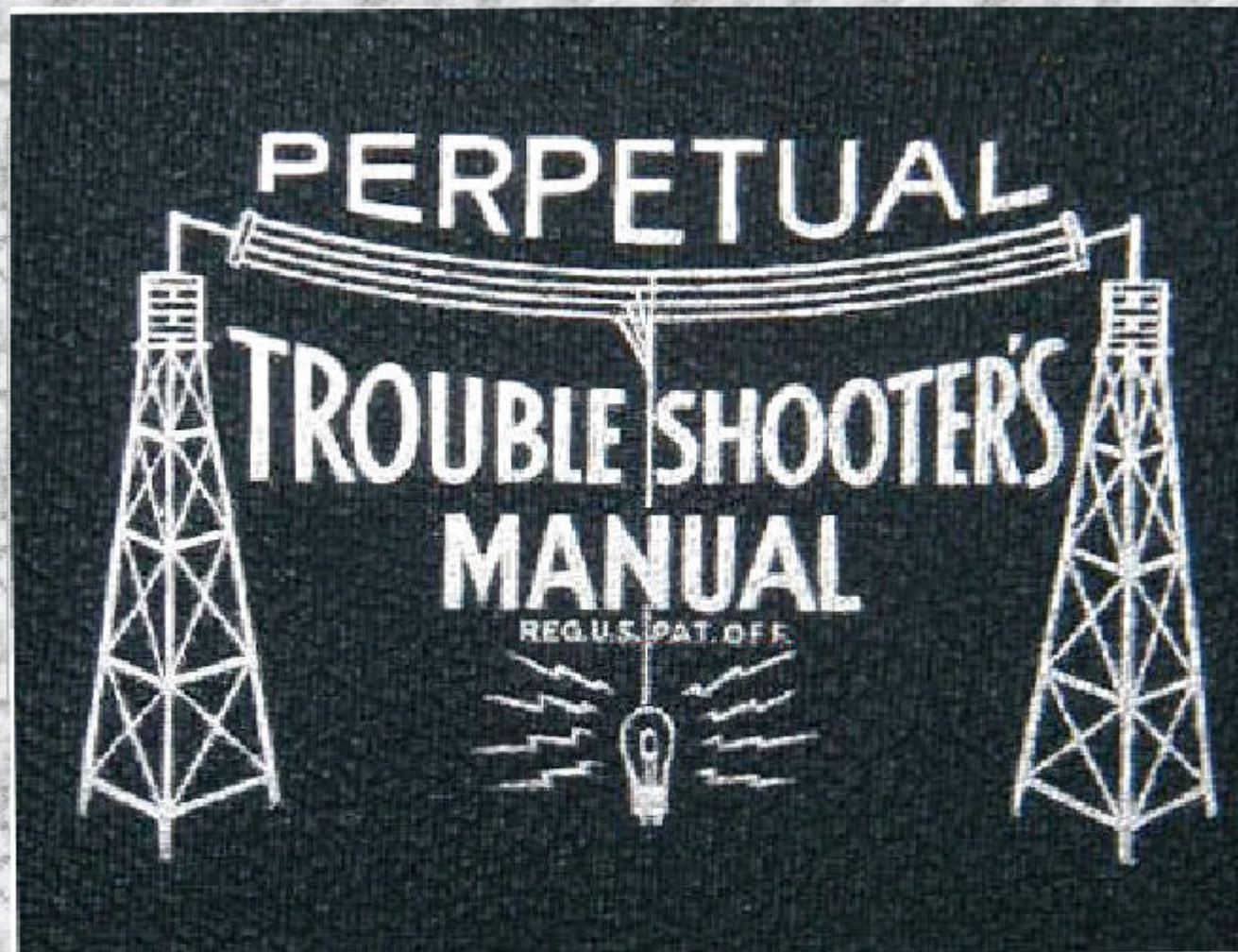


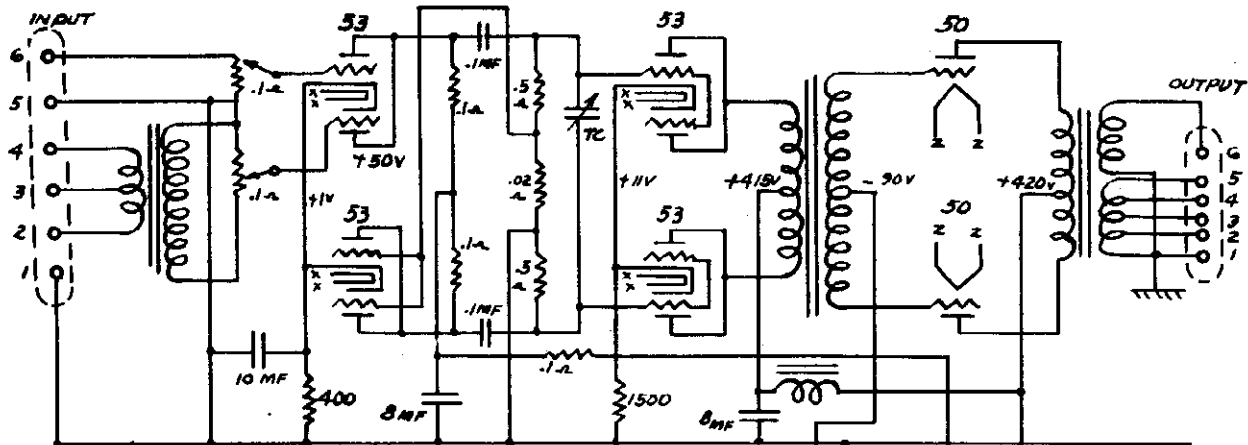
RIDER'S **VOLUME - VI**



**COVERING LATE 1934
THROUGH
LATE 1935**

MODEL 38
 MODELS 198, 199
 Schematics
 Impedances

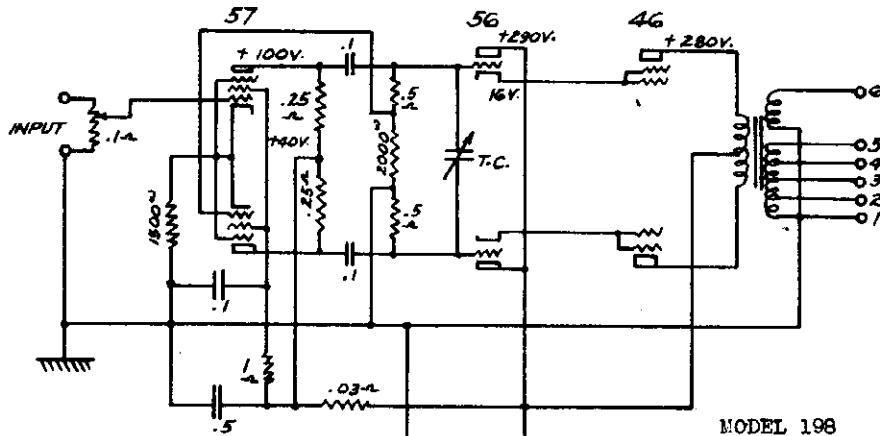
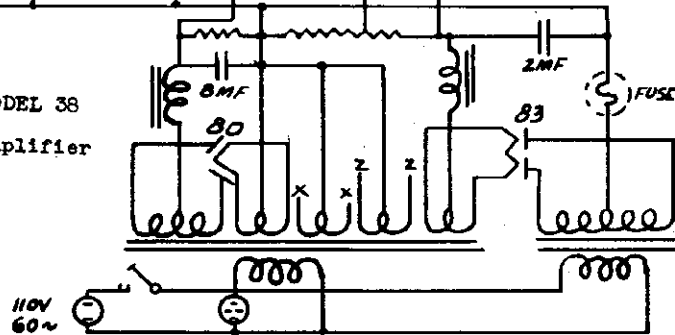
ACRATEST PRODUCTS



OUTPUT IMPEDANCES

Between terminals 1 and 2	-	2	ohms
" " 4 "	5	-	3
" " 3 "	4	-	4
" " 2 "	3	-	6
" " 3 "	5	-	7
" " 1 "	3	-	8
" " 2 "	4	-	10
" " 1 "	4	-	12
" " 2 "	5	-	13
" " 1 "	5	-	15
" " 1 "	6	-	500

MODEL 38
 Amplifier

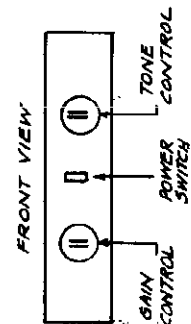
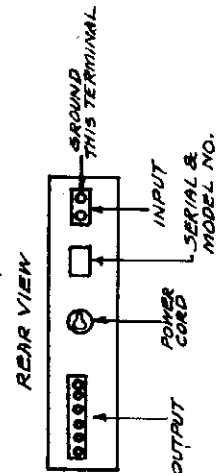
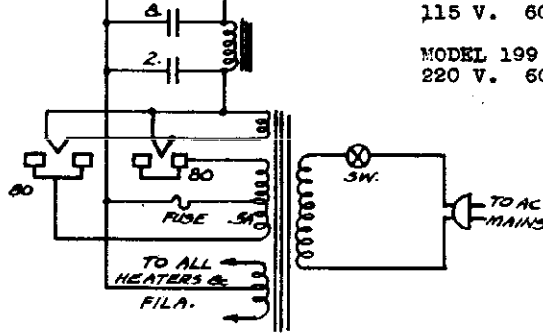


OUTPUT IMPEDANCES

Between Terminals 1 and 2	-	2	ohms
" " 4 "	5	-	3
" " 3 "	4	-	4
" " 2 "	3	-	6
" " 3 "	5	-	7
" " 1 "	3	-	8
" " 2 "	4	-	10
" " 1 "	4	-	12
" " 2 "	5	-	13
" " 1 "	5	-	15
" " 1 "	6	-	500

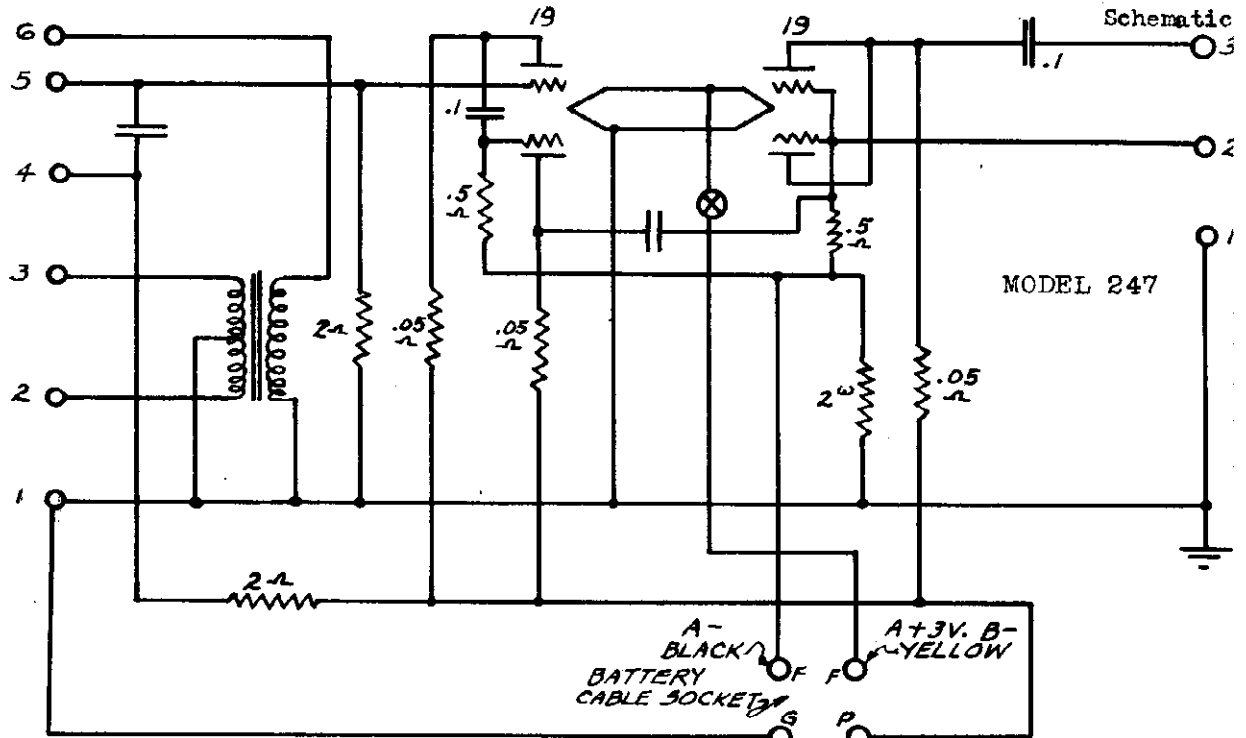
MODEL 198
 115 V. 60 CPS

MODEL 199
 220 V. 60 CPS



ACRATEST PRODUCTS

MODEL 247
MODEL 728
Schematic



INPUT CONNECTIONS:-

- 1 & 2 200 ω
- 2 & 3 500 ω
- 1 & 4 PHOTO CELL
OR COND. MIC.
- 1 & 5 CRYSTAL MIC.
HI-IMPEDANCE

PICKUP OR
RADIO TUNER

WHITE
(EXTERNAL
GROUND)

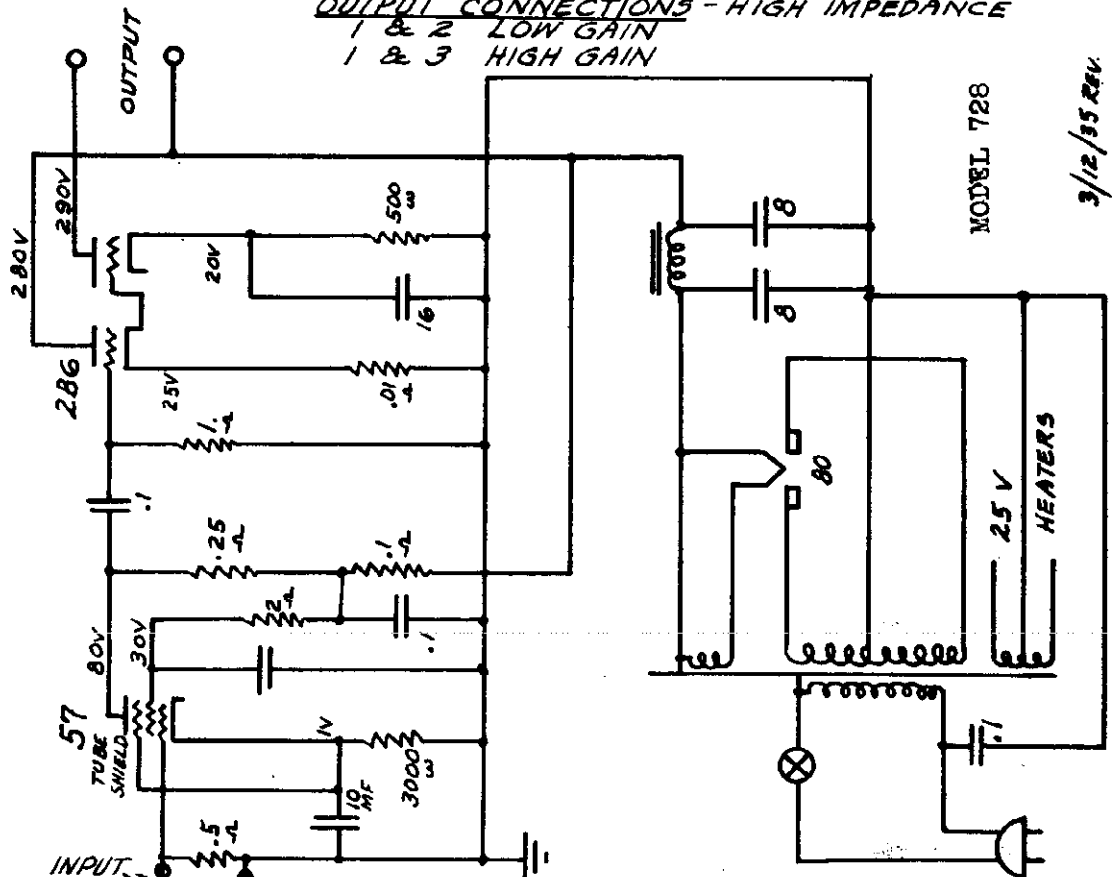
RED
(B + 90
-135)

NOTE:-

TERMINALS 5 & 6 MUST BE SHORT CIRCUITED
WHEN USING 200 ω OR 500 ω INPUT.

OUTPUT CONNECTIONS - HIGH IMPEDANCE

- 1 & 2 LOW GAIN
- 1 & 3 HIGH GAIN

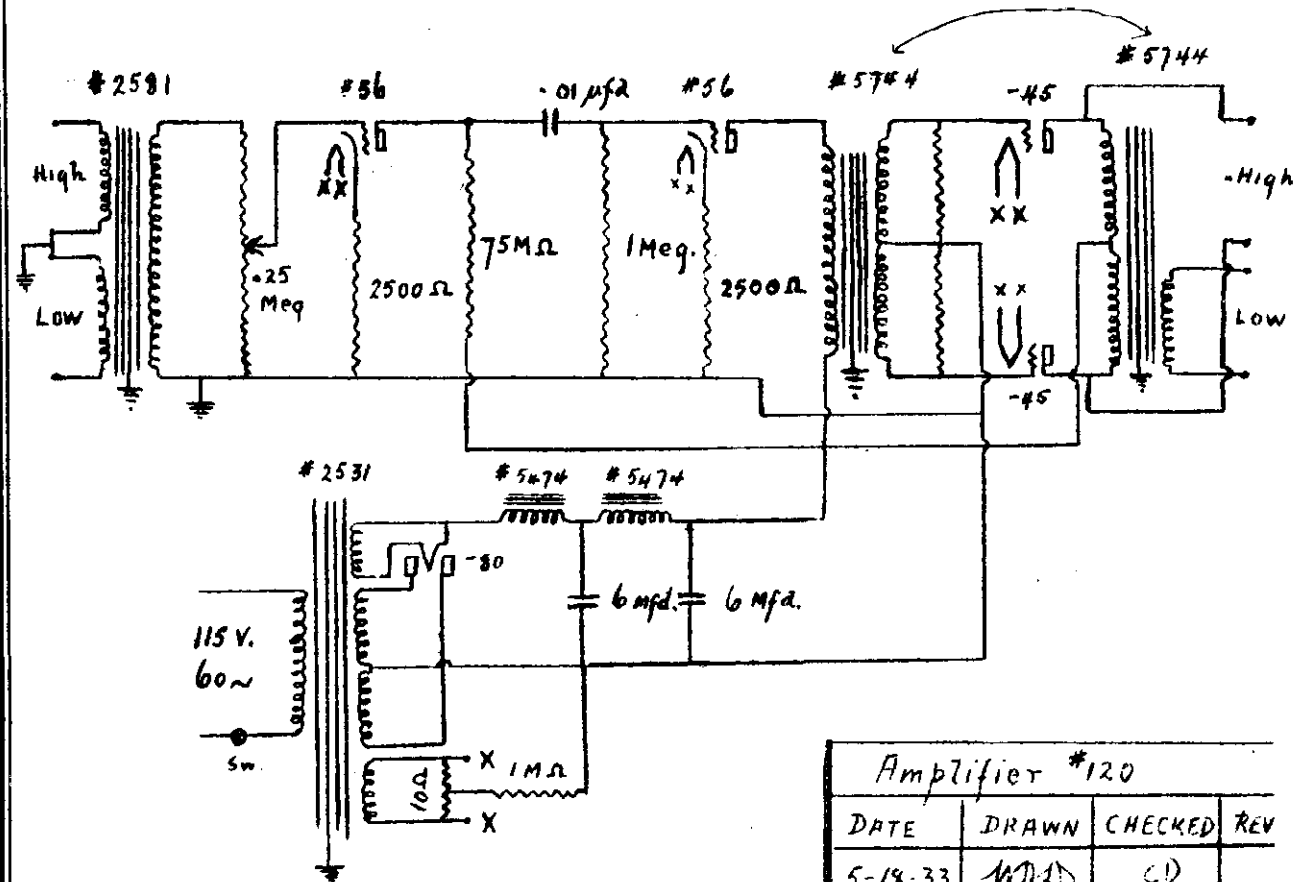


MODEL 728

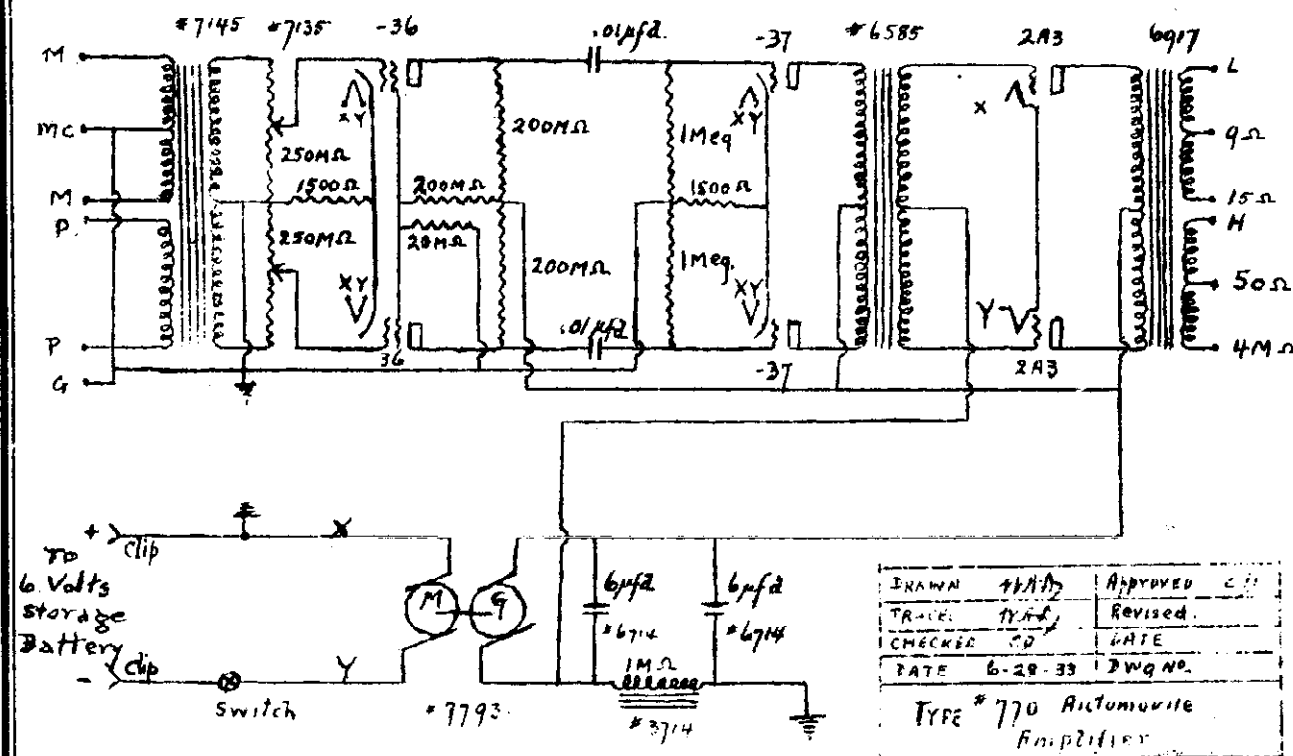
3/12/35 REV.
4/23/35 YLU

MODEL 120
MODEL 770
Schematics

ACRATEST PRODUCTS



Amplifier #120			
DATE	DRAWN	CHECKED	REV
5-18-33	WHD	CD	

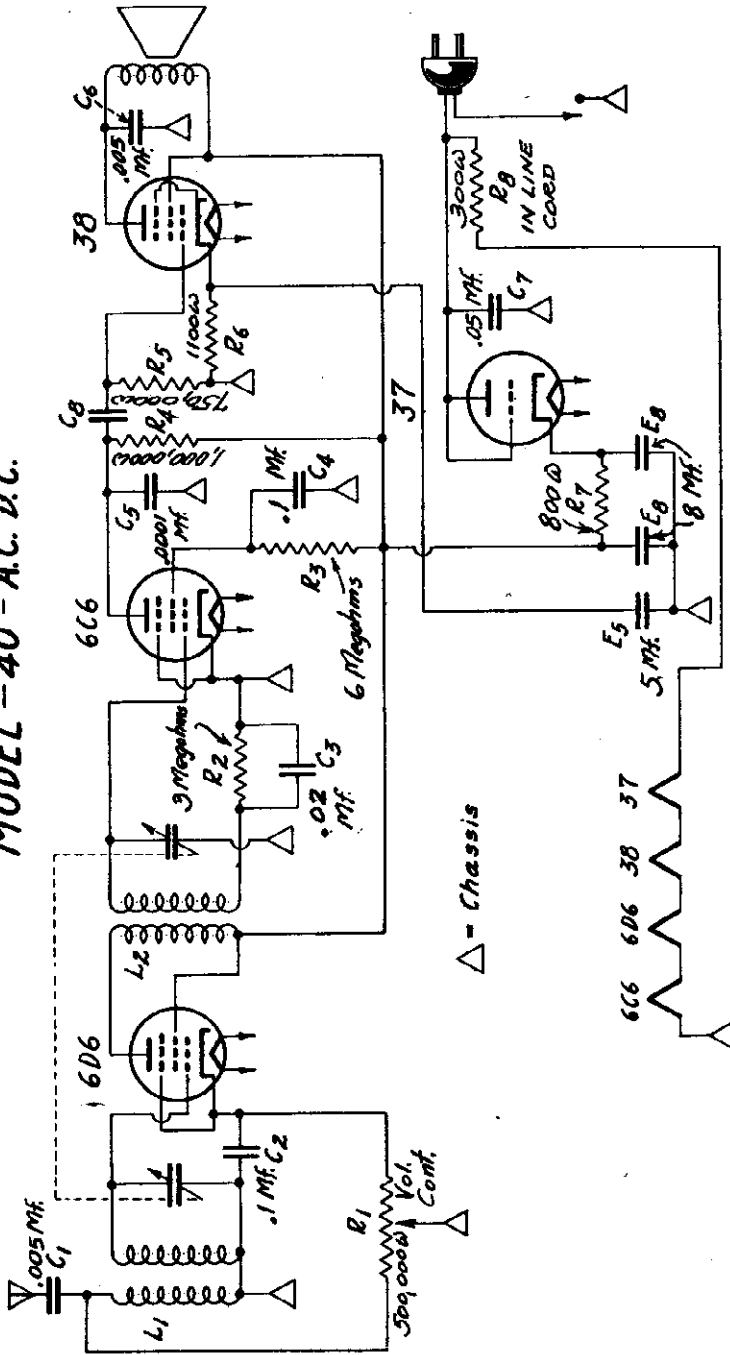


DRAWN	WHD	APPROVED	CD
TRACED	WHD	REVISED	
CHECKED	CD	GATE	
DATE	6-28-33	DWG NO.	
TYPE #770 Automobile Amplifier			

AIR KING PRODUCTS CORP.

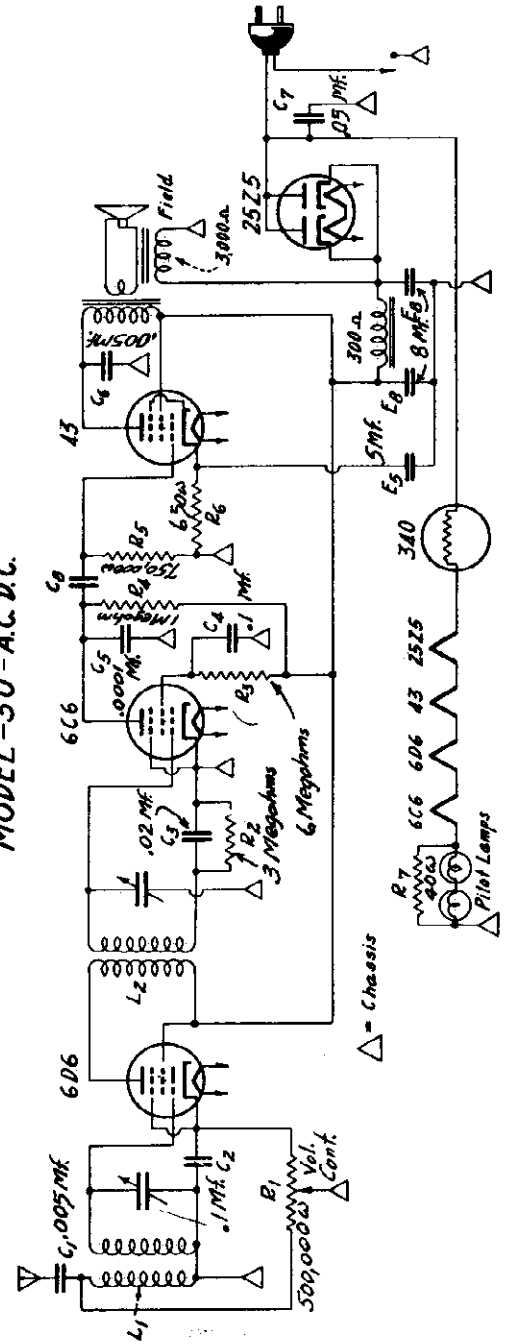
MODEL 40
MODEL 50
Schematics

MODEL - 40 - A.C. D.C.



△ = Chassis

MODEL - 50 - A.C. D.C.

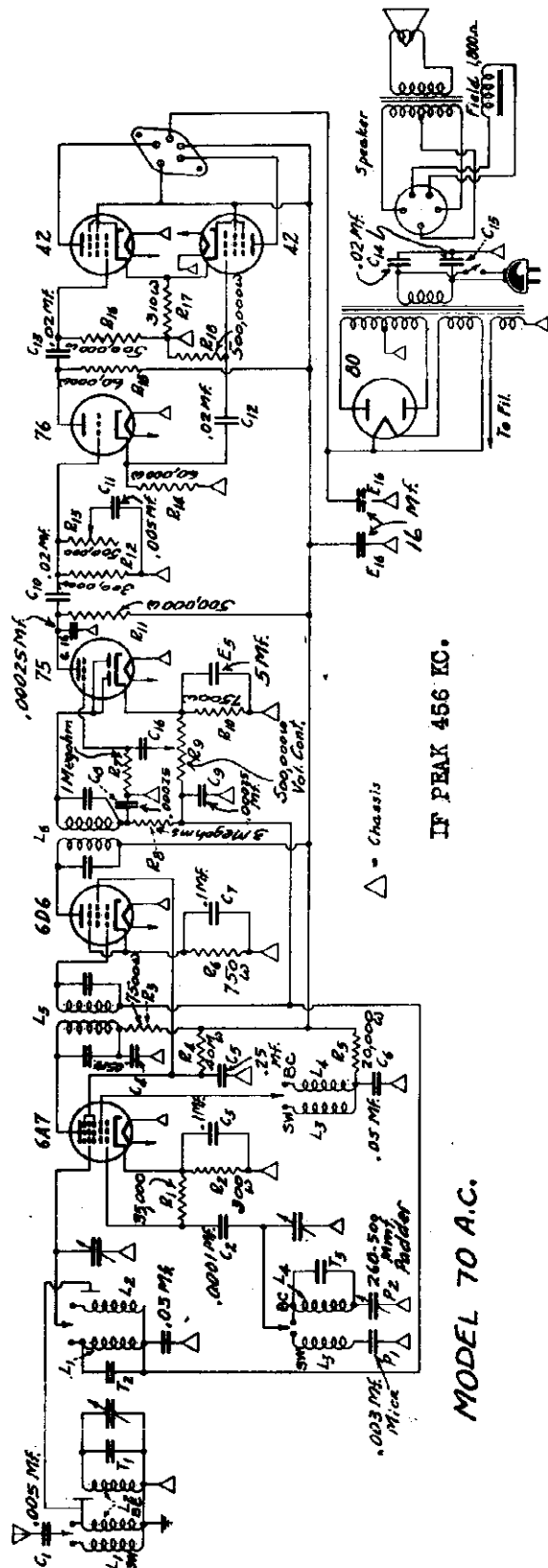
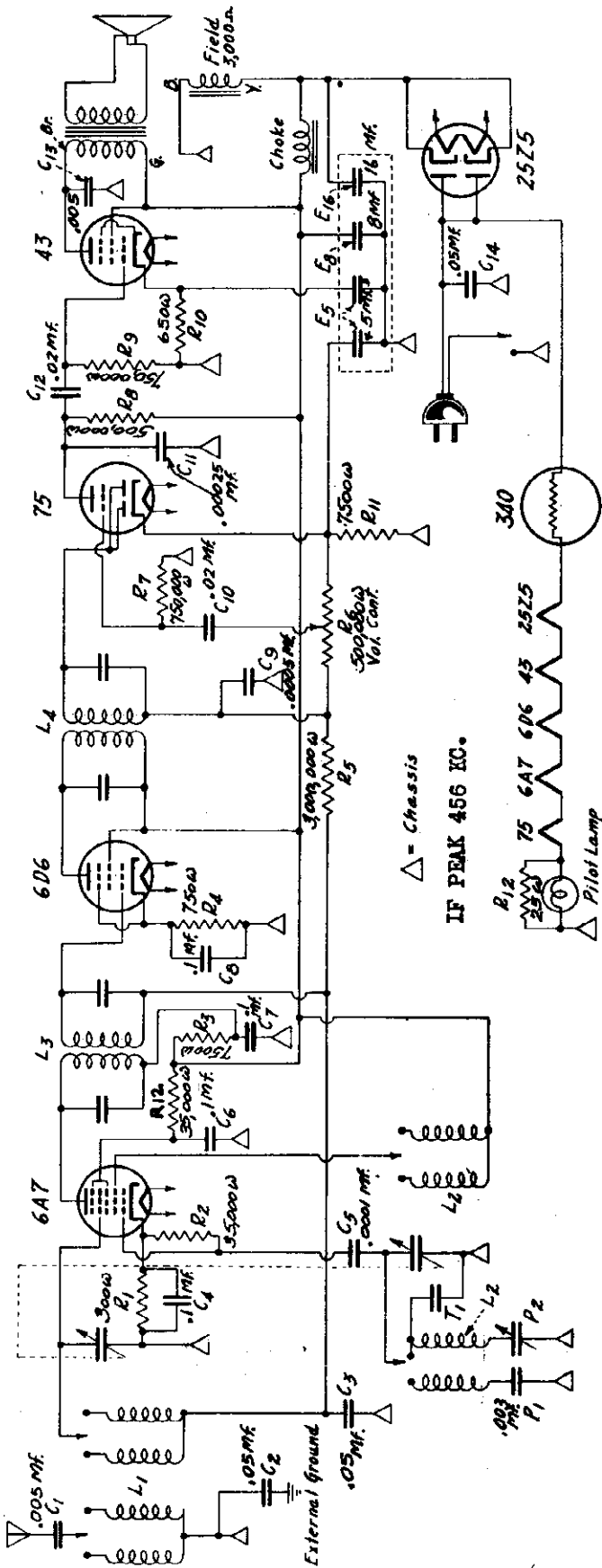


△ = Chassis

MODEL 66
MODEL 70
Schematics

AIR KING PRODUCTS CORP.

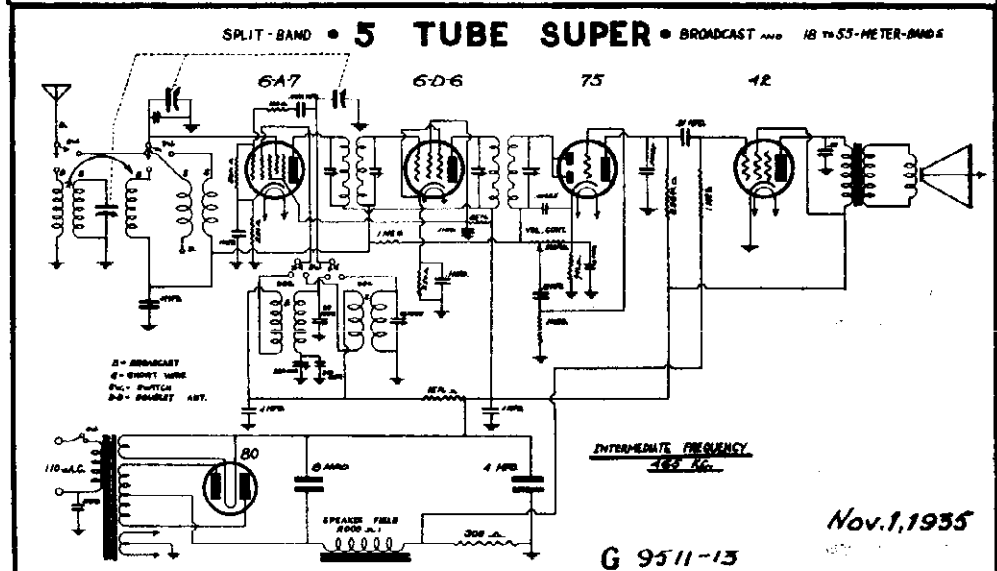
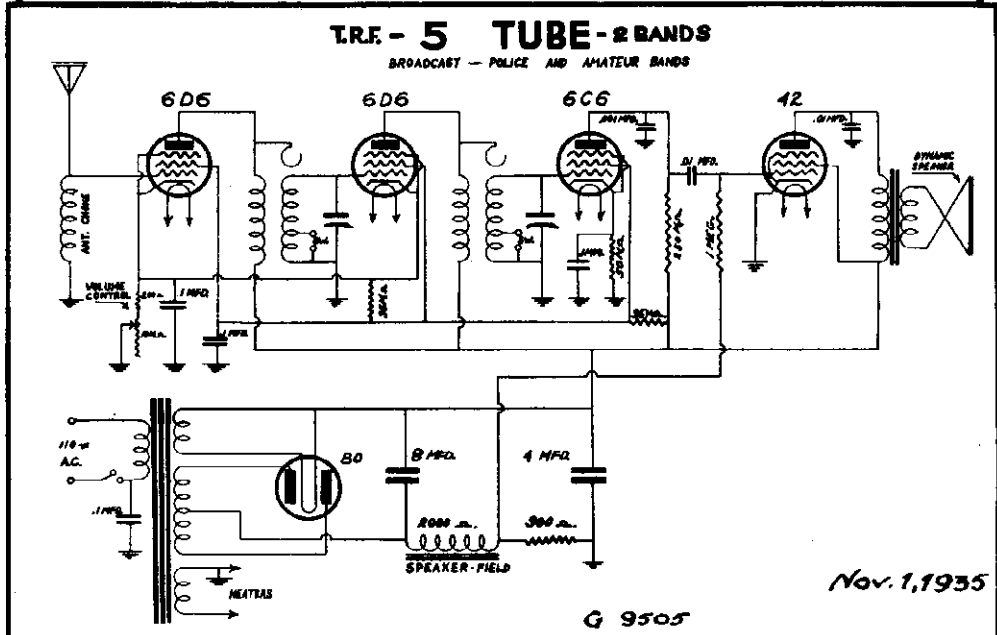
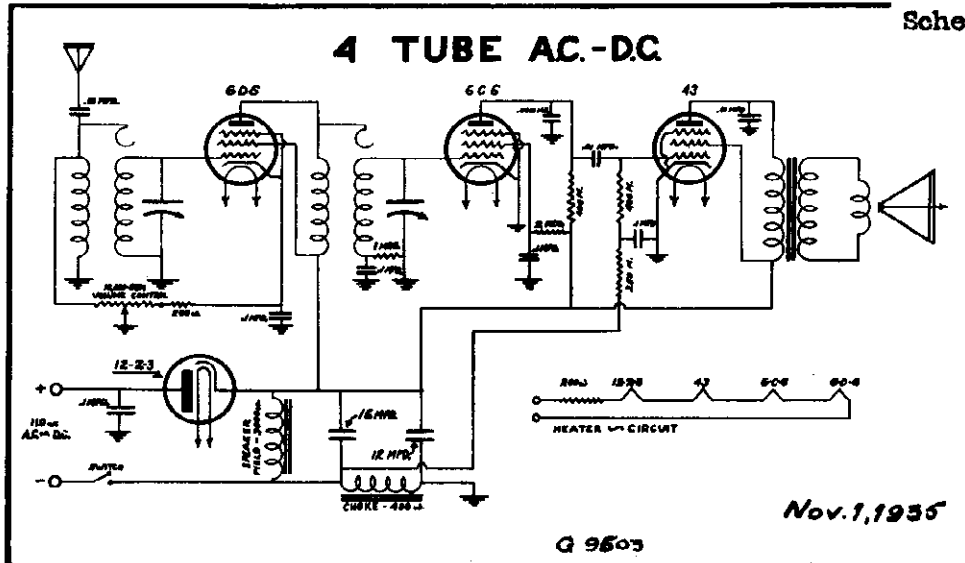
MODEL-66 -A.C. D.C.



MODEL 70 A.C.

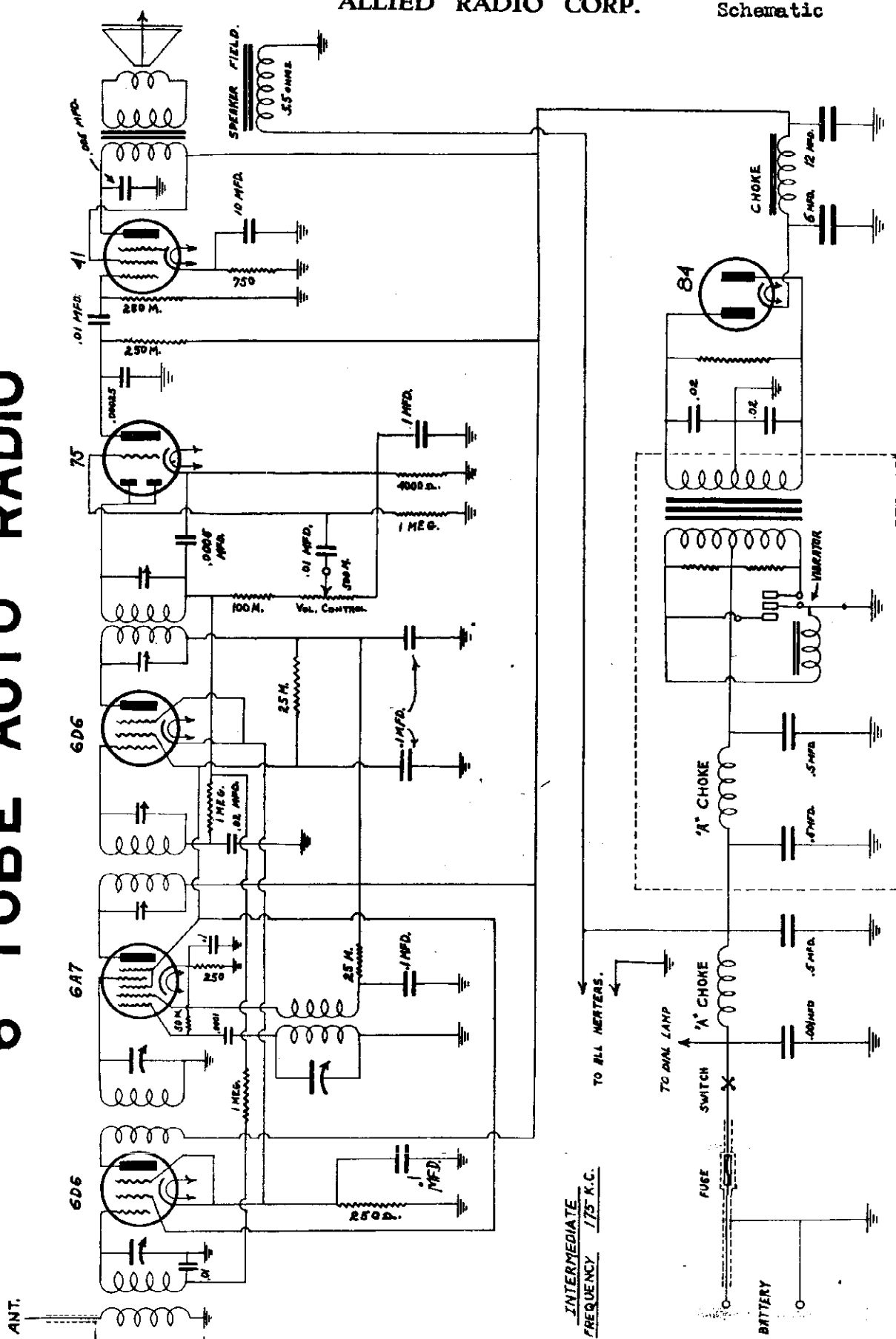
ALLIED RADIO CORP.

MODEL G-9503
 MODEL G-9505
 MODEL G-9511-13
 Schematics



ALLIED RADIO CORP.

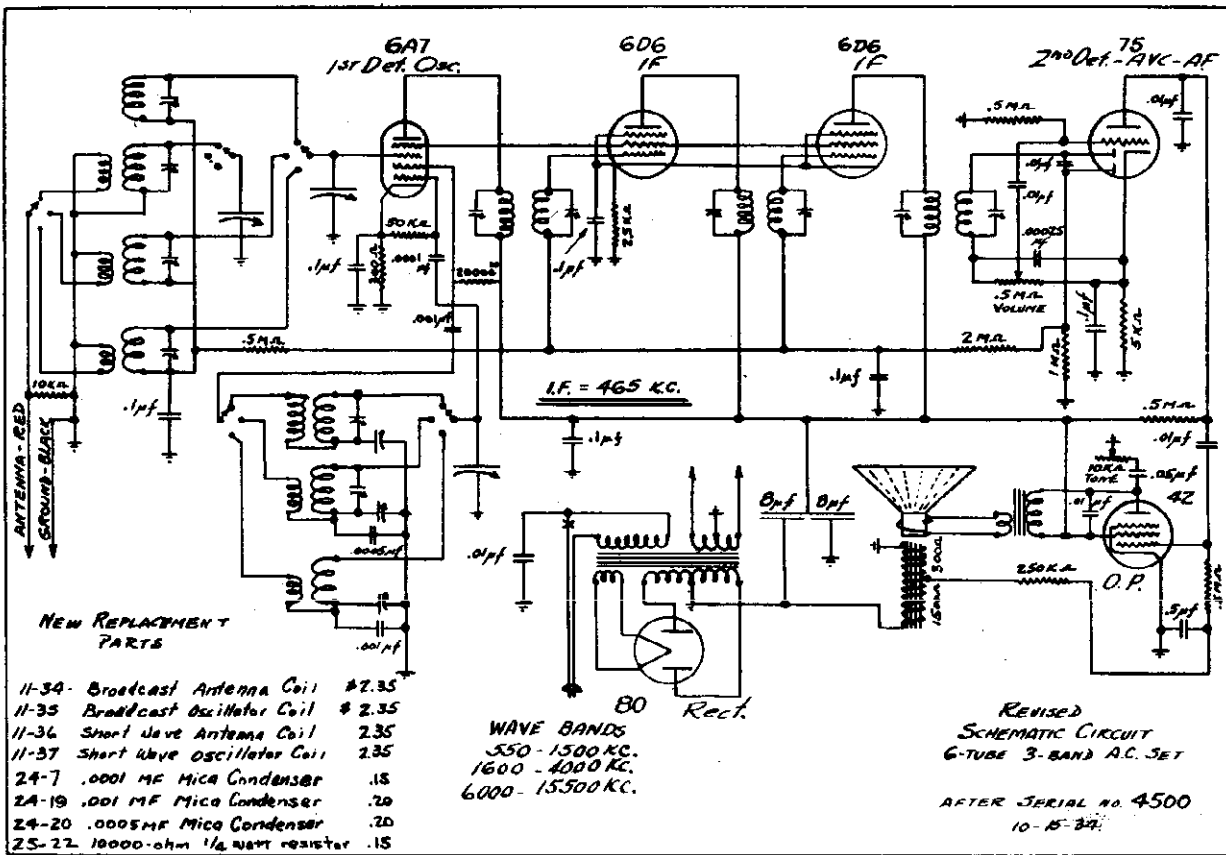
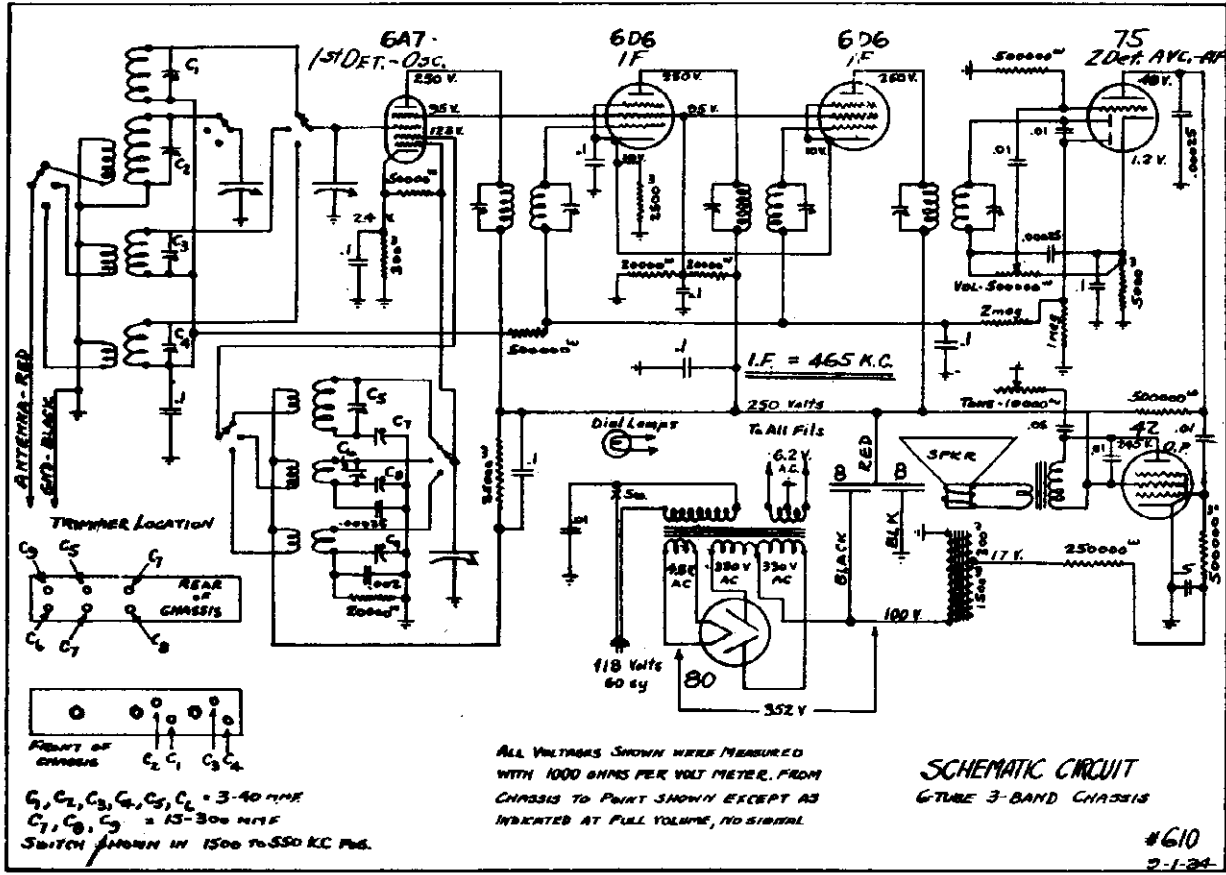
6 TUBE AUTO RADIO



APRIL I 1935

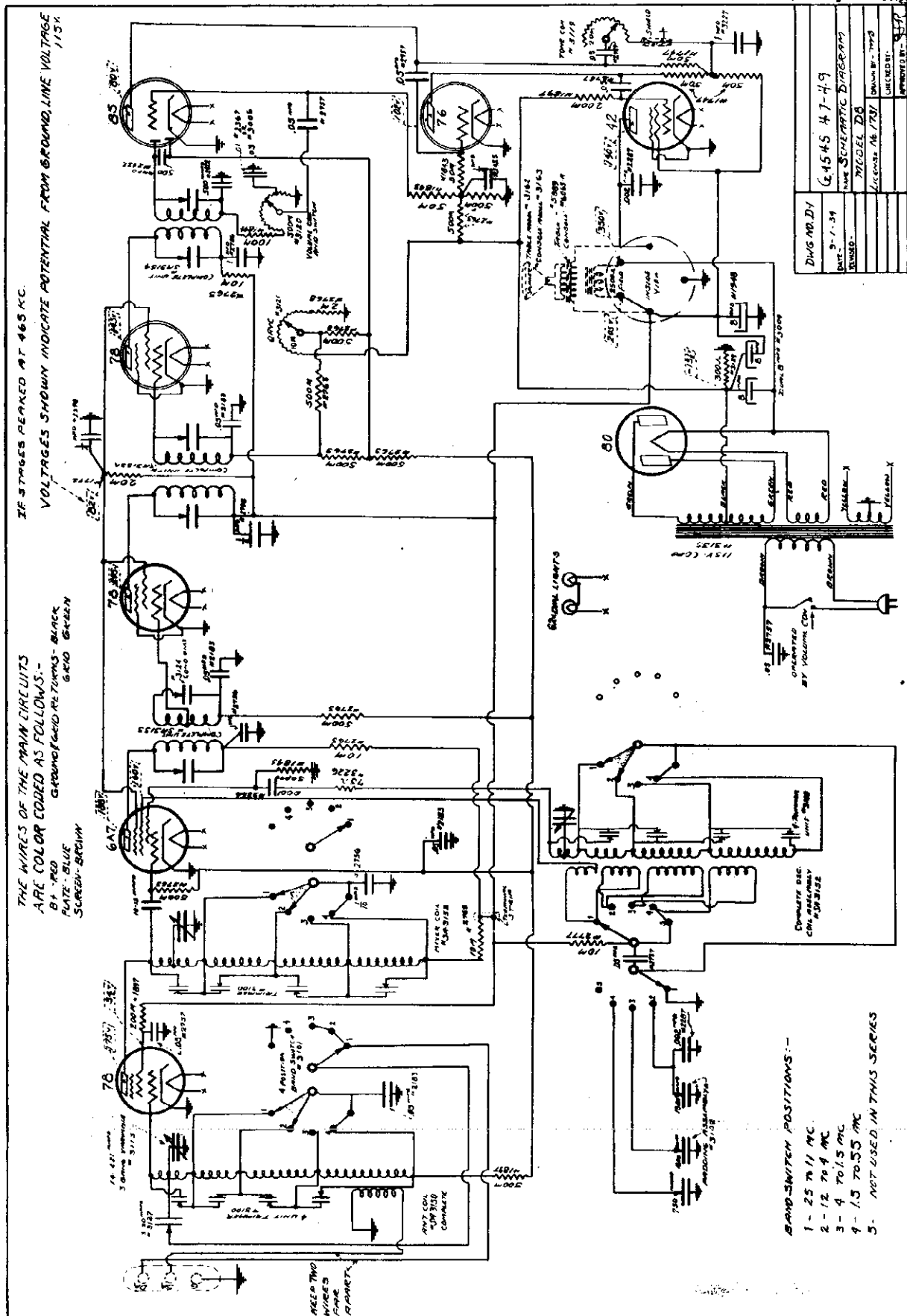
MODEL G-9533
Two Types
Schematics

ALLIED RADIO CORP.



ALLIED RADIO CORP.

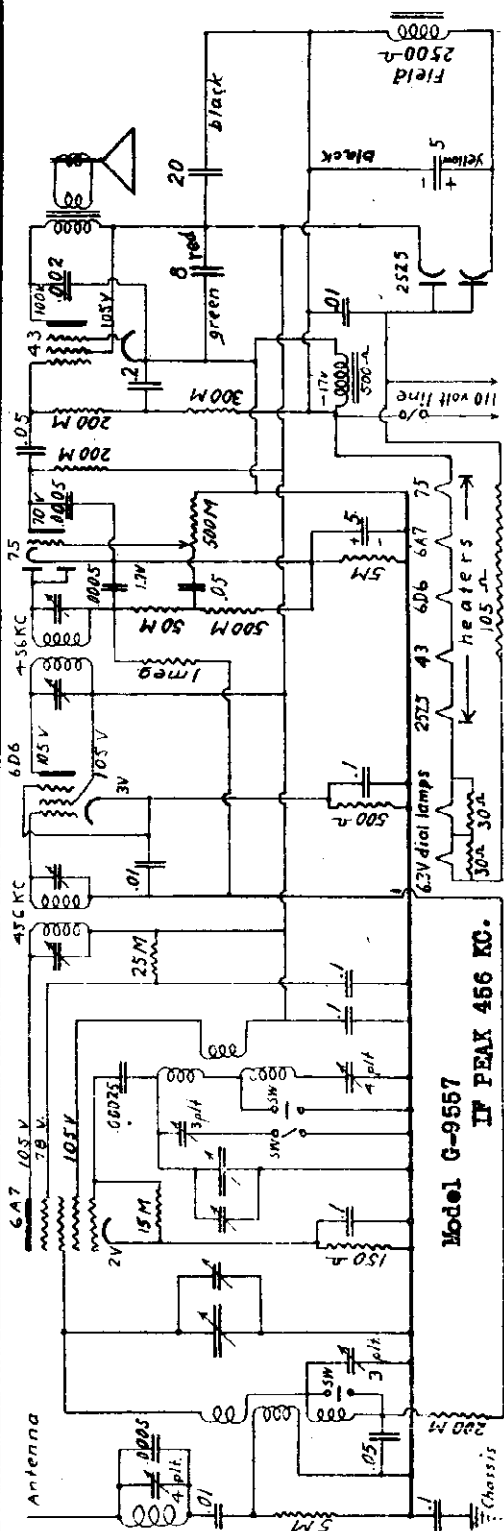
Schematic, Voltage



DWG NO. DY	64545 47-49
DATE	3-1-34
DESIGNED BY	SCHEMATIC DIAGRAM
CHECKED BY	MODEL DS
LICENSED	16/737
DRAWN BY	779
APPROVED BY	337

**MODEL G-9551
MODEL G-9557**
**Schematics, Voltage
Alignment, Notes**

ALLIED RADIO CORP.



CAUTION—This instrument is equipped for operation on 110 volts D. C. or A. C., any frequency from 25 to 185 cycles per second. Before attempting to operate on any other voltage be sure that the proper adaptors are connected and the instructions accompanying them are understood. Special adaptor can be secured from the factory at a slight extra cost, for operating this receiver on 220 volt A. C. or D. C. Cord for 110 volt or 220 volt heats moderately, as the cord contains resistance necessary for operation at these voltages.

The 20-foot aerial packed with the set may be unwound and hung outside a window or stretched along the floor under a rug after attaching one end to the antenna lead from the back of the set, and is ordinarily all the aerial required.

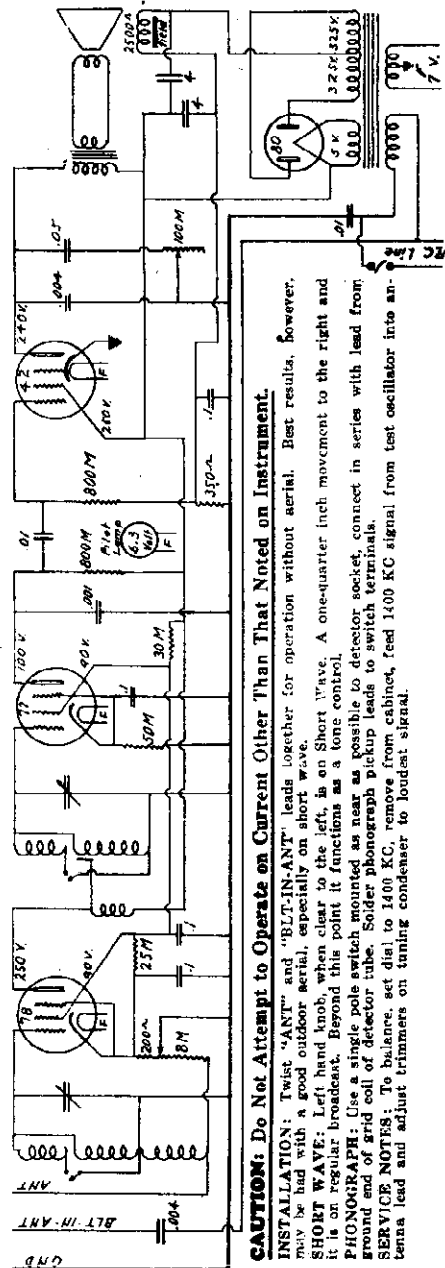
No ground connection should be used. Sometimes results are better if the tip of the antenna wire is connected to an outside aerial.

NOTE—When operating on D. C. current and set fails to operate after waiting a reasonable length of time for tubes to heat up, reverse power supply plug.

To remove set from cabinet, disconnect from power supply, remove knobs, remove back if compact model, and unscrew the four felt-headed screws on bottom of cabinet. To resistance set, remove from cabinet. Intermediates are first balanced by feeding a 456 KC signal into grid of 6A7 tube and adjusting trimmers on top of the two tall cans to greatest volume. Adjust wave trap in rear flange of chassis by turning the trimmer screw until a 456 KC signal applied to the antenna lead cannot be heard. Next, set band switch to broadcast position (counter-clock), turn tuning knob to 1400 KC, feed a 1400 KC signal into antenna lead and adjust trimmers on tuning condenser to greatest volume. Next, set band switch to long-wave (clockwise), turn tuning knob to 350 KC, feed a 350 KC signal into the antenna lead and adjust the two 8-plate trimmers on the under side of the panel to greatest volume. Turn tuning knob to 180 KC, set test oscillator to this frequency and adjust the 4-plate section of dual trimmer to maximum volume. Repeat the operations at 380 KC and 180 KC until trimming at one frequency does not affect the other.

NOTE—Should it be necessary to write to the factory for parts or information, always give the serial number of the set as stamped on the back of the chassis.

PHONOGRAPH—Install a single pole double-throw toggle switch and two pin jacks at a convenient place on the chassis near the 76 tube. Disconnect the .05mfd. condenser from volume control and attach to one side of toggle switch, connect disconnected volume control terminal to middle terminal of switch, other side of switch to one side of phonograph pickup, and other side of pickup to "B" minus.



Model G-9551

CAUTION: Do Not Attempt to Operate on Current Other Than That Noted on Instrument.

INSTALLATION: Twist "ANT" and "BLT-IN-ANT" leads together for operation without aerial. Best results, however, may be had with a good outdoor aerial, especially on short wave.

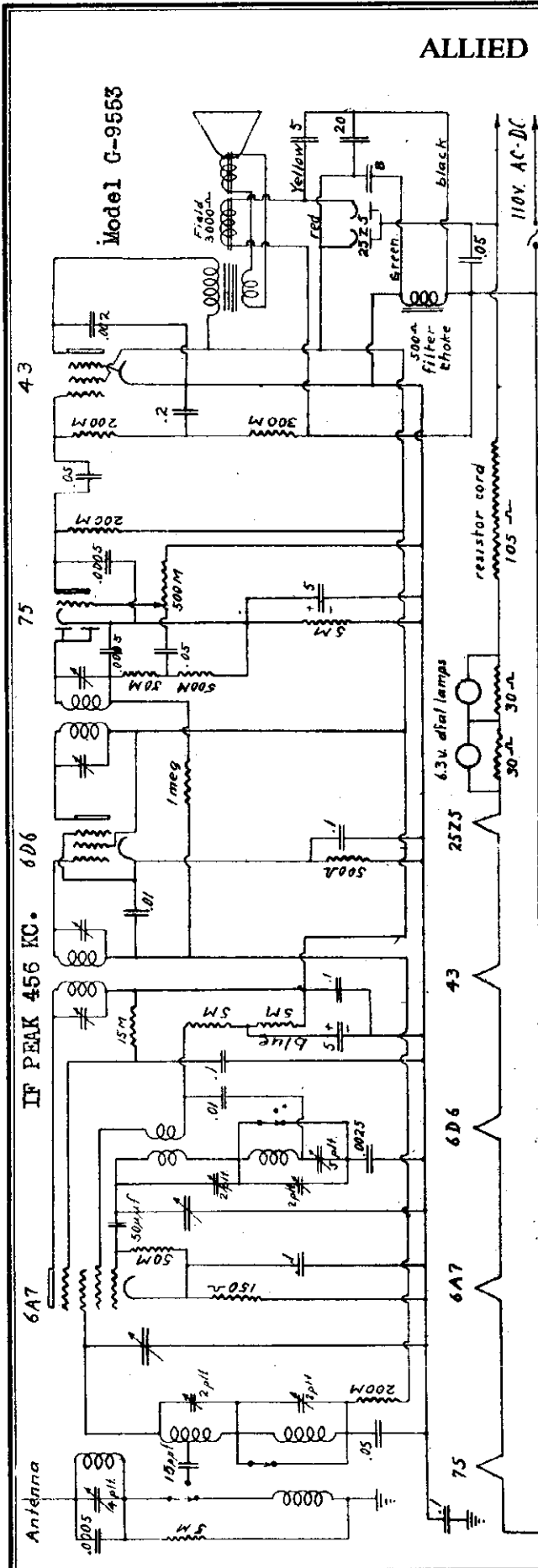
SHORT WAVE: Left hand knob, when clear to the left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

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.

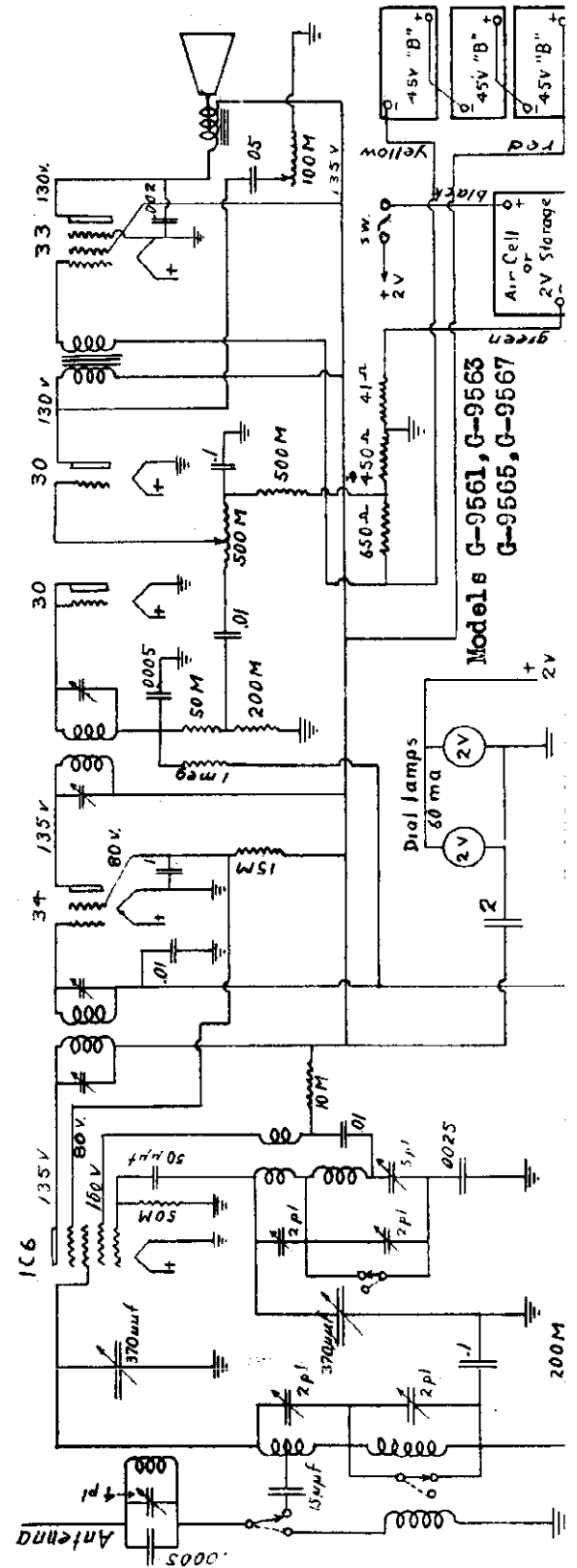
SERVICE NOTES: To balance, set dial to 1400 KC; remove from cabinet, feed 1400 KC signal from test oscillator into antenna lead and adjust trimmers on tuning condenser to loudest signal.

ALLIED RADIO CORP.

MODEL G-9553
MODEL G-9561, G-956
G-9565, G-9567
Schematics, Voltage



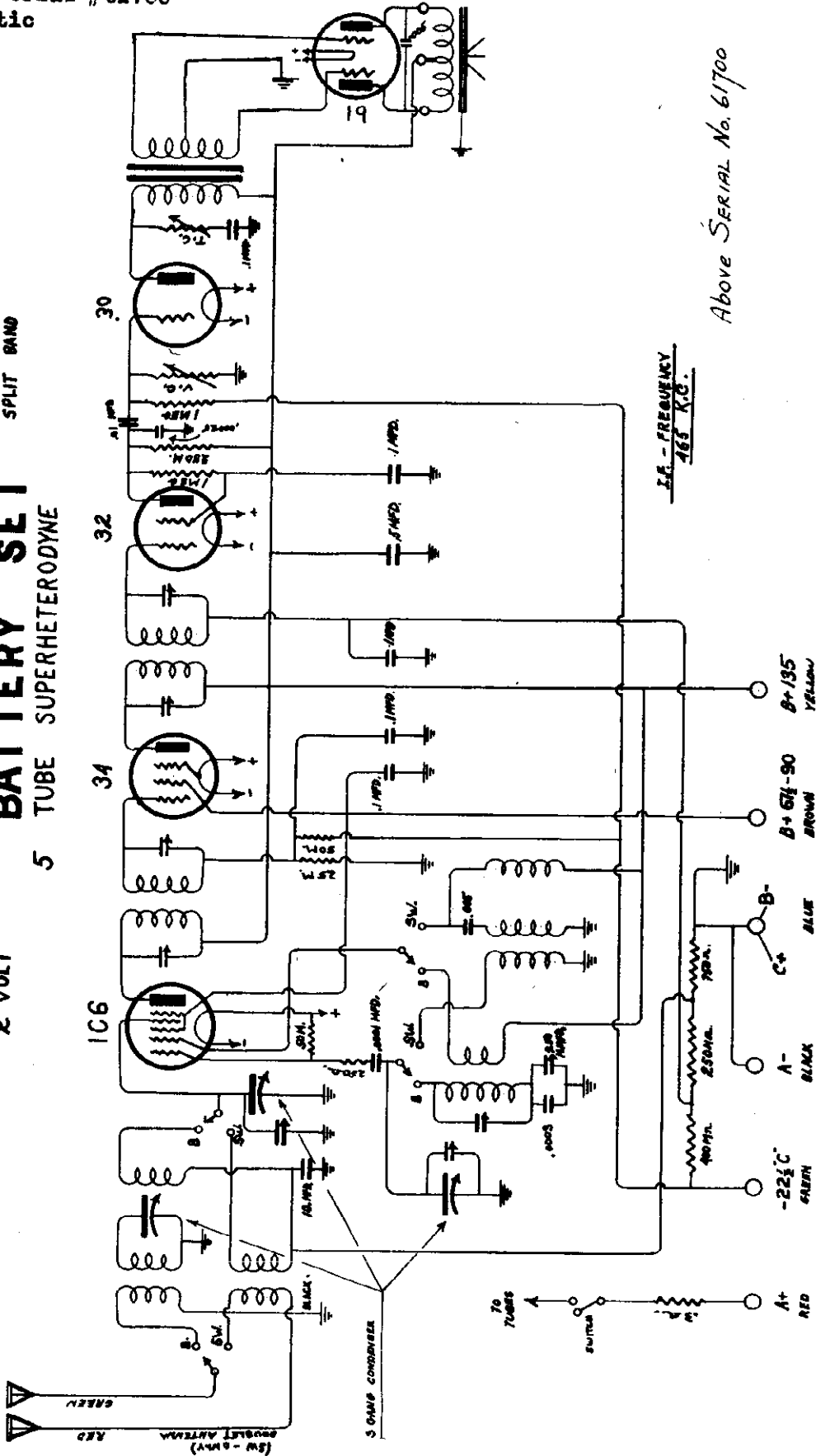
For Alignment data, see Index



MODEL G-9561, G-9563,
G-9565, G-9567
Above Serial #61700
Schematic

ALLIED RADIO CORP.

2 VOLT
BATTERY SET
5 TUBE SUPERHETERODYNE
SPLIT BAND



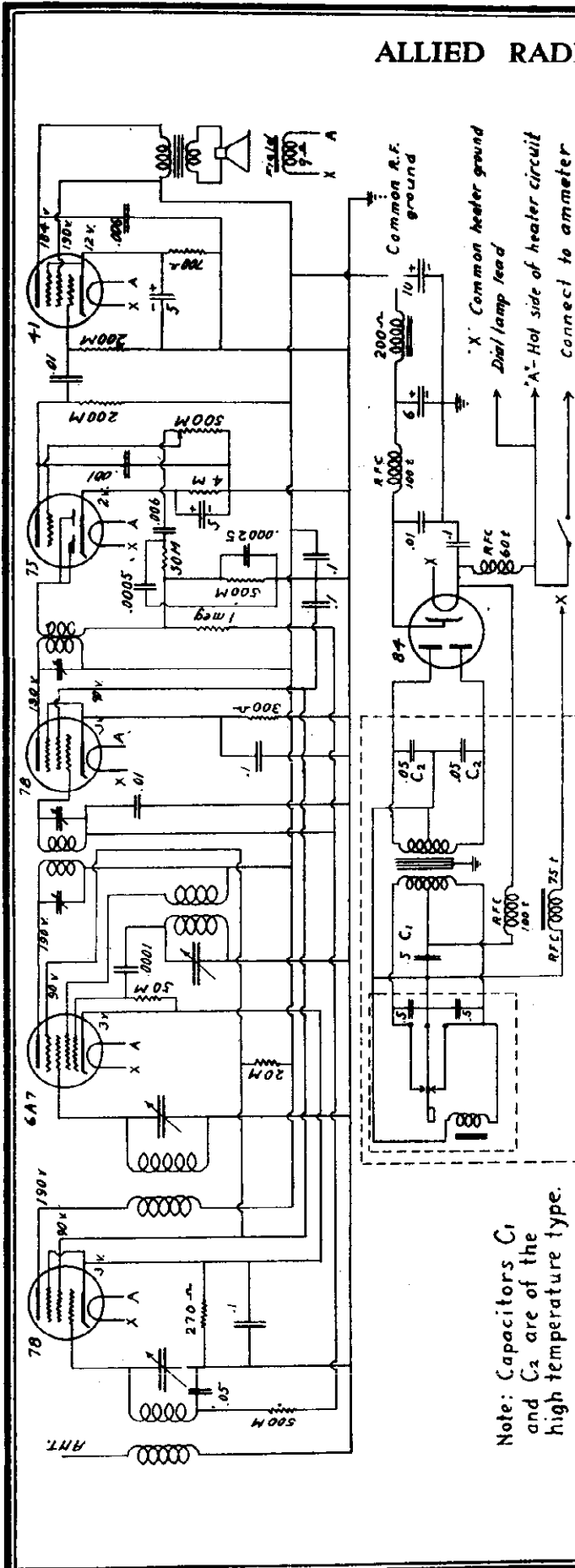
Above SERIAL No. 61700

I.A. - FREQUENCY
455 K.C.

- 22½ C GREEN
- A- BLACK
- C+ BLUE
- B+ 67½-90 BROWN
- B+ 135 YELLOW

ALLIED RADIO CORP.

MODEL G-9599
Schematic, Data
Voltage



Note: Capacitors C₁ and C₂ are of the high temperature type.

BALANCING I-F. COILS. These are trimmed through the tops of the tall cans by means of a small screwdriver and a 5-16" socket wrench. Remove chassis from cabinet and feed signal from test oscillator into grid cap of the 6A7.

BALANCING R-F. COILS. Tuning control must be attached to tuning condenser shaft with pointer set to 530 when condenser is turned to maximum. Tune in a weak signal at its proper dial marking near 1400 and adjust first and second trimmers on variable from front of chassis for loudest signal. If signal does not come at proper dial setting, carefully adjust rear trimmer on variable to shift signal to its proper location and then readjust first and second trimmers. After reinstalling set in car, slightly readjust the first trimmer through hole in top of cabinet.

Determine most satisfactory mounting position on bulkhead which should be at the left hand side or directly in front of steering column. Spot the mounting bolt location and drill 1/4" diameter hole. Insert bolt through hole and assemble washer and nut on engine side. Hang receiver over bolt head and tighten nut. Attach flexible shafts to control unit by first inserting shaft as far in as possible and then tighten set screws of shaft housing, being careful it is not so tight as to cause shaft to bind in housing.

Mount control unit on steering column in approximately correct position, set pointer to 530 on dial, turn upper control of receiver to extreme clockwise position, carefully place right hand shaft in position on upper receiver control and left hand shaft on lower control and tighten set screws securely.

Adjust control unit position so that shafts leave set with least amount of bend possible and fasten securely in this position. Trial of controls will show best location for smooth operation.

Attach heavy rubber covered lead to anmeter terminal. Connect pilot light wire from control head to short black wire on set, making connection close to set, and tape up joint. Ground shield by loosening screw under nearest corner of set and connecting wire therefrom to end of shield and tighten up screw.

Disconnect ignition leads from spark plugs, attach one suppressor to top of each plug and reattach the ignition lead to free end of suppressor. Disconnect center wire from distributor head, and substitute distributor suppressor, then plug center wire into free end of suppressor.

Attach generator bypass condenser to generator frame by means of screw holding cut-out. Connect wire from condenser to generator side of cut-out switch.

MODEL G-9611, G-9613
Schematic, Voltage
Alignment

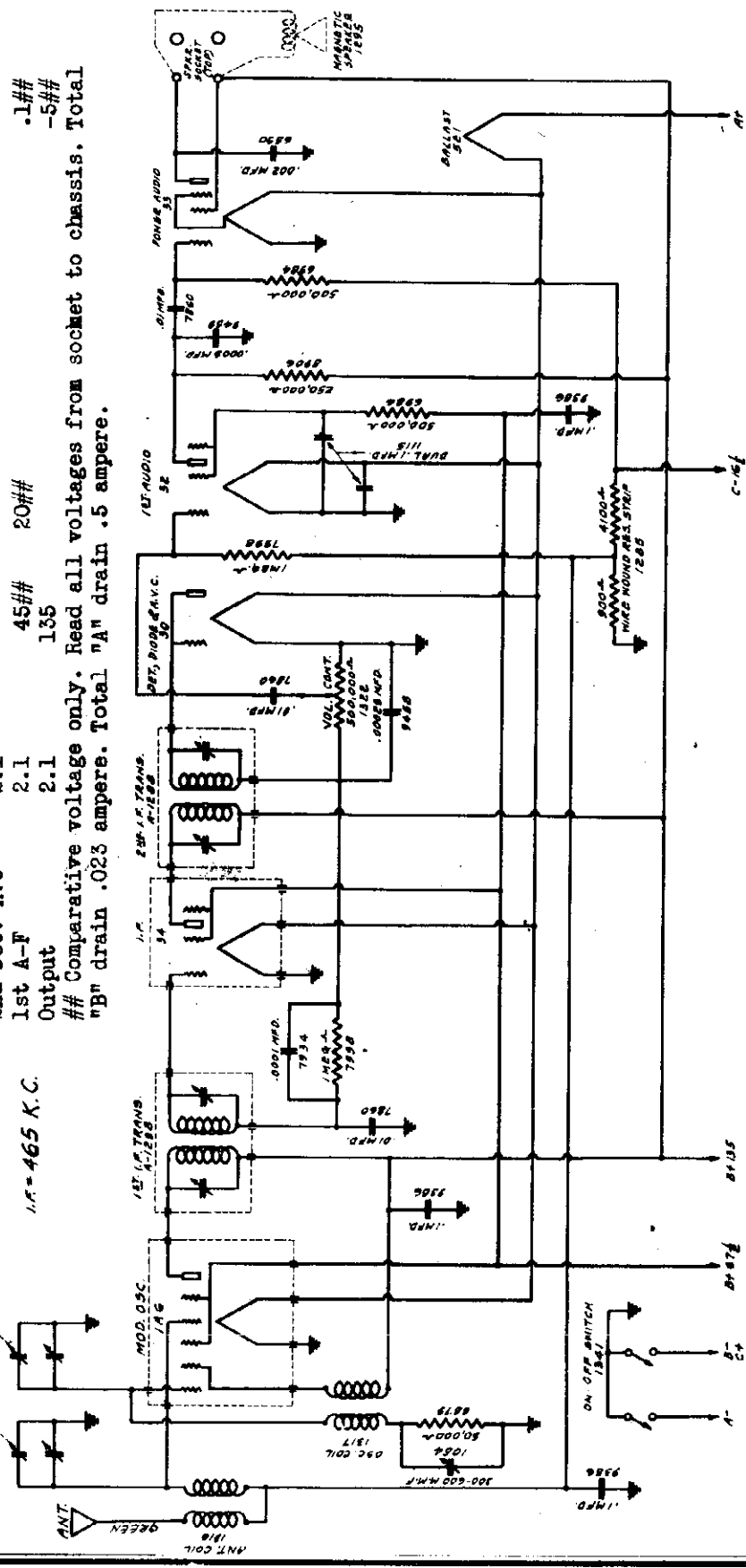
ALLIED RADIO CORP.

VOLTAGE TABLE

Tube	Fill.	Plate	Screen	Grid #2	Grid #3-#4	Con. Grid
Osc.-Mixer	2.1	135		135	67.5	
I-F	2.1	135		67.5		
2nd Det. AVC	2.1					
1st A-F	2.1	45##		20##		
Output	2.1	135				

Comparative voltage only. Read all voltages from socket to chassis. Total "B" drain .023 ampere. Total "A" drain .5 ampere.

NOTE:
1. DOTTED LINES DENOTE SOLDERING AREAS.
2. ALL PART NOS ARE OUR PART NOS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.
4. 2 GANG COND. 10-135E.



INTERMEDIATE ALIGNMENT

Align at 465 kc. Two types of i-f trimmers are 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 one trimmer, the other intermediate trimmer being adjusted by means of the trimmer screw located within the brass hex nut.

MIXER-OSCILLATOR ALIGNMENT

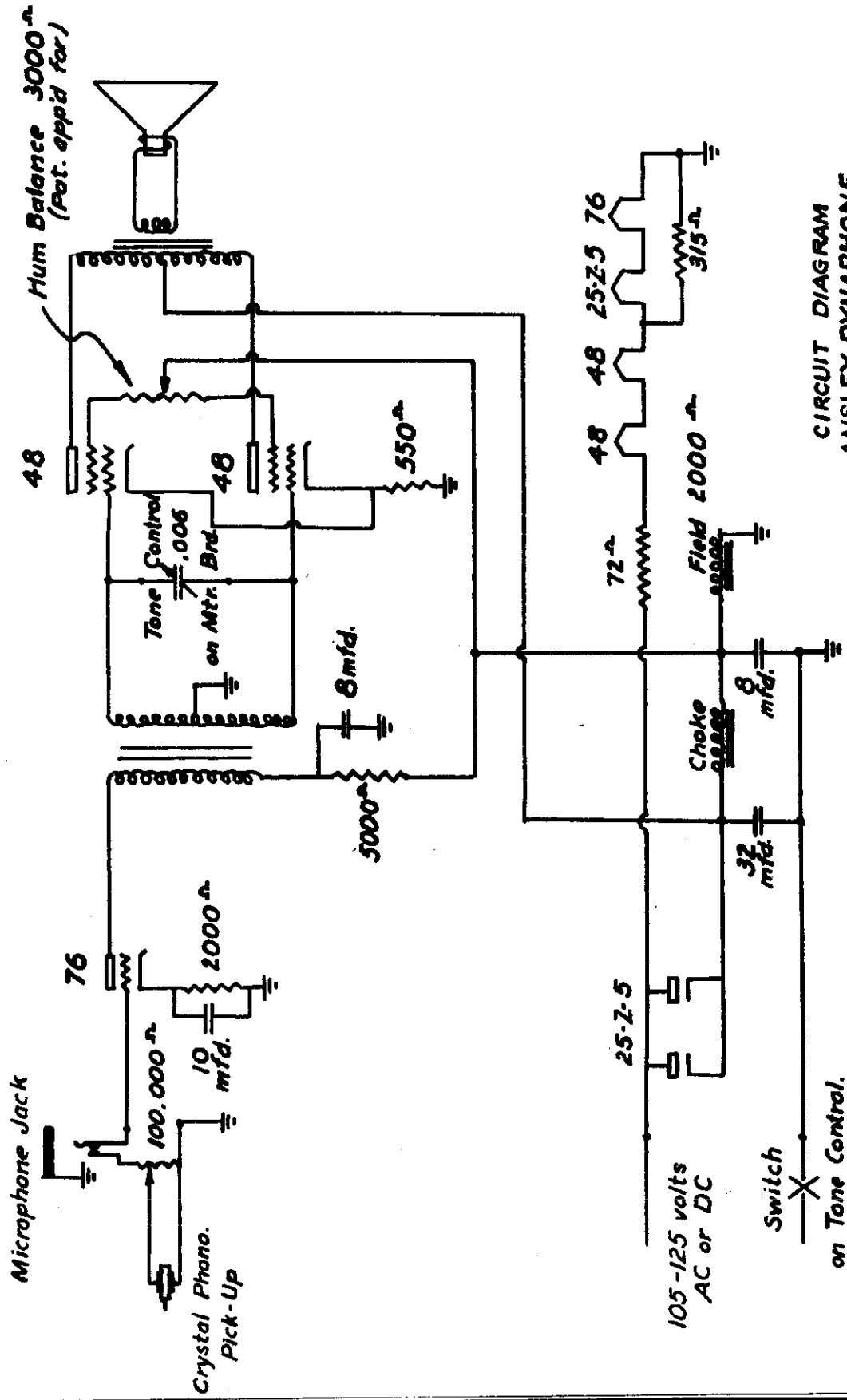
Connect test oscillator to antenna post and ground or chassis. Set test oscillator and receiver

dial to 1720 kc. Then adjust trimmer condenser located on top of the oscillator (front section) unit of the gang condenser.

Then tune the receiver to 600 kc. and reset the test oscillator to this frequency. Then rock the tuning condenser slightly to the right and left, while adjusting the 600 kc. oscillator padding condenser, which is accessible through the hole provided on the front of the chassis. Repeat all the adjustments for maximum output.

ANSLEY RADIO LABORATORIES

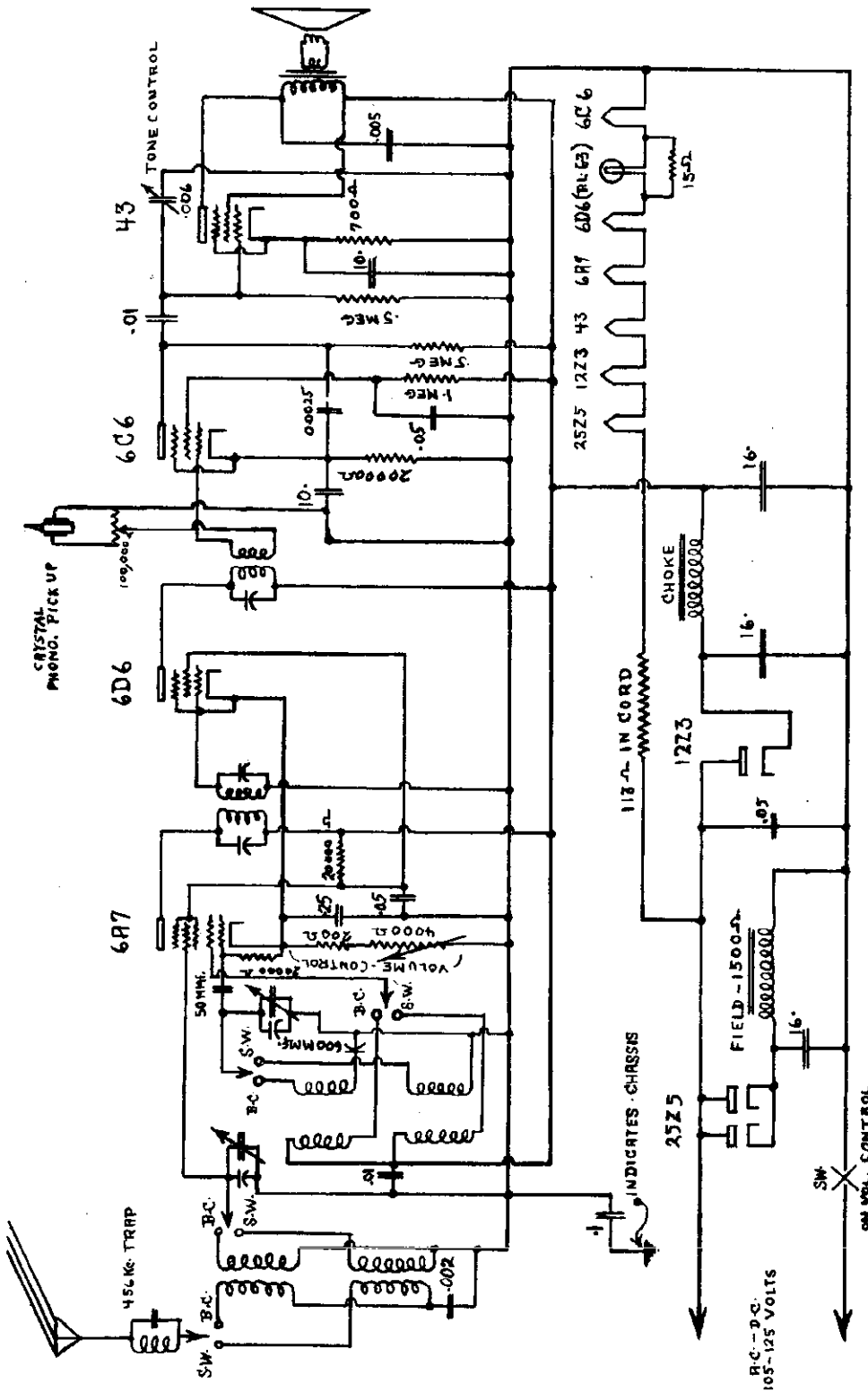
MODEL D-1
Dynaphone, Late Type
Schematic



CIRCUIT DIAGRAM
ANSLEY DYNAPHONE
Model D-1
(LATER TYPE)

MODEL U-10
Schematic
Socket

ANSLEY RADIO LABORATORIES

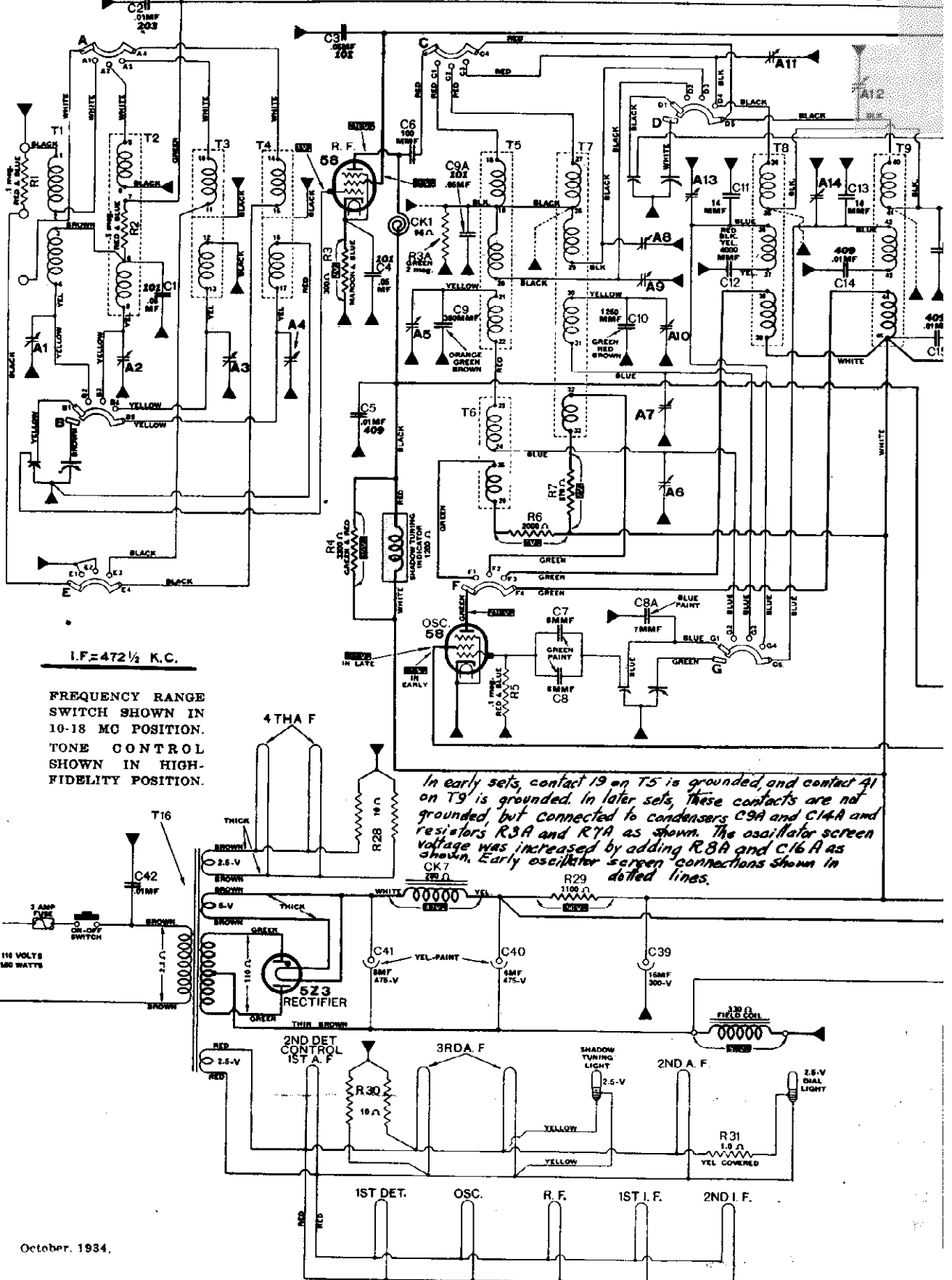


CIRCUIT DIAGRAM
ANSLEY UNIVERSAL RADIO
MODEL U-10
Used in
Radio-Dynaphone Combinations
Models D-9 & D-10

43	6C6	Block	6D6	6R7	VAR.
1223	Spkr. Plug		I.F.	COND.	

Layout of base showing location of tubes.

In early Model 112, the volume control is oblong shaped and in sets using this type of control, a .1 MF condenser is connected in series with the lead at the top end of the volume control, and a .5 U resistor is connected from the bottom end of the .1 U resistor



NT MFG. CO.

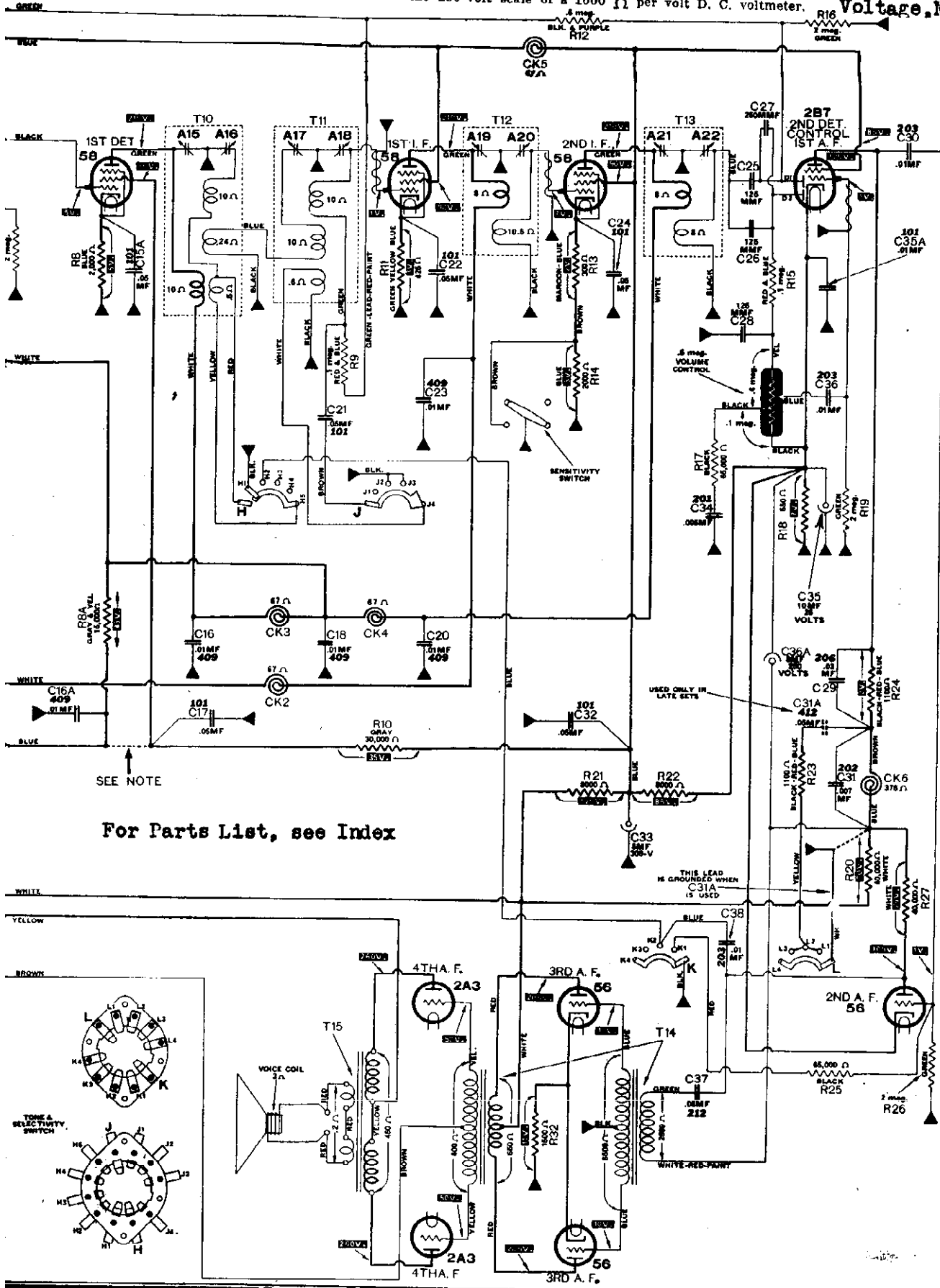
(in series with volume control) to the cathode of the 2B7 tube.

The voltages in this diagram were made with the 250-volt scale of a 1000 Ω per volt D. C. voltmeter.

MODEL 112

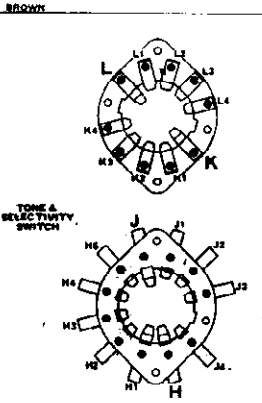
Schematic

Voltage Notes



SEE NOTE

For Parts List, see Index



TOPE & SELECTIVITY SWITCH

ATWATER-KENT MFG. CO.

MODEL 112

Trimmer Notes

ADJUSTING TRIMMER CONDENSERS

EQUIPMENT.

1. **OSCILLATOR.** The oscillator should extend from the lowest I. F. frequency (125 KC in Atwater Kent sets) to at least 18 MC. The oscillator should have a good attenuator and should be well shielded. If the oscillator is not well shielded, it may be difficult to peak the pre-selector trimmers on some models, owing to pick-up by the 1st-detector grid circuit. In general, it is advisable to connect an .00025MFD fixed condenser in series with the oscillator pick-up lead at the antenna terminal of the set.

2. **OUTPUT METER.** Use a sensitive output meter and keep the radio volume control turned on full volume. This is necessary to minimize the effect of the automatic-volume-control action of the set which would otherwise prevent sharp peaking of the trimmers.

3. **BALANCING UNIT.** Build two of the Type "A" balancing units and one of the I. F. coupling units shown below. These are required for correct adjustment of Atwater Kent super-heterodynes. The Type "B" balancing unit, also described, is used on earlier models of Atwater Kent sets.

(These Atwater Kent units may be purchased from your distributor.)

To use the I. F. coupling unit, place it on the grid cap of the 1st-detector tube as shown, and clip the lead (that ordinarily goes to the 1st-detector grid cap) to the left-hand end of the 10,000 Ω resistor as shown.

4. Use a non-metallic screw driver for adjustment of the trimmers.

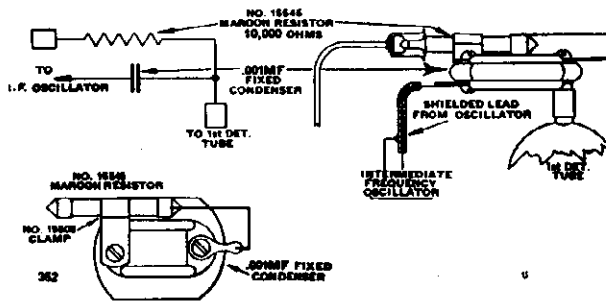


Fig. 1. I. F. Coupling unit, part No. 42590.

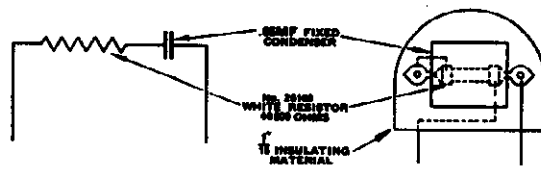


Fig. 2. Balancing unit "A," part No. 42610.

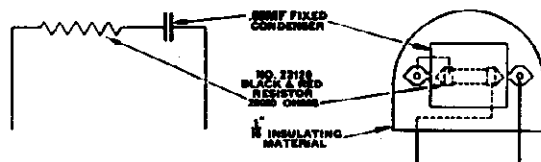


Fig. 3. Balancing unit "B," part No. 42620.

GENERAL NOTES.

- Do not make any trimmer adjustments and do not disturb the dial gear or the dial indicator adjustments unless absolutely necessary.
- With all-wave sets, it is very desirable to use a test oscillator that extends to 18 MC (18,000 KC). If you attempt to use harmonics of a broadcast oscillator, you are likely to use the wrong harmonic and set the trimmers incorrectly.
- When using a test oscillator, you will experience "double-spot" or image reception, particularly on the highest frequency range of the set. The double-spot point is twice the I. F. fre-

quency below the correct point. For instance, if a set has an I. F. frequency of 472½ kilocycles, and you are tuning in an 18 MC signal, the double-spot or image will be twice 472½ or 945 KC (.94 MC) below 18. In such a case you will hear the signal at 18 MC and also at 17.06 MC. In properly aligned sets of six tubes or more, the image should be weaker than the desired signal.

4. Because of the facts mentioned in paragraphs 2 and 3 above, it is very desirable, wherever possible, first to check the short-wave dial calibration and determine how far, and in what direction, the readings are "off." This should be done on actual reception of short-wave stations of known frequency. This pre-checking will assist you in selecting the correct harmonic (in case you are using a broadcast oscillator), and it will also minimize possibility of confusing the correct signal and the image signal.

5. On oscillator trimmers there may be two different settings at which the signal is received. Always use the *first* of these two positions as you screw the trimmer in from a loose or minimum-capacity position. **THIS IS IMPORTANT.**

6. On sets with a combined oscillator and 1st-detector tube, tune the set to a quiet point near 1000 KC while adjusting the I. F. trimmers.

OSCILLATOR GOVERNS DIAL ACCURACY.

It is essential to understand definitely that in a super-heterodyne the dial calibration depends on the oscillator circuit of the set, providing that the I. F. trimmers are correctly aligned. The pre-selector (R. F. and 1st-detector) trimmers do not affect the dial calibration but simply affect sensitivity.

If the dial calibration of one or more of the frequency ranges of the set is "off," check the oscillator trimmer, the oscillator tracking condenser and tracking trimmer, and the oscillator transformer for the particular range or ranges in question.

The oscillator trimmer is used to adjust the **high-frequency** end of the particular range.

The oscillator tracking condenser adjusts the **low-frequency** end of the particular range.

In Atwater Kent sets the fixed tracking condenser on the broadcast range (and in some models also on the police range) is shunted with an adjustable tracking trimmer condenser. The adjustable tracking trimmer condenser is not used on the high-frequency ranges.

The adjustment of the trimmers for the high-frequency and low-frequency end of a particular range is slightly interlocking. For example, assume that the broadcast range of a set is off calibration. First turn the tuning knob so the dial pointer is at 1500 KC and, using a 1500 KC signal, peak the broadcast oscillator trimmer. Then turn the set to 560 KC and, using a 560 KC signal, peak the oscillator broadcast tracking trimmer for maximum output. This adjustment will have slightly affected the previous adjustment at 1500 KC so it will be necessary to repeat the adjustment at 1500 KC and also possibly at 560 KC.

If adjustment of the oscillator trimmer and the oscillator tracking trimmer does not correct the dial readings, it may be necessary to replace the fixed oscillator tracking condenser or the oscillator transformer for that particular range.

Naturally, the I. F. trimmers should be checked, and adjusted if necessary, before any attempt is made to align the R. F. or oscillator trimmers.

GENERAL PROCEDURE

First check the I. F. trimmers. If reception is satisfactory and the dial calibration is correct on the broadcast range, it is safe to assume that the I. F. trimmers are correctly adjusted.

If the dial calibration is "off" (or the set is weak) on only one range, adjust the trimmers for that range only. If this does not correct the trouble, inspect the resistors, condensers, transformers, and switch contacts associated with that particular range.

In checking a set, do not **disturb** the position of the wiring any more than necessary.

MODEL 112
Alignment, Trimmers
Socket

ATWATER-KENT MFG. CO.

ADJUSTING TRIMMER CONDENSERS (Contd.)

I. F. TRIMMERS.

Connect an I. F. test oscillator to the 1st-detector tube by means of the I. F. coupling unit shown in Fig. 1. Adjust the I. F. oscillator to 472½ KC. Connect a sensitive output meter to the set. Use the weakest possible oscillator signal that will give a reading on the output meter with the radio volume control on full. Put tone control in 2nd-position from right.

Put balancing unit A (shown in Fig. 2) across trimmer A21 and peak A22.

Put unit A across A22 and peak A21.

Put unit A across A19 and peak A20.

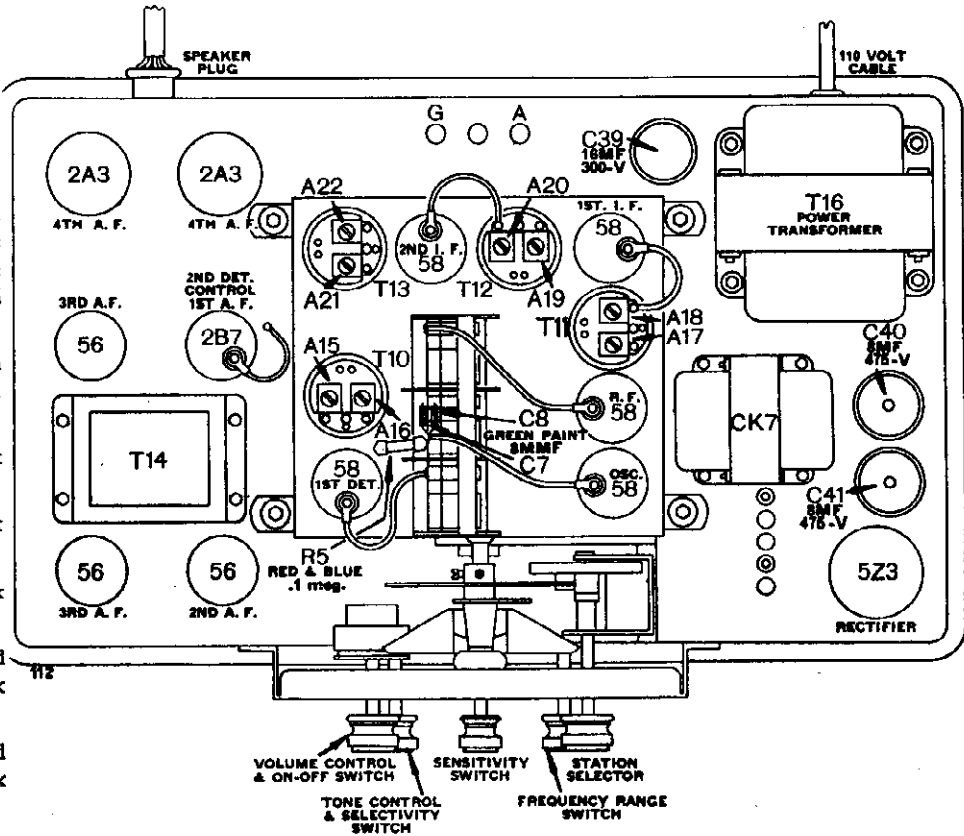
Put unit A across A20 and peak A19.

Put one unit A across A17 and another unit A across A15; peak A18 and A16.

Put one unit A across A18 and another unit A across A16; peak A17 and A15.

In case of instability while adjusting A21 and A22, place an extra balancing unit A across A18.

Remove the I. F. coupling unit and the balancing units and seal the trimmer screws.



R. F. TRIMMERS.

Connect an R. F. oscillator to the antenna and ground terminals of the set. Use the weakest possible signal to give a reading on the output meter. Loosen the trimmer screws for the frequency range or ranges that are to be re-adjusted.

10 to 18 MC range. Tune oscillator exactly to 18 MC and turn tuning knob of set so indicator is at 18 MC mark. Adjust trimmers A14, A4 and A12 for peak output.

4 to 10 MC range. Tune oscillator exactly to 10 MC and turn set to 10 MC mark on the 4 to 10 MC range. Peak trimmers A13, A3 and A11.

1.5 to 4 MC range. Tune oscillator to 4 MC and turn set to the 4 MC mark on the 1.5 to 4 MC scale. Peak trimmers A7, A2 and A8. Tune oscillator to 1.5 MC and, with set at 1.5. peak A10. Repeat adjustments on A7 and A10 if necessary.

Broadcast range. Tune oscillator and set to 1500 KC. Peak trimmers A6, A1 and A9. Tune oscillator to 560 KC and turn set to the 560 KC mark. Peak A5. Repeat adjustments on A6 at 1500 and A5 at 560 if necessary.

TUNING MECHANISM

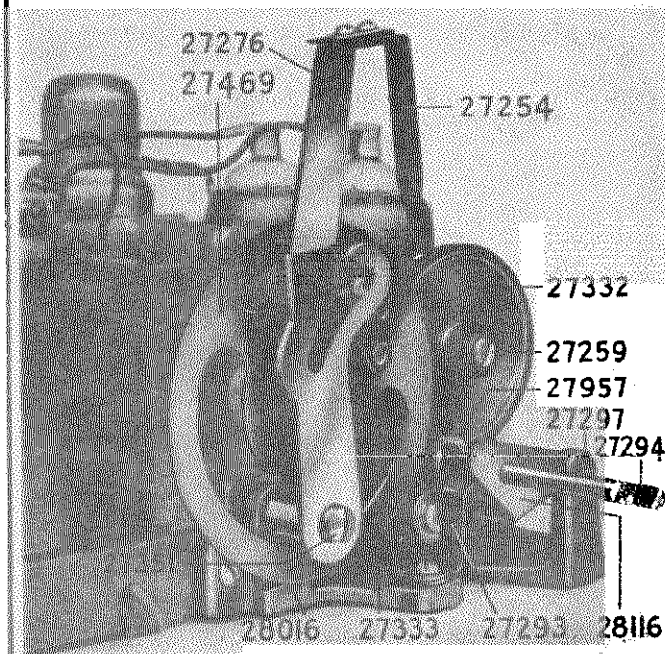


Illustration of parts in dual-speed compensated tuning mechanism in Models 112, 318, 447 and 559.

TRIMMERS ON MODEL 112

	10-18 MC Range	4-10 MC Range	1.5-4 MC Range	540-1600 KC Range
R. F.	A4	A3	A2	A1
1st-Detector	A12	A11	A8	A9
Oscillator	A14	A13	A7	A6
Tracking	None	None	A10	A5

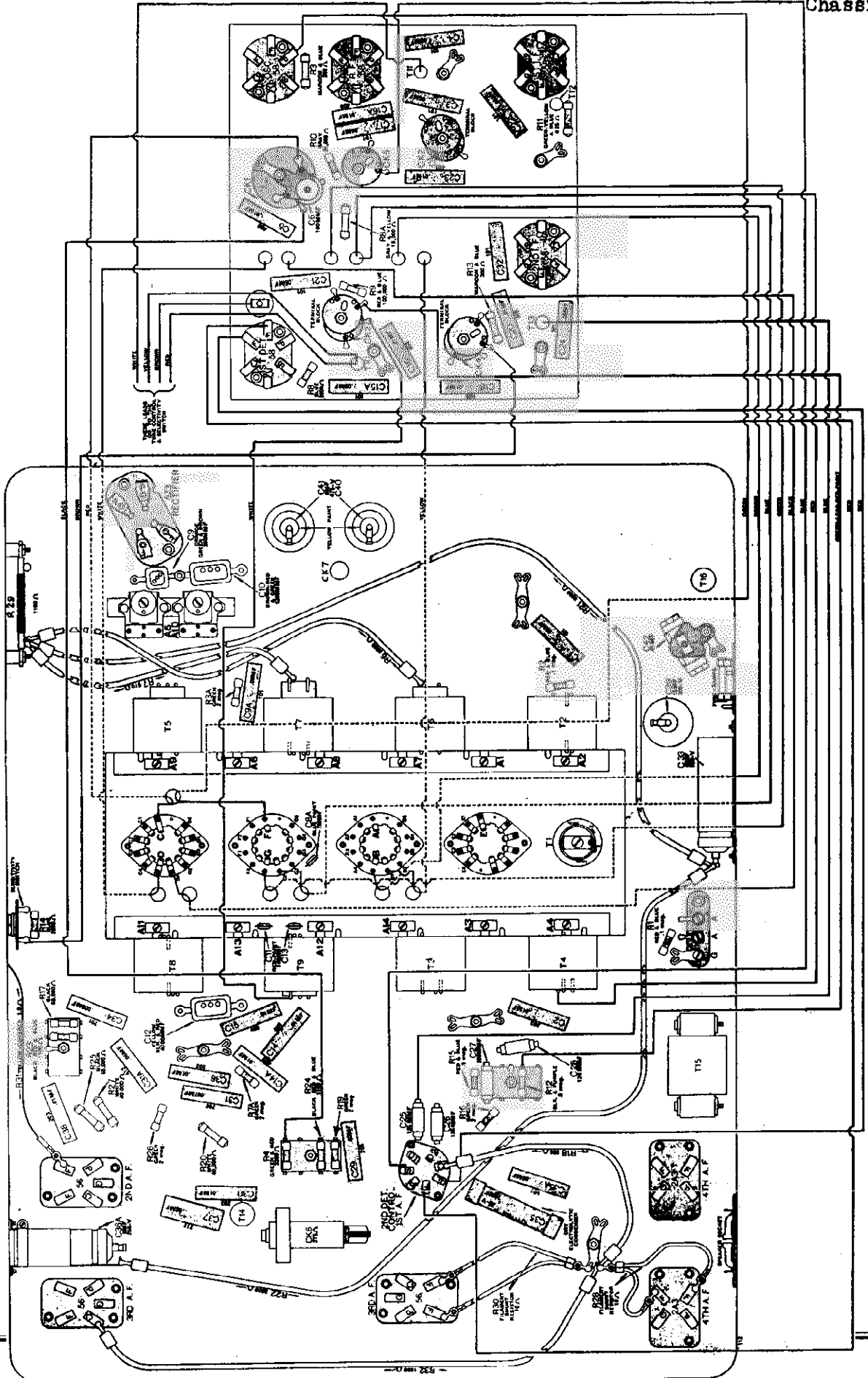
The I. F. trimmers are A15 to A22, inclusive.

ATWATER-KENT MFG. CO.

MODEL 112

Chassis

MODEL 112



This chart shows all connections between the upper unit and the lower base.

MODEL 112
MODEL 511
Parts Lists

ATWATER-KENT MFG. CO.

PARTS LIST FOR MODEL 511
Tune-O-Matic

MODEL 112
Replacement Parts

Part No.	Description	Part No.	Description	Part No.	Description	Part No.	Description
37287	Var. cond. assem.	28913	Front panel assem.	C1	31160 .05 MF (101)	CONDENSERS*	TUNE-O-MATIC PARTS
35601	Rubber grommet	29243	Excutor	C2	31150 .01 MF (101)	C1	28237
22649	Scrub	25689	Shadow tuning meter	C3	31160 .05 MF (101)	C2	27737
22646	Range switch	26757	Range switch	C4	31160 .05 MF (101)	C3	27737
32772	Crank arm	26758	R-F coil shield	C5	31160 .05 MF (101)	C4	27741
35380	Reflector assem.	26759	R-F coil shield	C6	31160 .05 MF (101)	C5	27741
35379	Front panel assem.	27343	R-F coil shield	C7	31160 .05 MF (101)	C6	27741
37354	Facutcheon	27344	R-F coil shield	C8	31160 .05 MF (101)	C7	27741
37354	Facutcheon	27344	R-F coil shield	C9	31160 .05 MF (101)	C8	27741
37354	Facutcheon	27344	R-F coil shield	C10	31160 .05 MF (101)	C9	27741
37354	Facutcheon	27344	R-F coil shield	C11	31160 .05 MF (101)	C10	27741
37354	Facutcheon	27344	R-F coil shield	C12	31160 .05 MF (101)	C11	27741
37354	Facutcheon	27344	R-F coil shield	C13	31160 .05 MF (101)	C12	27741
37354	Facutcheon	27344	R-F coil shield	C14	31160 .05 MF (101)	C13	27741
37354	Facutcheon	27344	R-F coil shield	C15	31160 .05 MF (101)	C14	27741
37354	Facutcheon	27344	R-F coil shield	C16	31160 .05 MF (101)	C15	27741
37354	Facutcheon	27344	R-F coil shield	C17	31160 .05 MF (101)	C16	27741
37354	Facutcheon	27344	R-F coil shield	C18	31160 .05 MF (101)	C17	27741
37354	Facutcheon	27344	R-F coil shield	C19	31160 .05 MF (101)	C18	27741
37354	Facutcheon	27344	R-F coil shield	C20	31160 .05 MF (101)	C19	27741
37354	Facutcheon	27344	R-F coil shield	C21	31160 .05 MF (101)	C20	27741
37354	Facutcheon	27344	R-F coil shield	C22	31160 .05 MF (101)	C21	27741
37354	Facutcheon	27344	R-F coil shield	C23	31160 .05 MF (101)	C22	27741
37354	Facutcheon	27344	R-F coil shield	C24	31160 .05 MF (101)	C23	27741
37354	Facutcheon	27344	R-F coil shield	C25	31160 .05 MF (101)	C24	27741
37354	Facutcheon	27344	R-F coil shield	C26	31160 .05 MF (101)	C25	27741
37354	Facutcheon	27344	R-F coil shield	C27	31160 .05 MF (101)	C26	27741
37354	Facutcheon	27344	R-F coil shield	C28	31160 .05 MF (101)	C27	27741
37354	Facutcheon	27344	R-F coil shield	C29	31160 .05 MF (101)	C28	27741
37354	Facutcheon	27344	R-F coil shield	C30	31160 .05 MF (101)	C29	27741
37354	Facutcheon	27344	R-F coil shield	C31	31160 .05 MF (101)	C30	27741
37354	Facutcheon	27344	R-F coil shield	C32	31160 .05 MF (101)	C31	27741
37354	Facutcheon	27344	R-F coil shield	C33	31160 .05 MF (101)	C32	27741
37354	Facutcheon	27344	R-F coil shield	C34	31160 .05 MF (101)	C33	27741
37354	Facutcheon	27344	R-F coil shield	C35	31160 .05 MF (101)	C34	27741
37354	Facutcheon	27344	R-F coil shield	C36	31160 .05 MF (101)	C35	27741
37354	Facutcheon	27344	R-F coil shield	C37	31160 .05 MF (101)	C36	27741
37354	Facutcheon	27344	R-F coil shield	C38	31160 .05 MF (101)	C37	27741
37354	Facutcheon	27344	R-F coil shield	C39	31160 .05 MF (101)	C38	27741
37354	Facutcheon	27344	R-F coil shield	C40	31160 .05 MF (101)	C39	27741
37354	Facutcheon	27344	R-F coil shield	C41	31160 .05 MF (101)	C40	27741
37354	Facutcheon	27344	R-F coil shield	C42	31160 .05 MF (101)	C41	27741
37354	Facutcheon	27344	R-F coil shield	C43	31160 .05 MF (101)	C42	27741
37354	Facutcheon	27344	R-F coil shield	C44	31160 .05 MF (101)	C43	27741
37354	Facutcheon	27344	R-F coil shield	C45	31160 .05 MF (101)	C44	27741
37354	Facutcheon	27344	R-F coil shield	C46	31160 .05 MF (101)	C45	27741
37354	Facutcheon	27344	R-F coil shield	C47	31160 .05 MF (101)	C46	27741
37354	Facutcheon	27344	R-F coil shield	C48	31160 .05 MF (101)	C47	27741
37354	Facutcheon	27344	R-F coil shield	C49	31160 .05 MF (101)	C48	27741
37354	Facutcheon	27344	R-F coil shield	C50	31160 .05 MF (101)	C49	27741
37354	Facutcheon	27344	R-F coil shield	C51	31160 .05 MF (101)	C50	27741
37354	Facutcheon	27344	R-F coil shield	C52	31160 .05 MF (101)	C51	27741
37354	Facutcheon	27344	R-F coil shield	C53	31160 .05 MF (101)	C52	27741
37354	Facutcheon	27344	R-F coil shield	C54	31160 .05 MF (101)	C53	27741
37354	Facutcheon	27344	R-F coil shield	C55	31160 .05 MF (101)	C54	27741
37354	Facutcheon	27344	R-F coil shield	C56	31160 .05 MF (101)	C55	27741
37354	Facutcheon	27344	R-F coil shield	C57	31160 .05 MF (101)	C56	27741
37354	Facutcheon	27344	R-F coil shield	C58	31160 .05 MF (101)	C57	27741
37354	Facutcheon	27344	R-F coil shield	C59	31160 .05 MF (101)	C58	27741
37354	Facutcheon	27344	R-F coil shield	C60	31160 .05 MF (101)	C59	27741
37354	Facutcheon	27344	R-F coil shield	C61	31160 .05 MF (101)	C60	27741
37354	Facutcheon	27344	R-F coil shield	C62	31160 .05 MF (101)	C61	27741
37354	Facutcheon	27344	R-F coil shield	C63	31160 .05 MF (101)	C62	27741
37354	Facutcheon	27344	R-F coil shield	C64	31160 .05 MF (101)	C63	27741
37354	Facutcheon	27344	R-F coil shield	C65	31160 .05 MF (101)	C64	27741
37354	Facutcheon	27344	R-F coil shield	C66	31160 .05 MF (101)	C65	27741
37354	Facutcheon	27344	R-F coil shield	C67	31160 .05 MF (101)	C66	27741
37354	Facutcheon	27344	R-F coil shield	C68	31160 .05 MF (101)	C67	27741
37354	Facutcheon	27344	R-F coil shield	C69	31160 .05 MF (101)	C68	27741
37354	Facutcheon	27344	R-F coil shield	C70	31160 .05 MF (101)	C69	27741
37354	Facutcheon	27344	R-F coil shield	C71	31160 .05 MF (101)	C70	27741
37354	Facutcheon	27344	R-F coil shield	C72	31160 .05 MF (101)	C71	27741
37354	Facutcheon	27344	R-F coil shield	C73	31160 .05 MF (101)	C72	27741
37354	Facutcheon	27344	R-F coil shield	C74	31160 .05 MF (101)	C73	27741
37354	Facutcheon	27344	R-F coil shield	C75	31160 .05 MF (101)	C74	27741
37354	Facutcheon	27344	R-F coil shield	C76	31160 .05 MF (101)	C75	27741
37354	Facutcheon	27344	R-F coil shield	C77	31160 .05 MF (101)	C76	27741
37354	Facutcheon	27344	R-F coil shield	C78	31160 .05 MF (101)	C77	27741
37354	Facutcheon	27344	R-F coil shield	C79	31160 .05 MF (101)	C78	27741
37354	Facutcheon	27344	R-F coil shield	C80	31160 .05 MF (101)	C79	27741
37354	Facutcheon	27344	R-F coil shield	C81	31160 .05 MF (101)	C80	27741
37354	Facutcheon	27344	R-F coil shield	C82	31160 .05 MF (101)	C81	27741
37354	Facutcheon	27344	R-F coil shield	C83	31160 .05 MF (101)	C82	27741
37354	Facutcheon	27344	R-F coil shield	C84	31160 .05 MF (101)	C83	27741
37354	Facutcheon	27344	R-F coil shield	C85	31160 .05 MF (101)	C84	27741
37354	Facutcheon	27344	R-F coil shield	C86	31160 .05 MF (101)	C85	27741
37354	Facutcheon	27344	R-F coil shield	C87	31160 .05 MF (101)	C86	27741
37354	Facutcheon	27344	R-F coil shield	C88	31160 .05 MF (101)	C87	27741
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37354	Facutcheon	27344	R-F coil shield	C96	31160 .05 MF (101)	C95	27741
37354	Facutcheon	27344	R-F coil shield	C97	31160 .05 MF (101)	C96	27741
37354	Facutcheon	27344	R-F coil shield	C98	31160 .05 MF (101)	C97	27741
37354	Facutcheon	27344	R-F coil shield	C99	31160 .05 MF (101)	C98	27741
37354	Facutcheon	27344	R-F coil shield	C100	31160 .05 MF (101)	C99	27741

* Voltages for condensers are determined by the first numeral of the code number on the condensers.
Example: 101=100 volts, 202=200 volts, 403=450 volts.

Ω—ohms. U—megohms.

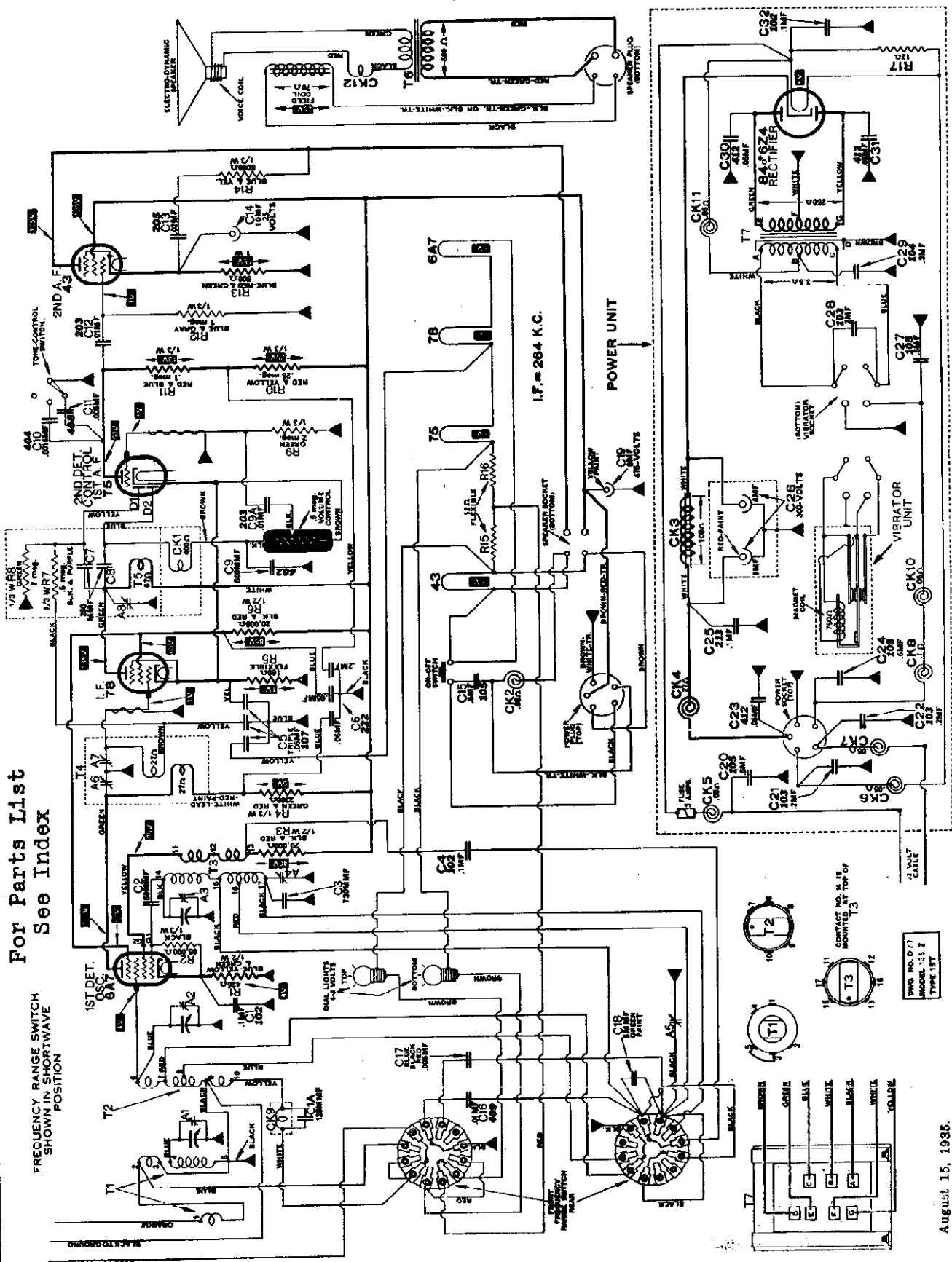
Example: 101=100 volts, 202=200 volts, 403=450 volts.

Example: 101=100 volts, 202=200 volts, 403=450 volts.

Example: 101=100 volts, 202=200 volts, 403=450 volts.

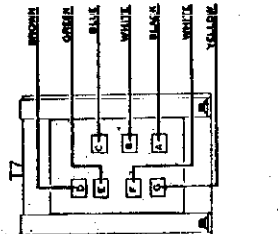
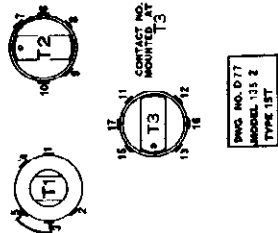
ATWATER-KENT MFG. CO.

MODELS 135Z, 216Z
Schematic, Voltage



For Parts List
See Index

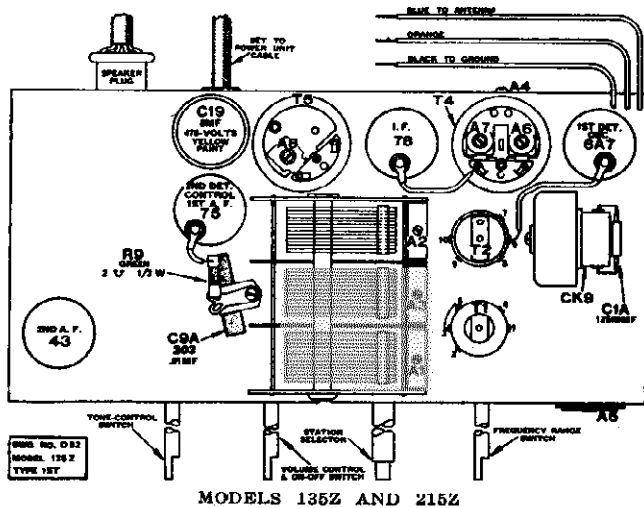
FREQUENCY RANGE SWITCH
SHOWN IN SHORTWAVE
POSITION



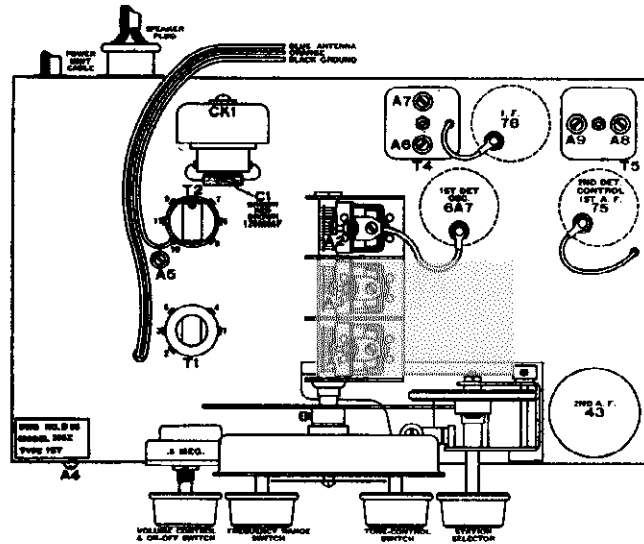
MODELS 135Z, 215Z
 MODELS 305Z, 565Z
 Trimmers, Socket
 Alignment

ATWATER-KENT MFG. CO.

ADJUSTING TRIMMER CONDENSERS



MODELS 135Z AND 215Z



MODELS 305Z AND 565Z

- A1—Preselector, 1500 KC.
- A2—1st-detector, 1500 KC.
- A3—Oscillator, 15 MC.
- A4—Tracking, 560 KC.
- A5—Oscillator, 1500 KC.
- A6—1st-detector plate, 264 KC.
- A7—I. F. grid, 264 KC.
- A8—I. F. plate, 264 KC.

- A1—Preselector, 1500 KC.
- A2—1st-detector, 1500 KC.
- A3—Oscillator, 15 MC.
- A4—Tracking, 560 KC.
- A5—Oscillator, 1500 KC.
- A6—1st-detector plate, 264 KC.
- A7—I. F. grid, 264 KC.
- A8—I. F. plate, 264 KC.
- A9—2nd-detector, 264 KC.

EQUIPMENT.

1. **OSCILLATOR.** The oscillator should cover the I. F. and R. F. frequencies. It should be well shielded and have a good attenuator. If the oscillator is not well shielded, it may be difficult to peak the pre-selector trimmers, owing to pick-up by the 1st-detector grid circuit. In general, it is advisable to connect an .00025 MFD fixed condenser in series with the pick-up lead at the antenna terminal of the set.
2. **OUTPUT METER.** Use a sensitive output meter and keep the radio volume control turned on full volume, and the tone control at high pitch. This is necessary to minimize the effect of the automatic volume control action of the set which would otherwise prevent sharp peaking of the trimmers.
3. **I. F. COUPLING UNIT.** Purchase from your distributor one of the special Atwater Kent I. F. coupling units No. 42590. This is placed on the grid cap of the I. F. or the 1st-detector tube, as specified, and the lead that normally connects to the grid cap is attached to the coupling unit.
4. Use a non-metallic screw driver for adjustment of the trimmers.

GENERAL NOTES.

1. Do not tamper with the trimmer adjustments unless the necessity is clearly apparent.
2. On the oscillator trimmer there are two different settings at which the signal will be received. Always use the first of these two positions as you screw the trimmer in from a loose or minimum-capacity position. THIS IS IMPORTANT.
3. Check the I. F. trimmers first.
4. In checking the set, do not disturb the position of the wiring any more than necessary.

DIAL CALIBRATION.

The dial calibration depends on the oscillator circuit of the set, providing that the I. F. trimmers are correctly aligned to their specified frequency. The pre-selector (R. F. and 1st-detector) trimmers do not affect the dial calibration, but simply affect sensitivity.

The oscillator trimmer is used to adjust the high-frequency end of the scale.

The oscillator tracking condenser adjusts the low-frequency end of the scale.

If adjustment of the oscillator trimmer and the oscillator tracking trimmer condenser does not correct the dial readings, it may be necessary to replace the fixed oscillator tracking condenser or the oscillator transformer.

Naturally the I. F. trimmers should be checked and adjusted, if necessary, before any attempt is made to align the R. F. or oscillator trimmers.

PROCEDURE

I. F. TRIMMERS.

Connect I. F. test oscillator (264 KC) to I. F. grid by means of regular I. F. coupling unit. Peak A8 (and A9 in 305Z, 565Z). Connect I. F. oscillator to 1st-detector grid and peak A7, A6.

DIAL POINTER ADJUSTMENT.

With rotor of variable condenser fully meshed, dial indicator should be at 538 KC.

R. F. TRIMMERS.

Connect an R. F. oscillator to antenna and ground of set. **Short-wave range.** With oscillator and dial at 15 MC, peak A3. Use the first point on the trimmer, as it is screwed in from a loose or minimum-capacity position.

Police range. No trimmers on this range.

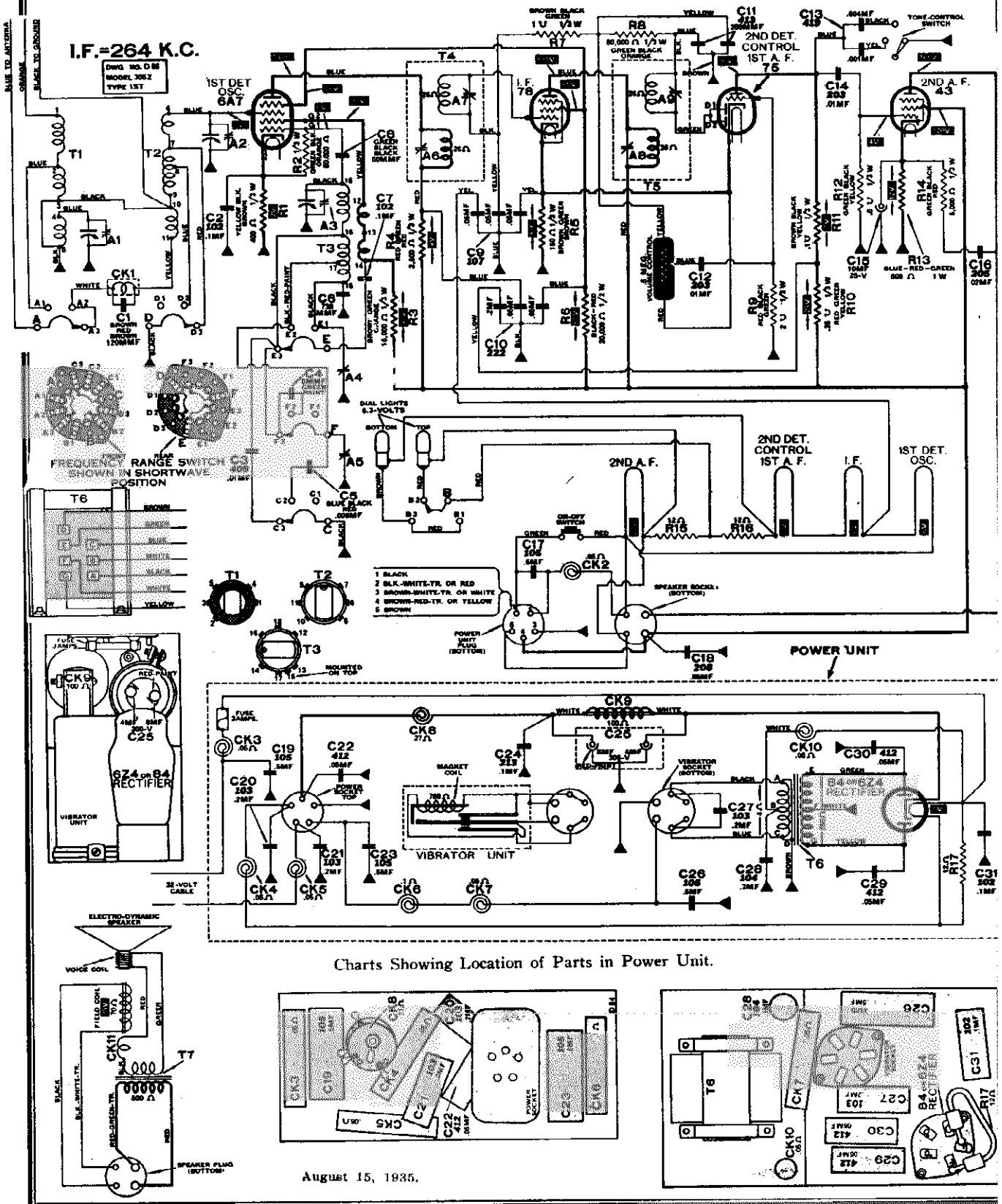
Broadcast range. With oscillator and dial at 1500 KC, peak A5, A2 and A1. With oscillator and dial at 560 KC, peak A4.

MODELS 305Z, 565Z
Schematic, Voltage
SPU Layout

ATWATER-KENT MFG. CO.

MODELS 305Z AND 565Z

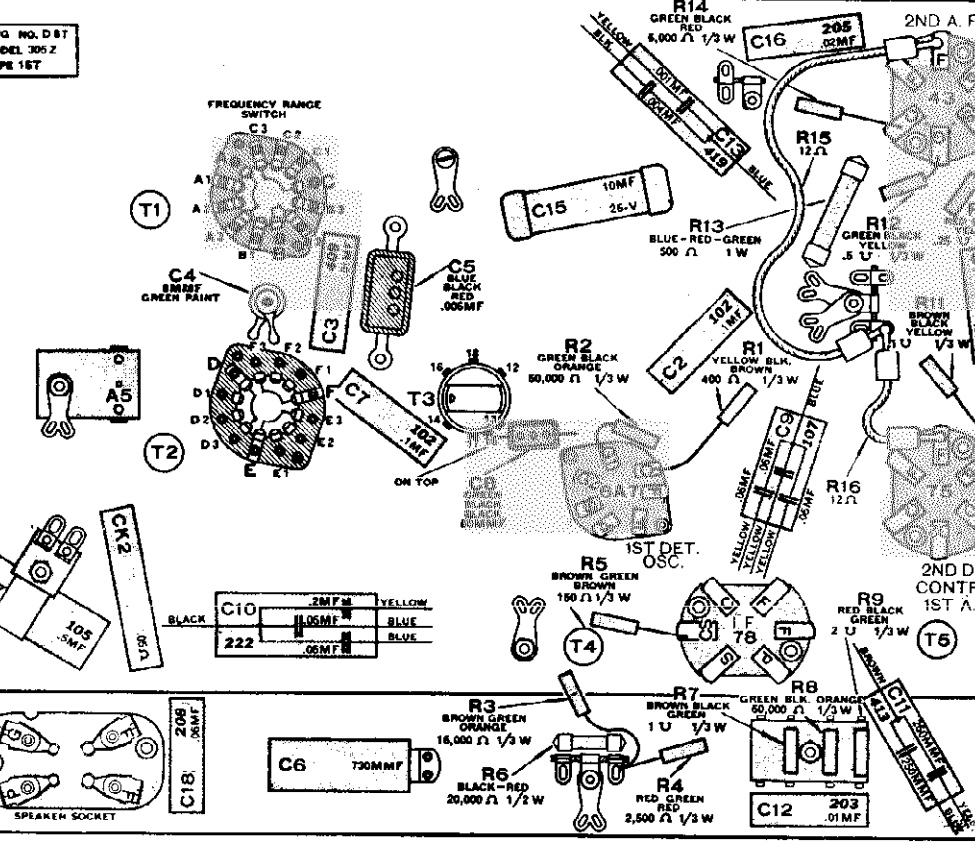
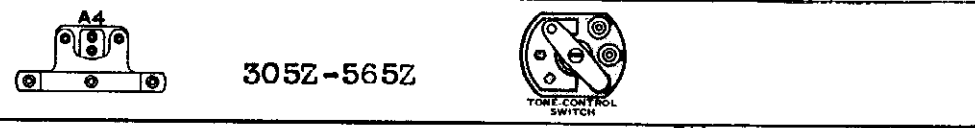
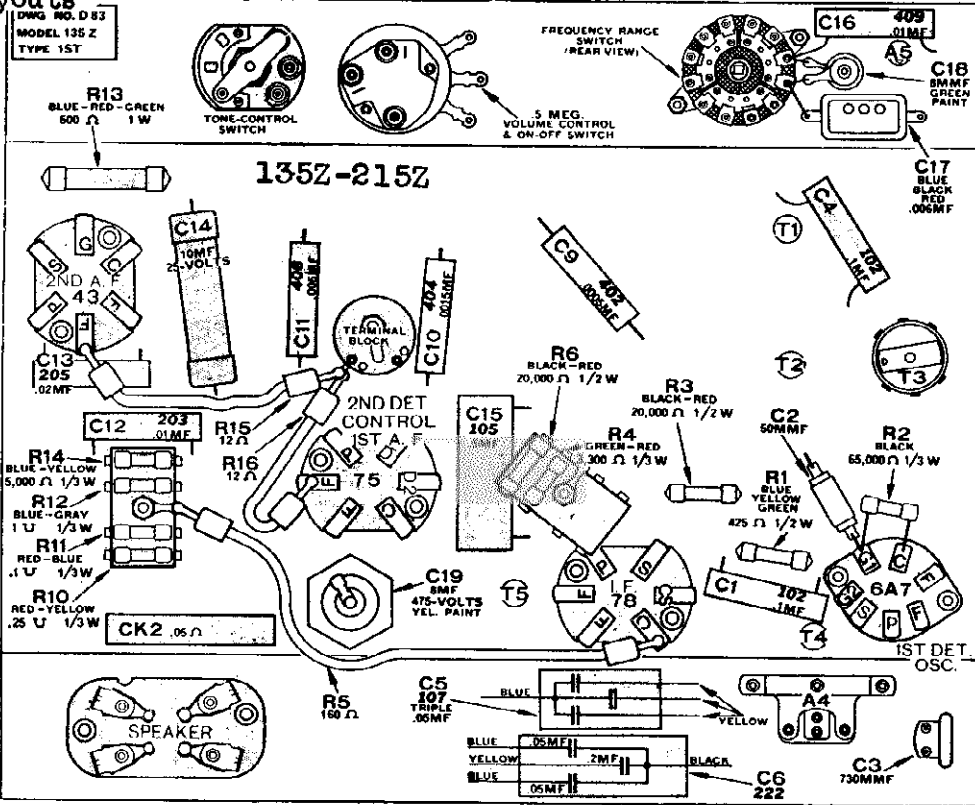
For Parts List See Index



MODELS 135Z, 215Z
MODELS 305Z, 565Z
Chassis Layouts

ATWATER-KENT MFG. CO.

DWG NO. D 83
MODEL 135 Z
TYPE 1ST

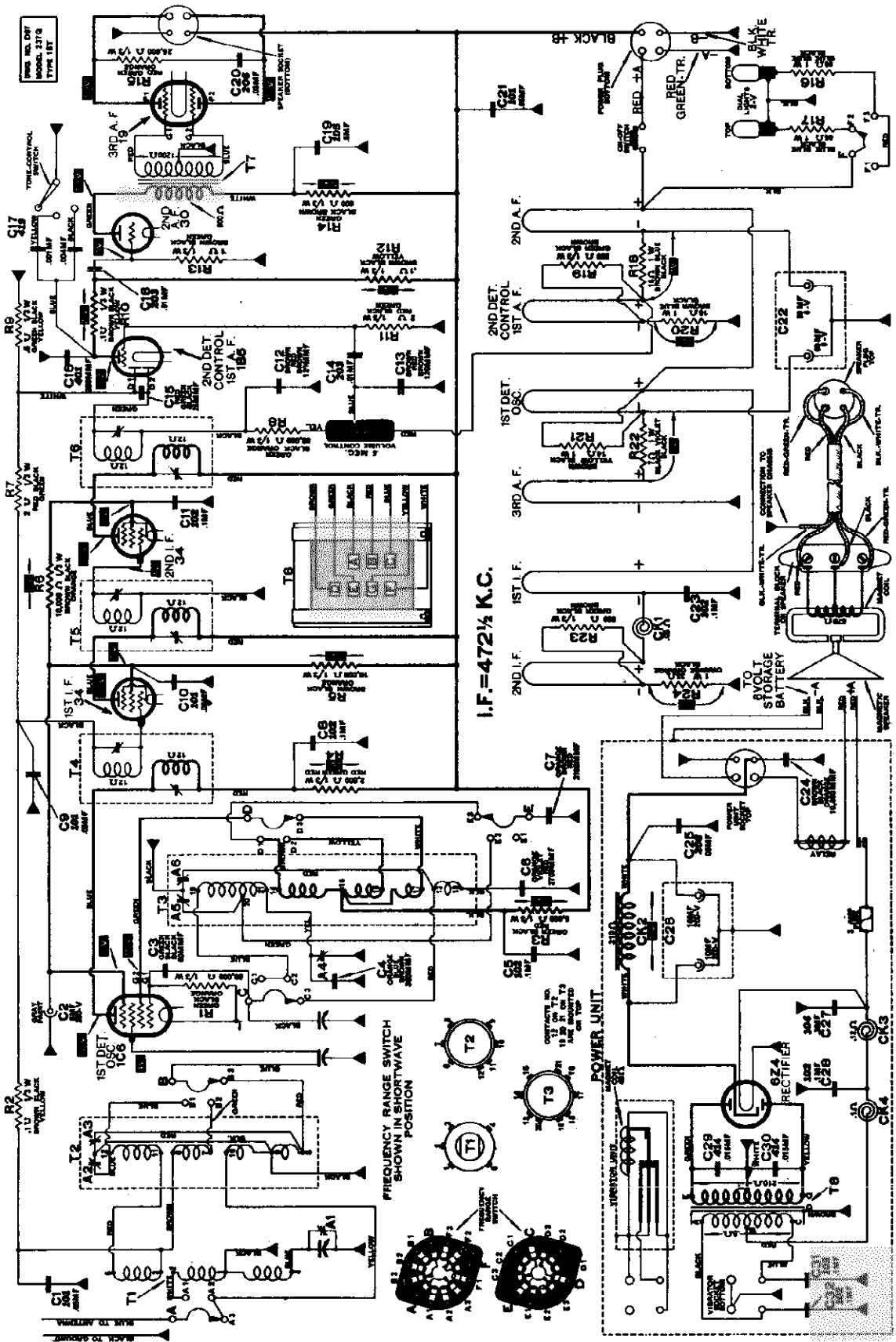


MODELS 237Q, 467Q
Schematic, Voltage

ATWATER-KENT MFG. CO.

TENTATIVE SERVICE DATA
MODELS 237Q AND 467Q

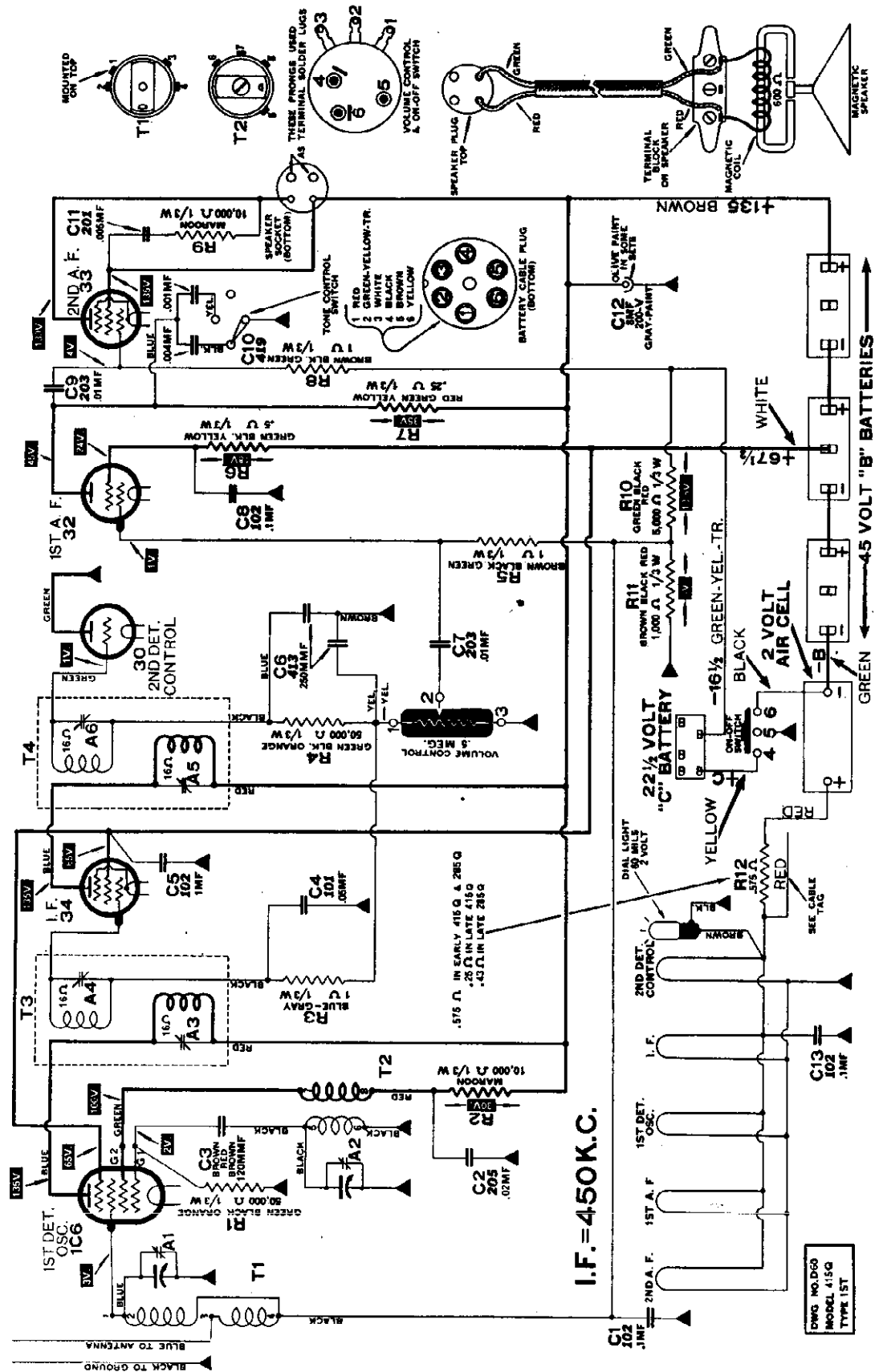
For Alignment Data
See Index.



August 10, 1936.

ATWATER-KENT MFG. CO.

MODELS 285Q AND 415Q

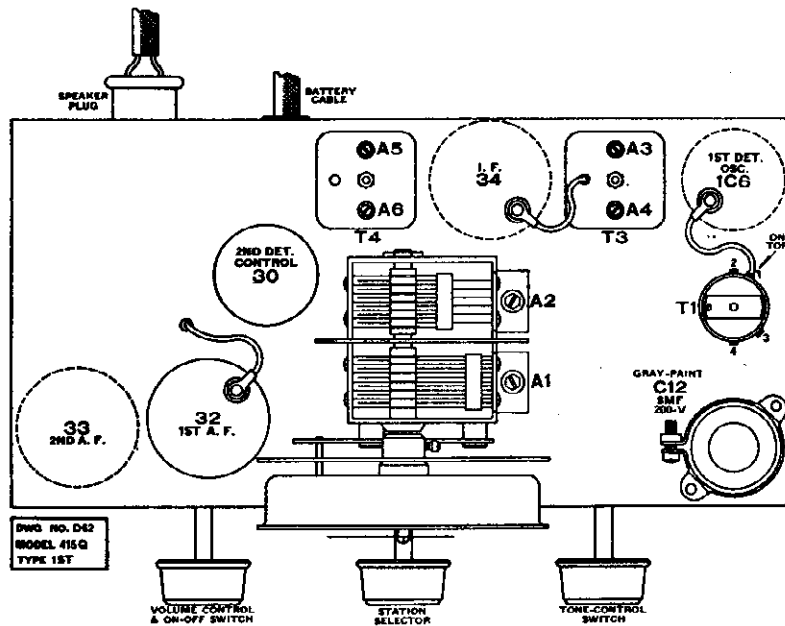


CHANGES. In late sets trimmer A1 is omitted; resistor R10 is 7500 ohms and resistor R11 is 1500 ohms.

June, 1935

MODELS 285Q, 415Q
 Trimmers, Chassis
 Alignment

ATWATER-KENT MFG. CO.

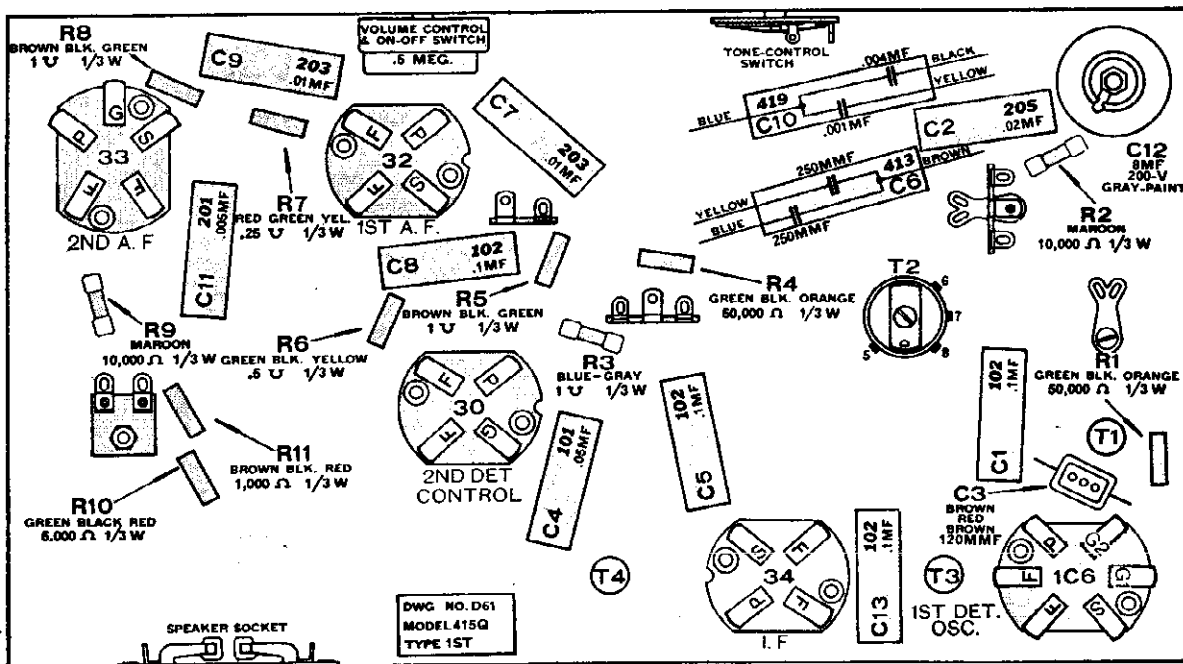


ADJUSTING TRIMMERS

I. F. Connect I. F. test oscillator (450 KC) to I. F. tube by means of regular I. F. coupling unit. Adjust A6 and A5 for maximum output. Connect coupling unit to 1st-detector and peak A4 and A3.

DIAL. With rotor of variable condenser fully meshed, dial indicator should be at 545 KC.

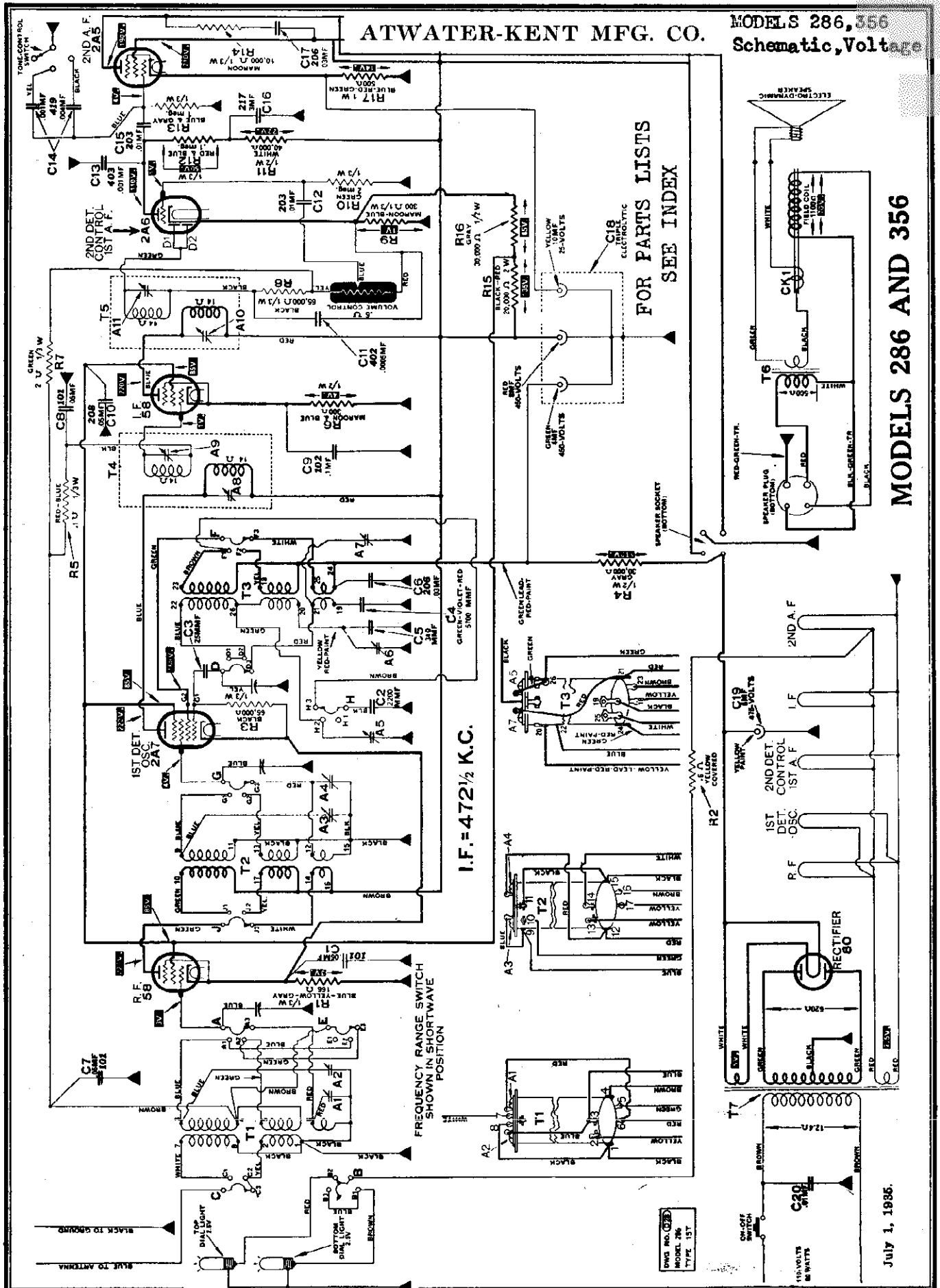
R. F. Connect R. F. test oscillator (1700 KC) to antenna and ground. With dial at 1700 KC, Peak A1 and A2. (On late sets A1 is not used.)



In late sets, R10 is 7500 ohms, and R11 is 1500 ohms.

ATWATER-KENT MFG. CO.

MODELS 286, 356
Schematic, Voltage



MODELS 286 AND 356

July 1, 1936.

MODELS 286, 356
Trimmers, Chassis
Alignment

ATWATER-KENT MFG. CO.

I. F. TRIMMERS.

Connect test oscillator (472½ KC) to I. F. tube by means of regular I. F. coupling unit. Peak A10, A11. Connect oscillator to 1st-detector tube and peak A8, A9.

DIAL POINTER ADJUSTMENT.

With rotor of variable condenser fully meshed, dial indicator should be at 535 KC.

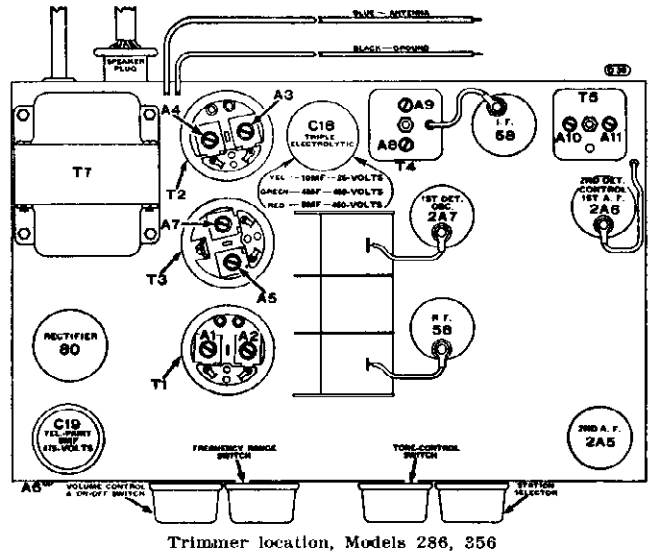
R. F. TRIMMERS.

Connect an R. F. oscillator to antenna and ground of set.
Short-wave range. With oscillator and dial at 15 MC, peak A7, A4, A1.
Police range. No trimmers on this range.
Broadcast range. With oscillator and dial at 1500 KC, peak A5, A3, A2. With oscillator and dial at 560 KC, peak A6.

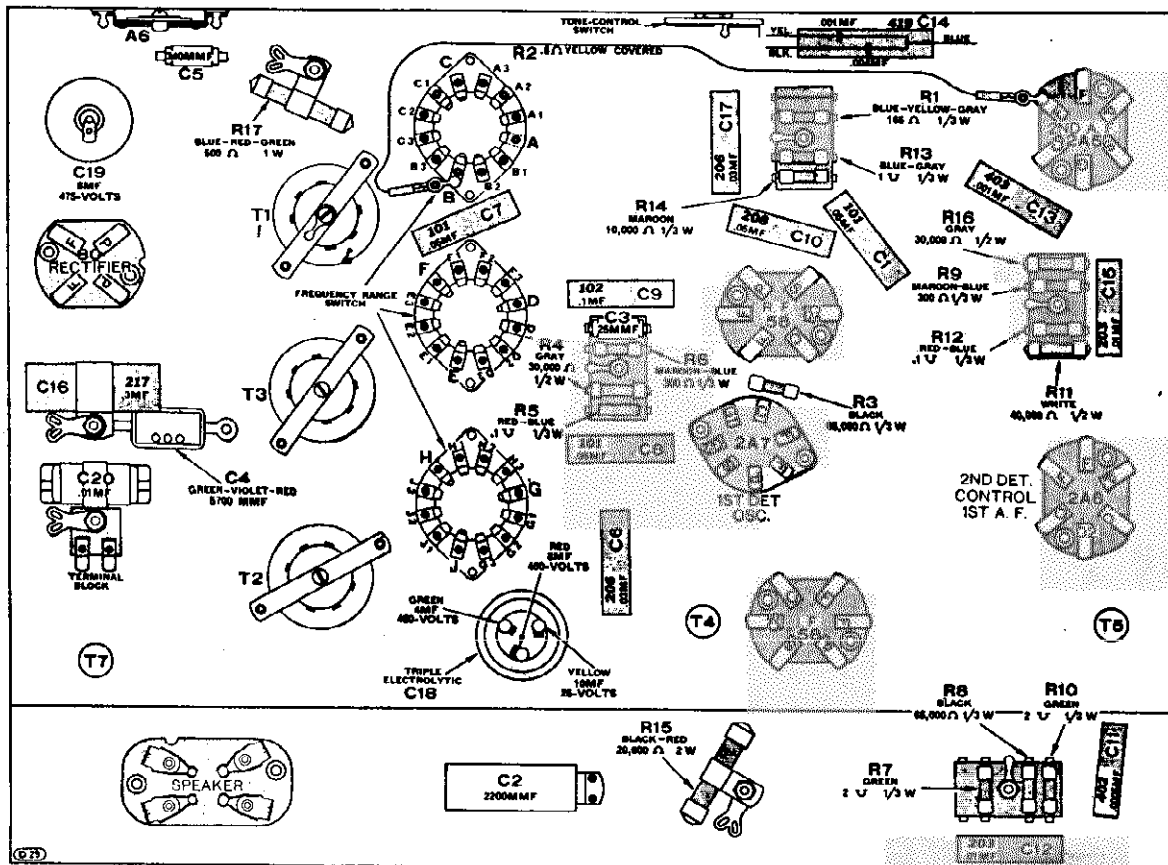
MODELS 286 AND 356

TRIMMERS

- A1—R. F., 15 MC.
- A2—R. F., 1500 KC.
- A3—1st-detector, 1500 KC.
- A4—1st-detector, 15 MC.
- A5—Oscillator, 1500 KC.
- A6—Oscillator, 560 KC.
- A7—Oscillator, 15 MC.
- A8—1st-detector-plate, 472½ KC.
- A9—I. F. grid, 472½ KC.
- A10—I. F. plate, 472½ KC.
- A11—2nd-detector, 472½ KC.



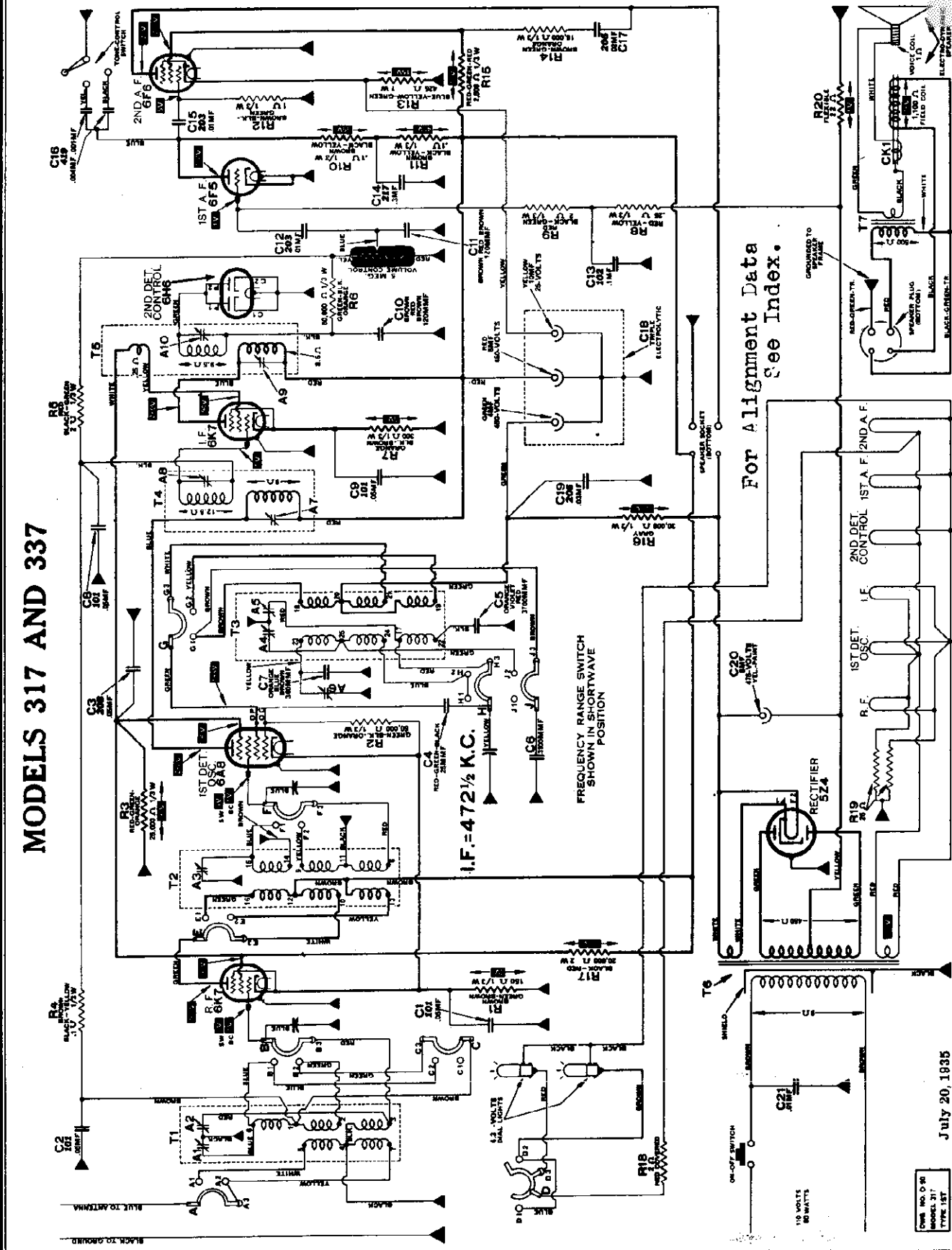
Trimmer location, Models 286, 356



ATWATER-KENT MFG. CO.

MODELS 317, 337 (Early)
Schematic, Voltage

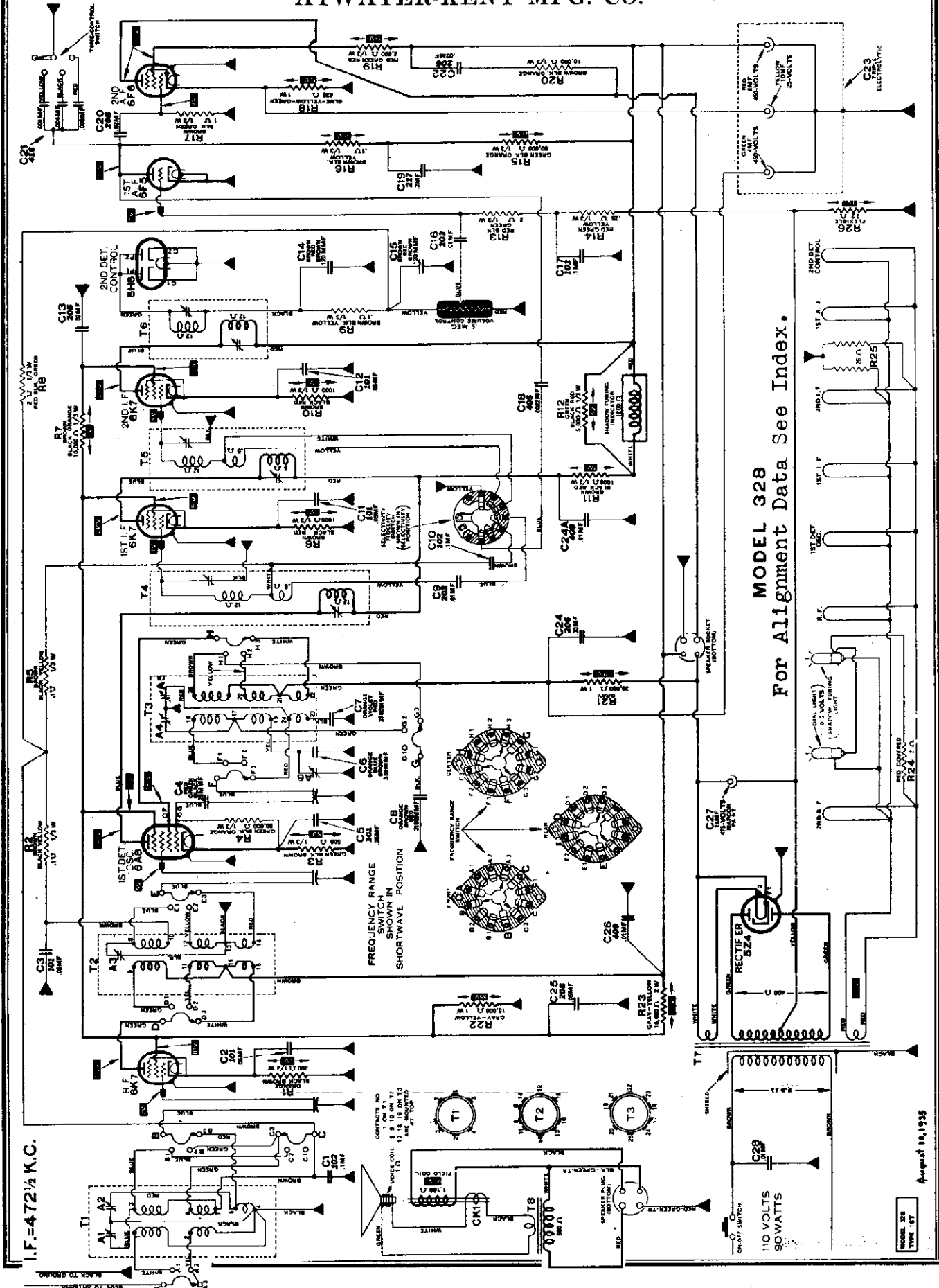
MODELS 317 AND 337



MODEL 328 (Early)

ATWATER-KENT MFG. CO.

Schematic, Voltage



MODEL 328
For Alignment Data See Index.

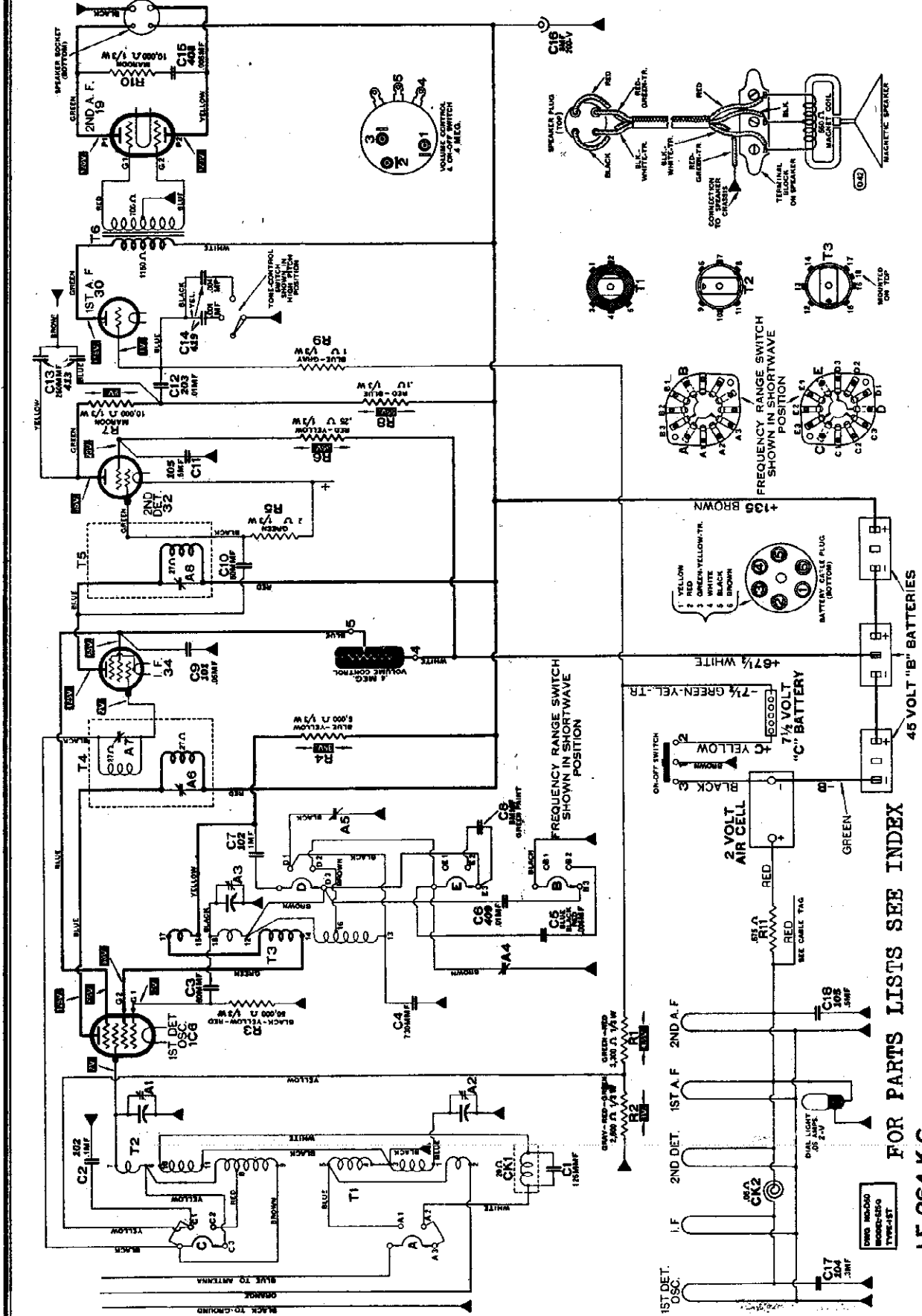
I.F.=472 1/2 K.C.

August 14, 1935

MODEL 328
TYPE 1ST

ATWATER-KENT MFG. CO.

MODEL S 3850, 6250
Schematic, Voltage



FOR PARTS LISTS SEE INDEX

I.F. 264 K.C.

Condenser C7 in oscillator plate circuit is 1 MF. In late sets, C9 (1. F. and 1st-detector screen bypass) is 2 MF (103).

MODELS 385Q, 625Q
Trimmers, Socket
Chassis, Alignment

ATWATER-KENT MFG. CO.

MODELS 385Q AND 625Q

I. F. TRIMMERS.

Connect I. F. test oscillator (264 KC) to I. F. tube by means of regular I. F. coupling unit. Peak A8. Connect I. F. oscillator to 1st-detector tube and peak A6, A7.

DIAL POINTER ADJUSTMENT.

With rotor of variable condenser fully meshed, dial indicator should be at 535 KC.

R. F. TRIMMERS.

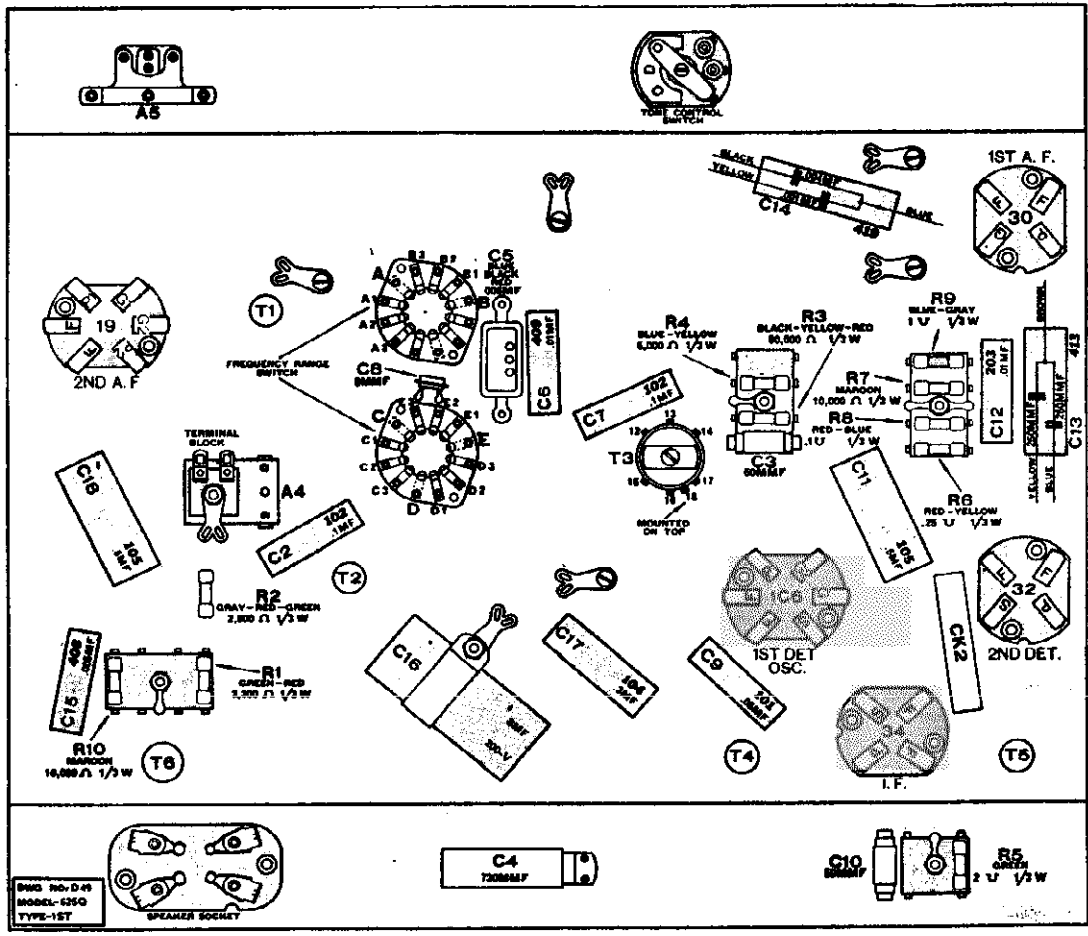
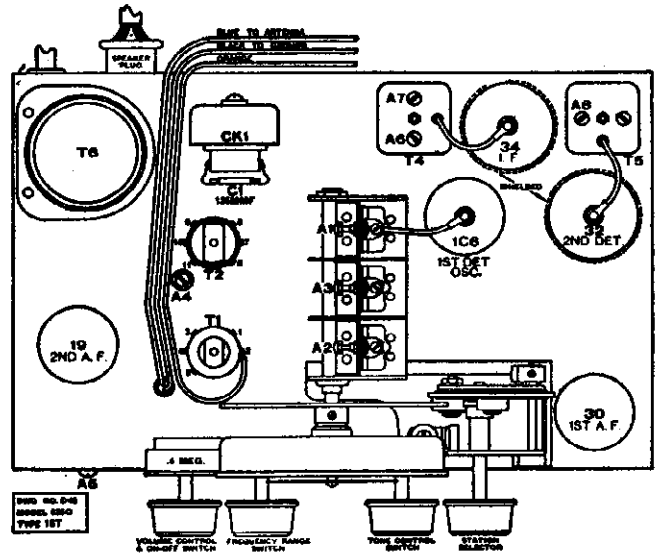
Connect an R. F. oscillator to the antenna and ground of set. *Short-wave range.* With oscillator and dial at 15 MC, peak A3.

Police range. No trimmers on this range.

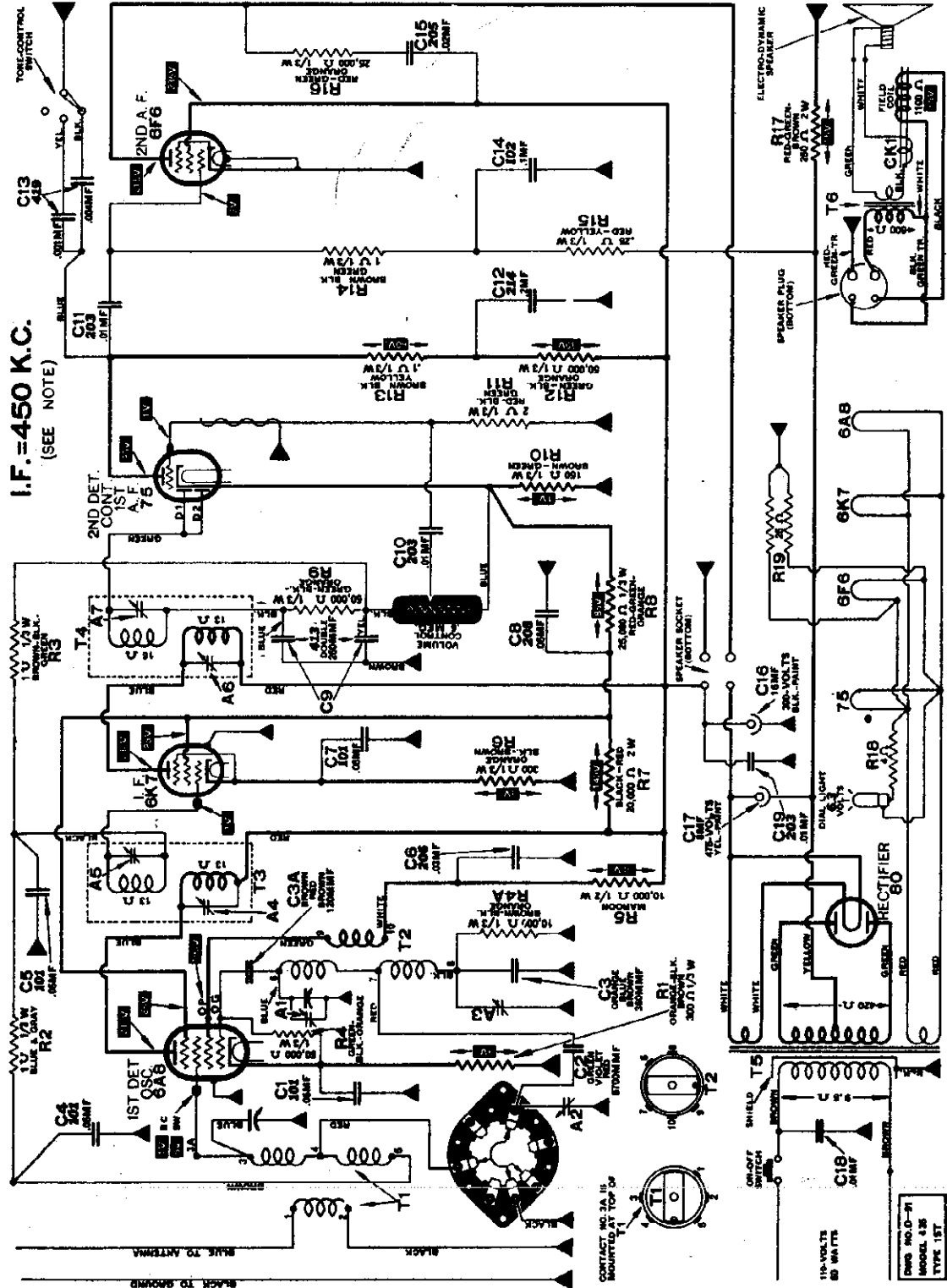
Broadcast range. With oscillator and dial at 1500 KC, peak A4, A1, A2. With oscillator and dial at 560 KC, peak A5.

TRIMMERS

- A1—1st-detector, 1500 KC.
- A2—Pre-selector, 1500 KC.
- A3—Oscillator, 15 MC.
- A4—Oscillator, 1500 KC.
- A5—Oscillator, 560 KC.
- A6—1st-detector plate, 264 KC.
- A7—I. F. grid, 264 KC.
- A8—I. F. plate, 264 KC.



MODEL 435 DIAGRAM



The frequency-range switch is shown in the short-wave position.

The I. F. in some Model 435 sets is 472 1/2 KC and a label to this effect is attached to the rear of the chassis. The I. F. transformers and trimmers, etc., are exactly the same for either 450 or 472 1/2 KC.

MODELS 286, 356
 MODELS 385Q, 625Q
 MODELS 475, 735
 Parts Lists

ATWATER-KENT MFG. CO.

MODELS 286, 356

- 29404 Cabinet with screen (356)
- 29127 Screen (356)
- 28531 Escutcheon and crystal
- 28954 Range switch
- 28961 Vol. control
- 42750 Tone control switch assem.
- 29101 Shaft and blade for the above ..
- 28946 Knob without dot (tuning and range)
- 28947 Knob with dot (volume and tone)
- 27432 Var. condenser
- 28968 Dial holder
- 28542 I. F. T. shield
- 27933 T1, T2 shield
- 27932 T3 shield
- 40090 Dial light socket assem.
- 27676 Dial lamp, 2.5-V (frosted)
- 22683 Tube shield
- 25058 R. F. T. shield cover
- 15213 Tube shield (H. F.)
- 29038 Shipping container (286)
- 29135 Shipping container (356)
- 29017 Instruction sheet, F-1217

TRANSFORMERS

- T1 42560 No. 1 R. F. T.
- T2 42570 No. 2 R. F. T.
- T3 42580 Osc. trans.
- T4 28527 No. 1 I. F. T. (includes trimmers)
- T5 28528 No. 2 I. F. T. (includes trimmers)
- T6 21672 Output trans.
- T7 28084 Power trans.

RESISTORS

- R2 16081 .6 Ω dial light resis.

CONDENSERS

- C2 40380 2200 MMF, 100-V.
- C3 33930 25 MMF, 500-V.
- C4 27599 5700 MMF, 450-V.
- C5 41580 340 MMF, 500-V.
- C18 27592 Triple elec., 4 MF, 8 MF, 450-V., 10 MF, 25-V.
- C19 28031 8 MF, 475-V.
- C20 23250 .01 MF, 450-V., line cond.

TRIMMERS

- A1, 2 39430 On T1
- A3, 4 39430 On T2
- A5, 7 39430 On T3
- A6 39630 Front of chassis (560 KC)

SOCKETS

- 24492 4 prong
- 24494 6 prong
- 26111 7 prong
- 21336 Speaker

475 and 286 SPEAKER No. 41800

- 25525 Small choke
- 21260 Field coil (1100 Ω)
- 21672 Output transformer
- 20737 Diaphragm
- 27611 Cable and plug
- 15079 Plug

735 and 356 SPEAKER No. 41900

- 25525 Small choke
- 21260 Field coil (1100 Ω)
- 21672 Output transformer
- 19465 Diaphragm
- 28345 Cable and plug
- 15079 Plug

MODELS 475, 735

- 29403 Cabinet with screen (735)
- 29143 Screen (735)
- 28531 Escutcheon and crystal assem.
- 27431 Variable condenser
- 42750 Tone control switch assem.
- 29101 Shaft and blade for the above ..
- 28961 Volume control, 5 U
- 28986 Range switch
- 28946 Knob without dot
- 28947 Knob with dot
- 28968 Dial holder
- 29121 Dial plate (735)
- 28989 Dial plate (475)
- 29183 I. F. T. shield
- 41020 Wave trap assem. (264 KC)
- 40090 Dial light socket assem.
- 27676 Dial lamp, 2.5-V (frosted)
- 22683 Tube shield
- 28993 Base cover (475)
- 29133 Instruction sheet, F-1217
- 29184 Shipping container (735)
- 29038 Shipping container (475)

TRANSFORMERS

- T1 43060 No. 1 R. F. T.
- T2 43070 No. 2 R. F. T.
- T3 43080 Osc. trans.
- T4 43290 No. 1 I. F. T.
- T5 43310 No. 2 I. F. T.
- T6 21672 Output trans. (on speaker)
- T7 25191 Power trans.

RESISTORS

- R1 16081 .6 Ω dial light

CONDENSERS

- C1 41650 125 MMF, 500-V.
- C2 25035 .006 MF, 450-V.
- C3 25661 8 MMF, 500-V.
- C7 42830 800 MMF, 100-V.
- C9 33930 25 MMF, 500-V.
- C20 25379 10 MF, 25-V.
- C21 28031 8 MF, 475-V.
- C22 27585 8 MF, 350-V.

TRIMMERS

- A4 28843 Osc. trimmer
- A5 39630 On front of chassis
- A6, 7 29119 On T4
- A8, 9 29119 On T5

CHOKES

- CK2 25525 On speaker

SOCKETS

- 24492 4 prong
- 24494 6 prong
- 26111 7 prong
- 21336 Speaker

PARTS FOR TUNING MECHANISM

(Used in all sets in this supplement)

- 28944 Condenser mounting bracket (rear)
- 28934 Tuning gear bracket
- 28995 Gear stop stud
- 28956 Tuning gear
- 27947 Dial pointer holder
- 27696 Screw for the above
- 28531 Escutcheon and crystal assem.
- 27522 Dial pointer
- 27535 Dial pointer screw
- 28116 Gear frame
- 27332 Large gear (rubber tired)
- 27333 Small gear (rubber tired)
- 28959 Tuning shaft
- 27957 Broadcast pinion gear
- 27297 Pin
- 27293 Detention spring

MODELS 385Q, 625Q

- 28986 Range switch
- 42750 Tone control switch assembly
- 29101 Shaft and blade for above
- 29251 Volume control, 4 U
- 40090 Dial light socket assembly
- 26721 Lamp, 2-V., .06 amp.
- 27431 Variable cond. assem.
- 29262 Dial holder
- 28531 Escutcheon and crystal assem.
- 29228 Dial plate (625Q)
- 29229 Dial plate (385Q)
- 29282 Tube shield (paper)
- 29183 I. F. T. shield
- 24327 Wave trap shield
- 29236 Instruction sheet, F-1238
- 29038 Shipping container (385Q)
- 29135 Shipping container (625Q)
- 30032 Cabinet with screen (625Q)
- 29127 Screen
- 28993 Base cover
- 41020 Wave trap assem. (264 KC)

CABLES

- 29331 Male cable and plug assembly (625Q)
- 29673 Female cable and socket assem. (385Q and 625Q)
- 30036 Male cable and plug assem. (385Q)
- 29055 Battery socket assembly
- 29054 Battery plug assembly
- 29227 Battery cable tag, F-1234

TRANSFORMERS

- T1 43060 Antenna trans.
- T2 44040 1st-det. trans.
- T3 44050 Osc. trans.
- T4 44070 No. 1 I. F. transformer
- T5 44170 No. 2 I. F. transformer
- T6 44240 Audio transformer

RESISTORS

- R11 40330 .575 Ω (on cable)
- 44230 1.03 Ω (in envelope)

CONDENSERS

- C1 41650 125 MMF, 500-V.
- C3 35840 50 MMF, 500-V.
- C4 43970 730 MMF, 100-V.
- C5 25035 .006 MF, 450-V., blue, blk., red
- C8 25661 8 MMF, 500-V.
- C10 35840 50 MMF, 500-V.
- C16 22472 8 MF, 200-V., dry electro.

TRIMMERS

- A4 28843 Osc. BC trimmer
- A5 39630 Osc. track cond.
- A6, 7 29119 On No. 1 I. F. T.
- A8 29119 On T5, No. 2 I. F. T.

CHOKES

- CK2 44160 Filament choke

SOCKETS

- 24492 4 prong
- 24494 6 prong
- 21336 Speaker

385Q SPEAKER No. 46800
 625Q SPEAKER No. 46700

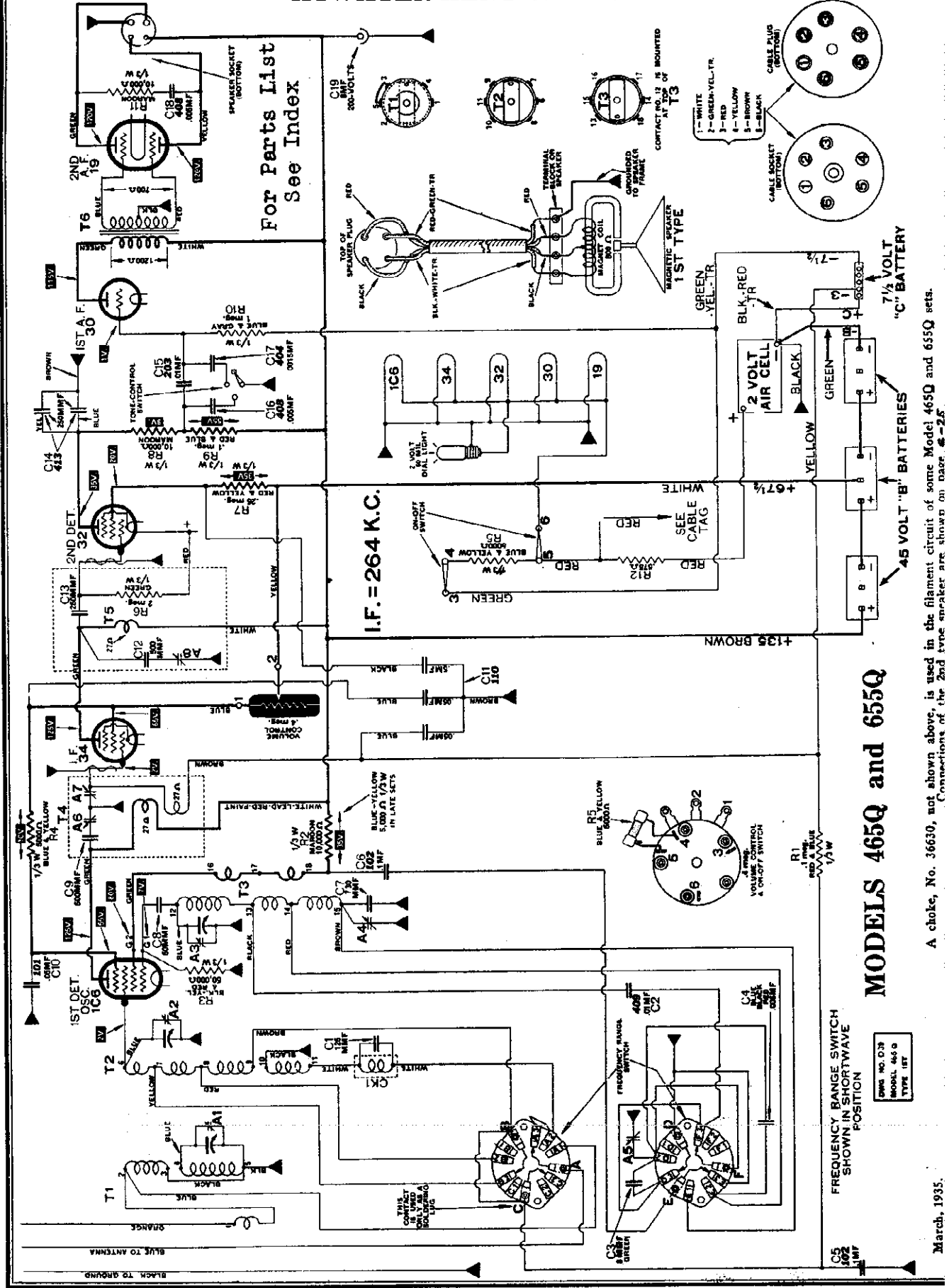
- 28974 Cone housing (625Q)
- 28979 Cone housing (385Q)
- 19469 Segment
- 29074 Cable and plug assembly
- 29075 Diaphragm assembly
- 29076* Sound unit complete
- 29077 Drive rod
- 17868 Drive rod nut

* Parts for this unit are not sold separately.

Schematic, Voltage

ATWATER-KENT MFG. CO.

MODELS 465Q, 655Q



For Parts List See Index

I.F. = 264 K.C.

MODELS 465Q and 655Q

FREQUENCY RANGE SWITCH SHOWN IN SHORTWAVE POSITION

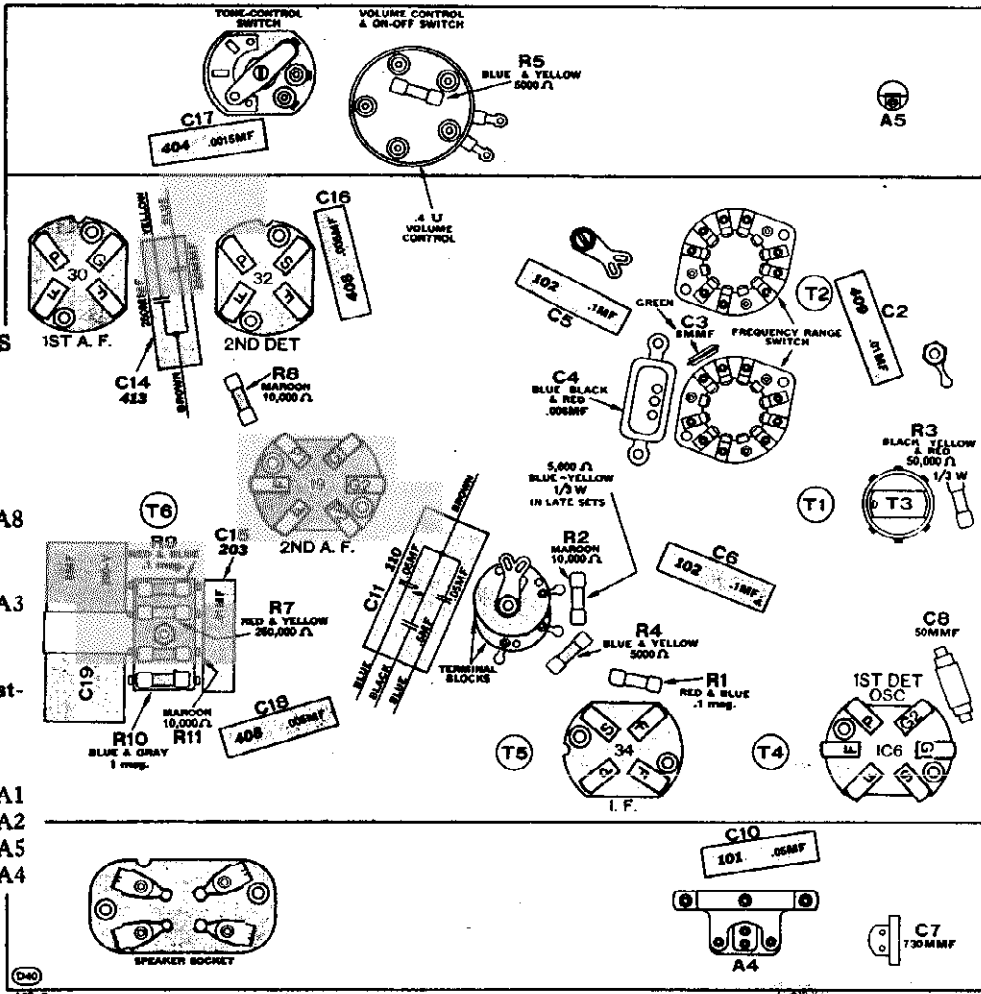
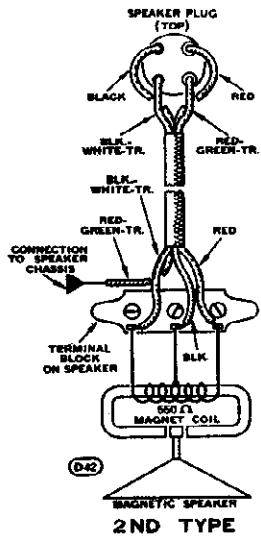
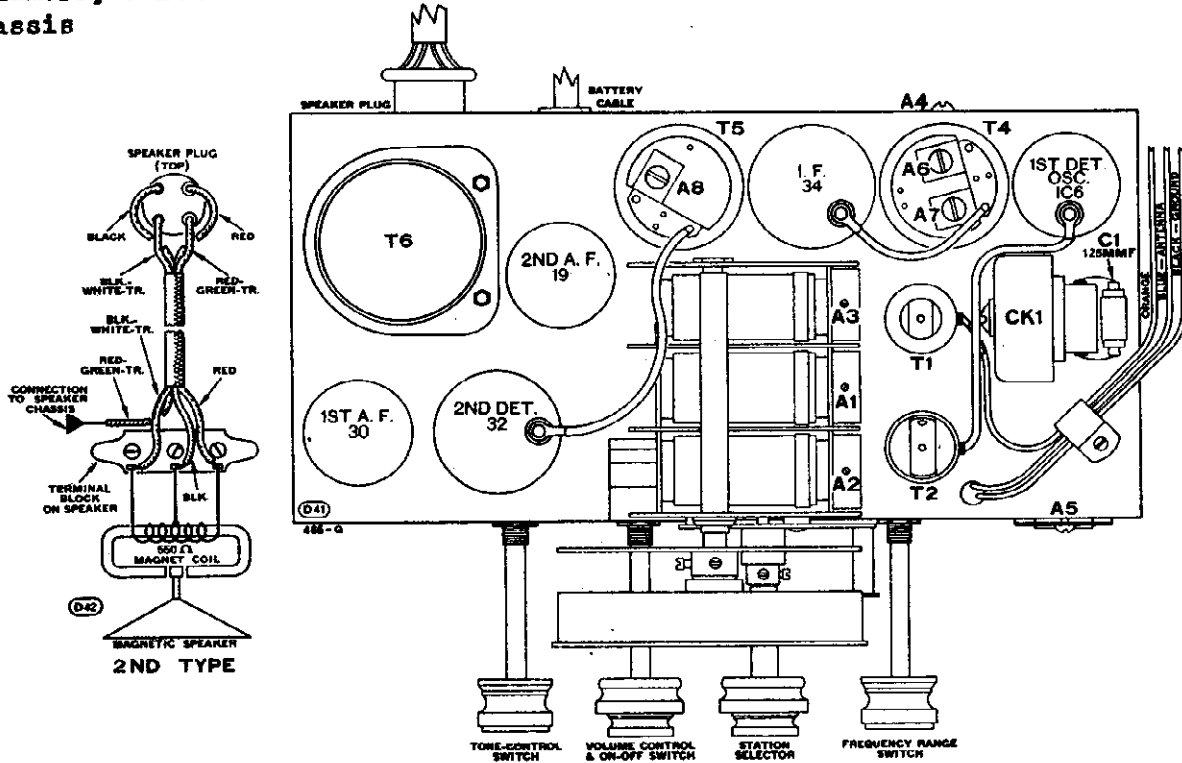
CWS NO. 0-38 MODEL 465 Q TYPE 1E7

A choke, No. 36630, not shown above, is used in the filament circuit of some Model 465Q and 655Q sets. Connections of the 2nd type speaker are shown on page 6-25

March, 1935.

MODELS 465Q, 655Q
Trimmers, Socket
Chassis

ATWATER-KENT MFG. CO.



TRIMMERS ON MODELS 465Q and 655Q

I. F. TRIMMERS

I. F. (264 KC).....A6, A7, A8

5.3 to 16 MC RANGE

Oscillator (15MC).....A5

1.6 to 4.8 MC RANGE

There are no trimmer adjustments for this range.

540 to 1600 KC RANGE

- Antenna (1500 KC).....A1
- 1st-Det. (1500 KC).....A2
- Oscillator (1500 KC).....A5
- Tracking (560 KC).....A4

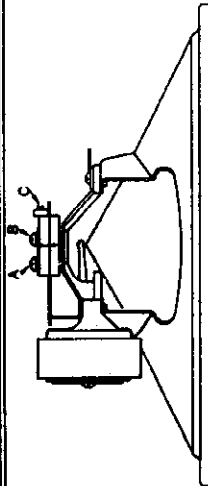
ATWATER-KENT MFG. CO.

MODELS 465Q, 655Q
Speaker Data, Alignment
MODELS 768Q, 978Q
Speaker Data

SERVICE DATA

MODELS 465Q, 655Q, 768Q and 978Q

SPEAKER ADJUSTMENT

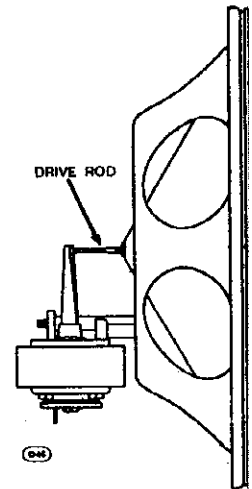


1st TYPE

1st Type: When adjustment is required, place set and speaker in operation and tune in a signal. Loosen screw A and tighten B, or vice versa, in order to center the armature in the magnet gap. If the armature is not correctly centered, it may strike against one pole of the magnet and cause chattering. If the speaker overloads or chatters only on a very strong signal, turn screw C anti-clockwise. This tightens the armature movement. In general it is not advisable to disturb the adjustment of screw C.

2nd Type: There are no centering adjustments on the 2nd type speaker used in late models 465Q and 655Q. If the unit becomes open or requires adjustment, it is necessary to replace the complete sound unit.

The diaphragm is clamped to the drive rod between two nuts. When installing a new diaphragm or unit, turn the rear nut back on the drive rod, fasten the diaphragm or unit to cone housing, and turn rear nut forward until it touches apex of diaphragm. Put the front nut on drive rod and tighten securely.



2nd TYPE

SYNCHRONIZING TRIMMER CONDENSERS

MODELS 465Q and 655Q

I. F. TRIMMERS.

Connect an I. F. test oscillator to the 1st-detector tube by means of the standard I. F. coupling unit described in January, 1935, supplement. Adjust the I. F. oscillator to 264KC. Connect a sensitive output meter to the set. Use the weakest possible oscillator signal that will give a reading on the output meter with the radio volume control on full. Turn the set to a quiet point near 1000 KC.

Peak trimmers A6, A7, and A8. Remove the I. F. coupling unit and seal the I. F. trimmers.

DIAL POINTER ADJUSTMENT.

With the variable condenser all the way in, the dial pointer should be set at 535 KC.

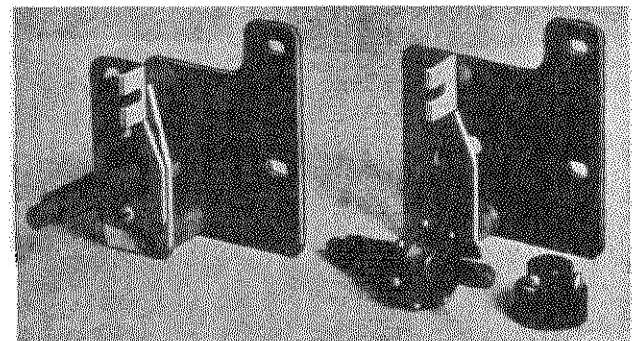
R. F. TRIMMERS.

Connect an R. F. test oscillator to the antenna and ground terminals of set. Use the weakest possible oscillator signal. Loosen the trimmer screws.

Short-wave range. Oscillator at 15 MC, and set turned to 15 MC mark, peak trimmer A3.

Police range. There are no trimmer adjustments for this range.

Broadcast range. Oscillator at 1500 KC, and dial pointer at 1500 KC mark, peak trimmers A5, A2 and A1. Tune oscillator and set to 560 KC. Peak A4. Repeat adjustments on A5 at 1500 KC and A4 at 560 KC if necessary.



EARLY TYPE

LATE TYPE

*Illustration of Early and Late Type Vernier Drive Arrangements used in Models 465Q, 655Q, etc.

The early type is superseded by the late type and parts for the early type are NOT furnished. When any part of the early type drive requires

replacement, it is necessary to install the complete new type assembly, which consists of two parts: No. 28281, front-and-back-plate assembly; and No. 28594, tuning shaft assembly.

The dial rubber and bushing, No. 22657, is the same in both types.

MODELS 465Q, 655Q
MODELS 768Q, 978Q
Parts Lists

ATWATER-KENT MFG. CO.

PARTS LIST FOR MODEL 465Q

- CONDENSERS**
 C1 41650 125 MMF. mica
 C2 32810 .01 MF. 400-V. (409)
 C3 28341 8 MMF. 500-V. mica
 C4 25035 .006 MF. blue, black, red, mica
 C5 31530 1 MF. 100-V. (102)
 C6 35630 750 MMF. 100-V. mica
 C7 35940 50 MMF. 500-V. mica
 C8 35150 500 MMF. 100-V. mica
 C9 35160 .05 MF. 100-V. (101)
 C10 31920 .05, .05, and .5, 100-V. (110)
 C11 35110 500 MMF. 500-V. mica
 C12 35170 250 MMF. 500-V. mica
 C13 35950 230 and 250 MMF. 400-V.
 C14 35950 230 and 250 MMF. 400-V.
 C15 27630 .01 (M1) 200-V. (203)
 C16 29830 .005 MF. 400-V. (408)
 C17 35650 .0015 MF. 400-V. (404)
 C18 29890 .005 MF. 400-V. (408)
 C19 22472 8 MF. 200-V., electrolytic
- TRIMMERS**
 A4 39630 Rear of chassis
 A5 38900 Front of chassis
 A6, 7 32880 On T4 (double)
 A8 40610 On T5 (single)
- CHOKES**
 CK1 28458 25-KC trap choke
 CK2 36630 Filament choke
- SOCKETS**
 21355 4 prong (speaker)
 24492 4 prong
 24494 6 prong
- 465-Q SPEAKER No. 42900 (1st type)**
 655-Q SPEAKER No. 45900 (1st type)
- WAVE TRAP**
 41020 Trap assembly (254KC)
 28458 Choke only (CK1)
 11650 125 MMF., 500-V. condenser
 24527 Shield
- TRANSFORMERS**
 T1 41250 No. 1 R. F. T.
 T2 41250 No. 2 R. F. T.
 T3 41270 Oscillator trans.
 T4 28165 No. 1 I. F. T.
 T5 28165 No. 2 I. F. T.
 T6 46650 Audio input trans.
- RESISTORS**
 R1 30340 1 U, 1/2 watt, red, blue
 R2 30350 10,000 Ω, 1/2 watt, maroon
 R3 30350 50,000 Ω, 1/2 watt, black, yellow
 R4 36430 500 Ω, 1/2 watt, blue, yellow
 R5 36430 5000 Ω, 1/2 watt, red, yellow
 R6 30370 2 U, 1/2 watt, green
 R7 31970 25 U, 1/2 watt, red, yellow
 R8 30320 10,000 Ω, 1/2 watt, maroon
 R9 30340 1 U, 1/2 watt, red, blue
 R10 30350 1 U, 1/2 watt, blue, gray
 R11 40330 570 Ω, 1/2 watt, maroon
 R12 40330 1.03 Ω, wire wound (for use with 3-V. "A" battery)
 R13 30360 1 U, 1/2 watt, gray
 R14 30360 1 U, 1/2 watt, purple, 1/2 watt
 R15 30360 1 U, 1/2 watt, yellow, 1/2 watt
 R16 40330 375 Ω, wire wound (for use with 3-V. "A" battery)
 R17 40350 1.03 Ω, wire wound (for use with 3-V. "A" battery)
 R18 30360 1 U, 1/2 watt, purple, 1/2 watt
 R19 40330 375 Ω, wire wound (for use with 3-V. "A" battery)
 R20 40350 1.03 Ω, wire wound (for use with 3-V. "A" battery)

- CONDENSERS**
 Model 465-Q
 27952 Base plate
 28051 Shipping container
 28011 Cable and plug assm. (male)
 28012 Cable and socket assm. (female)
 28029 Cabinet with screen
 27904 Screen
 27922 ar. cond. assm.
 27922 Rige knob and plug (male)
 28255 Battery cable and socket
 28254 Battery plug assm. (male)
 29056 Battery socket assm. (male)
 29057 Battery socket assm. (female)
 27754 Dial pointer
 27869 Dial and frame assembly
 27862 Dial frame only
 27811 Dial plate
 27806 Rectification panel assembly
 28212 Dial lamp (2 V., 50 ma.)
 27965 Vol. control (2 V., 50 ma.)
 28007 Tone control switch assm.
 28008 Shaft and blade for the above
 38740 Sensitivity switch assm.
 27628 Shaft and blade for the above
 28046 Knob (tuning and range)
 28047 Knob (vol. and tone)
 27663 Knob (sensitivity) F.1155
 27663 Knob (range) F.1155
 27993 Shipping container
- TRANSFORMERS**
 T1 41080 EC antenna trans.
 T2 41080 EC and 4-12 det. trans.
 T3 41120 L-C, 5, 12-22 det. trans.
 T4 41110 EC and 4-12 osc. trans.
 T5 28165 No. 1 I. F. T.
 T6 28165 No. 2 I. F. T.
 T7 28167 No. 3 I. F. T.
 T8 40710 Audio input trans.
 T9 40710
- RESISTORS**
 R1 30340 1 U, red, blue, 1/2 watt.
 R2 1572 10,000 Ω, maroon, 1/2 watt.
 R3 36430 500 Ω, blue, yellow, 1/2 watt.
 R4 36430 5000 Ω, blue, yellow, 1/2 watt.
 R5 30330 3300 Ω, green, red, 1/2 watt.
 R6 30350 5 U, black, purple, 1/2 watt.
 R7 30370 2 U, green, 1/2 watt.
 R8 30360 1 U, blue, gray, 1/2 watt.
 R9 30360 1 U, red, blue, 1/2 watt.
 R10 30340 1 U, red, blue, 1/2 watt.
 R11 30340 20,000 Ω, black, red, 1/2 watt.
 R12 37530 300 Ω, maroon, blue, 1/2 watt.
 R13 37530 300 Ω, maroon, blue, 1/2 watt.
 R14 37540 425 Ω, blue, yellow, green, 1/2 watt.
 R15 39790 500 Ω, blue, red, green, 1/2 watt.
 R16 30320 10,000 Ω, maroon, 1/2 watt.
 R17 30350 5 U, black, purple, 1/2 watt.
 R18 31970 25 U, red, yellow, 1/2 watt.
 R19 40330 375 Ω, wire wound (for use with 3-V. "A" battery)
 R20 40350 1.03 Ω, wire wound (for use with 3-V. "A" battery)

- CONDENSERS**
 C1 41650 125 MMF. mica
 C2 32810 .01 MF. 400-V. (409)
 C3 28341 8 MMF. 500-V. mica
 C4 25035 .006 MF. blue, black, red, mica
 C5 31530 1 MF. 100-V. (102)
 C6 35630 750 MMF. 100-V. mica
 C7 35940 50 MMF. 500-V. mica
 C8 35150 500 MMF. 100-V. mica
 C9 35160 .05 MF. 100-V. (101)
 C10 31920 .05, .05, and .5, 100-V. (110)
 C11 35110 500 MMF. 500-V. mica
 C12 35170 250 MMF. 500-V. mica
 C13 35950 230 and 250 MMF. 400-V.
 C14 35950 230 and 250 MMF. 400-V.
 C15 27630 .01 (M1) 200-V. (203)
 C16 29830 .005 MF. 400-V. (408)
 C17 35650 .0015 MF. 400-V. (404)
 C18 29890 .005 MF. 400-V. (408)
 C19 22472 8 MF. 200-V., electrolytic
- TRIMMERS**
 A4 39630 Rear of chassis
 A5 38900 Front of chassis
 A6, 7 32880 On T4 (double)
 A8 40610 On T5 (single)
- CHOKES**
 CK1 28458 25-KC trap choke
 CK2 36630 Filament choke
- SOCKETS**
 21355 4 prong (speaker)
 24492 4 prong
 24494 6 prong
- 465-Q SPEAKER No. 42900 (1st type)**
 655-Q SPEAKER No. 45900 (1st type)
- WAVE TRAP**
 41020 Trap assembly (254KC)
 28458 Choke only (CK1)
 11650 125 MMF., 500-V. condenser
 24527 Shield
- TRANSFORMERS**
 T1 41250 No. 1 R. F. T.
 T2 41250 No. 2 R. F. T.
 T3 41270 Oscillator trans.
 T4 28165 No. 1 I. F. T.
 T5 28165 No. 2 I. F. T.
 T6 46650 Audio input trans.
- RESISTORS**
 R1 30340 1 U, 1/2 watt, red, blue
 R2 30350 10,000 Ω, 1/2 watt, maroon
 R3 30350 50,000 Ω, 1/2 watt, black, yellow
 R4 36430 500 Ω, 1/2 watt, blue, yellow
 R5 36430 5000 Ω, 1/2 watt, red, yellow
 R6 30370 2 U, 1/2 watt, green
 R7 31970 25 U, 1/2 watt, red, yellow
 R8 30320 10,000 Ω, 1/2 watt, maroon
 R9 30340 1 U, 1/2 watt, red, blue
 R10 30350 1 U, 1/2 watt, blue, gray
 R11 40330 570 Ω, 1/2 watt, maroon
 R12 40330 1.03 Ω, wire wound (for use with 3-V. "A" battery)
 R13 30360 1 U, 1/2 watt, gray
 R14 30360 1 U, 1/2 watt, purple, 1/2 watt
 R15 30360 1 U, 1/2 watt, yellow, 1/2 watt
 R16 40330 375 Ω, wire wound (for use with 3-V. "A" battery)
 R17 40350 1.03 Ω, wire wound (for use with 3-V. "A" battery)
 R18 30360 1 U, 1/2 watt, purple, 1/2 watt
 R19 40330 375 Ω, wire wound (for use with 3-V. "A" battery)
 R20 40350 1.03 Ω, wire wound (for use with 3-V. "A" battery)

- CONDENSERS**
 Model 465-Q
 27952 Base plate
 28051 Shipping container
 28011 Cable and plug assm. (male)
 28012 Cable and socket assm. (female)
 28029 Cabinet with screen
 27904 Screen
 27922 ar. cond. assm.
 27922 Rige knob and plug (male)
 28255 Battery cable and socket
 28254 Battery plug assm. (male)
 29056 Battery socket assm. (male)
 29057 Battery socket assm. (female)
 27754 Dial pointer
 27869 Dial and frame assembly
 27862 Dial frame only
 27811 Dial plate
 27806 Rectification panel assembly
 28212 Dial lamp (2 V., 50 ma.)
 27965 Vol. control (2 V., 50 ma.)
 28007 Tone control switch assm.
 28008 Shaft and blade for the above
 38740 Sensitivity switch assm.
 27628 Shaft and blade for the above
 28046 Knob (tuning and range)
 28047 Knob (vol. and tone)
 27663 Knob (sensitivity) F.1155
 27663 Knob (range) F.1155
 27993 Shipping container
- TRANSFORMERS**
 T1 41080 EC antenna trans.
 T2 41080 EC and 4-12 det. trans.
 T3 41120 L-C, 5, 12-22 det. trans.
 T4 41110 EC and 4-12 osc. trans.
 T5 28165 No. 1 I. F. T.
 T6 28165 No. 2 I. F. T.
 T7 28167 No. 3 I. F. T.
 T8 40710 Audio input trans.
 T9 40710
- RESISTORS**
 R1 30340 1 U, red, blue, 1/2 watt.
 R2 1572 10,000 Ω, maroon, 1/2 watt.
 R3 36430 500 Ω, blue, yellow, 1/2 watt.
 R4 36430 5000 Ω, blue, yellow, 1/2 watt.
 R5 30330 3300 Ω, green, red, 1/2 watt.
 R6 30350 5 U, black, purple, 1/2 watt.
 R7 30370 2 U, green, 1/2 watt.
 R8 30360 1 U, blue, gray, 1/2 watt.
 R9 30360 1 U, red, blue, 1/2 watt.
 R10 30340 1 U, red, blue, 1/2 watt.
 R11 30340 20,000 Ω, black, red, 1/2 watt.
 R12 37530 300 Ω, maroon, blue, 1/2 watt.
 R13 37530 300 Ω, maroon, blue, 1/2 watt.
 R14 37540 425 Ω, blue, yellow, green, 1/2 watt.
 R15 39790 500 Ω, blue, red, green, 1/2 watt.
 R16 30320 10,000 Ω, maroon, 1/2 watt.
 R17 30350 5 U, black, purple, 1/2 watt.
 R18 31970 25 U, red, yellow, 1/2 watt.
 R19 40330 375 Ω, wire wound (for use with 3-V. "A" battery)
 R20 40350 1.03 Ω, wire wound (for use with 3-V. "A" battery)

- CONDENSERS**
 Model 465-Q
 27952 Base plate
 28051 Shipping container
 28011 Cable and plug assm. (male)
 28012 Cable and socket assm. (female)
 28029 Cabinet with screen
 27904 Screen
 27922 ar. cond. assm.
 27922 Rige knob and plug (male)
 28255 Battery cable and socket
 28254 Battery plug assm. (male)
 29056 Battery socket assm. (male)
 29057 Battery socket assm. (female)
 27754 Dial pointer
 27869 Dial and frame assembly
 27862 Dial frame only
 27811 Dial plate
 27806 Rectification panel assembly
 28212 Dial lamp (2 V., 50 ma.)
 27965 Vol. control (2 V., 50 ma.)
 28007 Tone control switch assm.
 28008 Shaft and blade for the above
 38740 Sensitivity switch assm.
 27628 Shaft and blade for the above
 28046 Knob (tuning and range)
 28047 Knob (vol. and tone)
 27663 Knob (sensitivity) F.1155
 27663 Knob (range) F.1155
 27993 Shipping container
- TRANSFORMERS**
 T1 41080 EC antenna trans.
 T2 41080 EC and 4-12 det. trans.
 T3 41120 L-C, 5, 12-22 det. trans.
 T4 41110 EC and 4-12 osc. trans.
 T5 28165 No. 1 I. F. T.
 T6 28165 No. 2 I. F. T.
 T7 28167 No. 3 I. F. T.
 T8 40710 Audio input trans.
 T9 40710
- RESISTORS**
 R1 30340 1 U, red, blue, 1/2 watt.
 R2 1572 10,000 Ω, maroon, 1/2 watt.
 R3 36430 500 Ω, blue, yellow, 1/2 watt.
 R4 36430 5000 Ω, blue, yellow, 1/2 watt.
 R5 30330 3300 Ω, green, red, 1/2 watt.
 R6 30350 5 U, black, purple, 1/2 watt.
 R7 30370 2 U, green, 1/2 watt.
 R8 30360 1 U, blue, gray, 1/2 watt.
 R9 30360 1 U, red, blue, 1/2 watt.
 R10 30340 1 U, red, blue, 1/2 watt.
 R11 30340 20,000 Ω, black, red, 1/2 watt.
 R12 37530 300 Ω, maroon, blue, 1/2 watt.
 R13 37530 300 Ω, maroon, blue, 1/2 watt.
 R14 37540 425 Ω, blue, yellow, green, 1/2 watt.
 R15 39790 500 Ω, blue, red, green, 1/2 watt.
 R16 30320 10,000 Ω, maroon, 1/2 watt.
 R17 30350 5 U, black, purple, 1/2 watt.
 R18 31970 25 U, red, yellow, 1/2 watt.
 R19 40330 375 Ω, wire wound (for use with 3-V. "A" battery)
 R20 40350 1.03 Ω, wire wound (for use with 3-V. "A" battery)

PARTS FOR TUNING MECHANISM

- 27660 Dial gear
 27276 Pointer arm
 27332 Dial pointer
 27332 Counter shaft gear (large)
 27325 Counter shaft gear (small)
 27325 Gear screw
 27325 Gear pinion gear
 28116 Gear frame
 27351 Screw (5/32" dia.)
 27351 Tuning shaft
 28016 Tuning bracket
 27293 Detention spring
 27298 Shaft spacer
 27297 Bracket holding pin

768-Q SPEAKER No. 43100

- 28448 Cable and plug assembly
 27129 Magnet
 27129 Magnet clamping plate
 9828 No. 5 lock washer
 23318 No. 2 washer
 27138 Clamping block top
 27139 Clamping block bottom
 27141 Adjusting screw, 5/32"
 27142 Cover plate
 27143 Mounting bracket
 27145 Conehead assembly
 27217 Coil
 27217 Mount brackets, pair (978-Q)
 27148 Spring
 27149 Terminal

MODEL 978-Q

- For parts not listed below refer to Model 768-Q.
 28897 Front panel assm.
 27963 Rectification
 28256 Battery cable and plug (male)
 28254 Battery cable and socket (female)
TRIMMERS
 A1 38180 Single trimmer on T1
 A2, 3 39430 Double trimmer on T2
 A4, 5 39430 Double trimmer on T3
 A6 39420 860 KC tracking
 A7 32860 Double trimmer on T6
 A8 32860 Double trimmer on T7
 A9 40610 Single trimmer on T8
 39140 Strip of four trimmers

MODEL 655-Q

- For parts not listed below refer to Model 465-Q.
 27952 Base plate
 28051 Shipping container
 28011 Cable and plug assm. (male)
 28012 Cable and socket assm. (female)
 28029 Cabinet with screen
 27904 Screen
 27922 ar. cond. assm.
 27922 Rige knob and plug (male)
 28255 Battery cable and socket
 28254 Battery plug assm. (male)
 29056 Battery socket assm. (male)
 29057 Battery socket assm. (female)
 27754 Dial pointer
 27869 Dial and frame assembly
 27862 Dial frame only
 27811 Dial plate
 27806 Rectification panel assembly
 28212 Dial lamp (2 V., 50 ma.)
 27965 Vol. control (2 V., 50 ma.)
 28007 Tone control switch assm.
 28008 Shaft and blade for the above
 38740 Sensitivity switch assm.
 27628 Shaft and blade for the above
 28046 Knob (tuning and range)
 28047 Knob (vol. and tone)
 27663 Knob (sensitivity) F.1155
 27663 Knob (range) F.1155
 27993 Shipping container

MODEL 465-Q

- For parts not listed below refer to Model 465-Q.
 27952 Base plate
 28051 Shipping container
 28011 Cable and plug assm. (male)
 28012 Cable and socket assm. (female)
 28029 Cabinet with screen
 27904 Screen
 27922 ar. cond. assm.
 27922 Rige knob and plug (male)
 28255 Battery cable and socket
 28254 Battery plug assm. (male)
 29056 Battery socket assm. (male)
 29057 Battery socket assm. (female)
 27754 Dial pointer
 27869 Dial and frame assembly
 27862 Dial frame only
 27811 Dial plate
 27806 Rectification panel assembly
 28212 Dial lamp (2 V., 50 ma.)
 27965 Vol. control (2 V., 50 ma.)
 28007 Tone control switch assm.
 28008 Shaft and blade for the above
 38740 Sensitivity switch assm.
 27628 Shaft and blade for the above
 28046 Knob (tuning and range)
 28047 Knob (vol. and tone)
 27663 Knob (sensitivity) F.1155
 27663 Knob (range) F.1155
 27993 Shipping container

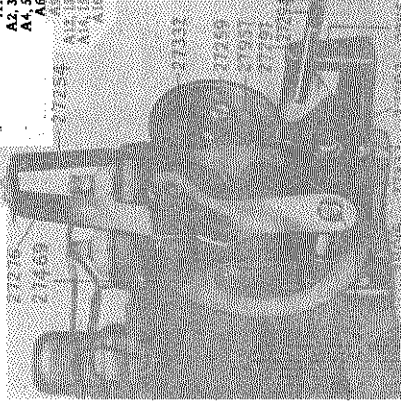
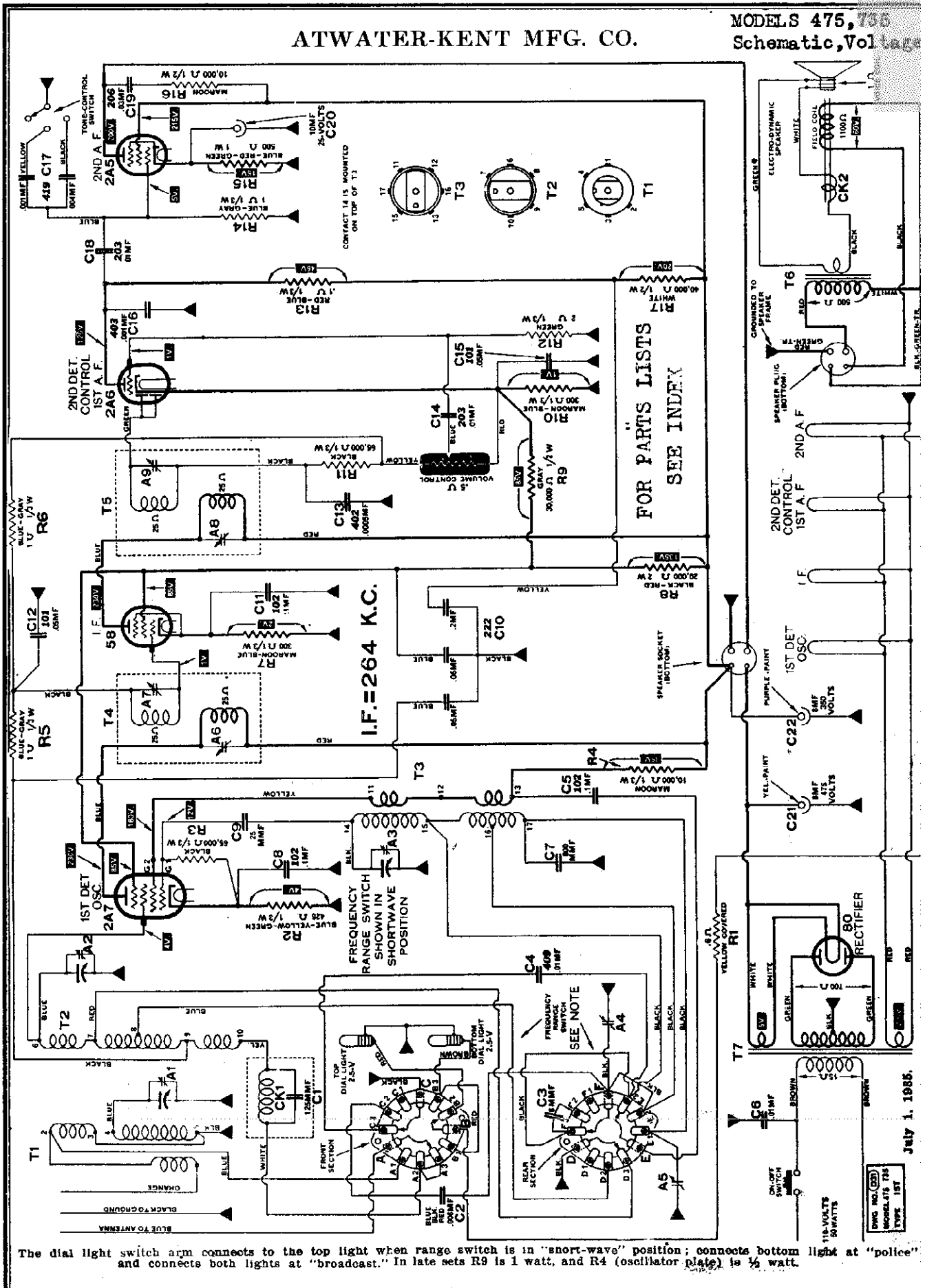


Illustration of parts in dual-speed component tuning mechanism in Model 768Q, etc.
 Ω = ohms.
 U = megohms.

ATWATER-KENT MFG. CO.

MODELS 475, 755
Schematic, Voltage



115-VOLTS
50WATTS

ON-OFF SWITCH

GREEN, NO. (20)

MODEL 475, 755

TYPE 1ST

MODELS 475, 735
Trimmers, Socket
Chassis, Alignment

ATWATER-KENT MFG. CO.

I. F. TRIMMERS.

Connect I. F. test oscillator (264 KC) to I. F. tube by means of regular I. F. coupling unit. Peak A9, A8. Connect I. F. oscillator to 1st-detector tube and peak A7, A6.

DIAL POINTER ADJUSTMENT.

With rotor of variable condenser fully meshed, dial indicator should be at 535 KC.

R. F. TRIMMERS.

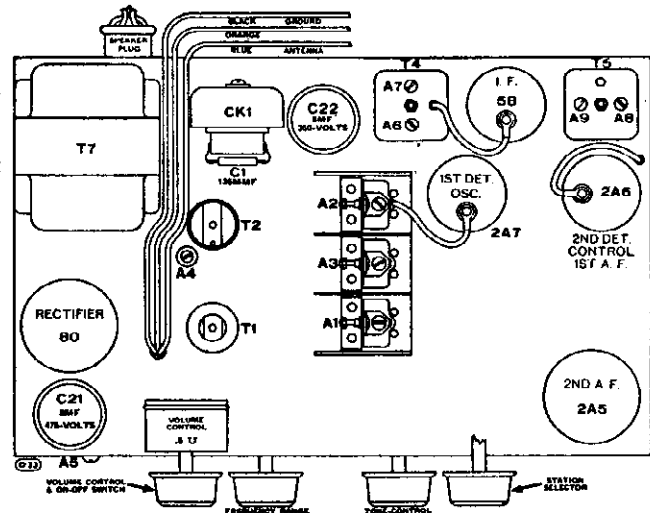
Connect an R. F. oscillator to antenna and ground of set.

Short-wave range. With oscillator and dial at 15 MC, peak A3. Use the first point on the trimmer, as it is screwed in from a loose or minimum-capacity position.

Police range. No trimmers on this range.

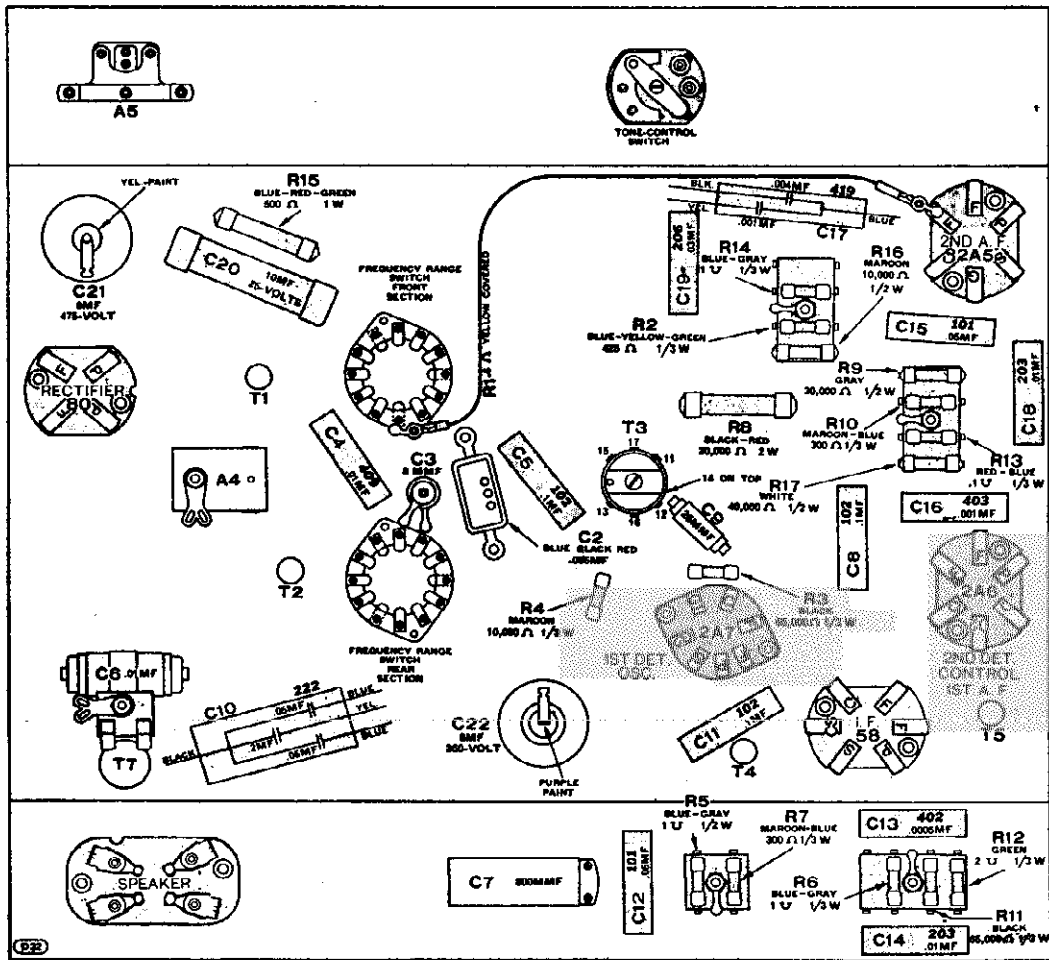
Broadcast range. With oscillator and dial at 1500 KC, peak A4, A2 and A1. With oscillator and dial at 560 KC, peak A5.

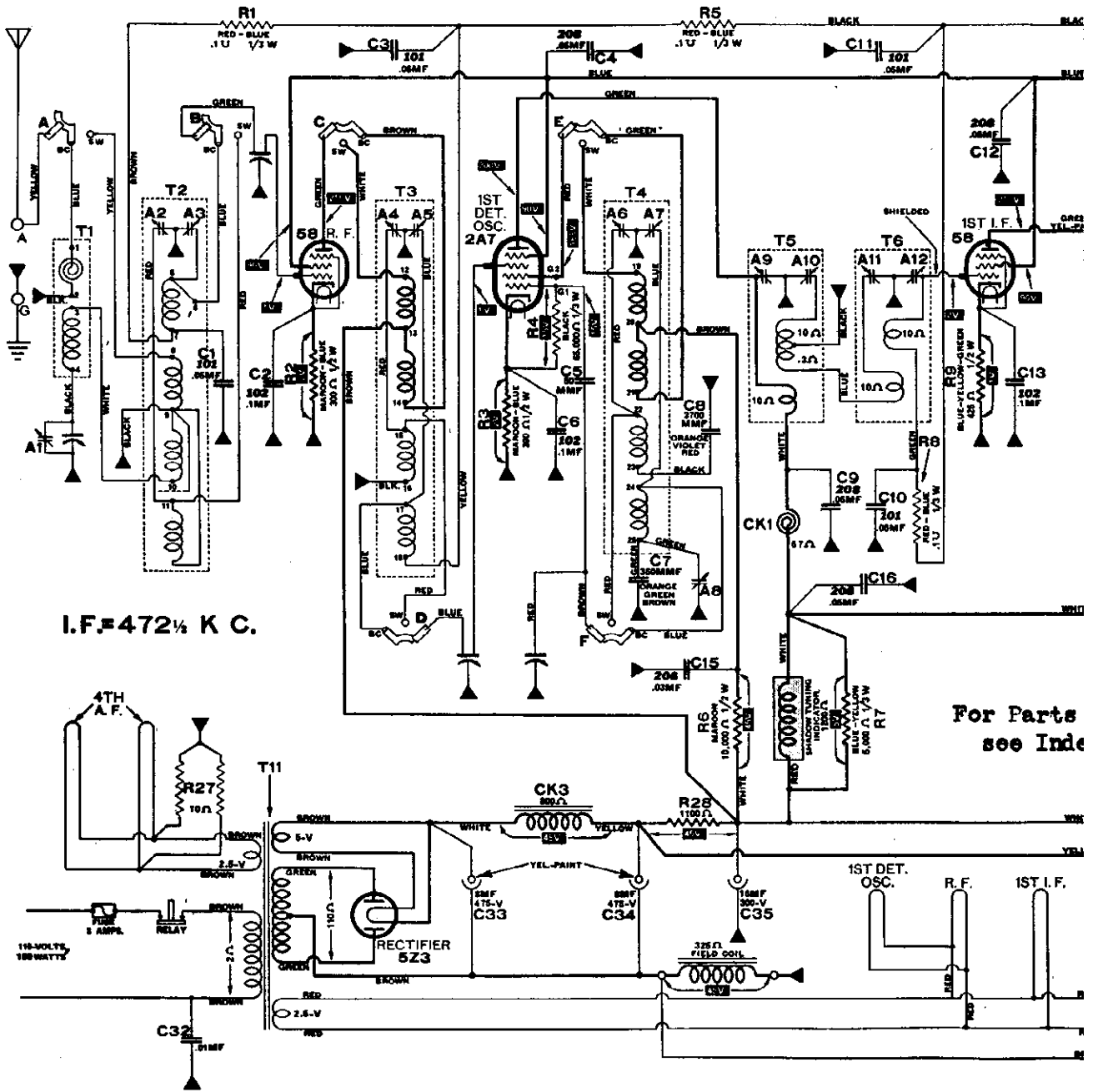
MODELS 475 AND 735



TRIMMERS

- A1—1st-detector, 1500 KC.
- A2—1st-detector, 1500 KC.
- A3—Oscillator, 15 MC.
- A4—Oscillator, 1500 KC.
- A5—Oscillator, 560 KC.
- A6—1st-detector plate, 264 KC.
- A7—I. F. grid, 264 KC.
- A8—I. F. plate, 264 KC.
- A9—2nd-detector, 264 KC.





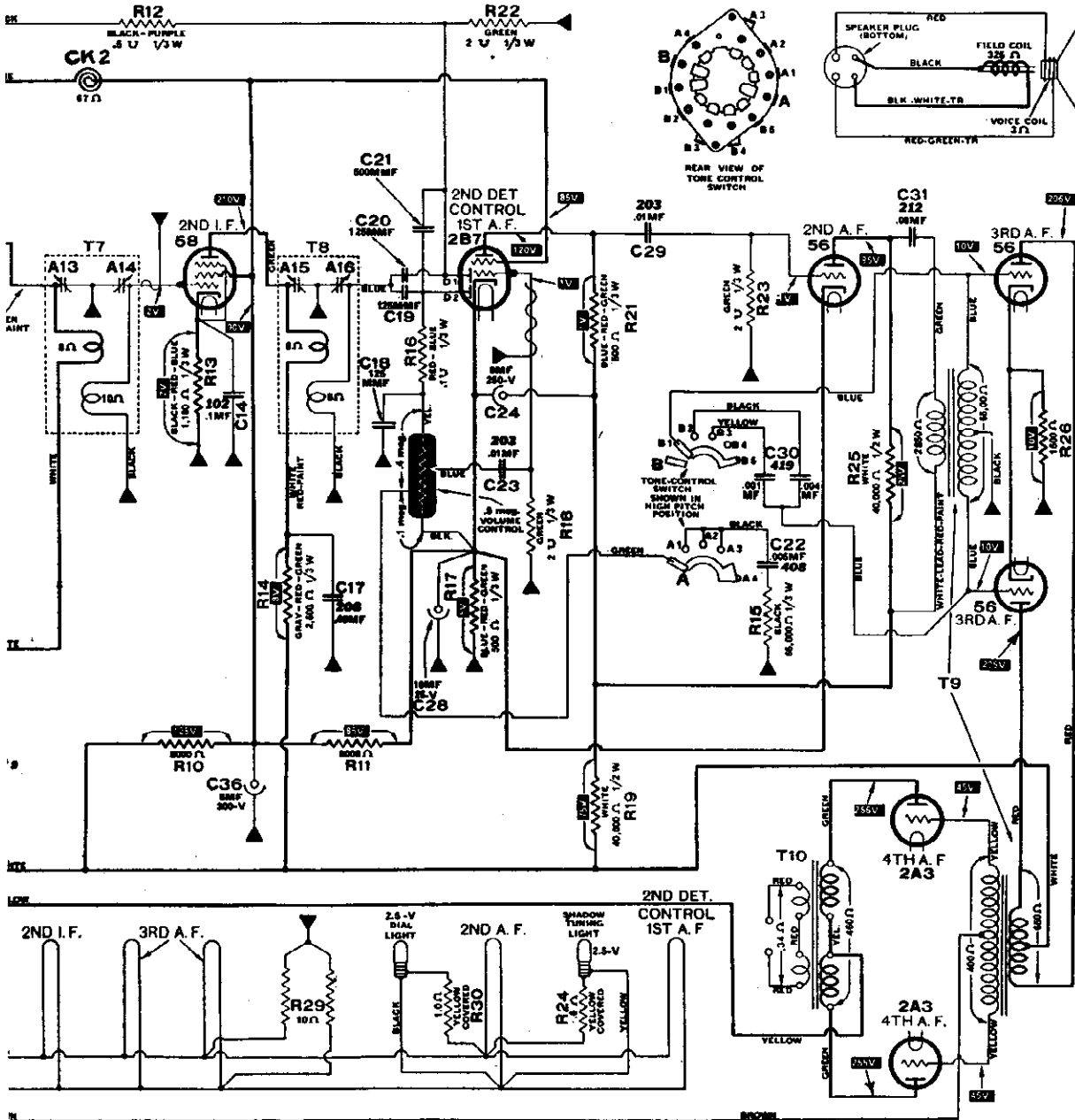
I.F. = 472 1/2 K C.

For Parts see Index

Model 511 has two frequency ranges: the broadcast range (BC) covers 540 to 1600 kilocycles, and the short-wave range (SW) covers 5500 to 15500 kilocycles.

MFG. CO.

MODEL 511
Schematic
Voltage



Nov., 1934

Only the late type audio circuit is shown above. In early sets, the plate circuit of the 2B7 is similar to that used in Model 112.

ATWATER-KENT MFG. CO.

MODEL 511
Tune-O-Matic Dial
Socket, Chassis

SERVICING THE Tune-O-Matic MECHANISM

In addition to the simplicity of design and operation of the TUNE-O-MATIC, the rugged construction and positive adjustments are such that, under normal conditions of operation, it WILL NOT be necessary for the Service Man to make ANY mechanical adjustments on this mechanism, other than that of setting the station selector discs. However should the initial adjustments of any part of the mechanism become changed at any time, it will cause the mechanism to function unsatisfactorily and corrective adjustments will be necessary. Several of the probable sources of trouble in this respect have been tabulated below, with a brief statement of the adjustments required. For additional details in regard to the latter, reference should be made to the respective sections under ADJUSTMENTS.

TROUBLE OBSERVED

1. Reversal switch control cam does not operate reversing switch.
2. Motor does not drive mechanism through complete operating cycle.
3. Mechanism runs continually.
4. Difficulty in manual tuning.

ADJUSTMENT REQUIRED

1. Loosen reversal switch mounting screws and move bakelite switch base to the right or left as required. (See Adjustments—Sec. A.)
2. Check bearing adjustments. Check large and small pulley adjustments. Check for continuous contact between selector disc and contact finger in question.
3. Reversal switch does not trip or does not make contact after it does trip. (See also, instructions—clock assembly adjustments.)
4. Loosen setscrew of reversal switch control cam on condenser shaft and relieve pressure of clutch-spring on clutch-disc gear sufficiently to allow tuning knob to turn easily during manual operation, but not enough to cause it to slip during automatic operation.

MECHANICAL NOISE DURING OPERATION OF MECHANISM

CAUSED BY

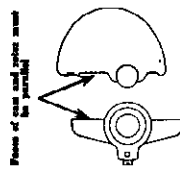
1. Dry worm and gear.
2. "Squeak" in motor bearings.
3. Improper mesh of worm and gear.
4. Worm shaft loose in bearings.
5. Solenoid plunger hangar wire does not hold plunger snugly.
6. Solenoid plunger and mounting arm vibrate.
7. felt washer omitted between top of plunger and plunger mounting arm.
8. Pointer control gear teeth in contact with metal of pointer control pinion instead of bakelite section.
9. Noise from selector disc drag cover.

REMEDY

1. Use graphite sparingly.
2. ONE DROP of 3 in 1 oil.
3. See that gear is centered in worm, and meshes about half the depth of the teeth.
4. See Adjustments Sec. B.
5. Pinch ends of hangar wire with pliers.
6. Set spacing between plunger and top of solenoid to 1/2" by adjusting.
7. Replace with Part No. 27767.
8. Adjust pointer control gear on condenser shaft.
9. Tighten mounting screws and make sure that cover does not contact clutch-disc gear.

ADJUSTMENTS

SEC. A. Failure of reversal switch control cam to operate reversal switch in either maximum positions may be corrected by adjusting solenoid switch position as previously mentioned. If further adjustment is necessary it should be made as follows: Checking the reversal switch by manual operation of the large pointer control gear—in position of minimum capacity of the gang condenser, the pointer control gear is adjusted on the condenser shaft so that the stop arm attached to the gear makes contact with the pointer control pinion gear. Take notice, however, that the reversal switch is tripped to the OFF position by reversal switch control cam, when the stop is within approximately 1/8" of the pointer control pinion gear. In the position of maximum capacity of the gang condenser, it may be necessary to move the reversal switch control cam slightly in a clockwise direction (when facing the rear of the mechanism) on the condenser shaft, in order that the reversal switch will be tripped to the ON position when the gang condenser is within 1/8" of complete mesh. It should be noted that when the proper adjustment has been made, the contact faces of the reversal switch cam are parallel to the flat edge of the condenser rotor.



Position of cam and rotor when

SEC. B. Improper adjustment of large and small pulleys. The large pulley is adjusted first, so that when it makes contact with the lower portion of the motor driving nib, the space between the solenoid plunger and the top of the solenoid is approximately one-half inch. The small pulley is then adjusted so that there is about 1/8" space between large pulley and motor driving-nib when the driving nib is in contact with the small pulley. This adjustment should place the small pulley in a position of positive contact with the motor driving-nib when the solenoid is not energized. If it does not, the mechanism will fail to return from the position of maximum mesh of the gang condenser.

Improper adjustment of worm shaft bearings will cause heating and partial or complete "freezing" of the shaft and bearing. To adjust the worm gear drive shaft bearings, the bearing adjusting screw is turned clockwise until a slight movement of the small pulley is observed, indicating contact

of the shaft and the bearing. The adjusting screw is then given 1/4 additional turn in the same direction and the lock nut tightened.

RELAY

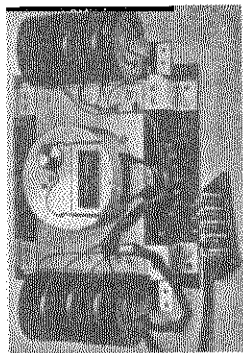
No trouble should be experienced with the OFF and ON relay used in conjunction with the TUNE-O-MATIC mechanism. Any tendency for contacts to stick may be removed by the use of emery cloth. In cases where buzzing of the relay occurs, it should be noted whether the armature seats properly.

STATION SELECTOR DISCS

Tension collar at rear of station discs may be loosened if station selector discs are difficult to set. However sufficient pressure should be retained to keep the discs in the position which they have been set, while the mechanism is in operation.

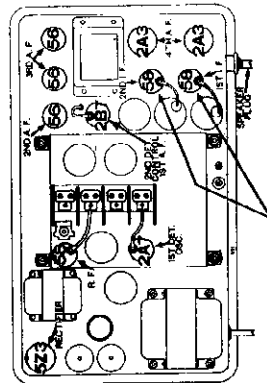
SERVICING TUNE-O-MATIC CLOCK ASSEMBLY

The TUNE-O-MATIC clock assembly is illustrated at right. No attempt should be made to make adjustments on any part of the clock assembly unit other than pointed out below. Where major adjustments are required, the complete unit must be removed from the cabinet and returned to the distributor.

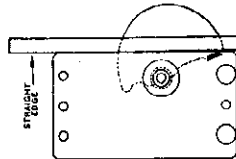


In cases where the contact arm, on the rear of the jack panel, jumps a noticeable period of time before or after the MINUTE hand reaches each successive 15 minute mark on the clock face, it will be necessary to set both the hour hand and the minute hand on 12, when the contact arm is on the 12 o'clock jack. To make this adjustment the clock crystal should be carefully removed, by releasing the crystal retaining spring (use narrow blade screwdriver), to allow access to the clock hands. Turn the knurled clock hand adjusting knob on the rear of the clock until the hand is almost at 12, then allow the clock to run on its own power. The instant the contact arm jumps to the 12 o'clock jack see that both the hour and the minute hand are within either direction manually to the 12 o'clock position. After the hands have been adjusted as indicated above, the relation of the minute hand and the time the contact arm jumps on the clock face in a like manner, and if found satisfactory, the clock crystal should be replaced and the retaining spring adjusted.

It may be well to note that if any selector cord tip, after being released from a time selector jack, should be come lodged against a selector cord tip of another station, the TUNE-O-MATIC mechanism will operate continuously until the cord tip is dislodged from its contact with the cord tip in the jack. The same action will occur if the contact arm should lodge on two jack contacts.



SPECIAL ALUMINUM SHIELDS ARE PLACED OVER THESE TWO TUBES
Top View, Model 511



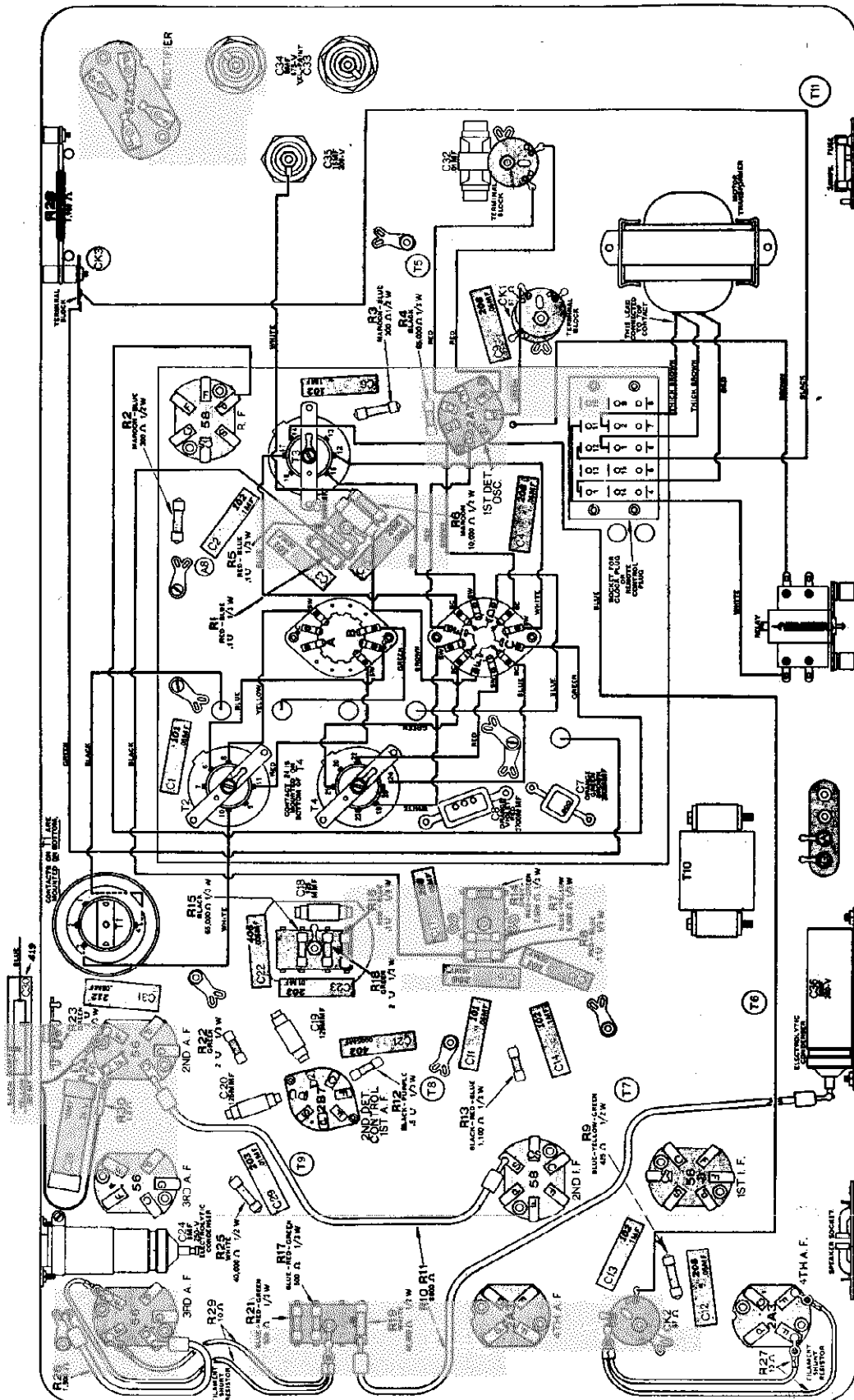
This illustration shows the correct position of the variable condenser rotor. The rotor should be held firmly against the front mounting plate of the variable condenser and the rotor is turned to the spacing bar (shown as a small black oblong) in the mounting plate. The rotor should be held against the spacing bar with a screwdriver. The rotor should be 1/4" thick, 1/2" wide, and 6" long. The 1/4" side is held against the mounting plate.

See section on "Dial Pointer Adjust-ment"

MODEL 511 (Late)
Chassis Wiring

ATWATER-KENT MFG. CO.

BOTTOM VIEW MODEL 511 (Late Type)



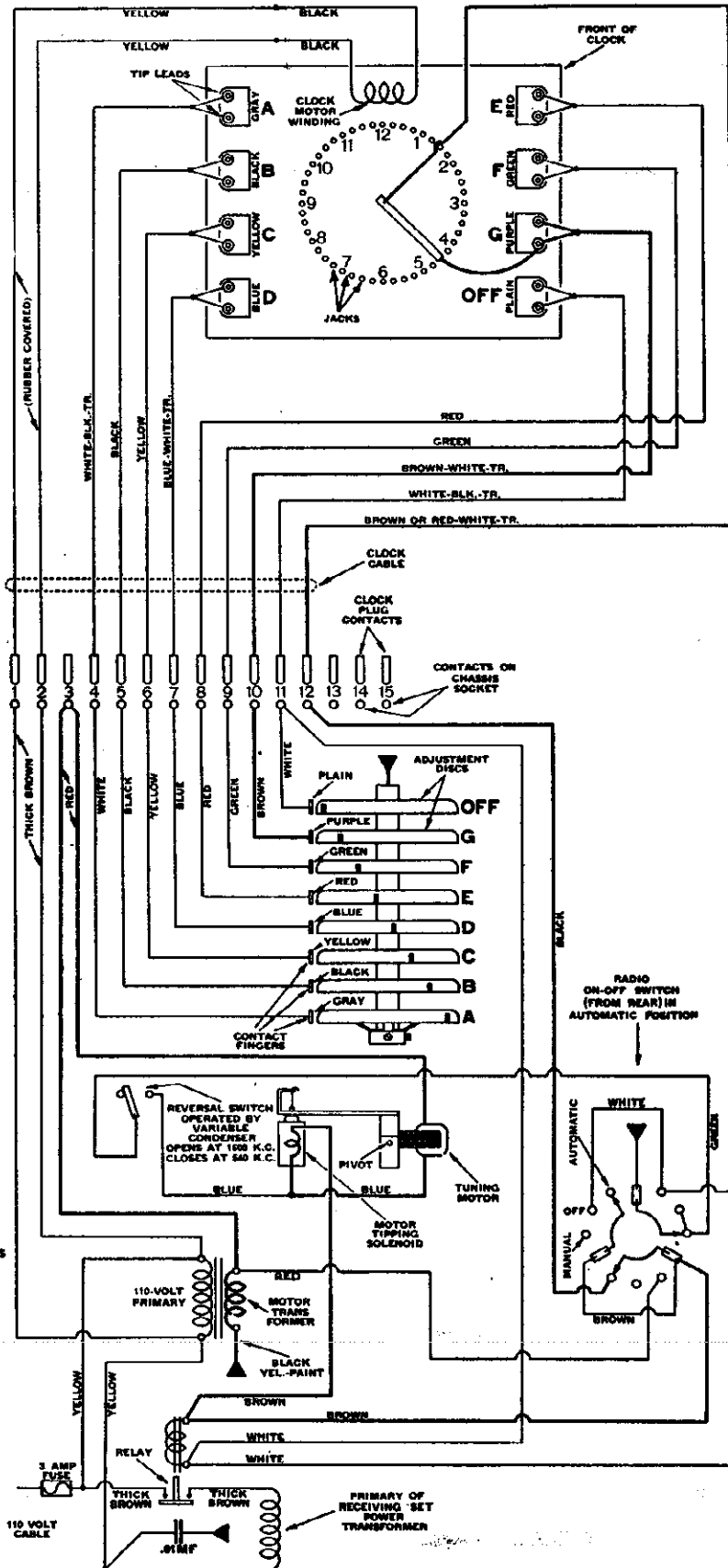
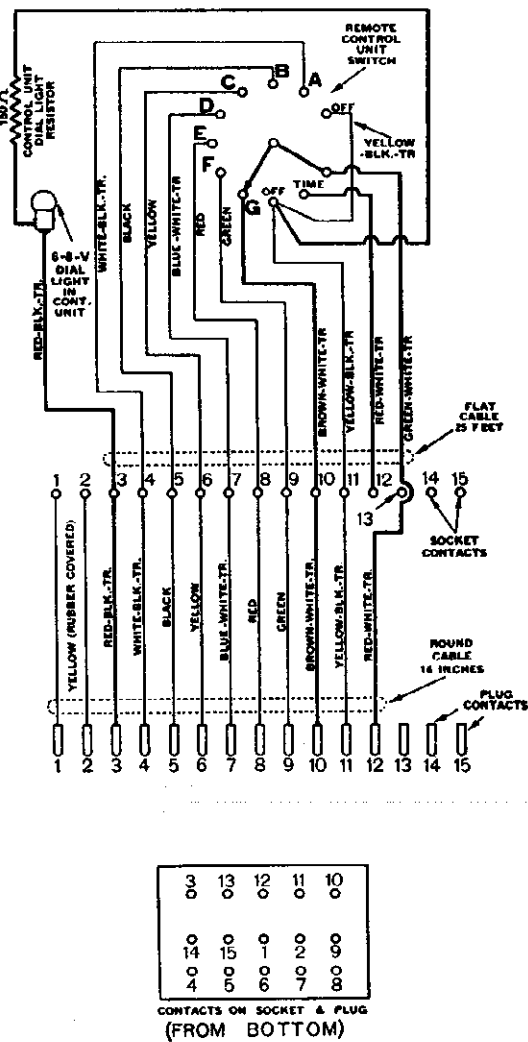
This illustration shows the connections from the top base to the main chassis assembly.

ATWATER-KENT MFG. CO. MODEL 511 Automatic Tuning, Clock, Control Units Schematic

CIRCUIT OF AUTOMATIC TUNING MECHANISM, CLOCK ASSEMBLY, AND REMOTE CONTROL UNIT.

When using Model 511 without remote control, the cable from the clock assembly is plugged into the chassis socket.

The remote control is added to Model 511 by removing the clock-assembly plug from the chassis socket and inserting it in the socket which is attached to the remote control. The plug of the remote control is inserted in the socket on the chassis.

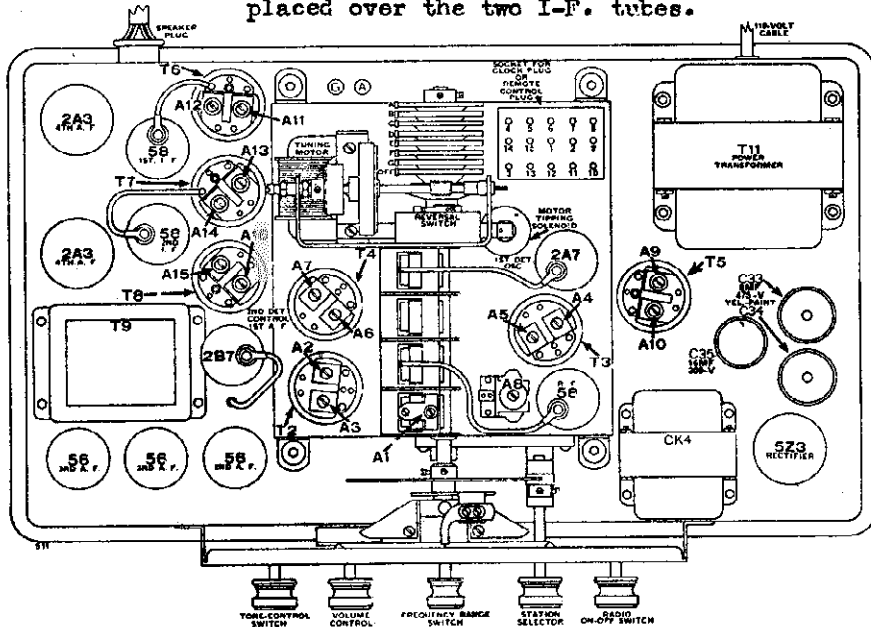


MODEL 511
Trimmers, Socket,
Alignment Data

ATWATER-KENT MFG. CO.

Special aluminum shields are placed over the two I-F. tubes.

TOP VIEW MODEL 511



	5.4 to 15.5 M.C.	540 to 1600 K.C.
R. F.	A2	A1 & A3
1st-Detector ...	A4	A5
Oscillator	A6	A7
Tracking	None	A8
I. F. Trimmers are A9 to A16 inclusive		

DIAL POINTER ADJUSTMENT.

If the dial gear and indicator have not been tampered with, leave them alone; but if they have been changed in any way, reset as follows:

1. Loosen the two set screws which hold pointer gear on condenser shaft.
2. Turn condenser to minimum.
3. See illustration at bottom of page 13. Place straight-edge gauge in vertical position with the long flat face against the front mounting plate of the variable condenser as shown. Turn the condenser until the front edge of the rotor spacing bar just touches the straight edge. Hold the condenser in this position and move the pointer arm so the pointer is at 1575 KC, after which tighten the set screws to hold the dial gear securely.
4. Loosen the screws which hold the pointer to the pointer arm, and adjust the pointer so that when the condenser is completely meshed, the pointer is at 530 KC.

Recheck at 1575 KC and repeat procedure 3 and 4 if necessary.

EQUIPMENT.

1. **OSCILLATOR.** The oscillator should extend from the lowest I. F. frequency (125 KC in Atwater Kent sets) to at least 18 MC. The oscillator should have a good attenuator and should be well shielded. If the oscillator is not well shielded, it may be difficult to peak the pre-selector trimmers on some models, owing to pick-up by the 1st-detector grid circuit. In general, it is advisable to connect an .00025MFD fixed condenser in series with the oscillator pick-up lead at the antenna terminal of the set.
2. **OUTPUT METER.** Use a sensitive output meter and keep the radio volume control turned on full volume. This is necessary to minimize the effect of the automatic-volume-control action of the set which would otherwise prevent sharp peaking of the trimmers.
3. **BALANCING UNIT.** Build or purchase from your distributor two of the Type "A" balancing units and one of the I. F. coupling units shown on right. These are required for correct adjustment of Atwater Kent super-heterodynes. The coupling unit is placed on the grid cap of the 1st-detector tube, and the lead that normally connects to the grid cap is attached to the end of the maroon resistor as shown.
4. Use a non-metallic screw driver for adjustment of the trimmers.

I. F. TRIMMERS.

Connect an IF oscillator to the 1st-detector tube by means of the IF coupling unit shown in FIG. 1. Adjust the IF oscillator to 472½ K.C. Connect a sensitive output meter to the set. Use the weakest possible oscillator signal that will give a reading on the output meter with the radio volume control full on. Put tone control in 2nd position from right.

- Put unit A on A15 and peak A16.
 - Put unit A on A16 and peak A15.
 - Put unit A on A13 and peak A14.
 - Put unit A on A14 and peak A13.
 - Put one unit A on A11 and one on A 9. Peak A12 and A10.
 - Put one unit A on A12 and one on A10. Peak A11 and A 9.
- In case of instability while adjusting A15 and A16, place an extra balancing unit A across A12.
- Remove the I. F. coupling unit and the balancing unit and seal the trimmers.

R. F. TRIMMERS.

Connect an RF oscillator to the antenna and ground terminals of the set. Use the weakest possible oscillator signal to give a reading on the output meter. Loosen the trimmer screws for the range or ranges that are to be re-adjusted.

5.4 to 15.5 MC range. Tune test oscillator to 15 MC. Turn oscillator trimmer A6 "in", stopping at the peak of position where the signal is first heard as the trimmer is turned in. Then tune the set to 14.06 MC and note whether the oscillator signal is present at this frequency and considerably weaker than at 15 MC. If so, the oscillator trimmer adjustment is correct and the R.F. trimmers A2 and A4 should be peaked at 15 MC.

Broadcast range. Tune test oscillator and set to 1500 KC. Turn trimmer A7 "in" until oscillator signal is heard and peaked. Peak R.F. trimmers A1, A3, and A5. Tune test oscillator and set to 560KC. Peak A8. Go back and forth between A7 at 1500 and A8 at 560 until both of these frequencies come in at the correct points on the dial.

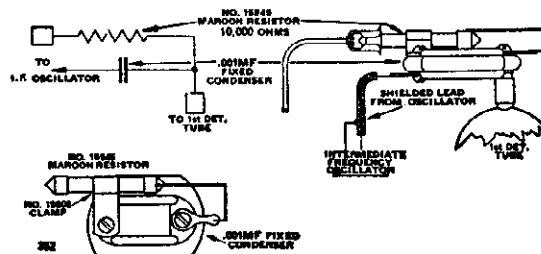


Fig. 1. I. F. Coupling unit, Part No. 42590

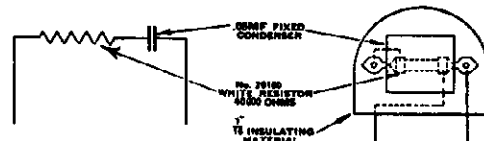
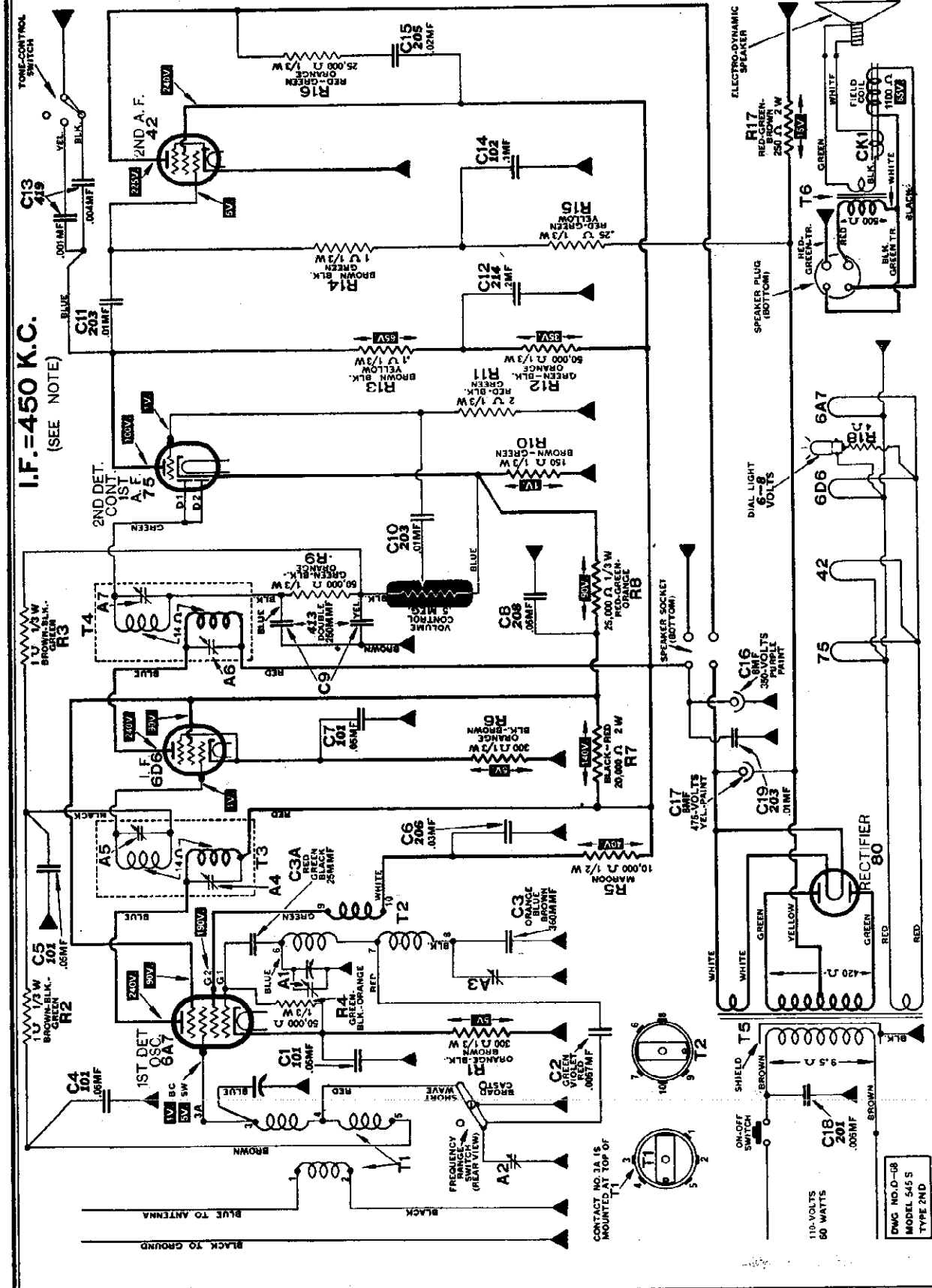


Fig. 2. Balancing unit "A," Part No. 42610

ATWATER-KENT MFG. CO.

MODEL 545 Schematic, Voltage



I.F. = 450 K.C. (SEE NOTE)

The I. F. in some Model 545 sets is 472½ KC and a label to this effect is attached to the rear of the chassis. The I. F. transformers and trimmers, etc., are exactly the same for either 450 or 472½ KC. CHANGES. Early Model 545 has 2.5-volt tubes and the circuit is similar to that shown above. Late sets have .01 MF line bypass; electrolytic C16

DWG. NO. D-18 MODEL 545 S TYPE 2ND

MODEL 545
Trimmers, Socket,
Chassis, Alignment

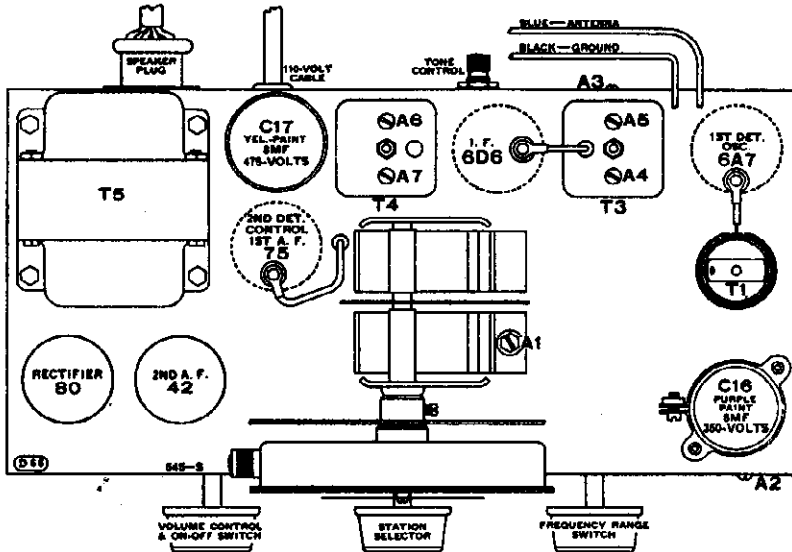
ATWATER-KENT MFG. CO.

ADJUSTING TRIMMERS

I. F. Connect I. F. test oscillator (450* KC) to I. F. tube by means of regular I. F. coupling unit. Peak A7 and A6. Connect coupling unit to 1st-detector and peak A5 and A4.

DIAL. With rotor of variable condenser fully meshed, dial indicator should be at 540 KC.

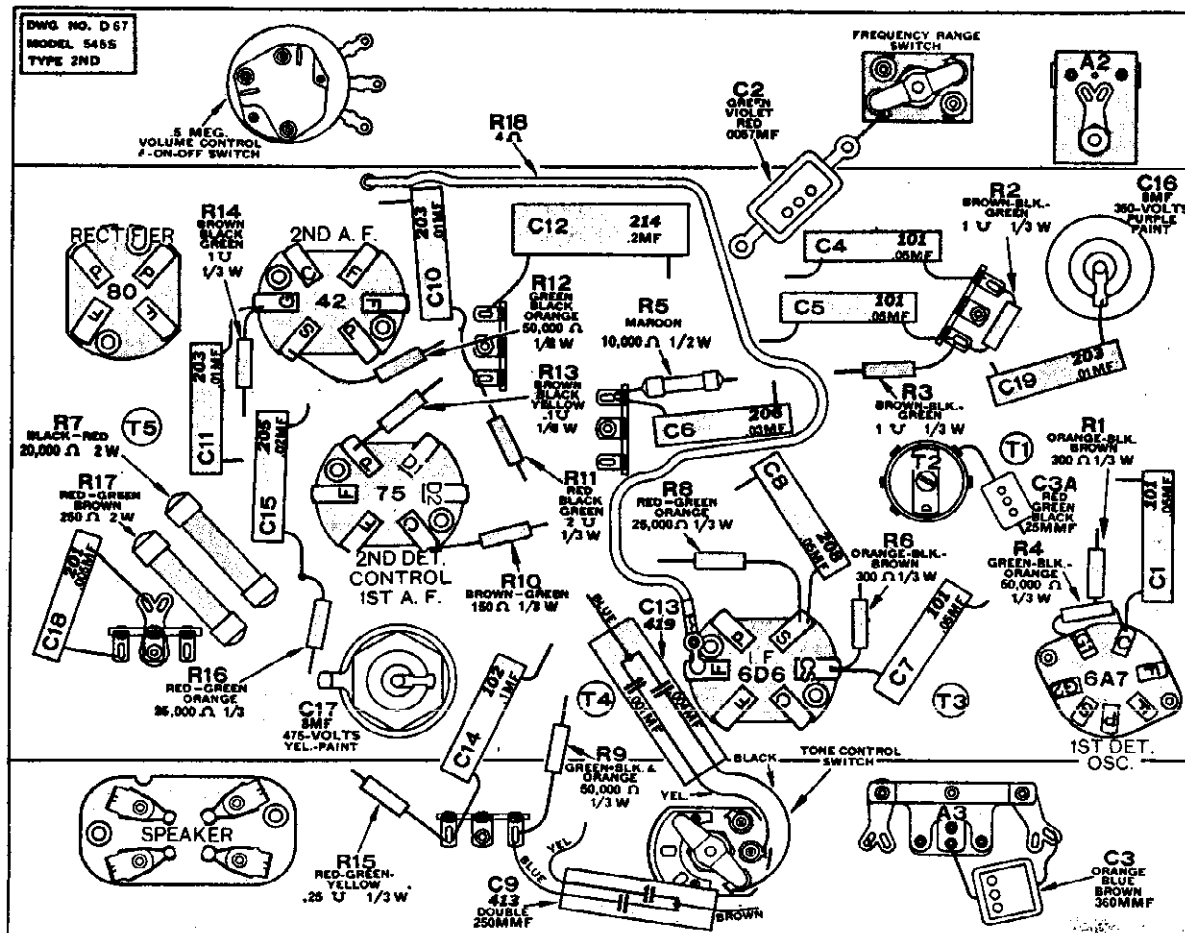
R. F. Connect a 6 MC oscillator to antenna and ground. Peak A1. With oscillator and dial at 1700 KC, peak A2. With oscillator and dial at 540 KC, peak A3.



Short-Wave Range Broadcast Range

- 1st Detector
 - Oscillator A1 A2
 - Tracking A3
- The I. F. trimmers are A4 to A7, inclusive.

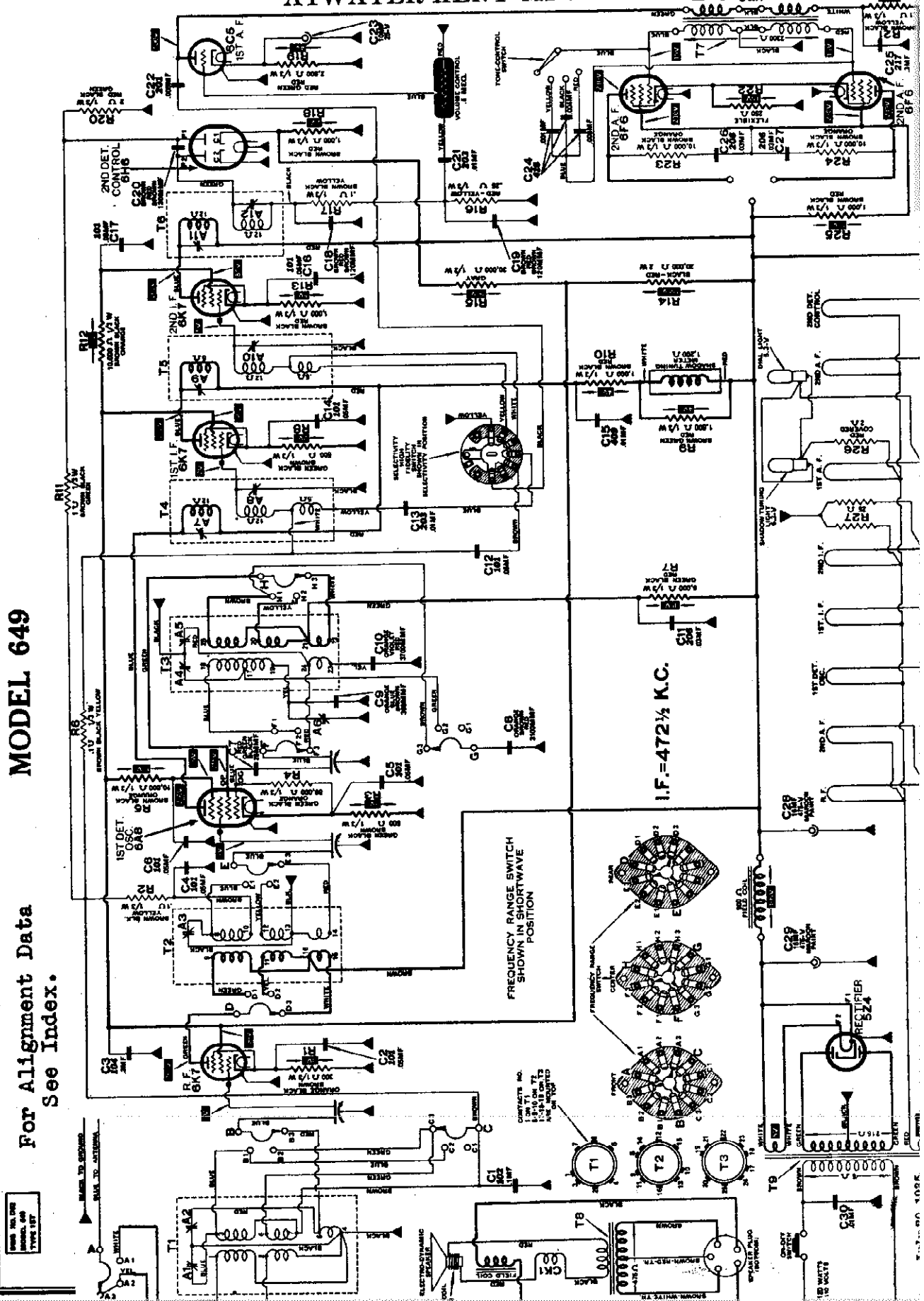
*In some Model 545 sets, the I. F. is 472½ KC and a label to this effect is attached to rear of chassis.



Schematic, Voltage

ATWATER-KENT MFG. CO.

MODEL 649 (Early)



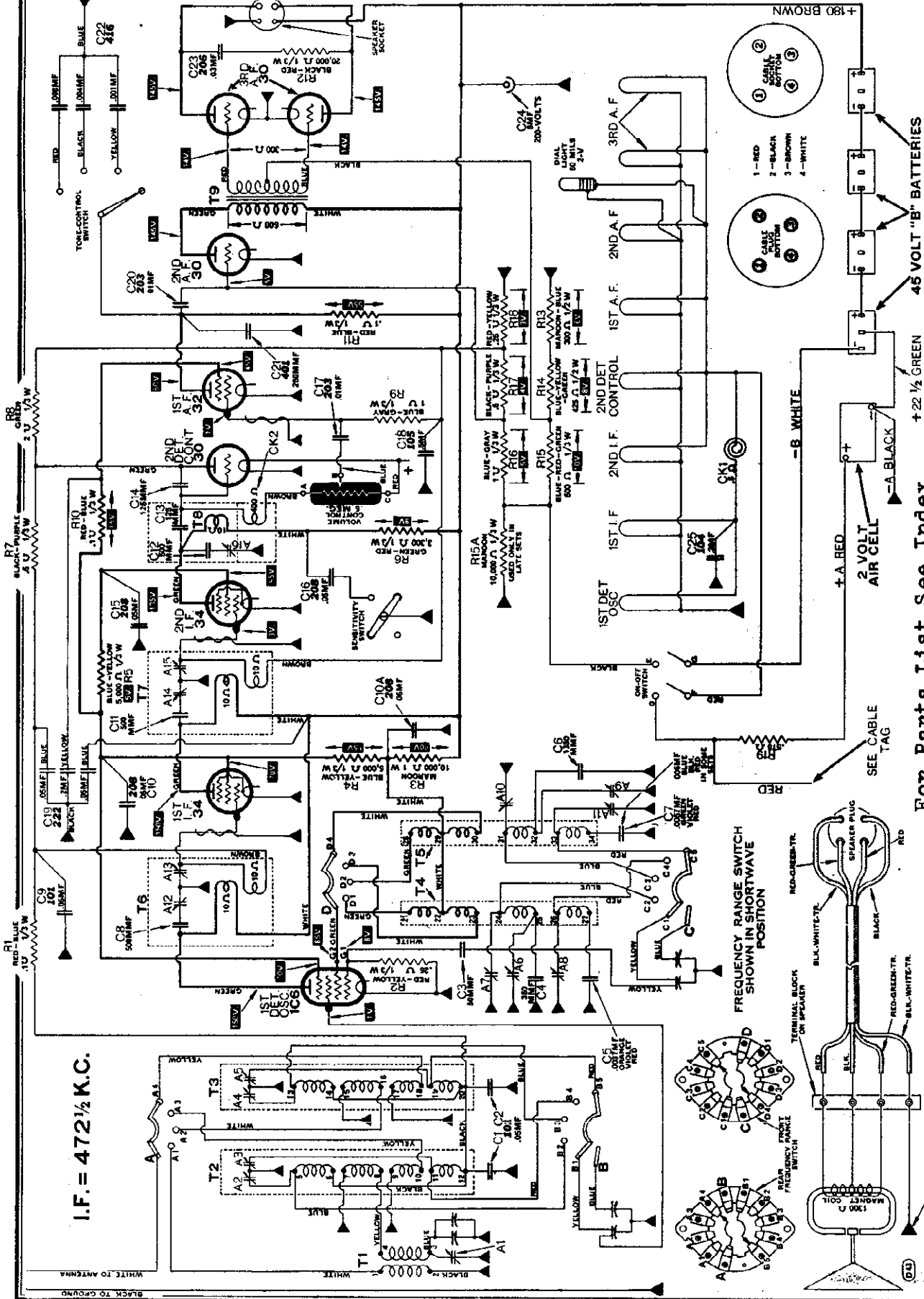
MODEL 649

For Alignment Data See Index.

MODELS 768Q, 978Q

ATWATER-KENT MFG. CO.

Schematic, Voltage



I.F. = 472½ K.C.

For Parts List See Index

An extra tracking condenser (No. 25837, 1100 MMF, brown-brown-red) is connected across C5 in some models.

MODELS 768Q and 978Q

March, 1935.

ATWATER-KENT MFG. CO.

MODELS 768Q, 978Q
Chassis
Alignment

MODELS 768Q and 978Q

I. F. TRIMMERS.

Connect an I. F. test oscillator to the 1st-detector tube by means of the standard I. F. coupling unit described in the January, 1935, supplement. Adjust the test oscillator to 472½ KC. Connect a sensitive output meter to the set. Use the weakest oscillator signal that will give a reading on the output meter with the radio volume control on full.

Peak A16. Then peak A15, 14, 13, and 12, using a 40000-ohm balancing unit alternately in the usual manner. Remove the coupling unit and seal the I. F. trimmers.

R. F. TRIMMERS.

12 to 22.5 MC range. Oscillator at 18 MC, dial pointer at 18 MC, peak trimmers A11, and A5.

4.6 to 12.2 MC range. Oscillator and pointer at 12 MC, peak trimmers A8, and A3.

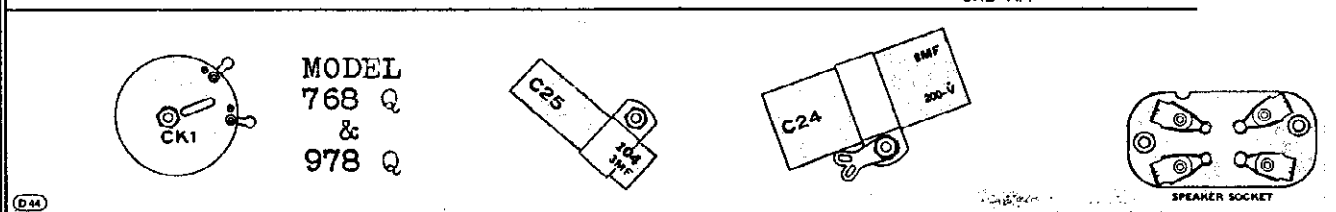
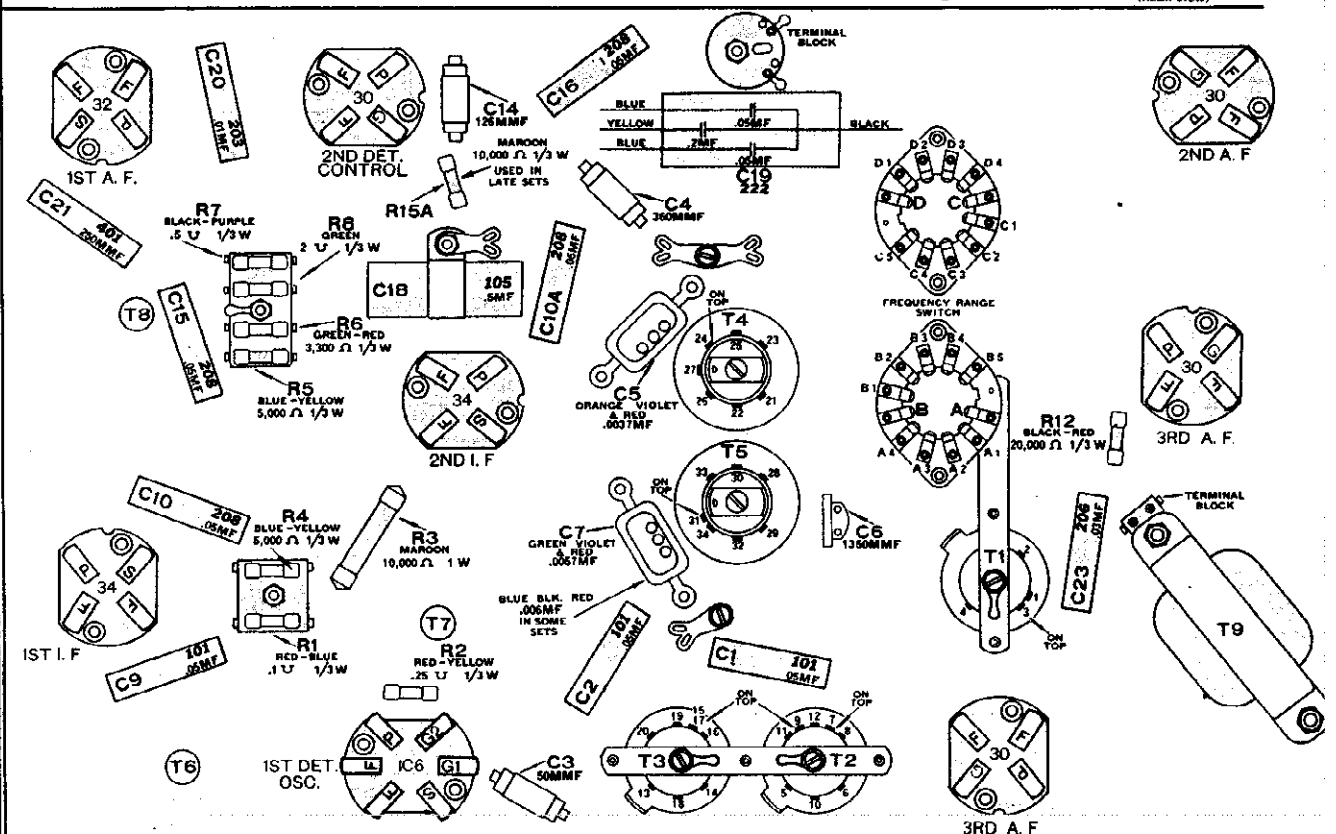
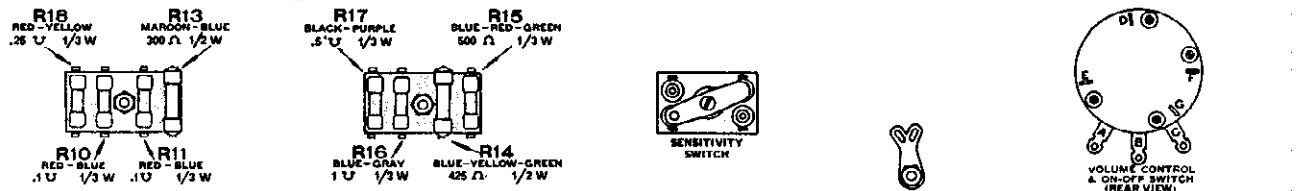
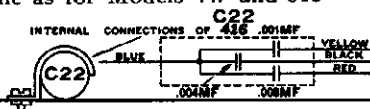
1.6 to 4.6 MC range. Oscillator and pointer at 4 MC, peak trimmers A10, and A4.

Tune oscillator to 1.7 with pointer at 1.7, peak A9.

Broadcast range. Oscillator at 1500 KC, and pointer at 1500 KC, peak A7, A1, and A2. With oscillator and dial pointer at 560, peak A6.

DIAL POINTER ADJUSTMENT.

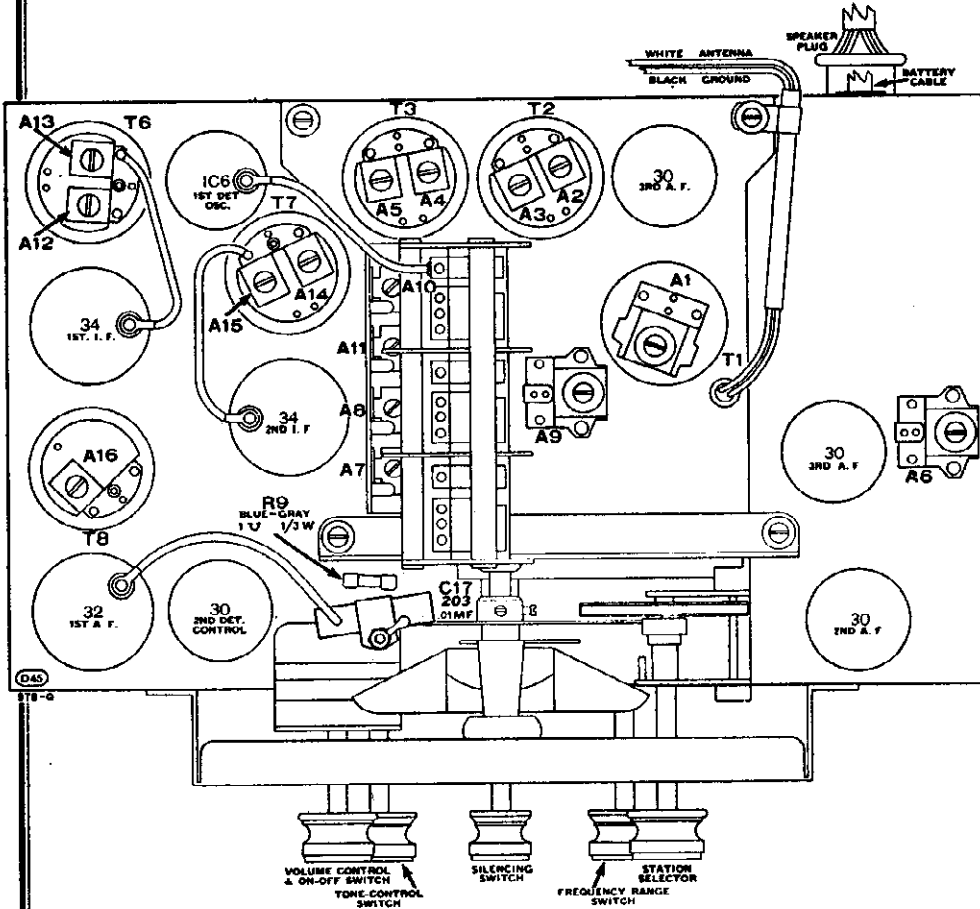
This procedure is the same as for Models 447 and 318



MODELS 768Q, 978Q
 Socket, Trimmers
 Battery Connections

ATWATER-KENT MFG. CO.

TOP VIEW, MODELS 768Q and 978Q



TRIMMERS ON MODELS 768Q and 978Q

(See page 1 for trimmer adjustment data.)

I. F. TRIMMERS

I. F. (472½ KC)....A12 to A16

12 to 22.5 MC RANGE

1st-Det. (18 MC).....A5
 Oscillator (18 MC).....A11

4.6 to 12.2 MC RANGE

1st-Det. (12 MC).....A3
 Oscillator (12 MC).....A8

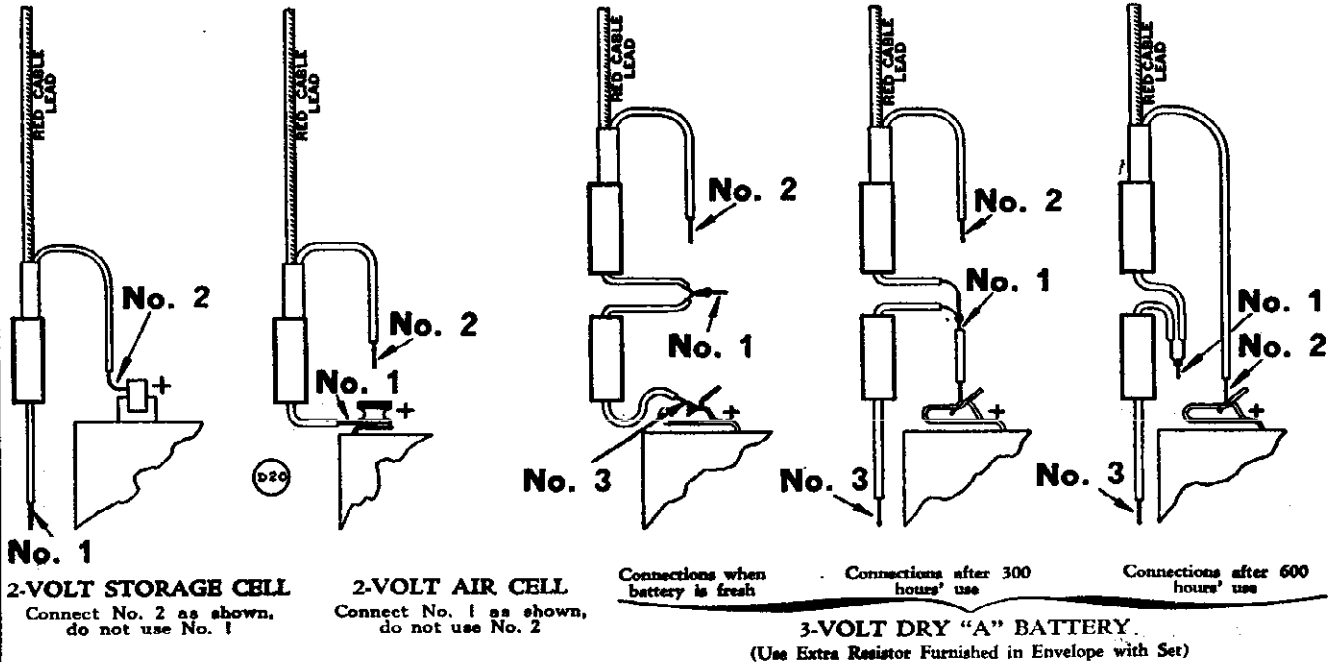
1.6 to 4.6 MC RANGE

1st-Det. (4 MC).....A4
 Oscillator (4 MC).....A10
 Tracking (1.7 MC).....A9

540 to 1600 KC RANGE

Antenna (1500 KC).....A1
 1st-Det. (1500 KC).....A2
 Oscillator (1500 KC).....A7
 Tracking (560 KC).....A6

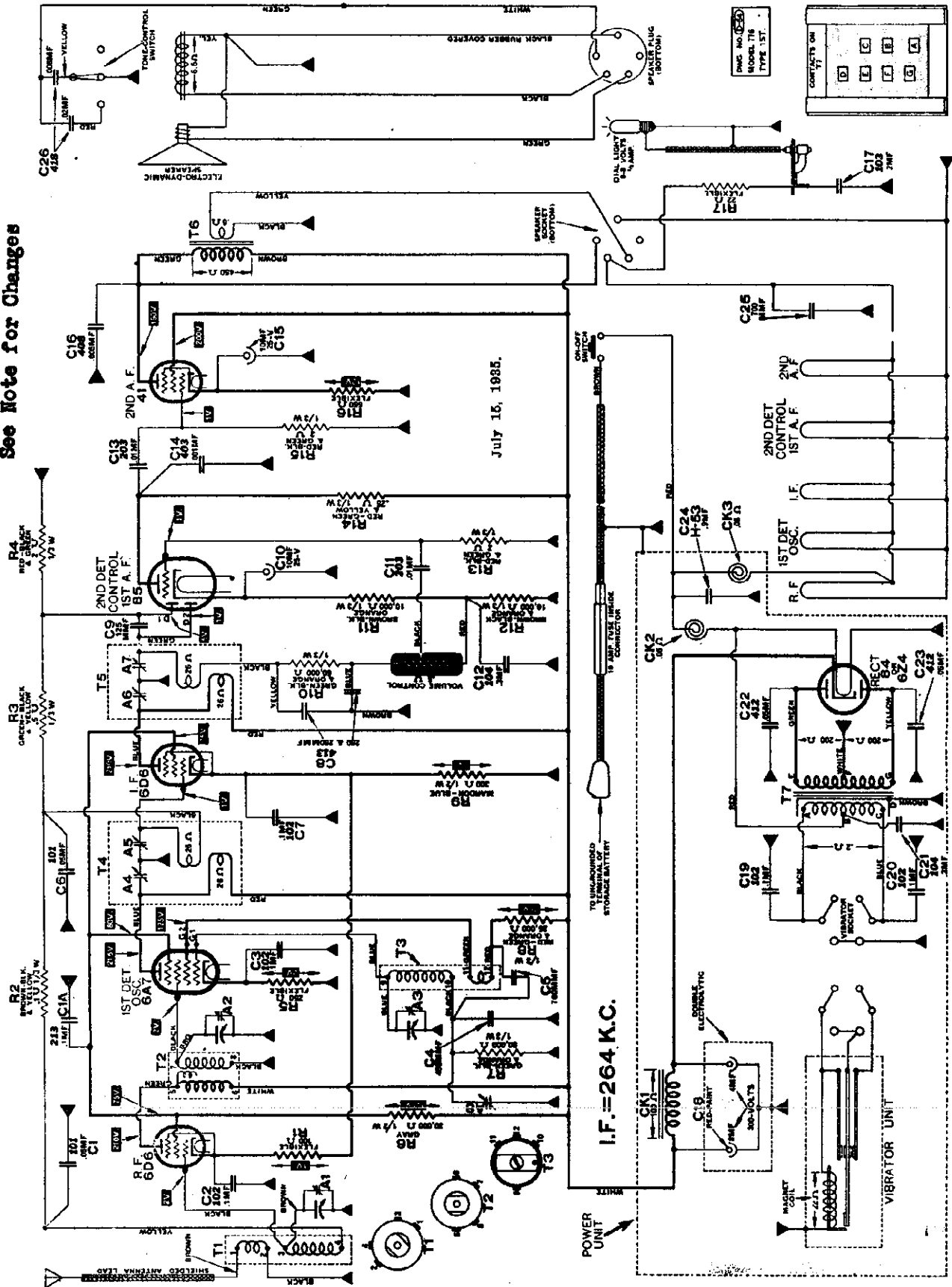
CONNECTIONS FOR DIFFERENT TYPES OF "A" BATTERIES



ATWATER-KENT MFG. CO.

MODEL 776 Schematic, Voltage

See Note for Changes

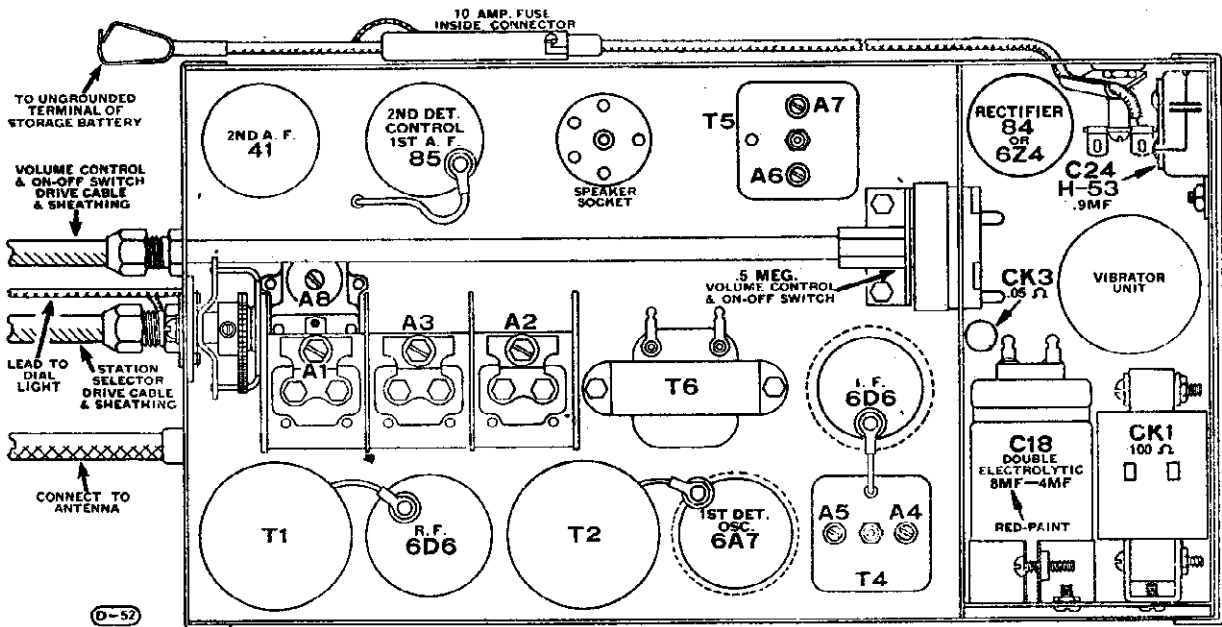


July 15, 1935.

I.F. = 264 K.C.

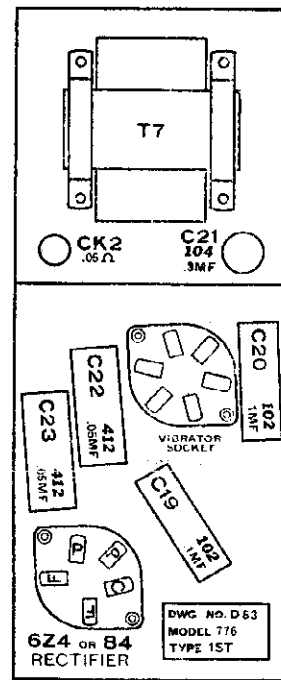
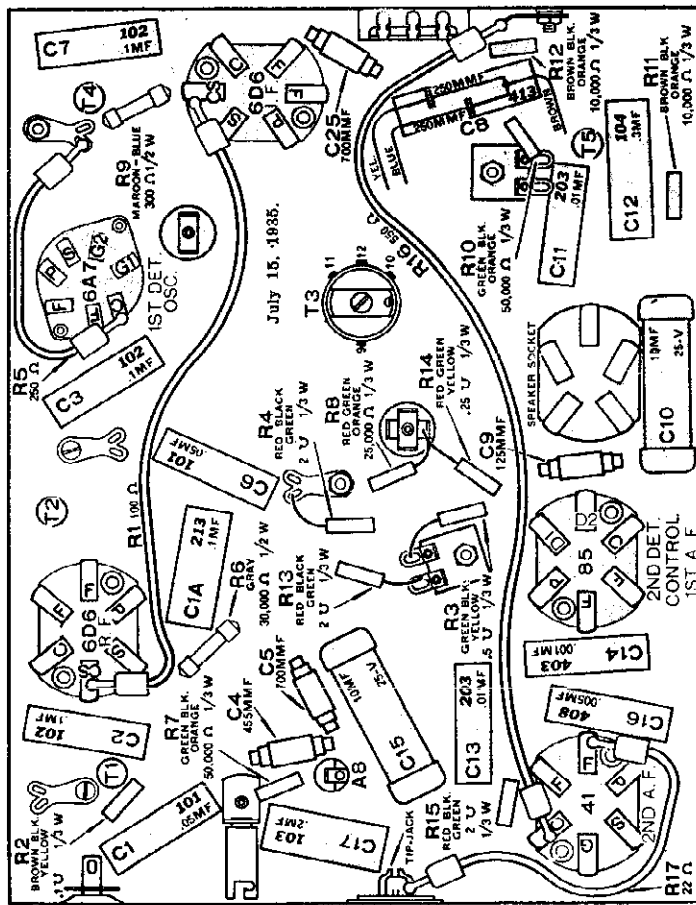
MODEL 776
Socket, Trimmers
Chassis
Changes

ATWATER-KENT MFG. CO.



In late sets these two resistors are each 10,000 ohms and there is approximately 6 volts across each. (At the same time this change was made, the 1st-A. F. plate resistor, R14 was changed from .1 meg. to .25 meg. With the .1 meg. resistor, the drop across it is 55 volts, and the plate voltage is 125. With the .25 meg. resistor, the plate voltage is lower. All voltages are measured with the 250-volt scale of a 1,000-ohm-per-volt voltmeter.)

The voltage across R11 regulates the "squeech" or minimum-signal level at which the 2nd-detector begins to function. The combined voltage across R11 and R12 acts as the bias on the AVC and the 1st-A. F. grid. Early Model 776 sets do not have tone control, and the "A" filter circuit is slightly different from that shown. C17 in the lower right-hand part of the diagram is .2 MF.



ATWATER-KENT MFG. CO.

PARTS LIST FOR MODEL 776

For part numbers of tubular resistors and condensers, refer to lists in previous supplements.

29296	Cabinet body, complete, less lid
29297	Inner plate with spring
29298	Tuning cable chuck and plate less nut
29225	Vol. control chuck less nut
29226	Chuck nut
26523	Rubber gasket
26128	Thumbcrew (specify gold finish)
29233	Instruction folder, F-1235
21143	Plug suppressor
21144	Distributor suppressor
23260	1 MF, 200-V. condenser (K 1)
38270	Filter cond., .5 MF (224)
26098	Antenna cable
26099	Battery cable
26611	Shipping container
26462	Variable condenser
29286	Shield for T3
27095	Shield for T1 and T2
29183	I. F. T. shield
26505	Volume control .5 U
26033	Volume control mounting bracket
29224	Volume control less nut
29232	Volume control shaft-tube support
29279	Volume control shaft tube
44340	Tone control switch assembly
30037	Tone control shaft and blade
26451	Tube shield (cardboard)
29094	Terminal card

SOCKETS	
24493	5-prong socket
24494	6-prong socket (85, 41)
27023	6-prong socket (6D6)
26111	7-prong socket
26572	Tip jack

TRANSFORMERS	
T1	38010 No. 1 R. F. T.
T2	43840 No. 2 R. F. T.
T3	43860 Osc. trans.
T4	43640 No. 1 I. F. T.
T5	43650 No. 2 I. F. T.
T6	26982 Output T.
T7	26291 Power T.

RESISTORS	
R1	20040 100 Ω , flexible
R5	31830 250 Ω , flexible
R16	23780 550 Ω , flexible
R17	16840 22 Ω , flexible

CONDENSERS	
C4	43910 455 MMF, 500-V.
C5	36510 700 MMF, 500-V.
C9	35290 125 MMF, 500-V.
C10, 15	25379 10 MF, 25-V. (electrolytic)
C18	26995 8 MF-4 MF, 300-V. (electrolytic)
C24	45530 .9 MF (H53)
C25	36510 700 MMF, 500-V.

TRIMMERS	
A4, 5	29119 On T4
A6	29119 On T5
A7	39420 Under var. cond.

POWER UNIT	
43940	Power unit complete with tube
29289	Power unit container
27005	Vibrator
27038	Vibrator cover tube
26985	5-prong socket (rectifier)
26986	6-prong socket (vibrator)
27011	Filter choke (iron core)
36635	Choke (48-turn)
29254	Clamp for 48-turn choke
29094	Terminal card
29252	"A" lead from power unit
26291	Power transformer
26995	Electrolytic cond., 4 and 8 MF, 300-V.

SPEAKER	
26851	Speaker less cable
29293	Lid with metal screen
26448	Plug only
19308	Cond. clamp
26826	Cone head assem.
26827	Field coil (6.3 Ω)

CONTROL UNIT	
(The key numbers refer to illustration on facing page.)	
30001	Case
30003	Bezel
30016	Dial plate
4 30002	Crystal
5 29341	Remote control complete with mounting parts less cables
6 30011	Key knob (volume)
7 30008	Tuning knob
8 30009	Tuning knob set screw
9 30023	Case mounting screw
10 30017	Pointer shaft
11 30007	Drive-shaft retaining screw
12 30036	Key retaining spring
13 30022	Post mounting screw
14 27118	6-8-volt dial light (green)
15 30013	Dial light socket and lead less lamp
16 30005	Drive shaft (gear)
17 30004	Dial pointer
18 30021	Lock washer
19 30006	Drive-shaft washer
20 29336	Strip and bushing
21 30015	Pointer gear
22 30014	Pointer pinion gear
23 26894	"U" washer, blue
24 30012	"U" washer, flat
25 29234	Vol. control cable assem.
26 29339	Steering post mtg. bracket
27 26105	Tuning cable assem.
30019	Sheath-clamping screw

I. F. COUPLING UNIT. Purchase from your distributor one of the special Atwater Kent I. F. coupling units No. 42590. This is placed on the grid cap of the I. F. or the 1st-detector tube, as specified, and the lead that normally connects to the grid cap is attached to the coupling unit.

GENERAL NOTES.

- Do not tamper with the trimmer adjustments unless the necessity is clearly apparent.
- On the oscillator trimmer there are two different settings at which the signal will be received. Always use the first of these two positions as you screw the trimmer in from a loose or minimum-capacity position. THIS IS IMPORTANT.
- Check the I. F. trimmers first.
- In checking the set, do not disturb the position of the wiring any more than necessary.

DIAL CALIBRATION.

The dial calibration depends on the oscillator circuit of the set, providing that the I. F. trimmers are correctly aligned to their specified frequency. The pre-selector (R. F. and 1st-detector) trimmers do not affect the dial calibration, but simply affect sensitivity.

The oscillator trimmer is used to adjust the high-frequency end of the scale.

The oscillator tracking condenser adjusts the low-frequency end of the scale.

If adjustment of the oscillator trimmer and the oscillator tracking trimmer condenser does not correct the dial readings, it may be necessary to replace the fixed oscillator tracking condenser or the oscillator transformer.

Naturally the I. F. trimmers should be checked and adjusted, if necessary, before any attempt is made to align the R. F. or oscillator trimmers.

PROCEDURE

I. F. TRIMMERS.

Connect I. F. test oscillator (264 KC) to I. F. tube by means of the regular I. F. coupling unit. Peak A6, A7. Connect I. F. oscillator to 1st-detector tube and peak A4, A5.

DIAL POINTER ADJUSTMENT.

Connect oscillator (560 KC) to antenna and ground and peak A8 while rocking the variable condenser for maximum sensitivity. Then adjust dial pointer to 560 KC mark by turning the adjustment nut at rear of control unit.

R. F. TRIMMERS.

Connect R. F. oscillator to antenna and ground of set.

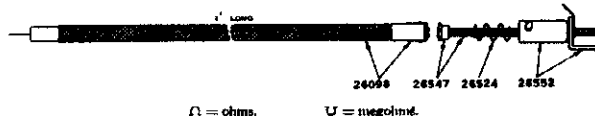
With oscillator and dial at 1500 KC, peak A3, A2, A1. Check frequency alignment at 560 KC.

Part Number	Description
26943	Universal mounting bracket for control unit in Models 666, 816, 926, 936, for mounting control head at lower edge of instrument panel.

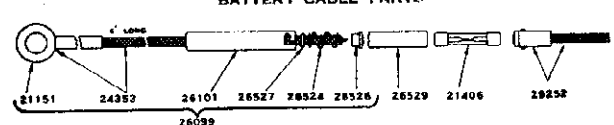
The mounting plates and bracket listed below are for Model 776 control unit

30025	1934 Ford	Dash finish.
30029	Universal mounting bracket for flush mounting of control head at lower edge of instrument panel. This type mounting may be used on all General Motors and other cars for which there are no mounting plates available. Also for cars which do not have the cut-out space in instrument panel.	
29592	1935 Chrysler Air Stream	Vertical wood-grain finish.
30027	1935 Plymouth, Dodge, DeSoto	Horizontal wood-grain finish.
29591	1935 Ford	Taupe finish.
30028	1935 Hudson and Terraplane	Dash finish.
30026	1934 Chrysler, Plymouth, Dodge	Black finish.

ANTENNA CABLE PARTS



BATTERY CABLE PARTS



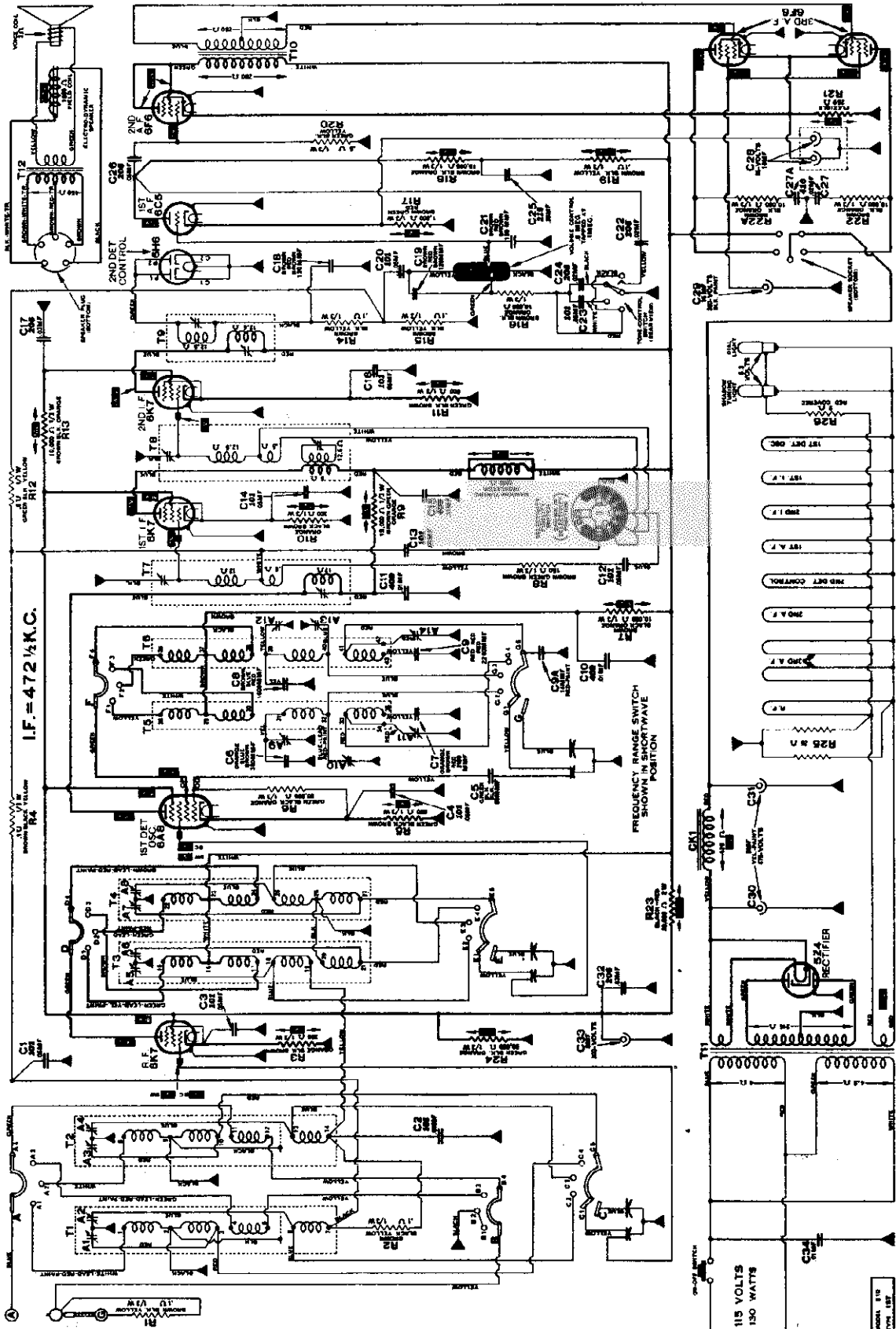
MODEL 810
Schematic, Voltage

ATWATER-KENT MFG. CO.

MODEL 810

I.F. = 472 1/2 K.C.

For Alignment Data See Index.

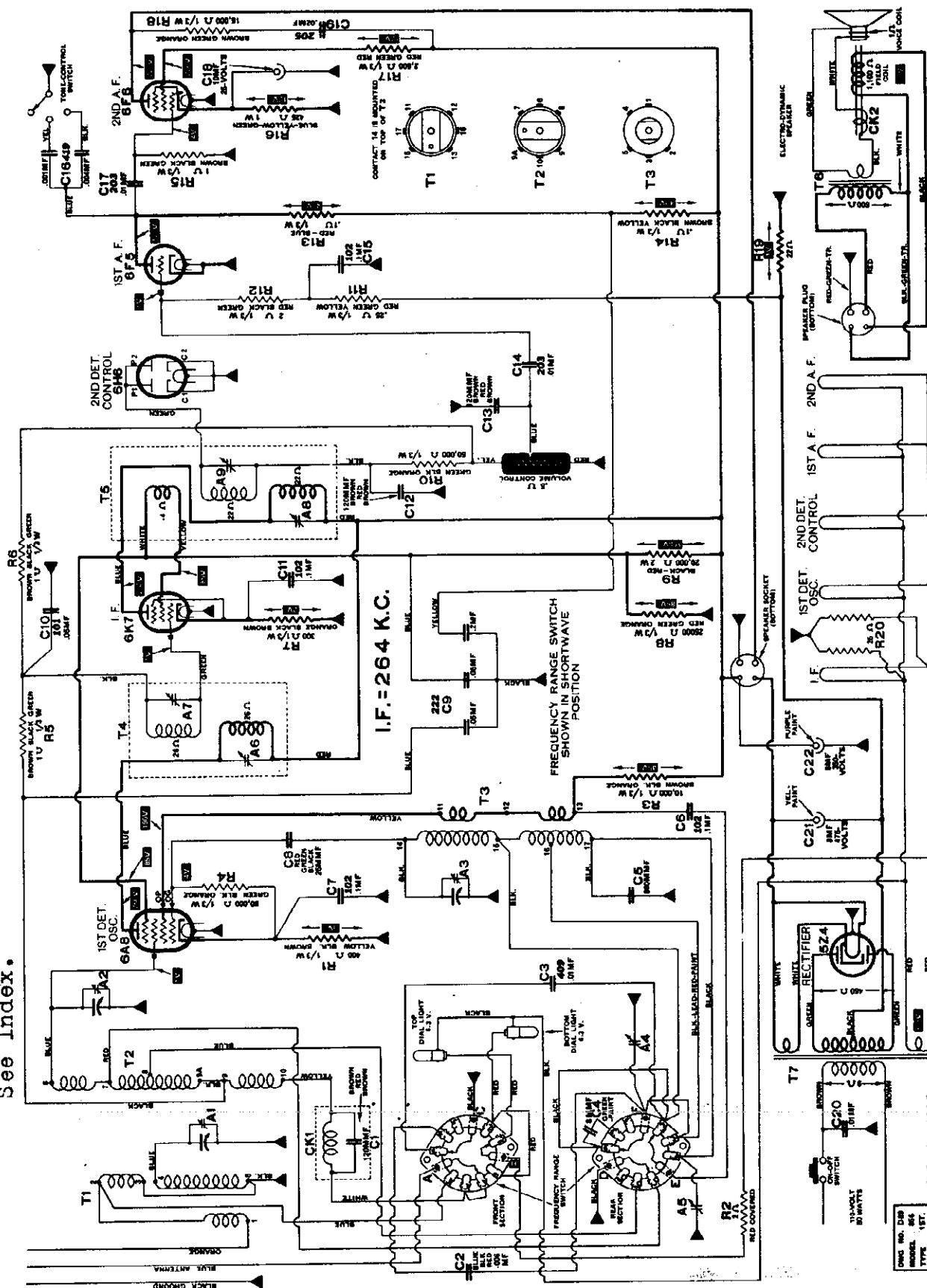


ATWATER-KENT MFG. CO.

Schematic, Voltage

MODELS 856 AND 976

For Alignment Data See Index.



July 20, 1935.

OWS NO. 218
MODEL '17'
TYPE

MODELS 237Q, 467Q

MODELS 317, 337

MODELS 856, 976

Trimmers, Alignment

ATWATER-KENT MFG. CO.

ATWATER KENT RADIO

ADJUSTING TRIMMER CONDENSERS

MODELS 237Q, 317, 328, 337, 467Q, 649, 810, 856 AND 976

GENERAL DATA.

When adjusting trimmers, keep the radio volume control turned on full, keep the tone control at "high," and turn the selectivity-fidelity switch (used in some models) to "selectivity."

Use the weakest possible oscillator signal that will give a reading on a sensitive output meter.

Use an Atwater Kent No. 42590 coupling unit to couple the I. F. oscillator to set. The coupling unit may be purchased from any Atwater Kent distributor, and is a necessity for correct I. F. alignment of Atwater Kent receivers.

On trimmers in the oscillator circuit, it may be found that there are two peaks (one peak where the oscillator frequency is higher than the signal by an amount equal to the I. F. frequency, and the second peak where the oscillator is lower than the signal by an amount equal to the I. F. frequency). The first peak (as the trimmer is screwed in from a loose or minimum-capacity position) is the correct peak.

On the 5- and 6-tube models, always peak the short-wave oscillator trimmer, which is mounted on variable condenser, before peaking the broadcast trimmer.

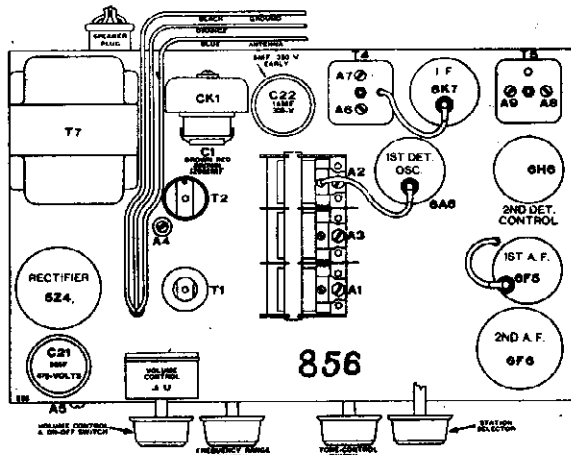
R. F. TRIMMERS.

Connect an R. F. test oscillator to the antenna and ground leads of set.

Short-wave range. With oscillator and dial at 18 MC, peak A5 and A2.

Police range. No trimmer adjustments on this range.

Broadcast range. With oscillator and dial at 1500 KC, peak A4, A3 and A1. With oscillator and dial at 560 KC, peak A6.



MODELS 856 AND 976

I. F. TRIMMERS.

Connect I. F. test oscillator (264 KC) to I. F. tube by means of regular I. F. coupling unit No. 42590. Peak A9 and A8. Connect I. F. oscillator to the 1st-detector grid and peak A7 and A6.

DIAL POINTER ADJUSTMENT.

With the variable condenser fully meshed, the dial pointer should be set at 535 KC.

R. F. TRIMMERS.

Connect an R. F. oscillator to the antenna and ground terminals of set.

Short-wave range. With oscillator and dial at 18 MC, peak A3.

Police range. No trimmers on this range.

Broadcast range. With oscillator and dial at 1500 KC, peak A4, A2 and A1. With oscillator and dial at 560 KC, peak A5.

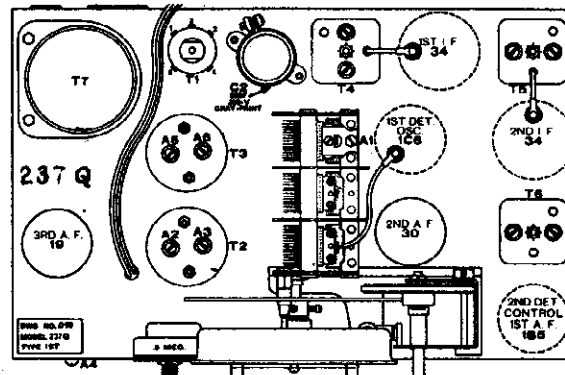
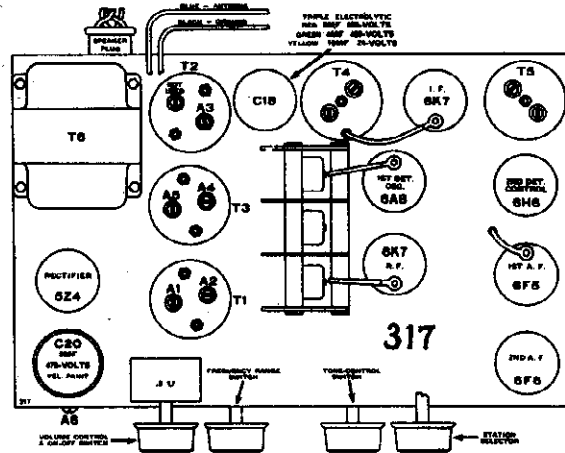
MODELS 317 AND 337

I. F. TRIMMERS.

Connect I. F. test oscillator (472½ KC) to I. F. tube by means of regular I. F. coupling unit No. 42590. Peak A9 and A10. Connect I. F. oscillator to grid of 1st-detector and peak A7 and A8.

DIAL POINTER ADJUSTMENT.

With variable condenser fully meshed, the dial pointer should be set at 538 KC.



MODELS 237Q AND 467Q

I. F. TRIMMERS.

Connect I. F. test oscillator (472½ KC) to 2nd-I. F. grid by means of regular I. F. coupling unit No. 42590. Peak two trimmers on top of T6.

Connect oscillator to 1st-I. F. grid and peak two trimmers on top of T5.

Connect oscillator to 1st-detector grid and peak two trimmers on T4.

DIAL POINTER ADJUSTMENT.

With the variable condenser fully meshed, the dial pointer should be set slightly below 540 KC.

R. F. TRIMMERS.

Connect an R. F. oscillator to the antenna and ground leads of set.

Short-wave range. Oscillator at 18 MC, and dial pointer at 18 MC, peak A6 and A3.

Police range. No trimmer adjustments for this range.

Broadcast range. Oscillator at 1500 KC, and dial pointer at 1500 KC, peak A5, A2 and A1. Tune oscillator to 560 KC, and with dial pointer at 560 KC mark, peak A7. Repeat adjustment of A5 at 1500 KC and A4 at 560 KC, if necessary.

ATWATER-KENT MFG. CO.

MODEL S 328, 649

MODEL 810

Trimmers, Alignment

TRIMMERS ON MODEL 810

	12 to 18 MC range	4.6 to 12.2 MC range	1.6 to 4.6 MC range	540 to 1600 KC range
R. F.	A3	A1	A4	A2
1st-DET.	A7	A6	A8	A5
OSCILLATOR	A14	A11	A13	A10
TRACKING			A12	A9

There are six I. F. trimmers, two on top of each I. F. transformer (T7, 8, 9). These are adjusted at 472½ KC.

MODELS 328 AND 649

I. F. TRIMMERS.

Connect I. F. test oscillator (472½ KC) to grid of 2nd-I. F. tube by means of regular I. F. coupling unit No. 42590. Peak two trimmers on top of T6. Connect I. F. oscillator to grid of 1st-I. F. and peak two trimmers on top of T5. Connect I. F. oscillator to grid of 1st-detector and peak two trimmers on top of T4.

DIAL POINTER ADJUSTMENT.

Refer to instructions under Model 810.

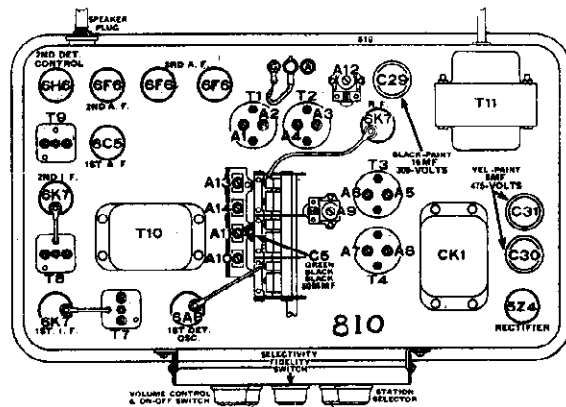
R. F. TRIMMERS.

Connect an R. F. test oscillator to the antenna and ground terminals of set. Loosen the trimmer screws for the range or ranges that are to be adjusted.

Short-wave range. Oscillator at 18 MC, dial at 18 MC, peak A5 and A2.

Police range. No trimmer adjustments for this range.

Broadcast range. Oscillator at 1500 KC and dial at 1500 KC, peak A4, A3 and A1. Oscillator and dial at 500 KC, peak A6.



MODEL 810

I. F. TRIMMERS.

Connect a sensitive output meter to set. Connect I. F. test oscillator (472½ KC) to grid cap of 2nd-I. F. tube, using an Atwater Kent No. 42590 coupling unit. Use the weakest possible oscillator signal that will give a reading on the output meter, and peak two trimmers on-T9.

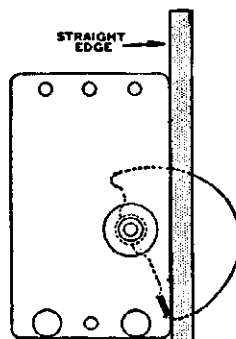
Connect oscillator to 1st-I. F. grid cap and peak two trimmers on T8.

Connect oscillator to 1st-detector grid cap and peak two trimmers on T7.

DIAL POINTER ADJUSTMENT.

If the dial gear and indicator have been changed in any way, reset as follows:

1. Loosen the two set screws which hold pointer gear on condenser shaft.
 2. Turn condenser to minimum.
 3. See illustration below. Place straight-edge gauge in vertical position with the long flat face against the front mounting plate of the variable condenser as shown. Turn the condenser until the front edge of the rotor spacing bar just touches the straight edge. Hold the condenser in this position and move the pointer arm so the pointer is at 1520 KC (1580 KC in 328, 649), after which tighten the set screws to hold the dial gear securely.
 4. Loosen the screws which hold the pointer to the pointer arm, and adjust the pointer so that when the condenser is completely meshed, the pointer is at 535 KC.
- Recheck at 1520 KC (1580 KC in 328, 649) and repeat procedure 3 and 4, if necessary.



This illustration shows the correct position of the variable condenser rotor for a dial pointer setting of 1520 KC (1580 KC in 328, 649). The straight edge is held firmly against the front mounting plate of the variable condenser and the rotor is turned so the spacing bar (shown as a small black oblong) is just touching the straight edge. The straight edge is a strip of bakelite or hard rubber ¼" thick, ⅜" wide, and 6" long. The ⅜" side is held against the mounting plate.

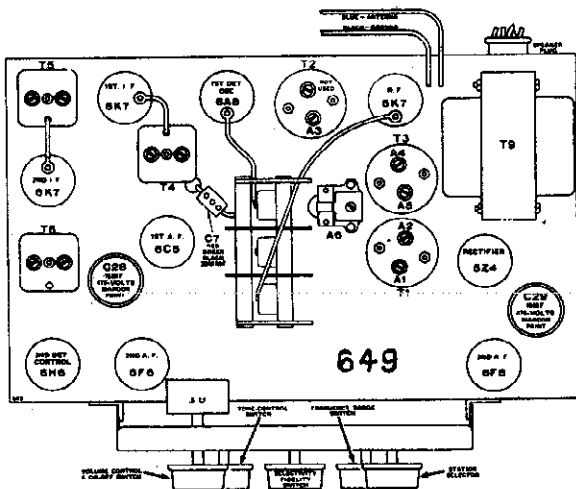
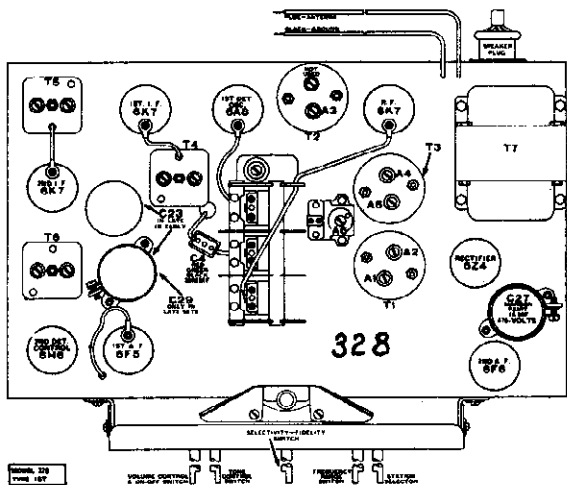
R. F. TRIMMERS.

12 to 18 MC range. Oscillator and dial pointer at 18 MC, peak A14, A7 and A3.

4.6 to 12.2 MC range. Oscillator and pointer at 12 MC, peak A11, A6 and A1.

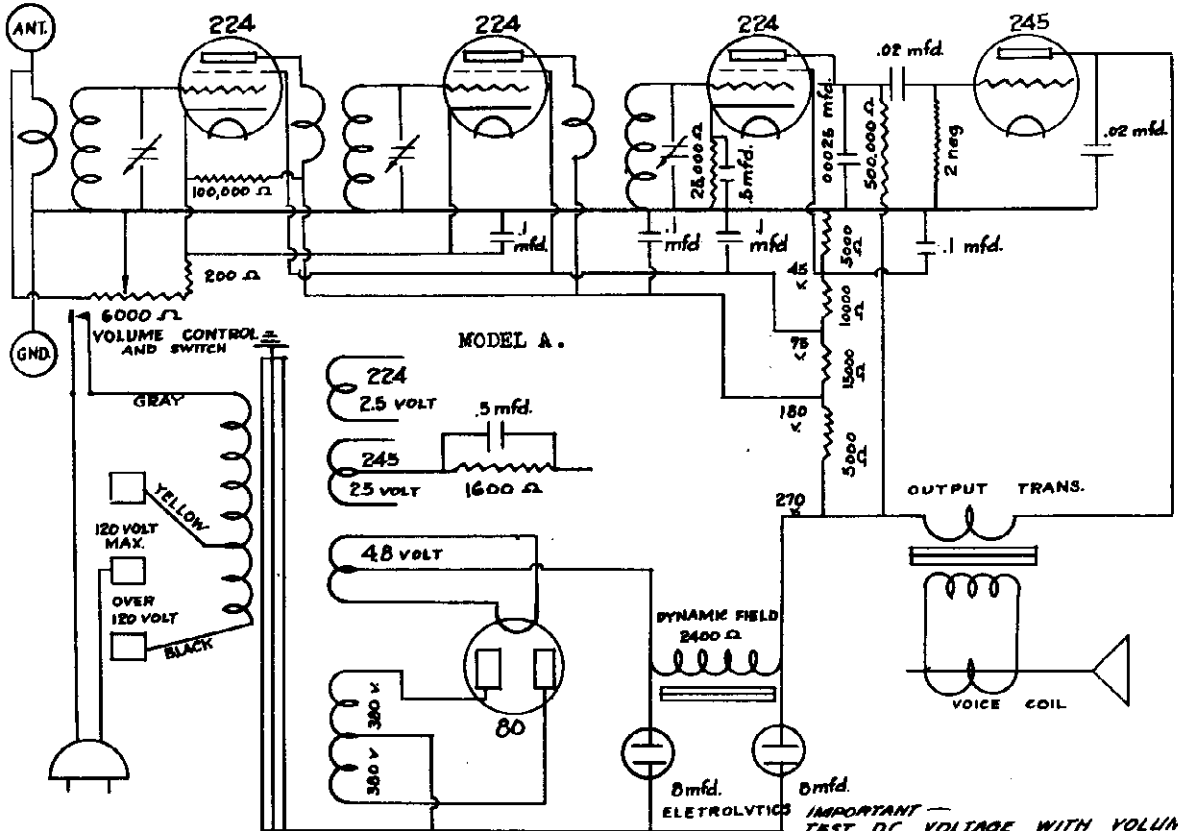
1.6 to 4.6 MC range. Oscillator and pointer at 4 MC, peak A13, A8 and A4. Tune oscillator to 1.7 MC, and with pointer at 1.7, peak A12.

540 to 1600 KC range. Oscillator and pointer at 1500 KC, peak trimmers A10, A5 and A2. Oscillator and pointer at 540 KC, peak A9.

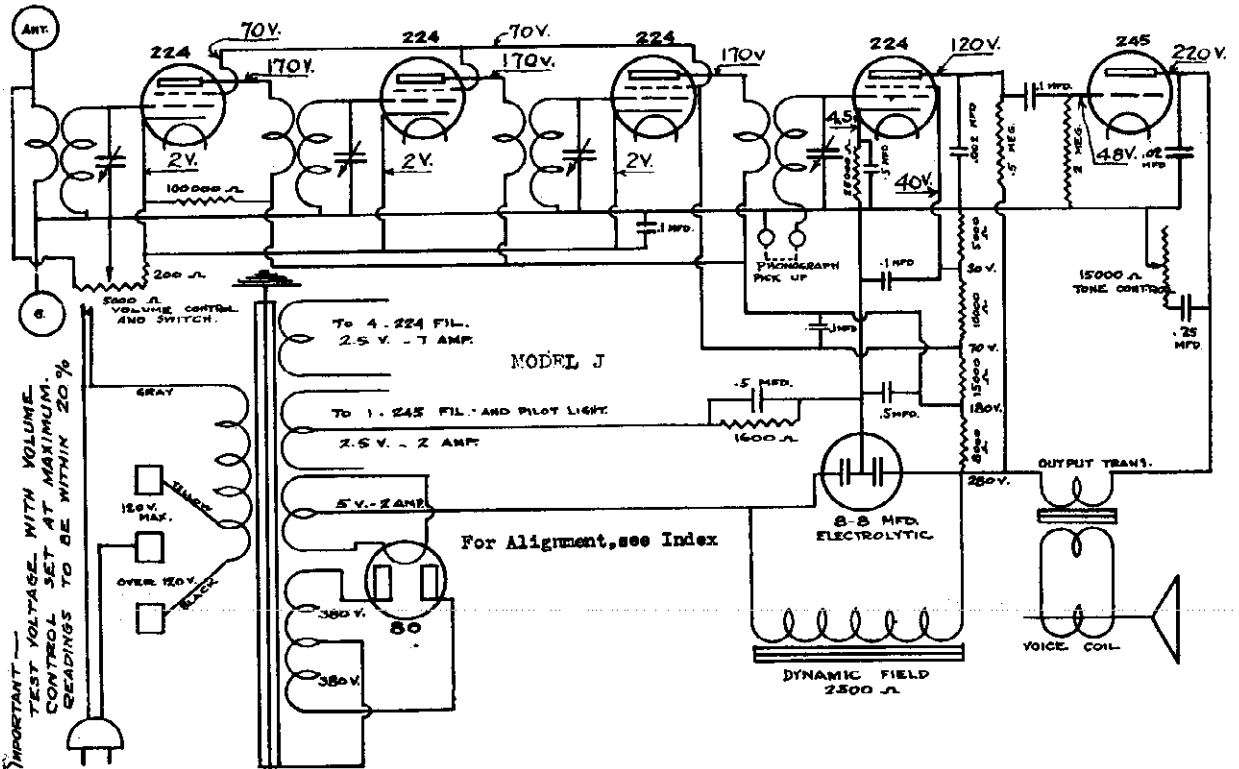


AUSTIN RADIO MFG. CO.

MODEL A
MODEL J
Schematic, Voltage



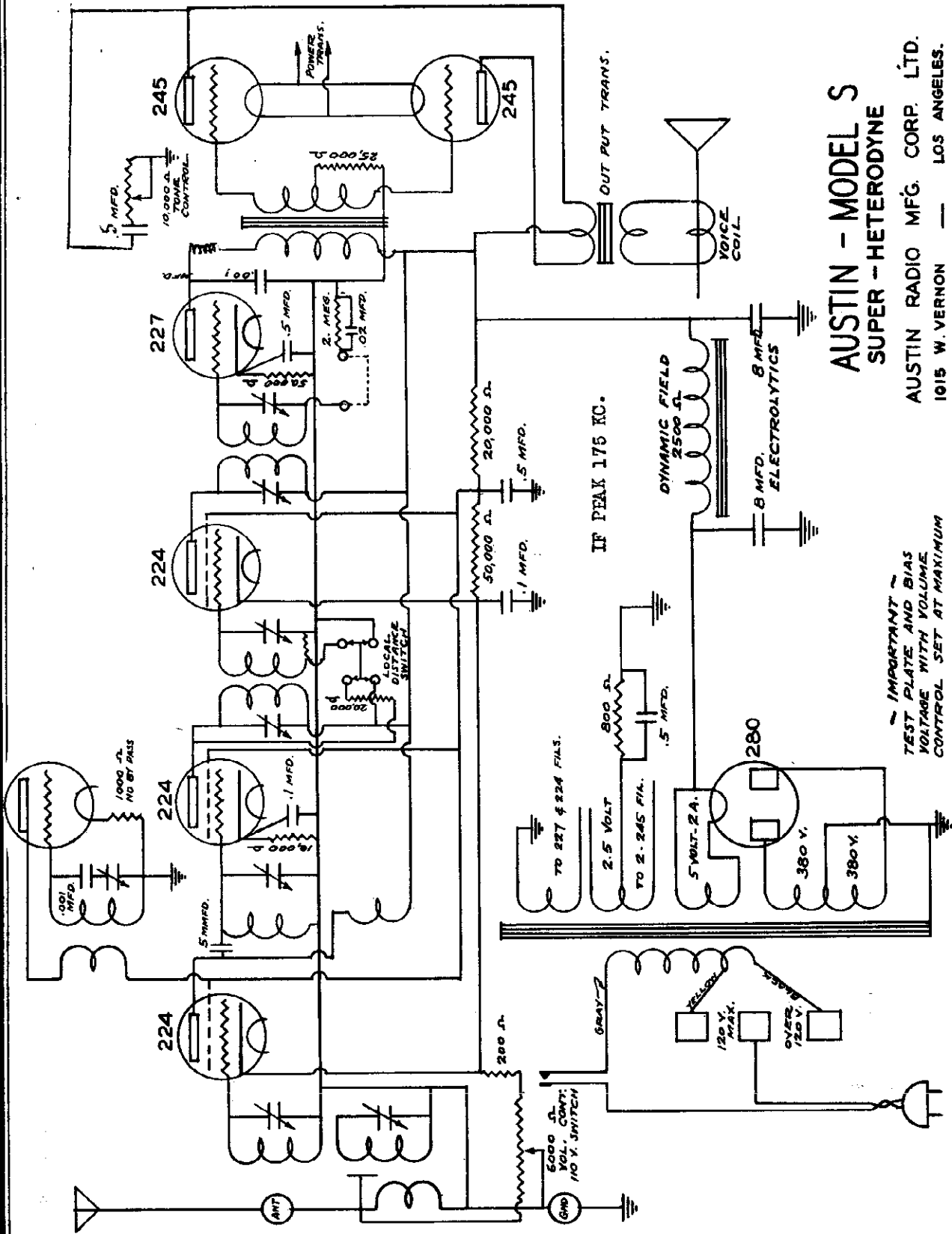
IMPORTANT —
TEST D.C. VOLTAGE WITH VOLUME
CONTROL SET AT MAXIMUM



IMPORTANT —
TEST VOLTAGE WITH VOLUME
CONTROL SET AT MAXIMUM.
READINGS TO BE WITHIN 20 %

MODEL S
Schematic

AUSTIN RADIO MFG. CO.



AUSTIN - MODEL S
SUPER-HETERODYNE

AUSTIN RADIO MFG. CORP. LTD.
1015 W. VERNON — LOS ANGELES.

HETZEL ENG.

~ IMPORTANT ~
TEST PLATE AND BIAS
VOLTAGE WITH VOLUME
CONTROL SET AT MAXIMUM

G. 131

MODEL J
 MODEL SP
 Alignment, Voltage

AUSTIN RADIO MFG. CO.

MODEL SP. (a) Intermediate frequency amplifier adjustment.
 The intermediate frequency amplifier has four tuning adjustments, accessible thru holes underneath the chassis. The amplifier should be peaked at 175 kilocycles.

(b) Tuning condenser adjustment.
 The four gang tuning condenser has four trimming condensers located on the top of the condenser unit. These should be all set at maximum (clockwise) and then reversed one full revolution. Set condenser dial at approximately 1350 K.C. and re-adjust all trimmers for maximum response. Then set condenser at approximately 650 K.C. and obtain maximum response by bending the split rotor plates.

Testing

All plate, screen, cathode or bias voltage readings must be made with a volt meter having a resistance of at least 1000 ohms per volt. Readings should be taken with the volume control full on with no signal.

R.F. amplifier plate voltage	190
Oscillator plate	60
Het. Det. plate	190
I. F. plate	190
Det. plate	110
Audio plate	230
R.F. & I.F. screens	60
R.F. cathode	2.8
Osc. cathode	2.5
Het. Det. cathode	4.8
I.F. cathode	3
Det. cathode	8.2
Audio bias	18
Audio screen bias	248

Balancing

MODEL J

Set all trimmer condensers on the gang variable condenser to maximum by turning adjusting screws to right (clockwise) and then reverse one complete revolution. Tune some station in at approximately 1400 kilocycles on the dial and adjust all trimmers for maximum signal strength. Next turn dial to approximately 700 kilocycles. Bend the split rotor plates on the variable gang condenser to accomplish the same condition of maximum signal strength.

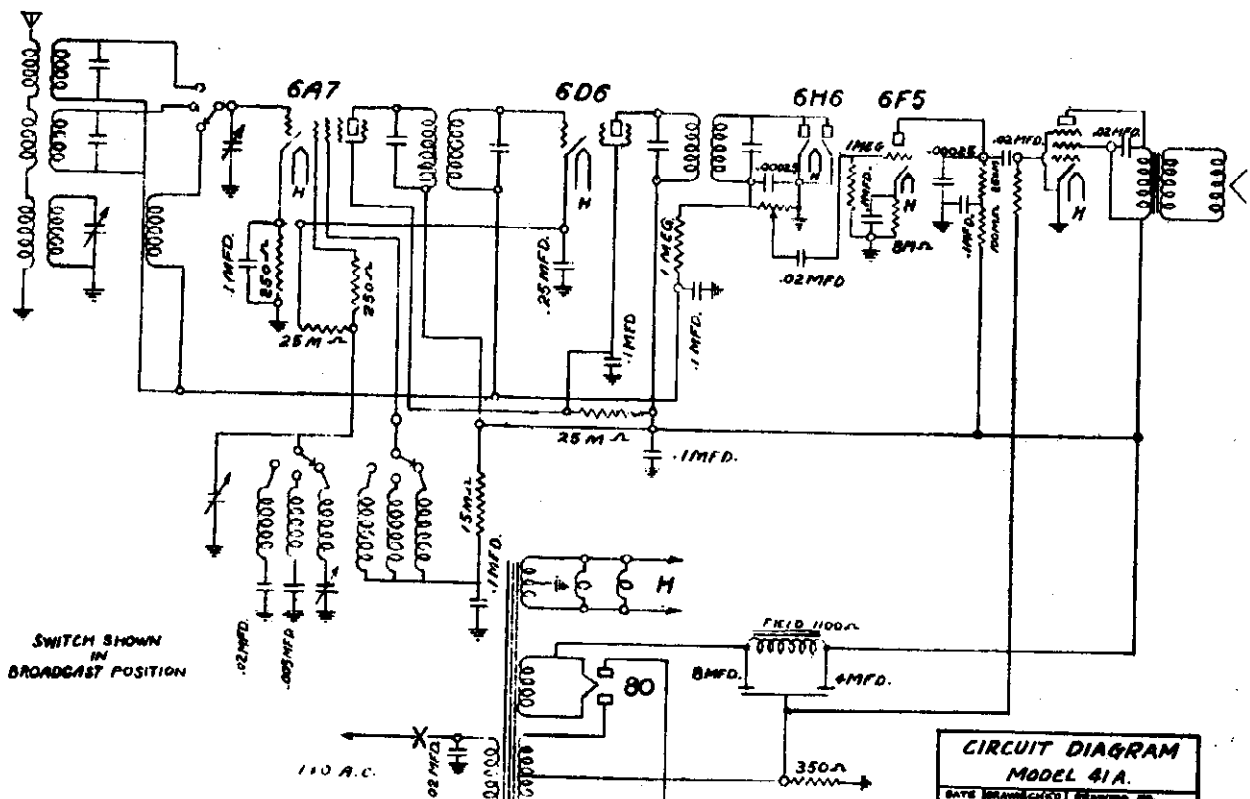
Testing

All readings of direct current voltage should be made with a high resistance voltmeter of at least 1000 ohms per volt. The following readings should be obtained with an allowable variation of 15%, with volume control set at maximum.

