volts, 50-60 cycle A.C. / Models WR-211 and WR-211X - 110-250 volts, 25-60 cycle A.C. / Model WR-211A - - - 105-125 volts, 50-60 cycle A.C.)

Power Consumption .... (Models WR-211 and WR-211X - 47 Watts / Model WR-211A - - - 62 Watts)

Maximum Output .... (Models WR-211 and WR-211X - 3 Watts / Model WR-211A - - - 3.8 Watts)

Maximum Undistorted Output .... (Models WR-211 and WR-211X - 2.4 Watts / Model WR-211A - - - 2.5 Watts)

LINE-UP CAPACITOR ADJUSTMENTS
MODEL WR-211X

ADJUSTMENT OF I.F. (465 KC.)

1. Set volume control to maximum position, the tone control to treble, the wave-change switch on Broadcast and the dial indicator at approximately 600 KC.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 KC., and apply signal to grid of 6K7 I.F. tube through a 0.5 mfd. blocking condenser.
4. Adjust trimmers #25 and #27 (#26 position on Figure 2 of Form #2565) to maximum output, reducing output of test oscillator as required.
5. Apply test signal to grid of 6A8 first detector-oscillator tube and adjust trimmers #21 and #23 (#22 position on Figure 2 of Form #2565) to maximum output.
6. Apply test signal to antenna of receiver.
7. Adjust trap coil trimmer #3 (#5 position on Figure 1 of Form #2565) to minimum output.

ADJUSTMENT OF LONG-WAVE BAND

1. Set the wave-change switch to the long-wave band position.
2. Set the dial scale and test oscillator to 350 KC., and apply the test signal to the antenna of the receiver through a .0002 mfd. series condenser.
3. Adjust the oscillator trimmer condenser #15 (#14 on Figure 2 of Form #2565) until the signal is received at a maximum.
4. Adjust antenna trimmer #7 (#4 on Figure 1 of Form #2565) to maximum output.
5. Set the test oscillator and dial indicator to 165 KC., and adjust oscillator series condenser #10 (located under base in front right-hand corner, viewing set from rear) to maximum output, at the same time rocking the variable tuning condenser.
6. Return both the test oscillator and dial indicator to 350 KC., and check adjustment of trimmers #15 and #7.

ADJUSTMENT OF BROADCAST BAND
(540 to 1500 KC.)

1. Set wave-change switch to standard Broadcast Band position.
2. Set test oscillator and dial indicator to 1400 KC.
3. Apply the test signal to the antenna of the receiver through a .0002 mfd. blocking condenser and adjust the oscillator trimmer condenser #18 (#13 on Figure 2 of Form #2565) until the signal is received.
4. Adjust the preselector trimmer #6 (#3 on Figure 1 of Form #2565) to maximum output.
5. Set the test oscillator and dial indicator to 600 KC., and adjust the oscillator series condenser #11 (#17 on Figure 1 of Form #2565) until the signal is received. Tune the variable condenser to a slightly lower frequency and readjust trimmer #17 to maximum output. If the sensitivity increases, continue this trial and error method in the same direction until no further improvement in sensitivity can be made. If the sensitivity decreases, try this adjustment at slightly higher frequencies.

ADJUSTMENT OF RED BAND

1. Set the wave-change switch to the Red Band position.
2. Set the test oscillator and dial indicator to 15,000 KC., and adjust the oscillator trimmer condenser #15 (#12 on Figure 2 of Form #2565) until the signal is received. Two positions may be found at which the signal may be tuned in. Use the position with the lower capacity trimmer setting or with the alignment screw turned farther out.
3. Adjust the preselector trimmer #5 (#5 on Figure 1 of Form #2565) to maximum output.
4. Check the receiver over scale for calibration and sensitivity.

MODEL WR-211A

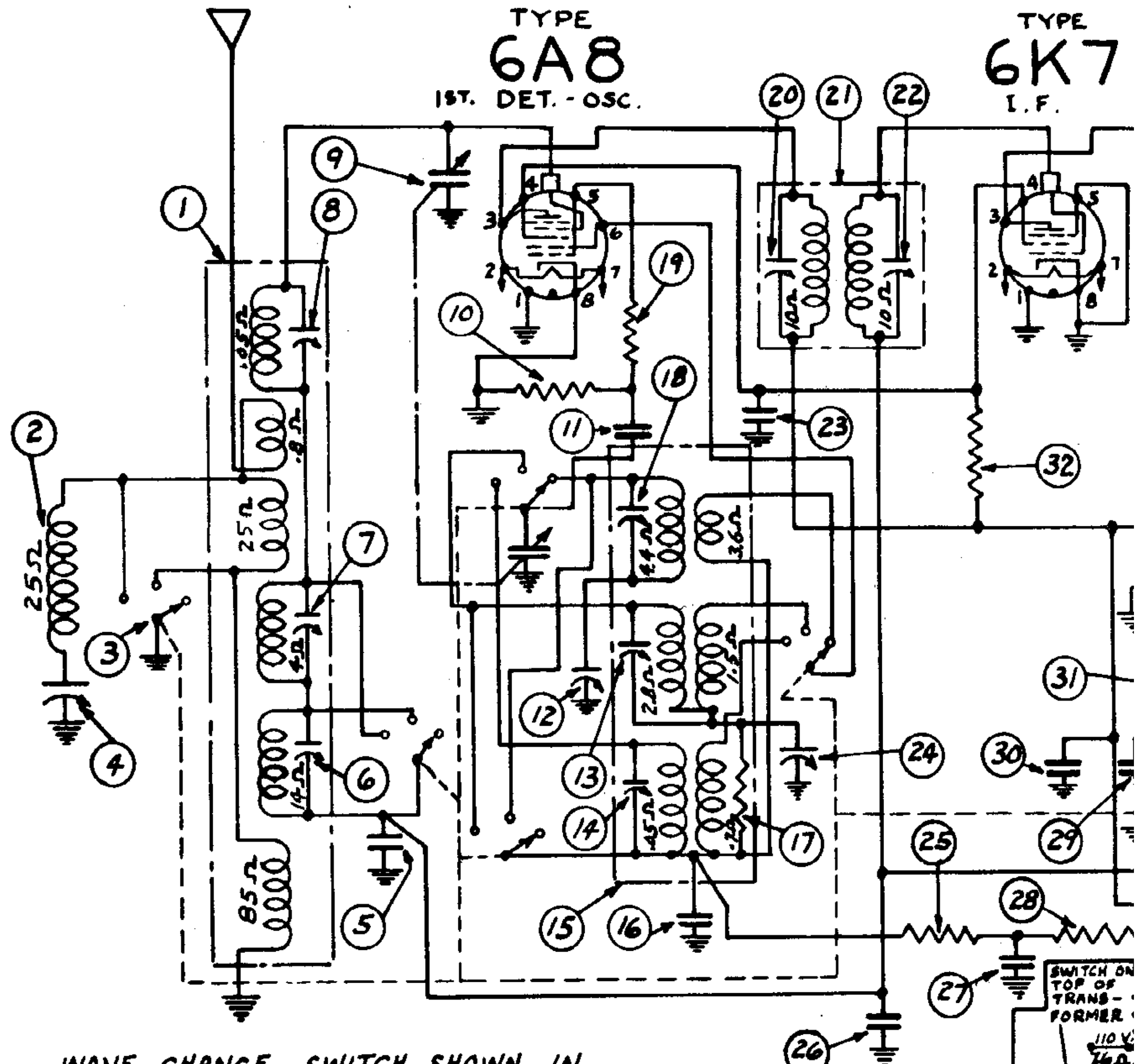
Position #30 of the wiring diagram of Form #2565 has been replaced by two 1 meg., ½ W. resistors (part #RE 95105) in series and bypassed from the mid-point of these resistors with a .25 mfd., 200 V. condenser (part #CW 2-25) to ground.

Dia. #	Part #	Description of Parts	List Price
36	RE 95105	1 meg., ½ W. insulated resistor	$ .15
39	TR 9586	Power transformer	4.00
55	CE 9554	18 mfd., 450 V. electrolytic condenser	.85
57	RE 95129	18 ohm, ½ W. insulated resistor	.10

SERVICE PARTS LIST MODEL WR-211X

Dia. #	Part #	Description of Parts	List Price
1	RC 95263	Preselector coil	$ 3.50
2	RC 9587	Trap coil	.55
3		30-60 mmf. trimmer condenser - part of RC 9587	
4	CG 9549	Variable tuning condenser	2.50
5		4-25 mmf. trimmer condenser - part of RC 9563	
6		1.5-10 mmf. trimmer condenser - part of RC 9563	
7		4-25 mmf. trimmer condenser - part of RC 9563	
8	CW 4-005	.005 mfd., 400 V. condenser	.15
9	RE 9575	50,000 ohm, 1/4 W. resistor	.15
10	CS 9566	150-300 mmf. trimmer condenser	.30
11	CS 9545	300-600 mmf. trimmer condenser	.40
12	SW 9548	Wave-change switch	1.00
14	CM 9511	65 mmf. mica condenser	.15
15		30-60 mmf. trimmer condenser - part of RC 95264	
16	RC 95264	Oscillator coil assembly	2.75
17	SA 105249	5000 ohm, 1/4 W. resistor	.15
18		4-25 mmf. trimmer condenser - part of RC 95264	
19	CM 9524	.0034 mfd. mica condenser	.35
20		1.5-10 mmf. trimmer condenser - part of RC 95264	
21		45-135 mmf. trimmer condenser - part of IC 9572	
22	IC 9572	1st I.F. coil	1.35
23		45-135 mmf. trimmer condenser - part of IC 9572	
24	CW 2-10	.1 mfd., 200 V. condenser	.15
25		30-100 mmf. trimmer condenser - part of IC 9574	
26	IC 9574	2nd I.F. coil	1.75
27		30-100 mmf. trimmer condenser - part of IC 9574	
28		100 mmf. mica condenser - part of IC 9574	
29		100 mmf. mica condenser - part of IC 9574	
30	RE 9524	50,000 ohm, 1/8 W. resistor	.10
31	SA 100050	Phono-jack	.10
32	SA 99777	25,000 ohm, 1 W. resistor	.20
33	CW 4-10	.1 mfd., 400 V. condenser	.15
34	RE 9577	2 meg., 1/2 W. insulated resistor	.15
35	CM 9519	.0005 mfd. mica condenser	.20
36	SA 101722	30,000 ohm, 1 W. resistor	.20
37	SA 100825	10,000 ohm, 1/2 W. resistor	.15
38	CW 2-10	.1 mfd., 200 V. condenser	.15
39		4 mfd., 450 V. electrolytic condenser - part of CE 9537	1.25
40		On-off switch - part of VR 9533	
41	CB 9512	Line cable	.50
42	TR 9565	Power transformer	7.00
43	CW 4-02	.02 mfd., 400 V. condenser	.15
44	RE 9574	1 meg., 1/4 W. resistor	.15
45	VR 9533	Volume control - 1/2 meg.	1.10
46	RE 9568	25,000 ohm, 1/4 W. resistor	.10
47	CW 4-01	.01 mfd., 400 V. condenser	.15
48	RE 9575	50,000 ohm, 1/4 W. resistor	.15
49	CW 2-25	.25 mfd., 200 V. condenser	.20
50	CE 9535	16 mfd., 300 V. electrolytic condenser	.75
51	CE 9536	12 mfd., 450 V. electrolytic condenser	.80
52	RE 9537	50 ohm, 1/4 W. resistor	.10
53	RE 9556	25 ohm, 1/4 W. resistor	.15
54	LP 951	Dial lamp - (6-8 Volt, .20 Amp.)	.20
55	CW 4-02	.02 mfd., 400 V. condenser	.15
56	RE 9572	500,000 ohm, 1/4 W. resistor	.15
57	RE 9531	250,000 ohm, 1/8 W. resistor	.10
58	CW 2-10	.1 mfd., 200 V. condenser	.15
59	RE 9581	50,000 ohm, 1/8 W. insulated resistor	.15
60	SA 107391	500 ohm, 1 W. resistor	.20
61	CW 4-005	.005 mfd., 400 V. condenser	.15
62	CW 4-05	.05 mfd., 400 V. condenser	.15
63	RE 9550	2000 ohm, ½ W. resistor	.15
64		10 mfd., 25 V. elect. condenser - part of CE 9537	1.25
65	VR 9534	Tone control - 20,000 ohm	.55
66	SK 9556	Speaker	6.50
67	SA 107357	Output transformer	1.25
68	SA 106617	Diaphragm and voice coil assembly	1.15

PRICES SUBJECT TO CHANGE WITHOUT NOTICE



WAVE CHANGE SWITCH SHOWN IN EXTREME CLOCKWISE POSITION.

SOCKET VOLTAGES-LINE = 115 VOLTS TAKEN FROM BOTTOM OF SOCKETS

MEASUREMENTS MADE WITH 1000 Ω PER VOLT VOLTMETER & WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION.

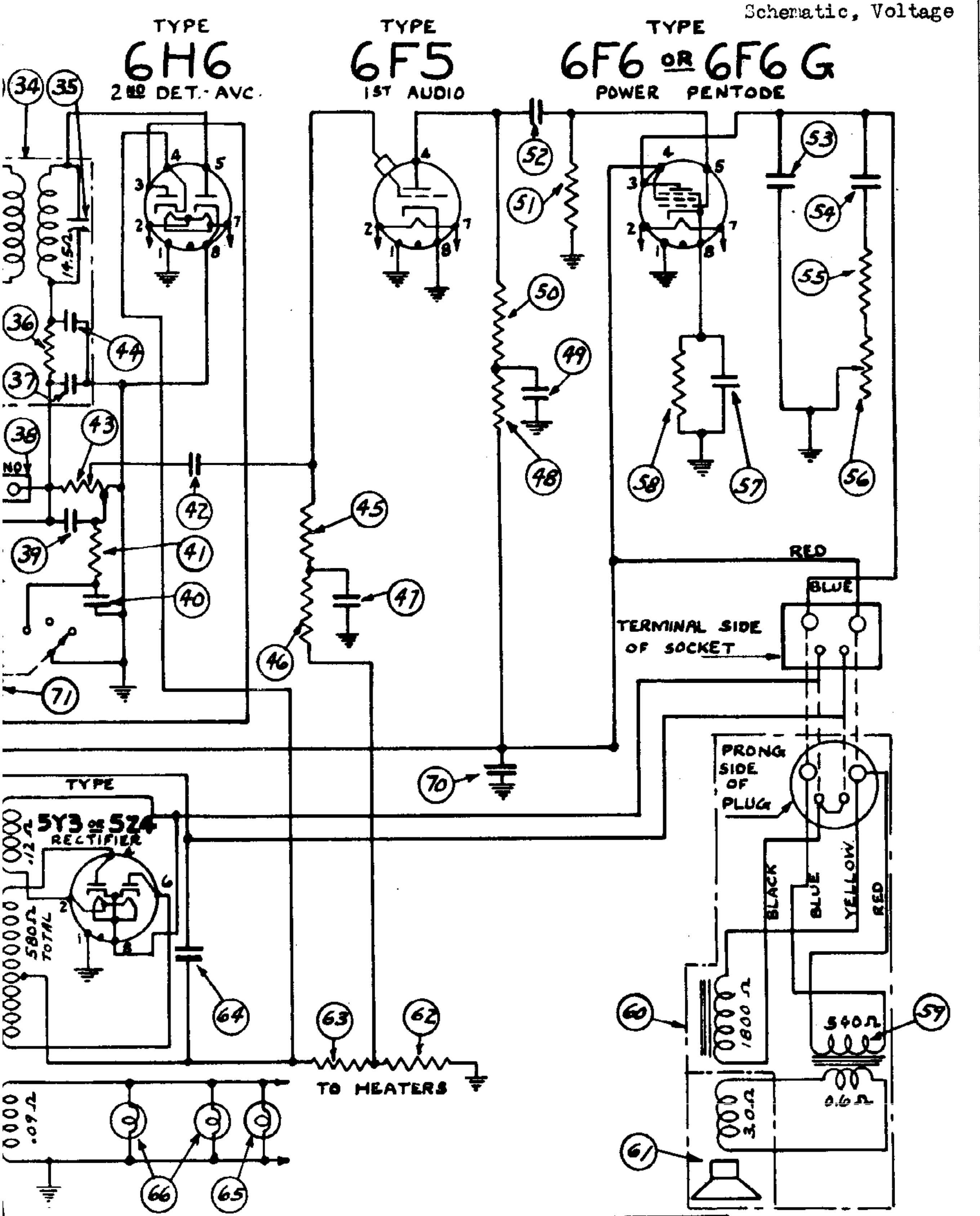
TUBE	STAGE	FIL.	PIN NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.	BIAS	PIN NOS.
6A8	1ST DET. OSC.	6.35	2-7	298 DET. 125 OSC.	3-1 6-1	62	4-1	⊗ SEE NOTE	
6K7	I. F.	6.35	2-7	298	3-1	62	4-1	⊗ SEE NOTE	
6H6	2ND DET. A.V.C.	6.35	2-7					-4.5	4-1
6F5	1ST AUDIO	6.35	2-7	*113	4-1			-1.5 ACROSS 62	
6F6	POWER PEN.	6.35	2-7	283	3-1	298	4-1	21.3	8-1
5Y3	RECTIFIER	5.15	2-8	395	8-1				

⊗ THE CONTROL GRID BIAS ON THE 6K7 & 6A8 TUBES EQUAL TO APPROX. SIX-TENTHS THE VOLTAGE FROM PINS 5-1 ON THE 6H6 TUBE SOCKET.

* 600 VOLT SCALE

NTERNATIONAL CO.

MODELS WR-211U, WR311(Final)
WR-311X
Schematic, Voltage



INT. FREQ. 465 K. C.

WESTINGHOUSE ELEC. INTERNATIONAL CO

MODELS WR-211U, WR-311 (Final)
WR-311X
Alignment, Parts

Type and Number of Tubes ..... 1 #6A8, 1 #6K7, 1 #6H6, 1 #6F5, 1 #6F6, 1 #5Y3 - Total 6
Power Supply Characteristics .... 110 to 250 volt, 25 to 60 cycle A.C.
Power Consumption .... 62 Watts
Maximum Output .... 3.5 Watts
Maximum Undistorted Output .... 2.8 Watts

Tuning Ranges ....
(Models WR-311, WR-211U
(White Band - 540 to 1,550 KC.
(Green Band - 1,500 to 4,500 KC.
(Red Band - - 5,500 to 16,500 KC.
(Model WR-311X
(White Band - 150 to 370 KC.
(Green Band - 540 to 1,500 KC.
(Red Band - - 5,500 to 16,500 KC.

Line-Up Frequencies . Models WR-311, WR-211U - I.F. 465 KC., 1400 KC., 600 KC., 4000 KC., 15,000 KC. - Model WR-311X - I.F. 465 KC., 350 KC., 165 KC., 1400 KC., 600 KC., 15,000 KC.

LINE-UP CAPACITOR ADJUSTMENTS
MODEL WR 311X

ADJUSTMENT OF I.F. (465 KC.)

1. Set volume control to maximum position, tone control to treble, wave-change switch on Broadcast (Green) and indicator at approximately 600 KC.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 KC., and apply signal to grid of 6K7 I.F. tube through a 0.5 mfd. blocking condenser.
4. Adjust trimmers #33 (#26 position on Figure 1 of Form #2567) and #35 (#25 position on Figure 1 of Form #2567) to maximum output, reducing output of test oscillator as required.
5. Apply test signal to grid of 6A8 first detector-oscillator tube and adjust trimmers #20 (#21 position on Figure 1 of Form #2567) and #22 to maximum output.
6. Apply test signal to antenna of receiver.
7. Adjust trap coil trimmer #4 (#5 position on Figure 1 of Form #2567) to minimum output.

ADJUSTMENT OF LONG-WAVE BAND (150-370 KC.)

1. Set the wave-change switch to the long-wave band position and apply the test signal to the antenna of the receiver through a .0002 mfd. condenser.
2. Set the dial indicator and test oscillator to 350 KC., and adjust trimmer condenser #18 (#14 on Figure 2 of Form #2567) until the signal is received at a maximum.
3. Adjust trimmer condenser #6 (#4 on Figure 1 of Form #2567) to maximum output.
4. Set the test oscillator and dial indicator to 165 KC., and adjust trimmer condenser #12 (located on front right-hand corner of chassis, viewed from rear of chassis) to maximum output, at the same time rocking the variable tuning condenser.
5. Return both the test oscillator and dial indicator to 350 KC., and check adjustment of trimmers #18 and #6.

ADJUSTMENT OF BROADCAST BAND (540-1500 KC.)

1. Set wave-change switch to standard Broadcast Band position.
2. Set test oscillator and dial indicator to 1400 KC.
3. Apply the test signal to the antenna of the receiver through a .0002 mfd. condenser and adjust the oscillator trimmer condenser #13 (#13 position on Figure 2 of Form #2567) until the signal is received.
4. Adjust the preselector trimmer #7 (#5 position on Figure 1 of Form #2567) to maximum output.
5. Set the test oscillator and dial indicator to 600 KC., and adjust the oscillator series condenser #24 (#17 position on Figure 1 of Form #2567) until the signal is received. Tune the variable condenser to a slightly lower frequency and readjust trimmer #24 to maximum output. If the sensitivity increases, continue this trial and error method in the same direction until no further improvement in sensitivity can be made. If the sensitivity decreases, try this adjustment at slightly higher frequencies.

ADJUSTMENT OF RED BAND (5,500-16,500 KC.)

1. Set the wave-change switch to the Red Band position.
2. Set the test oscillator and dial indicator to 15,000 KC., and adjust the oscillator trimmer condenser #14 (#12 position on Figure 2 of Form #2567) until the signal is received. Two positions may be found at which the signal may be tuned in. Use the position with the lower capacity trimmer setting or with the alignment screw turned farther out.
3. Adjust the preselector trimmer #8 (#2 position on Figure 1 of Form #2567) to maximum output.
4. Check the receiver over scale for calibration and sensitivity.

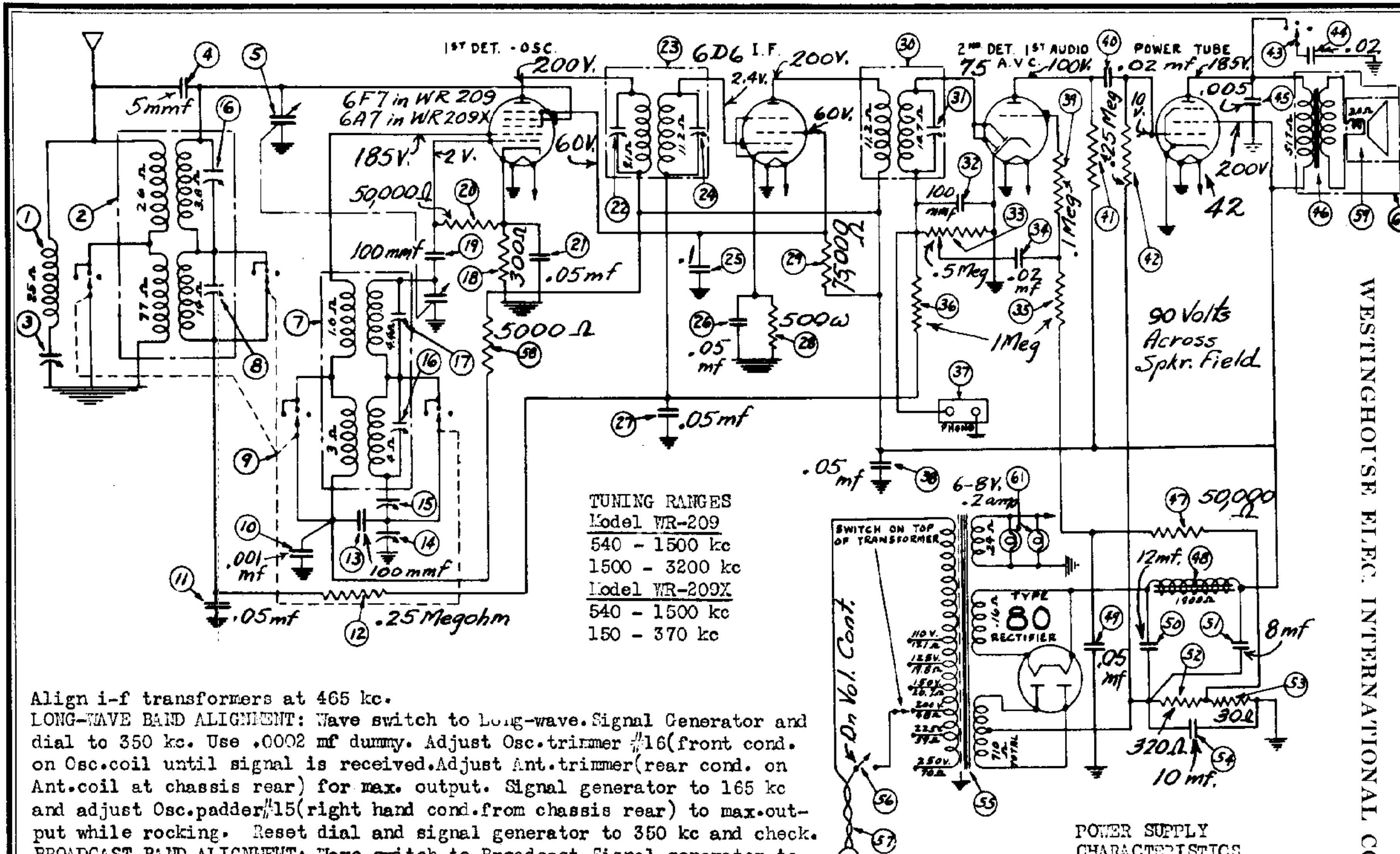
Dia. #	Part #	Description of Parts	List Price
1	RC 95263	Preselector coil	$ 3.50
2	RC 9587	Trap coil	.55
3	SW 9548	Wave-change switch	1.00
4		10-55 mmf. trimmer condenser - part of RC 9587	
5	CW 4-01	.01 mfd., 400 V. condenser	.15
6		4-25 mmf. trimmer condenser - part of RC 95263	
7		1.5-10 mmf. trimmer condenser - part of RC 95263	
8		4-25 mmf. trimmer condenser - part of RC 95263	
9	CG 9549	Variable tuning condenser - 2-gang	2.50
10	RE 9575	50,000 ohm, 1/4 W. resistor	.15
11	CM 9511	65 mmf. mica condenser	.15
12	CS 9566	150-300 mmf. trimmer condenser	.30
13		4-25 mmf. trimmer condenser - part of RC 95264	
14		1.5-10 mmf. trimmer condenser - part of RC 95264	
15	RC 95264	Oscillator coil assembly	2.75
16	CM 9524	.0034 mfd. mica condenser	.35
17	SA 105249	5000 ohm, 1/4 W. resistor	.15
18		60-90 mmf. trimmer condenser - part of RC 95264	
20		45-135 mmf. trimmer condenser - part of IC 9572	
21	IC 9572	1st I.F. coil (465 KC.)	1.35
22		45-135 mmf. trimmer condenser - part of IC 9572	
23	CW 2-10	.1 mfd., 400 V. condenser	.15
24	CS 9545	300-600 mmf. oscillator series condenser	.40
25	RE 95116	50,000 ohm, 1 W. resistor	.20
26	CW 2-05	.05 mfd., 200 V. condenser	.15
27		4 mfd., 450 V. electrolytic condenser - part of CE 9537	1.25
28	SA 100625	10,000 ohm, 1/2 W. resistor	.15
29	CW 2-10	.1 mfd., 200 V. condenser	.15
30	CW 4-10	.1 mfd., 400 V. condenser	.15
31	RE 9574	1 meg., 1/4 W. resistor	.15
32	SA 99957	40,000 ohm, 1 W. resistor	.25
33		30-100 mmf. trimmer condenser - part of IC 9574	
34	IC 9574	2nd I. F. coil (465 KC.)	1.75
35		30-100 mmf. trimmer condenser - part of IC 9574	
36	RE 9524	50,000 ohm, 1/8 W. resistor	.10
37		100 mmf. mica condenser - part of IC 9574	
38	SA 100050	Phono-jack	.10
39	CM 9519	500 mmf. mica condenser	.20
40	CW 2-05	.05 mfd., 200 V. condenser	.15
41	RE 9527	5000 ohm, 1/8 W. resistor	.10
42	CW 4-02	.02 mfd., 400 V. condenser	.15
43	VR 9535	Volume control - 1/2 meg.	1.10
44		100 mmf. mica condenser - part of IC 9574	
45	RE 9574	1 meg., 1/4 W. resistor	.15
46	RE 9575	50,000 ohm, 1/4 W. resistor	.15
47	CW 2-25	.25 mfd., 200 V. condenser	.20
48	RE 9563	50,000 ohm, 1/4 W. insulated resistor	.15
49	CW 4-10	.1 mfd., 400 V. condenser	.15
50	RE 9531	.25 meg., 1/8 W. resistor	.10
51	RE 9572	.5 meg., 1/4 W. resistor	.15
52	CW 4-02	.02 mfd., 400 V. condenser	.15
53	CW 6-005	.005 mfd., 600 V. condenser	.15
54	CW 4-05	.05 mfd., 400 V. condenser	.15
55	RE 9550	2000 ohm, 1/4 W. resistor	.15
56	VR 9534	Tone control - 20,000 ohm	.56
57		10 mfd., 25 V. electrolytic condenser - part of CE 9537	1.25
58	SA 107391	500 ohm, 1 W. resistor	.20
59	TR 9558	Output transformer	1.25
60	SK 9512	Speaker	10.75
61	DM 956	Diaphragm and voice coil assembly	1.25
62	RE 9556	25 ohm, ½ W. resistor	.15
63	RE 9557	50 ohm, ½ W. resistor	.10
64	CE 9536	12 mfd., 450 V. electrolytic condenser	.80
65	LP 9510	Dial lamp - 6.3 V., .25 Amp.	.15
66	LP 951	Dial lamp - 6-8 V., .20 Amp.	.20
67		On-off switch - part of VR 9535	
68	CB 9512	Line cable	.50
69	TR 9567	Power transformer	9.50
70	CE 9535	16 mfd., 500 V. electrolytic condenser	.75
71	RE 9574	1 meg., ½ W. resistor	.15

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODELS WR-209(Final),WR-209X

Schematic, Voltage
Alignment

WESTINGHOUSE ELEC. INTERNATIONAL CO.



TUNING RANGES

Model WR-209

540 - 1500 kc

1500 - 3200 kc

Model WR-209X

540 - 1500 kc

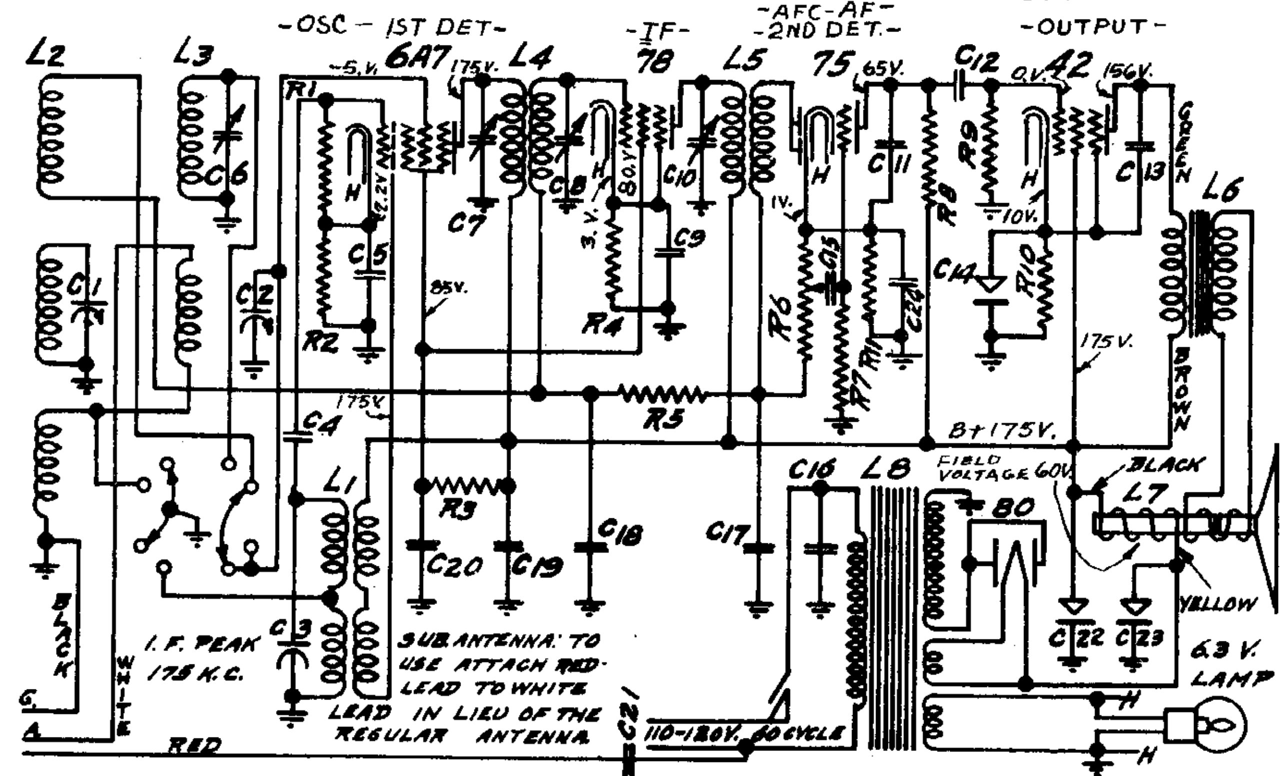
150 - 370 kc

Align i-f transformers at 465 kc.
LONG-WAVE BAND ALIGNMENT: Wave switch to Long-wave. Signal Generator and dial to 350 kc. Use .0002 mf dummy. Adjust Osc. trimmer #16(front cond. on Osc. coil until signal is received. Adjust Ant. trimmer(rear cond. on Ant. coil at chassis rear) for max. output. Signal generator to 165 kc and adjust Osc. padder #15(right hand cond. from chassis rear) to max. output while rocking. Reset dial and signal generator to 350 kc and check.
BROADCAST-BAND ALIGNMENT: Wave switch to Broadcast. Signal generator to 465 kc. Adjust wave-trap trimmer #3(under trap coil under base) to MINIMUM output. Set dial and signal generator to 1400 kc and adjust the Osc. trimmer(rear cond. on Osc. coil) until signal is received. Adjust trimmer #6 to maximum output. Set signal generator and dial to 600 kc and adjust Osc. padder #14(to left of #15 viewed from rear) to maximum output while rocking. Return signal generator and dial to 1400 kc and check alignment.

POWER SUPPLY
CHARACTERISTICS
WR-209:
130 Volts- 50-60 cyc.
220 Volts- 50-60 cyc.
WR-209X:
110-250 Volts
25-60 cyc.

MODEL 6A5
Schematic, Voltage
Socket, Alignment
Parts

WILCOX-GAY CORP.



C1	77-833	366 MMFD. Pres. Section of 3 Gang
C2	77-833	366 MMFD. Pres. Section of 3 Gang
C3	77-833	328 MMFD. Osc. Section of 3 Gang
C4	76-2002	.00005 Mfd. Mica Osc. Grid Condenser
C5	75-2006	.1 Mfd. 200 V. Paper 6A7 Cathode By-Pass Cond.
C6	78-2010	3-30 MMFD. Police Band Pres. Trimmer Cond.
C7	78-2008	First I.F. Primary Trimmer Condenser
C8	78-2011	First I.F. Secondary Trimmer Condenser
C9	75-2006	.1 Mfd. 200 V. Paper 78 Cathode By-Pass Cond.
C10	78-2009	Second I.F. Trimmer Condenser
C11	76-662	.002 Mfd. Mica 75 Plate Filter Condenser
C12	75-2003	.01 Mfd. 400 V. Paper Audio Feed Cond.
C13	75-2001	.002 Mfd. 600 V. Paper 42 Plate Filter Cond.
C14	18-928	25 Mfd. 25 V. Dry Electrolytic Condenser
C15	75-2003	.01 Mfd. 400 V. Paper Audio Feed Condenser
C16	75-2003	.01 Mfd. 400 V. Paper Line By-Pass Cond.
C17	76-307	.0005 Mfd. Mica Diode Filter Condenser
C18	75-2006	.1 Mfd. 200 V. Paper A.V.C. By-Pass Cond.
C19	75-2011	.5 Mfd. 200 V. Paper B Supply By-Pass Cond.
C20	75-2006	.1 Mfd. 200 V. Paper 6A7 & 78 Screen By-Pass Cond.
C21	75-2003	.01 Mfd. 400 V. Paper Sub. Antenna Condenser
C22	18-2006	16 Mfd. 250 W.V. Electrolytic Condenser
C23	18-2005	12 Mfd. 325 W.V. Electrolytic Condenser
C24	75-2006	.1 Mfd. 200 V. Paper 75 Cathode By-Pass Cond.
R1	53-898	50,000 Ohm 6A7 Grid Resistor
R2	53-1062	250 Ohm 6A7 Cathode Resistor
R3	53-1042	25,000 Ohm 6A7 & 78 Screen Resistor
R4	53-1063	500 Ohm 78 Cathode Resistor
R5	53-926	1 Meg Ohm A.V.C. Network Resistor
R6	19-1291	500,000 Ohm Volume Control & Switch
R7	53-925	500,000 Ohm 75 Grid Resistor
R8	53-924	250,000 Ohm 75 Plate Resistor
R9	53-925	500,000 Ohm 42 Grid Resistor
R10	53-1063	500 Ohm 42 Cathode Resistor
R11	53-919	5,000 Ohm 75 Cathode Resistor
L1	17-2101	Oscillator Coil Assembly
L2	17-2100	Broadcast Preselector Coil Assembly
L3	17-2103	Police Band Preselector Coil Assembly
L4	88-2012	First I. F. Transformer Assembly
L5	17-2102	Second I. F. Transformer Coil Assembly
L6	64-2021	5" Speaker 42 Tube Output Trans. on L7
L7	64-2021	5" Speaker 1500 Ohm Field
L8	80-2009	Power Transformer for 110-120 V. 60 Cycle

MODEL 6A5

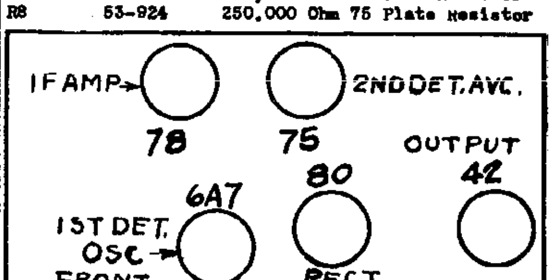
FREQUENCY RANGE -
1500 to 550 KC
4.0 to 1.5 MC
15.5 to 5.5 MC

BROADCAST - Gen. to ANT lead thru standard dummy antenna, set at 1400 KC, adjust OSC trim (rear of gang), then pre-selector trimmers to maximum peak. Pad OSC circuit at 600 KC. FOREIGN - Generator to 15 MC, locate signal on dial, peak PRE-SELECTOR trimmers, , and then check at 6 MC.

POLICE - Generator to 3.5 MC, locate signal on dial, then adjust PRE-SELECTOR trimmers to maximum peak.

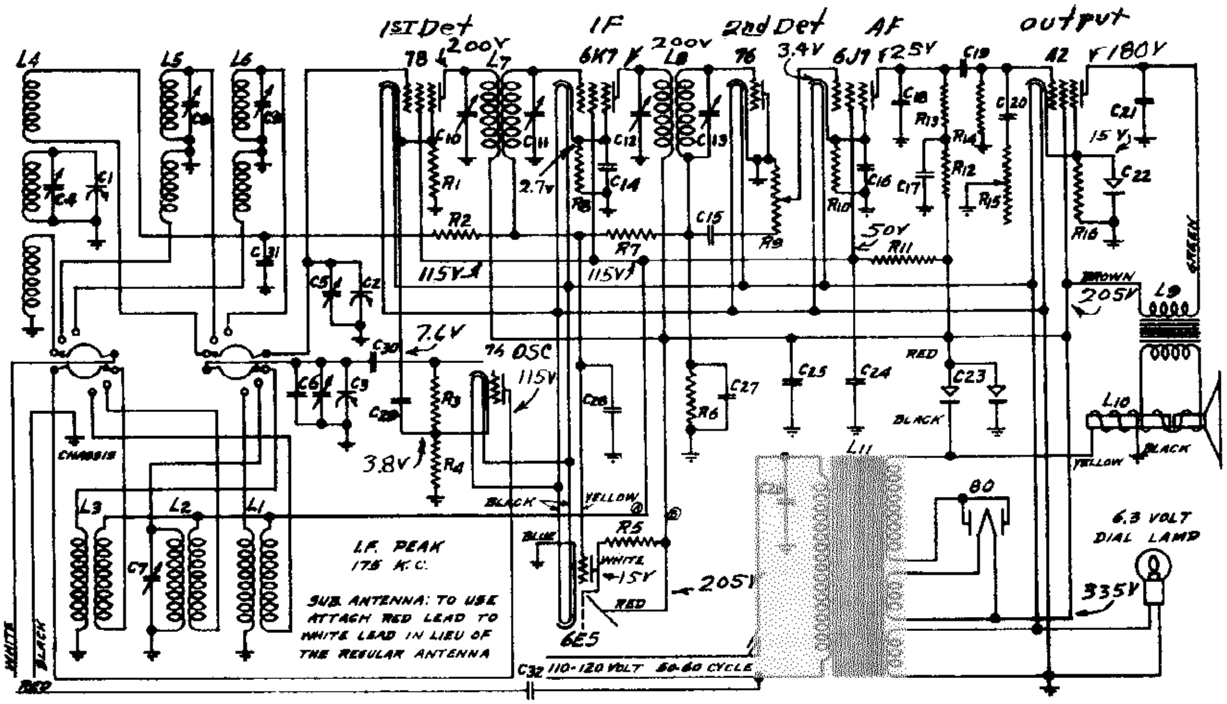
During Broadcast padding rock gang condenser.

CONVENTIONAL ALIGNMENT
(see special section)



MODEL 6B8
Schematic,Voltage
Socket,Alignment
Parts

WILCOX-GAY CORP.



R1	53-1065	1,000 Ohm First Detector Cathode Resistor
R2	53-923	100,000 Ohm A.V.C. Network Resistor
R3	53-941	20,000 Ohm Oscillator Grid Resistor
R4	53-1062	250 Ohm Oscillator Cathode Resistor
R5	53-926	1 Meg Ohm 6B5 Triode Plate Resistor
R6	53-925	500,000 Ohm Diode Load Resistor
R7	53-926	1 Meg Ohm A.V.C. Network Resistor
R8	53-1062	250 Ohm I.F. Amplifier Cathode Resistor
R9	19-1291	500,000 Ohm Volume Control & Switch
R10	53-920	10,000 Ohm First Audio Cathode Resistor
R11	53-290	5,000 Ohm Screen Resistor
R12	53-923	100,000 Ohm First Audio Plate Hum Resistor
R13	53-924	250,000 Ohm First Audio Plate Resistor
R14	53-925	500,000 Ohm Output Grid Resistor
R15	19-1317	250,000 Ohm Tone Control
R16	53-1428	750 Ohm Output Cathode Resistor
C1	77-833	16-366 MMFD. Preselector Section of 3 Gang
C2	77-833	16-366 MMFD. Preselector Section of 3 Gang
C3	77-833	16-328 MMFD. Oscillator Section of 3 Gang
C4	77-833	First Preselector Trimmer on C1
C5	77-833	Second Preselector Trimmer on C2
C6	77-833	Oscillator Trimmer on C3
C7	78-1688	3-30 MMFD. Police Band Oscillator Trimmer
C8	78-1389	3-30 MMFD. Police Band Preselector Trimmer
C9	78-1588	3-30 MMFD. Foreign Band
C10	78-2006	First I.F. Primary Trimmer Condenser
C11	78-2011	First I.F. Secondary Trimmer Condenser
C12	78-2008	Second I.F. Primary Trimmer Condenser
C13	78-2013	Second I.F. Secondary Trimmer Condenser
C14	75-2005	.1 Mfd. 200 Volt I.F. Cathode By-Pass Cond.
C15	75-2003	.01 Mfd. 400 Volt Audio Feed Condenser
C16	75-2011	.5 Mfd. 200 Volt First Audio Cathode By-Pass
C17	75-2005	.1 Mfd. 200 Volt First Audio Plate Hum Filter
C18	75-858	.001 Mfd. Mica First Audio Plate By-Pass Cond.
C19	75-2003	.01 Mfd. 400 Volt Audio Feed Condenser
C20	75-2003	.01 Mfd. 400 Volt Tone Control Condenser
C21	75-2001	.002 Mfd. 600 Volt Output Plate By-Pass Cond.
C22	18-928	.25 Mfd. 25 Volt Dry Electrolytic Condenser
C23	18-2002	4-4 Mfd. 450 W.V. Dry Electrolytic Condenser
C24	75-2005	.1 Mfd. 200 Volt Screen By-Pass Condenser
C25	75-2013	1. Mfd. 400 Volt B Supply By-Pass Condenser
C26	75-2003	.01 Mfd. 400 Volt Line By-Pass Condenser
C27	75-307	.0005 Mfd. Mica Diode Filter Condenser
C28	75-2005	.1 Mfd. 200 Volt A.V.C. Network By-Pass Cond.
C29	75-2003	.01 Mfd. 400 Volt Oscillator Coupling Cond.
C30	75-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C31	75-2003	.01 Mfd. 400 Volt A.V.C. Network By-Pass Cond.
C32	75-2003	.01 Mfd. 400 Volt Sub Antenna Condenser

INDUCTANCES

L1	17-2077	Foreign Band Oscillator Coil Assembly
L2	17-1667	Police Band Oscillator Coil Assembly
L3	17-2030	Broadcast Oscillator Coil Assembly
L4	17-2032	Broadcast Preselector Coil Assembly
L5	17-1666	Police Band Preselector Coil Assembly
L6	17-2076	Foreign Band Preselector Coil Assembly
L7	68-2026	First I.F. Trans. Assembly
L8	68-2024	Second I.F. Trans. Assembly
L9	64-2025	Speaker With #42 Output Trans.
L10	64-2025	Speaker With 2500 Ohm Field
L11	80-2010	Power Transformer (Unless Special)

MODEL 6B8

FREQUENCY RANGE -
1500 to 550 KC
4 to 1.5 MC
15.5 to 5.5 MC

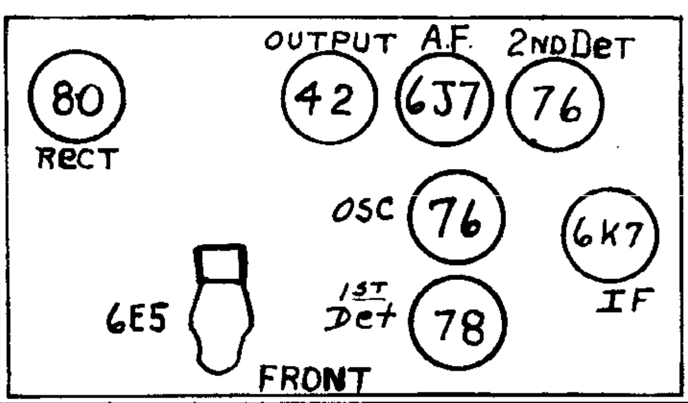
ALIGNMENT

BROADCAST - Generator is connected to ANT lead thru a standard dummy antenna, set at 1400 KC, trim the Oscillator trimmer, then the Pre-selector trimmers to maximum peak. Pad the Oscillator circuit at 600 KC while rocking the rotor of gang condenser.

FOREIGN - Generator is connected in same manner, set at 15 MC, locate signal on dial, trim Pre-selector trimmers to peak. Check at 6 MC

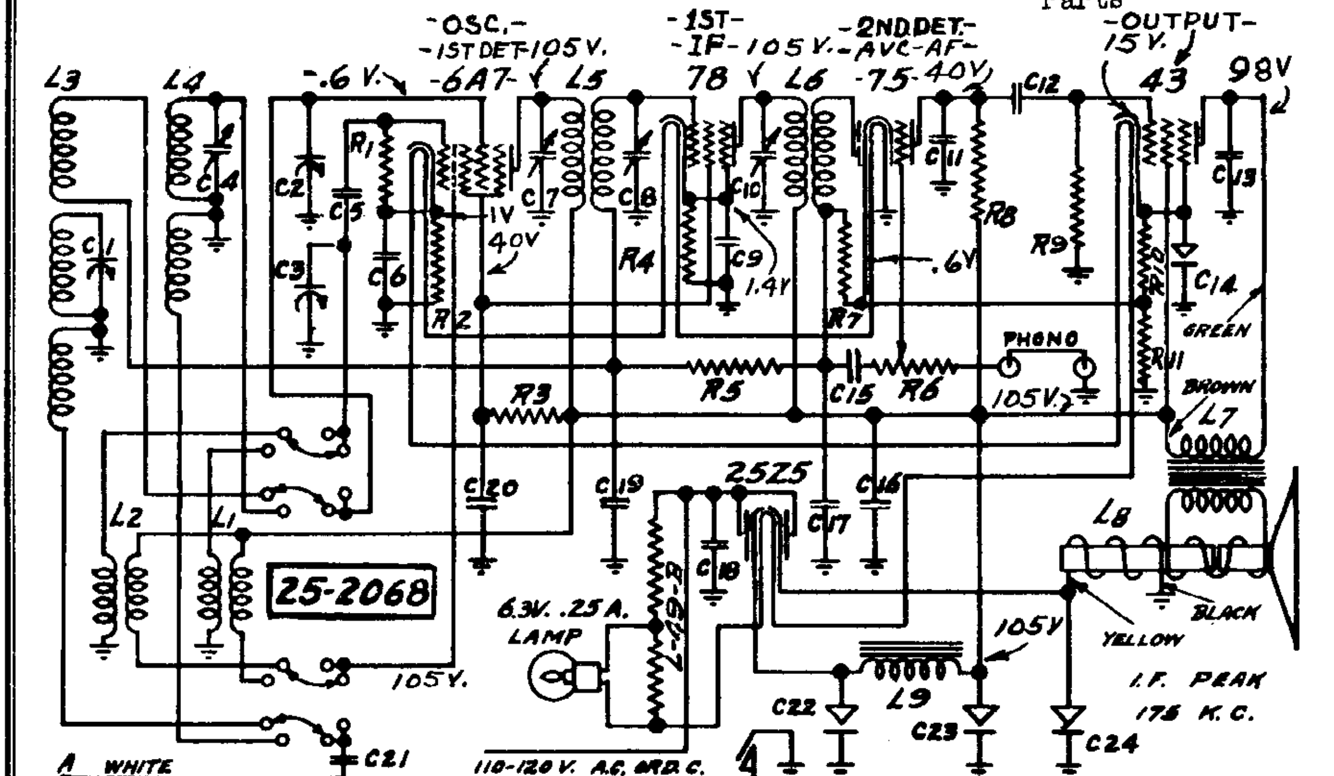
POLICE - Generator to 3.5 MC, locate signal on dial, then trim Pre-selector trimmers to peak. Repeat adjustments.

CONVENTIONAL ALIGNMENT
(See special section)

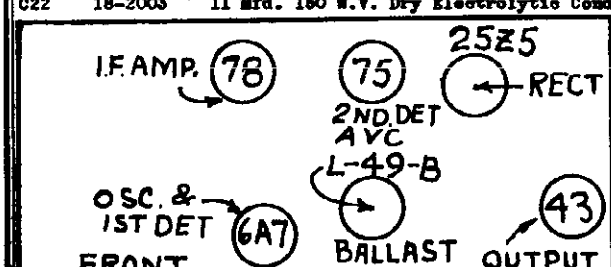


MODEL 6D6
Schematic, Voltage
Socket, Alignment
Parts

WILCOX-GAY CORP.



R1	53-898	50,000 Ohm Oscillator Grid Resistor
R2	53-1062	250 Ohm Oscillator Cathode Resistor
R3	53-1042	25,000 Ohm 6A7 & 78 Screen Resistor
R4	53-1063	500 Ohm 78 Cathode Resistor
R5	53-926	1 Meg Ohm AVC Network Resistor
R6	19-1291	500,000 Ohm Volume Control & Switch
R7	53-925	500,000 Ohm Diode Resistor
R8	53-924	250,000 Ohm 75 Plate Resistor
R9	53-925	500,000 Ohm 43 Grid Resistor
R10	53-1062	500 Ohm 43 Cathode Resistor
R11	53-1122	40 Ohm 75 Cathode Resistor
C1	77-833	366 MMFD. Preselector Section of 3 Gang
C2	77-833	366 MMFD. Preselector Section of 3 Gang
C3	77-833	328 MMFD. Oscillator Section of 3 Gang
C4	78-2010	3-30 MMFD. Foreign Band Preselector Trimmer Cond.
C5	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C6	75-2005	.1 Mfd. 200 Volt Paper 6A7 Cathode By-Pass Cond.
C7	78-2008	First I.F. Primary Trimmer Condenser
C8	78-2011	First I.F. Secondary Trimmer Condenser
C9	75-2005	.1 Mfd. 200 Volt Paper 78 Cathode By-Pass Cond.
C10	78-2009	Second I.F. Trimmer Condenser
C11	76-266	.001 Mfd. Mica 75 Plate Filter Condenser
C12	75-2003	.01 Mfd. 400 Volt Paper Audio Feed Condenser
C13	75-2002	.004 Mfd. 600 Volt Paper 43 Plate Filter Condenser
C14	18-928	25 Mfd. 25 Volt Dry Electrolytic Condenser
C15	75-2003	.01 Mfd. 400 Volt Paper Audio Feed Condenser
C16	75-2011	.5 Mfd. 200 Volt Paper B Supply By-Pass Condenser
C17	76-307	.0005 Mfd. Mica Diode Filter Condenser
C18	75-2005	.1 Mfd. 200 Volt Paper Line By-Pass Condenser
C19	75-2005	.1 Mfd. 200 Volt Paper A.V.C. Network By-Pass Cond.
C20	75-2005	.1 Mfd. 200 Volt Paper 6A7 & 78 Screen By-Pass Cond.
C21	75-2003	.01 Mfd. 400 Volt Paper Antenna Series Condenser
C22	18-2003	11 Mfd. 150 W.V. Dry Electrolytic Condenser
C23	18-2005	4 Mfd. 150 W.V. Dry Electrolytic Condenser
C24	18-2005	4 Mfd. 150 W.V. Dry Electrolytic Condenser
L1	17-2077	Foreign Band Oscillator Coil Assembly
L2	17-2079	Broadcast Oscillator Coil Assembly
L3	17-2080	Broadcast Preselector Coil Assembly
L4	17-2078	Foreign Band Preselector Coil Assembly
L5	68-2012	First I.F. Transformer Assembly
L6	17-2064	Second I.F. Transformer Assembly
L7	64-2006	5" Speaker 43 Output Transformer on L8
L8	64-2006	5" Speaker 3000 Ohm Field
L9	14-940	20 Henry Filter Choke



MODEL 6D6

FREQUENCY RANGE -
1500 to 550 KC
5.5 to 15.5 MC

BROADCAST BAND ALIGNMENT :

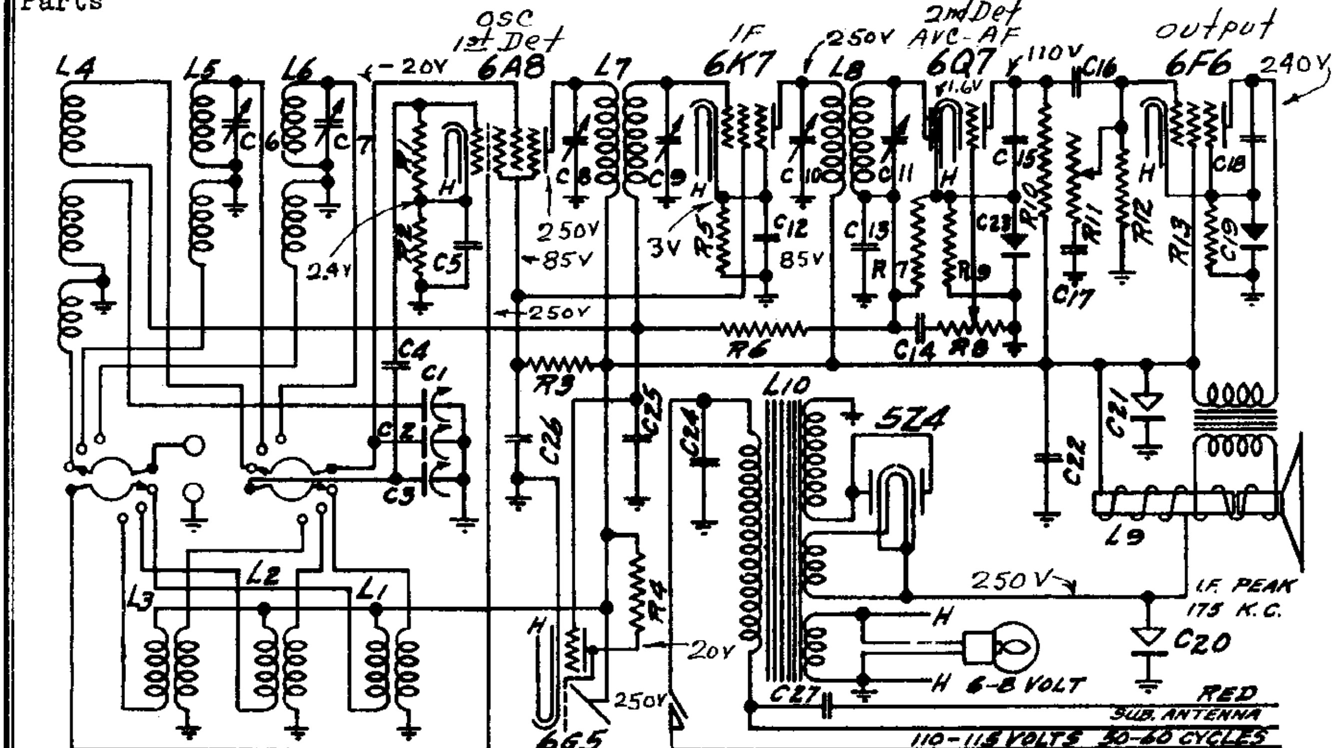
Wave change switch in counter clockwise position, generator to antenna lead thru standard dummy antenna. Adjust OSC trimmer (rear of gang) to 1400 KC peak. Then adjust the ANT and Pre-selector trimmers to peak. Pad the OSC circuit at 600 KC.

SHORT WAVE BAND - Wave change switch in clockwise position. Generator to 15 MC, locate signal on dial, then peak ANT and Pre-selector trimmers. No padding of oscillator circuit required on band.

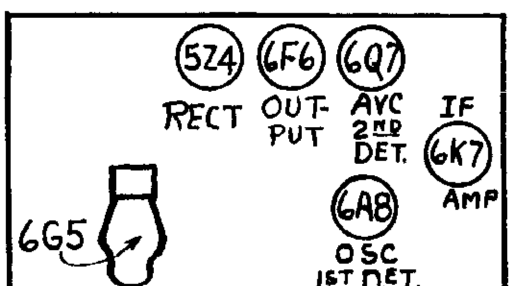
CONVENTIONAL ALIGNMENT -
(see the special section)

MODELS 6F6, 6FB6
Schematic, Voltage
Socket, Alignment
Parts

WILCOX-GAY CORP.



R1	53-898	50,000 Ohm Oscillator Grid Resistor
R2	53-1062	250 Ohm Oscillator Cathode Resistor
R3	53-898	50,000 Ohm R.F. & I.F. Screen Resistor
R4	53-926	1 Meg Ohm 6G5 Triode Plate Resistor
R5	53-1063	500 Ohm I.F. Cathode Resistor
R6	53-926	1 Meg Ohm A.V.C. Network Resistor
R7	53-925	500,000 Ohm Diode Load Resistor
R8	19-1311	500,000 Ohm Volume Control 19-2006 on Model 6FB6
R9	53-919	5,000 Ohm 6Q7 Cathode Resistor
R10	53-924	250,000 Ohm 6Q7 Plate Resistor
R11	19-1317	250,000 Ohm Tone Control
R12	53-925	500,000 Ohm 6F6 Grid Resistor
R13	53-1063	500 Ohm 6F6 Cathode Resistor
C1	77-833	366 MMFD. Preselector Section of 3 Gang
C2	77-833	366 MMFD. Preselector Section of 3 Gang
C3	77-833	328 MMFD. Oscillator Section of 3 Gang
C4	76-2002	.00005 Mfd. Mica Osc. Grid Condenser
C5	75-2005	.1 Mfd. 200 Volt Paper 6A8 Cathode Cond.
C6	78-1587	3-30 MMFD. Police Band Pres. Trimmer Cond.
C7	78-1587	3-30 MMFD. Foreign Band Pres. Trimmer Cond.
C8	78-2008	First I.F. Primary Trimmer Condenser
C9	78-2011	First I.F. Secondary Trimmer Condenser
C10	78-2008	Second I.F. Primary Trimmer Condenser
C11	78-2013	Second I.F. Secondary Trimmer Condenser
C12	75-2005	.1 Mfd. 200 Volt Paper 6K7 Cathode Cond.
C13	76-307	.0005 Mfd. Diode Filter Condenser
C14	75-2005	.1 Mfd. 200 Volt Paper Audio Feed Cond.
C15	76-265	.001 Mfd. Mica 6Q7 Plate Filter Cond.
C16	75-2005	.1 Mfd. 200 Volt Paper Audio Feed Cond.
C17	75-2003	.01 Mfd. 400 Volt Tone Control Cond.
C18	75-2001	.002 Mfd. 600 Volt Paper 6F6 Plate Filter Cond
C19	18-928	25 Mfd. 25 Volt Dry Electrolytic Condenser
C20	19-2006	12 Mfd. 325 W.V. Electrolytic Condenser
C21	18-2006	16 Mfd. 250 W.V. Electrolytic Condenser
C22	75-2012	.5 Mfd. 400 Volt Paper B Supply By-Pass Cond.
C23	18-928	25 Mfd. 25 Volt Elect. 6Q7 Cathode By-Pass Cond.
C24	75-2003	.01 Mfd. 400 Volt Paper Line By-Pass Cond.
C25	75-2005	.1 Mfd. 200 Volt Paper A.V.C. Network By-Pass Cond.
C26	75-2005	.1 Mfd. 200 V. Paper R.F. & I.F. Screen By-Pass Cond.
C27	75-2003	.01 Mfd. 400 Volt Paper Sub. Antenna Cond.
L1	17-2106	Broadcast Oscillator Coil Assembly
L2	17-2105	Police Band Oscillator Coil Assembly
L3	17-2095	Foreign Band Oscillator Coil Assembly
L4	17-2100	Broadcast Preselector Coil Assembly
L5	17-2104	Police Band Preselector Coil Assembly
L6	17-2096	Foreign Band Preselector Coil Assembly
L7	68-2026	First I.F. Transformer Assembly
L8	68-2024	Second I.F. Transformer Assembly
L9	64-2050	12" Speaker 1500 Ohm Field, 6F6 Trans.
	64-2022	8" Speaker, 1500 Ohm Field, 6F6 Trans.
L10	80-2017	Power Transformer



MODEL 6F6, 6FB6

FREQUENCY RANGE -

1500 to 550 KC
4 to 1.5 MC
15.5 to 5.5 MC

BROADCAST - Gen. to ANT lead thru standard dummy antenna, set at 1400 KC, trim OSC trimmer, then Pre-selector trimmers to maximum peak. Pad OSC circuit at 600 KC while rocking gang.

FOREIGN- Generator to 15 MC, locate signal on dial, peak Pre-selector trimmers to maximum. Check at 6 MC.