R.F. Plate voltage	170.
R.F. Screen "	70.
R.F. Cathode "	2.
Det. Plate "	120.
Det. Screen "	40.
Det. Cathode "	4.5
Audio Plate "	220.
Audio Bias "	48.

BALKEIT RADIO CO.

MODEL GT-16A
MODEL 41-A
Schematics



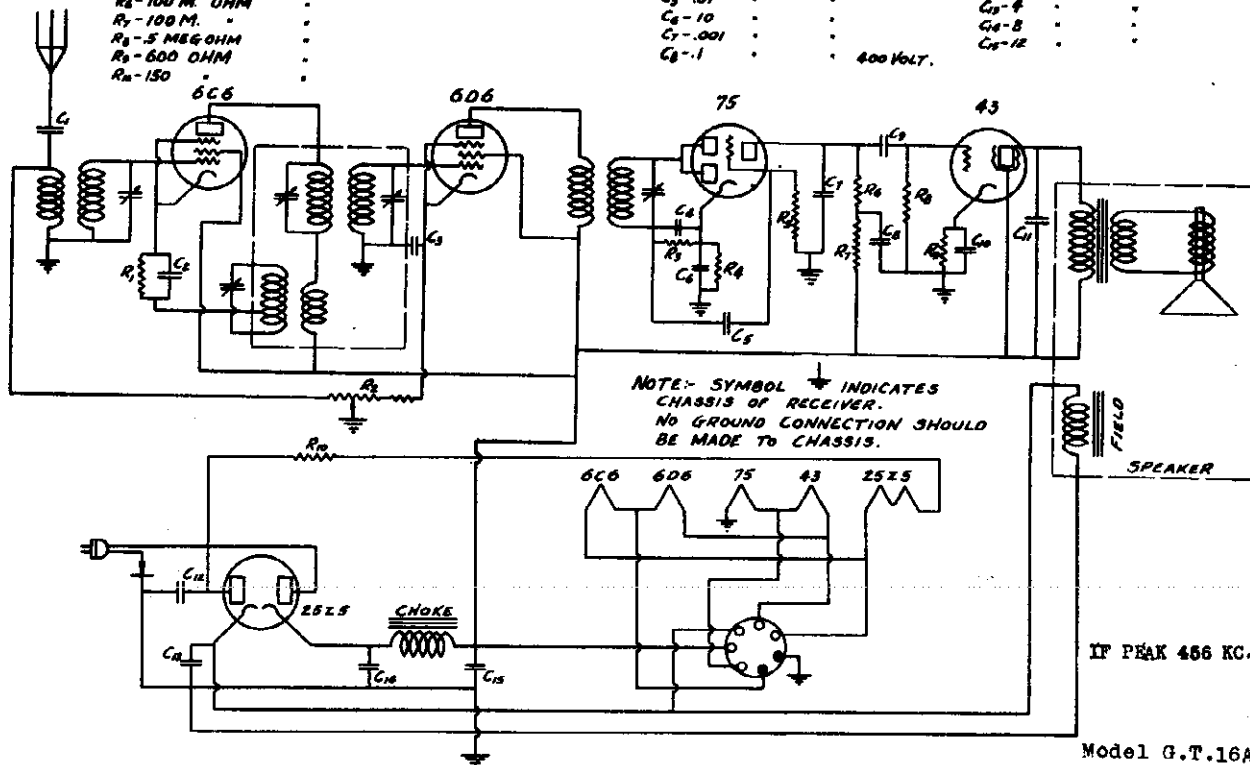
SWITCH SHOWN IN BROADCAST POSITION

CIRCUIT DIAGRAM MODEL 41A.

- R₁ - 8 M. OHM RESISTOR.
- R₂ - 300 M. OHM VOLUME CONTROL WITH 250 OHM
- R₃ - 5 MEGOHM RESISTOR. FIXED BIAS RESISTOR.
- R₄ - 8 M. OHM
- R₅ - 5 MEGOHM
- R₆ - 100 M. OHM
- R₇ - 100 M.
- R₈ - 5 MEGOHM
- R₉ - 600 OHM
- R₁₀ - 150

- C₁ - .001 MFD. CONDENSER
- C₂ - .002
- C₃ - .1
- C₄ - .00015
- C₅ - .01
- C₆ - 10
- C₇ - .001
- C₈ - .1

- C₉ - .01 MFD. CONDENSER
- C₁₀ - .006
- C₁₁ - .01
- C₁₂ - .1
- C₁₃ - .1
- C₁₄ - .01
- C₁₅ - .1



NOTE: SYMBOL INDICATES CHASSIS OF RECEIVER. NO GROUND CONNECTION SHOULD BE MADE TO CHASSIS.

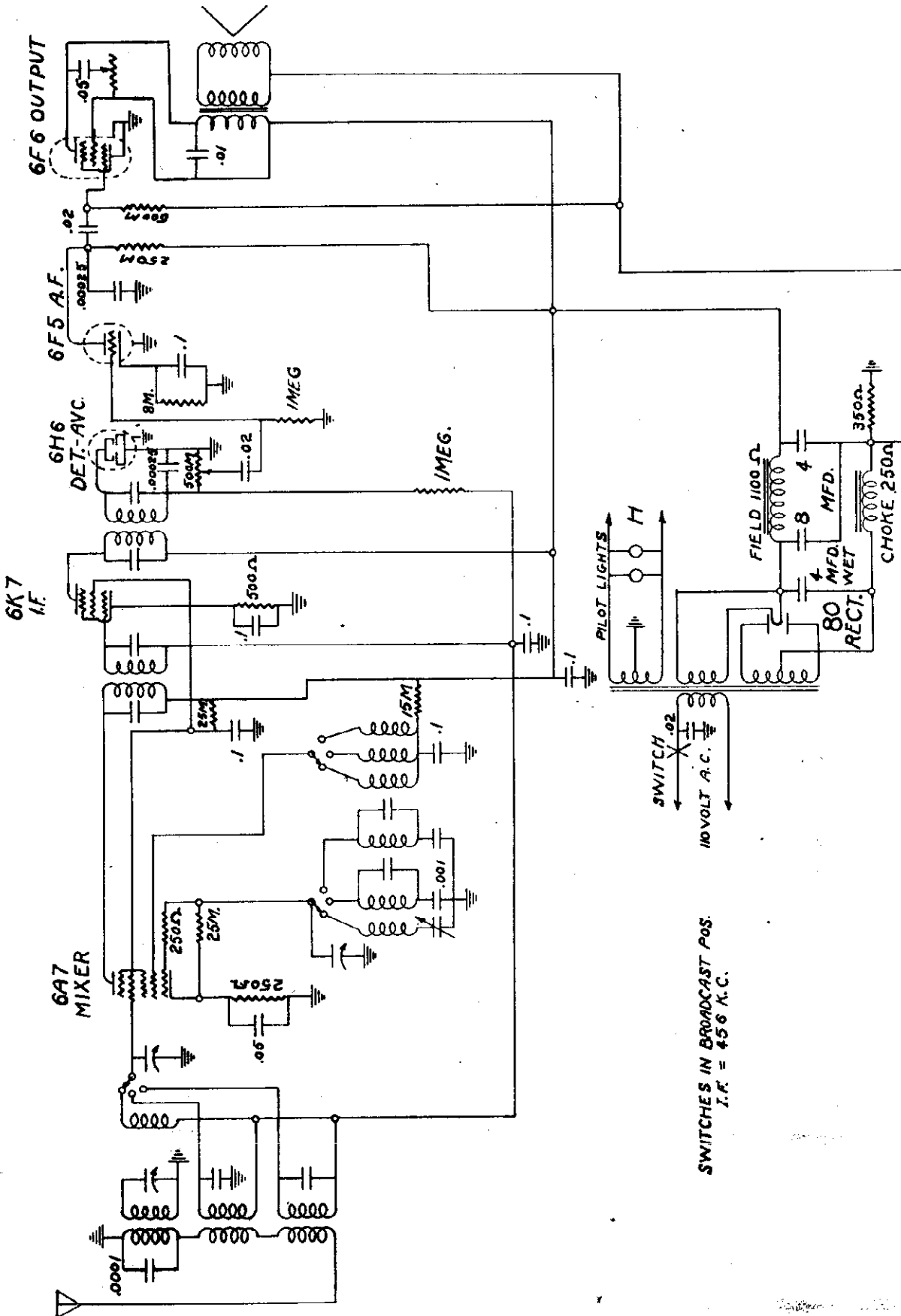
IF PEAK 456 KC.

Model G.T.16A

MODELS G-18A, G-19B

Schematic

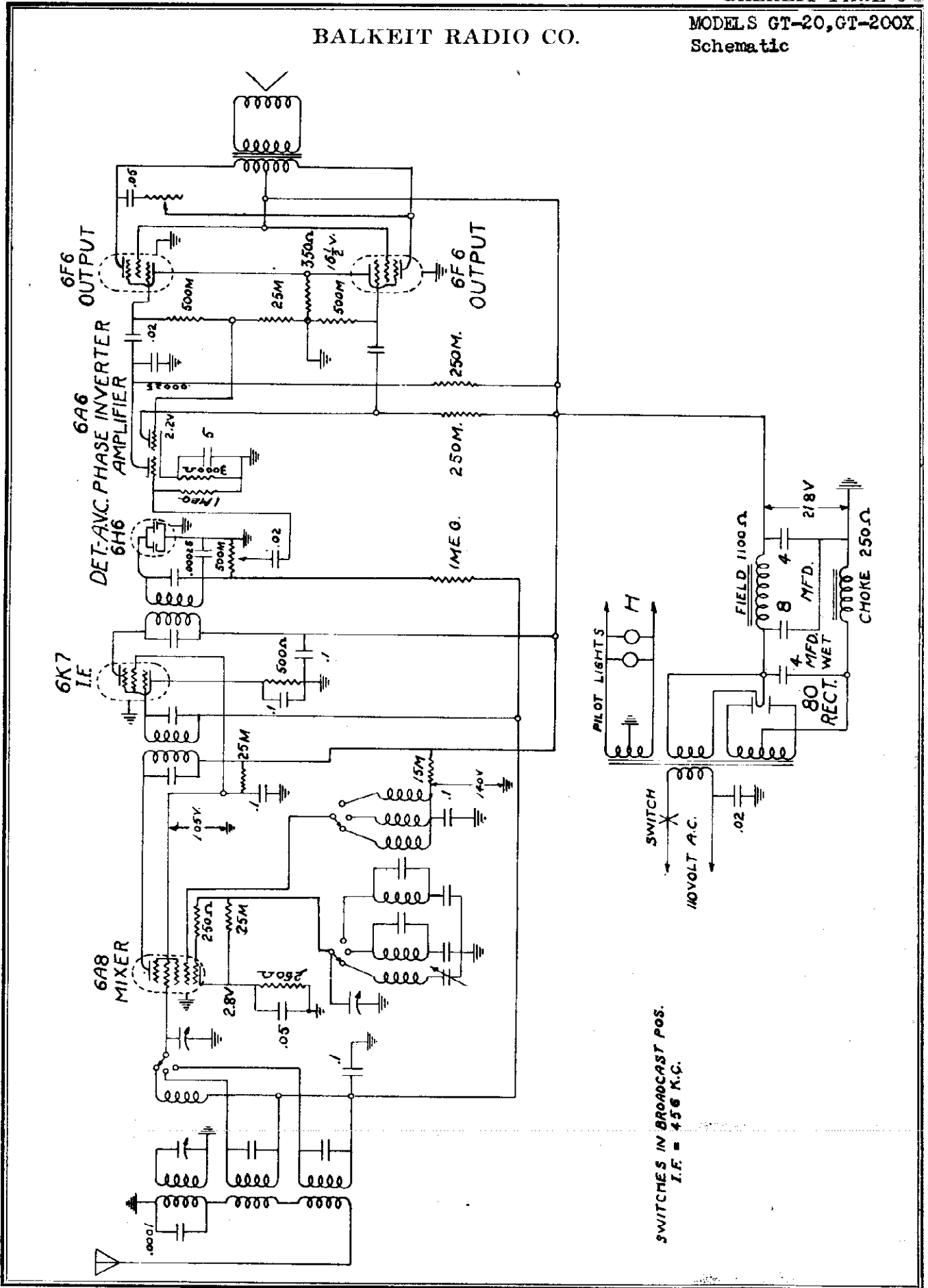
BALKEIT RADIO CO.



SWITCHES IN BROADCAST POS.
I.F. = 456 K.C.

BALKEIT RADIO CO.

MODELS GT-20,GT-200X.
Schematic

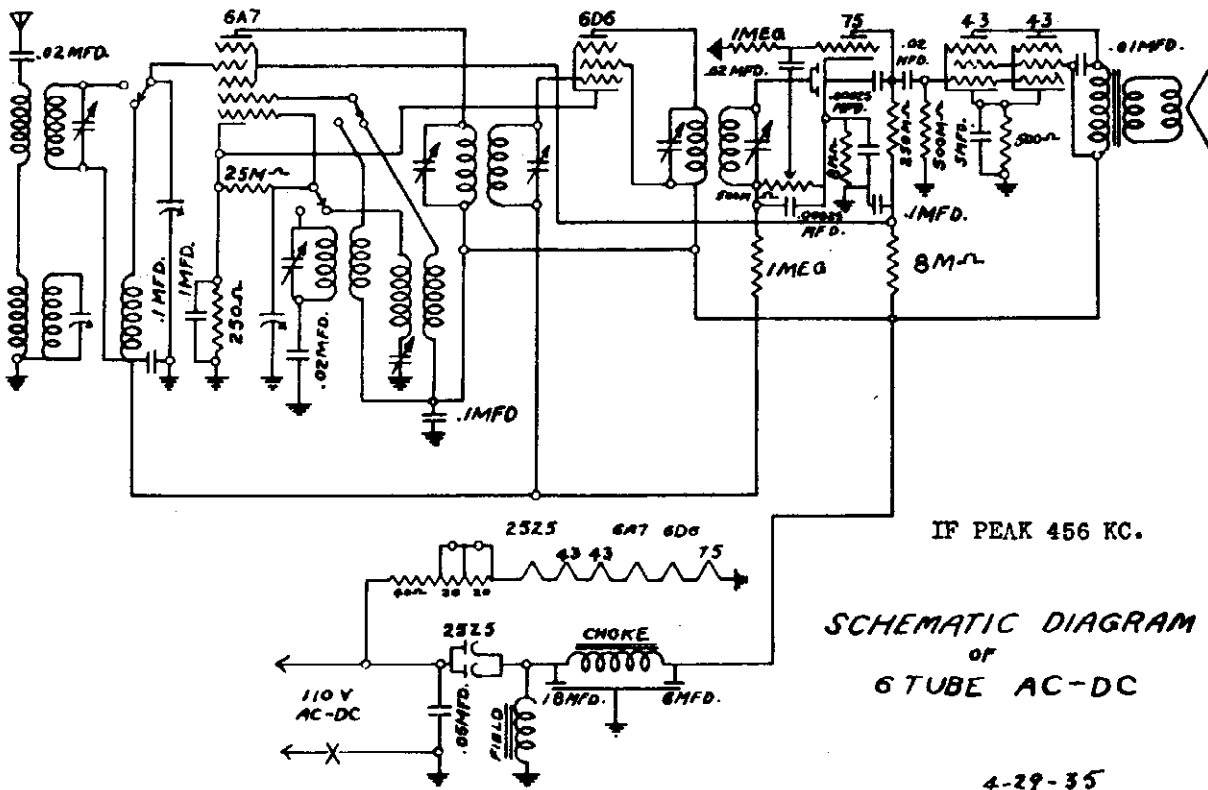


SWITCHES IN BROADCAST POS.
I.F. = 456 K.C.

MODEL GT-33

Schematic, Alignment

BALKEIT RADIO CO.



4-29-35

The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 3000 and 10,000 K.C. and an output meter to be connected across the primary or secondary of the output transformers.

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.

CAUTION: Do not let the test oscillator come in direct contact with the receiver chassis.

I.F. ALIGNMENT Adjust the test oscillator to 456 K.C. and connect the output to the grid of the 1st detector tube (6A7) through a .05 or .1 mfd. condenser. If desired 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.

R.F. ALIGNMENT Adjust the test oscillator to 1400 K.C. and connect the output to the antenna post through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 K.C. and adjust the rear gang condenser trimmer to peak. This adjusts the receiver on scale. Then adjust the two front gang trimmers to peak.

Next reset the dial pointer on the receiver and the test oscillator to 600 K.C. Slowly increase or decrease 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 seems a little complicated but is the easiest way to adjust the oscillator to the prescaler or R.F. section. The padding condenser is located on the left hand end of the chassis.

Return to 1400 K.C. and again go over the adjustments at that frequency to be sure they have not been thrown out of adjustment.

SHORT WAVE BANDS

The foreign band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coil located next to the gang condenser. Set the test oscillator to 10 megacycles or 31 meters.

The police and aviation band can be adjusted from a signal set at 5,000 K.C. or 300 on the Dial. The oscillator trimmer is located underneath the chassis and the R.F. trimmer is between the 6A7 tube and the wave change switch.

The gang condenser trimmers are not to be used for alignment of either of the short wave bands.

SERVICE HINTS

CAUTION: Be very careful in handling the receiver chassis as it is connected to one side of the power line.

LOW VOLUME This may be caused by weak or defective tubes (Replace with set of tubes known to be in good condition) open antenna coil, open or shorted by-pass condensers or defective wave change switch. Poor receiving locations such as steel buildings may require extra antenna to get good reception.

LOW VOLTAGE Low voltage may be caused by a defective rectifier tube, open filter condenser or shorted by-pass condensers.

HUM Excessive hum may be caused by a defective tube, open or shorted by-pass condensers or open audio grid leads.

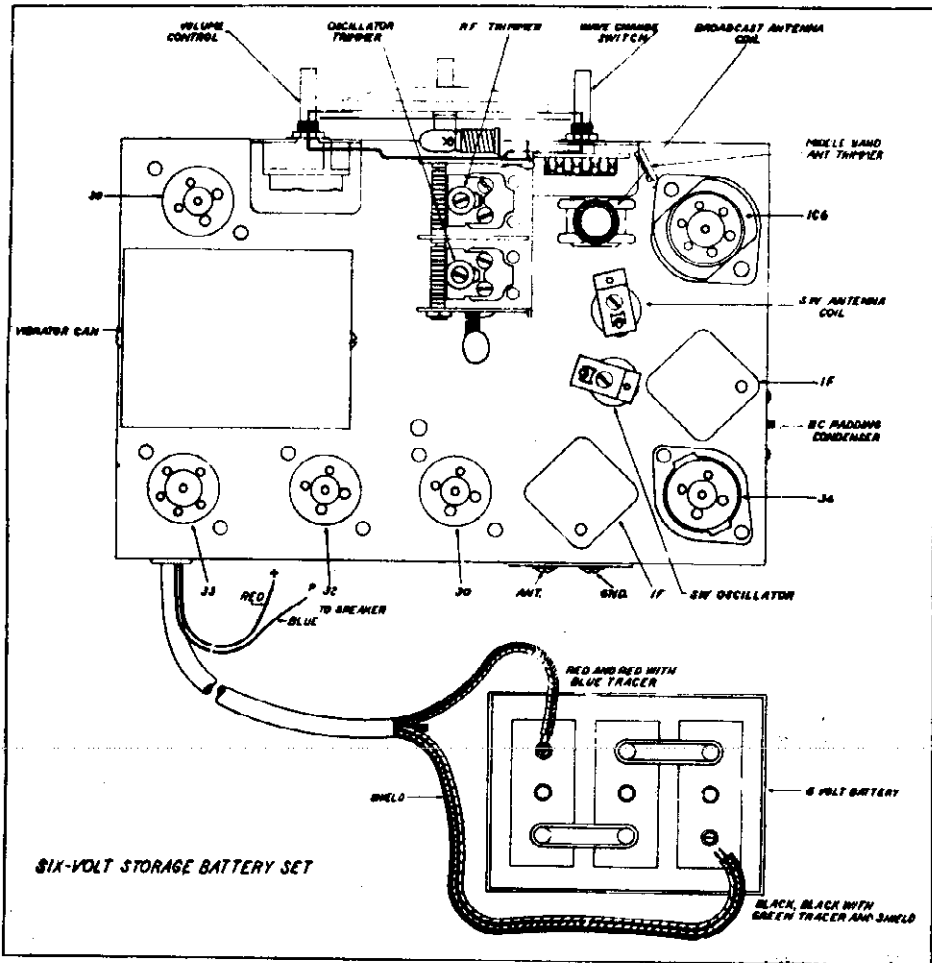
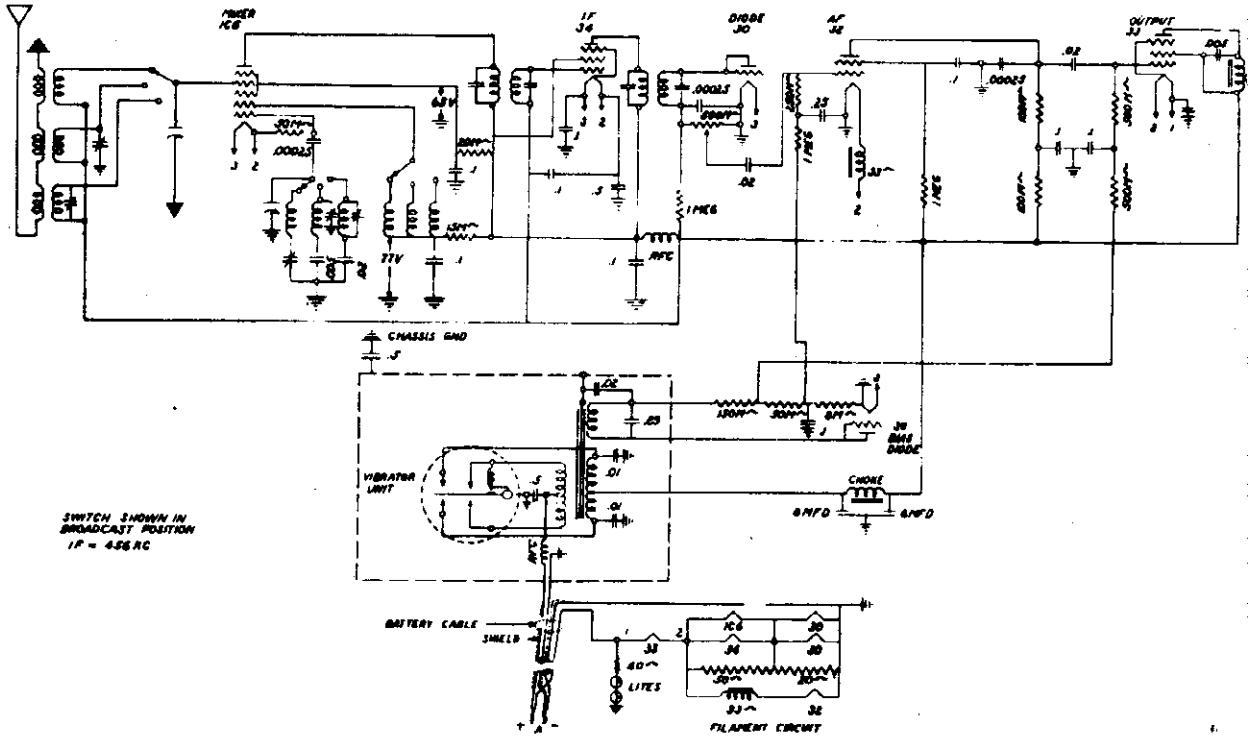
DISTORTED REPRODUCTION This may be caused by a defective 75 or 43 tube or a ground or open in the automatic volume control circuit. Check all circuits with an ohmmeter or continuity tester.

OSCILLATION Most trouble from oscillation is due to open by-pass condensers in the R.F. or I.F. circuits. Test each condenser with another condenser in parallel.

The grid lead on the 75 tube may also cause a howl if it runs too close to the 42 tube.

BALKEIT RADIO CO.

MODEL GT-156BA
Schematic, Socket
Trimmers



MODEL GT-156BA
Alignment Data

BALKEIT RADIO CO.

ALIGNMENT DATA

The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 3000 and 10,000 K. C. and an output meter to be connected across the speaker terminals.

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.

I.F. ALIGNMENT Adjust the test oscillator to 1400 K.C. and connect the output to the antenna wire through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 K.C. and adjust the rear gang condenser trimmer to peak. This adjusts the receiver on scale. Then adjust the front or R.F. trimmer to peak.

Next reset the dial pointer on the receiver and test oscillator to 600 K.C. Slowly increase or decrease 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 seems a little complicated but is the easiest way to adjust the oscillator to the R.F. section. The padding condenser is located on the left hand end of the chassis.

Return to 1400 K.C. and again go over the adjustment at that frequency to be sure they have not been thrown out of adjustment.

SHORT WAVE BANDS

The foreign band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coil located next to the gang condenser. Set the test oscillator to 10 megacycles or 31 meters.

The police and aviation band can be adjusted from a signal set at 3,000 K.C. or 300 on the dial. The oscillator trimmer is located underneath the chassis and the R.F. trimmer is between the 6A7 tube and the wave change switch.

The gang condenser trimmers are not to be used for alignment of either of the short wave bands.

SERVICE HINTS

VIBRATOR Vibrator noise may be due to the following: a discharged "A" battery, high resistance connections on battery terminals, a defective vibrator or a loose cover on the vibrator can.

The vibrator unit is a plug-in type and can be removed for replacement very easily. This unit should last a very long time as current through the contact points is very small.

Never leave the power switch turned on when the "A" battery is too low to make the receiver function as this is liable to seriously injure the vibrator or vibrator transformer. Never remove any of the tubes when the power switch is turned on as they are connected in a series parallel circuit.

MICROPHONICS The two volt type of tubes used in this receiver are ordinarily more microphonic than heater types. They can be detected by touching each tube with the finger tips. Another source might be caused by the dial glass touching the front or escutcheon plate.

LOW VOLUME This trouble may be caused by weak or defective tubes (replace with set of tubes known to be in good condition); antenna disconnected from the receiver; open antenna coil or open or shorted by-pass condensers.

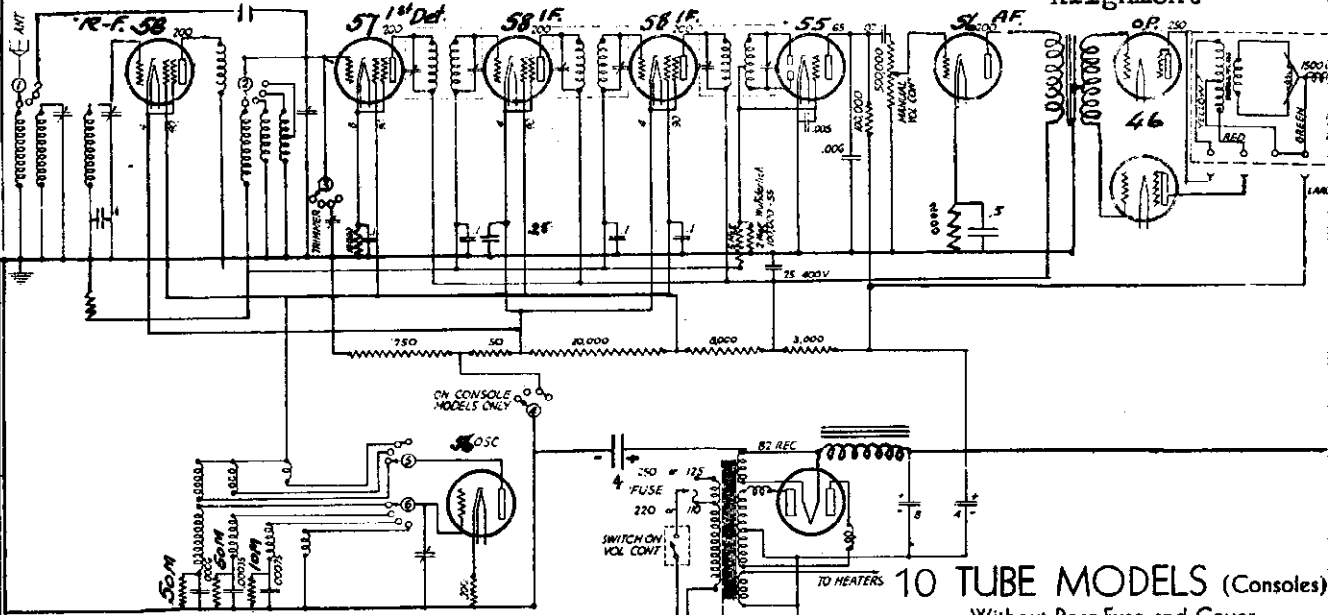
Some localities remote from broadcasting stations may require an extra long antenna of about two hundred feet.

LOW VOLTAGE Low voltage may be caused by a low battery, a defective vibrator, corroded battery terminal or shorted by-pass condensers. Increasing the length of battery leads might cause low voltage and vibrator noise.

MODEL P
Alignment

BARKER BROS.

MODEL L
MODEL M
Schematic, Voltage
Alignment



Models L, M, and P Alignment

INTERMEDIATES

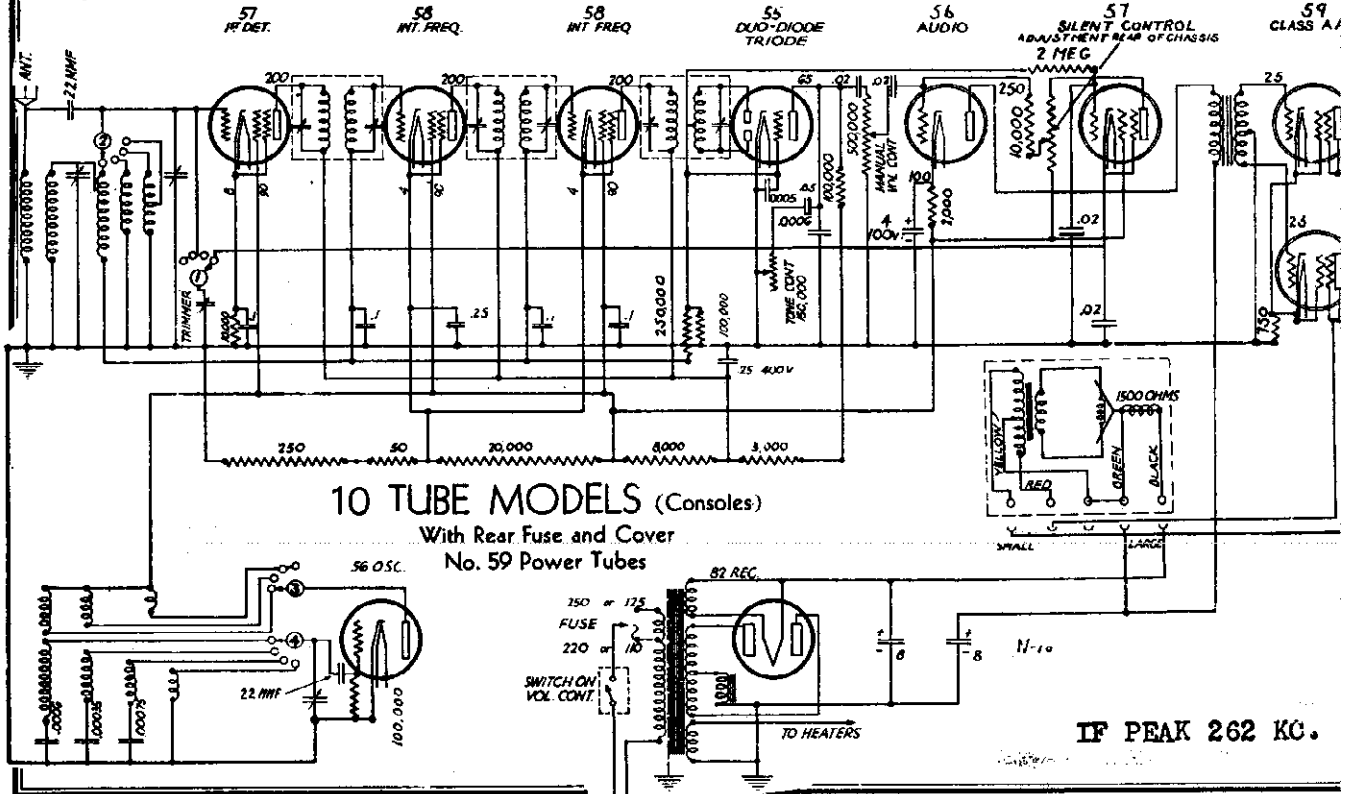
10 TUBE MODELS (Consoles)
Without Rear Fuse and Cover
No. 46 Power Tubes

Connect a 262 K.C. oscillator to the first detector grid (No. 57 tube next to the dial) leaving grid cap in place. Remove oscillator tube (No. 56). Set dial at 100. Hook up vacuum tube volt meter as described and carefully adjust 6 varitor screws for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

Set dial at 100 when gang is at maximum position and tighten dial set screws. Tune in a station (or use a oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section of gang until frequency is correct on dial.

If the intermediates are balanced on 262 K.C., the dial will now track within 5 K.C. over the entire dial. Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.



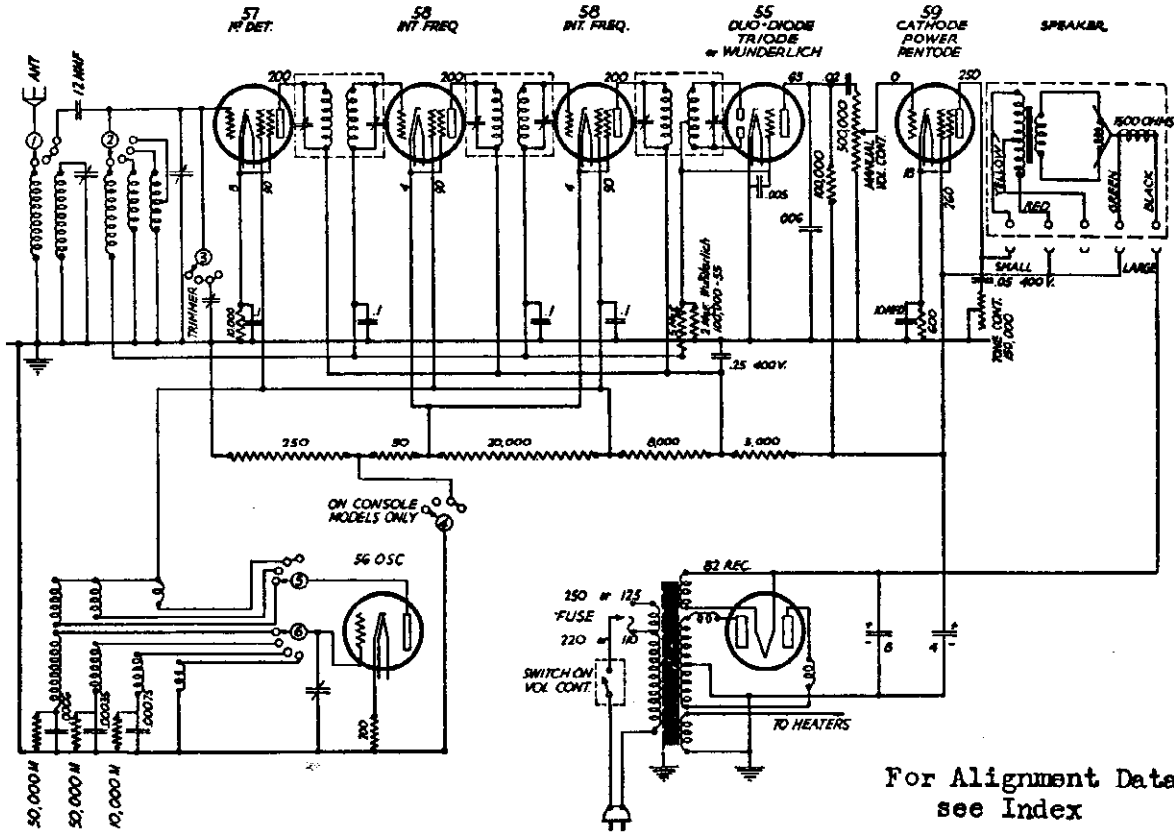
10 TUBE MODELS (Consoles)
With Rear Fuse and Cover
No. 59 Power Tubes

IF PEAK 262 KC.

MODEL P
Two Types
Schematic, Voltage

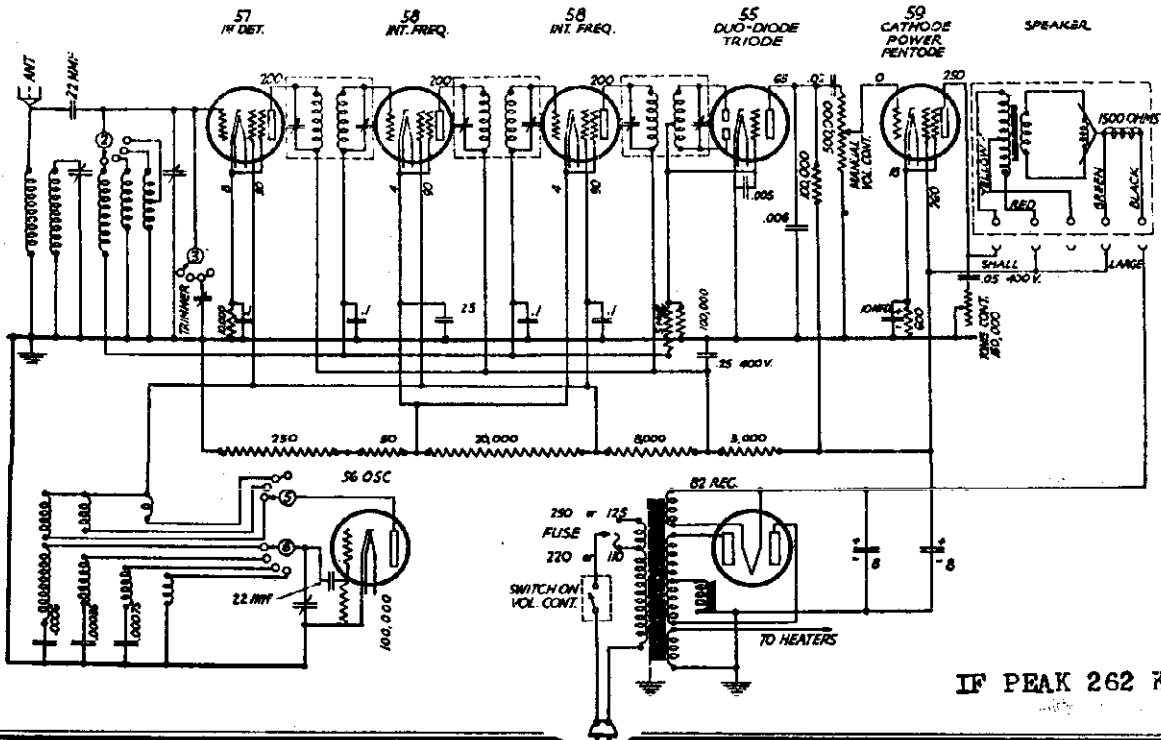
BARKER BROS.

7 TUBE MODELS (Compact and Consoles)
Without Rear Fuse and Cover



For Alignment Data,
see Index

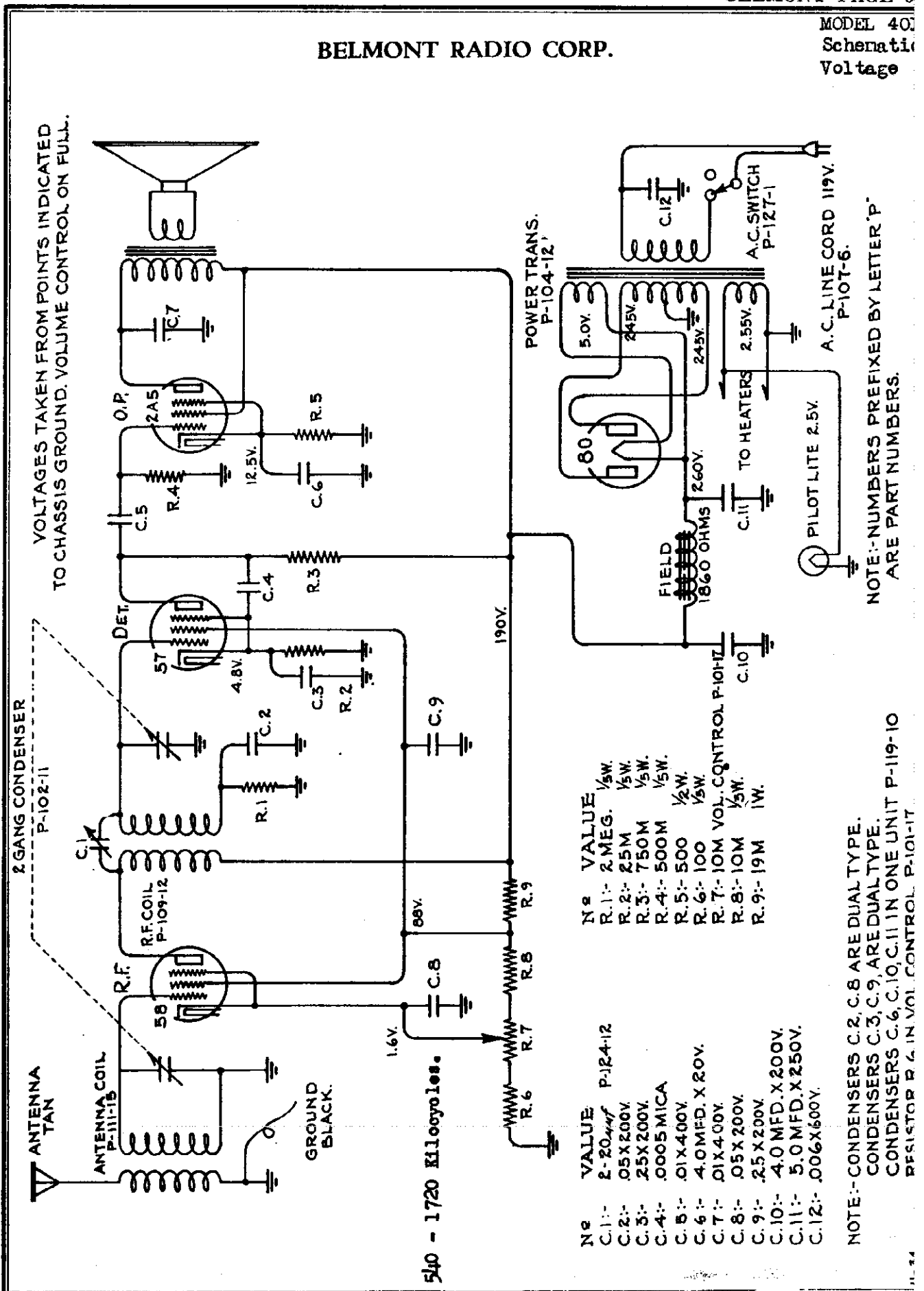
7 TUBE MODELS (Compact and Consoles)
With Rear Fuse and Cover



IF PEAK 262 KC.

BELMONT RADIO CORP.

MODEL 401
Schematic
Voltage



VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.

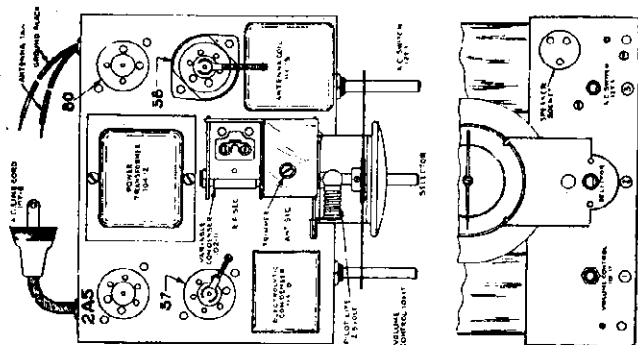
540 - 1720 Kilocycles.

- | | |
|------------------------------|---------------------------------|
| VALUE | VALUE |
| C.1:- 2-20 μ fd P-124-12 | R.1:- 2 MEG. $\frac{1}{2}$ W. |
| C.2:- .05X200V | R.2:- 25M $\frac{1}{2}$ W. |
| C.3:- .25X200V. | R.3:- 750M $\frac{1}{2}$ W. |
| C.4:- .0005 MICA | R.4:- 500M $\frac{1}{2}$ W. |
| C.5:- .01X400V. | R.5:- 500 $\frac{1}{2}$ W. |
| C.6:- 4.0 MFD. X 20V. | R.6:- 100 $\frac{1}{2}$ W. |
| C.7:- .01X4.00V. | R.7:- 10M VOL. CONTROL P-101-17 |
| C.8:- .05X200V. | R.8:- 10M $\frac{1}{2}$ W. |
| C.9:- .25X200V. | R.9:- 19M 1W. |
| C.10:- 4.0 MFD. X 200V. | |
| C.11:- 5.0 MFD. X 250V. | |
| C.12:- .006X600V. | |

NOTE:- CONDENSERS C.2, C.8 ARE DUAL TYPE.
CONDENSERS C.3, C.9, ARE DUAL TYPE.
CONDENSERS C.6, C.10, C.11 IN ONE UNIT P-119-10
RESISTOR R.4 IN VOL. CONTROL. P-101-17

MODEL 401
 Socket, Trimmers
 Alignment, Notes

BELMONT RADIO CORP.



From left to right, when facing the set, the controls are as follows:

- (1) Volume control. Clockwise, right turn, increases volume.
- (2) Center control, station selector. The top half of the pointer traverses a scale calibrated directly in kilocycles the bottom half a scale calibrated in meters. This scale is provided for your convenience, some stations are listed in kilocycles, others in meters.
- (3) Right rotation turns set on, left rotation turns set off. When turning receiver on dial will become illuminated. It is necessary to wait approximately 45 seconds for the tubes to heat up after turning set on.

MODEL 401

SERVICE MANUAL FOUR TUBE A.C. - T.R.F. RECEIVER

105-125 Volts, 60 Cycle Alternating Current - 40 Watts

FOR VOLTAGES IN EXCESS OF 125, A SPECIAL TRANSFORMER IS REQUIRED, ALSO FOR 25 CYCLES. A UNIVERSAL TRANSFORMER IS NOT AVAILABLE FOR THIS MODEL.

SERVICE NOTES

Should it ever become necessary or desirable to realign this receiver the proper procedure is as follows:

Before attempting any adjustment, the set must be disconnected from the power supply, the tubes should be checked, aerial inspected and connections cleaned if necessary. To remove chassis from cabinet, pull off volume, selector and switch knobs and remove the three bolts which fasten chassis to cabinet.

ALIGNMENT:

1. With an external oscillator set at 1720 kilocycles connected to the grid of the type 58 R.F. tube (cap at top of tube) and with the variable condenser at its minimum capacity position, plates entirely out of mesh, adjust trimmer on R.F. coil (accessible from the under side of the chassis) to resonance. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter to the plate and screen terminals of the type 2A5 output tube.
2. Re-set external oscillator to 1400 kilocycles and connect in series with a 50 mmfd. condenser, to the tan antenna lead and black ground lead and adjust the antenna trimmer (front section of variable condenser - see illustration) to resonance. When making this adjustment, rock the condenser back and forth with the selector knob while adjusting the trimmer until maximum output is obtained.
3. Bend plates of antenna, front section of condenser, to resonance with external oscillator set at 1200, 1000, 800, 600 kilocycles. Output should be fairly uniform over the entire band, dropping off slightly at the higher frequencies.

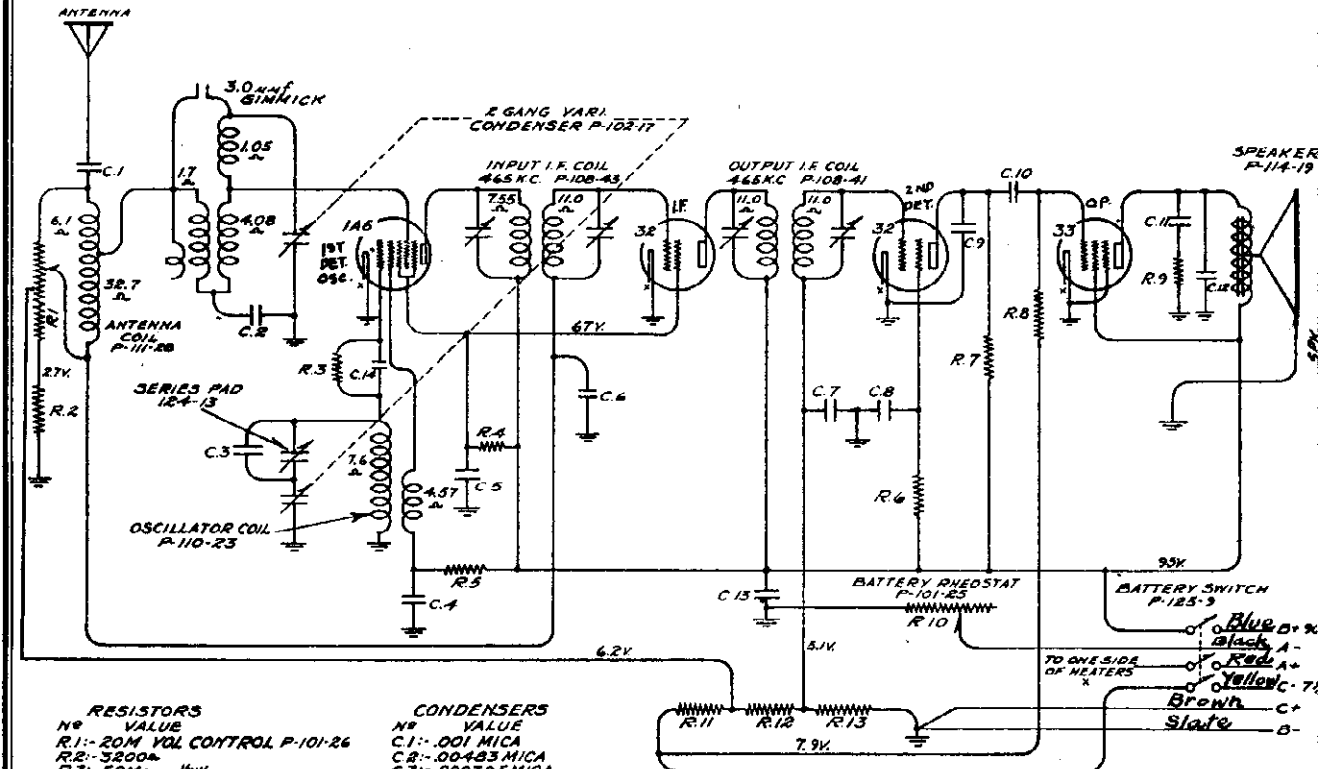
NOTES:

The pilot light used is a 2.5 volt, type T-41-G $\frac{1}{2}$. It can be replaced without removing the chassis from the cabinet, by removing the clip which fastens the assembly to the gang condenser (see illustration).

Voltages from chassis ground to different points are indicated on the schematic circuit diagram and should be measured with a voltmeter having a resistance of 1000 ohms per volt.

BELMONT RADIO CORP.

MODEL 404
Schematic, Voltages
Socket, Trimmers



RESISTORS

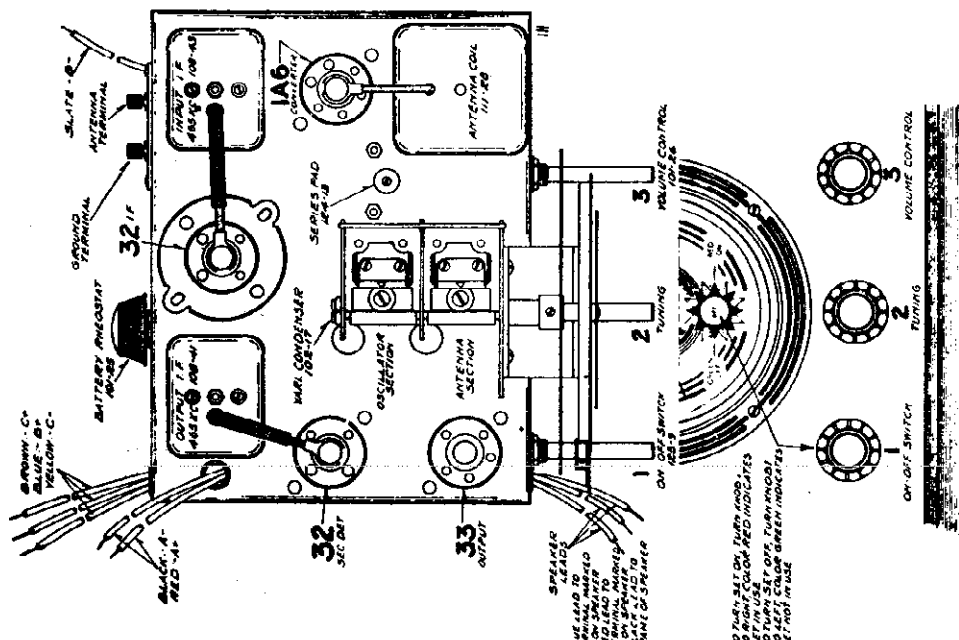
N ^o	VALUE
R.1	20M VOL CONTROL P-101-26
R.2	3200Ω
R.3	50MΩ 15W
R.4	11MΩ 15W
R.5	10MΩ 15W
R.6	3 MEGΩ 15W
R.7	750MΩ 15W
R.8	500MΩ 15W
R.9	35MΩ 15W
R.10	4Ω BAT. RHEOSTAT P-101-25
R.11	1300Ω
R.12	1920Ω
R.13	9800Ω 15W

CONDENSERS

N ^o	VALUE
C.1	.001 MICA
C.2	.00483 MICA
C.3	.000395 MICA
C.4	.01 X 200V
C.5	.05 X 200V
C.6	.25 X 200V
C.7	.05 X 200V
C.8	.01 X 200V
C.9	.00025 MICA
C.10	.01 X 400V
C.11	.01 X 400V
C.12	.0005 MICA
C.13	.25 X 200V
C.14	.00025 MICA

- NOTE -
R.2, R.11, R.12 ARE IN ONE UNIT P-106-21
C.4, C.5 ARE IN ONE UNIT P-118-11
C.6, C.13 " " " P-118-5
C.7, C.8 " " " P-118-11
NUMBERS PREFIXED BY LETTER 'P' ARE PART N^os
ALL VOLTAGES INDICATED ARE WITH NEW BATTERIES,
VOLUME CONTROL ON FULL

Serial No. 5D115200A and up



BATTERIES NEEDED

- The following batteries are needed.
- 2.....45 volt "B" Batteries.
 - 1.....7½ Volt "C" Battery.
 - 1.....3 Volt Dry "A" Battery or 2 Volt Storage Battery.

MODEL 404
Alignment, Parts
Battery Data

BELMONT RADIO CORP.

LIST OF REPAIR PARTS
Serial No. 5D115200A and up

Part No.	DESCRIPTION	No. Used In Set	MISCELLANEOUS	
	CONDENSERS			
	Unless Otherwise Listed— All Molded Mica Condensers			
	Unless Otherwise Listed— All Dual Section Tubular Paper By-Pass Condensers			
100-5	1 Mfd. x 120 V.—Plus 50%: Minus 10%	1	101-25	Filament Rheostat—4 Ohms
100-11	.01 x 400 V. + or — 25%	2	101-26	Volume Control
129-27	.00483 Mica—Type MH + or — 5%	1	102-17	Two Gang Variable Condenser
	RESISTORS		112-19	Drive Disc Assembly Complete
108-21	Metal Clad Resistor	1	112-65	Bakelite Escutcheon with Glass
	All Carbon Resistors		112-88	Dial Scale
	COILS		112-94	"On-Off" Indicator Complete with Hub and Scr
108-41	Output I.F. Coil Assembly Complete	1	112-95	Drive and Bracket Assembly Complete
108-43	Input I.F. Coil Assembly Complete	1	113-34	Antenna and Ground Strip
110-23	Oscillator Coil Complete	1	114-19	Six Inch Magnetic Speaker
111-28	Antenna Coil Assembly Complete	1	115-97	Tube Shield
			124-13	Type J-2-B Series Pad with Insulating Washer
			126-9	"On-Off" Switch
			131-2	Bakelite Knob
			131-12	Bakelite Knob with Arrow
			136	Complete Set of Connecting Wires

BROADCAST BAND ALIGNMENT:

- Set external oscillator to 1720 K.C. and connect it in series with a 200 mmfd. condenser to the antenna and ground posts.
 - With variable condenser in its minimum capacity position, plates entirely out of mesh, adjust oscillator trimmer (rear section of variable condenser) to resonance.
 - 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.
 - Re-set external oscillator to 600 K.C., move dial pointer to 600 K.C., and adjust series pad, part number 124-13 (see top view), to resonance. While making this adjustment, slowly rock variable condenser to and fro until maximum output is obtained.
 - Check for sensitivity at 800, 1000, 1200 K.C. DO NOT BEND PLATES.

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

- With volume control full on and with variable condenser at its minimum capacity position, plates entirely out of mesh, and with 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 108-41 and 108-43, 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 adaptor to the plate and screen of the type 33 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.

SERVICE DATA

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.

ALIGNING INSTRUCTIONS

CAUTION: No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as run down batteries, defective tubes, poor installations, open or grounded antenna systems, defective condensers and resistors. In order to properly align this chassis, an oscillator (generator) is necessary.

All adjustments should be made with a non-metallic screw driver.

PICTURE OF INSTRUCTIONS ATTACHED TO BACK OF CHASSIS

CAUTION
READ CAREFULLY

3 VOLT DRY "A" BATTERY OPERATION

The purpose of this knob is to reduce the 3 volt battery to the 2 volts required by the tubes.

If you use your radio about three hours each day turn the knob up one mark each week. However always keep the knob turned down as low as you can and still get proper reception. Whenever you install a new battery be sure to turn the control to the starting point marked new battery

NEVER TURN THE KNOB HIGHER THAN NECESSARY OR IT WILL BURN OUT THE TUBES AND RUN DOWN YOUR BATTERY

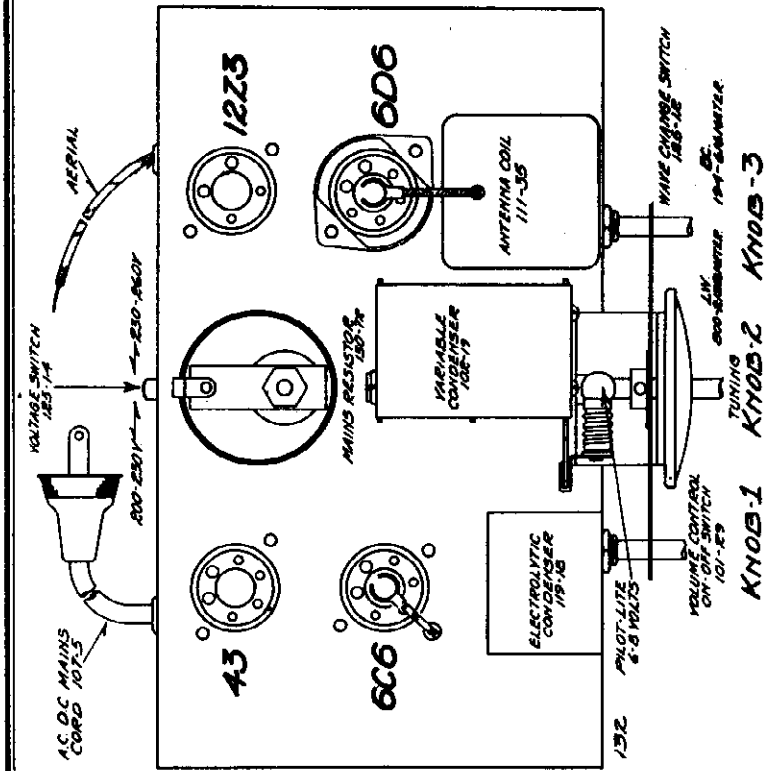
2 VOLT WET STORAGE BATTERY OPERATION

This radio may be operated with a 2 volt storage battery instead of the 3 volt Dry "A"

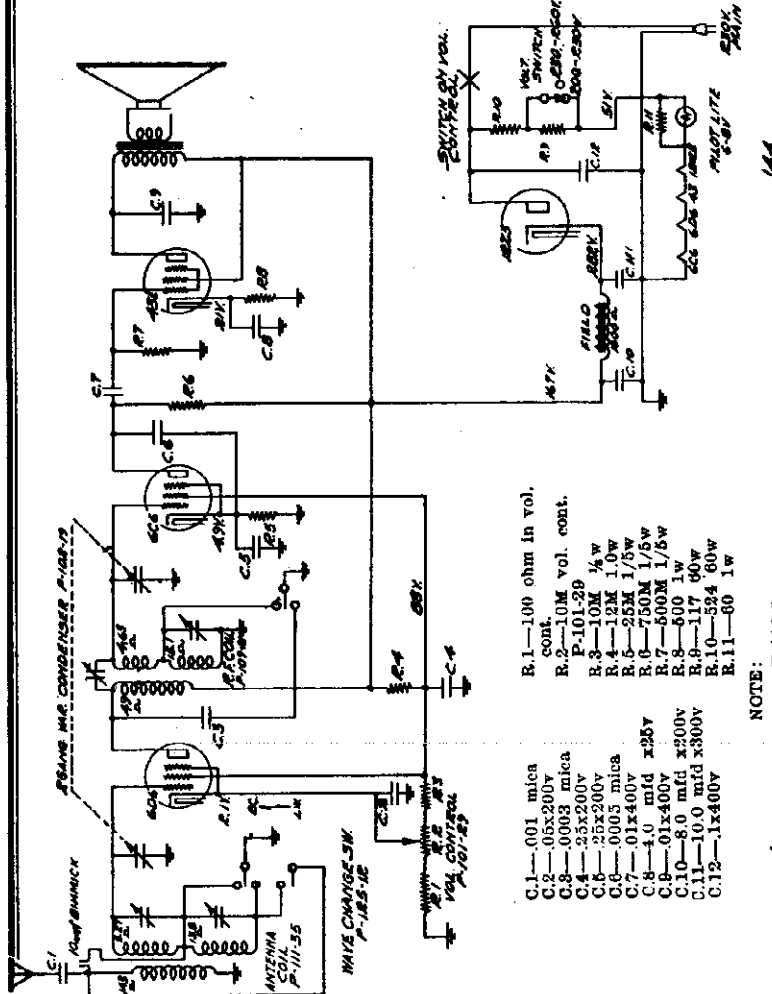
When this is done the knob at left should be turned to the point marked storage battery and left there at all times. Never attempt to use a 6 volt Auto or Radio storage battery.

BELMONT RADIO CORP.

MODEL 444
Schematic, Voltage
Socket, Chassis



- 114-23** Five Inch Dynamic
101-29 Volume Control and Switch
102-19 Two Gang Variable Condenser
107-6 Line Cord and Plug
112-15 Glass Dial Crystal Only
112-16 Dial Pointer
112-19 Dial Drive Disc Complete
112-80 Dial Bracket-Drive Complete
112-61 Pilot Light Clip
112-108 Dial Scale
112-68 Bakelite Escutcheon with Glass Complete
115-37 Resistor Shield
118-5 Pilot Light Bulb, T-80, 6-8 Volt
125-12 Wave Change Switch
125-14 Voltage Switch
115-22 Tube Shield
131-8 Bakelite Knob
131-8 Springs for Bakelite Knob
134-22 Felt Washer-(Under Knob)
135-14 Dial Pointer Screw
- MISCELLANEOUS**
- 114-23** Five Inch Dynamic
101-29 Volume Control and Switch
102-19 Two Gang Variable Condenser
107-6 Line Cord and Plug
112-15 Glass Dial Crystal Only
112-16 Dial Pointer
112-19 Dial Drive Disc Complete
112-80 Dial Bracket-Drive Complete
112-61 Pilot Light Clip
112-108 Dial Scale
112-68 Bakelite Escutcheon with Glass Complete
115-37 Resistor Shield
118-5 Pilot Light Bulb, T-80, 6-8 Volt
125-12 Wave Change Switch
125-14 Voltage Switch
115-22 Tube Shield
131-8 Bakelite Knob
131-8 Springs for Bakelite Knob
134-22 Felt Washer-(Under Knob)
135-14 Dial Pointer Screw
- SPEAKERS**
- 114-23** Five Inch Dynamic
- MISCELLANEOUS**
- 101-29** Volume Control and Switch
102-19 Two Gang Variable Condenser
107-6 Line Cord and Plug
112-15 Glass Dial Crystal Only
112-16 Dial Pointer
112-19 Dial Drive Disc Complete
112-80 Dial Bracket-Drive Complete
112-61 Pilot Light Clip
112-108 Dial Scale
112-68 Bakelite Escutcheon with Glass Complete
115-37 Resistor Shield
118-5 Pilot Light Bulb, T-80, 6-8 Volt
125-12 Wave Change Switch
125-14 Voltage Switch
115-22 Tube Shield
131-8 Bakelite Knob
131-8 Springs for Bakelite Knob
134-22 Felt Washer-(Under Knob)
135-14 Dial Pointer Screw
- Color of Dot**
- | | |
|--------|----------------|
| White | 2 1/2 % |
| Green | 5 % |
| Blue | 10 % |
| Yellow | 15 % |
| Red | 20 % |
| None | More than 20 % |
- Tolerance Percent**
- Color of Dot**
- Volume Control and Switch**
- Two Gang Variable Condenser**
- Line Cord and Plug**
- Glass Dial Crystal Only**
- Dial Pointer**
- Dial Drive Disc Complete**
- Dial Bracket-Drive Complete**
- Pilot Light Clip**
- Dial Scale**
- Bakelite Escutcheon with Glass Complete**
- Resistor Shield**
- Pilot Light Bulb, T-80, 6-8 Volt**
- Wave Change Switch**
- Voltage Switch**
- Tube Shield**
- Bakelite Knob**
- Springs for Bakelite Knob**
- Felt Washer-(Under Knob)**
- Dial Pointer Screw**
- Tolerance Percent**
- Color of Dot**
- White** 2 1/2 %
- Green** 5 %
- Blue** 10 %
- Yellow** 15 %
- Red** 20 %
- None** More than 20 %
- More than 20 %**
- 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:**



- 114-23** Five Inch Dynamic
101-29 Volume Control and Switch
102-19 Two Gang Variable Condenser
107-6 Line Cord and Plug
112-15 Glass Dial Crystal Only
112-16 Dial Pointer
112-19 Dial Drive Disc Complete
112-80 Dial Bracket-Drive Complete
112-61 Pilot Light Clip
112-108 Dial Scale
112-68 Bakelite Escutcheon with Glass Complete
115-37 Resistor Shield
118-5 Pilot Light Bulb, T-80, 6-8 Volt
125-12 Wave Change Switch
125-14 Voltage Switch
115-22 Tube Shield
131-8 Bakelite Knob
131-8 Springs for Bakelite Knob
134-22 Felt Washer-(Under Knob)
135-14 Dial Pointer Screw
- MISCELLANEOUS**
- 114-23** Five Inch Dynamic
101-29 Volume Control and Switch
102-19 Two Gang Variable Condenser
107-6 Line Cord and Plug
112-15 Glass Dial Crystal Only
112-16 Dial Pointer
112-19 Dial Drive Disc Complete
112-80 Dial Bracket-Drive Complete
112-61 Pilot Light Clip
112-108 Dial Scale
112-68 Bakelite Escutcheon with Glass Complete
115-37 Resistor Shield
118-5 Pilot Light Bulb, T-80, 6-8 Volt
125-12 Wave Change Switch
125-14 Voltage Switch
115-22 Tube Shield
131-8 Bakelite Knob
131-8 Springs for Bakelite Knob
134-22 Felt Washer-(Under Knob)
135-14 Dial Pointer Screw
- SPEAKERS**
- 114-23** Five Inch Dynamic
- MISCELLANEOUS**
- 101-29** Volume Control and Switch
102-19 Two Gang Variable Condenser
107-6 Line Cord and Plug
112-15 Glass Dial Crystal Only
112-16 Dial Pointer
112-19 Dial Drive Disc Complete
112-80 Dial Bracket-Drive Complete
112-61 Pilot Light Clip
112-108 Dial Scale
112-68 Bakelite Escutcheon with Glass Complete
115-37 Resistor Shield
118-5 Pilot Light Bulb, T-80, 6-8 Volt
125-12 Wave Change Switch
125-14 Voltage Switch
115-22 Tube Shield
131-8 Bakelite Knob
131-8 Springs for Bakelite Knob
134-22 Felt Washer-(Under Knob)
135-14 Dial Pointer Screw
- Color of Dot**
- | | |
|--------|----------------|
| White | 2 1/2 % |
| Green | 5 % |
| Blue | 10 % |
| Yellow | 15 % |
| Red | 20 % |
| None | More than 20 % |
- Tolerance Percent**
- Color of Dot**
- Volume Control and Switch**
- Two Gang Variable Condenser**
- Line Cord and Plug**
- Glass Dial Crystal Only**
- Dial Pointer**
- Dial Drive Disc Complete**
- Dial Bracket-Drive Complete**
- Pilot Light Clip**
- Dial Scale**
- Bakelite Escutcheon with Glass Complete**
- Resistor Shield**
- Pilot Light Bulb, T-80, 6-8 Volt**
- Wave Change Switch**
- Voltage Switch**
- Tube Shield**
- Bakelite Knob**
- Springs for Bakelite Knob**
- Felt Washer-(Under Knob)**
- Dial Pointer Screw**
- Tolerance Percent**
- Color of Dot**
- White** 2 1/2 %
- Green** 5 %
- Blue** 10 %
- Yellow** 15 %
- Red** 20 %
- None** More than 20 %
- More than 20 %**
- 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:**

MODEL 444
Alignment
Notes

BELMONT FOUR TUBE TWO-BAND RECEIVER

Model 444

Tuning Range

194—616 Meters
800—2136 Meters

TUBE COMPLEMENT:

1 6D6—Super control R.F. pentode as R.F. Amplifier.
1 6C6—R.F. pentode as second detector.
1 43E—Special pentode output amplifier.
1 12Z3—Rectifier.

POWER INPUT:

This receiver is designed for A.C. (any frequency) and D.C. operation over a range of 200-260 V. A line voltage switch is provided for operation from 200 to 230 and from 230 to 260 volts. The switch is mounted on the back flange of the chassis and the proper position is indicated by stamping the chassis with the voltage ranges. Chassis are sent from the factory in the high voltage position. In order to change the switch position, it is necessary to remove the back of the cabinet.

In case it is desired to use the receiver on 110 V. A.C. it is necessary to use a 110 to 220 volt transformer, having a power capacity of approximately 80 watts.

ALIGNMENT

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 chassis, pull knobs off, remove the three bolts by which chassis is fastened and the speaker plug which you will find on the rear flange of the chassis panel.

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 43E 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 voltmeter should be used.

DUMMY ANTENNAS:

Dummy (1)—Consists of .1 mfd. condenser in series with the ungrounded lead of the external oscillator.
Dummy (2)—Consists of 100 mmf. condenser in series with the ungrounded lead of the external oscillator.

TEST FREQUENCIES:

	Meters	Kilocycles
Long Wave Band	2000	150
	1200	250
	857.1	350
	800	375
	Broadcast Band	500	600
	300	1000
	214.3	1400
	193.4	1550

ALIGNMENT BROADCAST BAND:

1. Turn wave band switch to broadcast position (clockwise rotation).
2. Connect external oscillator to antenna lead through dummy (2) and set to 193.4 M.
3. Open condenser plates all the way (completely out of mesh) and align all broadcast trimmers:
 - (a) Lower hole in B.C. antenna coil shield (111-35). See top view.
 - (b) Trimmer on R.F. coil nearest end of chassis.
4. Set external oscillator to 214.3 meters. Tune in signal with receiver and realign broadcast antenna coil (3a) while rocking gang condenser to and fro until maximum output is obtained.
5. Check sensitivity and tracking at 300 and 500 meters.

ALIGNMENT LONG WAVE BAND:

1. Turn switch to long wave position (counter-clockwise).
2. Clip external oscillator on R.F. grid through dummy (1) and set at 800 meters.
3. With plates of variable condenser completely out of mesh, adjust long wave R.F. trimmer for maximum output:
 - (a) Trimmer on R.F. coil (No. 109-21) toward center of chassis.
4. Clip external oscillator on to antenna lead through dummy (1) and set at 857.1 meters.
5. Tune receiver to signal and adjust long wave antenna trimmer for maximum output:
 - (a) Upper hole in antenna coil (No. 111-35) can.
6. Check tracking and sensitivity at 1200 and 2000 meters.

SERVICE NOTES

To check for open by-pass condensers, shunt each condenser with another of similar capacity and of the same voltage rating, which is known to be good, until the defective unit is located. Open by-pass condensers frequently cause oscillation and distorted tone. Defective and shorted electrolytic filter condensers cause excessive hum, motor-boating, low volume and a reduction in all D.C. voltages. Open or shorted electrolytic and by-pass condensers (across bias resistor of type 43E tube) will cause low volume and distorted tone.

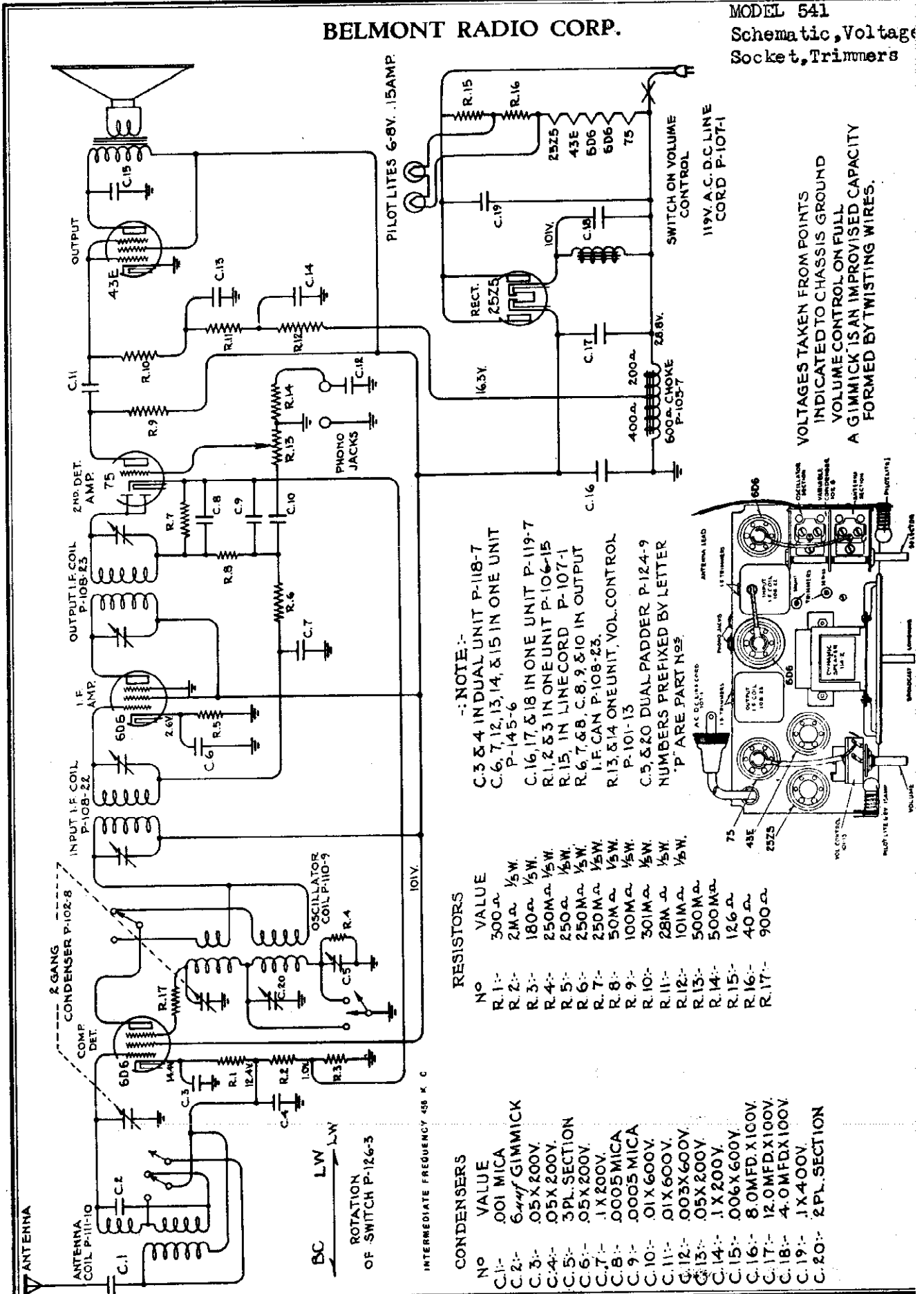
Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a voltmeter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

All voltages are measured with 230 volt mains and the switch in the 230-260 volt position.

Resistance of coils and transformer windings are indicated in ohms on schematic circuit diagram.

BELMONT RADIO CORP.

MODEL 541
Schematic, Voltage
Socket, Trimmers



NOTE :-
C.3 & 4 IN DUAL UNIT P-118-7
C.6, 7, 12, 13, 14, & 15 IN ONE UNIT P-145-6
C.16, 17, & 18 IN ONE UNIT P-119-7
R.1, 2, & 3 IN ONE UNIT P-106-15
R.15, IN LINECORD P-107-1
R.6, 7, & 8, C.8, 9, & 10 IN OUTPUT I.F. CAN P-108-23.
R.13, & 14 ONE UNIT, VOL. CONTROL P-101-13
C.5 & 20 DUAL PADDER P-124-9
NUMBERS PREFIXED BY LETTER 'P' ARE PART NOS

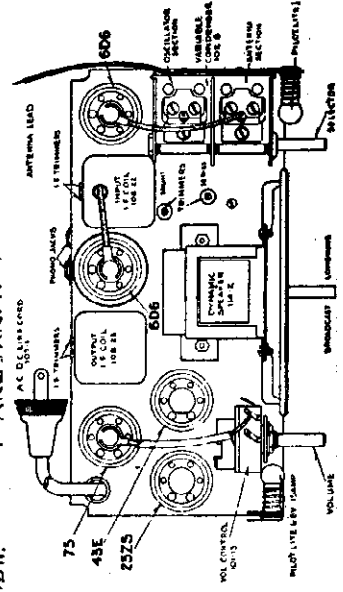
RESISTORS

No	VALUE
R.1:-	300Ω
R.2:-	2MΩ 1/2W
R.3:-	180Ω 1/2W
R.4:-	250MΩ 1/2W
R.5:-	250Ω 1/2W
R.6:-	250MΩ 1/2W
R.7:-	250MΩ 1/2W
R.8:-	50MΩ 1/2W
R.9:-	100MΩ 1/2W
R.10:-	301MΩ 1/2W
R.11:-	28MΩ 1/2W
R.12:-	500MΩ
R.13:-	500MΩ
R.14:-	126Ω
R.15:-	40Ω
R.16:-	900Ω
R.17:-	

CONDENSERS

No	VALUE
C.1:-	.001 MICA
C.2:-	6-447 GIMMICK
C.3:-	.05X200V.
C.4:-	.05X200V.
C.5:-	3PL SECTION
C.6:-	.05X200V.
C.7:-	.1X200V.
C.8:-	.0005 MICA
C.9:-	.0005 MICA
C.10:-	.01X600V.
C.11:-	.01X600V.
C.12:-	.003X600V.
C.13:-	.05X200V.
C.14:-	.1X200V.
C.15:-	.006X600V.
C.16:-	8.0MFD. X100V.
C.17:-	12.0MFD. X100V.
C.18:-	4.0MFD. X100V.
C.19:-	.1X400V
C.20:-	2 PL SECTION

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND VOLUME CONTROL ON FULL A GIMMICK IS AN IMPROVED CAPACITY FORMED BY TWISTING WIRES.



MODEL 541
Alignment
Parts, Notes

BELMONT RADIO CORP.

- (b) Re-set external oscillator to 150 kilocycles. Plot up oscillator signal by rotating variable condenser and adjusting the long wave series paddler, adjustable from top of chassis, adjustment located between speaker and variable condenser. Front hole marked "series" on top view. When making this adjustment, antenna wire should be held to the small hole in the chassis. Frequency by reading the variable condenser at the paddler is adjusted until maximum output is obtained.
- (c) When adjusting long wave series paddler, as explained in 9, retune adjustment of short paddler, as explained in 4, DO NOT BEND PLATES.

NOTES:

The pilot lights are connected in series. Should one burn out, the other will not light. To replace them it is necessary to remove chassis from cabinet. The lamps used are 5-8 volts, .15 amperes.

Volts from chassis to different points are indicated on the schematic circuit diagram and should be measured with a volt meter having a resistance of 1000 ohms per volt.

To convert kilocycles to meters, divide 300,000 by the frequency in kilocycles.

PARTS LIST
MODEL 541

When ordering parts, always specify part and model number as well as serial number of chassis.

PART NO.	DESCRIPTION	PAGE NO.	DESCRIPTION
101-13	Phono-Radio Volume Control	112-52	Selector Scale (541)
102-8	Two Gang Variable Condenser	112-53	Volume Scale (541)
105-7	Choke - 600 Ohms	115-22	No. 01360 Tube Shield
106-1	40 Ohm Metal Grid Resistor	115-23	Tube Shield Base
106-15	2400 Ohm Metal Grid Resistor	116-5	6-8 Volt Pilot Light
107-1	Coil & Plug (1.26 Ohm)	119-7	12-0-5 Mfd. Electrolytic Cond.
108-22	Input I.F. Transformer	124-9	Dual Padder (2 Plate Bus 3 Plate)
108-23	Output I.F. Transformer	126-3	Wave Change Switch
110-9	Oscillator Coil	131-1	Small Knob (Tune & L.W. Switch)
111-10	Antenna Coil	131-6	Knob (Volume & Selector)
112-11	Pilot Light Bracket	145-6	.250 Mfd. By-Pass Cond. Block
		171-1	Phono-Jack

All resistors are RMA coded - specify value and/or resistor number (per schematic diagram) and model number. When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

MODEL 541

SERVICE MANUAL FIVE TUBE TWO BAND SUPERHETERODYNE WITH A.T.C.

105-125 Volts Alternating (any cycles) or Direct Current - 40 Watts
FOR VOLTAGES IN EXCESS OF 125 AND UP TO 270 VOLTS AN EXTERNAL RESISTOR MUST BE USED SUCH AS AN ADDITIONAL LENGTH OF SPIRAL RESISTANCE COND.

200-590 Meters - 1000-3000 Meters

The tube complement of this chassis is as follows:

- 1 Type 6X6 - remote cut-off pentode as oscillator and first detector
- 1 Type 6X6 - remote cut-off pentode as intermediate frequency amplifier (456 k.c.s.)
- 1 Type 7A - diode triode as slide detector AVC and first AF amplifier
- 1 Type 6AR - remote output diode amplifier
- 1 Type 26Z5 - high vacuum rectifier.

SERVICE NOTES

Should it ever become necessary or desirable to re-align this receiver the proper procedure is as follows:

Before attempting any adjustments, the set must be disconnected from the power supply and the chassis removed from the cabinet. To remove the chassis, pull off the volume, selector and wave changing action knobs, remove the back and four screws that fasten the chassis to the cabinet. Insert plug in receptacle and proceed as follows:

I.F. ALIGNMENT:

- 1. With volume control on full, at the extreme right of its rotation, and with variable condenser at its maximum capacity position (extreme right of its rotation) make the following adjustments:
 - (a) Connect an external oscillator adjusted to 150 kilocycles, in series with a .1 mfd. condenser, to the control grid (cap at top of the 606 tube), located directly in back of the variable condenser.
 - (b) Adjust trimming condensers of both input (108-22) and output (108-23) I.F. transformers (see top view of chassis) to resonance. Use a resonance indicator and output meter connected across the primary of the speaker input transformer or between the plate and screen terminals of the type 12E tube, by means of an adapter. Maximum deflection on the meter indicates resonance.

Note: There are two trimmer adjustments on each I.F. transformer, they are accessible from the back of the chassis.

BROADCAST ALIGNMENT:
(200-590 Meters)

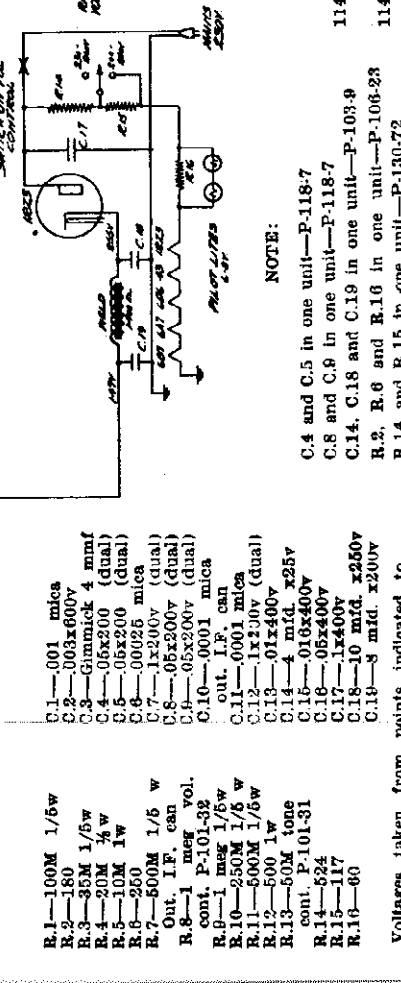
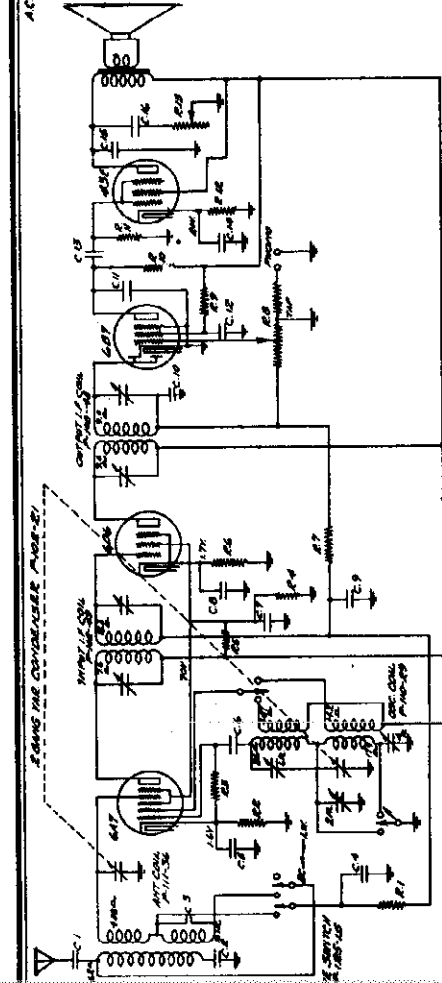
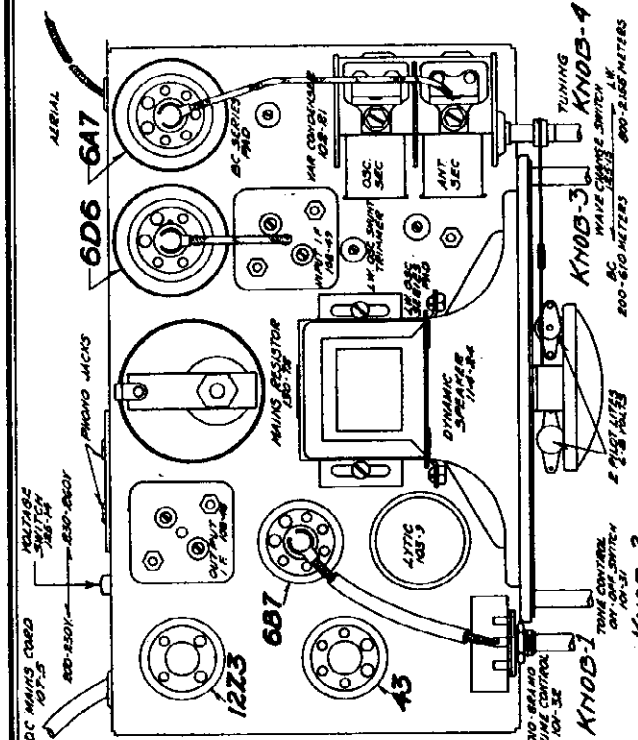
- 1. The broadcast band is aligned first. Rotate wave changing switch to the extreme left of its rotation. (Switch located directly under dynamic speaker).
- (a) Attach an external oscillator set at 1550 kilocycles, to the grid of the 606 tube, located in back of the variable condenser. With variable condenser at its minimum capacity position, extreme left of its rotation, plates entirely out of mesh, adjust the trimmer of the oscillator (rear section of the variable condenser) to resonance.
- (b) Re-set external oscillator to 1400 kilocycles. Change connection of oscillator output lead from cap of 606 to tan antenna wire. Rotate variable condenser until signal is picked up, then adjust antenna trimmer (front start section of variable condenser) to resonance.
- (c) Check output at 1200-1000-500-600 kilocycles. Bend plates of antenna section, front shaft of variable condenser, if required (do not bend plates of oscillator, rear, section of variable condenser).

LONG WAVE ALIGNMENT:
(1000-3000 Meters)

- 1. Rotate wave changing switch to the extreme right of its rotation.
 - (a) With external oscillator set at 350 kilocycles and connected to the tan antenna lead, rotate variable condenser until signal is picked up, then adjust long wave shunt paddler. This adjustment is accessible from the top of the chassis, between the variable condenser and the speaker and is the rear hole marked "long" on the top view of the chassis. When making this adjustment, care must be taken to hold the antenna wire to the frequency of the external oscillator by rotating variable condenser as the paddler is adjusted, until maximum output is obtained.

BELMONT RADIO CORP.

MODELS 544, 545
Schematic, Voltage
Socket, Trimmers
Parts List



NOTE:—Above diagram of Model 544-545 exactly the same except speaker is mounted in cabinet and dial is mounted on bracket secured to chassis.

- SPEAKERS**
- 114-24 Six Inch Dynamic (FOR MODEL 544 ONLY)—Plug and Bracket
 - 114-25 Six Inch Dynamic (FOR MODEL 545 ONLY)—Leads—Less Bracket
- COILS**
- Output I.F. Transformer Complete with Can
 - Input I.F. Transformer Complete with Can
 - Oscillator Coil Assembly Complete
 - Antenna Coil Complete

- MISCELLANEOUS**
- 101-31 Tone Control and Switch
 - 101-32 Volume Control—Less Switch
 - 102-21 Two Gauz Variable Condenser
 - 107-5 Line Cord and Plug
 - 107-9 Pilot Light Assembly
 - 112-111 Dial Drive Complete with Dial
 - 112-112 Metal Escutcheon Only
 - 115-23 Tube Shield
 - 115-37 Resistor Shield
 - 118-5 Pilot Light Bulb, 6-8 Volt, T-50
 - 124-14 J-6-S Single Padder
 - 124-20 J-4-2D Dual Padder
 - 125-14 Voltage Switch
 - 125-15 Band Switch
 - 131-2 Bakelite Knob
 - 131-8 Springs for Bakelite Knob
 - 134-22 Felt Washer (Under Knob)

NOTE:

- C.4 and C.5 in one unit—P-118-7
- C.8 and C.9 in one unit—P-118-7
- C.14, C.18 and C.19 in one unit—P-103-9
- R.2, R.8 and R.16 in one unit—P-106-23
- R.14 and R.15 in one unit—P-130-72
- C.7 and C.12 in one unit—P-118-1

Serial No. 5G132551A and up, 108-48
NOTE:—Buffer Resistor (106-24) of 300 Ohms added in series with cathode of 1273 not shown on diagram.

REPAIR PARTS LIST—MODEL 544-545

Part No.	Description	Serial No. 5G132551A and up
100-1	.1 x 400 Volt Tubular	
100-11	.01 x 400 Volt Tubular	
100-12	.008 x 600 Volt Tubular	
100-28	.016 x 400 Volt—.05 x 400 Volt Dual Tubular	
103-9	10 x 8 x 4 Electrolytic	
118-1	1.1 x 200 Volt Dual Tubular	
118-7	.05 x 200 Volt Dual Tubular	
129-1	.001 Mica—Type MT—20%	
106-23	Carbon Resistor Strip	
106-24	300 Ohm—2 Watt—Metal Clad Resistor	
130-3	500M Ohm—1/2 Watt—20%—100 Volt Carbon	
130-19	1M Ohm—1/2 Watt—20%—100 Volt Carbon	
130-20	100M Ohm—1/2 Watt—20%—50 Volt Carbon	
130-21	20M Ohm—1/2 Watt—20%—20 Volt Carbon	
130-45	250M Ohm—1/2 Watt—20%—50 Volt Carbon	
130-57	35M Ohm—1/2 Watt—20%—50 Volt Carbon	
130-72	641 Ohm—Vitreous Enamel Resistor	
130-77	10M Ohm—1 Watt—20%—100 Volt Carbon	

MODEL 544, 545
Alignment, Notes

BELMONT Model 544 and 545
FIVE TUBE TWO BAND SUPERHETERODYNE
With A. V. C., 200-260 Volts Alternating (any frequency) or Direct Current
200-610 Meters — 800-2155 Meters

adapter between the plate and screen terminals of the type 43E 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.

NOTE: All trimmer adjustments are made from the top of chassis.

Dummy Antennas

Two dummy antennas are required:
Dummy (1)—consists of a 1 mfd. condenser in series with the external oscillator.
Dummy (2)—consists of a 200 mfd. condenser and a 20 ohm resistor in series with each other and in series with the external oscillator.

DESCRIPTION

The tube complement of this chassis is as follows:

- 1—Type 6A7—Remote cut-off pentagrid converter as oscillator and first detector.
- 1—Type 6J6—Remote cut-off pentode as intermediate frequency amplifier (455 K.C.).
- 1—Type 6B7—Duplex diode pentode as a diode detector AVC and first A.F. amplifier.
- 1—Type 43E—Pentode output A.F. amplifier.
- 1—Type 12Z5—High vacuum rectifier.

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 EFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages should be measured with the switch in the high voltage position with 250 volts A.C. or D.C. on the line. In case it is impossible to secure the exact mains voltage, suitable allowances should be made.

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

To check for open by-pass condensers, short 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 6 shorted electrolytic condensers; open by-pass condensers frequently cause oscillation and distorted tone.

Dial Replacement:

To replace broken or frayed drive cord, turn set off (on model 545 only, pull out speaker plug), remove four chassis mounting bolts, four knobs and withdraw chassis from cabinet. Take off drive

bracket assembly by removing two nuts and bolts, which hold Dummy (2)—consists of a 200 mfd. condenser and a 20 ohm resistor in series with each other and in series with the external oscillator.

Remove old cord by taking out the set screws that hold it in place, salvaging the spring. Put both set screws back in place as they were, knotting a new piece of fish line 10-inches long around the set screw on the dial drive, about 3 inches from one end. Pass drive assembly to chassis with nuts and bolts.

With the heads of the set screws pointing opposite each other, namely, east and west, pull cord tightly and knot it around the end of the cord, threading the other end of cord through opposite side of spring. Pull tightly and tie in place while spring is in tension. Cut off hanging ends of cord (on model 545 only, plug in speaker), put chassis back in cabinet and fasten in place.

ALIGNING INSTRUCTIONS

Should it ever become necessary or desirable to re-align the receiver, the proper procedure is as follows:

CAUTION: NO ALIGNING ADJUSTMENTS SHOULD BE ATTEMPTED WITHOUT FIRST THOROUGHLY CHECKING OVER ALL OTHER POSSIBLE CAUSES OF TROUBLE, SUCH AS POOR INSTALLATIONS, OPEN OR GROUNDING ANTENNA SYSTEMS, LOW LINE VOLTAGES, DEFECTIVE TUBE TUBES, CONDENSERS AND RESISTORS.

In order to properly align this chassis, an oscillator (generator) is absolutely necessary.

Before attempting any adjustments, the set must be disconnected from the power supply and the chassis removed from the cabinet. To remove the chassis, pull off the volume, selector, tone control and wave changing switch knobs, remove the back and the four screws that fasten the chassis to the cabinet. Insert plug in receptacle and proceed as instructed.

In the case of the Model 544, the speaker is an integral part of the chassis and will be removed with the chassis. In the case of the Model 545, however, the speaker is fastened to the cabinet and connected to the chassis by a plug. It is generally not necessary to remove the speaker from the cabinet, as the cabinet can be tilted in such a manner as to permit alignment with speaker in cabinet adjacent to chassis.

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an

output meter between the plate and screen terminals of the type 43E 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.

NOTE: All trimmer adjustments are made from the top of chassis.

Dummy Antennas

Two dummy antennas are required:
Dummy (1)—consists of a 1 mfd. condenser in series with the external oscillator.
Dummy (2)—consists of a 200 mfd. condenser and a 20 ohm resistor in series with each other and in series with the external oscillator.

TEST FREQUENCIES:

1. Set wave changing switch in long wave position (extreme right of its rotation).

2. Connect external oscillator set at 800 meters in series with "Dummy 1", to the grid of type 6A7 tube (cap at top of tube).

3. Set variable condenser in its minimum capacity position (plates entirely out of mesh), dial pointer reading 800 meters.

4. Tune in external oscillator signal by adjusting long wave oscillator shunt trimmer (this adjustment is accessible from top of chassis and is located to the left of variable condenser rear hole—see top view).

5. Re-set external oscillator and move dial pointer to exactly 200 meters.

6. Tune in external oscillator signal by adjusting long wave oscillator series pad (this adjustment is accessible from top of chassis, located to the left of variable condenser front hole).

7. Re-set external oscillator and move dial pointer to 800 meters and re-check adjustment "g".

LONG WAVE BAND ALIGNMENT:

1. Set wave changing switch in long wave position (extreme right of its rotation).

2. Connect external oscillator set at 800 meters in series with "Dummy 1", to the grid of type 6A7 tube (cap at top of tube).

3. Set variable condenser in its minimum capacity position (plates entirely out of mesh), dial pointer reading 800 meters.

4. Tune in external oscillator signal by adjusting long wave oscillator shunt trimmer (this adjustment is accessible from top of chassis and is located to the left of variable condenser rear hole—see top view).

5. Re-set external oscillator and move dial pointer to exactly 200 meters.

6. Tune in external oscillator signal by adjusting long wave oscillator series pad (this adjustment is accessible from top of chassis, located to the left of variable condenser front hole).

7. Re-set external oscillator and move dial pointer to 800 meters and re-check adjustment "g".

BROADCAST BAND ALIGNMENT:

1. With wave changing switch still in broadcast position (left rotation) and with variable condenser in its minimum capacity position (plates entirely out of mesh), set dial at 200 meters.

2. Connect external oscillator set at 200 meters in series with "Dummy 2", to the tan antenna lead.

3. Adjust broadcast oscillator trimmer to resonance (this is adjustment on top of variable condenser rear section).

4. Re-set variable condenser until dial pointer reads exactly 545 meters.

5. Re-set external oscillator to exactly 545 meters

IMPORTANT: It is necessary to make the following adjustments when installing a new replacement antenna coil:

1. Connect external oscillator set at 857 meters in series with "Dummy 2", to tan antenna lead and adjust grinnick condenser by unwinding on antenna coil (grinnick is especially formed by winding fine wire over a larger wire) for maximum deflection on output meter. While making this adjustment on the grinnick, rock variable condenser to and fro to make certain that set is still in tune with external oscillator.

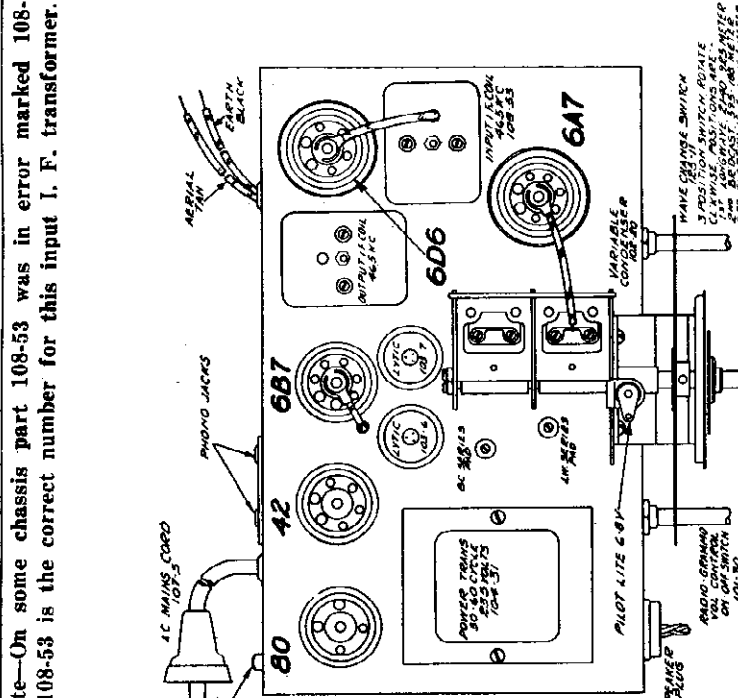
2. Re-set external oscillator to 2000 meters, tune in signal by rotating variable condenser and adjust long wave series pad as in "g" until maximum output is obtained.

Socket, Trimmers
Parts List

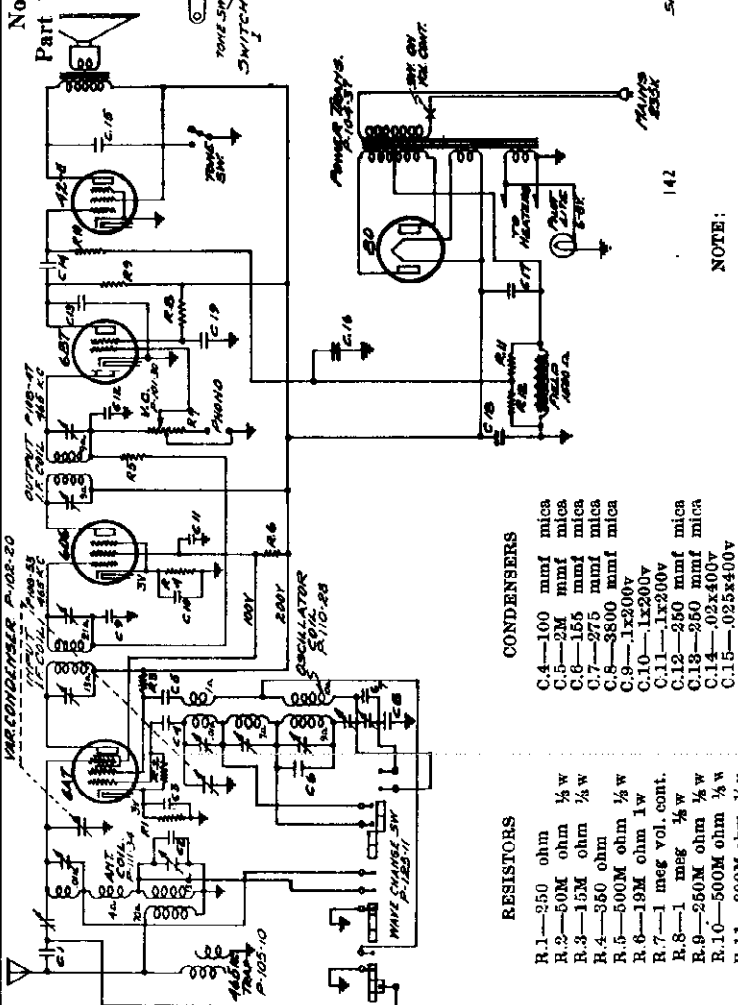
BELMONT RADIO CORP.

MODEL 555
Schematic, Voltage

Note—On some chassis part 108-53 was in error marked 108-38. Part 108-53 is the correct number for this input I. F. transformer.



Part No.	Description	Part No.	Description
104-31	50/00 Cycle—235 Volt Primary	112-75	Compression Spring Only
104-37	40 Cycle—235 Volt Primary	112-98	Dial Scale
104-38	25 Cycle—235 Volt Primary	116-22	Tube Shield
104-39	Universal—40 Cycle Primary	116-5	Pilot Light Bulb, 6.8 Volt, T-50
104-40	Universal—25 Cycle Primary	124-19	J-6-4D Dual Padder
		125-11	Wave Change Switch
		131-2	Bakelite Knob
		131-8	Springs for Bakelite Knob
		134-22	Felt Washer (Under Knob)
		135-14	Dial Pointer Screw
		143-1	Tone Switch
		171-2	Phono-jack Assembly
			Drive Bracket Assembly Complete with Ring



Part No.	Description	Part No.	Description
104-31	50/00 Cycle—235 Volt Primary	112-75	Compression Spring Only
104-37	40 Cycle—235 Volt Primary	112-98	Dial Scale
104-38	25 Cycle—235 Volt Primary	116-22	Tube Shield
104-39	Universal—40 Cycle Primary	116-5	Pilot Light Bulb, 6.8 Volt, T-50
104-40	Universal—25 Cycle Primary	124-19	J-6-4D Dual Padder
		125-11	Wave Change Switch
		131-2	Bakelite Knob
		131-8	Springs for Bakelite Knob
		134-22	Felt Washer (Under Knob)
		135-14	Dial Pointer Screw
		143-1	Tone Switch
		171-2	Phono-jack Assembly
			Drive Bracket Assembly Complete with Ring

REPAIR PARTS LIST—MODEL 555

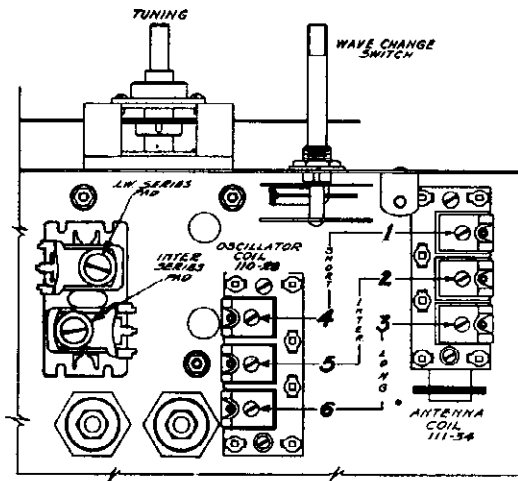
Serial No. 5G131400A and up	Serial No. 5G131400A and up
100-39	100-39
100-40	100-40
100-26	100-26
100-27	100-27
103-6	103-6
103-7	103-7
118-1	118-1
129-3	129-3
129-5	129-5
129-6	129-6
129-12	129-12
129-29	129-29
129-33	129-33
129-35	129-35

MODEL 555

Trimmers

Alignment, Notes

BELMONT RADIO CORP.



ALIGNING I. F. TRANSFORMERS:

1. With volume control full on, the extreme right of its rotation, and with wave changing switch in the broadcast position, center of its rotation, and with variable condenser at its minimum capacity position, plates entirely out of mesh, adjust the I.F. transformers (two adjustments at the top of parts number 108-47 and 108-53—see top view).
 - (a) Connect external oscillator which has been adjusted to 645.1 meters in series with I.F. dummy antenna, to the control grid cap of the type 6D6 tube and chassis ground. Adjust output I.F. transformer, part number 108-47, to resonance.
 - (b) Move generator output clip from grid of 6D6 to grid cap of 6A7 tube and align input I.F. transformer, part number 108-53.
 - (c) With generator connected to grid of type 6A7 tube, re-adjust output I.F. transformer, part number 108-47, to resonance.

BROADCAST BAND ALIGNMENT:

(188-595 meters)

1. With wave changing switch in the broadcast position, center of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with broadcast dummy antenna to tan antenna and black ground leads and make the following adjustments:
 - (a) With external oscillator set at 187.5 meters, adjust oscillator trimmer to resonance, for location of this adjustment, number 5, see diagram.
 - (b) Re-set external oscillator to 214.3 meters, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. For location of this adjustment, number 2, see diagram.
 - (c) Re-set external oscillator to 500 meters and adjust series pad to resonance, rotate condenser and move dial pointer to 500 meters by gently rocking condenser to and fro. Pick up oscillator signal while adjusting series pad to resonance, maximum deflection on an output meter. This adjustment is accessible from the top of the chassis and is located between variable condenser and power transformer, rear hole see top view—part number 124-19.
 - (d) Check for tracking and sensitivity at 300 meters.

SHORT WAVE BAND ALIGNMENT:

(16.5-56.6 meters)

1. Set wave changing switch to short wave position, extreme right of its rotation, set dial pointer to 16.7 meters.
 - (a) With external oscillator adjusted to 16.7 meters and connected in series with short wave dummy antenna to tan antenna and black ground leads, adjust the oscillator short wave trimmer until generator signal is picked up. For location of this adjustment, number 4, see diagram.
 - (b) Adjust short wave antenna trimmer to resonance. For location of this adjustment, number 1, see diagram.
 - (c) Re-set external oscillator to 50 meters, rotate condenser, move dial pointer to 50 meters, and check for tracking and sensitivity. Do not bend plates. **Note: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall at a higher wave length.**

LONG WAVE BAND ALIGNMENT:

(925-2140 Meters)

1. With wave changing switch in long wave position (extreme left of its rotation) and with variable condenser in its minimum capacity position (plates entirely out of mesh), make the following adjustments:
 - (a) With external oscillator set at 923 meters and connected in series with "Dummy 2" to the tan antenna lead, adjust rear trimmer of oscillator coil (adjustment No. 6, see diagram) until oscillator signal is picked up.
 - (b) Adjust rear trimmer of antenna coil to resonance with oscillator (adjustment No. 3, see diagram).
 - (c) Re-set external oscillator to 2000 meters and rotate variable condenser (move pointer) and pick up oscillator signal, adjust L.W. pad (front adjustment accessible from top of chassis and located between variable condenser and power transformer) to resonance. While making this adjustment, slowly rock variable condenser to and fro until maximum output is obtained.

SERVICE NOTES:

To check for open by-pass condensers, shunt each condenser with another of similar capacity and of the same voltage rating, which is known to be good, until the defective unit is located. Open by-pass condensers frequently cause oscillation and distorted tone. Defective and shorted electrolytic filter condensers cause excessive hum, motor-boating, low volume and a reduction in all D.C. voltages. Open or shorted electrolytic and by-pass condensers (across bias resistor of type 42E tube) will cause low volume and distorted tone.

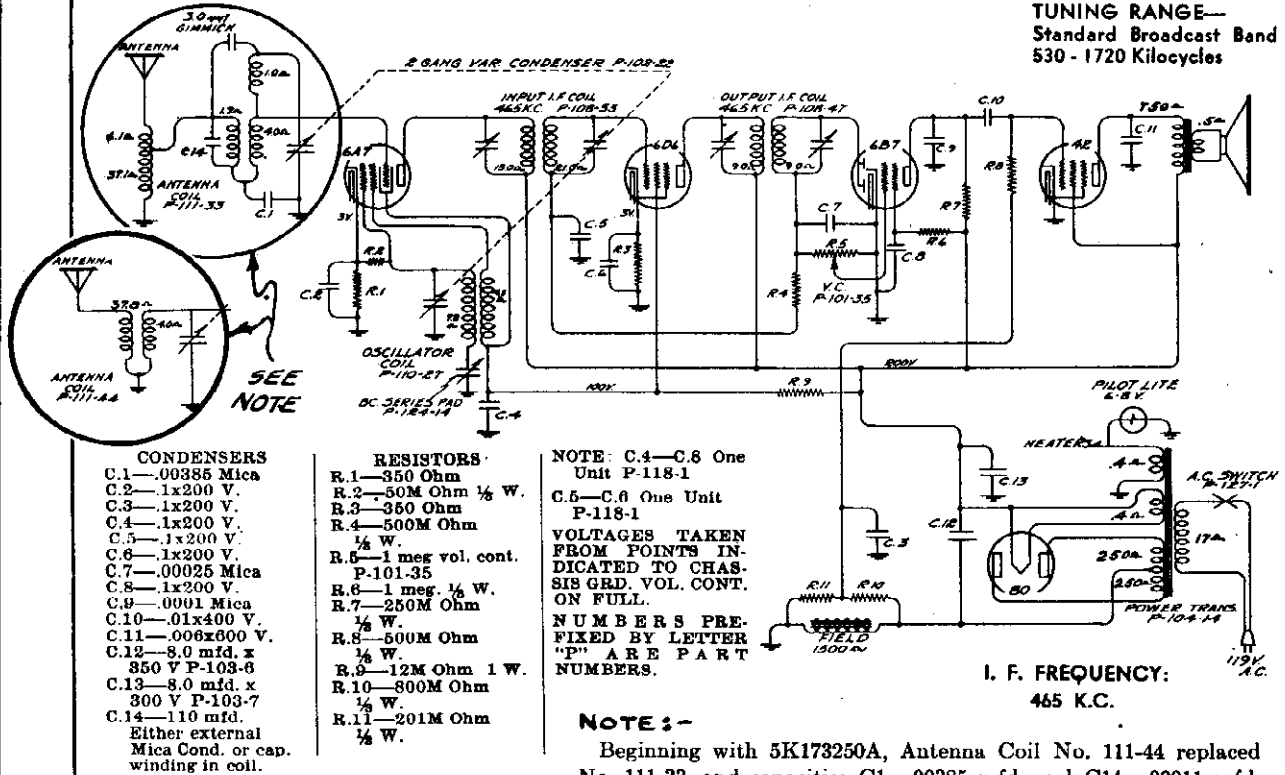
Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. The drive may be disassembled to replace the compression spring (part number 112-31) by removing the two screws which fasten it to the dial bracket. Before re-assembling all parts should be carefully cleaned and a small amount of vaseline applied to the ball bearings. All other dial parts are hardened and should cause no trouble.

BELMONT RADIO CORP.

MODEL 578 (Two Types)
Serial 5G133670A to
5K173250A and
Above Serial 5K173250A
Schematic, Voltage, Parts

MODEL 578—5G133670A—5K173250A

TUNING RANGE—
Standard Broadcast Band
530 - 1720 Kilocycles



- CONDENSERS**
- C.1—.00385 Mica
 - C.2—1x200 V.
 - C.3—1x200 V.
 - C.4—1x200 V.
 - C.5—1x200 V.
 - C.6—1x200 V.
 - C.7—.00025 Mica
 - C.8—1x200 V.
 - C.9—.0001 Mica
 - C.10—.01x400 V.
 - C.11—.006x600 V.
 - C.12—8.0 mfd. x 350 V P-103-6
 - C.13—8.0 mfd. x 300 V P-103-7
 - C.14—110 mfd.
- Either external Mica Cond. or cap. winding in coil.

- RESISTORS**
- R.1—350 Ohm
 - R.2—50M Ohm 1/2 W.
 - R.3—350 Ohm
 - R.4—500M Ohm 1/2 W.
 - R.5—1 meg. vol. cont. P-101-35
 - R.6—1 meg. 1/2 W.
 - R.7—250M Ohm 1/2 W.
 - R.8—500M Ohm 1/2 W.
 - R.9—12M Ohm 1 W.
 - R.10—800M Ohm 1/2 W.
 - R.11—201M Ohm 1/2 W.

NOTE: C.4—C.8 One Unit P-118-1
C.5—C.6 One Unit P-118-1

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GRD. VOL. CONT. ON FULL.

NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.

NOTE:—
Beginning with 5K173250A, Antenna Coil No. 111-44 replaced No. 111-33, and capacities C1—.00385 mfd. and C14—.00011 mfd. were eliminated. Note: On early models C14 was a capacity winding on the primary of the No. 111-33 Antenna Coil.

See revised diagram

REPAIR PARTS LIST
MODEL 578 - SERIES A
Serial No. 5G133670A and up

PART NO.	DESCRIPTION		
CONDENSERS			
100-11	.01 x 400 Volt Tubular Condenser	121-6	Six Prong Socket - Type 42
100-19	.006 x 600 Volt Tubular Condenser	121-6	Six Prong Socket - Type 6D6
100-20	1 x 200 Volt Tubular Condenser	121-7	Seven Prong Socket - Type 6B7
103-6	8 Mfd. x 350 Volt Electrolytic Condenser	121-7	Seven Prong Socket - Type 6A7
103-7	8 Mfd. x 300 Volt Electrolytic Condenser	121-8	Five Prong Socket - Type Speaker
118-1	Dual 1 x 200 Volt Tubular	121-9	Four Prong Socket - Type 80
129-5	.0001 Mica - Type MT - 20%	SPEAKER	
129-12	.00025 Mica - Type MT - 20%	114-15	Six Inch Dynamic Speaker
129-43	.00385 Mica - Type MW - 5%	114-16	Five Inch Dynamic Speaker
RESISTORS			
130-3	500M Ohm - 1/2 Watt - 20% - 100 Volt Carbon	MISCELLANEOUS	
130-8	201M Ohm - 1/2 Watt - 10% - 20 Volt Carbon	101-35	Volume Control - Less Switch
130-11	250M Ohm - 1/2 Watt - 20% - 50 Volt Carbon	102-22	Two Gang Variable Condenser
130-12	50M Ohm - 1/2 Watt - 20% - 20 Volt Carbon	107-6	Line Cord & Plug
130-19	1 Meg Ohm - 1/2 Watt - 20% - 100 Volt Carbon	112-15	Dial Crystal Only
130-46	800M Ohm - 1/2 Watt - 10% - 100 Volt Carbon	112-16	Dial Pointer
130-49	12M Ohm - 1 Watt - 20% - 100 Volt Carbon	112-19	Drive Disc Assembly Complete
130-74	350 Ohm - 1/2 Watt - 20% - 10 Volt Wire Wound	112-40	Pilot Light Bracket
COILS			
108-47	Output I.F. Transformer Complete	112-60	Drive Bracket Assembly Complete
108-53	Input I.F. Transformer Complete	112-66	Bakelite Escutcheon Complete with Glass
110-27	Oscillator Coil Complete	112-113	Dial Scale
111-33	Antenna Coil Complete	115-22	Tube Shield
111-44	Antenna Coil SK173250A-10	116-5	6-8 Volt, T-50 Pilot Light Bulb
TRANSFORMERS			
104-14	50/60 Cycle Power Transformer	124-14	Type J-6-S Series Pad
104-17	Universal Power Transformer - 40 Cy. Primary,	127-1	Line Switch
104-28	25 Cycle Power Transformer	131-2	Bakelite Knob
		135-14	Dial Pointer Screw

MODEL 578, Series A
Socket, Trimmers
Alignment

BELMONT RADIO CORP.

Model 578—Series A
5-TUBE A. C. SUPERHETERODYNE RECEIVER

DESCRIPTION

Tubes

The Tube complement of this chassis is as follows:

- 1 Type 6A7—pentagrid electron coupled oscillator and first detector.
- 1 Type 6D6—remote cut-off pentode as I.F. amplifier.
- 1 Type 6B7—duplex diode pentode as diode detector, A.V.C. and A.F.
- 1 Type 42—pentode output tube.
- 1 Type 80—high vacuum rectifier.

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.

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

Resistance of coils and transformer windings are indicated in ohms on schematic circuit diagram.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 108, 125, 150, 220 and 250 volts (see illustrations) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

ALIGNING INSTRUCTIONS

Description of various dummy antennas used and referred to in these instructions:

- (1) I.F. Dummy—Consists of a .1 mfd. condenser connected in series with the external oscillator.
- (2) Broadcast Dummy—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Resonance Indicator:

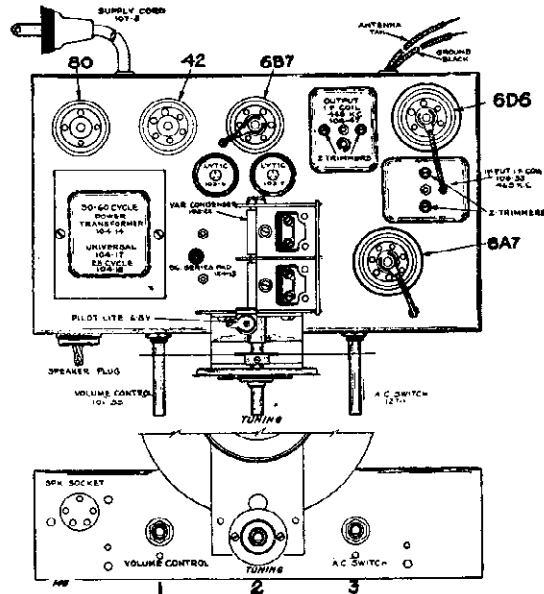
Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 42 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range volt meter should be used.

Alignment

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 three bolts by which it is fastened and the speaker plug which you will find on the front flange of the chassis panel.

Aligning I. F. Transformers

- 1. With volume control full on, the extreme right of its rotation, and with variable condenser at its minimum capacity position, plates entirely out of mesh, adjust the I.F. transformers (two adjustments at the top of parts number 108-53 and 108-47)
 - (a) Connect external oscillator which has been adjusted to 465 kilocycles in series with I.F. dummy antenna, to the control grid cap of the type 6D6 tube and chassis ground. Adjust output I.F. transformer, part number 108-47, to resonance.
 - (b) Move generator output clip from grid of 6D6 to grid cap of 6A7 tube and align input I.F. transformer, part number 108-53.



- (c) With generator connected to grid of type 6A7 tube, readjust output I.F. transformer, part number 108-47, to resonance.

R. F. Alignment—

(530 - 1720 Kilocycles)

- 1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with broadcast dummy antenna to an 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) Re-set external oscillator to 600 kilocycles and adjust series pad to resonance, rotate condenser and move dial pointer to 600 kilocycles by gently rocking condenser to and fro. Pick up oscillator signal while adjusting series pad to resonance, maximum deflection on an output meter. This adjustment is accessible from the top of the chassis and is located between variable condenser and power transformer.

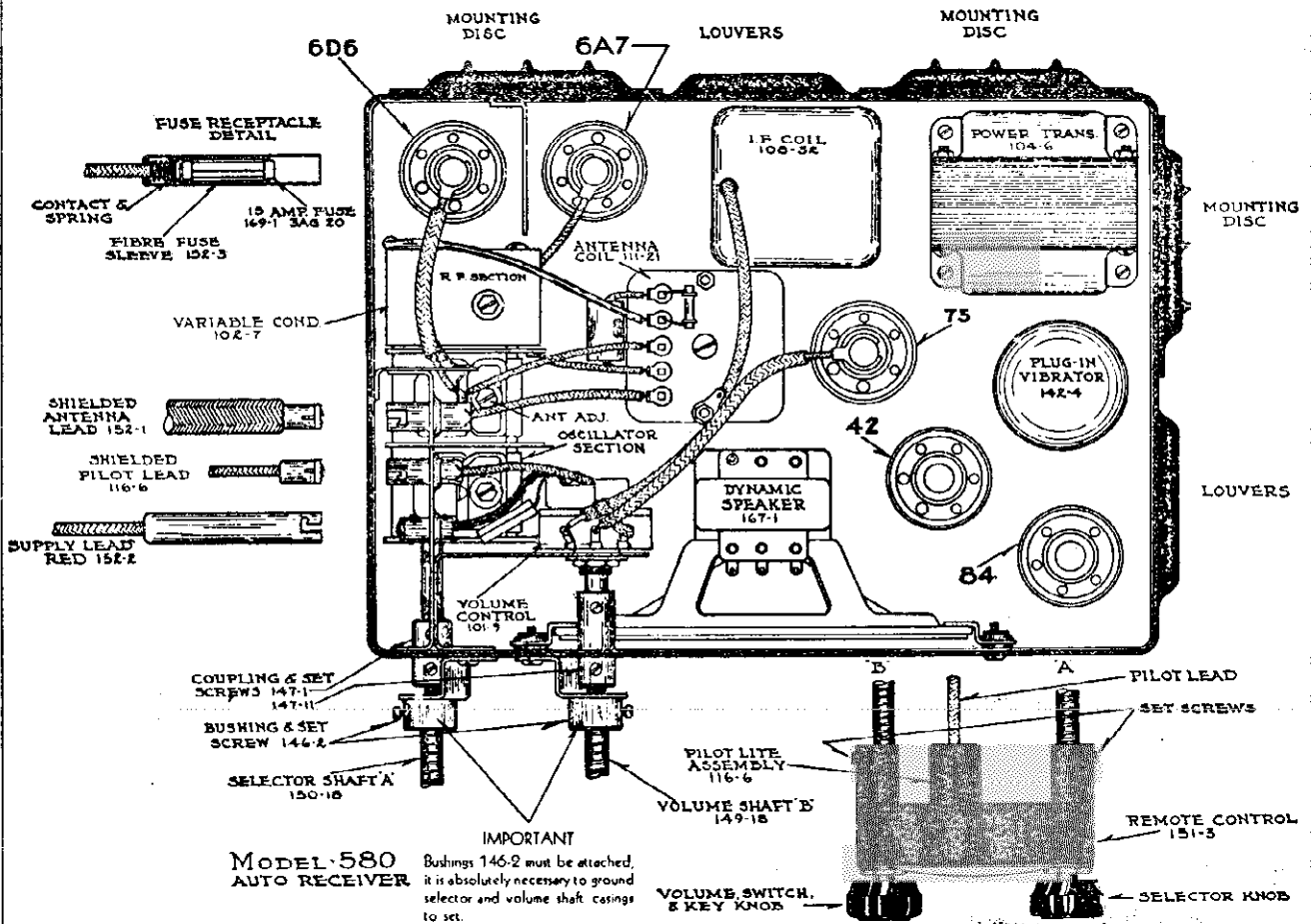
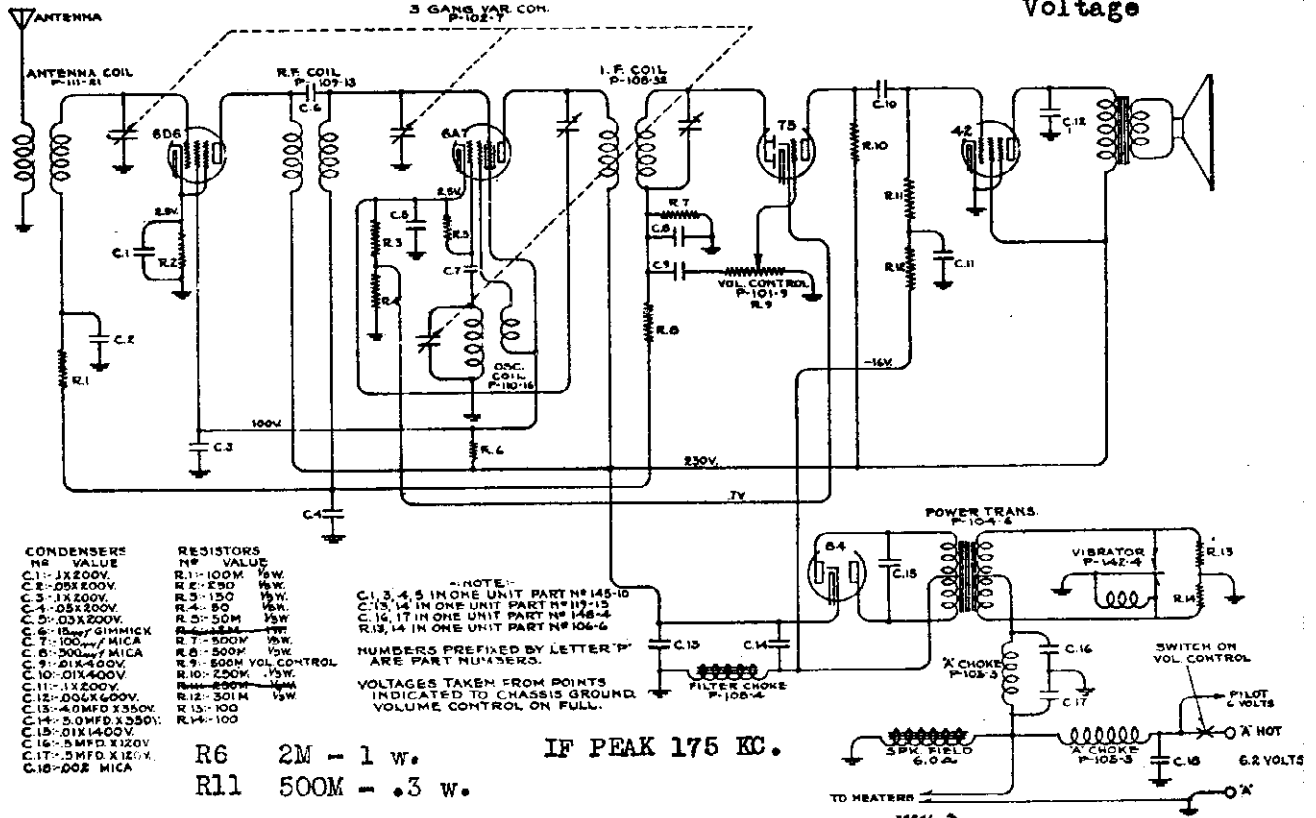
25 Cycle Chassis differ only from 60 cycle chassis in that part number 104-18 transformer is used in place of 50/60 cycle transformer, part number 104-14.

Service Notes

To check for open by-pass condensers, shunt each condenser with another of similar capacity and of the same voltage rating, which is known to be good, until the defective unit is located. Open by-pass condensers frequently cause oscillation and distorted tone. Defective and shorted electrolytic filter condensers cause excessive hum, motor-boating, low volume and a reduction in all D.C. voltages. Open or shorted electrolytic and by-pass condensers (across bias resistor of type 42 tube) will cause low volume and distorted tone.

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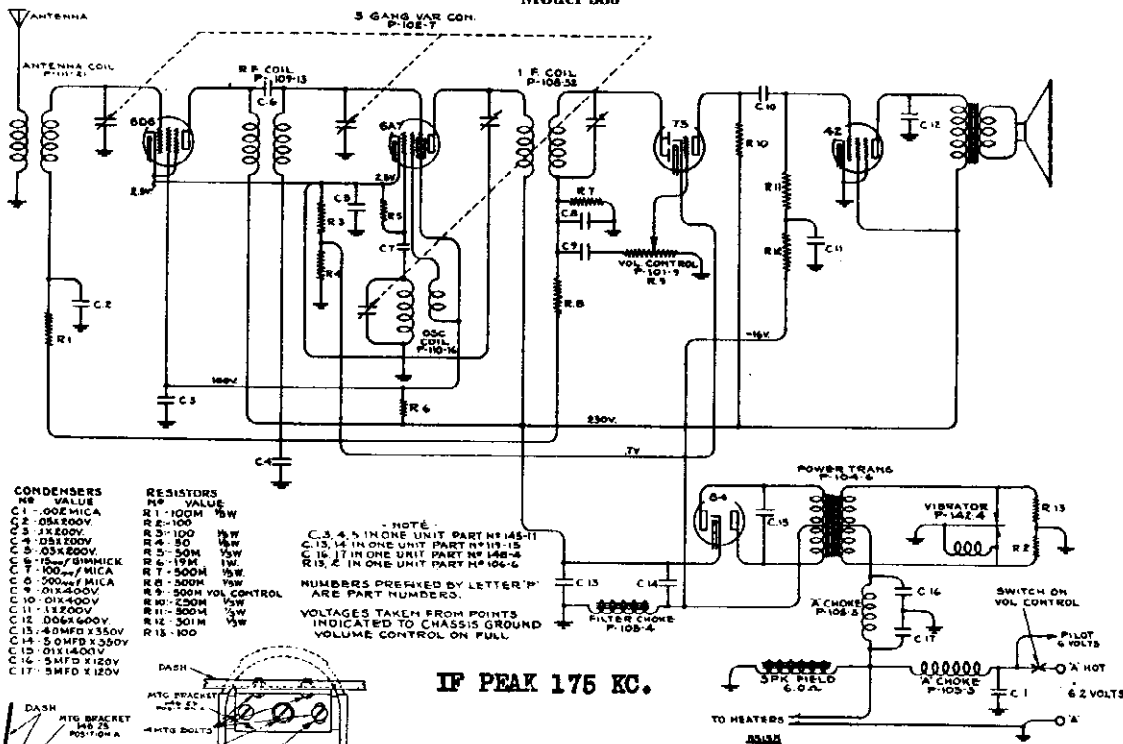
MODEL 580
Schematic, Socket
Voltage



MODEL 580 Revised
Above Serial 11501

BELMONT RADIO CORP.
Model 580

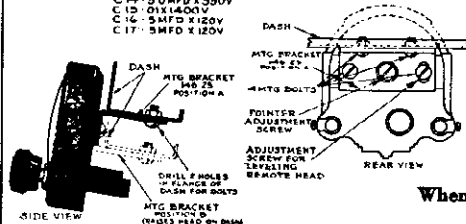
Schematic, Voltage
Parts List



IF PEAK 175 KC.

REPAIR PARTS—MODEL 580
Serial No. 11501 and up

When ordering parts, always specify part and model number as well as serial number of chassis.

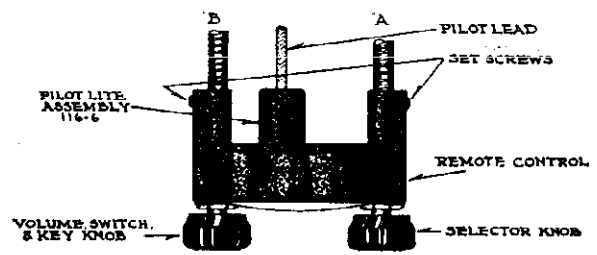


Part No.	Description	List Price Each
101-9	Volume Control with Switch	\$1.35
102-7	Three Gang Geared Variable Condenser	4.00
104-6	Vibrator Transformer	3.00
105-3	"A" Choke—40T—No. 16E—1/2" Dia.	.10
105-4	380 Ohm Filter Choke	.85
106-6	200 Ohm Center Tapped Resistor	.25
108-32	Output I. F. Transformer Complete, less can and resistor and Condenser Assembly (175 K. C.)	1.75
109-13	R. F. Coil	1.00
110-16	Osc. Coil & bracket	.75
111-21	Antenna Coil	1.00
115-18	Special partition shield	.20
116-5	6-8 Volt T-50 pilot lamp, screw base	.10
116-14	6-8 volt T-51 frosted glass bayonet base lamp	.13
116-6	Pilot light assembly, complete, less bulb	.40
119-15	5-4 Mfd. 300 Volt Electrolytic Filter Condenser	2.50
135-5	3/8x3" carriage bolt	.05
140-4	Container complete with top and bottom	2.50
142-4	Plug-In Vibrator	4.50
145-11	By-Pass Block	.75
146-1	Special bracket including battery, antenna, pilot light cable fittings, but less antenna coil volume control	.40
146-2	Bushing and bracket complete	.20
147-1	Selector Control Coupling	.10
147-11	Volume control coupling	.10
148-1	.5 Mfd. Generator Condenser	.50
148-3	.5 Mfd. Ammeter Condenser	.40
148-4	Dual .5 Mfd. x 120 Volt Condenser	.75
148-6	Special Ford ignition condenser	.60
152-1	Antenna cable	.40
152-2	Battery cable	.35
152-3	Fuse Insulating Sleeve	.05
167-1	Dynamic Speaker	5.00
168-1	Spark-plug type suppressor (Universal)	.30
168-2	Distributor plug-type suppressor	.40
168-3	Cable type suppressor	.40
169-1	15 Ampere Fuse (3AG-15)	.05
Unless otherwise listed, all Carbon Resistors		.20
Unless otherwise listed, all Single Section Tubular Paper By-Pass Condensers		.25
Unless otherwise listed, all Dual Section Tubular Paper By-Pass Condensers		.50
Unless otherwise listed, all Molded Mica Condensers		.25
All Sockets		.10
Plate antenna		3.50

Part No.	Description	List Price Ea
112-39	Selector Control Shaft	.20
112-41	Idle Gear	.15
112-42	Pointer Shaft	.05
112-43	Volume Control Shaft, Key type less knob	.10
112-85	Volume control shaft less knob	.05
112-44	Pointer (Specify White or Black)	.05
112-45	Bezel (Crystal Retainer)	.15
112-46	Celluloid Dial Crystal	.15
112-48	Pointer Shaft Gear	.05
112-89	Dial	.25
131-5	Black bakelite remote control knobs	.15
146-8	Die Cast Remote Control Mounting Bracket	.30
146-12	Steering Column Strap	.15
146-25	Dash Mounting Bracket	.15
147-3	Selector Control Bushing for 112-39 shaft	.10
147-4	Volume Control Bushing for 112-43-112-85 shaft	.10
149-18	Flexible Volume Control Cable—18"	1.25
149-24	Flexible Volume Control Cable—24"	1.50
150-18	Flexible Selector Cable—18"	1.25
150-24	Flexible Selector Cable—24"	1.50
151-7	Remote Control Head, less flexible shafts, with pilot assemblies and with knobs and mounting hardware	4.90

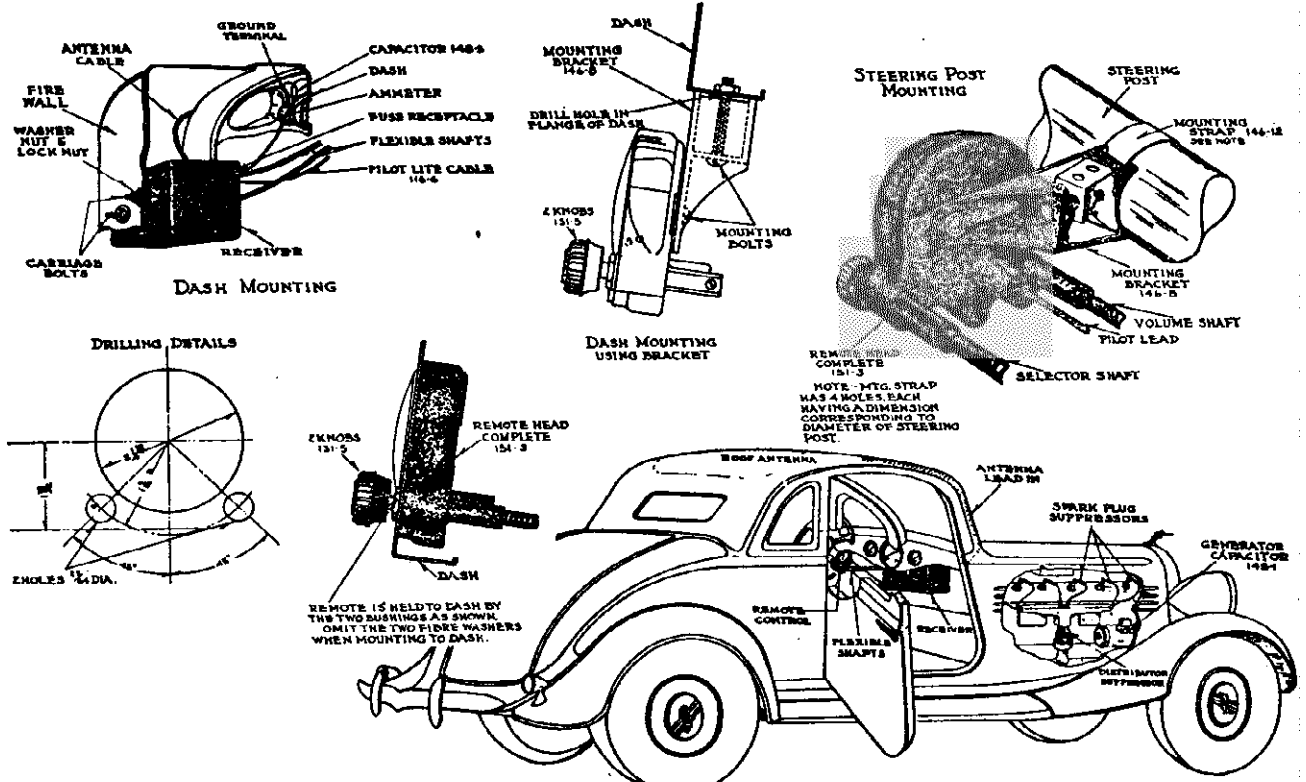
PILOT LIGHT:

Pilot light assembly, part number 116-9, plugs into the set and to the rear of the remote control unit (see illustrations).



BELMONT RADIO CORP.

MODEL 580
Installation Details
Parts List



PARTS LIST—MODEL 580

Serial No. 10001 and up

When ordering parts, always specify part and model number as well as serial number of chassis.

Part No.	Description	Part No.	Description
101-9	Volume Control with Switch.....	112-39	Selector Control Shaft.....
102-7	Three Gang Geared Variable Condenser.....	112-41	Idle Gear.....
104-6	Vibrator Transformer.....	112-42	Pointer Shaft.....
105-3	"A" Choke—40T—No. 16E— $\frac{1}{2}$ " Dia.	112-43	Volume Control Shaft.....
105-4	380 Ohm Filter Choke.....	112-44	Pointer (Specify White or Black).....
106-6	200 Ohm Center Tapped Resistor.....	112-45	Dial Crystal Retainer.....
108-32	Output I. F. Transformer Complete, less can and resistor and Condenser Assembly (175 K. C.).....	112-46	Celluloid Dial Crystal.....
109-13	R. F. Coil.....	112-48	Pointer Shaft Gear.....
110-16	Osc. Coil & bracket.....	112-89	Dial.....
111-21	Antenna Coil.....	131-5	Black bakelite remote control knobs.....
115-18	Special partition shield.....	134-8	Black Fibre Washer for Volume and Selector Control Bushings.....
116-5	6-8 Volt T-50 pilot lamp.....	146-8	Die Cast Remote Control Mounting Bracket.....
116-6	Pilot light assembly, complete, less bulb.....	146-12	Steering Column Strap.....
119-15	6-3 Mfd. 350 Volt Electrolytic Filter Condenser.....	147-3	Selector Control Bushing.....
135-5	$\frac{3}{8}$ x3" carriage bolt.....	147-4	Volume Control Bushing.....
140-4	Container complete with top and bottom.....	149-18	Volume Control Shaft—18".....
142-4	Plug-In Vibrator.....	149-24	Volume Control Shaft—24".....
145-10	By-Pass Block.....	150-18	Selector Shaft—18".....
146-1	Special bracket including battery, antenna, pilot light cable fittings, but less antenna coil volume control.....	150-24	Selector Shaft—24".....
146-2	Bushing and bracket complete.....	151-3	Remote Control Head, less flexible shafts, with pilot assemblies and with knobs and mounting hardware.....
147-1	Selector Control Coupling.....		
147-11	Volume control coupling.....		
148-1	.5 Mfd. Generator Condenser.....		
148-3	.5 Mfd. Ammeter Condenser.....		
148-4	Dual .5 Mfd. x 120 Volt Condenser.....		
152-1	Antenna cable.....		
152-2	Battery cable.....		
152-3	Fuse Insulating Sleeve.....		
167-1	Dynamic Speaker.....		
168-1	Spark-plug type suppressor.....		
168-2	Distributor plug-type suppressor.....		
168-3	Cable type suppressor.....		
168-4	Special Ford spark-plug suppressor.....		
169-1	15 Ampere Fuse (3AC-15).....		

Note: Part No. 145-10 consisting of four separate sections can be replaced with tubular single section condensers at 25c each. It will not be necessary to replace the entire unit should any section thereof fail.

Vibrators can be reconditioned at a cost of \$2.25 each, if the old unit is returned.

All resistors are RMA color coded—specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

MODEL 580 Alignment Installation Data

BELMONT RADIO CORP.

Installed and no trouble should be experienced from this noise with... of course at occasional exception. The other cars present a minor...

This first essential procedure is to disconnect the high tension leads to the spark plugs and the spark plug suppressor (1063)...

removable set tray receivers and which are able to accommodate the remote control head of our Model 580 auto receiver.

INSTALLATION AND SERVICE INSTRUCTIONS MODEL 580 FIVE TUBE-SUPERHETERODYNE AUTO RADIO

The ignition system of car must be kept in good condition. It is advisable to advance the generator charging rate in order to compensate for the additional drain of the receiver on car storage battery.

After standard suppression has been applied and the hood clamped down to prevent radiation, the receiver should be turned on and the dial turned off a minimum of 1000 cycles.

Many of the 1931 model automobiles contain the same size and type receiver as the 1935 models and naturally installation of the receiver will be the same on these models.

RECEIVER INSTALLATION: Determine motor satisfactory or desirable mounting position. In most cases it will be found that the receiver can be mounted on the motor shaft, with key fitting at one end (tuner 150-18).

Aligning the antenna is a very important factor in obtaining maximum capacity positions. The antenna should be mounted on a support to cut the wire network back for a distance of at least three inches from all sides of the car.

Check for chassis pickup, disconnect the antenna from the antenna cable and ground the antenna lead to shield of cable, or remove antenna cable. Chassis pickup can be reduced by reducing the length of the antenna lead.

CONNECTIONS TO BATTERY: The antenna wire is connected to one end and terminal bar at other end and must be connected to battery terminal of ammeter. At the same time connect ammeter capacitor, number 1483, to battery terminal of ammeter, other end of condenser to a convenient grounded screw on back of instrument panel.

IMPORTANT—READ CAREFULLY: We are prepared to exchange, without charge, our standard number 1483 and 1501B electron tube cables for twenty-four inch cables, number 1483 and 1501B, if you will find that 97% of the installations let the antenna cable, the ammeter cable, and base to mount on, also the front of the dash.

Aligning the antenna is a very important factor in obtaining maximum capacity positions. The antenna should be mounted on a support to cut the wire network back for a distance of at least three inches from all sides of the car.

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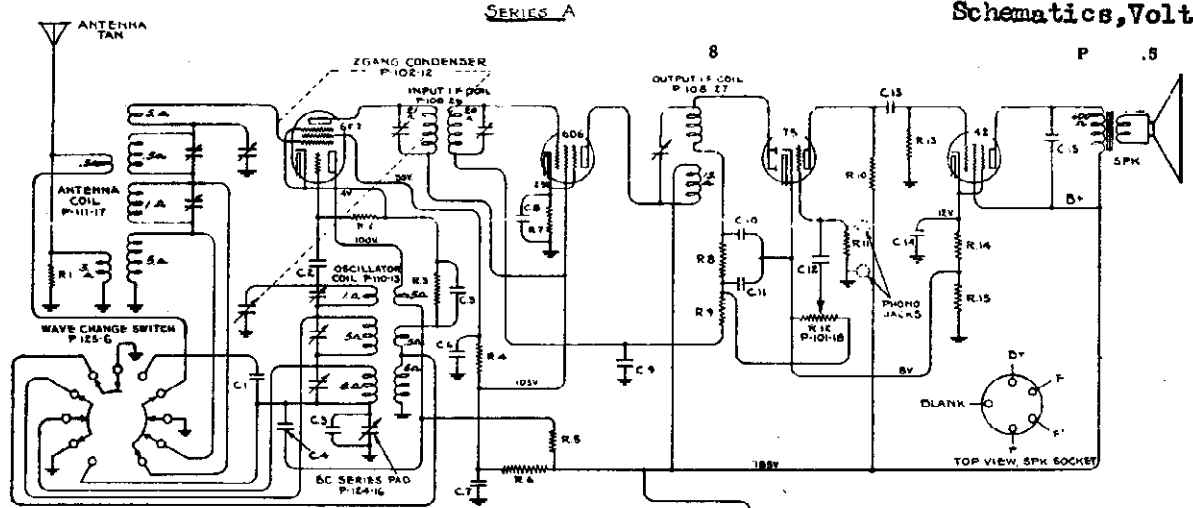
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CONNECTIONS TO BATTERY: The antenna wire is connected to one end and terminal bar at other end and must be connected to battery terminal of ammeter. At the same time connect ammeter capacitor, number 1483, to battery terminal of ammeter, other end of condenser to a convenient grounded screw on back of instrument panel.

IMPORTANT—READ CAREFULLY: We are prepared to exchange, without charge, our standard number 1483 and 1501B electron tube cables for twenty-four inch cables, number 1483 and 1501B, if you will find that 97% of the installations let the antenna cable, the ammeter cable, and base to mount on, also the front of the dash.

BELMONT RADIO CORP.

MODEL 585
Series A, B, C
Schematics, Voltage



LEGEND

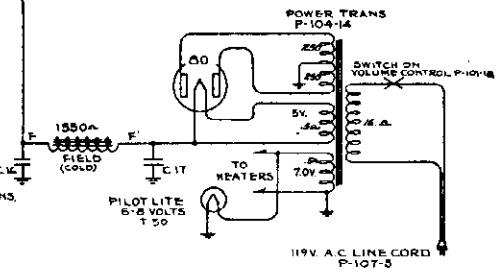
CONDENSERS	RESISTORS
C.1 - 2870 μ F MICA	R.1 - 800 Ω $\frac{1}{2}$ W
C.2 - 100	R.2 - 50M Ω
C.3 - 478	R.3 - 700 Ω
C.4 - 1 X 200V	R.4 - 100M Ω
C.5 - 1 X 200V	R.5 - 20M Ω $\frac{1}{2}$ W
C.6 - 1 X 200V	R.6 - 19M Ω $\frac{1}{2}$ W
C.7 - 1 X 200V	R.7 - 200 Ω
C.8 - 1 X 200V	R.8 - 50M Ω $\frac{1}{2}$ W
C.9 - 1 X 200V	R.9 - 1MEG
C.10 - 500 μ F MICA	R.10 - 250M Ω
C.11 - 500 μ F MICA	R.11 - 2MEG
C.12 - 0.5K 200V	R.12 - 500M Ω VOL. CONTROL
C.13 - 0.1 X 400V	R.13 - 500M Ω $\frac{1}{2}$ W
C.14 - 4.0MFD X 25V	R.14 - 500 Ω
C.15 - .015 X 400V	R.15 - 35 Ω
C.16 - 3.0MFD X 250V	
C.17 - 4.0MFD X 300V	

NOTE:
C.7, C.9 ARE IN ONE UNIT P-118-1
C.14, C.16, C.17 ONE UNIT LYTC P-119-11
R.7, R.14, R.15, ONE UNIT P-106-18

NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND, VOLUME CONTROL ON FULL

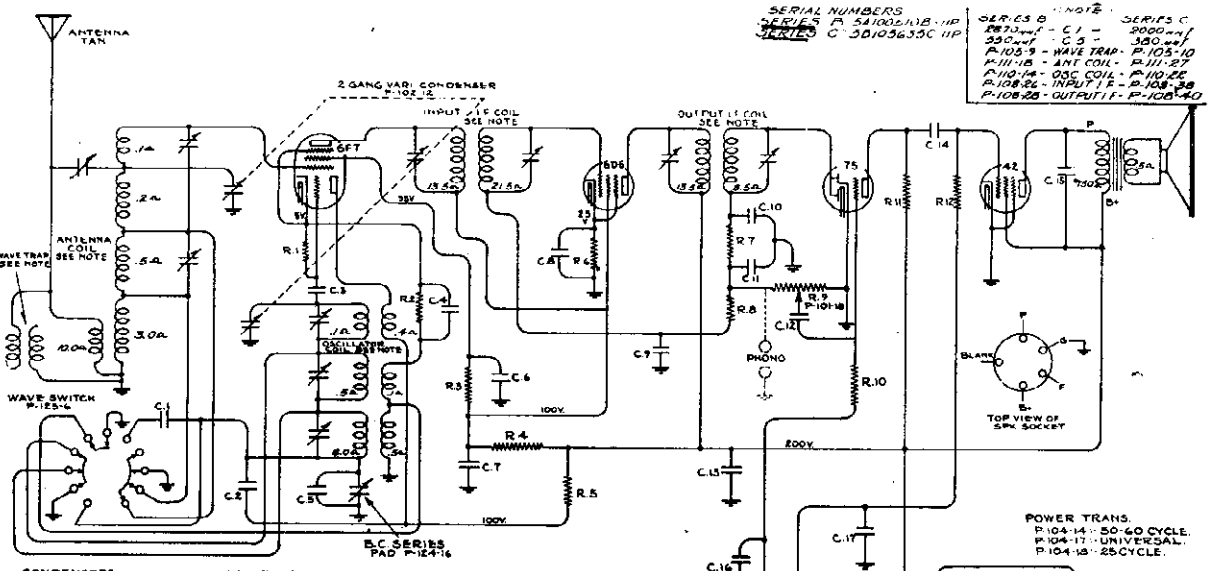
WAVE CHANGE SWITCH P-125-6 - 3 POSITIONS, ROTATING CLKWISE:
1ST POSITION - BC 1720-540KC
2ND - MW 7.4 - 2.35 MC
3RD - SW 23.0 - 7.5 MC
SWITCH SHOWN AT SW POSITION



TUNING RANGE—SERIES A:
Standard Broadcast Band
540 - 1720 Kilocycles
Intermediate Band
2.3 - 7.6 Megacycles
Short Wave Band
7.5 - 23.0 Megacycles

TUNING RANGE—SERIES B & C:
Standard Broadcast Band
530 - 1720 Kilocycles
Intermediate Band
2.35 - 7.7 Megacycles
Short Wave Band
7.6 - 19.0 Megacycles

I. F. FREQUENCY:
Series A } 370 K.C.
Series B }
Series C } 465 K.C.



CONDENSERS

C.1 - SEE NOTE
C.2 - 12200V
C.3 - 100 μ F MICA
C.4 - 1 X 200V
C.5 - SEE NOTE
C.6 - 1 X 200V
C.7 - 1 X 200V
C.8 - 1 X 200V
C.9 - 1 X 200V
C.10 - 100 μ F MICA
C.11 - 100 μ F MICA
C.12 - 0.5K 200V
C.13 - 8.0MFD X 500V P-103-7
C.14 - 0.1 X 400V
C.15 - 1 X 200V
C.16 - 1 X 200V
C.17 - 1 X 200V
C.18 - 8.0MFD X 350V P-103-6
C.19 - .015 X 600V

RESISTORS

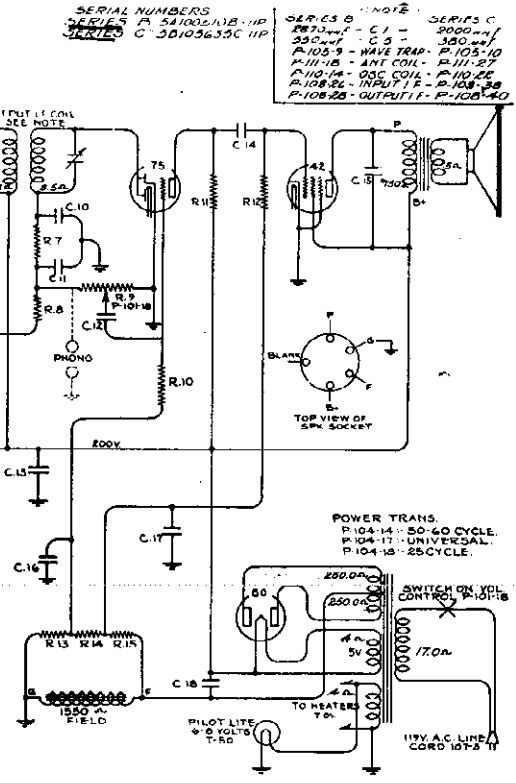
R.1 - 50M Ω $\frac{1}{2}$ W
R.2 - 700
R.3 - 100M Ω
R.4 - 23M Ω $\frac{1}{2}$ W
R.5 - 20M Ω
R.6 - 250 Ω $\frac{1}{2}$ W
R.7 - 50M
R.8 - 500M
R.9 - 500M VOL. CONTRL
R.10 - 1MEG Ω $\frac{1}{2}$ W
R.11 - 250M
R.12 - 250
R.13 - 15M
R.14 - 150M
R.15 - 800M

C.9, C.8 IN DUAL UNIT P-118-1
C.7, C.9
C.16, C.17

NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND, VOLUME CONTROL ON FULL

WAVE SWITCH P-125-6, 3 POSITIONS ROTATING CLKWISE:
1ST POSITION - BC 1720-540 KC
2ND - MW 7.4 - 2.35 MC
3RD - SW 19.0 - 7.5 MC
SWITCH SHOWN AT SW POSITION

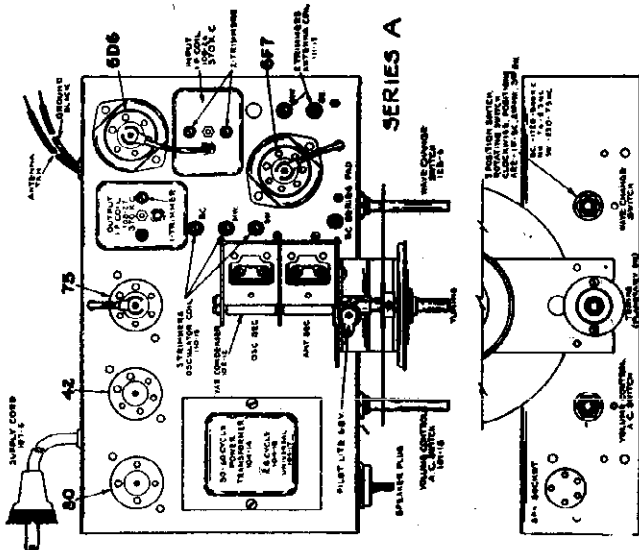
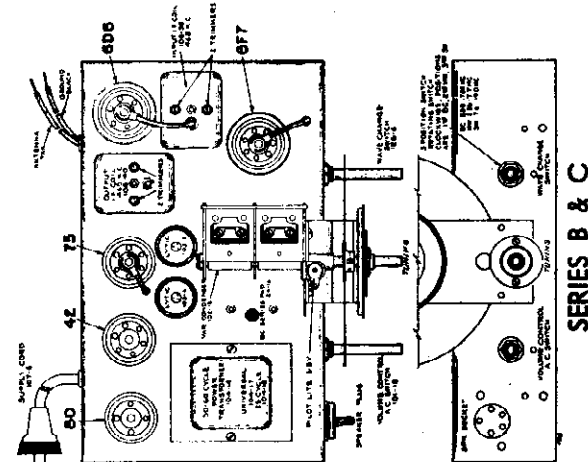
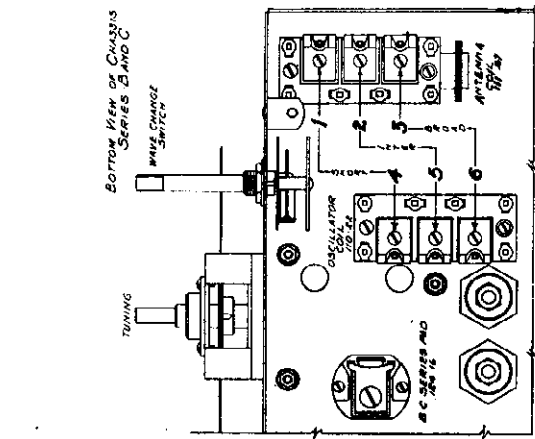


SERIAL NUMBERS
SERIES A 541002/118-11P
SERIES B 330105/119-11P
SERIES C 331056/35C 11P

NOTE:
SERIES B - C.1 - 5000 μ F
SERIES C - C.5 - 380 μ F
P-105-9 - WAVE TRIP - P-105-10
P-110-18 - ANT. COIL - P-111-27
P-110-24 - OSC. COIL - P-110-25
P-108-26 - INPUT I.F. - P-108-30
P-108-28 - OUTPUT I.F. - P-108-30

MODEL 585
Series A, B, C
Socket Layouts, Trimmers
Parts, Change Data

BELMONT RADIO CORP.



DESCRIPTION

Tubes
 The Tube complement of this chassis is as follows:
 1 Type 6F7—triode pentode as oscillator and first detector.
 1 Type 6D6—remote cut-off pentode as I.F. amplifier.
 1 Type 75—duplex diode triode as diode detector, A.V.C. and A.F.
 1 Type 42—pentode output tube.
 1 Type 80—high vacuum rectifier.
 Series "A" chassis are equipped with dry electrolytic filter condensers and are serially numbered on paper tags which are attached to the line cord and to the inside of the cabinet.
 Series "B" and "C" chassis are serially numbered on the back flange of the chassis, series "B" beginning with number "5A10510B" and up; series "C" chassis, beginning with number "5B105635C", differs only from series "B" in that the I.F. frequency was changed from 370 to 465 kilocycles.
 Series "B" and "C" may be identified by the letter "B" and "C" at the end of the serial numbers.
 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 diagrams of series "A," "B," and "C."
 All voltages are measured with 119 volts on the primary of the power transformer.
 Resistance of coils and transformer windings are indicated in ohms on schematic circuit diagram.
 Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 108, 125, 150, 220 and 250 volts (see illustrations) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universal.

LIST OF REPAIR PARTS - MODEL 585 (SERIES A - B - C)

Part No. in Ser. A	Part No. in Ser. B	Part No. in Ser. C	DESCRIPTION	Not Used In Ser.
100-11	100-11	100-11	68 x 400M—20%	
100-12	100-12	100-12	68 x 400M—20%	
100-13	100-13	100-13	68 x 400M—20%	
100-14	100-14	100-14	68 x 400M—20%	
100-15	100-15	100-15	68 x 400M—20%	
100-16	100-16	100-16	68 x 400M—20%	
100-17	100-17	100-17	68 x 400M—20%	
100-18	100-18	100-18	68 x 400M—20%	
100-19	100-19	100-19	68 x 400M—20%	
100-20	100-20	100-20	68 x 400M—20%	
100-21	100-21	100-21	68 x 400M—20%	
100-22	100-22	100-22	68 x 400M—20%	
100-23	100-23	100-23	68 x 400M—20%	
100-24	100-24	100-24	68 x 400M—20%	
100-25	100-25	100-25	68 x 400M—20%	
100-26	100-26	100-26	68 x 400M—20%	
100-27	100-27	100-27	68 x 400M—20%	
100-28	100-28	100-28	68 x 400M—20%	
100-29	100-29	100-29	68 x 400M—20%	
100-30	100-30	100-30	68 x 400M—20%	
100-31	100-31	100-31	68 x 400M—20%	
100-32	100-32	100-32	68 x 400M—20%	
100-33	100-33	100-33	68 x 400M—20%	
100-34	100-34	100-34	68 x 400M—20%	
100-35	100-35	100-35	68 x 400M—20%	
100-36	100-36	100-36	68 x 400M—20%	
100-37	100-37	100-37	68 x 400M—20%	
100-38	100-38	100-38	68 x 400M—20%	
100-39	100-39	100-39	68 x 400M—20%	
100-40	100-40	100-40	68 x 400M—20%	
100-41	100-41	100-41	68 x 400M—20%	
100-42	100-42	100-42	68 x 400M—20%	
100-43	100-43	100-43	68 x 400M—20%	
100-44	100-44	100-44	68 x 400M—20%	
100-45	100-45	100-45	68 x 400M—20%	
100-46	100-46	100-46	68 x 400M—20%	
100-47	100-47	100-47	68 x 400M—20%	
100-48	100-48	100-48	68 x 400M—20%	
100-49	100-49	100-49	68 x 400M—20%	
100-50	100-50	100-50	68 x 400M—20%	
100-51	100-51	100-51	68 x 400M—20%	
100-52	100-52	100-52	68 x 400M—20%	
100-53	100-53	100-53	68 x 400M—20%	
100-54	100-54	100-54	68 x 400M—20%	
100-55	100-55	100-55	68 x 400M—20%	
100-56	100-56	100-56	68 x 400M—20%	
100-57	100-57	100-57	68 x 400M—20%	
100-58	100-58	100-58	68 x 400M—20%	
100-59	100-59	100-59	68 x 400M—20%	
100-60	100-60	100-60	68 x 400M—20%	
100-61	100-61	100-61	68 x 400M—20%	
100-62	100-62	100-62	68 x 400M—20%	
100-63	100-63	100-63	68 x 400M—20%	
100-64	100-64	100-64	68 x 400M—20%	
100-65	100-65	100-65	68 x 400M—20%	
100-66	100-66	100-66	68 x 400M—20%	
100-67	100-67	100-67	68 x 400M—20%	
100-68	100-68	100-68	68 x 400M—20%	
100-69	100-69	100-69	68 x 400M—20%	
100-70	100-70	100-70	68 x 400M—20%	
100-71	100-71	100-71	68 x 400M—20%	
100-72	100-72	100-72	68 x 400M—20%	
100-73	100-73	100-73	68 x 400M—20%	
100-74	100-74	100-74	68 x 400M—20%	
100-75	100-75	100-75	68 x 400M—20%	
100-76	100-76	100-76	68 x 400M—20%	
100-77	100-77	100-77	68 x 400M—20%	
100-78	100-78	100-78	68 x 400M—20%	
100-79	100-79	100-79	68 x 400M—20%	
100-80	100-80	100-80	68 x 400M—20%	
100-81	100-81	100-81	68 x 400M—20%	
100-82	100-82	100-82	68 x 400M—20%	
100-83	100-83	100-83	68 x 400M—20%	
100-84	100-84	100-84	68 x 400M—20%	
100-85	100-85	100-85	68 x 400M—20%	
100-86	100-86	100-86	68 x 400M—20%	
100-87	100-87	100-87	68 x 400M—20%	
100-88	100-88	100-88	68 x 400M—20%	
100-89	100-89	100-89	68 x 400M—20%	
100-90	100-90	100-90	68 x 400M—20%	
100-91	100-91	100-91	68 x 400M—20%	
100-92	100-92	100-92	68 x 400M—20%	
100-93	100-93	100-93	68 x 400M—20%	
100-94	100-94	100-94	68 x 400M—20%	
100-95	100-95	100-95	68 x 400M—20%	
100-96	100-96	100-96	68 x 400M—20%	
100-97	100-97	100-97	68 x 400M—20%	
100-98	100-98	100-98	68 x 400M—20%	
100-99	100-99	100-99	68 x 400M—20%	
100-100	100-100	100-100	68 x 400M—20%	

BELMONT RADIO CORP.

MODEL 585 Series A,B,C Alignment Data.

ALIGNING INSTRUCTIONS—SERIES A

Description of various dummy antennas used and referred to in...

- (1) LF Dummy—Consists of a 200 mfd. condenser connected in series with the external oscillator.
(2) Broadcast Dummy—Consists of a 200 mfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.
(3) Intermediate Band Dummy—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

SERIES A

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an output meter of the low scale of a multi-range voltmeter...

Alignment

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installation, open or grounded antenna system, low line voltage, defective tubes, condensers and resistors...

Aligning I. F. Transformers

With volume control full on, the extreme right of its rotation, and with wave changing switch in the broadcast position, extreme left of its rotation, and with variable condenser at its maximum capacity...

Broadcast Band Alignment—[540 - 1720 Kilocycles]

With wave changing switch in the broadcast position, extreme left of its rotation, and with gag condenser in its minimum capacity, position plates entirely out of mesh, and with external antenna connected in series with broadcast dummy antenna...

Intermediate Band Alignment—[2.35 - 7.7 Megacycles]

With wave changing switch in the intermediate band position, extreme left of its rotation, and with variable condenser at its maximum capacity, position plates entirely out of mesh, adjust the LF transformer, part number 106-33, to resonance...

Short Wave Band Alignment—[7.5 - 23.0 Megacycles]

This band is aligned after the LF adjustments have been completed. It is extremely sensitive to misalignment of the fundamental signal of the oscillator, which will fall below the fundamental.

Service Notes

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

ALIGNING INSTRUCTIONS—SERIES B

Description of various dummy antennas used and referred to in...

- (1) LF Dummy—Consists of a 200 mfd. condenser connected in series with the external oscillator.
(2) Broadcast Dummy—Consists of a 200 mfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.
(3) Intermediate Band Dummy—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

SERIES B

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an output meter of the low scale of a multi-range voltmeter...

Alignment

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installation, open or grounded antenna system, low line voltage, defective tubes, condensers and resistors...

Aligning I. F. Transformers

With volume control full on, the extreme right of its rotation, and with wave changing switch in the broadcast position, extreme left of its rotation, and with variable condenser at its maximum capacity...

Broadcast Band Alignment—[530 - 1720 Kilocycles]

With wave changing switch in the broadcast position, extreme left of its rotation, and with gag condenser in its minimum capacity, position plates entirely out of mesh, and with external antenna connected in series with broadcast dummy antenna...

Intermediate Band Alignment—[2.35 - 7.7 Megacycles]

With wave changing switch in the intermediate band position, extreme left of its rotation, and with variable condenser at its maximum capacity, position plates entirely out of mesh, adjust the LF transformer, part number 106-33, to resonance...

Short Wave Band Alignment—[7.5 - 23.0 Megacycles]

This band is aligned after the LF adjustments have been completed. It is extremely sensitive to misalignment of the fundamental signal of the oscillator, which will fall below the fundamental.

Service Notes

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

ALIGNING INSTRUCTIONS—SERIES C

Description of various dummy antennas used and referred to in...

- (1) LF Dummy—Consists of a 200 mfd. condenser connected in series with the external oscillator.
(2) Broadcast Dummy—Consists of a 200 mfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.
(3) Intermediate Band Dummy—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

SERIES C

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an output meter of the low scale of a multi-range voltmeter...

Alignment

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installation, open or grounded antenna system, low line voltage, defective tubes, condensers and resistors...

Aligning I. F. Transformers

With volume control full on, the extreme right of its rotation, and with wave changing switch in the broadcast position, extreme left of its rotation, and with variable condenser at its maximum capacity...

Broadcast Band Alignment—[530 - 1720 Kilocycles]

With wave changing switch in the broadcast position, extreme left of its rotation, and with gag condenser in its minimum capacity, position plates entirely out of mesh, and with external antenna connected in series with broadcast dummy antenna...

Intermediate Band Alignment—[2.35 - 7.7 Megacycles]

With wave changing switch in the intermediate band position, extreme left of its rotation, and with variable condenser at its maximum capacity, position plates entirely out of mesh, adjust the LF transformer, part number 106-33, to resonance...

Short Wave Band Alignment—[7.5 - 19.0 Megacycles]

This band is aligned after the LF adjustments have been completed. It is extremely sensitive to misalignment of the fundamental signal of the oscillator, which will fall below the fundamental.

Service Notes

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

ALIGNING INSTRUCTIONS—SERIES D

Description of various dummy antennas used and referred to in...

- (1) LF Dummy—Consists of a 200 mfd. condenser connected in series with the external oscillator.
(2) Broadcast Dummy—Consists of a 200 mfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.
(3) Intermediate Band Dummy—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

SERIES D

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an output meter of the low scale of a multi-range voltmeter...

Alignment

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installation, open or grounded antenna system, low line voltage, defective tubes, condensers and resistors...

Aligning I. F. Transformers

With volume control full on, the extreme right of its rotation, and with wave changing switch in the broadcast position, extreme left of its rotation, and with variable condenser at its maximum capacity...

Broadcast Band Alignment—[530 - 1720 Kilocycles]

With wave changing switch in the broadcast position, extreme left of its rotation, and with gag condenser in its minimum capacity, position plates entirely out of mesh, and with external antenna connected in series with broadcast dummy antenna...

Intermediate Band Alignment—[2.35 - 7.7 Megacycles]

With wave changing switch in the intermediate band position, extreme left of its rotation, and with variable condenser at its maximum capacity, position plates entirely out of mesh, adjust the LF transformer, part number 106-33, to resonance...

Short Wave Band Alignment—[7.5 - 19.0 Megacycles]

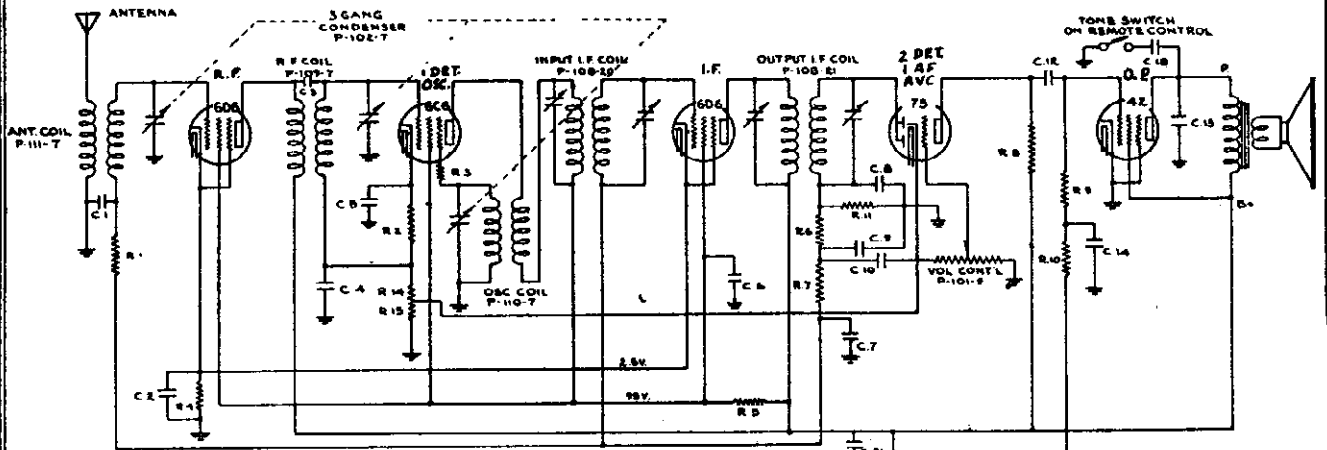
This band is aligned after the LF adjustments have been completed. It is extremely sensitive to misalignment of the fundamental signal of the oscillator, which will fall below the fundamental.

Service Notes

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

MODEL 670-A
Schematic, Voltage
Parts List

BELMONT RADIO CORP.



IF PEAK 175 KC.

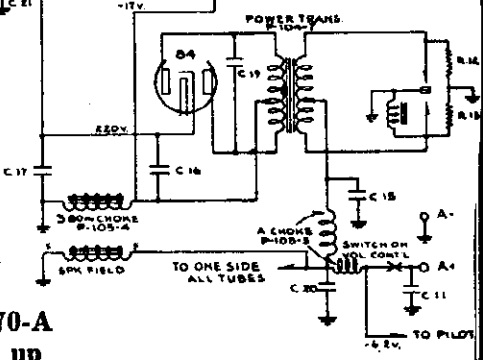
RESISTORS

NO.	VALUE
R.1-	250M 1/2W
R.2-	450Ω
R.3-	1500Ω
R.4-	150Ω
R.5-	25M 1/2W
R.6-	50M 1/2W
R.7-	250M 1/2W
R.8-	250M 1/2W
R.9-	200M 1/2W
R.10-	300M 1/2W
R.11-	250M 1/2W
R.12-	100Ω
R.13-	100Ω
R.14-	5M
VAR RESISTOR	500M
R.15	200Ω

CONDENSERS

NO.	VALUE
C.1-	05X200V.
C.2-	1X200V.
C.3-	11 1/2μF GIMMICK
C.4-	05X200V.
C.5-	05X200V.
C.6-	1X200V.
C.7-	1X200V.
C.8-	0005 MICA
C.9-	0005 MICA
C.10-	01X400V.
C.11-	002 MICA.
C.12-	01X400V.
C.13-	005X600V.
C.14-	1X200V.
C.15-	5MFDX120V.
C.16-	5MFDX350V.
C.17-	5MFDX350V.
C.18-	01X400V.
C.19-	015X1400V.
C.20-	5MFDX120V.
C.21-	01X400V.

NOTE
 NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS.
 VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.
 THE PHRASE GIMMICK MEANS A WIRE WOUND AROUND ANOTHER WIRE.
 RESISTORS IN ONE UNIT, P-104-4, R.2,4,15.
 CONDENSERS IN ONE UNIT, P-119-4, C.16,17.
 CONDENSERS C.2,C.4,C.5,C.6,C.7 ARE IN ONE UNIT P-145-5.
 RESISTORS AND CONDENSERS IN OUTPUT I.F. CAN, P-108-21, C.8,9,10 AND R.6,7,11.
 CONDENSER, C.1, IN ANT. COIL CAN P-111-7.
 CONDENSERS C.15, C.20 IN ONE UNIT P-148-4



PARTS LIST—MODEL 670-A
Serial No. 4D-502501 and up

Part No.	Description	Part No.	Description
101-9	Volume Control with Switch	150-24	Selector Shaft—24"
101-12	Tone Control Assembly, complete	151-2	Remote Control Head, less flexible shafts, less tone control and pilot assemblies, but with knobs and mounting hardware
102-7	Three Gang Geared Variable Condenser	152-1	Antenna cable
104-6	Vibrator Transformer	152-2	Battery cable
105-3	"A" Choke—40T—No. 16E—1/2" Dia.	131-5	Black bakelite remote control knobs
105-4	380 Ohm Filter Choke	146-8	Die Cast Remote Control Mounting Bracket
106-6	200 Ohm Center Tapped Resistor	146-12	Steering Column Strap
106-14	5800 Ohm Metal Clad Resistor	168-1	Spark-plug type suppressor
108-20	Input I. F. Transformer completely assembled in can (175 K. C.)	168-2	Distributor plug-type suppressor
108-21	Output I. F. Transformer complete with can, but less resistor and Condenser Assembly (175 K. C.)	168-3	Cable type suppressor
109-7	R. F. Coil	168-4	Special Ford spark-plug suppressor
110-7	Osc Coil & bracket		Unless otherwise listed, all Carbon Resistors
111-7	Antenna Coil		Unless otherwise listed, all Single Section Tubular Paper By-Pass Condensers
112-43	Volume Control Shaft complete with knob		Unless otherwise listed, all Dual Section Tubular Paper By-Pass Condensers
115-18	Special partition shield		Unless otherwise listed, all Molded Mica Condensers
115-22	Tube shield		All Sockets
116-5	6-8 Volt T-50 pilot lamp	167-1	Dynamic Speakers
116-6	Pilot light assembly, complete, less bulb		Plate antenna (clamps to frame of car)
119-4	8-8 Mfd. x 350 Volt Electrolytic Filter Condenser		
142-1	Plug-In Vibrator		
145-5	.4 Mfd. By-Pass Block		
146-14	Special bracket including battery antenna, pilot light and tone control cable fittings, but less antenna coil volume control		
148-4	Dual .5 Mfd. 120 Volt Condenser		
161-1	20 Ampere fuse		
147-1	Selector Control Coupling		
147-2	Bushing and bracket complete		
147-11	Volume control coupling		
135-5	3/8x3" carriage bolt		
140-3	Container complete with top and bottom		
148-1	.5 Mfd. Generator Condenser		
148-3	.5 Mfd. Ammeter Condenser		
149-18	Volume Control Shaft—18"		
149-24	Volume Control Shaft—24"		
150-18	Selector Shaft—18"		

Note: Part No. 145-5 consisting of five separate sections can be replaced with tubular single section condensers at 25c each. It will not be necessary to replace the entire unit should any section thereof fail.

Vibrators can be reconditioned at a cost of \$3.00 each, if the old unit is returned.

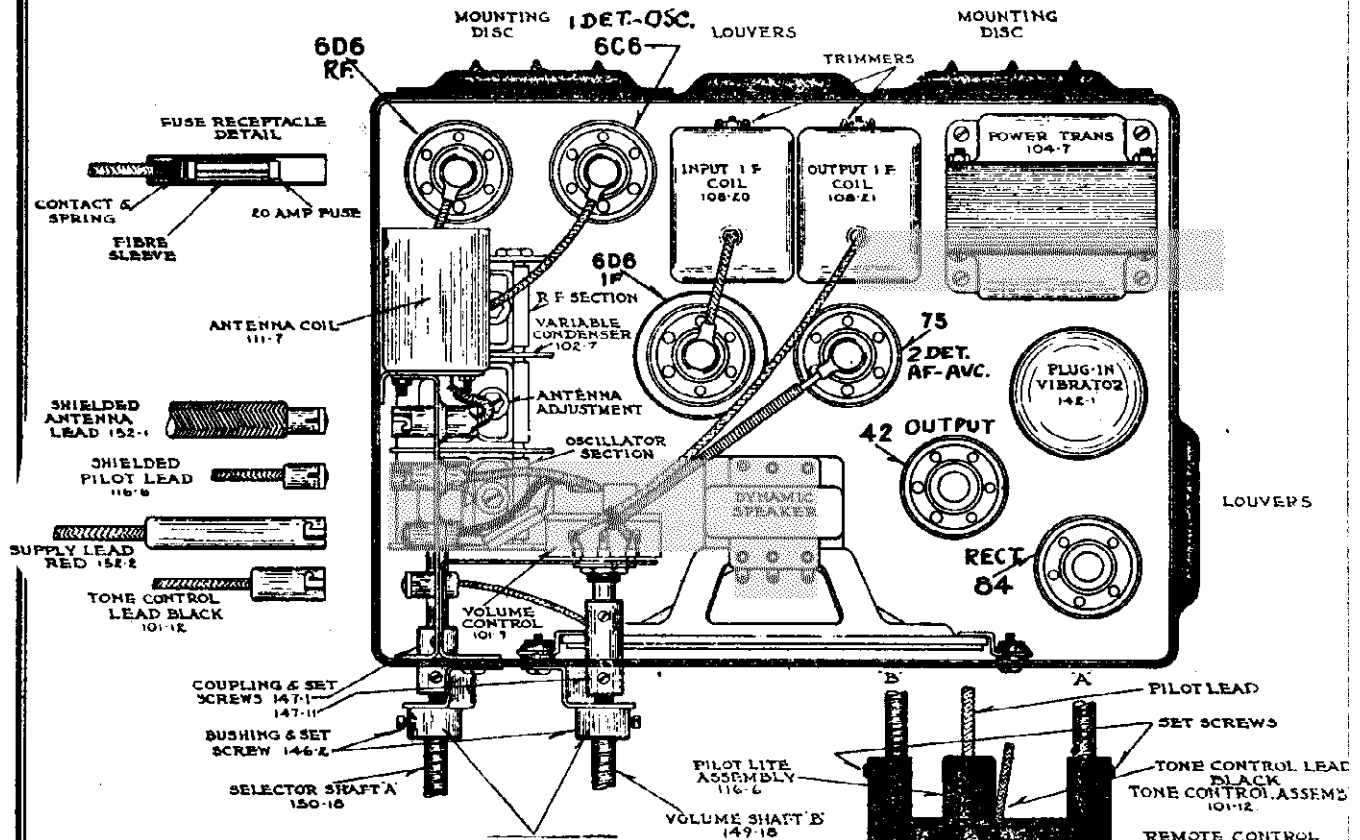
All resistors are RMA color coded—specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

We cannot supply speaker cones only. We can replace a speaker on which a cone has been damaged for \$1.50, if defective speaker is returned, transportation charges prepaid.

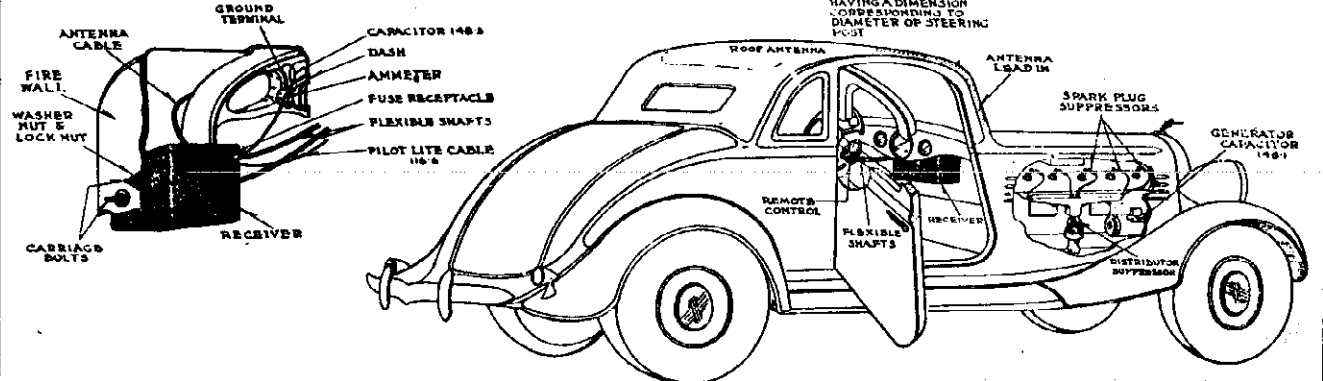
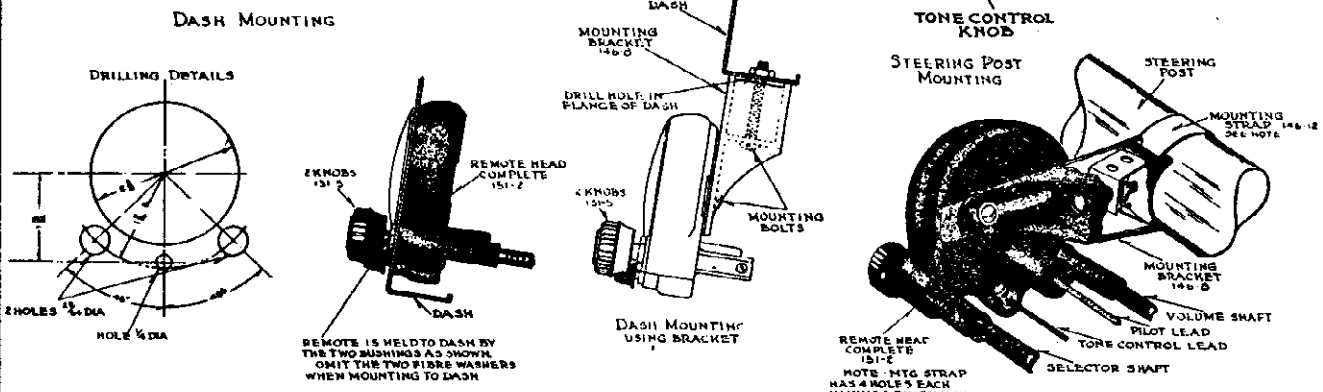
BELMONT RADIO CORP.

MODEL 670-A
Socket, Trimmers
Installation Details



MODEL 670A
AUTO RECEIVER

IMPORTANT
Bushing 146-2 must be attached; it is absolutely necessary to ground selector and volume shaft casings to set.



MODEL 670-A

Alignment
Installation Data

BELMONT RADIO CORP.

BALANCING SET TO ANTENNA:

When this set has been installed and is ready for operation it may be found necessary (depending on antenna) to balance set to this antenna. This is accomplished as follows:

With the receiver tuned to a very weak station, about 130 to 140 (1300 to 1400 kilocycles) on the dial, adjust the antenna trimmer with a screw driver until maximum volume is attained. To reach the antenna trimmer remove the plug button from the top of the case.

I. F. ALIGNMENT:

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 175 kilocycles to the grid cap of the 6C6 tube.

2. Adjust trimming condensers of both input and output I. F. transformers, parts number 108-20 and 108-21 (see top view of chassis) to resonance with an oscillator, as indicated on an output meter connected across the primary terminals of the speaker input transformer or between the plate and screen terminals of the type 42 output tube. The connection to the tube can be made by means of an adapter. Maximum deflection on the output meter indicates resonance.

Note: Each I. F. transformer has two adjustments, both of these adjustments on both transformers are accessible through holes located in the back of the case between the two mounting plates and directly under the louvres.

R. F. ALIGNMENT:

1. Attach oscillator connected in series with a 200 mmfd. condenser to the antenna lead and with the variable condenser at its minimum capacity position (extreme right of its rotation) and with an oscillator set at 1550 kilocycles, adjust condenser trimmer of oscillator section (Front shaft end) to resonance.

2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna (center section) and R. F. (rear section) trimmers to resonance.

3. Check alignment at 1500-1000-800-600-530 kilocycles by setting oscillator to these frequencies and picking up signal by rotating condenser.

4. Bend slotted plates of antenna and R. F. sections only if necessary. **UNDER NO CIRCUMSTANCES BEND PLATES OF OSCILLATOR SECTION.**

NOTES:

Volts from chassis to different points are indicated on schematic circuit diagram, and should be measured with a voltmeter having a resistance of 1000 ohms per volt.

Failure to operate, noisy or weak reception, may be due to defective tubes or poor contact between cap on top of tube and grid clip. Tubes may be checked by replacing with another tube which is known to be good.

If fuse blows out frequently, and insulating sleeve has been properly placed over fuse, the trouble probably is in the vibrator and vibrator should be replaced.

NEVER ATTEMPT TO ADJUST VIBRATOR POINTS.

Case rattles may be due to one or more of the following:

Loose screws in top or bottom covers. Loose elements in tubes. Loose tube shield. Loose R. F. coil shield. Loose grill cloth.

RECEIVER INSTALLATION:

Determine most satisfactory or desirable mounting position. In most cases it will be found that the receiver can be mounted on the car bulk head, above and to the right of the steering post.

Use the cardboard template which is the same size as set and mark location for two mounting bolts, if mounted on the long side and one bolt if on the short side.

Then drill two (2) one-half inch ($\frac{1}{2}$ ") holes, making certain that the paint around the hole on the engine side of fire wall or bulk head is scraped clean to insure a good ground connection between receiver and the frame of the car. Assemble brackets number 146-2 to case with self-tapping screws.

Insert bolts through dash, assemble plain, lockwashers and nuts on engine side, then hang receiver over bolt heads and tighten nuts securely.

Mount the remote control unit on steering column by means of mounting bracket or attach to instrument panel or under dash (see illustration).

Two flexible shafts are furnished, one with a slotted fitting on one end, which is the volume control shaft (number 149-18), the other is the selector shaft, with key fitting at one end (number 150-18).

Make certain that the outer casings of flexible shafts go into remote control bushings for approximately five-sixteenths of an inch and tighten set screws to secure cables. If cables are pushed too far into remote control head, shafts will not turn freely. Always try to install drive shafts in as straight a line as possible from remote control to set. **AVOID SHARP BENDS IN CABLES.**

IMPORTANT—READ CAREFULLY:

We are prepared to exchange, without charge, our standard number 149-18 and 150-18, eighteen inch cables for twenty-four inch cables,

number 149-24 and 150-24. You will find that 99% of the installations can be made with the standard eighteen inch cables, and bear in mind that the shorter the cable, the smoother the drive.

DIAL ADJUSTMENT:

Mount control head to steering column by means of bracket and strap or under dash by means of bracket or to instrument panel (see illustrations). Attach cables as above. Tune set to some station of a known frequency (between 800 and 1200 K.C.), hold selector knob, then with a screw driver adjust the slotted screw on back of the control head, and in that way adjust the dial pointer to the correct frequency setting.

CONNECTIONS TO BATTERY:

The battery cable, number 152-2, (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 inserting in receiver (see illustration). All bypass leads should be as short as possible.

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.

PILOT LIGHT:

Pilot light assembly, part number 116-6, a shielded cable, plugs into the set and to the rear of the remote control unit (see illustrations).

TONE CONTROL:

The tone control assembly, part number 101-12, attaches to the back of the remote control head by means of a special screw and plugs into the set (see illustrations).

ANTENNA CONNECTION:

The antenna is connected to the receiver by means of the antenna cable, number 152-1. The antenna wire is the single black wire projecting from the end of the cable. Splice this wire to the roof antenna lead and ground the pig-tail shielding as close to the corner post of the car as possible.

OPERATION:

Place key (knob) in lock of left hand control of the remote control unit. After waiting approximately 45 seconds for tubes to heat up, rotate station selector, right hand knob, until a desirable program is heard. De-tuning will very seriously affect the tone quality of this receiver. Tone control knob located between two black knobs (see illustrations) is a BASS and TREBLE switch, it is not a variable tone control. Turning it to the right makes the BASS connection, turning it to the left makes the TREBLE connection. You will note that the BASS position assists materially in reducing interference from static, street car lines and other high pitched disturbances.

MOTOR NOISE SUPPRESSION:

The ignition system of every automobile generates high frequency electrical interference. This high frequency interference arising from the ignition coil, the distributor and the spark plugs must be properly suppressed in order to obtain satisfactory reception. Each car will present more or less an individual problem but there is a definite procedure to follow which holds true in every case.

This first essential procedure is to disconnect the high tension leads to the spark plugs and attach the spark plug suppressors (168-1) (for V 8 Fords 168-4) the special distributor type suppressor (168-2) which is inserted in the center contact of the distributor as indicated in the illustration of a typical installation. (NOTE V 8 FORD USES NO DISTRIBUTOR SUPPRESSOR.) For cap type distributor, exchange the standard plug type distributor suppressor (168-2) for a special cable type suppressor (168-3) from your dealer. In some few cases, such as Buicks it is sometimes necessary to use cable type (168-3) suppressors. This type of suppressor is inserted in the leads running from the distributor to the spark plugs and which are concealed underneath the metal plate which covers the spark plugs.

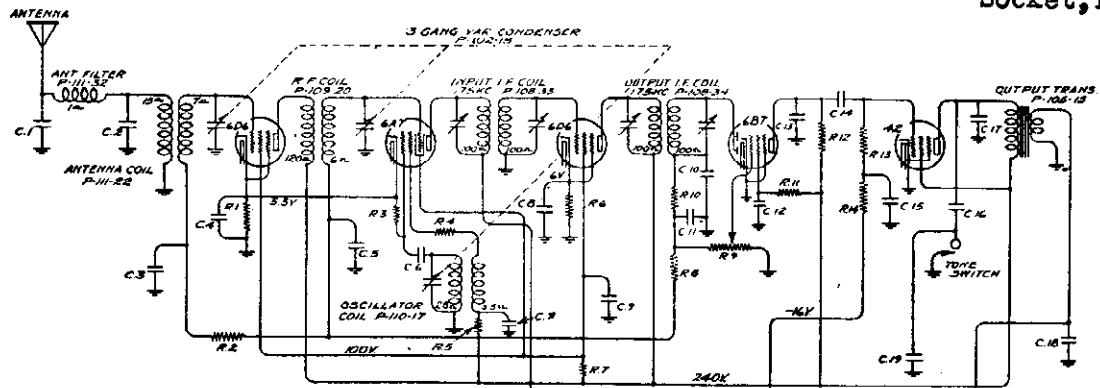
After the spark and distributor suppressors have been properly fastened the next in importance is the generator condenser (148-1), this filters a high pitched whining noise which would otherwise be heard as the motor is accelerated.

It is sometimes necessary in cars where the ignition coil is located under the dash, to use an additional capacitor (148-1) obtainable from your dealer. It must be installed between the battery side of the ignition coil and the frame of the car. Next connect capacitor (148-3) from the battery side of ammeter to frame of car. This is necessary in practically every installation and a good connection to the frame of the car is of utmost importance.

BELMONT RADIO CORP.

MODEL 680

MODEL 680
Schematic, Voltage
Socket, Trimmers



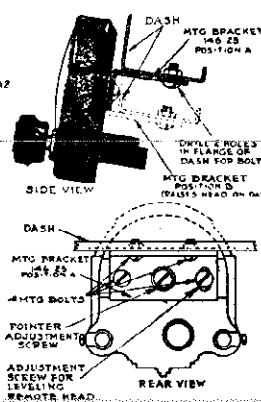
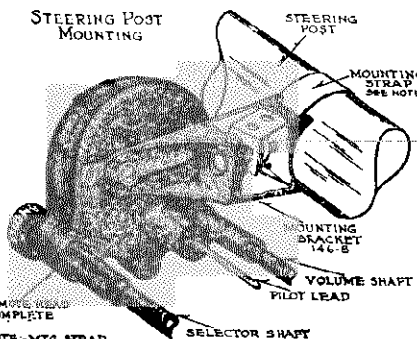
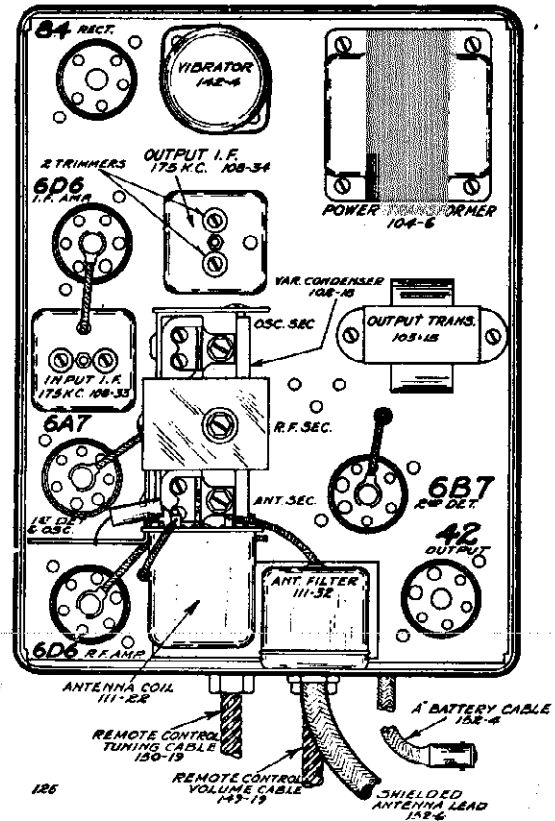
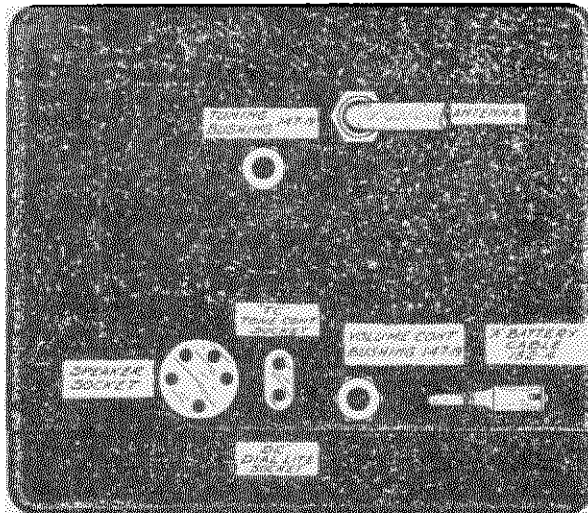
CONDENSERS	
No.	Value
C.1:	.20 MMF MICA
C.2:	.20 MMF MICA
C.3:	.01x400V.
C.4:	.1x200V.
C.5:	.05x200V.
C.6:	.100 MMF MICA
C.7:	.1x200V.
C.8:	.1x200V.
C.9:	.1x200V.
C.10:	.100 MMF MICA
C.11:	.100 MMF MICA
C.12:	.1x200V.
C.13:	.100 MMF MICA
C.14:	.01x400V.
C.15:	.25x400V.
C.16:	.025x400V.
C.17:	.015x400V.
C.18:	.500 MMF MICA
C.19:	.500 MMF MICA
C.20:	.500 MMF MICA
C.21:	.2000 MMF MICA
C.22:	.5 MFD.x120V.
C.23:	.8 MFD.x300V.
C.24:	.01x400V.
C.25:	.01x400V.
C.26:	.8 MFD.x300V.
C.27:	.5 MFD.x120V.

RESISTORS	
No.	Value
R.1:	.500
R.2:	.100M
R.3:	.50M
R.4:	.3500
R.5:	.20M
R.6:	.1500
R.7:	.25M
R.8:	.500M
R.9:	1 Meg. Vol. Control P-101-21
R.10:	.100M
R.11:	1 MEG.
R.12:	.250M
R.13:	.301M
R.14:	.301M
R.15:	.100
R.16:	.100

NOTE:
C.4 and C.9 are in one unit P-118-1
C.7 and C.8 are in one unit P-118-1
C.26 and C.23 are in one unit P-119-17
R.16 and R.15 are in one unit P-106-6
Numbers prefixed by letter "P" are part numbers.
Voltages taken from points indicated to chassis ground. Vol. control on full, no signal.

Serial No. 60001 and up.

IF PEAK 175 KC.



NOTE - MTS STRAP HAS 4 HOLES EACH HAVING A DIMENSION CORRESPONDING TO DIAMETER OF STEERING POST.

MODEL 680
Alignment
Parts List

BELMONT RADIO CORP.

DUMMY ANTENNAS:

The dummy antennas referred to in the following instructions are:
 "I.F. Dummy" —A .1 mfd. condenser connected in series with the test oscillator output lead.
 "Broadcast Dummy"—A 200 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 the screen of the type 42 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:

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 175 K.C., in series with I.F. dummy antenna, to the grid cap of the type 6A7 tube.
2. Adjust trimmer condensers of both input (108-33) and output (108-34) I.F. transformers 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. and 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 end section of the three gang condenser—see top view).
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust R.F. (center) and antenna (front) trimmers to resonance, see top view.

- (a) Check for sensitivity at 1000, 800 and 600 K.C. by setting test oscillator to these frequencies and picking up the signal by rotating variable condenser. Under no circumstances bend plates of oscillator section, bend R.F. and antenna plates only if absolutely necessary.

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.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good. If fuse blows out frequently and insulating sleeve has been properly placed over fuse, the trouble is probably in the vibrator, it should be replaced. Do not attempt to make any adjustments on the vibrators.

REPAIR PARTS - MODEL 680

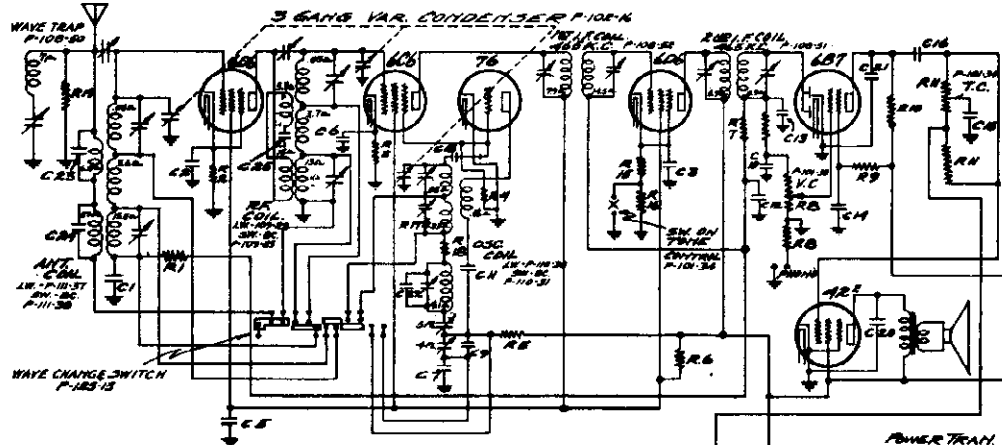
Serial No. 60001 and up

When ordering parts, always specify part and model number as well as serial number of chassis.

Part No.	Description	List Price Ea.	Part No.	Description	List Price Ea.														
CONDENSERS																			
	Unless otherwise listed, all single section tubular paper by-pass condensers	.25																	
	Unless otherwise listed, all dual section tubular paper by-pass condensers	.50																	
	Unless otherwise listed, all molded mica condensers	.25																	
119-17	Dual 6 mfd. electrolytic filter condenser	2.25																	
148-1	.5 Mfd. Generator Condenser	.50	123-1	All Sockets	.10														
148-3	.5 Mfd. Ammeter Condenser	.40		Dome Lite Filter	.90														
148-5	.5 Mfd. x 120 Volt Condenser	.50		Plate Antenna	3.50														
148-8	Special Ford Ignition Coil Condenser	.80	REMOTE CONTROL PARTS																
COILS																			
105-12	"A" Choke - 28 Turns No. 12 Wire	.10	112-30	Selector Control Shaft	.20														
105-14	"A" Choke - 37 Turns No. 12 Wire	.10	112-41	Idler Gear	.15														
108-33	Input I.F. Transformer Complete with Shield	1.50	112-42	Pointer Shaft	.05														
108-34	Output I.F. Transformer Complete with Resistors and Condensers, Mounted in Shield	3.50	112-86	Volume Control Shaft	.10														
109-20	R.F. Coil Complete - Less Shield	1.00	112-45	Bezel (Crystal Retainer)	.15														
110-17	Oscillator Coil Complete with Bracket	.75	112-46	Celluloid Dial Crystal	.15														
111-22	Antenna Coil Complete - Less Shield	1.00	112-48	Pointer Shaft Gear	.05														
111-32	Antenna Filter Assembly Complete with Shield and Antenna Cable	1.50	112-96	Celluloid dial	.25														
RESISTORS																			
	Unless otherwise listed, all carbon resistors	.20	110-13	0-8 Volt, T-51 Bulb Bayonet Base	.10														
106-6	200 Ohm Center Tapped Resistor	.25	110-14	0-8 volt T-51 frosted glass bayonet lamp	.13														
108-2	Distributor Suppressor	.40	116-9	Pilot Light Assembly	.45														
108-3	Cable Type Suppressor	.40	116-11	Tone Control Assembly Unit Complete	.35														
TRANSFORMERS																			
104-6	Power Transformer	3.00	131-5	Black Bakelite Remote Control Knobs	.30														
105-4	380 Ohm Filter Choke	.85	140-8	Die Cast Remote Control Mounting Bracket	.15														
105-15	Output Audio Transformer	1.50	140-12	Steering Column Strap	.15														
MISCELLANEOUS																			
101-21	Volume Control with Switch	1.35	140-25	Dash Mounting Bracket	.15														
102-18	Three Gang Variable Condenser	4.00	147-3	Selector Control Bushing for 112-39 Shaft	.10														
113-30	Two Lug Terminal Strip	.05	147-4	Volume Control Bushing for 112-43 Shaft	.10														
113-37	Terminal Strip	.05	149-25	Flexible Volume Control Cable - 24"	1.50														
115-34	Antenna and R.F. Coil Shield	.15	150-25	Flexible Selector Control Cable - 24"	1.50														
114-21	Speaker Chassis Only	5.00	151-7	Remote Control Head complete with Steering Column Bracket	5.00														
114-22	Ford Header speaker chassis only	5.00	151-8 Special General Motors Control Head Dash Mounting Kits for 1935 Chevrolet and Pontiac for use with 151-8 head Dash Mounting Kits for 1935 Oldsmobile for use with 151-8 head																
128-4	Complete Speaker Housing for 114-21	2.50																	
128-5	Ford speaker housing for 114-22	2.50	Vibrators can be reconditioned at a cost of \$3.00 each, if the old unit is returned.																
140-5	Set Case less Covers	1.00	All resistors are RMA color coded - specify value and/or resistor number (per schematic diagram) and model number.																
140-6	Covers for Above	1.25	When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.																
142-4	Plug-in Vibrator	4.50	Mica condensers are coded with an additional dot indicating tolerance:																
147-19	Flexible Cable Control Bushing	.10	<table border="0"> <tr> <td>Tolerance Percent</td> <td>Color of Dot</td> </tr> <tr> <td>2 1/2%</td> <td>White</td> </tr> <tr> <td>5%</td> <td>Green</td> </tr> <tr> <td>10%</td> <td>Blue</td> </tr> <tr> <td>15%</td> <td>Yellow</td> </tr> <tr> <td>20%</td> <td>Red</td> </tr> <tr> <td>More Than 20%</td> <td>None.</td> </tr> </table>			Tolerance Percent	Color of Dot	2 1/2%	White	5%	Green	10%	Blue	15%	Yellow	20%	Red	More Than 20%	None.
Tolerance Percent	Color of Dot																		
2 1/2%	White																		
5%	Green																		
10%	Blue																		
15%	Yellow																		
20%	Red																		
More Than 20%	None.																		
152-2	Battery Cable & Fuse Assembly	.35	All prices quoted are list and are subject to the usual trade discounts. Shipments are F.O.B. our Factory. When remitting in advance, please include postage.																
152-3	Fuse Insulating Sleeve	.05	WE CANNOT SUPPLY SPEAKER PARTS, CONES, TRANSFORMERS OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR \$3.00 NET, IF IT IS RETURNED TO OUR FACTORY TRANSPORTATION CHARGES PREPAID. PRICES SUBJECT TO CHANGE WITHOUT NOTICE.																
152-4	Chassis Battery Cable Assembly	.30	BRC - CHICAGO																
152-6	Antenna Cable	.50																	
152-8	Speaker Cable with Plug for 114-21	1.00																	
152-9	Special Ford Header speaker cable and plug	1.25																	
153-4	Special Speaker-Tone Control-Dial Light Socket Assembly	.25																	
160-11	Mounting Studs Complete with Nut & Washer	.05																	
169-1	15 Amp. Fuse (3AG-15)	.05																	

BELMONT RADIO CORP.

MODEL 755
Schematic, Socket
Parts, Layout

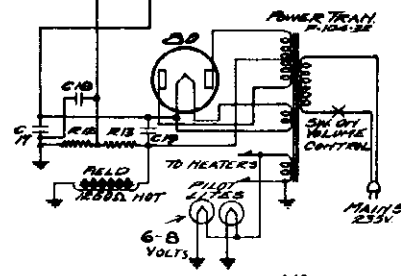


CONDENSERS

No.	Value
C.1	.05x200v
C.2	.25x200v
C.3	.25x200v
C.4	
C.5	.25x400v
C.6	.1x200v
C.7	.0019 mica
C.8	.000050 mica
C.9	.0005 mica
C.10	.00005 mica
C.11	.05x400v
C.12	.05x200v
C.13	.00003 mica
C.14	.1x200v
C.15	.01x400v
C.16	.05x400v
C.17	16 mfd. x350v (P-103-4)
C.18	.25x200v
C.19	14 mfd. x400v (P-103-8)
C.20	.006x600v
C.21	.0001 mica
C.22	.0001 mica
C.23	2400 mica
C.24	1000 mica
C.25	3600 mica

RESISTORS

R.1	100M 1/2 w
R.2	380 1/2 w
R.3	500 1/2 w
R.4	50M 1/2 w
R.5	18M 1.0w
R.6	15M 2.0w
R.7	500M 1/5w
R.8	1 meg vol. cont.
R.9	1 meg 1/5w
R.10	600M 1/2 w
R.11	300M tone control
R.12	250M 1/2 w
R.13	750M 1/5 w
R.15	380 1/2 w
R.16	30M 1/2 w
R.17	100 1/2 w
R.18	50 1/2 w
R.19	10M 1/2 w



NOTE:
C.14, C. 13. In dual unit.
P.118-12 numbers prefixed by letter "P" are part Nos.
Voltages taken from points indicated to chassis ground.
Set not tuned to strong signal. Tone control clockwise.
Serial No. 5G131980A and up
143

I. F. Frequency — 465 Kilocycles

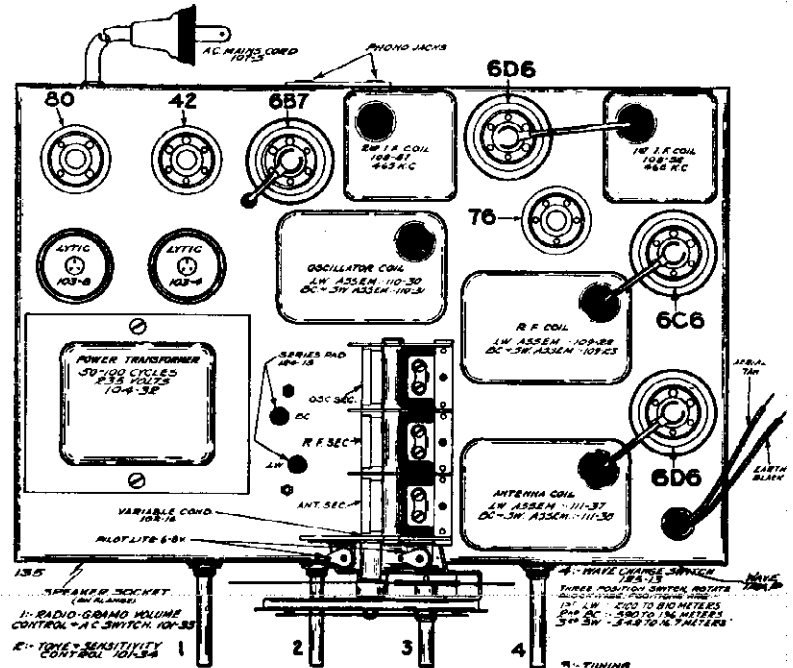
TUNING RANGE:

Long Wave Band
810-2100 Meters.
Broadcast Band
196-590 Meters.
Short Wave Band
16.7-54.5 Meters.

Part No.	Description
SPEAKERS	
114-13	Six Inch Dynamic
114-17	Eight Inch Dynamic
MISCELLANEOUS	
101-33	Volume Control and Switch
101-34	Wizard Control and Switch
102-16	Three Gang Variable Condenser
TRANSFORMERS	
104-32	50/60 Cycle—235 Volt Primary
104-33	40 Cycle—235 Volt Primary
104-34	25 Cycle—235 Volt Primary
104-35	Universal—40 Cycle Primary
104-36	Universal—25 Cycle Primary

COILS

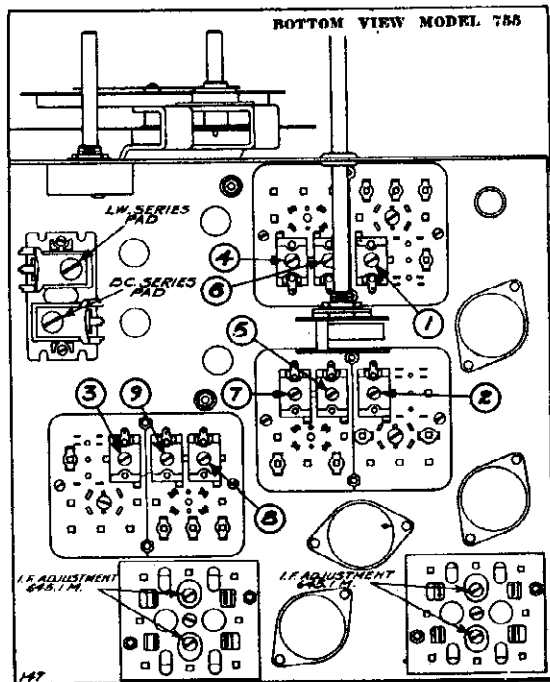
108-50	Wave Trap Coil and Trimmer Complete
108-51	Output I.F. Transformer Complete—Less Can
108-52	Input I.F. Transformer Complete—Less Can
109-22	Long Wave R.F. Coil Complete—Less Can
109-23	Broadcast and Short Wave R.F. Coil Complete—Less Can
110-30	Long Wave Oscillator Coil Complete—Less Can
110-31	Broadcast and Short Wave Oscillator Coil Complete—Less Can
111-37	Long Wave Antenna Coil Complete—Less Can
111-38	Broadcast and Short Wave Antenna Coil Complete—Less Can



Serial No. 5G131980A and up

MODEL 755
Trimmers
Alignment

BELMONT RADIO CORP.



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.

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

Each of 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, and with wave changing switch in the broadcast position, center of its rotation, and with variable condenser set to approximately 550 meters, make the following adjustments:

- Connect external oscillator set at 645.1 meters, in series with "Dummy 1", to the control grid cap of the type 6D6 tube, located between the two I.F. transformers, and adjust the output I.F. transformer to resonance.
- With "Dummy 1" still connected, move oscillator output clip from grid of 6D6 to grid cap to 6C6 and adjust input I.F. transformer to resonance.
- With oscillator still connected to 6C6, re-adjust output I.F. transformer.
- Disconnect oscillator from 6C6 and connect oscillator through "Dummy 2" to antenna lead (tan), adjust wave trap trimmer for a minimum response. (Adjustment located on right front chassis apron).

LONG WAVE BAND ALIGNMENT:

(810-2100 Meters)

1. With wave changing switch in the long wave position, extreme left of its rotation, and with external oscillator set at 2,000

meters and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:

- Adjust long wave series pad 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 electrolytic condenser. See top view.
- Re-set external oscillator and move dial pointer to 855 m. and adjust oscillator (adjustment number 3), R.F. (adjustment number 2) and antenna (adjustment number 1) to resonance. See bottom view for location of these adjustments.
- 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 OSCILLATOR IN FREQUENCY AND ABOVE IN WAVELENGTHS.

SHORT WAVE BAND ALIGNMENT:

(16.7-54.5 Meters)

1. With wave changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17.7 m., and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

- Move dial pointer to 17.7 meters and adjust short wave oscillator (adjustment number 8), short wave R.F. (adjustment number 7) and short wave antenna (adjustment number 6) to resonance.
- Re-set external oscillator to 50 meters and pick up signal by rotating variable condenser and check for sensitivity.

INTERMEDIATE OR BROADCAST BAND ALIGNMENT:

(190-590 Meters)

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

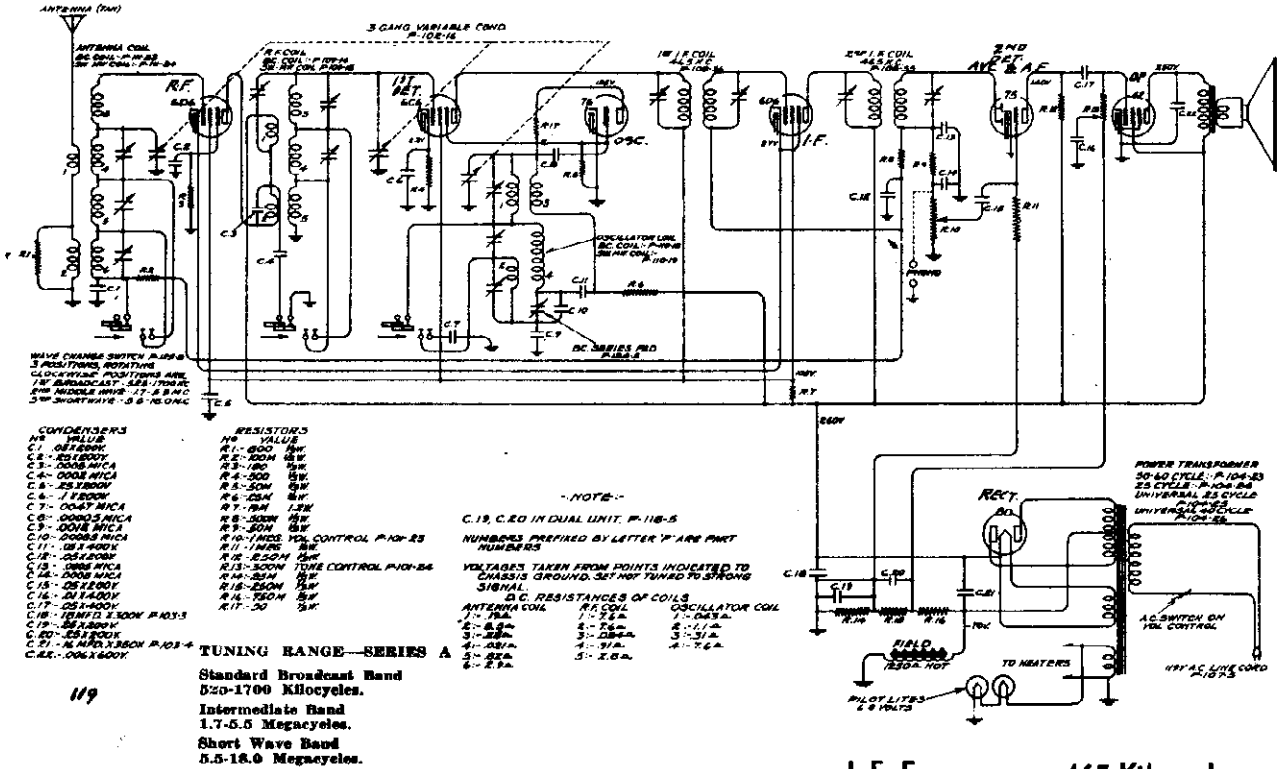
- Rotate variable condenser to approximately 545 meters tune in oscillator signal and adjust B.C. series pad (see top view) to resonance. Slowly rock condenser to and fro while making this adjustment to be sure maximum output is obtained.
- Set external oscillator at 231 meters, rotate condenser, pick up signal and adjust intermediate wave R.F. (adjustment number 5), intermediate wave antenna (adjustment number 4) and intermediate wave oscillator (adjustment number 9) to resonance.

- Re-check long wave alignment and if it is found necessary to re-adjust either R.F. or antenna trimmers, repeat the 17.7 meter short wave and 231 meter broadcast adjustments.

BELMONT RADIO CORP.

MODEL 777
Series A & B
Schematics
Voltage

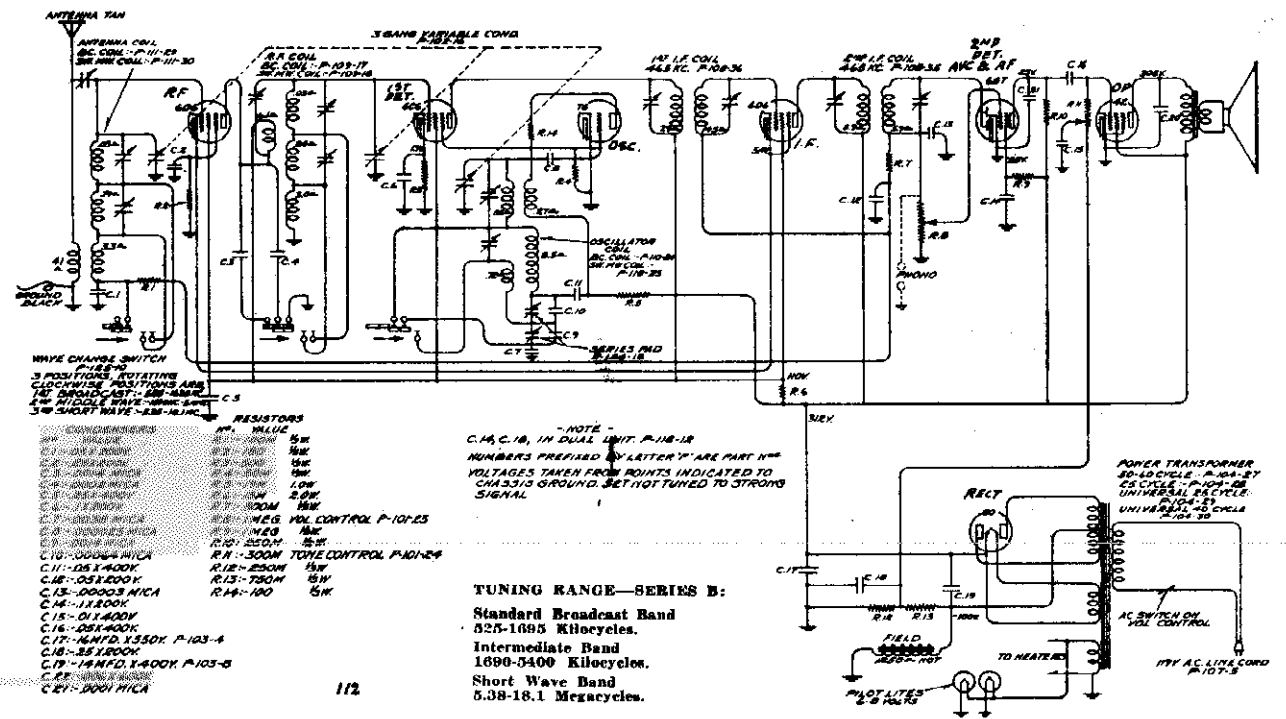
SERIES A



119

I. F. Frequency — 465 Kilocycles

SERIES B

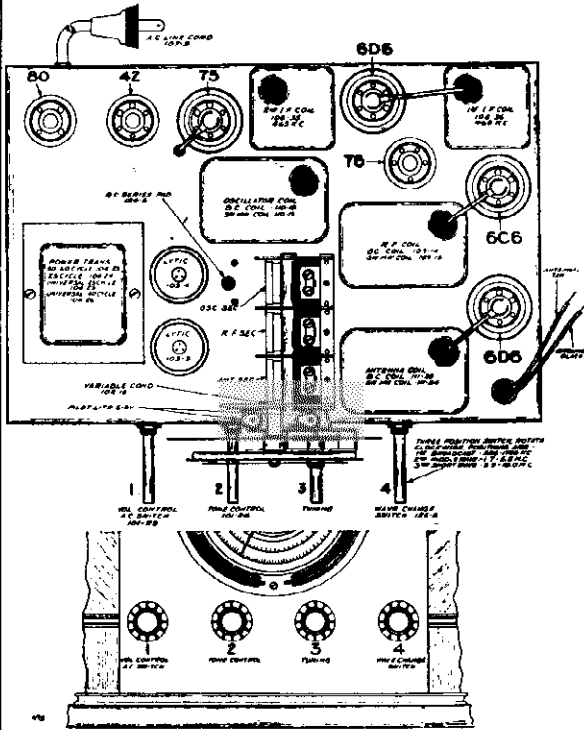


112

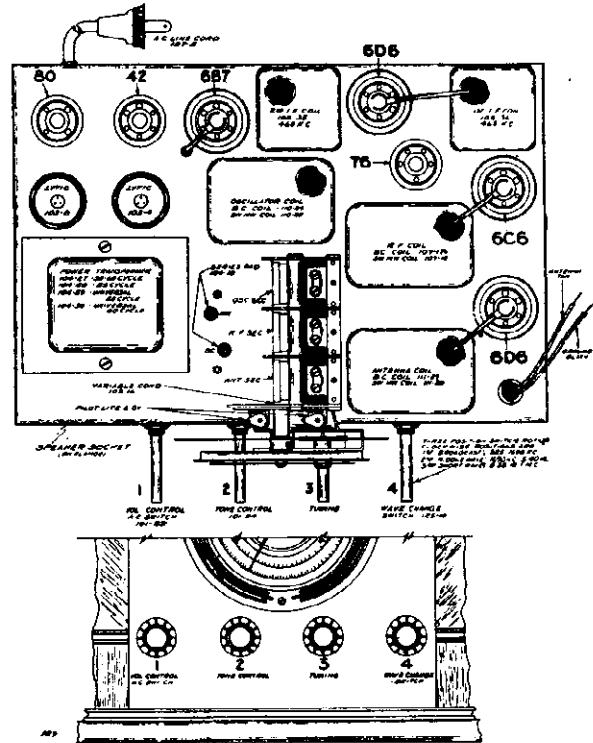
MODEL 777
Series A & B
Trimmers, Socket
Parts, Layouts

BELMONT RADIO CORP.

TOP VIEW - SERIES A

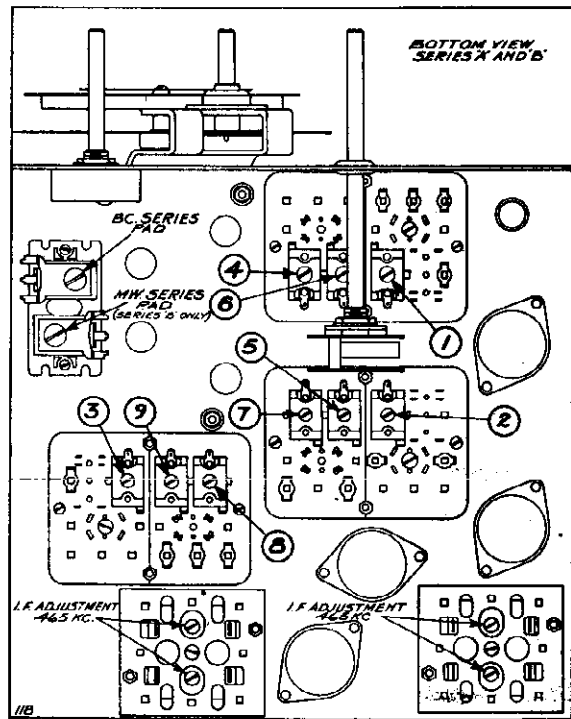


TOP VIEW - SERIES B



REPAIR PARTS LIST - MODEL 777
SERIES "A" & "B"

Parts Used In Ser. A Only	Parts Used In Ser. B Only	DESCRIPTION	List Price Each	101-23	101-23	MISCELLANEOUS
		CONDENSERS				Volume Control and Switch
		Unless Otherwise Listed—All Molded Mica	\$.35			Tone Control
		Unless Otherwise Listed—All Single Section Tubular Paper By-Pass	.25	101-24	101-24	Three Gang Variable Condenser
		Unless Otherwise Listed—All Dual Section Tubular Paper By-Pass	.50	102-16	102-16	Line Cord and Plug
103-3	Not Used.	18 Mfd. x 300 V. Electrolytic	1.35	107-5	107-5	
103-4	103-4	16 Mfd. x 350 V. Electrolytic	1.35			
Not Used.	103-5	14 Mfd. x 400 V. Electrolytic	1.35			
129-20	Not Used.	.0047 Mica—Type MH + or - 5%	.50			
Not Used.	129-29	.0038 Mica—Type MW + or - 2 1/2%	.50			
		RESISTORS				
		Unless Otherwise Listed—All Resistors	.20			
Not Used.	130-61	15M Ohm—2 Watt + or - 20%—180 V.	.40			
		COILS				
108-35	108-35	Output I.F. Coil Assembly Complete—Less Can	1.50			
108-36	108-36	Input I.F. Coil Assembly Complete—Less Can	1.50			
109-14	Not Used.	Broadcast R.F. Coil Assembly Complete—Less Can	1.00			
109-15	Not Used.	Mid-Wave & Short Wave R.F. Coil Assembly Complete—Less Can	1.50			
Not Used.	109-17	Broadcast R.F. Coil Assembly Complete—Less Can	.70			
Not Used.	109-18	Mid-Wave & Short Wave R.F. Coil Assembly Complete—Less Can	1.50			
110-18	Not Used.	Broadcast Oscillator Coil Assembly Complete—Less Can	.50			
110-19	Not Used.	Mid-Wave & Short Wave Oscillator Coil Assembly Complete—Less Can	1.25			
Not Used.	110-24	Broadcast Oscillator Coil Assembly Com.—Less Can	.75			
Not Used.	110-25	Mid-Wave & Short Wave Oscillator Coil Assembly Complete—Less Can	1.50			
111-23	Not Used.	Broadcast Antenna Coil Assembly Com.—Less Can	1.00			
111-24	Not Used.	Mid-Wave & Short Wave Antenna Coil Assembly Complete—Less Can	1.50			
Not Used.	111-29	Broadcast Antenna Coil Assembly Com.—Less Can	1.00			
Not Used.	111-30	Mid-Wave & Short Wave Antenna Coil Assembly Complete—Less Can	1.50			
		TRANSFORMERS				
104-23	Not Used.	50/60 Cycle Power Transformer	3.50			
104-24	Not Used.	25 Cycle Power Transformer	5.00			
104-25	Not Used.	Universal—25 Cycle Primary	7.50			
104-26	Not Used.	Universal—40 Cycle Primary	6.00			
Not Used.	104-27	50/60 Cycle Power Transformer	4.50			
Not Used.	104-28	25 Cycle Power Transformer	7.00			
Not Used.	104-29	Universal—25 Cycle Primary	7.50			
Not Used.	104-30	Universal—40 Cycle Primary	7.00			
		SPEAKERS				
114-13	114-13	Six Inch Speaker	6.00			
114-17	114-17	Eight Inch Speaker	8.50			
114-18	114-18	Ten Inch Speaker	8.00			



BELMONT RADIO CORP.

MODEL 777
Series A & B
Alignment

NOTE: IN SERIES B THE TYPE 75 WAS REPLACED BY TYPE 6H7, DUPLEX DIODE PENTODE AS A SECOND DETECTOR, A.V.C. AND AUDIO.

Series A and B chassis are serially numbered on the back flange of the chassis, series A beginning with number "5B104021A" and up, series B chassis beginning with number "5D114175B" and up. Series A and B may be identified by the letter "A" and "B" at the end of the serial numbers.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 108, 125, 150, 220 and 250 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 diagrams of series A and B.

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.

ALIGNING INSTRUCTIONS

Dummy Antennas

The following dummy antennas are used in aligning both series A and B 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 42 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.

ALIGNMENT PROCEDURE SERIES A ONLY

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

BROADCAST BAND ALIGNMENT:

1. With wave changing switch in the broadcast position, extreme left of its rotation, and with external oscillator set at 550 kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:

- Adjust broadcast series pad 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 electrolytic condenser. See top view.
- Re-set external oscillator to 1500 K.C., move dial pointer to 1500 K.C. and adjust oscillator (adjustment number 3), R.F. (adjustment number 7) and antenna (adjustment number 1) to resonance. See bottom view for location of these adjustments.
- 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 wave 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:

- Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 8), short wave R.F. (adjustment number 7) and short wave antenna (adjustment number 6) to resonance.
- Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check for sensitivity.

INTERMEDIATE BAND ALIGNMENT:

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

- Move dial pointer to 5 megacycles and adjust intermediate wave oscillator (adjustment number 9), intermediate wave R.F. (adjustment number 5) and intermediate antenna (adjustment number 4) to resonance.
- Re-set external oscillator to 1800 K.C. and pick up signal by rotating variable condenser and check for sensitivity.
- Re-check broadcast sensitivity as outlined under "Broadcast Band Alignment".

Series "A" chassis have no intermediate band series oscillator pad adjustment.

ALIGNMENT PROCEDURE SERIES B ONLY

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

BROADCAST BAND ALIGNMENT:

1. With wave 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:

- Adjust broadcast series pad 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 electrolytic condenser. See top view.
- Re-set external oscillator to 1400 K.C., move dial pointer to 1400 K.C. and adjust oscillator (adjustment number 3), R.F. (adjustment number 2) and antenna (adjustment number 1) to resonance. See bottom view for location of these adjustments.
- 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 wave 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:

- Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 8), short wave R.F. (adjustment number 7) and short wave antenna (adjustment number 6) to resonance.
- Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check for sensitivity.

INTERMEDIATE BAND ALIGNMENT:

1. With wave changing switch in the intermediate wave position, center of its rotation, and with external oscillator set at 1900 K.C. and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

- Rotate variable condenser to approximately 1800 K.C., tune in oscillator signal and adjust M.W. series pad (see top view) to resonance. Slowly rock condenser to and fro while making this adjustment to be sure maximum output is obtained.
- Set external oscillator at 5 M.C., rotate condenser, pick up signal and adjust intermediate wave R.F. (adjustment number 5), intermediate wave antenna (adjustment number 4) and intermediate wave oscillator (adjustment number 9) to resonance.
- 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. intermediate wave adjustments.

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

Series A and B.

Series A—Part No. 108-35 Output I.F. Transformer
Series A—Part No. 108-36 Input I.F. Transformer
Series B—Part No. 108-35 Output I.F. Transformer
Series B—Part No. 108-36 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, and with wave changing switch in the broadcast position, extreme left of its rotation, and with variable condenser set to approximately 1400 kilocycles, make the following adjustments:

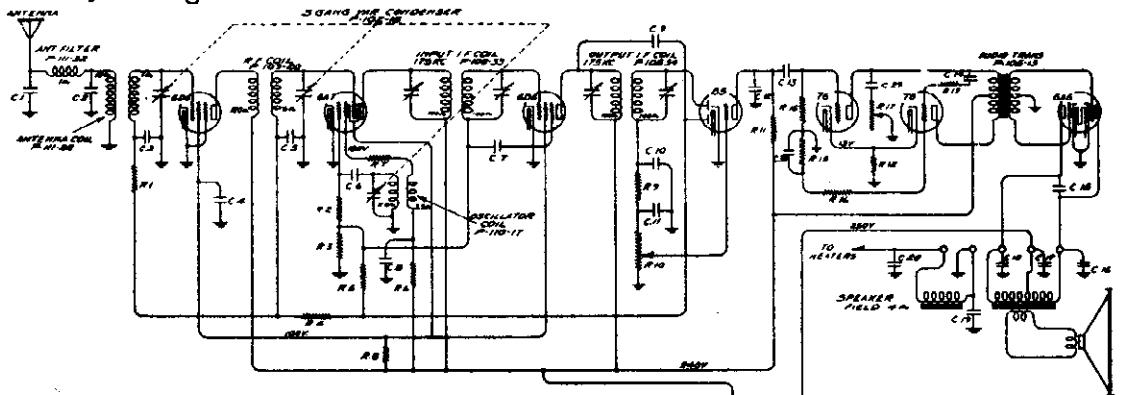
- Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6D6 tube, located between the two I.F. transformers, and adjust the output I.F. transformer to resonance.
- With "Dummy 1" still connected, move oscillator output clip from grid of 6D6 to grid cap to 6C6 and adjust input I.F. transformer to resonance.
- With oscillator still connected to 6C6, re-adjust output I.F. transformer.

MODEL 880

Series A & B

Schematics, Voltage

BELMONT RADIO CORP.



CONDENSERS	
No.	Value
C.1:-20	MMF MICA
C.2:-20	MMF MICA
C.3:-.01x400V.	
C.4:-.1x200V.	
C.5:-.05x200V.	
C.6:-100	MMF MICA
C.7:-.05x200V.	
C.8:-.1x200V.	
C.9:-20	MMF MICA
C.10:-100	MMF MICA
C.11:-100	MMF MICA
C.12:-100	MMF MICA
C.13:-.02x400V.	
C.14:-.02x400V.	
C.15:-.006x600V.	
No.	Value
C.16:-500	MMF MICA
C.17:-500	MMF MICA
C.18:-500	MMF MICA
C.19:-500	MMF MICA
C.20:-500	MMF MICA
C.21:-2000	MMF
C.22:-500	MMF MICA
C.23:-.5x120V.	
C.24:-.01x400V.	
C.25:-.5x120V.	
C.26:-.01x1400V.	
C.27:-12MFD.x350V.	
C.28:-8MFD.x350V.	
C.29:-.025x400V.	
C.30:-.01x400V.	

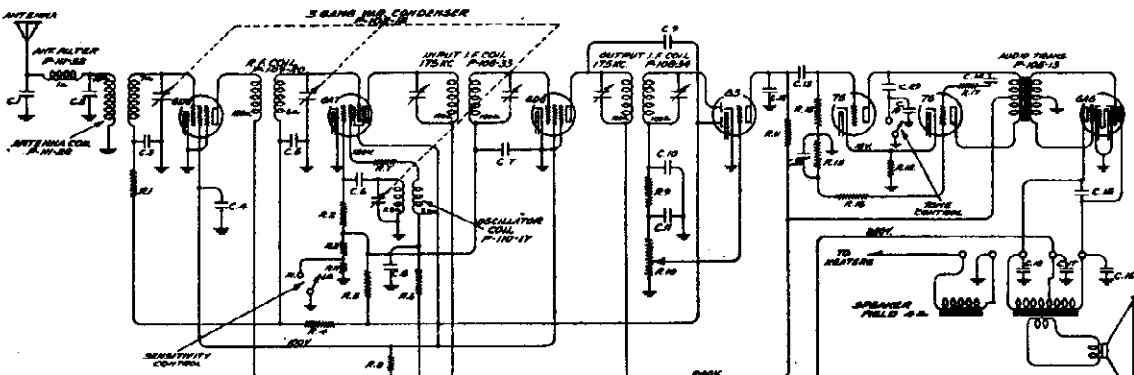
RESISTORS		
No.	Value	W.
R.1:-100M		1/4
R.2:-41M		1/4
R.3:-9M		1/4
R.4:-500M		1/4
R.5:-500M		1/4
R.6:-20M		1/4
R.7:-3500		1/4
R.8:-30M		1
R.9:-100M		1/4
R.10:-1	Meg. Vol.	
Control P-101-21		
R.11:-250M		1/4
R.12:-1500		1/4
R.13:-100		
R.14:-100		
R.15:-75M		1/4
R.16:-90M		1/4
R.17:-Switch		
R.18:-500M		1/4
R.19:-1	Meg.	1/4

NOTE:
 C.4 and C.8 are in one unit P-118-1
 C.27 and C.28 are in one unit P-119-16
 R.13 and R.14 are in one unit P-108-6
 Numbers prefixed by letter "P" are part numbers.
 Voltages taken from points indicated to chassis ground. Vol. control on full, no signal.

Serial No. 80001 and up.

MODEL 880 Series A

IF PEAK 175 KC.



CONDENSERS	
No.	Value
C.1:-20	MMF MICA
C.2:-20	MMF MICA
C.3:-.01x400V.	
C.4:-.1x200V.	
C.5:-.05x200V.	
C.6:-100	MMF MICA
C.7:-.05x200V.	
C.8:-.1x200V.	
C.9:-20	MMF MICA
C.10:-100	MMF MICA
C.11:-100	MMF MICA
C.12:-100	MMF MICA
C.13:-.02x400V.	
C.14:-.02x400V.	
C.15:-.006x600V.	
No.	Value
C.16:-500	MMF MICA
C.17:-500	MMF MICA
C.18:-500	MMF MICA
C.19:-500	MMF MICA
C.20:-5MFD.x120V.	
C.21:-2000	MMF
C.22:-500	MMF MICA
C.23:-.5x120V.	
C.24:-.01x400V.	
C.25:-1.0MFD.x120V.	
C.26:-.01x1400V.	
C.27:-12MFD.x350V.	
C.28:-8MFD.x350V.	
C.29:-.025x400V.	
C.30:-.01x400V.	

RESISTORS		
No.	Value	W.
R.1:-100M		1/4
R.2:-41M		1/4
R.3:-9M		1/4
R.4:-500M		1/4
R.5:-500M		1/4
R.6:-20M		1/4
R.7:-3500		1/4
R.8:-30M		1
R.9:-100M		1/4
R.10:-250M	ohms Vol	
Control P-101-21		
R.11:-350M		1/4
R.12:-1500		1/4
R.13:-100		
R.14:-100		
R.15:-75M		1/4
R.16:-90M		1/4
R.17:-4M		1/4
R.18:-500M		1/4
R.19:-1	Meg.	1/4

NOTE:
 C.4 and C.8 are in one unit P-118-1
 C.27 and C.28 are in one unit P-119-16
 R.13 and R.14 are in one unit P-108-6
 Numbers prefixed by letter "P" are part numbers.
 Voltages taken from points indicated to chassis ground. Vol. control on full, no signal.

Series A 80001 up
 Series B 81002 up

IF PEAK 175 KC.

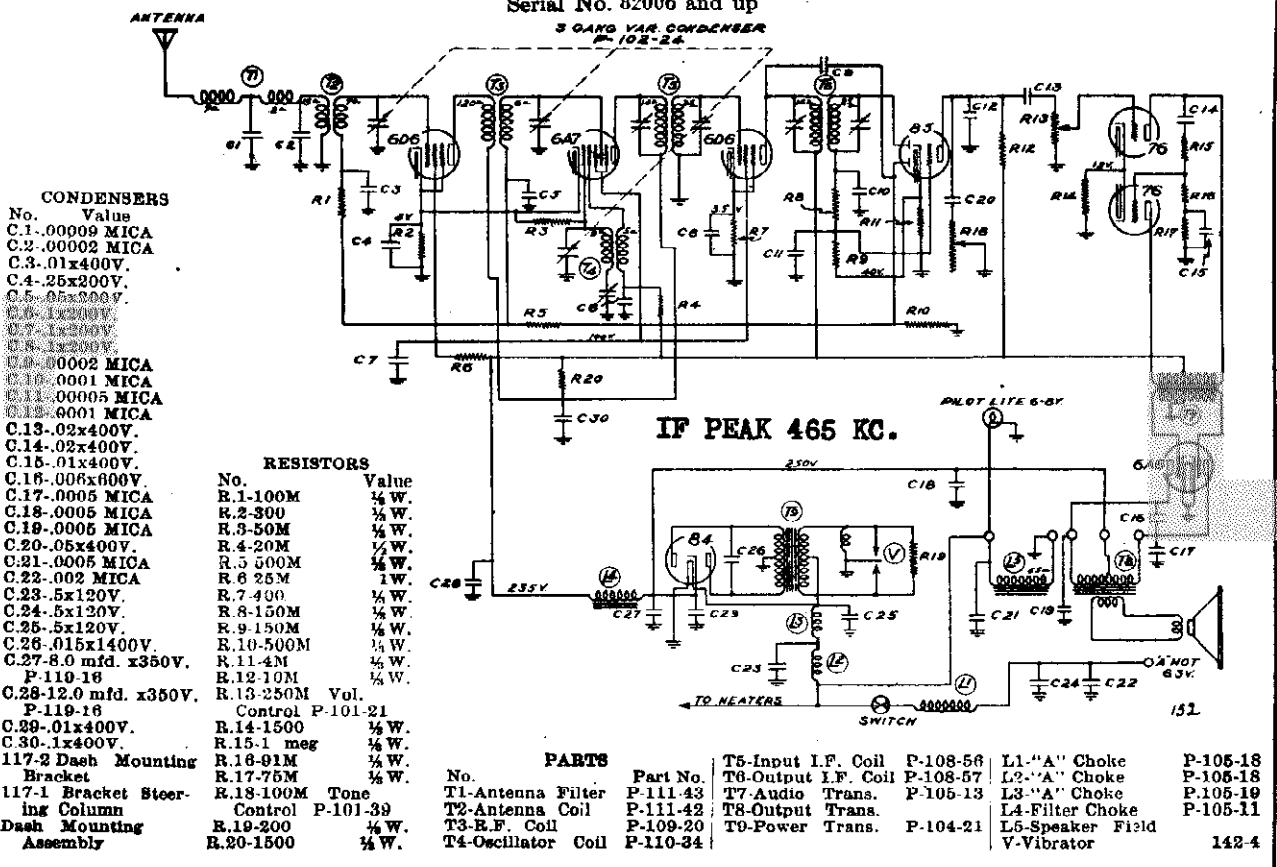
Model 880 Series B

Serial No. 80001 and up

BELMONT RADIO CORP.

MODEL 880
Series C
Schematic, Voltage
Data

Model 880 Series C
Serial No. 82006 and up



CONDENSERS

No.	Value
C.1-.00009 MICA	
C.2-.00002 MICA	
C.3-.01x400V.	
C.4-.25x200V.	
C.5-.05x200V.	
C.6-1x200V.	
C.7-1x200V.	
C.8-1x200V.	
C.9-.00002 MICA	
C.10-.0001 MICA	
C.11-.00005 MICA	
C.12-.0001 MICA	
C.13-.02x400V.	
C.14-.02x400V.	
C.15-.01x400V.	
C.16-.006x600V.	
C.17-.0005 MICA	
C.18-.0005 MICA	
C.19-.0005 MICA	
C.20-.05x400V.	
C.21-.0005 MICA	
C.22-.002 MICA	
C.23-.5x120V.	
C.24-.5x120V.	
C.25-.5x120V.	
C.26-.015x1400V.	
C.27-8.0 mfd. x350V.	
P-119-18	
C.28-12.0 mfd. x350V.	
P-119-18	
C.29-.01x400V.	
C.30-.1x400V.	

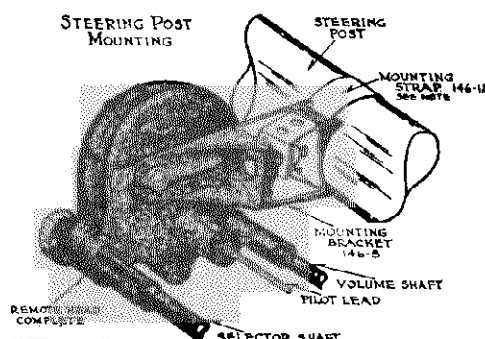
RESISTORS

No.	Value
R.1-100M	
R.2-300	
R.3-50M	
R.4-20M	
R.5-500M	
R.6-25M	
R.7-400	
R.8-150M	
R.9-150M	
R.10-500M	
R.11-4M	
R.12-10M	
R.13-250M Vol.	
Control P-101-21	
R.14-1500	
R.15-1 meg	
R.16-91M	
R.17-75M	
R.18-100M Tone	
Control P-101-39	
R.19-200	
R.20-1500	

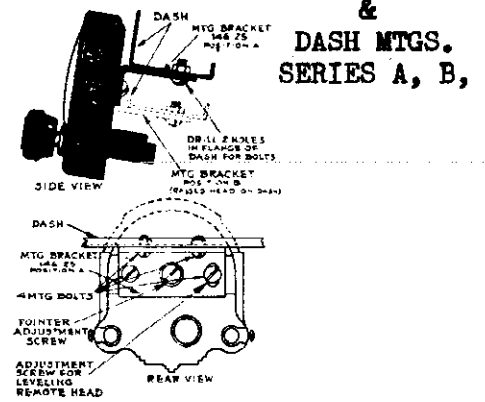
- 117-2 Dash Mounting Bracket
- 117-1 Bracket Steering Column
- Dash Mounting Assembly

PARTS

No.	Part No.	Description	Part No.	Description	Part No.	Description
T1-Antenna Filter	P-111-43	T5-Input I.F. Coil	P-108-56	L1-"A" Choke	P-105-18	
T2-Antenna Coil	P-111-42	T6-Output I.F. Coil	P-108-57	L2-"A" Choke	P-105-18	
T3-E.F. Coil	P-109-20	T7-Audio Trans.	P-105-13	L3-"A" Choke	P-105-19	
T4-Oscillator Coil	P-110-34	T8-Output Trans.		L4-Filter Choke	P-105-11	
		T9-Power Trans.	P-104-21	L5-Speaker Field		
				V-Vibrator	142-4	



NOTE - MTC STRAP HAS 4 HOLES EACH HAVING A DIMENSION CORRESPONDING TO DIAMETER OF STEERING POST.



STEERING POST & DASH MTGS. SERIES A, B, & C

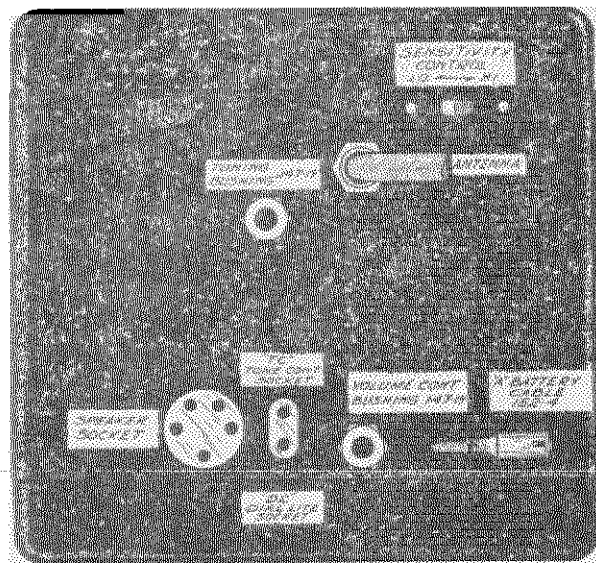
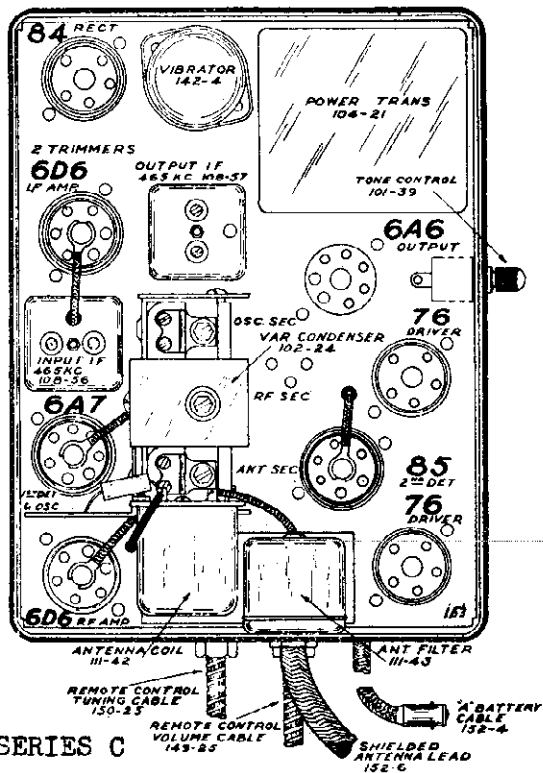
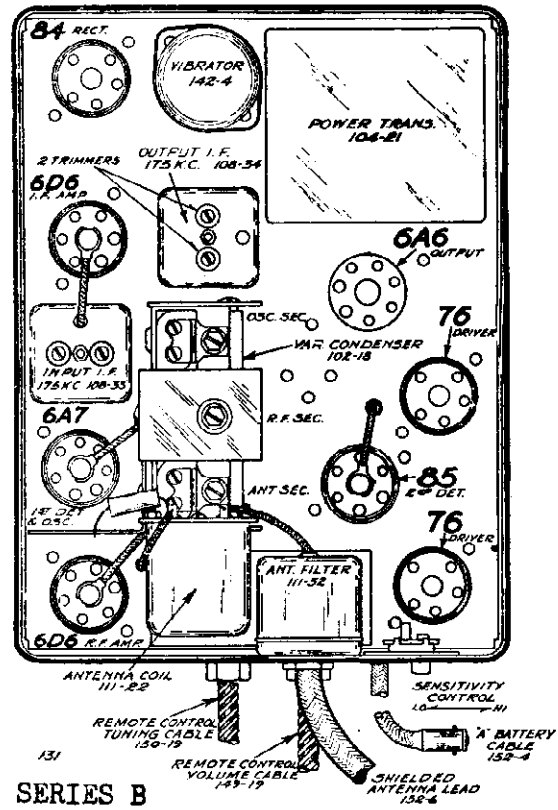
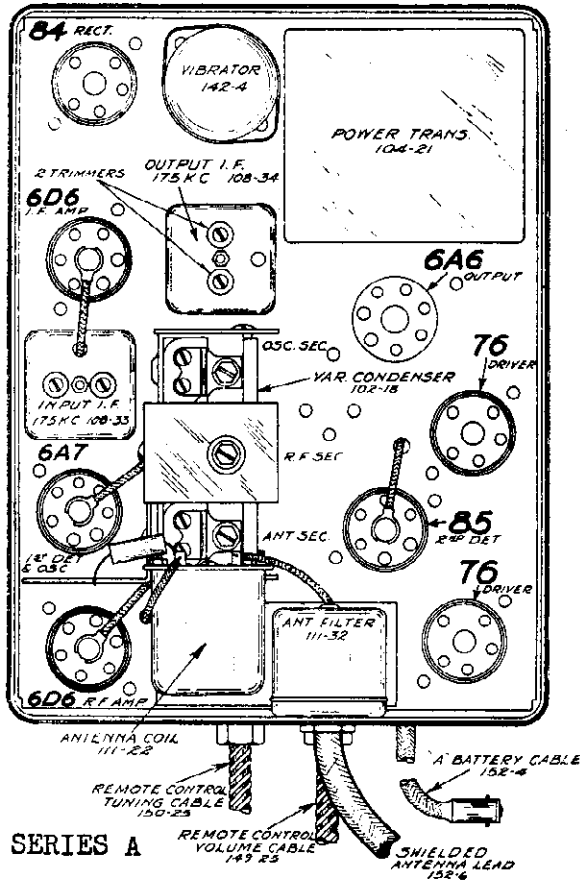
- Its tube complement is as follows: **SERIES C**
- 1 Type 6D6—remote cut-off pentode as an R.F. amplifier.
 - 1 Type 6A7—electron coupled oscillator as first detector and converter.
 - 1 Type 6D6—remote cut-off pentode and I.F. amplifier (465 K.C.)
 - 1 Type 85 —duplex diode triode second detector and A.V.C.
 - 2 Type 76 —triodes, push-pull first audio.
 - 1 Type 6A6—class B output.
 - 1 Type 84 —high vacuum rectifier.

- ACCESSORIES:**
The carton of accessories packed with this set contains the following:
- 1—No. 152-2 plug-in battery cable.
 - 1—No. 149-25 flexible volume control cable (slotted fitting).
 - 1—No. 150-25 flexible selector cable (key fitting).
 - 2—No. 154-2 set screws for 147-19 bushings.
 - 2—No. 160-11 3" x 1/8" carriage bolts and nuts for mounting set to bulk head.
 - 2—No. 134-1—Iron washers.
 - 2—No. 134-2—Lockwashers.
 - 1—No. 168-2—Distributor type suppressor.
 - 1—No. 148-1 generator condenser.
 - 1—No. 148-3 ammeter condenser.
 - 1—No. 117-1 Steering column bracket.
 - 1—No. 122-6 remote control head complete with 107-8 and 116-13.
 - 1—No. 152-3 Fuse insulating sleeve.
 - 1—No. 169-1 15 amp. fuse.

GENERATOR INTERFERENCE:
Remove the generator cutout mounting screw and fasten the condenser (148-1) bracket on the generator cutout mounting lug. Replace the cutout mounting screw and tighten down securely. Connect the condenser lead to the battery terminal of the cutout. The generator condenser is absolutely necessary as it is used to eliminate a high pitched whining noise which would otherwise be heard as the motor is accelerated.

MODEL 880
Series A,B,C
Socket, Trimmers

BELMONT RADIO CORP.



Arrangement of Series A & C is similar to Series B, except that Series A & C have no Sensitivity Control Switch

BELMONT RADIO CORP.

MODEL 880
Series A,B,C
Alignment,Parts

DUMMY ANTENNAS:

The dummy antennas referred to in the following instructions are:
"I.F. Dummy" —A .1 mfd. condenser connected in series with the test oscillator output lead.

"Broadcast Dummy"—A 200 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 two plates of the type 6A6 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: Series A & B

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 175 K.C., in series with I.F. dummy antenna, to the grid cap of the type 6A7 tube.
2. Adjust trimmer condensers of both input (108-33) and output (108-34) I.F. transformers 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. and 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 end section of the three gang condenser—see top view).
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust R.F. (center) and antenna (front) trimmers to resonance, see top view.
 - (a) Check for sensitivity at 1000, 800 and 600 K.C. by setting test oscillator to these frequencies and picking up the signal by rotating variable condenser. Under no circumstances bend plates of oscillator section, bend R.F. and antenna plates only if absolutely necessary.

I.F. ALIGNMENT: Series 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 the grid cap of the type 6A7 tube.
2. Adjust trimmer condensers of both input (108-56) and output (108-57) I.F. transformers 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. and 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 end section of the three gang condenser—see top view).

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.

3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust R.F. (center) and antenna (front) trimmers to resonance, see top view.
4. Re-set external oscillator to 600 K.C. and adjust series pad to resonance, rotate condenser and move dial pointer to 600 K.C. by gently rocking condenser to and fro. Pick up oscillator signal while adjusting series pad to resonance. This adjustment is accessible from the bottom of the chassis.
 - (a) Check for sensitivity at 1000, 800 and 600 K.C. by setting test oscillator to these frequencies and picking up the signal by rotating variable condenser. Under no circumstances bend plates of oscillator section, bend R.F. and antenna plates only if absolutely necessary.

SERIES A & B REPAIR PARTS - MODEL 880

Part No.	Description	List Price Ea.
CONDENSERS		
	Unless otherwise listed, all single section tubular paper by-pass condensers	\$.25
	Unless otherwise listed, all dual section tubular paper by-pass condensers	.50
	Unless otherwise listed, all molded mica condensers	2.50
119-16	8-12 Mfd. - 350 Volt Electrolytic Filter Condenser	.50
148-1	.5 Mfd. Generator Condenser	.40
148-3	.5 Mfd. Ammeter Condenser	.40
148-5	.5 Mfd. x 120 Volt Condenser	.50
148-6	Special Ford Ignition Coil Condenser	.69
COILS		
105-14	"A" Choke - 28 Turns No. 12 Wire	.10
105-14	"A" Choke - 37 Turns No. 12 Wire	.10
108-33	Input I.F. Transformer Complete with Shield	1.50
108-34	Output I.F. Transformer Complete with Resistors and Condensers, Mounted in Shield	2.50
109-20	R.F. Coil Complete - Less Shield	1.00
110-17	Oscillator Coil Complete with Bracket	.75
111-22	Antenna Coil Complete - Less Shield	1.00
111-32	Antenna Filter Assembly Complete with Shield and Antenna Cable	1.50
RESISTORS		
	Unless otherwise listed, all carbon resistors	.20
106-6	200 Ohm Center Tapped Resistor	.25
188-2	Distributor Suppressor	.40
188-3	Cable Type Suppressor	.40
TRANSFORMERS		
104-21	Power Transformer	4.00
105-11	350 Ohm Filter Choke	.85
105-13	Input Audio Transformer	1.75
MISCELLANEOUS		
101-21	Volume Control with Switch	1.35
102-18	Three Gang Variable Condenser	4.00
113-30	Two Lug Terminal Strip	.05
113-36	Terminal Strip	.05
115-34	Antenna and R.F. Coil Shield	.15
114-20	Speaker Chassis Only	10.00
128-4	Complete Speaker Housing	3.50
140-5	Set Case less Covers	1.00
140-6	Covers for Above	1.25
142-4	Plug-in Vibrator	4.50

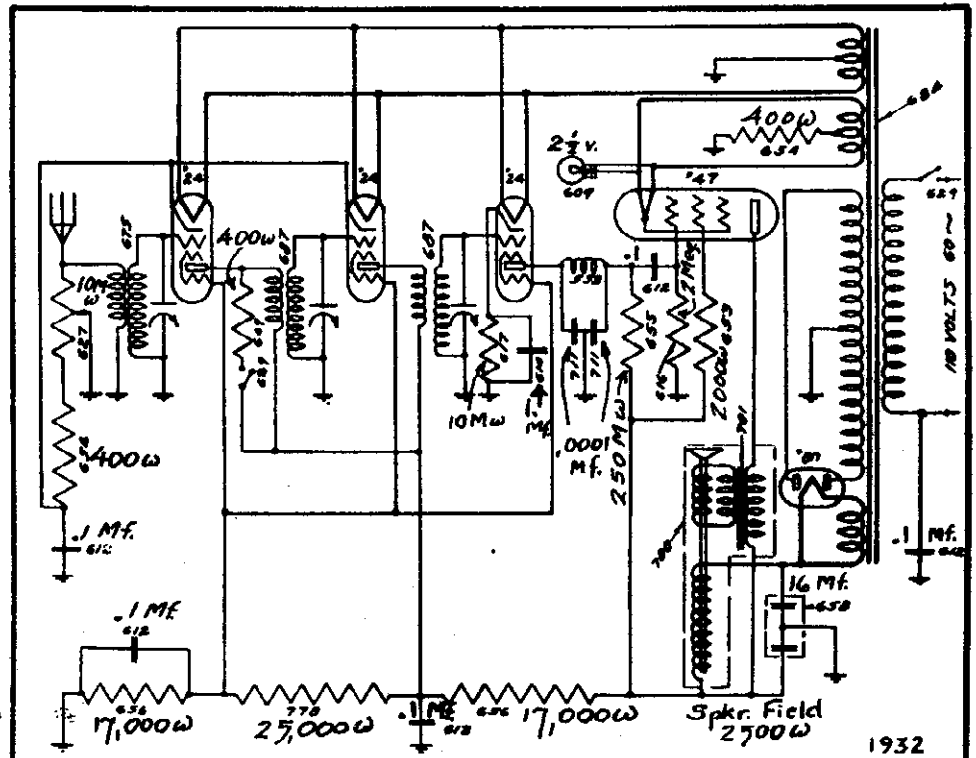
Serial No. 80001 and up

Part No.	Description	List Price Ea.
REMOTE CONTROL PARTS		
147-10	Plate Antenna	3.50
152-2	Flexible Cable Control Bushing	.10
152-3	Battery Cable & Fuse Assembly	.35
152-4	Fuse Insulating Sleeve	.05
152-6	Chassis Battery Cable Assembly	.30
152-7	Antenna Cable	.50
153-4	Speaker Cable with Plug	1.00
160-11	Special Speaker-Tone Control-Dial Light Socket Assembly	.25
169-1	Mounting Studs Complete with Nut & Washer	.05
169-1	15 Amp. Fuse (3AG-15)	.08
123-1	All Sockets	.10
123-1	Dome Lite Filter	.90
112-39	Selector Control Shaft	.20
112-41	Idler Gear	.16
112-42	Pointer Shaft	.05
112-42	Volume Control Shaft	.10
112-45	Bezel (Crystal Retainer)	.15
112-48	Celluloid Dial Crystal	.15
112-48	Pointer Shaft Gear	.05
112-97	Glass Dial	.35
112-108	Metal Disc Pointer	.10
116-13	6-8 Volt, T-51 Bulb Bayonet Base	.10
116-9	Pilot Light Assembly	.45
116-11	Tone Control Assembly Unit Complete	.35
131-5	Black Bakelite Remote Control Knobs	.40
134-32	Fibre Dial Mask	.05
146-6	Die Cast Remote Control Mounting Bracket	.30
146-12	Steering Column Strap	.15
146-26	Dash Mounting Bracket	.15
147-3	Selector Control Bushing for 112-39 Shaft	.10
147-4	Volume Control Bushing for 112-43 Shaft	.10
149-25	Flexible Volume Control Cable - 24"	1.50
150-25	Flexible Selector Control Cable - 24"	1.50
151-6	Remote Control Head Complete with Steering Column Bracket	5.00
151-8	Dash Mounting Kit (specify make and year of car)	1.25
151-8	Special General Motors Control Head	7.00
151-8	Dash Mounting Kits for 1935 Chevrolet and Pontiac for use with 151-8 head	1.50
151-8	Dash Mounting Kits for 1935 Oldsmobile for use with 151-8 head	1.75

REPAIR PARTS - MODEL 880 Otherwise same as Series A & B - SERIES C #32006 and up Sensitivity Control is not used

100-31	.5 Mfd. x 120 Volt Condenser	.80
148-6	Special Ford Ignition Coil Condenser	.60
121-21	.15-S Series Padder	.50
COILS		
105-18	"A" Choke L1-L2, 32 1/2 Turns, No. 14 wire	.10
105-19	"A" Choke L3, 60 Turns, No. 18 wire	.15
108-33	Input I.F. Transformer Complete with Shield	1.50
108-37	Output I.F. Transformer Complete with Resistors and Condensers, Mounted in Shield	3.50
106-20	R.F. Coil Complete - Less Shield	1.00
110-34	Oscillator Coil Complete with Bracket	.75
111-42	Antenna Coil Complete - Less Shield	1.00
111-43	Antenna Filter Assembly Complete with Shield and Antenna Cable	1.50
RESISTORS		
	Unless otherwise listed, all carbon resistors	.20
130-84	200 Ohm Resistor 1/4 Watt.	.15
MISCELLANEOUS		
101-39	Tone Control	1.00
101-31	Volume Control with Switch	1.35
102-24	Three Gang Variable Condenser	4.00

SCHEMATIC WIRING DIAGRAM OF THE Calvert 5-TUBE RADIO



D. C. Voltages

READING FROM—

Chassis (ground) to plates of R. F. tubes	130 to 150 volts
“ “ to plate of Detector	75 to 95 volts
“ “ to plate of Pentode	215 to 235 volts
“ “ to screen of R. F. tubes	45 to 65 volts
“ “ to screen of Detector	45 to 65 volts
“ “ to screen of Pentode	215 to 235 volts
“ “ to cathode of R. F. tubes	1.5 to 2.5 volts
“ “ to Cathode of Detector	4 to 6 volts
“ “ to pentode Filament Center Tap	14 to 18 volts

A. C. Voltages

1st R. F., 2nd R. F., Detector and Pentode Filaments	2.3 to 2.5 volts
Rectifier Filament	4.8 to 5.1 volts
Ground to plates of 280	approximately 375 volts

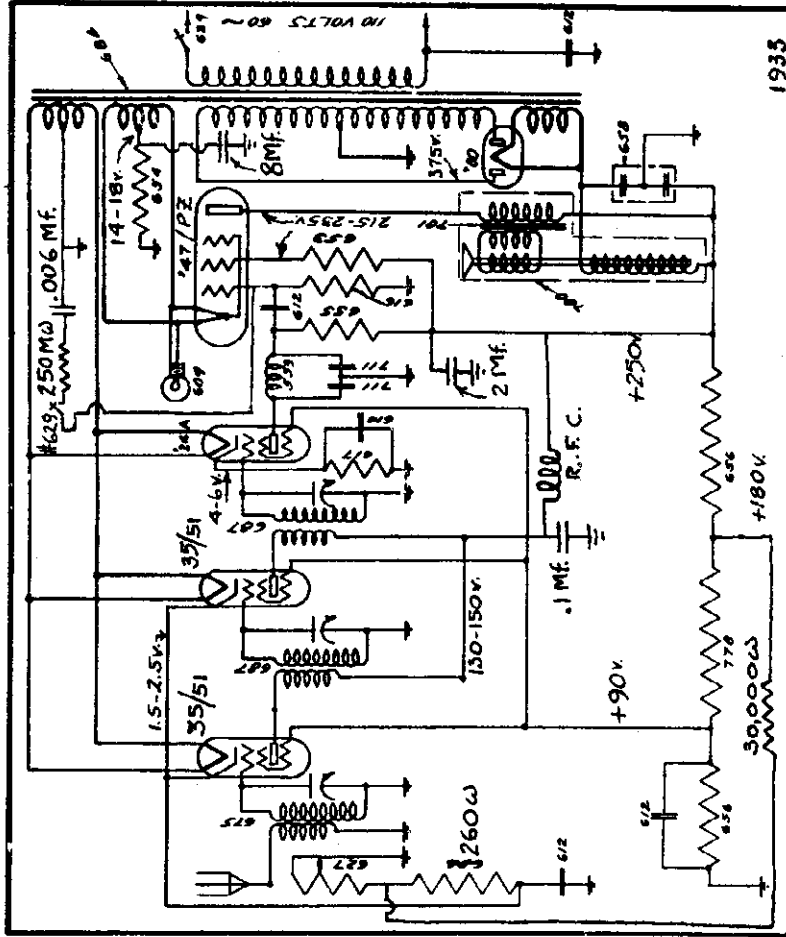
NOTE: Filament Voltages may be measured with a Weston Triple Range (0-4, 0-8, 0-150) Type 528 AC Voltmeter. The high voltage on the Rectifier Plates should be measured with a double range (300, 0-600) Type Weston AC Voltmeter.

Operation of Set

Also Use of Local and Distance Switch
After set is turned on it will be some time before the set will operate due to the tubes heating up. Turn Volume Control full on then rotate dial until station is heard, turn Volume Control until desired volume is reached.

If in the vicinity where a strong local is being received turn local and distance switch (found on left side of cabinet) to local position.

MODELS A-51-A, A-52-A
 Schematic, Voltage CALVERT MOTOR ASSOCIATES
 Parts List



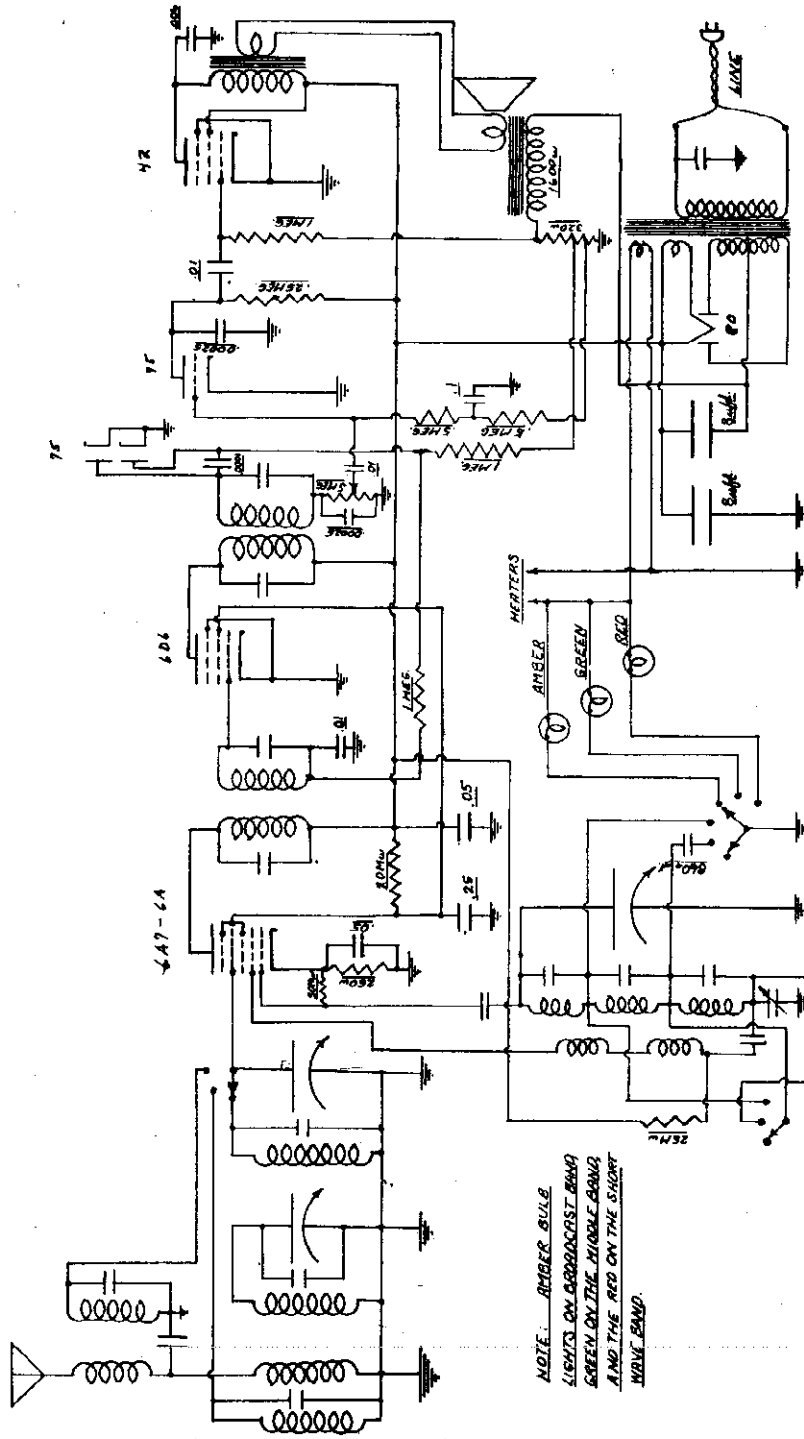
- 385 Tube Shielding Can
- 386 Antenna Coil Shielding Can
- 553 700 turn R. F. Choke
- 605 Grid Grip
- 609 2 1/2 volt Pilot Light
- 612 .1 Mfd. Condenser
- 614 1. Mfd. Condenser
- 616 2 megohm Resistor, 1/2 watt
- 617 10,000 ohm Resistor, 1/2 watt
- 627 10,000 ohm Centralab Volume Control
- 629 Toggle Switch
- 649 400 ohm Resistor, 1/2 watt
- 653 2,000 ohm Resistor, 1/2 watt
- 654 400 ohm Resistor, one watt
- 655 250,000 ohm Resistor, 1/2 watt
- 656 17,000 ohm Resistor, 1/2 watt
- 658 16 Mfd. Filter Condenser
- 663 Four prong socket
- 674 Five prong socket
- 675 Antenna Coil
- 687 R. F. Coil
- 684 Power Transformer
- 700 Dynamic Speaker with Output Transformer.
Magnavox Speaker Model 144, 2,500 ohm field.
- 701 Output Transformer only for Single Pentode grids connected as usual.
- 711 .0001 Mfd. Condenser.
- 778 25,000 ohm Resistor, 1/2 watt.

The same chassis is used for Model A52A as is used for Model A51A. The following tubes are used in Model A52A with the suppressor grids connected as usual.

1st R-F. Stage	Type 58
2nd R-F. Stage	" 58
Detector	" 57
Output Stage	" PZ/47
Rectifier	" 80

1934

CAVALCADE RADIO CO.



IF 456 KC

Operation of Set

The right hand knob switches on the set, and thereafter acts as the volume control. The upper middle knob is the station selector with which the stations are tuned in. The lower middle knob is the variable tone control, allowing you to control the tone for bass or sharp timbre. The left hand knob controls the three wave bands of the set. When turned to the extreme left, the broadcast band is on, showing an AMBER light; switched to the center, the police and amateur band is on, showing a GREEN light; the extreme right brings in the short wave, showing a RED light. Success with short wave requires more careful tuning than with the broadcast band and necessitates study of a chart to ascertain location of the principal short wave broadcasting stations. Air conditions are not always favorable to short wave reception, under which conditions nothing can be done, but with reasonable atmospheric clearance, good foreign reception may be had.

6-Tube Super heterodyne 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 - AMBER light
- Police and Amateur band - 1850-5000 kc - GREEN light
- Short wave, American & Foreign - 18-5.7 meg.-RED light

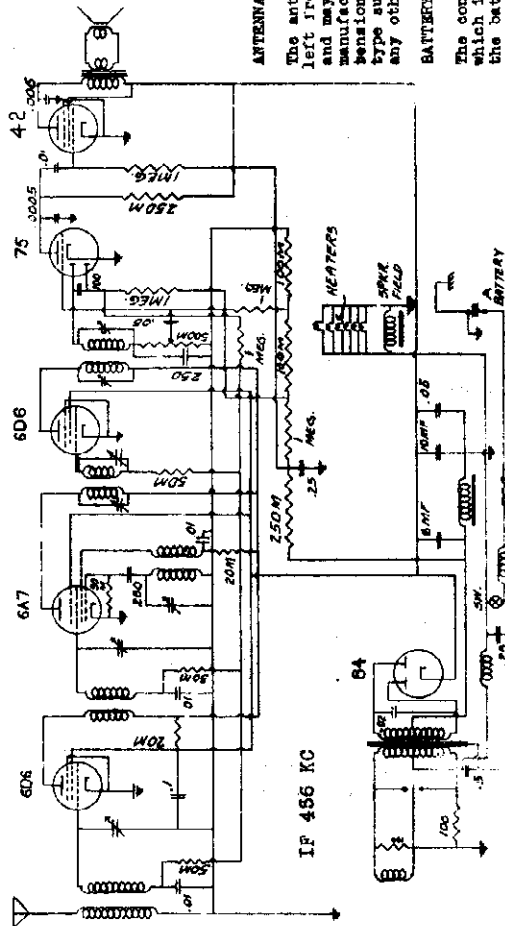
An outside antenna is desirable with this radio in order to obtain the maximum performance. With an efficient outside antenna, foreign reception is guaranteed. The short red wire in the rear should be connected to the antenna. It is desirable to have this antenna clear of surrounding objects and as high as possible from the ground. The black wire is the grounding terminal. If the lighting circuit is not already grounded, reception will be improved by connecting this black wire to the cold water pipe or radiator; otherwise the ground wire can be left free.

NOTE: AMBER BULB LIGHTS ON LOWEST BAND GREEN ON THE MIDDLE BANDS AND THE RED ON THE SHORT WAVE BAND.

MODEL 359
Schematic
Installation Data

CAVALCADE RADIO CO.

- Chassis in metal container
2 Flexible shafts
1 Tuning control head with pilot light
1 "A" battery cable with fuse
1 Antenna lead
1 Bolt, Nut, and Washer



ASSEMBLY AND MOUNTING:

The set may be mounted by means of a 3/8 inch machine bolt placed through a hole in the center of a space to clear 9/8 x 7 inches, and having no obstruction within 7 inches from its surface which will then clear the auto chassis. The rear of the set can then be joined to the head of this bolt, and the nut attached to the bolt and tightened against the opposite side of the partition, leaving the set in a rigid mounting. If, however, sufficient space cannot be found when rigid mounting in this manner, the set may also be mounted from one of the smaller ends. This requires a space 7/8 x 7 inches, having an obstruction in front of it for a distance of 9/8 inches. In this position the speaker should face towards the floor board, or if at one side of the car, toward the center.

The two flexible shafts should first be connected to the radio. One shaft has two screw-driver shaped ends; this shaft is for the tuning control. One end is inserted in the center hole of the radio and twisted until well engaged; then the set screw is tightened. The other end is inserted into the hole in the rear of the right hand knob on the control head, which is the tuning knob. The other shaft has one screw-driver end and one slotted end. The slotted end fits into the hole in the rear of the left hand knob of the control head, which is the volume control knob. The screw-driver end fits into the edge hole of the radio case, and must be well engaged in the slot before set screw is tightened. Set screws for these shafts must be tightened on the control head as well.

CONTROL MOUNTING:

The control head can next be secured to the steering column by means of the strap or bracket supplied for this purpose, or may be fastened to the dash itself in various positions. The pilot light already attached to control end in position, should be removed from the socket in the rear of the control head. Rotate the tuning knob (right hand knob) clockwise as far as it will go; then, by means of a small screw-driver inserted in the pilot light socket, turn the pointer on the dial until it reaches the right hand end of the scale. Where there is no screw in pilot light socket, this type of control is self adjusting by rotating the pointer clear to one end of scale and then to other, which automatically sets the pointer in proper position.

ANTENNA CONNECTION:

The antenna is a shielded lead which is fastened into the hole at the left front edge of the container fitting into a Delco-Remy receptacle and may be fastened to aerial provided for this purpose by most car manufacturers. In case there is no aerial in the automobile, an extension of shielded wire may be brought down to an aerial of the strap type suspended between the front and rear axles beneath the car, or any other type of automobile antenna.

BATTERY CONNECTION:

The connections to the "A" battery are made with the shielded lead which is brought out to the right rear of the set and is connected to the battery side of the ammeter. This will be indicated by no discharge being shown on the ammeter. The shielding is grounded to a convenient bolt or nut that may be loosened near the ammeter under which it may be tightened.

OPERATION OF SET:

To operate the set, turn the left hand knob to the right and the pilot bulb in the control head will light, showing that the set is connected. After a minute or less, the tubes should be warmed up and by turning the right hand control the stations desired may be tuned in whose frequency may be found on the dial. Adjust the volume by means of the left hand knob and do not turn off the station as distortion will occur unless it is tuned to the center of the signal.

ELIMINATION OF MOTOR NOISE:

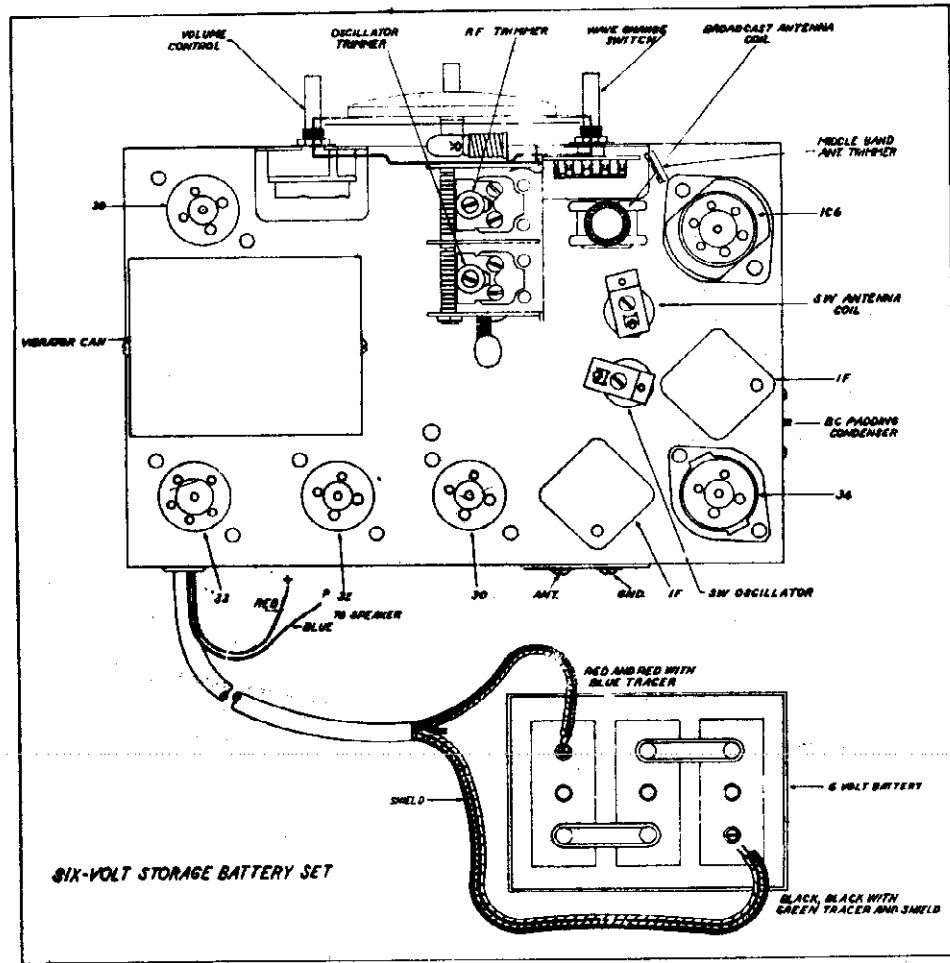
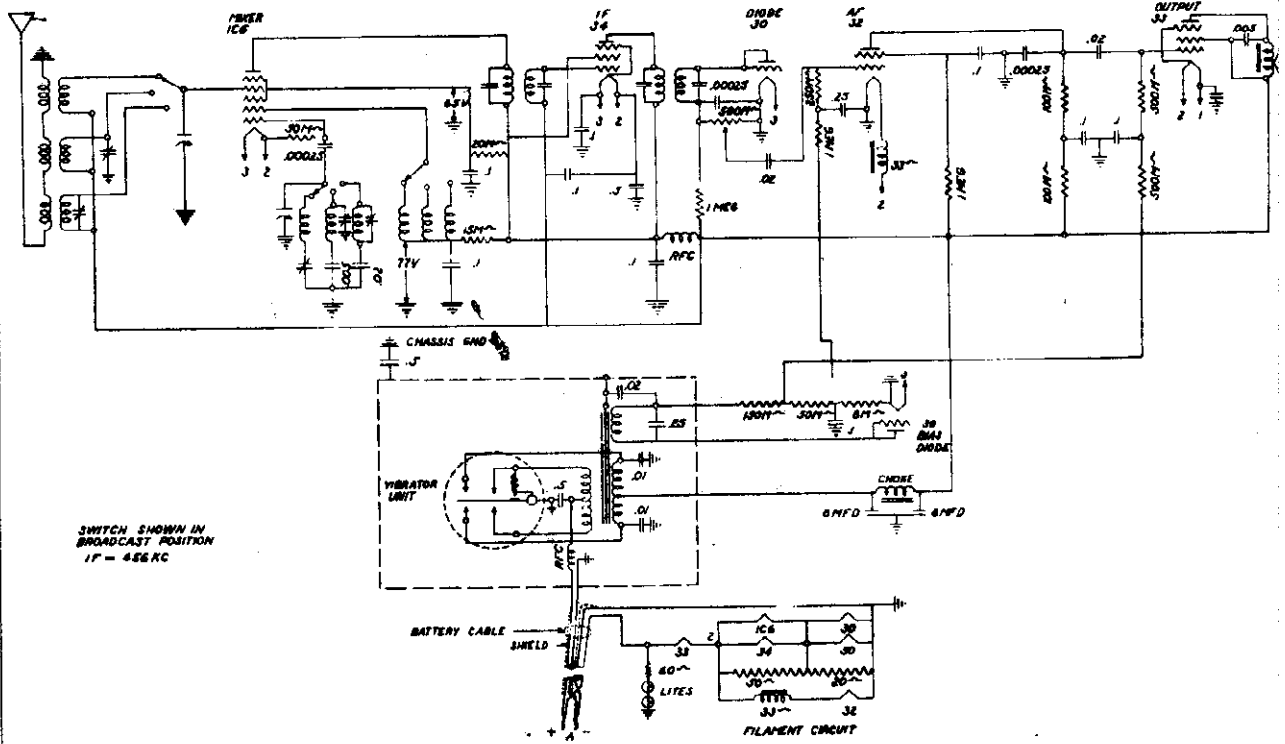
A car of the later type and in good mechanical condition will usually require no suppressors with this set. However, if the body of the car has loosened at joints due to wear, electrical disturbances may be caused which will require bonding of these parts together with heavy braided conductors, soldered across this portion. If considerable motor noises are heard in set they will reach the set through two paths. First, through the "A" battery connection, which is common to the generator and may be connected by a condenser either from the battery side to the ammeter to ground or a condenser placed across the charging terminal of the generator to ground. Second, by means of actual radiation from the ignition wires which can be reduced by shielding the antenna lead up to the antenna proper. Also, if necessary, suppressors may be inserted on spark plugs and distributor head.

IF SET DOES NOT PLAY:

If after all the above instructions have been followed and set does not operate, the top of the radio case may be removed by unscrewing the six screws holding it and ascertaining if all the tubes are lit and fully pressed into sockets, and be sure that all grid caps fastened to the tubes are in place. If tubes fail to light, check the fuse in shielded lead connected to ammeter. If there is no light buzzing sound from set when turned on and set does not play, remove the vibrator sound tained in can in right rear of set which plugs into socket in the manner of a tube and replace. If the above instructions are carried out and the set still does not play, consult reliable service man.

CAVALCADE RADIO CO.

MODEL 3511
Schematic
Socket, Trimmer



MODEL 3511
Alignment
Data

CAVALCADE RADIO CO.

ALIGNMENT DATA

The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 3000 and 10,000 K. C. and an output meter to be connected across the speaker terminals.

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.

I.F. ALIGNMENT Adjust the test oscillator to 1400 K.C. and connect the output to the antenna wire through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 K.C. and adjust the rear gang condenser trimmer to peak. This adjusts the receiver on scale. Then adjust the front or R.F. trimmer to peak.

Next rest the dial pointer on the receiver and test oscillator to 600 K.C. Slowly increase or decrease 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 seems a little complicated but is the easiest way to adjust the oscillator to the R.F. section. The padding condenser is located on the left hand end of the chassis.

Return to 1400 K.C. and again go over the adjustment at that frequency to be sure they have not been thrown out of adjustment.

SHORT WAVE BANDS

The foreign band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coil located next to the gang condenser. Set the test oscillator to 10 megacycles or 31 meters.

The police and aviation band can be adjusted from a signal set at 3,000 K.C. or 300 on the dial. The oscillator trimmer is located underneath the chassis and the R.F. trimmer is between the 6A7 tube and the wave change switch.

The gang condenser trimmers are not to be used for alignment of either of the short wave bands.

SERVICE HINTS

VIBRATOR Vibrator noise may be due to the following: a discharged "A" battery, high resistance connections on battery terminals, a defective vibrator or a loose cover on the vibrator can.

The vibrator unit is a plug-in type and can be removed for replacement very easily. This unit should last a very long time as current through the contact points is very small.

Never leave the power switch turned on when the "A" battery is too low to make the receiver function as this is liable to seriously injure the vibrator or vibrator transformer. Never remove any of the tubes when the power switch is turned on as they are connected in a series parallel circuit.

MICROPHONICS The two volt type of tubes used in this receiver are ordinarily more microphonic than heater types. They can be detected by touching each tube with the finger tips. Another source might be caused by the dial glass touching the front or escutcheon plate.

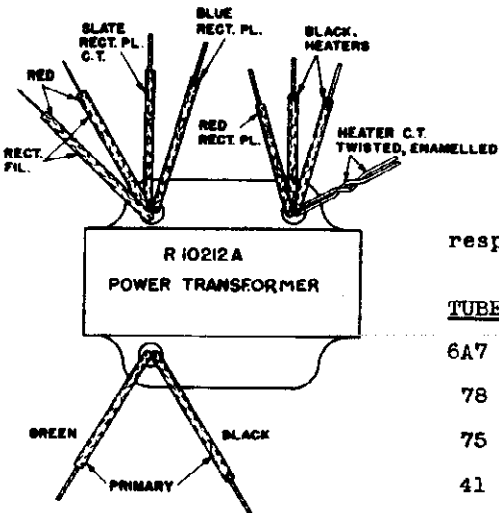
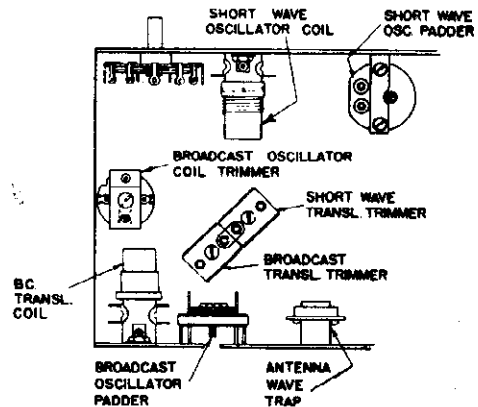
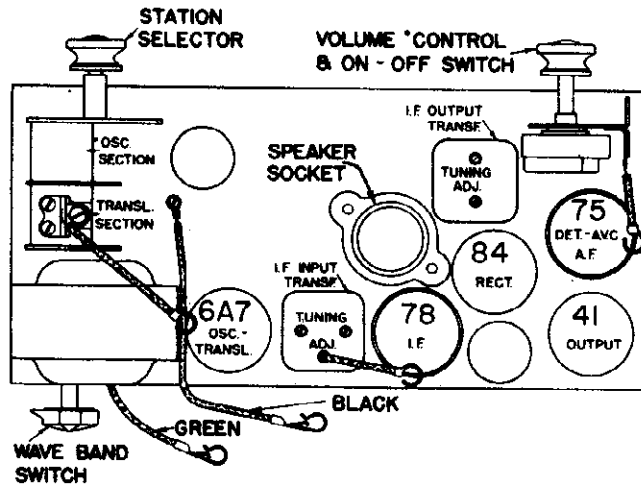
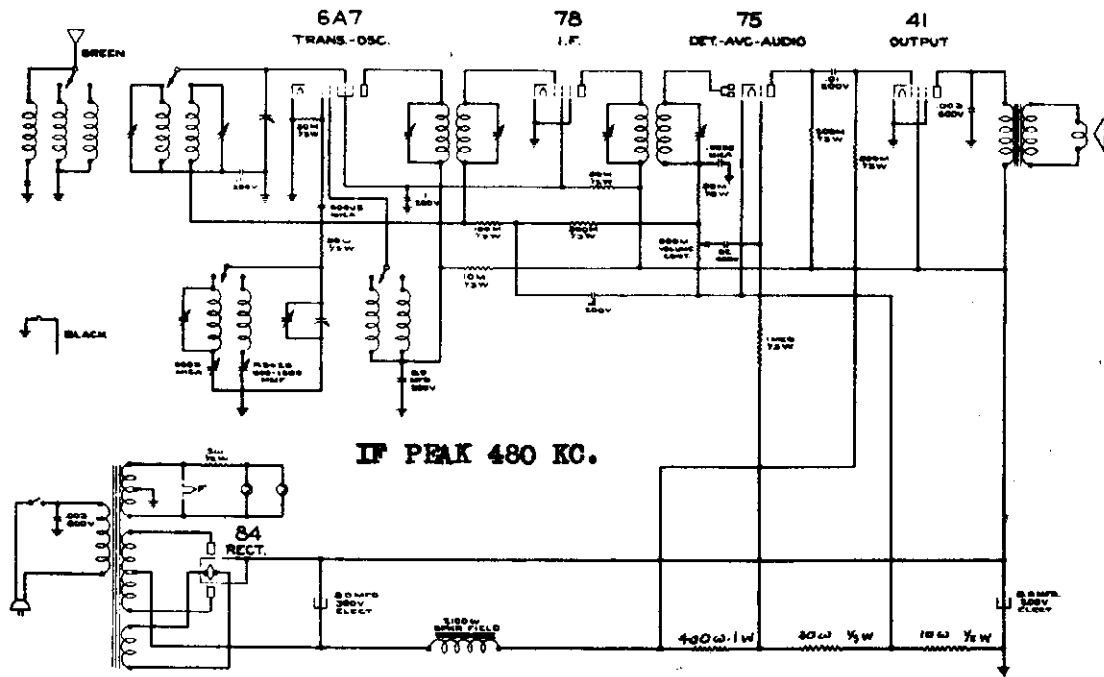
LOW VOLUME This trouble may be caused by weak or defective tubes (replace with set of tubes known to be in good condition); antenna disconnected from the receiver: open antenna coil or open or shorted by-pass condensers.

Some localities remote from broadcasting stations may require an extra long antenna of about two hundred feet.

LOW VOLTAGE Low voltage may be caused by a low battery, a defective vibrator, corroded battery terminal or shorted by-pass condensers. Increasing the length of battery leads might cause low voltage and vibrator noise.

MODEL 662
Schematic, Voltage
Socket, Trimmers

COLONIAL RADIO CORP.



TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

TUBE	PLATE	SCREEN	OSCILLATOR SECTION PLATE
6A7 - Osc-Transl	140	60	140
78 - IF	185	60	
75 - AVC-DET-AF	85		
41 - Output	175	185	

POWER TRANSFORMER CONNECTIONS - MODELS 651 & 662

COLONIAL RADIO CORP.

MODEL 662

Alignment, Notes

MODEL 662

The COLONIAL Model 662 is a five tube superheterodyne, almost identical with Model 651 except for the frequency coverage of its short wave range. The short wave range of the 651 is approximately 5500 kc to 18,000 kc, covering American and Foreign short wave broadcasting. The short wave range of the Model 662 is from approximately 1600 kc to 5200 kc, covering amateur, aircraft, and police transmissions.

Because of the difference in frequency range, the Model 662 uses a conventional type antenna whereas the Model 651 has provision for a short wave doublet antenna.

The tubes and their functions are:

6A7 - Oscillator-Translator
 78 - IF
 75 - Detector-AVC-AF
 41 - Output
 84 - Rectifier

In order to prevent interference from code stations, when the receiver is located near the coast, a wave trap is incorporated in the antenna circuit. Although this trap is shown in the schematic as a coil with a series condenser, actually it consists of two multi-layer coils wound on top of each other, with one end of each coil left unconnected. The distributed capacity between the coils is represented by the condenser in the schematic. The design of the coil is such that the combination of distributed capacity and inductance is resonant

at about 600 meters, which is the frequency used by ships and also is very near the IF frequency of the receiver.

The 75 Detector-AVC-AF Circuit:

The IF signal existing at the IF output transformer secondary is impressed between the diode plates and the cathode of the 75 tube, in series with the 50 M ohm resistor and the 500 M ohms of the volume control. Diode current flows, creating voltage drops across these resistances. Only the drop across the volume control resistance is used for AVC voltage. The control grid returns of the 6A7 and 78 tubes are connected through filter resistances to one end of the volume control. This end is negative in respect to the other end of the control, so that the voltage drop across it, due to the diode current, is impressed as negative bias on the control grids of the 6A7 and 78 tubes. Any increase in signal strength increases the voltage drop across the volume control and so increases the negative bias on the 6A7 and 78 tubes, with a resultant decrease in tube amplification. Since increases in signal strength are offset by decreases in tube amplification, the input to the detector tends to remain at a constant value.

Any desired portion of the audio component across the volume control can be picked off by the movable arm of the control and fed through the .02 mfd. condenser to the triode section of the 75 tube. It is there amplified and then coupled to the 41 output tube.

ALIGNMENT PROCEDUREThe IF Stages:

1. Connect the output meter across the loud speaker voice coil.
2. Connect the ground lead of the test oscillator to the receiver chassis.
3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the 78 tube, leaving the grid clip attached to the cap.
4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.
5. Change the test oscillator connection to the control grid cap of the 6A7 tube and adjust the IF input transformer.

6. Repeat the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

RF Alignment; Short Wave:

The short wave range must be aligned before the broadcast range.

1. Set the test oscillator to 5175 kc and couple its output to the green antenna lead of the receiver, leaving the antenna connected.
2. Put the wave switch in the short wave position and open the variable condenser plates all the way. Then adjust the trimmer on the variable con-

MODEL 662

Alignment, Part 2
Parts List

COLONIAL RADIO CORP.

Condenser for maximum output.

3. Set the test oscillator to 4500 kc and adjust the short wave translator coil trimmer for maximum output.

4. Set the test oscillator to 1700 kc and tune in its signal. Then slowly rotate the condenser back and forth a degree or two and, at the same time, adjust the short wave oscillator padder for maximum output.

5. Repeat the 5175 kc and 4500 kc adjustments. Always use the lowest possible output from the test oscillator.

RF Alignment; Broadcast:

1. Set the test oscillator to 1630 kc, leaving it coupled to the receiver's antenna lead as for short wave align-

ment.

2. With the wave band switch in the broadcast position, open the variable condenser plates all the way. Then adjust the broadcast oscillator coil trimmer for maximum output.

3. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the broadcast translator trimmer for maximum output.

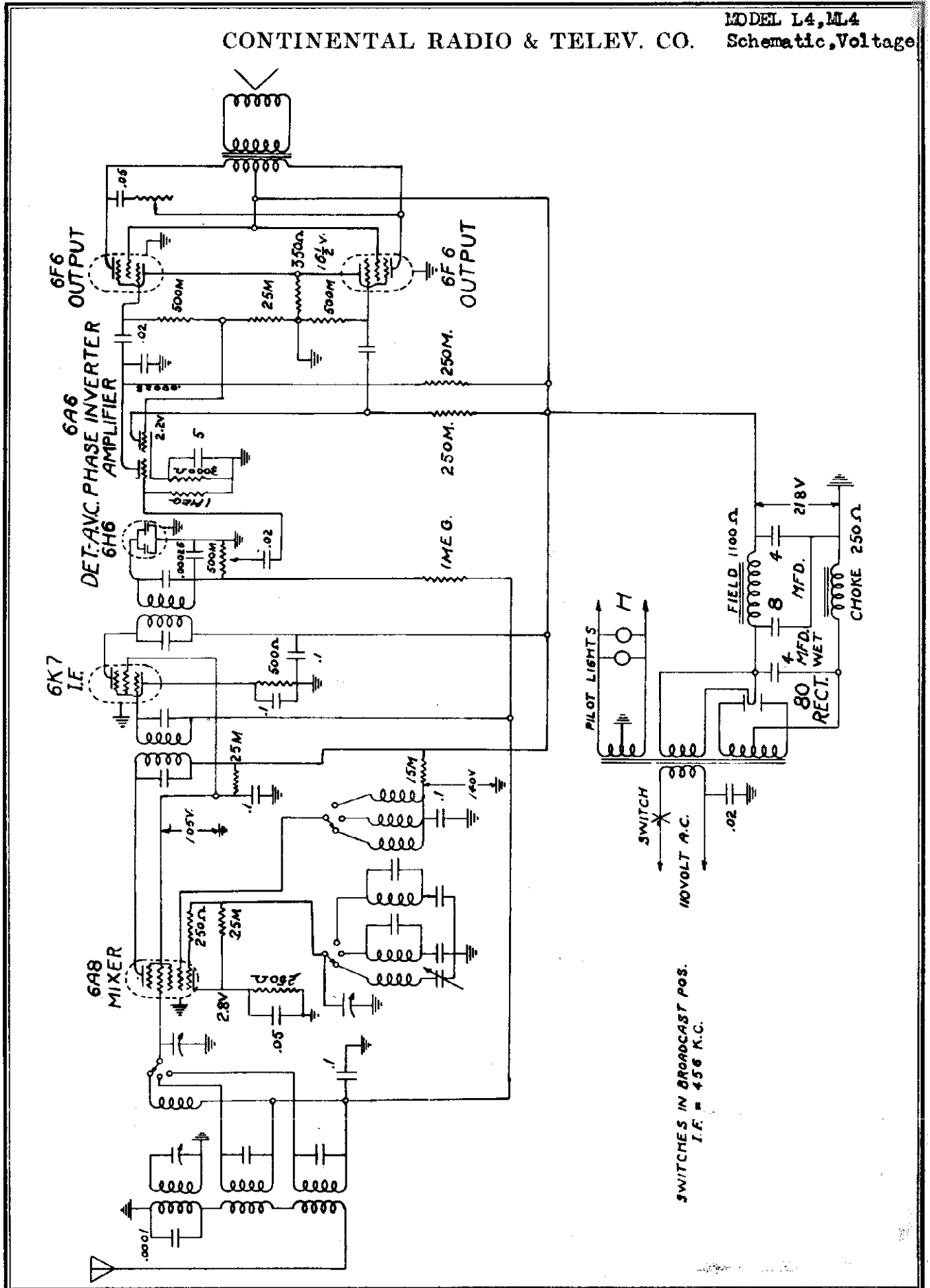
4. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the broadcast oscillator padder for maximum output.

5. Repeat the 1630 kc and 1400 kc adjustments, always using the lowest possible output from the test oscillator.

<u>PART NO.</u>	<u>DESCRIPTION</u>		
R8297A	Board - Terminal, double	R8253	Socket - 5 prong
R8308A	Board - Terminal, triple	R8092	Socket - 6 prong
R9446A	Board - Terminal, 4 terminals	R8072	Socket - 7 prong
R10859	Cabinet -	R10363D	Socket - Pilot light, with volume control mounting bracket
R10198	Coil - Translator, broadcast	R10373A	Socket - Pilot light, with bracket (mounted on variable condenser)
R10199	Coil - Oscillator, broadcast	S10248A	Speaker
R9829M	Coil - Translator, short wave	R10207	Switch - Wave
R9829N	Coil - Oscillator, short wave	R10208A	Transformer - IF input
R9565	Coil - Antenna wave trap	R10209	Transformer - IF output
R11198	Condenser - Variable	R10212B	Transformer - Power
R9204	Condenser - 8 mfd. 300 volts, electrolytic		
R8748	Condenser - 8 mfd. 200 volts, electrolytic		
R9426	Condenser - Padding, 1200 mmf.		
R9975	Condenser - Padding, 300 mmf.		
R10197	Condenser - Trimmer		
R6444	Condenser - .1 mfd. 200 volts		
R9818	Condenser - .02 mfd. 400 volts		
R8432	Condenser - .01 mfd. 200 volts		
R7681	Condenser - .003 mfd. 600 volts		
R10096	Condenser - .003 mfd. 800 volts		
R6760	Condenser - .0005 mfd. mica		
R8621	Condenser - .00005 mfd. mica		
R10604	Control - Volume with switch		
R7566	Cord - AC line		
R11212	Escutcheon - Wave switch		
R10980	Grommet - Variable condenser mounting		
R11213	Indicator - Station selector		
R10246	Indicator - Volume control		
R11204	Instruction leaflet		
R10240	Knob - Station selector		
R10247	Knob - Volume control		
R8278	Knob - Wave switch		
R2288	Lamp - Pilot		
R5346B	Lead - Antenna		
R5345D	Lead - Ground		
R10379A	Pointer		
R7585	Resistor - 1 megohm, 1/3 watt carbon		
R7228	Resistor - 500 M ohms, 1/3 watt carbon		
R8638	Resistor - 200 M ohms, 1/3 watt carbon		
R7586	Resistor - 100 M ohms, 1/3 watt carbon		
R8637	Resistor - 50 M ohms, 1/3 watt carbon		
R6445	Resistor - 50 M ohms, 1/2 watt carbon		
R7587	Resistor - 10 M ohms, 1/3 watt carbon		
R8632	Resistor - 50 ohms, 1/3 watt carbon		
R10364	Resistor - 30 ohms, 1/3 watt carbon		
R10493	Resistor - 10 ohms, 1/3 watt carbon		
R8066	Resistor - 400 ohms, 2 watts, flexible		
R10204	Resistor - 3 ohms, 1 watt, flexible (Pilot light circuit)		
R10206	Shield - Electrolytic condenser		
R9360	Shield - Tube		
R8366	Socket - 4 prong		

CONTINENTAL RADIO & TELEV. CO.

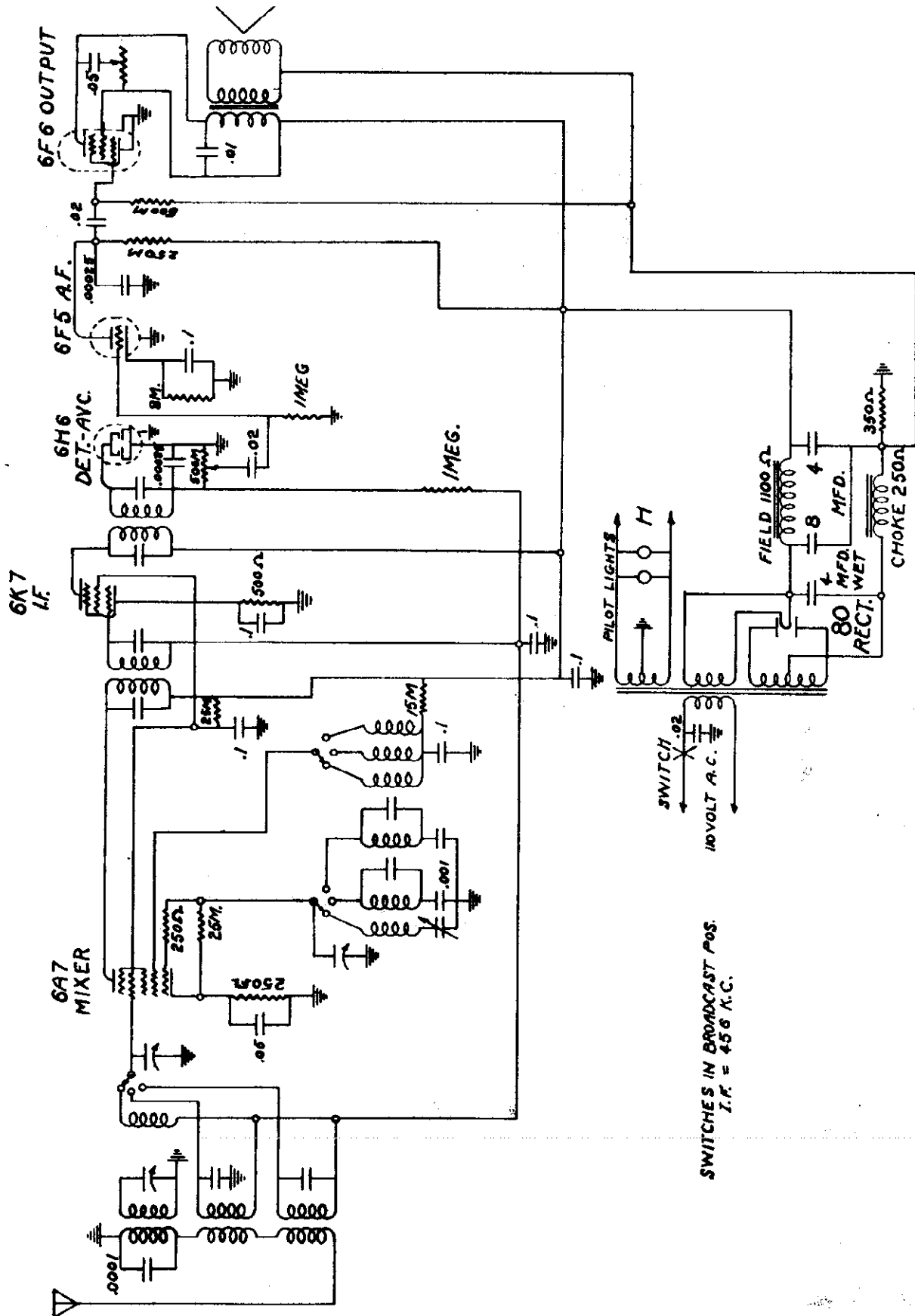
MODEL L4, ML4
Schematic, Voltage



MODELS L2, ML156,
ML266

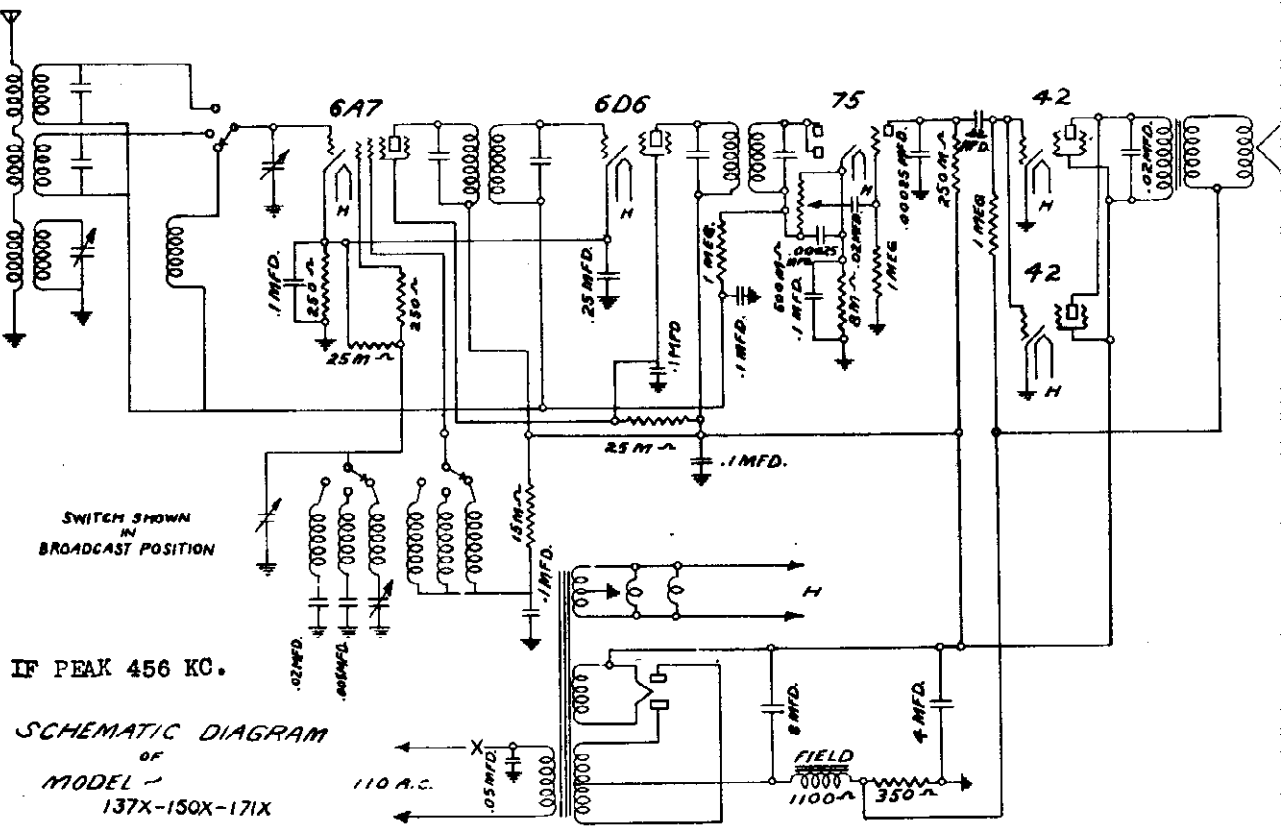
CONTINENTAL RADIO & TELEV. CO.

Schematic



CONTINENTAL RADIO & TELEV. CO.

MODEL S 137X, 150X, 171X Schematic, Alignment



IF PEAK 456 KC.

SCHEMATIC DIAGRAM OF MODEL 137X-150X-171X

4-29-35

ALIGNMENT DATA

The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456,500,1400,5000 and 10,000 K.C. and an output meter to be connected across the primary or secondary of the output transformers.

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.

I.F. ALIGNMENT Adjust the test oscillator to 456 K.C. and connect the output to the grid of the 1st detector tube (6A7) through an .05 or .1 mfd condenser. If desired 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.

R.F. ALIGNMENT Adjust the oscillator to 1400 K.C. and connect the output to the antenna post through a .0001 mfd. mica condenser to give the equivalent of an antenna about 50 feet. Set the receiver pointer to 1400 K.C. and adjust the rear gang condenser trimmer to peak.

Next rest the dial pointer on the receiver and the test oscillator to 500 K.C. Slowly increase or decrease the oscillator padding condensers, and as 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 seems a little complicated but is the easiest way to adjust the oscillator to the preslector or R.F. section. The padding condenser is located on the left hand end of the chassis.

Return to 1400 K.C. and again go over the adjustments at that frequency to be sure they have not been thrown out of adjustment.

SHORT WAVE BANDS

The foreign band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coil located next to the gang condenser. Set the test oscillator to 10 megacycles or 70 meters.

The police and aviation band can be adjusted from a signal set at 5,000 K.C. or 500 on the Dial. The oscillator trimmer is located underneath the chassis set and the R.F. trimmer is between the 6A7 tube and the wave change switch.

The gang condenser trimmers are not to be used for alignment of either of the short wave bands.

SERVICE HINTS

LOW VOLUME This may be caused by weak or defective tubes (Replace with set of tubes known to be in good condition), antenna disconnected from the receiver, open antenna coil, open or shorted by-pass condensers, or defective wave change switch.

LOW VOLTAGE Low voltage may be caused by a defective 80 rectifier, low line voltage, a defective power transformer or shorted by-pass condensers.

HUM Excessive hum may be caused by a defective 80 tube, open filter condenser, or open audio grid lead.

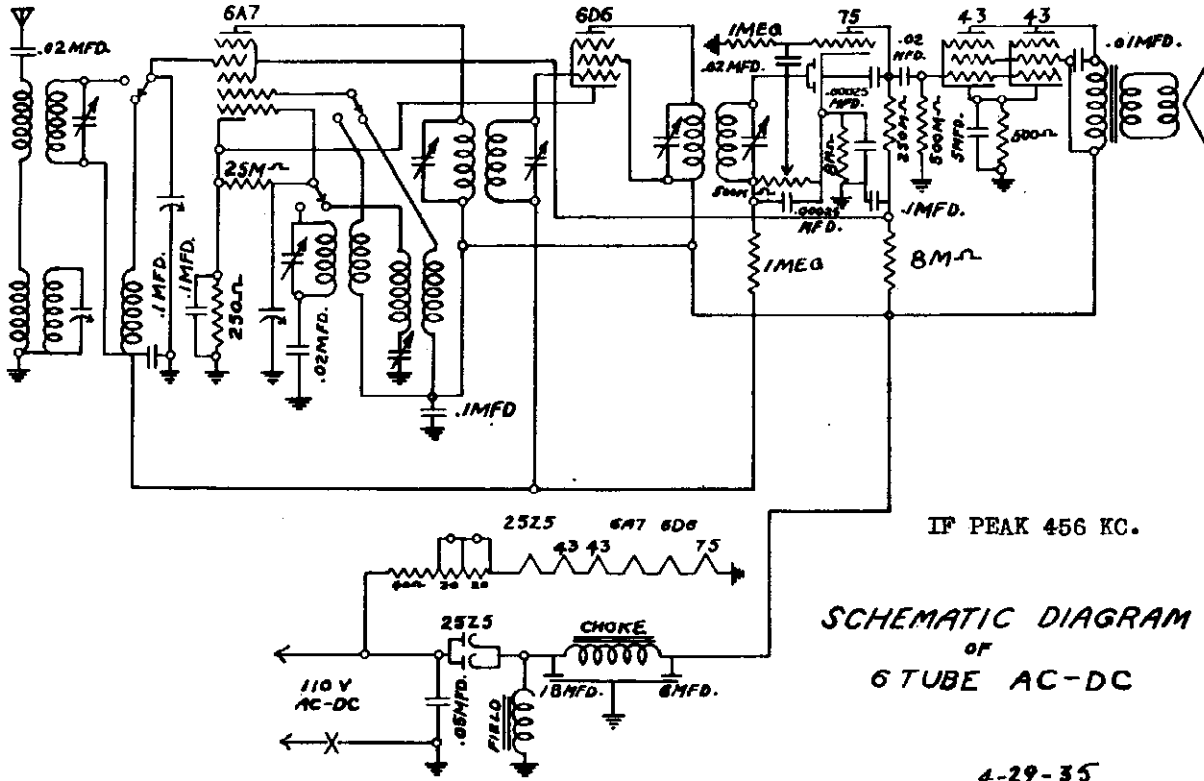
DISTORTED REPRODUCTIONS This may be caused by a defective 76 or 42 tube or a ground or open in the automatic volume control circuits. Check all circuits with an ohmmeter or continuity tester.

OSCILLATION Most trouble from oscillation is due to open by-pass or defective filter condenser. The grid lead on the 75 tube may also cause a howl if it runs too close to the 42 tube.

MODEL X-541

Schematic, Alignment

CONTINENTAL RADIO & TELEV. CO.



SCHEMATIC DIAGRAM
OF
6 TUBE AC-DC

4-29-35

The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455,500,1400,5000 and 10,000 K.C. and an output meter to be connected across the primary or secondary of the output transformers.

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.

CAUTION: Do not let the test oscillator come in direct contact with the receiver chassis.

I.F. ALIGNMENT Adjust the test oscillator to 456 K.C. and connect the output to the grid of the 1st detector tube (6A7) through a .05 or .1 mfd. condenser. If desired 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.

R.F. ALIGNMENT Adjust the test oscillator to 1400 K.C. and connect the output to the antenna post through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 K.C. and adjust the rear gang condenser trimmer to peak. This adjusts the receiver on scale. Then adjust the two front gang trimmers to peak.

Next rest the dial pointer on the receiver and the test oscillator to 600 K.C. Slowly increase or decrease 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 seems a little complicated but is the easiest way to adjust the oscillator to the prescaler or R.F. section. The padding condenser is located on the left hand end of the chassis.

Return to 1400 K.C. and again go over the adjustments at that frequency to be sure they have not been thrown out of adjustment.

SHORT WAVE BANDS

The foreign band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coil located next to the gang condenser. Set the test oscillator to 10 megacycles or 31 meters.

The police and aviation band can be adjusted from a signal set at 5,000 K.C. or 800 on the Dial. The oscillator trimmer is located underneath the chassis and the R.F. trimmer is between the 6A7 tube and the wave change switch.

The gang condenser trimmers are not to be used for alignment of either of the short wave bands.

SERVICE HINTS

CAUTION: Be very careful in handling the receiver chassis as it is connected to one side of the power line.

LOW VOLUME

This may be caused by weak or defective tubes (Replace with set of tubes known to be in good condition) open antenna coil, open or shorted by-pass condensers or defective wave change switch. Poor receiving locations such as steel buildings may require extra antenna to get good reception.

LOW VOLTAGE

Low voltage may be caused by a defective rectifier tube, open filter condenser or shorted by-pass condensers.

HUM

Excessive hum may be caused by a defective tube, open or shorted by-pass condensers or open audio grid leads.

DISTORTED REPRODUCTION

This may be caused by a defective 75 or 43 tube or a ground or open in the automatic volume control circuit. Check all circuits with an ohmmeter or continuity tester.

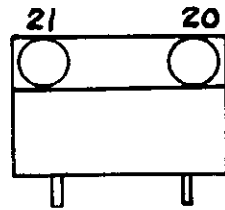
OSCILLATION

Most trouble from oscillation is due to open by-pass condensers in the R.F. or I.F. circuits. Test each condenser with another condenser in parallel.

The grid lead on the 75 tube may also cause a howl if it runs too close to the 42 tube.

CROSLY RADIO CORP.

MODEL 2C1, Sampler
Schematic, Voltage
Socket, Data, Parts



Specifications

Model 2-C-1 is a two tube tuned radio frequency receiver designed for operation from AC or DC 110 Volt electric circuit.

Tubes And Voltage Limits

The following are the tubes and voltages measured from tube contact to negative line with 250,000 ohm 250 Volt voltmeter with receiver in operating condition but with no signal to the antenna, and with a line voltage of 117.5 Volts 60 cy. AC-DC Voltages approximately 90% of values shown.

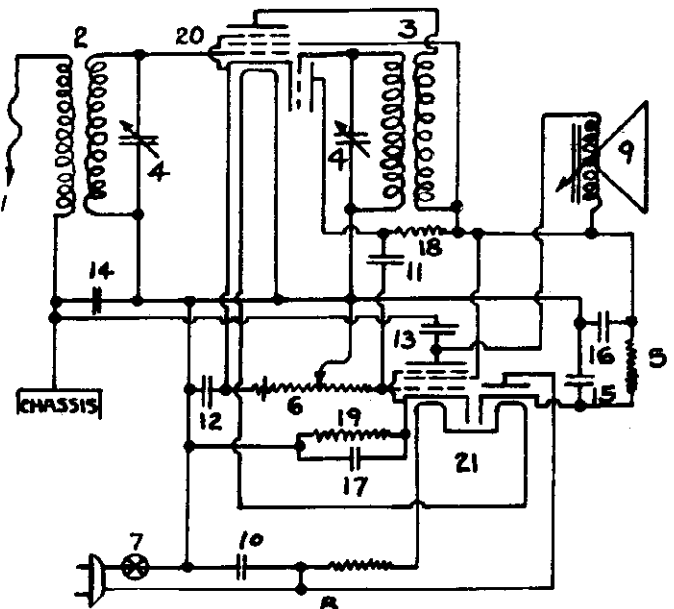
Tube	Position And Use	Plate	Scr. Grid	Control Grid	Cathode	PL	GL	KL	Filament
6-F-7	R. F. and Regen. Det.	125	125	0	5-30	30	0	—	6.5
12-A-7	A. F. and Rect.	115	125	0	10	117.5	—	135	12.5

VOLTAGE LIMITS ARE PLUS OR MINUS 10% OF VALUES GIVEN

Circuit

Referring to diagram.

The signal enters through antenna and is stepped up by antenna transformer (2) the secondary of which is tuned to the desired signal by one section of the variable condenser (4). This signal activates the pentode section of the 6-F-7 tube. The amplified signal is again stepped up in the R. F. Transformer (3) whose secondary is tuned by the other section of the variable condenser, and this amplified signal is fed into the triode section of the 6-F-7 tube which is operating as a detector. The gain in both sections of this tube is controlled by the volume control (6) which also acts as a grid resistor for the pentode section of the output tube 12-A-7. Resistor (18) serves as the plate resistor for the detector. The signal is coupled to the output pentode through coupling condenser (11) is amplified and then activates the speaker motor. This motor is mechanically connected to the front



of the cabinet which serves as the speaker diaphragm.

Condenser (12) is the 6-F-7 cathode bypass and condenser (14) is the bypass between chassis and negative line.

The 12-A-7 bias resistor (19) and bypass condenser (17) are combined with condensers (15) and (16) as part of the filter circuit. Resistor (5) is also part of this filter which serves to smooth the B supply from the rectifier section of 12-A-7 tube.

Condenser (10) is the hum modulation suppressor condenser and resistor (8) is a series filament resistor contained in the power supply cable.

Speaker

The front of cabinet is the speaker diaphragm. If chassis is to be removed from cabinet the speaker drive rod is unsoldered from speaker motor as explained on instruction card. Do not use glue to fasten front in cabinet. This front is held in place with Hydrolene.

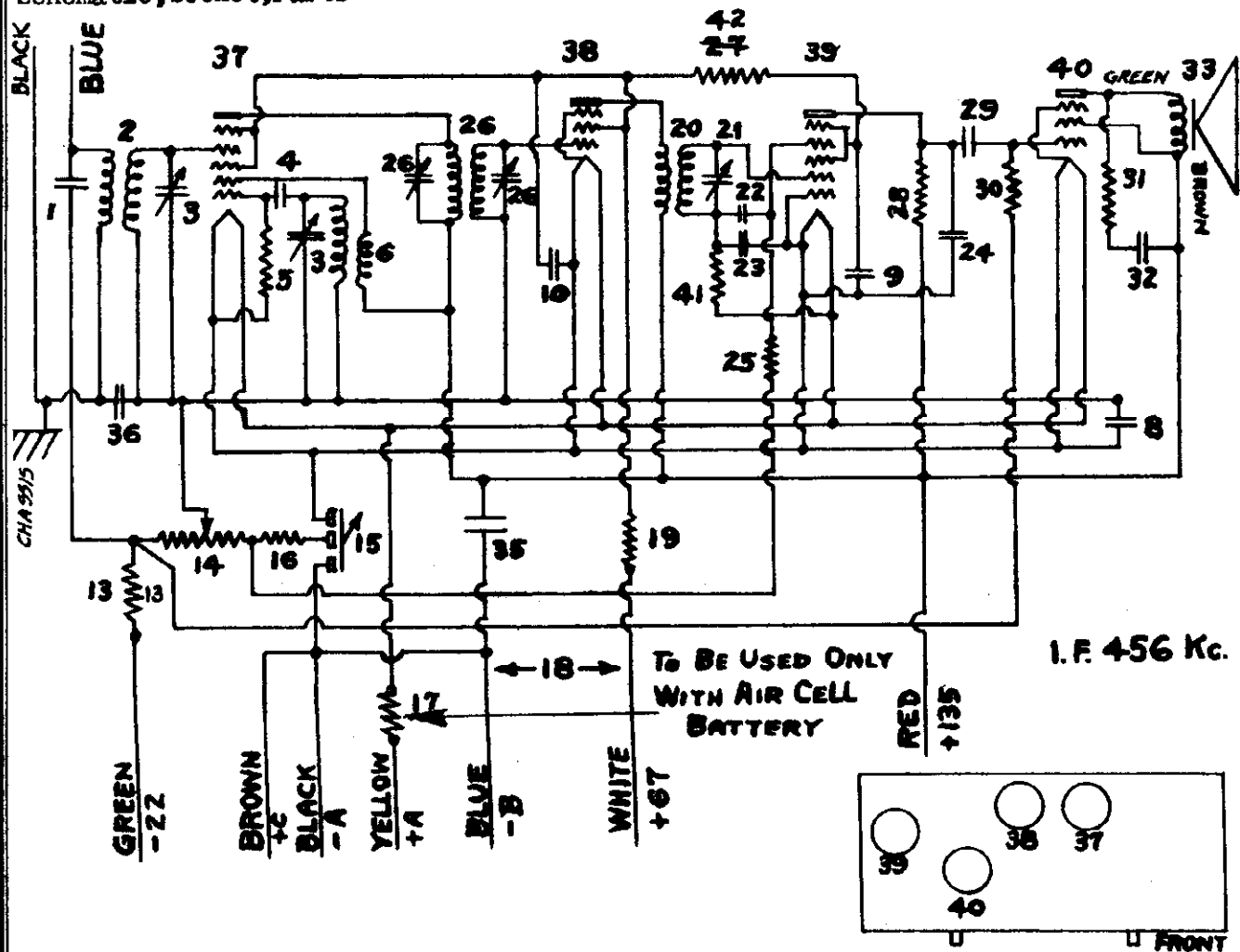
Dec. 1934 PARTS LIST—MODEL 2-C-1 "Sampler"

* Figures in 2nd last column refer to parts shown in diagram.

Qty.	Part No.	Description	Item	List Each	Qty.	Part No.	Description	Item	List Each
1	G83-32000	Antenna Trans.	2	.55	1	W34712	.25 Mfd. 160 V.	12	.20
1	G21-32001	R. F. Trans.	3	.90	1	W34714	.008-.05 Mfd. 160 V.-160 V.	13-14	.20
1	G8-33001	Variable Condenser	1	2.25	1	W24701A	16, 16, 8, Mfd. 199 V.-199 V.	15	.15
1	W34098B	Volume Control & Switch	6-7	1.00			20 V.	16-17	2.00
1	G49-28807	6F7 Socket	20	.10					
1	G77-28807	12A7 Socket	21	.10					
1	G7-34400	Tube Connector Assem.		.05					
1	G8-34400	Tube Connector Assem.		.05					
1	B34702B	Resistance Cable and Plug (325 Ohms)	8	.70	2	W22514	750 Ohm Flex.	5-10	.15
1	223M-B	Speaker Unit	9	2.33	1	21454	1 Megohm	18	.15
1	W34710	Speaker Bracket		.05	1	4AC	Cabinet (Ship Design)		.07
					1	4AE	Cabinet (Artists Pictures)		.07
					1	G1-34822	4AC Cabinet Front		.30
					1	G2-34822	4AE Cabinet Front		.30
					1	B34719	Cabinet Back		.05
1	W34711	.02 Mfd. 110 V.	10	.15	1	L-34885	Speaker Pin Assem.		.05
1	W34713	.006 Mfd. 160 V.	11	.15	2	W2244B	Knobs		.10

MODEL 4B1, Battery Forty
Schematic, Socket, Parts

CROSLLEY RADIO CORP.



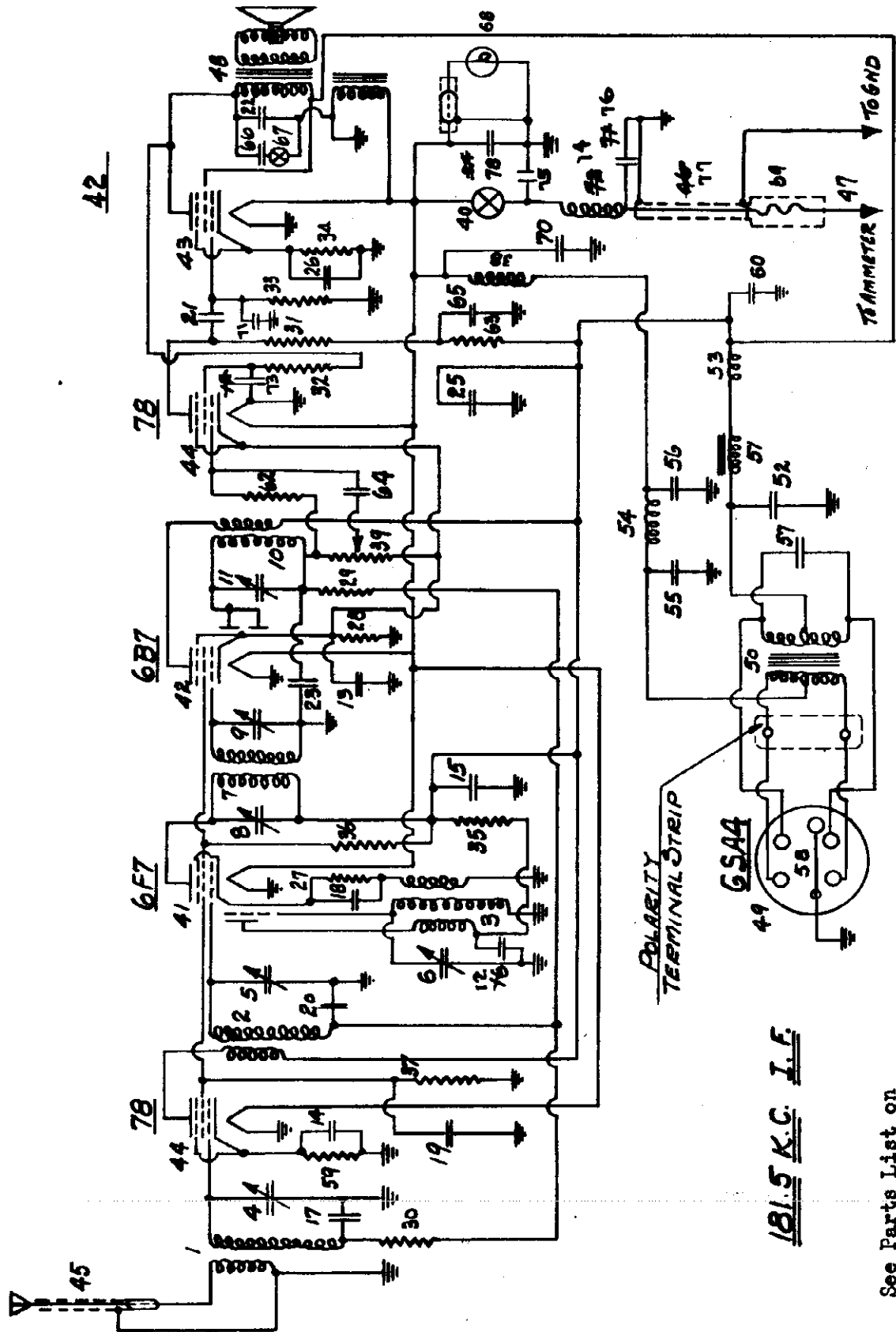
Parts List Model 4B1

Figures in first column correspond to figures in diagram

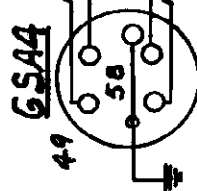
1	W	—28621	0.02 Mfd. 200 Volt	22	W	—28621	0.02 Mfd. 200 Volt
2	G27	—32000	Antenna Coil	23	W	—25572	{ 0.0005 Mfd. 400 Volt
3	G6	—33001	Variable Cond.	24	W	—25572	{ 0.0005 Mfd. 400 Volt
4	W	—5382	0.00025 Mfd.	25		—26577	3 Meg.
5		21875	100,000 Ohms	26	G9	—32004	1st I. F. Trans.
6	G9	—32002	Oscillator Coil	27		21455	300,000 Ohms
7				28		21454	1 Meg.
8	W	—28622	{ 0.1 Mfd. 200 Volt	29	W	—28621	0.02 Mfd. 200 Volt
9			{ 0.1 Mfd. 200 Volt	30		21454	1 Meg.
10	W	—30321-A	1.0 Mfd. 160 Volt	31		24814	7,000 Ohms
11				32	W	—28619	0.006 Mfd. 200 Volt
12				33		21M	Speaker
13		27121	5,000 Ohms	34			
14	W	—33922-A	{ Volume Control	35	W	—29910-A	0.25 Mfd. 200 Volt
15			{ 3 P. S. T. Switch	36	W	—28621	0.02 Mfd. 200 Volt
16	W	—23013	2,000 Ohms	37	G55	—27975	1A6 Socket
17	G5	—23300	0.6 Ohm	38	G31	—27975	34 Socket
18	G2	—29237	Cable & Marker Assem.	39	G4	—33070	1A6 Socket
19	W	—21452	1,100 Ohms	40	G36	—27975	33 Socket
20	G13	—32004	2nd I. F. Trans.	41		23785	500,000 Ohms
21	G5	—33005	I. F. Trimmer Cond.	42		24990	25,000 Ohms

CROSLLEY RADIO CORP.

MODEL 5A3, Battery Fiver
Schematic



POLARITY
TERMINAL STRIP



181.5 K.C. I.F.

See Parts List on
next page for values.

MODEL 5A3, Battery Five
Voltage, Parts List

CROSLLEY RADIO CORP.

JUNE 1935

MODEL 5A3—ROAMIO

TUBE VOLTAGES—MODEL 5A3									
Type	Where Used	Ef	Ep	Eg	Ec	Esg	Eosc	E Sup-G	
78	R. A. Amp	6.0	230	0-30	5.0	100	—	5.0	
6F7	Osc.-Mod.	6.0	230	0-30	8.0	100	55	—	
6B7	I. F. Amp. Diode Det. A. V. C.	6.0	230	0	3.0	100	—	—	
78	Audio Amp.	6.0	60	0-30	3.0	25	—	3.0	
42	Output	6.0	220	0	16.0	230	—	—	

VOLTAGES MEASURED TO CHASSIS WITH A 500 VOLT 1000 OHMS PER VOLT VOLTMETER.
6 VOLT BATTERY USED.

VOLTAGE LIMITS PLUS OR MINUS 10%.

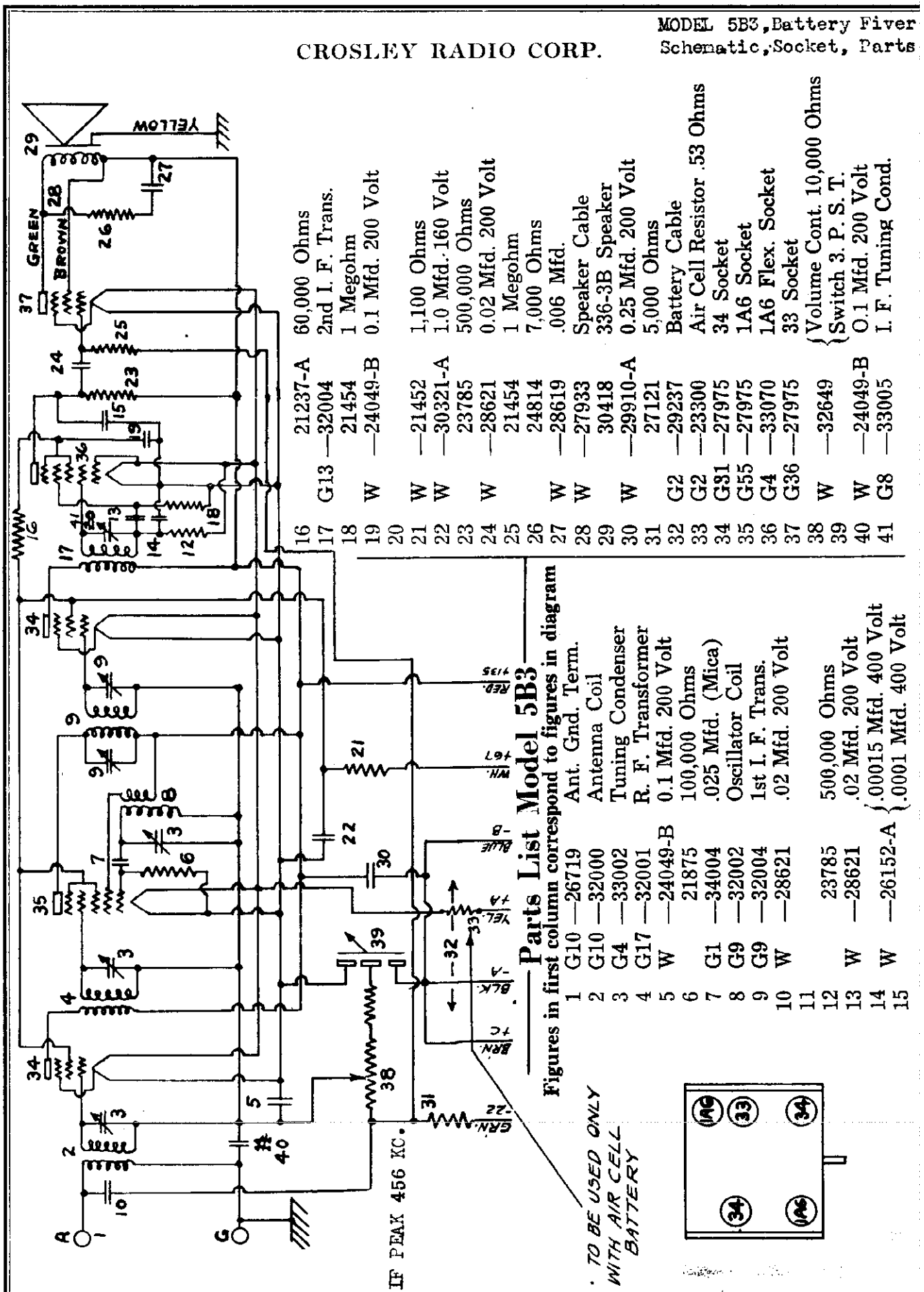
PARTS LIST—MODEL 5A3

Figures in first column refer to parts shown in diagrams.

Item No.	Part No.	Description	Item No.	Part No.	Description
1	G19—32000	Antenna Coil	48	W —31102	Fuse Carrier
	W —30802A	Coil Shield	49	LB —33B	Speaker
	W —30026A	Retaining Shield	50	LB —32037	6 SA 4 Syncrotube
2	G11—32001	R. F. Coil	51	G1 —32769	Power Transformer
	W —30802A	Coil Shield	52	W —24528	"B" Filter Choke
	W —30877	Insulating Washer	53	W —32759	8. Mfd. 300 Volt Condenser
	W —30026A	Retaining Ring	54	G1 —32755	R. F. "B" Choke
3	G14—32002	Osc. Coil	55	G6 —28067	R. F. "A" Choke
	W —25025B	Coil Shield	56	W —30366	0.5 Mfd. 160 Volt Condenser
	W —26891	Insulating Washer	57	W —30366	0.5 Mfd. 160 Volt Condenser
	W —21541C	Retaining Ring	58	W —32762	0.005 Mfd. 1,000 Volt Condenser
4	G2 —33002	Tuning Cond. Gang	58	G81—27975	6 SA 4 Socket
5			59	W —21452	1,100 Ohm Resistor
6			60	W —30741	0.00025 Mfd. (Mica) Condenser
7			61		
8	G6 —32003	1st. I. F. Trans.	62	W —21454	1 Megohm Resistor
9		1st. I. F. Prim. Tuning Cond.	63	W —21237A	60,000 Ohm ¼ Watt Resistor
10		1st. I. F. Sec. Tuning Cond.	64	W —32780B	0.05 Mfd. 400 Volt Condenser
11	G7 —32003	2nd. I. F. Trans.	65	W —32780B	0.05 Mfd. 400 Volt Condenser
12		2nd. I. F. Sec. Tuning Cond.	66	W —32782B	0.01 Mfd. 400 Volt Condenser
13		0.05 Mfd. 400 Volt	67	W —26156A	S. P. S. T. Switch (Tone Control)
14	W —32711A	0.1 Mfd. 200 Volt 4 Section Condenser	68		Dial Light
15		0.1 Mfd. 200 Volt	69	W —32757	12 Amp. Fuse
16		0.05 Mfd. 400 Volt	70	W —32741A	0.0005 Mfd. (Mica) Condenser
17	Deleted		71	W —32741A	0.0005 Mfd. (Mica) Condenser
18	W —32779B	0.02 Mfd. 200 Volt Condenser	72	Deleted See 74	
19	W —32781B	0.1 Mfd. 200 Volt Condenser	73	W —24784	0.25 Mfd. 200 Volt Condenser
20	W —32780B	0.05 Mfd. 400 Volt Condenser	74		"A" Choke
21	W —32779B	0.02 Mfd. 200 Volt Condenser	75	G8 —31701	.00025 Mfd. Condenser
22	W —32780B	0.05 Mfd. 400 Volt Condenser	76		.00025 Mfd. Condenser
23	W —23635	0.006 Mfd. 400 Volt Condenser	77		"A" Lead
24	W —32741A	0.0005 Mfd. (Mica) Condenser	78		.00025 Mfd. (Mica) Condenser
25	Deleted See 78			W —30741	1,100 Ohm Resistor
26	W —32802	8. Mfd. 300 Volt Condenser		B —32783	Antenna Cable
27	W —21452	8. Mfd. 20 Volt Condenser		W —29754C	0.5 Mfd. Condenser (Eliminator)
28	W —28589	1,100 Ohms Resistor		L —32810	Remote Control Assembly Complete
29	W —21454	350 Ohms Resistor		B —30372B	Housing
30	W —21875	1 Megohm ¼ Watt Resistor		G2 —31538	Cover Assem.
31	W —23403	100,000 Ohms Resistor		W —30370	Dial Glass only
32	W —21454	150,000 Ohms Resistor		B —32812	Dial
33	W —23875	1 Megohm Resistor		W —30371A	Dial Hand
34	W —25521	500,000 Ohm Resistor		G1 —30295	Gear Assem.
35	W —32331	450 Ohm Resistor		G5 —23472	Knob (Tuning)
36	W —26525B	55,000 Ohm ¼ Watt Resistor		G1 —28036	Knob (Key)
37	G4 —28067	15,000 Ohm Resistor		G7 —25868	Drive Shaft 15" (V. C.)
38	W —30436A	25,000 Ohm Resistor		G21—25868	Drive Shaft 15" (Tuner)
39		R. F. "A" Choke		G8 —25868	Drive Shaft 30" (V. C.)
40		Level Control		G20—25868	Drive Shaft 30" (Tuner)
41	G49—27975	Switch		W —26315	¼ x ¼ Dog Pt. S. P. Set Screw (4 used)
42	G48—27975	6-F-7 Socket		W —28029B	Steering Column Bracket
	W —27981A	6-B-7 Socket		G1 —28035	Strap Assem.
	W —30964	Tube Shield Base		R —186	¼ x ¾ R. H. Machine Screw (black) (1 used)
43	G25—27975	Tube Shield		W —20802	No. 10 Shakeproof Washer (black) (4 used)
44	G39—27975	42 Socket		R —181	No. 10 x ¼ R.H. Machine Screw (black) (3 used)
45	L —35108	78 Socket		C —141	¼ x 1½ Fr. Hd. Machine Screw (2 used)
	G1 —32750	Antenna Body and Sleeve Assem.		W —31539	No. 2-56 x ¼ R.H. Machine Screw (1 used)
46	Deleted See 77	Antenna Lead Assem.		G17—26317	Dial Light Bracket Assem.
47	G5 —31701	"A" Cable Assem.		G8 —32750	Dial Light Lead Assem.

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MODEL 5B3, Battery Five
Schematic, Socket, Parts

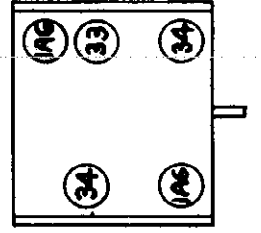


Parts List Model 5B3

Figures in first column correspond to figures in diagram

- | | | | |
|----|-----|----------|----------------------|
| 1 | G10 | -26719 | Ant. Gnd. Term. |
| 2 | G10 | -32000 | Antenna Coil |
| 3 | G4 | -33002 | Tuning Condenser |
| 4 | G17 | -32001 | R. F. Transformer |
| 5 | W | -24049-B | 0.1 Mfd. 200 Volt |
| 6 | | 21875 | 100,000 Ohms |
| 7 | G1 | -34004 | .025 Mfd. (Mica) |
| 8 | G9 | -32002 | Oscillator Coil |
| 9 | G9 | -32004 | 1st I. F. Trans. |
| 10 | W | -28621 | .02 Mfd. 200 Volt |
| 11 | | | |
| 12 | | 23785 | 500,000 Ohms |
| 13 | W | -28621 | .02 Mfd. 200 Volt |
| 14 | W | -26152-A | .00015 Mfd. 400 Volt |
| 15 | | | .0001 Mfd. 400 Volt |

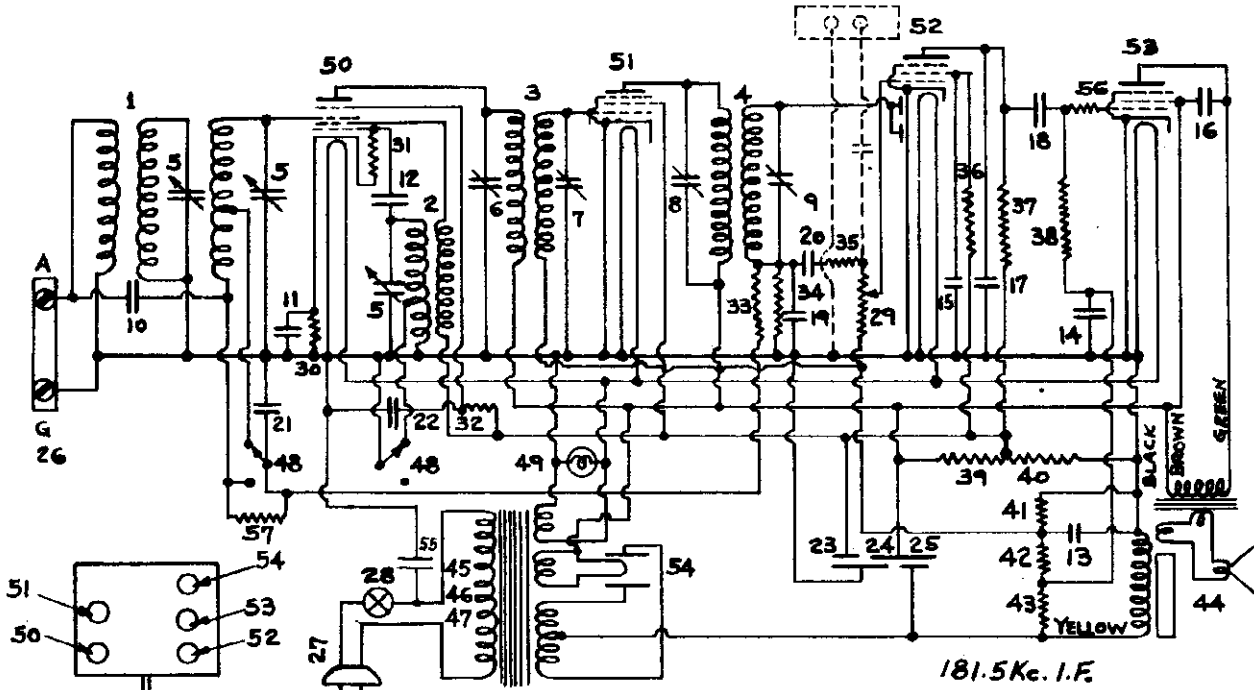
TO BE USED ONLY
WITH AIR CELL
BATTERY



- | | | |
|----|---------|----------------------------|
| 16 | 21237-A | 60,000 Ohms |
| 17 | G13 | 2nd I. F. Trans. |
| 18 | 21454 | 1 Megohm |
| 19 | W | 0.1 Mfd. 200 Volt |
| 20 | | |
| 21 | W | 1,100 Ohms |
| 22 | W | 1.0 Mfd. 160 Volt |
| 23 | 23785 | 500,000 Ohms |
| 24 | W | 0.02 Mfd. 200 Volt |
| 25 | 21454 | 1 Megohm |
| 26 | 24814 | 7,000 Ohms |
| 27 | W | .006 Mfd. |
| 28 | W | Speaker Cable |
| 29 | 30418 | 336-3B Speaker |
| 30 | W | 0.25 Mfd. 200 Volt |
| 31 | 27121 | 5,000 Ohms |
| 32 | W | Battery Cable |
| 33 | G2 | Air Cell Resistor .53 Ohms |
| 34 | G2 | 34 Socket |
| 35 | G81 | 1A6 Socket |
| 36 | G55 | 1A6 Socket |
| 37 | G4 | 1A6 Flex. Socket |
| 38 | G36 | 33 Socket |
| 39 | W | { Volume Cont. 10,000 Ohms |
| 40 | W | { Switch 3. P. S. T. |
| 41 | G8 | { O.1 Mfd. 200 Volt |
| | | { I. F. Tuning Cond. |

MODEL 5V2, Fiver DeLux
Schematic, Socket, Parts
Voltage

CROSLLEY RADIO CORP.



CIRCUIT DIAGRAM OF MODEL 5V2

TUBE VOLTAGES—MODEL 5V2

Type	Where Used	Ef	Ep	Eg	Eg	Eg	Eg	Eg	Ep-sec	Eg-sec	Ep-sec
6A7	Osc.-Mod.	6.5	240	0	90	3	0	0	—	—	125
6D6	I. F.	6.5	240	-3.5	125	0	0	0	-15	—	—
6B7	Diode-AF	6.5	30	-3.5	40	0	—	—	—	—	—
42	Output	6.5	200	-18	240	0	—	—	—	—	—
80	Rectifier	5.1	—	—	—	240	—	—	—	—	—

ALL VOLTAGES ARE PLUS OR MINUS 10%. ALL DC VOLTAGES ARE MEASURED TO CHASSIS AT 117.5 LINE WITH 1000 OHMS PER VOLT 250-VOLT VOLTMETER. POWER DEMAND IS 50 WATTS AT 110 VOLTS 60 CYCLES. ALIGNMENT AND SERVICING PROCEDURE SAME AS ON MODEL 5V1.

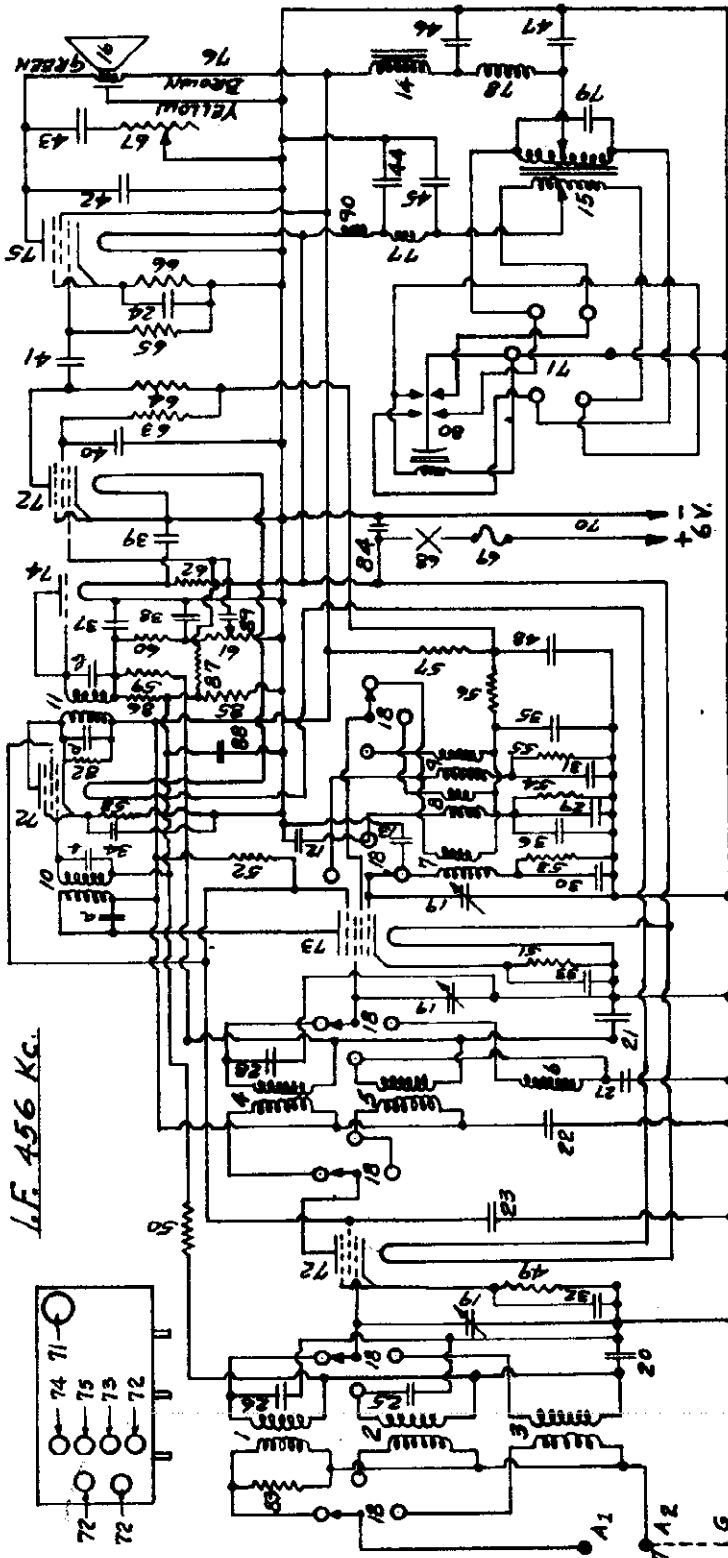
PARTS LIST—MODEL 5V2

Item No.	Part No.	Description	Item No.	Part No.	Description
1	G24-32000	Preselector Coil	25	G10-25719	Ant.-Cnd. Terminal
2	G15-32002	Oscillator Coil	26	B-33806A	A. C. Card and Plug
3	W-25025E	Coil Shield 1"	27	W-33556	A. C. Switch
4	W-26891	Coil Socket	28	W-25397	Level Control
5	W-21451C	Insulating Washer	29	W-21237A	275 Ohm Resistor
6	G2-32003	Retaining Ring	30	W-21876	10,000 Ohm Resistor
7	W-25024B	1st. I. F. Transformer	31	W-25777	3 Megohm Resistor
8	W-26891	Coil Socket	32	W-21455	500,000 Ohm Resistor
9	W-21451C	Insulating Washer	33	W-21875	500,000 Ohm Resistor
10	W-25200	Retaining Ring	34	W-21875	500,000 Ohm Resistor
11	W-26891	Coil Socket	35	W-21875	500,000 Ohm Resistor
12	G21-33002	2nd. I. F. Transformer	36	W-31883	8,500 Ohm Resistor
13	G8-32075	Coil Shield	37	W-24990	25,000 Ohm Resistor
14	G4-33005	Insulating Washer	38	W-21875	100,000 Ohm Resistor
15	W-25008A	Tuning Condenser Gang	39	W-23785	500,000 Ohm Resistor
16	G3-33005	Drive Wheel Assembly	40	W-418C	Speaker
17	G3-33005	1st. I. F. Primary Trimmer Condenser	41	W-3077A	Speaker Cable
18	G3-33005	1st. I. F. Secondary Trimmer Condenser	42	G6-30745	Power Transformer, 110 Volt, 60 Cy.
19	G3-33005	2nd. I. F. Primary Trimmer Cond.	43	G7-30745	Power Transformer, 110 Volt, 25 Cy.
20	G3-33005	2nd. I. F. Secondary Trimmer Cond.	44	G8-30745	Power Transformer, 220 Volt, 25 Cy.
21	W-28521	0.0001 Mid. Condenser	45	W-33557	D. P. D. T. Switch
22	W-26571	0.002 Mid. 200 Volt Condenser	46	G14-27812	Dial Light Bracket Assembly
23	W-30321A	1.0 Mid. 160 Volt Condenser	47	G47-27495	6-A-7 Socket
24	W-28521	0.02 Mid. 200 Volt Condenser	48	W-27981A	Tube Shield Base
25	W-30321A	1.0 Mid. 150 Volt Condenser	49	W-28632A	Tube Shield
26	W-28521	0.01 Mid. 200 Volt Condenser	50	W-27981A	Tube Shield Base
27	W-30323	0.01 Mid. 200 Volt Condenser	51	W-26009D	Tube Shield
28	W-25537A	0.08 Mid. 400 Volt Condenser	52	G48-27435	Tube Shield Base
29	W-30322A	0.0037 Mid. 200 Volt Condenser	53	W-27981A	Tube Shield
30	W-29271A	0.06 Mid. 200 Volt Condenser	54	W-27435	—42 Socket
31	W-30056C	0.02 Mid. 400 Volt Condenser	55	W-30605	80 Socket
32	W-30056C	8.0 Mid. 250 Volt (Yellow) Cond.	56	W-29013	0.01 Mid. 400 Volt Condenser
33	W-30056C	8.0 Mid. 450 Volt (Red) Condenser	57	W-21455	300,000 Ohm Resistor
34	W-30056C	8.0 Mid. 450 Volt (+Red, -No Code) Condenser		W-31282B	2,000 Ohm Resistor
				W-31282B	Knob (Black)
				W-31463	Knob (Brown)
					Escutcheon

Figures in first column refer to parts shown in diagrams.