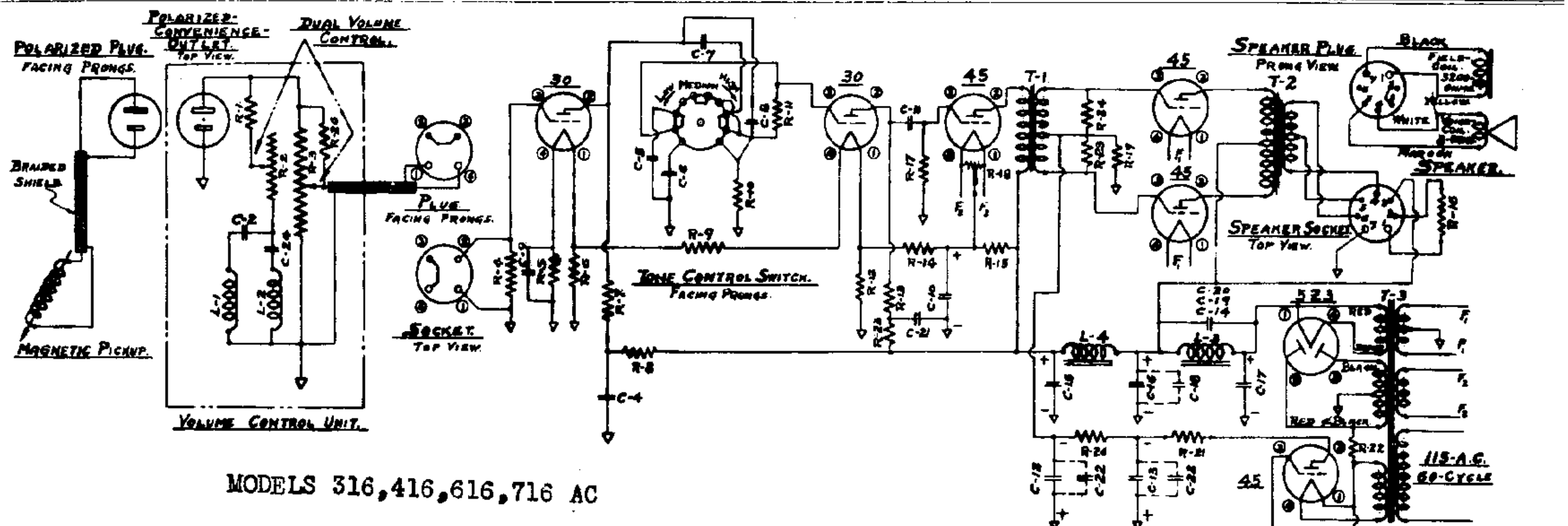
POLICE - Generator to 3.5 MC, locate the signal on dial, adjust Pre-selector trimmers to peak. Repeat adjustments for maximum response.

CONVENTION ALIGNMENT PROCEDURE
(see special section)

THE RUDOLPH WURLITZER CO.

MODELS 316,416,616
716 AC
Schematic, Voltage
Parts

PICKUP PART Nº 24707 | VOLUME CONTROL-#177-AM-PART Nº 24298 | AMPLIFIER-#771. 25-CYCLE-#24368. 40-CYCLE-#24370. 60-CYCLE-#24274 | SPEAKERS. JENSEN-#26923. MAGNAVOX-26409.



MODELS 316,416,616,716 AC

ITEM	PART Nº	VALUE	REMARKS	ITEM	PART Nº	VALUE	REMARKS
		RESISTORS					
R-1	22530	1,000-OHMS	±10% ¼-WATT	R-19	23012	5,000-OHMS	±5% 10-WATT
R-2	22765	12,000-OHMS	±15% VOLUME CONTROL	R-20	23011	2,000-OHMS	±5% 10-WATT
R-3	22765	150,000-OHMS	±15% VOLUME CONTROL	R-21	23011	2,000-OHMS	±5% 10-WATT
R-4	20750	500,000-OHMS	±20% ½-WATT	R-22	[illegible]	[illegible]	±5% 10-WATT
R-5	22354	65-OHMS	±5% ½-WATT	R-23	[illegible]	25,000-OHMS	±10% ½-WATT
R-6	22323	2,000-OHMS	±10% 1-WATT	R-24	[illegible]	7,000-OHMS	±10% ½-WATT
R-7	21938	100,000-OHMS	±10% ½-WATT	R-25	[illegible]	7,000-OHMS	±10% ½-WATT
R-8	21939	50,000-OHMS	±10% ¼-WATT	R-26	[illegible]	50,000-OHMS	±10% ½-WATT
R-9	23014	100-OHMS	±5% ½-WATT				
R-10	20750	500,000-OHMS	±20% ½-WATT				
R-11	20266	75,000-OHMS	±10% ½-WATT				
R-12	22383	2,000-OHMS	±10% 1-WATT				
R-13	23208	60,000-OHMS	±10% ¼-WATT				
R-14	23015	575-OHMS	BLEEDER [illegible]-WATT				
R-15	23015	9,000-OHMS	BLEEDER [illegible]-WATT				
R-16	23015	2,500-OHMS	BLEEDER [illegible]-WATT				
R-17	20728	250,000-OHMS	±20% ½-WATT				
R-48	20445	20-OHMS	HUM CONTROL				

ITEM	PART Nº	VALUE	REMARKS	ITEM	PART Nº	VALUE	REMARKS
		CONDENSERS		C-19	24363	1. -MFD.	FOR 25-30-CYCLE
C-1				C-20	24364	.5 -MFD.	FOR 40-CYCLE
C-2	20665	.25-MFD.	±10% 200-VOLT	C-21	24321	2. -MFD.	450-VOLT
C-3				C-22	23021	8-8-MFD.	FOR 25-30-CYCLE.
C-4	24321	2. -MFD.	450-VOLT	C-23			
C-5	24280	.00075-MFD.	[illegible] MICA	C-24	22241	.008-MFD.	±10% -MICA.
C-6	22241	.002-MFD.	±10% - MICA			CHOKES.	
C-7	21993	.05 -MFD.	±[illegible] [illegible]-VOLT	L-1	21693	540-MILLIHENRIES	CHOKE COIL.
C-8	26560	.004-MFD.	±10% [illegible]-VOLT	L-2	24365	390-MILLIHENRIES	CHOKE COIL.
C-9	24279	10. -MFD.	25-VOLT	L-3	21580	8.75-HENRIES.	#1-FILTER CHOKE.
C-10	24775	25. -MFD.	[illegible]-VOLT	L-4	23017	8 - HENRIES.	#2-FILTER CHOKE.
C-11	21736	.1 -MFD.	±20% [illegible]-VOLT			SPEAKERS.	
C-12	23021	8. -MFD.	[illegible]-VOLT		26394	FIELD-3200-OHMS	VOICE COIL-8-OHMS
C-13	23021	8. -MFD.	[illegible]-VOLT		26923	FIELD-3200-OHMS	VOICE COIL-8-OHMS.
C-14	20665	.25-MFD.	FOR 60-CYCLE			TRANSFORMERS.	
C-15	21720	25. -MFD.	[illegible]-VOLT	T-1	21548		AUDIO INPUT.
C-16	22325	6. -MFD.	[illegible]-VOLT	T-2	23019		AUDIO OUTPUT.
C-17	22325	4. -MFD.	[illegible]-VOLT	T-3	23016		POWER TRANSFORMER
C-18	21720	25. -MFD.	FOR 25 [illegible]-CYCLE				

VOLTAGES AND CURRENTS OF MODEL #771-AMPLIFIER. ALL MEASUREMENTS MADE WITH LINE VOLTAGE 115-VOLTS.
ALL VOLTAGES MEASURED WITH 1,000-OHMS PER VOLT VOLTMETER.

AVERAGE PLATE VOLTAGE MEASURED FROM PLATE + TO CHASSIS -.		AVERAGE PLATE CURRENT:-		AVERAGE GRID VOLTAGE MEASURED FROM GRID TO FILAMENT.		AVERAGE FILAMENT VOLTAGE:-	
OUTPUT -45	355-VOLTS D.C.	OUTPUT -45	28.0-M.A.D.C.	OUTPUT -45	87-VOLTS D.C.	RECTIFIER 5Z3	5.0-VOLTS A.C.
DRIVER -45	327-VOLTS D.C.	DRIVER -45	38.0-M.A.D.C.	DRIVER -45	40-VOLTS D.C.	OUTPUT -45	2.5-VOLTS A.C.
-30	175-VOLTS D.C.	-30	2.1-M.A.D.C.			DRIVER -45	2.5-VOLTS A.C.
-30	80-VOLTS D.C.	-30	1.5-M.A.D.C.			-30	2.1-VOLTS D.C.

AVERAGE VOLTAGES ACROSS SPEAKER FIELDS AND ELECTROLYTIC CONDENSERS.
3200-OHM SPEAKER FIELD VOLTAGE MEASURED FROM #1-CONTACT TO #7-CONTACT ON SPEAKER SOCKET 205-VOLTS D.C.
2500-OHM AUXILIARY SPEAKER FIELD VOLTAGE MEASURED FROM #1-CONTACT TO #3-CONTACT ON SPEAKER SOCKET 155-VOLTS D.C.

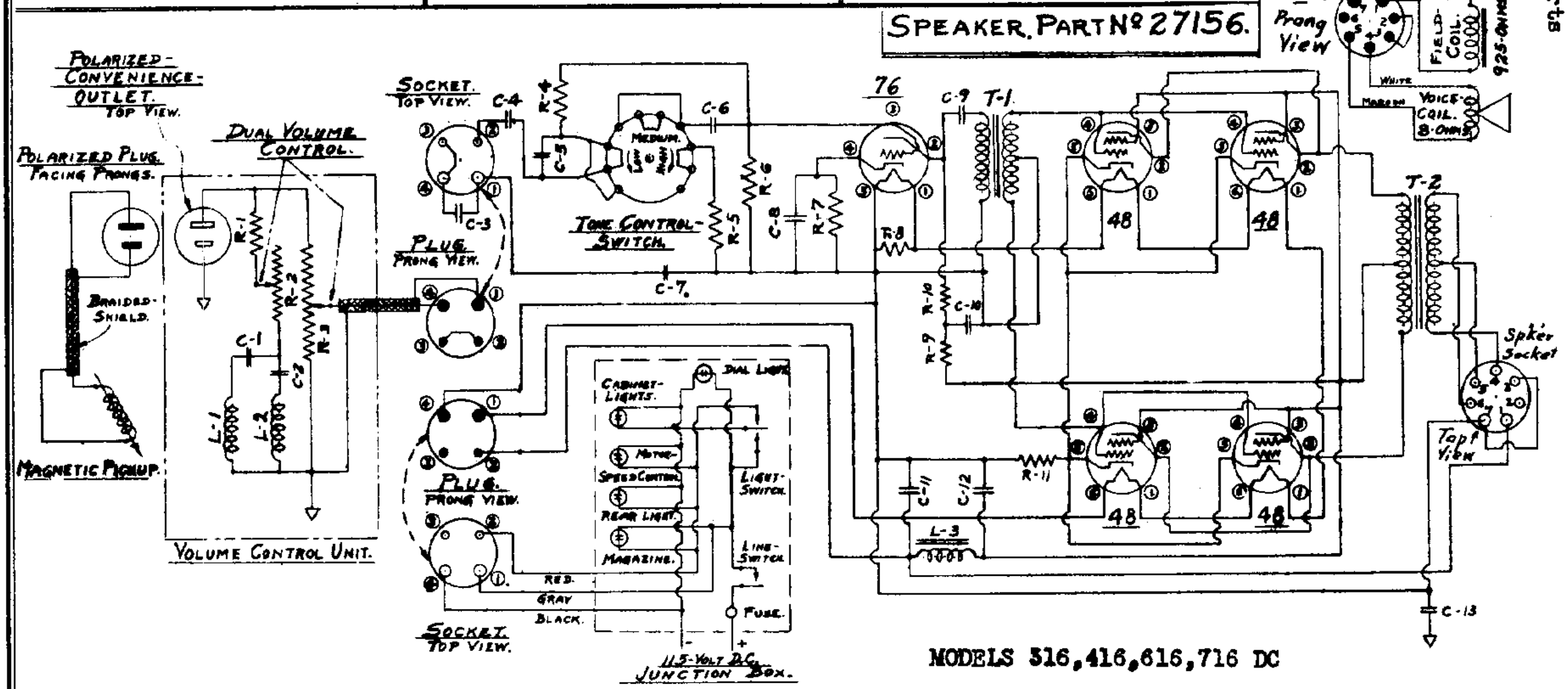
C-18	ELECTROLYTIC	385-VOLTS D.C.	
C-17	ELECTROLYTIC	360-VOLTS D.C.	FROM RECTIFIER -45-PLATE- TO CHASSIS + 150-VOLTS D.C.
C-16	ELECTROLYTIC	355-VOLTS D.C.	

1937

THE RUDOLPH WURLITZER CO.

PICKUP - PART Nº 24707. | VOLUME CONTROL-#157AM-PART Nº 26374 | AMPLIFIER-#751.-PART Nº 26367.

SPEAKER. PART Nº 27156.



MODELS 316,416,616,716 DC

ITEM	PART Nº	VALUE	REMARKS	ITEM	PART Nº	VALUE	REMARKS	ITEM	PART Nº	VALUE	REMARKS	ITEM	PART Nº	VALUE	
RESISTORS.				R-11	22851	63-OHM	±5% 10-WATT	C-4	[illegible]	.1 - MFD	±10% 200-W.VOLTS	C-15			
R-1	22590	1,000-OHM	±10% ¼-WATT	R-12				C-5	26372	.0075 MFD	±10% 200-W.VOLTS		SPEAKER.		
R-2	26378	7,500 OHM	DUAL V.C. REAR SECT.	R-13				C-6	26372	.0075-MFD.	±10% [illegible]-W.VOLTS.		26394	FIELD-925-OHMS	VOICE COIL-8-OHM
R-3	26378	150,000 OHM	DUAL V.C. PANEL SECT.	R-14				C-7	24363	1.0 - MFD.	±10% [illegible]-W.VOLTS		CHOKES.		
R-4	21939	50,000-OHM	±10% ¼-WATT.	R-15				C-8	24279	10. - MFD.	ELEC. 25-W.VOLTS	L-1	24305	290-MILLHENRIES	AIR CORE
R-5	21998	35,000-OHM	±10% ¼-WATT.	R-16				C-9	21736	.1 - MFD.	±20% 400-W.VOLTS	L-2	1693	590-MILLHENRIES	AIR CORE
R-6	20855	150,000-OHM	±10% ¼-WATT.	R-17				C-10	22535	.75 - MFD.	-10% +80% 200-W.VOLTS	L-3	[illegible]	1.35-HENRIES.	POWER FILTER
R-7	22529	2,000-OHM	±10% ¼-WATT	CONDENSERS.				C-11	22865	2.0 - MFD.	200-W.VOLTS.		TRANSFORMERS.		
R-8	22851	63-OHM	±5% 10-WATT	C-1	22241	.002 - MFD.	±10% MICA.	C-12	22865	1.0 - MFD.	200-W.VOLTS	T-1	[illegible]	AUDIO	INPUT
R-9	21997	50,000-OHM	±10% ½-WATT	C-2	20665	.25 - MFD.	±10% - 200 - W.VOLTS.	C-13	21736	.1 - MFD.	±20% 400-W.VOLTS	T-2	[illegible]	AUDIO	OUTPUT
R-10	21998	100,000-OHM	±10% ¼-WATT	C-3	22241	.002 - MFD.	±10% MICA.	C-14				T-3			

VOLTAGES AND CURRENTS OF MODEL-#751-AMPLIFIER. ALL MEASUREMENTS MADE WITH LINE VOLTAGE 115-VOLTS D.C.
ALL VOLTAGES MEASURED WITH 1000-OHMS PER VOLT VOLTMETER.

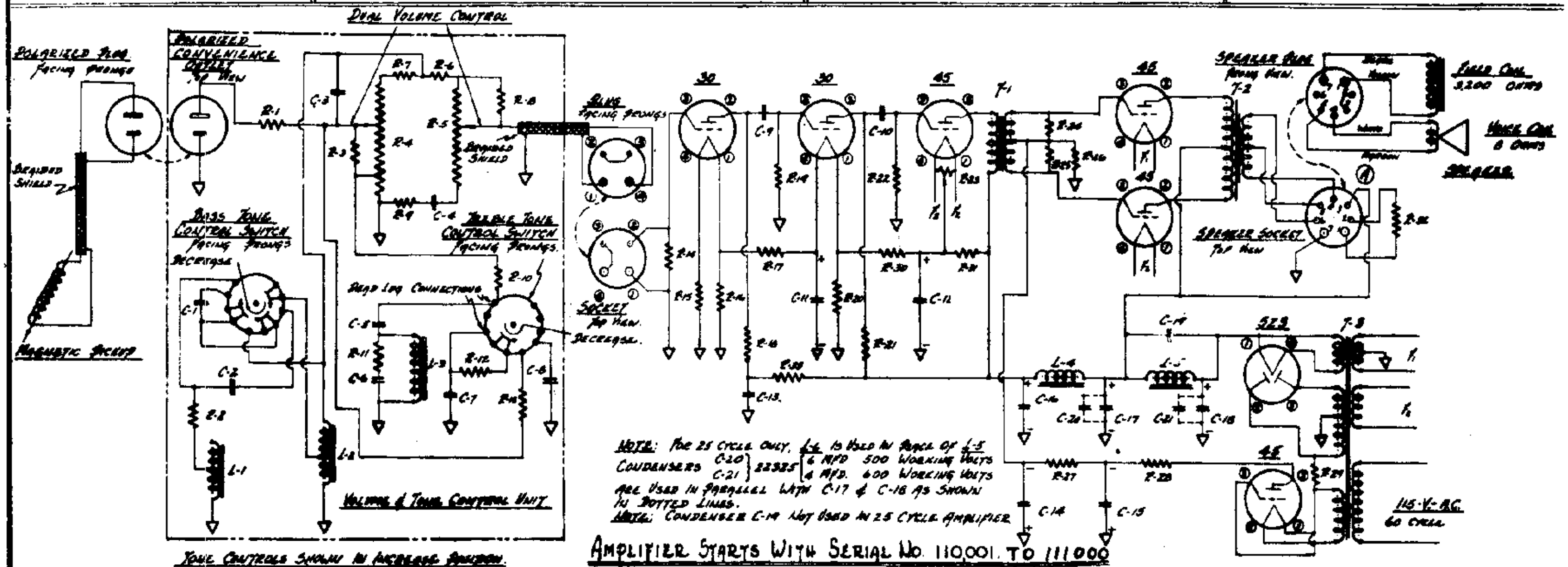
AVERAGE PLATE VOLTAGE MEASURED FROM PLATE + TO CONTACT #7-ON SPEAKER SOCKET.		AVERAGE PLATE CURRENT:-		AVERAGE BIAS VOLTAGE MEASURED FROM CATHODE OF TUBE TO #7-CONTACT ON SPEAKER SOCKET.		AVERAGE FILAMENT VOLTAGE:-	
-48	110-VOLTS D.C.	-48	48.0-M.A.	-48	16.0-VOLTS D.C.	-48	27.5-VOLTS D.C.
-76	20-VOLTS D.C.	-76	.6-M.A.	-76	1.0-VOLT D.C.	-76	6.1-VOLTS D.C.

1937

THE RUDOLPH WURLITZER CO.

MODEL 400
Ser #110001-111000
Schematic, Voltage
Parts

PICKUP PART Nº 23223 | VOLUME CONTROL #176-AM-PART Nº 23209 | AMPLIFIER #671. 25-CYCLE #23744. 60-CYCLE #23004 | SPEAKER PART Nº 23089.



AMPLIFIER STARTS WITH SERIAL No. 110,001. TO 111000

ITEM	PART No.	VALUE	REMARKS
RESISTORS			
R-1	22529	2,000 OHMS	±10% ½ WATT
R-2	21999	800 OHMS	±10% ½ WATT
R-3	20267	15,000 OHMS	±10% ½ WATT
R-4	23216	100,000 OHMS	±15% VOLUME CONTROL
R-5	23216	150,000 OHMS	±15% VOLUME CONTROL
R-6	23208	60,000 OHMS	±10% ½ WATT
[illegible]	[illegible]	[illegible] OHMS	±10% ½ WATT
[illegible]	[illegible]	[illegible] OHMS	±20% ½ WATT
[illegible]	[illegible]	[illegible] OHMS	±10% ½ WATT
[illegible]	[illegible]	[illegible] OHMS	±10% ½ WATT
[illegible]	[illegible]	[illegible] OHMS	±10% [illegible]
[illegible]	[illegible]	[illegible],300 OHMS	±10% [illegible]
[illegible]	[illegible]	[illegible],500 OHMS	±10% [illegible]
[illegible]	[illegible]	[illegible],000 OHMS	±10% [illegible]
[illegible]	[illegible]	65 OHMS	±5% [illegible]
[illegible]	[illegible]	2,000 OHMS	±3% [illegible]
[illegible]	23014	100 OHMS	±5% ½ WATT
[illegible]	21936	100,000 OHMS	±10% [illegible]
[illegible]	20726	250,000 OHMS	±20% [illegible]
[illegible]	22323	2,000 OHMS	±5% [illegible]
[illegible]	[illegible]	60,000 OHMS	±10% [illegible]
[illegible]	[illegible]	150,000 OHMS	±10% [illegible]
[illegible]	[illegible]	20 OHMS	HUM CONTROL
[illegible]	[illegible]	25,000 OHMS	±10% [illegible]
[illegible]	22322	25,000 OHMS	±10% ½ WATT
[illegible]	23018	5,000 OHMS	±5% 10 WATT
[illegible]	23011	2,000 OHMS	±5% 10 WATT
[illegible]	23011	[illegible] OHMS	±5% 10 WATT
R-29	23015	[illegible] OHMS	±10% 10 WATT
R-30	23016	[illegible] OHMS	BLEEDER 4 WATT
R-31	23016	[illegible] OHMS	BLEEDER 30 WATT
R-32	23016	[illegible] OHMS	BLEEDER 35 WATT
R-33	2026[illegible]	[illegible] OHMS	±10% ½ WATT

ITEM	PART No.	VALUE	REMARKS
CONDENSERS			
[illegible]	21990	.25 [illegible]	[illegible] 200 VOLT
[illegible]	22535	.75 [illegible]	±20% 200 VOLT
[illegible]	23221	.18 [illegible]	200 VOLT
[illegible]	22544	.15 [illegible]	200 VOLT
[illegible]	22544	.15 [illegible]	200 VOLT
[illegible]	22589	.0025 [illegible]	
[illegible]	22532	.009 [illegible]	
[illegible]	[illegible]	[illegible]	[illegible] 200 VOLT
[illegible]	[illegible]	[illegible]	±20% 400 VOLT
[illegible]	[illegible]	[illegible]	±20% 400 VOLT
[illegible]	[illegible]	[illegible]	25 VOLT
[illegible]	[illegible]	[illegible] MFD.	130 VOLT
[illegible]	[illegible]	[illegible] MFD.	±25% 400 VOLT
C-14	23021	8 MFD.	180 VOLT
C-15	23021	8 MFD.	130 VOLT
C-16	23020	25 MFD.	450 VOLT
C-17	23020	6 MFD.	500 VOLT
C-18	23020	4 MFD.	600 VOLT
C-19	22121	1.85 MFD.	±10% 200 VOLT
CHOKES			
L-1	22314		[illegible]
L-2	23316		[illegible]
L-3	23317		[illegible]
L-4	23018		[illegible]
L-5	23017		[illegible]
L-6	23746		[illegible]
TRANSFORMERS			
T-1	21848		AUDIO INPUT
T-2	23019		AUDIO OUTPUT
T-3	23016		POWER TRANSFORMER

VOLTAGES AND CURRENTS OF MODEL #671 AMPLIFIER. ALL MEASUREMENTS MADE WITH LINE VOLTAGE 115-VOLTS.

ALL VOLTAGES MEASURED WITH 1,000-OHMS PER VOLT VOLTMETER.

AVERAGE PLATE VOLTAGE MEASURED FROM PLATE + TO CHASSIS −			AVERAGE PLATE CURRENT:-			AVERAGE GRID VOLTAGE MEASURED FROM GRID TO FILAMENT.			AVERAGE FILAMENT VOLTAGE:-		
OUTPUT	-45	355-VOLTS D.C.	OUTPUT	-45	28.0-M.A.D.C.	OUTPUT	-45	87-VOLTS D.C.	RECTIFIER	523	5.0-VOLTS A.C.
DRIVER	-45	327-VOLTS D.C.	DRIVER	-45	38.0-M.A.D.C.	DRIVER	-45	40-VOLTS D.C.	OUTPUT	-45	2.5-VOLTS A.C.
	-30	175-VOLTS D.C.		-30	2.1-M.A.D.C.				DRIVER	-45	2.5-VOLTS A.C.
	-30	80-VOLTS D.C.		-30	1.5-M.A.D.C.					-30	2.1-VOLTS D.C.

AVERAGE VOLTAGES ACROSS SPEAKER FIELDS AND ELECTROLYTIC CONDENSERS.

3200-OHM SPEAKER FIELD VOLTAGE MEASURED FROM #1-CONTACT TO #1-CONTACT ON SPEAKER SOCKET 205-VOLTS D.C.

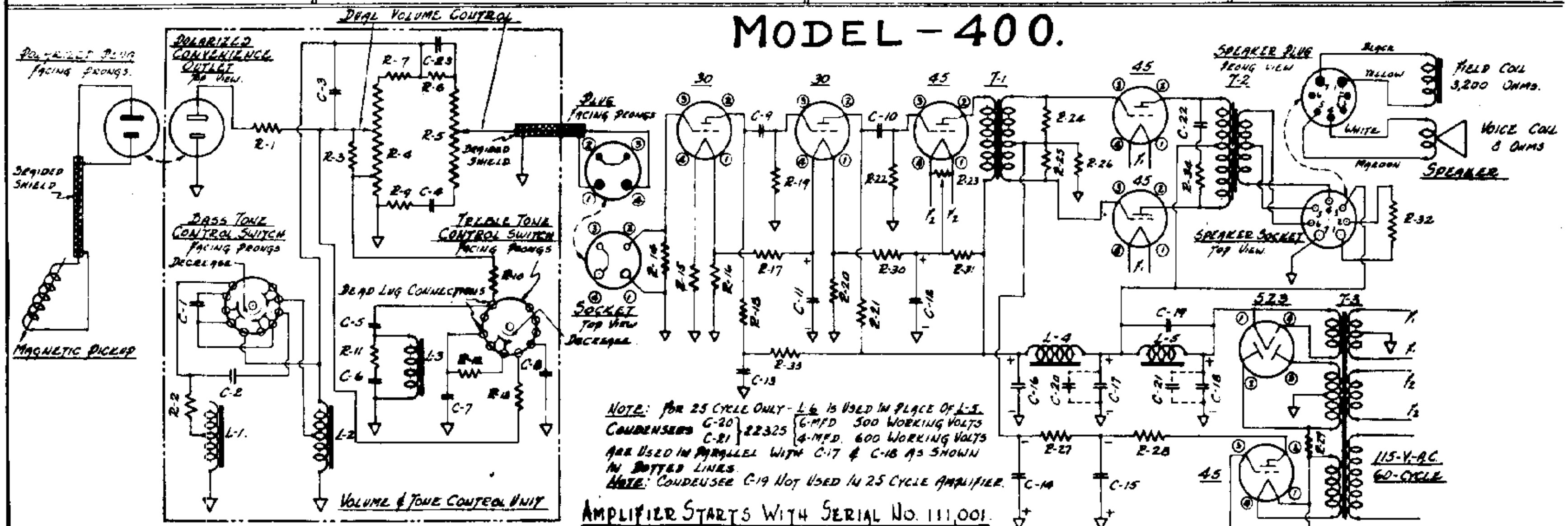
2500-OHM AUXILIARY SPEAKER FIELD VOLTAGE MEASURED FROM #1-CONTACT TO #3-CONTACT ON SPEAKER SOCKET 155-VOLTS D.C.

C-18	ELECTROLYTIC	385-VOLTS D.C.	
C-17	ELECTROLYTIC	360-VOLTS D.C.	FROM RECTIFIER -45-PLATE- TO CHASSIS + 130-VOLTS D.C.
C-16	ELECTROLYTIC	353-VOLTS D.C.	

MODEL 400
Ser. #111001-111500
Schematic, Voltage
Parts

THE RUDOLPH WURLITZER CO.

PICKUP PART Nº 23223 | VOLUME CONTROL #276-AM-PART Nº 24065 | AMPLIFIER #672-60-CYCLE-24062 | SPEAKER PART Nº 23089



AMPLIFIER STARTS WITH SERIAL NO. 111,001.
TO 111,500

ITEM	PART NO.	VALUE	REMARKS	ITEM	PART NO.	VALUE	REMARKS	ITEM	PART NO.	VALUE	REMARKS	ITEM	PART NO.	VALUE	REMARKS
		RESISTORS		R-19	20728	250,000 OHMS	±20% ¼ WATT			CONDENSERS		C-19	22121	1.25 MFD	±10% 200 VOLT
R-1	22588	3,000 OHMS	±10% ¼ WATT	R-20	22323	2,000 OHMS	±5% 1 WATT	C-1	21940	.25 MFD.	±10% 200 VOLT	C-20	22325	6 MFD.	500 VOLT
R-2	21999	800 OHMS	±10% ¼ WATT	R-21	23208	60,000 OHMS	±10% ½ WATT	C-2	22535	.75 MFD	-10% +20% 200 VOLT	C-21		4 MFD	600 VOLT
R-3	21998	35,000 OHMS	±10% ¼ WATT	R-22	20855	150,000 OHMS	±10% ¼ WATT	C-3	23221	.18 MFD.	±10% 200 VOLT	C-22	24063	.015 MFD.	±10% 600 VOLT
R-4	23215	100,000 OHMS	±15% VOLUME CONTROL	R-23	20445	20 OHMS	HUM CONTROL	C-4	22544	.15 MFD	±10% 200 VOLT	C-23	22531	.003 MFD.	±10%
R-5		150,000 OHMS	±15% VOLUME CONTROL	R-24	22322	25,000 OHMS	±10% ½ WATT	C-5	22544	.15 MFD	±10% 200 VOLT				
R-6	23084	25,000 OHMS	±10% ¼ WATT	R-25	22322	25,000 OHMS	±10% ½ WATT	C-6	22569	.0025 MFD.	±10%			CHOKES	
R-7	23084	25,000 OHMS	±10% ½ WATT	R-26	23012	5,000 OHMS	±5% 10 WATT	C-7	22532	.004 MFD.	±10%	L-1	24195		CHOKE TONE CONTROL
R-8				R-27	23011	2,000 OHMS	±5% 10 WATT	C-8	22534	.015 MFD.	±10% 200 VOLT	L-2	24318		REACTOR TONE CONTROL
R-9	20704	3,500 OHMS	±10% ¼ WATT	R-28	23011	2,000 OHMS	±5% 10 WATT	C-9	21993	.05 MFD.	±20% 400 VOLT	L-3	21693		CHOKE ASSEMBLY
R-10	20787	5,000 OHMS	±10% ¼ WATT	R-29	23013	3,500 OHMS	±10% 10 WATT	C-10	21736	.1 MFD.	±20% 400 VOLT	L-4	23018		#2 FILTER CHOKE
R-11	22783	7,000 OHMS	±10% ¼ WATT	R-30	23015	375 OHMS	BLEEDER 4 WATT	C-11	23010	10 MFD	25 VOLT	L-5	23017	60 CYCLE ONLY	#1 FILTER CHOKE
R-12	20704	3,500 OHMS	±10% ¼ WATT	R-31		9,000 OHMS	BLEEDER 30 WATT	C-12	23009	12 MFD.	150 VOLT	L-6	23746	25 CYCLE ONLY	#1 FILTER CHOKE
R-13	20704	3,500 OHMS	±10% ¼ WATT	R-32		2,500 OHMS	BLEEDER 33 WATT	C-13	20775	.5 MFD.	±25% 400 VOLT				
R-14	20750	500,000 OHMS	±10% ¼ WATT	R-33	20266	75,000 OHMS	±10% ¼ WATT	C-14	23021	8 MFD	150 VOLT			TRANSFORMERS	
R-15	22354	65 OHMS	±5% ½ WATT	R-34	24064	7,000 OHMS	±5% 10 WATT	C-15		8 MFD	150 VOLT	T-1	21548		AUDIO INPUT
R-16	22323	2,000 OHMS	±5% 1 WATT					C-16	23020	25 MFD.	450 VOLT	T-2	23014		AUDIO OUTPUT
R-17	23014	100 OHMS	±5% ½ WATT					C-17		6 MFD.	500 VOLT	T-3	23016		POWER TRANSFORMER
R-18	21938	100,000 OHMS	±10% ½ WATT					C-18		4 MFD.	600 VOLT				

VOLTAGES AND CURRENTS OF MODEL #672-AMPLIFIER. ALL MEASUREMENTS MADE WITH LINE VOLTAGE 115-VOLTS.
ALL VOLTAGES MEASURED WITH 1,000-OHMS PER VOLT VOLTMETER.

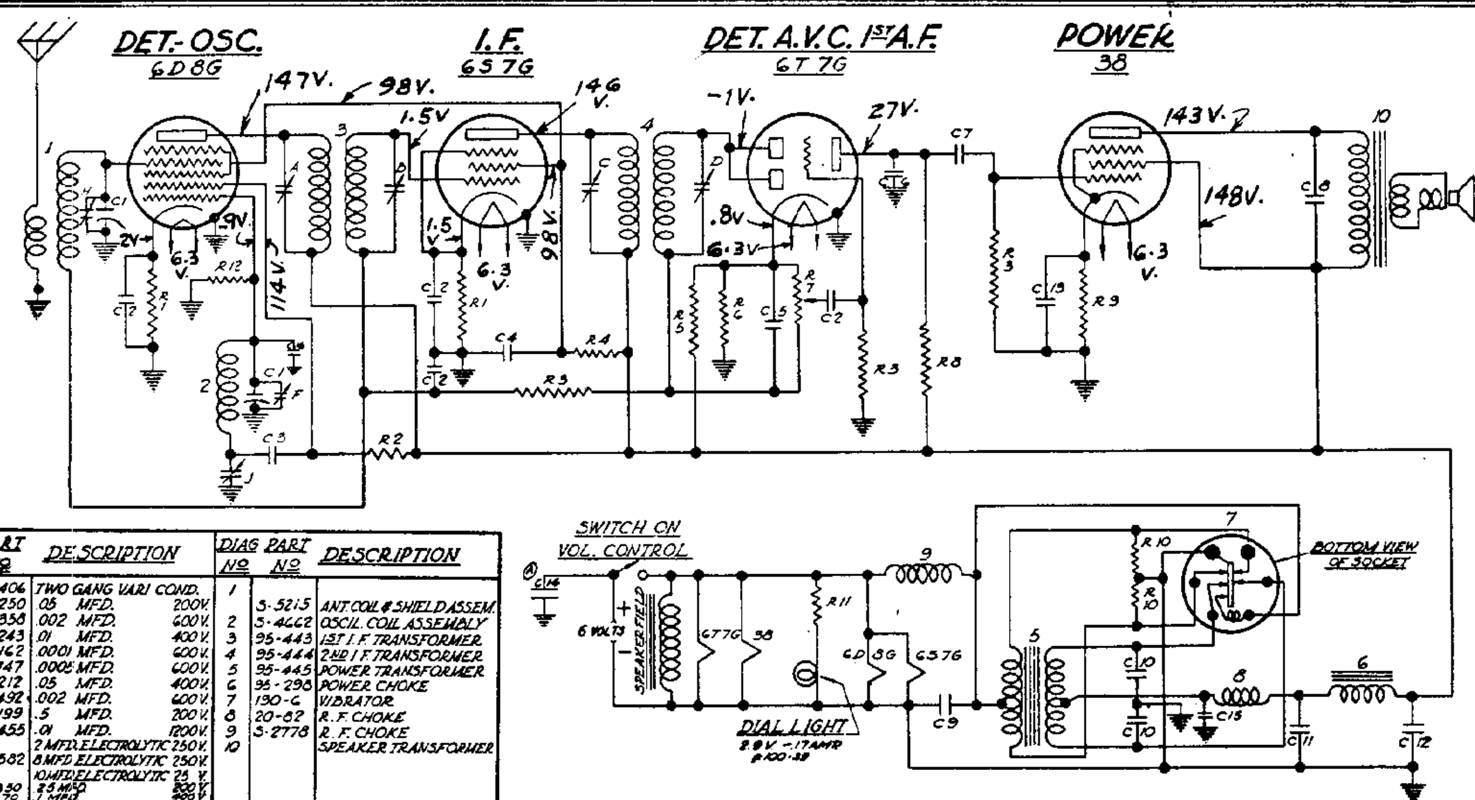
AVERAGE PLATE VOLTAGE MEASURED FROM PLATE + TO CHASSIS -.		AVERAGE PLATE CURRENT:-		AVERAGE GRID VOLTAGE MEASURED FROM GRID TO FILAMENT.		AVERAGE FILAMENT VOLTAGE:-	
OUTPUT -45	355-VOLTS D.C.	OUTPUT -45	28.0-M.A.D.C.	OUTPUT -45	87-VOLTS D.C.	RECTIFIER 5Z3	5.0-VOLTS A.C.
DRIVER -45	327-VOLTS D.C.	DRIVER -45	38.0-M.A.D.C.	DRIVER -45	40-VOLTS D.C.	OUTPUT -45	2.5-VOLTS A.C.
-30	175-VOLTS D.C.	-30	2.1-M.A.D.C.			DRIVER -45	2.5-VOLTS A.C.
-30	80-VOLTS D.C.	-30	1.5-M.A.D.C.			-30	2.1-VOLTS D.C.

AVERAGE VOLTAGES ACROSS SPEAKER FIELDS AND ELECTROLYTIC CONDENSERS.
3200-OHM SPEAKER FIELD VOLTAGE MEASURED FROM #1-CONTACT TO #7-CONTACT ON SPEAKER SOCKET 205-VOLTS D.C.
2500-OHM AUXILIARY SPEAKER FIELD VOLTAGE MEASURED FROM #1-CONTACT TO #3-CONTACT ON SPEAKER SOCKET 155-VOLTS D.C.

C-18	ELECTROLYTIC	385-VOLTS D.C.	FROM RECTIFIER -45-PLATE - TO CHASSIS + 150-VOLTS D.C.
C-17	ELECTROLYTIC	360-VOLTS D.C.	
C-16	ELECTROLYTIC	355-VOLTS D.C.	

Chassis 5409
Schematic, Voltage
Socket, Trimmers
Alignment, Parts

ZENITH RADIO CORP.

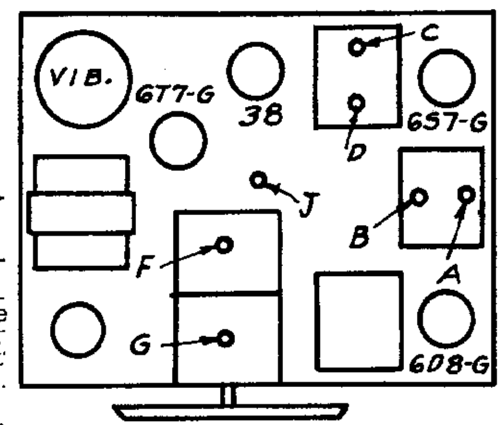


DIAG NO	PART NO	DESCRIPTION	
C-1	22-406	TWO GANG VARI COND.	
C-2	22-250	.05 MFD.	200V.
C-3	22-358	.002 MFD.	600V.
C-4	22-243	.01 MFD.	400V.
C-5	22-162	.0001 MFD.	600V.
C-6	22-147	.0005 MFD.	600V.
C-7	22-212	.05 MFD.	400V.
C-8	22-492	.002 MFD.	600V.
C-9	22-199	.5 MFD.	200V.
C-10	22-455	.01 MFD.	1200V.
C-11	22-582	2 MFD. ELECTROLYTIC	250V.
C-12		8 MFD. ELECTROLYTIC	250V.
C-13		10 MFD. ELECTROLYTIC	25 V.
C-14	22-350	.25 MFD.	200V.
C-15	22-170	.1 MFD.	400V.
R-1	63-632	560 OHM	¼W±10
R-2	63-150	10 M OHM	¼W±20
R-3	63-271	1 MEG OHM	¼W±20
R-4	63-681	56 M	½W±10
R-5	63-160	100 M	½W±10
R-6	63-634	820 OHM	¼W±10
R-7	63-547	400 M OHM VOLUME CONTROL	
R-8	63-597	470 M OHM	¼W±20
R-9	63-418	1500 OHM	½W±10
R-10	63-577	100 OHM	¼W±20
R-11	63-800	26 OHM WIREWOUND	1W±5
R-12	63-593	47 M OHM	¼W±20
C-16	22-385	5 MMFD CERAMIC	

DIAG NO	PART NO	DESCRIPTION
1	S-5215	ANT. COIL & SHIELD ASSEM.
2	S-4662	OSCIL. COIL ASSEMBLY
3	95-443	1ST I.F. TRANSFORMER
4	95-444	2ND I.F. TRANSFORMER
5	95-445	POWER TRANSFORMER
6	95-298	POWER CHOKE
7	190-6	VIBRATOR
8	20-82	R.F. CHOKE
9	S-2778	R.F. CHOKE
10		SPEAKER TRANSFORMER
		VARIABLE TRIMMERS
A		1ST I.F. TRANSF. PRIMARY
B		1ST I.F. TRANSF. SECONDARY
C		2ND I.F. TRANSF. PRIMARY
D		2ND I.F. TRANSF. SECONDARY
F		BROADCAST OSCIL. (ON GANG)
H		ANT. BROADCAST (ON GANG)
J	22-519	OSCILLATOR PADDER

4 TUBE BATTERY SUPERHETERODYNE
I.F. - FREQUENCY 456 K.C.

FOR PHONO. DATA, SEE INDEX

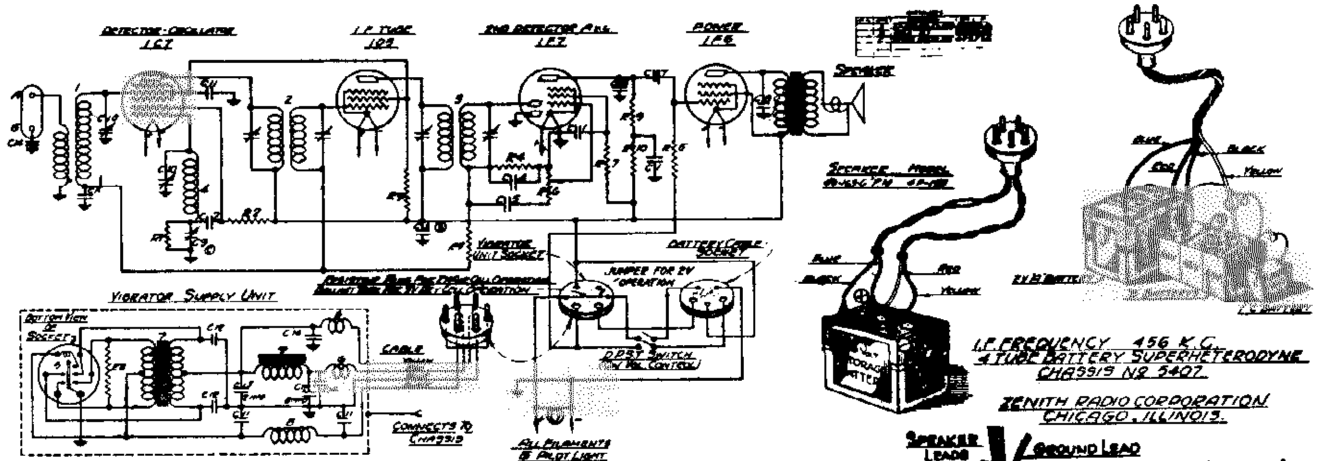


ALIGNMENT PROCEDURE

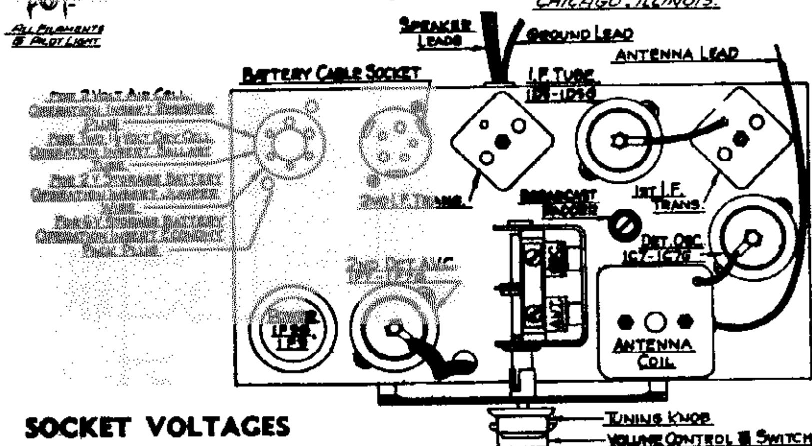
Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid ·	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5	" " "	200 Mmfd.	1500	"	1500	FG	Repeat 3 & 4.

MODEL 4F133
Chassis 5407
Schematic, Voltage
Socket, Trimmers
Alignment, Parts
Battery Conn.

ZENITH RADIO CORP.



Diag No.	Part No.	Description		Diag No.	Part No.	Description
C1	[illegible]	.05 MFD	200V			
C2	406	.002 MFD	600V	1	9-475	Antenna Coil Assem
C3	350	(B) 25 MFD.	200V	2	95-379	1st I.F. Transformer
C4	294	60 MMFD	400V	3	95-350	2nd I.F. Transformer
C5	327	.02 MFD	200V	4	S-4662	Oscillator Coil Assem
C6	182	.00025	600V	5	[illegible]	[illegible]
C7	68	.02 MFD	400V	6	[illegible]	[illegible]
C8	229	.005 MFD	600V	7	[illegible]	[illegible]
C9	[illegible]	350 MMFD Padder		8	[illegible]	[illegible]
C10	408	2 Gang Variable		9	[illegible]	[illegible]
C11	[illegible]	4 MFD	200V			
C12	455	.01 MFD (Tubular)	[illegible]			
C13	427	25.8 MFD Dry Elec.	250V			
C14	263	.01 MFD (Tubular)	400V			
R1	[illegible]	49 M Ohm	[illegible]			
R2	961	5 M Ohm	[illegible]			
R3	390	40 M Ohm	[illegible]			
R4	481	400 M Ohm	[illegible]			
R5	291	990 M Ohm	[illegible]			
R6	149	1 Megohm Vol. Cont & Sw.				
R7	461	1 Megohm	[illegible]			
R8	994	200 Ohm	[illegible]			
R9	400	750 M Ohm	[illegible]			
R10	298	94 M Ohm	[illegible]			



SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
1C7	1st Det. Osc.	0	2	128	48	—2	112	0	0	0
1D5	I.F.	0	2	126	48	—	—	0	0	0
1F7	2nd Det. A.V.C.	0	2	27	0	0	9	0	0	0
1F5	Power	0	2	122	126	0	—	0	0	—

All voltages measured with a 1000 ohm per volt D.C. meter and using the Zenith 6 V Economy Pack—Antenna and ground disconnected.

Battery Voltage—6.3 V.

Battery Drain—.98 amp.

ALIGNMENT

Connect the output leads of the signal generator to the grid of the first detector and receiver ground lead. Also connect an output meter across the speaker leads.

Set the signal generator at 456 K.C. and carefully adjust the four I.F. trimmers to the point giving the greatest output reading. These I.F. transformers are of a very high gain, selective type, and the adjustments should be repeated several times for greatest accuracy.

Change the signal generator leads to the antenna and ground terminals of the receiver.

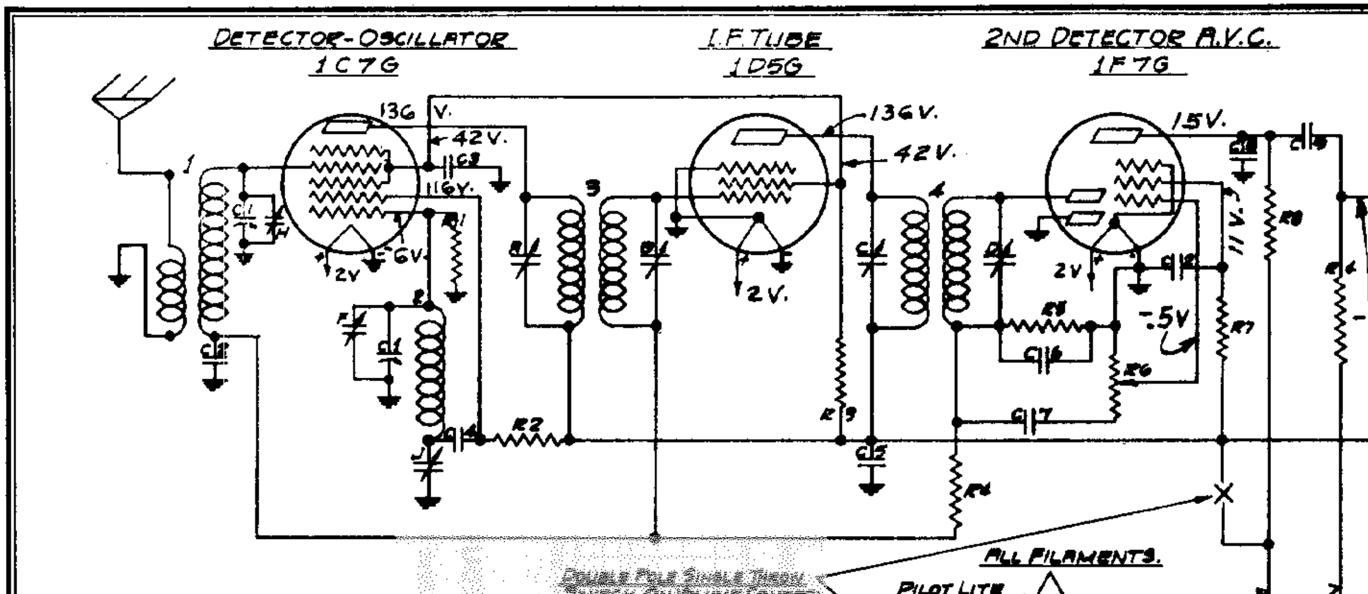
Set the signal generator at 1400 K.C. Set the pointer on the receiver dial at the same frequency. First adjust the oscillator and then the detector trimmers on the gang condenser to the point giving the maximum reading on the output meter, using as small a signal from the generator as possible so as to prevent the A.V.C. action from affecting the output readings.

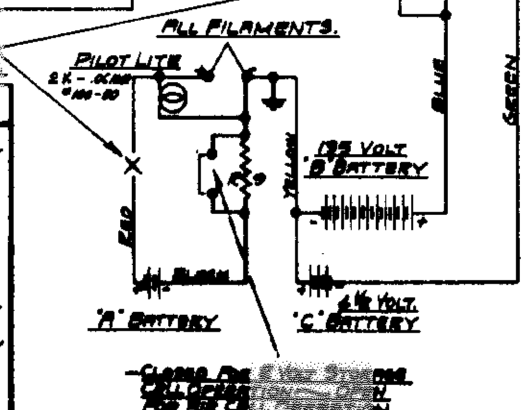
Reset the signal generator to 600 K.C.

Slowly rock the pointer past 600 K.C. on dial meanwhile adjusting the osc. padder (located in rear of gang condenser) to the combination giving the greatest output reading.

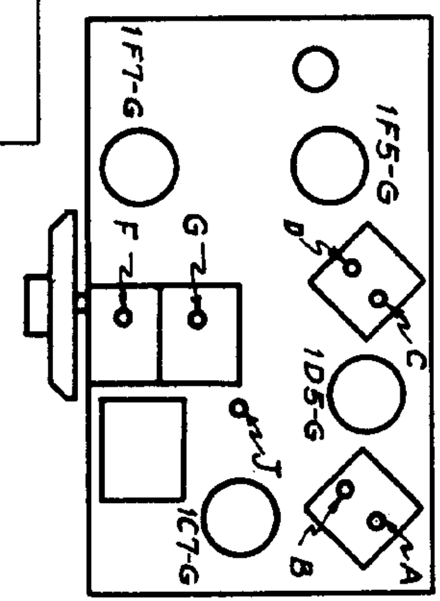
Repeat operation No. 4.

ZENITH RADIO CORP.





I.F. FREQUENCY 456 K.C.



DIAG NO	PART NO	DESCRIPTION—	
C1	22-406	TWO GANG VARIABLE	
C2	250	.05 MFD	200V
C3	199	.5 MFD	200V
C4	998	.002 MFD	600V
C5	212	.05 MFD	400V
C6	182	.0001 MFD	600V
C7	927	.02 MFD	200V
C8	147	.0005 MFD	600V
C9	188	.02 MFD	400V
C10	492	.002 MFD	600V
R1	63-603	47 M OHM	¼ W ± 20
R2	638	5600 OHM	¼ W ± 10
R3	647	39 M OHM	¼ W ± 10
R4	271	1 MEGOHM	¼ W ± 20
R5	668	390 M OHM	¼ W ± 10
R6	548	1 MEGOHM VOLUME CONTROL	
R7	441	1 MEGOHM	¼ W ± 10
R8	657	330 M OHM	¼ W ± 10
R9	684	.64 OHM (WIREWOUND)	¼ W ± 10

DIAG NO	PART NO	DESCRIPTION—
1	S 5100	ANT. COIL & SHIELD ASSEMBLY
2	S 4668	OSCILLATOR COIL ASSEMBLY
3	95-419	1ST. I.F. TRANSFORMER
4	95-420	2ND. I.F. TRANSFORMER
5	———	SPEAKER TRANS. (ON SPEAKER)
		VARIABLE TRIMMERS.—
A		1ST. I.F. TRANSFORMER PRIMARY
B		1ST. I.F. TRANSFORMER SECONDARY
C		2ND. I.F. TRANSFORMER PRIMARY
D		2ND. I.F. TRANSFORMER SECONDARY
F		BROADCAST OSCILLATOR (ON GANG)
H		ANTENNA BROADCAST (ON GANG)
J	22-519	OSCILLATOR PADDER.

MODEL 4F227   SPEAKER 49-209—6"

CLOSED FOR 2 VOLT STORAGE CELL OPERATION — OPEN FOR AIR CELL OPERATION

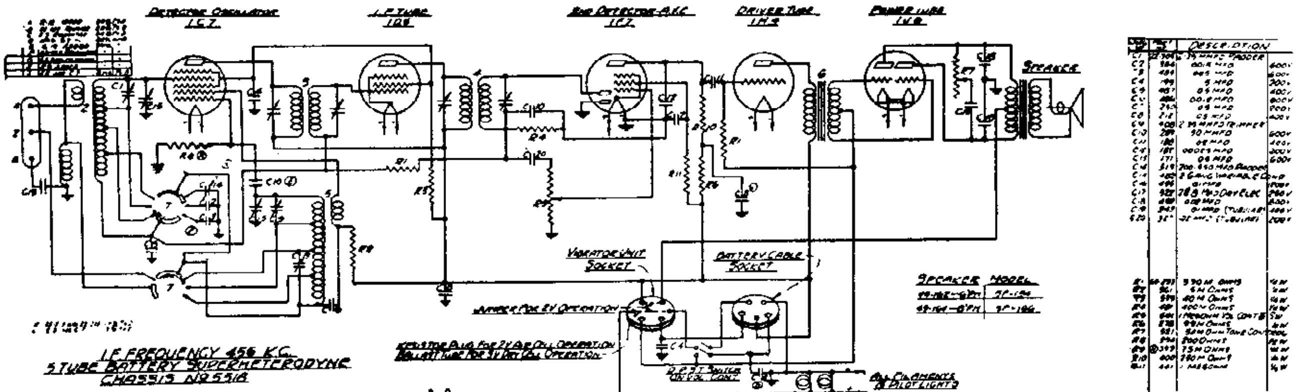
FOR PHONO. DATA, SEE INDEX

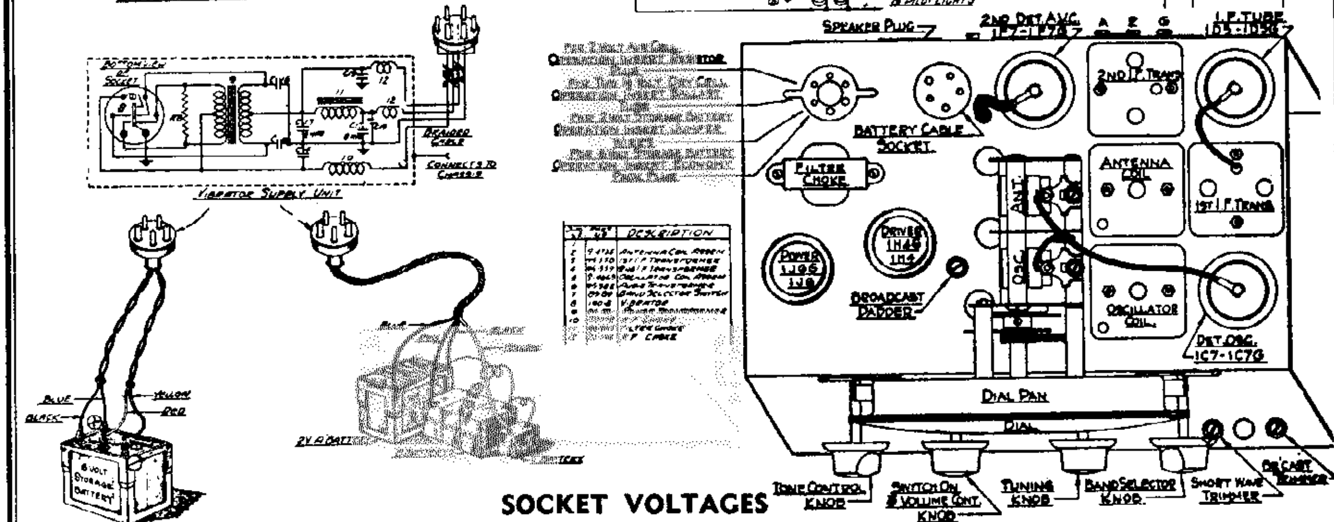
ALIGNMENT

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Algm't.
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Algm't of Ant.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5	" " "	200 Mmfd.	1500	"	1500	FG	Rpt. 2 & 4

MODELS 5F134, 5F166
Chassis 5518
Schematic, Voltage
Socket, Trimmers
Alignment, Parts
Battery Conn.

ZENITH RADIO CORP.





SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
1C7	1st Det. Osc.	0	2	130	53	0	115	0	0	0
1D5	I.F.	0	2	130	53	—	—	0	0	0
1F7	2nd Det. A.V.C.	0	2	24	0	0	15	0	0	0
1H4	Driver	0	2	120	—	0	—	0	0	—
1J6	Power	0	2	143	—1	—1	143	0	0	—

All voltages measured with a 1000 ohm per volt D.C. meter and using the Zenith 6 V Economy Pack—Antenna and ground disconnected.

Battery Voltage—6.3 V.

Battery Drain—1.1 ampere

ALIGNMENT PROCEDURE

Connect the output leads of the signal generator to grid of the first detector and receiver chassis. Also connect an output meter across the speaker transformer leads.

Set the signal generator at 456 K.C. and carefully adjust the four I.F. trimmers to the point giving the highest reading on the output meter. The I. F transformers are of a very high gain, selective type, and these adjustments should be repeated several times in order to secure maximum accuracy.

All adjustments should be made using as weak an output from the signal generator as possible in order to prevent the A.V.C. action from affecting the output readings.

Change the signal generator leads to the antenna and ground terminals of the receiver.

Set signal generator at 5 M.C. Switch receiver to band B and adjust osc. trimmer on gang for correct dial reading.

Set signal generator at 1400 K.C. Switch receiver to band A and adjust broadcast trimmer (located at front of chassis—see diagram below) for correct dial reading. Also adjust antenna trimmer on gang to resonance.

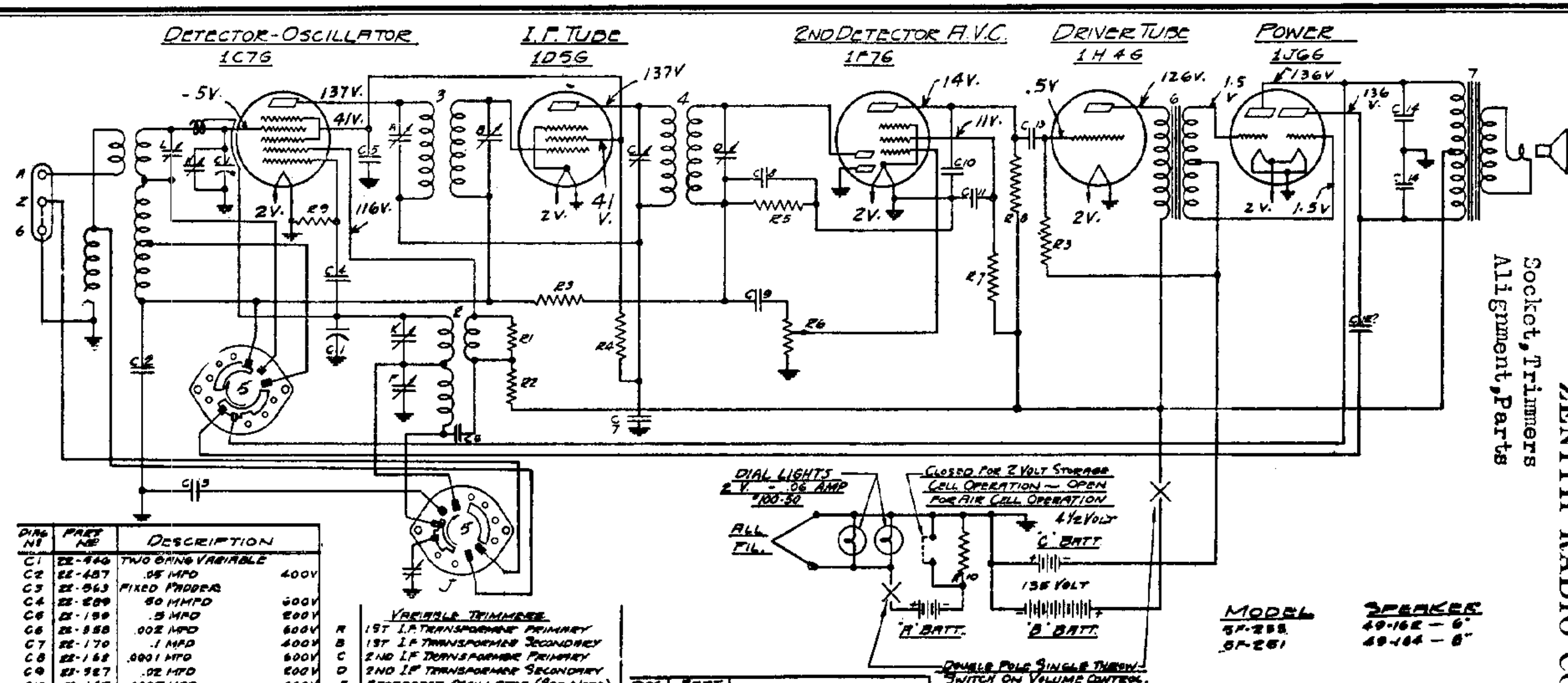
Set signal generator at 18 M.C.—Switch receiver to band C and adjust the short wave trimmer while rocking the pointer past 18 M.C. on the dial to the combination giving the greatest output.

Set signal generator at 600 K.C.—Switch receiver to band A and rock pointer past 600 on dial while adjusting the broadcast padder (located adjacent to gang condenser) to combination giving the greatest output reading.

Readjust broadcast and ant trimmers at 1400 K.C. (Same as No. 5).

MODELS 5F233, 5F25
Chassis 5522
Schematic, Voltage
Socket, Trimmers
Alignment, Parts

ZENITH RADIO CORP.



I.F. FREQUENCY 456 K.C.

5 TUBE BATTERY SUPERHETERODYNE

DIAG. No.	PART No.	DESCRIPTION	
C1	22-446	TWO GANG VARIABLE	
C2	22-487	.05 MFD	400V
C3	22-563	FIXED PADDER	
C4	22-209	50 MMFD	600V
C5	22-199	.5 MFD	200V
C6	22-158	.002 MFD	600V
C7	22-170	.1 MFD	400V
C8	22-162	.0001 MFD	600V
C9	22-327	.02 MFD	200V
C10	22-147	.0005 MFD	600V
C11	22-250	.05 MFD	200V
C12	22-171	.05 MFD	600V
C13	22-188	.02 MFD	400V
C14	22-492	.002 MFD	600V
R1	63-509	10 M OHM	¼W ±20
R2	63-630	5600 OHM	¼W ±10
R3	63-271	1 MEG OHM	¼W ±20
R4	63-648	47 M OHM	¼W ±10
R5	63-658	390 M OHM	¼W ±10
R6	63-541	1 MEG OHM VOLUME CONTROL	
R7	63-441	1 MEG OHM	¼W ±10
R8	63-657	330 M OHM	¼W ±10
R9	63-646	33 M OHM	¼W ±10
R10	63-612	.36 OHM (WIREWOUND)	¼W ±10

VARIABLE TRIMMERS

A	1ST I.F. TRANSFORMER PRIMARY
B	1ST I.F. TRANSFORMER SECONDARY
C	2ND I.F. TRANSFORMER PRIMARY
D	2ND I.F. TRANSFORMER SECONDARY
F	BROADCAST OSCILLATOR (SEE NOTE)
H	ANTENNA BROADCAST (ON GANG)
J	22-319 BROADCAST PADDER
K	SHORT WAVE OSCILLATOR (SEE NOTE)
L	SHORT WAVE DETECTOR 22-305

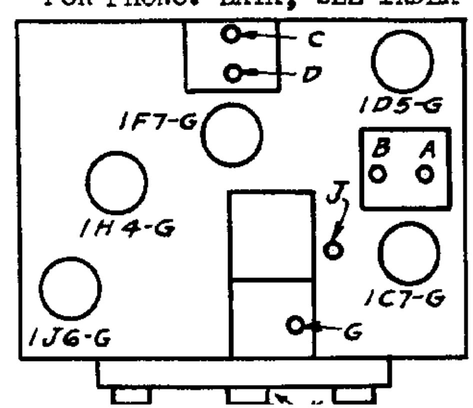
NOTE:— TRIMMERS F & K MOUNTED ON BAKELITE STRIP PART #22-408

DIAG. No.	PART No.	DESCRIPTION
1	95/63	ANT. COIL & SHIELD ASSEMBLY
2	94909	OSCILLATOR COIL ASSEMBLY
3	95-407	1ST I.F. TRANSFORMER
4	95-408	2ND I.F. TRANSFORMER
5	85-104	BAND SELECTOR SWITCH
6	95-440	AUDIO TRANSFORMER
7		SPEAKER TRANSFORMER (ON SPKR)

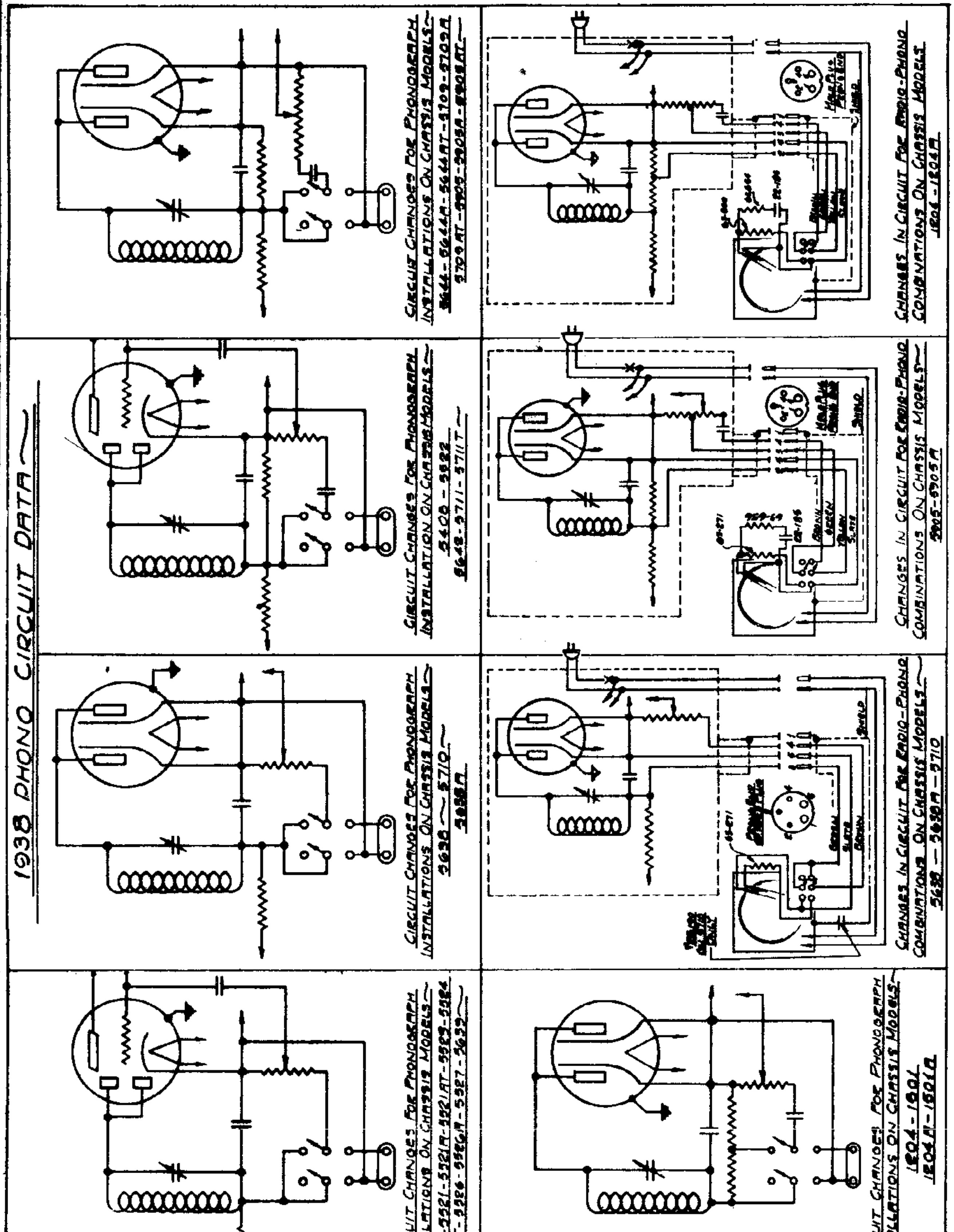
ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output.
5				"		FG	Repeat 3 & 4.
6	Rec. Ant. Lead	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
							Rock gang & adj.

FOR PHONO. DATA, SEE INDEX

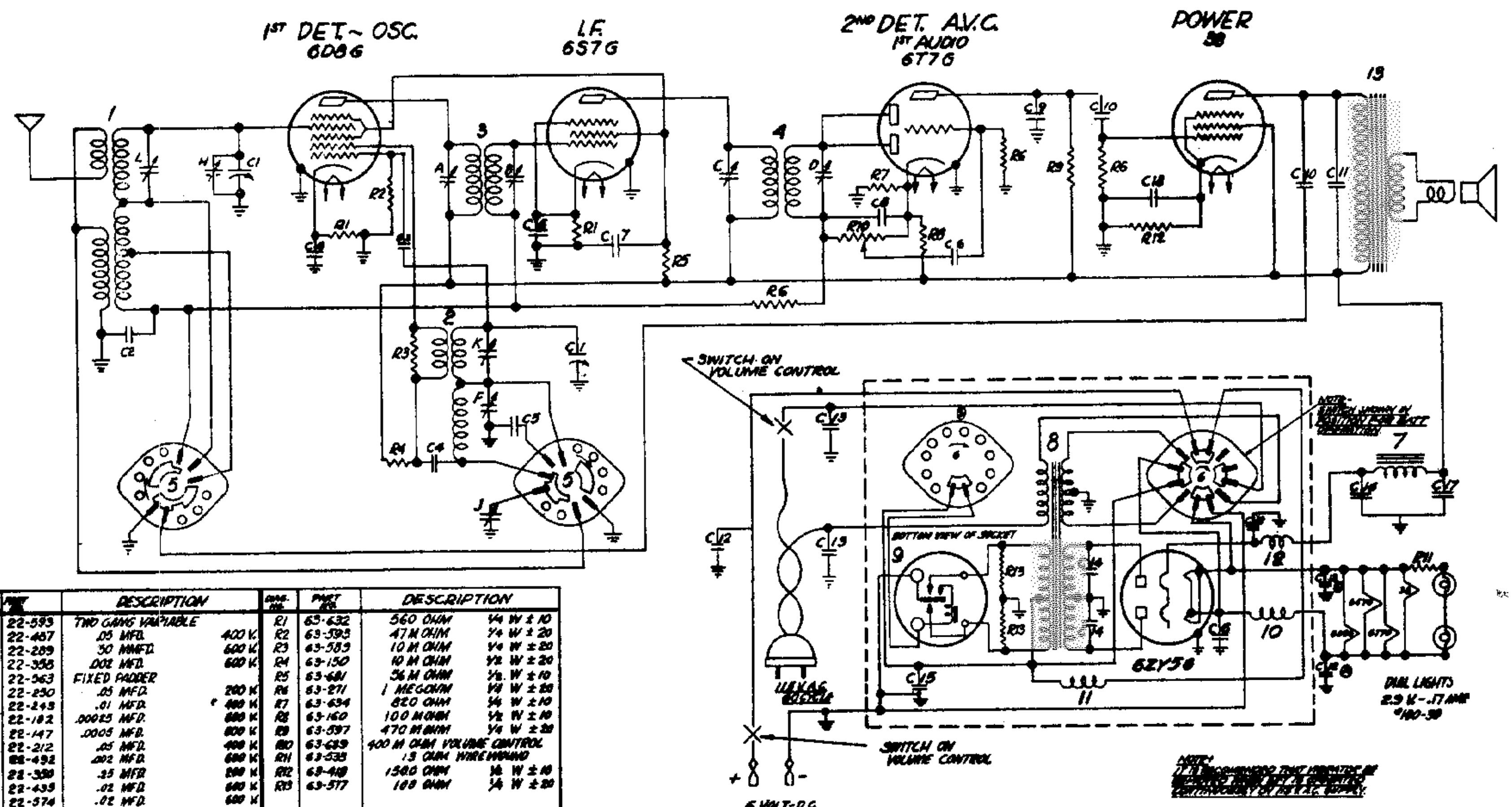


ZENITH RADIO CORP.



MODELS 5J217,5J247,5J255
Chassis 5524
Schematic,Parts

ZENITH RADIO CORP.



CIR. NO.	PART NO.	DESCRIPTION	
C1	22-593	TWO GANG VARIABLE	
C2	22-467	.05 MFD.	400 V.
C3	22-289	50 MMFD.	600 V
C4	22-358	.002 MFD.	600 V
C5	22-363	FIXED PADDER	
C6	22-250	.05 MFD.	200 V
C7	22-243	.01 MFD.	400 V
C8	22-182	.00025 MFD.	600 V
C9	22-147	.0005 MFD.	600 V
C10	22-212	.05 MFD.	400 V
C11	22-492	.002 MFD.	600 V
C12	22-380	.25 MFD.	200 V
C13	22-433	.02 MFD.	600 V
C14	22-574	.02 MFD.	600 V
C15	22-199	.5 MFD.	200 V
C16	22-577	8 MFD. ELECTROLYTIC	250 V
C17		8 MFD. "	250 V
C18		10 MFD. "	25 V

VARIABLE TRIMMERS

A	1ST I.F. TRANSFORMER PRIMARY
B	1ST I.F. TRANSFORMER SECONDARY
C	2ND I.F. TRANSFORMER PRIMARY
D	2ND I.F. TRANSFORMER SECONDARY
F	BROADCAST OSCILLATOR (see note)
H	ANTENNA BROADCAST (on gang)
J	#22-318 BROADCAST PADDER
K	SHORT WAVE OSCILLATOR (see note)
L	SHORT WAVE DETECTOR (see note)

NOTE — TRIMMERS F, K, & L MOUNTED ON BAKELITE STRIP #22-324

CIR. NO.	PART NO.	DESCRIPTION	
R1	63-632	560 OHM	¼ W ± 10
R2	63-593	47 M OHM	¼ W ± 20
R3	63-583	10 M OHM	¼ W ± 20
R4	63-150	10 M OHM	½ W ± 20
R5	63-681	56 M OHM	½ W ± 10
R6	63-271	1 MEGOHM	¼ W ± 20
R7	63-634	820 OHM	¼ W ± 10
R8	63-160	100 M OHM	½ W ± 10
R9	63-597	470 M OHM	¼ W ± 20
R10	63-639	400 M OHM VOLUME CONTROL	
R11	63-535	13 OHM WIRE WOUND	
R12	63-418	1500 OHM	½ W ± 10
R13	63-577	100 OHM	¼ W ± 20
1	S-5303	ANT. COIL & SHIELD ASSEMBLY	
2	S-4909	OSCILLATOR COIL ASSEMBLY	
3	95-443	1ST I.F. TRANSFORMER	
4	95-444	2ND I.F. TRANSFORMER	
5	85-104	BAND SELECTOR SWITCH	
6	85-125	POWER SUPPLY SWITCH	
7	95-298	POWER CHOKE	
8	95-425	POWER TRANSFORMER	
9	100-11	VIBRATOR	
10	S-2778	R.F. CHOKE ASSEMBLY	
11	S-5098	R.F. CHOKE ASSEMBLY	
12	20-82.	R.F. CHOKE	
13		SPEAKER TRANSFORMER	

FOR PHONO. DATA, SEE INDEX

MODEL	SPEAKER	
5-J-217	49-183	6"
5-J-247	49-153	6"
5-J-255	49-180	8"

I.F. FREQUENCY 456 K.C.
5 TUBE BATTERY SUPERHETERODYNE
6VOLT D.C. # 115 VOLT A.C.

Models 5-J-217, 5-J-247, 5-J-255 (5524 Chassis)

ZENITH RADIO CORP.
CHICAGO, ILLINOIS

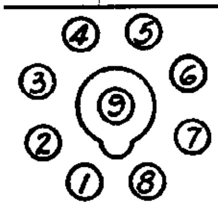
MODELS 5J217, 5J247, 5J255
Chassis 5524

ZENITH RADIO CORP.

Voltage, Socket, Trimmers
Alignment

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6D8	Converter Osc.	0	0	129	42.5	—2	110	6.3	1.5	0
6S7	I. F.	0	0	130	42.5	1.5	—	6.3	1.5	0
6T7	2nd Det. A.V.C. 1st Audio	0	0	23	.1	.1	—	6.3	.5	0
6ZY5G	Rect.	0	6.3	—3.5	—	—3.5	—	0	140	—
		H	P	S	K	H	G			
38	Power	0	124	129	12	6.3	0			



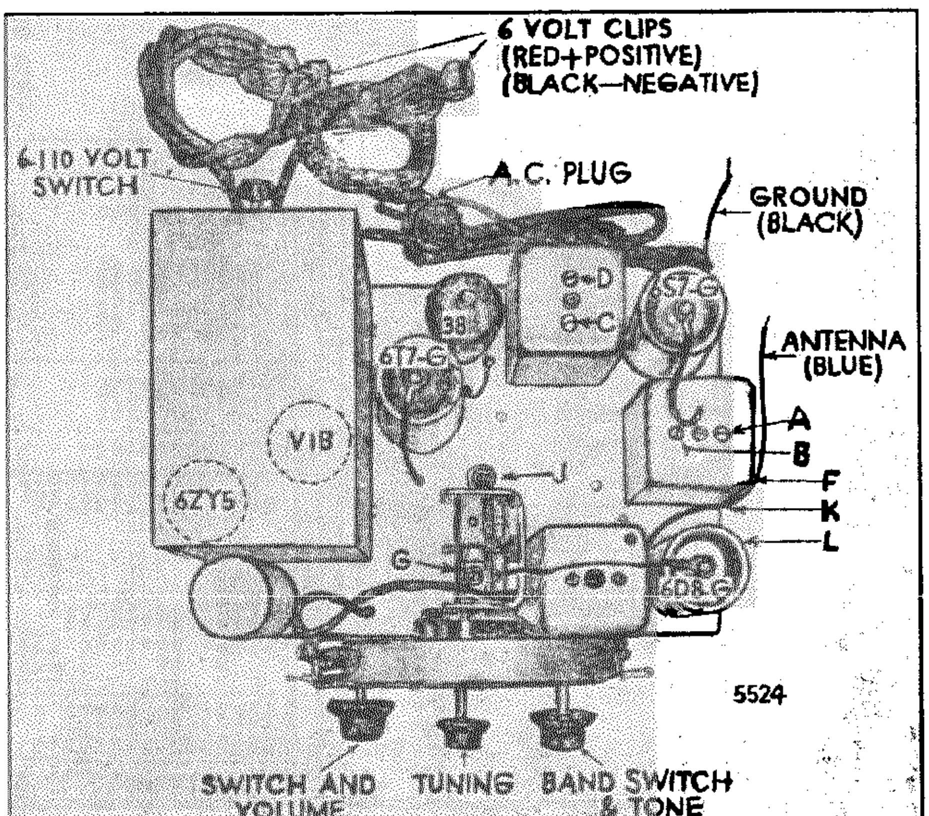
BOTTOM VIEW OF SOCKET

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 16W. Battery voltage 6.3V consumption 2.1 Amp. Power Output .84W.

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output.
5				"		FG	Repeat 2 & 3.
6	Rec. Ant. Lead	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
7	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output.

LOCATION OF TRIMMERS

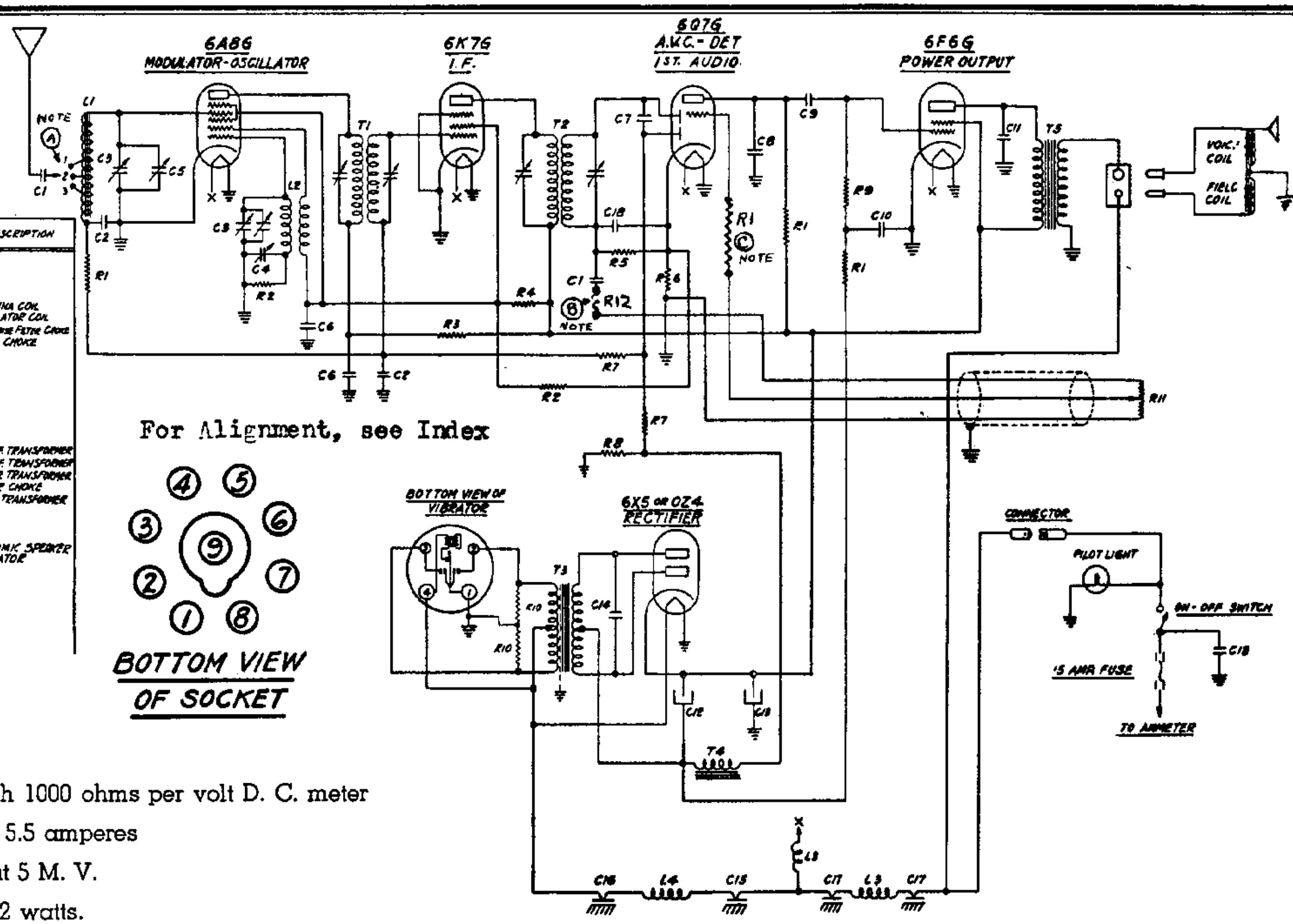


ZENITH RADIO CORP

CHANGES ON 5M-191

LETTER	DESCRIPTION	DATE
A	TAPS REVISED	1-4-37
B	RESISTOR ADDED (R12)	1-4-37
C	RESISTOR ADDED (R1)	1-4-37

DIAG. NO.	PART NUMBER	DESCRIPTION	DIAG. NO.	PART NUMBER	DESCRIPTION
R1	63-550	240M OHMS 1/4W.			
R2	63-490	49M OHMS 1/4W			
R3	63-506	1500 OHMS 1/4W.			
R4	63-555	3500 OHMS 2W			
R5	63-491	490M OHMS 1/4W.	L1	20-152	ANTENNA COIL
R6	63-423	600 OHMS 1/4W.	L2	5-4778	OSCILLATOR COIL
R7	63-464	1MEG 1/4W.	L3	5-4791	MOTOR NOISE FILTER CHOKE
R8	63-554	40 OHMS 1/4W	L4	5-2778	HASH CHOKE
R9	63-427	500M OHMS 1/4W.			
R10	63-563	80 OHMS 1/4W			
R11	63-551	1MEG VOL. CONTROL			
R12	63-552	99m OHMS 1/4W			
C1	22-327	.02 MFD. 200V.	T1	95-400	1ST I.F. TRANSFORMER
C2	22-250	.05 MFD. 200V.	T2	95-401	2ND I.F. TRANSFORMER
C3	22-533	2 GANG VAR. COND. (3825)	T3	95-389	POWER TRANSFORMER
C4	22-465	200-750 MMFD. PADDER	T4	95-396	POWER CHOKE
C5	22-538	1-12MMFD. AIR TRIMMER	T5	95-399	AUDIO TRANSFORMER
C6	22-170	.1 MFD. 400V.			
C7	22-289	.00005 MFD. 600V.			
C8	22-162	.0001 MFD 600V			
C9	22-212	.05 MFD. 400V.		49-170	DYNAMIC SPEAKER
C10	22-540	.25 MFD. 200V.		190-9	VIBRATOR
C11	22-229	.005 MFD. 600V.			
C12	22-528	4 MFD 360V.			
C13	22-528	8 MFD 350V.			
C14	22-533	.008 MFD. 1400V.			
C15	22-468	.5 MFD. 200V.			
C16	22-580	.5 MFD. 200V.			
C17		250 MMFD. LO-REACT.			
C18	22-182	.00025 MFD. 600V.			



For Alignment, see Index

BOTTOM VIEW OF SOCKET

Voltage at Battery 6V.

Voltage at Receiver 5.9 V.

Antenna disconnected

All voltages measured with 1000 ohms per volt D. C. meter

Total current consumption 5.5 amperes

Sensitivity at 1 watt out put 5 M. V.

Maximum power output 3.2 watts.

SOCKET VOLTAGES MODEL 5-M-191

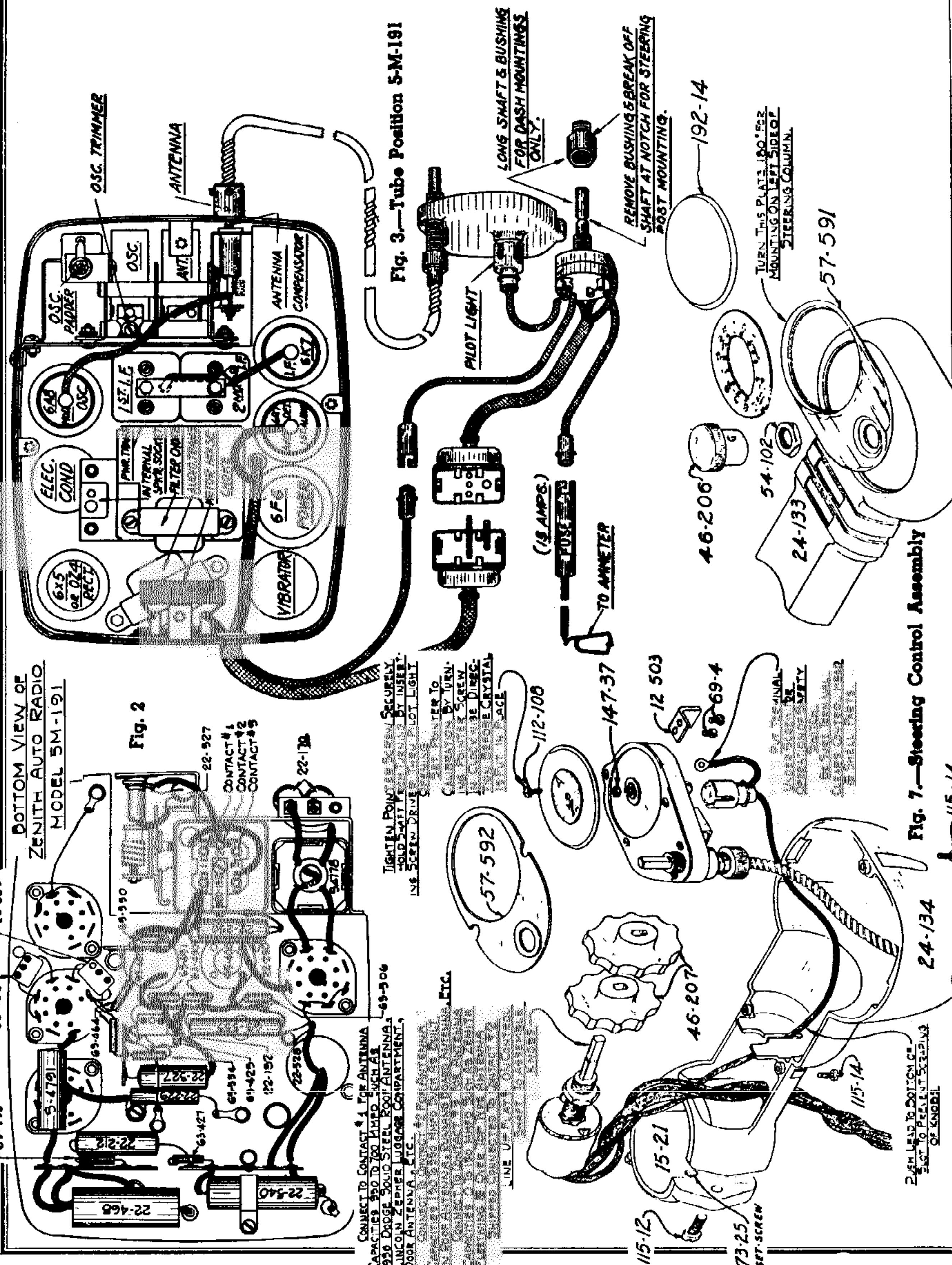
Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Mixer Osc.	0	0	190	90	—4	90	5.9	0	0
6K7	I. F.	0	0	195	90	0	—	5.9	0	0
6Q7	Det. A. V. C. Audio	0	0	80	0	—.1	—	5.9	.8	0
6F6	Power	0	0	185	195	—3.5	—	5.9	0	—

I.F FREQUENCY 456 K.C

ZENITH AUTO RADIO
MODEL 5M191 CHASSIS 5520
ZENITH RADIO CORPORATION
CHICAGO ILL.

MODEL 5M191
Socket, Trimmers
Chassis, Drive Data

ZENITH RADIO CORP.



ZENITH RADIO CORP.

ALIGNMENT

5-M-91

"A" Connect the service oscillator output leads to the control grid of the 6A8 tube, and to the chassis. If the oscillator output is a single shielded lead the shield should connect to the chassis.

Connect an output meter across the primary of the speaker transformer.

Set the service oscillator at 456 K.C. and adjust the trimmers on the I.F. transformers to the point giving the greatest reading on the output meter. These, as well as the following adjustments should be made using as small an output from the signal generator as possible so that the A.V.C. action will be least effective.

"B" Change the service oscillator lead from the grid of the 6A8 to the antenna connection. A male Delco Remy connector may be used in making a connection to the antenna lead.

Set the service oscillator at 1600 K.C. and rotate the gang condenser until the plates are entirely out of mesh. Adjust the oscillator section trimmer until the 1600 K.C. signal is tuned in.

"C" Set the service oscillator to 600 K.C. and rock the gang condenser slowly to and fro past the point where this signal is received, meanwhile adjusting the padder condenser for a setting which gives the greatest output reading.

"D" Repeat operation "B". See antenna instruction page 379 for correct alignment of antenna stage.

6-M-192 — 6-M-193 — 6-M-194 — 8-M-195

"A" Connect the service oscillator to the control grid of the 6A8 tube and the chassis.

Connect the output meter across the primary of the speaker transformer.

Set the service oscillator to 252.5 K.C. and adjust the trimmers on the I.F. transformers for the greatest output reading. These adjustments should be repeated several times using as weak an input signal as possible so as to obtain greater accuracy.

"B" Change the service oscillator lead from the grid of the 6A8 to the antenna connection. A male Delco Remy connector may be used in making a connection to the antenna lead.

Set the service oscillator at 1600 K.C. and rotate the gang condenser until the plates are entirely out of mesh. Adjust the oscillator section trimmer until the 1600 K.C. signal is tuned in.

Change the service oscillator to 1400 K.C. Rotate the gang condenser until this signal is tuned in, and then adjust the R.F. trimmer on the gang condenser to the point giving the greatest output reading.

"C" Set the service oscillator to 600 K.C. and rock the gang condenser slowly to and fro past the point where this signal is received, meanwhile adjusting the padder condenser for a setting which gives the greatest output reading.

"D" Repeat operation "B".

The sensitivity control should be in the extreme clockwise position when making all adjustments.

NOTE — Due to the high gain type of I.F. transformers used in these receivers it is essential that a non metallic screw driver be used in making all adjustments. See antenna instructions for correct alignment of antenna stage.

SERVICE NOTE

The 0Z4 rectifier tube used in the 5 and 6 tube models may be replaced with a 6X5 rectifier, providing the 6X5 tube is inclosed in a grounded tube shield.

The Goat shield with a ground clip which connects to the shield contact pin of the tube is the most convenient type to use.

IMPORTANT ANTENNA INFORMATION
(All Models)

Some cars are factory equipped with an antenna. If this is the case, the lead should be checked to make certain that it is not grounded, and after being shielded by a large diameter loom, ground this loom to the instrument panel, and attach the Delco-Remy male connector to the end of the antenna wire. This should be done carefully so as to insure a good solder joint, and prevent any grounding at this point to the braided shielding. Insert the antenna lead-in connector into the female Delco-Remy receptacle directly below the tuning cable shoulder on the receiver case.

Where a car is not equipped with an antenna, such as convertible models, or those with all steel turret top, any one of the following Zenith antennas may be used:

Undercar antenna—part No. S-4800 and S-4801.
Over the Top Antenna (Sedan) S-4802.
Over the Top Antenna (Coupe) S-4803.
Zenith Fleet Wing Antenna S-4821.
Zenith Bumper Pole Antenna S-4822.

Complete instructions covering the installation of each of the above antennas is furnished with the various kits.

IMPORTANT: BALANCING SET TO ANTENNA. There is such an extremely wide variation in antenna capacities that it is difficult to match this condition without some means of variable antenna alignment. To accomplish this, an antenna compensating adjustment is provided through the small hole directly above the antenna cable connector on the receiver case. In addition to this, a tapped antenna transformer is also incorporated (see Figure No. 2). The proper method of alignment is as follows: After completely connecting receiver, tune in a signal between 1400 and 1450 K.C. and adjust the antenna compensator shown in Figure 3, for either the roof antenna, or single or double under-car antenna. The receiver is shipped from the factory with the antenna tap shown in Figure 2 set to the No. 2 position, and, therefore, need not be changed for either of the two types of antennas mentioned.

For Zenith Fleet Wing, and Over the Top Antennas, unsolder the antenna lead from the No. 2 lug, and resolder it to the No. 3 lug. After this is done, tune in a station between 1450 and 1400 K.C., and adjust the antenna compensator shown in Figure 3 to resonance.

For high capacity antennas such as the 1936 Dodge solid steel roof, or the Lincoln Zephyr luggage compartment, drawer antenna, etc., remove the antenna lead from the No. 2 lug, as it comes from the factory, and resolder it to the No. 1 connector. After this is done, the same procedure of tuning in a signal from 1450 to 1400 K.C., and balancing to resonance with the antenna compensator, as described above, should be followed.

This system of tapped transformer, and variable compensating adjustment gives an extremely flexible means of resonating the receiver to any type of antenna, and it should be noted that the tap need only be changed in two cases. Of course, it is necessary to remove the bottom cover in order to shift the antenna tap where necessary.

IGNITION INTERFERENCE

Remove the center high tension lead of the distributor and insert the suppressor into the distributor at that point. The wire is then placed in the open end of the suppressor. The generator condenser is fastened under the cut-out housing and the wire connected to the generator connection on the cut-out. The coil condenser is attached to the battery connection of the coil and the other end to the coil case. Make absolutely certain that this condenser is not accidentally connected to the distributor side of the coil since this will increase motor noise terrifically and make operation of the receiver highly unsatisfactory when the motor is running. Where two distributors or two coils are employed a corresponding number of condensers and suppressors must be applied. In some instances it might be of benefit to attach a by-pass condenser from one side of the ammeter to a grounded part of the instrument panel. If the dome light is feeding interference to the antenna the lead should be cut where it comes from the post and a switch inserted on the instrument panel at that point, to turn it off and on. In some cases, a by-pass condenser connected to the dome-light lead and grounded at the post is as effective as a separate switch. Try this first.

If additional attention is necessary to reduce motor interference, the motor block must be securely bonded, both at the rear and front supports with ½ inch copper braid. Also bond or ground all metal control cables or pipes feeding from the motor side into the car. These bonds should be made to the control wire or pipe and soldered to the fire wall immediately adjacent on the motor side. As a further precaution the rotor should be lengthened to reduce the gap between it and the distributor head contacts by either peening the end or applying a small quantity of solder at this point.

MODEL 5M191
MODELS 6M192, 6M193, 6M194
MODEL 8M195
Parts Lists

ZENITH RADIO CORP.

PARTS LIST

Coils and Chokes

Part No.	Description	8T.	6T.	5T.	PRICE
20-149	Antenna Coil	8	6		$ 1.25
20-150	R.F. Coil	8	6		.60
20-152	Antenna Coil			5	1.25
95-392	1st I.F. Transformer		6		1.25
93-393	2nd I.F. Transformer		6		1.25
95-394	1st I.F. Transformer	8			1.25
95-395	2nd I.F. Transformer	8			1.25
95-400	1st I.F. Transformer			5	1.25
95-401	2nd I.F. Transformer			5	1.25
S-2778	Hash Choke	8	6	5	.15
S-4771	Oscillator Coil	8	6		.45
S-4278	Oscillator Coil			5	.45
S-4791	Motor Noise Filter Choke	8	6	5	.20

Condensers

Part No.	Description	8T.	6T.	5T.	PRICE
22-82	.001 mfd. 600 Volt	8	6		.25
22-162	.0001 mfd. 600 Volt	8	6	5	.20
22-170	.1 mfd. 400 Volt	8	6	5	.25
22-182	.00025 mfd. 600 Volt	8	6	5	.12
22-190	.1 mfd. 200 Volt		6		.20
22-212	.05 mfd. 400 Volt	8	6	5	.20
22-229	.005 mfd. 600 Volt		6	5	.15
22-250	.05 mfd. 200 Volt	8	6	5	.15
22-289	.00005 mfd. 600 Volt		6	5	.12
22-327	.02 mfd. 200 Volt	8	6	5	.15
22-336	.005 mfd. 120 Volt (Models 193-194 only)	8	6		.15
22-350	.25 mfd. 200 Volt	8	8		.20
22-463	200-750 mmfd. Osc. Padder	8	6	5	.35
22-468	.5 mfd. 200 Volt	8	8	5	.30
22-470	.00015 mfd. 600 Volt	8	6		.20
22-476	.0035 mfd. 750 Volt	8			.15
22-526	8-8 mfd. Dry Elect. 350 Volt		6		1.25
22-527	8-8 mfd. 350 Volt-20 mfd. 20 Volt	8			2.25
22-528	4-8 mfd. 350 Volt			5	1.25
22-531	.5 mfd. 120 Volt	8			.30
22-532	3 Gang Variable Cond. 385 mmfd.	8	6		4.50
22-533	2 Gang Variable Cond. 362.5 mmfd.			5	3.00
22-534	.25 mfd. 400 Volt	8	6		.25
22-535	.008 mfd. 1400 Volt	8	6	5	.20
22-537	.0005 mfd. 120 Volt	8	8		.15
22-538	1-12 mmfd. Air Trimmer	8	6	5	.20
22-539	.5 mfd. 200 Volt		6	5	.30
22-540	.25 mfd. 200 Volt			5	.25

Resistors

Part No.	Description	8T.	6T.	5T.	PRICE
63-422	200 Ohm 1/2 Watt	8	6	5	.20
63-423	600 Ohm 1/4 Watt		6	5	.20
63-426	250 M ohm 1/4 Watt		6		.20
63-427	500 M ohm 1/4 Watt			5	.20
63-443	300 Ohm 1/4 Watt	8			.20
63-446	750 M ohm 1/4 Watt	8			.20
63-464	1 megohm 1/4 Watt		6	5	.20
63-490	49 M ohm 1/4 Watt	8	6	5	.20
63-491	490 M ohm 1/4 Watt	8	6	5	.20
63-493	50 M ohm 1/4 Watt		6		.20
63-494	13 M ohm 2 Watt		6		.25
63-506	1500 ohm 1/4 Watt	8	6	5	.20
63-510	18 M ohm 2 Watt	8			.25
63-512	19 M ohm 1 Watt	8	6		.20
63-549	2 megohm vol. and tone control (dual)	8	6		2.00
63-550	240 M ohm 1/4 Watt	8	6	5	.20
63-551	1 megohm vol. control (6M192 only)		6	5	1.00
63-552	99 M ohm 1/4 Watt	8			.20
63-554	40 ohm 1/4 Watt			5	.20
63-555	9.500 ohm 2 Watt			5	.25
63-557	60 ohm 1/4 Watt		6		.20
63-559	120 ohm wire wound 1/4 Watt	8			.20
63-560	Sensitivity Control	8			.70
63-561	4900 ohm 1/4 Watt	8			.20

Control Head Assem, Part for Model 5M191

Part No.	Description	PRICE
S-4789	Volume Control and Cable Assembly	$ 3.50
	Above Assembly consists of	
	1 22-182 .00025 mfd. condenser 600 v.	.12
	1 52-93 Control Head Cable and Plug	1.00
	1 52-95 On-Off Switch Cable	.20
	1 52-96 Battery Cable	.20
	1 52-99 Pilot Light Cable and Socket	.20
	1 63-551 Volume Control and Switch	1.00
	1 94-239 Extension Bushing	.15
	1 183-6 Rubber Band	.01
26-140	Calibrated Dial Scale	.10
27-17	Dial Pointer Disc	.10
54-101	Cable Sheath Clamping Nut	.05
76-208	Tuning Control Flexible Shaft 18"	1.00
100-32	Pilot Light Bulb	.15
170-18	Remote Control Drive Mechanism	2.75

Control Head Assem. Part for Model 6M192

Part No.	Description	PRICE
S-4844	Volume Control and Cable Assembly	$ 4.00
	Above Assembly consists of	
-	1 22-182 .00025 mfd. Condenser 600 v.	.12
	1 52-95 On-Off Switch Cable	.20
	1 52-96 Battery Cable	.20
	1 52-98 Control Head Cable and Plug Assem.	1.00
	1 52-99 Pilot Light Cable & Socket	.20
	1 63-551 Volume Control and Switch	1.00
	1 94-239 Extension Bushing	.15
	1 183-6 Rubber Band	.01
26-141	Calibrated Dial Scale	.10
27-17	Dial Pointer Disc	.10
54-101	Cable Sheath Clamping Nut	.05
76-209	Tuning Control Flexible Shaft 24"	1.25
100-32	Pilot Light Bulb	.15
170-19	Remote Control Drive Mechanism	2.75

Control Head Assembly Parts for Models 6M193 - 6M194 - 8M195

Part No.	Description	PRICE
S-4846	Volume Control and Cable Assembly	$ 5.00
	Above Assembly consists of	
	1 22-182 .00025 mfd. Condenser 600 v.	.12
	1 22-336 .005 mfd. Condenser 120 v.	.15
	1 22-537 .005 mfd. Condenser 120 v.	.15
	1 52-95 On-Off Switch Cable	.20
	1 52-96 Battery Cable	.20
	1 52-98 Control Head Cable and Plug	1.00
	1 52-100 Pilot Light Cable and Socket	.30
	1 63-549 Volume & Tone Control & Switch Assem.	2.00
	1 183-7 Rubber Band	.01
26-141	Calibrated Dial Scale	.10
27-17	Dial Pointer Disc	.10
46-150	Tone Control Knob	.15
54-101	Cable Sheath Clamping Nut	.05
76-223	Tuning Control Flexible Shaft 24" long	1.25
100-32	Pilot Light Bulb Mazda	.15
147-28	Tuning Control Knob Spacer	.15
170-20	Remote Control Drive Mechanism	4.00

Additional Optional Control Cables

Models 6M192—5M191 Only

Part No.	Description	PRICE
76-209	Tuning Control Flexible Shaft 24"	1.25
76-214	Tuning Control Flexible Shaft 30"	1.50
76-218	Tuning Control Flexible Shaft 36"	1.75

Models 6M193—6M194—8M195 Only

Part No.	Description	PRICE
76-223	Tuning Control Flexible Shaft 24"	1.25
76-224	Tuning Control Flexible Shaft 30"	1.50
76-225	Tuning Control Flexible Shaft 36"	1.75

S-4700 Z-188

Steering Column Control Head Accessory Kit (Used on Models 6M193—6M194—8M195 Only)

Part No.	Description	PRICE
12-503	Mechanism Retaining Bracket	.05
15-21	Steering Column Mtg Cap	.30
24-133	Steering Column Mtg. Cover Upper Half	1.50
24-134	Steering Column Mtg. Cover Lower Half	2.00
46-206	Tuning Control Knob	.20
46-207	Volume & Tone Control Knobs	.15
57-591	Bezel Plate	.45
57-592	Mounting Plate	.30
69-4	No. 6/32 x 3/16" R.H.M.S. N.P.	.01
73-25	No. 10/32 x 5/16" Headless Set Screw	.01
94-238	Paper Bushings	.01
112-108	Dial Pointer Mtg. Screw 3/48" x 7/32	.01
115-12	No. 10/32 x 1/2 F.H.M.S. N.P.	.01
115-14	No. 4/36 x 3/8" F.H.M.S.	.01
147-37	Pointer Screw Spacer	.01
192-14	Unbreakable Dial Glass	.20

S-4810 R-188

Steering Column Mounting Shell (Used with Models 5M191 — 6M192 Only)

Part No.	Description	PRICE
12-459	Control Mechanism Retaining Bracket	.05
12-469	Control Housing Mtg. Bracket	.05
17-38	Control Housing Retaining Clamp	.05
43-11	Control Mechanism Housing	.50
46-150	Tuning & Volume Control Knobs	.25
54-106	No. 10/32 x 3/8" Hex Nuts	.01
57-594	Spacer Plate	.35
69-4	No. 6/32 x 3/16 R.H.M.S. N.P.	.01
69-124	No. 8/32 x 7/8" R.H.M.S. Parkerized	.01
69-125	No. 10/32 x 5/16" R.H.M.S.	.01
93-126	No. 8 Internal Shakeproof Lockwashers	.01
93-127	No. 10 Internal Shakeproof Lockwashers	.01
93-312	Shim Washers	.01
93-322	1/16" x 13/32" x 13/16 Steel Washer	.01
112-108	No. 3/48 x 7/32" B.J.M.S. Black Nickel Finish	.01
192-14	Unbreakable Dial Glass	.20

Special Cables to Adapt 1936 External Speakers to 1937 Auto Radios

Part No.	Description	PRICE
52-102	Firewall Cable (Used for BH-177 BH-177S Also)	1.50
52-103	Header Cable	2.25
	I.E. Additional of either of the above transforms 1936 speaker to X type (GM77+52-103=GM77X)	

Set Mounting Parts

Part No.	Description	8T.	6T.	5T.	PRICE
22-193	.5 mfd. Ignition Coil Condenser 200 volts				.45
22-194	.5 mfd. Generator Condenser				.50
52-90	Antenna Cable				.50
52-97	Battery Cable - Ammeter End				.25
54-102	3/8-32 x 1/2" Hex Nuts Cadmium				.01
57-478	Set Mounting Plate				.25
58-26	Delco Remy Fuse Bushing				.01
63-336	15 M ohm Distributor Suppressor				.35
69-84	No. 10/32 x 1/4" R.H.M.S. for Mounting Plate				.30
93-127	No. 10 Internal Shakeproof Lockwasher				.35
93-143	3/8" Internal Shakeproof Lockwasher				.01
93-222	7/16" Internal Shakeproof Lockwasher				.01
93-233	Set Mounting Bolt Washer 2 1/4" Dia.				.02
136-6	15 Amp. Fuse				.06
144-14	7/16" x 3" Carriage Bolt & Nut				.05
193-2	Installation Template				.01
196-1	Mounting Plate Gasket				.03

Miscellaneous

Part No.	Description	8T.	6T.	5T.	PRICE
12-502	Spkr. Mtg. Brackets (5M191 - 6M192 Only)		6	5	.03
19-65	Chassis Box Top Cover Grd. Clip Terminal	8	6	5	.01
44-14	Speaker Plug Jack		6	5	.10
46-205	Sensitivity Control Knob	8			.20
49-170	5" Dynamic Speaker (5M191 - 6M192 Only)*				3.50
	Cone & Voice Coil for 49-170				1.50
	Field Coil for 49-170				1.50
49-171	6" P.M. Dynamic Speaker (6M193 Only)				5.00
	Cone & Voice Coil for 49-171				2.00
49-172	8" P.M. Dynamic Speaker (BH-177 Only)				6.00
	Cone & Voice Coil for 49-172				2.00
49-173	6" P. M. Dynamic Speaker (BH-177S Only)				5.00
	Cone & Voice Coil for 49-173				2.00

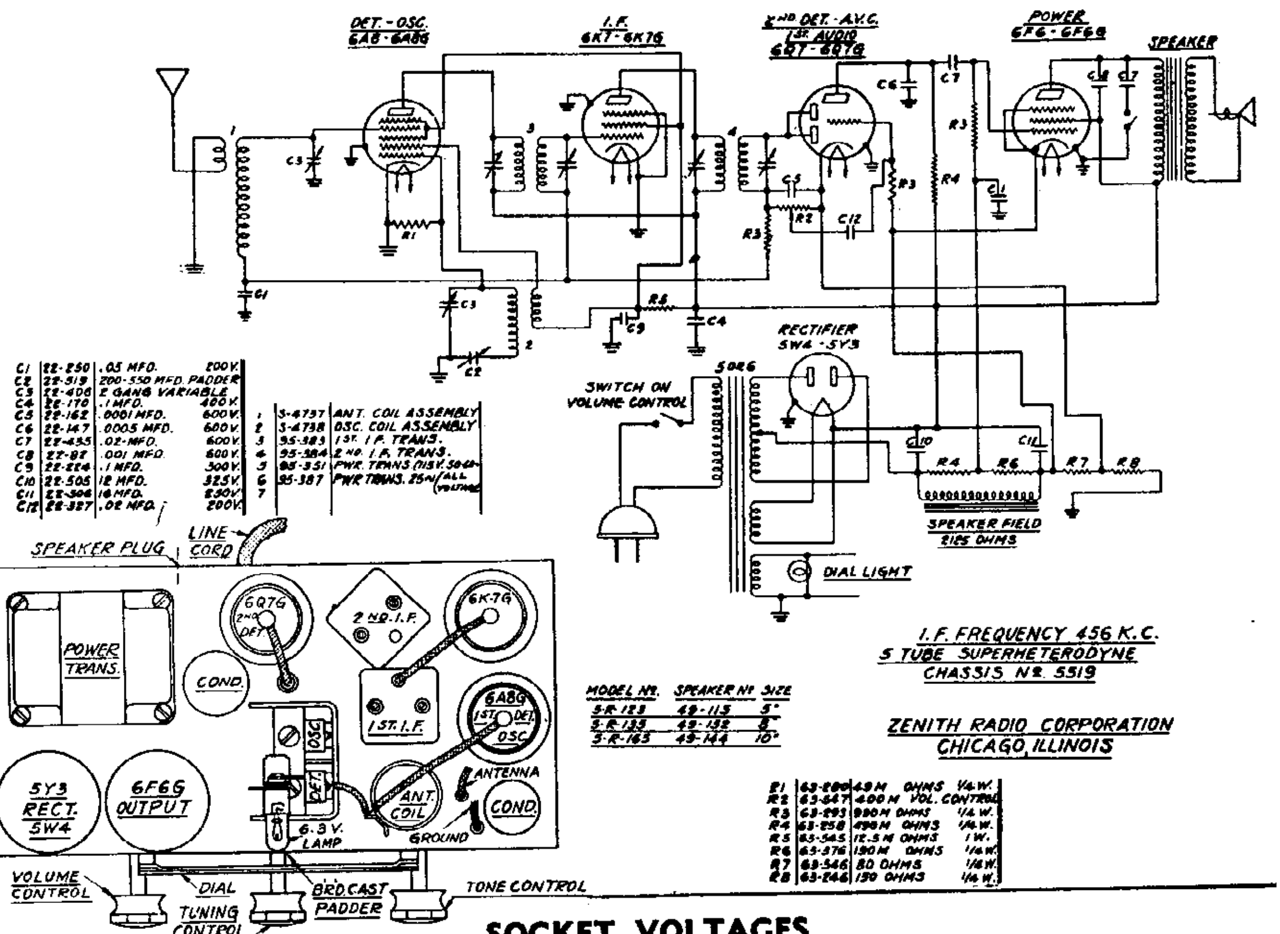
***IMPORTANT! When ordering speaker parts always give the entire part and code number i.e., 49-138AB or 49-138U.**

Part No.	Description	8T.	6T.	5T.	PRICE
52-91	Chassis & Speaker Supply Cable		6		1.75
52-94	Chassis Control Cable & Plug Assem.			5	1.50
52-101	Chassis Control Cable & Plug Assem.	8			1.70
69-129	10/32 x 1" R.H.M.S. Statuary Bronze for Mounting Top Cover	8	6	5	.01
69-130	10/32 x 3/8" R.H.M.S. Statuary Bronze for Mtg. Top Cover		6		.01
73-17	No. 8/32 x 1/4" Headless Set Screw Cuppoint				.01
78-115	Vibrator Wafer Type Socket	8	6	5	.10
78-133	No. 6H6 Wafer Type Socket	8			.15
78-148	No. 6Q7 Wafer Type Socket		6	5	.10
78-149	No. 6 x 5-No. OZ4 Wafer Type Socket	8	6	5	.10
78-150	No. 6K7 Wafer Type Socket	8	6	5	.15
78-151	No. 6A8 Wafer Type Socket	8	6	5	.15
78-152	No. 6F6 Wafer Type Socket		6	5	.10
78-156	No. 6C5 Wafer Type Socket	8			.10
78-157	No. 6N7 Wafer Type Socket	8			.10
95-388	Audio Transformer Assembly	8			4.00
95-389	Power Transformer			5	2.75
95-390	Power Transformer		6		2.75
95-391	Power Transformer	8			3.25
95-396	Power Choke				.75
95-397	Output Transformer		6		1.25
95-398	Power Choke	8			.90
95-399	Audio Transformer			5	1.00
112-130	No. 8 x 1/4" H.H. Slotted Self Tapping Screw Acorn Head	8	6	5	.01
126-131	Tube Shield Complete With Rings	8	6	5	.10
143-31	Insulated Coupling	8			.10
190-9	Vibrator	8	6	5	5.00

These Prices Supersede All Previous Quotations and Are Subject to Regular Discounts and Change Without Notice.

MODELS 5R123,5R135,5R16
Chassis 5519
Schematic,Socket,Voltag
Trimmers,Alignment,Part

ZENITH RADIO CORP.



C1	22-250	.05 MFD.	200V.
C2	22-519	200-550 MFD. PADDER	
C3	22-406	2 GANG VARIABLE	
C4	22-170	.1 MFD.	400V.
C5	22-162	.0001 MFD.	600V.
C6	22-147	.0005 MFD.	600V.
C7	22-455	.02 MFD.	600V.
C8	22-87	.001 MFD.	600V.
C9	22-224	.1 MFD.	300V.
C10	22-505	12 MFD.	325V.
C11	22-506	16 MFD.	250V.
C12	22-327	.02 MFD.	200V.

1	S-4737	ANT. COIL ASSEMBLY
2	S-4738	OSC. COIL ASSEMBLY
3	95-383	1ST. I.F. TRANS.
4	95-384	2ND. I.F. TRANS.
5	95-351	PWR. TRANS. (115V. 50-60~)
6	95-387	PWR TRANS. 25~ (ALL VOLTAGE)
7		

MODEL Nº.	SPEAKER Nº	SIZE
5-R-123	49-115	5"
5-R-135	49-132	8"
5-R-165	49-144	10"

R1	63-280	49 M OHMS	1/4 W.
R2	63-547	400 M VOL. CONTROL	
R3	63-293	990 M OHMS	1/4 W.
R4	63-258	490 M OHMS	1/4 W.
R5	63-545	12.5 M OHMS	1 W.
R6	63-376	190 M OHMS	1/4 W.
R7	63-546	80 OHMS	1/4 W.
R8	63-246	150 OHMS	1/4 W.

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8
6A8G	1st Det. Osc.	0	0	220	102	—5	97	6.1AC	0
6K7G	I. F.	0	0	220	102	0	—	6.1AC	0
6Q7G	2nd Det. A. V. C.	0	0	54	—3	—3	—	6.1AC	— .3
6F6G	Power	0	0	210	225	—4	—	6.1AC	—5
5Y3	Rect.	0	225	—	305AC	—	305AC	—	225

Line voltage 115 V. Antenna and ground disconnected. All voltages measured from point indicated to ground, using a 1000 ohm per volt meter.

ALIGNMENT PROCEDURE

Connect the output leads of the signal generator to the grid of the first detector and receiv ground lead. Also connect an output meter across the speaker leads.

Set the signal generator at 456 K.C. and carefully adjust the four I.F. trimmers to the point gi ing the greatest output reading. These I.F. transformers are of a very high gain, selectivity typ and the adjustments should be repeated several times for greatest accuracy.

Change the signal generator leads to the antenna and ground leads of the receiver.

Set the signal generator at 1400 K.C. Set the pointer on the receiver dial at the same frequen First adjust the oscillator and then the detector trimmers on the gang condenser to the point g ing the maximum reading on the output meter, using as small a signal from the generator possible so as to prevent the A.V.C. action from affecting the output readings.

Reset the signal generator to 600 K.C.

Slowly rock the pointer past 600 K.C. on dial meanwhile adjusting the osc. padder (located b neath dial on front of chassis) to the combination giving the greatest output reading.

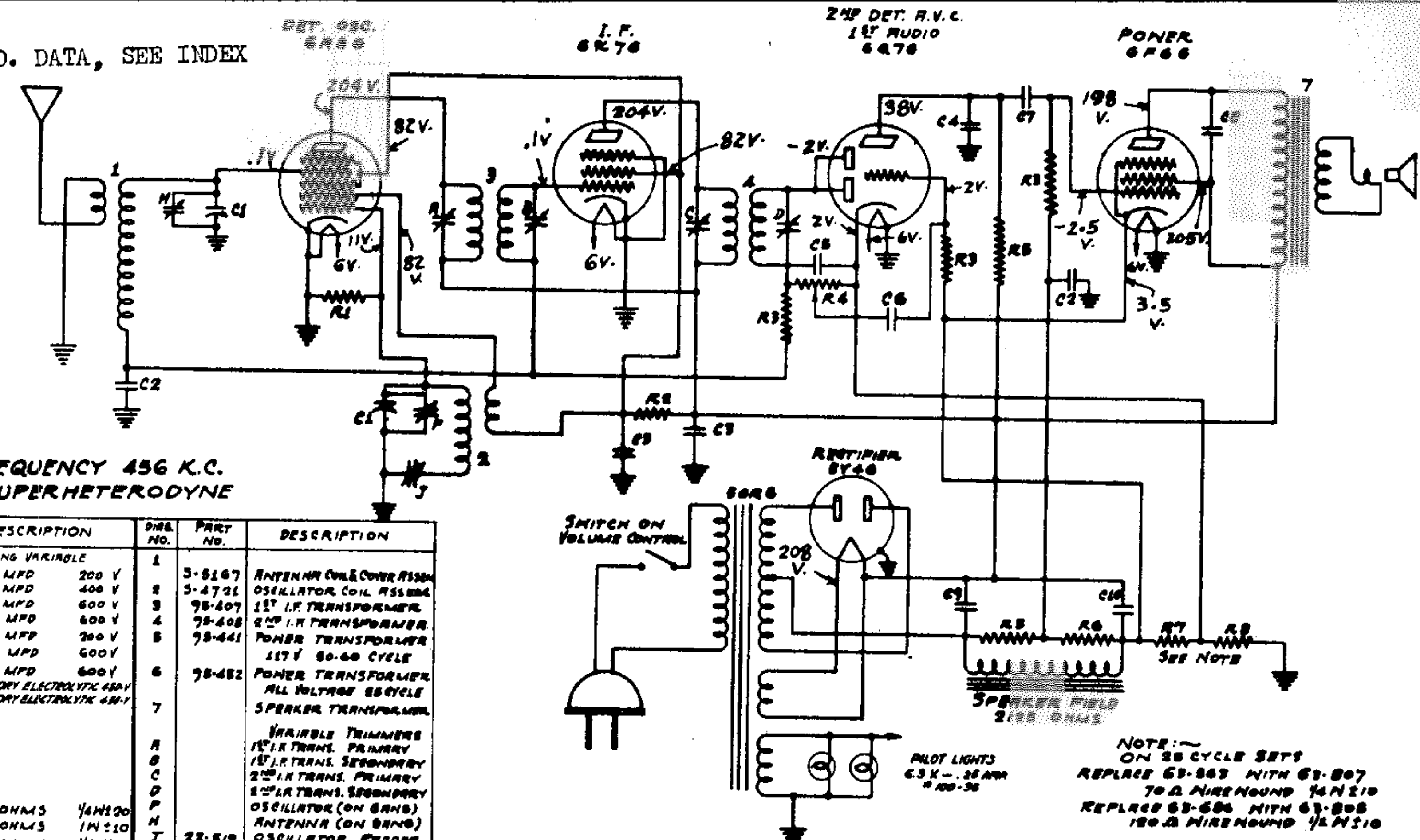
Repeat operation No. 4.

MODELS 5R216, 5R226, 5R236
Chassis 5526

ZENITH RADIO CORP.

Schematic, Voltage, Parts
Socket, Trimmers, Alignment

FOR PHONO. DATA, SEE INDEX



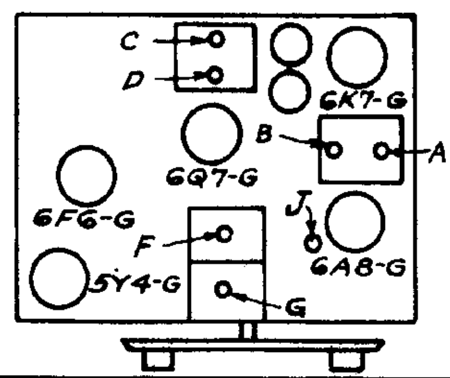
I. F. FREQUENCY 456 K.C.
5 TUBE SUPERHETERODYNE

DIAG. NO.	PART NO.	DESCRIPTION
C1	22-576	TWO GANG VARIABLE
C2	22-280	.08 MFD 200 V
C3	22-170	.1 MFD 400 V
C4	22-147	.0005 MFD 600 V
C5	22-162	.0001 MFD 600 V
C6	22-327	.02 MFD 200 V
C7	22-435	.02 MFD 600 V
C8	22-492	.002 MFD 600 V
C9	22-596	8 MFD DRY ELECTROLYTIC 450 V
C10		16 MFD DRY ELECTROLYTIC 450 V
R1	63-593	47 M.OHMS 1/4 W ±20
R2	63-208	12 M.OHMS 1 W ±10
R3	63-271	1 MEGOHM 1/4 W ±20
R4	63-565	500 M.OHMS VOL. CONTROL
R5	63-597	470 M.OHMS 1/4 W ±20
R6	63-654	180 M.OHMS 1/4 W ±10
R7	63-563	80 OHM WIRE WOUND 1/4 W ±10
R8	63-686	180 OHM WIRE WOUND 1/2 W ±10

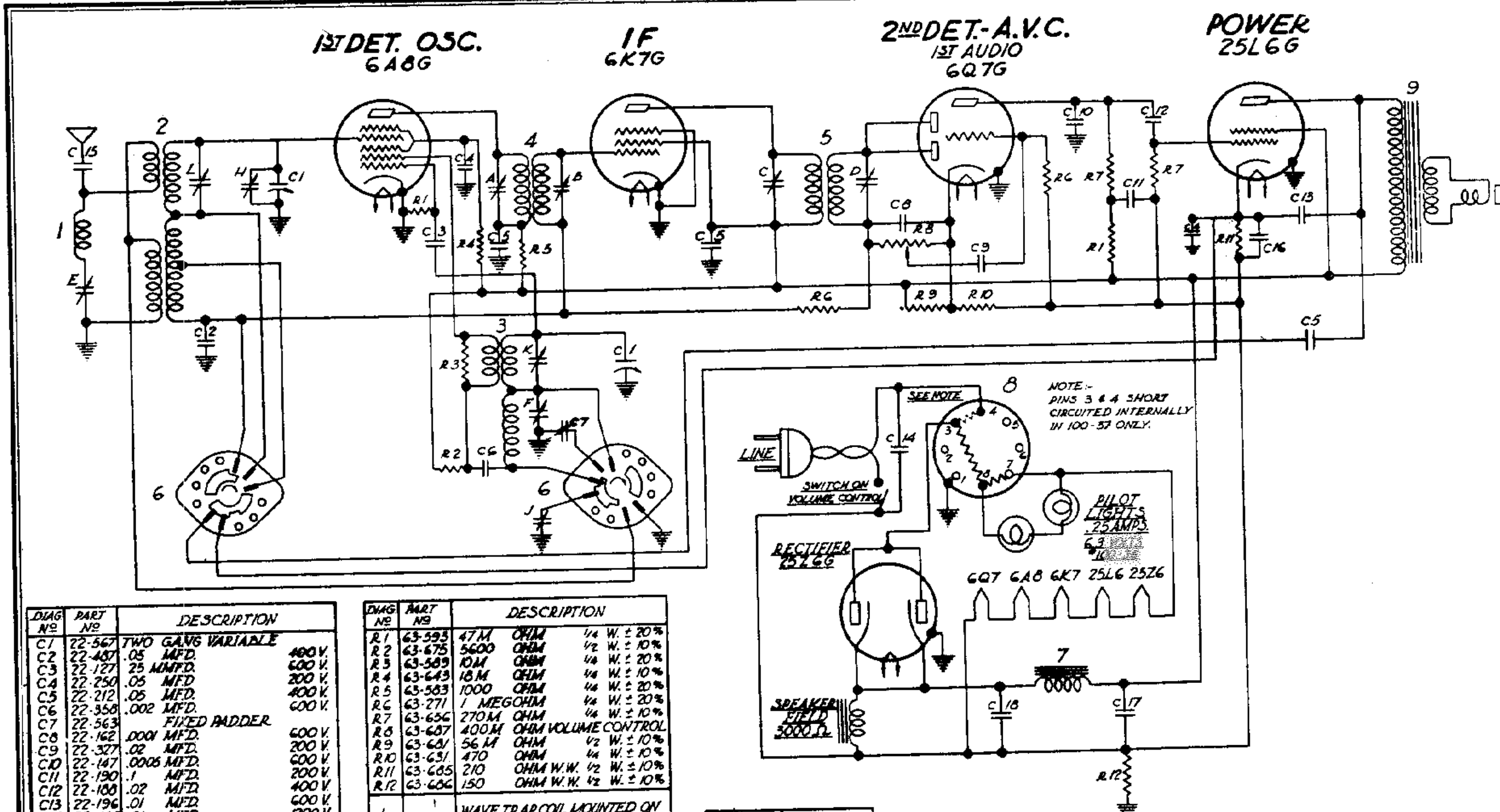
DIAG. NO.	PART NO.	DESCRIPTION
1	S-8167	ANTENNA COIL & COVER ASSEM.
2	S-4721	OSCILLATOR COIL ASSEM.
3	95-407	1ST I.F. TRANSFORMER
4	95-408	2ND I.F. TRANSFORMER
5	95-441	POWER TRANSFORMER 117 V 50-60 CYCLE
6	95-452	POWER TRANSFORMER ALL VOLTAGE 25 CYCLE
7		SPEAKER TRANSFORMER
		VARIABLE TRIMMERS
A		1ST I.F. TRANS. PRIMARY
B		1ST I.F. TRANS. SECONDARY
C		2ND I.F. TRANS. PRIMARY
D		2ND I.F. TRANS. SECONDARY
F		OSCILLATOR (ON GANG)
H		ANTENNA (ON GANG)
J	22-519	OSCILLATOR PADDER

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output.
5	" " "	200 Mmfd.	1500	"	1500	FG	Repeat 3 & 4.