CROSLLEY RADIO CORP.

MODEL 6B1, Battery Six Schematic, Parts Socket



L.F. 456 Kc.

PARTS LIST—MODEL 6B1

Figures in first column refer to parts shown in diagrams.

Item No.	Part No.	Description	Item No.	Part No.	Description
1	C20-32000	Law Freq. Ant. Coil	12	G14-33009	H. F. Osc. Trimmer
2	W-31267	Shield Assm.	13	W-29069	L. F. Osc. Trimmer
3	W-30028A	Retaining Ring	14	W-26621	L. F. Choke
4	W-32500	Ant. Coil	15	W-31052	Transformer
5	G1-30020A	Ant. Coil Assm.	16	W-426PT	Transformer Spring
6	C31-32000	Ant. Coil	17	G24-26719	Ant. Gnd. Terminal
7	W-26891	Coil Assm.	18	B-34443B	6 P. 3 T. Switch
8	W-21511C	Insulating Washer	19	W-32162C	Shield (metal)
9	C2-32001	Insulating Ring	20	C-33075B	Tuning Condenser Gang
10	W-25024R	Coil Socket	21	G25-32086	Dial Assembly
	W-25024R	Coil Socket	22	W-34857A	Dial Hand only
	W-25024R	Coil Socket	23	W-34855B	Dial Pointer only
	W-25024R	Coil Socket	24	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	25	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	26	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	27	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	28	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	29	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	30	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	31	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	32	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	33	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	34	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	35	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	36	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	37	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	38	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	39	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	40	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	41	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	42	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	43	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	44	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	45	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	46	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	47	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	48	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	49	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	50	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	51	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	52	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	53	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	54	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	55	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	56	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	57	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	58	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	59	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	60	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	61	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	62	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	63	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	64	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	65	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	66	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	67	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	68	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	69	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	70	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	71	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	72	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	73	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	74	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	75	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	76	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	77	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	78	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	79	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	80	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	81	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	82	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	83	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	84	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	85	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	86	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	87	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	88	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	89	W-31277A	0.02 Mid. 200 Volt Condenser
	W-25024R	Coil Socket	90	W-31277A	0.02 Mid. 200 Volt Condenser

MODEL 6B1, Battery Six
Chassis, Trimmers

CROSLLEY RADIO CORP.

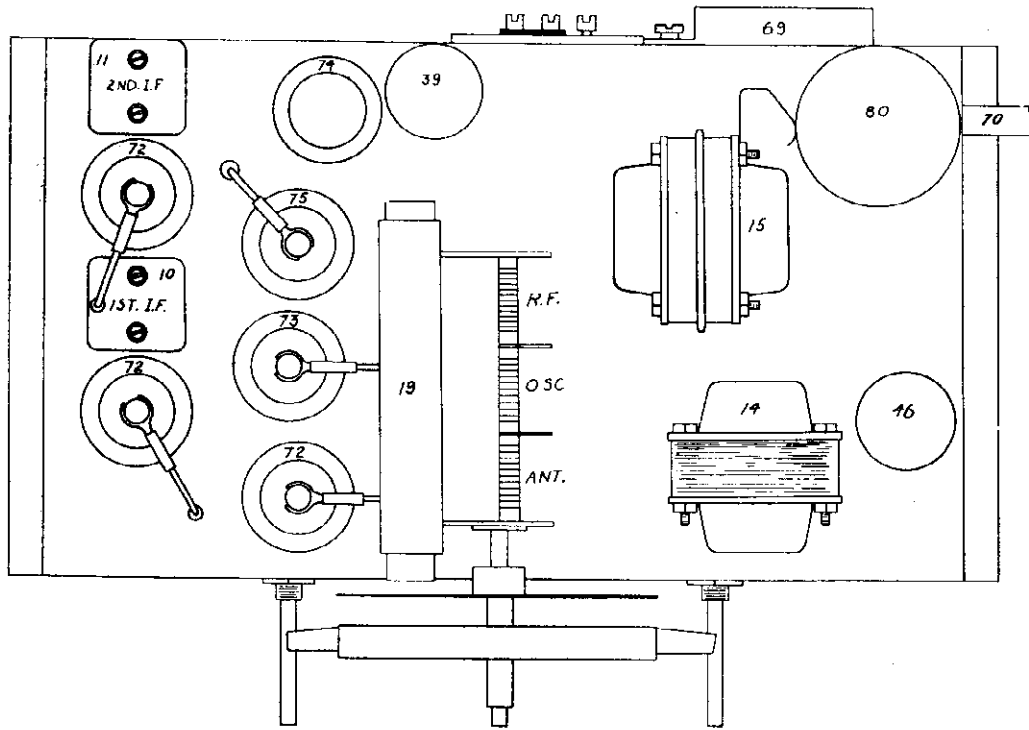


FIG. 2 - TOP VIEW

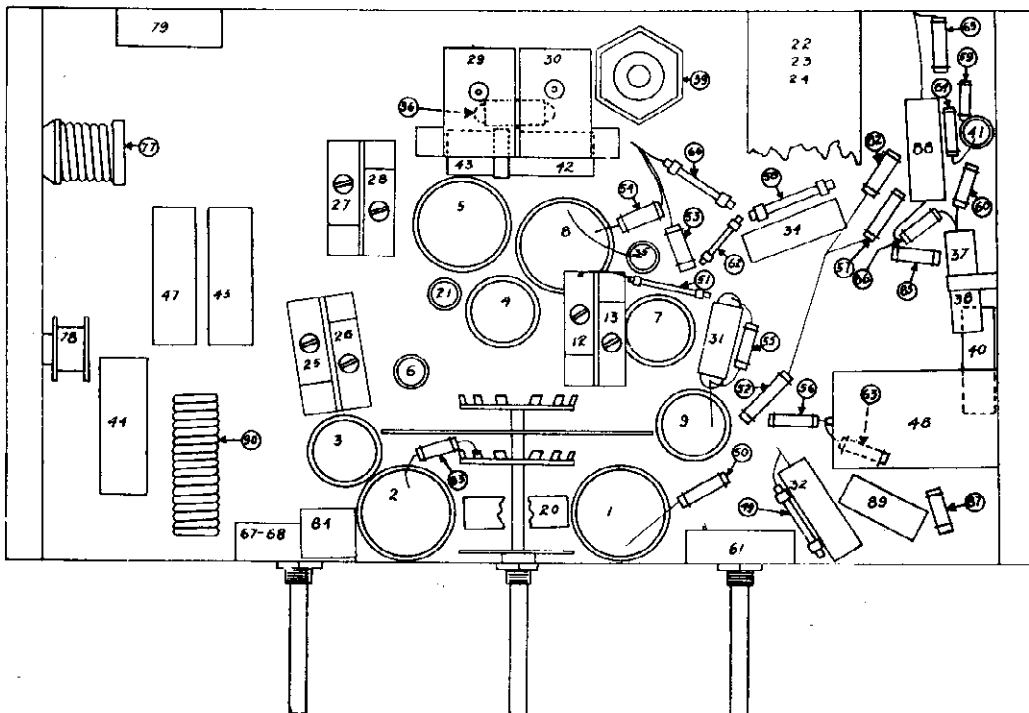


FIG. 3 - BOTTOM VIEW

- Osc. Parallel Trimmer Condenser, Band No. 1—Item No. 13.
- Osc. Parallel Trimmer Condenser, Band No. 2—Item No. 12.
- Osc. Series Trimmer Condenser, Band No. 1—Item No. 30.
- Osc. Series Trimmer Condenser, Band No. 2—Item No. 29.

- Ant. Parallel Trimmer Condenser, Band No. 1—Item No. 26.
- Ant. Parallel Trimmer Condenser, Band No. 2—Item No. 25.
- R.F. Parallel Trimmer Condenser, Band No. 1—Item No. 28.
- R.F. Parallel Trimmer Condenser, Band No. 2—Item No. 27.

CROSLLEY RADIO CORP.

MODEL 6B1, Battery Six Voltage, Alignment

MAY 1935 MODEL 6B1—BATTERY SIX No. 102

SPECIFICATIONS
The Crosley Model 6B1 is a six tube superheterodyne receiver designed for operation on a six volt storage battery. It tunes in three steps covering the following frequencies:

- Band No. 1—540-1725 Kilocycles.
 - Band No. 2—5600-15300 Kilocycles.
 - Band No. 3—1700-5500 Kilocycles.
- Band No. 1 is calibrated on the dial in Myriacycles (10 Kc.) and Bands No. 2 and 3 are calibrated in Mega-

cycles (1000 Kc.). It employs A. V. C., continuously variable tone control, class "A" pentode audio amplification and a band spread pointer, 36:1 ratio.

TUBES AND VOLTAGE LIMITS

The following are the tubes used and the voltages measured from the tube contacts to the chassis with a 250,000 ohm, 250 volt voltmeter with the receiver in full operating condition but with no signal to the antenna and using a six volt storage battery. A low range voltmeter should be used in measuring the filament voltages. Voltage limits are plus or minus 10% of the values given.

TUBE VOLTAGES—MODEL 6B1

Type	Where Used	E1	E2	E3	E4	E5	E6	E7	E8
15	R. F. Amp.	146	175	80	80	80	2.5		
6A7	Det. Mod.	146	175	80	80	80	4.0		
15	I. F. Amp.	146	175	80	80	80	2.5		
30	Det. A. F. Amp.	146	175	80	80	80	2.5		
38	Output	146	175	80	80	80	2.5	50 V. C. Full	V. C. Full 0

ALL VOLTAGES GIVEN ARE PLUS OR MINUS 10% AND ARE MEASURED WITH A 250 VOLT (1000 OHMS PER VOLT) VOLTMETER WITH A 6 VOLT BATTERY. A LOW RANGE VOLTMETER USED FOR MEASURING FILAMENT VOLTAGES.

POWER DEMAND APPROXIMATELY 13 WATTS. "A" BATTERY DRAIN AT 6 VOLTS APPROXIMATELY 2 AMP.

CIRCUIT DESCRIPTION

The circuit consists of one stage of R.F. amplification, an oscillator-modulator, one stage of I.F. amplification, diode detector, automatic volume control, two stages of audio amplification and power supply. The R. F. stage employs a Type 15 tube, the oscillator-modulator stage uses a Type 6A7 tube and the I.F. amplifier also uses a Type 15 tube. A Type 30 tube is used as a diode detector and to supply A. V. C. voltage to the control grids of the R.F. oscillator-modulator, I.F. and first A.F. tubes. The first A.F. amplifier employs a Type 15 tube which is resistance coupled to the Type 38 power output pentode tube. A permanent magnet, moving coil type speaker is used and is coupled to the plate of the Type 38 tube through an output transformer which is located on the speaker. A 6SA4 Synchronizer, self-rectifying type vibrator, is used to furnish the "B" power supply.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and should need no readjustment unless some coil or condenser has been replaced. Do not change the setting of any trimmer condenser unless it is definitely known that the adjustment is necessary. If re-alignment is found necessary, the circuits can be properly adjusted only with the use of a modulated test oscillator and an output meter.

CONNECTING OUTPUT METER

The output meter may be connected to the output circuit by connecting one terminal to the plate of the 38 power output tube and the other terminal to the screen

the 1st I.F. transformer shown in Fig. 2. Repeat operation (IV) to insure accurate adjustment of the I.F. tuning condensers.

PEAKING R.F. CIRCUITS

Connecting Test Oscillator To The Receiver:
It is necessary to connect a DUMMY ANTENNA in series with the test oscillator and the antenna terminal of the receiver. On Bands No. 1 and No. 3 this consists of a .0002 mid. mica condenser. On Band No. 2 it consists of a carbon resistor of approximately 400 ohms. With the tuning condenser plates completely meshed make certain that the dial pointer is exactly horizontal. If not, loosen the nut and set the pointer horizontal and tighten the nut again. The setting of the band spread pointer is not important.

To Peak Band No. 1:

NOTE: Be sure to use the lowest test oscillator output that will give a reasonable scale deflection on the output meter. 20-50 volts output should be sufficient for satisfactory alignment.

- (a) Set the band change switch to Band No. 1.
- (b) Set the test oscillator to 1400 kilocycles. Rotate the station selector until the dial pointer points to 140 on the dial. Then adjust the oscillator parallel trimmer condenser, Fig. 3, for Band No. 1 for maximum reading on the output meter.
- (c) With the same dial setting peak the Ant. and R.F. parallel trimmer condensers for Band No. 1.
- (d) Set the test oscillator to 600 kilocycles.
- (e) Tune in the 600 kilocycle signal with the station selector, in the region of 60 on the dial, for maximum reading on the output meter.
- (f) Close the oscillator series trimmer condenser for Band No. 1, Fig. 3, 3/4 turn and re-tune the station selector to the 600 kilocycle signal for maximum reading on the output meter.
- (g) Repeat operation (f) as many times as necessary to obtain the highest reading on the output meter. However, if the meter reads lower after operation (f) open the oscillator series trimmer condenser 1/4 turn and re-tune the station selector to the 600 kilocycle signal, noting the reading on the output meter as above, and repeat as many times as necessary to obtain the highest meter reading. Do not re-set the parallel trimmer condensers at this frequency.
- (h) Repeat operations (b) and (c) for more accurate adjustments.

To Peak Band No. 2:

NOTE: Be sure to use the lowest test oscillator output that will give a reasonable scale deflection on the output meter. 20-50 volts output should be sufficient for satisfactory alignment.

- (a) Be sure to change the DUMMY ANTENNA as described in (I) under Peaking R.F. Circuits.
- (b) Close the oscillator parallel trimmer condenser for Band No. 2 and then open it 2 turns.
- (c) Close the R.F. parallel trimmer condenser for Band No. 2 and then open it 1/4 turn.
- (d) Close the Ant. parallel trimmer condenser for Band No. 2 and then open it 3/4 turn.
- (e) Set the test oscillator to 15 megacycles.
- (f) Rotate the station selector until the dial pointer points to 15 on the dial (Band No. 2).
- (g) Peak the oscillator parallel-trimmer condenser for Band No. 2 on the first signal heard when closing this condenser.

To Peak Band No. 3:

NOTE: Be sure to use the lowest test oscillator output that will give a reasonable scale deflection on the output meter. 20-50 volts output should be sufficient for satisfactory alignment.

- (a) Set the test oscillator to 15 megacycles.
- (b) Rotate the station selector until the dial pointer points to 15 on the dial (Band No. 2).
- (c) Peak the oscillator parallel-trimmer condenser for Band No. 2 on the first signal heard when closing this condenser.

IV.

The circuits of Band No. 3 cannot be aligned as there are no trimmer condensers provided for this band.

NOTE: To check on the adjustment of the oscillator parallel trimmer condenser.

- (1) Increase the output of the test oscillator not more than ten times.
- (2) Try to tune in the 15 megacycle signal with the station selector at approximately 14 on the dial.
- (3) If the 15 megacycle signal is heard at approximately 14 on the dial in addition to 15 on the dial the oscillator parallel trimmer condenser has been aligned on the correct frequency.
- (h) Reduce the output of the test oscillator to the previous output and re-tune the station selector to the 15 megacycle signal at 15 on the dial.

(i) Close the R.F. parallel trimmer condenser for Band No. 2.

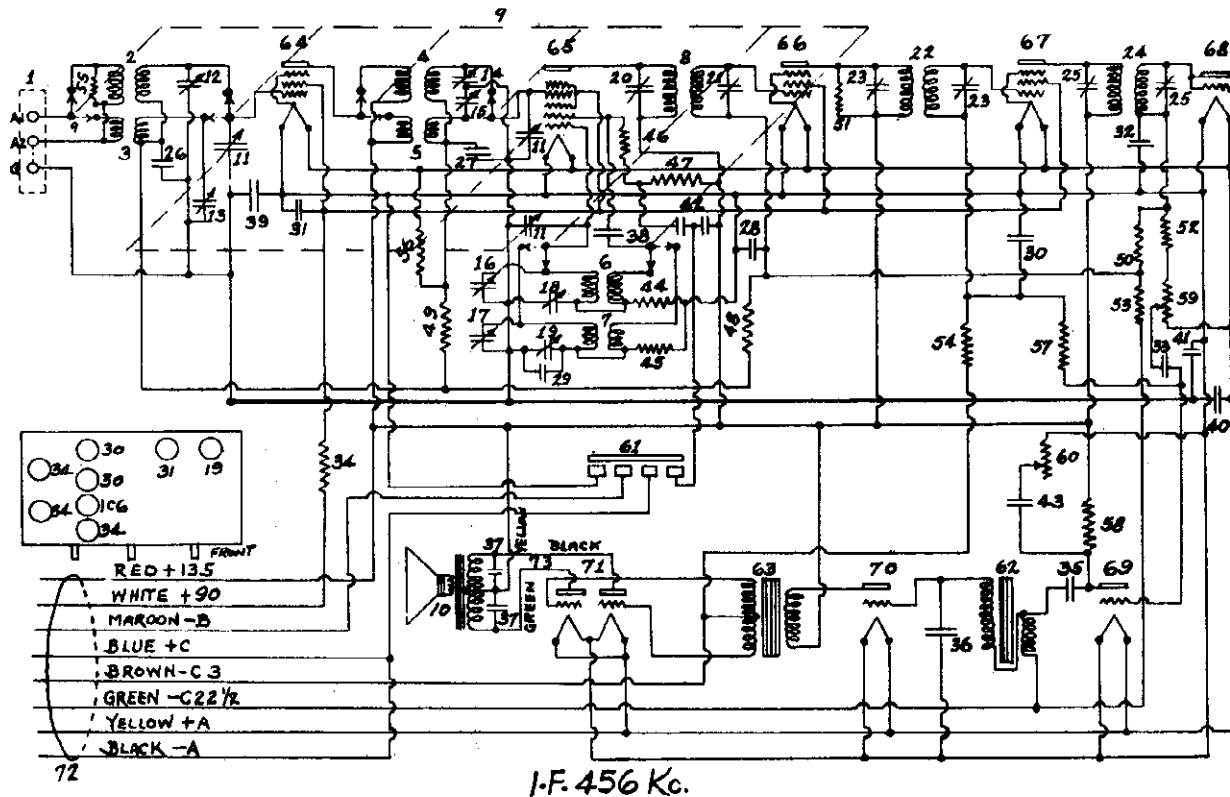
- (j) Open the R.F. parallel trimmer condenser for Band No. 2 not more than 3/4 turn and re-tune the station selector to the 15 megacycle signal for maximum output.
- (k) Repeat operation (j) as many times as necessary to obtain the highest reading on the output meter on the first peak from the closed position.
- (l) Close the Ant. parallel trimmer condenser for Band No. 2.
- (m) Open the Ant. parallel trimmer condenser for Band No. 2 not more than 1/4 turn and re-tune the station selector to the 15 megacycle signal for maximum output.
- (n) Repeat operation (m) as many times as necessary to obtain the highest reading on the output meter on the first peak from the closed position.
- (o) Set the test oscillator to 6 megacycles.
- (p) Tune in the 6 megacycle signal with the station selector in the region of 6 on the dial (Band No. 2) for maximum reading on the output meter.
- (q) Close the oscillator series trimmer condenser for Band No. 2, Fig. 3, 3/4 turn and re-tune the station selector to the 6 megacycle signal for maximum reading on the output meter.
- (r) Repeat operation (q) as many times as necessary to obtain the highest reading on the output meter. However, if the meter reads lower after operation (q) open the oscillator series trimmer condenser 1/4 turn and re-tune the station selector to the 6 megacycle signal, noting the reading on the output meter as above, and repeat as many times as necessary to obtain the highest meter reading. Do not re-set the parallel trimmer condenser at this frequency.
- (s) Repeat operations (i), (j) and (k) above in the order given.
- (t) Repeat operations (l), (m) and (n) above in the order given.
- (u) Repeat operations (o), (p) and (q) above in the order given.

IV.

The circuits of Band No. 3 cannot be aligned as there are no trimmer condensers provided for this band.

MODEL 8B3, Battery 8 AF
Schematic, Parts

CROSLLEY RADIO CORP.



I.F. 456 Kc.

Parts List Model 8B3

Figures in first column correspond to figures in diagram

1	G16	26719	Ant.-Cnd. Term.	38	W	25435	.003 Mfd. 400 Volt
2	G3	32000	L. F. Ant. Trans.	39	W	24049-B	1 Mfd. 200 Volt
3	G28	32000	H. F. Ant. Trans.	40	W	29910-A	.25 Mfd. 200 Volt
4	G2	32001	L. F. R. F. Trans.	41	W	30321-A	1.0 Mfd. 160 Volt
5	G18	32001	H. F. R. F. Trans.	42	W	33990	Dual 8 Mfd. Elect.
6	G2	32002	L. F. Osc. Trans.	43	W	27216	.05 Mfd. 200 Volt
7	G21	32002	H. F. Osc. Trans.	44	W	21875	100,000 Ohms
8	G1	32004	1st I. F. Trans.	45	W	21876	100,000 Ohms
9	B	34094	Band Change Switch	46	W	21876	10,000 Ohms
10	G25	42PM	Speaker	47	W	27121	5,000 Ohms
11	G25	33002	Variable Cond.	48	W	21455	300,000 Ohms
12	G1	33008	L. F. Ant. Trim. Cond.	49	W	21455	300,000 Ohms
13	G1	33008	H. F. Ant. Trim. Cond.	50	W	26577	3 Meg.
14	G9	33009	L. F. R. F. Trim. Cond.	51	W	21455	300,000 Ohms
15	G18	33009	H. F. R. F. Trim. Cond.	52	W	23403	150,000 Ohms
16	G18	33009	L. F. Osc. Trim. Cond.	53	W	33490	10 Meg.
17	G18	33009	H. F. Osc. Trim. Cond.	54	W	21455	300,000 Ohms
18	G20	33006	L. F. Osc. Series T. C.	55	W	31094	4,500 Ohms
19	G20	33006	H. F. Osc. Series T. C.	56	W	26578	5 Meg.
20	G6	33006	1st I. F. Pri. T. C.	57	W	21454	1 Meg.
21	G6	33006	1st I. F. Sec. T. C.	58	W	22196	20,000 Ohms
22	G21	32004	2nd I. F. Trans.	59	W	34095	Level Control
23	G21	32004	Trimmer Cond.	60	W	33993-A	Tone Control
24	G22	32004	3rd I. F. Trans.	61	W	33993-A	On-Off Switch
25	W	32379	Trimmer Cond.	62	G1	34189	1st Audio Trans.
26	W	32379	.02 Mfd. 200 Volt	63	G2	34189	2nd Audio Trans.
27	W	32379	.02 Mfd. 200 Volt	64	G31	27975	34 Socket
28	W	27216	.05 Mfd. 200 Volt	65	G84	33070	1C6 Socket
29	G3	34000	2200 Mmfd.	66	G31	27975	34 Socket
30	W	27216	.05 Mfd. 200 Volt	67	G31	27975	34 Socket
31	W	28869	2.0 Mfd. 200 Volt	68	G9	33070	30 Socket
32	W	27932	.0001 Mfd. 200 Volt	69	G9	27975	30 Socket
33	W	27216	.05 Mfd. 200 Volt	70	G14	27975	31 Socket
34	W	24814	7000 Ohms	71	G44	27975	19 Socket
35	W	29910-A	.25 Mfd. 200 Volt	72	G3	29237	Cable & Marker Assem.
36	G1	34004	.00025 Mica Cond.	73	W	31009-A	Speaker Cable
37	W	31158	Dual .006 Mfd. 400 Volt				

NOTE: TERMINALS 1 & 2 TO BE STRAPPED
TOGETHER WHEN PHONO ADAPTER IS NOT IN USE.

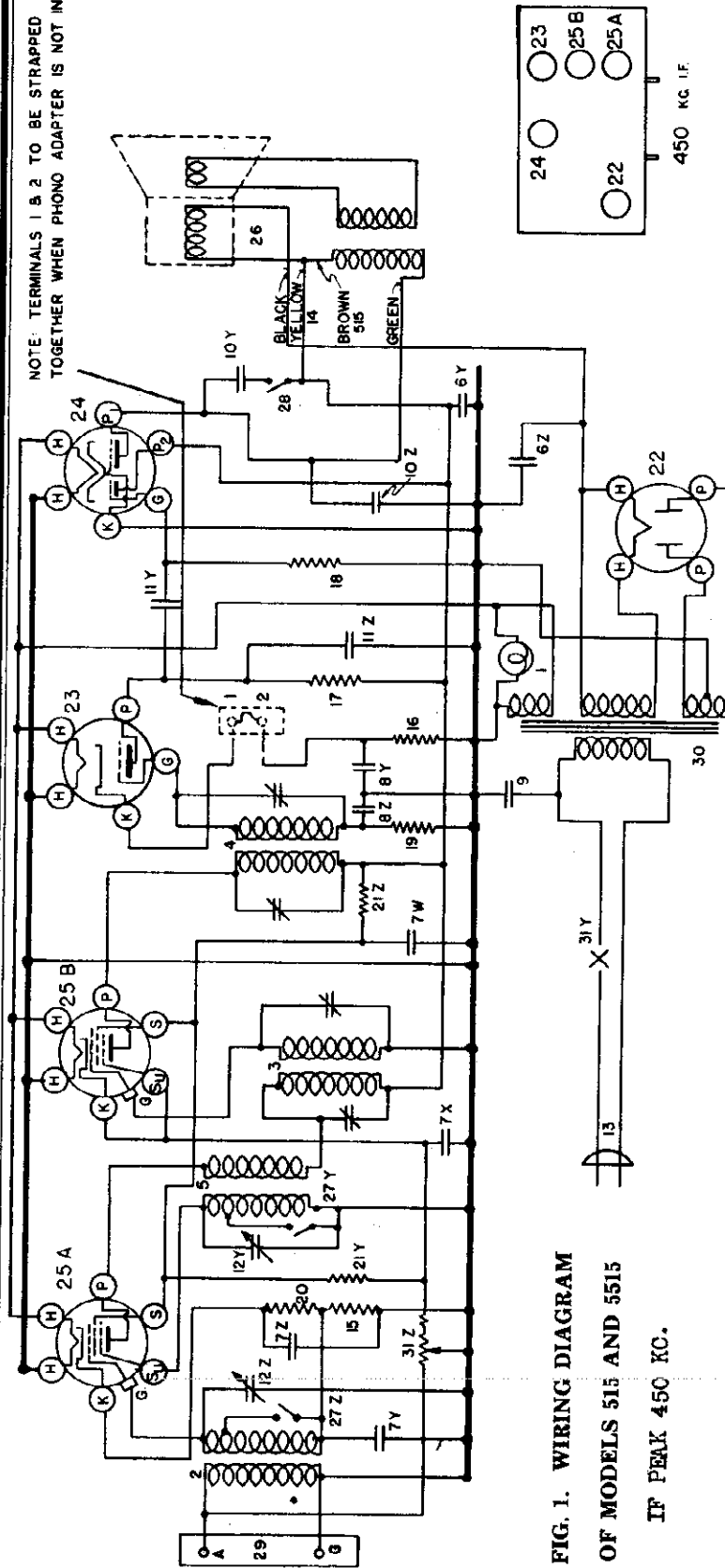


FIG. 1. WIRING DIAGRAM
OF MODELS 515 AND 5515
IF PEAK 450 KC.

OCTOBER 1935

PARTS LIST—MODELS 515 AND 5515

Figures in first column refer to parts shown in diagrams.

Item No.	Description	Part No.	Description	Item No.	Description	Part No.	Description
1	Dial Light Socket Assembly.	36148	Dial Assembly complete.	26	Speaker	219-BL9	Speaker
2	Coil Ant.	33466A	Cord—Power Supply.	27Z	Band Change Switch.	35753A	Band Change Switch.
3	1st. I. F. Trans.	35696	Speaker Cable (5515 only).	27Y	Tone Control Switch.	36184A	Tone Control Switch.
4	2nd. I. F. Trans.	31094	Resistor, 4.50 Ohms.	28	Ant. Gnd. Terminal.	26719	Ant. Gnd. Terminal.
5	Osc. Coil.	2127A	Resistor, 60,000 Ohms.	29	Power Transformer, 60 Cy., 110 V.	28500	Power Transformer, 60 Cy., 110 V.
6Z	Condenser, 8 Mfd., 450 Volts.	21455	Resistor, 300,000 Ohms.	30	Power Transformer, 25 Cy., 110 V.	28500	Power Transformer, 25 Cy., 110 V.
7Z	Condenser, 0.02 Mfd. 200 Volt.	23785	Resistor, 500,000 Ohms.	31Z	Volume Control.	37343	Volume Control.
7Y	Condenser, 0.02 Mfd. 200 Volt.	21454	Resistor, 1 Megohm.	31Y	On-Off Switch.	35917	On-Off Switch.
7X	Condenser, 0.02 Mfd. 200 Volt.	25937	Resistor, 275 Ohms Flex.	B	Escutcheon.	37158	Escutcheon.
7W	Condenser, 0.1 Mfd. 200 Volt.	35963	Resistor, 8,500 Ohms.	W	Dial Glass.	37156	Dial Glass.
8Y	Condenser, 0.1 Mfd. 200 Volt.	28807	Socket, 80.	W	Dial Pointer.	37157	Dial Pointer.
9	Condenser, 0.01 Mfd. 400 Volt.	80	Socket, 75.	W	Pointer Screw.	31585B	Pointer Screw.
10Z	Condenser, 0.006 Mfd. 400 Volt.	90	Socket, 65.	W	Knob (2) large.	36355	Knob (2) large.
10Y	Condenser, 0.03 Mfd. 400 Volt.	90	Socket, 65.	W	Knob (2) small.		Knob (2) small.
11Z	Condenser, 0.01 Mfd. 400 Volt.	75	Socket, 6D6.				
11Y	Condenser, 0.03 Mfd. 400 Volt.	75	Socket, 6D6.				
12Z	Variable Tuning Condenser Gang.	W	Tube Shield, Half.				
12Y		W	Tube Shield Cap.				
		W	Tube Shield Base.				

MODEL 515, 5515, Fiver
Voltage, Trimmers
Alignment, Chassis

CROSLLEY RADIO CORP.

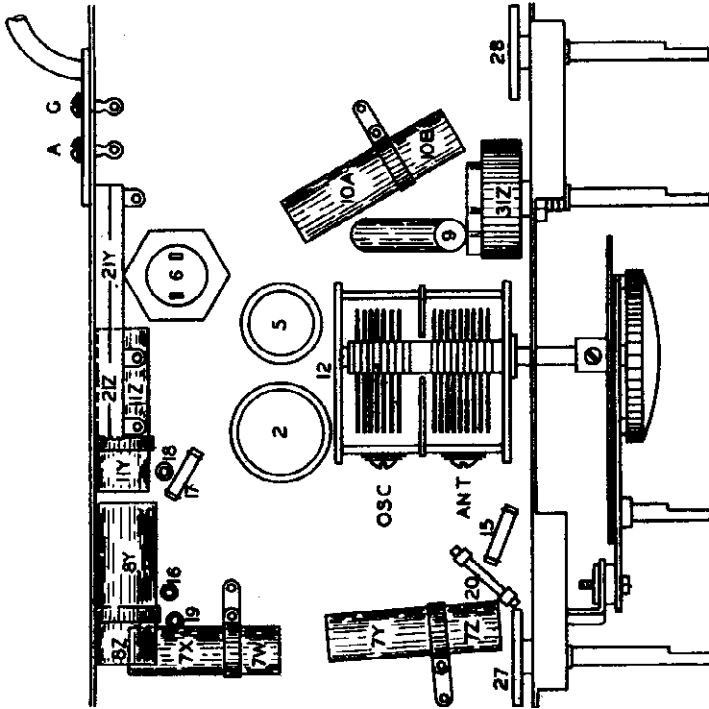


Fig. 3. Bottom View 515 and 5515

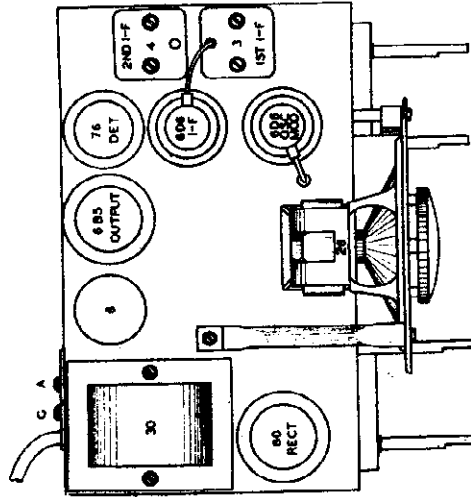


Fig. 2-A. Top View 515

Connecting Output Meter.

Connect one terminal of the output meter to P1 and the other terminal to P2 of the 6B5 output tube. Look at the bottom of the tube with the filament prongs at the bottom of the tube toward the left of the filament. The first prong to the left of the filament is P1. Be sure the meter is protected from D. C. by connecting a condenser (1 microfarad) in series with one of the leads.

1. Peaking I. F. Stages at 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. series condenser to the top cap of the 6D6 Osc.-Mod. tube, leaving the tube's grid clip in place. KEEP THE GENERATOR LEAD AS FAR AS POSSIBLE FROM THE OTHER S. G. TUBES.

(b) Connect the ground lead of the signal generator to the chassis frame or ground terminal of the receiver.

(c) Set the signal generator to 450 kilocycles.

(d) Rotate the receiver tuning condenser until the rotor plates are completely out of mesh.

(e) Turn the band selector switch to the right hand position. (Short Wave Band).

(f) Turn the volume control of the receiver on full.

(g) With the signal generator set to the lowest usable output level adjust the I. F. trimmer condensers located on top of the I. F. transformers, Fig. 2A&B for maximum output.

NOTE: Make the adjustments very carefully, going over them several times to insure that the final setting is at resonant frequency. An insulated screw driver should be used to insure accurate adjustments.

2. Aligning E. F. Circuits.

(a) Turn the band selector switch to the left hand position. (Broadcast Band).

(b) Leave the receiver tuning condenser rotor plates completely out of mesh.

(c) Connect the output lead from the signal generator through a .00025 mfd. series condenser to the antenna terminal of the receiver.

(d) Set the signal generator to approximately 1570 kilocycles.

(e) Adjust the trimmer on the "Osc." section of the tuning condenser gang for maximum output. (Fig. 3).

(f) Set the signal generator to 1400 kilocycles.

(g) Tune in the 1400 kilocycle signal with the station selector for maximum output.

NOTE: Do not disturb the setting of the "Osc." trimmer as this is adjusted at 1570 kilocycles only and any further adjustment at this point would affect both the tuning range of the receiver and the tracking of its circuits.

(h) Adjust the trimmer on the "Ant." section of the tuning condenser gang for maximum output.

NOTE: There are no adjustments on this receiver for the Police Band.

SPECIFICATIONS

The Crosley models 515 and 5515 employ the same chassis. The 515 is a table model with speaker attached to the 6B5 output tube. Look at the bottom of the tube with the filament prongs at the bottom of the tube toward the left of the filament. The first prong to the left of the filament is P1. Be sure the meter is protected from D. C. by connecting a condenser (1 microfarad) in series with one of the leads.

The tubes used are 6D6 Oscillator-Modulator, 6D6 I. F. Amplifier, 76 Detector, 6B5 Output and type 80 Rectifier.

SOCKET VOLTAGES

The tube socket voltages are measured from the socket contacts to the chassis with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with receiver in operating condition and no signal input. Readings may vary plus or minus 10% of values given. Filament readings are taken with a low range A. C. voltmeter.

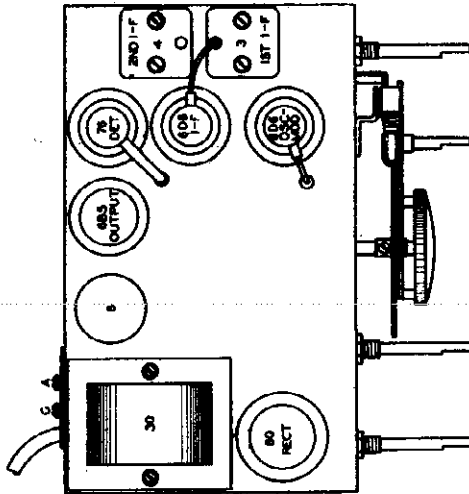


Fig. 2-E. Top View 5515

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	Su	G	P2	K
6D6	Osc.-Mod	6.3	210	120	0	28	—	31
6D6	I. F. Amp	6.3	310	120	3	0	—	3
76	Detector	6.3	.85	—	0	0	—	8.5
6B5	Output	6.3	200	—	0	210	0	—
80	Rectifier	4.5	200	—	—	—	—	—

CROSLLEY RADIO CORP.

OCTOBER 1935

PARTS LIST—MODEL 525

Figures in first column refer to parts shown in diagrams.

Part numbers with A, B, etc., following, mean duplicate part
Part numbers with Z, Y, X, etc., following, mean parts having multiple sections.

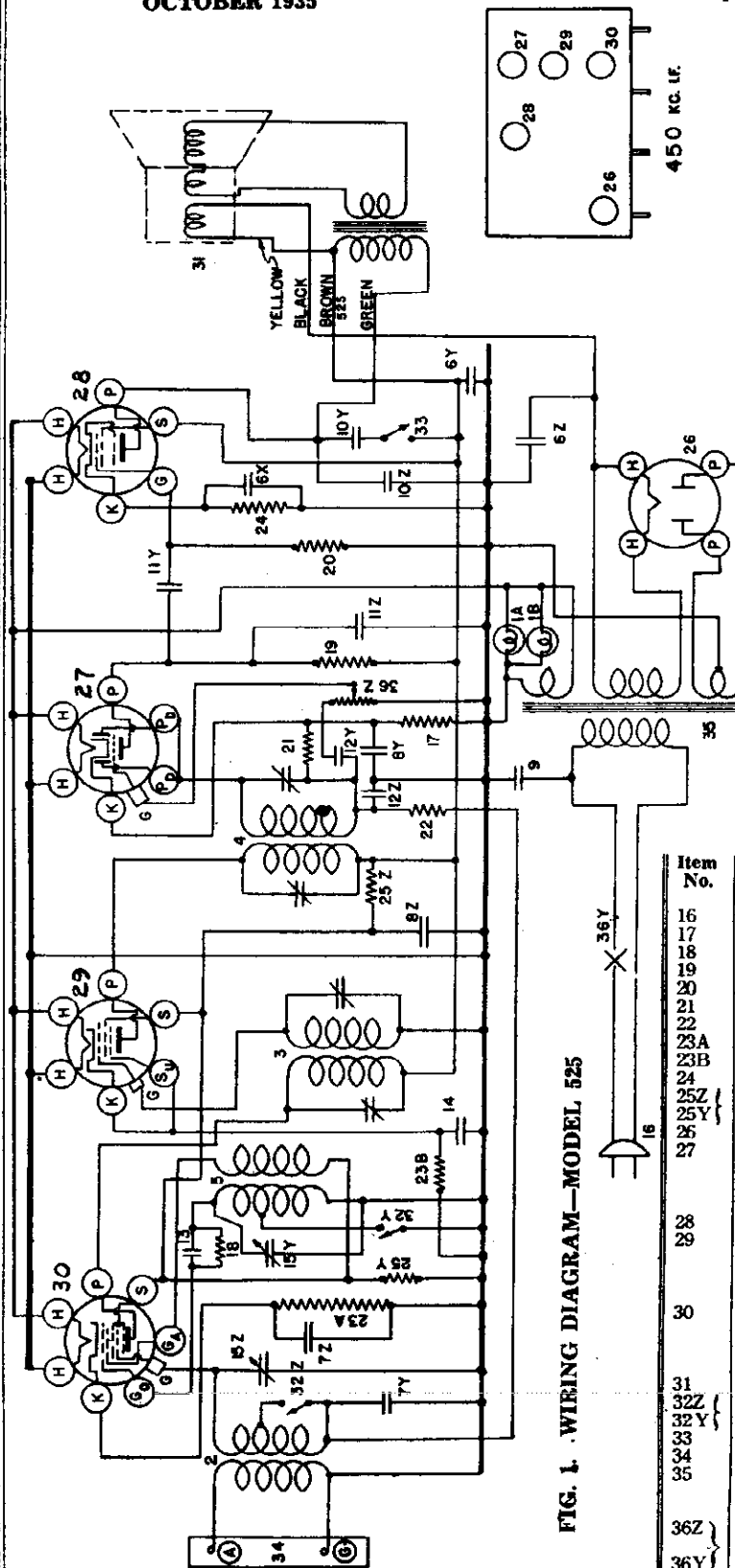


FIG. 1. WIRING DIAGRAM—MODEL 525

Item No.	Part No.	Description
1A	G4 —27134	Dial Light Bracket Assem
1B	G4 —27134	Dial Light Bracket Assem
2	G42 —32000	Coil, Ant. Trans.
	W —30802A	Coil Shield
	W —30026A	Coil Retaining Ring
	W —36178	Coil Insulator
3	G50 —32004	Coil, 1st. I. F.
	G3 —31927	Coil Shield
	W —35037A	Coil Insulator
4	G49 —32004	Coil, 2nd. I. F.
	G3 —31927	Coil Shield
	W —35037A	Coil Insulator
5	G43 —32002	Coil Oscillator
	W —25025B	Coil Shield
	W —21541C	Coil Retaining Ring
	W —26891	Coil Insulator
6Z		Condenser, 8 Mfd. 450 V
6Y	W —35750	Condenser, 6 Mfd. 450 V
6X		Condenser, 12 Mfd. 25 V
7Z	W —28623	Condenser, .02 Mfd. 200 V
7Y	W —28622	Condenser, .02 Mfd. 200 V
8Z	W —30805	Condenser, 0.1 Mfd. 200 V
8Y	W —30805	Condenser, 0.1 Mfd. 200 V
9	W —35011	Condenser, .01 Mfd. 400 V
10Z	W —35011	Condenser, .006 Mfd. 400 V
10Y		Condenser, .03 Mfd. 400 V
11Z	W —25537A	Condenser, .001 Mfd. 400 V
11Y		Condenser, .03 Mfd. 400 V
12Z	W —30322A	Condenser, .0017 Mfd.
12Y		Condenser, .006 Mfd.
13	G1 —34002	Condenser, .00025 Mfd.
14	W —28621	Condenser, .02 Mfd.
15Z		Condenser, 2 Gang Var. R.F.
15Y		Condenser, 2 Gang Var. 450
		Dial Drive Unit, complete
		Dial Pointer
		Dial Pointer Screw
		Dial Lens
G16	—35757	Dial Drive Mounting Bracke Assem.

Item No.	Part No.	Description
16	B —33906A	Cord, Power Supply
17	—21876	Resistor, 10,000 Ohms
18	—21453	Resistor, 40,000 Ohms
19	—21455	Resistor, 300,000 Ohms
20	—23785	Resistor, 500,000 Ohms
21	—21454	Resistor, 1 Megohm
22	—26577	Resistor, 3 Megohm
23A	—25937	Resistor, 275 Ohms, 1½ Watt Flex.
23B	—25937	Resistor, 275 Ohms, 1½ Watt Flex.
24	W —23907	Resistor, 750 Ohms, 1½ Watt Flex.
25Z	W —35963	Resistor, 8,500 Ohms, 3 Watt
25Y		Resistor, 25,000 Ohms, 3 Watt
26	G6 —28807	Socket 80
27	G41 —28807	Socket 75
	W —35774	Tube Shield Base
	W —35772	Tube Shield Half (2 used)
	W —35773	Tube Shield Cap
28	G22 —28807	Socket 41
29	G75 —28807	Socket 6D6
	W —35774	Tube Shield Base
	W —35772	Tube Shield half (2 used)
	W —35773	Tube Shield Cap
30	G47 —28807	Socket 6A7
	W —35774	Tube Shield Base
	W —35772	Tube Shield half (2 used)
	W —35773	Tube Shield Cap
31		Speaker, 318 BL9
32Z	W —35753A	Switch, Ant.
32Y		Switch, Osc.
33	W —36184A	Switch, Tone Control
34	G10 —26719	Terminal, Ant. Gnd.
35	G5 —28500	Transformer, Power, 60 Cy., 110 Volt
	G6 —28500	Transformer, Power, 25 Cy., 110 Volt
	G7 —28500	Transformer, Power, 25 Cy., 220 Volt
36Z	W —36227	Volume Control, 4,800 Ohm, 160 Ohm fixed.
36Y	W —31585B	On-Off Switch
	B —35917	Knobs
		Escutcheon

MODEL 525, 505
Voltage, Chassis
Trimmers, Alignment

CROSLEY RADIO CORP.

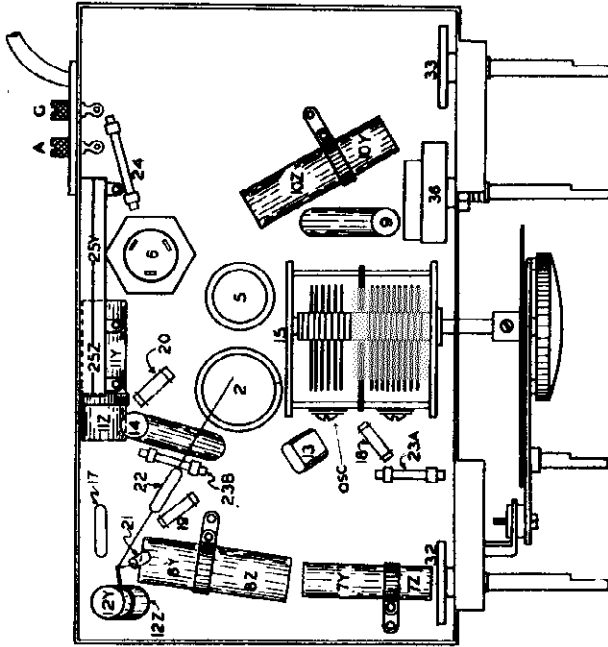


Fig. 3. Bottom View 525 and 505

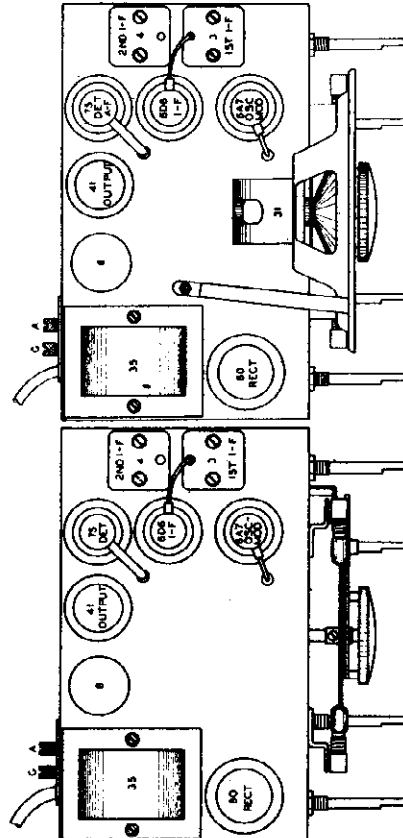


Fig. 2-A. Top View 525

Fig. 2-B. Top View 505

MODELS 525 AND 505

SPECIFICATIONS

The Crosley models 525 and 505 employ the same chassis. The 525 is a table model with speaker attached and the 505 is a console model with the speaker mounted in the cabinet. It is available or adaptable for operation on A.C. lines as follows: 110 V.-60 cycles, 110 V.-25 cycles and 220 V.-25 cycles. It is a two-band receiver tuning from approximately 540 to 1570 kilocycles in the broadcast band and from 1570 to 4000 kilocycles in the police and amateur band.

The tubes used are 6A7: Oscillator-Modulator, 6D6 I. F. Amplifier, 75 Detector, 41 Output and type 80 Rectifier.

SOCKET VOLTAGES

The tube socket voltages are measured from the socket contacts to the chassis with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with receiver in operating condition and no signal input. Readings may vary plus or minus 10% of values given. Filaments are measured with a low range A.C. Voltmeter.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	F	G	K	S	Sl	Ga	Go
6A7	Osc-Mod	6.3	215	0	3	105	0	105	4
6D6	I. F. Amp.	6.3	215	0	3	185	3	—	—
75	Detector & A. F. Amp.	6.3	80	0	—	75	—	—	—
41	Output	6.3	265	0	18	215	—	—	—
80	Rectifier	4.9	280	—	—	—	—	—	—

Measured on 117.5 Volt—60 Cycle Line.
Power Consumption Approximately 60 Watts.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can be properly aligned only 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 41 output tube. Looking at the bottom of the tube with the filament prongs toward you the plate prong will be the first to the left of the filament prongs and the screen prong will be next to the plate prong. 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. Peaking I. F. Stages at 450 Kilocycles.

- Connect the output of the signal generator through a .02 mfd. series condenser to the top cap of the 6A7 Osc-Mod tube, leaving the tube's grid clip in place. KEEP THE GENERATOR OUTPUT LEAD AS FAR AS POSSIBLE FROM THE OTHER S. C. TUBES.
- Connect the ground lead of the signal generator to the chassis frame or ground terminal of the receiver.
- Set the signal generator to 450 kilocycles.
- Rotate the receiver tuning condenser until the rotor plates are completely out of mesh.
- Turn the band selector switch to the right band position. (Short Wave Band).
- Turn the volume control of the receiver on full.

(g) With the signal generator set to the lowest usable output level adjust the I. F. trimmer condensers located on top of the I. F. transformers, Fig. 2AAB for maximum output.

NOTE: Make the adjustments very carefully, going over them several times to insure that the final setting is at resonant frequency. An insulated screw driver should be used to insure accurate adjustments.

2. Aligning R. F. Circuits.

- Turn the band selector switch to the left hand position. (Broadcast Band).
- Leave the receiver tuning condenser rotor plates completely out of mesh.
- Connect the output lead from the signal generator through a .00025 mfd. series condenser to the antenna terminal of the receiver.
- Set the signal generator to approximately 1570 kilocycles.

(e) Adjust the trimmer on the "Osc." section of the tuning condenser gang for maximum output. (Fig. 3).

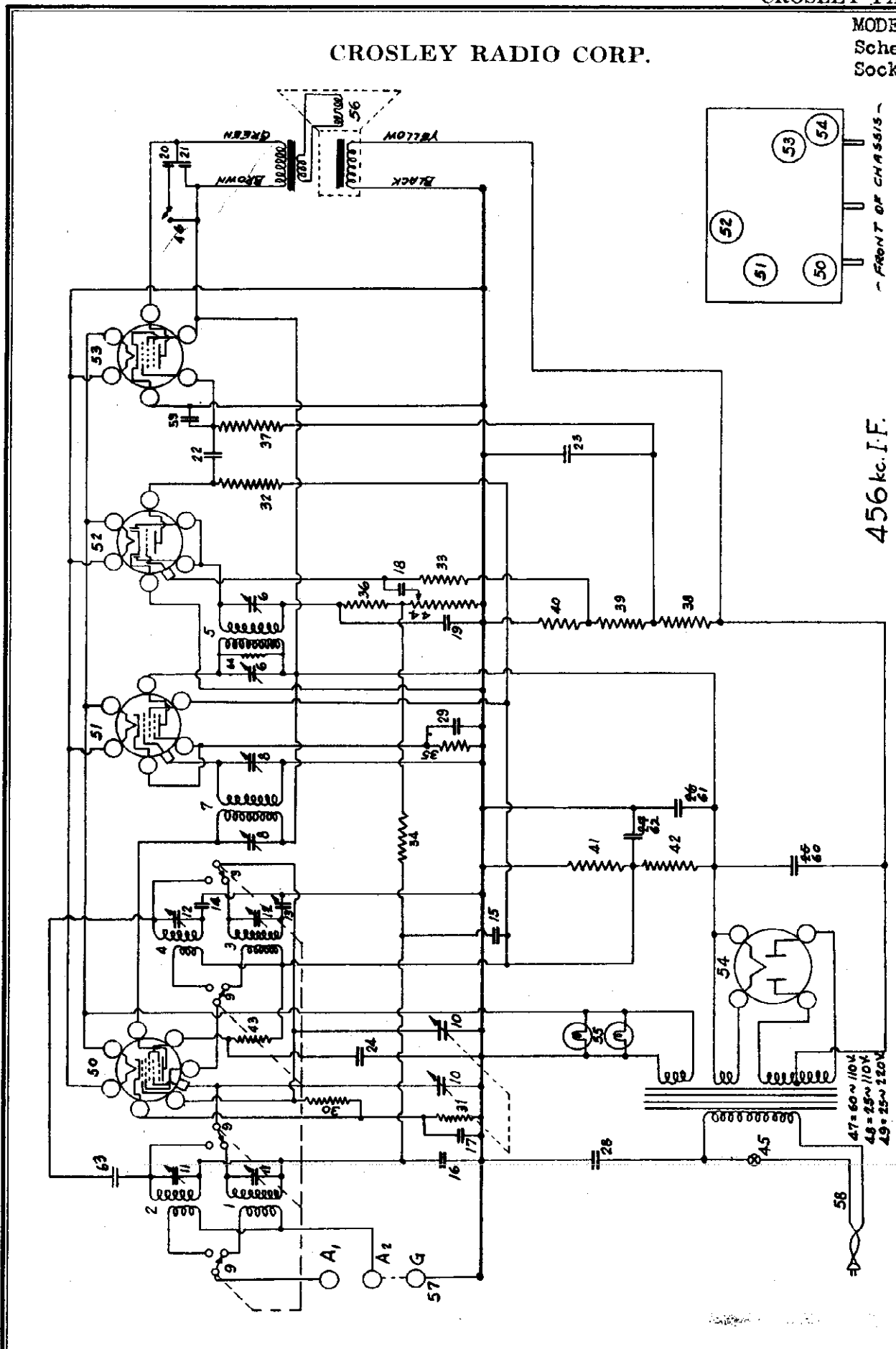
(f) Set the signal generator to 1400 kilocycles.

(g) Tune in the 1400 kilocycle signal with the station selector for maximum output.
NOTE: Do not disturb the setting of the "Osc." trimmer as this is adjusted at 1570 kilocycles only and any further adjustment at this point would affect both the tuning range of the receiver and the tracking of its circuits.

(h) Adjust the trimmer on the "Ant." section of the tuning condenser gang for maximum output.
NOTE: There are no adjustments on this receiver for the Police Band.

CROSLY RADIO CORP.

MODEL 534
Schematic
Socket



456 kc. I.F.

Fig. 1—Wiring Diagram of Model 534

MODEL 534

Chassis, Trimmers
Parts

CROSLEY RADIO CORP.

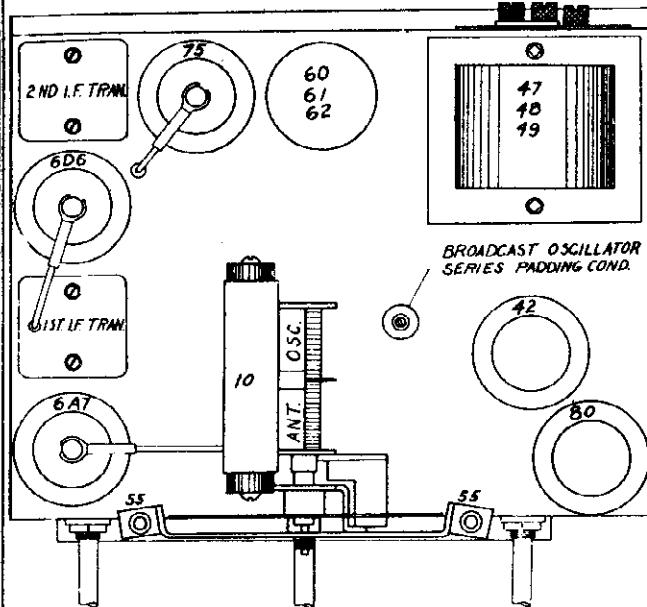


Fig. 2—Top View

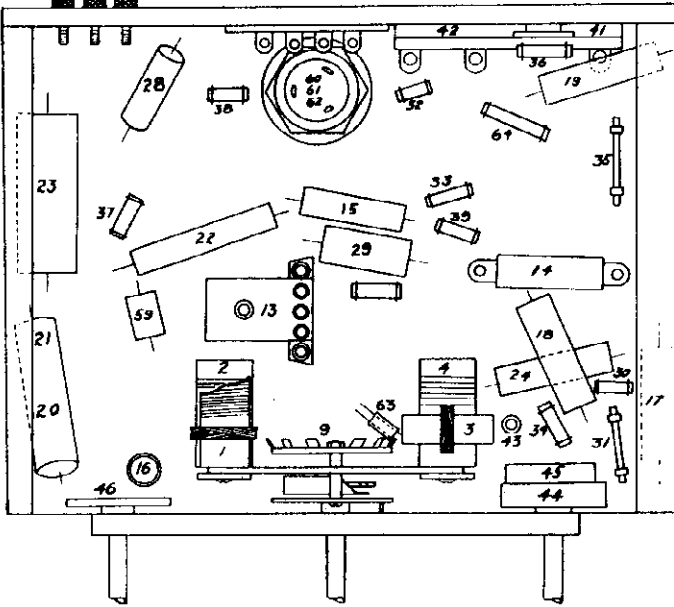


Fig. 4—Bottom View

PARTS LIST—MODEL 534

Figures in first column refer to parts shown in diagrams.

Item No.	Part No.	Description	Item No.	Part No.	Description
1	G39—32000	Low Freq. Ant. Trans.	40	—21876	10,000 Ohm Resistor
3	G40—32000	High Freq. Ant. Trans.	41	W —31883	25,000 Ohm Resistor
3	G31—32002	L. F. Osc. Trans.	42	W —23868	8,500 Ohm Resistor
4	G32—32002	H. F. Osc. Trans.	43	W —35013	6,500 Ohm Resistor
5	G38—32004	2nd I. F. Trans.	44	W —34191	Level Control 1 Megohm
6	G39—32004	I. F. Trimmer Cond.	45	G8 —28500	Power Switch
7	G39—32004	1st I. F. Trans.	46	G9 —28500	Tone Control Switch
8	B —35031	I. F. Trimmer Cond	47	G10—28500	Power Trans. 60 Cy. 110 V.
9	B —35025	4 Pole S. T. Sw.	48	G47—28807	Power Trans. 25 Cy. 110 V.
10	G26—32086	Variable Cond. Gang	49	W —27981A	Power Trans. 25 Cy. 220 V.
	W —32008A	Dial Drive Assembly	50	W —28632A	6A7 Socket
	W —32293	Dial Hand	51	G75—28807	Tube Shield Base
11	W —35033	Dial Hand Nuts (2)	51	W —27981A	Tube Shield
12	W —35033	Ant. Trimmer Cond.	51	B —28009D	6D6 Socket
13	G10—33005	Osc. Trimmer Cond.	52	G41—28807	Tube Shield Base
14	G12—34000	Osc. Trimmer Cond.	52	W —27981A	Tube Shield
15	W —32378	4725 Mmf. Cond.	52	W —28632A	-75 Socket
16	W —32380	0.01 Mfd. 400 V. Cond.	53	G25—28807	Tube Shield Base
17	W —28621	0.05 Mfd. 200 V. Cond.	53	W —27981A	Tube Shield
18	W —28619	0.02 Mfd. 200 V. Cond.	54	G6 —28807	-42 Socket
19	W —27932	0.006 Mfd. 200 V. Cond.	54	G1 —31128	-80 Socket
20	W —27932	0.0001 Mfd. 200 V. Cond.	55	W —34627	6-8 V. Dial Lamp
21	W —35011	0.03 Mfd. 400 V. Cond.	55	G4 —27134	Light Bracket Assem. (2)
21	W —27216	0.006 Mfd. 400 V. Cond.	56	W —318BL	Speaker
22	W —30321A	0.05 Mfd. 200 V. Cond.	56	G5 —31128	Speaker Term. Board
23	W —28621	1.0 Mfd. 160 V. Cond.	57	W —34627	Insulator
24	W —28621	0.02 Mfd. 200 V. Cond.	57	W —34628	Term. Board Cover
25	See 60-61-62		57	G16—26719	Ant. Gnd. Terminal
26	See 60-61-62		58	B —33905	Power Cable & Plug
27	See 60-61-62		59	G1 —34002	0.00025 Mfd. (Mica)
28	W —30805	0.01 Mfd. 400 V. Cond.	60	B —30059C	8 Mfd. 450 V.)
29	W —24049B	0.1 Mfd. 200 V. Cond.	61	B —30059C	8 Mfd. 450 V.)
30	—21453	40,000 Ohm Resistor	62	B —30059C	8 Mfd. 250 V.)
31	W —25937	275 Ohm Flex. Resistor	63	G31—34403	Condenser
32	—21455	300,000 Ohm Resistor	63	—21454	1.0 Mmf.
33	—26577	3 Megohm Resistor	64	B —35034	1 Megohm Resistor
34	—26577	3 Megohm Resistor		W —31157B	Chassis End (2)
35	W —25937	275 Ohm Flex. Resistor		W —33991	Knob (1) Station Selector
36	—21455	300,000 Ohm Resistor		W —31585B	Knob (1) Band Change
37	—23785	500,000 Ohm Resistor			Knob (2) (Tone Control & Volume Control)
38	—23785	500,000 Ohm Resistor			
39	—34018	200,000 Ohm Resistor			

CROSLLEY RADIO CORP.

MODEL 534
Voltage, Alignment
Data

APRIL, 1935

MODEL 534

SPECIFICATIONS

The Crosley Model 534 chassis is a five tube superheterodyne receiver designed for A. C. operation. It employs a tuned antenna circuit which covers from 535 kilocycles to 1730 kilocycles on the broadcast band and from 5.3 megacycles to 15.7 megacycles on the short wave band, automatic volume control, two step tone control and class "A" pentode audio amplification.

TUBES AND VOLTAGE LIMITS

The following are the tubes and voltages measured from the tube socket to chassis with a 500,000 ohm 500 Volt voltmeter with the receiver in operating condition but with no signal to the antenna, and with a line voltage of 117.5 volts. Voltage limits are plus or minus 10% of values given.

TUBE VOLTAGES—MODEL 534

Type	Where Used	E _t	E _p	E _g	E _{amp}	E _k	E _f
6A7	Osc. Mod.	4.3	100	2.5	2.5	2.5	0
6Z5	I. F. Amp.	6.3	205	3.0	3.0	3.0	0
6X4	Diode A. F.	6.3	186	0	0	0	3
40	Rect.	4.0	—	—	—	—	—

VOLTAGE ACROSS SPEAKER FIELD IS VOLTS.

X INDICATES HIGH RESISTANCE IN THE CIRCUIT WHICH PREVENTS ACCURATE MEASUREMENT.
ALL MEASUREMENTS MADE WITH A 1000 OHM PER VOLT VOLTMETER FROM CHASSIS.

(The power consumption at 117.5 volts is approximately 98 watts).

CIRCUIT DESCRIPTION

The circuit consists of a tuned antenna stage, an oscillator-modulator stage, one stage of I.F. amplification, diode detector and A.V.C. A.F. amplifier and power supply. The oscillator-modulator stage uses a Type 6A7 tube and the I. F. stage uses a Type 6Z5 tube. The A.V.C., second detector and first stage of audio amplification are combined in a Type 6X4 tube. The output stage uses a single Type 42 tube and the power supply uses a Type 40 tube.

PEAKING PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and will not need readjustment unless some coil or condenser has been replaced. Do not change the setting of any trimmer condenser unless it is definitely known that the adjustment is necessary. If readjustment is found necessary, the circuits can be properly adjusted only with the use of a modulated test oscillator and an output meter.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate of the Type 42 tube and the other terminal to the screen grid of the Type 42 tube. Looking at the bottom of the tube with the filament prongs toward you the plate prong will be the first to the left of the filament prongs and the screen grid prong will be next to the plate prong. Be sure that the meter is protected from D.C. by connecting a condenser (.1 mid. or larger) in series with one of the leads.

PEAKING I.F. STAGES AT 456 Kc.

NOTE: Be sure speaker is connected before turning on receiver.
1. Connect the ground lead of the test oscillator to the chassis frame. Connect a .1 mid., or larger, condenser in series with the other lead and connect

trimmer condenser (Broadcast Band) for maximum output.

(b) With the same dial setting peak the antenna parallel trimmer condenser for the Broadcast Band.

(c) Set the test oscillator at 600 kilocycles.

(d) Tune in the 600 kilocycle signal with the station selector in the region of 60 on the dial, for maximum reading on the output meter.

(e) Close the oscillator series padding condenser (Broadcast Band). Fig. 2, 1/4 turn and re-tune the station selector to the 600 kilocycle signal for maximum output, noting the reading on the output meter.

(f) If the meter reads higher after operation (e) repeat the operation again and again until no further improvement in the reading of the output meter can be obtained. If the meter reads lower after operation (e) open the oscillator series trimmer condenser 1/4 turn and re-tune the station selector to the 600 kilocycle signal, noting the reading on the output meter as above and repeat as many times as necessary to obtain the highest meter reading. Do not reset the parallel trimmer condensers at this frequency.

(g) Repeat operations (a) and (b) for more accurate adjustments.

To Peak The Short Wave Band:

(a) Be sure to change the dummy antenna as described above.

(b) Close the oscillator parallel trimmer condensers.

er (Short Wave Band) and then open three turns.

(c) Close the antenna parallel trimmer condenser (Short Wave Band) and then open 1/2 turn.

(d) Tune the station selector to 15 megacycles (15 on the dial).

(f) Peak the oscillator parallel trimmer condenser on the first signal heard when closing the condenser.

NOTE: To check on the adjustment of the oscillator parallel trimmer condenser:

(1) Increase the test oscillator output not more than ten times.

(2) Try to tune in the 15 megacycle signal with the station selector tuned to approximately 14 on the dial.

(3) If the 15 megacycle signal is heard at approximately 14 on the dial in addition to 15 on the dial the oscillator parallel trimmer condenser has been adjusted on the correct frequency.

(g) Reduce the output from the test oscillator to the previous output and re-tune the station selector to 15 megacycles at 15 on the dial.

(h) Peak the antenna parallel trimmer condenser for the Short Wave Band for maximum output, then re-tune the station selector again for maximum output.

(i) Repeat the two operations in (h) as many times as necessary to obtain the highest reading on the output meter.

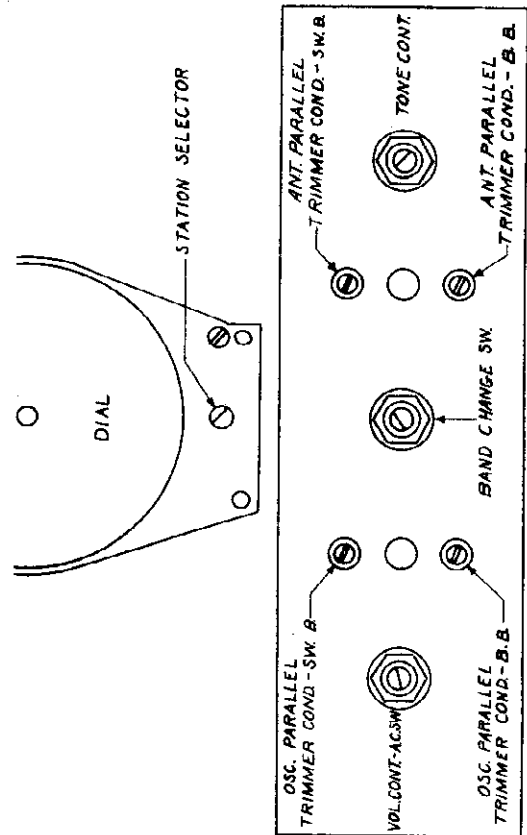
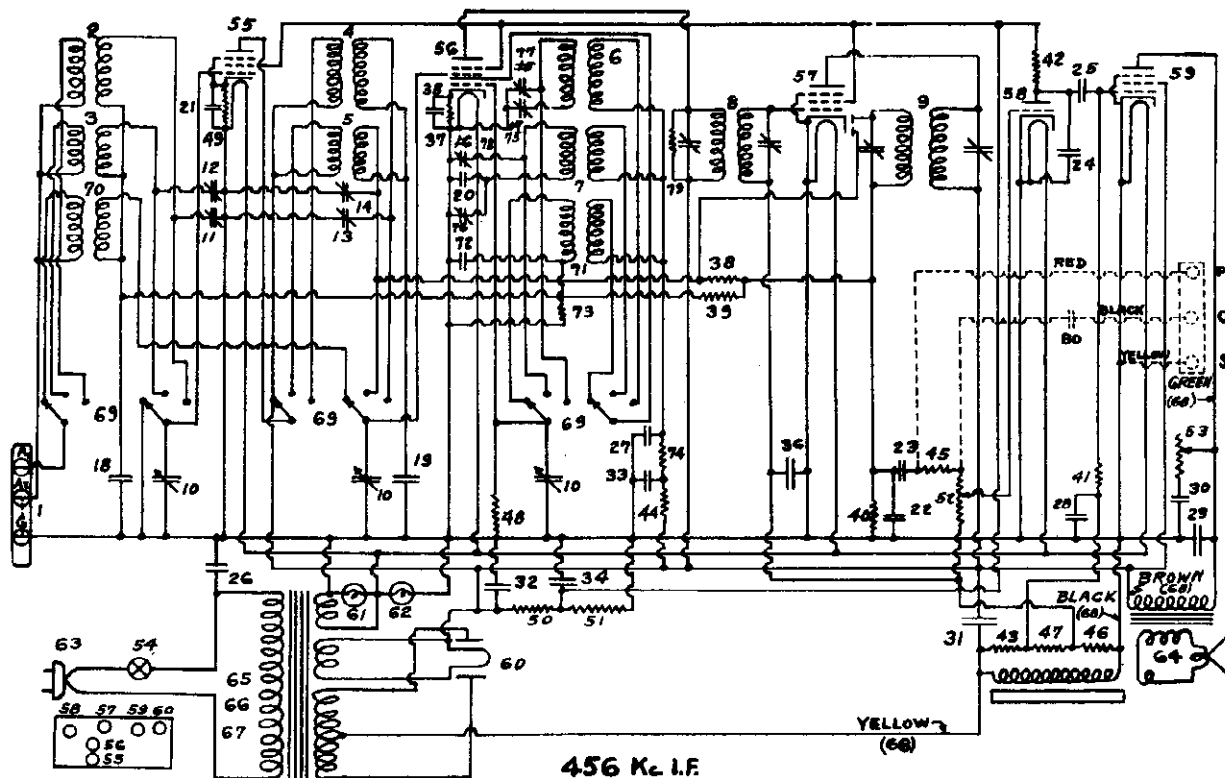


Fig. 3—Front View

MODEL 6H3, 614
Schematic, Socket
Parts

CROSLEY RADIO CORP.



Parts List Model 6H3

Figures in first column correspond to figures in diagram

1	G16	26719	Ant. Gnd. Term.	43	W	23785	500,000 Ohms
2	G3	32000	L. F. Ant. Coil	44	W	21876	10,000 Ohms
3	G1	32002	H. F. Ant. Coil	45	W	23785	500,000 Ohms
4	G2	32001	L. F. R. F. Coil	46	W	22831	15,000 Ohms
5	G1	32001	H. F. R. F. Coil	47	W	21875	100,000 Ohms
6	G2	32002	L. F. Osc. Coil	48	W	21453	40,000 Ohms
7	G1	32002	H. F. Osc. Coil	49	W	21984	185 Ohms
8	G18	32004	1st I. F. Trans.	50	W	31883	8,500 Ohms
9	G19	32004	Diode Trans.	51	W	28552	25,000 Ohms
10	G19	33002	Variable Cond.	52	W	28552	Level Control
11	G1	33008	L. F. Ant. Trimmer	53	W	25594-B	Tone Control
12	G1	33008	H. F. Ant. Trimmer	54	W	25594-B	S. P. S. T. Line Switch
13	G1	33008	L. F. R. F. Trimmer	55	G75	27456	6D6 Socket
14	G1	33008	H. F. R. F. Trimmer	56	G47	27456	6A7 Socket
15			H. F. R. F. Trimmer	57	G48	27456	6B7 Socket
16				58	G80	27456	78 Socket
17				59	G25	27456	42 Socket
18	W	32379	0.02 Mfd. 200 Volt	60	G6	27456	80 Socket
19	W	32379	0.02 Mfd. 200 Volt	61	W	4099-A	6 V. Dial Light
20	W	32304	1400 Mmfd. H. F.	62	W	4099-A	6 V. Dial Light
21	W	32379	0.02 Mfd. 200 Volt	63	B	33905	Cable & Plug
22	W	30322-A	0.00017 Mfd. 200 Volt	64	G6	318-B	Speaker
23			0.006 Mfd. 200 Volt	65	G6	30745	Power Trans. 60 Cy.
24	W	25537-A	0.001 Mfd. 400 Volt	66	G7	30745	Power Trans. 25 Cy.
25			0.03 Mfd. 400 Volt	67	G8	30745	110 Volt
26	W	30805	0.01 Mfd. 400 Volt	68	W	31007-A	Power Trans. 25 Cy.
27	W	32378	0.01 Mfd. 400 Volt	69	B	34427-A	220 Volt
28	W	30321-A	1.0 Mfd. 160 Volt	70	G31	32000	Speaker Cord
29	W	25517-A	0.008 Mfd. 400 Volt	71	G24	32002	Band Change Switch
30	W	26194-B	0.05 Mfd. 400 Volt	72	G7	34000	3rd Ant. Coil
31	W	29097-D	12 Mfd. 475 Volt	73	W	24990	3rd Osc. Coil
32	W	32379	8 Mfd. 450 Volt (Red)	74	W	22831	1450 Mmfd.
33	W	32379	8 Mfd. 450 Volt (Green)	75	G2	33007	25,000 Ohms
34	W	28589	8 Mfd. 250 V. (No Code)	76	W	33007	15,000 Ohms
35	W	29910-A	0.02 Mfd. 200 Volt	77	G9	33009	L. F. Osc. Series Cord
36	W	28589	0.25 Mfd. 200 Volt	78	W	23785	H. F. Osc. Trimmer
37	W	26577	350 Ohms	79	W	23191-A	L. F. Osc. Trimmer
38	W	26577	3-Megohm	80	W	23191-A	500,000 Ohms
39	W	26577	3-Megohm				.01 Mfd. 400 V. (For Only)
40	W	21454	1-Megohm				
41	W	23785	500,000 Ohms				
42	W	23403	150,000 Ohms				

CROSLY RADIO CORP.

MODEL 635, Buccaneer
Schematic, Voltage
Socket, Data

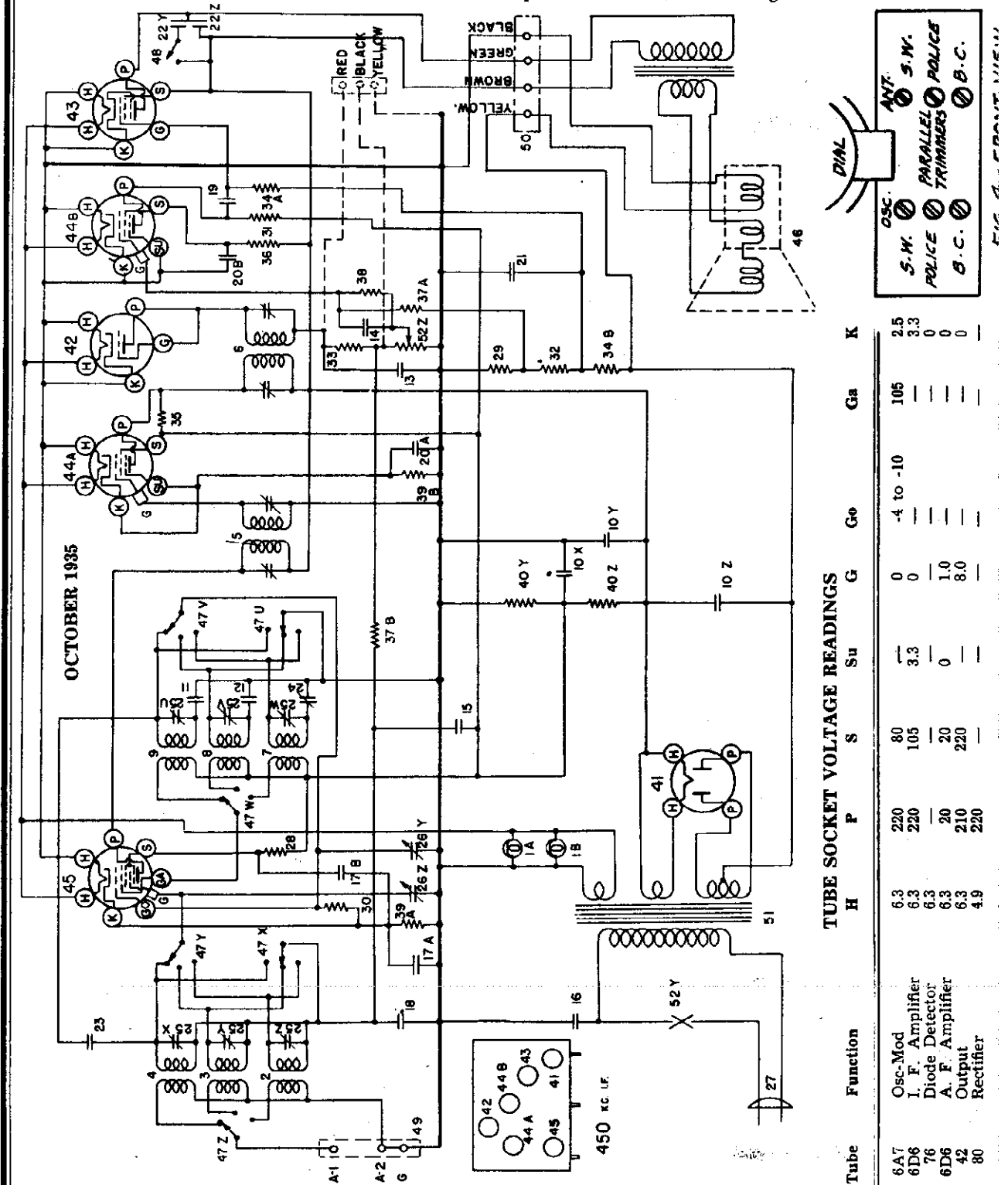
SPECIFICATIONS

The Crosley Model 635 radio is a six-tube superheterodyne receiver and is available or adaptable for operation on A-C lines as follows: 100 V.-60 cycles, 110 V.-25 cycles and 220 V.-25 cycles. It is a three band receiver tuning from 540 to 1700 kilocycles in the broadcast band, 1700 to 5200 kilocycles in the police and amateur band, and 5400 to 15,300 kilocycles in the high frequency band.

The tubes used are: 6A7 Oscillator-Modulator, 6D6 I. F. Amplifier, 76 Detector and AVC, 6D6 A. F. Amplifier, 42 Output and type 80 Rectifier.

SOCKET VOLTAGES

The tube socket voltages are measured from the socket contacts to the chassis with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with the receiver in operating condition and no signal input. Readings may vary plus or minus 10% of values given.

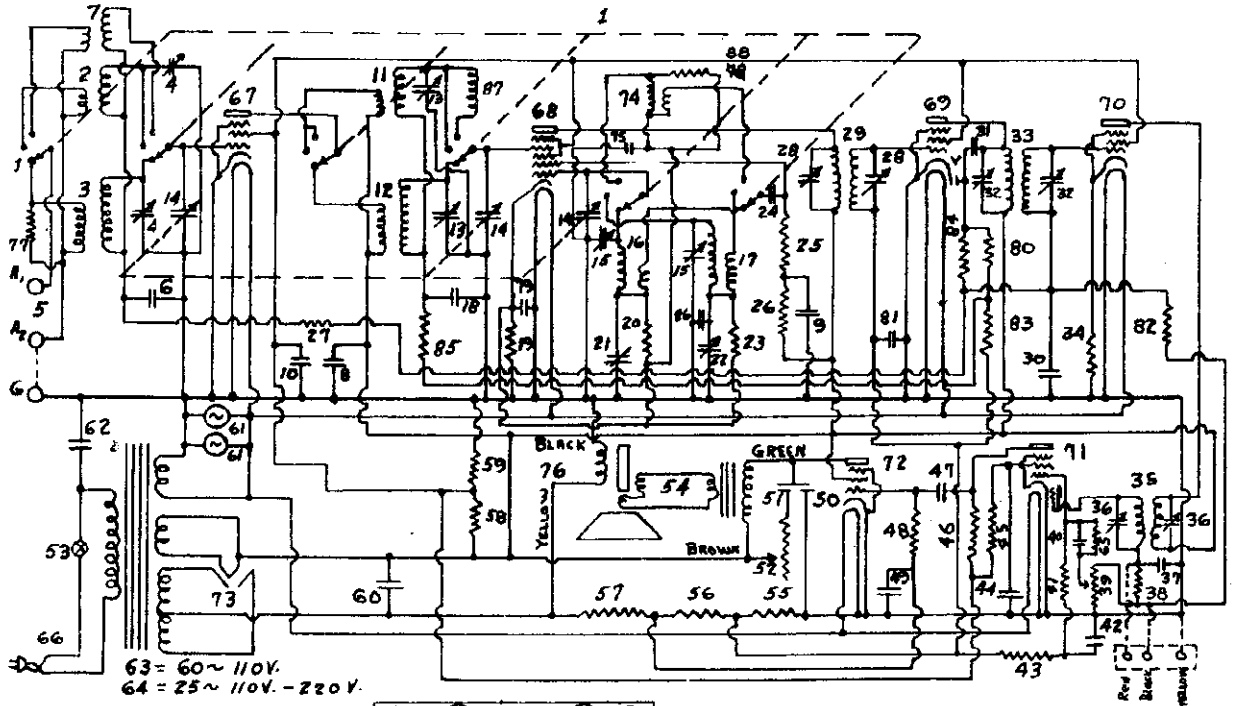


TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	F	S	Su	G	G ₀	G _a	K
6A7	Osc-Mod	6.3	220	80	—	0	-4 to -10	105	2.5
6D6	I. F. Amplifier	6.3	220	105	3.3	0	—	—	3.3
6D6	Detector	6.3	—	20	0	1.0	—	—	0
42	A. F. Amplifier	6.3	210	220	—	8.0	—	—	0
80	Rectifier	4.9	220	—	—	—	—	—	—

CROSLY RADIO CORP.

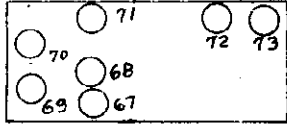
MODEL 714
Schematic, Socket
Parts



Parts List Model 714

Figures in first column correspond to figures in diagram

1	B	34443-A	Band Change Switch	46	21875	100,000 Ohms
2	G28	32000	16 Pole 3 Throw	47	W	.05 Mfd. 200 Volt
3	G3	32000	H. F. Ant. Coil	48	23785	500,000 Ohms
4	G1	33008	L. F. Ant. Coil	49	W	1.0 Mfd. 160 Volt
5	G16	26719	Ant. Trimming Cond.	50	W	.004 Mfd. 400 Volt
6	W	32379	Ant.-Grid. Term.	51	31052	.05 Mfd. 400 Volt
7	G31	32000	.02 Mfd. 200 Volt	52	W	Tone Control
8	W	29097-D	Pol. Ant. Coil	53	32063	S. P. S. T. Switch
9	G18	32001	8 Mfd. 450 Volt (Red)	54	411C	Speaker
10	G2	32001	8 Mfd. 450 Volt (Green)	55	33390	30,000 Ohms
11	G9	33009	8 Mfd. 250 Volt (No Code)	56	23403	150,000 Ohms
12	G18	33002	H. F.-R. F. Coil	57	21454	1 Meg.
13	G9	33009	L. F.-R. F. Coil	58	W	7,000 Ohms
14	G18	33002	R. F. Trimmer Cond.	59	W	11,000 Ohms
15	G2	33009	Variable Condenser	60	W	12 Mfd. 475 Volt
16	G2	32002	Osc. Trimming Cond.	61	W	6-8 V. Dial Light
17	G21	32002	L. F. Osc. Coil	62	W	.01 Mfd. 400 Volt
18	W	32380	H. F. Osc. Coil	63	G1	Power Trans. 60 Cy.
19	W	21452	.05 Mfd. 200 Volt	64	G39	Power Trans. 25 Cy.
20	G12	33006	1,100 Ohms	65	26578	110 V.-220 V.
21	G12	33006	60,000 Ohms	66	B	5 Meg.
22	W	21453	Series Cond. L. F.	67	W	Cord & Plug
23	W	25435	Series Cond. H. F.	68	G47	6D6 Socket (R. F. Amp.)
24	W	21876	40,000 Ohms	69	G48	6A7 Socket (Osc. Mod.)
25	W	21876	.003 Mfd. 400 Volt	70	G75	6B7 Socket (I. F. & Diode)
26	W	21876	10,000 Ohms	71	G49	6D6 Socket (2nd I. F.)
27	W	21455	10,000 Ohms	72	G25	6F7 Socket (Diode & A. F. Amp.)
28	G6	33006	300,000 Ohms	73	G6	42 Socket (Output)
29	G1	32004	I. F. Tuning Cond. 1st	74	G24	80 Socket (Rect.)
30	W	27216	1st I. F. Transformer	75	G6	Osc. Coil (Pol. Band)
31	W	31937	.05 Mfd. 200 Volt	76	W	Series Cond. 1350 Mmf.
32	G6	33006	.0001 Mfd.	77	W	Speaker Cord
33	G1	32004	I. F. Tuning Cond. 2nd	78	W	4,500 Ohms
34	W	25937	2nd I. F. Transformer	79	W	.02 Mfd. 200 Volt
35	G26	32004	275 Ohms	80	W	300,000 Ohms
36	W	27932	3rd I. F. Transformer	81	W	.02 Mfd. 200 Volt
37	W	27932	3rd I. F. Tuning Cond.	82	W	5 Meg.
38	W	23403	.0001 Mfd. 200 Volt	83	W	300,000 Ohms
39	W	32062	150,000 Ohms	84	W	1 Meg.
40	W	28619	Level Control 1 Meg.	85	W	1 Meg.
41	W	26577	.006 Mfd. 200 Volt	86	G2	3104 Mmf. Cond.
42	W	24049	3 Meg.	87	G19	Pol. Band R. F. Coil
43	W	21454	1 Mfd. 200 Volt	88	W	30,000 Ohms
44	W	24049	1 Meg.			
45	W	23785	1 Mfd. 200 Volt			



456 Kc. I.F.

MODEL 715, Corsair
Alignment, Chassis

CROSLLEY RADIO CORP.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can be properly aligned only 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 42 output tube. Looking at the bottom of the tube with the filament prongs toward you the plate prong will be the first to the left of the filament prongs and the screen prong will be next to the plate prong. 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 6A7 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 OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are open. 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 all the way to the left.

(d) Set the signal generator to 450 kilocycles.

be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is always approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator approximately ten 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 position.

To align the "series" trimmer set the signal generator to the frequency indicated and then tune-in this signal

(e) Close the middle trimmer condenser on the 1st I-F transformer. (Fig. 2)

(f) Adjust the trimmers located on top of the 2nd I-F transformer for maximum output. (Fig. 2)

(g) Adjust the top and bottom trimmers of 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.

(i) Reduce the output of the signal generator and adjust the middle trimmer on the 1st I-F transformer or maximum output. DO NOT READJUST THE OTHER TRIMMERS.

2. Aligning R-F Amplifier.

(a) When aligning the R-F amplifier the output lead from the signal generator is connected to the "Ant" terminal of the receiver. For the BLACK and GREEN bands a .00025 mfd. condenser must be connected in series with the output lead from 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 (if provision is made for series alignment). The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated for each adjustment.

Adjust the "Osc", "R-F" and "Ant" trimmers (Fig. 2) in the order given for maximum output and then check the adjustments in the same order. NOTE: When aligning the Police and High Frequency Band care must

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.

(b) Signal Input Frequencies.

	Shunt Alignment	Series Alignment
American Broadcast Band (BLACK)	1400 Kc.	600 Kc.
Police and Amateur Band (GREEN)	4000 Kc.	—
Night H-F Band (RED)	10 Megacycles	—

SPECIFICATIONS MODEL 715

The Crosley Model 715 radio is a seven-tube super-heterodyne receiver and is available or adaptable for operation on A-C lines as follows: 110 V-60 cycles, 110 V-25 cycles and 220 V-25 cycles. The tubes used are 6D6 R-F Amplifier, 6A7 Oscillator-Modulator, 6B7 I-F Amplifier and AVC, 76 Detector, 76 A-F Amplifier, 42 Output and type 80 Rectifier.

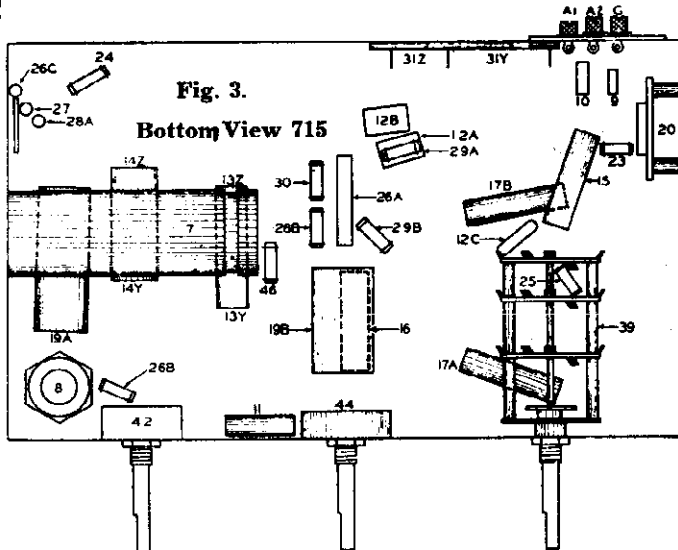
It is a three band receiver and the dial is divided into three sections as follows:

BLACK—540-1625 kilocycles (American Broadcast Band).

GREEN—1625-4700 kilocycles (Police and Amateur Band).

RED—5250-15300 kilocycles (Night High Frequency Band).

The positions on the band selector switch are in the above order, reading from right to left.



MODEL 715, Crosair
Schematic, Socket
Voltage

CROSLY RADIO CORP.

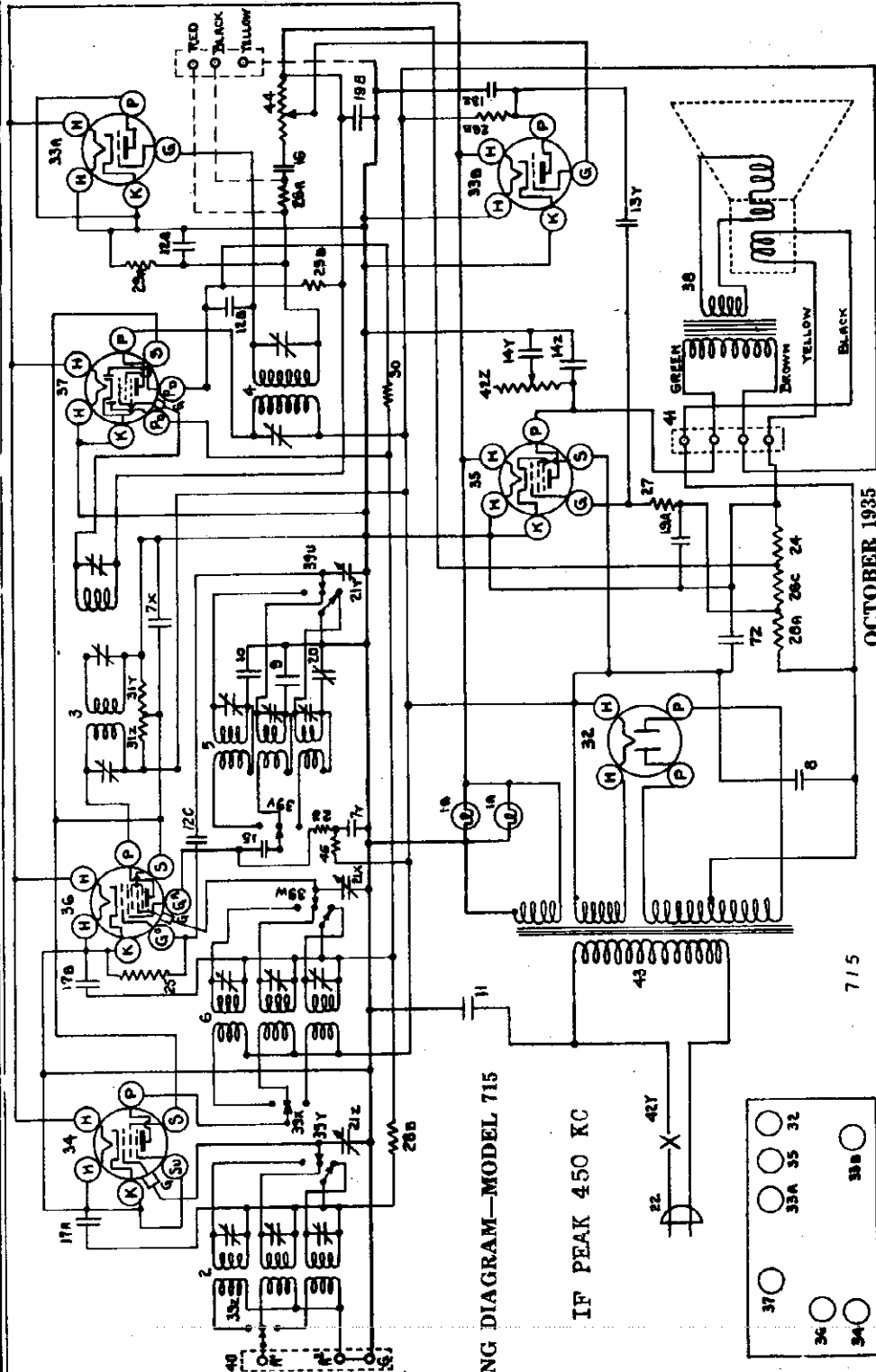


FIG. 1. WIRING DIAGRAM—MODEL 715

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	Su	G	K	Go	Ga
6D8	R-F Amplifier	6.3	315	110	0	3	0	0	165
6A7	Osc-Mod. & AVC	6.3	315	110	0	-3	0	-5 to -15	—
6B7	I-F Amp. & Detector	6.3	315	110	0	-3	0	—	—
76	A-F Amplifier	6.3	35	—	—	-3	0	—	—
42	Output	6.3	300	245	0	-16	0	—	—
80	Rectifier	5.0	320	—	—	—	—	—	—

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. Readings may vary plus or minus 10% of values given. Filament readings are taken with a low range A.C. voltmeter.

Measured on 117.5 Volt Line—60 Cycles A.C.

Power Consumption Approximately 60 Watts

MODEL 715, Corsair
Chassis, Parts

CROSLLEY RADIO CORP.

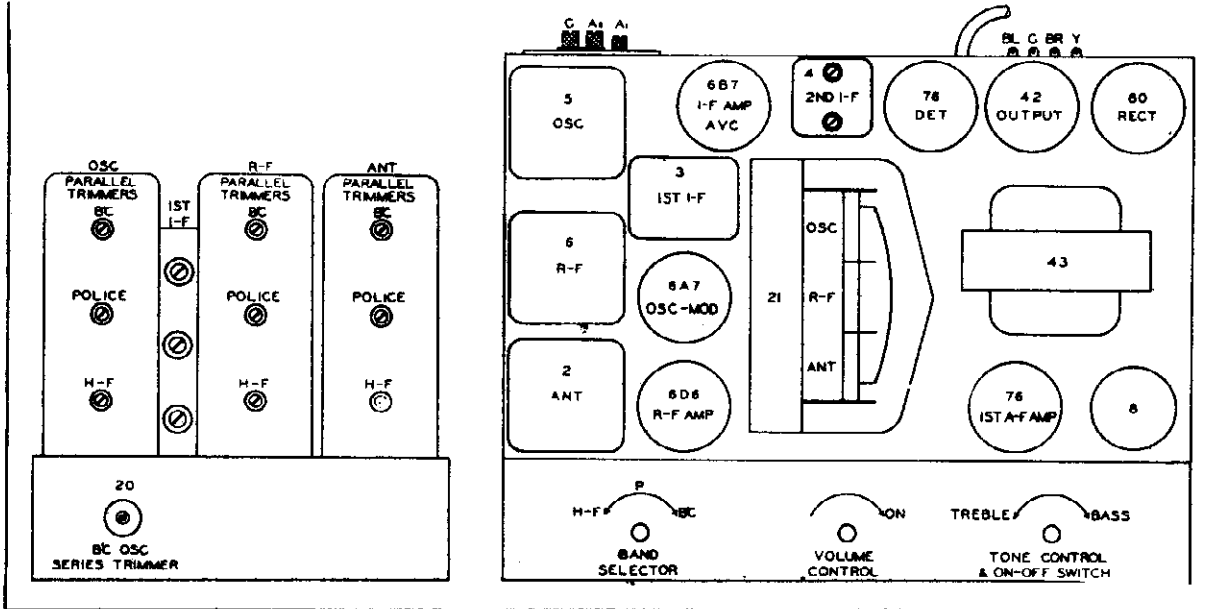


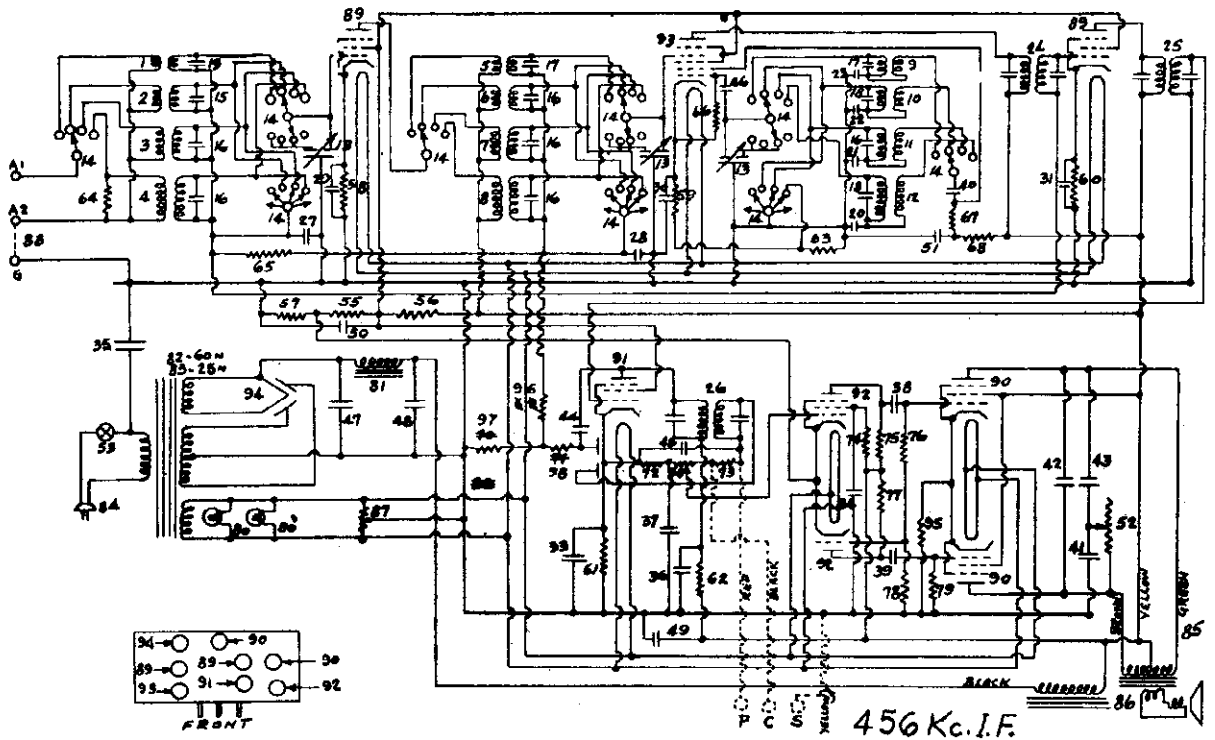
Fig. 2. Side And Top Views 715

Figures in first column refer to parts shown in diagrams.

Item No.	Part No.	Description	Item No.	Part No.	Description
1A	G4-27134	Dial Light Bracket Assembly.	23	--22831	Resistor, 15,000 Ohms.
1B	G4-27134	Dial Light Bracket Assembly.	24	--22196	Resistor, 20,000 Ohms.
2	G50-32000	Ant. Coil Assembly complete.	25	W-21875	Resistor, 100,000 Ohms.
	G44-32000	Ant. Coil Broadcast Band.	26A	--23403	Resistor, 150,000 Ohms.
	G45-32000	Ant. Coil Police Band.	26B	--23403	Resistor, 150,000 Ohms.
	G46-32000	Ant. Coil S. W. Band.	26C	--23403	Resistor, 150,000 Ohms.
	W-36032	Trimmer Condenser.	27	--21455	Resistor, 300,000 Ohms.
	G6-36031	Support Base Assembly.	28A	--23785	Resistor, 500,000 Ohms.
	G4-36031	Coil Shield Assembly.	28B	--23785	Resistor, 500,000 Ohms.
3	G47-32004	1st. I. F. Trans. Assembly.	29A	--21454	Resistor, 1 Megohm.
4	G46-32004	2nd. I. F. Trans. Assembly.	29B	--21454	Resistor, 1 Megohm.
5	G42-32002	Osc. Coil Assembly complete.	30	--26577	Resistor, 3 Megohm.
	G36-30202	Osc. Coil B. C. Band.	31Z	W-35963	Resistor, 8,500 Ohm.
	G37-32002	Osc. Coil Police Band.	31Y		Resistor, 25,000 Ohm.
	G38-32002	Osc. Coil S. W. Band.	32	G6-28807	Socket, 80.
	W-36032	Trimmer Condenser.	33A	G80-28807	Socket, 76.
	G7-36031	Support Base Assembly.	33B	G80-28807	Socket, 76.
	G5-36031	Coil Shield Assembly.	34	G75-28807	Socket, 6D6.
6	G29-32001	R. F. Coil Assembly complete.	W-35774		Tube Shield Base.
	G23-32001	R. F. Coil B. C. Band.	W-35772		Tube Shield Half.
	G24-32001	R. F. Coil Police Band.	W-35773		Tube Shield Cap.
	G25-32001	R. F. Coil S. W. Band.	35	G25-28807	Socket, 42.
	W-36032	Trimmer Condenser.	36	G47-28807	Socket, 6A7.
	G6-36031	Support Base Assembly.	W-35774		Tube Shield Base.
	G4-36031	Coil Shield Assembly.	W-35772		Tube Shield Half.
7Z	W-36056	Condenser, 8 Mfd. 450 Volt.	W-35773		Tube Shield Cap.
7Y		Condenser, 4 Mfd. 350 Volt.	37	G48-28807	Socket, 6B7.
7X		Condenser, 4 Mfd. 250 Volt.	W-35774		Tube Shield Base.
8	W-36055	Condenser, 35 Mfd. 450 Volt.	W-35772		Tube Shield Half.
9	G7-34000	Condenser, 0.00145 Mfd.	W-35773		Tube Shield Cap.
10	G12-34000	Condenser, 0.004725 Mfd.	38	318-BL-18	Speaker.
11	W-30806	Condenser, 0.01 Mfd., 400 Volt.	39	518-CL-22	Speaker.
12A	G2-34002	Condenser, 100 Mmf.	UtoZ	--36058B	Band Change Switch
12B	G2-34002	Condenser, 100 Mmf.	40	G27-26719	Ant.-Grd. Terminal.
12C	G2-34002	Condenser, 100 Mmf.	41	G5-31128	Speaker Terminal.
13Z	W-25537A	Condenser, 0.001 Mfd., 400 Volt.	W-34627		Terminal Board Insulator.
13Y		Condenser, 0.03 Mfd., 400 Volt.	W-34628		Terminal Board Cover.
14Z	W-31052	Condenser, 0.004 Mfd., 400 Volt.	42Z	--36062	Tone Control.
14Y		Condenser, 0.05 Mfd., 400 Volt.	42Y		On-Off Switch.
15	W-32378	Condenser, 0.01 Mfd., 400 Volt.	43	G6-30745	Power Transformer, 60 Cy., 110 V.
16	W-23191A	Condenser, 0.01 Mfd., 400 Volt.	G7-30745		Power Transformer, 25 Cy., 110 V.
17A	W-32379	Condenser, 0.02 Mfd., 200 Volt.	G8-30745		Power Transformer, 25 Cy., 220 V.
17B	W-32379	Condenser, 0.02 Mfd., 200 Volt.	--36060		Volume Control.
18	See 19B		44	See 12C	
19A	W-30321	Condenser, 1.0 Mfd., 160 Volt.	45	--21876	Resistor, 10,000 Ohms.
19B	W-30321	Condenser, 1.0 Mfd., 160 Volt.	W-34678B		Knob, Band Change.
20	G10-33005	Trimmer Condenser, 5 plate.	W-31585B		Knob, Controls.
21Z			B-33528C		Escutcheon.
21Y	G33-33002	Var. Tuning Condenser, 3 Gang.	W-33984		Escutcheon Gasket.
21X			W-36312		Band Change Switch Plate.
MG21	--36045	Dial Drive Assembly.	W-36309		Band Change Indicator, Celluloid.
	W-37198	Dial Pointer only.	W-36313		Tone Control Plate.
	W-32293	Dial Pointer Nut (2 used).	--35922		Grille Cloth, 5N Cabinet.
	C-36088	Dial Indicator Plate.	--35863		Grille Cloth, 5D Cabinet.
	B-30375A	Cord and Plug.			
22					

CROSLEY RADIO CORP.

MODEL 814
Schematic, Socket
Parts



Parts List Model 814

Figures in first column correspond to figures in diagram

1	G30	32000	Ant. Coil (10.0-22.0 Mc)	51	W	32258	8 Mfd. 300 Volt
2	G29	32000	Ant. Coil (4.0-10.0 Mc)	52	W	32063	{ Tone Control
3	G4	32000	Ant. Coil (1.5-4.0 Mc)	53	W	33378	{ Switch
4	G3	32000	Ant. Coil (Broadcast)	54	W	32301	Level Control
5	G16	32001	Inter. Coil (10.0-22.0 Mc)	55	W	30127	{ 15,000 Ohms
6	G15	32001	Inter. Coil (4.0-10.0 Mc)	56	W	25937	{ 10,000 Ohms
7	G8	32001	Inter. Coil (1.5-4.0 Mc)	57	W	27503	{ 450 Ohms Flex.
8	G2	32001	Inter. Coil (Broadcast)	58	W	27503	{ 275 Ohms Flex.
9	G23	32002	Osc. Coil (10.0-22.0 Mc)	59	W	27503	{ 1,400 Ohms Flex.
10	G22	32002	Osc. Coil (4.0-10.0 Mc)	60	W	30127	{ 1,400 Ohms Flex.
11	G3	32002	Osc. Coil (1.5-4.0 Mc)	61	W	22514	{ 750 Ohms Flex.
12	G17	32002	Osc. Coil (Broadcast)	62	W	29585	{ 600 Ohms Flex.
13	G24	33002	Variable Condenser	63	W	31094	{ 4,500 Ohms
14	B	34083-A	Band Change Switch	64	W	21455	{ 300,000 Ohms
15	G17	33009	Padding Condenser	65	W	21875	{ 100,000 Ohms
16	G7	33009	Padding Condenser	66	W	24814	{ 7,000 Ohms
17	G6	33009	Padding Condenser	67	W	24814	{ 7,000 Ohms
18	G5	33009	Padding Condenser	68	W		
19	G17	33006	Padding Condenser	69	W		
20	G16	33006	Trimmer Condenser	70	W		
21	G2	34000	{ Trimmer Condenser	71	W		
22	G2	34000	{ 3104 Mmfd.	72	W	21876	{ 10,000 Ohms
23	G1	34000	{ 1647 Mmfd.	73	W	23785	{ 500,000 Ohms
24	G25	32004	1st I. F. Transformer	74	W	23785	{ 500,000 Ohms
25	G23	32004	2nd I. F. Transformer	75	W	21237-A	{ 60,000 Ohms
26	G24	32004	3rd I. F. Transformer	76	W	23785	{ 500,000 Ohms
27	W	32379	0.02 Mfd. 200 Volt	77	W	23403	{ 150,000 Ohms
28	W	32379	0.02 Mfd. 200 Volt	78	W	21237-A	{ 60,000 Ohms
29	W	28621	0.02 Mfd. 200 Volt	79	W	23785	{ 500,000 Ohms
30	W	28621	0.02 Mfd. 200 Volt	80	W	4099-A	{ 6.3 V. Dial Lamp
31	W	28621	0.02 Mfd. 200 Volt	81	G1	24628	{ Filter Choke
32	W	28621	0.02 Mfd. 200 Volt	82	G37	25669	{ 60 Cy. Power Trans.
33	W	28621	0.02 Mfd. 200 Volt	83	G38	25669	{ 25 Cy. Power Trans.
34	W	23142	0.02 Mfd. 400 Volt	84	B	33906-A	{ Cord & Plug
35	W	30805	0.01 Mfd. 400 Volt	85	W	31007-A	{ Speaker Cable
36	W	23191-A	0.01 Mfd. 400 Volt	86	W	68C	{ Speaker
37	W	30321	1.0 Mfd. 160 Volt	87	W	32337	{ 10 Ohms-10 Ohms
38	W	23615	0.05 Mfd. 400 Volt	88	G14	26719	{ Ant.-Gnd. Term.
39	W	23615	0.05 Mfd. 400 Volt	89	G75	27975	{ 6D6 Socket
40	W	23635	0.006 Mfd. 400 Volt	90	G25	27975	{ 42 Socket
41	W	30270	0.001 Mfd. 400 Volt	91	G48	27975	{ 6B7 Socket
42	W	31052	{ 0.004 Mfd. 400 Volt	92	G49	27975	{ 6F7 Socket
43	W	32741-A	{ 0.0005 Mfd.	93	G2	33070	{ 6A7 Socket
44	W	31937	0.0001 Mfd.	94	G6	27975	{ 80 Socket
45	W	30741	0.00025 Mfd.	95	W	22873	{ 220 Ohms
46	W	30741	12 Mfd. 475 Volt	96	W	26577	{ 3 Megohm
47	W	26194-B	{ 8 Mfd. 450 Volt	97	W	23785	{ 500,000 Ohms
48	W	29097-D	{ 8 Mfd. 450 Volt	98	W	23785	{ 500,000 Ohms
49	W		{ 8 Mfd. 250 Volt				
50	W						

CROSLLEY RADIO CORP.

MODEL 1014, Centurion
Chassis, Trimmers
Voltage, Data

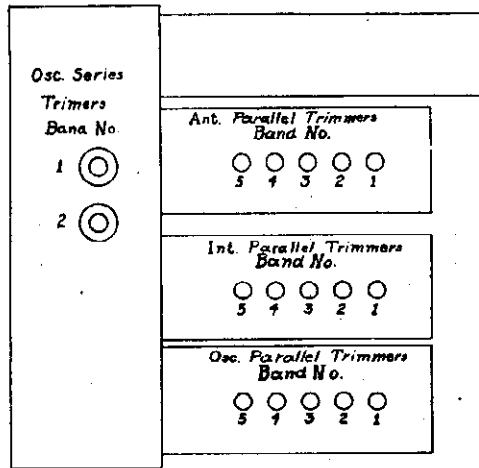


Fig. 3 End View

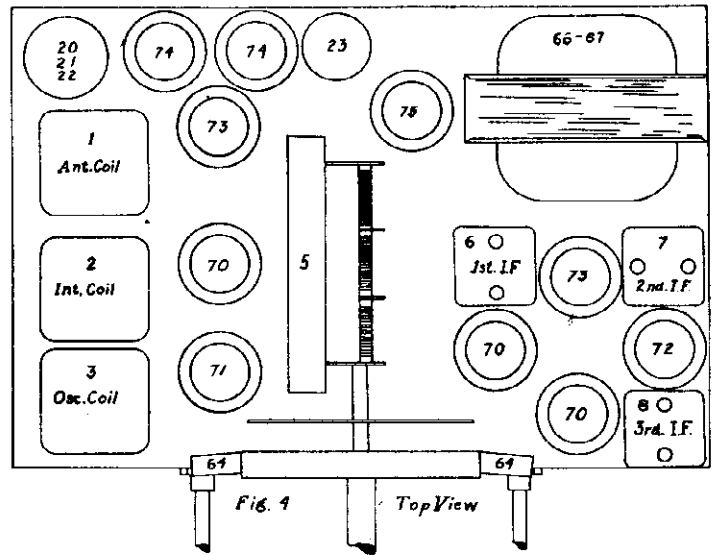


Fig. 4 Top View

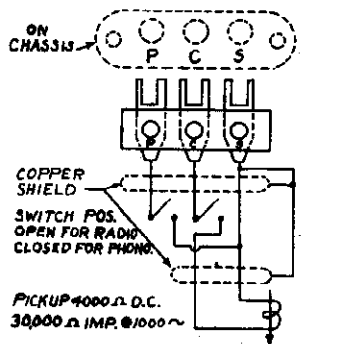


Fig. 5 Phone Connections

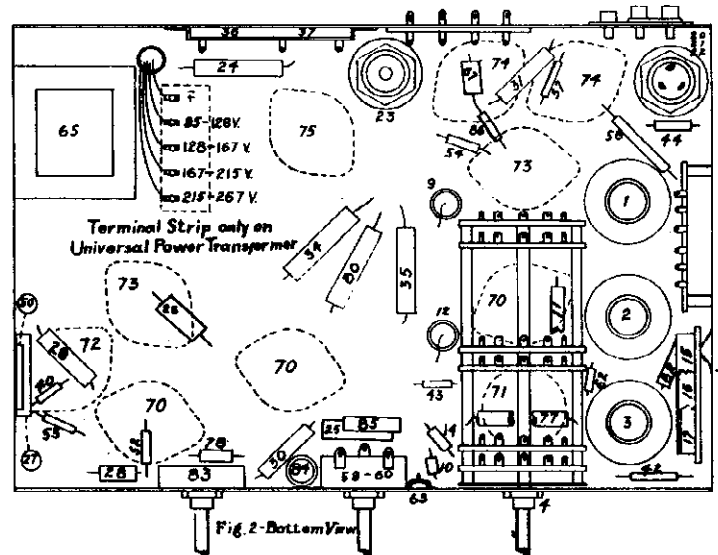


Fig. 2 Bottom View

TUBES AND VOLTAGE LIMITS

The following are the tubes and voltages measured from the tube contact to chassis with a 500,000 ohm 500-Volt voltmeter with receiver in operating condition but with no signal to the antenna, and with a line voltage of 117.5 volts 60 cycle. Voltage limits are plus or minus 10% of values given.

TUBE VOLTAGES—MODEL 1014 "CENTURION"									
Type	Where Used	Ef	Ek	Eg	Esg	Esup.	Ep	Esl	Ep1
			Bands 1-3	Bands 3-4-5					
6D6	R. F. Amp.	6.3	0	0	x	100	0	250	—
6A7	Osc. Mod.	6.3	11.0	0	x	100	0	250	—
6D6	1st I. F.	6.3	0	0	x	100	0	250	—
6E7	2nd I. F. & Det.	6.3	0	0	x	75	—	240	0
76	A. V. C.	6.3	0	0	x	—	—	x	—
6D6	1st A. F. Amp.	6.3	4	4	0	40	40	40	—
76	Phase Inv.	6.3	4	4	0	—	—	50	—
(2) 42	Output	6.3	16	16	0	250	—	245	—
80	Rect.	5.0	—	—	—	—	—	—	—

VOLTAGE DROP ACROSS FILTER CHOKE 20 VOLTS
VOLTAGE DROP ACROSS FIELD COIL 65 VOLTS

x IN ABOVE TABLE INDICATES HIGH RESISTANCE IN CIRCUIT WHICH PREVENTS ACCURATE MEASUREMENT.

ALL Measurements Made With A 1000 Ohms Per Volt Voltmeter From Chassis

(The power consumption at 117.5 volts is approximately 95 watts.)

MODEL 1014, Centurion Alignment, Data

CROSLLEY RADIO CORP.

MODEL 1014 "CENTURION"

SPECIFICATIONS

The Crosley Model 1014 is a ten tube superheterodyne all wave receiver designed for A.C. operation. It may be obtained for 110 volts, 60 cycles, or with a universal transformer for other voltages and frequencies. (See Universal Power Transformer). It is designed for five band operation covering the following frequencies:

- Band 1. 150-350 Kilocycles.
- Band 2. 540-1500 Kilocycles.
- Band 3. 1500-4000 Kilocycles.
- Band 4. 4000-10000 Kilocycles.
- Band 5. 10000-22000 Kilocycles.

Bands 1 and 2 are calibrated on the dial in Myriacycles (10 Kc.). Bands 3, 4 and 5 are calibrated in Megacycles (1000 Kc.). It employs a retroactive automatic volume control together with level control, continuously variable tone control, class "A" audio amplification and band spread dial pointer, 36 to 1 ratio.

CIRCUIT DESCRIPTION

The circuit consists of one stage of R.F. amplification, an oscillator-detector, two stages of I.F. amplification, automatic volume control, second detector, two stages of A.F. amplification and power supply. The R.F. stage employs a Type 6D6 tube. A Type 6A7 tube is used as an oscillator-detector. The first I.F. stage employs a Type 6D6 tube and the second stage uses a Type 6F7 tube which also serves as a second detector. A Type 76 tube is used in the A.V.C. circuit and is actuated by the output of the first I.F. stage. The first A.F. stage uses a Type 6D6 tube, connected as a variable mu triode, which is used in conjunction with a Type 76 tube in a phase inverter circuit to drive a pair of Type 42 tubes in push-pull. A Type 80 Tube is used in the power supply.

UNIVERSAL POWER TRANSFORMER

The Model 1014 chassis for use on other than 110 volts, 60 cycles, is supplied with a universal power transformer designed to operate on 25 cycles and up. When leaving the factory it is wired for the voltage indicated on the name plate. It is possible however by a slight wiring change in power transformer circuit to adapt the set to a different voltage anywhere from 95 to 265 volts. To adapt the set to a different line voltage it is necessary to remove the chassis from the cabinet, remove bottom from chassis and locate the terminal strip on the bottom of the power transformer. Fig. 2. After careful measurement of the maximum and minimum values of line voltage and determining the average value, unsolder the wire of the A.C. line cord and solder it to the terminal which most nearly represents the line voltage at which the set is to be operated.

PHONOGRAPH PICKUP

Chassis 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. 5.

PEAKING PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and will not need readjustment unless some coil or condenser has been replaced. Do not change the setting of any trimmer condenser unless it is definitely known that the adjustment is necessary. If re-alignment is found necessary, the circuits can be properly adjusted only with the use of a modulated test oscillator and output meter.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate of one of the Type 42 tubes and the other terminal to the plate of the other Type 42 tube. Looking at the bottom of the tube with the filament prongs toward you the plate prong will be the first to the left of the filament prongs. Be sure 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.

PEAKING I. F. STAGES AT 456 Kc.

- I. Connect the ground lead of the test oscillator to the chassis frame. Connect a .1 mfd., or larger, condenser in series with the other lead and connect this lead to the grid cap of the 6A7 tube, leaving the tube's grid clip in place. The .1 mfd. condenser is necessary to prevent a short circuit which would remove the bias voltage.
- II. Set the test oscillator at 456 kilocycles.
- III. Turn the volume control of the receiver on full. Turn the station selector until the tuning condenser plates are completely meshed and set the band switch to band No. 5.

- IV. (a) Peak both tuning condensers located on top of the first I.F. transformer shown on Fig. 4. NOTE: Be sure to use the lowest oscillator output that will give a reasonable scale deflection on the output meter. 30 to 90 volts output is satisfactory.
- (b) Peak both tuning condensers located on top of the 2nd I. F. transformer shown on Fig. 4.
- (c) Peak both tuning condensers located on top of the 3rd. I.F. transformer shown on Fig. 4.
- V. Repeat IV to insure accurate adjustment of the I.F. tuning condensers.

PEAKING R. F. CIRCUITS

- I. Connecting test oscillator to receiver: It is necessary to connect a dummy antenna in series with the test oscillator and the antenna terminal of the receiver. On bands 1 and 2 this consists of a .0002 mfd. mica condenser. On bands 3, 4 and 5 it consists of a carbon resistor of approximately 400 ohms. With the tuning condenser plates completely meshed make certain that the dial pointer is exactly horizontal. If not, loosen nut and set pointer horizontal and tighten nut again. The setting of the band spread pointer is not important.
- II. To Peak Band No. 1. NOTE: Be sure to use the lowest oscillator output that will give a reasonable scale deflection on the output meter. 30 to 90 volts output is satisfactory.

(a) Set test oscillator at 350 Kc. Tune station selector to 350 Kc. (35 on dial). Then adjust oscillator parallel trimmer condenser, Fig. 3, for maximum output.

(b) With same dial settings peak the interstage and antenna parallel trimmer condenser for Band No. 1.

(c) (1) Set test oscillator at 150 Kc.

(2) Tune station selector in the region of IS—Band No. 1—on dial for maximum reading on the output meter.

(3) Close the oscillator series trimmer condenser for Band No. 1, Fig. 3, $\frac{1}{8}$ turn and re-tune station selector to 150 Kc. signal for maximum output, noting reading on output meter.

(4) If meter reads higher after operation (3) repeat the operation again and again until no further improvement in the reading of the output meter can be obtained. If meter reads lower after operation (3) open the oscillator series trimmer condenser $\frac{1}{8}$ turn and re-tune station selector to 150 Kc. signal, noting reading on output meter as above and repeat as many times as necessary to obtain the highest meter reading. Do not reset the parallel trimmer condensers at this frequency.

(d) Repeat operations (a) and (b) for more accurate adjustments.

III. To Peak Band No. 2.

(a) Set test oscillator at 1400 Kc. Tune station selector to 1400 Kc. (140 on dial). Then adjust oscillator parallel trimmer condenser for Band No. 2 for maximum output.

(b) With same dial settings peak the interstage and antenna parallel trimmer condensers for Band No. 2.

(c) (1) Set test oscillator at 600 Kc.

(2) Tune station selector in the region of 60—Band No. 2—on dial for maximum reading on the output meter.

(3) Close the oscillator series trimmer condenser for Band No. 2, Fig. 3, $\frac{1}{8}$ turn and re-tune station selector to 600 Kc. signal for maximum output, noting reading on output meter.

(4) If meter reads higher after operation (3) repeat the operation again and again until no further improvement in the reading of the output meter can be obtained. If meter reads lower after operation (3) open the oscillator series trimmer condenser $\frac{1}{8}$ turn and re-tune station selector to 600 Kc. signal, noting reading on output meter as above and repeat as many times as necessary to obtain the highest meter reading. Do not reset the parallel trimmer condensers at this frequency.

(d) Repeat operations (a) and (b) for more accurate adjustments.

IV. To Peak Band No. 3.

(a) Be sure to change dummy antenna as described in I under Peaking R.F. Circuits.

(b) Set test oscillator at 4 megacycles. Tune the station selector to 4 megacycles (4.0—Band No. 3 on dial). Then adjust oscillator parallel trimmer condenser for Band No. 3 for maximum output.

(c) With the same dial settings peak the interstage and antenna parallel trimmer condensers for Band No. 3.

V. To Peak Band No. 4.

(a) Set test oscillator at 10 megacycles.

(b) Tune station selector to 10 megacycles (10—Band No. 4 on dial).

(c) Open oscillator parallel trimmer condenser for Band No. 4 about 3 turns from closed.

(d) Close the interstage parallel trimmer condenser for Band No. 4 and open $\frac{1}{8}$ turn.

(e) Close the antenna parallel trimmer condenser for Band No. 4 and then open $\frac{1}{2}$ turn.

(f) Peak the oscillator parallel trimmer condenser on the first signal heard when closing the condenser. As a check on the adjustment set the station selector to approximately 9 on the dial and try to tune in the 10 megacycle signal from the test oscillator. If a signal is heard the oscillator has been aligned on the correct frequency.

(g) Re-tune to 10 megacycles and peak the antenna parallel trimmer condenser for maximum output.

(h) Open the interstage parallel trimmer condenser another $\frac{1}{8}$ turn and re-tune the station selector to the 10 megacycle signal.

(i) Repeat operation (b) as many times as necessary to obtain the highest reading on the output meter on first peak obtained when opening trimmer condenser from closed position.

(j) Repeat operation (g) above.

VI. To Peak Band No. 5.

(a) Set test oscillator at 21 megacycles.

(b) Tune station selector to 21 megacycles (21—Band No. 5 on dial).

(c) Open oscillator parallel trimmer condenser for Band No. 5 about 3 turns from closed.

(d) Close the interstage parallel trimmer condenser for Band No. 5 and open $\frac{1}{8}$ turn.

(e) Close the antenna parallel trimmer condenser for Band No. 5 and then open $\frac{1}{4}$ turn.

(f) Peak the oscillator parallel trimmer condenser on the first signal heard when closing the condenser. As a check on the adjustment set the station selector to approximately 20 on the dial and try to tune in the 21 megacycle signal from the test oscillator. If a signal is heard the oscillator has been aligned on the correct frequency.

(g) Re-tune to 21 megacycles and Peak the antenna parallel trimmer condenser for maximum output.

(h) Open the interstage parallel trimmer condenser another $\frac{1}{8}$ turn and re-tune the station selector to the 21 megacycle signal.

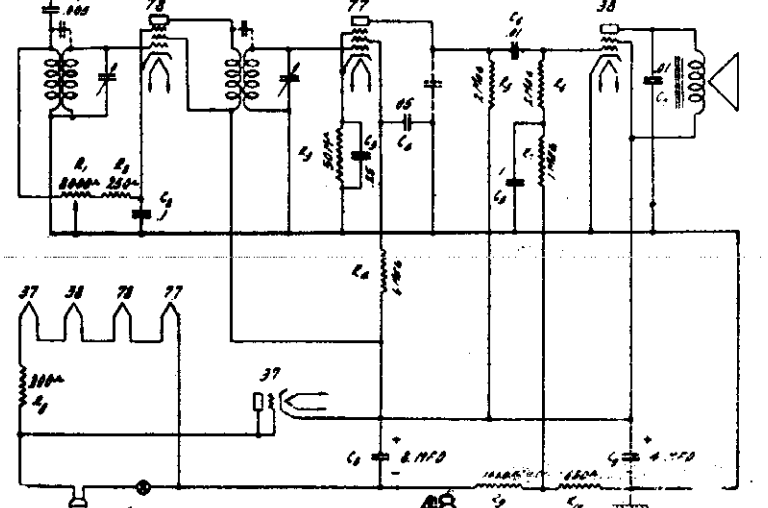
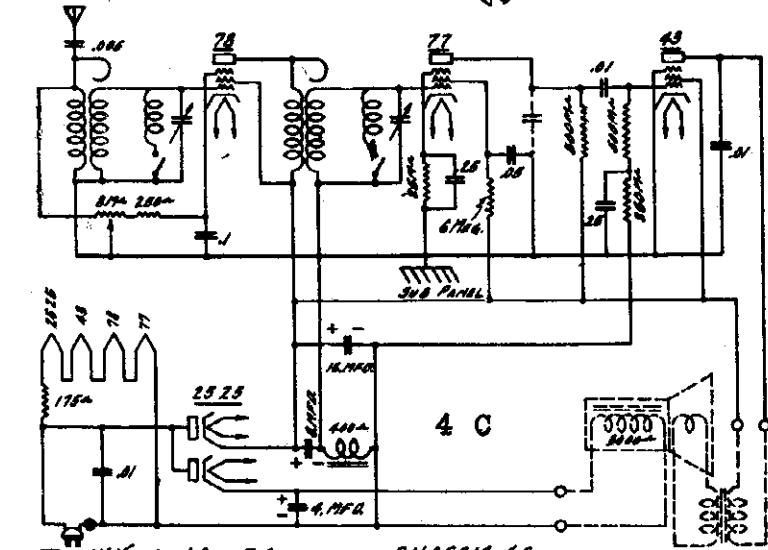
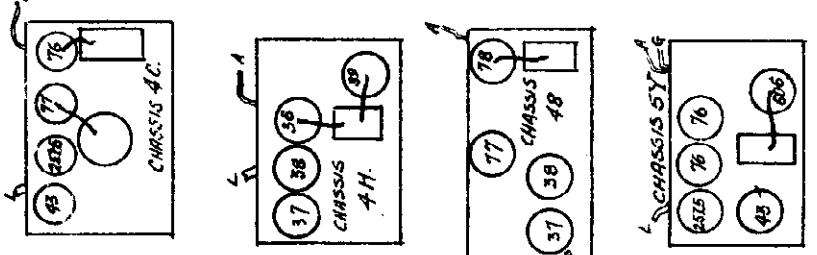
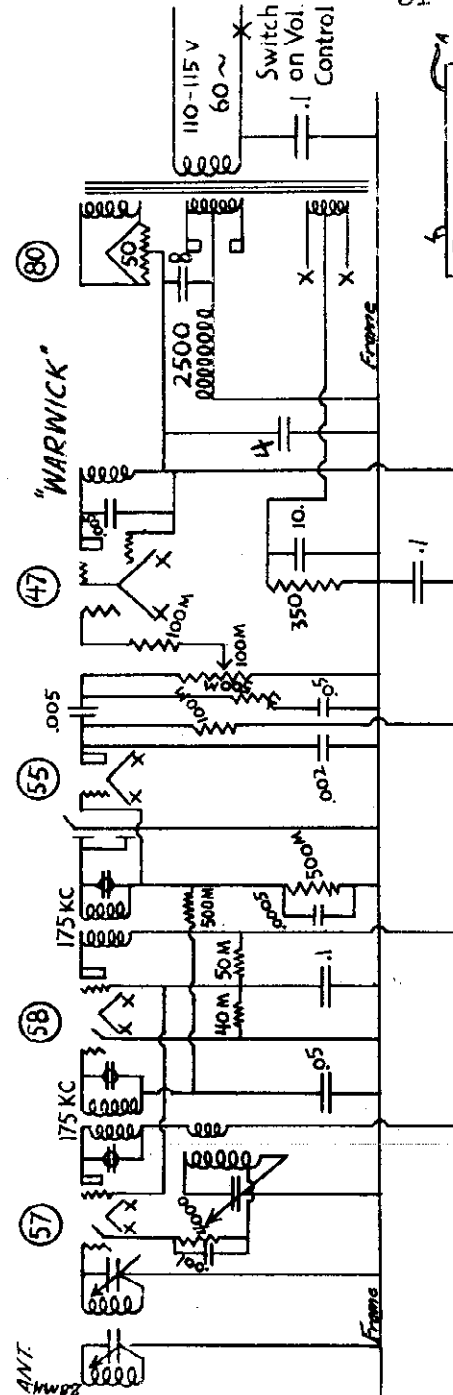
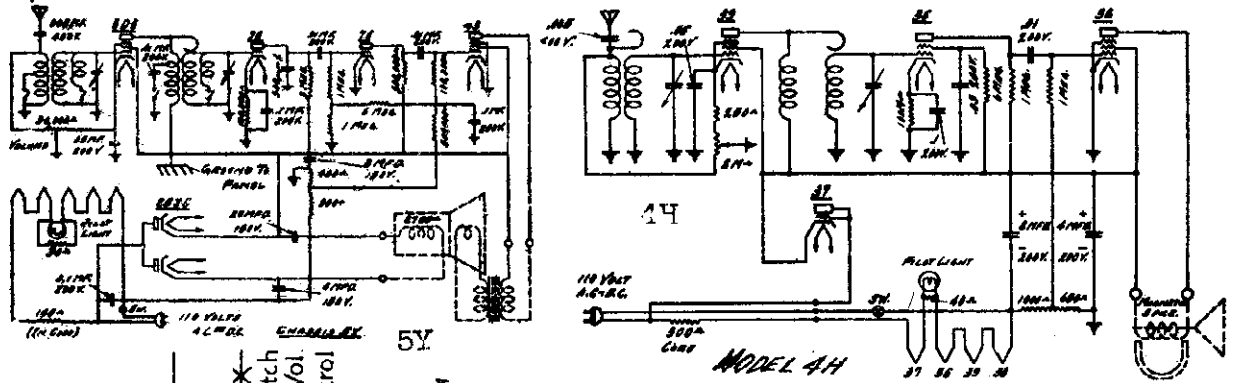
(i) Repeat operation (b) as many times as necessary to obtain the highest reading on the output meter on first peak obtained when opening trimmer condenser from closed position.

(j) Repeat operation (g) above.

MODEL 5Y
MODEL 48
MODEL Warwick

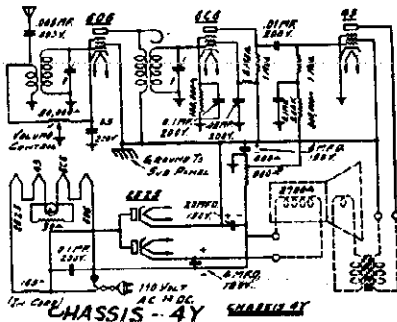
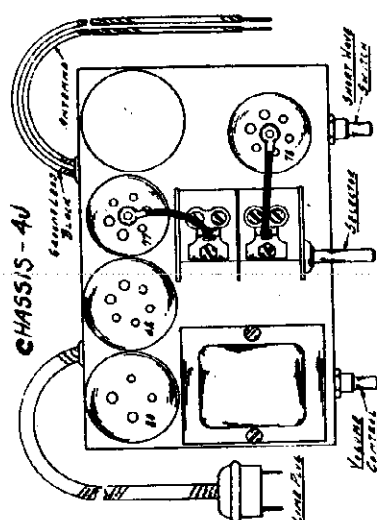
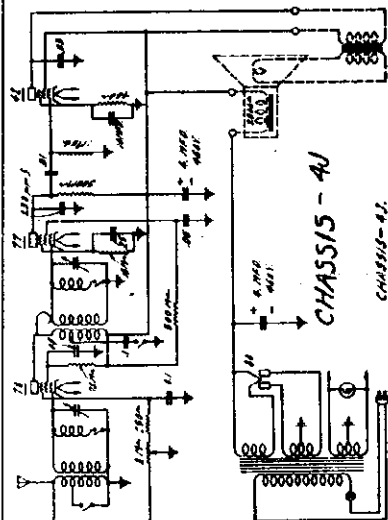
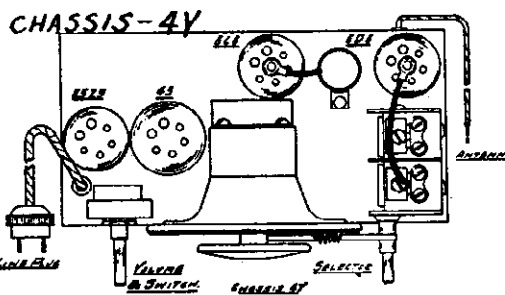
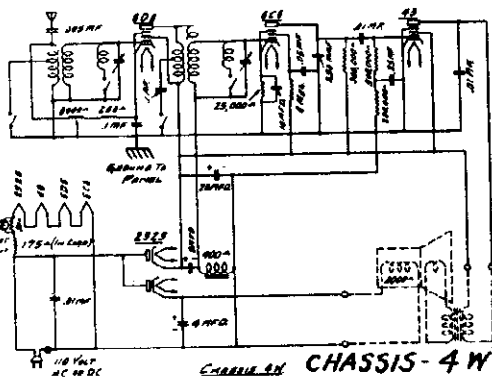
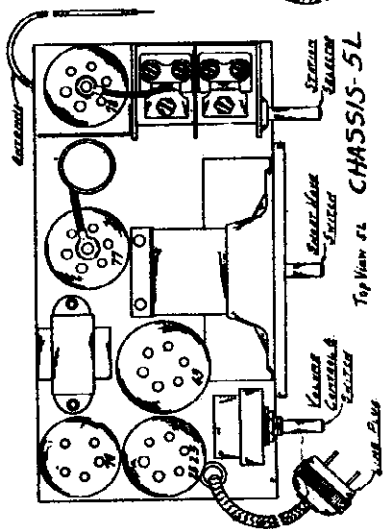
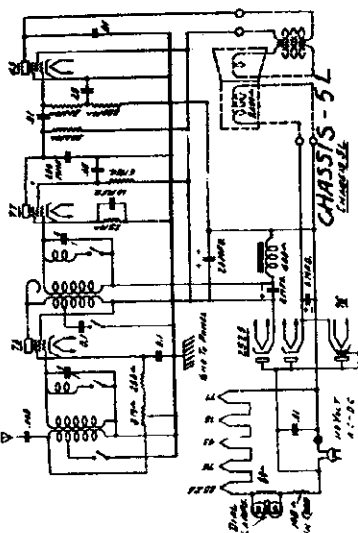
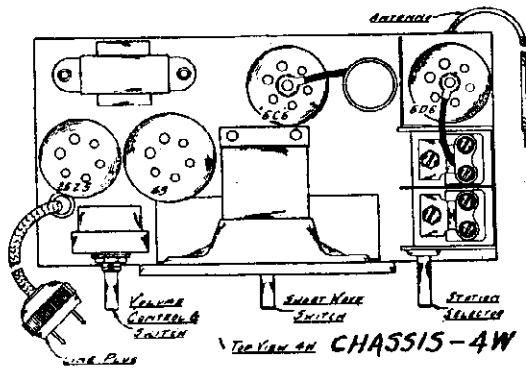
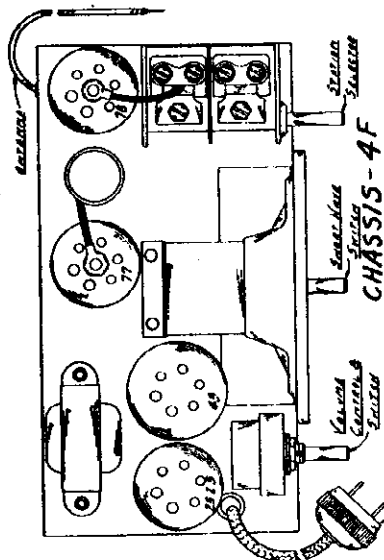
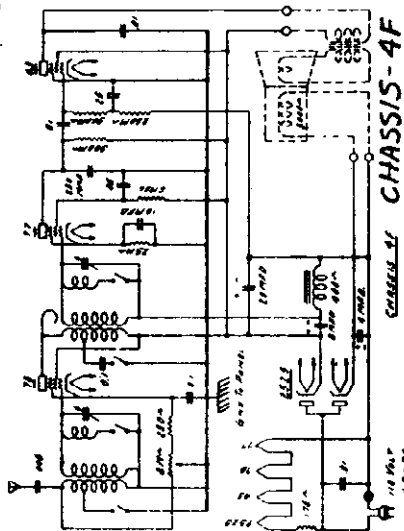
DETROLA RADIO CORP.

MODEL 4C
MODEL 4H
Schematics, Socket



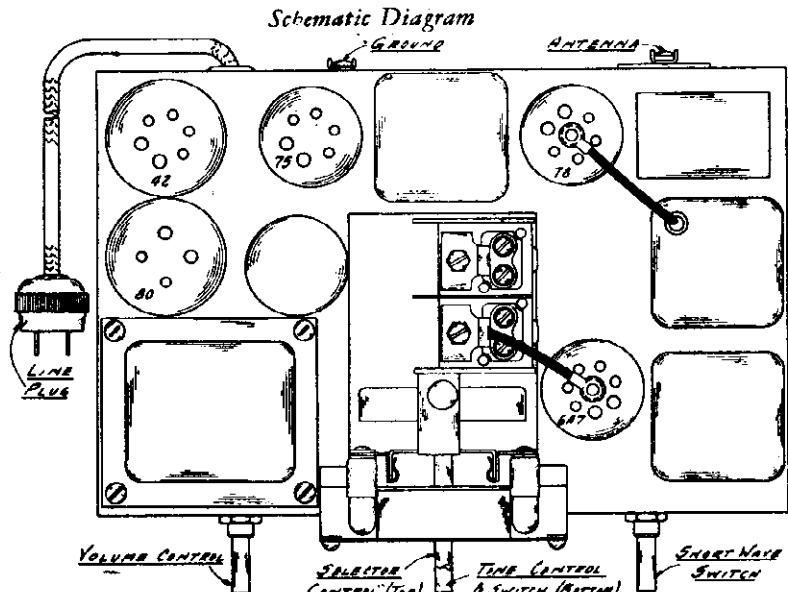
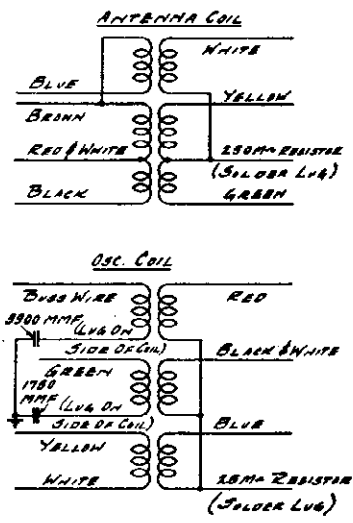
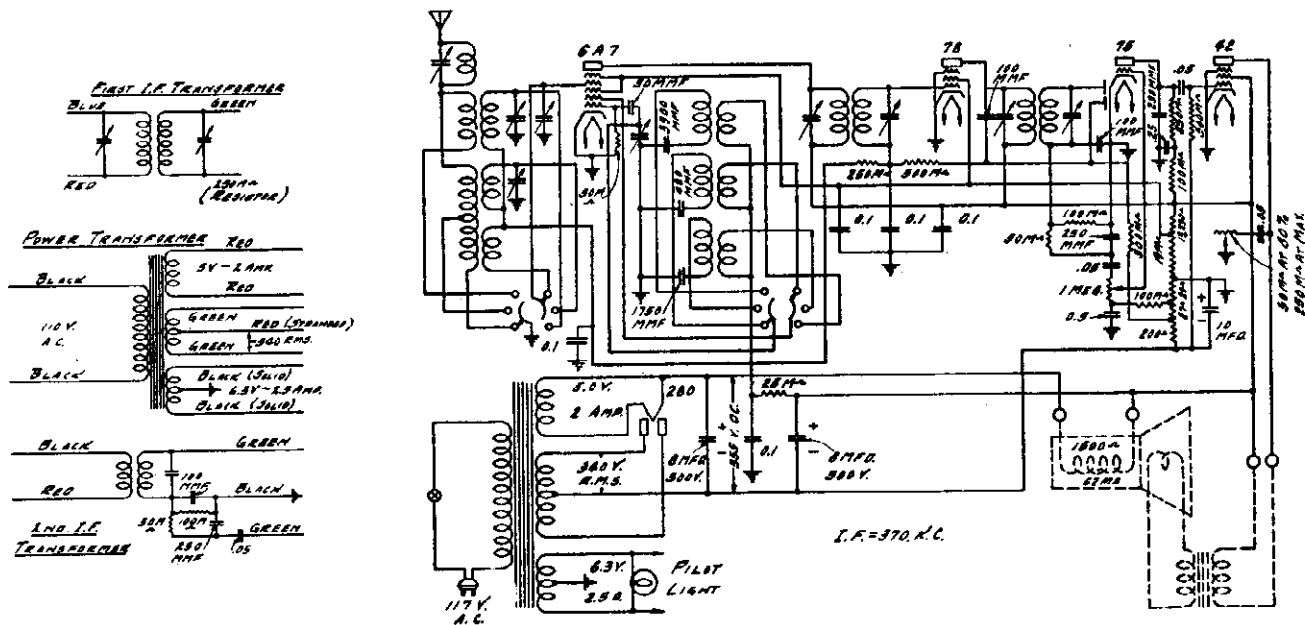
DETROLA RADIO CORP.

MODEL 4F
 MODEL 4J
 MODEL 4W
 MODEL 4Y
 MODEL 5L
 Schematic, Socket



DETROLA RADIO CORP.

MODEL 5B
Schematic, Voltage
Socket, Data



TUBE SOCKET VOLTAGES

Tube No.	Control Grid- to Cathode	Screen to Cathode	Plate to Cathode	Plate M. A.	Tube Socket Voltages Heater or Filament Voltage
6A7 1st Det.	* 3	100	250	4	6.3
OSC.	* 4	...	90	4	...
78-I. F.	* 3	100	250	7	6.3
75-2nd Det. A. V. C.	** 1.5	...	75	.8	6.3
42-Audio	***16	250	235	34	6.3
80-Rect.	....	...	...	29 per plate	5.0

All voltage readings taken with 1000 ohm per volt voltmeter using test leads.
 *10 volt scale, voltage from ground to terminal on candohm with 500M on resistor.
 **10 volt scale, voltage readings from ground to terminal on candohm with single black wire.
 ***250 volt scale, voltage readings from ground to terminal on candohm connected to filter condenser.

MODEL 5B
Alignment
Parts List

SERVICE NOTES

for

Detrola 5-B All Wave Receiver

The Detrola 5-B is a five-tube, three-band, all-wave, superheterodyne receiver designed for the reception of frequencies from 540 to 16000 KC. The broadcast band covers frequencies from 540 to 1700 KC; the Police band covers frequencies from 1.6 to 5.5 MC and the Foreign band covers frequencies from 5.4 to 16 MC.

The 5-B employs the following tubes, used in their respective circuits: 1 type 6A7 first detector and oscillator; 1 type 78 intermediate amplifier; 1 type 75 delayed AVC, second detector and first audio; 1 type 42 final audio stage; 1 type 80 double wave rectifier.

RF and IF ALIGNMENT

The RF and IF circuits of the 5-B are properly aligned and tested and should need no further adjustment. Should it become necessary, however, to check the adjustment the following equipment will be necessary: 1 calibrated oscillator calibrated for all the frequencies used in this receiver, both IF and RF, and a sensitive output meter.

In order to prevent the AVC from operating and giving a false reading on the output meter the following procedure should be followed: The oscillator should be loosely coupled to the receiver so that only a small deflection will show on the output meter with the volume control of the receiver on the maximum position. This applies to both IF and RF adjustments.

IF ALIGNMENT—To align the intermediate transformer, adjust the test oscillator to 370 KC and couple to the control grid of the first detector and adjust the trimmer condensers on the intermediate transformers for the maximum reading on the output meter.

RF ALIGNMENT—To align the RF circuit: (1) Set pointer on tuning chart to 1400 KC with band switch in broadcast position. (2) Adjust oscillator to 1400 KC and connect to antennae terminal on chassis. (3) Adjust trimmer on tuning condenser for maximum reading. (4) Reset dial pointer and test oscillator to 600 KC and adjust 600 KC padding condenser for maximum reading moving tuning condenser back and forth slowly while making adjustment. (5) Reset dial pointer and oscillator to 1400 KC and readjust trimmer on tuning condenser for maximum reading.

SHORTWAVE ALIGNMENT—(1) Set dial pointer on 3.5 MC and band switch on center position. (2) Adjust oscillator to approximately 3.5 MC or for maximum reading on output meter. (3) Adjust 3.5 MC padding condenser for further increase on the output meter. (4) Set band switch on right hand position. (5) Set dial pointer to 15 MC. (6) Readjust test oscillator to approximately 15 MC or for maximum reading on output meter and adjust 15 MC padding condenser for further increase on output meter.

ADJUSTMENT OF WAVE TRAP

To adjust wave trap to prevent the reception of commercial code signals from stations operating on or about 370 KC, connect test oscillator to antennae terminal on chassis and set to 370 KC and adjust wave trap padding condenser for minimum signal on output meter.

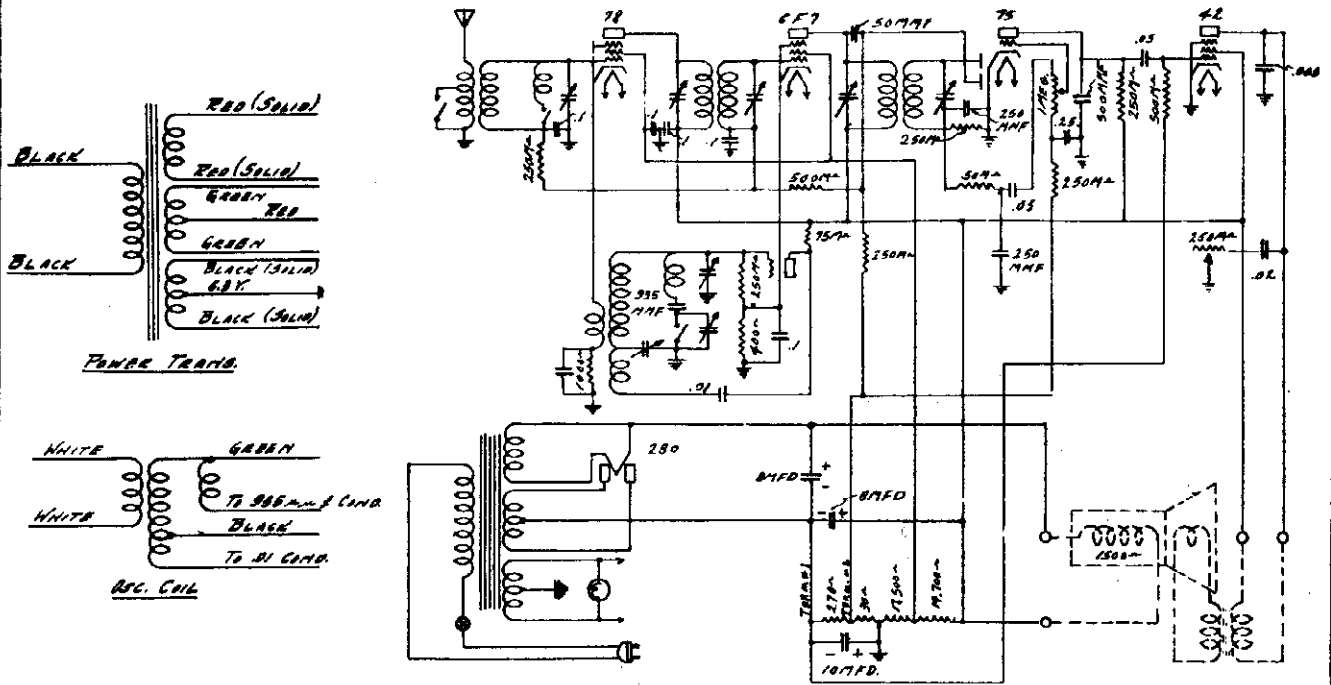
The high and low frequency padding condensers are mounted on the right hand end of the chassis in the following order from front to back: 3.5 MC, 15 MC, 600 KC, and wave trap.

RELACEMENT PARTS MODEL 5-B

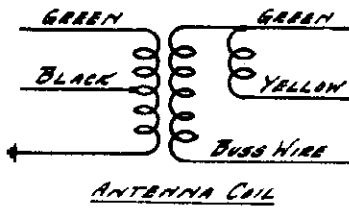
Part No.	DESCRIPTION	List Price	Part No.	DESCRIPTION	List Price
563	.05 mf—400 volt tubular condenser	\$0.15	1392	By-pass condenser block	1.30
572	.1 mf—200 volt tubular condenser	.15	1393	2 gang variable condenser	2.40
575	.1 mf—400 volt tubular condenser	.15	1396	Antenna coil can—natural finish	.20
578	Electrolytic condenser, 10 mfd, 30 volts	.65	1397	Oscillator coil can—natural finish	.20
589	50 mmf mica condenser, type "W"	.15	1398	Electrolytic condenser, 8-8 mfd, 450 volts	2.10
590	250 mmf mica condenser, type "W"	.15	1399	Power transformer	3.20
602	250,000 ohm carbon resistor, 1/2 watt	.15	1400	Candohm resistor	.60
603	100,000 ohm carbon resistor, 1/2 watt	.15	1401	All-wave switch	2.20
615	500,000 ohm carbon resistor, 1/2 watt	.15	1402	Single stage padder	.40
631	50,000 ohm carbon resistor, 1/2 watt	.15	1404	7 prong socket No. 6A7	.10
934	Attachment cord—6 feet	.30	1410	Dial chart	.40
936	4 prong socket No. 80	.10	1412	1750 mmf mica condenser, type "W"	.30
937	6 prong socket No. 42	.10	1413	3900 mmf mica condenser, type "W"	.40
939	6 prong socket No. 78	.10	1414	25,000 ohm carbon resistor, 1 watt	.15
1028	6 prong socket No. 75	.10	1415	6" speaker	6.30
1083	Tone control with A. C. switch, 250,000 ohms	1.00	1423	Knobs	.10
1084	Volume control, 1 megohm	.70	1427	Cabinet	5.40
1096	Tube shield (aluminum), natural finish	.15	1441	Oscillator coil	1.00
1097	Tube shield cap (aluminum)	.15	1442	Antenna coil	1.00
1098	Tube shield base (aluminum)	.10	1443	Wave trap	.90
1107	550 mmf mica condenser, type "W"	.20	1444	1st IF transformer	1.60
1199	Pointer	.10	1445	2nd IF transformer	2.40
1274	Escutcheon plate	.40			

DETROLA RADIO CORP.

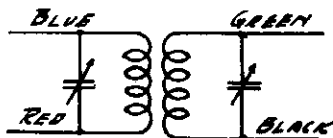
MODEL 5D
Schematic, Voltage
Socket, Data



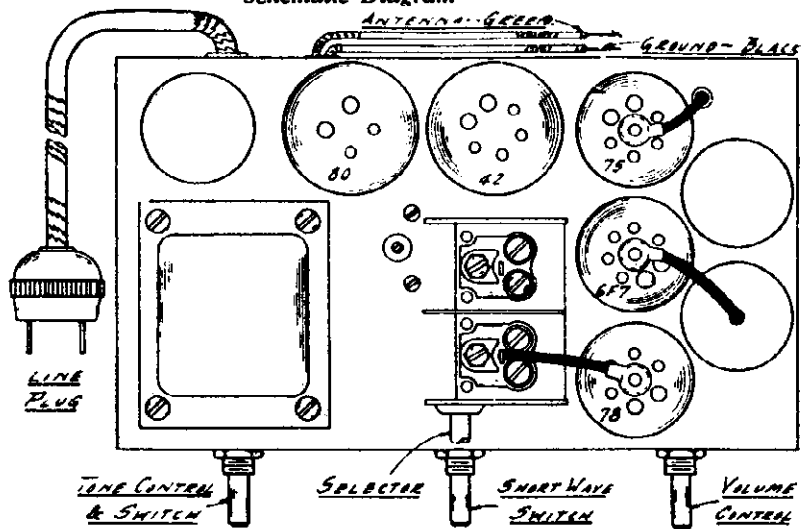
Schematic Diagram



ANTENNA COIL



1ST AND 2ND I.F. TRANS.



Top View of Chassis

TUBE SOCKET VOLTAGES

Tube No.	Cathode to Heater Voltage	Cathode to Screen Voltage	Cathode to Plate Voltage	Cathode to Control Grid Voltage	Plate M.A.	Heater Voltage
78-1st Det.	4.5	100	230	* 6.5	4.25	6.3
6F7 Pentode I. F. Triode OSC.	3	100	235	* 4.5	6.0	6.3
			80	4.75	2.0	
75-2nd Det.	...	...	220	* 1.75	.4	6.3
42-2nd Audio	...	235	220	**16.5	28.	6.3
80-Rect.	...	...	...	.....	27 per plate	5.0

*Voltage from cathode to terminal No. 2 on the voltage divider.
**Voltage from cathode to terminal No. 1 on the voltage divider.
All voltage readings taken with high resistance Volt Meter (1000 ohms per volt) using test leads, all tubes in sockets, antenna grounded to chassis, no signal.

MODEL 5D
Alignment
Parts List

SERVICE NOTES

for

Detrola 5-D Dual-Band Receiver

The Detrola 5-D is a five tube superheterodyne, dual-wave receiver covering broadcast frequencies of 550 to 1500 kilocycles and short-wave frequencies of 1.5 to 4.75 megacycles.

It employs the following tubes: Type 78, first detector; type 6F7, intermediate stage and oscillator (the pentode section being used for the intermediate stage, and the triode for the oscillator); type 75, delayed AVC, second detector, and first audio (one diode being used for the AVC and the other for the detector, triode being used for the first audio stage); type 42, final amplifier; type 80, rectifier.

R. F. and I. F. ALIGNMENT

The R. F. and I. F. circuits are properly aligned at the factory with a crystal control oscillator and should require little or no attention. Should it become necessary, however, to check the alignment, an output meter and a calibrated oscillator will be necessary. The automatic volume control in the receiver will defeat the purpose of the output meter unless the following precautions are taken:

I. F. ALIGNMENT—To align the intermediate frequency transformers (1) adjust test oscillator to 455 kilocycles and couple to the control grid of first

detector (reduce coupling so that only small deflection is obtained on output meter with volume control in the maximum position). (2) Adjust I. F. trimmers for maximum reading on output meter.

R. F. ALIGNMENT—To align the R. F. circuits (1) set the pointer on the tuning chart to 1400 kilocycles and adjust test oscillator to the 1400 kilocycles. (2) Connect oscillator to antenna connection of chassis, reducing coupling as outlined in I. F. adjustments and adjust trimmer on front of chassis for maximum reading. The above procedure should be repeated at 600 kilocycles adjusting **ONLY THE LOW FREQUENCY TRIMMER ON TOP OF CHASSIS**.

The short-wave band may be aligned by setting the test oscillator on 1400 kilocycles and using the 2800 kilocycles harmonic and setting the pointer on the tuning chart to approximately 2.8 megacycles and adjusting trimmers on tuning condenser for maximum reading.

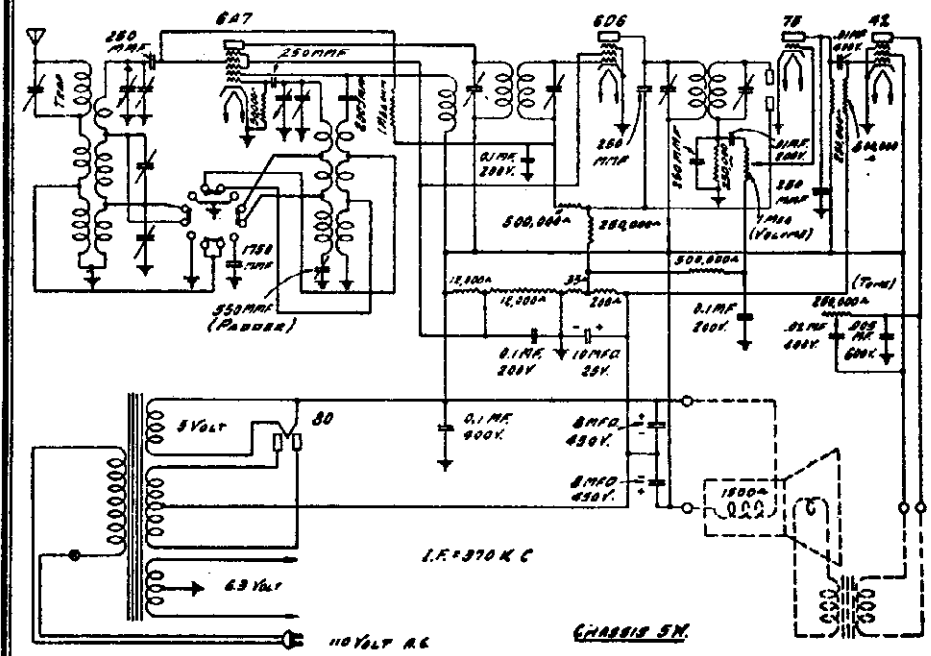
For a more detailed explanation concerning the operation of the delayed automatic volume control used in this receiver and for further service suggestions, refer to the service notes of the Detrola 7-A.

REPLACEMENT PARTS MODEL 5-D

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
532	Knobs	\$0.10	937	6 prong socket No. 42	.10
563	.05 mfd 400 volt condenser	.15	939	6 prong socket No. 78	.10
568	.01 mfd 400 volt condenser	.15	993	Oscillator coil shield	.10
572	.1 mfd 200 volt condenser	.15	997	Tube shield base	.15
575	.1 mfd 400 volt condenser	.20	1013	Power transformer	2.90
576	.02 mfd 400 volt condenser	.15	1014	8-8 mfd 450 volt filter condenser	2.05
579	.25 mfd 200 volt condenser	.20	1015	Short wave switch	.80
580	.05 mfd 200 volt condenser	.15	1016	.00002 padder condenser	.30
581	.005 mfd 600 volt condenser	.15	1017	.0005 padder condenser	.40
589	50 mmf mica condenser	.15	1018	1st IF transformer	1.60
590	.00025 mica condenser	.15	1019	2nd IF transformer	1.50
595	10 mfd 35 volt condenser	.65	1022	Cabinet	4.60
602	250,000 ohm resistor, 1/8 watt	.15	1027	4 prong socket No. 6F7	.10
612	75,000 ohm resistor, 1/2 watt	.15	1028	6 prong socket No. 75	.10
615	500,000 ohm resistor	.15	1034	Speaker	6.90
631	50,000 ohm resistor	.15	1038	Pyralin diffuser—blue	.10
791	Tube shield	.10	1042	Escutcheon plate	.30
912	Station selector dial	.25	1052	Candohm resistor, 1000 ohms	.20
919	Volume control	.70	1054	935 mmf mica condenser	.20
921	Tone control with A.C. switch	.90	1079	Candohm resistor, 350 ohms	.20
922	Candohm resistor, 32,500 ohms	.65	1124	Antenna coil	.50
926	Tuning condenser	2.20	1126	Oscillator coil	.50
934	Power cord	.30	1128	Pyralin diffuser—red	.10
936	4 prong socket No. 80	.10	1168	Pilot light socket	.15

DETROLA RADIO CORP.

MODEL 5W
Schematic
Voltage
Parts List



For Alignment,
see Index

TUBE SOCKET VOLTAGES

Tube Number	Control Grid to Cathode	Screen to Cathode	Plate to Cathode	M. A. Plate	Tube Socket Voltages Heater or Filament Voltage	
6A7	1st Det.	*2	80	210	3.	6.3
	OSC.			200	4.	6.3
6D6	I. F.	2	80	210	7.	6.3
75	2nd Det.	2		100	.5	6.3
42	2nd Audio	**15	210	190	32.	6.3
80	Rect.					
				25 Per Plate		

- 1715 Candohm resistor
- 1716 3-way, 12 point switch
- 1720 6-prong socket, marked 6D6
- 1721 7-prong tube socket, marked 75
- 1724 2000 mmf. Mica condenser
- 1733 Cabinet
- 1762 Dial
- 1646 1st I. F. Transformer
- 1647 2nd I. F. Transformer
- 1763 B. C. Antenna coil
- 1764 Short wave antenna coil
- 1765 Oscillator coil

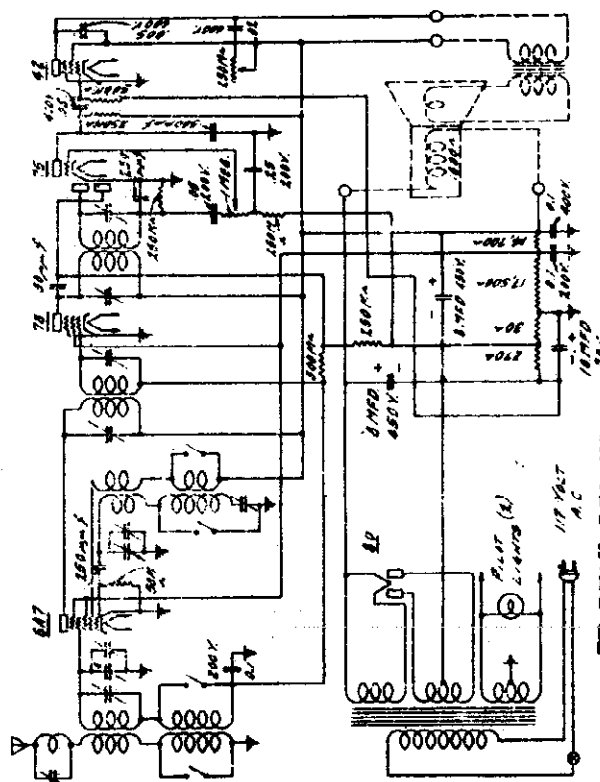
*Terminal No. 5 on candohm to ground.
**Terminal No. 6 on candohm to ground.

Stock No.	DESCRIPTION
565	.01 mf. 200 volt tubular condenser
568	.01 mf. 400 volt tubular condenser
572	.1 mf. 200 volt tubular condenser
575	.1 mf. 400 volt tubular condenser
581	.005 mfd. 600 volt tubular condenser
576	.02 mf. 400 volt tubular condenser
590	250 mmf. Mica condenser plus-minus 10%
602	250,000 ohm carbon resistors, 1/5 watt
615	500,000 ohm carbon resistors, 1/5 watt
624	1 megohm carbon resistors, 1/5 watt
631	50,000 ohm carbon resistors, 1/5 watt
791	Goat tube shields with ring
936	4-prong tube socket, marked No. 80
937	6-prong tube socket, marked No. 42
1013	Power transformer
1034	6" dynamic speaker
1199	Pointer
1203	Tension spring
1277	Dial cable
1402	Single paddler condenser
1404	7-prong tube socket, marked 6A7
1412	1750 mmf. Mica Condenser
1527	Escutcheon ring
1572	Volume control
1573	Tone control and AC switch
1597	Glass crystal
1611	Midget trimmer condenser, bakelite base
1626B	2-gang variable condenser

MODEL 5X

Schematic, Voltage
Parts List

Stock No.	DESCRIPTION
563	.05 mf. 400 volt tubular condenser
572	.1 mf. 200 volt tubular condenser
575	.1 mf. 400 volt tubular condenser
576	.02 mf. 400 volt tubular condenser
578	10 mfd. 30 volt tubular electrolytic condenser
579	.25 mf. 200 volt tubular condenser
580	.05 mf. 200 volt tubular condenser
581	.005 mf. 500 volt tubular condenser
588	500 mmf. mica condenser, type "W"
589	50 mmf. mica condenser, type "W"
590	250 mmf. mica condenser, type "W"
602	250,000 ohm carbon resistor, 1/5 watt
615	500,000 ohm carbon resistor, 1/5 watt
631	30,000 ohm carbon resistor, 1/5 watt
922	Candohm resistor (per dwg.)
934	Attachment cord
1013	Power transformer
1017	Padder condenser, 500 mmf.
1028	6-prong tube socket
1034	6" dynamic speaker
1168	Pilot light socket assembly
1199	Pointer
1404	7-prong tube socket, marked 6A7
1526	Bakelite knob
1527	Escutcheon plate
1571	Dual wave switch
1572	Volume control
1573	Tone control and A.C. switch
1611	Midjet trimmer condenser
1624	Elect. condenser 8-8 mfd. 450 volt
1625	Wave trap shield can
1626	2-gang variable condenser
1629	Dial chart
1627	Cabinet
1646	1st I. F. transformer assembly
1647	2nd I. F. transformer assembly
1648	Oscillator coil assembly
1649	Short wave antenna coil
1540	Broadcast antenna coil assembly
1650	Wave trap
1640	8" dynamic speaker



IF PEAK 370 KC.

Tube Number	Control Grid to Cathode	Screen to Cathode	Plate to Cathode	M. A. Plate	Tube Socket Voltages Heater or Filament Voltage
6A7	*1.75	92	225	4	6.3
78--I. F.	0	0	225	4	6.3
75--2nd Det.	*1.75	92	225	7	6.3
42--2nd Audio	*1.75	0	**110	.8	6.3
80--Rect.	***17	225	212	34	6.3

For Alignment, see Index

- ***Voltage from No. 1 terminal on voltage divider to ground using 250 volt scale.
 - **Voltage from plate to ground using 250 volt scale.
 - *Voltage from ground to second terminal on voltage divider using 10 volt scale.
- The above voltage readings were taken with 1,000 ohm per volt Volt Meter.

The Detrola 5-X is a 5 tube superheterodyne designed for receivers on frequencies from 540 to 1500 KC and from 5300 to 17,000 KC.

DETROLA RADIO CORP.

Service Notes

MODELS 5X & 6X

I. F. ALIGNMENT

To align the intermediate transformer the test oscillator should be adjusted to 370 KC and coupled to the control grid of the first detector and adjust the trimmer condensers on the first and second intermediate transformers for maximum reading on the output meter.

R. F. ALIGNMENT

The R.F. circuits: (1) Set pointer on tuning chart to 1400 KC with band switch in the broadcasting position. (2) Adjust test oscillator to 1400 KC and connect to antennae terminal on chassis. (3) Adjust trimmer on tuning condenser for maximum reading. (4) Reset dial pointer on test oscillator to 600 KC. (5) Reset test oscillator to 600 KC. (6) Adjust 600 KC padding condenser for maximum reading moving tuning condenser back and forth slowly while making adjustment. (7) Reset dial pointer and test oscillator to 1400 KC and readjust trimmer on tuning condenser for maximum reading on output meter. (The 600 KC padding condenser is the right hand condenser mounted on the rear of the chassis.)

SHORT WAVE ALIGNMENT

(1) Set dial pointer on 10 MC and band switch on short wave position. (2) Adjust test oscillator to approximately 10 MC or for maximum reading on output meter. (3) Adjust 10 MC padding condenser mounting on top of chassis near turning condenser for a further increase reading on output meter. (The wave trap trimmer condenser is the left hand condenser on the rear of the chassis.)

WAVE TRAP ADJUSTMENT

(1) To adjust wave trap to prevent reception of commercial code signals from stations operating on or about 370 KC, connect test oscillator to antennae terminal on chassis. (2) Adjust test oscillator to 370 KC. (3) Adjust wave trap condenser mounted on right hand end of the chassis for *minimum* signal on output meter.

POWER SUPPLY:

The 6-X is designed to operate on 110 volts A. C. or D. C. current. The Model 5-D-X may be supplied for operation on different sources of power supply; namely, 110 volts, 25 cycles; 110 volts, 60 cycles; and 200 volts, 60 cycles.

MODELS 5W & 6W

I. F. ALIGNMENT:

To align the intermediate transformer, the test oscillator should be adjusted to 370 K. C. and coupled to the control grid of the first detector and adjust the trimmer condensers on the first and second intermediate transformers for maximum reading on the output meter.

R. F. ALIGNMENT:

To adjust the R. F. circuits: (1) Set pointer on tuning chart to 1400 K. C. with band switch in the broadcasting position. (2) Adjust test oscillator to 1400 K. C. and connect to antenna lead on chassis. (3) Adjust trimmer on the oscillator section of the tuning condenser for maximum reading. (4) Reset dial pointer on receiver and test oscillator to 600 K. C. (5) Adjust 600 K. C. padding condenser for maximum reading moving tuning condenser back and forth slowly while making adjustment (the 600 K. C. padding condenser is mounted on the base at the left of the tuning condenser). (6) Reset oscillator and tuning pointer on the receiver to 1400 K. C. and readjust trimmer on oscillator section of tuning condenser for maximum reading. (7) Reset dial pointer on receiver and test oscillator to 15 megacycles. (8) Set band change switch in the right hand position. (9) Adjust trimmer on first section of tuning condenser for maximum reading. (10) Reset dial pointer on receiver and test oscillator to 3.6 megacycles. (11) Set band change switch in left hand position. (12) Adjust 3.6 megacycle trimmer condenser for maximum reading (the 3.6 megacycle trimmer is mounted under the chassis and directly in front of the band change switch. (13) Reset dial pointer on receiver and test oscillator to 1400 K. C. (14) Set band change switch in broadcasting position and adjust 1400 K. C. trimmer for maximum reading (the 1400 K. C. trimmer is mounted under the chassis directly over the antenna coil).

WAVE TRAP ADJUSTMENT:

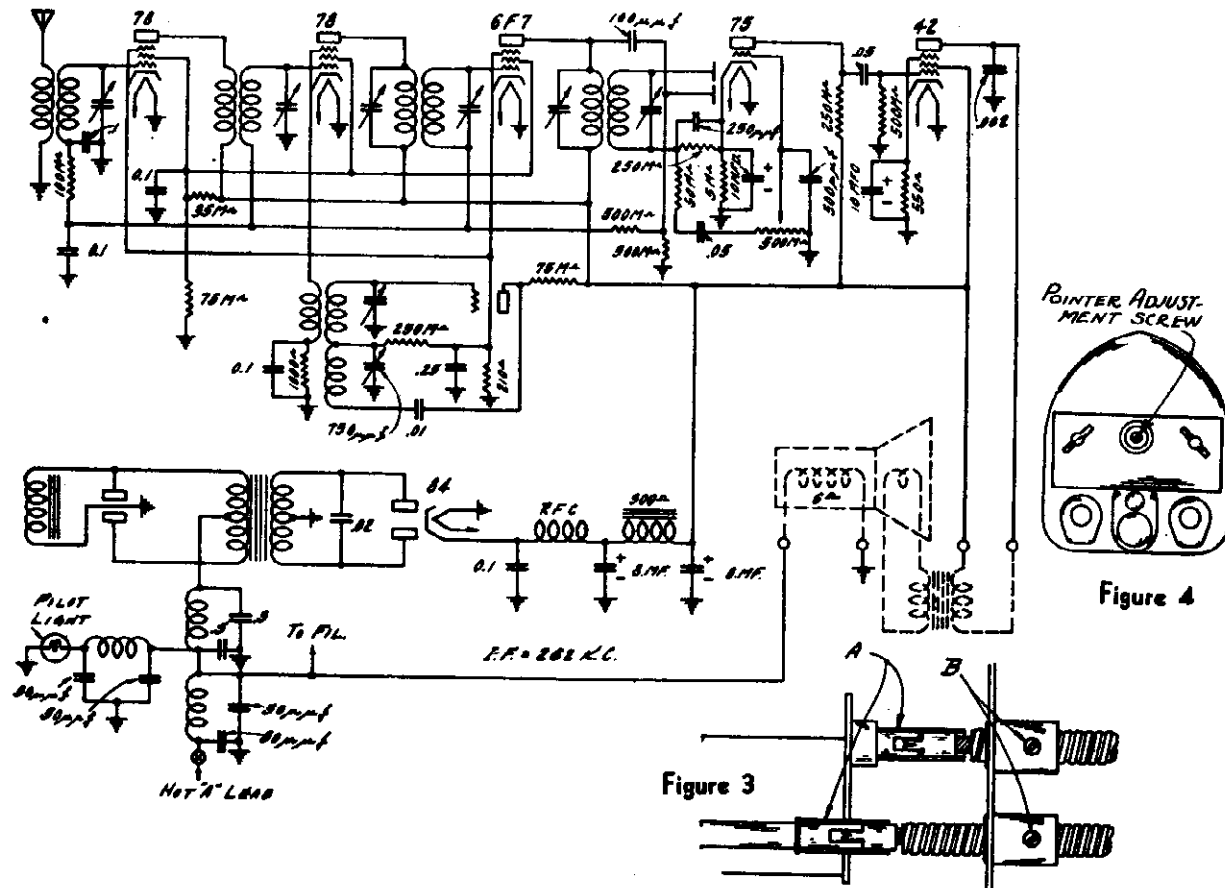
This receiver is designed with a wave trap to prevent interference from commercial code stations operating on or about 370 K. C. To adjust the wave trap, set test oscillator on 370 K. C. and connect to antenna lead on chassis and adjust wave trap trimmer condenser for minimum signal on the output meter (the wave trap is mounted on the rear left end of the chassis).

POWER SUPPLY:

The 5-W is designed for operation on different sources of power supply; namely, 110 volts, 25 cycles; 110 volts, 60 cycles, and 220 volts, 60 cycles.

MODEL 6A
Schematic, Voltage
Alignment

DETROLA RADIO CORP.



R. F. and I. F. Adjustments

The trimmers on the tuning condenser and the intermediate transformers are very accurately adjusted with a crystal control oscillator before the receiver leaves the factory and should need little or no attention; however, to check the adjustments the following procedure should be followed.

I. F. Adjustments

In order to make the I. F. adjustments it is necessary to remove the top and bottom cover of the receiver case and proceed as follows, adjust test oscillator at 262 kilocycles, place the receiver in operation and connect the oscillator output to the grid of the first detector tube and connect the output meter across the voice coil of the loud speaker. Then connect the antenna lead to the ground of the chassis and adjust the tuning condenser so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output coupling until a small deflection is obtained at the output meter. Unless this is done the action of the A. V. C. will make it impossible to obtain a correct adjustment. Adjust trimmers for maximum reading on output meter.

R. F. Adjustments

The trimmers on the tuning condenser should be adjusted at 1400 kilocycles, and the paddler condenser adjusted at 600 kilocycles respectively. Proceed as follows, adjust the test oscillator at 1400 kilocycles and couple to the antenna of the receiver. Set tuning condenser at minimum capacity and adjust pointer to 1550 kilocycles, reset tuning control to 1400 kilocycles. Place oscillator and receiver in operation and adjust oscillator output so that a weak signal is obtained on the output meter, adjust trimmers for maximum reading. To adjust 600 kilocycle position readjust oscillator and tuning control to 600 kilocycles and adjust the 750 M. M. F. paddler condenser (mounted on the chassis near the loud speaker) for maximum reading.

Service Data

Type and Number of Tubes Used:	1 Type 75
2 Type 78	1 Type 6F7
1 Type 42	1 Type 84
Total Battery Current	6.5 Amps.
Undistorted Output	3 Watts
Speaker Field Current	1 Amp.
Rectifier Output Voltage	250
Total Plate Current	50 M.A.

Plate Supply Unit

This receiver uses a vibrator type inverter and tube rectifier to provide a source of direct current voltage as plate and grid supply for all the tubes. This unit is very accurately adjusted at the factory, and service adjustment should not be attempted.

Low Volume

Low volume may be caused by weak or defective tubes (replace with set of tubes known to be in good condition); or antenna grounded or shielded due to wire netting not cut loose from the metal construction of the top.

Low Voltage

Low voltage may be caused by 84 rectifier, shunted filter or bypass condenser, defective power transformer or vibrator unit.

Excessive Hum

Excessive hum may be caused by defective 84 tube, or defective vibrator unit. In cases where the vibrator unit proves to be defective no adjustment should be attempted, the unit should be replaced with a new or replacement unit.

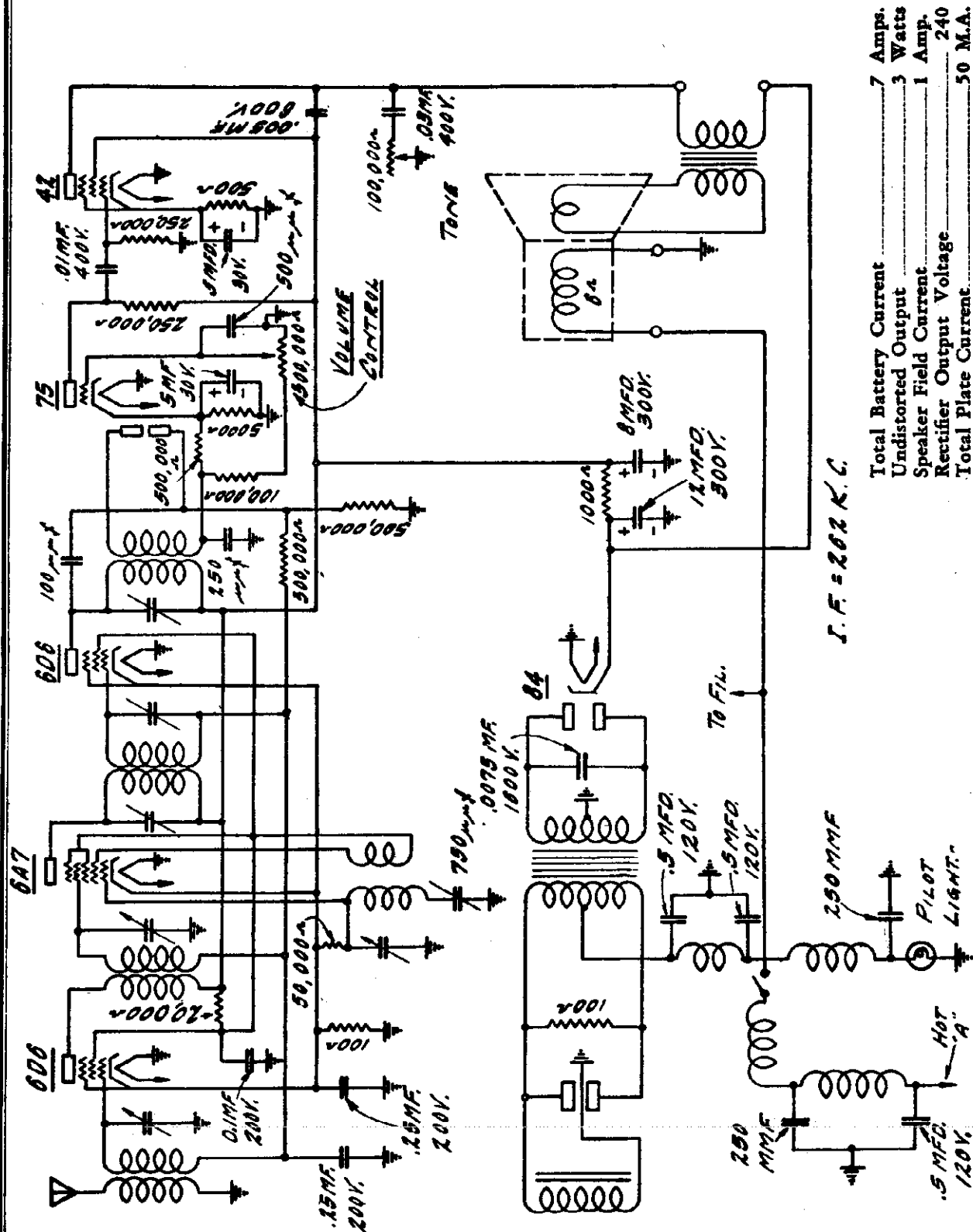
Continuity Test

By referring to the schematic diagrams in figures 5 and 6 a complete continuity test for open and short circuits can be made for all parts of the receiver. A suitable continuity test can be made by using 0 to 30 volt voltmeter and a 45 volt B battery. More accurate readings can be obtained by using a calibrated ohm meter.

TUBE SOCKET VOLTAGES
6.3 Volt Battery

Tube No.	Cathode to Ground Volts	Cathode to Screen Volts	Cathode to Filter Volts	Plate Current M. A.
78 R. F.	100	250	250	6.0
78 First Detector	100	250	250	4.0
6F7 Pentode I. F.	100	250	100	6.0
6F7 Triode OSC.	00	00	100	2.5
75 A. V. C.	00	00	**150	.3
42 Second Audio	*17.5	250	245	27.0
84 Rectifier				25 M.A. Per Plate

All the above voltage readings were taken by a high resistance volt meter (1000 ohms per volt) using test leads, all tubes in sockets no signal. (**250 volt scale) (*250 volt scale).



Schematic Diagram for Model 6-M.

MODELS 6M, 6R
Installation Data
Voltage, Alignment
Parts List

DETROLA RADIO CORP.

Tube No.	Cables to Ground	Cables to Screen	Cables to Plate	Plate Current
6D6 R. F.	*1.2	70	230	1.2
6A7 OSC.	*21.2	70	230	1.
6D6 I. F.	*1.2	70	230	1.2
75 AVC.	*1.2	**70		.3
42 First Audio	13	230	235	2.8
84 Rectifier.				23 M.A. Per Plate

All the above voltage readings taken with a 1,000 ohm per volt voltmeter using test leads all tubes in socket as signal.
*6 volts scale.
**250 volt scale.

Voltage across 19,000 ohm oscillator grid leak (6 volt scale), at the output meter. Unless this is done the action of the A. V. C. will make it impossible to obtain a correct adjustment. Adjust trimmers for maximum reading on output meter.

R. F. Adjustments

The trimmers on the tuning condenser should be adjusted at 1400 kilocycles, and the paddler condenser adjusted at 600 kilocycles respectively. Proceed as follows, adjust the test oscillator at 1400 kilocycles and couple to the antennas of the receiver. Set tuning condenser at minimum capacity and adjust pointer to 1530 kilocycles, reset tuning control to 1400 kilocycles. Place oscillator and receiver in operation and adjust oscillator output so that a weak signal is obtained on the output meter, adjust trimmers for maximum reading. To adjust 600 kilocycle position readjust oscillator and tuning control to 600 kilocycles and adjust the 750 M. M. F. paddler condenser (mounted on the chassis near the loud speaker) for maximum read-

ing.

for the driver, but will also allow for the least possible bend in the "Control Cables" which will ensure as smooth as possible operation of these controls, with a minimum possibility of the cables binding due to an extremely sharp bend.

Connecting Drive Cables and Casing to Control Unit

We would suggest that the "Drive Cables" be connected to the "Control Unit" before it is permanently fastened to the instrument panel. The cable connections to the receiver should be made on the bench, before the set is installed and it should not be necessary to remove these cables in making the installation.

The cable which enters the receiver at the top is the volume control and is connected to the volume control shaft by a slot milled in the end of the shaft and held in place by metal sleeve (A). See Fig. 3. The lower shaft is the tuning control and is connected in the same manner as the volume control.

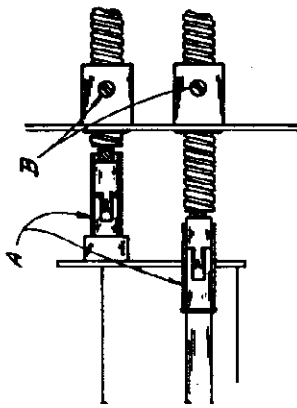


Figure 3

Adjusting the Dial Pointer

To adjust the dial pointer for the correct kilocycle reading, tune the receiver to a station of known frequency and adjust pointer with a screw driver by turning the adjusting screw on the back of the control head. (See Fig. No. 4.)

Pointer Adjustment

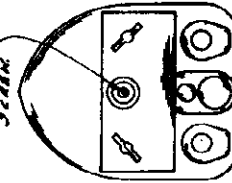


Figure 4

Drilling Template

Packed in each receiver package is a drilling template, which contains the exact location of the mounting holes. This template is furnished as a card in locating mounting holes for the chassis, doing away with the necessity of one man holding the chassis while another locates the hole. However, in using this template we wish to utter a word of caution: Do not overlook any rods, wires or units mounted on the dash, which might not interfere with the location of the template, but which would prohibit the mounting of the set. In this way, unnecessary drilling of holes will be avoided.

Antenna Lead-in Connection

An antenna lead-in shield is furnished in the receiver package. The antenna lead wire should be run through this shield, and the shield extended up to where the lead-in leaves the corner post in order to shield the entire length of the lead-in wire, the other end of this lead-in wire should be soldered to a small ferrule which makes connection with a spring socket on the inside of the chassis. At the other end of the shield there is a small piece of braid which should be securely grounded to the dash of the car. (See Fig. No. 2.)
Caution: Clean surfaces thoroughly where shield braid is fastened to the dash, in order to insure a good ground.

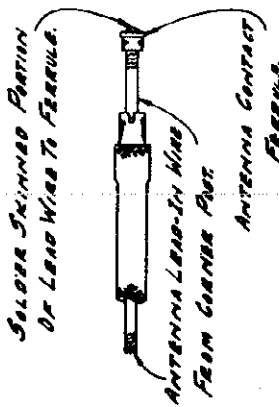


Figure 2

III. The Control Unit

The control unit is a combined Station Selector Dial (marked in kilocycles), tuning cable, volume control and switch cable, all assembled in one unit.

The control unit is designed to be fastened to the "dial" of the instrument panel by means of two thumb screws.

In locating the position for the control unit, it is advisable to leave this operation until the receiver has been located and mounted. Then the best position for the control unit can be determined which will not only allow easy accessibility

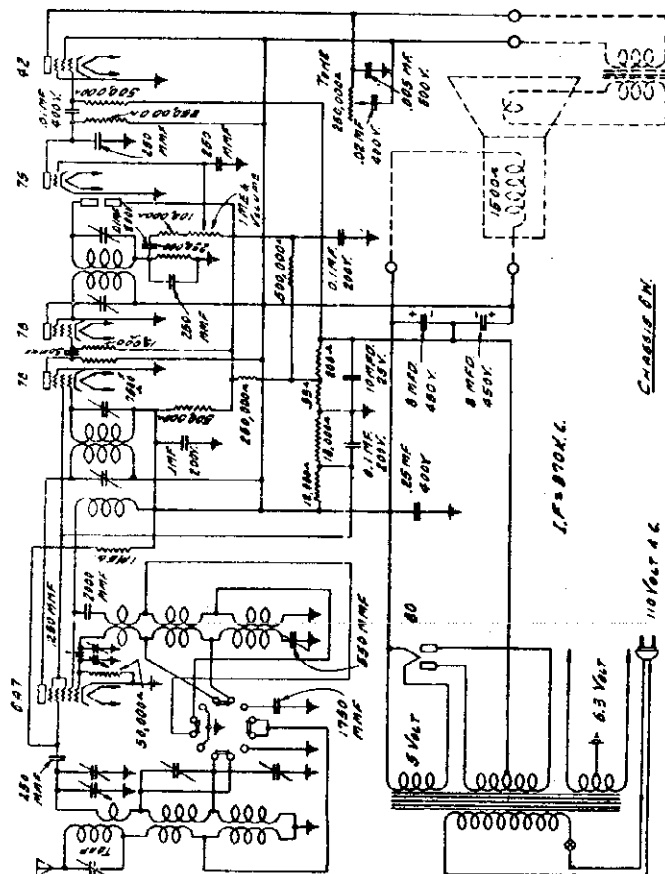
Stock No.	DESCRIPTION	List Price
537	Carriage bolt and nut	\$0.20
544	Dial plate	.10
565	.01 mfd. 200-volt tubular condenser	.10
568	.01 mfd. 400-volt tubular condenser	.20
569	.5 mfd. 200-volt interference condenser	.30
572	.1 mfd. 200-volt tubular condenser	.15
575	.1 mfd. 400-volt tubular condenser	.20
579	.25 mfd. 200-volt tubular condenser	.20
581	.005 mfd. 600-volt tubular condenser	.20
588	500 mfd. Mica condenser, type W	.20
589	50 mfd. Mica condenser, type W	.15
602	250,000 ohm carbon resistor, 1/2 watt	.15
603	100,000 ohm carbon resistor, 1/2 watt	.15
615	20,000 ohm carbon resistor, 1/2 watt	.15
616	10,000 ohm carbon resistor, 1/2 watt	.15
631	10,000 ohm carbon resistor, 1/2 watt	.15
632	5,000 ohm carbon resistor, 1/2 watt	.15
791	6-prong tube socket, marked No. 42	.10
937	6-prong tube socket, marked No. 71	.10
1021A	Cathode resistor, 1,000 ohm	.20
1235	Antenna and detector aluminum shield cap	.20
1235	Power transformer	2.80
1238	Vibrator unit	4.70
1241	"A" battery lead assembly	.60
1249	5-prong tube socket, marked No. 84	.10
1272	Low power factor condenser, .5 mfd., 120-volt	.40
1285	100 mfd. mica condenser	.15
1286	250 mfd. mica condenser	.15
1292	Shunt coupling tubing	.10
1295	Shielding connector socket	.40
1339	Antenna connector socket	.10
1404	7-prong tube socket, marked No. 447	.10
1727	6-prong tube socket, marked No. 4D4	.10
1869	Geot tube shield base	.10
1870	.015 mfd. 300-volt tubular condenser	.20
1871	750 mfd. variable paddler condenser	.30
1872	500 ohm carbon resistor, 1/2 watt	.15
1873	Oscillator shield can	.20
1880	1-gang variable condenser	3.60
1881	Volume control and switch	1.00
1882	Electrolytic condenser	1.95
1883	500 mfd. electrolytic condenser	1.25
1884	500 mfd. electrolytic condenser	.75
1885	7-prong tube socket, marked No. 42 (same control)	.10
1904	Second I. F. transformer	1.60
1910	Remote control unit	4.00
1914	Pilot Light lead	.40
1915	1 mfd. 120-volt low-power factor condenser	.30
1949	Volume control shaft	1.50
1950	Tuning control shaft	1.50
1951	Antenna coil	.75
1952	Detector coil	.75
1953	Oscillator coil	.40

DETROLA RADIO CORP.

MODEL 6W
Schematic
Voltage
Parts List

Stock No.	DESCRIPTION
565	.01 mf. 200 volt condenser.
568	.01 mf. 400 volt condenser.
572	.1 mf. 200 volt condenser.
575	.1 mf. 400 volt condenser.
578	10 mfd. 30 volt electrolytic condenser.
576	.02 mf. 400 volt condenser.
581	.005 mf. 600 volt condenser.
589	50 mmf. Mica condenser.
590	250 mmf. Mica condenser.
602	250,000 ohm carbon resistor, 1/5 watt.
603	100,000 ohm carbon resistor, 1/5 watt.
609	15,000 ohm carbon resistor, 1/5 watt.
610	7,500 ohm carbon resistor, 1/5 watt.
615	500,000 ohm carbon resistor, 1/5 watt.
624	1 megohm carbon resistor, 1/5 watt.
631	50,000 ohm carbon resistor, 1/5 watt.
936	4-prong tube socket, marked 80.
937	6-prong tube socket, marked 42.
939	6-prong tube socket, marked 78.
1013A	Power transformer.
1028	6-prong tube socket, marked 75.
1034	6" dynamic speaker.
1277	Dial cable.
1402	Single padder condenser.
1404	7-prong tube socket, marked 6A7.
1412	1750 mmf. Mica condenser.
1572	Volume control.
1573	Tone control and AC switch.
1597	Glass crystal.
1624A	8-8 mfd. 450 volt electrolytic condenser.
1714	Dial chart.
1715	Candohm resistor.
1716A	3-way, 12 point switch.
1727	Goat shield bases.
1724	2000 mmf. Mica condenser.
1733	Cabinet.
1741	Wave band escutcheon plate.
1742	Wave band pointer knob.
1745	Dual midget trimmer.
1768	1st I. F. transformer.
1769	2nd I. F. transformer.
1770	Wave trap.
1765	Oscillator coil.
1764	Short wave antenna coil.
1763	B. C. antenna coil.

For Alignment, see Index



TUBE SOCKET VOLTAGE

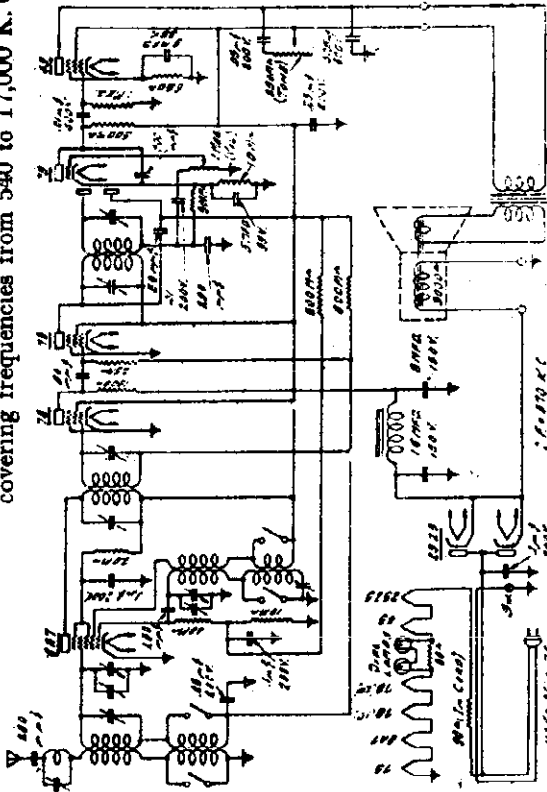
Tube Number	Control Grid to Cathode	Screen to Cathode	Plate to Cathode	M. A. Plate	Heater Voltage
6A7	*2	85	210	3.	6.3
78—1st I. F.			210	4.	
78—2nd I. F.	*2	85	150	7.	6.3
75—2nd Det.	*2	85	210	4.	6.3
42—2nd Audio	**15	210	110	.5	6.3
80—Rect.			190	32.	6.3
				25 Per Plate	5.

*Terminal No. 5 on candohm to ground.
**Terminal No. 6 on candohm to ground.

MODEL 6X
Schematic
Voltage
Parts List

DETROLA RADIO CORP.

The Model 6-X is a 6-tube superheterodyne receiver designed for receptions on standard broadcast, police and amateur and European short wave broadcast, covering frequencies from 540 to 17,000 K. C.



For Alignment, see Index

TUBE SOCKET VOLTAGES

Tube Number	Control Grid to Cathode	Screen to Cathode	Plate to Cathode	M. A. Plate	Tube Socket Voltage Heater or Filament Voltage
6A7 1st Det.	0	50	95	1.5	6.3
6A7 OSC.	2		95	3.	
78-1st I. F.	0	95	50	2.5	6.3
78-2nd I. F.	0	95	95	5.	6.3
75-2nd Det.	1.		30	.25	6.3
43-2nd Audio		95	75	20	25.
25z5-Rect.					25.

Stock No.	DESCRIPTION
532	Bakelite knobs, K. K.
565	.01 mf. 200 volt tubular condenser.
568	.01 mf. 200 volt tubular condenser.
572	.1 mf. 200 volt tubular condenser.
579	.25 mf. 200 volt tubular condenser.
580	.05 mf. 200 volt tubular condenser.
588	500 mmf. Mica condenser.
589	50 mmf. Mica condenser.
590	250 mmf. Mica condenser.
600	10,000 ohm carbon resistor, 1/5 watt.
610	7,500 ohm carbon resistor, 1/5 watt.
615	500,000 ohm carbon resistor, 1/5 watt.
617	20,000 ohm carbon resistor, 1/5 watt.
621	25,000 ohm carbon resistor, 1/5 watt.
624	1 megohm carbon resistor, 1/5 watt.
636	40,000 ohm carbon resistor, 1/5 watt.
1666	Candohm resistor, 60 ohms.
1667	Filter choke
1675	Volume control with hex. nut.
1676	Tone and A. C. switch with hex. nut.
1677	Dual wave switch and hex. nut.
1678	Elec. cond., 16-8-5.5 mfd.
1679	A. C. - D. C. cord, 90 ohms.
1680	Double stage trimmer.
1683	450 ohm carbon resistor, 1/2 watt.
1687	6-prong tube socket, marked 43.
1688	6-prong tube socket, marked 25z5.
1690	2-gang variable condenser.
1693	5" dynamic Rol-a-speaker.
1646	1st I. F. transformer assembly.
1647	2nd I. F. transformer assembly.
1649	Short wave antenna coil.
1540	Broadcast antenna coil.
1707	Oscillator coil.
1711	Wave trap.

DETROLA RADIO CORP.

MODEL 7A
Schematic
Voltage

Tube No.	Heater to Cathode Voltage	Control Grid to Cathode Voltage	Screen to Cathode Voltage	Plate to Cathode Voltage	Plate MA	Heater or Fil. Voltage
1—R. F.....	0	4.5*	100	250	6.0	6.3
2—1st Det.....	0	4.5*	100	250	6.0	6.3
3—I. F.....	0	4.5*	100	250	6.0	6.3
4—2nd Det. AVC.....	0	2.0**	0	125	.75	6.3
5—Osc.....	0	2.6	0	95	5.5	6.3
6—Audio.....	0	20.0	250	225	31.0	6.3
7—Rect.....	0				32 per plate	5.0

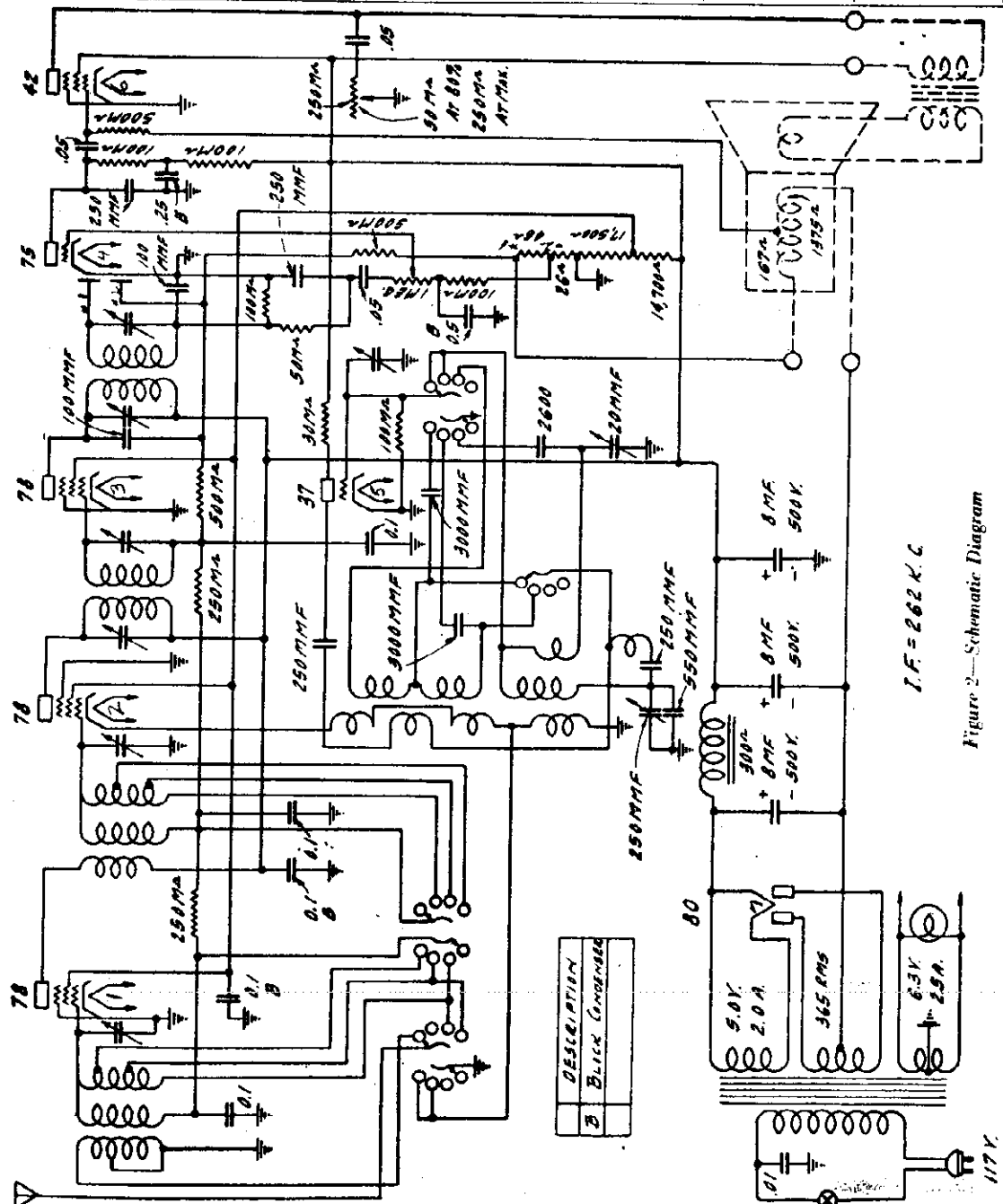


Figure 2—Schematic Diagram

Voltage reading taken with 1000 ohm per volt meter using test prods. All tubes in sockets, Ant. ground to chassis, no signal.
*Voltage from ground to terminal No. 1 ON THE VOLTAGE DIVIDER.
**Voltage from ground to terminal No. 2 ON THE VOLTAGE DIVIDER.

MODEL 7A Alignment Parts List

DETROLA RADIO CORP.

DETROLA RADIO CORP.

Detrola 7-A All-Wave Receiver

SERVICE NOTES for

The Detrola 7A is a seven tube all-wave super-heterodyne receiver...

by tuning the receiver to a powerful local station and measuring the voltage from No. 2 diode to No. 1 terminal...

(5) OSCILLATION. Oscillation may be caused in the R. F. or I. F. stage by open bypassing capacitors...

(6) HUM. Excessive hum may be caused by defective 80 tubes. (Replace with tube known to be in good condition)...

(7) R. F. and I. F. ALIGNMENT. The trimmer on the tuning condensers accurately adjusted before the receiver is assembled...

(8) NOISY RECEPTION. Noisy reception may be checked by aligning the antenna from the antenna...

(9) LOW VOLUME. This trouble may be caused by weak or defective tubes (replace with set of tubes known to be in good condition)...

(10) LOW VOLTAGE. Low voltage may be caused by defective 80 tubes (replace with set of tubes known to be in good condition)...

(11) DISTORTED REPRODUCTION. Failure of the automatic volume control to operate may be caused by defective 75 tube, shorted or open...

(12) AUTOMATIC VOLUME CONTROL. A word about the operation of the automatic volume control at this time...

(13) DETECTOR AND I. F. ALIGNMENT. The 75 tube operating in the R. F. and I. F. stages...

Volume control. Tune control and A.C. switch. Short wave switch for sets with full vision dial...

Tuning condenser for sets with full vision dial. Tuning condenser for sets with airplane dial. Filter choke...

A.C. cord. Pilot light socket. 250,000 ohm resistor. 100,000 ohm resistor. 50,000 ohm resistor...

550 mmf condenser. 250 mmf condenser. 2000 mmf condenser. 50,000 ohm resistor. 100,000 ohm resistor...

100,000 ohm resistor. 50,000 ohm resistor. 100,000 ohm resistor. 50,000 ohm resistor. 100,000 ohm resistor...

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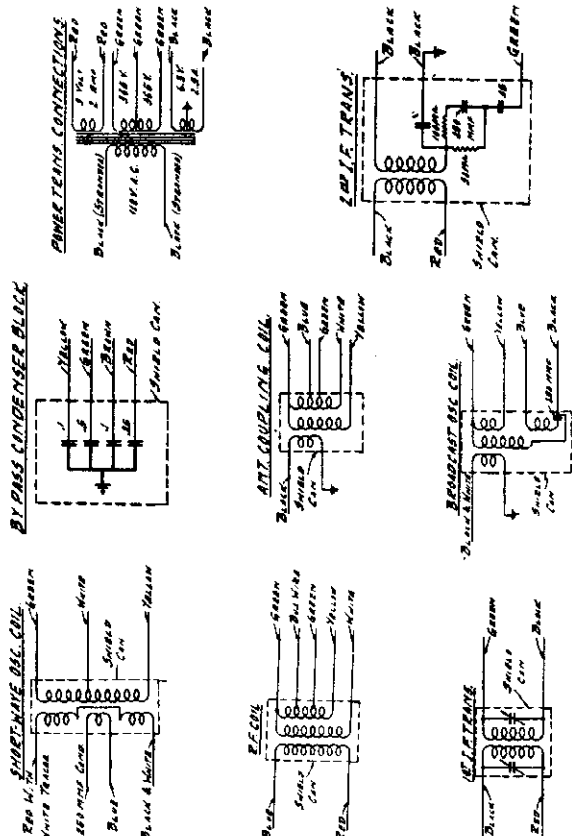
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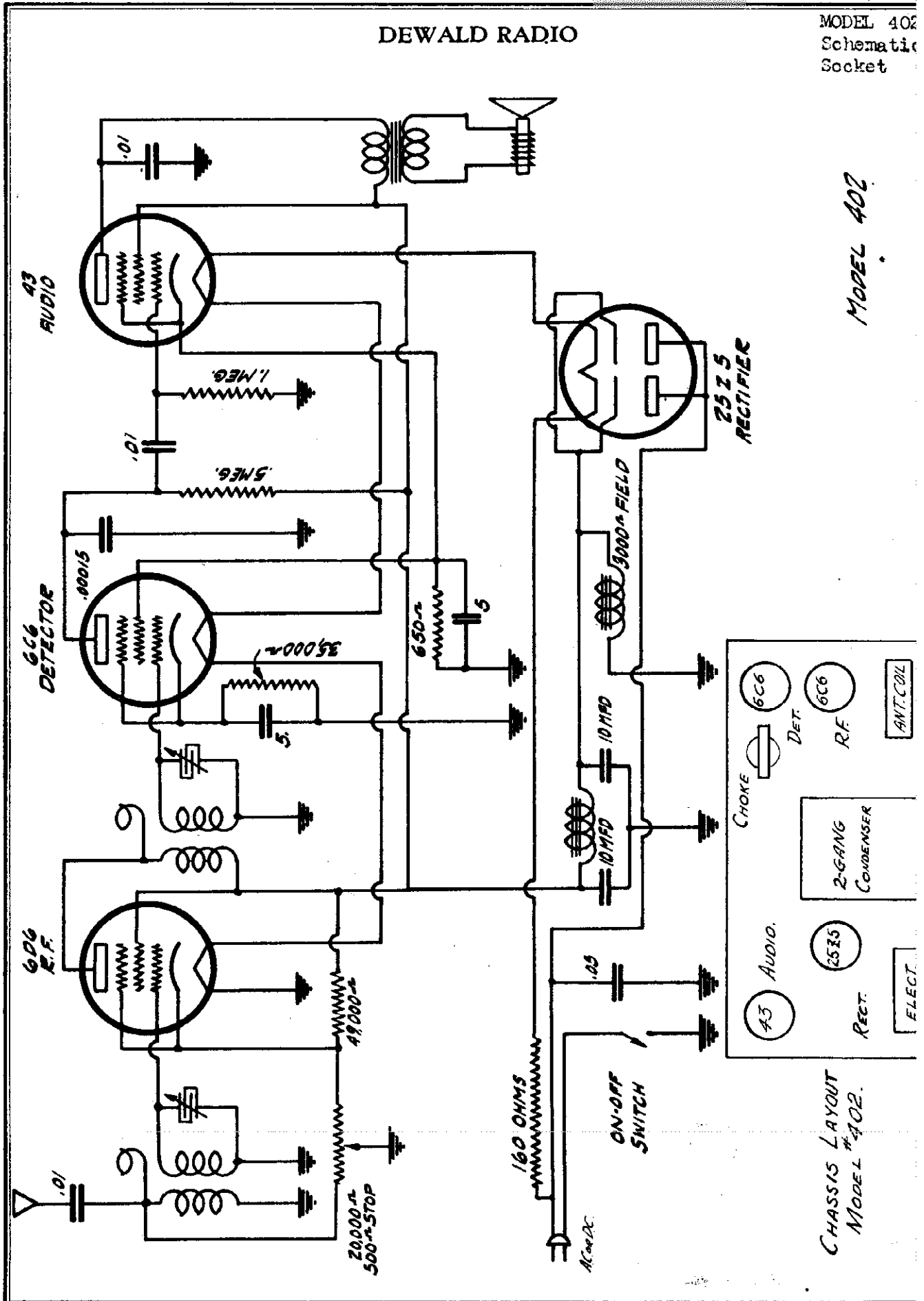


REPLACEMENT PARTS

Table with columns: Stock No., Description, List Price, Stock No., Description, List Price. Lists various electronic components and their prices.

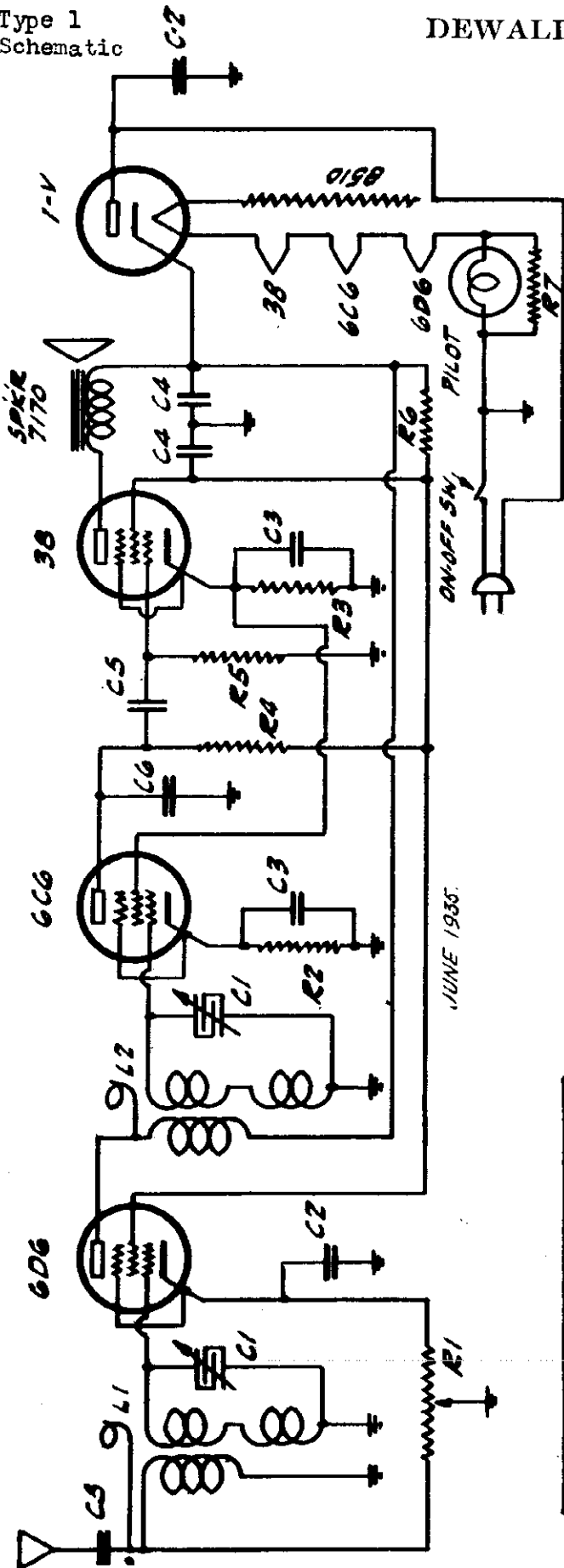
DEWALD RADIO

MODEL 402
Schematic
Socket



MODEL 403-4
Type 1
Schematic

DEWALD RADIO



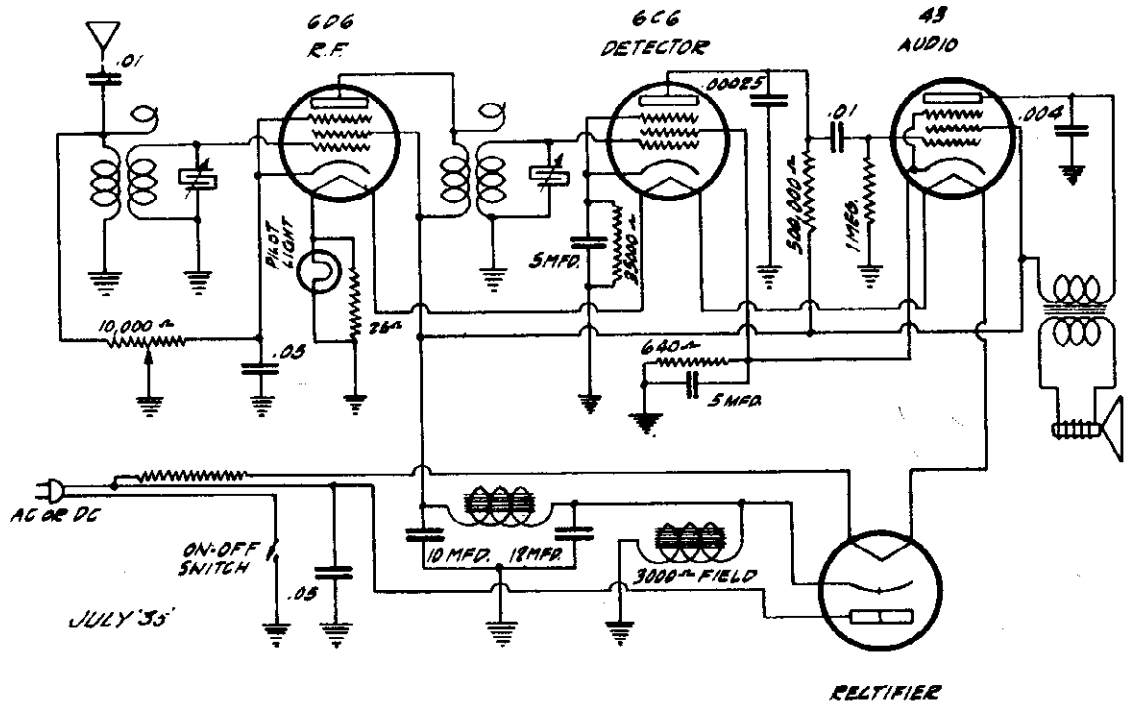
JUNE 1935

SOCKET VOLTAGES		
6D6	CATHODE TO GROUND	2.5 VOLTS
	PLATE TO CATHODE	120-135 V.
	SCREEN TO CATHODE	90-115 V.
6C6	CATHODE TO GROUND	.5 VOLTS
	PLATE TO CATHODE	20-30 V.
3B	CATHODE TO GROUND	10-15 V.
	PLATE TO CATHODE	115-125 V.
	SCREEN TO CATHODE	95-115 V.
1-V	CATHODE TO GROUND	120-140 V.

ALL READINGS TAKEN WITH VOLUME CONTROL IN MAXIMUM POSITION, USING 1000 OHM PER-CEM VOLTMEETER. FILAMENTS AT RATED VOLTAGES. A = 0-10 V. RANGE. B = 0-250 V. RANGE.

L1	- ANTENNA COIL	1/331
L2	- R.F. COIL	1/332
C1	- VARIABLE COND.	2284
C2	- .05 COND.	2046
C3	- 4 MFD. COND.	2289
C4	- 6 MFD. COND.	2283
C5	- .01 MFD. COND.	2056
C6	- .00025 MFD. COND.	2047
R1	- VOL. CONT. 25M OHMS	8499
R2	- 35,000 OHM. RES.	3261
R3	- 1,700 OHM. RES.	9395
R4	- 500,000 OHMS RES.	3161
R5	- 1ME OHM. RES.	3190
R6	- 10,000 OHM. RES.	9396
R7	- 25 OHM SHUNT	3313
	PILOT LIGHT 6-8 VOLTS	8407
	LINE COIL	8510
	SPEAKER	7170

DEWALD RADIO



MODEL 403-4

The Model 403 is a 4 Tube Receiver operating on A.C. or D. C., 110-120 Volts, 25-60 Cycles.

OPERATION Turn set on by turning ON-OFF switch. Allow 30 seconds for tubes to heat, turn volume control knob to middle position and then secure desired station by turning the station selector knob. When tuning in a station, set tuning control carefully to maximum station volume, then adjust with volume control knob to desired volume.

When operated on Direct Current if no reception is heard approximately one minute after set is turned on, reverse plug in Outlet. No ground wire is required with this set.

TUBES 1-6D6, 1-6C6, 1-43, and 1-1223

ANTENNA Unwind Antenna and place along baseboard or in any convenient location, the Antenna may also be grounded. For Additional signal strength an outside Antenna may be used.

IMPORTANT DO NOT TOUCH GROUND WIRE TO CHASSIS

NUMBERS & LIST PRICES OF REPLACEMENT PARTS

1331	Antenna Coil	.....	.55	2047	.00025 Mica Cond	.....	.35
1332	Detector Coil	.....	.56	7174	Speaker	.....	4.25
2283	Electrolytic Cond.	.....	1.00	8524	Line Cord Resistor	.....	.80
2284	Variable Condenser	.....	2.15	8499	Vol Control	.....	1.00
2056	.01 Cub Cond.	.....	.35	5093	Antenna	.....	.20
2046	.05 " "	.....	.35	8512	Knobs	.....	.20
1344	B Choke	.....	.75				

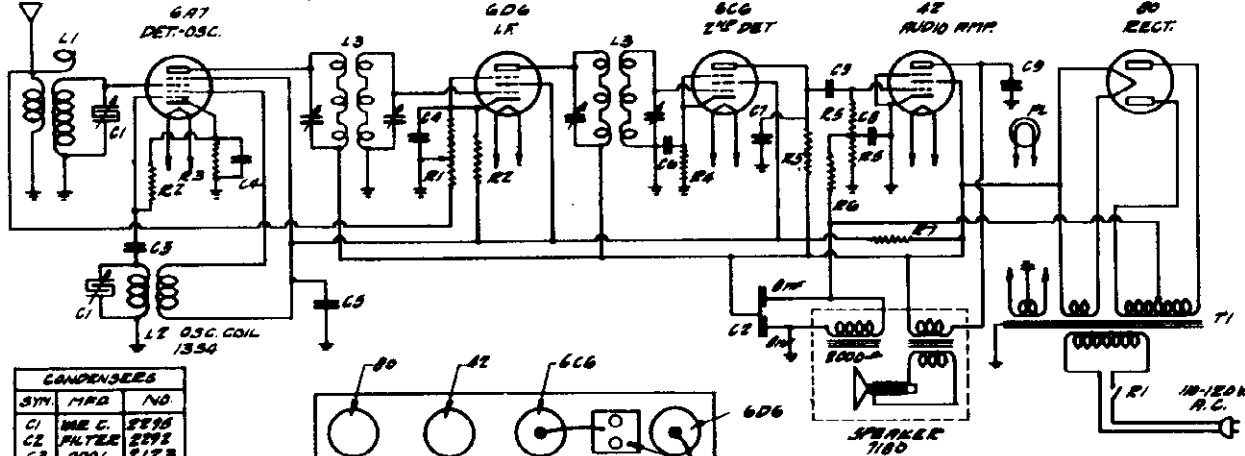
MODEL 505-F

Schematic, Socket, Alignment

MODEL 510

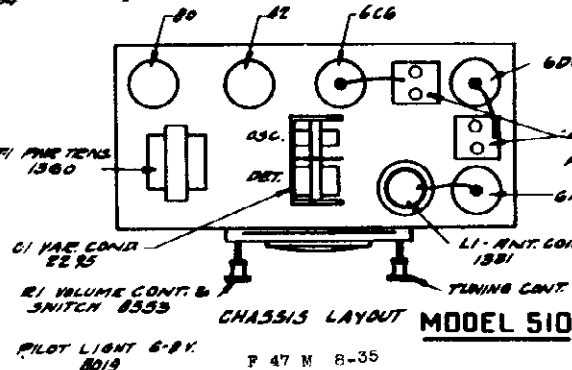
Schematic, Socket, Parts, Alignment

DEWALD RADIO



CONDENSERS		
SYM.	MFD.	NO.
C1	5ME. C.	2295
C2	FILTER	2992
C3	.0001	2123
C4	.05	2046
C5	.	2188
C6	.25	2053
C7	.00025	2047
C8	.	2022
C9	.01	2056

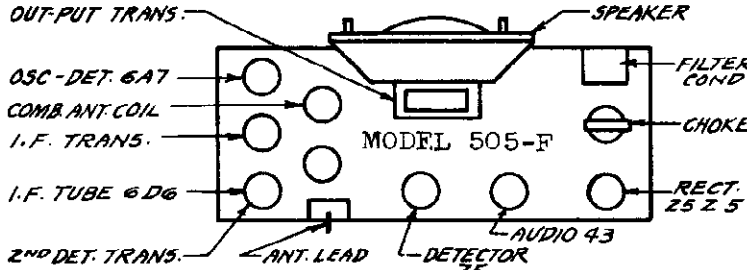
RESISTORS		
SYM.	OHMS	NO.
R1	50,000	2553
R2	50,000	2792
R3	300	3346
R4	35,000	3188
R5	5MEG.	5161
R6	7.5MEG.	3184
R7	18,000	3347



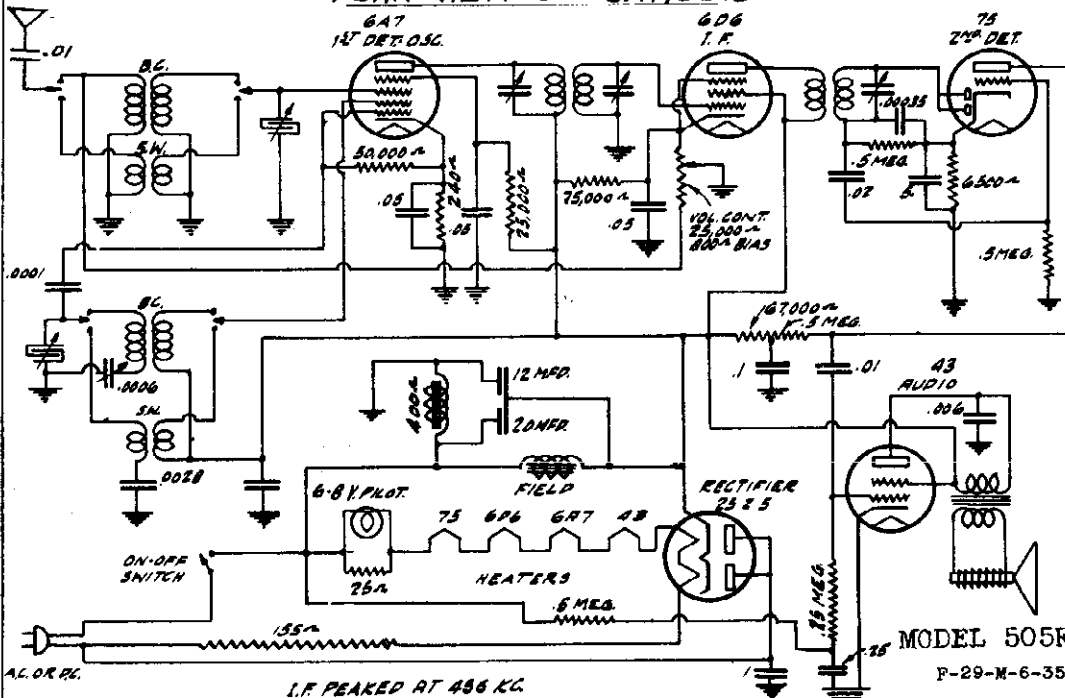
LIST PRICES OF REPLACEMENT PARTS

MODEL 510

1360	Power Transformer	\$2.85
1355	I. F. Transformer	1.40
1331	Ant. Coil	.55
1354	Osc. Coil	.55
2295	Variable Condenser	2.10
2292	Combination Electrolytic	1.60
2123	.0001 Mfd. Condenser	.40
2047	.00025 "	.55
2022	.1 Mfd. 200 V. Cond.	.55
2188	.1 Mfd. 400 V Cond.	.35
2056	.01 " "	.35
2046	.05 " 200 V "	.35
2033	.25 " 200 V "	.40
7180	Speaker	4.25
8553	Comb. Vol. Control	1.05
8496	Line Cord	.55
8512	Knobs	.20



PLAN VIEW OF CHASSIS

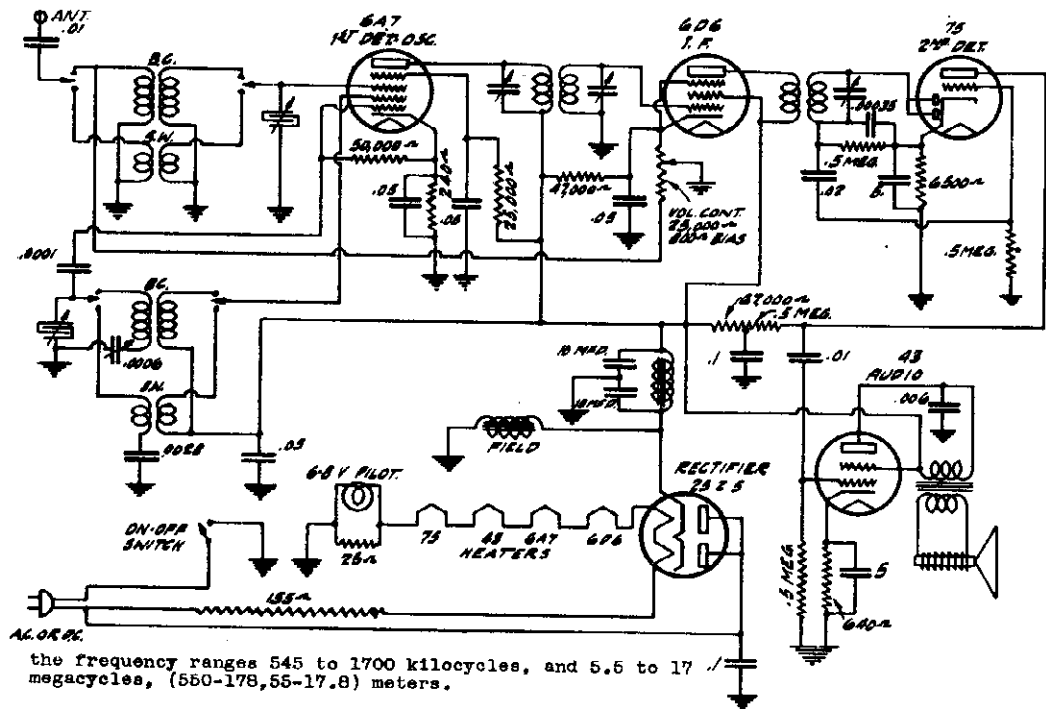


Should it become necessary to repeak this set, the following procedure should be followed. Set Service Oscillator to 456 K.C. and connect "hot" lead to grid of 6A7 tube. Ground stator of rear (osc.) section of Variable Condenser. Turn volume control for maximum output and repeak intermediate frequency trimmers for maximum gain.

MODEL 510 Remove short from Variable Condenser. Remove Service Oscillator lead from grid of 6A7 and connect same to red lead on rear of set. Adjust service Oscillator and receiver to 1500 K.C. and repeak trimmers on variable condensers for maximum gain. All other frequencies are automatically calibrated when receiver is peaked at 1500 K. C. due to the construction of the cut section of Variable Condenser.

DEWALD RADIO

MODEL 505-R
Schematic, Socket
Alignment, Parts



the frequency ranges 545 to 1700 kilocycles, and 5.5 to 17 megacycles, (560-178,55-17.8) meters.

505A

I.F. PEAKED AT 456 KC

Model 505-R

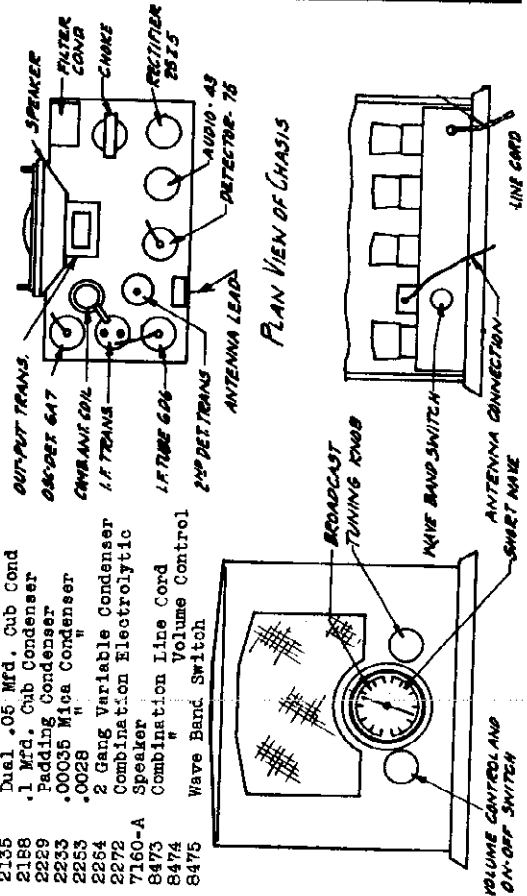
VOLTAGE

This receiver is designed to operate on 110-120 Volts 40-60 cycles, alternating current or 110-120 Volts direct current. When operated on D.C. it is necessary that the line plug be inserted to obtain the correct polarity. If no reception is heard approximately one minute after set has been tuned on, reverse line cord plug in outlet. **TWT. FREQ. ALIGNMENT.** Intermediate frequency peaked at 456 KC. Connect test oscillator to grid of 6A7 and chassis. (Ground stator of front section of variable condenser during this operation.) **R.F. ALIGNMENT**

Connect test oscillator to antenna and chassis and set dial to 1500 KC. and peak variable condensers. For low frequency adjustment set dial at 600 KC. and repeak padding condenser on front of chassis, rocking variable condenser at same time. Short wave Calibration is automatically taken care of by re-peaking at 1500 KC. The short wave coils are matched carefully for this setting. A fixed calibrated paddler automatically peaks the short waves for the low frequency setting.

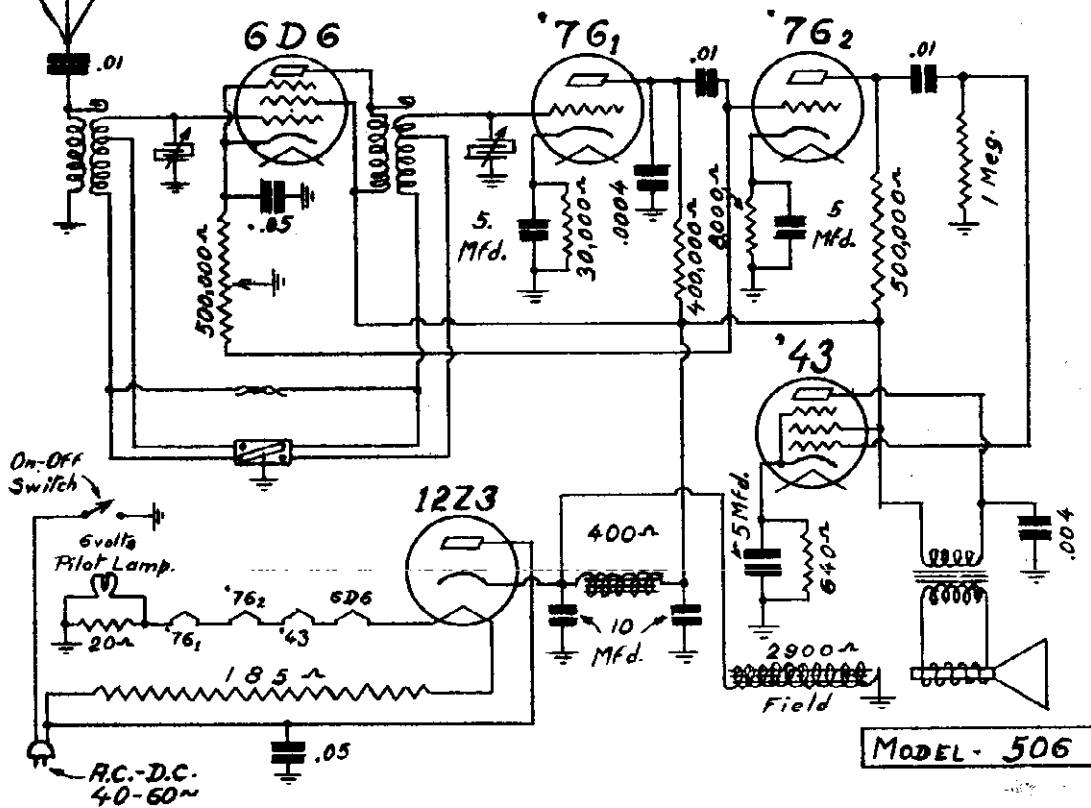
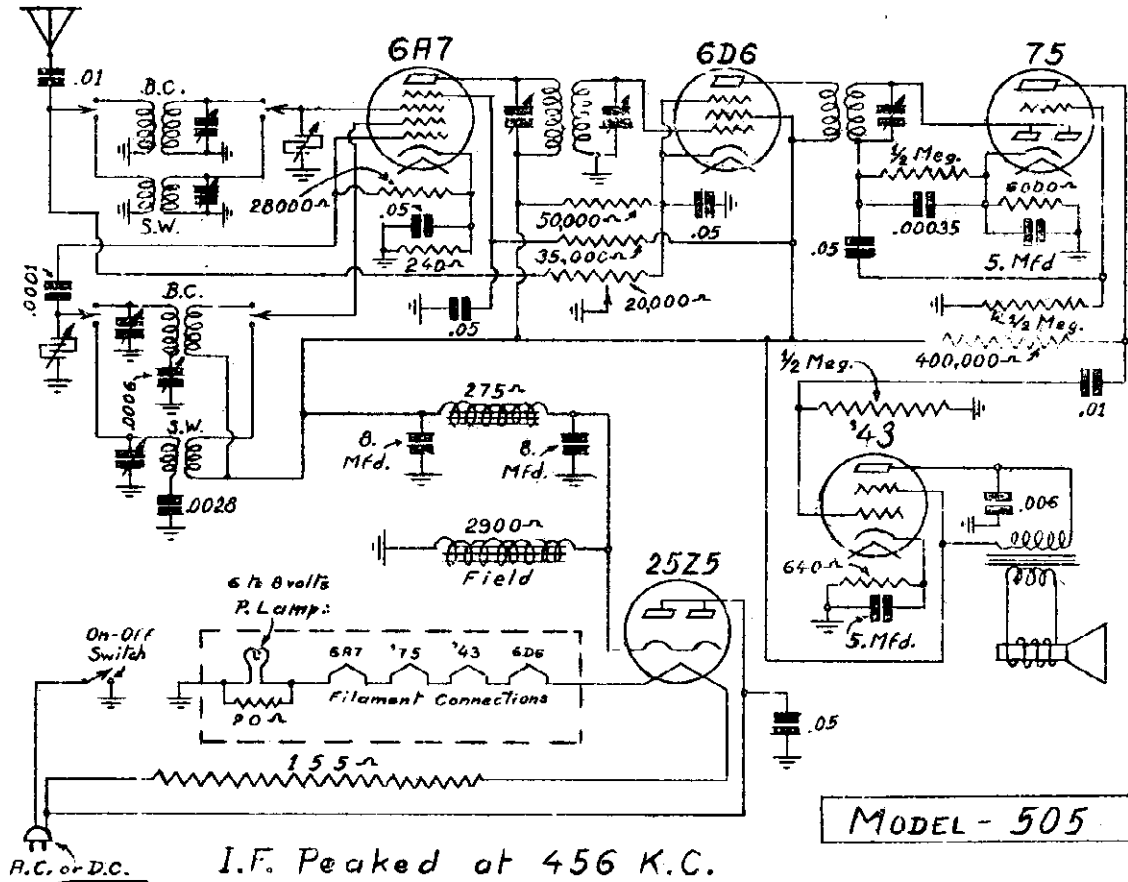
"B" Choke

- 1304 Combination Antenna Coil
- 1305 Oscillator Coil
- 1319 Dual I.F. Transformer
- 1820 Second Detector Coil
- 2007 .006 Mfd. Cdb Condenser
- 2012 .02 Mfd. Cdb Condenser
- 2046 .05 " "
- 2056 .01 " "
- 2123 .0001 Mfd. Mica "
- 2135 Dual .05 Mfd. Cdb Cond
- 2188 .1 Mfd. Cdb Condenser
- 2229 Padding Condenser
- 2233 .00035 Mica Condenser
- 2253 .0028 " "
- 2264 2 Gang Variable Condenser
- 2272 Combination Electrolytic
- 7160-A Speaker
- 8473 Combination Line Cord
- 8474 Volume Control
- 8475 Wave Band Switch



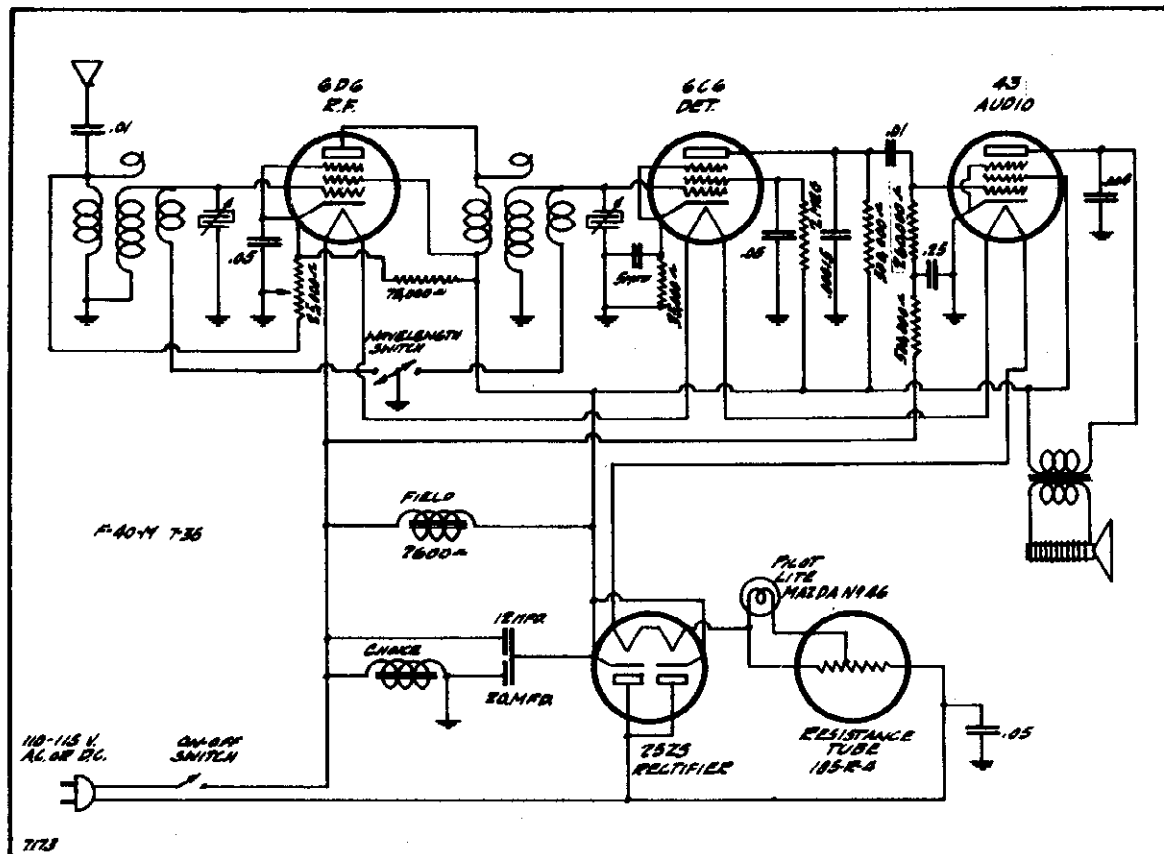
MODEL 505
MODEL 506
Schematics

DEWALD RADIO



DEWALD RADIO

MODEL 506-R
Schematic
Notes, Parts



MODEL 506-R INSTRUCTION SHEET

The Model 506-R receiver is a universal receiver operating on A.C. or D.C. 110-125 volts 40-60 cycles.
With an additional 280 volt ballast plug, set will operate on A.C. or D.C. 210-240 volts, 40-60 cycles.

OPERATION ON 110 A.C. OR D.C. SUPPLY
Insert line cord plug into receptacle. On direct current if no reception is heard one minute after switch has been turned on, reverse line plug in receptacle.

TUBES
1-45, 1-6D6, 1-26Z5, and 1-185 R-4, - 1-6C6.
The antenna may be placed along the baseboard, or may be grounded. For additional power, an outside antenna may be used.
NOTE: The antenna must be unwound or the receiver will not operate satisfactorily. No ground wire is necessary for the operation of the set.

IMPORTANT
BROADCAST:
Do NOT TOUCH GROUND WIRE TO CHASSIS.
Turn wave band switch located in rear position and turn tuning control as in desired station by turning tuning control.

SHORT-WAVE:
Turn wave band switch to the short wave position and turn tuning control as in Broadcast position. Use Band Two for Dial settings.

WARRANTY
This receiver is guaranteed to be free from defective materials and workmanship for a period of ninety days from date of purchase. We agree to remedy any such defects or to furnish new parts in exchange for any part of any unit of our manufacture which under normal installation or use in service discloses any defects within the stipulated guarantee period. This unit must be delivered by the owner to us or to our representative from whom purchase was made, intact, for our examination. All replacements for defective material will be made providing examination discloses in our judgment that it is thus defective. All transportation charges must be prepaid on merchandise returned to our factory for any cause whatsoever.

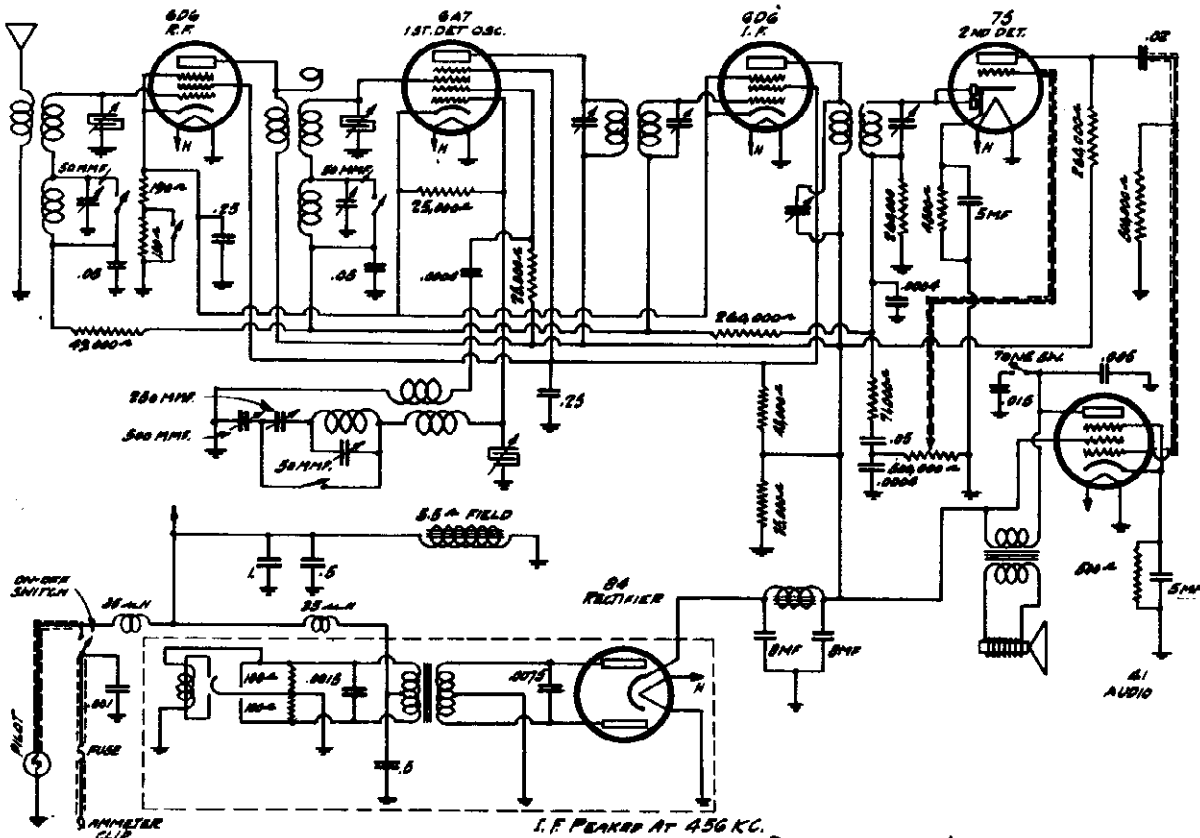
REPLACEMENT PARTS PRICE LIST

PART #	PRICE	PART #	PRICE
1326 Ant. Coil	.65	2035 .25 Mfd. Cond.	.40
1327 Det. Coil	.65	2081 .00025 Mfd. Mica Con. 40	
1328 B Choke	.75	7172 Speaker	4.25
2279 Elect. Cond.	1.50	8496 Line Cord	.80
2280 Variable Cond.	2.15	8487 Volume Control	1.06
2198 .05 Mfd. Cond.	.35	5093 Antenna Cable	.20
2054 .004 " "	.35	8521 Wave Band Switch	.45
2056 .01 " "	.35	8512 Knobs	.20

MODEL 607

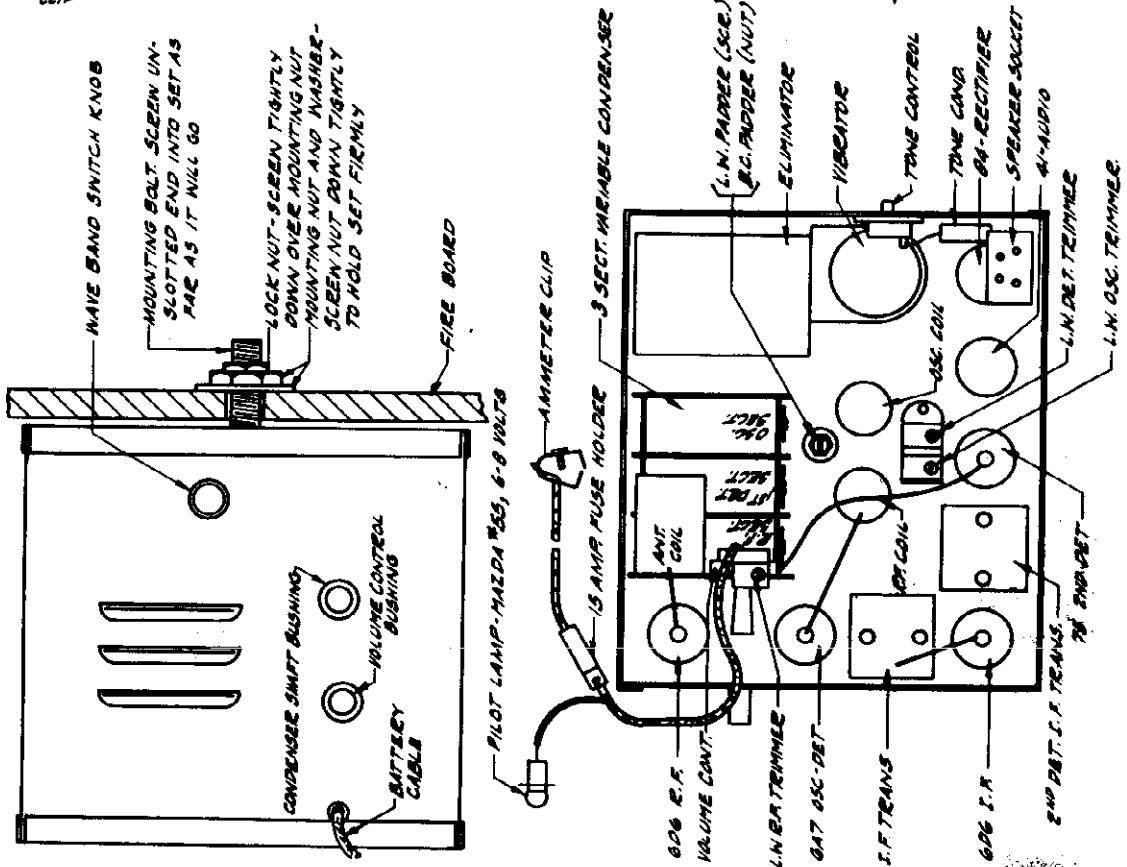
Schematic, Socket
Trimmers

DEWALD RADIO

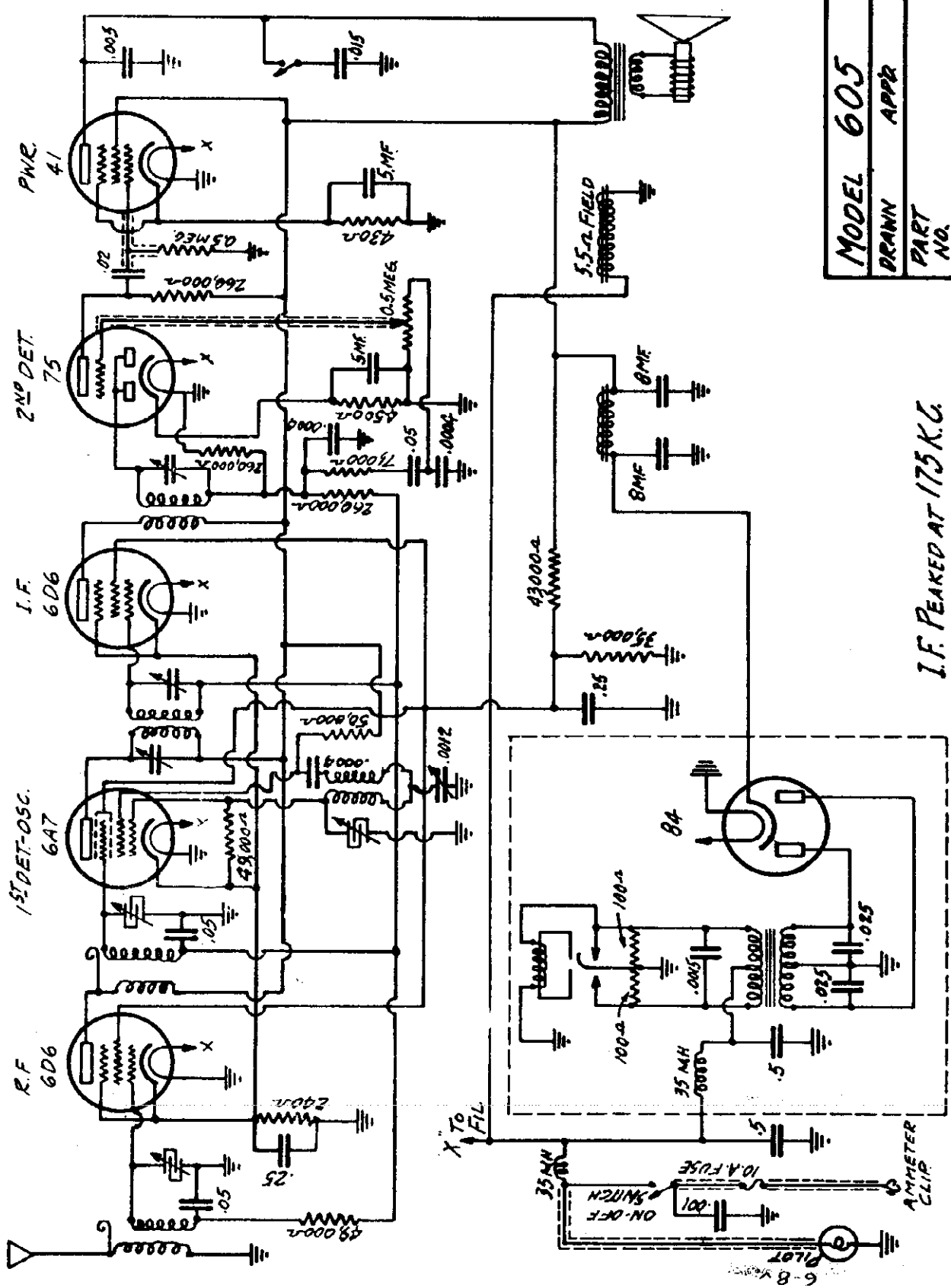


I.F. PEAK AT 456 KC.

FIG. 1



DEWALD RADIO

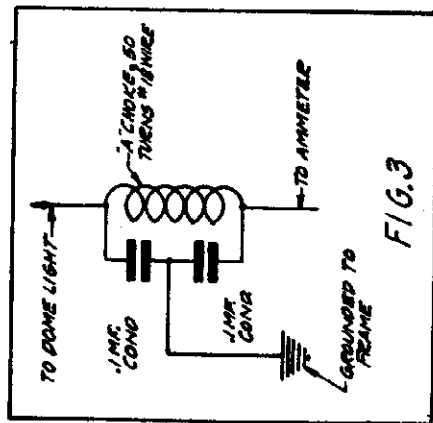
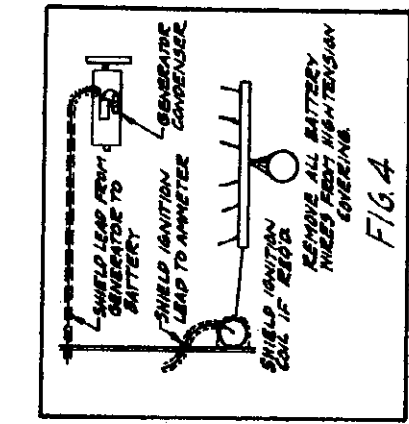
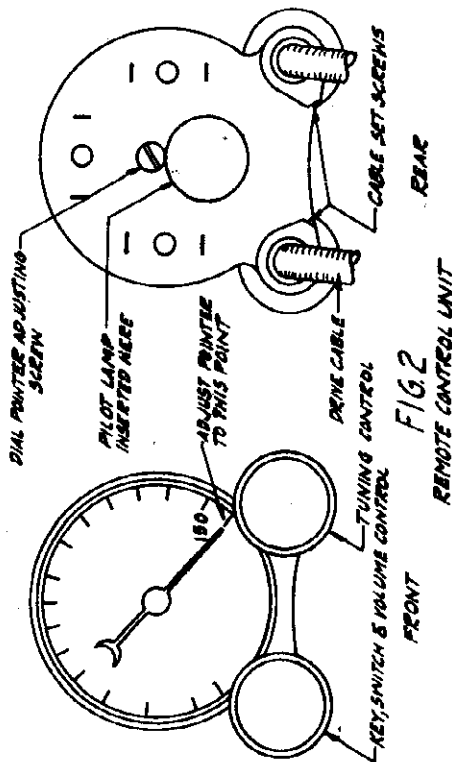


MODEL	605
BRANN	APPB
PART NO.	

I.F. PEAKED AT 175 K.C.

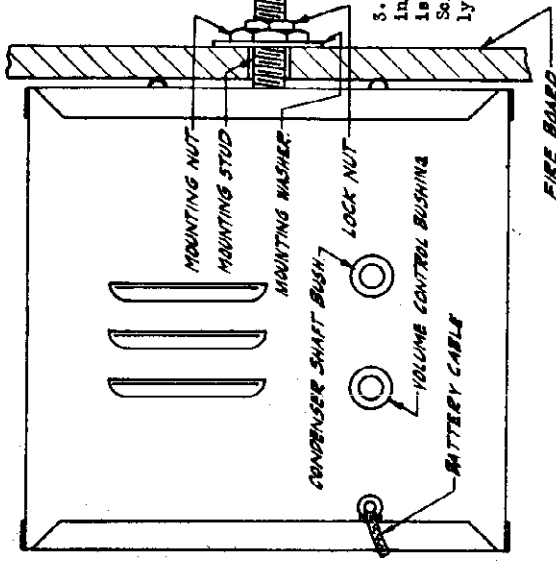
MODEL 605
Alignment
Socket, Trimmers
Parts Data

DEWALD RADIO

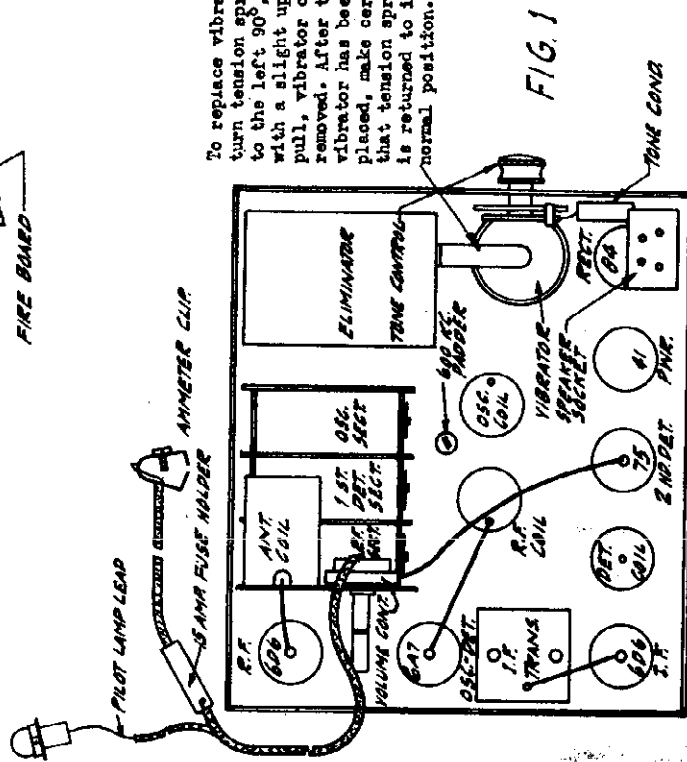


MOUNTING DATA

1. Screw unslotted end of mounting bolt tightly (up to the nicks) into large threaded hole in the rear of receiver case.
2. Determine location of set and drill 1-2 inch hole in the fire-board to pass the mounting bolt.
3. Screw on the mounting nut so that the set is held firmly in place. Screw on lock nut firmly over mounting nut.



To replace vibrator, turn tension spring to the left 90°, then with a slight upward pull, vibrator can be removed. After the vibrator has been replaced, make certain that tension spring is returned to its normal position.

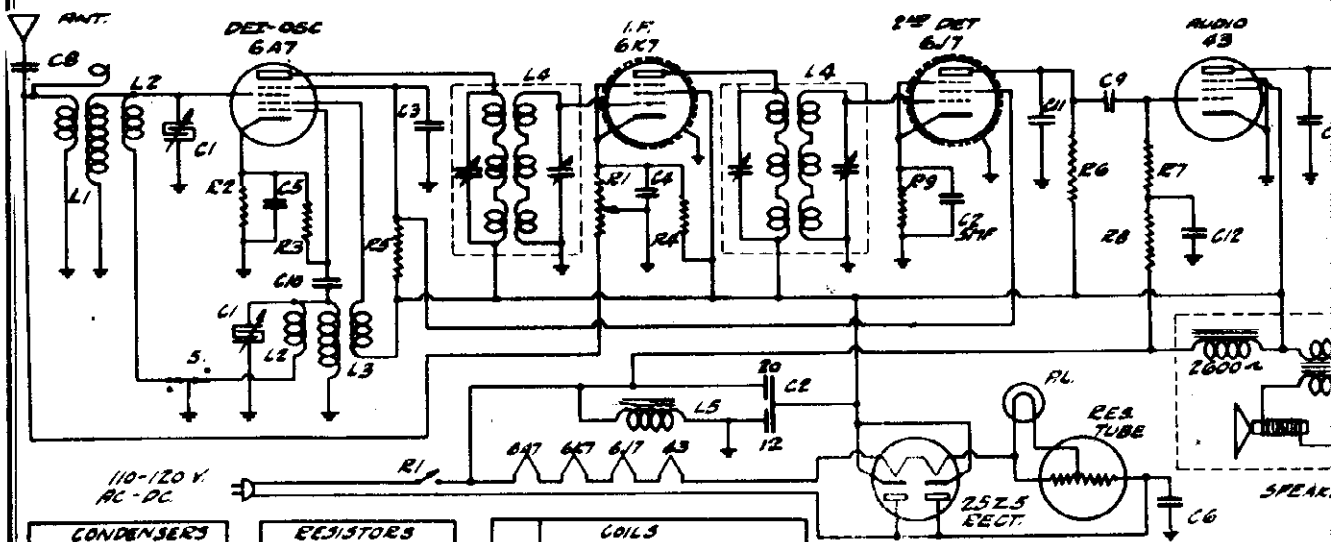


SERVICE NOTES

- INT. FREQ. ALIGNMENT** Intermediate frequency peaked at 175 K.C. Connect test oscillator to grid of 6AV and ground. (Ground stator of oscillator condenser during this operation)
- R.F. ALIGNMENT** Connect test oscillator to antenna and ground. Set dial to 1500 K.C. and align trimmer condensers on variable condensers for maximum signal. For low frequency adjustment set dial at 800 K.C. and rock paddler to match variable condenser setting of R.F. and 1st Detector.

DEWALD RADIO

MODEL 609
Schematic, Dat
Parts List



CONDENSERS		
SYM	MEG	NO.
C1	VAR.	2275
C2	20-12.5	2294
C3	.05	2046
C4	.05	2046
C5	.05	2046
C6	.05	2046
C7	.004	2054
C8	.02	2191
C9	.02	2191
C10	.0001	2123
C11	.0001	2123
C12	.1	2022

RESISTORS		
SYM	OHMS	NO.
R1	10K CONT.	8474
R2	300	3346
R3	50,000	3292
R4	50,000	3292
R5	35,000	3180
R6	.5 MEG.	3161
R7	.25 MEG.	3145
R8	1 MEG.	3140
R9	25,000	3180

COILS		
SYM	NAME	NO.
L1	ANT. COIL	1331
L2	SHUNT COIL	1353
L3	OSC. COIL	1354
L4	I.F. TRANSFORMER	1355
L5	CHOKE 400 μ	1328

MISC.		
SYM	NAME	NO.
PL	PILOT LAMP 6.3V.	8019
R1	VOL. CONT. & SWITCH	8474
S	WAVE BAND SWITCH	8521
	SPEAKER	7172
	LINE CORD	8496

MODEL 609

The Model 609 receiver is a 6 tube superheterodyne receiver operating on A.C. or D.C. 110-125 volts 40-60 cycles.

with an additional 220 volt ballast plug, set will operate on A.C. or D.C. 210-240 volts, 40-60 cycles.

OPERATION ON 110 A.C.
ON D.C. SUPPLY

Insert line cord plug into receptacle. On direct current if no reception is heard one minute after switch has been turned on, reverse line plug in receptacle.

TUBES

1-6A7, 1-6K7, 1-6J7, 1-43, 1-25Z5 and 1 Resistor Tube.

ANTENNA

The antenna may be placed along the base-board, or may be grounded. For additional power, an outside antenna may be used.

NOTE: The antenna must be unwound or the receiver will not operate satisfactorily. No ground wire is necessary for the operation of the set.

IMPORTANT

DO NOT TOUCH GROUND WIRE TO CHASSIS.

BROADCAST:

Turn wave band switch located in rear of cabinet to "Long" position, locate desired station by turning tuning control.

SHORT-WAVE:

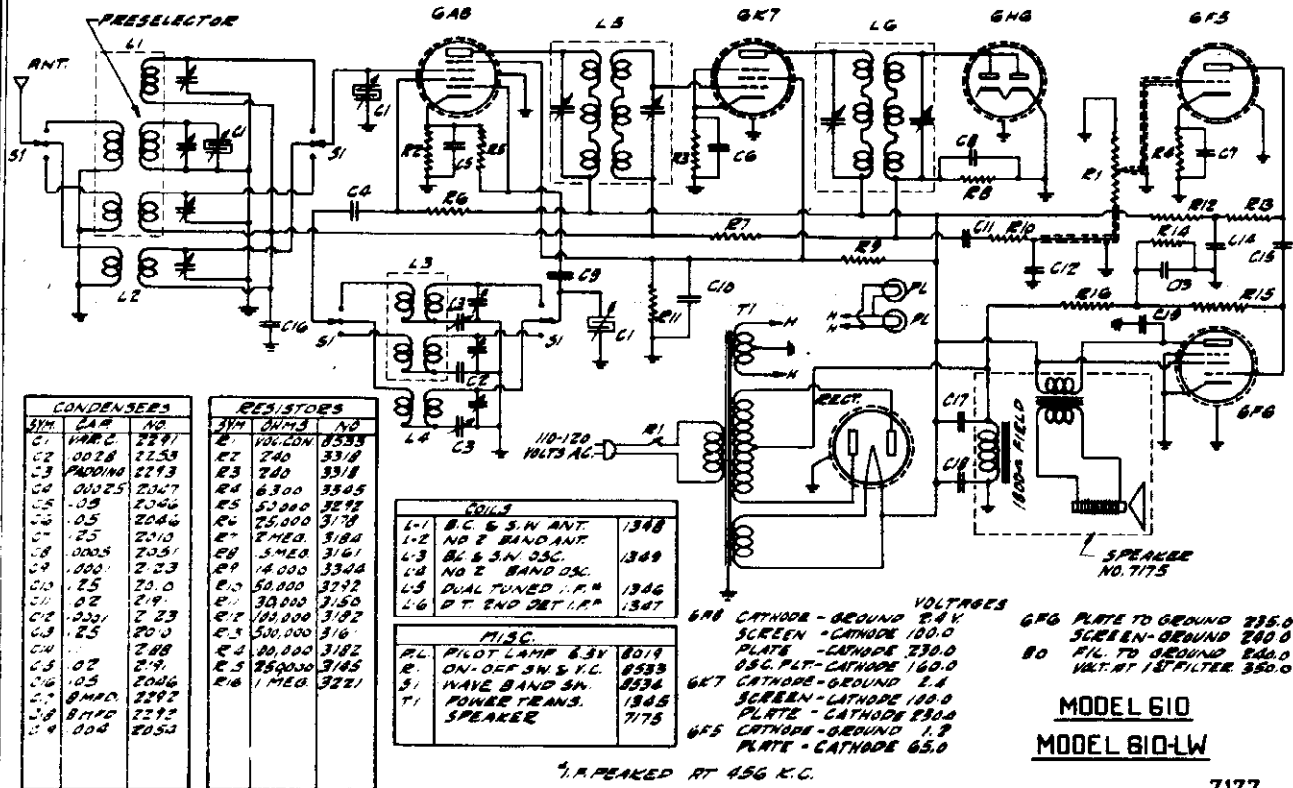
Turn wave band switch to the "short" position and turn tuning control as in Broadcast position. Use Band Two for Dial settings.

REPLACEMENT PARTS PRICE LIST

PART #		PRICE	PART #	PRICE
1328	"B" Choke	.75	2022	.1 Mfd. Cub Cond. .35
1331	Antenna Coil	.55	2295	2 Gang Var. " 2.10
1354	Oscillator Coil	.55	2294	Comb. Elect. " 1.40
1355	Dual I.F. Transformer	1.40	7172	Speaker 4.25
2054	.004 Mfd. cub Cond.	.35	8496	Line Cord .35
2191	.02 Mfd. Cub Cond.	.35	8474	Switch & Vol. Con. 1.05
2046	.05 " " "	.35	8521	Wave Band Switch .45
2123	.0001 Mfd. Mica Cond.	.40		

MODELS 610, 610-LW
Schematic, Socket
Alignment, Parts

DEWALD RADIO



TYPE	CAP.	NO.
C1	VARC	2291
C2	.0028	2253
C3	PADDING	2213
C4	.00025	2047
C5	.05	2046
C6	.05	2046
C7	.25	2010
C8	.0005	2051
C9	.001	2 23
C10	.75	20 0
C11	.02	219
C12	.22	2 23
C13	.25	20 0
C14	.01	248
C15	.02	219
C16	.05	2046
C17	.05 MFD.	2292
C18	.8 MFD.	2232
C19	.005	2053

TYPE	OHMS	NO.
R1	100,000	8533
R2	200	3318
R3	200	3318
R4	6300	3345
R5	53,000	3292
R6	25,000	3179
R7	2 MEG.	3184
R8	5 MEG.	3161
R9	14,000	3344
R10	50,000	3192
R11	30,000	3150
R12	100,000	3182
R13	50,000	316
R14	20,000	3182
R15	250,000	3185
R16	1 MEG.	3221

NO.	DESCRIPTION	PRICE
1-1	B.C. & SW ANT.	1.348
1-2	NO. 2 BAND ANT.	
1-3	BL. & SW. OSC.	1.369
1-4	NO. 2 BAND OSC.	
1-5	DUAL TUNED I.F.	1.846
1-6	P.T. END DET. I.F.	1.307
PL	PILOT LAMP 8.3V	8019
R	ON-OFF SW. & K.	8533
S	WAVE BAND SW.	8534
T	POWER TRANS.	1845
	SPEAKER	7175

VOLTAGES
 6AB CATHODE - GROUND 2.4V
 SCREEN - CATHODE 100.0
 PLATE - CATHODE 230.0
 OSC. PLT. - CATHODE 160.0
 6K7 CATHODE - GROUND 2.4
 SCREEN - CATHODE 100.0
 PLATE - CATHODE 230.0
 6F5 CATHODE - GROUND 1.2
 PLATE - CATHODE 65.0

6F6 PLATE TO GROUND 235.0
 SCREEN - GROUND 240.0
 B0 FIL. TO GROUND 240.0
 VOLT. AT 1ST FILTER 350.0

1/4 W. PEAKED AT 456 K.C.

MODEL 610
MODEL 610-LW

7177

INTERMEDIATE FREQUENCY ALIGNMENT

Intermediate frequency peaked at 456 K.C. Connect test oscillator to grid of 6AB and Chassis. Ground stator of front section of Variable Condenser during this operation.

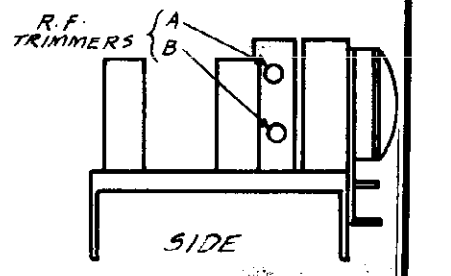
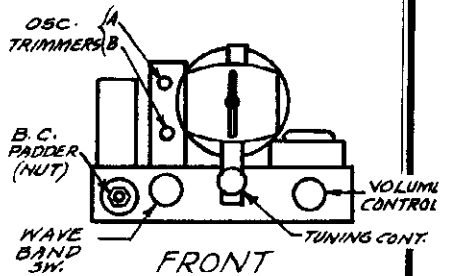
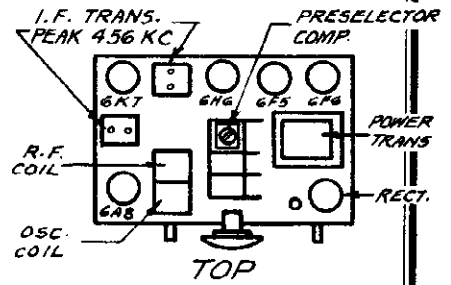
RF. ALIGNMENT Connect test oscillator to antenna and ground connections and set dial to 1500 K.C. and peak trimmers "A" for maximum signal. For low frequency adjustment, set dial at 600 K.C. and repeak padding condenser (Nut on front of chassis). Next readjust at 1500 K.C.

BAND 2 ALIGNMENT Police band adjustments for 610 only. Set test oscillator at 4000 K.C. Repeak the two trimmers located underneath chassis for maximum gain. Next set Variable Condenser at 1600 K.C. and repeak padder (screw) on front panel of Chassis. Next readjust trimmers underneath the chassis at 4000 Kilocycles.

Long wave adjustment for 610 LW only. These adjustments same as police except low frequency setting is 170 K.C. and high frequency setting is 350 K.C.

SHORT WAVE ALIGNMENT Set Variable Condenser to 15 Megacycles and connect test oscillator to Antenna and ground and repeak trimmers "B" for maximum gain. The low frequency setting is automatically taken care of. The Short wave coils are carefully matched for this setting and a fixed calibrated padder peaks the short waves for the low frequency setting.

SERVICE NOTES



MODEL 610
NUMBERS AND LIST PRICES OF REPLACEMENT PARTS

1345	Power Transformer	\$4.00	2293	Padding Condenser	.85
1348	Comb. Antenna Coil	2.15	2051	Mica Condenser .0005	.35
1350	Comb. Police Coil	1.50	2291	3 Gang Variable Cond.	4.05
1349	" Oscillator Coil	1.40	2292	Comb. Electrolytic Cond.	1.60
1346	Dual I.F. Transformer	1.50	2230	Dual Trimmer Cond.	.35
1347	Second Detector Coil	1.50	2010	.25 Mfd. Cub "	.65
2054	.004 Mfd. Cub Condenser	.35	8512	Knobs	.20
2191	.02 Mfd. Cub Condenser	.35	7175	Speaker	5.75
2046	.02 " " "	.35	8496	Line Cord	.35
2138	.1 " " "	.35	8533	Volume Control	1.05
2123	.0001 Mfd. Mica "	.40	8534	Wave Band Switch	.65
2253	.0028 Mica Condenser	.45			
2047	.00025 " " "	.35			

P - 44 - M 8-35

DEWALD RADIO

MODELS 611, 611-LW
Schematic, Socket
Trimmers, Alignment

INTERMEDIATE
FREQUENCY
ALIGNMENT

Intermediate frequency peaked at 456 K.C. Connect test oscillator to grid of 6A8 and Chassis. Short circuit stator of Variable Condenser during this operation.

RANGE: Model 611 covers the following ranges:- Broadcast - 545 to 1600 Kilocycles; Police - 1600 to 4600 Kilocycles and Short Wave - 5.5 to 16.5 Megacycles.

Model 611 L.W. covers the following ranges:- Long Wave - 150 to 410 Kilocycles; Broadcast - 545 to 1600 Kilocycles and Short Wave 5.5 to 16.5 Megacycles.

RF. ALIGNMENT Connect test oscillator to antenna and chassis. (See Sketch) and set dial to 1500 K.C. and peak trimmers "A" for maximum signal. For low frequency adjustment, set dial at 600 K.C. and repeak padding condenser (Nut on front of chassis). Next readjust at 1500 K.C.

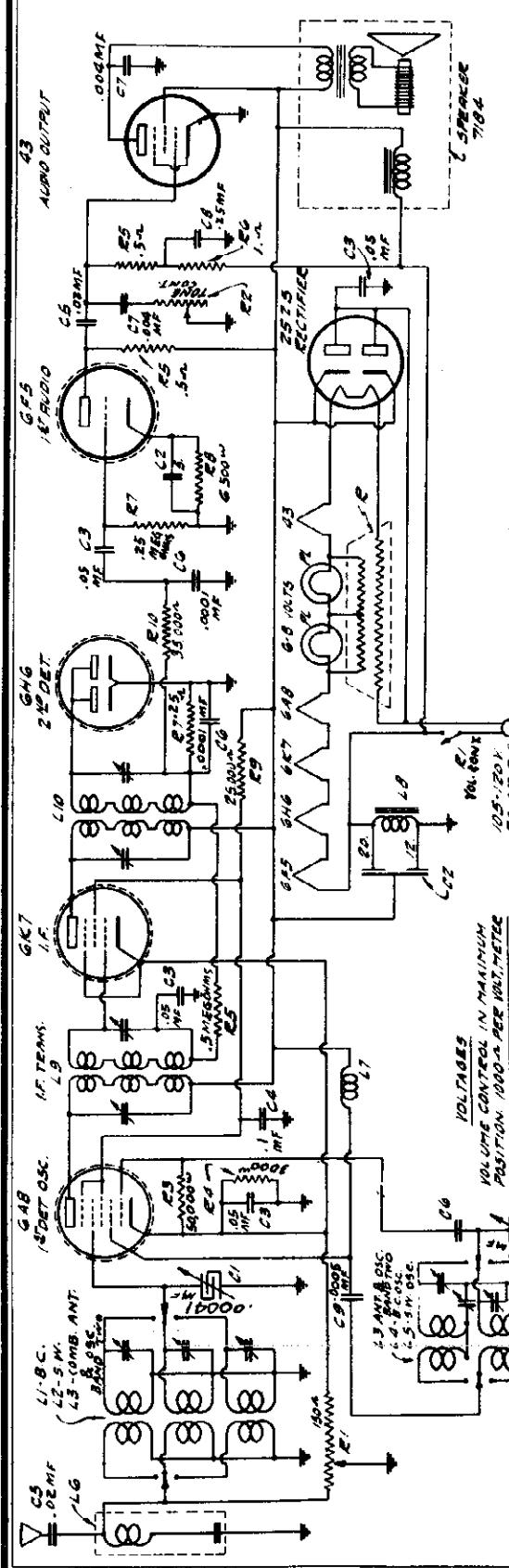
BAND 2

ALIGNMENT Police band adjustments for 611 only. Set test oscillator at 4000 K.C. Repeak the two trimmers "C" (see sketch) for maximum gain. Next set Variable Condenser at 1600 K.C. and repeak padder (screw) on front panel of Chassis. Next readjust trimmers at 4000 Kilocycles.

Long Wave adjustment for 611 LW only. These adjustments same as police except low frequency setting is 170 K.C. and high frequency setting is 350 K.C.

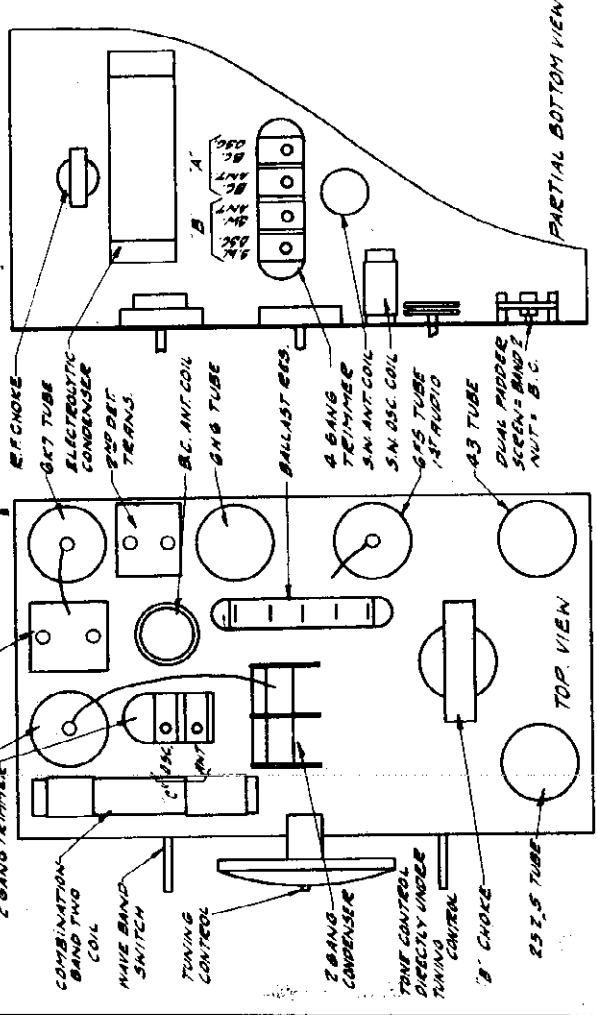
SHORT WAVE

ALIGNMENT Set Variable Condenser to 15 Megacycles and connect test oscillator to Antenna and ground and repeak trimmers "B" for maximum gain. The low frequency setting is automatically taken care of. The Short Wave coils are carefully matched for this setting and a fixed calibrated padder peaks the short waves for the low frequency setting.



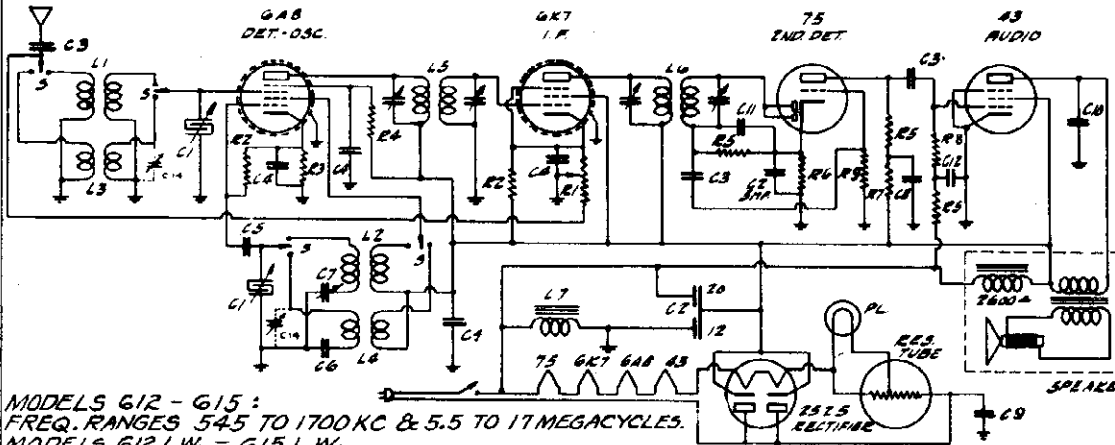
MODEL 611
MODEL 611-LW

VOLTAGES
VOLUME CONTROL IN MAXIMUM POSITION 1000.5 PER VOLTMETER
6A8 CATHODE TO GROUND 1-2 V
SCREEN TO GROUND 95-100 V
DET PLATE TO GROUND 90-100 V
6B7 SCREEN TO GROUND 95-100 V
PLATE TO GROUND 90-100 V
6G5 CATHODE TO GROUND 25-30 V
PLATE TO GROUND 90-95 V
SCREEN TO GROUND 90-100 V



MODELS 612, 612-LW,
615, 615-LW
Schematic, Sockket,
Alignment, Parts

DEWALD RADIO



MODELS - 612-615, 612LW-615LW.
ON MODELS - 612LW-615LW-TRIMMERS
2230 ARE USED. PADDER, C. 6. AS
REPLACED BY C.13. COIL L.3. REPLACED
BY L.8. AND COIL L.4 BY L.9

MODELS 612 - 615 :
FREQ. RANGES 545 TO 1700 KC & 5.5 TO 17 MEGACYCLES.
MODELS 612 LW - 615 LW.
RANGES 545 TO 1700 KC & 150 TO 353 KC.

SERVICE NOTES

INT. FREQ. ALIGNMENT. Intermediate frequency peaked at 456 K.C. Connect test oscillator to grid of 6AB and chassis. (Ground stator of front section of variable condenser during this operation.)

R. F. ALIGNMENT

Connect test oscillator to antenna and chassis and set dial to 1500 K.C. and peak variable condensers. For low frequency adjustment set dial at 600 K.C. and peak padding condenser on front of chassis, rocking variable condenser at the same time. Short wave Calibration is automatically taken care of by re-peaking at 1500 K.C. The short wave coils are matched carefully for this setting. A fixed Calibrated padder automatically peaks the short waves for the low frequency setting.

LONG WAVE ALIGNMENT ON 612 L.W. - 615 L.W.

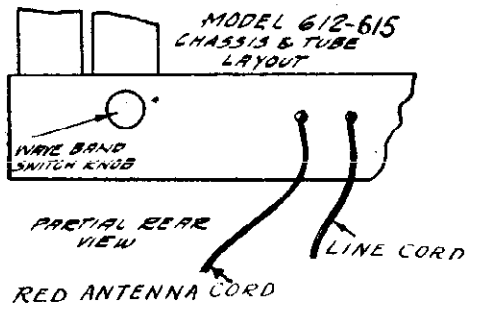
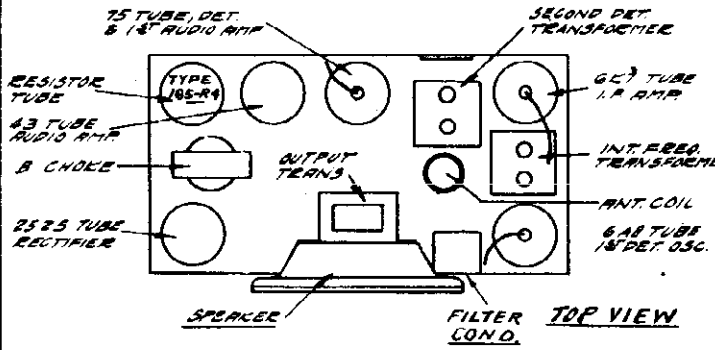
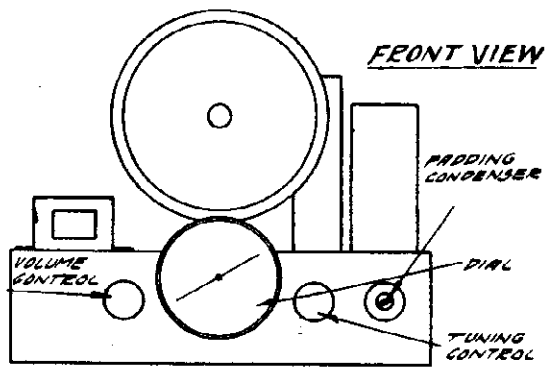
Turn wave band switch to "Foreign" position, and align the Long wave trimmers at 375 K.C. Adjust the Long wave padder (screw section) at 175 K.C.

CONDENSERS			RESISTORS		
SYM.	MFD.	NO.	SYM.	OHMS	NO.
C1	VAR.C.	2280	R1	100,000	8474
C2	20-125	2201	R2	50,000	3269
C3	.02	2191	R3	240	3252
C4	.05	2046	R4	75,000	3228
C5	.0001	2123	R5	5,000	3161
C6	.0028	2253	R6	4,500	3319
C7	PADDER	2229	R7	67,000	3321
C8	1-100V	2022	R8	260,000	3362
C9	1-100V	2188	R9	100,000	3192
C10	.006	2007			
C11	.00035	2233			
C12	.25	2033			
C13	L.W. PAD.	2277			
C14	L.W. TR.	2230			

MISC.		
SYM.	NAME	NO.
L1	B.C. ANT. COIL	1363
L2	B.C. OSC. COIL	1357
L3	S.W. ANT. COIL	1250
L4	S.W. OSC. COIL	1249
L5	DUAL TUNED I.F.	1355
L6	2ND DET. I.F.	1356
L7	B. CHOKE 400A	1328
L8	L.W. ANT. COIL	1351
L9	L.W. OSC. COIL	1352
PL	PILOT LITE 6-B V	8019
R1	VOL. CONT. & SW.	8474
	SPEAKER	7172
	WAVE BAND SW.	8475
	LINE CORD	8496

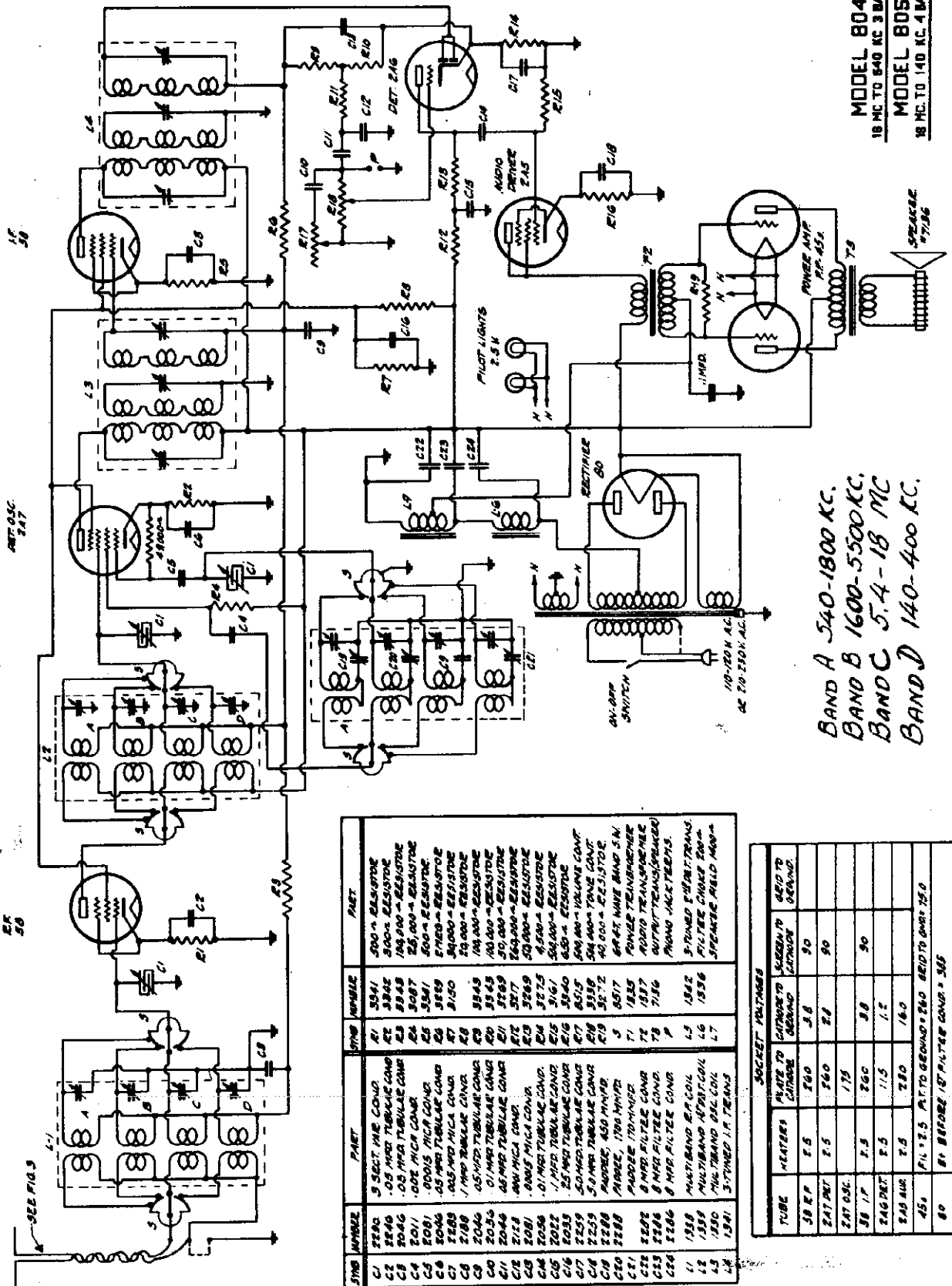
LIST OF REPLACEMENT PARTS

PART NUMBER	LIST PRICE	PART NUMBER	LIST PRICE
1328	.75	2123	.40
1363	.50	2253	.45
1357	.55	2233	.35
1250	.55	2033	.40
1249	.55	2229	.45
1355	1.40	7172	4.25
1356	1.40	8496	.35
2280	2.45	8474	1.05
2301	1.40	8475	.65
		8512	.20
2007	.35	1351	1.25
2191	.35	1352	1.25
2188	.35	2230	.40
2046	.35	2277	.90



DEWALD RADIO

MODEL 804
18 MC TO 540 KC 3 BANDS
MODEL 805
18 MC TO 140 KC 4 BANDS



BAND A 540-1800 KC.
BAND B 1600-5500 KC.
BAND C 5.4-18 MC
BAND D 140-400 KC.

SYMBOL	PART	SYMBOL	PART
C1	5 SECT. VAR. COND.	R1	500 Ω RESISTOR
C2	.05 MFD TUBULAR COND.	R2	300 Ω RESISTOR
C3	.05 MFD TUBULAR COND.	R3	100,000 Ω RESISTOR
C4	.005 MICR. COND.	R4	25,000 Ω RESISTOR
C5	.0005 MICR. COND.	R5	500 Ω RESISTOR
C6	.05 MFD TUBULAR COND.	R6	5000 Ω RESISTOR
C7	.005 MFD MICA COND.	R7	20,000 Ω RESISTOR
C8	.1 MFD TUBULAR COND.	R8	100,000 Ω RESISTOR
C9	.05 MFD TUBULAR COND.	R9	100,000 Ω RESISTOR
C10	.05 MFD TUBULAR COND.	R10	50,000 Ω RESISTOR
C11	.05 MFD TUBULAR COND.	R11	25,000 Ω RESISTOR
C12	.05 MFD TUBULAR COND.	R12	50,000 Ω RESISTOR
C13	.05 MFD TUBULAR COND.	R13	50,000 Ω RESISTOR
C14	.05 MFD TUBULAR COND.	R14	50,000 Ω RESISTOR
C15	.05 MFD TUBULAR COND.	R15	50,000 Ω RESISTOR
C16	.05 MFD TUBULAR COND.	R16	50,000 Ω RESISTOR
C17	.05 MFD TUBULAR COND.	R17	50,000 Ω RESISTOR
C18	.05 MFD TUBULAR COND.	R18	50,000 Ω RESISTOR
C19	.05 MFD TUBULAR COND.	R19	50,000 Ω RESISTOR
C20	.05 MFD TUBULAR COND.	R20	50,000 Ω RESISTOR
C21	.05 MFD TUBULAR COND.	R21	50,000 Ω RESISTOR
C22	.05 MFD TUBULAR COND.	R22	50,000 Ω RESISTOR
C23	.05 MFD TUBULAR COND.	R23	50,000 Ω RESISTOR
C24	.05 MFD TUBULAR COND.	R24	50,000 Ω RESISTOR
C25	.05 MFD TUBULAR COND.	R25	50,000 Ω RESISTOR
C26	.05 MFD TUBULAR COND.	R26	50,000 Ω RESISTOR
C27	.05 MFD TUBULAR COND.	R27	50,000 Ω RESISTOR
C28	.05 MFD TUBULAR COND.	R28	50,000 Ω RESISTOR
C29	.05 MFD TUBULAR COND.	R29	50,000 Ω RESISTOR
C30	.05 MFD TUBULAR COND.	R30	50,000 Ω RESISTOR
C31	.05 MFD TUBULAR COND.	R31	50,000 Ω RESISTOR
C32	.05 MFD TUBULAR COND.	R32	50,000 Ω RESISTOR
C33	.05 MFD TUBULAR COND.	R33	50,000 Ω RESISTOR
C34	.05 MFD TUBULAR COND.	R34	50,000 Ω RESISTOR
C35	.05 MFD TUBULAR COND.	R35	50,000 Ω RESISTOR
C36	.05 MFD TUBULAR COND.	R36	50,000 Ω RESISTOR
C37	.05 MFD TUBULAR COND.	R37	50,000 Ω RESISTOR
C38	.05 MFD TUBULAR COND.	R38	50,000 Ω RESISTOR
C39	.05 MFD TUBULAR COND.	R39	50,000 Ω RESISTOR
C40	.05 MFD TUBULAR COND.	R40	50,000 Ω RESISTOR
C41	.05 MFD TUBULAR COND.	R41	50,000 Ω RESISTOR
C42	.05 MFD TUBULAR COND.	R42	50,000 Ω RESISTOR
C43	.05 MFD TUBULAR COND.	R43	50,000 Ω RESISTOR
C44	.05 MFD TUBULAR COND.	R44	50,000 Ω RESISTOR
C45	.05 MFD TUBULAR COND.	R45	50,000 Ω RESISTOR
C46	.05 MFD TUBULAR COND.	R46	50,000 Ω RESISTOR
C47	.05 MFD TUBULAR COND.	R47	50,000 Ω RESISTOR
C48	.05 MFD TUBULAR COND.	R48	50,000 Ω RESISTOR
C49	.05 MFD TUBULAR COND.	R49	50,000 Ω RESISTOR
C50	.05 MFD TUBULAR COND.	R50	50,000 Ω RESISTOR
C51	.05 MFD TUBULAR COND.	R51	50,000 Ω RESISTOR
C52	.05 MFD TUBULAR COND.	R52	50,000 Ω RESISTOR
C53	.05 MFD TUBULAR COND.	R53	50,000 Ω RESISTOR
C54	.05 MFD TUBULAR COND.	R54	50,000 Ω RESISTOR
C55	.05 MFD TUBULAR COND.	R55	50,000 Ω RESISTOR
C56	.05 MFD TUBULAR COND.	R56	50,000 Ω RESISTOR
C57	.05 MFD TUBULAR COND.	R57	50,000 Ω RESISTOR
C58	.05 MFD TUBULAR COND.	R58	50,000 Ω RESISTOR
C59	.05 MFD TUBULAR COND.	R59	50,000 Ω RESISTOR
C60	.05 MFD TUBULAR COND.	R60	50,000 Ω RESISTOR
C61	.05 MFD TUBULAR COND.	R61	50,000 Ω RESISTOR
C62	.05 MFD TUBULAR COND.	R62	50,000 Ω RESISTOR
C63	.05 MFD TUBULAR COND.	R63	50,000 Ω RESISTOR
C64	.05 MFD TUBULAR COND.	R64	50,000 Ω RESISTOR
C65	.05 MFD TUBULAR COND.	R65	50,000 Ω RESISTOR
C66	.05 MFD TUBULAR COND.	R66	50,000 Ω RESISTOR
C67	.05 MFD TUBULAR COND.	R67	50,000 Ω RESISTOR
C68	.05 MFD TUBULAR COND.	R68	50,000 Ω RESISTOR
C69	.05 MFD TUBULAR COND.	R69	50,000 Ω RESISTOR
C70	.05 MFD TUBULAR COND.	R70	50,000 Ω RESISTOR
C71	.05 MFD TUBULAR COND.	R71	50,000 Ω RESISTOR
C72	.05 MFD TUBULAR COND.	R72	50,000 Ω RESISTOR
C73	.05 MFD TUBULAR COND.	R73	50,000 Ω RESISTOR
C74	.05 MFD TUBULAR COND.	R74	50,000 Ω RESISTOR
C75	.05 MFD TUBULAR COND.	R75	50,000 Ω RESISTOR
C76	.05 MFD TUBULAR COND.	R76	50,000 Ω RESISTOR
C77	.05 MFD TUBULAR COND.	R77	50,000 Ω RESISTOR
C78	.05 MFD TUBULAR COND.	R78	50,000 Ω RESISTOR
C79	.05 MFD TUBULAR COND.	R79	50,000 Ω RESISTOR
C80	.05 MFD TUBULAR COND.	R80	50,000 Ω RESISTOR
C81	.05 MFD TUBULAR COND.	R81	50,000 Ω RESISTOR
C82	.05 MFD TUBULAR COND.	R82	50,000 Ω RESISTOR
C83	.05 MFD TUBULAR COND.	R83	50,000 Ω RESISTOR
C84	.05 MFD TUBULAR COND.	R84	50,000 Ω RESISTOR
C85	.05 MFD TUBULAR COND.	R85	50,000 Ω RESISTOR
C86	.05 MFD TUBULAR COND.	R86	50,000 Ω RESISTOR
C87	.05 MFD TUBULAR COND.	R87	50,000 Ω RESISTOR
C88	.05 MFD TUBULAR COND.	R88	50,000 Ω RESISTOR
C89	.05 MFD TUBULAR COND.	R89	50,000 Ω RESISTOR
C90	.05 MFD TUBULAR COND.	R90	50,000 Ω RESISTOR
C91	.05 MFD TUBULAR COND.	R91	50,000 Ω RESISTOR
C92	.05 MFD TUBULAR COND.	R92	50,000 Ω RESISTOR
C93	.05 MFD TUBULAR COND.	R93	50,000 Ω RESISTOR
C94	.05 MFD TUBULAR COND.	R94	50,000 Ω RESISTOR
C95	.05 MFD TUBULAR COND.	R95	50,000 Ω RESISTOR
C96	.05 MFD TUBULAR COND.	R96	50,000 Ω RESISTOR
C97	.05 MFD TUBULAR COND.	R97	50,000 Ω RESISTOR
C98	.05 MFD TUBULAR COND.	R98	50,000 Ω RESISTOR
C99	.05 MFD TUBULAR COND.	R99	50,000 Ω RESISTOR
C100	.05 MFD TUBULAR COND.	R100	50,000 Ω RESISTOR

TUBE	HEATERS	PIVOTS TO GROUND	SCREEN TO GROUND	GRID TO GROUND
247 RF	F 5	F 5	F 5	F 5
247 OSC.	F 5	F 5	F 5	F 5
245 1P	F 5	F 5	F 5	F 5
245 DET.	F 5	F 5	F 5	F 5
245 AMP.	F 5	F 5	F 5	F 5
45A	F 5	F 5	F 5	F 5
80	F 5	F 5	F 5	F 5

SOCKET POLARITIES

PIVOTS TO GROUND = 240 GRID TO GROUND = 250
 SCREEN TO GROUND = 300
 GRID TO GROUND = 370
 PIVOTS TO GROUND = 240 GRID TO GROUND = 250

MODELS 804, 805
Socket, Trimmers,
Alignment, Data

DEWALD RADIO

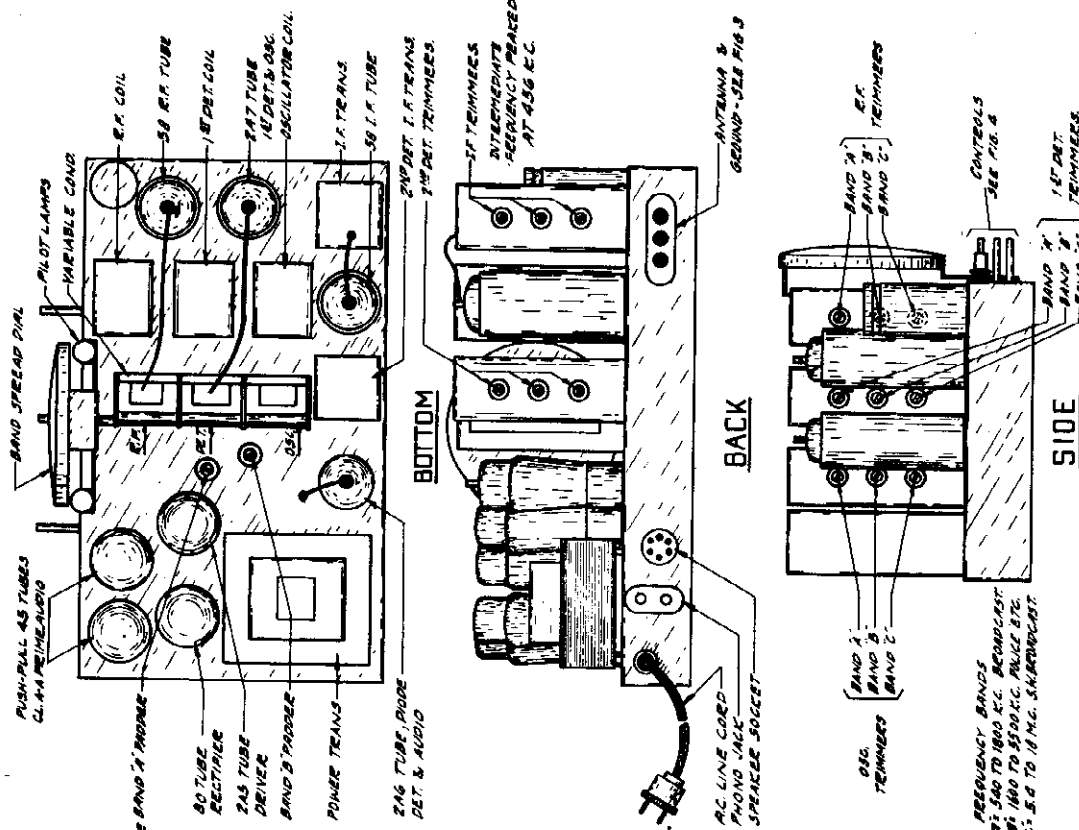


FIG. 2

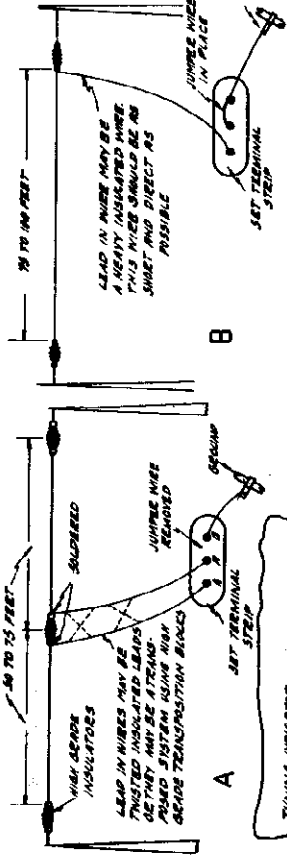


FIG. 3

The Models 804 and 805 are all new superheterodyne receivers designed to operate on 110-130 or 210-230 volts, 60 cycles a.c. power supply only. The primary tap on top of the power transformer must be connected properly for the voltage to be used.
Before plugging into the power line, make sure that the line voltage and current frequency agree with the line voltage and current frequency of the receiver. Under conditions, consult your local power company.
Check the tubes to be certain that they are securely seated in their respective sockets, and that the grid check the top of the tubes are firmly in place. Also check the antenna lead-in wire that is securely pushed into its socket at the rear of the Chassis.

TUBES 2-58, 1-2A7, 1-2A5, 1-5A6, 2-45, 1-80

INSTALLATION This receiver is arranged for "Doublet" antenna system, or an ordinary antenna system. For connections of either type see Fig. 2A & 2B. A good antenna is essential for the correct operation of this receiver, especially where distant reception is desired. The antenna should be placed as high as possible above the surrounding objects. No. 14 solid or stranded wire may be used for the flat top portion and well insulated semi-conductor material such as copper pipe or galvanized iron pipe for the lead-in section. The antenna should be supported by insulators. High grade porcelain are well suited for radio installations. The lead-in wire should be kept away from all nearby wires where they are at right angles to power or trolley lines. The antenna should be kept as short as possible into the house at the nearest point convenient to the receiver to avoid picking up noise from home electrical devices. The ground wire should be as short as possible and must be a good connection to water or other grounded pipe.

BAND SPREAD DIAL

This receiver is provided with a dual station selector drive to permit micrometer tuning which is especially desirable on the short waves where band spreading or its equivalent is especially necessary for easy and rapid registering of stations.

The large knob of the main selector drive is the low wave control with a normal ratio of 24 to 1 in 3000. This knob is calibrated in kilocycles and has a range of control with a knob ratio of 125 to 1 in 3000. Bands "A" and "B" are calibrated in kilocycles and Band "C" in megacycles. The Small Band Spread Dial control may be used to make fine adjustments not obtainable with the large knob.

FRONT PANEL It is possible to use this receiver for the reproduction of dial attachment. For this purpose, a Phono Jack is located at the rear of the Chassis. The volume control will control the high fidelity output for Phonograph reproduction (any high fidelity pickup of high quality may be used with this receiver).

SERVICE NOTES

ALIGNMENT The procedures outlined below should be followed for location alignment trimmer and potentiometers, see Fig. 2.

I. F. ALIGNMENT To align the Intermediate Frequency Section, the variable capacitor, the 58 R.F. Tube, the 58 I.F. Tube, the 2A7 Tube and check the output through the Variable Capacitor (check on each I.F. Transformer) for Max Signal. (Volume Control must be in maximum position during all adjustments. Use the least adjustment possible to prevent broadening of the resonance peak.)

BAND "A" (BROADCAST) ALIGNMENT After the Intermediate Frequency stages have been completely aligned, connect the band switch to "A" position. Set the test for oscillator to 485 K.C. and connect its output through the 2A7 Tube and check the output through the Variable Capacitor (check on each I.F. Transformer) for Max Signal. (Volume Control must be in maximum position during all adjustments. Use the least adjustment possible to prevent broadening of the resonance peak.)

BAND "B" (SHORT WAVE) ALIGNMENT Turn the Band Switch to "B" position and set the test for oscillator to 5000 K. C. Adjust test oscillator to this frequency and adjust three band "B" trimmers.

BAND "C" (LONG WAVE) ALIGNMENT Turn the Band Switch to "C" position and set the test for oscillator to 375 K. C. Adjust Band "C" Potentiometer on wave band switch to 375 K. C. Adjust Band "D" Potentiometer at 180 K. C.

FIG. 4

VIEW OF FRONT PANEL

MODELS 139,139C

Alignment

ECHOPHONE RADIO MFG. CO.

SERVICE MANUAL

MODELS #139 - #139C

This receiver is a six tube superheterodyne, designed to operate on 105 to 120 volts alternating current, 60 cycle and can also be furnished for 25 cycle.

Tube complement:

- 1 - 6A7 - first detector and oscillator
- 1 - 6D6 - I F amplifier
- 1 - 75 - second detector-AVC- 1st audio
- 2 - 42 - in parallel - power output
- 1 - 80 - rectifier

This receiver covers the following three wave bands:
540 - 1720 kilocycles
1720- 5000 kilocycles
5.5- 16 megacycles

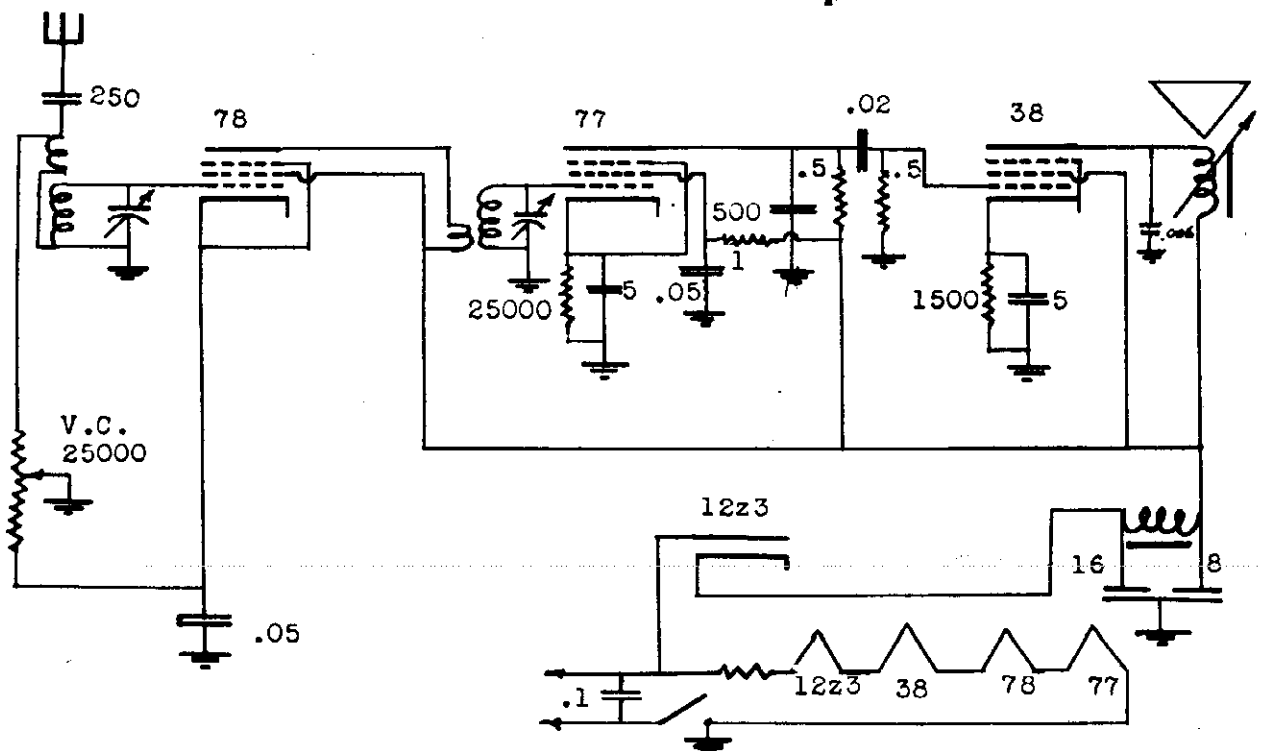
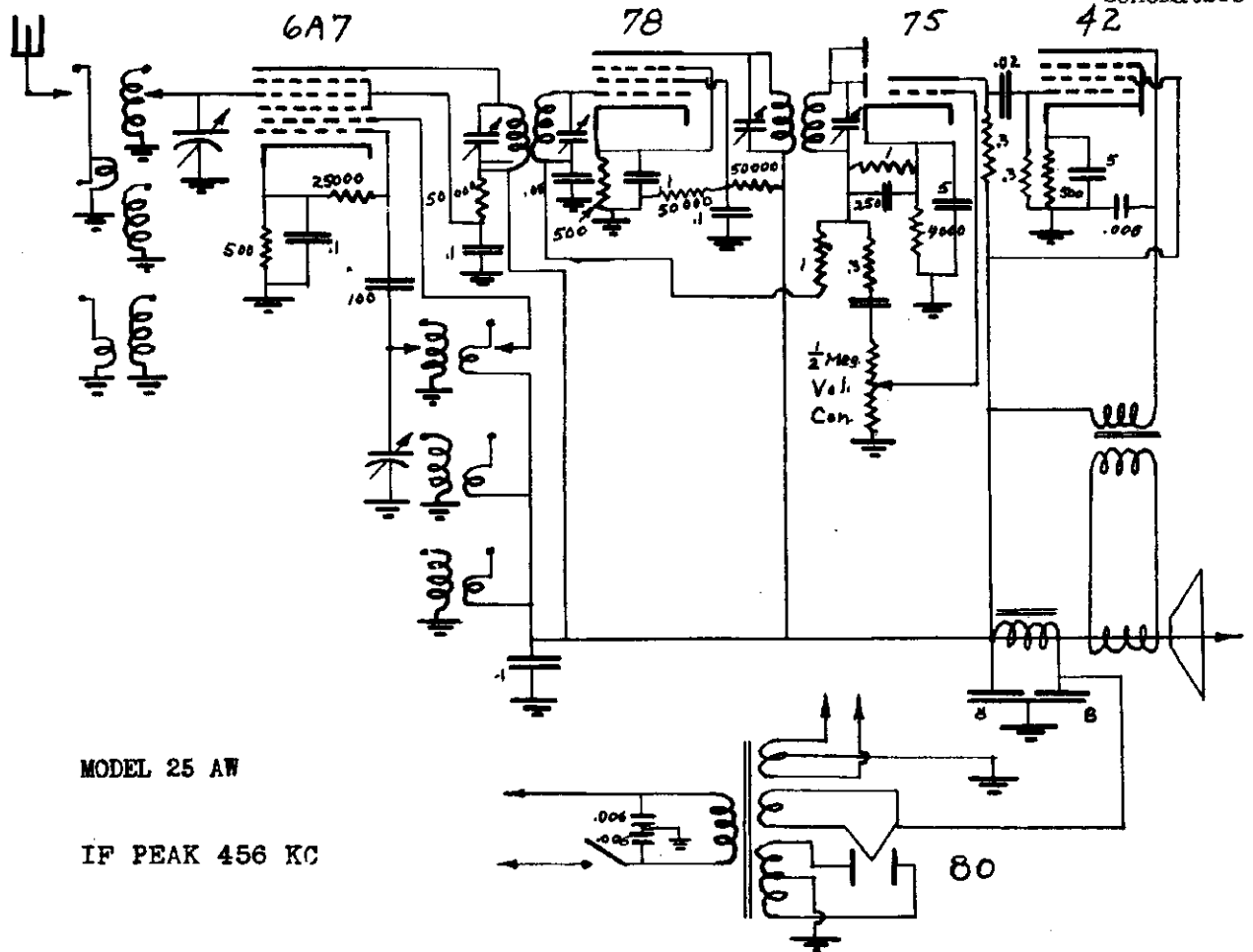
Very satisfactory results should be obtained with an antenna of from 40 to 75 feet long, well insulated and erected well up above ground and at least ten feet away from surrounding objects.

To align receiver, proceed as follows:

- 1 - Apply 456 KC note to control grid of 6A7 and peak I F transformers for maximum gain.
- 2 - Apply 4000 KC note to antenna wire; set band switch to second band and align trimmer on oscillator section of variable condenser to track with 4000 KC on dial.
- 3 - Turn band switch to broadcast band; apply 1500 KC note to antenna wire, adjust trimmer on RF section of variable condenser for maximum gain.
- 4 - Apply 600 KC note to antenna, adjust padder condenser for maximum gain, swinging condenser back and forth across 600 KC signal.
- 5 - Check 1400 KC signal for alignment.
- 6 - Turn band switch to second band; check 4000 KC signal for alignment and adjust trimmer on antenna coil for greatest gain at 4000 KC.
- 7 - Turn band switch to last band and adjust trimmer on antenna coil for greatest noise on 12 megacycles.

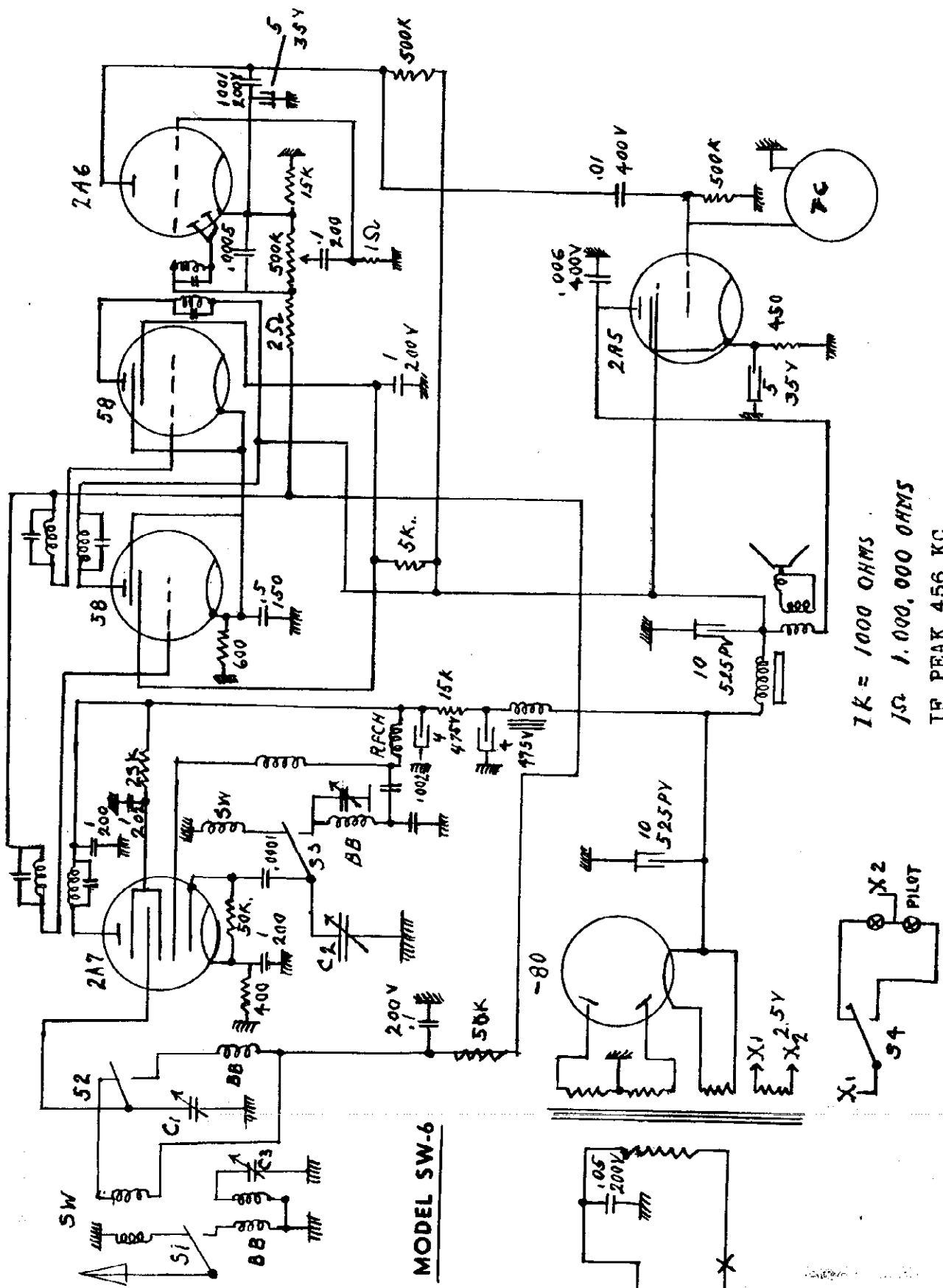
ELECTRIC & AUTOMOTIVE PROD. CO.

MODEL 4M
MODEL 25-AW
Schematics



MODEL SW-6
Schematic

ELECTRIC & AUTOMOTIVE PROD. CO.

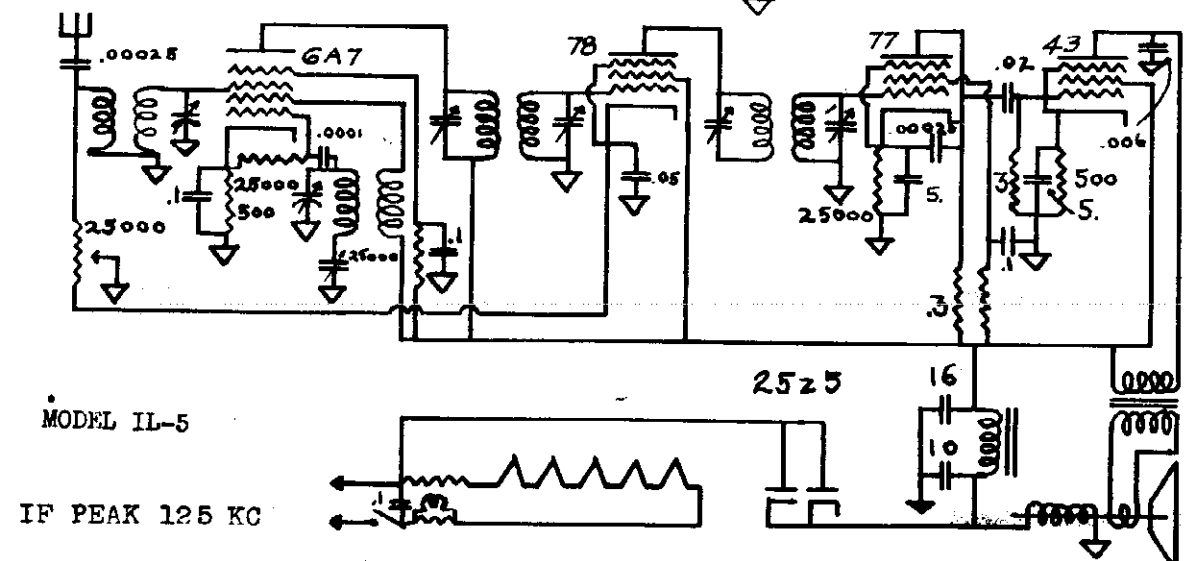
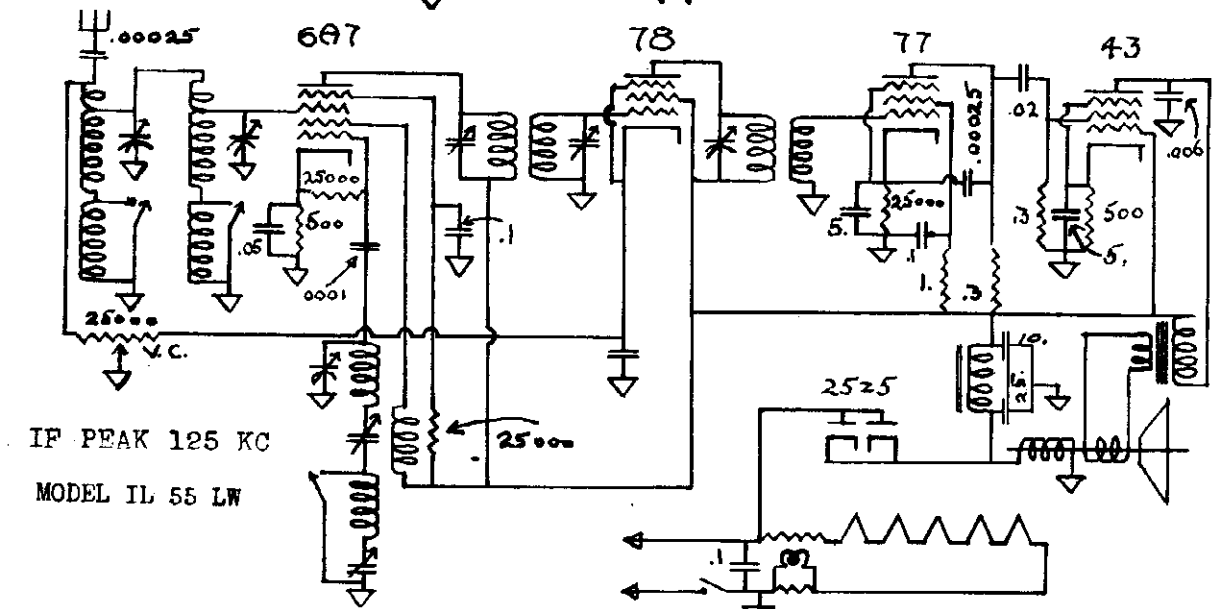
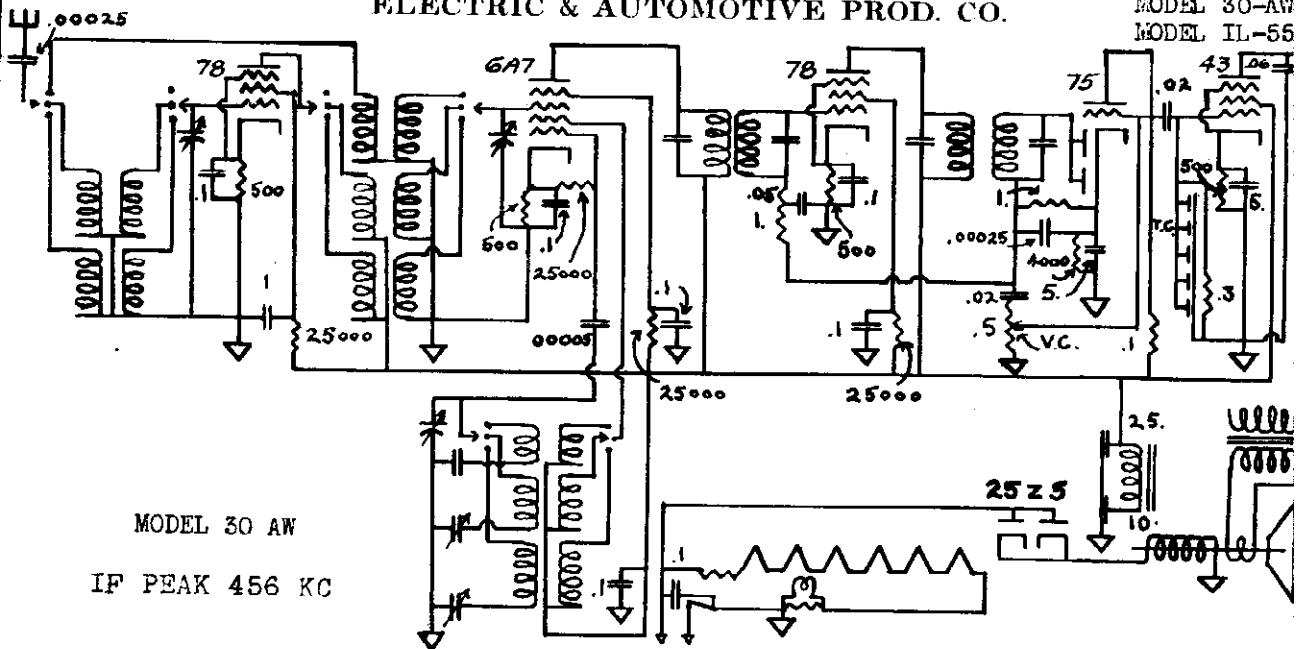


IK = 1000 OHMS
IS 1,000,000 OHMS
IF PEAK 456 KC

Schematics

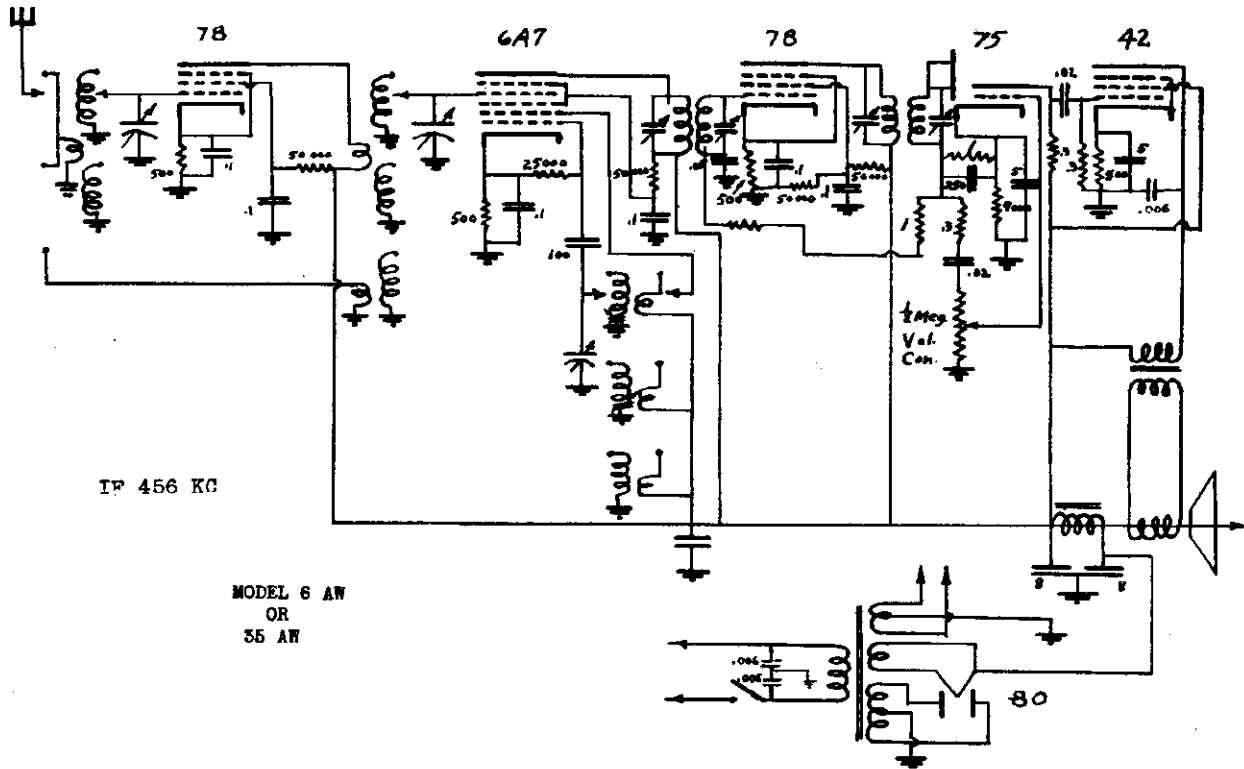
ELECTRIC & AUTOMOTIVE PROD. CO.

MODEL IL-5
MODEL 30-AW
MODEL IL-55



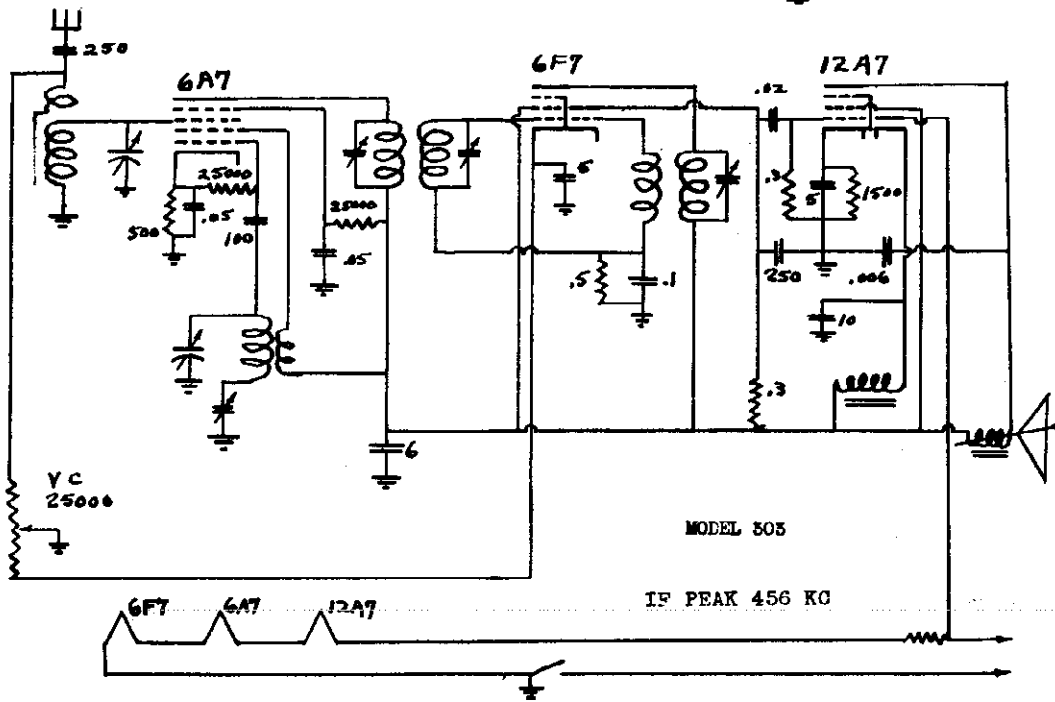
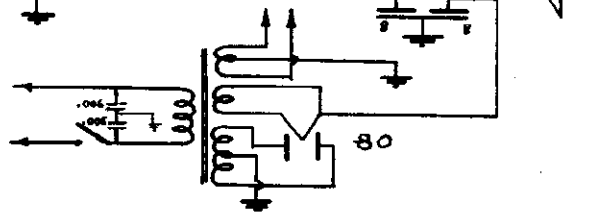
MODEL 6-AW,35-AW
MODEL 303
Schematics

ELECTRIC & AUTOMOTIVE PROD. CO.



IF 456 KC

MODEL 6 AW
OR
35 AW

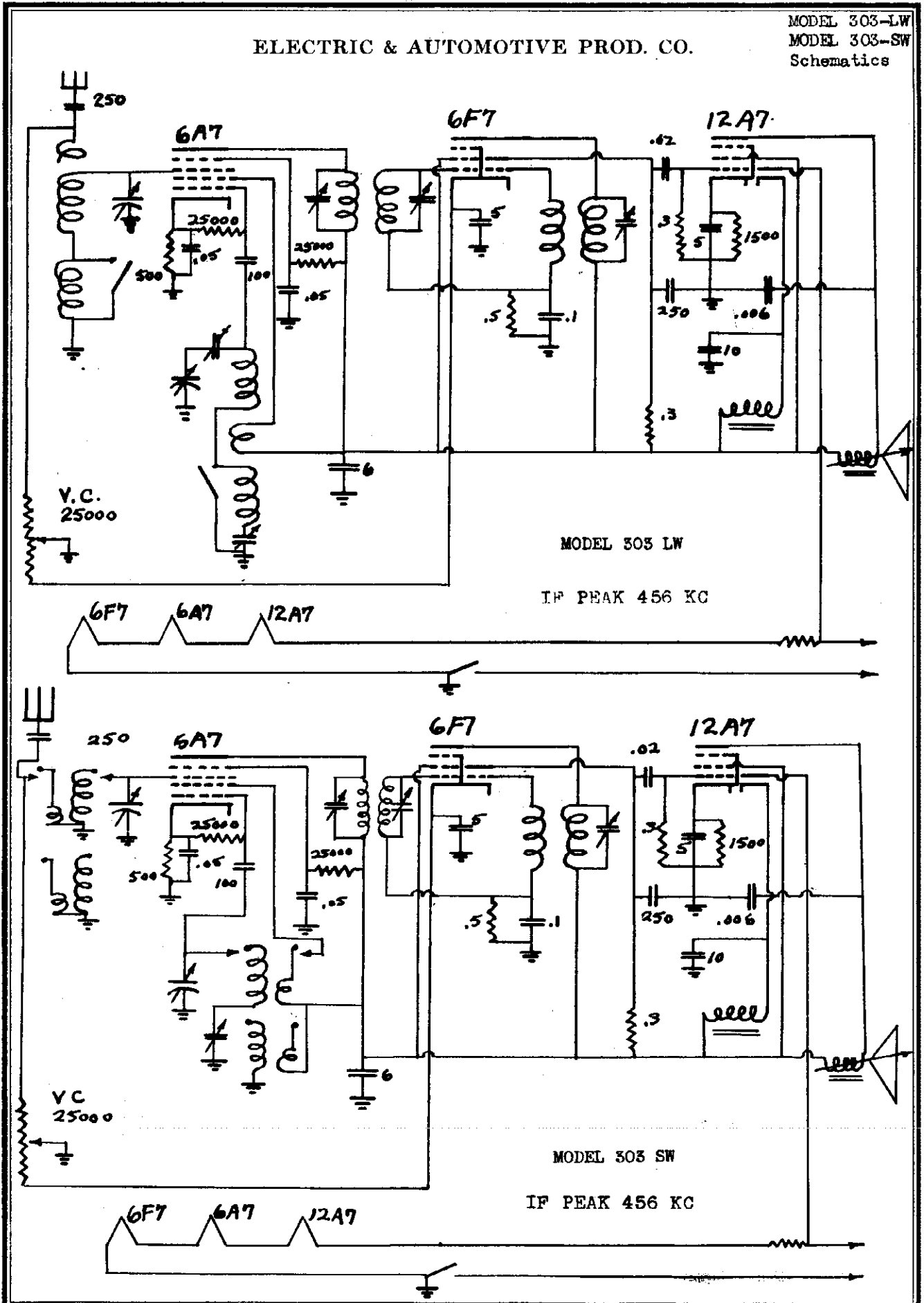


MODEL 303

IF PEAK 456 KC

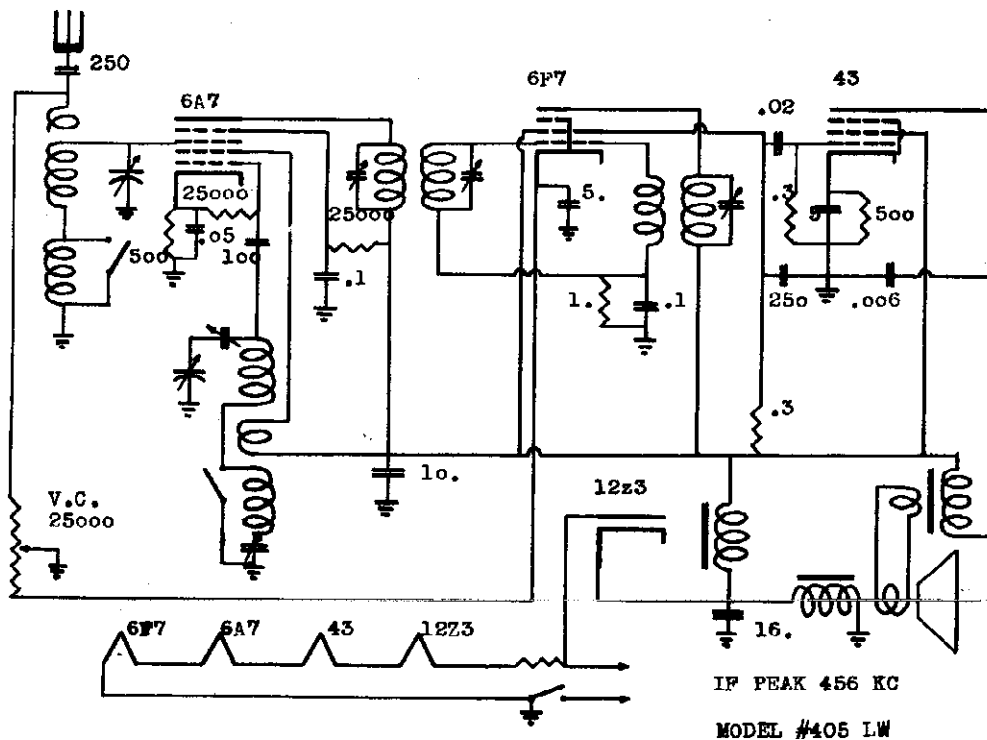
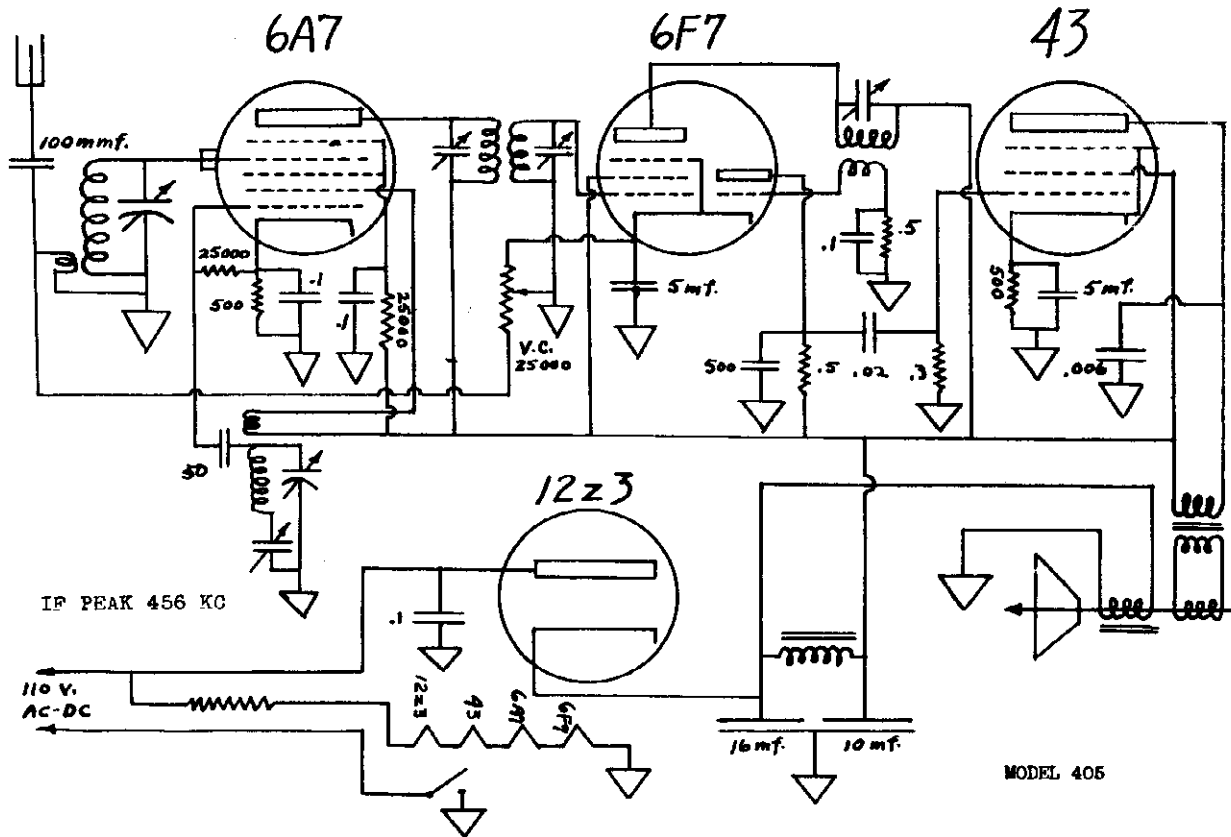
ELECTRIC & AUTOMOTIVE PROD. CO.

MODEL 303-LW
MODEL 303-SW
Schematics



MODEL 405
 MODEL 405-LW
 Schematics

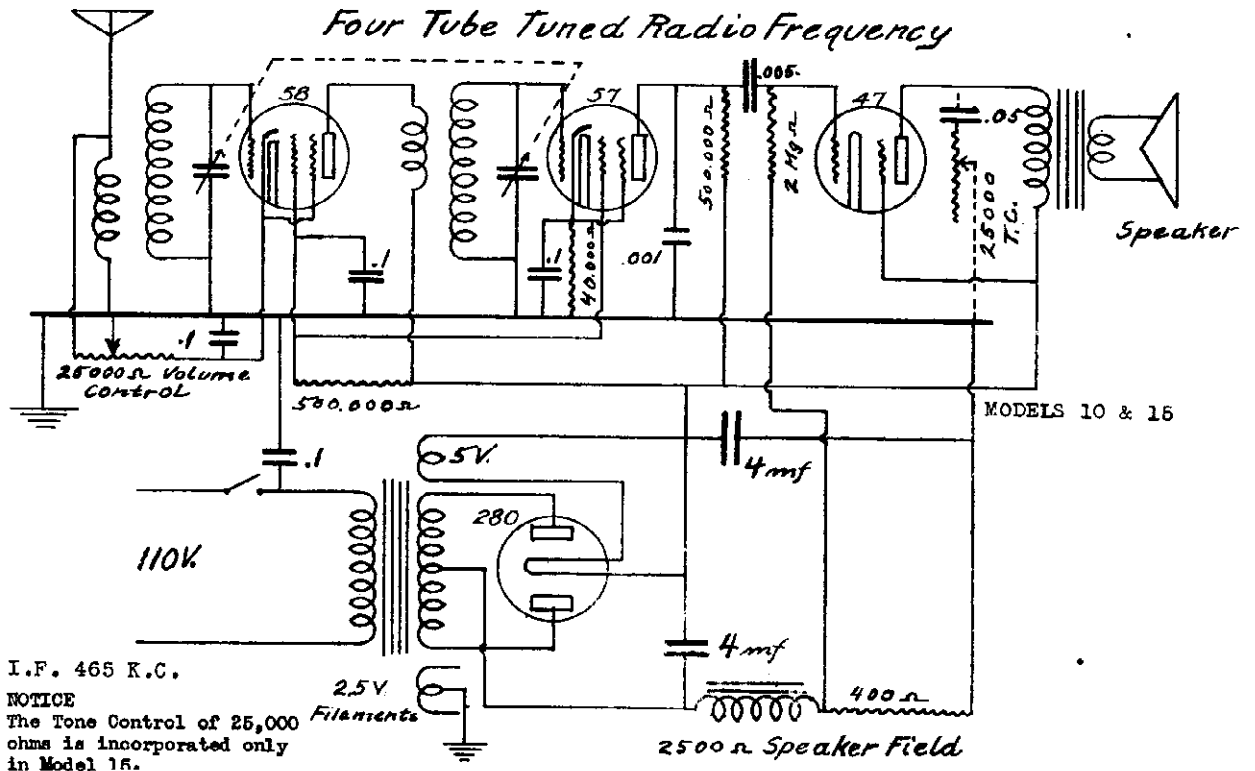
ELECTRIC & AUTOMOTIVE PROD. CO.



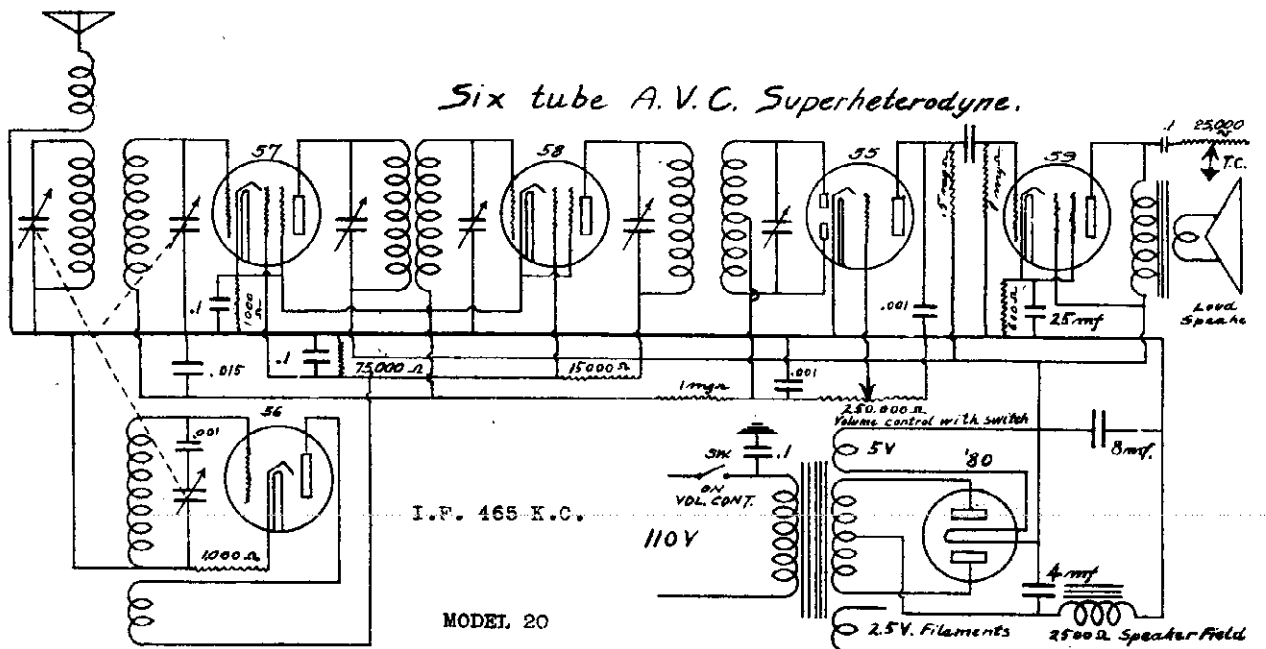
EL-REY RADIO MFG. CO.

MODELS 10, 11,
MODEL 20
Schematics

Four Tube Tuned Radio Frequency



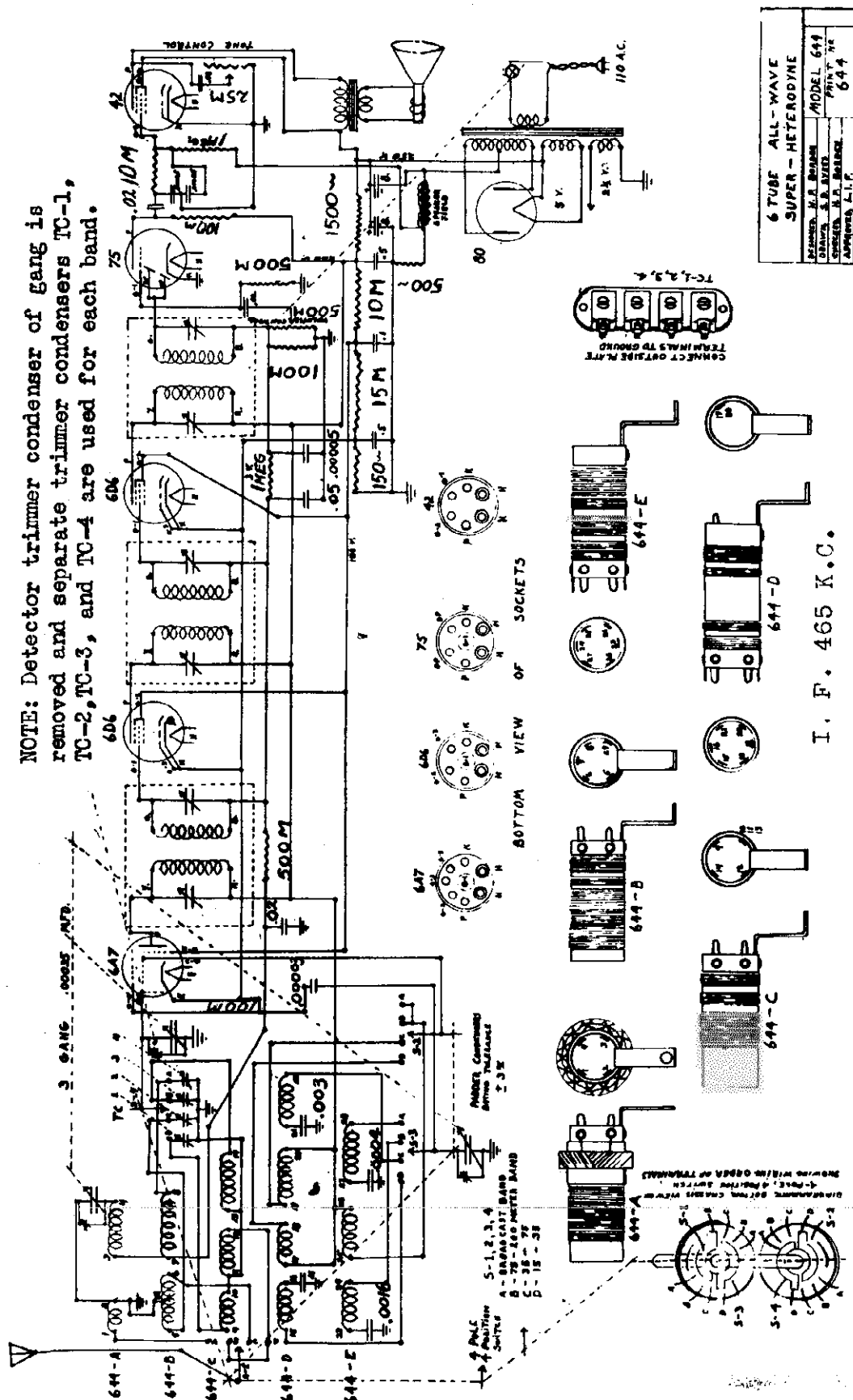
Six tube A.V.C. Superheterodyne.



EL-REY RADIO MFG. CO.

MODEL 644
Schematic

NOTE: Detector trimmer condenser of gang is removed and separate trimmer condensers TC-1, TC-2, TC-3, and TC-4 are used for each band.