ZENITH RADIO CORP.



DIAG. Nº	PART Nº	DESCRIPTION
C1	22-567	TWO GANG VARIABLE
C2	22-487	.05 MFD. 400 V.
C3	22-127	25 MMFD. 600 V.
C4	22-250	.05 MFD. 200 V.
C5	22-212	.05 MFD. 400 V.
C6	22-358	.002 MFD. 600 V.
C7	22-563	FIXED PADDER
C8	22-162	.0001 MFD. 600 V.
C9	22-327	.02 MFD. 200 V.
C10	22-147	.0005 MFD. 600 V.
C11	22-190	.1 MFD. 200 V.
C12	22-188	.02 MFD. 400 V.
C13	22-196	.01 MFD. 600 V.
C14	22-455	.01 MFD. 1200 V.
C15	22-492	.002 MFD. 600 V.
C16	22-560	10 MFD. ELECTROLYTIC 25 V.
C17	22-560	16 " " 150 V.
C18	22-560	35 " " 150 V.
		VARIABLE TRIMMERS
A		1ST I.F. TRANS. PRIMARY
B		1ST I.F. TRANS. SECONDARY
C		2ND I.F. TRANS. PRIMARY
D		2ND I.F. TRANS. SECONDARY
E		#22-570 WAVE TRAP
F		BROADCAST OSCILLATOR (SEE NOTE)
H		ANTENNA BROADCAST (ON GANG)
J		#22-519 BROADCAST PADDER
K		SHORT WAVE OSCILLATOR (SEE NOTE)
L		SHORT WAVE DETECTOR (SEE NOTE)

NOTE: TRIMMERS F, K, & L MOUNTED ON BAKELITE STRIP # 22-324

DIAG. Nº	PART Nº	DESCRIPTION
R1	63-595	47 M OHM 1/4 W. ± 20%
R2	63-675	5600 OHM 1/2 W. ± 10%
R3	63-589	10 M OHM 1/4 W. ± 20%
R4	63-643	18 M OHM 1/4 W. ± 10%
R5	63-583	1000 OHM 1/4 W. ± 20%
R6	63-271	1 MEGOHM 1/4 W. ± 20%
R7	63-656	270 M OHM 1/4 W. ± 10%
R8	63-687	400 M OHM VOLUME CONTROL
R9	63-681	56 M OHM 1/2 W. ± 10%
R10	63-631	470 OHM 1/4 W. ± 10%
R11	63-665	210 OHM W.W. 1/2 W. ± 10%
R12	63-666	150 OHM W.W. 1/2 W. ± 10%
1		WAVE TRAP COIL MOUNTED ON ANTENNA COIL ASSEMBLY
2	S-5055	ANT. COIL & SHIELD ASSEMBLY
3	S-4909	OSCILLATOR COIL ASSEMBLY
4	95-407	1ST I.F. TRANSFORMER
5	95-408	2ND I.F. TRANSFORMER
6	85-104	BAND SELECTOR SWITCH
7	95-410	POWER CHOKE
8	100-37	BALLAST TUBE 115 V.
	100-55	" " 125 V.
	100-56	" " 150 V.
	100-57	" " 175 V.
	100-58	" " 200 V.
	100-59	" " 220 V.
	100-60	" " 250 V.
9		SPEAKER TRANSFORMER

MODEL	SPEAKER	
6-D-219	49-189	5"
6-D-221	49-189	5"

I.F.-FREQUENCY 456 K.C.
6 TUBE SUPERHETERODYNE
2 BAND
CHASSIS Nº 5639 A.C.-D.C.
Models 6-D-202, 6-D-219, 6-D-221, 6-D-238

ZENITH RADIO CORP.
CHICAGO ILLINOIS

MODELS 6D202, 6D219
6D221, 6D238
Chassis 5639

ZENITH RADIO CORP.

Voltage, Alignment
Socket, Trimmers

SOCKET VOLTAGES

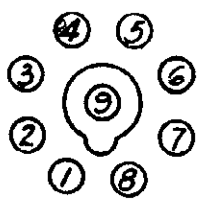
Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Converter Osc.	0	AC	102	55	—1	85	AC	0	—.1
6K7	I.F.	0	AC	104	104	0	—	AC	0	—.1
6Q7	2nd Det. AVC 1st Audio	0	AC	24	—1	—1	—	AC	—1	—1
25L6	Power	0	AC	94	104	—.5	—	AC	—4	—
25Z6	Rect.	0	AC	AC	119	AC	—	AC	119	—
	Ballast									

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 55W. Power output 1.75W.

ALIGNMENT PROCEDURE

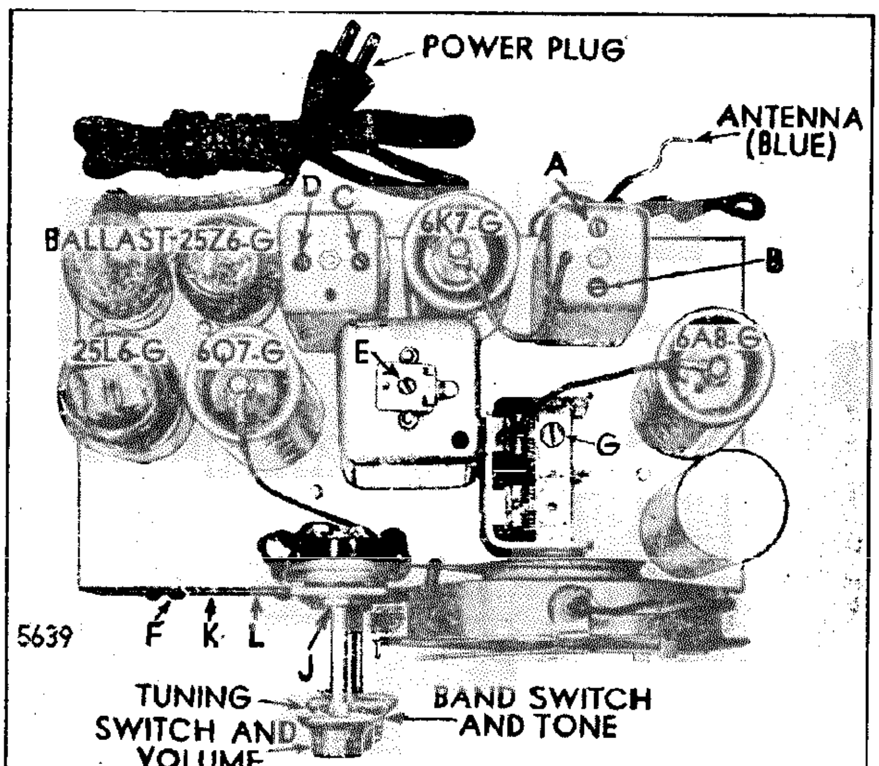
Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	456	"	600	E	See Note
3	" " "	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
4	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
5	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
6						FG	Repeat 3 & 4
7	" " "	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
8	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output

NOTE: If receiver is used in a location subject to code interference adjust wave trap (E) for minimum interference with antenna connected and receiver operating in broadcast band.



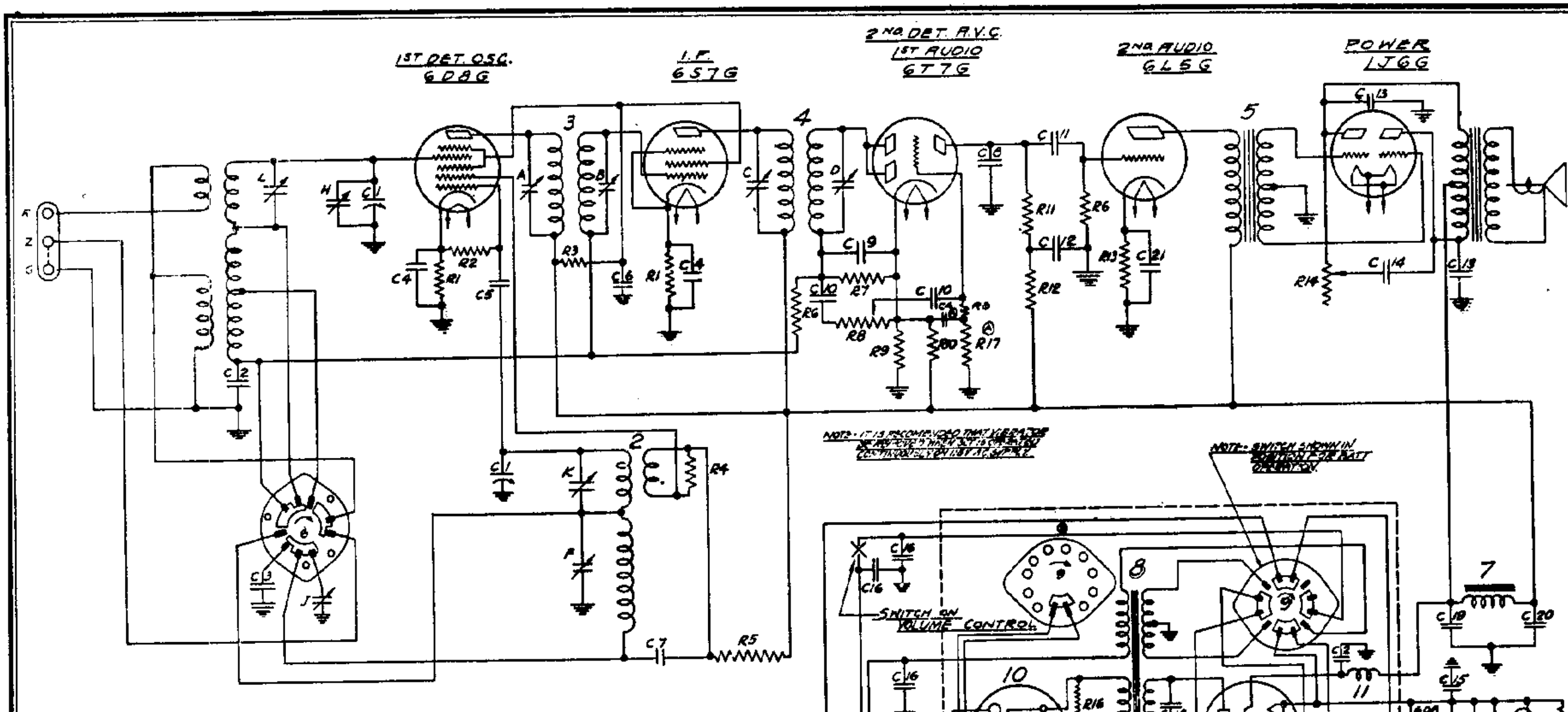
BOTTOM VIEW OF SOCKET

LOCATION OF TRIMMERS



MODELS 6J230, 6J257
Chassis 5642
Schematic, Parts

ZENITH RADIO CORP.



FOR PHONO. DATA, SEE INDEX

DWG NO.	PART NO.	DESCRIPTION
C1	22-632	TWO GANG VARIABLE
C2	22-487	.05 MFD 400 V.
C3	22-563	FIXED PADDER
C4	22-250	.05 MFD 200 V.
C5	22-289	50 MMFD 600 V.
C6	22-212	.05 MFD 400 V.
C7	22-358	.002 MFD 600 V.
C8	22-147	.0005 MFD 600 V.
C9	22-162	.0001 MFD 600 V.
C10	22-327	.02 MFD 200 V.
C11	22-188	.02 MFD 400 V.
C12	22-170	.1 MFD 400 V.
C13	22-492	.002 MFD 600 V.
C14	22-171	.05 MFD 600 V.
C15	22-350	.25 MFD 200 V.
C16	22-435	.02 MFD 600 V.
C17	22-199	.5 MFD 200 V.
C18	22-574	.02 MFD 600 V
C19	22-577	8 MFD. ELECTROLYTIC 250 V.
C20		8 MFD. ELECTROLYTIC 250 V.
C21		10 MFD. ELECTROLYTIC 25 V.

DWG NO.	PART NO.	DESCRIPTION
R1	63-632	560 OHM 1/4W ± 10
R2	63-593	47 M OHM 1/4W ± 20
R3	63-681	56 M OHM 1/2W ± 10
R4	63-589	10 M OHM 1/4W ± 20
R5	63-150	10 M OHM 1/2W ± 20
R6	63-271	1 MEGOHM 1/4W ± 20
R7	63-658	390 M OHM 1/4W ± 10
R8	63-798	1 MEGOHM VOLUME-CONT.
R9	63-634	820 OHM 1/4W ± 10
R10	63-160	100 M OHM 1/2W ± 10
R11	63-597	470 M OHM 1/4W ± 20
R12	63-656	270 M OHM 1/4W ± 10
R13	63-797	2200 OHM 1/2W ± 10
R14	63-521	50 M OHM TONE CONTROL
R15	63-501	21 OHM WIREWOUND 1/2W
R16	63-577	100 OHM 1/4W ± 20
R17	63-590	330 M OHM 1/4W ± 20

DWG NO.	PART NO.	DESCRIPTION
1	S 5272	ANT COIL & SHIELD ASSEM.
2	S 4909	OSCILLATOR COIL ASSEMBLY
3	95-443	1ST I.F. TRANSFORMER
4	95-414	2ND I.F. TRANSFORMER
5	95-446	AUDIO TRANSFORMER
6	85-112	BAND SELECTOR SWITCH
7	95-324	POWER CHOKE
8	95-425	POWER TRANS.
9	85-125	POWER SWITCH
10	190-11	VIBRATOR
11	20-82	R.F. CHOKE
12	S 2778	R.F. CHOKE ASSEMBLY
13	S 5043	R.F. CHOKE ASSEMBLY

VARIABLE TRIMMERS

A	1ST I.F. TRANSFORMER PRIMARY
B	1ST I.F. TRANSFORMER SECONDARY
C	2ND I.F. TRANSFORMER PRIMARY
D	2ND I.F. TRANSFORMER SECONDARY
F	BROADCAST OSCILLATOR (SEE NOTE)
H	ANTENNA BROADCAST (ON GANG)
J	#22-519 BROADCAST PADDER
K	SHORT WAVE OSC. (SEE NOTE)
L	SHORT WAVE DET. (SEE NOTE)

NOTE - TRIMMERS F, K, & L ARE MOUNTED ON BAKELITE STRIP #22-625

I.F. FREQUENCY 456 K.C.
6 TUBE SUPERHETERODYNE
6 VOLT DC 115 VOLT A.C.

MODEL	SPEAKER
6-J-230	49-162
6-J-257	49-164

6: 8: Models 6-J-230, 6-J-257 (5642 Chassis)

ZENITH RADIO CORPORATION
CHICAGO, ILL.

MODELS 6J230, 6J257
Voltage, Alignment
Socket, Trimmers

ZENITH RADIO CORP.

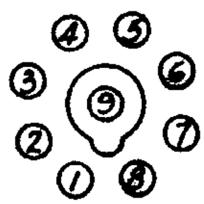
SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6D8	Converter Osc.	0	0	125	35	—1	97	6.3	1.5	0
6S7	I.F.	0	0	124	35	1	—	6.3	1	0
6T7	2nd Det. AVC 1st Audio	0	0	15	.1	.1	—	6.3	.5	0
6L5	2nd Audio	0	0	120	—	0	—	6.3	.2	—
1J6	Power	0	3	137	0	0	137	1	0	—
6ZY5	Rect.	0	6.3	AC	—	AC	—	0	140	—

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 17W. Battery voltage 6.3V consumption 2.04 Amp. Power output 1.75W.

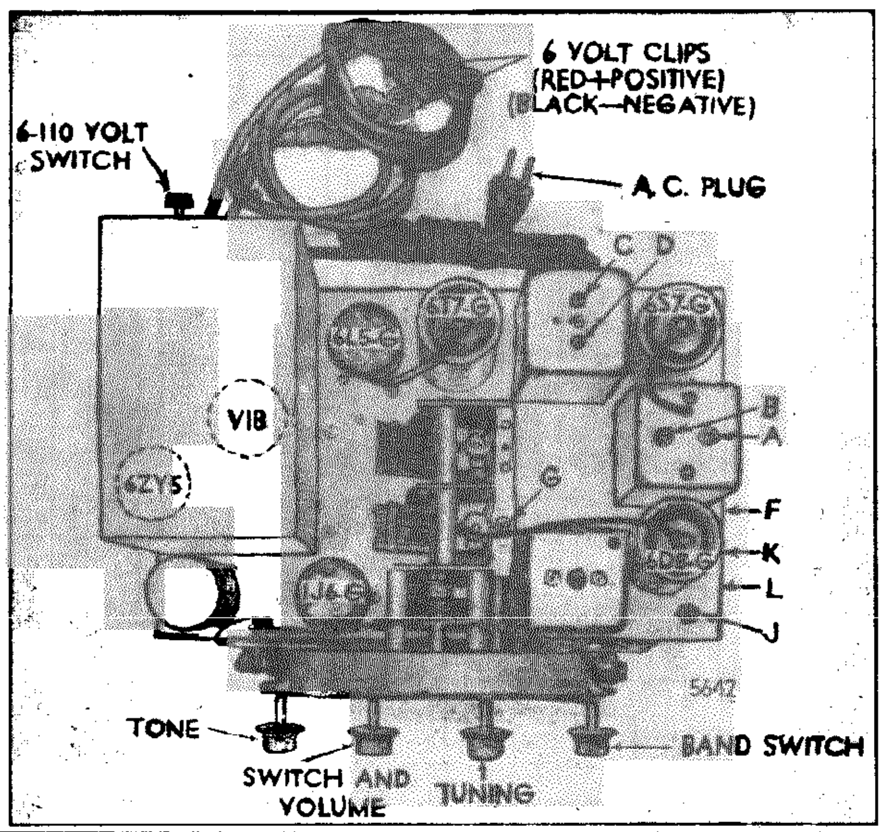
ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5				"		FG	Repeat 3 & 4
6	Rec. Ant. Lead	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
7	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output



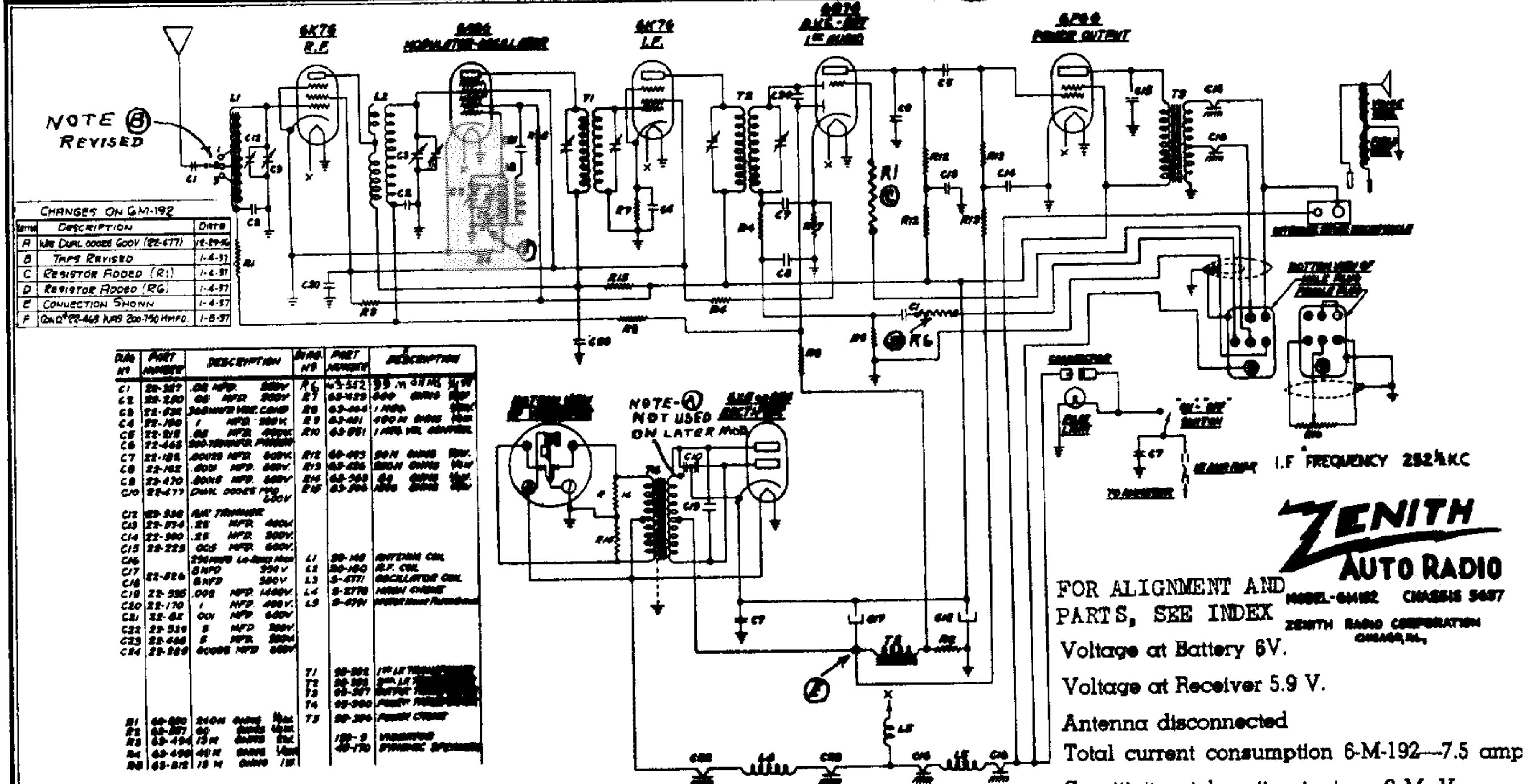
BOTTOM VIEW OF SOCKET

LOCATION OF TRIMMERS



MODEL 6M192
Chassis 5637
Schematic, Voltage
Changes, Parts

ZENITH RADIO CORP.



CHANGES ON 6M-192

Item	Description	Date
A	Was Dual .0002 600V (22-477)	12-29-36
B	Taps Revised	1-4-37
C	Resistor Added (R1)	1-4-37
D	Resistor Added (R6)	1-4-37
E	Connection Shown	1-4-37
F	Cond. 22-468 was 200-750 MMFD.	1-8-37

Diag. No.	Part Number	Description	Diag. No.	Part Number	Description
C1	22-327	.05 MFD. 200V	R6	63-552	35 M Ohms [illegible]
C2	22-250	.05 MFD. 200V	R7	63-[illegible]	600 Ohms [illegible]
C3	22-[illegible]	3-Gang Var. Cond.	R8	63-[illegible]	1 Meg. [illegible]
C4	22-190	1 MFD. 200V	R9	63-401	490 M Ohms [illegible]
C5	22-215	.05 MFD. 400V	R10	63-[illegible]	1 Meg. Vol. Control
C6	22-468	200-[illegible] MMFD. [illegible]			
C7	22-182	.00125 MFD. 600V	R12	63-[illegible]	50 M Ohms [illegible]
C8	22-182	.0005 MFD. 600V	R13	63-[illegible]	[illegible] Ohms [illegible]
C9	22-470	.0005 MFD. 600V	R14	63-[illegible]	[illegible] Ohms [illegible]
C10	22-477	Dual .0002 MFD 600V	R15	63-[illegible]	[illegible] Ohms [illegible]
C12	22-[illegible]	Ant. Trimmer			
C13	22-[illegible]	.25 MFD. 400V			
C14	22-390	.25 MFD. 200V			
C15	22-225	.005 MFD. 600V			
C16		250 MMFD Lo-Band [illegible]	L1	20-148	Antenna Coil
C17	22-[illegible]	8 MFD 350V	L2	20-150	R.F. Coil
C18		8 MFD 350V	L3	S-4771	Oscillator Coil
C19	22-595	.008 MFD. 1400V	L4	S-2770	Main Choke
C20	22-170	1 MFD. 400V	L5	S-4791	[illegible]
C21	22-[illegible]	.01 MFD 600V			
C22	22-539	.5 MFD 200V			
C23	22-460	.5 MFD. 200V			
C24	22-389	.00005 MFD 600V			
			T1	95-[illegible]	1st I.F. Transformer
			T2	95-[illegible]	2nd I.F. [illegible]
			T3	95-307	Output [illegible]
			T4	95-300	Power [illegible]
R1	63-[illegible]	240 M Ohms [illegible]	T5	95-[illegible]	Power Choke
R2	63-[illegible]	[illegible] Ohms [illegible]			
R3	63-494	75 M Ohms [illegible]		12-2	Vibrator
R4	63-490	45 M Ohms [illegible]		49-170	Dynamic Speaker
R5	63-[illegible]	15 M Ohms [illegible]			

FOR ALIGNMENT AND PARTS, SEE INDEX

Voltage at Battery 6V.

Voltage at Receiver 5.9 V.

Antenna disconnected

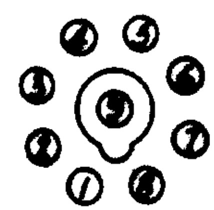
Total current consumption 6-M-192—7.5 amp

Sensitivity at 1 watt output — .9 M. V.

Maximum power output 4.5 watts.

SOCKET VOLTAGES 6-M-192

Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	0	225	95	0	—	5.9	0	0
6A8	Mixer Osc.	0	0	225	95	—32	140	5.9	0	0
6K7	I. F.	0	0	235	95	4	—	5.9	4	0
6Q7	Det. A. V. C. Audio	0	0	140	0	—.5	—	5.9	—2	0
6F6	Power	0	0	215	233	—14	—	5.9	0	—
OZ4	Rectifier	Inaccessible								



BOTTOM VIEW OF SOCKET

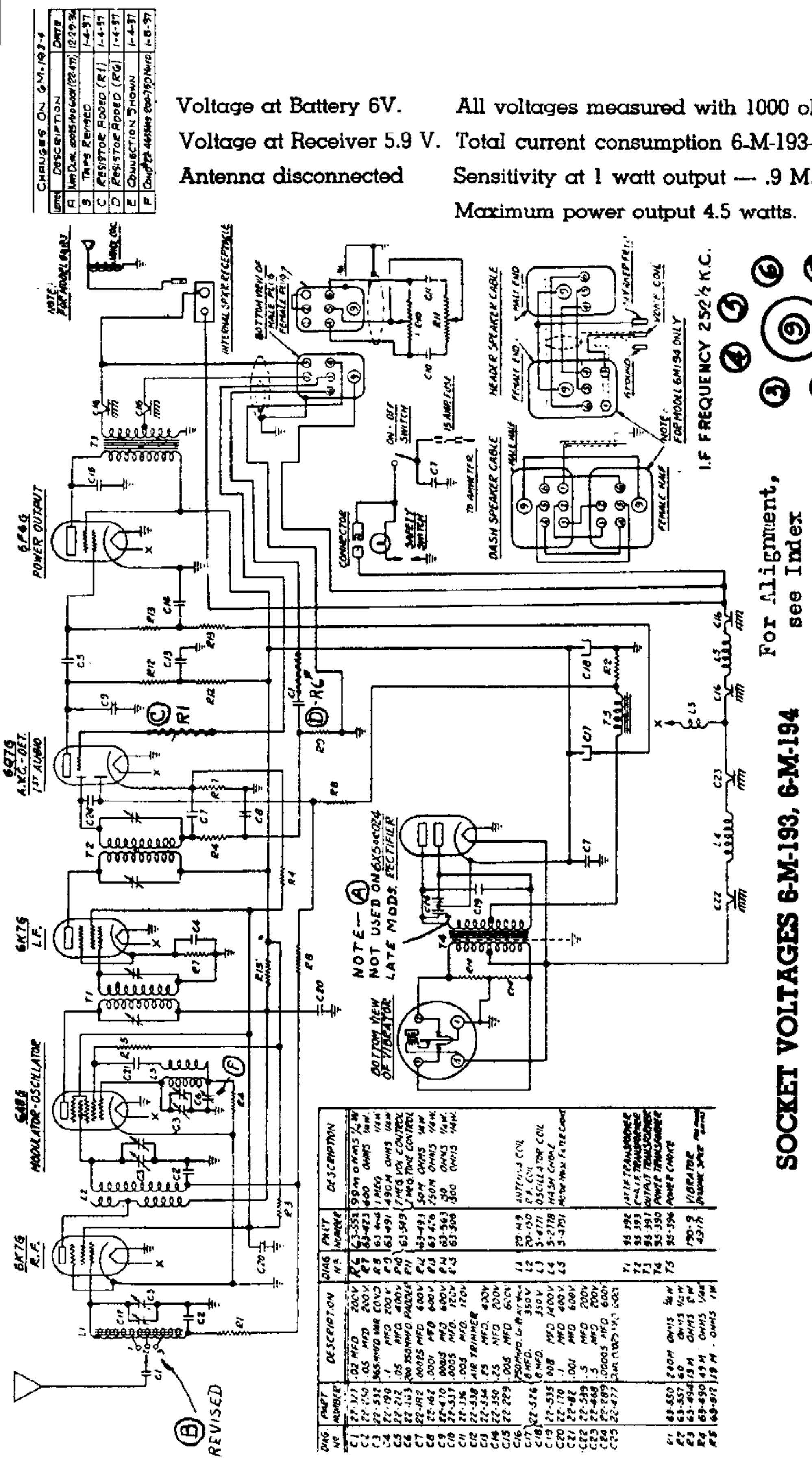
MODELS 6M193, 6M194
Chassis 5637

ZENITH RADIO CORP.

Schematic, Voltage
Parts, Changes

Voltage at Battery 6V.
Voltage at Receiver 5.9 V.
Antenna disconnected

All voltages measured with 1000 ohms per volt D. C. meter
Total current consumption 6-M-193—6-M-194 5.9 amperes
Sensitivity at 1 watt output — .9 M. V.
Maximum power output 4.5 watts.



BOTTOM VIEW OF SOCKET

ZENITH AUTO RADIO
MODELS 6M193-6M194 CHASSIS 5637
ZENITH RADIO CORPORATION

For Alignment, see Index

SOCKET VOLTAGES 6-M-193, 6-M-194

Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	0	225	95	0	—	5.9	0	0
6A8	Mixer Osc.	0	0	225	95	—32	140	5.9	0	0
6K7	I. F.	0	0	235	95	4	—	5.9	4	0
6Q7	Det. A. V. C. Audio	0	0	140	0	—.5	—	5.9	—2	0
6F6	Power	0	0	215	233	—14	—	5.9	0	—
OZ4	Rectifier	Inaccessible								

Chassis 5637
Socket,Trimmers
Chassis

ZENITH RADIO CORP.

MODEL 6M192
MODELS 6M193,6M194

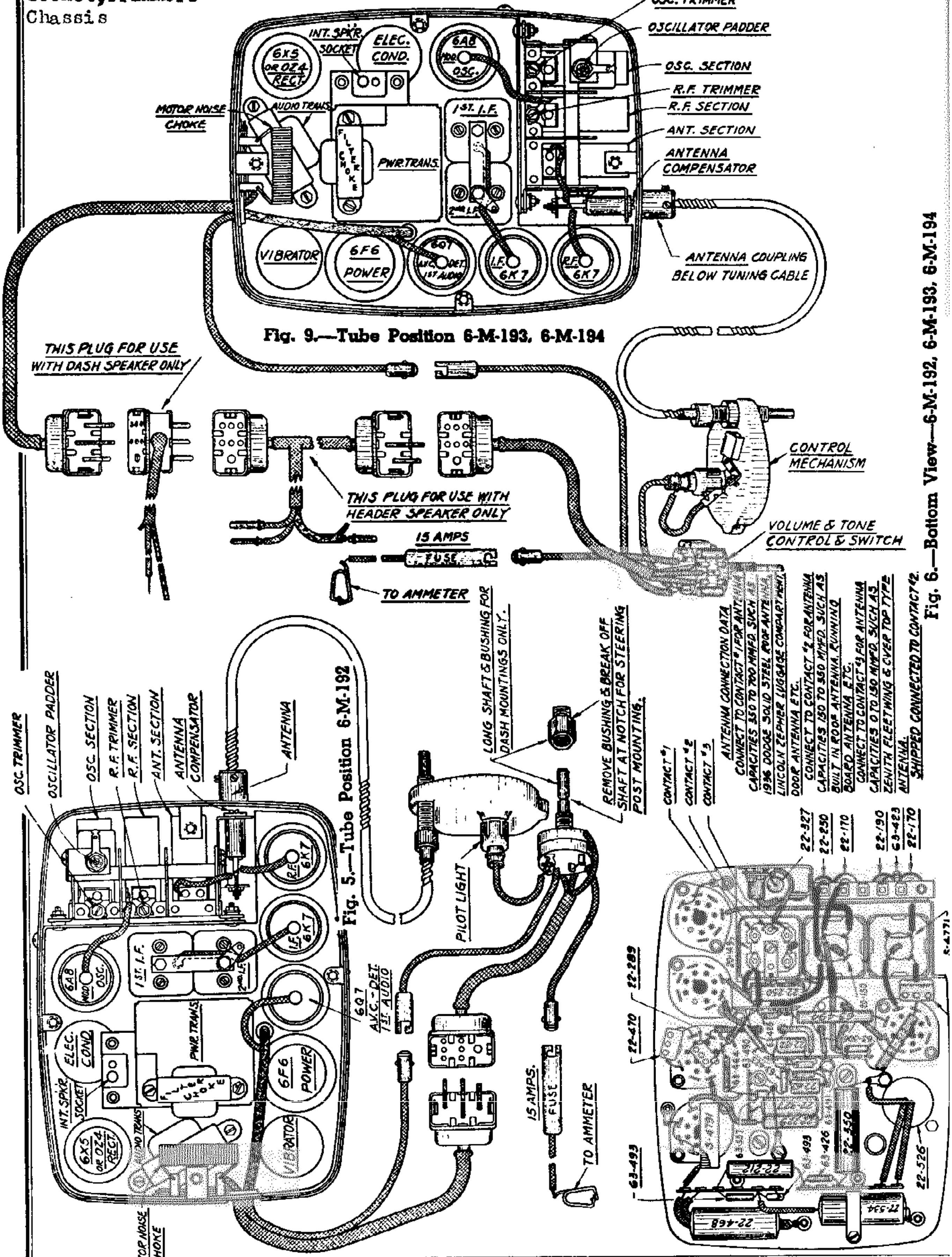


Fig. 9.—Tube Position 6-M-193, 6-M-194

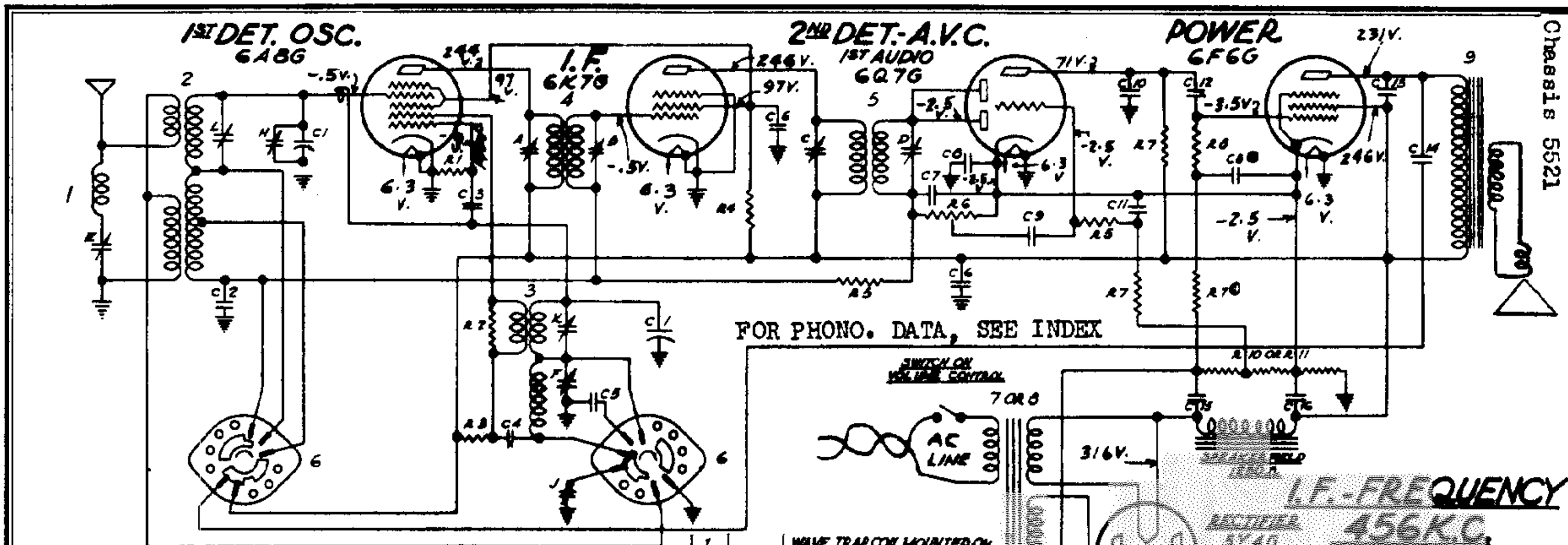
Fig. 5.—Tube Position 6-M-192

Fig. 6.—Bottom View—6-M-192, 6-M-193, 6-M-194

MODELS 5S201, 5S218, 5S220
5S228, 5S237, 5S250
5S252
Chassis 5521

ZENITH RADIO CORP

Schematic, Socket, Trimmers
Alignment, Voltage, Parts



I.F.-FREQUENCY 456K.C.

RECTIFIER 5Y4G

DIAG NO	PART NO	DESCRIPTION	
C1	22-546	TWO GANG VARIABLE	
C2	22-487	.05 MFD.	400V.
C3	22-127	25 MMFD.	600V.
C4	22-358	.002 MFD.	600V.
C5	22-565	FIXED PADDER	
C6	22-170	.1 MFD.	400V.
C7	22-162	.0001 MFD.	600V.
C8	22-185	.01 MFD.	200V.
C9	22-327	.02 MFD.	200V.
C10	22-147	.0005 MFD	600V.
C11	22-190	.1 MFD	200V.
C12	22-435	.02 MFD.	600V.
C13	22-492	.002 MFD.	600V.

DIAG NO	PART NO	DESCRIPTION
R1	63-[illegible]	[illegible]
R2	63-[illegible]	[illegible]
R3	63-[illegible]	[illegible]
R4	63-[illegible]	[illegible]
R5	63-271	1 MEGOHM [illegible]
R6	63-[illegible]	[illegible] OHM VOLUME CONTROL
R7	63-[illegible]	[illegible]
R8	63-[illegible]	[illegible]

	DIAG NO	PART NO	DESCRIPTION	
	C14	22-171	.05 MFD	600V.
A	C15	22-598	8 MFD DRY ELECTROLYTIC	450V
B	C16		14 MFD DRY ELECTROLYTIC	450V

DIAG NO	PART NO	DESCRIPTION
1		WAVE TRAP COIL MOUNTED ON ANTENNA COIL ASSEMBLY
2	3-4934	ANT COIL & SHIELD ASSEMBLY
3	3-4909	OSCILLATOR COIL ASSEMBLY
4	95-407	1ST I.F. TRANSFORMER
5	95-408	2ND I.F. TRANSFORMER
6	85-104	BAND SELECTOR SWITCH
7	95-406	POWER TRANSFORMER 117 VOLT 50-60 CYCLE
8	95-452	POWER TRANSFORMER ALL VOLTAGE 25 CYCLE
9		SPEAKER TRANSFORMER

DIAG NO	PART NO		DESCRIPTION
R10	63-613	3	SECTION CANDOHM 50-60 Ω
R11	63-806	3	SECTION CANDOHM 25 Ω

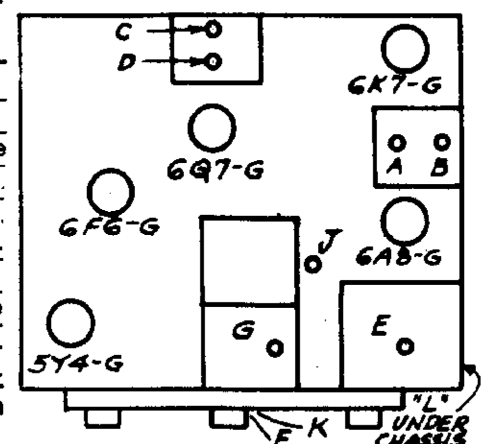
VARIABLE TRIMMERS

A	1ST I.F. TRANS PRIMARY
B	1ST I.F. TRANS SECONDARY
C	2ND I.F. TRANS PRIMARY
D	2ND I.F. TRANS SECONDARY
E	WAVE TRAP
F	BROADCAST OSCILLATOR (SEE NOTE)
G	ANTENNA BROADCAST [illegible]
J	[illegible]
K	SHORT WAVE OSCILLATOR (SEE NOTE) 22-[illegible]
L	SHORT WAVE DETECTOR

TRIMMERS F & K MOUNTED ON BAKELITE STRIP #22-408

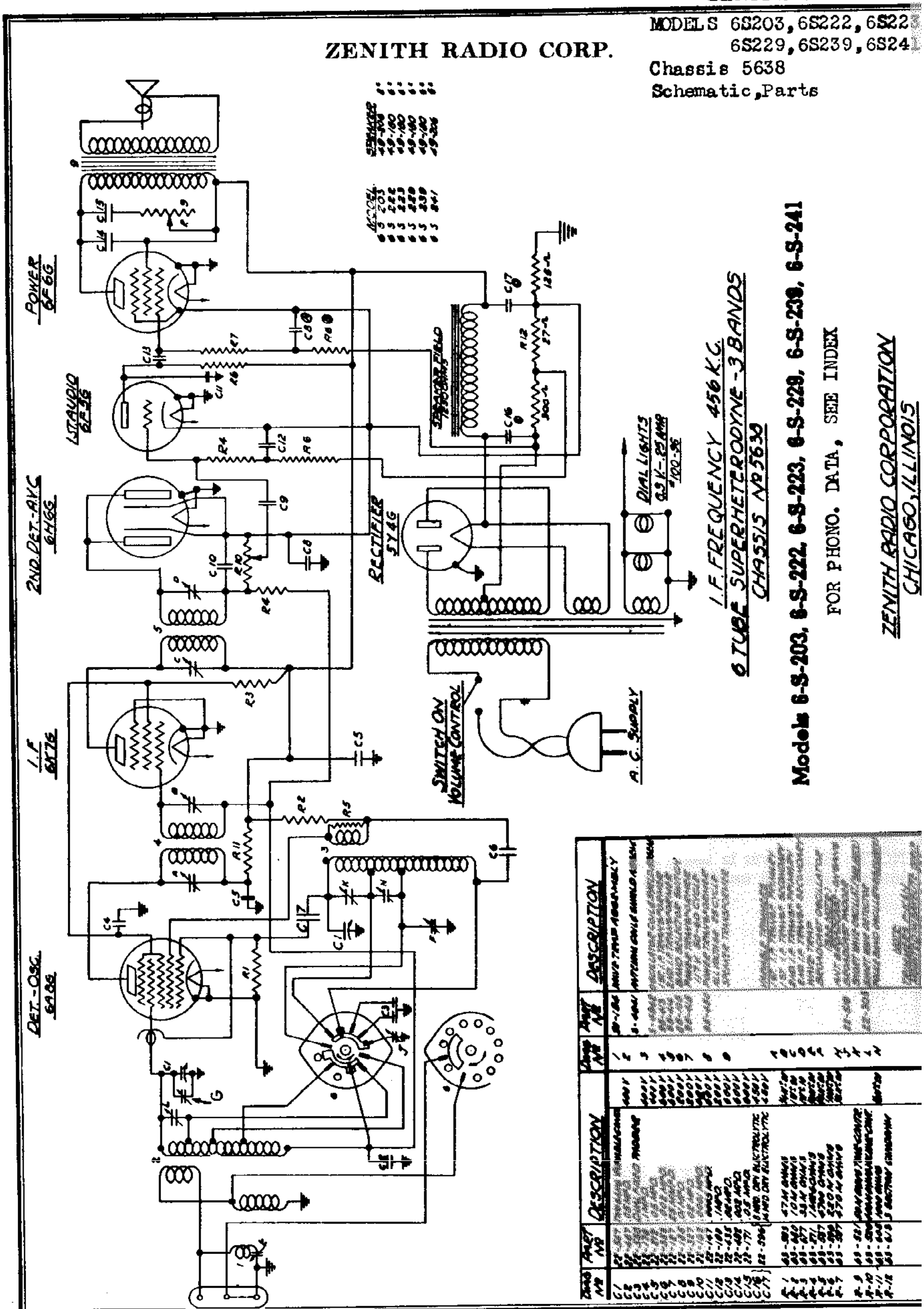
Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	456	"	600	E	See Note
3	" " "	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
4	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
5	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output.
6				"		FG	Repeat 3 & 4.
7	Rec. Ant. Lead	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
8	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output.

NOTE: If receiver is used in a location subject to code interference adjust wave trap (E) for minimum interference with antenna connected and receiver operating in broadcast band.



MODELS 6S203, 6S222, 6S223
6S229, 6S239, 6S241
Chassis 5638
Schematic, Parts

ZENITH RADIO CORP.

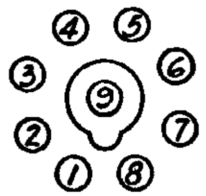


MODELS 6S203, 6S222, 6S223
6S229, 6S239, 6S241
Chassis 5638
Voltage, Alignment
Socket, Trimmers

ZENITH RADIO CORP.

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Converter Osc.	0	6.1	245	83	—9	200	0	0	—.1
6K7	I.F.	0	6.1	247	83	0	—	0	0	—.1
6H6	2nd Det. AVC	0	0	—2	—2	—2	—	6.1	—2	—
6F5	1st Audio	0	0	—	114	—	—	6.1	—2	—2
6F6	Power	0	0	231	247	—3.5	—	6.1	—2	—
5Y4	Rect.	0	—	AC	—	AC	—	322	322	—



BOTTOM VIEW OF SOCKET

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 65W. Power Output 4.5W.

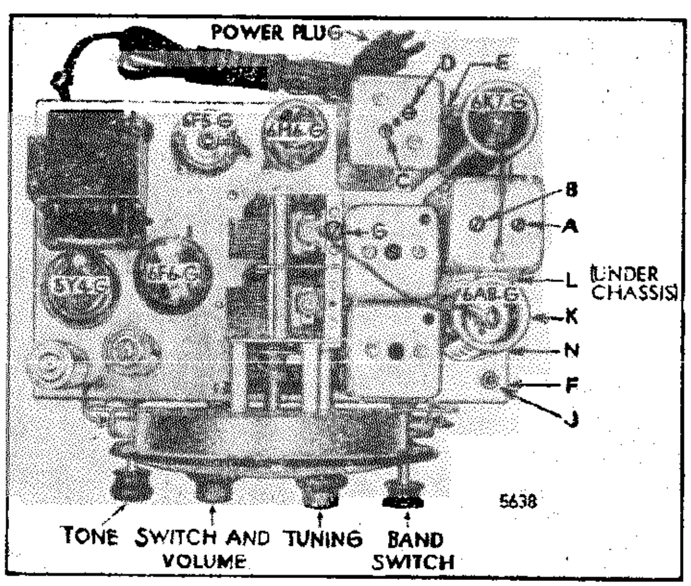
FOR PHONO. DATA, SEE INDEX

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	456	"	600	E	See Note
3	" " "	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
4	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
5	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
6	" " "	200 Mmfd.				FG	Repeat 3 & 4
7	" " "	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
8	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output
9	" " "	400 Ohms	5500	Police	5500	N	Rock gang & adj. for max. output

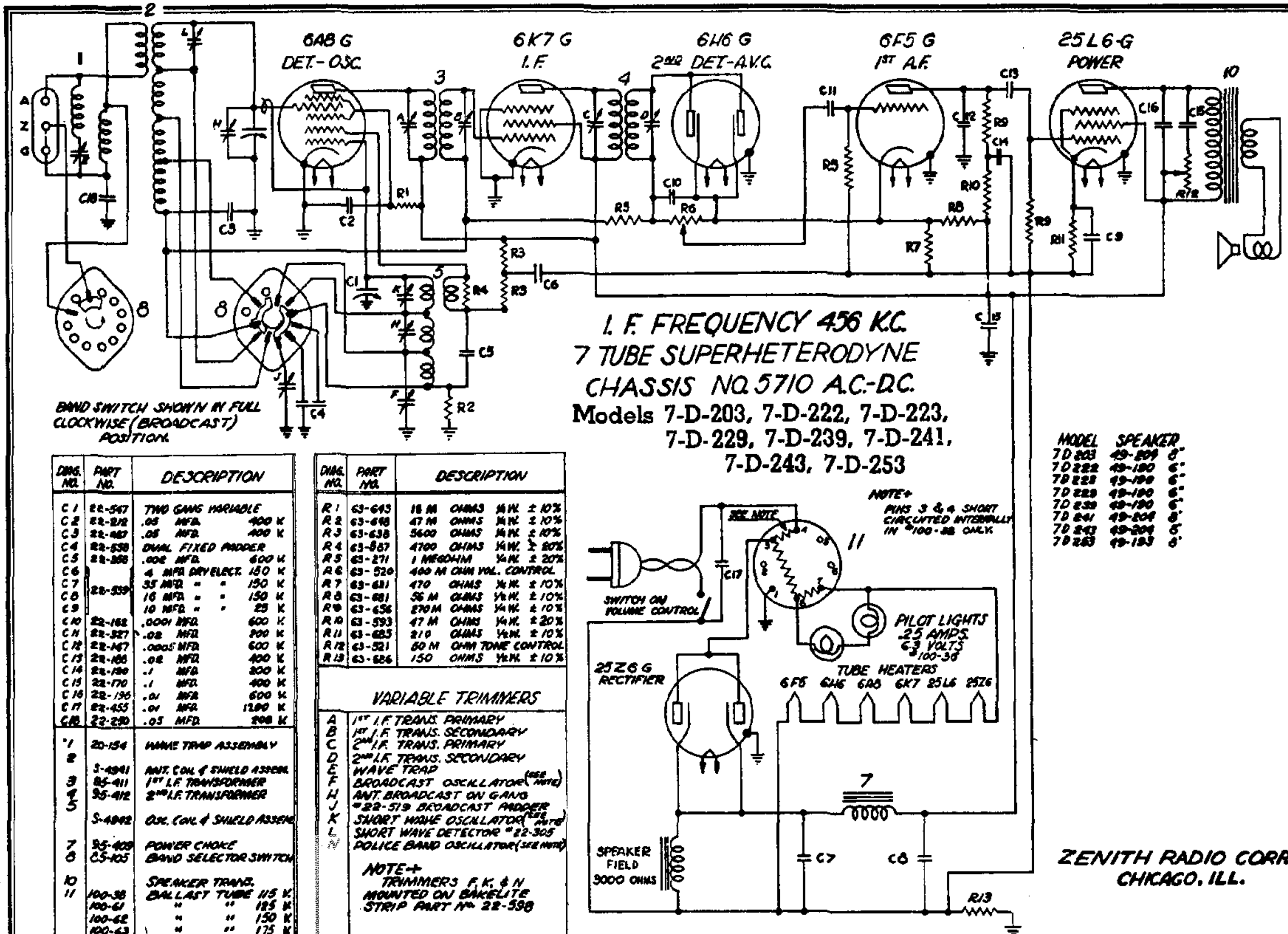
NOTE: If receiver is used in a location subject to code interference adjust wave trap (E) for minimum interference with antenna connected and receiver operating in broadcast band.

LOCATION OF TRIMMERS



MODELS 7D203, 7D222, 7D223
7D229, 7D239, 7D241
7D243, 7D253
Chassis 5710 AC-DC
Schematic, Parts

ZENITH RADIO CORP.



I. F. FREQUENCY 456 K.C.
7 TUBE SUPERHETERODYNE
CHASSIS NO. 5710 A.C.-D.C.
Models 7-D-203, 7-D-222, 7-D-223, 7-D-229, 7-D-239, 7-D-241, 7-D-243, 7-D-253

BAND SWITCH SHOWN IN FULL CLOCKWISE (BROADCAST) POSITION.

MODEL	SPEAKER	
7D203	49-204	8"
7D222	49-190	6"
7D223	49-190	6"
7D229	49-190	6"
7D239	49-190	6"
7D241	49-204	8"
7D243	49-204	8"
7D253	49-193	6"

DIAG. NO.	PART NO.	DESCRIPTION
C1	22-547	TWO GANG VARIABLE
C2	22-212	.05 MFD. 400 V
C3	22-487	.05 MFD. 400 V
C4	22-538	DUAL FIXED PADDER
C5	22-388	.002 MFD. 600 V
C6	22-539	4 MFD. DRY ELECT. 150 V
C7	22-539	35 MFD. " " 150 V
C8	22-539	16 MFD. " " 150 V
C9	22-539	10 MFD. " " 25 V
C10	22-162	.0001 MFD. 600 V
C11	22-327	.02 MFD. 200 V
C12	22-147	.0005 MFD. 600 V
C13	22-188	.02 MFD. 400 V
C14	22-190	.1 MFD. 200 V
C15	22-170	.1 MFD. 400 V
C16	22-196	.01 MFD. 600 V
C17	22-455	.01 MFD. 1200 V
C18	22-250	.05 MFD. 200 V
*1	20-154	WAVE TRAP ASSEMBLY
2	S-4941	ANT. COIL & SHIELD ASSEM.
3	95-411	1ST I.F. TRANSFORMER
4	95-412	2ND I.F. TRANSFORMER
5	S-4942	OSC. COIL & SHIELD ASSEM.
7	95-409	POWER CHOKE
8	CS-105	BAND SELECTOR SWITCH
10		SPEAKER TRANS.
11	100-38	BALLAST TUBE 115 V
	100-61	" " 125 V
	100-62	" " 150 V
	100-63	" " 175 V
	100-64	" " 200 V
	100-65	" " 220 V
	100-66	" " 230 V

DIAG. NO.	PART NO.	DESCRIPTION
R1	63-643	18 M OHMS 1/4 W. ± 10%
R2	63-648	47 M OHMS 1/4 W. ± 10%
R3	63-638	5600 OHMS 1/4 W. ± 10%
R4	63-587	4700 OHMS 1/4 W. ± 20%
R5	63-271	1 MEGOHM 1/4 W. ± 20%
R6	63-520	400 M OHM VOL. CONTROL
R7	63-631	470 OHMS 1/2 W. ± 10%
R8	63-681	56 M OHMS 1/2 W. ± 10%
R9	63-656	270 M OHMS 1/4 W. ± 10%
R10	63-593	47 M OHMS 1/4 W. ± 20%
R11	63-685	210 OHMS 1/2 W. ± 10%
R12	63-521	50 M OHM TONE CONTROL
R13	63-686	150 OHMS 1/2 W. ± 10%

VARIABLE TRIMMERS

A	1ST I.F. TRANS. PRIMARY
B	1ST I.F. TRANS. SECONDARY
C	2ND I.F. TRANS. PRIMARY
D	2ND I.F. TRANS. SECONDARY
E	WAVE TRAP
F	BROADCAST OSCILLATOR (SEE NOTE)
H	ANT. BROADCAST ON GANG
J	#22-519 BROADCAST PADDER
K	SHORT WAVE OSCILLATOR (SEE NOTE)
L	SHORT WAVE DETECTOR #22-305
N	POLICE BAND OSCILLATOR (SEE NOTE)

NOTE+
TRIMMERS F, K, & N MOUNTED ON BAKELITE STRIP PART No. 22-598

ZENITH RADIO CORP.
CHICAGO, ILL.

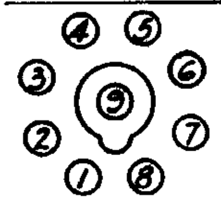
MODELS 7D203, 7D222, 7D223
7D229, 7D239, 7D241
7D243, 7D253

ZENITH RADIO CORP.

Chassis 5710 AC-DC
Voltage, Alignment, Socket
Trimmers

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Converter Osc.	0	AC	104	63	—5.5	74	AC	0	—.1
6K7	I.F.	0	AC	104	104	0	—	AC	0	—.1
6H6	2nd Det. A.V.C.	0	AC	—1.5	—1	—1.5	—	AC	—1	—
6F5	1st Audio	0	AC	—	24	—	—	AC	—1	—1.5
25L6	Power	0	AC	99	100	—.5	—	AC	4.5	—
25Z6	Rect.	0	AC	AC	119	AC	—	AC	119	—
	Ballast									



BOTTOM VIEW OF SOCKET

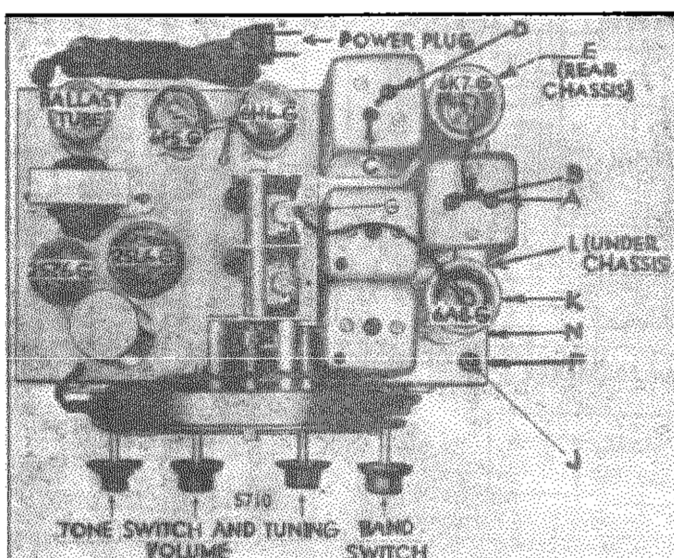
All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 55W. Power output 1.75W.

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	456	"	600	E	See Note
3	" " "	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
4	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
5	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
6	" " "	200 Mmfd.		"		FG	Repeat 3 & 4
7	" " "	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
8	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output
9	" " "	400 Ohms	5500	Police	5500	N	Rock gang & adj. for max. output

NOTE: If receiver is used in a location subject to code interference adjust wave trap (E) for minimum interference with antenna connected and receiver operating in broadcast band.

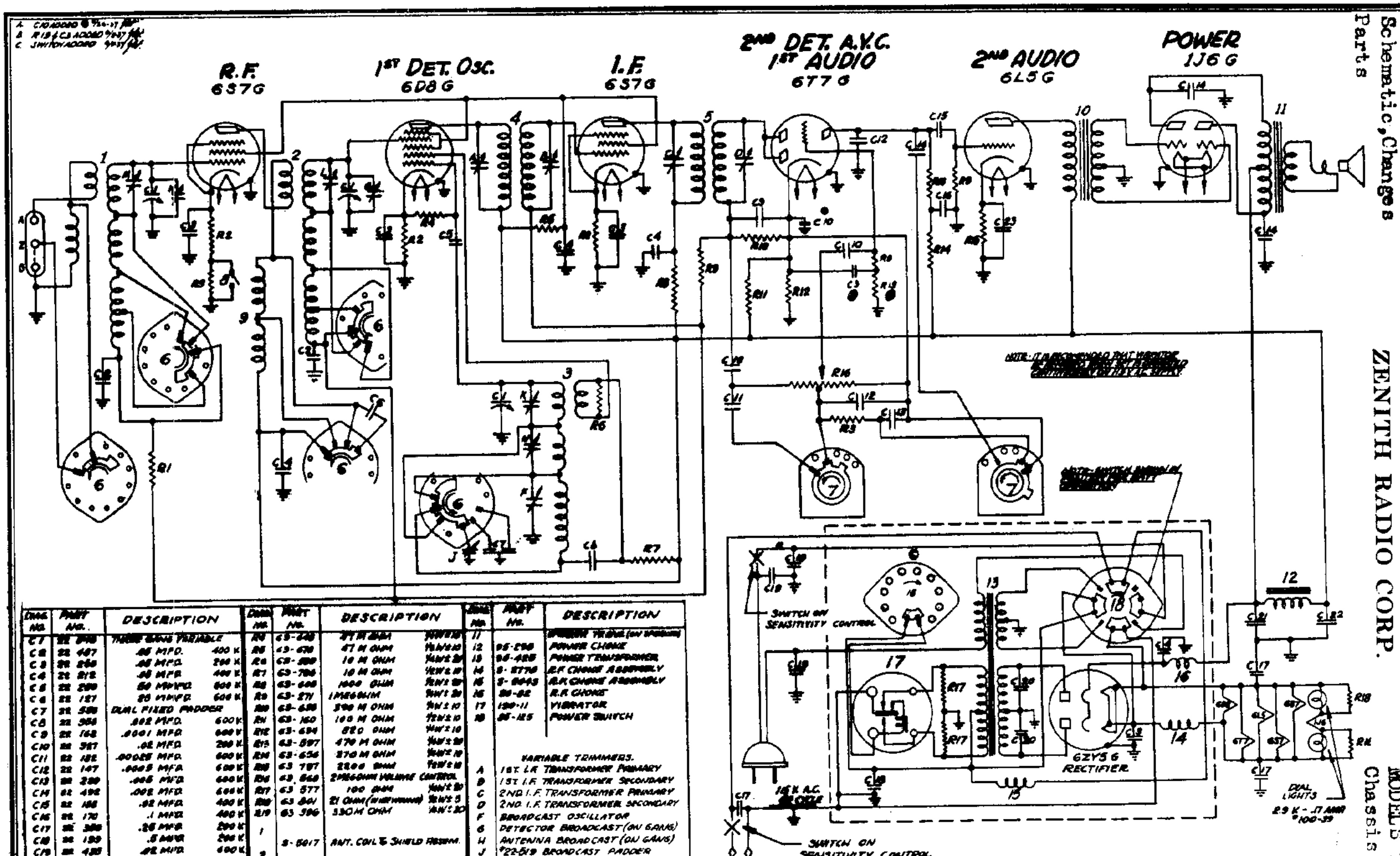
LOCATION OF TRIMMERS



Schematic, Changes
Parts

ZENITH RADIO CORP.

MODELS 7J232, 7J259
Chassis 5711



DIAG. NO.	PART NO.	DESCRIPTION	
C1	22-[illegible]	THREE GANG VARIABLE	
C2	22-487	.05 MFD.	400 K
C3	22-[illegible]	.05 MFD.	200 K
C4	22-[illegible]	.05 MFD.	400 K
C5	22-[illegible]	50 MMFD.	600 K
C6	22-127	20 MMFD.	600 K
C7	22-[illegible]	DUAL FIXED PADDER	
C8	22-[illegible]	.002 MFD.	600 K
C9	22-168	.0001 MFD.	600 V
C10	22-387	.02 MFD.	200 K
C11	22-182	.00025 MFD.	600 K
C12	22-147	.0005 MFD.	600 K
C13	22-[illegible]	.006 MFD.	600 K
C14	22-492	.002 MFD.	600 K
C15	22-[illegible]	.02 MFD.	400 K
C16	22-170	.1 MFD.	400 K
C17	22-[illegible]	.25 MFD.	200 K
C18	22-139	.5 MFD.	200 K
C19	22-[illegible]	.02 MFD.	600 K
C20	22-574	.02 MFD.	600 K
C21	22-577	8 MFD. ELECTROLYTIC	[illegible]
C22		8 MFD. "	[illegible] K
C23		10 MFD. "	25 K
R1	63-[illegible]	100 M OHM	[illegible]
R2	63-[illegible]	[illegible] OHM	[illegible]
R3	63-[illegible]	47 M OHM	[illegible]

DIAG. NO.	PART NO.	DESCRIPTION	
R4	63-[illegible]	47 M OHM	[illegible]
R5	63-670	47 M OHM	[illegible]
R6	63-[illegible]	10 M OHM	[illegible]
R7	63-706	10 M OHM	[illegible]
R8	63-[illegible]	1000 OHM	[illegible]
R9	63-271	1 MEGOHM	[illegible]
R10	63-[illegible]	390 M OHM	[illegible]
R11	63-160	100 M OHM	[illegible]
R12	63-694	820 OHM	[illegible]
R13	63-597	470 M OHM	[illegible]
R14	63-656	270 M OHM	[illegible]
R15	63-787	2200 OHM	[illegible]
R16	63-[illegible]	2 MEGOHM VOLUME CONTROL	
R17	63-577	100 OHM	[illegible]
R18	63-[illegible]	21 OHM (WIREWOUND)	[illegible] 5
R19	63-[illegible]	330 M OHM	[illegible]
1	S-5017	ANT. COIL & SHIELD ASSEM.	
2	S-5018	DET. COIL & SHIELD ASSEM.	
3	S-[illegible]	OSC. COIL & SHIELD ASSEM.	
4	95-416	1ST. I.F. TRANSFORMER	
5	95-417	2ND I.F. TRANSFORMER	
6	85-103	BAND SELECTOR SWITCH	
7	85-[illegible]	TONE CONTROL SWITCH	
8	85-117	SENSITIVITY SWITCH	
9	[illegible]-135	R.F. CHOKE	
10	95-446	AUDIO TRANSFORMER	

DIAG. NO.	PART NO.	DESCRIPTION
11		SPEAKER TRANS. (ON SPEAKER)
12	95-[illegible]	POWER CHOKE
13	95-425	POWER TRANSFORMER
14	S-[illegible]	R.F. CHOKE ASSEMBLY
15	S-[illegible]	R.F. CHOKE ASSEMBLY
16	[illegible]-82	R.F. CHOKE
17	130-11	VIBRATOR
18	85-125	POWER SWITCH

VARIABLE TRIMMERS.

A	1ST. I.F. TRANSFORMER PRIMARY
B	1ST I.F. TRANSFORMER SECONDARY
C	2ND I.F. TRANSFORMER PRIMARY
D	2ND I.F. TRANSFORMER SECONDARY
F	BROADCAST OSCILLATOR
G	DETECTOR BROADCAST (ON GANG)
H	ANTENNA BROADCAST (ON GANG)
J	#22-519 BROADCAST PADDER
K	SHORT WAVE OSC. (SEE NOTE)
L	SHORT WAVE DETECTOR (SEE NOTE)
M	#22-418 SHORT WAVE ANTENNA
N	POLICE BAND OSC. (SEE NOTE)

NOTE:— TRIMMERS F, K, L, & N MOUNTED ON BAKELITE STRIP PART #22-849

FOR PHONO. DATA, SEE INDEX

MODEL	SPEAKER
7J-232	49-[illegible] 8"
7J-259	49-[illegible] 10"

Models 7-J-232, 7-J-259 (5711 Chassis)

I.F. FREQUENCY 456 K.C.
7 TUBE SUPERHETERODYNE
6 VOLT D.C. — 115 VOLT A.C.

ZENITH RADIO CORPORATION
CHICAGO, ILL.

MODELS 7J232,7J259
Chassis 5711
Voltage,Alignment
Socket,Trimmers

ZENITH RADIO CORP.

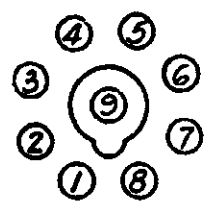
SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6S7	R.F.	0	6.3	126	34	1.5	—	0	1.5	0
6D8	Converter Osc.	0	6.3	126	34	—.1	106	0	1	0
6S7	I.F.	0	6.3	123	34	1	—	0	1	0
6T7	2nd Det. AVC 1st Audio	0	6.3	15	.1	.1	—	0	1	0
6L5	2nd Audio	0	6.3	122	—	0	—	0	4.5	—
1J6	Power	—	1	133	0	0	133	3	—	—
6ZY5G	Rect.	0	6.3	AC	—	AC	—	0	137	—

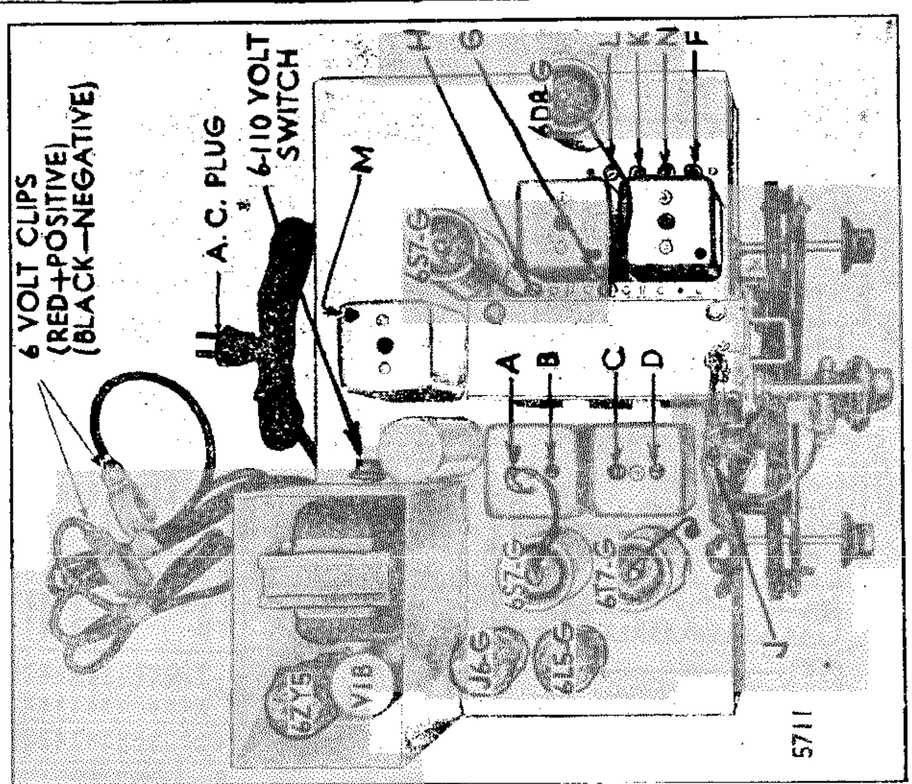
All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 19W. Battery voltage 6.3V consumption 2.19 Amp. Power output 1.75W.

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	GH	Algnt.of Ant.&Det
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5				"		FGH	Repeat 2 & 3
6	Rec. Ant. Post	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
7	" " "	400 Ohms	16500	S.W.	16500	LM	Rock gang & adj for max. output
8	" " "	400 Ohms	5500	Police	5500	N	Rock gang & adj. for max. output



BOTTOM VIEW OF SOCKET

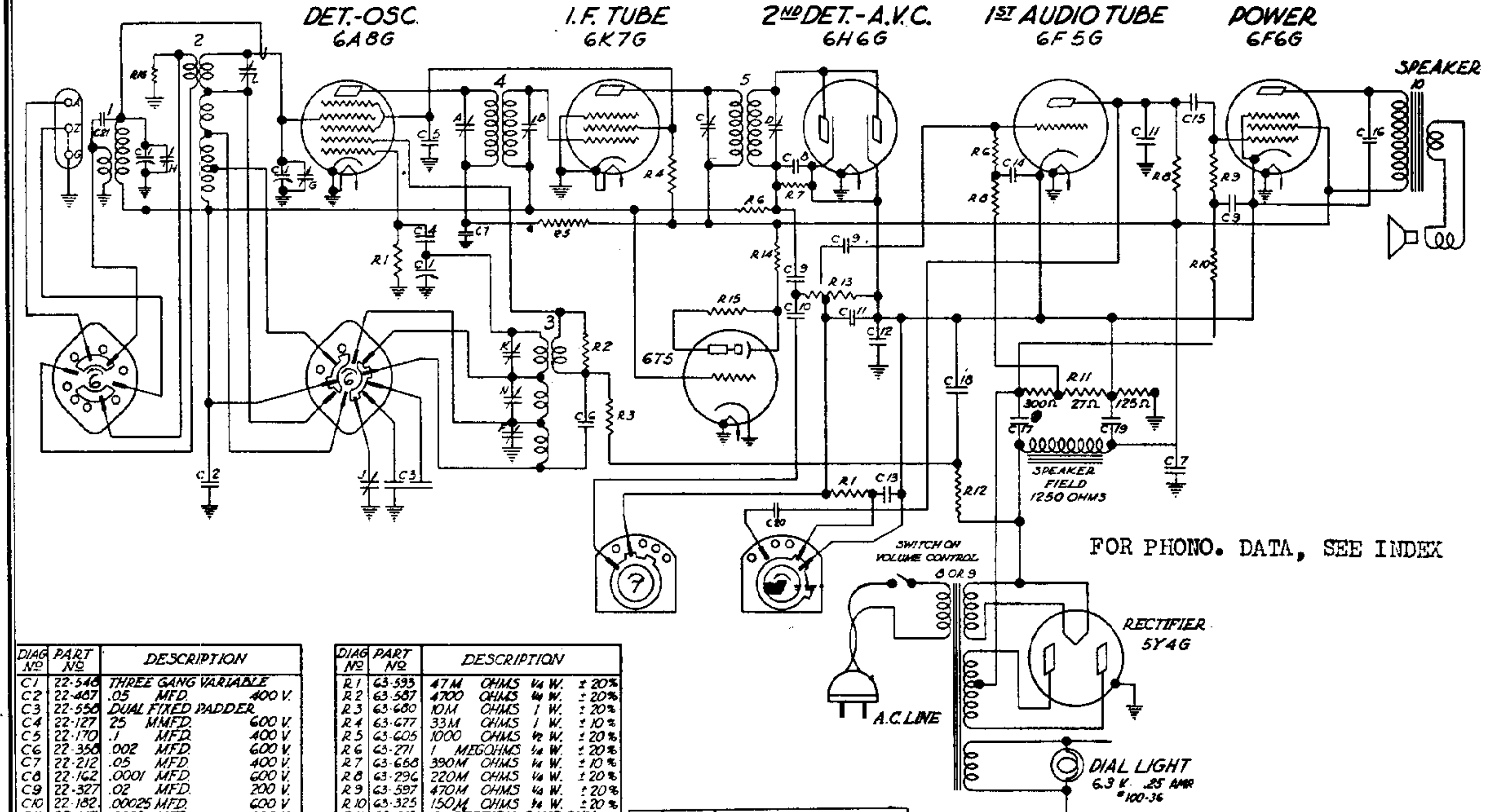


LOCATION OF TRIMMERS

Chassis 5709
Schematic, Parts

ZENITH RADIO CORP.

MODELS 7S204, 7S232, 7S240
7S242, 7S258, 7S260
7S261



FOR PHONO. DATA, SEE INDEX

DIAG NO	PART NO	DESCRIPTION
C1	22-546	THREE GANG VARIABLE
C2	22-467	.05 MFD. 400 V.
C3	22-550	DUAL FIXED PADDER
C4	22-127	25 MMFD. 600 V.
C5	22-170	.1 MFD. 400 V.
C6	22-350	.002 MFD. 600 V.
C7	22-212	.05 MFD. 400 V.
C8	22-162	.0001 MFD. 600 V.
C9	22-327	.02 MFD. 200 V.
C10	22-182	.00025 MFD. 600 V.
C11	22-147	.0005 MFD. 600 V.
C12	22-185	.01 MFD. 200 V.
C13	22-326	.003 MFD. 400 V.
C14	22-190	.1 MFD. 200 V.
C15	22-435	.02 MFD. 600 V.
C16	22-627	.002 MFD. (A) 1000 V.
C17	22-569	12 MFD. ELECTOLYTIC 450 V.
C18	22-562	2 MFD. " 450 V.
C19		16 MFD. " 450 V.
C20	22-448	.004 MFD. 600 V.
1	S-4760	ANTENNA COIL ASSEMBLY
2	S-5054	DETECTOR COIL & SHIELD ASSEM.
3	S-4969	OSCILLATOR COIL & SHIELD ASSEM.
4	95-416	1ST I.F. TRANS.
5	95-417	2ND I.F. TRANS.
6	85-110	BAND SELECTOR SWITCH
7	85-108	TONE CONTROL SWITCH
8	95-418	POWER TRANS.-117V. 50-60 CYCLE
9	95-451	POWER TRANS.-ALL VOLTAGE 25 CYCLE
10		SPEAKER TRANSFORMER

DIAG NO	PART NO	DESCRIPTION
R1	63-593	47 M OHMS 1/4 W. ±20%
R2	63-587	4700 OHMS 1/4 W. ±20%
R3	63-680	10 M OHMS 1 W. ±20%
R4	63-677	33 M OHMS 1 W. ±10%
R5	63-605	1000 OHMS 1/2 W. ±20%
R6	63-271	1 MEGOHMS 1/4 W. ±20%
R7	63-668	390 M OHMS 1/4 W. ±10%
R8	63-296	220 M OHMS 1/4 W. ±20%
R9	63-597	470 M OHMS 1/4 W. ±20%
R10	63-325	150 M OHMS 1/4 W. ±20%
R11	63-613	3 SECTION CAND OHM
R12	63-608	15 M OHMS 1 W ±20%
R13	63-611	2 MEGOHM VOLUME CONTROL
R14	63-609	22 M OHMS 1/2 W. ±20%
R15		1 MEGOHM MOUNTED IN TUNING TUBE SOCKET

VARIABLE TRIMMERS	
A	1ST I.F. TRANS PRIMARY
B	1ST I.F. TRANS SECONDARY
C	2ND I.F. TRANS PRIMARY
D	2ND I.F. TRANS SECONDARY
F	BROADCAST OSCILLATOR (SEE NOTE)
G	DETECTOR BROADCAST (ON GANG)
H	ANTENNA BROADCAST (ON GANG)
J	#22-519 BROADCAST PADDER
K	SHORT WAVE OSCILLATOR (SEE NOTE)
L	SHORT WAVE DETECTOR (SEE NOTE)
N	POLICE BAND OSCILLATOR (SEE NOTE)

NOTE:- TRIMMERS F, K, L, & N MOUNTED ON BAKELITE STRIP #22-549

DIAG NO.	PART NO.	DESCRIPTION
C21	22-601	10 MFD. CERAMIC
R16	63-383	1000 OHMS 1/4 W ± 20%

SPEAKERS		MODELS
49-203	8"	7-S-232
49-206	8"	7-S-240
49-206	8"	7-S-242
49-181	10"	7-S-258
49-195	12"	7-S-260
49-193	12"	7-S-261

I. F. - FREQUENCY 456 K.C.
7 TUBE SUPERHETERODYNE
3 BAND
CHASSIS NO 5709
Models 7-S-204, 7-S-232, 7-S-240, 7-S-242, 7-S-258, 7-S-260, 7-S-261

ZENITH RADIO CORP.
CHICAGO, ILLINOIS

MODELS 7S204, 7S232, 7S240
7S242, 7S258, 7S260
7S261

ZENITH RADIO CORP.

Chassis 5709
Voltage, Alignment, Socket
Trimmers

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Converter Osc.	0	6.4	255	89	—10	182	0	0	—2
6K7	I.F.	0	6.4	243	89	0	—	0	0	—2
6H6	2nd Det. A.V.C.	0	0	—2	—2	—2	—	6.4	—2	—
6F5	1st Audio	0	0	—	117	—	—	6.4	—1.5	—1.5
6F6	Power	0	0	243	255	—2	—	6.4	—2	—
5Y4	Rect.	0	—	AC	—	AC	—	328	328	—
		H	Ep	Eg	Et	Ek	H			
6T5	Target	0	16	—2	255	—2	6.4			

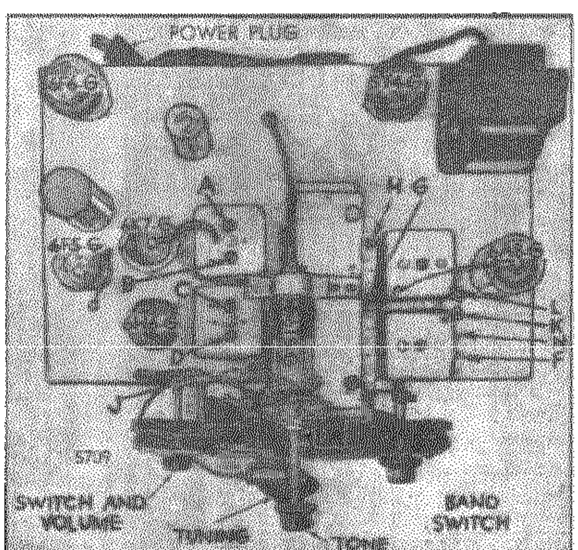
BOTTOM VIEW
OF SOCKET

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 75W. Power output 4.5W.

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	GH	Algnt. of Ant. & De.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5				"		FGH	Repeat 2 & 3
6	" " "	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
7	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output
8	" " "	400 Ohms	5500	Police	5500	N	Rock gang & adj. for max. output

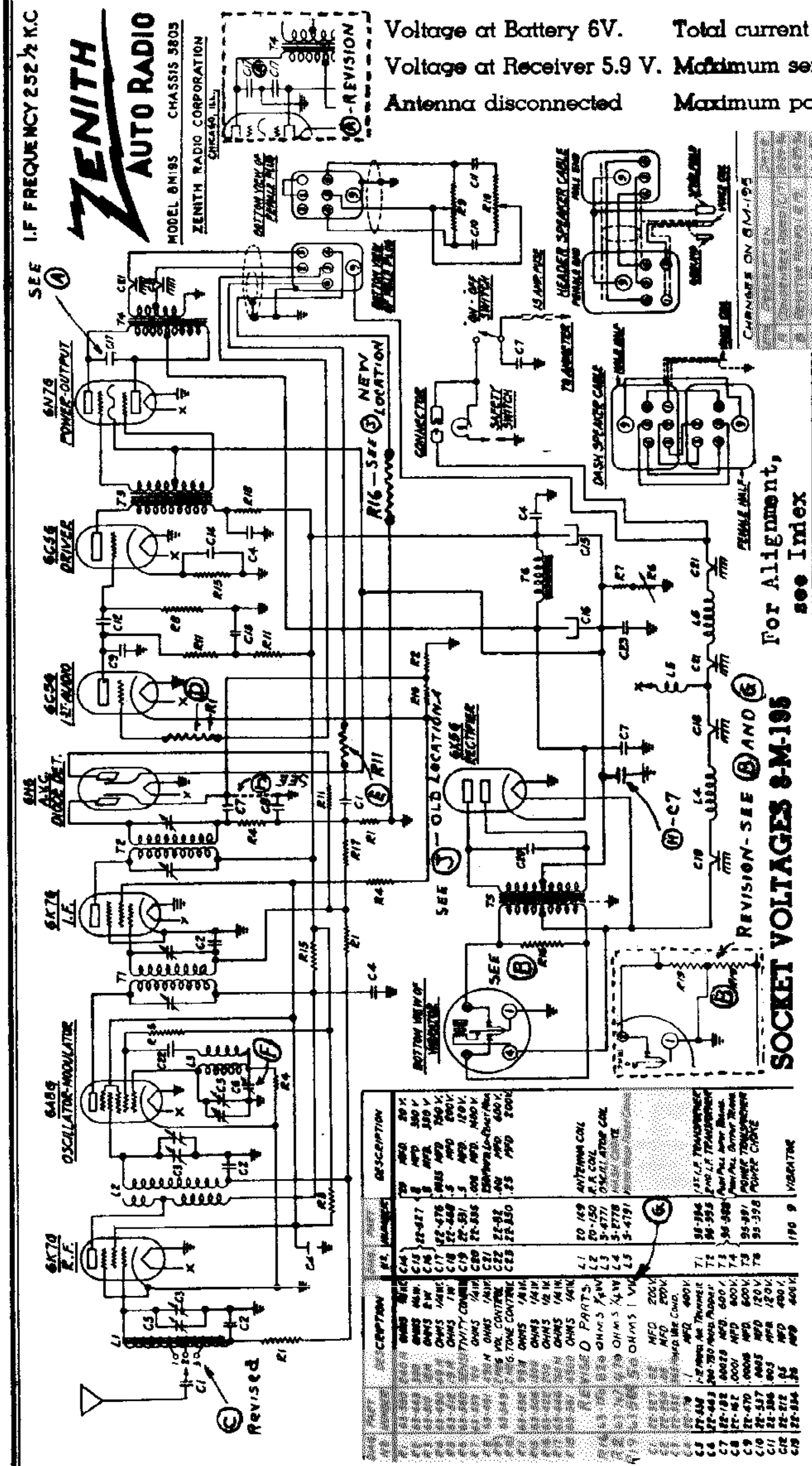
LOCATION OF TRIMMERS

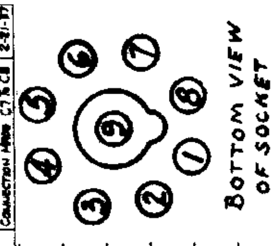


ZENITH RADIO CORP.

MODEL 8M195
Chassis 5803
Schematic, Voltage
Changes, Parts

Voltage at Battery 6V. Total current consumption 9.2 amperes
Voltage at Receiver 5.9 V. Maximum sensitivity at 1 watt output .9 M. V.
Antenna disconnected Maximum power output 9 watts





SOCKET VOLTAGES 8-M-195

For Alignment, see Index

Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	0	220	75	0	—	5.9	0	0
6A8	Mixer Osc.	0	0	220	75	—11	115	5.9	0	0
6K7	I. F.	0	0	230	75	0	—	5.9	0	0
6H6	Det. A. V. C.	Inaccessible								
6C5	Audio	0	5.9	44	—	0	—	0	1.1	—
6C5	Driver	0	5.9	200	—	0	—	0	6.8	—
6N7	Power	0	0	235	—3.5	—3.5	235	5.9	—3.5	—
6X5	Rectifier	Inaccessible								

MODEL 8M195
Chassis 5803
Socket, Trimmers
Chassis

ZENITH RADIO CORP.

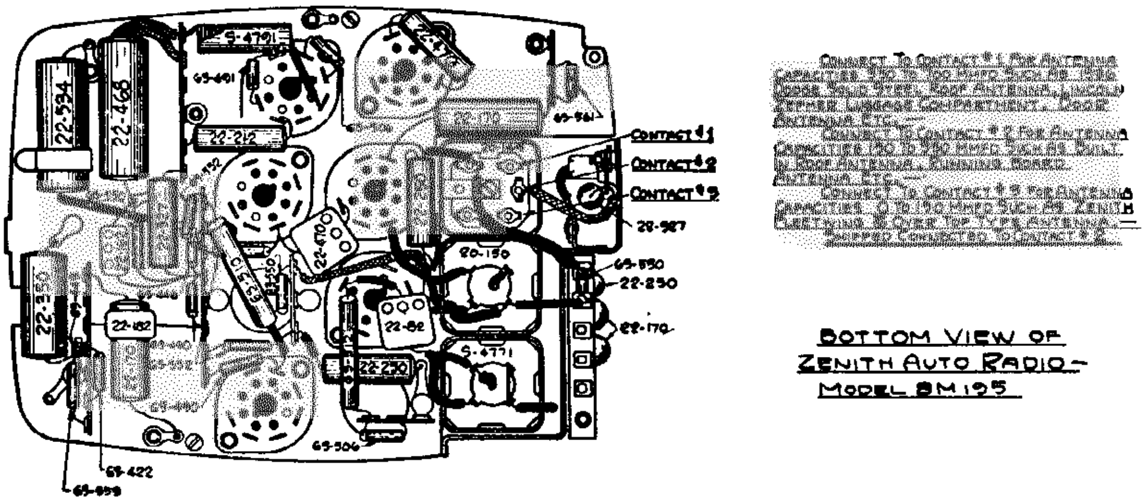


Fig. 12.—Bottom View 8-M-195

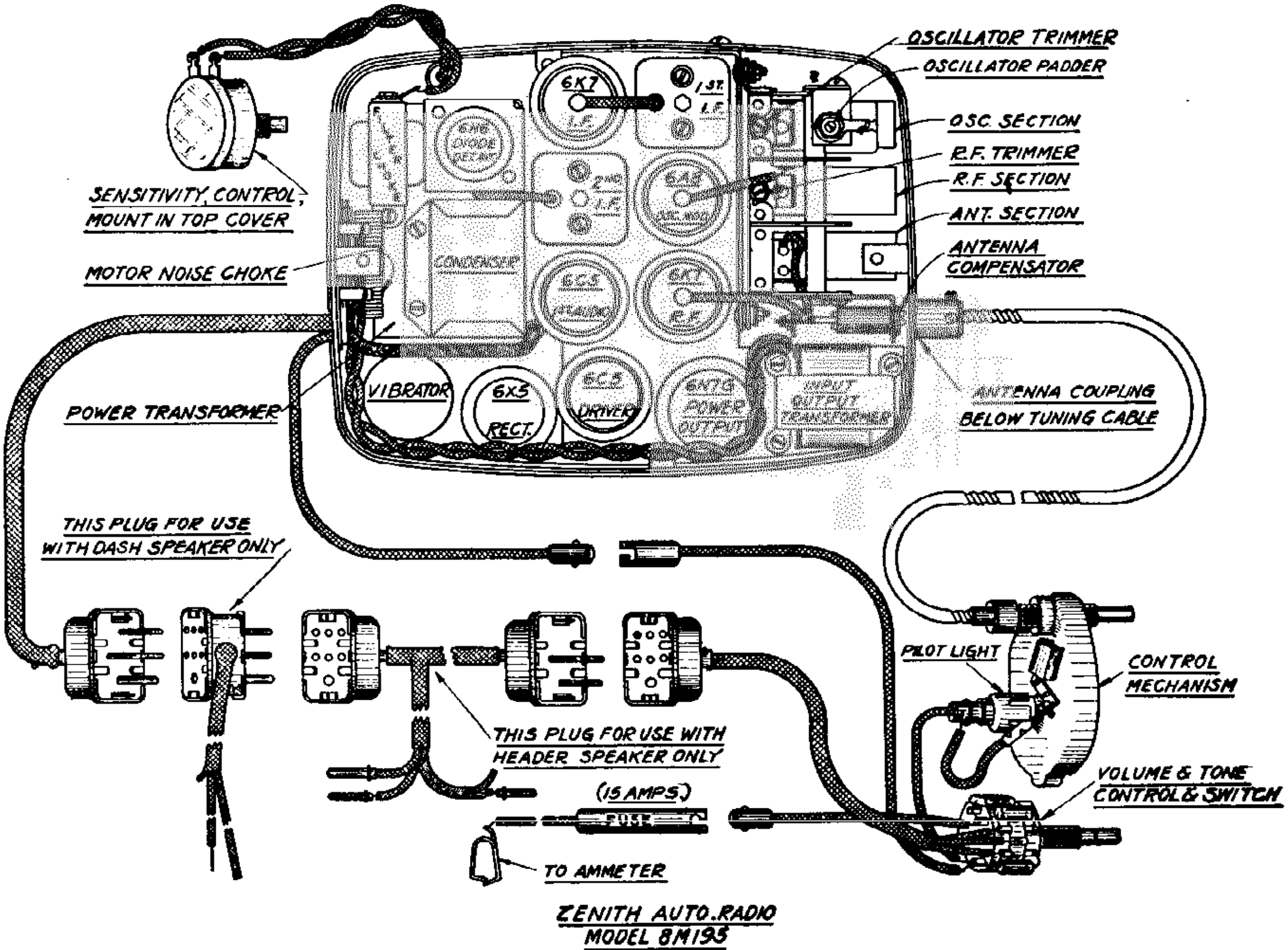


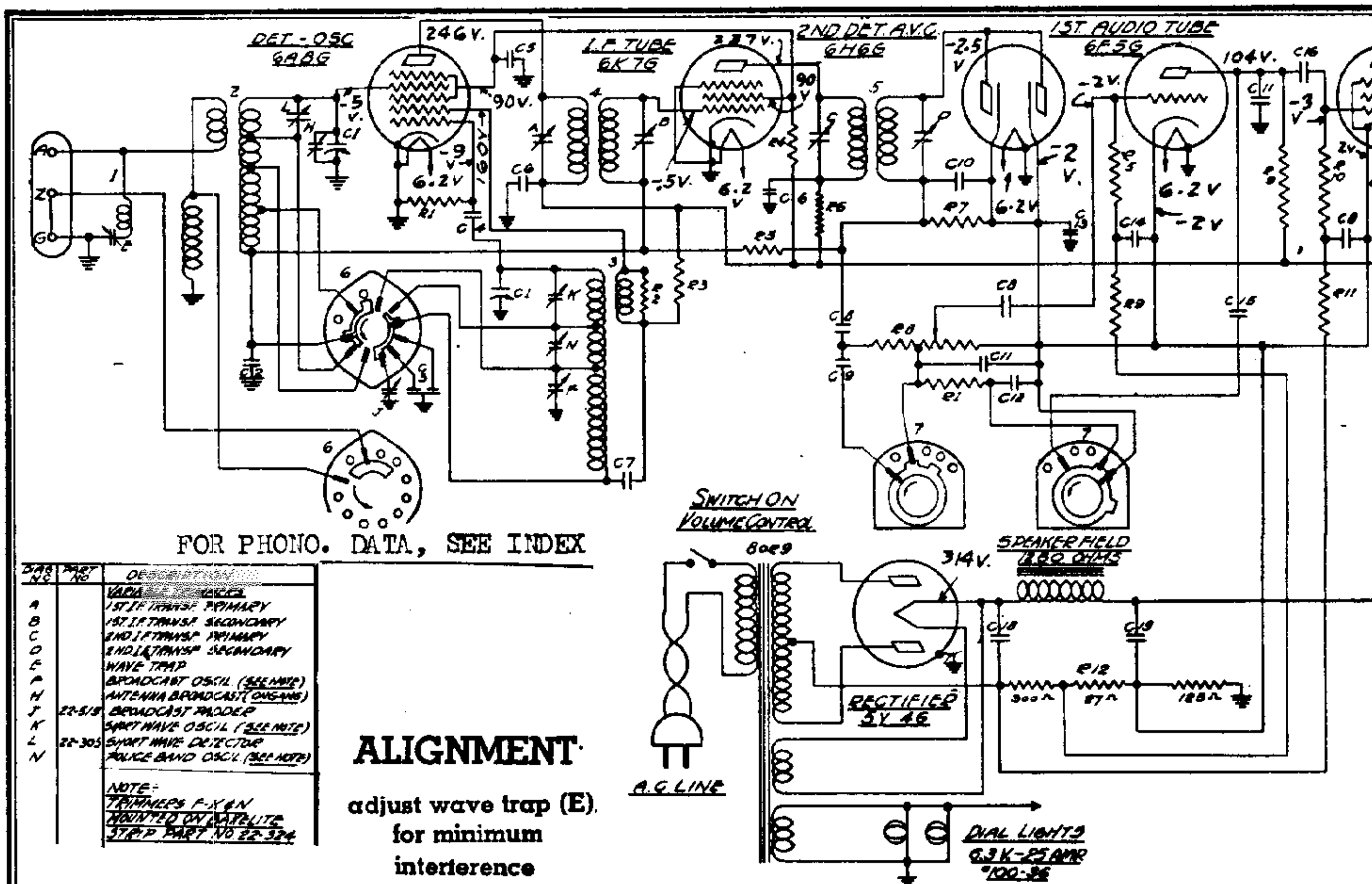
Fig. 11.—Tube Position 8-M-195

MODELS 6S254, 6S256
Chassis 5644

Schematic, Voltage
Socket, Trimmers
Alignment, Parts

ZENITH RADIO CORP.

I.F. FREQUENCY 456 KC
6 TUBE SUPERHETERODYNE -3 BAND
CHASSIS NO 5644



DIAG. NO.	PART NO.	DESCRIPTION	
C1	22-547	TWO GANG VARIABLE COND.	
C2	22-437	.05 MFD	400V
C3	22-558	DUAL FIXED PADDER	
C4	22-127	25 MMFD	600V
C5	22-170	1 MFD	400V
C6	22-212	.05 MFD	400V
C7	22-338	.002 MFD	600V
C8	22-327	.02 MFD	200V
C9	22-188	.00025 MFD	600V
C10	22-168	.0001 MFD	600V
C11	22-167	.0005 MFD	600V
C12	22-386	.003 MFD	400V
C13	22-185	.01 MFD	200V
C14	22-190	1 MFD	200V
C15	22-448	.004 MFD	600V
C16	22-435	.02 MFD	600V
C17	22-480	.002 MFD	600V
C18	22-551	16 MFD ELECTROL. COND.	400V
C19	22-552	20 MFD ELECTROL. COND.	300V
R-1	63-893	47 M OHM	1/4 W ±20
R-2	63-587	4700 OHM	1/4 W ±20
R-3	63-680	10 M OHM	1 W ±20
R-4	63-677	33 M OHM	1 W ±10
R-5	63-271	1 MEGOHM	1/4 W ±20
R-6	63-606	1000 OHM	1/4 W ±20
R-7	63-658	390 M OHM	1/4 W ±10
R-8	63-799	2 MEGOHM VOLUME CONTROL	
R-9	63-286	220 M OHM	1/4 W ±20
R-10	63-597	470 M OHM	1/4 W ±20
R-11	63-325	150 M OHM	1/4 W ±20
R-12	63-613	3 SECTION CANDOHM	
1	20-194	WAVE TRAP ASSEMBLY	
2	S-5073	ANT. COIL & SHIELD ASSEM.	
3	S-5074	OSCIL. COIL & SHIELD ASSEM.	
4	95-446	1ST. I.F. TRANSFORMER	
5	95-417	2ND I.F. TRAN. FORMER	
6	85-113	BAND SELECTOR SWITCH	
7	85-142	TONE CONTROL SWITCH	
8	95-432	POWER TRANSF. 117V 50-60 CYCLE	
9	95-434	POWER TRANSF. ALL VOLT 25 CYCLE	
10		SPEAKER TRANSFORMER	

FOR PHONO. DATA, SEE INDEX

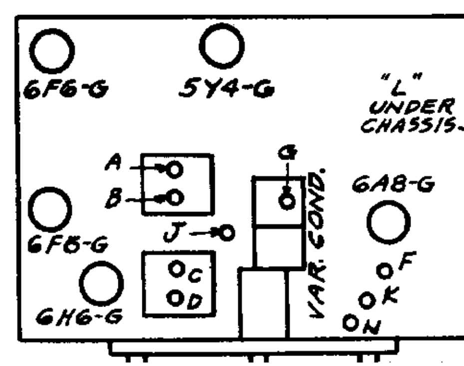
DIAG. NO.	PART NO.	DESCRIPTION
		VARIABLE TRIMMERS
A		1ST I.F. TRANSF. PRIMARY
B		1ST I.F. TRANSF. SECONDARY
C		2ND I.F. TRANSF. PRIMARY
D		2ND I.F. TRANSF. SECONDARY
E		WAVE TRAP
F		BROADCAST OSCIL. (SEE NOTE)
H		ANTENNA BROADCAST (ON GANG)
J	22-519	BROADCAST PADDER
K		SHORT WAVE OSCIL. (SEE NOTE)
L	22-305	SHORT WAVE DETECTOR
N		POLICE BAND OSCIL. (SEE NOTE)

NOTE:
TRIMMERS F-K & N MOUNTED ON BAKELITE STRIP PART NO 22-324

ALIGNMENT

adjust wave trap (E) for minimum interference

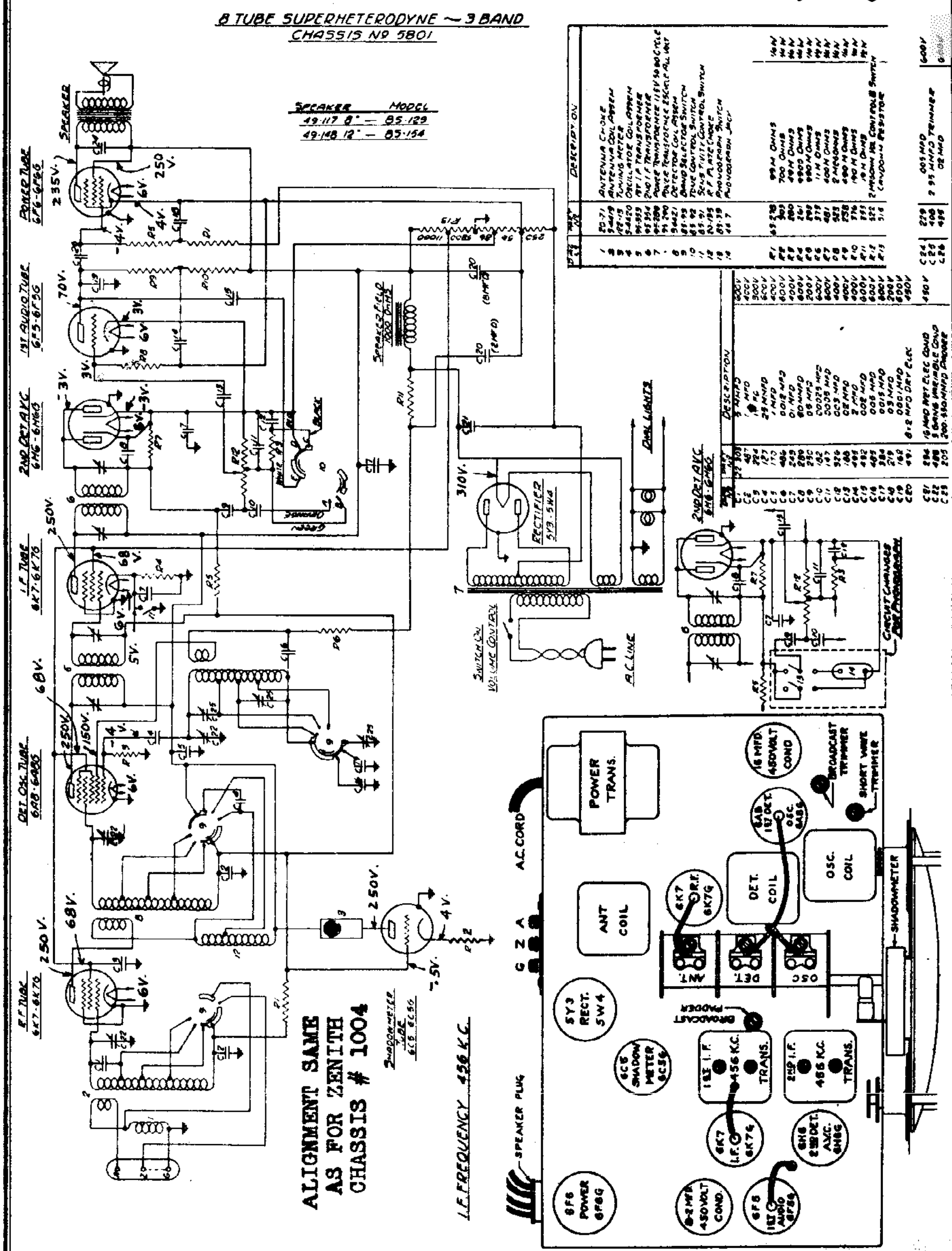
Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	456	"	600	E	See Note
3	" " "	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
4	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
5	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
6	" " "	200 Mmfd.				FG	Repeat 3 & 4
7	" " "	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
8	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output
[illegible]	" " "	[illegible]	[illegible]	[illegible]	[illegible]	N	Rock gang & adj. [illegible]



MODELS 8S129, 8S154
Chassis 5801

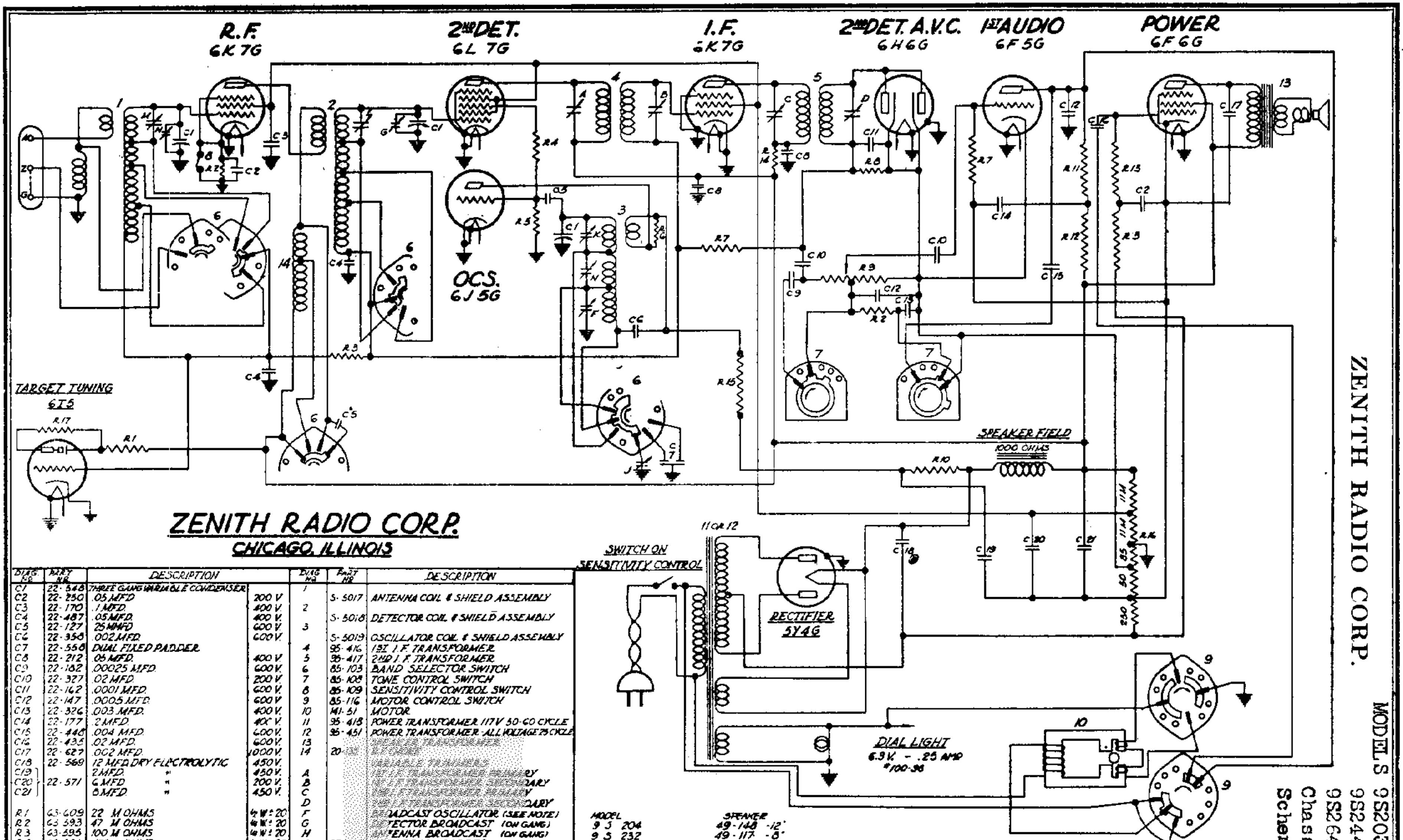
ZENITH RADIO CORP.

Schematic, Socket
Trimmers, Alignment
Parts, Voltage



MODELS 9S203,9S232,9S24
9S244,9S262,9S26
9S264
Chassis 5905
Schematic,Parts

ZENITH RADIO CORP.



ZENITH RADIO CORP.
CHICAGO, ILLINOIS

DIAG. NO.	PART NO.	DESCRIPTION	
C1	22-548	THREE GANG VARIABLE CONDENSER	
C2	22-250	.05 MFD	200 V
C3	22-170	.1 MFD.	400 V.
C4	22-487	.05 MFD.	400 V.
C5	22-127	25 MMFD	600 V.
C6	22-358	.002 MFD.	600 V.
C7	22-558	DUAL FIXED PADDER.	
C8	22-212	.05 MFD.	400 V
C9	22-182	.00025 MFD.	600 V.
C10	22-327	.02 MFD.	200 V.
C11	22-162	.0001 MFD.	600 V.
C12	22-147	.0005 MFD.	600 V
C13	22-326	.003 MFD.	400 V.
C14	22-177	.2 MFD.	400 V.
C15	22-448	.004 MFD.	600 V.
C16	22-435	.02 MFD.	600 V.
C17	22-627	.002 MFD.	1000 V.
C18	22-569	12 MFD. DRY ELECTROLYTIC	450 V.
C19	22-571	2 MFD. "	450 V.
C20		6 MFD "	200 V.
C21		8 MFD "	450 V.
R1	63-609	22 M OHMS	½ W ± 20
R2	63-593	47 M OHMS	¼ W ± 20
R3	63-595	100 M OHMS	¼ W ± 20
R4	63-581	470 OHMS	¼ W ± 20
R5	63-645	27 M OHMS	¼ W ± 10
R6	63-586	3300 OHMS	¼ W ± 20
R7	63-271	1 MEGOHMS	¼ W ± 20
R8	63-658	390 M OHMS	¼ W ± 10
R9	63-568	2 MEGOHM VOLUME CONTROL	
R10	63-608	15 M OHMS	1 W ± 20
R11	63-296	220 M OHMS	¼ W ± 20
R12	63-654	180 M OHMS	¼ W ± 10
R13	63-597	470 M OHMS	¼ W ± 20
R14	63-605	1000 OHMS	½ W ± 20
R15	63-680	10 M OHMS	1 W ± 20
R16	63-570	5 SECTION CANDOHM	
R17		1 MEGOHM MOUNTED IN	

DIAG NO.	PART NO.	DESCRIPTION
1	S-5017	ANTENNA COIL & SHIELD ASSEMBLY
2	S-5018	DETECTOR COIL & SHIELD ASSEMBLY
3	S-5019	OSCILLATOR COIL & SHIELD ASSEMBLY
4	95-416	1ST I.F. TRANSFORMER
5	95-417	2ND I.F. TRANSFORMER
6	85-103	BAND SELECTOR SWITCH
7	85-108	TONE CONTROL SWITCH
8	85-109	SENSITIVITY CONTROL SWITCH
9	85-116	MOTOR CONTROL SWITCH
10	M1-51	MOTOR
11	95-418	POWER TRANSFORMER 117V 50-60 CYCLE
12	95-451	POWER TRANSFORMER-ALL VOLTAGE 25 CYCLE
13		[illegible]
14	20-[illegible]	[illegible]
A		[illegible]RY
B		[illegible]ARY
C		[illegible]Y
D		[illegible]ARY
F		[illegible]ADCAST OSCILLATOR (SEE NOTE)
G		[illegible]TECTOR BROADCAST (ON GANG)
H		[illegible]TENNA BROADCAST (ON GANG)
J	22-[illegible]	[illegible]ADCAST PADDER
K		SHORT WAVE OSCILLATOR (SEE NOTE)
L		SHORT WAVE DETECTOR (SEE NOTE)
M	22-418	SHORT WAVE ANTENNA
N		POLICE BAND OSCILLATOR (SEE NOTE)

NOTE:- TRIMMERS F, K, L & N MOUNTED ON BAKELITE STRIP PART NO 22-549

MODEL	SPEAKER
9 S 204	49-148 12"
9 S 232	49-117 8"
9 S 242	49-205 10"
9 S 244	49-205 10"
9 S 262	49-148 12"
9 S 263	49-148 12"
9 S 264	49-148 12"

FOR ALIGNMENT AND PHONO. DATA, SEE INDEX

I.F.-FREQUENCY 456 K.C.
9 TUBE SUPERHETERODYNE
3 BAND
CHASSIS No 5905
Models 9-S-203, 9-S-232, 9-S-242, 9-S-244, 9-S-262, 9-S-263, 9-S-264

MODELS 6B107,6B129,6B164
Chassis 5635
MODELS 8S129,8S154
Chassis 5801

ZENITH RADIO CORP.

MODELS 12U158,12U159
Chassis 1203 Alignment

MODELS 10S130,10S147,10S153
10S155,10S156,10S157
10S160
Chassis 1004

CHASSIS Nos. 5635-5801-1004

ALIGNMENT PROCEDURE

(1) Connect the output leads of the signal generator to the grid of the first detector and receiver chassis. Also connect an output meter across the speaker transformer leads.

(2) Set the signal generator at 456 K.C. and carefully adjust the four I.F. trimmers to the point giving the highest reading on the output meter. The output transformers are of a very high gain, selective type and these adjustments should be repeated several times in order to secure maximum accuracy. All adjustments should be made using as weak an output from the signal generator as possible in order to prevent the A.V.C. action from affecting the output readings.

(3) Change the signal generator leads to the antenna and ground terminals of the receiver.

(4) Set signal generator at 6 M.C.—Switch receiver to band B, and adjust osc. trimmer on gang for correct dial reading.

(5) Set signal generator at 1400 K.C.—Switch receiver to band A and adjust broadcast trimmer (located in front of oscillator tube—see diagram below) for correct dial reading. Also adjust ant. and det. trimmer on gang to resonance, adjust only the det. trimmer on two gang sets.

(6) Set signal generator at 18 M.C.—Switch receiver to band C and adjust the short wave trimmer while rocking the pointer past 18 M.C. or the dial to the combination giving the greatest output.

(7) Set signal generator at 600 K.C.—Switch receiver to band A, and rock pointer past 600 on dial while adjusting the broadcast padder (located adjacent to gang condenser) to combination giving the greatest output reading.

(8) Re-align broadcast trimmers at 1400 K.C. as outlined in operation 5.

SERVICE NOTES 1004 CHASSIS

OFF SCALE AT LOW FREQUENCY END OF DIAL, UNABLE TO ADJUST BY REGULAR ALIGNMENT—Check 600 padder, broken lug, wire, etc. Also check .0012 condenser in oscillator plate circuit C-6 22-485.

LACK OF SENSITIVITY ON ALL BANDS—Check tubes, antenna and ground—all coils. Poor contact on sensitivity switch—rebalance.

LACK OF SENSITIVITY ON BROADCAST BAND—Open radio frequency plate choke.

NOISY—Tubes, check condenser bond wires to clear chassis; dirty gang condenser or wipers; loose lugs on candohm resister; shorted bus bar wires in coil circuits; aerial and ground. Also loose connecting wire between G and Z on aerial strip.

NOISY ON "C" BAND ONLY IN SPOTS—Check dial pulley—move pulley away from dial pan; condenser bonds do not clear chassis hold. Poor contacts on any of the band, tone or sensitivity switches; defective volume control; defective 16 mmfd. condenser—22-506.

HUM—Tubes, oscillator tube shorted or output tubes not matched; open filter, electrostatic shield open in power transformer. This will give carrier hum and can be corrected by by-passing the A.C. line with .001 mica-condenser. Reverse A.C. plug.

STATIONS RIDE IN—Check balance; check .0012 condenser in oscillator plate circuit.

WEAK OR LACK VOLUME—Open 2nd detector cathode resistor or candohm; will also affect tone quality if open; .00025 condenser grounded in tone circuit, noticeable on high fidelity position of switch, with distortion. Repeak I.F.'s to 456 K.C. Defective tubes, in particular 1st and 2nd detector. Switch on normal and with lack volume—check tone switch for short circuit to foreign lug.

FLUTTERING AT LOW FREQUENCY—Tubes, particularly oscillator tube, rebalance I.F.'s to 456.

INTERMITTENT RECEPTION—Tubes, I.F. trimmers short; dirty variable condenser, poor ground at candohm; loose link wire across Z and G on aerial strip. Poor contact on band switch; defective aerial; defective by-pass condenser.

POOR ACTION OF TARGET TUNER—Note: Do not expect target to center exactly in the center of bull's eye, except on very strong input signal. Check 6C5 tube or replace target unit.

IMPORTANT!

Connect ordinary single wire antenna to A with jumper wire placed between Z and G (shipped from factory in this manner.)

When using a ZENITH DOUBLET ANTENNA, remove jumper wire between Z and G and attach coublet lead-in to A and Z.

Although it is not usually necessary to ground the receiver, there may be occasional instances where a ground connection removes noise or may aid reception of signals. It should be tried and left connected if any improvement is noted. Where it does not help, or if it introduces hum, try reversing the wall plug or leave the ground lead off entirely.

CHASSIS No. 1203

ALIGNMENT PROCEDURE

(1) Connect the output leads of the signal generator to the control grid of the first detector and receiver ground. Also connect an output meter across the speaker transformer leads.

(2) Set the signal generator at 456 K.C. and carefully adjust the four I.F. trimmers to the point giving the highest reading on the output meter. The output transformers are of a very high gain, selective type, and these adjustments should be repeated several times in order to secure maximum accuracy. All adjustments should be made using as weak an output from the signal generator as possible in order to prevent the A.V.C. action from affecting the output readings.

(3) Change the signal generator leads to the antenna and ground terminals of the receiver.

(4) Set signal generator at 1400 K.C.—Switch receiver to Band A and adjust broadcast oscillator trimmer "A" (located on front of chassis) for correct dial reading. Also adjust the R.F. and det. trimmers on gang condenser for greatest output.

(5) Set signal generator at 600 K.C., and rock pointer past 600 K.C. on dial scale, meanwhile adjusting the broadcast padder until combination is reached which gives the greatest output reading.

(6) Readjust broadcast trimmers as outlined in operation No. 4.

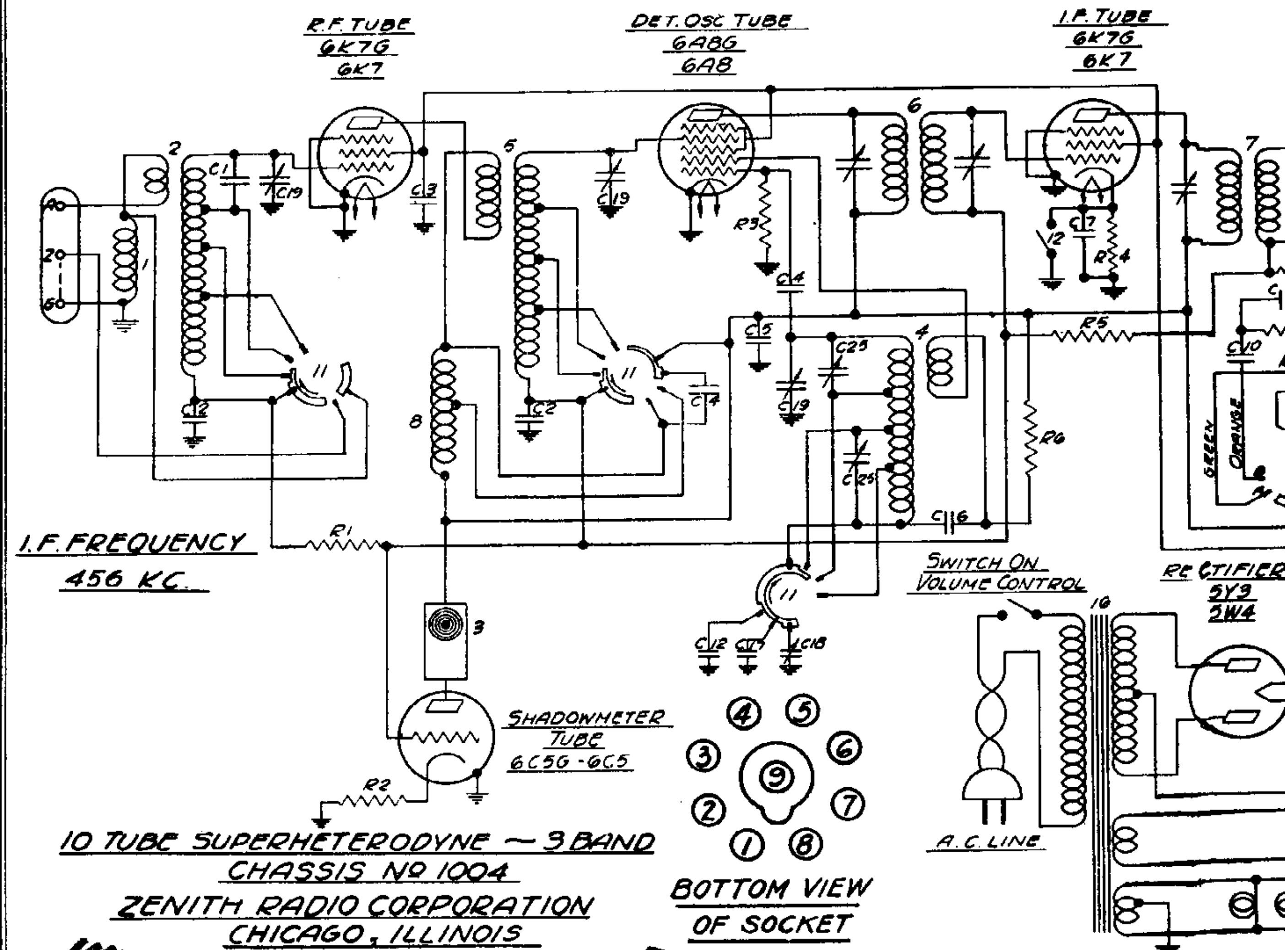
(7) Set signal generator at 5.5 M.C.—Switch receiver to Band B, and adjust trimmer "B" (located on front of chassis) while rocking pointer past 5.5 on dial scale for combination giving the highest output reading.

(8) Set signal generator at 18 M.C.—Switch receiver to Band D and adjust the short wave trimmer "D" (located on front of chassis) while rocking the pointer past 18 M.C. on dial scale to combination giving the highest output reading.

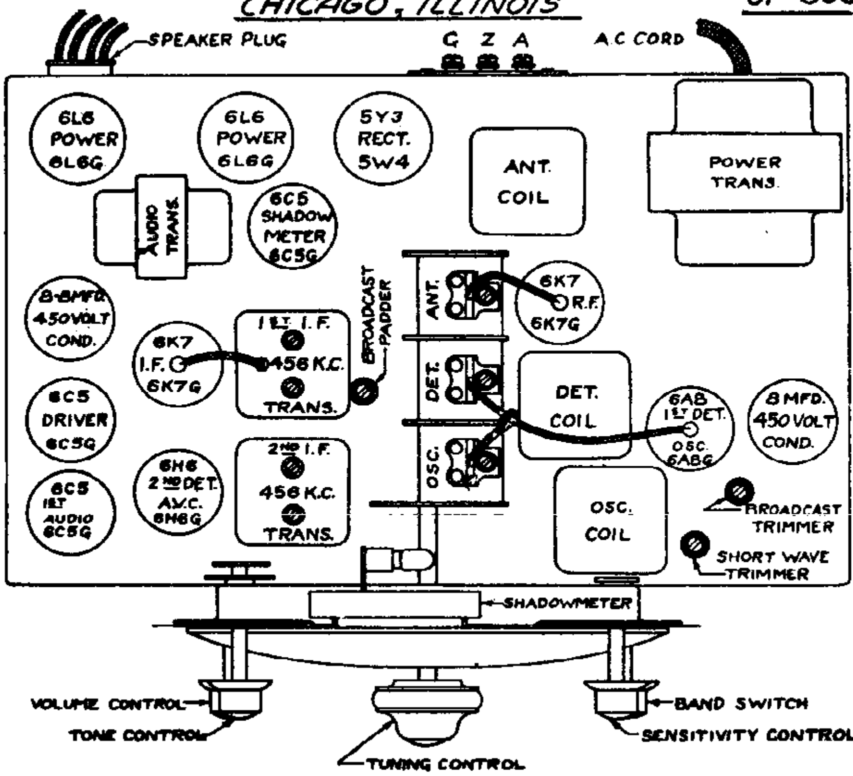
(9) There are no adjustments on the (C) ultra short wave band. Caution! The length and position of the leads on both coil trimmers and band switch greatly affect the tuning on the short wave bands. These leads should not be altered in any way.

SERVICE NOTES ON 1203 CHASSIS

OFF SCALE—Unable to line up and gain drops off—check 20 ohm resistor in screen of 1st detector for open R-16 63-411.—check 50 mmfd condenser in oscillator circuit C4—22-289.
NOISY—Tubes, antenna and ground. Poor contact on band switch; volume control; coil wires short to band switch; poor contact on sensitivity switch. Noisy air trimmers, 16 mfd. screen condenser noisy, C-21—22-506.
NOISY ON "D" BAND—Clear gang bonds away from chassis, center in chassis holes, wire of "D" band tuned circuit shorting, loose solder lugs or terminals.
LACK SENSITIVITY ON "D" BAND—Open coil winding, defective 6H6, 6L7 tubes, poor contact of tube prongs, poor contact on band switch, check antenna, check I.F. peak, 456 K.C. Shorted 25 mmfd condenser in oscillator circuit; if shorted sensitivity will fall off on all bands, but more noticeable on "D" band. Check coupling of wires in "D" band circuit.
NOISY AND OFF SCALE ON "D" BAND—Replace 50 mmfd. in oscillator circuit, will vary scale reading considerably if defective.
STATIONS RIDE IN—Check balance. Check .0012 in oscillator plate circuit.
LACK SENSITIVITY ON ULTRA SHORT WAVE—Note: Do not expect extreme pick-up on this band. However, the following will affect operation of the band—open oscillator coil, open or shorted .0012 condenser, shorted 50 mmfd across H.F coil, grounded trimmer on detector section of gang. Do not alter or change length of wires or position of coils, etc., as this will affect entire short wave band operation—leave or replace all units in position shipped from factory. Open 5 ohm resistor at H.F. coil, will give spotty sensitivity; tubes, in particular 1st detector has a great effect on ultra short wave reception; also aerial installation.
DISTORTION—Tubes, open 16 mfd condenser, output tubes mismatched, 10 mfd. dry electrolytic in cathode circuit shorted; open cathode circuits, defective by-pass condenser; grounded or shorted tone circuit, defective speaker. Distortion only on normal, tone switch lugs are shorted. Also shorted .005 on one of the output tubes, open P.P. transformer.
CARRIER HUM—Open electrostatic shield in power transformer, by-pass A.C. line with approx. .001 micamold. Reverse A.C. plug. Open candohm ground—shorted .005 plate of output tube, grounded tap on volume control, tubes 6C5, 6H6 and output.
LACKS HIGHS—Poor contact on tone switch .00025 open; if tap on volume control is open, tone control will have no effect.
DEAD—Audio but no R.F. signals. 5 meter coil broken loose from gang terminal. Shorted air trimmer, gang trimmer shorted, open resistor in plate 1st audio. Tubes, filters shorted or by-pass condenser. Open coils.
B. C. OFF SCALE—Check pointer—line up across dial scale parallel to line with gang closed. Note: Air trimmer for "B" band as shown in earlier receivers and listed in technical book not used on later models. B.C. and D trimmers in same position as shown—follow usual line up procedure.