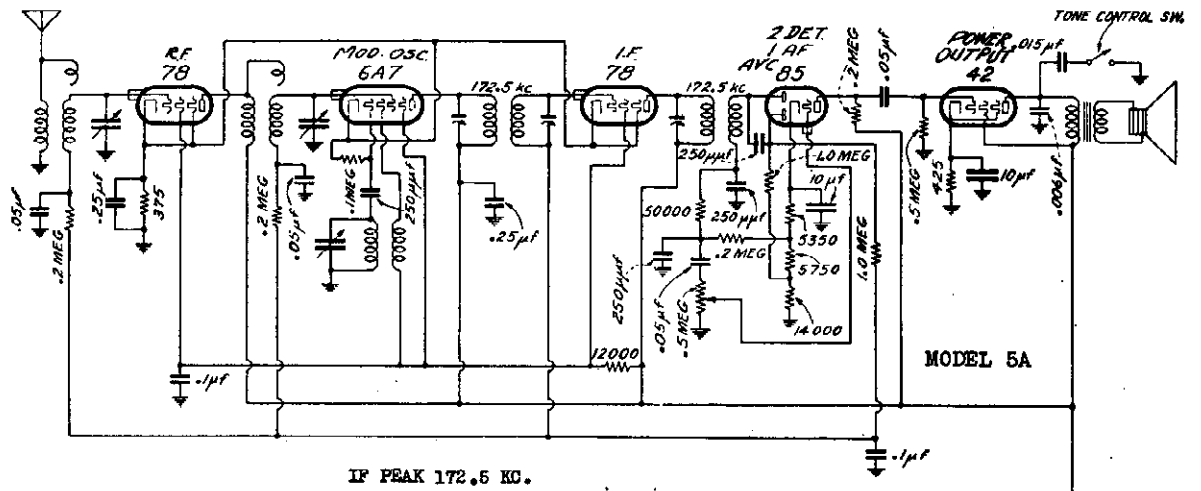


6 TUBE ALL-WAVE SUPER - HETERODYNE	
DESIGNED BY R. BURTON	MODEL 644
DRAWN BY R. BURTON	PRINTED IN U.S.A.
CHECKED BY R. BURTON	644
APPROVED BY R. BURTON	

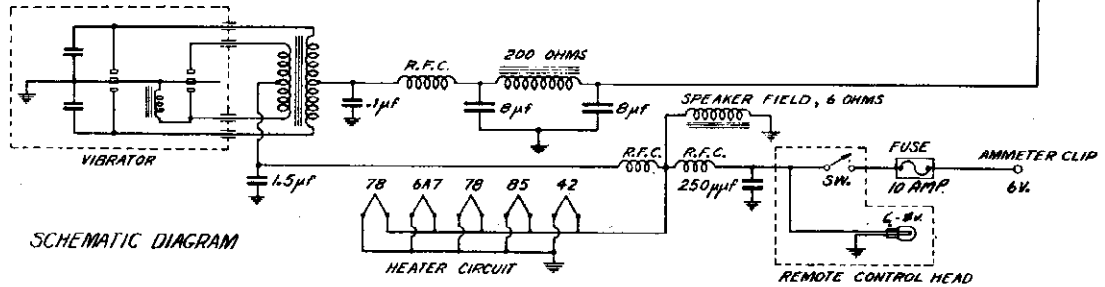
I. F. 465 K.C.

EMERSON RADIO AND PHONOGRAPH CORPORATION

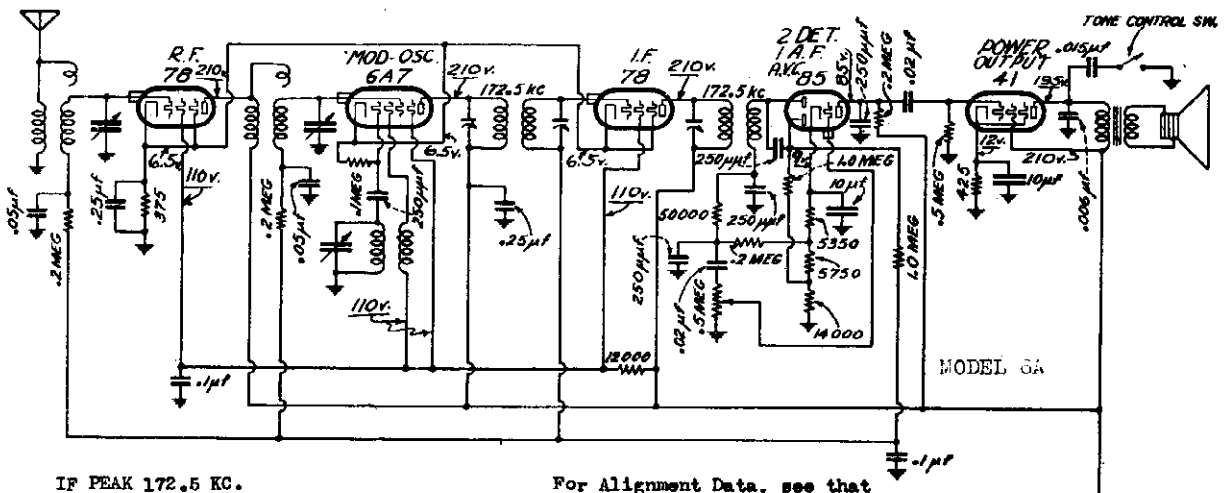
MODEL 5A
Schematic
MODEL 6A
Schematic, Voltage



IF PEAK 172.5 KC.

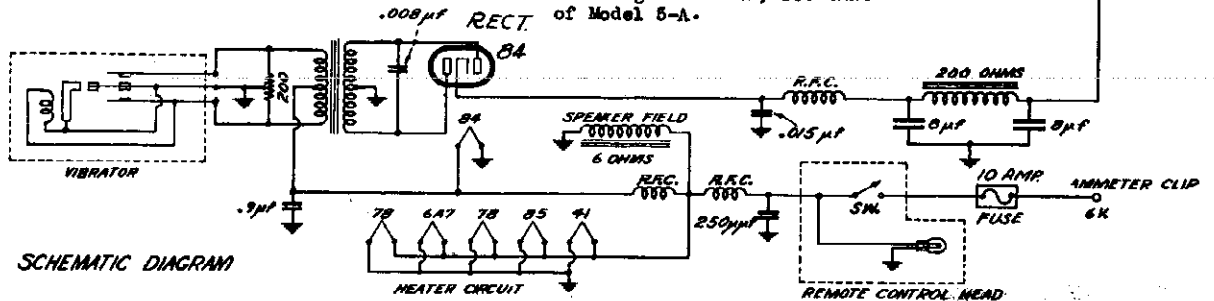


SCHMATIC DIAGRAM



IF PEAK 172.5 KC.

For Alignment Data, see that of Model 5-A.



SCHMATIC DIAGRAM

MODEL 5A
Alignment, Voltage
MODEL 6A
Alignment

EMERSON RADIO AND PHONOGRAPH CORPORATION

Remove bottom cover. See that all tubes are pushed down in their sockets, and that the grid clips are in place. Remove clamp holding vibrator in socket by removing screw fastening it to transformer case. Note whether vibrator is polarized correctly (i.e., if receiver is to be installed in car having the negative side of the battery grounded, the red arrow on transformer case should point to (—) on top of the vibrator). The polarity may be changed by removing the vibrator from socket, turning the complete unit until correct polarity sign is indicated by arrow, and then re-inserting into socket. The polarity must be correct, otherwise serious damage might be incurred to both vibrator and receiver. Replace the clamp over the vibrator after this has been checked.

Below is a list of cars and their correct polarization:

<i>Positive Ground</i>		
Auburn	Ford	Nash
Austin	Graham	Packard
Cadillac	Hudson	Pierce Arrow
Chrysler	Hupmobile	Plymouth
De Soto	La Fayette	Studebaker
Dodge	La Salle	Terraplane
<i>Negative Ground</i>		
Buick	Lincoln	Reo
Chevrolet	Oldsmobile	Stutz
Duesenberg	Pontiac	Willys

Intermediate Transformers

To align the intermediate frequency transformers, use a good modulated oscillator set for 172½ kc. Set the volume control for maximum volume and turn the dial to a point where little or no signal is received; then ground the antenna.

Connect the oscillator output between the grid of the 6A7 tube and ground. 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 small reading on the meter, adjust the two i.f. transformers for the largest reading obtainable. Use a non-metallic screw driver if possible.

Radio Frequency and Oscillator

To align the r.f. and oscillator sections, couple the oscillator through a standard dummy antenna to the antenna lead and ground of the receiver. Set the test oscillator to some frequency near 1400 kc. Set the dial to the frequency selected. Adjust trimmers on the variable condenser, beginning with the oscillator trimmer. Reduce the output of the test oscillator and repeat. In the absence of an oscillator, the r.f. sections may be aligned on broadcast signals. Tune in a weak station between 1350 and 1450 kc. and align as before. If an output meter is not available, adjust for maximum volume, then reduce the input and repeat.

Voltage Analysis:

NOTE: All "B" and "C" voltages should be measured on a high resistance voltmeter of 1000 ohms per volt or over.

The voltages are measured to ground from the points named. Ground the antenna to its shield when taking readings.

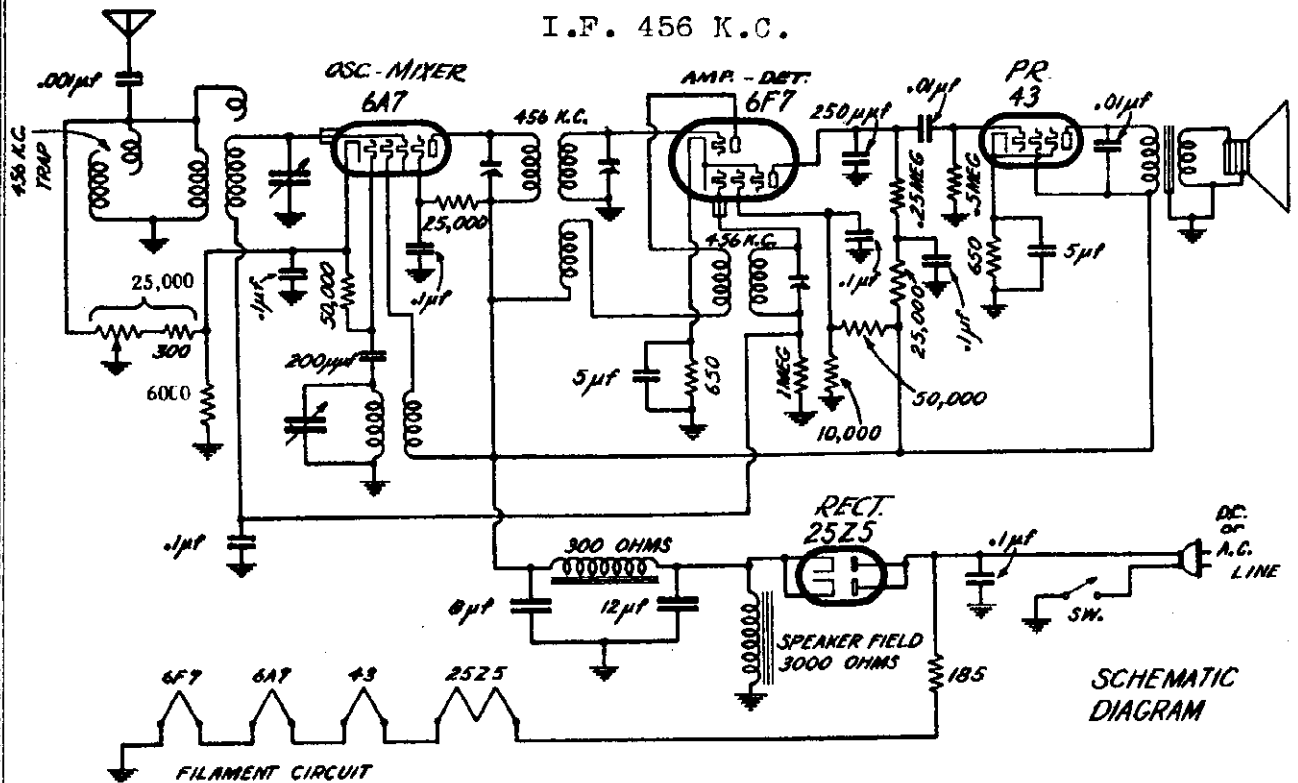
Battery volts—6.3, voltage across heaters—5.5, voltage across speaker field—5.5:

Tube	Plate	Screen	Cathode	Suppressor	Osc. Plate
78	215	110	10	10	—
6A7	215	110	10	—	110
78	215	110	10	10	—
85	95	—	9.5	—	—
42	205	215	12.5	—	—

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL 19
Chassis UV4
Schematic
Voltage, Parts

I.F. 456 K.C.



CAUTION — UNDER NO CIRCUMSTANCE ALLOW A GROUND WIRE TO COME IN CONTACT WITH THE METAL PARTS OF THIS RECEIVER.

Voltage Readings:

Measurements should be made with the volume control on full, using a d-c voltmeter of 1000 ohms-per-volt. Measurements are given from the point indicated to ground, with an input power line voltage of 117.5 volts, 60 cycles.

	Plate	Screen	Cathode	Occ. Plate
6A7 Oscillator-mixer	105	53	1.5	100
6F7	Triode	—	2.5	—
	Pentode	50	15	2.5
43 Power pentode	95	100	14	—

Voltage across speaker field, 112 volts, d-c.

For operation on power line voltages other than 105 to 130 volts special ballast resistors may be secured.

REPLACEMENT PARTS

- | | | | |
|----------|---------------------------------|---------|--|
| KKT-134 | Antenna Coil | KKC-142 | Two-gang variable condenser |
| KKT-135 | Oscillator Coil | KKC-143 | 12 and 8 mf dry electrolytic filter condenser |
| KKT-136 | First i-f transformer assembly | KKC-145 | Dual 5 mf, 25 volt, dry electrolytic by-pass condenser |
| KKT-137A | Second i-f transformer assembly | KS-38B | 5" dynamic speaker |
| KKT-138 | Iron-core filter choke | KKW-46A | 185 ohm, 17 watt, resistor line cord |

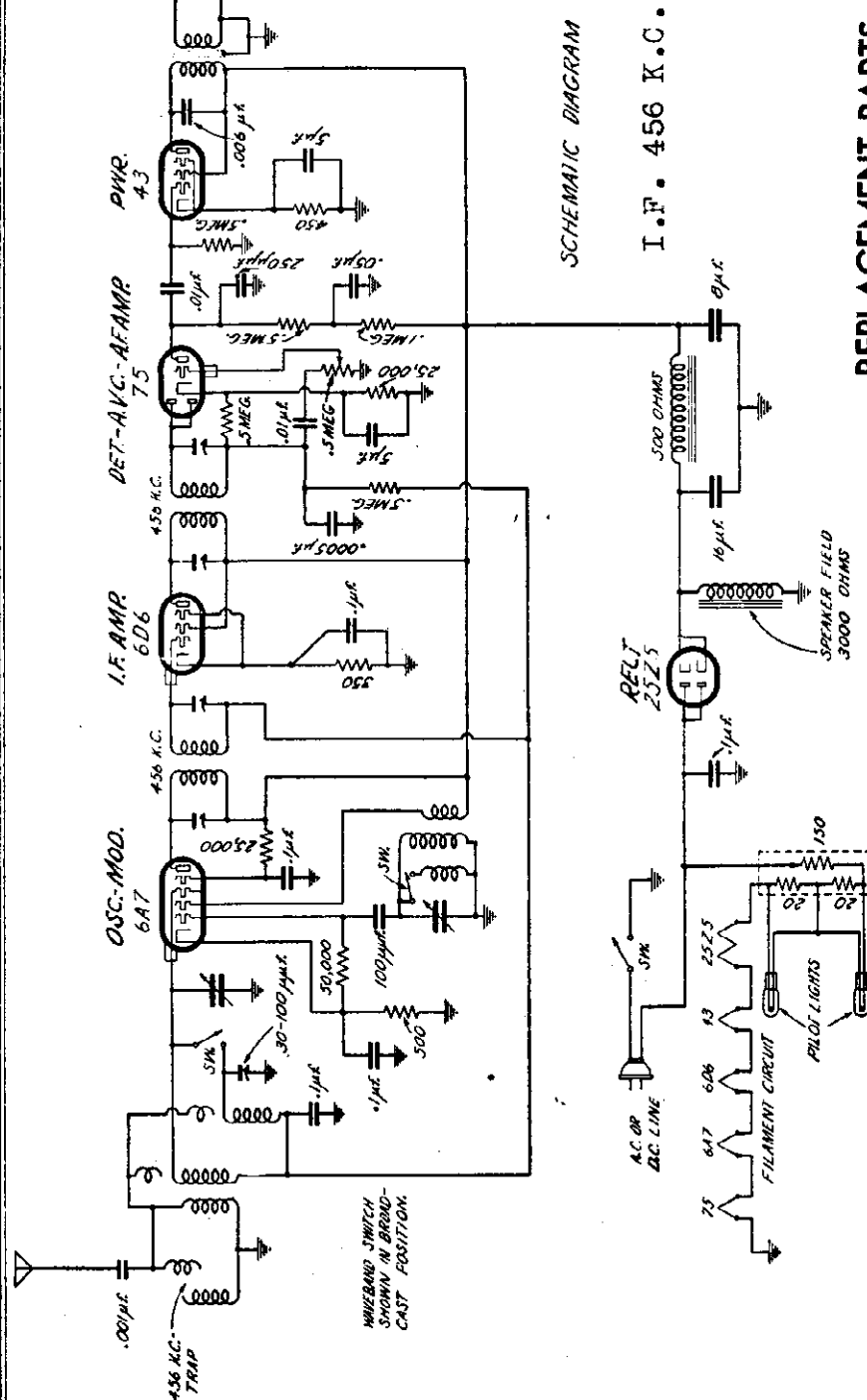
MODEL 32
Chassis U55
Schematic
Voltage, Parts

EMERSON RADIO AND PHONOGRAPH CORPORATION

FIVE-TUBE SUPERHETERODYNE RECEIVER
A.C.-D.C....105-130 Volts...25-70 Cycles

Short-Wave Range
1500—3000 Kilocycles
200—100 Meters

Broadcast Range
540—1500 Kilocycles
550—200 Meters



SCHEMATIC DIAGRAM

I.F. 456 K.C.

REPLACEMENT PARTS

Part No.	Description
GGT-130	Antenna coil
GGT-131	Oscillator coil
GGT-132	First i-f transformer
GGT-133	Second i-f transformer
KT-40	Filter choke
GGR-143	Volume control
GGR-128	Ballast resistor
GGC-136A	Variable condenser
5C-81	Single padding condenser
GGC-137	Combination by-pass and filter condenser
KS-42	Wave band selector switch
KS-38A	5" Dynamic speaker
KL-6	Pilot light

CAUTION—UNDER NO CIRCUMSTANCES SHOULD A GROUND WIRE BE PERMITTED TO COME IN CONTACT WITH THE METAL CHASSIS OF THIS RECEIVER.

Voltage Readings:

Readings should be taken with volume control on full, using a d-c voltmeter of 1000 ohms-per-volt. Measurements given are for a line voltage of 117.5 volts, 60 cycles and are measured from point indicated to ground with the antenna grounded to the metal chassis.

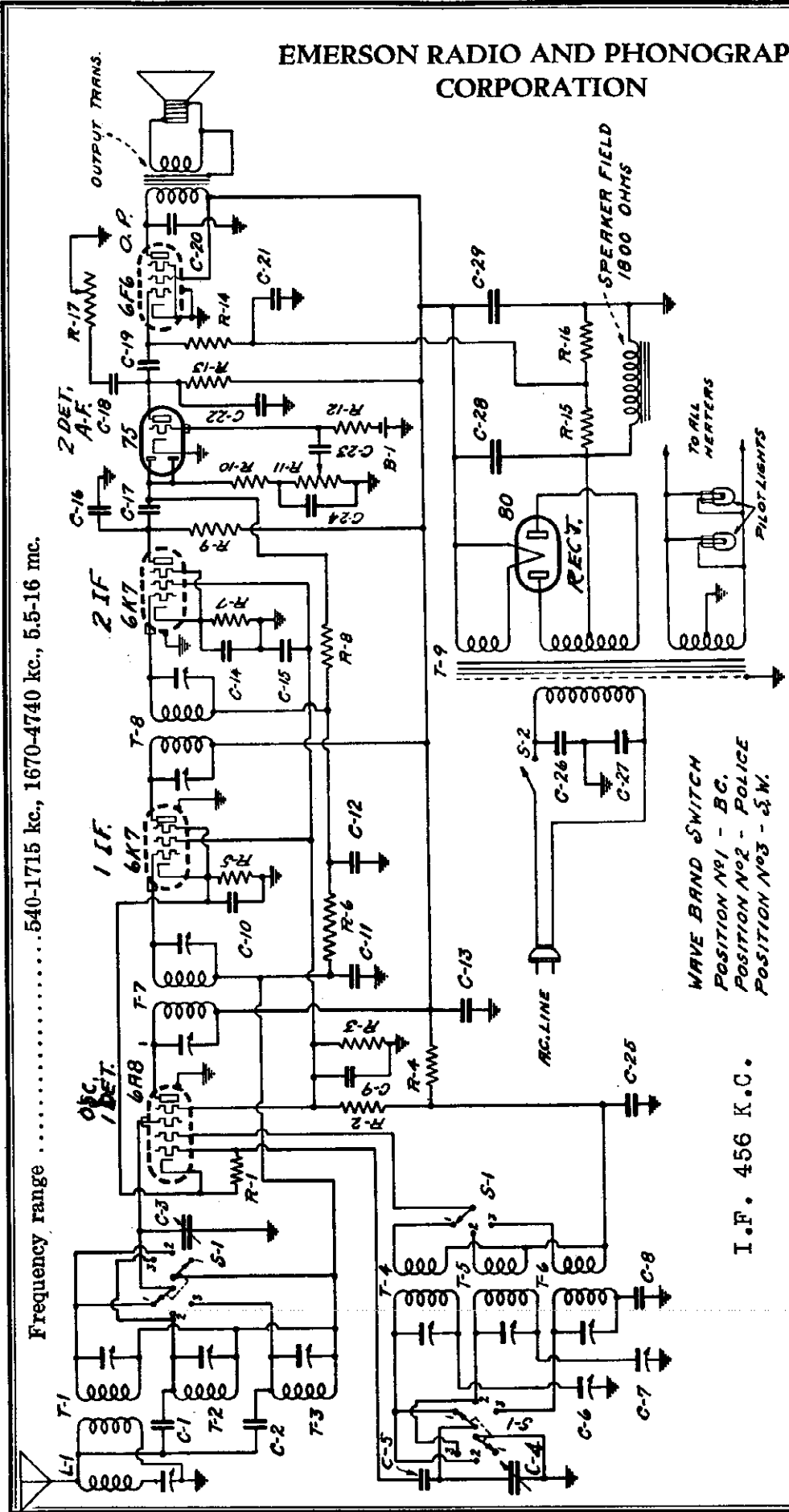
Plate	Screen	Cathode	Suppressor	One Plate
6A7 Oscillator-modulator	55	3	100	100
6D6 Lf.	100	3	3	
75 A.f.	30	1.5		
43 Output	80	11		

Voltage across speaker field, 125 volts.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS 34C, 101
Chassis C6, D6
Schematic
Voltage

Frequency range540-1715 kc., 1670-4740 kc., 5.5-16 mc.



WAVE BAND SWITCH
POSITION No. 1 - BC.
POSITION No. 2 - POLICE
POSITION No. 3 - S.W.

I.F. 456 K.C.

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to ground, with no signal. Line voltage for these readings was 117.5 v., a.c., 60 cycles.

Tube	Plate	Screen	Osc. Plate	Cathode	Fil
6A8	250	75	160	5	6.3 a-c
6K7 1st i-f	250	75	—	5	6.3 a-c
6K7 2nd i-f	145	75	—	5	6.3 a-c
75	100	—	—	0	6.3 a-c
6F6	225	250	—	0	6.3 a-c

B plus at 80 filament—355 volts.
Voltage across speaker field—105 volts.

MODELS 34C,101
Chassis C6,D6
Alignment,Parts

EMERSON RADIO AND PHONOGRAPH CORPORATION

REPLACEMENT PARTS

4. When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from hitting the cabinet, otherwise microphonism will result.

This receiver was carefully aligned and adjusted at the factory. No one but a serviceman experienced with short-wave receivers should attempt to realign the receiver.

An oscillator with frequencies of 456, 600, 1600, 1800, 4500 and 15,000 kc. should be used. In addition, an output meter should be used across the voice coil or output transformer for indicating maximum response.

Alignment Procedure:

1. Set variable condenser to minimum and turn wave-band switch to broadcast (clockwise). Introduce a 456 kc. signal on grid of the 6A8 tube. Adjust both trimmers of each of the two i-f transformers for maximum deflection on the output meter (maximum response). Repeat the process.
2. Remove 456 kc. signal from 6A8 grid and feed it through the antenna. Adjust the 456 kc. interference trap trimmer for *minimum* response. The trap trimmer is at the rear wall beneath the chassis deck.
3. With pointer at 600 feed 600 kc. through the antenna and adjust the broadcast series paddler (headless set-screw, closest to front) for maximum response. Move pointer to 1600, feed 1600 kc., and align the broadcast oscillator (on left row, nearest front) and then the antenna (on right row, furthest from front). Return to 600 kc. and readjust paddler, rocking the variable condenser for maximum response. Return to 1600 kc. again and check. (See General Instructions below).
4. Set switch at police-band (central position) and pointer at 1800. Feed 1800 kc. and align police-band series paddler (headless set-screw, furthest from front). Move pointer to 4500, feed 4500 kc. and align oscillator (middle one at left) and antenna (middle one at right). Return to 1800 kc. and readjust series paddler, rocking for maximum response. Return again to 4500 kc. and check.
5. Set switch at short-wave (counter-clockwise) and pointer at 15 megacycles (the thin line on the dial marking the edge of the 19 meter band). Feed 15,000 kc. and align the short-wave oscillator (furthest from front at left), choosing the minimum capacity peak, and then the antenna (nearest front at right) choosing the maximum capacity peak. The receiver is now completely aligned.

General Instructions

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 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 receiver should never be turned on with either the speaker plug or the 42 tube out of its respective socket, since the rapid rise in rectifier voltage will damage the electrolytic condenser.
2. Bias for the grid of the audio section of the 75 tube is obtained by means of a very small one-volt battery (bias cell). Do not put a voltmeter across this bias cell. Check it by temporarily replacing with a new cell or some other one-volt source and noting results. To remove the bias cell, simply pull up on the spring clip and lift the cell from its cup. The cell assembly is mounted on a bakelite strip on the inside of the right-hand chassis wall. On replacing the cell be sure the clip makes good contact.
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.

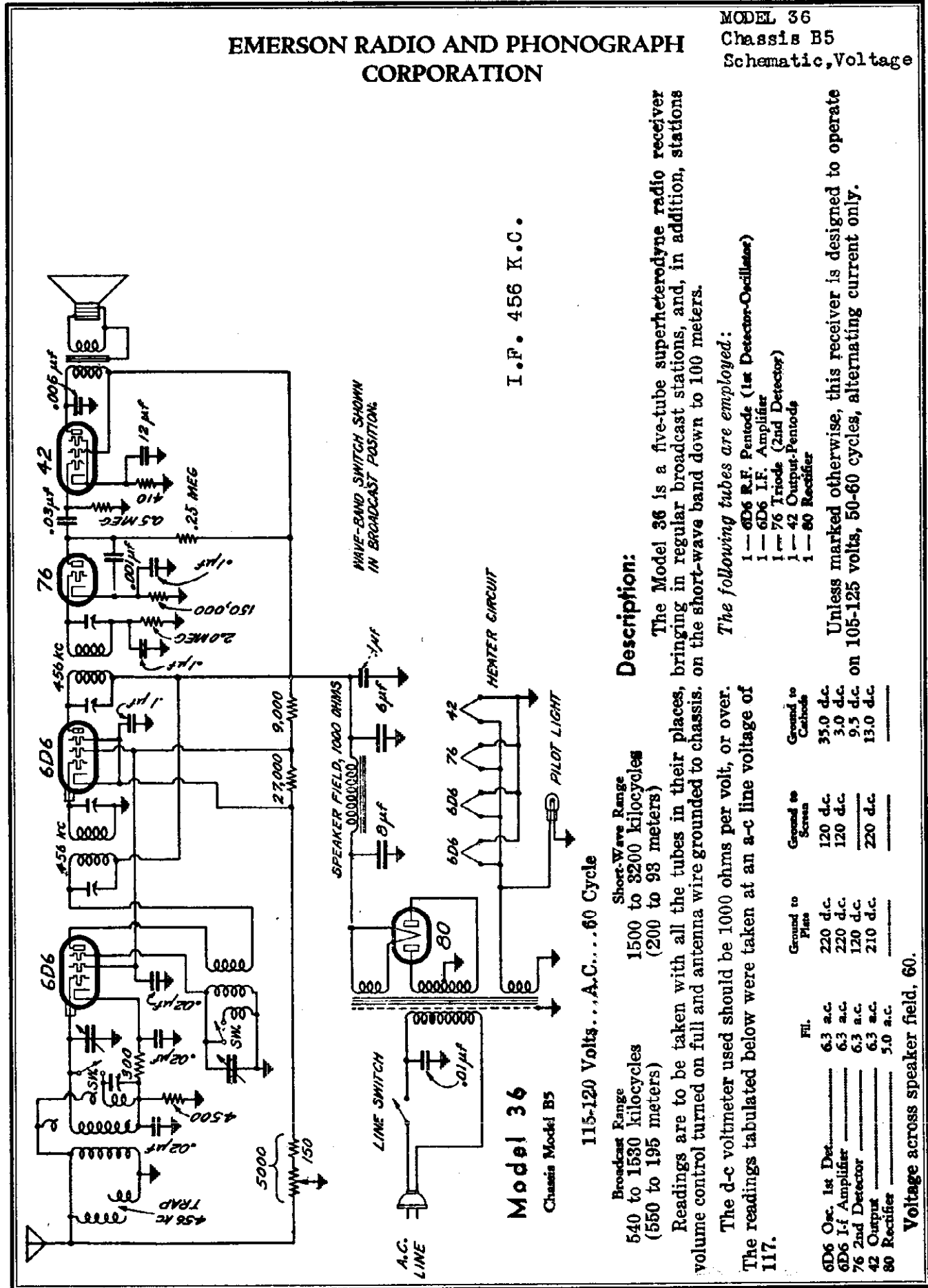
* ITEM	PART NO.	DESCRIPTION
L1	MMT-149	456 kc tunable wave trap.
T1, T2, T3	XXT-186	Three band antenna coil assembly.
T4, T5, T6	XXT-187	Three band oscillator coil assembly.
T7	XXT-188A	456 kc 1st i-f transformer.
T8	XXT-189A	456 kc 2nd i-f transformer.
T9	XXT-190	Power transformer.
R11	XXR-185A	Volume control—25 megohm.
R17, S2	XXR-186A	Tone control with switch—25 megohm.
R7	KR-51	2,500 ohm—1/4 watt carbon resistor.
R1, R9	KR-53	50,000 " " " "
R10, R14	KR-54	100,000 " " " "
R13	LR-61	200,000 " " " "
R16	XXR-202	210,000 " " " "
R4	KR-55	250,000 " " " "
R12	KR-56	500,000 " " " "
R8	KR-57	1 meg. " " " "
R15	XXR-203	1.1 " " " "
R5	FFR-126	500 ohm wire-wound resistor—1/2 watt.
R2, R3, R4	XXR-194	30,000 ohm metal clad wire-wound tapped resistor. R2 = 10,400 ohms—1 watt R3 = 18,000 ohms—1 watt R4 = 6,600 ohms—1/4 watt
C3, C4	XXC-187	Two-gang variable condenser.
C25, C29	XXC-188	Dual 8 mf dry electrolytic condenser.
C6, C7	JJC-144D	Dual padding condenser. C6—250 to 600 mmf. C7—800 to 1800 mmf.
C1, C2, C16	IIC-183A	.000025 mf mica condenser.
C5	EC-24A	.0001 mf mica condenser.
C17	AC-7A	.00025 mf mica condenser.
C22, C24	IC-47	.0005 mf mica condenser.
C8	XXC-197	.0088 mf mica condenser.
C18	XXC-207	.005 mf-400 v. tubular condenser.
C20	ZC-115	.005 mf-1000 v. tubular condenser.
C23	CC-127	.01 mf-200 v. tubular condenser.
C19	KC-58	.01 mf-400 v. tubular condenser.
C11, C12	BC-12	.05 mf-200 v. tubular condenser.
C26, C27	XXC-220	Dual .01 mf, 250 volt condenser.
C9, C14	AC-6	.1 mf-200 v. tubular condenser.
C10, C15	EBC-182	.1 mf-400 v. tubular condenser.
C18, C25	BC-13	.25 mf-200 v. tubular condenser.
C21	XXS-127	6" dynamic speaker.
S1	2BS-130	10" dynamic speaker.
B1	XXS-117A	Wave-band switch.
	KL-6	Pilot light, 6-9 volt, 1.6 amp.
	XXD-25B	Airplane dial.
	XXZ-195	Escutcheon with crystal.
	XXZ-213	Bias cell.

When Ordering Replacement Parts Specify Part Number

*Item number locates the article on the Schematic Diagram.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL 36
Chassis B5
Schematic, Voltage



I.F. 456 K.C.

Description:

The Model 36 is a five-tube superheterodyne radio receiver, bringing in regular broadcast stations, and, in addition, stations on the short-wave band down to 100 meters.

The following tubes are employed:

- 1 — 6D6 R.F. Pentode (1st Detector-Oscillator)
- 1 — 6D6 I.F. Amplifier
- 1 — 76 Triode (2nd Detector)
- 1 — 42 Output-Pentode
- 1 — 80 Rectifier

Unless marked otherwise, this receiver is designed to operate on 105-125 volts, 50-60 cycles, alternating current only.

115-120 Volts...A.C....60 Cycle

Broadcast Range	Short-Wave Range
540 to 1530 kilocycles (550 to 195 meters)	1500 to 3200 kilocycles (200 to 93 meters)

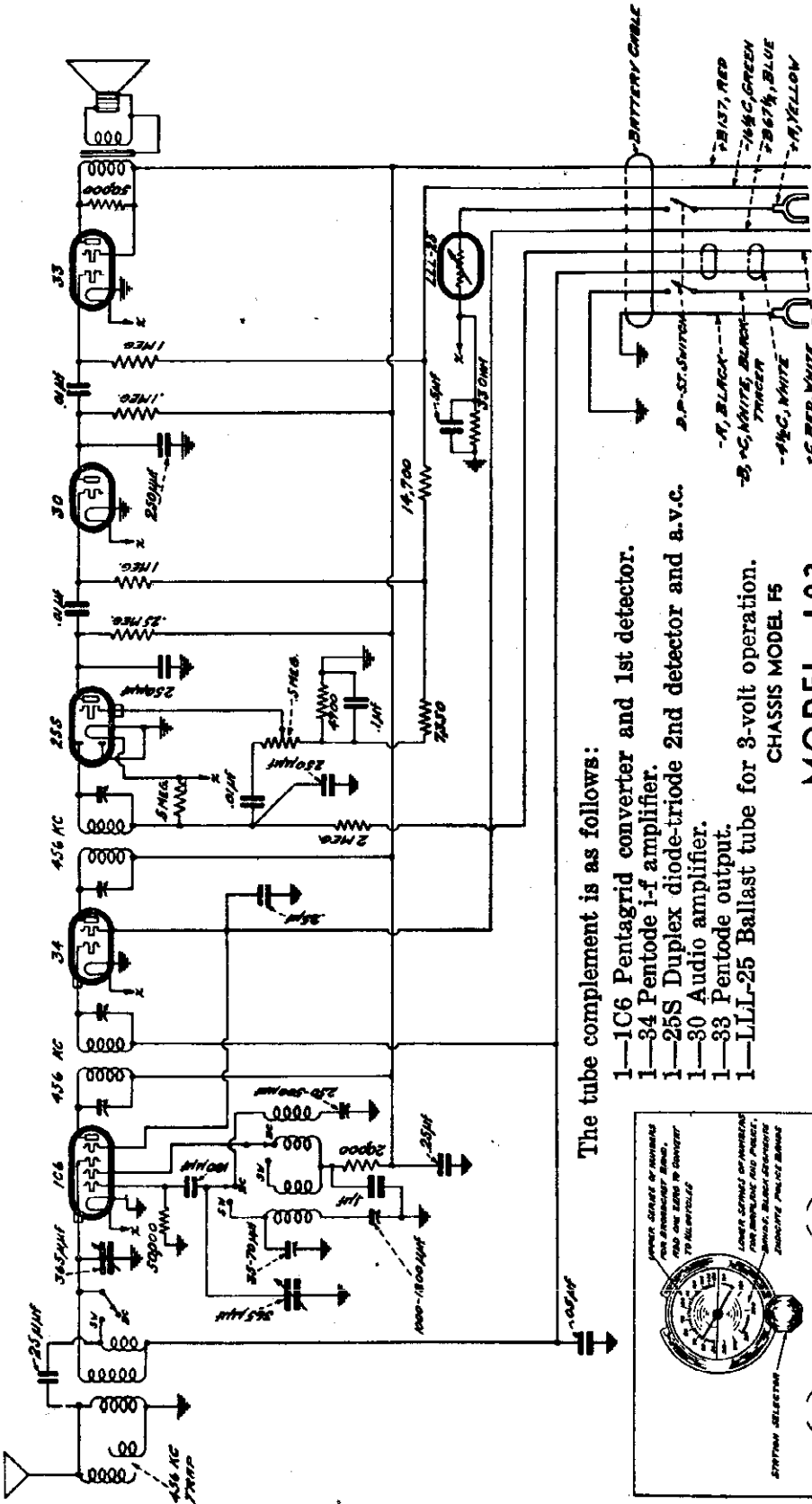
The d-c voltmeter used should be 1000 ohms per volt, or over. The readings tabulated below were taken at an a-c line voltage of 117.

	FIL.	Ground to Plate	Ground to Screen	Ground to Cathode
6D6 Osc. 1st Det.	6.3 a.c.	220 d.c.	120 d.c.	35.0 d.c.
6D6 I-f Amplifier	6.3 a.c.	220 d.c.	120 d.c.	3.0 d.c.
76 2nd Detector	6.3 a.c.	120 d.c.	220 d.c.	9.5 d.c.
80 Rectifier	5.0 a.c.	210 d.c.	220 d.c.	13.0 d.c.

Voltage across speaker field, 60.

MODEL 103
Chassis F5
Schematic
Voltage

EMERSON RADIO AND PHONOGRAPH CORPORATION



The tube complement is as follows:

- 1—1C6 Pentagrid converter and 1st detector.
- 1—34 Pentode i-f amplifier.
- 1—25S Duplex diode-triode 2nd detector and a.v.c.
- 1—30 Audio amplifier.
- 1—33 Pentode output.
- 1—LLL-25 Ballast tube for 3-volt operation.

CHASSIS MODEL F5

MODEL 103

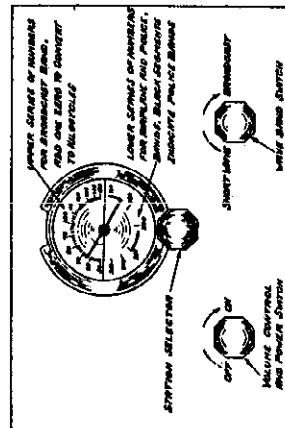
BROADCAST RANGE
540 to 1700 kilocycles
(555 to 176 meters)

SHORT-WAVE RANGE
1620 to 3950 kilocycles
(185 to 76 meters)

Readings should be taken with 1000 ohms-per-volt voltmeter with 135 volts of "B" battery and 3 volts of "A" battery. Voltages listed below are from point indicated to ground.

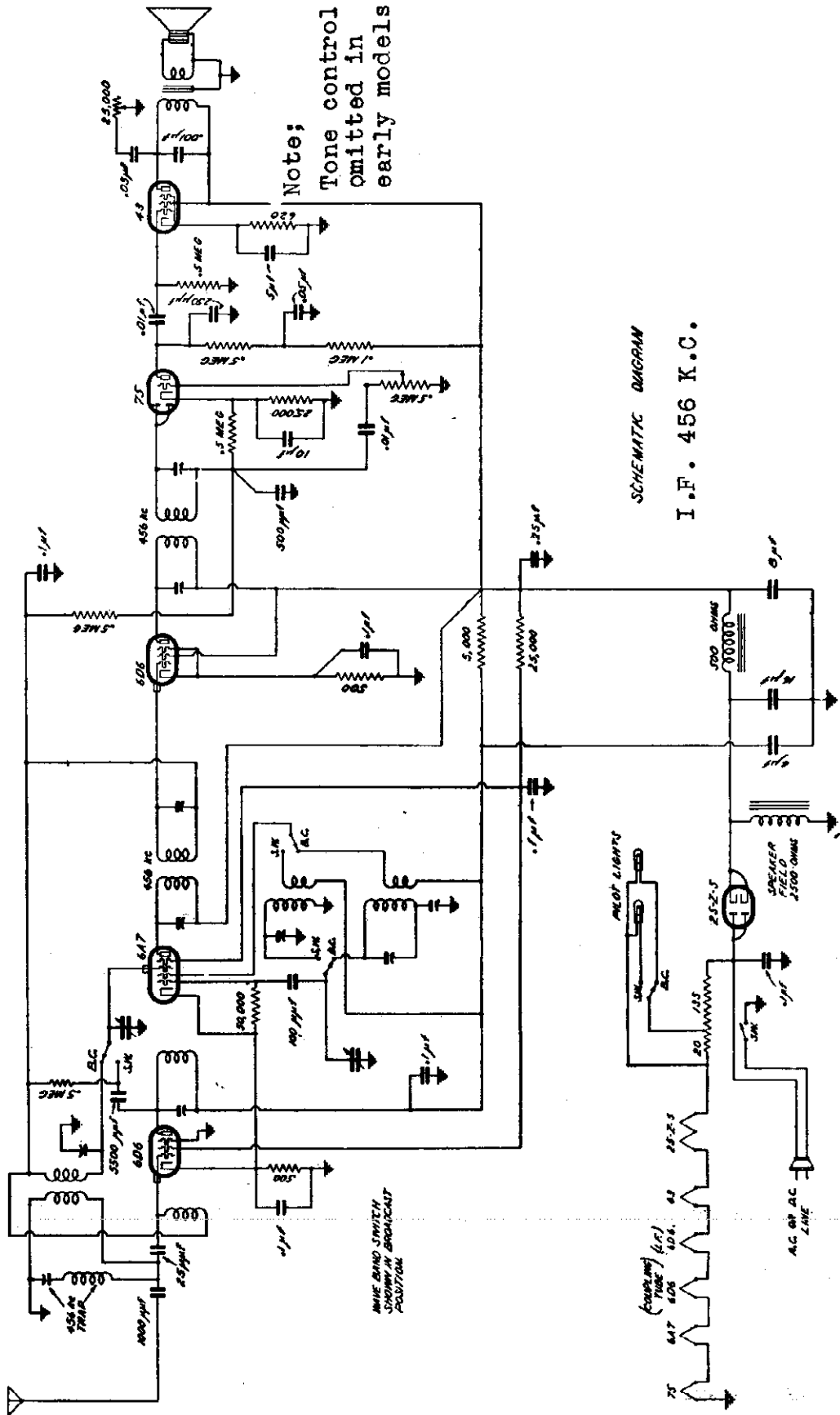
Tube	Plate	Screen	Bias	Osc. Plate
33	135	135	-16.5	—
30	90	—	-3.0	—
25S	80	—	-1.5	—
34	135	67.5	0	—
1C6	135	67.5	0	80

I.F. 456 K.C.



MODELS 38, 42, 49
Chassis U8
Schematic

EMERSON RADIO AND PHONOGRAPH CORPORATION



Note; Tone control omitted in early models.

SCHEMATIC DIAGRAM
I. F. 456 K.C.

MODELS 38,42,49
 Chassis U6
 Alignment, Voltage

EMERSON RADIO AND PHONOGRAPH
 CORPORATION

Alignment Procedure:

1. Short circuit the oscillator stator of the variable condenser to ground.
2. Introduce a 456 kc signal on the grid of the 6A7 tube.
3. Adjust both trimmers of each of the two i-f transformers for maximum response on the output meter. Repeat the process.
4. Remove the short circuit from the oscillator stator of the variable condenser.
5. Remove the 456 signal from 6A7 grid and connect to the antenna.
6. Set the range switch to the broadcast band.
7. Set the pointer at the low frequency end of the dial.
8. Adjust the 456 kc interference trap trimmer for *minimum response*. The trap trimmer is across the 1/2 inch coil form just behind the speaker.
9. Make sure that the pointer on the dial reaches its extreme positions at both ends of the broadcast band when the gang condenser is at the maximum and minimum positions. If it does not, loosen the set screws on the hub of the dial and rotate the gang condenser to maximum capacity. Then rotate the pointer of the dial, by means of the selector knob, to its extreme position at the 550 kc end of the broadcast band. Tighten the set screws securely and proceed to re-align the set.
10. Set the pointer to 1600 kc on the dial.
11. Introduce a 1600 kc signal into the antenna.
12. Adjust the oscillator trimmer (the one farthest from the chassis, on the oscillator coil) and the antenna trimmer (at the bottom of the large antenna coil on top of the chassis) for maximum response. The oscillator coil is on the underside of the chassis.
13. Introduce a 600 kc signal into the antenna. Rock the gang condenser back and forth around the 600 kc dial reading and, at the same time, adjust the series padding condenser for maximum output. Leave the series padder set at the point of maximum sensitivity. The series padder is on the front of the chassis.
14. Repeat steps 12 and 13 until no further readjustment of the trimmer and padder is necessary.
15. Throw the range switch to the short-wave position and introduce a 15 megacycle (mc) signal into the antenna.
16. Set the dial to 15 mc. Adjust the short-wave oscillator trimmer for maximum response. If two peaks are evident, the correct one is at the maximum capacity end. The short-wave oscillator trimmer is the one nearest the chassis on the oscillator coil beneath the chassis.
17. Connect an outside antenna to the set antenna lead and adjust the interstage coil trimmer for maximum noise when the pointer on the dial is set at 14 mc. Two peaks may be noticed. The correct peak is the one nearest the minimum capacity end. The interstage coil is on top of the chassis immediately behind the large antenna coil.
18. Set range switch to broadcast band and set pointer to 600 kc. Feed 456 to antenna and again adjust the interference trap trimmer for *minimum response*.
19. The set is now ready for operation.

Voltage Analysis:

Readings should be taken with a 1000 ohms per volt meter.

Voltages listed below are from the point indicated to ground.

	Plate	Screen	Suppressor	Cathode
6D6 R.f.	80	45	0	3
6A7 Oscillator-Modulator	100	45	—	3
6D6 I.f.	100	100	4.0	4.0
75 A.f.	35	—	—	1
43 Output	95	100	—	13.5

The pilot light used is Mazda No. 40, 6-8 volts and .15 ampere, brown bead.

Voltage across field—120 volts, d.c. Line voltage—117.5 volts a.c.

EMERSON RADIO AND PHONOGRAPH CORPORATION

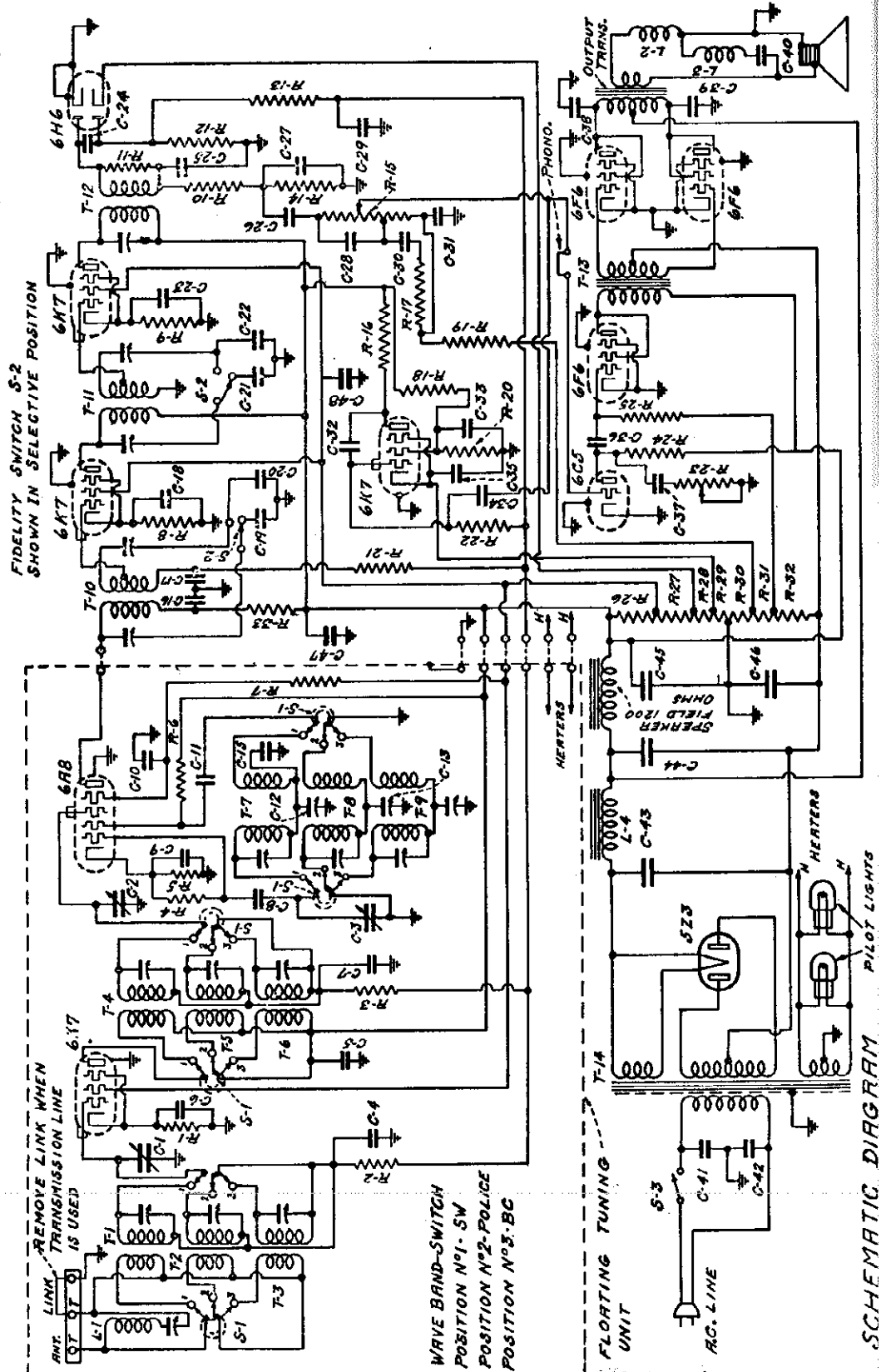
MODEL 105
Chassis All
Schematic

The tube complement is as follows:
 1-6K7 (metal)—R-f amplifier
 1-6K7 (metal)—1st i-f amplifier
 1-6K7 (metal)—2nd i-f amplifier
 1-6K7 (metal)—Automatic tone control and interstation noise suppressor
 1-6A8 (metal)—Pentagrid oscillator-modulator
 1-6H6 (metal)—Diode detector and automatic volume control
 1-6C5 (metal)—1st audio amplifier
 1-6F6 (metal)—Class "A, B" driver
 2-6F6's (metal)—Push-pull output
 1-5Z8 (glass)—Full-wave rectifier.

I. F. 456 K.C.

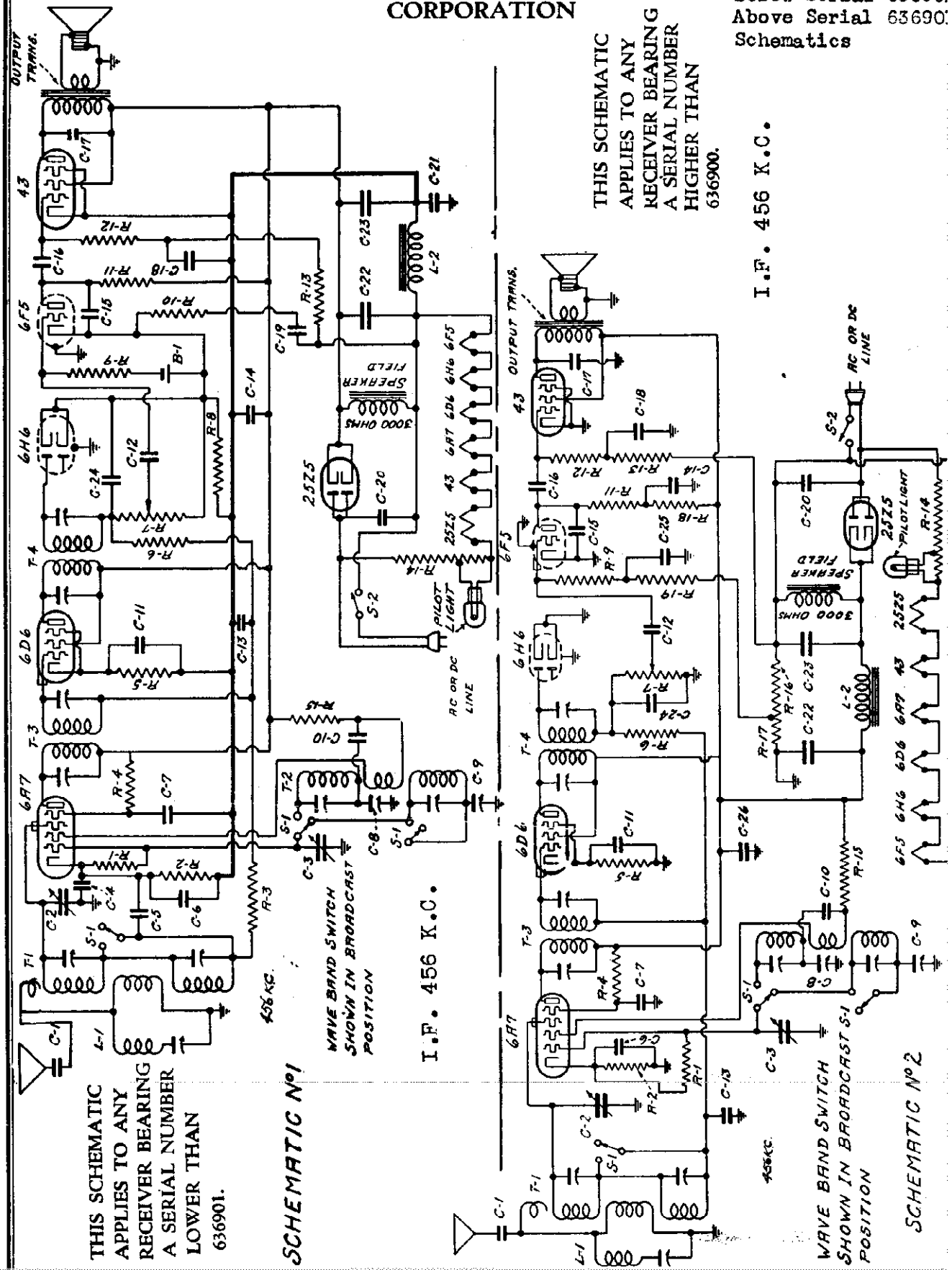
MODEL 105 Chassis Model A11

Voltage rating 110-120 volts a-c
 Current drain 1.15 amps.
 Frequency ranges 540 to 1800 kc, 1710 to 5950 kc,
 5.5 to 19.0 megacycles



EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL 106 (2 Types)
Chassis UGB
Below Serial 63690:
Above Serial 63690:
Schematics



THIS SCHEMATIC APPLIES TO ANY RECEIVER BEARING A SERIAL NUMBER LOWER THAN 636901.

SCHEMATIC NO. 1

WAVE BAND SWITCH SHOWN IN BROADCAST POSITION
I.F. 456 K.C.

THIS SCHEMATIC APPLIES TO ANY RECEIVER BEARING A SERIAL NUMBER HIGHER THAN 636900.

I.F. 456 K.C.

WAVE BAND SWITCH SHOWN IN BROADCAST POSITION

SCHEMATIC NO. 2

MODEL 106 (2 Types)

Chassis U6B
Alignment, Parts
Voltage

EMERSON RADIO AND PHONOGRAPH CORPORATION

VOLTAGE ANALYSIS

Readings should be taken with a 1,000 ohm-per-volt meter. Voltages listed below are from point indicated to B cathode (B minus). Line voltage for these readings was 117.5 volts, 60 cycles.

Tube	Plate	Screen	Control	Grids	Wt.
6A7	105	65	1.7	100	6 A-C
6D6	105	105	2.75	—	6 A-C
6H6	—	—	0	—	6 A-C
6P6	65	—	0	—	6 A-C
45	100	105	0	—	24 A-C

Voltage across choke (B minus to line switch)—20 volts.

Voltage across speaker field (25Z5 cathode to line switch)—125 volts.

PRODUCTION CHANGES

Schematic No. 1 illustrates the circuit used in receivers bearing a serial number lower than 616901. Minor parts changes made in this circuit are as follows:

C10 originally .0001 mf mica condenser.
R15 added. C1 added. R4 originally 1/2 watt carbon resistor.
Speaker changed from part No. ZC3-181B to part No. KS-38B (price \$3.50).
C21 removed and B minus grounded to chassis as indicated by dotted lines in schematic.

Schematic No. 2 illustrates the revised circuit used in all receivers bearing a serial number higher than 616900. To convert the circuit in schematic No. 1 to the circuit in schematic No. 2 the following changes in parts were necessary:

L2, filter choke, changed from part No. ZCT-196 to ZCT-207, 200 ohm choke (price 60c).
R10 removed. R3 removed.
R13 changed from 1 megohm resistor to 0.5 megohm 1/4 watt carbon resistor, part No. KR-55 (price 16c).
R18 added. R18 is 100,000 ohm 1/4 watt carbon resistor, part No. KR-46 (price 16c).
R19 added. R19 is 0.5 megohm 1/4 watt carbon resistor, part No. KR-46 (price 16c).
R16, R17 added, 250 ohm wire-wound metal clad tapped resistor, part No. ZCR-211. R16—230 ohms. R17—20 ohms (price 25c).
C22, C23 changed from multiple 8 and 15 mf electrolytic condenser to dual 12 mf electrolytic condenser, part No. ZCC-222 (price \$1.05).

C19 No. ZCC-222 (price \$1.05).
C25, C26 added, 0.1 mf, 200 volt tubular condensers, part No. AC-6 (price 16c).
B1, bias coil, removed.

In later production runs of this second series the pilot light was changed to part No. XL-9, Mazda No. 46.

REPLACEMENT PARTS

Part No.	DESCRIPTION
MMR-149	456 kc adjustable wave trap
ZCT-196	Filter choke—500 ohms
ZCT-197	Filter choke—500 ohms
ZCT-198	Two-band oscillator coil assembly
ZCT-199	Two-band oscillator coil assembly
ZCT-118C	456 kc first I-F transformer
ZCT-118B	456 kc second I-F transformer
KR-55	50,000 ohm, 1/4 watt carbon resistor
KR-46	380 ohm, 1/4 watt wire-wound resistor
UCR-140	300,000 ohm, 1/4 watt carbon resistor
ZCR-196	300 ohm, 1/4 watt carbon resistor
AAE-119	1 megohm, 1/4 watt carbon resistor
KR-47	Volume control with line switch—0.5 megohm
ZCR-195	500 ohm, 1/4 watt wire-wound resistor
FRP-123	250,000 ohm, 1/4 watt carbon resistor
KR-55	500,000 ohm, 1/4 watt carbon resistor
ZCR-196	Wire-wound ballast resistor—139 ohms
ZCR-196	2,000 mf, 200 v. electrolytic condenser
AAE-114	Two-gang variable condenser
ZCC-196	Four-section condenser block
BC-12	0.05 mf, 200 v. tubular condenser
ZCC-196	Four-section condenser block
JJC-144C	Dual adjustable padding condenser CS—20 to 140 mmf. C8—250 to 500 mmf.
IG-47A	0.0005 mf mica condenser
ZCC-127	0.01 mf, 200 v. tubular condenser
ZCC-195	Four-section condenser block C17—0.25 mf, 200 v. C17—0.01 mf, 400 v.
AC-7A	0.00025 mf mica condenser
ZCC-194	0.2 mf, 200 v. tubular condenser
ZCC-194	5 and 20 mf electrolytic filter condenser block
ZCC-181B	F dynamic speaker. C28—9 mf, 160 v.
ZCC-182	Wave-band switch
XL-9	Pilot light, 6.3 volt, 0.15 amp.

GENERAL NOTES

1. To take the chassis out of the cabinet first remove the knobs (knobs are of push-on type), and then the cabinet bottom. Remove the two wood screws and four nuts holding the chassis to the cabinet. With the receiver bottom side up, slide the chassis towards the back and lift out of cabinet.

2. If replacements are made or the wiring disturbed in the r-f section of the circuit the receiver should be carefully realigned.

3. On early production runs bias for the grid of the 6P6 tube is obtained by means of a very small one-volt battery (bias cell). This battery is located on the inside of the left-hand chassis wall. Do not put a voltmeter across this bias cell. Check it by temporarily shorting the terminals of some other one-volt source, and noting results. To remove the bias cell simply pull up on the spring clip and lift the cell from its cup. On re-placing cell be sure the clip makes good contact.

4. If adjustment of the sliding scale dial is necessary, loosen the two slotted hexagon-head guides at the top edge of the scale. These guides are held in place by the chassis. Do not bend the guides by moving them either up or down in the slotted holes in the chassis. Do not bend the guides by moving them either up or down in the slotted holes in the chassis. Do not bend the guides by moving them either up or down in the slotted holes in the chassis. Do not bend the guides by moving them either up or down in the slotted holes in the chassis.

After replacing a dial scale, care should be taken to align it properly with respect to the variable condenser. To do this, turn the maximum capacity (lower) screw on the hub of the pinion gear and slide the scale so that the extreme right-hand scale mark (near 88) is in line with the center of the speaker. With scale and condenser in these positions tighten the set-screw.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1425, 1600 and 9800 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

I-F and Wave-Trap Alignment

The I-F coils are located in cans on the top of the chassis. The second I-F transformer is the one directly behind the speaker. The four trimmers, two for each transformer, are located at the tops of the cans.

Turn the wave-band switch to the broadcast position, clockwise. Rotate the variable condenser to the minimum position and feed 600 kc through the four I-F trimmers for maximum response. Feed 456 kc through the antenna lead and adjust the 456 kc wave-trap trimmer for maximum response. This trimmer will be found on the small wave-trap which is mounted on the bracket extending vertically from the right-hand chassis wall.

Location of Coils

The broadcast antenna coil and the short-wave antenna coil are wound on one form, mounted on the vertical bracket at the right-hand side of the chassis. The trimmers for these coils are mounted on the same assembly facing outward, and are available through two holes in the bracket. The lower trimmer is for the short-wave antenna coil and the upper for the broadcast antenna coil.

The broadcast oscillator coil and short-wave oscillator coil are wound on one form mounted below the chassis deck. The trimmers are mounted on the same assembly, facing outward, and are accessible through two holes in the right-hand chassis wall. The front one is for the short-wave oscillator coil and the rear one is for the broadcast oscillator coil.

The dual padding condenser for the oscillator coils is mounted on the inside of the front chassis wall. The two adjusting screws are accessible through two holes in the front wall of the chassis. The upper screw is for the broadcast padler and the lower for the short-wave padler.

Broadcast Alignment

Turn wave-band switch to clockwise position (broadcast), set dial to 600 (use center of speaker as reference point), and feed 600 kc through the antenna. Adjust the broadcast oscillator padler (upper screw on front chassis wall) for maximum response. Set the dial to 1425 and feed 1425 kc through the antenna. Adjust the broadcast antenna trimmer (rear screw on right-hand side of chassis), for maximum response and then adjust the broadcast antenna trimmer (upper screw on vertical bracket) for maximum response. Reset dial to 600 and rock variable condenser (rotate back and forth through small arc) while realigning the broadcast oscillator padler.

Short-Wave Alignment

Turn wave-band switch to counter-clockwise position (short-wave), set dial to 970 and feed 1000 kc through antenna. Adjust the short-wave oscillator padler (lower screw on front chassis wall) for maximum response. Set dial to 1280 and feed 9600 kc through the antenna. Adjust the short-wave antenna trimmer (front screw on right-hand chassis wall) for maximum response and then adjust the short-wave antenna trimmer (lower screw on vertical bracket) for maximum response. Reset dial to 970, feed 1000 kc and rock variable condenser while realigning the short-wave oscillator padler.

TUBE DATA

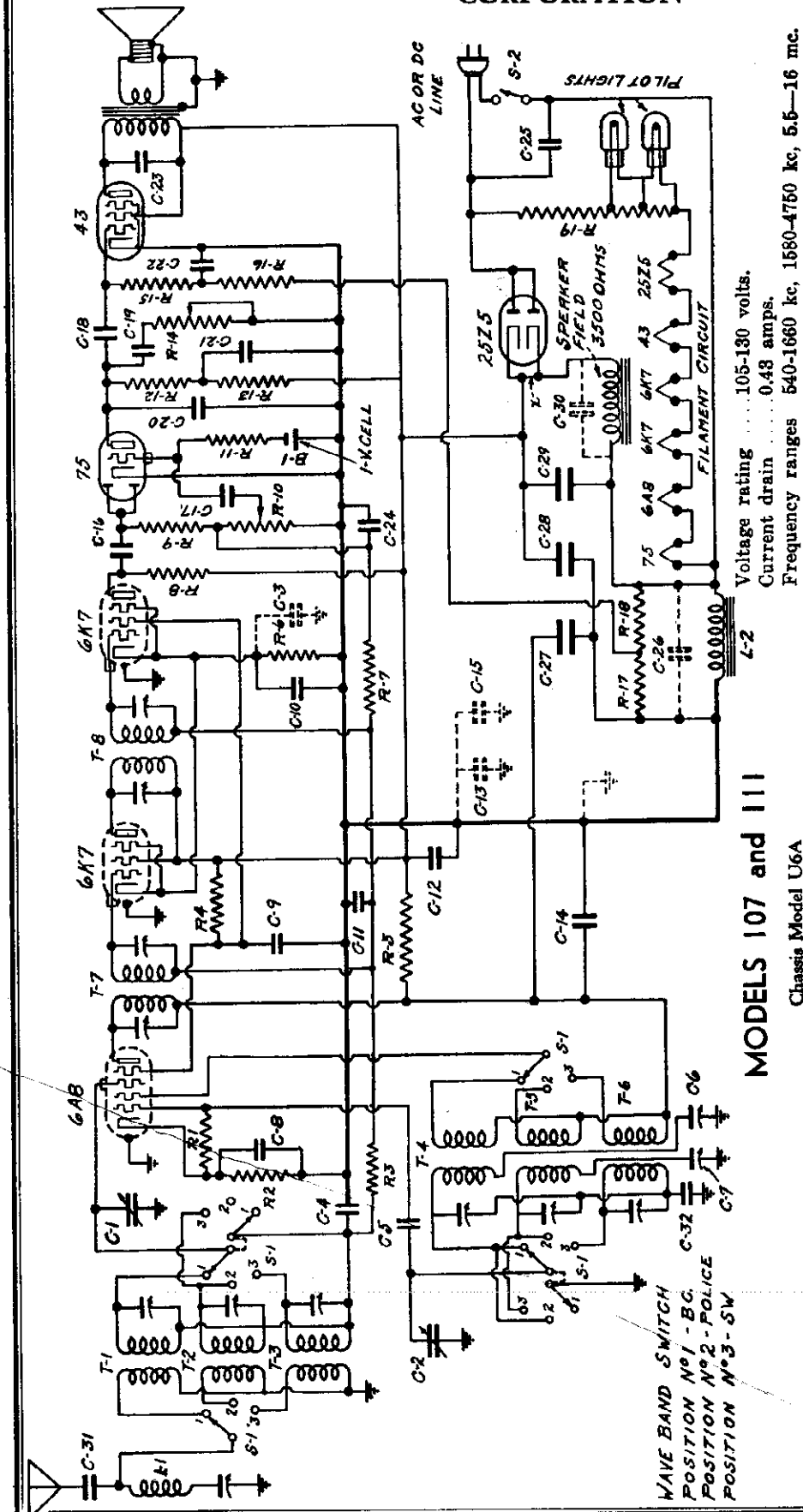
The tube complement is as follows:
 1—6P6 (metal)—Diode detector and a.v. c.
 1—6P6 (metal)—Audio amplifier.
 1—45 (glass)—Power pentode output.
 1—45 (glass)—Dual full-wave rectifier.
 1—45 (glass)—Dual full-wave rectifier.
 1—45 (glass)—I-F amplifier.

MODEL 106

Voltage rating 105-150 volts
 Current drain 0.45 amps
 Frequency range 50 to 1450 kc, 1490 to 4300 kc.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS 107, 111
Chassis U6A
Schematic
Voltage



MODELS 107 and 111

Chassis Model U6A

Voltage rating ... 105-130 volts.
Current drain ... 0.43 amps.
Frequency ranges 540-1660 kc, 1580-4750 kc, 5.5-16 mc.

These service notes apply only to chassis model U6A. Different service notes are available for chassis model U6F also used in the models 107 and 111 cabinets. The chassis model number for this receiver is the group of symbols before the dash in the serial number printed on the license plate.

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (cathode of 43 tube). Line voltage for these readings was 117.5 volts, a.c., 60 cycles.

The tube complement is as follows:

Tube	Plate	Screen	Ca. Plate	Osc. Plate	Fil.
6A8	82	50	2	82	6
6K7 1st i-f	107	107	5	—	6
6K7 2nd i-f	65	50	5	—	6
75	50	—	0	—	6
43	95	107	0	—	24

Voltage across speaker field (25Z5 cathode to line switch) — 107 volts.

Voltage across speaker choke (43 cathode to line switch) — 22 volts.

I. F. 456 K.C.

MODELS 107,111
Chassis U6A
Alignment, Parts
Changes

EMERSON RADIO AND PHONOGRAPH
CORPORATION

REPLACEMENT PARTS

Part No.	DESCRIPTION	Price
MMT-149	456 to adjustable wave-trap	.85
ZFT-196	Filter choke—500 ohms	.60
ZFT-192A	Three-band antenna coil assembly	1.80
ZFT-193	Three-band oscillator coil assembly	1.80
ZFT-194	456 kc first IF transformer	1.15
ZFT-195	456 kc second IF transformer	1.15
KR-83	60,000 ohm, 1/4 watt carbon resistor	.16
FFR-126	500 ohm, 1/4 watt wire-wound resistor	.16
KR-87	1 megohm, 1/4 watt carbon resistor	.16
ZFR-196	80,000 ohm, 1/4 watt carbon resistor	.16
ZFR-197	10,000 ohm, 1/4 watt carbon resistor	.16
ZFR-198	100,000 ohm, 1/4 watt wire-wound resistor	.16
KR-84	100,000 ohm, 1/4 watt carbon resistor	.16
ZFR-190A	Volume control with 100,000 ohm carbon resistor and 10 megohms	.16
LR-61	200,000 ohm, 1/4 watt carbon resistor	.16
ZFR-191A	Tone control—0.25 megohms	.16
KR-86	600,000 ohm, 1/4 watt carbon resistor	.16
ZFR-192	100,000 ohm, 1/4 watt carbon resistor	.16
ZFR-192A	100,000 ohm, 1/4 watt carbon resistor	.16
ZFR-194A	100,000 ohm, 1/4 watt carbon resistor	.16
ZFC-184	Pre-gang variable condenser—150 ohms	1.80
AC-6	0.1 mf, 200 volt tubular condenser	.16
EC-24A	0.0001 mf mica condenser	.16
JYC-144C	Dual adjustable padding condenser C6—250 to 650 mmf. C7—800 to 1400 mmf.	.60
ZZC-191B	Seven-section condenser block C8—0.1 mf, 200 v. C9—0.1 mf, 200 v. C10—0.2 mf, 200 v. C11—0.05 mf, 200 v.	1.05
ZZC-205	0.03 mf, 200 v. tubular condenser	.16
AC-7A	0.00025 mf mica condenser	.16
CCC-127	0.01 mf, 200 v. tubular condenser	.16
ZZC-213	0.005 mf, 200 v. tubular condenser	.16
AC-114	0.001 mf mica condenser	.16
ZZC-192A	4, 8 C27—4 mf, 150 ohmic film condenser block C28—5 mf, 150 v. C29—5 mf, 150 v.	2.25
YC-98A	Tubular 4 mf, 150 v. electrolytic condenser	.70
ZZC-204	0.005 mf mica condenser	.16
ZZS-126A	5" dynamic speaker	3.76
ZZS-126A	Wave-band switch	1.05
ML-5	Pilot light, 6.3 volt, .15 amp.	.15
ZLD-16A	Airplane dial	.85
XXZ-213	Bias cell, one volt	.15
ZZZ-209	Escutcheon with crystal	.20

GENERAL NOTES

- To take the chassis out of the Model 107 cabinet first remove the knobs (knobs are of push-on type) and then the cabinet bottom. Remove the two wood screws and four nuts holding the chassis to the cabinet. With the receiver bottom side up, slide the chassis toward the back and lift out of cabinet.
- If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully re-aligned.
- Blas for the grid of the audio section of the 75 tube is obtained by means of a very small one-volt battery (plus cell). The cell assembly is mounted on a bakelite strip in the front corner of the chassis near the volume control. Do not place the battery in contact with any other part of the chassis. The battery is connected to the one-volt source, and no other results. To remove the bias cell, simply pull up on the spring clip and lift the cell from its cup.

ADJUSTMENTS

An oscillator with frequencies of 455, 600, 1600, 1700, 4570 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.

I-f Alignment

The I-f trimmers ZFT-194 and ZFT-195 are located on the top of the chassis. The four trimmers, two for each I-f transformer, are adjusted at the top of the coils. Set the volume control at the center position and adjust the trimmers to minimum. Feed 456 kc to grid of the 6AS tube and adjust the four I-f trimmers for maximum response. Then feed 456 kc through the antenna and adjust the wave-trap trimmer for minimum response. The trimmer is on the wave-trap, which is located on top of the chassis behind the speaker.

Location of Coils

The antenna coils for the three bands are wound on one form and mounted on top of the chassis to the right of the speaker. The three trimmers for these coils are mounted on a bakelite strip above the tubing. The trimmer nearest the speaker is for the short-wave antenna coil. The center trimmer is for the police antenna coil and the trimmer furthest from speaker is for the broadcast antenna coil.

The oscillator coils for the three bands are wound on one form and mounted underneath the chassis deck on the right-hand wall with the trimmers facing out. The trimmer screws are available through three holes in the chassis wall. The trimmer closest to front is for the broadcast oscillator coil, the central trimmer is for the police oscillator coil and the trimmer furthest from front is for the short-wave oscillator coil.

The adjusting screws for the wave-trap trimmer are available at the right-hand chassis wall. The screw closest to the front is for the broadcast band and the other is for the police band. The short-wave band has no adjustable padding.

Broadcast Alignment

Set the wave-band switch to broadcast position (extreme clockwise) and dial pointer to 600. Feed 600 kc through antenna lead and adjust broadcast padding (lower row on right wall, closest to front) for maximum response. Set pointer to 1600, feed 1600 kc and adjust the broadcast oscillator trimmer (central trimmer on right wall, closest to front) for maximum response, and adjust the broadcast antenna trimmer (top row on right wall, closest to front) for maximum response. Then feed 456 kc through the antenna and adjust the wave-trap trimmer for maximum response. If a readjustment is necessary return to 1600 and realign the antenna and oscillator trimmers.

Police Alignment

Set the wave-band switch to police (central position), pointer to 1700 and feed 1700 kc through antenna lead. Adjust police band padding (further from front on right wall, lower row) for maximum response. Set pointer to 4500 kc. Adjust police band oscillator trimmer (central trimmer on right wall, upper row) for maximum response. If two peaks are heard, select the one of minimum capacity (see General Instructions below), then adjust police band antenna trimmer (central one on top) for maximum response, selecting the peak of maximum capacity. Again feed 1700 kc, with pointer at 1700, rock variable condenser and adjust police band padding for maximum response. Realign at 4500 kc, if necessary.

Short-Wave Alignment

Set wave-band switch to counter-clockwise (short-wave) position and pointer at 15 megacycles. Feed 15,000 kc through antenna. Adjust short-wave oscillator trimmer (furthest from front on right wall, top row) for maximum response. If two peaks are obtained, select the one of minimum capacity.

Check all three bands for dead spots or incorrect tuning responses.

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 signal.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna and I-f trimmers. The last action 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 microphony.

In aligning antenna trimmers on the high-frequency signal, there is usually a tendency for the oscillator to drift, due to interlocking. To compensate for this, always keep re-tuning the variable condenser.

When ordering replacement parts specify part number.

Production Changes

In early production runs C3 was a 0.03 mf, 200 v. condenser. Later it was changed to a 0.1 mf, 200 v. condenser and subsequently removed entirely from the circuit.

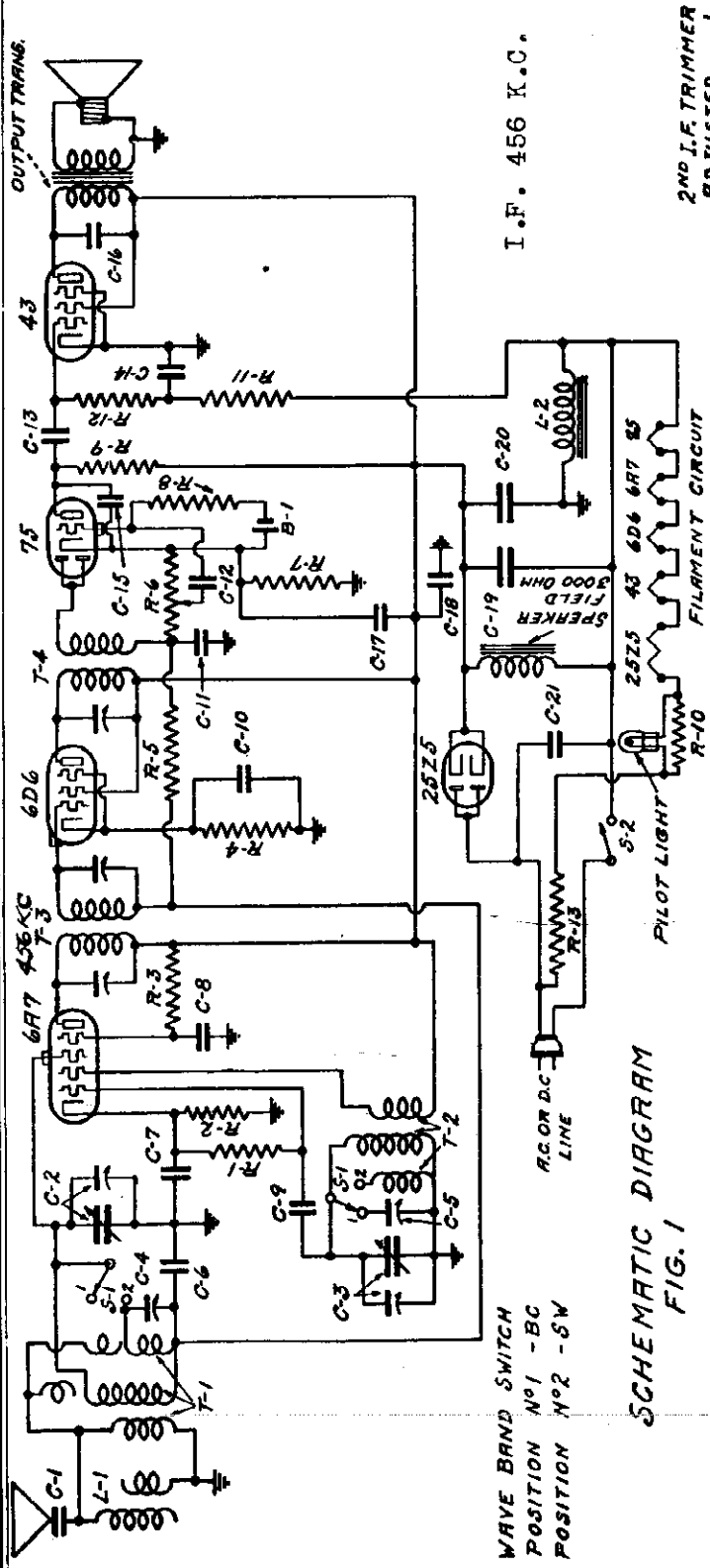
In later production runs, the following changes were made:

- C20 added and circuit broken at X; 2525 cathodes separated (see schematic). C26 removed.
- B minus grounded to chassis. C15 and C13 removed. C22 placed in the condenser block.
- R11 changed from 1 megohm carbon resistor to 0.5 megohm, 1/4 watt carbon resistor, our part KR-86.
- R16 changed from 0.5 megohm carbon resistor to 0.25 megohm, 1/4 watt carbon resistor, our part KR-86.

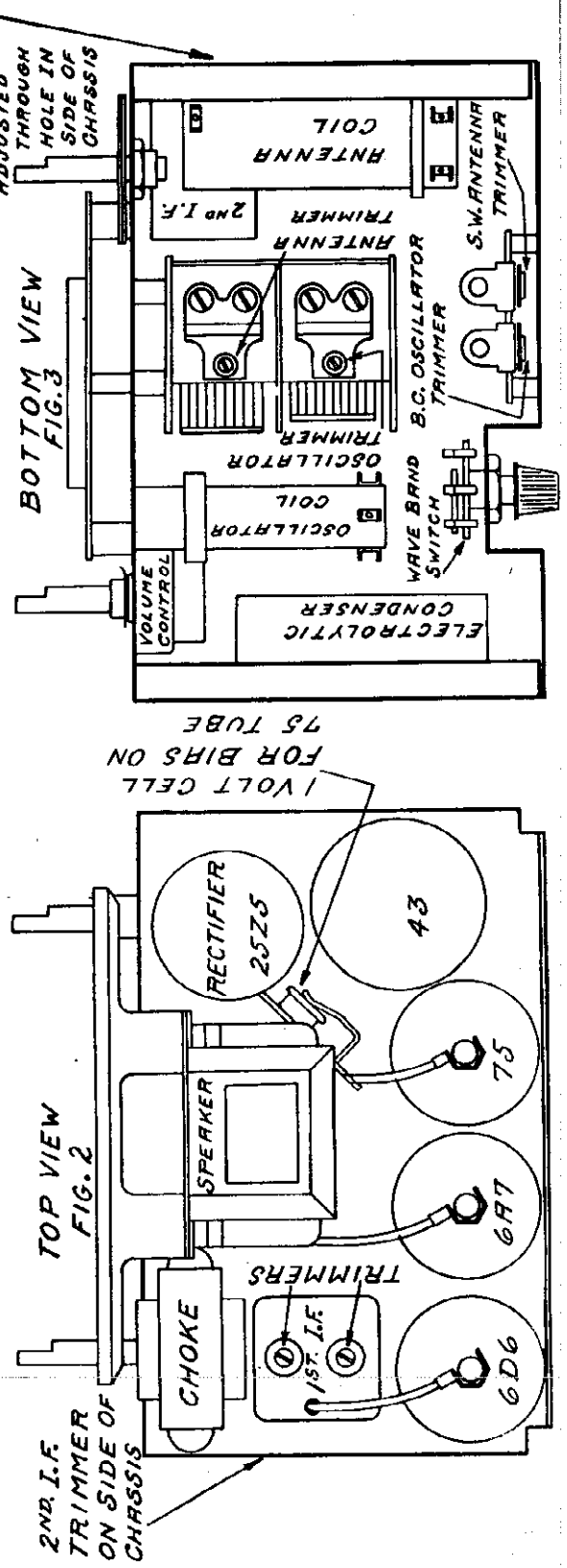
* Item number locates the article on the schematic diagram.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL S 108, 110
Chassis USA
Schematic
Socket, Trimmers



SCHEMATIC DIAGRAM
FIG. 1



MODELS 108,110
Chassis USA
Alignment
Voltage, Parts

EMERSON RADIO AND PHONOGRAPH
CORPORATION

TUBE DATA

The tube layout is illustrated in a diagram on the next page, Fig. 2. The complement of tubes and their functions are as indicated in the following table.

- 1-6A7—Pentagrid oscillator-modulator.
- 1-6D6—1-f amplifier.
- 1-75—Diode detector, audio amplifier, automatic volume control.
- 1-43—Pentode power output.
- 1-25Z5—Dual half-wave rectifier.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohm per-volt meter. Voltages listed below are from point indicated to ground. Line voltage for these readings was 115 volts, 60 cycles, a.c.

Tubes	Plate	Screen	Cathode	Occ. Plate	FIL
6A7	105	85	1.6	105	6
6D6	105	105	3.0	—	6
75	45	—	0	—	6
43	100	105	0	—	24

Voltage across speaker field (25Z5 cathode to line switch)—125 volts.
Voltage across choke (chassis to line switch)—20 volts.

REPLACEMENT PARTS

*Item	Part No.	DESCRIPTION
L2	Z2T-196	Filter choke—600 ohms
T1, L1	2DT-199	Two-band antenna coil with 455 kc wave trap
T2	2DT-200	Two-band oscillator coil
T3	2DT-201	455 first 1-f transformer
T4	2DT-202A	455 second 1-f transformer
R1	KB-53	50,000 ohm 1/4 watt carbon resistor
R2	CCR-140	350 ohm 1/4 watt wire-wound resistor
R3	Z2R-196	30,000 ohm 1/4 watt carbon resistor
R4	AAE-119	300 ohm 1/4 watt wire-wound resistor
R5, R8	KR-87	1 megohm 1/4 watt carbon resistor
R6, S9	ZDR-189	Volumes control with line switch—0.5 megohm
R7	PR-79	1,000 ohm 1/4 watt carbon resistor
R9, R11, R12	KB-56	0.5 megohm 1/4 watt carbon resistor
R10	ZDR-200	25 ohm wire-wound metal clad resistor
R18	EDW-48	145 ohm, 15 watt resistor wire in line cord
C1, C11	IC-47A	0.0005 mf mica condenser
C2, C3	ZDC-302	Two gang variable condenser
C4, C5	ZDC-312	Dual trimmer on bakelite strip 3 to 20 mmf—each trimmer
C6, C14, C21	AC-5	0.1 mf, 200 volt tubular condenser
C7, C8, C10	EC-12	0.05 mf, 200 volt tubular condenser
C9	EC-9A	0.0001 mf mica condenser
C12, C13	CCG-127	0.01 mf, 200 volt tubular condenser
C15	AC-7A	0.00025 mf mica condenser
C16	EC-84	0.005 mf, 600 volt tubular condenser
C17	EC-19	0.5 mf, 200 volt tubular condenser
C18	BC-13	0.25 mf, 200 volt tubular condenser
C19, C20	ZDC-308	Multiple 8 and 16 mf electrolytic filter condenser C19—16 mf, 150 volts. C20—8 mf, 150 volts.
B1	XXZ-313	Bias cell, one volt
S1	ZDS-102A	Wave-band switch
	ES-293	1" dynamic speaker
	KL-4	Pilot light, 6-8 volt, 15 amp.
	ZDW-42	Line cord with built-in resistor wire (R-18)
	ZDD-31A	Dial Assembly consists of:
	ZDD-31B	Dial scale and bezel
	ZDD-31C	Pyralin drive disc
	ZDD-31D	Vernier friction drive
	ZDD-31E	Dial crystal
	ZDD-31F	Dial pointer

MODELS 108 and 110

Chassis Model USA

Voltage rating	105-130 volts
Current drain	0.4 amp.
Frequency ranges	580-1550 kc, 1500-3600 kc.

GENERAL NOTES

1. Bias for the grid of the audio section of the 75 tube is obtained by means of a very small one-volt battery (bias cell). The cell assembly is mounted on a bakelite strip on top of the chassis. Do not put a voltmeter across this bias cell. If the set distorts, check the cell by temporarily replacing with a new cell, or some other one-volt source, and noting results. To remove the bias cell, simply pull up on the spring clip and lift the cell from its cup. On replacing it be sure the clip makes good contact.
2. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.
3. 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.
4. The filament dropping resistor, (R13—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.
5. In operating the receiver on 4-c it may be necessary to reverse the line plug for correct polarity.
6. The color coding of the 1-f transformer leads is as follows:
Grid—green
Grid return—black
Plate—blue
B plus—red.

ADJUSTMENTS

The diagrams, Fig. 2 and Fig. 3, on the second page illustrate the location of the trimmers on the chassis. Note that the first 1-f transformer, part No. 2DT-201, has two trimmer pots at the top of the case. The second 1-f transformer is mounted on the inside of the right-hand chassis wall and has one trimmer, accessible through a hole in the chassis.

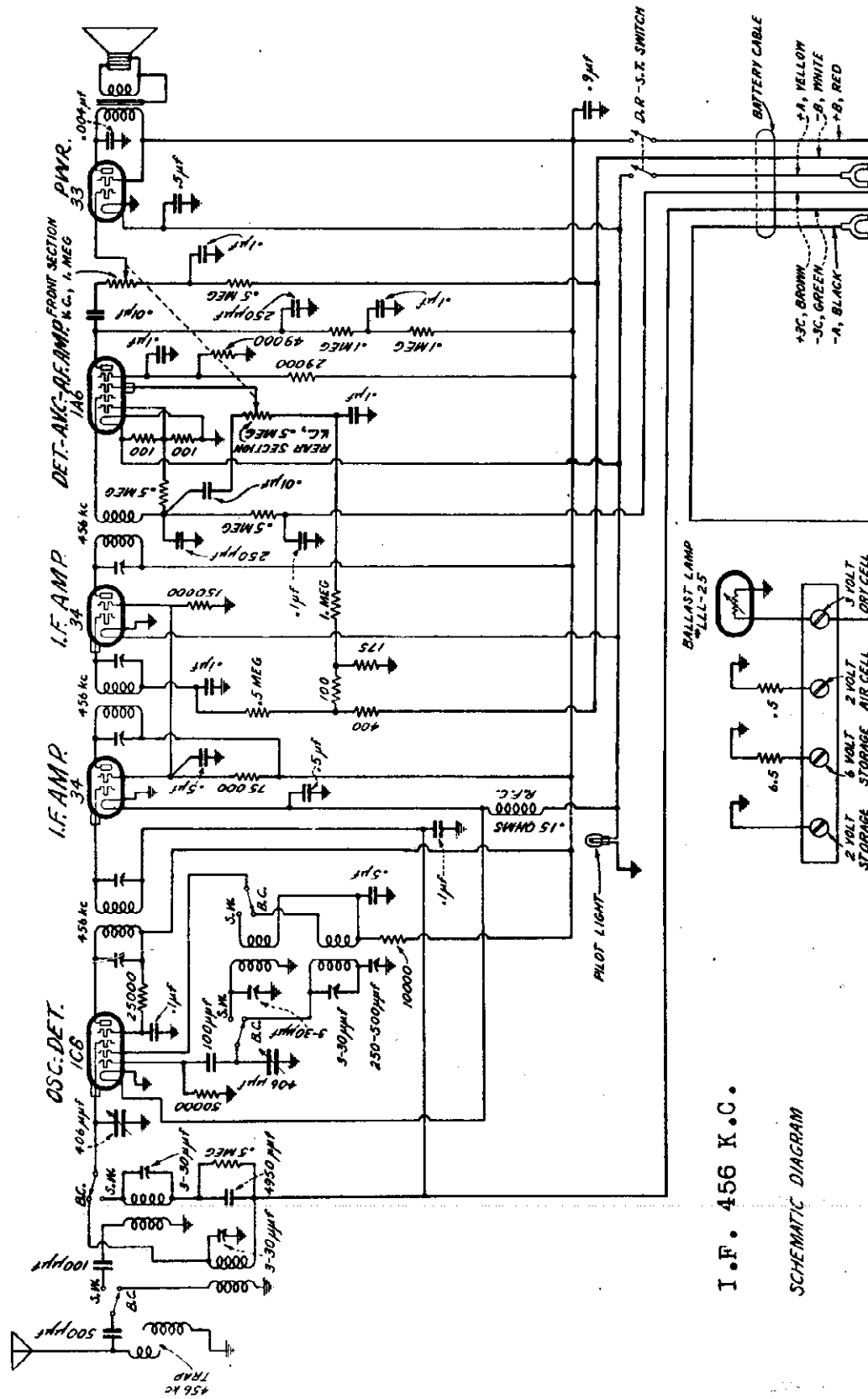
Two trimmers are mounted on the metal strap at the rear of the chassis. The trimmer nearest the wave-band switch is for the broadcast oscillator coil. The trimmer furthest away from the wave-band switch is for the short-wave antenna coil. The antenna stage trimmer will be found on the front section of the variable condenser and the oscillator stage trimmer on the rear section.

Alignment Procedures:

1. An oscillator with frequencies of 456, 1425, 2500 and 3600 kc should be used.
2. An output meter should be used across the voice coil or output transformer for observing maximum response.
3. Turn the wave-band switch clockwise, to the broadcast position, and rotate the variable condenser to minimum.
4. Feed a 456 kc signal to the grid of the 6A7 tube.
5. Adjust the three 1-f trimmers for maximum response.
6. Turn the wave-band switch counter-clockwise, to the short-wave position.
7. Set the dial pointer to 3600 and feed 3600 kc through the antenna lead.
8. Adjust the variable condenser oscillator trimmer (rear) for maximum response.
9. Turn wave-band switch to broadcast position and set the dial pointer to 1425.
10. Feed 1425 kc through the antenna and adjust the broadcast oscillator trimmer (on rear dual-trimmer strip, nearest band switch) for maximum response. Then adjust the antenna (front) section of variable condenser for maximum response.
11. Turn the wave-band switch counter-clockwise to the short-wave position. Set the dial pointer to 2500 and feed 2500 kc through the antenna.
12. Adjust the short-wave antenna trimmer (on rear strip, furthest from band switch) for maximum response.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL 280
Chassis F6D
Schematic



I.F. 456 K.C.

SCHEMATIC DIAGRAM

Broadcast Range
540-1700 kilocycles
(555 to 180 meters)

Short-Wave Range
5.7 to 15.5 Megacycles
(52.5 to 19.3 meters)

MODEL 280
Chassis F6D
Alignment, Parts
Voltage, Data

EMERSON RADIO AND PHONOGRAPH CORPORATION

ADJUSTMENTS

This instrument was carefully aligned and adjusted at the factory. No one but a service man experienced with short-wave receivers should attempt to re-align the receiver. If it becomes necessary, the following procedure may be accurately followed:

An oscillator with frequencies of 456, 550, 1600 and 15000 kc (15 mc) should be used. In addition, an output meter should be used across the voice coil for the precise results necessary.

Alignment Procedure:

1. Set the range switch to the broadcast band.
2. Short circuit oscillator stator of the variable condenser to ground. (Front section.)
3. Introduce the 456 kc signal on the grid of 1C6 tube.
4. Adjust the single-tuned i-f transformer for maximum response on the output meter.
5. Adjust both trimmers on first two i-f transformers for maximum response.
6. Remove 456 kc signal from 1C6 grid.
7. Remove the short circuit from the stator of the oscillator section of the gang condenser.
8. Make sure that the dial reaches its extreme position at both ends of the broadcast band when the gang condenser is at maximum and minimum. If the dial does not do this, loosen the set screws on the hub and rotate the gang condenser to maximum capacity. Then rotate the dial (by means of the selector knob) to its extreme position at the 550 kc end of the broadcast band. Tighten the set-screws securely and proceed to re-align the set.
9. Set the dial to 1600 kc.
10. Introduce a 1600 kc signal into the antenna.
11. Adjust broadcast oscillator trimmer (on universal-wound oscillator coil under chassis) for maximum response.
12. Adjust trimmer on top of b.c. detector coil (long coil on top of chassis) for maximum response.
13. Introduce a 550 kc signal into the antenna. Rotate the gang condenser back and forth around the 550 kc dial reading and at the same time adjust the series padding condenser for maximum output. Leave the series paddler set to the point of maximum sensitivity. The series paddler is on the front of the chassis.
14. Return to 1600 kc and repeat 11 and 12.
15. Now throw the range switch to short-wave position and introduce a 15 megacycles (mc) signal into the antenna.
16. Set the dial to 15 mc.
17. Adjust oscillator trimmer for maximum output. The short-wave oscillator trimmer is on the heavy-wire coil beneath the chassis.
18. Connect an outside antenna to the set and adjust the a. w. detector coil trimmer for maximum noise at 15 mc. The a. w. detector coil is the heavy-wire coil on top of the chassis. Before gradually increase it. A peak will be noticed and then as the capacity is increased the noise diminishes and disappears. When the capacity is increased further, the noise may increase again. The correct peak is the one at the minimum capacity end.

SERVICE PARTS

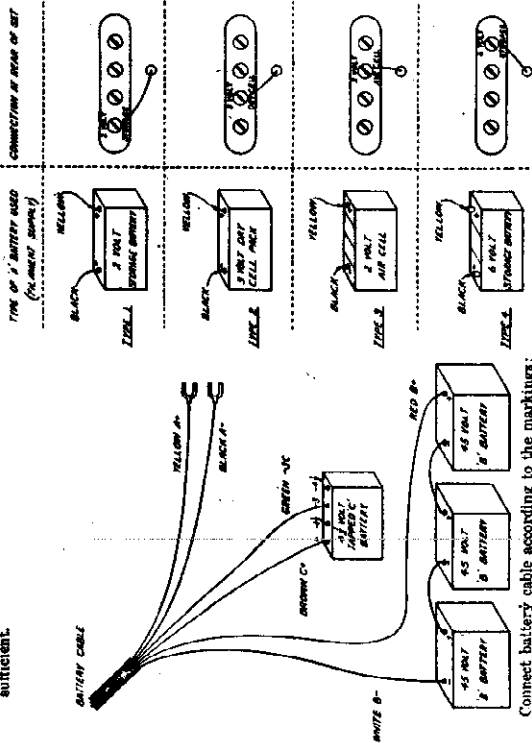
Part No.	Description
LLT-139	Broadcast antenna coil..... LLC-146A Multiple condenser tank
LLT-140	Short-wave antenna coil..... BRC-131 9 mf tubular condenser
LLT-141	Broadcast oscillator coil..... LLC-149 .00495 mf (4950 mmf) mica condenser
LLT-142	Short-wave oscillator coil..... LLS-95 34 socket
LLT-143A	Flament r-f choke coil..... LLS-96 1A6 socket
LLT-144	Dual tuned second i-f transformer..... LLS-97 1C8 socket
DDT-121	Single tuned third i-f transformer..... LLS-99 LL-25 socket (for ballast)
LLR-144	Volume control..... LLS-90 Wave-band switch
LLR-145	.5 ohm aircrd resistor..... LLS-91 6" permanent magnet speaker
LLR-146	6.5 ohm 3 watt resistor (for 6 volt operation) LL-24 6 volt .06 amp pilot light
EC-19	.5 mf 200 volt tubular condenser..... LLW-49 Battery cable
LLC-147	Variable condenser..... LLZ-142 Battery terminal strip
BRC-121	Adjustable padding condenser..... LLB-18A Vernier dial and scale

DESCRIPTION

The following batteries are required:
 For filament supply, one of the following: 2 volt storage battery, 2½ volt air cell, 3 volt dry cell pack or 6 volt storage battery.

High voltage: either 135 or 180 volts of B batteries.
 Bias: either 3 or 4½ volts of C Battery (3 volts if 135 volt B is used, 4½ volts if 180 volt B is used).

Use of 180 volts (four 45 volt blocks) of B Battery is justified only when an unusually loud volume is required. For home use 135 volts (three 45 volt blocks) is sufficient.



Connect battery cable according to the markings:

- yellow A+to.....positive (+) side of filament supply. (A battery)
- black A-to.....negative (-) side of filament supply
- white B+to.....+ side of 4½ volt tapped C battery
- brown C+to.....+ side of 4½ volt tapped C battery
- red B+180 B+135 to.....+ 180 or + 135 B
- green C-4½ C-3 to.....- 4½ if 180 volt B is used, - 3 if 135 volt B is used.

Voltage Analysis:

Readings should be taken with 1000 ohms-per-volt voltmeter with 135 volts of B battery and 3 volts of C battery. Voltages are from points listed to ground.

Tube	Plate	S. G.	Bias	Oct. plate
1C6	118	6C-70	-3 to +3C	85
84	118	45-50	-3 to +3C	
84	118	45-50	-3	
1A6	70	32-38	-8	
33	116	118	-15	

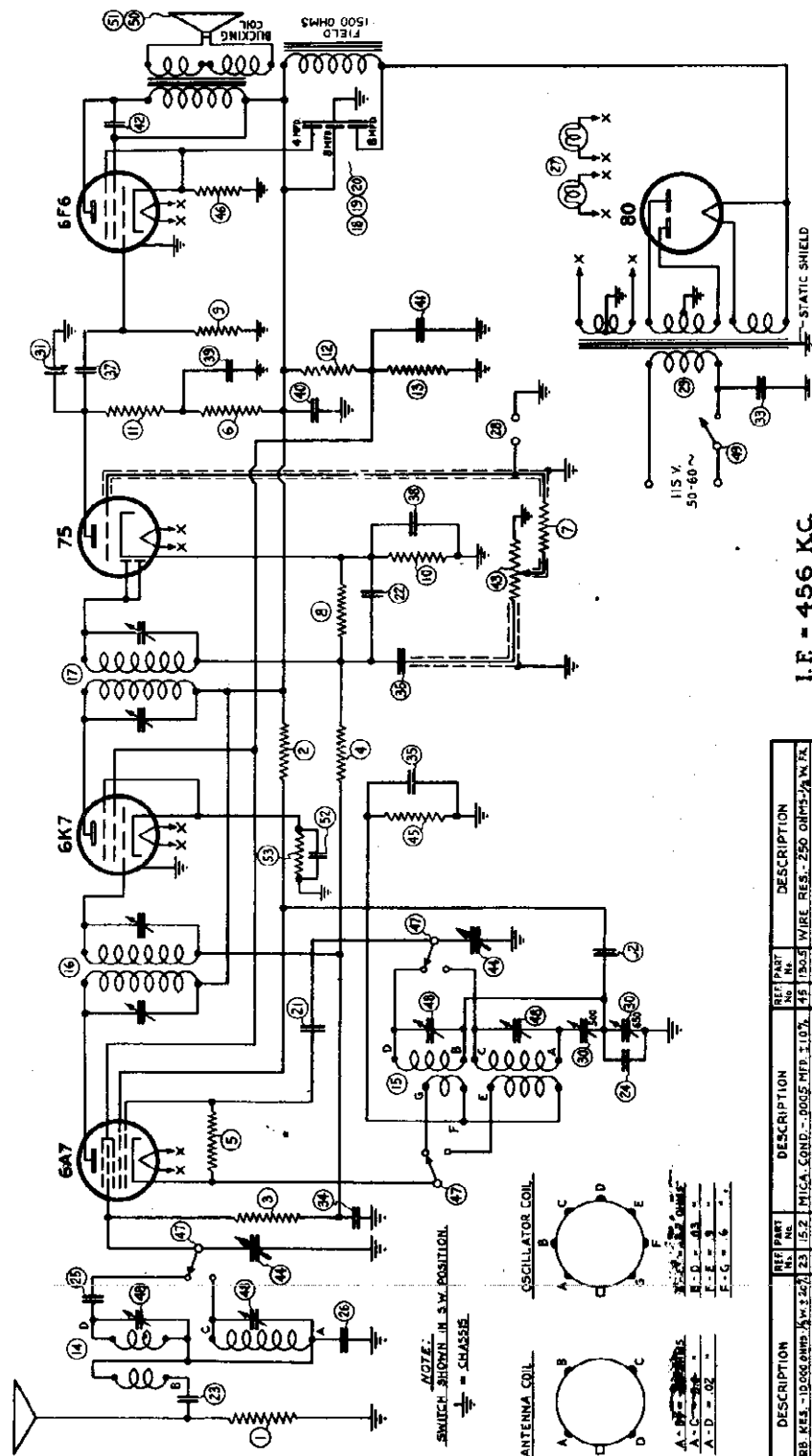
Measure bias voltage along resistor series circuit below chassis. Pilot light is 2 volt .06 amp. No other should be used. Set should not be operated without it.

The ballast (voltage regulator) tube is used only when a 3 volt dry cell pack is employed for filament supply. With a new dry cell unit the filament voltage on the tubes should not exceed 2.2 volts as measured with an accurate 1000 ohms-per-volt voltmeter. When the dry cell voltage has dropped to 2.2 volts, the filament voltage should not be less than 1.8 volts. A dry cell pack showing less than 2.2 volts with load should be discarded.

FADA RADIO & ELECTRIC CORP.

MODEL 150 (2 Types)
Schematic

NOTE: In some receivers 6D6 is used instead of 6K7 and 8 42 is used in place of the 6F6.



I.F. = 456 KC.

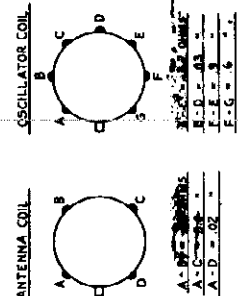
FADA RADIO & ELECTRIC CO. Low 10 AMP. CIRT. N.Y.
MODEL 150
DESIGNED BY J.P.
CHECKED BY J.P.
DATE 7-10-35
APP. P.F.F.

1ST I.F. TRANS. PRI. - 14.5 OHMS. SEC. - 14.5
2ND I.F. TRANS. PRI. - 14.5 OHMS. SEC. - 14.5

NOTE: In sets using 6D6, the cathode of 6D6 joins resistor 45 and units 52 and 53 are not used. In these receivers 35 is .01 MFD. and 36 is .25 MFD.

REF. PART	DESCRIPTION	REF. PART	DESCRIPTION
1	ANTENNA COIL	16	WIRE RES. - 250 OHMS - 1/4 W. R.F.
2	1000 MFD. 50 V. CAP.	17	WIRE RES. - 500 OHMS - 1/4 W. R.F.
3	1000 MFD. 50 V. CAP.	18	WIRE RES. - 500 OHMS - 1/4 W. R.F.
4	1000 MFD. 50 V. CAP.	19	WIRE RES. - 500 OHMS - 1/4 W. R.F.
5	1000 MFD. 50 V. CAP.	20	WIRE RES. - 500 OHMS - 1/4 W. R.F.
6	1000 MFD. 50 V. CAP.	21	WIRE RES. - 500 OHMS - 1/4 W. R.F.
7	1000 MFD. 50 V. CAP.	22	WIRE RES. - 500 OHMS - 1/4 W. R.F.
8	1000 MFD. 50 V. CAP.	23	WIRE RES. - 500 OHMS - 1/4 W. R.F.
9	1000 MFD. 50 V. CAP.	24	WIRE RES. - 500 OHMS - 1/4 W. R.F.
10	1000 MFD. 50 V. CAP.	25	WIRE RES. - 500 OHMS - 1/4 W. R.F.
11	1000 MFD. 50 V. CAP.	26	WIRE RES. - 500 OHMS - 1/4 W. R.F.
12	1000 MFD. 50 V. CAP.	27	WIRE RES. - 500 OHMS - 1/4 W. R.F.
13	1000 MFD. 50 V. CAP.	28	WIRE RES. - 500 OHMS - 1/4 W. R.F.
14	1000 MFD. 50 V. CAP.	29	WIRE RES. - 500 OHMS - 1/4 W. R.F.
15	1000 MFD. 50 V. CAP.	30	WIRE RES. - 500 OHMS - 1/4 W. R.F.
16	1000 MFD. 50 V. CAP.	31	WIRE RES. - 500 OHMS - 1/4 W. R.F.
17	1000 MFD. 50 V. CAP.	32	WIRE RES. - 500 OHMS - 1/4 W. R.F.
18	1000 MFD. 50 V. CAP.	33	WIRE RES. - 500 OHMS - 1/4 W. R.F.
19	1000 MFD. 50 V. CAP.	34	WIRE RES. - 500 OHMS - 1/4 W. R.F.
20	1000 MFD. 50 V. CAP.	35	WIRE RES. - 500 OHMS - 1/4 W. R.F.
21	1000 MFD. 50 V. CAP.	36	WIRE RES. - 500 OHMS - 1/4 W. R.F.
22	1000 MFD. 50 V. CAP.	37	WIRE RES. - 500 OHMS - 1/4 W. R.F.
23	1000 MFD. 50 V. CAP.	38	WIRE RES. - 500 OHMS - 1/4 W. R.F.
24	1000 MFD. 50 V. CAP.	39	WIRE RES. - 500 OHMS - 1/4 W. R.F.
25	1000 MFD. 50 V. CAP.	40	WIRE RES. - 500 OHMS - 1/4 W. R.F.
26	1000 MFD. 50 V. CAP.	41	WIRE RES. - 500 OHMS - 1/4 W. R.F.
27	1000 MFD. 50 V. CAP.	42	WIRE RES. - 500 OHMS - 1/4 W. R.F.
28	1000 MFD. 50 V. CAP.	43	WIRE RES. - 500 OHMS - 1/4 W. R.F.
29	1000 MFD. 50 V. CAP.	44	WIRE RES. - 500 OHMS - 1/4 W. R.F.
30	1000 MFD. 50 V. CAP.	45	WIRE RES. - 500 OHMS - 1/4 W. R.F.
31	1000 MFD. 50 V. CAP.	46	WIRE RES. - 500 OHMS - 1/4 W. R.F.
32	1000 MFD. 50 V. CAP.	47	WIRE RES. - 500 OHMS - 1/4 W. R.F.
33	1000 MFD. 50 V. CAP.	48	WIRE RES. - 500 OHMS - 1/4 W. R.F.
34	1000 MFD. 50 V. CAP.	49	WIRE RES. - 500 OHMS - 1/4 W. R.F.
35	1000 MFD. 50 V. CAP.	50	WIRE RES. - 500 OHMS - 1/4 W. R.F.
36	1000 MFD. 50 V. CAP.	51	WIRE RES. - 500 OHMS - 1/4 W. R.F.
37	1000 MFD. 50 V. CAP.	52	WIRE RES. - 500 OHMS - 1/4 W. R.F.
38	1000 MFD. 50 V. CAP.	53	WIRE RES. - 500 OHMS - 1/4 W. R.F.
39	1000 MFD. 50 V. CAP.	54	WIRE RES. - 500 OHMS - 1/4 W. R.F.
40	1000 MFD. 50 V. CAP.	55	WIRE RES. - 500 OHMS - 1/4 W. R.F.

NOTE: SWITCH SHOWN IN S.W. POSITION.
- = CHASSIS



A - 6F6
B - 75
C - 6K7
D - 6A7
E - 600
F - 600

MODEL 150
Alignment, Trimmers
Socket, Voltage

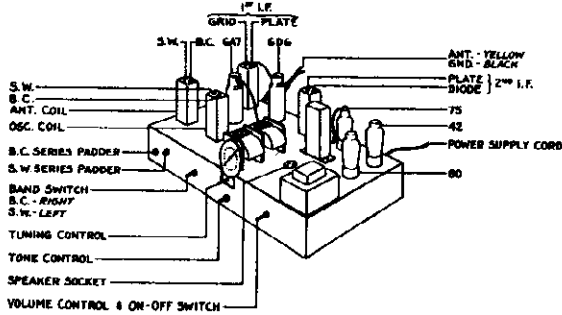
FADA RADIO & ELECTRIC CORP.

COMPENSATING INSTRUCTIONS FOR

MODEL 150 SERIES

In order to adjust accurately the various aligning condensers of the receiver in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier which can be attenuated at 456 KC, 600 KC, 1200 KC, 6 MC and 15 MC.

This receiver is equipped with an automatic volume 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.



ADJUSTMENT OF THE I.F. CONDENSERS

The four (4) intermediate frequency (I.F.) condensers are located as shown in the sketch.

- 1st - Disconnect the outside antenna system from the receiver.
- 2nd - Disconnect the control grid lead from the 6A7 tube.
- 3rd - Connect the high potential lead of the signal generator to the control grid of the 6A7 tube, and the low potential side to the receiver "ground" lead.
- 4th - Place an output meter (copper oxide type) across the speaker voice coil so that variations in signal output can be noted.
- 5th - Place the signal generator in operation and adjust the carrier frequency to 456 KC. Regulate the attenuator control of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.
- 6th - With the aid of a bakelite type screw driver, adjust the four (4) I.F. condensers to resonance as indicated by the greatest swing of the needle on the output meter. Repeat these adjustments as there is a slight interlocking effect.

ADJUSTMENT OF S.W. SHUNT COMPENSATORS

The compensators are located as indicated on the sketch.

- 1st - Remove the signal generator connection from the control grid of the 6A7 tube and replace the control grid lead.
- 2nd - Connect the antenna wire of the receiver chassis through a 400 ohm carbon resistor to the high potential side of the signal generator. The ground wire should remain connected to the signal generator.
- 3rd - Adjust the carrier frequency output of the signal generator to 15 MC.
- 4th - Turn the wave band selector switch to the left - short wave position. Set the calibrated dial of the receiver to read 15 MC.
- 5th - Adjust the S.W. oscillator shunt compensator for maximum signal output. If two peaks are noted on this adjustment, the proper one is that with the compensator furthest "in". To determine that this compensator has not been adjusted to the image frequency, turn the receiver dial to approximately 15.9 MC. If no signal can be heard at this setting, even with a greater signal generator output, the S.W. oscillator shunt compensator has been improperly adjusted and it will be necessary to return the dial to 15 MC and adjust to the proper peak. After re-adjusting check to see that the image frequency comes in at 15.9 MC on the receiver dial. It is well to bear in mind throughout these adjustments that with the same signal input to the receiver, the image response point should be weaker than the original (fundamental) signal frequency.
- 6th - Having determined the correct peak, and maximum setting, for the S.W. oscillator shunt compensator, adjust the S.W. detector shunt compensator for maximum signal output.

ADJUSTMENT OF S.W. OSCILLATOR SERIES PADDLER

- 1st - Adjust the carrier frequency output of the signal generator to 6 MC.

- 2nd - Turn the calibrated dial of the receiver to pick up this 6 MC signal.

- 3rd - With the aid of a bakelite type screw driver, adjust the S.W. oscillator series paddler (see sketch) until a maximum output signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum output signal.

- 4th - Having determined the maximum peak of the S.W. oscillator series paddler, re-adjust the carrier frequency of the signal generator to 15 MC. Turn the calibrated dial to 15 MC and re-adjust S.W. oscillator shunt compensator, and then S.W. detector shunt compensator for maximum signal output; checking for image point as outlined in the foregoing instructions.

ADJUSTMENT OF BC SHUNT COMPENSATORS

The compensators are located as indicated in the sketch.

- 1st - Remove the 400 ohm resistor from the high potential side of the signal generator and insert a 200 mfd. mica condenser in its place.
- 2nd - Turn the wave band selector switch to the right - broadcast position.
- 3rd - Adjust the carrier frequency to 1500 KC.
- 4th - Set the calibrated dial of the receiver to read 1500 KC.
- 5th - Adjust the BC oscillator shunt compensator for maximum signal output.
- 6th - Adjust the BC detector shunt compensator for maximum signal output.

ADJUSTMENT OF BC OSCILLATOR SERIES PADDLER

- 1st - Adjust the carrier frequency output of the signal generator to 600 KC.
- 2nd - Turn the calibrated dial of the receiver to pick up this 600 KC signal.
- 3rd - With the aid of a bakelite type screw driver, adjust the BC oscillator series paddler (see sketch) until a maximum signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.
- 4th - Having determined the maximum peak of the BC oscillator series paddler, re-adjust the carrier frequency of the signal generator to 1500 KC. Turn the calibrated dial to 1500 KC and re-adjust the BC oscillator shunt and the BC detector shunt compensators for maximum signal output as outlined in the foregoing instructions.

CONTINUITY AND VOLTAGE READINGS ON

MODEL 150 SERIES

Line Voltage 110 - Input Current .45 amp.
 No Signal Input - Wave Band Switch - Right.

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CATHODE VOLTS	GRID VOLTS
6A 7	1st Det.-Osc.	182	1.9	4.0	80
6D6	Int. Freq.	182	5.5	4.0	80
75	2nd Det.	---	---	---	---
42	1st Aud.	82*	0.5	1.5	---
80	2nd Aud.	165	20.0	13.0	175
80	Rectifier	---	42.0 TOTAL	---	---

6A7 Osc. Anode voltage -- 132 and Current -- 4.8 ma.

* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

VOLTAGE ACROSS ELECTROLYTIC CONDENSER

1st SIGNAL ON	2nd SIGNAL ON
132	180
Voltage across speaker field.....	132 volts
" " 20,000 ohm 1 watt resistor.....	102 "
" " 50,000 " 1/2 "	84 "

D.C. RESISTANCE VALUES

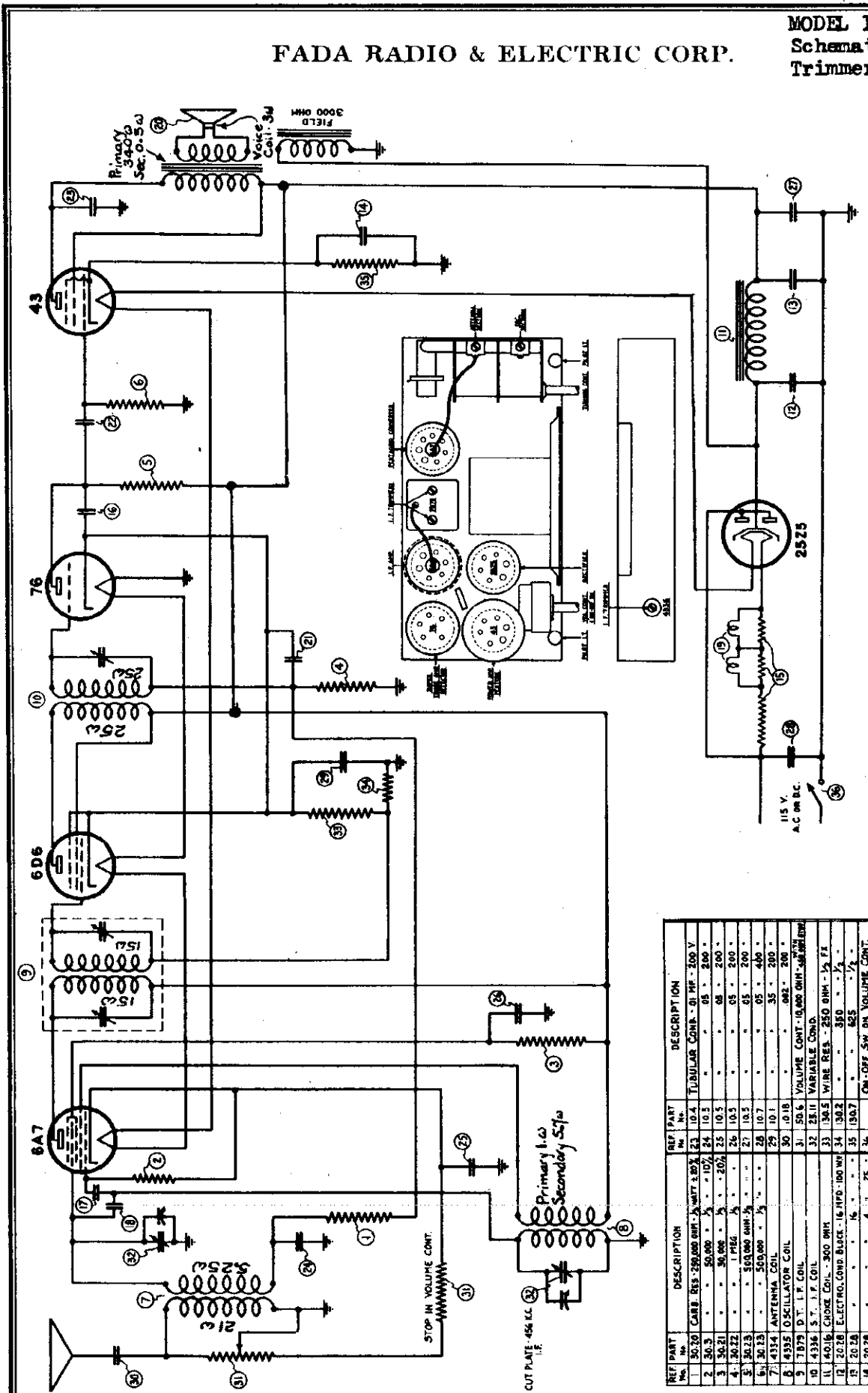
	PRIMARY	SECONDARY
Speaker input transformer	580. ohms	.335 ohms
field coil	1,520. "	"
voice coil	2.9 "	"
bucking coil	.345 "	"

FORM 5-2147
 July 1, 1935

SERVICE DIVISION

FADA RADIO & ELECTRIC CORP.

MODEL 155
Schematic, Socket
Trimmers



FADA RADIO ELECTRIC CO. LONG ISLAND CITY, N.Y.	
MODEL 155	
DRAWN BY	DATE 4-8-35
CHECKED BY	APP. 1/15

VOLTAGE ACROSS
ELECTROLYTIC COND.
1st Section 120 V.
2nd " 109 V.
" " FILTER CHOKE - 11V.

NOTE: * - CHASSIS
I.F. = 456 KC

REF. PART No.	DESCRIPTION	REF. PART No.	DESCRIPTION
1	50.20 CARB. RES. 250,000 OHM. 1/4 WATT 5% TOL.	10.4	TUBULAR COND. - 50 PF. - 500 V
2	30.9 50,000 1/4 "	10.5	" " " " " " " "
3	50.21 " " " " " "	10.6	" " " " " " " "
4	30.22 " " " " " "	10.7	" " " " " " " "
5	30.23 " " " " " "	10.8	" " " " " " " "
6	30.24 " " " " " "	10.9	" " " " " " " "
7	30.25 " " " " " "	11.0	" " " " " " " "
8	30.26 " " " " " "	11.1	" " " " " " " "
9	30.27 " " " " " "	11.2	" " " " " " " "
10	4336 S. T. I.F. COIL	11.3	" " " " " " " "
11	4016 CHOKE COIL - 300 OHM	11.4	" " " " " " " "
12	2078 ELECTRO. COND. BUCK. 16 MFD 100 MF	11.5	" " " " " " " "
13	2028 " " " " " "	11.6	" " " " " " " "
14	2028 " " " " " "	11.7	" " " " " " " "
15	1137 LINE RESISTOR - 140 - 34.38 OHMS	11.8	" " " " " " " "
16	151 MICA COND. - 0.0005 MF 3.10%	11.9	" " " " " " " "
17	15 3 " " " " " "	12.0	" " " " " " " "
18	15 16 " " " " " "	12.1	" " " " " " " "
19	15 1 " " " " " "	12.2	" " " " " " " "
20	10321 PILOT LIGHTS - 8.5V. 250 MA	12.3	" " " " " " " "
21	10.4 TUBULAR COND. - 50 PF. - 200 V	12.4	" " " " " " " "
22	10.4 " " " " " "	12.5	" " " " " " " "

MODEL 155
Alignment
Voltage

FADA RADIO & ELECTRIC CORP.

COMPENSATING INSTRUCTIONS FOR

MODEL 155

In order to adjust accurately the various trimmer condensers of the receiver in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier which can be attenuated at 456 KC and 1500 KC.

This receiver is equipped with an automatic overload control which necessitates setting the manual volume control of the receiver to the maximum position, to assure accuracy in alignment. To control the signal output of the receiver it will be necessary to use the attenuator control of the signal generator.

NOTE: Do not remove knobs, screws or chassis from the cabinet before removing the line cord plug from the power line socket. If the above precaution is not followed a severe electric shock, or damage to the receiver, may result.

ADJUSTMENT OF I.F. CONDENSERS

The three (3) intermediate frequency (I.F.) condensers are located as shown in the sketch.

1st - Turn the rotor plates of the ganged variable condenser to a position where no broadcast station carrier is heard. If this is not possible, the oscillator stator section (see sketch) of the ganged variable condenser may be short circuited to chassis.

2nd - Disconnect the control grid lead from the 6A7 oscillator-modulator tube.

3rd - Connect the high potential lead of the signal generator to the control grid of the 6A7 oscillator-modulator tube, and the low potential lead to the receiver chassis.

4th - Place an output meter (copper oxide type) across the speaker voice coil terminals so that variations in signal output can be noted.

5th - Place the signal generator in operation and adjust the carrier frequency to 456 KC. Regulate the attenuator control of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.

6th - With the aid of a bakelite type screw driver, adjust the three (3) I.F. condensers to resonance as indicated by the greatest swing of the needle on the output meter.

ADJUSTMENT OF THE GANGED VARIABLE CONDENSER

The compensators are located at the top of their respective tuning condenser section and can be adjusted with the aid of a screw driver.

1st - Remove signal generator connection from control grid of 6A7 oscillator-modulator tube and replace control grid lead.

2nd - Connect the antenna wire of the receiver to the high potential lead of the signal generator through a 250 mmfd. condenser.

3rd - Adjust the carrier frequency of the signal generator to 1500 KC.

4th - Set the dial of the receiver to read 1500 KC.

5th - Starting with the compensator nearest the front of the receiver, adjust each compensator (as indicated on sketch) for maximum signal output. Do not disturb the setting of the gang condenser during these operations.

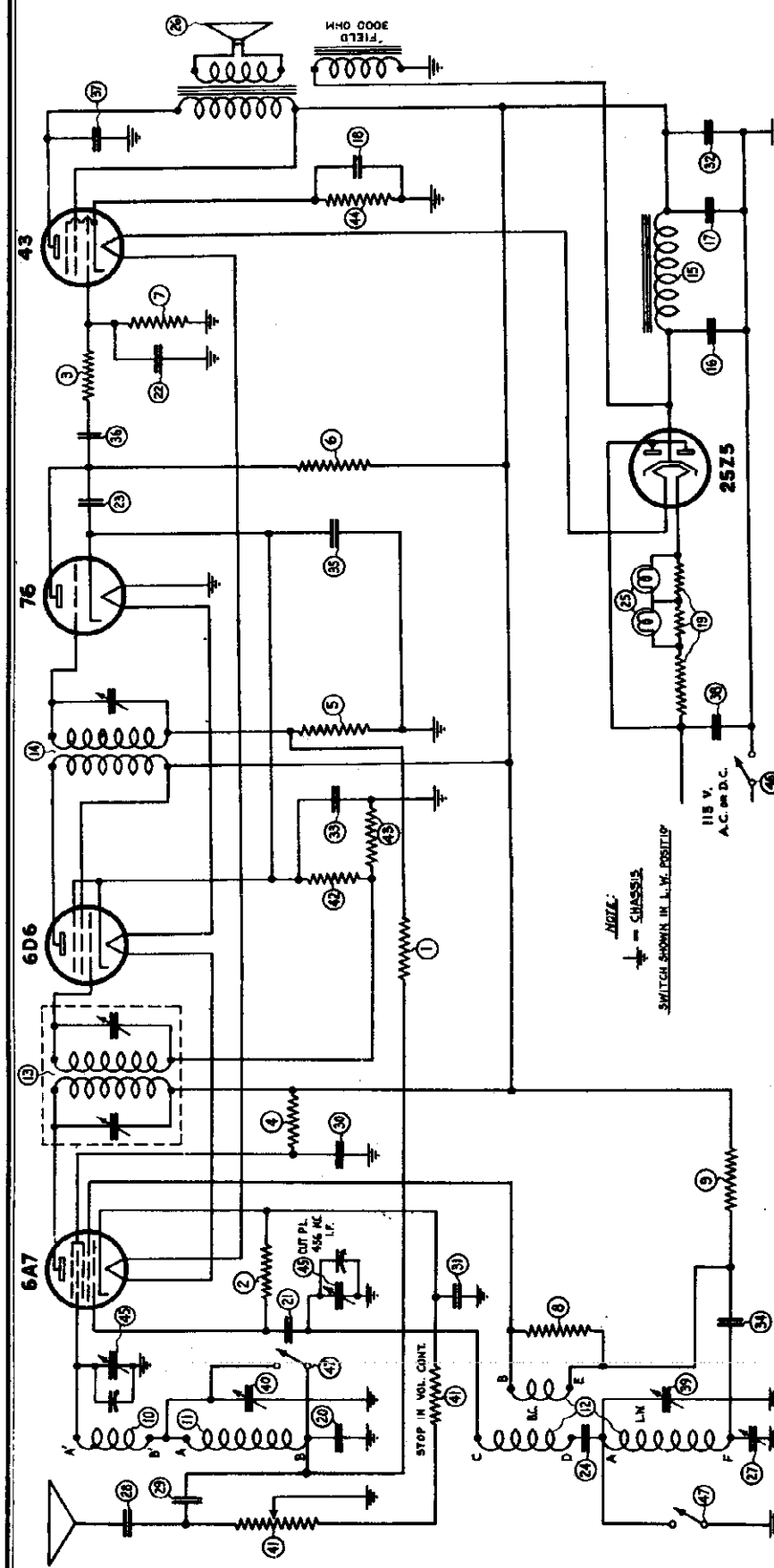
TYPE OF TUBES	POSITION OF TUBES	PLATE VOLTS	PLATE CURRENT MA	CONTROL GRID VOLTS	SCREEN GRID VOLTS
6A7	1st Det. Osc.	107	1.0	2.0**	48
6D6	Int. Freq.	102	0.0	2.5	102
76	2nd Det.	34*	0.1	6.5**	
43	Pwr. Pentode	89	18.0	14.0**	95
25Z5	Rectifier		76. TOTAL		

* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

** Correct readings cannot be obtained at control grid, due to series resistors. To be measured across each respective bias resistor.

FADA RADIO & ELECTRIC CORP.

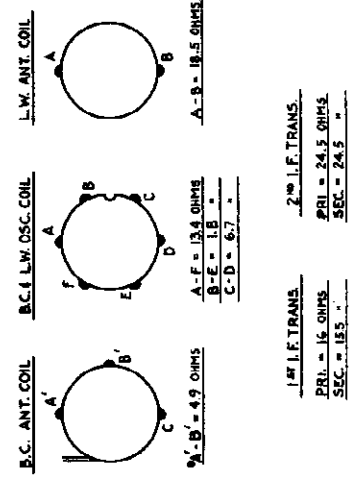
MODEL 156
Schematic



NOTE:
- CHASSIS
SWITCH SHOWN IN L.W. POSITION

FADA RADIO & ELECTRIC CO.	
LONG ISLAND CITY, N.Y.	
MODEL 156	
PRINTED BY	DATE 6-27-35
DESIGNED BY	AM JES

I.F. = 456 K.C.



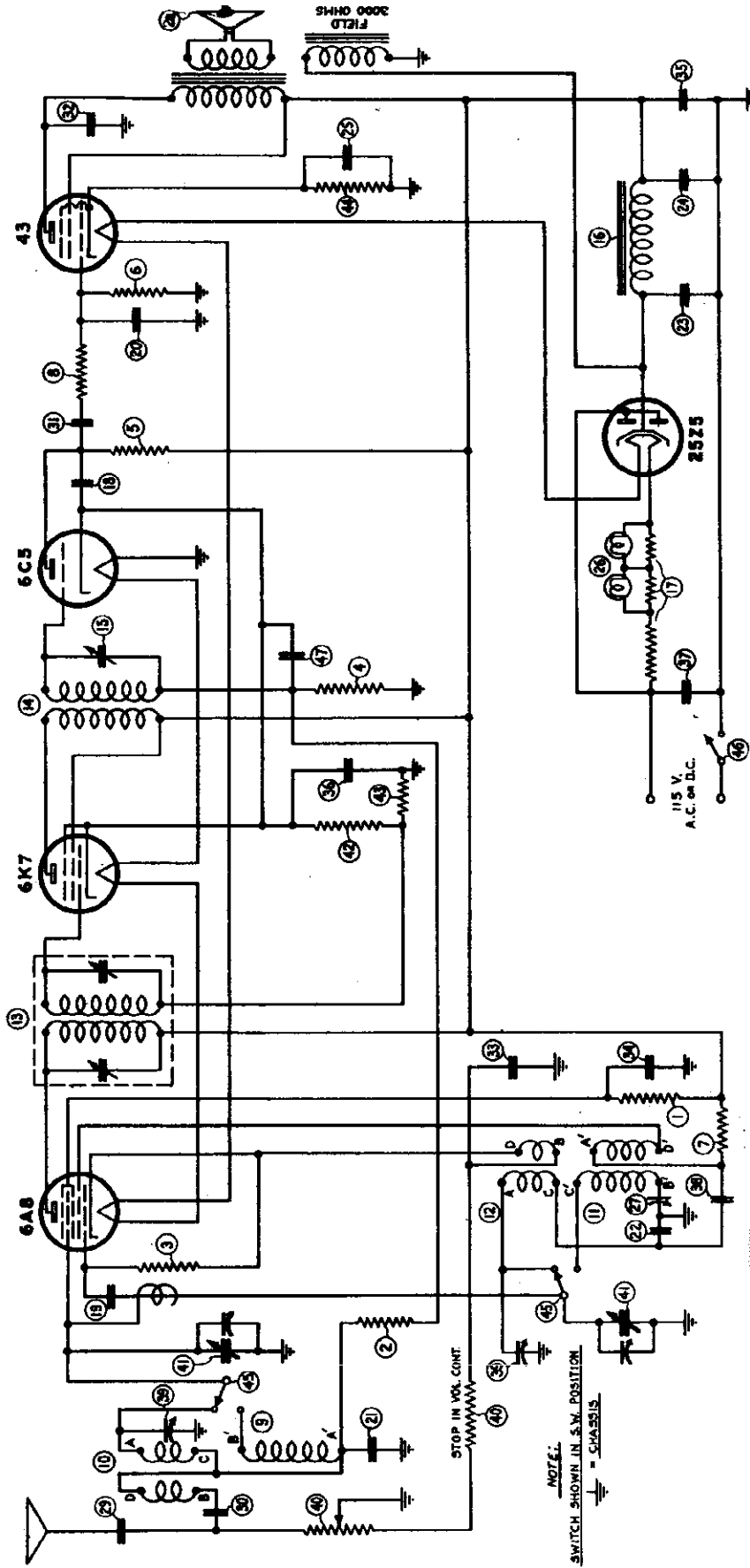
1ST I.F. TRANS.
PRI. = 15 OHMS
SEC. = 24.5 "

2ND I.F. TRANS.
PRI. = 24.5 OHMS
SEC. = 24.5 "

REF. PART NO.	DESCRIPTION	REF. PART NO.	DESCRIPTION	REF. PART NO.	DESCRIPTION
1	30.20 CARB. RES. - 250,000 OHMS	23	15.2 MICA COND. - .0005 MFD. ± 10%	45	23.11 VARIABLE COND.
2	30.3 " " " " " " " " " " " "	24	15.17 " " " " " " " " " " " "	46	ON-OFF SW. ON VOLUME CONT.
3	30.5 " " " " " " " " " " " "	25	120.1 PILOT LIGHTS - 6.3 V. 25 A.	47	45.5 BAND SWITCH
4	30.21 " " " " " " " " " " " "	26	105.11 SPEAKER - 8000 OHM		
5	30.22 " " " " " " " " " " " "	27	28.41 PADDING COND. - 400 PPF		
6	30.23 " " " " " " " " " " " "	28	10.18 TUBULAR COND. - .002 MFD. 200 V.		
7	30.24 " " " " " " " " " " " "	29	10.18 " " " " " " " " " " " "		
8	30.1 " " " " " " " " " " " "	30	10.5 " " " " " " " " " " " "		
9	30.1 " " " " " " " " " " " "	31	10.5 " " " " " " " " " " " "		
10	45.74 BROADCAST ANTENNA COIL	32	10.5 " " " " " " " " " " " "		
11	45.76 LONG WAVE	33	10.1 " " " " " " " " " " " "		
12	45.75 B.C. I.L.W. OSCILLATOR	34	10.4 " " " " " " " " " " " "		
13	43.36 S.T. I.F.	35	10.4 " " " " " " " " " " " "		
14	40.16 CHOKE COIL - 300 OHM	36	10.4 " " " " " " " " " " " "		
15	20.28 ELECTRO. COND. BLOCK - SUPPLY	37	10.4 " " " " " " " " " " " "		
16	20.28 " " " " " " " " " " " "	38	10.7 " " " " " " " " " " " "		
17	20.28 " " " " " " " " " " " "	39	25.38 TRIMMER - 10-60 PPF		
18	20.28 " " " " " " " " " " " "	40	25.14 " " " " " " " " " " " "		
19	115.7 LINE RESISTOR - 140-38-38 OHM	41	50.6 VOLUME CONT. - 10,000 OHM WIRE WOUND		
20	15.5 MICA COND. - .002 MFD. ± 3%	42	30.5 WIRE RES. - 250 OHM - 1/4 FX		
21	15.3 " " " " " " " " " " " "	43	130.2 " " " " " " " " " " " "		
22	15.3 " " " " " " " " " " " "	44	130.1 " " " " " " " " " " " "		

MODEL 157
Schematic

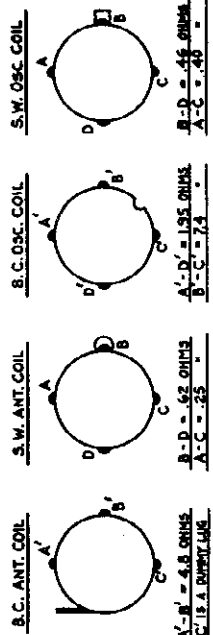
FADA RADIO & ELECTRIC CORP.



I. F. = 456 KC.

1ST. I.F. TRANS. 2ND I.F. TRANS.
PRI. = 16 OHMS PRI. = 24.5 OHMS.
SEC. = 15.5 SEC. = 24.5

FADA RADIO & ELECTRIC CO. LONG ISLAND CITY, N.Y.	
DESIGNED BY	MODEL 157
CHECKED BY	DATE 7-12-35

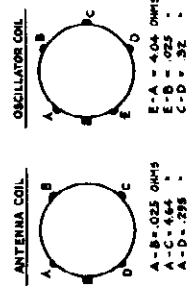
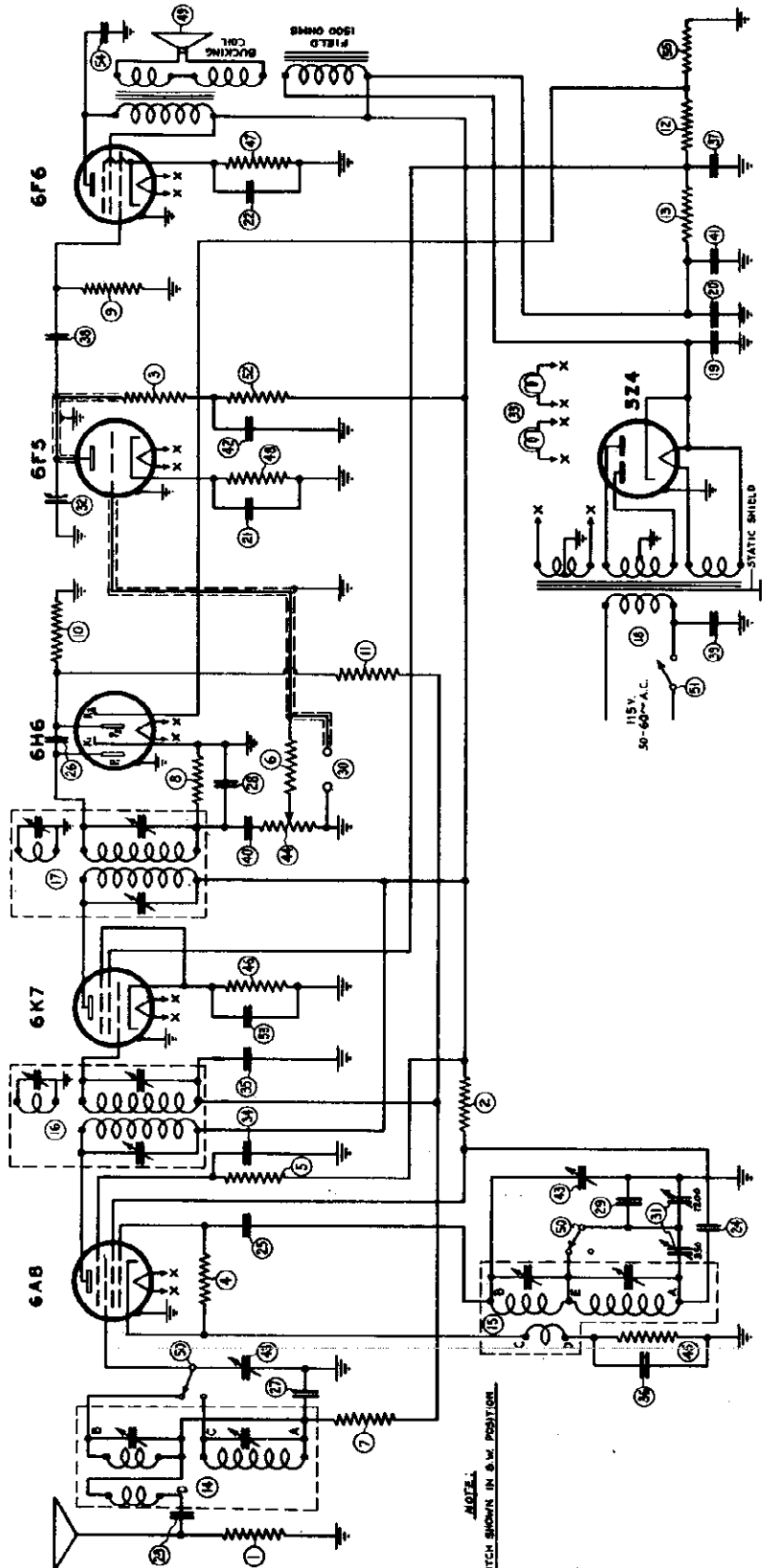


QTY.	NO.	DESCRIPTION
1	3031	CARB. RES. - 3000 OHMS - S.W. CONT.
1	458	ELECTR. COND. - 1000 MFD. - 250 V.
1	46	ON-OFF SW. COIL VOL. CONT. (40)
1	47	10.4 TUBULAR COND. - .01 MFD. - 200 V.
1	48	PILOT LIGHTS 6-3 V. 25 A.
1	49	PADDING COND. - 500 OHMS
1	50	SPEAKER - 3000 OHMS
1	51	TUBULAR COND. - .002 MFD. - 200 V.
1	52	30 10.4
1	53	32 10.4
1	54	33 10.5
1	55	34 10.5
1	56	35 10.5
1	57	36 10.1
1	58	37 10.7
1	59	38 10.28
1	60	39 25.14
1	61	40 50.6
1	62	41 25.87
1	63	42 130.5
1	64	43 130.2
1	65	44 130.1

NOTE:
SWITCH SHOWN IN S.W. POSITION
- CHASSIS

FADA RADIO & ELECTRIC CORP.

MODEL 160 Series Schematic



NOTE: - = CHASSIS

I. F. = 456 K.C.

1.7 I.F. TRANS. 2ND I.F. TRANS.
 PH. = 5.5 OHMS PH. = 5.5 OHMS
 SEC. = 13.0 SEC. = 18.0

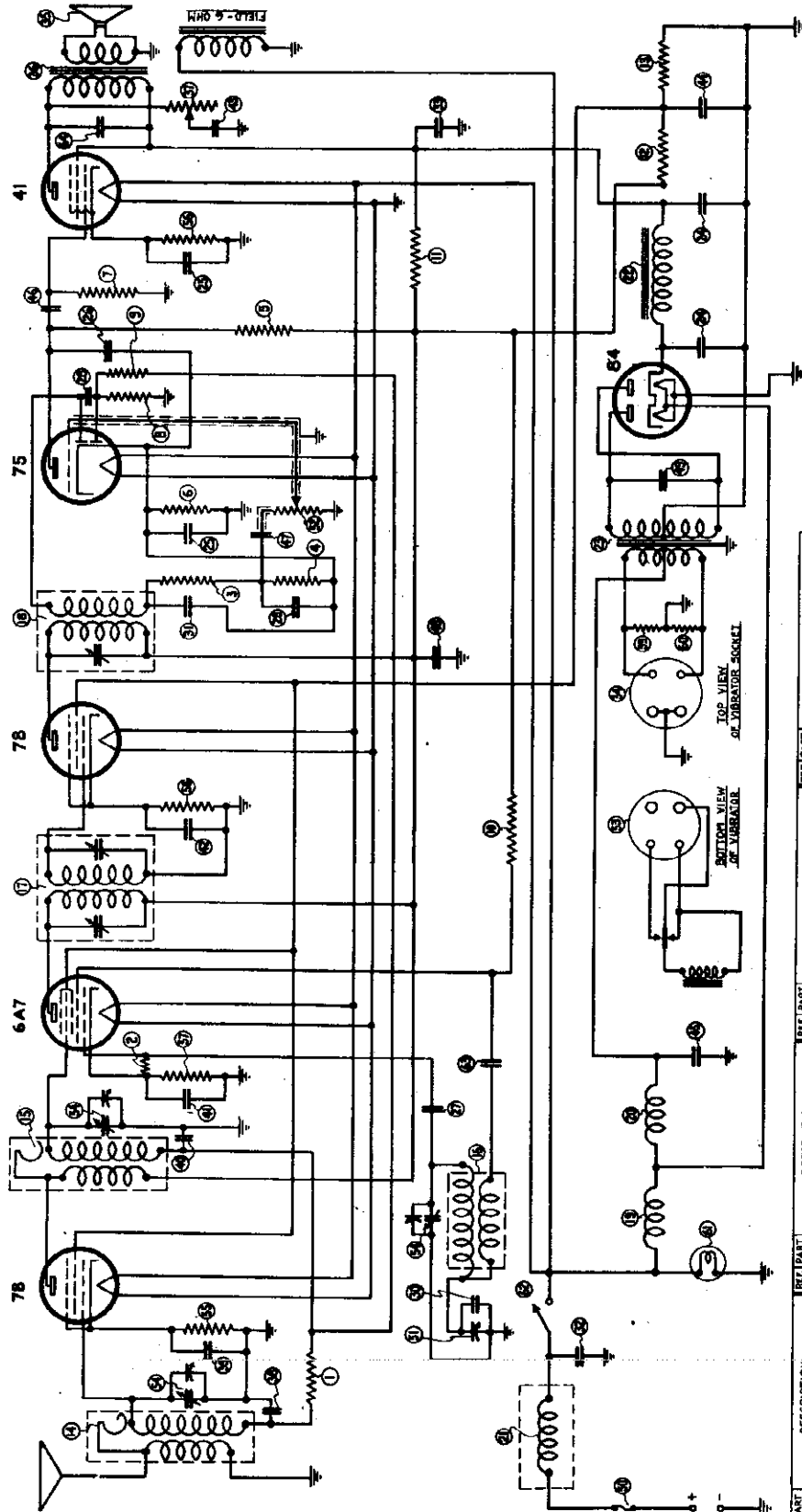
FADA RADIO & ELECTRIC CO.	
LONG ISLAND CITY, N. Y.	
MODEL 160	
DESIGNED BY	DATE 6-27-35
CHECKED BY	APP. P. J.

PART	DESCRIPTION	QTY	DESCRIPTION	QTY	DESCRIPTION
1	CARB. RES. - 5000 OHMS - 1/2 W.	12	18.7	18.7	MICA COND. - .002 MFD. ± 10%
2	5000	13	19	19	WIRE RES. - 250 OHMS - 1/2 W. P.
3	25000	14	20	20	200
4	50000	15	21	21	200
5	100000	16	22	22	200
6	200000	17	23	23	200
7	500000	18	24	24	200
8	1000000	19	25	25	200
9	5000000	20	26	26	200
10	10000000	21	27	27	200
11	20000000	22	28	28	200
12	50000000	23	29	29	200
13	100000000	24	30	30	200
14	200000000	25	31	31	200
15	500000000	26	32	32	200
16	1000000000	27	33	33	200
17	10000000000	28	34	34	200
18	100000000000	29	35	35	200
19	1000000000000	30	36	36	200
20	10000000000000	31	37	37	200
21	100000000000000	32	38	38	200
22	1000000000000000	33	39	39	200
23	10000000000000000	34	40	40	200
24	100000000000000000	35	41	41	200
25	1000000000000000000	36	42	42	200
26	10000000000000000000	37	43	43	200
27	100000000000000000000	38	44	44	200
28	1000000000000000000000	39	45	45	200
29	10000000000000000000000	40	46	46	200
30	100000000000000000000000	41	47	47	200
31	1000000000000000000000000	42	48	48	200
32	10000000000000000000000000	43	49	49	200
33	100000000000000000000000000	44	50	50	200
34	1000000000000000000000000000	45	51	51	200
35	10000000000000000000000000000	46	52	52	200
36	100000000000000000000000000000	47	53	53	200
37	1000000000000000000000000000000	48	54	54	200
38	10000000000000000000000000000000	49	55	55	200
39	100000000000000000000000000000000	50	56	56	200
40	1000000000000000000000000000000000	51	57	57	200
41	10000000000000000000000000000000000	52	58	58	200
42	100000000000000000000000000000000000	53	59	59	200
43	1000000000000000000000000000000000000	54	60	60	200
44	10000000000000000000000000000000000000	55	61	61	200
45	100000000000000000000000000000000000000	56	62	62	200
46	1000000000000000000000000000000000000000	57	63	63	200
47	100	58	64	64	200
48	1000	59	65	65	200
49	100	60	66	66	200
50	1000	61	67	67	200
51	100	62	68	68	200
52	1000	63	69	69	200
53	100	64	70	70	200
54	1000	65	71	71	200
55	100	66	72	72	200
56	1000	67	73	73	200
57	100	68	74	74	200
58	1000	69	75	75	200
59	100	70	76	76	200
60	1000	71	77	77	200
61	100	72	78	78	200
62	1000	73	79	79	200
63	100	74	80	80	200
64	1000	75	81	81	200
65	100	76	82	82	200
66	1000	77	83	83	200
67	100	78	84	84	200
68	1000	79	85	85	200
69	100	80	86	86	200
70	1000	81	87	87	200
71	100	82	88	88	200
72	1000	83	89	89	200
73	100	84	90	90	200
74	1000	85	91	91	200
75	100	86	92	92	200
76	1000	87	93	93	200
77	100	88	94	94	200
78	1000	89	95	95	200
79	100	90	96	96	200
80	1000	91	97	97	200
81	100	92	98	98	200
82	1000	93	99	99	200
83	100	94	100	100	200

NOTE: SWITCH SHOWN IN 'ON' POSITION.

FADA RADIO & ELECTRIC CORP.

MODEL 166, Motoset Schematic



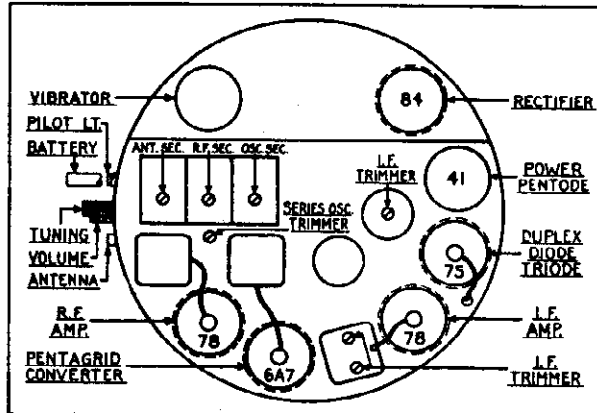
I.F. = 175 K.C.

FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.
MODEL 166 - MOTOSSET
DESIGNED BY [Signature]
BUILT BY [Signature] 4-13-36
CHECKED BY [Signature] [Signature]

REF. PART No.	DESCRIPTION	REF. PART No.	DESCRIPTION	REF. PART No.	DESCRIPTION	REF. PART No.	DESCRIPTION
1	3020 CABE RES. 25000 OHM. 1/2 WATT. 5%	33	4R15 POWER TRANSFORMER	45	10E TUBULAR COND. 3 MFD. 150 V	50	8013 FUSE - 10 AMP. .01 - 1000
2	3013 5000	34	3129 ELECTRO COND. 2 MFD. 350 VAC	46	10C TUBULAR COND. .01 - 400	51	2534 TAPPING COND. 1000.50 MFD.
3	3013 5000	35	3036	47	10C4 .01 - 250	52	3005 VOLUME CONTROL - 1MEG.
4	3013 5000	36	3036	48	10C4 .01 - 250	53	3017 VIBRATOR
5	3014 100000	37	157 MICA COND. .002 MFD. 2 1/2 V.	49	10C20	54	2531 VARIABE COND. - 500.50 MFD.
6	3011 5000	38	3036	50	8013 FUSE - 10 AMP. .01 - 1000	55	3022 WIRE RES. - 750 OHM. 1/2 W.
7	3023 5000	39	3036	51	2534 TAPPING COND. 1000.50 MFD.	56	3018 .01 - 1000
8	3023 5000	40	3036	52	3005 VOLUME CONTROL - 1MEG.	57	3021
9	3023 5000	41	3036	53	3017 VIBRATOR	58	3018 .01 - 1000
10	3023 5000	42	3036	54	2531 VARIABE COND. - 500.50 MFD.	59	3018 .01 - 1000
11	3023 5000	43	3036	55	3022 WIRE RES. - 750 OHM. 1/2 W.	60	3018 .01 - 1000
12	3023 5000	44	3036	56	3022 WIRE RES. - 750 OHM. 1/2 W.	61	3018 .01 - 1000
13	3023 5000	45	3036	57	3021	62	3018 .01 - 1000
14	3023 5000	46	3036	58	3022 WIRE RES. - 750 OHM. 1/2 W.	63	3018 .01 - 1000
15	3023 5000	47	3036	59	3022 WIRE RES. - 750 OHM. 1/2 W.	64	3018 .01 - 1000
16	3023 5000	48	3036	60	3022 WIRE RES. - 750 OHM. 1/2 W.		
17	3023 5000	49	3036	61	3022 WIRE RES. - 750 OHM. 1/2 W.		
18	3023 5000	50	3036	62	3022 WIRE RES. - 750 OHM. 1/2 W.		
19	3023 5000	51	3036	63	3022 WIRE RES. - 750 OHM. 1/2 W.		
20	3023 5000	52	3036	64	3022 WIRE RES. - 750 OHM. 1/2 W.		
21	3023 5000	53	3036				
22	3023 5000	54	3036				

**MODEL 166, Motaset
Alignment, Socket
Trimmers, Data**

FADA RADIO & ELECTRIC CORP.



SERVICE DIVISION

CHASSIS LAYOUT

FORM S-2136
MAY 21, 1935
MM/1/s

- 4th - With the aid of the remote control unit, turn the ganged variable condenser to pick up this 1500 KC signal.
- 5th - Starting with the oscillator compensator, adjust each compensator for maximum signal output. Do not disturb the setting of the ganged variable condenser during these operations.

ADJUSTMENT OF OSCILLATOR SERIES CONDENSER
The oscillator series condenser can be adjusted through the hole in the chassis as indicated in the sketch.

- 1st - Adjust the carrier frequency output of the signal generator to 800 KC.
- 2nd - Turn the remote control unit until the 800 KC signal is tuned in.

CURRENT AND VOLTAGE READINGS ON

MODEL 166 MOTASET

(No signal input)
Battery supply voltage 6.0 volts
Battery current drain 5.5 amperes

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTAGE	PLATE CURRENT	CONTROL GRID VOLTAGE	SCREEN GRID VOLTAGE
7B	R.F. Amp. (1st Detector)	125	3.0	2.75*	68
6AY	R.F. Amp. (2nd Det. & 1st A.F.)	150	2.7	5.5**	66
7B	L.F. Amp.	125	2.0	3.2	66
7B	2nd Det. & 1st A.F.	107*	3.3	1.13*	255
41	Power Pentode	250	19.0	15.0**	
84	Rectifier		57.0 TOTAL		

* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

** Correct readings cannot be obtained at control grid due to series resistors. To be measured across each respective bias resistor.

VOLTAGE ACROSS ELECTROLYTIC FILTER CONDENSER (20.00) - 1st section
250 VOLTS

D.C. RESISTANCE VALUES

PART NO.	DESCRIPTION	PRIMARY	SECONDARY
4303	Antenna coil	50.0 ohms	4.9 ohms
4304	R.F. coil	70.0 "	4.8 "
4422	Oscillator coil	1.7 "	3.5 "
4423	1st I.F. Transformer	30.0 "	80.0 "
40-15	2nd I.F. Transformer	50-21.5 "	50.0 "
40-22	Audio output transformer	495-1.0 "	540-1.2 "
4414	R.F. choke	.024 "	
4424	Spark filter choke	.022 "	
40-1	Filter choke	300.0 "	
105-22	Speaker field coil	6.0 "	
105-22	Speaker voice coil	3.0 "	

3rd - With the aid of a bakelite type screw driver, adjust the oscillator series compensator until maximum output signal is indicated on the output meter. No further perfect adjustment is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

4th - Having determined the maximum peak of the oscillator series compensator, readjust the carrier frequency of the signal generator to 1500 KC. Turn the ganged variable condenser to 1500 KC, and readjust all variable compensators as outlined in the foregoing instructions.

COMPENSATING INSTRUCTIONS FOR

MOTASET - MODEL 166

In order to adjust accurately the various trimmer condensers of the MOTASET in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier which can be attenuated at 175 KC, 800 KC and 1500 KC.

The MOTASET is equipped with an automatic volume control which necessitates setting the manual volume control of the MOTASET to its maximum sensitivity in alignment. To control the signal output of the MOTASET it will be necessary to use the attenuator control of the signal generator.

The following adjustments can be made without removing the MOTASET chassis from its housing; it is only necessary to remove the front housing cover. The speaker cable should remain connected to the MOTASET chassis.

ADJUSTMENT OF I.F. CONDENSERS

The three (3) intermediate frequency (I.F.) condensers are located as shown in the sketch.

- 1st - Turn the rotor plates of the ganged variable condenser to a position where no broadcast station carrier is heard. If this is not possible, the oscillator stator section (see sketch) of the ganged variable condenser may be short circuited to chassis.

- 2nd - Disconnect the control grid lead from the 6A7 tube.

- 3rd - Connect the high potential lead of the signal generator to the control grid of the 6A7 pentagrid converter tube, and the low potential lead to the shielding on the antenna cable.

- 4th - Place an output meter (copper oxide type) across the speaker voice coil terminals so that variations in signal output can be noted.

- 5th - Place the signal generator in operation and adjust the carrier frequency to 175 KC. Regulate the attenuator control of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.

- 6th - With the aid of a bakelite type screw driver, adjust the three (3) I.F. condensers to resonance as indicated by the greatest swing of the needle on the output meter. Repeat these adjustments as there is a slight interlocking effect.

ADJUSTMENT OF THE GANGED VARIABLE CONDENSER

Turn the ganged variable condenser until the rotor plates are fully meshed. Pull out the pilot light socket from the rear of the remote control head and insert a small screw driver. Turn the adjusting screws so that the dial pointer reads on the last division below 500 KC. This procedure aligns the remote control calibration scale to the ganged variable condenser. To hold this alignment it will be necessary to prevent any shifting of the remote control head or its cables in relation to the MOTASET.

The compensators are located at the top of their respective tuning condenser section and can be adjusted with the aid of a screw driver.

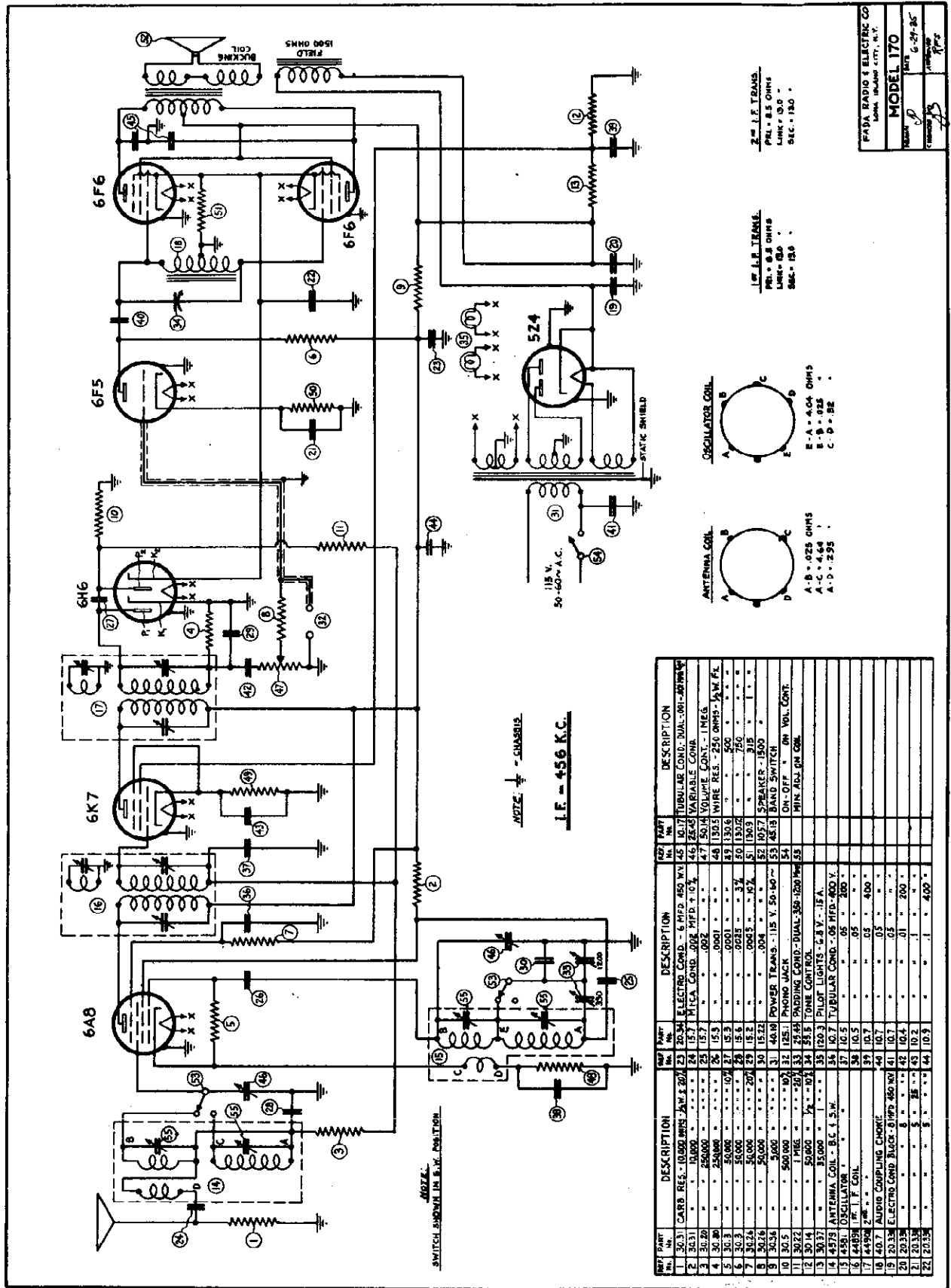
- 1st - Remove the signal generator connection from the control grid of the 6A7 pentagrid converter tube and replace control grid lead.

- 2nd - Connect the antenna cable of the MOTASET to the high potential lead of the signal generator through a 250 ohm condenser.

- 3rd - Adjust the carrier frequency of the signal generator to 1500 KC.

FADA RADIO & ELECTRIC CORP.

MODEL 170
Schematic



FADA RADIO & ELECTRIC CO LAKA INLAND CITY, N.Y.	
MODEL 170	
DATE: 1/25/35	REV: 1
DESIGNED BY: [Signature]	CHECKED BY: [Signature]

REF. PART NO.	DESCRIPTION	REF. PART NO.	DESCRIPTION	REF. PART NO.	DESCRIPTION
1	3031 CARB. RES. - 10,000 OHMS	23	2034 ELECTRO COND. - 6 MFD. 450 WV	45	1017 TUBULAR COND. - DUAL - 0.01 - 200 MFD.
2	3032 CARB. RES. - 10,000	24	1017 MICA COND. - 0.02 MFD. ± 10%	46	2243 VARIABLE COND.
3	3033 CARB. RES. - 25,000	25	1017 MICA COND. - 0.02 MFD. ± 10%	47	5014 VOLUME CONT. - 1 MEG.
4	3034 CARB. RES. - 25,000	26	1017 MICA COND. - 0.02 MFD. ± 10%	48	1923 WIRE RES. - 250 OHMS - 1/4 W. P.E.
5	3035 CARB. RES. - 50,000	27	1017 MICA COND. - 0.02 MFD. ± 10%	49	1358 WIRE RES. - 500
6	3036 CARB. RES. - 50,000	28	1017 MICA COND. - 0.02 MFD. ± 10%	50	1358 WIRE RES. - 500
7	3037 CARB. RES. - 50,000	29	1017 MICA COND. - 0.02 MFD. ± 10%	51	1358 WIRE RES. - 500
8	3038 CARB. RES. - 50,000	30	1017 MICA COND. - 0.02 MFD. ± 10%	52	1057 SPARKED - 1500
9	3039 CARB. RES. - 50,000	31	4018 POWER TRANS. - 115 V. 50-140	53	4818 BAND SWITCH
10	3040 CARB. RES. - 50,000	32	1251 POWER JACK	54	ON-OFF
11	3041 CARB. RES. - 50,000	33	7141 PARING COND. - DUAL - 350 - 1200 P.F.	55	MIN. ADJ. COIL
12	3042 CARB. RES. - 50,000	34	5513 TONE CONTROL		
13	3043 CARB. RES. - 50,000	35	1203 PILOT LIGHTS - 2.8 V. - 1/4 A.		
14	4573 ANTENNA COIL - B.C. 1.5 W.	36	1017 TUBULAR COND. - 0.05 MFD. - 400 V.		
15	4451 I.F. COIL	37	1017 TUBULAR COND. - 0.05 MFD. - 400 V.		
16	407 AUDIO COUPLING CHOK	38	1017 TUBULAR COND. - 0.05 MFD. - 400 V.		
17	4452 I.F. COIL	39	1017 TUBULAR COND. - 0.05 MFD. - 400 V.		
18	407 AUDIO COUPLING CHOK	40	1017 TUBULAR COND. - 0.05 MFD. - 400 V.		
19	2034 ELECTRO COND. - 6 MFD. 450 WV	41	1017 TUBULAR COND. - 0.05 MFD. - 400 V.		
20	2034 ELECTRO COND. - 6 MFD. 450 WV	42	1017 TUBULAR COND. - 0.05 MFD. - 400 V.		
21	2034 ELECTRO COND. - 6 MFD. 450 WV	43	1017 TUBULAR COND. - 0.05 MFD. - 400 V.		
22	2034 ELECTRO COND. - 6 MFD. 450 WV	44	1017 TUBULAR COND. - 0.05 MFD. - 400 V.		

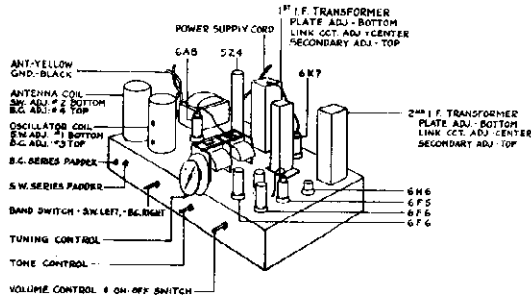
MODEL 170
Socket, Trimmers
Alignment, Voltage

FADA RADIO & ELECTRIC CORP.

COMPENSATING INSTRUCTIONS FOR
MODEL 170 SERIES

In order to adjust accurately the various trimmer condensers of the receiver in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier which can be attenuated at 456 KC, 600 KC, 1500 KC, 6 MC and 15 MC.

This receiver is equipped with an automatic volume 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.



ADJUSTMENT OF I.F. CONDENSERS

The six (6) intermediate frequency (I.F.) condensers are located as shown in the sketch.

- 1st - Disconnect the outside antenna system from the receiver.
- 2nd - Disconnect the control grid lead from the 6A8 tube.
- 3rd - Connect the high potential lead of the signal generator to the control grid of the 6A8 tube, and the low potential side to the receiver "ground" lead.
- 4th - Place an output meter (copper oxide type) across the speaker voice coil so that variations in signal output can be noted.
- 5th - Place the signal generator in operation and adjust the carrier frequency to 456 KC. Regulate the attenuator control of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.
- 6th - With the aid of a bakelite type screw driver, adjust the six (6) I.F. condensers to resonance; adjusting first the I.F. condenser across the secondary winding of the 2nd I.F. transformer and then each in turn, ending with the adjustment of the condenser across the primary winding of the 1st I.F. transformer.

ADJUSTMENT OF S.W. SHUNT COMPENSATORS

The compensators are located as indicated on the sketch.

- 1st - Remove the signal generator connection from the control grid of the 6A8 tube and replace the control grid lead.
- 2nd - Connect the antenna wire of the receiver chassis through a 400 ohm carbon resistor to the high potential side of the signal generator. The ground wire should remain connected to the signal generator.
- 3rd - Adjust the carrier frequency output of the signal generator to 15 MC.
- 4th - Turn the wave band selector switch to the left - short wave position. Set the calibrated dial of the receiver to read 15 MC.
- 5th - Adjust the S.W. oscillator shunt compensator (#1 on sketch) for maximum signal output. If two peaks are noted on this adjustment, the proper one is that with the compensator farthest "in". To determine that this compensator has not been adjusted to the image frequency, turn the receiver dial to approximately 15.9 MC. If no signal can be heard at this setting even with a greater signal generator output, the S.W. shunt compensator (#1) has been improperly adjusted and it will be necessary to re-adjust to the proper peak. After re-adjusting check to see that the image frequency comes in at 15.9 MC. It is well to bear in mind throughout these adjustments that with the same signal input to the receiver, the image response point should be weaker than the original signal frequency output reading.
- 6th - Having determined the correct peak, and maximum setting, for the S.W. oscillator shunt compensator (#1) adjust the S.W. detector shunt compensator (#2) for maximum output.

ADJUSTMENT OF S.W. OSCILLATOR SERIES TRIMMER

- 1st - Adjust the carrier frequency output of the signal generator to 6 MC.

- 2nd - Turn the calibrated dial of the receiver to pick up this 6 MC signal.
- 3rd - With the aid of a bakelite type screw driver, adjust the S.W. oscillator series trimmer (see sketch) until a maximum output signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.
- 4th - Having determined the maximum peak of the S.W. oscillator series trimmer, re-adjust the carrier frequency of the signal generator to 15 MC. Turn the calibrated dial to 15 MC, and re-adjust S.W. oscillator shunt compensator (#1), and then, S.W. detector shunt compensator (#2) for maximum signal output; checking for image point as outlined in the foregoing instructions.

ADJUSTMENT OF BC. SHUNT COMPENSATORS

The compensators are located as indicated in the sketch.

- 1st - Remove the 400 ohm resistor from the high potential side of the signal generator and insert a 250 mmfd. mica condenser in its place.
- 2nd - Turn the wave band selector switch to the right - broadcast position.
- 3rd - Adjust the carrier frequency to 1500 KC.
- 4th - Set the calibrated dial of the receiver to read 1500 KC.
- 5th - Adjust the BC. oscillator shunt compensator (#3) for maximum signal output.
- 6th - Adjust the BC. detector shunt compensator (#4) for maximum signal output.

ADJUSTMENT OF BC. OSCILLATOR SERIES TRIMMER

- 1st - Adjust the carrier frequency output of the signal generator to 600 KC.
- 2nd - Turn the calibrated dial of the receiver to pick up this 600 KC signal.
- 3rd - With the aid of a bakelite type screw driver, adjust the BC. oscillator series trimmer (see sketch) until a maximum signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.
- 4th - Having determined the maximum peak of the BC. oscillator series trimmer, re-adjust the carrier frequency of the signal generator to 1500 KC. Turn the calibrated dial to 1500 KC and re-adjust BC. oscillator shunt compensator (#3) and BC. detector shunt compensator (#4) for maximum signal output as outlined in the foregoing instructions.

CONTINUITY AND VOLTAGE READINGS ON

MODEL 170 SERIES

Line Voltage 115 - Input Current .69 Amp.
 No Signal Input - Wave Band Switch - Right

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CATHODE VOLTS	SCREEN GRID VOLTS
6A8	1st Det.-Osc	252	3.0	2	80
6K7	Int. Freq.	249	6.0	5	109
6H6	2nd Det.	---	---	---	---
6P5	A.V.C.	---	---	19	---
6P6	1st Aud.	158*	1.3	1	---
6P6	P.P. 2nd Aud.	232	24.0	19	235
5Z4	Rectifier	---	77.0 TOTAL	---	---

6A8 Oso. Anode Voltage -- 182 and current 2.9 Ma.

* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

VOLTAGE ACROSS ELECTROLYTIC CONDENSER (#20.55B)

	1st section	2nd section
Voltage across speaker field.....	131 volts	140 "
" " 50,000 ohm resistor (#30.37).....	114 "	114 "
" " 5,000 " " (#30.14).....	33 "	33 "

D. C. RESISTANCE VALUES

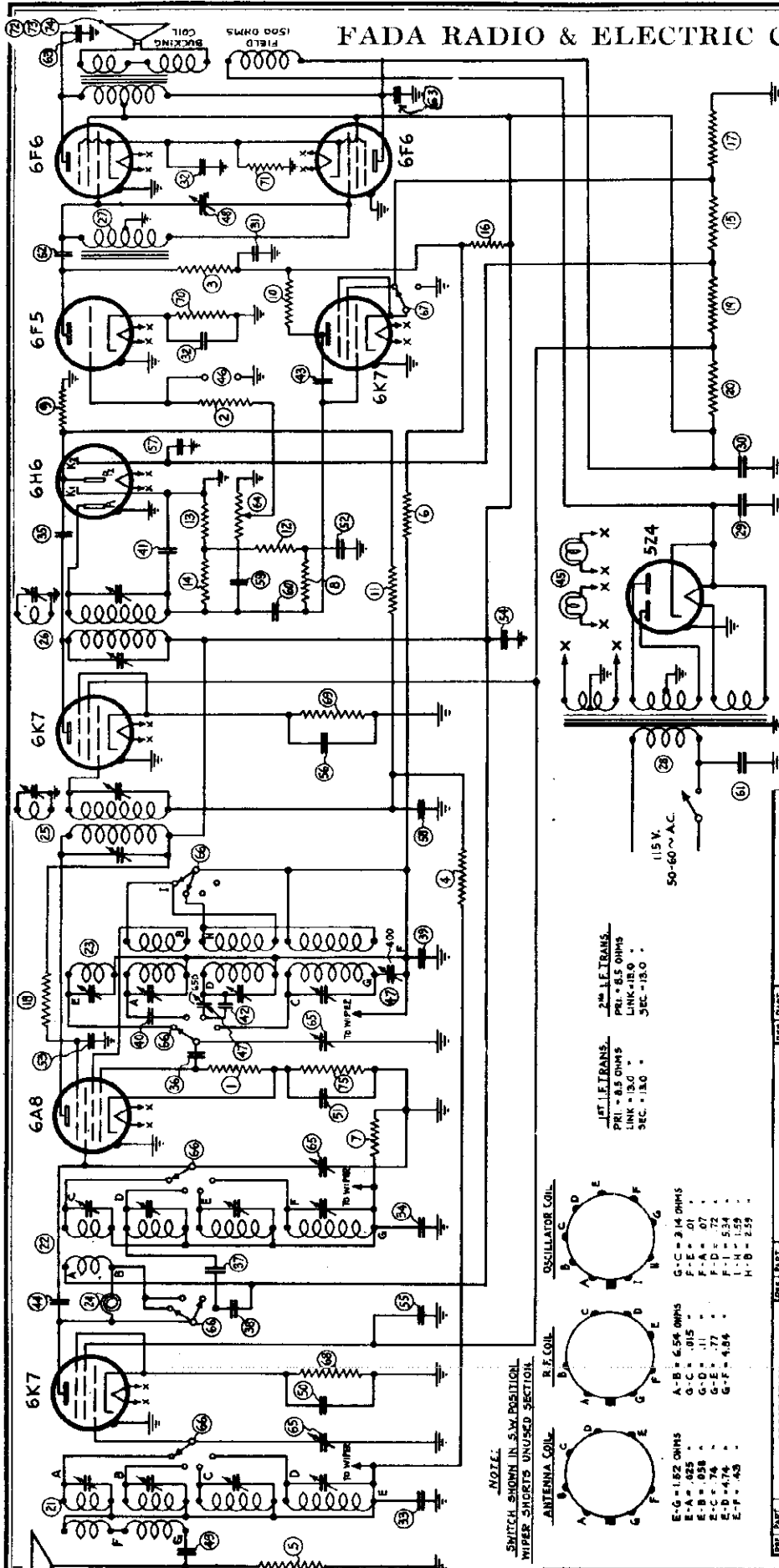
	PRIMARY	SECONDARY
Speaker input transformer	392 ohms	.09 ohms
" field coil	1,540 "	"
" voice coil	1.9 "	"
" bucking coil	26 "	"
Audio Coupling Choke	2,440 "	"

FORM S-2145
 June 26, 1935

SERVICE DIVISION

FADA RADIO & ELECTRIC CORP.

MODEL 190 Schematic



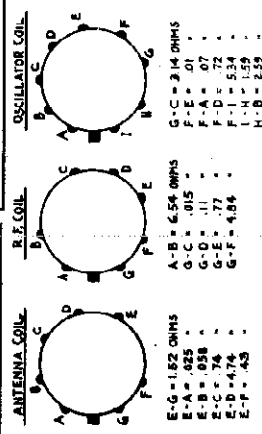
NOTE: ϕ = CHASSIS

I. F. 456 K. C.

FADA RADIO & ELECTRIC CO. LONG ISLAND CITY, N.Y.	
DESIGNER	MODEL 190
CHECKER	DATE 6-29-35
REV.	FIG. 4

1ST I.F. TRANS.
PRI. - 85 OHMS
LINK - 18.0
SEC. - 13.0

2ND I.F. TRANS.
PRI. - 85 OHMS
LINK - 18.0
SEC. - 13.0



NOTE:
SWITCH SHOWN IN S.W. POSITION.
WIPE SHORTS UNUSED SECTION.

REF. PART NO.	DESCRIPTION	REF. PART NO.	DESCRIPTION
1	30.24 CAB. RES. - 50,000 OHMS - 1/4 W. 250V	23	4650 OSCILLATOR COIL
2	30.26 " " " " " " " " " " " " " "	24	3216 CHOKER COIL
3	30.27 " " " " " " " " " " " " " "	25	4495C 1ST I.F. COIL
4	30.28 " " " " " " " " " " " " " "	26	4495C 2ND I.F. COIL
5	30.3 " " " " " " " " " " " " " "	27	40.7 AUDIO CHOKER COIL
6	30.32 " " " " " " " " " " " " " "	28	40.25 POWER TRANS.
7	30.3 " " " " " " " " " " " " " "	29	20.7 ELECTRO. COND. - 12 MFD. - 550 MV.
8	30.32 " " " " " " " " " " " " " "	30	20.7 ELECTRO. COND. - 12 MFD. - 550 MV.
9	30.32 " " " " " " " " " " " " " "	31	20.7 " " " " " " " " " " " " " "
10	30.32 " " " " " " " " " " " " " "	32	20.7 " " " " " " " " " " " " " "
11	30.32 " " " " " " " " " " " " " "	33	15.5 MICA COND. - .003 MF. 50V
12	30.32 " " " " " " " " " " " " " "	34	15.5 " " " " " " " " " " " " " "
13	30.32 " " " " " " " " " " " " " "	35	15.3 " " " " " " " " " " " " " "
14	30.4 " " " " " " " " " " " " " "	36	15.3 " " " " " " " " " " " " " "
15	30.1 " " " " " " " " " " " " " "	37	15.14 " " " " " " " " " " " " " "
16	30.1 " " " " " " " " " " " " " "	38	15.14 " " " " " " " " " " " " " "
17	30.15 " " " " " " " " " " " " " "	39	15.25 " " " " " " " " " " " " " "
18	30.14 " " " " " " " " " " " " " "	40	15.34 " " " " " " " " " " " " " "
19	30.4 " " " " " " " " " " " " " "	41	15.2 " " " " " " " " " " " " " "
20	30.33 " " " " " " " " " " " " " "	42	15.2 " " " " " " " " " " " " " "
21	46.48 ANTENNA COIL	43	15.13 " " " " " " " " " " " " " "
22	46.43 R.F. COIL	44	15.16 " " " " " " " " " " " " " "
23	46.51 PILOT LIGHTS	45	120.3 " " " " " " " " " " " " " "
24	120.3 PHONO JACK	46	120.3 " " " " " " " " " " " " " "
47	25.1 PADDING COND. - DUAL - 400-650MM	47	25.1 " " " " " " " " " " " " " "
48	52.2 TONE CONTROL	48	52.2 " " " " " " " " " " " " " "
49	10.0 TUBULAR COND. - .003 MF. - 450 V.	49	10.0 " " " " " " " " " " " " " "
50	10.5 " " " " " " " " " " " " " "	50	10.5 " " " " " " " " " " " " " "
51	10.5 " " " " " " " " " " " " " "	51	10.5 " " " " " " " " " " " " " "
52	10.5 " " " " " " " " " " " " " "	52	10.5 " " " " " " " " " " " " " "
53	10.5 " " " " " " " " " " " " " "	53	10.5 " " " " " " " " " " " " " "
54	10.5 " " " " " " " " " " " " " "	54	10.5 " " " " " " " " " " " " " "
55	10.5 " " " " " " " " " " " " " "	55	10.5 " " " " " " " " " " " " " "
56	10.5 " " " " " " " " " " " " " "	56	10.5 " " " " " " " " " " " " " "
57	10.5 " " " " " " " " " " " " " "	57	10.5 " " " " " " " " " " " " " "
58	10.5 " " " " " " " " " " " " " "	58	10.5 " " " " " " " " " " " " " "
59	10.5 " " " " " " " " " " " " " "	59	10.5 " " " " " " " " " " " " " "
60	10.5 " " " " " " " " " " " " " "	60	10.5 " " " " " " " " " " " " " "
61	10.5 " " " " " " " " " " " " " "	61	10.5 " " " " " " " " " " " " " "
62	10.5 " " " " " " " " " " " " " "	62	10.5 " " " " " " " " " " " " " "
63	10.5 " " " " " " " " " " " " " "	63	10.5 " " " " " " " " " " " " " "
64	50.17 VARIABLE CONTROL - 1MBE	64	50.17 " " " " " " " " " " " " " "
65	25.44 VARIABLE COND.	65	25.44 " " " " " " " " " " " " " "
66	45.4 BAND SWITCH	66	45.4 " " " " " " " " " " " " " "
67	45.16 2NAP SWITCH	67	45.16 " " " " " " " " " " " " " "
68	130.5 WIRE RES. - 250 OHMS 1/4 PK	68	130.5 " " " " " " " " " " " " " "
69	130.6 " " " " " " " " " " " " " "	69	130.6 " " " " " " " " " " " " " "
70	130.3 " " " " " " " " " " " " " "	70	130.3 " " " " " " " " " " " " " "
71	130.9 " " " " " " " " " " " " " "	71	130.9 " " " " " " " " " " " " " "
72	130.7 " " " " " " " " " " " " " "	72	130.7 " " " " " " " " " " " " " "
73	130.7 " " " " " " " " " " " " " "	73	130.7 " " " " " " " " " " " " " "
74	130.7 " " " " " " " " " " " " " "	74	130.7 " " " " " " " " " " " " " "
75	130.5 WIRE RES. - 250 OHMS 1/4 PK	75	130.5 " " " " " " " " " " " " " "

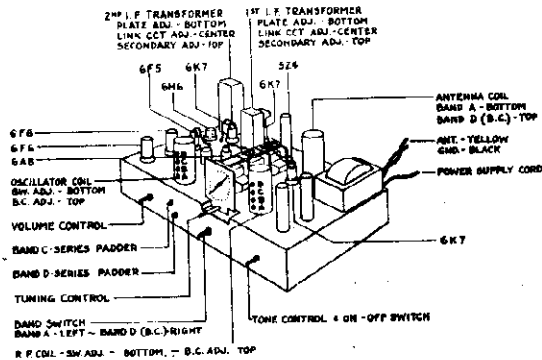
**MODEL 190
Socket, Trimmers
Alignment**

FADA RADIO & ELECTRIC CORP.

**COMPENSATING INSTRUCTIONS FOR
MODEL 190 SERIES**

In order to adjust accurately the various trimmer condensers of the receiver in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier which can be attenuated at 456 KC, 600 KC, 1500 KC, 3750 KC, 4 MC, 10 MC and 20 MC.

This receiver is equipped with an automatic volume 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.



ADJUSTMENT OF I.F. CONDENSERS

The six (6) intermediate frequency (I.F.) condensers are located as shown in the sketch.

- 1st - Disconnect the outside antenna system from the receiver.
- 2nd - Disconnect the control grid lead from the 6A8 tube.
- 3rd - Connect the high potential lead of the signal generator to the control grid of the 6A8 tube, and the low potential side to the receiver "ground" lead.
- 4th - Place an output meter (copper oxide type) across the speaker voice coil terminals so that variations in signal output can be noted.
- 5th - Place the signal generator in operation and adjust the carrier output to 456 KC. Regulate the attenuator of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.
- 6th - With the aid of a bakelite type screw driver, adjust the six (6) I.F. condensers to resonance. From a fidelity standpoint the best procedure for aligning the I.F. system is to adjust the I.F. condenser connected across the secondary winding feeding into the diode (2nd detector), then the link circuit condenser and finally the primary circuit condenser. The same procedure is to be followed in adjusting the 1st I.F. transformer. Do not adjust the I.F. condensers at random but follow the above procedure of alignment carefully.

ADJUSTMENT OF S.W. BAND "A" SHUNT COMPENSATORS

The compensators are located as indicated in the sketch.

- 1st - Remove the signal generator connection from the control grid of the 6A8 tube and replace the control grid lead.
- 2nd - Connect the antenna wire of the receiver chassis through a 400 ohm carbon resistor to the high potential side of the signal generator.
- 3rd - Adjust the carrier output of the signal generator to 20 MC.
- 4th - Turn the wave band selector switch to band "A" - left. Set the calibrated dial of the receiver to read 20 MC.
- 5th - Adjust the S.W. band "A" oscillator shunt compensator for maximum signal output. If two peaks are noted on this adjustment, the proper one is that with the compensator farthest "in". To determine that this compensator has not been adjusted to the image frequency, turn the receiver dial to approximately 20.9 MC. If no signal can be heard at this setting, even with a greater signal generator output, the S.W. band "A" oscillator shunt compensator has been improperly adjusted and it will be necessary to re-adjust to the proper peak. After re-adjusting, check to see that the image frequency comes in at 20.9 MC. It is well to bear in mind throughout these adjustments that with the same signal input to the receiver, the image point should be weaker than the original reading.
- 6th - Having determined the correct peak, and maximum setting for the S.W. band "A" oscillator shunt compensator, adjust the S.W. band "A" R.F. stage shunt compensator, and the S.W. band "A" detector shunt compensator for maximum signal output. Turn the receiver dial to the image point (20.9 MC) to determine that both compensators have been adjusted to the correct peak (See paragraph 5 for determining image).

- 7th - Adjust the carrier frequency output of the signal generator to 10 MC.
- 8th - Turn the calibrated dial of the receiver to pick up this 10 MC signal and check for sensitivity at this point. There is no variable oscillator series condenser at this frequency to adjust as the receiver employs a fixed oscillator series paddler.

ADJUSTMENT OF S.W. BAND "B" SHUNT COMPENSATORS

The compensators are located as indicated in the sketch.

- 1st - Maintaining the same signal generator output (10 MC) turn the wave band selector switch to band "B".
- 2nd - Turn the calibrated dial of the receiver to 10 MC on wave band "B".
- 3rd - Adjust the S.W. band "B" oscillator shunt compensator for maximum signal output. If two peaks are noted on this adjustment, the proper one is that with the compensator farthest "out". Check for image point on the calibrated dial at approximately 9 MC (See paragraph 5 under the heading "ADJUSTMENT OF S.W. BAND "A" SHUNT COMPENSATORS" for determining image).
- 4th - Having determined the correct peak and maximum setting, for the S.W. band "B" oscillator shunt compensator, adjust the S.W. band "B" R.F. stage shunt compensator and the S.W. band "B" detector shunt compensator for maximum signal output. Turn the receiver dial to the image point (9 MC) to determine that both compensators have been adjusted to the correct peak (See paragraph 5 under the heading "ADJUSTMENT OF S.W. BAND "A" SHUNT COMPENSATOR").
- 5th - Adjust the carrier frequency output of the signal generator to 4 MC.
- 6th - Turn the calibrated dial of the receiver to pick up this 4 MC signal and check for sensitivity at this point. There is no variable oscillator series condenser to adjust at this frequency as the receiver employs a fixed oscillator series paddler.

ADJUSTMENT OF S.W. BAND "C" SHUNT COMPENSATORS

The compensators are located as indicated in the sketch.

- 1st - Adjust the carrier frequency output of the signal generator to 3.75 MC.
- 2nd - Turn the calibrated dial of the receiver to 3.75 MC on wave band "C".
- 3rd - Adjust the S.W. band "C" oscillator shunt compensator for maximum signal output. If two peaks are noted on this adjustment, the proper one is that with the compensator farthest "out". Check for image point on the calibrated dial at approximately 2.8 MC (See paragraph 5 under the heading "ADJUSTMENT OF S.W. BAND "A" SHUNT COMPENSATORS" for determining image).
- 4th - Having determined the correct peak, and the maximum setting, for the S.W. band "C" oscillator shunt compensator adjust the S.W. band "C" R.F. stage shunt compensator and the S.W. band "C" detector shunt compensator for maximum signal output. Turn the receiver dial to the image point (2.8 MC) to determine that both compensators have been adjusted to the correct peak (See paragraph 5 under the heading "ADJUSTMENT OF S.W. BAND "A" SHUNT COMPENSATORS" for determining image).

ADJUSTMENT OF S.W. BAND "C" OSCILLATOR SERIES TRIMMER

- 1st - Adjust the carrier frequency output of the signal generator to 1.5 MC.
- 2nd - Turn the calibrated dial of the receiver to pick up this 1.5 MC signal.
- 3rd - Adjust the S.W. band "C" oscillator series trimmer (see sketch) until a maximum output signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.
- 4th - Having determined the maximum peak of the S.W. band "C" oscillator series trimmer, re-adjust the carrier frequency of the signal generator to 3.75 MC. Turn the calibrated dial of the receiver to 3.75 MC and re-adjust S.W. band "C" oscillator shunt compensator, and then, S.W. band "C" R.F. stage shunt compensator and S.W. band "C" detector shunt compensator for maximum signal output; checking for image point as outlined in the foregoing instructions.

ADJUSTMENT OF BC BAND "D" SHUNT COMPENSATORS

The compensators are located as indicated in the sketch.

- 1st - Remove the 400 ohm carbon resistor from the high potential side of the signal generator and insert a 250 mfd. mica condenser in its place.
- 2nd - Turn the wave band selector switch to band "D" - broadcast position.
- 3rd - Adjust the carrier frequency of the signal generator to 1500 KC.
- 4th - Set the calibrated dial of the receiver to 1500 KC.
- 5th - Adjust the BC band "D" oscillator shunt compensator and then, the BC band "D" R.F. stage shunt compensator and BC detector shunt compensator for maximum signal output.

FADA RADIO & ELECTRIC CORP.
ADJUSTMENT OF BC BAND "D" OSCILLATOR SERIES TRIMMER

MODEL 190
 Alignment, Part
 Voltage

- 1st - Adjust the carrier frequency output of the signal generator to 600 KC.
- 2nd - Turn the calibrated dial of the receiver to pick up this 600 KC signal.
- 3rd - Adjust the BC band "D" oscillator series trimmer (see sketch) until a maximum signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.
- 4th - Having determined the maximum peak of the oscillator series trimmer, re-adjust the carrier of the signal generator to 1500 KC. Turn the calibrated dial to 1500 KC and then, re-adjust the BC band "D" shunt compensators as outlined in the foregoing instructions.

CONTINUITY AND VOLTAGE READINGS ON
MODEL 190 SERIES

Line Voltage 118 - Input Current .74 Amp.
 No Signal Input - Wave Band Switch - Right
 A.T.C. Toggle Control Switch "ON"

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CATHODE VOLTS	SCREEN GRID VOLTS
6K7	R.F.	229	7.8	3	89
6A8	1st Det.-Osc.	229	3.1	3	78
6K7	Int. Freq.	228	5.8	4	88
6K7	A.T.C.	30*	.15	--	6
6H6	2nd Det.	---	---	--	--
	A.V.C.	---	---	17	--
6F5	1st Aud.	154*	.9	1	--
6F6	P.P. 2nd Aud.	212	22.0	15	217
5Z4	Rectifier	---	80.0 TOTAL	--	--

6A8 Osc. Anode Voltage -- 166 and current -- 3.7 ma.

* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

VOLTAGE ACROSS ELECTROLYTIC CONDENSERS
1st (#20.7) 372 2nd (#20.4) 232

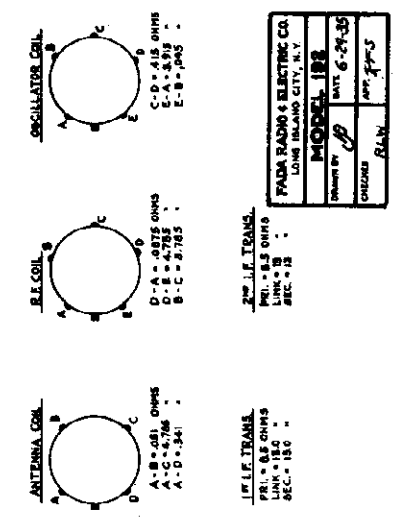
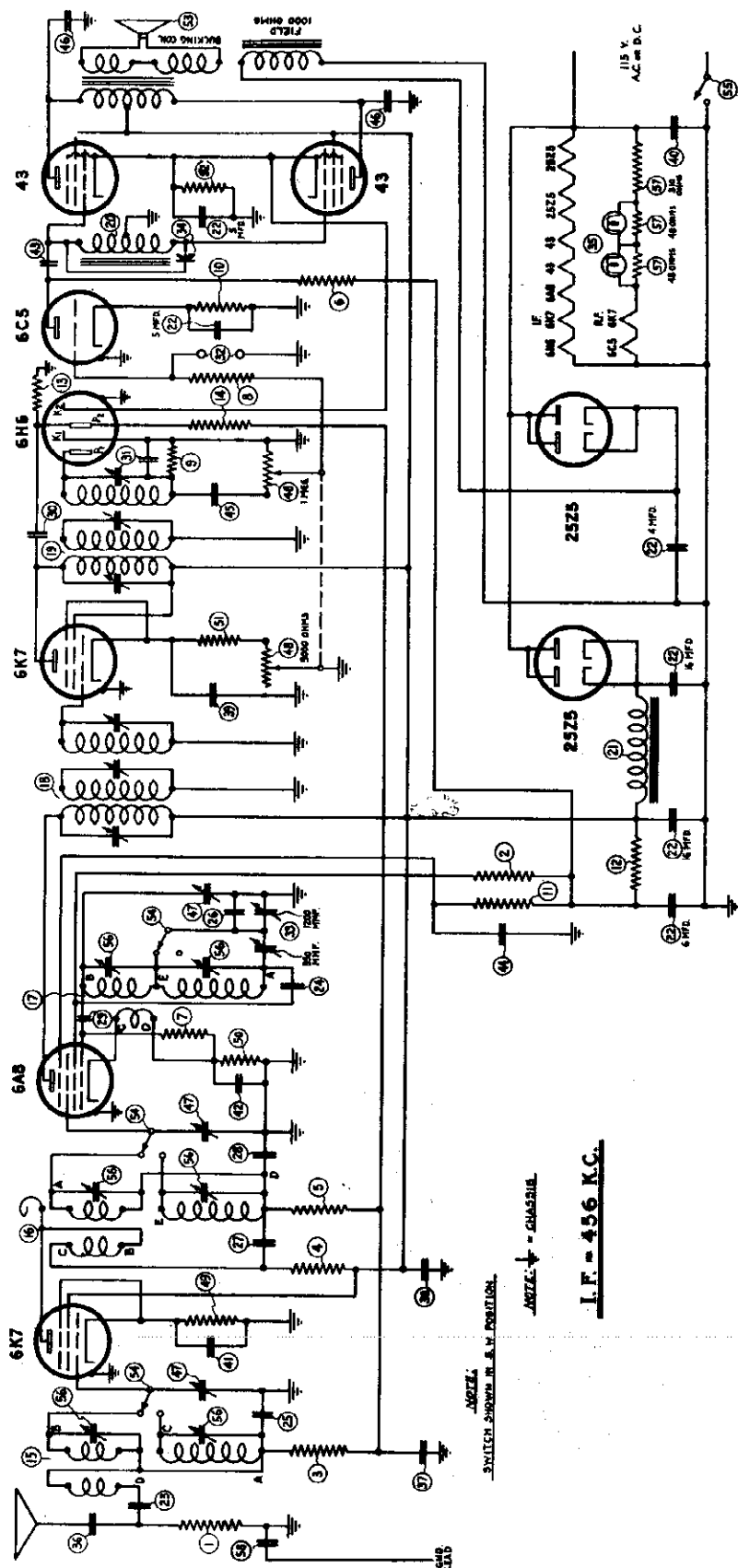
Voltage across speaker field.....	140 volts
" " 25,000 ohm 1 watt resistor (#30.33).....	133 "
" " 25,000 " 1/2 " " (#30.41).....	72 "
" " 5,000 " 1/3 " " (#30.1).....	14 "
" " 2,000 " 1/3 " " (#30.15).....	6 "
" " 5,000 " 1/3 " " (#30.1) **	22 "

** Resistor in series with Osc. & 1st A.F. "B" Supply
D.C. RESISTANCE VALUES

	PRIMARY	SECONDARY
Speaker input transformer	392 ohms	.09 ohms
" field coil	1,540 "	
" voice coil	1.9 "	
" bucking coil	.26 "	
Audio Coupling Choke (#40.7)	2,440 "	
R.F. plate circuit choke (#3216)	42.5 "	

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MODEL 192
Schematic



REF. PART NO.	DESCRIPTION	REF. PART NO.	DESCRIPTION	REF. PART NO.	DESCRIPTION
1	ANTENNA JACK	1	ANTENNA JACK	1	ANTENNA JACK
2	500 OHMS	2	500 OHMS	2	500 OHMS
3	1000 OHMS	3	1000 OHMS	3	1000 OHMS
4	1000 OHMS	4	1000 OHMS	4	1000 OHMS
5	1000 OHMS	5	1000 OHMS	5	1000 OHMS
6	1000 OHMS	6	1000 OHMS	6	1000 OHMS
7	1000 OHMS	7	1000 OHMS	7	1000 OHMS
8	1000 OHMS	8	1000 OHMS	8	1000 OHMS
9	1000 OHMS	9	1000 OHMS	9	1000 OHMS
10	1000 OHMS	10	1000 OHMS	10	1000 OHMS
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95	1000 OHMS	95	1000 OHMS	95	1000 OHMS
96	1000 OHMS	96	1000 OHMS	96	1000 OHMS
97	1000 OHMS	97	1000 OHMS	97	1000 OHMS
98	1000 OHMS	98	1000 OHMS	98	1000 OHMS
99	1000 OHMS	99	1000 OHMS	99	1000 OHMS
100	1000 OHMS	100	1000 OHMS	100	1000 OHMS

MODEL 192

Socket, Trimmers
Alignment, Voltage

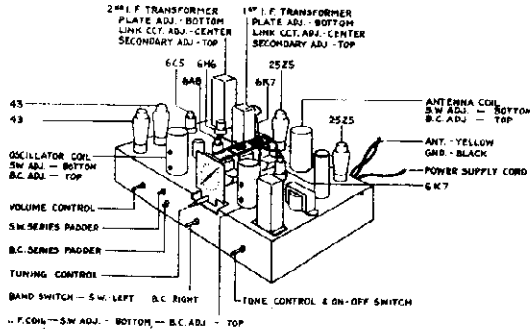
FADA RADIO & ELECTRIC CORP.

COMPENSATING INSTRUCTIONS FOR

MODEL 192 SERIES

In order to adjust accurately the various trimmer condensers of the receiver in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier which can be attenuated at 456 KC, 600 KC, 1500 KC, 6 MC and 15 MC.

This receiver is equipped with an automatic volume 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.



ADJUSTMENT OF THE I.F. CONDENSERS

The six (6) intermediate frequency (I.F.) condensers are located as shown in the sketch.

- 1st - Disconnect the outside antenna system from the receiver.
- 2nd - Disconnect the control grid lead from the 6A8 tube.
- 3rd - Connect the high potential lead of the signal generator to the control grid of the 6A8 tube, and the low potential side to the receiver "ground" lead.
- 4th - Place an output meter (copper oxide type) across the speaker voice coil terminals so that variations in signal output can be noted.
- 5th - Place the signal generator in operation and adjust the carrier output to 456 KC. Regulate the attenuator control of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.
- 6th - With the aid of a bakelite type screw driver, adjust the six (6) I.F. condensers to resonance. From a fidelity standpoint the best procedure for aligning the I.F. system is to adjust the I.F. condenser connected across the secondary winding feeding into the diode (2nd detector), then the link circuit condenser and finally the primary circuit. The same procedure is to be followed in adjusting the 1st I.F. transformer. Do not adjust the I.F. condensers at random but follow the above procedure of alignment carefully.

ADJUSTMENT OF S.W. SHUNT COMPENSATORS

The compensators are located as indicated in the sketch.

- 1st - Remove the signal generator connection from the control grid of the 6A8 tube and replace the control grid lead.
- 2nd - Connect the antenna wire of the receiver chassis through a 400 ohm carbon resistor to the high potential side of the signal generator. The ground wire should remain connected to the signal generator.
- 3rd - Adjust the carrier frequency output of the signal generator to 15 MC.
- 4th - Turn the wave band selector switch to the left - short wave position - set the calibrated dial of the receiver to read 15 MC.
- 5th - Adjust the S.W. oscillator shunt compensator for maximum signal output. If two peaks are noted on this adjustment, the proper one is that with the compensator farthest "in". To determine that this compensator has not been adjusted to the image frequency, turn the receiver dial to approximately 15.9 MC. If no signal can be heard at this setting even with a greater signal generator output, the S.W. oscillator shunt compensator has been improperly adjusted and it will be necessary to re-adjust to the proper peak. After re-adjusting, check to see that the image frequency comes in at 15.9 MC. It is well to bear in mind throughout these adjustments that with the same signal input to the receiver, the image response point should be weaker than the original reading.
- 6th - Having determined the correct peak, and maximum setting, for the S.W. oscillator shunt compensator, adjust the S.W. RF stage shunt compensator and the S.W. detector shunt compensator for maximum signal output. Turn the receiver dial to the image point (15.9 MC) to determine that both compensators have been adjusted to the correct peak (See Paragraph 5).

ADJUSTMENT OF S.W. OSCILLATOR SERIES TRIMMER

- 1st - Adjust the carrier frequency output of the signal generator to 6 MC.
- 2nd - Turn the calibrated dial of the receiver to pick up this 6 MC signal.
- 3rd - With the aid of a bakelite type screw driver, adjust the S.W. oscillator series trimmer (see sketch) until a maximum output signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.
- 4th - Having determined the maximum peak of the S.W. oscillator series trimmer, re-adjust the carrier frequency of the signal generator to 15 MC. Turn the calibrated dial to 15 MC, and re-adjust S.W. oscillator shunt compensator, and then, S.W. RF stage shunt compensator and S.W. detector shunt compensator for maximum signal output; checking for image point as outlined in the foregoing instructions.

ADJUSTMENT OF BC SHUNT COMPENSATORS

The compensators are located as indicated in the sketch.

- 1st - Remove the 400 ohm resistor from the high potential side of the signal generator and insert a 250 mfd, mica condenser in its place.
- 2nd - Turn the wave band selector switch to the right - broadcast position.
- 3rd - Adjust the carrier frequency to 1500 KC.
- 4th - Set the calibrated dial of the receiver to read 1500 KC.
- 5th - Adjust the BC oscillator shunt compensator for maximum signal output.
- 6th - Adjust the BC RF stage shunt compensator and the BC detector shunt compensator for maximum signal output.

ADJUSTMENT OF BC OSCILLATOR SERIES TRIMMER

- 1st - Adjust the carrier frequency output of the signal generator to 600 KC.
- 2nd - Turn the calibrated dial of the receiver to pick up this 600 KC signal.
- 3rd - With the aid of a bakelite type screw driver, adjust the BC oscillator series trimmer (see sketch) until a maximum signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.
- 4th - Having determined the maximum peak of the BC oscillator series trimmer, re-adjust the carrier frequency of the signal generator to 1500 KC. Turn the calibrated dial to 1500 KC and re-adjust BC oscillator shunt compensator, and then, BC RF stage shunt compensator and BC detector shunt compensator for maximum signal output, as outlined in the foregoing instructions.

CONTINUITY AND VOLTAGE READINGS ON

MODEL 192 SERIES

Line Voltage 115 - Input Current .61 Amp.
No Signal Input - Wave Band Switch - Right.

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CATHODE VOLTS	SCREEN GRID VOLTS
6K7	R.F.	90	0.8	3	111
6A8	1st Det. Dec.	115	1.0	1	49
6K7	I.F.	107	5.3	7	107
6H6	2nd Det. AVC	---	---	16	---
6G5	1st Aud.	65*	1.2	2	---
45	F.P. 2nd Aud.	91	20.0	16	98
5R5S	"B" Rectifier	---	87.0 TOTAL	---	---
5R5S	Spk. Rectifier	---	77.0 TOTAL	---	---

6A8 Osc. Anode Voltage -- 76 and current -- 1.4 ma.
* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

VOLTAGE ACROSS ELECTROLYTIC CONDENSER (#20.32)	
1st section	2nd section
150	114

Voltage across speaker field.....	85 volts
" " " filter choke (#40.3).....	16 "
" " " 4,000 ohm resistor (#30.12).....	17 "
" " " 50,000 ohm resistor (#30.10).....	47 "

D.C. RESISTANCE VALUES

	PRIMARY	SECONDARY
	710 ohms	34 ohms
Speaker input transformer		
" field coil	1,000	
" voice coil	2.05	
" backing coil	.35	
Audio coupling choke (#40.7)	2,420	

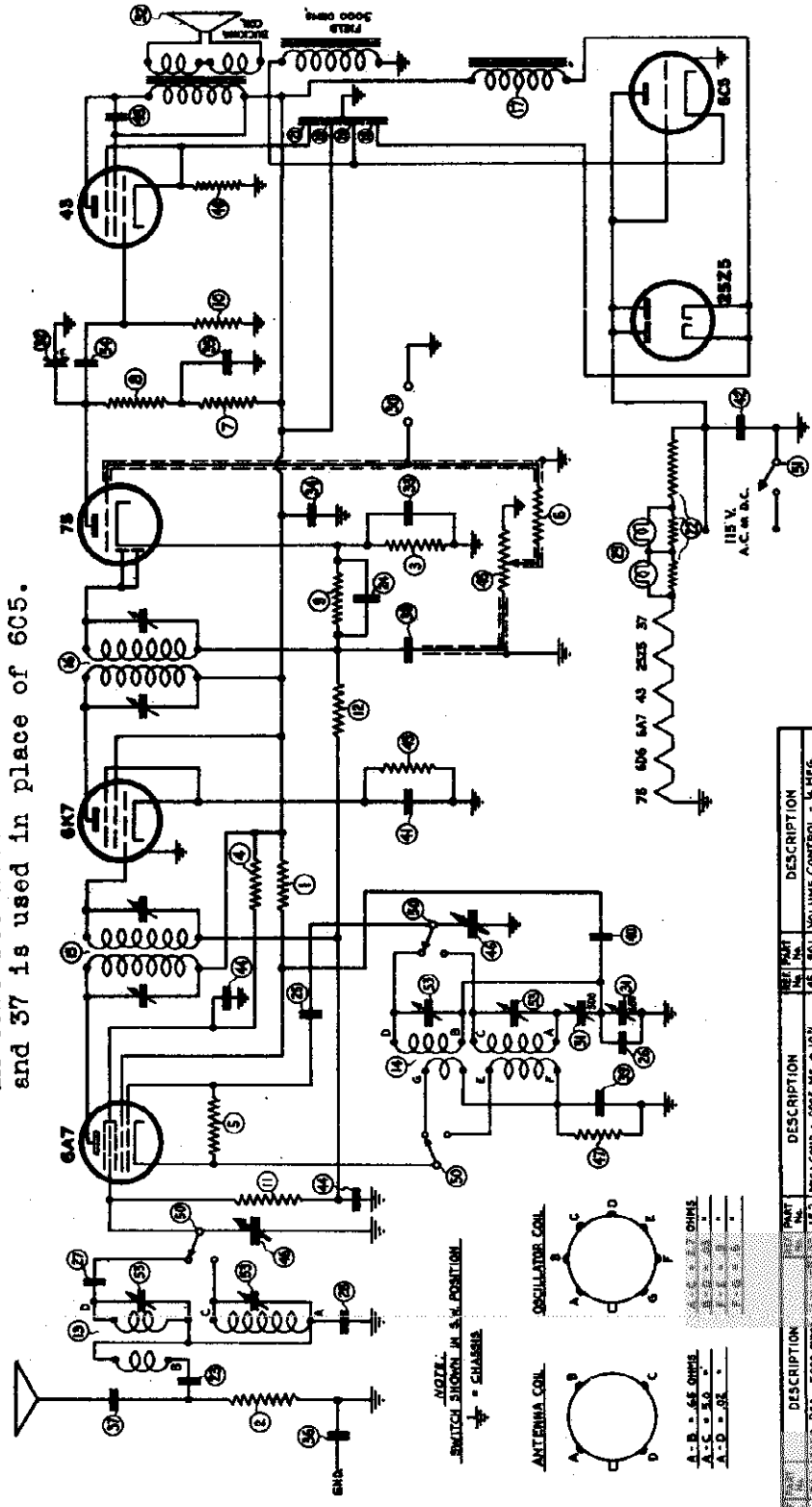
FORM 5-2140
JUNE 26, 1935

SERVICE DIVISION

FADA RADIO & ELECTRIC CORP.

MODEL 1462
Two Types
Schematic

NOTE: In some receivers 6D6 is used instead of 6K7 and 37 is used in place of 6C5.



PART No.	DESCRIPTION	PART No.	DESCRIPTION
15.1	500 OHM RES.	45	500 OHM RES.
15.2	10,000 OHM RES.	46	10,000 OHM RES.
15.3	100,000 OHM RES.	47	100,000 OHM RES.
15.4	1,000,000 OHM RES.	48	1,000,000 OHM RES.
15.5	50,000 OHM RES.	49	50,000 OHM RES.
15.6	500,000 OHM RES.	50	500,000 OHM RES.
15.7	1,000,000 OHM RES.	51	1,000,000 OHM RES.
15.8	50,000 OHM RES.	52	50,000 OHM RES.
15.9	500,000 OHM RES.	53	500,000 OHM RES.
15.10	1,000,000 OHM RES.	54	1,000,000 OHM RES.
15.11	50,000 OHM RES.	55	50,000 OHM RES.
15.12	500,000 OHM RES.	56	500,000 OHM RES.
15.13	1,000,000 OHM RES.	57	1,000,000 OHM RES.
15.14	50,000 OHM RES.	58	50,000 OHM RES.
15.15	500,000 OHM RES.	59	500,000 OHM RES.
15.16	1,000,000 OHM RES.	60	1,000,000 OHM RES.
15.17	50,000 OHM RES.	61	50,000 OHM RES.
15.18	500,000 OHM RES.	62	500,000 OHM RES.
15.19	1,000,000 OHM RES.	63	1,000,000 OHM RES.
15.20	50,000 OHM RES.	64	50,000 OHM RES.
15.21	500,000 OHM RES.	65	500,000 OHM RES.
15.22	1,000,000 OHM RES.	66	1,000,000 OHM RES.
15.23	50,000 OHM RES.	67	50,000 OHM RES.
15.24	500,000 OHM RES.	68	500,000 OHM RES.
15.25	1,000,000 OHM RES.	69	1,000,000 OHM RES.
15.26	50,000 OHM RES.	70	50,000 OHM RES.
15.27	500,000 OHM RES.	71	500,000 OHM RES.
15.28	1,000,000 OHM RES.	72	1,000,000 OHM RES.
15.29	50,000 OHM RES.	73	50,000 OHM RES.
15.30	500,000 OHM RES.	74	500,000 OHM RES.
15.31	1,000,000 OHM RES.	75	1,000,000 OHM RES.
15.32	50,000 OHM RES.	76	50,000 OHM RES.
15.33	500,000 OHM RES.	77	500,000 OHM RES.
15.34	1,000,000 OHM RES.	78	1,000,000 OHM RES.
15.35	50,000 OHM RES.	79	50,000 OHM RES.
15.36	500,000 OHM RES.	80	500,000 OHM RES.
15.37	1,000,000 OHM RES.	81	1,000,000 OHM RES.
15.38	50,000 OHM RES.	82	50,000 OHM RES.
15.39	500,000 OHM RES.	83	500,000 OHM RES.
15.40	1,000,000 OHM RES.	84	1,000,000 OHM RES.
15.41	50,000 OHM RES.	85	50,000 OHM RES.
15.42	500,000 OHM RES.	86	500,000 OHM RES.
15.43	1,000,000 OHM RES.	87	1,000,000 OHM RES.
15.44	50,000 OHM RES.	88	50,000 OHM RES.
15.45	500,000 OHM RES.	89	500,000 OHM RES.
15.46	1,000,000 OHM RES.	90	1,000,000 OHM RES.
15.47	50,000 OHM RES.	91	50,000 OHM RES.
15.48	500,000 OHM RES.	92	500,000 OHM RES.
15.49	1,000,000 OHM RES.	93	1,000,000 OHM RES.
15.50	50,000 OHM RES.	94	50,000 OHM RES.
15.51	500,000 OHM RES.	95	500,000 OHM RES.
15.52	1,000,000 OHM RES.	96	1,000,000 OHM RES.
15.53	50,000 OHM RES.	97	50,000 OHM RES.
15.54	500,000 OHM RES.	98	500,000 OHM RES.
15.55	1,000,000 OHM RES.	99	1,000,000 OHM RES.
15.56	50,000 OHM RES.	100	50,000 OHM RES.
15.57	500,000 OHM RES.	101	500,000 OHM RES.
15.58	1,000,000 OHM RES.	102	1,000,000 OHM RES.
15.59	50,000 OHM RES.	103	50,000 OHM RES.
15.60	500,000 OHM RES.	104	500,000 OHM RES.
15.61	1,000,000 OHM RES.	105	1,000,000 OHM RES.
15.62	50,000 OHM RES.	106	50,000 OHM RES.
15.63	500,000 OHM RES.	107	500,000 OHM RES.
15.64	1,000,000 OHM RES.	108	1,000,000 OHM RES.
15.65	50,000 OHM RES.	109	50,000 OHM RES.
15.66	500,000 OHM RES.	110	500,000 OHM RES.
15.67	1,000,000 OHM RES.	111	1,000,000 OHM RES.
15.68	50,000 OHM RES.	112	50,000 OHM RES.
15.69	500,000 OHM RES.	113	500,000 OHM RES.
15.70	1,000,000 OHM RES.	114	1,000,000 OHM RES.
15.71	50,000 OHM RES.	115	50,000 OHM RES.
15.72	500,000 OHM RES.		
15.73	1,000,000 OHM RES.		
15.74	50,000 OHM RES.		
15.75	500,000 OHM RES.		
15.76	1,000,000 OHM RES.		
15.77	50,000 OHM RES.		
15.78	500,000 OHM RES.		
15.79	1,000,000 OHM RES.		
15.80	50,000 OHM RES.		
15.81	500,000 OHM RES.		
15.82	1,000,000 OHM RES.		
15.83	50,000 OHM RES.		
15.84	500,000 OHM RES.		
15.85	1,000,000 OHM RES.		
15.86	50,000 OHM RES.		
15.87	500,000 OHM RES.		
15.88	1,000,000 OHM RES.		
15.89	50,000 OHM RES.		
15.90	500,000 OHM RES.		
15.91	1,000,000 OHM RES.		
15.92	50,000 OHM RES.		
15.93	500,000 OHM RES.		
15.94	1,000,000 OHM RES.		
15.95	50,000 OHM RES.		
15.96	500,000 OHM RES.		
15.97	1,000,000 OHM RES.		
15.98	50,000 OHM RES.		
15.99	500,000 OHM RES.		
16.00	1,000,000 OHM RES.		

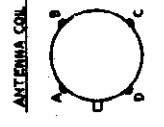
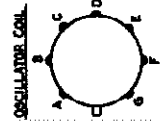
I.F. - 456 KC.

FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.
MODEL 1462
7-17-36

2nd I.F. TRANS.
PRL - 14.5 OHMS
SEC. - 6.2

1st I.F. TRANS.
PRL - 14.5 OHMS
SEC. - 6.2

NOTE: SWITCH SHOWN IN S.W. POSITION.



A-B - 45 OHMS
A-C - 3.0
A-D - .08

MODEL 1462

Two Types
Socket, Trimmers
Alignment, Voltage

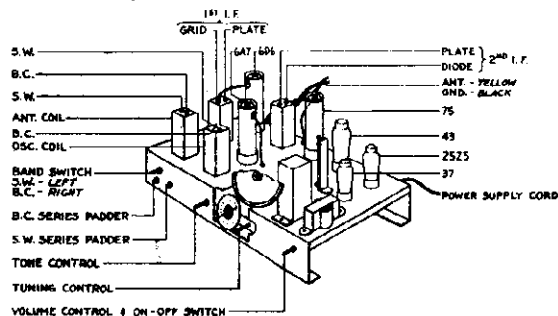
FADA RADIO & ELECTRIC CORP.

COMPENSATING INSTRUCTIONS FOR

MODEL 1462 SERIES

In order to adjust accurately the various trimmer condensers of the receiver in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier which can be attenuated at 466 KC, 600 KC, 1500 KC, 6 MC and 15 MC.

This receiver is equipped with an automatic volume 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.



ADJUSTMENT OF THE I.F. CONDENSERS

The four (4) intermediate frequency (I.F.) condensers are located as shown in the sketch.

- 1st - Disconnect the outside antenna system from the receiver.
- 2nd - Disconnect the control grid lead from the 6A7 tube.
- 3rd - Connect the high potential lead of the signal generator to the control grid of the 6A7 tube, and the low potential side to the receiver "ground" lead.
- 4th - Place an output meter (copper oxide type) across the speaker voice coil so that variations in signal output can be noted.
- 5th - Place the signal generator in operation and adjust the carrier frequency to 466 KC. Regulate the attenuator control of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.
- 6th - With the aid of a bakelite type screw driver, adjust the four (4) I.F. condensers to resonance as indicated by the greatest swing of the needle on the output meter. Repeat these adjustments as there is a slight interlocking effect.

ADJUSTMENT OF S.W. SHUNT COMPENSATORS

The compensators are located as indicated on the sketch.

- 1st - Remove the signal generator connection from the control grid of the 6A7 tube and replace the control grid lead.
- 2nd - Connect the antenna wire of the receiver chassis through a 400 ohm carbon resistor to the high potential side of the signal generator. The ground wire should remain connected to the signal generator.
- 3rd - Adjust the carrier frequency output of the signal generator to 15 MC.
- 4th - Turn the wave band selector switch to the left - short wave position. Set the calibrated dial of the receiver to read 15 MC.
- 5th - Adjust the S.W. oscillator shunt compensator for maximum signal output. If two peaks are noted on this adjustment the proper one is that with the compensator farthest "in." To determine that this compensator has not been adjusted to the image frequency, turn the receiver dial to approximately 15.9 MC. If no signal can be heard at this setting, even with a greater signal generator output, the S.W. oscillator shunt compensator has not been properly adjusted and it will be necessary to return the dial to 15 MC and adjust to the proper peak. After re-adjusting check to see that the image frequency comes in at 15.9 MC on the receiver dial. It is well to bear in mind throughout these adjustments that with the same signal input to the receiver, the image response point should be weaker than the original (fundamental) signal frequency.
- 6th - Having determined the correct peak, and maximum setting, for the S.W. oscillator shunt compensator, adjust the S.W. detector shunt compensator for maximum signal output.

ADJUSTMENT OF S.W. OSCILLATOR SERIES PADDER

- 1st - Adjust the carrier frequency output of the signal generator to 6 MC.

- 2nd - Turn the calibrated dial of the receiver to pick up this 6 MC signal.
- 3rd - With the aid of a bakelite type screw driver, adjust the S.W. oscillator series padder (see sketch) until a maximum output signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum output signal.
- 4th - Having determined the maximum peak of the S.W. oscillator series padder, re-adjust the carrier frequency of the signal generator to 15 MC. Turn the calibrated dial to 15 MC and re-adjust S.W. oscillator shunt compensator, and then S.W. detector shunt compensator for maximum signal output; checking for image point as outlined in the foregoing instructions.

ADJUSTMENT OF BC SHUNT COMPENSATORS

The compensators are located as indicated in the sketch.

- 1st - Remove the 400 ohm resistor from the high potential side of the signal generator and insert a 250 mmfd. mica condenser in its place.
- 2nd - Turn the wave band selector switch to the right - broadcast position.
- 3rd - Adjust the carrier frequency to 1500 KC.
- 4th - Set the calibrated dial of the receiver to read 1500 KC.
- 5th - Adjust the BC oscillator shunt compensator for maximum signal output.
- 6th - Adjust the BC detector shunt compensator for maximum signal output.

ADJUSTMENT OF BC OSCILLATOR SERIES PADDER

- 1st - Adjust the carrier frequency output of the signal generator to 600 KC.
- 2nd - Turn the calibrated dial of the receiver to pick up this 600 KC signal.
- 3rd - With the aid of a bakelite type screw driver, adjust the BC oscillator series padder (see sketch) until a maximum signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.
- 4th - Having determined the maximum peak of the BC oscillator series padder, re-adjust the carrier frequency of the signal generator to 1500 KC. Turn the calibrated dial to 1500 KC and re-adjust the BC oscillator shunt and the BC detector shunt compensators for maximum signal output as outlined in the foregoing instructions.

CONTINUITY AND VOLTAGE READINGS ON

MODEL 1462 SERIES

Line Voltage 117 - Input Current .46 amp.
No Signal Input - Wave Band Switch - Right

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CATHODE VOLTS	SCREEN GRID VOLTS
6A7	1st Det.-Osc.	121	2.4	5	70
6D6	Int. Freq.	117	5.3	7	117
75	1st Aud.	55*	.1	1	---
	2nd Det.	---	---	---	---
45	2nd Aud.	99	22.0	17	107
37	Spk. Rectifier	---	26.0	---	---
28Z5	"B" Rectifier	---	42.0 TOTAL	---	---

6A7 Osc. Anode Voltage -- 100 and Current -- 3.3 ma.

* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

VOLTAGE ACROSS ELECTROLYTIC CONDENSER

	1st section 15V	2nd section 124
Voltage across speaker field.....	80	volts
filter choke.....	15	

D.C. RESISTANCE VALUES

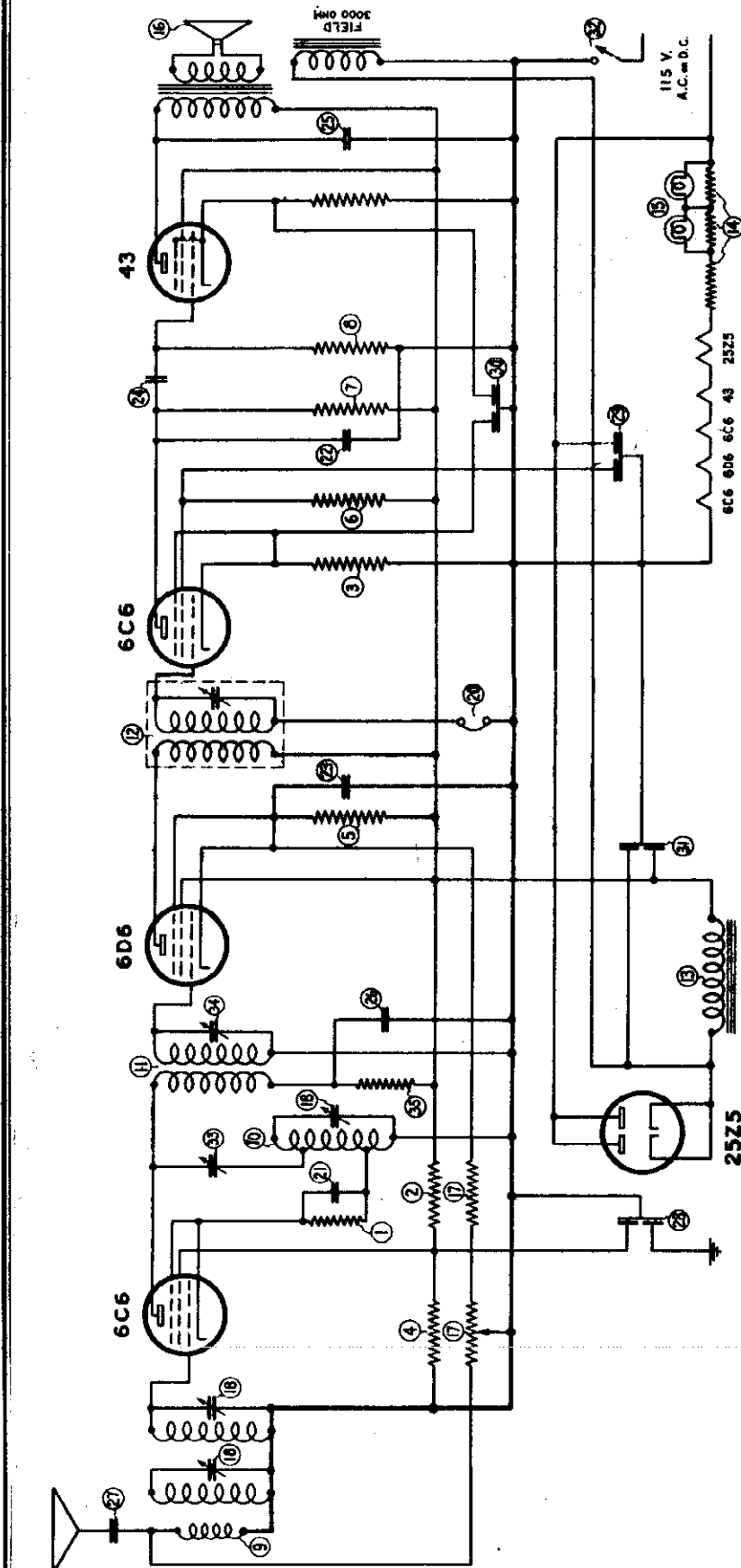
	PRIMARY	SECONDARY
Speaker input transformer	350. ohms	.42 ohms
field coil	3,000. "	"
voice coil	5. "	"
bucking coil	.58 "	"

FORM 3-2146
July 1, 1935

SERVICE DIVISION

FADA RADIO & ELECTRIC CORP.

MODEL 1556
Schematic

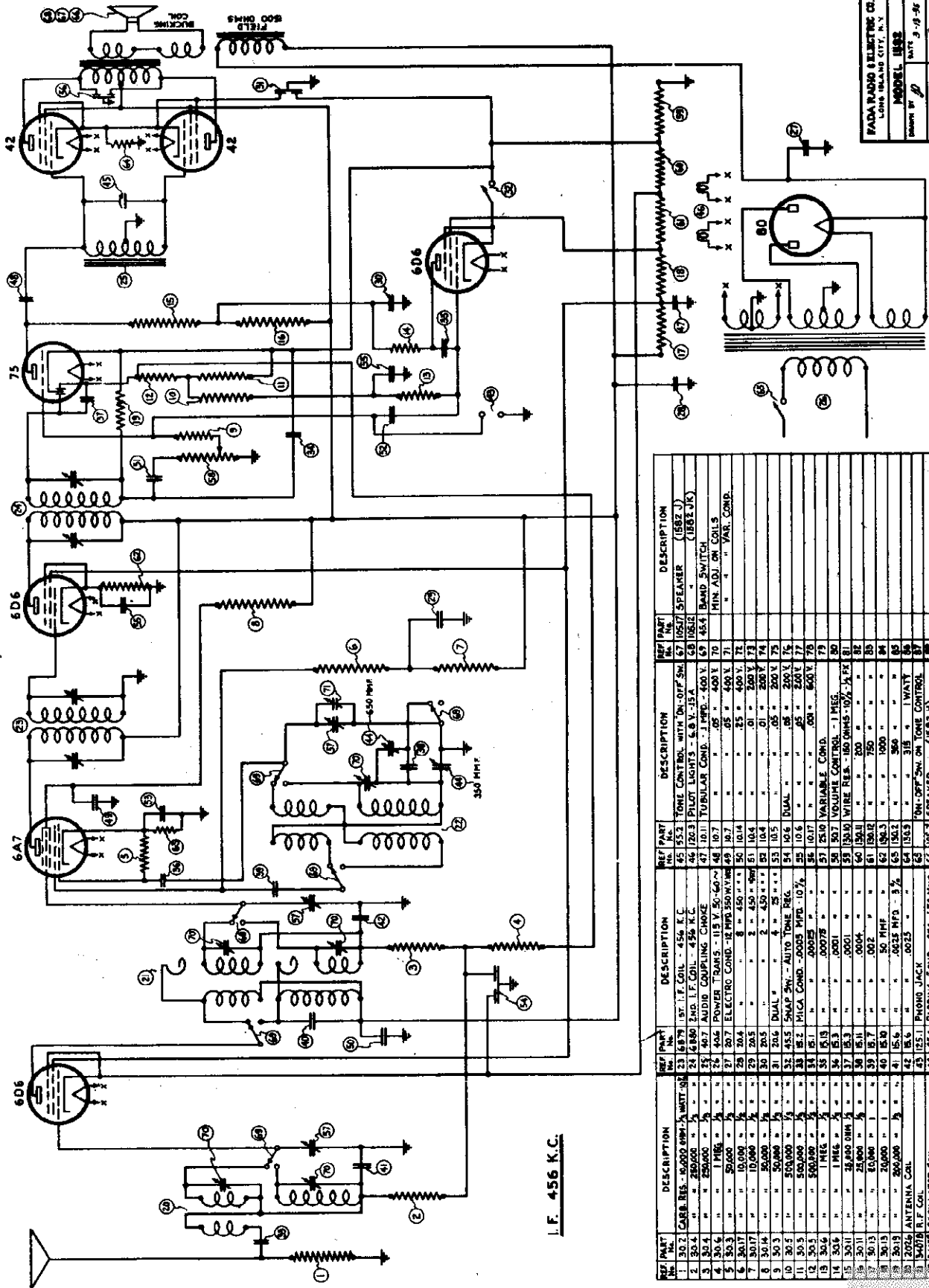


FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N. Y.
MODEL 1556
REVISED BY S-24-35
CHECKED BY R.W. 7-5

REF. PART No.	DESCRIPTION	REF. PART No.	DESCRIPTION
1	30.12 CARB. RES. 4.00 OHM - 1/2 W. 5.0%	23	10.5 TUBULAR COND. - 05 MF. - 250V.
2	30.0	24	10.4
3	30.11	25	10.4
4	30.3	26	10.1
5	30.8	27	10.23
6	30.6	28	10.6
7	30.3	29	10.6
8	30.3	30	20.17 ELECTRO. COND. 2-4 MF.
9	X204-E ANTENNA COIL (PRESELECTOR)	31	20.22
10	X205 F. OSCILLATOR COIL	32	ON - OFF SW. ON VRL. CONT.
11	X205 D.T. I.F. COIL	33	25.90 PADDING CONDENSER
12	X204-S.T. I.F. COIL	34	25.40
13	40.1 CHOK. COIL - 300 OHMS	35	30.35 CARB. RES. - 1000 OHM - 1/2 W. 5.0%
14	105.6 LINE RESISTOR - 140 OHM - 20 WATT	36	
15	120.3 PILOT LIGHT - 6.3 V. 25 W.	37	
16	100.2 SPEAKER - 3000 OHMS	38	
17	50.1 VOL. CONT. - 5000 OHMS	39	
18	25.16 VARIABLE COND.	40	
19	150.1 WIRE RES. - 6.25 OHM - 1/2 W.	41	
20	125.1 PHONO JACK	42	
21	15.7 MICA COND. - .002 MF.	43	
22	15.3	44	

MODEL 1582
Schematic

FADA RADIO & ELECTRIC CORP.

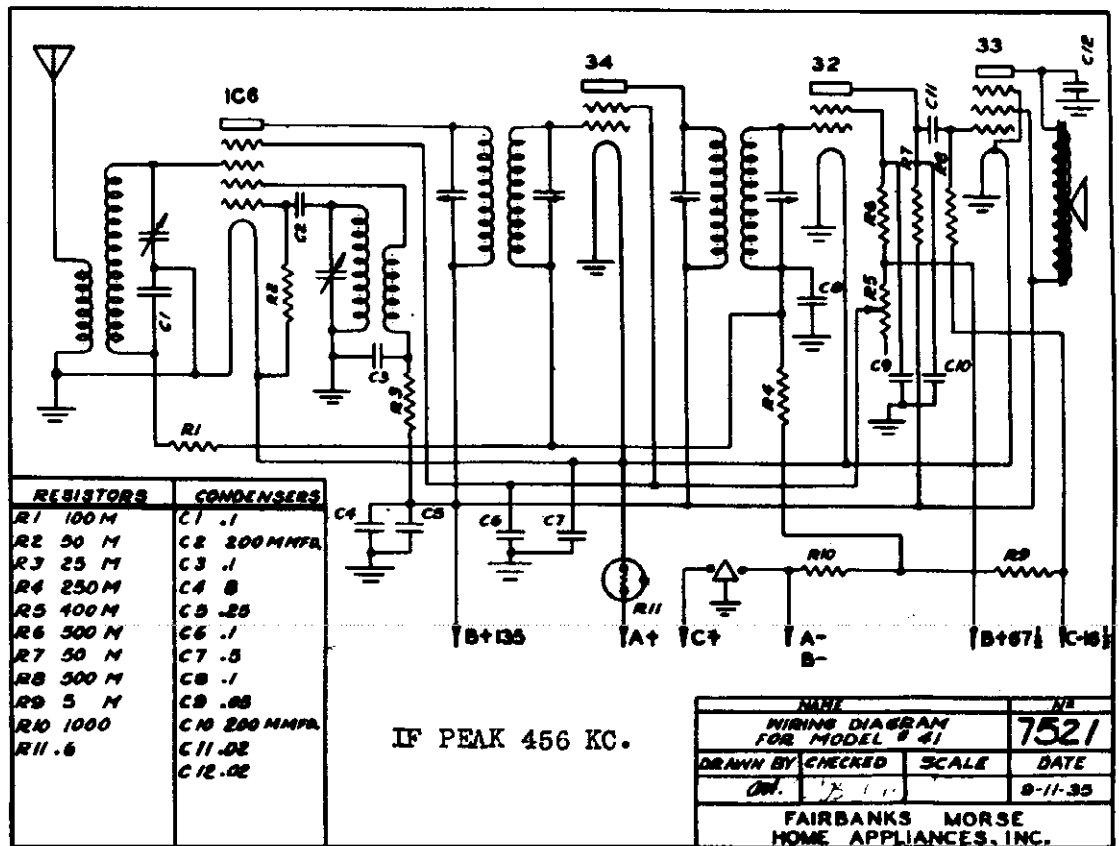
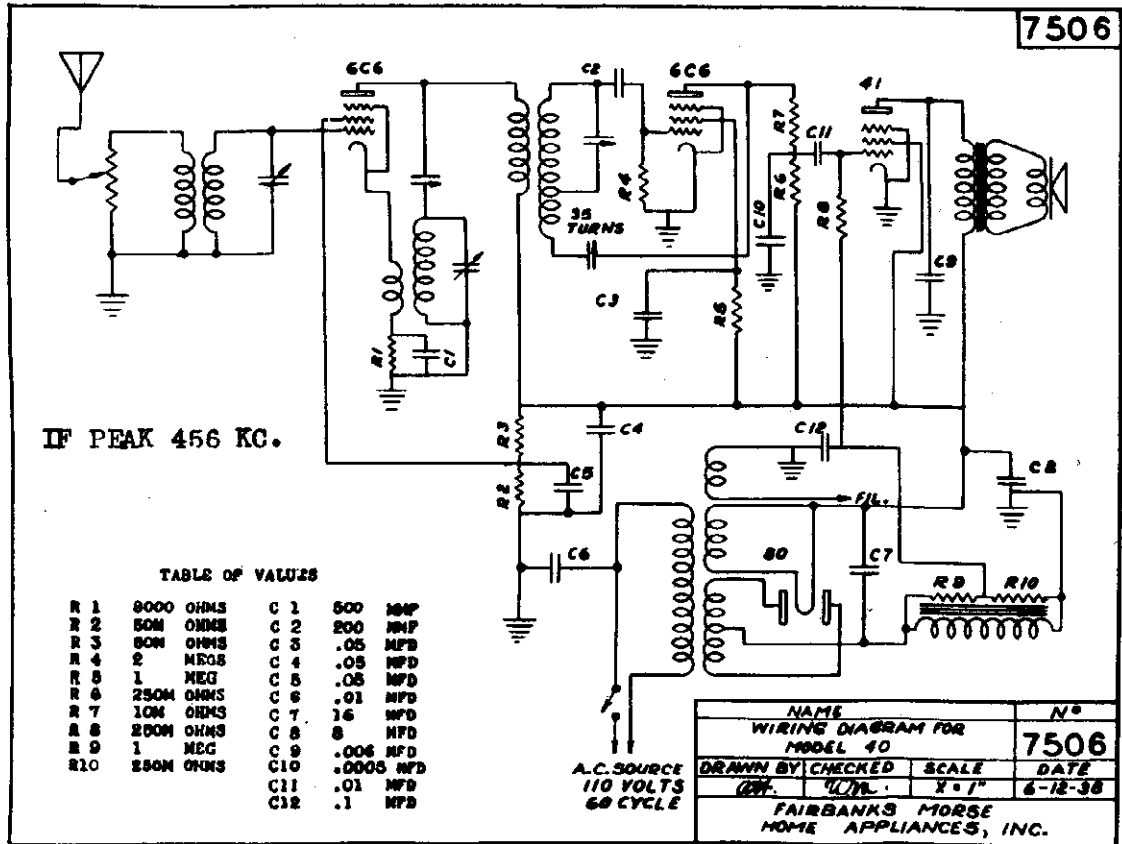


FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N. Y.
DESIGNED BY P. W. W. 3-18-36
CHECKED BY R. W. W.

REF. PART	DESCRIPTION	REF. PART	DESCRIPTION	REF. PART	DESCRIPTION
30.1	CARB. RES. - 10,000 OHMS - 1/2 WATT	45	5523 TONE CONTROL WITH ON-OFF SW.	57	10547 SPEAKER (1582 J)
30.2	20,000 "	46	12033 PILOT LIGHTS - 6.3 V. - 15 A.	58	10812 "
30.3	50,000 "	47	10111 TUBULAR COND. - 1 MFD. - 400 V.	59	464 BAND SWITCH
30.4	1 MEG. "	48	1017 "	60	MIN. ADJ. ON COILS
30.5	50,000 "	49	1014 "	71	" " VAR. COND.
30.6	10,000 "	50	1014 "	72	" " " "
30.7	10,000 "	51	1014 "	73	" " " "
30.8	10,000 "	52	1014 "	74	" " " "
30.9	50,000 "	53	1015 DUAL "	75	2510 VARIABLE COND.
30.10	50,000 "	54	1016 DUAL "	80	507 VOLUME CONTROL - 1 MEG.
30.11	50,000 "	55	1016 DUAL "	81	12010 WIRE RES. - 100 OHMS - 10% - 1/2 FT.
30.12	50,000 "	56	1017 MICA COND. - 0.005 MFD. - 10% "	82	200 "
30.13	50,000 "	57	1017 MICA COND. - 0.0078 "	83	750 "
30.14	50,000 "	58	1017 MICA COND. - 0.001 "	84	1000 "
30.15	50,000 "	59	1017 MICA COND. - 0.001 "	85	300 "
30.16	50,000 "	60	1017 MICA COND. - 0.001 "	86	750 "
30.17	50,000 "	61	1017 MICA COND. - 0.002 "	87	1000 "
30.18	50,000 "	62	1017 MICA COND. - 0.003 MFD. - 10% "	88	300 "
30.19	50,000 "	63	1017 MICA COND. - 0.003 MFD. - 10% "	89	300 "
30.20	50,000 "	64	1017 MICA COND. - 0.003 MFD. - 10% "	90	300 "
30.21	50,000 "	65	1017 MICA COND. - 0.003 MFD. - 10% "	91	300 "
30.22	50,000 "	66	1017 MICA COND. - 0.003 MFD. - 10% "	92	300 "
30.23	50,000 "	67	1017 MICA COND. - 0.003 MFD. - 10% "	93	300 "
30.24	50,000 "	68	1017 MICA COND. - 0.003 MFD. - 10% "	94	300 "
30.25	50,000 "	69	1017 MICA COND. - 0.003 MFD. - 10% "	95	300 "
30.26	50,000 "	70	1017 MICA COND. - 0.003 MFD. - 10% "	96	300 "
30.27	50,000 "	71	1017 MICA COND. - 0.003 MFD. - 10% "	97	300 "
30.28	50,000 "	72	1017 MICA COND. - 0.003 MFD. - 10% "	98	300 "
30.29	50,000 "	73	1017 MICA COND. - 0.003 MFD. - 10% "	99	300 "
30.30	50,000 "	74	1017 MICA COND. - 0.003 MFD. - 10% "	100	300 "
30.31	50,000 "	75	1017 MICA COND. - 0.003 MFD. - 10% "	101	300 "
30.32	50,000 "	76	1017 MICA COND. - 0.003 MFD. - 10% "	102	300 "
30.33	50,000 "	77	1017 MICA COND. - 0.003 MFD. - 10% "	103	300 "
30.34	50,000 "	78	1017 MICA COND. - 0.003 MFD. - 10% "	104	300 "
30.35	50,000 "	79	1017 MICA COND. - 0.003 MFD. - 10% "	105	300 "
30.36	50,000 "	80	1017 MICA COND. - 0.003 MFD. - 10% "	106	300 "
30.37	50,000 "	81	1017 MICA COND. - 0.003 MFD. - 10% "	107	300 "
30.38	50,000 "	82	1017 MICA COND. - 0.003 MFD. - 10% "	108	300 "
30.39	50,000 "	83	1017 MICA COND. - 0.003 MFD. - 10% "	109	300 "
30.40	50,000 "	84	1017 MICA COND. - 0.003 MFD. - 10% "	110	300 "
30.41	50,000 "	85	1017 MICA COND. - 0.003 MFD. - 10% "	111	300 "
30.42	50,000 "	86	1017 MICA COND. - 0.003 MFD. - 10% "	112	300 "
30.43	50,000 "	87	1017 MICA COND. - 0.003 MFD. - 10% "	113	300 "
30.44	50,000 "	88	1017 MICA COND. - 0.003 MFD. - 10% "	114	300 "
30.45	50,000 "	89	1017 MICA COND. - 0.003 MFD. - 10% "	115	300 "
30.46	50,000 "	90	1017 MICA COND. - 0.003 MFD. - 10% "	116	300 "
30.47	50,000 "	91	1017 MICA COND. - 0.003 MFD. - 10% "	117	300 "
30.48	50,000 "	92	1017 MICA COND. - 0.003 MFD. - 10% "	118	300 "
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30.54	50,000 "	98	1017 MICA COND. - 0.003 MFD. - 10% "	124	300 "
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30.57	50,000 "	101	1017 MICA COND. - 0.003 MFD. - 10% "	127	300 "
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30.72	50,000 "	116	1017 MICA COND. - 0.003 MFD. - 10% "	142	300 "
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30.74	50,000 "	118	1017 MICA COND. - 0.003 MFD. - 10% "	144	300 "
30.75	50,000 "	119	1017 MICA COND. - 0.003 MFD. - 10% "	145	300 "
30.76	50,000 "	120	1017 MICA COND. - 0.003 MFD. - 10% "	146	300 "
30.77	50,000 "	121	1017 MICA COND. - 0.003 MFD. - 10% "	147	300 "
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30.82	50,000 "	126	1017 MICA COND. - 0.003 MFD. - 10% "	152	300 "
30.83	50,000 "	127	1017 MICA COND. - 0.003 MFD. - 10% "	153	300 "
30.84	50,000 "	128	1017 MICA COND. - 0.003 MFD. - 10% "	154	300 "
30.85	50,000 "	129	1017 MICA COND. - 0.003 MFD. - 10% "	155	300 "
30.86	50,000 "	130	1017 MICA COND. - 0.003 MFD. - 10% "	156	300 "
30.87	50,000 "	131	1017 MICA COND. - 0.003 MFD. - 10% "	157	300 "
30.88	50,000 "	132	1017 MICA COND. - 0.003 MFD. - 10% "	158	300 "
30.89	50,000 "	133	1017 MICA COND. - 0.003 MFD. - 10% "	159	300 "
30.90	50,000 "	134	1017 MICA COND. - 0.003 MFD. - 10% "	160	300 "
30.91	50,000 "	135	1017 MICA COND. - 0.003 MFD. - 10% "	161	300 "
30.92	50,000 "	136	1017 MICA COND. - 0.003 MFD. - 10% "	162	300 "
30.93	50,000 "	137	1017 MICA COND. - 0.003 MFD. - 10% "	163	300 "
30.94	50,000 "	138	1017 MICA COND. - 0.003 MFD. - 10% "	164	300 "
30.95	50,000 "	139	1017 MICA COND. - 0.003 MFD. - 10% "	165	300 "
30.96	50,000 "	140	1017 MICA COND. - 0.003 MFD. - 10% "	166	300 "
30.97	50,000 "	141	1017 MICA COND. - 0.003 MFD. - 10% "	167	300 "
30.98	50,000 "	142	1017 MICA COND. - 0.003 MFD. - 10% "	168	300 "
30.99	50,000 "	143	1017 MICA COND. - 0.003 MFD. - 10% "	169	300 "
30.100	50,000 "	144	1017 MICA COND. - 0.003 MFD. - 10% "	170	300 "

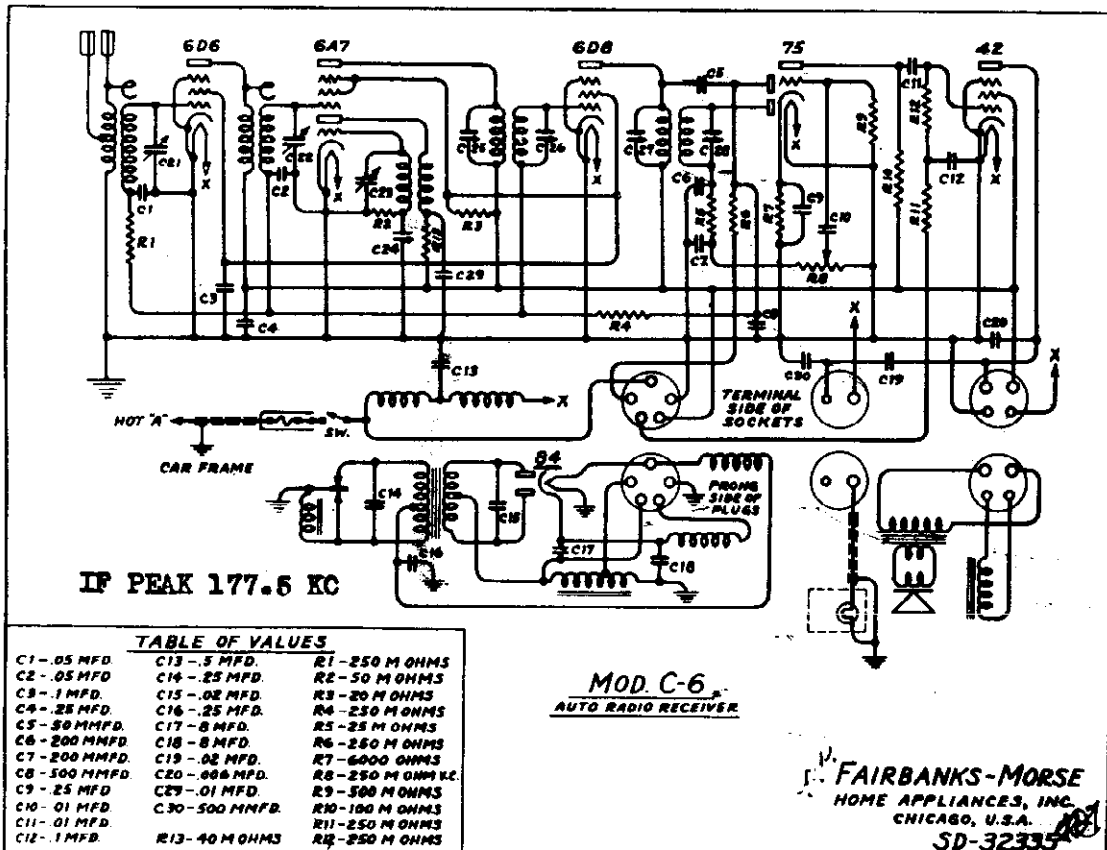
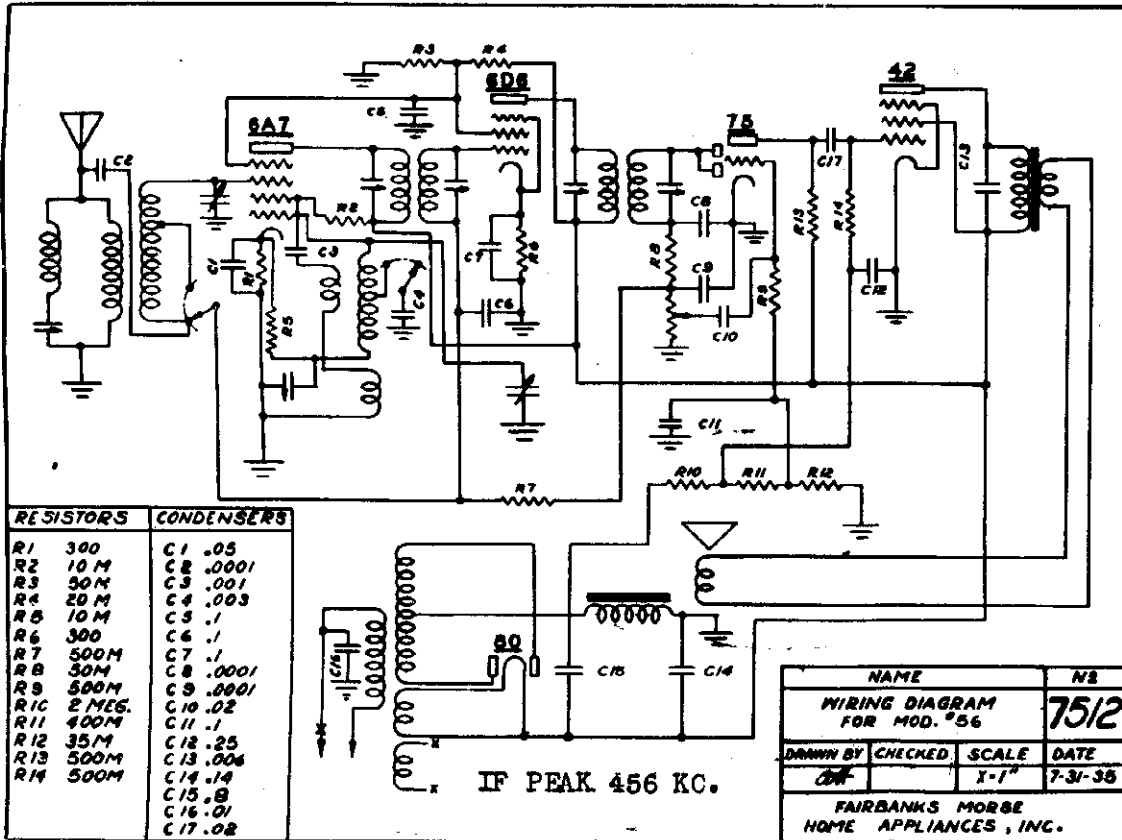
I.F. 456 K.C.

FAIRBANKS-MORSE HOME APP., INC.



MODEL C-6
MODEL 56
Schematics

FAIRBANKS-MORSE HOME APP., INC.



FAIRBANKS-MORSE HOME APP., INC.

MODEL 63
MODEL 64
Schematic

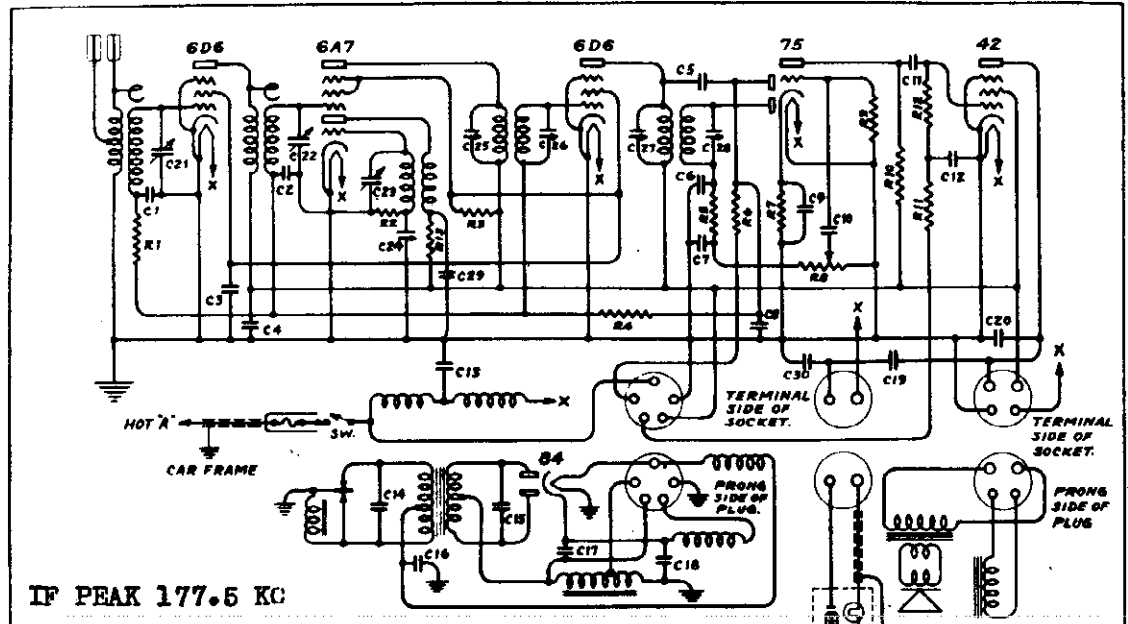
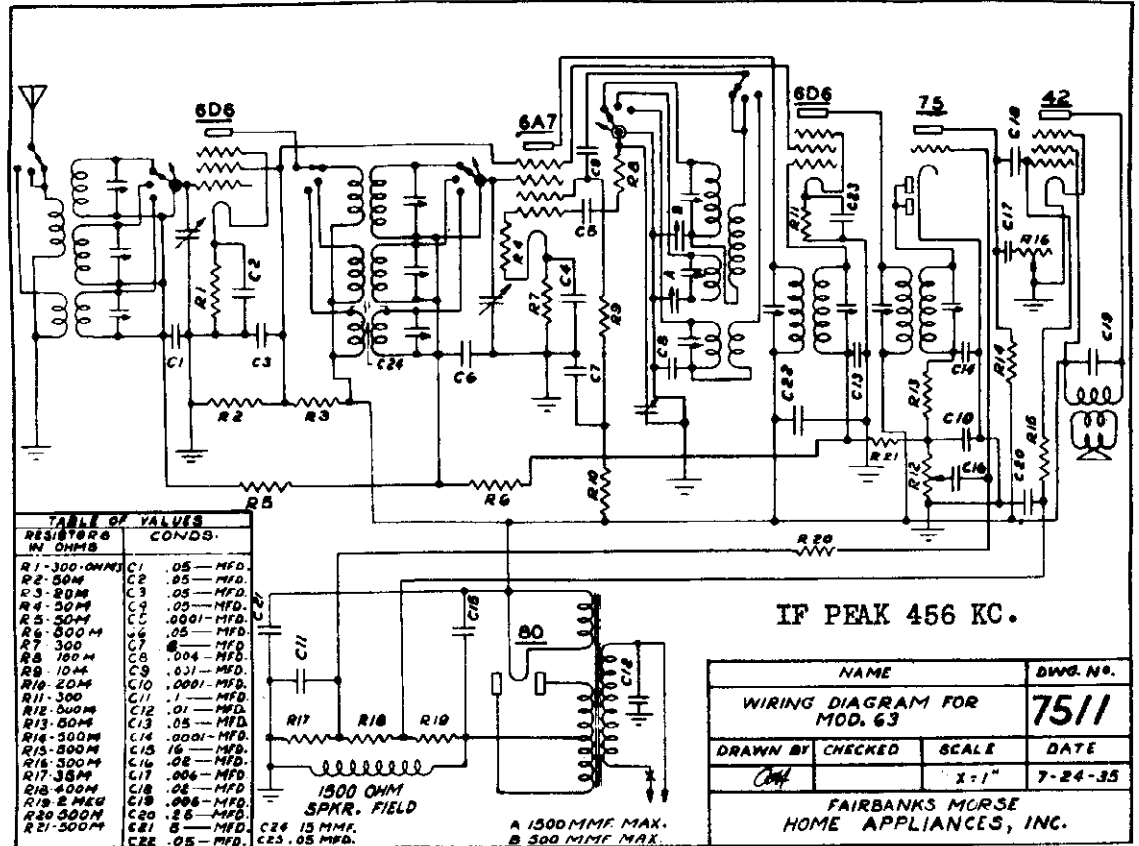


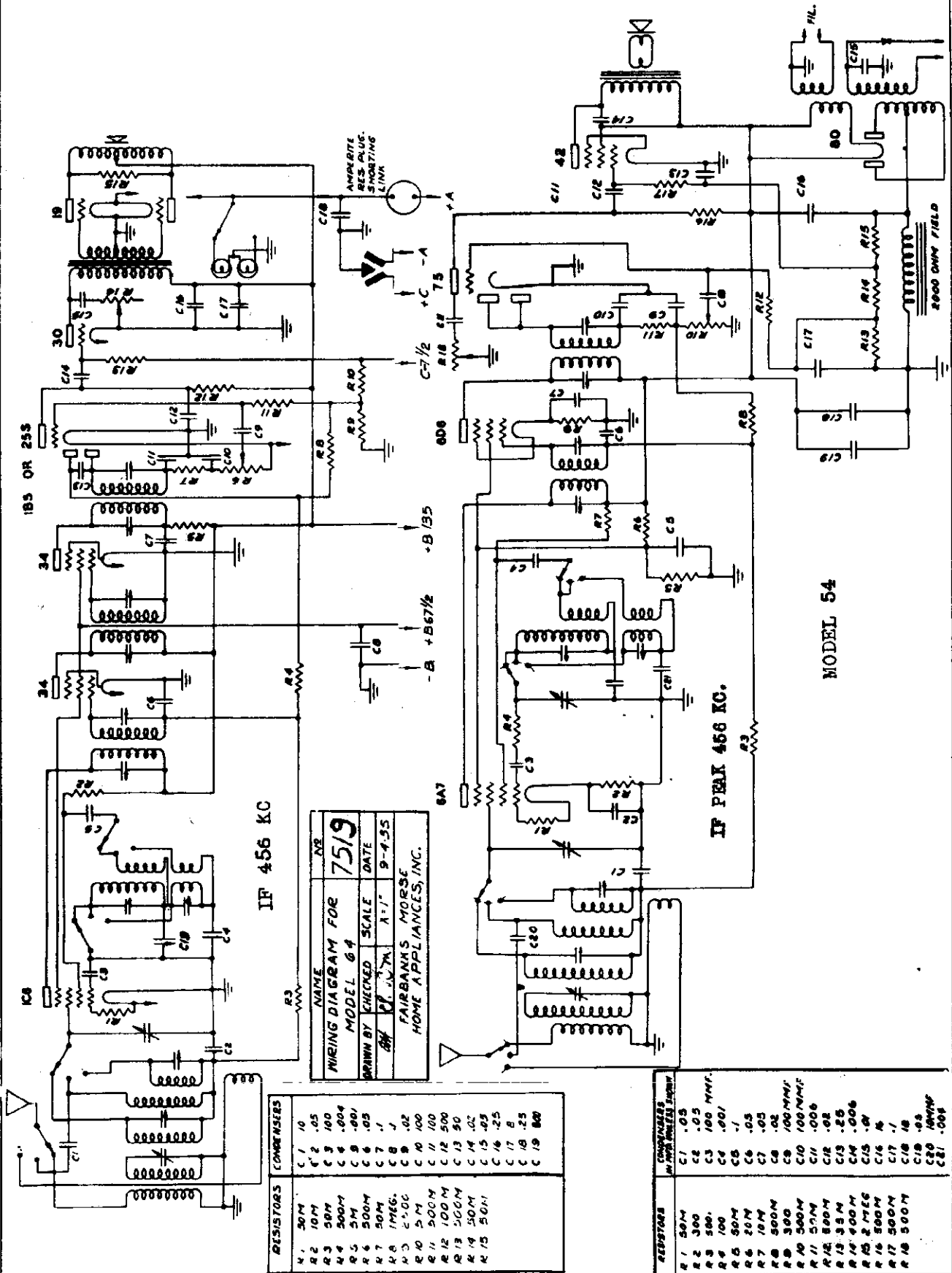
TABLE OF VALUES		
C1 .05 MFD	C13 .5 MFD	R3-20 M OHMS
C2 .05 MFD	C14 .25 MFD	R4-250 M OHMS
C3 1 MFD	C15 .02 MFD	R5 25 M OHMS
C4 25 MFD	C16 .25 MFD	R6 250 M OHMS
C5 50 MMFD	C17 .5 MFD	R7 6000 OHMS
C6 200 MMFD	C18 .5 MFD	R8-250 M OHM VC
C7 200 MMFD	C19 .02 MFD.	R9-500 M OHMS
C8 300 MMFD	C20 .006 MFD.	R10-100 M OHMS
C9 .25 MFD.	C21 .01 MFD	R11-250 M OHMS
C10 .01 MFD	C22-500 MMFD	R12-250 M OHMS
C11 .01 MFD	R1-250 M OHMS	R13-40 M OHMS
C12 .1 MFD.	R2-50 M OHMS	

MOD. 64
AUTO RADIO RECEIVER

FAIRBANKS-MORSE
HOME APPLIANCES, INC.
CHICAGO, U.S.A.
SD-21235

MODEL 54
MODEL 64
Schematics

FAIRBANKS-MORSE HOME APP., INC.



WIRING DIAGRAM FOR
MODEL 64
DRAWN BY CHECKED SCALE DATE
J.V.A. A-1 9-4-35
FAIRBANKS, MORSE
HOME APPLIANCES, INC.

RESISTORS	CONDENSERS
R 1 50M	C 1 .10
R 2 10M	C 2 .05
R 3 50M	C 3 .10
R 4 500M	C 4 .004
R 5 5M	C 5 .001
R 6 500M	C 6 .05
R 7 50M	C 7 .1
R 8 1MEG.	C 8 .1
R 9 500M	C 9 .02
R 10 5M	C 10 .100
R 11 500M	C 11 .100
R 12 100M	C 12 .500
R 13 50M	C 13 .50
R 14 50M	C 14 .02
R 15 50M	C 15 .05
	C 16 .25
	C 17 .5
	C 18 .25
	C 19 .005

RESISTORS	CONDENSERS IN P.P.S. UNIT IN P.P.S.
R 1 50M	C 1 .05
R 2 300	C 2 .05
R 3 500	C 3 100 MMF.
R 4 100	C 4 .001
R 5 50M	C 5 .1
R 6 20M	C 6 .05
R 7 10M	C 7 .05
R 8 500M	C 8 .02
R 9 500M	C 9 100 MMF.
R 10 500M	C 10 100 MMF.
R 11 50M	C 11 .005
R 12 500M	C 12 .02
R 13 35M	C 13 .25
R 14 400M	C 14 .005
R 15 2M5E	C 15 .05
R 16 500M	C 16 .1
R 17 500M	C 17 .1
R 18 500M	C 18 .05
	C 19 100MMF
	C 20 .005
	C 21 .005

MODEL 54

FAIRBANKS-MORSE HOME APP., INC.

MODEL 71
MODEL 74
Schematic

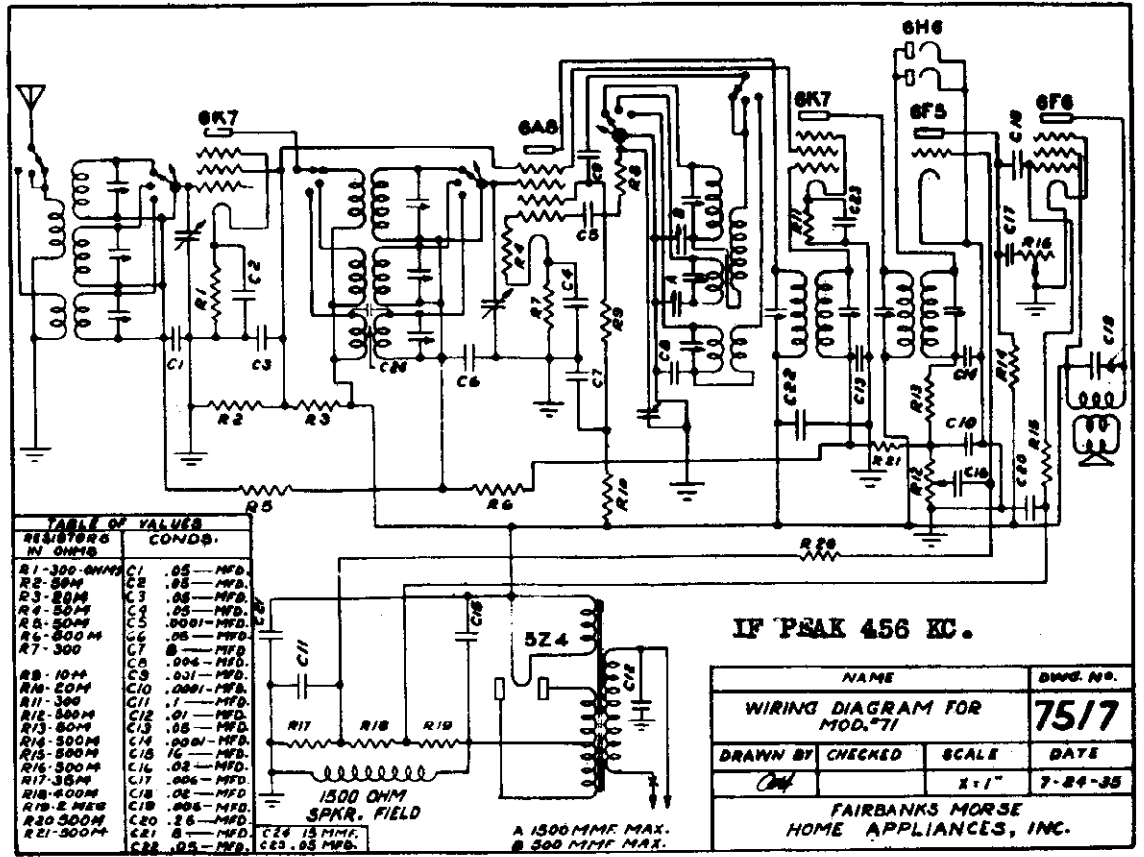


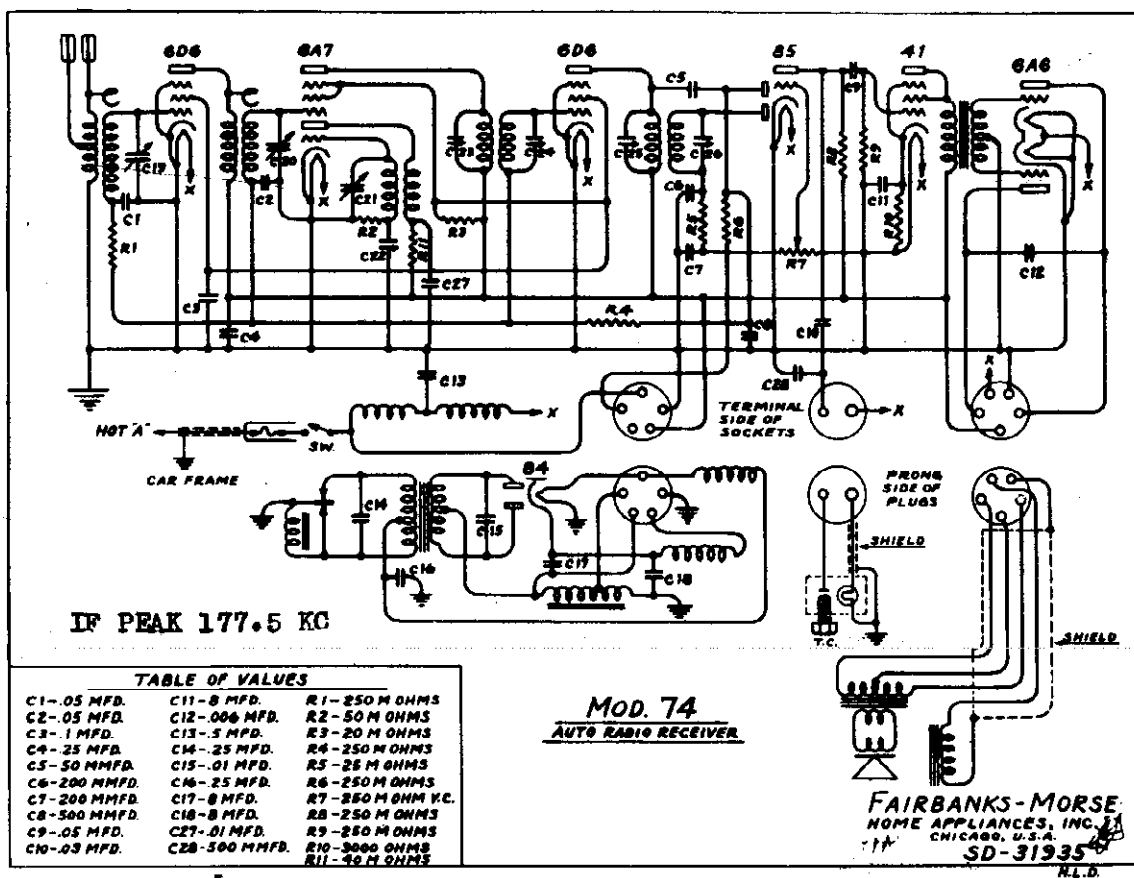
TABLE OF VALUES

RESISTORS IN OHMS	COND.
R1-300 OHMS	C1-.05 MFD.
R2-50M	C2-.05 MFD.
R3-50M	C3-.05 MFD.
R4-50M	C4-.05 MFD.
R5-50M	C5-.0001 MFD.
R6-500M	C6-.05 MFD.
R7-300	C7-.05 MFD.
R8-10M	C8-.006 MFD.
R9-20M	C9-.001 MFD.
R10-300	C10-.0001 MFD.
R11-300	C11-1 MFD.
R12-500M	C12-.01 MFD.
R13-50M	C13-.05 MFD.
R14-500M	C14-.0001 MFD.
R15-500M	C15-16 MFD.
R16-500M	C16-.02 MFD.
R17-35M	C17-.006 MFD.
R18-400M	C18-.02 MFD.
R19-2 MEG	C19-.006 MFD.
R20-500M	C20-.26 MFD.
R21-500M	C21-8 MFD.
R22-500M	C22-.05 MFD.

IF PEAK 456 KC.

NAME		DWG. NO.
WIRING DIAGRAM FOR MOD. 71		7517
DRAWN BY	CHECKED	SCALE
Out		2-1"
		DATE
		7-24-35

FAIRBANKS MORSE HOME APPLIANCES, INC.



IF PEAK 177.5 KC

TABLE OF VALUES

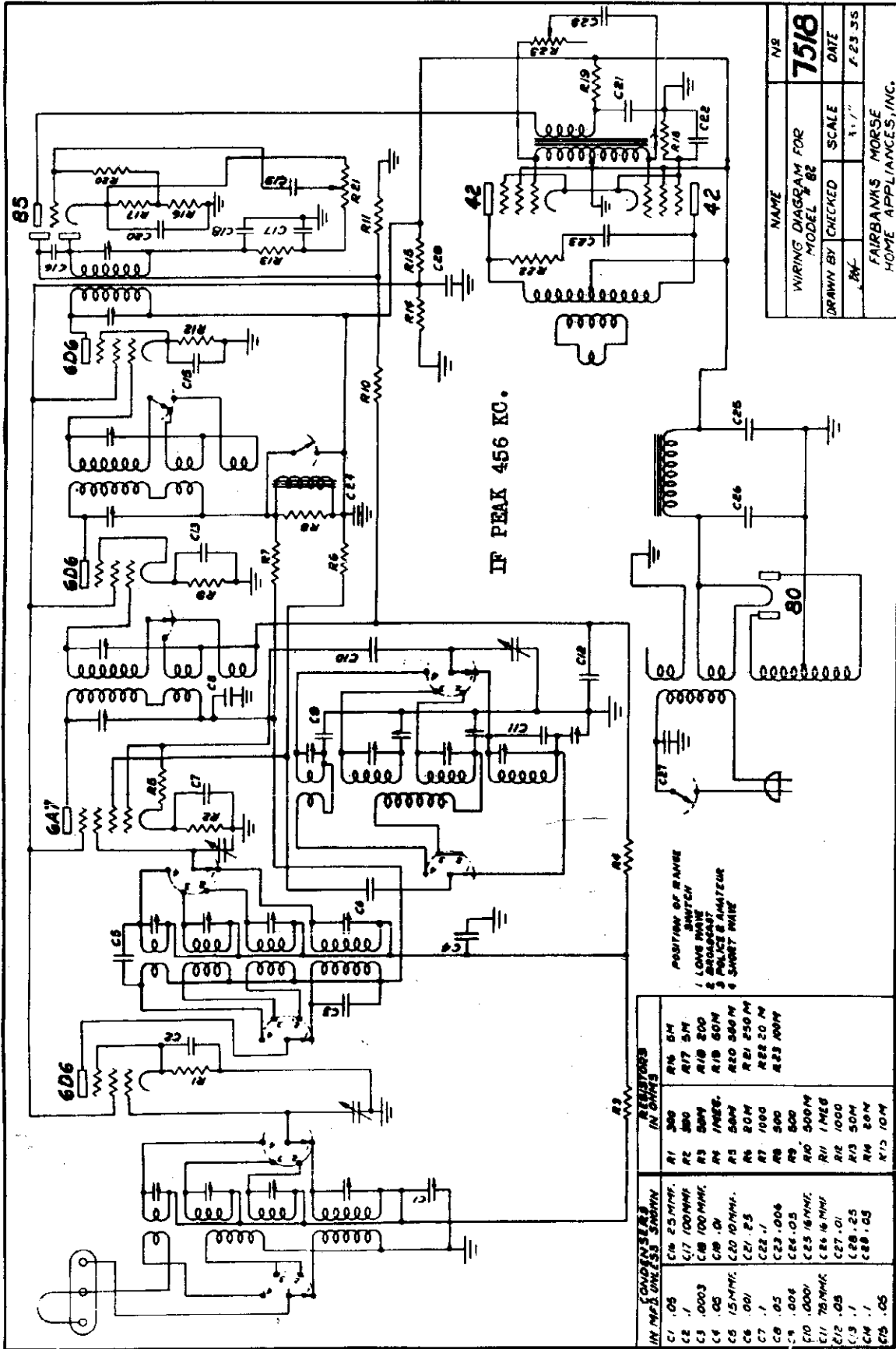
C1-.05 MFD.	C11-8 MFD.	R1-250 M OHMS
C2-.05 MFD.	C12-.006 MFD.	R2-50 M OHMS
C3-1 MFD.	C13-.3 MFD.	R3-20 M OHMS
C4-.25 MFD.	C14-.25 MFD.	R4-250 M OHMS
C5-50 MMFD.	C15-.01 MFD.	R5-25 M OHMS
C6-200 MMFD.	C16-.25 MFD.	R6-250 M OHMS
C7-200 MMFD.	C17-8 MFD.	R7-250 M OHM KC.
C8-500 MMFD.	C18-8 MFD.	R8-250 M OHMS
C9-.05 MFD.	C27-.01 MFD.	R9-250 M OHMS
C10-.03 MFD.	C28-500 MMFD.	R10-3000 OHMS
		R11-50 M OHMS

MOD. 74
AUTO RADIO RECEIVER

FAIRBANKS-MORSE HOME APPLIANCES, INC. CHICAGO, U.S.A. SD-31935 N.L.B.

MODEL 82
Schematic

FAIRBANKS-MORSE HOME APP., INC.



NAME	NR
WIRING DIAGRAM FOR	7518
MODEL	82
DRAWN BY	SCALE
CHK	1 1/2"
DATE	F. 23 '35

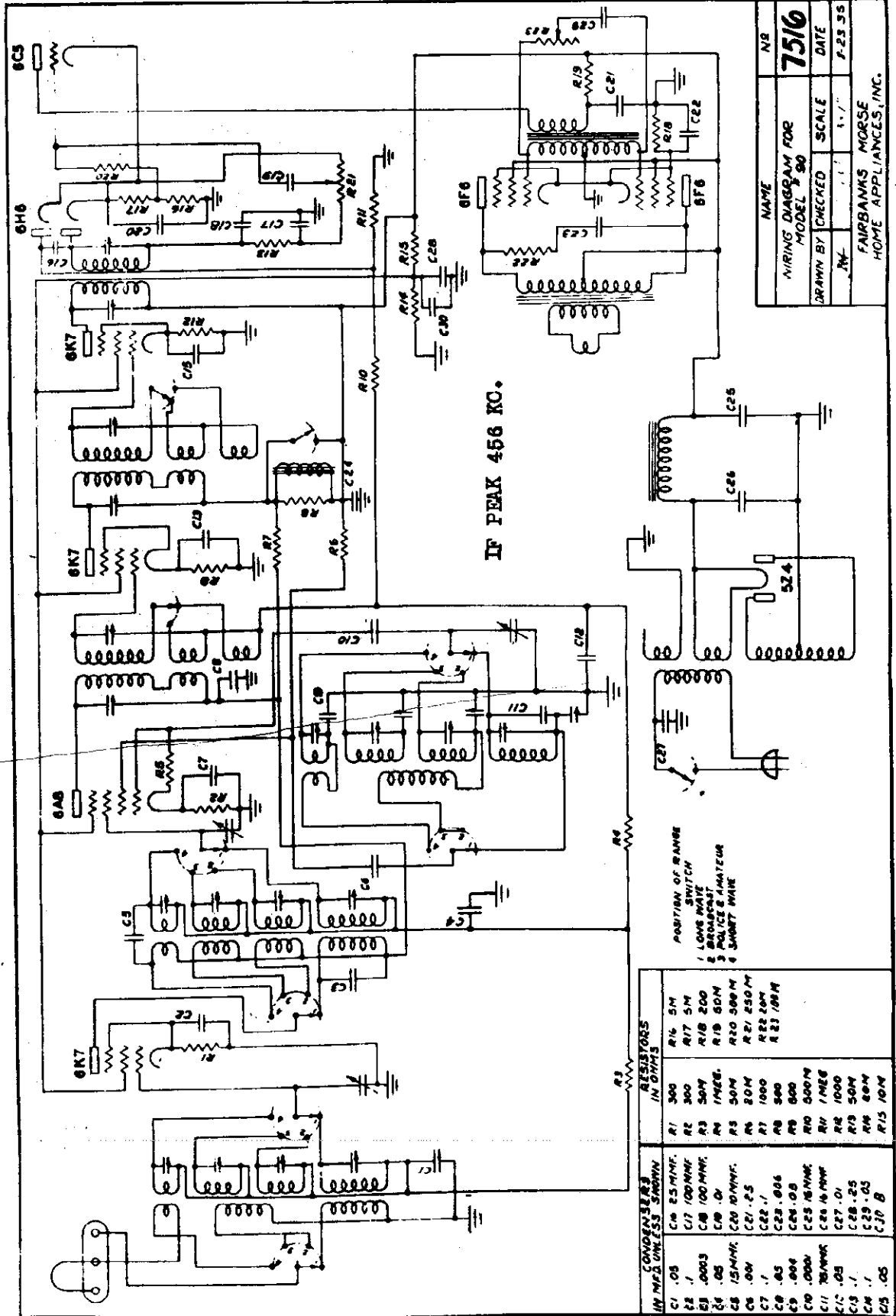
FAIRBANKS MORSE
HOME APPLIANCES, INC.

POSITION OF RANGE
SWITCH
1 LONG WAVE
2 POLICE AMATEUR
3 SHORT WAVE

CONDENSERS IN P.P.S. UNLESS SHOWN	RESISTORS IN OHMS
C1 .05	R1 200
C2 .1	R2 200
C3 .0003	R3 500
C4 .05	R4 1/2MEG.
C5 15 MFC.	R5 500
C6 .001	R6 20M
C7 .1	R7 1000
C8 .05	R8 500
C9 .004	R9 500
C10 .0001	R10 500M
C11 75 MFC.	R11 1/2MEG
C12 .05	R12 1000
C13 .1	R13 50M
C14 .05	R14 20M
C15 .05	R15 10M
	R16 5M
	R17 5M
	R18 500
	R19 50M
	R20 500M
	R21 2500M
	R22 20M
	R23 100M

FAIRBANKS-MORSE HOME APP., INC.

MODEL 90
Schematic



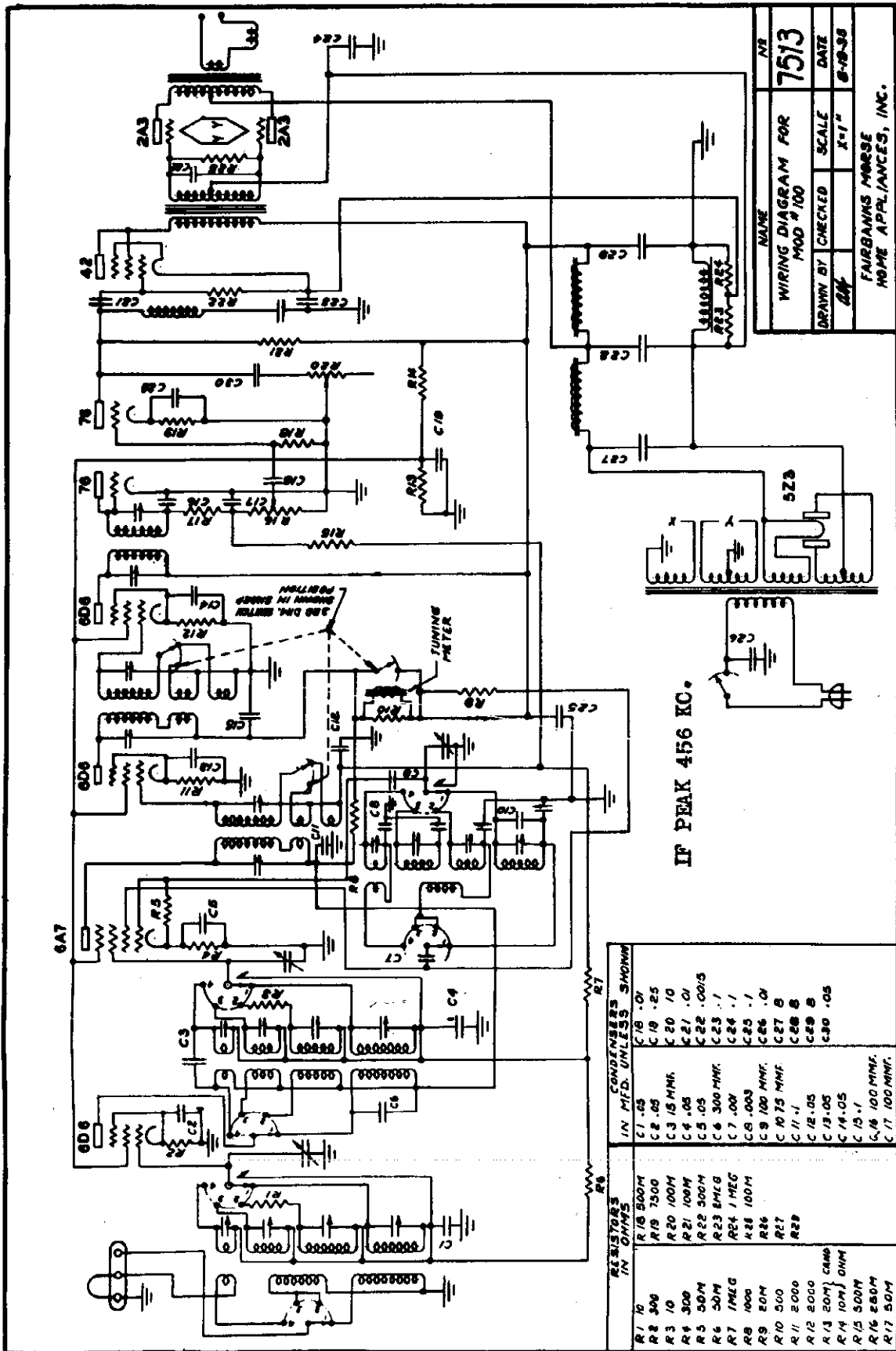
NAME	NR
WIRING DIAGRAM FOR	7516
MODEL	90
DRAWN BY	CHECKED
SCALE	1:1
DATE	F-23-35
FAIRBANKS MORSE HOME APPLIANCES, INC.	

CONDENSERS (IN MFD UNLESS SHOWN)		RESISTORS (IN OHMS)	
C1	.05	R1	300
C2	.05	R2	300
C3	.003	R3	500
C4	.05	R4	1000
C5	.05	R5	500
C6	.05	R6	500
C7	.05	R7	1000
C8	.05	R8	500
C9	.05	R9	500
C10	.05	R10	500
C11	.05	R11	500
C12	.05	R12	500
C13	.05	R13	500
C14	.05	R14	500
C15	.05	R15	500

POSITION OF RANGE
1 LOW RANGE
2 BROADCAST
3 POLICE AMATEUR
4 SHORT WAVE

MODEL 100
Schematic

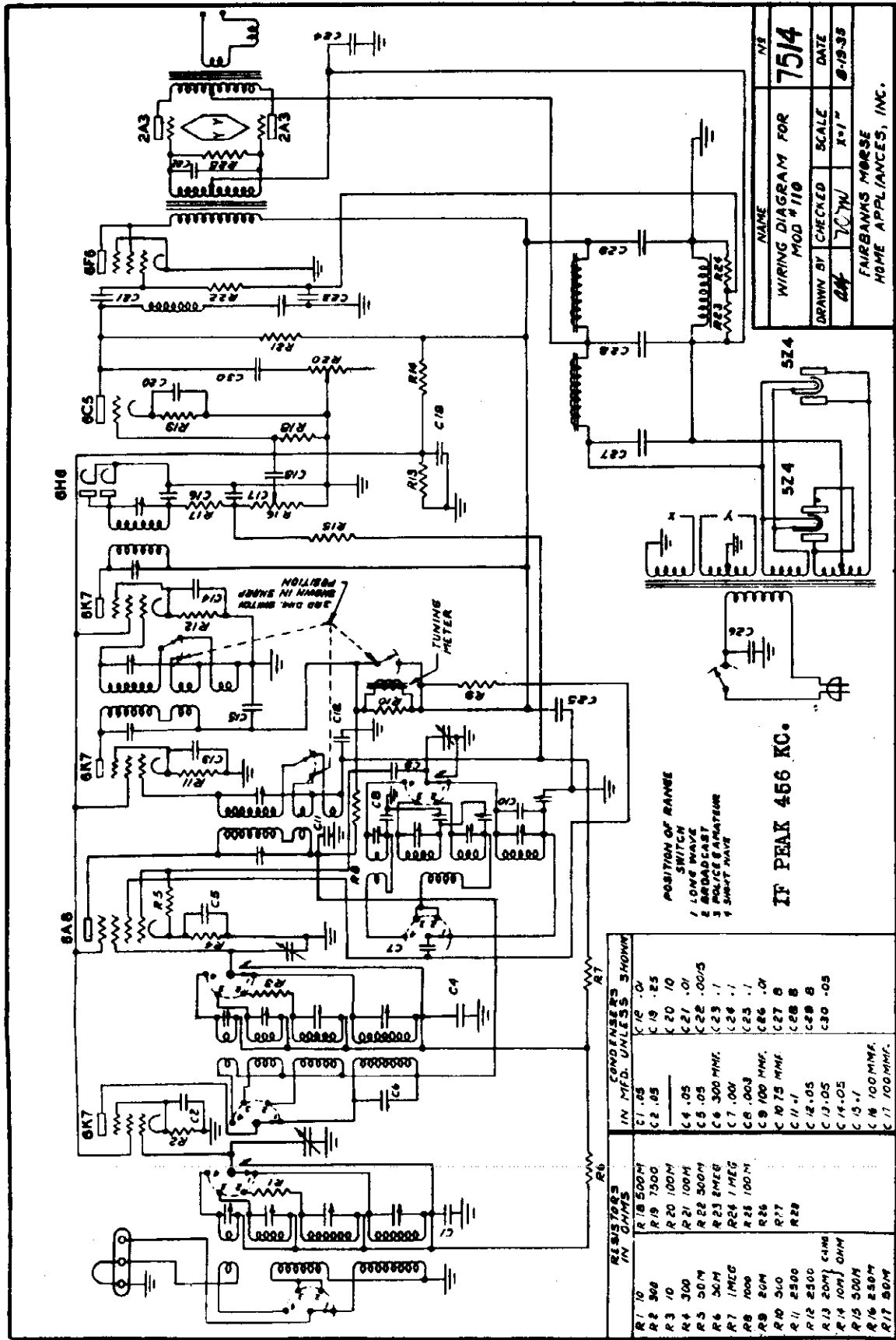
FAIRBANKS-MORSE HOME APP., INC.



NAME	NR
WIRING DIAGRAM FOR	7513
MOD #	100
DRAWN BY	CHKD
CHECKED	SCALE
	X-1"
DATE	8-18-36
FAIRBANKS MORSE HOME APPLIANCES, INC.	

RESISTORS IN OHMS	VALUES	CAPACITORS IN MFD. UNLESS SHOWN	VALUES
R1	10	C1	.05
R2	300	C2	.05
R3	10	C3	15 MFD.
R4	300	C4	.05
R5	30M	C5	.05
R6	50M	C6	300 MFD.
R7	1MEG	C7	.001
R8	1000	C8	.003
R9	20M	C9	100 MFD.
R10	500	C10	75 MFD.
R11	2000	C11	.1
R12	2000	C12	.05
R13	20M OHM	C13	.05
R14	10M OHM	C14	.05
R15	500M	C15	.1
R16	250M	C16	100 MFD.
R17	50M	C17	100 MFD.
R18	500M	C18	.01
R19	7500	C19	.25
R20	100M	C20	10
R21	100M	C21	.01
R22	300M	C22	.0015
R23	5MEG	C23	.1
R24	1MEG	C24	.1
R25	100M	C25	.1
R26		C26	.01

FAIRBANKS-MORSE HOME APP., INC.



NAME	NZ
WIRING DIAGRAM FOR	7514
MOD #	110
DRAWN BY	WJW
CHECKED	
SCALE	X 1/2"
DATE	8-19-38
FAIRBANKS MORSE HOME APPLIANCES, INC.	

POSITION OF RANGE SWITCH
 1 LONG WAVE
 2 BROADCAST
 3 POLICE & MARINE
 4 SHORT WAVE

IF PEAK 456 KC.

RESISTORS IN OHMS	CONDENSERS IN MFD. UNLESS SHOWN
R1 10	C1 .05
R2 500	C2 .05
R3 10	C3 .25
R4 300	C4 .05
R5 50M	C5 .05
R6 50M	C6 300 MFD.
R7 1MEG	C7 .001
R8 1000	C8 .003
R9 50M	C9 100 MFD.
R10 50	C10 75 MFD.
R11 2500	C11 .1
R12 2500	C12 .05
R13 20M C-146	C13 .05
R14 10M OHM	C14 .05
R15 500M	C15 .1
R16 250M	C16 100 MFD.
R17 50M	C17 100 MFD.

MODELS 6010,6044
Chassis 60
Resistance Test
Voltage, Data

FAIRBANKS-MORSE HOME APP., INC.

RESISTANCE TESTS

These tests should be made with an accurate ohm-meter. The speaker should be connected. All tubes should be removed from the set. The volume and tone controls should be full "on." The A. C. line plug must be removed from the A. C. outlet.

VOLTAGE TESTS

These readings should be taken with all tubes in their sockets. The volume and tone controls should be full "on." The antenna should be disconnected. Tune the set to a point where no signal is received.

RESISTANCE AND VOLTAGE ANALYSIS CHART

LINE VOLTAGE 115

FROM	TO	Resistance in Ohms	MEASURED VOLTAGE		Meter Range in Volts	If Reading Differs More Than 10% plus or minus from Stated Value Check These Units.
			B. C. Band	S. W. Band		
6D6 Ant. R. F. Stage			6.2 A. C.	6.2 A. C.		
1. Heater	Ground	.2				fil. Winding; Pilot Light Socket
2. Plate	Ground	55,000	217.5	217.	300	RFC-1; C-2; C-5; C-6; C-31; C-32; R-3; R-4
3. Screen	Ground	40,000	90	80	300	C-2; R-3; R-4
4. Suppressor	Ground	300	2.4	2.2	3	R-1; C-4
5. Cathode	Ground	300	2.4	2.2	3	R-1; C-4
6. Heater	Ground	0	0	0		Defective Ground
7. Grid	Ground	1,251,000				Coil; R-2; R-9; R-10; C-20
6A7 Converter						
8. Heater	Ground	0	0	0		Defective Ground
9. Plate	Ground	55,000	217.5	217	300	Coil; R-3; R-4; C-2; C-31; C-32
10. Screen G-3 G-5	Ground	40,000	90	80	300	C-2; R-3; R-4
11. Osc. Plate G-2	Ground	65,000	165	145	300	Coil; RFC-2; R-7; R-3; R-4; C-2; C-31; C-32
12. Osc. Grid G-1	Ground	50,300	*-5	*1.5	30	R-6; R-5; C-8
13. Cathode	Ground	300	*3	*4.25	30	R-5; C-8
14. Heater	Ground	.2	6.2 A. C.	6.2 A. C.		fil. Winding; Pilot Light Socket
15. Grid	Ground	1,250,000				Switch; Coil; R-9; R-10; C-20
6D6 I. F. Stage						
16. Heater	Ground	.2	6.2 A. C.			fil. Winding; Pilot Light Socket
17. Plate	Ground	55,000	217.5	217	300	Coil; R-3; R-4; C-2; C-31; C-32
18. Screen	Ground	40,000	90	80	300	C-2; R-3; R-4
19. Suppressor	Ground	300	2.35	2.05	3	R-19; C-19
20. Cathode	Ground	300	2.35	2.05	3	R-19; C-19
21. Heater	Ground	0	0	0		Defective Ground
22. Grid	Ground	1,750,000				Coil; R-8; R-9; R-10; C-18; C-20
6B7 Det. AVC & A. F.						
23. Heater	Ground	.2	6.2 A. C.	6.2 A. C.		fil. Winding; Pilot Light Socket
24. Plate	Ground	305,000	*75	*75	300	R-13; R-3; R-4; C-27; C-2; C-31; C-32
25. Screen	Ground	2,055,000	*22.5	*22.5	300	R-12; R-3; R-4; C-26; C-2; C-31; C-32
26. Diode Plate	Ground	250,000				Coil; R-10; C-20
27. Diode Plate	Ground	0	0	0		Defective Ground
28. Cathode	Ground	0	0	0		Defective Ground
29. Heater	Ground	0	0	0		Defective Ground
30. Grid	Ground	2,004,850				R-11; R-16; C-21; C-33
42 Output						
31. Heater	Ground	.2	6.2 A. C.	6.2 A. C.		Defective Ground
32. Plate	Ground	55,600	205	205	300	Coil; R-3; R-4; C-29; C-30; C-31; C-32; C-2
33. Screen	Ground	55,000	215	215	300	R-3; R-4; C-2; C-31; C-32
34. Grid	Ground	761,000				R-14; R-16; R-17; R-18; C-27; C-28; Field
35. Cathode	Ground	0	0	0		Defective Ground
36. Heater	Ground	0	0	0		Defective Ground
80 Rectifier						
37. Filament	Ground	55,000	215	215	300	fil. Winding; C-31; C-32; C-2; R-3; R-4
38. Plate	Ground	2,200	-130	-130	300	H. V. Winding; Field
39. Plate	Ground	2,200	-130	-130	300	H. V. Winding; Field
40. Filament	Ground	55,000	215	215	300	C-31; C-32; C-2; R-3; R-4
Miscellaneous						
41. A. C. Line	Ground					Pri. Winding; Switch; C-34
42. A. C. Line	Ground					Pri. Winding; Switch; C-34
43. Ant. (Blue)	Ground	5.7				Coil; C-1
44. Ant. (Blue & Black)	Ground	.02	(OPEN ON BROADCAST)			Switch
45. Ground	Ground	0				Defective Ground
41. A. C. Line	42. A. C. Line	8				Switch; Primary; Cord; Plug
38. Plate 80	39. Plate 80	400				H. V. Winding
37. Filament 80	40. Filament 80	.12				Filament Winding

STANDARD R M A

Resistor and Condenser Color Code

If Resistance Readings are low, try reversing polarity of Ohm-Meter.

*Subject to large variations.

†Figures in the first column refer to socket hole numbers on Figure 3. 0 Black 2 Red 4 Yellow 6 Blue 8 Grey

**Meter must be 1,000 ohms per volt.

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.

FIRST I. F. TRANSFORMER

Plate Blue
Plus "B" Red
Grid Return Black
Grid (Top) Green

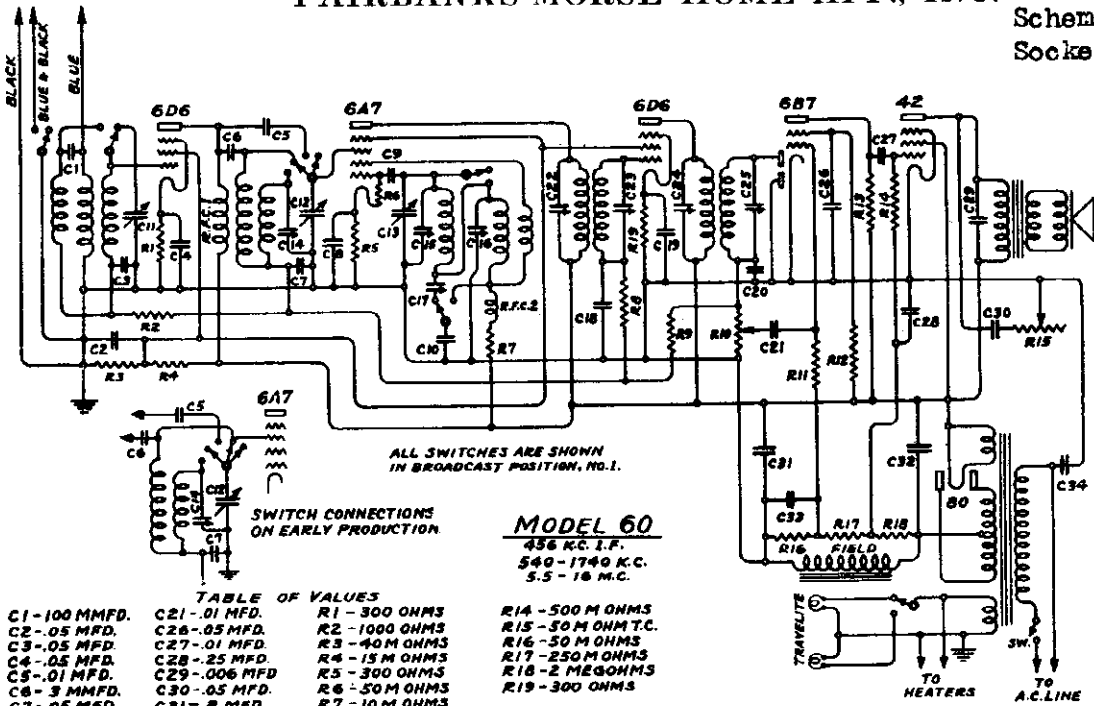
SECOND I. F. TRANSFORMER

Plate Blue
Plus "B" Red
Diode Return Black
Diode Green

POWER TRANSFORMER

Primary Two Brown Leads
6.3 Volt Filament Two Black Leads
5. Volt Filament Two Yellow Leads
High Voltage Two Green Leads
C. T. High Voltage Red

MODELS 6010, 6044
FAIRBANKS-MORSE HOME APP., INC. Chassis 60
 Schematic, Trimmers
 Socket



MODEL 60
 456 K.C. I.F.
 540-1740 K.C.
 5.5-16 M.C.

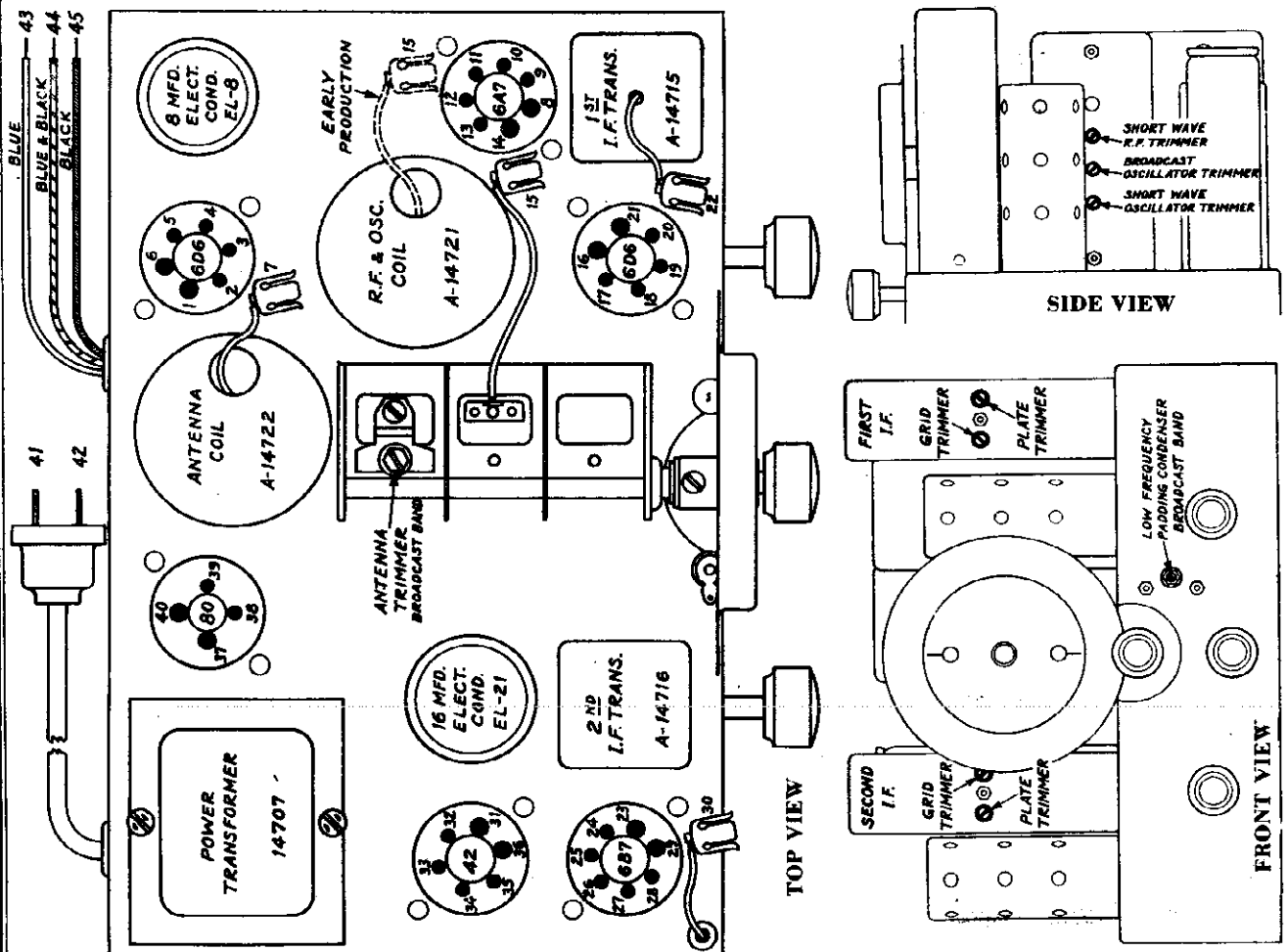
TABLE OF VALUES

C1-100 MMFD.	C21-.01 MFD.	R1-300 OHMS
C2-.05 MFD.	C26-.05 MFD.	R2-1000 OHMS
C3-.05 MFD.	C27-.01 MFD.	R3-40M OHMS
C4-.05 MFD.	C28-.25 MFD.	R4-15M OHMS
C5-.01 MFD.	C29-.006 MFD.	R5-300 OHMS
C6-3 MMFD.	C30-.05 MFD.	R6-50M OHMS
C7-.05 MFD.	C31-.8 MFD.	R7-10M OHMS
C8-.05 MFD.	C32-16 MFD.	R8-500M OHMS
C9-50 MMFD.	C33-.1 MFD.	R9-1 MEGOHM
C10-.01 MFD.	C34-.01 MFD.	R10-250M OHM V.C.
C18-.05 MFD.		R11-1 MEGOHM
C19-.05 MFD.		R12-2 MEGOHMS
C20-200 MMFD.		R13-250M OHMS

- R14-500M OHMS
- R15-50M OHM T.C.
- R16-50M OHMS
- R17-250M OHMS
- R18-2 MEGOHMS
- R19-300 OHMS

FIELD-2000 OHMS
 R.F.C.1-R.F. PLATE CHOKE
 R.F.C.2-OSC. PLATE CHOKE

FAIRBANKS-MORSE
 HOME APPLIANCES, INC.
 3D-103134



MODELS 6010, 6044

Chassis 60

Alignment, Coil Data

FAIRBANKS-MORSE HOME APP., INC.

I. F. ALIGNMENT

All Intermediate Frequency alignment adjustments must be made with the band selector switch in the broadcast (left hand) position.

1. Supply a 456 Kilocycle signal from an accurate service oscillator, to the grid of the 6A7 tube. It is advisable to connect a small condenser, about .00005 Mfd. (50 MMFD) in series with the lead from the service oscillator to prevent the characteristics of the service oscillator circuit from affecting the set.
2. Adjust the grid circuit trimmer condenser of the first intermediate frequency transformer, carefully, for maximum output with minimum input from the service oscillator. The grid circuit trimmer condenser of the first intermediate frequency transformer is controlled by the left hand adjustment screw located on the front of the intermediate frequency transformer can (see Figure 4).
3. Adjust the plate circuit trimmer condenser of the first intermediate frequency transformer, carefully, for maximum output with minimum input from the service oscillator. The plate circuit trimmer condenser of the first intermediate frequency transformer is controlled by the right hand adjustment screw located on the front of the intermediate frequency transformer can (see Figure 4).
4. Adjust the diode circuit trimmer condenser of the second intermediate frequency transformer, carefully, for maximum output with minimum input from the service oscillator. The diode plate circuit trimmer condenser of the second intermediate frequency transformer is controlled by the right hand adjustment screw located on the front of the intermediate frequency transformer can (Grid Trimmer Figure 4).
5. Adjust the plate circuit trimmer condenser of the second intermediate frequency transformer carefully, for maximum output with minimum input from the service oscillator. The plate circuit trimmer condenser of the second intermediate frequency transformer is controlled by the left hand adjustment screw located on the front of the intermediate frequency transformer can (see Figure 4).
6. Much of the sensitivity and selectivity of the receiver depends upon the proper setting of these critical adjustments, for this reason it is necessary to go back over them to make sure they are correct.

R. F. AND OSCILLATOR ALIGNMENT

An alignment jig is available for use in aligning the broadcast and short wave bands of the Model 60. The part number of this jig is 14726, it may be obtained through any Fairbanks-Morse jobber.

BROADCAST BAND

1. Place the alignment jig on the front of the chassis. Tune the gang condenser to 1700 Kilocycles. Supply a 1700 Kilocycle signal from the service oscillator to the antenna of the set. Adjust the broadcast band oscillator trimmer (see Figure 5) for maximum output with minimum input from the service oscillator. It is advisable to turn the gang condenser back and forth across the signal while this adjustment is being made to make sure the peak of greatest intensity is obtained. This is necessary to bring the oscillator into track with the R. F. circuit since, in most cases, the R. F. circuit has no trimmer. If the dial reading is incorrect after this adjustment has been made the travelite disc should be adjusted until the reading is correct.

2. Adjust the broadcast band antenna trimmer (Figure 3) for maximum output with minimum input from the service oscillator.

3. Supply a 600 Kilocycle signal to the antenna of the set. Turn the gang condenser to 600 Kilocycles. Adjust the low frequency padding condenser (Figure 4) for maximum output with minimum input from the service oscillator. While making this adjustment turn the gang condenser back and forth across the signal to make sure the peak of greatest intensity is obtained.

SHORT WAVE BAND

1. Supply a 15 megacycle signal to the antenna of the set. Turn the gang condenser to 15 megacycles. Adjust the short wave oscillator trimmer (Figure 5) for maximum output with minimum input from the service oscillator.

2. Adjust the short wave R. F. trimmer (Figure 5) for maximum output with minimum input from the service oscillator. While making this adjustment it is advisable to turn the gang condenser back and forth across the signal to make sure the peak of greatest intensity is obtained. This is desirable because of the reflected effect of the adjustment of one stage on the other.

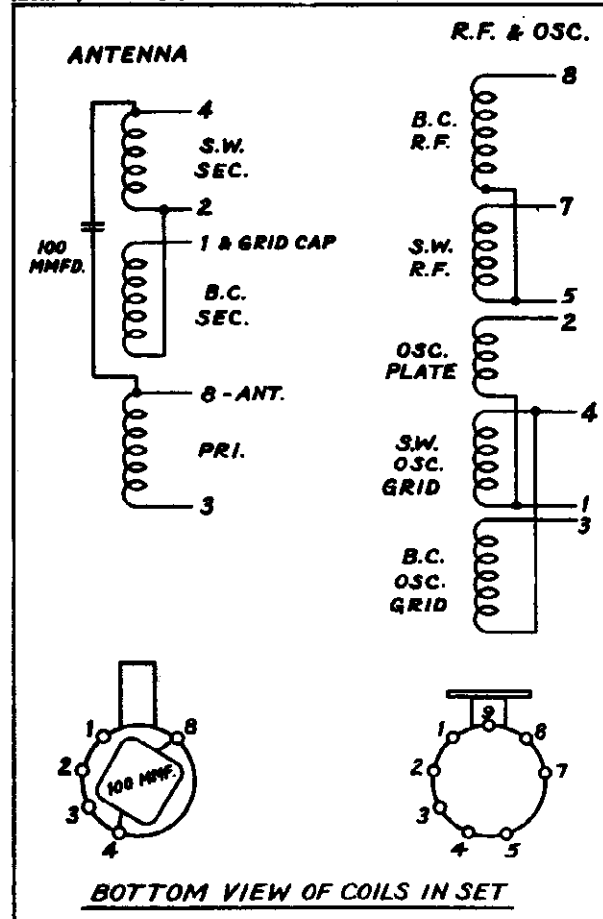
NOTE: After all alignment adjustments have been completed the set should be tuned slowly from one end of the dial to the other, on the short wave band. If a howl or "squak" is heard at any point, the set is "crossing track." To remedy this condition loosen the short wave oscillator trimmer (Figure 5) slowly and carefully to the point where the howl disappears.

DIAL CALIBRATION IN CABINET

After the set has been aligned in accordance with the foregoing instructions the dial readings will be approximately correct on all frequencies. When the chassis is placed in the cabinet it should be bolted down and any differences in calibration should be adjusted by loosening the set screw in the travelite disc hub and turning the travelite disc until the reading is correct and then tightening the set screw.

GANG CONDENSER PLATES

The adjustment of the slotted end plates on the gang condenser is very critical since it must be accurate on both bands. These adjustments are made in the factory with precision equipment and under no condition should it be necessary to change them by bending plates.



COIL	FROM	TO	D. C. RESISTANCE
ANTENNA COIL	Lug 3	Lug 8	5.5 Ohms
	Lug 1	Lug 2	4. Ohms
	Lug 2	Lug 4	.5 Ohm
RADIO FREQUENCY AND OSCILLATOR COILS	Lug 3	Lug 4	2.8 Ohms
	Lug 4	Lug 1	.1 Ohm
	Lug 1	Lug 2	.35 Ohm
FIRST I. F. TRANSFORMER	Lug 7	Lug 5	.1 Ohm
	Lug 5	Lug 8	4. Ohms
	Black	Green	9. Ohms
SECOND I. F. TRANSFORMER	Red	Blue	7.25 Ohms
	Black	Green	7.5 Ohms
OSCILLATOR PLATE CHOKE	Red	Blue	4.5 Ohms
	B + End	Plate End	12. Ohms
R. F. PLATE CHOKE	B + End	Plate End	75. Ohms
	Brown	Brown	7.5 Ohms
POWER TRANSFORMER 115 VOLT 60 CYCLE	Black	Black	.12 Ohm
	Yellow	Yellow	.1 Ohm
	Green	Red	185. Ohms
	Green	Red	185. Ohms

FAIRBANKS-MORSE HOME APP., INC.

MODELS 6210, 6244
Chassis 62
Schematic, Parts

MODEL NO. 62

AC - DC RECEIVER 456 KC. IF.
18-52 METERS - 5.0-16.5 MEGACYCLES.
197-553 METERS - 540-1600 KILOCYCLES.
810-2000 METERS - 150-370 KILOCYCLES.

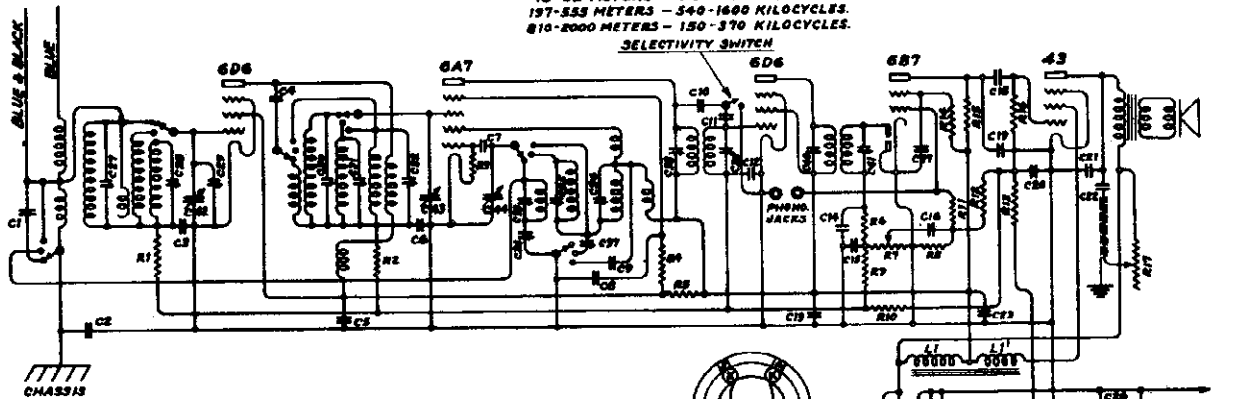
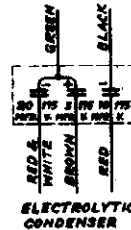


TABLE OF VALUES

C1-1000 MMFD.	C15-200 MMFD.	R1-1000 OHMS	R15-250 M OHMS
C2-.1 MFD.	C16-.05 MFD.	R2-2 MEGOHMS	R16-250 M OHMS
C3-.05 MFD.	C17-.1 MFD.	R3-25 M OHMS	R17-50 M OHMS TC.
C4-500 MMFD.	C18-.01 MFD.	R4-25 P. OHMS	R18-300 OHMS
C5-.1 MFD.	C19-100 MMFD.	R5-300 OHMS	R19-350 OHMS
C6-.05 MFD.	C20-.25 MFD.	R6-30 M OHMS	R20-40 OHMS
C7-50 MMFD.	C21-.005 MFD.	R7-250 M OHMS TC.	R21-75 OHMS
C8-.1 MFD.	C22-.05 MFD.	R8-1 MEGOHM	
C9-.004 MFD.	C23-10 MFD.	R9-1 MEGOHM	
C10-5 MMFD.	C24-20 MFD.	R10-5 MEGOHMS	L1-350 OHMS
C11-5 MMFD.	C25-5 MFD.	R11-50 M OHMS	L1'-15 OHMS
C12-.05 MFD.	C26-.05 MFD.	R12-5 MEGOHMS	L2-2000 OHMS
C13-1 MFD.		R13-100 M OHMS	SPKRN FIELD.
CM-100 MMFD.		R14-1 MEGOHM	



FAIRBANKS-MORSE
HOME APPLIANCES, INC.
SD-11635

PARTS LIST MODEL 62

Part Number	Description	List Price	Part Number	Description	List Price
A-14715	I. F. Transformer, First	\$ 2.00	V-6507	Tone Control and Switch, 50,000 ohms	1.20
A-14716	I. F. Transformer, Second	2.00	V-6508	Volume Control, 250,000 ohms	.80
A-14853	Coil Assembly in Can, Antenna	3.00	R-846	Resistor, 300 ohms 1/2 watt	.20
A-14854	Coil Assembly in Can, Oscillator	3.00	R-1116	Resistor, 25,000 ohms 1/2 watt	.20
A-14855	Coil Assembly in Can, R. F.	3.00	R-1146	Resistor, 50,000 ohms 1/2 watt	.20
14851	Choke Coil, Iron Core, Tapped	2.80	R-1191	Resistor, 100,000 ohms 1/2 watt	.20
14728	Dial Assembly complete	2.50	R-1256	Resistor, 250,000 ohms 1/2 watt	.20
14729	Dial Drive Roller (small)	.25	R-1296	Resistor, 1 Megohm 1/2 watt	.20
14730	Dial Drive Spring	.25	R-1311	Resistor, 2 Megohm 1/2 watt	.20
14731	Dial Drive Shaft	.50	R-1331	Resistor, 5 Megohm 1/2 watt	.20
14856	Dial Seals, Calibrated	.75	R-1446	Resistor, 300 ohms 1/2 watt	.20
14704	Dial Face, extruded celluloid	.50	R-1451	Resistor, 350 ohms 1/2 watt	.20
14404	Dial Escutcheon	1.00	R-1491	Resistor, 1000 ohms 1/2 watt	.20
14720	Pilot Lamp 6-8 Volt Tubular	.10	R-1701	Resistor, 20,000 ohms 1/2 watt	.20
14849	Pilot Lamp Leads, 2 Conductor Tinsel	.25	R-1716	Resistor, 25,000 ohms 1/2 watt	.20
K-868	Knob, Inlaid Wood	.20	R-5010	Resistor, 75 and 40 ohms, metal clad	.50
K-551	Knob, Black Bakelite	.20	14702	Condenser, Variable, 3 gang	4.50
X-7220	Screw, Chassis Mounting, 10-24 x 7/8"	.05	C-212	Condenser, trimmer strip, 3 gang	.60
X-7228	Screw, Decorative Head, 8-32 x 1"	.05	EL-25	Condenser, Dry Electrolytic	2.25
P-625	Tip Jack with washers	.10	EC-7	Condenser, .25 Mfd., 300 volt, Tubular	.30
S-5907	Socket, Speaker	.10	EC-5	Condenser, .1 Mfd., 300 volt, Tubular	.25
S-5918	Socket, 6D6	.10	EC-2	Condenser, .01 Mfd., 400 volt, Tubular	.20
S-5919	Socket, 6A7	.10	EC-4	Condenser, .05 Mfd., 400 volt, Tubular	.20
S-5920	Socket, 6B7	.10	EC-26	Condenser, .05 Mfd., 300 volt, Tubular	.20
S-5922	Socket, 43	.10	EC-12	Condenser, .006 Mfd., 400 volt, Tubular	.20
S-5923	Socket, 25Z5	.10	C-310	Condenser, 50 Mmfd., Moulded	.20
S-5819	Shield Base, Vacuum Tube	.05	C-307	Condenser, 100 Mmfd., Moulded	.20
S-5820	Shield, Vacuum Tube	.15	C-305	Condenser, 200 Mmfd., Moulded	.20
S-5821	Shield Cap, Vacuum Tube	.05	C-313	Condenser, .001 Mfd., Moulded	.25
R-5009	Terminal Strip, Common, Metal Clad	.15	C-320	Condenser, .004 Mfd., Moulded	.25
SW-6102	Switch, Selectivity	.30	14863	Alignment Jig	2.25
14852	Switch, Band Selector	3.50	T-698	Alignment Tool, Insulated	1.50
14852	Switch, AC-DC	1.25	14857	Dynamic Speaker, 6 inch, 2000 ohm Field	8.00
14857	Power Cord and Plug, 110-120 Volt	2.00	14866	Dynamic Speaker, 8 inch, 2000 ohm Field	12.00
14854	Adapter Cord and Plugs, 220-240 Volt	1.50			

SPEAKER CONES

Speaker cones cannot be supplied. Speakers on which cones have been damaged will be repaired at the following list prices:

6 inch speaker cone repair	\$2.50
8 inch speaker cone repair	2.50

We reserve the right to make changes in specifications and prices at any time without incurring any obligation on parts or sets previously sold. All sets are subject to standard RMA or Code guarantees.

MODELS 6210, 6244

Chassis 62

Voltage

Alignment

FAIRBANKS-MORSE HOME APP., INC.

Line Voltage 110 Volts AC or DC

Tube	AC OR DC	Plate	Screen	Grid	Osc. Plate	Osc. Grid
6D6 R.P.	AC DC	100 80	100 80	— —		
6A7 Det. Osc.	AC DC	105 85	80 40	— —	105 85	15 to 10 5 to 10
6D6 I.F.	AC DC	105 85	105 85	— —		
6B7 A.F.	AC DC	85 80	85 80	— —		
43 A.F.	AC DC	105 85	105 85	—10 —10		
25Z5 Rect.	AC	From P5 to P6 From P6 to P2 From P2 to P3	90 V.D.C. 200 V.D.C. 115 V.D.C.			See schematic diagram for reference points

MEASURED VOLTAGES

Model 62

All measurements made from cathode with 1000 ohms per volt meter. 300 volt scale.

The bands must be aligned in the following order: The 197 to 585 meter band first, the 810 to 2000 meter band second, and the 19 to 52 meter band third.

Bandpass Condensers: A dual padding or low frequency adjusting condenser is located on the left rear of the chassis. The adjusting nut and screw are accessible through a hole in the chassis. The hexagon nut is the adjustment for the 197 to 585 meter band. The center screw is the adjustment for the 810 to 2000 meter band.

- Place the alignment jig on the front of the chassis. Turn the gang condenser all the way out of mesh. Supply a 187 meter (1600 kilocycle) signal to the antenna of the set. Adjust the oscillator trimmer condenser for maximum output with minimum input from the service oscillator.
- Turn the gang condenser to 220 meters. Supply a 220 meter signal (1350 kilocycles) to the antenna of the set. Adjust the R. F. trimmer condenser for maximum output with minimum input from the service oscillator.
- Adjust the antenna trimmer condenser for maximum output with minimum input from the service oscillator. This trimmer is located on the front section of the gang condenser.
- Supply a 500 meter (600 kilocycle) signal to the antenna of the set. Tune the gang condenser to 500 meters. Adjust the low frequency padding condenser for maximum output with minimum input from the service oscillator. The gang condenser should be turned back and forth across the signal until this adjustment is being made to insure the peak of greatest intensity.

810 to 2000 Meter Band:

- Supply an 800 meter (375 kilocycle) signal to the antenna of the set. Turn the gang condenser all the way out of mesh. Adjust the oscillator trimmer for maximum output with minimum input from the service oscillator.
- Supply a 900 meter (335 kilocycle) signal to the antenna of the set. Tune the gang condenser to 900 meters. Adjust the R. F. trimmer condenser for maximum output with minimum input from the service oscillator.
- Adjust the antenna trimmer for maximum output with minimum input from the service oscillator.
- Supply an 1800 meter (167 kilocycle) signal to the antenna of the set. Tune the gang condenser to 1800 meters. Adjust the low frequency padding condenser for maximum output with minimum input from the service oscillator. The gang condenser should be turned back and forth, across the signal, while this adjustment is being made to insure the peak of greatest intensity.

19 to 52 Meter Band:

- Supply an 18.7 meter (16 megacycle) signal to the antenna of the set. Turn the gang condenser all the way out of mesh. Adjust the oscillator trimmer condenser for maximum output with minimum input from the service oscillator.
- Supply a 22 meter (13.6 megacycle) signal to the antenna of the set. Tune the gang condenser to 22 meters. Adjust the R. F. trimmer condenser for maximum output with minimum input from the service oscillator.
- Adjust the antenna trimmer condenser for maximum output with minimum input from the service oscillator.

DEAL CALIBRATION IN CABINET

After the set has been aligned in accordance with the foregoing instructions the dial readings will be approximately correct on all frequencies. When the chassis has been bolted down in the cabinet any differences in calibration can be adjusted by loosening the set screw in the travelite disc hub and turning the travelite disc until the reading is correct and then tightening the set screw.

ALIGNMENT PROCEDURE

General: To insure the performance the model 62 is capable of delivering the following instructions should be carefully studied before any adjustments are undertaken.

Proper adjustment of the various tuned circuits will only be possible through the use of a reliable all wave, service oscillator and an output meter.

The output meter should be connected across the secondary of the output transformers. The voice coil need not be disconnected but a larger meter indication will be obtained, on a given signal, when the voice coil is disconnected.

All adjustments should be made with the volume control "Full on". Any desired variations in signal strength should be obtained by adjusting the output of the service oscillator.

I. F. ALIGNMENT

General: All intermediate frequency alignments must be made with the band selector switch on the center position. The 197 to 585 meter band.

- Supply a 456 kilocycle signal, from an accurate service oscillator, to the grid of the 6A7 tube.
- Adjust the grid and plate circuit trimmer condensers, of the first I. F. transformer, for maximum output with minimum input from the service oscillator. The first I. F. transformer is located at the rear center of the chassis.
- Adjust the grid and plate circuit trimmer condensers of the second I. F. transformer for maximum output with minimum input from the service oscillator. The second I. F. transformer is located at the left of the gang condenser on the front of the chassis.

OSCILLATOR, R.F. AND ANTENNA ALIGNMENT

General: The adjustment condensers, or trimmers, for the antenna, R. F., and oscillator stages are located in the same shields that house the coils for these stages. These coils are contained in three large round shield cans located at the right of the gang condenser on the chassis. Three holes are located in the side of each of these cans, through each of which a trimmer adjusting screw is accessible. The center trimmer adjusting screw on the antenna coil is not used. When adjusting the antenna stage on the 197 to 585 meter band the trimmer located on the front section of the gang condenser should be used.

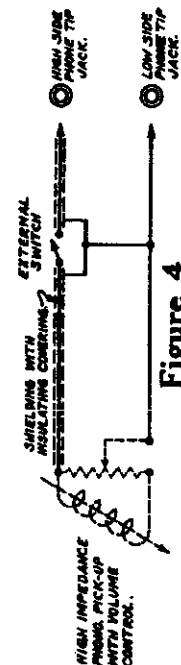


Figure 4

RECOMMENDED PHONO CONNECTIONS

On each coil can the upper screw is for the 810 to 2000 meter band, the center screw is for the 197 to 585 meter band, and the lower screw is for the 19 to 52 meter band.

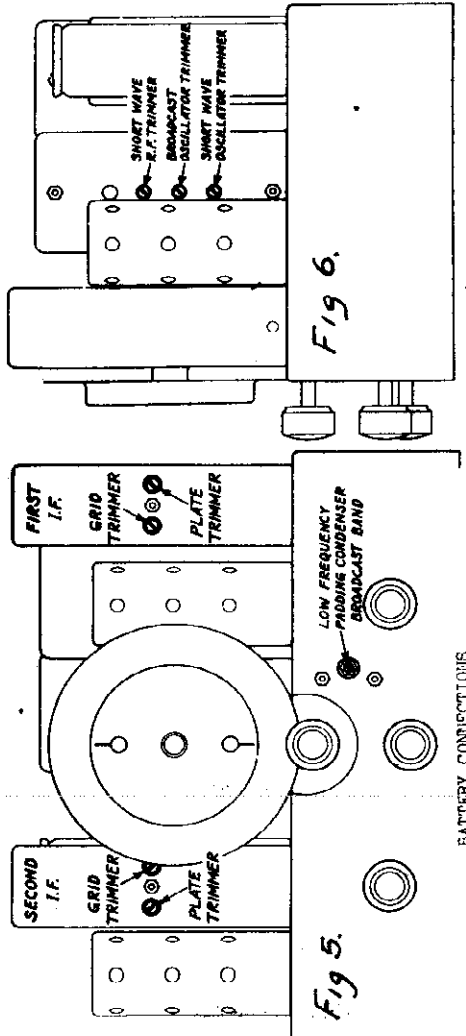
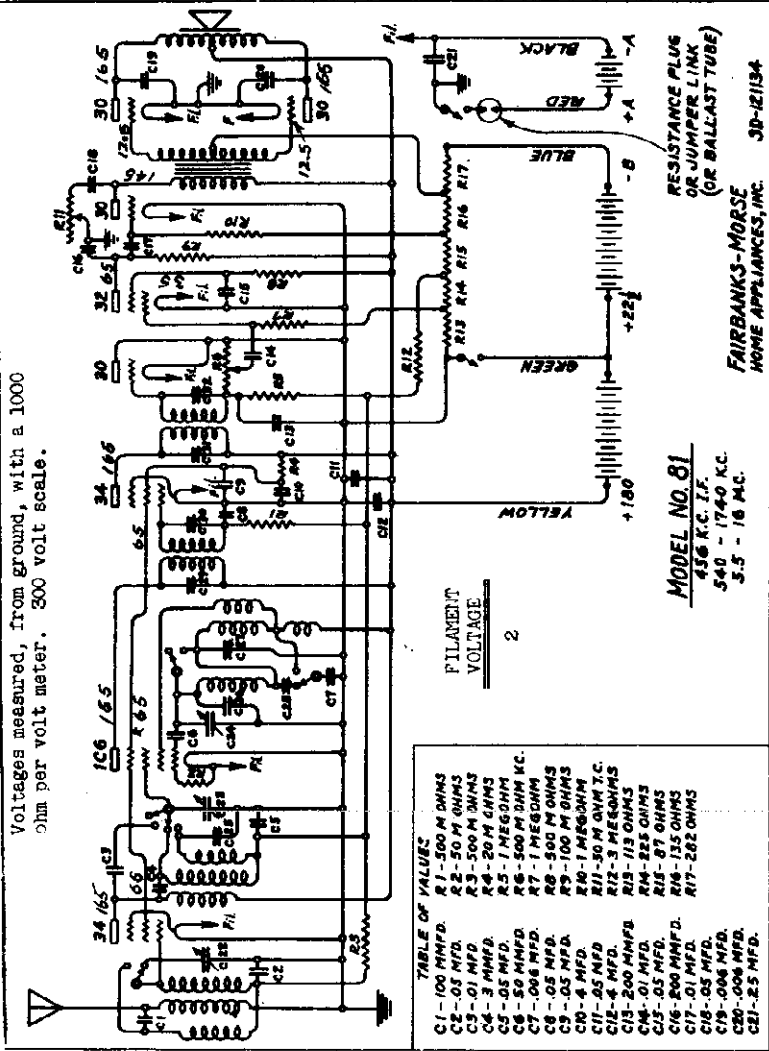
The first shield, from the front of the chassis contains the antenna coils and trimmers, the second or center shield contains the R. F. coils and trimmers, and the third or rear shield contains the oscillator coils and trimmers.

An alignment jig is available for use in aligning the various bands on the model 62. The part number of this jig is given in the parts list. It may be obtained through any Fairbanks-Morse Radio Agency.

FAIRBANKS-MORSE HOME APP., INC.

MODELS 8110, 8141
Chassis 81
Schematic, Parts

Part Number	Description	List Price
14808	First I. F. Transformer (square can)	1.50
14844	Second I. F. Transformer (round can)	3.00
14809	First I. F. Transformer	1.50
14813	R. F. and Osc. Coil Assembly	3.50
A-14722	Antenna Coil Assembly	3.00
A-14465	R. F. Plate Choke Assembly	1.00
A-14550	Osc. Plate Choke Assembly	1.00
14701	Band Selector Switch	1.00
14728	Dial Assembly Complete	2.50
14729	Dial Drive Roller (small)	.25
14730	Dial Drive Spring	.25
14731	Dial Drive Shaft	.50
14719	3 Conductor Dial Light Cable (tinsel)	.30
14404	Escutcheon for Dial	1.00
14706	Calibrated Dial Scale	.75
14704	Extruded celluloid Dial Face	.50
14806	2 Volt Tubular Pilot Lamp	.20
S-5907	Speaker Socket	.10
S-5927	30 Tube Socket	.10
S-5923	32 Tube Socket	.10
S-5923	34 Tube Socket	.10
S-5926	106 Tube Socket	.10
S-5930	Ballast Socket	.10
S-5819	Tube Shield	.05
S-5820	Tube Shield	.15
14807	5 Wire Battery Cable	.75
14802	Class "B" Input Transformer	4.00
X-7220	10-24 x 7/8" Chassis Mounting Screws	.05
K-7228	8-32 x 1" Decorative Head Screws	.05
K 868	Inlaid Wood Knobs	.20
14702	3 Gang Variable Condenser	4.50
C-213	Padding Condenser	1.00
EC-2	.01 Mfd. Tubular Condenser C-3, C-14, C-17	.20
EC-4	.06 Mfd. Tubular Condenser C-9, C-11, C-16, C-18	.20
EC-7	.25 Mfd. Tubular Condenser C-21	.30
EC-12	.005 Mfd. Tubular Condenser C-19, C-20	.20
EC-31	.003 Mfd. Tubular Condenser C-15, C-16	.20
C-305	200 MMfd. Moulded Condenser C-15, C-16	.20
C-307	100 MMfd. Moulded Condenser C-1	.20
C-312	50 MMfd. Moulded Condenser C-6	.20
V-6514	Volume Control and Dual Switch R-6	1.50
V-6504	Tone Control R-11	.50
R-1701	20000 Ohms, Carbon Resistor 1/2 Watt R-4	.20
R-1146	50000 Ohms, Carbon Resistor 1/4 Watt R-2	.20
R-1191	100000 Ohms, Carbon Resistor 1/4 Watt R-9	.20
R-1266	500000 Ohms, Carbon Resistor 1/4 Watt R-1, R-3, R-8	.20
R-1296	1 Megohm, Carbon Resistor 1/4 Watt R-6, R-7, R-10	.20
R-1326	3 Megohms, Carbon Resistor 1/4 Watt R-12	.20
R-5008	842 Ohms, Metal Clad Resistor R-13, to R-17	.75
14811	Jumper Link	.05
14805	Resistance Plug .55 Ohm	.30
6-1	Amperite Ballast Tube	1.75
14726	Alignment Jig	2.25
T-688	Insulated Alignment Tool	1.50
14803	6 1/2 Inch Special Class "B" Kinematic Speaker	5.00
14804	6 Inch Special Class "B" Kinematic Speaker	6.00



The Model 81 will operate equally well on an Air Amperite 6-1 ballast tube must be employed. Cell of a two volt storage battery for filament supply. A three volt dry battery may be used also but an Amperite 6-1 ballast tube must be employed.

MODELS 8110, 8141

Chassis 81

FAIRBANKS-MORSE HOME APP., INC.

Alignment, Data

ALIGNMENT PROCEDURE

The following instructions should be carefully studied before any alignment adjustments are attempted. All adjustments should be made with volume control "full on". Any desired variations in signal strength should be obtained by adjusting the output of the service oscillator.

I. F. ALIGNMENT

All Intermediate Frequency alignment adjustments must be made with the band selector switch in the broadcast (left hand) position.

1. Supply a 456 kilocycle signal to the grid of the 106 tube.
2. Adjust the Grid circuit and the plate circuit trimmer condensers of the first I. F. transformer, carefully, for maximum output with minimum input from the service oscillator (see Figure 6).
3. Repeat Number 2. on the second I. F. transformer.

R. F. AND OSCILLATOR ALIGNMENT

An alignment jig is available for use on the Model 81. The part number is 14728, it may be obtained from any Fairbanks-Morse jobber.

BROADCAST BAND

1. Place the alignment jig on the front of the chassis. Tune the gang condenser to 1400 Kilocycles. Supply a 1400 Kilocycle signal from the service oscillator to the antenna of the set. Adjust the broadcast band oscillator trimmer (see Figure 5) for maximum output with minimum input from the service oscillator. It is advisable to turn the gang condenser back and forth across the signal while this adjustment is being made to make sure the peak of greatest intensity is obtained. This is necessary to bring the oscillator into track with the R.F. circuit since, in most cases, the R.F. circuit has no trimmer. If the dial reading is incorrect after this adjustment has been made the travelite disc should be adjusted until the reading is correct.

2. Adjust the broadcast band antenna trimmer (on gang condenser) for maximum output with minimum input from the service oscillator.

3. Supply a 600 Kilocycle signal to the antenna of the set. Turn the gang condenser to 600 Kilocycles. Adjust the low frequency padding condenser (Figure 6) for maximum output with minimum input from the service oscillator. While making this adjustment turn the gang condenser back and forth across the signal to make sure the peak of greatest intensity is obtained.

SHORT WAVE BAND

1. Supply a 15 megacycle signal to the antenna of the set. Turn the gang condenser to 15 megacycles. Adjust the short wave oscillator trimmer (Figure 5) for maximum output with minimum input from the service oscillator.

2. Adjust the short wave R. F. trimmer (Figure 5) for maximum output with minimum input from the service oscillator. While making this adjustment it is advisable to turn the gang condenser back and forth across the signal to make sure the peak of greatest intensity is obtained. This is desirable because of the reflected effect of the adjustment of one stage on the other.

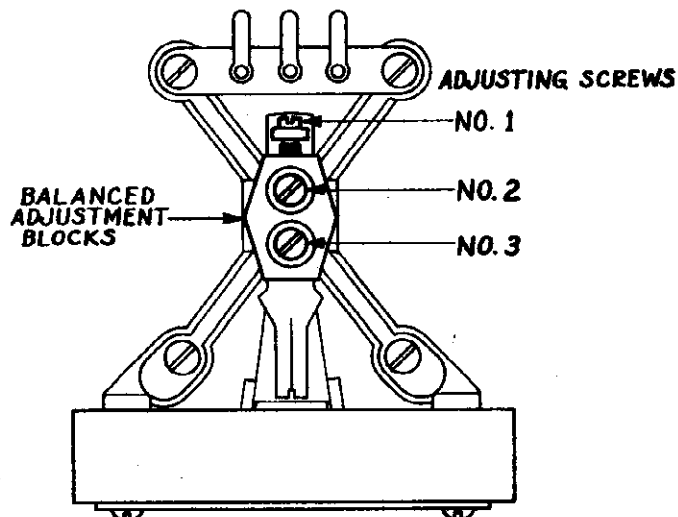
DIAL CALIBRATION IN CABINET

After the set has been aligned in accordance with the foregoing instructions the dial readings will be approximately correct on all frequencies. When the chassis is placed in the cabinet it should be bolted down and any differences in calibration should be adjusted by loosening the set screw in the travelite disc hub and turning the travelite disc until the reading is correct and then tightening the set screw.

SPEAKER ADJUSTMENT PROCEDURE

1. Loosen adjustment screw number two about one fourth turn (see Figure 4).
2. Turn screw number one (Figure 4) until the correct adjustment is obtained.
3. Tighten screw number two.

In extreme cases it may be necessary to reset the balanced adjustment blocks (see Figure 4). This can be accomplished by turning screws number two and three. Loosen either screw number two or three about one fourth turn. Tighten the other screw the same amount. If this does not correct the condition the procedure should be reversed.



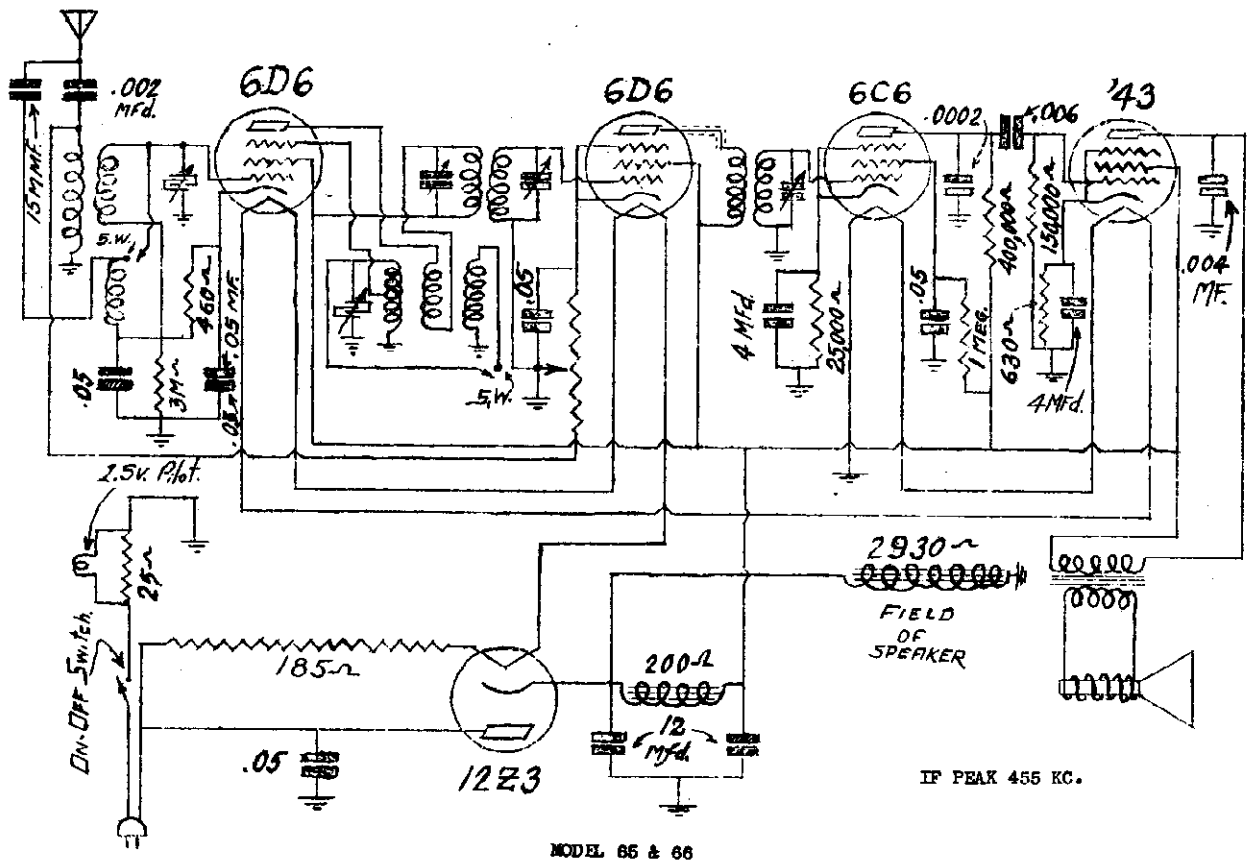
SPEAKER UNIT

Figure 4

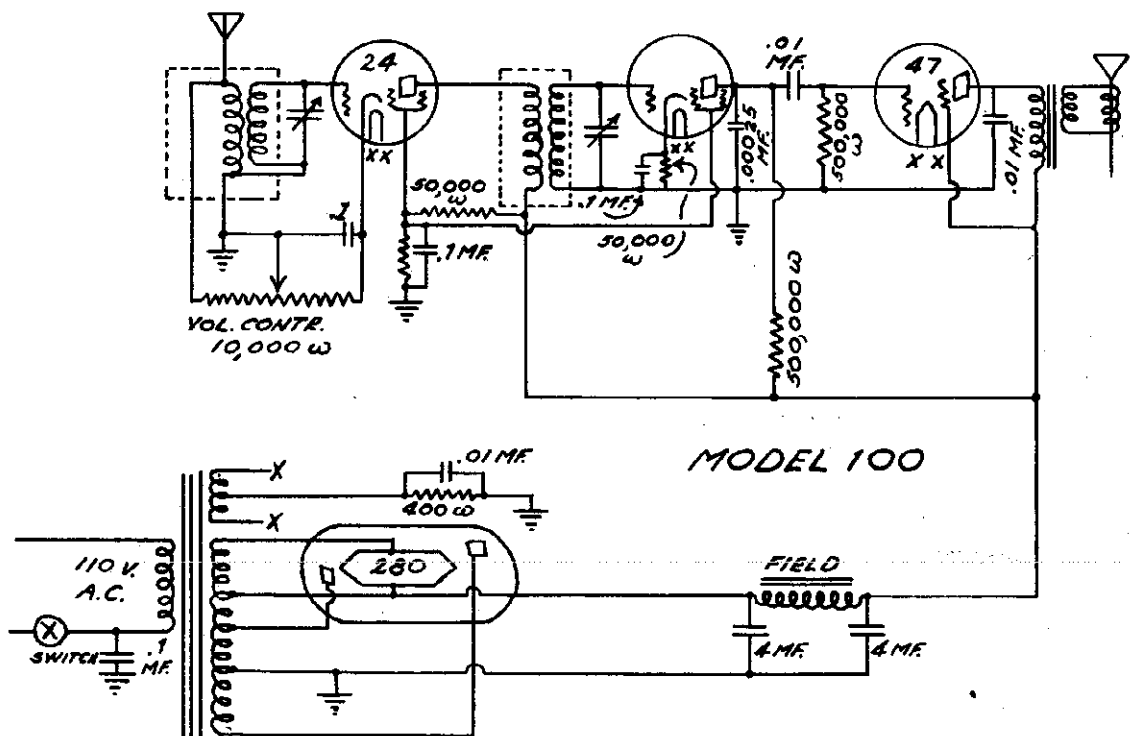
MODEL 81 CHASSIS

The Model 81 is a battery operated, standard and short wave broadcast superheterodyne chassis covering frequency ranges of 540 to 1740 kilocycles and 5.5 to 16 megacycles. Several outstanding battery set developments are incorporated. These include a multi-purpose pentagrid converter; full automatic volume control; new type, high efficiency intermediate frequency transformers; individual low loss, radio frequency coils; class "B" output stage; and a new style, high efficiency, speaker.

FEDERATED PURCHASER



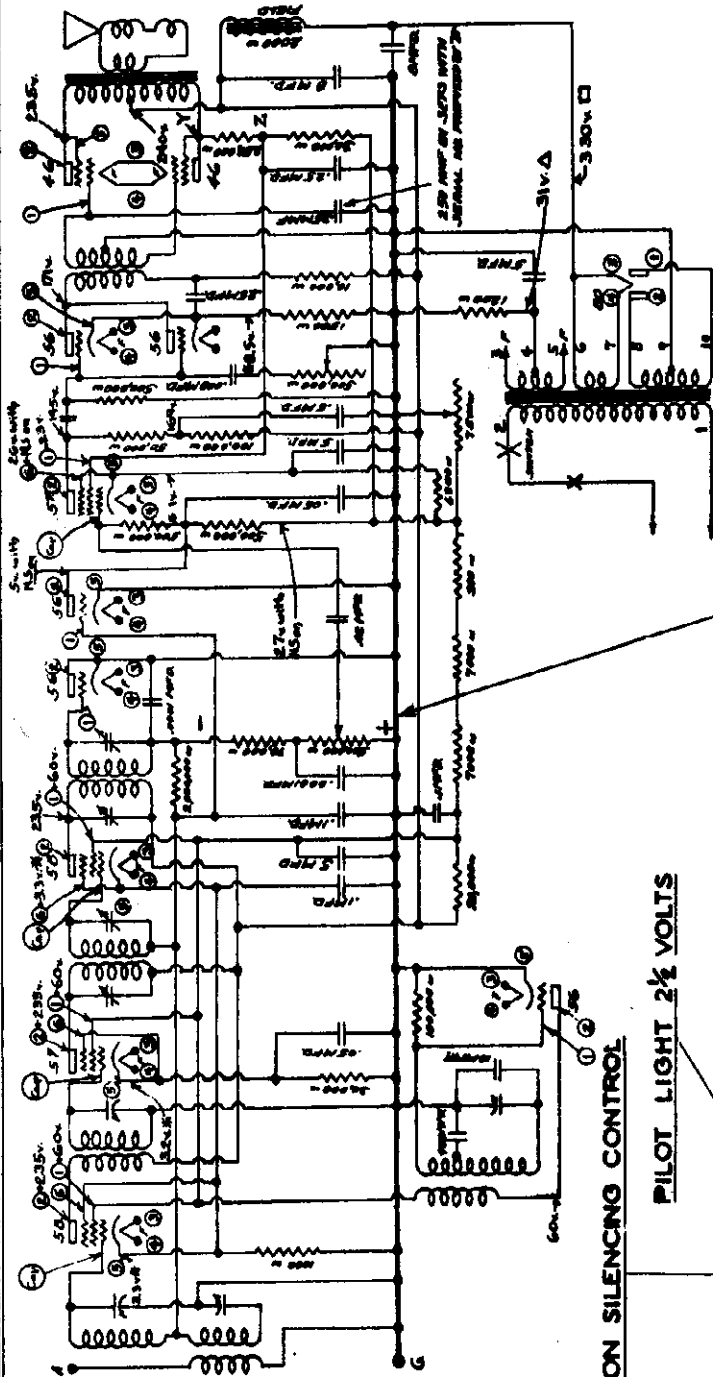
MODEL 65 & 66



MODEL 100

MODELS 79,80
Schematic
Voltage, Socket

FEDERATED PURCHASER



1	2	3	4	5	6	7	8	9	10	11	12
100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K

POWER TRANSFORMER
TERMINAL BOARD

NOTE - ALL VOLTAGES TAKEN FROM THIS POINT. ALL VOLTAGE READINGS LISTED ARE TAKEN WITH ALL CONTROLS TURNED ON FULL AND NO SIGNAL. USE 1000 OHMS PER VOLT VOLTMETER.
 □ INDICATES 600V SCALE Δ = 120V * = 10V.
 LINE = 115V 60 CYCLE.
 INTERMEDIATE FREQUENCY = 175 K.C.
 NUMBERS IN CIRCLES INDICATE TUBE ELEMENT IN ACCORDANCE WITH R.C.A. RADIOTRON PINBASE LAYOUT.