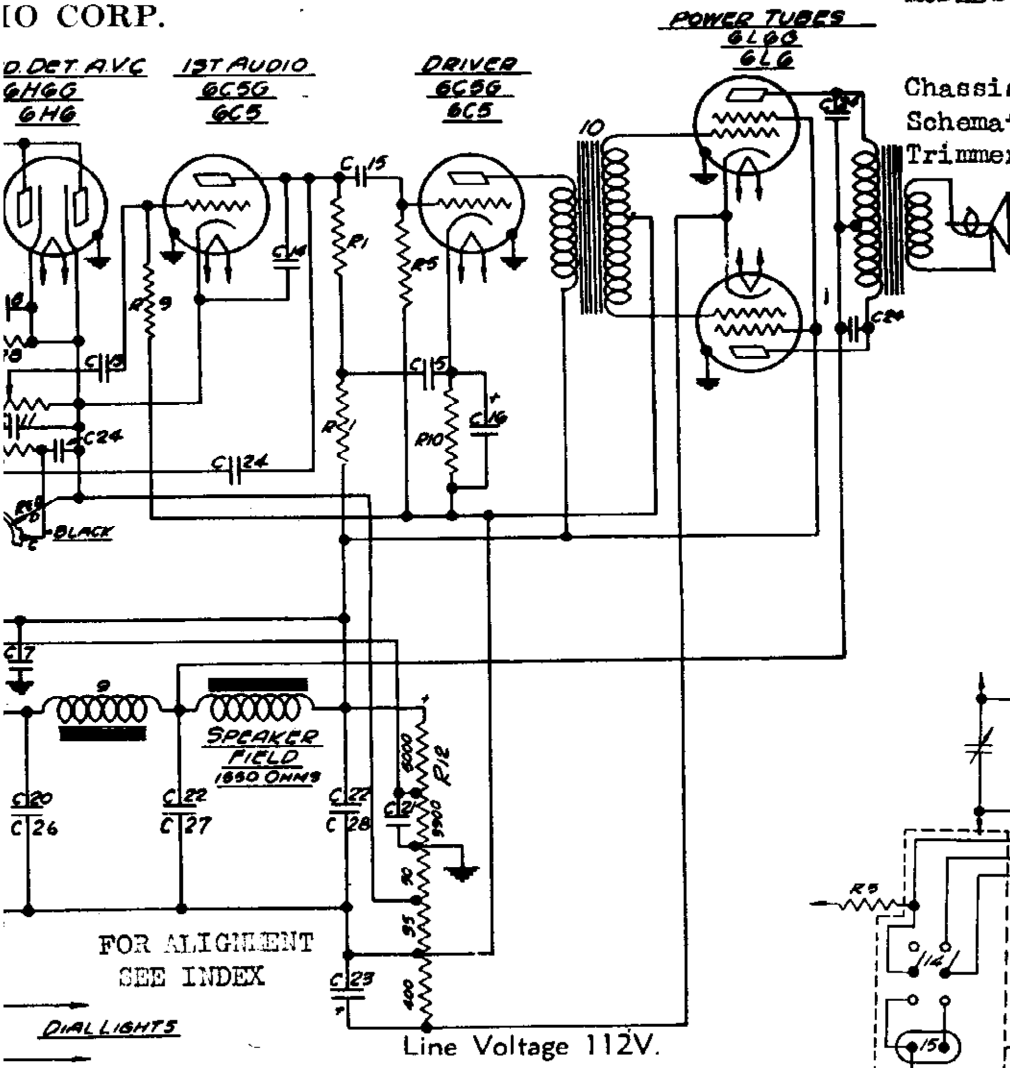
10 TUBE SUPERHETERODYNE ~ 3 BAND
CHASSIS Nº 1004
ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS



DIAG Nº	PART Nº	DESCRIPTION		DIAG Nº	PA…
C1	22-303	5 MMFD	600V	1	20
C2	487	.05 MFD	400V	2	S4
C3	224	.1 MFD	300V	3	22
C4	127	25 MMFD	600V	4	S4
C5	170	1 MFD	400V	5	S4
C6	486	.0012 MFD	600V	6	95-
C7	243	01 MFD	400V	7	95-
C8	289	50 MMFD	600V	8	20-
C9	250	.05 MFD	200V	9	95-
C10	182	.00025 MFD	600V	10	95-
C11	147	.0005 MFD	600V	11	85-
C12	485	.005 MFD	600V	12	85-
C13	188	.02 MFD	400V	13	85-
C14	162	.0001 MFD	600V	14	85-
C15	435	02 MFD	600V	15	44
C16	507	10 MFD DRY ELEC. COND	25V	16	95-
C17	384	.0015 MFD	600V		95-
C18	205	200-550 MMFD OSC PADDER			
C19	488	3 GANG VARIABLE COND			
C20	504	8 MFD WET ELEC. COND. 60CYCLE	450V		
C21	500	16 MFD WET ELEC COND	250V		
C22	493	8x8 MFD DRY ELEC. COND 60~	450V		
C23	405	10 MFD DRY ELEC COND	50V		
C24	229	.005 MFD	600V		
C25	408	2-35 MMFD TRIMMER			
R1	63-278	99 M OHMS	1/4 W		
R2	303	700 OHMS	1/4 W		
R3	280	49 M OHMS	1/4 W		
R4	261	9900 OHMS	1/4 W		
R5	293	990 M OHMS	1/4 W		
R6	373	11 M OHMS	1/2 W		
R7	260	100 M OHMS	1/4 W		
R8	385	300 M OHMS	1/4 W		
R9	525	2 MEGOHMS	1/4 W	C26	22
R10	300	990 OHMS	1/4 W	C27	22
R11	522	2 MEGOHM VOLUME CONT & SW		C28	
R12	516	CANDOHM RESISTOR			

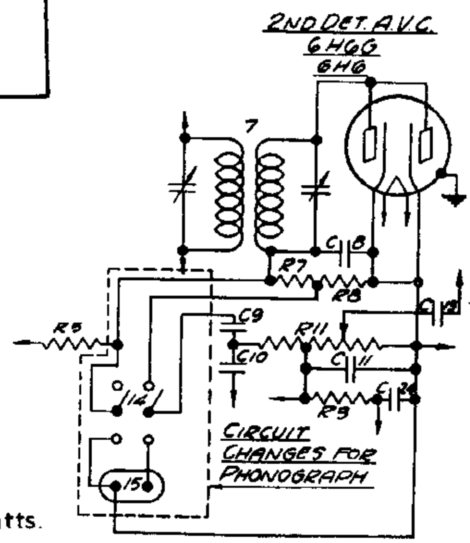
IO CORP.

MODELS 10S130, 10S147, 10S153
10S155, 10S156, 10S157
10S160
Chassis 1004
Schematic, Voltage, Socket
Trimmers, Phono. Data, Parts



SPEAKER		MODEL
49-146	8"	10S130
49-147	12"	10S155, 10S156, 10S160
49-156	12"	10S147, 10S153, 10S157

FOR ALIGNMENT SEE INDEX



Line Voltage 112V.
Current Consumption 110 watts.
Power Output 12 watts.

DESCRIPTION
NTENNA CHOKE
NTENNA COIL ASSEM
NING METER
SCILLATING COIL ASSEM
TECTOR COIL ASSEM
T I F TRANSFORMER
D I.F TRANSFORMER
F PLATE CHOKE
OWER CHOKE
UDIO TRANSFORMER
AND SELECTOR SWITCH
NSITIVITY CONT. SWITCH
NE CONTROL SWITCH
HONOGRAPH SWITCH
HONOGRAPH JACK
WER TRANS 115V 50-60 CYCLE
WER TRANS 25 CYCLE - ALL VOLTAGE

OTE —
#22-510 8x8x8 MFD DRY ELECTROLYTIC REPLACES 2-493 & #22-506. #22-512-MFD DRY ELECTROLYTIC REPLACES #22-504 8 MFD WET ELECTROLYTIC IN MODEL 5-147 END TABLE.

MFD WET ELEC COND. 25 CYCLE 450V
MFD DRY ELEC COND 25 CYCLE 450V
MFD DRY ELEC. COND 25 CYCLE 450V

SOCKET VOLTAGES

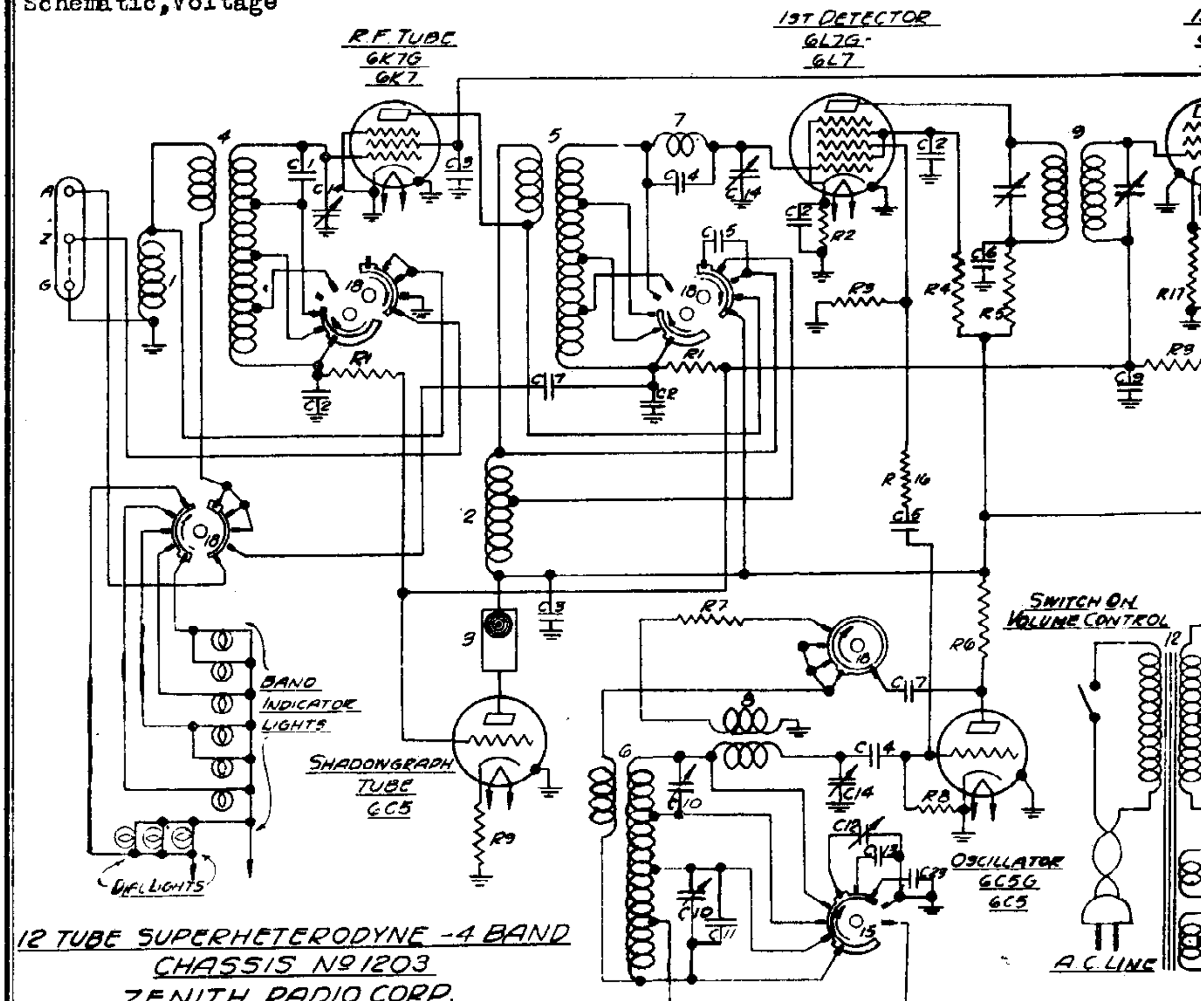
Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	3AC	250	100	0	—	3AC	0	0
6A8	1st Det. Osc.	0	3AC	250	100	−6.5	175	3AC	0	0
6K7	I. F.	0	3AC	250	100	0	—	3AC	Local 9	0
6H6	2nd Det. A.V.C.	0	3AC	−2.5	.25	−2.5	—	3AC	−2.5	—
6C5	1st Audio	0	3AC	45	—	−2	—	3AC	−2.5	—
6C5	Driver	0	3AC	235	—	−2	—	3AC	2	—
6L6	Power	0	3AC	320	120	−4	—	3AC	13	—
6C5	Target Tuning Amp.	0	3AC	250	—	−.5	—	3AC	4	—
5Y3 5W4	Rectifier	0	340	—	AC	—	AC	—	340	—

All voltages measured from point indicated to ground, using a 1000 ohm per volt meter. Antenna and ground disconnected.

MODELS 12U158,12U159
Chassis 1203
Schematic,Voltage

Socket,Trimmers
Phono. Data,Parts

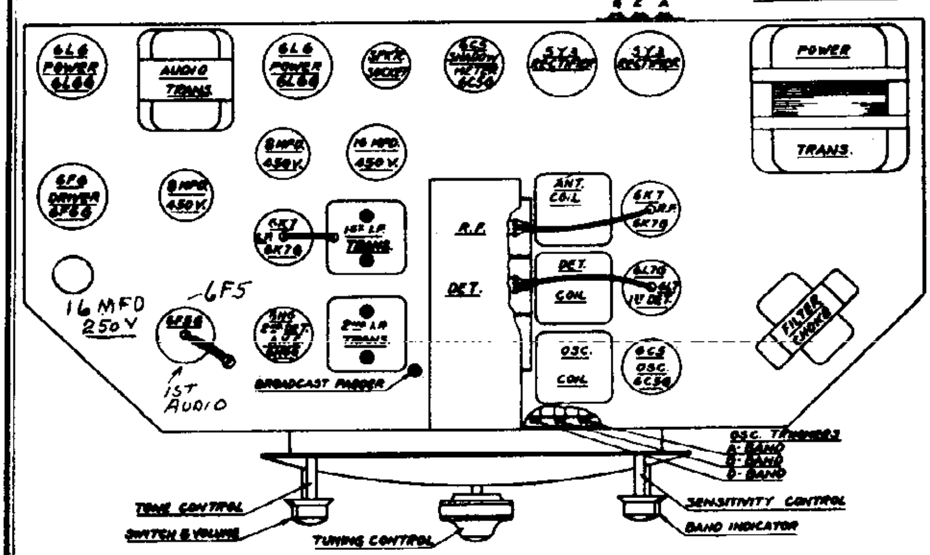
ZENIT



12 TUBE SUPERHETERODYNE - 4 BAND
CHASSIS Nº 1203
ZENITH RADIO CORP.
CHICAGO, ILL.

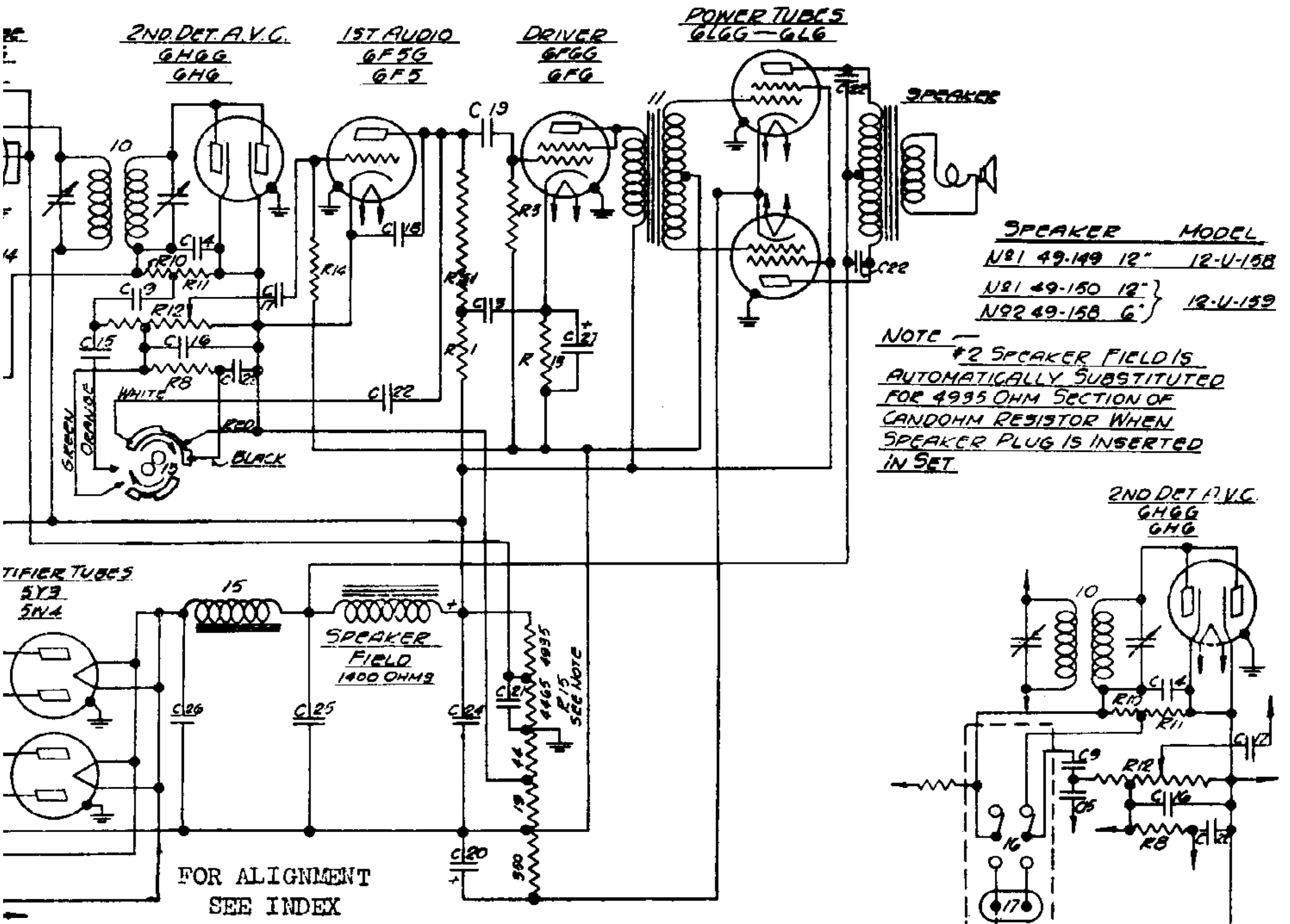
I.F. FREQUENCY 456 KC

SOCK



TUBE POSITION

Tube	Position	1
6K7	R. F.	0
6L7	1st Det.	0
6C5	Osc.	0
6K7	I. F.	0
6H6	2nd Det. A.V.C.	0
6F5	1st Audio	0
6F6	Driver	0
6L6	Power	0
6C5	Target Tuning Amp.	0
5Y3 5W4	Rectifier	0



Line Voltage 112V.

Current Consumption 120 watts.

Power Output 17 watts.

VOLTAGES

	3	4	5	6	7	8	9
C	235	100	0	—	3AC	0	0
C	230	120	–.5	—	3AC	0	0
C	185	—	–8	—	3AC	0	—
C	235	100	0	—	3AC	Local 9	0
	–2.5	–2.5	–2.5	—	3AC	–2.5	—
C	—	90	—	—	3AC	–2.5	—
	215	215	–.5	—	3AC	11	—
C	330	210	–3	—	3AC	14	—
C	230	—	0	—	3AC	0	—
0	—	AC	—	AC	—	340	—

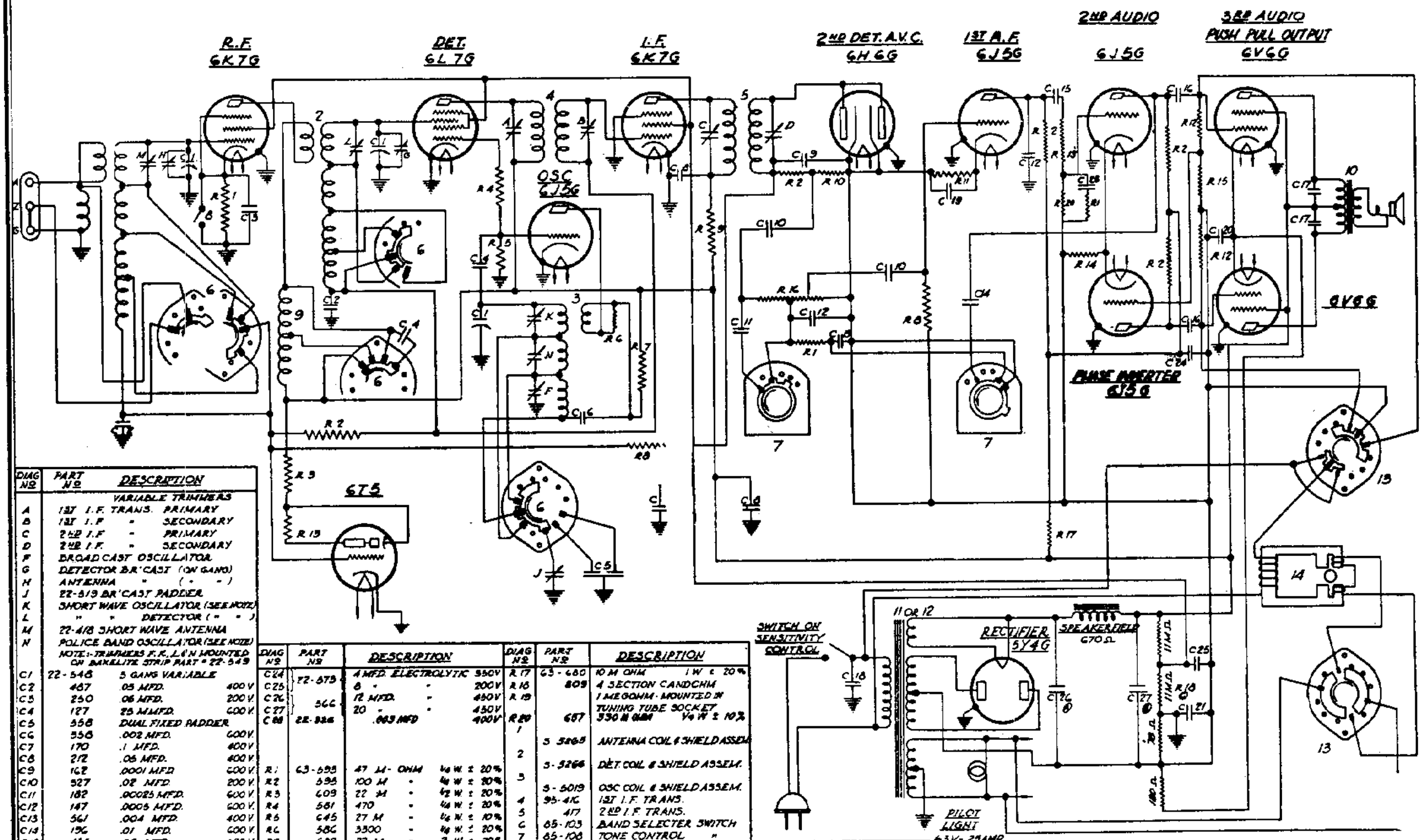
DIAG Nº	PART Nº	DESCRIPTION	
C1	22-303	5 MMFD	600V
C2	487	.05 MFD	400V
C3	170	.1 "	400V
C4	289	50 MMFD	600V
C5	127	25 MMFD	600V
C6	212	05 MFD	400V
C7	486	.0012 "	600V
C8	243	.01 "	400V
C9	250	.05 "	200V
C10	508	TRIMMER COND	
C11	285	10MMFD	600V
C12	205	200-550 MFD PADDER	
C13	384	0015 MFD	600V
C14	489	3 GANG VARIABLE	
C15	182	00025 MFD	600V
C16	147	0005 "	600V
C17	188	02 "	400V
C18	162	.0001 "	600V
C19	495	02	600V
C20	509	10 MFD DRY ELEC COND	50V
C21	506	16 " WET " "	250V
C22	229	.005 MFD (TUBULAR)	600V
C23	485	.005 "	600V
C24	125	8 MFD WET ELEC. COND	450V
C25	294	16 " " " "	450V
C26	304	8 " " " (CHROM)	450V
C27	405	10 " DRY " COND.	50V
R1	63-278	99 M OHM	¼W
R2	357	900 "	¼W
R3	295	990 M "	¼W
R4	208	12 M "	1W
R5	436	990 "	½W
R6	532	5100 "	1W
R7	550	5 "	¼W
R8	280	49 M "	¼W
R9	303	700 "	¼W

DIAG Nº	PART Nº	DESCRIPTION	
R10	63-260	100 M OHMS	¼W
R11	385	300 M "	¼W
R12	522	2 MEGOHM VOL CONT & SW.	
R13	581	650 OHM	1W
R14	529	2 MEGOHM	¼W
R15	528	CANDOHM	
R16	411	20 OHM	¼W
R17	261	9900 OHM	¼W
1	20-71	ANTENNA CHOKE	
2	20-136	R.F. PLATE "	
3	122-14	TUNING METER	
4	S4545	ANTENNA COIL ASSEM	
5	S4546	DETECTOR " "	
6	S4547	OSCILLATOR " "	
7	S4387	H.F. DETECTOR " "	
8	S-4388	H.F. OSCILLATOR " "	
9	95-368	1ST I.F. TRANS	
10	95-369	2ND I.F. "	
11	95-367	AUDIO "	
12	95-570	POWER " 115V 50-60 CYCLE	
	95-573	" " 25 CYCLE ALL VOLT	
13	85-92	TONE CONT SWITCH	
14	85-91	SENSITIVITY CONT SW	
15	95-366	POWER CHOKE	
16	85-89	PHONO SWITCH	
17	44-7	" JACK	
18	85-94	BAND SELECTOR SWITCH	

MODELS 12S205,12S2
12S245,12S2
12S266,12S2
12S268

Chassis 1204
Schematic,Parts

ZENITH RADIO CORP.



FOR PHONO. DATA SEE INDEX

DIAG NO	PART NO	DESCRIPTION	
		VARIABLE TRIMMERS	
A		1ST I.F. TRANS. PRIMARY	
B		1ST I.F. " SECONDARY	
C		2ND I.F. " PRIMARY	
D		2ND I.F. " SECONDARY	
F		BROADCAST OSCILLATOR	
G		DETECTOR BR'CAST (ON GANG)	
H		ANTENNA " (" ")	
J		22-519 BR'CAST PADDER	
K		SHORT WAVE OSCILLATOR (SEE NOTE)	
L		" " DETECTOR (" ")	
M		22-418 SHORT WAVE ANTENNA	
N		POLICE BAND OSCILLATOR (SEE NOTE)	
		NOTE:- TRIMMERS F.K., L & N MOUNTED ON BAKELITE STRIP PART # 22-549	
C1	22-548	3 GANG VARIABLE	
C2	467	.05 MFD.	400 V
C3	250	.06 MFD.	200 V.
C4	127	25 MMFD.	600 V.
C5	558	DUAL FIXED PADDER	
C6	556	.002 MFD.	600 V.
C7	170	.1 MFD.	400 V
C8	212	.06 MFD.	400 V.
C9	162	.0001 MFD.	600 V.
C10	527	.02 MFD.	200 V.
C11	182	.00025 MFD.	600 V.
C12	147	.0005 MFD.	600 V.
C13	561	.004 MFD.	400 V.
C14	156	.01 MFD.	600 V.
C15	435	.02 MFD.	600 V.
C16	171	.05 MFD.	600 V.
C17	229	.005 MFD.	600 V.
C18	525	.005 MFD.	1000 V.
C19	572	10 MFD ELECTROLYTIC	25 V.
C20		10 " "	25 V.
C21		10 " "	25 V.

DIAG NO	PART NO	DESCRIPTION	
C24	22-573	4 MFD. ELECTROLYTIC	350V
C25		8 " "	200V
C26	566	12 MFD. "	450V
C27		20 " "	450V
C28	22-326	.003 MFD	400V
R1	63-593	47 M-OHM	1/4 W. ± 20%
R2	593	100 M "	1/4 W. ± 20%
R3	609	22 M "	1/2 W. ± 20%
R4	561	470 "	1/4 W. ± 20%
R5	645	27 M "	1/4 W. ± 10%
R6	586	3300 "	1/4 W. ± 20%
R7	682	22 M "	2 W. ± 20%
R8	271	1 MEG OHM	1/4 W. ± 20%
R9	605	1000 OHM	1/2 W. ± 20%
R10	596	330 M "	1/4 W. ± 20%
R11	282	2200 "	1/4 W. ± 10%
R12	260	100 M "	1/4 W. ± 10%
R13	653	150 M "	1/4 W. ± 10%
R14	439	2700 "	1/4 W. ± 10%
R15	639	6800 "	1/4 W. ± 10%
R16	568	2 MEGOHM VOLUME CONTROL	

DIAG NO	PART NO	DESCRIPTION
R17	63-680	10 M OHM 1 W. ± 20%
R18	809	4 SECTION CANDOHM
R19		1 MEGOHM - MOUNTED IN TUNING TUBE SOCKET
R20	667	330 M OHM 1/4 W ± 10%
1	S 5265	ANTENNA COIL & SHIELD ASSEM.
2	S-5266	DET. COIL & SHIELD ASSEM.
3	S-5019	OSC COIL & SHIELD ASSEM.
4	95-416	1ST I.F. TRANS.
5	417	2ND I.F. TRANS.
6	85-103	BAND SELECTER SWITCH
7	85-108	TONE CONTROL "
8	85-109	SENSITIVITY "
9	20-135	R.F. CHOKE
10		SPEAKER TRANS.
11	95-421	POWER TRANS 117V-50-60 CYCLE
12	95-455	" " ALL VOLTAGE 25 CYCLE
13	85-120	MOTOR CONTROL SWITCH
14	141-51	MOTOR

MODEL	SP'KR PART NO	SIZE
12 S-205	49-185	12
12 S-232	49-183	8
12 S-245	49-184	12
12 S-265	49-185	12
12 S-266	49-185	12
12 S-267	49 185	12
12 S-268	49-185	12

I.F. FREQUENCY 456 K.C.
12 TUBE SUPERHETERODYNE
3 BAND

ZENITH RADIO CORP.
CHICAGO, ILLINOIS

MODELS 9S203, 9S232, 9S242
9S244, 9S262, 9S263
9S264
Chassis 5905

ZENITH RADIO CORP.

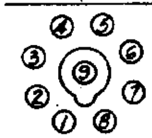
Voltage, Alignment
Socket, Trimmers

MODELS 12S205, 12S232
12S245, 12S265
12S266, 12S267
12S268
Chassis 1204

CHASSIS 5905
MODEL 9S series

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	0	240	80	0	—	6.2	0	—2
6L7	Converter	0	6.2	240	80	—7	—	0	0	—1
6J5	Osc.	0	6.2	130	—	—8	—	0	0	—
6K7	I.F.	0	6.2	237	80	0	—	0	0	—1
6H6	2nd Det. A.V.C.	0	0	—2.5	—2	—2.5	—	6.2	—2	—
6F5	1st Audio	0	0	—	82	—	—	6.2	—2	—2.5
6F6	Power	0	0	225	240	—3.5	—	6.2	—4.5	—
5Y4	Rect.	0	—	AC	—	AC	—	298	298	—
		H	Ep	Eg	Et	Ek	H			
6T5	Target	0	10	—2	240	—2	6.2			



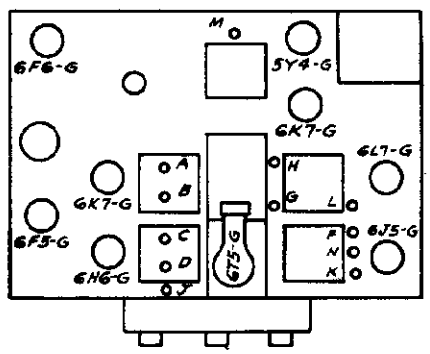
BOTTOM VIEW OF SOCKET

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 75W. Power output 4.5W.

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	GH	Algnt. of Ant. & Det
4	" " "	200 Mmfd.	600	"		J	Rock gang & adj. for max. output
5				"		FGH	Repeat 2 & 3
6	Rec. Ant. Post	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
7	" " "	400 Ohms	16500	S.W.	16500	LM	Rock gang & adj. for max. output
8	" " "	400 Ohms	5500	Police	5500	N	Rock gang & adj. for max. output

LOCATION OF TRIMMERS



CHASSIS 1204
Model 12S series

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	3.2	246	83	0	—	3.2	0	0
6L7	Converter	0	3.2	243	83	—10	—	3.2	0	0
6J5	Osc.	0	3.2	121	—	—10.5	—	3.2	0	—
6K7	I. F.	0	3.2	237	83	0	—	3.2	0	0
6H6	2nd Det. A.V.C.	0	3.2	—2	—1.5	—2	—	3.2	-1.5	—
6J5	1st Audio	0	3.2	70	—	—.5	—	3.2	-1.5	—
6J5	2nd Audio	0	3.2	74	—	—2	—	3.2	-.5	—
6J5	Inverter	0	3.2	76	—	—2	—	3.2	-.5	—
6V6	Power	0	3.2	231	240	—2.5	—	3.2	8	—
6V6	Power	0	3.2	231	240	—2.5	—	3.2	8	—
5Y4	Rect.	0	—	AC	—	AC	—	318	318	—
		H	Ep	Eg	Et	Ek	H			
6T5	Target	3.2	13	—1.5	240	—1.5	3.2			

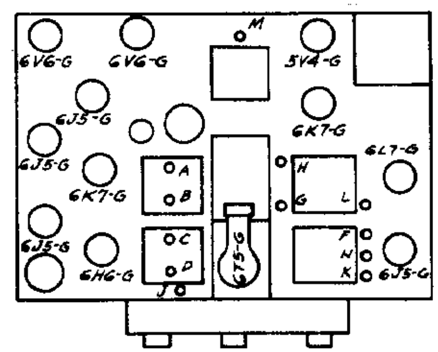
BOTTOM VIEW OF SOCKET

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 110W. Power output 15W.

ALIGNMENT PROCEDURE

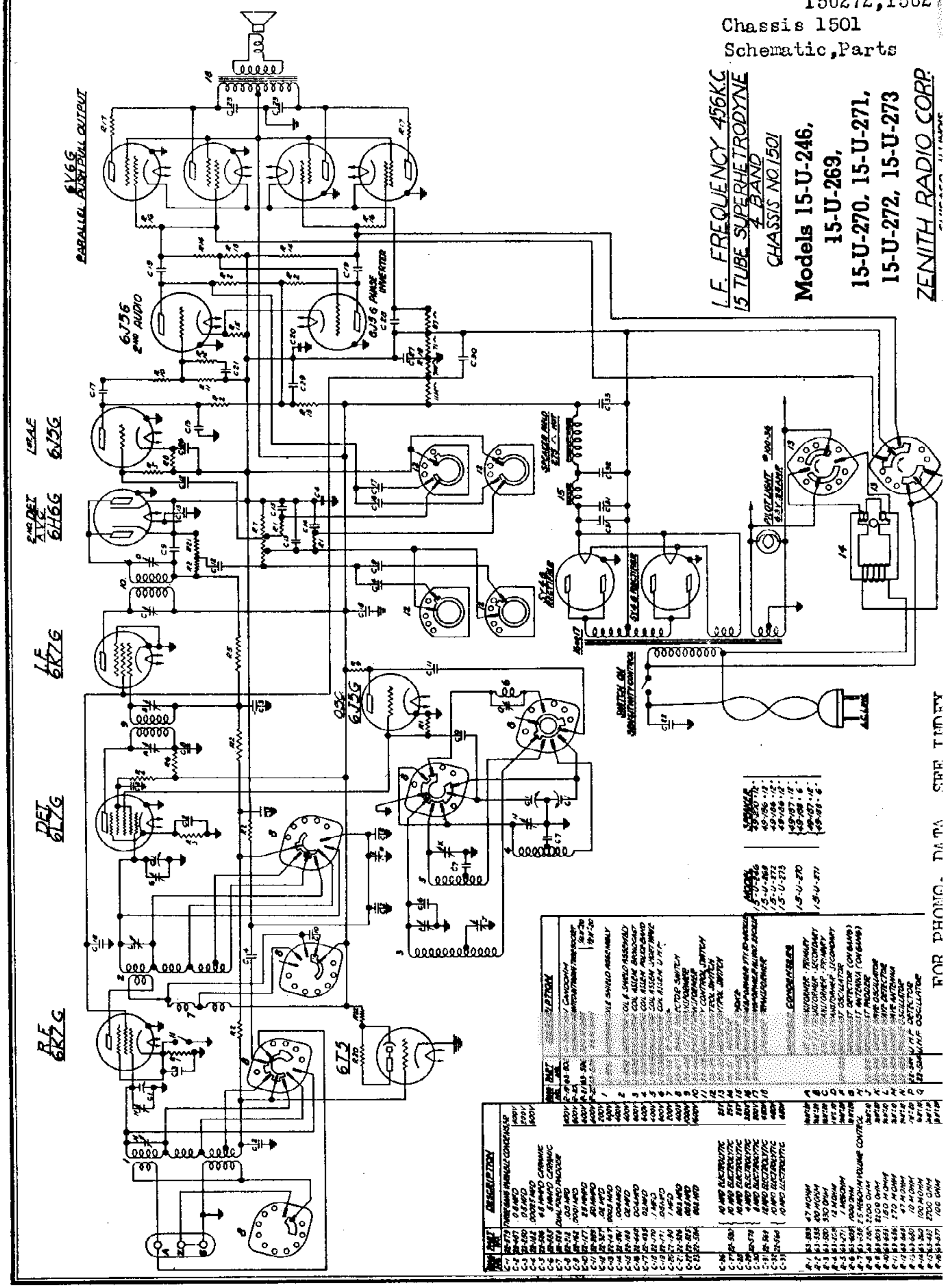
Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	GH	Algnt. of Ant & Det
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5						FGH	Repeat 2 & 3
6	Rec. Ant. Post	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
7	" " "	400 Ohms	16500	S.W.	16500	LM	Rock gang & adj. for max. output
8	" " "	400 Ohms	5500	Police	5500	N	Rock gang & adj. for max. output

LOCATION OF TRIMMERS



MODELS 15U246,15U2
15U270,15U27
15U272,15U27
Chassis 1501
Schematic,Parts

ZENITH RADIO CORP.

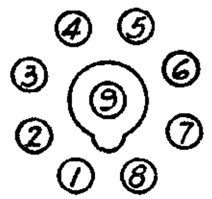


MODELS 15U246, 15U269
15U270, 15U271
15U272, 15U273

ZENITH RADIO CORP.

Chassis 1501
Voltage, Alignment
Socket, Trimmers

SOCKET VOLTAGES



BOTTOM VIEW OF SOCKET

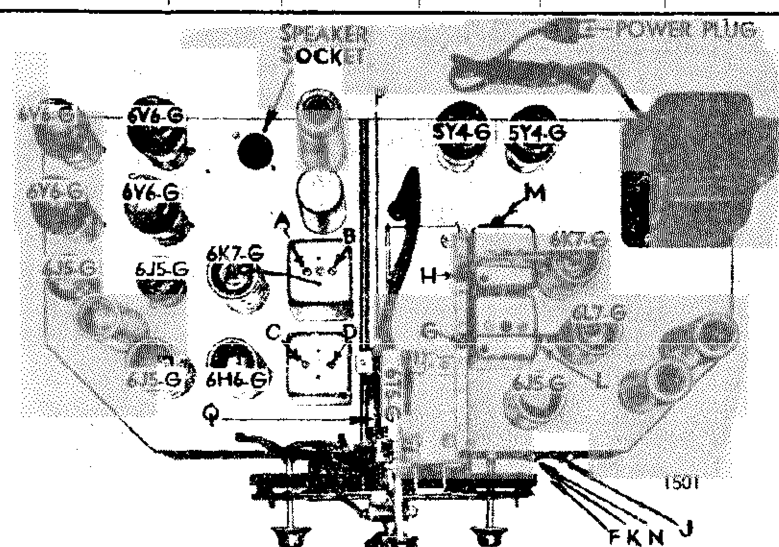
Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	3	250	93	0	—	3	0	—3
6L7	Converter	0	3	250	153	—8	—	3	3	—2
6J5	Osc.	0	3	225	—	—8	—	3	0	—
6K7	I. F.	0	3	250	93	0	—	3	0	—1
6H6	2nd Det. AVC	0	3	—3	—3	—3	—	3	—3	—
6J5	1st Audio	0	3	53	—	—.1	—	3	—.1	—
6J5	2nd Audio	0	3	82	—	—.5	—	3	1.5	—
6J5	Inverter	0	3	82	—	—2.5	—	3	1.5	—
6V6	Power	0	3	243	250	—1	—	3	8	—
6V6	Power	0	3	243	250	—1	—	3	8	—
6V6	Power	0	3	243	250	—1	—	3	8	—
6V6	Power	0	3	243	250	—1	—	3	8	—
5Y4	Rect.	0	—	AC	—	AC	—	320	320	—
5Y4	Rect.	0	—	AC	—	AC	—	320	320	—
		Eh	Ep	Eg	Et	Ek	Eh			
6T5	Target	3	11	—3	216	—3	3			

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 160W. Power output 30W.

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	GH	Algnt. of Ant. & Det
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5				"		FGH	Repeat 2 & 3
6	Rec. Ant. Post	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
7	" " "	400 Ohms	16500	S.W.	16500	LM	Rock gang & adj. for max. output
8	" " "	400 Ohms	5500	Police	5500	N	Rock gang & adj. for max. output
9	" " "	400 Ohms	40000	U.H.F.	40000	Q	Set Osc. to Scale
10	" " "	400 Ohms	40000	U.H.F.	40000	P	Rock gang & adj. for max. output

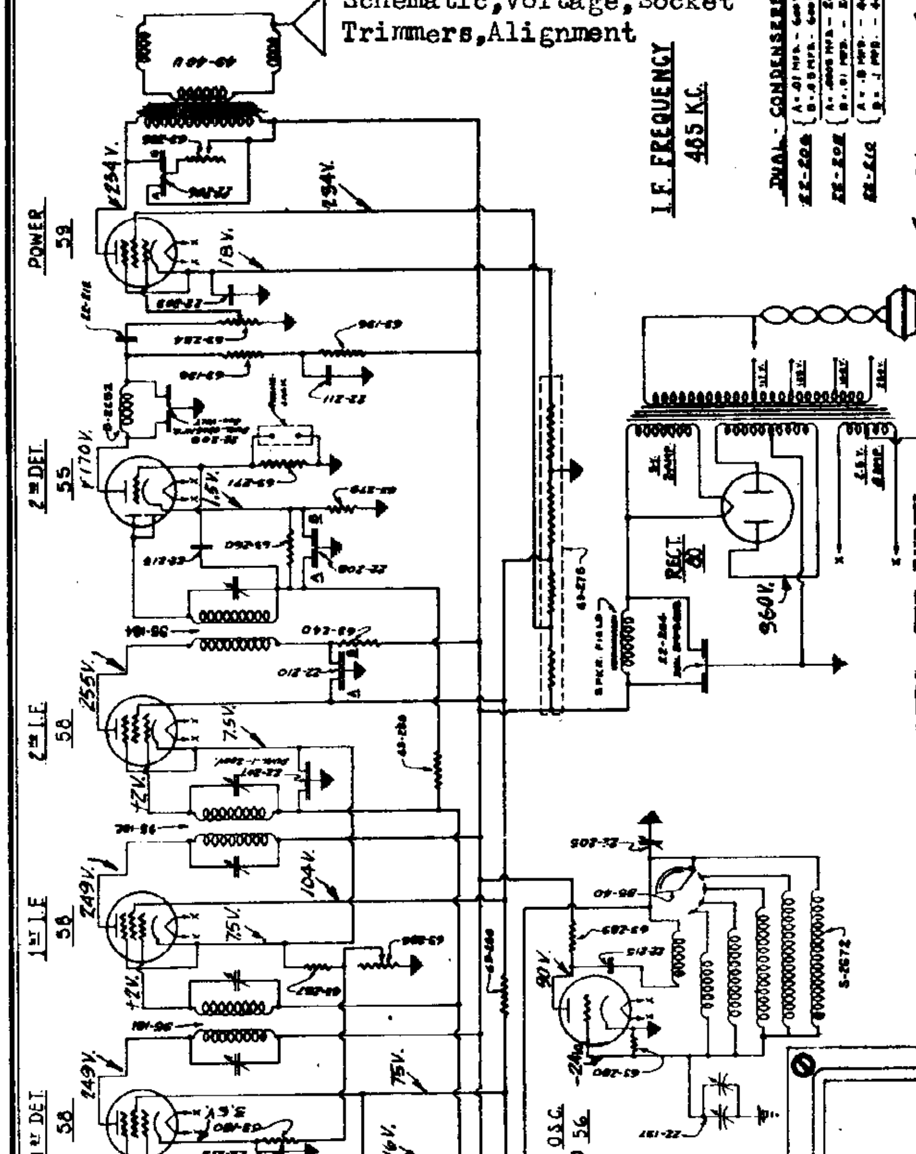
LOCATION OF TRIMMERS

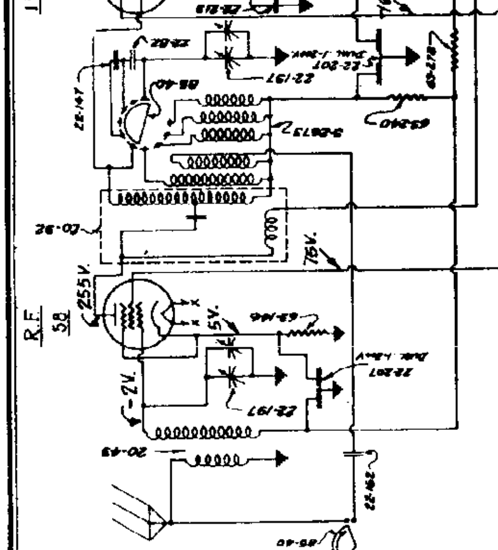


MODELS 258,268,278,280
281,288,289,478
558,568,578,589
590

ZENITH RADIO CORP.

Chassis 2051
Schematic,Voltage,Socket
Trimmers,Alignment



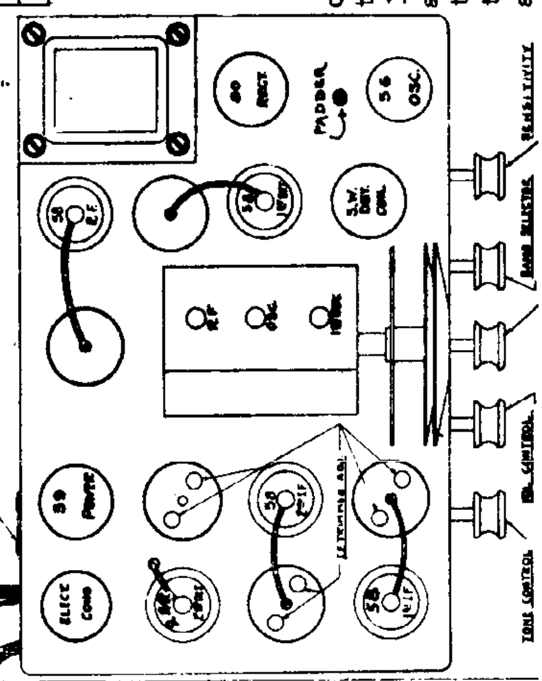


FOR PARTS VALUES, SEE INDEX

March 10,1933

NOTE: Voltages are indicated on the Schematic Diagram. Measurements to be taken from point indicated to Ground, with a 1000 ohm per volt meter.

Tube Layout

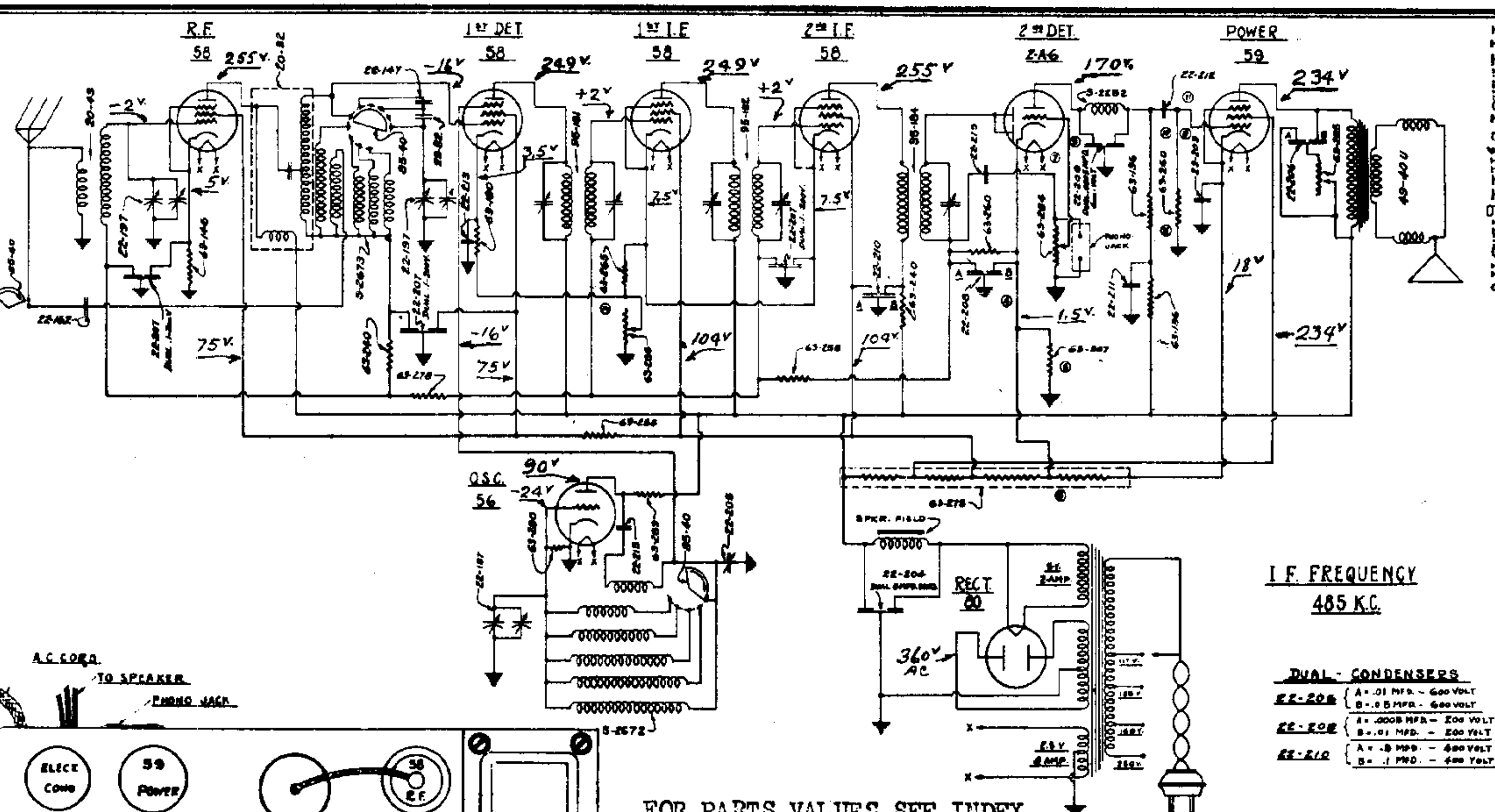


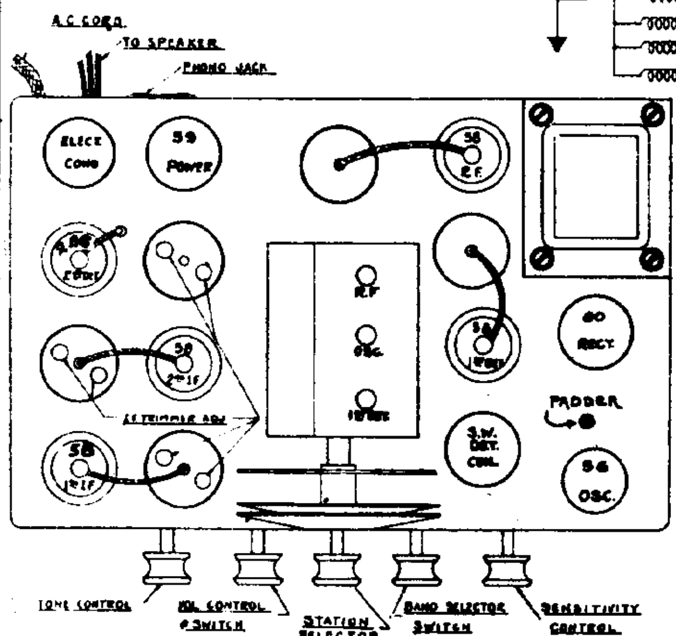
Aligning Procedure

First adjust I.F. trimmers by attaching an accurate 485 K.C. test oscillator to the grid of the 1st detector and ground. Remove oscillator tube and turn I.F. adjusting screws indicated on the diagram below. Insert oscillator tube and connect the test oscillator to the aerial and ground posts. Set the test oscillator and dial to 1500 and turn the three trimmers on the tuning condenser to resonance, then turn the test oscillator and dial to 600 K.C. and set the padder condenser to a position which gives greatest output. Repeat the entire procedure

MODELS 258,268,278,280
281,288,289,478
558,568,578,589
590 Revised
Chassis 2051 - Late
Schematic,Voltage,Socket
Trimmers,Alignment

ZENITH RADIO CORP.





FOR PARTS VALUES, SEE INDEX

STANDARD AND SHORT WAVE

REVISED 3-10-33

8 TUBE SUPERHETERODYNE
CHASSIS # 2051

Aligning Procedure

First adjust I.F. trimmers by attaching an accurate 485 K.C. test oscillator to the grid of the 1st detector and ground. Remove oscillator tube and turn I.F. adjusting screws indicated on the diagram below. Insert oscillator tube and connect the test oscillator to the aerial and ground posts. Set the test oscillator and dial to 1500 and turn the three trimmers on the tuning condenser to resonance, then turn test oscillator and dial to 600 K.C. and set the padder condenser to a position which gives greatest output. Repeat the entire procedure for greater advantage.

MODELS 258,268,278,280 558,568,578,589, 590
281,288,289,478

ZENITH RADIO CORP.

Chassis 2051,Early-Late
Parts List

22-82	.001 mfd 500 volt (band switch)........................	.25
22-113	.05 " 200 " (1st detector cathode)................	.35
22-115	.01 " 400 " (oscillator plate & 2nd detector grid)	.35
22-147	.0005 " 600 " (band switch)........................	.25
22-162	.0001 " 500 " (band switch)........................	.20
22-197	Variable Condenser..	2.75
22-203	10. mfd 25 volt (power cathode)........................	.60
22-204	Dual 8 " 500 " (filter)....................................	2.00
22-205	Oscillator Padder..	.35
22-206	Dual .01 mfd 600 volt(tone control)..................	.25
22-207	Dual .1 " 200 " (R.F.,1st det. I. F. grid & cathode)..	.25
22-208	Dual .01 & .0005 mfd 400 volt(2nd det. grid & cathode)....	.20
22-209	Dual .01 mfd 400 volt(2nd det. plate)................	.20
22-210	Dual .1 & .5 mfd 400 volt(2nd I. F. screens & plate)......	.35
22-211	.1 mfd 300 volt (2nd detector plate)..................	.20
22-212	.05 " 400 " (audio coupling)........................	.20
63-136	50M ohm ½ watt...(2nd detector plate)................	.20
63-146	2M " ½ " ...(R. F. cathode)........................	.20
63-180	1M " ½ " ...(1st detector cathode)................	.20
63-240	1900 " ¼ " ...(1st detector grid & 2nd I.F. plate)..	.20
63-258	490M " ¼ " ...(2nd detector anode)................	.20
63-260	100M " ¼ " ...(power grid)........................	.20
63-265	220 " ½ " ...(I. F. Cathodes)....................	.20
63-271	1 meg" ¼ " ...(2nd detector grid)................	.20
63-275	15500 " ...(voltage divider)........................	.70
63-278	99M " ¼ " ...(R.F. & 1st detector grid return).....	.20
63-280	49M " ¼ " ...(oscillator bias)........................	.20
63-284	500M " Volume Control........................	1.00
63-285	50M " Tone Control........................	.75
63-286	50M " Sensitivity Control........................	.75
63-288	19M " ½ watt...(R. F. & 1st detector screens)........	.20
63-289	29M " 1 " ...(oscillator plate)........................	.20
63-307	40 " 1 " ...(2nd detector cathode)..metal..........	.15
20-32	Standard Wave Detector Coil........................	1.00
20-43	Antenna Coil..	.75
95-181	1st I. F. Transformer............(485 kilocycle)......	1.25
95-182	2nd I. F. Transformer............(485 kilocycle)......	1.25
95-184	3rd I. F. Transformer............(485 kilocycle)......	1.25
S-2252	Plate Choke and Bracket Assembly........................	.50
S-2672	Short Wave Oscillator Coil........................	1.25
S-2673	Short Wave Detector Coil........................	1.25
4-118	Tube Shield Base..	.05
8-25	Antenna and Ground Binding Post Assembly..........	.20
44-4	Phono Connector Jack........................	.15
46-59	Large Control Knob........................	.15
46-60	Small Control Knob........................	.15
49-44	Dynamic Speaker..	8.00
	Cone and Voice Coil for above #8304 (3 hole mounting spider)........................	3.00
	Output Transformer for 49-44 Speaker........................	2.00
57-342	Escutcheon Plate..	.60
85-40	Two Gang Selector Switch........................	1.50
93-167	Rubber Cushion for Chassis Mounting (lower)..........	.01
93-168	Rubber Cushion for Chassis Mounting (upper)..........	.01
95-168	All Voltage, All Cycle Power Transformer..........	6.00
100-18	2½ volt Dial Lamp..	.12
106-109	Tube Shield..	.10

ALL PRICES SUBJECT TO REGULAR DISCOUNT AND CHANGE WITHOUT NOTICE.

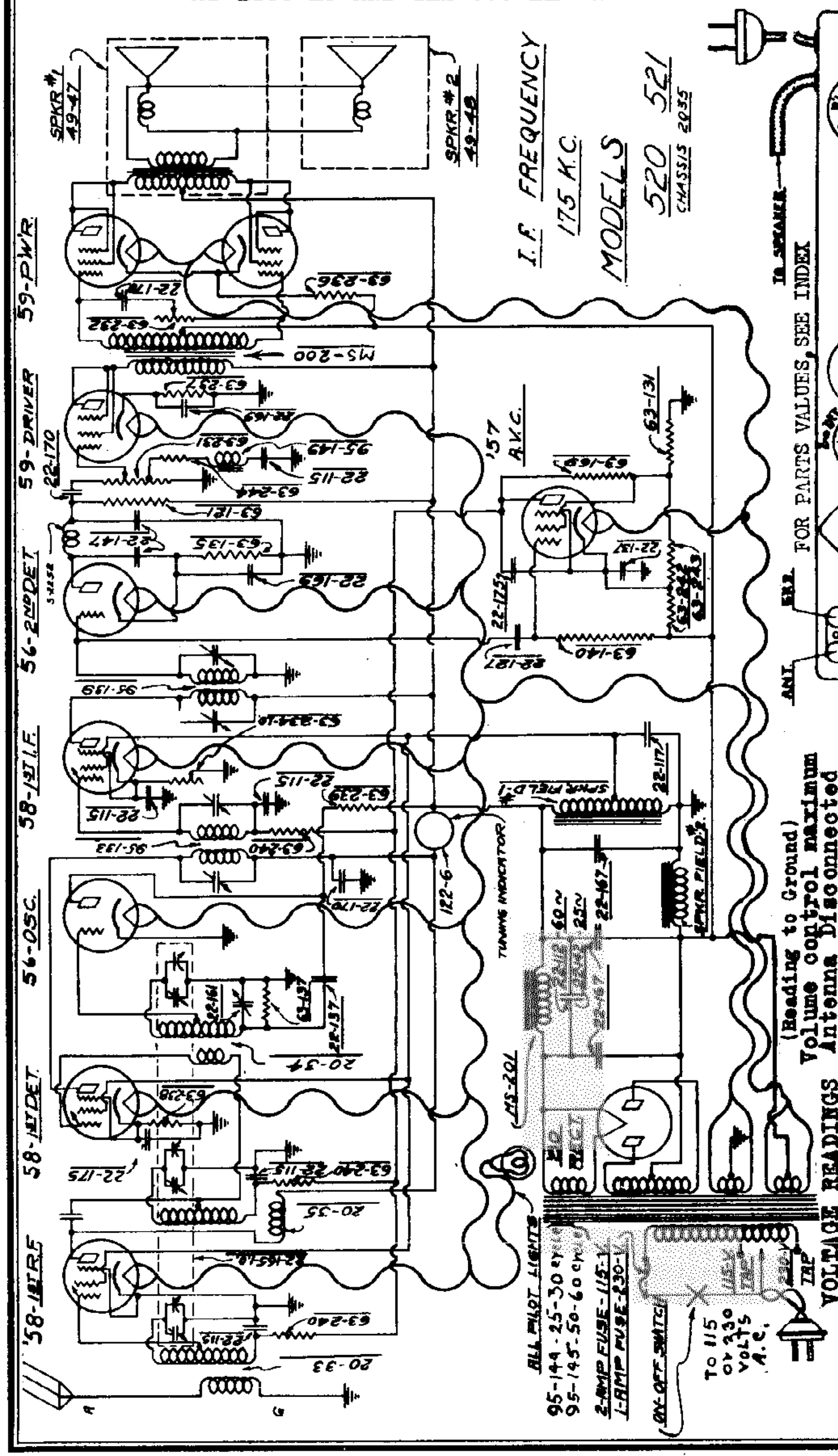
S-2678	Dial Tuning Shaft and Bracket Assembly....	.80
11-2	Dial Cord..........per ft.	.10
S-2679	Dial Strip and Support Assembly(plain)....	1.00
12-297	Dial Lamp Bracket..........	.05
S-2680	Dial Mask and Support Assembly..........	1.25
73-19	Dial Bushing Set Screw..........	.01

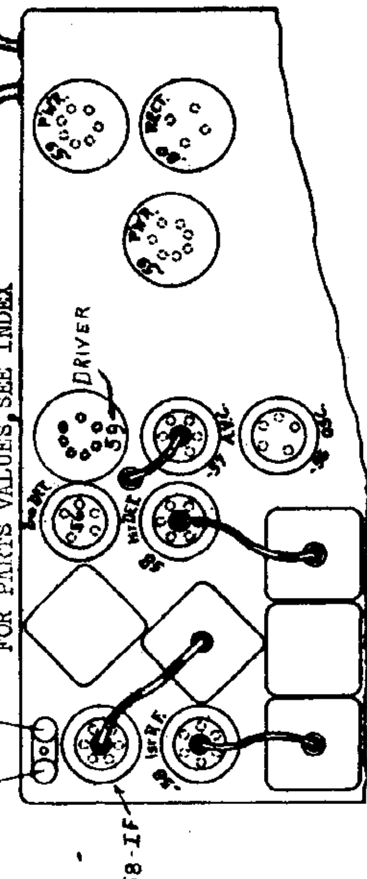
MODELS 520, 521, 602, 605
608, 611, 615
Chassis 2035

ZENITH RADIO CORP.

Schematic, Socket, Voltage
Trimmers, Alignment

BALANCE INTERMEDIATE FREQUENCY AT 175 KC. CONDENSER GANG AT 1500 KC AND THE OSCILLATOR PADDER AT 600 KC.





VOLTAGE READINGS
(Reading to Ground)
Volume control maximum
Antenna Disconnected

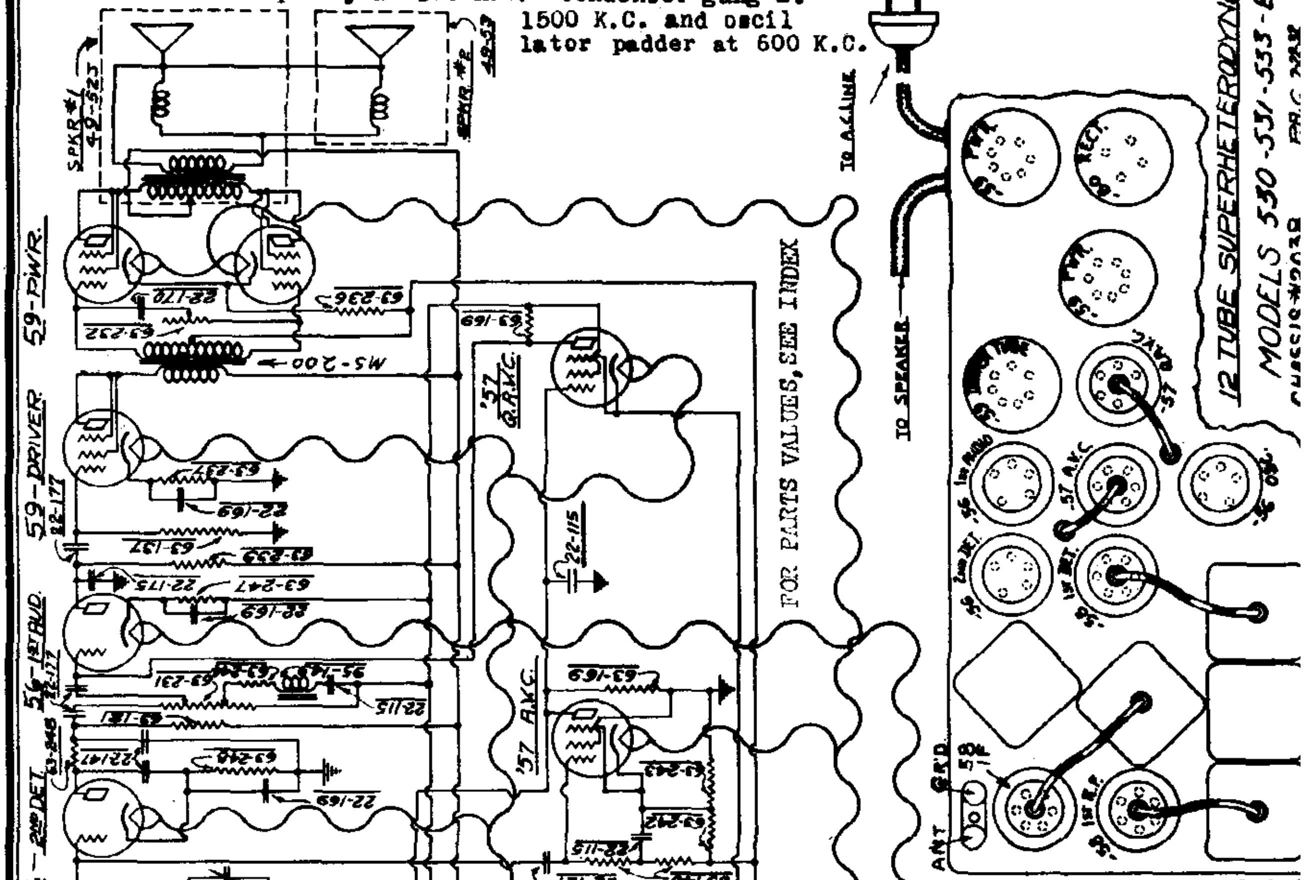
TUBE TYPE	POSITION	FIL. VOLTS	PLATE VOLTS	CATH. VOLTS	SCREEN VOLTS	PLATE MILS
Z-58	R.F.	2.5	220	0	100	5.2
Z-58	1st Det	2.5	220	+2	100	3.0
Z-56	OSC.	2.5	120	0	0	4.0
Z-58	I.F.	2.5	220	0	100	6.0
Z-56	2nd Det	2.5	120	20	0	0.75
Z-57	A.V.C.	2.5	-40	-75	-2	0
Z-59	Driver	2.5	220	+25	220	8.2
Z-59	Power	2.5	230	-65	230	25
Z-80	Rect.	5.0	400"	0	0	62.5

Chassis 2038
Schematic, Voltage, Socket
Trimmers, Alignment

ZENITH RADIO CORP.

MODELS 530, 531, 532, 53[illegible]
603, 612, 617, 62[illegible]
623

BALANCE I.F. frequency at 175 K.C. Condenser gang at 1500 K.C. and oscillator padder at 600 K.C.



VOLTAGE READINGS - (Reading to Ground)

TUBE TYPE	POSITION	FIL. VOLTS	PLATE VOLTS	CATH. VOLT	SCREEN VOLTS	SUPP. VOLT	PLATE MILS
Z58	1st RF	2.5	175	2.2	75	2.2	5.7
Z58	1st Det	2.5	190	4.5	75	4.5	2.3
Z56	OSC	2.5	100	0	-	-	3.5
Z58	1st IF	2.5	200	2.2	75	2.2	5.5
Z56	2nd Det	2.5	110	10	-	-	.3
Z56	1st Aud	2.5	170	80	-	-	.8
Z57	A.V.C.	2.5	-	-85	-	-85	-
Z57	Q. AVC	2.5	30	13	75	13	-
Z59	Driver	2.5	190	20	190	190	13
Z59	Power	2.5	195	-70	195	195	22

MODELS 520, 521, 602, 605
608, 611
Chassis 2035

ZENITH RADIO CORP.

MODELS 530, 531, 532, 533
603, 612, 617, 620
623 Parts Lists
Chassis 2038

PARTS LIST

MODELS 520, 521, 602, 608, 611
Chassis 2035

11-3	Dial Pulley String....per ft.	$ .25
26-38	Calibrated Dial Strip....	.15
80-69	Dial Cord Tension Spring....	.01
80-65	Volume and Tone Control Dial Tension Spring....	.01
63-274	Volume Control Dial Strip....	.10
63-275	Tone Control Dial Strip....	.10
100-18	2.5 Volt Pilot Lamp....	.12
122-5	Shadowgraph Meter....	2.00
22-112	.1 mfd 300 Volt (Filter)....	.25
22-115	.1 " 200 " (5 used, see footnote)....	.35
22-117	.5 " 300 " (Filter)....	.50
22-137	.05 " 400 " (Oscillator Plate)....	.25
22-142	.4 " 300 " (Filter, 25 Cycle Only)....	.40
22-147	.0005 600 " (2nd Detector Plate)....	.20
22-161	Padder....	.45
22-165	Three Gang Variable....	3.50
22-167	8. mfd 500 Volt (Filter)....	1.50
22-169	8. " 50 " (2nd Detector Cathode, Driver Cathode, and 1st Audio Cathode)....	.55
22-176	.1 " 400 " (1st Detector Plate, Audio Coupling and Tone Control)....	.25
63-121	100M Ohm 1 Watt (2nd Detector Plate)....	.25
63-135	50M " 1 " (2nd Detector Cathode)....	.25
63-137	250M " ½ " (Oscillator Grid)....	.25
63-140	1 Meg" ½ " (A. V. C. Grid)....	.25
63-169	400 " ½ " (A. V. C. Plate)....	.25
63-251	Volume Control Assembly....	1.25
63-232	Tone Control Assembly....	.75
63-234	Sensitivity Control....	.75
63-236	500 Ohm....(Power Bias) (Wide Metal)....	.25
63-237	1500 " ....(Driver Bias)(Narrow Metal)....	.25
63-238	1000 " ¼ Watt (1st Detector Cathode)....	.25
63-239	24M " 1 " (Oscillator Plate)....	.25
63-240	1900 " ½ " (R.F., 1st Detector & I.F. Grids)....	.25
63-242	2500 " ½ " (A. V. C. Cathode)....	.25
63-243	18M " 1 " (A. V. C. Cathode)....	.25
63-244	500 " ¼ " (Acoustic Filter)....	.25
20-33	Antenna Coil....	.75
20-34	Oscillator Coil....	.85
20-35	Detector Coil....	1.00
S-2252	2nd Detector Plate Choke and Bracket....	.50
95-133	1st I. F. Transformer (with Grid Lead)....	1.25
95-139	2nd I. F. Transformer (without Grid Lead)....	1.25
*22-115	R. F., 1st Detector, I. F. Grid Returns, I. F. Cathode, and Acoustic Filter.	
49-47	Dynamic Speaker with transformer	7.00
49-48	Dynamic Speaker without transformer	8.25
95-144	115 volt 25-30 cycles Power Transformer....	7.25
95-145	115 Volt 50-60 Cycles Power Transformer....	5.00
95-149	Acoustic Filter Choke	.30
MS-200	Push-Pull input transformer....	3.50
MS-201	Power filter choke....	3.25

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

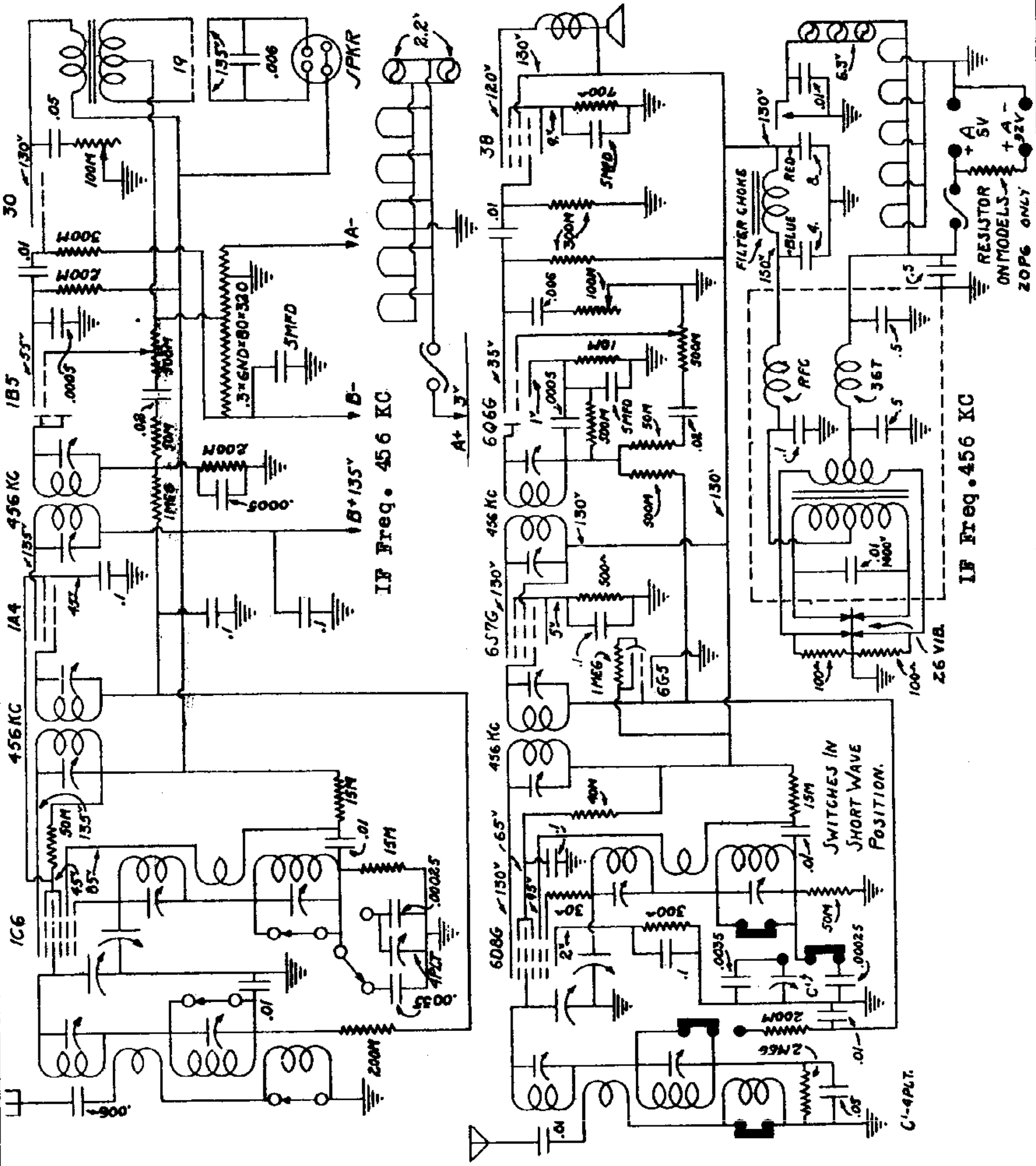
PARTS LIST - MODELS 530, 531, 532, 533, 603, 612, 617, 620, 623

(Chassis 2038)

22-112	.1 mfd 300 volt...(Filter)....	.25
*22-115	.1 " 200 " ...(Eight Used, See Below)....	.35
22-117	.5 " 300 " ...(Filter)....	.50
22-127	.000025 600 " ...(A.V.C. Grid)....	.35
22-137	.05 mfd 400 " ...(Oscillator Plate)....	.25
22-142	.4 " 300 " ...(Filter 25 Cycle Only)....	.40
22-147	.0005" 600 " ...(2nd Detector Plate)....	.20
22-161	Padder....	.45
22-165	Three Gang Variable....	3.50
22-167	8. mfd 500 volt...(Filter)....	1.50
22-169	8. " 50 " ...(2nd Det. Cathode, Driver Cathode & 1st Audio Cathode)....	.55
22-170	.1 " 400 " ...(1st Det. Plate, Tone Control)....	.25
22-175	.002 " 600 " ...(1st Audio Plate)....	.25
22-177	.2 " 400 " ...(2nd Det. Plate, 1st Audio Grid, 1st Audio Plate)....	.25
63-121	100M ohm 1 watt...(2nd Detector Plate)....	.25
63-137	250M " ½ " ...(Driver Grid)....	.25
63-140	1 meg" ½ " ...(A.V.C. Grid & Cathode)....	.25
63-169	400 " ½ " ...(A.V.C. & Q.A.V.C. Plate)....	.25
63-231	Volume Control & Switch Assembly....	1.40
63-232	Tone Control....	.75
63-236	500 ohm ...(Wide Metal) (Power Tube Bias)....	.25
63-237	1500 " ...(Narrow Metal) (Driver Tube Bias)....	.25
63-239	24M " 1 watt...(Osc. & 1st Audio Plate)....	.25
63-240	1900 " ½ " ...(R.F. 1st Det. & I.F. Grids)....	.25
63-242	2500 " ½ " ...(A.V.C. Cathode)....	.25
63-243	18M " 1 " ...(A.V.C. Cathode)....	.25
63-244	500 " ¼ " ...(Acoustic Filter)....	.25
63-245	1500 " ¼ " ...(1st Detector Cathode)....	.25
63-246	150 " ¼ " ...(R.F. Cathode)....	.25
63-247	8M " ¼ " ...(1st Audio Cathode)....	.25
63-248	50M " 1 " ...(2nd Det. Plate & Cathode)....	.25
63-249	Sensitivity & Quiet Control....	.75
*22-115	R.F. 1st Detector, I.F. Grid Returns, A.V.C. Plate, A.V.C. Cathode, 1st Detector Cathode, R.F. Cathode, and Acoustic Filter.	
20-33	Antenna Coil....	$ .75
20-34	Oscillator Coil....	.85
20-35	Detector Coil....	1.00
95-133	1st I.F. Transformer with Grid Lead....	1.25
95-139	2nd I.F. Transformer without Grid Lead....	1.25
46-61	Large Knobs....	.20
46-62	Small Knobs....	.10
49-52	Dynamic Speaker (With Transformer)....	8.25
49-53	Dynamic Speaker (Without Transformer)....	7.00
52-34	Speaker Multicord....	.45
57-343	Escutcheon Plate....	.50
78-56	Type 59 Socket....	.15
78-57	Type 56 Socket....	.15
78-58	Type 58 Socket....	.15
78-59	Type 57 Socket....	.15
78-60	Type 80 Socket....	.15
93-167	Upper Cushion Washer for Chassis Mounting....	.01
93-168	Lower Cushion Washer for Chassis Mounting....	.01
95-142	115 volt 25 cycle Power Transformer....	7.25
95-143	115 volt 60 cycle Power Transformer....	5.25
95-149	Acoustic Filter Choke....	.30
106-129	Small Tube Shield....	.10
MS-200	Push Pull Input Transformer....	3.50
MS-201	Power Filter Choke....	3.25
122-5	Shadowgraph Meter....	2.00

ZEPHYR RADIO CO.

MODELS 20A6,21A6,22A6
MODELS 20B6,21B6,22B6
20P6,21P6,22P6
Schematics,Voltage

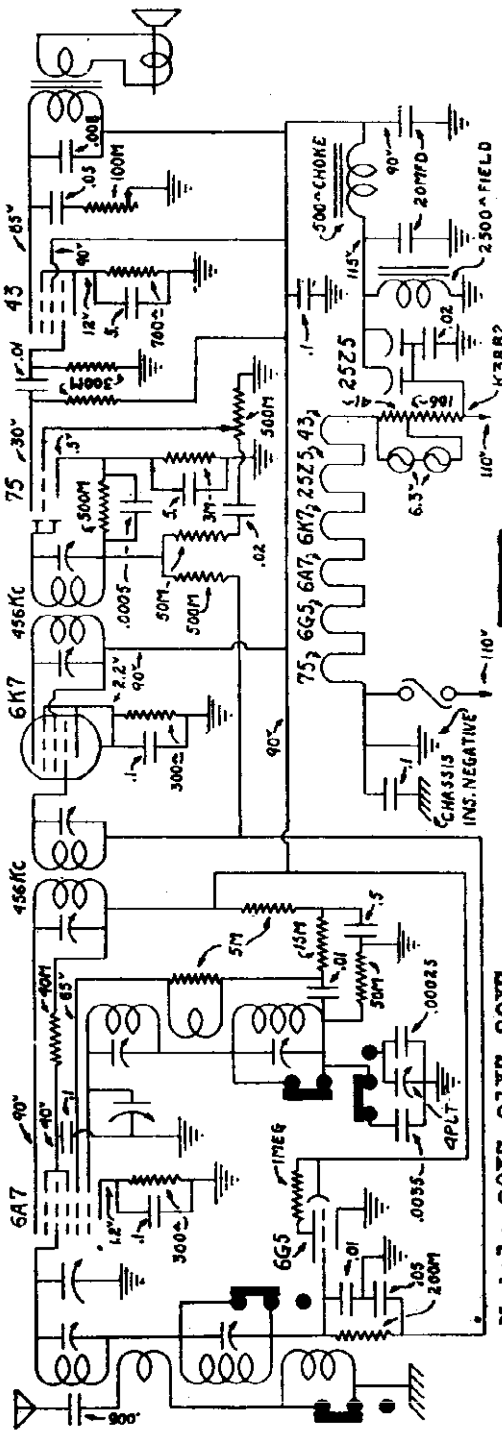


Models 20A6,21A6,22A6
460.001 AND UP

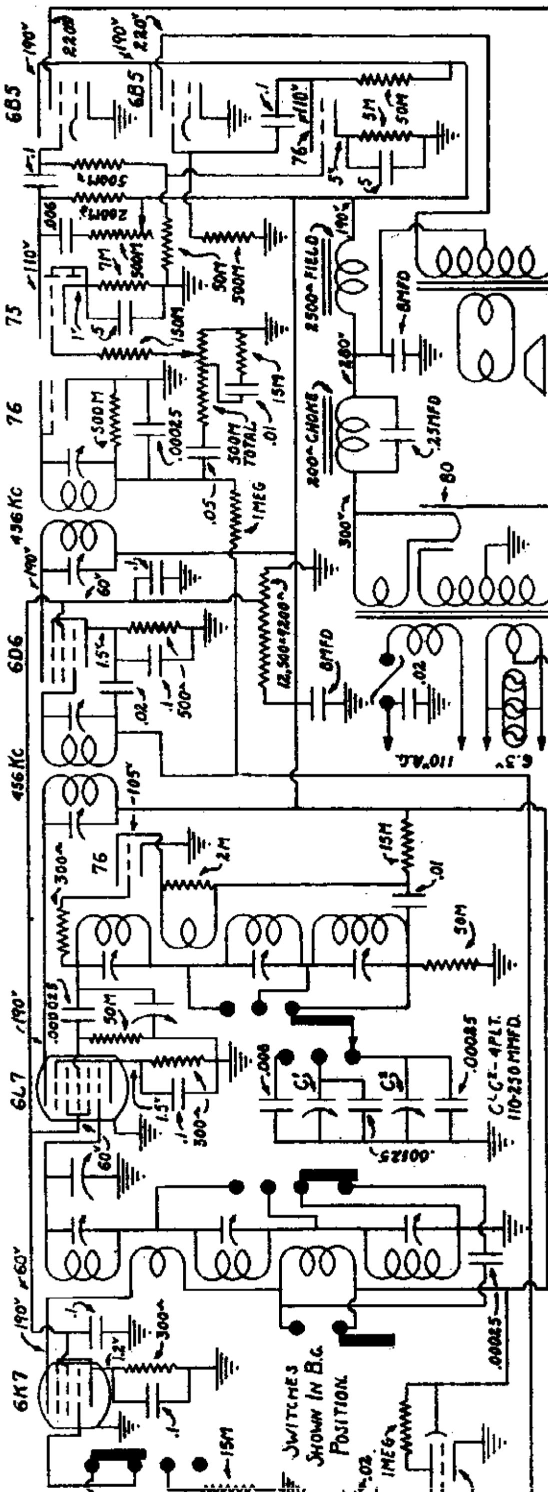
500.001 AND UP
Models 20B6,21B6,22B6
Models 20P6,21P6,22P6
Zephyr Radio Co.,Detroit,Michigan

MODELS 20X7,21X7,22X7
MODEL 25Y11
Schematics,Voltage

ZEPHYR RADIO CO.



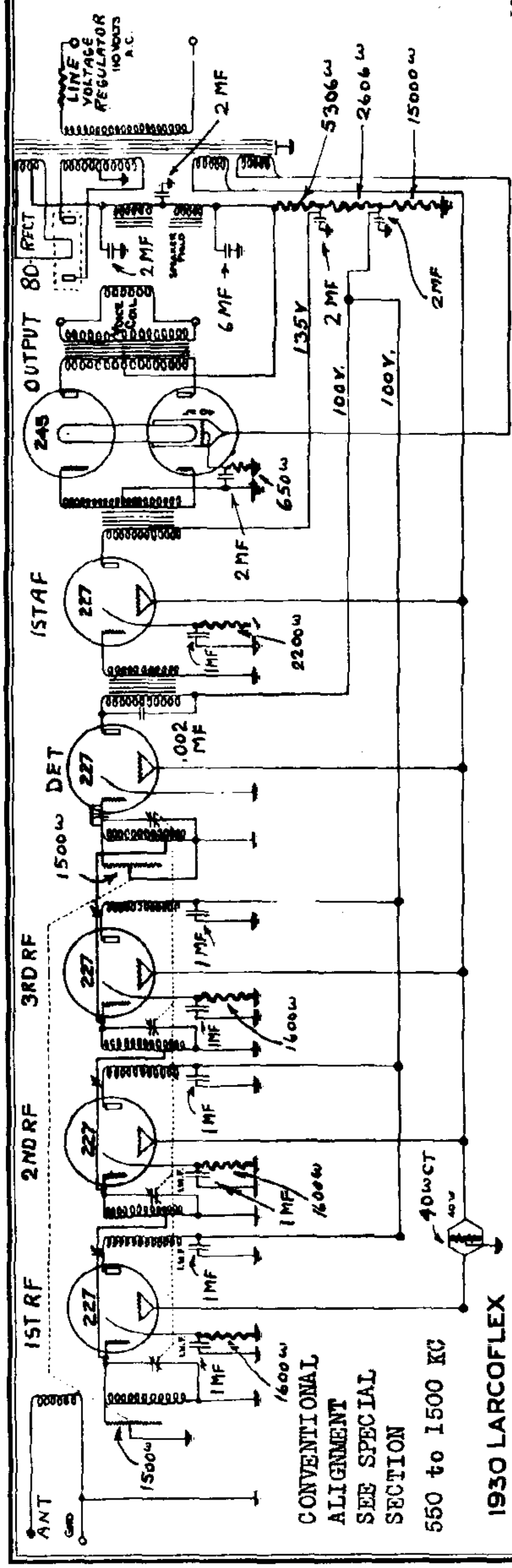
Models 20X7,21X7,22X7
IF Freq. 456 KC

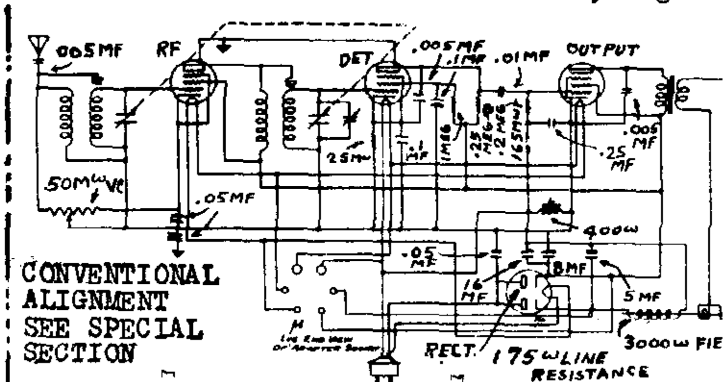


Zephyr Radio Co. Det.,Mich.
Model 25Y11
IF Frequency 456 KC

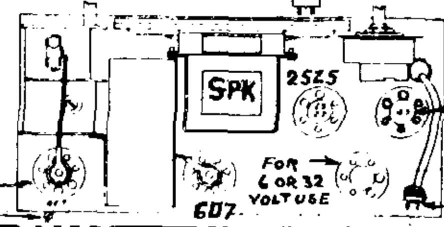
BROWNING-DRAKE CORP.
LARCOFLEX
SONGBIRD

MODEL 50 Series
MODEL 1930 Larcofl
MODEL 1000
Schematics,Alignme





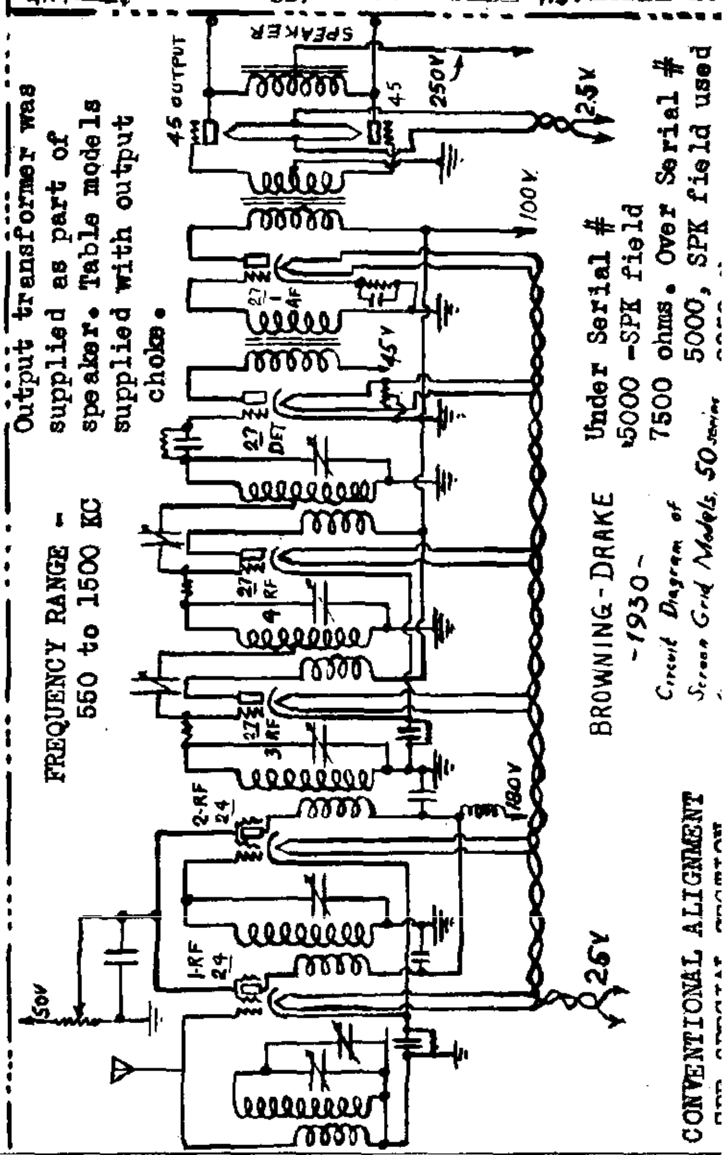
CONVENTIONAL
ALIGNMENT
SEE SPECIAL
SECTION



550 - 1500

43 FOR 115V USE
41 FOR 6V USE
43 FOR 32V USE

AC-DC SONGBIRD MODEL 10
115v



Output transformer was supplied as part of speaker. Table models supplied with output choke.

FREQUENCY RANGE - 550 to 1500 KC

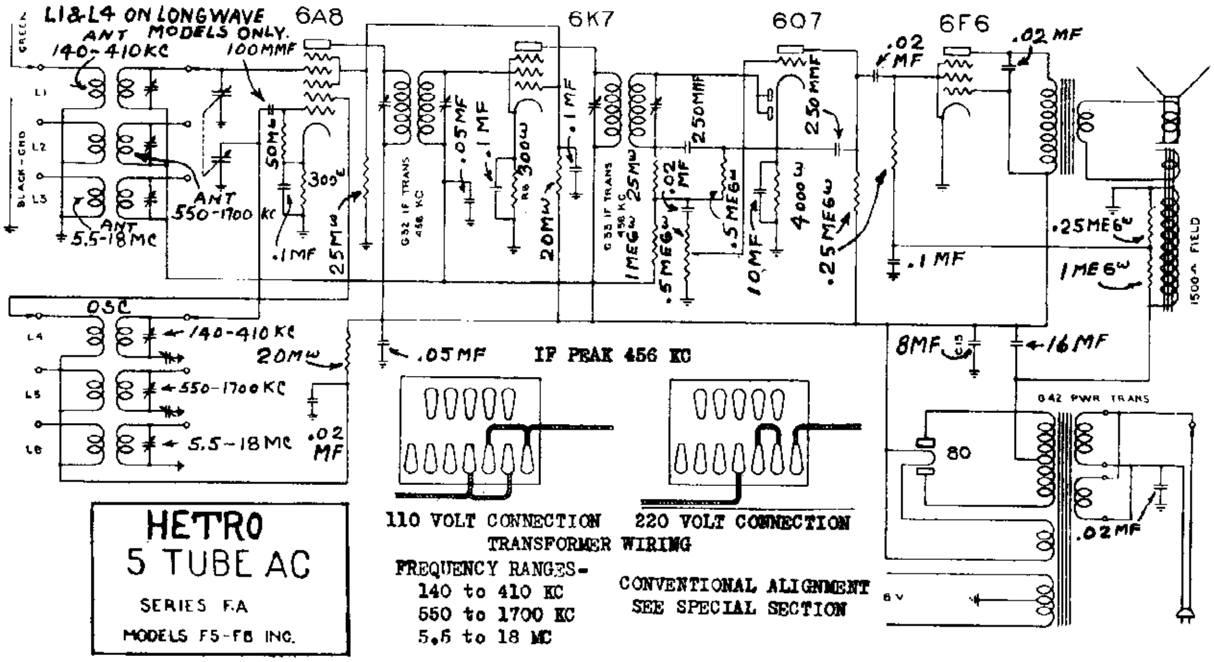
Under Serial # 5000 -SPK field 7500 ohms. Over Serial # 5000, SPK field used

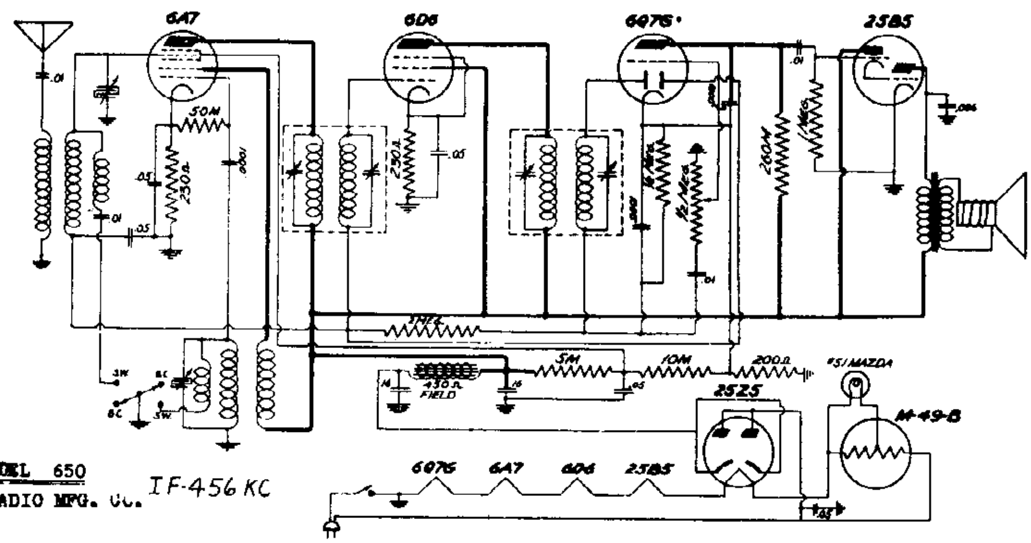
BROWNING-DRAKE
-1930-
Circuit Diagram of Screen Grid Models, 50 series

CONVENTIONAL ALIGNMENT

MODELS F5,F6,F7,F8
MODEL 650
Schematics,Alignment

HETRO ELECTRICAL INDUSTRIES
WATTERSON RADIO MFG. CO.





MODEL 650
WATTERSON RADIO MFG. CO.
IF-456 KC

CONVENTIONAL ALIGNMENT - SEE THE SPECIAL SECTION

Set service oscillator to 456 KC and connect "HOT" lead to grid of 6A7. Ground the stator of rear (oscillator) section of variable condenser. Turn Volume Control for maximum output, and peak IF trimmers for maximum gain. Remove variable condenser short and turn wave band switch knob towards right. Adjust service oscillator and receiver to 1500 KC, and peak variable condenser trimmers for maximum gain.

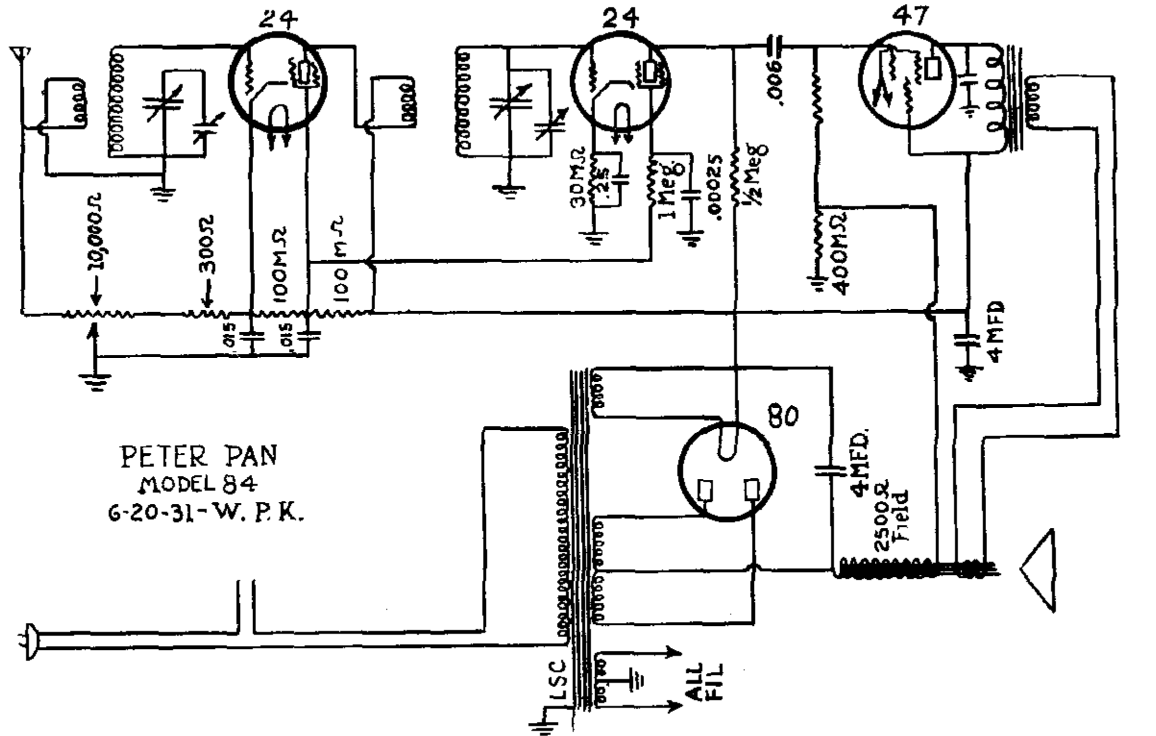
This is a dual wave superheterodyne with automatic volume control and a frequency range 1650-545 and 3700-1600 Kilocycles.

ANTENNA: No outside antenna is necessary unless used in a steel or shielded building, but it is necessary to unwind the reel of wire that is attached to the receiver chassis. For addition power the brown wire may be connected to an outside antenna.

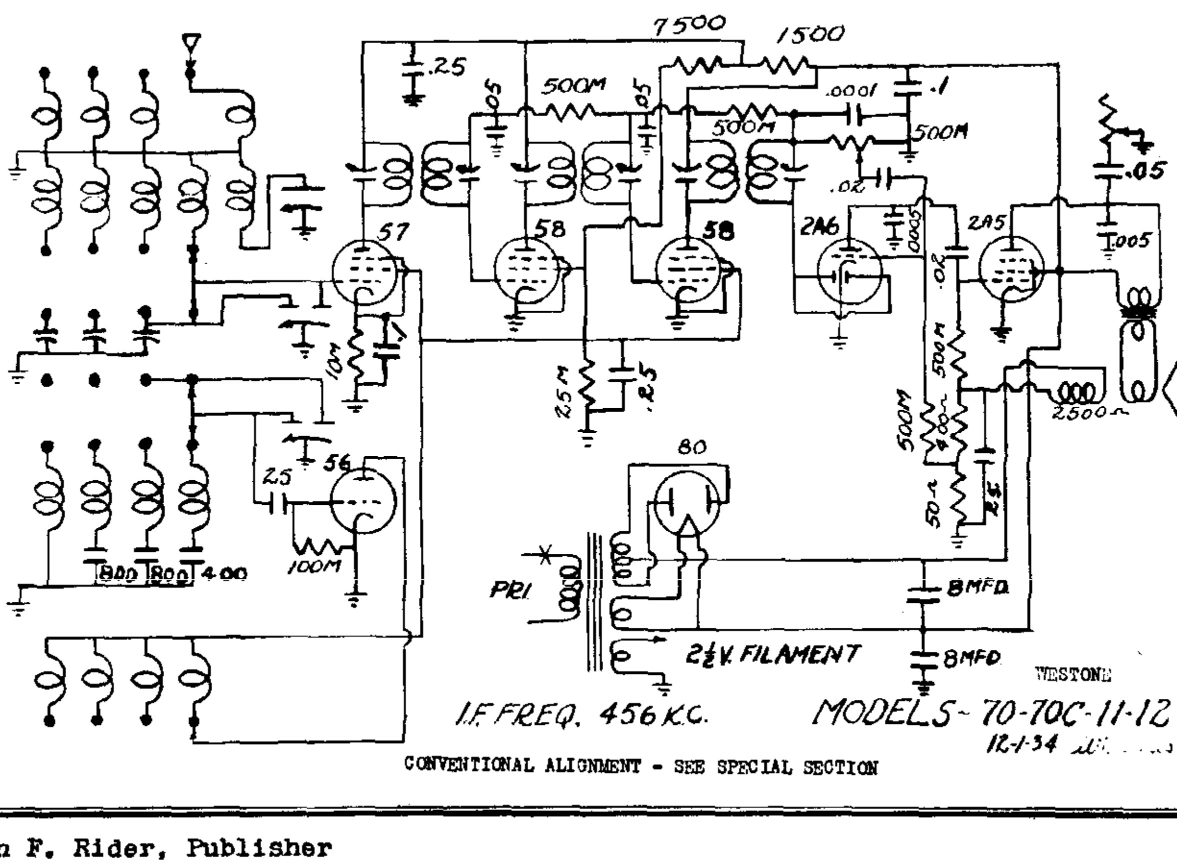
TUBES: 6D6, 6A7, 6Q7G, 25B5, 25Z5, M49B

IMPORTANT: DO NOT GROUND THIS RECEIVER OR TOUCH GROUND WIRE TO CHASSIS IN ANY WAY.

JACKSON-BELL CO., INC.
WESTONE RADIO CORP.



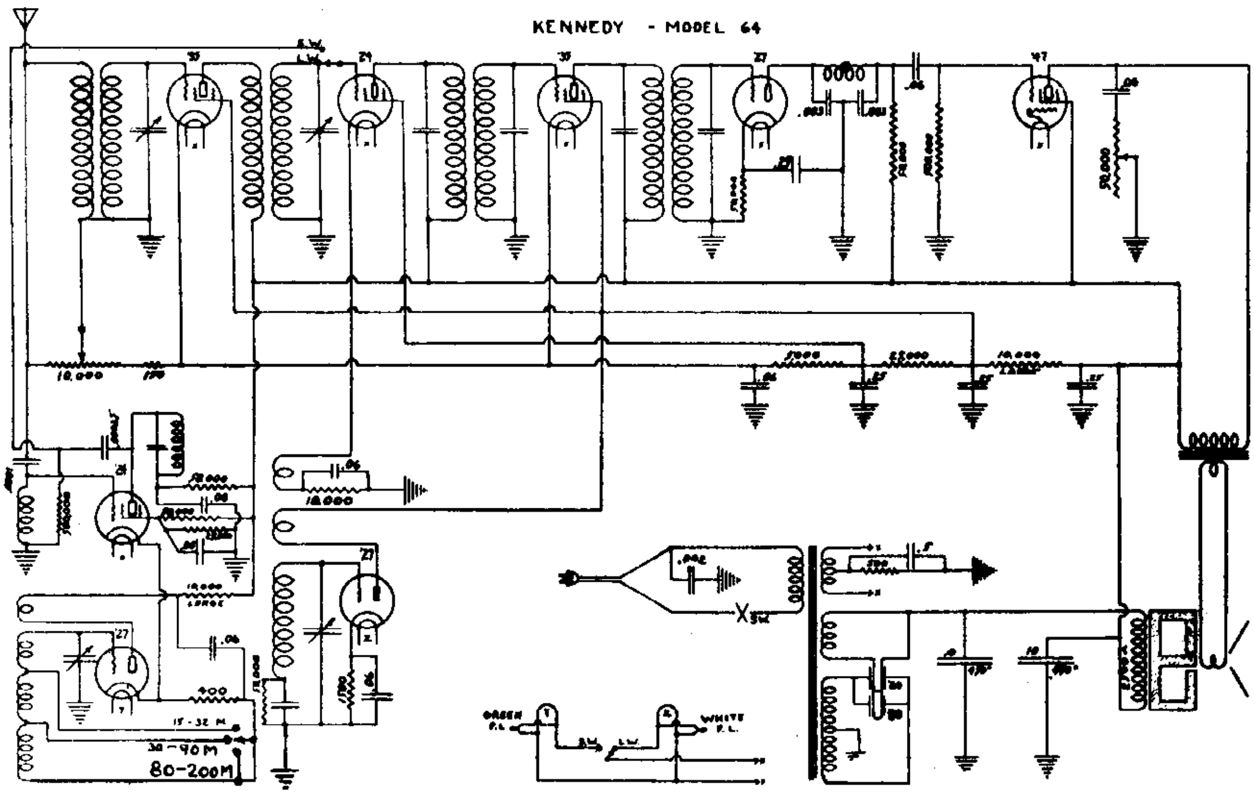
FREQUENCY RANGE - 550 to 1500 KC
CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION



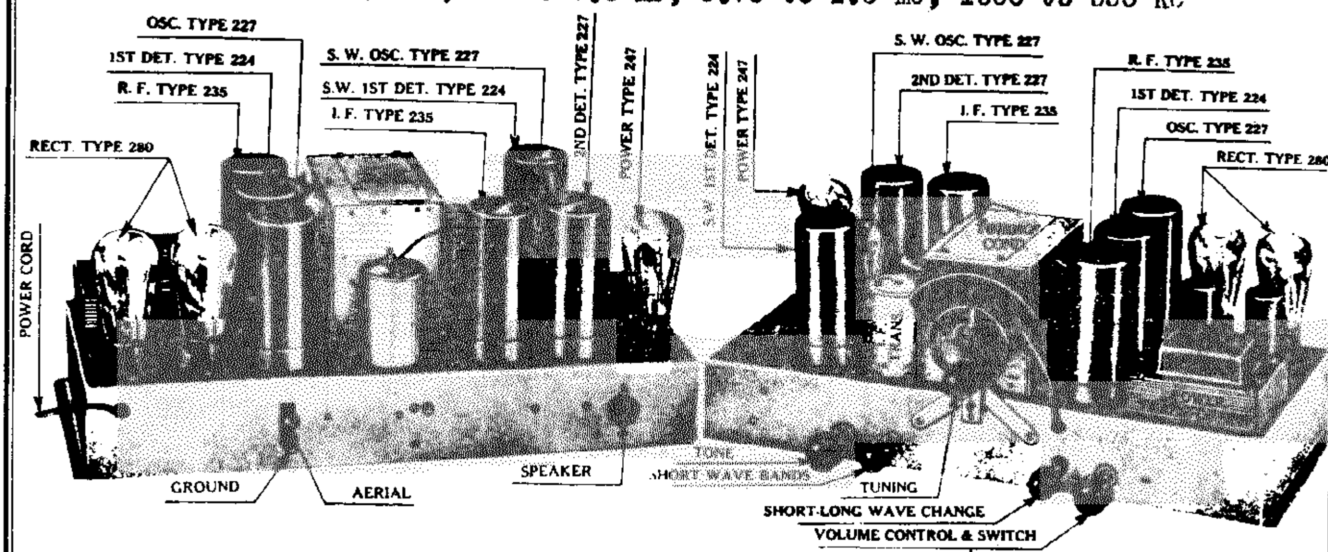
CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION

MODEL 64
Schematic, Socket
Alignment

COLIN B. KENNEDY



FREQUENCY RANGES -
20 to 9.5 MC, 10 to 3.3 MC, 3.75 to 1.5 MC, 1500 to 550 KC



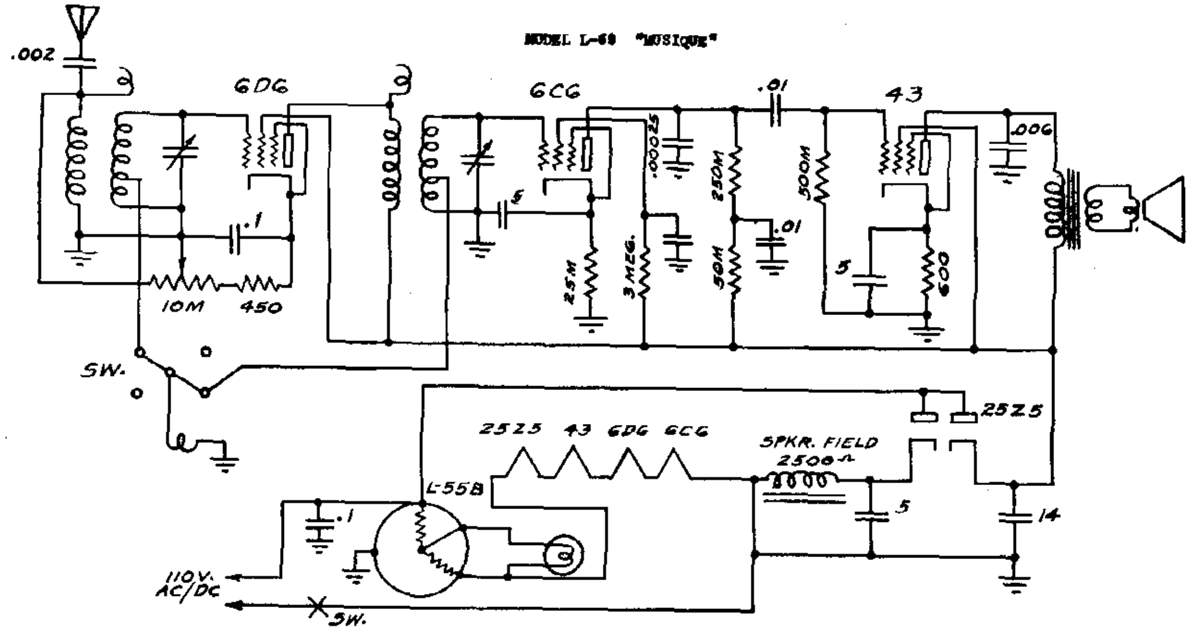
CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION

Align the I-F transformer trimmers at 175 KC. The generator and dial of the receiver are now set to 1500 KC. The Oscillator trimmer and then the R-F and Antenna trimmers are adjusted to maximum peak. Generator and dial next set to 600 KC, pad the oscillator circuit for maximum peak. Padding condenser is reached thru hole in rear center of chassis. Rock the variable condenser during the padding adjustment. The front section of the variable condenser is used for shortwave reception, and requires no adjustment other than above.

LAUREHK RADIO MFG. CO.

MODEL L-69 Musique
MODEL L-600 Musique
Schematics, Alignment

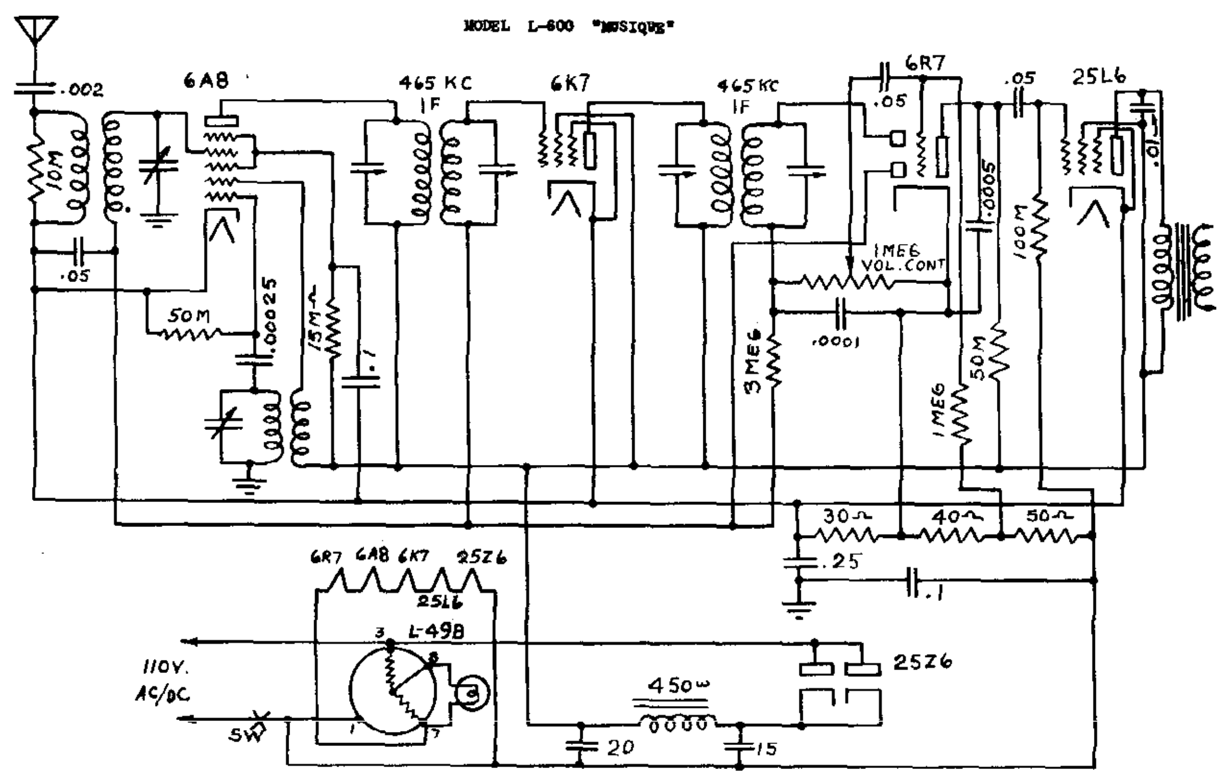
MODEL L-69 "MUSIQUE"



CONVENTIONAL ALIGNMENT -SEE SPECIAL SECTION
FREQUENCY RANGE - 550 to 1500 KC

LAUREHK RADIO MFG CO

MODEL L-600 "MUSIQUE"

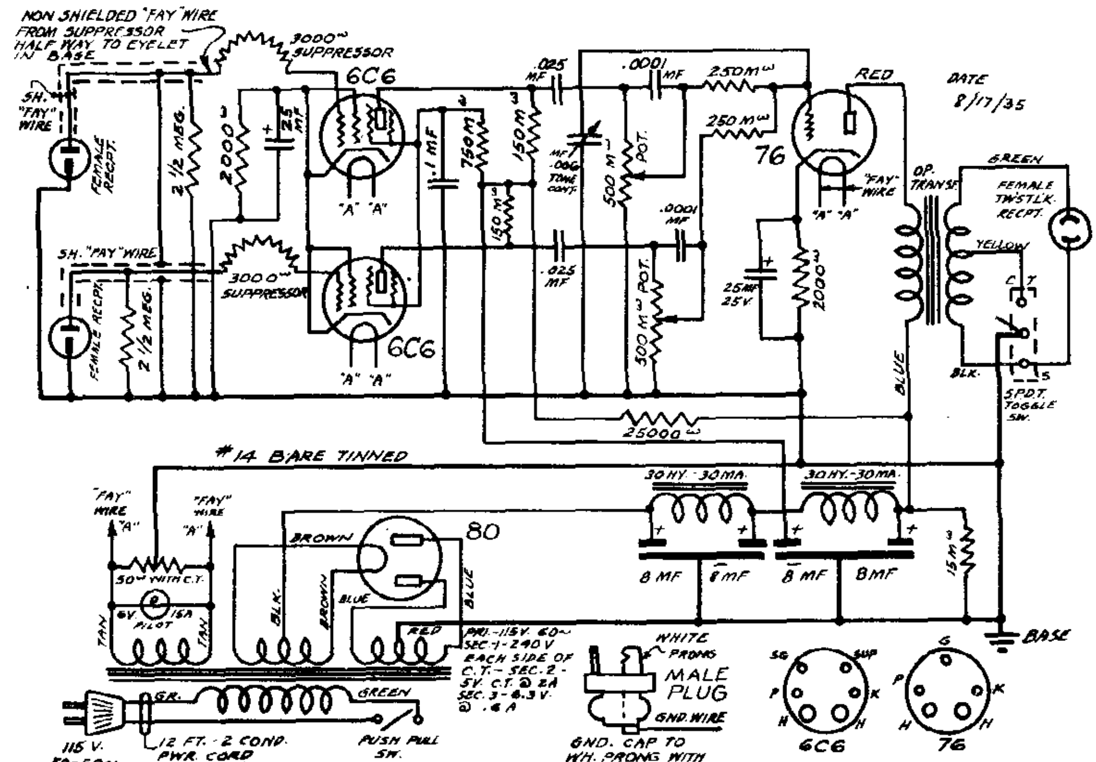


CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION
FREQUENCY RANGE - 550 to 1500 KC

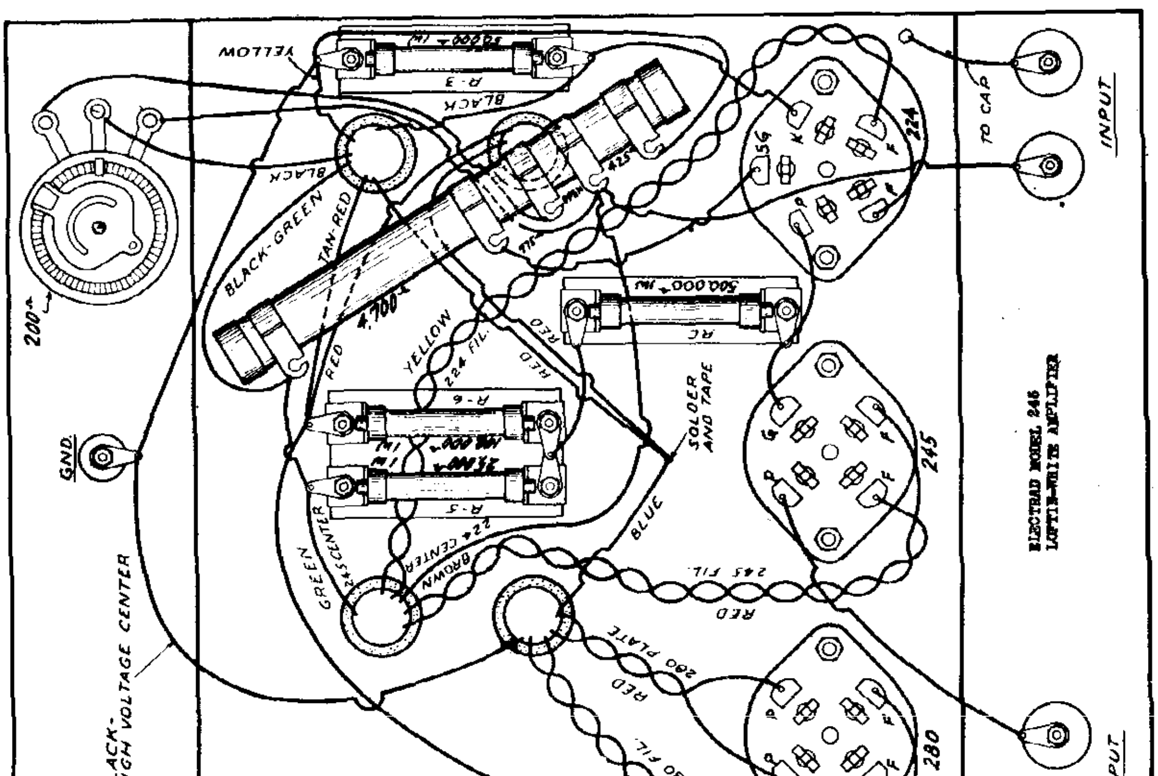
LAUREHK RADIO MFG CO

MODEL 245 Amplifier
MODEL 660 Amplifier
Schematics

OPERADIO MFG. CO.
ELECTRAD, INC.

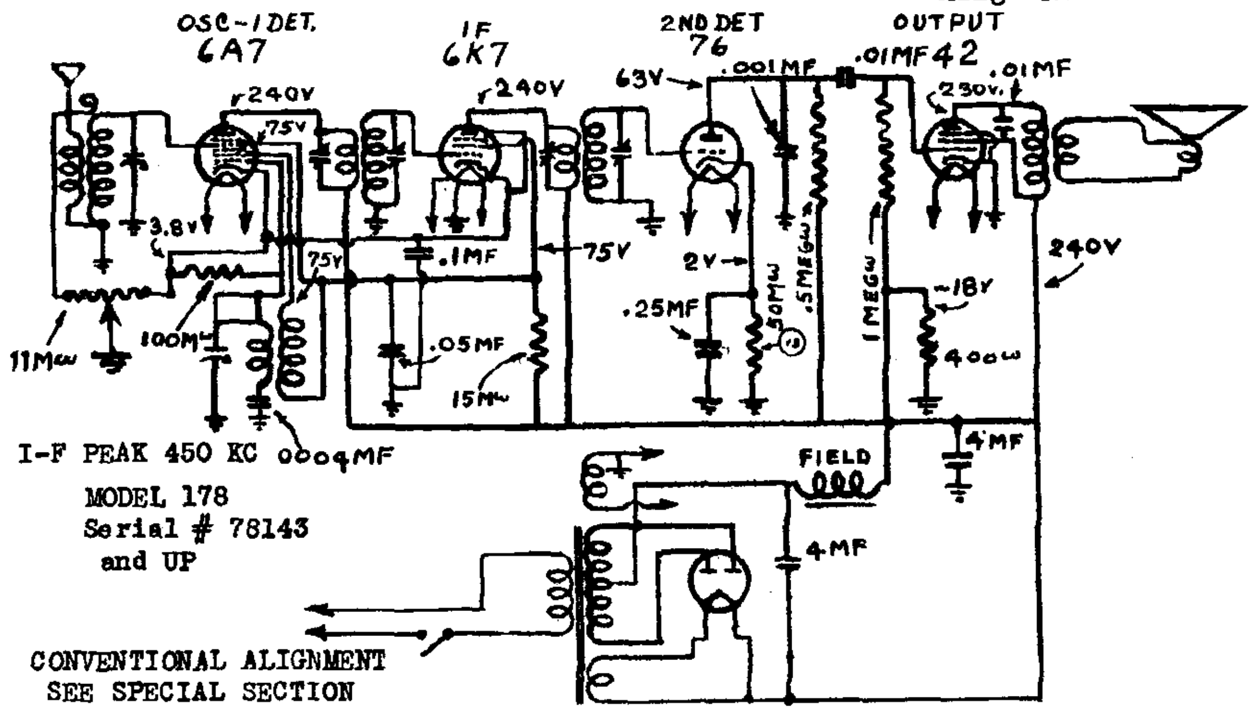


OPERADIO MODEL 660 (PRE-AMPLIFIER)



ELECTRAD MODEL 245 LOFTIN-WHITE AMPLIFIER

RADIO PRODUCTS SALES CO. MODEL 178 Clipper
Schematics, Voltage
Alignment

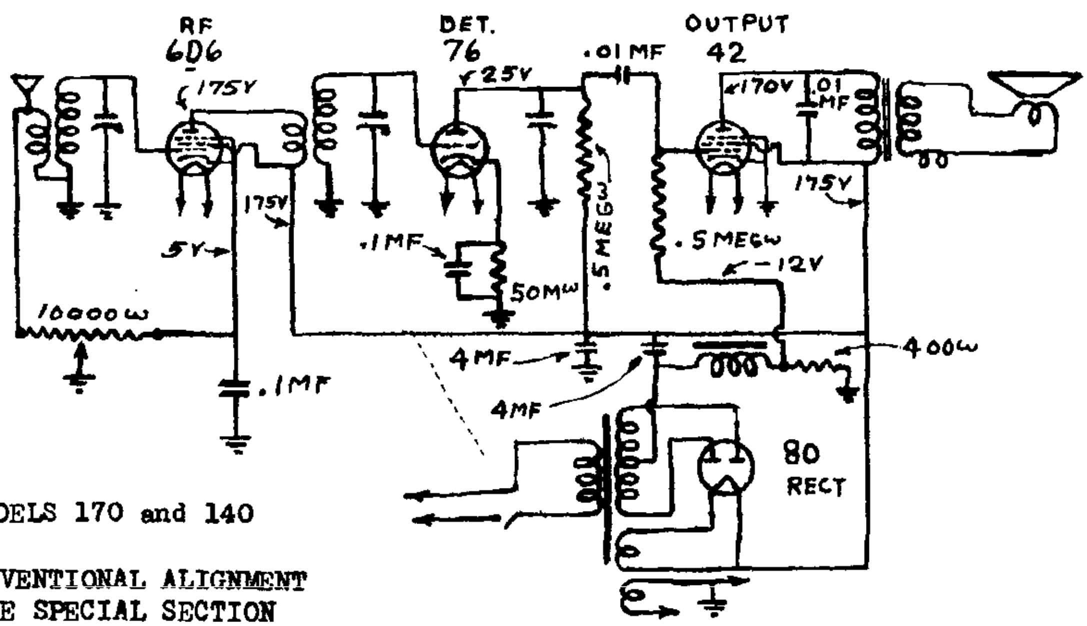


I-F PEAK 450 KC .0004MF

MODEL 178
Serial # 78143
and UP

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION

Align the I-F transformer trimmers at 450 KC.
Generator set to 1400 KC, align the rear trimmer of the variable condenser to a maximum peak. (Oscillator section)
Generator at the same frequency, align the front trimmer of the variable condenser to maximum peak. (Antenna trimmer)
No padding is required for the Oscillator circuit.



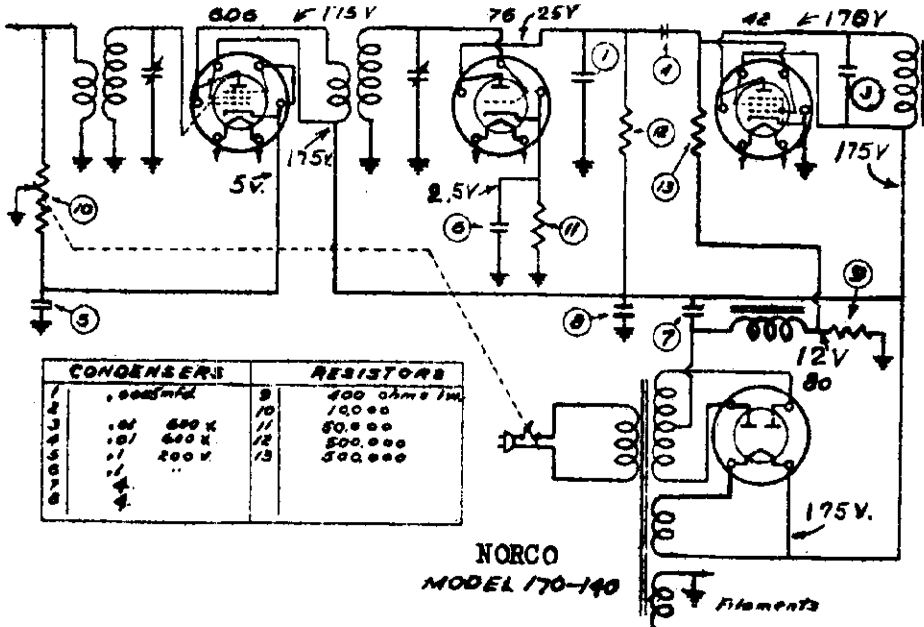
MODELS 170 and 140

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION

The generator is connected to the antenna of the receiver and set to 1400 KC. The trimmer of the front section of the variable condenser is then adjusted to maximum peak. The rear trimmer of the variable condenser (ANT) is next peaked to maximum.