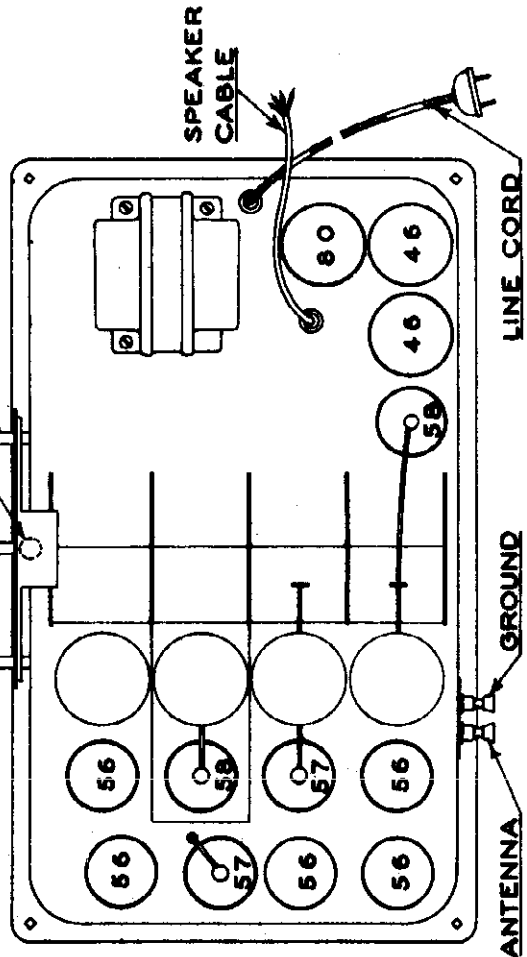
NS or INTER-STATION SILENCING CONTROL

TUNING CONTROL

VOLUME CONTROL

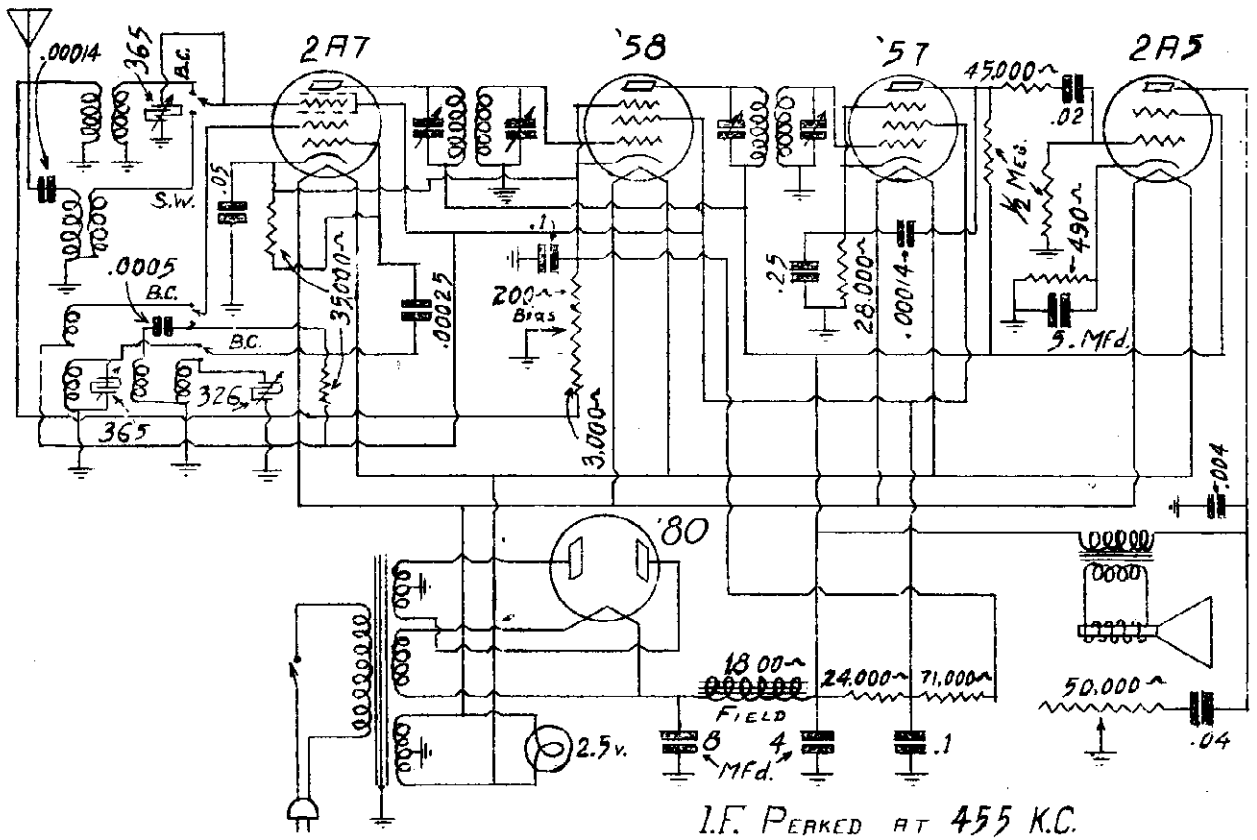
PILOT LIGHT 2 1/2 VOLTS

STONE CONTROL



FEDERATED PURCHASER

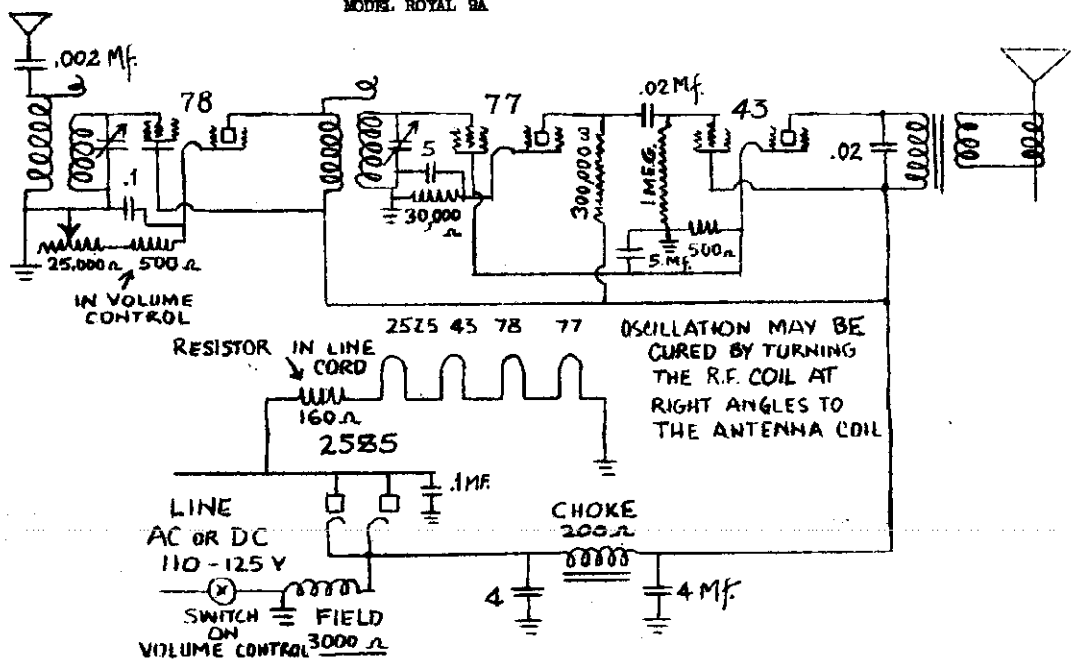
MODEL 88
MODEL Royal 9A
Schematics



MODEL 88

STENCIL 147

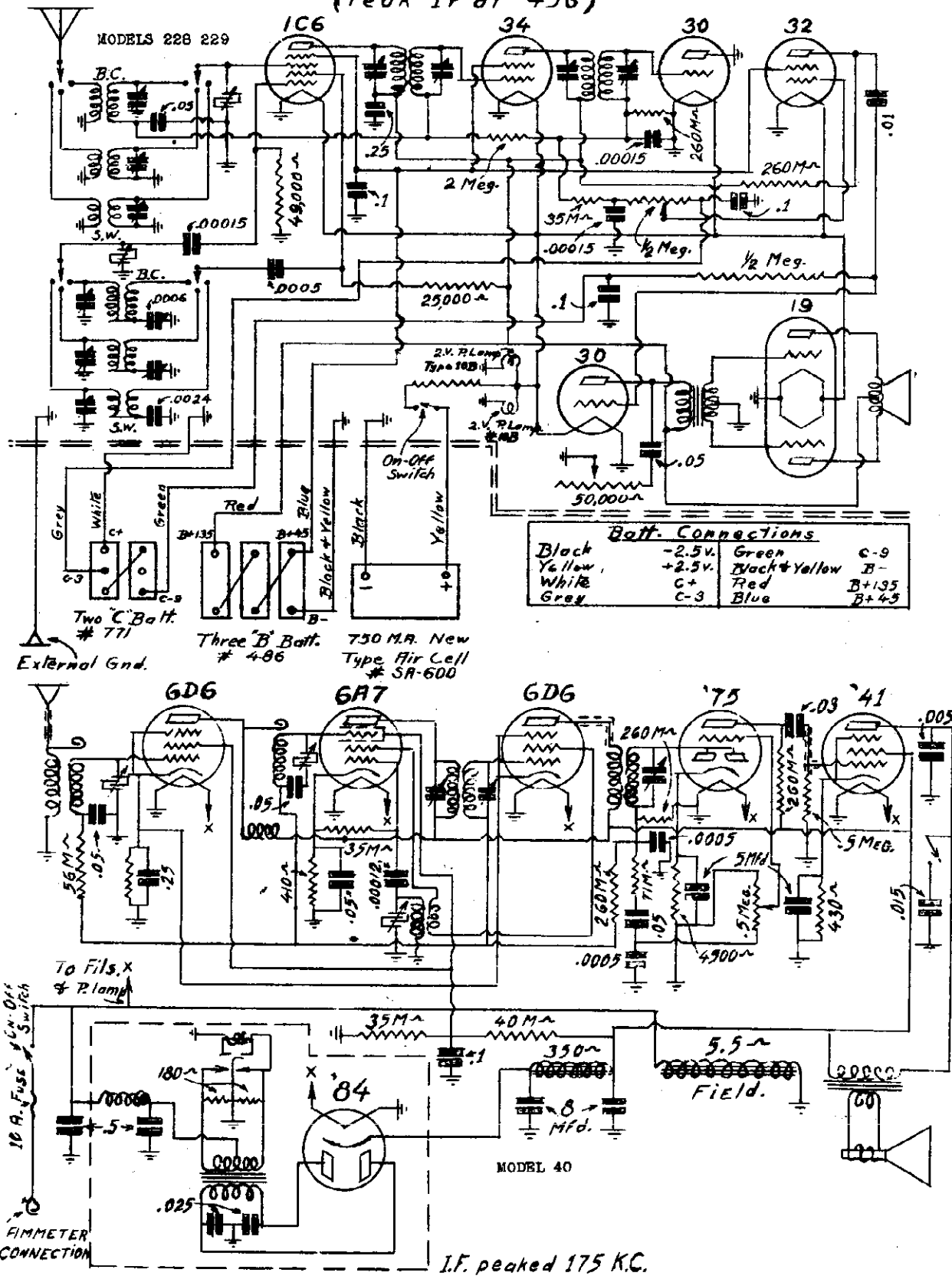
MODEL ROYAL 9A

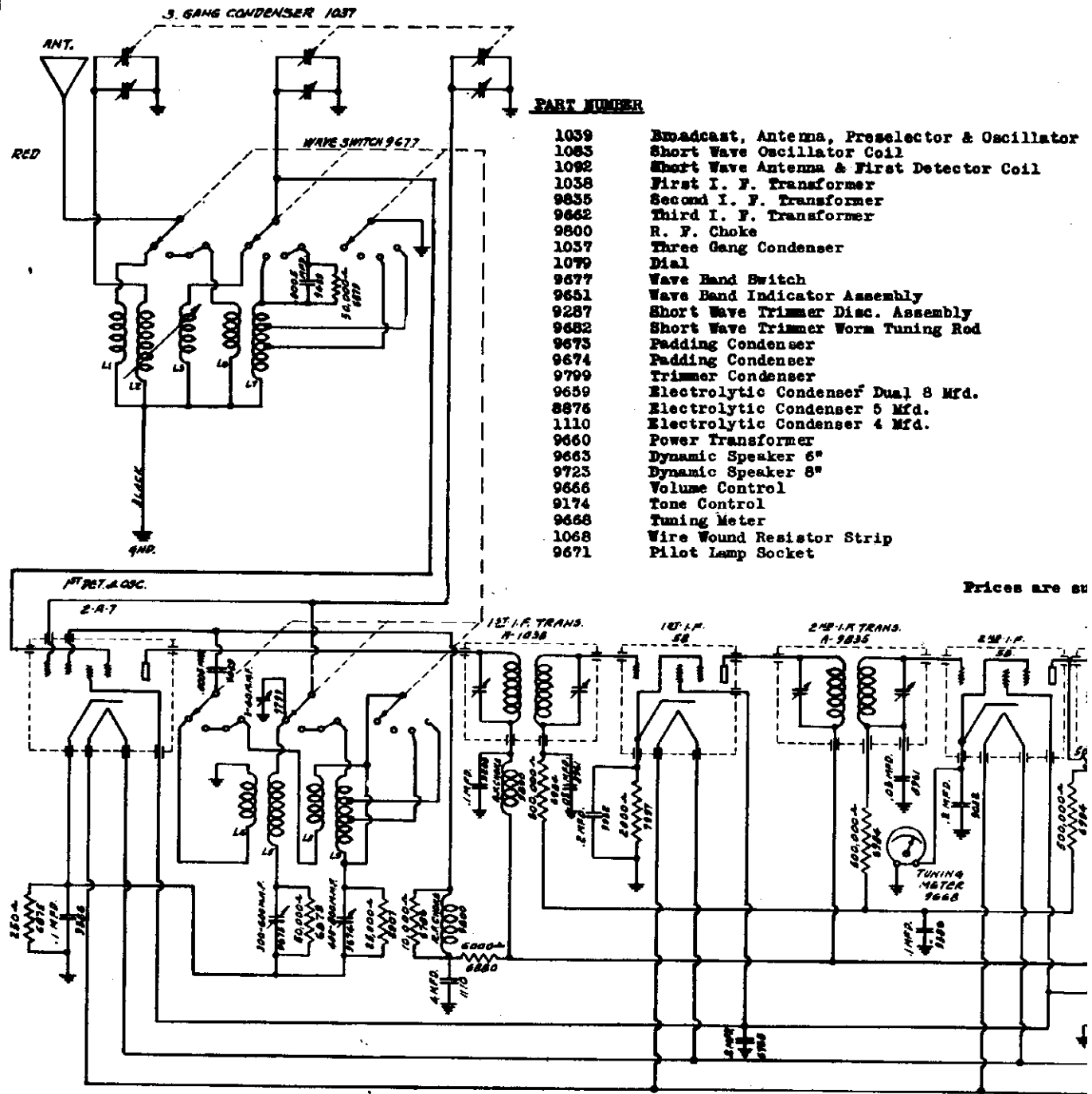


MODEL 40
MODELS 228,229
Schematics

FEDERATED PURCHASER

(Peak IF at 456)





- PART NUMBER**
- 1039 Broadcast, Antenna, Preselector & Oscillator
 - 1083 Short Wave Oscillator Coil
 - 1092 Short Wave Antenna & First Detector Coil
 - 1038 First I. F. Transformer
 - 9835 Second I. F. Transformer
 - 9862 Third I. F. Transformer
 - 9800 R. F. Choke
 - 1037 Three Gang Condenser
 - 1079 Dial
 - 9677 Wave Band Switch
 - 9651 Wave Band Indicator Assembly
 - 9287 Short Wave Trimmer Disc. Assembly
 - 9682 Short Wave Trimmer Worm Tuning Rod
 - 9673 Padding Condenser
 - 9674 Padding Condenser
 - 9799 Trimmer Condenser
 - 9659 Electrolytic Condenser Dual 8 Mfd.
 - 8876 Electrolytic Condenser 5 Mfd.
 - 1110 Electrolytic Condenser 4 Mfd.
 - 9660 Power Transformer
 - 9663 Dynamic Speaker 6"
 - 9723 Dynamic Speaker 8"
 - 9666 Volume Control
 - 9174 Tone Control
 - 9668 Tuning Meter
 - 1068 Wire Wound Resistor Strip
 - 9671 Pilot Lamp Socket

Prices are su

L₁ L₂ L₃ L₄ L₅ = BROADCAST PRESELECTOR & OSCILLATOR COIL ASSEMBLY 1039
 L₁ L₁ = SHORT WAVE ANTENNA & 1ST DETECTOR COIL ASSEMBLY A-1092
 L₁ L₁ = SHORT WAVE OSCILLATOR COIL A-1083

NOTE:
 1. DOTTED LINES DENOTE
 2. ALL NOS. SHOWN ARE
 3. NUMBERS SHOWN IN
 4. WHEN PROVISION A
 CONNECTION IS MADE
 5. I. F. = 465 K.C.

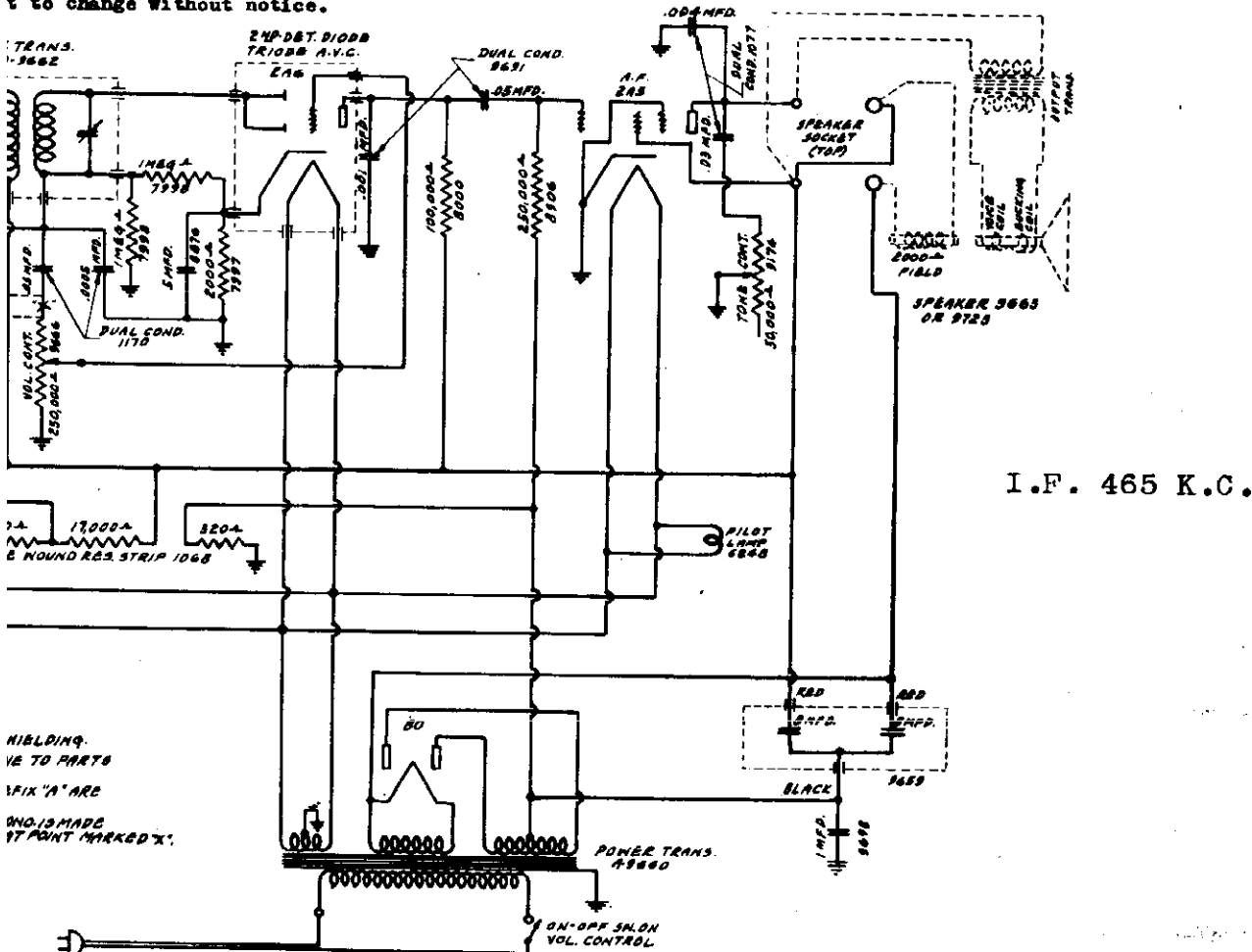
PURCHASER

MODEL 117
Schematic
Parts List

PARTS & PRICE LIST
for the
SIX TUBE SUPERHETERODYNE RECEIVER
24 Megacycles to 540 Kilocycles

LIST PRICE			
\$ 2.75	6248	2.5 Volt Pilot Lamp Bulb	.17
.75	8980	Tube Shield	.11
.75	9082	Tube Shield Cap	.04
2.20	9459	.0005 Mfd. Moulded Condenser	.21
2.20	9698	1 Mfd. 100 Volt Condenser	.56
2.05	9203	.1 Mfd. 400 Volt Condenser	.21
.83	9386	.1 Mfd. 200 Volt Condenser	.19
4.25	8961	.05 Mfd. 400 Volt Condenser	.18
.61	1077	.03 Mfd. & .004 Mfd. 400 Volt Condenser	.62
3.58	1170	.0005 Mfd. & .05 Mfd. 400 Volt Condenser	.34
1.10	9691	.001 Mfd. & .05 Mfd. 400 Volt Condenser	.39
.39	6765	.2 Mfd. 400 Volt Condenser	.26
.88	9032	.2 Mfd. 200 Volt Condenser	.25
.50	6984	500,000 Ohm 1/3 Watt Resistor	.19
.15	8000	100,000 Ohm 1/3 Watt Resistor	.19
2.80	6879	50,000 Ohm 1/3 Watt Resistor	.19
.72	8907	25,000 Ohm 1/3 Watt Resistor	.19
1.14	6875	250 Ohm 1/3 Watt Resistor	.19
4.02	7997	2,000 Ohm 1/3 Watt Resistor	.19
9.79	6786	10,000 Ohm 1/3 Watt Resistor	.19
12.00	7998	1 Meg Ohm 1/3 Watt Resistor	.19
1.27	8906	250,000 Ohm 1/3 Watt Resistor	.19
.94	6880	6,000 Ohm 1/3 Watt Resistor	.19
2.75	6576	Phone Jacks	.14
.96	6123	S.P.D.T. Phone-Radio Switch	.55
.09	9889	Tuning Control Knob	.22
	9889	Tone Control Knob	.22
	9887	Short Wave Switch Control Knob	.22
	9886	Volume Control Knob	.22
	9888	Short Wave Trimmer Knob	.22

to change without notice.



WELDING
VE TO PARTS
IFIX "A" ARE
AND IS MADE
AT POINT MARKED "X"

FEDERATED PURCHASER

MODEL 117
Voltage
Alignment

SHORT WAVE TRIMMER: A short wave trimmer control is incorporated in the receiver and is used for a fine tuning adjustment when tuning for short wave reception from 1.5 megacycles to 24 megacycles. The band selector switch knob consists of two sections. The small front section knob is used for adjusting the short wave trimmer and the large rear section is the band selector switch knob. When tuning for short wave reception always rotate the tuning control slowly until a station is heard with maximum volume. Don't hurriedly skim over the dial or pass up any weak signals. After adjusting the tuning control so as to bring the station in at its loudest point adjust the short wave trimmer control by turning the trimmer knob first in the clockwise and then in the counter-clockwise direction to the position of greatest volume. Occasionally after tuning in this manner still better results may be obtained by readjusting the tuning control, and then further fine adjustment should be made with the short wave trimmer for maximum volume. It may be found that when adjusting the short wave trimmer that the signal will disappear, indicated by the elimination of signal, static and background noises. Rotating the short wave trimmer control slightly either clockwise or counter-clockwise will bring the signal in again. When operating the receiver on the broadcast band (1500 K.C. to 540 K.C.) the trimmer is inoperative.

VOLTAGE TABLE

TUBE	Fil.	Plate	Screen	Cathode Volts	Line Voltage : 115		
					Grid No. 1	Grid No. 2	Grid No. 3 & 5
2A7 Oscillator 1st Detector	2.45	220		2.2	3.5	200	90
58 First I. F. Amplifier	2.45	220	90	6			
58 Second I. F. Amplifier	2.45	220	90	3.5			
2A6 Second Detector	2.45	120##		1			
2A5 Output	2.45	210	220				
80 Rectifier	4.89						

Triode Plate. Comparative voltage only. The voltmeter is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

ALIGNMENT PROCEDURE: Only when an antenna, oscillator or I. F. transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 2A7 First Detector tube, leaving the grid clip disconnected. 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 the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter, then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.
4. The second and third I. F. transformers should next be adjusted in the same manner as the first I.F. transformer.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning the variable condenser and padding condensers to follow the procedure given carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the antenna and the ground to the chassis.
2. Place the band selector switch for operation on the 1.5 to 4 megacycle band. Tune the receiver to exactly 1.7 megacycles on the dial, set the short wave trimmer about half the distance between maximum clockwise and counter-clockwise rotation and adjust the oscillator frequency to exactly 1.7 megacycles. Next, bring this 1.7 megacycle signal in to maximum output by adjusting the padding condenser accessible through the hole in the right hand side and closest to the rear of the chassis.
3. Leave the band selector switch for operation on the 1.5 to 4 megacycle band and tune the receiver to exactly 3.4 megacycles on the dial. Next, set the test oscillator to exactly 3.4 megacycles and tune the signal in by adjusting the oscillator variable condenser trimmer mounted on top of the variable condenser. The middle section of the variable condenser is the oscillator section. Recheck the 1.7 megacycle adjustment after making the adjustment at 4 megacycles. For best results it is always advisable to check each adjustment several times. **NOTE:** This completes the short wave adjustment.

4. Adjust the band selector switch for operation on the broadcast band (1500 to 540 kilocycles) and tune the receiver to exactly 1400 kilocycles on the dial and set the oscillator to this frequency. Turn the receiver on and bring this 1400 kilocycle signal in to maximum output by adjusting the trimmer screw on the small trimmer, which is located adjacent to the short wave switch underneath the chassis.

Next, adjust the antenna and preselector variable condenser section trimmers mounted on top of the variable condenser for maximum signal output. (These are the front and rear gang sections).

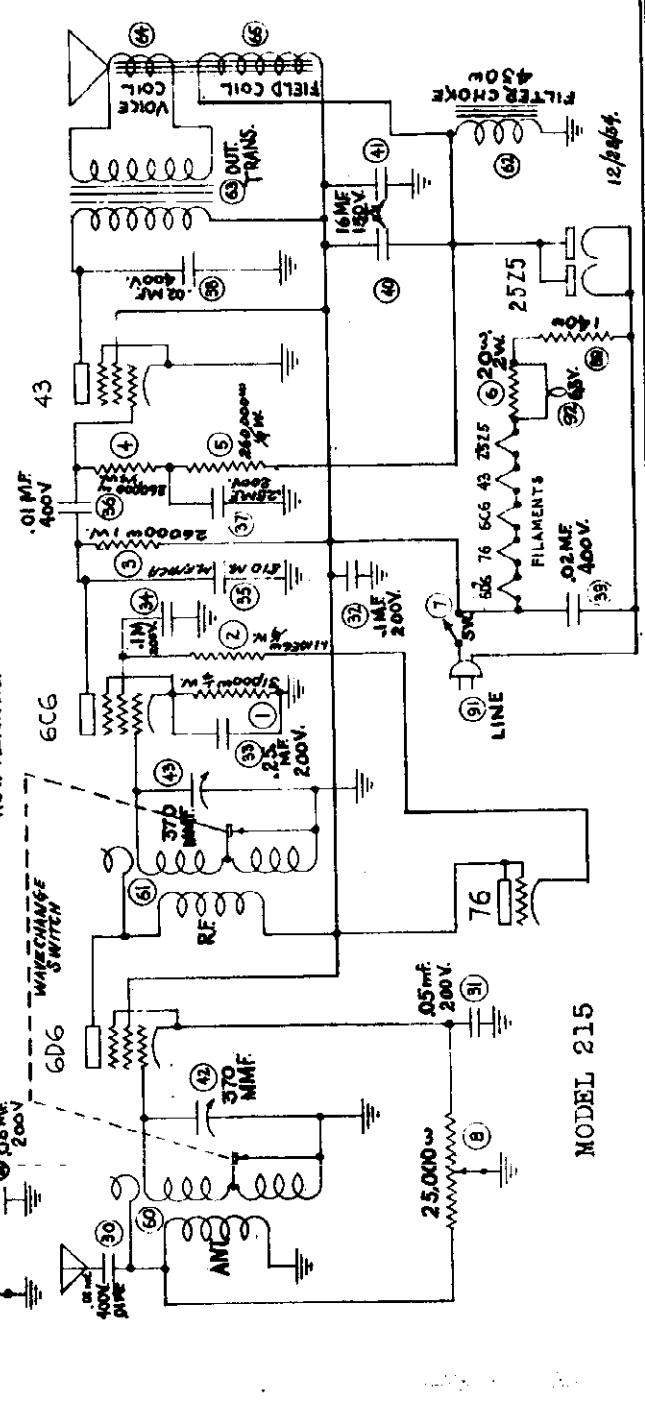
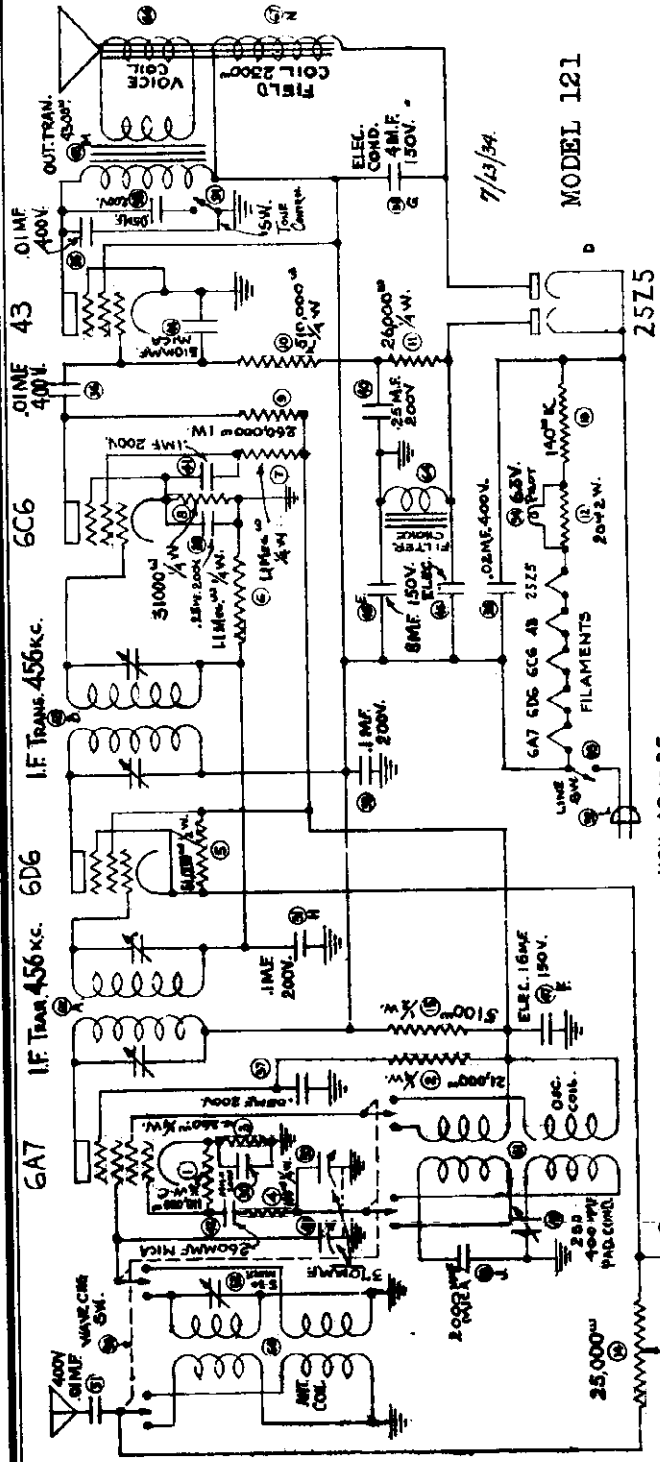
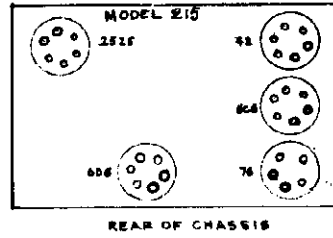
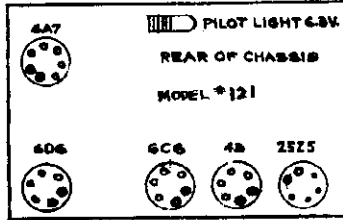
5. Leave the band selector switch for operation on the broadcast band (1500 to 540 kilocycles) and tune the receiver and oscillator to approximately 600 kilocycles. Then adjust the 600 kilocycle padding condenser which is located on the right hand side and towards the front of the chassis for maximum output reading. This adjustment is quite critical and it is necessary to rock the condenser slightly to the right and left to obtain maximum sensitivity.

Always recheck the 1400 kilocycle alignment after making the adjustment at 600 kilocycles.

MODEL 121
 MODEL 215
 Schematics
 Socket Layouts

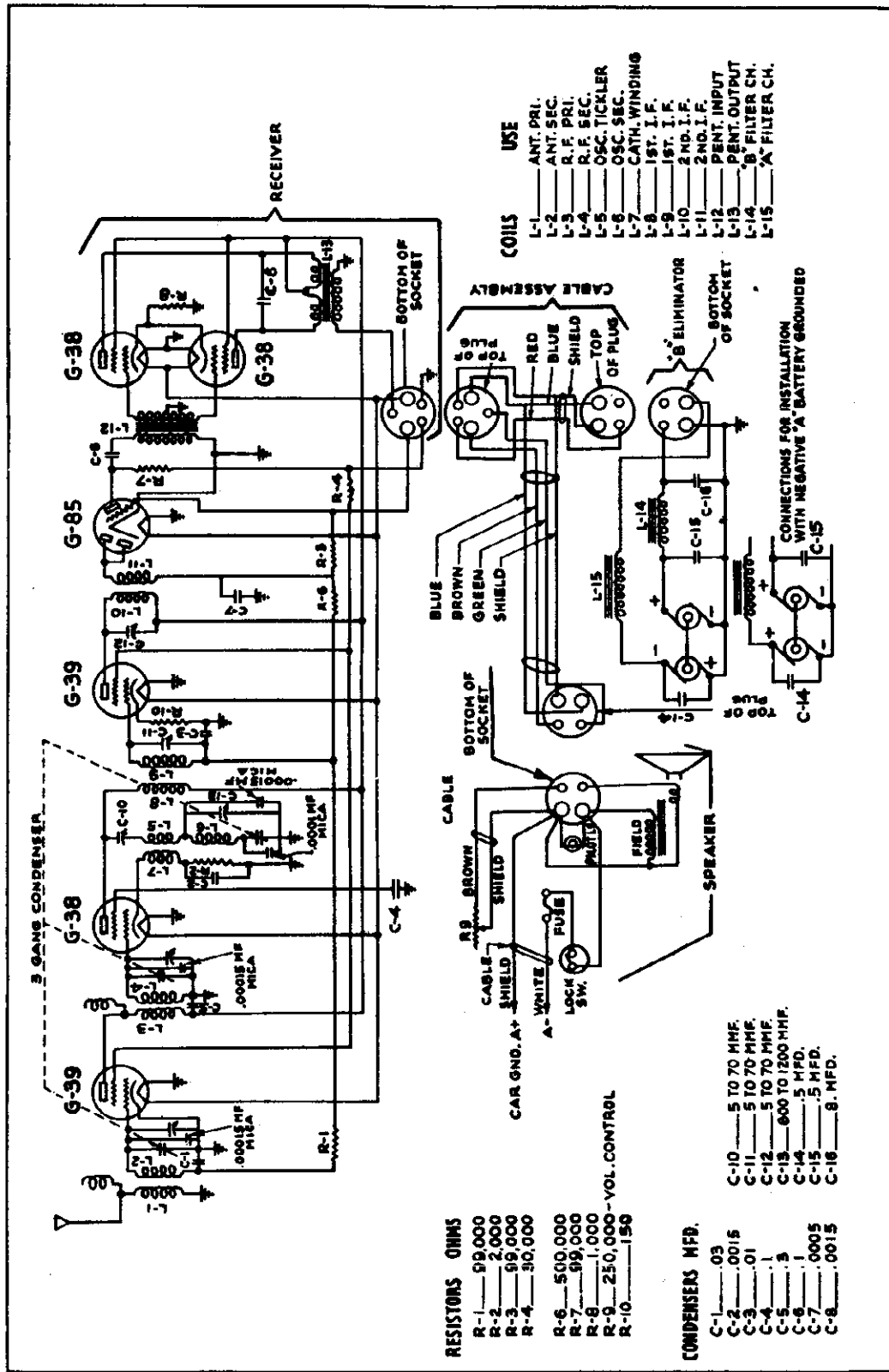
FEDERATED PURCHASER

REV.	DATE	DESCRIPTION
1	10/15/34	INITIAL
2	11/15/34	REVISIONS
3	12/15/34	REVISIONS
4	1/15/35	REVISIONS
5	2/15/35	REVISIONS
6	3/15/35	REVISIONS
7	4/15/35	REVISIONS
8	5/15/35	REVISIONS
9	6/15/35	REVISIONS
10	7/15/35	REVISIONS
11	8/15/35	REVISIONS
12	9/15/35	REVISIONS
13	10/15/35	REVISIONS
14	11/15/35	REVISIONS
15	12/15/35	REVISIONS
16	1/15/36	REVISIONS
17	2/15/36	REVISIONS
18	3/15/36	REVISIONS
19	4/15/36	REVISIONS
20	5/15/36	REVISIONS
21	6/15/36	REVISIONS
22	7/15/36	REVISIONS
23	8/15/36	REVISIONS
24	9/15/36	REVISIONS
25	10/15/36	REVISIONS
26	11/15/36	REVISIONS
27	12/15/36	REVISIONS
28	1/15/37	REVISIONS
29	2/15/37	REVISIONS
30	3/15/37	REVISIONS
31	4/15/37	REVISIONS
32	5/15/37	REVISIONS
33	6/15/37	REVISIONS
34	7/15/37	REVISIONS
35	8/15/37	REVISIONS
36	9/15/37	REVISIONS
37	10/15/37	REVISIONS
38	11/15/37	REVISIONS
39	12/15/37	REVISIONS
40	1/15/38	REVISIONS
41	2/15/38	REVISIONS
42	3/15/38	REVISIONS
43	4/15/38	REVISIONS
44	5/15/38	REVISIONS
45	6/15/38	REVISIONS
46	7/15/38	REVISIONS
47	8/15/38	REVISIONS
48	9/15/38	REVISIONS
49	10/15/38	REVISIONS
50	11/15/38	REVISIONS
51	12/15/38	REVISIONS
52	1/15/39	REVISIONS
53	2/15/39	REVISIONS
54	3/15/39	REVISIONS
55	4/15/39	REVISIONS
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63	12/15/39	REVISIONS
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73	10/15/40	REVISIONS
74	11/15/40	REVISIONS
75	12/15/40	REVISIONS
76	1/15/41	REVISIONS
77	2/15/41	REVISIONS
78	3/15/41	REVISIONS
79	4/15/41	REVISIONS
80	5/15/41	REVISIONS
81	6/15/41	REVISIONS
82	7/15/41	REVISIONS
83	8/15/41	REVISIONS
84	9/15/41	REVISIONS
85	10/15/41	REVISIONS
86	11/15/41	REVISIONS
87	12/15/41	REVISIONS
88	1/15/42	REVISIONS
89	2/15/42	REVISIONS
90	3/15/42	REVISIONS
91	4/15/42	REVISIONS
92	5/15/42	REVISIONS
93	6/15/42	REVISIONS
94	7/15/42	REVISIONS
95	8/15/42	REVISIONS
96	9/15/42	REVISIONS
97	10/15/42	REVISIONS
98	11/15/42	REVISIONS
99	12/15/42	REVISIONS
100	1/15/43	REVISIONS



FORD MOTOR CAR CO.

MODEL Ford Police
Auto Radio
Built by Grigsby-Grumow
Schematic



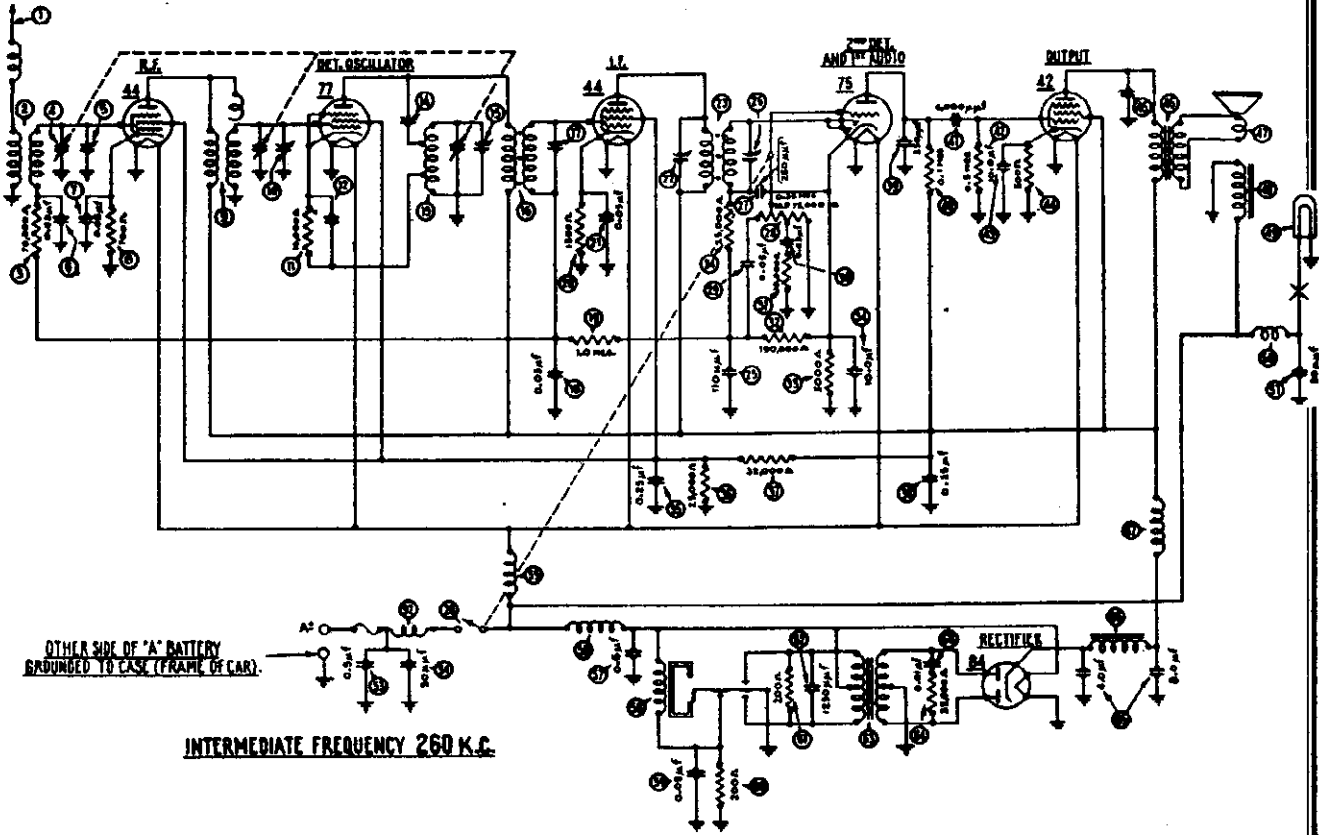
FORD TYPE POLICE AUTO RADIO RECEIVER WITH MOTOR-GENERATOR "B" SUPPLY

Model N, Center Control
Schematic
Parts List

FORD MOTOR CAR CO.

FORD CENTER CONTROL TYPE RADIO

Model N - Schematic Wiring Diagram



Model N Parts List

No. Shown on Schematic	Description	Part No.	No. Shown on Schematic	Description	Part No.	No. Shown on Schematic	Description	Part No.
1	Antenna Choke	32-1372	24	Resistor (25,000 ohms)	33-1013	67	Cone and Voice Coil	02861
2	Antenna Transformer	32-1331	25	Condenser (110 mmfd.)	30-1031	68	Field Coil Assembly	36-3097
3	Resistor (70,000 ohms)	33-1115	26	Padder (Sec. 2nd I. F. Trans.)		69	Pilot Lamp	34-2038
4	Tuning Condenser	31-1166	27	Condenser (250 mmfd.)	30-1032	70	Interference Choke	32-1374
5	1st Padder (on tun. cond.)		28	Vol. Con. & Switch Assm.	33-5067	71	Condenser (50 mmfd.)	30-1029
6	Condenser (.03 mfd.)	30-4025	29	Condenser (.05 mfd.)	30-4020	72	Interference Choke	32-1374
7	Condenser (.05 mfd.)	30-4020	30	Condenser (.03 mfd.)	30-4025	73	Condenser (.5 mfd.)	30-4184
8	Resistor (700 ohms)	6443	31	Resistor (10,000 ohms)	33-1000	74	Condenser (50 mmfd.)	30-1029
9	R. F. Transformer	32-1332	32	Resistor (190,000 ohms)	33-1116	75	"A" Choke	32-1368
10	2nd Padder (on tun. cond.)		33	Resistor (5000 ohms)	6096	76	Vibrator Choke	33-1367
11	Resistor (10,000 ohms)	33-1000	34	Condenser (10 mfd.)	30-2076	77	Condenser (.5 mfd.)	30-4047
12	Condenser (1000 mmfd.)	30-1007	35	Condenser (.25-.25 mfd.)	30-4126	78	Vibrator	38-5036
13	Oscillator Transformer	32-1333	36	Resistor (25,000 ohms)	3656	79	Condenser (.05 mfd.)	30-4039
14	Padder (Prim. 1st I. F. Tran.)		37	Resistor (32,000 ohms)	3525	80	Resistor (200 ohms)	7217
15	3rd Padder (on tun. cond.)		38	Condenser (.25-.25 mfd.)	30-4126	81	Resistor (200 ohms)	7217
16	First I. F. Transformer	32-1329	39	Condenser (250 mmfd.)	30-1032	82	Condenser (1250 mmfd.)	5886
17	Padder (Sec. 1st I. F. Trans.)		40	Resistor (100,000 ohms)	6099	83	Power Transformer	32-7233
18	Condenser (.03 mfd.)	30-4025	41	Condenser (6000 mmfd.)	30-3031	84	Resistor (32,000 ohms)	3525
19	Resistor (1,000,000 ohms)	33-1096	42	Resistor (500,000 ohms)	6097	85	Condenser (4-8 mfd.)	30-2030
20	Resistor (2300 ohms)	33-3048	43	Condenser (10 mfd.)	30-2076	86	"B" Choke	32-7233
21	Condenser (.05 mfd.)	30-4020	44	Resistor (50 ohms)	33-3031	87	R. F. Choke	32-1078
22	Padder (Pri. 2nd I. F. Trans.)		45	Condenser (4000 mmfd.)	30-4185	88	Condenser (.01 mfd.)	30-4051
23	Second I. F. Transformer	32-1237	46	Output Transformer	32-7019		4-prong Socket	27-6015
							5-prong Socket	27-6014
							6-prong Socket	6417
							Spark Plug Resistor	33-1015
							Spark Plug Terminal	28-6179
							Interference Cond. (Gen.)	30-4181
							Interference Cond. (Dist.)	30-4176
							Dial Assembly	42-5166
							Knobs	27-4124
							Knob Springs	28-1738
							Battery Cable	38-5749
							Fuse	7227
							Fuse Insulator	27-7131
							Flex. Control Shaft (Tuning)	28-8241
							" " " (Volume)	28-8243
							Glass for Control	27-7325
							Dial Assembly	42-5166
							Pointer	28-1958
							Antenna Lead	L-1741
							"T" Bolt (set mounting)	28-6161
							Nut (set mounting)	W-518A

FORD MOTOR CAR CO.

The New Ford Auto Radio Incorporates: New, advanced principles of circuit and tube design. Six tube Superheterodyne with bass compensation. Rugged, compact, single unit chassis. Built-in, Electro-dynamic speaker. Highly developed automatic volume control. Illuminated, custom-built instrument panel control, mounting in ash tray opening.

Receiver mounts directly above steering column, out of sight and out of the way.

Controls go into ash tray opening. A special drilling template is furnished with each receiver by means of which the receiver can be mounted in cars without ash tray equipment.

These instructions have been carefully prepared for your use in installing the 40-18805-E receiver in Ford 1933 and 1934 cars. Read them carefully in every detail before attempting an installation.

Antenna

Antenna have been built in all closed Ford cars for some time with aerial lead coming down at the rear of the body or the right-hand windshield pillar. Closed cars of recent manufacture have aerial leads coming down the left-hand windshield pillar. (See Fig. 268.)

When installing this radio in a car having the antenna lead-in at the rear of the body, cut this lead-in (40-18812-AR) off as short as possible (taping the end and fastening it securely to prevent shorting, the antenna through contact with the metal of the body) and install the new lead-in (40-18812-D). Loosen the front left-hand corner of the headlining sufficiently to pass the single end of the lead-in through the center of the front L.H. pillar and solder that portion of the lead-in which is stripped to the wire roof netting (after two turns of the lead-in have been made around the netting). See Figure 268 connection "X". The roof netting must be scraped clean of any paint where the lead-in is to be soldered. A braided "pigtail" which is soldered to the male connector at the receiver end of the aerial lead must be grounded to a body brace just at the base of the pillar. This can be soldered or fastened with a sheet metal screw. Scrape the surface of the brace clean with a file to insure a good connection. (See "S" Figure 268.)

The spare wheel antenna, Part No. 40-18812-C should be used on all open cars.

Antenna extension lead, Part No. 40-18818, will have to be used on some cars having lead-in coming down right-hand windshield pillar. For the majority of cars, the lead is long enough to reach without this extension. Con-

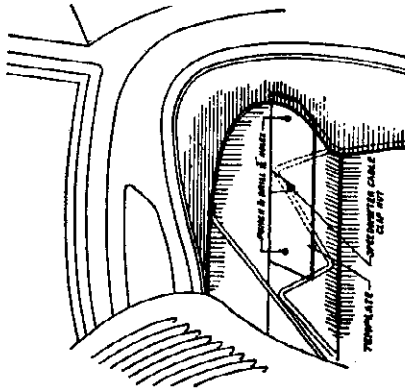


Fig. 269

nect lead below glove box, then slip up and over top of box. Plug the extension into receiver lead, place it over the top of the glove box and plug it into aerial lead socket at right-hand pillar.

Radio Location and Installation

Refer to Figure 269 for location of receiver mounting holes.

Place cardboard template on body ledge under left-hand hood as indicated in Figure 269 and prick punch hole locations. Drill 7/16" holes. Assemble T bolts loosely as shown in Figure 270.

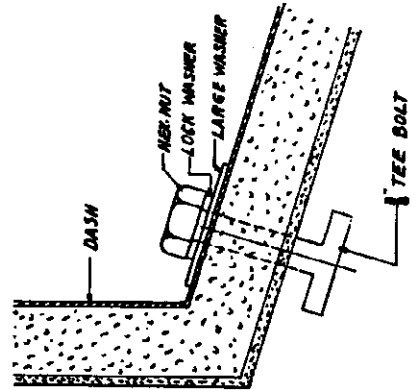


Fig. 270

Remove speedometer cable clip bolt and relocate speedometer cable to the left of the radio receiver. Relocate gas gauge line on the right of the radio receiver.

Install receiver above steering column with speaker facing towards driver and hook the T bolts into the brackets on top of the receiver. Tighten receiver into place. Bring aerial lead around rear of receiver and connect it into male plug on the end of the car antenna.

Ammeter Lead

Place the fuse and fuse insulator in the metal housing and assemble. Now connect the eyelet terminal to the hot (left) side of the fuse block.

Instrument Panel Control

Remove ash receptacle by dropping it forward and bending retaining clips toward the center. See Figure 271.

With a pair of pliers, bend upward ash receptacle back-stop to allow clearance for control head.

Assemble control head and cables in this hole by means of the U-clamp and two wing nuts. Draw up the wing nuts until the cover plate is against the instrument panel. See Figure 272.

The cowl ventilator handle should pass between the two flexible shafts. The shaft on the right with the male end is the station selector and is pushed into the right hand bushing on the receiver (closest to the dash). The left shaft is the switch and volume control. This has a female end and should be pushed into the bushing on the receiver nearest the instrument board. (See Figure

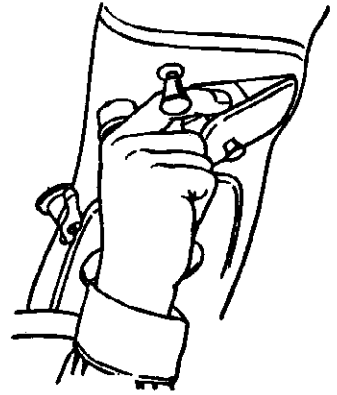


Fig. 271

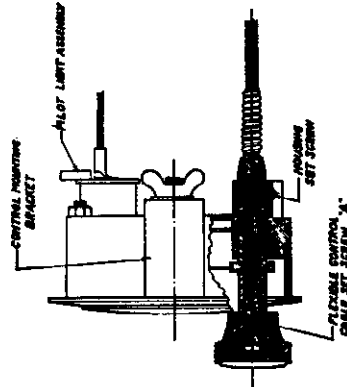


Fig. 272

268.) After the shafts are properly seated, tighten the two shaft couplings. Plug the dial light wire into its receptacle close to the switch volume control bushing.

Installing Dash Controls in Cars Without Ash Receptacle

Place the template on the instrument panel, as indicated in Figure 273.

Be sure that the throttle and choke rods come to the bottom of the slots in the top of the template and that the bottom of the template is flush with the bottom of the instrument panel. With a sharp-pointed instrument score the panel around the opening in the template. Cut out dash to these lines by drilling around inside of mark with a 1/8" drill and filing. Care must be taken not to mar the instrument board or file beyond line during this operation.

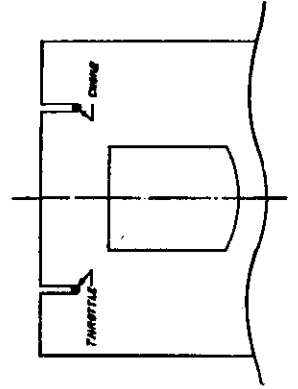


Fig. 273

**MODEL N, Center Control
Socket, Alignment
Service Notes**

FORD MOTOR CAR CO.

Dial Calibration

The receiver is calibrated in kilocycles with the last "0" omitted. Turn on receiver by loosening left-hand knob in clockwise direction. Turn volume in four increments for the tubes to heat up. There is a station of known frequency. Remove the right-hand knob by pulling it towards you. This is held in position by a spring clamp. Loosen the set screw on shaft (See "A"—Figure 272) under knob. Dial pointer moves freely. Now turn the pointer to the frequency of the station which is tuned in, tighten set screw and replace knob. Check accuracy of calibration on other stations at different points on the dial and adjust further if necessary.

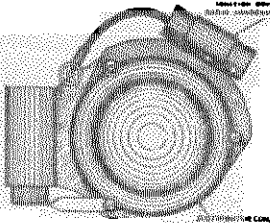


Fig. 275

Spark Noise Elimination

Cut off the cyclet terminals on all spark plug wires at the spark plug and screw on the angle resistors. See Figure 274.

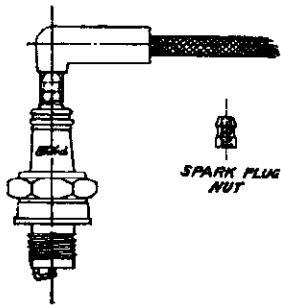


Fig. 274

Remove the round knurled nut and in its place use snap-type nut furnished. Press resistors on snap nuts.

The by-pass condenser with special coil bracket should be mounted on the ignition coil with the condenser wire on the terminal, as shown in Figure 275.

These operations should reduce the interference to a satisfactory level. However, there may be an occasional car which will require an additional B-1827 condenser, either at the ignition switch or at the fuse block.

The condenser to be used at the fuse block can be mounted underneath the bolt which holds the loom adjacent to the fuse block. Connect the wire leading from the condenser to the terminal on either side of the fuse.

If this condenser is to be used at the ignition switch a small hole should be drilled in the instrument board flange just to the right of the steering column, using an 8-32 bolt, nut and lockwasher to mount the condenser. The wire from the condenser should be attached to either terminal at the ignition switch.

If the above operations do not reduce the electrical interference to a satisfactory point, it may be necessary to reduce the clearance between the distributor rotor and the terminal plate electrodes. Remove one distributor cap and terminal plate and clean electrodes with a small file or knife. Build up these contacts with rosin core solder about 1/32". Replace terminal plate and cap and revolve motor with crank, leaving ignition switch off. Remove terminal plate and inspect carefully, removing excess solder which may have sheared off.

Repeat this same operation on the other side of the distributor.

Operating Instructions

To turn on the receiver, turn the left-hand knob slightly in a clockwise direction. The balance of the rotation of this knob controls the volume of the radio receiver. This receiver is equipped with a highly developed automatic volume control system which tends to maintain the volume at a constant level. However, there are some places—under viaducts, tunnels, bridges, etc., where the radio signal becomes so weak that it cannot be heard. When driving under trolley lines or in noisy locations, it is advisable to tune in on a strong local station.

Be sure the receiver is tuned in accurately, otherwise distorted reception will result, and local electrical interference will be magnified.

When turning off the receiver be sure the left-hand knob is turned counterclockwise until a snap is heard and the dial light goes off; otherwise the receiver will continue to operate and discharge the battery.

Generator Interference

Remove generator relay mounting screw and slip condenser bracket under the generator cut-out mounting lug. Re-insert cutout mounting screw and tighten down securely. Connect the condenser wire to the battery terminal of the cutout. See Figure 276.

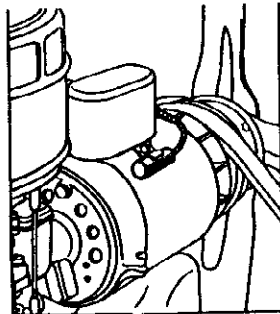


Fig. 276

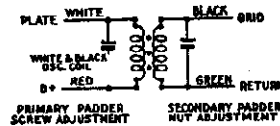


Fig. 277

1st I. F. Transformer

The following instructions are intended for radio engineers only.

I. F. Transformers and Padders

A new type I. F. transformer complete with padders is used in the Ford center control radio receiver.

The padders are placed in the top of the shield can, one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figure 280.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figures 277 and 278.

If replacements are ever necessary, replace the entire coil assembly for the first or second I. F. stage. Neither the coil nor the padders can be obtained separately.

Adjustments

All adjustments have been carefully checked at the factory. If, however, at any time it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood.

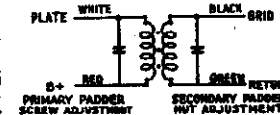


Fig. 278

2nd I. F. Transformer

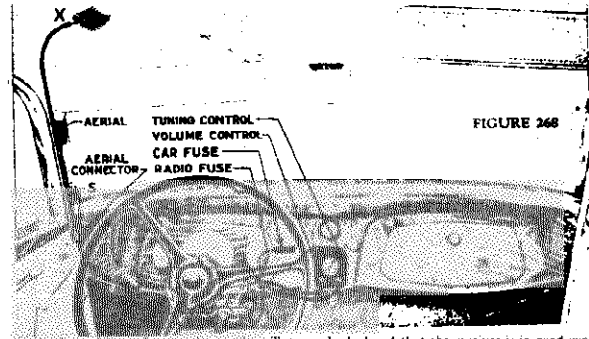


FIGURE 268

stood or without the use of a grid oscillator or signal generator and output meter.

The receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been

checked and that the receiver is in good condition except for the padding adjustments.

Remove the lid from the receiver. Remove the grid cap terminal from the 77 tube (for location see Figure 280).

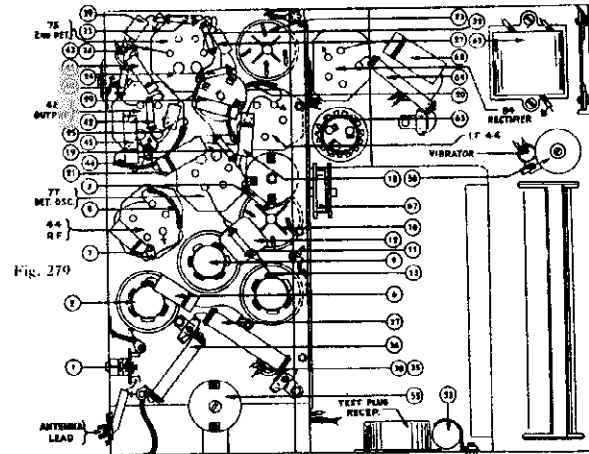


Fig. 279

Set up the signal generator and adjust it to exactly 260 K.C. Connect the generator lead to the grid cap of the 77 tube. (See Figure 280.) The output meter must be connected.

The receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders (22) and (26) are adjusted first (Figure 280). Turn the adjusting screw (22) all the way in. A metal screwdriver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut (26) with a fibre wrench for the maximum reading on the output meter. This applies to the sets to date, but sets of the future, with the broad tuning, the I. F. is close-coupled and will have two peaks, and must be tuned between the two peaks. This requires good judgment and careful adjustment.

Then adjust the screw (22) for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

Repeat the above procedure with the condensers (14) and (17).

After padding the first I. F. stage, remove the generator lead from the 77 tube and reconnect the grid lead to the antenna lead.

Set the generator to 1600 K.C. and then connect the generator lead to the antenna lead. There are four holes in line, one in each of the sections of the tuning condenser housing. (See Figure 280.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder (15) until the maximum reading is obtained in the output meter. This is the true setting for 1600 K.C., 160 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K.C., and set the signal generator for 1400 K.C. The R. F. padder (10) and the antenna padder (5) are next adjusted for the maximum reading on the output meter.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the receiver is adjusted properly.

Schematic drawing of the center control type radio is given in Figure 281.

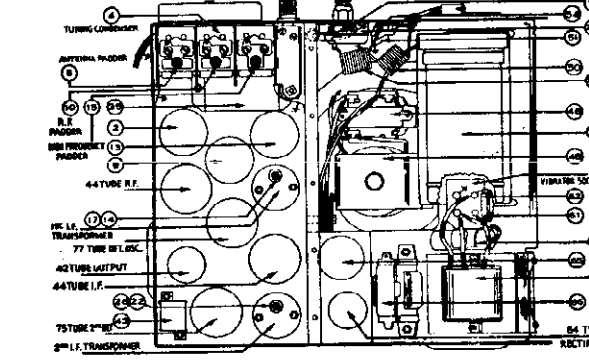
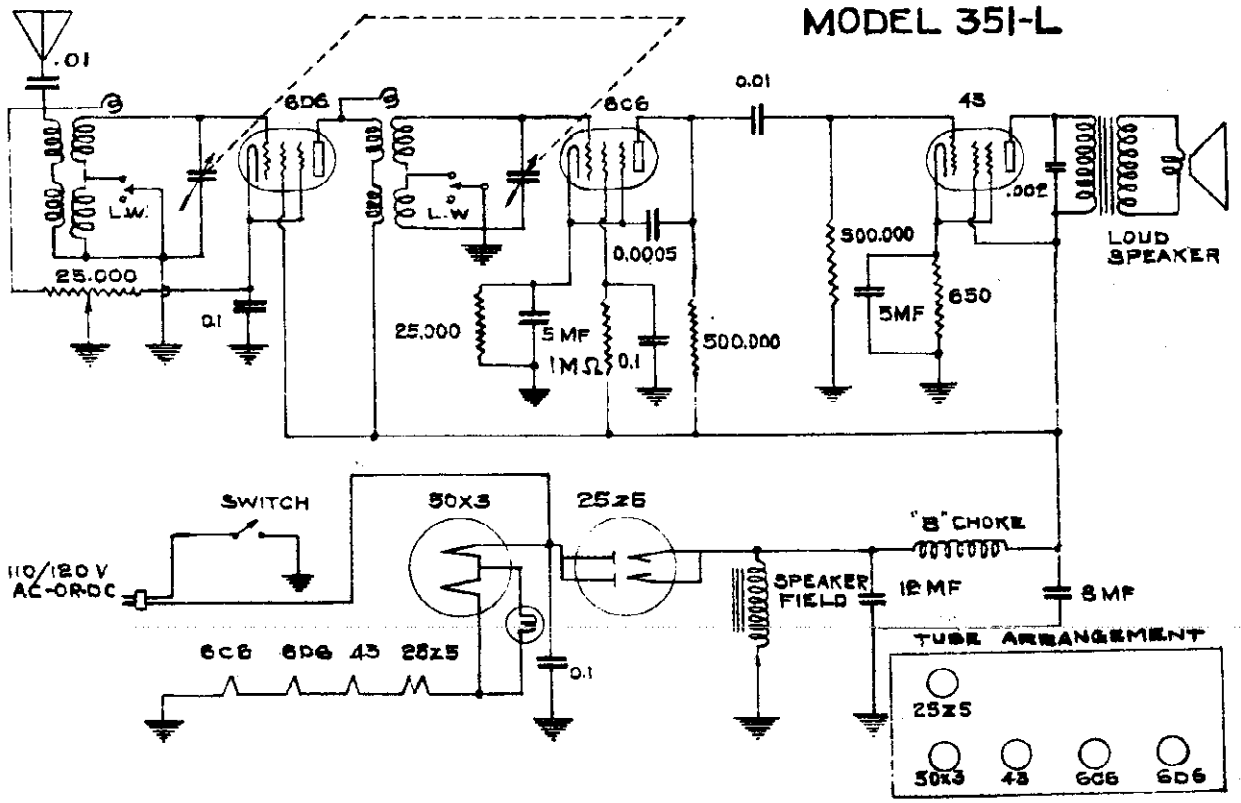
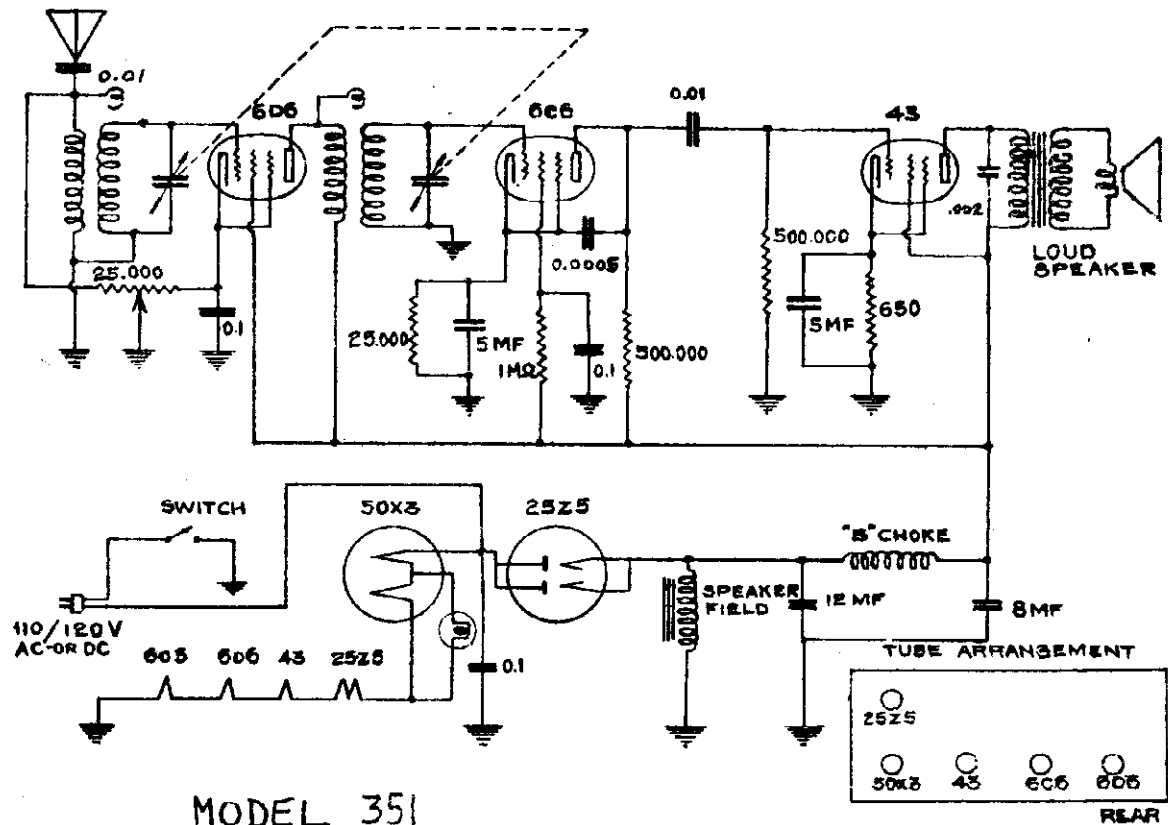


Fig. 280

FREED MFG. CO., INC.

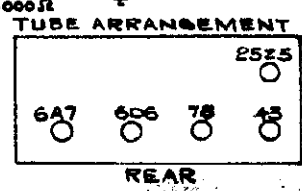
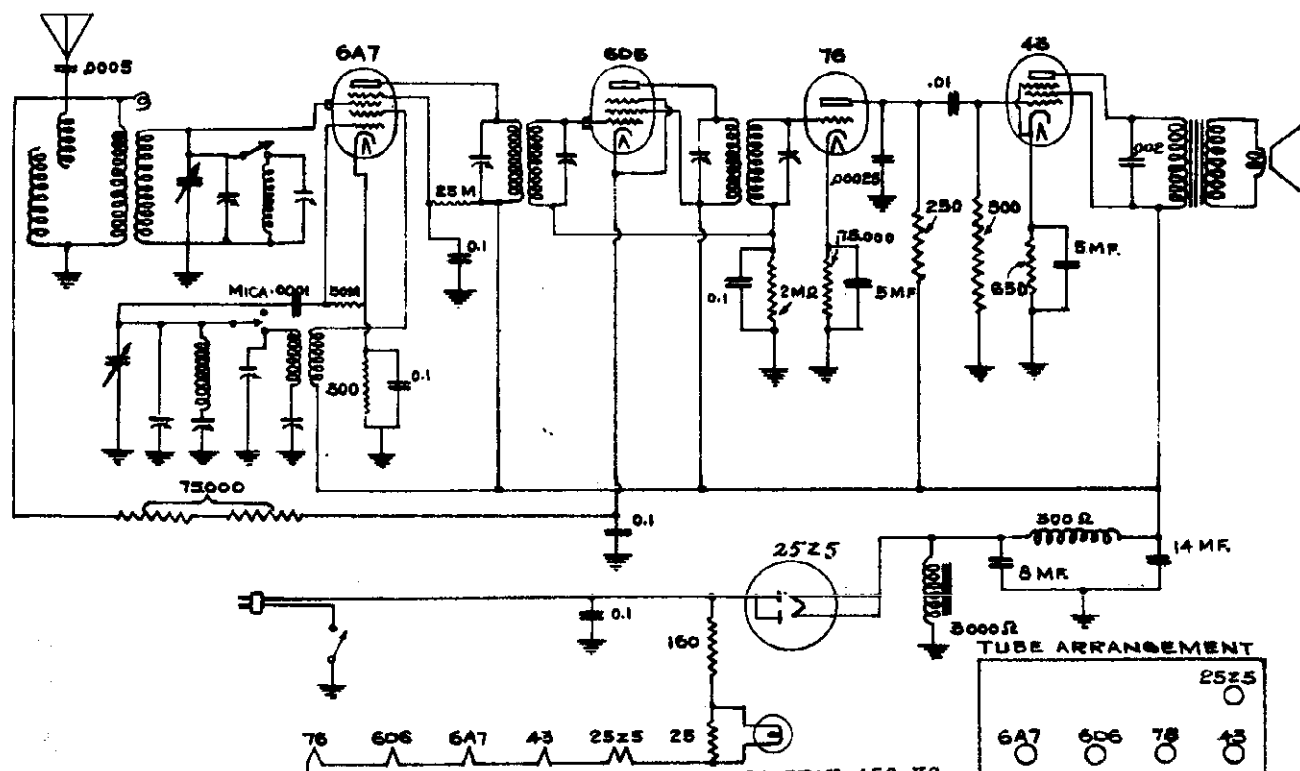
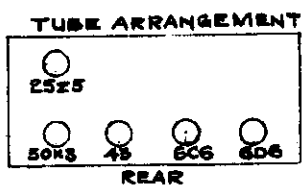
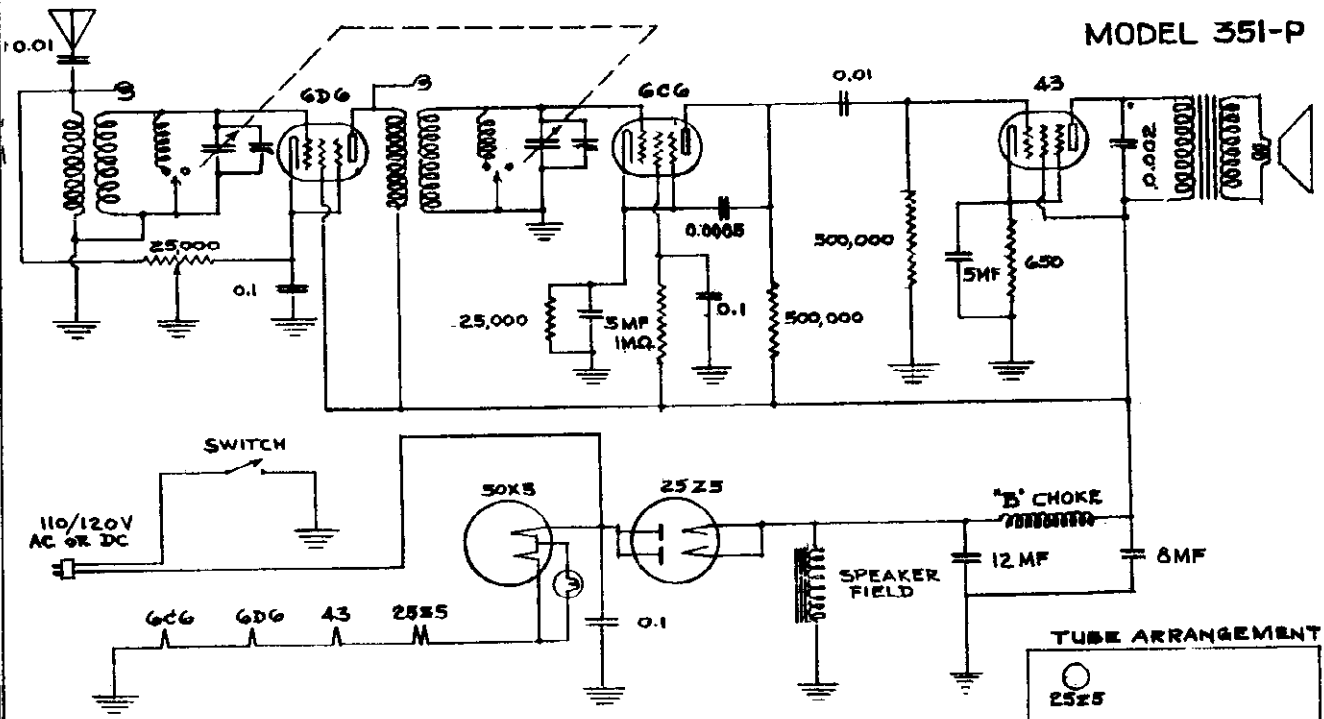
MODEL 351
 MODEL 351-L
 Schematics
 Socket



MODEL 351-P
 MODEL 357-P

Schematics, Socket

FREED MFG. CO., INC.



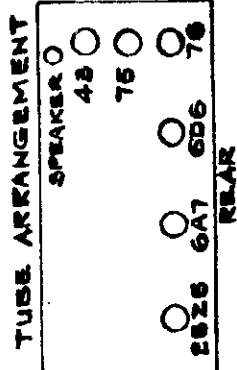
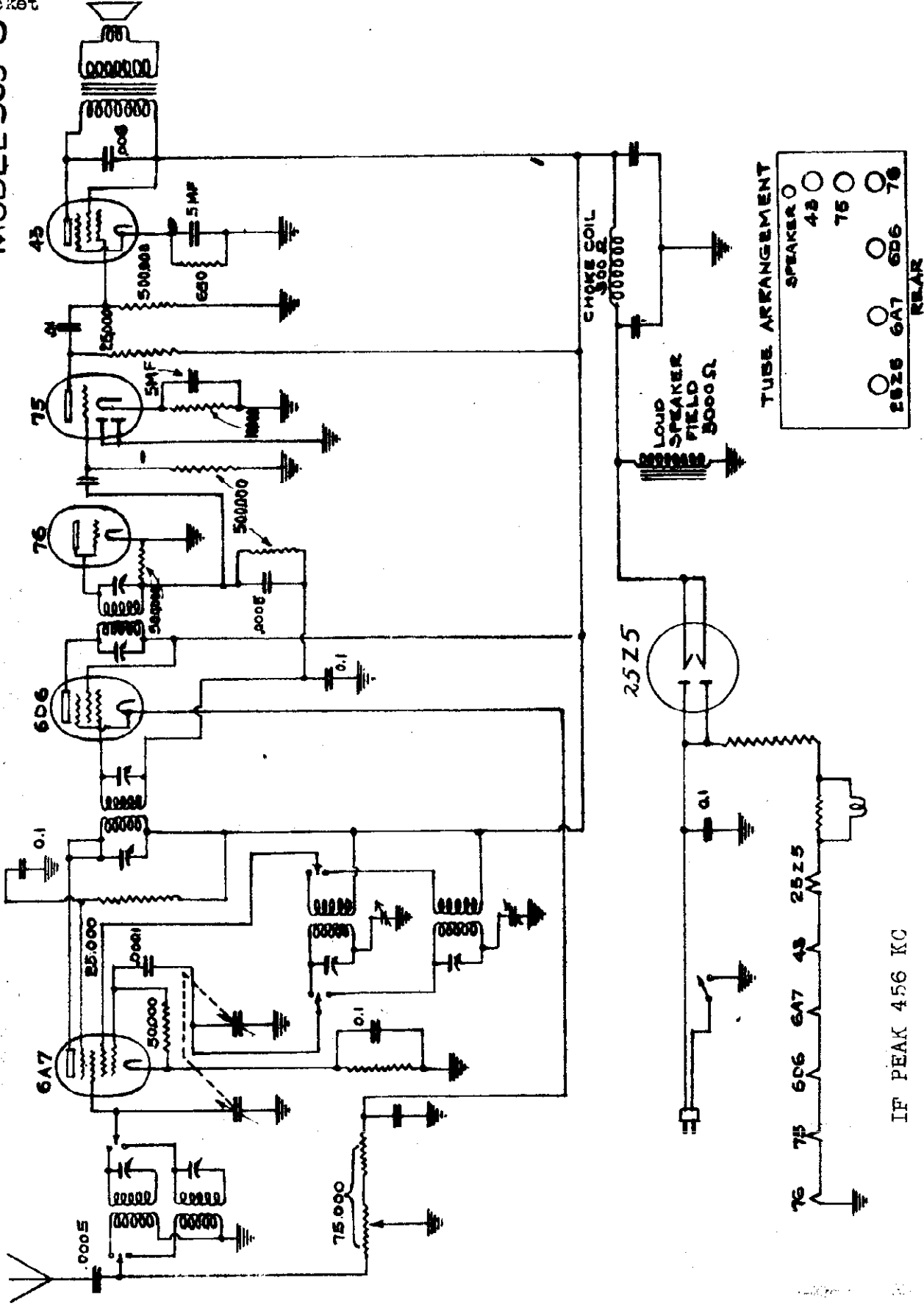
MODEL 357-P IP PEAK 456 KC

MODEL 369-S

Schematic
Socket

FREED MFG. CO., INC.

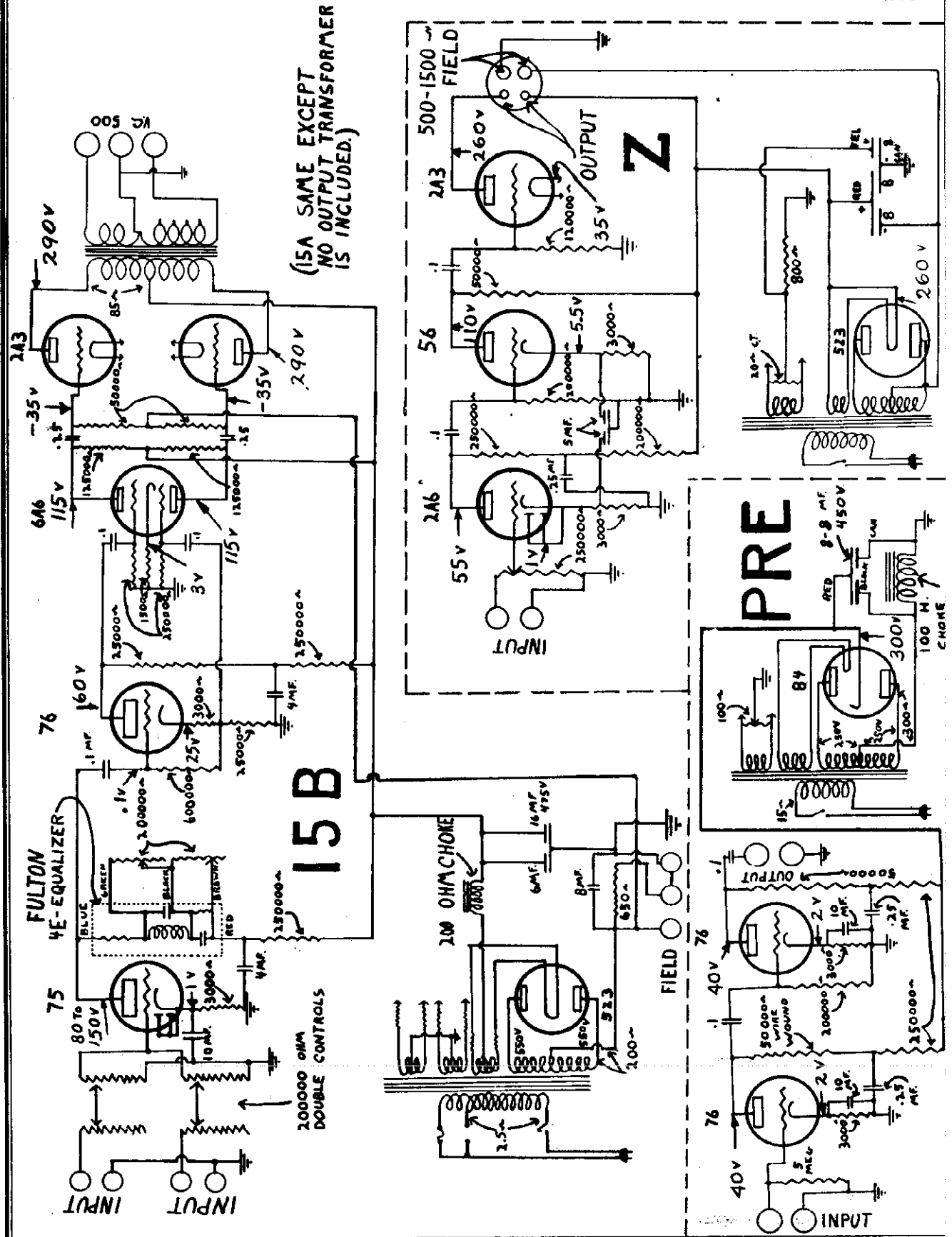
MODEL-369-S



IF PEAK 456 KC

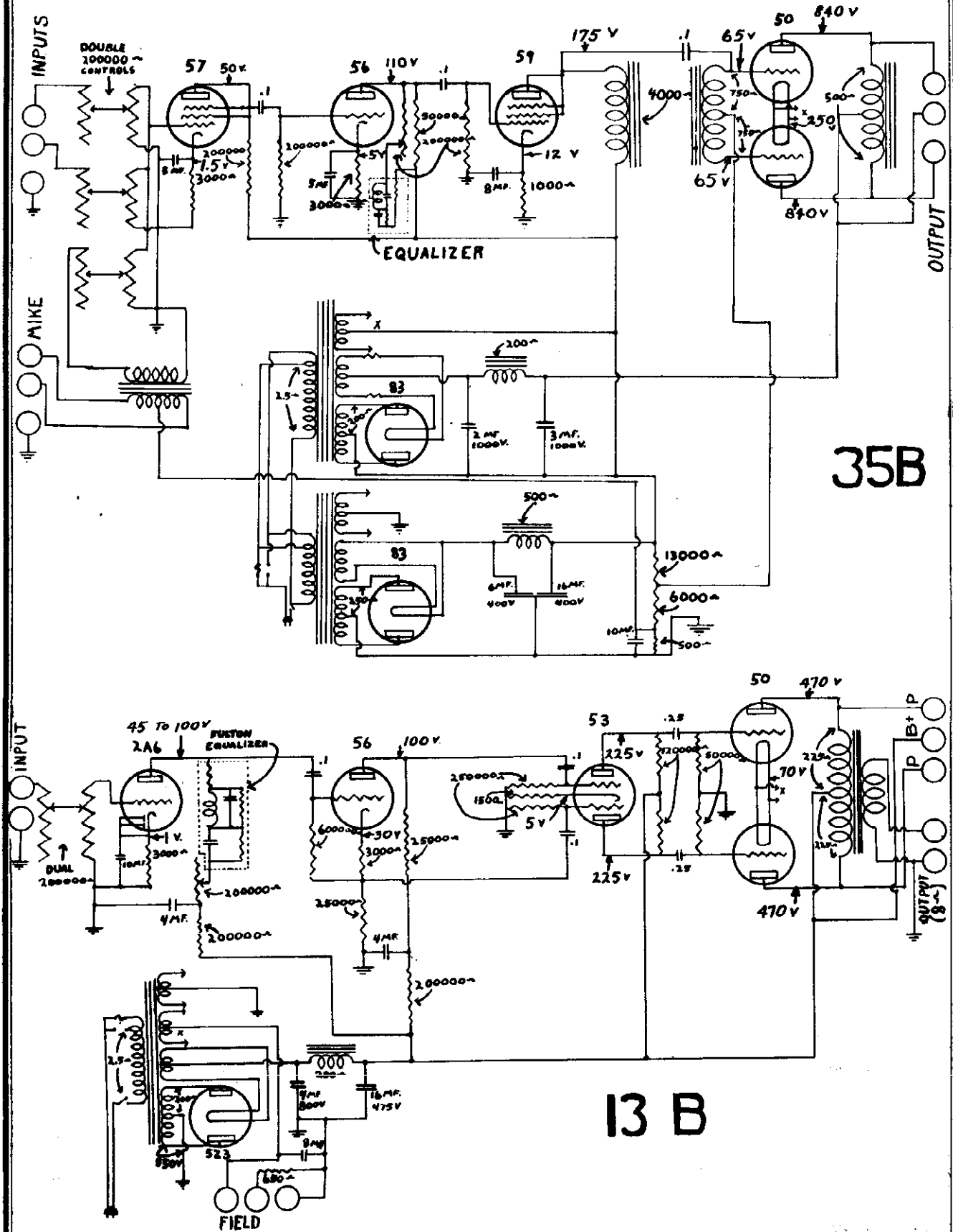
FULTON RADIO CORP.

MODEL Pre
MODEL 15B
MODEL Z
Schematics



MODEL 13B
MODEL 35B
Schematics

FULTON RADIO CORP.

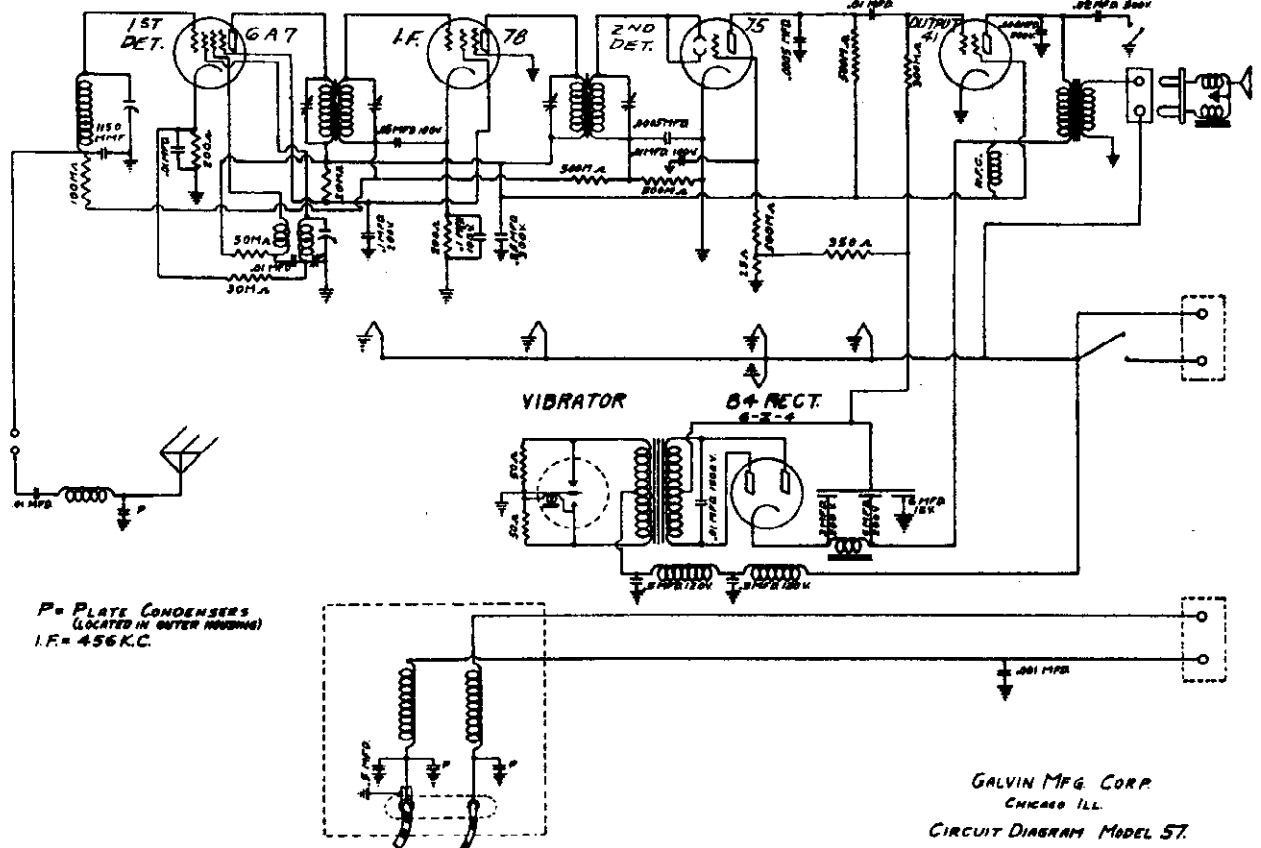


35B

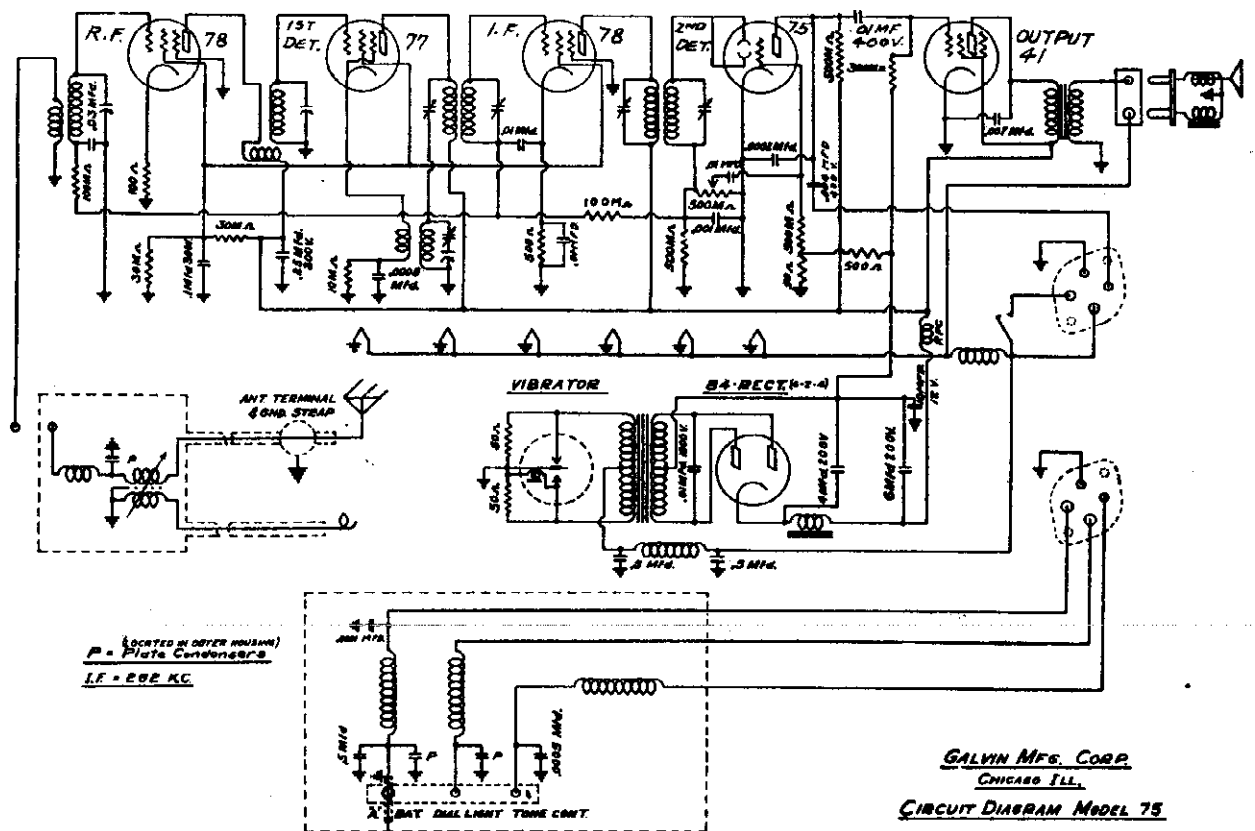
13 B

Schematics

GALVIN MFG. CO.



Model No. 62 Circuit is the same as Model No. 57 except that No. 62 uses an Iron Core Antenna Coil.



Model No. 79 Circuit is the same as Model No. 75 except that No. 79 uses an Iron Core Antenna Coil.

MODELS 75, 79
MODELS 100, 110
Alignment, Data

GALVIN MFG. CO.

ALIGNMENT PROCEDURE

ALIGNMENT OF THE I. F. TRANSFORMERS:

Models No. 75, No. 79, No. 100 and No. 110—Connect the feeder from the oscillator to the grid of the No. 77 autodyne tube. Remove the grid connection and connect a 500 M resistor from grid of the tube to ground.

Rotate the variable condensers to full open position.

Set the oscillator to a frequency of 262 K. C. adjust the A. F. and diode feeder trimmers to obtain maximum reading on the output meter.

Models No. 57 and No. 62—the same procedure as above is followed, with the exception that the service oscillator is set at 456 K. C. and the I. F. and diode feeder trimmers are adjusted to that frequency.

ALIGNMENT OF VARIABLE CONDENSERS:

All Models—connect the feeder from a service oscillator to the antenna lead of the set and adjust the oscillator to 1540 K. C. Next, completely open the condenser, going to minimum capacity, and adjust the oscillator trimmer on the condenser gang for greatest reading on the output meter.

Now set the service oscillator to 1400 K. C. and rotate the variable condenser for a peak reading on the output meter of the signal from the oscillator. Then adjust the R. F. and antenna trimmers on the condenser gang for maximum reading of the output meter.

Next set the service oscillator to 600 K. C. Close the condenser gang until the signal is again tuned in and rotate the condensers back and forth while adjusting the oscillator padder condenser for highest reading on the output meter. The variable condensers should now track perfectly and coincide with the dial calibration.

The Models No. 75 and No. 79 may be placed in operation on the service bench by connecting the hot "A" battery lead to one of the large pins of the 4 contact chassis plug. No. service extension cable is required. The Models No. 57 and No. 62 may be operated by connecting the hot "A" lead into the top connection of the two way receptacle.

The tuning condensers may also be aligned by using the MOTOROLA alignment gauge. When this is used it is only necessary to insert the gauge between the sections of the variable condenser gang. Set the rotor plates of the condensers to the line marked 1400. Adjust all three trimmers to maximum output. Then reset to the 600 K. C. line and adjust the 600 K. C. padder. The balance of the frequency calibration lines on the gauge may be used for further checking if desired.

BENCH SERVICING OF MODELS No. 57, No. 62, No. 75, No. 79, No. 100 and No. 110:

All of the above models are equipped with plug-in chassis so that they may be removed from the set housing without affecting the original installation in the car.

SERVICING THE CONTROL HEAD:

Should the mechanism within the control head require servicing, it may be reached by prying the bezel ring upward as shown in Figure No. 2. This method of removal prevents damage to the bezel ring and it may be reinserted without difficulty. When inserting NEW rings, use an old control head casting, as a jig, inverted over the face of the control being repaired and tap lightly with a hammer to guide ring in place.

Figure (1) shows the rear view of the chassis of Model No. 100 or No. 110, illustrating the method of connecting the speaker to the set on the test bench, thereby eliminating the use of an extension service cable. The connector pin for the Bat. supply lead may be secured from an old tube base.

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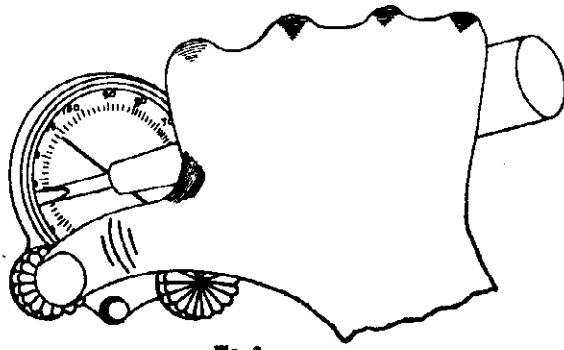


Fig. 2

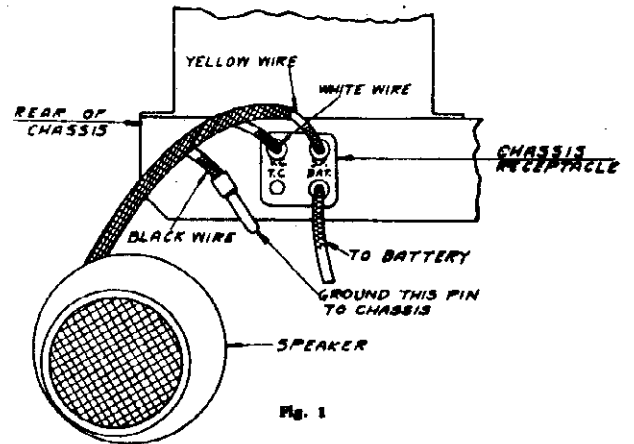
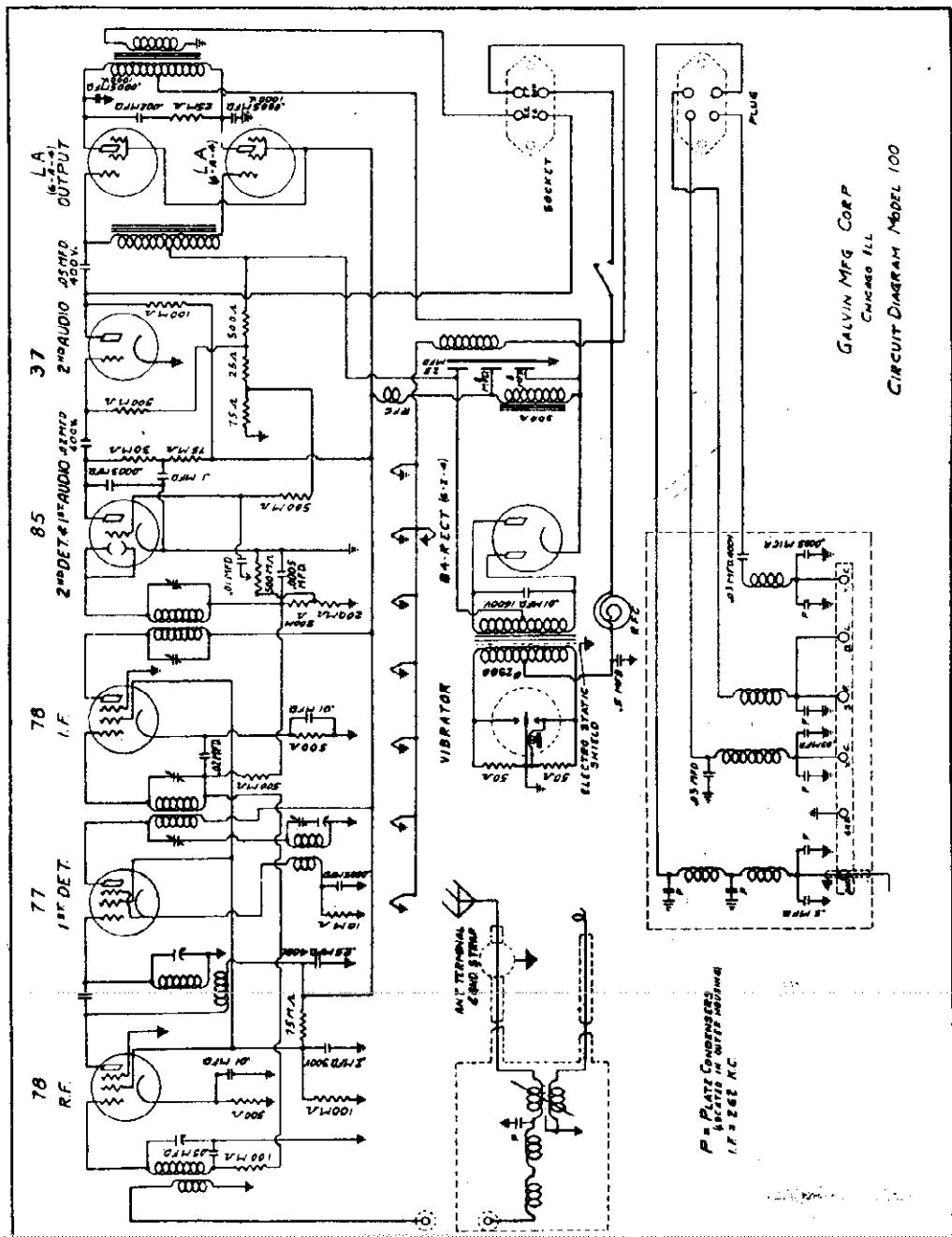


Fig. 1



Model No. 110 Circuit is the same as Model No. 100 except that No. 110 uses an Iron Core Antenna Coil.

MODEL 100

Magic Eliminode Data

GALVIN MFG. CO.

4th -- Connect the dim light filter in the dash light circuit and ground the case thoroughly to the car body. Connect the capacitor condenser to the resistor output. Connect the other condenser supplied, to the primary post of the ignition coil and ground it under a CLEAN CASE COVER STUD or connect the capacitor condenser to the ignition switch ground it to the instrument panel and connect noise feeder to the point where condenser is grounded. Place the screws under the floor mat on the right side of the car body and ground it to car body. Ground both sides of the hood thoroughly at their rear edges.

5th -- Turn on the radio and the car motor and tune the dial across the tuning range to check for interference. IF NO INTERFERENCE IS ENCOUNTERED, the installation is complete and no further work is necessary. DO NOT CONNECT THE INTERFERENCE FEEDER AS IT IS NOT NEEDED.

IF, however, there is no interference at 800 K.C., but it appears when tuning toward 1500 K.C. it will be necessary to use the balancer.

Proceed as follows:

With the set turned on and tuned to about 1500 K.C. remove the volume control shaft bushing from its socket and insert it in the Magic Eliminode socket (located a little to the rear and above volume control knob), and turn volume knob all the way to the left. Next attach the clamp on the free end of the interference feeder to the choke rod, throttle rod or instrument panel. Now turn the volume control knob to the right until the noise is balanced out. If the balancing coil travels its full length before balance is reached, it will be necessary to move the feeder clamp to another spot on the choke or throttle rod or some other point on the car, such as instrument panel, dash, etc., until a point of balance is secured.

If, when the set was first checked for motor noise it was found that the noise could be heard at 600 K.C., it indicates that its level is too high for the filter and it will be necessary to reduce its intensity by -- better grounding of all parts of the radio installation, CHANGING POSITION OF HEAD-IN LOOM, bending instrument panel to dash, etc., or changing the mounting position of the antenna lead junction box to secure a better ground. THIS IS EXTREMELY IMPORTANT and should be determined by trial. As soon as the interference level is brought down within the range of the filter at 600 K.C., the balancer may be employed to eliminate all interference over the rest of the tuning range of the receiver.

When making an installation with the Magic Eliminode be sure to remember the following:

- 1st ... THAT A GOOD MECHANICAL INSTALLATION AND PROPER GROUNDING OF EVERY PART OF THE SET IS VERY IMPORTANT. Do not expect a slipshod installation to give good results.
- 2nd ... The Magic Eliminode will eliminate interference within reasonable limits only as encountered in any standard automobile. It cannot be expected to work in cases where special high voltage ignition coils, spark intensifier, ignition boosters, or ignition wiring changes have been made. Remember it does NOT work wirelessly.
- 3rd ... Use all accessories as supplied with each set and follow instructions carefully.
- 4th ... When balancing out interference keep the hood down and grounded and have the car doors closed.
- 5th ... Do not connect the interference feeder clamp to its point of interference pickup until after checking the filter only. If the filter is found to be sufficiently effective do not use the interference feeder.

In some cars there may exist a slight trace of interference when accelerating the engine. This may be overcome by connecting a Motorola dim light filter in series with the primary breaker point wire between the coil and distributor and ground it to the engine block.

NOTES OF MAGIC ELIMINODE THEORY OF OPERATION

The Magic Eliminode in the 1935 Motorola consists of a combination of an extremely efficient high frequency filter and balancing system.

In practically every car the Magic Eliminode will completely eliminate ignition interference when the installation of the set is made according to instructions and the intensity of the motor noise is not so great as to be beyond the range of the Magic Eliminode.

The Magic Eliminode should not be expected to work miracles or to do the impossible, but after analyzing its operation you will find that it works on good, sound and fundamental principles.

The filter used in the Magic Eliminode operates most effectively at the lower broadcast frequencies, therefore, if when tuning the set from about 600 to 850 K.C. no motor noise is heard, it can be assumed that the noise level is within the range of the Magic Eliminode and the noise then heard when tuning toward 1500 K.C. may be easily balanced out with the variable eliminode coil and complete elimination of motor noise secured.

THE MAGIC ELIMINODE WILL WORK IN ANY CAR OF WELDED STEEL BODY CONSTRUCTION WHEN THE INSTALLATION IS MADE ACCORDING TO INSTRUCTIONS AND THE ACCESSORIES SUPPLIED WITH EACH SET ARE PROPERLY USED.

It is not guaranteed to work in extremely old cars in which the joints (not welded) between the various body sections have separated and rusted. It will not work when the interference level is so high as to be entirely beyond the range of the eliminode but if by proper shielding and bonding the level is reduced sufficiently so that the filter will handle it at 600 K.C., the balancer will take care of it over all other portions of the tuning range of the receiver.

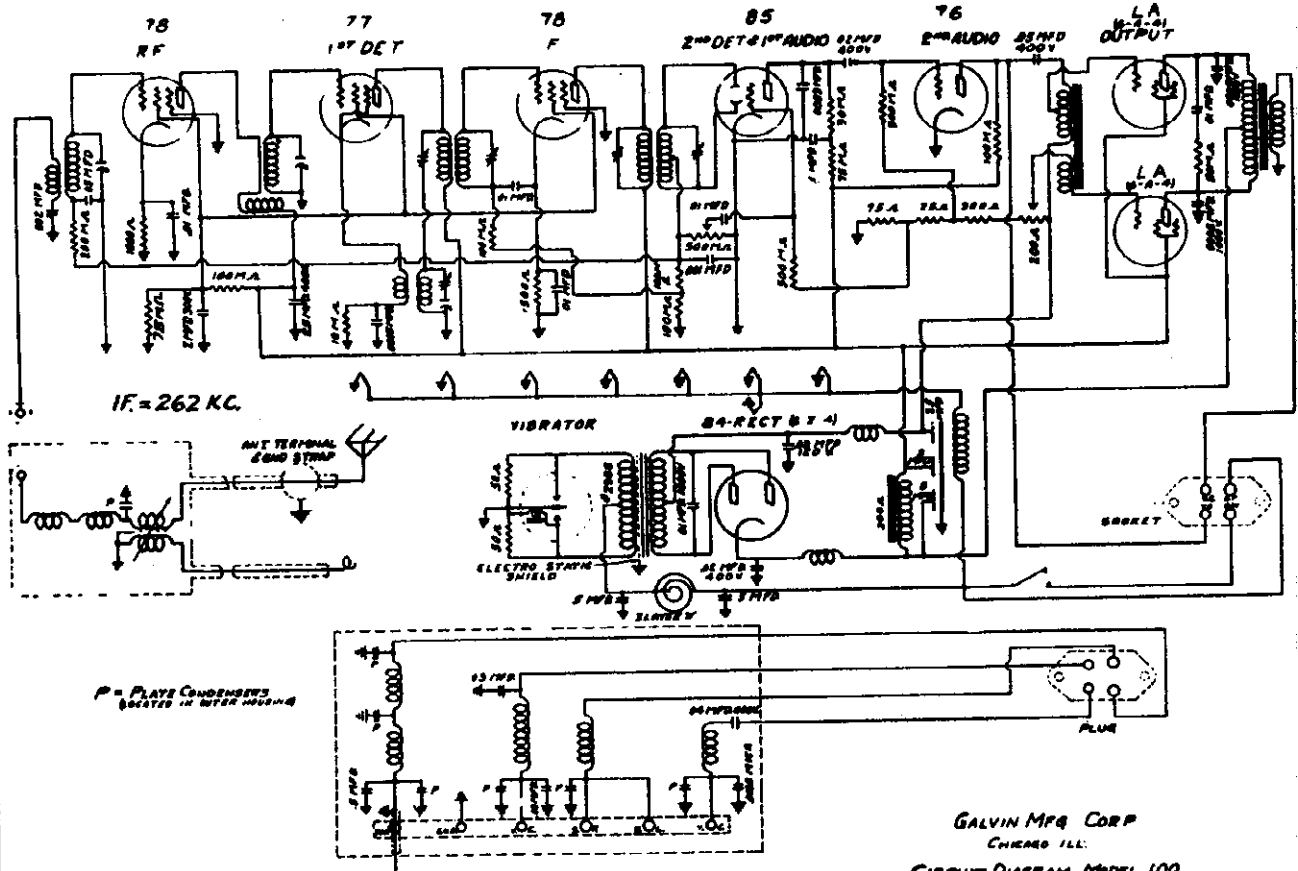
In like manner there will be found many cars in which the filter is so effective that it alone completely eliminates all motor noise and balancing is not required. In that case IT IS UNNECESSARY TO EVEN CONNECT THE INTERFERENCE FEEDER TO THE MOTOR.

To further acquaint ourselves with the use and operation of the Magic Eliminode, let us follow a step-by-step procedure in the installation of a Motorola Model 100 in a 1934 V-8 Ford car.

The above combination is used because of the great sensitivity of the Model No. 100 and the fact that no distributor suppressor is used in the V-8 gives us a most extreme combination.

- 1st -- Mount the set near the right center of the dash with the control head if preferred in the instrument panel.
- 2nd -- Mount the speaker near the steering column on the left side of the dash.
- 3rd -- Connect the "A" lead to a convenient point on the 6 volt wiring as close to the starter switch as possible. Insert the speaker, dial light, tone control plugs in the receptacles at the right end of the receiver. Dress wires so that their position is remote to steering column and other wiring, control rods and pipes.
- 4th -- Connect the two flexible control shafts to the radio by inserting them in their respective sockets and turning each approximately a quarter turn to the right.
- 5th -- Take the small antenna lead-in junction box that has the short piece of shielded lead attached to it and fish the car antenna lead through this loop until the lead extends into the junction box. Now insert the set antenna lead-in through the female in this box so that the two leads may be soldered together within the box and be totally shielded. STOP THE SHIELD TO THE FRESH AIR WITH SOLDER TO SECURE A GOOD GROUND. Next mount the junction box on left side of coil where paint has been removed and mount it up into the corner post. Bolt the box down firmly so as to secure a perfect ground (THIS IS EXTREMELY IMPORTANT).

GALVIN MFG. CO.

MODEL 100 (Type 1)
Schematic
Installation DataINSTALLATION IN FORD V-8GALVIN MFG CORP
CHICAGO ILL.
CIRCUIT DIAGRAM MODEL 100
KAM

When mounting the Model #100 in the motor compartment of the V-8 Ford, be sure to mount it at least 5 inches above the rear spark plug of the left motor block.

If it is mounted too close to spark plugs, interference difficulties may occur.

A special accessory package carrying catalog number MF-37 for Ford motor compartment mounting may be secured from your distributor.

This package includes the following:

- 1 - Mounting bracket of heavy gauge steel
- 2 - 2/16" x 1 1/2" bolts for fastening bracket to bulkhead
- 2 - 5/16" x 3/8" studs for fastening set to bracket
- 1 - Curved padding compression washer
- 1 - Drilling templet

FORD IGNITION COIL CONDENSER

A specially constructed condenser (catalog Number M-42) for Ford V-8's may be secured from your distributor.

This condenser should be connected to the primary terminal post of the ignition coil and is provided with a bracket for mounting under one of the engine gear case cover studs.

When installing #75 or #100 in V-8's, connect the interference feeder to the lower lip of the instrument panel - directly above the ignition switch, end at the point where the ignition switch-by-pass condenser is grounded.

MODEL 100 Mounting Notes Adjustments

GALVIN MFG. CO.

LOCATION OF THE RADIO SET

The Motorola model 100 should be securely bolted to the dash or instrument panel of the car. The following instructions should be followed in the selection of the location for the set. Consideration should be given to freedom from vibration and sharp bends in the control shafts that may affect their operation.

Also give consideration to the future servicing of this instrument and mount it in such a position that the chassis may easily be removed for servicing without removal of the complete set housing.

LOCATION OF THE UNIVERSAL AIRPLANE TYPE CONTROL

The Universal Airplane type control head may be mounted on either the right or left side of the steering column with the mounting bracket as shown in Figure 1, or in those cases where an opening has been provided in the instrument panel for the special instrument panel installation plates and mounting brackets as supplied for Figure 1.

The various makes of cars. These installations should be checked to match the leader and finish of the instrument panel, may be secured from your Motorola dealer or distributor. BE SURE TO STATE MAKE AND MODEL OF CAR.



MOUNTING OF THE SET

The Motorola model 100 may be mounted either in the motor or driver's compartment and the requirements for mounting the set in the motor compartment. However, the same general instructions apply when mounting the set in the driver's compartment.

It is especially recommended that extreme care be taken and a good nut mechanical installation be made, particularly to the location of the antenna lead and A lead regarding their proximity to high voltage lines, ignition coils, etc., as this will later help immeasurably in the complete elimination of all ignition interferences.

1. Place the cardboard drilling template in position on the dash and mark the mounting holes for the set.
2. Mark the position for the hole for the shielded aerial lead and the two flexible control shafts, also mark the positions of the heads which will occur in the shafts, as this will seriously affect their operation.
3. Locate a suitable position for the speaker, mark the position of the hole for the single speaker mounting stud.

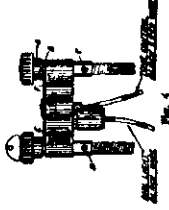
NOTE: To secure the full high fidelity tone designed into this radio set, it is **EXTREMELY IMPORTANT** that the speaker be mounted at an angle in the car, as shown in Figure 3. In every car there is a very definite position in which the speaker may be mounted to take full advantage of the cone resonance determined by trial, by so locating the speaker in this position the tone quality will be improved. The speaker may be mounted in its Universal mounting stud and then after the set has been placed in operation, tune to a radio station of good sound quality and adjust the angle of the speaker until full bass note response is secured.

4. Drill all holes with a 3/8" drill.
5. Screw the set mounting studs into the tapped holes at the rear of the set.
6. Mount set and speaker in their respective positions, using the large washers to compress against the padding on the dash.

NOTE: Before placing the set in position on the dash it is **EXTREMELY IMPORTANT** that the points be cleaned around each hole and the special lock washers provided affixed to fit into the metal at these points.

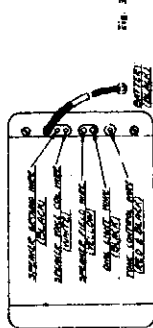
7. Mount the control head on the steering column or in the instrument panel, as shown in Figures 1 and 2.

INSTRUMENT PANEL MOUNTING OF CONTROL



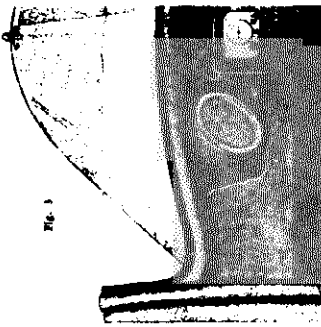
To remove tuning shaft, loosen set screws A, B, and C, Figure 4. To remove volume control dial, loosen set screw D. To remove knob, remove set screws and instrument panel. To remove control head, insert them to their limit, then release housing about 1/32" to relieve binding.

8. Insert the volume control shaft in hole (4) in the center of the left end of the receiver by placing the tongue of the flexible shaft into the slot in the volume control shaft, then insert the housing bushing. Insert the tuning control shaft in hole C Figure 5 on the left end of the receiver. The shaft springs are of the self-locking type and may be quickly secured by turning the tuning control knob to the right, tighten finger tight only. Do not use wrench or pliers.
9. Insert the plugs on the speaker wires, dial light wire, and tone control wire into their proper receptacles, Figure (5) located at the rear right end of the receiver.

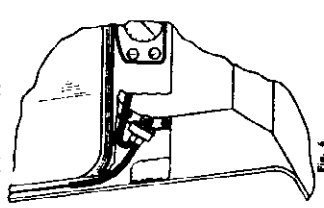


- (4) Insert black speaker wire into the receptacle at top marked (G. N. D.) "ground".
- (b) White wire into 2nd receptacle marked (V. C.) "Voice Coil".
- (c) Yellow wire into 3rd receptacle marked (S) "Speaker Field".
- (d) Dial Light wire into 4th receptacle marked (D. L.) "Dial Light".
- (e) Tone control wire into 5th receptacle marked (T. C.) "Tone Control".

10. Connect the A lead to any convenient 6 volt supply as close in the starter switch as possible. It is not necessary to run it directly to the battery.



NOTE: Do not connect interference leads until after the set has been tried and the necessity for it is apparent.



11. Mount the antenna lead in the antenna lead body it is a welded member, and not to the instrument panel, then slip the car antenna lead through the shielded loop allowing the lead to extend up into the front corner post, as shown in Figure 6. Insert the antenna lead on the receiver into the hole provided in the junction box, solder its shield to the box, splice and insulate the lead-in connection, and replace cap on junction box.

ANTENNA

Practically all automobiles are now equipped with antennae. The lead-in wire will usually be found on the right or left-hand side, behind the instrument panel. If the car is not already so equipped, an antenna of this square type of screen wire is recommended.

OPERATION

Insert the key in the left-hand control knob. Turn knob slightly to the right until the volume control knob is in the position of the station selector. The right-hand knob is the station selector. The center knob is the variable tone control. Turn it to the right for bass and to the left for treble.

ADJUSTING THE STATION SELECTOR INDICATOR

Tune in a station of known frequency, preferably about 1000 K.C. Insert a small screw driver in the center gear of the control head and adjust indicator to the frequency of the station being received. Figure 7.



ADJUSTMENT OF TUNING CONDENSER GEAR

The tuning condenser may be adjusted against its drive pinion by turning the cam screw, which is reached through a hole in the left side of the set housing, Figure (8). This hole is covered by a plug button, easily prised off with a screw driver. Turn the screws to the left until a slight drag is felt on the tuning selector knob, then back off slightly until free movement is obtained and replace plug button.

BALANCING SET TO THE ANTENNA

After the set is installed ready for operation, it may be necessary to balance the set to the antenna. This is done by adjustment of the antenna trimmer, located under a plug button at the top of the set, which may be removed by prying upward with a screw driver. In making this adjustment, tune in a very weak station between 1000 and 200 on the dial. Adjust the trimmer with a screw driver until the point of maximum volume is reached.

ELIMINATION OF IGNITION INTERFERENCE

Insert the distributor suppressor in the high tension wire not more than two inches from the distributor.

Mount the generator condenser on the generator frame and connect the pigtail connection to the contact on the generator contact.

Connect the Motorola Dome Lite Filter in the dome light wire at the point where the wire enters the front corner post of the car, making sure that filter case is well grounded.

Connect the Motorola ammeter condenser to one side of the Ignition Switch and to ground.

Place the Motorola floor board shield on the toe boards on the left side of the car under the floor mat and ground it by removing the toe board screws and replacing them through the screen. Except in those cases as noted on the interference chart.

At this point the set should be tuned up, the motor started and checked for ignition interference. Tune the set across in standard key and if no interference is encountered it is unnecessary to connect the interference leader or to proceed with balancing.

CONNECTING THE INTERFERENCE FEEDER

The purpose of the interference feeder is to lead into the Magic Eliminator a sufficient amount of interference to counteract the interference being picked up by the car antenna. Therefore, it is necessary to connect it to some point on the motor or instrument panel which will give the required result. (Refer to first column of sectioned Interference Elimination chart).

BALANCING PROCEDURE

The balancing of the Magic Eliminator is a very simple procedure. After the set is completely installed it is necessary to turn the set on, tune it for greatest minor noise intensity, then remove the plug button from the side of the housing marked (B) Figure (9).

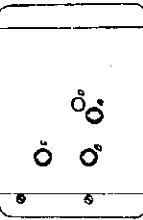
Remove volume control knob, housing from the set by turning its bushing a quarter turn to the left; remove and insert in hole from which plug button was removed. Turn volume control knob either to the right or left, but in the direction in which the intensity decreases. Continue until the interference is entirely eliminated or reduced to its lowest point.

If you find that when turning the knob to the right the interference is entirely eliminated, it indicates that the interference is of such an amount that it is being fed in by the interference feeder. It will be necessary then to move or connect it to a different point on the engine or car body.

If this condition occurs when turning knob to the left, it indicates too much interference being fed in, and another pickup point should be selected that will supply a lower value within the range of the Magic Eliminator.

It is always advisable when balancing out interference with the Magic Eliminator to clamp the car hood down tight with the hood latches so that the interference being fed in, and another pickup point should be selected that will supply a lower value within the range of the Magic Eliminator.

After the interference has been eliminated, the volume control knob should be turned to its original position and the plug button replaced over the Magic Eliminator balancing shaft (B) Figure (9).



NOTE: This adjustment is permanent and will not change unless some change is made in the car wiring, or the radio set is installed in another car.

GAMBLE-SKOGMO, INC.

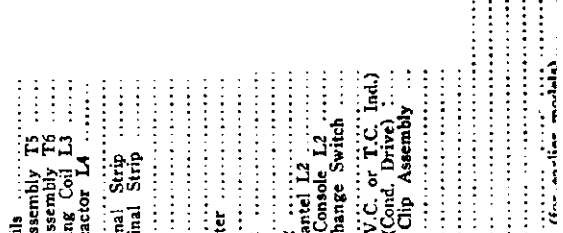
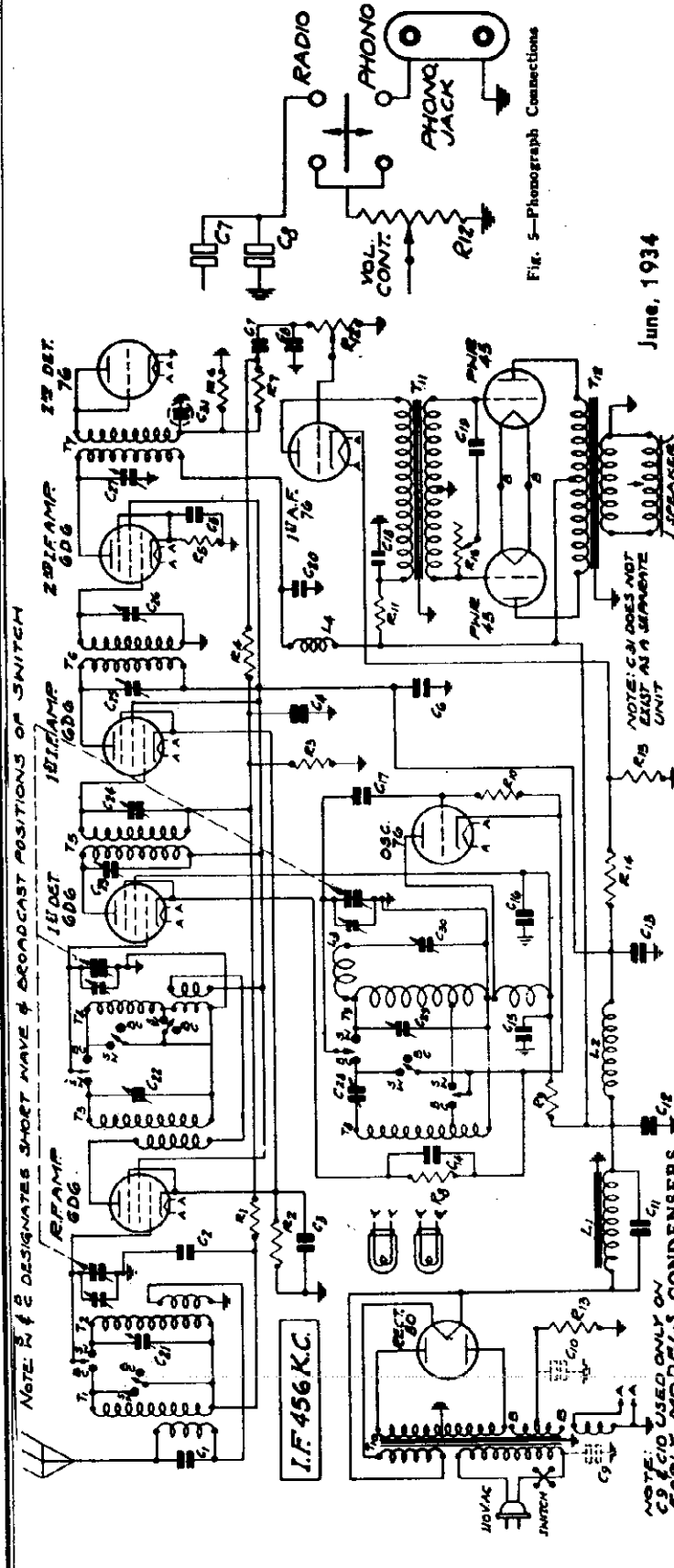


Fig. 5 - Photograph Connections

June, 1934

- Cans for the above coils
- P-40433
 - P-5184
 - P-5185
 - P-5190
 - P-5151
 - P-70702
 - P-1421
 - P-1441
 - P-2062
 - P-2063
 - P-30342A
 - P-30456
 - P-20912
 - P-2012
 - P-10272
 - P-10270
 - P-20875
 - P-2152
 - P-1968
 - P-2101
 - P-20905

- 1st I.F. Coil & Can Assembly T5
- 2nd I.F. Coil & Can Assembly T6
- H. F. Oscillator Tracking Coil L3
- I.F. Plate Isolating Reactor L4
- A.C. Cord & Plug
- Single Insulated Terminal Strip
- Double Insulated Terminal Strip
- Large Knob
- Small Knob
- Grid Cap only
- Small Pointer
- Large Double End Pointer
- Pilot Light Bulb
- Rubber Mounting Feet
- Glass Crystal
- Crystal Retaining Ring
- 8" Dynamic Speaker Mantel L2
- 10" Position Band Change Switch
- Condenser Shield
- 8" Black Drive Cord (V.C. or T.C. Ind.)
- 29" Lamp Socket & Clip Assembly
- Pilot Lamp Socket (Cond. Drive)
- Bottom Shield
- Phono-Radio Switch
- Phono Jack
- No. 80 Socket
- No. 45 Socket
- No. 76 Socket
- No. 6D6 Socket
- Speaker Socket

- RESISTORS
- | Part No. | Code | Resistance | Watts | Type |
|----------|------|-------------|-------|---------------------------|
| P-95204 | R1 | 200,000 ohm | .2 | Carbon |
| P-99023 | R2 | 150 ohm | .5 | Flex. Wire Wound |
| P-95105 | R3 | 1 megohm | .2 | Carbon |
| P-95205 | R4 | 2 megohm | .2 | Carbon |
| P-99074 | R5 | 400 ohm | .5 | Flex. Wire Wound |
| P-94504 | R6 | 300,000 ohm | .2 | Carbon |
| P-95104 | R7 | 100,000 ohm | .2 | Carbon |
| P-94352 | R8 | 2,500 ohm | .2 | Carbon |
| P-98022 | R9 | 50,000 ohm | .2 | Carbon |
| P-95104 | R10 | 100,000 ohm | .2 | Carbon |
| P-94303 | R11 | 30,000 ohm | 1.0 | Carbon |
| P-96005 | R12 | 2 megohm | .2 | Carbon |
| P-98006 | R13 | 780 ohm | 3.0 | Volume Control and Switch |
| P-97003 | R14 | 6000 ohm | 1.4 | Armored Wire Wound |
| | R15 | 460 ohm | .2 | Tone Control |
| | R16 | 3 megohm | .2 | Tone Control |

- CONDENSERS
- | Part No. | Code | Capacity | Volts | Type |
|----------|------|---------------|-------|-----------------------|
| P-80919 | C1 | 250 mmfd. | 200V. | Moulded |
| P-80962 | C2 | .05 mid. | 200V. | Tubular |
| P-80988 | C3 | .25 mid. | 200V. | Tubular |
| P-80962 | C4 | .05 mid. | 200V. | Tubular |
| P-80988 | C5 | .05 mid. | 200V. | Tubular |
| P-80988 | C6 | .25 mid. | 200V. | Tubular |
| P-81005 | C7 | .05 mid. | 200V. | Tubular |
| P-80997 | C8 | .01 mid. | 600V. | Moulded |
| P-80988 | C9 | .01 mid. | 200V. | Tubular |
| P-80988 | C10 | .15 mid. | 400V. | Tubular |
| P-81009 | C11 | 15.0 mid. | 150V. | Wet Electrolytic |
| P-81018 | C12 | 5.0 mid. | 400V. | Dry Electrolytic |
| P-80862 | C13 | 2.0 mid. | 300V. | Tubular |
| P-81005 | C14 | .05 mid. | 200V. | Tubular |
| P-80864 | C15 | .10 mid. | 600V. | Moulded |
| P-80863 | C16 | 2.0 mid. | 200V. | Tubular |
| P-81041 | C17 | .35 mid. | 200V. | Tubular |
| P-2102 | C18 | .04 mid. | 200V. | Tubular |
| P-2103 | C19 | .10 mid. | 200V. | Tubular |
| P-2103 | C20 | 1.0 mid. | 200V. | Tubular |
| P-2103 | C21 | 3.40 mmfd. | 400V. | Ant. S.W. Trimmer |
| P-1685 | C22 | 200±50 mmfd. | 200V. | 1st Det. S.W. Trimmer |
| P-2112 | C23 | 200±50 mmfd. | 200V. | Dual Trimmer |
| P-2112 | C24 | 200±50 mmfd. | 200V. | Part of I.F. Assen. |
| P-2112 | C25 | 200±50 mmfd. | 200V. | Dual Trimmer |
| P-2112 | C26 | 200±50 mmfd. | 200V. | Part of I.F. Assen. |
| P-2112 | C27 | 70±50 mmfd. | 200V. | 3rd I.F. Coil Trimmer |
| P-2112 | C28 | 300±500 mmfd. | 200V. | 600 K.C. Trimmer |
| P-2112 | C29 | 3.40 mmfd. | 200V. | Osc. S.W. Trimmer |

Fig. 1 - Schematic Circuit Diagram

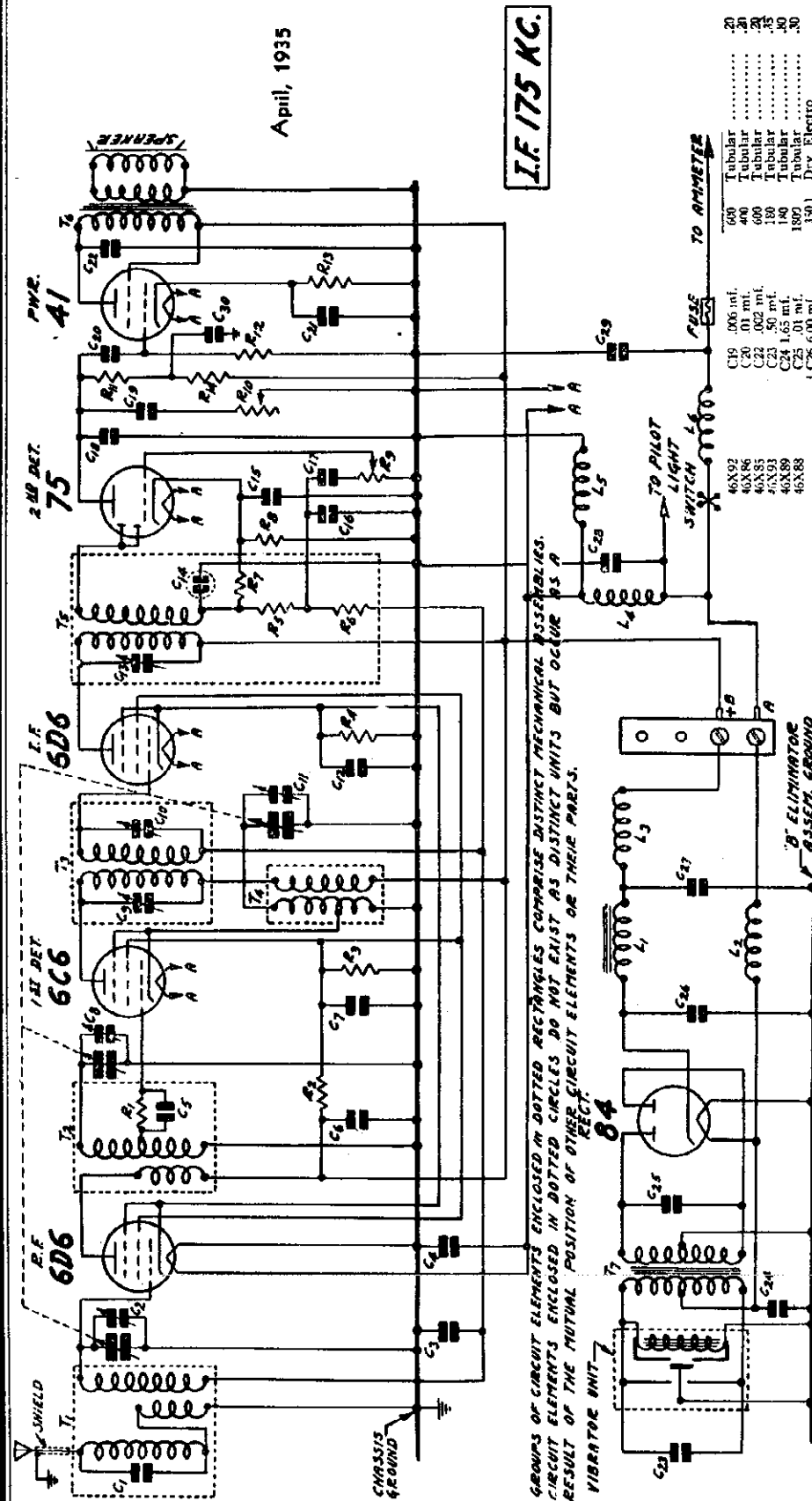
- *Used in Early Models only.
- NOTE: C8 DOES NOT EXIST AS A SEPARATE UNIT
- NOTE: C9 & C10 USED ONLY ON EARLY MODELS CONDENSERS

GAMBLE-SKOGMO, INC.

MODEL 2691
Schematic

April, 1935

I.F. 175 KC.



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.

TRANSFORMERS AND COILS

New Part No.	Old Part No.	Description	Code	List Price
5X17-6S	47X54	Output Transformer	T6	1.55
9A358-6S	48X50	Antenna Coil Assembly (Less Can)	T1	.50
9A359-6S	47X50	R.F. Interstage Coil Assembly (Less Can)	T2	1.25
1A23-6S	46X48	Dual-Coil Can Assembly Only (for 1st I.F. Coil & Can Assembly)	T3	.30
9A371-6S	47A32	Complete Coil & Can Assembly	T4	1.70
9A370-6S	47A33	Complete Coil & Can Assembly	T4	.80
9A375-6S	46X82	Pilot Light Choke Assembly	T5	2.05
9A373-6S	47A18	Motor Noise Choke	L4	.25
9A268-6S	46X23	R.F. "B" Choke Coil Assembly	L3	.30
9A374-S	45X23	F-lancon Reactor	L2	.30
53X12-6S	4X52	Power Transformer	T7	3.20
52X2-6S	4X52	Filter Choke	L1	.90

CONDENSERS

Code	Capacity	Voltage	Type	List Price
C1	.0005 mf.		Moulded	.15
C2	Aerama Trimmer		Part of Tuning Condenser	.25
C3	.003 mf.		Moulded	.10
C4	.003 mf.		Moulded	.25
C5	.00033 mf.		Tubular	.25
C6	.10 mf.		1st I.F. Trimmer Con.	.50
C7	.10 mf.		1st I.F. Trimmer Con.	.50
C8	130-500 mf.		1st I.F. Trimmer Con.	.50
C9	70-150 mf.		1st I.F. Trimmer Con.	.50
C10	70-150 mf.		1st I.F. Trimmer Con.	.50
C11	Oscillator		Part of Gang Condenser	.25
C12	.10 mf.		Tubular	.25
C13	70-150 mf.		1st I.F. Trimmer Assembly	.35
C14	.100 mf.		Dry Electro.	.15
C15	.100 mf.		Dry Electro.	.15
C16	.00025 mf.		Moulded	.15
C17	.01 mf.		Tubular	.15
C18	.00025 mf.		Moulded	.15

RESISTORS

Code	Resistance	Wattage	Type	List Price
R1	500.0 Ohm	.02	Carbon	.10
R2	15,000 Ohm	.05	Carbon	.15
R3	20,000 Ohm	.05	Carbon	.15
R4	500 Ohm	.02	Amorced Wire	.30
R5	500 Ohm	.02	Amorced Wire	.30
R6	10,000 Ohm	.02	Carbon	.10
R7	500,000 Ohm	.02	Carbon	.10
R8	500,000 Ohm	.02	Carbon	.10
R9	7,500 Ohm	.02	Volume Control & Switch	1.15
R10	50,000 Ohm	.02	Tone Control	.75
R11	200,000 Ohm	.02	Carbon	.10
R12	150,000 Ohm	.02	Carbon	.10
R13	50,000 Ohm	.02	Carbon	.10
R14	50,000 Ohm	.02	Carbon	.10

Code	Capacity	List Price
C19	.006 mf.	.20
C20	.01 mf.	.20
C22	.002 mf.	.25
C23	.50 mf.	.35
C24	1.65 mf.	.50
C25	.01 mf.	.30
C26	600 mf.	2.10
C27	800 mf.	2.10
C28	.50 mf.	.25
C29	.05 mf.	.25
C30	.25 mf.	.30
3 Section Gang Condensers 4.20		

MODEL 26SI
Installation Details

GAMBLE-SKOGMO, INC.

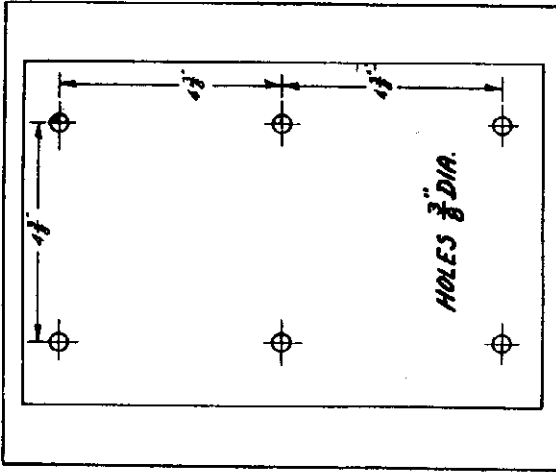


Fig. 2—Location of Mounting Holes.

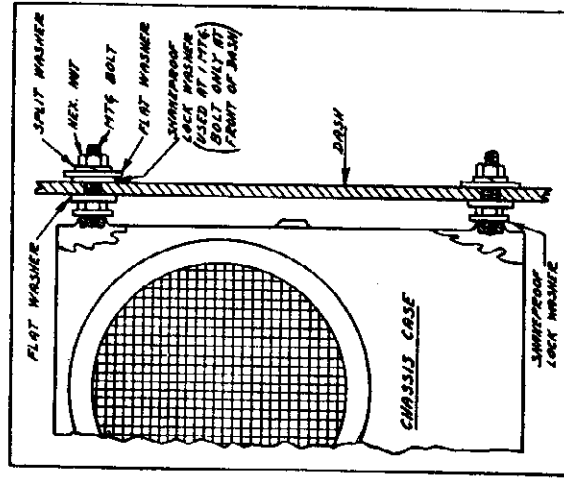


Fig. 3—Details of Chassis Mounting on Dash

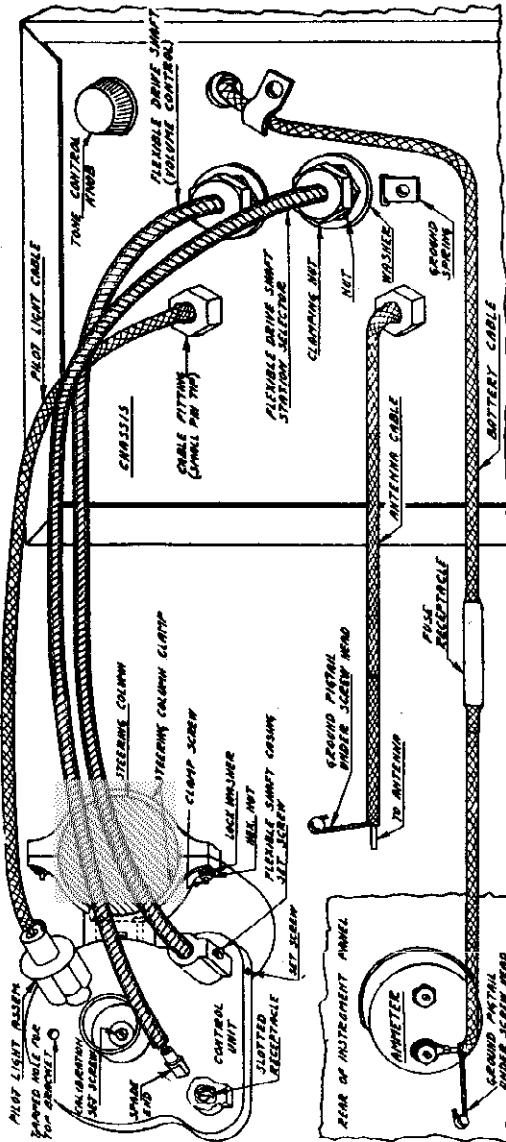


Fig. 4—General Installation View—Control Unit on Steering Column

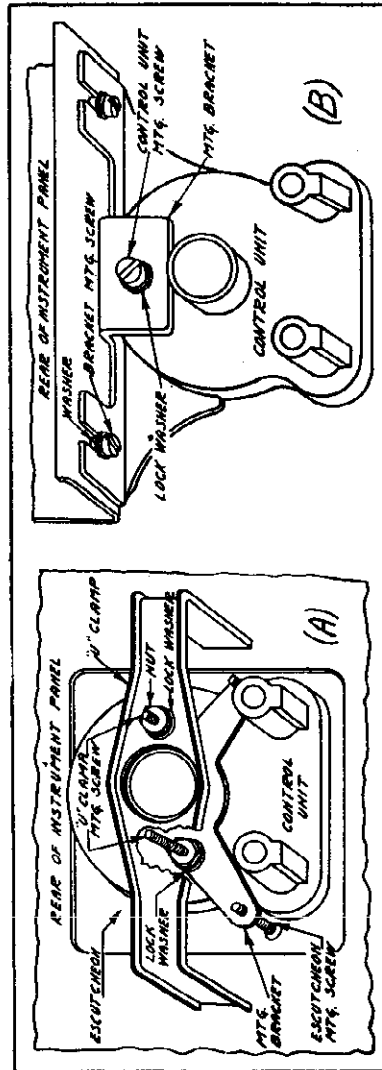


Fig. 5—Mounting Control Unit In and Under the Instrument Panel

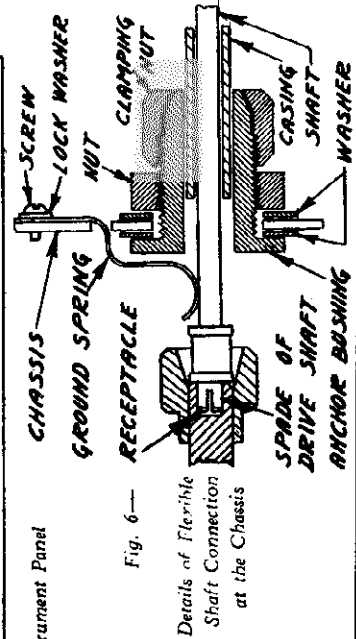


Fig. 6—

Details of Flexible Shaft Connection at the Chassis

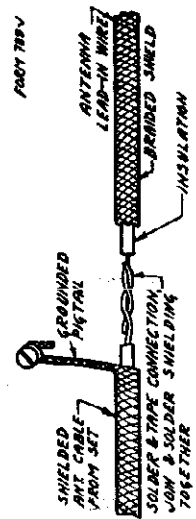


Fig. 7—Extension of Antenna Cable Shield

GAMBLE-SKOGMO, INC.

MODEL 2651

Voltage, Alignment, Socket Trimmers, Resistance Data

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, 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. (Center Tap to inside)	T2	1.8
	(Center Tap to ground)		1.3
9A371-6S	1st I.F. Trans. Primary	T3	58.
9A370-6S	1st I.F. Trans. Secondary	T3	58.
	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.
11N17-6S	Output Trans. Primary	T6	440.
	Output Trans. Sec. and Voice coil in parallel	T6	4.
13X72-6S	Power Trans. Primary	T7	3.
	Power Trans. Secondary	T7	500.
	Filter Choke	T7	300.
92X27-6S	Filament Reactor	L1	Small
9A374-6S	R.F. "B" Choke	L2	3.5
9A268-6S	Pilot Light Choke Assembly	L3	Small
9A375-6S	Speaker Field	L4	5.
12A62A	Motor Noise Choke	L5	Small
9A373-6S		L6	

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)

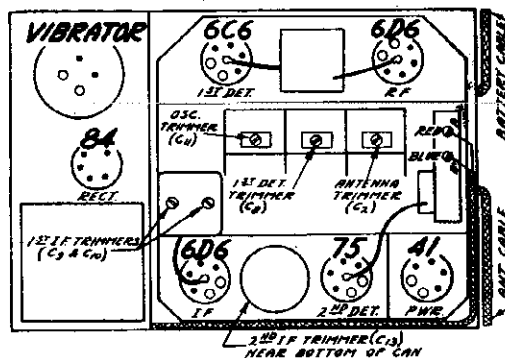


Fig. 2—Tube Sockets and Trimmers

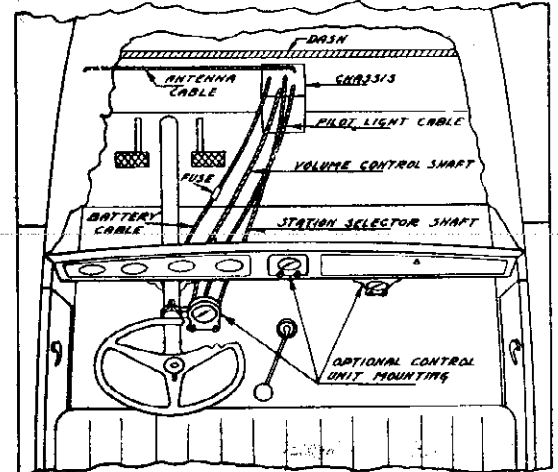
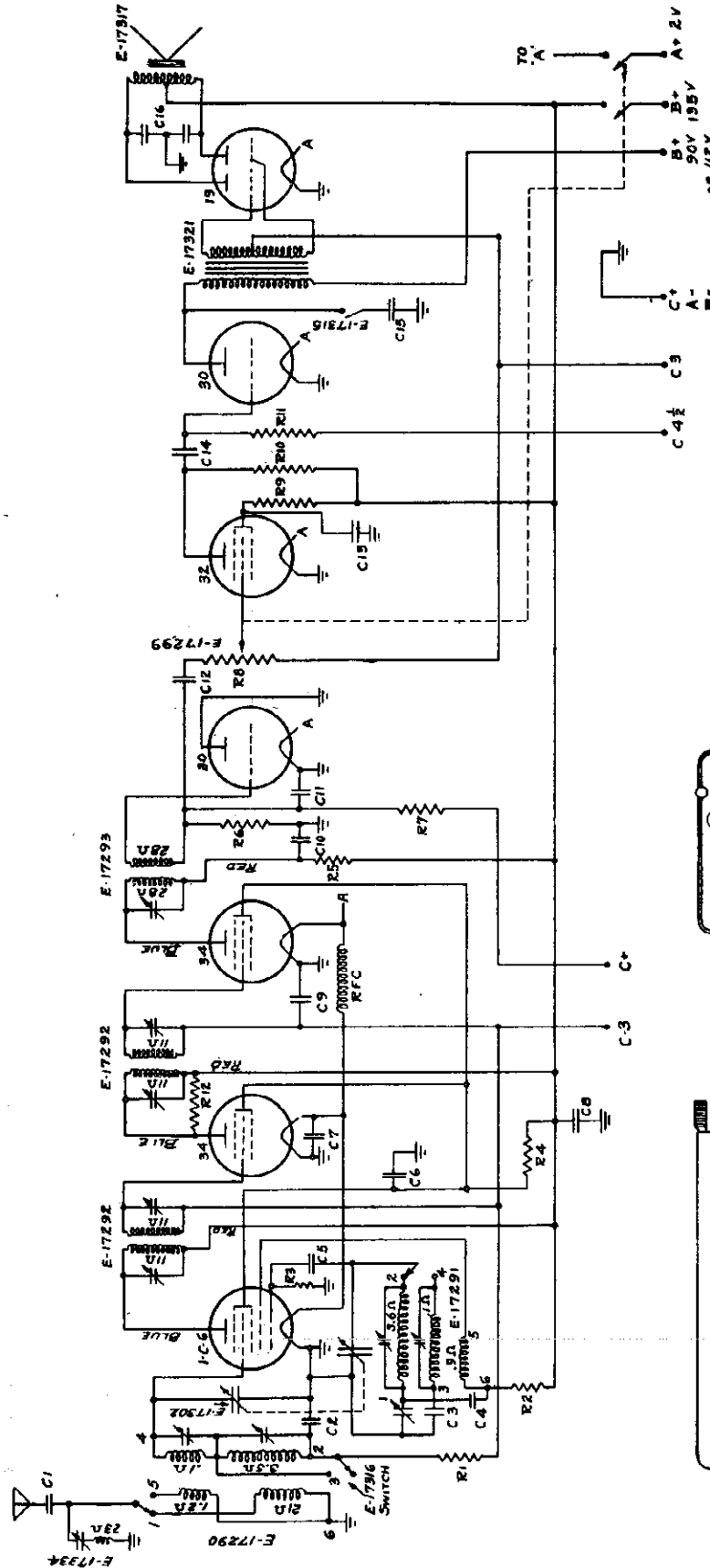


Fig. 1—General Mounting Position

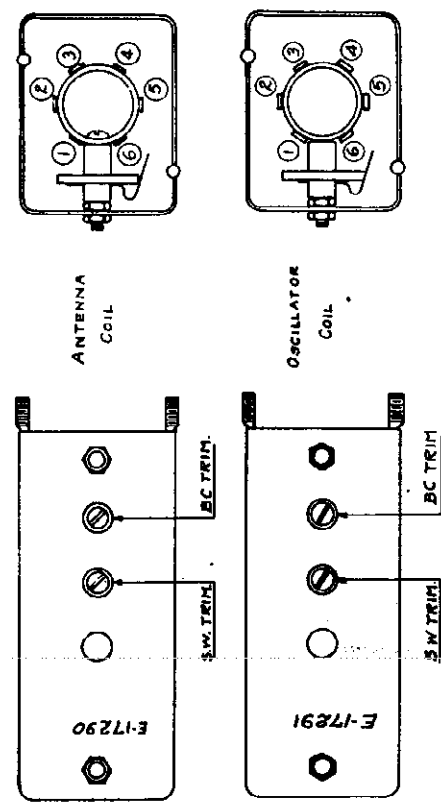
MODEL 77
Schematic

GAMBLE-SKOGMO, INC.



C1	.01	200 V	R1	100,000	OHMS
C2	.05	200 V	R2	10,000	"
C3	.004	MICA	R3	50,000	"
C4	.0025	MICA	R4	20,000	"
C5	.00005	MICA	R5	2,000	"
C6	.25	200 V	R6	500,000	"
C7	.5	100 V	R7	2,000,000	"
C8	.25	200 V	R8	500,000	" VOL. CONT.
C9	.05	200 V	R9	500,000	"
C10	.05	200 V	R10	250,000	"
C11	.001	400 V	R11	1,000,000	"
C12	.01	200 V	R12	100,000	"
C13	.05	200 V			
C14	.01	400 V			
C15	.02	400 V			
C16	.001-.001	800 V			

MODEL 77
BATTERY SET



GAMBLE-SKOGMO, INC.

MODELS 27C1, 27C5
Schematic, Voltage
Socket, Trimmers, Parts

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-A95104	R1	100,000 Ohm	.2	Carbon
P-A98303	R2	30,000 Ohm	.2	Carbon
P-A95104	R3	100,000 Ohm	.2	Carbon
P-A93602	R4	6,000 Ohm	.2	Carbon
P-B93902	R5	9,000 Ohm	.5	Carbon
P-A95505	R6	5 Megohm	.2	Carbon
P-98012	R7	1 Megohm		Volume Control.
P-A95505	R8	5 Megohm	.2	Carbon
P-A94603	R9	60,000 Ohm	.2	Carbon
P-A95104	R10	100,000 Ohm	.2	Carbon
P-A95104	R11	100,000 Ohm	.2	Carbon

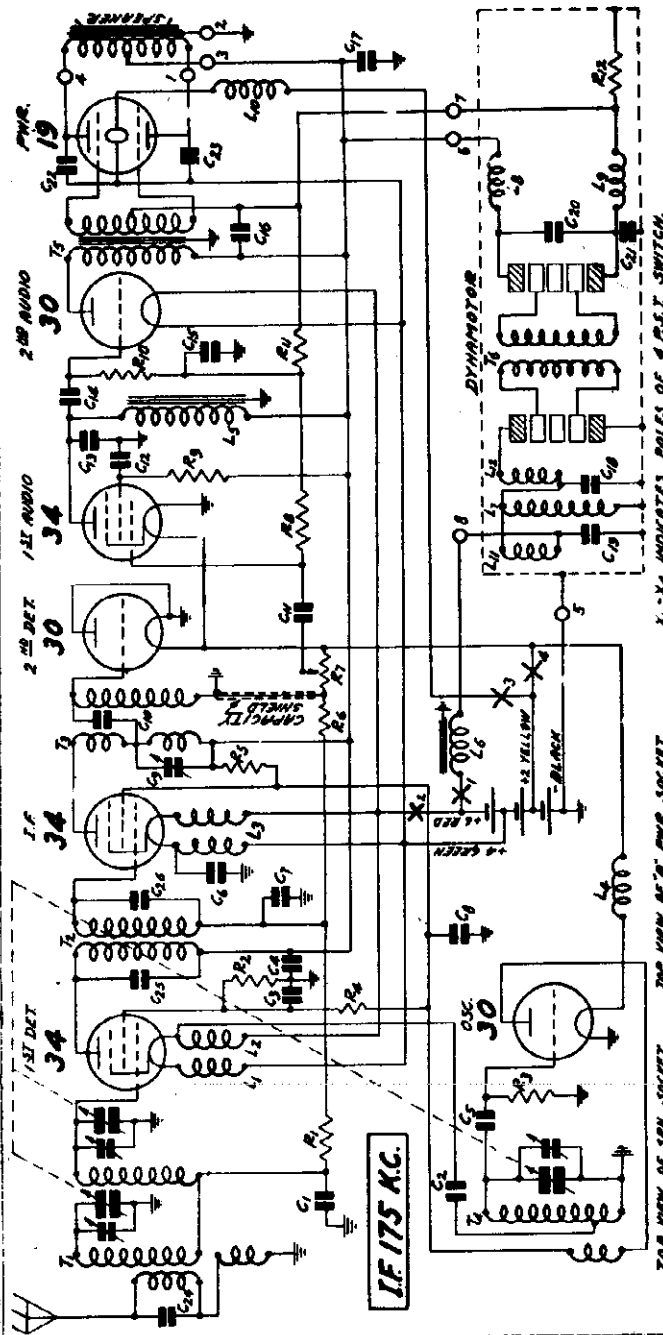
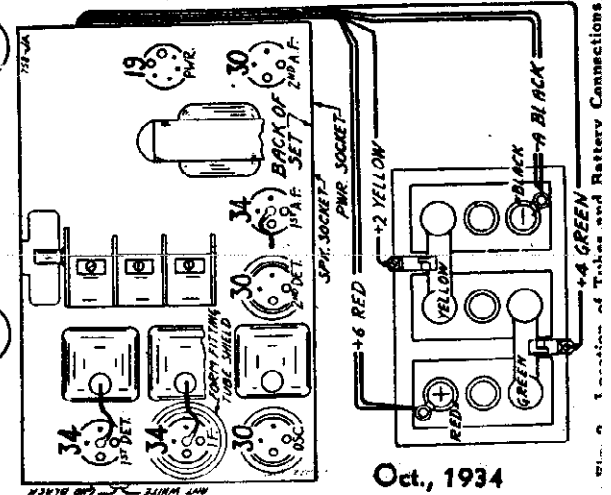


Fig. 1. Schematic Circuit Diagram



CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-80862	C1	0.050 Mf.	200V	Tubular
P-80862	C2	0.050 Mf.	200V	Tubular
P-80862	C3	0.050 Mf.	200V	Tubular
P-80862	C4	0.100 Mf.	200V	Tubular
P-81801	C5	35 Mmf.	Cap. Part of Osc. Coil Assem.	
P-80888	C6	0.250 Mf.	200V	Tubular
P-80862	C7	0.050 Mf.	200V	Tubular
P-80988	C8	1.500 Mf.	140V	Tubular
P-1965	C9	70-140 Mmf.	Trimmer	
P-81800	C10	50 Mmf.	Cap. Part of 2nd I.F. Coil -As.	
P-80981	C11	0.010 Mf.	400V	Tubular
P-80888	C12	0.250 Mf.	200V	Tubular
P-80945	C13	500 Mmf.	Moulded	
P-80862	C14	0.050 Mf.	200V	Tubular
P-80888	C15	0.250 Mf.	200V	Tubular
P-81014	C16	15.00 Mf.	Electrolytic Block	
	C17	15.00 Mf.		
P-80914	C22	0.002 Mf.	800V	Tubular
P-80914	C23	0.002 Mf.	800V	Tubular
P-81812	C24	200 Mmf.	Cap. Part of Ant. Assem.	
P-81807	C25	70 Mmf.	Cap. Part of 1st I.F. Coil As.	
P-81805	C26	45 Mmf.	Cap. Part of 1st I.F. Coil As.	

Three Gang Condenscr.
P-81015

Antenna Shorted to Ground
Voltages at Sockets

Type of Tube	Function	Fila-ment Volt.	Plate to Neg. Filament	Screen to Neg. Filament	Grid to Neg. Filament	Normal Plate M. A.
34	1st Detector	2.0	135	55	8.0 av.	1.90
30	Oscillator	2.0	75		0.0	3.70
34	I. F.	2.0	135	70	3.0 av.	8.00
30	2nd Detector	2.0	2			
34	1st A. F.	2.0	140	65	4.0	2.30
30	2nd A. F.	2.0	135		8.0	3.10
19	Output	2.0	137		8.0	1.00 per plate

MODELS 27C1, 27C5

Drive Cord Adjustment GAMBLE-SKOGMO, INC.

Alignment, Resistance Data

Condenser Alignment

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.

First set the signal generator to a frequency of 175 KC. Connect the antenna lead of the lead 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 KC. 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 KC 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 KC 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.

The use of the cut plate type of condenser eliminates the necessity of a 800 KC padder and no adjustment at this frequency, therefore, is required.

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 Off-On switch 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 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 approxi-

mately 1/4" 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.

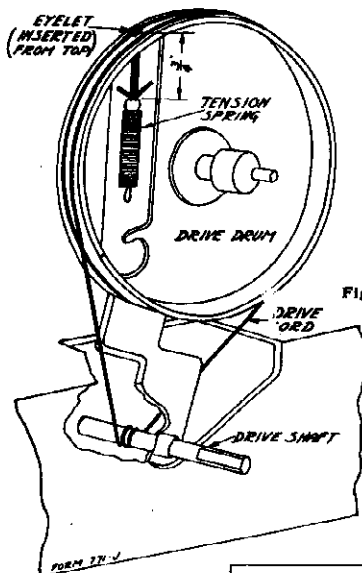


Fig. 4 Drive Cord Replacement.

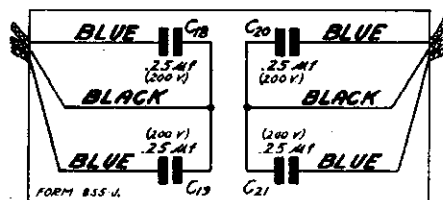


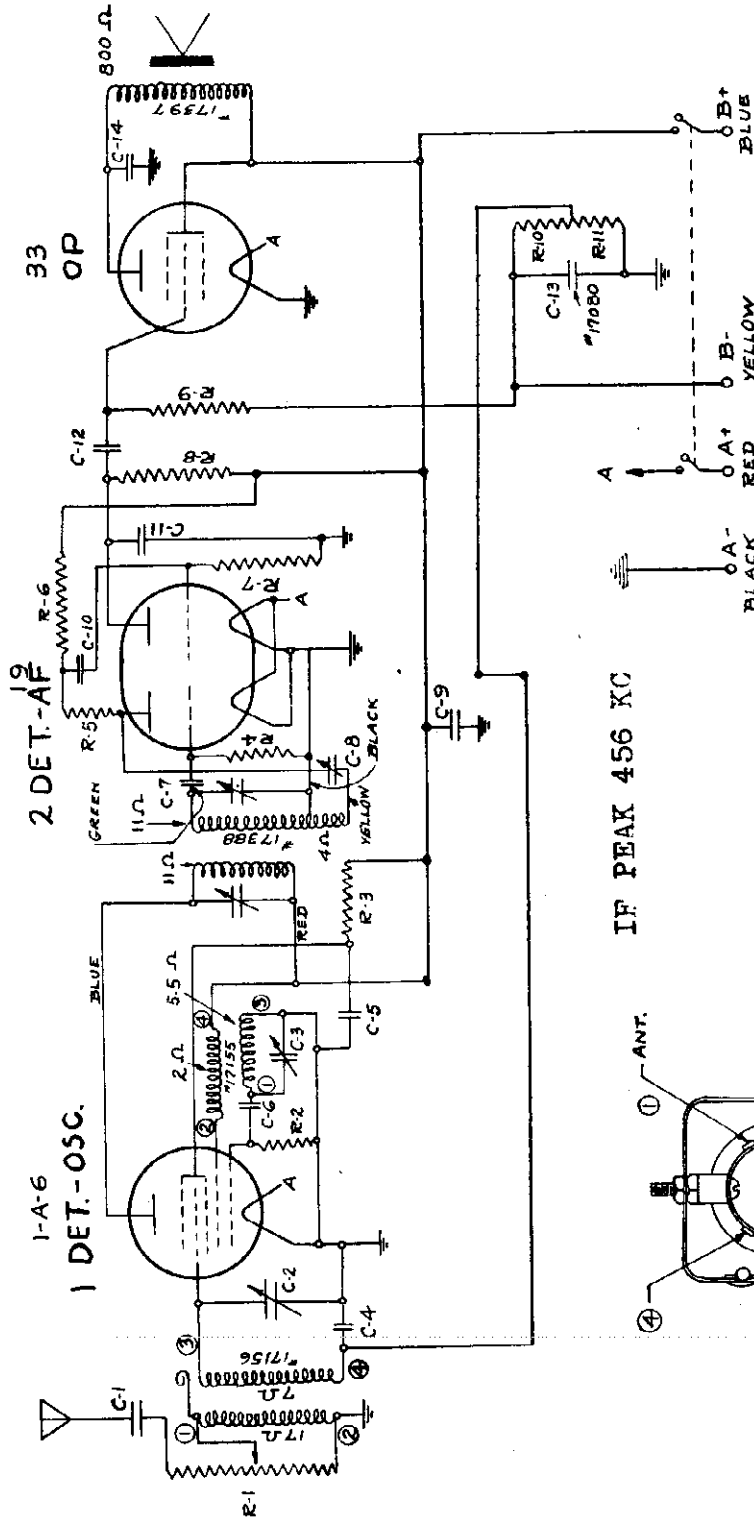
Fig. 3. Four Section Condenser in Power Unit Box

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.

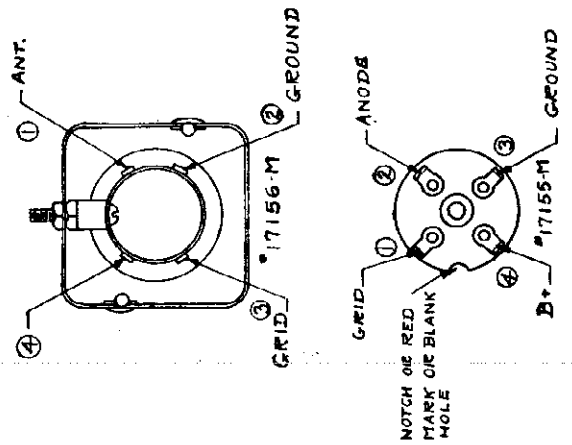
Part No.	Item	Code	D. C. Resistance in Ohms
P-5200	Double Tuned Antenna Transformer, Primaries in series	T1	20.1
	Double Tuned Antenna Transformer Secondary Preslector	T1	3.3
	Double Tuned Antenna Transformer Secondary Detector	T1	3.1
P-5159	Oscillator Grid Coil	T4	3.6
	Oscillator Plate Coil	T4	1.6
P-5170	I. F. Coil Primary	T2	89.
	I. F. Coil Secondary	T2	126.
P-5171	I. F. Reactor Coil Plate Winding	T3	99.
	I. F. Reactor Coil Grid Winding	T3	429.
P-5172	Double Filament Reactor Assembly each section	L1, L2	Small
P-5173	Combined Filament Reactor Assembly each section	L3, L4	Small
P-50621	Audio Plate Reactor	L5	4940.
P-50622	Iron Core Isolating Reactor	L6	Small
P-5222	Filament Reactor	L10	Small
P-50625	Audio Transformer Primary	T5	1086.
	Audio Transformer Secondary (center tap to inside)	T5	614.
	Audio Transformer Secondary (center tap to outside)	T5	665.
P-2010	6" Magnetic Speaker (center tap to inside)		260.
	6" Magnetic Speaker (center tap to outside)		300.

GAMBLE-SKOGMO, INC.



IF PEAK 456 KC

C-1	.01	200V	R-1	10,000 VOL. CONTROL 17381
C-2	TUNING COND. 370-0T		R-2	50,000
C-3			R-3	15,000
C-4	.05	200V	R-4	2,000,000
C-5	.01	200V	R-5	10,000
C-6	.0002	MICA	R-6	250,000
C-7	.0002	MICA	R-7	1,000,000
C-8	.00008	REGENERATION	R-8	250,000
C-9	.25	200V	R-9	1,000,000
C-10	.01	200V	R-10	400
C-11	.0005	600V	R-11	100
C-12	.01	200V		
C-13	10 MFD. 25 V ELECTROLYTIC.			
C-14	.002	800V		

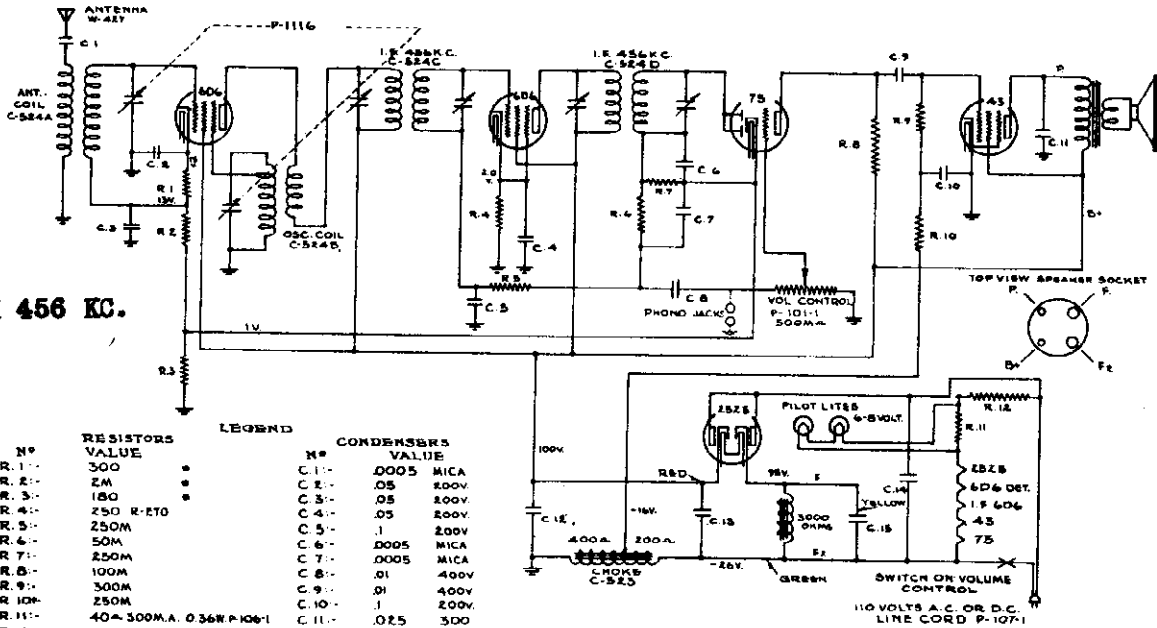


MODEL 430
BATTERY RADIO

MODEL 540
Schematic, Socket
Alignment, Parts
Voltage

GAMBLE-SKOGMO, INC.

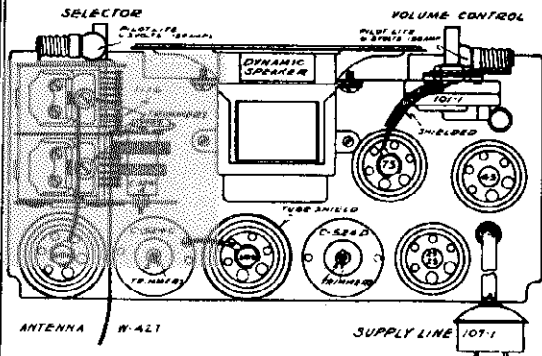
IF PEAK 456 KC.



LEGEND

RESISTORS		CONDENSERS	
N ^o	VALUE	N ^o	VALUE
R. 1-	300	C. 1-	.0005 MICA
R. 2-	2M	C. 2-	.05 200V
R. 3-	180	C. 3-	.05 200V
R. 4-	250 R-ETO	C. 4-	.05 200V
R. 5-	250M	C. 5-	.1 200V
R. 6-	50M	C. 6-	.0005 MICA
R. 7-	250M	C. 7-	.0005 MICA
R. 8-	100M	C. 8-	.01 400V
R. 9-	300M	C. 9-	.01 400V
R. 10-	250M	C. 10-	.1 200V
R. 11-	40-300M. 0.36W P-106-1	C. 11-	.025 500
R. 12-	126 IN CORDMOT-1	C. 12-	5.0MFD. C-525D
		C. 13-	25.0MFD. *
		C. 14-	.1 400V
		C. 15-	5.0MFD *

NOTE:-
* R. 1, R. 2 & R. 3 IN ONE UNIT PART NUMBER R-248.
* C. 13 AND C. 15 IN ONE UNIT PART NUMBER C-525-C
NUMBERS PREFIXED BY LETTERS ARE PARTS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL MEASURED ON A.C. CURRENT



SERVICE NOTES

Should it be at any time necessary to rebalance this set, the correct procedure is as follows:

1. Volume control on full during all alignment.
2. Variable condenser in minimum capacity position, plates open, at start of all aligning.

I.F. ALIGNMENT

1. To peak I.F. transformers, connect oscillator set at 456 kilocycles to the grid of the 6D6 tube directly in back of the variable condenser and adjust the trimming condensers of the I.F. transformers to resonance (Maximum deflection on an output meter connected across the primary of the speaker input transformer).

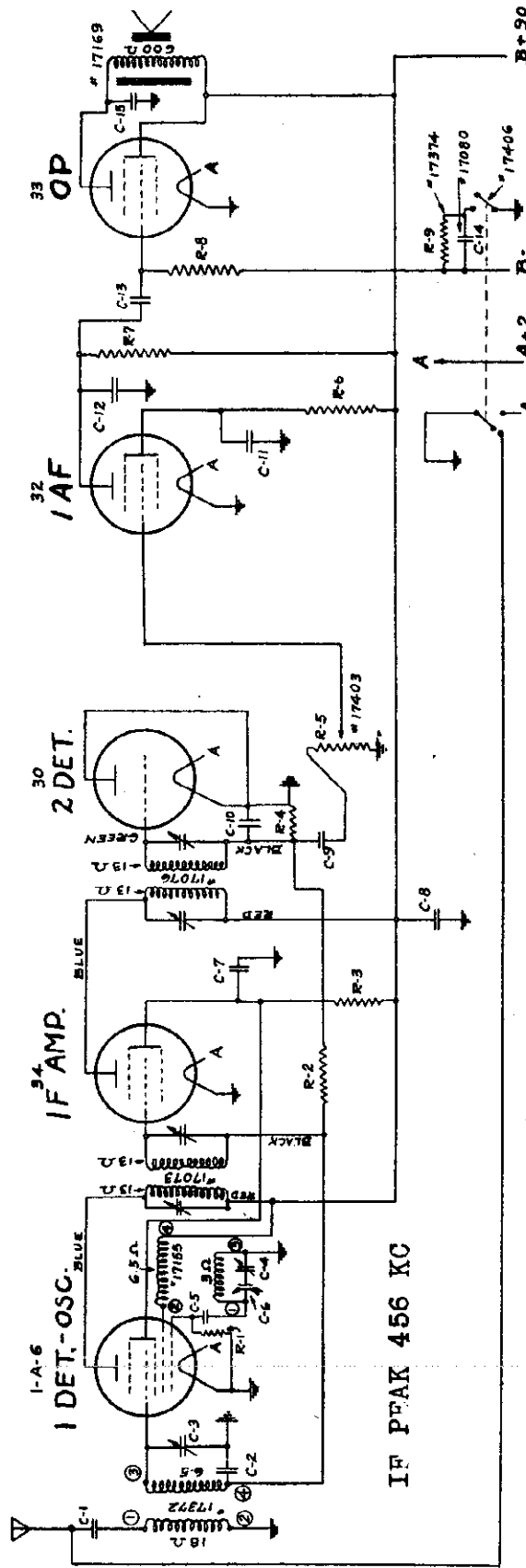
Each I.F. trimmer has two adjustments, one nut and one screw, both of which are adjustable from the top.

BROADCAST BAND ALIGNMENT

1. Disconnect antenna wire and connect oscillator in series with a 75 mfd. condenser to the antenna coil. With the variable condenser set at its minimum capacity position, at the extreme right of its rotation, and with an oscillator output adjusted to 1720 kilocycles, adjust trimmer of oscillator section of variable condenser (rear section) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer). Next adjust the trimmer condenser of the front section of the variable condenser to resonance.
2. Check alignment at 1400-1200-1000-800-600-530 kilocycles, bending the slotted plates of the front section of the variable condenser only if absolutely necessary.

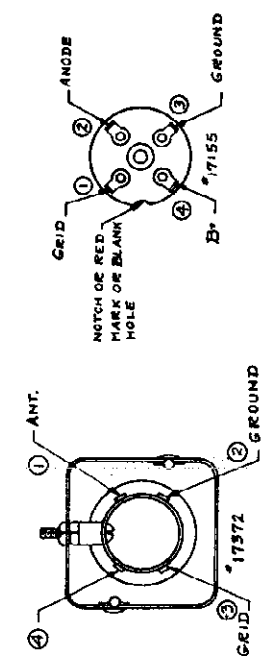
Part No.	Description	Part No.	Description
C-524B	Oscillator Coil	C-524C	Input I.F. Transformer
101-1	Volume Control with Switch	C-524D	Output I.F. Transformer
106-1	40 Ohm Resistor-10%	G-525C	5-25 Mfd. Electrolytic Condenser
107-1	126 Ohm Special Cord and Plug	G-525D	5 Mfd. Electrolytic Condenser
G-523	600 Ohm Choke	R-268	2480 Ohm Resistor
C-524A	Antenna Coil	R-270	250 Ohm Wire Wound Resistor

GAMBLE-SKOGMO, INC.



C-1	.01	200Y
C-2	.05	200Y
C-3		.00037 TUNING COND.
C-4		.00002 MICA
C-5		.0005 PAD
C-6	.05	200Y
C-7	.25	200Y
C-8	.01	200Y
C-9	.0005	600V
C-10	.05	200Y
C-11	.0005	600Y
C-12	.01	.200Y
C-13		10 MFD. 25Y ELECTROLYTIC
C-14		.002
C-15		800Y
R-1	50,000	
R-2	2,000,000	
R-3	15,000	
R-4	500,000	
R-5	500,000 VOL. CONTROL	
R-6	500,000	
R-7	250,000	
R-8	1,000,000	
R-9	500	

MODEL 550
BATTERY RADIO



MODEL 575

Schematic, Socket
Voltage, Alignment

GAMBLE-SKOGMO, INC.

Service Notes

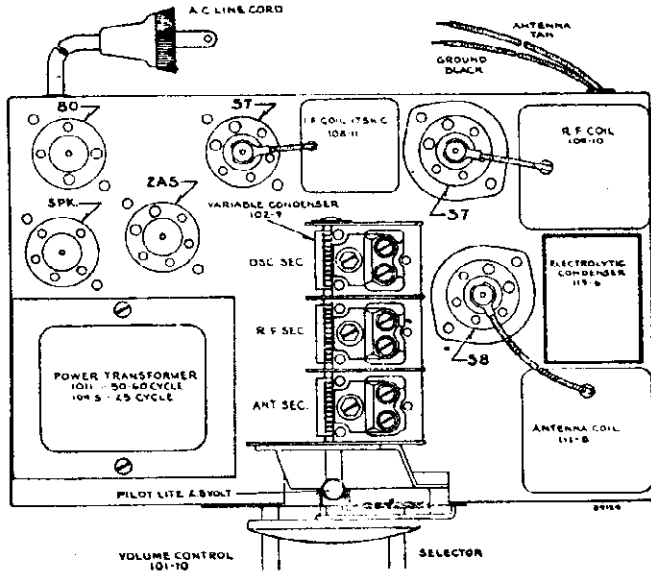
Voltages taken from different points of circuit to chassis are measured with volume control full on, using a voltmeter having a resistance of 1000 ohms per volt. These voltages are indicated on the schematic circuit diagram.

Part No. 145-2

- Common Black to Brown —.003 x 600 Volts
- Common Black to Green —.1 x 200 Volts
- Common Black to Red —.1 x 200 Volts
- Common Black to Orange —.25 x 200 Volts
- Blue to Blue —.05 x 400 Volts

Part No. 145-3

- Common Black to Brown —.1 x 200 Volts
- Common Black to Green —.05 x 200 Volts
- Common Black to Orange —.05 x 200 Volts
- Common Black to Yellow —.05 x 200 Volts



Aligning I. F. Transformer

1. With volume control full on, at extreme right of its rotation, and with variable condenser at its maximum capacity position (extreme right of its rotation) make the following adjustments:

- (a) Connect an external oscillator adjusted to 175 kilocycles, in series with a .1 mfd. condenser, to the control grid cap of the type 57 tube located between the R. F. coil (part numbers 109-10) and the I. F. transformer (part number 108-11) and chassis.
- (b) Adjust trimming condensers of I. F. transformer (part number 108-11) to resonance. See top view of chassis. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or between the plate and screen terminals of the type 2A5 tube, by means of an adapter. Maximum deflection of the meter indicates resonance. Care must be taken to use only enough signal to give a readily readable output, as excessive input will result in overload and a false resonance point.

NOTE: The two trimmer condensers which tune the primary and secondary of the I. F. transformer are adjusted by set screws accessible from the back of the chassis.

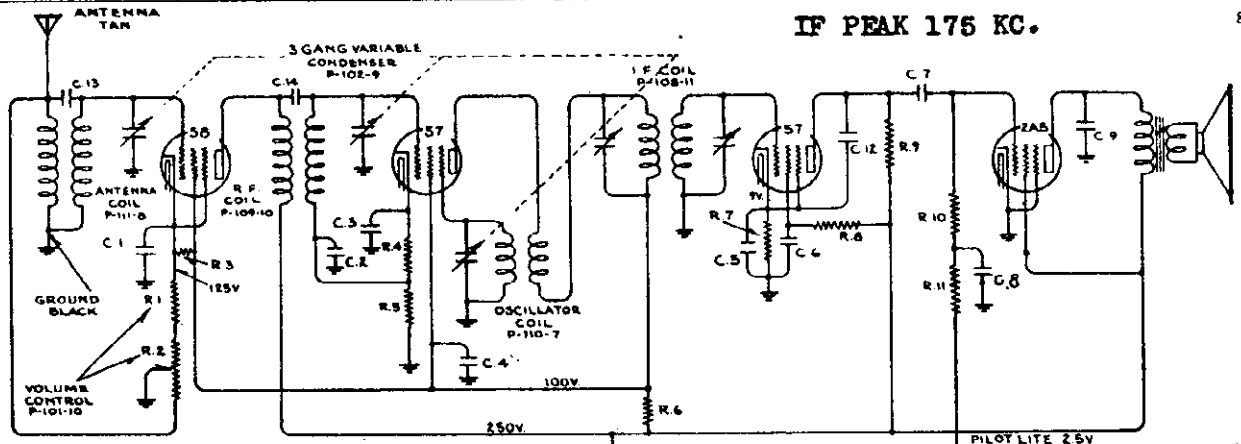
Aligning R. F. and Oscillator Circuits

1. Connect the external oscillator set at 1720 kilocycles and in series with a 200 Mfd. condenser, between the antenna (tan) and ground (black) leads.

- (a) With volume control full on and variable condenser plates in minimum capacity position, plates entirely out of mesh (extreme left of its rotation), adjust trimmer of rear oscillator section of variable condenser to resonance.
- (b) Shift external oscillator frequency from 1720 to 1400 kilocycles, pick up signal by rotating variable condenser and peak R. F. (center) and antenna (front) section trimmers of variable condenser to resonance.
- (c) Check tracking at 1500, 1200, 1000, 800, 600 and 530 kilocycles by changing external oscillator frequency and rotating variable condenser to pick up signal. Adjust slotted end plates of R. F. (center) and antenna (front) sections to increase output, if necessary. DO NOT BEND OSCILLATOR PLATES.

IF PEAK 175 KC.

8-1-34



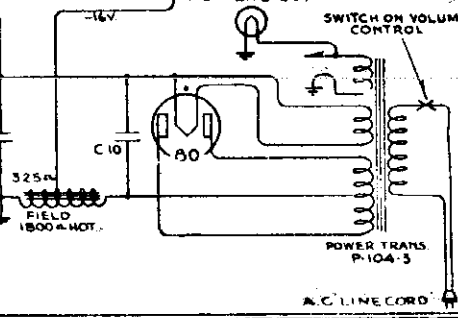
CONDENSERS

NO	VALUE
C 1	.05X200V
C 2	.05X200V
C 3	.05X200V
C 4	.1X200V
C 5	.25X200V
C 6	.1X200V
C 7	.05X200V
C 8	.1X200V
C 9	.003X600V
C 10	.80MED X 400V
C 11	.80MFD X 400V
C 12	.001 MICA
C 13	1047 GIMMICK
C 14	447 GIMMICK

RESISTORS

NO	VALUE
R 1	100
R 2	75M
R 3	50M 1/2W
R 4	480
R 5	5M
R 6	19M
R 7	50M 1/2W
R 8	1MEG 1/2W
R 9	250M 1/2W
R 10	200M 1/2W
R 11	300M 1/2W

NOTE -
CONDENSERS C 10, C 11, IN ONE UNIT P-119-6
CONDENSERS C 1, C 2, C 3, C 4 IN ONE UNIT P-145-3
RESISTORS R 4, R 5, IN ONE UNIT P-106-10
NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS
PHRASE GIMMICK IS A WIRE WOUND AROUND ANOTHER WIRE
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND, VOLUME CONTROL ON FULL, CONDENSERS C 5, C 6, C 7, C 8, C 9 IN ONE UNIT P-145-2

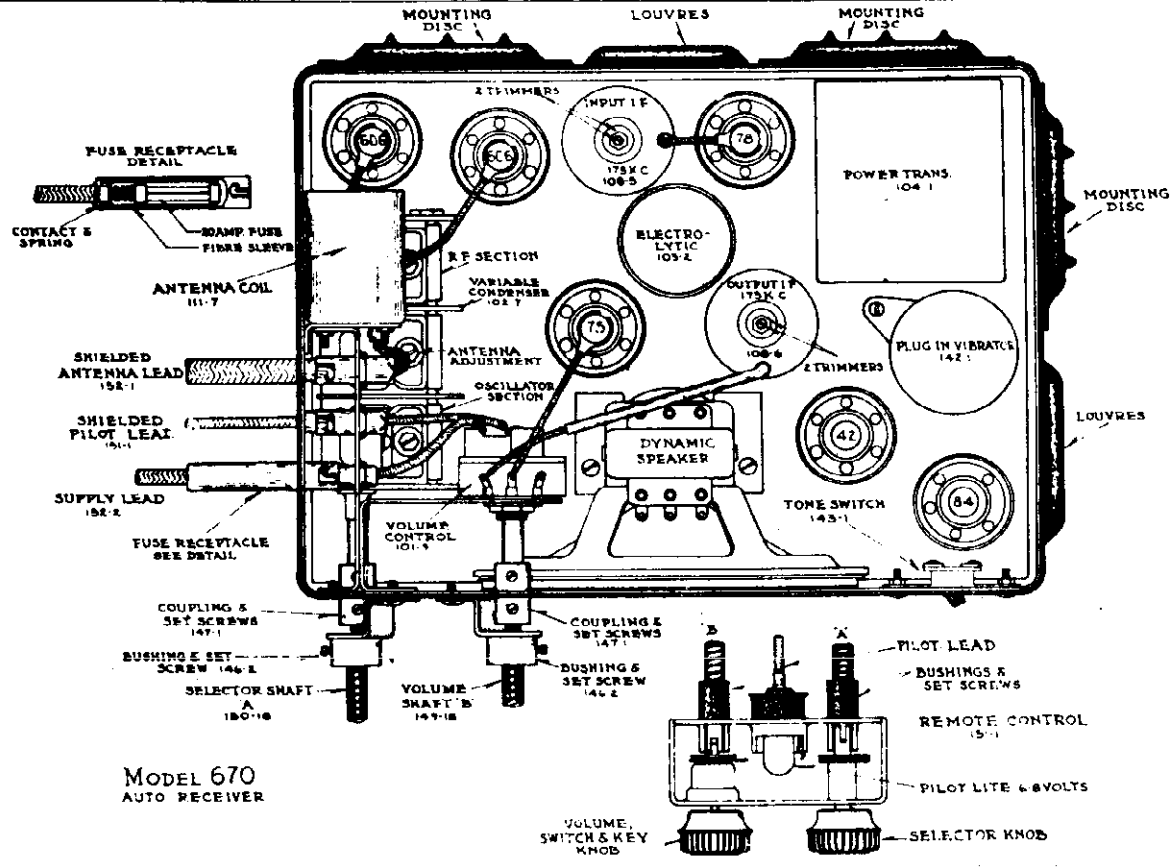
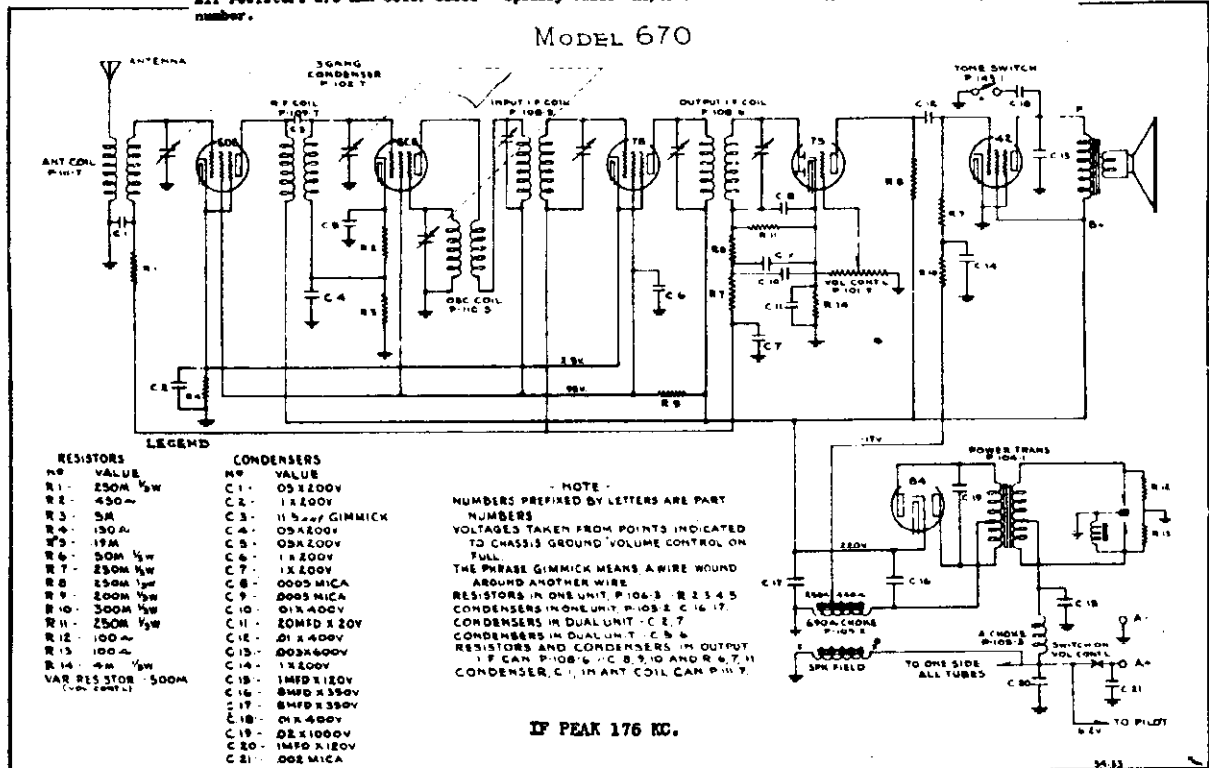


GAMBLE-SKOGMO, INC.

MODEL 670
Schematic, Voltage
Socket, Trimmers

Vibrators can be reconditioned at a cost of \$5.00 each, if the old unit is returned.

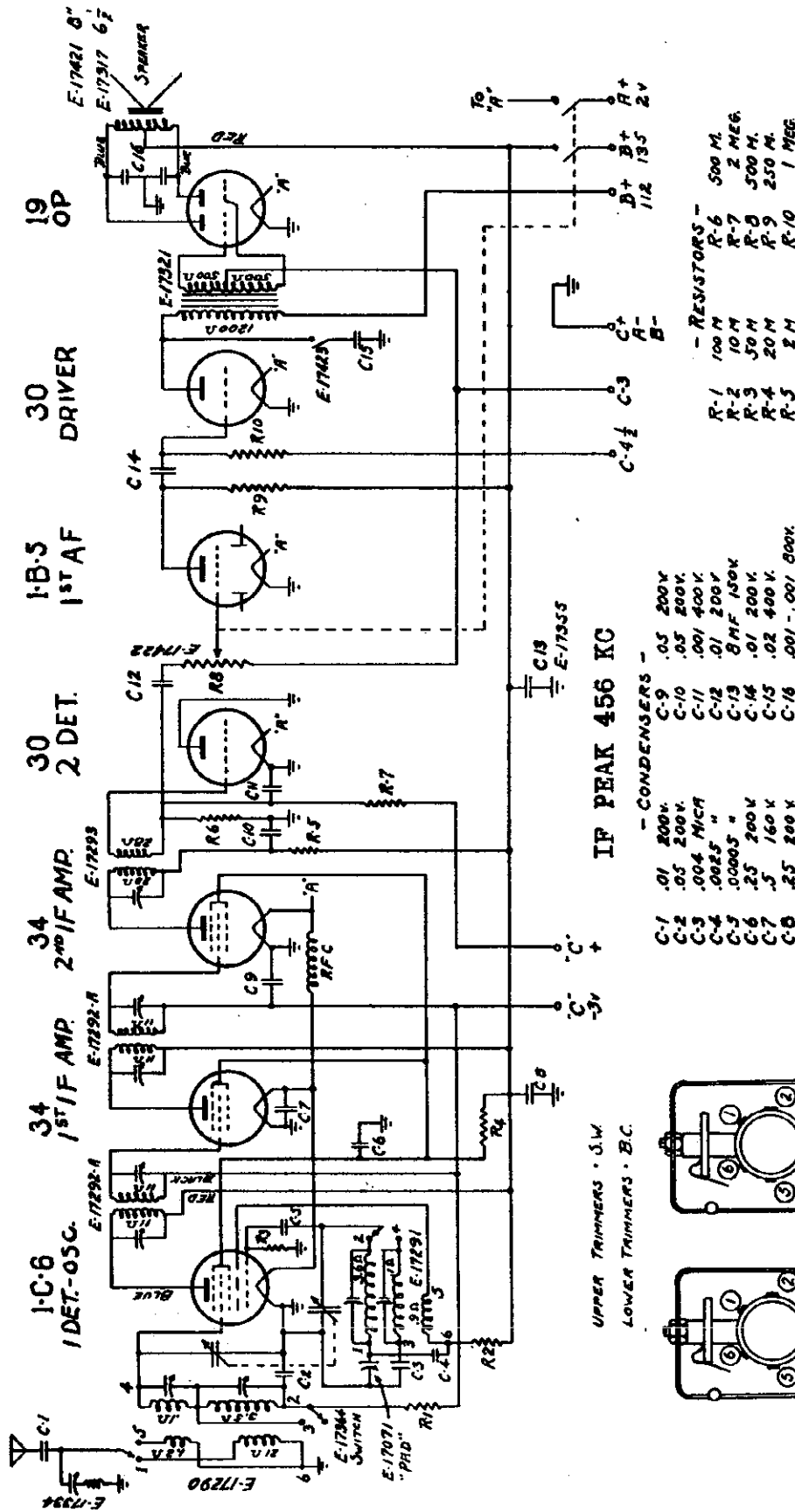
All resistors are EIA color coded - specify value and/or resistor number (per schematic diagram) and model number.



MODEL S 780, 780B

Schematic

GAMBLE-SKOGMO, INC.

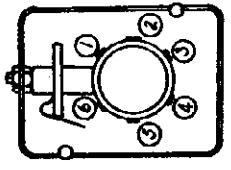


- RESISTORS -
- R-1 100 M
 - R-2 10 M
 - R-3 50 M
 - R-4 20 M
 - R-5 5 M
 - R-6 500 M
 - R-7 2 MEG
 - R-8 500 M
 - R-9 250 M
 - R-10 1 MEG

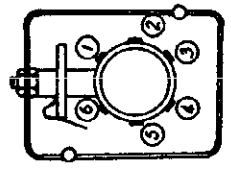
- CONDENSERS -
- C-1 .01 200V
 - C-2 .05 200V
 - C-3 .004 MICR
 - C-4 .0025 "
 - C-5 .00005 "
 - C-6 .25 200V
 - C-7 .5 160V
 - C-8 .25 200V
 - C-9 .05 200V
 - C-10 .05 200V
 - C-11 .001 400V
 - C-12 .01 200V
 - C-13 5MF 150V
 - C-14 .01 200V
 - C-15 .02 400V
 - C-16 .001-.001 500V

MODEL 780 & 780-B
BATTERY RADIO

UPPER TRIMMERS - J.W.
LOWER TRIMMERS - B.C.



E-17291
OSC.



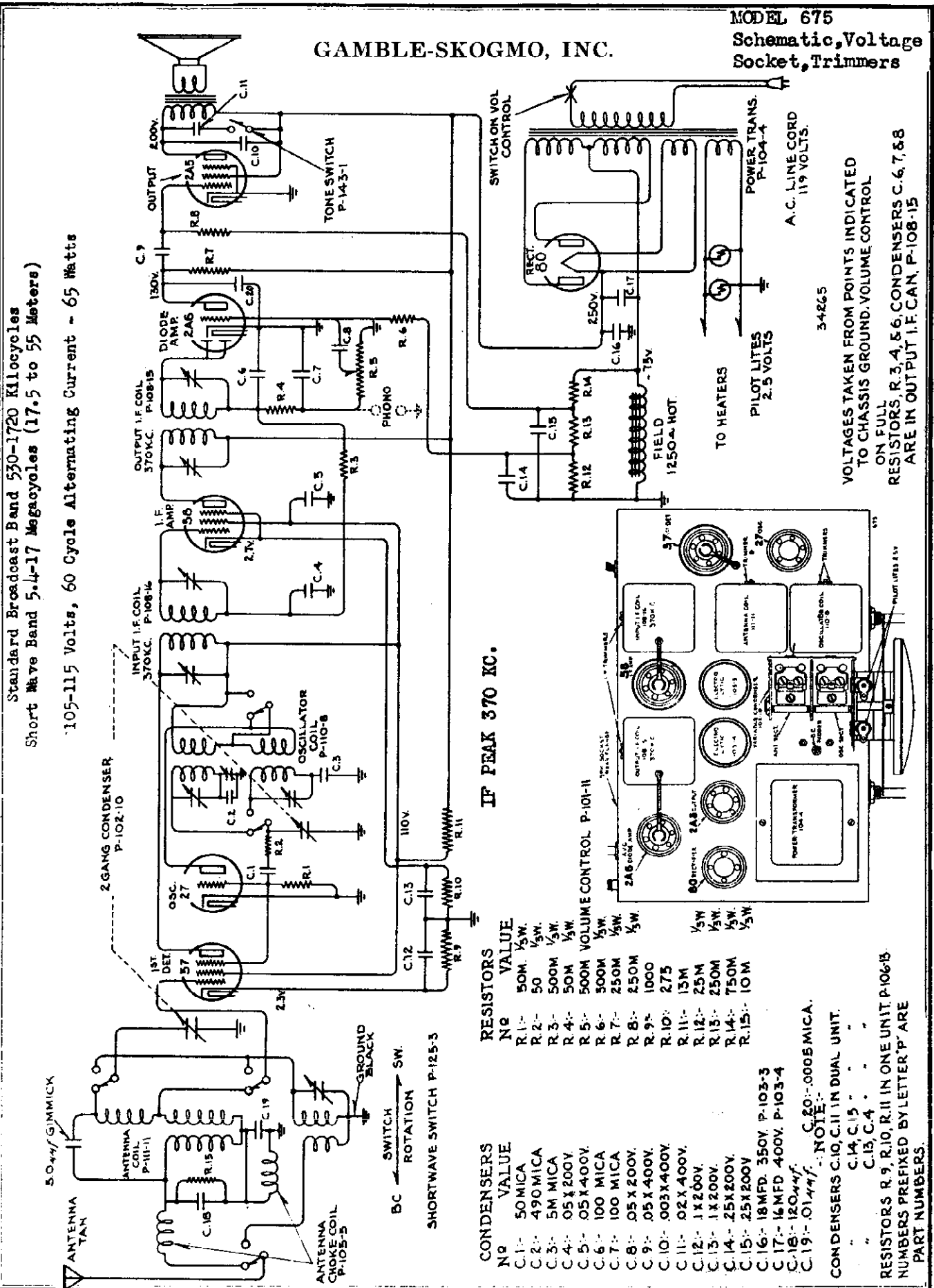
E-17290
ANT.

8-17-35 KRC

GAMBLE-SKOGMO, INC.

MODEL 675
Schematic, Voltage
Socket, Trimmers

Standard Broadcast Band 530-1720 Kilocycles
Short Wave Band 5.4-17 Megacycles (17.5 to 55 Meters)
105-115 Volts, 60 Cycle Alternating Current - 65 Watts



IF PEAK 370 KC.

CONDENSERS	RESISTORS
No	No
VALUE	VALUE
C.1- 50 MICA	R.1- 50M 1/2W.
C.2- 490 MICA	R.2- 50 1/2W.
C.3- 5M MICA	R.3- 500M 1/2W.
C.4- 05 X 200V.	R.4- 50M 1/2W.
C.5- 05 X 400V.	R.5- 500M 1/2W.
C.6- 100 MICA	R.6- 500M 1/2W.
C.7- 100 MICA	R.7- 250M 1/2W.
C.8- 05 X 200V.	R.8- 250M 1/2W.
C.9- 05 X 400V.	R.9- 1000 1/2W.
C.10- 003 X 400V.	R.10- 275 1/2W.
C.11- 02 X 400V.	R.11- 13M 1/2W.
C.12- 1 X 200V.	R.12- 25M 1/2W.
C.13- 1 X 200V.	R.13- 250M 1/2W.
C.14- 25 X 200V.	R.14- 750M 1/2W.
C.15- 25 X 200V.	R.15- 10M 1/2W.
C.16- 18 MFD. 350V. P-103-3	
C.17- 16 MFD 400V. P-103-4	
C.18- 120 MFD.	
C.19- .01 MFD.	

NOTE: C.20- .0005 MICA.
CONDENSERS C.10, C.11 IN DUAL UNIT.
C.14, C.15 - "
C.13, C.4 - "
RESISTORS R.9, R.10, R.11 IN ONE UNIT P-106-B
NUMBERS PREFIXED BY LETTER 'P' ARE
PART NUMBERS.

MODEL 675
Alignment

GAMBLE-SKOGMO, INC.

SERVICE NOTES

Voltages taken from different points of the circuit are measured with a voltmeter having a resistance of 1000 ohms per volt and are made between the points indicated and the chassis pan. These voltages are indicated on the 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.

ALIGNMENT:

No aligning adjustments should be made until the set has been thoroughly checked for all other possible causes of trouble, such as poor installations, low line voltages, defective tubes, condensers and resistors.

ALIGNING I.F. TRANSFORMERS:

1. With volume control full on, at the extreme right of its rotation, and with wave selector switch in the broadcast position, extreme left of its rotation, and with variable condenser at its minimum capacity position, extreme left of its rotation, plates entirely out of mesh, adjust the I.F. transformers (parts number 108-15 and 108-16) in the following manner:
 - (a) Connect an external oscillator which has been adjusted to 370 kilocycles, in series with a .1 mfd. condenser to the control grid cap of the type 57 first detector tube (see diagram and chassis).
 - (b) Adjust trimming condensers of both I.F. transformers (Parts number 108-15 and 108-16) to resonance. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between plate and screen terminals of type 2A5 output tube. Maximum deflection of the meter indicates resonance. Care should be taken to use only enough signal to give a readily readable output.

Note: The two adjustments on each transformer are accessible through holes in the transformer cans from the back of the chassis.

BROADCAST BAND ALIGNMENT:

1. Shift frequency of external oscillator to 535 kilocycles and connect in series with a 200 mmfd. condenser to the tan antenna wire and the black ground wire.
 - (a) Set the variable condenser in its maximum capacity position, extreme right of its rotation.
 - (b) Adjust the broadcast oscillator series trimmer to resonance with oscillator. This trimmer is located between the gang condenser and the power transformer (see top view).
2. Shift frequency of external oscillator to 1712 kilocycles and set variable condenser in its minimum capacity position, extreme left of its rotation, plates entirely out of mesh.
 - (a) Adjust the broadcast oscillator shunt trimmer to resonance. This adjustment is the top adjustment in the oscillator coil can, part number 110-8.

SHORT WAVE BAND ALIGNMENT:

1. Set the wave changing switch in the short wave position, extreme right of its rotation, and change external oscillator frequency to 15 megacycles.
 - (a) Adjust variable condenser with selector knob so that pointer is opposite the 15 megacycle calibration on the dial.
 - (b) Adjust the short wave oscillator shunt trimmer to resonance with the signal (use extreme care and make certain that you do not adjust to resonance with the image instead of the signal). This trimmer is the bottom trimmer (closest to the chassis) on the oscillator coil, part number 110-8, and is accessible from the side of the chassis.
 - (c) Adjust the short wave antenna trimmer to resonance (single trimmer in antenna can, part number 111-11, accessible from the side of the chassis, between type 27 and 57 tubes).

NOTES:

Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. This drive may be dis-assembled by removing the two screws which fasten it to the dial bracket. The part number of the compression spring is 112-31. All of the other dial parts are hardened and should cause no trouble.

GAROD RADIO CO.

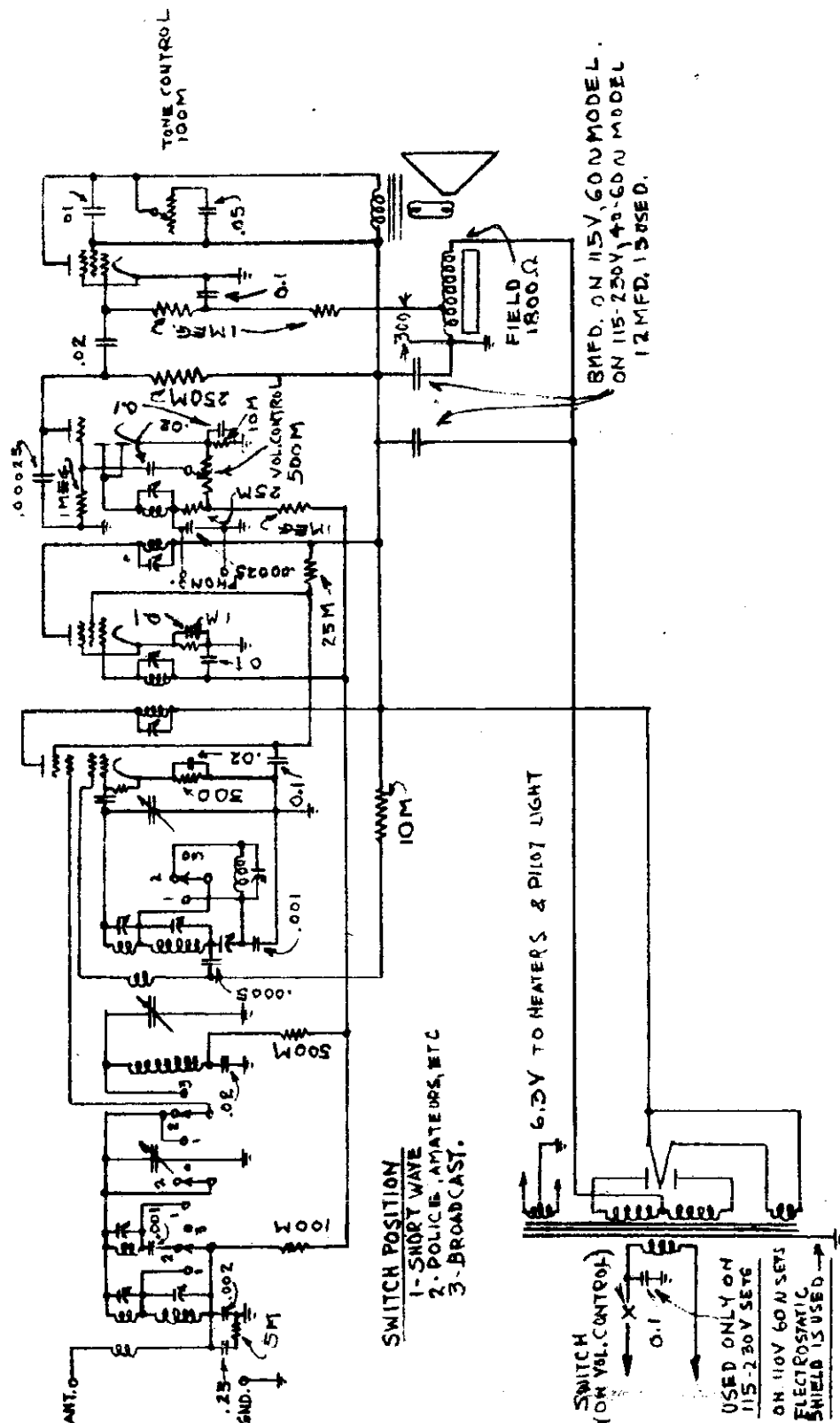
MODEL 25
Schematic

SCHEMATIC CIRCUIT
BROADCAST, POLICE & SHORT WAVE
A.C. RECEIVER

USED ON
MODEL 25
SCALE

MATERIAL	DATE 1/5/35
STOCK PER	DR. D.S.T.
FINISH	TR.
TOOL NOS.	CH. J.B.V.
MAKE ALSO	APPROVED

ALTERATION TABLE	
LET. ITEM	IN'L APP. DATE



SWITCH POSITION
1- SHORT WAVE
2- POLICE, AMATEURS, ETC
3- BROADCAST.

SWITCH
(ON VAL. CONTROL)
USED ONLY ON
115-230V SETS
ON 110V 60W SETS
ELECTROSTATIC
SHIELD IS USED

8MFD. ON 115V 60W MODEL
ON 115-230V 40-60W MODEL
12 MFD. 150V D.

MODEL 27
Schematic

GAROD RADIO CO.

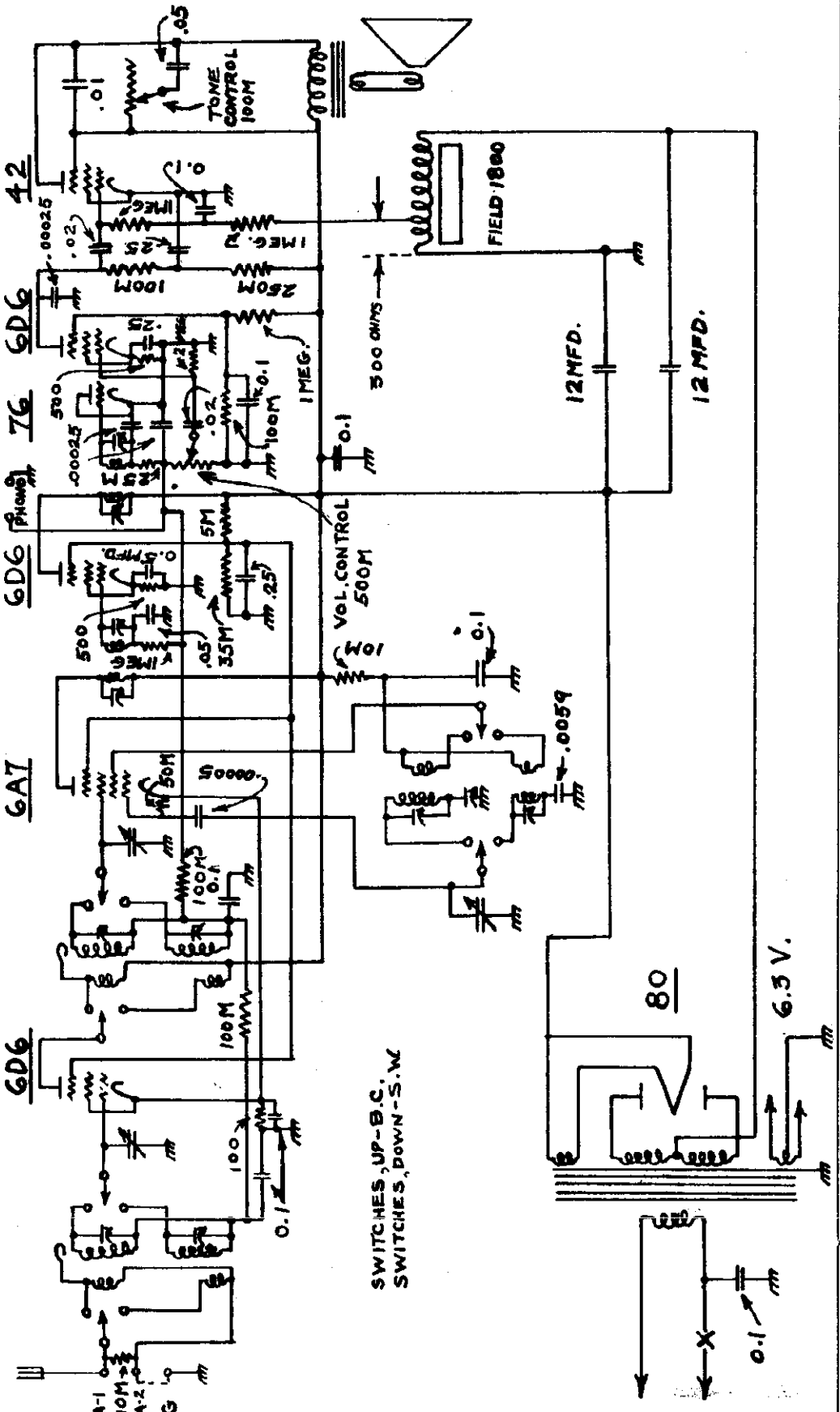
GAROD RADIO CORP.
NEW YORK CITY, N.Y.
SCHEMATIC CIRCUIT
7 TUBE AC.
B.C. & S.W. RECEIVER

USED ON MODEL 27 SCALE

DATE	12/1/34
DR.	B.G.T.
TR.	
CH.	J.B.V.
APPROVED	

MATERIAL	
STOCK PER	
FINISH	
TOOL NOS.	
MAKE ALSO	

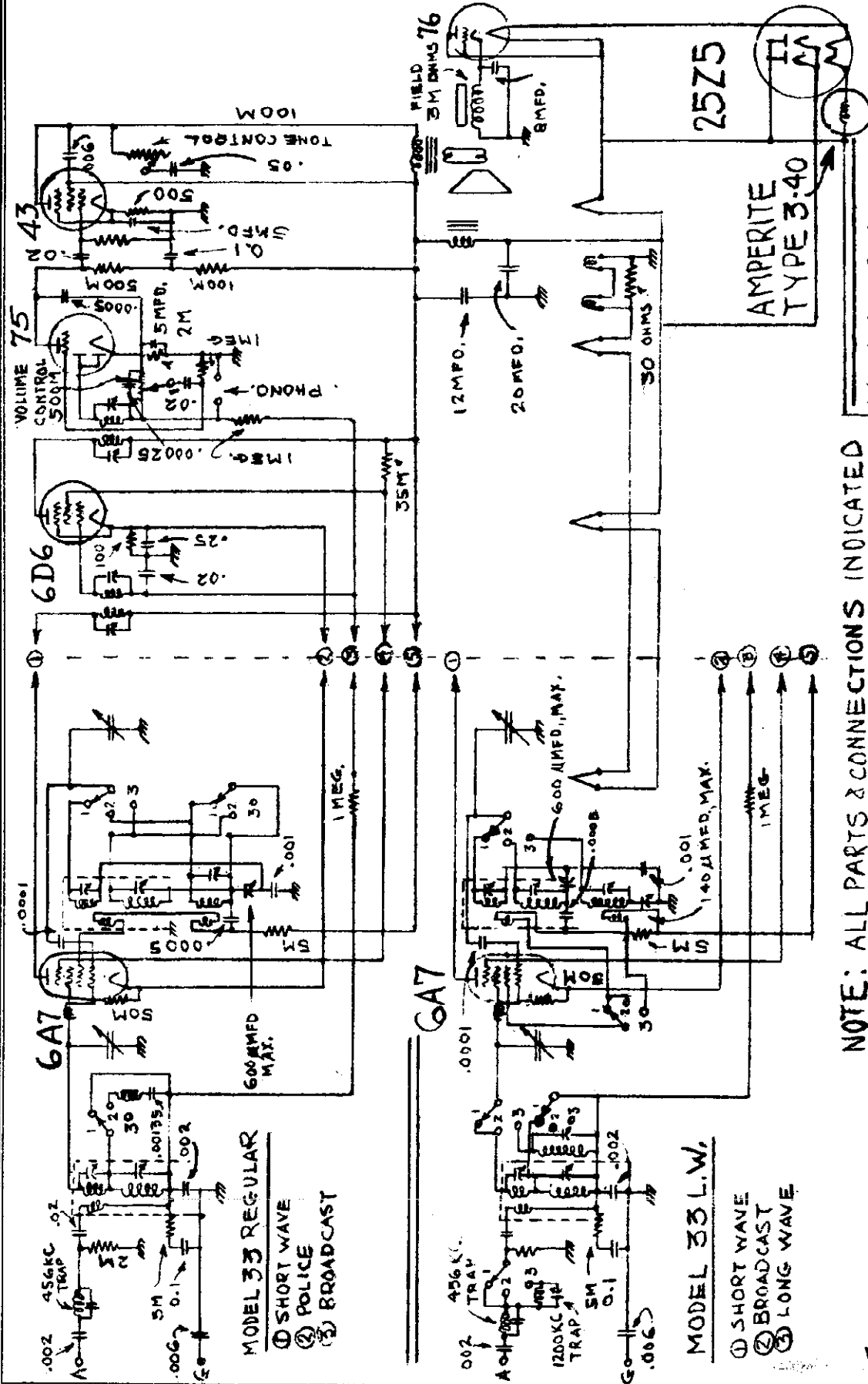
ALTERATION TABLE		IN'L	APP.	DATE
LET. ITEM	WAS			



SWITCHES, UP-B.C.
SWITCHES, DOWN-S.W.

GAROD RADIO CO.

MODEL 33
MODEL 33-LW
Schematic



MODEL 33 & 33 L.W.
 DRAWN BY [Signature]
 CHECKED BY [Signature]
 APPROVED BY [Signature]
 DATE 3/13/25

NOTE: ALL PARTS & CONNECTIONS INDICATED TO RIGHT OF DOTTED LINE ARE IDENTICAL ON MODEL 33 & 33 L.W.

MODEL 58
Schematic

GAROD RADIO CO.

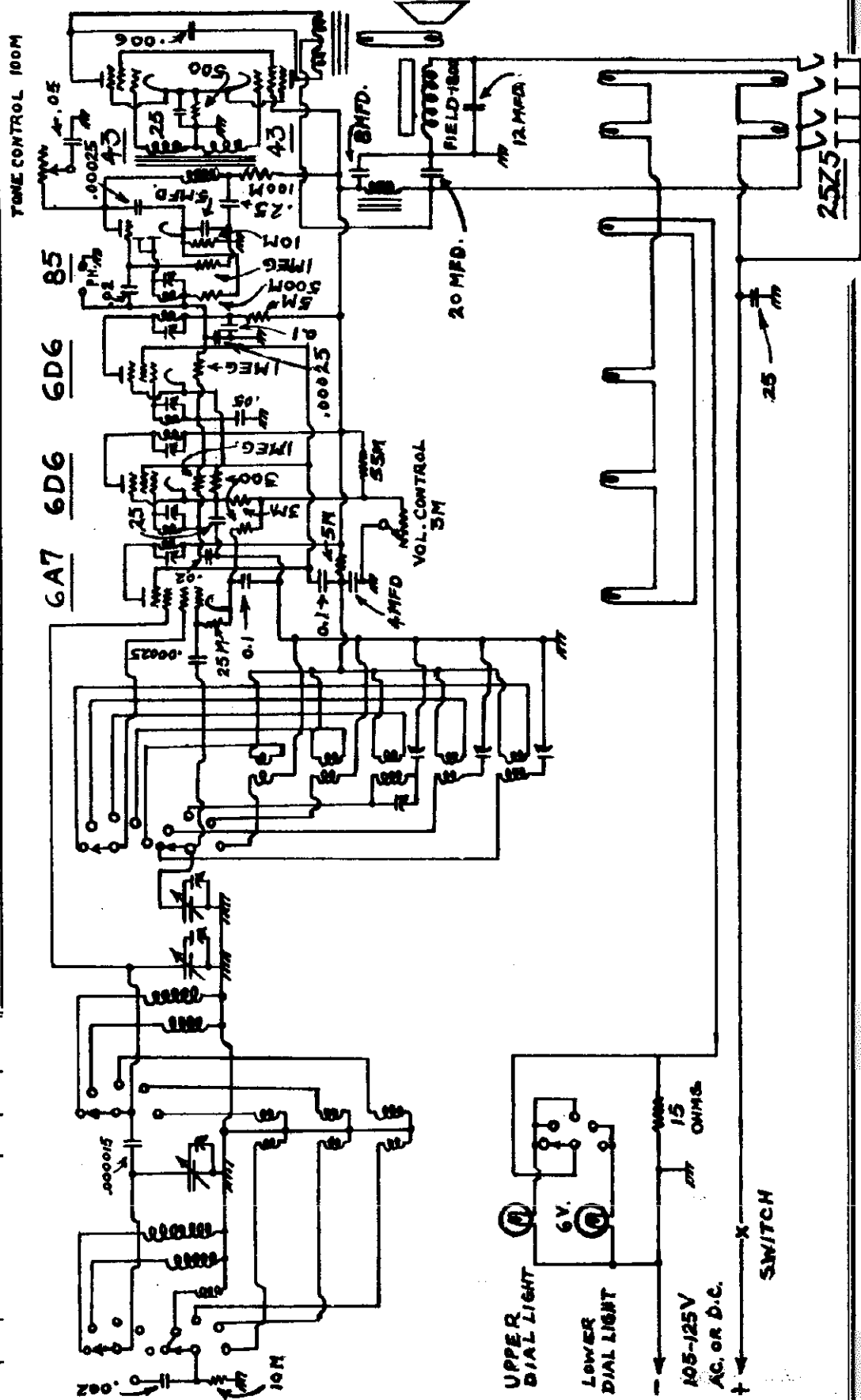
SCHEMATIC CIRCUIT
8 TUBE AC-DC.
ALL-WAVE RECEIVER

USED ON
MODEL 58
SCALE

DATE	12/4/54
DR.	BST
TR.	
CH.	J.B.V.
APPROVED	

STOCK PER	
FINISH	
TOOL NOS.	
MAKE ALSO	

LET. ITEM		WAS		IN'L	APP.	DATE



GAROD RADIO CO.

MODEL 66
Schematic

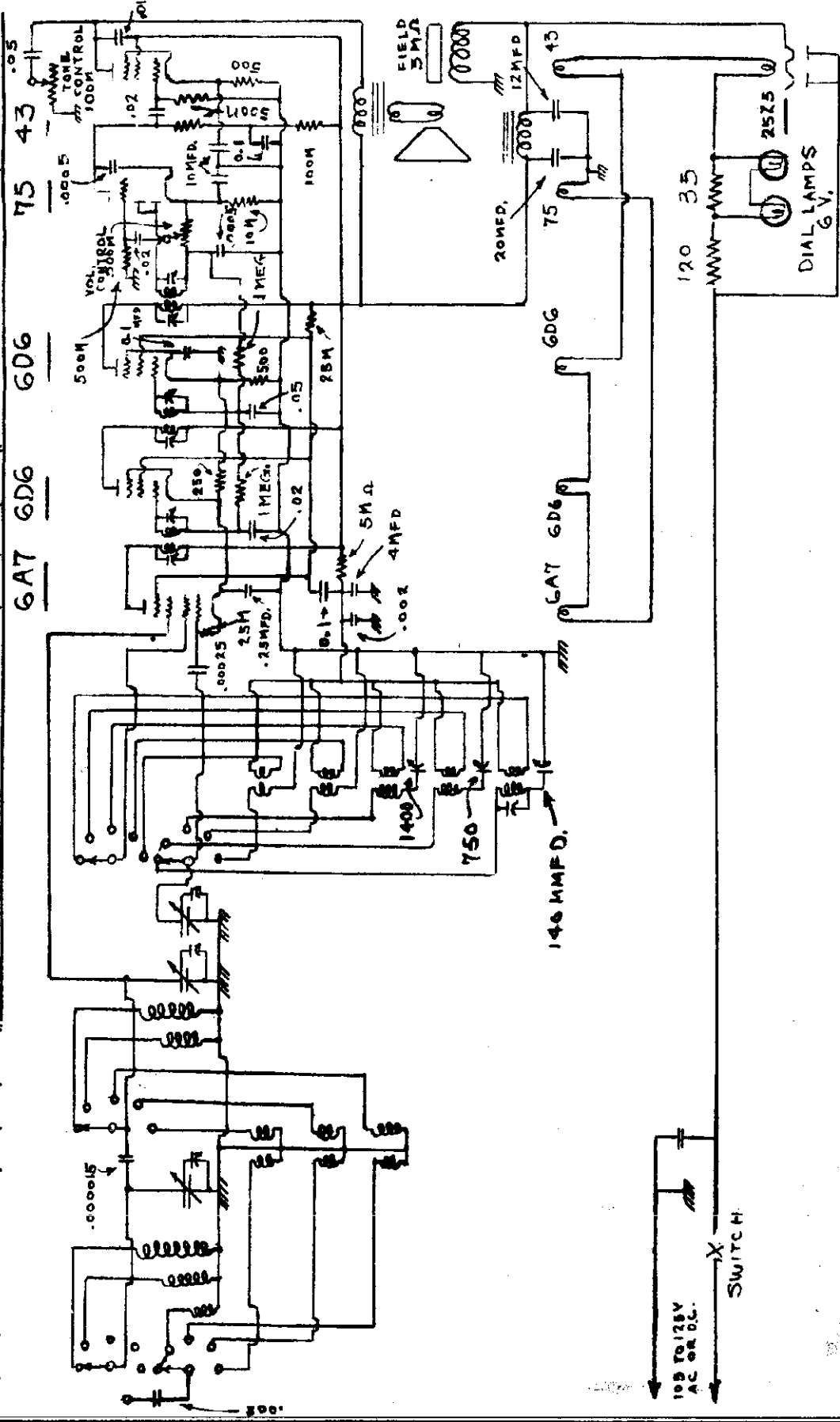
SCHEMATIC CIRCUIT
AC-DC
ALL WAVE RECEIVER

USED ON
MODEL 66
SCALE

DATE	5/20/54
DR.	BRT
TR.	
CH.	BLL
APPROVED	<i>[Signature]</i>

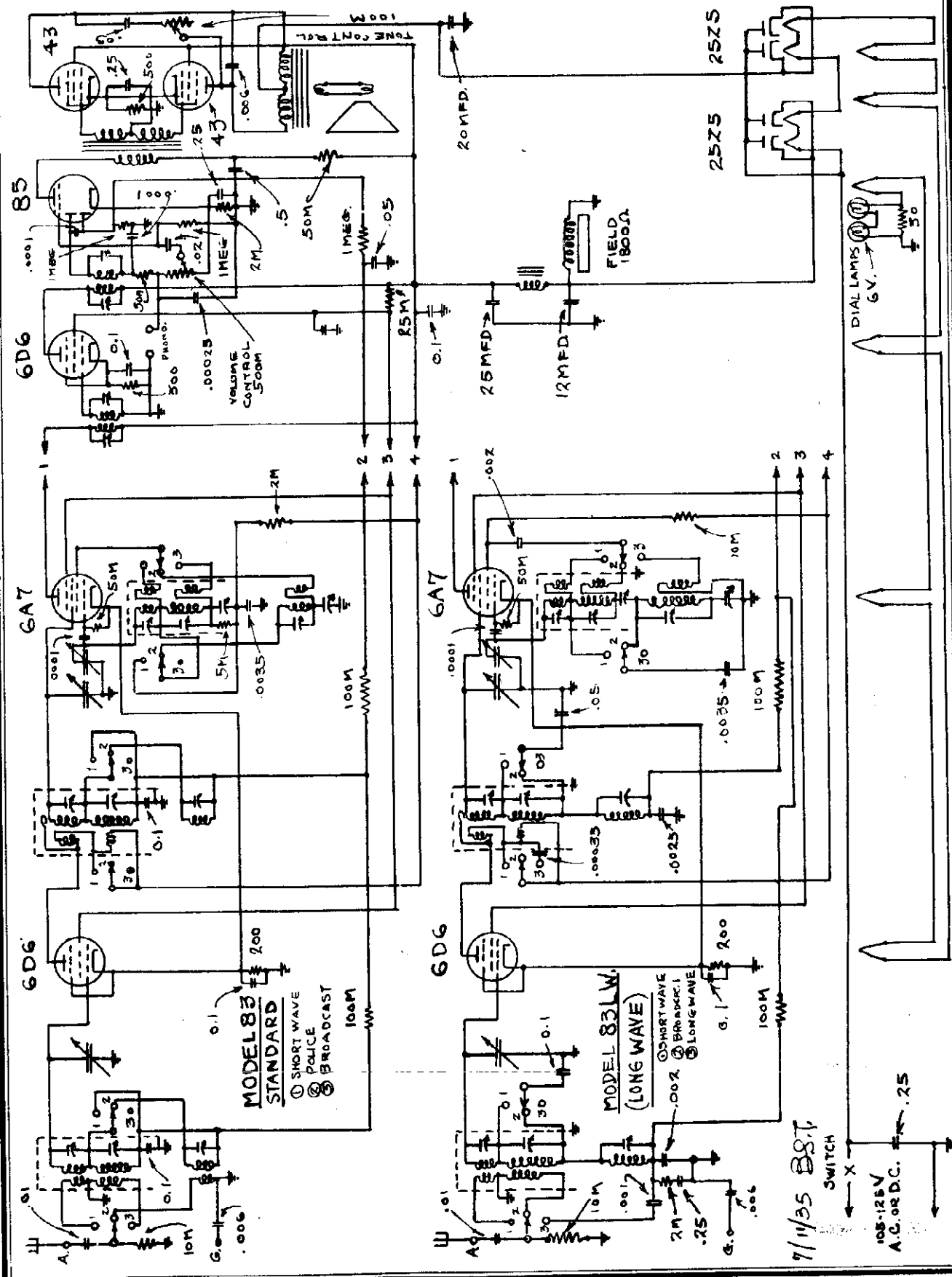
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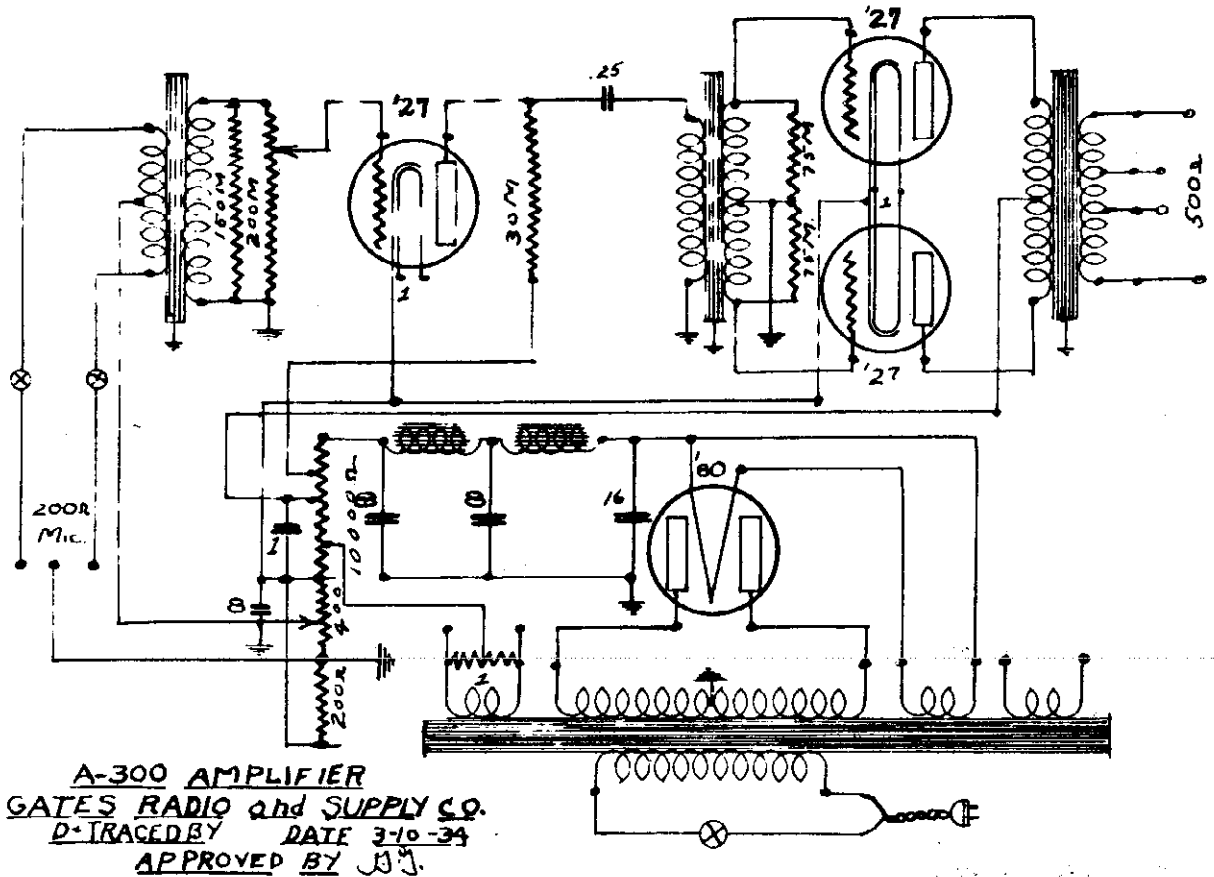
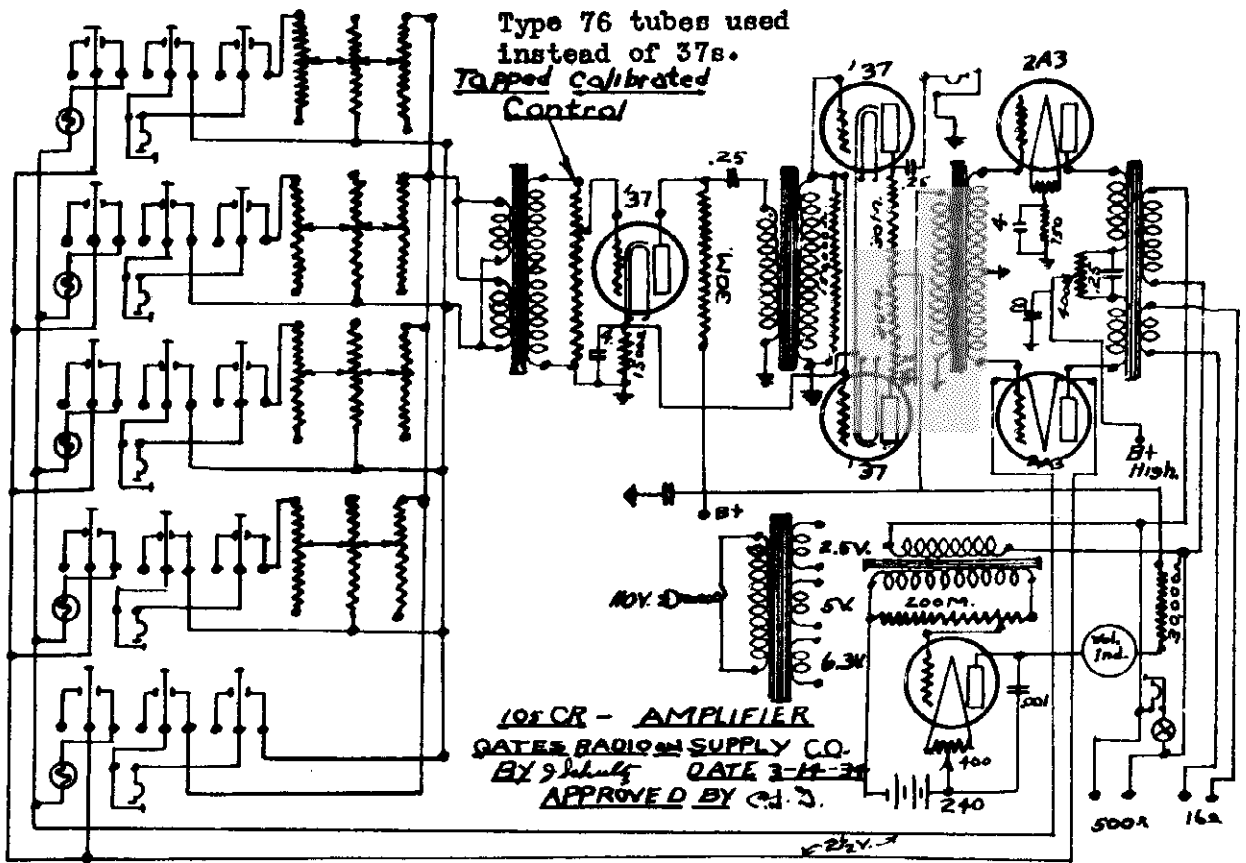


MODEL 83
MODEL 83-LW
Schematics

GAROD RADIO CO.

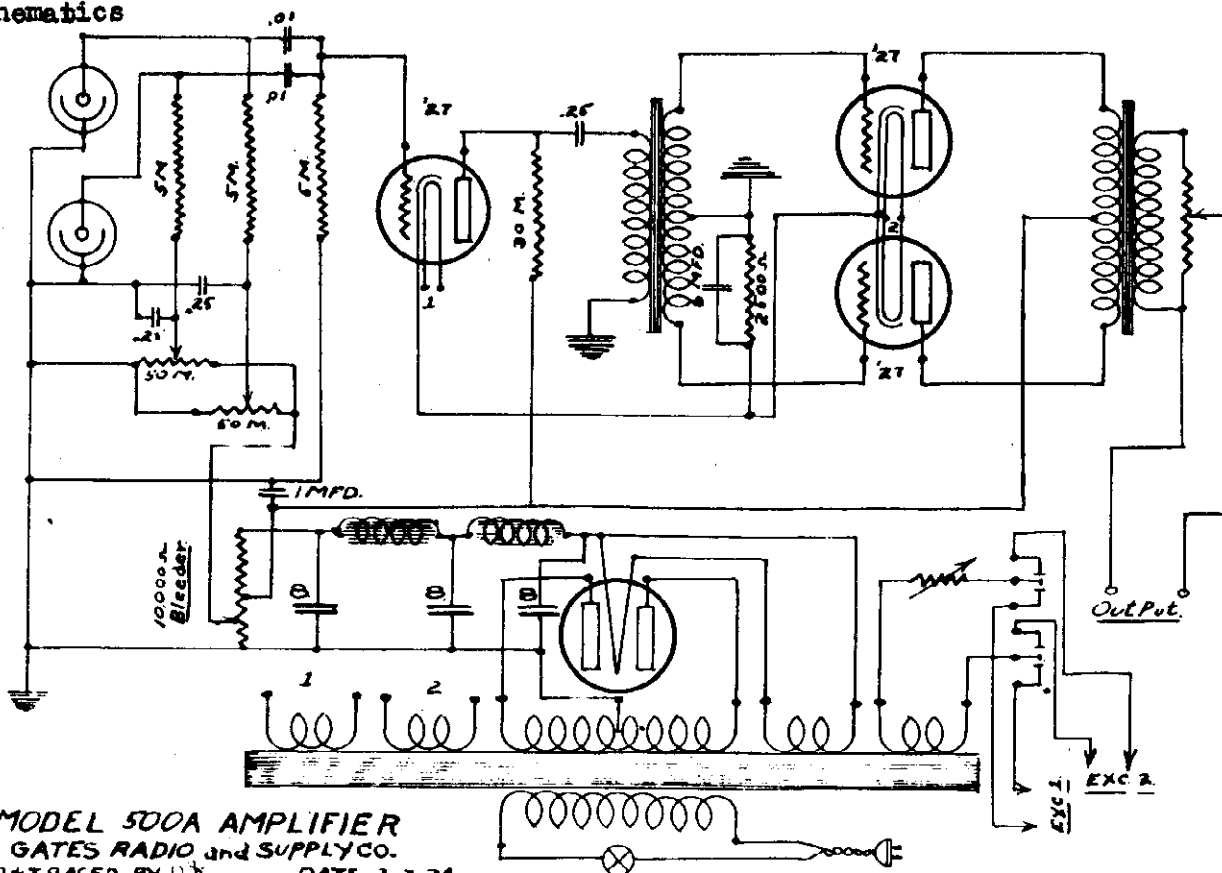


GATES RADIO & SUPPLY CO.



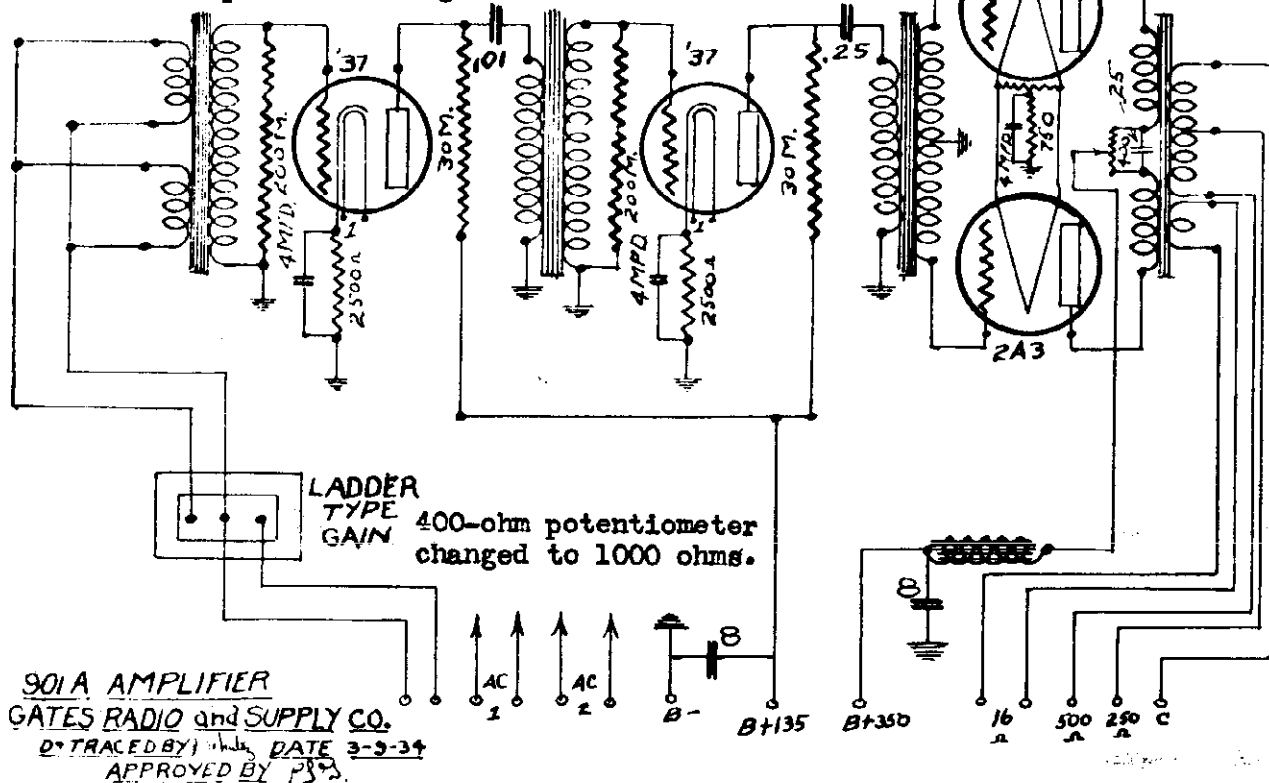
MODEL 500-A
MODEL 901-A
Schematics

GATES RADIO & SUPPLY CO.



MODEL 500A AMPLIFIER
GATES RADIO and SUPPLY CO.
D. TRACED BY [initials] DATE 3-7-34

In late models, plate resistors of 37 tubes changed to 60,000 ohms. Type 76 tubes used instead of 37. The 0.01-mf. plate blocking condenser, now is 0.25 mf.



901A AMPLIFIER
GATES RADIO and SUPPLY CO.
D. TRACED BY [initials] DATE 3-3-34
APPROVED BY [initials]

GENERAL ELECTRIC CO.

MODEL KV-100
V-Doublet Antenna
Installation, Data

"V-DOUBLET" ANTENNA SYSTEM
STOCK NO. KV-100
FOR ALL-WAVE RADIO RECEIVERS

Description of System

With the advent of "all-wave" radio receivers, the antenna installation became a fundamental rather than an incidental problem. Short waves are used primarily because of their ability to travel great distances with relatively low transmitting power. Upon reaching the receiver, therefore, these waves are in general far weaker and fade much more severely than those from stations in the standard broadcast band (540 to 1600 kilocycles). Obviously, the antenna must perform very efficiently in the short-wave spectrum; it must be able to transfer signals to the receiver with negligible loss or reliable results will be practically impossible.

Short-wave broadcasting covers a very wide frequency range, being segregated by international agreement into four principal narrow bands located approximately at: 19, 25, 31 and 49 meters. For any given length, a conventional antenna will favor certain frequencies and tend to reject others. Antennas of the conventional single wire or conventional doublet type are therefore quite unsatisfactory, for there is no one length which would operate with any degree of uniformity over the required range. The "V-doublet" antenna system, however, serves the purpose admirably.

As its name implies, this system incorporates a doublet, the center portion of which takes the form of a "V." The factor responsible for the non-uniform sensitivity of a conventional single-wire or doublet antenna is the development of standing waves along its length, which results in points of high and low sensitivity at different frequencies. The "V-doublet" reduces these standing waves because the center portion is tapered, which makes the system somewhat aperiodic. The first high-impedance point is thereby extended out to such a high frequency that efficient pick-up is obtained on the antenna proper, and the high impedance point does not have the usual derogation of signal strength experienced with conventional doublets. The result is a doublet of better uniform sensitivity over the short-wave bands.

Signals intercepted by the doublet are fed to the receiver through a balanced, twisted-pair lead-in (hereinafter called the transmission line). A further function of the tapered "V" is to couple efficiently the fairly high impedance antenna to the low impedance transmission line, in which case the taper performs the function of a transformer. The transmission line is coupled to the receiver through a specially constructed receiver-coupling transformer. The length of the transmission line and coupling ratio of the transformer are correct to afford proper electrical matching for greatest energy transfer from the antenna to the receiver.

While natural static is almost negligible in the short-wave spectrum, "man-made" interference is often very severe. Such interference usually is of local origin, being radiated by the house-wiring or by external electrical apparatus, including even the ignition systems of passing automobiles. It is "picked up" mainly by the antenna lead-in, and so, little or nothing can be done with ordinary types of antennas to prevent annoyance from that source. Doublet antennas, however, are particularly advantageous from a standpoint of noise reduction since the transmission line does not form an active part of the system, but serves merely to transfer signals from the doublet to the receiver. In this "V-doublet" system, complete rejection of signals picked up along the transmission line is achieved by virtue of the special balanced design of the receiver-coupling transformer.

There is yet another consideration involved. With an all-wave receiver, the antenna must not sacrifice performance in the standard broadcast and other low-frequency bands in order to obtain good short-wave reception. At the lower frequencies, therefore, this antenna system is converted from its "V-doublet" form to one approximating the conventional "T-type" arrangement so that the transmission line acts as part of the effective length. This change-over is accomplished automatically by the special circuit employed in the receiver-coupling transformer.

Installation

The design of the "V-doublet" antenna system is not complicated and its installation is simple. A typical installation is shown in Fig. 1. In order to intercept radio signals most efficiently, the horizontal portion of the antenna should be at least 30 feet above the effective ground. Ordinarily, the antenna will be erected either upon the roof of a building or suspended between that roof and a near-by tree or pole. For the usual dwelling having a roof and framework of non-metallic materials, the height will be measured with respect to the actual surface of the earth. In the case of a building with metal framework or roof such as a modern apartment house or hotel, effective ground is assumed as the roof of such a building.

Interference Considerations

It is also desirable that the doublet be erected as high as conveniently possible so as to place that portion of the system which intercepts the signal at the maximum distance from any source of man-made interference. Interference "picked up" by the transmission line cannot affect the receiver. The doublet, therefore, should be erected well

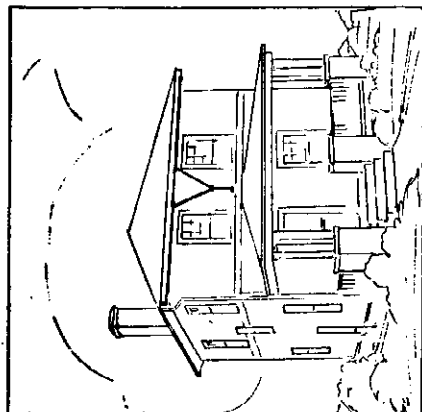


Fig. 2A

remote from sources of interference such as automobile highways, street-railway lines or motor-driven electrical appliances. In some cases it may be necessary to locate the antenna proper as much as 500 feet distant from the receiver, adding the required length of transmission line to the 100-foot length supplied with the kit. To maintain the correct electrical matching, not less than 100 feet of transmission line should be used in any case. If less than 100 feet is required, the excess amount should be coiled up neatly at the end known impedance, do not use any random twisted-pair lamp cord for additional length; use only the genuine transmission line sold by your dealer. Each conductor of the genuine transmission line is covered with special high-grade white rubber insulation and a covering of waterproof braid is woven over the twisted pair.

Advantage should also be taken of the directional effect of the horizontal arrangement wherever possible. Least interference will be intercepted by the doublet when the span points toward the source of disturbance. This resource will be particularly helpful when the antenna cannot be removed from the field of interference, as in cases where a radio transmitter (such as an amateur station) is operating in the neighborhood.

Alternative Antenna Arrangements

The geometric design of the "V-doublet" lends itself easily to a variety of methods of suspension besides that shown in Fig. 1. Another possible arrangement is suspension from the eaves of a building as shown in Fig. 2A, providing sufficient span and height above ground can be obtained in this manner and the antenna is not run parallel to a metal rain-gutter. Or, if restrictions make it inadvisable to erect two chimneys, the doublet might be suspended between two chimneys, as shown in Fig. 2B, with the plane of the "V" parallel to

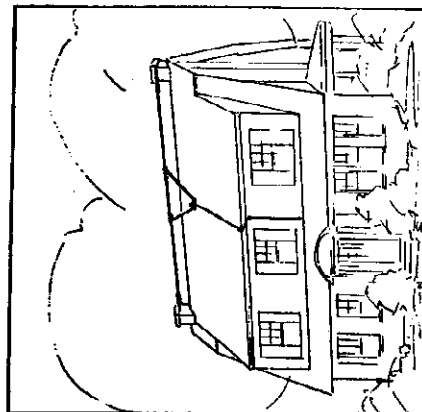


Fig. 2B

the roof. The "V" may be rotated about the horizontal legs as axes, to any position desired, and supported at the apex to which the transmission line is attached.

Highest efficiency is obtained by making the legs of the doublet the recommended length. If sufficient ground space is not available to provide the normal span of 51 feet, the legs may be shortened somewhat. This will result, however, in slightly decreased efficiency in the region of the 49-meter band.

Set-up Procedure

The "V-doublet" antenna system proper, consisting of the doublet wires, glass strain insulators and transmission line, is assembled. Use of a soldering iron is therefore not necessary. The receiver end of the transmission line is stripped for ready connection to the receiver-coupling transformer.

Equipment—The following parts are supplied with the kit:

- 1 Doublet and transmission line assembly.
- 1 Receiver-coupling transformer.
- 5 Nail-on insulators.
- 1 Entrance-tube insulator.
- 1 Adapter (for receiver-coupling transformer).

Installation—It is desirable to unpack the kit near the place where the doublet is to be suspended. The doublet wires will be found coiled at the top of the package, with the transmission line coiled below. The receiver-coupling transformer and porcelain insulators are wrapped separately in tissue paper. Connecting links and the adapter for the receiver-coupling transformer will be found in the envelope packed with the kit.

First carefully uncoil and lay out the doublet wires and transmission line to form the "V-doublet."

**MODEL KV-100
Installation
Part 2, Parts**

GENERAL ELECTRIC CO.

illustrated in Figure 1. Then attach the suspension ropes to the end strain insulators and hang the system as a unit between the masts or intended points of support. If it is necessary to shorten the 20-foot legs of the doublet because of insufficient space, each leg must be shortened by an equal amount. It is important to avoid excessive tension in the doublet or "V" wires or breakage may occur. These wires must not be stretched tightly but should be allowed to sag so that the center portion of the doublet is two or three feet below the end insulators.

Connection to Receiver—The opposite end of the transmission line is brought to the receiver, using the nail-on insulators and entrance-tube insulator at points best suited to the installation. If lightning arresters are desirable or required by local ordinance, two (low-capacity) units should be installed as shown in Fig. 1, Detail "B." Simply remove a small strip of insulation from the transmission line conductors at the lightning arresters, connect the bared portions one to each "antenna" terminal and continue on without cutting the transmission line. The ground terminals of the lightning arresters are made common and connected to a metal stake or pipe driven five to eight feet into the soil.

Fasten the receiver-coupling transformer to the "ANT-GND" terminal board on the receiver chassis, using the two links supplied with the kit. Make certain to install the transformer correctly; the links should be attached to those terminals identified as "A" and "G" on the transformer and the label should face toward the receiver. Connect the end of the transmission line to the terminals marked "T" and "L," leaving any additional length coiled up behind the receiver. Finally, attach a wire from the "GND" terminal to the nearest cold-water pipe as close as possible to the point where the pipe enters the earth, or to some other good ground connection. The latter connection should be as short as possible and preferably made with No. 14 or larger rubber-covered stranded copper wire. On account of the variation in length of lead and type of ground

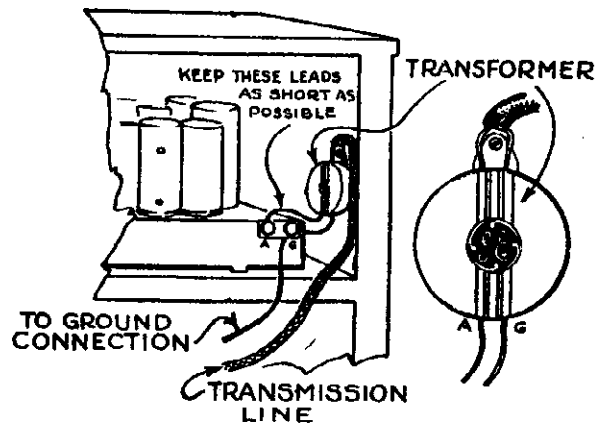


Fig. 3

available, the ground wire and clamp are not furnished with the kit. *The importance of a good ground connection cannot be overestimated, as the degree of noise reduction obtained will depend to a large extent upon this factor.*

In receivers having no "ANT-GND" terminal board, fasten the coupling transformer to the cabinet as near as possible to the chassis, using the adapter supplied with the kit as shown in Fig. 3. To insure most noise elimination, the connection from the "GND" terminal of the transformer should be made directly to the chassis metal with a wire no longer than one inch. The connection from the "ANT" terminal of the transformer to the receiver antenna lead or terminal also should be no longer than necessary and it is important to avoid close proximity of this wire to the dome (grid) clips of the radio tubes.

Installation Service

Although this "V-doublet" antenna system is not difficult to install, many persons nevertheless prefer to have it erected by an experienced radio serviceman. Upon request, your dealer or service engineer will make the complete installation at a nominal charge.

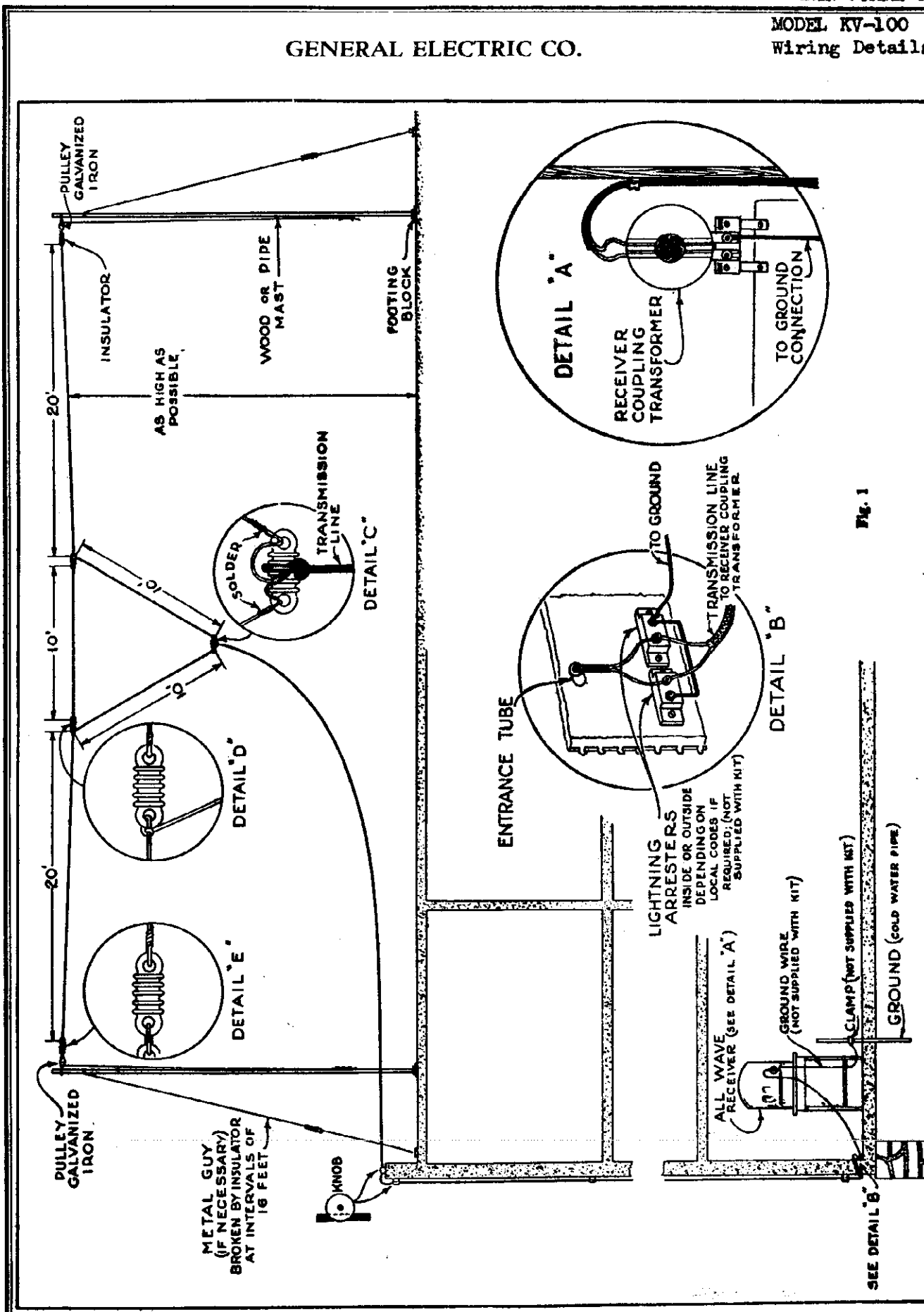
REPLACEMENT PARTS

Insist on genuine factory-tested parts, which may be purchased from authorized dealers.

Stock No.	Description	List Price
KV-101	Wire—Antenna Wire (Roll of 31 feet).....	\$0.25
KV-102	Wire—Antenna Wire (Roll of 11 feet).....	.12
KV-103	Transmission Line (Roll of 100 feet).....	3.90
KV-104	Transformer—Receiver-coupling transformer.....	2.50
KV-105	Link—Connection Link—Connects receiver-coupling transformer to "ANT-GND" terminal board on receiver chassis. Package of 10.....	.10
KV-106	Adapter—For mounting receiver-coupling transformer on any make of receiver.....	.10
KV-107	Insulator—Glass Strain Insulator. Package of 5.....	.50
KV-108	Porcelain Knob—Package of 5.....	.25
KV-109	Porcelain Tube.....	.10

March, 1935

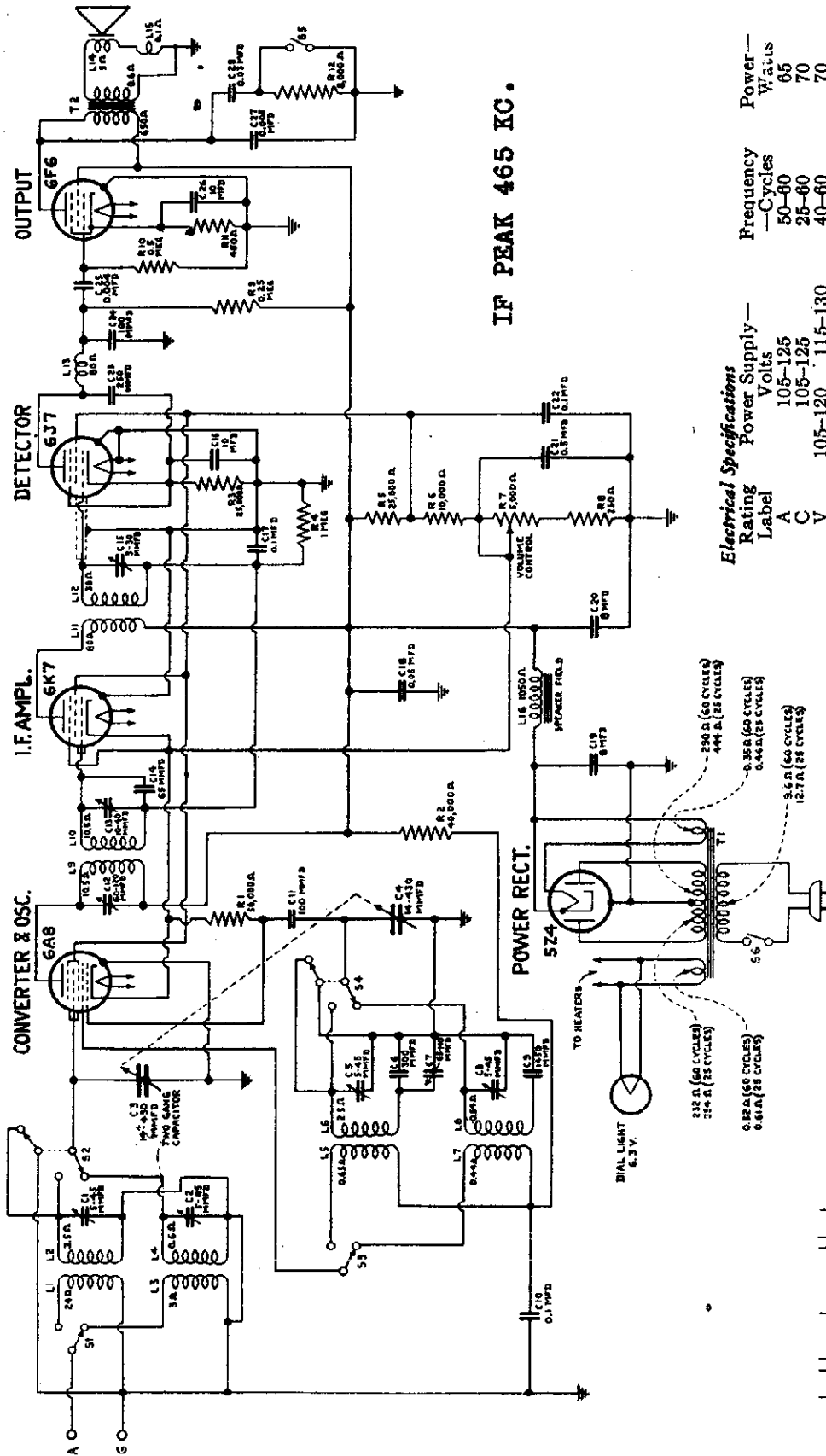
GENERAL ELECTRIC CO.



MODEL A-53
Schematic

GENERAL ELECTRIC CO.

IF PEAK 465 KC.



Electrical Specifications

Rating Label	Power Supply Volts	Frequency Cycles	Power Watts
A	105-125	50-60	65
C	105-125	25-60	70
V	105-120	40-60	70
	200-230	220-250	

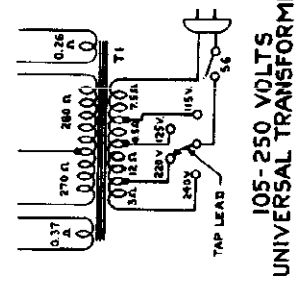
Tuning Frequency Range
Broadcast 540-1600 kc.
Short Wave 2.4-6.8 mc. (2400-6800 kc.)
Control Drive Ratio: 5 to 1

Electrical Power Output
Undistorted Maximum 1.5 watts
2.5 watts

Loud-speaker—Electrodynamic
Cone: 7 in. overall, 6 in. effective diameter
Cone coil impedance: 5 ohms at 400 cycles

Fig. 2 Schematic Circuit Diagram

Alignment Frequencies
Broadcast Short-wave
580 kc. 6000 kc.
1500 kc.



105-250 VOLTS
UNIVERSAL TRANSFORMER

GENERAL ELECTRIC CO.

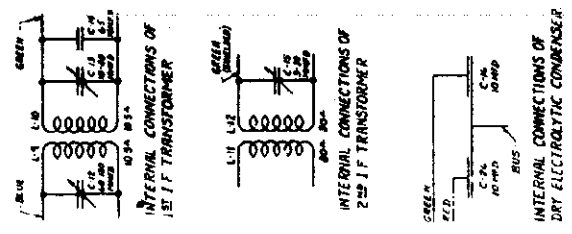
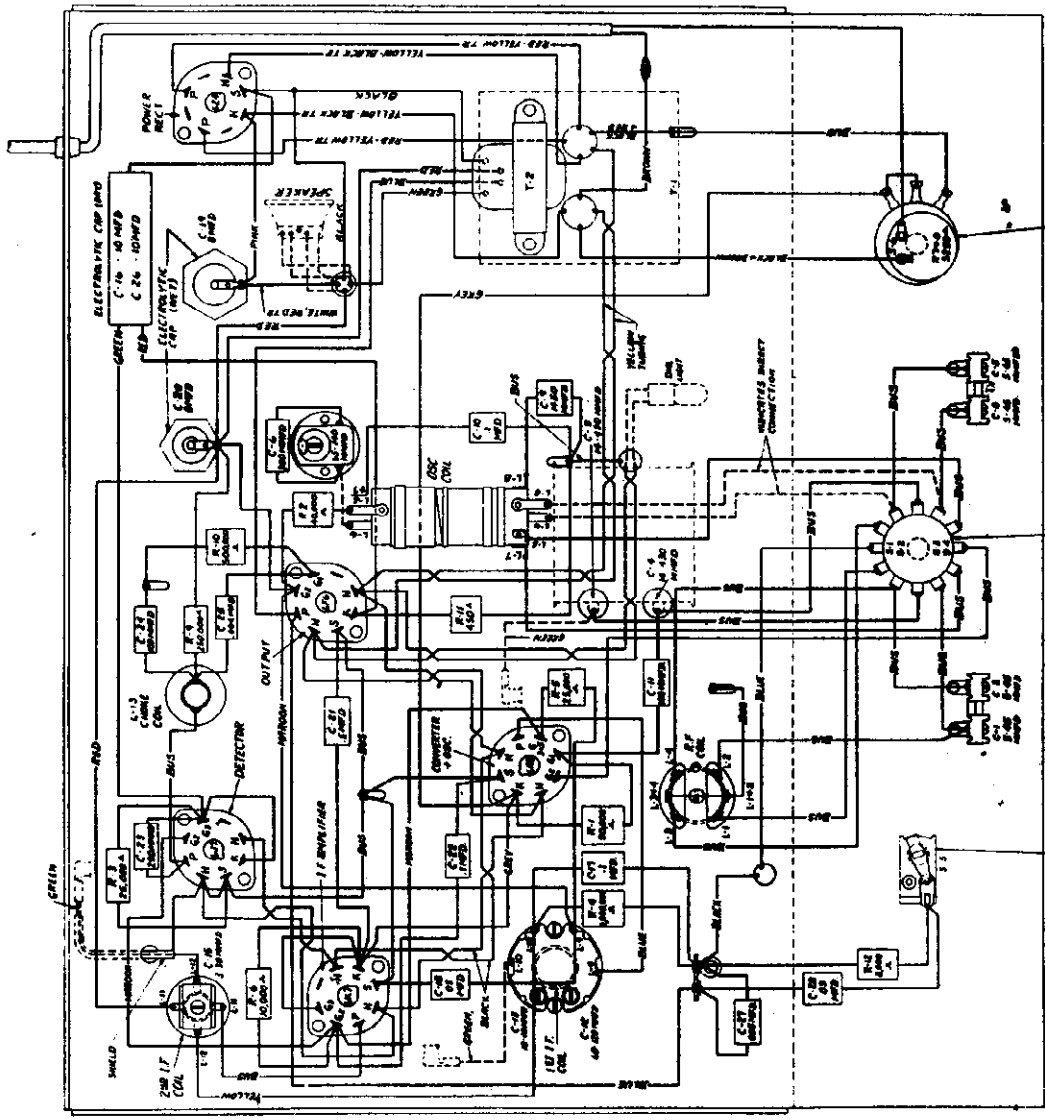
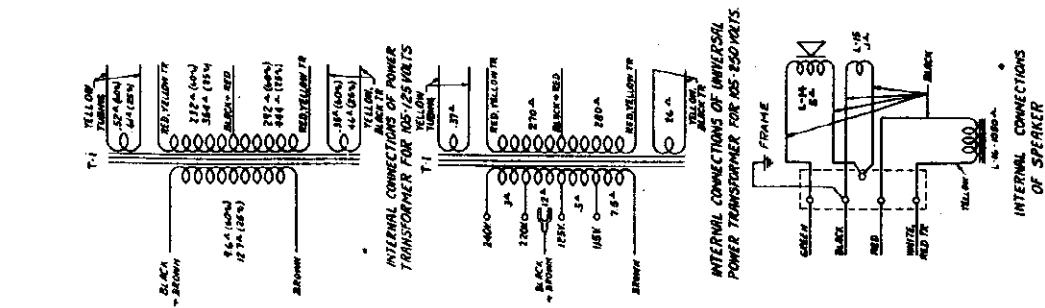


Fig. 3 Chassis Wiring Diagram

MODEL A-53
Circuit Data
Alignment

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Code Interference

In certain localities near to high-powered radio-telegraph stations operating at frequencies in the vicinity of 465 kc., slight code interference may be present on both bands of the receiver. This condition usually occurs over the entire tuning range and is not greatly affected by change of tuning. To overcome this interference, a Wave Trap, such as General Electric Stock No. WT-100, should be installed. The wave trap is connected between the blue and black leads of the receiver, and the antenna lead-in and ground wire, according to the instructions furnished with the trap.

OPERATION

Model A-53 receiver has four controls located as shown below:

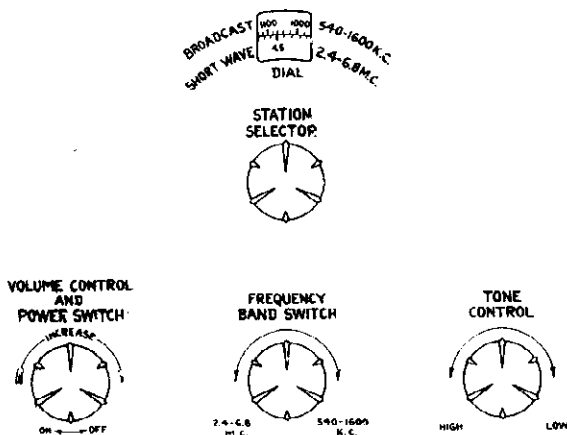


Fig. 1

DESCRIPTION OF ELECTRICAL CIRCUIT

The signal from the antenna is applied to the control grid of the 6A8 tube through the R.F. coil the secondary of which is tuned to the incoming signal by the rear section of the 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 coil 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, the first of which has both primary and secondary tuned. The second transformer is unshielded and has only the secondary tuned to 465 kc.

Control of volume is obtained by the use of a variable resistor in the cathode circuits of the 6A8 and 6K7 tubes.

The output of the I. F. amplifier is applied to the grid of the 6J7 tube, used as a biased power detector. This tube has in its grid circuit a 1-megohm resistor, which is also tied to the grid-return of the 6K7 tube. The purpose of this arrangement is to prevent excessive overloading of the 6J7 detector when the volume control is turned up on a strong signal.

The output of the 6J7 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 .03-mfd. capacitor which is normally connected from the plate of the 6F6 to ground through a resistor. When it is desired to reduce the high frequency output of the receiver, the resistor is short-circuited by the tone control switch connecting the .03-mfd. capacitor directly from the 6F6 plate to ground.

Plate and grid voltages for all tubes are supplied by the power supply system employing a 5Z4 full-wave rectifier tube and utilizing the loud-speaker field as a filter reactor 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 6.0-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. 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.

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MODEL A-53
Alignment, Part 2
Voltage, Socket

(1) I. F. Alignment

The I. F. amplifier should be tuned to 465 kc.; set the oscillator dial at this frequency. Set the volume control at maximum and short-circuit the antenna and ground leads. Tune the receiver to a point where no signal comes in and ground the chassis.

Connect the test oscillator output between the 6A8 converter tube grid 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 three I. F. trimmers are adjusted in the following sequence:

1. Secondary trimmer on second I. F. transformer.
2. Secondary trimmer on first I. F. transformer.
3. 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, 1500, and 6000 kc. With the tuning condenser plates fully meshed, line up the pointer and dial by adjusting the dial set screws so that the line at the extreme end of the dial is indicated.

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

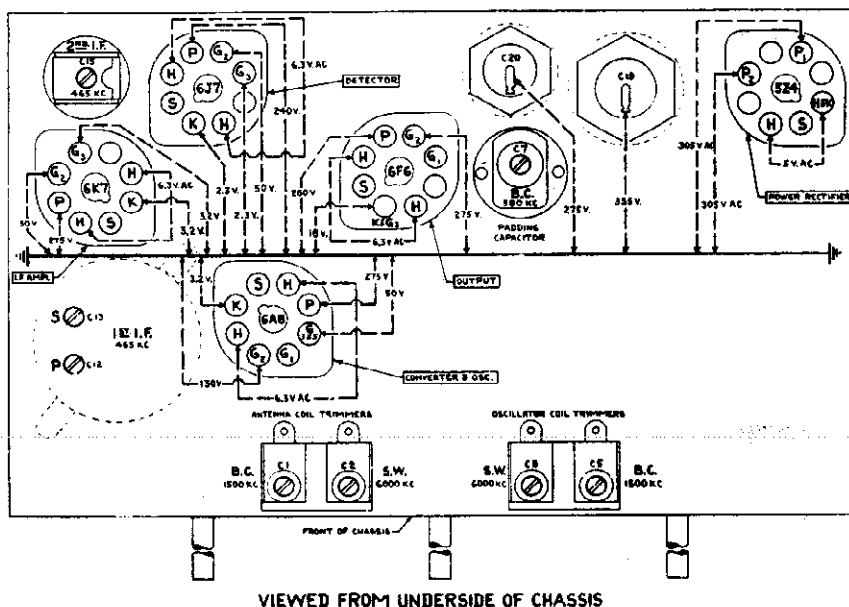
the broadcast band for maximum output. Next, set the R. F. trimmer for maximum output, taking care that the output from the test oscillator is not high enough to overload any part of the set. After these adjustments, tune the set and the test oscillator to 580 kc. Adjust the broadcast padding capacitor 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.

Short-wave Band

With the frequency band switch in the counterclockwise position, set the receiver dial to 6.0 mc. Set the test oscillator at 6000 kc. and adjust the short-wave oscillator trimmer for maximum output. Next, set the short-wave R. F. trimmer for maximum output. Repeat these adjustments a second time. After aligning the S. W. band, turn the test oscillator to approximately 6930 kc. with the receiver dial still at 6 mc. Increase the test oscillator output until a signal is heard in the neighborhood of 6930 kc. This is the image frequency and if the set has been properly aligned the sensitivity at this point will be much less than at 6000 kc. In the event the image frequency cannot be found, the alignment should be rechecked at 6.0 mc. It will be noticed that the oscillator trimmer will have two positions at which the signal will give maximum output. The position which gives the lower trimmer capacitance obtained by turning the trimmer screw counterclockwise is the proper adjustment.

When these adjustments have been completed the receiver will be in alignment.



MODEL A-53
Voltage
Parts

GENERAL ELECTRIC CO.

SOCKET VOLTAGES

Tube	Cathode to Ground Volts	Screen Grid to Ground Volts	Plate to Ground Volts	Plate Current MA	Heater Volts A-c.
6A8 Converter	3.2	50	275	1.5	6.3
Oscillator			130	3.5	
6K7 I. F. Amplifier	3.2	50	275	2.2	6.3
6J7 Detector	2.3	50	*	.12	6.3
6F6 Power Output	18	275	260	33	6.3
5Z4 Rectifier	335		305	27 per plate	5.0

* 6J7 plate voltage is supply voltage (275) minus drop in load resistor.

Measured at 120 volts supply. No signal input. Volume control maximum. Voltmeter 1000 ohms per volt; measurements taken on highest scale giving accurate readable deflection.

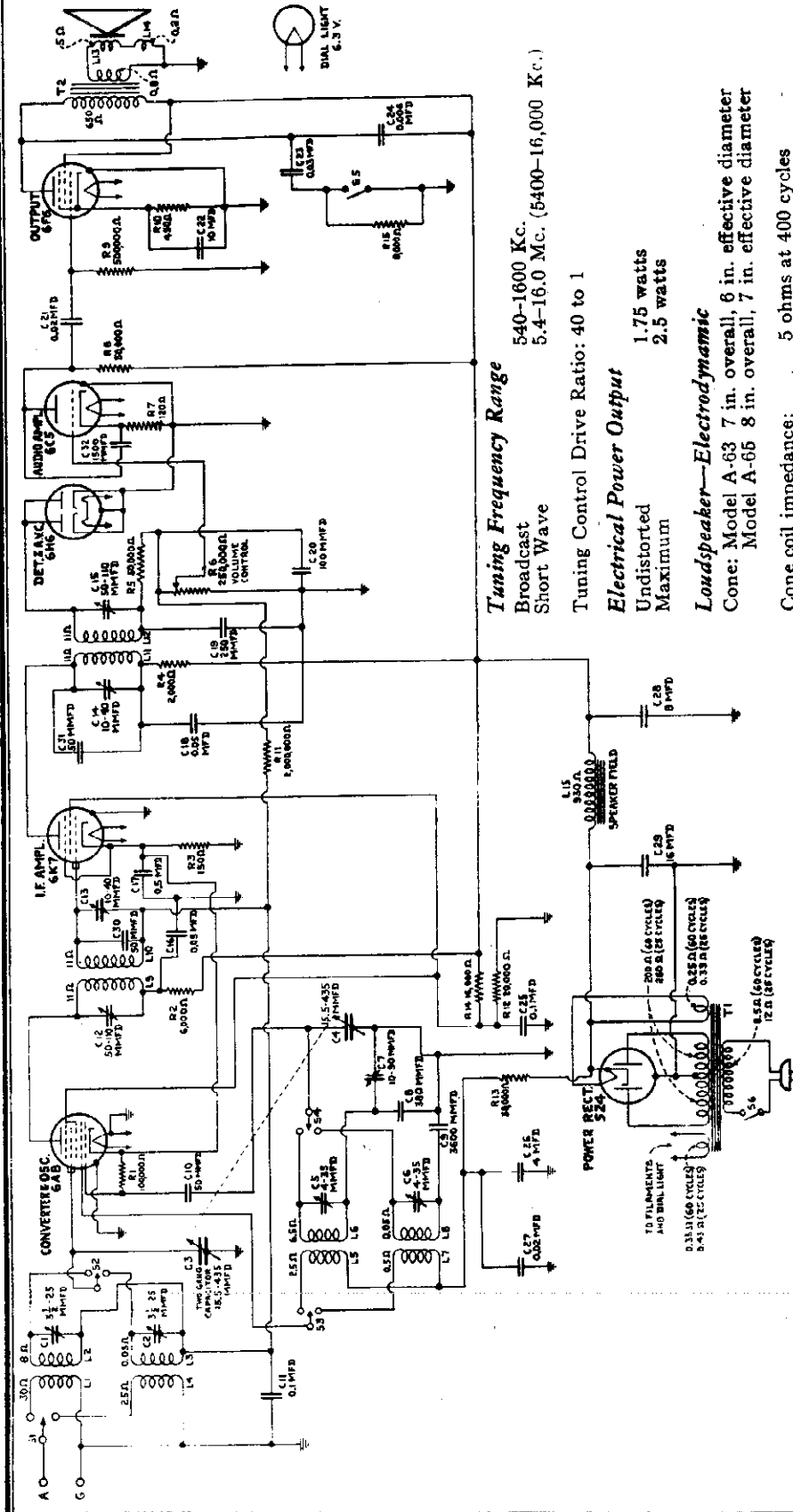
REPLACEMENT PARTS

Insist on genuine factory-tested parts, which may be purchased from authorized dealers.

RECEIVER ASSEMBLIES			Stock No.	Description	List Price
Stock No.	Description	List Price	RR-036	RESISTOR—50,000 Ohms, ¼ Watt (R-1) Carbon Resistor, Pkg of 5	\$0.70
RB-014	BOARD—Terminal Board	\$0.10	RR-062	RESISTOR—250,000 Ohms, ¼ Watt (R-9) Carbon Resistor, Pkg of 5	.70
RB-113	BRACKET—Lamp Bracket and Indicator	.20	RR-064	RESISTOR—500,000 Ohms, ¼ Watt (R-10) Carbon Resistor, Pkg of 5	.60
RC-022	CAPACITOR—.004 Mfd, 400 Volts (C-25) Paper Dielectric	.25	RR-067	RESISTOR—1 Megohm, ¼ Watt (R-4) Carbon Resistor, Pkg of 5	.70
RC-029	CAPACITOR—.005 Mfd, 400 Volts (C-27) Paper Dielectric	.30	RR-189	RESISTOR—40,000 Ohms, ½ Watt (R-2) Carbon Resistor, Pkg of 5	.80
RC-083	CAPACITOR—.03 Mfd, 400 Volts (C-28) Paper Dielectric	.25	RR-224	RESISTOR—8000 Ohms, 1 Watt (R-12) Carbon Resistor, Pkg of 5	.85
RC-091	CAPACITOR—.05 Mfd, 400 Volts (C-18) Paper Dielectric	.30	RR-226	RESISTOR—10,000 Ohms, 1 Watt (R-6) Carbon Resistor, Pkg of 5	1.00
RC-096	CAPACITOR—.1 Mfd, 200 Volts (C-17, C-22) Paper Dielectric	.30	RR-279	RESISTOR—25,000 Ohms, 2 Watts (R-5) Carbon Resistor	.50
RC-123	CAPACITOR—.1 Mfd, 400 Volts (C-10) Paper Dielectric	.35	RR-339	RESISTOR—450 Ohms, 1 Watt (R-11) Flexible Resistor, Pkg of 5	.70
RC-158	CAPACITOR—.5 Mfd, 200 Volts (C-21) Paper Dielectric	.40	RS-105	SHIELD—1st I. F. Transformer Shield	.30
RC-235	CAPACITOR—100 Mmfd, (C-11, C-24) Mica Dielectric	.25	RS-200	SOCKET—Eight-pin Tube Socket, Pkg of 5	.75
RC-258	CAPACITOR—250 Mmfd, (C-23) Mica Dielectric	.25	RS-300	SWITCH—Tone Control Switch (S-5)	.25
RC-267	CAPACITOR—300 Mmfd, (C-6) Mica Dielectric	.25	RS-304	SWITCH—Frequency Band Switch (S-1, S-2, S-3, S-4)	.75
RC-345	CAPACITOR—1450 Mmfd, (C-9) Mica Dielectric	.35	RT-051	TRANSFORMER—Power Transformer (T-1) 50-60 Cycles, 105-125 Volts (Rating "A")	4.00
RC-402	CAPACITOR—.8 Mfd, 375 Volts (C-19) Wet Electrolytic	1.10	RT-052	TRANSFORMER—Power Transformer (T-1) 25-60 Cycles, 105-125 Volts (Rating "C")	6.25
RC-403	CAPACITOR—.8 Mfd, 350 Volts (C-20) Wet Electrolytic	1.00	RT-053	TRANSFORMER—Power Transformer (T-1) 40-60 Cycles, 105-130, 200-250 Volts (Rating "V")	7.25
RC-511	CAPACITOR—Two 10 Mfd, 25 Volts (C-16, C-26) Dry Electrolytic	.80	RT-209	TRANSFORMER—First I. F. Transformer (C-12, C-13, C-14, L-9, L-10)	2.00
RC-604	CAPACITOR—Twin 5-45 Mmfd Trimmer Capacitor (C-1, C-2, C-5, C-8)	.45	RT-210	TRANSFORMER—Second I. F. Trans- former (C-15, L-11, L-12)	1.10
RC-605	CAPACITOR—65-140 Mmfd Oscillator Padder Capacitor (C-7)	.40	RT-403	TRANSFORMER—Output Transformer (T-2)	1.50
RC-703	CONDENSER—Two-gang Tuning Con- denser (C-3, C-4)	2.75	RV-005	VOLUME CONTROL—Potentiometer, 5250 Ohms (R-8, R-7) and Power Switch (S-6)	1.25
RC-850	CORD—Power Cord with Plug	.65	RX-005	SCREW ASSEMBLY—Chassis Mounting Screw Assembly, Pkg of 3	.25
RD-008	DIAL—Dial Scale and Hub Assembly	.55			
RE-003	ESCUTCHEON—Dial Escutcheon	.50			
RF-004	FOOT—Chassis Mounting Foot with Cush- ions	.15			
RG-001	GRID CAP—Grid Connection Cap, Pkg of 5	.10			
RK-001	KNOB—Tuning, Volume, Tone Control or Band Switch Knob, Pkg. of 5	.50			
RL-109	COIL—R. F. Coil Assembly (L-1, L-2, L-3, L-4)	1.25			
RL-208	COIL—Oscillator Coil Assembly (L-5, L-6, L-7, L-8)	1.00			
RR-027	RESISTOR—25,000 Ohms, ¼ Watt (R-3) Carbon Resistor, Pkg of 5	.70			
				SPEAKER ASSEMBLY	
			RC-902	CONE—Speaker Cone and Cone Coil	\$1.00
			RF-103	FIELD—Field Coil Magnet and Cone Support	4.05
			RS-001	SPEAKER—Seven-inch Reproducer Com- plete	6.10

GENERAL ELECTRIC CO.

MODEL A-63, A-65
Schematic
Data



Tuning Frequency Range
Broadcast
540-1600 Kc.
Short Wave
5.4-16.0 Mc. (5400-16,000 Kc.)

Tuning Control Drive Ratio: 40 to 1
Electrical Power Output
Undistorted 1.75 watts
Maximum 2.5 watts

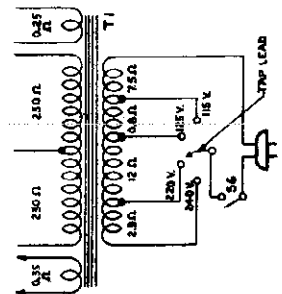
Loudspeaker—Electrodynamic
Cone: Model A-63 7 in. overall, 6 in. effective diameter
Model A-65 8 in. overall, 7 in. effective diameter

Cone coil impedance: 5 ohms at 400 cycles
Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	105-125	50-60	75
C	105-125	25-60	80
V	105-120 115-130 200-230 220-250	40-60	80

NOTE: Taps on universal transformers (Rating "V") are accessible by removing the cap cover mounted on the top of the transformer. Schematic and wiring diagrams of the universal transformer are shown in Figures 2 and 3, respectively.

IF PEAK 465 KC



105-250 VOLTS
UNIVERSAL TRANSFORMER

MODELS A-63, A-65
Chassis Wiring

GENERAL ELECTRIC CO.

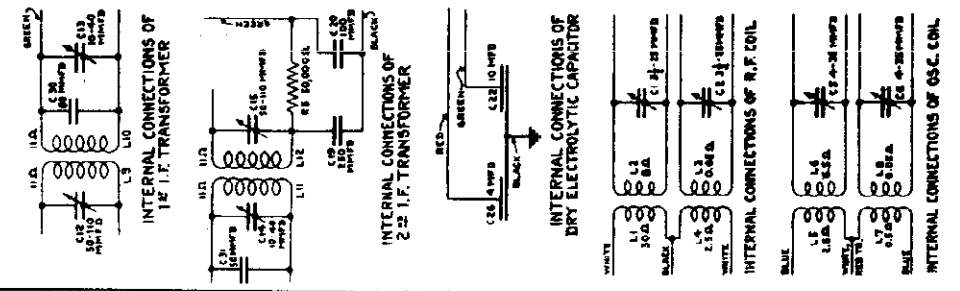
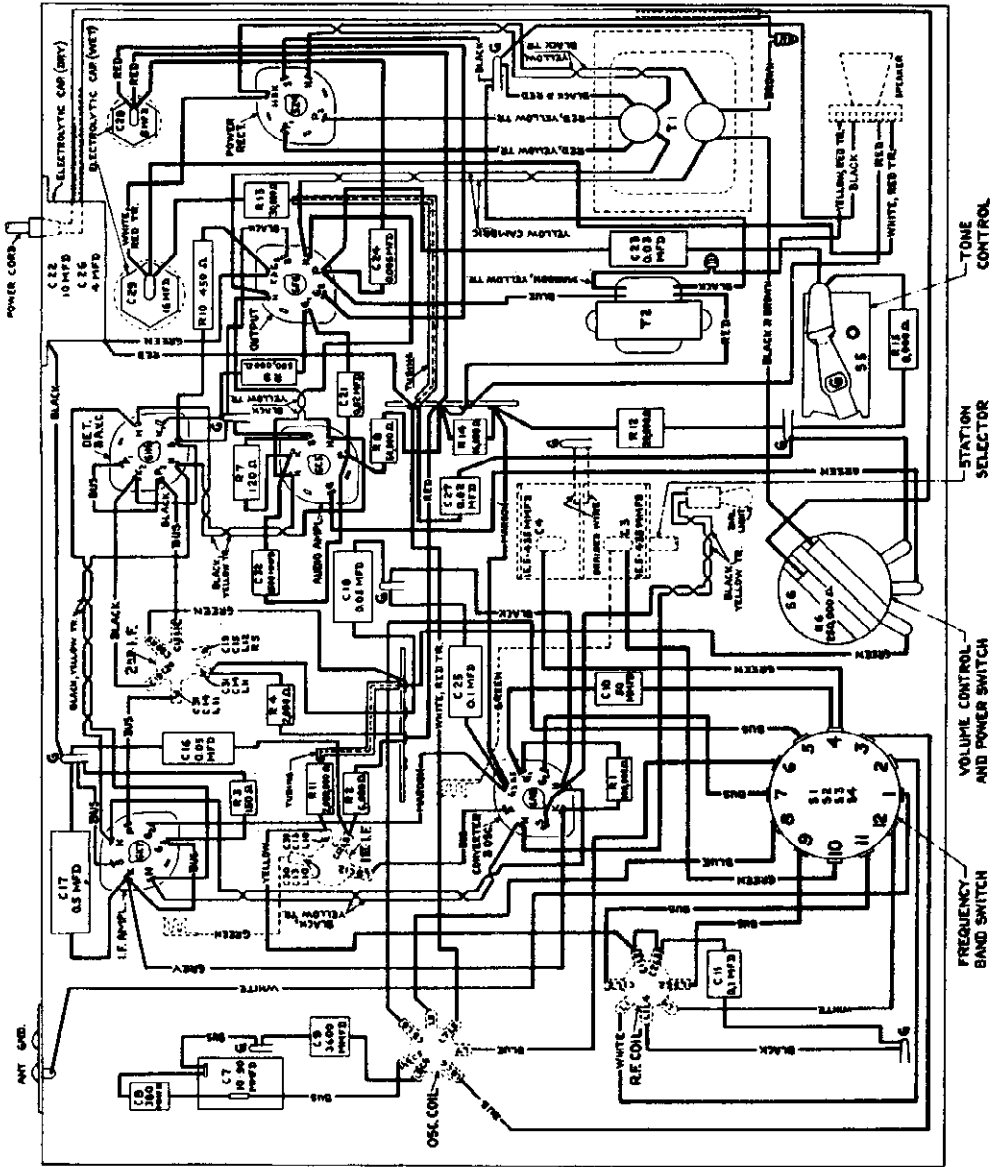
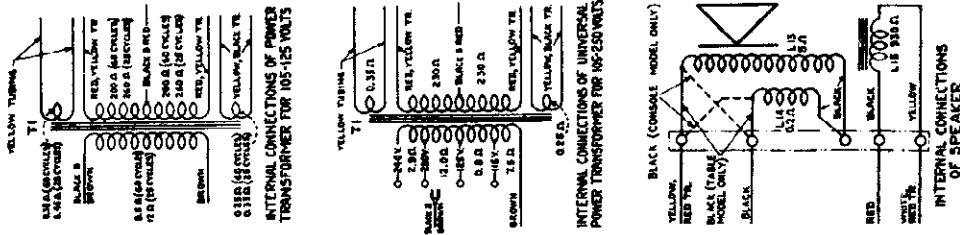


Fig. 3. Chassis Wiring Diagram

GENERAL ELECTRIC CO.

Model A-63 and A-65 receivers have four controls located as shown below:

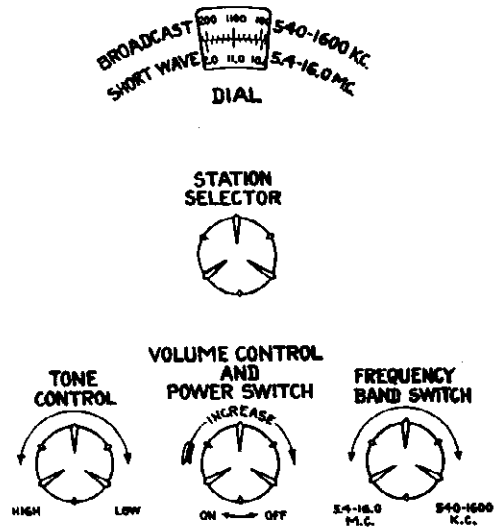


Fig. 1

Code Interference

In certain localities near high-powered radio-telegraph stations operating at frequencies in the vicinity of 465 kc., slight code interference may be present on both bands of the receiver. This condition usually occurs over the entire tuning range and is not affected by change of tuning. To overcome this interference, a Wave Trap, such as General Electric Stock No. WT-100, should be installed. Terminals are spaced so that the wave trap may be connected directly to the antenna and ground terminals of the receiver by means of the links supplied. The "V-Doublet" antenna coupling transformer may be mounted directly on top of the wave trap, as the terminal spacing is the same. General Electric Wave Trap, Stock No. WT-100, is available as an accessory from your General Electric Radio Dealer.

DESCRIPTION OF ELECTRICAL CIRCUIT

Models A-63 and A-65 employ six metal envelope tubes in a superheterodyne circuit giving the excellent selectivity and sensitivity inherent in this type circuit. Separate groups of coils are used for each frequency band. 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 tube through the R. F. coil, the secondary of which is tuned to the incoming signal by the first 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 elements of this tube, and the proper frequency difference is maintained throughout the tuning range by the second section of the main tuning condenser in conjunction with the oscillator coil and padding capacitors.

The combination of the two signals 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 a 6K7 tube and two 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-6. This voltage drop provides automatic bias for the converter and I. F. amplifier tubes and so gives automatic volume control action.

The manual volume control selects the amount of audio signal applied to the grid of the 6C5 first audio amplifier and thus regulates the output of the receiver. The output of the 6C5 tube is resistance coupled to the grid of the 6F6 audio power amplifier pentode. The plate circuit of the 6F6 is suitably matched to the loudspeaker by means of a step-down output transformer.

The tone control circuit consists of a .03-mfd. capacitor which is normally connected from the plate of the 6F6 to ground through a resistor. When it is desired to reduce the high frequency output of the receiver, the resistor is short-circuited by the tone control switch connecting the .03-mfd. capacitor directly from the 6F6 plate to ground.

Plate and grid voltages for all tubes are supplied by the power supply system employing a 5Z4 full-wave rectifier

tube and utilizing the loudspeaker field as a filter reactor which, together with a suitable network of resistors and capacitors, supplies the required voltages and filtering action.

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 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 center of a particular coil, through the opening provided in the top of the shield, 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	

In Models A-63 and A-65 the broadcast band R. F. and oscillator coils are located in the upper half of their respective shield cans; the short-wave coils in the lower half.

Alignment Frequencies

I. F.	Broadcast	Short Wave
465 Kc.	600 Kc. 1500 Kc.	15,000 Kc.

In order to align these receivers properly, it is necessary to have available a modulated test oscillator capable of producing the above alignment frequencies, a non-metallic alignment screwdriver, and an output meter. The location

MODELS A-63, A-65
Alignment
Voltage

GENERAL ELECTRIC CO

of all trimmer capacitors as well as socket voltages is shown in Fig. 4.

1. I. F. Alignment

Set the frequency band switch of the receiver in the clockwise position, short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum 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 in 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 output indication.

Adjust the secondary trimmer of the second 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 second I. F. transformer for maximum output. Continue this procedure, adjusting the secondary trimmer of the first I. F. transformer, 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.

2. R. F. Alignment

The R. F. and oscillator trimmers are aligned at 600, 1500 and 15,000 kc. Line up the pointer and dial so that with the tuning condenser plates fully meshed, the pointer indicates the mark at the extreme right-hand end of the dial. Make sure the antenna and ground terminals of the receiver are

not short circuited and connect to them the output from the test oscillator. Connect the output meter across the speaker cone coil.

Broadcast—With the band switch turned clockwise, set the tuning dial at 1500 kc. Set the test oscillator at this frequency and adjust its output so that with the receiver volume control in its extreme clockwise position, a small deflection is observed on the output meter. Adjust the broadcast oscillator trimmer for maximum output. There, as before, maintain the output meter at a small deflection during the entire alignment process. When optimum adjustment on the broadcast oscillator trimmer is obtained, adjust the broadcast R. F. trimmer for maximum output. Now set the test oscillator and receiver at 600 kc. Adjust the 600 kc. padding capacitor for maximum output while rocking the tuning condenser back and forth through the signal. When this has been done, return to 1500 kc. on the receiver and test oscillator and recheck the alignment for maximum output. When this is done, the broadcast band has been aligned.

Short Wave—Place the band switch in the counterclockwise position and set the receiver and test oscillator at 15,000 kc. Adjust the short-wave oscillator trimmer for maximum output. Next adjust the short-wave R. F. trimmer for maximum output while rocking the tuning condenser back and forth through the signal.

It will be noticed on the short-wave band that the oscillator and R. F. trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance obtained by turning the screw counterclockwise is the proper adjustment for the oscillator, while the position that uses the higher capacitance is proper for the R. F. trimmer.

When these adjustments have been completed, the receiver will be in alignment.

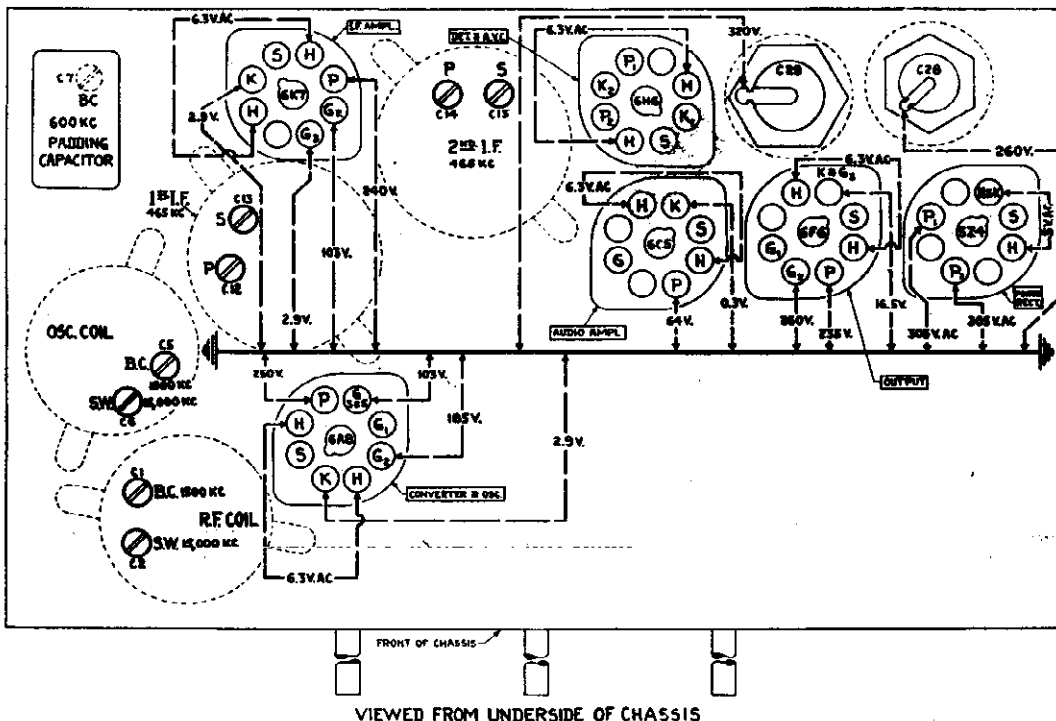


Fig. 4. Trimmer Locations and Socket Voltages

GENERAL ELECTRIC CO.

SOCKET VOLTAGES

Tube	Cathode to Ground Volts	Screen Grid to Ground Volts	Plate to Ground Volts	Plate Current MA	Heater Volts A-c.
6A8—Converter	2.9	103	250*	3.5	6.3
Oscillator			185*	4.5	
6K7—I. F.	2.9	103	240	8.5	6.3
6H6—Detector and AVC					6.3
6C5—Audio	0.3		64*	3.6	6.3
6F6—Output	16.5	260	235	30.0	6.3
5Z4—Rectifier	320		305 Rms., A. c.	33 per plate	5.0

Measured at 120 volts supply. No signal input. Volume control maximum. Voltmeter 1000 ohms per volt; measurements taken on highest scale giving accurate readable deflection.
* Measured with meter drawing less than 100 microamperes.

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which may be purchased from authorized dealers.

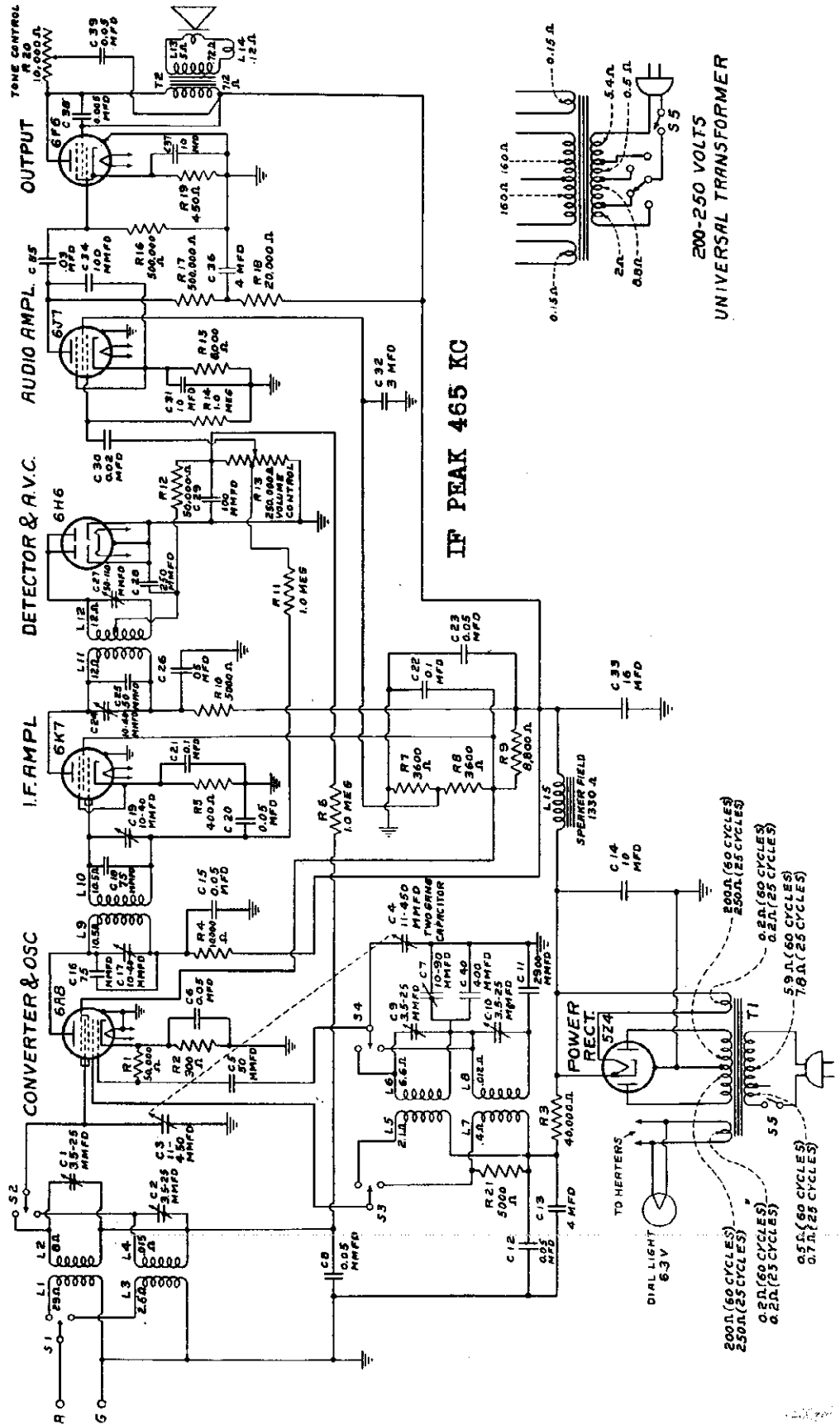
RECEIVER ASSEMBLIES

Stock No.	Description	List Price	Stock No.	Description	List Price
RB-001	BOARD—Antenna Terminal Board	\$0.10	RR-098	RESISTOR—2000 ohms, 1/8 watt (R-4), Carbon Resistor, pkg. of 5	\$0.60
RB-002	BOARD—Terminal Board	.15	RR-192	RESISTOR—50,000 ohms, 1/2 watt (R-8), Carbon Resistor, pkg. of 5	.70
RB-100	BRACKET—Dial Lamp Socket, Bracket and Pointer	.25	RR-224	RESISTOR—8000 ohms, 1 watt (R-15), Carbon Resistor, pkg. of 5	.80
RC-030	CAPACITOR—.006 Mfd. 400 Volt (C-24) Paper Dielectric	.25	RR-239	RESISTOR—20,000 ohms, 1 watt (R-12), Carbon Resistor, pkg. of 5	.80
RC-080	CAPACITOR—.02 Mfd. 400 Volt (C-21, C-27) Paper Dielectric	.25	RR-241	RESISTOR—30,000 ohms, 1 watt (R-13), Carbon Resistor, pkg. of 5	.80
RC-083	CAPACITOR—.03 Mfd. 400 Volt (C-23) Paper Dielectric	.25	RR-298	RESISTOR—16,000 ohms, 3 watt (R-14), Carbon Resistor	.50
RC-091	CAPACITOR—.05 Mfd. 400 Volt (C-16, C-18) Paper Dielectric	.30	RR-310	RESISTOR—150 ohms, 3/8 watt (R-3), Flexible Resistor, pkg. of 5	.70
RC-096	CAPACITOR—.1 Mfd. 200 Volt (C-11, C-25) Paper Dielectric	.30	RR-339	RESISTOR—450 ohms, 1 watt (R-10), Flexible Resistor, pkg. of 5	.70
RC-157	CAPACITOR—.5 Mfd. 200 Volt (C-17) Paper Dielectric	.40	RS-100	SHIELD—R.F. Coil Shield	.30
RC-210	CAPACITOR—50 mmfd. (C-10) Mica Dielectric Moulded Case	.25	RS-101	SHIELD—First I.F. Transformer Shield	.30
RC-286	CAPACITOR—380 mmfd. (C-8) Mica Dielectric Moulded Case	.25	RS-102	SHIELD—Second I.F. Transformer Shield	.30
RC-346	CAPACITOR—1500 mmfd. (C-32) Mica Dielectric Moulded Case	.35	RS-114	SHIELD—Oscillator Coil Shield	.30
RC-357	CAPACITOR—3600 mmfd. (C-9) Mica Dielectric Moulded Case	.50	RS-200	SOCKET—Eight-pin Tube Socket pkg. of 5	.70
RC-403	CAPACITOR—8 mfd. 350 Volt (C-28) Wet Electrolytic	1.00	RS-300	SWITCH—Tone Control Switch (S-5)	.20
RC-409	CAPACITOR—16 mfd. 390 Volt (C-29) Wet Electrolytic	1.25	RS-301	SWITCH—Frequency Band Switch (S-1, S-2, S-3, S-4)	.70
RC-501	CAPACITOR—One 10 mfd. 25 Volt (C-23), one 4 mfd. 450 Volt (C-26) Dry Electrolytic Pack	1.30	RT-061	TRANSFORMER—Power Transformer (T-1) 50-60 cycles 105-125 Volts (Rating "A")	5.50
RC-600	CAPACITOR—10-90 mmfd. Trimmer Capacitor (C-7)	.50	RT-062	TRANSFORMER—Power Transformer (T-1) 25-60 cycles 105-125 Volts (Rating "C")	8.20
RC-700	CONDENSER—Two-gang Tuning Condenser (C-3, C-4)	3.55	RT-063	TRANSFORMER—Power Transformer (T-1) 40-80 cycles 105-130, 200 250 Volts (Rating "V")	9.30
RC-800	CABLE—Loudspeaker Cable	.45	RT-200	TRANSFORMER—First I.F. Transformer (L-9, L-10, C-12, C-13, C-30)	1.90
RC-850	CORD—Power Cord with Plug	.65	RT-201	TRANSFORMER—Second I.F. Transformer (L-11, L-12, C-14, C-15, C-19, C-20, C-31, R-5)	2.30
RD-001	DIAL—Dial Scale and Hub Assembly	.50	RT-400	TRANSFORMER—Output Transformer (T-2)	1.10
RE-001	ESCUTCHEON—Dial Escutcheon	.35	RV-001	VOLUME CONTROL—Potentiometer 250,000 ohms (R-6) and Power Switch (S-6)	1.10
RF-001	FOOT—Chassis Mounting Foot with Cushions	.45	RX-001	SCREW ASSEMBLY—Chassis Mounting Screws and Washers, pkg. of 4	.10
RG-001	GRID CAP—Grid Connection Cap, pkg. of 5	.10	RX-003	CUSHION ASSEMBLY—Tuning Condenser Mounting Nuts, Washers and Cushions, pkg. of 3	.10
RK-001	KNOB—Tuning, Volume, Tone Control or Band Switch Knob, pkg. of 5	.50			
RL-100	COIL—R.F. Coil Assembly (L-1, L-2, L-3, L-4, C-1, C-2)	1.95		SPEAKER ASSEMBLY A-63	
RL-200	COIL—Oscillator Coil Assembly (L-5, L-6, L-7, L-8, C-5, C-8)	1.85	RC-902	CONE—Speaker Cone and Cone Coil	1.00
RR-018	RESISTOR—120 ohms 1/4 watt (R-7), Carbon Resistor, pkg. of 5	.60	RF-100	FIELD—Field Coil, Magnet and Cone Support	3.80
RR-020	RESISTOR—6000 ohms 1/4 watt (R-2), Carbon Resistor, pkg. of 5	.60	RS-012	SPEAKER—Seven-inch Reproducer Unit Complete	6.30
RR-050	RESISTOR—100,000 ohms 1/4 watt (R-1), Carbon Resistor, pkg. of 5	.70		SPEAKER ASSEMBLY A-65	
RR-064	RESISTOR—500,000 ohms 1/4 watt (R-9), Carbon Resistor, pkg. of 5	.60	RC-900	CONE—Speaker Cone and Cone Coil	1.00
RR-068	RESISTOR—2 megohms, 1/4 watt (R-11), Carbon Resistor, pkg. of 5	.60	RF-101	FIELD—Field Coil Magnet and Cone Support	4.40
			RS-010	SPEAKER—Eight-inch Reproducer Unit Complete	6.80

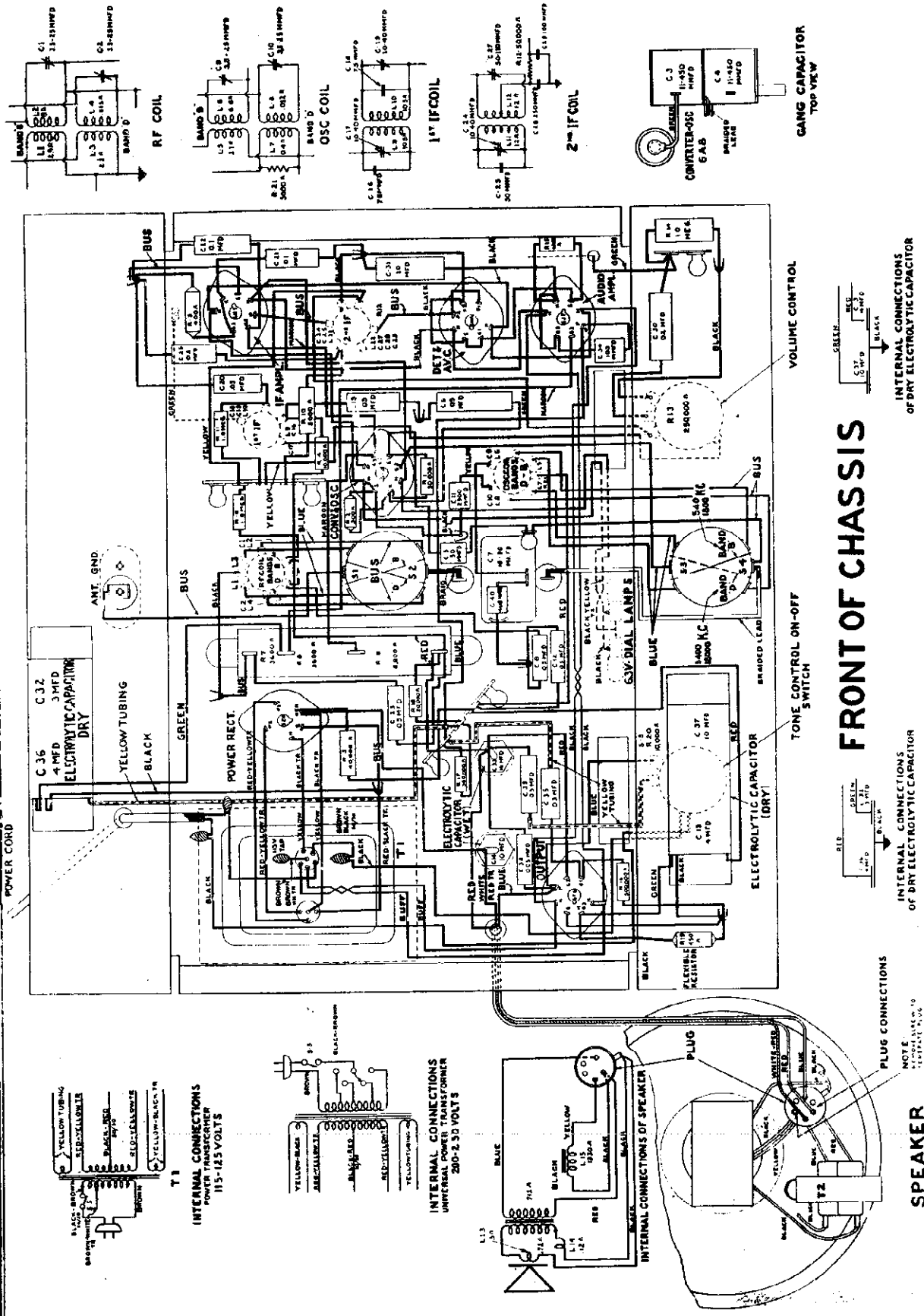
MODELS A-64, A-67

Schematic

GENERAL ELECTRIC CO.



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FRONT OF CHASSIS

Fig. 3. Chassis Wiring Diagram

MODEL A-64, A-67

Circuit Data, Trimmers
Alignment, Socket

GENERAL ELECTRIC CO.

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, as well as socket voltages, is shown in Fig. 4.

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 some point above 1600 KC so that no signal is heard, short-circuiting the antenna and ground terminals if necessary, and ground the chassis.

Remove the control grid clip (green lead) from the 6A8 tube and connect the test oscillator output between chassis and the dome terminal of the 6A8 tube. The I. F. amplifier is tuned to 465 KC; set the oscillator dial at this frequency. Make sure that a d-c path exists between the output terminals of the test oscillator; if an ohmmeter does not show continuity between the test oscillator terminals, connect a resistor of fairly high resistance between the 6A8 dome terminal and chassis to provide a d-c grid return path.

Connect the output meter across the cone coil of the speaker and adjust the test oscillator output control

tuning wand into the particular R. F. coil being used 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
Signal Trimmer Adjustment Required

Metal Ring Decrease	None
Iron Filings Increase	Decrease capacity
Metal Ring Decrease	Increase capacity
Iron Filings Increase	Decrease capacity

In Models A-64 and A-67 the broadcast band R. F. and oscillator coils are located in the upper half of their respective shield cans; the short-wave coils, in the lower half.

ALIGNMENT FREQUENCIES

Broadcast	Short-wave
590 KC	18,000 KC
1740 KC	

In order to align these receivers properly it is necessary to have available:

coil, 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 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 two signals 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 a 6K7 tube and two I. F. 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 this rectified signal drops a voltage drop across R-13. This voltage drop provides automatic bias for the converter and I. F. amplifier tubes and so gives automatic volume control action. Full automatic bias is applied to the converter tube, while a part of this voltage, taken from a tap on R-13, is applied to the I. F. amplifier tube, which handles a somewhat larger signal voltage than the converter tube.

The manual volume control selects the amount of audio signal applied, through coupling capacitor C-30, to the grid of the 6J7 audio amplifier tube, and this regulates the output of the receiver. The output of the 6J7 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 .05-mfd capacitor connected in series with a continuously variable 0-10,000 ohm resistance across the primary of the output transformer. When it is desired to reduce the high frequency output of the receiver, resistance is cut out of the circuit by turning the tone control knob counterclockwise.

Plate and grid voltages for all tubes are supplied by the 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.

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 nonmagnetic metal attached to one end, and a small carefully divided iron connected into the opposite end. By inserting the metal ring end into the center of either R. F. coil through the opening provided in the top of the coil shield, the inductance of that 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

SERVICE DATA

Physical Specifications	A-64	A-67
Model	1914 in.	36 3/4 in.
Height	14 in.	23 1/2 in.
Depth	10 in.	11 1/4 in.
Weight: Packed	33 lb	65 lb

Electrical Specifications	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
Rating Label			
A	105-130	50-80	85
C	105-130	25-50	90
V	105-130 and 200-250	40-80	90

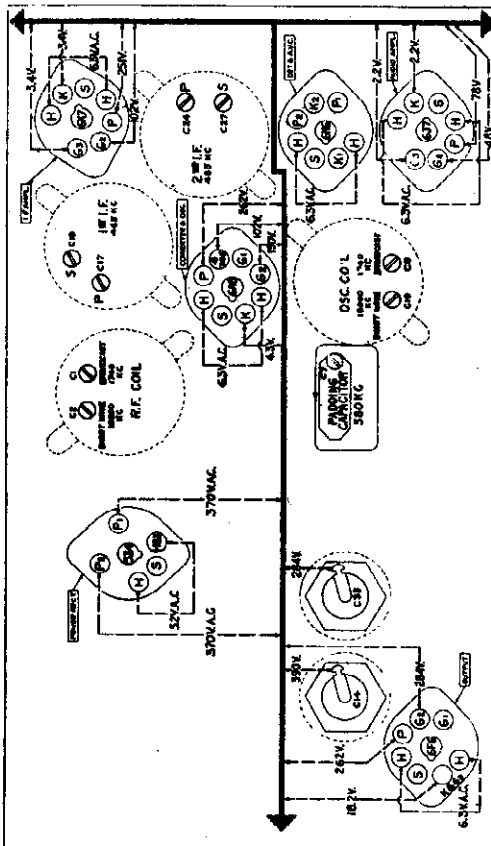
Note: Tap on universal transformers (rating 100%) are accessible by removing the top of the transformer. Schematic and wiring diagrams of universal transformer are shown in Figures 2 and 3, respectively.

- Tuning Frequency Range**
- Broadcast.....540-1600 KC
 - Short Wave.....5.4-18.0 MC (5400-18,000 KC)
- Tuning Control Drive Ratio**
- Fast Tuning.....5 1/2 to 1
 - Vernier Tuning.....55 to 1
- Electrical Power Output**
- Undistorted.....2.0 Watts
 - Maximum.....3.0 Watts
- Loud-speaker—Electrodynamics**
- Model A-64 8 in. overall, 7 in. effective diameter
 - Model A-67 10 3/4 in. overall, 9 1/2 in. effective diameter
- Cone Coil Impedance: 5 ohms at 400 cycles.

- Tube**
- Oscillator and Converter.....6A8 Pentagrid Converter
 - I. F. Amplifier.....6K7 Triple-grid Super-control Amplifier
 - Detector and AVC.....3H6 Twin Diode
 - First Audio Amplifier.....6J7 Triple-grid Detector Amplifier
 - Audio Power Amplifier.....6F6 Power Amplifier Pentode
 - Rectifier.....5Z4 Full-wave Rectifier
 - Dial Lamps.....MAEDA No. 46.

DESCRIPTION OF ELECTRICAL CIRCUIT

Models A-64 and A-67 employ six metal envelope tubes in a superheterodyne circuit giving the excellent selectivity and sensitivity inherent in this type circuit. Separate groups of coils are used for each frequency band. 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 tube through the R. F. circuits



VIEWED FROM UNDERSIDE OF CHASSIS

Measured at 120 volts supply. No signal input. Volume control maximum. Voltmeter 1000 ohms per volt; measurements taken on highest scale giving accurate readable deflection.

Fig. 4. Trimmer Locations and Socket Voltages

GENERAL ELECTRIC CO.

MODELS A-64, A-67
Alignment, Part 2
Voltage, Dial Data

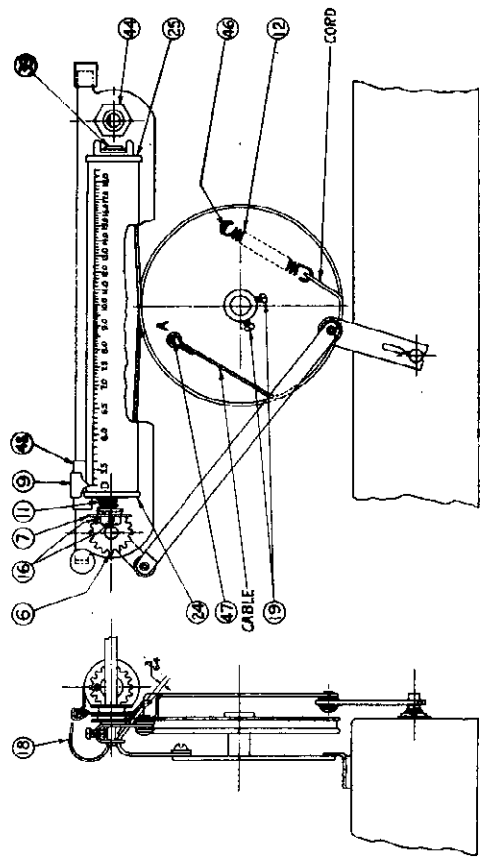


Fig. 5. Dial Mechanism

back and forth through the 18,000 KC signal, increase the short-wave R. F. trimmer capacitance until a maximum response point is obtained.

It will be noticed on the short-wave band that the oscillator and R. F. trimmers will have two positions at which the signal will give maximum output. The position corresponding to the lower trimmer capacitance is obtained by turning the trimmer-screw counter-clockwise is the proper adjustment for the oscillator trimmer, while the position corresponding to the higher capacitance is proper for the R. F. trimmer.

When these adjustments have been completed the receiver should 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 screws, the complete assembly being rubber-mounted by means of rubber cushions and bushings at points of support. The dial pointer, station selector reduction drive, and tuning condenser drive drum are interconnected by means of the drive cord and drive cable; the frequency band switch, cylindrical dial scale and switch operating shaft, by gear and toggle assemblies.

- 1. Position of Drum on Condenser Shaft**
With set screws (19) loosened and tuning condenser plates fully engaged, place the drum in the position shown in Fig. 5 so that the top rim of the drum is $\frac{1}{16}$ in. away from the mounting plate. Guide (48) should stop at equal distances from each end of the mounting plate slot.
- 2. Removing and Replacing Scale**
Pry out fastener (39) and remove the scale by lowering that end below the ear and taking the scale out of cap assembly (24), holding parts (24) (11) and (7) in place. Replace locating tabs of case (24) and (25) in slots of scale. Replace fastener (39).
- 3. Locating Scale**
Loosen the two gear set screws (18). Rotate the scale upward until there is slight tension on spring (11) with the pointer indicating on the broadcast (Band "B") scale. With the frequency band switch in the broadcast position, place gear (7) in mesh with the gear on part (6) and tighten the two set screws (16).
- 4. Replacing Drive Cord**
The position of the dial scale pointer with respect to a special metal braid cable connecting the drum with the guide (48). Tension is maintained on the cable through the drum spring (12) and drive cord. To replace either the drive cable or the drive cord, remove the dial scale for convenient access to guide (48). Unhook spring (12) from tab (46) to release tension. Unhook the cable or cord from guide (48) and unwind from the pulleys and drum. To replace the cable, rethread to agree with Fig. 5, and rehook drum spring (12) as shown.
- 5. Replacing Reducing Drive**
To replace the reduction drive, unhook spring (12), loosen the drive cord. Unscrew palmst (44) and remove drive. Replace with new drive and rehook drive cord.
- 6. Replacing Toggle Assembly**
Loosen the set screw holding the toggle mechanism on shaft (6) and spread the fork on the lower lever arm enough to remove it from the band switch shaft. Replace with new assembly. Rotate shaft (6) clockwise, until there is slight tension on spring (11) with the scale in the Band "B" position. Place upper lever arm in shaft and tighten set screw.
- 7. Setting Dial Pointer**
The dial pointer (9) is soldered to the guide (48).
- 8. Replacing Dial Lamp**
Take hold of the terminals of the lamp bracket and push up until the lamps protrude above the opening in reflector (18). Lamps may then be replaced in socket clips. After replacing lamps, slide the socket mounting bracket back into the mounting clip.

Broadcast—340-1800 KC.

Set the frequency band switch to the position where the dial indicates the above range. Tune the test oscillator to 1740 KC and set the dial pointer on the receiver to this frequency. Adjust the broadcast oscillator trimmer for maximum output, keeping the receiver volume control at its extreme clockwise position and adjusting the test oscillator output to maintain a small reading on the output indicator. When optimum adjustment on the broadcast oscillator trimmer is obtained, adjust the broadcast R. F. trimmer for maximum output.

Now set the test oscillator at 580 KC and tune the receiver to that frequency. Slowly rock 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 1740 KC on the receiver and test oscillator and recheck the alignment for maximum output. The broadcast band should now be in alignment.

Short Waves—54-180 MC (5400-18,000 KC)

Set the frequency band switch to the position where the dial indicates the above range. Tune the test oscillator at 18,000 KC and set the dial pointer on the receiver to that frequency. Adjust the short-wave oscillator trimmer for maximum output, using the first peak obtained when increasing the capacitance from minimum to maximum.

Check for the image signal which should be received at about 17,070 on the receiver dial. It may be necessary to increase input to the receiver from the test oscillator for this check. Return the receiver to the correct scale reading (18,000 KC) and reduce the test oscillator output to its previous value.

Reduce the capacitance of the R. F. trimmer to a minimum. While slowly rocking the tuning condenser

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	4.3	102	190	18.7	6.3
6K7 I. F. Amplifier	3.4	102	251	8.1	6.3
6H6 Detector and AVC	2.3	48	78*	.38	6.3
6J7 Audio Amplifier	18.3	284	382	38.7	6.3
5Z4 Power Rectifier	...	...	740/370 Rms	76.1	5.2

*Measured at 125 volts supply. No signal input. Volume control maximum. Voltmeter 1000 ohms per volt; measurements taken on highest scale giving accurate readable deflection.
*Measured on 1000-volt scale.

MODELS A-64, A-67

Parts List

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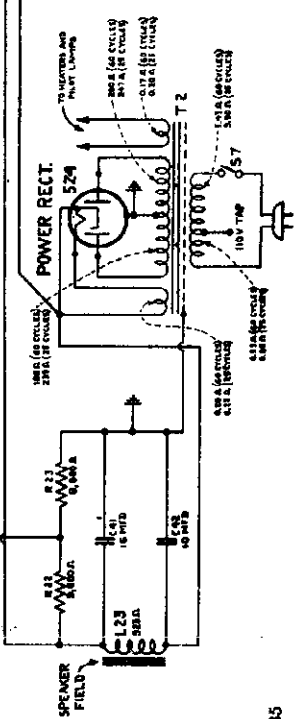
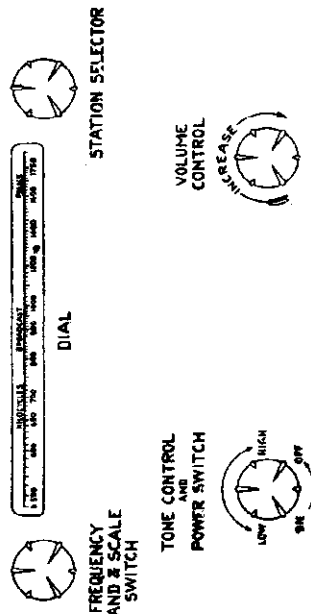
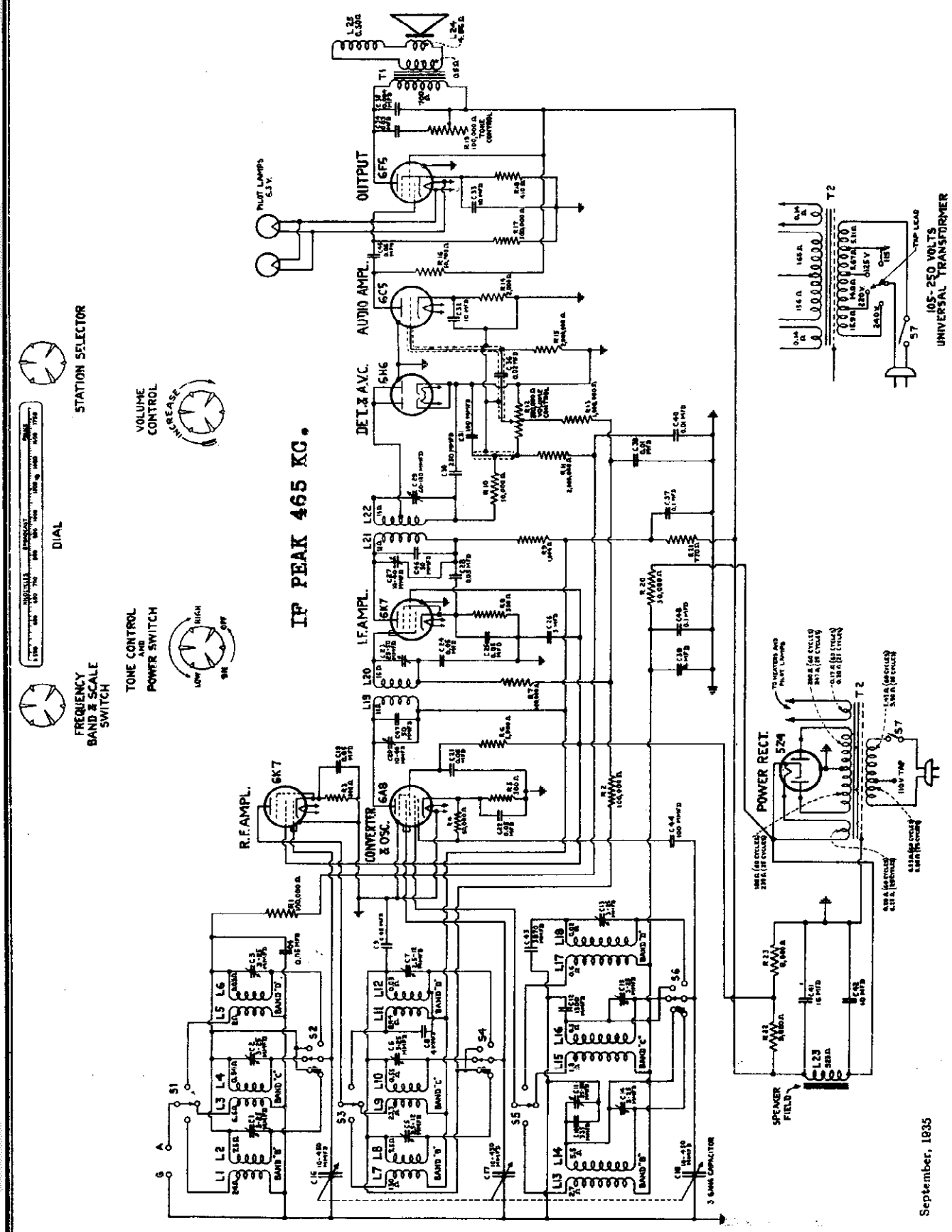
REPLACEMENT PARTS

Insist on genuine factory-tested parts, which may be purchased
from authorized dealers

Stock No.	Description	List Price	Stock No.	Description	List Price
RECEIVER ASSEMBLIES					
RB-001	BOARD—Antenna Terminal Board	\$0.10	RR-339	RESISTOR—450 ohms, 1 watt (R-19) Flexible Resistor, Pkg. of 5	\$0.70
RB-009	BOARD—Terminal Board (Single Terminal)	.15	RR-703	RESISTOR—Tapped Resistor (R-7, R-8, R-9)	.60
RB-015	BOARD—Terminal Board (Triple Terminal)	.15	RS-102	SHIELD—Second I. F. Transformer Shield	.30
RB-016	BOARD—Terminal Board (For 6J7 Grid Lead)	.10	RS-113	SHIELD—R. F. Coil Shield	.30
RB-116	BRACKET—R. H. Front Bracket Assembly	.25	RS-120	SHIELD—First I. F. Transformer Shield	.30
RB-119	BRACKET—L. H. Front Bracket Assembly	.25	RS-121	SHIELD—Oscillator Coil Shield	.20
RB-200	BRACE—Dial Opening Brace (Model A-64)	.30	RS-200	SOCKET—Eight-pin Tube Socket, Pkg. of 5	.75
RC-029	CAPACITOR—.005 mfd., 400 volts (C-38) Paper Dielectric	.30	RS-204	SOCKET—Five-pin Tube Socket (5Z4), Pkg. of 5	.75
RC-046	CAPACITOR—.02 mfd., 200 volts (C-30) Paper Dielectric	.25	RS-305	SWITCH—Frequency Band Switch with Mounting Nut (S-1, S-2, S-3, S-4)	1.30
RC-072	CAPACITOR—.05 mfd., 200 volts (C-6, C-8, C-20, C-39) Paper Dielectric	.25	RS-605	SUPPORT—Dial Mechanism Support Post	.20
RC-083	CAPACITOR—.03 mfd., 400 volts (C-35) Paper Dielectric	.25	RT-064	TRANSFORMER—Power Transformer (T-1) 50-60 cycles, 105-120 volts (Rating "A")	5.65
RC-091	CAPACITOR—.05 mfd., 400 volts (C-12, C-15, C-23, C-26) Paper Dielectric	.30	RT-065	TRANSFORMER—Power Transformer (T-1) 25-60 cycles, 105-130 volts (Rating "C")	8.50
RC-006	CAPACITOR—.1 mfd., 200 volts (C-21, C-22) Paper Dielectric	.30	RT-066	TRANSFORMER—Power Transformer (T-1) 40-60 cycles, 105-130, 200-250 volts (Rating "V")	7.05
RC-210	CAPACITOR—50 mfd., (C-5) Mica Dielectric	.25	RT-211	TRANSFORMER—First I. F. Transformer (C-16, C-17, C-18, C-19, L-9, L-10)	1.95
RC-235	CAPACITOR—100 mmfd., (C-34) Mica Dielectric	.25	RT-212	TRANSFORMER—Second I. F. Transformer (C-24, C-25, C-27, C-28, C-29, L-11, L-12, R-12)	2.35
RC-289	CAPACITOR—400 mmfd., (C-40) Mica Dielectric	.25	RT-704	tone CONTROL—Rheostat 10,000 ohms (R-20) and Power Switch (S-5)	1.60
RC-352	CAPACITOR—2900 mmfd., (C-11) Mica Dielectric	.40	RV-006	VOLUME CONTROL—Potentiometer 250,000 ohms (R-13)	.95
RC-404	CAPACITOR—10 mfd., 400 volts (C-14) Wet Electrolytic	1.10	RW-002	WINDOW—Dial Window	.15
RC-407	CAPACITOR—16 mfd., 380 volts (C-33) Wet Electrolytic	1.15	RX-003	CUSHION ASSEMBLY—Tuning Condenser Mounting Nuts, Washers and Cushions	.15
RC-501	CAPACITOR—One 10 mfd., 25 volts (C-37); One 4 mfd., 450 volts (C-13) Dry Electrolytic Pack	1.30	RX-004	SCREW ASSEMBLY—Chassis Mounting Screws and Washers	.10
RC-502	CAPACITOR—One 4 mfd., 450 volts (C-36); One 3 mfd., 150 volts (C-32) Dry Electrolytic Pack	1.40	SPEAKER ASSEMBLY A-64		
RC-504	CAPACITOR—10 mfd., 25 volts (C-31) Dry Electrolytic	.70	RC-900	CONE—Eight-inch Speaker Cone and Cone Coil (L-13)	1.00
RC-600	CAPACITOR—10-90 mmfd. Trimmer Capacitor (C-7)	.50	RP-009	PLUG—Speaker Male Plug Connector	.20
RC-704	CONDENSER—Two-gang Tuning Condenser (C-3, C-4)	3.25	RP-012	PLUG—Speaker Female Plug Connector	.20
RC-804	CABLE—Loud-speaker Cable	.60	RS-008	SPEAKER—Eight-inch Loud-speaker Complete with Output Transformer	10.50
RC-853	CORD—Power Cord with Plug	.50	RT-405	TRANSFORMER—Output Transformer (T-2)	1.70
RE-005	ESCUTCHEON—Dial Escutcheon	.80	SPEAKER ASSEMBLY A-67		
RF-006	FOOT—Mounting Foot Assembly	.30	RC-901	CONE—10 1/4-in. Speaker Cone and Cone Coil (L-13)	1.45
RG-001	GRID CAP—Grid Connection Cap, Pkg. of 5	.10	RP-009	PLUG—Speaker Male Plug Connector	.20
RI-003	INSULATOR—Escutcheon Shaft Insulating Bushing, Pkg. of 10	.40	RP-012	PLUG—Speaker Female Plug Connector	.20
RK-001	KNOB—Tuning, Volume, Tone Control or Band Switch Knob, Pkg. of 5	.60	RS-008	SPEAKER—10 1/4-in. Loud-speaker Complete with Output Transformer	12.75
RL-108	COIL—R.F. Coil (C-1, C-2, L-1, L-2, L-3, L-4)	2.10	RT-405	TRANSFORMER—Output Transformer	1.70
RL-209	COIL—Oscillator Coil (C-9, C-10, L-5, L-6, L-7, L-8, R-21)	1.95	DIAL MECHANISM (See Fig. 5)		
RN-001	NUT—Escutcheon Mounting Nut, Pkg. of 10	.45	RB-117	BRACKET—Dual Lamp Bracket	.25
RP-014	PLATE—Escutcheon Mounting Plate, Pkg. of 2	.25	RC-805	CABLE—Drive Cable, Pkg. of 5	.80
RR-017	RESISTOR—6000 ohms, 1/4 watt (R-15) Carbon Resistor, Pkg. of 5	.60	RC-856	CORD—Drive Cord, Pkg. of 5	.65
RR-021	RESISTOR—10,000 ohms, 1/4 watt (R-4) Carbon Resistor, Pkg. of 5	.60	RC-954	CAP—Scale Cap Assembly (Gear End) (24)	.10
RR-025	RESISTOR—20,000 ohms, 1/4 watt (R-18) Carbon Resistor, Pkg. of 5	.60	RC-955	CAP—Scale Cap Assembly (Drive End) (25)	.10
RR-035	RESISTOR—50,000 ohms, 1/4 watt (R-1) Carbon Resistor, Pkg. of 5	.70	RC-958	CUSHION—Rubber Dial Mounting Cushion, Pkg. of 2	.10
RR-065	RESISTOR—500,000 ohms, 1/4 watt (R-16, R-17) Carbon Resistor, Pkg. of 5	.65	RD-011	DIAL—Dial Mechanism Complete	2.50
RR-067	RESISTOR—1,000,000 ohms, 1/4 watt (R-6, R-11, R-14) Carbon Resistor, Pkg. of 5	.70	RD-006	DRIVE—"Automatic Vernier" Reduction Drive	1.00
RR-100	RESISTOR—5,000 ohms, 1-3 watt (R-10, R-21) Carbon Resistor, Pkg. of 5	.60	RD-013	DRUM—Drive Drum Assembly	.35
RR-281	RESISTOR—40,000 ohms, 2 watts (R-3) Carbon Resistor	.30	RD-014	DIAL—Dial Scale	.75
RR-324	RESISTOR—300 ohms, 3/4 watt (R-2) Flexible Resistor, Pkg. of 5	.60	RF-200	FASTENER—Dial Fastener (39), Pkg. of 10	.10
RR-336	RESISTOR—400 ohms, 3/4 watt (R-5) Flexible Resistor, Pkg. of 5	.65	RG-002	GEAR—Dial Gear Assembly (7)	.15
			RG-200	GUIDE—Dial Pointer Guide (48), Pkg. of 5	.15
			RP-003	POINTER—Dial Pointer (9), Pkg. of 2	.15
			RP-004	PULLEY—Drive Cord Idler Pulley, Pkg. of 2	.10
			RP-005	PLATE—Dial Mounting Plate Assembled Complete	.50
			RS-401	SPRING—Drum Spring (12), Pkg. of 2	.20
			RS-403	SPRING—Dial Spring (11), Pkg. of 2	.10
			RS-900	SHAFT—Shaft and Gear Assembly (6)	.15
			RT-800	TOGGLE—Toggle Assembly	.25

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IP PEAK 465 KG.



MODELS A-70, A-75
Chassis Wiring

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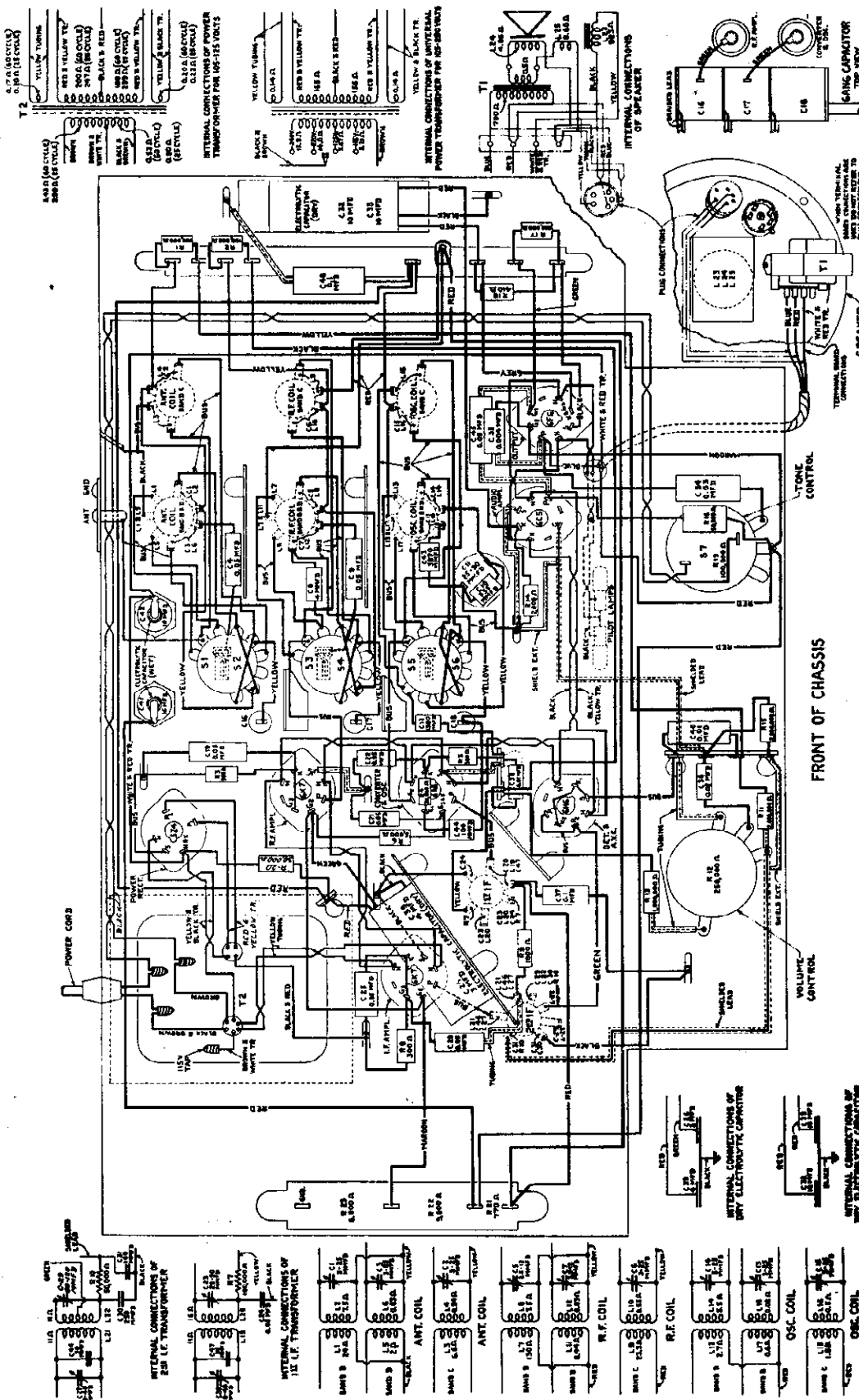


Fig. 3. Chassis Wiring Diagram

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MODELS A-70, A-75 Alignment, Trimmers Socket, Voltage

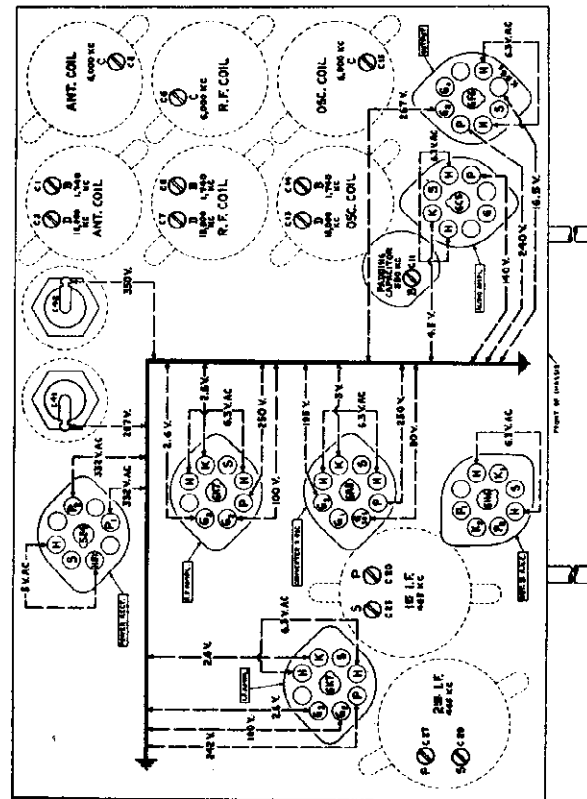


Fig. 5. Trimmer Locations and Socket Voltages
VIEWED FROM UNDERSIDE OF CHASSIS

ALIGNMENT FREQUENCIES

I. F. Band "B" 580 kc.
Band "C" 6000 kc.
Band "D" 465 kc.
1740 kc.
18,000 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, 1740, 6000, and 18,000 kc.
2. An output indicator, such as a high resistance μ -v. voltmeter with a maximum scale reading of 5 to 8 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 Fig. 5.

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 above 1500 kc. so that 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 in 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 second I. F. transformer until a maximum output on the output meter throughout alignment by adjusting the test oscillator output. Next adjust the primary trimmer of the second I. F. transformer for maximum output. Continue this procedure, adjusting the secondary trimmer of the first I. F. transformer 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.

R. F. Alignment

Band "B" requires four trimmer adjustments, while Band "C" and Band "D" each require three adjustments. Care should be taken to adjust only the trimmers of the band under test. Check the position of the dial pointer as outlined in the section on adjustment of the dial mechanism. Make sure the antenna and ground terminals of the receiver are not short-circuited and connect to them the output from the test oscillator, preferably using a dummy antenna of 250 mfd. in series with 200 ohms between the test oscillator and receiver antenna terminal. Connect the output indicator across the speaker cone coil.

Band "B"—580-1740 kc.

Set the frequency band switch to the position where the dial indicates the above range. Tune the test oscillator to 1740 kc. and set the dial pointer on the oscillator to 1740 kc. and set the dial pointer on the

test oscillator for this check. Return the receiver to the correct scale reading (6000 kc.) and reduce the test oscillator output to its previous value. Then adjust the Band "C" R. F. and antenna trimmers for maximum output.

Band "D"—6.0-19.5 mc. (6000-19,500 kc.)

Set the band switch to the position where the dial indicates the above range. Tune the test oscillator to 18,000 kc. and set the dial pointer on the receiver to this frequency. Adjust the Band "D" oscillator trimmer for maximum output, using the first peak obtained when increasing the capacitance from minimum to maximum.

Check for the image signal which should be received at about 17070 on the receiver dial. It may be necessary to increase input to the receiver from the test oscillator for this check. Return the receiver to the correct scale reading (18,000 kc.) and reduce the test oscillator output to its previous value.

Reduce the capacitance of the R. F. trimmer to a minimum. While slowly rocking the tuning condenser through the 18,000-kc. point, increase the Band "D" R. F. trimmer capacitance until a maximum response point is obtained. The Band "D" antenna trimmer should next be peaked. It is not necessary to rock the tuning condenser while making this last adjustment.

receiver to this frequency. Adjust the Band "B" oscillator trimmer for maximum output, keeping the receiver volume control at its extreme clockwise position and adjusting the test oscillator output to maintain a small reading on the output indicator. When optimum adjustment on the Band "B" oscillator trimmer is obtained, adjust the Band "B" R. F. and antenna trimmers for maximum output.

Now tune the test oscillator to 580 kc. and set the receiver to that frequency. Slowly rocking the tuning condenser back and forth through the signal, adjust the 680-kc. padding capacitor for maximum output. When this has been done, return to 1740 kc. on the receiver and test oscillator and recheck the alignment for maximum output. Band "B" should now be in alignment.

Band "C"—1.75-6.0 mc. (1750-6000 kc.)

Set the band switch to the position where the dial indicates the above range. Tune the test oscillator to 6000 kc. and set the dial pointer on the receiver to this frequency. Adjust the Band "C" oscillator trimmer for maximum output, using the first peak obtained when increasing the capacitance from minimum to maximum.

Check for the image signal which should be received at about 5070 kc. on the receiver dial. It should be necessary to increase input to the receiver from the

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. By inserting the brass cylinder end into the center of a particular coil, through the opening provided in the top of the shield, 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.

Wand	Signal	Trimmer Adjustment Required
Brass cylinder	Increase	None
Iron filings	Decrease	None
Brass cylinder	Increase	Decrease capacity
Iron filings	Decrease	Increase capacity
Brass cylinder	Increase	Increase capacity
Iron filings	Decrease	Decrease capacity

Fig. 4 shows the location of the antennas, R. F. and oscillator coils for each of the three frequency bands of Model A-70 and A-75 receivers.

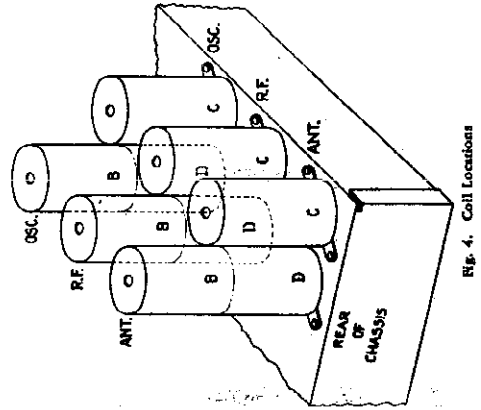


Fig. 4. Coil Locations

MODELS A-70, A-75
Circuit Data
Dial Data

GENERAL ELECTRIC CO.

groups of coils are used for each frequency band. Sample undistorted output is obtained through diode detector and two audio amplifier stages.

The signal from the antenna is applied to the control grid of the 6K7 R. F. amplifier 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 by the band switch to prevent absorption of energy at its resonant frequency which falls in the next higher band.

The amplified radio frequency signal is impressed on the control grid of the 6A8 converter and oscillator tube through the R. F. coil, the secondary of which is tuned to the signal frequency by the center 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 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 capacitor. The oscillator section of the main tuning condenser, although of the same capacity as the other two sections, is larger physically to permit wider spacing of the plates, thereby reducing the possibility of inter-plate feedback howl.

The combination of the signal frequency with the local oscillator frequency in the converter tube produces the intermediate frequency of 485 kilocycles. This particular intermediate frequency is chosen to reduce image response and improve short-wave performance. The intermediate frequency amplifier consists of a 6K7 tube and two 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-12. 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 R. F. amplifier tube, while half this voltage, from the midtap of R-12, is applied to the converter tube and I. F. amplifier, which handle a somewhat larger signal voltage than the R. F. amplifier.

The manual volume control selects the amount of audio signal applied through coupling capacitor C-36 to the grid of the 6C5 audio amplifier tube, and this regulates the output of the receiver. The output of the 6C5 tube is resistance coupled to the grid of the 6R6 power amplifier pentode. The plate circuit of the 6R6 is suitably matched to the load-speaker by means of a step-down output transformer.

The tone control circuit consists of a 0.05-mfd. capacitor connected in series with a continuously variable 0-100,000-ohm resistance across the primary of the output transformer. When it is desired to reduce the high frequency output of the receiver, resistance is cut out of the circuit by operating the tone control knob.

Plate and grid voltages for all tubes are supplied by the 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.

SERVICE DATA

Physical Specifications
 Model A-70 A-75
 Height 20 1/2 in. 40 3/4 in.
 Width 14 1/2 in. 23 3/4 in.
 Depth 11 1/2 in. (Knobs 1 1/4 in. (Knobs project beyond) project beyond)
 Weight packed 34 lb. 68 lb.

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	105-130	50-60	100
C	105-130	25-60	105
V	105-130 and 200-250	40-60	105

Notes: Taps on universal transformers (Rating "V") are accessible by removing the cap cover mounted on the top of the transformer. The ratings of the primary and secondary of universal transformer are shown in Fig. 2 and 5, respectively.

Tuning Frequency Range

Band "B" 540-1750 kc.
 Band "C" 1.75-6.0 mc. (1750-6000 kc.)
 Band "D" 6.0-19.3 mc. (6000-19,500 kc.)

Tuning Control Drive Ratio

Fast Tuning 5 1/4 to 1
 Vernier Tuning 55 to 1

Electrical Power Output

Undistorted Maximum 2.0 watts
 Maximum 3.0 watts

Load-speaker—Electrodynamo

Cone: Model A-70 8 in. overall, 7 in. effective diameter
 Model A-75 10 1/4 in. overall, 9 1/4 in. effective diameter

Cone Coil Impedance: 5 ohms at 400 cycles

Tubes

R. F. Amplifier.....6K7 Triple-grid Super-control Oscillator and Amplifier
 Converter and I. F. Amplifier.....6K7 Triple-grid Super-control Amplifier
 Detector and AVC.....6H6 Twin Diode
 Audio Amplifier.....6C5 Detector Amplifier Triode Output
 Power Rectifier.....5Z4 Full-wave Pentode
 Dial Lamps.....Mazda No. 46

DESCRIPTION OF ELECTRICAL CIRCUIT

CIRCUIT

Models A-70 and A-75 employ seven metal envelope tubes to perform the above functions in a superheterodyne circuit, giving the excellent selectivity and sensitivity inherent in this type circuit. Separate

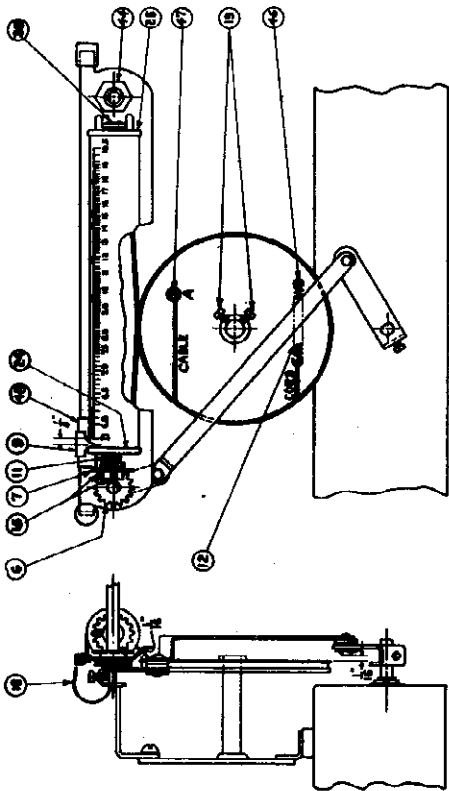


Fig. 6. Dial Mechanism

Adjustment of Dial Mechanism

The dial mechanism is rigidly mounted to the frame of the tuning condenser by means of two removable screws, the complete assembly being rubber-mounted by means of rubber cushions and bushings at points of support. The dial pointer, station selector knob, and tuning condenser drive drum are interconnected by means of the drive cord and drive cable; the frequency band switch, the cylindrical dial scale and switch knob, by gear and toggle assemblies.

1. Position of Drums on Condenser Shaft

With set screws (18) loosened and tuning condenser plates fully engaged, place the drum in the position as shown in Fig. 6 so that drum spring (12) is approximately horizontal, and the top rim of the drum is 1/4 in. away from the mounting plate. Guide (48) should stop at equal distances from each end of the mounting plate slot.

2. Reversing and Replacing Scale

Fry out fastener (38), and remove the scale by lowering that end below the ear and taking the scale out of cap assembly (24), holding parts (24), (11), and (7) in place. Replace, locating tabs of caps (24) and (25) in slots of scale. Replace fastener (38).

3. Locating Scale

Loosen the two gear set screws (16). Rotate the scale upward until there is slight tension on spring (11) with the pointer indicating on the Band "D" scale. With the frequency band switch in the Band "D" position, place gear (7) in mesh with the gear on part (6) and tighten the two set screws (16).

4. Replacing Drive Cord

The tuning of the dial scale pointer with respect to the position condenser drum is held fixed by means of a special metal braided cable connecting the drum with the guide (48). Tension is maintained on the cable through the drum spring (12) and drive cord. To

replace either the drive cable or the drive cord, remove the dial scale for convenient access to guide (48). Unhook spring (12) from tab (48) to release tension. Unhook the cable or cord from guide (48) and unwind from the pulleys and drum. To replace the cable rethread to agree with Fig. 6, and rehook drum spring (12) as shown.

5. Replacing Reducetive Drive

To replace the reduction drive, unhook spring (12), loosening the drive cord. Unscrew palmnut (44) and remove drive. Replace with new drive and rehook drive cord.

6. Replacing Toggle Assembly

Loosen the two set screws holding the toggle mechanism on the band change switch and on shaft (6). Replace with new assembly, setting lower lever arm 1/4 in. away from the condenser drive drum as shown in Fig. 6, and tighten set screw on frequency band switch shaft. Rotate shaft (6) clockwise until there is slight tension on spring (11) with the scale in the Band "D" position. Place upper lever arm in shaft and tighten set screw.

7. Setting Scale Pointer

The scale pointer is soldered to the slider. To set the pointer mechanically, turn the tuning condenser rotor so that the plates are fully engaged, and solder the pointer to indicate 1/4 in. to the left of the extreme left-hand line on the Band "D" scale as shown in Fig. 6.

8. Replacing Dial Lamp

Take hold of terminals of lamp bracket and push up until lamps protrude above the opening in reflector (16). Lamps may then be replaced in socket clips. After replacing lamps, slide the socket mounting bracket back into the mounting clip.

MODELS A-70, A-75
Voltage Parts

GENERAL ELECTRIC CO.