MODELS 140,170 Norco
MODEL 178 Norco
Schematics,Voltage
Alignment

REMLER COMPANY, LTD.



CONDENSERS		RESISTORS	
1	.0005 mfd	9	400 ohms Im.
2		10	10,000
3	.01 600 V	11	50,000
4	.01 600 V	12	500,000
5	.1 200 V	13	500,000
6	.1 "		
7	4		
8	4		

NORCO
MODEL 170-140

TUBES:

Type 6D6 Triple grid super control amplifier
" 75 Detector
" 42 Power Amplifier
" 80 Rectifier
" T46 Pilot lamp

A.C. VOLTAGES:

Line		120 Volts
Filaments:		
	6D6, 76, 42	6.3
	80	5.0

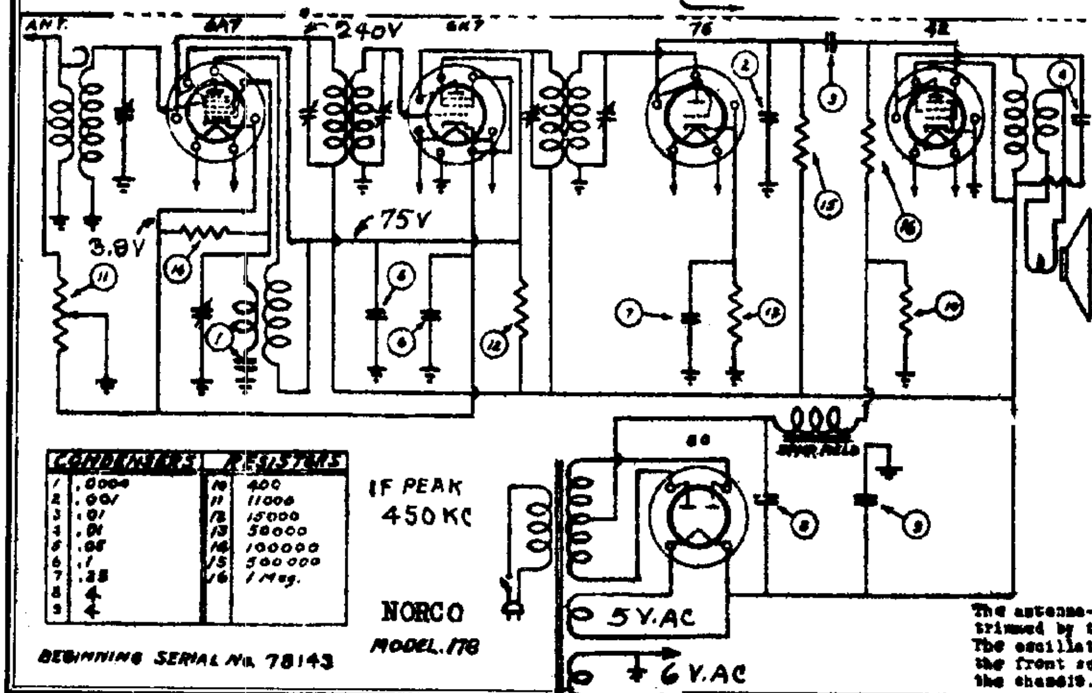
D.C. VOLTAGES: Full volume No signal

From chassis to:

80	Rectifier, filament	175 Volts
6D6	Plate	175
6D6	Screen	175
6D6	Cathode	5
76	Plate	25
76	Cathode	2.5
42	Plate	170
42	Screen	175
42	Grid bias supply	12

SERVICE DATA. Voltages read with 1000 ohm per volt meter.

The antenna-R.F. coil is located in back of the variable condenser (above the condenser on Model 140) and is trimmed by the trimmer on the rear section of the variable condenser. The detector coil is mounted under the chassis and is trimmed by the front trimmer section.



CONDENSERS		RESISTORS	
1	.0004	10	400
2	.001	11	11000
3	.01	12	15000
4	.01	13	50000
5	.05	14	100000
6	.1	15	500000
7	.25	16	1 Meg.
8	4		
9	4		

IF PEAK
450 KC

NORCO
MODEL 178

BEGINNING SERIAL No. 78143

TUBES

Type 6A7 Converter
" 6K7 I.F. Amplifier
" 76 Detector
" 42 Power Amplifier Pentode
" 80 Rectifier
" T46 Dial Lamp

A.C. VOLTAGES

Line		120 Volts
Filaments:		
	6A7, 6K7, 76, 42	6 "
	80	5 "

D.C. VOLTAGES

No signal, full volume

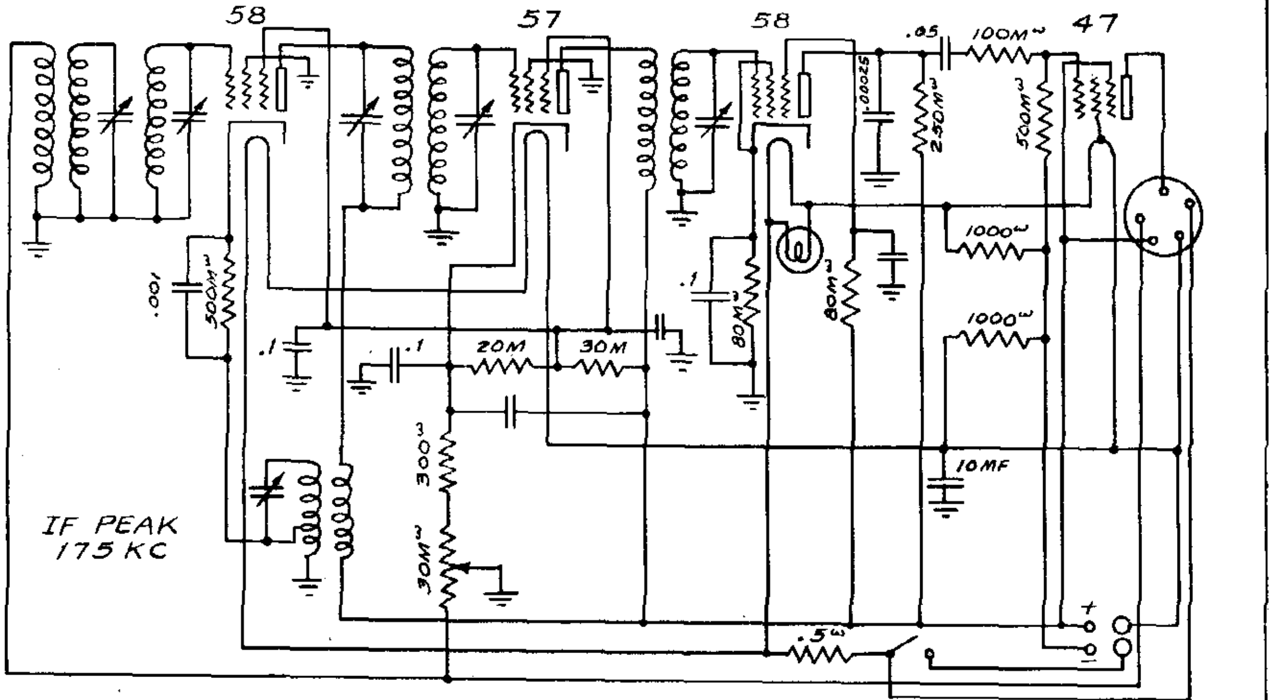
From chassis to-

6A7	Plate	240 Volts
6A7	Screen	75
6A7	Osc. Plate	75
6A7	Cathode	3.8
6K7	Plate	240
6K7	Screen	75
6K7	Cathode	3.6
76	Plate	65
76	Cathode	2
42	Plate	230
42	Screen	240
42	Grid	-18

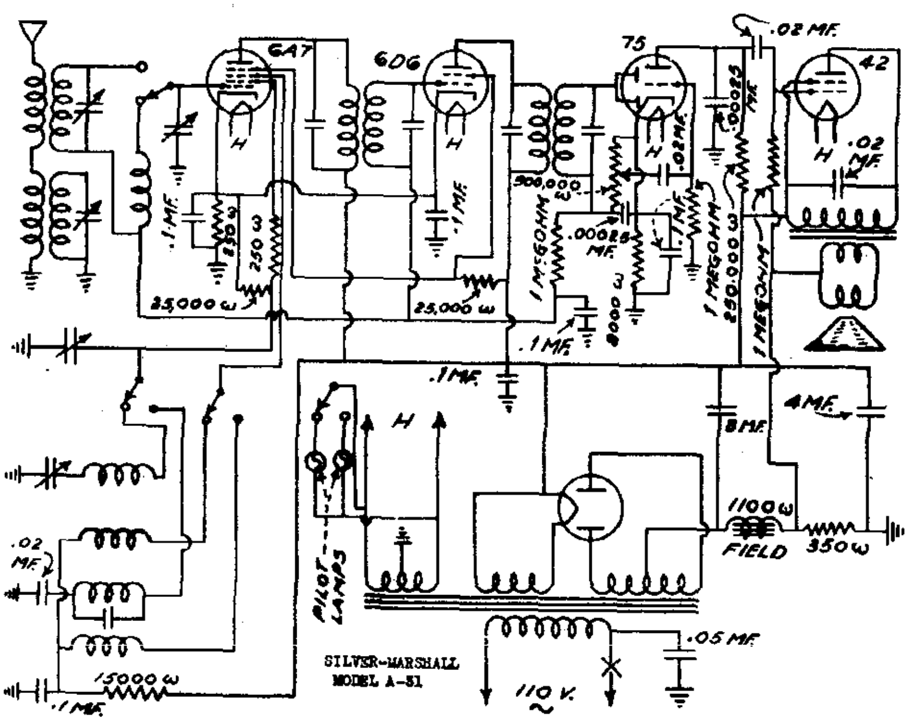
Voltages read with 1000-ohm per volt meter.

The antenna-R.F. coil is located over the variable condenser and is trimmed by the trimmer on the rear section of the variable condenser. The oscillator coil is mounted under the chassis and is trimmed by the front section. The I.F. transformers and trimmers are mounted under the chassis. The I.F. frequency is 450 K. C.

SILVER-MARSHALL MFG. CO. MODEL A-31
MODEL Little Red Rooster
Schematics



LITTLE RED ROOSTER



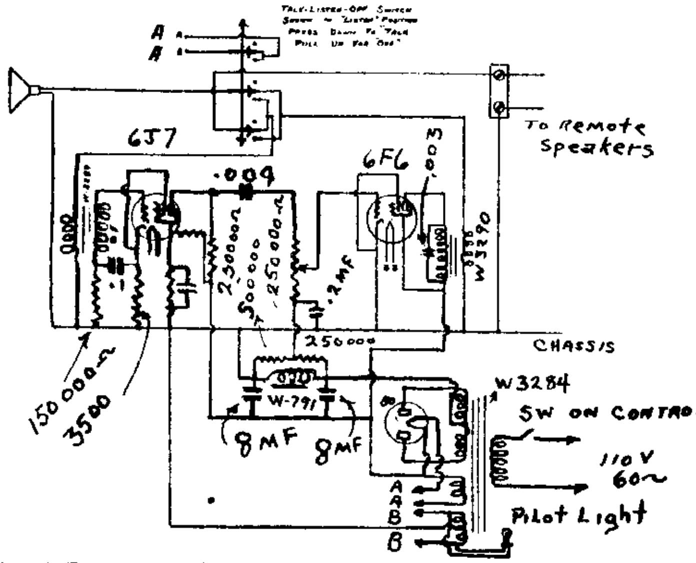
CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION

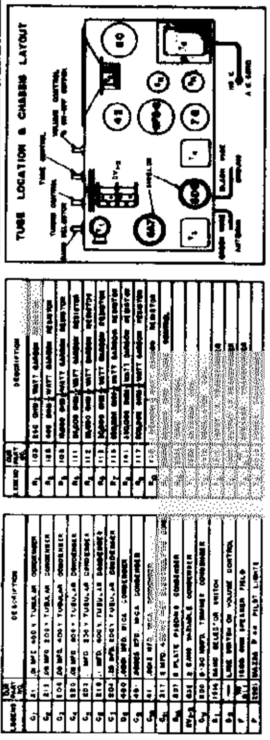
MODEL A-31

MODEL AX
MODELS HMS, HMT Teletalk
MODEL ICS-1241
MODEL MS
Schematics

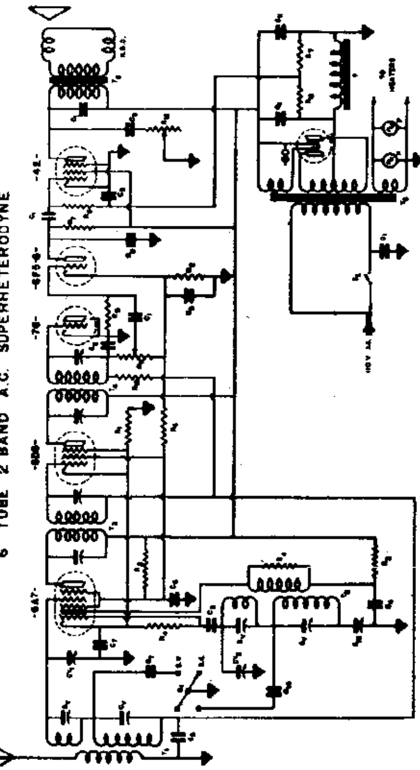
WEBSTER ELECTRIC CO.
RADIO VISION CORP.

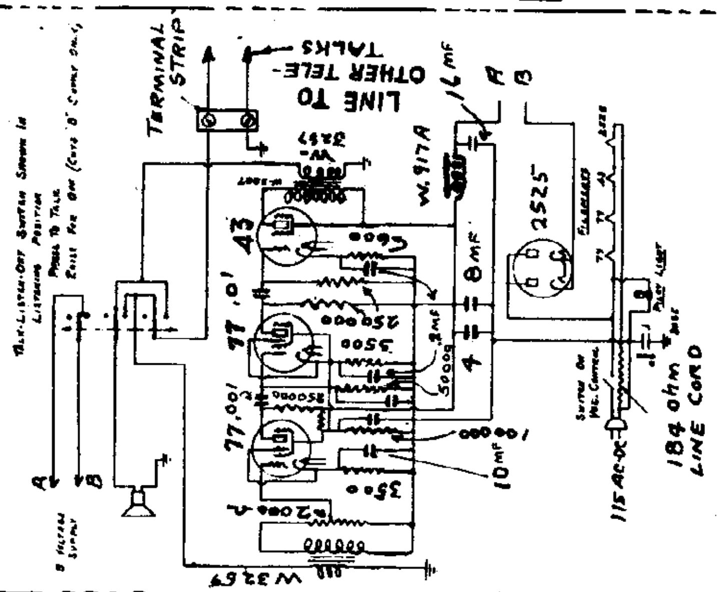
HMS and HMT Webster Electric "Teletalk" Unit



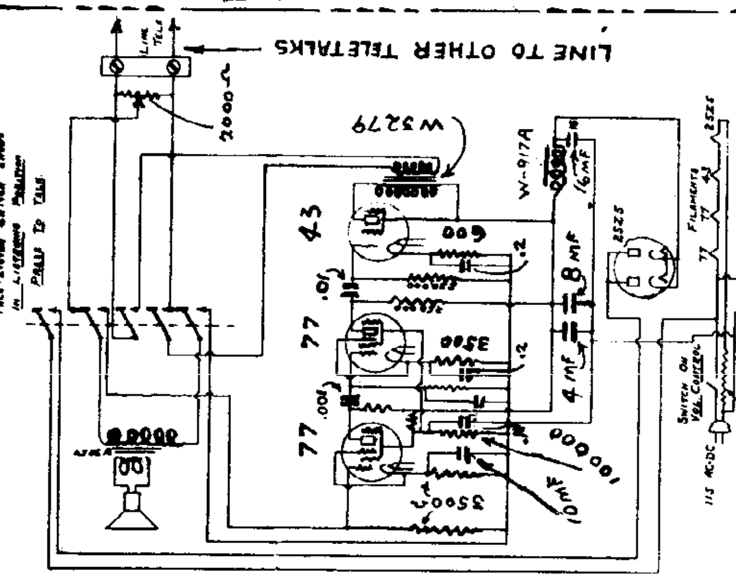


IF PEAK 456 KC
CONVENTIONAL ALIGNMENT- SEE SPECIAL SECTION.
RADIO VISION CORP.





Model "MS"



Model ICS-124-1

Emerson L117, L122, L133, L135, L141

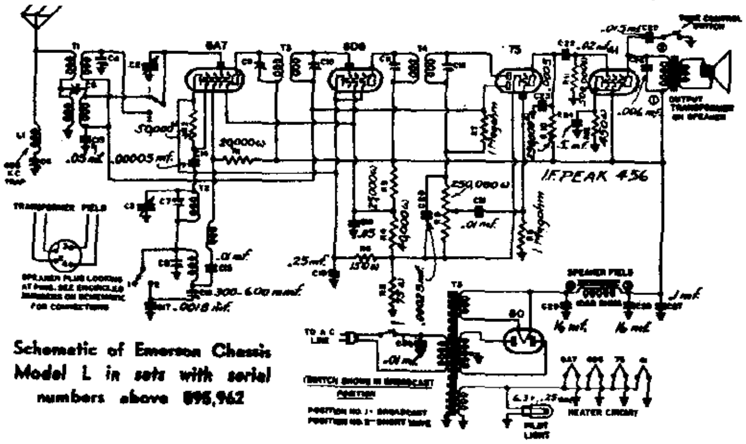
The schematic on *page 7-27 of Rider's Volume VII* applies only to sets bearing serial numbers *under* 895,962. Since the publication of Volume VII we have been advised by the manufacturer that changes have been made in this chassis, Model L, and in order that you may have the latest data, we are showing herewith the schematic of the chassis that is used in those sets with serial numbers *above* 895,962. Also please note that a sixth model number has been added to the above list: L150.

In this late chassis a 75 second detector has been substituted for the 85 tube. The voltage table, given with the rest of the servicing data on *page 7-28 of Rider's Volume VII*, is the same as that of the new chassis, except for the readings of the 75 tube, which are:

Plate	120
Screen	—
Cathode	1.8
Filament	6.3

Note that in Model L150 the electrolytic condensers, C28 and C29, have values of 12 mf. and 8 mf. respectively, and have a voltage rating of 450. Also note that in sets having serial numbers below 961,900 the two primaries of the antenna coil, T1, were in parallel from antenna to ground, and a 0.00005-mf. mica condenser was in series with the antenna lead and the short-wave primary. Also, C17 was an 0.00135-mf. mica condenser.

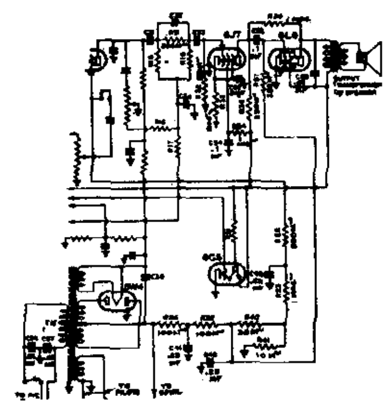
The General Notes and Adjustments on *Emerson page 7-28* apply to this new chassis, as well as the early.



Schematic of Emerson Chassis Model L *in sets with serial* numbers *above* 895,962

Emerson Chassis C and CLW

The 6C5 and the 6F6 tubes of these chassis have been replaced by a 6J7 and 6L6 respectively. There have also been other changes in the audio amplifier, which can be seen by comparing the partial schematic shown herewith and the original which will be found on *page 7-36 of Rider's Volume VII*. The values of parts on the accompanying schematic are the new values. *These changes apply to sets* carrying serial numbers above 880,050 of Chassis C and above 848,410 for Chassis CLW.



Changes in Emerson Chassis C and CLW

Also please make a note that Chassis CLW is the same as Chassis C, except that a long-wave coil has been substituted for that one covering the police range.

The voltage data that appears on *page 7-35* applies to sets having the above changes incorporated with the exception of the readings for the 6J7 tube; these are: *Plate*—115; *Screen*—45, and *Cathode*—1.2. This means that the readings for the 6L6 are the same as those for the 6F6.

Emerson H-5

The schematic of this chassis appears on *page 3-6 of Rider's Volume III and page 884 of the Rider-Combination Manual*. The voltage data and socket layout appears on *page 4-5 of Rider's Volume IV*. Also on this latter page is the schematic diagram for the chassis No. H-5-L, which receiver has the same voltage and socket layout with the following exceptions:

A 6A7 tube is used as a 1st detector-oscillator and the "screen" voltage reading in the table should be 50 instead of 98. This tube in the socket layout is the top one on the right-hand side nearest the gang condenser and should be so marked on the above-mentioned page, bearing in mind, of course, that this layout also applies to the H-5 chassis, which uses a 78 tube as a 1st detector-oscillator.

Also please note that the model numbers of this chassis, H-5, are 30, 250, and 300.

Emerson 117

We are advised by the manufacturer that receivers having serial numbers above 761,440 of this model (Chassis C-5) have the following changes incorporated in the circuit:

The compensator on the oscillator coil trimmer strip, which formerly went from the grid condenser to ground, now goes directly across the broadcast oscillator secondary. This change facilitates alignment.

The compensator on the antenna coil trimmer strip, which formerly went from the grid end of the broadcast antenna secondary to ground, now goes from the grid end of the broadcast antenna secondary directly to the antenna lead. This change introduces capacity coupling and increases the sensitivity at the high-frequency end of the broadcast band.

The schematic of this receiver will be found on *page 7-21 of Rider's Volume VII.*

Emerson 35

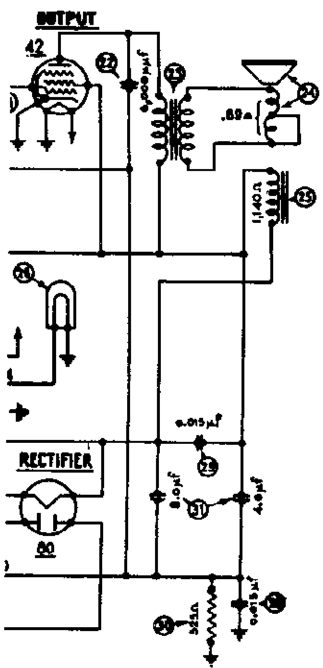
The voltage readings for Chassis T6, used with the model 35, will be found below. The schematic of this receiver *will be found on page 4-3 of Rider's Volume IV.*

Tube	Plate	Screen	Cathode	Suppressor
78 1st R.F.	98	98	1-3.5	0
78 Det-Osc.	98	98	13	13
78 I.F.	98	98	1-3.5	0
75 2nd Det. AVC	50	..	1.0	..
43 O.P.	90	98	0	..

The bias for the 43 tube is measured across the filter choke and should be between 15 and 18 volts. The voltage across the speaker field should be approximately 115.

Philco 59

The schematic, furnished by the manufacturer and shown on *page* 5-30 *of Rider's Volume V,* has an error in the field coil circuit, Part No. 25. Compare



Partial schematic of Philco 59, showing correct wiring of the field coil, Part No. 25.

the partial schematic shown here with the one mentioned above and you will see the difference in the connections to the field coil.

•

Philco 37-33

Starting with Run No. 3, the filament wiring of the 1D5G i-f. tube was reversed, thus improving operation of the set. In Fig. 1 on *page* 7-16 *of Rider's Volume VII,* the left-hand filament terminal of this tube is marked "2 volts." This terminal is now grounded to the chassis.

Referring to Fig. 3 on the same page, resistor No. 8 has been removed from the r-f. terminal panel and connected directly from the oscillator grid contact on the 1D7G socket to ground. This change improved the sensitivity in the center of the broadcast band.

•

Philco 630

The schematic of this receiver shown on *page* 6-31 of *Rider's Volume VI* indicates a · ld-coil resistance of 1140 ohms. This is incorrect and should be 640 ohms. Please make this change in your Volume VI.

Philco 65

The schematic of this receiver was published on the following pages of *Rider's Volume I: page 1-16 of the revised edition and page *459 of the early edition; and on page 1638 of the Rider-Combination Manual.* At the time of publication the values of the parts were unobtainable and these are now given in the list below. The first column is the identifying number used on the schematic; the second column is the part number; and the third column is the value.

Schematic Number	*Part Number*	*Value*
1	3524	10,000 ohms
5	3292A	.1 mf. — 250 ohms
6	3584A	.05 mf. — 250 ohms
13	3583	.5 mf.
14	3525	32,000 ohms
21	3422	200 "
22	3526	5,000 "
23	3518	4,000 "
24	3512	2700 ohms (700,2000)
25	3528	2,000 ohms
26	3628	6 "
27	3292B	.05 mf. 00 250 ohms
29	2850	3200 "

•

Philco 645

The schematic of this set will be found on *page* 7-109 *of Rider's Volume VII.* Several changes have been made, as follows:

Starting with Run No. 3, the 51,000-ohm resistor, No. 16, has been removed. A 32,000-ohm resistor, ½ watt, Part No. 33-332334, has been connected from the oscillator grid of the 6A7 to the suppressor grid of the 78 r-f. tube. The 0.05-mf. condenser, No. 61, has been removed. The 25,-000-ohm resistor, No. 60, has been replaced with one having a value of 240,000 ohms, ¼ watt, Part No. 33-424143.

A 0.06-mf. condenser, Part No. 30-4114, has been connected from the —C end of the B.C. resistor, No. 64, to the junction of the 1-megohm and 490,-000-ohm resistors, Nos. 66 and 67.

The filament voltage of the 80 rectifier is shown as 6.3 volts in Fig. 3 on *page* 7-108 *of Rider's Volume VII.* This should be 5.0 volts.

Beginning with Run No. 4, the green and yellow leads of the a-f input transformer, No. 52, were reversed to reduce hum.

•

Philco 651

The leads of the i-f. transformer should be separated as widely as possible from each other, in order to reduce the possibilities of i-f. oscillation. This means, too, that the leads from one of these transformers should be as far as possible from the leads of the other.

The -B lead from the suppressor plate terminal of the 78 r-f. tube to the wiring panel mounted on the 0.05-mf. condenser, No. 72, should be run close to the baseboard and away from the wave trap coil. This should eliminate motor-boating at 540 kc.

For schematic, see *page 7-111, Rider's Volume VII.*

•

Philco 655

In the paragraph titled "Police" of the alignment instructions on *page* 7-116 *of Rider's Volume VII,* it reads that the detector trimmer No. 11 should be adjusted for maximum output. This should be trimmer No. 12 to conform with the layout of Fig. 4 at the top of the page.

In Fig. 1, the designations of the r-f. transformers on *page* 7-114 should be changed as follows: 15-A, oscillator, to 16; 9, antenna, to 3; and 14, detector, to 10. To correct the lead designations of the oscillator transformer, No. 16 on the schematic, change No. 3 to 7; 7 to 5; 5 to 4; and 4 to 3.

Another error in the manufacturer's data was in the tube layout shown on the top of *page* 7-115 *of Rider's Volume VII.* The second detector is a 75, not an 85. The designation on the schematic on this same page is correct. Please make these changes in your Volume VII.

Beginning with Run No. 2, the 51,000-ohm resistor, No. 14, was removed and a 32,000-ohm resistor, Part No. 33-332334, ½ watt, was connected from the oscillator grid of the 6A7 to the suppressor of the 78 r-f. tube.

•

Philco I-F. Peaks

In certain localities it has been found advisable to align certain two- and three-gang Philco sets at some other i-f. peak than the one for which they were designed, i.e., 470 kc. This change has been found necessary because of some interference that is peculiar to these localities: Portland, Maine; Miami, Fla.; New Haven, Conn.; San Diego, Cal.; about one third of northern Long Island; Newark and southern New Jersey.

Therefore, if you are operating in any of these places and are bothered by code interference, align either of the two type sets mentioned above at 456 kc., 465 kc., or 480 kc. The i-f. peaks just mentioned are to be used depending on the location and type of interference.

Philco 37-600

To prevent reduction in sensitivity at the low-frequency end of the band, the 200-ohm resistor, No. 7, has been changed to 300 ohms, starting with Run No. 3. This change has been noted in the Parts List on *page 7-37 of Rider's Volume VII*, but it still shows as 200 ohms on the schematic, which will be found on the same page.

The lead connecting the suppressor grid to the cathode of the 6J7G i-f tube has been changed. It now runs from the suppressor grid to the junction of the sensitivity control, No. 23, and the secondary of the i-f transformer, No. 19.

•

Philco 37-116

Up to Run No. 4, a condenser was connected between the heater contact and ground of the 6K7G r-f tube. This condenser was removed starting with Run No. 4 to prevent hum modulation on Range 5. It is not shown on the schematic appearing on *page 7-31, 7-32 of Rider's Volume VII.*

Electrolytic condensers, Nos. 126 and 127, 8 mf., have been changed to 4 mf. Part No. 30-2174, starting with Run No. 5.

Starting with Run No. 6, the two 25,000-ohm resistors, Nos. 110 and 111, have been removed from the audio unit and relocated in the power unit near the 6B4G sockets.

To obtain the proper selectivity curve in the expanded position of the i-f expanding unit and to avoid regeneration, dress the plate lead (white) of the 6L7G tube as follows: The plate lead should lay across the 6L7G socket, then pass into the oscillator section close to the base; from here the wire must pass through the second aperture from the front of the r-f unit into the i-f unit.

To prevent clicks when tuning the bass compensation control on a very strong carrier, a 2-megohm resistor, Part No. 33-520339, was connected from the lug on which the 70,000-ohm resistor, No. 103, and the .008-mf. condenser, No. 104, are connected in the audio unit, to ground.

It will be noticed in the schematic on *page 7-31, 7-32 of Rider's Volume VII*, that two parts carry the same number: No. 135. One is the pilot light and this is the correct number for this part; the second is a switch, located on the schematic just below and to the left of the 6J5G AVC tube. The number of this switch should be 137. This number does not appear in the list of parts on *page 7-36*, but the switch is used on the automatic dial mechanism and appears in the parts list under "Code 122" as "Plunger Stop and Switch Assembly, Part No. 45-2330."

Another switch located betwen Nos. 100 and 103 on the schematic with the wording "used in code 122 only," is used to short the audio system when using the automatic dial. This switch is located on the vernier drive assembly. The part numbers of the removable sections which contain the riveted contacts, are 45-2350 and 28-4110.

The magnetic tuning transformer has been changed. Its old part number was 32-2217 and its new number is 32-2361.

•

Philco 37-38

Starting with Run No. 4, the filament wiring of the 1D5G i-f. tube was reversed to improve the operation of the set. In Fig. 1 on *page 7-18 of Rider's Volume VII*, the "F+" of the 1D5G socket becomes "F—" and is grounded to the lug near the socket.

The 32,000-ohm resistor, No. 8 (see schematic on *page 7-17 of Rider's Volume VII*) has been replaced with one having a value of 51,000 ohms, Part No. 33-351339. The resistor is removed from the range switch assembly and is connected directly to the oscillator grid of the 1C7G tube and ground. This change was made to improve the sensitivity in the center of the broadcast band.

•

Philco 37-60

Run No. 2. The 1000-mf. condenser, No. 11, was changed to 250 mmf., Part No. 30-1032, and resistor No. 12 was changed from Part No. 33-351339 to No. 33-332339. This change was made to prevent relaxation oscillation.

Run No. 5. Refer to the Base View of the chassis on *page 7-22 of Rider's Volume VII*. The condenser No. 46 has been moved from the location shown—near the front—to the rear of the power unit. The tubular condenser No. 40 has been replaced with Part No. 8318-SU Bakelite condenser and mounted in the location from which No. 46 was removed.

Run No. 6. The suppressor grid of the 6K7G, i-f tube, is removed from ground and connected to the —2.5 negative tap of the bias resistor, No. 43. See schematic on *page 7-19 of Rider's Volume VII.*

Beginning with Run No. 9, the i-f transformers were changed. The first i-f transformer No. 15 now is Part No. 32-2274 and the second, No. 27, is Part No. 32-2276. The first i-f transformer has a stabilizing winding which is placed in series with the suppressor grid of the 6K7G i-f tube. The short or yellow lead is connected to the ground lug and the long lead to the suppressor grid.

•

Philco 37-61

The changes applying to Philco Model 37-60 also apply to Model 37-61 with the exception of the first paragraph. The schematic diagram appears on *page 7-23 in Rider's Volume VII.*

•

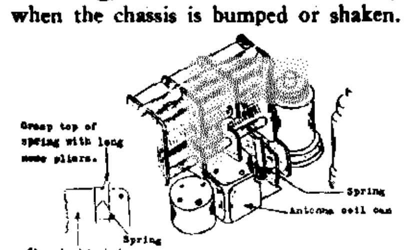
Philco 90, 90A

Please make a note on *page 84 of Aligning Philco Receivers* that the i-f. peak of both chassis used in these models (with two 45s and one 47) is 175 kc. Note 1 on this page should read "175 kc. for both chassis." The correct i-f. peak is indicated on the schematics in Rider's Manuals.

•

Wells-Gardner 6K Series

If noise (not motor or vibrator) is encountered in this model, it may be due to the fact that the antenna transformer shield can is not grounding satisfactorily. The noise brought about by this condition is a popping or scratching, and will be heard only when the chassis is bumped or shaken.



By inserting a spring as shown above in the *Wells-Gardner 6K series chassis*, a *good* ground is assured for the antenna transformer shield.

This condition can easily be remedied without removing the chassis from the case by inserting a phosporbronze spring between the antenna coil can and the chassis bracket. This spring is inserted with a pair of longnose pliers and the position after insertion is shown in the illustration.

For other data, see *pages 7-20 and 7-21 in Rider's Volume VII.*

•

RCA Automatic Record Changer

Data and notes on the automatic record changer will be found incorporated in the service data of model RE-73. These notes will be found on the following pages in *Rider's Volume II: revised edition, pages* 2-79 *to* 2-83 *inclusive; early edition, pages* 504-*Q to* 504-*U inclusive; and in the Rider Combination Manual, pages* 1897 *to* 1901 *inclusive.*

Please make a note in your Index where these data may be found.

•

RCA 690

We have been advised by the manufacturer that no service data on this model were issued, but that it contained a Radiola Model 82 chassis and a Capehart Model 1012-C automatic record changer.

The schematic diagram of the 82 chassis will be found on *page* 1-45 *of the revised Volume I; page* *502 *of the early edition; and on page* 1929 *of the Rider-Combination Manual.* Other data will be found on the following pages: 2-92, 2-93, *and* 2-94 *of the revised Volume II;* 502-*C,* 502-*D, and front of the early edition; and on pages* 1930, 1931, *and* 1932 *of the Rider-Combination Manual.*

•

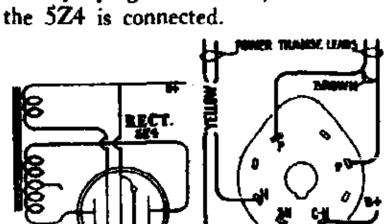
RCA T11-8

A 5Z4 metal rectifier has been substituted for the 5Z3 in this chassis, the schematic for which will be found *on page* 7-144 *of Rider's Volume VII.*

•

RCA T6-1 and C6-2

A metal rectifier tube, 5Z4, has been substituted in the chassis used in these models in place of the type 80 shown in the schematic on *page* 6-83 *of Rider's Volume VI.* The partial schematic and wiring diagrams in the accompanying illustration, show how the 5Z4 is connected.



These diagrams show the connections for the 5Z4 rectifier in the RCA models T6-1 and C6-2.

The resistor, R3, in the cathode circuit of the 6A8 tube has been changed from 56,000 ohms to 100,000, the new Part No. 3118. The resistor, R4, in the screen grid circuit of the same tube, has been changed from 12,000 ohms to 33,000, the new Part No. 8072. New power transformers have also been substituted, depending on the voltage and frequency of the line; they are: 105-125 volts, 50-60 cycles, Part No. 11848; same voltage for 25-50 cycles, Part No. 11849; for 100 up to 250 volts, 40-60 cycles, Part No. 11850. The following parts are not used in the revised chassis: the .1-mf. condenser, C23; and the resistors, R8, 1200 ohms, and R9, 220,000 ohms.

•

RCA D11-2

Several changes have been incorporated in this model, the schematic of which may be found on *page* 7-137 *of Rider's Volume VII.*

A 5Z4 metal rectifier tube has been substituted for the 5Z3 formerly used. The phonograph motor has been changed and is now of the capacitor type. The motor is wired in this instrument as follows: One power supply lead connects to one terminal of switch S14, the main toggle switch. The other terminal of S14 connects to one terminal of the brake switch S15. The other terminal of S15 connects to the yellow motor lead. The green motor lead connects to one lead of the motor capacitor, Part No. 12051. The red motor lead connects to the other capacitor lead and also to the remaining power-supply lead. A new suspension spring is also used, Part No. 12050.

The 0.01-mf. condenser, C24, is no longer used. The following parts are added to the revised model D11-2: the motor, 105-125 volts, for 60 and 50 cycles. Part Nos. 9650 and 9651 respectively for the motor formerly employed; filter pack for phonograph that is used in some models, Part No. 12037; and a new reproducer, complete, Part No. 6952.

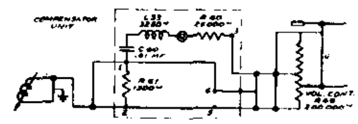
•

RCA R-14

For servicing information on this model, please refer to the data covering Radiola Model 42, which will be found on *page* 3-19 *of Rider's Volume III and on page* 1866 *in the Rider-Combination Manual.*

RCA 342

This combination radio-phonograph set is similar to the Model 341 with the exception of the pick-up coupling transformer. Instead of this unit, the



Change in the pick-up circuit of the RCA 342. Compare with Model 341.

apparatus shown in the schematic herewith, has been substituted in the 342. The schematic for Model 341 will be found on *page* 5-157 *in Rider's Volume V.*

•

RCA AR-4229

Certain changes were made in this police auto radio receiver, necessitating new components. Below will be found corrections for the parts list, which was run on *page 5-206 in Rider's Volume V.*

New Stock No.	Old Stock No.	Description
4049	3745	C-12, 1310 mmf.*
7701	7601	3-gang variable condenser
7702	6540	R-f coil assembly
7703	6731	Antenna coil
7704	6471	Oscillator coil
6570	6784	Dial scale
7698	G-7850	Control box cover
7705	G-7851	Control box complete
6161	G-5021	Station selector knob

*Was 745 mmf.

•

RCA 6K10, 6T10, 8T10, 9K10

These receivers are similar to models 6K2, 6T2, 8T, and 9K2 respectively, except for cabinet design. The servicing data, as published on the following pages in *Rider's Volume VII,* applies to these new model numbers: 6T10 and 6K10, *page* 7-41; 8T10, *page* 7-56; and 9K10, *page* 7-99.

•

RCA 10K11, 10T11

The chassis and speakers of these two models are identical to models 10K and 10T, which will be found in *Rider's Volume VII on page* 7-132. The service data starting on that page applies to these new model numbers with the exception of some minor replacement parts for the new cabinets in which these chassis are housed.

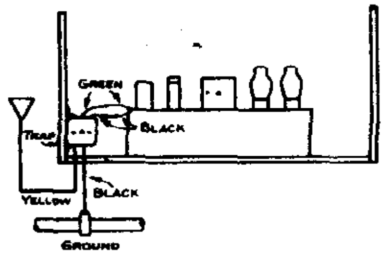
•

Silvertone Wave-Trap

A wave-trap has been designed for use with the following receivers when they are used near ship transmitters, airports, or air beacon stations, which cause code interference: 1989, 4408, 4420, 4520, 4409, 4413, 4442, 4443, 4522, 4523, 4542, 4543. The part number of this wave-trap is 101311-4256.

Installation:

The trap should be mounted, by means of two wood screws, at any convenient place on the chassis shelf or cabinet, where it will be near the an-



Installation of wave-trap in various Silvertone chassis

tenna terminal of the set. Connect the yellow lead of the wave-trap to the antenna downlead and splice the green wire of the wave-trap to the green antenna lead of the receiver. Cut off any excess wire from the trap and from the chassis antenna lead, so that the green lead from the wave-trap to the chassis is as short as possible. The yellow lead from the wave-trap should be run so that it is as far as possible from the green lead. Splice one of the black leads from the wave-trap to the black ground lead of the receiver. Connect the other black lead to the ground that is used for the installation. See accompanying illustration.

Adjustment:

The trap is pre-tuned to the intermediate frequency of the set, so that normally no further adjustment should be needed. However, if interference still be experienced, tune the receiver to approximately between 550 and 600 kc. Then adjust the wave-trap until the interference is eliminated, by means of the trimmer screw at the bottom of the container. The addition of the trap will reduce the sensitivity of the receiver around 600 kc. by about 50%. *It would be wise to advise the set owner of this fact before installing this trap.*

•

Silvertone 2- and 3-Volt Chassis

The model numbers in which these chassis are used are as follows: 4404, 4406, 4424, 4444, 4524, and 4544 for the 3-volt models; 4410, 4411, 4425, and 4445 for the 2-volt models. The schematic for both chassis will be found on *page 7-55 of Rider's Volume VII.*

In some localities where a 930-kc. station is operating, it may be desirable to shift the i-f. peak — 465 kc. — of these chassis to eliminate a whistle due to a beat between the second harmonic of the i-f. peak and the signal of 930 kc.

First determine at what point between 900 and 960 kc. the whistle will be least objectionable. Dividing this frequency in half will give the new i-f. peak at which the receiver should be aligned. For example: assume that the whistle at 915 kc. would be unobjectionable, then the new i-f. peak would be 915 ÷ 2, or 457.5 kc. Align the i-f. transformers at this new frequency and then realign the rest of the receiver, as described on *page 7-56 of Rider's Volume VII.*

•

Silvertone 1802A, 1803A, 1807

Refer to the schematic *page 5-31 of Rider's Volume V.* The 0.001-mf. condenser in the plate circuit of the 2A6, second detector, is no longer grounded. One side is still connected to the plate, as it was in the schematic mentioned above, but the other side now is connected to the cathode of the 2A6.

Silvertone 1825, 1828

A change has been made in the antenna circuit of this chassis, the schematic of which appears on *page 5-39 of Rider's Volume V.* The switch, connected across the 100,000-ohm resistor in the antenna primary circuit, has been eliminated.

•

Silvertone 1945

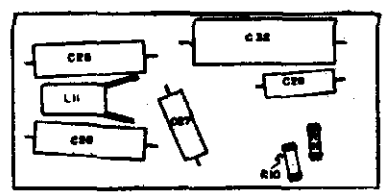
The original production of this model was supplied with 1.5-ampere fuses. Sometimes trouble was experienced with these fuses blowing out, due to the initial charging current of the electrolytic condensers This occurred only when the receiver had not been used for a considerable time, so that the electrolytic condensers momentarily drew large forming current when the set was first turned on.

Later production of this model was supplied with a 2-ampere fuse and if you come across any of these models with the smaller fuse, substitute the 2-ampere type.

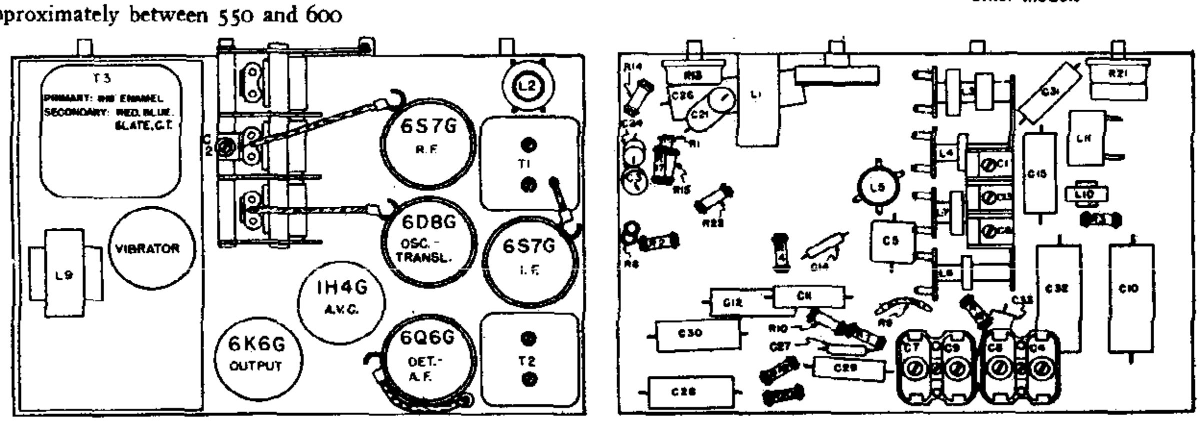
•

Silvertone 4428A, 4448A, 4528A, 4548A

We have been advised by the manufacturer that the tube layout and the two chassis views that were supplied with the servicing instructions of the chassis used in the above models, were incorrect. We are reproducing here the three correct layouts that should appear on *pages 7-61 and 7-62 of Rider's Volume VII.* Please make proper notation on these pages in your Manual.



The locations of the parts under the power supply unit of the Silvertone 4428A and other models

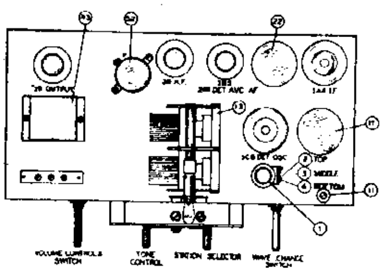


LOCATIONS OF PARTS ON TOP OF CHASSIS LOCATIONS OF PARTS UNDER CHASSIS

The correct chassis views of the Silvertone models 4428A, 4448A, 4528A, and 4548A.

Bosch 601

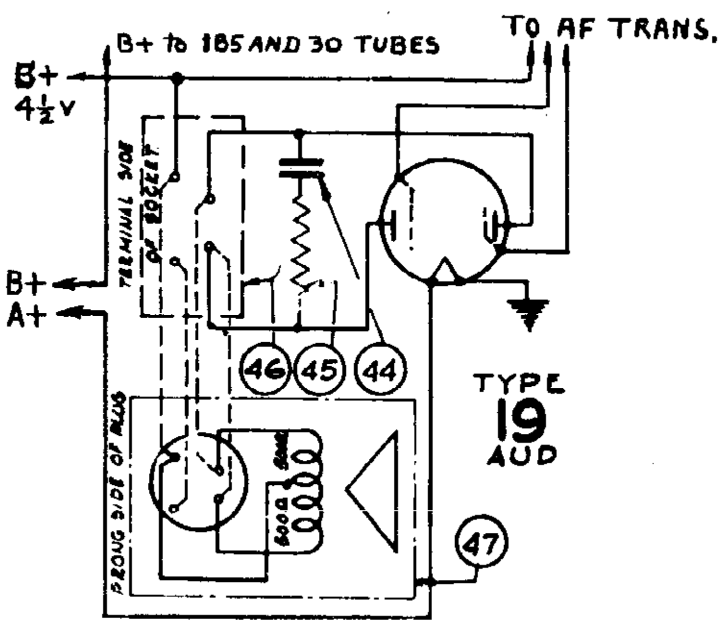
Several omissions of parts values were in the preliminary schematic diagram of this set which was published on *page 7-20 of Rider's Volume VII* and these missing values will be found below opposite the diagram number by which the various components are designated. The connections are the



Top view of Bosch 601 chassis

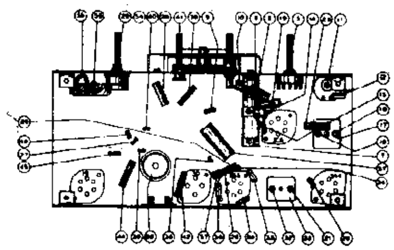
same in the final schematic as they are shown on the above-mentioned page with the one exception: A 0.5-mf. condenser has been inserted between the high side of the filament supply and ground. Draw this in on your schematic just to the left of the dial lamp (No. 53) where the lead to the filament of the 1A4 tube is connected. The part number of this new condenser is CW 2-50 and its diagram number is 57.

Diagram No.	*Part No.*	*Description*
10, 28, 37	CW 4-02	0.02 mf., 400 v.
19, 23	CW 2-05	0.05 mf., 200 v.
29	VR 9538	0.5 megohm, vol. con.
38	CW 4-005	0.005 mf., 400 v.
42	CW 6-005	0.005 mf., 600 v.
44	CW 4-01	0.01 mf., 400 v.



CORRECTION OF SPEAKER CABLE CONNECTIONS TO THE SPEAKER PLUG OF MODEL 601.

Also check the values of diagram numbers 55 and 56; they should be 0.94 and 0.42 ohm respectively.



Bottom view of Bosch 601 chassis

Below will be found the alignment data for this receiver together with the layouts of the apparatus on both the top and bottom of the chassis. The numbers of the parts correspond with the diagram numbers on the schematic already published in Rider's Volume VII.

Wave Switch	Dial Position	Dummy Antenna	Sig. Gen. Frequency	Sig. Gen. Connection	Trimmers	Output Signal
Bcdcst.[1]	600 kc.	.5 mf.	465 kc.	1A4 grid	21, 22	Max.
"	"	"	"	1C6 grid	16, 18	"
"	"	—	"	Antenna	4	Min.
"	1600 kc.	.0002 mf.	1600 kc.	"	5	Max.
"	"	"	"	"	2	"
"	600 kc.	"	600 kc.	"	11[2]	"
"	1600 kc.	"	1600 kc.	"	8, 3	"
Sht. Wave	6000 kc.	"	6000 kc.	"	7	"
"	"	"	"	"	2	"

[1] Volume control to maximum and tone control to treble
[2] While rocking condenser.

Bosch 605, 605C

The final schematic is the same as the preliminary, which will be found on *page 7-25 of Rider's Volume VII,* with the following change in the value of the .01-mf. condenser, Diagram No. 39. The new value is .005 mf., Part No. CW4-005.

Below will be found the resistance of the windings of the power transformer:

Winding	Primary	Sec. Total	6.3 Fil.	Rect. Fil.
TR 9555	15.5 ohms	600 ohms	.24 ohm	.17 ohm
TR 9564	16.5 ohms	570 ohms	.23 ohm	.14 ohm
TR 9565	61 ohms	580 ohms	.23 ohm	.15 ohm

Please add these data to the schematic.

Bosch 650

The final schematic of this model is the same as the preliminary, which will be found on *page 7-33 of Rider's Volume VII,* with the following exceptions:

Diagram No.	Old Value	New Value	Part No.
10	.0001 mf.	.000065 mf.	CM9511
18	005 mf.	.005 mf.	CW4005
23	40,000 ohms	40,000 ohms	SA99957
38	.05 mf.	.25 mf.	CW2-25
51	30,000 ohms	50,000 ohms	RE95116
56	65 ohms	50 ohms	RE9537

Note that the part numbers only of items 18 and 23 are changed; the values remain the same.

Please make a correction on the schematic. The lower plate of condenser No. 10 should be connected to the junction of the tuning condenser and condenser No. 12. This was omitted from the drawing.

Bosch 640

The final schematic is the same as the preliminary, which will be found on *page 7-31 of Rider's Volume VII,* with the following exceptions:

Diagram No	Old Value	New Value	Part No.
10	.0001 mf.	.000065 mf.	C59511
23	40,000 ohms	25,000 ohms	SA99777
38	.05 mf.	.25 mf.	CW2-25
50	.05 mf.	.1 mf.	CW2-10
56	65 ohms	50 ohms	RE9537

Please make these changes in the list of parts on *Bosch page 7-32 in Rider's Volume VII.*

Silvertone Wave-trap Change

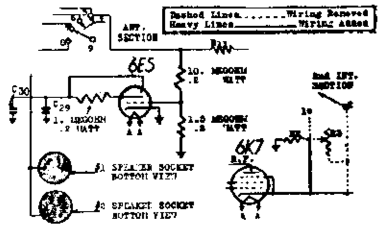
Wave-trap, Part No. 1013114477, used for eliminating code interference in models 1986, 1987, 4403, 4463, 4464, 4484, 4563, and 4584 *(see page 7-45 of Rider's Volume VII),* is described as having three leads.

In later production of this trap only two leads were used, having the colors black and green. The green lead is to be connected to the green lead of the set's antenna lead or connected to the antenna terminal, if the receiver has a terminal board. The black lead of the trap is to be connected to ground.

This trap acts as a series resonant circuit connected across the antenna and ground terminals of the set.

Wells-Gardner 2CM-3A Series

When the 6E5 cathode-ray tube is used in conjunction with the 2CM Series receiver, the set becomes a 3A series by the addition of the extra tube, which is a resonance indicator and is connected in the circuit as shown in



Wiring changes in Wells-Gardner 2CM for addition of 6E5 tube

the accompanying illustration. Refer also to the schematic shown on *page 7-4 of Rider's Volume VII.*

The 6E5 tube may be removed as follows: Pull off the cable assembly socket and swing the upper part of the tube bracket away from the console panel. Then loosen the thumb screw until the tube can be removed. To re-insert the tube, reverse the above instructions.

•

Wells-Gardner 6L Series

If r-f. noise or vibrator hash is encountered in this model, the following procedure may be followed to eliminate the trouble. See schematic on *page 7-22 of Rider's Volume VII.* Models in which these changes have already been incorporated may be identified by the paint mark on the "A" cable near the bayonet connector.

The lead from the antenna section of the gang condenser (section nearest 6D6 r-f. tube) should be unsoldered from the antenna coil terminal and cut to the exact length necessary to reach the terminal. It should then be re-soldered to the terminal in the position shown in Fig. 1.

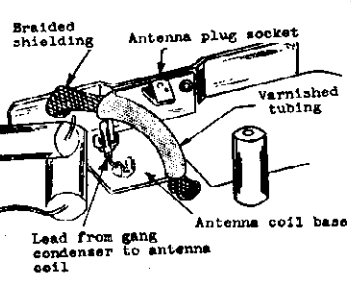


Fig. 1—New position of the antenna lead with shielding and tubing in place.

One end of a 4 inch piece of heavy braided shielding should be soldered to the ground lug on which the gang condenser braided cable is grounded—See Fig. 1. This piece of shielding must be very heavy and should be composed of 4 pieces of ordinary braided shielding, each of which is made up of at least 64 strands of No. 34 wire. Slip a piece of varnished tubing 2 inches long over the free end of the cable. Then solder this end to the chassis base between the antenna and interstage coil bases at the point shown in Fig. 1.

On the side of the chassis case opposite the control cables, a hole should be drilled through the case and chassis base at the point shown in Fig. 2, using a No. 32 drill. Enlarge the hole in the case by using a slightly larger drill. Clean off the paint around the hole in

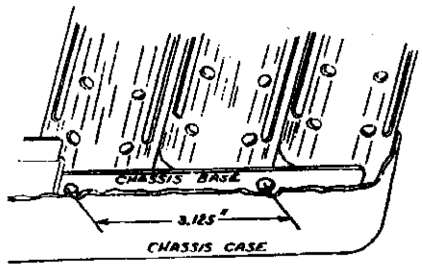


Fig. 2—Location of the hole through the chassis case and chassis base.

the chassis case so that the screw head will be well grounded. Then use a No. 6 self-tapping screw to ground the case to the chassis.

•

Wells-Gardner 2DL Series

We have been advised by the manufacturer that if an a-c. hum develops in this model the following should be checked:

Be sure that the volume control lugs are not grounded on the flat portion of the metal chassis wall which supports the rubber mounting foot.

The bottom plate under the chassis must be under the r-f. end of the chassis and away from the filter choke. If it is in the center or left side (from back of the set), move it towards the right side about one-half inch from the mounting bolt holes.

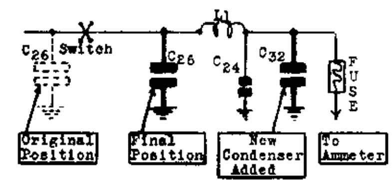
If you will consult the schematic diagram on *page 7-7 of Rider's Volume VII,* it will be seen that a 5Z4MG rectifier tube is employed. This is a metal-glass tube and that type only should be used. Do not substitute a 5Z4 (metal tube), as this will not operate satisfactorily at the voltages used in this model.

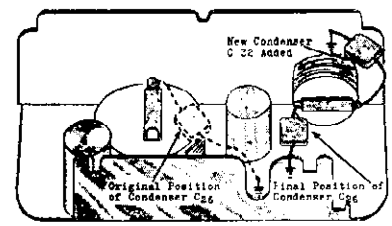
•

Wells-Gardner 6R

A change and an addition in the "A" line filter circuit has been made in this receiver, the schematic of which will be found on *page 7-27 in Rider's Volume VII.* Referring to Fig. 1, condenser C26 (.002 mf.) is moved to the opposite side of the switch as indicated. A new condenser C32—.002 mf. is added as shown. The actual points at which these condensers are connected are shown in Fig. 2.

Receivers of this series having this change incorporated can be identified by a green paint mark on the battery lead. There will also be a letter "C" stamped on the chassis.





Schematic, Fig. 1, shows changes in Wells-Gardner 6R to eliminate motor noise. Fig. 2, below, shows new parts positions

The above mentioned changes are not required for most car installations and are made only to take care of extreme cases of motor noise.

It will be necessary in many Ford V8 installations to take the steps described above. If motor noise persists after the regular procedure has been followed, make this change in the "A" line circuit in Ford V8s or any other cars.

If motor noise still persists, it may be radiated through the openings in the chassis case on the tuning condenser side. Remove the chassis from the case and solder a piece of tin plate on the inside of the case over the openings on the tuning condenser side to completely cover these openings.

•

Wells-Gardner 1936 Receivers

In all 1936 receivers using 5Z4MG rectifier tubes it will be advisable to use 5Y3G rectifier tubes for replacement purposes. The latter is a common tube, easy to obtain and is not subject to the breakdown that was encountered in some of the 5Z4MG tubes.

Howard HA-6

In some cases of the early production of this model the wax holding the iron core of the i-f. transformers melted, causing the iron to collect at the bottom of the coil. A loss of sensitivity resulted. This trouble has been corrected in the later production.

Note that the same chassis is used in the Silvertone 4400.

Zenith 18E

This model uses the same chassis as that used in Models 11E and 14E, the schematic for which will be found on *page 1-3 in the revised edition and page *654 of the early edition of Rider's Volume I and on page 2687 of the Rider-Combination Manual.* The power pack used with these three models is ZE9.

We have received from the manufacturer a schematic which includes the values of some parts that were omitted from the original diagram. The value of the volume control is 6 ohms. The tapped resistor in series with the heater of the 227 is 10 ohms and the grid leak of the 227 is 3 megohms. The fixed condenser between the plate and cathode of the 227 has a value of 0.001 mf.

The schematic of the power pack, Model ZE9, will be found on *page 2-2 of Rider's Volume II, revised edition, and on page 654-A of the early edition, and on page 2688 of the Rider-Combination Manual.* The resistor in the lead from the mid-tap of the upper 5-volt winding of the power transformer has a value of 3000 ohms. The three sections of the voltage divider, starting at the top (+B) and going down, are 8000, 7800, and 6000 ohms respectively.

Please mark these values on the respective schematics in your Rider's Manuals.

•

Zenith 462

To replace the power supply unit of this receiver, the servicing data for which appears on *pages 4–3 and 4–4 of Rider's Volume IV,* the steps below should be followed:

Unsolder two red leads from the rectifier (6Z4) socket; the blue lead from the terminal strip near tone control and the black lead from green terminal on electrolytic condenser. These leads run through the chassis base beneath the power supply unit.

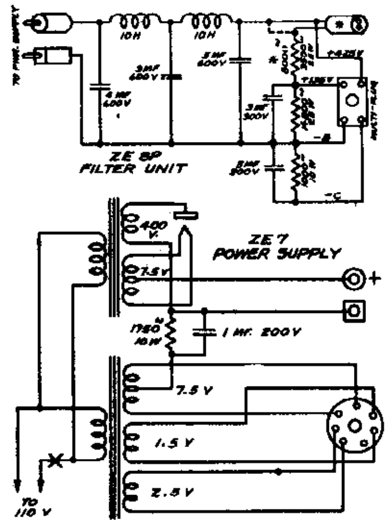
Remove the four 8/32 screws which hold power supply unit in place beneath the chassis base.

If the loud speaker has to be replaced, the steps below should be followed for its removal:

Remove the four 8/32 screws at lower left and right hand corners of the front panel. Unsolder the speaker leads from the terminal strip and 42 socket on under side of chassis. Remove the four 8/32 speaker screws from around grill on panel.

Zenith ZE7, ZE8, ZE8P

The power pack ZE7 and the filter ZE8 are used with models 15E and 16E. The same power pack and filter ZE8P are used with models 15EP and 16EP. The schematic diagram of the receiver chassis will be found on *page 7–26 in Rider's Volume VII; page *655 in the early edition of Volume I and on page 2689 of the Rider–Combination Manual,*



Schematics of Zenith ZE7 power supply and ZE8 and ZE8P filter units.

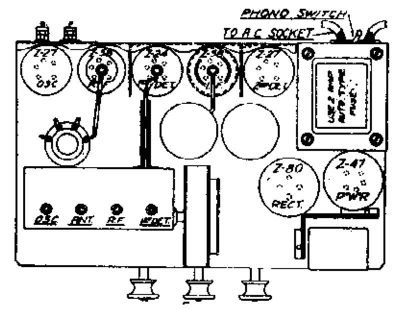
We have been able to secure from the manufacturer the schematics and values of this power pack and the filter units, which are reproduced herewith. We suggest that you make a notation on the pages mentioned above where this data may be found.

The ZE8 filter unit is the same as the ZE8P except that the receptacle marked (*) in the schematic is not used. An 8000-ohm resistor is used instead of the 3500-ohm resistor and is connected to the +425-volt line, as is indicated by the dotted line in the top illustration.

•

Zenith 210, 220, 221

The schematic and socket layout for chassis 2022-A & B, which is used in the above receivers, will be found on *page 3–2 in Rider's Volume III and on page 2730 in the Rider-Combination Manual.* We have just received the voltage data and the layout showing the location of the trimmers, which are reproduced herewith.



Socket and trimmers locations for Zenith Models 210, 220 and 221

Tube	Plate	Cathode	Screen	Suppressor	Plate ma.
Z-58 R.F. ...	248	3	115	3	9.5
Z-24 1st Det.	248	22	115	..	0.4
Z-27 Osc....	118	..	..	..	3.0
Z-58 I.F.	248	3	115	3	8.0
Z-27 2nd Det.	110	50	..	..	0.4
Z-47 O.P. ...	226	..	245	..	38.
Z-80 Rect. ...	360	..	..	..	32.

The intermediate frequency is 175 kc. The condenser gang is adjusted at 1500 kc. and the oscillator padder at 600 kc.

•

Zenith Chassis 5516, 5634, 5707

The alignment data given below applies to the three chassis, the servicing data for which will be found on the following pages in Rider's Volume VII: *Chassis* 5516 *on page* 7-7; *chassis* 5634, *page* 7-17, *and chassis* 5707, *page* 7-18.

Wave-band Sw. Position	Dial Position	Sig. Gen. Frequency	Sig. Gen. Connection	Trimmer Adjusted	Output Signal
A..............	550 kc.	456 kc.	Cont. grid of 1st Det.	Note 1	Max
A..............	550 kc.	456 kc.	Antenna	Wavetrap	Min.
B..............	6 mc.	6 mc.	Antenna	Osc. H.F.	Max
A..............	1400 kc.	1400 kc.	Antenna	Broadcast	Max
A..............	1400 kc.	1400 kc.	Antenna	Antenna	Max
C..............	18 mc.	18 mc.	Antenna	Sh.-Wave[2]	Max
A..............	600 kc.	600 kc.	Antenna	Bdcst. Pad.[2]	Max
A..............	1400 kc.	1400 kc.	Antenna	Broadcast	Max.
A..............	1400 kc.	1400 kc.	Antenna	Antenna	Max.

Note 1. Follow usual procedure, starting at the trimmer of the secondary of the 2nd i-f. transformer and working to the primary of the first.

Note 2. Make this adjustment while rocking gang condenser about 600 kc.