GEJ-40 Radio Receivers, Models A-70 and A-75

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 Voltage A.C.
6B7 R. F.	2.5	100	250	8.7	6.3
6A8 Oscillator	...	...	195	...	6.3
6B7 R. F.	2.0	90	250	10.0	6.3
6B7 First Detector	2.0	100	245	8.7	6.3
6B7 L. F.	...	...	...	...	6.3
6H10 Second Detector	...	...	...	...	6.3
6C25 1st A. F.	4.5	...	140	2.2	6.3
6F6 A. P. Power	16.5	207	240	42.5	6.3
6E4 Power Rectifier	...	...	694/822 R.M.S.	85.0	5.0

Measured at 125 volts supply. No signal input. Volume control maximum. 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	Stock No.	Description	List Price
RB-001	BOARD—Antenna Terminal Board	...	RC-303	CAPACITOR—One 10 mfd., 95 volts (C-303) Dry Electrolytic	\$1.10
RE-005	BOARD—Terminal Board (Supports C-38, R-6)	...	RC-301	CAPACITOR—Trimmer Capacitor; 25-50 mfd. (C-11)	.40
RB-006	BOARD—Terminal Board (Supports C-36, R-6)	.10	RC-701	CONDENSER—Three-gang Tuning Cond. (C-16, C-17, C-18) Plug	4.25
RB-017	BOARD—R. F. Coil Board (Supports R-20)	.10	RC-954	COIL—R. F. Coil, Band C (C-6, L-9, L-10)	4.25
RB-115	BRACKET—Dial Mechanism Support Bracket	.20	RP-002	FOOT—Mounting Foot Assembly	.80
RB-200	BRACE—Dial Opening Brace (Model A-70)	.30	RG-001	GRID CAP—Grid Connection Cap. Plug of 5	.20
RC-022	CAPACITOR—.004 mfd., 400 volts (C-33) Dielectric	.25	RI-003	INSULATOR—Excitation Shaft Insulator	.10
RC-034	CAPACITOR—.01 mfd., 200 volts (C-38) Paper Dielectric	.25	RK-001	KNOB—Tuning Volume, Tone Control or Band Switch Knob, Plug of 5	.40
RC-046	CAPACITOR—.02 mfd., 200 volts (C-38) Paper Dielectric	.25	RL-001	COIL—Antenna Coil, Bands B and D (C-1, C-3, L-1, L-2, L-3, L-4)	.50
RC-072	CAPACITOR—.05 mfd., 200 volts (C-4) Paper Dielectric	.25	RL-002	COIL—Antenna Coil, Band C (C-2, L-3, L-4, L-5, L-6)	2.25
RC-082	CAPACITOR—.03 mfd., 400 volts (C-34) Paper Dielectric	.25	RL-101	COIL—R. F. Coil, Bands B and D (C-5, C-7, L-7, L-8, L-11, L-12)	1.60
RC-091	CAPACITOR—.05 mfd., 400 volts (C-39) Paper Dielectric	.30	RL-102	COIL—R. F. Coil, Band C (C-6, L-9, L-10)	2.50
RC-123	CAPACITOR—.1 mfd., 400 volts (C-37) Paper Dielectric	.35	RL-201	COIL—Oscillator Coil, Bands B and D (C-13, C-14, L-13, L-14, L-17, L-18)	1.60
RC-202	CAPACITOR—.4 mfd., (C-6) Mica Dielectric	.25	RL-202	COIL—Oscillator Coil, Band C (C-15, L-15, L-16)	2.10
RC-225	CAPACITOR—100 mfd., (C-44) Mica Dielectric	.25	RN-001	NU7—Excitation Mounting Nut, Plug of 10	1.70
RC-277	CAPACITOR—325 mfd., (C-10) Mica Dielectric	.25	RP-014	PLATE—Excitation Mounting Plate, Plug of 3	.45
RC-344	CAPACITOR—180 mfd., (C-13) Mica Dielectric	.25	RR-006	RESISTOR—500 ohms, 1/4 watt (R-3, R-5, R-6)	.25
RC-391	CAPACITOR—3870 mfd., (C-43) Mica Dielectric	.35	RR-013	RESISTOR—2000 ohms, 1/4 watt (R-14)	.70
RC-494	CAPACITOR—10 mfd., 440 volts (C-42) Paper Dielectric	.40	RR-014	RESISTOR—1000 ohms, 1/4 watt (R-9) Carbon Resistor, Plug of 6	.70
RC-498	CAPACITOR—10 mfd., 440 volts (C-41) Paper Dielectric	1.10	RR-015	RESISTOR—500 ohms, 1/4 watt (R-6) Carbon Resistor, Plug of 5	.70
RC-602	CAPACITOR—One 4 mfd., 450 volts (C-39) Wet Electrolytic	1.15	RR-035	RESISTOR—50,000 ohms, 1/4 watt (R-4) Carbon Resistor, Plug of 5	.70
		1.40	RR-049	RESISTOR—100,000 ohms, 1/4 watt (R-1, R-2) Carbon Resistor, Plug of 5	.70

Stock No.	Description	List Price	Stock No.	Description	List Price
RR-064	RESISTOR—500,000 ohms, 1/4 watt (R-17) Carbon Resistor, Plug of 5	\$0.80	RC-900	SPEAKER ASSEMBLY A-70	1.70
RR-067	RESISTOR—1,000,000 ohms, 1/4 watt (R-18) Carbon Resistor, Plug of 5	.70	RC-909	CONV.—Speaker Cone and Cone Coil (L-24)	1.00
RR-068	RESISTOR—2,000,000 ohms, 1/4 watt (R-19) Carbon Resistor, Plug of 5	.60	RP-009	PLUG—Speaker Male Plug Connector	\$.00
RR-192	RESISTOR—40,000 ohms, 1/4 watt (R-16) Carbon Resistor, Plug of 5	.70	RP-013	PLUG—Speaker Female Plug Connector	.20
RR-211	RESISTOR—410 ohms, 1 watt (R-18) Carbon Resistor, Plug of 5	1.15	RS-009	SPEAKER—8-inch Loud-speaker Complete with Output Transformer	9.15
RR-241	RESISTOR—3000 ohms, 1 watt (R-22) Carbon Resistor, Plug of 5	.85	RS-011	SPEAKER—8-inch Loud-speaker Complete with Output Transformer	9.00
RR-700	RESISTOR—500 ohms, 1 watt (R-22) Carbon Resistor, Plug of 5	1.00	RT-402	TRANSFORMER—Output Transformer (T-1) Speaker Plug Type	1.80
RS-103	SHIELD—Antenna or R. F. Coil Shield, Band C	.20	RT-405	TRANSFORMER—Output Transformer (T-1) Speaker Plug Type	1.70
RS-104	SHIELD—Antenna or R. F. Coil Shield, Bands B and D	.25			
RS-105	SHIELD—R. F. Shield (Short)	.25			
RS-117	SHIELD—Second I. F. Transformer Shield	.25			
RS-118	SHIELD—Oscillator Coil Shield, Band C	.25			
RS-119	SHIELD—Oscillator Coil Shield, Bands B and D	.25			
RS-150	SHIELD—R. F. Shield (Short)	.10			
RS-151	SHIELD—R. F. Shield (Beneath I. F. Transformer)	.15			
RS-152	SHIELD—R. F. Shield (Long)	.15			
RS-154	SHIELD—R. F. Shield (Beneath 6H6 tube)	.15			
RS-200	SOCKET—Eight-pin Tube Socket, Plug of 6	.75	RT-402	TRANSFORMER—Output Transformer (T-1) Speaker Plug Type	11.65
RS-204	SOCKET—Five-pin Tube Socket with Mounting Nut (S-1, S-2, S-3, S-4, S-5)	.75	RT-405	TRANSFORMER—Output Transformer (T-3) Speaker Plug Type	1.80
RS-302	SWITCH—Frequency Band Switch with Mounting Nut (S-1, S-2, S-3, S-4, S-5)	3.25			
RS-720	STRIP—Terminal Strip	.50			
RT-071	TRANSFORMER—Power Transformer (T-2) 50-50 cycles, 105-130 volts (Rating "A")	5.75			
RT-072	TRANSFORMER—Power Transformer (T-2) 25-50 cycles, 105-130 volts (Rating "B")	8.75			
RT-073	TRANSFORMER—Power Transformer (T-2) 40-60 cycles, 104-130, 200-250 Volts (Rating "V")	7.25			
RT-202	TRANSFORMER—First I. F. Transformer (C-20, C-28, C-24, C-47, L-19, L-20, L-22, R-10)	2.50			
RT-203	TRANSFORMER—Second I. F. Transformer (C-27, C-29, C-30, C-31, L-21, L-22, R-10)	2.50			
RT-700	TONE CONTROL—Potentiometer, 100-1000 ohms, (R-19) and Power Switch (C-10)	90			
RV-002	VOLUME CONTROL—Potentiometer, 250,000 ohms (R-12)	1.15			
RW-002	WINDOW—Dial Window	1.15			
RX-003	CUSHION—Dial Gear Assembly, Plug of 2	.15			
RX-004	SCREW ASSEMBLY—Chassis Mounting Screws and Washers	.10			

DIAL MECHANISM

RB-117	BRACKET—Dual Lamp Bracket	.25
RC-835	CABLE—Drive Cable, Plug of 5	.35
RC-836	CABLE—Drive Cable, Plug of 5	.10
RC-854	CAP—Seal Cap Assembly (Gear End)	.10
RC-955	CAP—Seal Cap (Drive End)	.10
RC-958	CUSHION—Rubber Dial Mounting Cushion, Plug of 2	.10
RD-002	DIAL—Dial Mechanism Complete	2.75
RD-006	DIAL—Automatic Vernier Reduction Drive	1.00
RD-013	DRUM—Drive Drum Assembly	.35
RD-016	DIAL—Dial Scale	.75
RP-200	PASTENER—Dial Pastener, Plug of 10	.10
RG-002	CHASSIS—Dial Gear Assembly, Plug of 5	.15
RP-009	PLATE—Dial Point Contact, Plug of 5	.15
RP-004	PULLEY—Drive Cord Idler Pulley, Plug of 2	.10
RP-006	PLATE—Dial Mounting Plate assembled complete	.50
RS-401	SPRING—Dial Spring, Plug of 2	.10
RS-402	SPRING—Dial Spring, Plug of 2	.10
RS-900	SHAFT—Shaft and Gear Assembly	.15
RT-801	TOGGLE—Toggle Assembly	.25

MODELS A-82, A-87
Schematic

GENERAL ELECTRIC CO.

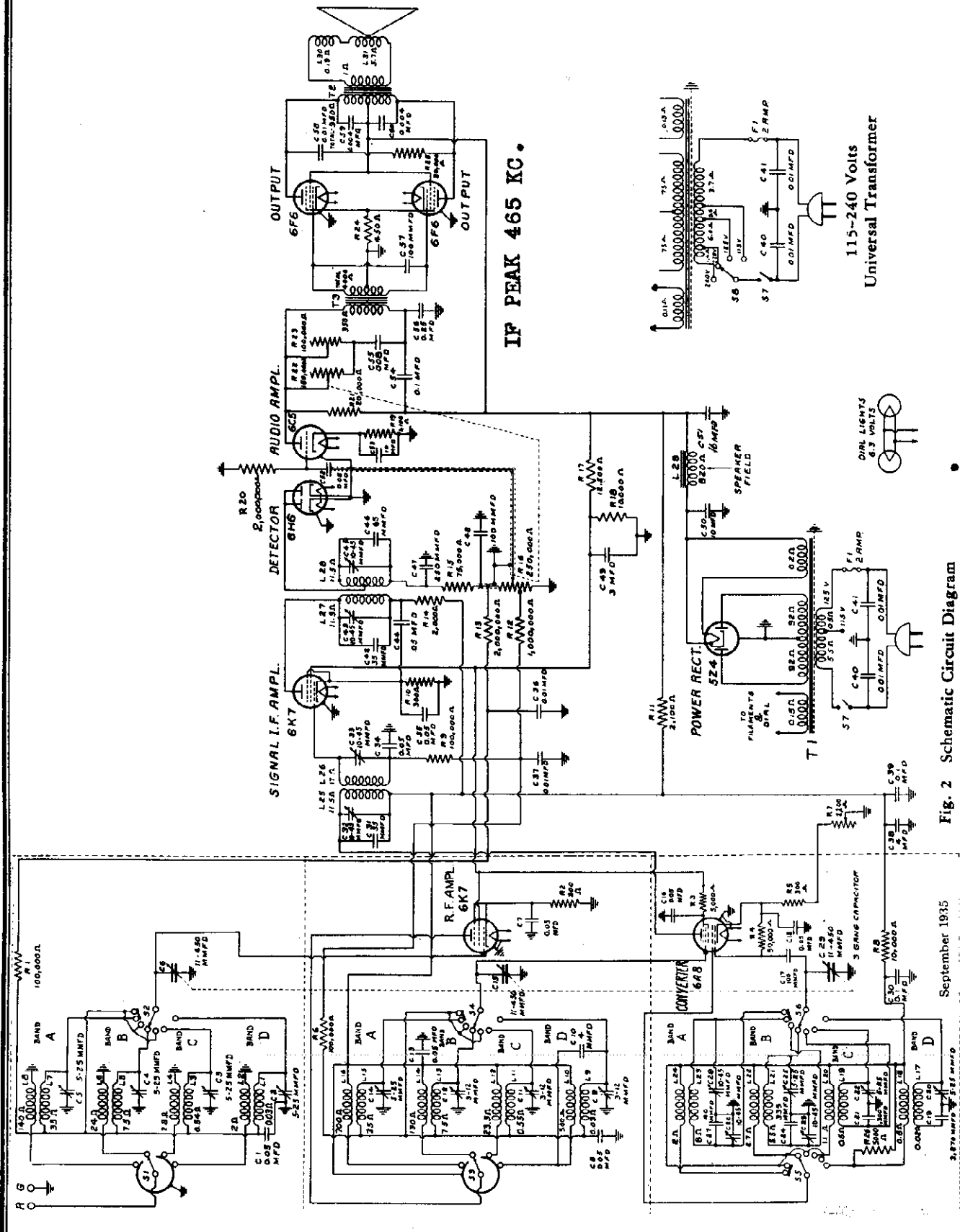


Fig. 2 Schematic Circuit Diagram

September 1935

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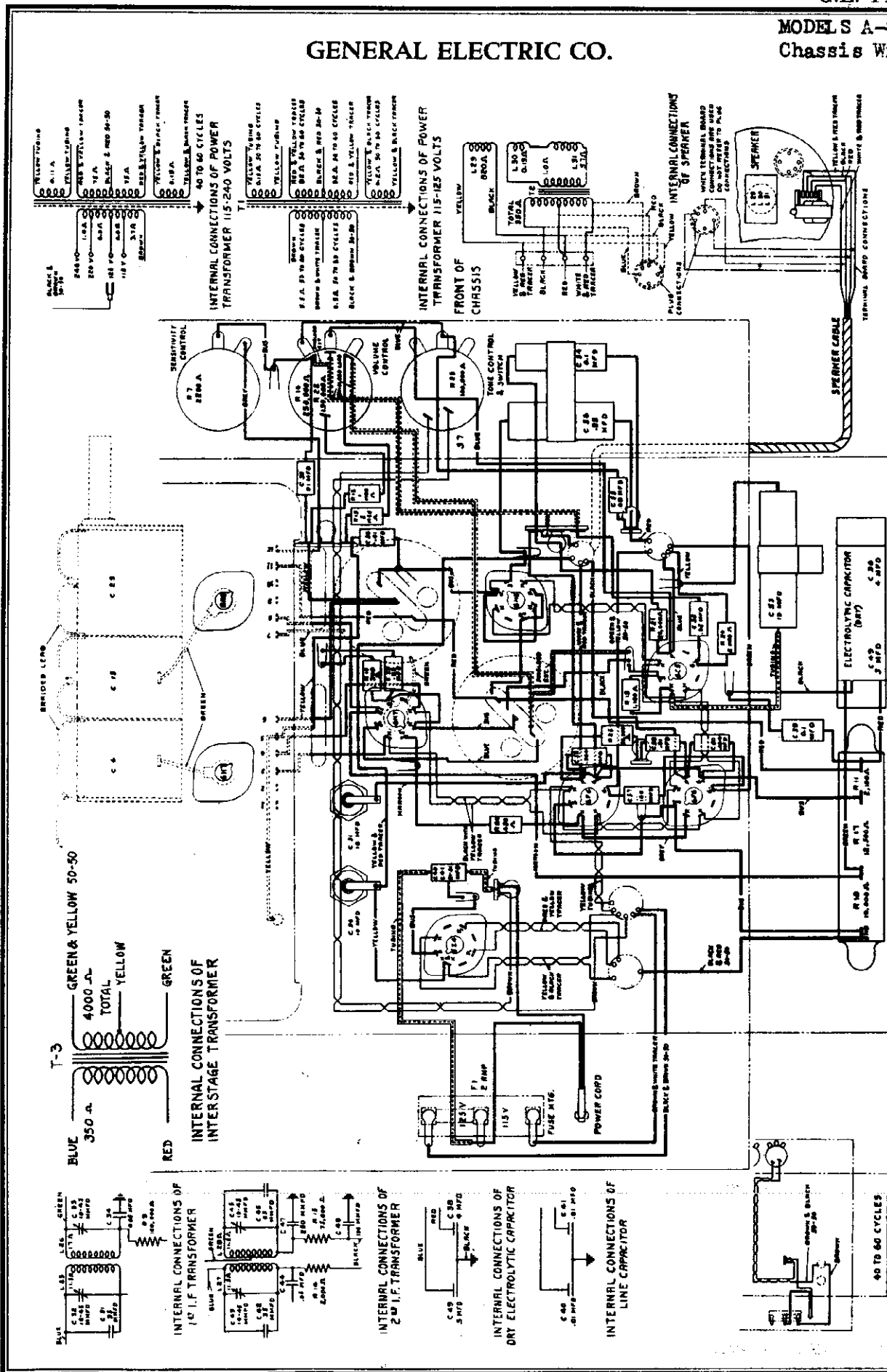


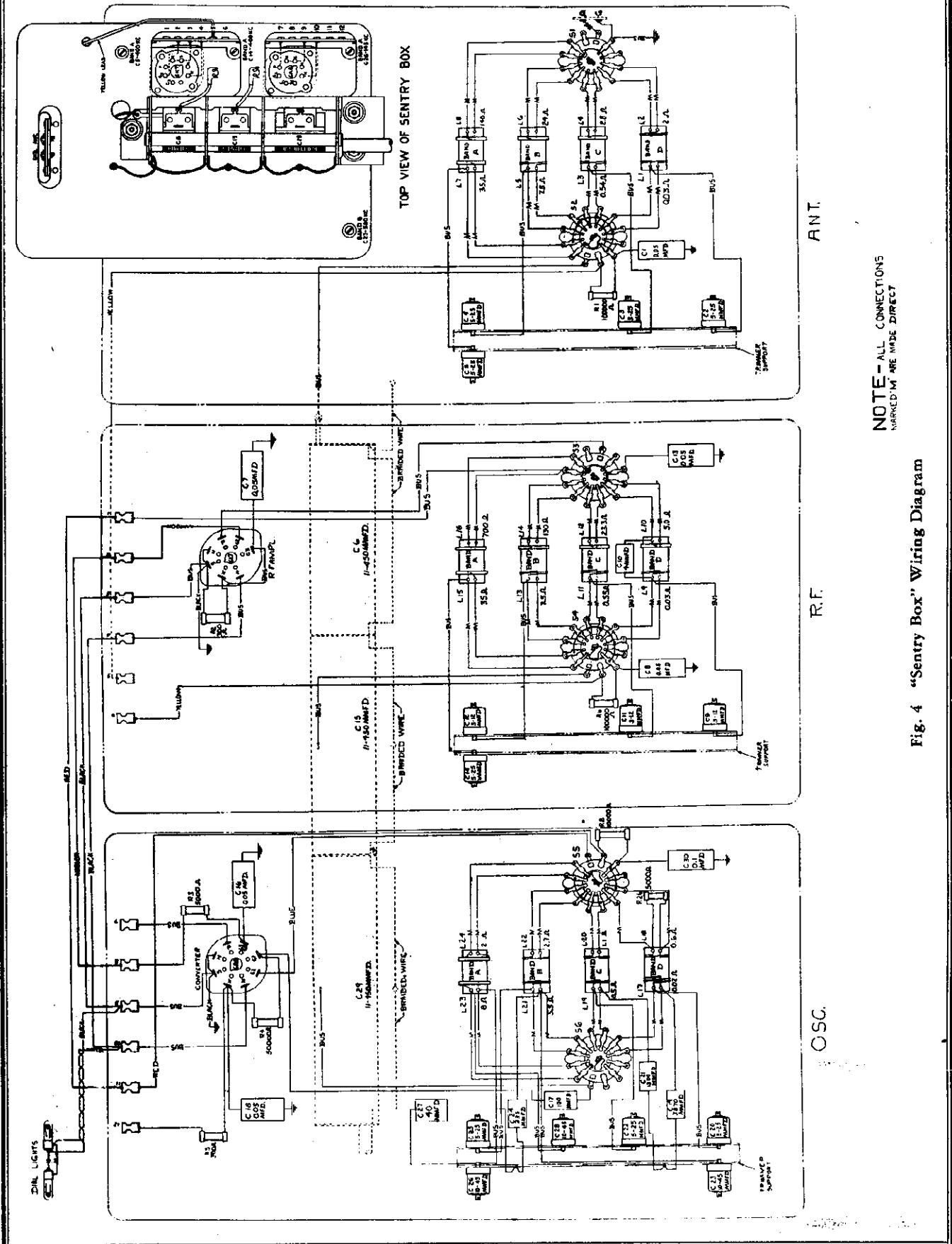
Fig. 3 Chassis Wiring Diagram

(Rating "V" Receivers)

MODEL S A-82, A-87

Sentry Box
Chassis Wiring

GENERAL ELECTRIC CO.



GENERAL ELECTRIC CO.

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	105-130	50-60	105
C	105-130	25-60	110
V	105-130 and 220-250	40-60	110

NOTE—Taps on universal transformers (Rating "V") are accessible by removing the cap cover on the top of the transformer.

Tuning Frequency Range

Band "A"	140-410 kc
Band "B"	540-1750 kc
Band "C"	1.75-6.0 mc (1750-6000 kc)
Band "D"	6.0-19.6 mc (6000-19,500 kc)

Tuning Control Drive Ratio

Fast Tuning	5½ to 1
Vernier Tuning	55 to 1

Electrical Power Output

Undistorted	5.0 watts
Maximum	7.0 watts

Loud-speaker—Electrodynamic

Cone: Model A-82	10¼ in. overall, 9¼ in. effective diameter
Model A-87	10¼ in. overall, 9¼ in. effective diameter
Cone Coil Impedance:	5 ohms at 400 cycles

DESCRIPTION OF ELECTRICAL CIRCUIT

The signal from the antenna is applied to the control grid of the 6K7 R. F. amplifier 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 by the band switch to prevent absorption of energy, at its resonant frequency, which falls in the next higher band. The primaries of all coils not in use are also short-circuited by the band switch.

The amplified radio frequency signal is impressed on the control grid of the 6A8 converter and oscillator tube through the R. F. coil, the secondary of which is tuned to the signal frequency by the center section of the main tuning condenser. The sensitivity control consists of a variable resistor in the cathode circuit of the 6A8 converter tube. 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 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 oscillator section of the main tuning condenser, although of the same capacity as the other two sections, is larger physically to permit wider spacing of the plates, thereby reducing the possibility of microphonic feedback howl.

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 a 6K7 tube and two 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-16. This voltage drop provides automatic bias for the R. F. and I. F. amplifier tubes and converter tube and so gives automatic volume control action. Full automatic bias is applied to the R. F. amplifier tube, while a part of this voltage, from a tap on R-16, is applied to the converter tube and I. F. amplifier,

which handle somewhat larger signal voltage than the R. F. amplifier.

The manual volume control selects the amount of audio signal applied through coupling capacitor C-52 to the grid of the 6C5 audio amplifier tube, and thus regulates the output of the receiver. This is a dual control, the second or lo-note compensation section acting to preserve proper balance between high and low audio frequencies as the volume is changed, by means of a variable 150,000-ohm resistance (R-22) in series with a capacitor (C-55) across the primary of the interstage audio transformer. The tone control consists of a variable 100,000-ohm resistor (R-23) connected in parallel with the lo-note compensation section of the volume control, so as to permit attenuation of the higher audio frequencies as desired.

The output of the 6C5 tube is coupled to the grids of the push-pull 6F6 output pentodes by means of a resistance capacity network working into the interstage audio transformer. The plate circuits of the 6F6 output pentodes are suitably matched to the loud-speaker by means of a step-down output transformer.

Plate and grid voltages for all tubes are supplied by the 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.

ALIGNMENT PROCEDURE

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 through the openings provided in the "Sentry Box" compartment shields, 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	

Fig. 6 shows the location of the antenna, R. F. and oscillator coils for each of the four frequency bands of Models A-82 and A-87 receivers. Openings are provided in the coil shields for insertion of the tuning wand into the antenna or R. F. coil of any band. No provision is made for checking the alignment of the oscillator circuits, as this is easily determined by noting the dial calibration.

Alignment Frequencies

I. F.	Band "A"	Band "B"	Band "C"	Band "D"
465 kc	140 kc	580 kc	6000 kc	18,000 kc
	410 kc	1740 kc		

In order to align these receivers properly, it is necessary to have available the following test equipment:

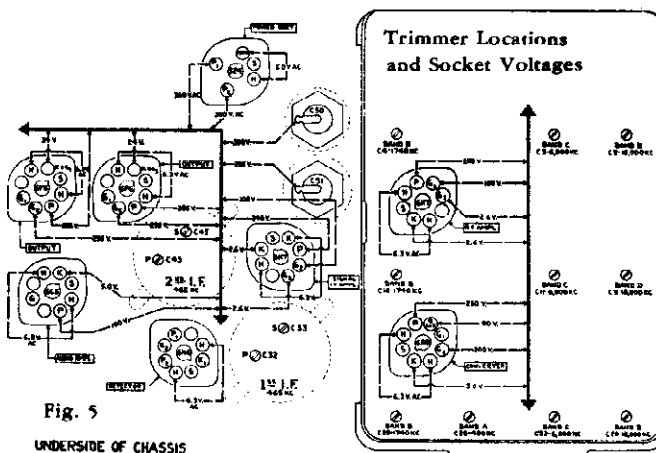
MODELS A-82, A-87
Alignment, Part 2
GENERAL ELECTRIC CO.

1. A modulated test oscillator with frequencies available of 140, 410, 465, 580, 1740, 6000, 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.

The location of all trimmer capacitors is shown in Fig. 5. It should be noted that on all "Permaliner" trimmer capacitors, clockwise rotation of the adjusting screw decreases capacity while counterclockwise rotation increases capacity.

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 at some point above 1500 kc so that no signal is heard. Set the volume control and sensitivity control at maximum (extreme clockwise position) and ground the chassis.


Fig. 5
UNDERSIDE OF CHASSIS

The I. F. amplifier is tuned to 465 kc; set the test oscillator dial at this frequency. Make sure that a d-c path exists between the output terminals of the test oscillator, then remove the control grid clip (green lead) from the 6A8 tube and connect the test oscillator output between chassis and the dome terminal of the 6A8 tube. 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 second I. F. transformer until a maximum output reading is obtained, maintaining a small deflection on the output meter throughout alignment by adjusting the test oscillator output. Next, adjust the primary trimmer of the second I. F. transformer for maximum output. Continue this procedure, adjusting the secondary trimmer of the first I. F. transformer 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.

2. R. F. Alignment

Bands "A" and "B" each require four trimmer adjustments, while Bands "C" and "D" each require three adjustments. Care should be taken to adjust only the trimmers of the band under test. Check the position of the dial pointer with the tuning condenser plates fully engaged as outlined in the section on adjustment of the dial mechanism. Make sure the antenna and ground terminals of the receiver are not short-circuited and connect to them the output from the test oscillator, preferably using a dummy antenna of 250 mmfd in

series with 200 ohms between the test oscillator and the receiver antenna terminal. Connect the output indicator across the speaker cone coil.

Band "A," 140-410 kc

Set the frequency band switch to the position where the dial indicates the above range. Tune the test oscillator to 410 kc, and turn the dial pointer on the receiver to this frequency. Adjust the Band "A" oscillator trimmer for maximum output, keeping the receiver volume control at its extreme clockwise position and adjusting the test oscillator output to maintain a small deflection on the output indicator. When optimum adjustment on the Band "A" oscillator trimmer is obtained, adjust the Band "A" R. F. and antenna trimmers for maximum output.

Now tune the test oscillator to 140 kc and set the receiver to that frequency. Slowly rocking the tuning condenser back and forth through the signal, adjust the 140-kc padding capacitor for maximum output. When this has been done, return to 410 kc on the receiver and test oscillator and recheck the alignment for maximum output. This completes alignment of Band "A."

Band "B," 540-1750 kc

Set the frequency band switch to the position where the dial indicates the above range. Tune the test oscillator to 1740 kc and set the dial pointer on the receiver to this frequency. Adjust the Band "B" oscillator trimmer for maximum output, keeping the receiver volume control at its extreme clockwise position and adjusting the test oscillator output to maintain a small reading on the output indicator. When optimum adjustment on the Band "B" oscillator trimmer is obtained, adjust the Band "B" R. F. and antenna trimmers for maximum output.

Now tune the test oscillator to 580 kc and set 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 1740 kc on the receiver and test oscillator and recheck the alignment for maximum output. Band "B" should now be in alignment.

Band "C," 1.75-6.0 mc (1750-6000 kc)

Set the band switch to the position where the dial indicates the above range. Tune the test oscillator to 6000 kc and set the dial pointer on the receiver to this frequency. Adjust the Band "C" oscillator trimmer for maximum output, using the first peak obtained when increasing the capacitance from minimum to maximum.

Check for the image signal which should be received at about 6070 kc on the receiver dial. It should be necessary to increase input to the receiver from the test oscillator for this check. Retune the receiver to the correct scale reading (6000 kc) and adjust the test oscillator output to its previous value. Then adjust the Band "C" R. F. and antenna trimmers for maximum output.

Band "D," 6.0-19.5 mc (6000-19,500 kc)

Set the band switch to the position where the dial indicates the above range. Tune the test oscillator to 18,000 kc and set the dial pointer on the receiver to this frequency. Adjust the Band "D" oscillator trimmer for maximum output, using the first peak obtained when increasing the capacitance from minimum to maximum.

Check for the image signal which should be received at about 17,070 on the receiver dial. It may be necessary to increase input to the receiver from the test oscillator for this check. Retune the receiver to the correct scale reading (18,000 kc) and adjust the test oscillator output to its previous value.

Reduce the capacitance of the R. F. trimmer to a minimum. While slowly rocking the tuning condenser through the 18,000-kc point, increase the Band "D" R. F. trimmer capacitance until a maximum response point is obtained. The Band "D" antenna trimmer should now be peaked. It is not

GENERAL ELECTRIC CO.

MODELS A-82, A-87
Sentry Box Data
Dial Data

necessary to rock the tuning condenser while making the last adjustment.

When these adjustments have been completed, the receiver will be in alignment.

METHOD OF SERVICE PROCEDURE— SENTRY BOX

The "Sentry Box" assembly includes the tuning condenser and dial mechanism as well as the coil and switch compartments. The complete unit may be dismantled from the chassis by removing the side-fastening bolts, unscrewing the dial mechanism anchoring nut and unsoldering the leads to the chassis from the terminal strips.

In order to remove the coil shield cans it is necessary to take out the frequency band switch shaft. With the "Sentry Box" dismantled from the chassis the dial gears may be disengaged and the switch shaft removed merely by lifting the reduction drive end of the dial assembly, allowing the switch shaft gear to pass the dial scale cap shaft. With the "Sentry Box" mounted in place, removal of the switch shaft requires removing the dial scale gear and cap shaft.

Each compartment shield can houses a bracket assembly comprising the coils, band switch and other component parts associated with that particular circuit. With the band

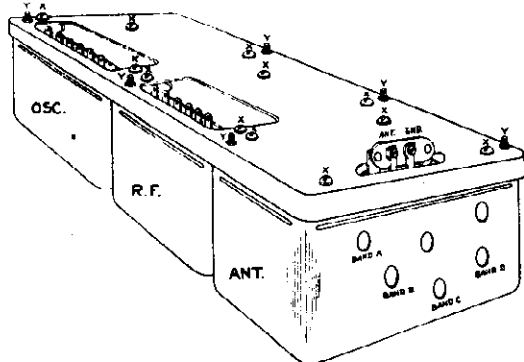


Fig. 6 "Sentry Box" Coil Locations and Assembly

switch shaft out, any shield can be easily removed by unscrewing the two mounting stud nuts ("Y," Fig. 6).

In most cases, coils or Permaliner trimmer capacitors may be replaced merely by removing their particular shield can. It is an easy matter, however, to remove each complete bracket assembly by taking out the mounting bolts ("X," Fig. 6) and unsoldering the bus or braid connections to the tuning condenser. In the case of the R. F. or oscillator units it will also be necessary to unsolder the external leads to the respective terminal boards of these units.

Permaliner trimmers are replaced by unsoldering the bus lead from the trimmer terminal, and then unsoldering the Permaliner case from its mounting cup. The latter operation may require the use of two soldering irons.

Coils are replaceable by merely unsoldering the coil lugs from the switch lugs. If it is necessary to replace a section of the band switch, however, it will be found expedient to remove the complete bracket and coil assembly for easy access to the switch lugs.

ADJUSTMENT OF DIAL MECHANISM

The dial mechanism is rigidly mounted at one end to the tuning condenser frame by two removable screws and anchored to the chassis deck at the other end by a rubber-cushioned nut. The dial pointer, station selector knob, and tuning condenser drive drum are interconnected by means of the drive cord and drive cable; the frequency band switch and cylindrical scale by the switch shaft and scale gears.

1. Position of Drum on Condenser Shaft

With set screws (5) loosened and tuning condenser plates fully engaged, place the drum in the position shown in Fig. 7. The drum should be located on the tuning condenser shaft so

as to be in line with the drive cord pulleys ($\frac{1}{8}$ in. from the dial mechanism mounting bracket), and so that, with condenser plates fully engaged, guide (38) occupies the position shown in Fig. 7.

2. Removing and Replacing Scale

Pry out fastener (40) and remove the scale by lowering the fastener end below the mounting ear. Take the scale out of cap assembly (29). Replace by placing tabs of caps (29) and (30) in slots of scale. Replace fastener (40).

3. Removing and Replacing Band Switch Shaft

To remove the band switch shaft with the "Sentry Box" assembled in place, the dial scale cap and gear must be removed. This is done by removing the cylindrical scale as in

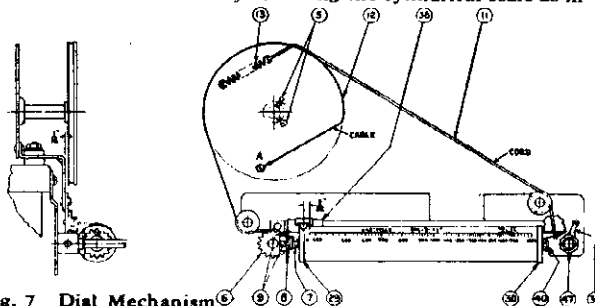


Fig. 7 Dial Mechanism

paragraph 2. Then loosen set screws (9) and remove cap (29), spring (7) and gear (8).

When replacing the switch shaft, note that the shaft will fit the switch gang slots in only one position; turn the shaft before inserting so that the locating button will pass through the keyed side of the slots. Note also that the brass bearing just behind the switch shaft gear determines the forward position of the gear. Insert the bushing just far enough into the index plate hub so that the shaft gear meshes snugly with the scale gear, then tighten the set screw.

4. Locating Scale

Loosen the two gear set screws (9). Rotate the scale backward until there is slight tension on spring (7) with the pointer indicating on the Band "A" scale. With the frequency band switch in the Band "A" position, place gear (8) in mesh with the gear on part (6) and tighten the two set screws (9).

5. Replacing Drive Cord and Drive Cable

The position of the dial scale pointer with respect to the tuning condenser drum is held fixed by a special metal braid cable (12) connecting the drum with guide (38). Tension is maintained on the cable through the drum spring (13) and drive cord (11). To replace either the drive cable or the drive cord, remove the dial scale for convenient access to guide (38). Unhook spring (13) from its drum tab to release tension. Unhook the cable or cord from guide (38) and unwind from the pulleys and drum. To replace the cable or cord, rethread to agree with Fig. 7, and rehook drum spring (13) as shown.

6. Replacing Reduction Drive

To replace the reduction drive, unhook spring (13), loosening the drive cord. Unscrew pal nut (47) and remove drive. Replace with new drive and rehook drive cord.

7. Setting Scale Pointer

The scale pointer is soldered to the slider. To set the pointer mechanically, turn the tuning condenser rotor so that the plates are fully engaged, and solder the pointer to indicate a point $\frac{1}{8}$ in. to the left of the extreme left-hand mark on the scale on Band "B."

8. Replacing Dial Lamp

The dial lamp sockets are easily accessible by lifting them clear of the dial mechanism. Lamps may then be replaced in their sockets. After replacing lamps, slide the socket clip back onto the mounting bracket.

MODELS A-82, A-87
Voltage, Parts

GENERAL ELECTRIC CO.

REPLACEMENT PARTS (Continued)

Inset on genuine factory-issued parts, which may be purchased from authorized dealers.

Stock No.	Description	List Price
RS-800	SENSITIVITY CONTROL—Rheostat 2200 ohms (R-7)	\$0.85
RT-081	TRANSFORMER—Power Transformer (T-1) 50-90 cycles, 105-130 volts (Rating "A")	6.75
RT-082	TRANSFORMER—Power Transformer (T-2) 50-90 cycles, 105-130 volts (Rating "B")	8.70
RT-083	TRANSFORMER—Power Transformer (T-3) 40-90 cycles, 105-130-250 volts (Rating "V")	8.25
RT-204	TRANSFORMER—First I. F. Transformer (C-3) 50-90 cycles, 105-130-250 volts (Rating "A")	2.95
RT-205	TRANSFORMER—Second I. F. Transformer (C-4) 50-90 cycles, 105-130-250 volts (Rating "A")	3.30
RT-500	TRANSFORMER—Intermediate Audio Transformer (T-3)	2.25
RT-701	RE-ENTRY CONTROL—Rheostat 100,000 ohms (R-2)	1.25
RV-003	VOLUME CONTROL—Potentiostat 150,000 ohms (R-10) and Rheostat 150,000 ohms (R-22)	1.70
RW-002	WINDOW—Dial Window	.10
RX-002	CUSTOMER ASSEMBLY—Tuning Wrench	.10
RX-004	SCREW ASSEMBLY—Chassis Mounting Screws and Washers	.10

"SENTRY BOX" ASSEMBLIES

Stock No.	Description	List Price
RA-001	ASSEMBLY—Antenna Compartment Assembly Complete	\$9.00
RA-101	ASSEMBLY—R. F. Compartment Assembly Complete	12.50
RA-201	ASSEMBLY—Oscillator Compartment Assembly Complete	14.75
RB-010	BOARD—R. F. or Oscillator Compartment Terminal Board	.10
RB-012	BOARD—Antenna Terminal Board	.15
RB-103	BRACKET—Antenna Bracket Assembly	.55
RB-105	BRACKET—Oscillator Bracket Assembly	.55
RB-073	BRACKET—R. F. Bracket Assembly	.85
RC-072	CAPACITOR—.05 Mfd. 200 Volt (C-1, C-7, C-8, C-15, C-18) Paper Dielectric	.25
RC-091	CAPACITOR—.05 Mfd. 400 Volt (C-13) Paper Dielectric	.30
RC-098	CAPACITOR—.1 Mfd. 200 Volt (C-30) Paper Dielectric	.30
RC-202	CAPACITOR—.1 mfd. (C-10) Mica Dielectric Molded Case	.25
RC-233	CAPACITOR—.100 mfd. (C-17) Mica Dielectric Molded Case	.55
RC-209	CAPACITOR—.40 mfd. (C-37) Mica Dielectric Molded Case	.35
RC-274	CAPACITOR—.335 mfd. (C-24) Mica Dielectric Molded Case	.30
RC-344	CAPACITOR—.130 mfd. (C-31) Mica Dielectric Molded Case	.50
RC-361	CAPACITOR—.320 mfd. (C-19) Mica Dielectric Molded Case	.50
RC-902	CAPACITOR—Permalloy Trimmer Capacitor 10-45 mfd. (C-23, C-26, C-28)	.60
RC-903	CAPACITOR—Permalloy Trimmer Capacitor 30-200 mfd. (C-2, C-4, C-5, C-30, C-29, C-25)	.85
RC-906	CAPACITOR—Permalloy Trimmer Capacitor 3-13 mfd. (C-9, C-11, C-13)	.60
RC-702	CONDENSER—Three-gang Tuning Condenser (C-6, C-15, C-20)	4.25
RC-953	Motor Permalloy Trimmer Capacitor	.10
RC-901	GRID CAP—Grid Connection Cap, pkg. of 5	1.00
RC-100	GUARD—Terminal Strip Guard	.15

REPLACEMENT PARTS

Inset on genuine factory-issued parts, which may be purchased from authorized dealers.

RECEIVER CHASSIS ASSEMBLIES

Stock No.	Description	List Price
RB-007	BOARD—Fuse Board, Rating "V" Receivers	\$0.40
RB-008	BOARD—Terminal Board (Double terminal)	.10
RB-009	BOARD—Terminal Board (Single terminal)	.15
RB-011	BOARD—Fuse Board, Rating "A" or "C" Receivers	.30
RB-200	BRACKET—Dial Opening Braces (Model A-82)	.50
RC-022	CAPACITOR—.05 Mfd. 400 Volt (C-36) Paper Dielectric	.25
RC-034	CAPACITOR—.01 Mfd. 200 Volt (C-36) Paper Dielectric	.25
RC-040	CAPACITOR—.01 Mfd. 400 Volt (C-36) Paper Dielectric	.25
RC-045	CAPACITOR—.05 Mfd. 200 Volt (C-35) Paper Dielectric	.25
RC-072	CAPACITOR—.05 Mfd. 400 Volt (C-35) Paper Dielectric	.25
RC-094	CAPACITOR—.05 Mfd. 400 Volt (C-35) Paper Dielectric	.25
RC-123	CAPACITOR—.1 Mfd. 400 Volt (C-39) Paper Dielectric	.25
RC-130	CAPACITOR—.25 Mfd. 400 Volt (C-36) Paper Dielectric	.35
RC-285	CAPACITOR—.10 mfd. (C-37) Mica Dielectric Molded Case	.25
RC-405	CAPACITOR—.10 Mfd. 450 Volt (C-50) Wet Electrolytic	1.15
RC-468	CAPACITOR—.15 Mfd. 470 Volt (C-51) Wet Electrolytic	1.15
RC-502	CAPACITOR—One 4 Mfd. 450 Volt (C-38) one 3 Mfd. 150 Volt (C-46) Dry Electrolytic	1.40
RC-604	CAPACITOR—10 Mfd. 25 Volt (C-53) Dry Electrolytic	.80
RC-750	CAPACITOR—Line Capacitor, Two .01 Mfd. (C-40, C-41)	.50

CIRCUIT ANALYSIS—SENTRY BOX

A table of socket voltages is shown below. If it is found desirable to check voltages at the sockets mounted in the "Sentry Box," only the shield can for the socket measured should be off while measurements are being taken.

MODELS A-82 AND A-87

Voltages at Tube Sockets

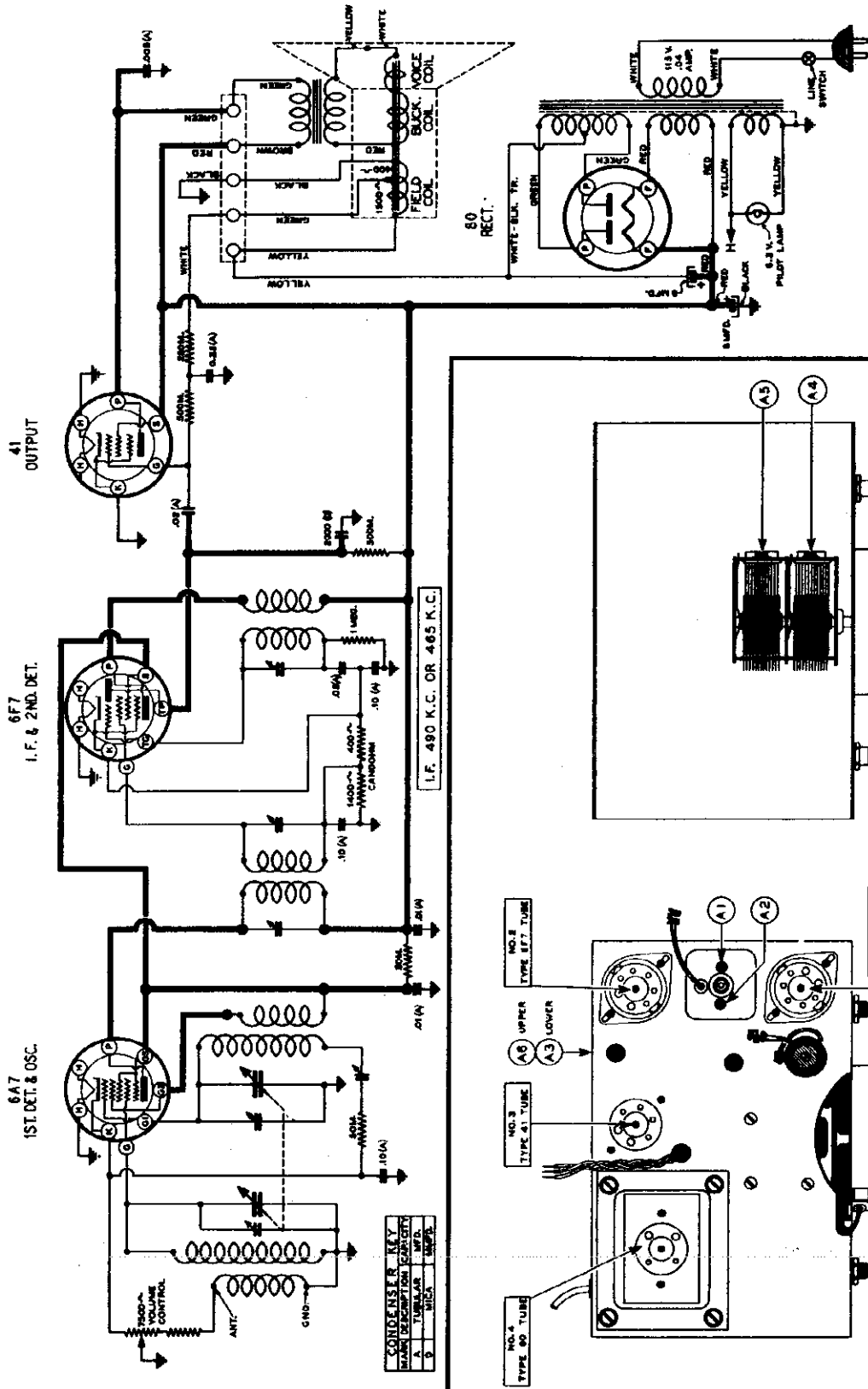
Fuse in 125 V. Clip—125 Volts A-C Line—

Maximum Volume and Sensitivity—No Signal

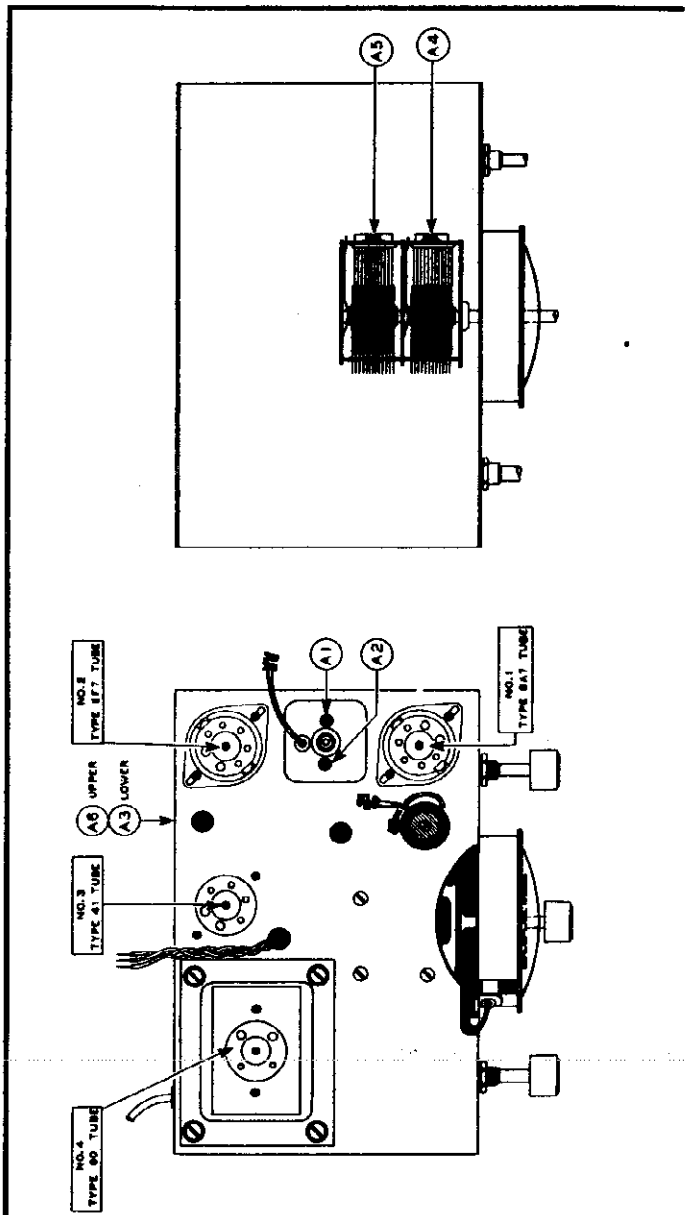
Tube No.	Cathode to Ground Volts D-c	Screen to Grid to Ground Volts D-c	Plate to Ground Volts D-c	Carbide Contact M.A.	Heater A-c
6X7 R. P.	2.6	100	250	8.7	6.3
6A3 Oscillator	3.0	185	185	10.0	6.3
6K7 I. F.	2.6	100	242	8.7	6.3
6H6 Detector	5.0	185	285	26.5	6.3
6C5 A. P.	24	295	285	26.5	6.3
6F9 A. P. Power	24	295	285	26.5	6.3
5Z4 Rectifier			720/300 Rms	90.0	3.0

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 470
Chassis 4C
Schematic
Socket, Trimmers



Grunow Radio
CHASSIS TYPE 4-C
RECEIVER MODEL 470
SERIAL 883
GENERAL HOUSEHOLD UTILITIES CO.
RADIO SERVICE DEPARTMENT
18 000-100 CHICAGO, U.S.A. P.A.S. 88



MODEL 470
Chassis 4C
Alignment

GENERAL HOUSEHOLD UTILITIES CO.

SERVICE INSTRUCTIONS GRUNOW 4 C BROADCAST SUPERHETERODYNE RECEIVER

MODEL - 470
SPEAKER - 8B3

Coupling Condensers of .25 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 full meshed. The dial pointer should be on the horizontal line of the dial.

3 - I.F. ALIGNMENT:

(A) Connect signal lead of oscillator through .25 Mfd. condenser to grid of 6A7 (1st Detector Tube) located on front right hand corner of Chassis. Connect the ground lead to the Chassis.

(B) Place oscillator in operation at 465 or 490 K.C., (see note below) and turn receiver volume control to maximum. (Volume Control should remain at maximum during entire alignment procedure and signal should be attenuated at oscillator to lowest value consistent with obtaining a readable indication on output meter.)

(C) Align three I.F. trimmers (A1 - A2 - A3) located on top of I.F. Transformers. Two on top of 1st I.F. Can and 1 (A3) on rear of Chassis, being the bottom of the two at this position.

4 - 1400 K. C. ALIGNMENT.

(A) Connect signal lead of oscillator to antenna lead (the blue wire leading from rear of Chassis) through 200 Mmf. Condenser.

(B) Set Dial at 1400 K.C. and place oscillator in operation at 1400 K.C.

(C) Align oscillator trimmer (A4), which is the first of the two on the variable condenser as you face Chassis.

(D) Align Antenna Trimmer (A5), which is the second trimmer on variable condenser as you face chassis.

5 - 600 K.C. ALIGNMENT.

(A) Place oscillator in operation at 600 K.C.

(B) Tune in signal to maximum (this point does not have to be exactly at the 600 K.C. dial setting).

(C) Adjust the 600 K.C. trimmer (A6 - located on rear face of Chassis, being the top of the two at this position) in direction of signal increase and at the same time rock the tuning condenser back and forth through resonance. Continue this procedure until maximum signal is obtained on the output meter.

(D) This should be performed with great care so that the alignment is the best that can be obtained, otherwise the selectivity of the set will suffer.

(E) Recheck adjustment on 1400 K.C. antenna trimmer.

NOTE:-

Due to interference caused by commercial code stations in some locations, it has been necessary to use two I.F. Frequencies on this Receiver, one of 490 K.C. where code interference is in the neighborhood of 455 K.C. and the other where the interfering stations are operating in the 500 K.C. band, we use an I.F. of 465 K.C.

The I.F. Frequencies of the Receiver is stamped on the rear of the Chassis, and if there is any doubt as to I.F. peaking, it is only necessary to apply a variable I.F., signal to the I.F. Amplifier, and maximum output will indicate resonance or frequency at which the I.F.'s were peaked.

MODELS 501, 520,
530, 550
Chassis 5B
Alignment

GENERAL HOUSEHOLD UTILITIES CO.

JUNE, 1935

SERVICE NOTES AND PARTS LIST

Grunow Radio

Chassis 5B

Models 501-520-530-550

GENERAL HOUSEHOLD UTILITIES COMPANY

31557-2

CHICAGO, U. S. A.

INTRODUCTION

The following characteristics apply to the GRUNOW output tube is a power amplifier pentode and is capable of producing large power output with a relatively small Radio—Chassis Type 5D:

This model is a 5-tube Super-Heterodyne Broadcast (550 to 1720 K.C.) Receiver using 1-78 tube as a 1st Detector, 1-6F7 tube as an I.F. Amplifier and Oscillator. 1-75 (Duplex-diode high mu triode) tube is used as a 2nd Detector or Signal Rectifier, delayed Automatic Volume Control (AVC) and high gain audio Amplifier. The 43

which is well filtered through the action of the speaker field and the 4, 8, and 20 mfd. electrolytic condensers.

This receiver operates on either A.C. (alternating current) or D.C. (direct current) of 105 to 125 volts.

ALIGNMENT PROCEDURE CHASSIS 5B

Do not attempt to align the 5B Chassis without the proper equipment. Alignment condensers are shown in the accompanying illustrations and are numbered in order of procedure.

C—Align three I.F. trimmers (A1—A2—A3) located on under side of Chassis at base of I.F. Coils.

1. EQUIPMENT.

A—Test Oscillator.

A modulated oscillator capable of producing signals at 455 K.C., 600 K.C. and 1400 K.C. is necessary for alignment of the 5B Chassis.

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 so that extremely strong signals may be read.

C—Coupling Means.

Coupling Condensers of 200 Mmf., 25 Mfd., should be used when coupling oscillator to receiver during alignment as specified in following paragraphs.

2. I. F. ALIGNMENT.

A—Connect signal lead of oscillator through .25 Mfd. condenser to grid of 78 tube (1st Detector Tube). The ground lead to ground post on rear of Chassis.

B—Place oscillator in operation at 455 K.C. and turn receiver volume control to maximum. (Volume Control should remain at maximum during entire alignment procedure and signal should be attenuated at oscillator to lowest value consistent with obtaining a readable indication on output meter).

3. DIAL CALIBRATION.

A—With condensers fully meshed dial pointer should be directly over end mark on dial.

B—When Chassis is removed from cabinet it will be necessary to simulate dial escutcheon which incorporates dial pointer.

4. 1400 K.C. ALIGNMENT.

A—Connect signal lead of oscillator through 200 Mmf. Condenser to antenna leading from Chassis.

B—Turn dial to 140 (1400 K.C.) and align 1400 K.C. oscillator trimmer (A4), located forward on variable condenser.

C—Align Antenna Trimmer (A5) which is the second trimmer on variable condenser.

5. 600 K.C. ALIGNMENT.

A—Place oscillator in operation at 600 K.C. Tune in signal (this does not have to be exactly on 600 Dial Setting).

B—Adjust 600 K.C. trimmer (A6) located on under side of Chassis directly under variable condenser) in direction of signal increase. Rocking dial knob through resonance until maximum output is obtained.

C—Recheck dial calibration: Over several points on dial.

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 560
Chassis 5E
Schematic, Voltage
Socket, Trimmers
Parts, Chassis Layout

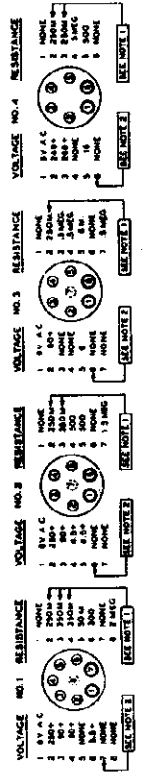
PARTS PRICE LIST		
PART NO.	DESCRIPTION	PRICE
22441	ATTACHMENT CAB	2.35
22442	GRID CAP	0.05
22443	RESISTOR 1M	0.10
22444	RESISTOR 100K	0.10
22445	RESISTOR 10K	0.10
22446	RESISTOR 1K	0.10
22447	RESISTOR 100	0.10
22448	RESISTOR 10	0.10
22449	RESISTOR 1	0.10
22450	RESISTOR 0.1	0.10
22451	RESISTOR 0.01	0.10
22452	RESISTOR 0.001	0.10
22453	RESISTOR 0.0001	0.10
22454	RESISTOR 0.00001	0.10
22455	RESISTOR 0.000001	0.10
22456	RESISTOR 0.0000001	0.10
22457	RESISTOR 0.00000001	0.10
22458	RESISTOR 0.000000001	0.10
22459	RESISTOR 0.0000000001	0.10
22460	RESISTOR 0.00000000001	0.10
22461	RESISTOR 0.000000000001	0.10
22462	RESISTOR 0.0000000000001	0.10
22463	RESISTOR 0.00000000000001	0.10
22464	RESISTOR 0.000000000000001	0.10
22465	RESISTOR 0.0000000000000001	0.10
22466	RESISTOR 0.00000000000000001	0.10
22467	RESISTOR 0.000000000000000001	0.10
22468	RESISTOR 0.0000000000000000001	0.10
22469	RESISTOR 0.00000000000000000001	0.10
22470	RESISTOR 0.000000000000000000001	0.10
22471	RESISTOR 0.0000000000000000000001	0.10
22472	RESISTOR 0.00000000000000000000001	0.10
22473	RESISTOR 0.000000000000000000000001	0.10
22474	RESISTOR 0.0000000000000000000000001	0.10
22475	RESISTOR 0.00000000000000000000000001	0.10
22476	RESISTOR 0.000000000000000000000000001	0.10
22477	RESISTOR 0.0000000000000000000000000001	0.10
22478	RESISTOR 0.00000000000000000000000000001	0.10
22479	RESISTOR 0.000000000000000000000000000001	0.10
22480	RESISTOR 0.0000000000000000000000000000001	0.10
22481	RESISTOR 0.00000000000000000000000000000001	0.10
22482	RESISTOR 0.000000000000000000000000000000001	0.10
22483	RESISTOR 0.0000000000000000000000000000000001	0.10
22484	RESISTOR 0.00000000000000000000000000000000001	0.10
22485	RESISTOR 0.000000000000000000000000000000000001	0.10
22486	RESISTOR 0.0000000000000000000000000000000000001	0.10
22487	RESISTOR 0.00000000000000000000000000000000000001	0.10
22488	RESISTOR 0.000000000000000000000000000000000000001	0.10
22489	RESISTOR 0.0000000000000000000000000000000000000001	0.10
22490	RESISTOR 0.001	0.10
22491	RESISTOR 0.0001	0.10
22492	RESISTOR 0.001	0.10
22493	RESISTOR 0.0001	0.10
22494	RESISTOR 0.001	0.10
22495	RESISTOR 0.0001	0.10
22496	RESISTOR 0.001	0.10
22497	RESISTOR 0.0001	0.10
22498	RESISTOR 0.001	0.10
22499	RESISTOR 0.0001	0.10
22500	RESISTOR 0.001	0.10

SPEAKER PARTS		
22844	VOICE COIL WIRE ASST	1.10
22845	VOICE COIL WIRE ASST	1.10
22846	VOICE COIL WIRE ASST	1.10
22847	VOICE COIL WIRE ASST	1.10
22848	VOICE COIL WIRE ASST	1.10
22849	VOICE COIL WIRE ASST	1.10
22850	VOICE COIL WIRE ASST	1.10
22851	VOICE COIL WIRE ASST	1.10
22852	VOICE COIL WIRE ASST	1.10
22853	VOICE COIL WIRE ASST	1.10
22854	VOICE COIL WIRE ASST	1.10
22855	VOICE COIL WIRE ASST	1.10
22856	VOICE COIL WIRE ASST	1.10
22857	VOICE COIL WIRE ASST	1.10
22858	VOICE COIL WIRE ASST	1.10
22859	VOICE COIL WIRE ASST	1.10
22860	VOICE COIL WIRE ASST	1.10
22861	VOICE COIL WIRE ASST	1.10
22862	VOICE COIL WIRE ASST	1.10
22863	VOICE COIL WIRE ASST	1.10
22864	VOICE COIL WIRE ASST	1.10
22865	VOICE COIL WIRE ASST	1.10
22866	VOICE COIL WIRE ASST	1.10
22867	VOICE COIL WIRE ASST	1.10
22868	VOICE COIL WIRE ASST	1.10
22869	VOICE COIL WIRE ASST	1.10
22870	VOICE COIL WIRE ASST	1.10
22871	VOICE COIL WIRE ASST	1.10
22872	VOICE COIL WIRE ASST	1.10
22873	VOICE COIL WIRE ASST	1.10
22874	VOICE COIL WIRE ASST	1.10
22875	VOICE COIL WIRE ASST	1.10
22876	VOICE COIL WIRE ASST	1.10
22877	VOICE COIL WIRE ASST	1.10
22878	VOICE COIL WIRE ASST	1.10
22879	VOICE COIL WIRE ASST	1.10
22880	VOICE COIL WIRE ASST	1.10
22881	VOICE COIL WIRE ASST	1.10
22882	VOICE COIL WIRE ASST	1.10
22883	VOICE COIL WIRE ASST	1.10
22884	VOICE COIL WIRE ASST	1.10
22885	VOICE COIL WIRE ASST	1.10
22886	VOICE COIL WIRE ASST	1.10
22887	VOICE COIL WIRE ASST	1.10
22888	VOICE COIL WIRE ASST	1.10
22889	VOICE COIL WIRE ASST	1.10
22890	VOICE COIL WIRE ASST	1.10
22891	VOICE COIL WIRE ASST	1.10
22892	VOICE COIL WIRE ASST	1.10
22893	VOICE COIL WIRE ASST	1.10
22894	VOICE COIL WIRE ASST	1.10
22895	VOICE COIL WIRE ASST	1.10
22896	VOICE COIL WIRE ASST	1.10
22897	VOICE COIL WIRE ASST	1.10
22898	VOICE COIL WIRE ASST	1.10
22899	VOICE COIL WIRE ASST	1.10
22900	VOICE COIL WIRE ASST	1.10

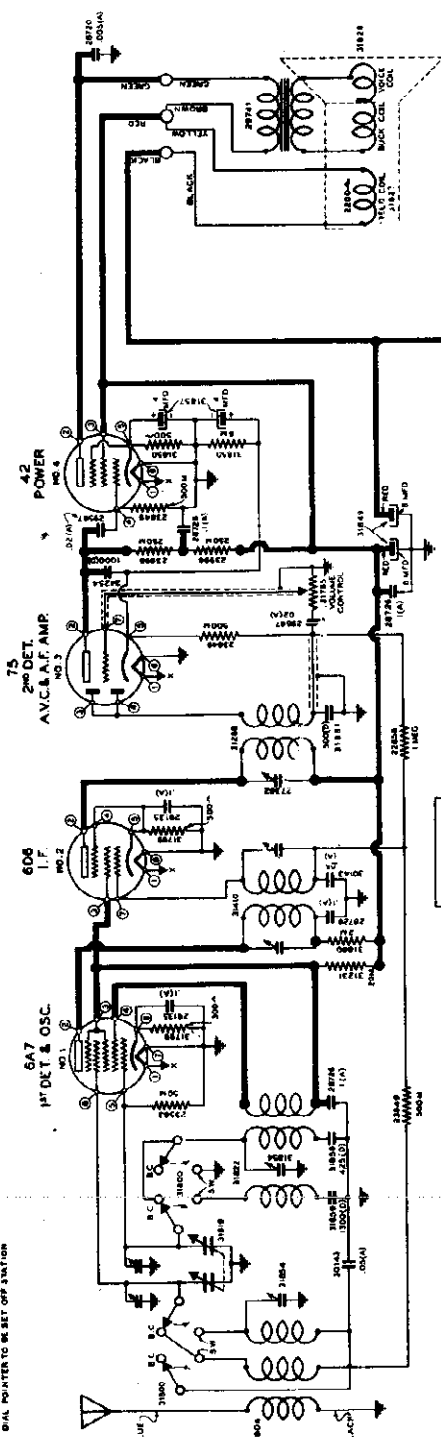
COMPLETE SPEAKERS MAY NOT BE RETURNED FOR CREDIT

GENERAL HOUSEHOLD UTILITIES CO.
CHICAGO, ILL.
CHICAGO, ILL.

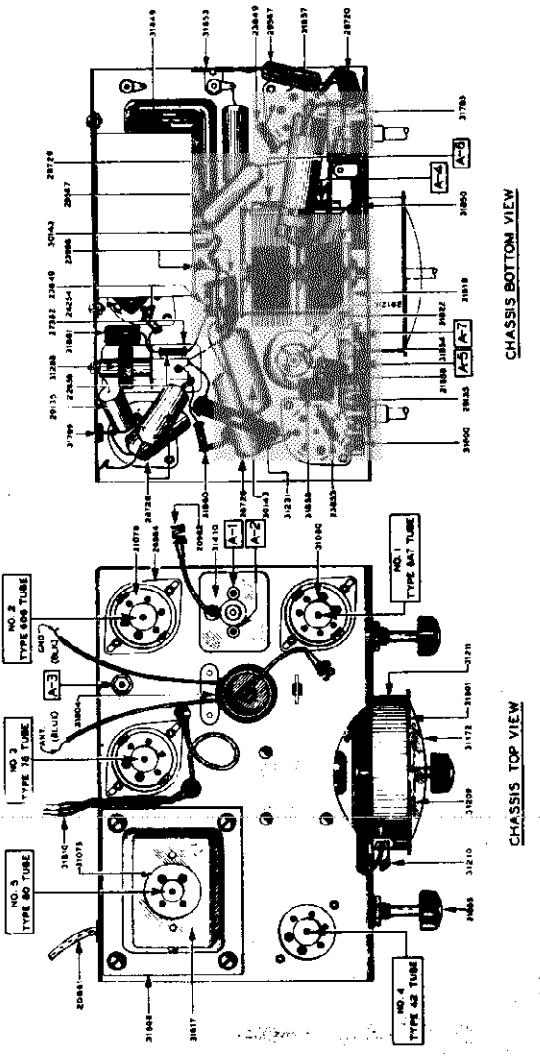
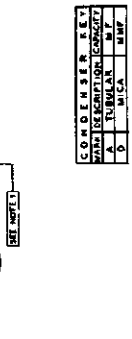
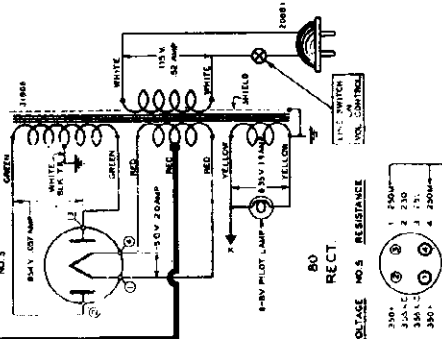
NOTES:
1. D.C. MEASUREMENTS - ELECTROLYTIC CONDENSERS
2. ONE SIDE OF TRANSFORMER IS GROUND
ALL CONTACTS SHOWN ON B.C. RANGE, S.D. - 1000 K.C.
(SHORT WAVE RANGE 1000 K.C. TO 4 DM.C.)
TUBE SOCKETS SHOWN BOTTOM VIEW



VOLTAGE RATINGS ARE TAKEN FROM POWER SUPPLY
A 1000 OHM PER VOLT VOLTMETER (WITH TUBES IN SOCKETS)
RESISTANCE RATINGS ARE TAKEN WITH A STANDARD
COMMETER (POWER COIL DISCONNECTED)
LINE VOLTAGE 115V 50-60 CYCLES A.C.
VALVE CONTROLS FULL ON
RANGE SWITCH ON BROADCAST (TUNE IN)
DIAL POINTER TO BE SET EXACTLY



I.F. 455 K.C.



CHASSIS BOTTOM VIEW

CHASSIS TOP VIEW

MODEL 560
Chassis 5E
Alignment

GENERAL HOUSEHOLD UTILITIES CO.

November 1934

SERVICE NOTES AND PARTS LIST

Grunow Radio

CHASSIS TYPE 5E
Receiver Model 560
Speaker Type 8B6

GENERAL HOUSEHOLD UTILITIES COMPANY

31568-1

CHICAGO, U. S. A.

INTRODUCTION

The following characteristics apply to the GRUNOW Radio—Chassis 5E:

This model is a 5 tube Super-Heterodyne Dual Wave (540 to 1500 K.C. and 1500 to 4000 K.C.) Receiver using 1-6A7 tube as a 1st Detector and Oscillator, 1-6D6 tube as an I.F. Amplifier, 1-75 tube as a Diode Detector, delayed Automatic Volume Control (AVC) and high gain audio Amplifier. The 42 output tube is a power amplifier pentode and is capable of producing large power output with a 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.

The tuning range is divided into two bands or divisions, one covering the band of 540 to 1500 K.C. and the other 1500 to 4000 K.C. In both bands the following three variable circuits are used: R.F. input, detector or mixer input and oscillator. These circuits are tuned by a 2 gang variable condenser of rugged construction.

The remainder of the circuit is typical and has been designed along lines of what is considered the best engineering practice to date. Parts are all oversize and of the finest quality.

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 underside.

The Range switch is a simple four pole double throw switch.

ALIGNMENT PROCEDURE

Do not attempt to align the 5E Chassis without the proper equipment. Alignment condensers are shown in the accompanying illustrations and are numbered in order of procedure.

1. EQUIPMENT.

a. Test Oscillator.

A modulated oscillator capable of producing signals at 455 K.C.—600 K.C.—1400 K.C., and 3700 K.C. is necessary for alignment of the 6A Chassis.

b. Non-metallic screw driver (all bakelite or fibre) about 6 inches long.

c. 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, and should also incorporate an adjustable shunt so that extremely strong signals may be read.

d. Coupling Means.

Coupling condensers of 200 Mmf., and .25 Mfd. should be used when coupling oscillator to receiver during alignment as specified in the following paragraphs.

2. DIAL SETTING.

Turn dial knob until condensers are fully meshed.

3. I.F. ALIGNMENT.

a. Connect signal lead of test oscillator to grid of the 6A7 (first detector tube) through a .25 Mfd. condenser. Connect the ground lead to the Chassis.

b. Set dial pointer to 140 and range switch on broadcast position.

c. Place test oscillator in operation at 455 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 the three I.F. trimmers (A1-A2-A3) until maximum output is obtained. During alignment maintain as low a value of signal as will allow obtaining of accurate adjustment.

4. 3700 K.C. ALIGNMENT.

a. Connect signal lead of test oscillator through 200 Mmf. condenser to antenna binding post of Chassis.

b. Connect the ground lead to ground terminal of Chassis.

c. Set range switch to S.W. range.

d. Place test oscillator in operation at 3700 K.C. and set dial pointer on 3700 K.C.

e. Adjust oscillator trimmer (A4) (located on variable condenser).

5. 1400 K.C. ALIGNMENT.

a. Turn range switch to broadcast position.

b. Place test oscillator in operation at 1400 K.C. and set dial pointer at 140.

c. Adjust the 1400 K.C. trimmer (A5) located on the front face of the Chassis, the upper right of the two at this location.

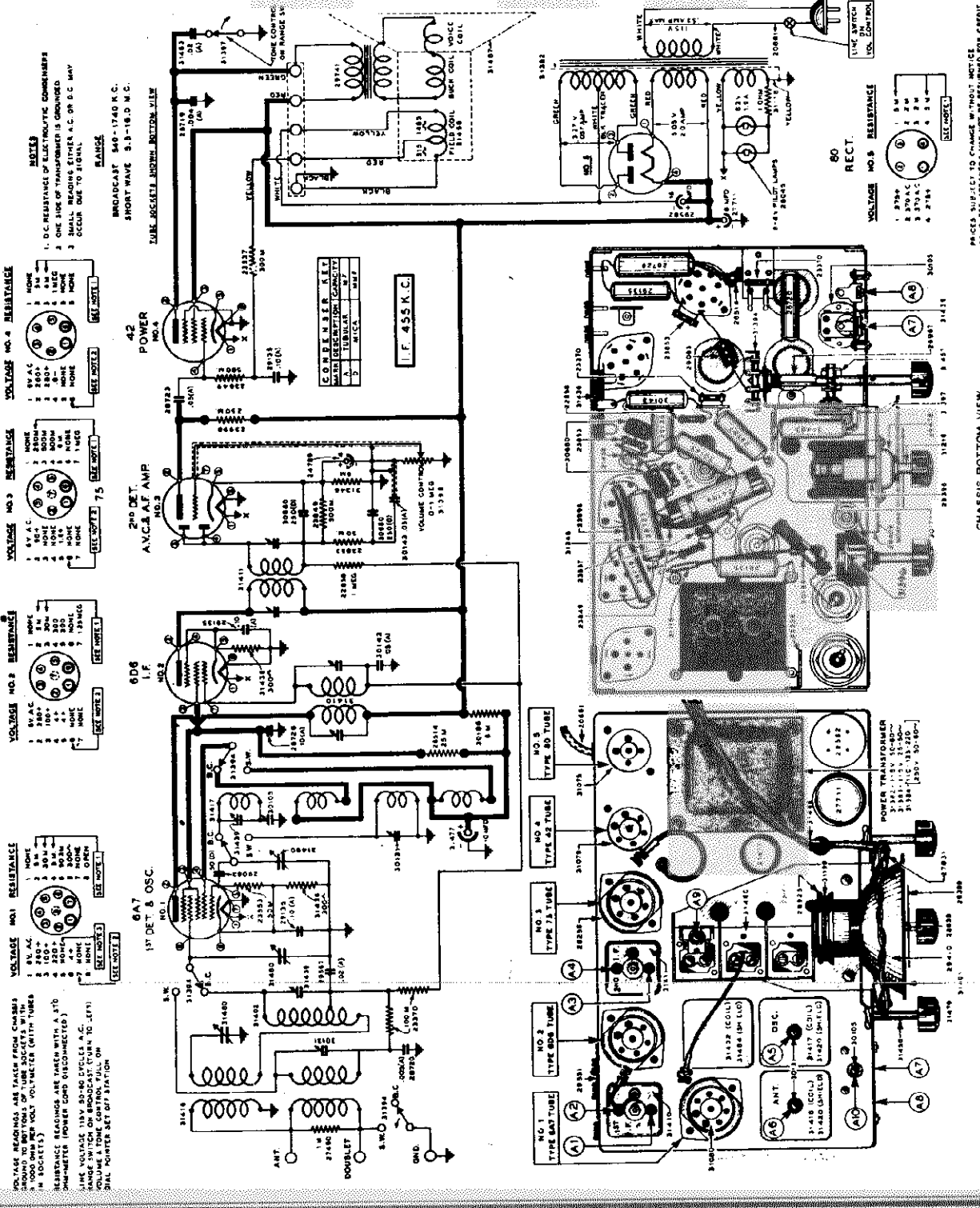
d. Adjust the second and third trimmers (A6 and A7)

e. Repeat the 1400 K.C. alignment at least twice.

MODELS 570, 571
GENERAL HOUSEHOLD UTILITIES CO. Chassis 5D
 Schematic, Voltage
 Socket, Trimmers, Parts

PART NO.	DESCRIPTION	QTY	PRICE
20881	ANTENNA COIL	1	1.10
20882	ANTENNA COIL	1	1.10
20883	ANTENNA COIL	1	1.10
20884	ANTENNA COIL	1	1.10
20885	ANTENNA COIL	1	1.10
20886	ANTENNA COIL	1	1.10
20887	ANTENNA COIL	1	1.10
20888	ANTENNA COIL	1	1.10
20889	ANTENNA COIL	1	1.10
20890	ANTENNA COIL	1	1.10
20891	ANTENNA COIL	1	1.10
20892	ANTENNA COIL	1	1.10
20893	ANTENNA COIL	1	1.10
20894	ANTENNA COIL	1	1.10
20895	ANTENNA COIL	1	1.10
20896	ANTENNA COIL	1	1.10
20897	ANTENNA COIL	1	1.10
20898	ANTENNA COIL	1	1.10
20899	ANTENNA COIL	1	1.10
20900	ANTENNA COIL	1	1.10
20901	ANTENNA COIL	1	1.10
20902	ANTENNA COIL	1	1.10
20903	ANTENNA COIL	1	1.10
20904	ANTENNA COIL	1	1.10
20905	ANTENNA COIL	1	1.10
20906	ANTENNA COIL	1	1.10
20907	ANTENNA COIL	1	1.10
20908	ANTENNA COIL	1	1.10
20909	ANTENNA COIL	1	1.10
20910	ANTENNA COIL	1	1.10
20911	ANTENNA COIL	1	1.10
20912	ANTENNA COIL	1	1.10
20913	ANTENNA COIL	1	1.10
20914	ANTENNA COIL	1	1.10
20915	ANTENNA COIL	1	1.10
20916	ANTENNA COIL	1	1.10
20917	ANTENNA COIL	1	1.10
20918	ANTENNA COIL	1	1.10
20919	ANTENNA COIL	1	1.10
20920	ANTENNA COIL	1	1.10
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20950	ANTENNA COIL	1	1.10
20951	ANTENNA COIL	1	1.10
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20979	ANTENNA COIL	1	1.10
20980	ANTENNA COIL	1	1.10
20981	ANTENNA COIL	1	1.10
20982	ANTENNA COIL	1	1.10
20983	ANTENNA COIL	1	1.10
20984	ANTENNA COIL	1	1.10
20985	ANTENNA COIL	1	1.10
20986	ANTENNA COIL	1	1.10
20987	ANTENNA COIL	1	1.10
20988	ANTENNA COIL	1	1.10
20989	ANTENNA COIL	1	1.10
20990	ANTENNA COIL	1	1.10
20991	ANTENNA COIL	1	1.10
20992	ANTENNA COIL	1	1.10
20993	ANTENNA COIL	1	1.10
20994	ANTENNA COIL	1	1.10
20995	ANTENNA COIL	1	1.10
20996	ANTENNA COIL	1	1.10
20997	ANTENNA COIL	1	1.10
20998	ANTENNA COIL	1	1.10
20999	ANTENNA COIL	1	1.10
21000	ANTENNA COIL	1	1.10

Grunow Radio
 CHASSIS TYPE 5-D
 RECEIVER MODELS 570 & 571
 GENERAL HOUSEHOLD UTILITIES CO.
 1400 MARINE COMPANY
 PASADENA, CALIF. U.S.A.



PRICES SUBJECT TO CHANGE WITHOUT NOTICE
 COMPLETE SPEAKERS MAY NOT BE RETURNED FOR CREDIT

MODELS 570, 571
Chassis 5D
MODELS 570X, 571X
Chassis 5DX
MODELS 570Z, 571Z
Chassis 5DZ
Alignment

GENERAL HOUSEHOLD UTILITIES CO.

November 1934

SERVICE NOTES AND PARTS LIST

Grunow Radio

CHASSIS TYPE 5D
115 volt, 50-60 cycle
Receiver Models 570-571
Speaker Types 8B4

CHASSIS 5DX
115 volt, 25-50 cycle
Model 570X
Model 571X

CHASSIS 5DZ
110-135-220-250 volt, 50-60 cycle
Model 570Z
Model 571Z

GENERAL HOUSEHOLD UTILITIES COMPANY

31558-1

CHICAGO, U. S. A.

INTRODUCTION

The following characteristics apply to the Grunow Radio—Chassis Type 5D:

This model is a 5-tube Super-Heterodyne Broadcast and Short Wave (550 to 1720 K.C. and 5.5 to 16.00 M.C.) Receiver using 1-6A7 (Pentagrid converter) tube as a 1st Detector and Oscillator. 1-6D6 (Triple-grid super-control) tube as an I.F. Amplifier. 1-75 (Duplex-diode high mu triode) tube is used as a Diode Detector or Signal Rectifier, delayed Automatic Volume Control (AVC) and high gain audio amplifier. The 42 output tube is a power amplifier pentode and

is capable of producing large power output with a relatively small signal input. This tube receives its bias through the voltage drop produced in the tapped speaker field. The rectifier tube is an 80, the output of which is well filtered through the action of the speaker field and the 8, 10 and 18 mfd. electrolytic condensers.

The tuning range is divided into two bands or divisions, one covering the band of 550 to 1720 K.C. and the other 5.5 to 16.00 M.C.

ALIGNMENT PROCEDURE

Do not attempt to align the 5D Chassis without the proper equipment. Alignment condensers are shown in the accompanying illustrations and are numbered in order of procedure.

1. EQUIPMENT.

a. Test Oscillator

A modulated oscillator capable of producing signals at 455 K.C.—600 K.C.—1400 K.C. and 15 M.C. is necessary for alignment of the 5D Chassis.

b. Non-metallic screw driver (all bakelite or fibre) about 6 inches long.

c. 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, and should also incorporate an adjustable shunt so that extremely strong signals may be read.

d. Coupling Means.

Coupling condensers of 200 Mmf., 25 Mfd., and a 400 Ohm resistor should be used when coupling oscillator to receiver during alignment as specified in the following paragraphs.

e. The receiver should be aligned in a location free from local interference (man made static)—as high frequency disturbances will cause difficulties when the short wave section is being adjusted. (A screen room is to be recommended.)

2. DIAL SETTING.

Turn dial knob until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial.

3. I.F. ALIGNMENT.

a. Connect signal lead of test oscillator to grid of the 6A7 (first detector tube) through a .25 Mfd. condenser. Connect the ground lead to the Chassis.

b. Set dial pointer to 1400 K.C. and range switch on broadcast position.

c. Place test oscillator in operation of 455 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 the four I.F. trimmers (A1-A2-A3-A4) located on the top side of Chassis, until maximum output is obtained. During alignment maintain as low a value of signal as will allow obtaining of accurate adjustment.

4. 15 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 S.W. range.

d. Place test oscillator in operation at 15 M.C. and set dial pointer on 15 M.C.

e. Adjust trimmer (A5) on top of oscillator coil, trimmer (A6) on top of the antenna coil—to maximum output—the oscillator and antenna coils are located on left hand side on top of the Chassis).

f. On oscillator alignment use the lower of the images for the oscillator alignment point. It will be noted that there are two settings at which the signal will be received. Use the setting giving most capacity, that is, the setting at which the trimmer screw is farthest in. While adjusting the oscillator and antenna coil trimmers, rock the variable condensers back and forth through resonance until maximum output is obtained.

5. 1400 K.C. ALIGNMENT.

a. Turn range switch to broadcast position.

b. Connect signal lead of test oscillator through 200 Mmf. condenser to antenna binding post.

c. Place test oscillator in operation at 1400 K.C. and set dial pointer on 1400 K.C.

d. Adjust the two trimmers (A7 Oscillator and A8 Detector) located at the left front end of Chassis and trimmer (A9) on 3rd section of variable condensers to maximum output

6. RECHECK OPERATION No. 4.

(15 M.C. Alignment.)

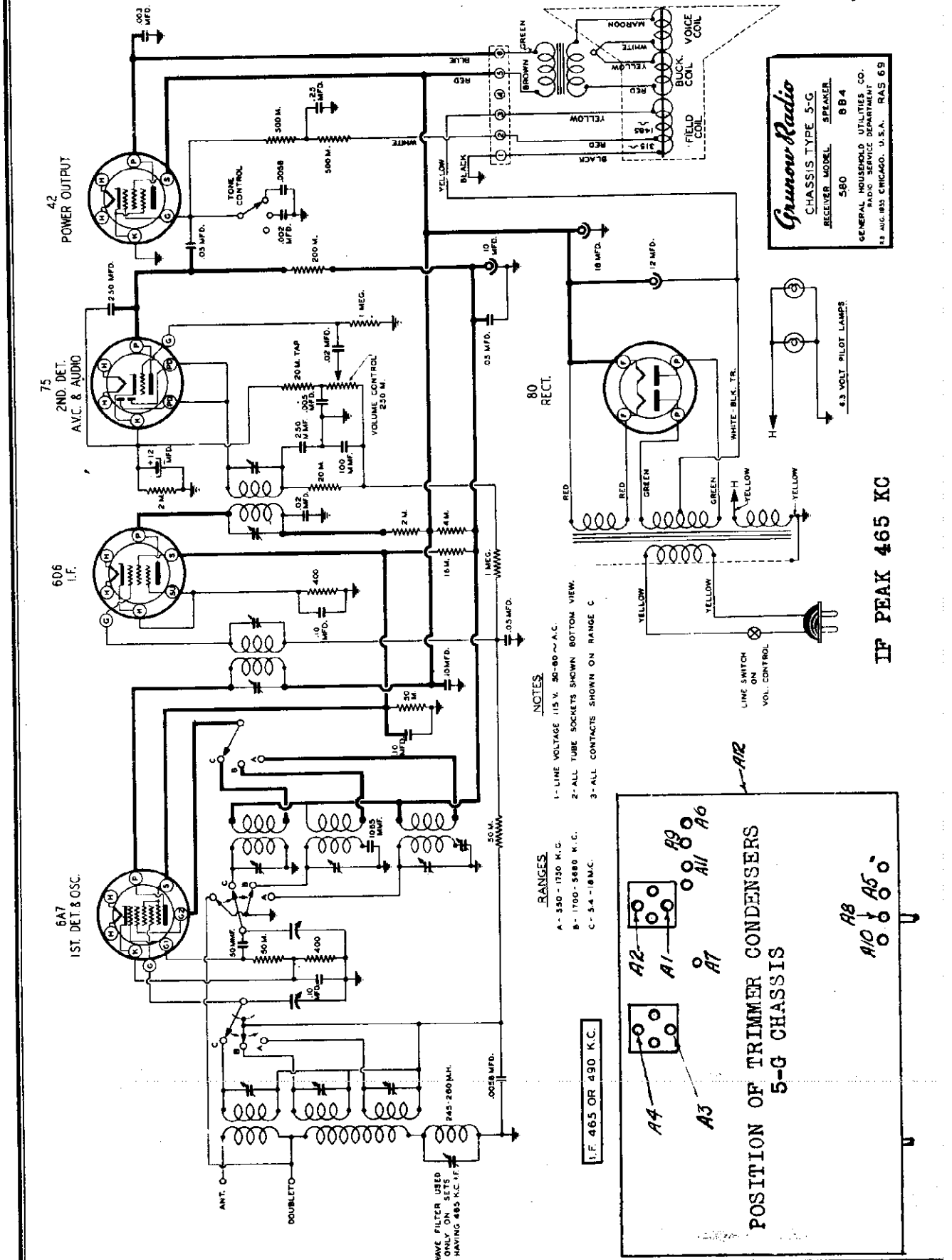
7. 600 K.C. ALIGNMENT.

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 (A10) (this is the upper of the two trimmers located at the left front end of Chassis), in direction of signal increase; at the same time rock the tuning condenser back and forth through resonance while adjusting padding condenser until maximum output is obtained.

GENERAL HOUSEHOLD UTILITIES CO. MODEL 580, 581 Chassis 5G Schematic, Trimmer



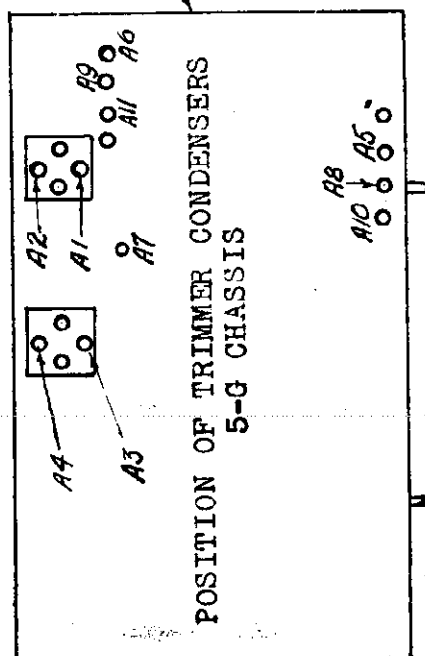
Grunow Radio
 CHASSIS TYPE 5-G
 RECEIVER MODEL 580
 SPEAKER 8 B 4
 GENERAL HOUSEHOLD UTILITIES CO.
 RADIO SERVICE DEPARTMENT
 88 AUG. 1935 CHICAGO, U.S.A. RAS 69

NOTES
 1- LINE VOLTAGE 115 V. 50-60~A.C.
 2- ALL TUBE SOCKETS SHOWN BOTTOM VIEW.
 3- ALL CONTACTS SHOWN ON RANGE C

RANGES
 A- 550 - 1150 K.C.
 B- 1700 - 5880 K.C.
 C- 5.4 - 18 M.C.

IF 465 OR 490 K.C.

IF PEAK 465 KC



MODELS 580, 581
Chassis 5G
Alignment

GENERAL HOUSEHOLD UTILITIES CO

5 - 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), Fig. (1), (which is on top of Chassis to the rear of variable condenser) 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 - RECHECK 1400 K.C. ALIGNMENT

7 - 5 M. C. ALIGNMENT:

- (A) Set Range switch at "B".
- (B) Place Test Oscillators in operation at 5 M.C.
- (C) Turn Dial Pointer to 5 M.C.
- (D) Adjust Set Oscillator Trimmer (A8), Fig. (1), to maximum output.
- (E) Adjust Detector Trimmer (A9) Fig. (1) to maximum output.
- (F) Check Dial Setting at 1800 K.C.

8 - 18 K.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 range "G" and turn dial pointer to 18 M.C.
- (D) Place Test Oscillator in operation at 18 M.C.
- (E) Adjust set Oscillator Trimmers (A10), Fig. (1), to maximum output.
- (F) Adjust Detector Trimmers (A11), Fig. (1), to maximum output.
- (G) On the 18 M.C. 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. Check dial setting at 6 M.C.

NOTE:-

Due to interference caused by commercial code stations in some locations, it has been necessary to use two I.F. Frequencies on this Receiver, one of 490 K.C. where code interference is in the neighborhood of 455 K.C. and the other where the interfering stations are operating in the 500 K.C. band, we use an I.F. of 465 K.C.

The I. F. Frequencies of the Receiver is stamped on the rear of the Chassis, and if there is any doubt as to I.F., peaking, it is only necessary to apply a variable I.F. signal to the I.F. Amplifier, and maximum output will indicate resonance or frequency at which the I.F.'s were peaked.

To further overcome this form of interference, sets peaked at 465, also incorporate a wave filter in the Antenna circuit. This filter should be tuned to the same frequency as the I.F. Transformers. Tuning is accomplished after the set has been completely aligned by applying the I.F. Frequency signal through to a .002 Mfd. condenser to the Antenna binding post of the Receiver, and tuning the wave filter condenser, (A12) (located on the right hand side of the Chassis) so that the incoming signal is at minimum output.

In other words, apply a strong 465 K.C. signal to the Receiver Antenna Post thru the .002 Mfd. Condenser, and tune wave filter so that the output meter indicates minimum.

SERVICE INSTRUCTIONS GRUNOW CHASSIS 5 G
BROADCAST AND SHORT WAVE RECEIVER
MODELS 580 - 581
SPEAKERS 584 - 584

The frequency range is divided into three bands or divisions, one covering the band of 550 to 1750 K.C. (A), one the band from 1700 to 5680 K.C. (B), and the other from 5.4 to 19 megacycles (C).

CIRCUIT ALIGNMENT PROCEDURE

Do not attempt to align the 5 G Chassis without proper equipment. Alignment condensers are shown in the accompanying illustrations, - I.F. Condensers on top of the I.F. Transformers.

1 - EQUIPMENT:

- (A) Test Oscillator
- A modulated oscillator capable of producing signals at the I.F., Broadcast and Short-Wave frequencies is necessary for alignment of the 5 G Chassis.
- (B) Insulated Screw Driver - (all bakelite or fibre) about 6" long.
- (C) Output Meter.

This may be any of the standard Output Meters, but should be sufficiently sensitive to provide a good deflection at low signal strength.

(D) Coupling Means.

Coupling condensers of 200 mfd., .25 mfd., and a 400 Ohm resistor should be used when coupling oscillators to receiver during alignment as specified in the procedure.

(E) The Receiver should be aligned in a location free from local interference (interference caused by motors - flashers - automobile ignition, etc.) as high frequency disturbances will cause difficulties when the short wave section is being adjusted. (A screen room is to be recommended).

2 - 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.

3 - I. F. ALIGNMENT:

Connect signal lead of test oscillator to grid of 6A7 (1st detector tube) through .25 mfd. condenser. Connect the ground lead to the Chassis.

(A) Set dial pointer to 1400 K.C. and range switch on position "A".

(B) Place test Oscillator in operation at 490 K.C. or 465 K.C. (see note below.) Turn receiver volume control and tone control to maximum.

(C) Attenuate test Oscillator output to lowest value, consistent with obtaining a readable indication on output meter.

(D) 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.

4 - 1400 K. C. ALIGNMENT:

(A) Connect signal lead of test oscillator through 200 mfd., condenser to antenna binding post.

(B) Connect the test oscillator ground lead to the ground post of Chassis.

(C) Place test oscillator in operation at 1400 K.C.

(D) Turn dial pointer to 1400 K.C.

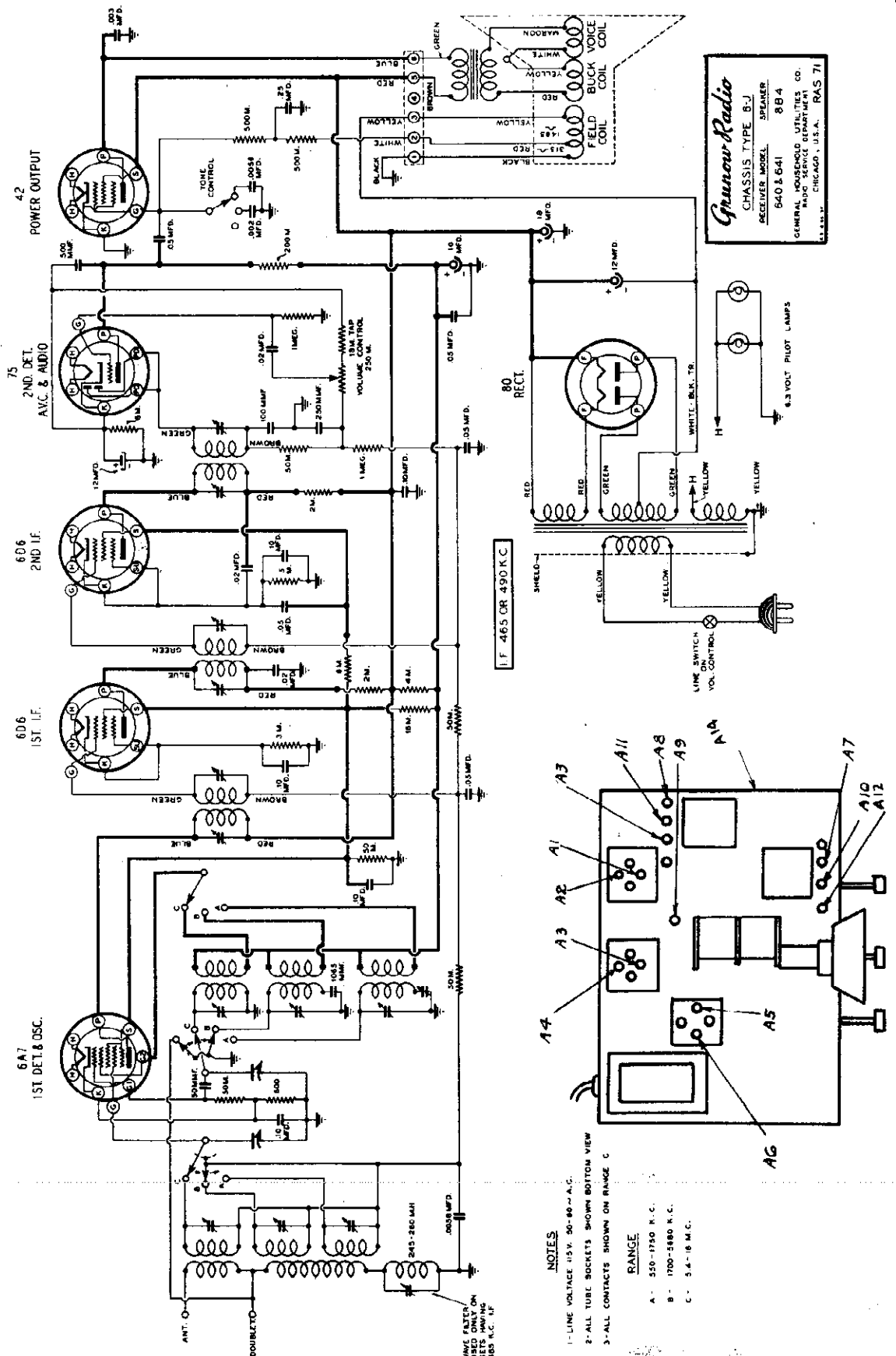
(E) Turn range switch to range "A".

(F) Adjust broadcast oscillator trimmer A5, Fig. (1), to maximum output.

(G) Adjust 1st Det. Trimmer (A6), Fig. (1), to maximum output.

GENERAL HOUSEHOLD UTILITIES CO.

MODELS 640, 641
Chassis 6J
Schematic
Trimmers



Grunow Radio
CHASSIS TYPE 6J
RECEIVER MODEL 640 & 641
SPEAKER 8Ω 4
GENERAL HOUSEHOLD UTILITIES CO.
RADIO SERVICE DEPARTMENT
CHICAGO, U.S.A. RAS 71

- NOTES**
- 1- LINE VOLTAGE 115V. 60-60-HZ. A.C.
 - 2- ALL TUBE SOCKETS SHOWN BOTTOM VIEW
 - 3- ALL CONTACTS SHOWN ON RANGE C
- RANGE**
- A - 550-1750 K. C.
 - B - 1700-5680 K. C.
 - C - 5.4-10 M. C.

MODELS 640, 641

Chassis 6J
Alignment

GENERAL HOUSEHOLD UTILITIES CO.

SERVICE INSTRUCTIONS GRUNOW CHASSIS 6 J
BROADCAST AND SHORT WAVE RECEIVER
MODELS 640 - 641
SPEAKERS 8P4 - 8P5

GENERAL:

The GRUNOW 6 J Chassis is a six tube, 115 V - 50-60 cycle A.C., three band receiver with A.V.C., Tone Control and a "Band Spread" dial. The tubes used are: 6A7 1st Detector and Oscillator, 6D6 1st I.F. Amplifier, 6D6 2nd I.F. Amplifier, 75 2nd Detector, A.V.C., and 1st Audio Amplifier, 4Z Power Output tube and an 80 Rectifier tube.

The frequency range is divided into three bands or divisions, one covering the band of 550 to 1750 K.C. (A), one the band from 1700 to 6680 K.C. (B), and the other from 5.4 to 18 megacycles (C).

CIRCUIT ALIGNMENT PROCEDURE

Do not attempt to align the 6 J Chassis without proper equipment. Alignment condensers are shown in the accompanying illustrations, - I.F. Condensers on top of the I.F. Transformers.

1 - EQUIPMENT:

- (A) Test Oscillator
- A modulated oscillator capable of producing signals at the I.F. Broadcast and Short-Wave frequencies is necessary for alignment of the 6 J Chassis.
- (B) Insulated Screw Driver - (all bakelite or fibre) about 6" long.
- (C) Output Meter.
- This may be any of the standard output meters, but should be sufficiently sensitive to provide a good deflection at low signal strength.
- (D) Coupling Means.
- Coupling Condensers of 200 mfd., .25 mfd., and a 400 Ohm resistor should be used when coupling oscillators to receiver during alignment as specified in the procedure.
- (E) The Receiver should be aligned in a location free from local interference (interference caused by motors - flashers - automobile ignition, etc.) as high frequency disturbances will cause difficulties when the short wave section is being adjusted.
- (A screen room is to be recommended.)

2 - 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.

3 - I. F. ALIGNMENT:

- Connect signal lead of test oscillator to grid of 6A7 (1st detector tube) through .25 mfd., condenser. Connect the ground lead to the Chassis.
- (A) Set Dial pointer to 1400 K.C. and range switch on position "A".
- (B) Place test Oscillator in operation at 480 K.C. or 465 K.C. (see Note 1.) Turn receiver volume control and tone control to maximum.
- (C) Attenuate Test Oscillator output to lowest value, consistent with obtaining a readable indication on output meter.
- (D) Adjust six I.F. Trimmers, A1, A2, A3, A4, A5, A6, located on the I.F. Transformers on top of Chassis. Fig. (2), until maximum output is obtained. During alignment, maintain as low a value of signal as will allow obtaining of accurate adjustment.

* - 1400 K. C. ALIGNMENT:

- (A) Connect signal lead of test oscillator through 200 mfd., condenser to Antenna binding post.
- (B) Connect the test oscillator ground lead to the ground post of Chassis.
- (C) Place test oscillator in operation at 1400 K.C.
- (D) Turn dial pointer to 1400 K.C.
- (E) Turn range switch to range "A".
- (F) Adjust broadcast oscillator trimmer A7, Fig. (2), to maximum output.
- (G) Adjust 1st Det. Trimmer (A8), Fig. (2), to maximum output.

5 - 600 K. C. ALIGNMENT:

- (A) Place test oscillator in operation at 600 K.C.
- (B) Turn 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 (A9), Fig. (2), (which is on top of Chassis to the rear of variable condenser) 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 - CHECK 1400 K.C. ALIGNMENT

7 - 5 M. C. ALIGNMENT:

- (A) Set Range switch at "B".
- (B) Place test Oscillators in operation at 5 M.C.
- (C) Turn Dial Pointer to 5 M.C.
- (D) Adjust Set Oscillator Trimmer (A10), Fig. (2), to maximum output.
- (E) Adjust Detector Trimmer (A11) Fig. (2) to maximum output.
- (F) Check Dial Setting at 1800 K.C.

8 - 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 range "C" and turn dial pointer to 18 M.C.
- (D) Place Test Oscillator in operation at 18 M.C.
- (E) Adjust set oscillator Trimmers (A12) Fig. (2) to maximum output.
- (F) Adjust Detector Trimmers (A13), Fig. (2), to maximum output.
- (G) On the 18 M.C. Alignment it will be noted that there are two settings at which the signal will be received. Use the lower of the two for alignment point, that is, the setting giving most capacity or the point at which the trimmer screw is farthest in. Check dial setting at 6 M.C.

NOTES:-

Due to interference caused by commercial code stations in some locations, it has been necessary to use two I.F. Frequencies on this Receiver, one of 480 K.C. where code interference is in the neighborhood of 465 K.C. and the other where the interfering stations are operating in the 500 K.C. band, we use an I.F. of 465 K.C.

The I.F. Frequencies of the Receiver is stamped on the rear of the Chassis, and if there is any doubt as to I.F. peaking, it is only necessary to apply a variable I.F. signal to the I.F. Amplifier, and maximum output will indicate resonance or frequency at which the I.F.'s were peaked.

To further overcome this form of interference, sets peaked at 465, also incorporate a wave filter in the antenna circuit. This filter should be tuned to the same frequency as the I.F. Transformers. Tuning is accomplished after the set has been completely aligned by applying the I.F. Frequency signal through to a .0002 Mfd. condenser to the antenna binding post of the Receiver, and tuning the wave filter condenser, (A14) (located on the right hand side of the chassis) so that the incoming signal is at minimum output.

In other words, apply a strong 465 K.C. signal to the Receiver Antenna Post thru the .0002 Mfd., Condenser, and tune wave filter so that the output meter indicates minimum.

MODEL S 690, 691
 Chassis 6F
 Alignment, Parts

GENERAL HOUSEHOLD UTILITIES CO.

Supplement to
6D SERVICE NOTES AND PARTS LIST
 31561-2

Grunow Radio

CHASSIS TYPE 6-F

Receiver Model 690-691

Speaker Model 8C8-108C2

GENERAL HOUSEHOLD UTILITIES COMPANY

RADIO SERVICE DEPT.

CHICAGO, U. S. A.

31561-2 SUP.

JANUARY, 1935

The Grunow Model 6F is identical to the 6D except for the dial arrangement and a slight change in the audio circuit as shown on the schematic diagram on the back of this sheet. Use the alignment procedure as outlined for the 6D and excepting for the few additional parts listed below, the 6D parts list may also be used.

For Alignment of Chassis 6D, see Index

SUPPLEMENTARY PARTS USED ON CHASSIS 6F AND NOT ON CHASSIS 6D

Part No.	Description	No. Used	List Price
22856	Resistor—25M Ohm 1/4 Watt	1	\$0.20
28728	Condenser—.25 Mfd. Tubular	1	.30
29621	Tone Control Knob	1	.20
29623	Volume Control Knob	1	.20
29818	Condenser—.003 Mfd. Tubular	1	.25
30100	Drive String and Spring Assembly	1	.15
31119	Range Switch Knob	1	.25
31350	Tuning Knob	1	.30
31710	Drive Drum, Hub and Gear Assembly	1	1.10
31714	Gear Tension Spring	1	.05
31723	Pointer and Pinion Assembly	1	.40
31726	Pinion, Gear and Adjusting Plate Assembly	1	.55
31962	Pointer	1	.10
31987	Variable Condenser	1	4.15
31997	Dial Chart	1	.65

SPEAKER PARTS

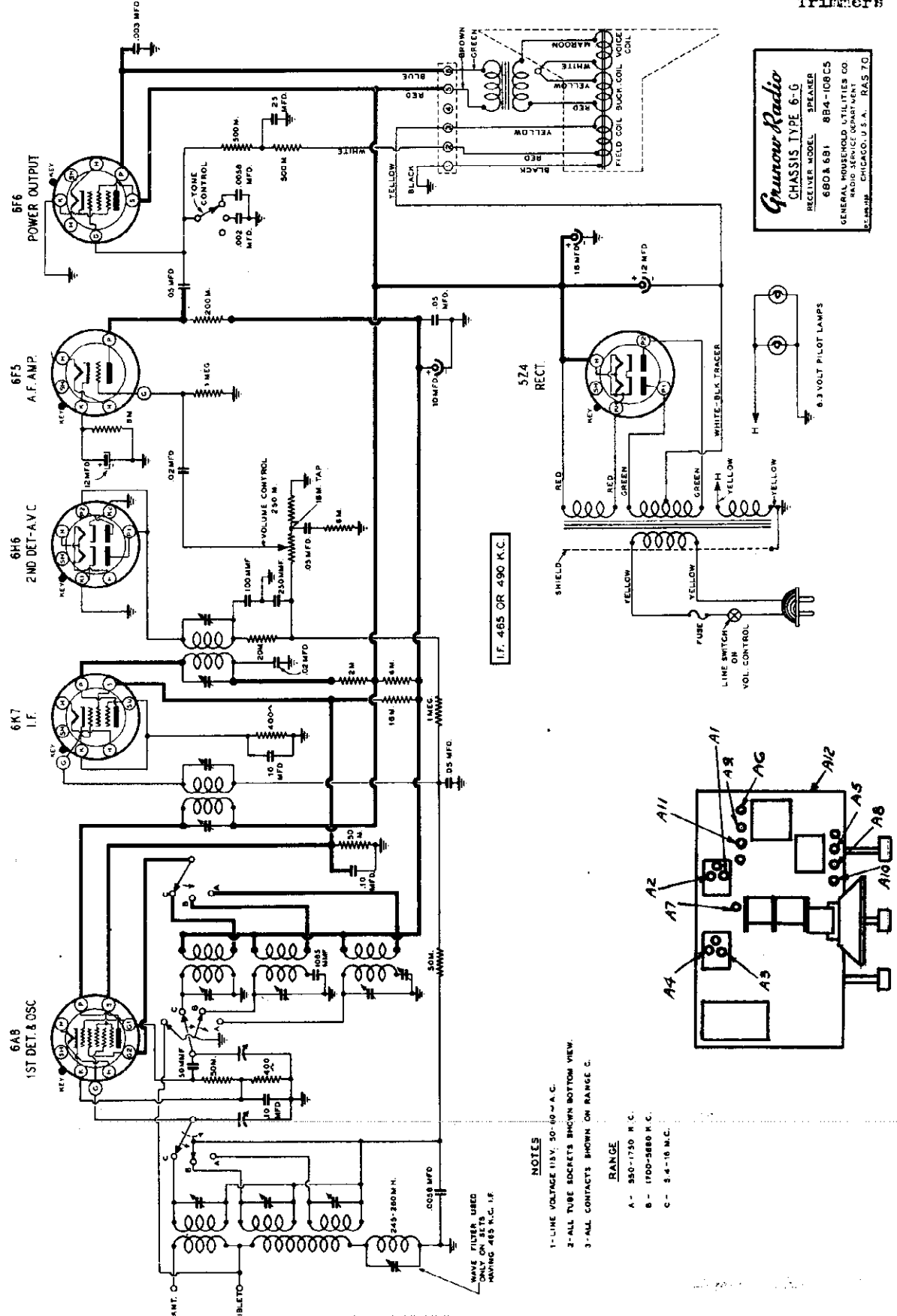
29732	Output Transformer (8C8 and 108C2)		\$ 1.75
31309	Cone and Voice Coil Assembly (8C8)		3.10
31995	8C8 Speaker Complete		10.50
31996	108C2 Speaker Complete		11.50
32003	Field Coil (108C2)		3.50
32004	Field Coil (8C8)		2.75
32008	Cone and Voice Coil Assembly (108C2)		3.10

(ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE)

GENERAL HOUSEHOLD UTILITIES CO.

MODELS 680, 681
Chassis 6G
Schematic
Trimmers

Grunow Radio
CHASSIS TYPE 6-G
RECEIVER MODEL SPEAKER
680 & 681 8B4-106CS
GENERAL HOUSEHOLD UTILITIES CO.
RADIO SERVICE DEPARTMENT
CHICAGO, U.S.A. RAS 70



MODELS 680, 681

Chassis 6G
Alignment Notes

GENERAL HOUSEHOLD UTILITIES CO.

SERVICE INSTRUCTIONS GRUNOW CHASSIS 6G
BROADCAST and SHORT WAVE RECEIVER
MODELS 680 - 681
SPEAKERS 384 - 1086

GENERAL:

The GRUNOW 6 G Chassis is a six tube, 115 V - 50-60 cycle A.C., three band receiver with A.V.C., Ions Control and a "Band Spread" dial. The tubes used are: 6A8 1st Detector and Oscillator, 8K7 1st I.F. Amplifier, 6X5 2nd Detector and A.V.C., 6F5 1st Audio Amplifier, 6F6 Power Output tube and a 5Z4 Rectifier Tube.

The frequency range is divided into three bands or divisions, one covering the band of 550 to 1750 K.C. (A), one the band from 1700 to 5680 K.C. (B), and the other from 5.4 to 18 megacycles (C)

CIRCUIT ALIGNMENT PROCEDURE

Do not attempt to align the 6 G Chassis without proper equipment. Alignment condensers are shown in the accompanying illustrations, - I.F. Transformers on top of the I.F. Transformers.

1 - EQUIPMENT:

- (A) Test Oscillator
 - (B) Modulated Oscillator capable of producing signals at the I.F., Broadcast and Short-Wave frequencies is necessary for alignment of the 6 G Chassis.
 - (C) Insulated Screw Driver - (all bakelite or fibre) about 8" long.
 - (D) Output Meter.
- This may be any of the standard output meters, but should be sufficiently sensitive to provide a good deflection at low signal strength.
- (E) Coupling Means.
 - (F) Coupling Condensers of 200 mfd., .25 mfd., and a 400 Ohm resistor should be used when coupling oscillators to receiver during alignment as specified in the procedure.
 - (G) The receiver should be aligned in a location free from local interference (interference caused by motors - flashers - automobile ignition, etc.) as high frequency disturbances will cause difficulties when the short wave section is being adjusted. (A screen room is to be recommended.)

2 - 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.

3 - I. F. ALIGNMENT:

- Connect signal lead of test oscillator to grid of 6A8 (1st detector tube) through .25 mfd. condenser. Connect the ground lead to the Chassis.
- (A) Set Dial Pointer to 1400 K.C. and range switch on position "A".
- (B) Place Test Oscillator in operation at 490 K.C. or 465 K.C. (see note below.) Turn receiver volume control and tone control to maximum.
- (C) Adjust test oscillator output to lowest value, consistent with obtaining a readable indication on output meter.
- (D) 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.

4 - 1400 K.C. ALIGNMENT

- (A) Connect signal lead of test oscillator through 200 mfd., condenser to

Antenna binding post.

- (B) Connect the test oscillator ground lead to the ground post of Chassis.
- (C) Place test oscillator in operation at 1400 K.C.
- (D) Turn dial pointer to 1400 K.C.
- (E) Turn range switch to range "A".
- (F) Adjust broadcast oscillator trimmer A5, Fig. (1), to maximum output.
- (G) Adjust 1st Det. Trimmer (A6), Fig. (1), to maximum output.

5 - 800 K.C. ALIGNMENT:

- (A) Place test oscillator in operation at 800 K.C.
- (B) Tune in signal to maximum (this point does not have to be exactly at 800 K.C. dial setting)
- (C) Adjust the 600 K.C. Padding Condenser (A7), Fig. (1), (which is on top of Chassis to the Rear of variable condenser) in directing 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 - RECHECK 1400 K.C. ALIGNMENT

7 - 5 M. C. ALIGNMENT:

- (A) Set Range switch at "B".
- (B) Place test Oscillators in operation at 5 M. C.
- (C) Turn Dial Pointer at 5 K.C.
- (D) Adjust Set Oscillator Trimmer (A8), Fig. (1), to maximum output.
- (E) Adjust Detector Trimmer (A9) Fig. (1) to maximum output.
- (F) Check Dial Setting at 1900 K.C.

8 - 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 range "C" and turn dial pointer to 18 M.C.
- (D) Place Test Oscillator in operation at 18 M.C.
- (E) Adjust set oscillator Trimmers (A10) Fig. (1) to maximum output.
- (F) Adjust Detector Trimmers (A11), Fig. (1), to maximum output.
- (G) On the 18 M.C. Alignment it will be noted that there are two settings where the signal will be received. Use the lower of the two for alignment adjustment. The setting giving most capacity or the point at which the trimmer screw is farthest in. Check dial setting at 6 M.C.

NOTE:-

Due to interference caused by commercial code stations in some locations, it has been necessary to use two I.F. Frequencies on this Receiver, one of 490 K.C. where code interference is in the neighborhood of 465 K.C. and the other where the interfering stations are operating in the 500 K.C. band, we use an I.F. of 465 K.C.

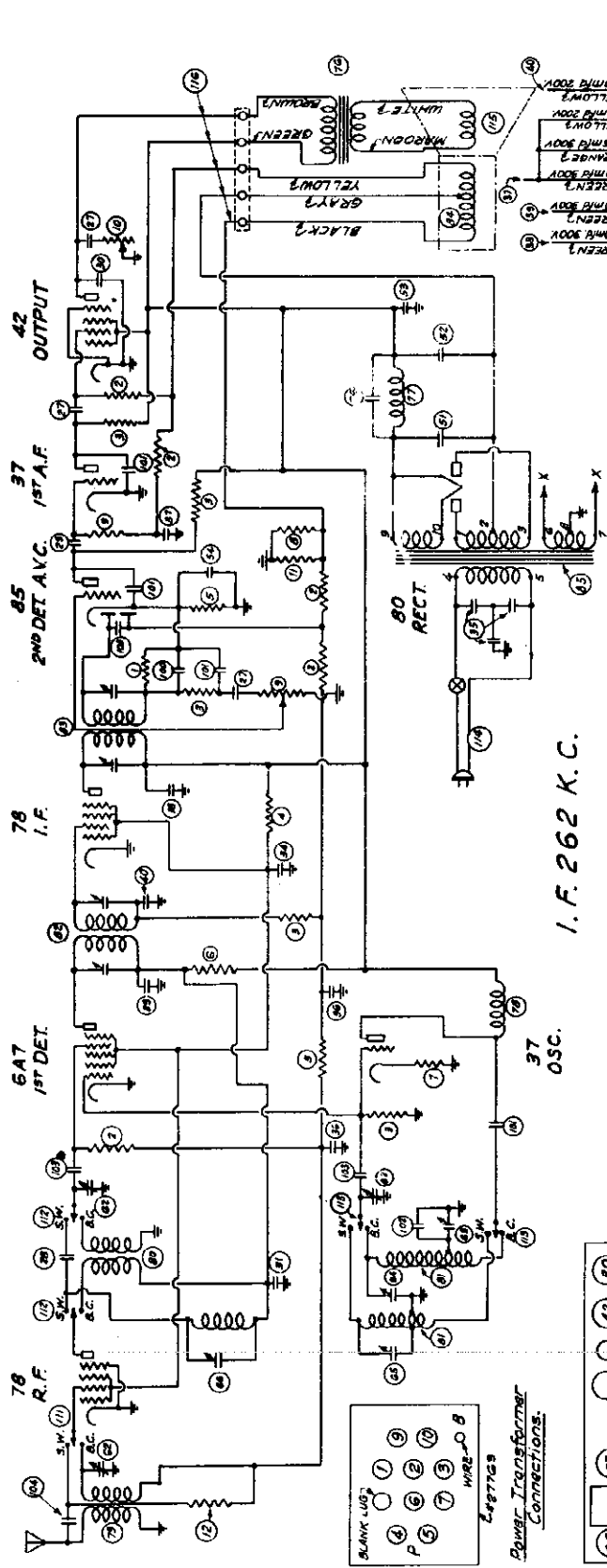
The I. F. Frequencies of the Receiver is stamped on the rear of the Chassis, and if there is any doubt as to I.F. peaking, it is only necessary to apply a variable I.F. signal to the I.F. Amplifier, and Maximum output will indicate resonance or frequency at which the I.F.'s were peaked.

To further overcome this form of interference, sets peaked at 465, also incorporate a wave filter in the Antenna circuit. This filter should be tuned to the same frequency as the I.F. Transformers. Tuning is accomplished after the set has been completely aligned by applying the I.F. Frequency signal through to a .0002 Mfd., condenser to the Antenna binding post of the Receiver, and tuning the wave filter condenser, (A12) (located on the right hand side of the Chassis) so that the incoming signal is at minimum output.

In other words, apply a strong 465 K.C. signal to the Receiver Antenna Post thru the .0002 Mfd., Condenser, and tune wave filter so that the output meter indicates minimum.

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 821
Chassis 8B
Schematic, Trimmers
Socket, Parts

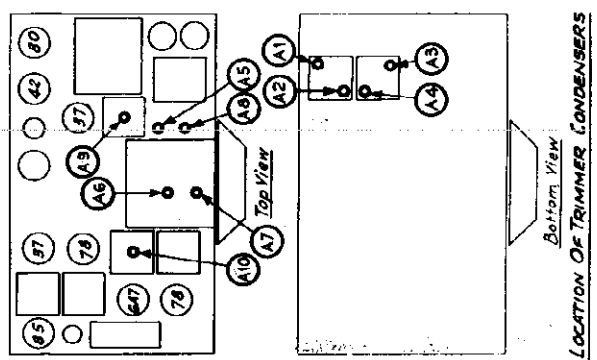


I. F. 262 K. C.

RESISTORS		PAPER CONDENSERS		ELECTROLYTIC CONDENSERS	
Part No.	Description	Part No.	Description	Part No.	Description
1	22858 1 Meg. ±20% 1/4Wt.	1	20 26 28 226 0.1 Mfd. 400 Volt	1	25 51 27414 8 Mfd. 500V.
2	123849 500,000 Ohm ±20% 1/4W.	5	20 27 28 729 0.05 Mfd. 400 Volt	3	25 52 27419 8 Mfd. 500V.
3	123853 50,000 Ohm ±20% 1/4W.	7	20 28 29 567 0.02 Mfd. 400 Volt	1	25 53 29562 18 Mfd. 300V.
4	123850 16,000 Ohm ±10% 1/4W.	1	20 29 28 721 0.1 Mfd. 500 Volt	1	25 54 27668 8 Mfd. 25V.
5	122857 10,000 Ohm ±10% 1/4W.	1	20 30 28 717 0.002 Mfd. 700 Volt	1	25
6	126118 1,000 Ohm ±10% 1/4W.	1	20 31 28 725 0.08 Mfd. 400 Volt	1	25
7	27784 400 Ohm ±10% 1/4W.	1	20 34 28 238 1 Mfd. Con.	1	25 62 31932 Variable Condenser
8	31515 80 Ohm ±10% 1/4W.	1	20 35 28 043 9-01 Mfd. Battery	1	60 100 24 251 100 Mmf. ±20%
9	27687 Vol. Control, 1 Meg.	1	110 36 27524 2-10 Mfd. 200 V.	1	25 07 24487 250 Mmf. ±10%
10	27646 Tone Control	1	15 37	1	25 08 24255 500 Mmf. ±10%
11	27446 Camdohm	1	80 38	1	25 09 29083 50 Mmf. ±20%
12	21948 100,000 Ohm ±20% 1/4W.	1	25 39	1	25 09 29083 50 Mmf. ±20%
TRANSFORMERS & CHOKES		1	40	1	25 09 29083 50 Mmf. ±20%
76	27591 Output Transformer	1	150	1	60 104 29 597 600 Mmf.
77	27387 Filter Choke	1	180	MISCELLANEOUS	
78	29539 R. F. Choke	1	60	1	80 111
79	31494 Ant. Coil	1	100	1	80 112
80	31488 Det. Coil	1	80	1	80 113
81	31498 Osc. Coil	1	175	1	81 502
82	28044 1st I. F. Assy.	1	100	1	81 503
83	31511 2nd I. F. Assy.	1	200	1	81 504
84	27214 Speaker Field	1	275	1	81 505
85	27163 Power Transformer	1	800	1	81 506

MICA CONDENSERS	
Part No.	Description
1	25 07 24487 250 Mmf. ±10%
2	25 08 24255 500 Mmf. ±10%
3	25 09 29083 50 Mmf. ±20%
4	25 09 29083 50 Mmf. ±20%
5	25 09 29083 50 Mmf. ±20%
6	60 104 29 597 600 Mmf.

Grunow Radio
CHASSIS TYPE 8-B
RECEIVER MODEL SPEAKER
821 10A6
GENERAL HOUSEHOLD UTILITIES CO.
RADIO SERVICE DEPARTMENT
CHICAGO, ILL.
RAS-35 970734



MODEL 821
Chassis 8B
Alignment

GENERAL HOUSEHOLD UTILITIES CO.

SERVICE NOTES AND PARTS LIST

Grunow Radio

CHASSIS TYPE 8B
Receiver Model 821
Speaker Type 10A6

GENERAL HOUSEHOLD UTILITIES COMPANY

31563-1

Chicago, U. S. A.

INTRODUCTION

The following characteristics apply to the GRUNOW Radio—Chassis 8B.

This model is an 8 tube Super-Hetrodyne Broadcast and Short Wave (550 to 1550 KC and 6.0 to 13 M.C.) Receiver using 1-78 tube as an R.F. amplifier, 1-6A7 tube as a 1st detector, 1-37 tube as an oscillator, 1-78 tube as an I.F. amplifier, 1-85 tube as a Diode detector and delayed Automatic Volume Control (AVC), 1-37 tube as 1st A.F. amplifier, resistance coupled to the 42 output tube. The 42 tube

receives its bias through the voltage drop produced in the tapped speaker field. The rectifier tube is an 80, the output of which is well filtered through the action of the tuned choke, speaker field, the two 8 and one 18 mfd. Electrolytic Condensers.

The tuning range is divided into two bands or divisions, one covering the band of 550 to 1500 K.C., and the other 6.0 to 13 M.C.

ALIGNMENT PROCEDURE

Alignment condensers are shown on the accompanying diagram and are numbered in order of procedure.

1. EQUIPMENT.

a. Test Oscillator.

A modulated oscillator capable of producing signals at 262 K.C.—600 K.C.—1400 K.C. and 12 M.C. is necessary for alignment of the 8B Chassis.

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 200 Mmf., .25 Mfd., and a 400 Ohm resistor should be used when coupling oscillator to receiver during alignment as specified in the following paragraphs.

d. The receiver should be aligned in a location free from local interference (man made static)—as high frequency disturbances will cause difficulties when the short wave section is being adjusted. (A screen room is to be recommended).

2. DIAL SETTING.

Turn dial knob until condensers are fully meshed. The dial pointer should be on the last mark on the low frequency end of the dial.

3. I. F. ALIGNMENT.

a. Connect signal lead of test oscillator to grid of the 6A7—(1st Detector Tube) through .25 Mfd. Condenser. Connect the ground lead to the Chassis.

b. Set Dial pointer to 1400 K.C. and range switch to Broadcast Position.

c. Place test Oscillator in operation at 262 K.C. Turn receiver volume control and tone 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 under side of Chassis, until maximum output is obtained. During alignment, maintain as low a value of signal as will allow obtaining of accurate adjustment.

4. 1400 K.C. ALIGNMENT.

a. Connect signal lead of test oscillator through 200 Mmf. condenser to antenna binding post.

b. Connect the test oscillator ground lead to the ground post of Chassis.

c. Place test oscillator in operation at 1400 K.C.

d. Turn dial pointer to 1400 K.C.

e. Turn Range Switch to Broadcast Range.

f. Adjust 1400 K.C. padding condenser, A5, which is located on top of Chassis on the right of gang condenser toward rear.

g. Adjust 1st Detector Trimmer, A6, which is the center on top of variable condenser.

h. Adjust R.F. Trimmer, A7, which is the first on top of variable condenser.

5. 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 (which is on top of Chassis on right of gang condenser toward front), 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. 12 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 Range and turn dial pointer to 12 M.C.

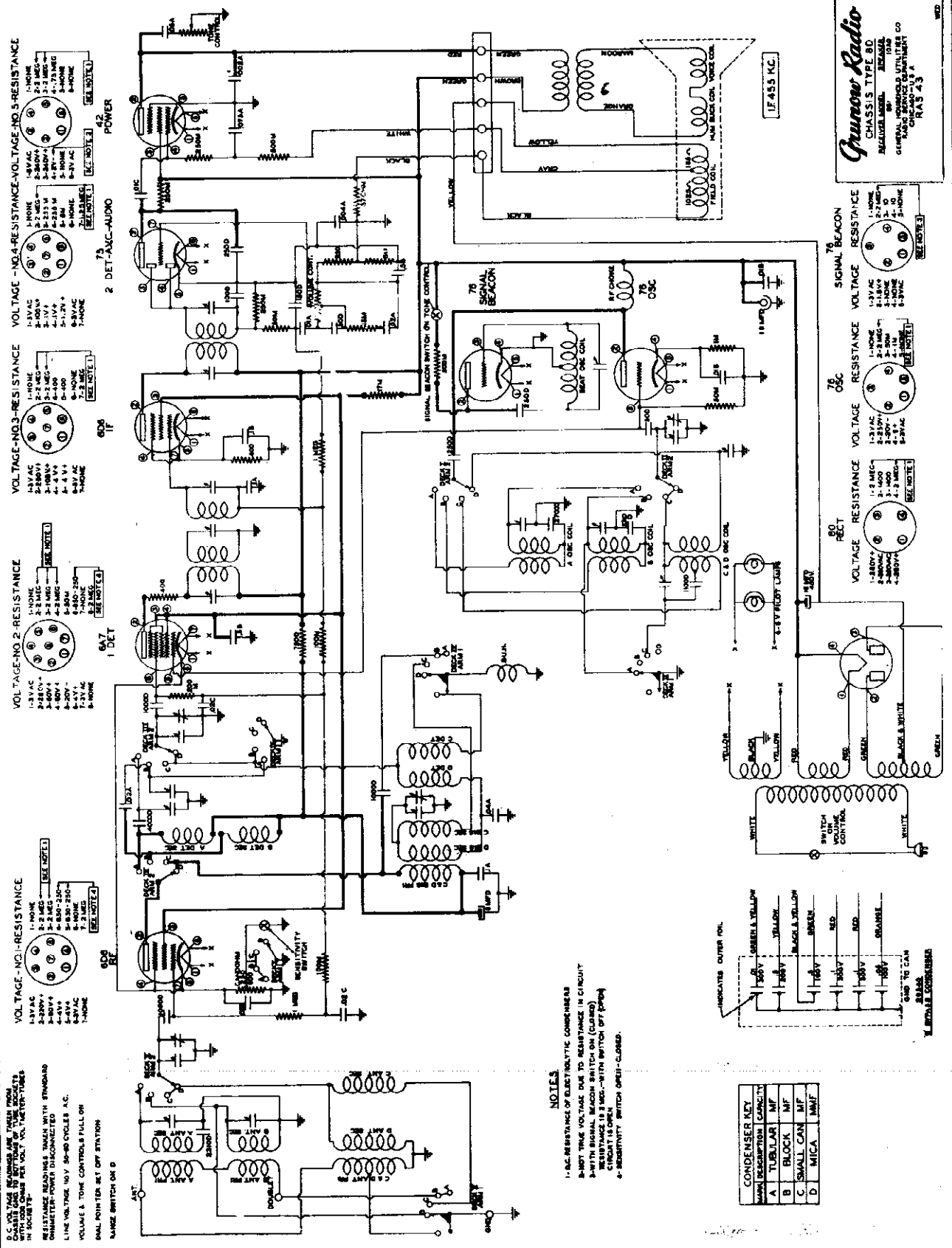
d. Place test oscillator in operation at 12 M.C.

e. Adjust set oscillator trimmer A9 through hole in oscillator transformer shield located on right side of variable condenser on top of Chassis.

f. Adjust detector trimmer A10 through hole in Detector Transformer Shield located on left side of variable condenser on top of Chassis.

GENERAL HOUSEHOLD UTILITIES CO.

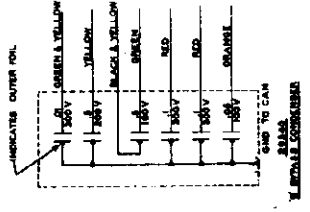
MODEL 861
Chassis 8D
Schematic
Voltage



D.C. VOLTAGE READINGS ARE TAKEN FROM POINTS SHOWN WITH RESISTANCE INDICATED IN SQUARES.
RESISTANCE READINGS TAKEN WITH STANDARD OHMMETER-POWER DISCONNECTED.
LINE VOLTAGE 105 V. 50-60 CYCLES A.C.
VOLUME & TONE CONTROLS FULL ON.
SMALL SWITCHER SET OFF POSITION.
LARGE SWITCH OFF 0.

- NOTES
- 1- A.C. RESISTANCE OF ELECTROLYTIC CONDENSERS
 - 2- PART TIME VOLTAGE DUE TO NEARNESS IN CIRCUIT
 - 3- SWITCH WITH SIGNAL SWITCH ON (CLOSED)
 - 4- RESISTANCE IS 2 MEG.-WITH SWITCH OFF (OPEN)
 - 5- RESISTANCE IS OPEN
 - 6- SENSITIVITY SWITCH OPEN-CLOSED.

CONDENSER KEY	MARKING	DESCRIPTION	CAPACITY
A	TUBULAR	MF	
B	BLOCK	MF	
C	SMALL CAN	MF	
D	MICA	MMF	



Grunow Radio
CHASSIS TYPE 8D
REPLACES MODEL 850
GENERAL HOUSEHOLD UTILITIES CO.
PLANO, TEXAS
R.A.S. 4.3

VOLTAGE-RESISTANCE

1-NONE	1-100V AC
2-100V AC	2-100V AC
3-100V AC	3-100V AC
4-100V AC	4-100V AC
5-100V AC	5-100V AC

VOLTAGE-RESISTANCE

1-NONE	1-100V AC
2-100V AC	2-100V AC
3-100V AC	3-100V AC
4-100V AC	4-100V AC
5-100V AC	5-100V AC

VOLTAGE-RESISTANCE

1-NONE	1-100V AC
2-100V AC	2-100V AC
3-100V AC	3-100V AC
4-100V AC	4-100V AC
5-100V AC	5-100V AC

VOLTAGE-RESISTANCE

1-NONE	1-100V AC
2-100V AC	2-100V AC
3-100V AC	3-100V AC
4-100V AC	4-100V AC
5-100V AC	5-100V AC

VOLTAGE-RESISTANCE

1-NONE	1-100V AC
2-100V AC	2-100V AC
3-100V AC	3-100V AC
4-100V AC	4-100V AC
5-100V AC	5-100V AC

VOLTAGE-RESISTANCE

1-NONE	1-100V AC
2-100V AC	2-100V AC
3-100V AC	3-100V AC
4-100V AC	4-100V AC
5-100V AC	5-100V AC

VOLTAGE-RESISTANCE

1-NONE	1-100V AC
2-100V AC	2-100V AC
3-100V AC	3-100V AC
4-100V AC	4-100V AC
5-100V AC	5-100V AC

VOLTAGE-RESISTANCE

1-NONE	1-100V AC
2-100V AC	2-100V AC
3-100V AC	3-100V AC
4-100V AC	4-100V AC
5-100V AC	5-100V AC

VOLTAGE-RESISTANCE

1-NONE	1-100V AC
2-100V AC	2-100V AC
3-100V AC	3-100V AC
4-100V AC	4-100V AC
5-100V AC	5-100V AC

VOLTAGE-RESISTANCE

1-NONE	1-100V AC
2-100V AC	2-100V AC
3-100V AC	3-100V AC
4-100V AC	4-100V AC
5-100V AC	5-100V AC

VOLTAGE-RESISTANCE

1-NONE	1-100V AC
2-100V AC	2-100V AC
3-100V AC	3-100V AC
4-100V AC	4-100V AC
5-100V AC	5-100V AC

MODEL 861

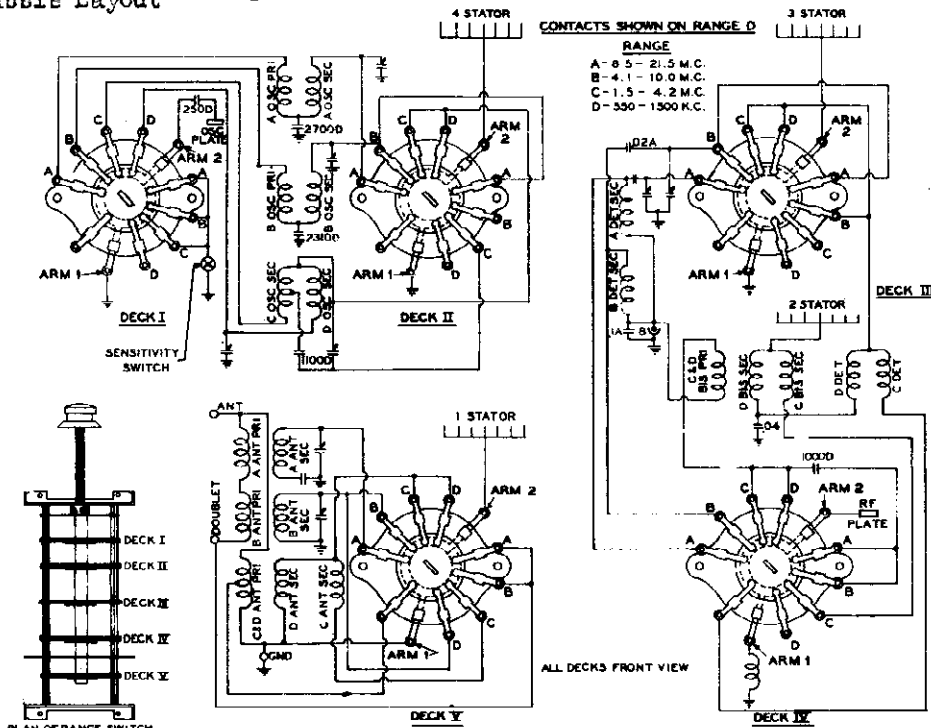
Chassis 8D

Switch & Coil Assembly

Trimmers, Chassis Layout

GENERAL HOUSEHOLD UTILITIES CO.

FIGURE 3



SCHEMATIC DIAGRAM OF RANGE SWITCH AND COIL ASSEMBLY ON CHASSIS 8-D

RA5 44

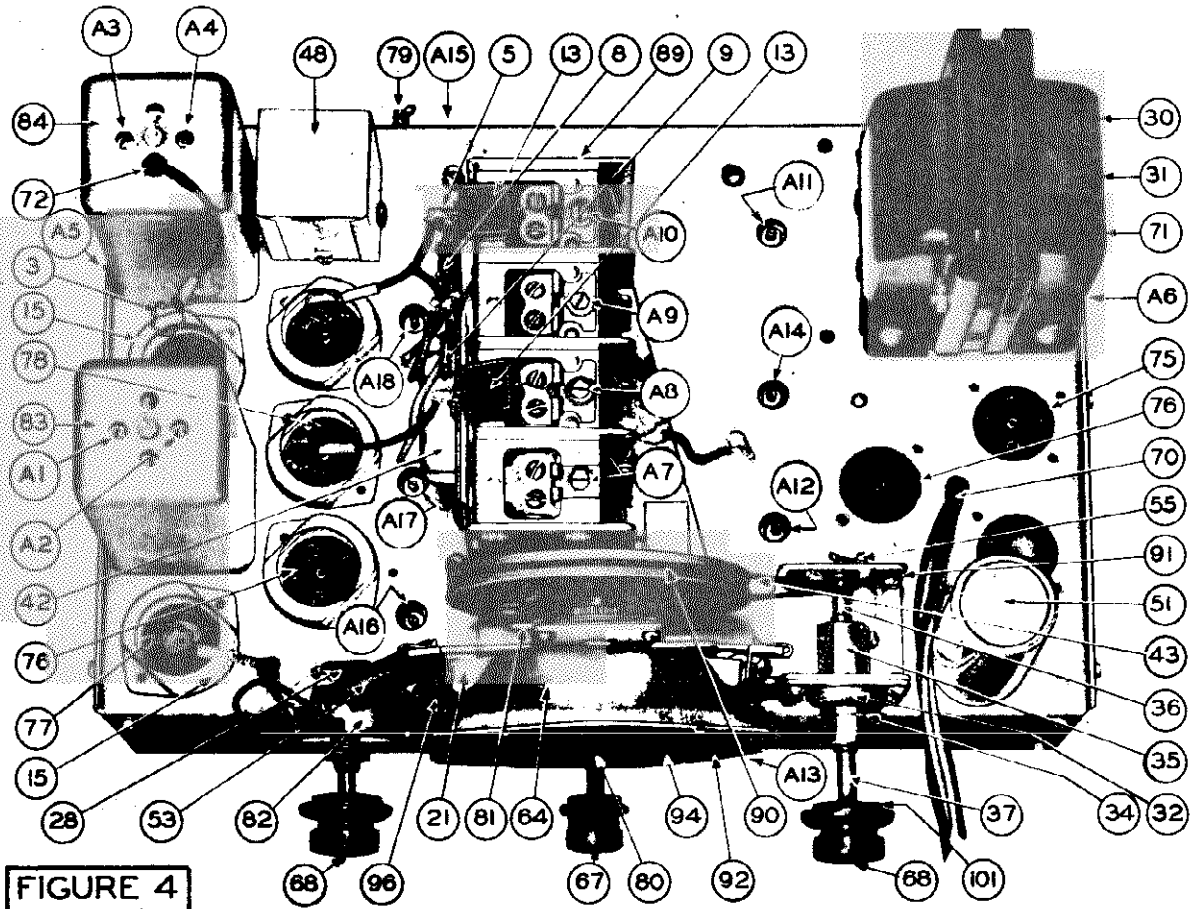


FIGURE 4

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 861
Chassis 8D
Circuit Data
Socket Layout

SERVICE DATA

The Range Switch

In servicing the 8D Receiver consider the radio frequency end as four different and distinct radios:

- One working from 550 to 1500 K.C. (D Range)
- One working from 1500 to 4200 K.C. (C Range)
- One working from 4100 to 10000 K.C. (B Range)
- One working from 8500 to 21500 K.C. (A Range)

These four radios are put into operation as desired by means of the Range Switch.

When on position "A" the short wave coils covering the range from 8,500 to 21,500 K.C. are connected into the three tuned circuits of the receiver; one coil as an R.F. Transformer, one as the Detector Coupler, and one as the Oscillator Transformer.

On position "B" the 4100 to 10,000 K.C. coils are put into operation.

On position "C" the 1500 to 4200 K.C. coils are shunted across the 550 to 1500 K.C. coils in such a manner as to lower the total inductance of the combined coils and reduce the losses caused by open end coils.

On both the "C" and "D" positions, four coil sets are put into the circuit and the receiver operates as a four-tuned circuit radio. On all four ranges the receiver works at maximum sensitivity and selectivity. All coils and condensers are of such construction that atmospheric and temperature changes have minimum effect.

Each circuit is completely shielded from each other, and the complete range switch and coil assembly may be removed for inspection or repair.

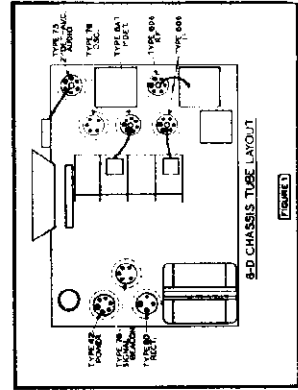


Fig. 1

The Chassis frame is built in such a way that the end plates may be disconnected, allowing easy inspection of the underside of the Chassis assembly (Fig. 6.)

The range switch and coil assembly is made up in a unit and may be removed for inspection or repair. (Fig. 7.) The removal of this assembly necessitates the unsoldering of 14 wire leads. These leads and the position to which they are connected are marked on the illustrations with letters. The leads A-B-C on the Coil Assembly (Fig. 7) are attached to the points marked A-B-C on the Chassis Assembly (Fig. 5). The leads marked D-E-F-G on the Coil Assembly (Fig. 7) are attached to the points of corresponding letters on the Chassis Assembly (Fig. 6). Leads H, I, J, K, L, M on Coil Assembly are connected as follows:

Lead "H" connects the ground side of the short wave antenna transformer (Red) to the rotor ground of the variable condenser.

Lead "I" connects Arm 2 of Deck 5 to the No. 1 stator of the variable condenser.

Lead "J" is the shielded lead connecting the bi-stator transformer to the No. 2 stator of the variable condenser.

Lead "K" connects Arm 2 of Deck 3 to the No. 3 stator of the variable condenser.

Lead "L" connects the switch assembly ground to the variable condenser rotor ground.

Lead "M" connects Arm 2 of Deck 2 with No. 4 stator of the variable condenser.

Care should be exercised in making these connections. (A soldering iron with a bent point should be used in this operation.)

Lead "N" connects contacts A-B-C of Arm 1 on Deck 1 to the sensitivity control switch and the 250-Ohm bias resistor.

Lead "P" connects the plate of the signal Beacon to an insulator, acting as a pick-up lead.

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 underside.

January, 1935

Service Notes and Parts List

Grunow Radio

CHASSIS TYPE 8D

Receiver Model 861
Speaker Model 10A9

GENERAL HOUSEHOLD UTILITIES COMPANY

CHICAGO, U. S. A.

3158-1

Chassis 8D—115 volt 50-60 cycle

Chassis 8DX—115 volt 25-50 cycle

Power Consumption 75 watts.

Chassis 8DZ { 110-115-220-250 volt

Tubes—2-6D6, 1-6A7, 1-75, 1-42, 2-76, 1-80

INTRODUCTION

The following characteristics apply to the Grunow Radio—Chassis Type 8D:

This model is an 8 tube Super-Heterodyne All Wave (550 to 21,000 KC) Receiver, using 1-6D6 tube as an R. F. Amplifier, 1-6A7 tube as a 1st Detector or mixer—being electronically coupled to a 76 Oscillator tube, 1-6D6 tube as an I.F. amplifier with the 1st I.F. Transformer of the Bi-Selector type and both 1st and 2nd transformers tuned to 455 K.C. A 75 tube (double diode high mu Triode) is used as a diode detector, delayed Automatic Volume Control (AVC) and a high gain audio amplifier. The 42 output tube receives its bias through the voltage drop produced in the tapped speaker field. A type 76 tube is used as a Signal Beacon or beat oscillator. Plate voltage to the Signal Beacon being applied by closing the switch on the tone control. The rectifier tube is an 80, the output of which is well filtered through the choke action of the speaker field and the 8, 15 and 18 mid. electrolytic condensers.

The broadcast section of the receiver consists of the following 4 variable tuned circuits: R.F. input, bi-selector, mixed 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 variable 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 8D chassis. When this tube is brought into operation it acts as a local oscillator, with a frequency of 455 K.C. The signal of this oscillating circuit is fed into the I.F. circuit through a short lead that acts as a radiator and beats against the incoming signal at the I.F. frequency. 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 is also used to receive telegraph or continuous wave signals.

A sensitivity control is incorporated in the 8D chassis and consists of a switch on the rear of the Chassis. This switch when in position No. 1 reduces the sensitivity by allowing the total resistance of 850 Ohms to be used as a grid bias on the 6D6 R.F. tube and the 6A7 1st Det. tube. When on position No. 2, the bias is changed to 250 Ohms by grounding out the 600-Ohm section and increasing the sensitivity of the receiver. It will be noted by referring to schematic diagram that this control is effective only on the "D" or broadcast range.

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.

MODEL 861

Chassis 8D

Alignment, Parts

GENERAL HOUSEHOLD UTILITIES CO.

PARTS AND PRICE LIST

PART NUMBERS ARE GIVEN ON THE ILLUSTRATION AND THE NUMBERS ARE BROUGHT DOWN IN NUMERICAL ORDER FOR CONVENIENCE

Index No.	Part No.	DESCRIPTION	Quantity Required	Price	Index No.	Part No.	DESCRIPTION	Quantity Required	Price	Index No.	Part No.	DESCRIPTION	Quantity Required	Price
1	20678	Ground Terminal	1	.02	37	29488	Drive Shaft, Outer	1	.75	72	30104	Grommet (Rubber)	2	.02
2	20861	Line Cord and Plug	1	.35	38	29490	Range Switch	1	4.00	73	30169	Trimmer Condenser (I.F.)	1	.40
3	20962	Cup Cap	4	.02	39	29496	Antenna Transformer (Broadcast)	1	1.75	74	30198	Condenser, 1100 MMF. Mica	1	.25
4	21598	Rubber Grommet	10	.02	40	29498	1st Detector Transformer (Broadcast)	1	1.25	74	31052	Condenser, Dry Electrolytic, 8 Mfd., 350 Volt	1	1.25
5	22858	Resistor, 1 Megohm, Carbon, 1/4 Watt	3	.20	41	29501	1st Detector Transformer (Short Wave), Black	1	1.25	75	31075	4 Prong Socket	1	.10
6	23284	Bakelite Washer	13	.02	42	29511	Resistor Panel Assy. (Includes 29518)	1	1.25	76	31078	5 Prong Socket	2	.10
7	23458	Insulated Terminal Assy. (Single)	3	.10	43	29520	Drive Cable Assy.	1	.10	77	31079	6 Prong Socket	4	.15
8	23570	Resistor, 100,000 Ohm, Carbon, 1/4 Watt	3	.20	44	29521	3/16" Ball Bearing	1	.01	78	31080	7 Prong Socket	1	.15
9	23538	Resistor, 200,000 Ohm, Carbon, 1/4 Watt	1	.20	45	29522	11/32" Ball Bearing	4	.02	31215	Tube Shield Cap	4	.10	
10	23849	Resistor, 500,000 Ohm, Carbon, 1/4 Watt	3	.20	46	29523	Condens. Mounting Bearing	1	.10	31360	Window Gasket	1	.05	
11	23853	Resistor, 50,000 Ohm, Carbon, 1/4 Watt	2	.20	47	29524	Cable Tension Spring	1	.10	31363	Sensitivity Switch	1	.40	
12	23998	Resistor, 250,000 Ohm, Carbon, 1/4 Watt	4	.20	48	29533	Resistor, Carbon, 5000-37 Ohms	1	.60	80	31723	Pointer and Pinion Assy.	1	.40
13	24254	Condenser, 100 MMF. Mica (2nd I.F.)	1	.15	49	29534	Condens. Mounting Bearing	1	.10	81	31726	Pinion, Gear and Adj. Plate Assy.	1	.55
14	24487	Condenser, 250 MMF. Mica	3	.20	50	29552	Escutcheon Window	1	.10	82	31910	Volume Control	1	1.30
15	26256	Tube Shield Base	5	.05	51	29553	Window Retaining Ring	1	.10	83	31911	1st I.F. Coil and Shield Assy.	1	4.10
16	27382	Trimmer Condenser Assy.	5	.35	52	29554	Escutcheon	1	.60	84	31912	2nd I.F. Coil and Shield Assy.	1	3.30
17	27455	Tube Shield	1	.15	53	29562	Condenser, Wet Electrolytic, 16 Mfd., 450 Volt	1	1.90	85	31914	Range Switch and Coil Assy.	1	26.50
18	27490	Resistor, 1000 Ohm, Carbon, 1/4 Watt	1	.20	54	29563	Condenser, Tubular, .075 Mfd., 100 Volt	1	.30	86	31916	Trimmer Condenser	1	.35
19	27520	Condenser, 2310 MMF. Mica	1	.45	55	29567	Condenser, Tubular, .02 Mfd., 400 Volt	1	.25	31918	Oscillator Transformer (Broadcast)	1	1.50	
20	27801	Rubber Grommet	3	.05	56	29580	Signal Beacon Trimmer Condenser	1	.75	31919	Oscillator Transformer (Short Wave), Green	1	1.50	
21	27831	Pilot Light Socket, Insulated	2	.12	57	29584	Signal Beacon Shield	1	.30	88	31936	Signal Beacon Assy.	1	2.25
22	28183	Resistor, 7500 Ohm, Carbon, 1/4 Watt	1	.20	58	29596	Drive Leaf Spring	2	.05	89	31942	Variable Condenser, 4 Gang	1	7.50
23	28573	Short Wave Coil Shield Assy.	1	.75	59	29611	Coupling Inductance Coil	1	.25	90	31945	Drive Drum, Hub, and Gear Assy.	1	1.10
24	28638	Dial Pointer Screw	1	.02	60	29612	Escutcheon Retaining Spring	1	.20	91	31947	Mounting Bracket and Bearing Assy.	1	.60
25	28717	Condenser, Tubular, .002 Mfd., 700 Volt	1	.25	61	29613	Condenser, 4000 MMF. Mica	1	.50	92	31952	Dial Chart	1	.50
26	28723	Condenser, Tubular, .05 Mfd., 400 Volt	1	.25	62	29616	Insulated Terminal Assy. (Double)	5	.10	93	31958	Resistor, Carbon, 250-600 Ohm	1	.40
27	28726	Condenser, Tubular, .1 Mfd., 400 Volt	1	.25	63	29628	Insulated Terminal (4)	1	.10	94	31962	Pointer	1	.10
28	29083	Condenser, 50 MMF. Mica	2	.20	64	29628	Condenser, Tubular, .04 Mfd., 500 Volt	1	.30	95	31964	Resistor, 17,000 Ohm, Carbon, 1/2 Watt	1	.25
29	29135	Condenser, Tubular, .1 Mfd., 100 Volt	1	.25	65	29632	Tube Shield Body	4	.15	96	31966	Resistor, 15,000 Ohm, Carbon, 1/4 Watt	1	.20
30	29414	Power Transformer, 115 Volt, 50-60 Cycles	1	6.00	66	29836	Trimmer Condenser Assy.	1	.25	97	31967	Vertical Term. Assy., 4 Lug	1	.15
31	29416	Power Transformer, 115 Volt, 25-50 Cycles	1	7.25	67	29893	Reflector Assembly	1	.50	98	32096	Antenna Transformer (Short Wave), Red	1	1.75
32	29476	Ball Race	1	.10	68	29900	Trimmer Condenser Assy.	1	.50	32102	Condenser, 150 MMFD. Mica (2nd I.F.)	1	.20	
33	29482	Broad Cast Coil Shield Assy.	1	.80	69	29952	Knob (Range Switch)	1	.30	99	32300	Bi-Selector Transformer (Broadcast)	1	1.50
34	29483	Drive Shaft-Stop Spring	1	.05	70	29953	Knob (Tone Control)	1	.20	100	32301	Vertical Insulated Terminal	1	1.10
35	29486	Drive Sleeve	1	.05	71	30006	Power Transformer 1110-125, 220-250 Volt, 50-60 Cycle	1	7.50	62578	Chassis Mtg. Assy.	4	.02	
36	29487	Drive Shaft, Inner	1	.50	30030	Rubber Mtg. Washer, Upper, Red	3	.05	62582	Chassis Shipping Screw	2	.02		
					30031	Rubber Mtg. Washer, Upper, Red	1	.05	63001	Drive Drum Set Screw	2	.02		
					30032	Rubber Mtg. Washer, Lower, Black	4	.02	63011	Drive Sleeve Set Screw	2	.01		

SPEAKER PARTS—TYPE 10A9

20010	Speaker Pot and Pole Piece Assy.	1	1.15
20041	Speaker Pot Clamp	1	.10
20045	Terminal Strip Cover	1	.15
20047	Terminal Strip	1	.10
27240	Cone Gasket	1	.10
27591	Output Transformer	1	1.75
28755	Cone and Voice Coil Assy.	1	3.80
29964	Field Coil Assembly	1	3.30
31961	Speaker (Complete)	1	11.50

ALIGNMENT PROCEDURE

Do not attempt to align the 8D Chassis without the proper equipment. Alignment condensers are shown in the accompanying illustrations and are numbered in order of procedure.

1. EQUIPMENT

A—Test Oscillator.
A modulated oscillator capable of producing signals at 455 K.C., 600 K.C., 1400 K.C., 3700 K.C., 10 M.C. and 18 M.C. is necessary for alignment of the 8D Chassis.
B—Insulated screw driver.—(All bakelite or fibre) about 6" long.
C—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. It should also incorporate an adjustable shunt so that extremely strong signals may be read.
D—Coupling Means.
Coupling Condensers of 200 mmf., .25 Mfd., and a 400 Ohm resistor should be used when coupling oscillator to receiver during alignment as specified in the following paragraphs.

E—The receiver should be aligned in a location free from local interference (main-mode static as high frequency disturbance) and should be adjusted with the screen room as is recommended.

2. DIAL SETTING

The turn dial knob until condensers are fully meshed. The dial pointer (hour hand) should be on the horizontal line of the dial, pointing to 7 and 3 o'clock. The minute hand should be at 12 o'clock or in a vertical position.

3. I. F. ALIGNMENT

Connect signal lead of test oscillator to grid of the 6A7 (1st Detector Tube) through .25 Mfd. Condenser. Connect the ground lead to the chassis.
A—Set Dial pointer to 1400 K.C. and range switch on position D.
B—Place test Oscillator in operation at 455 K.C. of chassis.
Turn receiver volume control and tone control to maximum.
C—Attenuate test oscillator output to lowest value consistent with obtaining a readable indication on output meter.
D—Adjust five I.F. Trimmers, A1-A2-A3-A4-A5 (Fig. 4), located on the I.F. transformers on top of chassis (2 trimmers are on top of each transformer and one, the Bi-Selector, is at the lower side of the 1st I.F. Transformer), until maximum output is obtained. During alignment, maintain at low a value of signal as will allow obtaining of accurate turn the tone control counter clockwise until the Signal Beacon switch snaps on.
E—Adjust Signal Beacon Trimmer A5 (Fig. 4), which is located on right-hand side of chassis, to zero beat with the 455 K.C. incoming signal.

4. 1400 K. C. ALIGNMENT

A—Place test oscillator in operation at 1400 K.C.
B—Turn dial pointer to 1400 K.C.
C—Turn range switch to range D.
D—Adjust broadcast oscillator trimmer A7 which is on the variable condenser section nearest the dial to maximum output. It may be necessary to reduce the capacity of the 500 K.C. peeder (A11) to about half the capacity before the oscillator will peak at 1400 K.C.
E—Adjust 1st Det. Trimmer A8 (Fig. 4), which

is the second from front on top of variable condenser.
F—Adjust Bi-Selector Trimmer A9 (Fig. 4), which is the third from front on top of variable condenser.
G—Adjust Antenna Trimmer A10 (Fig. 4), which is the fourth from the front on top of variable condenser.

5. 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. Padder Condenser A11 (Fig. 4) (which is on top of chassis on right-hand side third from front as you face chassis) in direction of signal increases. At same time rock the tuning condenser back and forth through resonance until adjusting padder condenser until maximum output is obtained.
D—Readjust Oscillator Trimmer (A7) for maximum output with pointer and signal set at 1400 K.C. (see 1400 K.C. Alignment).

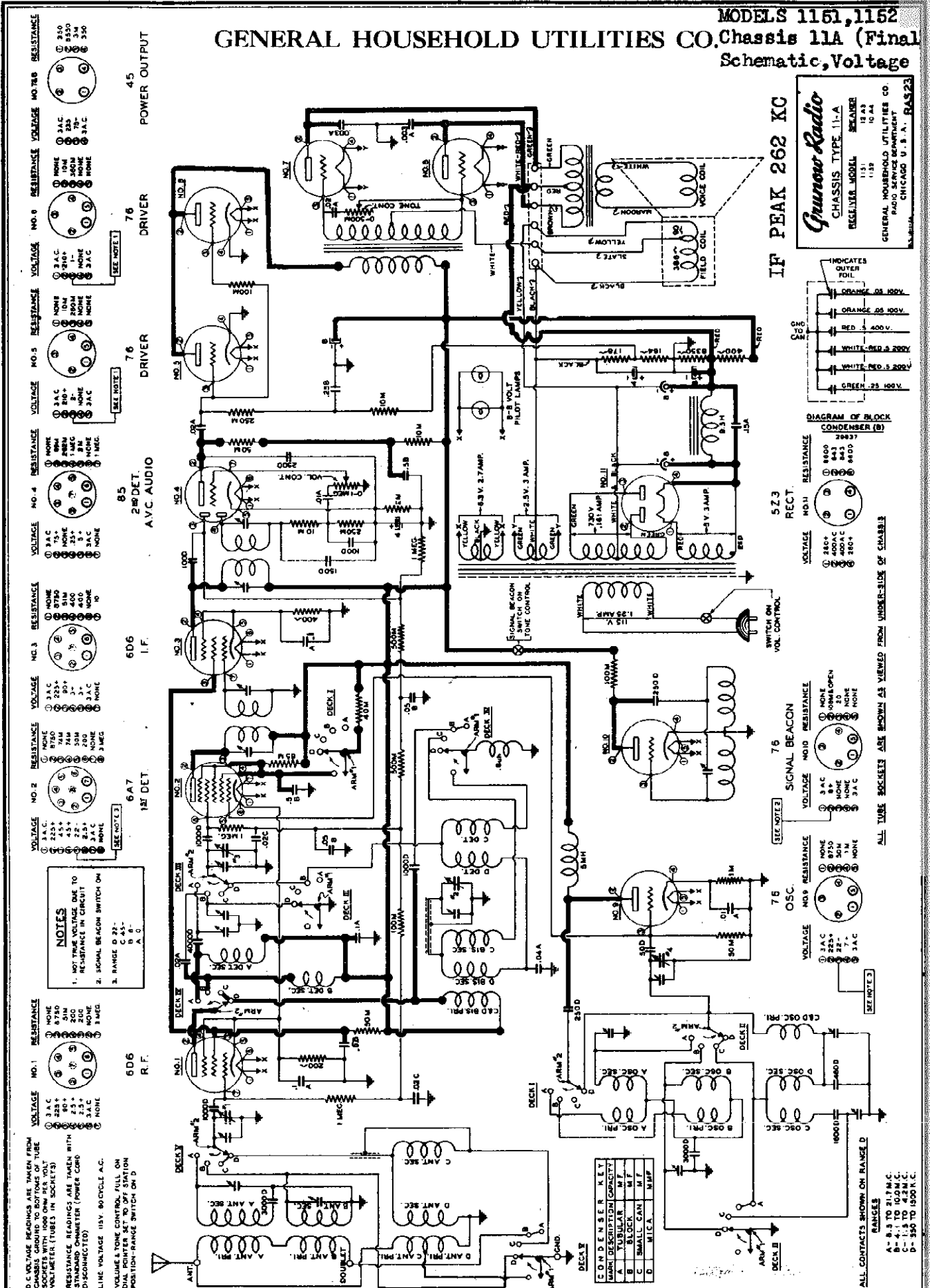
6. 3700 K. C. ALIGNMENT
A—Connect signal lead of test oscillator through 200 mmf. condenser to antenna binding post.
B—Connect the test oscillator ground lead to the ground post of chassis.
C—Turn range switch to range "C" and set dial pointer to 3700 K.C.
D—Adjust, the 3700 K.C. Oscillator Trimmer A12 (Fig. 4) (which is the first of the three located on top of chassis on the right-hand side as you face it) in direction of signal increase. At same time work the tuning condenser back and forth through resonance while adjusting trimmer condenser until maximum output is obtained.

7. 10 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 range "B" and turn dial pointer to 10 M.C.
D—Place Test Oscillator in operation at 10 M.C.
E—Adjust Set Oscillator Trimmer A13 (Fig. 4), located on front face of chassis.
F—Adjust Detector Trimmer A14 (Fig. 4), located on right-hand side on top of chassis, second from front.
G—Adjust Antenna Trimmer A15 (Fig. 4), located on rear face of chassis.
8. 18 M. C. ALIGNMENT
A—Set Range Switch on Range "A".
B—Place Test Oscillator in operation at 18 M.C.
C—Turn Dial Pointer to 18 M.C.
D—Adjust Set Oscillator Trimmer A16 (Fig. 4), located on top of chassis on left of gang condenser, first from front.
E—Adjust Detector Trimmer A17 (Fig. 4), located second from front on top of chassis on left-hand side.
F—Adjust Antenna Trimmer A18 (Fig. 4), located third from front on top of chassis on left-hand side.
G—It may be necessary to rock the variable condenser back and forth through resonance while adjusting the Detector (A17) and the Antenna (A18) for maximum output.

GENERAL HOUSEHOLD UTILITIES CO. Chassis 11A (Final Schematic, Voltage)

MODELS 1151, 1152

Grunow Radio
 CHASSIS TYPE 11-A
 RECEIVER MODEL 1151
 GENERAL HOUSEHOLD UTILITIES CO.
 RADIO SERVICE DEPARTMENT
 CHICAGO U. S. A. RA3923



NOTES
 1. NOT TRUE VOLTAGE DUE TO RESISTANCE IN CIRCUIT
 2. SIGNAL BEACON SWITCH ON
 3. RANGE B 22-
 D 8-
 A C

VOLTAGE	RESISTANCE	NO. 1	RESISTANCE	NO. 2	VOLTAGE	RESISTANCE	NO. 3	VOLTAGE	RESISTANCE	NO. 4	VOLTAGE	RESISTANCE	NO. 5	VOLTAGE	RESISTANCE	NO. 6	VOLTAGE	RESISTANCE	NO. 7	RESISTANCE	NO. 8
3 A.C.	250M	3 A.C.	100K	3 A.C.	250M	3 A.C.	100K	3 A.C.	10M	3 A.C.	100K	3 A.C.	100M	3 A.C.	100K	3 A.C.	100K	3 A.C.	100K	3 A.C.	100K
3 A.C.	10M	3 A.C.	1M	3 A.C.	1M	3 A.C.	1M	3 A.C.	10M	3 A.C.	10M	3 A.C.	10M	3 A.C.	10M	3 A.C.	10M	3 A.C.	10M	3 A.C.	10M
3 A.C.	10M	3 A.C.	10M	3 A.C.	10M	3 A.C.	10M	3 A.C.	10M	3 A.C.	10M	3 A.C.	10M	3 A.C.	10M	3 A.C.	10M	3 A.C.	10M	3 A.C.	10M
3 A.C.	10M	3 A.C.	10M	3 A.C.	10M	3 A.C.	10M	3 A.C.	10M	3 A.C.	10M	3 A.C.	10M	3 A.C.	10M	3 A.C.	10M	3 A.C.	10M	3 A.C.	10M

IF PEAK 262 KC

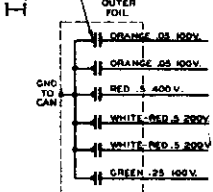


DIAGRAM OF BLOCK CONDENSER (B) 20037

VOLTAGE	RESISTANCE
250V	250M
400V	400M
500V	500M
200V	200M

5Z3 RECT.

VOLTAGE	RESISTANCE
3 A.C.	3 A.C.
3 A.C.	3 A.C.
3 A.C.	3 A.C.
3 A.C.	3 A.C.

75 OSC.

VOLTAGE	RESISTANCE
3 A.C.	3 A.C.
3 A.C.	3 A.C.
3 A.C.	3 A.C.
3 A.C.	3 A.C.

76 SIGNAL BEACON

VOLTAGE	RESISTANCE
3 A.C.	3 A.C.
3 A.C.	3 A.C.
3 A.C.	3 A.C.
3 A.C.	3 A.C.

ALL TUBE SOCKETS ARE SHOWN AS VIEWED FROM UNDER-SIDE OF CHASSIS

RANGES
 A - 2.5 TO 20 P.F.M.C.
 B - 1.5 TO 2.5 P.F.M.C.
 C - 1.5 TO 2.5 P.F.M.C.
 D - 350 TO 1500 K.C.

MODELS 1151, 1152 GENERAL HOUSEHOLD UTILITIES CO.

Chassis 11A
Switch & Coil
Assembly
Trimmers
Chassis Layout

FIGURE 3

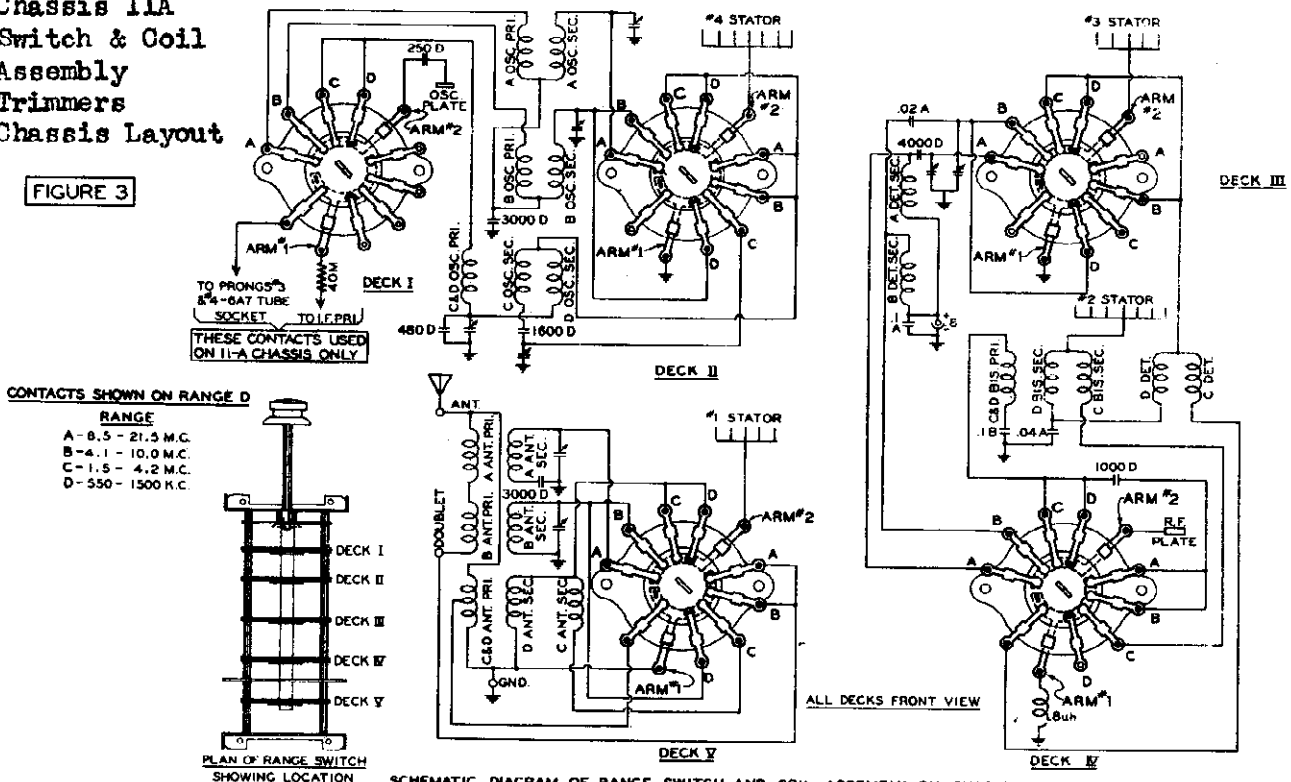
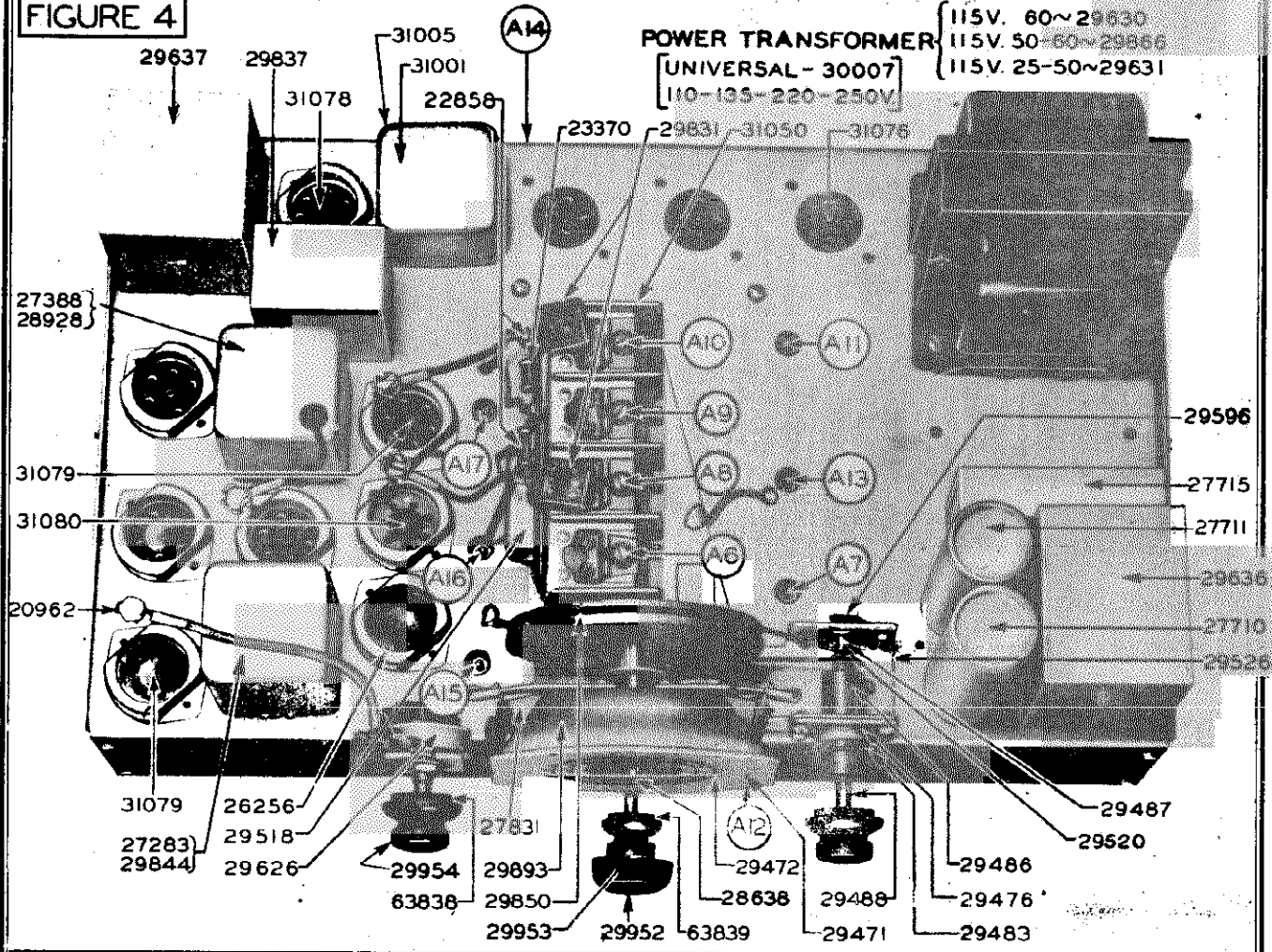


FIGURE 4



GENERAL HOUSEHOLD UTILITIES CO.

MODELS 1151, 1152
Chassis 11A (Final)
Switch Data, Socket

SERVICE DATA

The chassis frame is built in such a way that the end plates may be disconnected allowing easy inspection of the underside of the chassis assembly. (Fig. 6).

The range switch and coil assembly is made up in a unit and may be removed for inspection or repair. (Fig. 7). The removal of this assembly necessitates the unsoldering of 15 wire leads. These leads and the positions to which they are connected are marked on the illustrations with letters. The leads A-B-C on the Coil Assembly (Fig. 7) are attached to the points marked A-B-C on the Chassis Assembly (Fig. 5). The leads marked D-E-F-G on the Coil Assembly (Fig. 7) are attached to the points of corresponding letters on the Chassis Assembly (Fig. 6). Leads H-I-J-K-L-M on Coil Assembly are connected as follows:

Lead "H" connects the ground side of the short wave antenna transformer (Red) to the rotor ground of the variable condenser.

Lead "I" connects Arm 2 of Deck 5 to the No. 1 stator of the variable condenser.

Lead "J" is the shielded lead connecting the bi-selector transformer to the No. 2 stator of the variable condenser.

Lead "K" connects Arm 2 of Deck 3 to the No. 3 stator of the variable condenser.

Lead "L" connects the switch assembly ground to the variable condenser rotor ground.

Lead "M" connects Arm 2 of Deck 2 with No. 4 stator of the variable condenser.

Leads "N" and "O" connect Arm 1 of Deck 1 to the 5th contact on the range switch—shunting a 40,000 ohm resistor when the "C" range is in operation.

Lead "P" connects the plate of the Signal Beacon to an insulator, acting as a pick-up lead. Care should be exercised in making these connections. (A soldering iron with a bent point should be used in this operation).

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 underside.

The Range Switch

In servicing the 11A Receiver, consider the radio frequency end as four different and distinct radios:

- One working from 550 to 1500 k.c. (D Range)
- One working from 1500 to 4200 k.c. (C Range)
- One working from 4100 to 10,000 k.c. (B Range)
- One working from 8500 to 21,500 k.c. (A Range)

These four radios are put into operation as desired by means of the Range Switch.

When on position "A" the short wave coils covering the range from 8,500 to 21,500 k.c. are connected into the three tuned circuits of the receiver, one coil as an R.F. Transformer, one as the Detector Coupler, and one as the Oscillator Transformer.

On position "B" the 4100 to 10,000 k.c. coils are put into operation.

On "C" position, the 1500 to 4200 k.c. coils are shunted across the 550 to 1500 k.c. coils in such a manner as to lower the total inductance of the combined coils and reduce the losses caused by open end coils.

On both the "C" and "D" positions, four coil sets are put into the circuit and the receiver operates as a four tuned circuit radio. On all four ranges the receiver works at maximum sensitivity and selectivity. All coils and condensers are of such construction that atmospheric and temperature changes have minimum effect.

Each circuit is completely shielded from each other, and the complete range switch and coil assembly may be removed for inspection or repair.

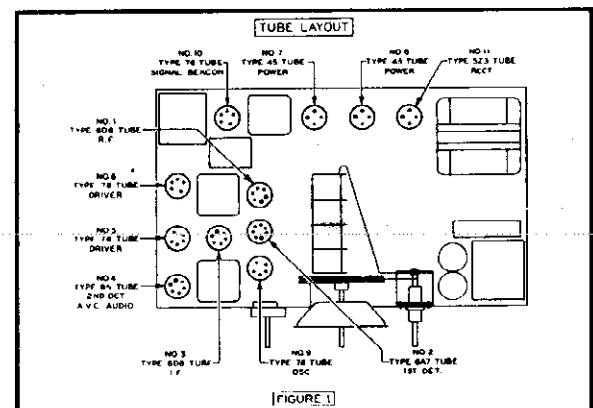


Fig. 1

MODELS 1151, 1152 Chassis 11A (Final) GENERAL HOUSEHOLD UTILITIES CO. Alignment, Parts

PARTS AND PRICE LIST

PART NUMBERS ARE GIVEN ON THE ILLUSTRATION AND THE NUMBERS ARE BROUGHT DOWN IN NUMERICAL ORDER FOR CONVENIENCE

Table with 4 columns: Part No., Description, No. used, List Price. Includes parts like Ground Terminal, Resistor, Grid Cap, Rubber Grommet, etc.

SPEAKER PARTS

Table with 4 columns: Part No., Description, TYPE 10A4, LIST PRICE. Includes parts like Pot and Pole Piece Assembly, Pot Clamp, Terminal Strip Cover, etc.

ALIGNMENT PROCEDURE

Do not attempt to align the 11A Chassis without the proper equipment. Alignment condensers are shown in the accompanying illustrations and are numbered in order of procedure.

1. EQUIPMENT

- a—Test Oscillator.
b—Modulated oscillator capable of producing signals at 252 K.C., 600 K.C., 1400 K.C., 3700 K.C., 10 M.C. and 20 M.C.
c—Insulated screw driver with ball bevels or fibre) about 6" long.

2. DIAL SETTING.

- a—Turn dial knob until condensers are fully meshed.
b—The dial pointer should be on the horizontal line of the dial.

3. I. F. ALIGNMENT.

- a—Connect signal lead of test oscillator to grid of the 6A7.
b—Adjust trimmer Condenser in operation at 252 K.C.
c—Adjust trimmer Condenser in operation at 600 K.C.
d—Adjust trimmer Condenser in operation at 1400 K.C.
e—Adjust trimmer Condenser in operation at 3700 K.C.

4. 3700 K.C. ALIGNMENT.

- a—Connect signal lead of test oscillator through 200 Mmf. condenser to Antenna binding post.
b—Connect the test oscillator ground lead to the ground post of Chassis.
c—Turn range switch to range "C" and set dial pointer to 3700 K.C.
d—Align Set Oscillator or front trimmer A4, Fig. 4, on variable condenser. It may be necessary to approximate adjustment of the other trimmers on variable condenser to obtain sufficient sensitivity to make 3700 K.C. adjustment.

5. 1400 K.C. ALIGNMENT.

- a—Place test oscillator in operation at 1400 K.C.
b—Turn dial pointer to 1400 K.C.
c—Turn Range Switch to range D.
d—Adjust 1400 K.C. padding condenser, A7 of Chassis on the right hand side as you face it.
e—Adjust 1st Det. Trimmer A8, Fig. 4, which is the second from front on top of variable condenser.
f—Adjust Bi-selector, trimmer A9, Fig. 4, which is the third from front on top of variable condenser.
g—Adjust Antenna Trimmer A10, Fig. 4, which is the fourth from the front on top of variable condenser.

6. 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 A11, Fig. 4, which is on top of Chassis on right hand side from front as you face Chassis, 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.

7. 10 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 Range "g" and turn dial pointer to 10 M.C.
d—Place test oscillator in operation at 10 M.C.
e—Adjust set oscillator trimmer A12, Fig. 4, (located on front face of chassis).
f—Adjust detector trimmer A13, Fig. 4, (located on right hand side on top of Chassis section from front).
g—Adjust antenna trimmer A14, Fig. 4, (located on rear face of Chassis).
h—20 M.C. ALIGNMENT.
i—Set Range Switch on Range A.
j—Place Test Oscillator in operation at 20 M.C.
k—Turn Dial Pointer to 20 M.C.
l—Adjust Set Oscillator trimmer A15, Fig. 4, (located on top of Chassis on left of gang condenser, first from front).
m—Adjust Detector trimmer A16, Fig. 4, (located second from front on top of Chassis on left hand side).
n—Adjust Antenna trimmer A17, Fig. 4, (located third from front on top of Chassis on left hand side).

MODELS 1151, 1152,
1161, 1162
Chassis 11A (Type 2)

GENERAL HOUSEHOLD UTILITIES CO.

Chassis 11B
Schematic,
Voltage, Data

RESISTANCE VALUES ARE TAKEN FROM CHASSIS WITH 400 OHM PER VOLT SOCKET (TUBES IN SOCKETS)

RESISTANCE READINGS ARE TAKEN WITH RESISTANCE MEASURER (POWER COIL DISCONNECTED)

LINE VOLTAGE 115V BICYCLE P.C.

SUMMATING CONTROL: FULL ON POSITION - RANGE SWITCH ON 0

606 R.F.

6A7 131 DET

606 I.F.

85 2ND DET A.V.C. AUDIO

76 DRIVER

76 DRIVER

45 POWER OUTPUT

RESISTANCE TABLES:

NO. 1: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 2: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 3: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 4: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 5: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 6: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 7: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 8: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 9: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 10: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 11: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 12: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 13: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 14: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 15: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 16: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 17: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 18: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 19: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 20: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 21: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 22: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 23: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 24: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 25: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 26: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 27: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 28: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 29: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 30: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 31: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 32: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 33: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 34: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 35: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 36: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 37: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 38: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 39: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 40: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 41: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 42: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 43: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 44: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 45: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 46: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 47: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 48: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 49: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 50: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 51: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 52: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 53: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 54: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 55: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 56: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 57: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 58: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 59: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 60: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 61: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 62: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

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NO. 67: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 68: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 69: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 70: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 71: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 72: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 73: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 74: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 75: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 76: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 77: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 78: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 79: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 80: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 81: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 82: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 83: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 84: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 85: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 86: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 87: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 88: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 89: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 90: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 91: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 92: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 93: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 94: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 95: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

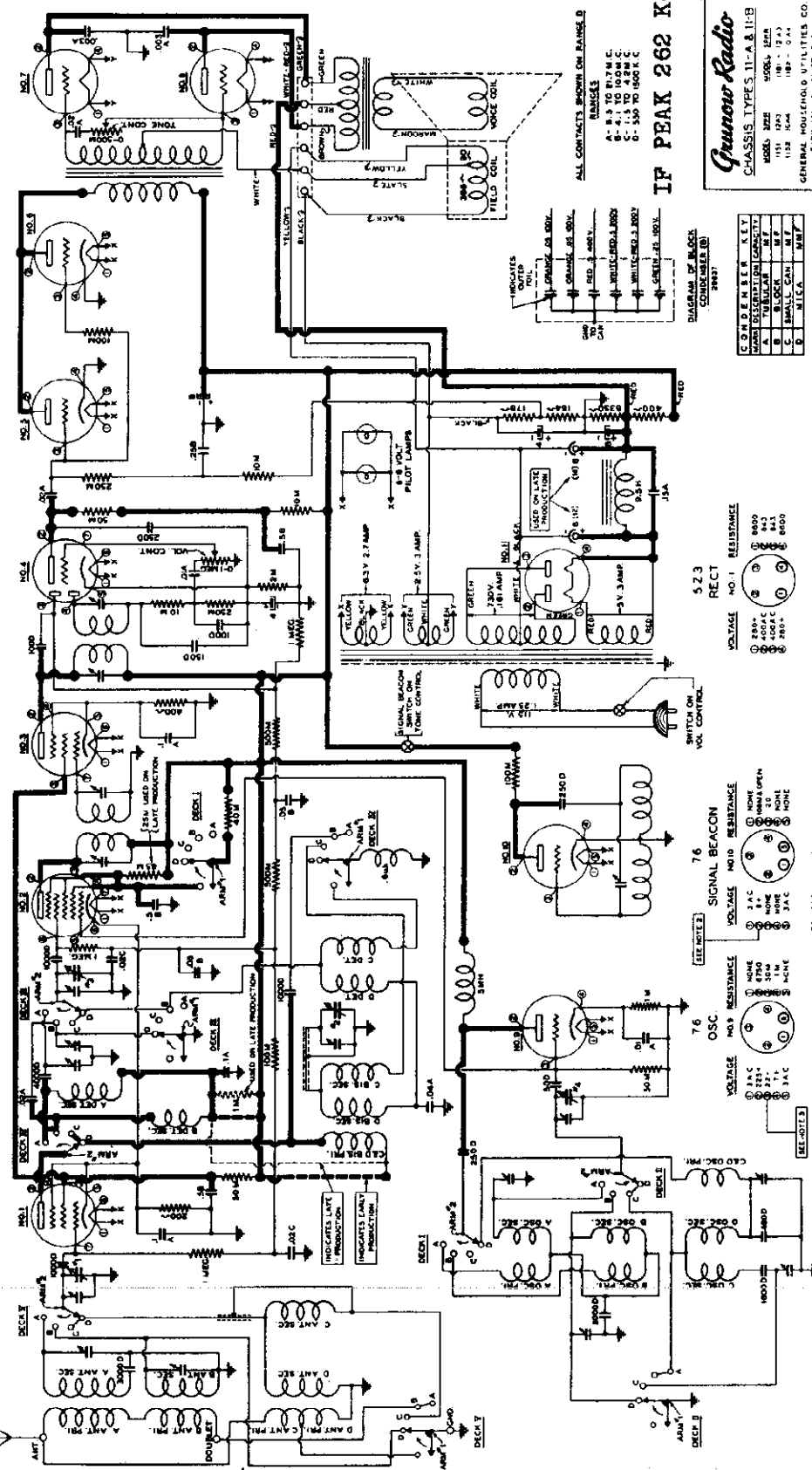
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NO. 97: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 98: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 99: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

NO. 100: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE



IF PEAK 262 KC

Grunow Radio
CHASSIS TYPES 11-A & 11-B
MODEL SIZE MODEL SIZE
115 1243 118 1243
116 1644 119 1644
GENERAL HOUSEHOLD UTILITIES CO.
CHICAGO U.S.A. RA523

DIAGRAM OF BLADES (SEE NOTE 1)

CODE	RES.	VAL.
A	1000	1000
B	1000	1000
C	1000	1000
D	1000	1000
E	1000	1000
F	1000	1000
G	1000	1000
H	1000	1000
I	1000	1000
J	1000	1000
K	1000	1000
L	1000	1000
M	1000	1000
N	1000	1000
O	1000	1000
P	1000	1000
Q	1000	1000
R	1000	1000
S	1000	1000
T	1000	1000
U	1000	1000
V	1000	1000
W	1000	1000
X	1000	1000
Y	1000	1000
Z	1000	1000

523 RECT

RESISTANCE TABLE:

NO. 1: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

76 SIGNAL BEACON

RESISTANCE TABLE:

NO. 1: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

76 OSC

RESISTANCE TABLE:

NO. 1: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

76 SIGNAL BEACON

RESISTANCE TABLE:

NO. 1: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

76 OSC

RESISTANCE TABLE:

NO. 1: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

76 SIGNAL BEACON

RESISTANCE TABLE:

NO. 1: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

76 OSC

RESISTANCE TABLE:

NO. 1: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

76 SIGNAL BEACON

RESISTANCE TABLE:

NO. 1: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

76 OSC

RESISTANCE TABLE:

NO. 1: 3AC, 2B5, 2B7, 2B8, 2B9, 2C, NONE

ALL TUBE SOCKETS ARE SHOWN AS VIEWED FROM UNDER-SIDE OF CHASSIS

REVISED FOR 11-B CHASSIS 9-1-35

MODELS 1151,1152
1161,1162
Chassis 11A,11B
Parts List

GENERAL HOUSEHOLD UTILITIES CO.

11-A & 11-B
TYPE 2

JANUARY 1935

**Supplement to
Service Notes and Parts List
31565-2**

Grunow Radio

CHASSIS TYPE 11-A AND 11-B

Receiver Model	Speaker Model
1151	12A3
1152	10A4
1161	12A3
1162	10A4

GENERAL HOUSEHOLD UTILITIES COMPANY

RADIO SERVICE DEPT.

CHICAGO, U. S. A.

31565-2 SUP.

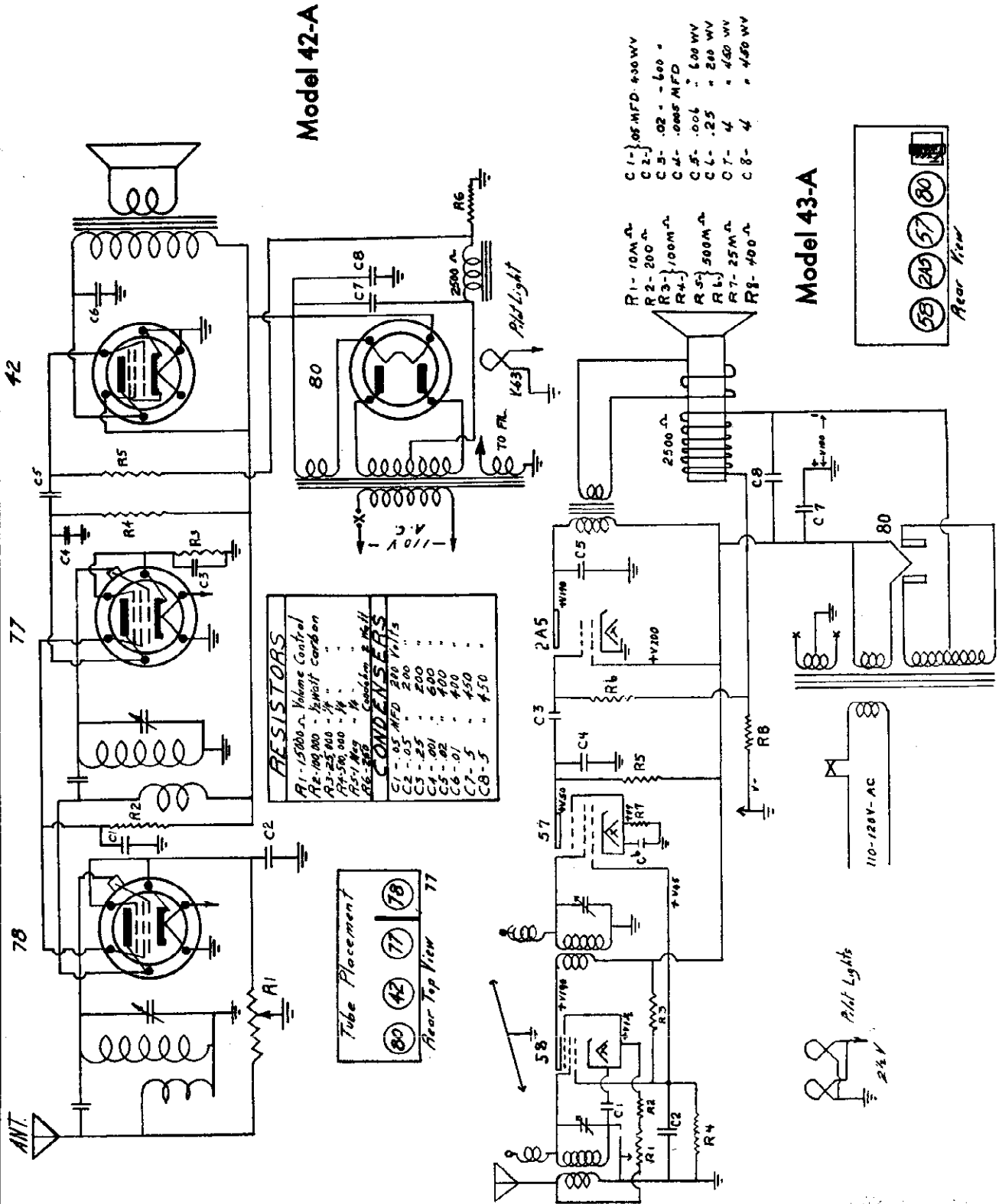
Chassis 11A —115 volt, 60 cycle	Chassis 11AZ { 110-135-220-250 volt 50-60 cycle
Chassis 11AW—115 volt, 50-60 cycle	
Chassis 11AX —115 volt, 25-50 cycle	Chassis 11BZ { 110-135-220-250 volt 50-60 cycle
Chassis 11B —115 volt, 50-60 cycle	
Power Consumption 145 watts.	Tubes: 1-6D6, 1-6A7, 1-6D6, 1-85, 4-76, 2-45, 1-5Z3

SUPPLEMENTARY PARTS USED ON LATE PRODUCTION OF CHASSIS 11A AND ALSO ON CHASSIS 11B

Part No.	Description	No. Used	List Price	Part No.	Description	No. Used	List Price
20705	25,000 Ohm Carbon Resistor 1 Watt	1	\$0.20	31726	Pinion Gear and Plate Assembly	1	\$0.55
24254	1,000 Mmf. Mica Condenser.	3	.20	31743	12 Mfd. 450 Volt Wet Elec. Condenser	1	1.35
29485	Drive Shaft Thrust Spring...	1	.05	31860	2,000 Ohm Carbon Resistor, ¼ Watt	1	.20
29621	Tone Control Knob.....	1	.20	31942	4-Gang Tuning Condenser...	1	7.50
29622	Range Switch Knob.....	1	.25	31945	Drive Drum and Gear Assembly	1	1.10
29623	Tuning or Volume Control Knob	2	.20	31947	Condenser Mounting Bracket	1	.75
31205	Electrolytic Insulator	1	.05	31962	Pointer—Large	1	.05
31360	Window Gasket	1	.02	32292	Dial Chart	1	.50
31483	02 Mfd. 500 Volt Tubular Condenser	1	.25	63325	Elec. Condenser Nut.....	2	.03
31629	16 Mfd. 350 Volt Wet Elec. Condenser	1	1.25	63578	Chassis Mounting Screw ...	4	.01
31723	Pointer and Pinion Assembly.	1	.40	63582	Chassis Shipping Screw	2	.01
				64334	Elec. Condenser Lockwasher	2	.01

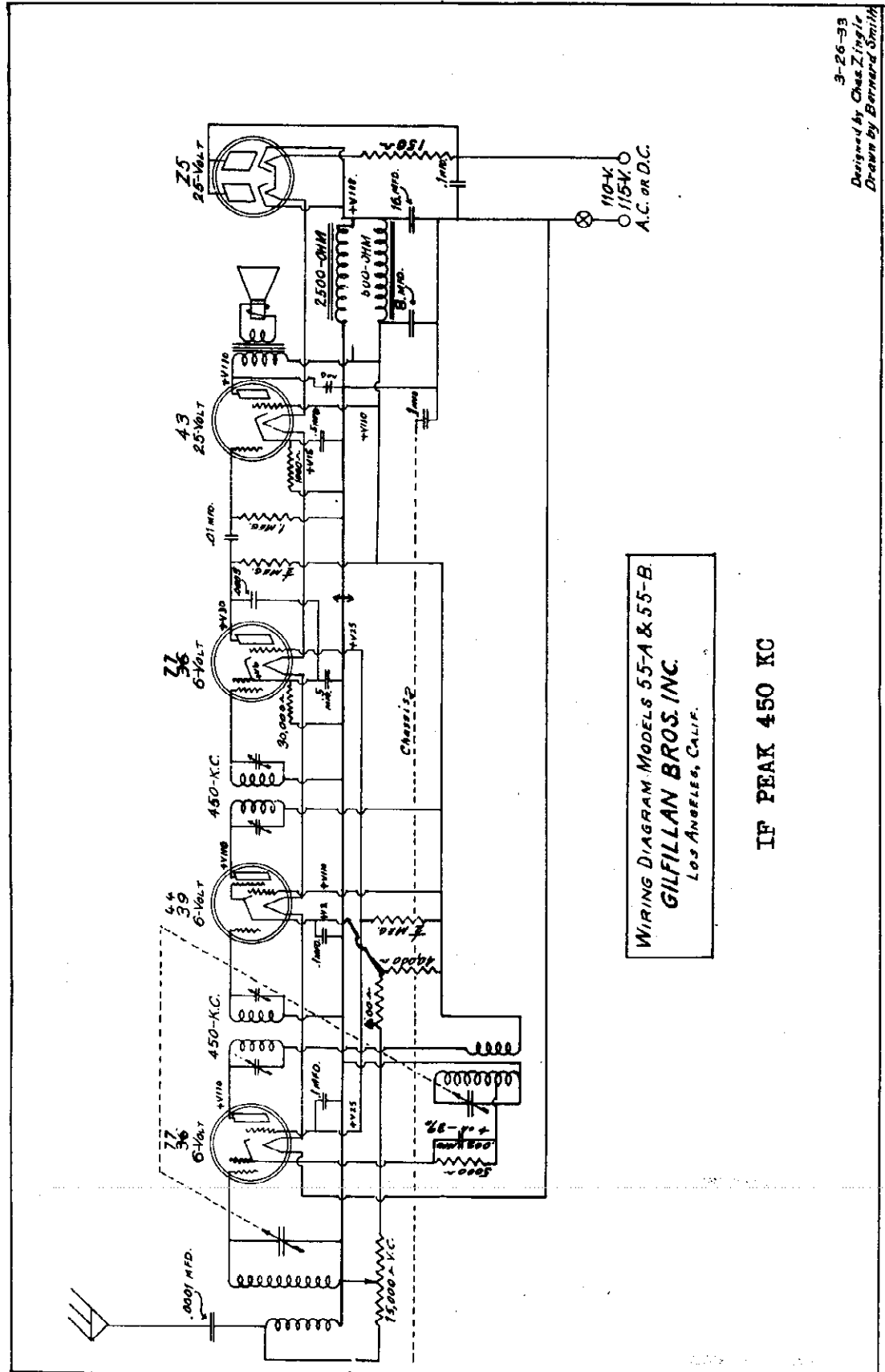
MODEL 42A
MODEL 43A
Schematic, Socket

GILFILLAN BROS., INC.



GILFILLAN BROS., INC.

MODELS 55A, 55B
Schematic



WIRING DIAGRAM MODELS 55-A & 55-B
GILFILLAN BROS. INC.
 LOS ANGELES, CALIF.

IF PEAK 450 KC

3-26-33
 Designed by Chas. Ziegler
 Drawn by Bernard Smith

MODEL 62B-X
 MODELS 63B, 63X
 Schematics
 Socket

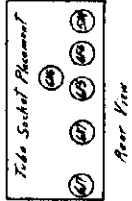
GILFILLAN BROS., INC.

Model 62 B-X

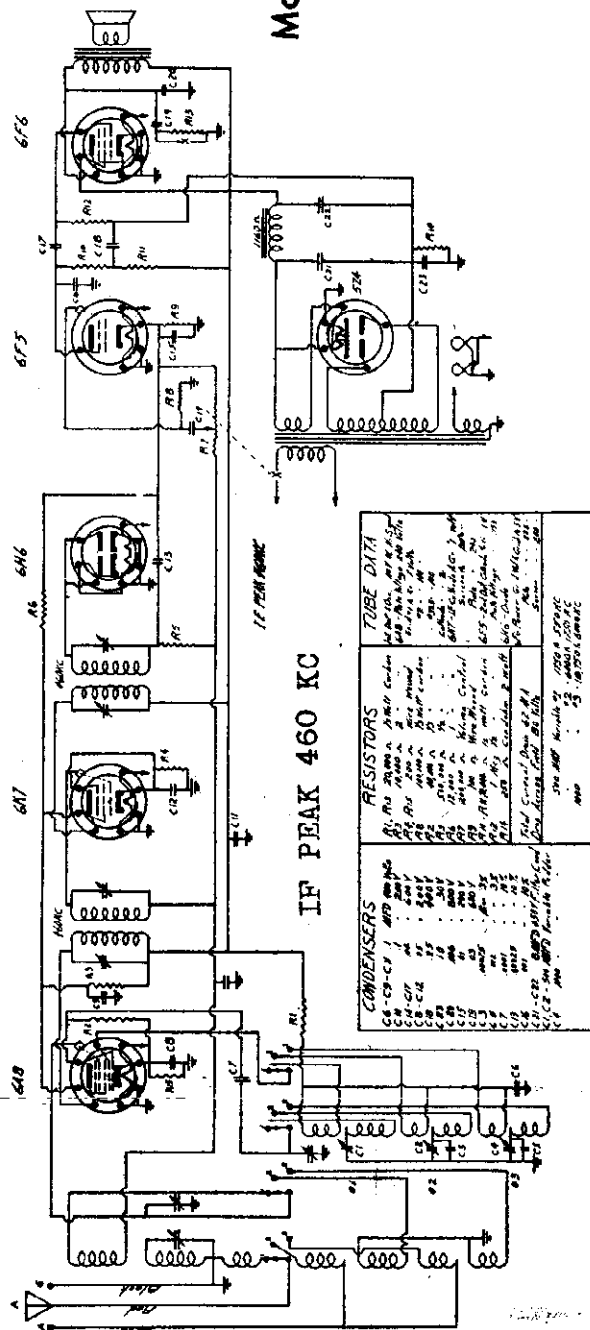
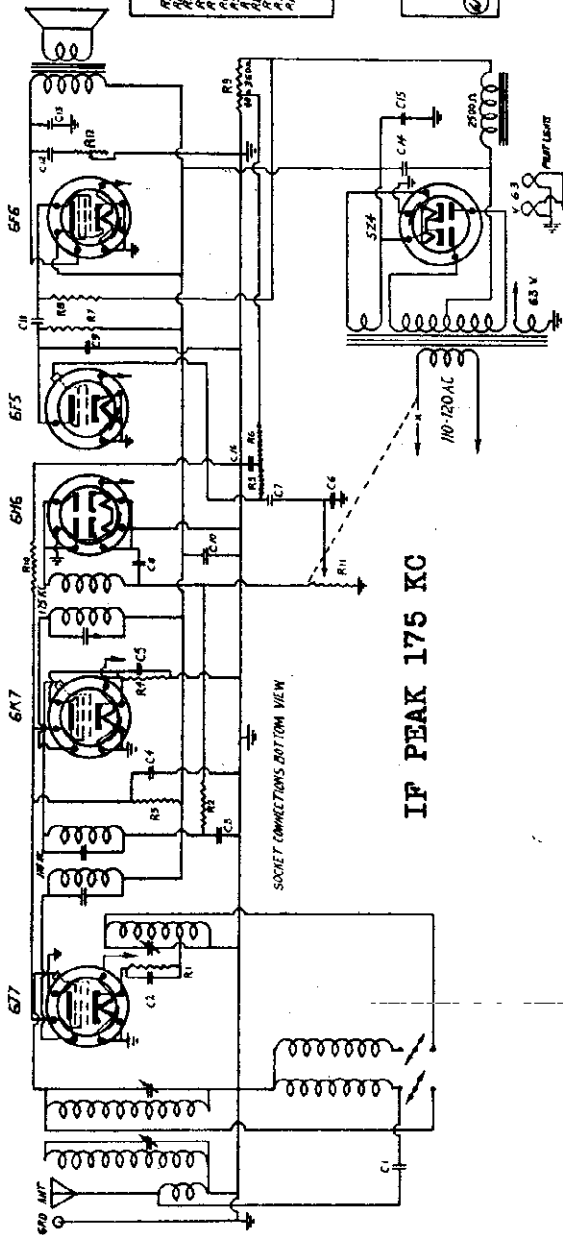
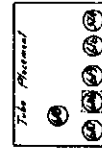
RESISTORS		CONDENSERS	
R1 5000 OHM	1/2 WATT CARBON	C1	100 PFD 150 WV TUBULAR
R2 5000	"	C2	100 PFD 150 WV TUBULAR
R3 5000	"	C3	100 PFD 150 WV TUBULAR
R4 5000	"	C4	100 PFD 150 WV TUBULAR
R5 5000	"	C5	100 PFD 150 WV TUBULAR
R6 5000	"	C6	100 PFD 150 WV TUBULAR
R7 5000	"	C7	100 PFD 150 WV TUBULAR
R8 5000	"	C8	100 PFD 150 WV TUBULAR
R9 5000	"	C9	100 PFD 150 WV TUBULAR
R10 5000	"	C10	100 PFD 150 WV TUBULAR
R11 5000	"	C11	100 PFD 150 WV TUBULAR
R12 5000	"	C12	100 PFD 150 WV TUBULAR
R13 5000	"	C13	100 PFD 150 WV TUBULAR
R14 5000	"	C14	100 PFD 150 WV TUBULAR
R15 5000	"	C15	100 PFD 150 WV TUBULAR
R16 5000	"	C16	100 PFD 150 WV TUBULAR
R17 5000	"	C17	100 PFD 150 WV TUBULAR
R18 5000	"	C18	100 PFD 150 WV TUBULAR
R19 5000	"	C19	100 PFD 150 WV TUBULAR
R20 5000	"	C20	100 PFD 150 WV TUBULAR
R21 5000	"	C21	100 PFD 150 WV TUBULAR
R22 5000	"	C22	100 PFD 150 WV TUBULAR
R23 5000	"	C23	100 PFD 150 WV TUBULAR
R24 5000	"	C24	100 PFD 150 WV TUBULAR
R25 5000	"	C25	100 PFD 150 WV TUBULAR
R26 5000	"	C26	100 PFD 150 WV TUBULAR
R27 5000	"	C27	100 PFD 150 WV TUBULAR
R28 5000	"	C28	100 PFD 150 WV TUBULAR
R29 5000	"	C29	100 PFD 150 WV TUBULAR
R30 5000	"	C30	100 PFD 150 WV TUBULAR
R31 5000	"	C31	100 PFD 150 WV TUBULAR
R32 5000	"	C32	100 PFD 150 WV TUBULAR
R33 5000	"	C33	100 PFD 150 WV TUBULAR
R34 5000	"	C34	100 PFD 150 WV TUBULAR
R35 5000	"	C35	100 PFD 150 WV TUBULAR
R36 5000	"	C36	100 PFD 150 WV TUBULAR
R37 5000	"	C37	100 PFD 150 WV TUBULAR
R38 5000	"	C38	100 PFD 150 WV TUBULAR
R39 5000	"	C39	100 PFD 150 WV TUBULAR
R40 5000	"	C40	100 PFD 150 WV TUBULAR
R41 5000	"	C41	100 PFD 150 WV TUBULAR
R42 5000	"	C42	100 PFD 150 WV TUBULAR
R43 5000	"	C43	100 PFD 150 WV TUBULAR
R44 5000	"	C44	100 PFD 150 WV TUBULAR
R45 5000	"	C45	100 PFD 150 WV TUBULAR
R46 5000	"	C46	100 PFD 150 WV TUBULAR
R47 5000	"	C47	100 PFD 150 WV TUBULAR
R48 5000	"	C48	100 PFD 150 WV TUBULAR
R49 5000	"	C49	100 PFD 150 WV TUBULAR
R50 5000	"	C50	100 PFD 150 WV TUBULAR

TUBE DATA (Cont'd)

TUBE No.	Power (W)	Grids	Screen	Control	Wave
6A7	1.5	3	1	1	AF
6B6	1.5	3	1	1	AF
6B7	1.5	3	1	1	AF
6B8	1.5	3	1	1	AF
6C7	1.5	3	1	1	AF
6D6	1.5	3	1	1	AF
6E6	1.5	3	1	1	AF
6F5	1.5	3	1	1	AF
6F6	1.5	3	1	1	AF
6G6	1.5	3	1	1	AF
6H6	1.5	3	1	1	AF
6I6	1.5	3	1	1	AF
6J6	1.5	3	1	1	AF
6K6	1.5	3	1	1	AF
6L6	1.5	3	1	1	AF
6M6	1.5	3	1	1	AF
6N6	1.5	3	1	1	AF
6O6	1.5	3	1	1	AF
6P6	1.5	3	1	1	AF
6Q6	1.5	3	1	1	AF
6R6	1.5	3	1	1	AF
6S6	1.5	3	1	1	AF
6T6	1.5	3	1	1	AF
6U6	1.5	3	1	1	AF
6V6	1.5	3	1	1	AF
6W6	1.5	3	1	1	AF
6X6	1.5	3	1	1	AF
6Y6	1.5	3	1	1	AF
6Z6	1.5	3	1	1	AF



Model 63B-63X (AC)



CONDENSERS		RESISTORS		TUBE DATA	
C1-C3	100 PFD 150 WV TUBULAR	R1-R50	5000 OHM 1/2 WATT CARBON	6A7	1.5 W 3G1 AF
C4-C6	100 PFD 150 WV TUBULAR	R51-R100	5000 OHM 1/2 WATT CARBON	6B6	1.5 W 3G1 AF
C7-C9	100 PFD 150 WV TUBULAR	R101-R150	5000 OHM 1/2 WATT CARBON	6B7	1.5 W 3G1 AF
C10-C12	100 PFD 150 WV TUBULAR	R151-R200	5000 OHM 1/2 WATT CARBON	6B8	1.5 W 3G1 AF
C13-C15	100 PFD 150 WV TUBULAR	R201-R250	5000 OHM 1/2 WATT CARBON	6C7	1.5 W 3G1 AF
C16-C18	100 PFD 150 WV TUBULAR	R251-R300	5000 OHM 1/2 WATT CARBON	6D6	1.5 W 3G1 AF
C19-C21	100 PFD 150 WV TUBULAR	R301-R350	5000 OHM 1/2 WATT CARBON	6E6	1.5 W 3G1 AF
C22-C24	100 PFD 150 WV TUBULAR	R351-R400	5000 OHM 1/2 WATT CARBON	6F5	1.5 W 3G1 AF
C25-C27	100 PFD 150 WV TUBULAR	R401-R450	5000 OHM 1/2 WATT CARBON	6F6	1.5 W 3G1 AF
C28-C30	100 PFD 150 WV TUBULAR	R451-R500	5000 OHM 1/2 WATT CARBON	6G6	1.5 W 3G1 AF
C31-C33	100 PFD 150 WV TUBULAR	R501-R550	5000 OHM 1/2 WATT CARBON	6H6	1.5 W 3G1 AF
C34-C36	100 PFD 150 WV TUBULAR	R551-R600	5000 OHM 1/2 WATT CARBON	6I6	1.5 W 3G1 AF
C37-C39	100 PFD 150 WV TUBULAR	R601-R650	5000 OHM 1/2 WATT CARBON	6J6	1.5 W 3G1 AF
C40-C42	100 PFD 150 WV TUBULAR	R651-R700	5000 OHM 1/2 WATT CARBON	6K6	1.5 W 3G1 AF
C43-C45	100 PFD 150 WV TUBULAR	R701-R750	5000 OHM 1/2 WATT CARBON	6L6	1.5 W 3G1 AF
C46-C48	100 PFD 150 WV TUBULAR	R751-R800	5000 OHM 1/2 WATT CARBON	6M6	1.5 W 3G1 AF
C49-C51	100 PFD 150 WV TUBULAR	R801-R850	5000 OHM 1/2 WATT CARBON	6N6	1.5 W 3G1 AF
C52-C54	100 PFD 150 WV TUBULAR	R851-R900	5000 OHM 1/2 WATT CARBON	6O6	1.5 W 3G1 AF
C55-C57	100 PFD 150 WV TUBULAR	R901-R950	5000 OHM 1/2 WATT CARBON	6P6	1.5 W 3G1 AF
C58-C60	100 PFD 150 WV TUBULAR	R951-R1000	5000 OHM 1/2 WATT CARBON	6Q6	1.5 W 3G1 AF

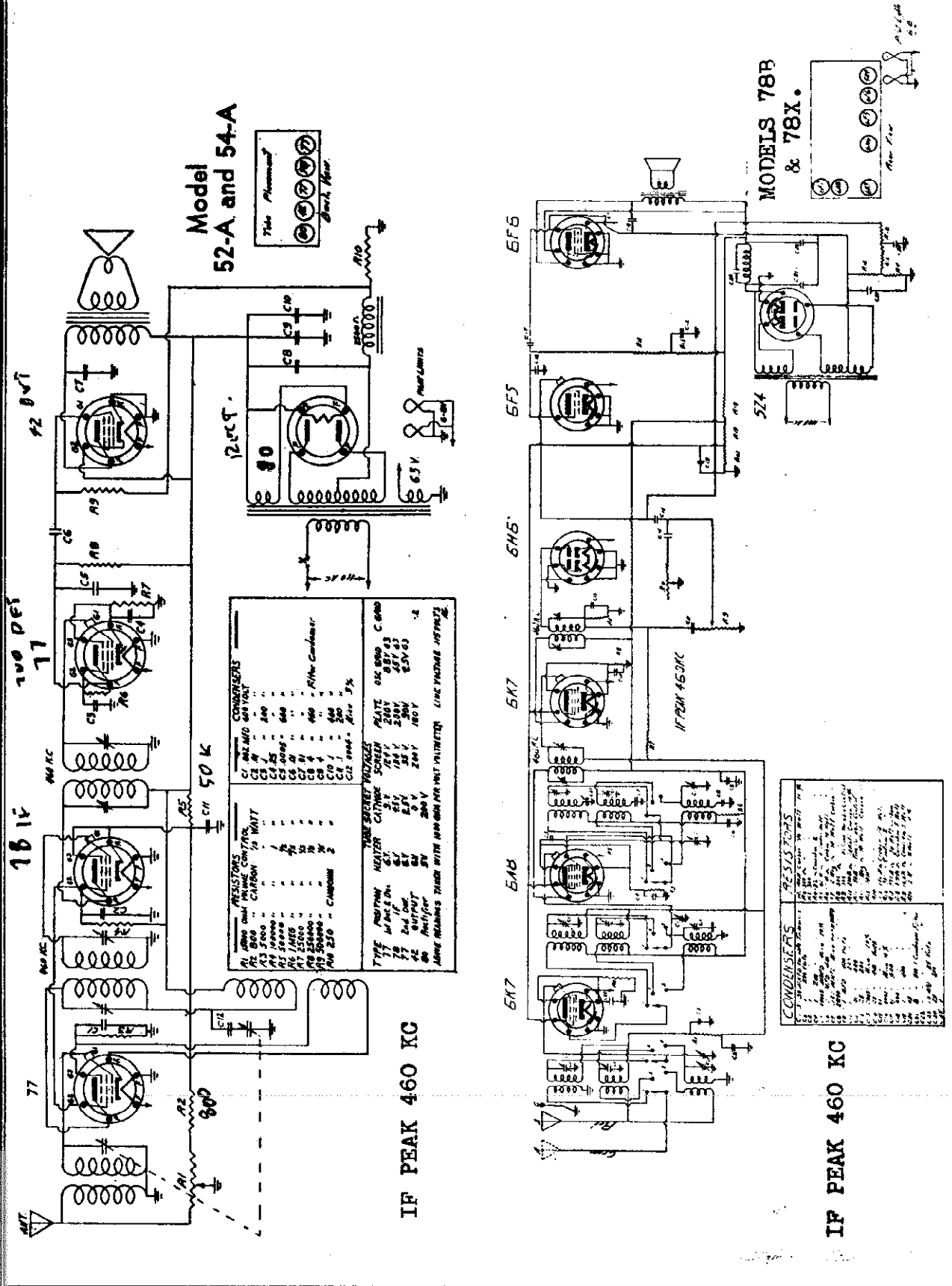
AERIAL and GROUND INSTRUCTIONS

If regular straight wire aerial is used connect green wire to aerial and red and white wires both to ground.
 For doublet antenna system connect white to short doublet lead and green to long doublet lead and red to ground.

MODELS 52A, 54A
MODELS 78B, 78X
Schematics, Socket

GILFILLAN BROS., INC.

15 DEC 56



Model 52-A and 54-A

MODELS 78B & 78X.

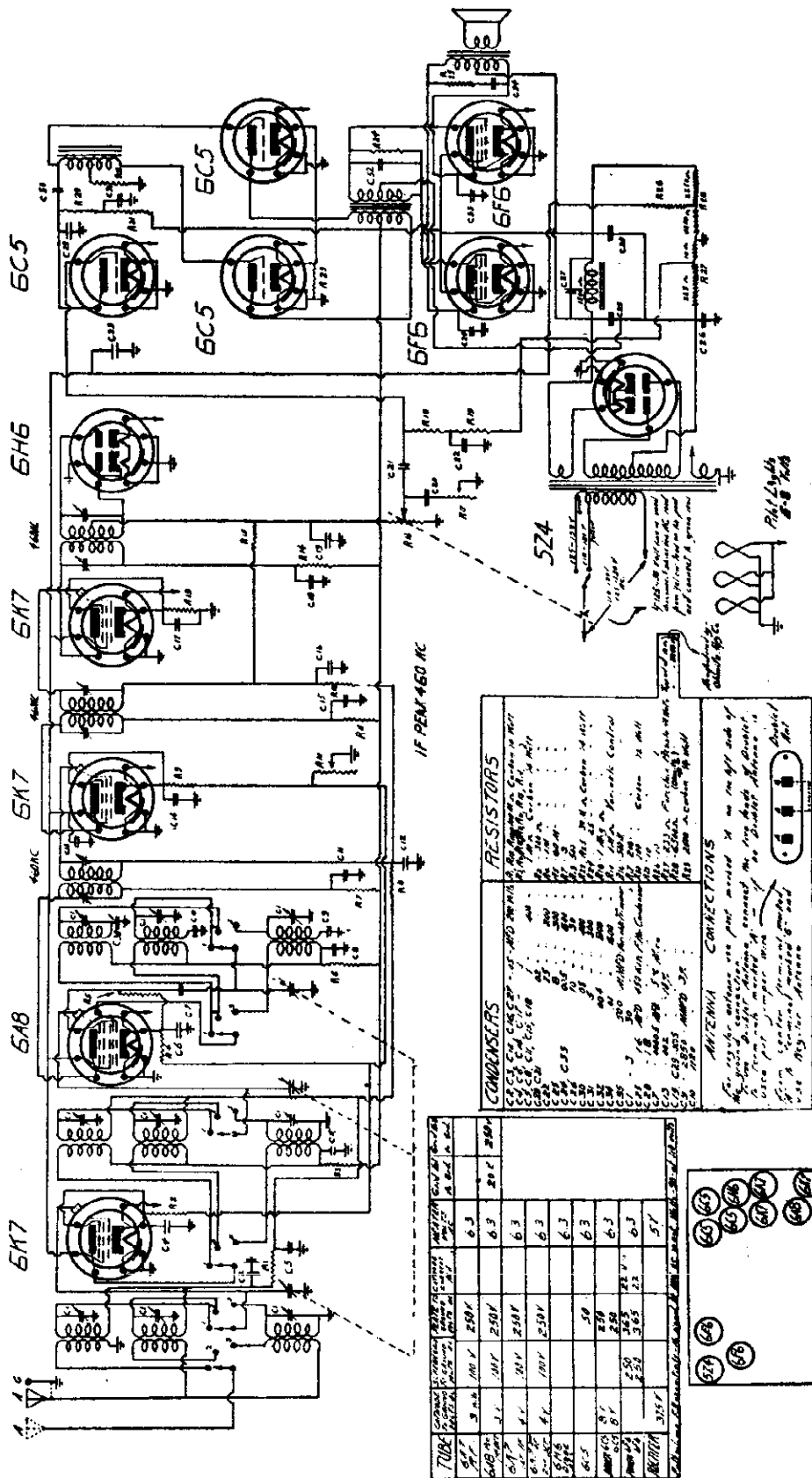
IF PEAK 460 KC

IF PEAK 460 KC

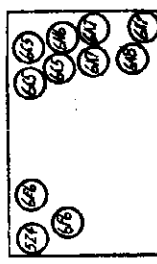
RESISTORS		TUBE SOCKET SOCKETS		CONDENSERS	
77	100 Ohm	6A7	HEATER	C1	400 MFD 450 VOLT
78	500 Ohm	6A5	CATHODE	C2	500 " "
79	1000 Ohm	6A5	SCREEN	C3	500 " "
80	5000 Ohm	6A5	GRID	C4	500 " "
81	10000 Ohm	6A5	CONTROL	C5	500 " "
82	50000 Ohm	6A5	PLATE	C6	500 " "
83	100000 Ohm	6A5	50V	C7	500 " "
84	200000 Ohm	6A5	250V	C8	500 " "
85	500000 Ohm	6A5	50V	C9	500 " "
86	1000000 Ohm	6A5	250V	C10	500 " "
87	2000000 Ohm	6A5	50V	C11	500 " "
88	5000000 Ohm	6A5	250V	C12	500 " "
89	10000000 Ohm	6A5	50V	C13	500 " "
90	20000000 Ohm	6A5	250V	C14	500 " "
91	50000000 Ohm	6A5	50V	C15	500 " "
92	100000000 Ohm	6A5	250V	C16	500 " "
93	200000000 Ohm	6A5	50V	C17	500 " "
94	500000000 Ohm	6A5	250V	C18	500 " "
95	1000000000 Ohm	6A5	50V	C19	500 " "
96	2000000000 Ohm	6A5	250V	C20	500 " "
97	5000000000 Ohm	6A5	50V	C21	500 " "
98	10000000000 Ohm	6A5	250V	C22	500 " "
99	20000000000 Ohm	6A5	50V	C23	500 " "
100	50000000000 Ohm	6A5	250V	C24	500 " "
101	100000000000 Ohm	6A5	50V	C25	500 " "
102	200000000000 Ohm	6A5	250V	C26	500 " "
103	500000000000 Ohm	6A5	50V	C27	500 " "
104	1000000000000 Ohm	6A5	250V	C28	500 " "
105	2000000000000 Ohm	6A5	50V	C29	500 " "
106	5000000000000 Ohm	6A5	250V	C30	500 " "
107	10000000000000 Ohm	6A5	50V	C31	500 " "
108	20000000000000 Ohm	6A5	250V	C32	500 " "
109	50000000000000 Ohm	6A5	50V	C33	500 " "
110	100000000000000 Ohm	6A5	250V	C34	500 " "
111	200000000000000 Ohm	6A5	50V	C35	500 " "
112	500000000000000 Ohm	6A5	250V	C36	500 " "
113	1000000000000000 Ohm	6A5	50V	C37	500 " "
114	2000000000000000 Ohm	6A5	250V	C38	500 " "
115	5000000000000000 Ohm	6A5	50V	C39	500 " "
116	10000000000000000 Ohm	6A5	250V	C40	500 " "
117	20000000000000000 Ohm	6A5	50V	C41	500 " "
118	50000000000000000 Ohm	6A5	250V	C42	500 " "
119	100000000000000000 Ohm	6A5	50V	C43	500 " "
120	200000000000000000 Ohm	6A5	250V	C44	500 " "
121	500000000000000000 Ohm	6A5	50V	C45	500 " "
122	1000000000000000000 Ohm	6A5	250V	C46	500 " "
123	2000000000000000000 Ohm	6A5	50V	C47	500 " "
124	5000000000000000000 Ohm	6A5	250V	C48	500 " "
125	10000000000000000000 Ohm	6A5	50V	C49	500 " "
126	20000000000000000000 Ohm	6A5	250V	C50	500 " "
127	50000000000000000000 Ohm	6A5	50V	C51	500 " "
128	100000000000000000000 Ohm	6A5	250V	C52	500 " "
129	200000000000000000000 Ohm	6A5	50V	C53	500 " "
130	500000000000000000000 Ohm	6A5	250V	C54	500 " "
131	1000000000000000000000 Ohm	6A5	50V	C55	500 " "
132	2000000000000000000000 Ohm	6A5	250V	C56	500 " "
133	5000000000000000000000 Ohm	6A5	50V	C57	500 " "
134	10000000000000000000000 Ohm	6A5	250V	C58	500 " "
135	20000000000000000000000 Ohm	6A5	50V	C59	500 " "
136	50000000000000000000000 Ohm	6A5	250V	C60	500 " "
137	100000000000000000000000 Ohm	6A5	50V	C61	500 " "
138	200000000000000000000000 Ohm	6A5	250V	C62	500 " "
139	500000000000000000000000 Ohm	6A5	50V	C63	500 " "
140	1000000000000000000000000 Ohm	6A5	250V	C64	500 " "
141	2000000000000000000000000 Ohm	6A5	50V	C65	500 " "
142	5000000000000000000000000 Ohm	6A5	250V	C66	500 " "
143	10000000000000000000000000 Ohm	6A5	50V	C67	500 " "
144	20000000000000000000000000 Ohm	6A5	250V	C68	500 " "
145	50000000000000000000000000 Ohm	6A5	50V	C69	500 " "
146	100000000000000000000000000 Ohm	6A5	250V	C70	500 " "
147	200000000000000000000000000 Ohm	6A5	50V	C71	500 " "
148	500000000000000000000000000 Ohm	6A5	250V	C72	500 " "
149	1000000000000000000000000000 Ohm	6A5	50V	C73	500 " "
150	2000000000000000000000000000 Ohm	6A5	250V	C74	500 " "
151	5000000000000000000000000000 Ohm	6A5	50V	C75	500 " "
152	10000000000000000000000000000 Ohm	6A5	250V	C76	500 " "
153	20000000000000000000000000000 Ohm	6A5	50V	C77	500 " "
154	50000000000000000000000000000 Ohm	6A5	250V	C78	500 " "
155	100000000000000000000000000000 Ohm	6A5	50V	C79	500 " "
156	200000000000000000000000000000 Ohm	6A5	250V	C80	500 " "
157	500000000000000000000000000000 Ohm	6A5	50V	C81	500 " "
158	1000000000000000000000000000000 Ohm	6A5	250V	C82	500 " "
159	2000000000000000000000000000000 Ohm	6A5	50V	C83	500 " "
160	5000000000000000000000000000000 Ohm	6A5	250V	C84	500 " "
161	10000000000000000000000000000000 Ohm	6A5	50V	C85	500 " "
162	20000000000000000000000000000000 Ohm	6A5	250V	C86	500 " "
163	50000000000000000000000000000000 Ohm	6A5	50V	C87	500 " "
164	100000000000000000000000000000000 Ohm	6A5	250V	C88	500 " "
165	200000000000000000000000000000000 Ohm	6A5	50V	C89	500 " "
166	500000000000000000000000000000000 Ohm	6A5	250V	C90	500 " "
167	1000000000000000000000000000000000 Ohm	6A5	50V	C91	500 " "
168	2000000000000000000000000000000000 Ohm	6A5	250V	C92	500 " "
169	5000000000000000000000000000000000 Ohm	6A5	50V	C93	500 " "
170	10000000000000000000000000000000000 Ohm	6A5	250V	C94	500 " "
171	20000000000000000000000000000000000 Ohm	6A5	50V	C95	500 " "
172	50000000000000000000000000000000000 Ohm	6A5	250V	C96	500 " "
173	100000000000000000000000000000000000 Ohm	6A5	50V	C97	500 " "
174	200000000000000000000000000000000000 Ohm	6A5	250V	C98	500 " "
175	500000000000000000000000000000000000 Ohm	6A5	50V	C99	500 " "
176	1000000000000000000000000000000000000 Ohm	6A5	250V	C100	500 " "

MODELS 116B, 116X
 MODELS 117B, 117X
 Schematic, Socket
 Voltage

GILFILLAN BROS., INC.
 Models 116B-116X & 117B-117X (AC)

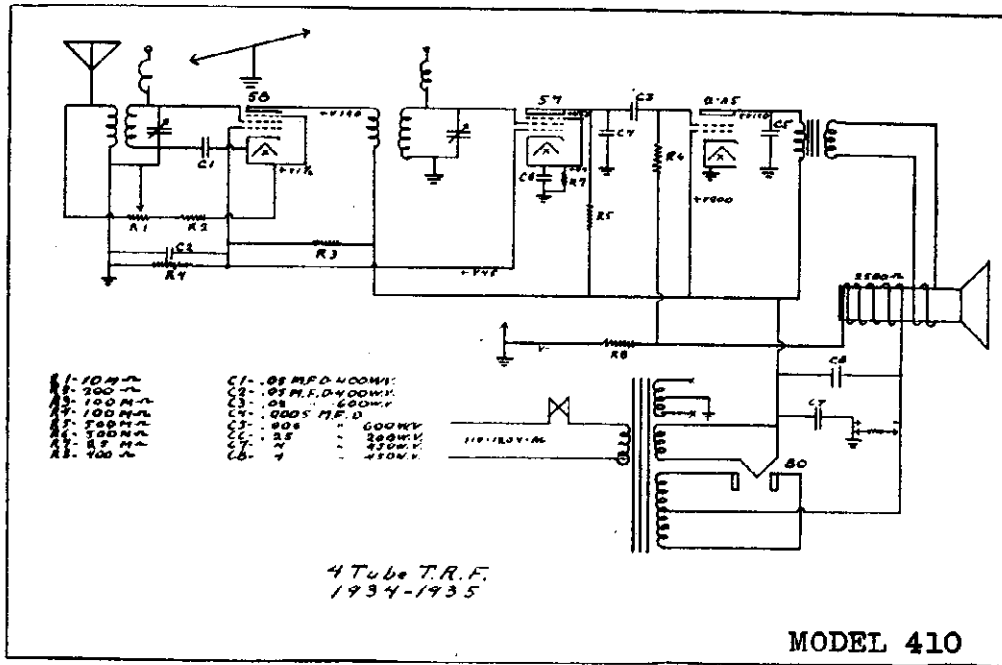


TUBE	SOCKET	RESISTORS	CAPACITORS	ANTENNA CONNECTIONS
5Y4	9	200K, 100K, 50K, 25K, 10K, 5K, 2.5K, 1.5K, 1K, 500, 250, 100, 50, 25, 10, 5, 2.5, 1, 500, 250, 100, 50, 25, 10, 5, 2.5, 1	0.001, 0.002, 0.005, 0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 50, 100, 200, 500, 1000, 2000, 5000, 10000, 20000, 50000, 100000, 200000, 500000, 1000000	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

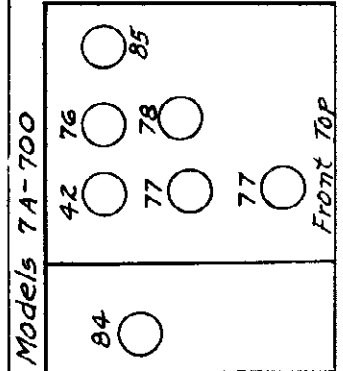
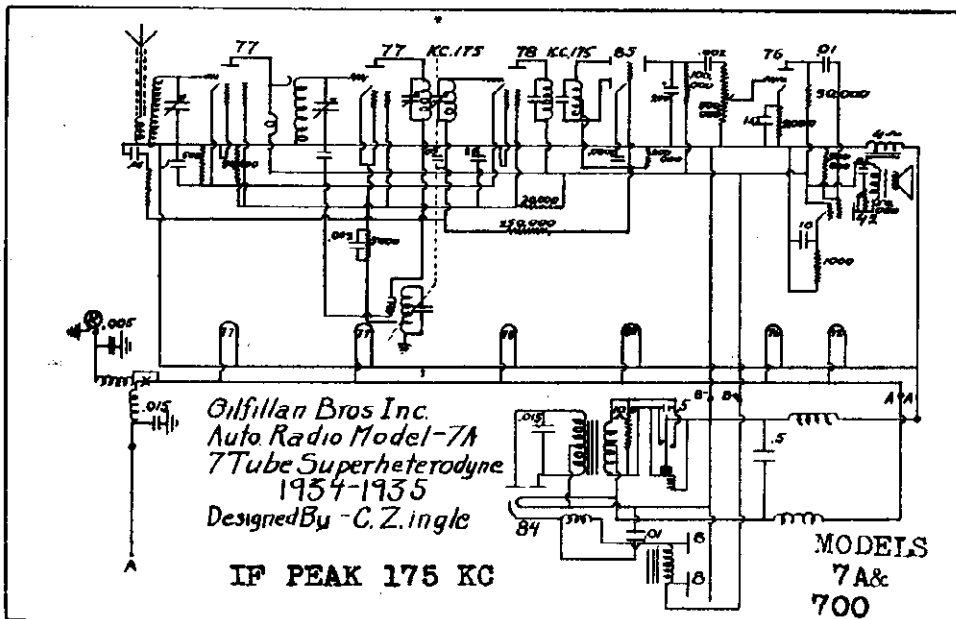
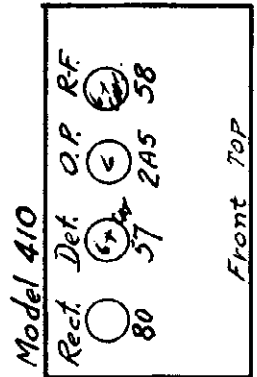


GILFILLAN BROS., INC.

MODELS 7A, 700
 MODEL 410
 Schematics
 Socket



MODEL 410



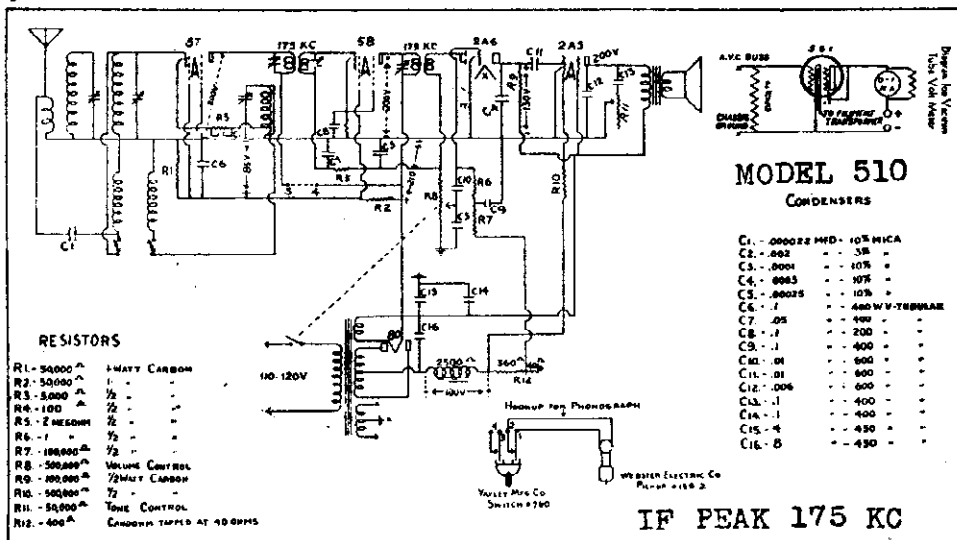
Locate convenient space under automobile dash for mounting of chassis and speaker. Triangle chassis mounting plate will serve as template for the drilling of the necessary holes. Bolt in the plate, then hook chassis on to plate and fasten with thumb screw. Drill hole for speaker and fasten up with nut. Install remote control to steering post or convenient position on dash and connect drives to set. Connect "A" lead to 'Hot side' of generator or to + battery lead. Other small lead goes to pilot lamp in remote control head and heavy shielded lead to aerial.

Install spark plug suppressors and cut-outs if needed.

To set dial pointer, spin drive knob to right until it can go no further and then turn back to left as far as possible. Pointer will then be set in exact calibration to condenser gang.

MODELS 510, 520
Schematic, Socket
Alignment, Data

GILFILLAN BROS., INC.



SERVICE DATA, FIVE TUBE SUPER-HETERODYNE, 1934-1935

All models have automatic volume control of the diode type, controlling the first detector as well as the high frequency amplifier tubes. This A.V.C. makes it impossible to service and rebalance without a meter of the type to be described. This meter will work on any make or type of A.V.C., provided care is used. It can not be damaged by improper connection of the leads.

PARTS REQUIRED FOR VACUUM TUBE VOLT METER

- 1—O to 1 or O to 1.5 milliammeter.
- 1—Bell ringing transformer with secondary of 6-10 volts.
- 1—3 prong socket.
- 1—551 tube.
- 1—2 megohm grid leak.
- 1—10 ohm rheostat.
- 1—45 volt B battery.
- Clips, Box, Cord, Hookup Wire.

USING VACUUM TUBE VOLT METER

The cathode clip is connected to the cathodes of the tubes controlled by the A.V.C. The buss clip is connected to the A.V.C. buss in front of the isolating resistor. Adjust rheostat shunt until meter shows full scale reading. All balancing is done with maximum peak indicated by the meter swing toward O. Sensitivity of various receivers can be checked by the swing of meter from a known station. Short Wave fading can be seen by tuning in the station with meter connected to set.

REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

Connect a 175 K.C. oscillator to the first detector grid (No. 57 tube) leaving grid cap in place. Set dial at 1400 K.C. Hook up vacuum tube volt meter as described and carefully adjust 3 screws on top of Intermediates for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

Set dial at 1400 K.C. when gang is at minimum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section of gang until frequency is correct on dial.

If the intermediates are balanced on 175 K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

Don't bend any condenser plates unless absolutely necessary.

OVERLOADING—OR POOR QUALITY AT LOW VOLUME

The chief cause of this trouble is too long an antenna. A powerful local station will cause the H. F. tubes to block. Check this by disconnecting the antenna on the station causing the trouble. If too close to a powerful station, installing a switch in the aerial circuit helps this. In rare cases the set seems to overload and the A.V.C. works too quickly on all stations.

Check the following:

Disconnect 2 meg. resistor from A.V.C. buss at tie point. Have all tubes cold. Use high voltage, high resistance ohmmeter capable of reading 25 megohms and test from ground to A.V.C. buss for leakage. After condensers have charged, no leakage should be shown. This must read around 100 megohms to ground.

If slight leakage is observed, disconnect bypass condensers from buss until defective one is found. Sometimes moisture is found on coil terminals. Scrape this clear.

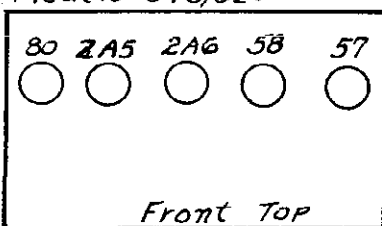
NOISY OPERATION (Not Static)

A defective tube will cause a sharp 60 cycle R.F. pickup. This is most prominent on low frequency. Replace with a good tube.

In many cases it is found that the noise cannot be eliminated by servicing the receiver. Noise may enter into the light lines or via the antenna. The only way to check the source is to turn off one after another all electrical apparatus in the vicinity of the set.

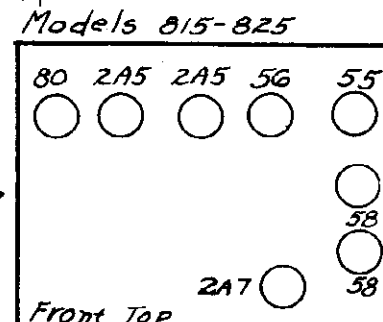
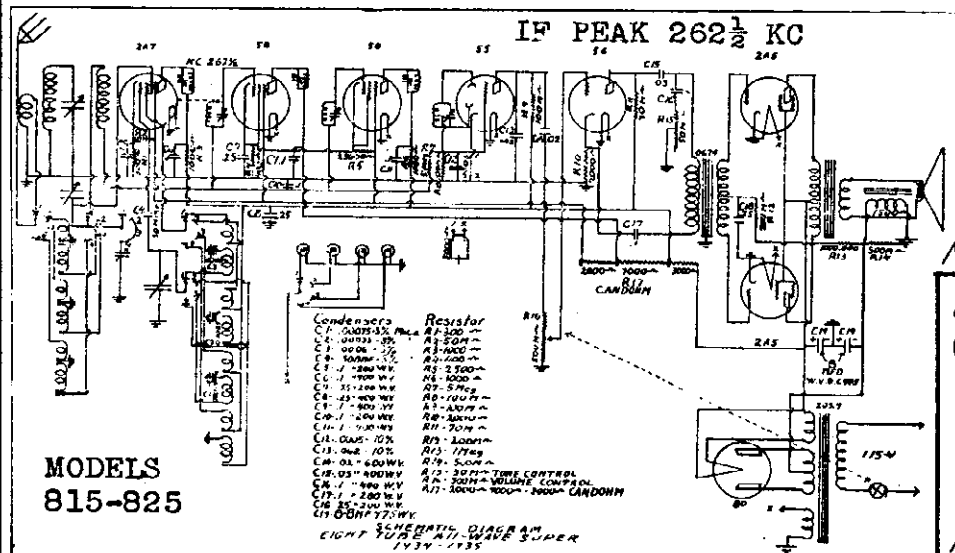
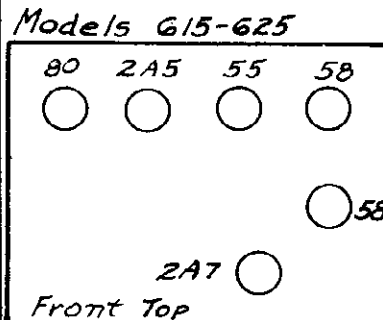
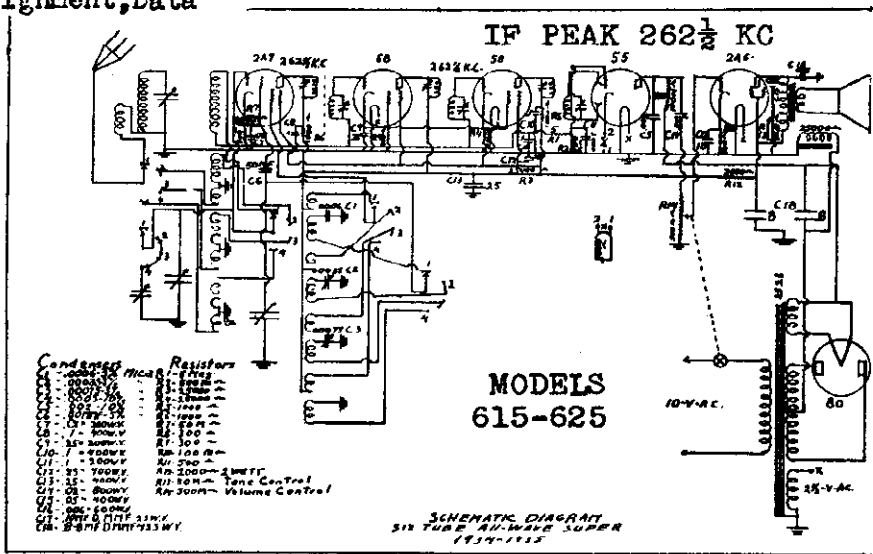
There is no freak or trick antenna that will eliminate natural static.

Models 510, 520



MODELS 615,625
 MODELS 815,825
 Schematics, Socket
 Alignment, Data

GILFILLAN BROS., INC.



USING VACUUM TUBE VOLT METER
 The cathode clip is connected to the cathodes of the tubes controlled by the A.V.C. The buss clip is connected to the A.V.C. buss in front of the isolating resistor. Adjust rheostat shunt until meter shows full scale reading. All balancing is done with maximum peak indicated by the meter swing toward O. Sensitivity of various receivers can be checked by the swing of meter from a known station. Short Wave fading can be seen by tuning in the station with meter connected to set.

REBALANCING
 Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES
 Connect a 262 1/2 K. C. oscillator to the first detector grid (No. 2-A 7 tube) leaving grid cap in place. Set dial at 1400 K.C. Hook up vacuum tube meter as described and carefully adjust 3 screws on top of Intermediates for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG
 Set dial at 1400 K.C. when gang is at minimum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section of gang until frequency is correct on dial.

If the intermediates are balanced on 262 1/2 K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers. Don't bend any condenser plates unless absolutely necessary.

OVERLOADING—OR POOR QUALITY AT LOW VOLUME
 The chief cause of this trouble is too long an antenna. A powerful local station will cause the R. F. tubes to block. Check this by disconnecting the antenna on the station causing the trouble. If too close to a powerful station, installing a switch in the aerial circuit helps this. In rare cases the set seems to overload and the A.V.C. works too quickly on all stations. Check the following:

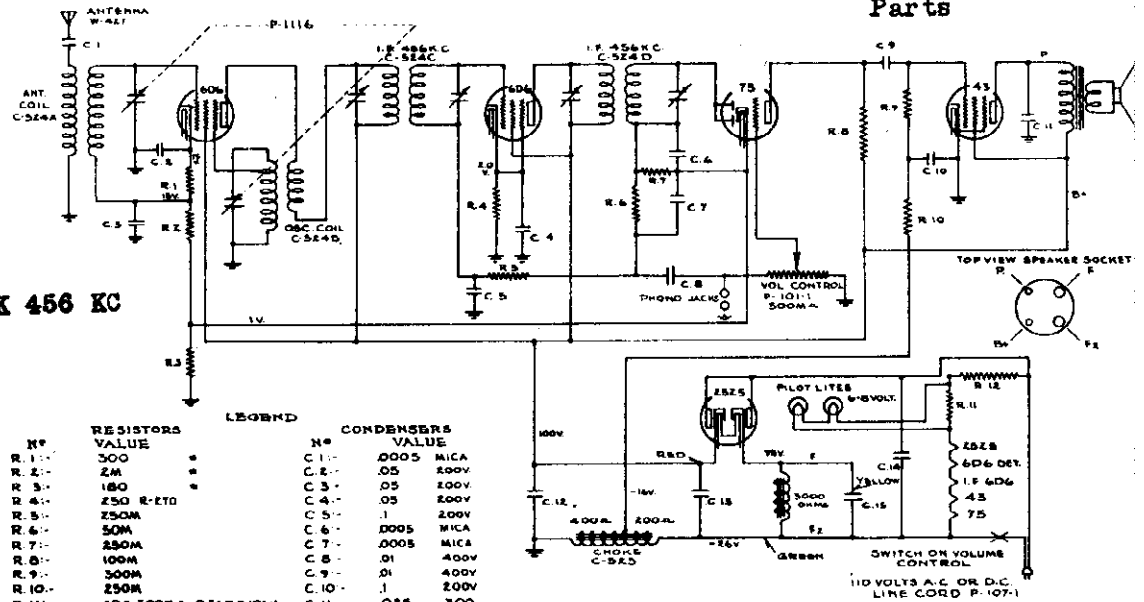
Disconnect 2 meg. resistor from A.V.C. buss at tie point. Have all tubes cold. Use high voltage, high resistance ohmmeter capable of reading 25 megohms and test from ground to A.V.C. buss for leakage. After condensers have charged, no leakage should be shown. This must read around 100 megohms to ground.

If slight leakage is observed, disconnect bypass condensers from buss until defective one is found. Sometimes moisture is found on coil terminals. Scrape this clear.

GOODYEAR SERVICE

MODEL 540
Schematic, Voltage
Socket, Alignment
Parts

IF PEAK 456 KC



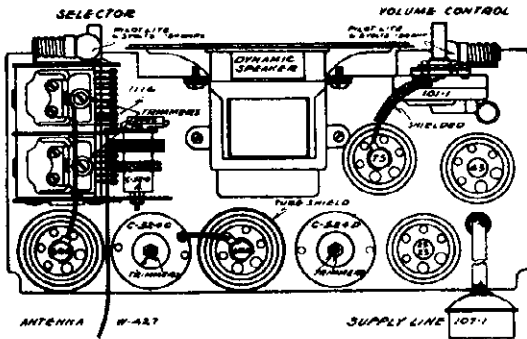
RESISTORS

Nº	VALUE
R. 1-	300
R. 2-	2M
R. 3-	180
R. 4-	250 R-ETO
R. 5-	250M
R. 6-	50M
R. 7-	250M
R. 8-	100M
R. 9-	300M
R. 10-	250M
R. 11-	40Ω 300MA. 0.5W P-106-1
R. 12-	1Ω IN CORDNOT-1

CONDENSERS

Nº	VALUE
C. 1-	.0005 MICA
C. 2-	.05 200V
C. 3-	.05 200V
C. 4-	.05 200V
C. 5-	.1 200V
C. 6-	.0005 MICA
C. 7-	.0005 MICA
C. 8-	.01 400V
C. 9-	.01 400V
C. 10-	.1 200V
C. 11-	.025 300
C. 12-	5.0MFD C-525D
C. 13-	25.0MFD *
C. 14-	.1 400V
C. 15-	5.0MFD *

* R. 1, R. 2 & R. 3 IN ONE UNIT PART NUMBER R-268.
* C. 13 AND C. 15 IN ONE UNIT PART NUMBER C-525-C
NUMBERS PREFIXED BY LETTERS ARE PARTS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS
GROUND. VOLUME CONTROL ON FULL MEASURED ON
A. C. CURRENT.



Part No.	Description	Part No.	Description
		C-524B	Oscillator Coil
101-1	Volume Control with Switch	C-524C	Input I.F. Transformer
106-1	40 Ohm Resistor-10%	C-524D	Output I.F. Transformer
107-1	126 Ohm Special Cord and Plug	C-525C	5-25 Mfd. Electrolytic Condenser
C-523	600 Ohm Choke	C-525D	5 Mfd. Electrolytic Condenser
C-524A	Antenna Coil	R-268	2480 Ohm Resistor
		R-270	250 Ohm Wire Wound Resistor

SERVICE NOTES

Should it be at any time necessary to rebalance this set, the correct procedure is as follows:

1. Volume control on full during all alignment.
2. Variable condenser in minimum capacity position, plates open, at start of all aligning.

I.F. ALIGNMENT

1. To peak I.F. transformers, connect oscillator set at 456 kilocycles to the grid of the 6D6 tube directly in back of the variable condenser and adjust the trimming condensers of the I.F. transformers to resonance (Maximum deflection on an output meter connected across the primary of the speaker input transformer).

Each I.F. trimmer has two adjustments, one nut and one screw, both of which are adjustable from the top.

BROADCAST BAND ALIGNMENT

1. Disconnect antenna wire and connect oscillator in series with a 75 mfd. condenser to the antenna coil. With the variable condenser set at its minimum capacity position, at the extreme right of its rotation, and with an oscillator output adjusted to 1720 kilocycles, adjust trimmer of oscillator section of variable condenser (rear section) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer). Next adjust the trimmer condenser of the front section of the variable condenser to resonance.
2. Check alignment at 1400-1200-1000-800-600-530 kilocycles, bending the slotted plates of the front section of the variable condenser only if absolutely necessary.

MODEL 575

Schematic, Voltage
Socket, Trimmers
Alignment

GOODYEAR SERVICE

Service Notes

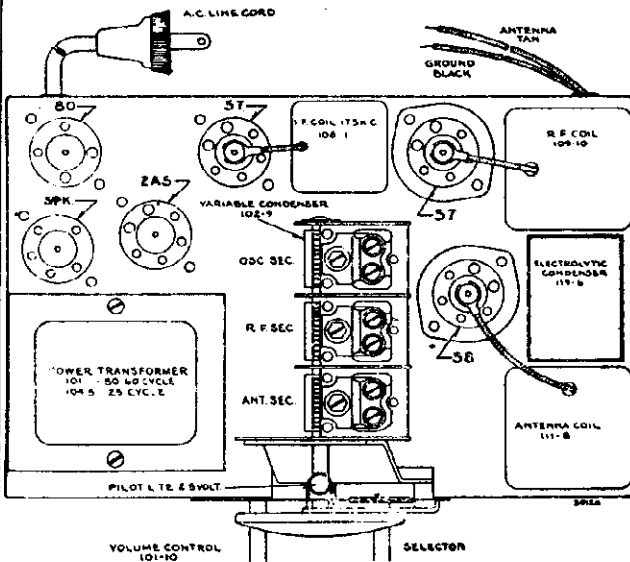
Voltages taken from different points of circuit to chassis are measured with volume control full on, using a voltmeter having a resistance of 1000 ohms per volt. These voltages are indicated on the schematic circuit diagram.

Part No. 145-2

- Common Black to Brown —.003 x 600 Volts
- Common Black to Green —.1 x 200 Volts
- Common Black to Red —.1 x 200 Volts
- Common Black to Orange —.25 x 200 Volts
- Blue to Blue —.05 x 400 Volts

Part No. 145-3

- Common Black to Brown —.1 x 200 Volts
- Common Black to Green —.05 x 200 Volts
- Common Black to Orange —.05 x 200 Volts
- Common Black to Yellow —.05 x 200 Volts



Aligning I. F. Transformer

1. With volume control full on, at extreme right of its rotation, and with variable condenser at its maximum capacity position (extreme right of its rotation) make the following adjustments:

- (a) Connect an external oscillator adjusted to 175 kilocycles, in series with a .1 mfd. condenser, to the control grid cap of the type 57 tube located between the R. F. coil (part numbers 109-10) and the I. F. transformer (part number 108-11) and chassis.
- (b) Adjust trimmer condensers of I. F. transformer (part number 108-11) to resonance. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or between the plate and screen terminals of the type 2A5 tube, by means of an adapter. Maximum deflection of the meter indicates resonance. Care must be taken to use only enough signal to give a readily readable output, as excessive input will result in overload and a false resonance point.

NOTE: The two trimmer condensers which tune the primary and secondary of the I. F. transformer are adjusted by set screws accessible from the back of the chassis.

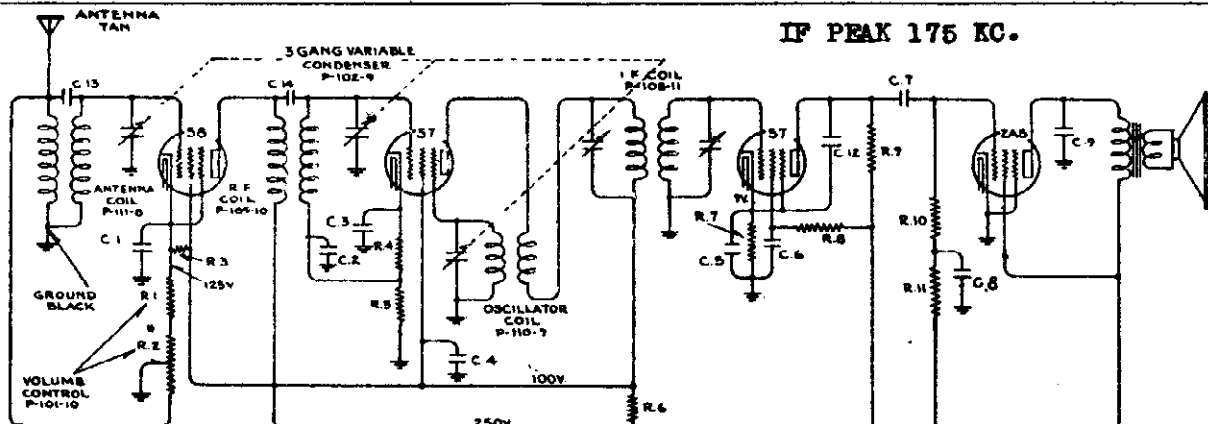
Aligning R. F. and Oscillator Circuits

1. Connect the external oscillator set at 1720 kilocycles and in series with a 200 Mfd. condenser, between the antenna (tan) and ground (black) leads.

- (a) With volume control full on and variable condenser plates in minimum capacity position, plates entirely out of mesh (extreme left of its rotation), adjust trimmer of rear oscillator section of variable condenser to resonance.
- (b) Shift external oscillator frequency from 1720 to 1400 kilocycles, pick up signal by rotating variable condenser and peak R. F. (center) and antenna (front) section trimmers of variable condenser to resonance.
- (c) Check tracking at 1500, 1200, 1000, 800, 600 and 530 kilocycles by changing external oscillator frequency and rotating variable condenser to pick up signal. Adjust slotted end plates of R. F. (center) and antenna (front) sections to increase output, if necessary. DO NOT BEND OSCILLATOR PLATES.

IF PEAK 175 KC.

8-1-34



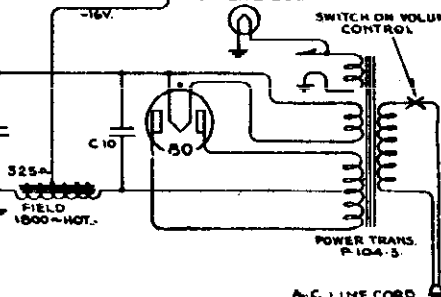
CONDENSERS

Nº	VALUE
C1	.05X200V
C2	.05X200V
C3	.05X200V
C4	.1X200V
C5	.25X200V
C6	.1X200V
C7	.05X200V
C8	.1X200V
C9	.003X600V
C10	.80MFDX400V
C11	.80MFDX400V
C12	.001 MICA
C13	.10MFD GIMMICK
C14	.4MFD GIMMICK

RESISTORS

Nº	VALUE
R1	100
R2	75M
R3	50M 1/2W
R4	450
R5	5M
R6	19M
R7	50M 1/2W
R8	1MEG 1/2W
R9	250M 1/2W
R10	200M 1/2W
R11	300M 1/2W

NOTE: CONDENSERS C10, C11, IN ONE UNIT P-119-6. CONDENSERS C1, C2, C3, C4 IN ONE UNIT P-145-3. RESISTORS R4, R5, IN ONE UNIT P-108-10. NUMBERS PREFIXED BY LETTER 'P' ARE PART NUMBERS. PHRASE GIMMICK IS A WIRE WOUND AROUND ANOTHER WIRE. VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL. CONDENSERS C5, C6, C7, C8, C9 IN ONE UNIT P-145-2.

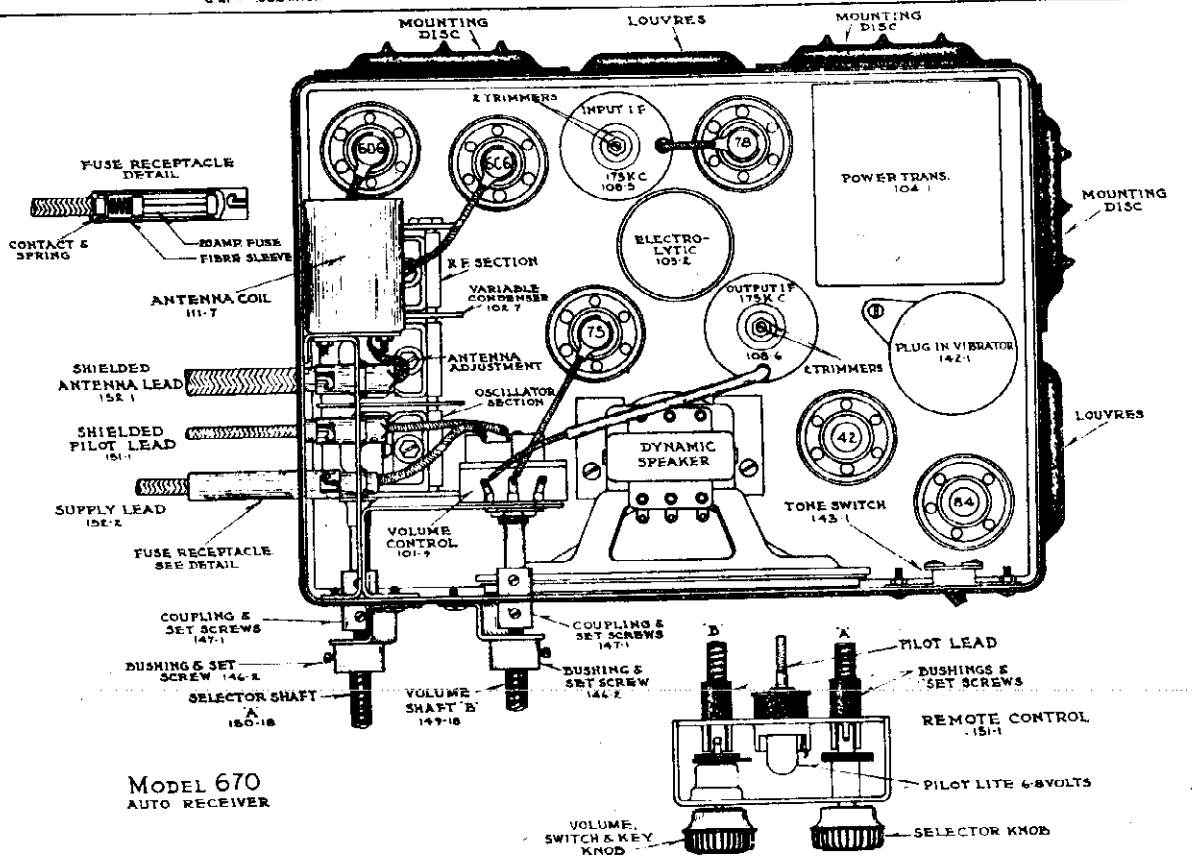
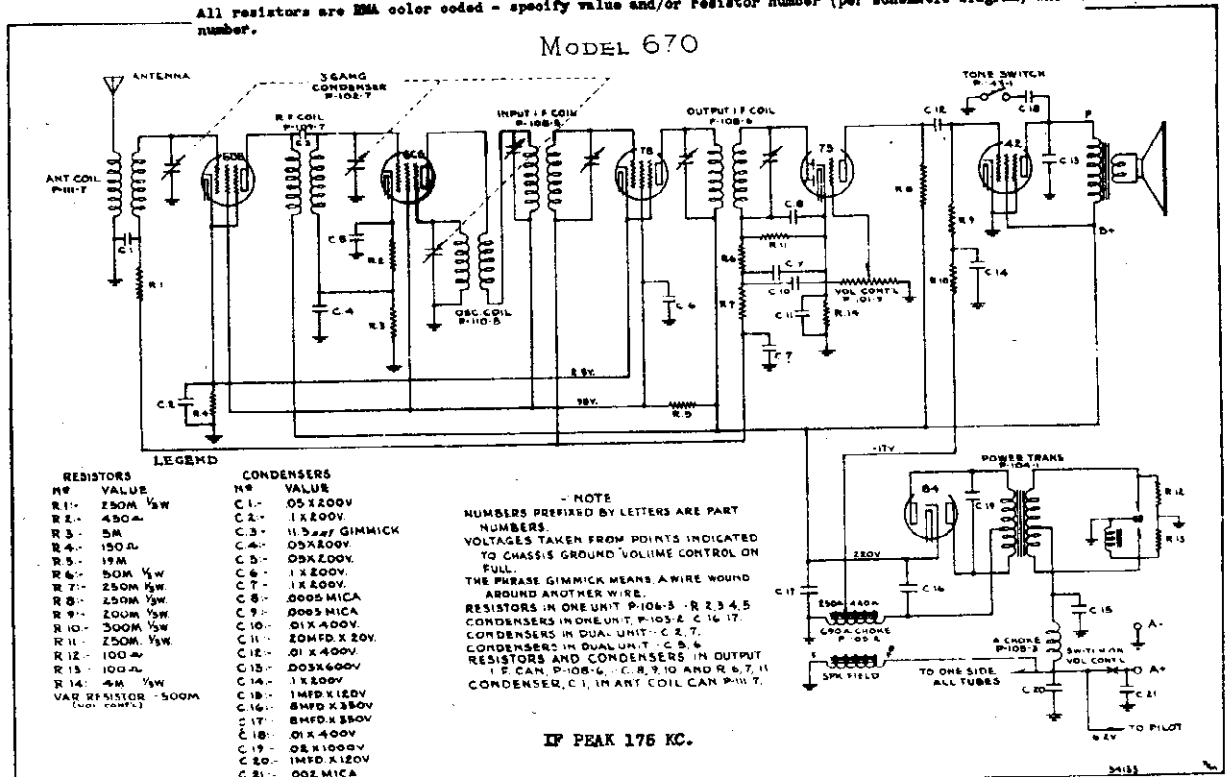


GOODYEAR SERVICE

MODEL 670
Schematic, Voltage
Socket, Trimmers

Vibrators can be reconditioned at a cost of \$5.00 each, if the old unit is returned.

All resistors are RMA color coded - specify value and/or resistor number (per schematic diagram) and model number.



MODEL 670

Alignment

Elimination Notes

GOODYEAR SERVICE

ELIMINATION OF MOTOR NOISE:

In some few cases, such as Buicks, it is necessary to use screw type suppressors. Cut lead about two inches from distributor and screw one end of suppressor into the wire attached to distributor, screw wire from coil into other end of suppressor.

Generator capacitor, number 14B-1, is connected to generator side of outout. The ground side of capacitor can be fastened to the generator housing under the same screw that holds the relay housing to generator. In some cases, an additional capacitor, number 14B-1, (obtainable from your dealer) must be installed between the battery side of ignition coil and the car frame.

If after connecting suppressors and condensers as outlined above there is still motor noise, make the following tests:

Shield high tension leads.

Bond flexible shaft leads, such as free wheeling, which run close to distributor, radiating ignition interference which is picked up by the antenna inside of car.

Cars using wooden floor boards, place a grounded copper screen under toe board.

Excessive gap between distributor rotor and high tension contacts, replace with a special radio rotor arm or build up end with solder and dress end with file so that its original shape is retained. The rotor should not brush or wipe the contacts, but should just clear them.

In some cases, such as V-8 Ford, it is necessary to pull battery and primary leads out of special tube which houses high tension leads, shield end ground these leads. Also on V-8 Fords it is necessary to install a capacitor at primary terminal of coil housing.

Additional suppressors can be obtained from your dealer.

The ignition system of car must be kept in good condition.

Fouled plugs or plugs with improperly adjusted gaps will affect the operation of receiver as well as of the automobile. Burned or poorly adjusted breaker points will also impair the performance. It is advisable to advance the generator charging rate in order to compensate for the additional drain of the receiver on car storage battery.

It is sometimes necessary to connect a condenser (14B-3) between the hot side of the dome light switch and ground.

BALANCING SET TO ANTENNA:

When this set has been installed and is ready for operation, it may be found necessary (depending on antenna) to balance set to this antenna. This is accomplished as follows:

With the receiver tuned to a very weak station, about 150 to 140 (1300 to 1400 kilocycles) on the dial, adjust the antenna trimmer with a screw driver until maximum volume is attained. To reach the antenna trimmer remove the plug button from the top of the case.

SERVICE NOTES

Should it ever be necessary or desirable to re-align this receiver, the proper method is as follows:

Adjustments can be made with the receiver mounted in the cabinet, being necessary only to remove the top cover.

I.F. ALIGNMENT:

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 17.5 kilocycles to the grid cap of the 6SC tube.
2. Adjust trimming condensers of both input and output I.F. transformers, parts number 12A-7 and 12B-6 (see top view of chassis) to resonance with oscillator, as indicated on an output meter connected across the primary terminals of the speaker input transformer. Maximum deflection on the meter indicates resonance.

Notes: Each I.F. transformer trimmer has two adjustments, one nut and one screw, both of which are adjustable through the top of the can.

FREQUENCY ALIGNMENT:

1. Attach oscillator connected in series with a 200 mmfd. condenser to the antenna lead and with the variable condenser at its minimum capacity position (extreme right of its rotation) and with an oscillator set at 1550 kilocycles, adjust condenser trimmer of oscillator section (shaft end, to resonance.
2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna and R.F. trimmers to resonance.
3. Check alignment at 1200-1300-800-600-550 kilocycles by setting oscillator to these frequencies and picking up signal by rotating condenser.
4. Bend slotted plates of antenna and R.F. sections only if necessary. UNDER NO CIRCUMSTANCES BEND PLATES OF OSCILLATOR SECTION.

NOTES:

Voltages from chassis to different points are indicated on schematic circuit diagram, and should be measured with a volt meter having a resistance of 1000 ohms per volt.

Failure to operate, noisy or weak reception, may be due to defective tubes or poor contact between cap on top of tube and grid clip.

Tubes may be checked by replacing with another tube which is known to be good.

If fuse blows out frequently, and insulating sleeve has been properly placed over fuse, the trouble probably is in the vibrator and vibrator should be replaced.

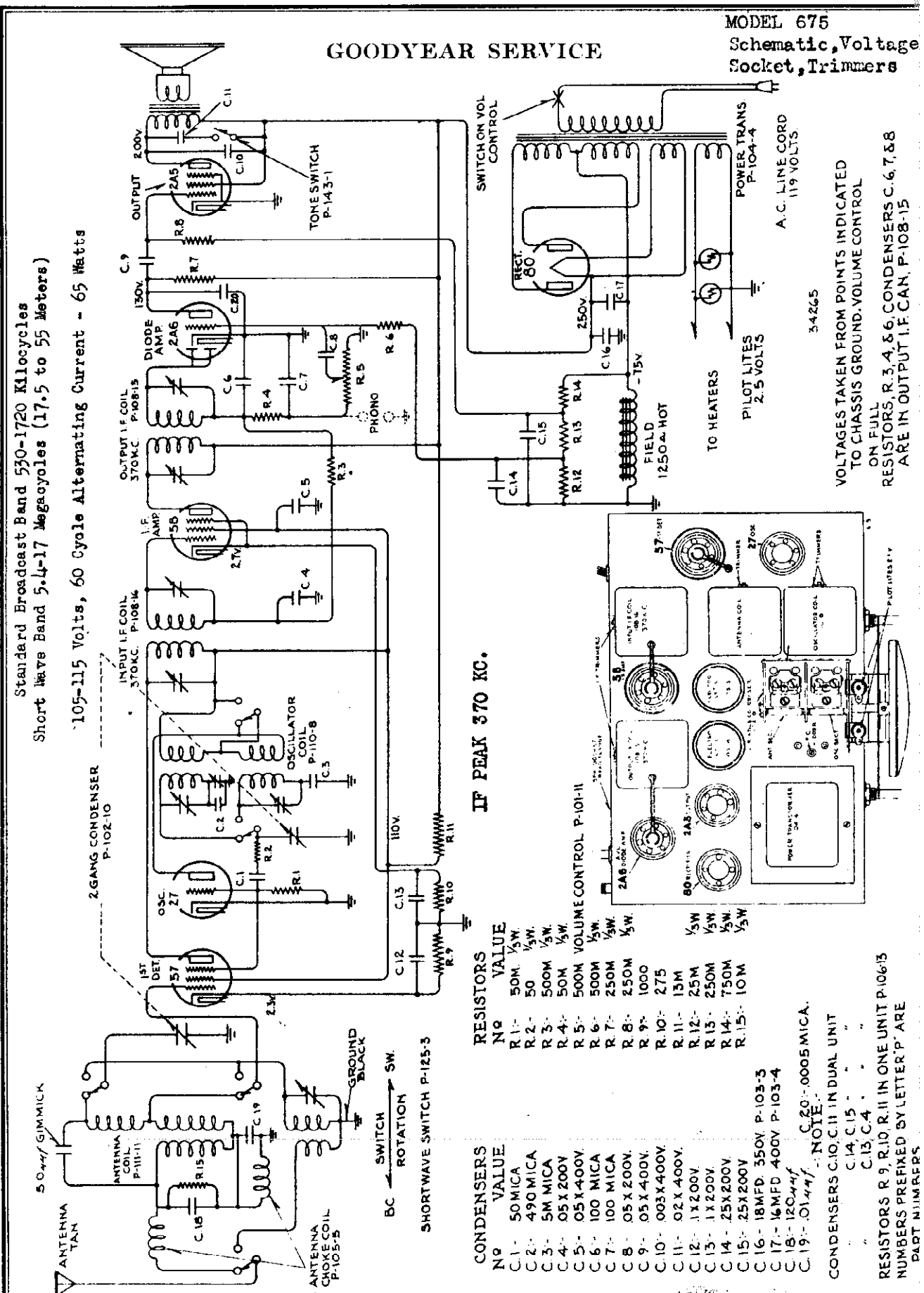
NEVER ATTEMPT TO ADJUST VIBRATOR POINTS.

GOODYEAR SERVICE

MODEL 675
Schematic, Voltage
Socket, Trimmers

Standard Broadcast Band 530-1720 Kilocycles
Short Wave Band 5.4-17 Megacycles (17.5 to 55 Meters)

105-115 Volts, 60 Cycle Alternating Current - 65 Watts



IF PEAK 370 KC.

- | CONDENSERS | |
|------------|----------------------|
| No | VALUE |
| C-1 | 50MICA |
| C-2 | 50 1/2W. |
| C-3 | 5M MICA |
| C-4 | 05 X 200V |
| C-5 | 05 X 400V. |
| C-6 | 100 MICA |
| C-7 | 250M 1/2W. |
| C-8 | 05 X 200V. |
| C-9 | 05 X 400V. |
| C-10 | 003 X 400V. |
| C-12 | 1 X 200V. |
| C-13 | 1 X 200V |
| C-14 | 25 X 200V |
| C-15 | 25 X 200V |
| C-16 | 18MFD 350V P-103-3 |
| C-17 | 16MFD 400V P-103-4 |
| C-18 | 120 1/2W. |
| C-19 | .0147 200-0005 MICA. |
-
- | RESISTORS | |
|-----------|------------|
| No | VALUE |
| R-1 | 50M. 1/2W. |
| R-2 | 50 1/2W. |
| R-3 | 500M 1/2W. |
| R-4 | 50M 1/2W. |
| R-5 | 500M 1/2W. |
| R-6 | 500M 1/2W. |
| R-7 | 250M 1/2W. |
| R-8 | 250M 1/2W. |
| R-9 | 1000 |
| R-10 | 275 |
| R-11 | 13M |
| R-12 | 25M |
| R-13 | 1 X 200V |
| R-14 | 250M |
| R-15 | 10M |

NOTE: C-20-.0005 MICA.
CONDENSERS C-10, C-11 IN DUAL UNIT
C-14, C-15 " "
C-13, C-4 " "
RESISTORS R-9, R-10, R-11 IN ONE UNIT P-106/13
NUMBERS PREFIXED BY LETTER 'P' ARE
PART NUMBERS

VOLTAGES TAKEN FROM POINTS INDICATED
TO CHASSIS GROUND. VOLUME CONTROL
ON FULL
RESISTORS, R-3, 4, 5, 6, CONDENSERS C-6, 7, 8
ARE IN OUTPUT I.F. CAN, P-108-15

MODEL 675

Alignment

GOODYEAR SERVICE

SERVICE NOTES

Voltages taken from different points of the circuit are measured with a voltmeter having a resistance of 1000 ohms per volt and are made between the points indicated and the chassis pan. These voltages are indicated on the 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.

ALIGNMENT:

No aligning adjustments should be made until the set has been thoroughly checked for all other possible causes of trouble, such as poor installations, low line voltages, defective tubes, condensers and resistors.

ALIGNING I.F. TRANSFORMERS:

1. With volume control full on, at the extreme right of its rotation, and with wave selector switch in the broadcast position, extreme left of its rotation, and with variable condenser at its minimum capacity position, extreme left of its rotation, plates entirely out of mesh, adjust the I.F. transformers (parts number 108-15 and 108-16) in the following manner:
 - (a) Connect an external oscillator which has been adjusted to 370 kilocycles, in series with a .1 mfd. condenser to the control grid cap of the type 57 first detector tube (see diagram and chassis).
 - (b) Adjust trimming condensers of both I.F. transformers (Parts number 108-15 and 108-16) to resonance. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between plate and screen terminals of type 2A5 output tube. Maximum deflection of the meter indicates resonance. Care should be taken to use only enough signal to give a readily readable output.

Note: The two adjustments on each transformer are accessible through holes in the transformer cans from the back of the chassis.

BROADCAST BAND ALIGNMENT:

1. Shift frequency of external oscillator to 535 kilocycles and connect in series with a 200 mmfd. condenser to the tan antenna wire and the black ground wire.
 - (a) Set the variable condenser in its maximum capacity position, extreme right of its rotation.
 - (b) Adjust the broadcast oscillator series trimmer to resonance with oscillator. This trimmer is located between the gang condenser and the power transformer (see top view).
2. Shift frequency of external oscillator to 1712 kilocycles and set variable condenser in its minimum capacity position, extreme left of its rotation, plates entirely out of mesh.
 - (a) Adjust the broadcast oscillator shunt trimmer to resonance. This adjustment is the top adjustment in the oscillator coil can, part number 110-8.

SHORT WAVE BAND ALIGNMENT:

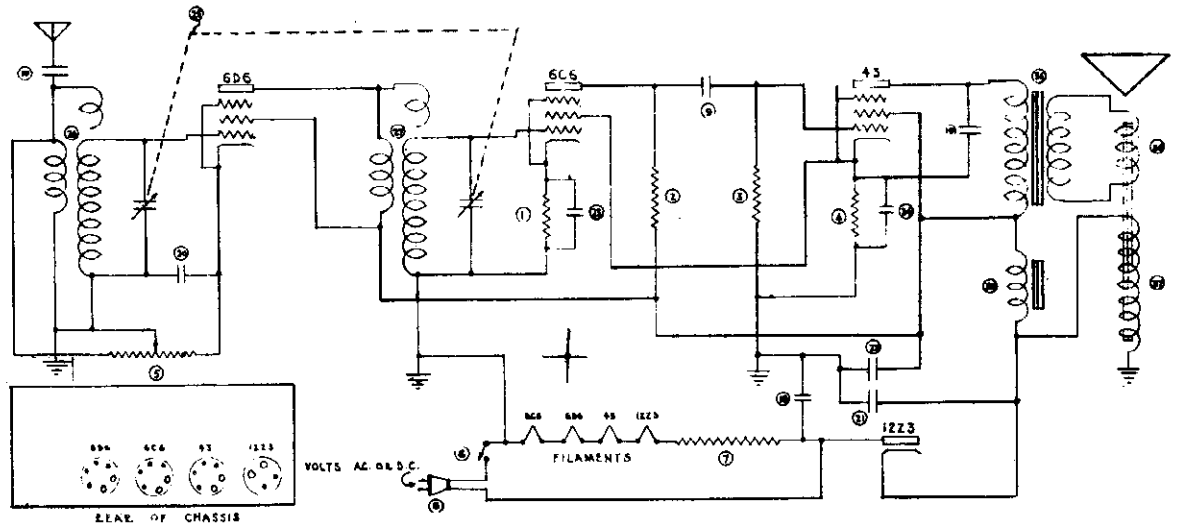
1. Set the wave changing switch in the short wave position, extreme right of its rotation, and change external oscillator frequency to 15 megacycles.
 - (a) Adjust variable condenser with selector knob so that pointer is opposite the 15 megacycle calibration on the dial.
 - (b) Adjust the short wave oscillator shunt trimmer to resonance with the signal (use extreme care and make certain that you do not adjust to resonance with the image instead of the signal). This trimmer is the bottom trimmer (closest to the chassis) on the oscillator coil, part number 110-8, and is accessible from the side of the chassis.
 - (c) Adjust the short wave antenna trimmer to resonance (single trimmer in antenna can, part number 111-11, accessible from the side of the chassis, between type 27 and 57 tubes).

NOTES:

Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. This drive may be dis-assembled by removing the two screws which fasten it to the dial bracket. The part number of the compression spring is 112-31. All of the other dial parts are hardened and should cause no trouble.

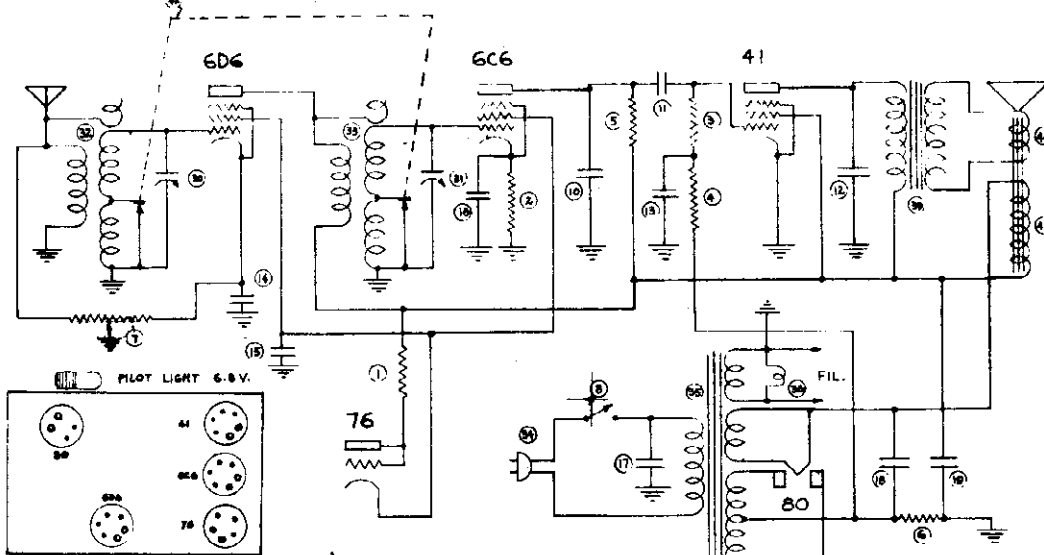
HALSON RADIO MFG. CO.

MODEL 45
MODEL 52
Schematic, Socket



- | | | | | | |
|----|--|----|----------------------------------|----|---|
| 1 | 1413 RESISTOR 29,000 ^Ω 1/2 WATT | 18 | 1102 CONDENSER .02 M.F. 400V. | 35 | 1418 OUTPUT TRANS. |
| 2 | 1414 " 490,000 ^Ω " | 19 | " " " " " " | 36 | 3PXL VOICE COIL |
| 3 | 1415 " 990,000 ^Ω " | 20 | 1040 " .05 M.F. 200V. | 37 | 455Y FIELD COIL 3500 ^Ω (HOT) |
| 4 | 1412 " 510 ^Ω 1/2 WATT | 21 | 1408 } ELEC. COND. 16 M.F. 150V. | 38 | 12B1 FILTER CHOK 400 ^Ω |
| 5 | 1405 } VOL. CONTROL 25,000 ^Ω | 22 | 1408 } " " 8 M.F. 150V. | | |
| 6 | 1405 } LINE SWITCH | 23 | 1408 } " " 5 M.F. 35V. | | |
| 7 | 1417 } RESISTANCE 220 ^Ω | 24 | 1408 } " " 5 M.F. 35V. | | |
| 8 | 1417 } LINE CORD & PLUG | 25 | 1404 VARIABLE COND. 370 M.M.F. | | |
| 9 | 1416 CONDENSER .001 M.F. 600V. | 26 | 1406 ANTENNA COIL | | |
| 10 | 1101 " .01 M.F. 400V. | 27 | 1407 R.F. COIL | | |

CIRCUIT DIAGRAM			MODEL 45
DRAWN BY A.S. H-2-36	CHECKED BY [Signature]	APPROVED BY [Signature]	HALSON NUMBER 45
HALSON RADIO MFG. CO. N.Y.C.			

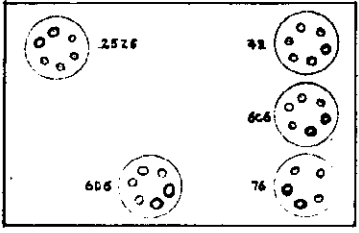
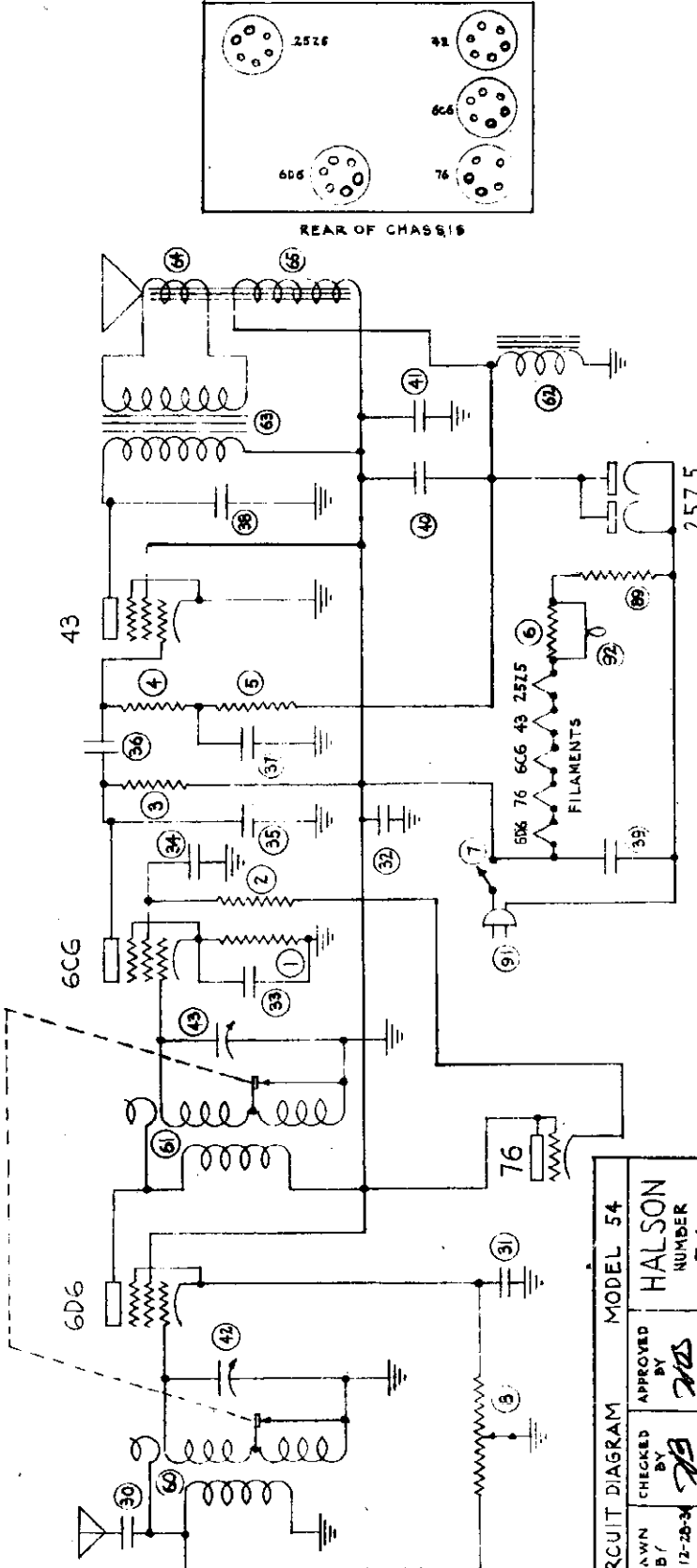


- | | | | | | | | |
|----|---|----|--|----|--------------------------------|----|-----------------------------------|
| 1 | 1158 RESISTOR 110,000 ^Ω 1 WATT | 11 | 1101 CONDENSER .01 M.F. 400V. | 30 | 1432 VARIABLE COND. 570 M.M.F. | 39 | 1431 OUTPUT TRANS. |
| 2 | 1160 " 81,000 ^Ω 1/2 " | 12 | 1305 " " " 600V. | 31 | " " " " " " | 40 | 5PXL VOICE COIL |
| 3 | 1162 " 260,000 ^Ω " | 13 | 1040 " .05 " 200V. | 32 | 1433 ANTENNA COIL | 41 | 455Y FIELD COIL 2000 ^Ω |
| 4 | " " " " " " | 14 | " " " " " " | 33 | 1438 R.F. COIL | 42 | 1439 WAVE CHANGE SWITCH |
| 5 | 1028 " " " " " " | 15 | 1036 " .1 " " " | 34 | 1115 LINE CORD & PLUG | | |
| 6 | 1258 " 400 ^Ω " " " | 16 | 1103 " .25 " " " | 35 | 1434 POWER TRANSFORMER | | |
| 7 | 1208 } VOLUME CONTROL 25,000 ^Ω | 17 | 1102 " .02 " 400V. | 36 | 1086 PILOT LIGHT 6.3V. | | |
| 8 | 1208 } LINE SWITCH | 18 | 1487 } ELECTROLYTIC COND. B.M.F. 500V. | | | | |
| 10 | 1096 CONDENSER 510 M.M.F. MICA | 19 | " " " " " " | | | | |

CIRCUIT DIAGRAM			MODEL 52
DRAWN BY A.S. H-2-36	CHECKED BY [Signature]	APPROVED BY [Signature]	HALSON NUMBER 52
HALSON RADIO MFG. CO. N.Y.C.			

MODEL 54
Schematic
Socket

HALSON RADIO CORP.



REAR OF CHASSIS 16

CIRCUIT DIAGRAM MODEL 54

DRAWN BY	CHECKED BY	APPROVED BY
AS 12-25-34	MS	MS
HALSON RADIO MFG. CORP. N.Y.C.		HALSON NUMBER 54

1	1027	RESISTOR	31,000 ^Ω	1/4 WATT	30	1101	CONDENSER	.01 M.F.	400V.	58	1102	CONDENSER	.02 M.F.	400V.	62	1281	FILTER CHOKE	430 ^Ω	
2	1094	"	1.1 MEG ^Ω	"	31	1040	"	.05 "	200V.	39	"	"	"	"	63	1441	OUTPUT TRANS.		
3	1029	"	260,000 ^Ω	1 "	32	1036	"	.1 "	"	40	1440	{	ELEC. COND.	16 M.F.	150V.	64	SPKR	VOICE COIL	
4	1165	"	"	1/4 "	33	1103	"	.25 "	"	41	{	"	"	"	"	65	ASSY	(FIELD COIL 2300 ^Ω) (HOT)	
5	"	"	"	"	34	1036	"	.1 "	"	42	{	VARIABLE COND.	370 M.M.F.	"	"	69	{	RESISTANCE	140 ^Ω
6	1016	"	20 ^Ω	2 "	35	1098	"	510 M.M.F.	MICA	43	{	"	"	"	"	91	{	LINE CORD & PLUG	
7	1209	{	LINE SWITCH		36	1101	"	.01 M.F.	400V.	60	1433	ANTENNA COIL				92	1086	PILOT LIGHT	6.3V.
8		{	VOLUME CONTROL	25,000 ^Ω	37	1103	"	.25 "	200V.	61	1438	R.F. COIL				93	439	WAVE CHANGE SWITCH	

PILOT LIGHT 6.3 V.

HALSON RADIO CORP.

MODEL 66-AW
Schematic, Socket
Notes, Parts

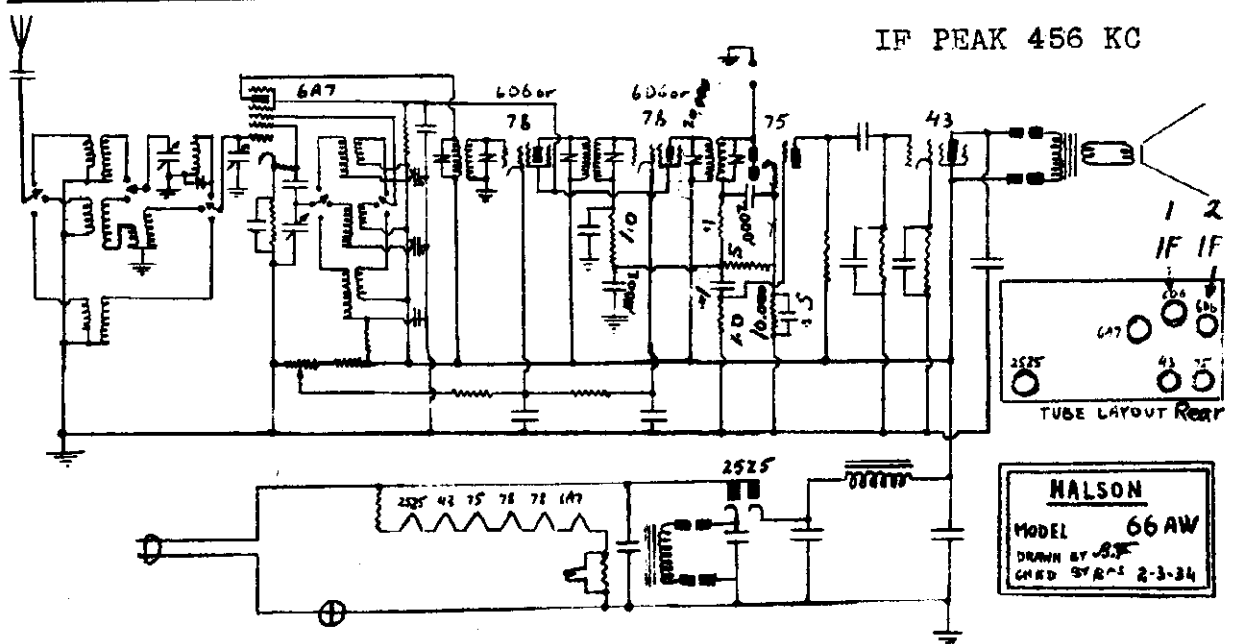
Halson Model 66-AW is a six tube superheterodyne radio operating either on AC or DC. The wave bands are divided in three distinct steps, namely: No. 1 from 15 to 55 meters, No. 2 from 180 to 550 meters, and No. 3 from 1000 to 2000 meters. Unless otherwise specified, all stock sets are designed to operate on any 110 volts lighting outlets.

INSTALLATION The set as furnished is complete in every detail for efficient operation. Connect the line and resistor cord to any convenient outlet, unroll the antenna wire and stretch same around the room. (Note) If operated on DC current, should the tubes light and no reception can be heard, reverse the outlet plug for correct polarization. Make sure that all tubes are inserted in the right socket, the diagram herein shown, gives you the tube lay-out. Some locations differ from others, the self enclosed antenna is generally sufficient for local and near-by broadcastings, also under auspicious weather conditions for short-wave, but we recommend a short outside antenna well insulated for more efficient long distance receptions.

OPERATION The left hand knob controls the switch and volume control. Turn it clockwise to start receiver, adjust the volume to the desired degree. For short-wave operation, turn volume control till the set begins oscillation, short-wave reception best can be heard with least disturbances and noises slightly back of the oscillation point. Center knob marked 1. 2. 3. indicates the three different wave-bands the set has been designed to operate. No. 1 is the short-wave, No. 2 the Broadcast, No. 3 the Long Wave. (Note) This knob automatically changes the positions of the dial readings for each individual wave-band.

The right hand knob is the station selector and operates the dial, which is calibrated in megacycles for the short-wave band and in kilocycles for the broadcast and long-wave band. TO SHUT OFF THE SET - turn the left knob counterclockwise (to the left) until the switch can be heard to snap off.

MINOR REASONS FOR FAILURE OF SET TO PROPERLY FUNCTION Defective tubes, grid caps off tubes, volume control not fully turned on, tubes not properly inserted in their respective sockets, shorted aerial, defective plug, or wiring connection loose in socket.



REPLACEMENT PARTS LIST

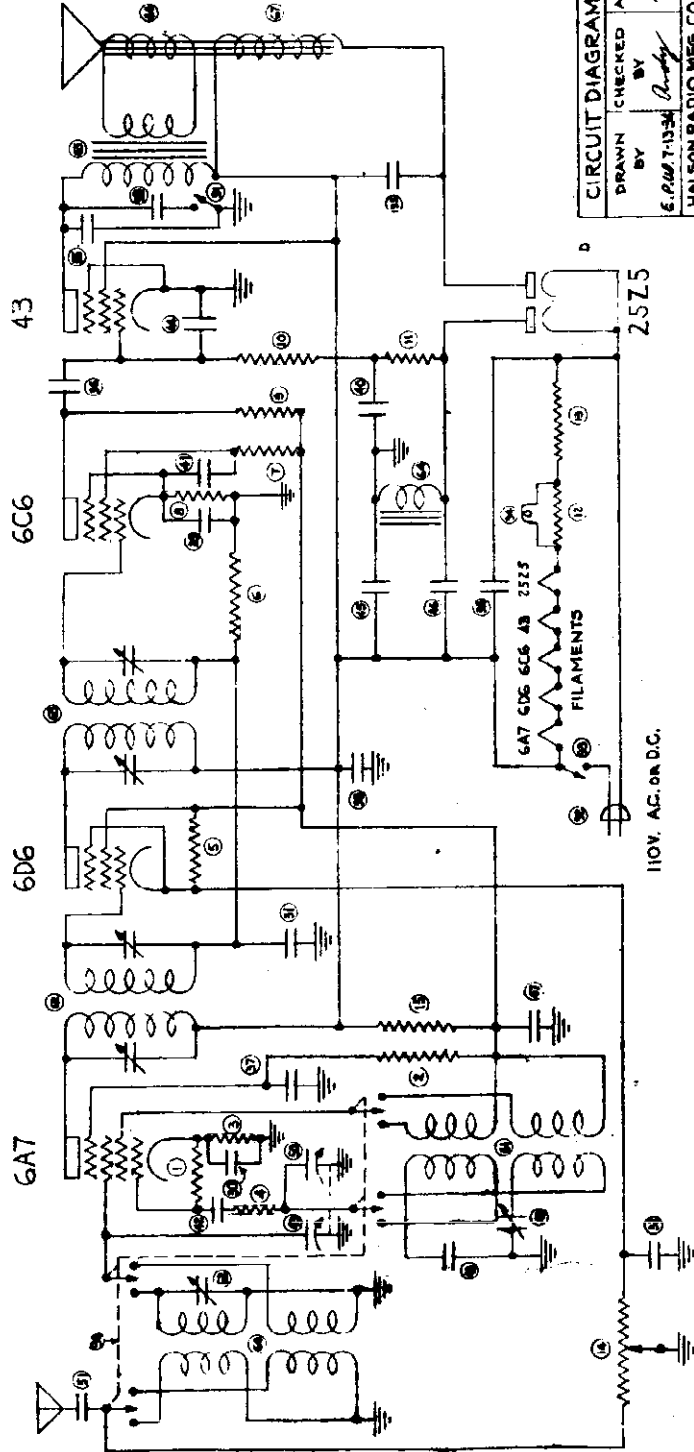
- | | |
|---|--|
| 6601 Volume Control | 6608 Mica Condensers from 0002 to 0025 |
| 6602 6" Dynamic Speaker | 6609 Resistors 1 1/3 W |
| 6603 Replacement Coils per set | 6610 Line Cord and resistor |
| 6604 Choke | 6611 5 mfd. Condenser |
| 6605 3 sections switch | 6612 1 watt resistor |
| 6606 Electrolytic Condenser | 6613 20 W. Resistor |
| 6607 Tubular Condenser (from 1 mfd. to .002 mfd.) | 6614 Set of extra tubes |

MODEL 535
Schematic, Socket
Parts List

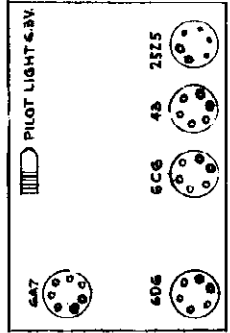
HALSON RADIO CORP.

REV.	DATE	DESCRIPTION
1	1/15/35	INITIAL
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3	1/15/35	REVISION
4	1/15/35	REVISION
5	1/15/35	REVISION
6	1/15/35	REVISION
7	1/15/35	REVISION
8	1/15/35	REVISION
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98	1/15/35	REVISION
99	1/15/35	REVISION
100	1/15/35	REVISION

CIRCUIT DIAGRAM MODEL 535
DRAWN BY E. P. W. T. 1/15/35
CHECKED BY [Signature]
APPROVED BY [Signature]
HALSON NUMBER 535
HALSON RADIO MFG. CORP. N.Y.C.

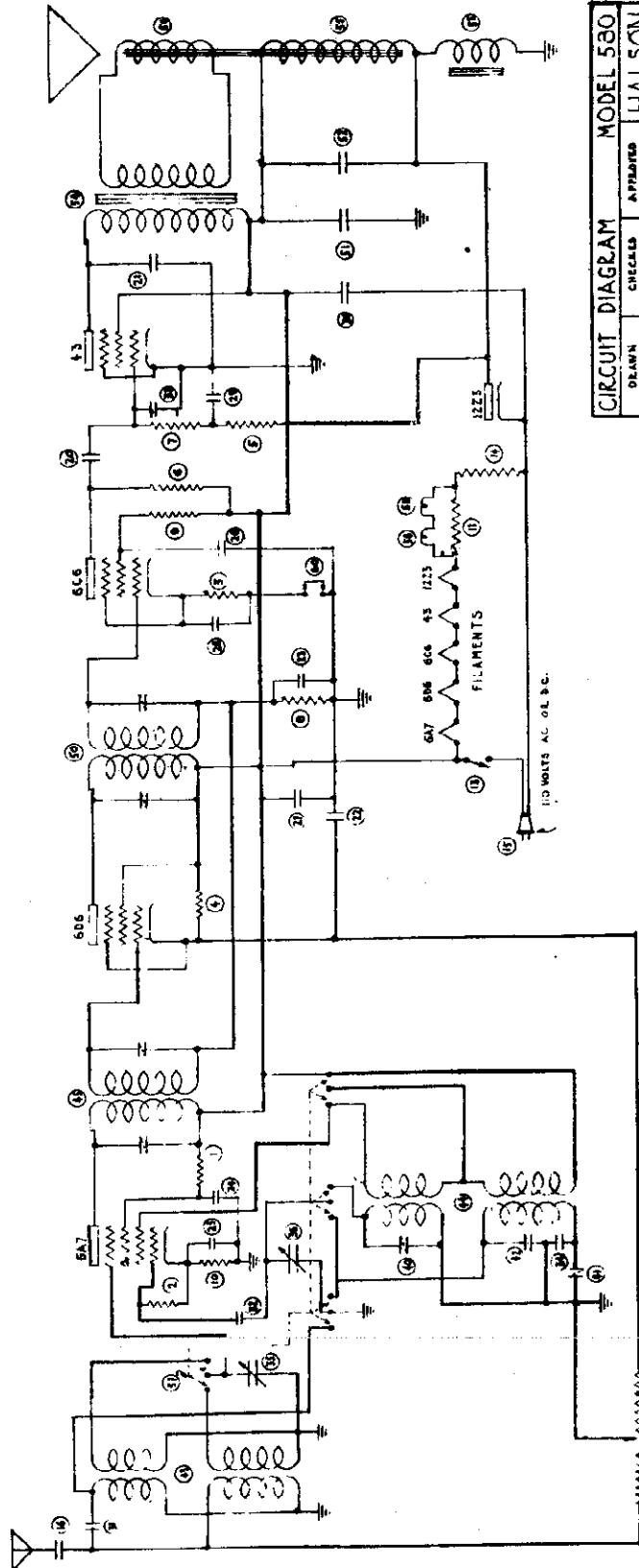


Part No.	Description	Value	Part No.	Description	Value
C 1	1092 RESISTOR	110,000 $\frac{1}{2}$ WATT	K 3	—	RESISTANCE 14-0 $\frac{1}{2}$ WITH 92
2	1242	"	38	1086	"
3	1243	"	39	1103	"
4	1276	"	40	"	"
5	1245	"	41	1086	"
6	1084	"	42	1089	"
7	"	"	43	1393	"
8	1027	"	44	1088	"
9	1029	"	45	1392	"
10	1030	"	46	"	"
11	1165	"	47	"	"
12	1016	"	48	1104	"
49	1206	"	90	1210	"
50	"	"	91	1203	"
51	1101	"	92	1394	"
52	1107	"	93	—	"
60	1211	"	94	1086	"
61	1212	"	95	1392	"
62	1070	"			
63	1070	"			
64	1281	"			
65	1396	"			
66	57KR	"			

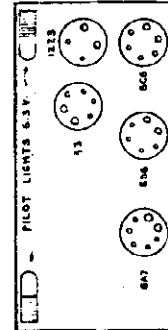


HALSON RADIO CORP.

MODEL 580
Schematic, Socket
Parts List



CIRCUIT DIAGRAM	MODEL 580
DRAWN BY	APPROVED BY
CHECKED BY	BY
DATE	DATE
11-6-34	2003
HALSON RADIO MFG. CORP. N.Y.C.	
HALSON NUMBER 580	

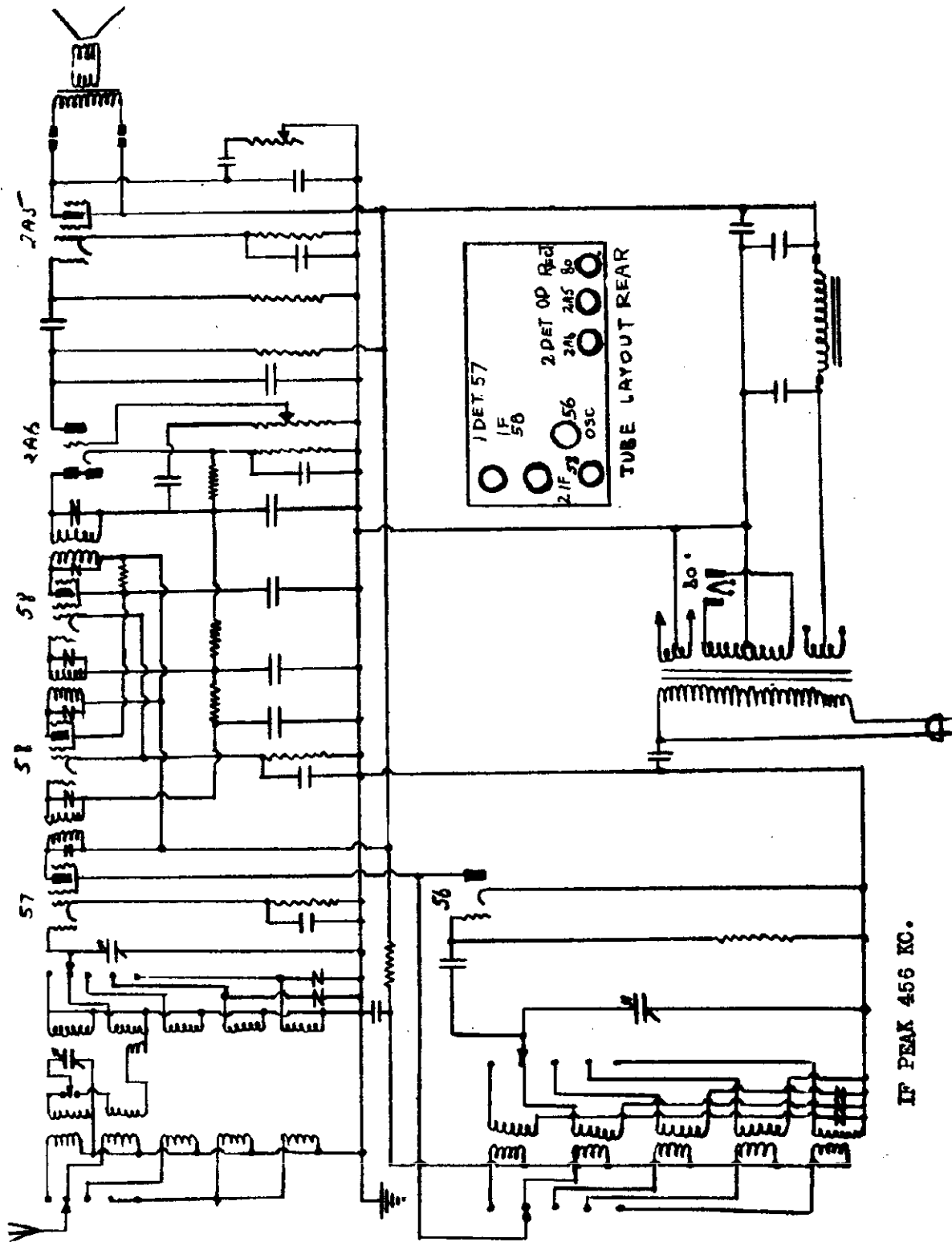


- 40 1107 DC ST TRIMMER COND. 5-30 M.M.F.
- 41 1262 1/2 W. PADDING COND. 50-120 M.M.F.
- 42 1262 1/2 W. TRIMMING COND. 5 30 M.M.F.
- 43 1390 ANTENNA COIL
- 44 1391 OSCILLATOR COIL
- 45 1070 I.F. TRANSFORMER 151 456 K.C.
- 50 " " 2M " "
- 51 1381 { ELEC. CONDENSER. 16 M.F. 150V
- 52 1381 { " " " " " " " "
- 53 1281 { FILTER CHOKE 400"
- 54 1369 { OUTPUT TRANS. 4300"
- 55 1369 { FIELD COIL
- 56 1369 { VOICE COIL
- 57 1362 WAVE CHANGE SWITCH
- 58 1086 PILOT BULB 6.3 VOLTS
- 59 " " " "
- 60 1315 PHONO JACK

- 20 1101 CONDENSER .01 M.F. 400V
- 21 " " " " " "
- 22 1040 " .05 M.F. 200V
- 23 " " " " " "
- 24 " " " " " "
- 25 " " " " " "
- 26 1036 " .1 M.F. 200V
- 27 " " " " " "
- 28 1103 " .25 M.F. 200V
- 29 " " " " " "
- 30 " " " " " "
- 31 1097 " 110 M.M.F. MICA
- 32 1099 " 260 " " "
- 33 1098 " 510 " " "
- 34 1589 " 150 " " "
- 35 1369 { VARIABLE COND 370 M.M.F.
- 36 1369 { " " " 250 M.M.F.
- 1 1267 RESISTOR 11,000" 1/4 WATT
- 2 1242 " 21,000" " "
- 3 1027 " 31,000" " "
- 4 1245 " 51,000" 1/4 WATT
- 5 1165 " 260,000" 1/4 WATT
- 6 " " " " " "
- 7 1030 " 510,000" " "
- 8 1094 " 1,100,000" " "
- 9 " " " " " "
- 10 1243 " 260" " "
- 11 1374 " 40" 4 WATT
- 12 1366 { VOLUME CONTROL 25,000"
- 13 1366 { LINE SWITCH
- 14 1376 { RESISTANCE 170"
- 15 1101 CONDENSER .01 M.F. 400V

MODEL 770-AW
Schematic
Socket

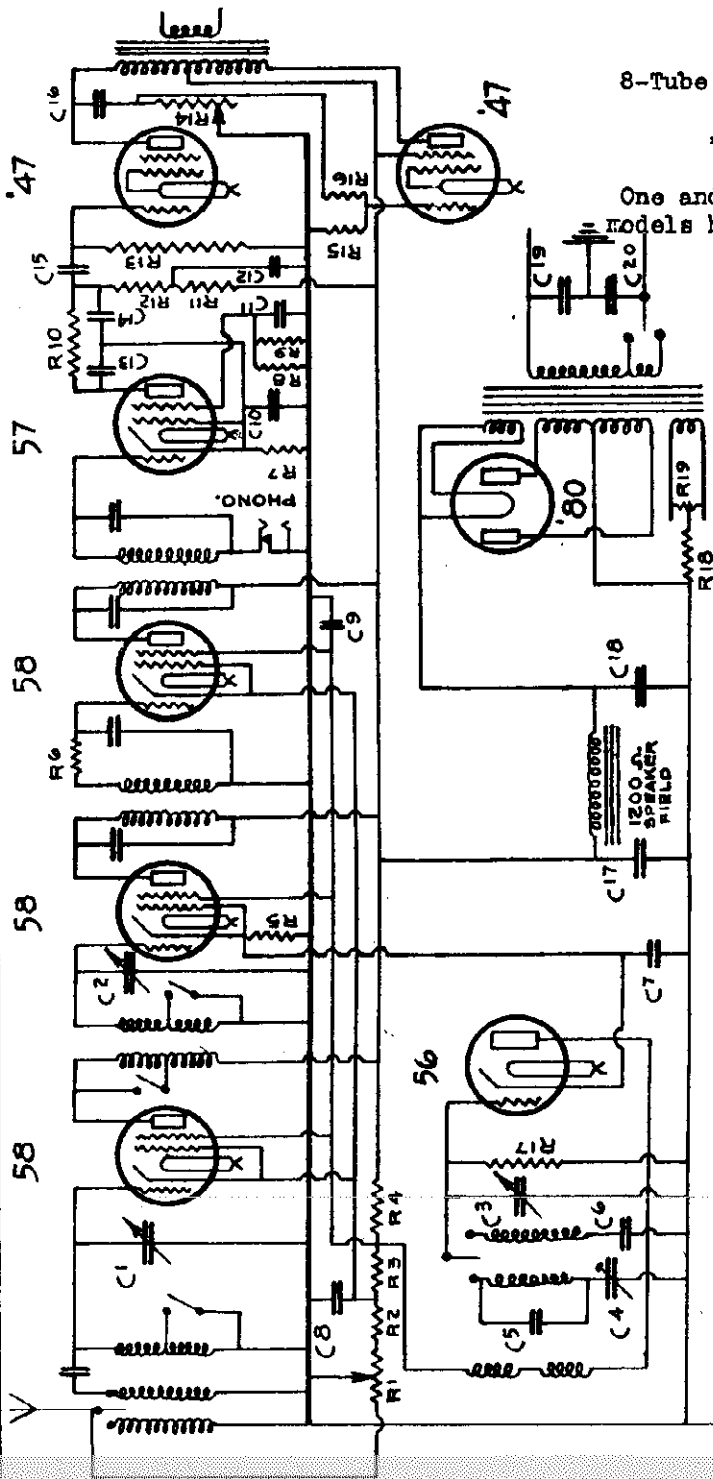
HALSON RADIO CORP.



HETRO ELECTRICAL INDUSTRIES, INC.

MODEL 22 (2Types)
Schematic, Voltage

VOLTAGE TESTS. All voltage tests made with volume control on full and no signal in set; "SS" means single-speaker models; "DS" means two-speaker models. Plates of 58 to ground SS 225-235 v., DS 240-250 v. Screen of 58 to ground, SS 70-80 v., DS 75-85 v. Cathode of RF and IF, 1-2 v. all models. Cathode 1st Det. and Osc. 2-3 v. all models. Plate of 56 to ground, SS 70-80 v. DS 75-85 v. Plate of 57 to ground 10-12 all models. Screen of 57 to ground 11-13 v. all models. Cathode of 57 to ground 3-4 v. all models. Plates of 47s to ground SS 220-230 v., DS 230-240 v. Across speaker field 120-130 v. for SS; DS 170-180 v. All heaters 2.4-2.6 v. all models. Filament 80 tube 4.8-5.2 v. Center tap of heaters to ground SS 17-18 v., DS 18-19 v. Plate of 80 to ground SS 350-370 v. AC, DS 400-420 v. AC.



8-Tube Long-Wave (200-2000 Meters)
Model 22

One and two-speakers models. Two-speaker models have two 4000-ohm speakers in parallel.

IF PEAK 115 KC.

- | | | |
|--------|--------|-----------------|
| C1, C2 | .00036 | VARIABLE |
| C3 | 450 | MMF |
| C4 | 50 | MMF |
| C5 | .002 | MICA +5% |
| C6 | .001 | MICA |
| C7 | .1 | 200V. |
| C8 | .5 | 200V. |
| C9 | .1 | 200V. |
| C10 | .1 | 400V. |
| C11 | .00025 | MICA |
| C12 | .006 | 400V. |
| C13 | .05 | 400V. |
| C14 | 8MF | 450V. |
| C15 | 8MF | 450V. |
| C16 | .01 | 400V. |
| C17 | .01 | 400V. |
| C18 | 20 | Ω CENTER TAPPED |
| C19 | 1200 | Ω SPEAKER FIELD |
| C20 | 2 | Ω |

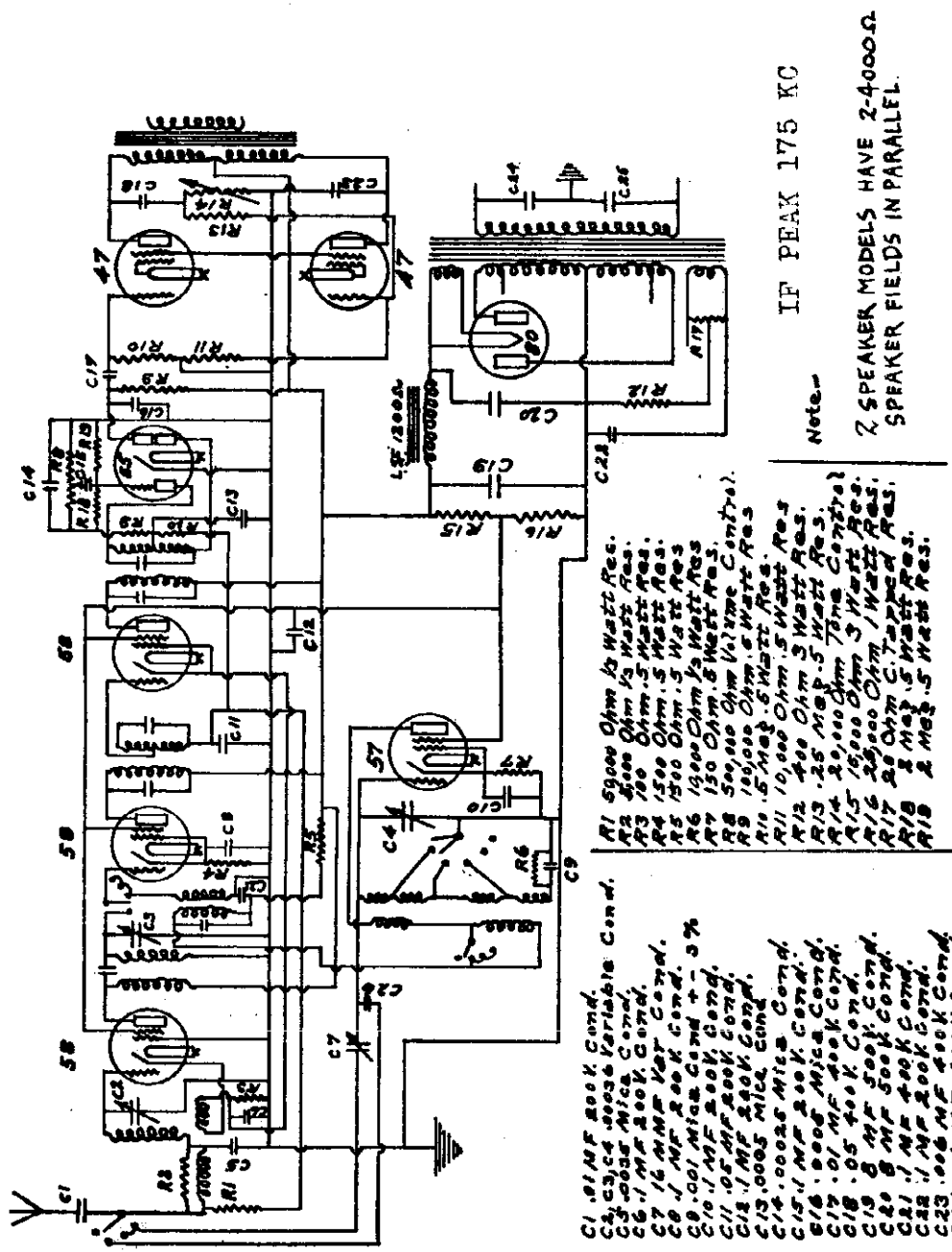
ALL CONDENSERS & RESISTORS ± 10% UNLESS OTHERWISE SPECIFIED

MODEL 31 (2Types)

Schematic, Voltage HETRO ELECTRICAL INDUSTRIES, INC.

VOLTAGE TESTS. Taken from places named to Ground. Plates of 58 tubes single speaker 225-235 v. double speaker 240-250 v. Screen grid 58 tubes 90-100 and 95-105 v. Cathode RF and IF tubes 1 to 2 v. Cathode 1st Det. 6 to 8 v. Plate Osc. tube 210-220 v., single speaker; 215-225 v. double speaker. Screen grid Osc. tube 90-100 single speaker; 95-105 double speaker. Cathode Osc. tube 1 v. Audio plate of 55 tube 20-30 v. Plates of 247 tubes 220-230 v. single speaker; 230-240 v. double speaker. Across speaker field 120-130 v. single speaker; 170-180 v. double speaker. All heaters 2.4 to 2.6 v. Filament 280 tube 4.8 to 5.2 v. Center tap of heaters to ground 17-18 v. single models; 18-19 v. double models. 280 plate to ground 350-370 v. AC, single speaker models and 400-420 v. AC, double speaker models.

OCT. 1933



- Note-**
 2. SPEAKER MODELS HAVE 2-4000 G. SPEAKER FIELDS IN PARALLEL.
- IF PEAK 175 KC
- All Condensers & Resistors + - 10 % Unless Otherwise Spec.
- C1 .01 MF 200K Cond.
 - C2 .03, .04 200K Variable Cond.
 - C3 .0025 Mica Cond.
 - C4 .01 MF 200K Cond.
 - C5 .01 MF 200K Cond.
 - C6 .01 MF 200K Cond.
 - C7 .01 MF 200K Cond.
 - C8 .01 MF 200K Cond.
 - C9 .001 Mica Cond. + .5%
 - C10 .01 MF 200K Cond.
 - C11 .05 MF 200K Cond.
 - C12 .01 MF 200K Cond.
 - C13 .0005 Mica Cond.
 - C14 .00025 Mica Cond.
 - C15 .01 MF 200K Cond.
 - C16 .0005 Mica Cond.
 - C17 .01 MF 200K Cond.
 - C18 .05 MF 200K Cond.
 - C19 .01 MF 200K Cond.
 - C20 .01 MF 200K Cond.
 - C21 .01 MF 200K Cond.
 - C22 .01 MF 200K Cond.
 - C23 .005 MF 400K Cond.
 - C24 .01 MF 400K Cond.
 - C25 .01 MF 400K Cond.
 - C26 .01 MF 400K Cond.
- R1 5000 Ohm 1/2 Watt Res.
 - R2 500 Ohm 1/2 Watt Res.
 - R3 100 Ohm 1/2 Watt Res.
 - R4 1500 Ohm 1/2 Watt Res.
 - R5 1500 Ohm 1/2 Watt Res.
 - R6 1500 Ohm 1/2 Watt Res.
 - R7 1500 Ohm 1/2 Watt Res.
 - R8 50,000 Ohm 1/2 Watt Res.
 - R9 15,000 Ohm 1/2 Watt Res.
 - R10 10,000 Ohm 1/2 Watt Res.
 - R11 10,000 Ohm 1/2 Watt Res.
 - R12 400 Ohm 1/2 Watt Res.
 - R13 .25 Meg 1/2 Watt Res.
 - R14 20,000 Ohm 1/2 Watt Res.
 - R15 15,000 Ohm 1/2 Watt Res.
 - R16 25,000 Ohm 1/2 Watt Res.
 - R17 20 Ohm 1/2 Watt Res.
 - R18 2 Meg 1/2 Watt Res.

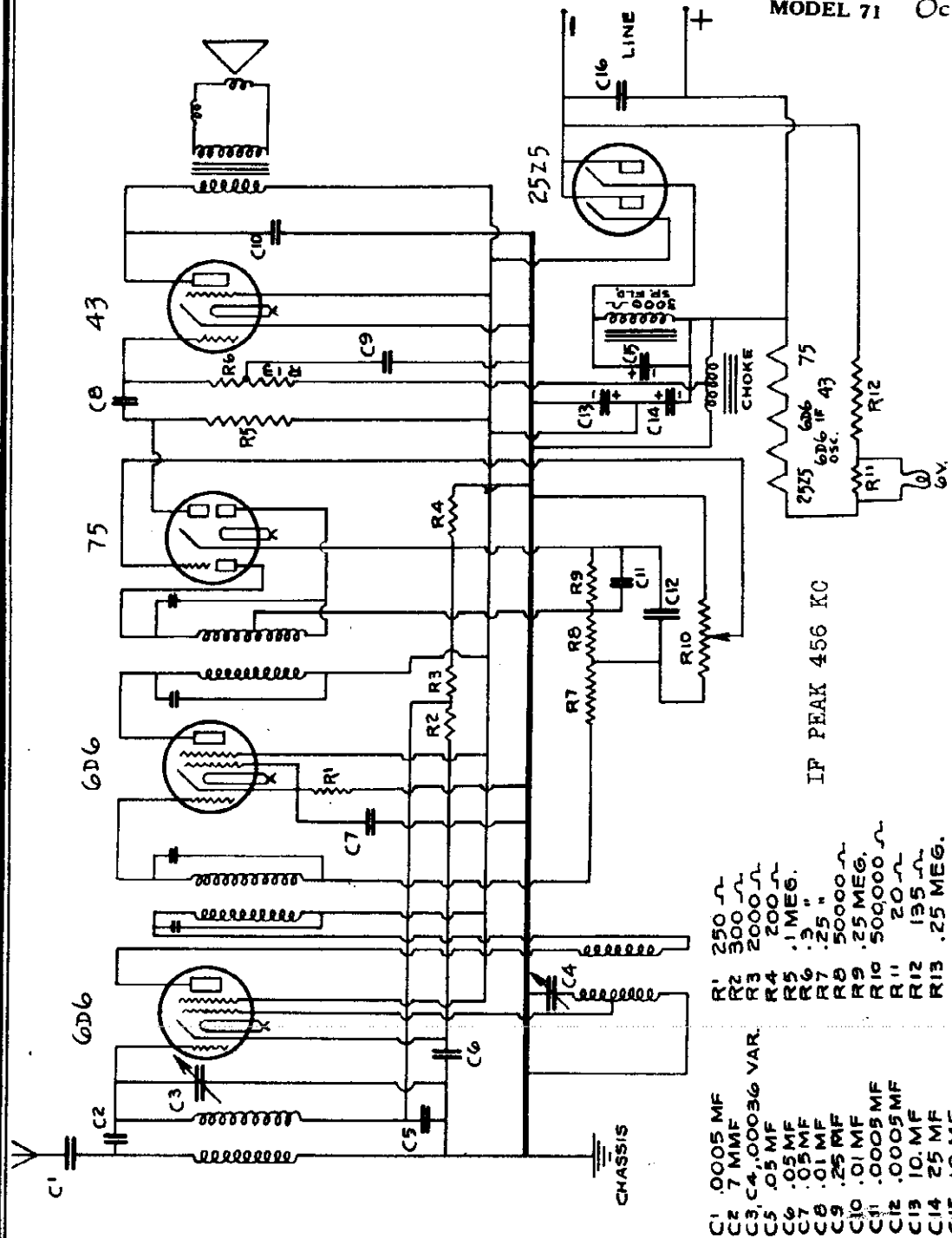
8 Tube Super-Hetro-Dyne Chassis—Schematic Diagram
 15 to 550 Meters — Short - Medium Wave MODEL 31

HEIRO ELECTRICAL INDUSTRIES, INC.

MODEL 71
Schematic
Voltage

All D. C. voltages given were tested on 250 volt 1000 ohms per volt meter, tests made with volume control on full and no signal in receiver. Plates of 6D6 tubes to chassis 110-115 volts. Screen of 6D6 tubes to chassis 112-117 v. Cathode oscillator tube to chassis 18-20 v. Suppressor grid of oscillator 15-17 v. Cathode 6D6, 2-3 v. Plate of 75, 40-45 v. Cathode of 75, 1-2 v. Plate of 43 100-105 v. Across speaker 100-105 v. Control grid 43, 4-6 v. negative. Heaters to chassis 30-35 v. HEATERS OF ALL TUBES IN SERIES. If one tube burns out the receiver will not operate.

MODEL 71 Oct. 1933



- IP PEAK 456 KC
- COND. - 200V.
RESIST. - 1/3 WATT.
- C1 .0005 MF
 - C2 7 MMF
 - C3, C4 .00036 VAR.
 - C5 .05 MF
 - C6 .05 MF
 - C7 .05 MF
 - C8 .01 MF
 - C9 .25 MF
 - C10 .01 MF
 - C11 .0005 MF
 - C12 .0005 MF
 - C13 10. MF
 - C14 25 MF
 - C15 10 MF
 - C16 .1 MF
 - R1 250 Ω
 - R2 300 Ω
 - R3 2000 Ω
 - R4 200 Ω
 - R5 .1 MEG.
 - R6 .3 "
 - R7 .25 "
 - R8 50000 Ω
 - R9 .25 MEG.
 - R10 50000 Ω
 - R11 20 Ω
 - R12 195 Ω
 - R13 .25 MEG.

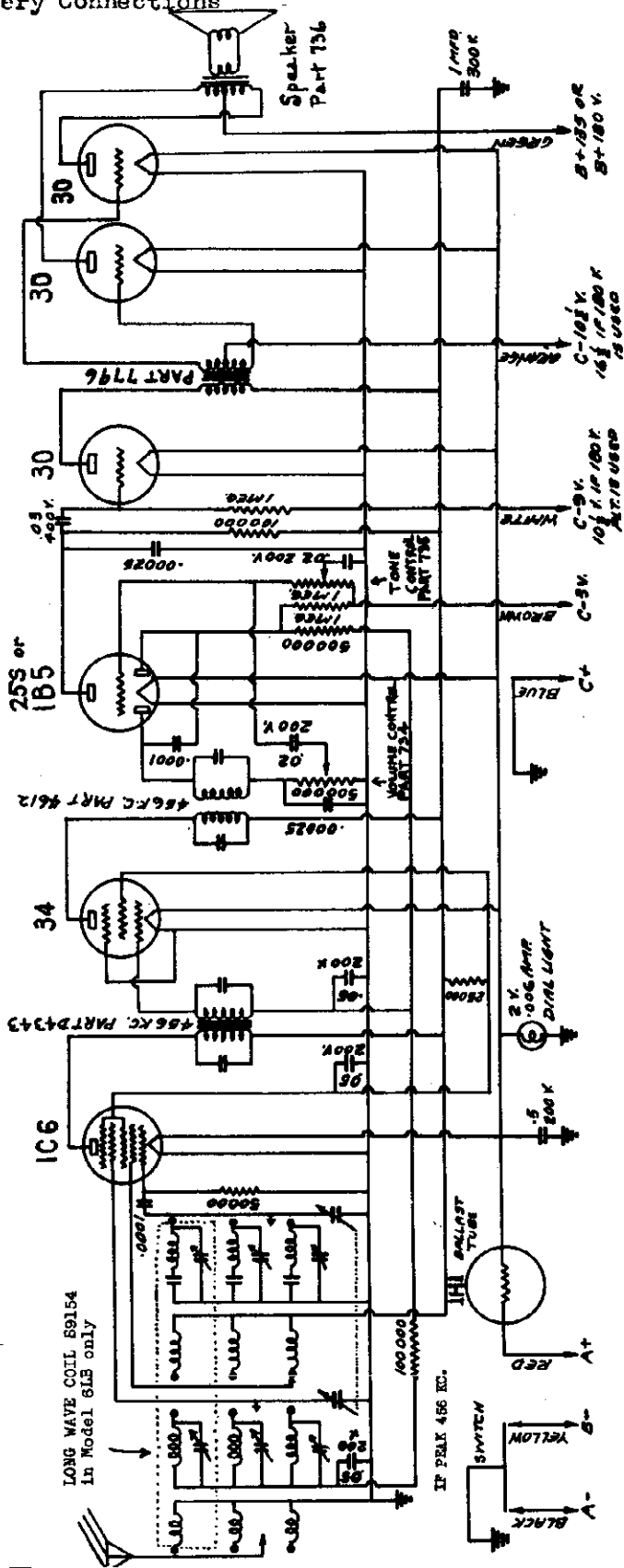
Compact
A. C. - D. C.
200 to 550 Meters

MODELS 6LB, 6EB

Schematic, Socket HETRO ELECTRICAL INDUSTRIES, INC.

Trimmers, Alignment

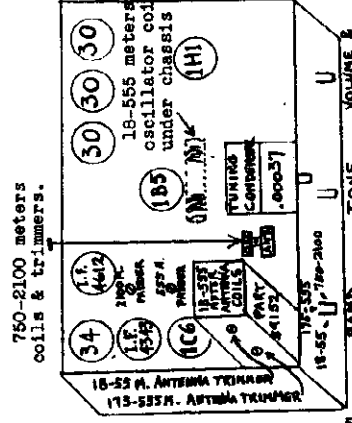
Battery Connections



Before connecting the batteries be sure that the switch is in the "off" position, volume control knob must be all the way to left. Check all the battery connections very carefully or serious damage to the tubes may result. Make sure that all the tubes are firmly inserted in their sockets. Use a good antenna from 75 to 100 ft. long and a good ground for best results.

In battery operated receivers the two most common causes of low volume are run down batteries and defective tubes. Test your batteries from time to time. If no tube tester is available, procure a new set of tubes, or a set that is operating satisfactorily in another receiver. Insert these misalignment or poor tracking of tuning condenser may also be the cause, but do not try to align the receiver in case of low volume unless other causes have first been investigated.

The aligning of the I.F. transformers is done in the regular manner. The I.F. frequency is 456 K.C. The first I.F. has iron core and the selectivity and sensitivity of the receiver are greatly affected by its alignment. Alignment of the Short Wave band should be done at about 19 meters, the broad cast band at 1500 K.C. and the long wave band at about 350 K.C. If no signal generator is available these adjustments may be effected with a transmitting signal, but anyone without some technical knowledge should not attempt to align the set. All receivers are carefully adjusted before leaving the factory. The oscillator trimmers seldom need attention.

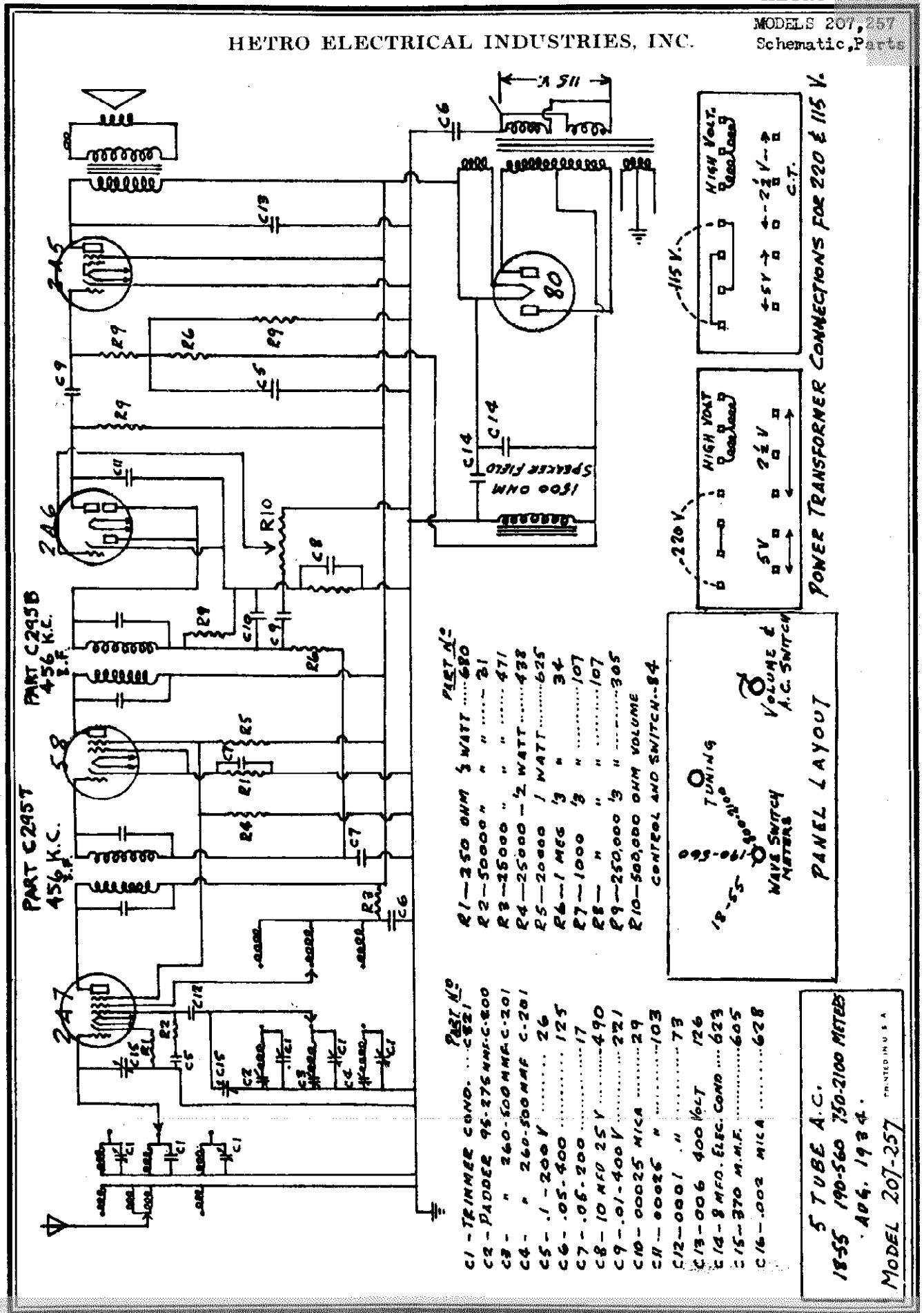


Battery equipment: 155 or 180 volts "B"
 22 1/2 volts "C"
 2 or 3 volts "A"

7 TUBE BATTERY RECEIVERS
 Model 6EB 18-52 175-555 meters.
 Model 6LB 18-52 175-555 750-2100 meters.

HETRO ELECTRICAL INDUSTRIES, INC.

MODELS 207, 257
Schematic, Parts



PART C295T
456 K.C.

PART C295B
456 K.C.

- PLATE A.C.
- R1 - 250 OHM 1/2 WATT ... 680
 - R2 - 50000 " " " ... 21
 - R3 - 25000 " " " ... 471
 - R4 - 25000 - 2 WATT ... 438
 - R5 - 20000 1 WATT ... 625
 - R6 - 1 MEG 1/2 " " ... 34
 - R7 - 1000 " " " ... 107
 - R8 - " " " " ... 107
 - R9 - 250,000 " " " ... 305
 - R10 - 500,000 OHM VOLUME CONTROL AND SWITCH ... 84

- PART NO
- C1 - TRIMMER COND. ... C821
 - C2 - PADDER 95-376 MFC-C-00
 - C3 - " 260-500 MFC-C-201
 - C4 - " 260-500 MFC C-201
 - C5 - .1 - 200V ... 26
 - C6 - .05-400 ... 125
 - C7 - .05-200 ... 17
 - C8 - 10 MFD 25V ... 490
 - C9 - .01-400V ... 221
 - C10 - 00025 MICA ... 29
 - C11 - 00025 " ... 103
 - C12 - 0001 " " ... 73
 - C13 - 006 400 VOLT 126
 - C14 - 8 MFD. ELEC. COND ... 623
 - C15 - 370 M.M.F. ... 605
 - C16 - .002 MICA ... 628

18-55
TUNING
VOLUME & A.C. SWITCH
METERS
PANEL LAYOUT

115 V.

HIGH VOLT. 0-1000 VOLTS

5V → 2 1/2 V → 115 V →

220 V.

HIGH VOLT 0-1000 VOLTS

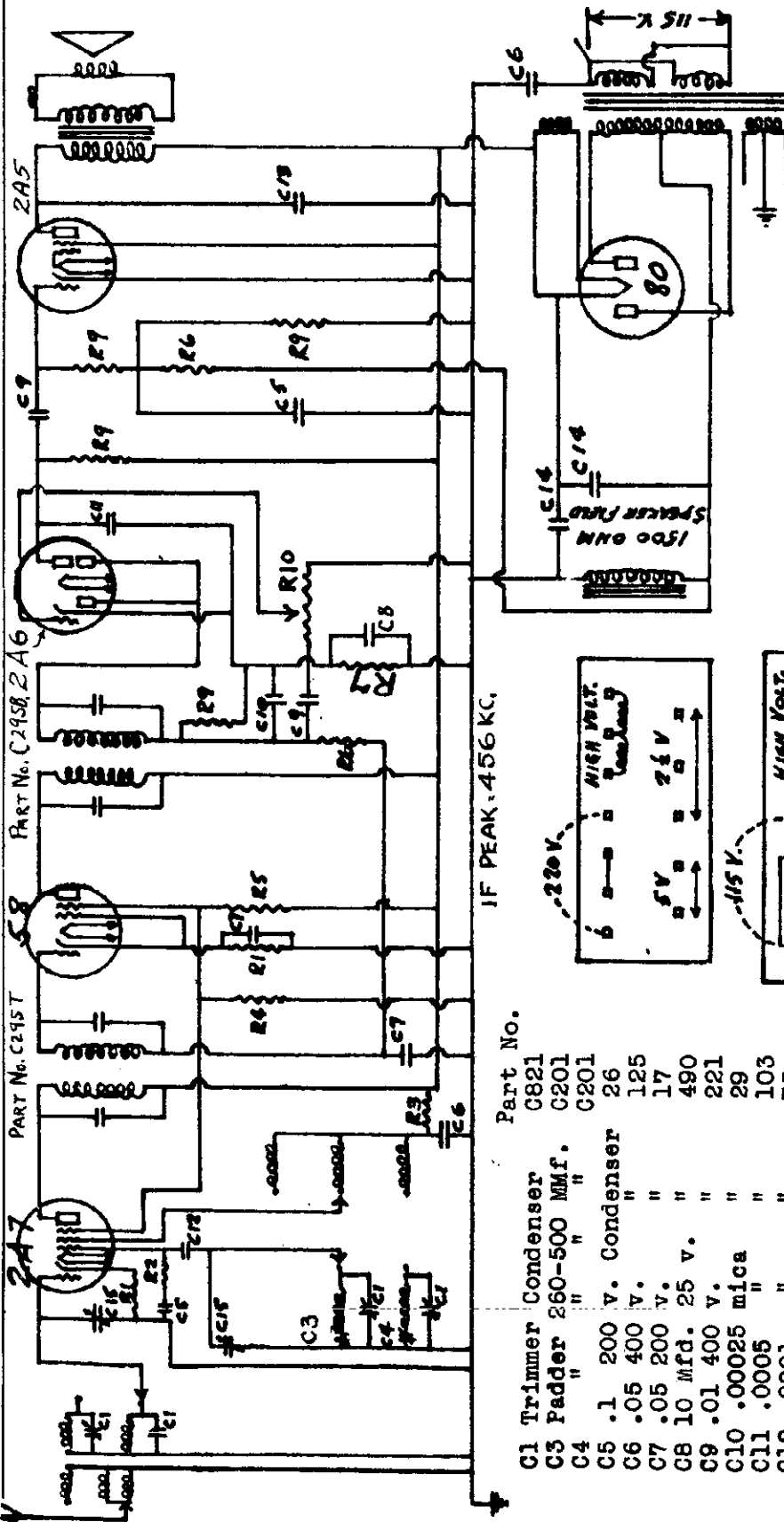
5V → 2 1/2 V → 115 V →

POWER TRANSFORMER CONNECTIONS FOR 220 & 115 V.

5 TUBE A.C.
1855 190-560 750-2100 METERS
APR. 1934.
MODEL 207-257
PAT. IN U.S.A.

MODELS 209,259
Schematic, Parts

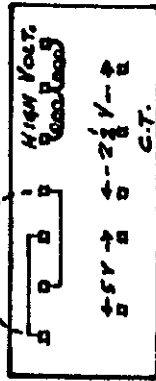
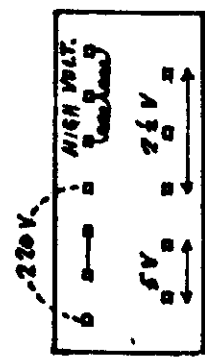
HETRO ELECTRICAL INDUSTRIES, INC.



Part No.

- C1 Trimmer Condenser C821
- C3 Padder 260-500 MMF. C201
- C4 " " " C201
- C5 .1 200 V. Condenser 26
- C6 .05 400 V. " 125
- C7 .05 200 V. " 17
- C8 10 Mfd. 25 v. " 490
- C9 .01 400 v. " 221
- C10 .00025 mica " 29
- C11 .0005 " " 103
- C12 .0001 " " 73
- C13 .006 400 v. " 126
- C14 8 mfd. electrolytic 623
- C15 370 MMF. Var. cond. 605
- C16 .002 mica cond. 628
- R1 250 ohm 1/3 watt 680
- R2 50.000 ohm 1/3 watt 31
- R3 25.000 " " 471
- R4 25.000 " 1/2 " 438
- R5 20.000 " 1 " 625
- R6 1 megohm 1/3 " 34
- R7 R8 1000 ohm " " 107
- R9 250.000 " " 305
- R10 500.000 " volume control and A.C. switch 84

IF PEAK 456 KC.



POWER TRANSFORMER CONNECTIONS
FOR 200 & 115 volts A.C.

5 Tube A.C.

18 to 55 - 200 to 555 meters

MODEL 209-259

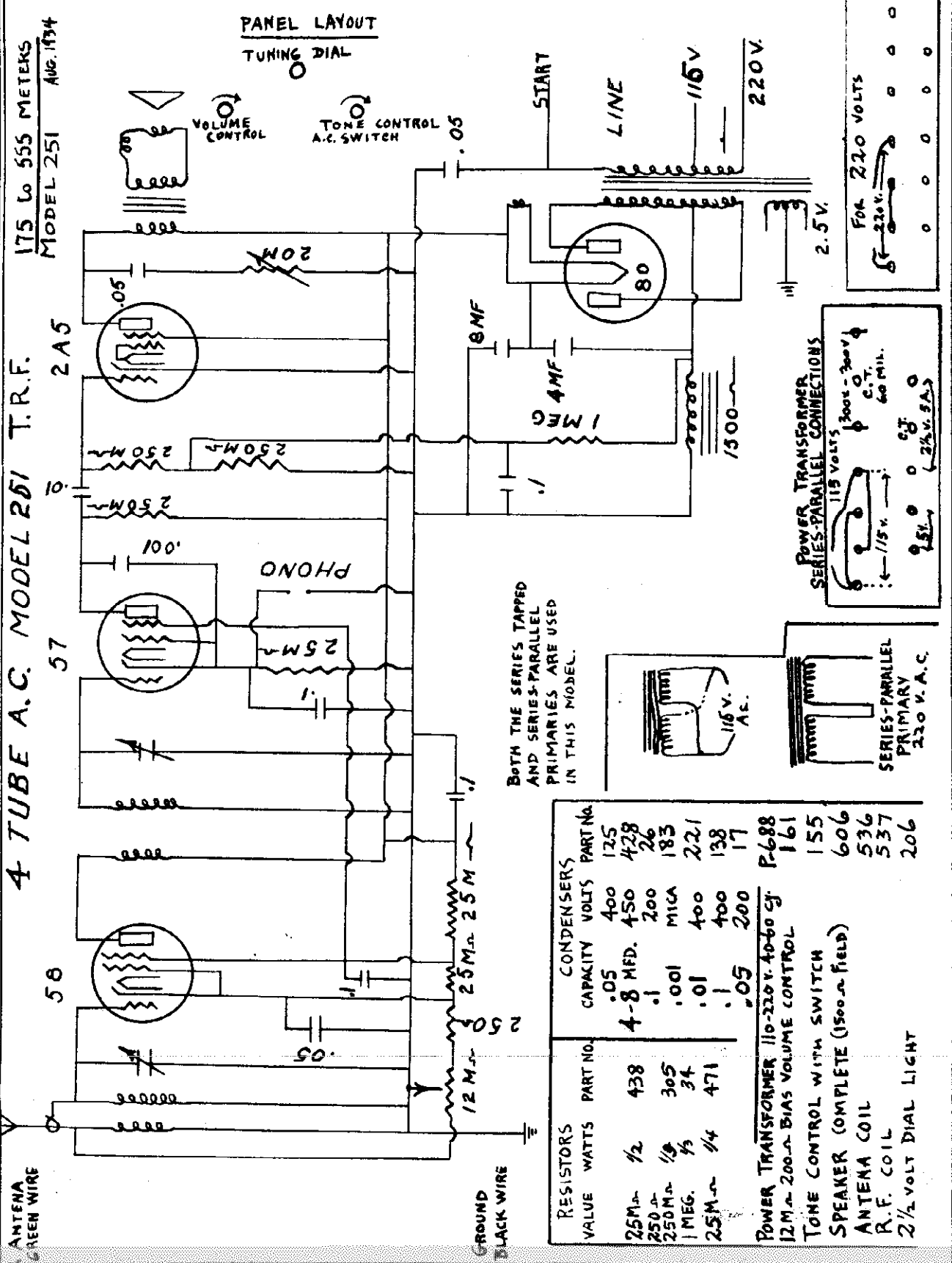
18-55 200-555 Tuning Knob
WAVE BAND SWITCH VOLUME & AC SWITCH
-METERS- Panel Layout

Aug. 1934

PRINTED IN U.S.A.

MODEL 251
Schematic

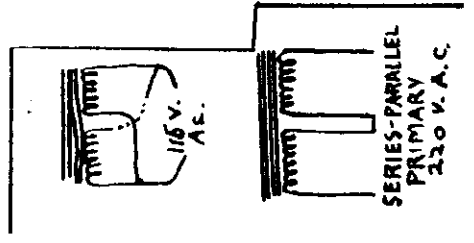
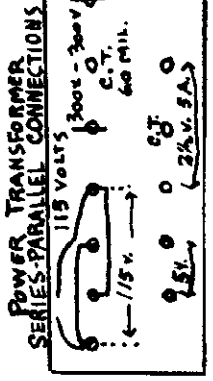
HETRO ELECTRICAL INDUSTRIES, INC.



175 Lo 555 METERS
MODEL 251
AUG. 1934

PANEL LAYOUT
TUNING DIAL

4 TUBE A.C. MODEL 251 T.R.F.



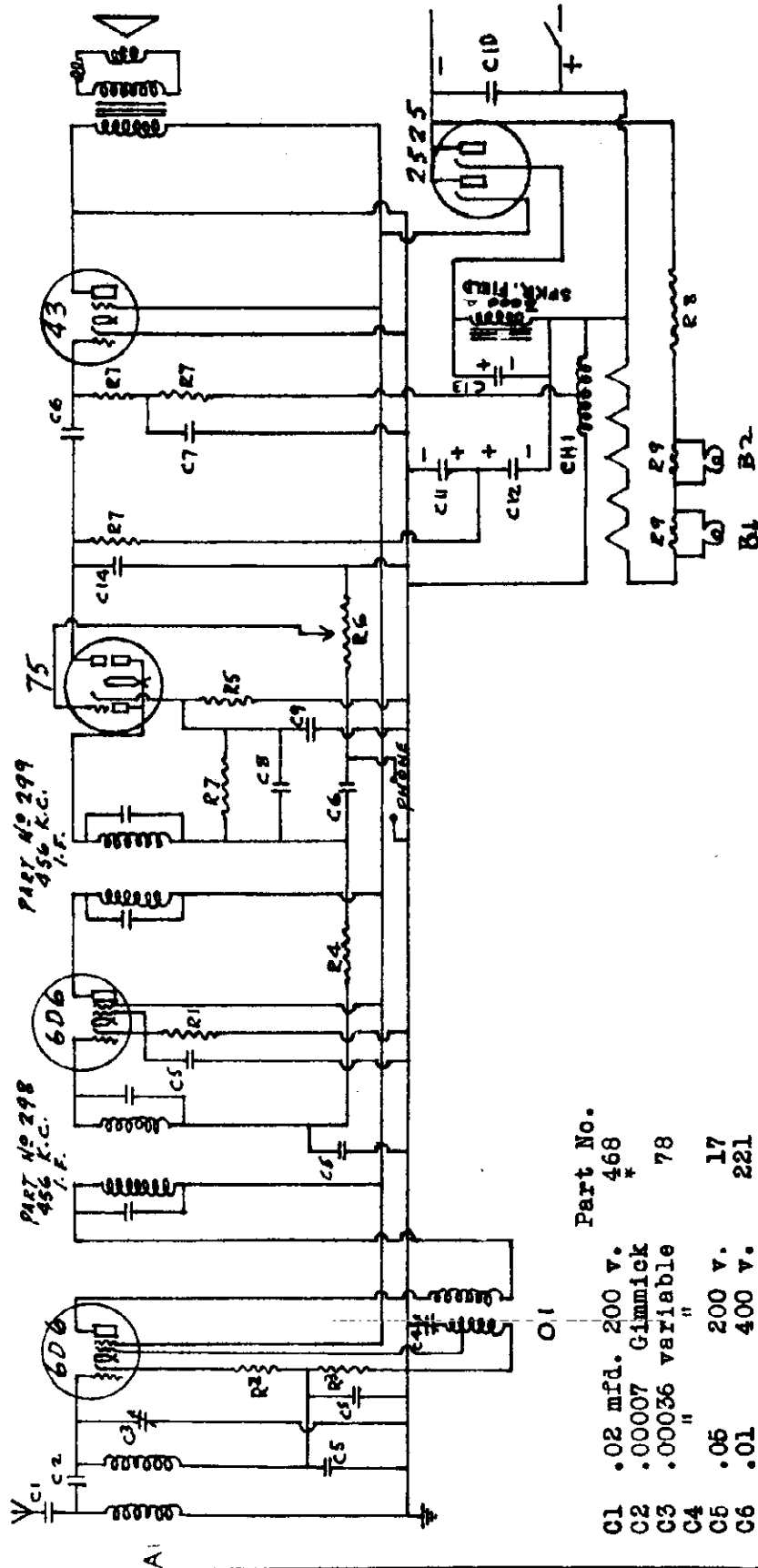
BOTH THE SERIES TAPPED AND SERIES-PARALLEL PRIMARIES ARE USED IN THIS MODEL.

RESISTORS	CONDENSERS
VALUE	CAPACITY
WATTS	VOLTS
PART NO.	PART NO.
25M Ω	.05
12	400
438	450
1/2	4-8 MED.
1/8	200
305	200
34	MICA
1/4	.001
471	.01
	400
	400
	.05
	200

POWER TRANSFORMER 110-220 V. 40-60 CF. P-688
12M Ω 200 Ω BIAS VOLUME CONTROL 161
TONE CONTROL WITH SWITCH 155
SPEAKER COMPLETE (1500 Ω FIELD) 606
ANTENNA COIL 536
R.F. COIL 537
2 1/2 VOLT DIAL LIGHT 206

MODEL 295
Schematic
Parts

HETRO ELECTRICAL INDUSTRIES, INC.



5 TUBE A.C.D.C.
.175-555 METERS.
Aug.-1934.
MODEL 295
PRINTED IN U.S.A.

C1	.02 mfd.	200 v.	468	Part No.
C2	.00007 Gimmick		*	
C3	.00036 variable		78	
C4	"			
C5	.05	200 v.	17	
C6	.01	400 v.	221	
C7	.1	200 v.	26	
C8	.00025 Mica		29	
C9	10. mfd.	25 v.	490	
C10	.1	400 v.	138	
C11	10 Mfd.	Filter	466	R6 500.000 ohms volume control & switch
C12	25 "	"		R8 Service cord & plug with 120 ohm restr.
C13	5 "	"	103	R9 40 ohm, 10 watt center tapped resistor
C14	.0006	Mica	680	Complete speaker 3000 ohm field
R1	250	1/3 Watt	180	CH1 600 ohm choke tapped at 200 ohms
R2	300	"	549	A1 antenna coil
R3	3M	"	34	O1 Oscillator coil
R4	1 Megohm	"	361	B1, B2, 6 volt dial bulbs
R5	5M	"		
R7	250M	"	306	

*The phrase gimmick designates a wire wound around another wire

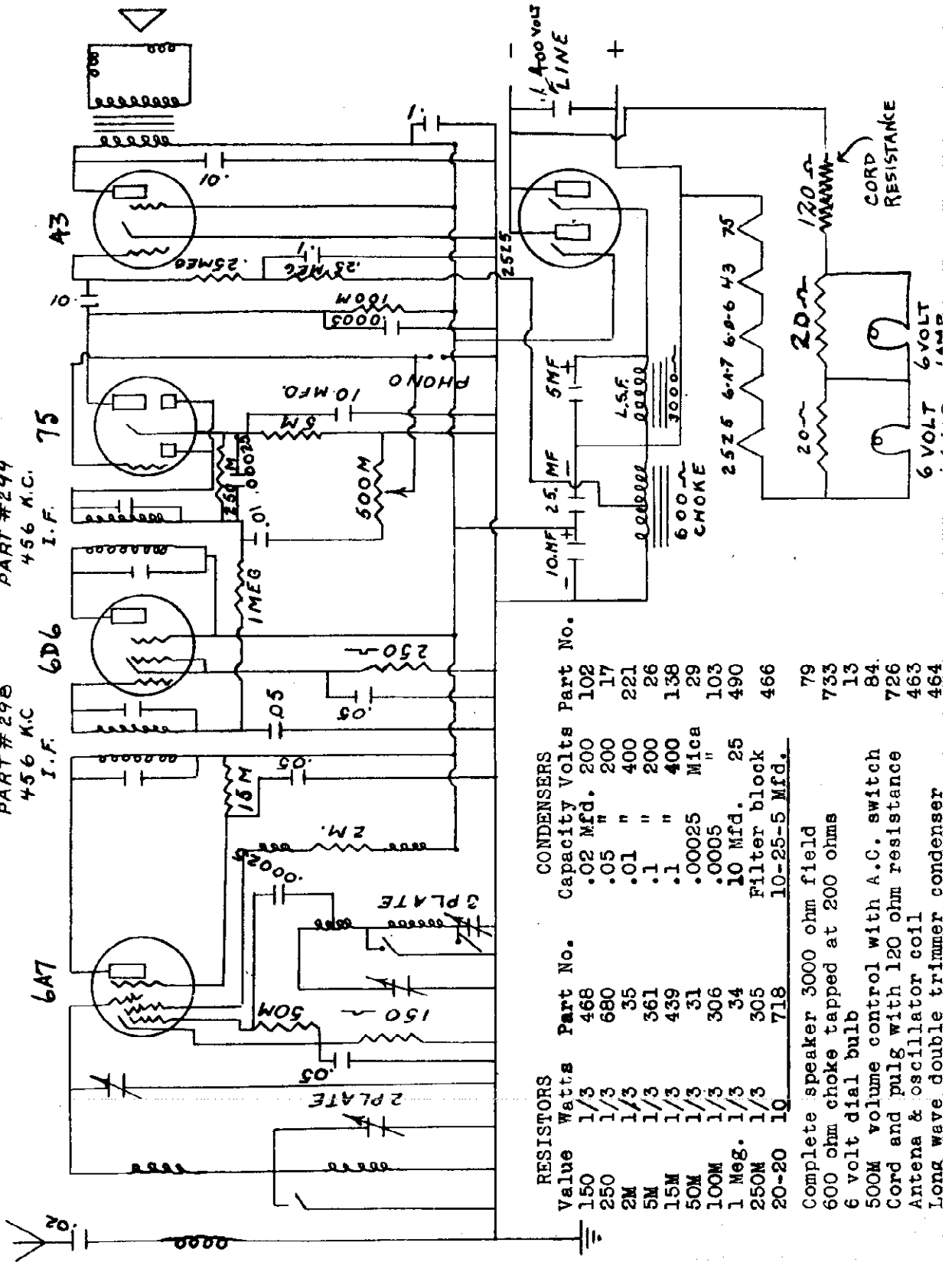
HETRO ELECTRICAL INDUSTRIES, INC.

MODEL 297
Schematic
Parts

MODEL 297 STUBE A.C.D.C. 200-2200 METERS

AUG. 1934

PART # 299 PART # 299
456 K.C. 456 K.C.
I.F. I.F.



RESISTORS	CONDENSERS		
Value Watts	Part No.	Capacity Volts Part No.	
150 1/3	468	.02 Mfd. 200	102
250 1/3	680	.05 " 200	17
2M 1/3	35	.01 " 400	221
5M 1/3	361	.1 " 200	26
15M 1/3	439	.1 " 400	138
50M 1/3	31	.00025 Mica	29
100M 1/3	306	".0005 "	103
1 Meg. 1/3	34	10 Mfd. 25	490
250M 1/3	305	Filter block	466
20-20 10	718	10-25-5 Mfd.	

- Complete speaker 3000 ohm field
- 600 ohm choke tapped at 200 ohms
- 6 volt dial bulb
- 500M volume control with A.C. switch
- Cord and pulg with 120 ohm resistance
- Antena & oscillator coil
- Long wave double trimmer condenser

MODEL 412

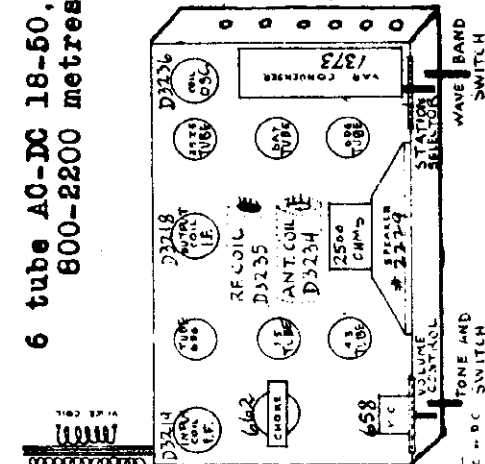
MODEL 466

HETRO ELECTRICAL INDUSTRIES, INC.

Schematic, Socket

6 tube A0-DC 18-50, 200-555 and 800-2200 metres. #412-466

TRIMMERS
 Metres 200-550] OSC.
 18-50]
 200-550] R.F.
 18-50]
 200-550] ANT.
 18-50]



CONDENSERS VOLTS		RESISTORS WATTS	
C 1	.006	R 1	250M ohm 1/3
C 2	.05	R 2	25M " "
C 3	.25	R 3	250 " " "
C 4	.05	R 4	10M " " "
C 5	.1	R 5	4M " " "
C 6	.1	R 6	1 MEG. " " "
C 7	.1	R 7	1 " " "
C 8	.006	R 8	100M " " "
C 9	.0001 Mica	R 9	500M Volume Control
C10	10.0	R10	10M ohm 1/3
C11	.02	R11	250M " " "
C12	10.0	R12	500M " " "
C13	.02	R13	500 " " "
C14	.006	R14	100M Tone Control
C15	.1	R15	55 } Line
C16	16.0	R16	115 } Filament
C17	24.0	R17	250 ohm 1/3
C18	.05		
C19	.5		

Speaker, 2500 ohm field,
 43 out-put; Part #2229.
 Volume control Part #658
 Tone control Part #657
 Filter choke Part #662
 Wave band switch #663
 Trimmer strip #D3538
 Input I.F. transformer D3219
 Output " " D3218

TUNING COILS
 ANT. 18-550 metres #D3234
 OSC. " " #D3236
 R.F. " " #D3235
 ANT. 200-2200 " #D4324
 OSC. " " #D4326
 R.F. " " #D4325

Condensers 3,5,6,7,15 in one container #C8056
 Condensers 12,16,17 in one container #C2092
 Resistors 15,16 are one unit. Part #659

RF AND OSCILLATOR SECTION
 #412 18-50 200-550 metres
 Balance of circuit same as #466

HETRO ELECTRICAL INDUSTRIES, INC.

MODEL 6-Tube AC Schematic, Voltage Socket, Trimmers Alignment

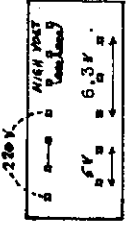
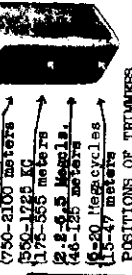
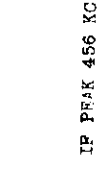
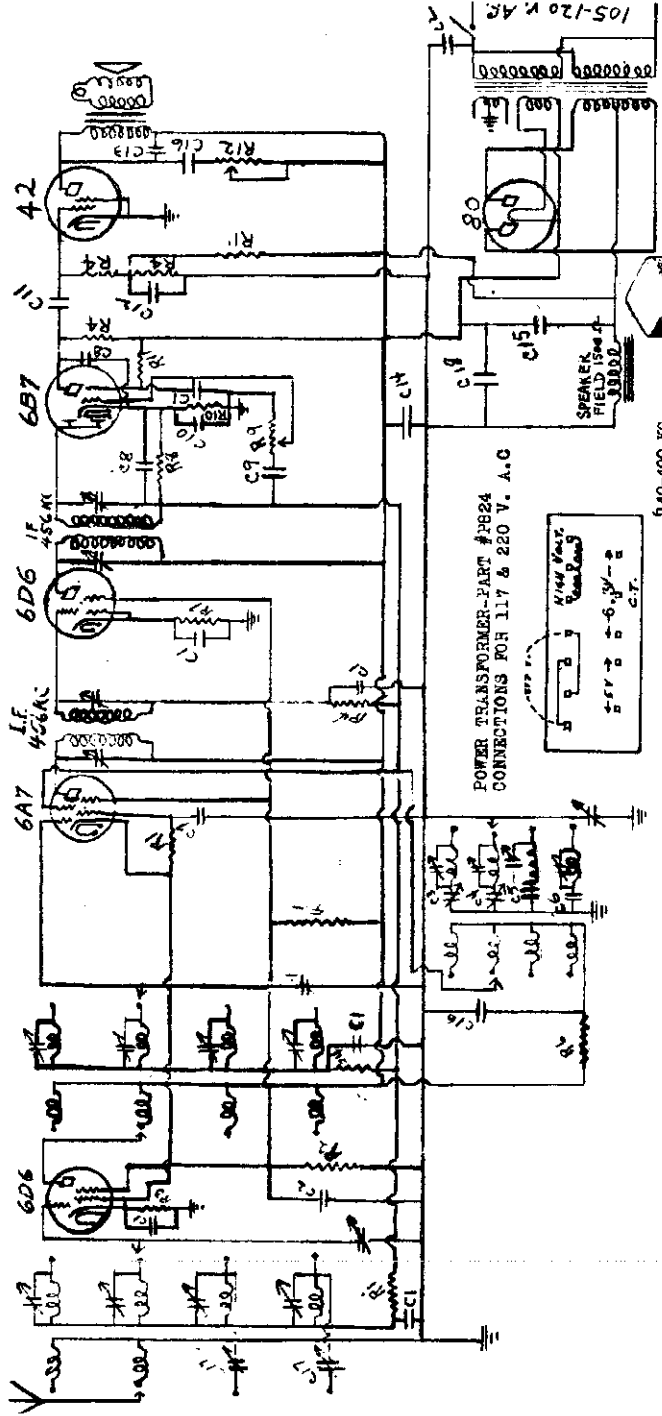
APPROXIMATE NORMAL TUBE VOLTAGES MEASURED WITH A 0-300 VOLT, 1000 OHM PER VOLT D.C. VOLTMETER WITH VOLUME CONTROL IN FULL POSITION

Tubes	Plate	Screen	Cathode	Grid
42	225-235	230-240	0	1 to 2
5B7	35-45	25-35	3 1/2	4
6D6 IF.	230-240	70-80	3 1/2	4
6D6 RF.	230-240	70-80	3 1/2	4
6A7 Det.	230-240	70-80	3 1/2	4
6A7 Osc.	155-165	-	-	-

Across speaker field 85-95 negative.

- CONDENSERS
- C 1 .05 MFD. 200 volts
 - C 2 .1 " 400 "
 - C 3 5 plate paddler
 - C 4 5 plate paddler
 - C 5 .003 mica
 - C 6 .005 "
 - C 7 .0005 "
 - C 8 .00025 "
 - C 9 .01 MFD. 400 volts
 - C 10 .1 " 25 "
 - C 11 .02 " 400 "
 - C 12 .1 " 200 "
 - C 13 .006 " 400 "
 - C 14 .5 " 400 "
 - C 15 8. " Electrolytic
 - C 16 .05 " 400 volts
 - C 17 30 mmfd. trimmers
 - C 18 30. MFD. Electrolytic
- RESISTORS
- R 1 50,000 ohms 1/2 watt
 - R 2 25,000 " 1/2 "
 - R 3 250 " 1/2 "
 - R 4 50,000 " " "
 - R 5 15,000 " " "
 - R 6 20,000 " " "
 - R 7 500 " " "
 - R 8 300,000 " " "
 - R 9 500,000 " " "
 - A.C. switch
 - R10 5,000 ohms 1/2 watt
 - R11 1 megohm " "
 - R12 40,000 ohms tone control

6 TUBE A.C. 15-2100 METERS

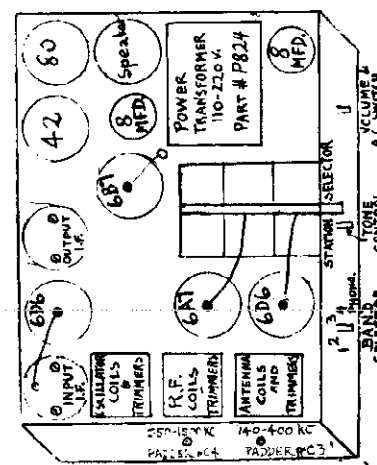


ALIGNMENT: The use of a service oscillator or signal generator is imperative.

I.F. TRANSFORMERS: Connect the signal generator to the grid of the 6A7 tube through a .05 mfd. or smaller capacity condenser, set the rotor plates of the tuning condenser completely out and adjust the trimmers on top of the I.F. transformers to a 456 KC signal from the generator. Volume control must be at maximum and the signal from the generator attenuated to a minimum so that no action is obtained from the automatic volume control.

ANTENNA, R.F., and OSCILLATOR stages. Connect the antenna and ground leads of the generator to the antenna and ground of the receiver. To align first short wave band set the generator and the receiver at 16 megacycles, adjust the trimmers of this band to maximum output. The same procedure is to be followed in aligning the other bands and adjustments should be made at the following frequencies: Second short-wave band at 6 megacycles (6000 KC.); Medium-wave #3 at 1500 KC.; Extra long-wave #4 at 300 KC. See diagram for trimmer and coil positions inside of shields. The OSCILLATOR trimmers will affect the dial setting and should not be changed unless absolutely necessary.

CAUTION: DO NOT ATTEMPT TO ALIGN THE RECEIVER UNLESS YOU HAVE SOME EXPERIENCE. IF THE RECEIVER PERFORMS WELL DO NOT RE-ALIGN. Signal generators usually emit a harmonic signal of slightly higher frequency than the fundamental and in adjusting the lower setting should be used. All adjustments should be made with a minimum input signal from the generator.



BAND SELECTOR SWITCH POSITIONS

- 1-Short waves 6 to 20 megacycles 15-47 meters
- 2-Short waves 2.2 to 6.5 " 46-125 "
- 3-Medium waves-Broadcast 550-1725 KC. 175-555 M.
- 4-Extra long waves 140-400 KC. 750-2100 meters

Extreme right position for phonograph operation

MODEL 6-Tube AC-DC

Schematic, Voltage HETRO ELECTRICAL INDUSTRIES, INC.
Socket, Trimmers Alignment

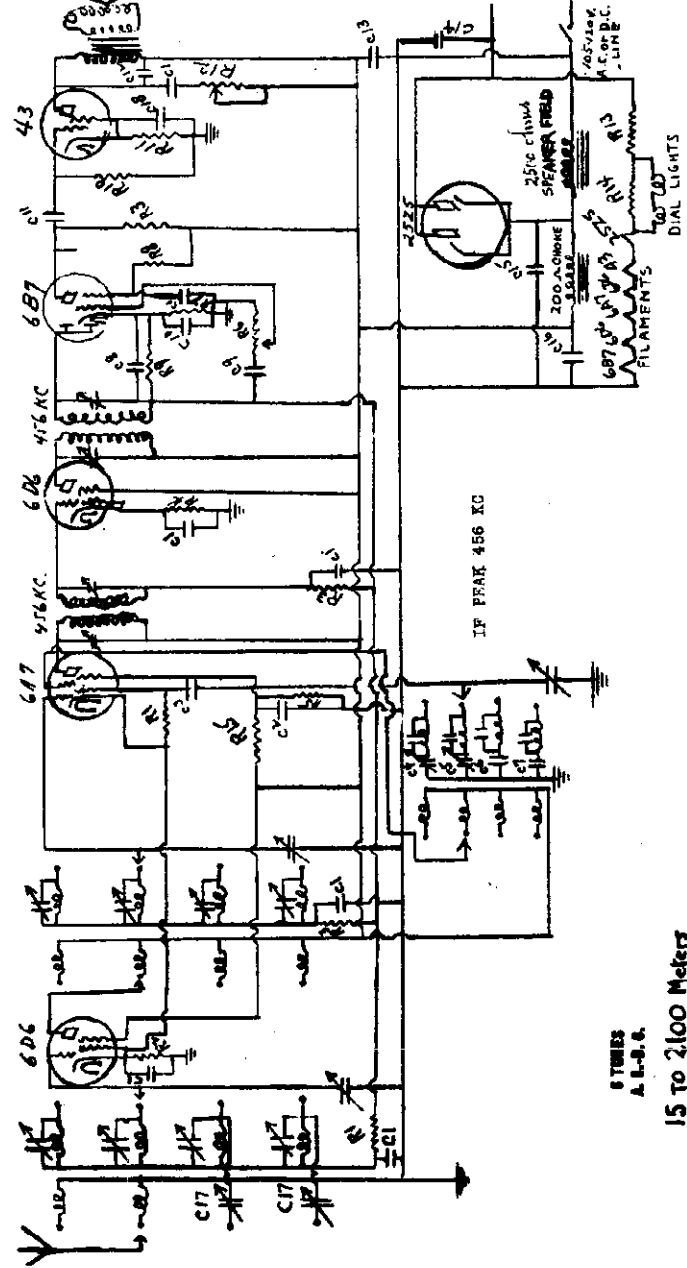
These models should not be used with currents higher than 125 volts without an external voltage reducer. Do not remove tubes or speaker while the receiver is operating. Do not use a ground connection unless in series with a condenser of at least 400 volts test. If after the set has been connected to D.C. for 1 minute fails to operate, reverse the plug in the current outlet.

ALIGNMENT: The use of a service oscillator or signal generator is imperative. I.F. transformers. Connect signal generator to grid of 6A7 through a .05 mfd. condenser, with the rotor plates of the tuning condenser completely cut; adjust the trimmer on top of the transformer to a 456 KC signal from the generator. Volume control at maximum, attenuate signal so that automatic volume control action is not obtained.

To align the ANTENNA, RF, and OSCILLATOR stages, the antenna and ground leads of the signal generator should be connected to the antenna and ground connections of receiver.

ANTENNA, R.F., and OSCILLATOR stages are adjusted with the trimmers located inside of the shields. See diagram for positions. 1st Short wave band should be adjusted with a signal of 16 megacycles. 2nd Short wave band at 6 megacycles (6000 cycles). Medium wave No. 3 at 1500 kilocycles. Long Waves No. 4, at 300 kilocycles.

The OSCILLATOR trimmers will affect the dial settings and should not be changed unless absolutely necessary.
CAUTION: DO NOT ATTEMPT TO ALIGN THE SET UNLESS YOU HAVE SOME EXPERIENCE AND IS ABSOLUTELY NECESSARY.



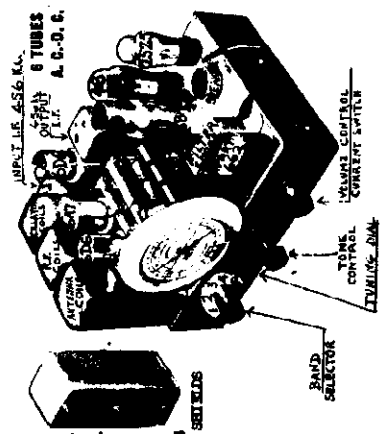
APPROXIMATE NORMAL TUBE VOLTAGES MEASURED WITH A 0-300 VOLT, 1000 OHM PER VOLT D.C. VOLTMETER, VOLUME CONTROL IN FULL POSITION.

Tubes	Plate	Screen	Cathode
6A7	90 to 100	95 to 105	15 to 15
6B7	15 to 20	10 to 15	5 to 15
6D6	95 to 105	95 to 105	25 to 35
6A7	95 to 105	95 to 105	5 to 4
6A7	95 to 105	95 to 105	5 to 4
6A7	95 to 105	95 to 105	5 to 4

6A7 Oscillator plate voltage 95 to 105
Across speaker field 95 to 105 volts D.C.

- CONDENSERS**
- C 1 .05 mfd. 200 volts
 - C 2 .1 " "
 - C 3 .0005 mica
 - C 4 5 plate padder
 - C 5 .05 " "
 - C 6 .005 mica
 - C 7 .005 " "
 - C 8 .00025 " "
 - C 9 .01 mfd. 400 volts
 - C 10 .10 " 50 "
 - C 11 .08 " 400 "
 - C 12 .006 " "
 - C 13 .5 " 200 "
 - C 14 .08 " 400 "
 - C 15 .24 " 500 "
 - C 16 . " "
 - C 17 30 mfd. Trimmer
 - C 18 10. mfd. 25 volts.
- *C15, C16, C18 are in one container. Part #C8098
- RESISTORS**
- R 1 50,000 ohms 1/2 watt
 - R 2 200 " "
 - R 3 250,000 " "
 - R 4 250 " "
 - R 5 10,000 " "
 - R 6 500,000 " volume control
 - R 7 5,000 ohms 1/2 watt
 - R 8 1 megohm " "
 - R 9 500,000 ohms " "
 - R 10 500,000 " "
 - R 11 500 " "
 - R 12 40,000 " Tune control
 - R 13 115 " One unit
 - R 14 53 " "
 - R 15 4,000 " 1/2 watt
- *R13, R14 are in a single unit Gaudoin, Part #459

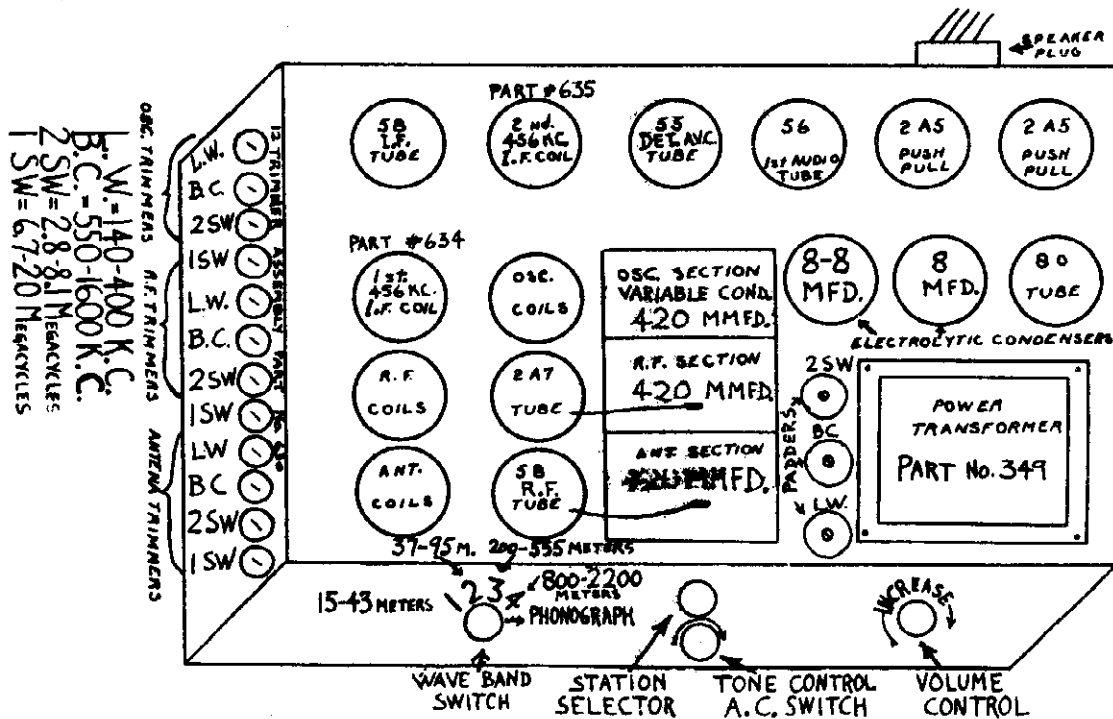
8 TUBES
A. E. - D. C.
15 TO 2100 Meters
Sept. 1935



- POSITIONS OF TRIMMERS AND COILS WITHIN THE SHIELDS
- 150-400 KC.
 - 750-2100 meters
 - 175-555 KC.
 - 175-555 meters
 - 2.2-6.5 Megacyle.
 - 34-125 meters
 - 15-47 meters

MODEL 8-Tube
Superhet.
Voltage, Socket
Trimmers, Parts

HETRO ELECTRICAL INDUSTRIES, INC.



CHASSIS LAYOUT

8 TUBE SUPERHETERODYNE
Tuning Ranges

15 to 100, 200 to 555, 800 to 2100 Meters

SWITCH POSITIONS:

No. 1 - 15 to 45 Meters - 6.7 Megacycles	No. 2 - 37 to 95 Meters - 2.1 - 2.8 Megacycles
No. 3 - 200 to 555 Meters - 1400 - 550 Kilocycles	No. 4 - 800 to 2100 Meters - 140 - 400 Kilocycles

TUBE - SOCKET - VOLTAGES - 115 VOLT A.C. LINE

Tubes	Screen Grid to Ground	Plate to Ground	Cathode to Ground	Filament Heater-Volts
55 End. Det. A.V.C.	-	50-60	-	2.5-2.5 A.C.
56 A.F. Driver	-	225-235	10-12	2.5-2.5 A.C.
58 I.F.	70-80	225-235	24-4	2.5-2.5 A.C.
58 R.F.	70-80	225-235	24-4	2.5-2.5 A.C.
2A5 Push-Pull	220-245	225-235	18-22	2.5-2.5 A.C.
2A7 Det. Sec.	70-80	225-235	8-3	2.5-2.5 A.C.
80 Rectifier	-	150-160	-	2.5-2.5 A.C.

80 Rectifier Filament to Ground 235 to 260 Volts
Across Filament 4.5 to 5 Volts A.C.
Voltage drop across Speaker Field 95 to 105 Volts.
Voltage drop across Filter Choke 14 to 16 Volts.
All voltages taken with 250-500 Volt, 1000 ohms per volt meter.
Volume control on full and no signal in Receiver.

CONDENSERS

Part No.

C 1 .00042 var.	425
C 2 Trimmers	630 2 plates
C 3 Padders	629
C 4 " "	629 } 5 plates
C 5 " ,002 mica	629
C 6 .005 mica	627
C 7 .05 200 volts	17
C 8 .25 200 "	442
C 9 .05 200 "	17
C10 .05 400 "	125
C11 .00025 mica	29
C13 .006 400 volts	126
C14 10 Mfd. 25 volts	490
C15 .006 400 volts	126
C16 8 Mfd. 600 volts	622
C17 .01 400 volts	221
C18 .25 200 "	442
C19 .01 400 "	221
C20 .0005 mica	103
C21 8-8 Mfd. 500 volt	604

RESISTORS

PART NO.

R 1 2 Megohm	1/4 watt	33
R 2 250 ohm	1/4 "	567
R 3 15M "	1/4 "	439
R 4 20M "	1 "	625
R 5 15M "	3 "	389
R 6 25M "	1/4 "	471
R 7 250M "	1/4 "	305
R 8 50M "	1/4 "	31
R11 6M "	1/4 "	656
R13 500 "	1 "	626
R10 2Meg. volume control		410
R12 500M ohm tone control and A.C. Switch		418
R14 300 ohm 1/3 watt		180
R15 700 ohm 1/3 "		548
R16 30M ohm 1.3 "		487

OCT. 1934

MODEL 9-Tube
Air-Ace
Alignment

HETRO ELECTRICAL INDUSTRIES, INC.

THE ALIGNMENT OF THE AFRESH, R.F. AND OSCILLATOR tuning coils has been greatly simplified by having the trimmers and coils connected together and mounted within the same shield. Proceed as follows: BAND No. 1: Set Band Switch at No. 1 and adjust again. With a Signal Generator, generate at 18 megacycles signal and tune the receiver to it. Then adjust to maximum output the trimmers of the antenna, R.F. and Oscillator stages in #1 band (6 to 20 megacycles) located at the bottom of each coil assembly. (2) Also set the Signal Generator at 9 or 10 megacycles. If no Signal Generator is available, the signal from a 16 or 19 meter short wave station may be used while the receiver is tuned to it. BAND No. 2: Set the Band Switch at No. 2 position. Set the Signal Generator at 6 megacycles, tune the set to the signal, adjust to maximum output the trimmers of the Antenna, R.F. and Oscillator stages in #2 band (2.2-6.5 megacycles) located second from the bottom in all coil assemblies. Set the Signal Generator at 2000 KC. and adjust the padder condenser C6 nearest to the back of the chassis to maximum output. Check again at 5 megacycles. If Signal Generator is not available a 47 or 49 meter short wave station may be used. BAND No. 3: Place Band Switch in No. 3 position, set the Signal Generator at 1500 KC., tune the set to the signal. If a Signal Generator is not available, tune in a station at about this frequency and adjust to maximum output the Antenna, R.F. and Oscillator coil trimmers (550-1725 KC.) to maximum output in all coil assemblies; set the Signal Generator at 600 KC., tune from the bottom in all coil assemblies; set the padder condenser in this band, (the other C6) to maximum output, then tune again to 1500 KC. and reset. BAND No. 4: With Band Switch in No. 4 position, set the Signal Generator to 350 KC. tune the set to the signal and adjust trimmers of the 140 to 400 KC. band (located at the top of the coil assemblies) to maximum output, set the Signal Generator at 160 KC., tune the receiver to the signal and adjust the padder C6 to maximum volume, turn the set to 350 KC. and recheck. This completes the alignment. All sets are carefully adjusted before leaving the factory and will require little or no adjustment, particularly the Oscillator trimmers and the padder condensers, which should not be touched unless absolutely necessary. The alignment should be done preferably with a Signal Generator or Oscillator and by someone with some experience. Variation of the Oscillator trimmers and the padder condensers will vary the dial calibration. All adjustments should be done very slowly. A 1/2 turn of the screws should be sufficient in most cases. CAUTION: If the receiver is not performing correctly, before attempting to re-align the receiver be sure that the grid caps are not "shorted" to the ground, that all tubes are good and that the grid caps are not "shorted" higher shields. If the receiver performs well, do not re-align. When aligning was an insulated screw driver. Adjustments should be made with a minimum input signal. Signal generators usually emit a harmonic signal of slightly higher frequency than the fundamental and in adjusting the lower of the settings should be used. When adjusting the R.F. rotate slightly the receiver dial and reset again to the generator signal because the latter is often changed by the R.F.

NOTES ON SHORT-WAVE RECEPTION

Adjustment and Control—The efficiency of any antenna varies greatly with the frequency of incoming radio waves. A given length of antenna is most efficient at certain frequencies and is inefficient at other frequencies. From a practical standpoint, however, very good results can be obtained using two antennas of different lengths, one 25-30 feet for short-wave reception and the other 20-30 feet for medium-wave reception. The antenna for short-wave reception should be made of galvanized iron pipe or steel pipe and should be supported by a wooden mast. The antenna for medium-wave reception should be made of galvanized iron pipe or steel pipe and should be supported by a wooden mast. The antenna for short-wave reception should be made of galvanized iron pipe or steel pipe and should be supported by a wooden mast. The antenna for medium-wave reception should be made of galvanized iron pipe or steel pipe and should be supported by a wooden mast.

Antenna and Control—The efficiency of any antenna varies greatly with the frequency of incoming radio waves. A given length of antenna is most efficient at certain frequencies and is inefficient at other frequencies. From a practical standpoint, however, very good results can be obtained using two antennas of different lengths, one 25-30 feet for short-wave reception and the other 20-30 feet for medium-wave reception. The antenna for short-wave reception should be made of galvanized iron pipe or steel pipe and should be supported by a wooden mast. The antenna for medium-wave reception should be made of galvanized iron pipe or steel pipe and should be supported by a wooden mast.

OPERATION

CONTROLS: The four control knobs in the front of the cabinet serve the following purposes.

WAVE BAND SWITCH: (Left hand knob) Has 5 positions. #1 corresponds with (1) on the dial and covers 15-48 meters (6 to 20 megacycles); #2 corresponds with (2) on the dial and covers 46-125 meters (2.2 to 6.5 megacycles); #3 corresponds with (3) on the dial and covers 175-535 meters (1.725 to 550 kilocycles); #4 corresponds with (4) on the dial and covers 750-2100 meters (130 to 410 kilocycles). The 5 position is for phonograph reproduction.

STATION SELECTOR: (Upper Middle Dual Knob) Large knob has a 9 to 1 tuning speed. Small knob has a speed of 45 to 1 for finer tuning.
POWER SWITCH AND VOLUME CONTROL: (Right hand knob).
TUNE CONTROL: (Lower Middle Knob).

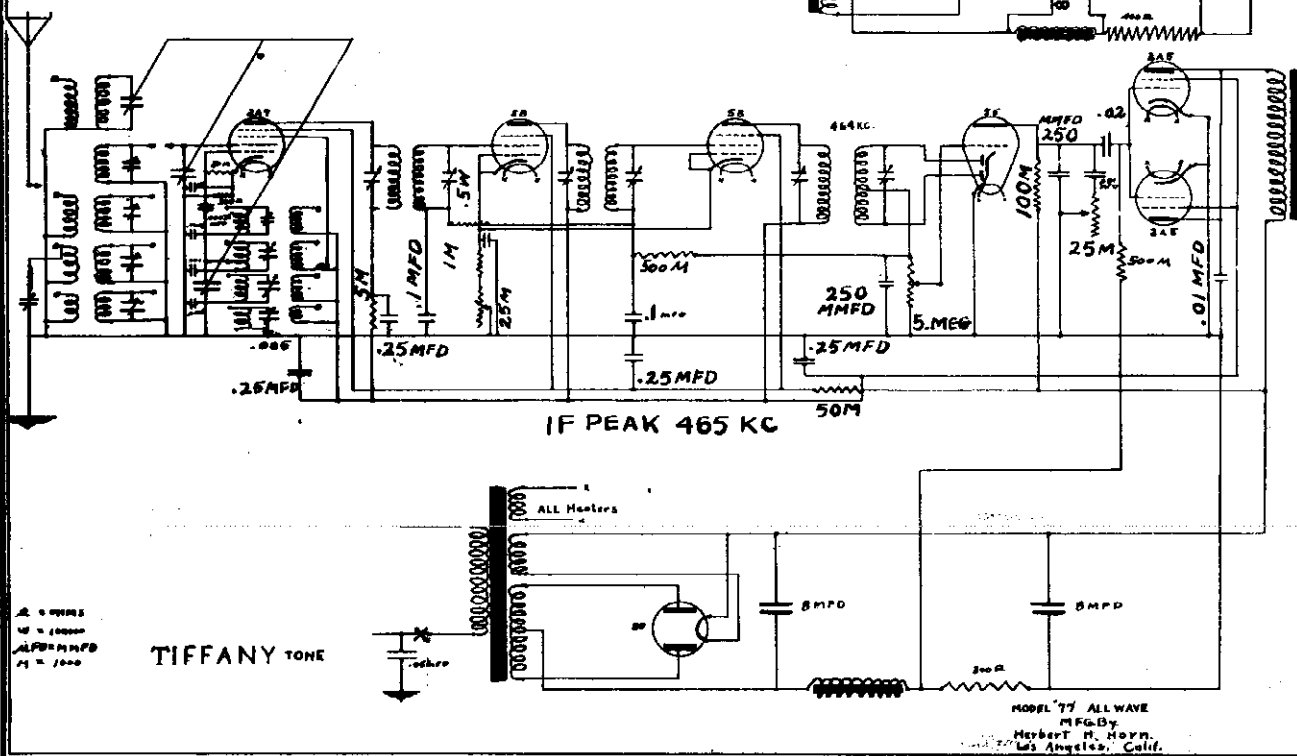
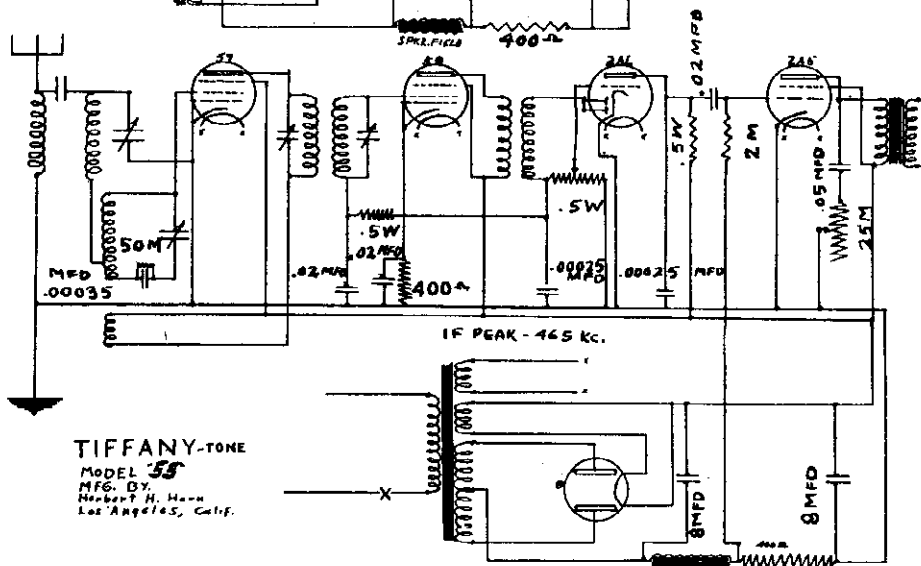
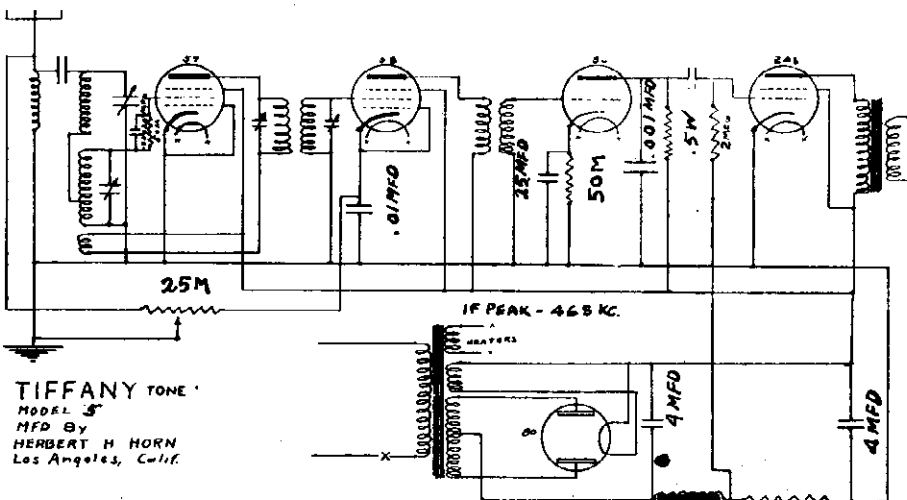
PROCEDURE: Remove all carton and packing from inside of cabinet. Make sure that tubes and tube shields are well inserted. Connect Antenna to screw marked "A" and ground to screw marked "G" in back of the chassis. Attach the power cord to the electrical outlet, first making sure that the available current is alternating and the voltage within 10% of the voltage specified in the rating tag supplied with the receiver. The actual operation is simple. However, the full possibilities of any short-wave receiver cannot be attained until the user has become familiar with the handling of the different controls. (2) Turn the power switch clockwise. (1) Set the Band Switch for the desired range. (2) Turn the power switch clockwise. This will illuminate the dial. Allow one minute for the tubes to heat. (3) Advance volume control half way and with the large selector knob turn the black pointer to frequency or wavelength of the desired station. With the small selector knob rotate very slowly the Band Spread (black) pointer over a 15 point tuning process if necessary, until the signal is heard. (4) After receiving the signal, turn Volume Control to low level. Readjust the station selector to the very exact point where the quality of the tone is best. This setting minimizes the background noise. (5) Adjust the Volume Control to the desired level. (6) Adjust tone control to desired bass response by turning clockwise. (7) When in this direction decrease treble response and noise interference. (8) When through operating, turn the Volume Control knob to its extreme counter-clockwise position to switch "off" the power. (9) For phonograph operation the Band Switch should be turned to the extreme clockwise position and the magnetic pickup terminal should be inserted in the receptacle marked "PHONO" located near the rear of the chassis. Phonograph combinations are supplied with a switch to connect or disconnect the pickup from the set. (10) The Volume and Tone controls in the set also regulate the phonograph reproduction, but an additional Volume Control in the pickup is helpful. Do not remove the speaker or tubes from their sockets while the set is in operation.

SERVICING

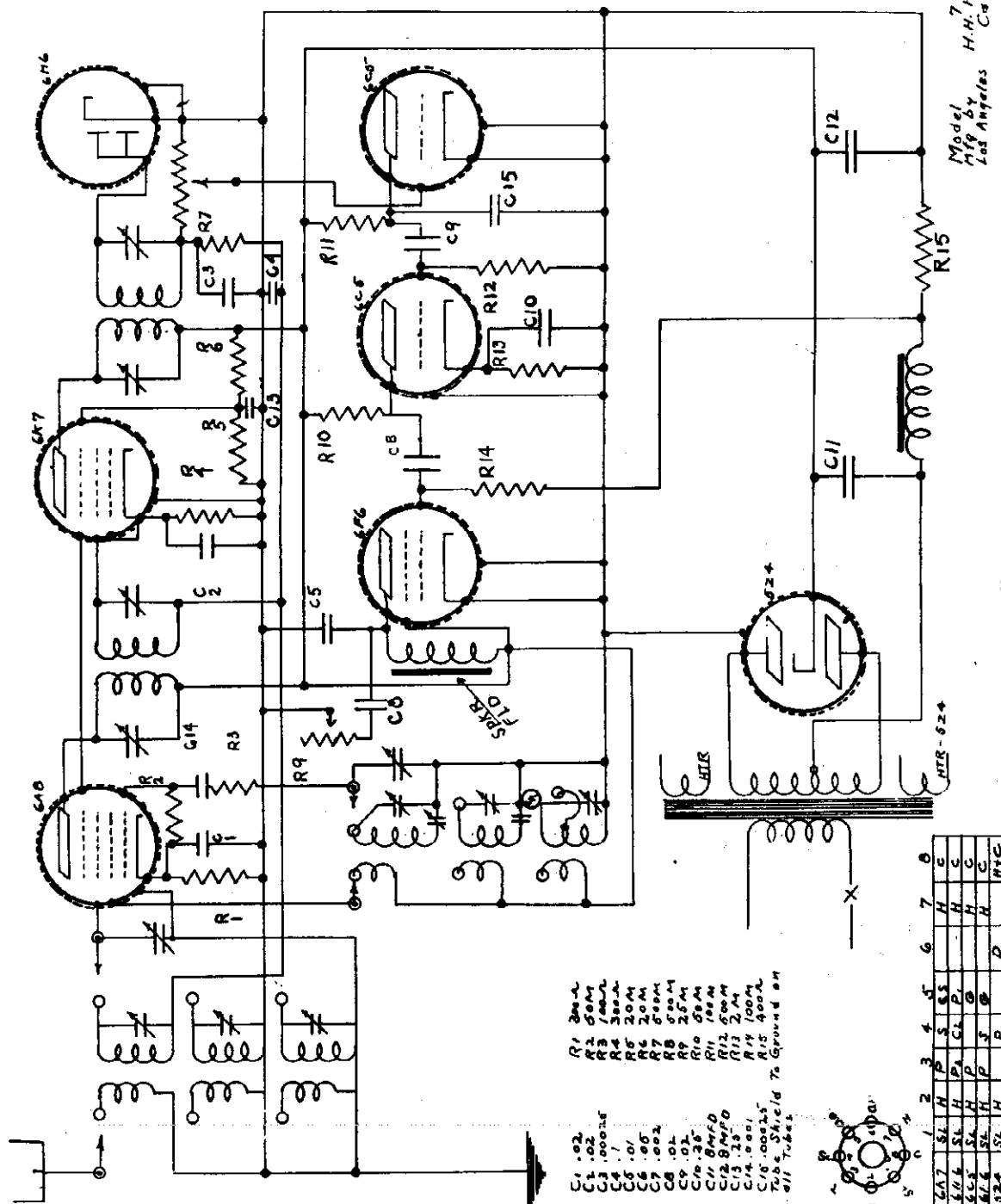
If the receiver does not oscillate in the high frequencies, try another 6AV tube. Check all plate and screen voltages. The power transformer is practically universal and by simply moving one connection in the primary, the receiver may be operated with any A.C. current from 100 to 260 volts. Make sure that the tuning dial does not touch the cabinet or the dial escutcheon and that the chassis is mounted on the rubber supports provided. The screws holding the chassis to the cabinet should be fairly loose. This will prevent microphonic noises caused by the speaker vibration, particularly while receiving short waves. ALIGNMENT and ADJUSTMENT: The I.F. frequency is 456 KC. and the I.F. transformers are adjusted in the usual manner through the trimmers located on the top side. If necessary to align the I.F. amplifier, place the Band Switch on position #3 and start with the output I.F. stage, then the interstage and finally the input I.F. which is an iron core transformer. Use an Oscillator or Signal Generator and be sure that the signal is very weak in order that the automatic Volume Control remains inactive. If the peak is correct, rotating the variable condenser should not change the signal output.

HERBERT H. HORN

MODEL 5
MODEL 55
MODEL 77
Schematics



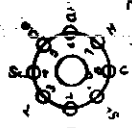
HERBERT H. HORN



Model
Mfg by
Los Angeles

7 MT
H.H. Horn
Calif.

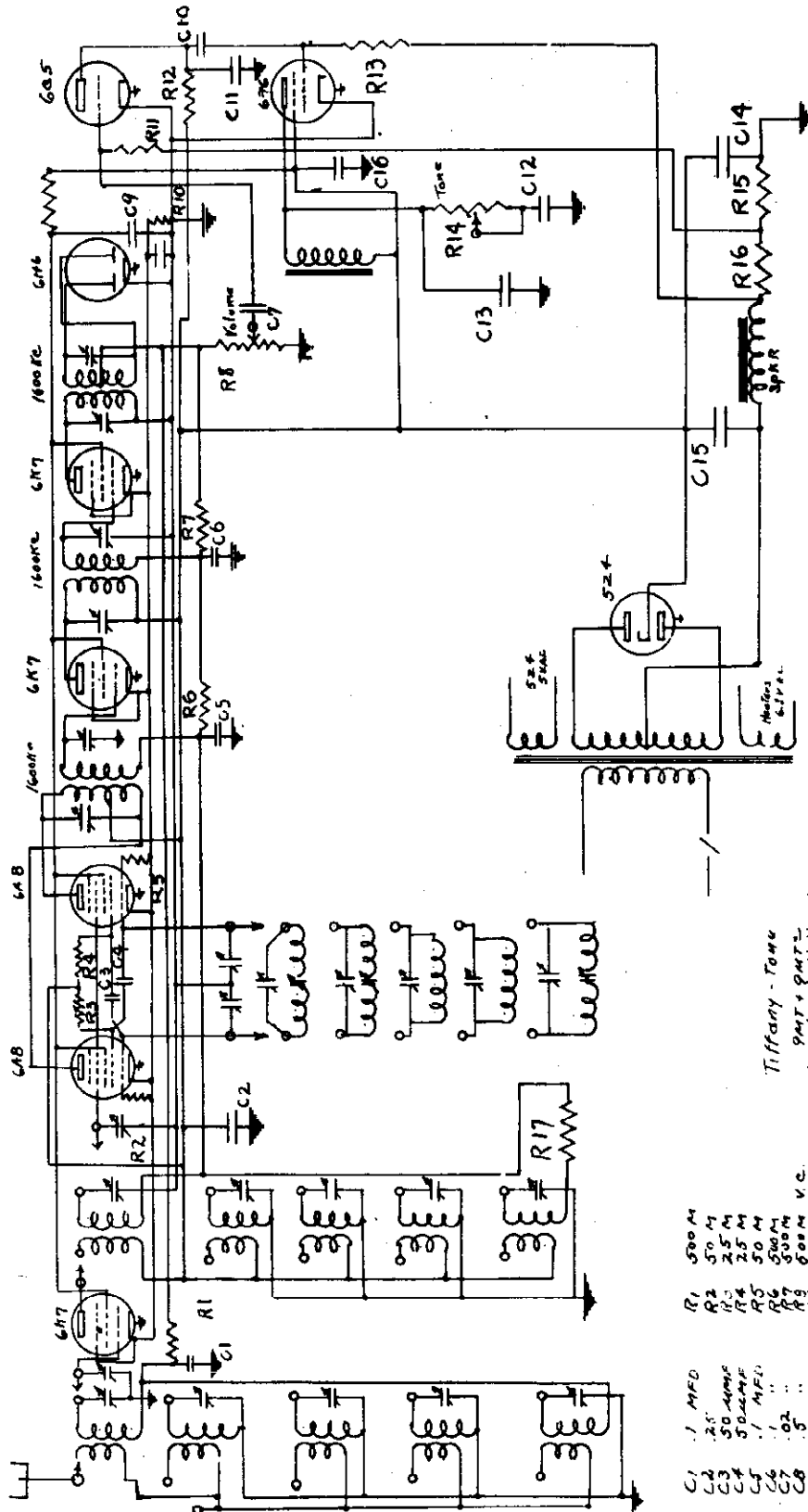
- R1 300K
- R2 600K
- R3 300K
- R4 300K
- R5 20M
- R6 20M
- R7 500M
- R8 25M
- R9 50M
- R10 50M
- R11 50M
- R12 500M
- R13 2M
- R14 100M
- R15 400K
- C1 .02
- C2 .001
- C3 .01
- C4 .01
- C5 .05
- C6 .05
- C7 .01
- C8 .01
- C9 .35
- C10 80P
- C11 80P
- C12 80P
- C13 .15
- C14 .001
- C15 .0015
- C16 .0015
- Tube Shield To Ground on
all Tubes



6X4	6AR5	6BE6	6AV6	6Z4	NTC
1	A	A	A	A	
2	B	B	B	B	
3	C	C	C	C	
4	D	D	D	D	
5	E	E	E	E	
6	F	F	F	F	
7	G	G	G	G	
8	H	H	H	H	
9	C	C	C	C	

MODELS 9MT, 9MTC
Schematic

HERBERT H. HORN

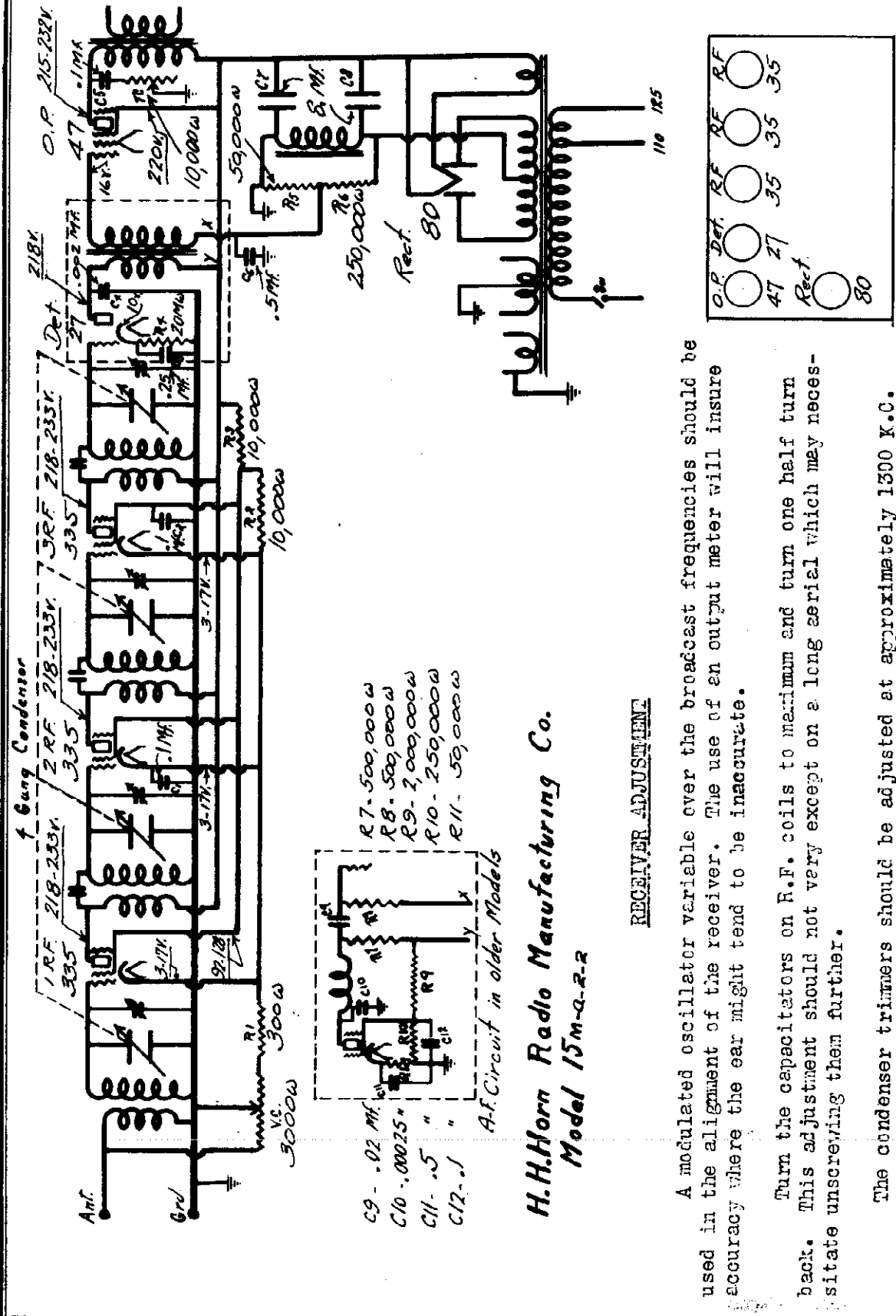


- R1 500 M
- R2 50 M
- R3 2.5 M
- R4 2.5 M
- R5 50 M
- R6 500 M
- R7 500 M
- R8 500 M
- R9 100 M
- R10 100 M
- R11 2.5 M
- R12 500 M
- R13 2.5 M
- R14 2.5 M
- R15 2.5 M
- R16 300 M
- R17 600 M

- C1 1 MFD
- C2 25
- C3 50 MFD
- C4 50 MFD
- C5 1 MFD
- C6 1
- C7 1
- C8 1
- C9 1
- C10 1
- C11 .005 MFD
- C12 .05 MFD
- C13 .01
- C14 .01
- C15 16
- C16 25

Tiffany - Tone
9MT + 9MTC
Mfg. by H. H. Horn
Los Angeles

HERBERT H. HORN



H.H.Horn Radio Manufacturing Co.
Model 15M-a-2-2

RECEIVER ADJUSTMENT

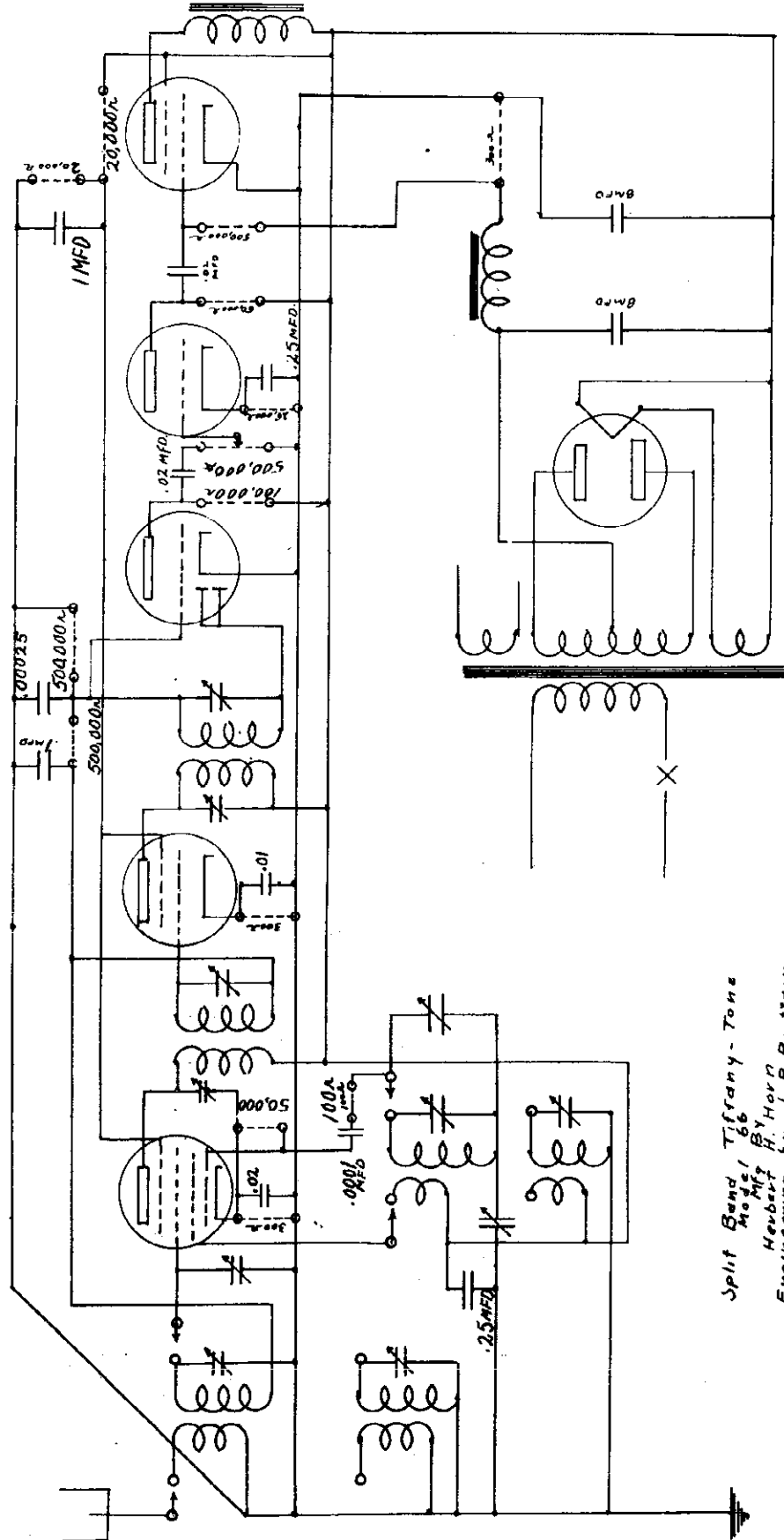
A modulated oscillator variable over the broadcast frequencies should be used in the alignment of the receiver. The use of an output meter will insure accuracy where the ear might tend to be inaccurate.

Turn the capacitors on R.F. coils to maximum and turn one half turn back. This adjustment should not vary except on a long aerial which may necessitate unscrewing them further.

The condenser trimmers should be adjusted at approximately 1300 K.C. The maximum sensitivity for the rest of the band should be obtained by spreading the split rotor plates. It may be necessary to go over the trimmers and plate spreading several times before the gang is properly balanced. Time expended in properly adjusting a receiver is well spent.

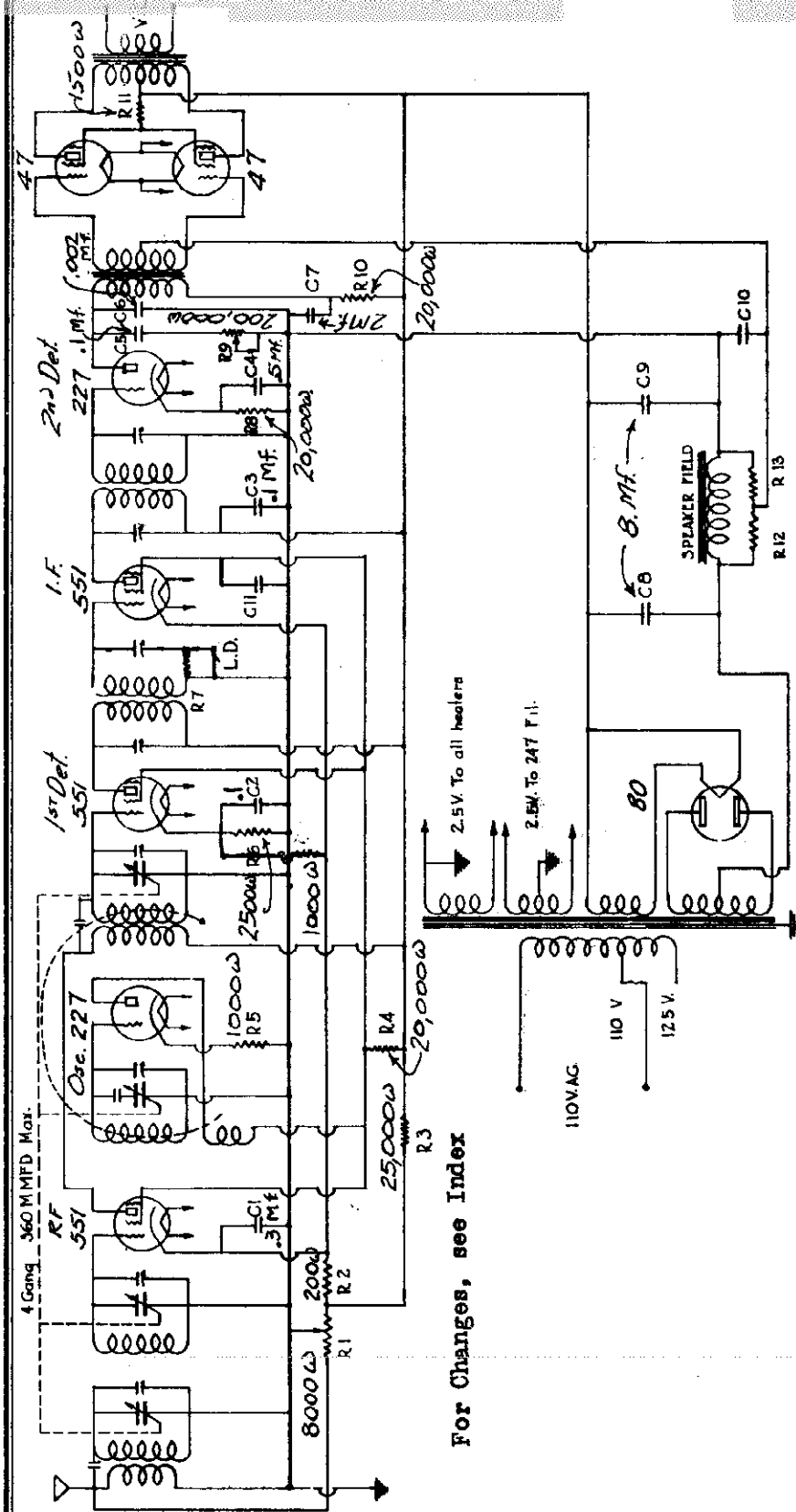
MODEL 66
Schematic

HERBERT H. HORN



Split Band Tiffany-Tone
 Model 66
 Mfg. By
 Herbert H. Horn
 Engineering by L. B. Brittain

HERBERT H. HORN

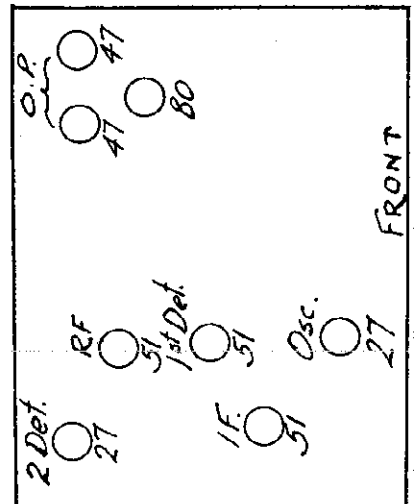


For Changes, see Index

VOLTAGES

TUBE	VOLUME CONTROL AT MAXIMUM			VOLUME CONTROL AT MINIMUM		
	PLATE	SCREEN	CATHODE	PLATE	SCREEN	CATHODE
51 RF.	225	94	3.5*	250	112	33*
27 Osc.	94	---	4.0*	112	---	5*
51 1 Det.	225	94	3.5*	250	112	33*
51 I.F.	225	94	3.5*	250	112	33*
27 2 Det.	160	---	20.0*	195	---	22*
47 O.P.	225	215	16.5*	243	235	17.5*

*Voltmeter resistance 50,000 ohms. All other voltages measured with 250,000 ohm-meter. Filament voltage 2.1, except for 47s



MODELS 79,99,109 Alignment, Changes

HERBERT H. HORN

The following changes have been made on all current production sets:

The tone control, composed of a 200,000 ohm variable resistor in series with a .1 MFD condenser is shunted from one power tube grid to ground. This control is R9 and C5 on the diagram placed in the new position.

The speaker field which is used as the filter choke has been shifted from the negative side of the power supply to the positive making a conventional brute force filter.

The resistors #12 and #13 have been omitted and the grid return of the pentode tubes has been run direct to ground. The bias for the pentode tubes has been run direct to ground. The bias for the pentode tubes is now obtained by the drop across a 500 ohm resistor in series with the pentode filament center tap and ground making the filament 16½ volts positive in relation to the grid return to ground. With this type of circuit it is possible to secure a correct reading of the bias with a standard set analyzer.

The circuit and other data in this manual applies to both the 8 and 10 tube models. The two tubes in the 10 tube model are connected in the following manner:

One 27 tube is used in parallel with the 27 second detector shown on diagram. This tube is added at this point to increase the voltage output capacity of the second detector stage, consequently increasing the overload point to a considerably greater level than it is possible to obtain with a single tube.

One 27 tube is used as a ballast tube on the cathode supply to the R.F. tubes, thus enabling the volume control to smoothly control the volume on powerful local stations. The plate of this tube is run to the high voltage, the grid to the point between R1 and R2, and the cathode through a 2,000 ohm resistor to the cathode side of R2.

ADJUSTMENT OF INTERMEDIATE FREQUENCY CONDENSERS.

There are two intermediate frequency transformers. Both the grid and plate circuits of each must be tuned sharply to 175 kilocycles. The condenser adjustments are accessible from the under side of the chassis, there being two slotted screws protruding through the insulated base of each intermediate.

A modulated oscillator, accurately calibrated to 175 kilocycles, and some form of output meter is necessary. Connect the output of the oscillator to the control grid cap of the translator tube, removing the normal grid lead. The ground terminal of the oscillator must be connected to the ground terminal of the set. Connect the output meter as specified by its manufacturer. Turn the set on, adjust the volume control of the set and the output control of the oscillator until the oscillator signal is audible in the speaker and indicated on the output meter.

Be sure that the "local-distance" switch on the set is in the "distance" position. Then adjust the four intermediate condenser screws for maximum output, reducing the oscillator output when necessary to keep the indicating meter within its scale range. Go over the four adjustments twice to make sure that they are peaked as closely as possible. This completes the I.F. tuning adjustments.

* * * * *

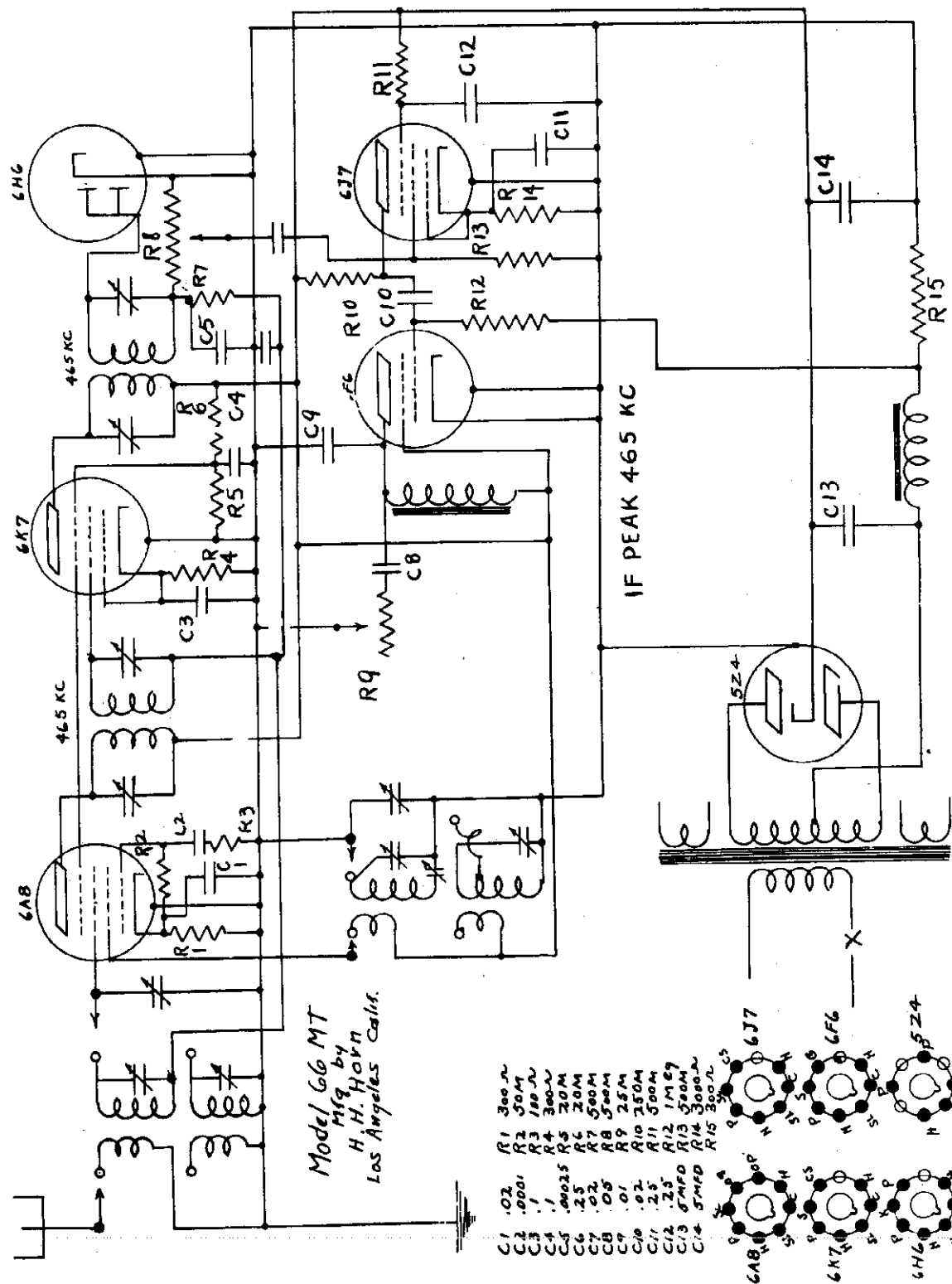
LINE-UP ADJUSTMENTS OF THE GANG CONDENSER

The four sections of the tuning condenser function as follows: The first section, looking at the rear of the chassis, tunes the selector stage. The second section tunes the grid circuit of the R.F. amplifier. The third section tunes the grid circuit of the translator tube, and the fourth section (nearest the front of the chassis) tunes the oscillator. The first three must track together at signal frequency, while the oscillator circuit must maintain a frequency 175 kilocycles higher than the signal frequency.

A modulated oscillator variable over the broadcast frequencies and accurately calibrated must be used in connection with an output meter. It should be equipped with a dummy antenna and attenuator.

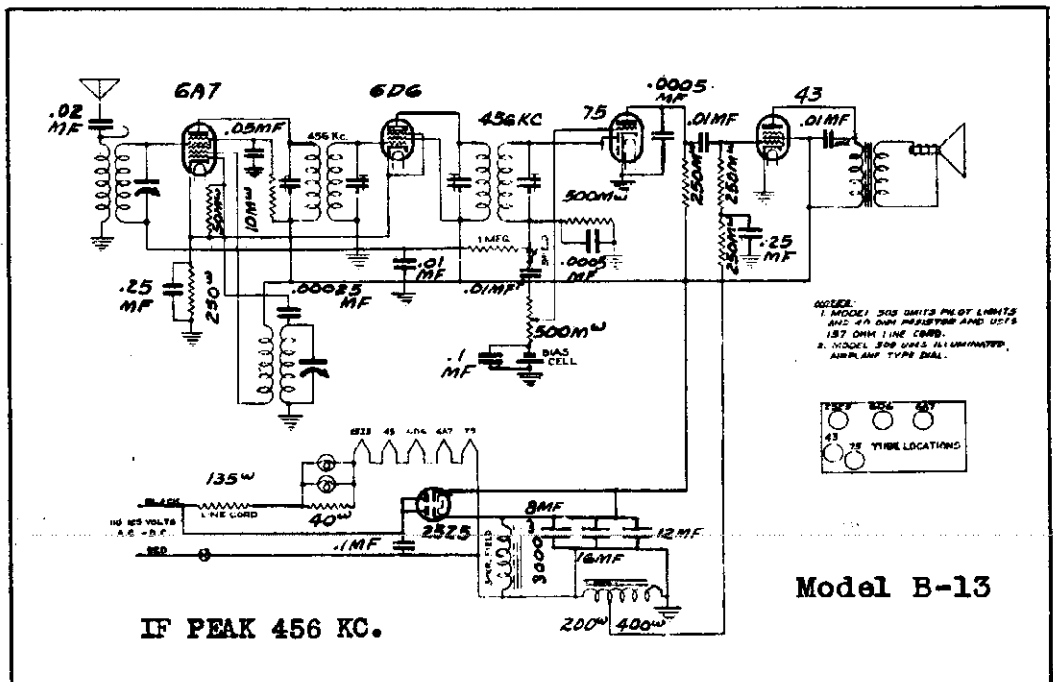
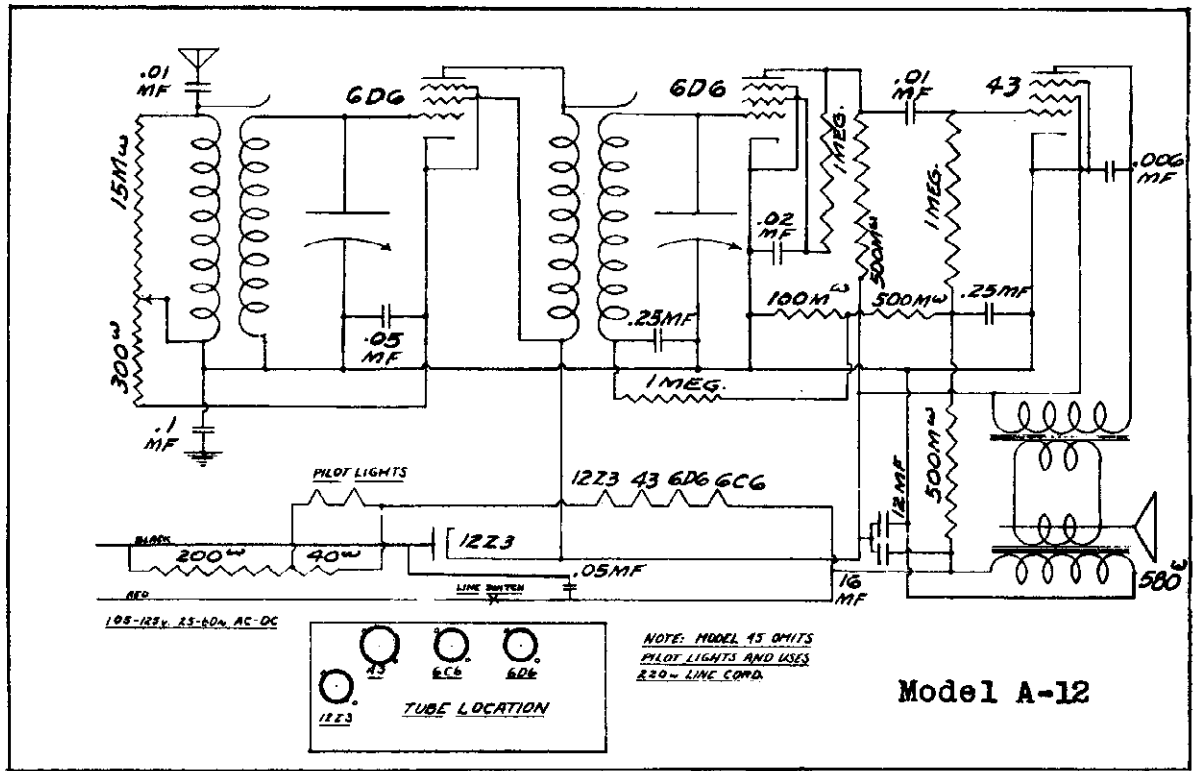
Connect the output of the oscillator through the dummy antenna to the antenna and ground posts of the receiver. Connect the output meter as before. Set the oscillator at 1200 KC and the dial on the set at 1200 KC. Then adjust the oscillator section trimmer, translator, R.F., and pre-selector output. Do not again change the trimmers but establish resonance over the tuning range by bending the vanes of the split rotor plates as necessary.

HERBERT H. HORN



HOWARD RADIO CO.

MODEL A-1
MODEL B-1
Schematic
Socket



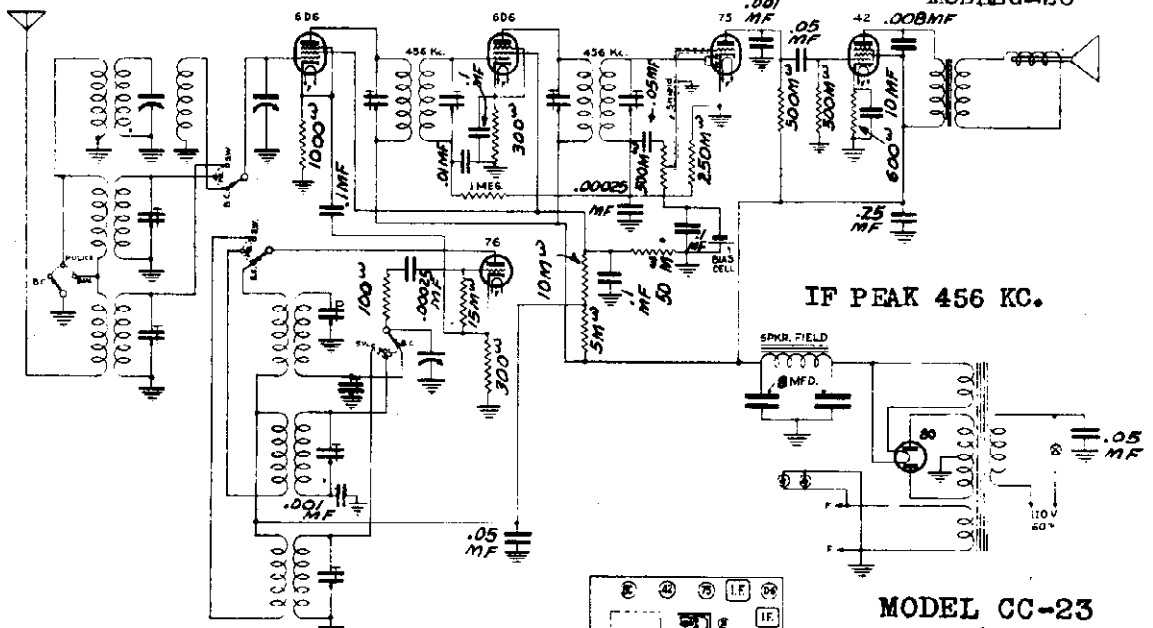
Schematics, Socket

HOWARD RADIO CO.

MODEL CC-23, CC-24

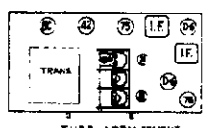
MODEL AA-25

MODEL G-26



IF PEAK 456 KC.

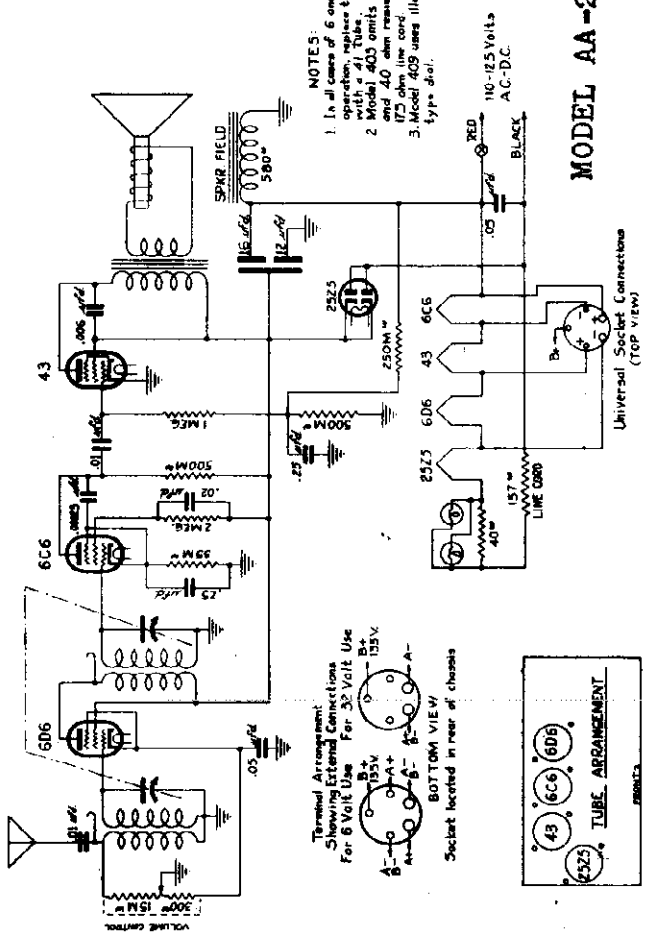
MODEL CC-23 & MODEL CC-24



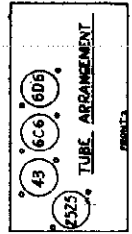
TUBE ARRANGEMENT

- NOTES:
- 1. In all cases of 6 and 32 Volt operation, replace the 43 tube with a 41 tube.
 - 2. Model 403 omits pilot lights and 40 ohm resistor and uses 175 ohm line cord.
 - 3. Model 409 uses illuminated Airplane type dial.

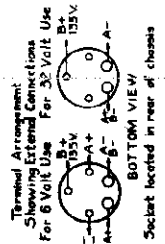
MODEL AA-25



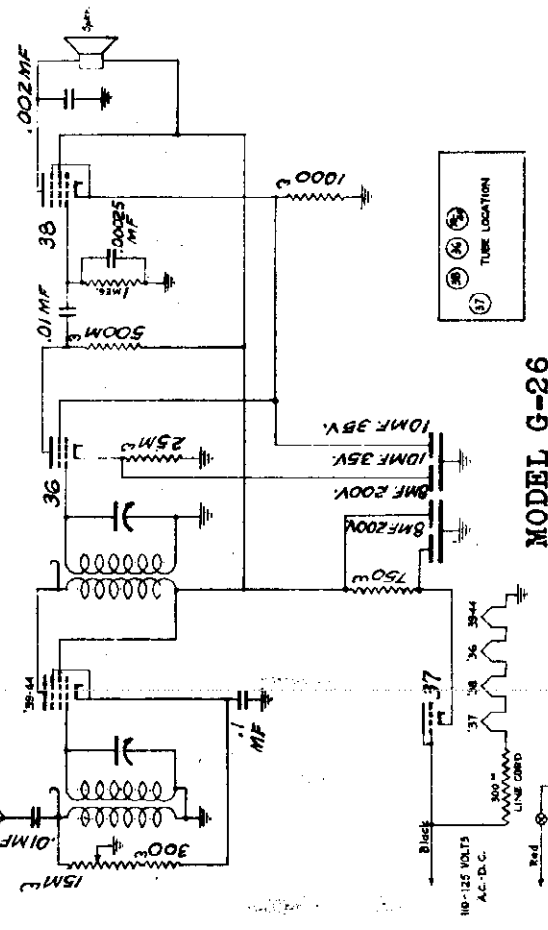
Universal Socket Connections (TOP VIEW)



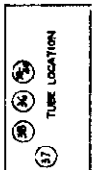
TUBE ARRANGEMENT



Terminal Arrangement Showing Connections For 8 Volt Use Per 32 Volt Use



MODEL G-26



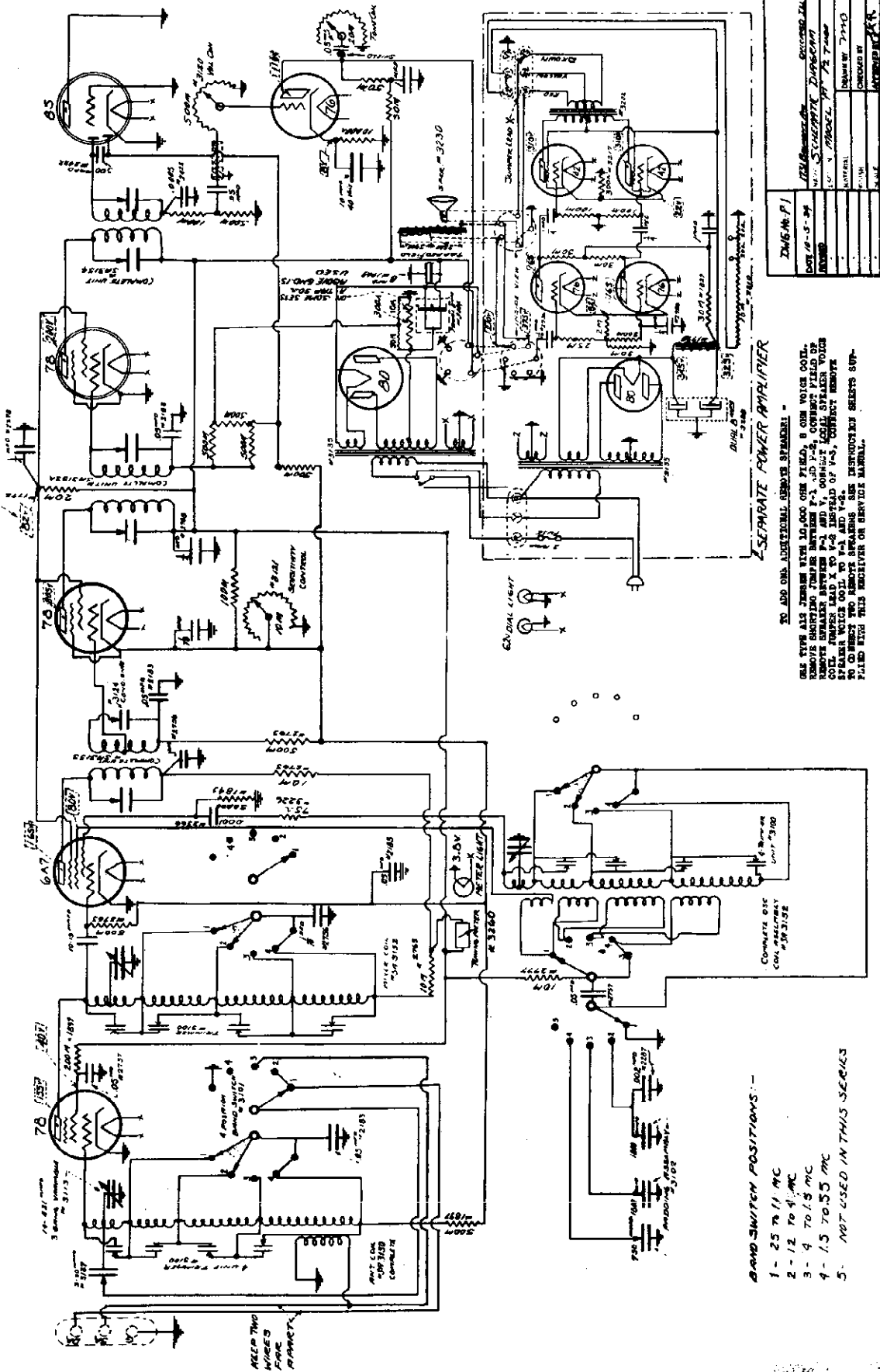
TUBE LOCATION

MODEL F

Schematic, Voltage

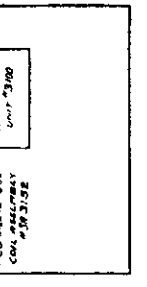
HOWARD RADIO CO.

IF 31 PAGES PEAKED AT 465 KC.
VOLTAGES SHOWN INDICATE POTENTIAL FROM GROUND, LINE VOLTAGE 115V.



ZME No. F1	
DATE 10-5-39	DESIGNED BY
REVISED 11-1-39	BY S. J. JACOBSON
BY S. J. JACOBSON	CHECKED BY
DATE 11-1-39	BY
CHECKED BY	DATE

TO ADD ONE ADDITIONAL SERVICE SPACER -
 1. USE THE 150 OHM COIL WITH 10,000 OHM FIELD. 8 OHM VOICE COIL.
 2. REMOVE SPEAKER JUMPER BETWEEN P-1 AND P-2. CONNECT FIELD COIL.
 3. REMOVE SPEAKER BETWEEN P-3 AND P-4. CONNECT LOCAL SPEAKER VOICE COIL. JUMPER LEAD X TO P-3. INSTEAD OF P-3, CONNECT SERVICE.
 4. IN ORDER TO OBTAIN THE BEST SERVICE FROM THIS RECEIVER SELECT SUPPLYED BATTERY OR SERVICE MANUAL.



- BAND SWITCH POSITIONS -
- 1 - 25 TO 11 MC
 - 2 - 12 TO 9 MC
 - 3 - 9 TO 7.5 MC
 - 4 - 7.5 TO 5.5 MC
 - 5 - NOT USED IN THIS SERIES

MODELS D,F
Alignment
HOWARD RADIO CO.
THE PROCEDURE TO ALIGN THE I.F. STAGES

The IF's are aligned in the usual system of feeding the intermediate frequency of 455 KC into the grid of the 6A7 1st Detector tube.

Make certain that the sensitivity adjustment (which is the knurled shaft extending from the back of the chassis) is turned all the way to the right when gaining the IF, RF or Oscillator circuits.

The two trimmers in each of the three IF Coil Cans should be very carefully tuned to resonance as they are very critical and will greatly affect the performance of the receiver.

The sensitivity of the IF stages should be between 10 and 20 Microvolts.

On some of the models the trimmer screws extend through the bottom of the chassis as per pictorial view. On other styles the trimmers are reached through the top of each IF shield can.

5. NOTES ON ALIGNING THE R.F. AND OSCILLATOR CIRCUITS

(a) After the IF's are aligned, the various circuits may be aligned in the order given below.

(b) Keep the sensitivity adjustment all the way on to the right as before.

(c) It is not necessary that the oscillator be taken out of its socket when aligning any of the RF circuits.

(d) Always adjust the oscillator stage before the RF in any particular band.

(e) Before adjusting any band, make certain that the pointer of the station indicator is set on the last line when the dial is turned all the way to the right, on above 560 - at this point the variable condenser should be all the way in to maximum capacity. See pictorial.

(f) The plates on the dial line up ONLY on the Broadcast Band.

(g) Always seal the trimmers with wax or collidon after their adjustment.

(h) After the high frequency adjustments have been made on short wave bands, the test oscillator or generator should be advanced to 950 KC higher in frequency - the output voltage of generator advanced considerably and notice of the image signal of receiver oscillator falls at this point. In case this signal is not heard, the adjustment of the receiver oscillator has been incorrectly made. As an example:-

After the third short wave band has been adjusted at 20 Mc. it should be possible to move the test oscillator to 20+950 KC and hear the signal.

(i) Before starting with the alignment adjust antenna series condenser A - without the use of the signal generator - by turning the screw all the way down to maximum capacity, and then loosen the screw about one half turn.

(j) Start with the third (highest frequency). Short wave band as follows:-

4. THIRD SHORT WAVE BAND

Refer to the pictorial views of the chassis.

Rotate band switch all the way to left to 25-11 Megacycle setting.

Set dial hand to 24 Megacycles.

Peak trimmer B to 24 Megacycles from the signal generator fed into the antenna.

If the set is far out of alignment, it may be necessary to use a heavy input from the generator and also vary the Antenna Coil and Mixer Coil Trimmers C and D until the heavy signal is not necessary. Make the final adjustment on C and D after the oscillator B trimmer is set.

Next, set the dial hand to 12 Megacycles on the same band and with a 12 Megacycle signal, resonance may be checked and corrected by shifting the ground lead at "Y" (see pictorial) by sliding it in either direction as necessary along the bare ground wire for the greatest gain.

As mentioned above in paragraph three - the image signal may be checked to determine if the adjustments have been made on the correct signal.

5. SECOND SHORT WAVE BAND

Rotate band switch to 12-4 Megacycles.

Set dial hand to 12 Megacycles.

Peak trimmer E at 12 Megacycles.

Peak Trimmers F and G in the RF circuits on the same frequency.

Set dial hand to 4½ Megacycles on the same band.

Adjust padding condenser H to the 4½ Megacycle signal.

6. FIRST SHORT WAVE BAND

Rotate band switch to 4-1.5 Megacycles.

Set dial hand to 4 Megacycles.

Peak Trimmer I to 4 Megacycles.

Peak Trimmers J and K in the R.F. circuits to the same frequency.

Set dial hand to 1.5 Megacycles.

Adjust Padding Condenser L to resonance with 1.5 Megacycles.

7. BROADCAST BAND

Rotate band switch to "B" position.

Set dial hand to 1500 Kilocycles.

Peak Trimmer M to 1500 Kilocycles.

Peak Trimmers N and O to 1500 Kilocycles.

Set dial to 550 Kilocycles.

Adjust Padding Condenser P to resonance with 550 Kilocycles.

Recheck dial at 1500 Kilocycles.

Check the middle of the dial at 950 Kilocycles for example and bend the plates of the variable condenser if necessary to line up with the calibration.

8. THE LONG WAVE

This adjustment applies to sets that have the extra band from 150 Kilocycles to 350 Kilocycles attached.

The alignment trimmers are shown in dotted lines on the Pictorial Diagram.

Rotate band switch to its fifth position - all the way to the right.

Set dial hand to 350 Kilocycles.

Peak Trimmer Q to 350 Kilocycles from the signal generator.

Peak Trimmers R and S in the RF circuits to the same frequency.

Set dial hand to 150 Kilocycles.

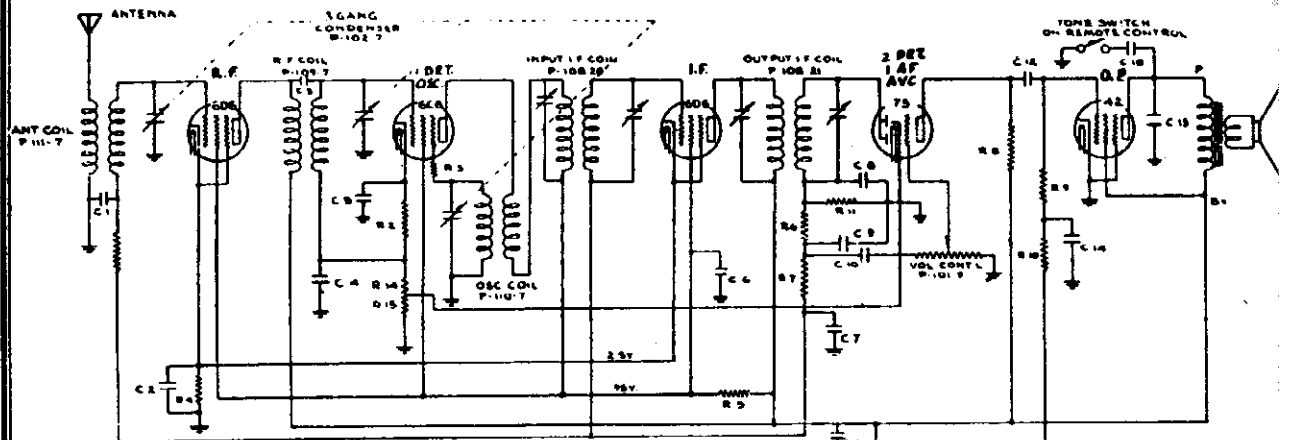
Adjust Padding Condenser T at 150 Kilocycles.

9. NOTES

(a) On some series the two resistors - 800 and 2000 ohm, have been added.

(b) Refer to schematic #4903 showing changes, if any, that have been made since sets were in production.

HOWARD RADIO CO.

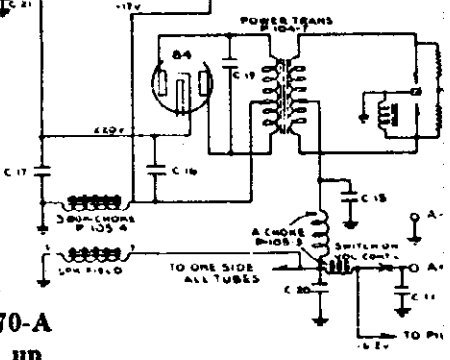


IF PEAK 175 KC.

LEGEND

RESISTORS	CONDENSERS
NO. VALUE	NO. VALUE
R1 - 250M 1/2W	C1 - 05X200V
R2 - 450Ω	C2 - 1X200V
R3 - 150Ω	C3 - 11.9μF GIMMICK
R4 - 150Ω	C4 - 05X200V
R5 - 25M 1/2W	C5 - 05X200V
R6 - 50M 1/2W	C6 - 1X200V
R7 - 250M 1/2W	C7 - 1X200V
R8 - 250M 1/2W	C8 - 0005 MICA
R9 - 200M 1/2W	C9 - 0005 MICA
R10 - 300M 1/2W	C10 - 01X400V
R11 - 250M 1/2W	C11 - 002 MICA
R12 - 100Ω	C12 - 01X400V
R13 - 100Ω	C13 - 005X600V
R14 - 5M	C14 - 1X200V
VAR RESISTOR (500M 500M)	C15 - 5MFD.120V
R15 - 200Ω	C16 - 5MFD.350V
	C17 - 5MFD.350V
	C18 - 01X400V
	C19 - 015X1400V
	C20 - 5MFD.120V
	C21 - 01X400V

NOTE
 NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS
 VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND VOLUME CONTROL ON FULL
 THE PHRASE GIMMICK MEANS A WIRE WOUND AROUND ANOTHER WIRE
 RESISTORS IN ONE UNIT, P-108-19, R-2, 4, 15
 CONDENSERS IN ONE UNIT, P-119-4, C-16, 17
 CONDENSERS C-2, C-4, C-5, C-6, C-7 ARE IN ONE UNIT, P-115-5
 RESISTORS AND CONDENSERS IN OUTPUT I.F. CAN, P-108-21, C-8, 9, 10 AND R-6, 7, 11
 CONDENSER, C-1 IN ANT. COIL CAN, P-111-7
 CONDENSERS C-18, C-20 IN ONE UNIT, P-114-4



PARTS LIST—MODEL 670-A
 Serial No. 4D-502501 and up

Part No.	Description	Part No.	Description
101-9	Volume Control with Switch	150-24	Selector Shaft—24"
101-12	Tone Control Assembly, complete	151-2	Remote Control Head, less flexible shafts, less tone control and pilot assemblies, but with knobs and mounting hardware
102-7	Three Gang Geared Variable Condenser	152-1	Antenna cable
104-6	Vibrator Transformer	152-2	Battery cable
105-3	"A" Choke—40T—No. 16E—1/2" Dia.	131-5	Black bakelite remote control knobs
105-4	380 Ohm Filter Choke	146-8	Die Cast Remote Control Mounting Bracket
106-6	200 Ohm Center Tapped Resistor	146-12	Steering Column Strap
106-14	5800 Ohm Metal Clad Resistor	168-1	Spark-plug type suppressor
108-20	Input I. F. Transformer completely assembled in can (175 K. C.)	168-2	Distributor plug-type suppressor
108-21	Output I. F. Transformer complete with can, but less resistor and Condenser Assembly (175 K. C.)	168-3	Cable type suppressor
	Resistor and Condenser Assembly for 108-21	168-4	Special Ford spark-plug suppressor
109-7	R. F. Coil		Unless otherwise listed, all Carbon Resistors
110-7	Osc Coil & bracket		Unless otherwise listed, all Single Section Tubular Paper By-Pass Condensers
111-7	Antenna Coil		Unless otherwise listed, all Dual Section Tubular Paper By-Pass Condensers
112-43	Volume Control Shaft complete with knob		Unless otherwise listed, all Molded Mica Condensers
115-18	Special partition shield		All Sockets
115-22	Tube shield	167-1	Dynamic Speakers
116-5	6-8 Volt T-50 pilot lamp		Plate antenna (clamps to frame of car)
116-6	Pilot light assembly, complete, less bulb		
119-4	8-8 Mfd. x 350 Volt Electrolytic Filter Condenser		
142-1	Plug-In Vibrator		
145-5	.4 Mfd. By-Pass Block		
146-14	Special bracket including battery antenna, pilot light and tone control cable fittings, but less antenna coil volume control		
148-4	Dual .5 Mfd. 120 Volt Condenser		
161-1	20 Ampere fuse		
147-1	Selector Control Coupling		
147-2	Bushing and bracket complete		
147-11	Volume control coupling		
135-5	3/8x3" carriage bolt		
140-3	Container complete with top and bottom		
148-1	.5 Mfd. Generator Condenser		
148-3	.5 Mfd. Ammeter Condenser		
149-18	Volume Control Shaft—18"		
149-24	Volume Control Shaft—24"		
150-18	Selector Shaft—18"		

Note: Part No. 145-5 consisting of five separate sections can be replaced with tubular single section condensers at 25c each. It will not be necessary to replace the entire unit should any section thereof fail.

Vibrators can be reconditioned at a cost of \$3.00 each, if the old unit is returned.

All resistors are RMA color coded specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

We cannot supply speaker cones only. We can replace a speaker of which a cone has been damaged for \$1.50, if defective speaker is returned, transportation charges prepaid.

MODEL 670-A, HA-1**Alignment, Notes****HOWARD RADIO CO.****BALANCING SET TO ANTENNA:**

When this set has been installed and is ready for operation it may be found necessary (depending on antenna) to balance set to this antenna. This is accomplished as follows:

With the receiver tuned to a very weak station, about 130 to 140 (1300 to 1400 kilocycles) on the dial, adjust the antenna trimmer with a screw driver until maximum volume is attained. To reach the antenna trimmer remove the plug button from the top of the case.

I. F. ALIGNMENT:

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 175 kilocycles to the grid cap of the 6C6 tube.

2. Adjust trimming condensers of both input and output I. F. transformers, parts number 108-20 and 108-21 (see top view of chassis) to resonance with an oscillator, as indicated on an output meter connected across the primary terminals of the speaker input transformer or between the plate and screen terminals of the type 42 output tube. The connection to the tube can be made by means of an adapter. Maximum deflection on the output meter indicates resonance.

Note: Each I. F. transformer has two adjustments, both of these adjustments on both transformers are accessible through holes located in the back of the case between the two mounting plates and directly under the louvers.

R. F. ALIGNMENT:

1. Attach oscillator connected in series with a 200 mmfd. condenser to the antenna lead and with the variable condenser at its minimum capacity position (extreme right of its rotation) and with an oscillator set at 1550 kilocycles, adjust condenser trimmer of oscillator section (Front shaft end) to resonance.

2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna (center section) and R. F. (rear section) trimmers to resonance.

3. Check alignment at 1500-1000-800-600-530 kilocycles by setting oscillator to these frequencies and picking up signal by rotating condenser.

4. Bend slotted plates of antenna and R. F. sections only if necessary. **UNDER NO CIRCUMSTANCES BEND PLATES OF OSCILLATOR SECTION.**

NOTES:

Voltages from chassis to different points are indicated on schematic circuit diagram, and should be measured with a voltmeter having a resistance of 1000 ohms per volt.

Failure to operate, noisy or weak reception, may be due to defective tubes or poor contact between cap on top of tube and grid clip.

Tubes may be checked by replacing with another tube which is known to be good.

If fuse blows out frequently, and insulating sleeve has been properly placed over fuse, the trouble probably is in the vibrator and vibrator should be replaced.

NEVER ATTEMPT TO ADJUST VIBRATOR POINTS.

Case rattles may be due to one or more of the following:

Loose screws in top or bottom covers. Loose elements in tubes. Loose tube shield. Loose R. F. coil shield. Loose grill cloth.

RECEIVER INSTALLATION:

Determine most satisfactory or desirable mounting position. In most cases it will be found that the receiver can be mounted on the car bulk head, above and to the right of the steering post.

Use the cardboard template which is the same size as set and mark location for two mounting bolts, if mounted on the long side and one bolt if on the short side.

Then drill two (2) one-half inch ($\frac{1}{2}$) holes, making certain that the point around the hole on the engine side of fire wall or bulk head is scraped clean to insure a good ground connection between receiver and the frame of the car. Assemble brackets number 146-2 to case with self-tapping screws.

Insert bolts through dash, assemble plain, lockwashers and nuts on engine side, then hang receiver over bolt heads and tighten nuts securely.

Mount the remote control unit on steering column by means of mounting bracket or attach to instrument panel or under dash (see illustration).

Two flexible shafts are furnished, one with a slotted fitting on one end, which is the volume control shaft (number 149-18), the other is the selector shaft, with key fitting at one end (number 150-18).

Make certain that the outer casings of flexible shafts go into remote control bushings for approximately five-sixteenths of an inch and tighten set screws to secure cables. If cables are pushed too far into remote control head, shafts will not turn freely. Always try to install drive shafts in as straight a line as possible from remote control to set. **AVOID SHARP BENDS IN CABLES.**

IMPORTANT—READ CAREFULLY:

We are prepared to exchange, without charge, our standard number 149-18 and 150-18, eighteen inch cables for twenty-four inch cables,

number 149-21 and 150-21. You will find that 99% of the installations can be made with the standard eighteen inch cables, and bear in mind that the shorter the cable, the smoother the drive.

DIAL ADJUSTMENT:

Mount control head to steering column by means of bracket and strap or under dash by means of bracket or to instrument panel (see illustrations). Attach cables as above. Tune set to some station of a known frequency (between 800 and 1200 K.C.), hold selector knob, then with a screw driver adjust the slotted screw on back of the control head, and in that way adjust the dial pointer to the correct frequency setting.

CONNECTIONS TO BATTERY:

The battery cable, number 152-2, (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 inserting in receiver (see illustration). All bypass leads should be as short as possible.

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.

PILOT LIGHT:

Pilot light assembly, part number 116-6, a shielded cable, plugs into the set and to the rear of the remote control unit (see illustrations).

TONE CONTROL:

The tone control assembly, part number 101-12, attaches to the back of the remote control head by means of a special screw and plugs into the set (see illustrations).

ANTENNA CONNECTION:

The antenna is connected to the receiver by means of the antenna cable, number 152-1. The antenna wire is the single black wire projecting from the end of the cable. Splice this wire to the roof antenna lead and ground the pig-tail shielding as close to the corner post of the car as possible.

OPERATION:

Place key (knob) in lock of left hand control of the remote control unit. After waiting approximately 45 seconds for tubes to heat up, rotate station selector, right hand knob, until a desirable program is heard. De-tuning will very seriously affect the tone quality of this receiver. Tone control knob located between two black knobs (see illustrations) is a BASS and TREBLE switch, it is not a variable tone control. Turning it to the right makes the BASS connection, turning it to the left makes the TREBLE connection. You will note that the BASS position assists materially in reducing interference from static, street car lines and other high pitched disturbances.

MOTOR NOISE SUPPRESSION:

The ignition system of every automobile generates high frequency electrical interference. This high frequency interference arising from the ignition coil, the distributor and the spark plugs must be properly suppressed in order to obtain satisfactory reception. Each car will present more or less an individual problem but there is a definite procedure to follow which holds true in every case.

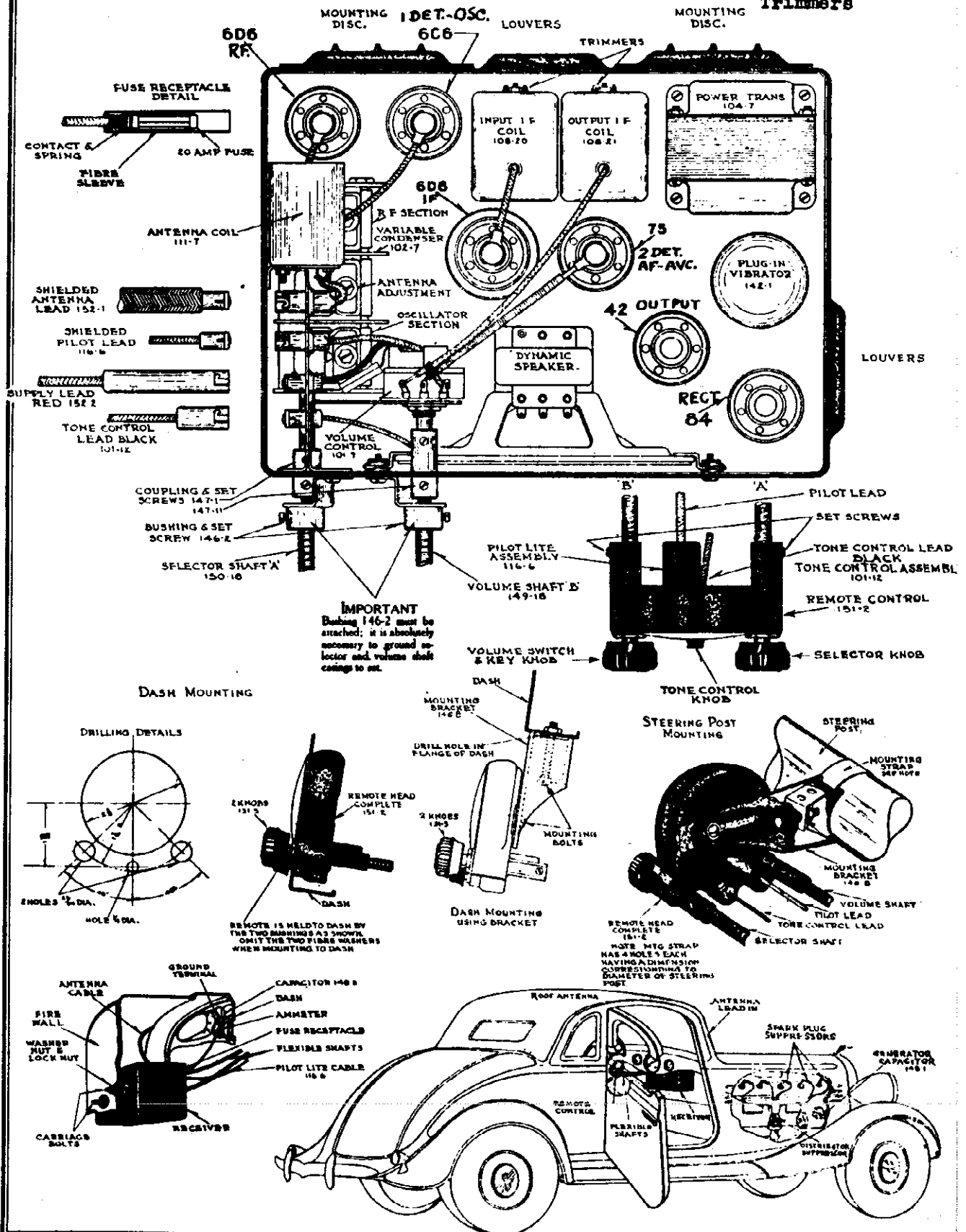
This first essential procedure is to disconnect the high tension leads to the spark plugs and attach the spark plug suppressors (168-1) (for V 8 Fords 168-1) the special distributor type suppressor (168-2) which is inserted in the center contact of the distributor as indicated in the illustration of a typical installation. (NOTE V 8 FORD USES NO DISTRIBUTOR SUPPRESSOR.) For cap type distributor, exchange the standard plug type distributor suppressor (168-2) for a special cable type suppressor (168-3) from your dealer. In some few cases, such as Buicks it is sometimes necessary to use cable type (168-3) suppressors. This type of suppressor is inserted in the leads running from the distributor to the spark plugs and which are concealed underneath the metal plate which covers the spark plugs.

After the spark and distributor suppressors have been properly fastened the next in importance is the generator condenser (149-1), this filters a high pitched whining noise which would otherwise be heard as the motor is accelerated.

It is sometimes necessary in cars where the ignition coil is located under the dash, to use an additional capacitor (148-1) obtainable from your dealer. It must be installed between the battery side of the ignition coil and the frame of the car. Next connect capacitor (148-3) from the battery side of ammeter to frame of car. This is necessary in practically every installation and a good connection to the frame of the car is of utmost importance.

HOWARD RADIO CO.

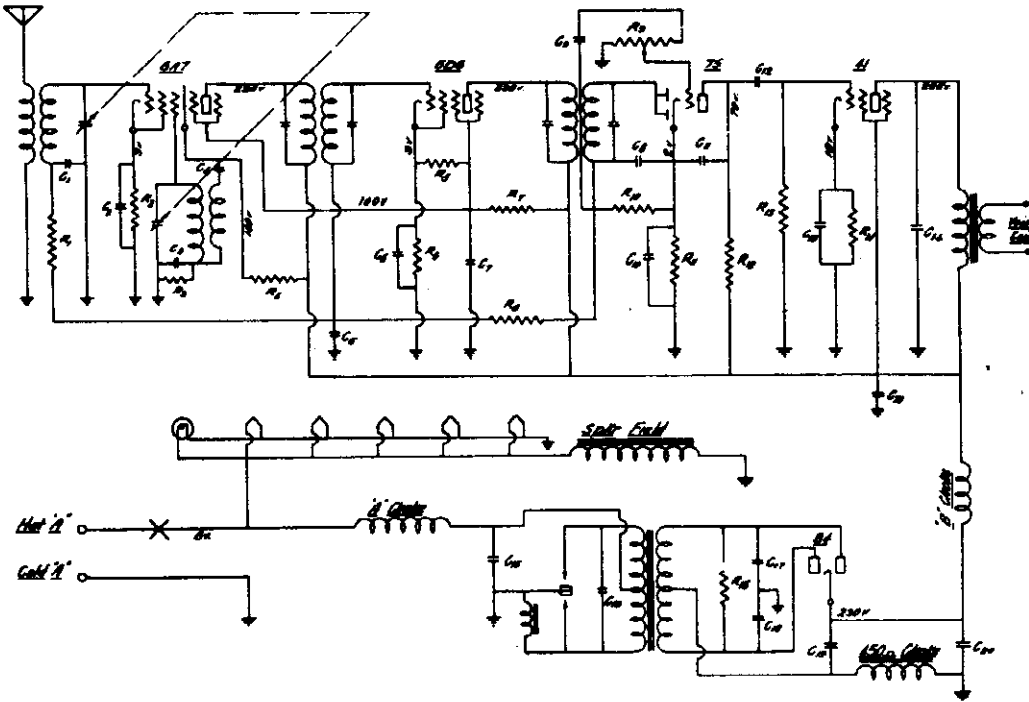
MODEL 670-A, HA-1 Socket Layout Parts Details Trimmers



MODELS 52, 502, HA-2
Schematic, Socket

HOWARD RADIO CO.

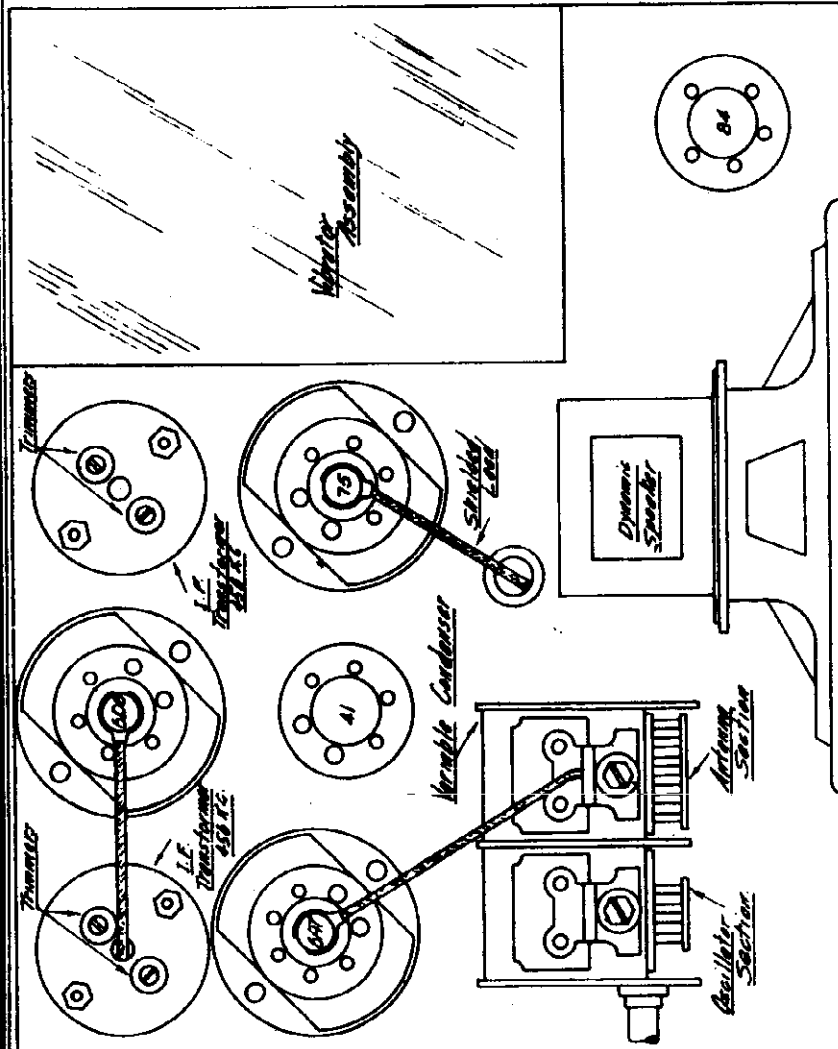
Trimmers, Notes



CIRCUIT DATA			
B.	C.	G.	MEG.
1	500M	1	.05
2	250	2	1
3	50M	3	.01
4	15M	4	.002
5	35M	5	.05
6	250	6	1
7	15M	7	1
8	1.0M	8	.0005
9	500M/16	9	.02
10	250M	10	.00005
11	5M	11	.0005
12	250M	12	.02
13	250M	13	.00005
14	750	14	.002
15	500M	15	5
16		16	5
17	4-30-34	17	.002
18		18	.002
19		19	5
20		20	5
21		21	.25

Model 502
Auto Receiver
Drawn by F. G. Hill

Values taken from parts indicated in circuit diagram



DIAL ADJUSTMENT:

After the control unit and cables have been connected to the set the dial pointer must be adjusted. To do this, rotate the tuning control knob slowly to either right or left until a definite stop is reached; do not force the knob after the stop, as this will damage the control mechanism. Now rotate the knob slowly in the opposite direction until another stop is reached. The pointer will usually come to the end of the dial strip before the stop is reached. It is in this manner that the dial is automatically adjusted to indicate the correct frequency to which the receiver is tuned.

HOWARD RADIO CO.

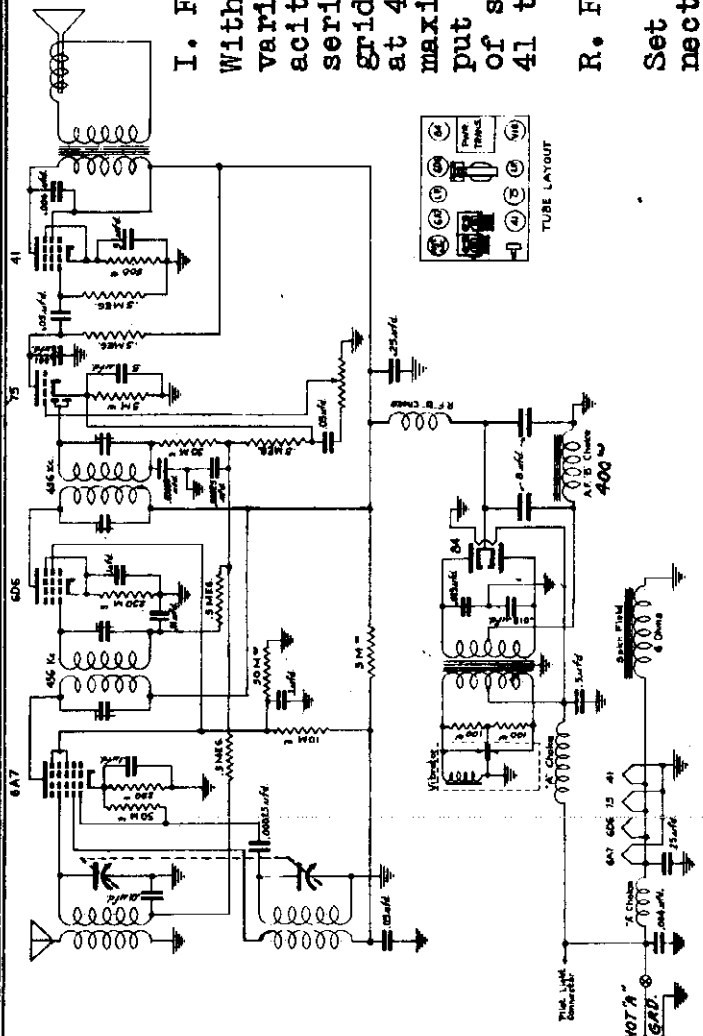
MODEL HA-3
Schematic, Socket
Alignment, Notes

I. F. Alignment:

With volume control turned on full and variable gang condenser at maximum capacity, attach test oscillator lead in series with a 250 mmf. condenser to grid of 6A7 tube. Set test oscillator at 456 KC and adjust I.F. trimmers for maximum output as indicated on an output meter connected across voice coil of speaker or from plate and screen of 41 tube.

R. F. Alignment:

Set test oscillator at 1500 KC and connect to antenna of receiver. Rotate variable gang condenser to minimum capacity and back off slightly. Adjust trimmer on oscillator section of gang condenser (first section from shaft end) to resonance indicated by maximum output. Re-set test oscillator at 1400 KC and rotate variable condenser until oscillator signal is picked up. Adjust antenna (rear section) to resonance. Check alignment at 1400, 1000, 600, and 550 kilocycles by setting test oscillator to these frequencies and rotate condenser until signal is picked up. Off tracking at 1000 and 600 kilocycles may be compensated for by slightly bending the slotted plates of the antenna section of the gang condenser. DO NOT BEND PLATES OF OSCILLATOR SECTION.



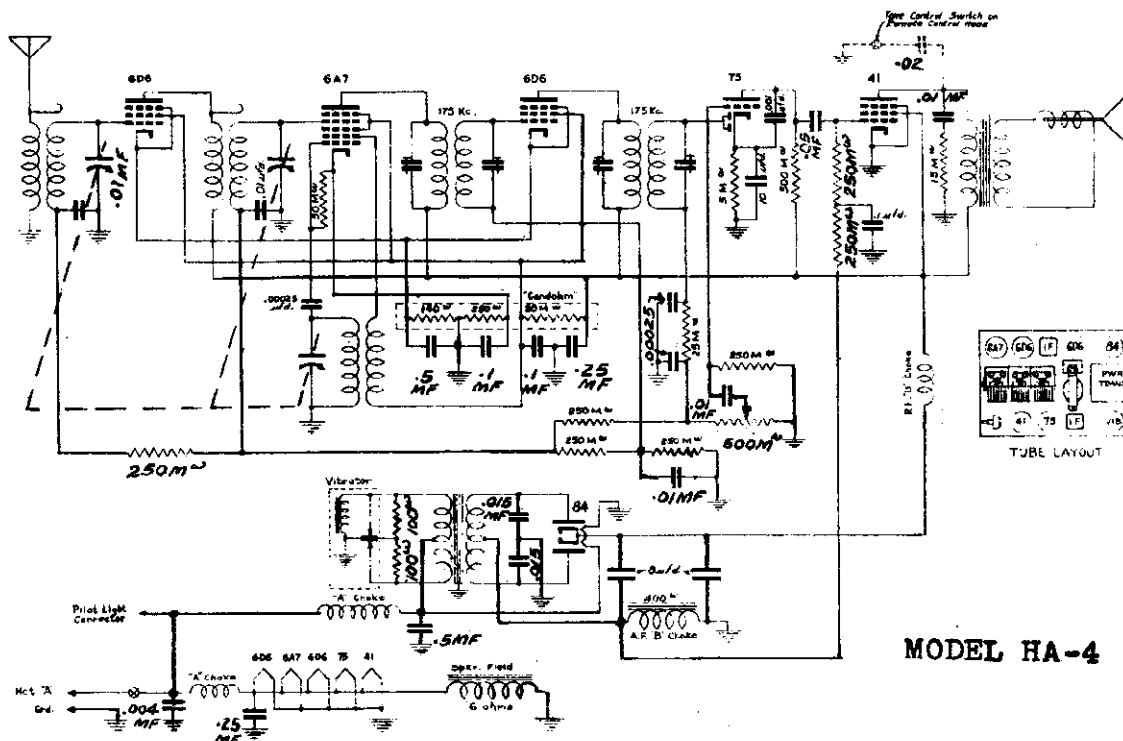
1 1/2 PEAK 456 KC.

DIAL ADJUSTMENT:

After the control unit and cables have been connected to the set the dial pointer must be adjusted. To do this, rotate the tuning control knob slowly either right or left until a definite stop is reached; do not force the knob after the stop, as this will damage the control mechanism. Now rotate the knob slowly in the opposite direction until another stop is reached. The pointer will usually come to the end of the dial strip before the stop is reached. It is in this manner that the dial is automatically adjusted to indicate the correct frequency to which the receiver is tuned.

MODEL HA-4
Schematic, Socket
Alignment

HOWARD RADIO CO.



MODEL HA-4

IF Peak 175 kc.

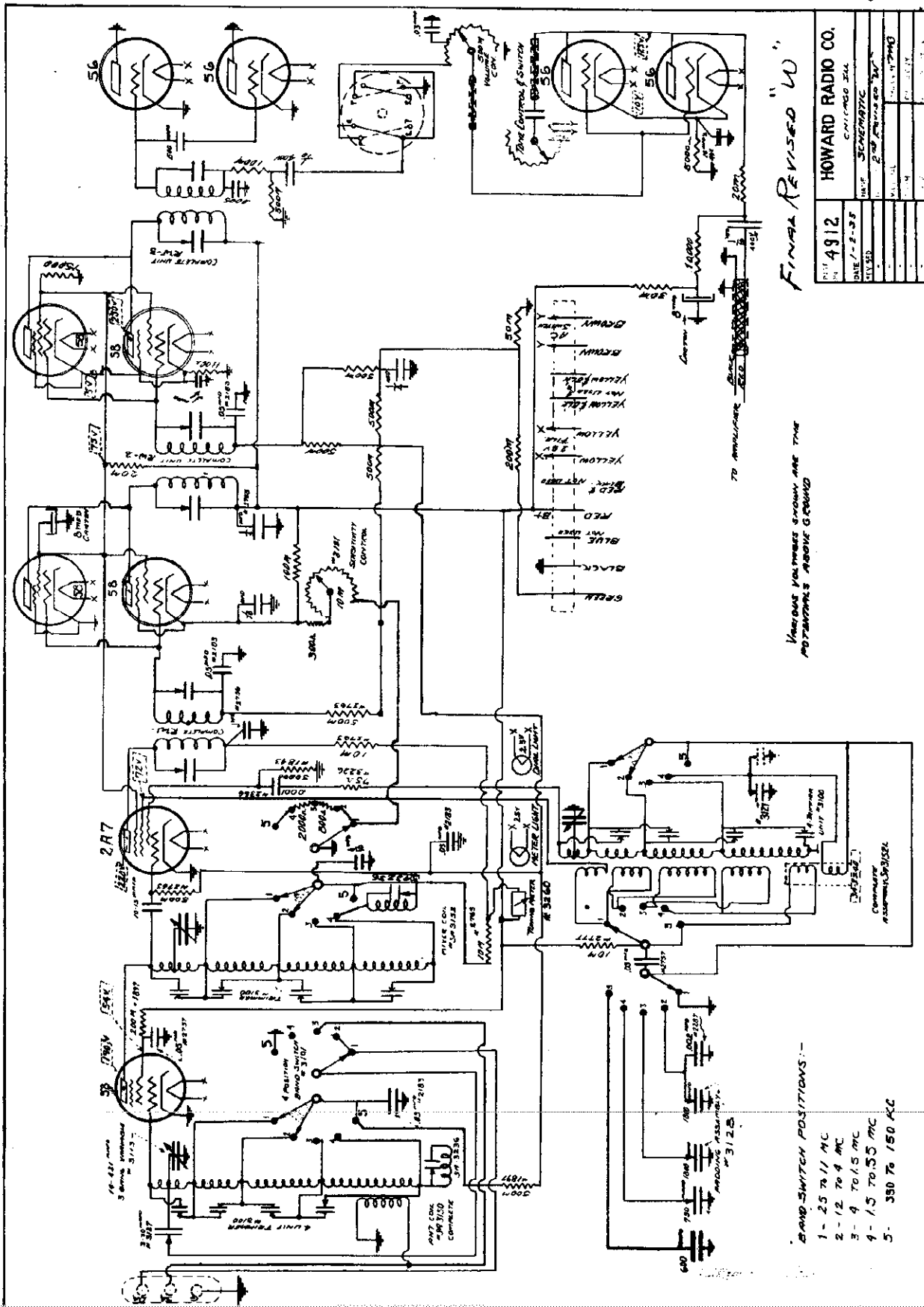
I. F. Alignment:
With volume control turned on full and variable gang condenser at maximum capacity, attach test oscillator lead in series with a 250 mmf. condenser to grid of 6A7 tube. Set test oscillator at 175 KC and adjust I.F. trimmers for maximum output as indicated on an output meter connected across voice coil of speaker or from plate and screen of 41 tube.

R. F. Alignment:
Set test oscillator at 1550 KC and connect to antenna of receiver. Rotate variable gang condenser to minimum capacity and back off slightly. Adjust trimmer on oscillator section of gang condenser (first section from shaft end) to resonance indicated by maximum output. Re-set test oscillator of 1400 KC and rotate variable condenser until oscillator signal is picked up. Adjust antenna trimmer (rear section) and R. F. trimmer (center section) to resonance. Check alignment at 1400, 1000, 600, 550 kilocycles by setting test oscillator to these frequencies and rotate condenser until signal is picked up. Off tracking compensated for by slightly bending the slotted plates of the antenna and R. F. section of the gang condenser. **DO NOT BEND PLATES OF OSCILLATOR SECTION. DIAL ADJUSTMENT:**

To correctly adjust dial pointer, tune set to a station of known frequency or turn selector knob to end of tuning range in either direction and adjust screw in back of remote head until dial pointer reaches correct frequency setting.

HOWARD RADIO CO.

MODEL W, Explorer
Final Revised
Schematic, Voltage



Final Revised "W"

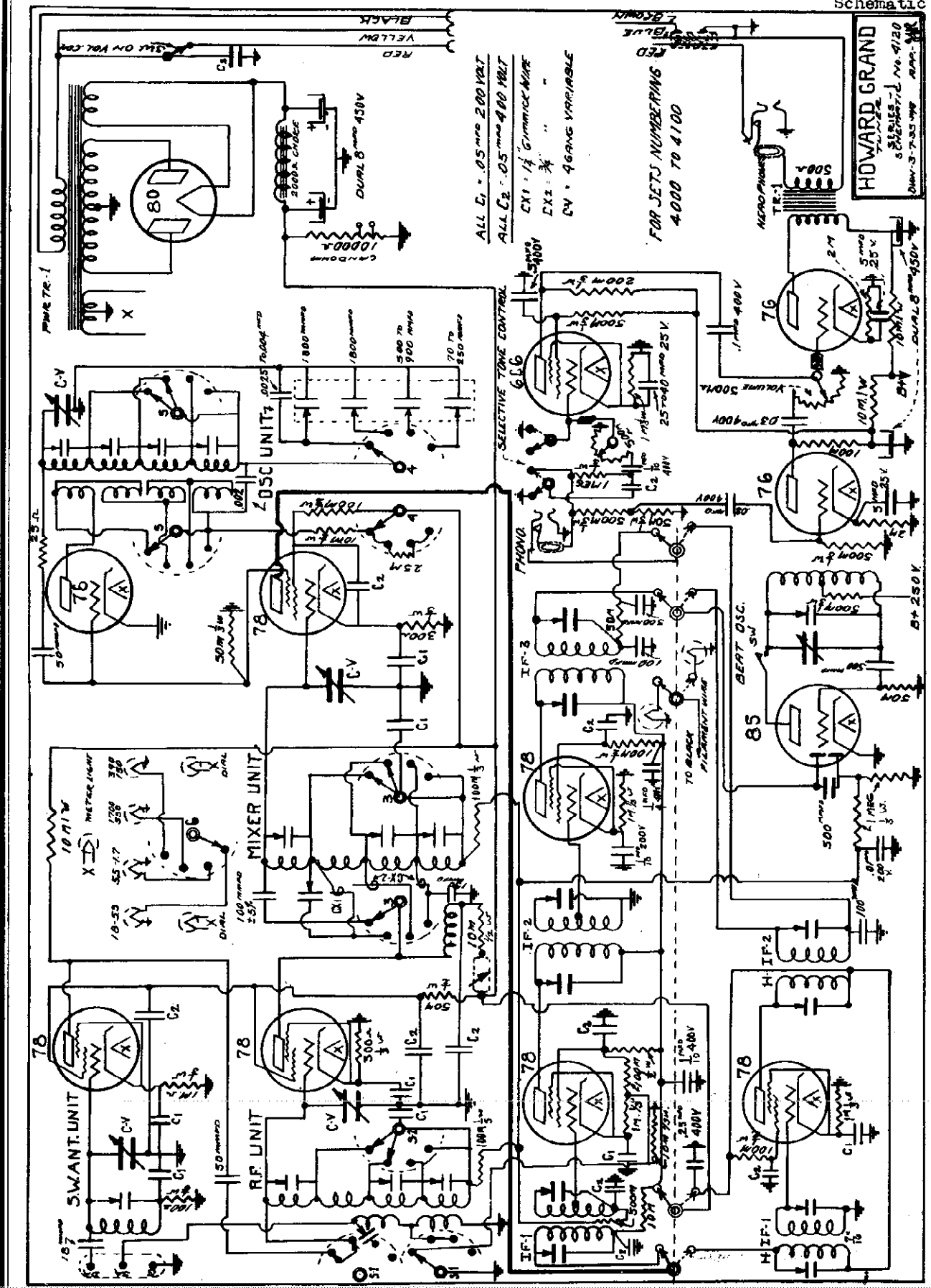
Various voltages shown are the potentials above ground

NO. 4912	HOWARD RADIO CO.
DATE 7-2-35	CHICAGO, ILL.
DIV. 30	UNIT SCHEMATIC
	2nd Edition
	REVISED BY
	DATE

- BAND SWITCH POSITIONS--
- 1- 25 TO 11 MC
 - 2- 12 TO 4 MC
 - 3- 9 TO 1.5 MC
 - 4- 1.5 TO .55 MC
 - 5- .350 TO .150 KC

HOWARD RADIO CO.

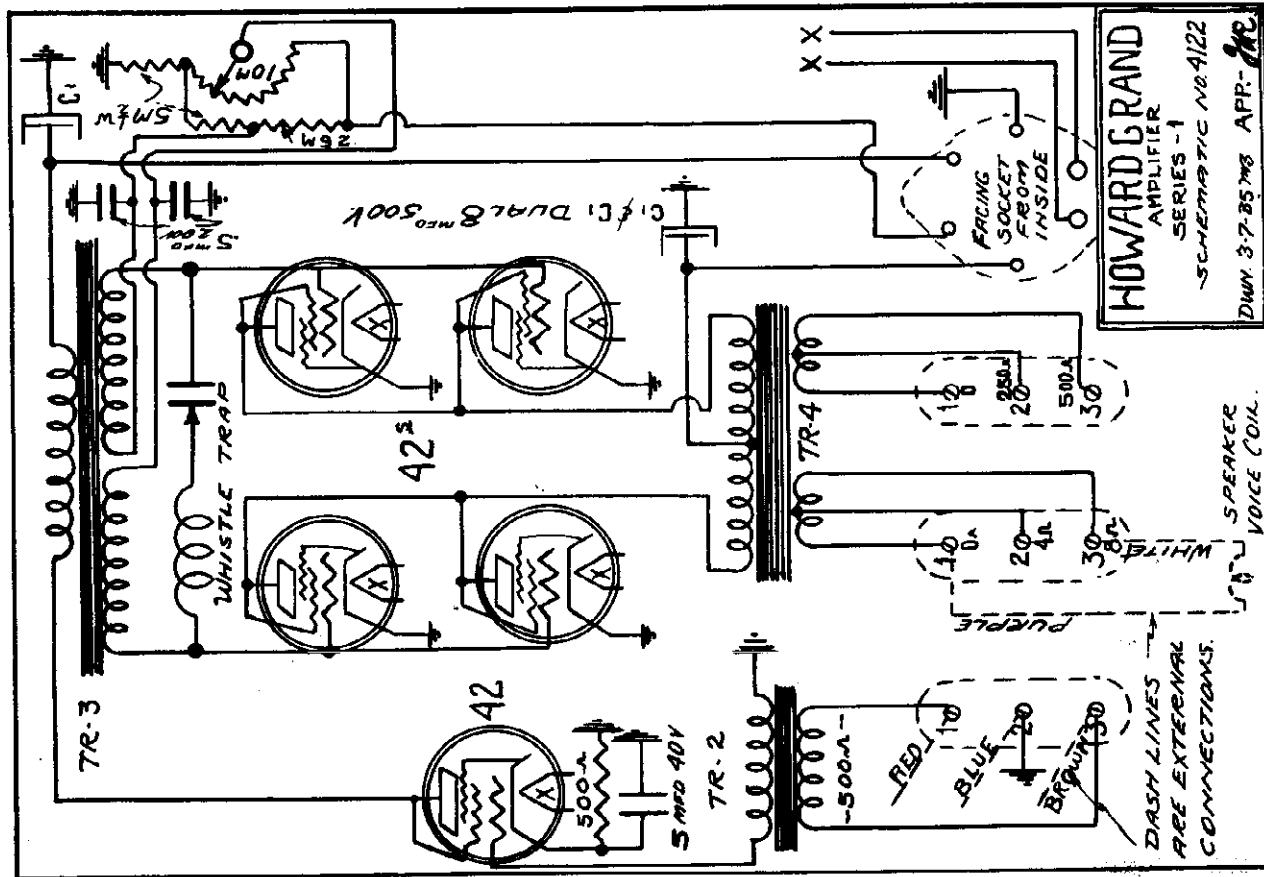
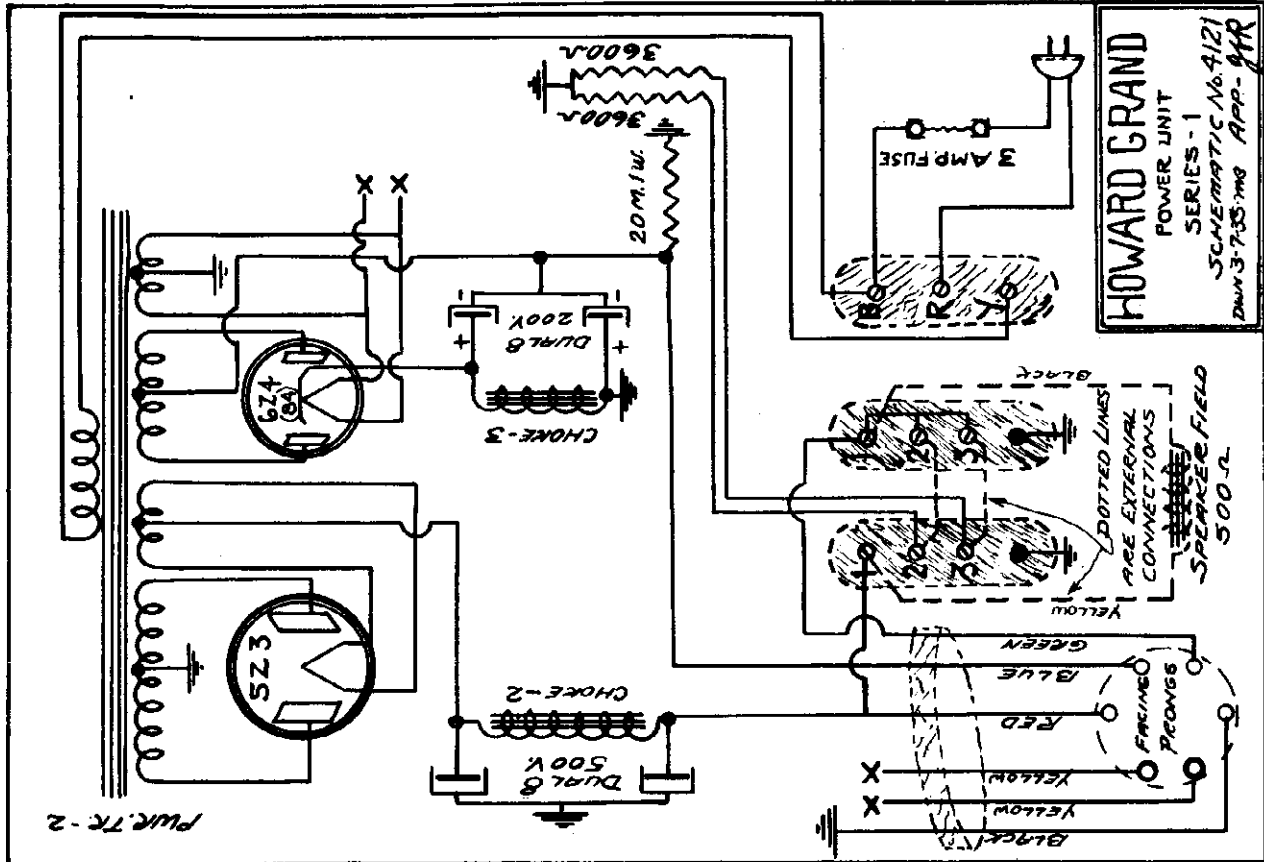
MODEL Grand Series 1 Schematic



HOWARD GRAND
 S. 24155-7, No. 4120
 Div. 3-7-35 400
 400-400

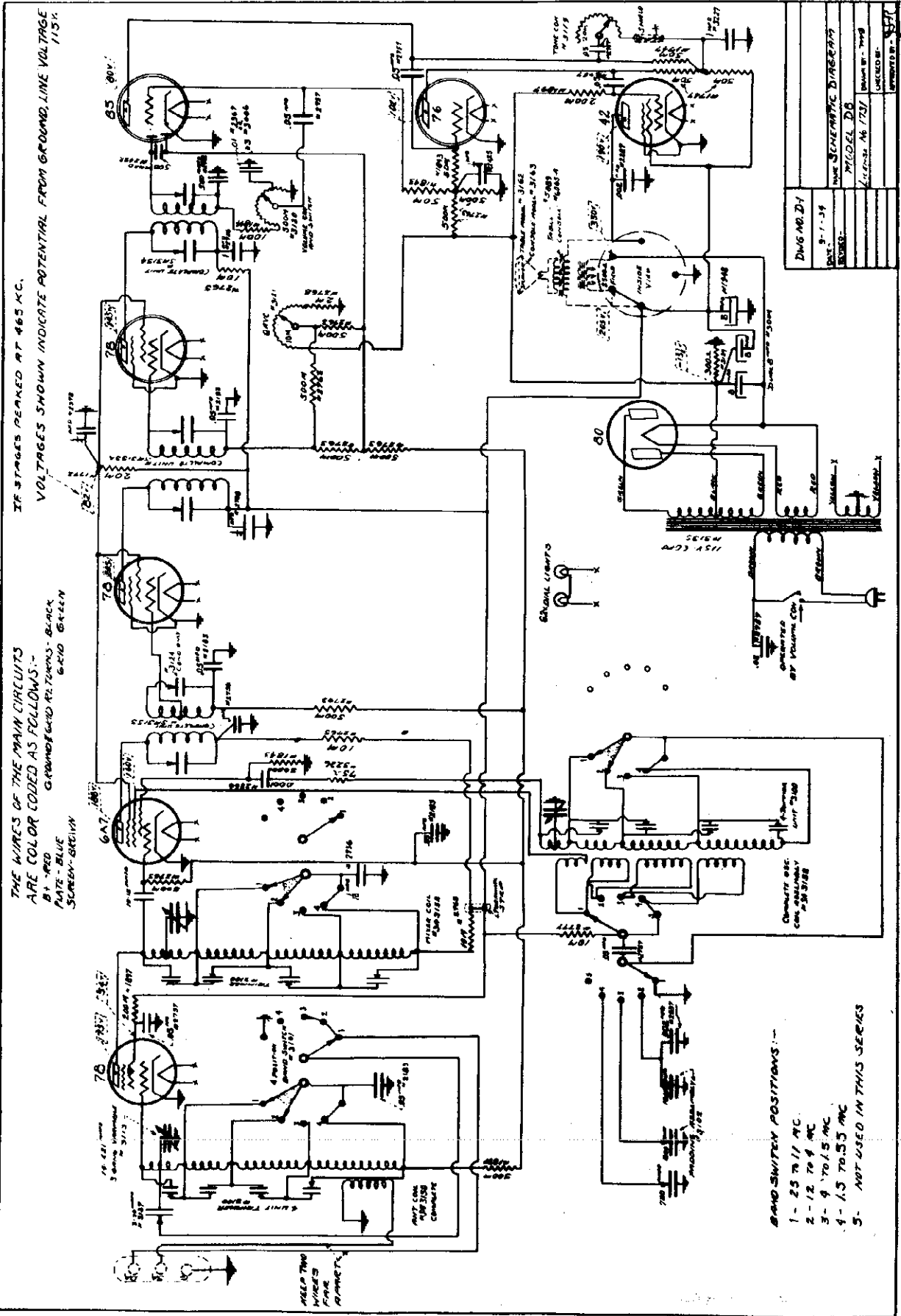
MODEL Grand, Series 1
Amplifier & SPU Schematics

HOWARD RADIO CO.



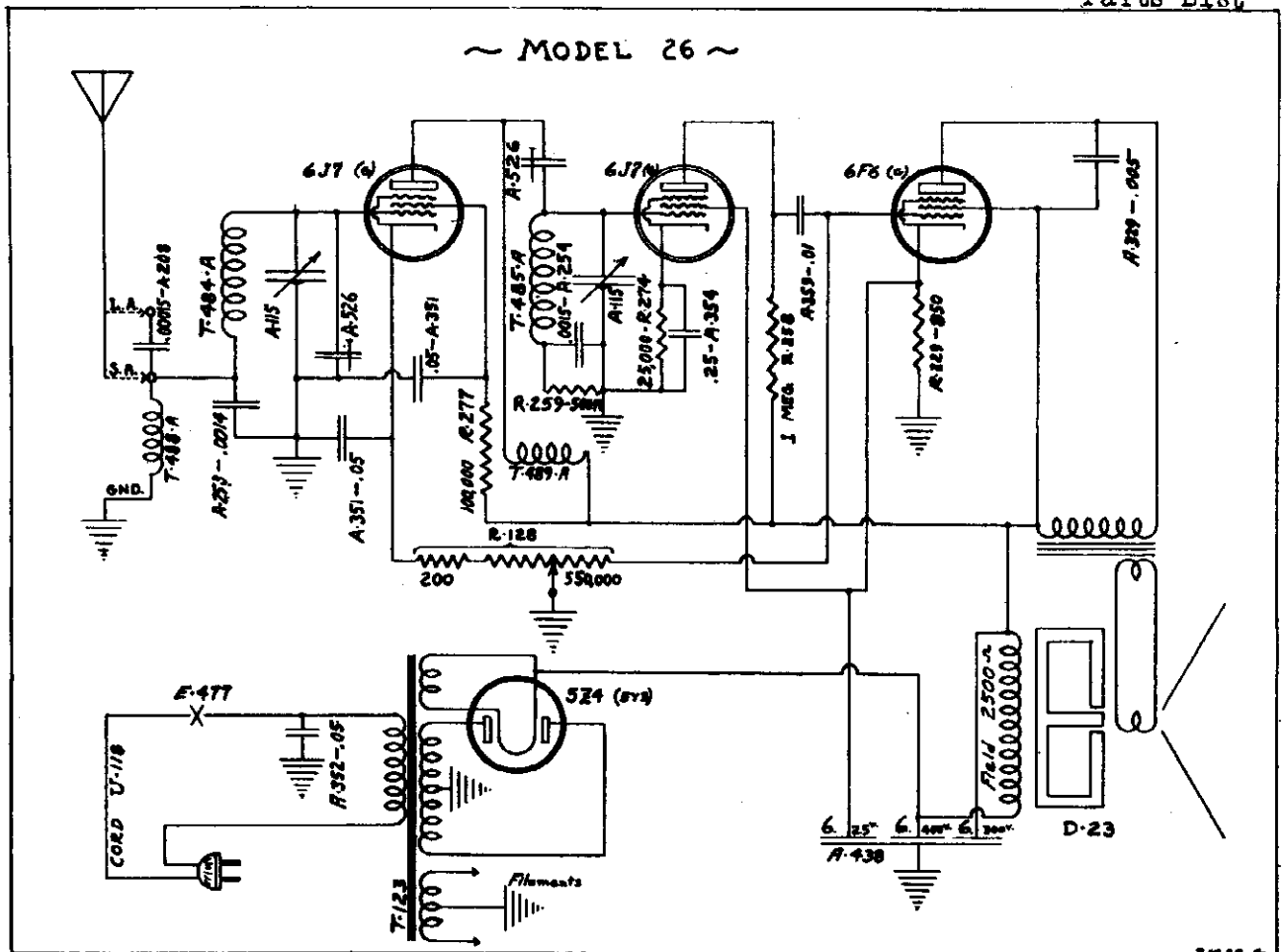
HOWARD RADIO CO.

MODEL D-8
Schematic, Voltage



INTERNATIONAL RADIO CORP.

~ MODEL 26 ~



PARTS LIST

PART NO.	DESCRIPTION	LIST PRICE			
A-115	2 gang tuning condenser	\$1.85	E-483	Pilot light socket	.10
A-208	150 mmf. mica condenser	.20	H-53	6J7 tube socket	.10
A-253	1400 mmf. mica condenser	.20	H-56	6F6 tube socket	.10
A-254	1500 mmf. mica condenser	.20	H-57	5Y3 tube socket	.10
A-329	.005 mf., 600 v. paper condenser	.15	R-128	Volume control	.55
A-351	.05 mf., 200 v. paper condenser	.15	R-229	850 ohm, 1/2 w. carbon resistor	.20
A-352	.05 mf., 300 v. paper condenser	.15	R-258	1 megohm, 1/3 w. carbon resistor	.20
A-354	.25 mf., 25 v. paper condenser	.20	R-259	500M ohm, 1/3 w. carbon resistor	.20
A-359	.01 mf., 400 v. paper condenser	.15	R-274	25M ohm, 1/3 w. carbon resistor	.20
A-438	Electrolytic filter condenser block	1.35	R-277	100M ohm, 1 w. carbon resistor	.20
A-526	Semi-variable trimmer condenser	.15	T-123	Power transformer	2.35
D-23	Dynamic speaker	3.50	T-484A	Antenna coil	.75
E-157	1" knob	.15	T-485A	Detector coil	.75
E-158	13/16" knob	.15	T-488A	Choke	.20
E-259	Dial pointer	.05	T-489A	Choke	.20
E-267	Dial scale	.25	U-118	A.C. cord and plug	.30
E-472	6-8 volt pilot light bulb	.15	U-207	4 wire speaker cable	.20
E-476	Antenna-ground binding post strip	.10	X-341	Cabinet (model 26)	5.30
E-477	A.C. power switch	.25	X-348	Cabinet (model 226)	5.30


SEPTEMBER, 1935. Prices subject to change without notice

MODELS 26,226
Voltage
Alignment, Data

INTERNATIONAL RADIO CORP.

AVERAGE SOCKET VOLTAGES

Bottom View of Socket. VOLTAGES SHOWN ARE FROM TUBE PINS TO GROUND



	POSITION	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8
6J7	R. F	Shell	HTR.	250	95	0	—	HTR.	7
6J7	Det.	Shell	HTR.	25	20	10	—	HTR.	10
6F6 5Z4	A. F. Rect.	Shell Shell	HTR. 345	240 —	250 A.C.	0 —	— A.C.	HTR. —	20 345

Line 118 volts. Volume Control Full On. 10% Variation Allowable.

This chassis is a four tube tuned-radio-frequency receiver designed to operate from 115 volts, 60 cycle A.C. power lines. It tunes the band of 1760 to 540 kilocycles. The following tubes are employed:

6J7 (metal) or 6J7G (glass) Radio frequency 6F6 (metal) or 6F6G (glass) Pentode output
6J7 (metal) or 6J7G (glass) Detector 5Z4 (metal) or 5Y3 (glass) Rectifier

The metal and glass tubes are interchangeable but when changing from one type to the other it is advisable to realign for perfect resonance.

ANTENNA LENGTH

- S. A. binding post accommodates antenna of 25 to 60 feet including lead-in.
- L. A. binding post, over 60 feet (useful in remote sections).

ALIGNMENT DATA

The rear section of the 2 gang condenser tunes the R. F. stage; the front section the detector. The R. F. section only, has a trimmer condenser connected across it. The small semi-adjustable condenser attached to the detector section is the coupling condenser connected between the R. F. tube plate and Detector control grid.

Alignment may be accomplished using either a signal generator or weak broadcast signals although the signal generator is preferable. An output meter should be connected from the plate of the 6F6 tube to ground (blue and black speaker wires).

Set signal generator at 1400 kilocycles and feed signal to antenna binding post. Keep the output from signal generator as low as possible. Tune in signal on radio and make adjustments for maximum output. Rock the tuning condenser back and forth across the signal while adjusting the R. F. trimmer for resonance.

Next check the alignment at 1000 Kc. Insert a thin bakelite, celluloid or mica feeler strip between the plates of the variable condensers to determine whether the circuits are properly matched. The action is this—the dielectric constant of the celluloid feeler strip being higher than that of the air it displaces, results in an increase of capacity. Open the variable condenser just enough to indicate two or three points below maximum signal. As the feeler is inserted the meter reading should indicate increasing signal and then decreasing as the feeler is inserted farther. This procedure should be followed on both sections. Should the meter fail to show an increase in signal as the strip is inserted in one section this indicates too great a capacity for the section. This may be corrected by bending the outside rotor plates out at the point where they begin to mesh with the stator.

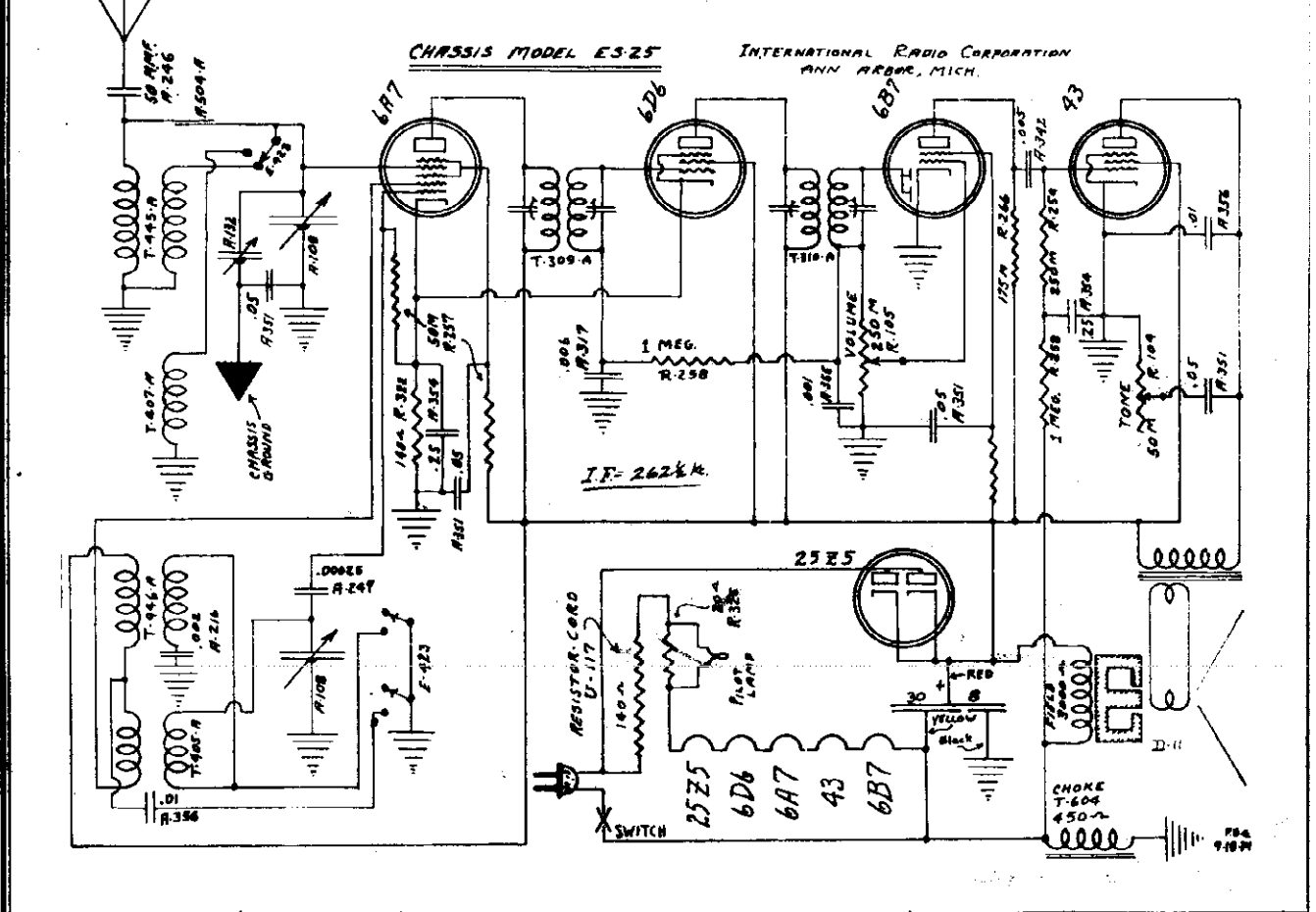
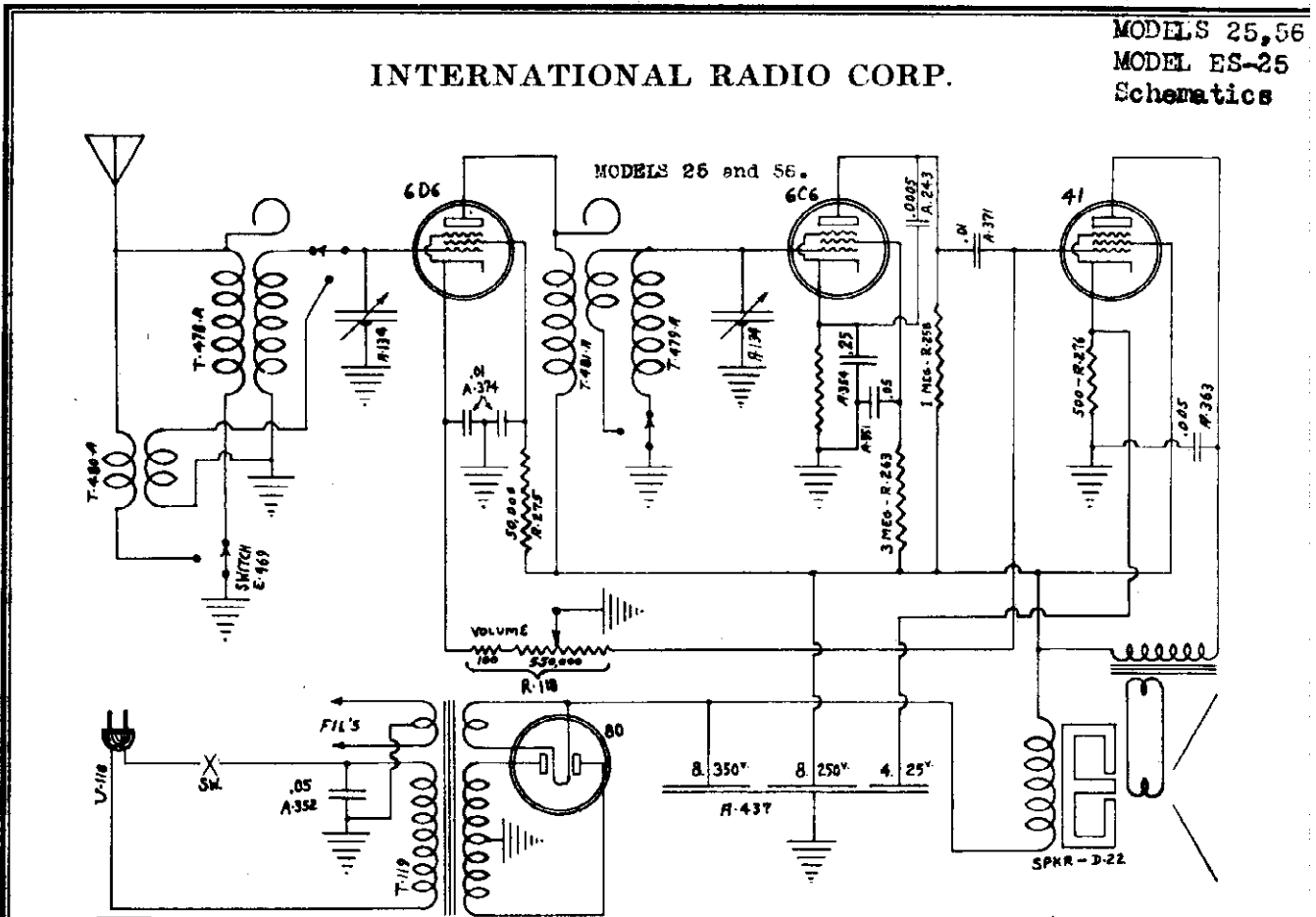
After checking the alignment at 1000 Kc. repeat the process at 600 Kc.

INTERSTAGE COUPLING CONDENSER

The interstage coupling condenser connected between the plate of the R.F. tube and control grid of the detector should be adjusted so there is slight oscillation at the high frequency end of the band when the volume control is in full on position. Slight oscillation may be noticed also at the low frequency end.

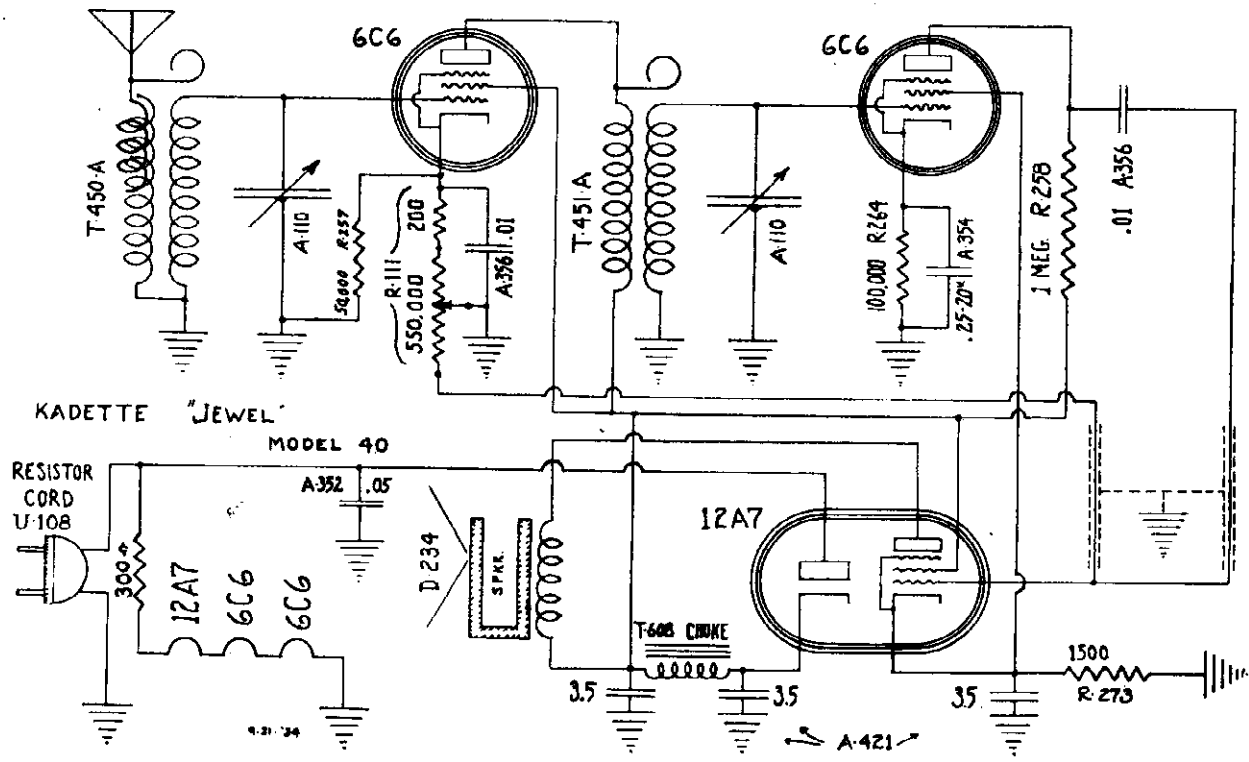
INTERNATIONAL RADIO CORP.

MODELS 25, 56
MODEL ES-25
Schematics

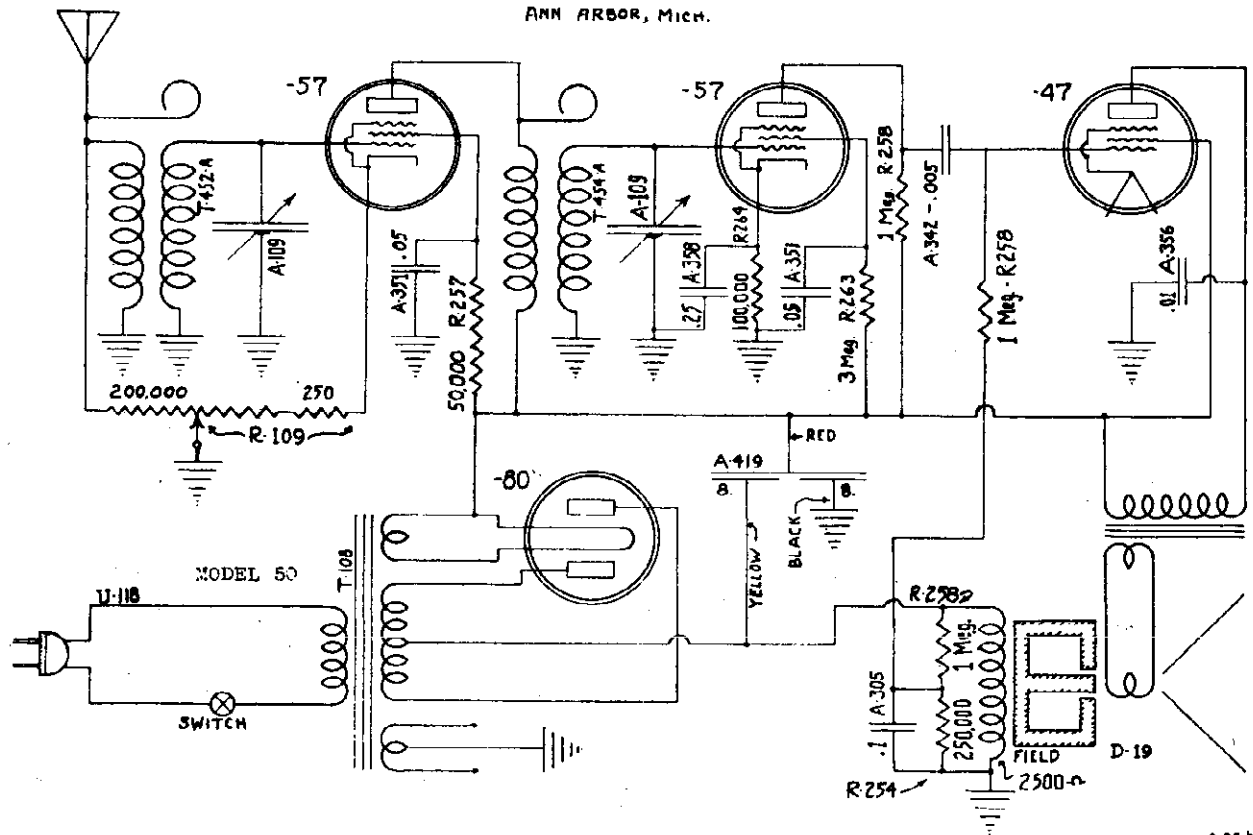


MODEL 40, Jewel
 MODEL 50
 Schematics

INTERNATIONAL RADIO CORP.

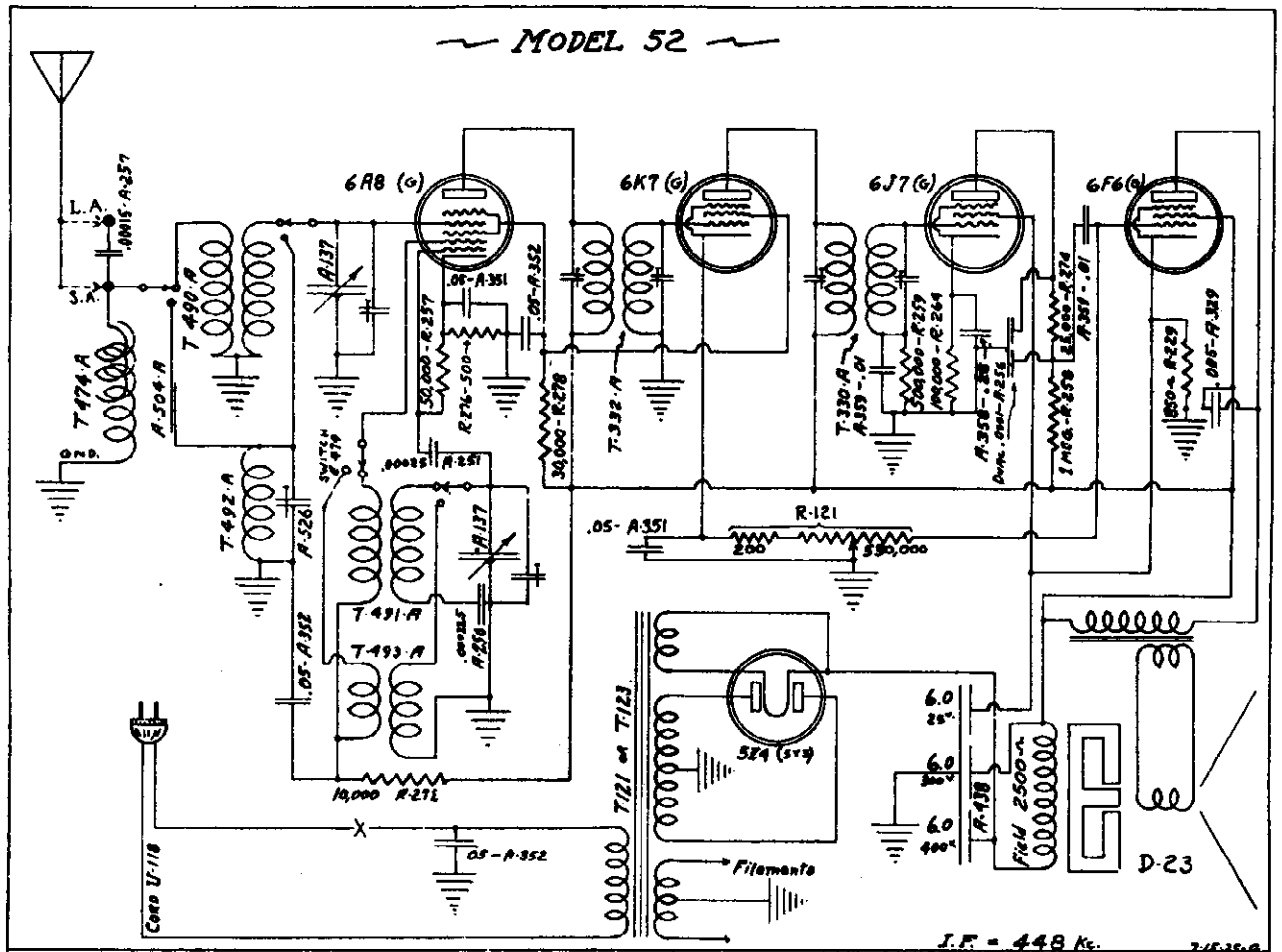


INTERNATIONAL RADIO CORPORATION
 ANN ARBOR, MICH.



INTERNATIONAL RADIO CORP.

MODEL 52



PARTS LIST

PART NO.	DESCRIPTION	LIST PRICE
A-137.....	2 gang tuning condenser	\$1.65
A-208.....	150 mmf. mica condenser .....	.20
A-250.....	325 mmf. mica condenser .....	.20
A-251.....	.00025 mf. mica condenser .....	.20
A-256.....	Dual .0001 mf. mica condenser .....	.20
A-329.....	.005 mf., 600v. paper condenser .....	.15
A-351.....	.05 mf., 200v. paper condenser .....	.15
A-352.....	.05 mf., 300v. paper condenser .....	.15
A-358.....	.25 mf., 120v. paper condenser .....	.20
A-359.....	.01 mf., 400v. paper condenser .....	.15
A-438.....	6-6-6 mf. electrolytic filter condenser	1.35
A-526.....	Semi-variable trimmer condenser .....	.15
D-29.....	5 inch dynamic speaker	3.50
E-157.....	Black and silver knobs .....	.15
E-160.....	Black and silver knob with yellow and .....	.15
E-265.....	Dial assembly	1.50
E-472.....	Pilot light bulbs 6-8 volts .....	.15
E-476.....	Antenna and ground strip .....	.10
E-479.....	Wave band switch .....	.45
H-49.....	6A8 tube socket .....	.10
H-53.....	6J7 tube socket .....	.10
H-54.....	6K7 tube socket .....	.10
H-56.....	6F6 tube socket .....	.10
H-57.....	5Y3 tube socket .....	.10
R-121.....	Volume control with power switch .....	.75
R-229.....	850 ohm, 1/2 w. carbon resistor .....	.20
R-257.....	50M ohm, 1/3 w. carbon resistor .....	.20
R-258.....	1 megohm, 1/3 w. carbon resistor .....	.20
R-259.....	500M ohm, 1/3 w. carbon resistor .....	.20
R-264.....	100M ohm, 1/3 w. carbon resistor .....	.20
R-272.....	10M ohm, 1/3 w. carbon resistor .....	.20
R-274.....	25M ohm, 1/3 w. carbon resistor .....	.20
R-276.....	500 ohm, 1/3 w. carbon resistor .....	.20
R-278.....	30M ohm, 1 w. carbon resistor .....	.20
S-102.....	Goat tube shield .....	.10
T-121.....	Power transformer	2.35
T-330A.....	2nd I.F. transformer	1.25
T-332A.....	1st I.F. transformer	1.25
T-474A.....	448 Kc. wave trap .....	.35
T-490A.....	Broadcast detector coil	1.00
T-491A.....	Broadcast oscillator coil	1.00
T-492A.....	Short wave detector coil .....	.35
T-493A.....	Short wave oscillator coil .....	.35
U-118.....	A.C. cord and plug .....	.30
U-206.....	4 wire speaker cable .....	.20
X-343.....	Cabinet	5.70


SEPTEMBER, 1935 Prices Subject to Change Without Notice

MODEL 52
Voltage
Alignment

INTERNATIONAL RADIO CORP.

AVERAGE SOCKET VOLTAGES

Bottom View of Socket. VOLTAGES SHOWN ARE FROM TUBE PINS TO GROUND



	POSITION	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8
6A8	Det.-Osc.	Shell	HTR.	195	70	— 10	140	HTR.	3
6K7	I. F.	Shell	HTR.	210	90	1.5	—	HTR.	1.5
6J7	2nd Det.	Shell	HTR.	50	15	4	—	HTR.	.4
6F6	A. F.	Shell	HTR.	200	210	0	—	HTR.	15
5Z4	Rect.	Shell	300	—	A.C.	—	A.C.	—	300

Line 118 volts. Switch on Broadcast Position. Volume Control Full On. 10% Variation Allowable.

Model 52 is designed to operate from 115 volts, 60 cycle alternating current power lines. It is a two band receiver covering the American broadcast and Foreign short wave bands.

The following tubes are employed:

- 6A8 (metal) or 6A8G (glass) 1st Detector-Oscillator
- 6K7 (metal) or 6K7G (glass) I.F. Amplifier
- 6J7 (metal) or 6J7G (glass) 2nd Detector
- 6F6 (metal) or 6F6G (glass) Pentode output
- 5Z4 (metal) or 5Y3 (glass) Rectifier

The metal and glass tubes are interchangeable but when changing from one type to the other it is advisable to realign for perfect resonance. The 6J7G tube should be shielded but shielding may be omitted when using the all metal 6J7.

ALIGNMENT

The standard type of output meter should be used to indicate signal strength. It should be connected from the plate (pin No. 3) of the 6F6 to ground. The signal from the signal generator *must be kept at a very low level.*

ESSENTIAL DATA: The intermediate frequency used is 448 Kc. On the broadcast band the oscillator frequency is 448 Kc. higher than the signal frequency. On the short wave band it is 448 Kc. lower than the signal frequency.

Aligning should be done on the following frequencies: Broadcast band 1400 and 600 kilocycles; Short wave band 12 and 6 megacycles.

It is permissible to bend condenser plates when aligning the broadcast band but not the short wave band.

INTERMEDIATES: To align the I.F. circuits, set the signal generator to 448 Kc. and feed its modulated signal direct to the antenna. Short out the oscillator section of the two gang condenser. 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 may result.

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 (on condenser gang) for maximum reading.

There is no adjustable padder condenser in this model so resonance on the low frequency end is accomplished by bending plates on the tuning condensers.

SHORT WAVE BAND: There is a separate trimmer condenser across the short wave detector coil. It is mounted on the bottom of the chassis at the end. Adjustment should be made at 12 megacycles. Instead of bending condenser plates at 6 megacycles, alignment is accomplished by spreading or crowding turns on the short wave detector coil. If much crowding or spreading is necessary it is advisable to go back and recheck at 12 megacycles.

MICROPHONIC HOWL

The tuning condenser is cushion mounted to eliminate vibration. Do not allow the dial to touch the escutcheon plate on the cabinet or a microphonic condition will be created.

INTERNATIONAL RADIO CORP.

MODELS 53, 553
Early and Late
Alignment

Models 53 & 553

This chassis is designed to operate from 115 volt, 60 cycle, alternating current power lines. It is a three band receiver covering the American broadcast, police and airport, and Foreign shortwave bands. The following tubes are employed:

6A8 (metal) or 6A8G (glass) 1st Detector-Oscillator	6K7 (metal) or 6K7G (glass) I. F. Amplifier
*6J7 (metal) or 6J7G (glass) 2nd Detector	* 75 (glass) 2nd Detector, A.V.C. and 1st A.F.
6F6 (metal) or 6F6G (glass) Pentode output	5Z4 (metal) or 5Y3 (glass) Rectifier

*6J7 or 6J7G used in first production; 75 used in later production.

The metal and glass tubes are interchangeable but when changing from one type to the other it is advisable to realign for perfect resonance. Glass counterpart types should be shielded. The metal tubes need not be. Shielding provisions are provided. The 75 tube must be shielded at all times.

TWO CIRCUITS

It will be noted by referring to the circuit diagram that sets of early production did not incorporate A.V.C. In later production the 6J7 tube has been replaced with a 75 and A.V.C. added. In other respects the two circuits are identical.

ALIGNMENT

The standard type of output meter should be used to indicate signal strength. It should be connected from the plate (pin No. 3) of the 6F6 to ground. Tone control should be turned "high." The signal from the signal generator *must be kept at a very low level.*

ESSENTIAL DATA: The intermediate frequency employed is 448 Kc. On the broadcast and middle bands the oscillator frequency is 448 kilocycles higher than the signal frequency. On the short wave band it is 448 kilocycles lower than the signal frequency.

Aligning should be done on the following frequencies: Broadcast band, 1,400 and 600 Kc.; Middle band, 6,000 and 2,400 Kc.; Short wave band 15 megacycles.

Do not bend tuning condenser plates when aligning or it will be impossible to make all three bands track correctly. The front section of the two gang condenser is the oscillator section, the rear section the first detector.

INTERMEDIATES: To align the I.F. circuits, set the signal generator to 448 Kc. and feed its modulated signal direct to the antenna. Short out the oscillator section of the two gang condenser. 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 may result.

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 (see sketch) for maximum reading. Although a trimmer is provided for the Broadcast detector coil it will be found not connected in many sets as it is not necessary in obtaining correct balance.

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.

MIDDLE BAND: Turn the band change switch to the middle position and tune radio and signal generator to 6000 Kc. Adjust the oscillator trimmer and then the detector trimmer for maximum output.

Rock in the padder condenser at 2400 Kc. Then recheck at 6000 Kc. and 2400 Kc.

SHORT WAVE BAND: Turn band change switch to short wave band. Tune radio and signal generator to 15 megacycles and adjust trimmers. No padder condenser is used on the short wave band so no other adjustments are necessary. On this band the oscillator frequency is 448 Kc. lower than the signal frequency

MICROPHONIC HOWL

The 2 gang condenser is cushion mounted to eliminate vibration of the plates. Do not allow the dial to touch the escutcheon plate on the cabinet or a microphonic condition will be created.

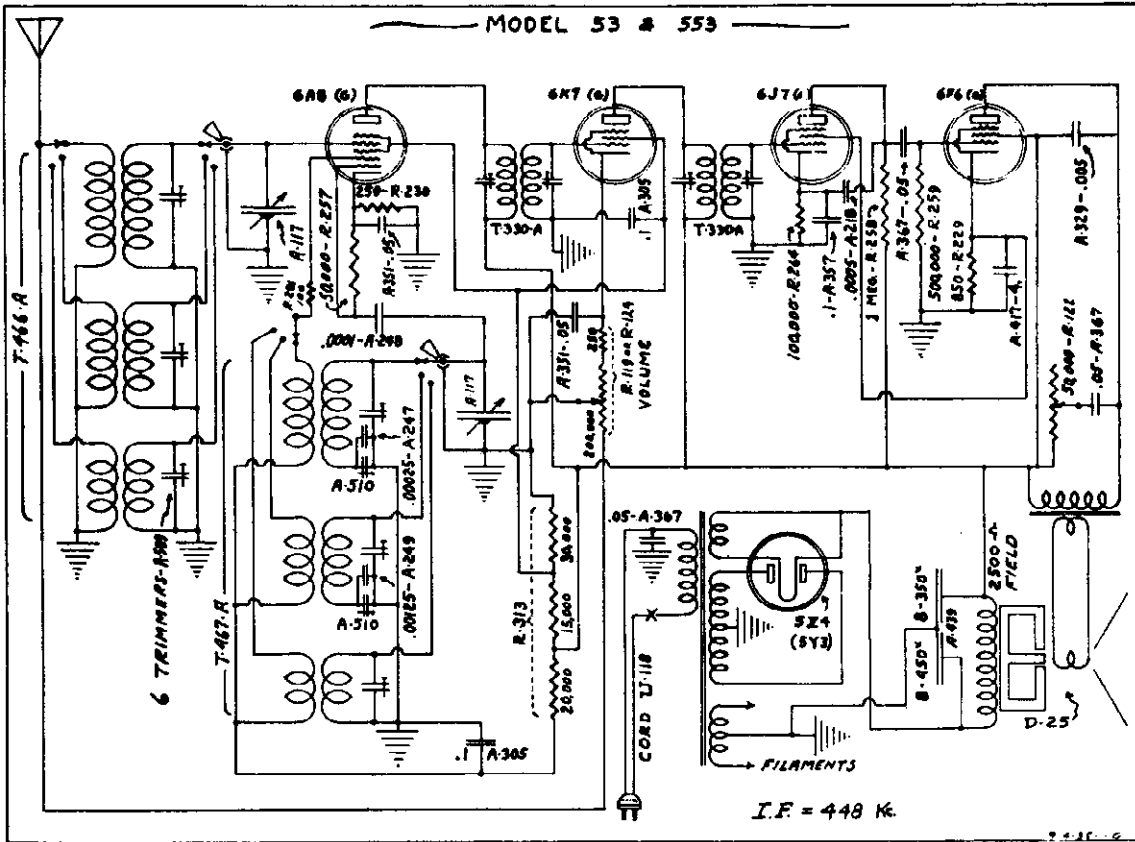
LONG WAVE-EXPORT MODEL

Model 53 is also built with a four position switch (part number E-482) and an extra set of coils tuning the foreign long wave band. The order of band change switch positions is broadcast, mid-band, short wave, long wave band. Alignment—adjust long wave trimmers at 350 Kc. and rock in long wave padder at 160 Kc. See sketch for location of coils and condensers.

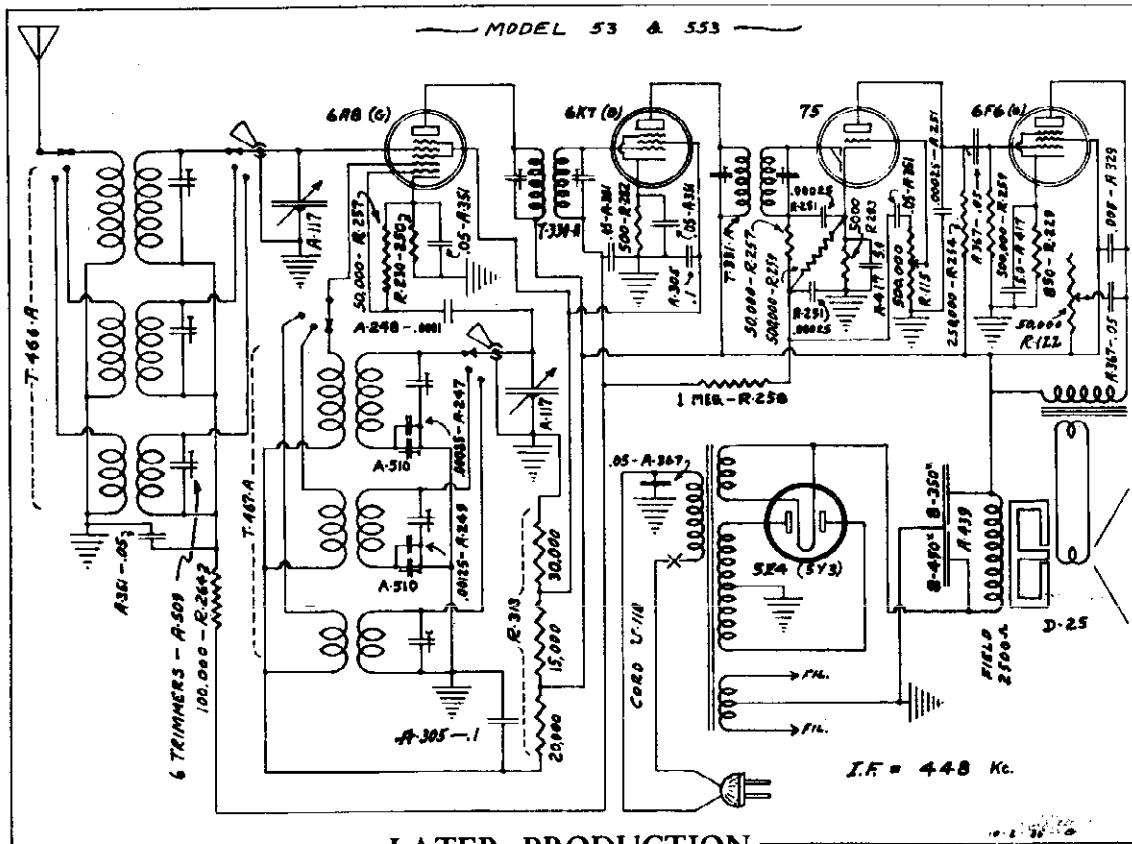
Some export sets also contain a 25 cycle power transformer (part number T-502) which has a tapped primary winding allowing operation from 125, 150 or 250 volt A.C. power lines. The tap switch is made available by removing part of the cover of the power transformer. 25 cycle sets may be used on 60 cycle although the converse is not true.

MODEL 53, 553
Early and Late
Schematics

INTERNATIONAL RADIO CORP.



FIRST PRODUCTION



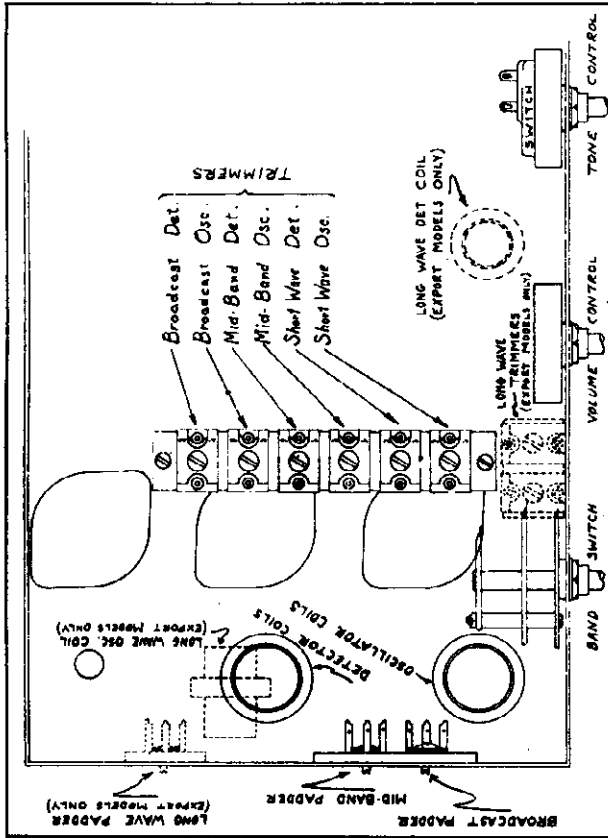
LATER PRODUCTION

INTERNATIONAL RADIO CORP.

MODELS 53, 553
Trimmers, Parts
Voltage

PARTS PRICE LIST
MODELS 53 & 553

PART NO.	DESCRIPTION	LIST PRICE
A-317	2 gang tuning condenser	\$2.00
A-218	.0005 mf. mica condenser	.20
A-247	.00025 mf. mica condenser	.20
A-248	.0015 mf. mica condenser	.20
A-251	.0015 mf. mica condenser	.20
A-252	.0015 mf. mica condenser	.20
A-304	1 mf. 200 v. paper condenser	.15
A-329	.05 mf. 600 v. paper condenser	.15
A-351	.05 mf. 200 v. paper condenser	.15
A-357	.1 mf. 25 v. paper condenser	.15
A-367	.05 mf. 400 v. paper condenser	.15
A-417	.4 mf. 25 v. electrolytic condenser	.55
A-459	Electrolytic filter condenser	1.30
A-509	6 gang trimmer condenser	.55
A-310	Dual trimmer condenser	.45
A-315	Single padder (long wave model only)	.25
A-327	Dual trimmer condenser (long wave model only)	.20
D-25	Dynamic speaker	4.55
E-153	1 inch knob	.15
E-156	1 1/2 inch knob	.15
E-159	1 inch knob with colored dots	.20
E-269	Dial assembly	1.65
E-271	Dial assembly (for long wave model)	1.65
E-480	5 position band change switch	1.00
E-481	3 position band change switch (long wave model)	1.00
E-484	Patron ground binding post susp.	.10
H-25	7 1/2 tube socket	.30
H-29	6AB tube socket	.30
H-31	6I7 tube socket	.30
H-34	6X7 tube socket	.30
H-36	616 tube socket	.30
H-57	5Z4 tube socket	.10
R-115	Volume control	.55
R-119 or R-124	Volume control	.60
R-122	Tone control with power switch	.70
R-229	890 ohm. 1/2 w. carbon resistor	.20
R-230	250 ohm. 1/3 w. carbon resistor	.20
R-254	250M ohm. 1/3 w. carbon resistor	.20
R-257	90M ohm. 1/3 w. carbon resistor	.20
R-258	1 megohm. 1/3 w. carbon resistor	.20
R-259	300M ohm. 1/3 w. carbon resistor	.20
R-264	100M ohm. 1/3 w. carbon resistor	.20
R-281	100 ohm. 1/3 w. carbon resistor	.20
R-283	500 ohm. 1/3 w. carbon resistor	.20
R-285	100 ohm. 1/3 w. carbon resistor	.20
R-313	Control resistor, 20K-13M 30M ohms	.55
T-122	Gen. tube shield	.30
T-130A	Power transformer (60 cycle)	2.50
T-130A	JF transformer	1.25
T-466A	Oscillator coil	1.75
T-467A	Oscillator coil	1.75
T-468A	L.W. Detector coil (long wave model only)	.85
T-469A	L.W. Oscillator coil (long wave model only)	.85
T-302	Power transformer 25 cycle tapped-primary	6.50
L-118	A.C. cord and plug	.30
L-206	3 wire speaker cable	.20
X-311	Cabinet (Model 53)	7.50
X-319	Cabinet (Model 553)	7.25



Bottom View of Socket. VOLTAGES SHOWN ARE FROM TUBE PINS TO GROUND

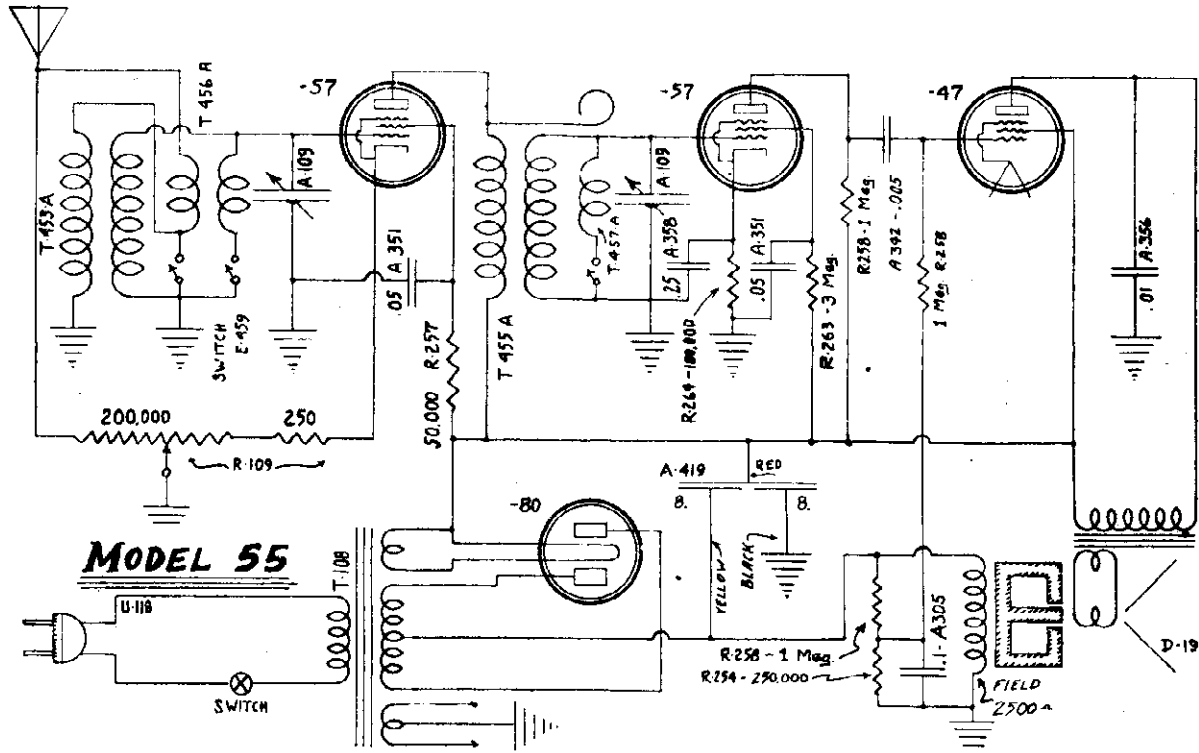
POSITION	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8
6A8 Det.-Osc.	Shell	HTR.	265	98	—	138	HTR.	1
6K7 I. F.	Shell	HTR.	265	98	1	—	HTR.	1
*6J7 2nd Det.	Shell	HTR.	55	20	5	—	HTR.	5
6F6 A. F.	Shell	HTR.	255	265	0	—	HTR.	20
5Z4 Rect.	Shell	390	—	A.C.	—	A.C.	—	390

Position	E _k	E _p	E _{sp}
*75 2nd Det.	1.5	95	0

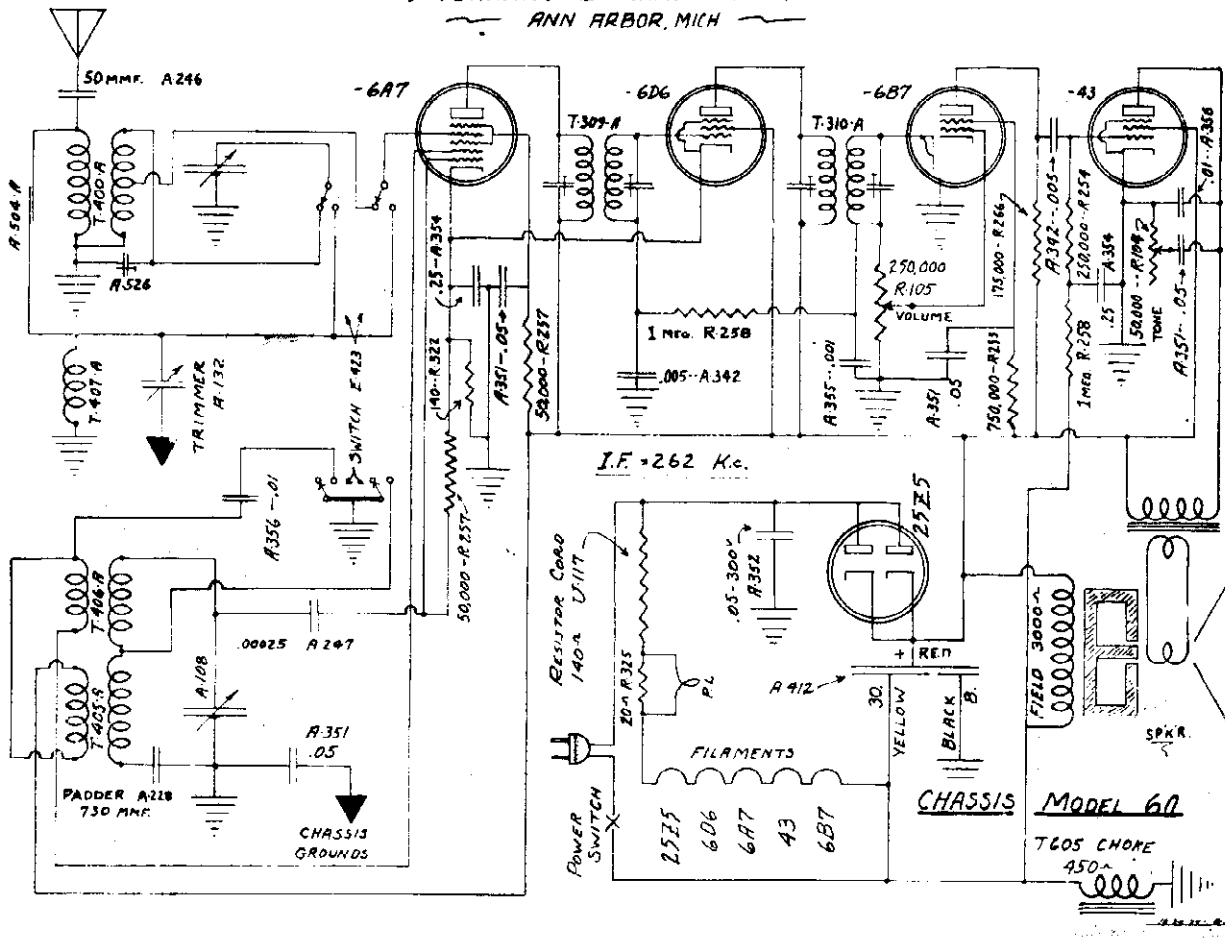
Line 118 Volts. Switch On Broadcast Position. Volume Control Full On. 10% Variation Allowable.

MODEL 55
 MODEL 60
 Schematics

INTERNATIONAL RADIO CORP.

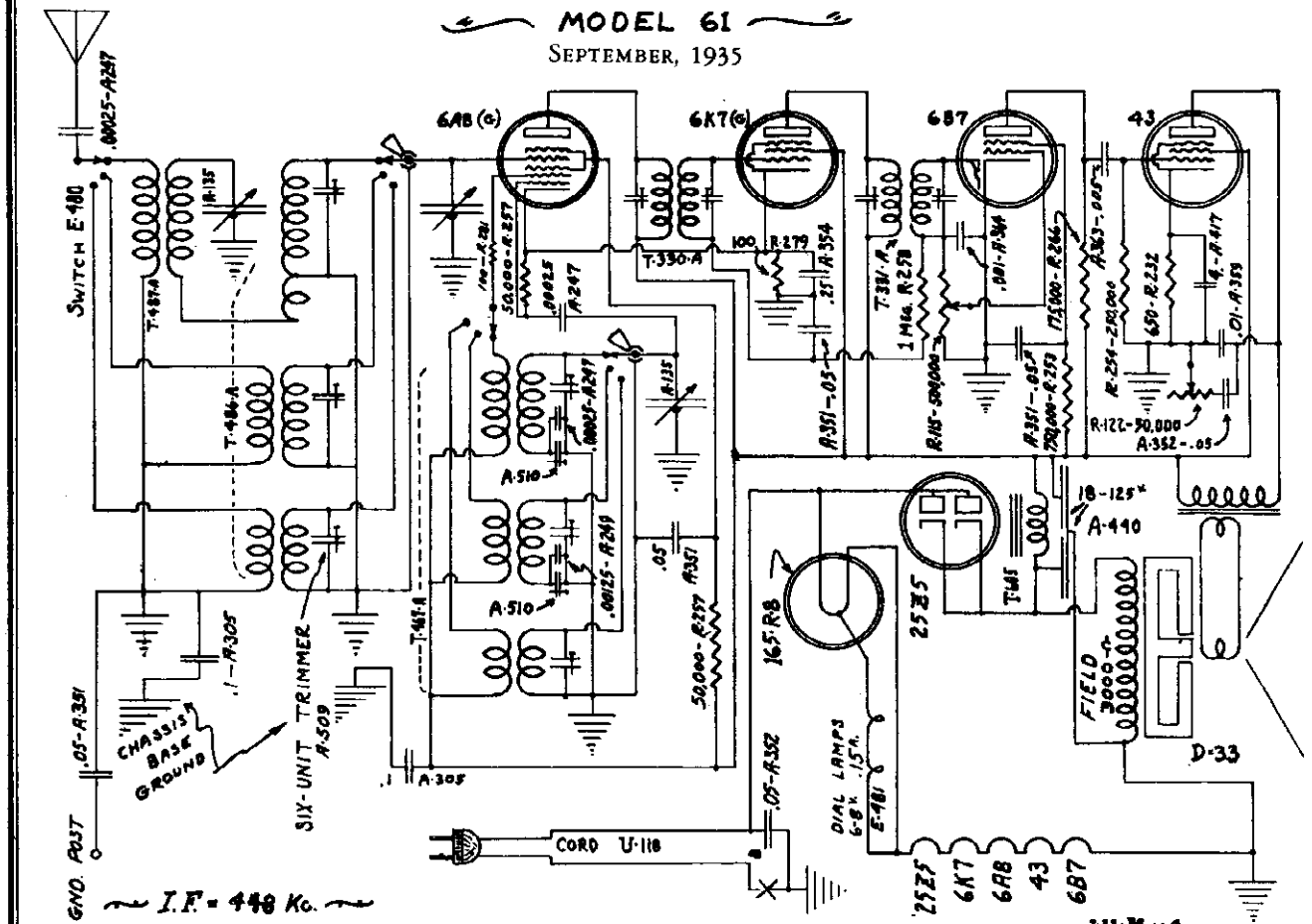


INTERNATIONAL RADIO CORPORATION
 ANN ARBOR, MICH



INTERNATIONAL RADIO CORP.

MODEL 61, 661
Schematic
Parts



PARTS LIST

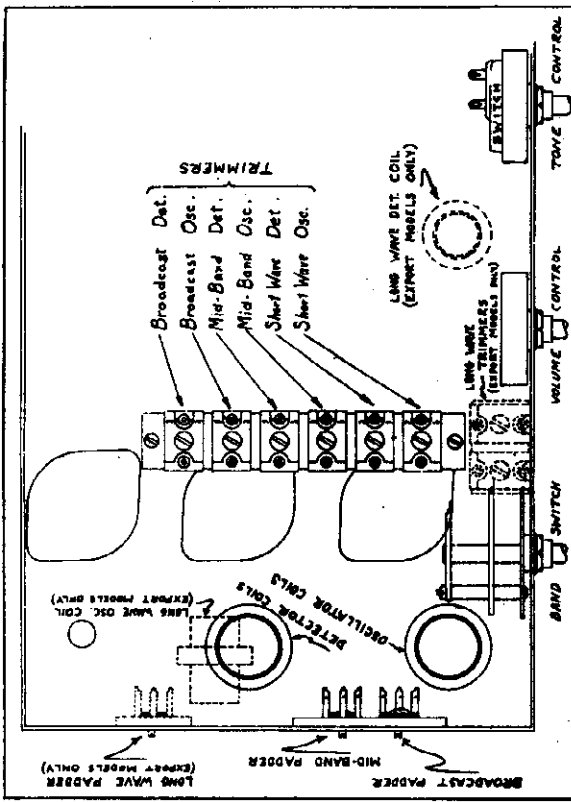
PART No.	DESCRIPTION	LIST PRICE
A-135.....	3 gang tuning condenser	\$2.80
A-247.....	.00025 mf. mica condenser	.20
A-249.....	.00125 mf. mica condenser	.20
A-305.....	1 mf., 200 v. paper condenser	.15
A-351.....	.05 mf., 200 v. paper condenser	.15
A-352.....	.05 mf., 300 v. paper condenser	.15
A-354.....	.25 mf., 25v. paper condenser	.20
A-359.....	.01 mf., 400 v. paper condenser	.15
A-363.....	.005 mf., 400 v. paper condenser	.15
A-364.....	.001 mf., 400 v. paper condenser	.15
A-417.....	5 mf., 25 v. electrolytic condenser	.55
A-440.....	Electrolytic filter condenser	1.25
A-509.....	6 gang trimmer condenser	.55
A-510.....	Dual padder condenser	.45
A-515.....	Single padder (long wave model only)	.25
A-527.....	Dual trimmer condenser (long wave model only)	.20
D-33.....	Dynamic speaker	3.50
E-155.....	1 inch knob	.15
E-156.....	1 3/16 inch knob	.15
E-159.....	1 inch knob with colored dots	.20
E-269.....	Dial assembly	1.65
E-271.....	Dial assembly (for long wave model)	1.65
E-460.....	Antenna-ground binding post strip	.10
E-480.....	3 position band change switch	1.00
E-481.....	Special pilot lamps 6-8 v., .15 amperes	.15
E-482.....	4 position band change switch (long wave model)	1.50
H-18.....	25Z5 tube socket	.10
H-20.....	6B7 tube socket	.10
H-21.....	43 tube socket	.10
H-49.....	6A8 tube socket	.10
H-54.....	6K7 tube socket	.10
H-58.....	165R8 tube socket	.10
R-115.....	Volume control	.55
R-122.....	Tone control with power switch	.70
R-232.....	650 ohm, 1/2 w. carbon resistor	.20
R-253.....	750M ohm, 1/3 w. carbon resistor	.20
R-254.....	250M ohm, 1/3 w. carbon resistor	.20
R-257.....	50M ohm, 1/3 w. carbon resistor	.20
R-258.....	1 megohm, 1/3 w. carbon resistor	.20
R-266.....	175M ohm, 1/3 w. carbon resistor	.20
R-279.....	100 ohm, 1/3 w. carbon resistor	.20
R-281.....	100 ohm, 1/3 w. carbon resistor	.20
S-102.....	Goat tube shield	.10
T-330A.....	1st I.F. transformer	1.25
T-331A.....	2nd I.F. transformer	1.25
T-467A.....	Oscillator coil (model only)	1.75
T-468A.....	L. W. Detector coil (long wave)	.85
T-469A.....	L. W. Oscillator coil (long wave)	.85
T-486A.....	Detector coil (model only)	1.75
T-487A.....	Antenna coil	1.00
T-605.....	Filter choke	.65
U-118.....	A.C. cord and plug	.30
U-206.....	Four wire speaker cable	.20
X-345.....	Cabinet (Model 61)	8.50
X-350.....	Cabinet (Model 661)	8.00

MODELS 61, 661
Voltage, Trimmers
Alignment

INTERNATIONAL RADIO CORP.

LONG WAVE-EXPORT MODEL

Model 61 is also built with a four position switch (part number E-482) and an extra set of coils tuning the foreign long wave band. The order of band change switch positions is broadcast, mid-band, short wave, long wave band. Alignment—adjust long wave trimmers at 350 Kc. and rock in long wave padler at 160 Kc. See sketch for location of coils and condensers.



AVERAGE SOCKET VOLTAGES

Bottom View of Sockets. VOLTAGES SHOWN ARE FROM TUBE PINS TO GROUND

Position	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8
6A8 Det-Osc.	Shell	HTR.	90	27	0	90	HTR.	0
6K7 I. F.	Shell	HTR.	90	90	0	—	HTR.	0
	E_k	E_{os}	E_p	E_{dp}				
6B7 2nd Det.	0	7	12	0				
45 A. F.	12	90	85	—				
25Z5 Rect.	105	—	A. C.	—				

Line 118 Volts. Switch On Broadcast Position. Volume Control Full On. 10% Variation Allowable.

This chassis is designed to operate from 115 volt power lines, either alternating or direct current. It is a three band receiver covering the American broadcast, police and airport, and Foreign short wave bands.

The following tubes are employed:

- 6A8 (metal) or 6AG (glass) 1st Detector-Oscillator
- 6K7 (metal) or 6K7G (glass) I.F. amplifier
- 6B7 (glass) 2nd detector, A.V.C. and 1st A.F.
- 45 (glass) Penode output
- 25Z5 (glass) Rectifier
- 165R8 (glass) Regulator

The metal and glass tubes are interchangeable but when changing from one type to the other it is advisable to align for perfect resonance. Glass counterpart types should be shielded, the metal tubes need not be. Shielding provisions are provided.

ALIGNMENT

The standard type of output meter should be used to indicate signal strength. It should be connected from the plate of the 45 tube to ground. Tone control should be turned "high". The signal from the signal generator must be kept at a very low level.

ESSENTIAL DATA: The intermediate frequency employed is 448 Kc. On the broadcast and middle bands the oscillator frequency is 448 kilocycles higher than the signal frequency. On the short wave band it is 448 kilocycles lower than the signal frequency.

Aligning should be done on the following frequencies: Broadcast band, 1400 and 600 Kc.; Middle band, 6000 and 2400 Kc.; Short wave band 15 megacycles.

In aligning on broadcast band it is permissible to bend plates on the band pass sections only of the three gang condenser. Do not bend plates when aligning the middle and short wave bands.

The front section of the three gang condenser is the oscillator section; the middle section, first detector; the rear section, band pass. The band pass is in circuit only on the broadcast band.

INTERIMATES: To align the IF circuit first remove the grid clip from the 6A8 tube and connect a 1/2 meg. resistance from the 6A8 grid (top of tube terminal) to ground. Set the signal generator to 448 Kc. and feed it modulated signal direct to the grid of the 6A8 through a 100 mf. condenser. Adjust the first IF transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process on the second IF transformer. If adjustments are not made accurately selectivity will be poor and IF may oscillate.

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 (see sketch) and band pass trimmer (on condenser gang) for maximum reading. Although a trimmer is provided for the Broadcast detector coil it will be found not connected on many sets as it is not necessary in obtaining correct balance.

Turn dial and signal generator to 600 Kc. and rock the padler into correct adjustment. This is accomplished by very slowly adjusting the padler 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 padler at 600 Kc. It is permissible to bend plates on the band pass section only in resonating circuits.

MIDDLE BAND: Turn the band change switch to the middle position and tune radio and signal generator to 6000 Kc. Adjust the oscillator trimmer and then the detector trimmer for maximum output.

Rock in the padler condenser 2400 Kc. Then recheck at 6000 Kc. and 2400 Kc.

SHORT WAVE BAND: Turn band change switch to short wave band. Tune radio and signal generator to 15 megacycles and adjust trimmers. No padler condenser is used on the short wave band so no other adjustments are necessary. On this band the oscillator frequency is 448 Kc. lower than the signal frequency.

PILOT LAMPS

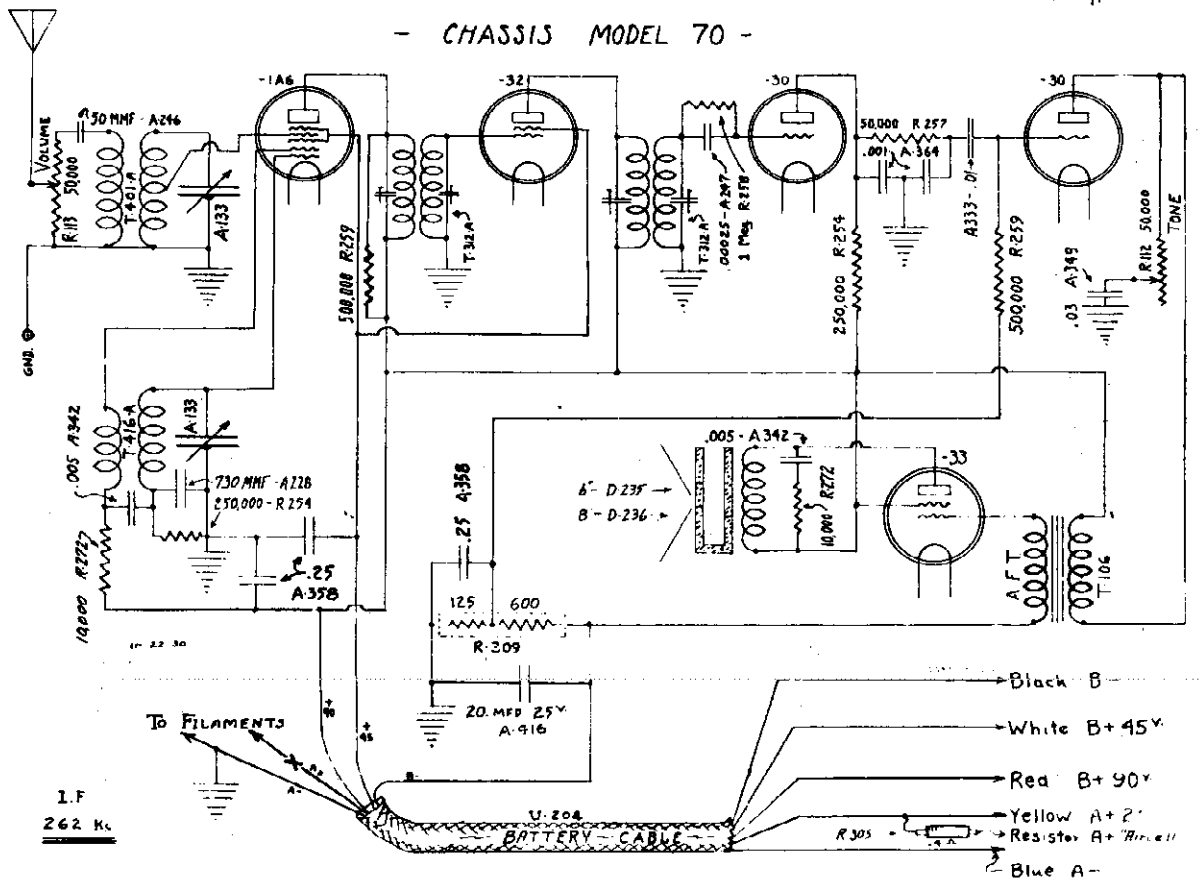
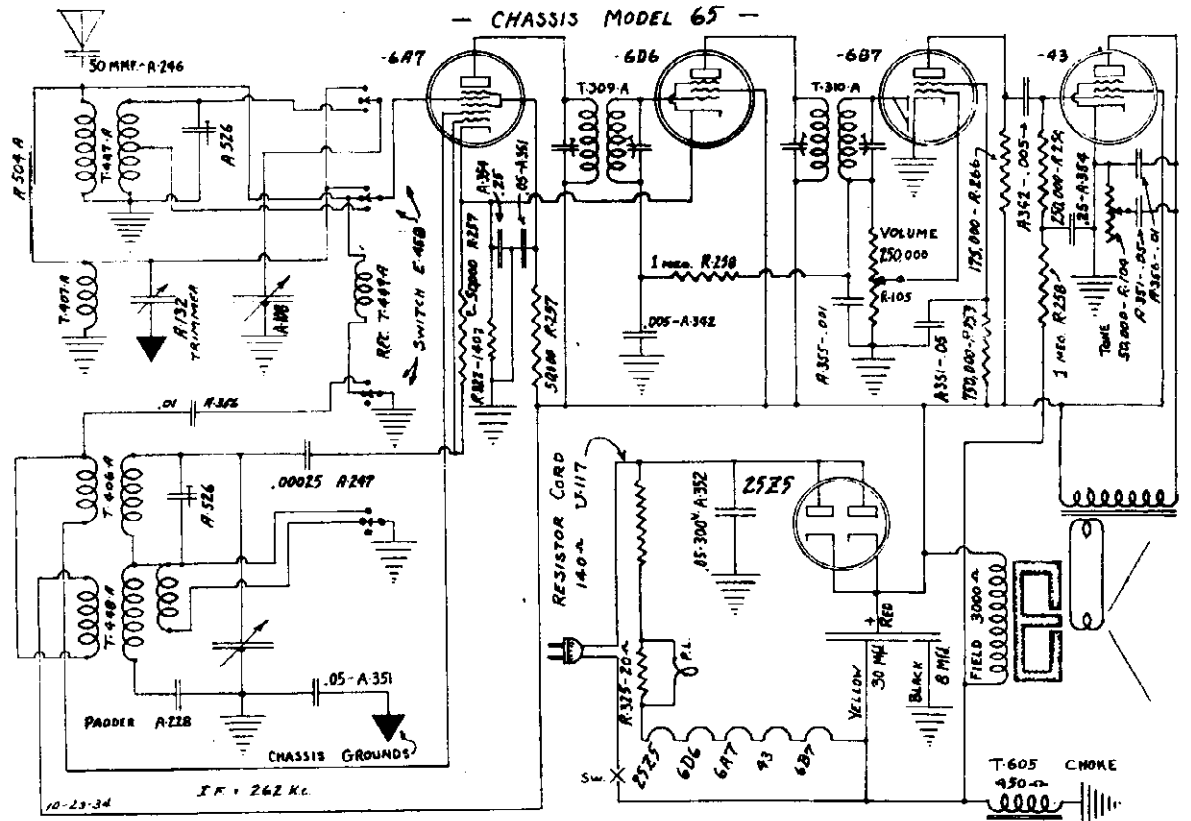
The pilot lamps are special 6-8 volt drawing only .15 amperes. It is necessary lamps of this rating only be used. In ordering specify our part number E-481.

MICROPHONIC HOWL

The tuning condenser is cushion mounted to eliminate vibration. Do not allow the dial to touch the excutcheon plate on the cabinet or a microphonic condition will be created.

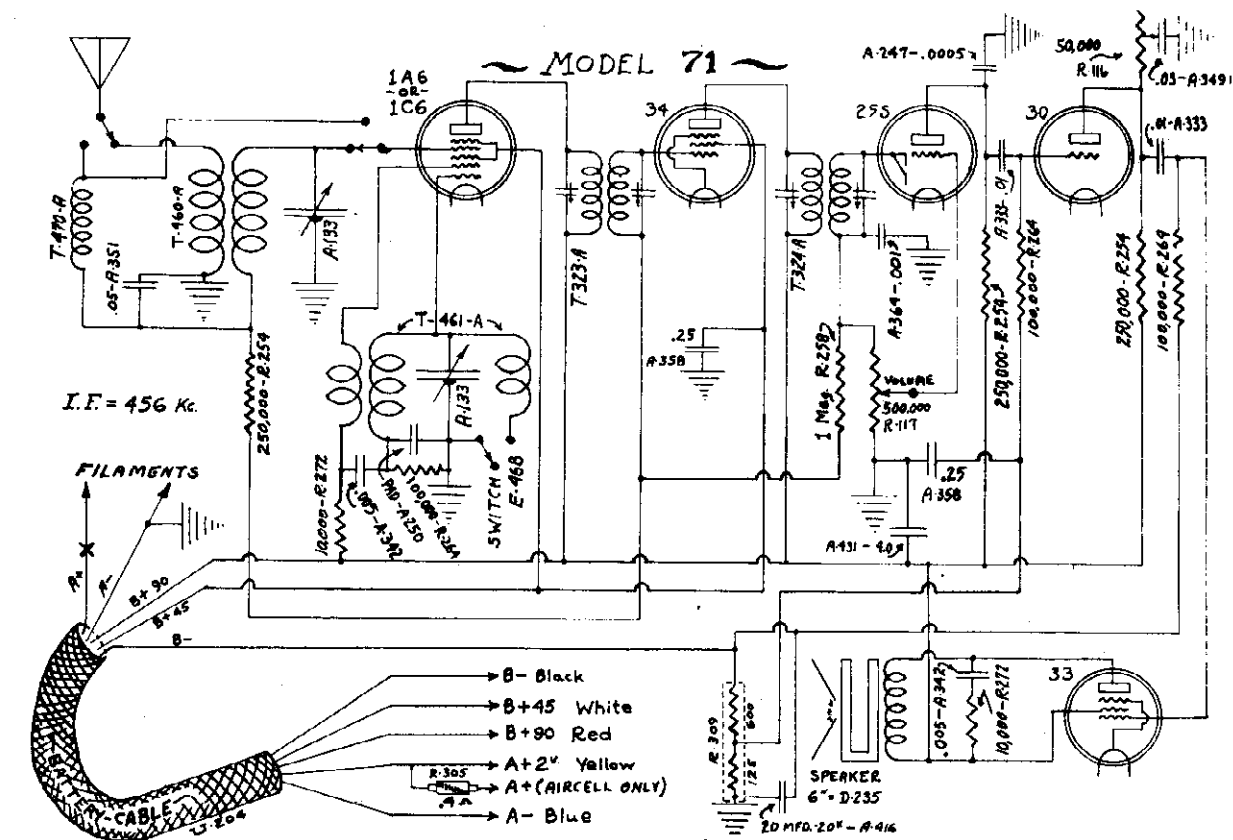
INTERNATIONAL RADIO CORP.

MODEL 65
MODEL 70
Schematics



MODEL 71
MODEL 71C
Schematics

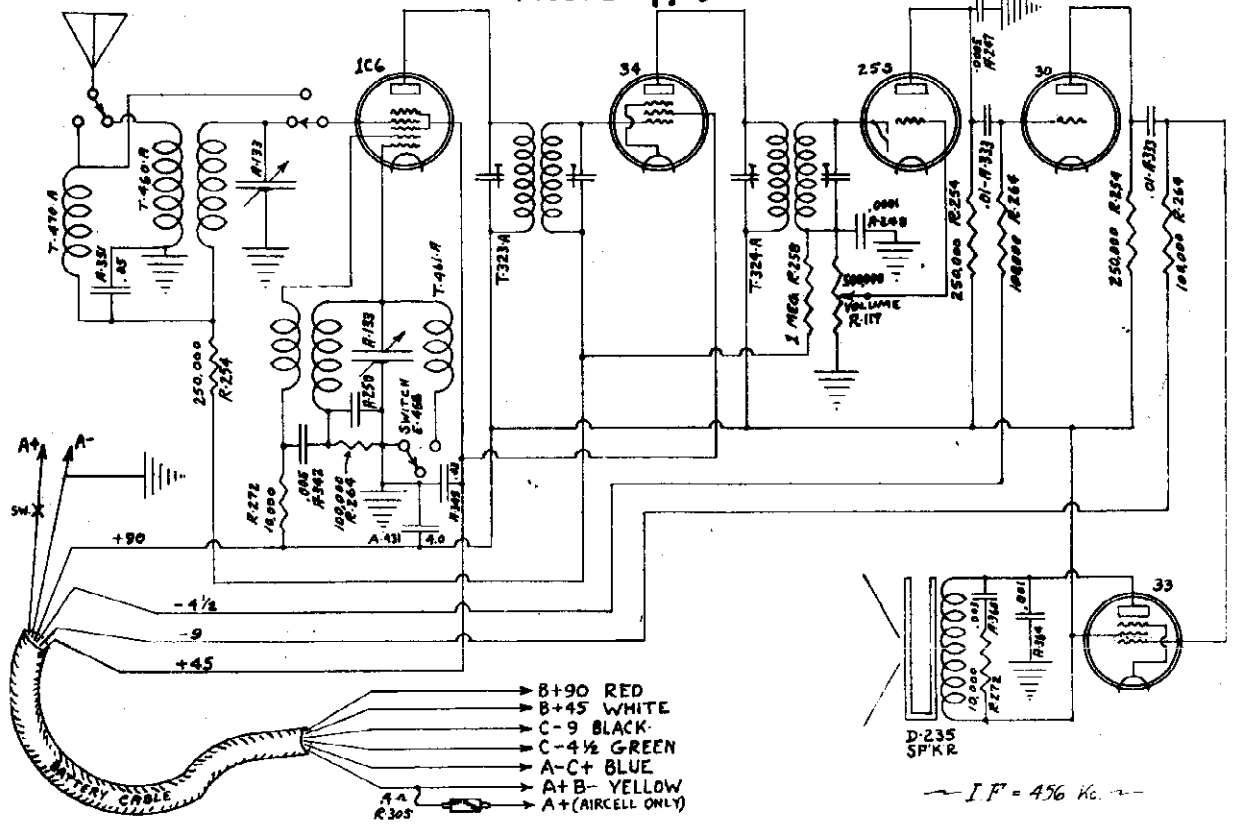
INTERNATIONAL RADIO CORP.



I.F. = 456 Kc.

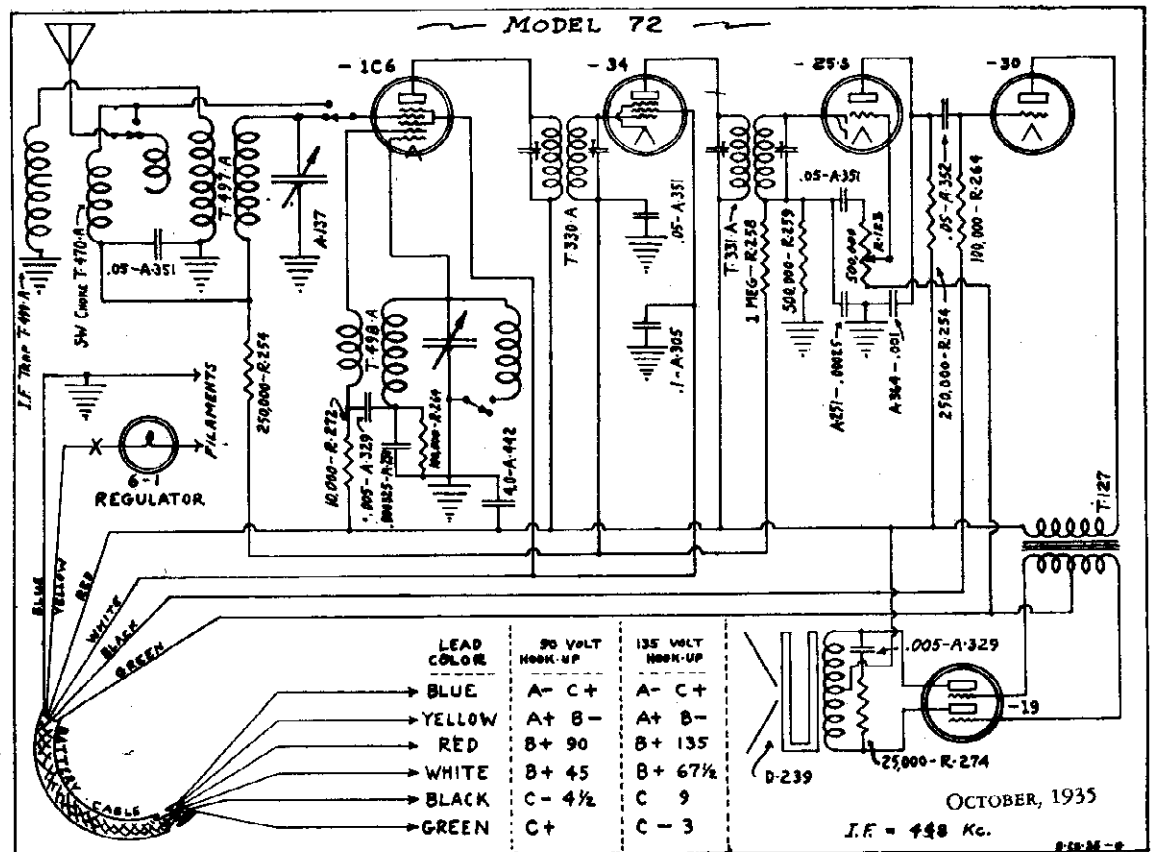
FILAMENTS

MODEL 71-C



I.F. = 456 Kc.

INTERNATIONAL RADIO CORP.



ESSENTIAL DATA: The intermediate frequency employed is 448 Kc. On the broadcast band the oscillator frequency is 448 kilocycles higher than the signal frequency. On the short wave band it is 448 kilocycles lower than the signal frequency.

The rear section of the two gang condenser is the oscillator section; the front section, first detector.

INTERMEDIATES: To align the I.F. Circuits, set the signal generator to 448Kc. and feed its modulated signal direct to the antenna. Short out the oscillator section of the two gang condenser. 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 may result. Due to the I.F. trap in the antenna circuit a strong signal is necessary.

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. On most sets the detector trimmer has its adjusting screw purposely removed.

There is no adjustable padder condenser in this model so resonance on the low frequency end is accomplished by bending plates on the tuning condensers. Check the alignment at 1000 Kc. Insert a thin bakelite, celluloid or mica feeler strip between the plates of the variable condensers to determine whether the circuits are properly matched. The action is this—the dielectric constant of the celluloid feeler strip being higher than that of the air it displaces, results in an increase of capacity. Open the variable condenser just enough to indicate two or three points below maximum signal. As the feeler is inserted the meter reading should indicate increasing signal and then decreasing as the feeler is inserted farther. This procedure should be followed on both sections. Should the meter fail to show an increase in signal as the strip is inserted in one section this indicates too great a capacity for that section. This may be corrected by bending the outside rotor plates out at the point where they begin to mesh with the stator.

After checking the alignment at 1000 Kc. repeat the process at 600 Kc.

SHORTWAVE BAND: No alignment necessary due to untuned detector circuit.

MODEL 72
Parts List

INTERNATIONAL RADIO CORP.

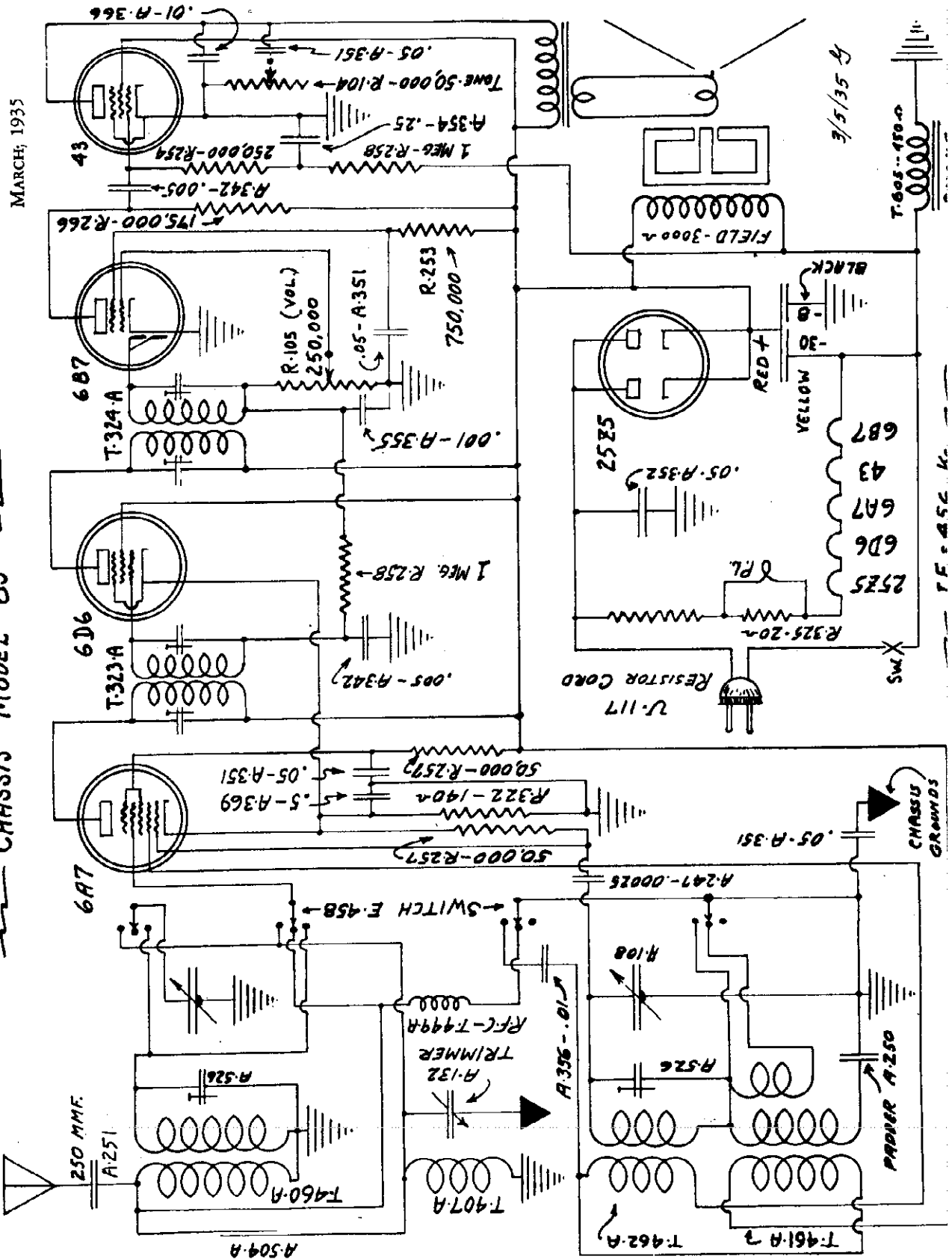
PARTS PRICE LIST

MODEL 72

PART NO.	DESCRIPTION	LIST PRICE
A-137	2 gang tuning condenser	\$1.65
A-250	325 mmf. mica padder condenser	.20
A-251	250 mmf. mica condenser	.20
A-305	.1 mf., 200 v. paper condenser	.15
A-329	.005 mf., 600 v. paper condenser	.15
A-351	.05 mf., 200 v. paper condenser	.15
A-352	.05 mf., 300 v. paper condenser	.15
A-364	.001 mf., 400 v. paper condenser	.15
A-442	4 mf. electrolytic condenser	.65
D-239	Magnetic speaker	5.00
E-157	Large knob	.15
E-160	Small knob	.15
E-270	Dial assembly	1.50
E-479	Wave band switch	.45
E-486	Antenna-ground binding post strip	.10
H-33	30 tube socket	.10
H-45	25S tube socket	.10
H-46	34 tube socket	.10
H-58	6-1 regulator socket	.10
H-59	1C6 tube socket	.10
H-60	19 tube socket	.10
R-123	Volume control and switch	.65
R-254	250M ohm carbon resistor	.20
R-258	1 megohm carbon resistor	.20
R-259	500M ohm carbon resistor	.20
R-264	100M ohm carbon resistor	.20
R-272	10M ohm carbon resistor	.20
R-274	25M ohm carbon resistor	.20
S-102	Goat tube shield	.10
T-127	Push pull class B audio transformer	1.10
T-330A	1st I.F. transformer	1.25
T-331A	2nd I. F. transformer	1.25
T-470A	Short wave choke	.50
T-497A	Detector coil	1.00
T-498A	Oscillator coil	1.00
T-499A	I. F. trap	.35
U-208	Battery cable	.60
X-353	Cabinet	8.25

Prices Subject to Change Without Notice

INTERNATIONAL RADIO CORP.



MARCH, 1935
CHASSIS MODEL 85

MODEL 85

Alignment
Voltage, Parts

INTERNATIONAL RADIO CORP.

AVERAGE TUBE OPERATING VOLTAGES

Position	Tube	Ek	Eg ¹	Eg ²	Eg ³	Ep	Edp
1st Det-Osc.	6A7	.8	Det. 0 Osc. 0	50	—	Det. 110 Osc. 110	—
IF Amp.	6D6	.8	*	110	.8	110	—
2nd Det-AVC	6B7	0	.4	45	—	80	*
Power Amp.	43	0	.2	110	—	110	—
Rectifier	25Z5	110	—	—	—	—	—

k—Cathode; g¹—Control grid; g²—Screen grid; g³—Suppressor grid; p—Plate; dp—Diode plates*—Depends on applied signal strength. All voltages measured from indicated points to circuit ground. Line voltage 115 volts.

PARTS PRICE LIST--Model 85

PART NO.	DESCRIPTION	LIST PRICE
A-132	Trimmer condenser	.75
A-133	2 gang tuning condenser	1.75
*A-288	.00075 mfd. mica padlder condenser	.25
*A-246	.30 mmfd mica condenser	.20
A-247	.00025 mfd. mica condenser	.20
*A-250	.000325 mfd. mica padlder condenser	.25
**A-251	.250 mmfd. mica condenser	.20
A-251	.005 mfd. paper condenser 200 volt	.15
A-342	.05 mfd. paper condenser 200 volt	.15
A-351	.25 mfd. paper condenser 100 volt	.15
A-352	.01 mfd. paper condenser 400 volt	.15
A-354	.25 mfd. paper condenser 100 volt	.15
A-355	.001 mfd. paper condenser 200 volt	.15
A-356	.01 mfd. paper condenser 200 volt	.15
A-412	8-30 mfd. electrolytic filter condenser	1.65
A-526	Semi-variable trimmer condenser	.15
D-11	Dynamic speaker 6-inch	5.50
E-114	Large tuning knob	1.50
E-115	Small knob	.85
E-256	Dial	1.85
E-405	Pilot light	.25
E-438	3 position band change switch	1.00
H-17	6A7 tube socket	.10
H-18	25Z5 tube socket	.10
H-19	6D6 tube socket	.10
H-20	6B7 tube socket	.10
H-21	43 tube socket	.10
I-306	Speaker terminal strip	.20
R-104	50M ohm tone control	.50
R-105	250M ohm volume control with switch	.75
R-253	750M ohm resistor	.20
R-254	250M ohm resistor	.20
R-257	50M ohm resistor	.20
R-258	1 meg. resistor	.20
R-266	175M ohm resistor	.20
R-322	140 ohm flexible resistor	.20
R-325	20 ohm "Candohm" resistor	.25
S-102	Coat tube shield	.15
*T-315A	1st IF coil assembly	1.25
*T-316A	2nd IF coil assembly	1.25
*T-323A	1st IF coil assembly	1.25
*T-324A	2nd IF coil assembly	1.25
*T-406A	S. W. oscillator coil	.30
T-407A	S. W. antenna coil	.25
*T-447A	B. C. antenna coil	.85
*T-448A	B. C. oscillator coil	.85
T-449A	R. F. C.	.25
**T-600A	B. C. antenna coil	.85
**T-610A	B. C. oscillator coil	.85
*T-625A	S. W. oscillator coil	.30
T-605	Filter choke	.65
U-117	Power cord	.55
	Cabinet complete	7.00

*Serial numbers under 185-499 intermediate frequency is 262 Kc.
**Serial numbers above 185-498 intermediate frequency is 456 Kc.

Prices subject to change without notice
ALWAYS ORDER BY PART NUMBER

MODEL 85 is an AC-DC receiver designed to operate from 110-volt power lines. It tunes the American broadcast band, police band and Foreign short wave bands.

INTERMEDIATE FREQUENCY

Sets bearing serial numbers under 185-499 use an intermediate frequency of 262KC.

Sets bearing serial numbers over 185-498 use an intermediate frequency of 456KC.

ALIGNMENT

The standard type of AC output meter should be used to indicate signal strength. It should be connected from the plate of the 43 tube to the circuit ground (variable condenser frame). The signal from the test oscillator must be kept at a very low level to get below the A.V.C. action.

A microammeter may be used to indicate signal strength if preferred (see Manual of General Service Information). One lead from the meter should be attached to the circuit ground and the other to the terminal of the volume control to which is connected a 1 megohm resistor.

To adjust 262KC IF circuits set the test oscillator to 262KC and couple it to the antenna wire of the set (wave band switch should be on B/C position). Short out oscillator section of 2 gang tuning condenser (rear section). Adjust IF transformers for maximum meter reading. Go over adjustments at least twice for accuracy. Use fibre screw driver.

To adjust 456KC IF circuits first remove grid clip from 6A7 tube and connect a 500M ohm resistance from the 6A7 grid (top of tube terminal) to ground. Set test oscillator to 456 KC and feed its signal direct to the grid of the 6A7. Short out oscillator section of 2 gang tuning condenser and proceed as in above paragraph.

Before aligning RF circuits see that the dial is correctly adjusted. With the 2 gang condenser all the way out of mesh the dial pointer should be on the 5900 KC mark.

Place band change switch on B/C position. The trimmer across the B/C antenna coil is located on the bottom of the chassis at the end. It should be set at approximately minimum capacity. Set the test oscillator to 1900 KC and couple to the antenna wire of the set. With the dial pointer on 1900 KC adjust the oscillator trimmer (on 2 gang condenser) for maximum signal. Shift the 2 gang condenser slightly to one side or the other of 1900 KC and continue adjustments for maximum signal. The correct balance between oscillator and antenna circuits will be found very close to the 1900 KC mark on the dial.

Check alignment at 1600 and 600KC (see Manual of General Service Information).

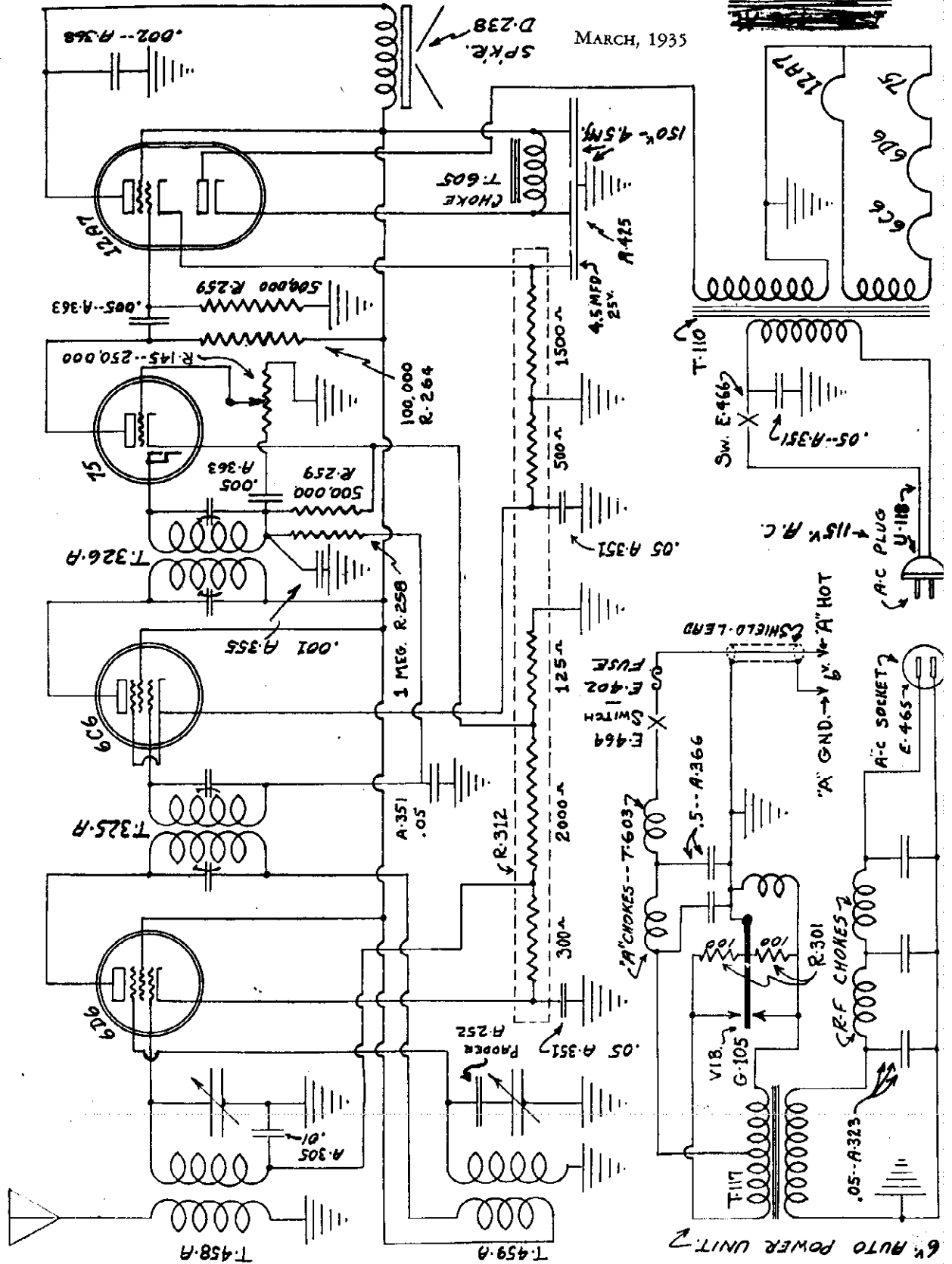
Turn wave band switch to extreme left and turn dial to about 19 meters, adjust test oscillator so it is producing a signal at approximately 19 meters. Turn tuning condenser slightly back and forth, at the same time adjusting the short wave oscillator trimmer (mounted beside S/W oscillator coil) for maximum signal. The two plate vernier condenser on top of the chassis should be out of mesh while this is being done.

Tune test oscillator and radio to about 49 meters and check for resonance. Do not bend condenser plates to align but spread or crowd together turns on the short wave antenna coil (see Manual of General Service Information.) The two plate vernier condenser on top of the chassis should be in mesh while this is being done.

INTERNATIONAL RADIO CORP.

MARCH, 1935

INTERNATIONAL RADIO CORPORATION -- MODEL 90 RECEIVER & AUTO POWER UNIT.



MODEL 90
Alignment
Voltage, Parts

INTERNATIONAL RADIO CORP.

PARTS PRICE LIST

MODEL 90 AUTO POWER UNIT

PART NO.	DESCRIPTION	LIST PRICE
A-323	.05 mfd. tubular paper condenser, 400v.	.15
A-366	.5-.5 mfd. special filter condenser, 160v.	.60
B-166	metal case with top and bottom	1.00
E-402	15 amp. fuse	.05
E-464	toggle switch	.50
E-465	A.C. outlet	.70
F-6	fuse holder	.10
F-19	ammeter clip	.05
G-105	vibrator	3.25
H-43	vibrator socket	.10
R-301	200 ohm wire wound center tapped resistor	.15
T-117	power transformer	2.00

MODEL 90 32-VOLT UNIT

Parts same as auto power unit with following exceptions

PART NO.	DESCRIPTION	LIST PRICE
G-106	vibrator	\$3.25
T-118	power transformer	2.20

MODEL 90 RADIO

PART NO.	DESCRIPTION	LIST PRICE
A-113	.2 gang tuning condenser	\$1.85
A-228	.730 mmfd. mica paddler condenser	.25
*A-248	.0001 mfd. mica antenna series condenser	.20
A-303	.1 mfd. tubular condenser, 200v.	.15
A-351	.05 mfd. tubular condenser, 200v.	.15
A-352	.05 mfd. tubular condenser, 300v.	.15
A-353	.001 mfd. tubular condenser, 200v.	.15
A-363	.005 mfd. tubular condenser, 400v.	.15
A-368	.002 mfd. tubular condenser, 300v.	.15

A-425	4.5-4.5-4.5 mfd. electrolytic filter condenser	.90
D-238	5 inch speaker	4.25
E-133M	large tuning knob	.10
E-148G	small knob	.10
E-466	rotary power switch	.35
H-19	6D6 tube socket	.10
H-25	75 tube socket	.10
H-41	6C6 tube socket	.10
H-42	12A7 tube socket	.10
R-145	250M ohm volume control	.50
R-254	250M ohm carbon resistor	.20
R-258	1 megohm carbon resistor	.20
R-259	500M ohm carbon resistor	.20
R-264	100M ohm carbon resistor	.20
R-312	special candohm resistor	.20
S-114	goat tube shield	.45
T-110	power transformer	1.75
*T-317A	1st IF coil assembly	1.25
*T-318A	2nd IF coil assembly	1.25
**T-325A	1st IF coil assembly	1.25
**T-326A	2nd IF coil assembly	1.25
**T-458A	antenna coil assembly	.85
**T-459A	oscillator coil assembly	.90
*T-463A	antenna coil assembly	.85
*T-464A	oscillator coil assembly	.90
T-605	filter choke	.65
U-118	A.C. cord and plug	.30
WL20	antenna wire 22 ft.	.10
	cabinet (less back)	2.00
	back only	1.00

*Serial numbers under ~~6500~~ use 2621F
**Serial numbers over ~~2500~~ use 4561F

Prices subject to change without notice

INTERMEDIATE FREQUENCY

Sets bearing serial numbers under ~~6500~~ use an intermediate frequency of 262 K.C.
Sets bearing serial numbers over ~~6500~~ use an intermediate frequency of 456 K.C.

ALIGNMENT

The standard type of AC output meter should be used to indicate signal strength. It should be connected from the plate prong of the 12A7 amplifier section to ground. The signal from the test oscillator must be kept at a very low level to get below the A.V.C. action.

To adjust IF circuits first turn the tuning condenser to a setting approximating 600KC. Do not short out the oscillator section of the 2 gang condenser. Set test oscillator to correct intermediate frequency and attach to antenna of set. Adjust primary and secondary of 1st IF transformer for maximum reading on meter. Repeat with 2nd IF transformer and then go over all adjustments a second time. Fibre screw driver and socket wrench are necessary for accuracy.

Next set the test oscillator to 1500 KC. Turn the 2 gang condenser so the plates are just slightly meshed (about 1/8 inch). Adjust trimmers on both sections for maximum signal.

If coils have been changed it may be necessary to bend plates at 1000 KC and 550 KC. See Manual of General Service Information for instructions. Do not bend plates on the oscillator section (rear) unless absolutely necessary.

SPEAKER ADJUSTMENT

To adjust speaker remove cover plate from speaker unit. Two screws will be found at each end of the unit within the magnets. When adjusting either pair of screws, one is to be loosened slightly and the other tightened. You will notice this moves the armature slightly to one side. The air gap on both sides of the armature should be the same.

6 VOLT POWER UNIT

The power unit should deliver between 110 and 120 volts AC under the load of the set. Low output usually indicates a poor vibrator or the set may be drawing an abnormal amount of current.

AVERAGE TUBE OPERATING VOLTAGES

Position	Tube	Ek	Eg ¹	Eg ²	Eg ³	Ep	E _{dp}
1st Det-Osc.	6D6	18	15	110	0	110	—
IF amp.	6C6	2.7	*	110	2.7	110	—
2nd Det-AVC	75	1	0	—	—	.75	*
Rect-Pwr. amp.	12A7	Amp. 11 Rect. 120	0	115	—	Amp. 110 Rect. 120AC	—

K—Cathode; g¹—Control grid; g²—Screen grid; g³—Suppressor grid; p—Plate; dp—Diode plate; *—Depends on applied signal strength. All voltages measured from indicated points to ground. Line voltage 115 volts.

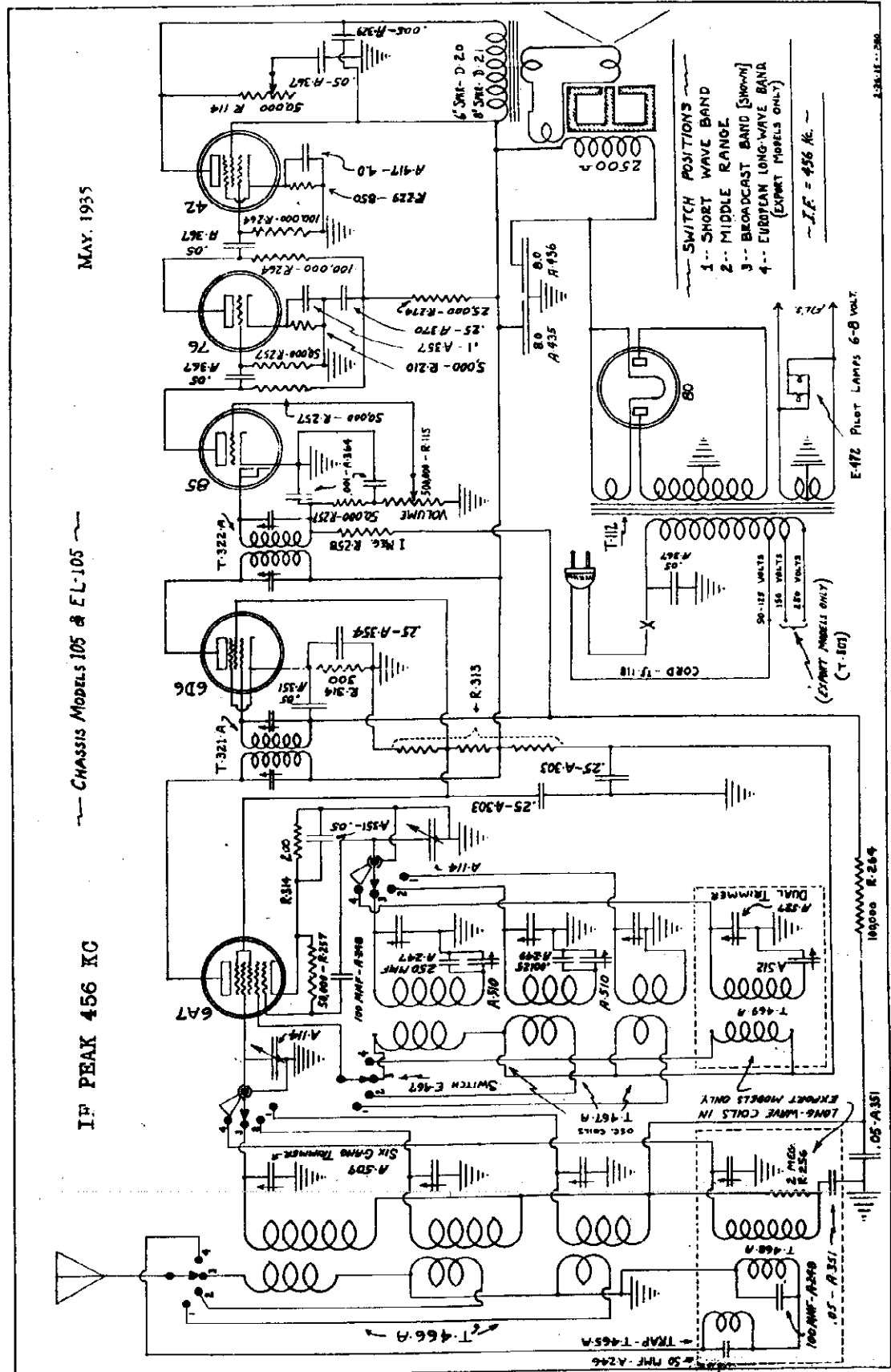
INTERNATIONAL RADIO CORP.

MODEL S 105, EL-105 1050 Schematic

MAY, 1935

CHASSIS MODELS 105 & EL-105

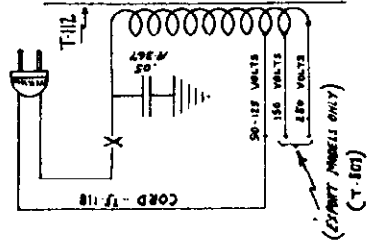
IF PEAK 456 KC



- SWITCH POSITIONS
- 1-- SHORT WAVE BAND
 - 2-- MIDDLE RANGE
 - 3-- BROADCAST BAND [SWITCH]
 - 4-- EUROPEAN LONG-WAVE BAND [EXPERT MODELS ONLY]

-- I.F. = 456 kc. --

E-472 PILOT LAMPS 6-8 VOLT.



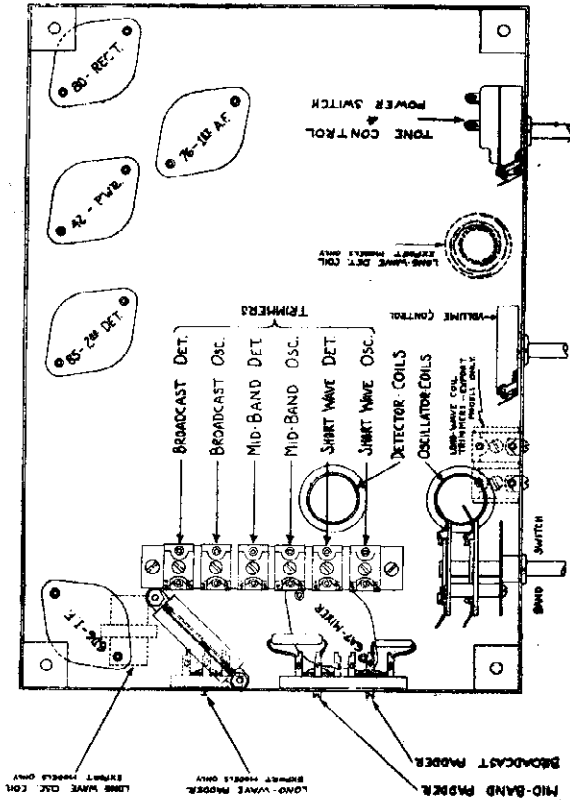
(EXPERT MODELS ONLY) (T-118)

100000 R-249

1.05-A31

MODELS 105, 1050
Alignment, Voltage
Trimmers, Parts

INTERNATIONAL RADIO CORP.



PARTS PRICE LIST--Models 105 & 1050

PART NO.	DESCRIPTION	PRICE
A-114	Two gang tuning condenser	\$1.90
A-247	.00025 mid. mica condenser	.20
A-248	.00012 mid. mica condenser	.20
A-249	.00125 mid. mica condenser	.20
A-303	.25 mid. tubular condenser, 200 volt	.15
A-329	.005 mid. tubular condenser, 200 volt	.15
A-351	.05 mid. tubular condenser, 200 volt	.15
A-354	.25 mid. tubular condenser, 25 volt	.15
A-357	.1 mid. tubular condenser, 25 volt	.15
A-364	.001 mid. tubular condenser, 400 volt	.15
A-467	.05 mid. tubular condenser, 500 volt	.15
A-470	.25 mid. tubular condenser, 500 volt	.15
A-477	.4 mfd. (for larger electrolytic condenser, 25 v	.50
A-455	.8 mid. electrolytic filter condenser	.75
A-456	.8 mid. electrolytic filter condenser	.75
A-509	Six gang trimmer condenser unit	.60
A-510	Dual paddler condensers	.45
D-20	Six inch dynamic speaker for Model 105	4.85
D-21	Eight inch dynamic speaker for Model 1050	5.80
E-114	Large tuning knob	1.85
E-115	Small knob with gold line	.15
E-116	Large knob with gold line	.15
E-237	Dial assembly	1.85
E-403	Pilot lamps, 3.8 volts for series connection	.15
E-460	Antenna and ground binding post strip	.20
E-471	Wave band switch (3 position)	1.25
E-472	Wave band switch (4 position, export models)	1.35
H-472	Pilot lamps, 6.8 volt for parallel connection	.15
H-17	6A7 tube socket	.10
H-19	6D6 tube socket	.10
H-26	76 tube socket	.10
H-29	85 tube socket	.10
H-36	42 tube socket	.10
H-40	80 tube socket	.10
H-44	Speaker connection socket	.10
H-114	Tone control with power switch, 50M ohms	.70
R-115	Volume control, 500M ohms	.50
R-210	5M ohm carbon resistor, 1/3 Watt	.20
R-229	850 ohm carbon resistor, 1/2 Watt	.20
R-257	50K ohm carbon resistor, 1/3 Watt	.20
R-258	1 megohm carbon resistor, 1/3 Watt	.20
R-264	100M ohm carbon resistor, 1/3 Watt	.20
R-274	25M ohm carbon resistor, 1/3 Watt	.20
R-313	Candohm resistor, 20M ohm-13M ohm	.20
R-314	Candohm resistor, 200 ohm-300 ohm	.25
S-102	Coat tube shield	.15
S-116	Coil shield	.15
T-112	Power transformer	2.75
T-321A	1st IF transformer	1.25
T-322A	2nd IF transformer	1.25
T-166A	Antenna coil assembly	1.50
T-167A	Oscillator coil assembly	1.50
T-168A	Long wave antenna coil (export models only)	.70
T-169A	Long wave oscillator coil (export models only)	.70
U-501	Power transformer (export models only)	6.35
U-118	A.C. power cord and plug	.30
X-335	Model 105 cabinet	9.50
X-336	Model 1050 cabinet	24.75

Prices subject to change without notice
ALWAYS ORDER BY PART NUMBER

Models 105 and 1050 are A.C. receivers designed to operate from 115 volt power lines. They tune the American broadcast band, police and airport bands and foreign short wave bands. The models built for export also tune the European long wave band and because of the tapped power transformer in these models they may be operated on A.C. lines up to 230 volts. (See circuit diagram. Switch is available by removing part of cover of power transformer.)

ALIGNMENT
The standard type of AC output meter should be used to indicate signal strength. It should be connected from the plate of the 42 tube to ground. Tone control should be turned "high". The signal from the test oscillator *must be kept at a very low level.* To align the IF circuits first remove the grid clip from the 6A7 tube and connect a 50,000 ohm resistor from the 6A7 grid (top of 6A7) to ground. Short the 6A7 to ground. Adjust the 2 gang tuning condenser. Set the test oscillator to 550 KC and feed in modulated test signal. Short the 6A7 to ground. Adjust the 2 gang trimmer for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process in the second IF transformer. If adjustments are not made accurately selectivity will be poor and IF may oscillate.
Before aligning AF circuits see that the dial is correctly advanced. With the 2 gang condenser at full mesh the pointer should be on 540 KC.

BROADCAST BAND
Place the band change switch in "Broadcast" position. Turn the dial to 2000 KC. and feed a very weak 2000 KC. modulated signal from your test oscillator to the antenna. Adjust the broadcast oscillator trimmer (see sketch) for maximum reading. Usually the trimmer is needed across the broadcast antenna coil.

Turn dial and test oscillator to 600 KC. and rock the paddler into current adjustment. This is accomplished by very slowly adjusting the paddler condenser and at the same time turning the dial slightly back and forth across 600 KC. until an adjustment is reached giving maximum output. Go back to 3500 KC. and readjust the oscillator trimmer slightly if necessary. Then rock the paddler at 600 KC.

MIDDLE BAND
Turn the band change switch to the middle position and tune radio and test oscillator to 6000 KC. Adjust the oscillator trimmer and then the antenna trimmer for maximum output.
Rock in the paddler; condenser at 2400 KC. Then rock at 6000 KC and 2400 KC.

SHORT WAVE BAND
Turn band change switch to short wave band. Tune radio and test oscillator to 16.5 megacycles and adjust trimmer. Generally the oscillator trimmer will be very loose. No paddler condenser is used on the short wave band in other adjustments are necessary.

EUROPEAN LONG WAVE BAND
Alignment instructions are same as for broadcast band. Align at 350 and 160 KC.

MICROPHONIC HOWL
The 2 gang condenser is caution mentioned to eliminate vibration of the plates. Do not allow the dial to touch the oscillation plate on the cabinet or a microphonic condition will be created.

PILOT LIGHTS
In sets built prior to publication of this bulletin the pilot lights were wired in series and 3.8 volt bulbs were used (our part number E-403). If they burn out in an unreasonably short time it is suggested that the sockets be rewired to parallel connection and the number E-472, 6.8 volt bulbs be used.

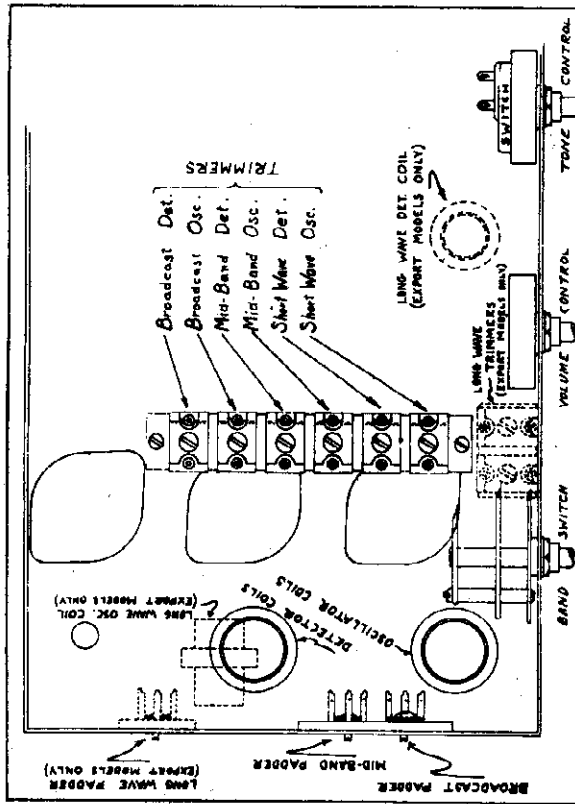
AVERAGE TUBE OPERATING VOLTAGES

Position	Tube	Ek	Eg ¹	Eg ²	Eg ³	Ep	Equip
1st Det-Osc.	6A7	2	Det. * Osc.-1	100	—	Det. 230 Osc. 145	—
IF Amp.	6D6	2	*	100	2	230	—
2nd Det-AVC.	85	0	0	—	—	40	*
1st AF Amp.	76	5	0	—	—	65	—
Power Amp.	42	20	0	230	—	215	—
Rectifier	80	FIL	—	—	—	—	—
		270	—	—	—	—	—

*—Cathode; g¹—Control grid; g²—Screen grid; g³—Suppressor grid; p—Plate; dp—Diode plates; *—Depends on applied signal strength. All voltages measured from indicated points to ground using 1000 ohm per volt D.C. voltmeter. Line voltage 115 volts.

INTERNATIONAL RADIO CORP. Schematic, Trimmers
Voltage

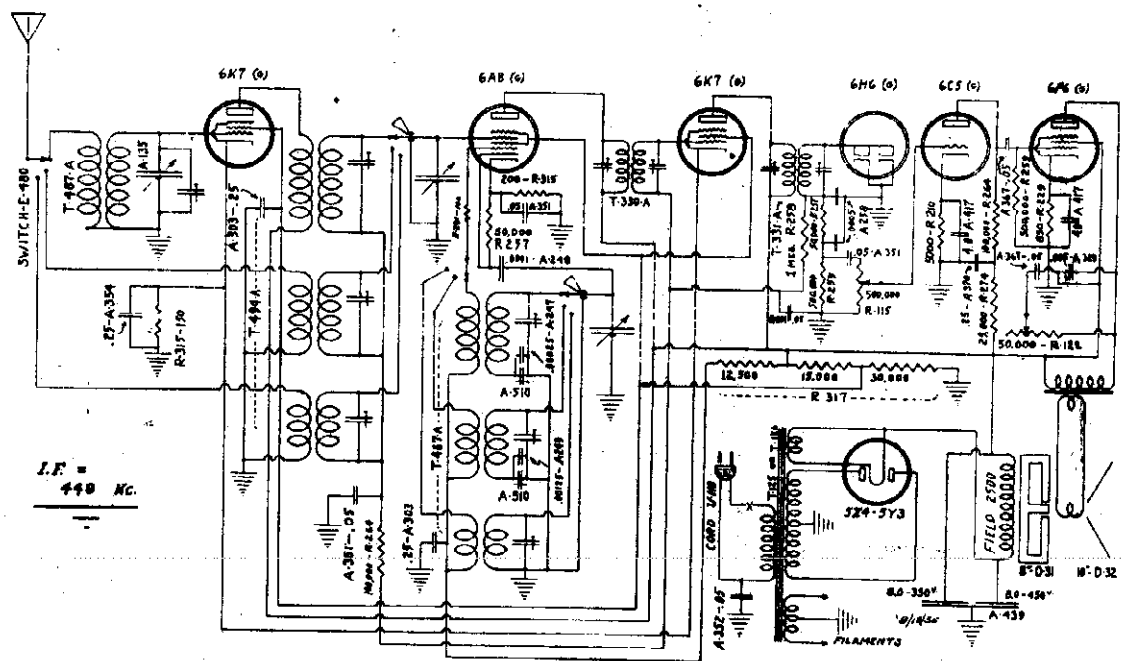
MODELS 120, 1200, 2200



Bottom View of Chassis. VOLTAGES SHOWN ARE FROM TUBE PINS TO GROUND

POSITION	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8
6K7	Shell	HTR.	210	80	1.5	—	HTR.	1.5
6A8	Shell	HTR.	210	80	0	150	HTR.	1.5
6K7	Shell	HTR.	210	80	1.5	—	HTR.	1.5
6H6	Shell	HTR.	0	0	0	—	HTR.	0
6C5	Shell	HTR.	80	—	0	—	HTR.	3
6T6	Shell	HTR.	200	210	0	—	HTR.	15
5Z1	Shell	345	—	A.C.	—	A.C.	—	345

Line 118 Volts. Switch on Broadcast Position. Volume Control Full On. 10% Variation Allowable.



MODELS 120,1200

2200

Alignment, Parts

INTERNATIONAL RADIO CORP.

This chassis is designed to operate from 115 volt, 60 cycle, alternating current power lines. It is a three band receiver covering the American broadcast, police and airport, and Foreign short wave bands.

The following tubes are employed:

- | | |
|---|--|
| 6K7 (metal) or 6K7G (glass) R.F. amplifier | 6C5 (metal) or 6C5G (glass) A.F. amplifier |
| 6A8 (metal) or 6A8G (glass) 1st Detector-Oscillator | 6F6 (metal) or 6F6G (glass) Pentode output |
| 6K7 (metal) or 6K7G (glass) I.F. amplifier | 5Z4 (metal) or 5Y3 (glass) Rectifier |
| 6H6 (metal) or 6H6G (glass) Diode detector | |

The metal and glass tubes are interchangeable but when changing from one type to the other it is advisable to realign for perfect resonance. Glass counterpart types should be shielded, the metal tubes need not be. Shielding provisions are provided.

ALIGNMENT

The standard type of output meter should be used to indicate signal strength. It should be connected from the plate (pin No. 3) of the 6F6 to ground. Tone control should be turned "high". The signal from the signal generator *must be kept at a very low level.*

ESSENTIAL DATA: The intermediate frequency employed is 448 Kc. On the broadcast and middle bands the oscillator frequency is 448 kilocycles higher than the signal frequency. On the short wave band it is 448 kilocycles lower than the signal frequency.

Aligning should be done on the following frequencies: Broadcast band, 1400 and 600 Kc.; Middle band, 6000 and 2400 Kc.; Short wave band 15 megacycles.

In aligning on broadcast band it is permissible to bend plates on the *R. F. section only* of the three gang condenser. Do not bend plates when aligning the middle and short wave bands.

The front section of the three gang condenser is the oscillator section; the middle section, first detector; the rear section, R.F. amplifier. The R.F. amplifier is in circuit only on the broadcast band.

INTERMEDIATES: To align the I.F. circuits, set the signal generator to 448 Kc. and feed its modulated signal direct to the antenna. Short out the oscillator section of the three gang condenser. 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 may result.

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 (see sketch) and R.F. stage trimmer (on condenser gang) for maximum reading. Although a trimmer is provided for the Broadcast detector coil it will be found not connected on many sets as it is not necessary in obtaining correct balance.

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. It is permissible to bend plates on the R.F. section only in resonating circuits.

MIDDLE BAND: Turn the band change switch to the middle position and tune radio and signal generator to 6000 Kc. Adjust the oscillator trimmer and then the detector trimmer for maximum output.

Rock in the padder condenser at 2400 Kc. Then recheck at 6000 Kc. and 2400 Kc.

SHORT WAVE BAND: Turn band change switch to short wave band. Tune radio and signal generator to 15 megacycles and adjust trimmers. No padder condenser is used on the short wave band so no other adjustments are necessary. On this band the oscillator frequency is 448 Kc. lower than the signal frequency.

MICROPHONIC HOWL

The tuning condenser is cushion mounted to eliminate vibration. Do not allow the dial to touch the escutcheon plate on the cabinet or a microphonic condition will be created.

LONG WAVE-EXPORT MODELS

These models are also built with a four position switch (part number E-482) and an extra set of coils tuning the foreign long wave band. The order of band change switch positions is broadcast, midband, short wave, long wave band. Alignment—adjust long wave trimmers at 350 Kc. and rock in long wave padder at 160 Kc. See sketch for location of coils and condensers.

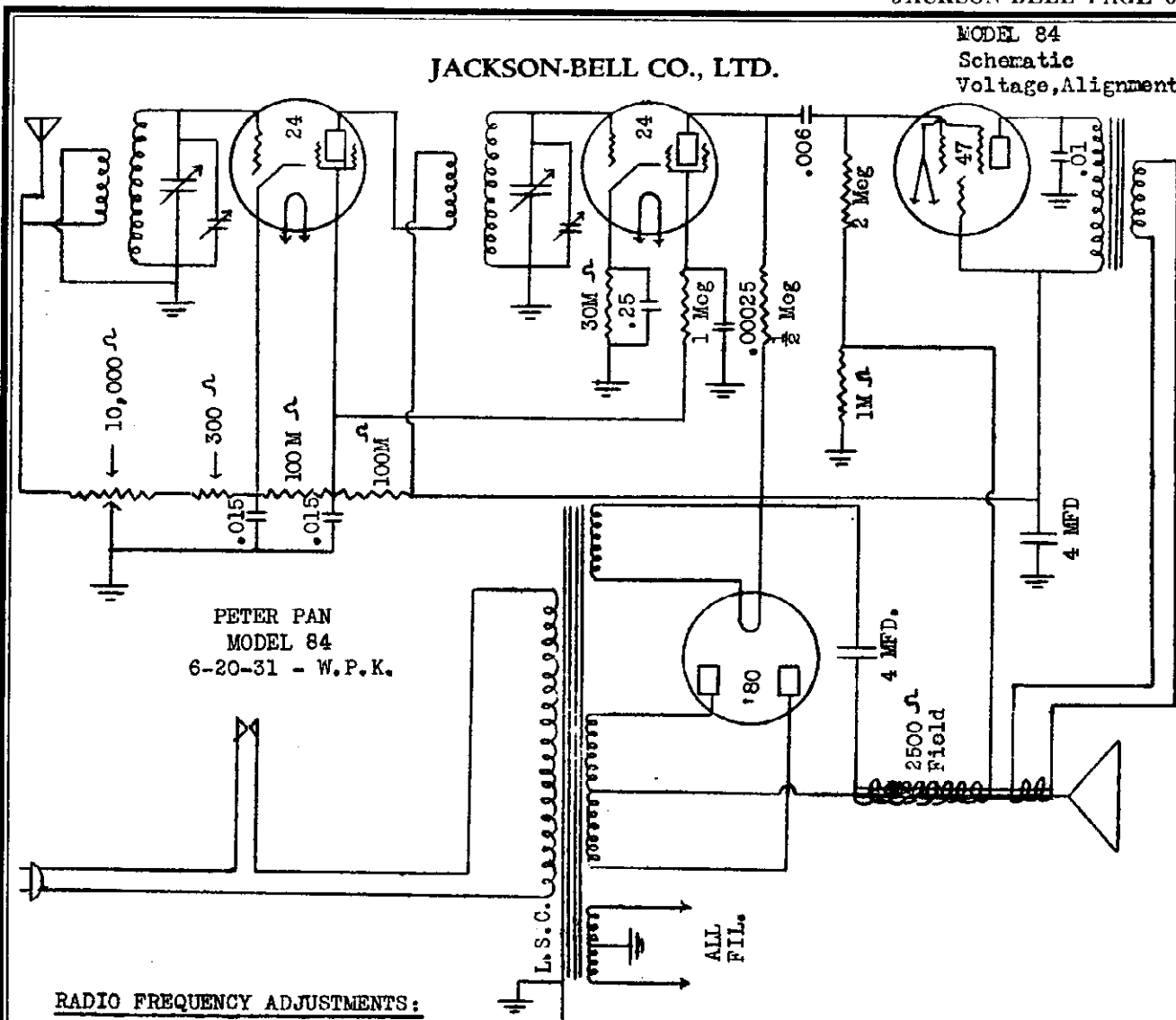
Some export sets also contain a 25 cycle power transformer (part number T-502) which has a tapped primary winding allowing operation from 125, 150 or 250 volt A.C. power lines. The tap switch is made available by removing part of the cover of the power transformer. 25 cycle sets may be used on 60 cycle although the converse is not true.

PARTS LIST

PART NO.	DESCRIPTION				
A-135	3 gang tuning condenser	\$.20	D-32	10 inch Dynamic speaker	7.50
A-247	.00025 mf. mica condenser	.20	E-154	Duo dial knob	.20
A-248	.001 mf. mica condenser	.20	E-155	1 inch knob	.15
A-249	.00125 mf. mica condenser	.20	E-156	.13/16 inch knob	.15
A-258	.0005 mf. mica condenser	.20	E-159	1 inch knob with colored dots	.20
A-303	.25 mf., 200 v. paper cond	.15	E-266	Dial assembly	2.50
A-329	.005 mf., 600 v. paper cond	.15	E-272	Dial assembly (long wave models)	2.50
A-351	.05 mf., 200 v. paper cond	.15	E-460	Antenna-ground binding post strip	.10
A-352	.05 mf., 300 v. paper cond	.15	E-472	Pilot lamps, 6-8 volt	.15
A-354	.25 mf., 25 v. paper cond	.20	E-482	3 position band change switch	1.00
A-367	.05 mf., 400 v. paper cond	.15	H-49	6A8 tube socket	.10
A-370	.25 mf., 300 v. paper cond	.20	H-50	6C5 tube socket	.10
A-417	.5 mf., 25 v. electrolytic cond	.55	H-52	6H6 tube socket	.10
A-439	Electrolytic filter condenser	1.30	H-54	6K7 tube socket	.10
A-509	.6 gang trimmer condenser	.55	H-56	6F6 tube socket	.10
A-510	Dual padder condenser	.45	H-57	5Z4 tube socket	.10
A-515	Single padder (long wave)	.25	R-115	Volume control	.70
A-527	Dual trimmer condenser	.20	R-122	Tone control with power switch	.70
D-31	8 inch Dynamic speaker	4.50	R-210	5M ohm, 1/3 w. carbon resistor	.20
			R-229	850 ohm, 1/2 w. carbon res	.20
			R-257	50M ohm, 1/3 w. carbon res	.20
			R-258	1 megohm, 1/3 w. carbon res	.20
			R-259	500M ohm, 1/3 w. carbon res	.20
			R-264	100M ohm, 1/3 w. carbon res	.20
			R-274	25M ohm, 1/3 w. carbon resistor	.20
			R-281	100 ohm, 1/3 w. carbon resistor	.20
			R-315	Candohm resistor 150-200 ohms	.25
			R-317	Candohm resistor, 12,500-15M-30	.55
			S-102	Goat tube shield	.10
			T-126	Power transformer (60 cycle)	2.50
			T-330A	1st I.F. transformer	1.25
			T-331A	2nd I.F. transformer	1.25
			T-467A	Oscillator coil	1.75
			T-468A	L. W. Detector coil (long wave)	.85
			T-469A	L. W. Oscillator coil (long wave)	.85
			T-487A	Antenna coil	1.00
			T-494A	Detector coil	1.75
			T-502	Power transformer, 25	6.30
			U-118	A.C. cord and plug	.30
			U-206	4 wire speaker cable	.20

JACKSON-BELL CO., LTD.

MODEL 84
Schematic
Voltage, Alignment



RADIO FREQUENCY ADJUSTMENTS:

Should it become necessary to resonate the radio frequency circuit, proceed as follows:

Set the tuning dial to read about 50 - then with a modulated oscillator and output meter (or a grid dip meter) resonate the two circuits at this point by means of the trimmer condensers on the main tuning condenser, then check for resonance at the end of each split plate in the condenser, bending plates where necessary. When properly resonated, and using about 50 feet of antenna, the set should oscillate, with volume control at maximum, up to 700 kilocycles,

VOLTAGE AND CURRENT VALUES

With the volume control at maximum, the following readings should be obtained, with an allowable 10% variation:-

Detector Plate Current,.....	0.15 M.A.	Line Voltage,.....	110 V.
Pentode Plate Voltage,.....	190 V.	R.F. Plate Voltage,.....	200 V.
Pentode Screen Voltage,.....	200 V.	R.F. Screen Voltage,.....	60 V. *
Pentode Grid Voltage,.....	13 V.	R.F. Cathode Bias,.....	1.5 V.
Pentode Plate Current,.....	24.0 M.A.	R.F. Plate Current,.....	2.2 M.A.
R.F. Filament,.....	2.2 V.	Detector Plate Voltage,.....	80 V.
Detector Filament,.....	2.2 V.	Detector Screen Voltage,.....	60 V.
Pentode Filament,.....	2.2 V.	Detector Cathode,.....	5 V.
Rectifier Filament,.....	4.1 V.		

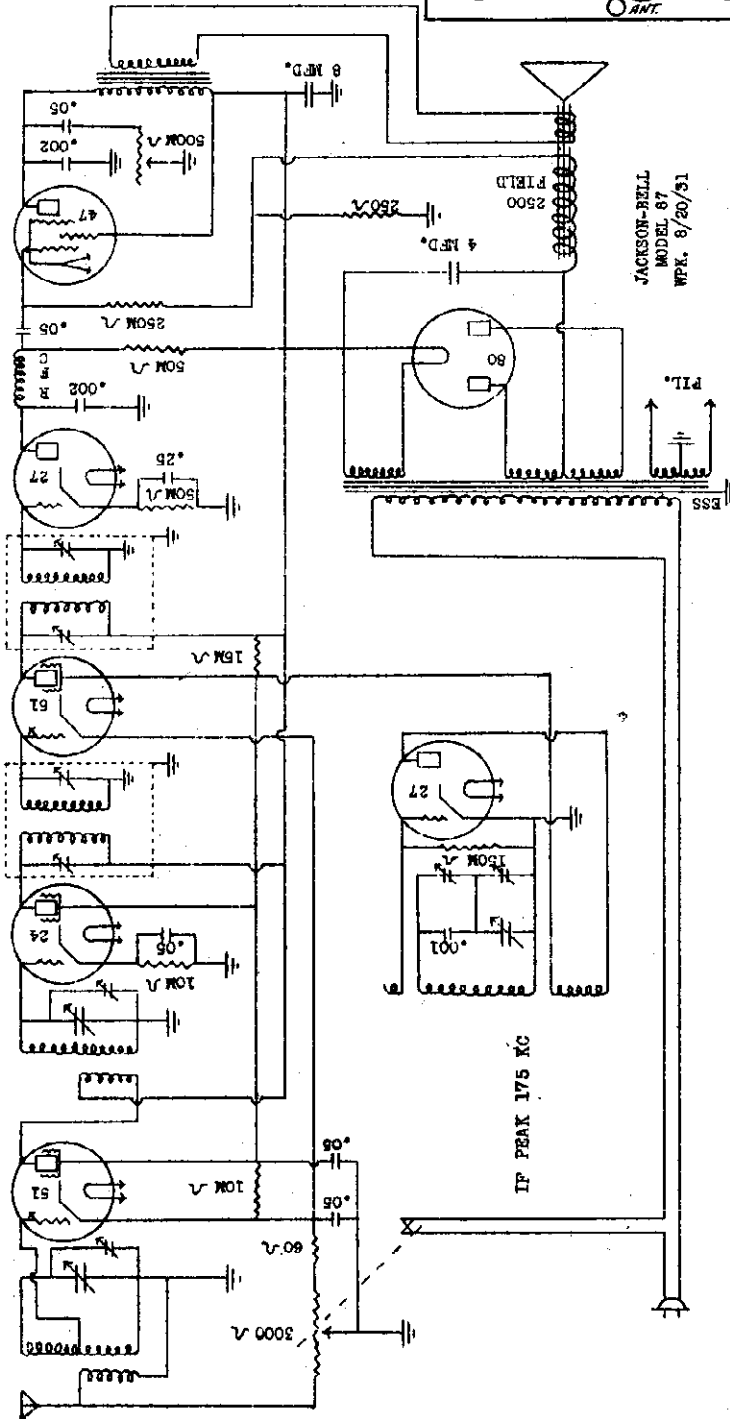
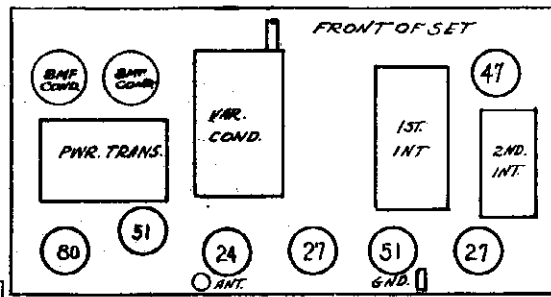
*These readings made with the 300,000 ohm voltmeter in a Jewel 199 Set Analyzer are not true readings, due to the high resistances in the receiver circuit.

MODEL 87
Schematic, Socket
Voltage, Alignment

JACKSON-BELL CO., LTD.

RESISTOR CODE

60	OHM WIRE WOUND	
250	"	100 M.A.
10M	"	BROWN, ORANGE, BLACK END
15M	"	" " GREEN "
50M	"	" " BLACK "
150M	"	" " BROWN, GREEN, YELLOW "
250M	"	" " RED, " "



plished by bonding the split sections of the condenser plates to give the maximum alignment indicated by the output meter. If condenser plates have to be bent apparently too much at the low end of the band, it is advisable to start at the beginning and compensate the difference from the receiver and connect the test oscillator to the grid of the first detector tube. The trimming condensers for the intermediate circuit are adjusted by means of the screws accessible thru the holes in the sides of the intermediate transformer shield covers. The volume control should be in the maximum or full-on position. Retune the adjusting screws until maximum response is shown in the output meter.

CIRCUIT ALIGNMENT:

The first step in alignment of the receiver is to align the intermediate amplifier. This must be done with a test oscillator set at exactly 175 kilocycles, and an output indicating device. Remove the oscillator tube from the receiver and connect the test oscillator to the grid of the first detector tube. The trimming condensers for the intermediate circuit are adjusted by means of the screws accessible thru the holes in the sides of the intermediate transformer shield covers. The volume control should be in the maximum or full-on position. Retune the adjusting screws until maximum response is shown in the output meter.

ALIGNMENT OF THE SIGNAL FREQUENCY CIRCUIT:

For this operation, a modulated test oscillator covering the broadcast band is required, or stations of known frequency may be used. In order to properly resonate the signal frequency circuit of this receiver, turn the dial to some known frequency on the high end of the band, adjust the oscillator trimming condenser of the tuning condenser, until the greatest response is shown in the output meter. Then adjust the first detector section and next the first R.F. circuit section of the tuning condenser. Now move up to the next known frequency, preferably located at the next split section of the condenser. The alignment from here on is accom-

AVERAGE VOLTAGES & CURRENTS:

	FIL. VOLTS	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	CATHODE VOLTS	MAXIMUM PLATE CURRENT
R.F. Tubes	2.25	195	95	0	1.5	3.25 MILLS
First Detector Tube	2.25	185	95	0	3.5	5.5
First I.F. Tube	2.25	185	95	0	1.5	3.25
Second Detector Tube	2.25	145	75	0	12.5	5
Oscillator Tube	2.25	85	45	0	5	5
Output Tube	2.25	185	195	11	24	24
Rectifier Tube	4.5	250	---	---	---	45

JACKSON-BELL CO., LTD.

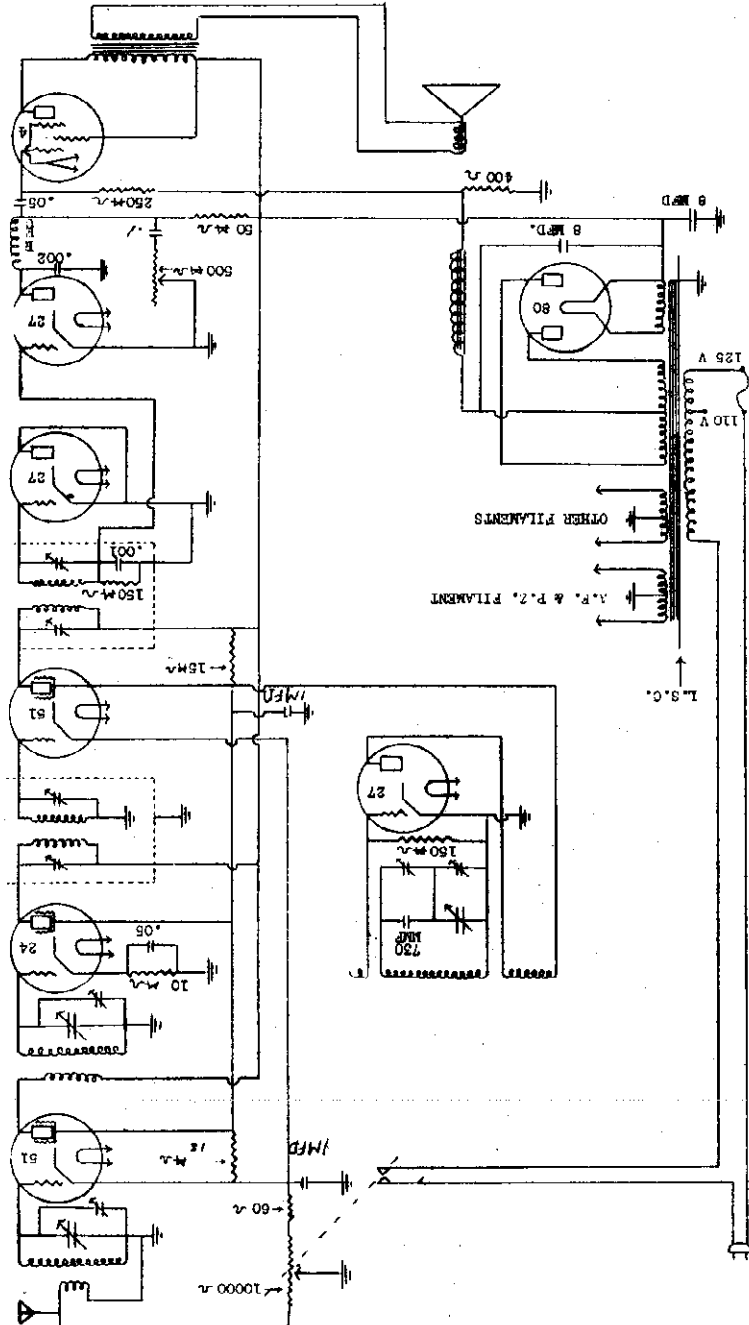
MODEL 88
Schematic, Voltage Alignment

JACKSON-BELL SUPERHETERODYNE
MODEL 88 IMPROVED
N.P.K. 6/9/31

CHECK VOLTAGES WITH VOLTMETER
AT MAXIMUM

- 200 v.
- 75 v.
- 1.6 v.
- 2 v.
- 200 v.
- 75 v.
- 1.5 v.
- 2 v.
- 0 v.
- 0 v.
- .5 v.
- 0 v.
- 2.25v.
- 200 v.
- 75 v.
- 6.25 v.
- 2 v.
- 75 v.
- .25 v.
- 0 v.
- 40 v.
- .5 v.
- 0 v.
- 200 v.
- 195 v.
- 16 v.
- 2.25 v.
- 4.5 v.
- 25 ma.

- R-f. Plate
- R-f. Screen
- R-f. Cathode
- I-f. Filament
- I-f. Plate
- I-f. Screen
- I-f. Cathode
- I-f. Filament
- Detector Plate
- Detector Grid
- Detector Cathode to Gnd.
- Detector Filament
- Trans. Plate
- Trans. Screen
- Trans. Cathode
- Trans. Filament
- Osc. Plate
- Osc. Grid
- Osc. Cathode to Gnd.
- 1st A-f. Plate
- 1st A-f. Grid
- 1st A-f. Cathode to Gnd.
- P.Z. or 47 Plate
- P.Z. or 47 Grid
- P.Z. or 47 Filament
- 80 Filament
- 80 Plate Drain per plate



RADIO FREQUENCY CIRCUIT ADJUSTMENT

The first operation in aligning the radio frequency circuit should be the tuning of the intermediate frequency transformers. First, remove the oscillator tube and connect a modulated oscillator tuned exactly to 175 kilocycles between the grid of the first detector and the chassis. Remove the first audio tube and insert an adapter in this socket with leads long enough so that the two may be placed in a position to make accessible the two holes in the I.F. transformer shield so that the adjusting screws may be turned. This adapter need contain simply a five prong socket at one end, and a five prong plug at the other end with about six or eight inches of flexible wire connecting the two. The top condenser of the second I.F. transformer, which is the one behind the 27 first audio tube, will be broad and unvertical in its adjustment. The bottom condenser which is the primary, should be sharp. Both coils will peak, but a little juggling may be necessary as the coupling is so close that one condenser will tend to tune both coils, so it may be necessary to back up on one to make the other balance and then rebalance the other.

Repeat this operation with the other transformer located behind the Pentode tube and adjust all screws for maximum reading on an output meter, which should be connected when these adjustments are being made.

When the I.F. circuit has been accurately adjusted to 175 kilocycles, the oscillator tube should be replaced and a test modulated oscillator connected to the antenna terminal of the receiver. Factory alignment of these receivers is started at 1720 kilocycles, in order to be able to cover the bands used by police broadcast stations. Should the test oscillator reach this frequency, then the dial should be adjusted to about 3 when alignment is made at this point.

If unable to test at 1720 kilocycles, the first alignment operation may be made at 1500 kilocycles, with the dial set so that the 1500 kilocycle mark is directly above the center of the condenser shaft. With the dial set in the position corresponding to the highest frequency which is used in the preliminary alignment, rotate the condenser screw on the center section of the variable condenser until maximum response is noted in the output meter. This center section tunes the oscillator circuit. Without changing the adjustment of either the oscillator or the receiver dial, adjust the antenna compensator, (the one nearest the front of the chassis) for maximum response. This should then be followed by the first detector, and when resonance is approached with the first detector compensator, the main tuning dial of the receiver should be rocked back and forth slightly at the same time that the compensator is retaced slowly until the highest output indication is obtained.

Best results will be obtained when a dummy antenna is used between the oscillator and the receiver when the three gang condenser is being aligned. This can consist of a .00025 condenser, a 20 ohm resistor, and about 25 turns of small magnetic wire wound on a one inch form, carried in series between the antenna terminal of the receiver and the output terminal of the oscillator. The alignment operation may then be completed at the lower frequencies by the customary bending of the split rotor plates.

For aligning the oscillator circuit, at 550 kilocycles, the variable padding condenser located under the chassis and accessible thru a hole to the left of the center section of the tuning condenser should be used in preference to bending plates. This may be done immediately after the 1500 kilocycle alignment, and then the set should be re-checked at 1500 kilocycles, and alignment continued from that point back to 550.

MODEL 89-A
Schematic, Socket
Voltage, Alignment

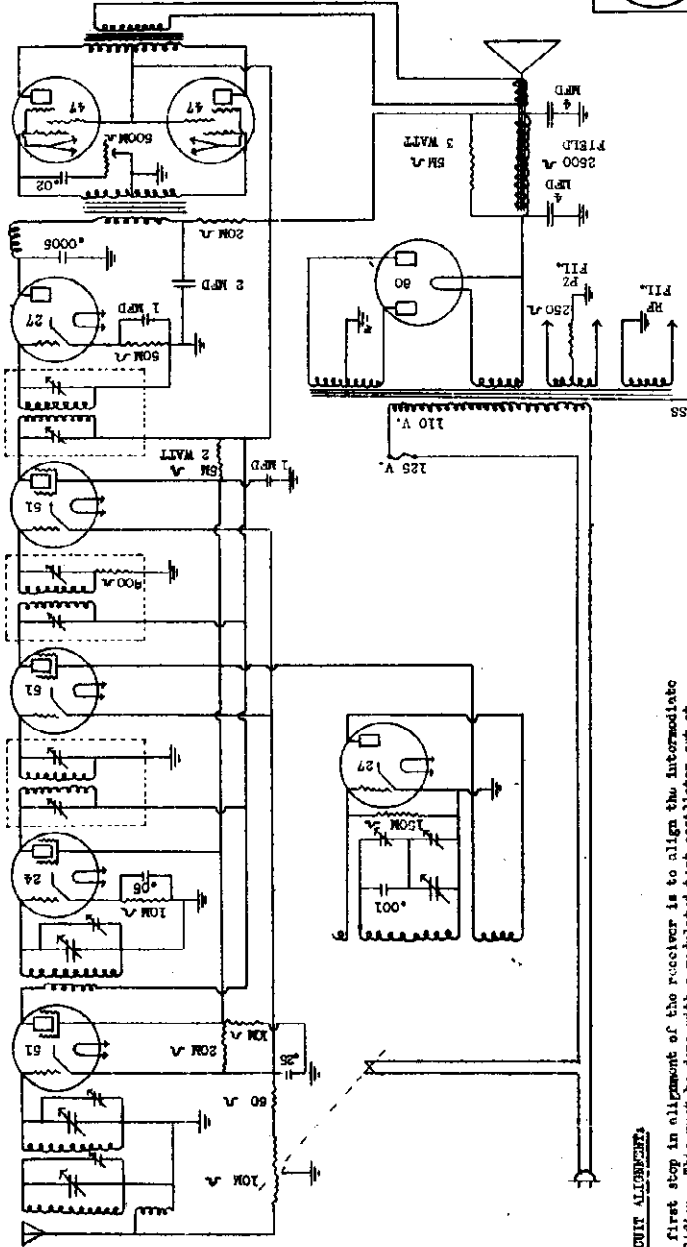
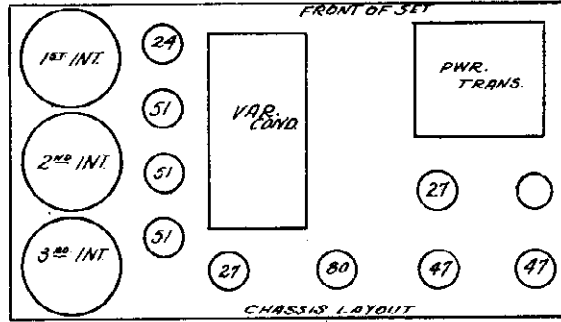
JACKSON-BELL CO., LTD.

JACKSON-BELL SUPER
MODEL 89A
W. P. K. 6-16-31

IF PEAK 175 KC

RESISTOR CODE

- 60 OHM WIRE WOUND
- 250 " " " 100MA
- 5000 " GREEN, BLACK, RED DOT
- 10000 " BROWN, " ORANGE DOT
- 20000 " RED, " "
- 50000 " GREEN, " "
- 150000 " BROWN, GREEN, YELLOW



- b) Rotate the adjusting screws of the oscillator and first detector sections of the tuning condenser until maximum response is obtained in the output meter.
- c) Remove the short from the radio frequency amplifier section of the tuning condenser and connect the test oscillator to the antenna terminal of the receiver. Now adjust the compensating condenser for the band selector and radio frequency section to give maximum response.

From this point on the alignment is the same as with a I.R.F. circuit, except the oscillator section. After bending the plates, where necessary, of the three signal frequency section of the tuning condenser for maximum response, bend the oscillator plate in and out while "rocking" the condenser short, and note for maximum response. It is recommended that a check of alignment be made at each split section of the rotor plates of the tuning condenser.

AVERAGE VOLTAGES & CURRENTS:

	FIL VOLTS	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	CATHODE VOLTS	PLATE CURRENT
R.F. Amplifier Tube	2.5	200	100	0	2.0	3-8
First Detector Tube	2.5	200	100	0	4.0	.8 MA
First I. P. Tube	2.5	200	100	0	2.0	3-5
Second I. P. Tube	2.5	200	100	0	2.0	3-5
Second Detector Tube	2.5	180	---	---	8	2 MA
Oscillator Tube	2.5	100	---	---	0	6 MA
Output Tube (1)	2.5	185	200	16	0	20 MA
Output Tube (2)	2.5	185	200	16	0	20 MA
Rectifier Tube	5.0	375	---	---	---	55 PER PLATE

CIRCUIT ALIGNMENT

The first step in alignment of the receiver is to align the intermediate amplifier. This must be done with a modulated test oscillator set at exactly 175 kilocycles, and an output indicating device. Remove the oscillator tube from the receiver (see chassis drawing No. 1) and connect the test oscillator to the grid of the first detector tube. The six tuning condensers for the intermediate circuit are adjusted by means of the screws accessible thru the holes in the sides of the intermediate transformer shield covers. The volume control should be in the maximum or full-on position. Rotate the adjusting screws until maximum response is shown in the output meter.

Oscillation in the intermediate amplifier may be caused by:-

- 1) Open by-pass condenser.
- 2) Improper alignment.
- 3) Shorted suppressor resistor in the second intermediate transformer.
- 4) Defective tube.

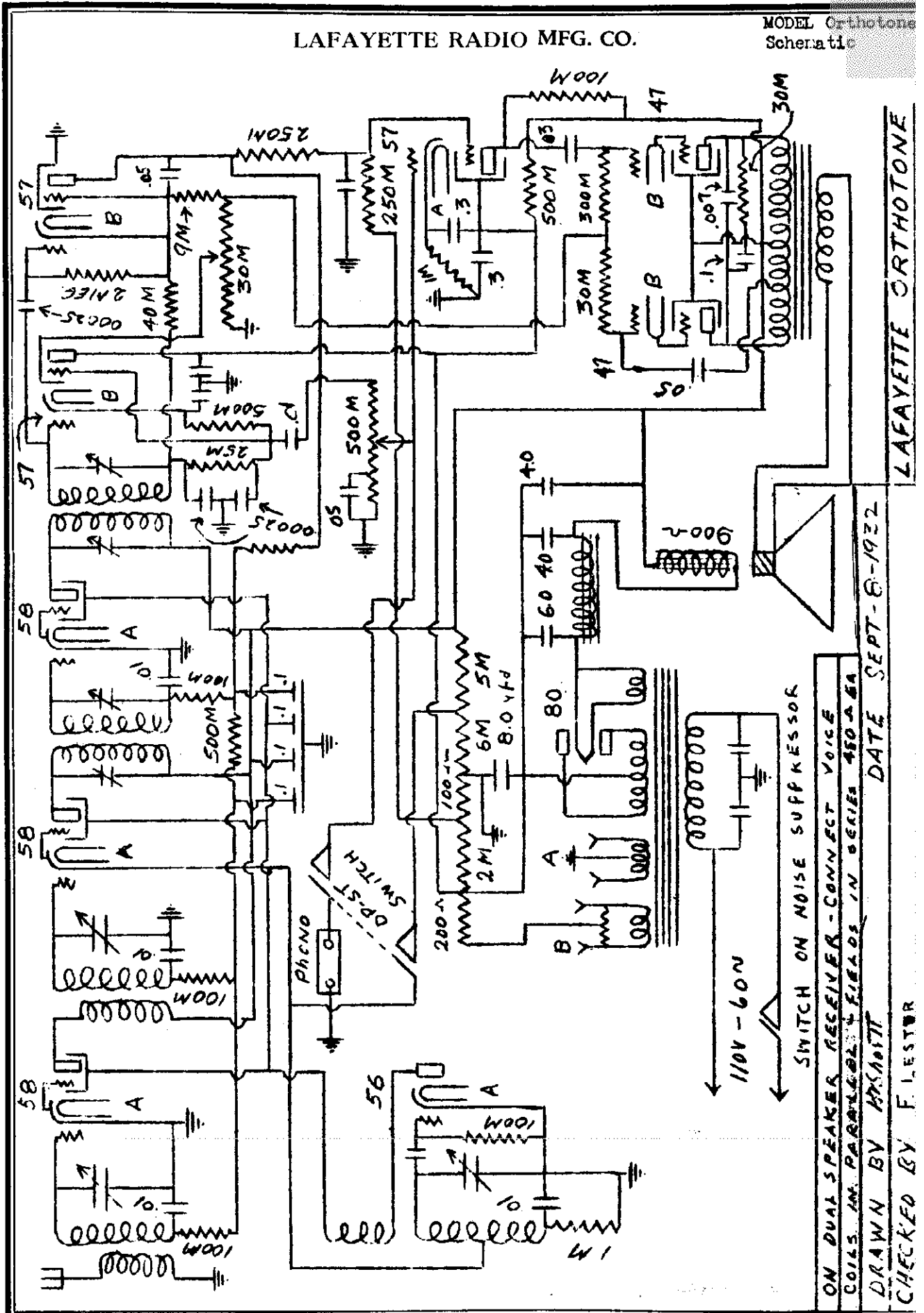
ALIGNMENT OF THE SIGNAL FREQUENCY CIRCUIT:

For this operation, a modulated test oscillator covering the broadcast band is required. In order to properly resonate the signal frequency circuit of this receiver, the pro-selector and radio frequency amplifier circuits must be eliminated from the preliminary alignment operation, and a difference of 175 kilocycles must be established between the first detector and oscillator tuning condensers.

- a) Short circuit that section of the main tuning condenser which is connected to the grid of the radio frequency amplifier tube. Couple the test oscillator to the first detector tube by placing the lead from the test oscillator near (but not touching) the grid terminal. Set the main tuning dial at 1500 kilocycles, and adjust the test oscillator to 1500 kilocycles.

LAFAYETTE RADIO MFG. CO.

MODEL Orthotone
Schematic



LAFAYETTE ORTHOTONE

DATE SEPT-8-1932

ON DUAL SPEAKER RECEIVER - CONNECT VOICE
COILS IN PARALLEL + FIELDS IN SERIES 450-A-6A

DRAWN BY MCKENITT

CHECKED BY F. LESTER

SWITCH ON NOISE SUPPRESSOR

110V - 60N

MODEL 10C10

Condenser Data, Notes **LAFAYETTE RADIO MFG. CO.**
 Parts (Early Model)

Bypass Condenser Block

The key number, capacity, and lead colors of the sections of the original bypass condenser block used in the early models are shown in the following list. The key numbers refer to Fig. 3.

Key No.	Capacity	Lead Color	Lead Color
C22	.5 mfd.	Yellow	Yellow
C16	.5 mfd.	Red	Common Black
C4	.5 mfd.	Blue	Common Black
C8	.5 mfd.	Brown	Common Black
C5	.1 mfd.	White, Green Tr.	Common Black
C2	.1 mfd.	White, Green Tr.	Common Black
C7	.1 mfd.	White, Red Tr.	Common Black
C6	.1 mfd.	Black, White Tr.	Black, White Tr.
C13	.1 mfd.	White	White

Referring to sections C6 and C13 in the above list, it will be noted that these have two leads each with the same color code. This was changed in a later model to one lead each, the other lead of each section being connected to the common black lead.

At a later date, two further changes in this condenser block were made. Section C6 which bypassed the grid return of the first I.F. tube to ground was discontinued and section C4 was changed to .25 mfd. These changes bring the block up to date.

The key numbers (C5, etc.) in the above description of the condenser block refer to the key numbers as shown in the schematic circuit diagram of the early chassis, Fig. 3. The key numbers of the condenser block as shown in the parts list in the foregoing service manual conform with the key numbers as shown in the schematic of the present chassis, Fig. 1. As explained at the beginning of this supplement, the two sets of key numbers do not coincide.

Resonance Meter

In the early model receivers, the resonance meter was in the plate lead of the R.F., first detector, and first I.F. tubes. In the present receivers the resonance meter is in the plate lead of the R.F. tube only. The meter is not the same in both cases.

Voltage Divider Resistor

In the early models a "Candohm" armored wire wound voltage divider resistor was used. This was replaced in the later models by a vitreous enamel voltage divider. It will be noted that there are ten lugs on the "Candohm" resistor while there are only six resistor sections, which would ordinarily call for seven lugs. The extra three lugs are blank lugs not connected with the resistance element and used for wiring purposes only. Starting with the high potential end of the resistor, the blank lugs are the second, fourth and ninth. In ordering a new voltage divider resistor for the ten tube chassis be sure to order the correct type.

Speaker

The early models in this series of receivers used a single speaker and not the dual speakers as mentioned in the foregoing manual. The single speaker field resistance is 450 ohms.

Supplementary Parts List for Early Models

The parts in this list replace the corresponding parts as shown in the parts list in the foregoing service manual.

Stock No.	Name
P-1363	Interstage Transformer Assembly
P-90954-B	250,000 ohm Resistor (R3, R4)
P-90956-A	30,000 ohm Resistor (R12)
P-90977-B	Tone Control and On-Off Switch (R14).....
P-80867	.0005 mfd. Condenser (C14).....
P-80861-B	Bypass Condenser Block.....
P-1367	Shielded 1st I.F. Transformer Assembly.....
P-1364	Shielded 2nd I.F. Transformer Assembly.....
P-1365	Shielded 3rd I.F. Transformers Assembly.....
P-1349	Resonance Meter
P-1366	Shielded Oscillator Unit Assembly.....
P-90974-C	"Candohm" Voltage Divider Resistor.....
*P-1351	Drive Bracket and Bearing Assembly.....
*P1197	Friction Drive Shaft Assembly
*P-1356	Dial Strip and Disc Assembly.....
*P-1177	Dial Light Bracket Assembly, less socket and hub.

*Asterisk refers to friction drive parts used on early models.

LAFAYETTE RADIO MFG. CO.

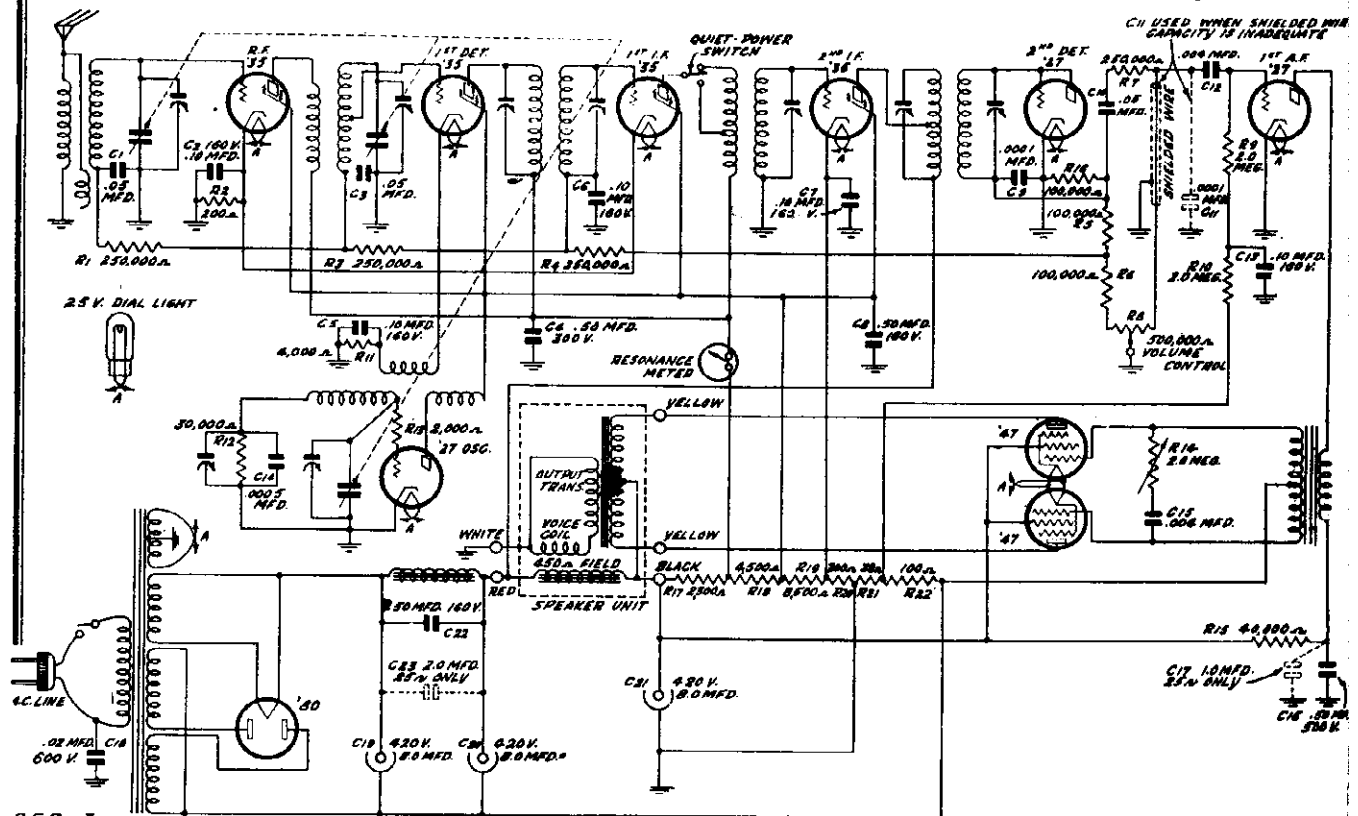
MODEL 10C10 (Early)
Schematic, Data

Fig. 3. Schematic Circuit Diagram of Early Model

Data on Earlier Models in This Series

The foregoing service manual describes the chassis of this series as it is manufactured at the present time. However, when the model was first brought out it was slightly different mechanically and electrically than the present model.

In this supplement, the changes of importance from a servicing standpoint from the first models to the present are discussed. This section should be gone over carefully by the service technician, as it is of importance both in servicing the set and when ordering replacement parts. The changes described were not all made at the same time. Investigation of the chassis will show which of the changes are incorporated. One way of eliminating error in replacing parts is to return the old part when ordering a new one.

Key Numbers

In Fig. 3 is shown the schematic circuit diagram of the original model. In the changes as described below, reference will be made both to this diagram and to the schematic circuit diagram of the present model Fig. 1. Note that the key numbers of the resistors and condensers in Figs. 1 and 3 do not coincide.

Interstage Transformer

The interstage R.F. transformer of the original sets contained a 250,000 ohm isolating resistor shown in Fig. 3 as R3. This is replaced by the present type of interstage R.F. transformer with no resistor.

Isolating Resistors

Isolating resistor R3, as shown in Fig. 3 is omitted and isolating resistor R4, 250,000 ohms, is changed in the later models to 500,000 ohms.

Tone Control and On-Off Switch

The early models in this series used a combination tone control and On-Off switch. In the later models these units are separate.

I.F. Transformer Assemblies

The old I.F. assemblies were in square cans and the condenser adjusting screws were reached from the top of the chassis. The new assemblies as used on the present models are in round cans and the adjusting screws are reached from the bottom of the chassis through holes in the sub-panel.

Oscillator Assembly

The oscillator assembly as used in the early models had the 600 K.C. tracking condenser in the same can as the balance of the assembly. In the new assembly as used in the present models, the 600 K.C. trimmer is mounted separately under the sub-panel. The adjusting screw for this condenser is reached from the top of the chassis. It is just in back of and to the side of the oscillator coil can.

Condenser C14, Fig. 3, .0005 mfd., is not used in the later models in which the afore-mentioned change in the oscillator assembly is made.

Resistor R12, 30,000 ohms, is changed to 40,000 ohms in the models in which the afore-mentioned oscillator assembly change is made.

MODEL 10C10
Alignment, Parts
Data

LAFAYETTE RADIO MFG. 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 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. Disconnect the grid cap from the first detector tube. Connect the antenna lead from the signal generator to the grid terminal of this tube. The ground lead goes to the ground connection. Then adjust the five 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 1400 K.C. The input in this instance is made to the antenna lead of the receiver. Replace the grid cap on the first detector tube. 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.

Then, set the signal generator for a signal of 600 K.C. The oscillator 600 K. C. trimmer condenser is underneath the chassis but the adjusting screw is reached from the top of the chassis and is adjacent to the oscillator coil can. Adjust this oscillator 600 K.C. trimmer condenser for maximum output, turning the rotor slowly back and forth over the 600 K.C. setting until highest output is obtained. A recheck may then be made of the alignment at 1400 K.C.

Replacing Rubber Drive

You will note that the Vernier tuning drive on this chassis uses a rubber pinion. Under normal operating conditions this rubber will last for a number of years. Should it become worn it can be readily replaced by loosening the set screw of the brass bushing located next to the rubber pinion and pulling out the station selector shaft. Place a new bushing in position, slip the station selector shaft in place and tighten the set screw.

Replacing R. F. Transformers and Oscillator Unit

The first and second R.F. transformers and oscillator assembly are matched. If one of these units is replaced, it is essential that the new one be of the correct value. At the bottom of the unit assembly a spot of paint will be seen. Be sure when ordering one of these assemblies to indicate in your order the color of the spot of paint.

Dual Speaker Connections

Two speakers are used in this model, one designed to give best response on the higher audio frequencies and the other designed to give best response on the lower frequencies. The fields of the two speakers are connected in series, and the voice coils in parallel. The resistance of the two fields in series is 450 ohms.

Part No.	Name
P-1464	'35 Tube Socket
P-1468	'47 Tube Socket
P-1474	'80 Tube Socket
P-1462	'27 Tube Socket
P-1422	Antenna Transformer Assembly (No Shield)
P-1423-A	Interstage Transformer Assembly (No Shield)
P-1400-A	Oscillator Unit Assembly (No Shield)
P-1433	Shielded 1st I. F. Transformer Assembly
P-1425	Shielded 2nd I. F. Transformer Assembly
P-1426	Shielded 3rd I. F. Transformer Assembly
P-50533	Pushpull Audio Input Transformer

Part No.	Name
P-20408	Tube Shield Base
P-1193	Laminated Phono Jack
P-50532	Power Transformer, 60 Cycle
P-50536	Power Transformer, 25 Cycle
P-5053	Power Transformer, 220 V., 40-60 Cycle
P-20461	Condenser Shield
P-1326	Aluminum Antenna Coil Shield with Bracket, (Rectangular)
P-1327	Aluminum Interstage Coil Shield with bracket (Rectangular)
P-70702	Attachment Cord and Plug
P-1355	Speaker Cable Terminal Strip
P-70716	Speaker Cable
P-1385-B	Oscillator 600 K. C. Trimmer Condenser
P-20406	Tube Shield
P-1273	Dial Light Bulb, 2.5 volts
P-1011	S. P. D. T. Switch (Quiet-Power or Phono)
P-1384	Resonance Meter
P-50534	Power Supply Choke
P-10180	Rubber Chassis Support (Large)
P-10181	Rubber Chassis Support (Small)
P-1146	Terminal Strip (Large)
P-1173	Terminal Strip (Small)
P-20427	Chassis Mounting Stud
P-20286	Resistor Spring Mtg. Bracket
P-1054	On-Off Toggle Switch
P-80889	3 Gang Condenser less drive for rubber pinion drive only
P-1383-B	Drive Bracket & Bearing Assembly
P-30365	Bushing for rubber pinion
P-10182	Rubber pinion
P-20473	Drive Shaft
P-1394	Dial Strip & Bracket Assembly
P-1382	Drive Disc Hub & Fulcrum Assembly
P-1393	Indicator Assembly
P-80866	3 Gang Condenser less drive for friction drive models
*P-1128	Drive Bracket & Bearing Assembly
*P-1197-B	Friction Drive Shaft Assembly
*P-1340	Dial Strip
*P-20283	Dial Drum

*Asterisk refers to parts used on drum dial models.

RESISTORS

Part No.	Key No.	Resistance	Type
P-90954-B	R1	250,000	Carbon
P-90935-A	R2	200	Carbon
P-90938	R3	500,000	Carbon
P-90912-A	R4	100,000	Carbon
P-90912-A	R5	100,000	Carbon
P-90954-B	R6	250,000	Carbon
P-90980	R7	0-500,000	Volume Control
P-90923-A	R8	2 meg.	Carbon
P-90923-A	R9	2 meg.	Carbon
P-90947	R10	4,000	Carbon
P-90916	R11	40,000	Carbon
P-90986-B	R12	0-2 meg.	Tone Control
P-90945	R13	40,000	Carbon
P-90912-A	R14	100,000	Carbon
P-91000	R15	2,300	Vitreous Enamel Resistor
	R16	4,500	
	R17	8,500	
	R18	300	
	R19	38	
	R20	100	

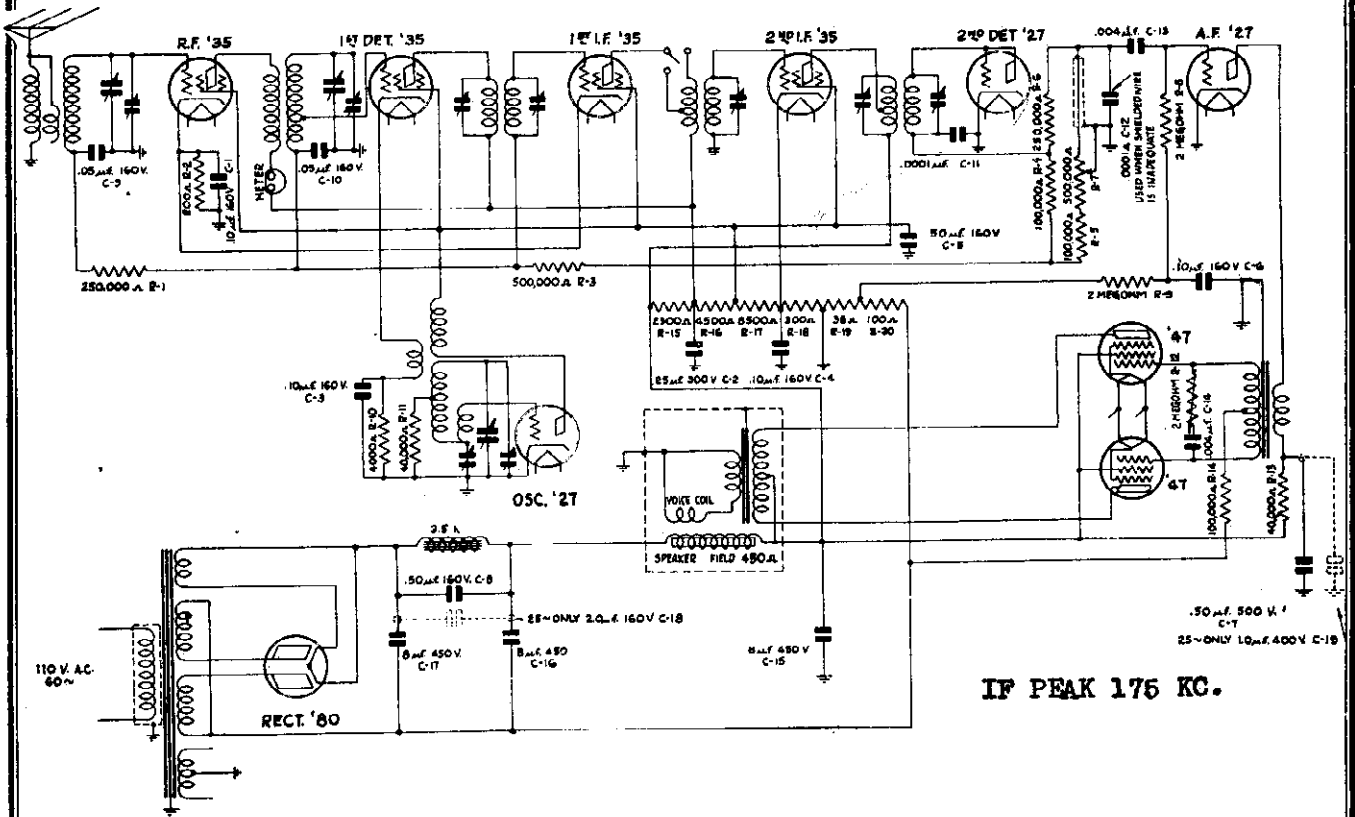
CONDENSERS

Part No.	Key No.	Capacity	Type	Voltage Rating
P-80862	C9	.05	Tubular	160 V.
P-80862	C10	.05	Tubular	160 V.
P-80865	C11	.0001	Molded	
P-80865	C12	.0001	Molded	
P-80863	C13	.004	Tubular	
P-80863	C14	.004	Tubular	
P-80901	C15	8.0	Electrolytic	450 V.
P-80900	C16	8.0	Electrolytic	450 V.
P-80900	C17	8.0	Electrolytic	450 V.
P-80861-F (Block)	C1	.1	Block	160 V. White, Green Tr.
	C2	.25		300 V. Blue
	C3	.1		160 V. White, Green Tr.
	C4	.1		160 V. White, Red Tr.
	C5	.5		160 V. Brown
	C6	.1		160 V. White
	C7	.5		500 V. Red
	C8	.5		160 V. Yellow (2 Leads)
P-80879	C18	2.0	Block	160 V. 1 25 cv. only
	C19	1.0		400 V. 1 25 cv. only

Common Black Lead

LAFAYETTE RADIO MFG. CO.

MODEL 10C10 (Late)
Schematic, Socket
Voltage

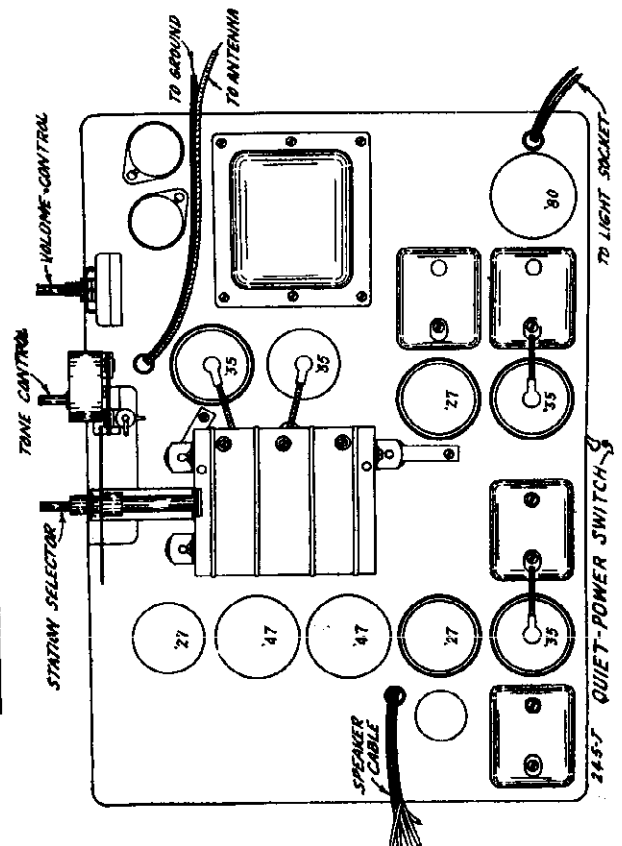


Voltages at Sockets

LINE VOLTAGE 115—VOLUME CONTROL AT
MAXIMUM—SECOND DETECTOR TUBE
REMOVED FROM SOCKET

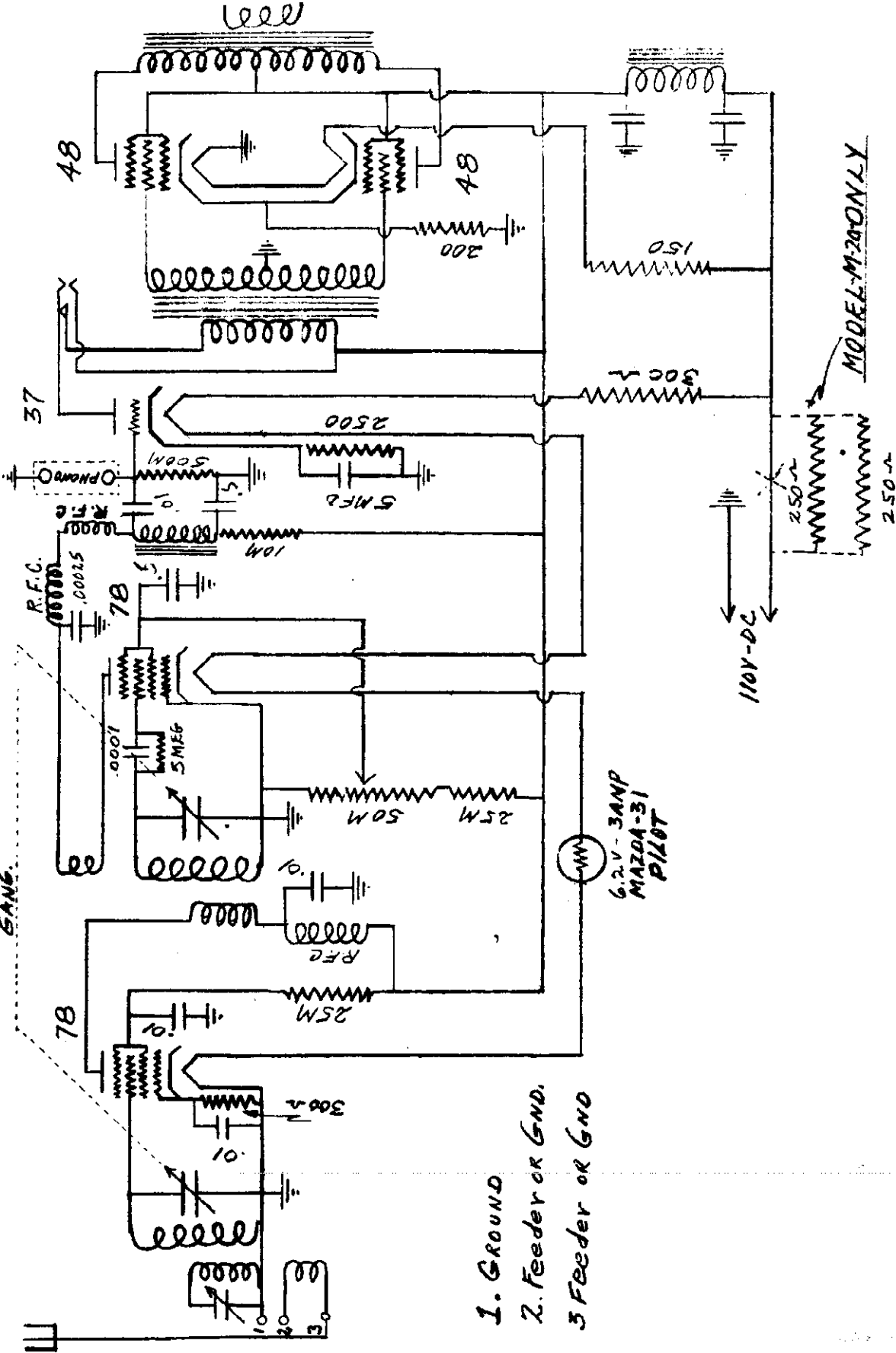
Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
'35	R.F.	2.2	180	92	3 ⁽¹⁾	6.2
'35	1st. Det.	2.2	178	85	10 ⁽¹⁾	2.2
'27	Oscil.	2.2	94		6 ⁽²⁾	4.0 ⁽²⁾
'35	1st. I.F.	2.2	180	92	3 ⁽¹⁾	6.0
'35	2nd. I.F.	2.2	260 ⁽⁵⁾	90	6	5.5
'27	1st. Audio	2.2	105		5 ⁽³⁾	4.2
'47	2nd. Audio	2.2	245	260	17 ⁽⁴⁾	31.
'80	Rect.	4.8	725 volts plate to plate			66 per plate

(1) Read from cathode to ground.
 (2) Subject to variation with dial setting.
 (3) Read across 38 ohm section of voltage divider resistor.
 (4) Read across 38 and 100 ohm sections of voltage divider.
 (5) Changes to 178 volts in latest models.
 NOTE: All readings, except heater, for second detector tube are zero.



MODELS M-14-20
Schematic

LAFAYETTE RADIO MFG. CO

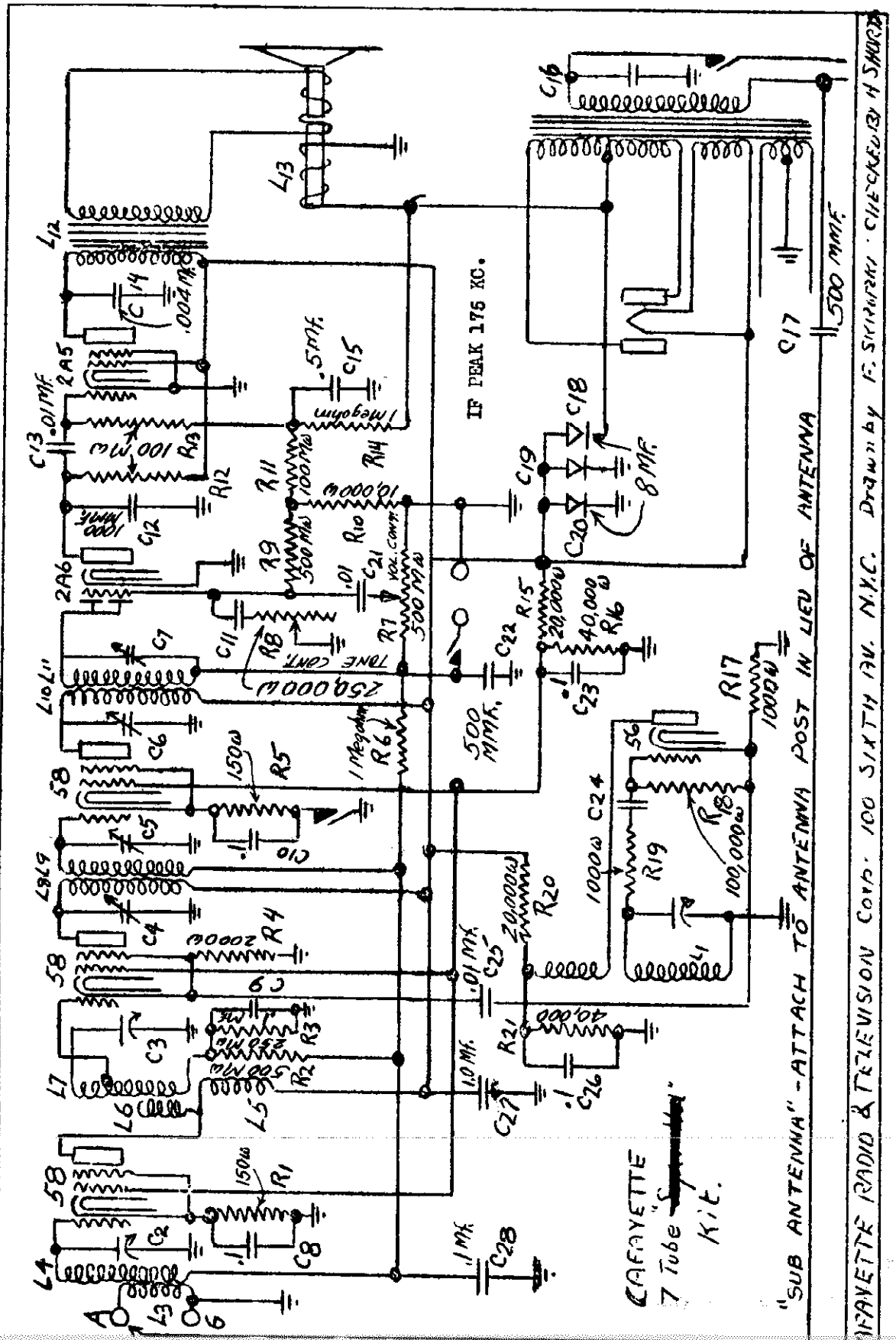


DRAWN BY H. SHORTT CHECKED BY F. LESTER DATE AUG-12-35

LAFAYETTE DIRECT CURRENT M-14-20

LAFAYETTE RADIO MFG. CO.

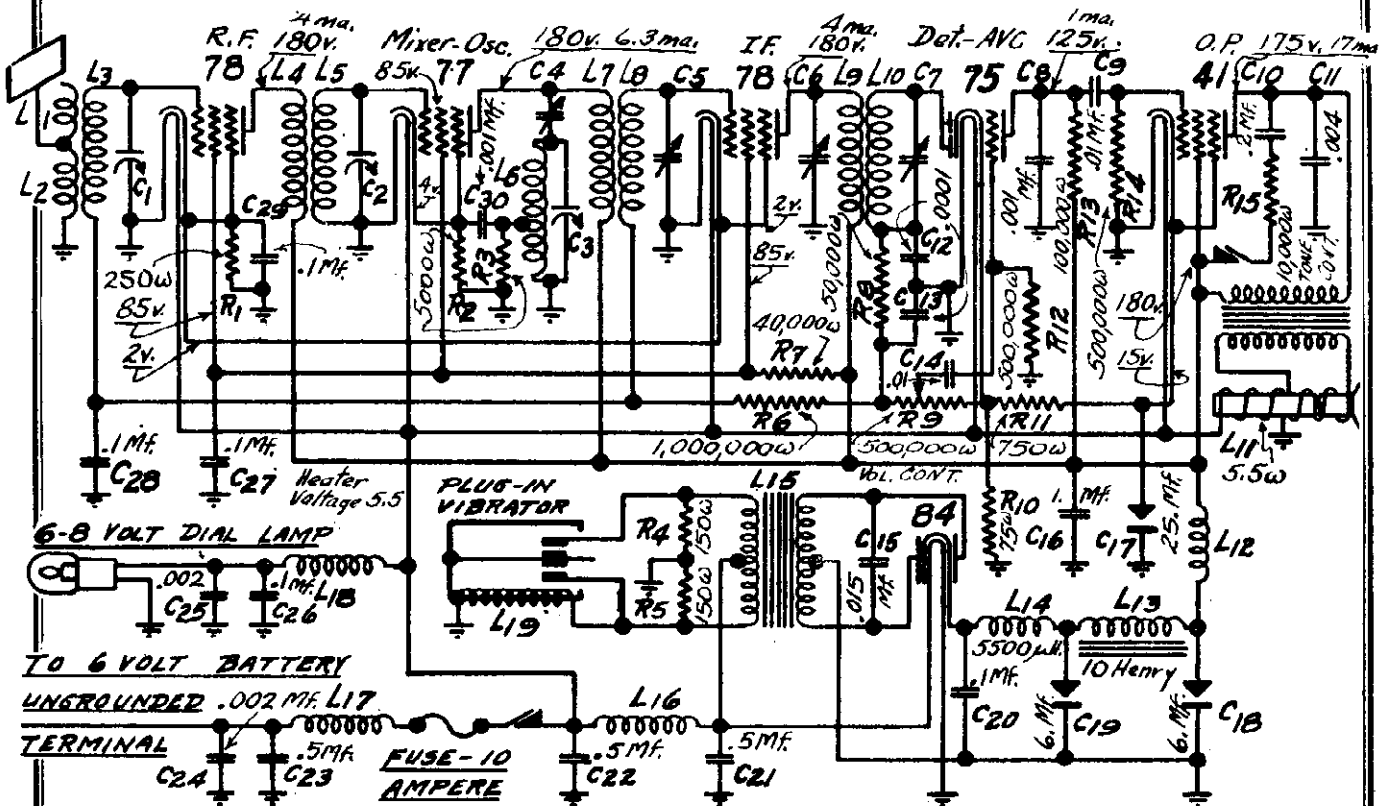
MODEL A-20
Schematic



LAFAYETTE RADIO & TELEVISION CORP. 100 SIXTH AV. N.Y.C. DRAWN BY F. SKIRSKI - CHECKED BY H. SHORR

MODEL AM-20
Schematic, Voltage
Alignment

LAFAYETTE RADIO MFG. CO.



The three R. F. trimming condensers are adjusted at 1400 K. C.. Proceed as follows:
Procure a modulated oscillator giving a signal at 1400 K.C..

IF PEAK 175 KC.

Remove the chassis from case, couple the output of the oscillator from antenna to ground, set the dial at 1400 and the oscillator at 1400 K.C..

Place the oscillator and receiver in operation and adjust the oscillator output so that a weak signal is heard in the loudspeaker when the volume control is at its maximum position.

Then adjust the trimming condensers starting with C 3, C 2 and then C 1 until maximum output is obtained. Readjust a second time as there is a slight interlocking of adjustments.

A more accurate adjustment can be made with an output meter.

I. F. Adjustment:

The four I. F. trimming condensers are adjusted at 175 K.C.. Proceed as follows:

Procure a modulated oscillator giving a signal at 175 K.C., a non-metallic screw driver and an output meter.

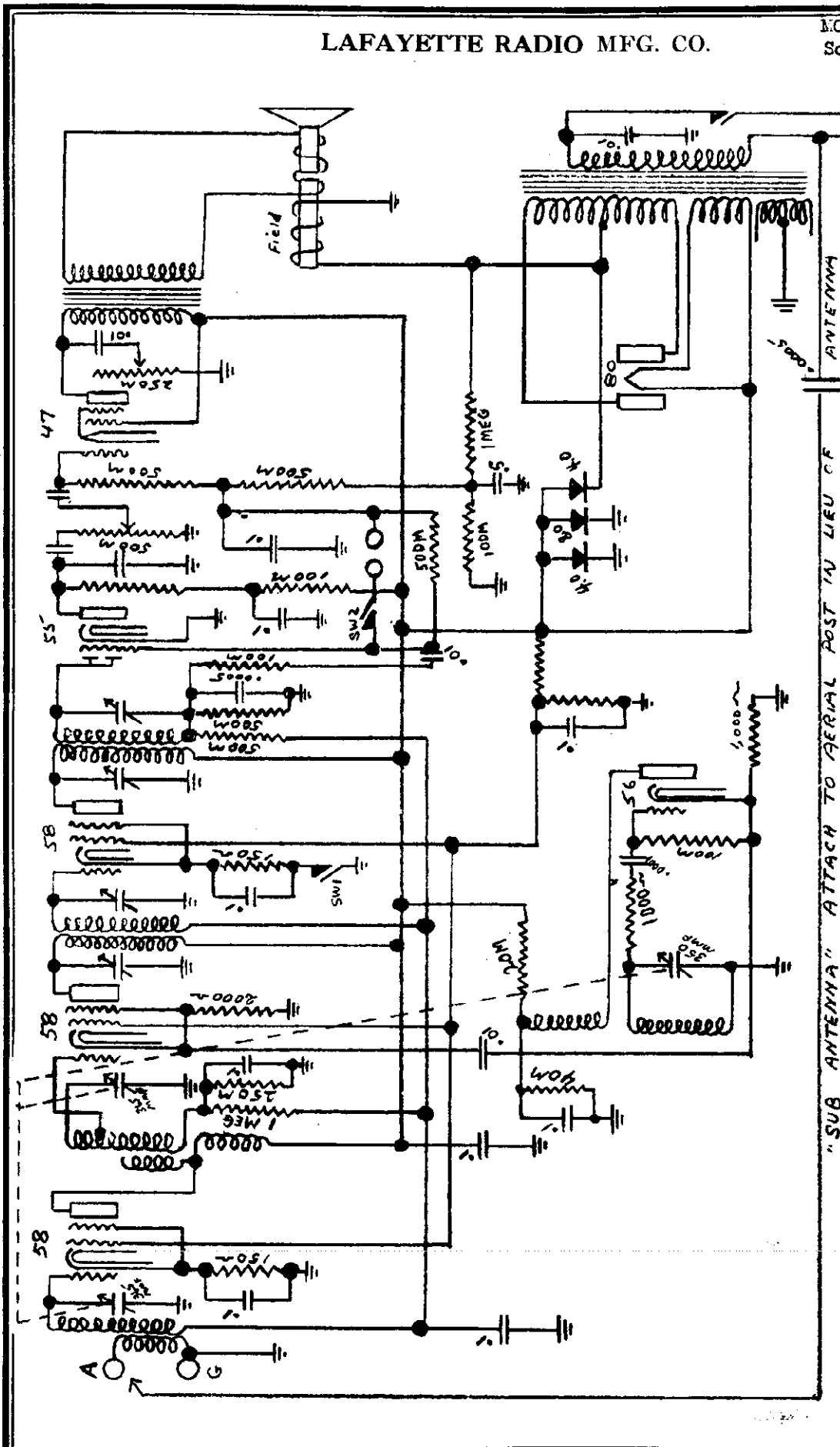
Connect the oscillator output between the first detector grid and ground. Connect output meter.

Adjust the tuning condenser so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the oscillator output until a small deflection is obtained. Unless this is done the action of the AVC will make it impossible to obtain correct adjustments.

Trim in order C 4, C 5, C 6 and C 7, repeat adjustments and then follow with the R. F. adjustments.

LAFAYETTE RADIO MFG. CO.

MODELS M-35, 37, 53
Schematic



"SUB ANTENNA" ATTACH TO AERIAL POST IN LIEU OF ANTENNA

IF PEAK 175 KC.

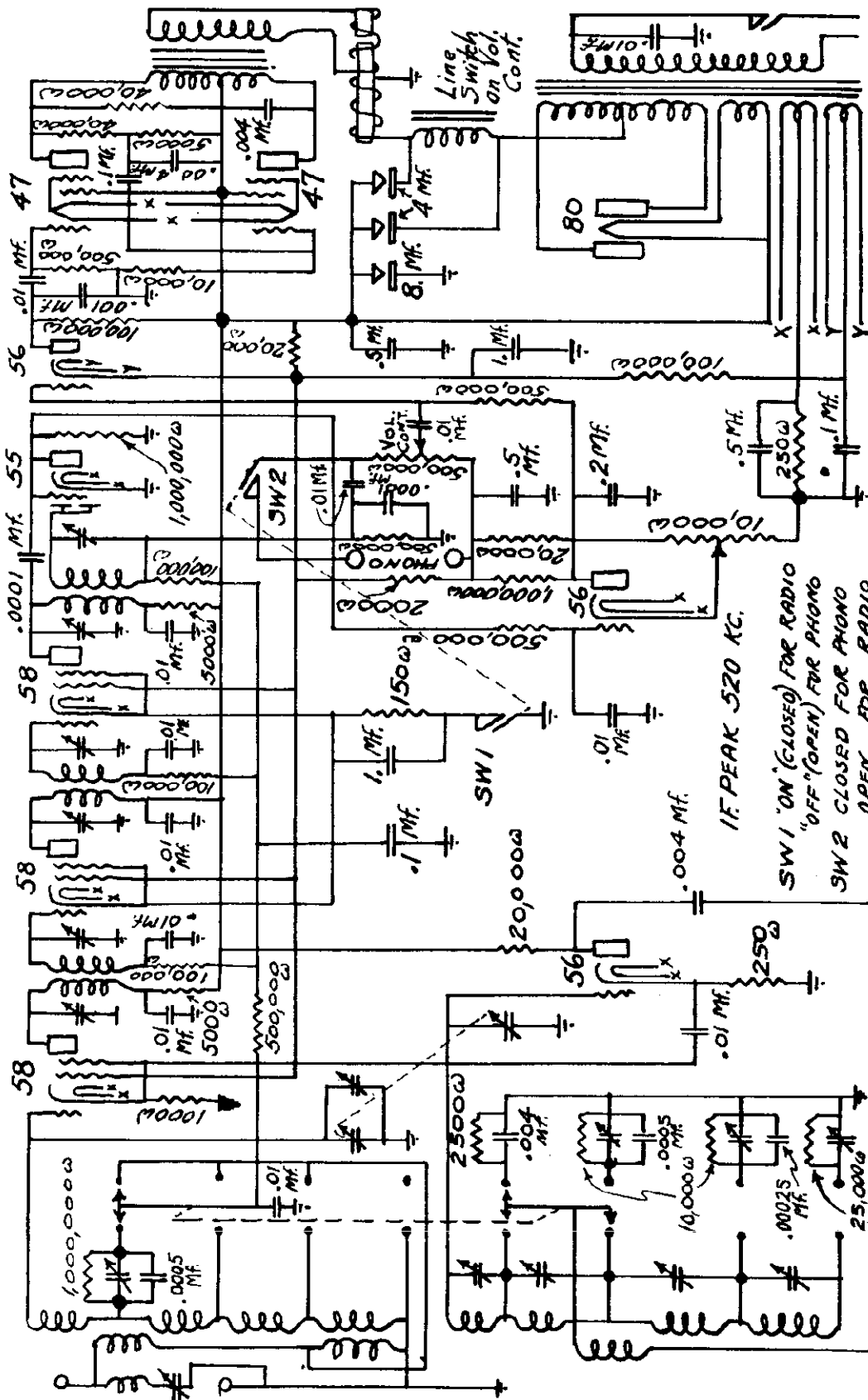
SW1 "ON" (CLOSED) For Radio
 "OFF" (OPEN) For Phonograph
 SW2 (CLOSED) For Phonograph
 (OPEN) For Radio

Models M35-37-53

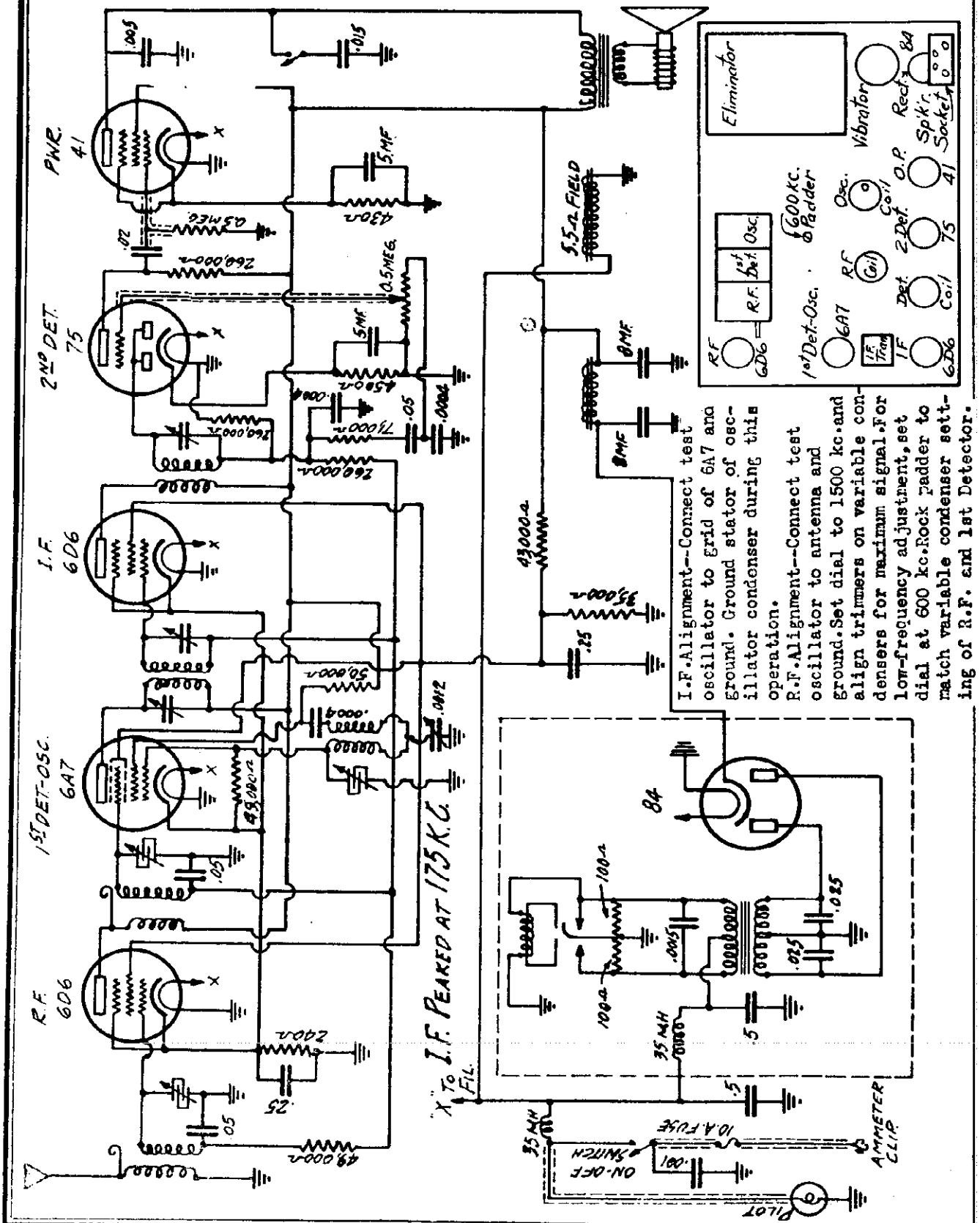
LAFAYETTE RADIO & TELEVISION Corp. (F.H.S.) 100 SIXTH AV. N.Y.C.

MODEL M-47
Schematic

LAFAYETTE RADIO MFG. CO.



LAFAYETTE RADIO & TELEVISION CORP. Schematic
 MODEL C-60 Socket, Alignment

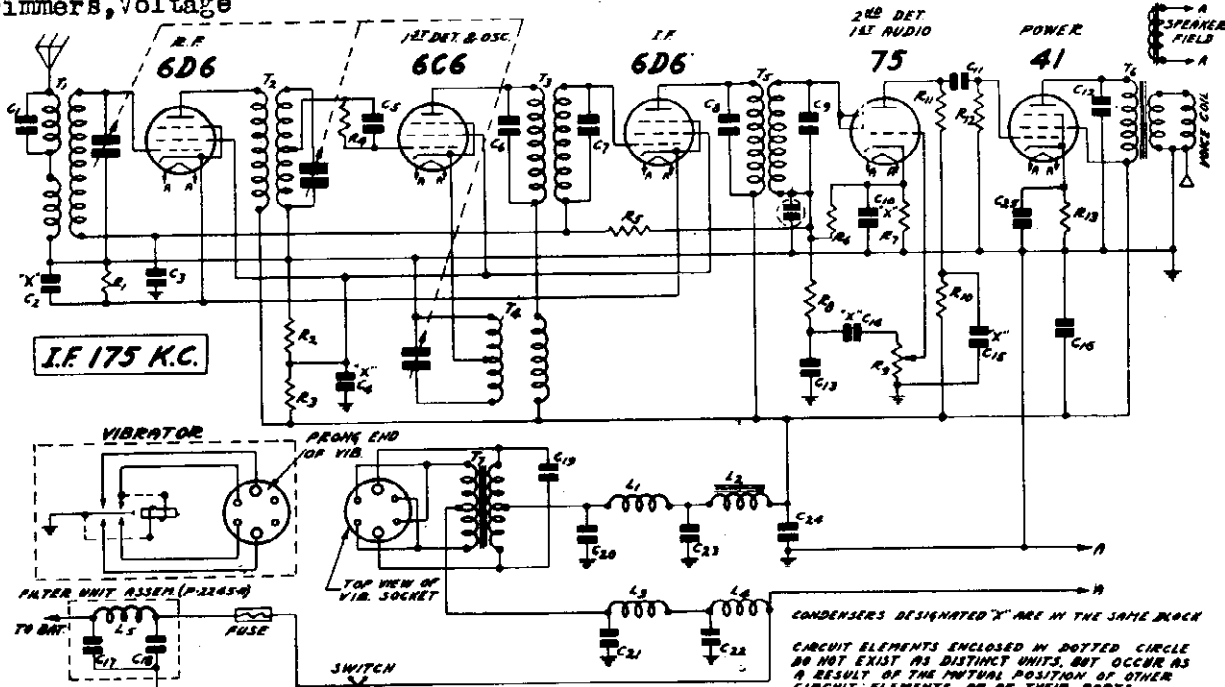


MODEL B-62

Schematic, Socket Trimmers, Voltage

LAFAYETTE RADIO & TELEVISION CORP.

Resistance Test



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.

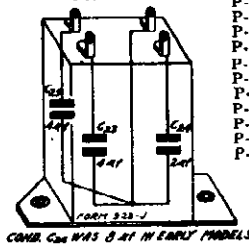
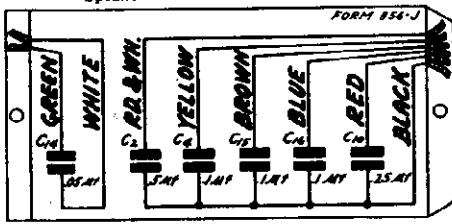
Part No.	Item	Code	D.C. Resistance in Ohms
P-5247	Antenna Trans. Pri. in Series	T1	17.50
	Antenna Trans. Sec.	T1	5.25
P-5248	R. F. Interstage Trans. Pri.	T2	2.31
	R. F. Interstage Trans. Sec. (Center Tap to Inside)		3.23
	(Center Tap to Outside)		3.98
P-5249	1st I. F. Trans. Primary	T3	100.00
	1st I. F. Trans. Secondary	T3	100.00
	Oscillator Cathode Coil (Total)	T4	4.50
	Oscillator Plate Coil	T4	9.00
P-5250	2nd I. F. Trans. Pri.	T5	100.00
	2nd I. F. Trans. Sec.	T5	100.00
P-50656	Power Trans. Pri.	T7	0.36
	Power Trans. Sec.	T7	860.00
P-5174	"B" R. F. Choke	L2	1.65
P-50657	Power Choke	L3	Small
P-5251	"A" Choke	L4	Small
P-5253	Line Choke	L5	Small
P-5252	Choke Coil	L6	690.00
P-2228	Output Trans. Pri.		0.80
	Output Trans. Sec. and Voice Coil in Par.		6.00
	Speaker Field		

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-81814	C1	250 mmf.	200V.	Part of Antenna Coil Assembly)
	C2	.50 mf.	140V.	Bypass Block
P-82600D	C4	.10 mf.	140V.	
	C10	.25 mf.	140V.	
	C14	.05 mf.	300V.	
	C15	.10 mf.	200V.	
P-81116	C3	.05 mf.	200V.	Tubular
P-81815	C5	35 mmf.		Part of Grid Leak Assembly
P-81806	C6	70 mmf.		Part of 1st I. F. & Osc. Coil Assembly
I-81806	C7	70 mmf.		
	C8	70 mmf.		
E-81115	C11	.05 mf.	300V	Tubular
P-81114	C12	.006 mf.	600V.	Tubular
P-81814	C13	250 mmf.		Moulded
P-81132	C16	.10 mf.	300V.	Tubular
	C17	.01 mf.	120V.	In Choke Condenser Unit
	C18	.01 mf.	120V.	
P-81120	C19	.007 mf.	1600V.	Tubular
P-81122	C20	.10 mf.	300V.	Tubular
P-81121	C21	.50 mf.	140V.	Tubular
P-81816	C22	.002 mf.		Moulded
P-82002	C23	4.0 mf.	250V.	Dry Electrolytic Block
	C24	2.0 mf.	250V.	
	C25	4.0 mf.	25V.	
P-82500				Gang Condenser

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-B94351ww	R1	350 Ohm	.5	Flexible Wire Wound
P-B95253	R2	25,000 Ohm	.5	Carbon
P-B95103	R3	10,000 Ohm	.5	Carbon
P-A95105	R4	1 Megohm	.2	Carbon
P-A95105	R5	1 Megohm	.2	Carbon
P-A95504	R6	500,000 Ohm	.2	Carbon
P-A94752	R7	7,500 Ohm	.2	Carbon
P-A95104	R8	100,000 Ohm	.2	Carbon
P-96017	R9	2 Megohm		Volume Control and Switch
P-A93503	R10	50,000 Ohm	.2	Carbon
P-A95204	R11	200,000 Ohm	.2	Carbon
P-A95504	R12	500,000 Ohm	.2	Carbon
P-B94801ww	R13	800 Ohm	.5	Flexible Wire Wound

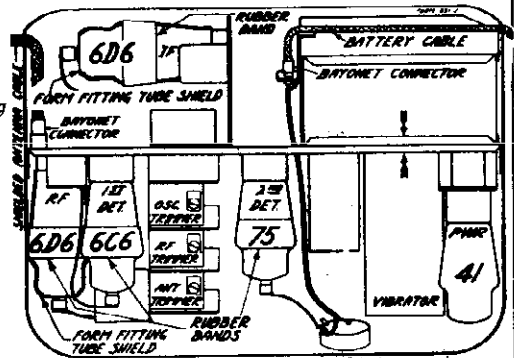


Condenser Block Internal Wiring

Electrolytic Block Internal Wiring

Type of Tube	Puncion	Volts at Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
6D6	R. F.	6.2	154	95	3.0	5.2
6C6	1st Det. & Osc.	6.2	160	97	0	3.0
6D6	I. F.	6.2	154	95	3.0	5.2
75	2nd Det. & 1st A. F.	6.2	110		1.	.25
41	Power	6.2	143	146	14.	13.0

VOLTAGES AT SOCKETS
Input 6.3 volts
Antenna disconnected at connector.



LAFAYETTE RADIO MFG. CO.

MODEL 80-M
2 Types
Schematic

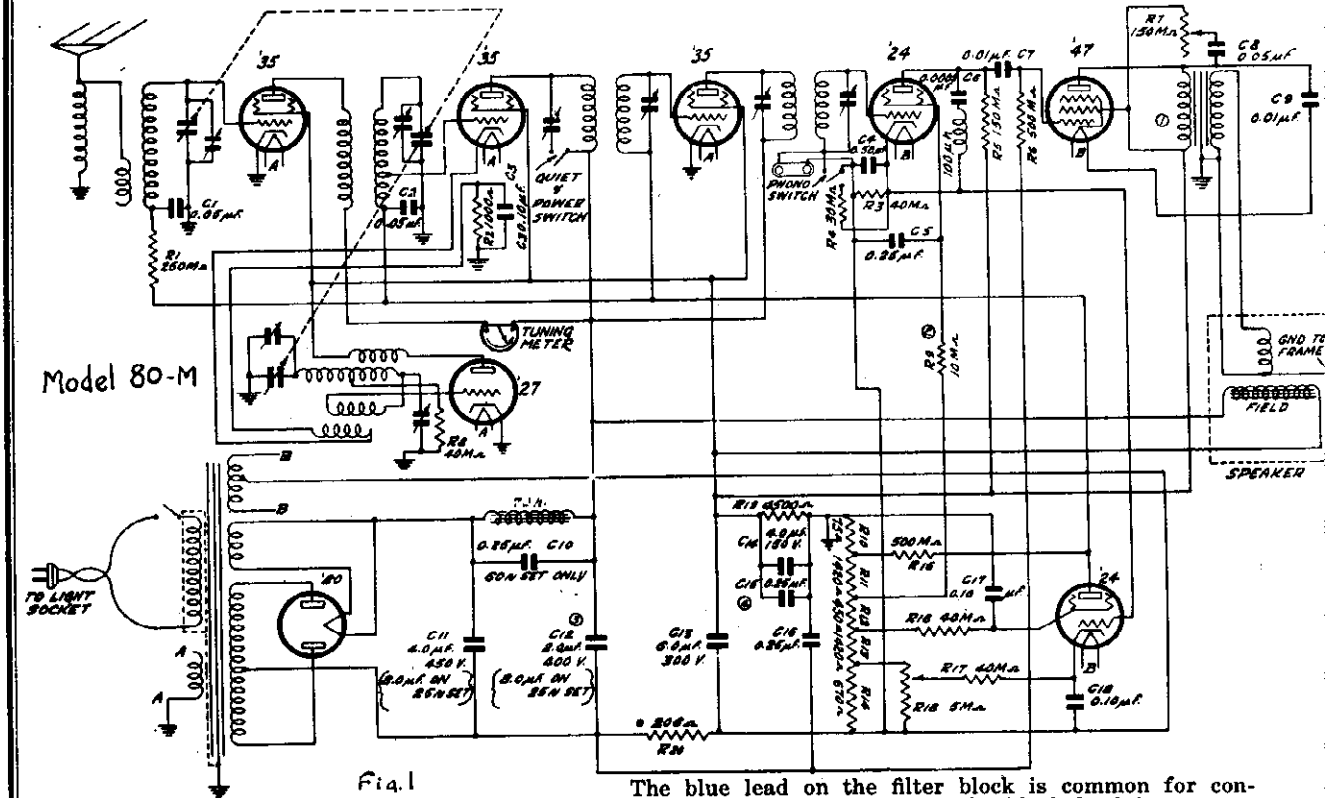


Fig. 1

IF PEAK 175 KC.

The blue lead on the filter block is common for condensers C4, C5, and C18, and the black lead is common for condensers C3, C15, C16, and C17. The second detector plate filter choke is also contained in the block and is connected by two yellow leads, C8, (white-red leads) and C10 (red leads) are connected as shown in Fig. 1 schematic

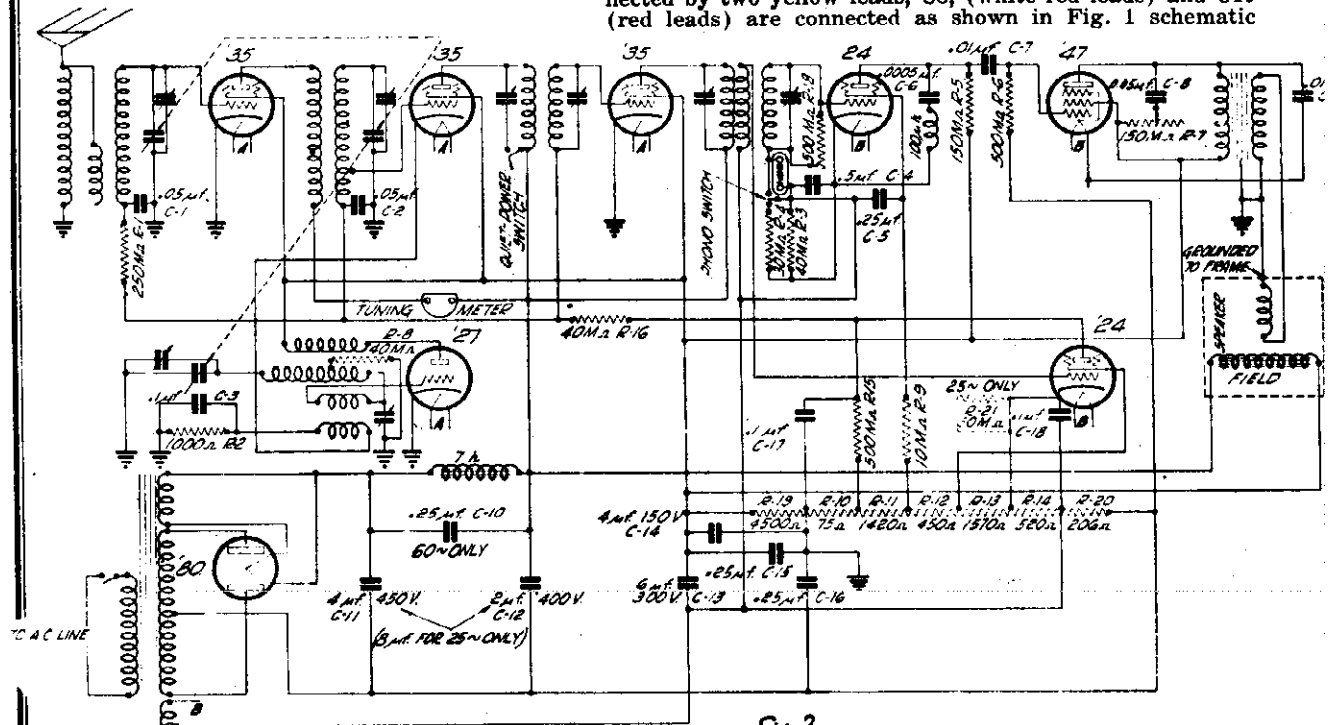


Fig. 2

Model 80-M
2nd Type

The 2nd Type has a GREEN paint identification mark on the left rear corner of the chassis near speaker socket.

MODEL 80-M

Alignment, Parts

LAFAYETTE RADIO MFG. CO.

INTERMEDIATE CIRCUITS.—Tune the test oscillator to exactly 175 K.C., and connect its output to the grid of the first detector tube after removing the clip on the tip of the tube. Connect the output meter across the secondary of the speaker coupling transformer and then adjust all four condensers which tune the intermediate transformers, for the greatest deflection on the output meter. Check the settings of all four condensers to make certain the maximum output has been obtained.

When the above instructions have been followed remove the test oscillator coupling and replace the grid clip on the tip of the first detector tube.

GANG CONDENSERS.—Turn the gang condenser plates all the way in and see that the dial pointer is on the first dial division point below 550 K.C.

Tune the test oscillator to 1,400 K.C., turn the dial to read 1,400 K.C., and then adjust each gang condenser trimmer for maximum output.

OSCILLATOR.—Tune the test oscillator to 600 K.C., and tune the receiver to the signal. Disconnect the output meter and then, rotate the adjusting screw on the oscillator 600 K.C. tracking condenser. Rock the gang condenser back and forth across the signal at the same time, and listen closely until the maximum volume is obtained. The tracking condenser is then properly adjusted and remains fixed thereafter.

The gang condenser trimmers only must then be adjusted again at 1,400 K.C. for maximum output.

The receiver should be accurately aligned if the above instructions have been followed and no further adjustments need be made.

REPAIR PARTS LIST

"^{1st} only" precedes the names of the parts used only on the Series 80-M Chassis. "only" precedes the names of the parts used only on the Series 80-M 1/2 Chassis. When ordering repair parts, the number of the parts and the serial number of the chassis MUST be given.

Part No.	Name
1318	'35 Tube Socket
1316	'27 Tube Socket
1315	'24 Tube Socket
1322	'47 Tube Socket
1312	'80 Tube Socket
1387	Speaker Socket
1396	Antenna Transformer Assembly (no shield)
1397	Interstate R.F. Trans. Assembly (no shield)
1391	1st I.F. Transformer Assembly (with shield)
1400	Oscillator Coil Assembly (no shield)
1392	^{1st} ONLY, 2nd I.F. Transformer Assembly (with shield)
1446	^{2nd} ONLY, 2nd I.F. Transformer Assembly (with shield)
50539	Power Transformer, 60-cycle
50540	Power Transformer, 25-cycle
50537	Speaker Coupling Transformer
50538	Power Supply Choke
1092	Grid Clip Assembly
1402	"QUIET POWER" (S.P.S.T.) Switch
1054	"ON-OFF" Toggle Switch
20406	Tube Shield
1273	2 1/2-volt Dial Lamp
1336	Control Knob
1388	Escutcheon Plate
40412	Shield for R.F. and Oscillator Coils

1011	"PHONO" Switch, S.P.D.T.
1193	Phono Jacks Assembly
70719	Shielded Volume Control Wire Assembly
10142	1/2" Rubber Washer (for gang condenser mounting)
10143	1/4" Rubber Washer (for gang condenser mounting)
20252	3/4" Flat Metal Washer (for gang condenser mounting) 10 for
20388	Gang Condenser Cover
30865	Bushing for Rubber Pinion
10182	Rubber Pinion
20488	Drive Shaft
1384-C	Resonance Meter
1394	Dial Strip and Bracket Assembly
1383	Drive Bracket and Bearing Assembly
1382	Drive Disc, Hub and Fulcrum Assembly
1398	Indicator Assembly
70702	A.C. Cord and Plug
1407	Dial Lamp Clip Assembly (no lamp)

RESISTORS

Part No.	Key No.	Resistance	Type	Identification Base End Dot
90954-B	R-1	250,000 ohm	Carbon	Red Green Yellow
90940	R-2	1,000 ohm	Carbon	Brown Black Red
90916	R-3	40,000 ohm	Carbon	Yellow Black Orange
90966	R-4	30,000 ohm	Carbon	Orange Black Orange
90983	R-5	150,000 ohm	Carbon	Brown Green Yellow
90938-B	R-6	500,000 ohm	Carbon	Green Black Yellow
90984	R-7	500,000 ohm	Tone Control	
90916	R-8	40,000 ohm	Carbon	Yellow Black Orange
90930	R-9	10,000 ohm	Carbon	Brown Black Orange
90938	R-15	500,000 ohm	Carbon	Green Black Yellow
90916	R-16	40,000 ohm	Carbon	Yellow Black Orange
90916	R-17	40,000 ohm	ONLY CARBON	Yellow Black Orange
90983	R-18	5,000 ohm	Only Vol. Control	
90988	R-18	500,000 ohm	Only Vol. Control	
	R-10	75 ohm		
	R-11	1,420 ohm		
	R-12	450 ohm		
90985	R-13	1,420 ohm	^{1st} ONLY CANDOHM	
	R-14	870 ohm		
	R-19	4,500 ohm		
	R-20	206 ohm		
	R-10	75 ohm		
	R-11	1,420 ohm		
	R-12	450 ohm		
90989-A	R-13	1,570 ohm	^{2nd} ONLY CANDOHM	
	R-14	520 ohm		
	R-19	4,500 ohm		
	R-20	206 ohm		

CONDENSERS

Part No.	Key No.	Capacity	Type	Voltage Rating
80862	C-1	.05 mfd.	Tubular	400 V.
80862	C-2	.05 mfd.	Tubular	400 V.
80855	C-6	.0005 mfd.	Molded	
80872	C-7	.01 mfd.	Tubular	500 V.
80872	C-9	.01 mfd.	Tubular	500 V.
80873-B	C-11	4.0 mfd.	Dry Electrolytic	450 V.
80874	C-12	2.0 mfd.	Dry Electrolytic	450 V.
80875	C-13	6.0 mfd.	Dry Electrolytic	450 V.
80878	C-14	4.0 mfd.	Dry Electrolytic	150 V.
	C-3	.1 mfd.		160 V. White-Green
	C-4	.5 mfd.		160 V. White
	C-5	.25 mfd.		160 V. White-Brown
	C-8	.1 mfd.		600 V. White-Red
	C-10	.25 mfd.		160 V. Red (2)
80876-G	C-15	.25 mfd.	Block	160 V. Brown
	C-16	.25 mfd.		200 V. Green
	C-17	.1 mfd.		160 V. White Green
	C-18	.1 mfd.		160 V. Black-White-Yellow
			Detector plate filter choke	
80871			Gang cond. only, no cover, dial assem. or drive assem.	
1385			Oscillator 600 K.C. adjustable tracking condenser	

LAFAYETTE RADIO MFG. CO.

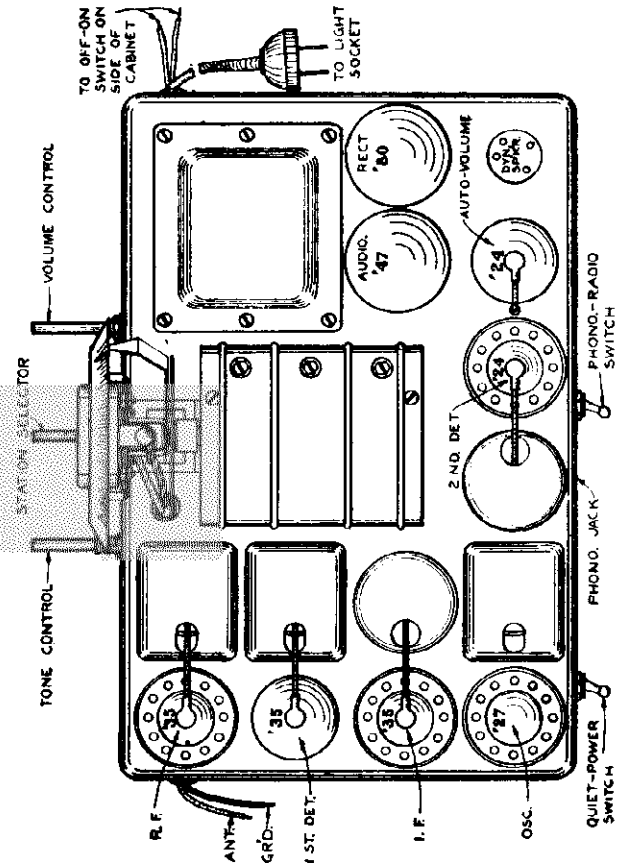
MODEL 80-LI
 Socket, Voltage
 Alignment, Pickup Data

Voltages at Sockets

The voltages shown in the chart were taken with a 1,000 ohm per volt voltmeter; voltage measurements taken with a voltmeter having a different resistance will, of course, differ from those shown.

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 the line voltage.

Tube	Circuit	LINE VOLTAGE				
		90 V.	100 V.	110 V.	120 V.	130 V.
R. F. '35	Screen-Grid Plate	70 143	78 159	85 175	92 191	100 207
1st Det. '35	Screen-Grid Plate	70 143	78 159	85 175	92 191	100 207
I. F. '35	Screen-Grid Plate	70 143	78 159	85 175	92 191	100 207
Oscillator '27	Plate	70	78	85	92	100
2nd Det. '24	Screen-Grid Plate	66 127	73 134	80 141	87 148	94 155
A. V. C. '24	Grid Screen-Grid	14 24	15.5 26	17 28	18.5 30	20 32
Audio '47	Accelerating-Grid Plate	199 171	221 190	244 210	267 230	289 250
Rectifier '80	Current (both plates) Plate to Plate Volt.	67 MA 512	75 MA 569	82 MA 625	89 MA 682	96 MA 739



Condenser Alignment

A thorough check of the receiver should be made before any attempt is made to re-align any circuits. Examine the antenna and ground connections. Test all the tubes and check all voltages to determine if the failure of the receiver to operate properly is not due to some fault other than misalignment. A superheterodyne receiver must be accurately aligned to be selective and sensitive. This receiver has been accurately aligned at the factory, and due to the mechanical design of the gang and adjustable condensers, will not lose its alignment unless damaged by abuse or accident.

A modulated test oscillator and an output meter MUST be used when aligning this receiver to insure accurate alignment. It is important that the oscillator deliver a signal at exactly 175 K.C. in addition to frequencies in the broadcast band.

The adjustable condensers which tune the primaries and secondaries of the I.F. transformers are adjusted by inserting a screw driver through the holes in the chassis base directly below the I.F. transformer assemblies.

A trimmer condenser is mounted over each section in the gang and is adjusted by turning the screw located under the hole in the top of the gang shield.

The oscillator 600 K.C. tracking condenser is on the back of the chassis near the "QUIET-POWER" switch.

Make each adjustment in the order given below or the receiver may be thrown further out of alignment and it will then be a difficult task to align it properly.

The receiver and test oscillator must be well grounded and the output kept within the range of the output meter at all times.

All shields must be in place when making the adjustments.

Phonograph Pickup

A high impedance pickup is recommended for use with this receiver, as that type gives greatest volume when a transformer is not available. A transformer should be used with a low impedance pickup, as that type of pickup generally does not otherwise provide sufficient volume. A transformer having a ratio of 4 to 1 will prove satisfactory in most instances.

A pickup with a self-contained volume control is required as the volume control on the chassis cannot be used to adjust the volume.

To connect the pickup, remove the wire between the two jacks, mounted on bakelite on the rear of the chassis, and plug in the tips of the pickup cord. The word "PHONO" is stamped on the bakelite. Turn the receiver on and then throw the switch, near the center, on the back of the chassis, to the right. The pickup will then be connected and records may be played.

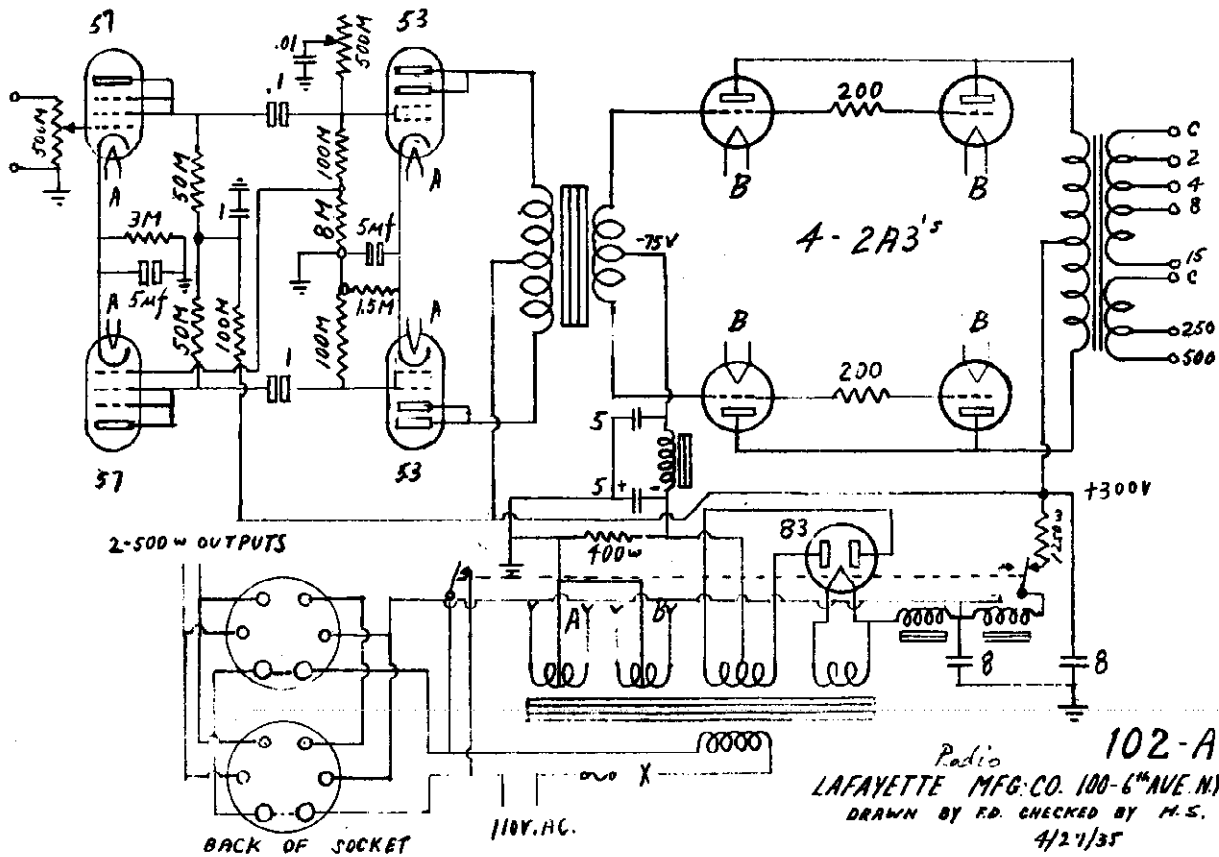
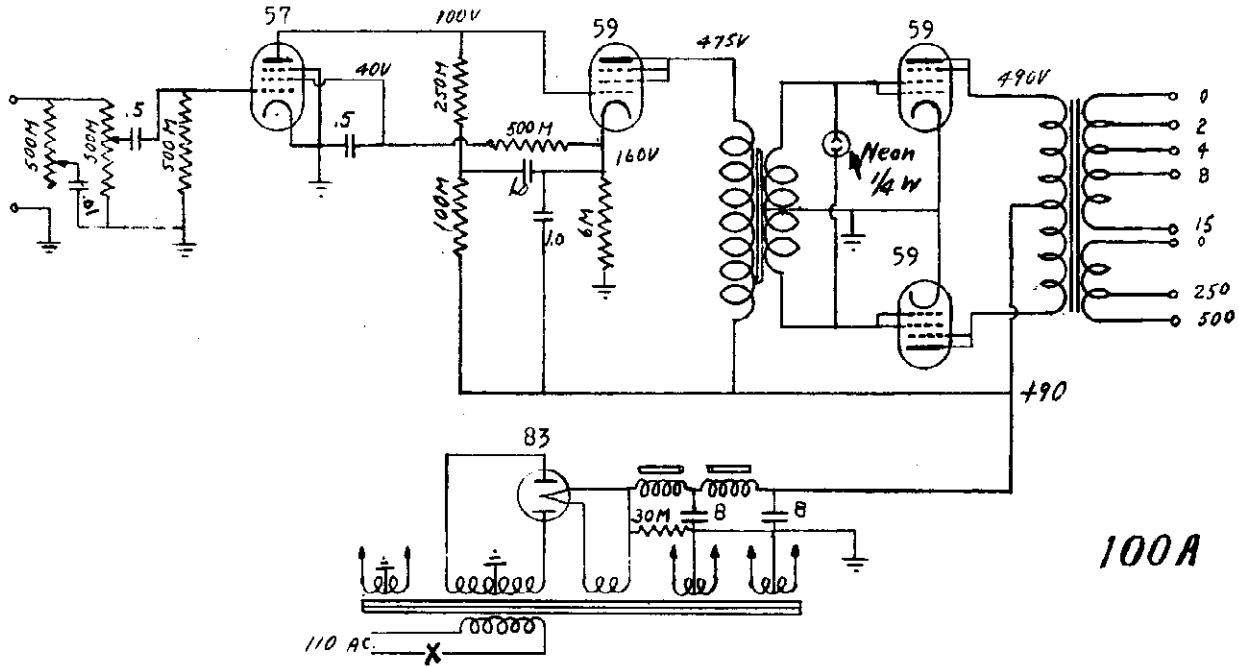
The switch connects the pickup in the grid circuit of the second detector tube and connects the 30,000 ohm cathode bias resistor (R4) so that a proper bias is obtained for record reproduction.

When a transformer is used, connect the pickup cord tips to the primary of the transformer and connect the secondary to the phono jacks on the chassis.

When it is desired to tune in broadcast signals it is only necessary to throw the switch to the left. The pickup cords must not be removed. If, for any reason, they are removed, the wire which originally connected the phone jacks must be replaced before the receiver is used for broadcast reception.

MODEL 100A
 MODEL 102A
 Schematics

LAFAYETTE RADIO MFG. CO.

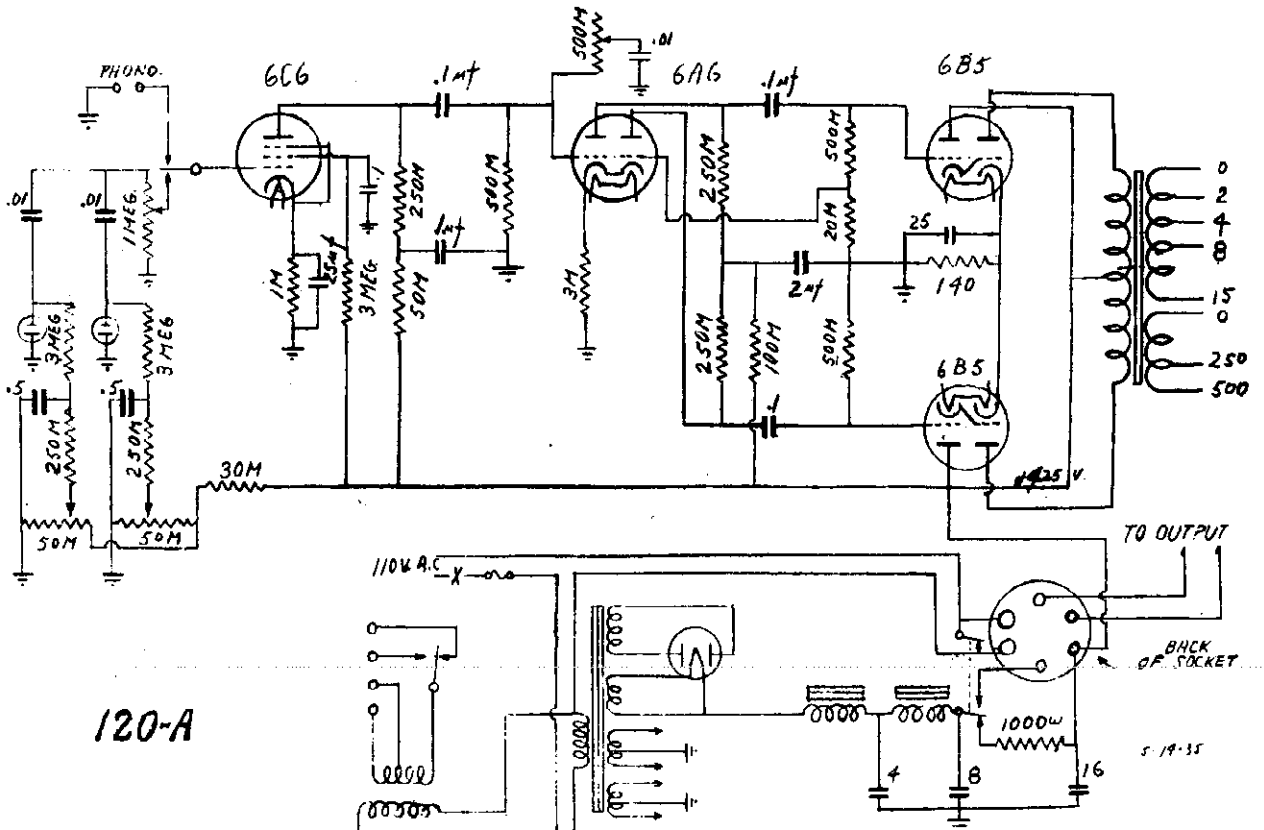
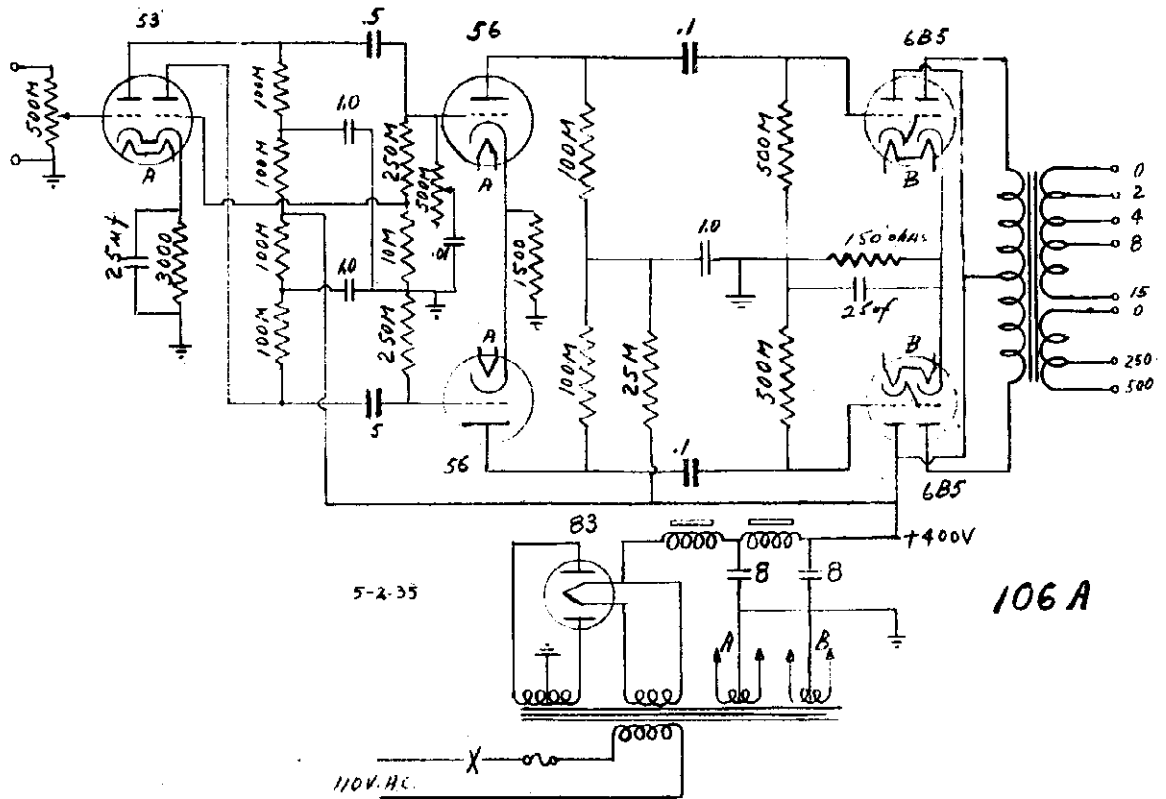


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MODEL 106-

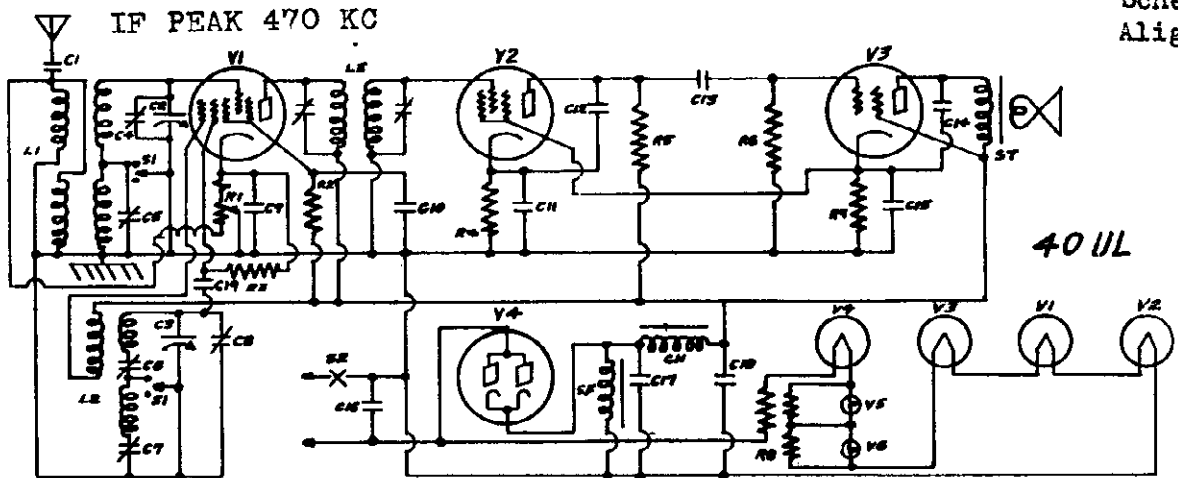
MODEL 120-

Schematics



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MODEL 40-UL
MODEL 50-US
Schematics
Alignment

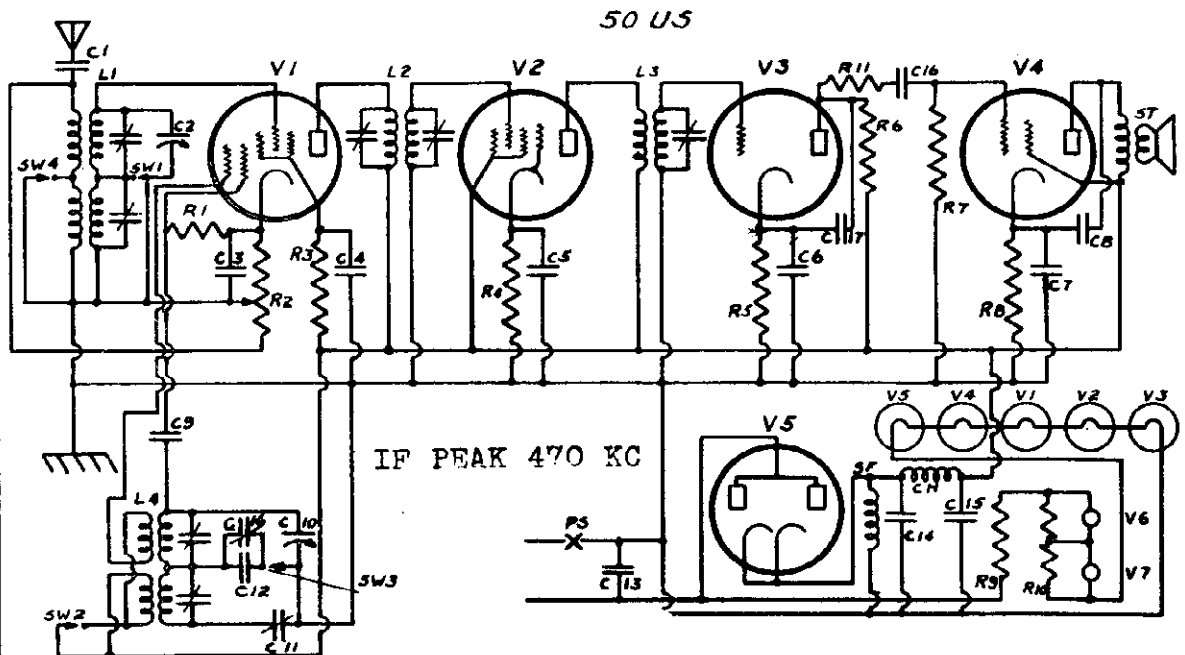


- V1—6A7 Tube
- V2—6C6 Tube
- V3—43 Tube
- V4—28Z5 Tube
- V5—6—6-8V Pilot Bulb
- C1—.002 Mf. Cond.
- C2-3—365 Mmf. Cond.
- C4-5-8—40 Mmf. Cond.
- C6—500 Mmf. Cond.
- C7—140 Mmf. Cond.

- C9-10-16—.05 Mf. Cond.
- C11-15—10 Mf. Cond.
- C12-19—.00025 Mf. Cond.
- C13-14—.01 Mf. Cond.
- C17—12 Mf. Cond.
- C18—8 Mf. Cond.
- R1—10,000w Vol. Cont. 120w Min.
- R2—15,000w Resistor
- R3-4—20,000 Resistor
- R5-6—500,000 Resistor

- R7—700w Resistor
- R8—150-25-25 Resistor
- L1—Antenna Coil
- L2—Oscillator Coil
- L3—DT IF Trans—470 KC
- S1—Band Switch
- S2—Power Switch
- ST—Speaker Trans.
- SF—Speaker Field—3000w
- CH—Choke Coil

TO ALIGN RECEIVER: Apply 470 KC to Grid of V1 and adjust L3—Turn Band Switch to Broadcast. Apply 1490 KC to Ant. and Adjust C4 and C8. Apply 600 KC and Adjust C6. Turn to Long Wave—Apply 150 KC and adjust C7—Apply 300 KC and adjust C5.



- V1—6A7
- V2—6D6
- V3—76
- V4—43
- V5—25Z5
- V6, 7—6-8 V. Pilot Lamps
- L1—Antenna Coil
- L2—D.T. I.F. Trans.—470 K.C.
- L3—S.T. I.F. Trans.—470 K.C.
- L4—Oscillator Coil
- C1—.002 Mfd.
- C2, 10—365 Mmf.

- C3, 4, 5, 13—.05 Mfd.
- C8, 16—.01 Mfd.
- C9—.0001 Mfd.
- C11, 16—300-600 Mmf.
- C12—.0018 Mfd.
- C6, 7—10 Mfd.
- C14—12 Mfd.
- C15—8 Mfd.
- C17—.0005 Mfd.
- R1, 5, 11—50,000 Ohms
- R2—10,000 Ohms Vol. Cont. 120 Ohms Min.

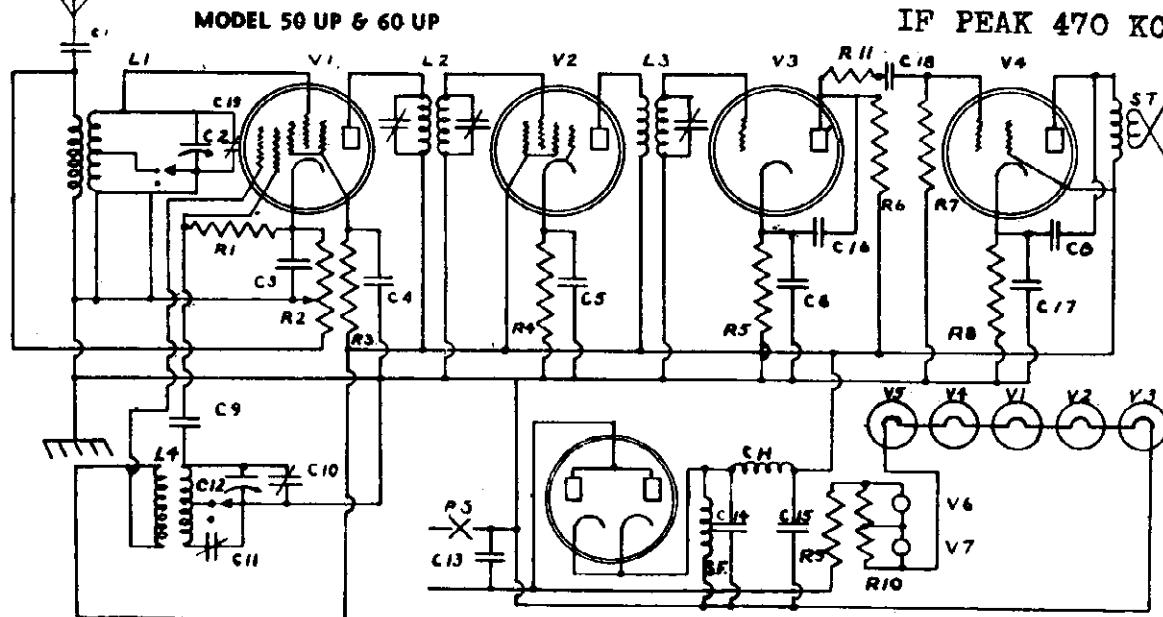
- R3—15,000 Ohms
- R4—400 Ohms
- R6, 7—500,000 Ohms
- R8—700 Ohms
- R9—130 Ohms (Line Cord)
- R10—25-25 Ohms
- CH—Filter Choke
- PS—Power Switch
- SF—Speaker Field-3000 Ohms
- ST—Speaker Transformer
- SW 1, 2, 3, 4—Band Switch

TO ALIGN RECEIVER:—Turn band switch to Short Wave. Short C10, Apply 470 kilocycles to grid of V1 and adjust L2 trimmers and L3 trimmer. Remove short from C10. Set dial to 15 megacycles calibration. Apply this frequency to antenna and adjust L4 short wave trimmer. Adjust L1 short wave trimmer. Turn band switch to Broadcast. Set dial to 150 calibration. Adjust L4 broadcast trimmer. Adjust L1 broadcast trimmer. Set dial to 60 calibration and adjust C11. Return dial to 150 calibration and re-adjust L4 broadcast trimmer.

MODELS 50-UP, 60-UP
MODEL 50-AS

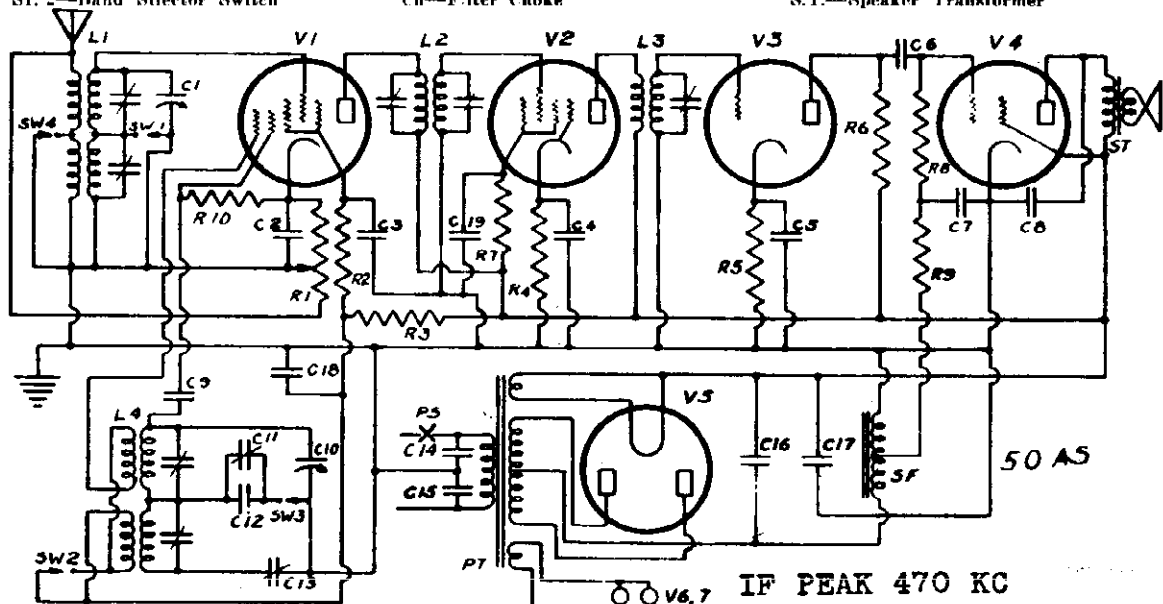
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Schematics, Alignment



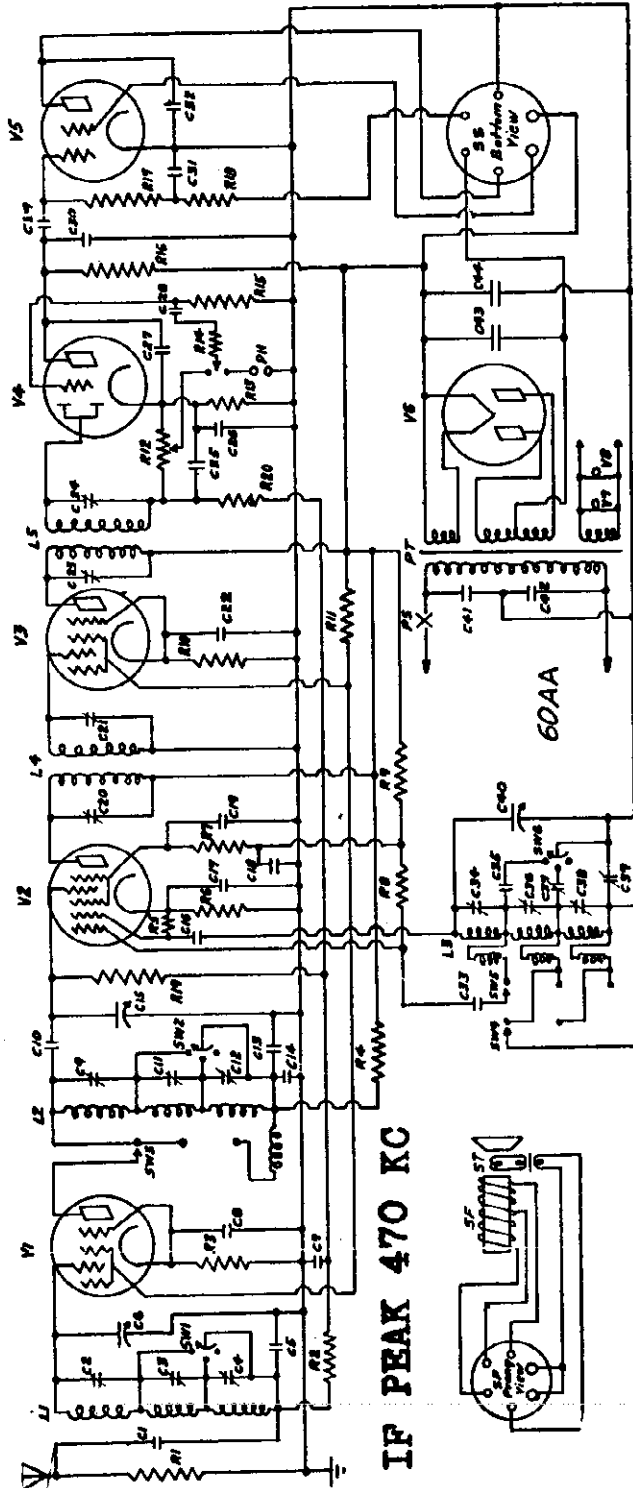
TO ALIGN RECEIVER:—Turn band switch to Short Wave. Short C12. Apply 470 kilocycles to grid of V1 and adjust L2 trimmers and L3 trimmer. Remove short from C12. Turn band switch to Broadcast. Set dial to 150 calibration. Adjust L4 broadcast trimmer. Adjust L1 broadcast trimmer. Set dial to 60 calibration and adjust C11. Return dial to 150 calibration and re adjust L4 broadcast trimmer.

- | | | |
|----------------------------|-----------------------|---------------------------------------|
| V1—6A7 | C1—.002 Mfd. | R1, 5, 11—50,000 Ohms |
| V2—6D6 | C2, 12—365 Mmfd. | R2—10,000 Ohms Vol. ont. |
| V3—76 | C3, 4, 5, 13—.05 Mfd. | R3—15,000 Ohms |
| V4—43 | C10, 19—20 Mmfd. | R4—400 Ohms |
| V5—25Z5 | C8, 18—.01 Mfd. | R6, 7—500,000 Ohms |
| V6, 7—6-8V. Pilot Lamp | C6, 17—10 Mfd. | R8—700 Ohms |
| L1—Ant. Coil | C14—12 Mfd. | R9—130 Ohms Line Cord or Ballast Tube |
| L2—D.T. I.F. Transformer | C15—8 Mfd. | R10—25-25 |
| L3—S.T. I.F. | C9, 16—.00025 Mfd. | P.S.—Power Switch |
| L4—Oscillator Coil | C11—600 Mmfd. | S.F.—Speaker Field |
| S1, 2—Band Selector Switch | Ch—Filter Choke | S.T.—Speaker Transformer |



- | | | | | |
|--------------------------|-------------------------|----------------|---------------------------|--------------------------|
| V1—6A7 | L4—Oscillator Coil | C13—600 Mmfd. | R1—10,000 Ohms Vol. Cont. | PT—Power Transformer |
| V2—6D6 | PS—Power Switch | C12—.0018 Mfd. | 120 Ohms Minimum | SF—Speaker Field |
| V3—76 | C1, 10—365 Mmfd. | C5—.10 Mfd. | R2—30,000 Ohms | ST—Speaker Transformer |
| V4—38 | C2, 3, 4, 19—.05 Mfd. | C16—8 Mfd. | R3—20,000 Ohms | SW1, 2, 3, 4—Band Switch |
| V5—80 | C6, 14, 15, 18—.01 Mfd. | C18—4 Mfd. | R4—300 Ohms | |
| V6, 7—6-8 V. Pilot Lamp | C7—.1 Mfd. | C17—12 Mfd. | R5, 9, 10—50,000 Ohms | |
| L1—Antenna Coil | C9—.0001 Mfd. | | R6, 8—500,000 Ohms | |
| L2—D.T. I.F. Transformer | | | 7—75,000 Ohms | |
| L3—S.T. I.F. Transformer | | | R9—50,000 Ohms | |

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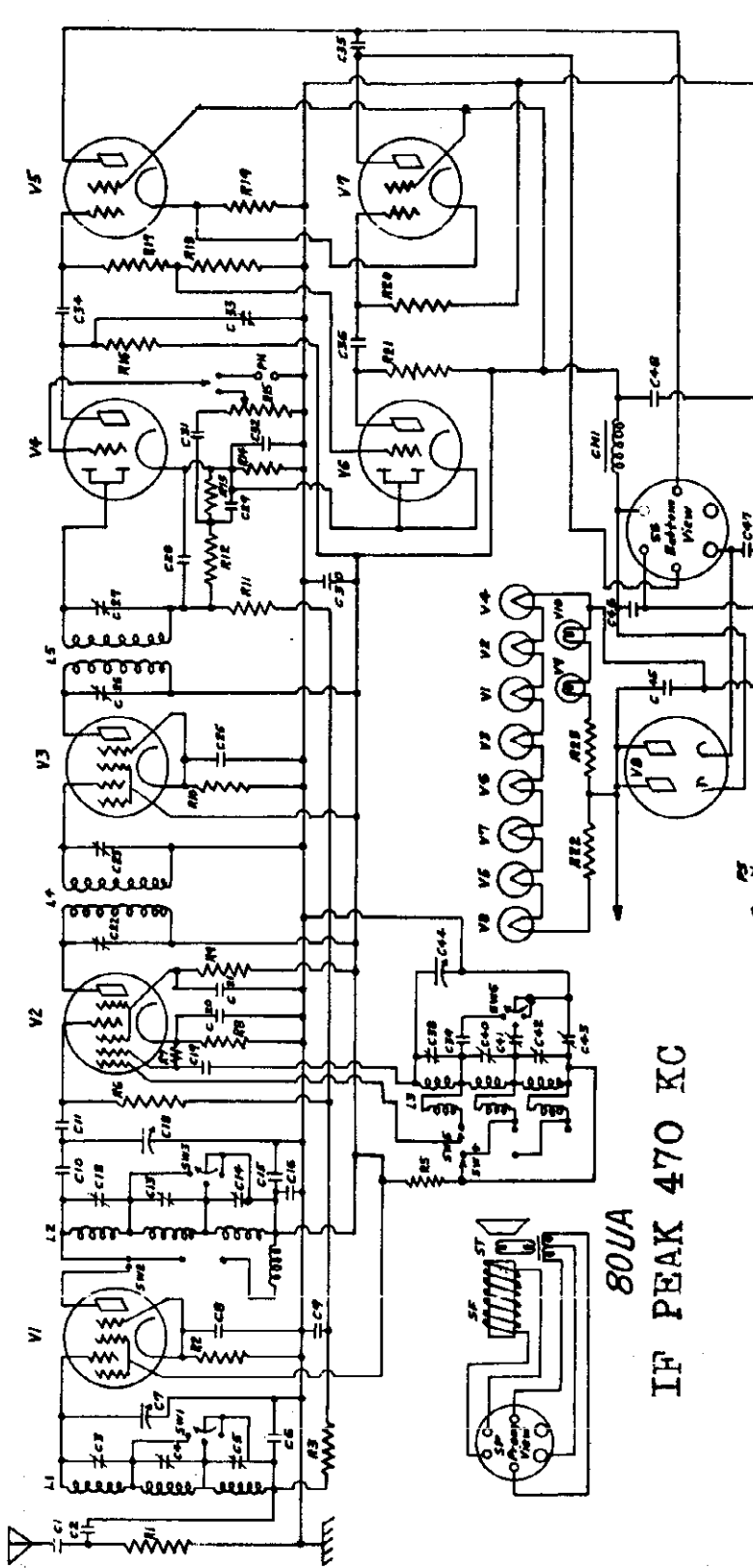


IF PEAK 470 KC

- | | |
|---------------------------------|------------------------------------|
| V1-3-6D6 Tube | R12-500,000 Ohm Vol. Cont. |
| V2-6A7 Tube | R13-3,000 Ohm |
| V4-75 Tube | R15-17-500,000 Ohm |
| V5-41 Tube | R16-18-250,000 Ohm |
| V6-80 Tube | R-19-20-1,000,000 Ohm |
| V7-8-6-8V Pilot Bulb | L1-Antenna Coil |
| C1-.0001 Mf. | L2-R. F. Coil |
| C2-3-4-9-11-12-34-36-38-40 Mmf. | L3-Oscillator Coil |
| C5-.001819 Mf. | L4-DT IF Trans. 470 KC-Step Up |
| C6-15-40-440 Mmf. | L5-DT IF Trans. 470 KC-Step Down |
| C7-8-17-19-22-.05 Mf. | SW1-2-3-4-5-6-Band Selector Switch |
| C10-.003636 Mf. | PS-Power Switch |
| C13-.1 Mf. | PT-Power Transformer |
| C14-18-4 Mf. | SS-Speaker Socket |
| C16-.00005 Mf. | SP-Speaker Plug |
| C20-24-220 Mmf. | ST-Speaker Transformer |
| C21-23-140 Mmf. | SF-Speaker Field-1800 Ohm-Tap 266 |
| C25-.0005 Mf. | PH-Phono Jack |
| C26-5 Mf. | |
| C27-.00025 Mf. | |
| C28-29-41-42-.01 Mf. | |
| C30-.006 Tone Control | |
| C31-.25 Mf. | |
| C32-.006 Mf. | |
| C33-.002 Mf. | |
| C35-.001282 Mf. | |
| C37-1000-2000 Mf. | |
| C39-300-600 Mf. | |
| C43-44-8 Mf. | |
| R1-8-20,000 Ohm | |
| R2-100,000 Ohm | |
| R3-400 Ohm | |
| R4-9-10,000 Ohm | |
| R5-14-50,000 Ohm | |
| R6-300 Ohm | |
| R7-25,000 Ohm | |
| R10-500 Ohm | |
| R11-40,000 Ohm | |

MODEL 80-UA
Schematic

LANG RADIO CORP. (New Co.)



500kVA
IF PEAK 470 KC

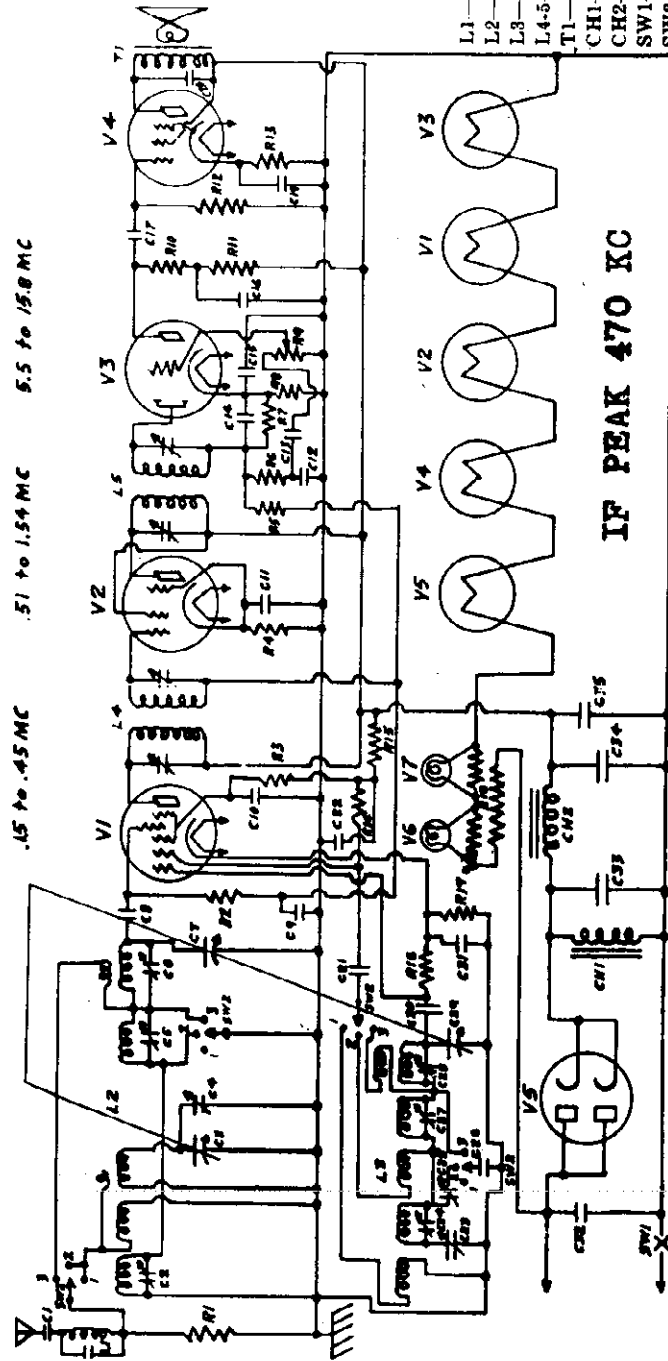
- C30—.25 Mf.
- C31-34-86—.01 Mf.
- C33—.006 Tone Control
- C35—.002 Mf.
- C39—.001282 Mf.
- C41-1000-2000 Mmf.
- C43-300-600 Mmf.
- C46-47-48—.16 Mf.
- C11-19—.00005 Mf.
- C15—.1 Mf.
- C16-32-4 Mf.
- C22-27-220 Mmf.
- C23-26-140 Mmf.
- C28-29—.00025 Mf.
- L1-Antenna Coil
- L2-R. F. Coil
- L3-Oscillator Coil
- L4-DT IF Trans. 470 KC-Step Up
- L5-DT IF Trans. 470 KC-Step Down
- SW1-2-3-4-5-6-Band Selector Switch
- PS-Power Switch
- SS-Speaker Socket
- SF-Speaker Field-3000 Ohm
- ST-Speaker Transformer
- SP-Speaker Plug
- CH1-Filter Choke
- PH-Phono Jack
- R1-20,000 Ohm
- R2-200 Ohm
- R3-16-21-100,000 Ohm
- R6-11-1,000,000 Ohm
- R8-10-400 Ohm
- R9-15,000 Ohm
- R12-7-50,000 Ohm
- R13-500,000 Ohm
- R14-2,500 Ohm
- R15-500,000 Ohm Volume Cont.
- R17-20-250,000 Ohm
- R18-5-10,000 Ohm
- R19-350 Ohm
- R22-50 Ohm
- R23-700 Ohm
- V1-3-6D6 Tube
- V2-6A7 Tube
- V4-6-75 Tube
- V5-7-43 Tube
- V8-25Z5 Tube
- V9-10-6-8V Pilot Bulb
- C1-.002 Mf.
- C2-.0001 Mf.
- C3-4-5-12-13-14-38-40-42-40 Mmf.
- C6-.001819 Mf.
- C7-18-44-440 Mmf.
- C8-9-20-21-25-45-.05 Mf.
- C10-.003636 Mf.

LANG RADIO CORP. (New Co.)

MODELS 503-UT, 523-UT
Schematic, Alignment

MODELS
523-UT
503-UT

- L1—Wavetrap 470 KC
- L2—Antenna Coil
- L3—Oscillator. Coil
- L4-5—D.T.—IF Trans. 470 KC
- T1—Speaker Trans.
- CH1—Speaker Field 3,000 Ohm
- CH2—Filter Choke
- SW1—Power Switch
- SW2—Band Selector Switch



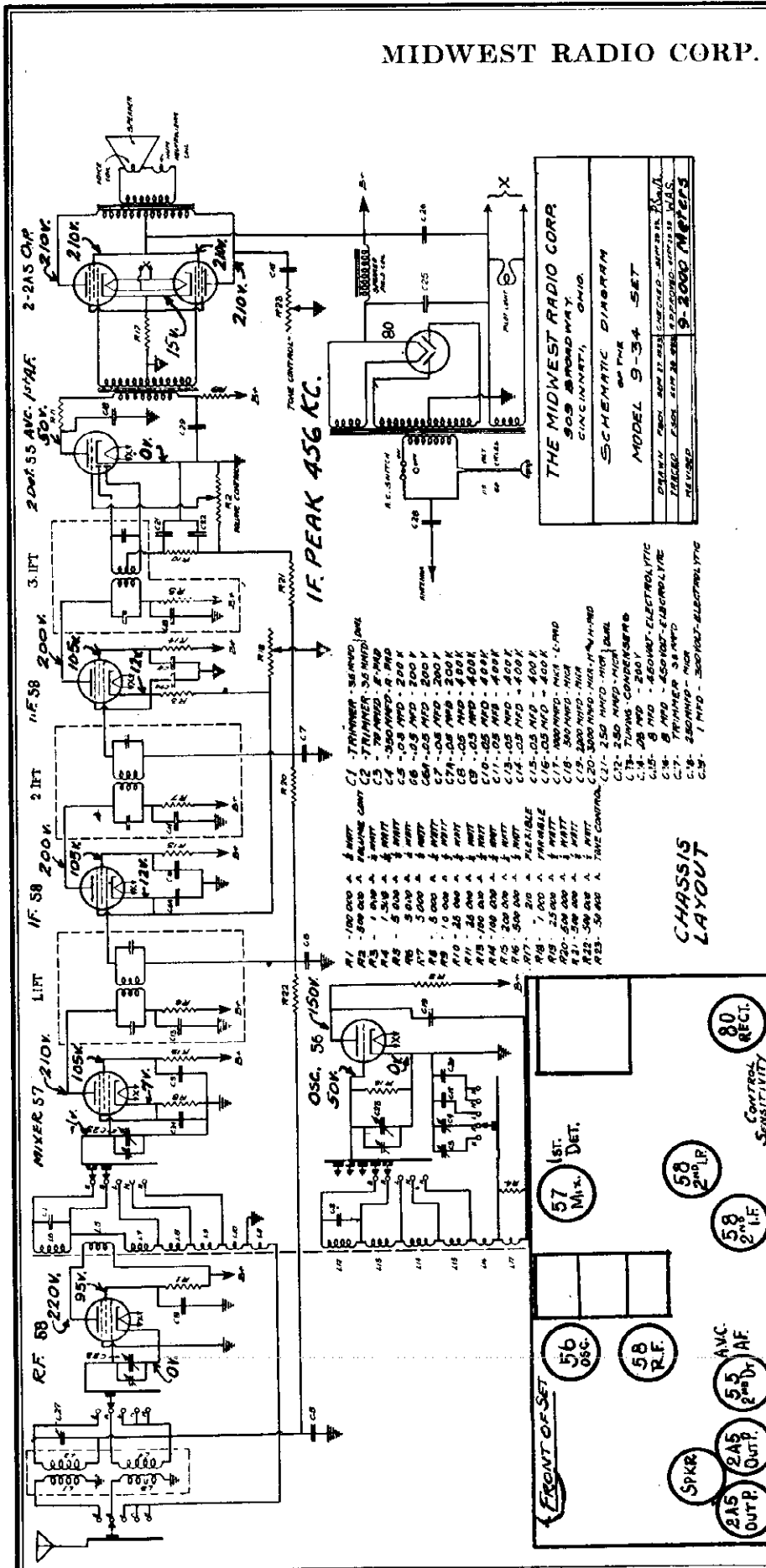
.15 to .45 MC .51 to 1.54 MC 5.5 to 15.0 MC

- C1-21—.002 Mf. Cond.
- C2-4-6-6-24-27-28—40 Mmf. Cond.
- C3-7-29—365 Mmf. Cond.
- C8—0001 Mf. Cond.
- C9-10-11-16-31-32—.05 Mf. Cond.
- C12-14—.00025 Mf. Cond.
- C15-19—10 Mf. Cond.
- C18-17-20—.01 Mf. Cond.
- C22-34—8 Mf. Cond.
- C23—140 Mmf. Cond.
- C25—500 Mmf. Cond.
- C26—.016 Mf. Cond.
- C30—.00005 Mf. Cond.
- C33—16 Mf. Cond.
- R1-8—5,000 Ohm Resistor
- C35—.05 Mf. Cond.
- R2-5—1,000,000 Ohm Resistor
- R3—15,000 Ohm Resistor
- R13—700 Ohm Resistor
- R6—50,000 Ohm Resistor
- R7—750,000 Ohm Resistor
- R10-11—100,000 Ohm Resistor
- R12—500,000 Ohm Resistor
- R14-16—20,000 Ohm Resistor
- R15—3,000 Ohm Resistor
- R4-17—400 Ohm Resistor
- R18—130-29-29 Ohm Resistor
- R9—1,000,000 Ohm Volume Control
- V1—6A7 Tube
- V2—6D6 Tube
- V3—75 Tube
- V4—48 Tube
- V5—25Z5 Tube
- V6-7—6-8V. Pilot Bulb

TO ALIGN THE RECEIVER:—Turn band switch to short wave—short C29—apply 470 KC to grid of V2 and adjust L5—apply 470 KC to grid of V1 and adjust L4—remove short from C29—apply 12MC to antenna and adjust C28 and C6 . . . Turn band switch to long wave—apply 150 KC to antenna and adjust C23—apply 300 KC and adjust C24 and C2—keep re-adjusting at these frequencies until done . . . Turn band switch to broadcast—apply 1400 KC to antenna and adjust C27, C4 and C5—apply 600 KC and adjust C25—readjust at 1400 KC if necessary.

MIDWEST RADIO CORP.

MODEL 9-34
Schematic, Voltage
Socket, Alignment



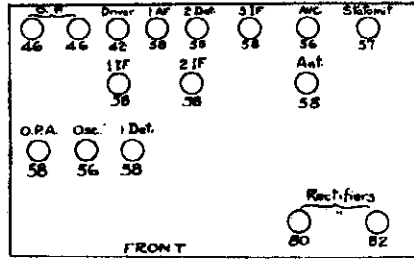
ALIGNMENT: Apply a modulated signal, 456 kc. to the control grid of the 57 Mixer Tube. Trim the i-f. transformers to greatest AVC voltage developed. Keep applied signal low.

ALIGNING BANDS: Turn wave-band switch to the (E) position and adjust the (E) padder at 160 kc. Adjust the (E) trimmers, osc., mixer, and the r-f. at 370 kc Turn wave-band switch to (A) position and adjust the (A) padder at 550 kc. Adjust the (E) trimmers which will be found on top of the variable condenser to 1500 kc.

The adjusting of the L, M and H bands is accomplished at the factory by adjusting the spacing of the turns of the coils. We do not advise that you try this, as it is critical work.

MODEL 16-33
Voltage, Socket
Trimmers, Alignment

MIDWEST RADIO CORP.



consistent with proper operation. Measure the AVC voltage developed for peaking purposes. If signal input is too great, it will result in double peaking of stations.

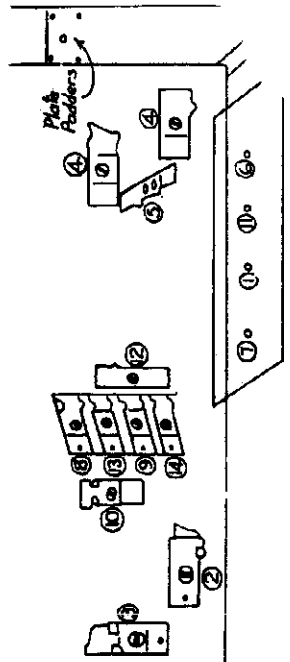
When the i-f. trimmers have been adjusted, the next step is the trimming of the "A" band (white). **NOTICE.** Do not attempt to adjust the plate paddler. It was adjusted at the factory and should not be changed. Proceed as follows: Rotate the tuning dial to 5 and adjust the "A" band r-f. trimmers to highest output. The frequency will be about 1490 kc. Adjust the "A" band paddler at 550 kc., with the dial set to 98.

Then set the tuning dial to "L" band (red). Dial should be at division 2. Adjust the "L" band r-f. trimmers. The frequency will be about 4.1 megacycles or 4100 kilocycles. Set dial to 98 and adjust paddler for that band. The frequency for adjustment is 1712 kc. Adjust feed condenser until maximum sensitivity is reached all over the band. The condenser, in almost all cases, will be tight.

Then adjust "M" band (green). Proceed as for other bands. Adjust "M" band r-f. trimmers at 9.0 megacycles, 8000 kilocycles at 2 on the dial. Adjust the "M" band paddler at 4.5 megacycles, which is 4500 kilocycles. Adjust the feed condenser same as for "L" band. Adjust "H" band (blue or amber). Adjust the "H" band r-f. trimmers at 5 on the dial. The frequency will be about 20. megacycles. Adjust the "H" band paddler at 9.0 megacycles at 98 on the dial.

The alignment instructions follow:

Before attempting to align the i-f. amplifier, we suggest that you inspect the i-f. transformers for correct spacing, as these transformers often collapse and cause broad tuning. The correct spacing of the windings is 3/4 inch between the faces of the coils. Wax the coils tightly in place and then start the procedure of alignment, by adjusting your signal generator to 450 kc., which is the i-f. peak in this receiver. Keep the test signal input at the lowest possible level

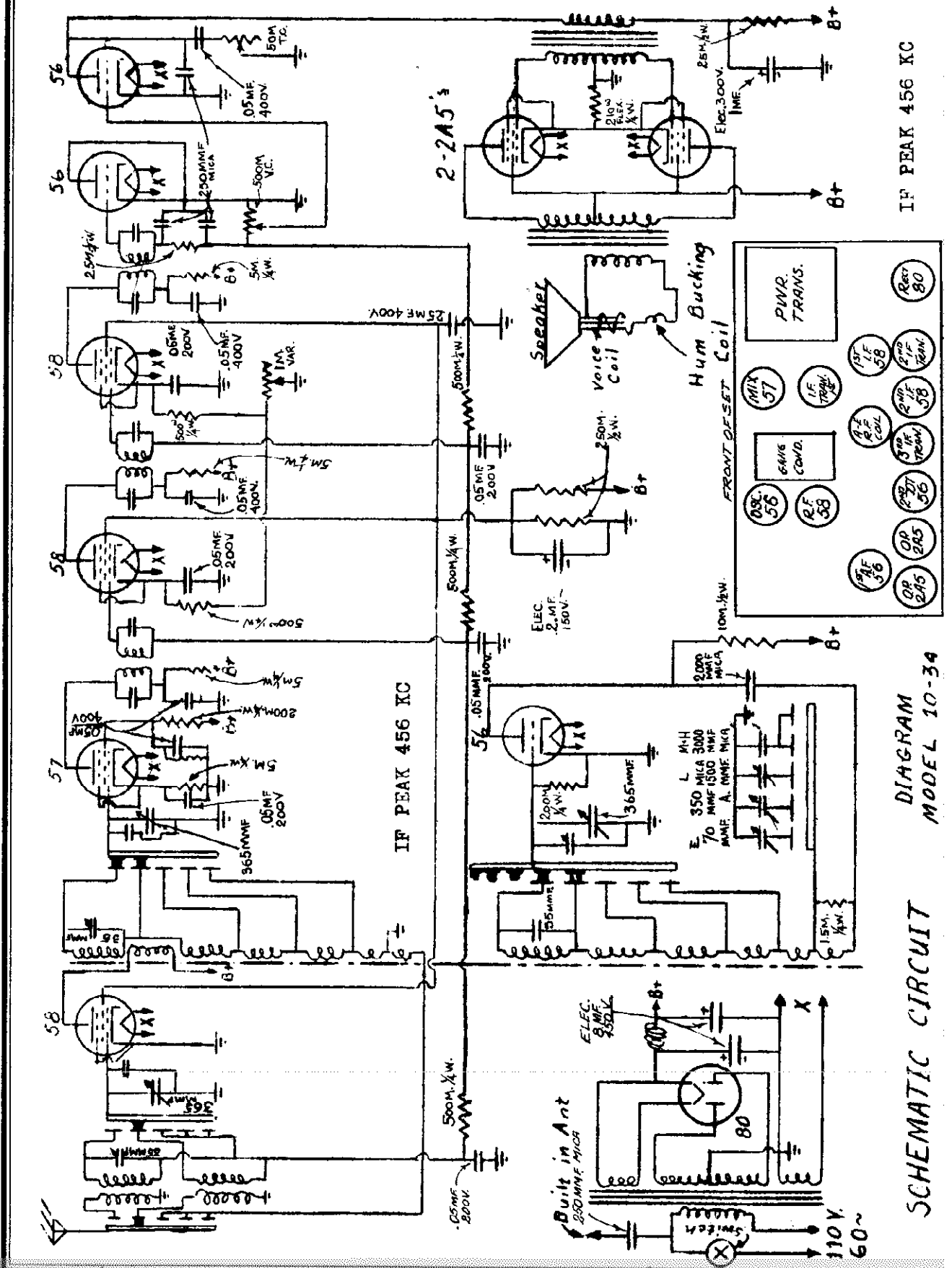


On the right will be found the locations of the padding and trimming condensers of the Midwest 16-tube receiver, 1933

1. "A" band paddler
2. "A" band r-f. trimmer
3. "A" band r-f. trimmer
4. "L" band r-f. trimmer
5. "L" band feeder condenser
6. "L" band paddler
7. "M" band paddler
8. "M" band r-f. trimmer
9. "M" band r-f. trimmer
10. "M" band feed condenser
11. "H" band paddler
12. "H" band feed condenser
13. "H" band r-f. trimmer
14. "H" band r-f. trimmer

Type	Function	Plate	Screen	Cathode	C. Grid	File
58	Ant.	220	88	0	.25	2.5
58	Mixer	220	128	2	4.25	2.5
56	Osc.	189	0	0	0	2.5
58	O.P.A.	128	92	0	3.5	2.5
58	1st IF.	216	80	7	2.0	2.5
58	2nd IF.	216	80	7	.25	2.5
58	3rd IF.	216	76	8	0	2.5
55	2nd det.	0	0	0	AVC	2.5
56	A.V.C.	0	0	0	0	2.5
57	Statomit	33	76	8	0	2.5
58	1st AF.	98	97	94	36	2.5
42	Driver	184	216	14	0	6.2
46	Output	478	0	0	0	2.5
46	Output	478	0	0	0	2.5
80	Rect.	350 r.m.s. each plate	0	0	0	5.0
82	Rect.	345 r.m.s. each plate	0	0	0	2.6

All readings are taken with no signal input and Statomit full on (clockwise). All voltages are plus or minus 15 percent, depending on line voltage.



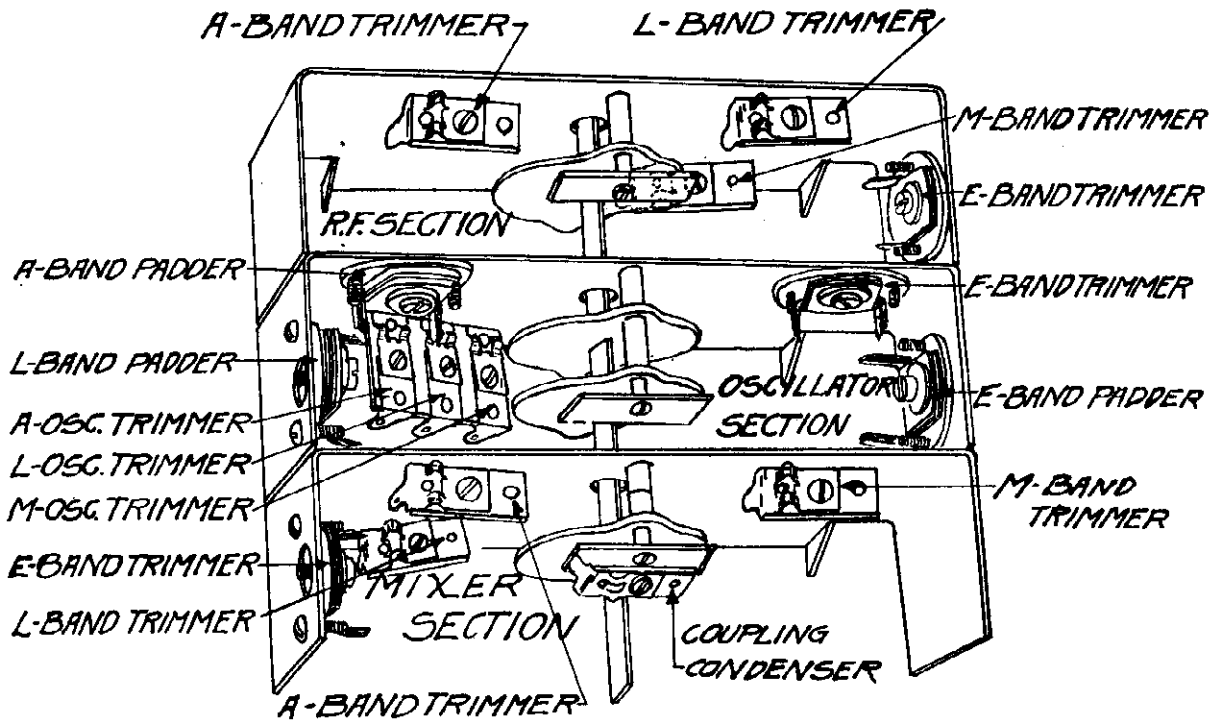
IF PEAK 456 KC

DIAGRAM MODEL 10-34

SCHEMATIC CIRCUIT

MODEL 10-34
 Trimmers, Alignment
 Voltage

MIDWEST RADIO CORP.



THE MIDWEST RADIO CORP.			CINCINNATI, OHIO.
DATE	NO. REQD.	MODEL NO.	LOCATION OF TRIMMERS AND PADDERS OF 10-34 MODEL.
DRAWN F.SCH. OCT. 16, 33		MODEL NO. 10-34	
TRACED F.SCH. OCT. 16, 33		SCALE NONE	
CHECKED		REVISIONS	
APPROVED			

INSTRUCTIONS FOR REBALANCING THE 9 & 10 TUBE ALL-WAVE
 1934 MODEL

To rebalance the Midwest 9 and 10 tube all-wave model receivers proceed as follows:

Apply a signal (modulated) of 456 K. C. to the control grid of the 57 1st. Det. or Mixer tube. Trim the I. F. Transformers to greatest A. V. C. voltage developed. Remember always to keep the signal applied to the 1st. Det. as low as possible.

To align the bands proceed as follows: Turn wave band switch to the (R) position and adjust the (S) padder at 160 K. C. adjust the (R) trimmers, osc., mixer and the R. F., at 370 K.C.

Turn wave band switch to (A) position and adjust the (A) padder at 530 K. C. adjust the (A) trimmers which will be found on top of the variable condenser to 1500 K. C.

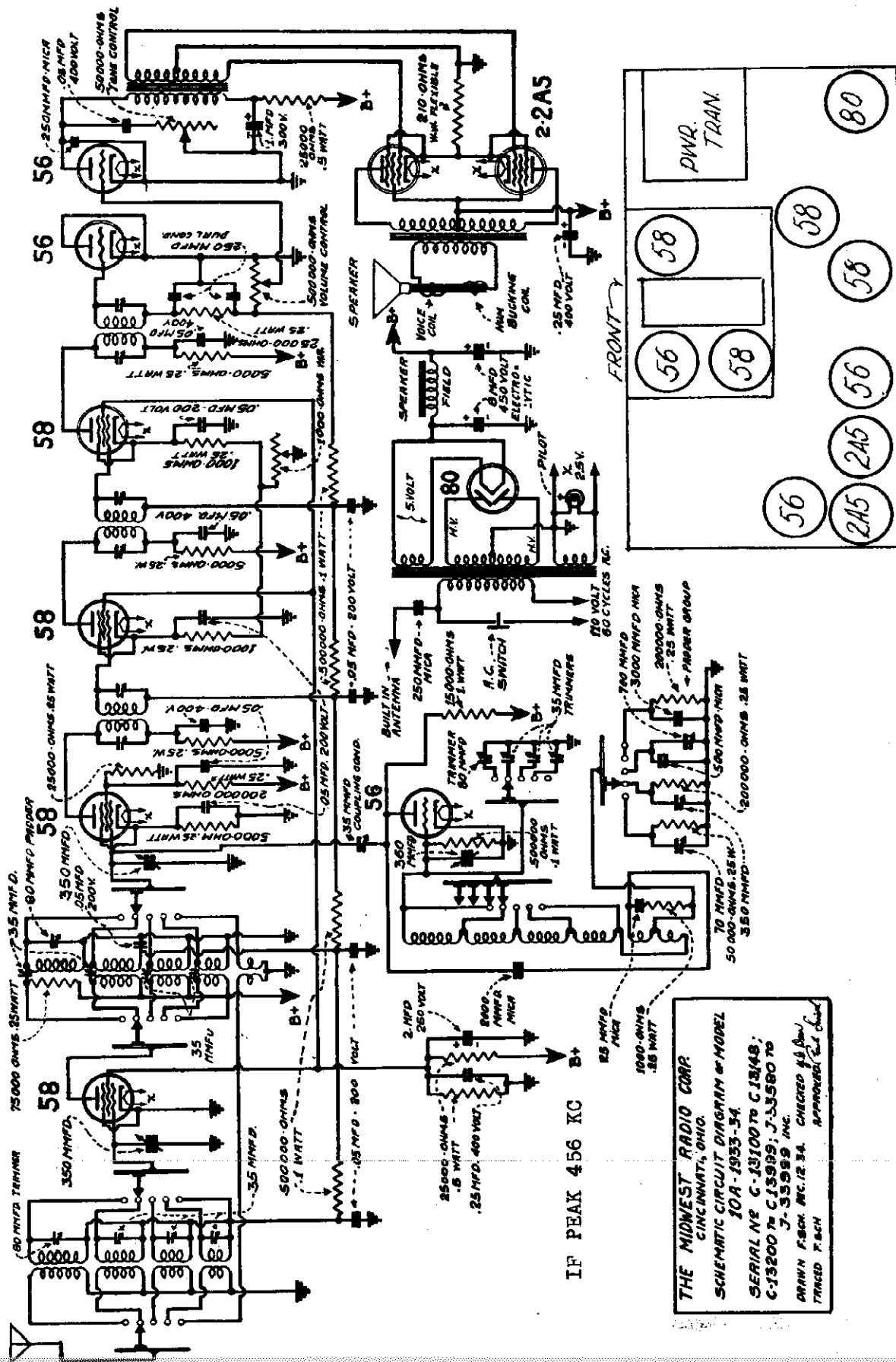
The adjusting of the L.M. and H bands is accomplished at the factory by adjusting the spacing of the turns of the coils. We do not advise that you try this as it is very critical work and can be done only by very carefully trained experts.

ALL TESTS MADE WITH NO SIGNAL INPUT AND WITH STATOMETER TURNED FULL ON (-CLOCKWISE)

TYPE	POSITION	PLATE VOLTS	SCREEN VOLTS	SUPP. VOLTS	KATHODE VOLTS	GRID VOLTS	FIL. VOLTS
56	R.F.	225	115	0	0	1 AVC	2.5
57	Mixer	225	25	2.5	2.5	0	2.5
56	Osc.	175	---	---	0	-45 on A Band	2.5
58	1st. I.F.	225	110	.20	.20	AVC	2.5
58	2nd. I.F.	225	110	.20	.20	AVC	2.5
56	2nd. Det.	0	---	---	0	AVC	2.5
56	1st. A.P.	210	---	---	0	---	2.5
2A5	Output	235	240	---	- 15	---	2.5
2A5	Output	235	240	---	- 15	---	2.5
80	Rect.	240	---	---	---	---	5.0

1000 Ohm per Volt Meter used for tube D.C. Measured from ground. Voltages ± 15% Depending on line voltage.

MIDWEST RADIO CORP.



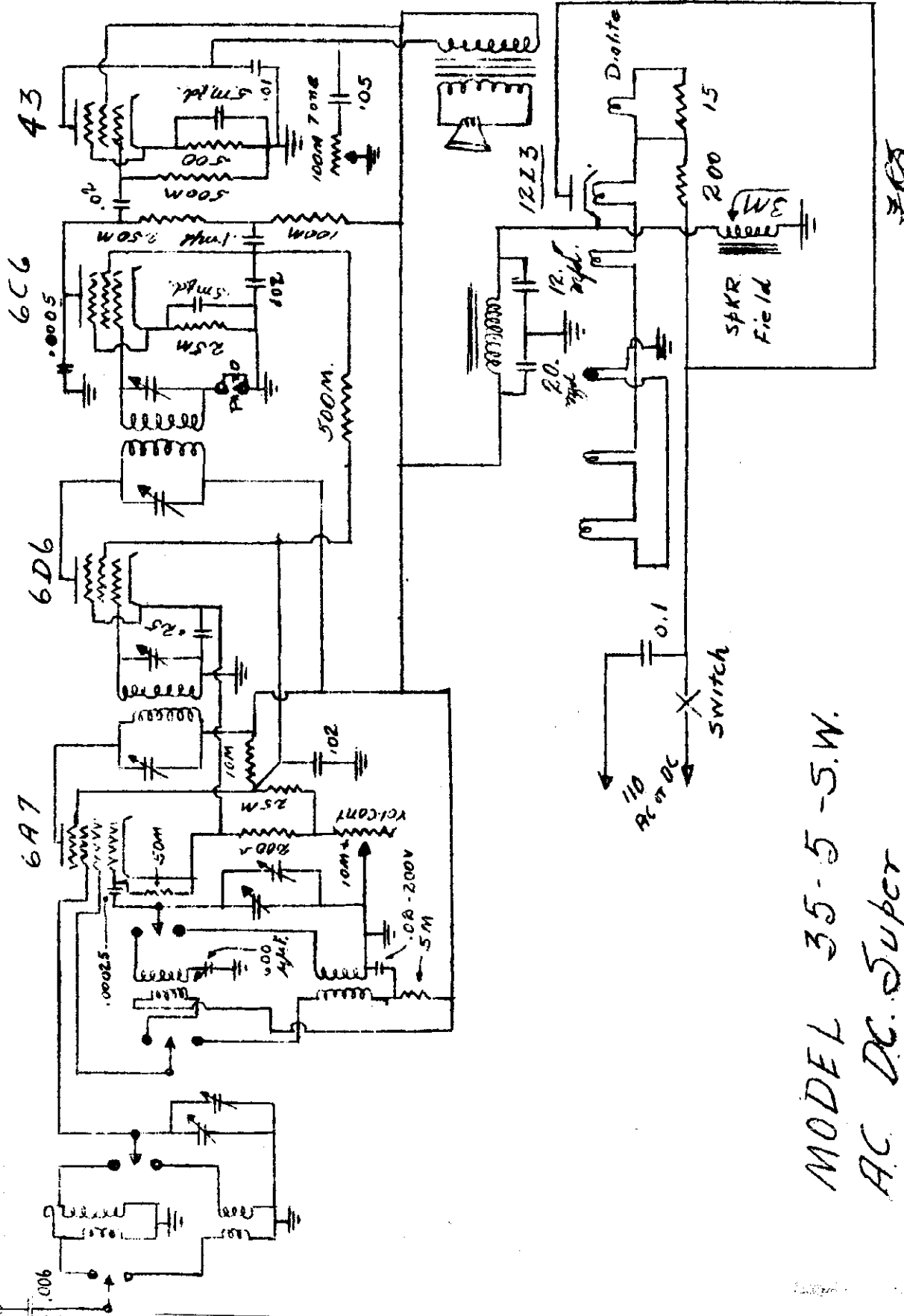
IF PEAK 456 KC B+

THE MIDWEST RADIO CORP
 CINCINNATI, OHIO.
 SCHEMATIC CIRCUIT DIAGRAM OF MODEL
 10A-1933-34
 SERIAL NO C-13100 TO C13148;
 C-13200 TO C13299; J-33580 TO
 J-33999 INC.
 DRAWN F.B.H. REC. 12-34. CHECKED J.S.H.
 TRACED P.B.H. APPROVED T.L.H.

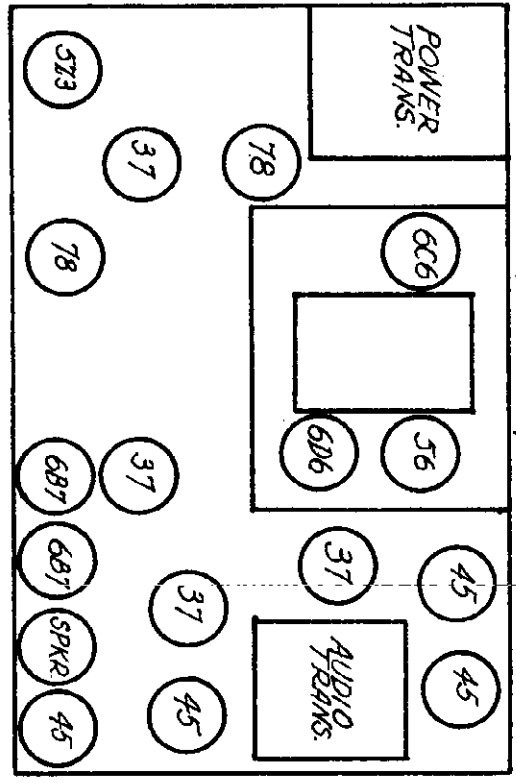
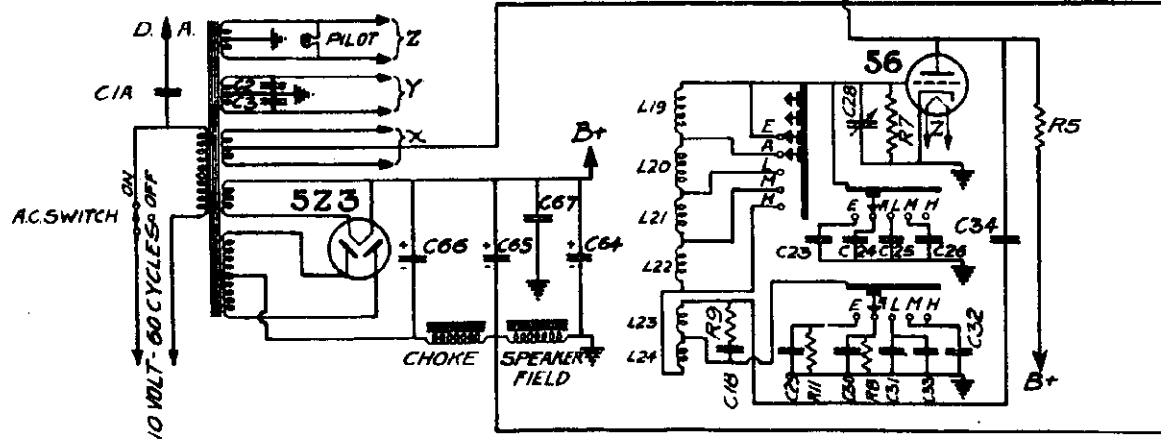
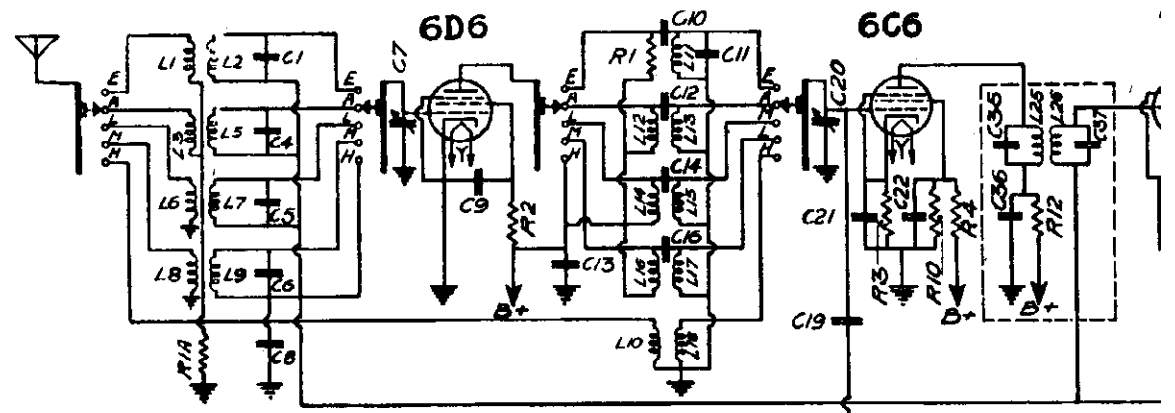
CHASSIS LAYOUT.

MODEL 35-5-SW
Schematic

MIDWEST RADIO CORP.

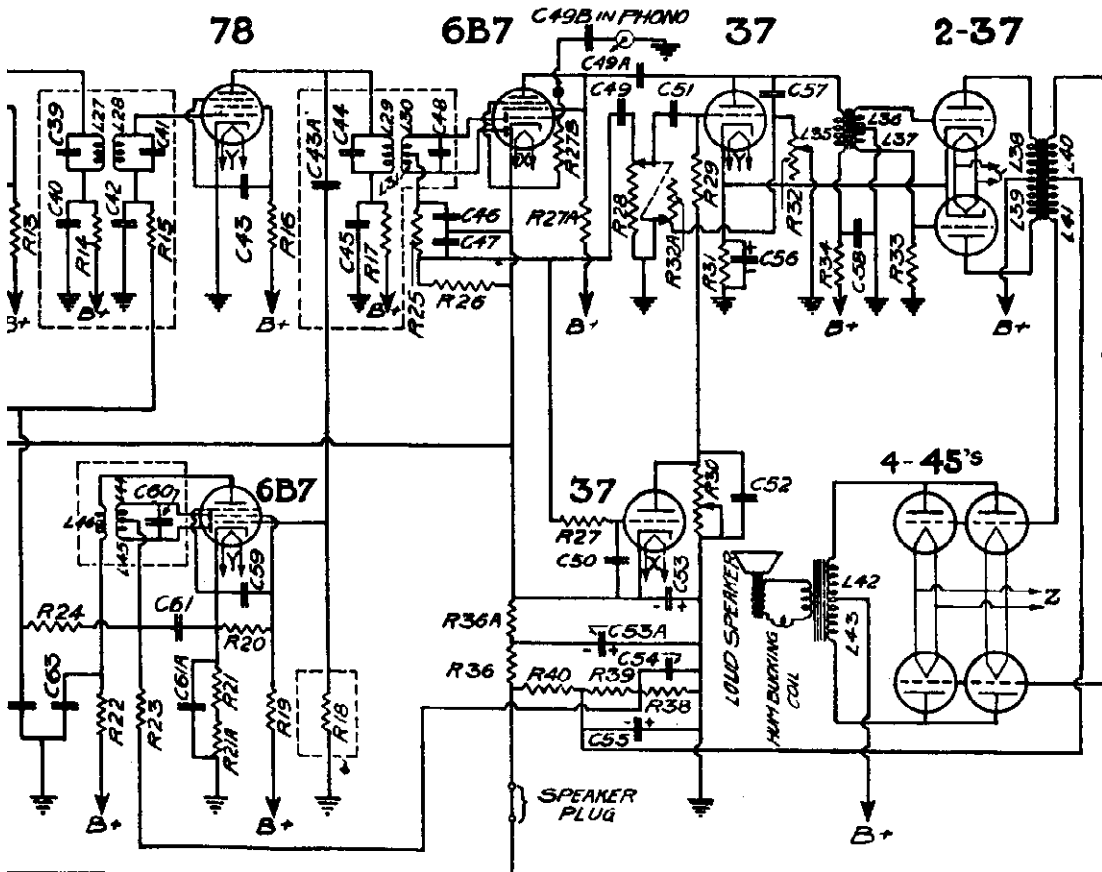


MODEL 35-5-S.W.
A.C. D.C. Super



C45	.05	MFD	400 VOLT	R27B	100 000	.25	"
C46	.250	MFD	MCA	R28	500 000	.25	WATT
C47	.250	"	"	R29	500 000	.25	WATT
C48	.1	TRIMMER	"	R30	50 000	POT. STAT-O-MT CONTROL	"
C49	.05	MFD	200 WATT	R31	50 000	1" FILE SLIDE	"
C50	.05	"	"	R32	50 000	VARIABLE TONE CONTROL	"
C51	.05	"	"	R33A	50 000	ARMATURE TONE	"
C52	.01	"	"	R33	10 000	.25	WATT COMPENSATION
C53	.25	"	"	R34	15 000	1	"
C54	.05	"	"	R35	25 000	.25	"
C55	.25	"	"	R36A	25 000	.25	"
C56	.12	"	"	R36B	25 000	.25	"
C57	.05	"	"	R37	100 000	.25	"
C58	.1	"	"	R38	50 000	.25	"
C59	.05	"	"	R39	100 000	.25	"
C60	.001	MFD	600 VOLT	R40	50 000	.25	"
C61A	.05	"	"				
C62	.001	"	"				
C63	.05	"	"				
C64	.05	"	"				
C65	.05	"	"				
C66	.05	"	"				
C67	.25	"	400 VOLT				

IO CORP.



- | | | | | |
|-----|--------|-----|---|------------------|
| C18 | .250 | MFD | - | MICR |
| C1 | 80 | MFD | - | TRIMMER |
| C2 | .05 | MFD | - | 200 VOLT |
| C3 | .05 | MFD | - | 200 |
| C4 | 20 | MFD | - | TRIMMER |
| C5 | 20 | " | " | " |
| C6 | 20 | " | " | " |
| C7 | .365 | " | - | TUNING CONDENSER |
| C8 | .05 | MFD | - | 200 VOLT |
| C9 | .05 | MFD | - | 400 |
| C10 | 25 | MFD | - | MICR |
| C11 | 80 | " | - | TRIMMER |
| C12 | 20 | " | - | " |
| C13 | .05 | MFD | - | 400 VOLT |
| C14 | 20 | MFD | - | TRIMMER |
| C15 | 20 | " | - | " |
| C16 | 25 | " | - | " |
| C17 | 20 | " | - | " |
| C18 | 25 | " | - | " |
| C19 | 20 | " | - | " |
| C20 | .365 | " | - | TUNING CONDENSER |
| C21 | .05 | MFD | - | 200 VOLT |
| C22 | .05 | " | - | 200 |
| C23 | 80 | MFD | - | TRIMMER |
| C24 | 20 | " | - | " |
| C25 | 20 | " | - | " |
| C26 | 20 | " | - | " |
| C28 | .365 | " | - | TUNING CONDENSER |
| C29 | .60 | " | - | PRIMER |
| C30 | .560 | " | - | " |
| C31 | 700 | " | - | " |
| C38 | 5000 | " | - | NICA |
| C35 | 500 | " | - | " |
| C34 | 2000 | " | - | " |
| C35 | I.F.T. | " | - | TRIMMER |
| C36 | .05 | MFD | - | 400 VOLT |
| C37 | I.F.T. | " | - | TRIMMER |
| C38 | .05 | MFD | - | 400 VOLT |
| C39 | I.F.T. | " | - | TRIMMER |
| C40 | .05 | MFD | - | 400 VOLT |
| C41 | I.F.T. | " | - | TRIMMER |
| C42 | .05 | MFD | - | 200 VOLT |

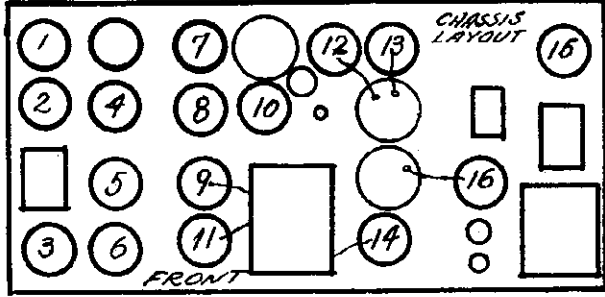
- | | | | | |
|------|---------|---|----|------|
| R18 | 5 000 | " | 25 | WATT |
| R1 | 75 000 | " | 25 | " |
| R2 | 200 000 | " | 25 | " |
| R3 | 5 000 | " | 25 | " |
| R4 | 50 000 | " | 25 | " |
| R5 | 15 000 | " | 1 | " |
| R7 | 500 000 | " | 25 | " |
| R8 | 200 000 | " | 25 | " |
| R9 | 10 000 | " | 25 | " |
| R10 | 10 000 | " | 25 | " |
| R11 | 50 000 | " | 25 | " |
| R12 | 5 000 | " | 25 | " |
| R12A | 100 000 | " | 25 | " |
| R13 | 200 000 | " | 25 | " |
| R14 | 5 000 | " | 25 | " |
| R15 | 5 000 | " | 25 | " |
| R16 | 3 MEG | " | 25 | " |
| R17 | 5 000 | " | 25 | " |
| R18 | 3 MEG | " | 25 | " |
| R19 | 25 000 | " | 25 | " |
| R20 | 50 000 | " | 25 | " |
| R21 | 4 000 | " | 25 | " |
| R21A | 4 000 | " | 25 | " |
| R22 | 5 000 | " | 25 | " |
| R23 | 500 000 | " | 25 | " |
| R24 | 100 000 | " | 25 | " |
| R25 | 100 000 | " | 25 | " |

THE MIDWEST RADIO CORP.
909 BROADWAY. CINCINNATI, OHIO.

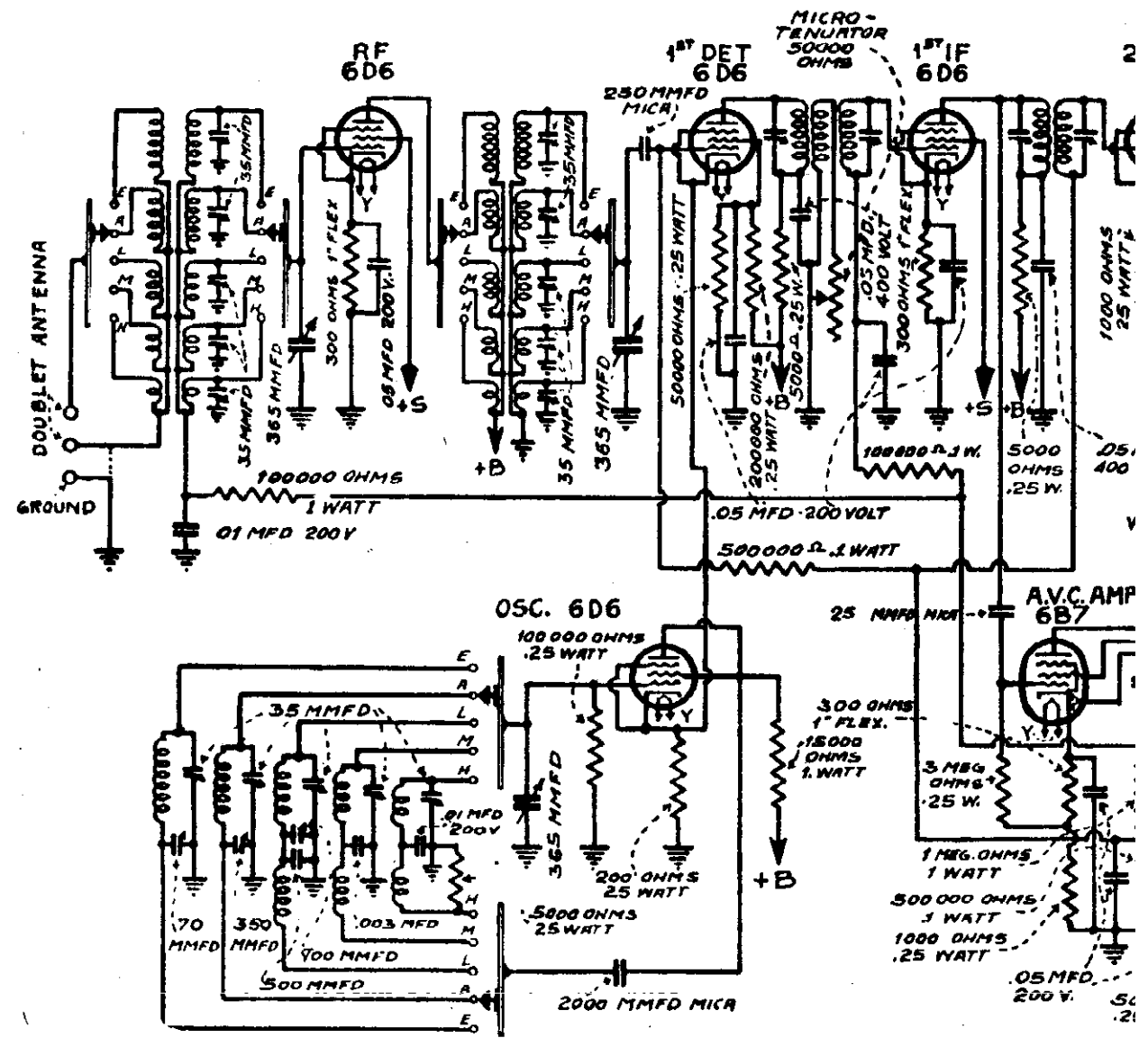
SCHEMATIC CIRCUIT DIAGRAM
OF THE
MODEL 16-34 SET

DRAWN F.SCH. SEPT. 14, 1933.
TRACED F.SCH. OCT. 10, 1933.
CHECKED P.B. OCT. 10, 1933.
APPROVED W.A.S. OCT. 10, 1933.

- NO. TUBE
 1-45 OUTPUT
 2-45 OUTPUT
 3-45 OUTPUT
 4-2A5 DRIVER
 5-75, 1ST. A.F.
 6-45 OUTPUT
 7-75 2ND DET.
 8-6D6 O.A.V.C.
 9-5D8 R.F.A.M.P.
 10-76
 11-606 OSC.
 12-6B7 A.V.C. AMP.
 13-6D6 2ND I.F. AMP.
 14-6D8 MIXER
 15-5Z8 RECT.
 16-6D6 1ST I.F. AMP.



SCHEMATIC CIRCUIT DIA

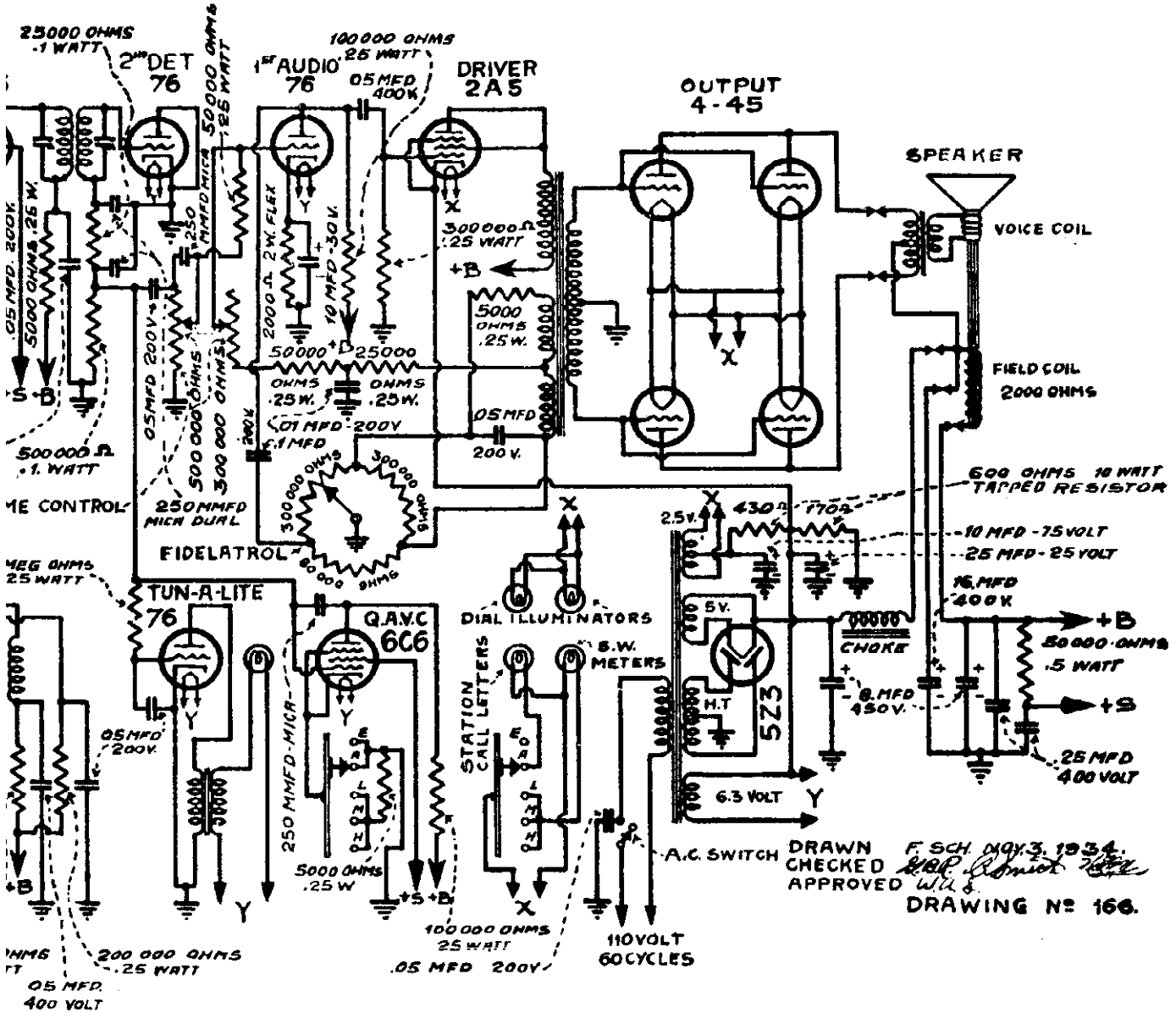


RADIO CORP.

IF PEAK 456 KC

MODEL 16-35
Schematic, Socket

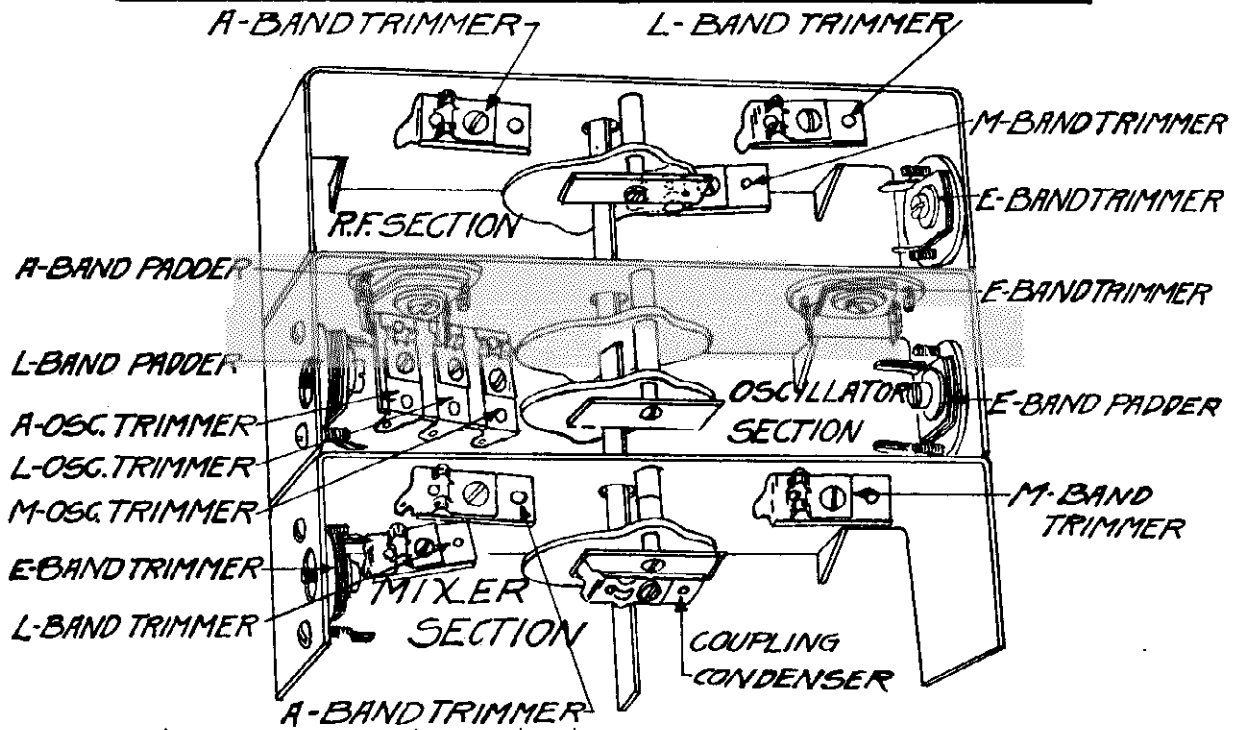
WIRING DIAGRAM FOR 16-35 MODEL.



MIDWEST RADIO CORP.

MODEL 16-34
Trimmers, Voltage

THE MIDWEST RADIO CORP.		CINCINNATI, OHIO.	
DATE	NO. REGRD.	LOCATION OF TRIMMERS AND PADDERs OF 16-34 MODEL.	
DRAWN F.SCH. OCT. 16, 33	MODEL NO. 16-34		
TRACED F.SCH. OCT. 16, 33	SCALE NAME		
CHECKED	REVISIONS		
APPROVED			



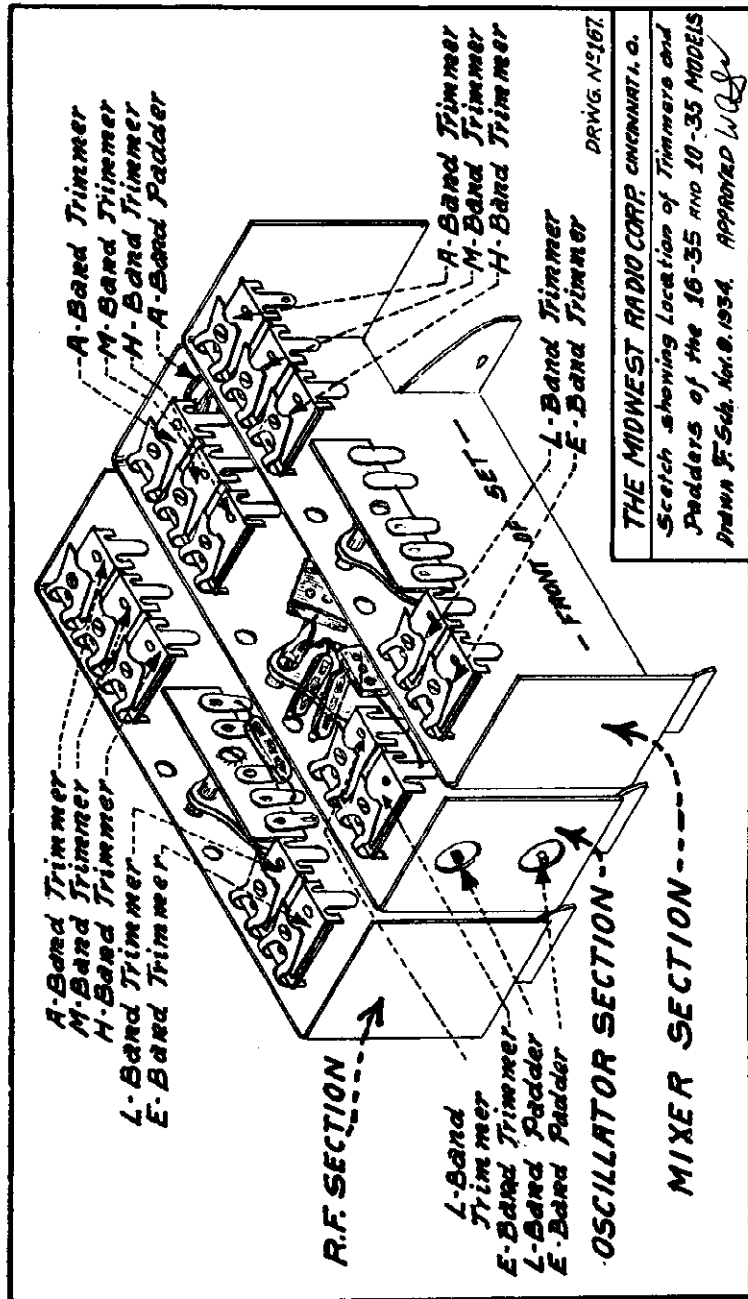
LIST OF TUBE VOLTAGES OF MODEL 16 - 1934		ALL TESTS MADE WITH NO SIGNAL INPUT AND WITH STATOMIT TUNED FULL ON (CLOCKWISE)										
TYPE	POSITION	VOLTS	SCREEN	SUPPRESSOR	KATHODE	GRID	FIL.					
			VOLTS	VOLTS	VOLTS	VOLTS	VOLTS					VOLTS
6D6	R.F.	240	125	---	---	-5 ϕ AVC	6.5					
6C6	MIXER	230	50	3	3	---	6.3					
56	OSC.	125	---	---	---	---	2.5					
78	1st. IF TUBE	230	60	---	---	-5 ϕ AVC	6.3					
78	2nd IF TUBE	230	125	---	---	-5 ϕ AVC	6.3					
6B7	A.V.C. AMPL.	230	125	---	35	---	6.3					
6B7	2nd DET.	-20	-20	---	40	---	6.3					
37	STATOMIT	Full On 0	---	---	40	---	6.3					
37	1st A.F.	170	---	---	13	---	6.3					
37	2nd A.F.	230	---	---	13	---	6.3					
37	2nd A.F.	230	---	---	13	---	6.3					
45	OUTPUT	240	---	---	60	---	2.5					
45	OUTPUT	240	---	---	60	---	2.5					
45	OUTPUT	240	---	---	60	---	2.5					
45	OUTPUT	240	---	---	60	---	2.5					
5Z3	RECT.	250 R.M.S. PER ANODE										5.0

240 VOLT OUTPUT FROM FILTER
1000 ohm per volt meter used for test D.C. measured from ground voltages \pm 15% depending on line voltage.

Drawn Fifty Sch. 10-1-34
Checked
A.P.P.
Drawing No. 73

MODEL 10-35
 Trimmers, Alignment

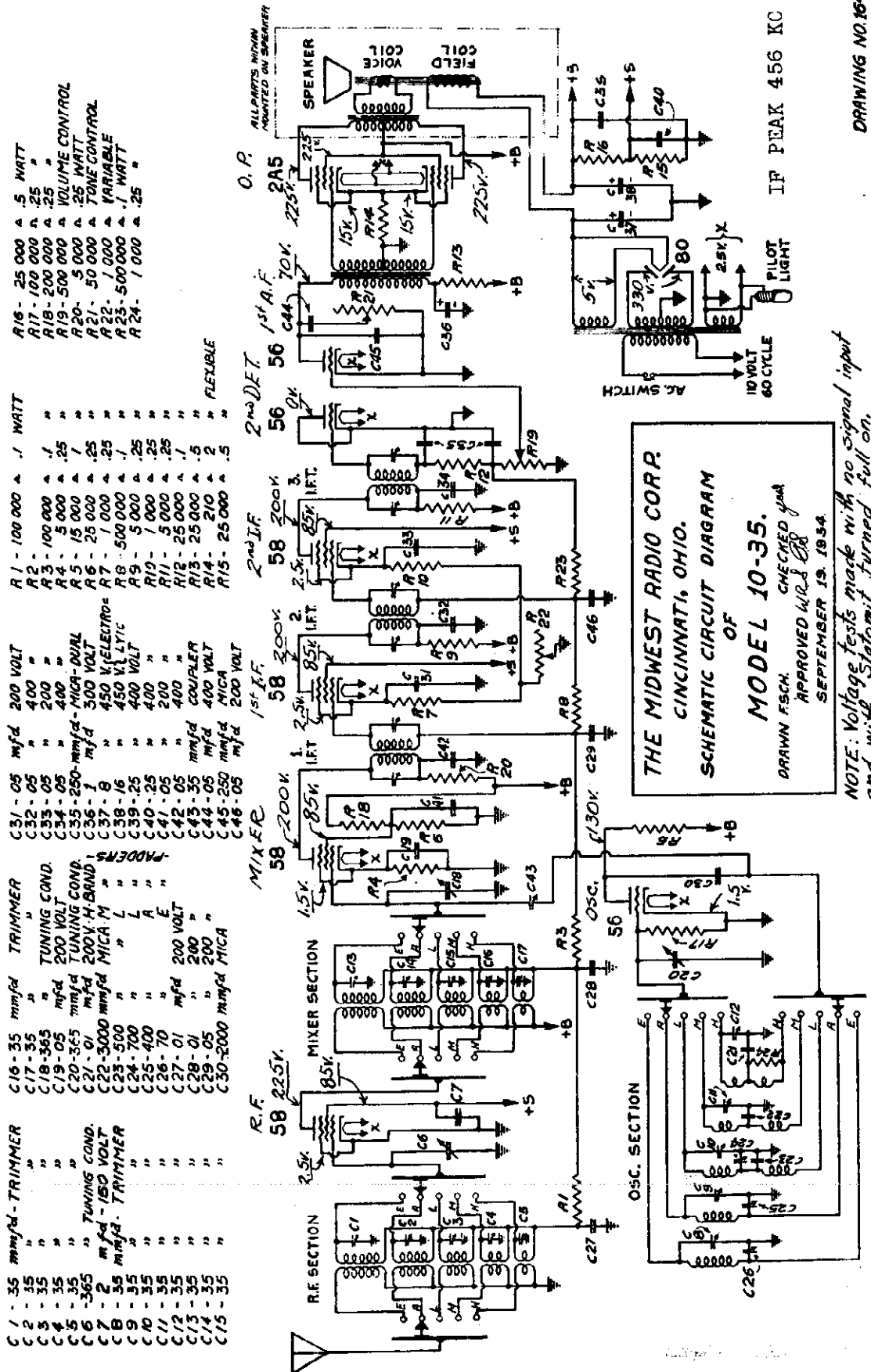
MIDWEST RADIO CORP.



Procedure for rebalancing the Midwest 10 - 1935 receiver is as follows:
 The I.F. Amplifier is designed to operate at 458 K.C. Peak the 1st, 2nd and 3rd, I.F. transformers to maximum A.F. output. Trim small A.V.C. transformer to minimum A.F. output. Do not measure A.V.C. as an indication of output. The adjustments screws for the I.F. amplifier will be found in the top of the I.F. Transformers which may be located from the parts location chart.
 After the I.F. amplifier has been aligned proceed as follows in the procedure of aligning the R.F. portion of the receiver.
 Connect a modern signal generator or to the Antenna and Ground posts. Set wave change switch to the "E" band.
 Set signal generator or to 325 K.C. Rotate dial of receiver to 325 K.C. Trim "E" Osc. trimmer until maximum signal is obtained. Trim the "E" band R.F. and "E" band mixer trimmers until maximum signal is obtained. Set signal generator or to 125 K.C. Rotate dial to 125 K.C. trim "E" band padder until signal is received.
 Set wave change switch to the "A" band. Set signal generator to 1400 K.C. Set dial at 1400 K.C. adjust the "A"

band Osc. trimmer until the signal is received at maximum. Adjust the A.R.F. and "A" band mixer trimmers to maximum output. Set signal generator or at 550 K.C. set dial at 550 band K.C. Adjust the "A" band Osc. padder until signal is received. Set wave change switch to the "I" band. Set signal generator or to 4 Meg. Set dial to 4 Meg. Adjust the "I" band Osc. Trimmer until the signal is received at maximum. Adjust the "I" band R.F. and "L" band Mixer trimmers until the signal is received at maximum. Set signal generator to 1600 K.C. and adjust the "L" band padder until signal is received.
 Set the wave change to the "M" band. Set signal generator to 11.5 Meg. Set dial to 11.5 Meg. Adjust the "M" band Osc. trimmer until the signal is received at maximum strength. Adjust the "M" band R.F. and "M" band Mixer trimmers until maximum signal is received. No padder is provided on this band.
 Set wave change switch to the "H" band. Set the signal generator or to 28 Meg. Set dial to 28 Meg. Adjust the "H" band Osc trimmer until the signal is received at maximum. Adjust the "H" band R.F. and "H" band Mixer trimmers until the maximum signal is received. No padder is provided for this band.

MIDWEST RADIO CORP.



- R1 - 25 000 Δ .5 WATT
- R2 - 100 000 Δ .25 "
- R3 - 200 000 Δ .25 "
- R4 - 500 000 Δ .25 "
- R5 - 1 000 000 Δ .25 "
- R6 - 5 000 Δ .1 "
- R7 - 15 000 Δ .1 "
- R8 - 25 000 Δ .25 "
- R9 - 50 000 Δ .25 "
- R10 - 100 000 Δ .25 "
- R11 - 1 000 Δ .25 "
- R12 - 5 000 Δ .25 "
- R13 - 15 000 Δ .25 "
- R14 - 25 000 Δ .25 "
- R15 - 50 000 Δ .25 "
- R16 - 100 000 Δ .25 "
- R17 - 200 000 Δ .25 "
- R18 - 500 000 Δ .25 "
- R19 - 1 000 000 Δ .25 "
- R20 - 5 000 Δ .1 WATT
- R21 - 15 000 Δ .1 WATT
- R22 - 25 000 Δ .25 WATT
- R23 - 50 000 Δ .25 WATT
- R24 - 100 000 Δ .25 WATT
- R25 - 200 000 Δ .25 WATT

- C1 - 35 mfd
- C2 - 35 mfd
- C3 - 35 mfd
- C4 - 35 mfd
- C5 - 35 mfd
- C6 - 35 mfd
- C7 - 2 mfd
- C8 - 2 mfd
- C9 - 35 mfd
- C10 - 35 mfd
- C11 - 35 mfd
- C12 - 35 mfd
- C13 - 35 mfd
- C14 - 35 mfd
- C15 - 35 mfd
- C16 - 35 mfd
- C17 - 35 mfd
- C18 - 35 mfd
- C19 - 35 mfd
- C20 - 35 mfd
- C21 - 35 mfd
- C22 - 35 mfd
- C23 - 35 mfd
- C24 - 35 mfd
- C25 - 35 mfd
- C26 - 35 mfd
- C27 - 35 mfd
- C28 - 35 mfd
- C29 - 35 mfd
- C30 - 35 mfd
- C31 - 35 mfd
- C32 - 35 mfd
- C33 - 35 mfd
- C34 - 35 mfd
- C35 - 35 mfd

- C31 - 05 mfd
- C32 - 05 mfd
- C33 - 05 mfd
- C34 - 05 mfd
- C35 - 250 mfd
- C36 - 1 mfd
- C37 - 8 mfd
- C38 - 16 mfd
- C39 - 25 mfd
- C40 - 25 mfd
- C41 - 05 mfd
- C42 - 05 mfd
- C43 - 35 mfd
- C44 - 05 mfd
- C45 - 250 mfd
- C46 - 05 mfd

- C16 - 35 mfd
- C17 - 35 mfd
- C18 - 35 mfd
- C19 - 35 mfd
- C20 - 35 mfd
- C21 - 35 mfd
- C22 - 35 mfd
- C23 - 35 mfd
- C24 - 35 mfd
- C25 - 35 mfd
- C26 - 35 mfd
- C27 - 35 mfd
- C28 - 35 mfd
- C29 - 35 mfd
- C30 - 35 mfd

- C1 - 35 mfd
- C2 - 35 mfd
- C3 - 35 mfd
- C4 - 35 mfd
- C5 - 35 mfd
- C6 - 35 mfd
- C7 - 2 mfd
- C8 - 2 mfd
- C9 - 35 mfd
- C10 - 35 mfd
- C11 - 35 mfd
- C12 - 35 mfd
- C13 - 35 mfd
- C14 - 35 mfd
- C15 - 35 mfd

THE MIDWEST RADIO CORP.
CINCINNATI, OHIO.
SCHEMATIC CIRCUIT DIAGRAM
OF
MODEL 10-35.
DRAWN F.S.C. CHECKED J.M.A.
APPROVED W.R.S. B.B.
SEPTEMBER 19, 1934.

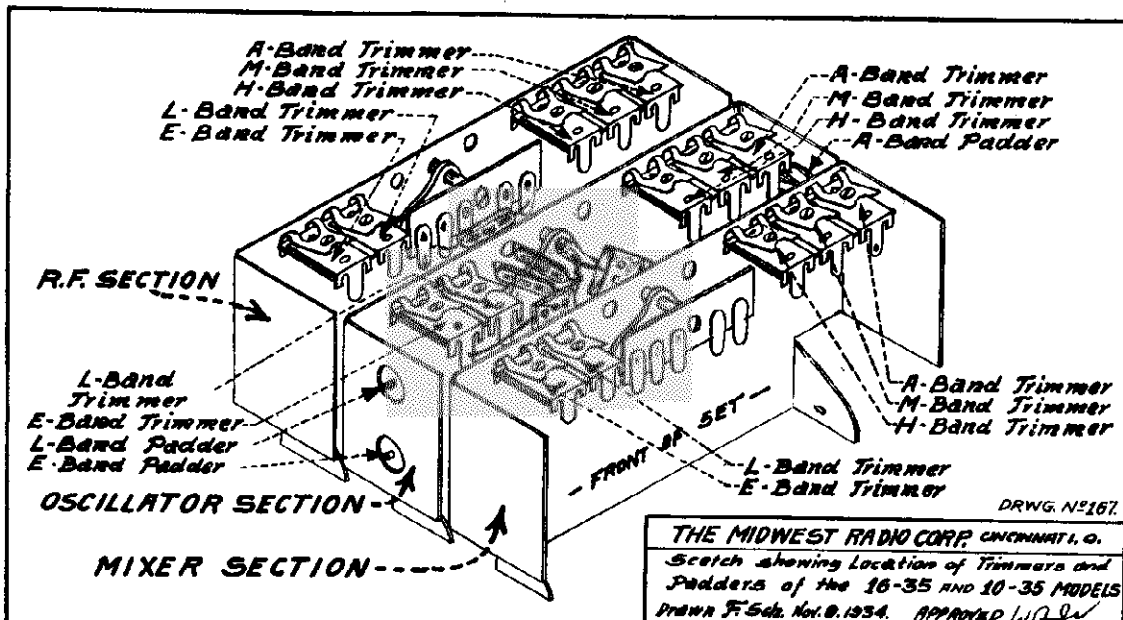
IF PEAK 456 KC

DRAWING NO. 164.

NOTE: Voltage tests made with no signal input and with Statomit turned full on. Line Voltage - 120.

MODEL 16-35
Alignment
Trimmers

MIDWEST RADIO CORP.



THE MIDWEST RADIO CORP. CINCINNATI, O.
Sketch showing Location of Trimmers and Padders of the 16-35 AND 10-35 MODELS
Drawn F. S. H. Nov. 9, 1934. APPROVED W. G. J.

REBALANCING

Procedure for rebalancing the Midwest 16 - 1935 receiver is as follows:

The I.F. Amplifier is designed to operate at 456 K.C. Peak the 1st, 2nd and 3rd, I.F. transformers to maximum A.F. output. Trim small A.V.C. transformer to minimum A.F. output. Do not measure A.V.C. as an indication of output. The adjustments screws for the I.F. amplifier will be found in the top of the I.F. Transformers which may be located from the parts location chart.

After the I.F. amplifier has been aligned proceed as follows in the procedure of aligning the R.F. portion of the receiver.

Connect a modern signal generator to the Antenna and Ground posts. Set wave change switch to the "E" band.

Set signal generator to 325 K.C. Rotate dial of receiver to 325 K.C. Trim "E" Osc. trimmer until maximum signal is obtained. Trim the "E" band R.F. and "E" band mixer trimmers until maximum signal is obtained. Set signal generator to 125 K.C. Rotate dial to 125 K.C. trim "E" band padder until signal is received.

Set wave change switch to the "A" band. Set signal generator to 1400 K.C. Set dial at 1400 K.C. adjust the "A" band Osc. trimmer until the signal is received at maximum. Adjust the A.R.F. and "A" band mixer trimmers to maximum output. Set signal generator to 550 K.C. set dial at 550 band K.C. Adjust the "A" band Osc. padder until signal is received. Set wave change switch to the "L" band. Set signal generator to 4 Meg. Set dial to 4 Meg. Adjust the "L" band Osc. Trimmer until the signal is received at maximum. Adjust the "L" band R.F. and "L" band Mixer trimmers until the signal is received at maximum. Set signal generator to 1600 K.C. and adjust the "L" band padder until signal is received.

Set the wave change to the "M" band. Set signal generator to 11.5 Meg. Set dial to 11.5 Meg. Adjust the "M" band Osc. trimmer until the signal is received at maximum strength. Adjust the "M" band R.F. and "M" band Mixer trimmers until maximum signal is received. No padder is provided on this band.

Set wave change switch to the "H" band. Set the signal generator to 28 Meg. Set dial to 28 Meg. Adjust the "H" band Osc. trimmer until the signal is received at maximum. Adjust the "H" band R.F. and "H" band Mixer trimmers until the maximum signal is received. No padder is provided for this band.

This completes the alignment process.

TUBE VOLTAGES

TYPE	POSITION	PLATE VOLTS	SCREEN SUPP. VOLTS	GRID SUPP. VOLTS	KATHODE FIL. VOLTS	PIL. VOLTS
6D6	R. F.	215	85	2.7	2.7	6.0
6D6	MIXER	210	20	2.2	2.2	6.0
6D6	OSC.	96	96	2.2	2.2	6.0
6D6	1st. I.F.	190	86	2.6	2.6	6.0
6D6	2nd I.F.	215	86	5.0	5.0	6.0
6E7	AVC. AMP.	190	46	---	6.0	6.0
6C6	Q.A.V.C.	130	86	0-AE 8.0-1M3/0-1M3	0-AE	6.0
76	2nd. DET.	0	--	---	0	6.0
76	DIM A LIGHT	115 A.C.	---	---	0	6.0
76	1st. A.F.	60	--	---	2.3	6.0
2A5	DRIVER	210	--	---	18	2.5
45	OUTPUT	330	--	---	GRID 60	2.5
45	OUTPUT	330	--	---	60	2.5
45	OUTPUT	330	--	---	60	2.5
45	OUTPUT	330	--	---	60	2.5

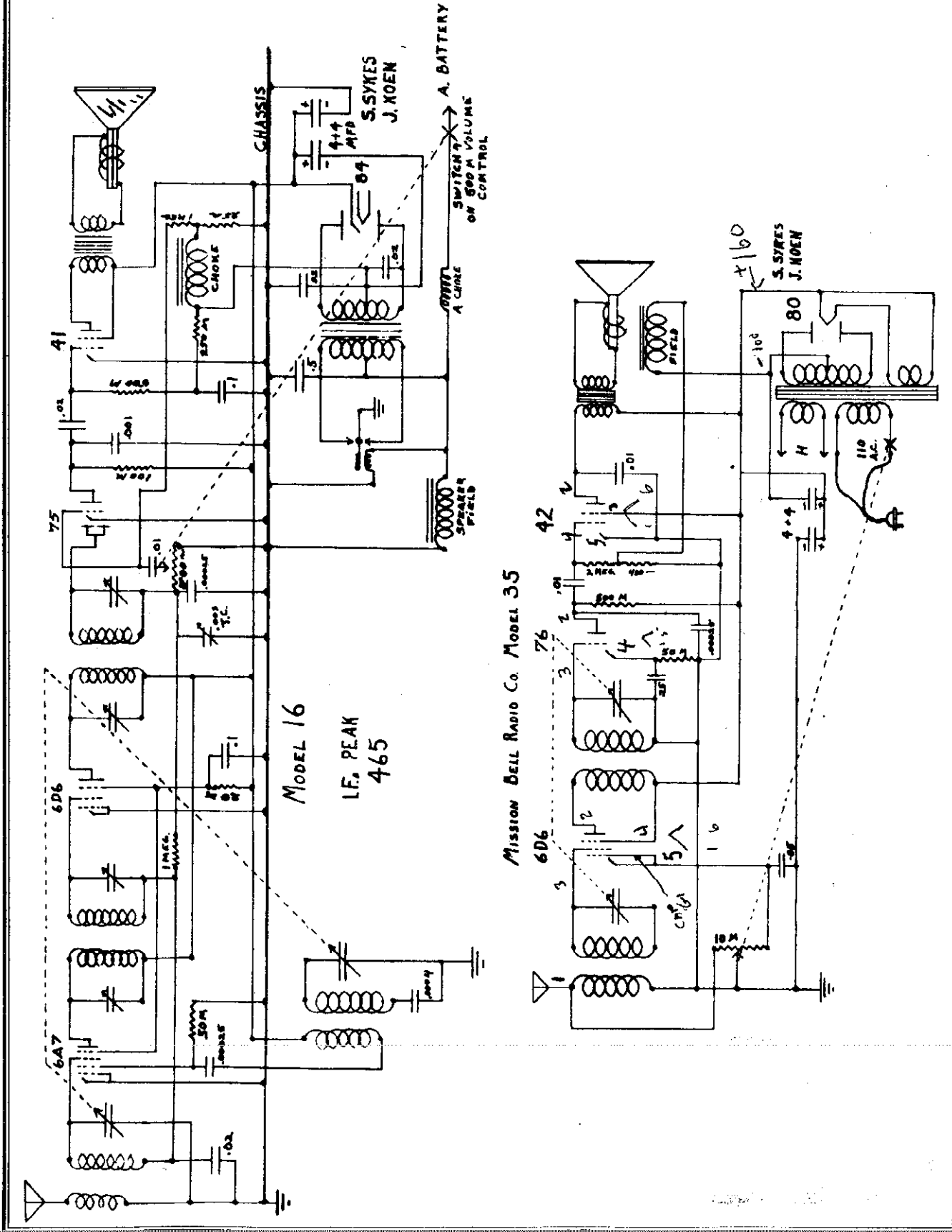
5Z5 Rect. 355 volts from Filter

ALL TESTS MADE WITH NOS IOML INPUT

Line voltage 120
1000 ohm per volt meter used for all D.C. measurements from ground. Voltage 15% depending on line voltage.

MISSION-BELL RADIO MFG. CO., INC.

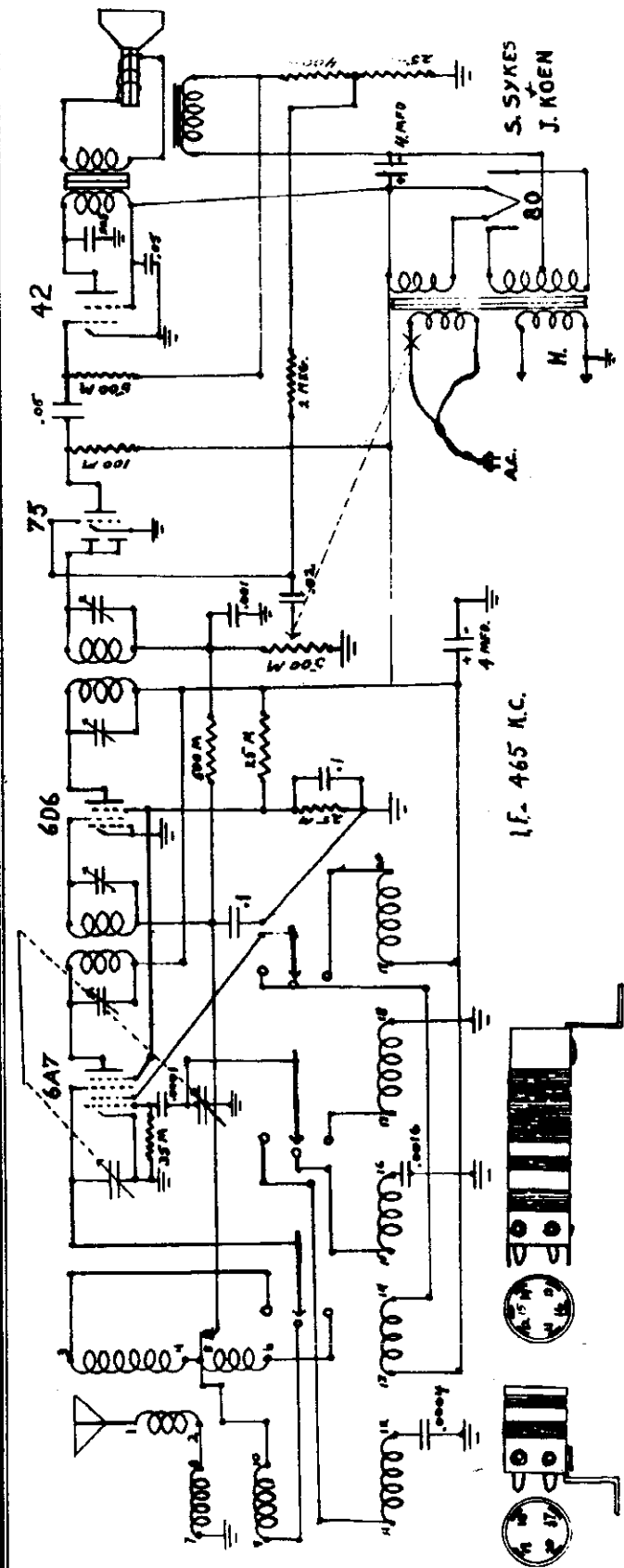
MODEL 16
 MODEL 35
 Schematics



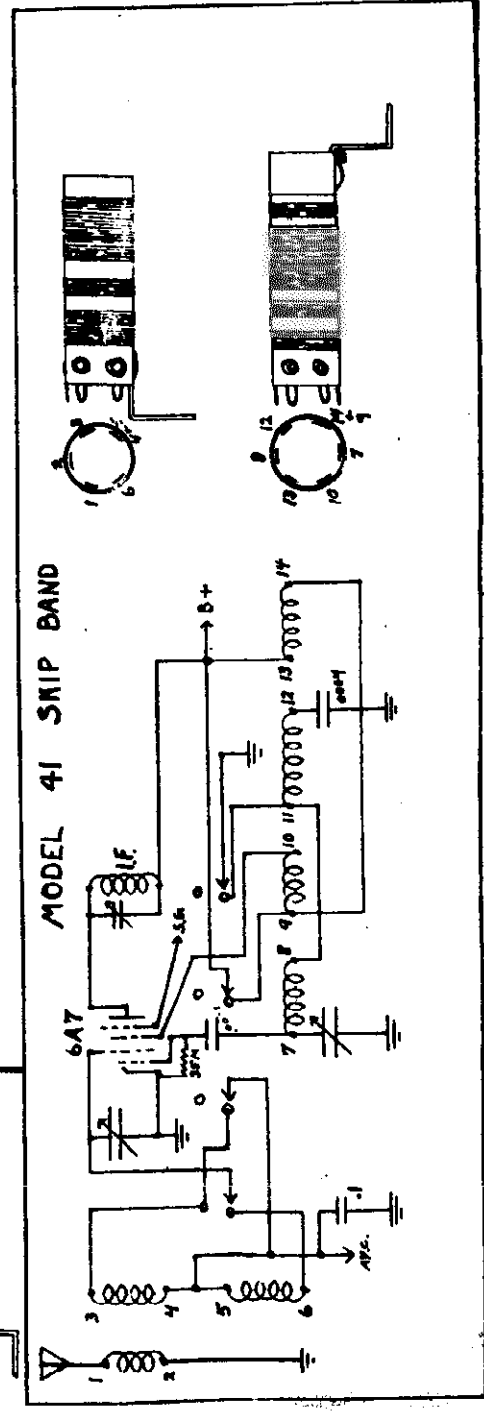
MODEL 41AW

MODEL 41 Skip Band MISSION-BELL RADIO MFG. CO., INC.

Schematics

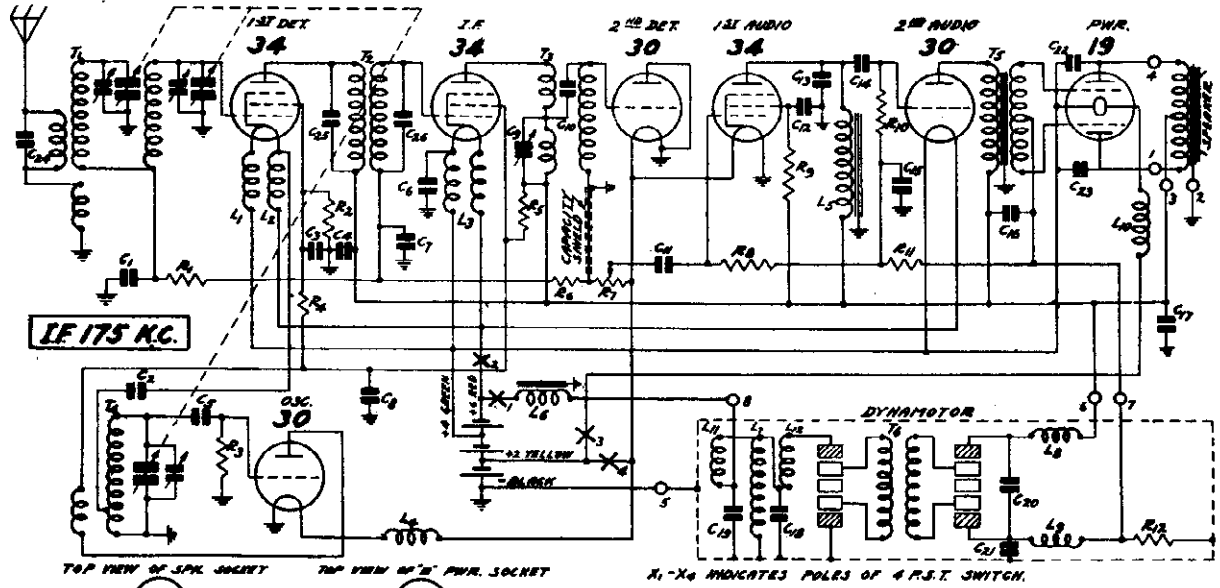


MISSION BELL MODEL 41
ALL WAVE-



MONTGOMERY-WARD & CO.

MODELS 62-114, 62-116
Schematic, Socket, Parts



Sept., 1934

MISCELLANEOUS

Part No.	ITEM	Selling Price
P-1640	Speaker Socket	\$0.06
P-1833	No. 19 Socket	.08
P-1644	No. 30 Socket	.08
P-1645	No. 34 Socket	.08
P-1912	"B" P.W.R. Socket	.06
P-50821	Plate Reactor Assem. L5	.70
P-50822	"A" Filter Reactor Assem. L6	.94
P-50825	Audio Transformer Assem. T5	.82
P-5172	Double Filament Reactor Assem. L1 and L2	.14
P-5173	Dual Filament Reactor Assem. L3 and L4	.22
P-5222	Single Filament Reactor L10	.18
P-5200	Antenna R. F. Transformer Assem. T1	.64
P-40433	Can for the above Assem.	.08
P-5170	1st I. F. Assem. Complete with Can T2	.80
P-5173	2nd I. F. Assem. Complete with Can T3	1.42
F-5169	Oscillator Coll. Complete with Can T4	.46
P-40415	Replacement Can for Osc. Coil	.04
P-10269	8" Black Drive Cord (V. C. or Switch)	.02
P-10370	29" Black Drive Cord (Cond. Drive)	.04

Part No.	Code	Capacity	Voltage	Type	Selling Price
P-80862	C8	0.050	Mf. 200V	Tubular	.08
P-80864	C4	0.100	Mf. 200V	Tubular	.10
P-81801	C5	.85	Mmf. Cap.	Part of Osc. Coil Assem.	.08
P-80888	C6	0.250	Mf. 200V	Tubular	.12
P-80862	C7	0.050	Mf. 200V	Tubular	.08
P-80988	C8	1.500	Mf. 140V	Tubular	.40
P-1965	C9	70-140	Mmf.	Trimmer	.18
P-81800	C10	.50	Mmf.	Cap. Part of 2nd I.F. Coil As.	.08
P-80981	C11	0.010	Mf. 400V	Tubular	.10
P-80888	C12	0.250	Mf. 200V	Tubular	.12
P-80945	C13	.500	Mmf.	Moulded	.08
P-80862	C14	0.050	Mf.	Tubular	.08
P-80888	C15	0.250	Mf. 200V	Tubular	.12
P-81014	{C16 16.00 Mf. C17 16.00 Mf.}			Electrolytic Block	1.22
P-80914	C22	0.002	Mf. 600V	Tubular	.10
P-80914	C23	0.002	Mf. 600V	Tubular	.10
P-81812	C24	200	Mmf. Cap.	Part of Ant. Assem.	.08
P-81807	C25	70	Mmf. Cap.	Part of 1st I.F. Coil As.	.08
P-81805	C26	45	Mmf. Cap.	Part of 1st I.F. Coil As.	.08
P-81015			Three Gang	Condenser	1.70

"B" POWER UNIT PARTS

Part No.	ITEM	Selling Price
P-2132	Dynamotor Complete with Case and Cover	\$12.00
P-2159	Gelotex Box and Cover	.50
P-5151	"B" Reactor Assem. L8 and L9	.12
P-60880	"A" Choke Coil	.20
P-70785B	Cable and Plug	.34
P-1504	Insulated Terminal Strip	.08
P-10191	Rubber Cushion	.04
P-98033	R12 200 Ohm 0.2 Wire Wound	.08
P-81047	{C18 0.250 mf 200V C19 0.250 mf 200V C20 0.250 mf 200V C21 0.250 mf 200V}	Condenser Block .58

RESISTORS

Part No.	Code	Resistance	Wattage	Type	Selling Price
P-A95104	R1	100,000 Ohm	.2	Carbon	\$0.08
P-A93303	R2	30,000 Ohm	.2	Carbon	.10
P-A95104	R3	100,000 Ohm	.2	Carbon	.08
P-A93602	R4	6,000 Ohm	.2	Carbon	.10
P-B93902	R5	9,000 Ohm	.5	Carbon	.10
P-A95505	R6	5 Megohm	.2	Carbon	.08
P-96012	R7	1 Megohm		Volume Control	.40
P-A95505	R8	5 Megohm	.2	Carbon	.08
P-A94603	R9	60,000 Ohm	.2	Carbon	.08
P-A95104	R10	100,000 Ohm	.2	Carbon	.08
P-A95104	R11	100,000 Ohm	.2	Carbon	.08

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	Selling Price
P-80862	C1	0.050	Mf. 200V	Tubular	\$0.08
P-80862	C2	0.050	Mf. 200V	Tubular	.08

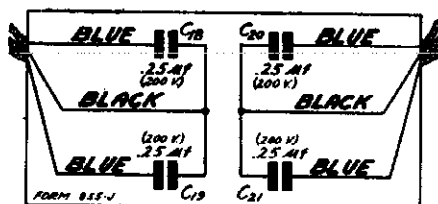


Fig. 3. Four Section Condenser in Power Unit Box

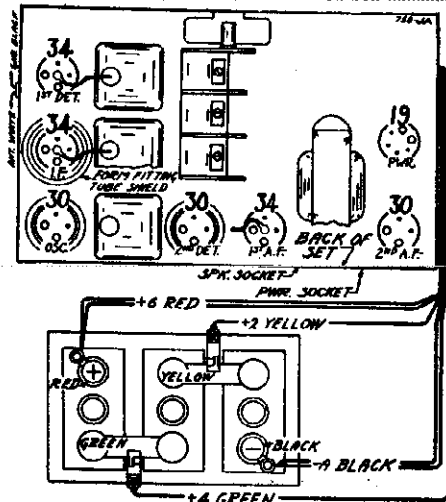


Fig. 2. Location of Tubes and Battery Connections

MODELS 62-114, 62-116

Voltage, Resistance Test MONTGOMERY-WARD & CO.
Alignment, Data

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 Off-On switch 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

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum
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

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth 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 1/4" 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 tens on 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.

Voltages at Sockets

ANTENNA SHORTED TO GROUND

Type of Tube	Function	Fila-ment Volt.	Plate to Neg. Filament	Screen to Neg. Filament	Grid to Neg. Filament	Normal Plate M. A.
34	1st Detector	2.0	135	55	3.0 av.	1.90
30	Oscillator	2.0	75		0.0	3.70
34	I. F.	2.0	135	70	3.0 av.	3.00
30	2nd Detector	2.0	2			
34	1st A. F.	2.0	140	65	4.0	2.30
30	2nd A. F.	2.0	135		8.0	3.10
19	Output	2.0	137		6.0	1.00 per plate

Condenser Alignment

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.

First set the signal generator to a frequency of 175 KC. Connect the antenna lead of the lead 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 KC. 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 KC 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 KC 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.

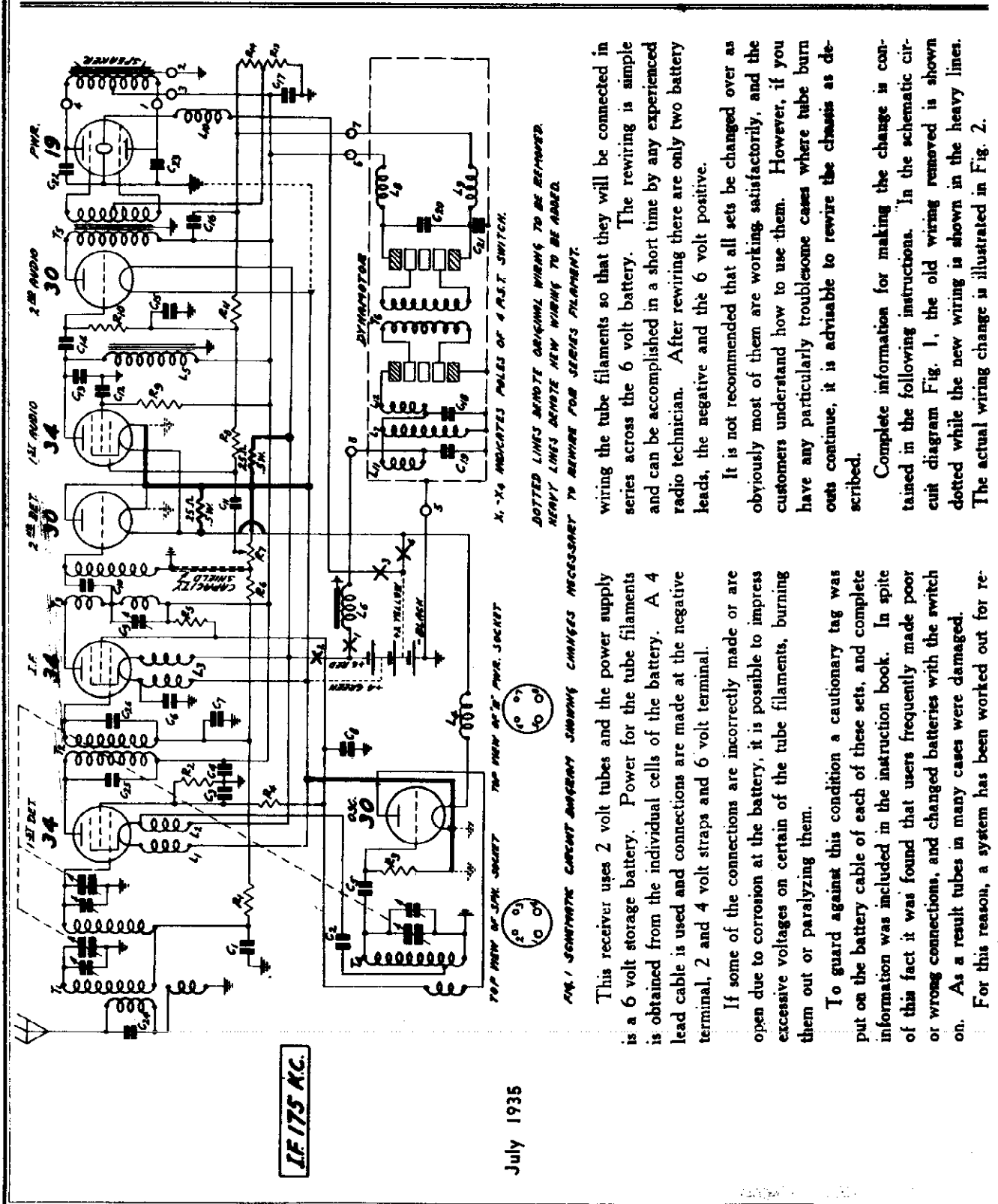
The use of the cut plate type of condenser eliminates the necessity of a 600 KC padder and no adjustment at this frequency, therefore, is required.

D. C. Resistance of Windings

Part No.	Item	Code	D. C. Resistance in Ohms
P-5168	Double Tuned Antenna Transformer, Primaries in series	T1	20.1
	Double Tuned Antenna Transformer Secondary Preselector	T1	3.3
	Double Tuned Antenna Transformer Secondary Detector	T1	3.1
P-5169	Oscillator Grid Coil	T4	3.6
	Oscillator Plate Coil	T4	1.6
P-5170	I. F. Coil Primary	T2	89.
	I. F. Coil Secondary	T2	126.
P-5171	I. F. Reactor Coil Plate Winding	T3	99.
	I. F. Reactor Coil Grid Winding	T3	429.
P-5172	Double Filament Reactor Assembly each section	L1, L2	Small
P-5173	Combined Filament Reactor Assembly each section	L3, L4	Small
P-50621	Audio Plate Reactor	L5	4940.
P-50622	Iron Core Isolating Reactor	L6	Small
P-50222	Filament Reactor	L10	Small
P-50625	Audio Transformer Primary	T5	1066.
	Audio Transformer Secondary (center tap to inside)	T5	614.
	Audio Transformer Secondary (center tap to outside)	T5	666.
P-2124	6" Magnetic Speaker (center tap to inside)		260.
	6" Magnetic Speaker (center tap to outside)		300.

Models 114 and 116 "B" Batteryless Receivers

Method of changing the filament wiring to 6 volt series operation.



IF 175 KC.

July 1935

This receiver uses 2 volt tubes and the power supply is a 6 volt storage battery. Power for the tube filaments is obtained from the individual cells of the battery. A 4 lead cable is used and connections are made at the negative terminal, 2 and 4 volt straps and 6 volt terminal.

If some of the connections are incorrectly made or are open due to corrosion at the battery, it is possible to impress excessive voltages on certain of the tube filaments, burning them out or paralyzing them.

To guard against this condition a cautionary tag was put on the battery cable of each of these sets, and complete information was included in the instruction book. In spite of this fact it was found that users frequently made poor or wrong connections, and changed batteries with the switch on. As a result tubes in many cases were damaged.

For this reason, a system has been worked out for re-wiring the tube filaments so that they will be connected in series across the 6 volt battery. The rewiring is simple and can be accomplished in a short time by any experienced radio technician. After rewiring there are only two battery leads, the negative and the 6 volt positive.

It is not recommended that all sets be changed over as obviously most of them are working satisfactorily, and the customers understand how to use them. However, if you have any particularly troublesome cases where tube burn outs continue, it is advisable to rewire the chassis as described.

Complete information for making the change is contained in the following instructions. In the schematic circuit diagram Fig. 1, the old wiring removed is shown dotted while the new wiring is shown in the heavy lines. The actual wiring change is illustrated in Fig. 2.

Fig. 1. SCHEMATIC CIRCUIT SHOWING CHANGES NECESSARY TO REWIRE FOR SERIES FILAMENT.

TOP VIEW OF 5-PIN SOCKET

TOP VIEW OF 7-PIN PWR. SOCKET

1-1/4" DIA. CURRENT EMERGENCY SWITCH

DOTTED LINES INDICATE ORIGINAL WIRING TO BE REMOVED. HEAVY LINES DENOTE NEW WIRING TO BE ADDED.

X-1/4 INDICATES POLES OF 4 P.S.T. SWITCH.

MODELS 62-114, 62-116

Chassis View of Changes MONTGOMERY-WARD & CO.

Data

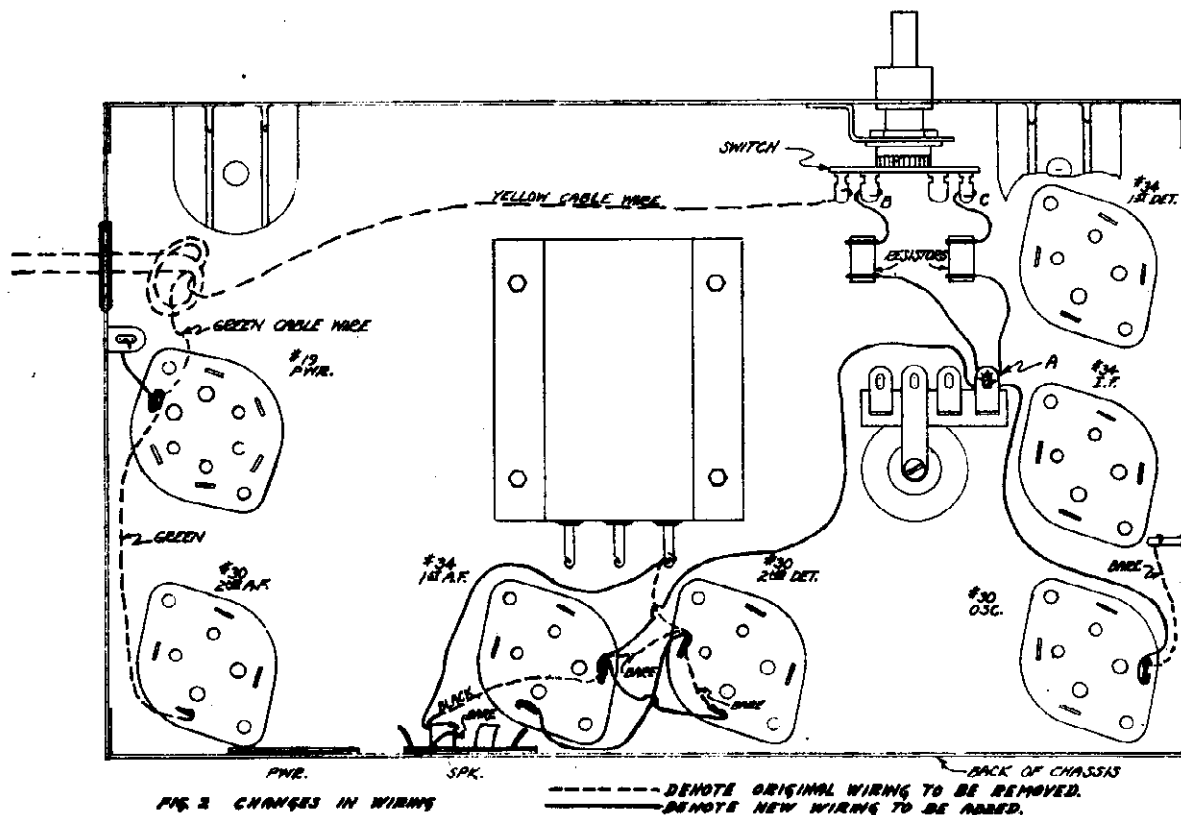


FIG. 2 CHANGES IN WIRING

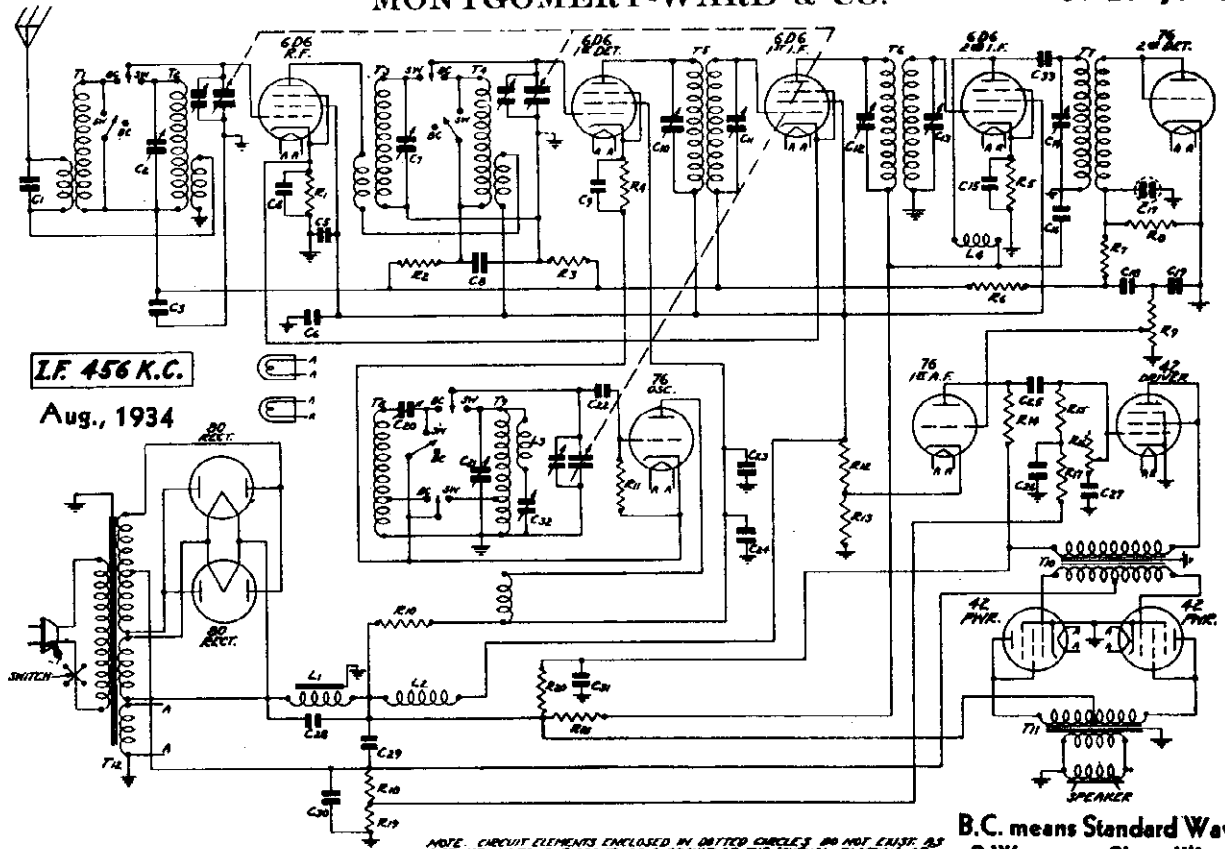
----- DENOTE ORIGINAL WIRING TO BE REMOVED.
 ————— DENOTE NEW WIRING TO BE ADDED.

1. Cut the yellow battery lead at the switch and remove it from the cable. Use this for hook-up wire.
2. Disconnect the wire connecting the 2nd A.F. and 19 tube filaments at the 2nd A.F. terminal and ground it at the lug on the side of the chassis.
3. Remove rear mounting foot.
4. Cut out the bare wire jumpers from the 2nd Det. and 1st A.F. filaments to the plate of the second detector and replace with a bare wire jumper connecting between the two filaments only, leaving just the black wire on the second detector plate.
5. Disconnect that black wire at the condenser block and connect it to the same lug to which the green wire is connected on the 1st A.F. filament.
6. At the 1st A.F. tube socket disconnect the black wire from the filament prong and connect it to the empty lug on the condenser block.
7. Extend the lead from the bare wire junction of the 2nd Detector and 1st A.F. filaments to the lug marked "A." (Do not solder yet).
8. Remove filament ground on oscillator tube and extend the lead so that it can be connected to lug "A." (Do not solder yet).
9. Connect a 25 ohm .5 watt \pm 5% resistor between lugs "A" and "B." (Do not solder lug A).
10. Connect a 25 ohm .5 watt \pm 5% resistor between lugs "A" and "C." Note: All 4 connections can now be soldered to lug A.
11. Cut the green cable wire at the 19 tube socket and remove it from the cable.
12. Replace the mounting foot and check to see that the 25 ohm resistors are not in a position to short on the bottom plate or other connections.

Schematic, Parts

MONTGOMERY-WARD & CO.

MODELS 62-134, 62-134X
62-139, 62-139X



I.F. 456 K.C.

Aug., 1934

B.C. means Standard Wave
S.W. means Short Wave

REPAIR PARTS LIST FOR 12 TUBE
SUPERHETERODYNE RECEIVER

Part No.	ITEM	Selling Price	Part No.	Code	Capacity	Voltage	Type	Selling Price
P-5176	Sho. W. and Std. W. Antenna R. F. Transformer less can T1, T2	\$0.86	P-A93401ww	R5	400 Ohm	0.2	Wire Wound	.08
P-5241	Sho. W. and Std. W. Interstage R. F. Transformer less can T3, T4	.94	P-A95205	R6	2.0 Megohm	0.2	Carbon	.08
P-5183	Oscillator Coil Assembly less can T8, T9	.32	P-A95104	R7	100,000 Ohm	0.2	Carbon	.08
P-5245	3rd I. F. Transformer less can T7	.76	P-A94304	R8	300,000 Ohm	0.2	Carbon	.08
P-40433	Cans for the above assemblies	.08	P-95005	R9	2.0 Megohm	0.2	Carbon	.08
P-5243	1st I. F. Trans. & Can Assem. T5	1.04	P-E94408	R10	40,000 Ohm	3.0	& Sw. Vol. Con	.60
P-5244	2nd I. F. Trans. & Can Assem. T6	1.04	P-A95104	R11	100,000 Ohm	0.2	Carbon	.08
P-5190	H. F. Oscillator Tracking Coil L3	.18	P-98038	R12	4,000 Ohm	2.5	Armored Wire Wound	.38
P-5246	2nd I. F. Plate Reactor L4	.30	P-B95603	R13	390 Ohm	0.6		
P-50650-2B	Power Choke L1	1.06	P-A95603	R14	60,000 Ohm	0.5		
P-50652-2B	Input Transformer T10	1.32	P-97011	R15	60,000 Ohm	0.2		
P-50642A-2B	Output Transformer T11	.76	P-A95205	R16	150,000 Ohm	0.2		
P-50620-2B	Power Transformer 115V 60 Cycle T12	3.40	P-98087	R17	20,000 Ohm	0.2	Carbon	.08
P-50652-2B	Power Transformer 115V 25 Cycle T12	4.52		R18	128 Ohm	2.5	Carbon	.08
P-50651-2B	Power Transformer 115-250V 40-60 Cycle T12	3.74		R19	145 Ohm	3.0	Carbon	.08
P-2025	No. 80 Tube Socket	.08		R20	4,000 Ohm	4.0	Carbon	.08
P-1884	No. 42 Tube Socket	.08		R21	6,000 Ohm	2.0	Carbon	.08
P-2022	No. 76 Tube Socket	.08					Armored Wire Wound	.34
P-1885	No. 6D6 Tube Socket	.08						
P-1637	Speaker Socket	.06						
P-40445	Tube Shield	.08						
P-40443	Tube Shield Base	.04						
P-1925	Speaker	5.92						
P-10320	Glass Crystal	.08						
P-20875	Crystal Retainer Ring	.06						
P-20660	Knob, Small	.10						
P-20662	Knob, Large	.12						
P-10272	Rubber Chassis Cushion	.04						
P-20912	Large Double End Pointer	.10						
P-2101	Band Change Switch	.90						
P-30455	Small Pointer	.04						
P-2012	Pilot Light Bulb	.08						
P-20905	Condenser Shield	.02						
P-10369	3" Black Drive Cord (V. C. or T. C. Ind.)	.04						
P-10370	29" Black Drive Cord (Con. Drive)	.04						
P-2126	Pilot Light Socket and Clip Assem.	.06						
P-70702	Cord and Plug Assem.	.32						
P-30342	Grid Cap Only	.04						
P-1504	8 Lug Terminal Strip	.06						
P-1421	Single Lug Terminal Strip	.04						

RESISTORS

Part No.	Code	Resistance	Wattage	Type	Selling Price
P-A93141ww	R1	140 Ohm		Wire Wound	\$0.08
P-A95204	R2	200,000 Ohm	0.2	Carbon	.08
P-A95105	R3	1.0 Megohm	0.2	Carbon	.08
P-A94252	R4	2,500 Ohm	0.2	Carbon	.08

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	Selling Price
P-80919	C1	250 mmf	600V	Moulded	\$0.08
P-2102	C2	3-40 mmf	Short Wave	Wave Ant. Trimmer	.08
P-81076	C3	0.05 mf	200V	Tubular	.10
P-81111	C4	0.25 mf	200V	Tubular	.12
P-81117	C5	0.25 mf	300V	Tubular	.12
P-81056	C6	6.0 mf	150V	Dry Electrolytic	.68
P-2102	C7	3-40 mmf	Short Wave			Inter. Trimmer	.08
P-81076	C8	0.05 mf	200V	Tubular	.10
P-81076	C9	0.05 mf	200V	Tubular	.10
P-2103	C10	150-250 mmf		Double Trimmer (Part of 1st I. F. Trans.)	.28
P-2103	C11	150-250 mmf		Double Trimmer (Part of 2nd I. F. Trans.)	.28
P-1685	C12	150-250 mmf		Double Trimmer (Part of 3rd I. F. Trans. Pri. Trimmer)	.18
P-81076	C14	40-100 mmf	200V	Tubular	.10
P-81097	C15	0.05 mf	200V	Tubular	.14
P-81076	C16	0.10 mf	500V	Tubular	.10
P-81076	C17	0.05 mf	200V	Integral Part of 3rd I. F. Assem.	.10
P-81081	C18	35 mmf	400V	Wire Capacitor	.08
P-2112	C19	300-500 mmf	Osc. Std. W. Padding Cond.		.22
P-2102	C20	3-40 mmf	Osc. Sho. W. Trimmer		.08
P-81081	C21	35 mmf	400V	Wire Capacitor	.08
P-81118	C22	0.10 mf	400V	Tubular	.14
P-81096	C23	0.25 mf	400V	Tubular	.18
P-81117	C24	25 mf	200V	Tubular	.12
P-81076	C25	0.05 mf	200V	Tubular	.10
P-81099	C26	0.15 mf	220V	AC Tubular	.26
P-81058	C27	16 mf	450V	Wet Electrolytic	.84
P-82000	C28	30 mf	50V	Dry Electrolytic	.62
P-81089A	C29	16 mf	400V	Wet Electrolytic	.72
P-1685	C30	40-100 mmf	Osc. Sho. W. Padding Cond.		.18
P-80919	C31	250 mmf	600V	Moulded	.08

MODELS 62-134, 62-134X
62-139, 62-139X
Resistance Test, Socket
Trimmers, Voltage

MONTGOMERY-WARD & CO.

12 Tube A. C. Standard and Short Wave Superheterodyne Receiver

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	B. C. Antenna Transformer Primary.....	T1	28.
	B. C. Antenna Transformer Secondary..	T1	4.9
	S. W. Antenna Transformer Primary.....	T2	.3
P-5241	S. W. Antenna Transformer Secondary	T2	Small
	B. C. & S. W. Interstage R. F. Transformer Primaries in series.....	T4	2.9
P-5243	B. C. Interstage R. F. Trans. Sec.....	T4	7.8
	S. W. Interstage R. F. Trans. Sec.....	T3	Small
	1st I. F. Transformer Primary.....	T5	4.8
P-5244	1st I. F. Transformer Secondary.....	T5	4.8
	2nd I. F. Transformer Primary.....	T6	5.
P-5245	2nd I. F. Transformer Secondary.....	T6	5.
	3rd I. F. Transformer Primary.....	T7	12.0
P-5188	3rd I. F. Transformer Secondary.....	T7	30.0
	B. C. Oscillator Grid Coil.....	T8	3.3
P-50653-2B	S. W. Oscillator Grid Coil.....	T9	Small
	S. W. Oscillator Plate Coil.....	T9	0.25
	Audio Input Transformer Primary.....	T10	400.
P-50642A-2B	Audio Input Transformer Secondary (Center Tap to Inside).....	T10	200.
	Audio Input Transformer Secondary (Center Tap to Outside).....	T10	280.
	Audio Output Transformer primary (Center Tap to Inside).....	T11	300.
P-50620-2B	Audio Output Transformer Primary (Center Tap to Outside).....	T11	340.
	Audio Output Transformer Secondary..	T11	.4
	Power Trans. (115V 60 Cycles) prim.	T12	2.5
P-50650-2B	Power Transformer (115V 60 Cycles) H. T. Sec. (Center Tap to Inside).....	T12	150.
	Power Transformer (115V 60 Cycles) H. T. Sec. (Center Tap to Outside).....	T12	165.
	Power Transformer (115V 60 Cycles) Secondary (80 Filament).....	T12	Small
P-5190	Power Transformer (115V 60 Cycles) Secondary A-A (Filament).....	T12	Small
	Power Choke.....	L1	140.
P-1925	H. F. Oscillator Tracking Coil.....	L3	1.2
P-1926	2nd I. F. Plate Reactor.....	L4	57.
P-1925	Speaker Voice Coil.....	L2	1.6
P-1925	Speaker Field Coil.....	L2	5300.

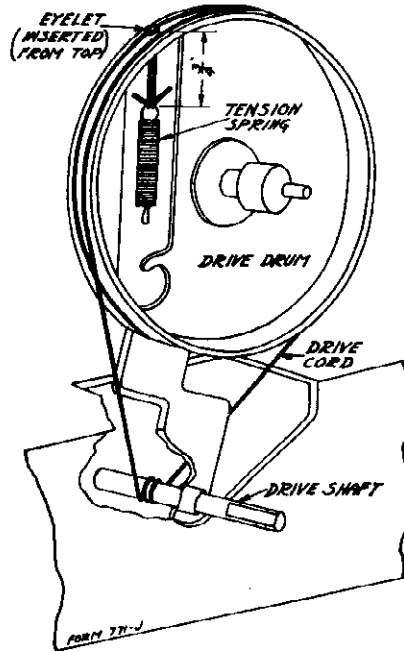


Fig. 3 Drive Cord Replacement.

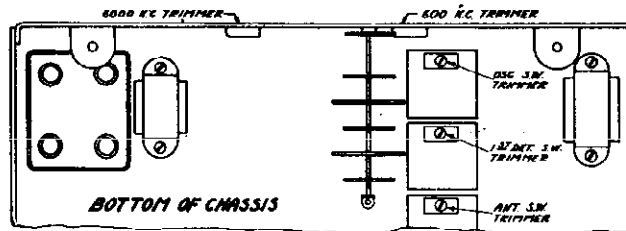
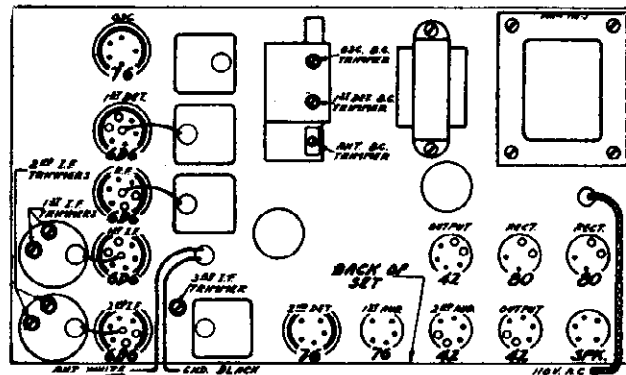
TUNING RANGE
Standard Wave Band
530 to 1740 Kilocycles
Short Wave Band
5.8 to 18.3 Megacycles

60 Cycle { Model 62-134
" " 62-139
25 Cycle { " " 62-134x
" " 62-139x

Voltages at Sockets LINE VOLTAGE — 115 ANTENNA SHORTED TO GROUND

Type of Tube	Function	Across Fila. or Heater	Plate to Cath.	Screen to Cathode	Grid to Cath.	Normal Plate M. A.
6D6	R. F.	6.3	105	105	2.8	8.8
6D6	1st Detector	6.3	95	105	10.0	3.3
76	Oscillator	6.3	115		0.0	5.8 ⁽¹⁾ 7.7 ⁽²⁾
6D6	1st I. F.	6.3	260	105	2.8	8.8
6D6	2nd I. F.	6.3	260	105	3.2	7.2
76	2nd Detector	6.3				
76	1st Audio	6.3	170		11.0	1.2
42	Driver Stage	6.3	235	235	18 ⁽³⁾	26.5
42	Output	6.3	350	350	38.0	21.0
80	Rectifier	4.6	435			35.5 per plate

(1) Switch in Standard Wave position.
(2) Switch in Short Wave position (No Signal).
(3) Measured across resistor R19.



BOTTOM OF CHASSIS

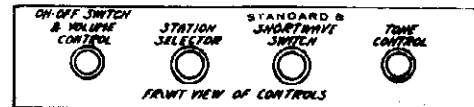


Fig. 2—Location of Tubes, Trimmers and Controls

MONTGOMERY-WARD & CO.

MODEL 5 62-134, 62-135
62-139, 62-139A

Alignment, Data

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 top panel of the chassis as shown in Fig. 2 and the adjustment screw is reached through a hole in the top panel.

Standard Wave Band Adjustment

The standard-short wave switch should be in the standard wave 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 standard wave 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 standard wave band scale. Retighten the hub set screw. Then adjust the antenna and 1st detector standard wave 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 standard wave band alignment as described above has been made, do not change the adjustment of any of the standard wave 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 standard-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 3000 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 the setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained.

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:

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. 3.

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. 3. 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. 3.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth 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 $\frac{3}{4}$ " from the flange of the drum as shown in Fig. 3. Cut off the surplus length of cord after it is knotted.

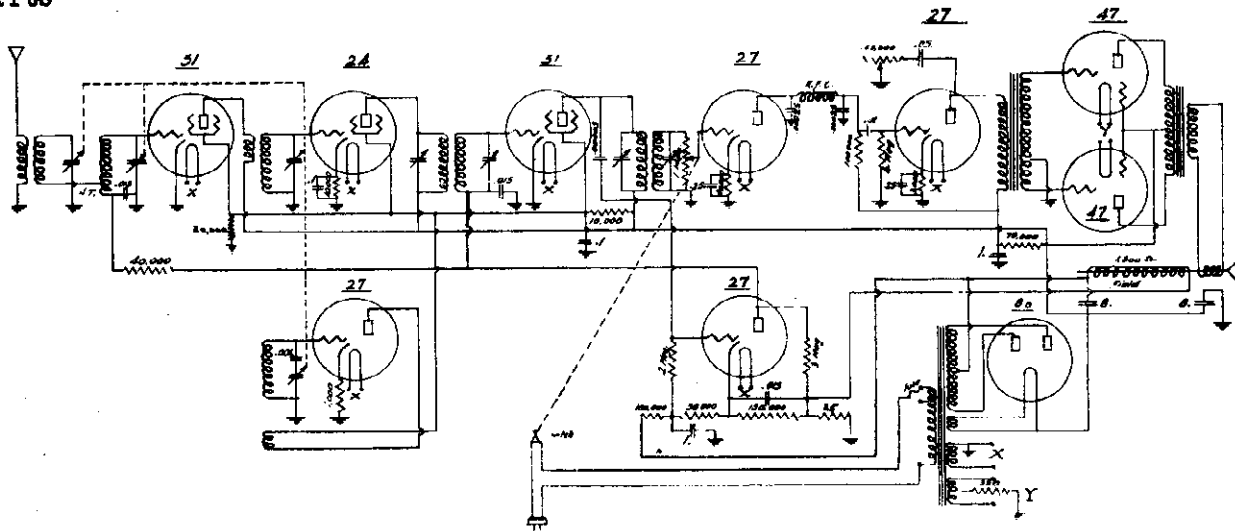
Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly after which the chassis may be reinstalled in the cabinet.

MODEL 62-16
Schematic, Voltage
Parts

MONTGOMERY-WARD & CO.



Ten Tube Super-Heterodyne

This receiver is a super-heterodyne employing the following tubes:
Signal frequency amplifier, type No. 235; First detector, type No. 224;
Intermediate frequency amplifier, type No. 235; Second detector, type
No. 227; First audio, type No. 227; Second audio, two type No. 247's;
Rectifier, type No. 280 and AVC tube, type No. 227.

A pre-selector is used between the antenna and the signal frequency
RF stage being tuned by the two rear sections of the gang condenser.
One coil is mounted directly behind the condenser, in a shield, and the
other is located to the right of the condenser, next to the RF tube.
The oscillator and detector coils are magnetically coupled and are lo-
cated underneath the variable condenser.

The I. F. amplifier is designed to give as nearly as possible a flat top
response with a band width of ten kilocycles at a signal interference
ratio of 1,000 to 1. The coils in the I. F. transformers, therefore are
adjusted to approximately critical coupling, and in aligning the I. F.
tuned circuits it is unnecessary to stagger the condensers to produce the
desirable flat top tuning curve.

INSTALLATION

The sensitivity of this receiver being extremely high, (2 to 5 micro-
volts) certain precautions are necessary in the installation which are un-
important with receivers of poorer sensitivity. While no definite length
can be established for the antenna due to varying local conditions, the
average installation should be from 20 to 50 feet, including lead-in. In
some locations where field strength is very low, longer antennas may be
used, but in all cases, the antenna should be the shortest possible con-
sistent with good station pickup.

The following voltages should be read with no signal being received:

With 100,000 ohm voltmeter (200 volt scale, 1,000 ohms per volt)---	
From ground to R. F. screen	95
From ground to R. F. plate	200
From ground to First detector cathode	10
From ground to Oscillator cathode	5
From ground to Second detector cathode	6
From ground to Second detector plate	30
From ground to Second detector plate resistance	75
From ground to First AF plate	75
From ground to Second AF screen	200
From ground to Second AF plate	190
From ground to Speaker field	140
With 30,000 ohm meter (30 volt scale, 1,000 ohms per volt)---	
Second AF bias	13.5
Second RF bias	2.5
First AF bias	4.8
With 600,000 ohm meter (600 volt scale, 1,000 ohms per volt)---	
80 filament to C. T. of power transformer secondary	345 V.
A. V. C. grid voltage	20
A. V. C. plate voltage	60
A. V. C. filter voltage	40

AC VOLTAGE

Heater filaments	2 V.
Pentode filaments	2.25
80 filaments	4.6

Replacement Parts List Model 62-16

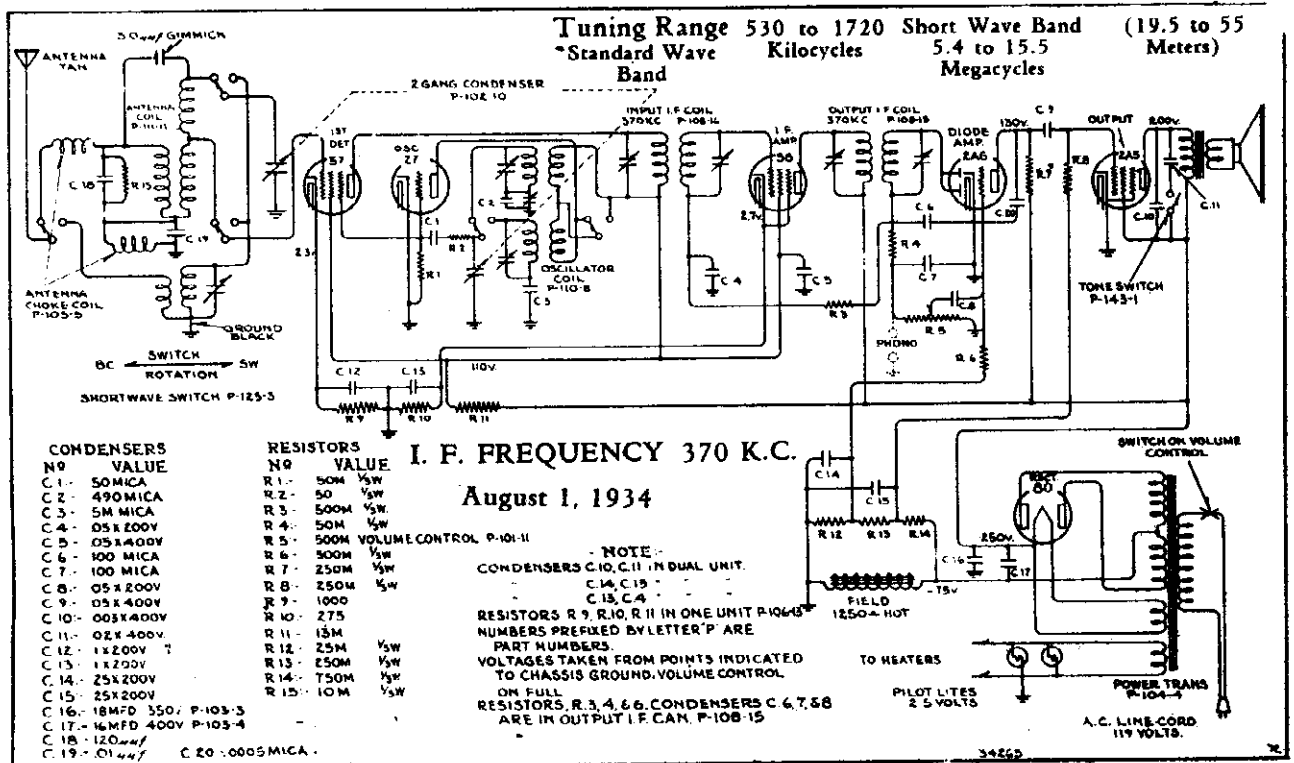
Supplier: Davison-Haynes Mfg. Co., Los Angeles, California

Part No.	PART NAME	Unit Price	Per Chassis	Cost Price	Selling Price	Part No.	PART NAME	Unit Price	Per Chassis	Cost Price	Selling Price
62-A 1	Power Transformer	1		\$2.00	\$5.00	62-A22	50,000 ohm 1/3 watt	1		.08	.20
62-A 2	Audio Transformer	1		.87	2.17	62-A23	100,000 ohm 1/3 watt	3		.08	.20
62-A 3	Intermediate Coil—1st stage	1		.40	1.00	62-A24	150,000 ohm—1/3 watt	1		.08	.20
62-A 4	Intermediate Coil—2nd stage	1		.40	1.00	62-A25	250,000 ohm—1/3 watt	1		.08	.20
62-A 5	Band Pass Coil	1		.40	1.00	62-A26	2 meg ohm 1/3 watt	1		.08	.20
62-A 6	Antenna Coil	1		.40	1.00	62-A27	3 meg ohm 1/3 watt	1		.08	.20
62-A 7	Coil Shield Can	4		.08	.20	62-A28	60 ohm wirewound	1		.08	.20
62-A 8	Tube Shield Can	7		.08	.20						
62-A 9	Variable Condenser—4 gang	1		2.60	6.10	62-A29	.015—200 Volt	3		.12	.30
62-A10	Volume Control with Switch—1 meg ohm	1		.48	1.20	62-A30	.01—400 Volt	1		.15	.37
62-A11	Tone Control 100,000 ohm	1		.36	.90	62-A31	.05—400 Volt	1		.12	.30
62-A12	Electrolytic Condenser 4 mfd.	2		.60	1.50	62-A32	.25—200 Volt	2		.15	.37
62-A13	By Pass Block 2x1. mfd.	1		.10	1.25	62-A33	.1—400 Volt	1		.12	.30
62-A14	Dial Assembly with Escutcheon	1		.75	1.87	62-A34	.001—3% R. F. Choke	1		.21	.52
						62-A35	Tuning Meter	1		.75	1.88
						62-A36	A. C. Cord and Plug	1		.16	.40
62-A15	350 ohm—2 watt	1		.12	.30	62-A37	Antenna and Ground Post	1		.12	.30
62-A16	15,000 ohm—2 watt	1		.12	.30	62-A38	Phonograph Jack	1		.12	.30
62-A17	75,000 ohm—1 watt	1		.09	.22	62-A39	Magnavox Speaker No. 114	2	2.75	6.88	
62-A18	1,000 ohm—1 watt	1		.09	.22	62-A40	Knobs	3		.10	.25
62-A19	40,000 ohm—1/3 watt	3		.09	.20	62-A41	Tube Sockets:	11		.06	.15
62-A20	10,000 ohm—1/3 watt	1		.08	.20						
62-A21	1,000 ohm—1/3 watt	1		.08	.20	4 227, 2-247, 1-280, 1-224, 2-235, 1 speaker socket.					

MONTGOMERY-WARD & CO.

MODELS 62-135, 62-150
62-154

Schematic, Voltage, Parts



CONDENSERS

No.	VALUE
C.1-	50MICA
C.2-	490MICA
C.3-	5M MICA
C.4-	05K 200V
C.5-	05K 400V
C.6-	100 MICA
C.7-	100 MICA
C.8-	05K 200V
C.9-	05K 400V
C.10-	005K 400V
C.11-	02K 400V
C.12-	1K 200V T
C.13-	1K 200V
C.14-	25K 200V
C.15-	25K 200V
C.16-	18MFD 350V P-103-3
C.17-	16MFD 400V P-103-4
C.18-	120MFD
C.19-	01MFD
C.20-	0005MICA

RESISTORS

No.	VALUE
R.1-	50M 1/2W
R.2-	50 1/2W
R.3-	500M 1/2W
R.4-	50M 1/2W
R.5-	500M VOLUME CONTROL P-101-11
R.6-	300M 1/2W
R.7-	250M 1/2W
R.8-	250M 1/2W
R.9-	1000
R.10-	275
R.11-	15M
R.12-	25M 1/2W
R.13-	250M 1/2W
R.14-	750M 1/2W
R.15-	10M 1/2W

MODEL NUMBERS FOLLOWED BY "X" INDICATES 25-CYCLES

Repair Parts Price List

Order all parts on stock order from Chicago or Oakland only.
Return defective parts for credit to Chicago or Oakland only.

Part No.	Description	No. Used in Set	Selling Price
BE 100-9	.05 x 200 Volt Condenser—20%.....	1	.10
BE 100-13	.05 x 400 Volt Condenser—20%.....	2	.10
BE 100-14	.1 x 200 Volt Condenser—20%.....	1	.10
BE 100-18	.01 x 400 Volt Condenser—5%.....	1	.10
BE 101-11	Volume Control with Switch.....	1	.60
BE 102-10	Two Gang Variable Condenser.....	1	1.30
BE 103-3	18 Mfd. x 300 V. Electro. Cond.....	1	.70
BE 103-4	16 Mfd. x 350 V. Electro. Cond.....	1	.70
BE 104-4	Power Transformer—50-60 Cycle.....	1	2.00
BE 104-10	Power Transformer—25 Cycle.....	1	3.00
BE 104-11	Power Transformer—Universal Primary—40 Cycle.....	1	3.50
BE 104-15	Power Transformer—Universal Primary—25 Cycle.....	1	4.60
BE 105-5	Antenna Choke Coil.....	1	.30
BE 106-13	14,275 Ohm Metal Clad Resistor.....	1	.40
BE 107-5	Line Cord and Plug.....	1	.30
BE 108-15	Output I.F. Transformer Complete.....	1	.80
BE 108-16	Input I.F. Transformer Complete.....	1	.70
BE 110-8	Oscillator Coil Complete in Can.....	1	1.00
BE 111-11	Antenna Coil Complete in Can.....	1	1.10
BE 112-10	Drive Bracket—Less Planetary.....	1	.30
BE 112-21	Dial.....	1	.20
BE 112-23	Pointer.....	1	.06
BE 112-24	Dial Glass.....	1	.10
BE 112-26	Planetary Drive Complete.....	1	.50
BE 112-31	Compression Spring.....	1	.02
BE 112-38	Bakelite Escutcheon.....	1	.30
BE 112-40	Pilot Light Bracket.....	2	.10
BE 112-65	Glass Retaining Escutcheon with glass.....	1	.40
BE 112-68	Dial Scale used on sets with BE 112-65 escutcheons.....	1	.25
BE 112-70	Dial Bracket—Less Planetary Replaces BE 112-10 on sets using Glass Retaining Escutcheon BE 112-65.....	1	.30

Part No.	Description	No. Used in Set	Selling Price
BE 114-1	Dynamic Speaker—Six Inch.....		3.80
BE 114-4	Dynamic Speaker—Eight Inch.....		4.20
BE 116-1	2.5 Volt Pilot Lamp—41-G3 1/2.....	2	.10
BE 118-3	.05 x .1—200 Volt Condenser—20%.....	1	.20
BE 118-4	.003 x .02—400 Volt Dual Cond. 20%.....	1	.20
BE 118-7	.25 x .25—200 Volt Dual Cond. 20%.....	1	.20
BE 124-5	J-3-S Series Padder.....	1	.16
BE 125-3	Short Wave Switch.....	1	.70
BE 129-2	.0005 Mica Condenser—20%.....	1	.10
BE 129-5	.0001 Mica Condenser—20%.....	2	.10
BE 129-9	.005 Mica Condenser—10%.....	1	.30
BE 129-10	.00049 Mica Condenser — 12 1/2% Min. 8%.....	1	.10
BE 129-11	.00005 Mica Condenser—30%.....	1	.10
BE 129-13	120 Mmf. Mica Condenser—10%.....	1	.10
BE 130-1	25M Ohm—1/3 Watt Carbon Res. 1.....	1	.10
BE 130-3	500M Ohm—1/3 Watt Carbon Res. 2.....	2	.10
BE 130-11	250M Ohm—1/3 Watt Carbon Res. 2.....	2	.10
BE 130-12	70M Ohm—1/3 Watt Carbon Res. 2.....	2	.10
BE 130-17	10M Ohm—1/3 Watt Carbon Res. 1.....	1	.10
BE 130-27	50M Ohm—1/3 Watt Carbon Res. 1.....	1	.10
BE 130-28	750M Ohm—1/3 Watt Carbon Res. 1.....	1	.10
BE 130-33	240M Ohm—1/3 Watt Carbon Res. 1.....	1	.10
BE 131-2	Bakelite Knobs (Inc. Springs).....	3	.10
BE 143-1	Tone Switch.....	1	.12
	All Sockets.....		.20
	Cabinet—Model 62-135.....		5.60
	Cabinet—Model 62-150.....		5.60
	Cabinet—Model 62-154.....		13.00

All resistors are RMA color coded—specify value and/or resistor (per schematic diagram) and model number.
When ordering condensers, specify part number, model number 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.

MODELS 62-135, 62-150, 62-154

Socket, Trimmers, Alignment MONTGOMERY-WARD & CO.

60 Cycle Chassis No. 62-135, No. 62-150 and 62-154

25 Cycle Chassis No. 62-135-X, No. 62-150-X and 62-154-X

Service Notes

Voltages taken from different points of circuit to chassis are measured with volume control full on, right turn, with a voltmeter having a resistance of 1000 ohms per volt. These voltage are indicated on the schematic circuit diagram.

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

Excessive hum, low volume, stuttering 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 reproduction.

Should the planetary type vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked, broken or weak compression spring. This drive may be dis-assembled by removing the two screws which fasten it to the dial bracket. The part number of the compression spring is BE112-31. All of the other dial parts are hardened and should cause no trouble.

Part BE 106-13, a metal clad resistor combining resistors R9, R10, R11, can be repaired without removing by replacing open sections with carbon resistors.

R 9 = $\frac{3}{8}$ watt 1000 ohms \pm 10%
 R10 = $\frac{3}{8}$ watt 275 ohms \pm 10%
 R11 = 2 watts 13000 ohms \pm 10%

Care should be used in replacing broken dial crystals, the small retaining ears sometimes break off unless they are carefully adjusted. Should they break, it is best to solder them in place rather than replace the entire BE112-10 unit.

Some chassis are equipped with glass retaining escutcheons Part No. BE 112-65, on these chassis dial scale No. BE 112-68 replaces BE 112-21.

25 Cycle Chassis

The 25 cycle chassis, models 62-135X, 62-150X and 62-154X may be used on a power supply from 105 to 115 volts, 60 cycles, but the 60 cycle models must not under any circumstances be operated on 25 cycles.

Chassis equipped with transformers for special voltages or frequencies are so marked.

Aligning I. F. Transformers:

1. With volume control full on, at extreme right of its rotation, and with wave selector switch in the broadcast position, extreme left of its rotation, with variable condenser at its minimum capacity position, plates entirely out of mesh, adjust the I.F. transformers, parts number BE108-15 and BE108-16 in the following manner:

- (a) Connect an external oscillator adjusted to 370 kilocycles in series with a .1 mfd. condenser to the control grid cap of the type 57 first detector tube.
- (b) Adjust trimming condensers of both I.F. transformers to resonance. 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 2A5 output tube. Maximum deflection of the meter indicates resonance. Care should be taken to use only enough signal to give a readily readable output.

Note: The two trimmer condensers which tune the primary and secondary of the I.F. transformers are adjusted by set screws and are accessible from the back of the chassis.

Broadcast Band Alignment:

1. Shift the frequency of the external oscillator to 535 kilocycles and connect it in series with a 200 mmfd condenser to the tan antenna wire and the black ground wire.

- (a) Set the variable condenser in its maximum capacity position, plates entirely in mesh.
- (b) Adjust the broadcast oscillator series trimmer to resonance with oscillator. This adjustment is located between the variable condenser and the power transformer and is accessible from the top of the chassis.

Alignment

The set should be carefully checked for all other possible causes of trouble, such as defective tubes, condensers, resistors, poor installations and low line voltages before any attempt is made at re-alignment.

Note: When making this adjustment, slowly vary the frequency of the external oscillator as the adjustment is made. Adjust for maximum output.

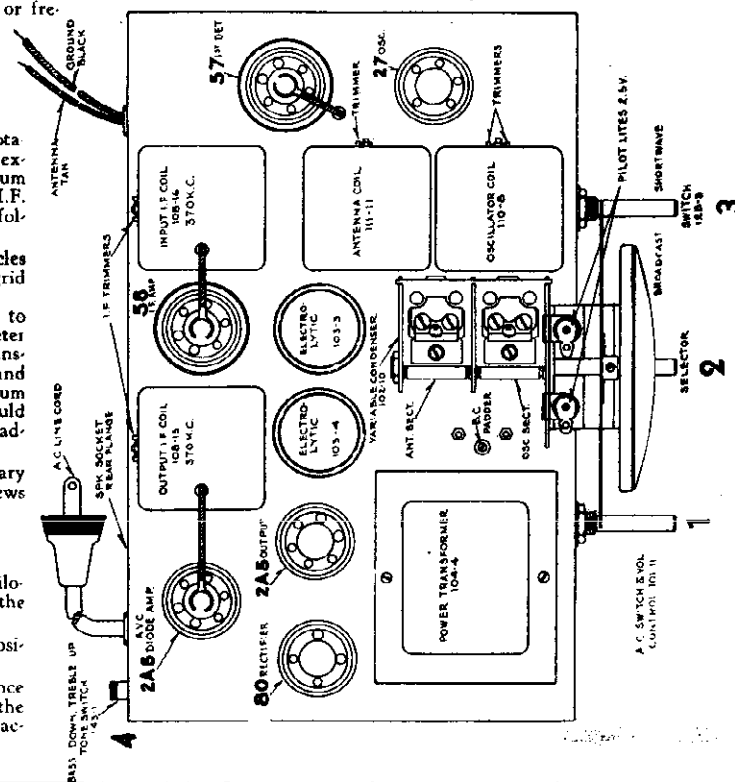
2. Shift frequency of external oscillator to 1712 kilocycles and set variable condenser in its minimum capacity position, plates entirely out of mesh:

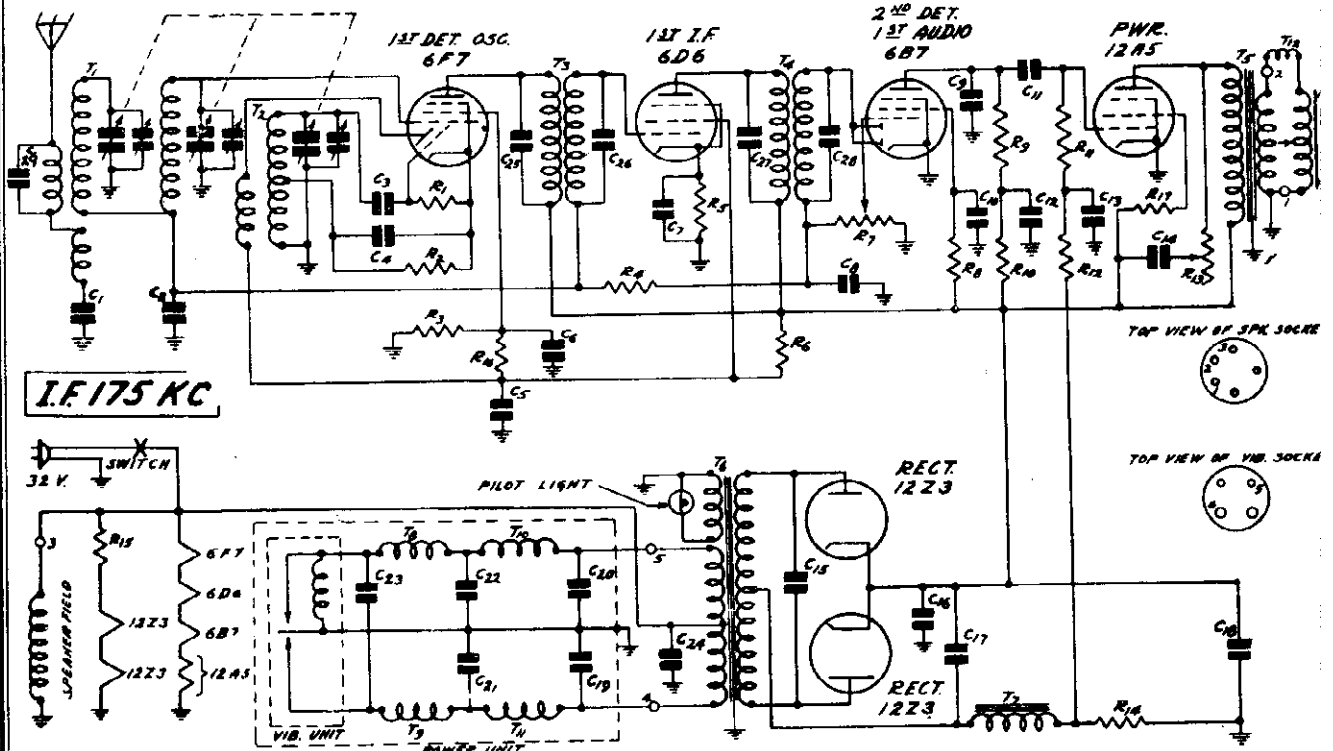
- (a) Adjust the broadcast oscillator shunt trimmer to resonance. This adjustment is the top adjustment in oscillator can assembly, part number BE110-8 (see top view).

Short Wave Band Alignment:

1. Set the wave changing switch in the short wave position, right turn, and shift external oscillator frequency to 15 megacycles. Connect oscillator to tan antenna lead in series with a 300 ohm resistor to black ground wire.

- (a) With selector knob adjust variable condenser so that dial indicator points to the 15 megacycle calibration on the bottom sector of the dial.
- (b) Adjust the short wave oscillator shunt trimmer to resonance with the 15 megacycle signal (use care and make certain that you do not adjust to resonance with the image instead of the signal). This adjustment is the one closest to the chassis on the side of the oscillator coil can assembly, part number BE110-8, and is accessible from the side of the chassis.
- (c) Adjust the short wave antenna trimmer to resonance. This adjustment is the single adjustment on the side of the antenna coil can assembly, part number BE111-11, and is accessible from the side of the chassis, between the type 57 and 27 tubes.





The numbers on the 2 sockets shown at the right above, correspond with the numbers as shown, in the circuit.

P-5221	1st I. F. Coil and Can Assembly	.78
P-5203	2nd I. F. Coil and Can Assembly	.72
P-50626	Power Transformer	1.69
P-50624A	6B Output Transformer	.48
P-50637	"B" Filter Reactor	.42
P-1885	6D6 Tube Socket	.06
P-1944	6B7 Tube Socket	.06
P-1945	6F7 Tube Socket	.06
P-1946	12A5 Tube Socket	.06
P-2020	12Z3 Tube Socket	.08
P-1637	Speaker Socket	.06
P-2069	Knob, Small	.10
P-2062	Knob, Large	.10
P-10272	Rubber Chassis Cushions	.04
P-40445	Tube Shield	.08
P-40443	Tube Shield Base	.04
P-10320	Glass Crystal	.08
P-30875	Crystal Retainer Ring	.06
P-1421	Single Lug Mtg.	.04
P-2130	Double Insulated Mtg. Lug	.04
P-20912	Large Double End Pointer	.10
P-30456	Small Pointer	.04
P-30342	Grid Cap Only	.04
P-70702	115 Volt Line and Plug Assembly	.32
P-70703	Antenna and Ground Wires	.16
P-3012	Pilot Light Bulb (6.8 volts)	.08
P-2147	Speaker 6" Mantel	3.62
P-2173	Speaker 8" Console	4.20
P-10347	Rubber Grommet (Small Gang Cond. Mtg.)	.04
P-10296	Rubber Grommet (Large)	.04

"B" POWER UNIT PARTS

P-70770	Shield Cable and Plug	.24
P-40439	Vibrator Shield Can	.12
P-2153	Vibrator Unit	2.98
P-5172	R. F. Choke Coils	.14
P-2021	Vibrator Socket	.06
P-10349	Rubber Band (For Mtg. Vib.)	.12
P-20926	Screw Hook (For Mtg. Vib.)	.04
P-81101	C19 .01 Mf. 400V Tubular Condenser	.08
P-81101	C20 .01 Mf. 400V Tubular Condenser	.08
P-80888	C21 .25 Mf. 200V Tubular Condenser	.12
P-80888	C22 .25 Mf. 200V Tubular Condenser	.12
P-81054	C23 .5 Mf. 140V Tubular Condenser	.16

Part No.	Code	Capacity	Voltage	Type	Selling Price
P-80862	C1	.05 Mf.	200V	Tubular	\$.08
P-80862	C2	.05 Mf.	200V	"	.08
P-81801	C3	.35 Mmf.		Wire Capacitor Part of Osc. Assem.	.08
P-80862	C4	.05 Mf.	200V	Tubular	.08
P-80888	C5	.25 Mf.	200V	"	.12
P-81049	C6	.05 Mf.	200V	"	.30
	C7	.05 Mf.	200V	"	
P-81811	C8	100 Mmf.		Wire Capacitor	.08
P-81051	C9	.002 Mf.	600V	Tubular	.08
P-80888	C10	.25 Mf.	200V	"	.12
P-80872	C11	.01 Mf.	600V	"	.12
P-80888	C12	.25 Mf.	100V	"	.12
P-81062	C13	.01 Mf.	140V	"	.12
P-81055	C14	.05 Mf.	400V	"	.12
P-81052	C15	.015 Mf.	1600V	"	.18
P-80887	C16	.10 Mf.	400V	"	.10
P-81016	C17	8.0 Mf.	300V	Electrolytic Block	1.10
	C18	8.0 Mf.	300V	"	
P-80993	C24	.5 Mf.	140V	Tubular	.18
P-81806	C25	70 Mmf.		Wire Capac. Part of 1st I. F. Assem.	.08
P-81874	C26	45 Mmf.		Wire Capac. Part of 1st I. F. Assem.	.08
P-81808	C27	90 Mmf.		Wire Capac. Part of 2nd I. F. Assem.	.08
P-81810	C28	100 Mmf.		Wire Capac. Part of 2nd I. F. Assem.	.08
P-81812	C29	200 Mmf.		Wire Capac. Part of Ant. Assem.	.08
P-81015				Three Gang Condenser	1.76

CONDENSERS

RESISTORS

Part No.	Code	Resistance	Wattage	Type	Selling Price
P-A95104	R1	100,000 Ohm	.2	Carbon	\$.03
P-A95152	R2	1,500 Ohm	.2	Carbon	.08
P-B94303	R3	30,000 Ohm	.5	Carbon	.08
P-A98205	R4	2 Megohm	.2	Carbon	.08
P-98021	R5	400 Ohm	.2	Wire Wound	.08
P-C93702	R6	7,000 Ohm	1.0	Carbon	.10
P-96014	R7	500,000 Ohm		Volume Control	.50
P-B94204	R8	200,000 Ohm	.5	Carbon	.68
P-B94603	R9	60,000 Ohm	.5	Carbon	.68
P-A95203	R10	20,000 Ohm	.2	Carbon	.10
P-A95504	R11	500,000 Ohm	.2	Carbon	.08
P-A94104	R12	100,000 Ohm	.2	Carbon	.08
P-97011	R13	150,000 Ohm		Tone Control	.36
P-98035	R14	450 Ohm	2.0	Wire Wound	.08
P-98034	R15	25 Ohm	3.0	Wire Wound	.08
P-B95602	R16	6,000 Ohm	.5	Carbon	.08

INTERFERENCE ELIMINATION PARTS

Part No.	Description	Selling Price
P-80933	Dual .5 Mfd. Generator Condenser	.60
62-5424	Spark Plug Suppressor	.25

Part No.	Description	Selling Price
P-5200	Antenna Transformer Assembly less Can	\$.64
P-40433	Can for Above Assembly	.05
P-5702	Oscillator Coil and Can Assembly	.56

MODEL 62-136, 62-138

Voltage, Socket, Data Alignment

MONTGOMERY-WARD & 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 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 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 1/4" 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.

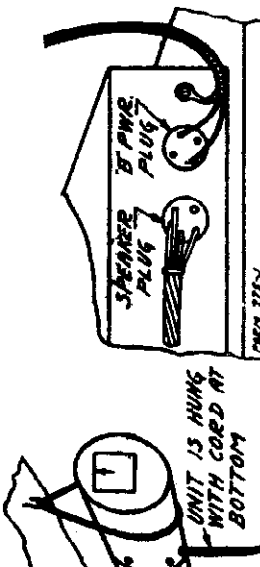


Fig. 3—Method of Installing "B" Power Unit

Condenser Alignment

Misalignment or mistacking 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 for 1730 K. C. Turn the rotor to the full open position. The antenna-lead from the signal generator adjustment is connected to the antenna lead of the receiver. Adjust the trimmer of the oscillator section of the 9 gang condenser until maximum output is obtained. The oscillator section is the one with the cut plate rotor.

Now 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.

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.

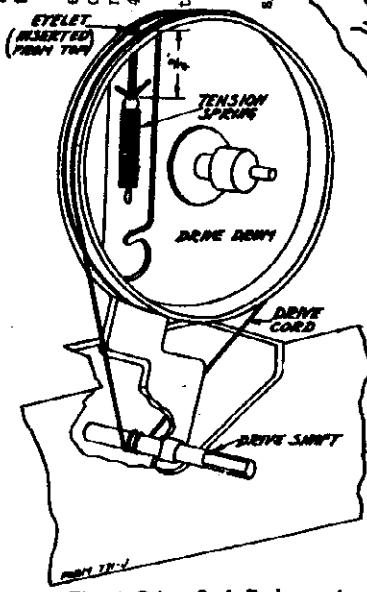


Fig. 4—Drive Cord Replacement

Power Transformer H. V. Secondary.....	T6	322
Center Tap to Inside.....	T6	339
Center Tap to Outside.....	T6	3
Power Transformer Pilot Lamp Sec.....	T6	1025
Vibrator Unit Magnifying Coil.....		3.0
Vibrator Unit Filter Chokes.....		

VOLTAGES AT SOCKETS

Input 32 Volts—Antenna Shorted to Ground

Type of Tube	Function	Across Filament Cathode	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
6F7	1st Det. & Osc.	0.3	167(1)	90	2.6	7.0(1)
6D6	I. F.	6.3	172	120	3.2	2.8(2)
6B7	2nd Det.	6.3	25	25	7.25	8.2
12A5	Output	12.6	180	180	25	2.0
12Z3	Rectifier	12.6	225			32
						25

(1) Pentode Section of Tube; (2) Triode Section of Tube

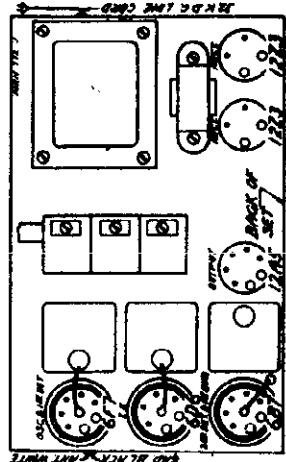


Fig. 2—Arrangement of Tubes

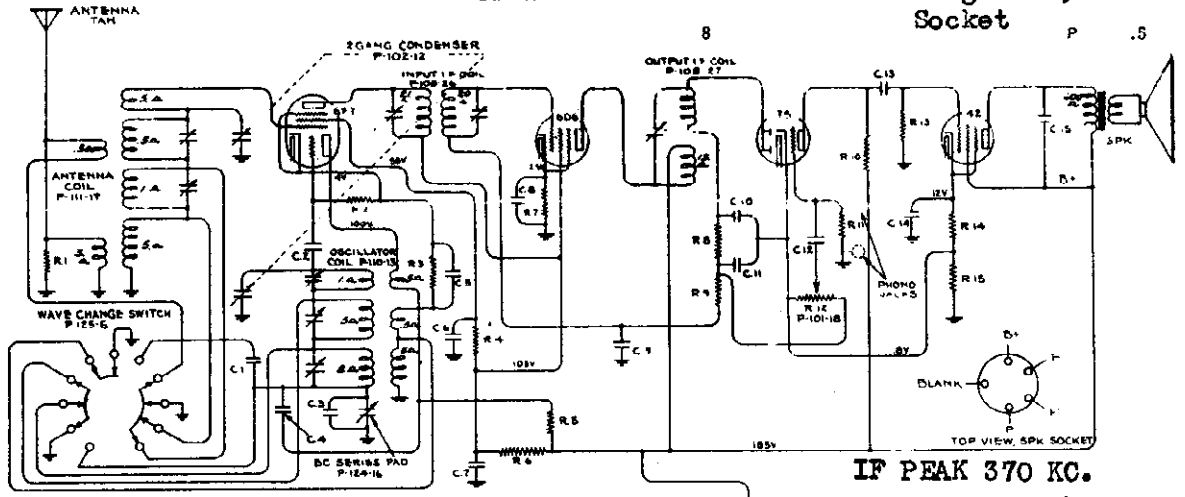
Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	D. C. Resist. across in Ohms
P-5200	Primary of Antenna Trans. in Series.....	T1	Small
	1st Secondary of Antenna Transformer.....	T1	3.2
	2nd Secondary of Antenna Transformer.....	T1	2.4
P-5201	Oscillator Plate Coil.....	T2	2.0
	Oscillator Grid Coil.....	T2	3.5
P-5221	1st I. F. Transformer Primary.....	T3	67
	1st I. F. Transformer Secondary.....	T3	93
P-5231	2nd I. F. Transformer Primary.....	T3	60
	2nd I. F. Transformer Secondary.....	T4	63
P-5264	Output Transformer Primary.....	T5	240
	Output Transformer Secondary and Bucking Coil in Series.....	T5 & L12	Small
P-4063	"B" Filter Reactor.....	T7	300
P-2147	Speaker Field.....		97
P-2173	Speaker Voice Coil.....		Small
P-50626	Power Transformer Primary.....	T6	3.6
	Center Tap to Inside.....	T6	4.4
	Center Tap to Outside.....	T6	

MONTGOMERY-WARD & CO.

Schematic, Voltage Alignment, Trimmers Socket

SERIES A



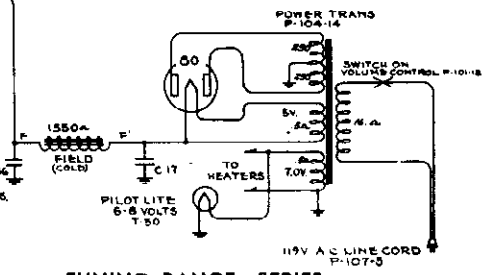
CONDENSERS

NO.	VALUE
C1	2070 MICA
C2	100
C3	475
C4	1X200V
C5	1X200V
C6	1X200V
C7	1X200V
C8	1X200V
C9	1X200V
C10	500 MICA
C11	500 MICA
C12	0.5X200V
C13	0.1X400V
C14	40MFD X 25V
C15	0.5X400V
C16	3.0MFD X 250V
C17	4.0MFD X 300V

LEGEND

RESISTORS	VALUE
R1	800Ω 1/2W
R2	50MΩ 1/2W
R3	700Ω
R4	100MΩ
R5	20MΩ
R6	19MΩ 1/2W
R7	500Ω
R8	50MΩ 1/2W
R9	1MEG
R10	250MΩ
R11	2MEG
R12	500MΩ VOL CONTROL
R13	500MΩ 1/2W
R14	500Ω
R15	35Ω

NOTE:
C7, C9 ARE IN ONE UNIT P-118-4
C14, C16 C17 ONE UNIT LYTC P-119-11
R7, R14, R15, ONE UNIT P-106-10
NUMBERS PREFIXED BY LETTER 'P' ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.
WAVE CHANGE SWITCH P-125-6 3 POSITIONS, ROTATING CLKWISE - 1' POSITION - BC 1720-540KC 2' MW 7.6-7.5MC 3' SW 23.0-7.5MC SWITCH SHOWN AT 3' POSITION



IF PEAK 370 KC.

TUNING RANGE—SERIES A:
Standard Broadcast Band 540 - 1720 Kilocycles
Intermediate Band 2.3 - 7.6 Megacycles
Short Wave Band 7.5 - 23.0 Megacycles

Series "A" chassis are equipped with dry electrolytic filter condensers and are serially numbered on paper tags which are attached to the line cord and to the inside of the cabinet.

X AFTER MODEL NUMBER INDICATES 25-CYCLE OPERATION

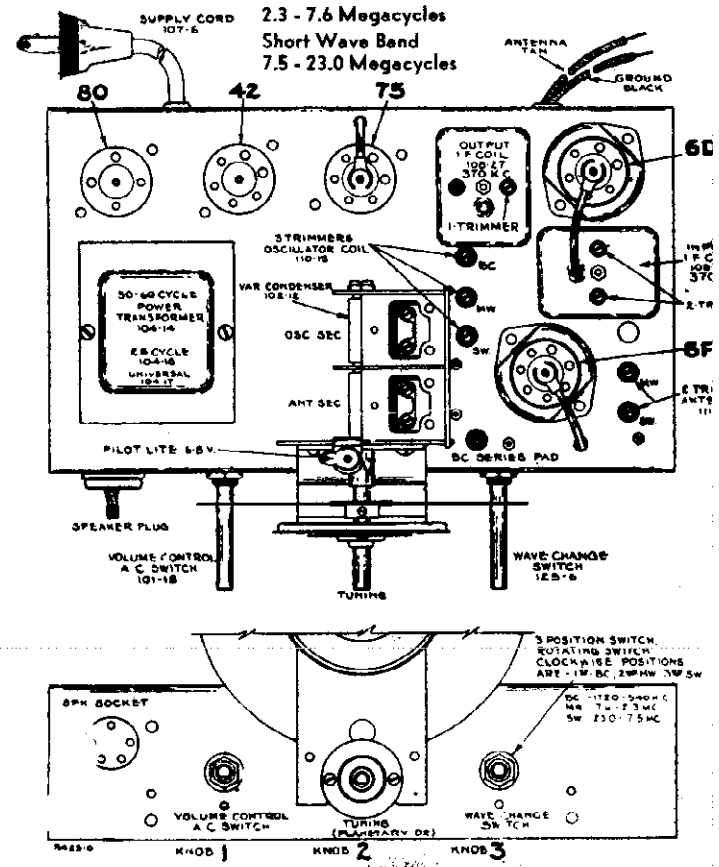
ALIGNING INSTRUCTIONS—SERIES A

Description of various dummy antennas used and referred to in these instructions:

- (1) I.F. Dummy—Consists of a .1 mfd. condenser connected in series with the external oscillator.
- (2) Broadcast Dummy—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.
- (3) Intermediate and Short Wave Dummy—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 42 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 volt meter should be used.



MODELS 62-147, 62-156
62-164, Series A

MONTGOMERY-WARD & CO.

Alignment

Aligning I. F. Transformers

1. With volume control full on, the extreme right of its rotation, and with wave changing switch in the broadcast position, extreme left of its rotation, and with variable condenser at its minimum capacity position, plates entirely out of mesh, adjust the I.F. transformers (adjustments at the top of parts number 108-26 and 108-27—see top view).
 - (a) Connect external oscillator in series with I.F. dummy antenna. With external oscillator adjusted to 370 kilocycles, in series with I.F. dummy antenna to the control grid cap of the type 6D6 tube and chassis ground, adjust output I.F. transformer, part number 108-27, to resonance.

Note: Output I.F. transformer, part number 108-27, has only one adjustment.

- (b) Move generator output clip from grid of 6D6 to grid cap of type 6F7 tube and align input I.F. transformer, part number 108-26, to resonance. NOTE: IT IS EXTREMELY NECESSARY TO ALIGN BOTH I.F. STAGES SEPARATELY.

Broadcast Band Alignment— (540 - 1720 Kilocycles)

1. With wave 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 broadcast dummy antenna to tan antenna lead and black ground lead, make the following adjustments:
 - (a) Set external oscillator to 1720 kilocycles and adjust oscillator trimmer to resonance. This adjustment is the rear adjustment of a group of three located next to the variable condenser.
 - (b) Readjust external oscillator to 600 kilocycles and adjust broadcast series pad to resonance by rotating condenser to approximately 600 kilocycles, rocking it slowly to and fro until by adjusting pad maximum output is attained. This adjustment is located at the front of the chassis next to the variable condenser and wave changing switch.
 - (c) Check for tracking and sensitivity at 1400 and 1000 kilocycles. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

Short Wave Band Alignment— (7.5 - 23.0 Megacycles)

1. This band is aligned after the I.F. adjustments have been completed. Set wave selector switch in the short wave position, extreme right of its rotation, set pointer of dial to 21 megacycles.
 - (a) With external oscillator set at 21 megacycles, and connected to the tan antenna lead in series with the short wave dummy and to the black ground lead, adjust the oscillator short wave trimmer until generator signal is picked up. This trimmer is the one closest to the front of the chassis of the group of three trimmers located next to the gang condenser (see top view of chassis).
 - (b) Adjust short wave antenna trimmer to resonance. This adjustment is to the right of the 6F7 tube and is the one closest to the front of the chassis (see top view).
 - (c) Re-set external oscillator to 9 megacycles and pick up oscillator signal by rotating variable condenser, moving dial pointer. Check for tracking and sensitivity and do not bend plates. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

Intermediate Band Alignment— (2.3 - 7.6 Megacycles)

1. With wave selector switch in the center position and with dial pointer set to 7 megacycles, makes the following adjustments:
 - (a) With external oscillator set at 7 megacycles and connected in series with the short wave dummy antenna to the tan antenna lead and black ground lead, same as for short wave adjustments, adjust center trimmer of oscillator coil, part number 110-13, until 7 megacycle signal is picked up. This is the center adjustment of a group of three located next to the gang condenser (see top view).
 - (b) Adjust antenna trimmer to resonance, this adjustment is the rear of a group of two located at the right of the chassis next to the 6F7 tube (see top view).
 - (c) Re-set external oscillator to 2.5 megacycles (2500 kilocycles), pick up signal by rotating condenser and moving dial pointer. Check for tracking and sensitivity. Do not bend plates. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

Service Notes

To check for open by-pass condensers, shunt each condenser with another of similar capacity and of the same voltage rating, which is known to be good, until the defective unit is located. Open by-pass condensers frequently cause oscillation and distorted tone. Defective and shorted electrolytic filter condensers cause excessive hum, motor-boating, low volume and a reduction in all D.C. voltages. Open or shorted electrolytic and by-pass condensers (across bias resistor of type 42 tube) will cause low volume and distorted tone.

Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. The drive may be disassembled to replace the compression spring (part number 112-31) by removing the two screws which fasten it to the dial bracket. Before reassembling all parts should be carefully cleaned and a small amount of vaseline applied to the ball bearings. All other dial parts are hardened and should cause no trouble.

Notes—(Series "A" Only)

25 Cycle chassis differ from regular 60 cycle and 40 cycle chassis in that a larger electrolytic filter condenser is used. The regular condenser is part number 119-11 and the larger unit for the 25 cycle chassis is part number 119-12.

Part number 106-18, a metal clad resistor, consists of the following sections with resistances and wattages as noted: one, 500 ohms; one, 35 ohms, one, 200 ohms, all 1/3 watt, plus or minus 10%.

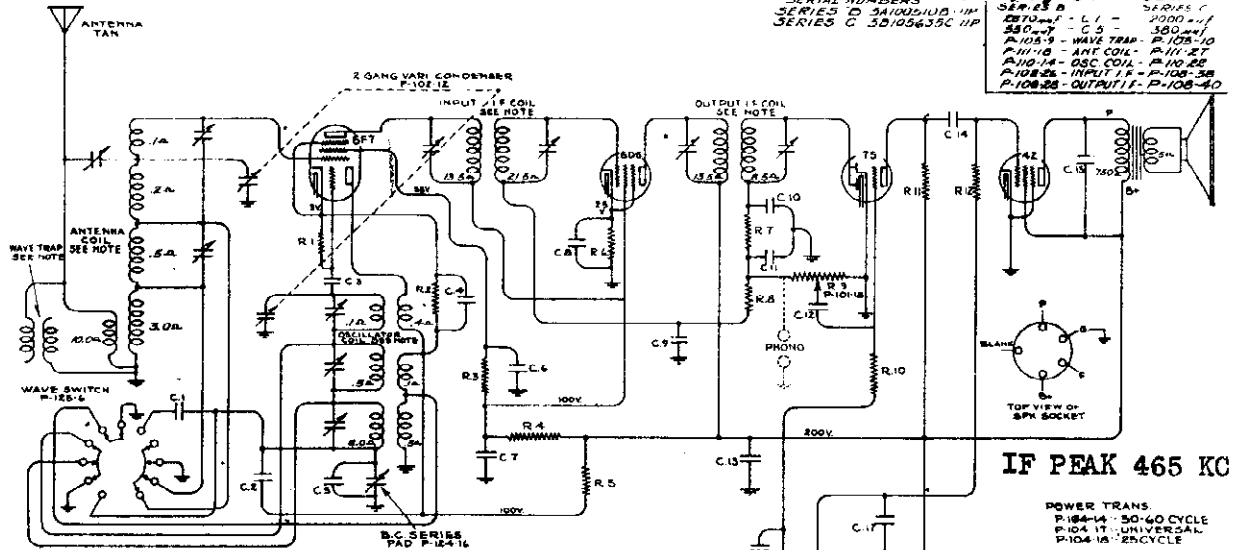
**X AFTER MODEL NUMBER INDICATES
25-CYCLE OPERATION**

SERIES A

Alignment

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 three bolts by which it is fastened and the speaker plug which you will find on the front flange of the chassis.

MONTGOMERY-WARD & CO.



SERIAL NUMBERS
 SERIES B 3A100510B HP
 SERIES C 5B105635C HP

500000 P
 250000 P
 100000 P
 50000 P
 25000 P
 10000 P
 5000 P
 2500 P
 1000 P
 500 P
 250 P
 100 P
 50 P
 25 P
 10 P
 5 P
 2.5 P
 1 P
 .5 P
 .25 P
 .1 P
 .05 P
 .025 P
 .01 P
 .005 P
 .0025 P
 .001 P

CONDENSERS		RESISTORS	
NO	VALUE	NO	VALUE
C1	SEE NOTE	R1	50M 1/2W
C2	1500V	R2	100
C3	100M MICA	R3	100M
C4	1500V	R4	25M 1/2W
C5	SEE NOTE	R5	50M
C6	1500V	R6	250 1/2W
C7	1500V	R7	50M
C8	1500V	R8	500M
C9	1500V	R9	100M VOL. CONTR.
C10	100M MICA	R10	1MEG 1/2W
C11	100M MICA	R11	250M
C12	500000	R12	100M
C13	50MFD X 350V P-103-7	R13	15M
C14	500000	R14	150M
C15	.015 X 500V	R15	500M
C16	1500V		
C17	1500V		
C18	50MFD X 350V P-103-4		
C19	.015 X 500V		

C6, C8 IN DUAL UNIT P-118-1
 C7, C9
 C16, C17

NUMBERS PREFIXED BY LETTER 'P'
 ARE PART NUMBERS.

VOLTAGES TAKEN FROM POINTS
 INDICATED TO CHASSIS GROUND
 VOLUME CONTROL ON FULL

WAVE SWITCH P-125-4, 5 POSITIONS
 ROTATING CLOCKWISE:
 1ST POSITION: BC 1720 530KC
 2ND " " " " 1720 530KC
 3RD " " " " 1720 530KC
 4TH " " " " 1720 530KC
 5TH " " " " 1720 530KC

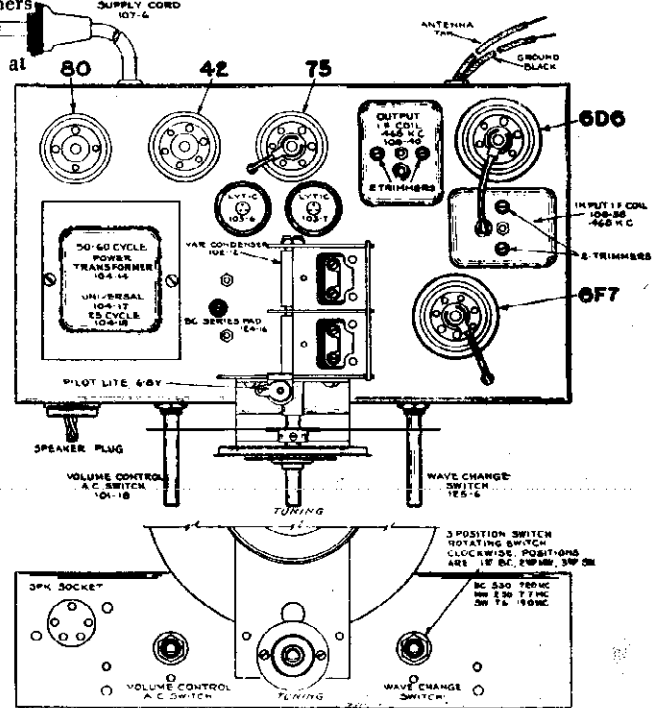
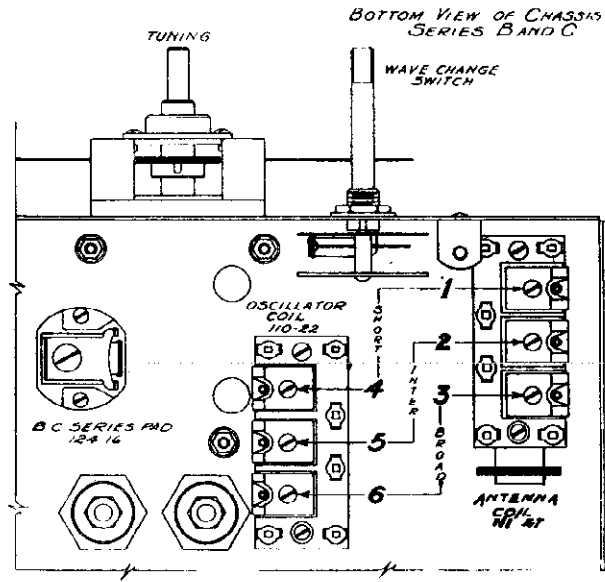
Series "B" and "C" chassis are serially numbered on the back flange of the chassis, series "B" beginning with number "5A100510B" and up; series "C" chassis, beginning with number "5B105635C", differs only from series "B" in that the I.F. frequency was changed from 370 to 465 kilocycles.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 108, 125, 150, 220 and 250 volts (see illustrations) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

Series "B" and "C" may be identified by the letter "B" and "C" at the end of the serial numbers.

TUNING RANGE—SERIES B & C:

- Standard Broadcast Band 530 - 1720 Kilocycles
- Intermediate Band 2.35 - 7.7 Megacycles
- Short Wave Band 7.6 - 19.0 Megacycles



MODELS 62-147, 62-156,
62-164. Series B & C.
Alignment, Notes

MONTGOMERY-WARD & CO.

ALIGNING INSTRUCTIONS—SERIES "B" & "C"

NOTE: These instructions are written for series "C". The instructions are identical for series "B", except that for series "B" the I.F. frequency is 370 kilocycles and for series "C", 465 kilocycles. Also, the I.F. transformers are different:

Series "B"

Part No. 108-26—Input I. F. Trans.
Part No. 108-28—Output I. F. Trans.

Series "C"

Part No. 108-38—Input I. F. Trans.
Part No. 108-40—Output I. F. Trans.

Description of various dummy antennas used and referred to in these instructions:

- (1) I.F. Dummy—Consists of a .1 mfd. condenser connected in series with the external oscillator.
- (2) Broadcast Dummy—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.
- (3) Intermediate and Short Wave Dummy—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 42 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 volt meter should be used.

SERIES B & C

Alignment

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 three bolts by which it is fastened and the speaker plug which you will find on the front flange of the chassis panel.

Aligning I. F. Transformers

1. With volume control full on, the extreme right of its rotation, and with wave changing switch in the broadcast position, extreme left of its rotation, and with variable condenser at its minimum capacity position, plates entirely out of mesh, adjust the I.F. transformers (two adjustments at the top of parts number 108-38 and 108-40—see top view).
 - (a) Connect external oscillator which has been adjusted to 465 kilocycles in series with I.F. dummy antenna, to the control grid cap of the type 6D6 tube and chassis ground. Adjust output I.F. transformer, part number 108-40, to resonance.
 - (b) Move generator output clip from grid of 6D6 to grid cap of 6F7 tube and align input I.F. transformer, part number 108-38.
 - (c) With generator connected to grid of type 6F7 tube, readjust output I.F. transformer, part number 108-40, to resonance.

Broadcast Band Alignment— (530 - 1720 Kilocycles)

1. With wave 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, connect an external oscillator in series with broadcast dummy antenna to tan antenna and black ground leads and make the following adjustments:
 - (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance, for location of this adjustment, number 6, see diagram.

- (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. For location of this adjustment, number 3, see diagram.
- (c) Re-set external oscillator to 600 kilocycles and adjust series pad to resonance, rotate condenser and move dial pointer to 600 kilocycles by gently rocking condenser to and fro. Pick up oscillator signal while adjusting series pad to resonance, maximum deflection on an output meter. This adjustment is accessible from the top of the chassis and is located between variable condenser and power transformer, see top view—part number 124-16.
- (d) Check for tracking and sensitivity at 1000 kilocycles.

NOTE (Series "B" and "C" Only)

25 Cycle Chassis differ only from 60 cycle chassis in that part number 104-18 transformer is used in place of 50/60 cycle transformer, part number 104-14.

Short Wave Band Alignment— (7.6 - 19.0 Megacycles)

1. This band is aligned after the I.F. adjustments have been completed. Set wave changing switch to short wave position, extreme right of its rotation, set dial pointer to 18 megacycles.
 - (a) With external oscillator adjusted to 18 megacycles and connected in series with short wave dummy antenna to tan antenna and black ground leads, adjust the oscillator short wave trimmer until generator signal is picked up. For location of this adjustment, number 4, see diagram.
 - (b) Adjust short wave antenna trimmer to resonance. For location of this adjustment, number 1, see diagram.
 - (c) Re-set external oscillator to 9 megacycles, rotate condenser, move dial pointer to 9 megacycles and check for tracking and sensitivity. Do not bend plates. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

Intermediate Band Alignment— (2.35 - 7.7 Megacycles)

1. With wave changing switch in center position, and with dial pointer set to 7 megacycles, make the following adjustments:
 - (a) With external oscillator set at 7 megacycles and connected in series with short wave dummy antenna, as for short wave adjustments, adjust trimmer of oscillator coil, part number 110-22 until 7 megacycle signal is picked up. For location of this adjustment, number 5, see diagram.
 - (b) Adjust antenna trimmer to resonance, adjustment number 2, see diagram.
 - (c) Re-set external oscillator to 2.5 megacycles (2500 kilocycles), rotate variable condenser, move pointer, pick up oscillator signal and check for tracking and sensitivity. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

Service Notes

To check for open by-pass condensers, shunt each condenser with another of similar capacity and of the same voltage rating, which is known to be good, until the defective unit is located. Open by-pass condensers frequently cause oscillation and distorted tone. Defective and shorted electrolytic filter condensers cause excessive hum, motor-boating, low volume and a reduction in all D.C. voltages. Open or shorted electrolytic and by-pass condensers (across bias resistor of type 42 tube) will cause low volume and distorted tone.

Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. The drive may be disassembled to replace the compression spring (part number 112-31) by removing the two screws which fasten it to the dial bracket. Before re-assembling all parts should be carefully cleaned and a small amount of vaseline applied to the ball bearings. All other dial parts are hardened and should cause no trouble.

MONTGOMERY-WARD & CO.

MODEL S 62-147, 62-147X, 62-156, 62-156X, 62-164, 62-164X. Series A, B & C Parts List

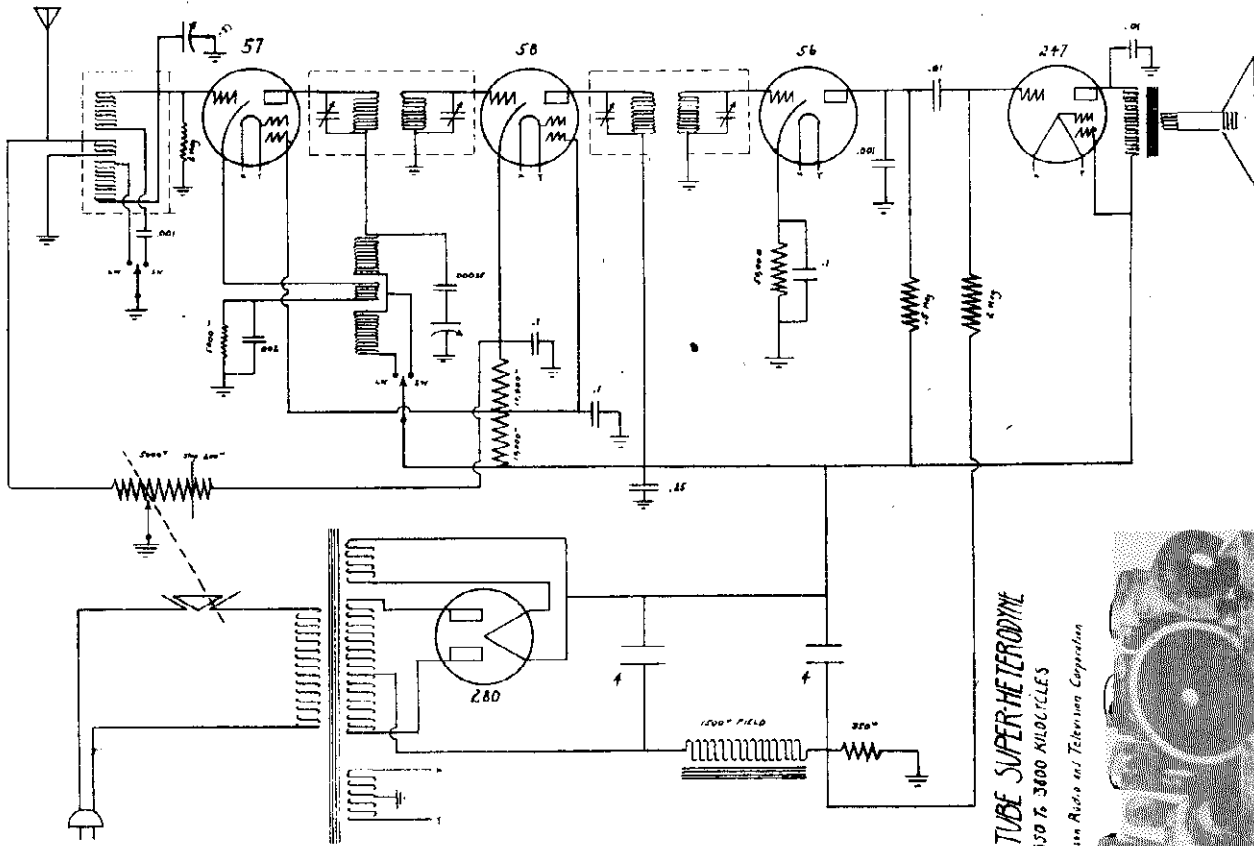
LIST OF REPAIR PARTS

RETAIL STORES: ORDER ALL PARTS FROM DIVISION SUPERINTENDENT AT CHICAGO OR OAKLAND. ON STOCK ORDER. RETURN DEFECTIVE PARTS TO DIVISION SUPERINTENDENT ONLY

Parts Used in Ser. A.	Parts Used in Ser. B.	Parts Used in Ser. C.	DESCRIPTION	No. Used in Set	Not Used.	Not Used.	Not Used.	Color of Dot
BE 100-11	BE 100-11	BE 100-11	.01 x 400V-25%	1	BE 110-13	Not Used.	Oscillator Coil Complete	1
BE 100-15	BE 100-15	BE 100-15	.015 x 400V-Plus 10% ; Minus 20%	1	BE 110-14	Not Used.	Oscillator Coil Complete	1
BE 100-19	BE 100-19	BE 100-19	.006 x 600V-25%	1	BE 110-22	BE 110-22	Oscillator Coil Complete	1
BE 100-20	BE 100-20	BE 100-20	.1 x 120V-25%	4	Not Used.	BE 111-17	Antenna Coil Complete	1
BE 100-22	BE 100-22	BE 100-22	.05 x 200V-25%	1	BE 111-18	Not Used.	Antenna Coil Complete	1
BE 103-6	BE 103-6	BE 103-6	8 Mid. x 350V Electrolytic	1	Not Used.	BE 111-27	Antenna Coil Complete	1
BE 103-7	BE 103-7	BE 103-7	8 Mid. x 300V Electrolytic	1	BE 121	BE 121	SOCKETS	1
BE 118-1	BE 118-1	BE 118-1	Dual J. x 200V-Plus 50% ; Minus 10% (Series B & C use 3 per set)	1	BE 121	BE 121	Four Prong Socket-Type 80	1
Not Used.	Not Used.	Not Used.	4-3-4 Mid. Electrolytic	1	BE 121	BE 121	Five Prong Socket-Speaker	1
BE 119-11	Not Used.	Not Used.	8-8-4 Mid. Electrolytic (For 25 Cy. Only)	1	BE 121	BE 121	Six Prong Socket-Type 42	1
BE 119-12	Not Used.	Not Used.	.0005 Mica-MT-20%	2	BE 121	BE 121	Six Prong Socket-Type 78	1
BE 129-2	BE 129-2	BE 129-2	.0001 Mica-MT-20%	1	BE 121	BE 121	Six Prong Socket-Type 6D6	1
BE 129-5	BE 129-5	BE 129-5	.00055 Mica-MT-5%	1	BE 121	BE 121	Seven Prong Socket-Type 6F7	1
BE 129-15	BE 129-15	Not Used.	.00287 Mica-MW-5%	1	BE 121	BE 121	MISCELLANEOUS	1
BE 129-16	BE 129-16	Not Used.	.0022 Mica-MW-5%	1	BE 101-18	BE 101-18	Volume Control	1
Not Used.	Not Used.	Not Used.	.000425 Mica-MT-5%	1	BE 102-12	BE 102-12	Two Gang Variable Condenser	1
Not Used.	Not Used.	BE 129-24	RESISTORS	1	BE 106-18	Not Used.	Metal Chad Resistor	1
BE 130-3	BE 130-3	BE 130-3	500M Ohm-1/5 Watt-20%-100V-Carbon	1	BE 107-5	BE 107-5	Line Cord	1
BE 130-11	BE 130-11	BE 130-11	250M Ohm-1/3 Watt-20%-50V-Carbon	1	BE 112-15	BE 112-15	Crystal	1
BE 130-12	BE 130-12	BE 130-12	50M Ohm-1/3 Watt-20%-20V-Carbon	1	BE 112-16	BE 112-16	Pointer	1
BE 130-19	BE 130-19	BE 130-19	1 Meg Ohm-1/3 Watt-20%-100V-Carbon	1	BE 112-19	BE 112-19	Drive Disc Complete	1
BE 130-20	BE 130-20	BE 130-20	100M Ohm-1/5 Watt-20%-50V-Carbon	1	BE 112-26	BE 112-26	Planetary Drive Complete	1
BE 130-32	BE 130-32	BE 130-32	250 Ohm-1/3 Watt-20%-10V-Wire W	1	BE 112-31	BE 112-31	Compression Spring	1
Not Used.	Not Used.	Not Used.	2 Meg Ohm-1/3 Watt-20%-20V-Carbon	1	BE 112-40	BE 112-40	Pilot Light Bracket	1
BE 130-39	BE 130-39	BE 130-39	700 Ohm-1/3 Watt-20%-20V-Carbon	1	BE 112-62	BE 112-62	Drive Bracket Assembly	1
Not Used.	Not Used.	Not Used.	19M Ohm-1/2 Watt-20%-150V-Carbon	1	BE 112-66	BE 112-66	Bakelite Excutekoon with Glass	1
BE 130-41	Not Used.	Not Used.	800 Ohm-1/3 Watt-20%-20V-Carbon	1	Not Used.	Not Used.	Dial Scale	1
BE 130-42	BE 130-42	BE 130-42	20M Ohm-1/2 Watt-20%-100V-Carbon	1	BE 112-64A	BE 112-64A	Dial Scale	1
Not Used.	BE 130-44	BE 130-44	25M Ohm-1/2 Watt-20%-150V-Carbon	1	BE 115-22	BE 115-22	Tube Shield	2
Not Used.	BE 130-46	BE 130-46	800M Ohm-1/5 Watt-10%-100V-Carbon	1	BE 116-5	BE 116-5	Pilot Light Bulb-6-8V-T50	1
Not Used.	BE 130-47	BE 130-47	15M Ohm-1/5 Watt-10%-20V-Carbon	1	BE 124-16	BE 124-16	Type J-2.5 Padder	1
Not Used.	BE 130-48	BE 130-48	POWER TRANSFORMERS	1	BE 125-6	BE 125-6	Wave Change Switch	1
BE 104-14	BE 104-14	BE 104-14	50/60 Cycle Power Transformer	1	BE 131-2	BE 131-2	Bakelite Knob	2
BE 104-17	BE 104-17	BE 104-17	Universal Power Transformer-40 Cy. Pri.	1	BE 131-10	BE 131-10	Bakelite Knob-(3 Dots)	1
BE 104-18	BE 104-18	BE 104-18	25 Cycle Power Transformer	1	Not Used.	BE 114-11	Five Inch Speaker	1
Not Used.	BE 105-9	Not Used.	COILS	1	BE 114-16	BE 114-16	Five Inch Speaker	1
Not Used.	Not Used.	Not Used.	Antenna Choke Coil	1	Not Used.	Not Used.	* NOTE: Speakers cannot be ordered, defective speakers must be repaired.	
BE 108-26	BE 108-26	BE 108-26	Input I.F. Transformer Complete	1	Not Used.	Not Used.	Mica condensers are RMA color coded and on the reverse side they are coded with an extra dot which indicates the capacity tolerance, tolerances wider than 20% are not coded.	
BE 108-27	Not Used.	Not Used.	Output I.F. Transformer Complete	1	Not Used.	Not Used.	All resistors are RMA color coded-specify value and/or resistor (per schematic diagram) and model number.	
Not Used.	Not Used.	Not Used.	Input I.F. Transformer Complete	1	Not Used.	Not Used.	When ordering condensers, specify part number, model and/or capacitor (per schematic diagram) and model number.	
Not Used.	Not Used.	Not Used.	Output I.F. Transformer Complete	1	Not Used.	Not Used.	When ordering parts, always specify part and model numbers as well as serial number of chassis.	

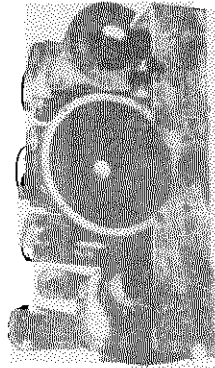
MODEL 62PC43
Schematic
Voltage, Parts

MONTGOMERY-WARD & CO.



5 TUBE SUPER-HETERODYNE
550 TO 3400 KILOCYCLES

Davison Radio and Television Corporation



VOLTAGES

With the volume control at maximum and no signal being received, the following values of voltage should be observed at the points indicated:

- Ground to R. F. Plate, 240
- Ground to First Detector Plate, 240
- Ground to Second Detector Plate, 60
- Ground to A. F. Plate, 220

- Ground to Screens, 115.
- Across Field, 95
- Across 350w Bias Resistor, 20
- Across Second Detector Bias, 10
- Across First Detector Bias, 10
- Across I. F. Bias, 3 1/2.
- Filament, 2.25 A. C.
- Rectifier, 4.8 A. C.

Replacement Parts List

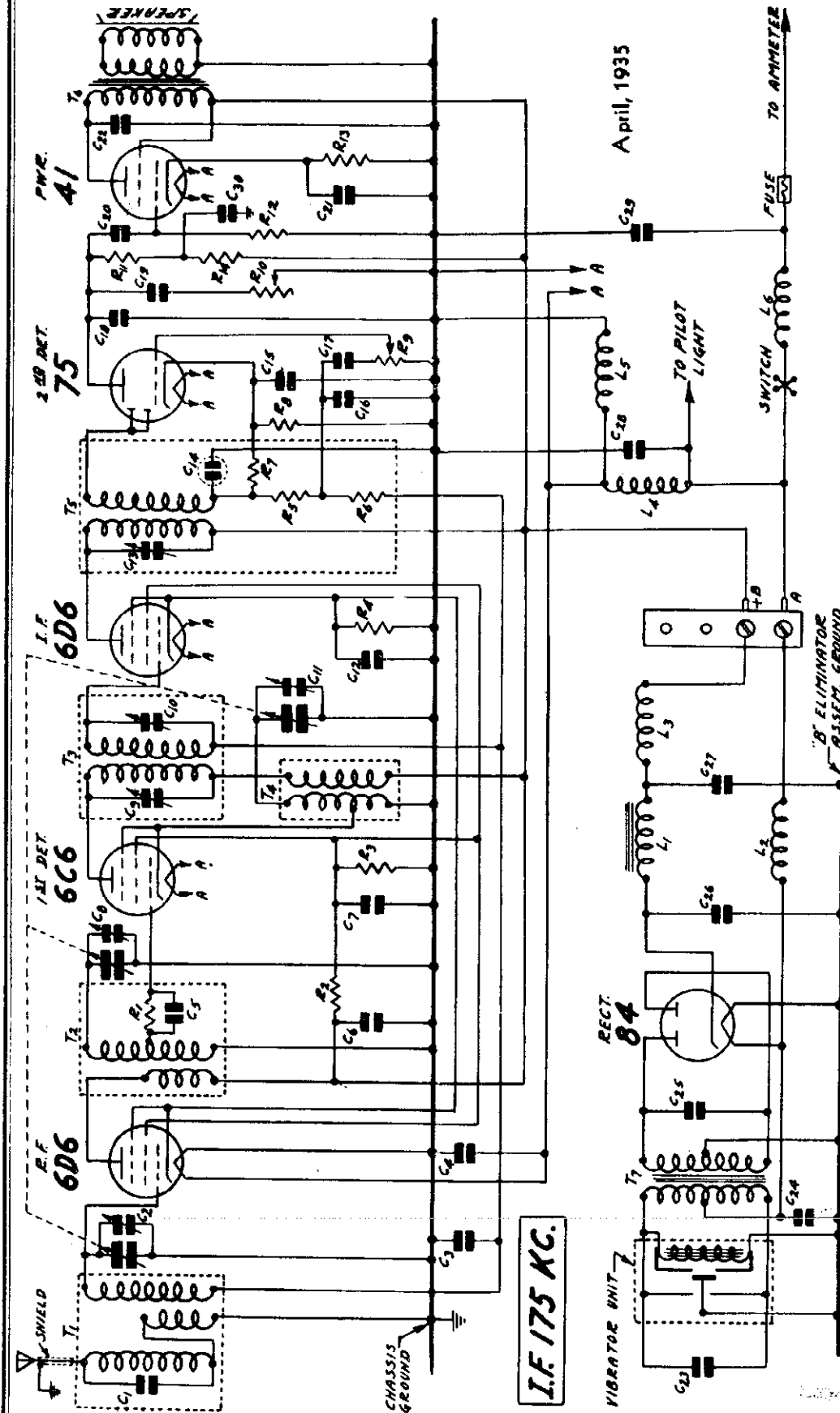
Airline Model 62-PC-43

Supplier: Davison Radio and Television Corporation, Los Angeles, California

Part No.	PART NAME	Unit Per Chassis	Cost Price	Selling Price	Part No.	PART NAME	Unit Per Chassis	Cost Price	Selling Price
SW-431	Tube Socket No. 56	1	.06	.15	SW-4317	R. F. Coil	1	.25	.63
SW-432	Tube Socket No. 57	1	.06	.15	SW-4318	Oscillator Coil	1	.25	.63
SW-433	Tube Socket No. 58	1	.06	.15	SW-4319	Electrolytic Condenser, Dual, 4 Mfd.	1	.60	1.50
SW-434	Tube Socket No. 47	1	.06	.15	SW-4320	Wave Switch	1	.75	1.88
SW-435	Tube Socket No. 80	1	.06	.15	SW-4321	Cub Condenser, .1-200 Volt	3	.12	.30
SW-436	Variable Condenser, 2 Gang	1	1.00	2.50	SW-4322	Cub Condenser, .1-400 Volt	1	.18	.45
SW-437	Dial	1	.75	1.88	SW-4323	Cub Condenser, .01	2	.12	.30
SW-438	Power Transformer	1	1.25	3.13	SW-4324	Cub Condenser, .001-10%	1	.12	.30
SW-439	Volume Control	1	.48	1.20	SW-4325	Cub Condenser, .001-3%	1	.18	.45
SW-4310	Speaker	1	1.75	4.38	SW-4326	Cub Condenser, .00035-3%	1	.18	.45
SW-4311	Coil Shields	3	.06	.15	SW-4327	Resistor Strip—350 W. W.	1	.10	.25
SW-4312	Tube Shields	2	.06	.15	SW-4328	Resistor Strip—Two 10,000 Ohms	1	.25	.63
SW-4313	I. F. Transformer	2	.40	1.00	SW-4329	Resistor—2 Meg. 1/3 Watt	2	.06	.15
SW-4314	Varitor	2	.20	.50	SW-4330	Resistor—5,000 Ohm 1/3 Watt	1	.06	.15
SW-4315	Ant. and Ground Post	1	.10	.25	SW-4331	Resistor—50,000 Ohm 1/3 Watt	1	.06	.15
SW-4316	Pilot Light	1	.06	.15	SW-4332	Resistor—1 Megohm 1/3 Watt	1	.06	.15

MONTGOMERY-WARD & CO.

April, 1935



I.F. 175 KC.

- 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.
- | | | | | | |
|----|------------------|-----|---------------------------|-----|-------------------------|
| C1 | 500 MMF. MOULDED | C17 | .01 MF. 180 V. | R5 | 50000 OHM .2 W. |
| C2 | GANG TRIMMER | C18 | .00025 MF. MOULDED | R6 | 1.0 MEGOHM .2 W. |
| C3 | .05 MF. 180 V. | C19 | .006 MF. 600 V. | R7 | 500000 OHM .2 W. |
| C4 | .001 MF. MOULDED | C20 | .01 MF. 400 V. | R8 | 7500 OHM .2 W. |
| C5 | 35. MMF. MOULDED | C21 | .002 MF. 600 V. | R9 | 2.0 MEGOHM VOL. CONTROL |
| C6 | .10 MF. 300 V. | C22 | .002 MF. 180 V. | R10 | 150000 OHM .2 W. |
| C7 | .10 MF. 180 V. | C23 | .50 MF. 180 V. | R11 | 150000 OHM .2 W. |
| C8 | GANG TRIMMER | C24 | 1.65 MF. 180 V. | R12 | 500000 OHM .2 W. |
| | | C25 | .01 MF. 1800 V. | R13 | 50000 OHM .2 W. |
| | | C26 | .50 MF. 180 V. | R14 | 500000 OHM .2 W. |
| | | C27 | 8.0 MF. 350 V. \| ELECTRO. | | |
| | | C28 | .25 MF. 300 V. \| LYTIC | | |
| | | C29 | .003 MF. MOULDED | | |
| | | | | | |

MODEL 62-166

Alignment, Voltage
Socket, Trimmers
Resistance Test

MONTGOMERY-WARD & CO.

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, 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.

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.

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

Part No.	ITEM	Code	D. C. Resistance in Ohms
P-9A368	Antenna Trans. Primaries in Series	T1	6.3
	Antenna Trans. Secondary	T1	2.5
P-9A369	R.F. Interstage Trans. Pri.	T2	4.5
	R.F. Interstage Trans. Sec. (Center Tap to inside)		1.8
	(Center Tap to ground)		1.3
P-9A371	1st I.F. Trans. Primary	T3	58.
	1st I.F. Trans. Secondary	T3	58.
P-9A370	Oscillator Cathode Coil (Total)	T4	3.
	Oscillator Plate Coil	T4	6.
P-9A372	2nd I.F. Trans. Primary	T5	46.
	2nd I.F. Trans. Secondary	T5	46.
P-51X17	Output Trans. Primary	T6	440.
	Output Trans. Sec. and Voice coil in parallel	T6	4
P-53X72	Power Trans. Primary	T7	.3
	Power Trans. Secondary	T7	500.
P-52X27	Filter Choke	L1	300.
P-9A374	Filament Reactor	L2	Small
P-9A268	R.F. "B" Choke	L3	3.5
P-9A375	Pilot Light Choke Assembly	L4	Small
P-12A62A	Speaker Field	L5	5.
P-9A373	Motor Noise Choke	L6	Small

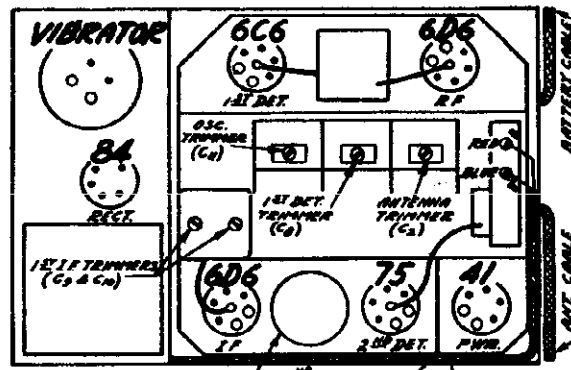


Fig. 2—Tube Arrangement and Trimmers

MONTGOMERY-WARD & CO.

Replacement Parts List

INSTALLATION ITEMS

Part No.	Quan. Used	Description	Selling Price
P-18A31	1	25" Volume Control Flexible Drive Shaft (Standard Equipment)	.58
P-18A34	1	25" Tuning Condenser Flexible Drive Shaft (Standard Equipment)	.62
P-18A32	1	20" Volume Control Flexible Drive Shaft	.54
P-18A35	1	20" Tuning Condenser Flexible Drive Shaft	.54
P-18A37	1	32" Volume Control Flexible Drive Shaft	.74
P-18A38	1	32" Tuning Condenser Flexible Drive Shaft	.78
P-13X52	1	Ammeter Cable and Fuse Receptacle	.16
P-13X204	1	Antenna Cable and Fitting	.36
P-13X211	1	Pilot Light Cable Assembly	.38
P-7A32	1	Pilot Light Bulb—Bayonet Pin Base (6-8 V)	.10
P-20X59	4	Double End Hexagon Bolts for Mounting Chassis to dash	.04
P-20X74	4	5/16" Shakeproof Lockwashers for above Mounting Assembly	.04
P-19X18	8	Flat Washers for above mounting assembly	.08
P-20X75	8	5/16" Split Lockwashers for above mounting assembly	.04
P-20X77	8	5/16"-18 Hexagon Nuts for above assembly	.08
P-28X33	1	Ground Spring (to ground Tuning Condenser Flexible Shaft)	.04
P-20X76	1	No. 6 Shakeproof Lockwasher to assemble Ground Spring	.04
P-20X78	1	6-32x3/4" Round Head Machine Screw to mount Ground Spring	.04
P-16X14	1	20 Ampere Fuse	.04
P-16X3	1	Fuse Shield	.04
P-21A6	1	Distributor Suppressor	.16
P-48X27	1	Generator Condenser	.30
P-20X74	1	Additional 5/16" Shakeproof Lockwasher to Ground Chassis Case to Metal Dash Surface on Engine Side	.04
P-21A5	1	Choke Condenser Unit (not shipped with set)	.72
P-21A7	1	Spark Plug Suppressors (not shipped with set)	.20
P-25A33	1	Set of Steering Column Mounting Brackets complete with necessary mounting screws, nuts and lockwashers	.46
P-25A34	1	Under Instrument Panel Mounting Bracket complete with necessary mounting screws, nuts and lockwashers	.36

MISCELLANEOUS

Part No.	Description	Selling Price
P-3A114	6C6 Tube Socket	.06
P-3A113	6D6 Tube Socket	.06
P-3A116	41 Tube Socket	.06
P-3A09	75 Tube Socket	.05
P-8X8	Rubber Bands (for above tubes)	.04
P-12A62	6" Speaker	2.74
P-13X53	"A" Cable	.14
P-3A108	Small Pin Jack (For Pilot Light Connection)	.06
P-3A136	Large Pin Jack (For Antenna Connection)	.06
P-4A46	2 Lug Terminal Strip (Ground Lug Extended)	.04
P-4A48	"A" & "B" Power Terminal Strip	.01
P-4A38	1 Lug Terminal Strip (Insulated—Left Hand Mounting)	.01
P-30X14	Grid Cap Only	.04
P-10A20	Tone Control Knob	.06
P-30X1	Wire Clamp	doz .06
P-29X16	Flexible Shaft Anchor Bushing	.12
P-20X27	Anchor Bushing Clamping Nut	.06
P-20X28	Hexagon Nut for above assembly	.05
P-20X80	Shakeproof Lockwasher (for above assembly)	doz .04
P-19X13	Flat Washers (for above assembly)	doz .04
P-20X61	8-32 Wing Nuts for securing cover to case	doz .05
P-20X79	No. 8 Split Lockwashers (for above nuts)	doz .04

"B" UNIT PARTS

Part No.	Description	Code	Selling Price
P-9A268	R.F. "B" Choke Coil Assembly	L3	.06
P-9A374	Filament Reactor	L2	.24
P-53X72	Power Transformer	T7	1.52
P-53X27	Filter Choke	L1	.48
P-19A14	Vibrator—Mallory		2.62
P-19A16	Vibrator—Radiart		2.62
P-3A127	Vibrator Socket		.06
P-3A128	84 Tube Socket		.06
P-4A42	2 Lug Terminal Strip (Both Insulated)		.06
P-4A17	1 Lug Terminal Strip (Insulated—Right Hand Mounting)		.01
P-45X204	Dry Electrolytic (See Condensers)	{C26} {C27}	1.00
P-46X89	1.65 mf. 180 Volt Tubular Condensers	C25	.38
P-46X88	.01 mf. 1800 Volt Tubular Condensers	C25	.14
P-46X93	.50 mf. 180 Volt Tubular Condensers	C28	.18

TRANSFORMERS AND COILS

Part No.	Description	Code	Selling Price
P-51X17	Output Transformer	T6	.78
P-9A368	Antenna Coil Assembly (Less Can)	T1	.44
P-9A369	R.F. Interstage Coil Assembly (Less Can)	T2	.60
P-1A23	Dual-Coil Can Assembly Only (for above two coils)		.16
P-9A371	1st I.F. Coil & Can Assembly Complete	T3	.82
P-9A370	Oscillator Coil & Can Assembly Complete	T4	.30
P-9A372	2nd I.F. Coil & Can Assembly Complete	T5	.98
P-9A375	Pilot Light Choke Assembly	L4	.08
P-9A373	Motor Noise Choke	L6	.14
P-9A268	R.F. "B" Choke Coil Assembly	L3	.05
P-9A374	Filament Reactor	L2	.24
P-53X72	Power Transformer	T7	1.52
P-52X27	Filter Choke	L1	.44

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	Selling Price
P-47X54	C1	.0005 mf.		Moulded	.08
P-46X80	C2	.05 mf.	180	Tubular	.08
P-47X50	C3	.003 mf.		Moulded	.12
P-47X53	C4	.000035 mf.		Moulded	.05
P-46X81	C5	.10 mf.	400	Tubular	.12
P-46X83	C6	.10 mf.	180	Tubular	.12
*P-17A32	C7	1st Detector Trimmer—Part of Gang Condenser			
†P-17A33	C8	130-300 mmf. 1st I. F. Trimmer Condensers			.24
	C9	130-300 mmf. 1st I. F. Trimmer Condensers			.18
	C10	70-150 mmf. 1st I. F. Trimmer Condensers			.18
	C11	70-150 mmf. 1st I. F. Trimmer Condensers			.18
	C12	10 mf. 180		Tubular	.12
P-46X82	C13	70-140 mmf. 2nd I.F. Trimmer Condenser			.18
P-17A18	C14	.00025 mf. Part of 2nd I.F. Coil Assembly			.25
	C15	12.00 mf. 25		Dry Electro-	
P-45X203	C21	12.00 mf. 25		lytic Block	.50
P-47X52	C16	.00025 mf.		Moulded	.08
P-46X84	C17	.01 mf.	180	Tubular	.08
P-47X52	C18	.00025 mf.		Moulded	.10
P-46X92	C19	.006 mf.	600	Tubular	.10
P-46X86	C20	.01 mf.	400	Tubular	.10
P-46X85	C22	.002 mf.	600	Tubular	.10
P-46X93	C23	.50 mf.	180	Tubular	.18
P-46X89	C24	1.65 mf.	180	Tubular	.38
P-46X88	C25	.01 mf.	1800	Tubular	.14
P-45X204	C26	6.00 mf. 350		Dry Electro-	
P-46X93	C27	8.00 mf. 350		lytic Block	1.00
P-47X50	C28	.50 mf.	180	Tubular	.18
P-46X94	C29	.063 mf.		Moulded	.12
P-14A39	C30	.25 mf.	300	Tubular	.14
			3	Section Gang Condenser	2.00

RESISTORS

Part No.	Code	Resistance	Wattage	Type	Selling Price
P-A95504	R1	500,000 Ohm	0.2	Carbon	.06
P-B94153	R2	15,000 Ohm	3.5	Carbon	.08
P-B94103	R3	20,000 Ohm	0.5	Carbon	.08
P-43X41	{R4} {R13}	450 Ohm 800 Ohm	{0.2} {0.5}	Armored Wire Wound	.14
P-A95503	R5	50,000 Ohm	0.2	Carbon	.06
P-A95105	R6	1.0 Megohm	0.2	Carbon	.06
P-A94504	R7	500,000 Ohm	0.2	Carbon	.06
P-95752	R8	7,500 Ohm	0.2	Carbon	.06
P-36X290	R9	2.0 Megohm		Volume Control & Switch	.56
P-40X201	R10	300,000 Ohm		Tone Control	.34
*P-A95204	R11	200,000 Ohm	0.2	Carbon	.06
†P-A95154	R11	150,000 Ohm	0.2	Carbon	.06
P-A95504	R12	500,000 Ohm	0.2	Carbon	.06
†P-A95503	R14	50,000 Ohm	0.2	Carbon	.06

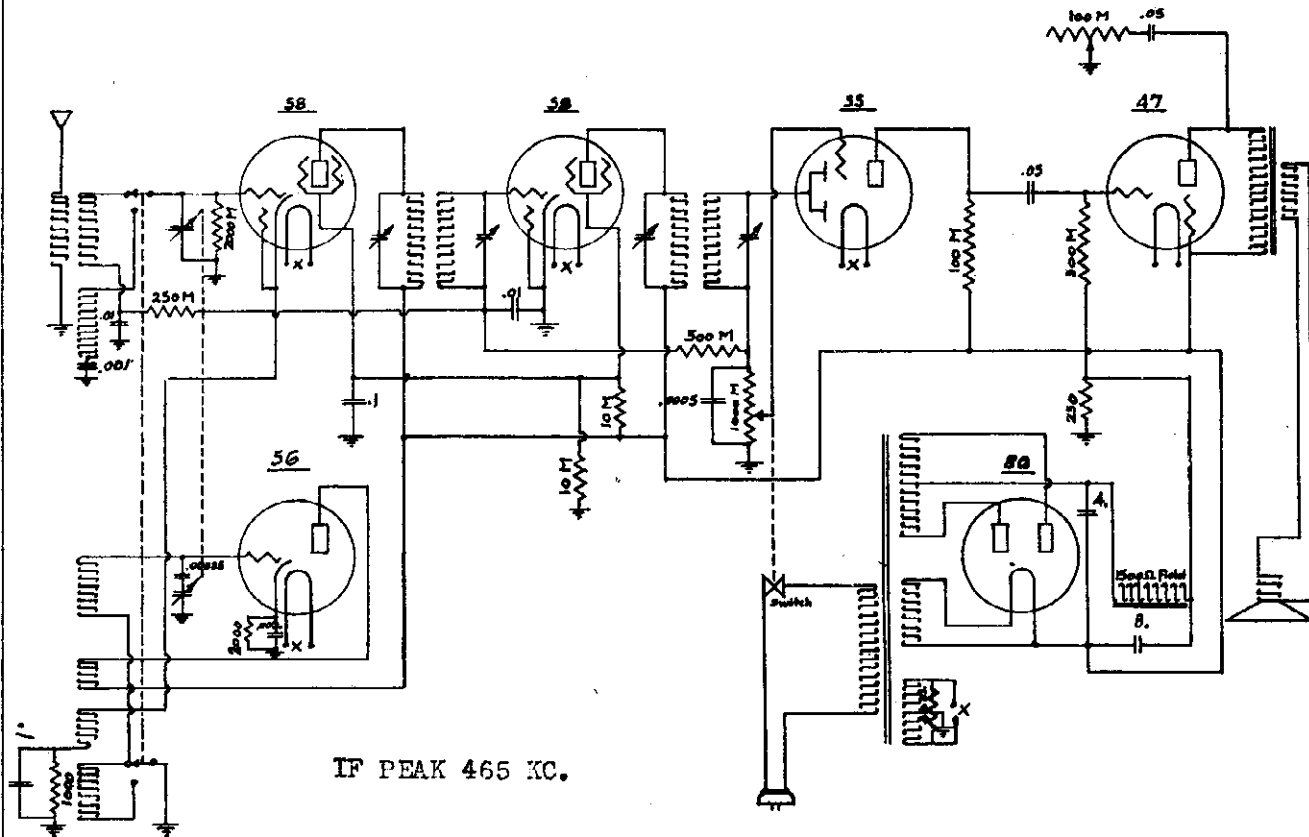
CONTROL UNIT PARTS

Part No.	Quan. Used	Description	Selling Price
P-20A17	1	Complete Remote Control Less Flexible Shafts and Pilot Light Cable Assembly	\$2.00
P-35X37	1	Control Unit Case (front) With Screws	.30
P-35X38	1	Control Unit Case (back) With Screws	.42
P-35X41	1	Dial Scale Assembly with Printer and Celluloid Gear (Specify for part P-20A17)	.48
P-35X39	1	Station Selector Shaft Complete with Gear and Horse Shoe Lock	.20
P-34X211	1	Intermediate Gear	.06
P-28X214	1	Volume Control Shaft	.01
P-28X45	1	Volume Control Tension Spring with Nut and Lockwasher	.12
P-17X9	1	Celluloid Crystal	.08
P-10A52	2	Knob with Set Screw	.08

* Used in early models. (See article on changes in this manual.)
† Used in later models. (See article on changes in this manual.)

MODEL 62PC55
Schematic, Voltage
Alignment

MONTGOMERY-WARD & CO.



SERVICE NOTES ON MODEL 62-PC-55
6-TUBE AIRLINE RECEIVER

The No. 55 is a combination long and short wave receiver, with a frequency range from 3400 K.C. to 550 K.C., and the change from the short wave to broadcast band is accomplished by a 2-section change-over switch.

The oscillator uses a separate 56 tube. The first detector is also connected to the A.V.C. section of the No. 55 tube, so that better A.V.C. action may be had. The I.F. amplifier is resonated at 465 K.C. The No. 55 tube is used as second detector, and functions as an automatic volume control and triode audio stage also. The 247 power pentode is connected to the output of the 55 through a resistance or capacity circuit. The high voltage rectifier is an 80 tube.

CIRCUIT ADJUSTMENTS

In aligning this receiver, a 465 K.C. modulated oscillator and output meter are required, and the following procedure is recommended:

Use output meter connected in parallel with the plate circuit of the power pentode. Connect the oscillator with the grid of the first detector. Adjust each of the trimming condensers on the I.F. transformers located underneath the chassis, until maximum signal is shown on the output meter. Go over these trimmers several times, as the over-all performance of this receiver depends on I.F. transformer adjustment. If a signal other than 465 K.C. is used, for aligning the amplifier, the oscillator and pre-selector circuit will fail to track. Images will also appear at the low frequency end of the broadcast band. Next, set the dial at 100 degrees when the variable condenser plates are fully meshed. Then set the oscillator to give a 1400 K.C. signal. When the dial is turned to 1400 K.C., a signal should be heard. Adjust the

trimming condenser on the variable condenser section nearest the front of the chassis, until the maximum signal is indicated by output meter. Now, adjust the trimmers on the other two sections for maximum signal. The same procedure should be followed with the oscillator set at 900, 700 and 600 K.C.

CAUTION

Do not attempt to bend oscillator plates. All balancing should be done with volume control wide open, and to test oscillator, adjust it to low signal level.

If the intermediate transformers and 2-gang condenser are properly aligned for broadcast, no adjustment is necessary for the tracking of the high frequency bands.

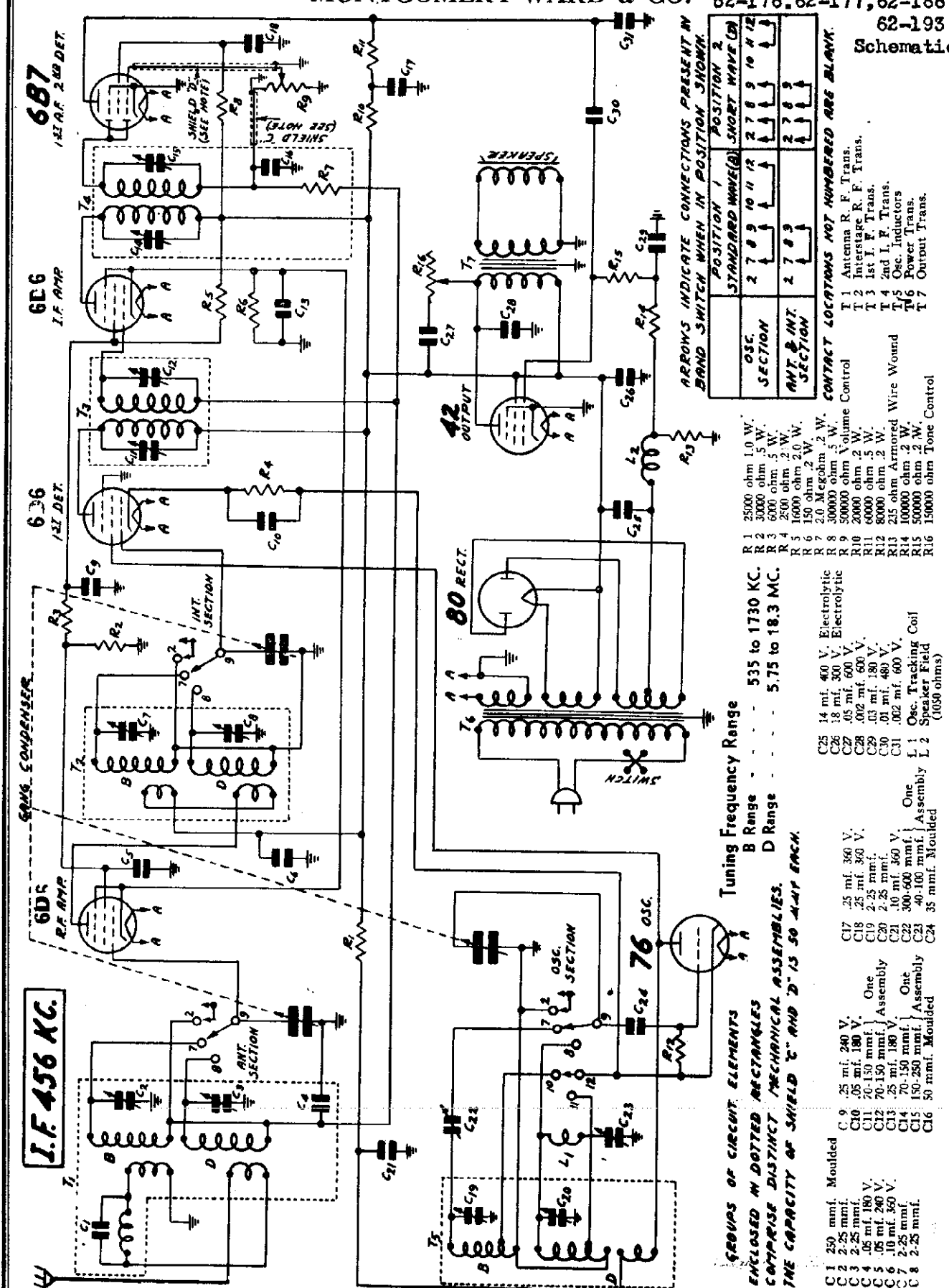
VOLTAGES OF 6-TUBE SET

Ground to Audio Plate	215 Volts
Ground to Audio Screen	240 Volts
Ground to 2nd Detector Plate	70 Volts
Ground to I.F. and 1st Detector Plates	240 Volts
Ground to I.F. and 1st Detector Screens	80 Volts
Ground to Oscillator Plate	80 Volts
Drop through Speaker Fields	105 Volts
Measured with 300,000 Ohm Meter.	
Ground to 1st Detector Cathode	2 Volts
Ground to Oscillator Cathode	21 Volts
Measured with 30,000 Ohm Meter.	
A. C.	
All Filaments	2.35 Volts
80 Filaments	4.75 Volts
Input Filaments	111 Volts

MONTGOMERY-WARD & CO.

MODEL S 62-173, 62-175,
62-176, 62-177, 62-188
62-193

Schematic



ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1	POSITION 2
OSC.	2 7 8 9 10 11 12	2 7 8 9 10 11 12
SECTION	1 1 1 1 1 1 1	1 1 1 1 1 1 1
ANT. & INT. SECTION	2 7 8 9	2 7 8 9

- CONTACT LOCATIONS NOT NUMBERED ARE BLANK.
- T 1 Antenna R. F. Trans.
 - T 2 Interstage R. F. Trans.
 - T 3 1st I. F. Trans.
 - T 4 2nd I. F. Trans.
 - T 5 Osc. Inductors
 - T 6 Power Trans.
 - T 7 Output Trans.

- R 1 25000 ohm 1.0 W.
- R 2 30000 ohm .5 W.
- R 3 6000 ohm .5 W.
- R 4 2500 ohm .2 W.
- R 5 16000 ohm 2.0 W.
- R 6 150 ohm 2.0 W.
- R 7 2.0 Megohm 2.0 W.
- R 8 300000 ohm 5.0 W.
- R 9 50000 ohm 2.0 W.
- R 10 20000 ohm 2.0 W.
- R 11 60000 ohm 1.5 W.
- R 12 80000 ohm 2.0 W.
- R 13 235 ohm Armored Wire Wound
- R 14 100000 ohm .2 W.
- R 15 500000 ohm .2 W.
- R 16 150000 ohm Tone Control

- C 25 14 mf. 40 V. Electrolytic
- C 26 18 mf. 300 V. Electrolytic
- C 27 .05 mf. 600 V.
- C 28 .002 mf. 600 V.
- C 29 .03 mf. 180 V.
- C 30 .01 mf. 480 V.
- C 31 .002 mf. 600 V.
- C 32 300-600 mmf. Assembly
- C 33 40-100 mmf. Assembly
- C 34 25 mf. 360 V.
- C 35 2.25 mmf. Moulded
- C 36 2.25 mmf.
- C 37 .05 mf. 180 V.
- C 38 20-150 mmf. Assembly
- C 39 70-150 mmf. Assembly
- C 40 2.25 mmf.
- C 41 .10 mf. 360 V.
- C 42 300-600 mmf. Assembly
- C 43 150-250 mmf. Assembly
- C 44 80 mmf. Moulded

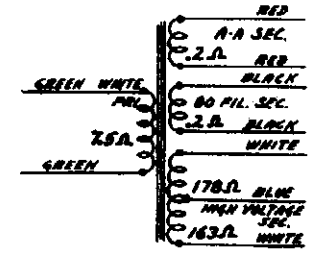
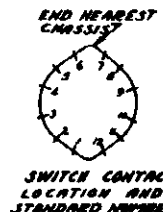
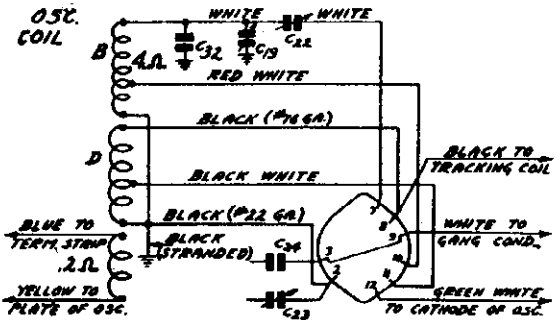
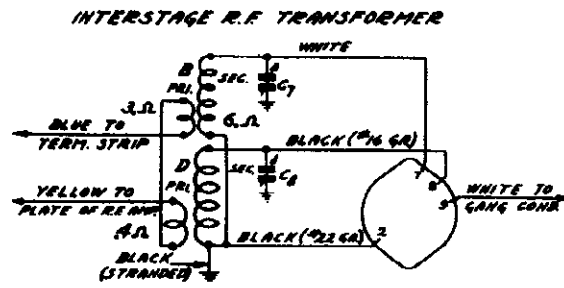
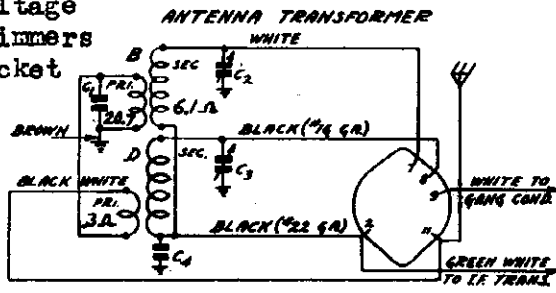
- GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES. THE CAPACITY OF SHIELD 'C' AND 'D' IS 50 MMF EACH.
- Tuning Frequency Range
B Range 535 to 1730 KC.
D Range 5.75 to 18.3 MC.

MODELS 62-173, 62-175,
62-176, 62-177, 62-188
62-193

MONTGOMERY-WARD & CO.

Color Coding,
Resistance Data

Voltage
Trimmers
Socket



NOTE: RESISTANCE VALUES NOT SHOWN ARE SMALL.

Fig. 3—Color Coding of Coil Wires and D. C. Resistance of Windings

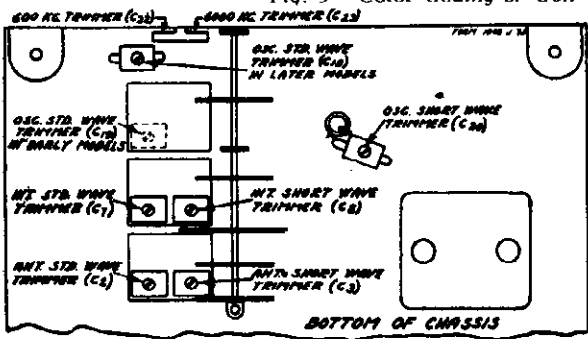


Fig. 4—Location of Trimmers

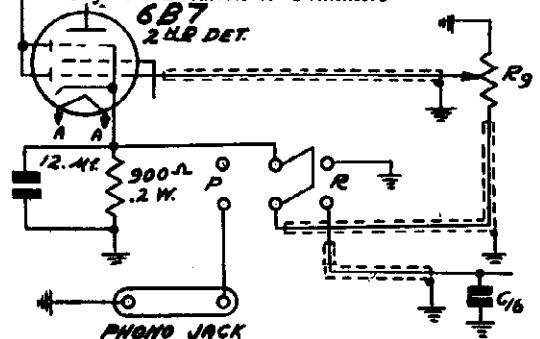


Fig. 7—Phonograph Connections

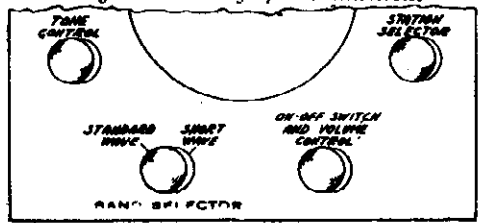


Fig. 1—Arrangement of Controls

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	45	0	2.3
42	Power	6.1	225	240	17 (1)	38.0
80	Rectifier	4.6				32.0 per plate

(1) As read across R13.

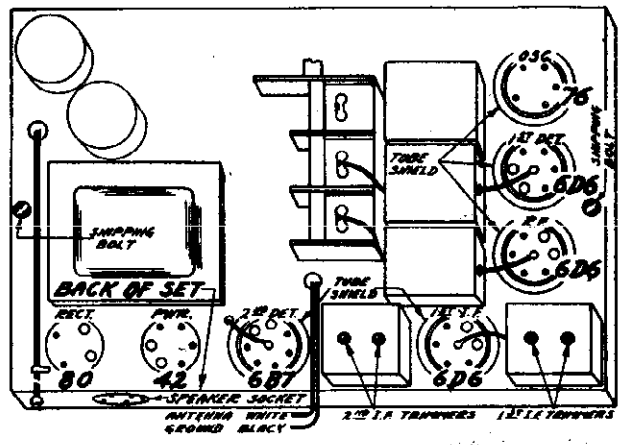


Fig. 6—Location of Tubes

MODELS 62-173, 62-175,
62-176, 62-177, 62-188
62-193

Resistance Test, Parts

General Service Data

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	Part No.	Value	Material	Resistance
9A368	Antenna Transformer			46X104	C9	.250 mfd.	240 Tubular .25
	Range B Primary Winding	T1	20.7	46X80	C10	.050 mfd.	180 Tubular .15
	Range D Primary Winding	T1	0.3	17A33	{ C11 70-150 mmfd. }	1st I.F. Trimmers	.40
	Range B Secondary Winding	T1	6.1	46X102			
	Range D Secondary Winding	T1	Small	17A34	{ C12 70-150 mmfd. }	180 Tubular	.30
			47X56				
9A387	R. F. Interstage Transformer			46X107	{ C13 .250 mfd. }	180 Tubular	.30
	Range B Primary Winding	T2	3.0	46X116			
	Range D Primary Winding	T2	0.4	17A36	{ C14 70-150 mmfd. }	2nd I.F. Trimmers	.40
	Range B Secondary Winding	T2	6.0	46X105			
	Range D Secondary Winding	T2	Small	17A35	{ C15 150-250 mmfd. }	C16	50 mmfd.	Moulded .10
			46X105				
9A388	Oscillator Coils			47X53	C17	.250 mfd.	360 Tubular .30
	Range B Grid Coil	T5	4.0	44X10	C18	.250 mfd.	360 Tubular .33
	Red White to White		Small	44X11			
	Red White to ground			46X108	C19	2-25 mmfd.	Oscillator Standard Wave Trimmer .10
	Range D Grid Coil	T5	4.0	46X109			
Black White to Black		Small	46X110	C20	2-25 mmfd.	Oscillator Short Wave Trimmer .10	
Black White to ground		Small	46X109				
9A389	1st I. F. Transformer			46X109	C21	.100	360 Tubular .20
	Primary Winding	T3	12.0	47X63			
	Secondary Winding	T3	11.1	14A42			
9A390	2nd I. F. Transformer			A94253	{ C22 300-600 mmfd. }	Padding Trimmer	.45
	Primary Winding	T4	12.0	B93303			
	Secondary Winding	T4	4.5	B94602	{ C23 40-100 mmfd. }	Oscillator (600 KC) Padding Trimmer	.45
	Output Transformer (Part of Speaker Assembly)			A94252			
	Primary Winding	T7	510.	D93163	C24	35 mmfd.	Moulded .10
Secondary Winding	T7	1.0	A94151				
53X91	Dynamic Speaker			A95205	C25	14.00 mfd.	400 Wet Electrolytic 1.25
	Speaker Field	L2	1025.	B94304			
	Speaker Voice Coil		4.1	36X205	C26	18.00 mfd.	300 Wet Electrolytic 1.10
	Speaker Bucking Coil		0.2	A94203			
	115 volt 60 cycle Power Transformer			B94603	C27	.050 mfd.	600 Tubular .20
Primary Winding	T6	7.5	A94504				
Tube Filament Secondary (A-A)	T6	0.2	A94803	C28	.002 mfd.	600 Tubular .15	
80 Filament Secondary	T6	0.2	43X42				
9A391	High Frequency Oscillator			A94104	C29	.030 mfd.	180 Tubular .15
	Tracking Coil	L1	1.1	A95504			
	Center tap to inside		153.	40X204	C30	.010 mfd.	480 Tubular .15
	Center tap to outside		178.	2A31			
				3A12	C31	.002 mfd.	600 Tubular .15
			10A36				
			45X37	C32	10 mmfd.	Moulded .10	
			A94901				

Replacement Parts

New Part No.	Old Part No.	Description	List Price
12A222		6" Dynamic Speaker Comp. with Output Trans. T7	4.15
12A223		8" Dynamic Speaker Comp. with Output Trans. T7	4.90
12A221		10" Dynamic Speaker Comp. with Output Trans. T7	6.45
2A41		Two Section Band Change Switch	1.65
25X221		Chassis Mounting Feet	.10
30X14	30342	Grid Clip	.10
4A38	2106	Two Lug Terminal Strip (1 Lug Insulated)	.10
4A17	1421	Single Lug Terminal Strip	.10
4A49		Single Lug Terminal Strip (Mtg. hole used)	.10
4A50		Two Lug Terminal Strip (Both Lugs Insulated - Mtg. Foot in Center)	.10
9A386	T1	Antenna Trans. and Can Assembly	\$2.35
9A387	T2	R.F. Interstage Trans. and Can Assembly	1.75
9A389	T3	1st I.F. Coil and Can Assembly	1.50
9A390	T4	2nd I.F. Coil and Can Assembly	2.10
9A388	T5	Oscillator Coil and Can Assembly	1.70
53X91	T6	Power Transformer 115 Volt; 60 cycles	3.60
53X92	T6	Power Transformer 115 Volt; 25 cycles	5.95
53X99	T6	Power Transformer 230 Volt; 50 cycles	4.10
9A391	L1	High Frequency Oscillator Tracking Coil Assembly	.25
47X59	C1	250 mmfd. Moulded	\$.15
17A36	C2	2-25 mmfd. Antenna Standard Wave Trimmer	.10
17A36	C3	2-25 mmfd. Antenna Short Wave Trimmer	.10
46X80	C4	.050 mfd. 180 Tubular	.15
46X103	C5	.050 mfd. 240 Tubular	.15
46X105	C6	.100 mfd. 360 Tubular	.20
17A36	C7	2-25 mmfd. R.F. Interstage Standard Wave Trimmer	.10
17A36	C8	2-25 mmfd. R.F. Interstage Short Wave Trimmer	.10
R1		25,000 ohms 1.0 Carbon	.15
R2		30,000 ohms .5 Carbon	.20
R3		6,000 ohms .5 Carbon	.15
R4		2,500 ohms .2 Carbon	.15
R5		16,000 ohms 2.0 Carbon	.45
R6		150 ohms .2 Carbon	.15
R7		2.0 Megohms .2 Carbon	.10
R8		300,000 ohms .5 Carbon	.15
R9		500,000 ohms Volume Control & Switch	1.05
R10		20,000 ohms 2 Carbon	.15
R11		60,000 ohms .5 Carbon	.15
R12		80,000 ohms .2 Carbon	.15
R13		235 ohms 2.0 Armored Wire Wound	.25
R14		100,000 ohms .2 Carbon	.15
R15		500,000 ohms .2 Carbon	.10
R16		150,000 ohms Tone Control	.75
		Phono Switch (Double Pole Double Throw Switch)	\$.60
		Phono Jack	.10
		Switch Knob	.20
		12.0 Mf. - 25 Volt - Dry Electrolytic Condenser	.75
		900 Ohm - 0.2 Watt	.15
		12 inches of No. 722G Shielded Hookup Wire	.10
		Dial and Drive Assembly (Specify name and Model No.)	2.35
		Dial Strip Only (Specify name and Model No.)	.55

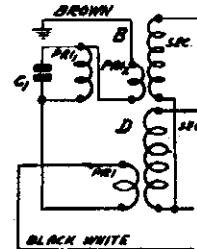


Fig. 5—Antenna Transformer on Early Models

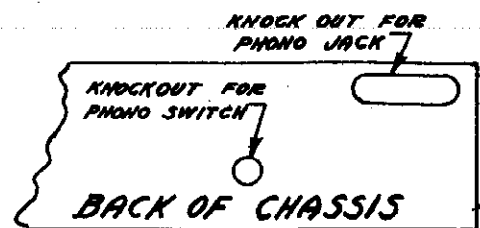


Fig. 8—Location of Phono Knockouts

MODELS 62-173, 62-175
62-176, 62-177, 62-188
62-193

MONTGOMERY-WARD & CO.

Alignment, Data

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.

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 1/4" from the bottom, 3/8" and 1/4" from the front of the chassis.

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 200 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.

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.

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 output.

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.

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 nut 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.

grid coil in use is tuned by the oscillator section of the three gang condenser. The oscillating circuit is always resonant at 476 KC above the frequency to which the R. F. amplifier is tuned. When the switch is in the standard wave position, connections are completed to the B grid coil and the D grid coil is open circuited. When the switch is in the short wave position, connections are completed to the D grid coil and the B grid coil is short circuited. Padding condensers C12 and C13 are used in conjunction with the standard wave and short wave oscillator circuits respectively.

The oscillator potential is fed into the cathode circuit of the 6D6 first detector tube. This results in the intermediate or beat frequency of 476 K. C. being present in the plate circuit of this tube.

One stage of I. F. amplification is employed using a 6D6 tube. The primaries and secondaries of the first and second I. F. transformers are tuned by small trimmer condensers.

A type 6B7 diode pentode 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 R. F. and I. F. tubes. The audio voltage developed across volume control resistor R9 is applied through the movable arm to the control grid of the 6B7 tube. Resistance coupling is used between the first audio stage and the output stage which employs a type 42 output pentode tube. A type 80 full wave rectifier tube is used in the power unit.

Alignment and Calibration

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 that 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.

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.

Dual band coverage is accomplished by means of dual sets of R. F. and oscillator coils and a three section double throw switch. The various circuits made and broken as this switch is thrown are indicated in the schematic circuit diagram Fig. 1.

Referring to the schematic, the standard wave coils are indicated by the letter B, while the short wave coils are indicated by the letter D. The antenna transformer primaries are connected in series. When the switch is in the standard wave position, the B secondary is connected to the grid circuit of the 6D6 R.F. amplifier while the C secondary is open circuited. When the switch is in the short wave position, the C secondary is connected to the grid circuit of this tube while the B secondary is short circuited. The three gang condenser is connected to the antenna section of the three gang condenser.

The output of the R. F. 6D6 tube is fed through another R. F. transformer with tuned secondary into a second 6D6 tube which functions as the first detector. The interstage section of the three gang condenser is used for tuning this circuit. As in the case of the antenna transformer, the R. F. interstage transformer standard wave windings are indicated in the schematic by the letter B, while the short wave windings are indicated by the letter D. The connections to the two coils are made in the same manner as described above for the antenna R. F. transformer.

A separate type 76 tube is employed in the oscillator circuit. Referring to the schematic, B is the standard wave grid coil and D is the short wave grid coil. The winding shown below is the oscillator plate coil. The

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.

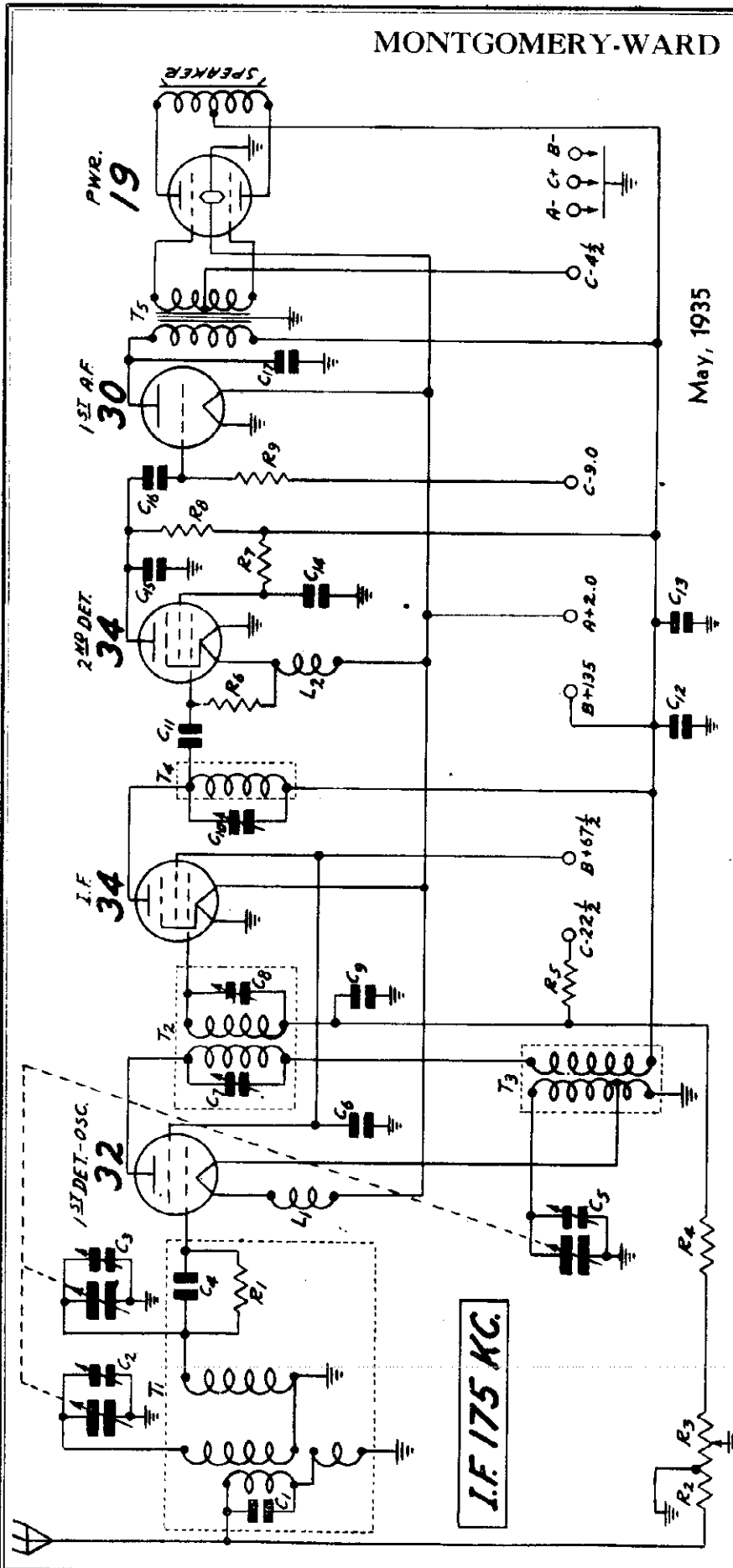
Keep the band switch in the standard wave position. Connect the antenna lead of the receiver through a .210 mmf. condenser to the output of the signal generator.

MONTGOMERY-WARD & CO.

MODELS 62-178, 62-181

62-189, 62-211

Schematic



May, 1935

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

- C1 150 KMF MOULDED
- C2 GANG TRIMMER
- C3 GANG TRIMMER
- C4 35 KMF MOULDED
- C5 GANG TRIMMER
- C6 .25 MF 180V.
- C7 40-100 KMF DUAL
- C8 20-70 KMF (P-17A37)
- C9 .05 MF 180V.
- C10 40-100 KMF (P-17A38)
- C11 50 KMF MOULDED
- C12 .10 MF 180V.
- C13 4.0 MF 150V. ELECTROLYTIC (P-45X28)
- C14 10 MF 180V.
- C15 .002 MF 300V.
- C16 .006 MF 300V.
- C17 .002 MF 300V.
- R1 10 MEGOHM .2 W.
- R2 10000 OHM
- R3 60000 OHM
- R4 900 OHM .2 W.
- R5 6500 OHM .2 W.
- R6 2.0 MEGOHM .2 W.
- R7 100000 OHM .5 W.
- R8 40000 OHM .5 W.
- R9 1.0 MEGOHM .2 W.

- L1 SINGLE FILAMENT REACTOR (P-9A281)
- L2 SINGLE FILAMENT REACTOR (P-9A281)
- T1 DOUBLE TUNED ANTENNA COIL (P-9A301)
- T2 1.5I I.F. COIL (P-9A303)
- T3 OSC. COIL (P-9A302)
- T4 2ND I.F. COIL (P-9A304)
- T5 AUDIO INPUT TRANS. (P-50X11)

MODELS 62-178, 62-181
62-189, 62-211

Alignment, Data

MONTGOMERY-WARD & CO.

Replacing Drive Cord

Remove chassis from cabinet.
Take off the pointer by removing the screw at the center of the dial.
Remove the dial by taking out the six rivets from the dial assembly.
Remove the on-off indicator dial by pulling it forward.
With the condenser plates in a completely open position, slip the new drive cord thru hole "A" (from the front) in the drive drum. See Fig. 9.
Pull the cord thru this hole far enough to tie a knot near the end. Make this knot large enough so that it will not pull back thru the hole.
Slip the opposite end of the drive cord thru hole "B" of the drive drum.

Now slip the piece of fine tubing (about $\frac{3}{4}$ " long) over the drive cord and insert about half of this tubing into hole "B" as shown in the illustration. This is important to prevent the cord from being cut.

Bring the drive cord down to the drive shaft and wrap the cord in a clockwise direction about two and one-half times around this shaft, progressing toward the front.

Bring the cord up from the drive shaft and wrap it around the drive drum approximately one and one-half times in a clockwise direction, progressing toward the front until the cord is up to the turned-in portion of the flange "C". See Fig. 9.

Pull the cord tight and tie the end of the cord to the tension spring as shown in the illustration. The knot should be at the band in the flange so that the spring will be under sufficient tension to prevent the drive cord from slipping.

Now, by applying a little tension on the spring, hook the other end of the spring into hole "D" on the opposite side of the drum. Hook the spring from the inside (in later models hole "D" is replaced by a hook on the inside of the drive drum).

Turn the drive shaft back and forth several times to take out the slack and see if the drive is operating properly. If the cord slips on the drive shaft, remove the spring from the drive drum and add an additional knot in the cord at the spring in order to put greater tension on the spring.

Replace the on-off indicator dial care being taken that the indicator is so placed that it will properly show the on and off positions.

Re-assemble the pointer and dial to the drive assembly. If the rivets are broken use No. 2 by $\frac{1}{4}$ " long round head machine screws and nuts.

Alignment Procedure and Dial 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 1 MF condenser to the coil end of the grid leak resistor R1. There is a lead which runs from the center tuning condenser stator to a lug at the bottom of the R. F. coil assembly. This connection can be made at the lug on the coil to which this lead is connected.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the volume control to the maximum position.

Then adjust the three 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. 8.

As stated above, use a non-metallic screwdriver to make the adjustment.

1750 KC Adjustment

Set the signal generator for 1750 KC.

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

Connect the antenna lead of the receiver thru a 250 mmf. condenser to the output of the signal generator.

Adjust the volume control at the maximum position. Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained. The location of this trimmer is shown in Fig. 8.

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 1st detector and antenna trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

Circuit

A type 32 tube functions as the first detector-oscillator. Referring to Fig. 1, T2 is the 1st I.F. transformer while T3 is the oscillator assembly. 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. circuit is tuned.

One stage of I.F. amplification is employed using a 34 tube. The primary and secondary of the first I.F. transformer are tuned by small trimmer condensers. A second I.F. unit of the impedance coupled type is provided in which the inductance T4 is tuned by a trimmer condenser C10.

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 R4. 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 R5, R4 and R3, which resistors are connected across the 22 $\frac{1}{2}$ volt "C" battery.

A 34 tube is used as the 2nd detector or demodulator. Demodulation takes place in the grid circuit of this tube.

Batteries

3 Volt "A" Battery—The voltage regulator required with this type of battery as illustrated in Fig. 4 is not supplied with the receiver unless specified. This device consists of a rheostat which controls the voltage, a voltmeter for measuring its value as supplied to the receiver and a small push button switch for cutting the voltmeter in and out of the circuit. It has two prongs at the bottom which plug into the socket in the platform at the rear left corner of the chassis. The circuit diagram of the regulator is shown in Fig. 5.

The receiver is shipped from the factory with a jumper between the two socket connections and a fibre strip over the socket. This strip must be removed and the jumper taken out as illustrated in Figs. 6 and 7 before the regulator can be inserted as shown in Fig. 4. The jumper is in the "A+" line.

When a new 3 volt "A" battery is inserted, the adjusting knob must be turned to the left hand position and then turned up until the voltmeter indicates 1.9 to 2 volts. The push button must be held in until the adjustment is completed. **Caution the user never to operate the receiver with the adjustment beyond 2 volts.**

MONTGOMERY-WARD & CO.

MODEL S 62-178, 62-181
62-189, 62-211
Voltage, Socket, Trimmers
Resistance Test, Parts

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis.

Part No.	Code	D. C. Resistance in Ohms
9A81	T1	17.
	T2	3.5
	T3	3.5
9A82	T4	10.
	T5	7.
9A83	T6	50.
9A84	L1	Small
9A85	L2	Small
9A86	T5	50.
9A87	T5	60.
9A88	T5	50.
9A89	T5	20.
9A90	T5	250.

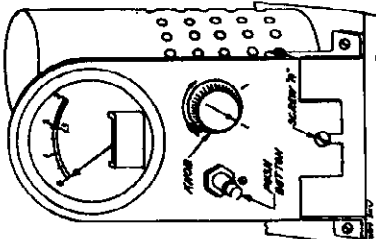


Fig. 4—Voltage Regulator in Position

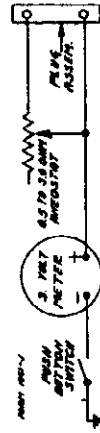


Fig. 5—Schematic Diagram of Voltage Regulator

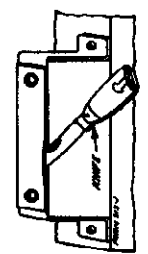


Fig. 6—Prying off Fiber Cover

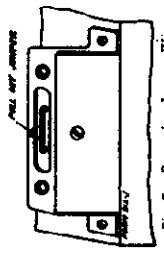


Fig. 7—Removing Jumper Wire

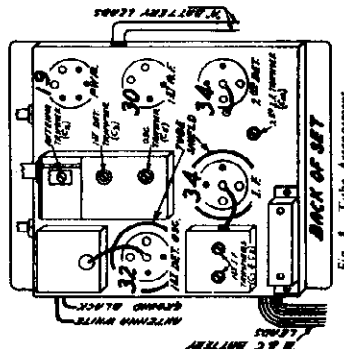


Fig. 8—Tube Arrangement

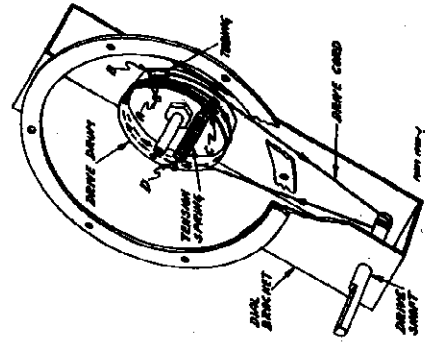


Fig. 9—Replacing Drive Cord

"A" Battery and Regulator

This receiver is designed to operate with a 2 volt storage cell, but may be operated with a 3 volt dry "A" battery if used with a voltage regulator. The receiver may also be used with an air cell "A" battery provided a series resistor is used.

Air Cell "A" Battery—If an air cell "A" battery is used, a series resistor will be required to reduce the voltage to the proper level of 2 volts for the tube filaments. Although the voltage regulator mentioned above can be used, the series resistor is cheaper and is satisfactory as the voltage of one of these batteries drops very little during the useful life of the battery.

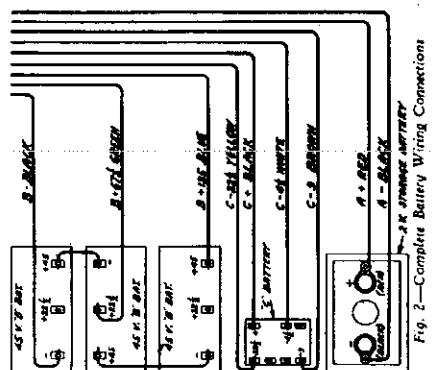


Fig. 2—Complete Battery Wiring Connections

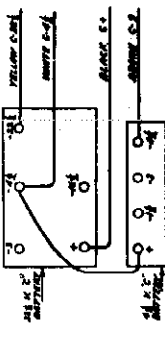


Fig. 3—"C" Battery Connections, Using Standard "C" Battery

TYPE of Tube	Function	Across Filament	Across Plate to Filament	Grid to Cathode	Normal Plate M. A.	
62	1st Det. & Osc.	2.0	135	07.5	7.5 (0.00)	2.5
64	I. F.	2.0	135	07.5	25.0 (0)	2.8
34	2nd Det.	2.0	50	40 (0)	0	1.8
30	1st Audio	2.0	135	9 (0)	—	3.0
19	Output	2.0	135	4.5	3.2	Total

1) With 20.00 ohm meter. 2) Subject to variation. 3) With 200 ohm meter. 4) With 200 ohm meter. 5) With 200 ohm meter.

Replacement Parts

Part No.	OM Part No.	DESCRIPTION	Type	Value	Price
42X13	T1	Double Tuned Antenna Transformer	Carbon	1.66	
42X14	T2	Transformer Can for above Assembly	Carbon	1.66	
42X15	T3	1st I.F. Transformer and Can Assembly	Carbon	2.00	
42X16	T4	Oscillator Coil and Can Assembly	Carbon	1.00	
42X17	T5	2nd I.F. Reactor Coil and Can Assembly	Carbon	1.75	
42X18	T6	Push Pull Audio Input Transformer	Carbon	2.10	
42X19	T7	Element Reactor in 1st Det. Circuit	Carbon	2.50	
42X20	T8	Element Reactor in 2nd Det. Circuit	Carbon	2.50	
42X21	T9	Double Tuned Antenna Transformer	Carbon	1.66	
42X22	T10	Transformer Can for above Assembly	Carbon	1.66	
42X23	T11	1st I.F. Transformer and Can Assembly	Carbon	2.00	
42X24	T12	Oscillator Coil and Can Assembly	Carbon	1.00	
42X25	T13	2nd I.F. Reactor Coil and Can Assembly	Carbon	1.75	
42X26	T14	Push Pull Audio Input Transformer	Carbon	2.10	
42X27	T15	Element Reactor in 1st Det. Circuit	Carbon	2.50	
42X28	T16	Element Reactor in 2nd Det. Circuit	Carbon	2.50	

Part No.	OM Part No.	DESCRIPTION	Type	Value	Price
42X29	T17	Double Tuned Antenna Transformer	Carbon	1.66	
42X30	T18	Transformer Can for above Assembly	Carbon	1.66	
42X31	T19	1st I.F. Transformer and Can Assembly	Carbon	2.00	
42X32	T20	Oscillator Coil and Can Assembly	Carbon	1.00	
42X33	T21	2nd I.F. Reactor Coil and Can Assembly	Carbon	1.75	
42X34	T22	Push Pull Audio Input Transformer	Carbon	2.10	
42X35	T23	Element Reactor in 1st Det. Circuit	Carbon	2.50	
42X36	T24	Element Reactor in 2nd Det. Circuit	Carbon	2.50	

Part No.	OM Part No.	DESCRIPTION	Type	Value	Price
42X37	T25	Double Tuned Antenna Transformer	Carbon	1.66	
42X38	T26	Transformer Can for above Assembly	Carbon	1.66	
42X39	T27	1st I.F. Transformer and Can Assembly	Carbon	2.00	
42X40	T28	Oscillator Coil and Can Assembly	Carbon	1.00	
42X41	T29	2nd I.F. Reactor Coil and Can Assembly	Carbon	1.75	
42X42	T30	Push Pull Audio Input Transformer	Carbon	2.10	
42X43	T31	Element Reactor in 1st Det. Circuit	Carbon	2.50	
42X44	T32	Element Reactor in 2nd Det. Circuit	Carbon	2.50	

MODEL 62PC68
Schematic, Voltage
Alignment

MONTGOMERY-WARD & CO.

SERVICE NOTES ON MODEL 62-PC-68
9-TUBE AIRLINE RECEIVER

The 68 receiver uses the following tubes:—

- 1 No. 56 Oscillator.
- 1 No. 58 R. F.
- 1 No. 57 First Detector.
- 1 No. 58 Intermediate.
- 1 No. 55 Second Detector.
- 1 No. 46 First Audio.
- 2 No. 46 Push Pull in Second Audio.
- 1 No. 82 Rectifier.

The oscillatory and intermediate circuits of this receiver are of the conventional type. The Second Detector, incorporating No. 55 tube, will be found very interesting as it performs as a diode detector and automatic control and one stage of audio, which is equivalent to three tubes in the usual receiver. The audio channel uses the 46 to drive a pair of 46's in Class B. It will be found in voltage checks that the plate is near 400 volts, while the current drain will be in the order of 7 M.A., with no signal on the grids of the 46's in push pull, but when sufficient power is furnished by the driver, the power output may reach 15 watts with an instantaneous current drain of 200 M.A.

The noise control, or noise suppressor, is a 10,000 ohm variable resistor in the cathode circuit of the I.F. and R.F. tubes, working much the same as the volume control in the older types of sets.

CIRCUIT ALIGNMENT

The intermediate frequency is tuned at 175 K.C. and 2 I.F. transformers are used. The usual care must be used in adjusting these if good results are to be had. All adjustments of this receiver should be made with the volume control at maximum. The following procedure is recommended:—

Use output meter connected in parallel with the plate circuit of the power pentode. Connect the oscillator with the grid of the first detector. Adjust each of the trimming condensers on the I.F. transformers located underneath the chassis, until maximum signal is shown on the output meter. Go over these trimmers several times, as the overall performance of this receiver depends on I.F. transformer adjustment. If a signal other than 175 K.C. is used for aligning the amplifier, the oscillator and pre-selector circuit will fail to track. Images will also appear at the low frequency end of the broadcast band. Next, set the dial at 100 degrees when the variable condenser plates are fully meshed. Then set the oscillator to give a 1400 K.C. signal. When the dial is turned to 1400 K.C., a signal should be heard. Adjust the trimming condenser on the variable condenser section nearest the front of the chassis, until the maximum signal is indicated by output meter. Now, adjust the trimmers on the other two sections for maximum signal. The same procedure should be followed with the oscillator set at 900, 700 and 600 K.C.

CAUTION

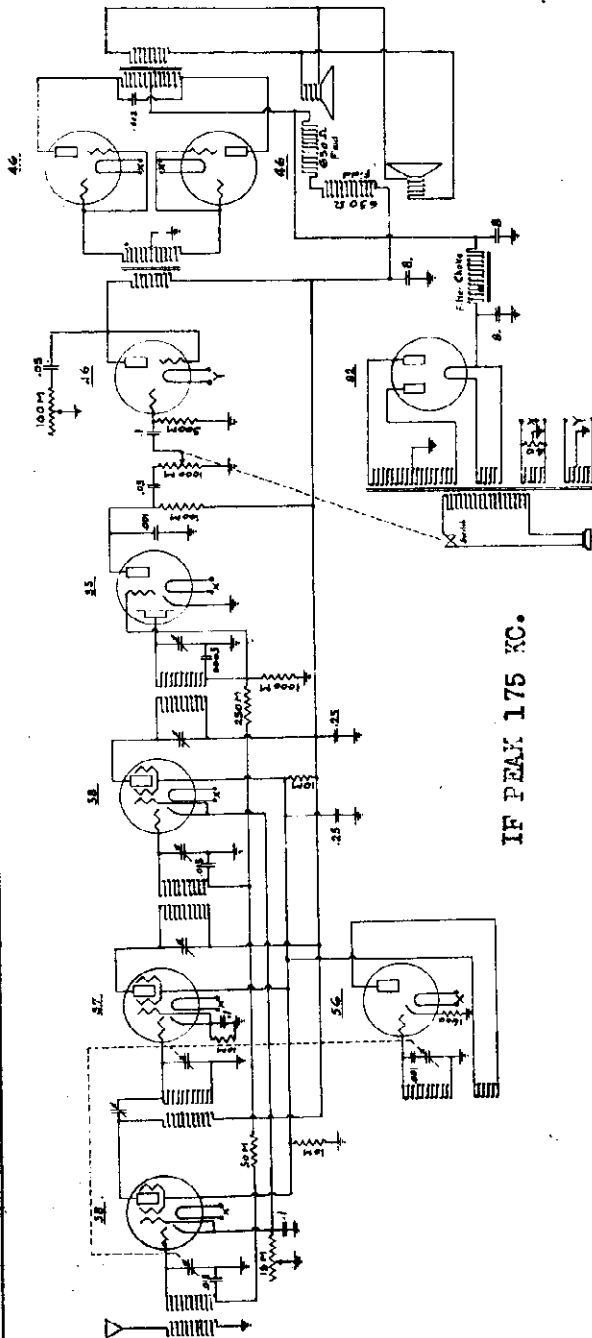
Do not attempt to bend oscillator plates. All balancing should be done with volume control wide open, and to test oscillator, adjust it to low signal level.

VOLTAGES OF 9-TUBE SET

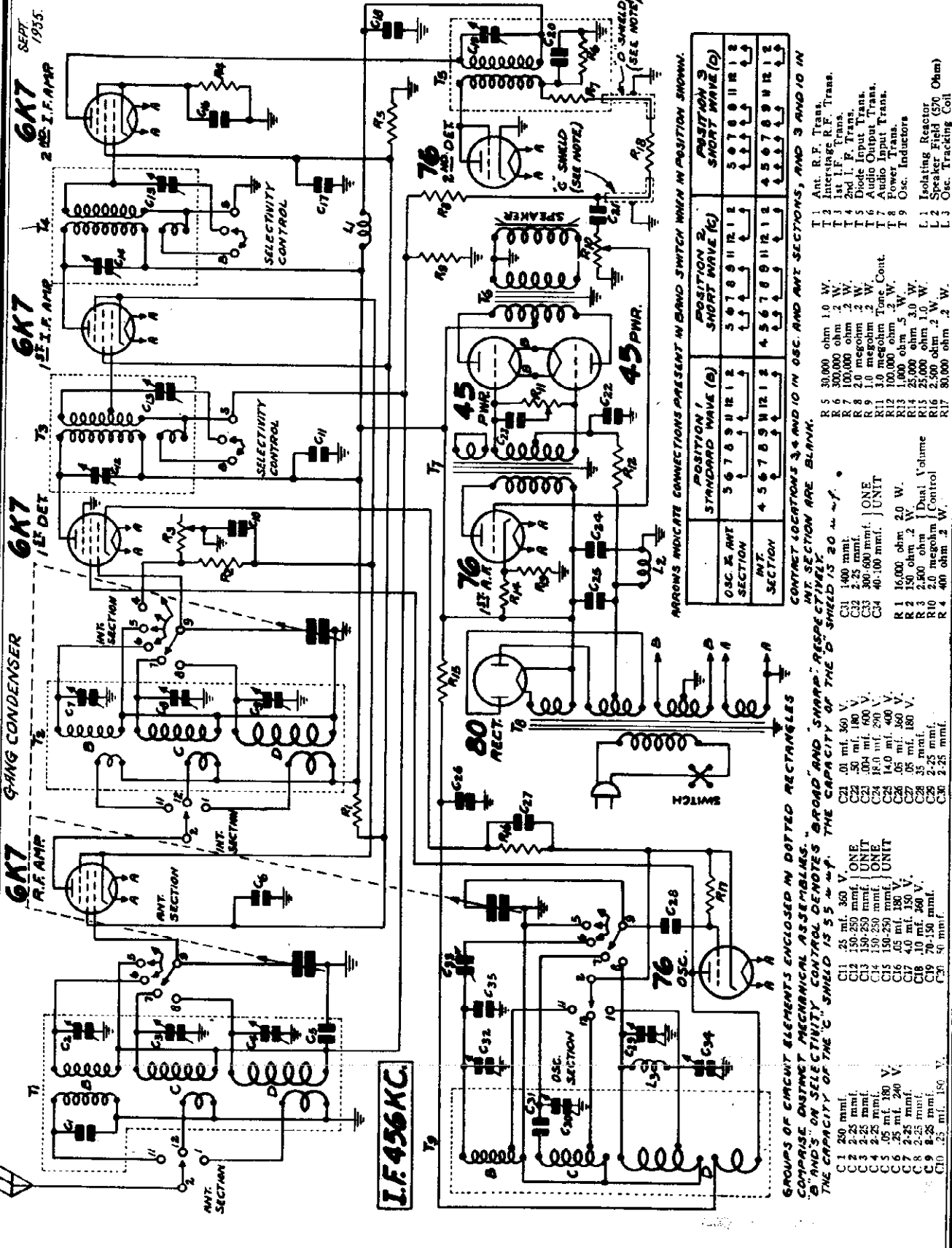
Ground to 2nd Audio Plates	340 Volts
Ground to High side of speaker Fields	340 Volts
Measured with Meter 1000 ohms per volt.	
Ground to Other side of speaker Fields	260 Volts
Drop Across Fields	80 Volts
Ground to 2nd Detector Plate	35 Volts
Ground to I.F. and 1st Detector Plates	260 Volts
Ground to Oscillator Plate	90 Volts
Ground to I.F. and 1st Detector Screens	90 Volts
Ground to 46 Driver	260 Volts
Measured with Meter 1000 ohms per volt.	
Drop through Filter Choke	17 Volts
Ground to I.F. Cathodes	3-5 Volts
Measured with Meter 1000 ohms per volt.	

A. C.

246 Audio Filament	2.15 Volts
Heater Filament	2.10 Volts
82 Filament	2.20 Volts
Input	106 Volts



MONTGOMERY-WARD & CO.



SEPT. 1935.

6K7
2nd I.F. AMP

6K7
1st I.F. AMP

6K7
1st DET

6K7
R.F. AMP

6K7
45 PWR

76
OSC.

76
RECT.

76
DET.

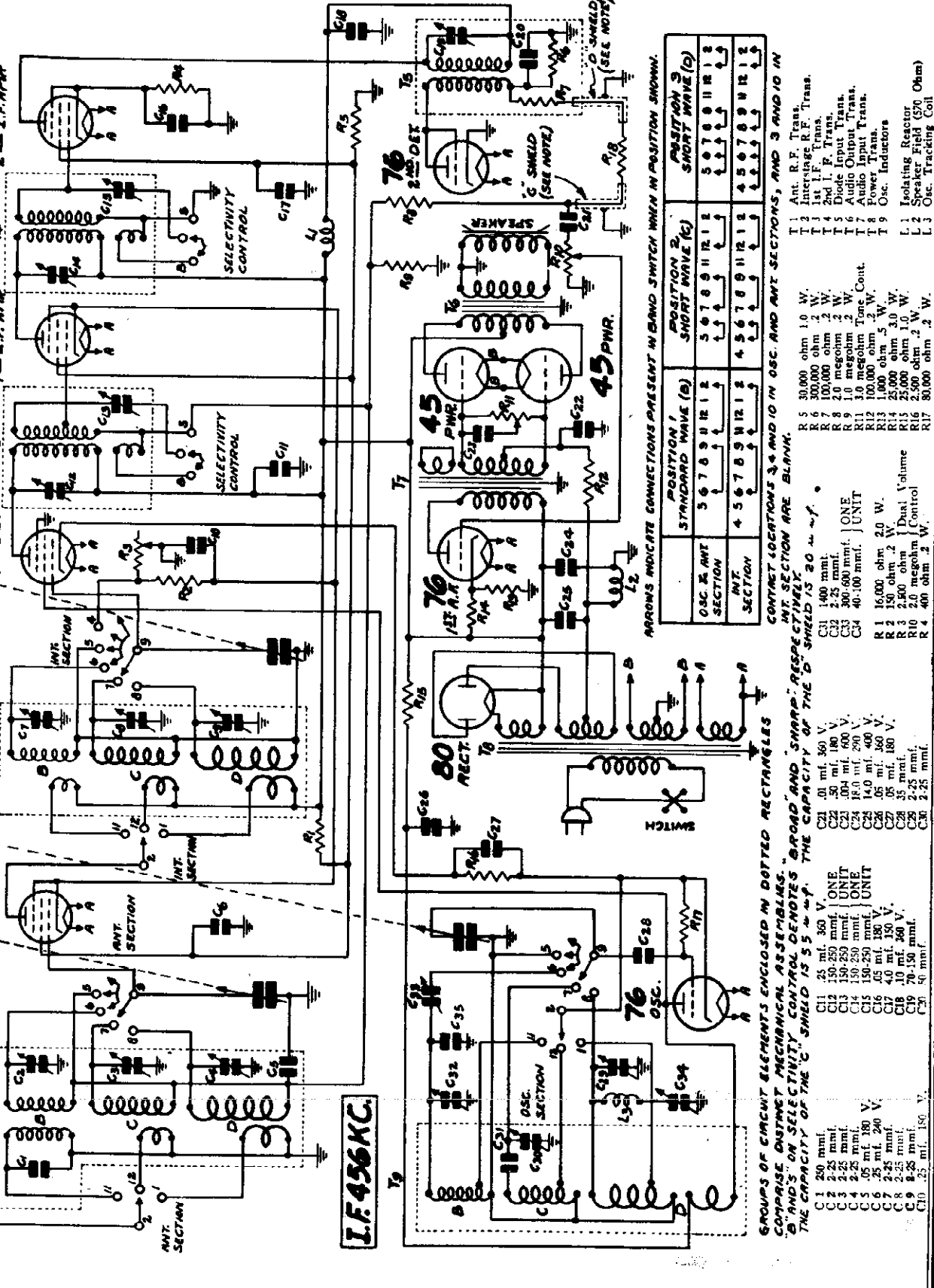
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ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

POSITION 1	POSITION 2	POSITION 3
OSC. & ANT. SECTION	STANDARD WAVE (B)	SHORT WAVE (D)
1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12
ANT. SECTION	ANT. SECTION	ANT. SECTION
1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12

- GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES. "B" AND "D" ON SELECTIVITY CONTROL DENOTES "BROAD AND SHARP" RESPECTIVELY. THE CAPACITY OF THE "C" SHIELD IS 5.5 μf. THE CAPACITY OF THE "D" SHIELD IS 20 μf.
- C1 250 mmf.
 - C2 2.25 mmf.
 - C3 2.25 mmf.
 - C4 2.25 mmf.
 - C5 .05 mf. 180 V.
 - C6 .25 mf. 240 V.
 - C7 .25 mf. 180 V.
 - C8 10 mf. 150 V.
 - C9 1.5 mf. 150 V.
 - C10 .25 mf. 150 V.
 - C11 25 mf. 350 V.
 - C12 150-250 mmf. | ONE UNIT
 - C13 150-250 mmf. | ONE UNIT
 - C14 150-250 mmf. | ONE UNIT
 - C15 150-250 mmf. | ONE UNIT
 - C16 .05 mf. 180 V.
 - C17 4.0 mf. 150 V.
 - C18 10 mf. 150 V.
 - C19 70-150 mmf.
 - C20 50 mmf.
 - C21 .01 mf. 350 V.
 - C22 .50 mf. 180 V.
 - C23 .004 mf. 600 V.
 - C24 18.0 mf. 290 V.
 - C25 14.0 mf. 400 V.
 - C26 .05 mf. 350 V.
 - C27 .05 mf. 180 V.
 - C28 35 mmf.
 - C29 2.25 mmf.
 - C30 2.25 mmf.
 - C31 1400 mmf.
 - C32 2.25 mmf.
 - C33 300-600 mmf. | ONE UNIT
 - C34 40-100 mmf. | ONE UNIT
 - R1 16,000 ohm 20 W.
 - R2 150 ohm 2 W.
 - R3 2,500 ohm | Dual Volume Control
 - R10 2.0 megohm | Control
 - R4 40 ohm 2 W.
 - R5 30,000 ohm 1.0 W.
 - R6 300,000 ohm 2 W.
 - R7 100,000 ohm 2 W.
 - R8 20 megohm 2 W.
 - R9 1.0 megohm 2 W.
 - R11 3.0 megohm Tone Cont.
 - R12 100,000 ohm 2 W.
 - R13 1,000 ohm 5 W.
 - R14 25,000 ohm 3.0 W.
 - R15 25,000 ohm 1.0 W.
 - R16 2,500 ohm 2 W.
 - R17 80,000 ohm 2 W.
 - T1 Ant. R.F. Trans.
 - T2 Interstage R.F. Trans.
 - T3 1st I.F. Trans.
 - T4 2nd I.F. Trans.
 - T5 Diode Input Trans.
 - T6 Diode Output Trans.
 - T7 7.8 Audio Trans.
 - T8 Power Trans.
 - T9 Osc. Inductors
 - L1 Isolating Reactor (570 Ohm)
 - L2 Speaker Field (570 Ohm)
 - L3 Osc. Tracking Coil

MODELS 62-179, 62-194
62-206, 62-216, 62-218

MONTGOMERY-WARD & CO.

Alignment, Changes
Data

Metal Tubes

One type of the new metal tubes is used in this receiver, namely the 6K7. This replaces the type 6D6 glass tube. This metal tube operates at the same voltage and is nearly identical in characteristics to the corresponding glass tube which it replaces. In Fig. 6 are shown the metal tube pin positions from a front and top view. The metal tubes are held in place by a metal tube pin which is quite hot and users should be cautioned against touching them.

Servicing R. F. Coil Assemblies

The R. F. transformer and oscillator coil assemblies in this receiver are sold complete with can. This is due to the fact that the trimmers are soldered to the top of the can and the trimmers are soldered to the lead wires and resistances of the various windings in this assembly are shown in Fig. 4.

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.

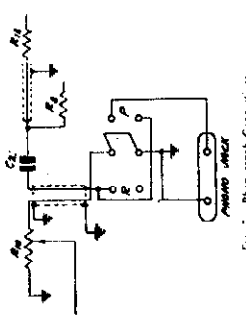


Fig. 7. Phonograph Connections

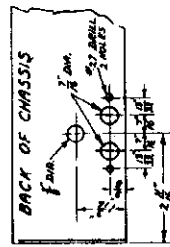


Fig. 8. Details of Panel Drilling for Photo Assembly

Testing Frequency Range	..... 575 to 1700 KC.
C Band	..... 1715 to 2000 KC.
D Band	..... 2750 to 3000 KC.
Sensitivity	..... 0.7 Microvolts Absolute
B Base Averages	..... 1.0 Microvolts Absolute
C Base Averages	..... 1.0 Microvolts Absolute
D Base Averages	..... 1.0 Microvolts Absolute
Power Consumption - 90 W. A.C. (A.C.11's with 60 cycle)	..... 5 Watts Undistorted
Power Output	..... 5 Watts Undistorted
Selectivity - 24 KC Band at 1000 times Signal (Sharp)	..... 456 KC.
Intermediate Frequency	..... 10" Dynamic

Adjust the oscillator Range D trimmer (C23) 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. Condenser C19 and antenna Range D trimmer (C24) to Range D trimmer. Adjust the interstage Range D trimmer (C25) and antenna Range D trimmer (C24) to Range D trimmer. When adjusting the trimmers, the tuning condenser rotor should be turned 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 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.

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required to make this installation are shown in the parts list.

To mount the phono switch and phono jack, drill holes at a size and in the position shown in Fig. 3 at the left hand side (from back) of the rear panel of the chassis.

The connections are made by opening the circuit at the volume control. Unsolder the condenser C21 from the lug on the volume control and reconnect it to the new terminal strip provided (see parts list). This terminal strip should be secured to the inside of the front panel of the chassis base at a point near the volume control and should be soldered in position. From the terminal lug on the above strip, and from the volume control lug from which the condenser C21 was removed, connect leads to the phono switch on the rear panel of the chassis as shown in Fig. 7. Before connecting these two leads permanently to the switch, tweak them together and endlock.

A high impedance phonograph pickup of good quality should be used. If a low impedance pickup 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.

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 115-210 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Changes in Early Models

In the early models of this receiver the tone control resistor (R11) was connected as a series variable resistor connecting in series through the con-

necting a 400 ohm resistor to the input 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 (15 short wave band—green dial color).

Adjust the oscillator Range D trimmer (C23) 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 (C8) and antenna Range C trimmer (C3) to maximum. Do not change the setting of the oscillator Range C 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—red dial color).

Phonograph connections can be made as shown in Fig. 7. The parts required to make this installation are shown in the parts list.

To mount the phono switch and phono jack, drill holes at a size and in the position shown in Fig. 3 at the left hand side (from back) of the rear panel of the chassis.

The connections are made by opening the circuit at the volume control. Unsolder the condenser C21 from the lug on the volume control and reconnect it to the new terminal strip provided (see parts list). This terminal strip should be secured to the inside of the front panel of the chassis base at a point near the volume control and should be soldered in position. From the terminal lug on the above strip, and from the volume control lug from which the condenser C21 was removed, connect leads to the phono switch on the rear panel of the chassis as shown in Fig. 7. Before connecting these two leads permanently to the switch, tweak them together and endlock.

Selectivity Control—Referring to the 1st and 2nd F transformers T1 and T4 in Fig. 2, it will be noted that there are coupling windings shown in the illustration below the primaries.

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 greatly widened bandwidths and a wide range of audio frequencies can be obtained.

Dual Volume Control—A dual manual volume control is used for setting the audio volume applied to the 76 tube audio tube is varied (R33). The purpose of the latter section is to reduce the sensitivity of the receiver at low volume settings in order to cut down noise pick-up between stations. The variable section R3 is shorted out through contact No. 4 of the interstage section of the band selector when in the 2nd short wave position.

A type 76 tube functions as a double second detector. AVC voltage is applied through isolating resistor in the control grid circuit of the R, F and 1st I. F. tubes. The AVC voltage is derived from the tuning condenser R1 and the AVC section of the Type 76 tube audio tube. Transformer coupling is used between the first two audio tubes and the output stage which employs two type 45 tubes. A type 80 full wave rectifier tube is used in the power unit.

Alignment and Calibration

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 mfd. 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 (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 pointer set screw and set the large band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C7) 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 greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

5800 KC Adjustment

Set the signal generator for 5800 KC. Connect the antenna lead of the receiver through

This model is a three band receiver with a tuning range in each band as shown in the specifications above. Three band coverage is accomplished by means of three sets of R. F. and oscillator coils and a three section triple switch.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R. F. transformer assemblies and T3 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters A, B, C and D respectively. The three sections of the antenna, interstage and oscillator sections.

The band switch completes connections to the coils in use. It also short circuits the R. F. and oscillator secondary and oscillator coil of lower frequency not in use.

The antenna transformer with tuned secondary feeds the type 6K7 R. F. audio tube. The oscillator transformer with tuned secondary feeds another 6K7 tube which functions as the 1st detector.

A separate type 76 tube is employed in the oscillator circuit. Referring to the oscillator assembly, Fig. 2, B, C and D refer to the standard wave, 1st short wave and 2nd short wave oscillator coils respectively. 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 6K7 first detector tube. This results in the intermediate or beat frequency of 456 KC being present in the plate circuit of this tube.

Two stages of I. F. amplification are employed using 6K7 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.

Correct alignment is extremely important in connection with all wave receivers. The receivers are properly aligned at the factory with precision instruments and should work perfectly without adjustment 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, 1750, 3100, 600, 1800, 5000, 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. If a sensor is tuned in with the selectivity control in the broad position and this condition is maintained, the alignment will be correct. This is not an indication that the receiver is out of alignment.

The complete procedure for the adjustments:

I. F. Adjustments

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 grid of the 1st detector.

Connect the ground lead of this 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 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 leveling 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. 3.

Range B Alignment

Set the signal generator for 1750 KC.

MONTGOMERY-WARD & CO.

MODELS 62-179, 62-194
62-206, 62-216, 62-218
Voltage, Trimmers
Socket, Data

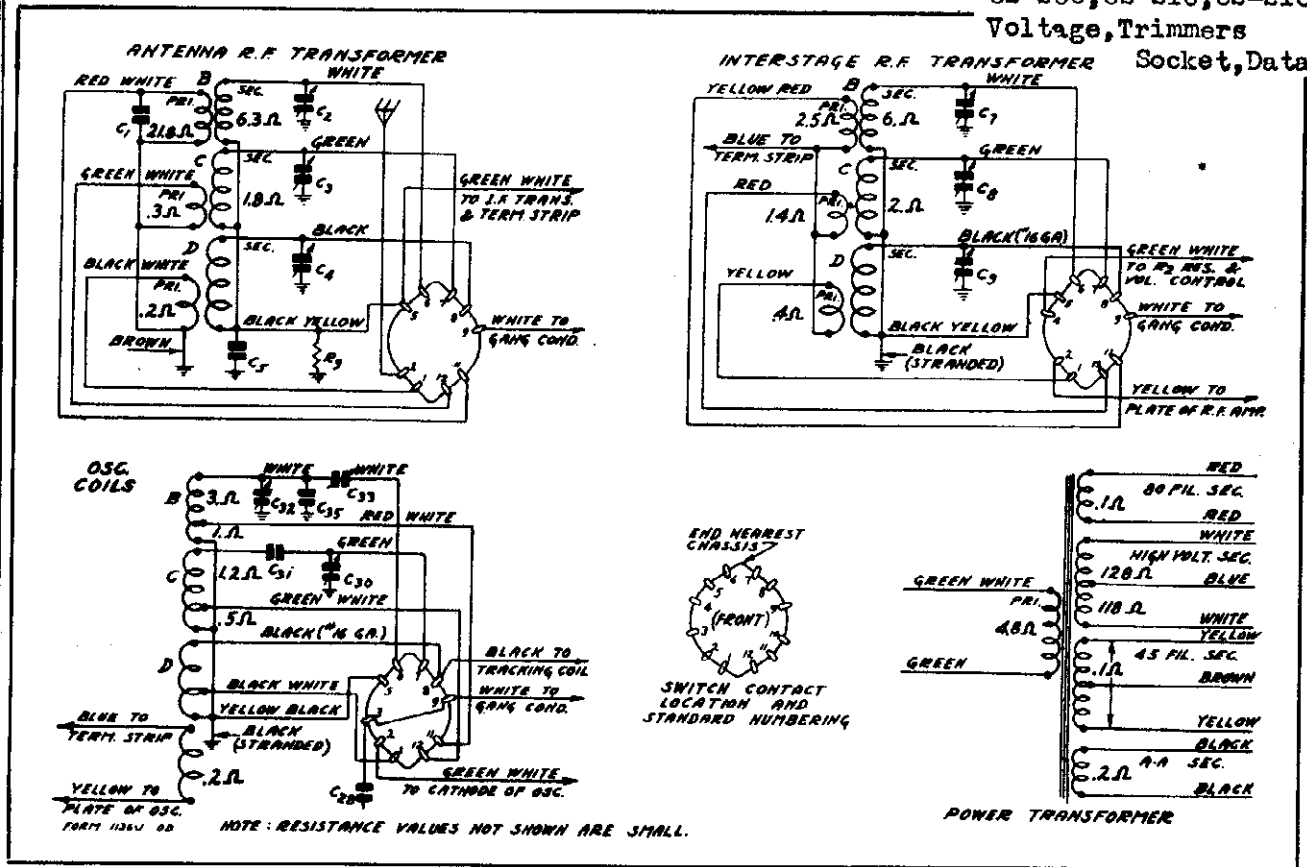


Fig. 4--Color Coding of Coil Wires and D. C. Resistance of Windings (Also see complete D. C. Resistance List in this Manual)

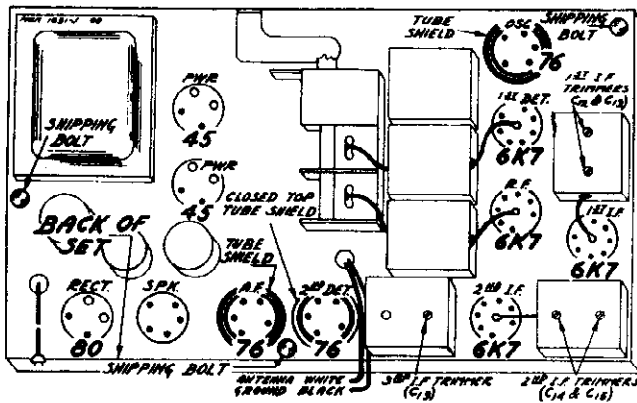


Fig. 5—Location of Tubes

VOLTAGES AT SOCKETS
 Line Voltage, 115 - Volume Control at Maximum
 Antenna Shorted to Ground

Type of Tube	Function	Heater or Filament	Plate to Ground	Screen to Ground	Cathode to Ground	Cathode M. A.
6K7 (6D6)	R. F.	6.1	265	120	3.7	9.0
6K7 (6D6)	1st Det.	6.1	265	110	9.5	3.8
76	Osc.	6.1	110			5.8
6K7 (6D6)	1st. I. F.	6.1	265	120	3.7	9.0
6K7 (6D6)	2nd I. F.	6.1	265	120	3.7	9.0
76	2nd Det.	6.1				
76	1st A. F.	6.1	265		14.	5.0
45	Power	2.5	265		50. (1)	22.
80	Rectifier	4.9				90. (total)

(1) As read with 500 Volt Scale. Grid to Ground.

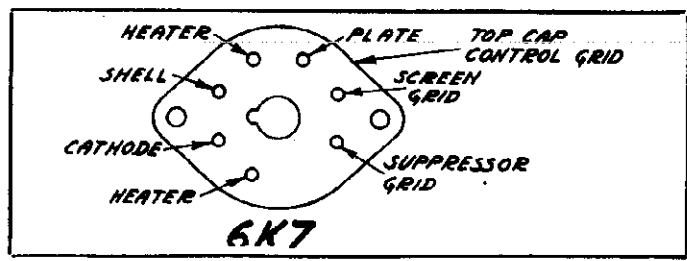


Fig. 6—Metal Tube—Bottom View of Socket

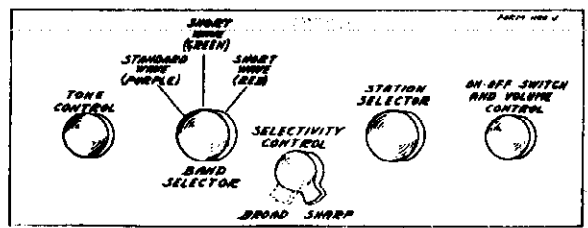
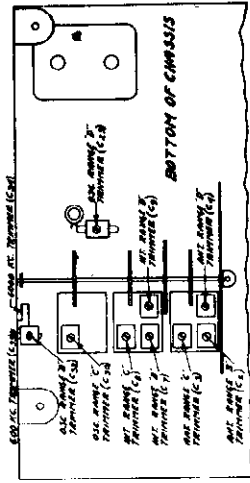


Fig. 1—Arrangement of Controls

MODEL S 62-179, 62-194
62-206, 62-216, 62-218
Resistance Test Parts

MONTGOMERY-WARD & CO.



D. C. Resistance of Windings
Refer to Fig. 4.
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-9A405	Antenna R. F. Transformer	T1	21.8
	Range B Primary Winding		0.3
	Range B Secondary Winding		0.2
	Range C Primary Winding		6.3
	Range C Secondary Winding		1.8
	Range D Primary Winding		2.5
	Range D Secondary Winding		1.4
P-9A425	Interstage B Primary Winding	T2	1.4
	Range C Primary Winding		0.4
	Range B Secondary Winding		2.0
	Range C Secondary Winding		Small
P-9A446	Oscillator Coil	T3	3.0
	Red White Tap to Ground		1.0
	Range C White Tap to Green		1.2
	Range D White Tap to Ground		0.5
	Black White Tap to Black		Small
	White Tap to Ground		0.2
P-9A397	1st. I. F. Transformer	T3	4.6
	Secondary Winding		1.7
	Spooling Position		0.2
P-9A398	2nd I. F. Transformer	T4	8.4
	Primary Winding		9.0
	Secondary Winding		0.5
P-9A399	3rd I. F. Transformer	T5	10.2
	Primary Winding		28.4
P-9A316	Audio Input Transformer	T7	2350.
	Primary Winding		2000.
	Secondary Winding		2500.
P-51A322	Audio Output Transformer	T6	198.
	Center Tap to Inside		222.
	Center Tap to Outside		0.4
P-12A208	Dynamic Speaker (10")		1.6
	Speaker Field		570.
P-55A394	110 Volt 60 Cycle Power Transformer	T5	48
	Tube Filament Secondary (A-A)		0.2
	Tube Filament Secondary (B-B) (45)		61
	Rectifier Filament Secondary		0.1
	High Voltage Secondary Winding		118
	Center Tap to Outside		129.
	Center Tap to Inside		36.
P-9A420	2nd. I. F. Plate Isolating Reactor	T1	1.1
P-9A391	High Frequency Oscillator Tracking Coil	T3	1.2

DIAL AND DRIVE ASSEMBLY—Continued

New Part No.	Old Part No.	Description	List Price
P-15A48		Dial Bracket Assembly Complete	3.90
P-25X34		Painter Slide, Take-up Spring Only	.10
P-10X59		Black Drive Cord, Only for 10" Dials	.10
P-25X42		Break Collar Drive Cord to Shaft	.10
P-25X42		Gang Condenser and Drive Assembly, less Condenser	.10

NOTE: The Gang Condenser and Drive Assembly, less Condenser, can be purchased complete—see Condenser List.

RESISTORS

Part No.	Code	Resistance	Watts	Type	List Price
P-19A163	R1	16,000 ohms	2.0	Carbon	\$.045
P-19A164	R2	1,500 ohms	0.2	Carbon	.10
P-36X206	R4	2.0 Megohms	Dual	Volume Control	.175
P-A94401	R5	400 ohms	0.2	Carbon	.15
P-C94303	R6	30,000 ohms	0.2	Carbon	.15
P-A94304	R7	100,000 ohms	0.2	Carbon	.15
P-A94305	R8	200,000 ohms	0.2	Carbon	.15
P-A94306	R9	1.0 Megohm	0.2	Carbon	.15
P-A94307	R10	10.0 Megohms	0.2	Carbon	.15
P-A95104	R11	100,000 ohms	0.1	Carbon	.15
P-A95105	R12	100,000 ohms	0.1	Carbon	.15
P-A95106	R13	25,000 ohms	0.1	Carbon	.15
P-C94453	R14	25,000 ohms	1.0	Carbon	.15
P-C94454	R15	25,000 ohms	0.2	Carbon	.15
P-A95252	R16	2,500 ohms	0.2	Carbon	.15
P-A94803	R17	80,000 ohms	0.2	Carbon	.15
P-A95104	R18	100,000 ohms	0.1	Carbon	.10

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	List Price
P-47X59	C1	250 mmf.		Molded	\$.15
P-17A30	C2	Range B Antenna	Trimmer		.10
P-17A31	C3	2.25 mmf.	Range C Antenna	Trimmer	.10
P-17A32	C4	2.25 mmf.	Range D Antenna	Trimmer	.10
P-65A104	C5	0.05 mfd.	180 Tubular		.15
P-17A36	C6	2.25 mfd.	240 Tubular		.10
P-17A37	C7	2.25 mfd.	360 Tubular		.10
P-65X117	C8	0.25 mfd.	Range C Interstage	Trimmer	.10
P-65X121	C9	0.25 mfd.	Range D Interstage	Trimmer	.10
P-17A39	C10	2.25 mfd.	180 Tubular		.25
P-17A40	C11	0.25 mfd.	360 Tubular		.30
P-17A41	C12	150-250 mmf.	1st. I. F. Trimmer	Condensers	.45
P-17A42	C13	150-250 mmf.	2nd I. F. Trimmer	Condensers	.45
P-46X18	C14	0.05 mfd.	180 Tubular		.15
P-46X19	C15	0.05 mfd.	360 Tubular		.15
P-17A43	C16	4.0 mfd.	Met. Electrolytic		.20
P-17A44	C17	10.0 mfd.	Met. Electrolytic		.30
P-17A45	C18	70-150 mfd.	3rd I. F. Primary	Trimmer	.30
P-17A46	C19	50 mmf.	Molded		.10
P-46X120	C20	0.01 mfd.	360 Tubular		.15
P-46X121	C21	0.004 mfd.	360 Tubular		.15
P-46X122	C22	0.004 mfd.	360 Tubular		.15
P-46X123	C23	0.004 mfd.	360 Tubular		.15
P-46X124	C24	0.004 mfd.	360 Tubular		.15
P-46X125	C25	0.004 mfd.	360 Tubular		.15
P-46X126	C26	0.004 mfd.	360 Tubular		.15
P-46X127	C27	0.004 mfd.	360 Tubular		.15
P-46X128	C28	0.004 mfd.	360 Tubular		.15
P-17A41	C29	2.25 mmf.	Oscillator Range D	Trimmer	.10
P-17A42	C30	100 mmf.	Oscillator Range C	Trimmer	.10
P-17A43	C31	100 mmf.	Oscillator Range B	Trimmer	.10
P-17A44	C32	2-25 mmf.	Oscillator Range A	Trimmer	.10
P-17A45	C33	300-600 mmf.	600 KC Padding	Condenser	.45
P-17A46	C34	40-100 mmf.	600 KC Padding	Condenser	.15
P-17A47	C35	10 mmf.	Section of Condensers	with Drive Assembly—Less Dial Assembly	5.40

PHONO ATTACHMENT PARTS

New Part No.	Old Part No.	Description	List Price
P-2A31	2172	Phono Switch (Double Pole Double Throw)	\$0.60
P-3A12	1193	Switch Knob	.10
P-3A13	212	Terminal Strip	.20
P-4A17	1421	Terminal Strip	.20
		7 Inches of No. 8667 Shielded Steering (5/16 Dia.)	.15

NOTICE—A change has been made in our parts numbering system. Old parts which are used in new receivers will have a new number assigned to them. For your convenience we are listing below the new part number and the corresponding old part number, should there be one. Order by new part number 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 series number and this large letter.

MISCELLANEOUS

New Part No.	Old Part No.	Description	List Price
P-3A126	202	Type 76 Glass Tube Socket	\$0.10
P-3A111	1853	Type 616 Glass Tube Socket	.30
P-3A211	1641	Type 6K7 Metal Tube Socket	.10
P-3A63	1641	Type 6K7 Metal Tube Socket	.10
P-32X10	4034	Tube Shield Have to Fit All Shields Below	.10
P-32X12	4034	Bottle-neck Type Shield (Used on 616 Tubes)	.15
P-32X13		Closed Top Type Shield (Used on 2nd Det. Tube)	.10
P-3A38	1637	Speaker Socket	.10
P-12A208		Dynamic Speaker Complete with Output Transformer	6.70
		Small Push-on Type Knob	.15
		Large Set Screw Type Knob	.15
		Special Selectivity Control Knob (Set Screw Type)	.20
P-17A38	1080	Flat Washers for use with above knobs	.45
P-3A23	2023	Uprail Retainer Ring	.15
P-3A24	1072	Rubber Chassis Mounting Cushions	.10
P-2A44		Band Change Switch	2.05
P-2A45		Selectivity Control Switch	.45

TRANSFORMERS AND COILS

New Part No.	Old Part No.	Description	List Price
P-9A405	T1	Antenna R. F. Transformer & Can Assembly	\$2.80
P-9A425	T2	Interstage R. F. Transformer & Can Assembly	2.30
P-9A426	T3	Oscillator Coil & Can Assembly	2.30
P-9A427	T4	2nd I. F. Transformer & Can Assembly	2.15
P-9A428	T5	3rd I. F. Transformer & Can Assembly	1.85
P-9A429	T6	Audio Input Transformer & Can Assembly	2.40
P-9A430	T7	Audio Output Transformer (Set of Speakers)	2.40
P-51X12	T8	Power Transformer—115 Volt; 60 Cycle	4.70
P-51X13	T9	Power Transformer—115 Volt; 25 Cycle	8.20
P-51X14	T10	Power Transformer—115-230 Volt; 25 Cycle	6.70
P-51X15	T11	High Frequency Oscillator Tracking Coil	.50
P-51X16	T12	2rd I. F. Plate Isolating Reactor	.50

DIAL AND DRIVE ASSEMBLY

New Part No.	Old Part No.	Description	List Price
P-5A27		Gang Condenser Bracket and Bearing	1.45
P-5A28		Drive Shaft with set screw	.15
P-5A29		Main Shaft; Pointer Stud	.10
P-5A30		Gear (Rotary)	.10
P-5A31		Gear (Stationary)	.10
P-5A32		Main Pointer Shaft Assembly	.45
P-5A33		Compound Gear Assembly	.15
P-5A34		Tension Bell Spring	.20
P-5A35		Dial Clamp to secure Dial Strip to frame (with 6-32x1/16" mounting screw)	.30
P-5A36		Dial Strip Only (Specify Series No. and Name of Receiver)	.50
P-5A37		Metal Pointer	.10
P-5A38		Metal Pointer	.10
P-5A39		Pilot Lamp Bulb (6-8V)	.15
P-5A40		Pilot Lamp Sockets & Spring Clips	.10

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Tuning Frequency Range

- B Range - 535 to 1730 KC.
- C Range - 1715 to 5800 KC.
- D Range - 5750 to 18300 KC.

THE CAPACITY OF SHIELD "C" "D"
AND "E" IS 50-MUF EACH.

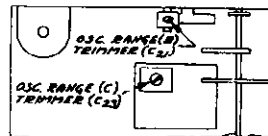
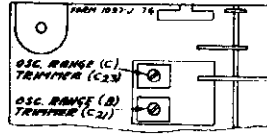


Fig. 4 - Oscillator Trimmer Location in Early and Intermediate Models

Three Types Schematic Trimmers

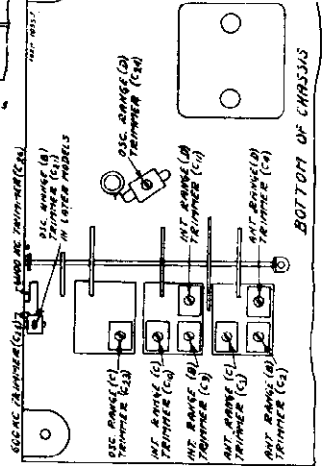
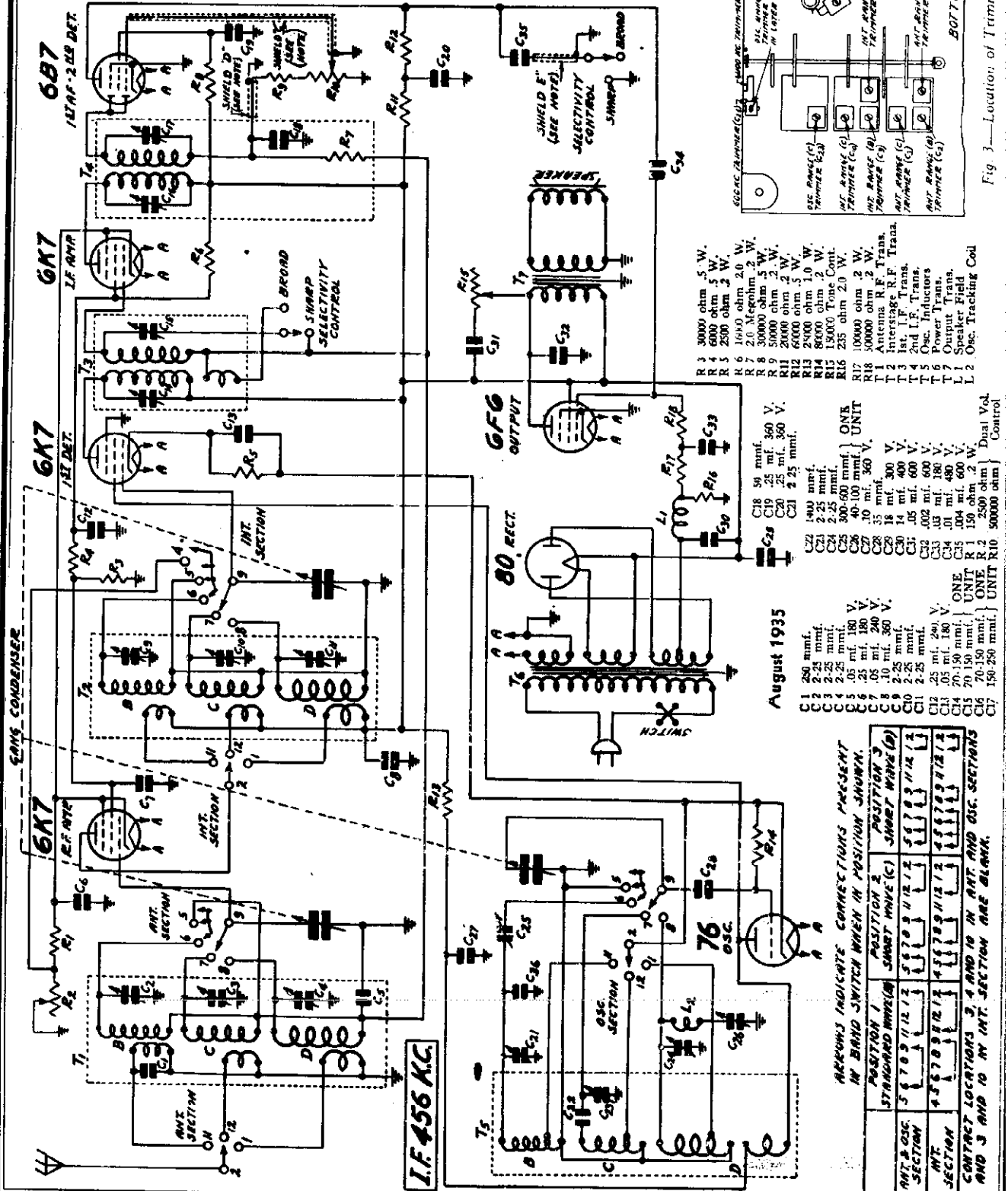


Fig. 3 - Location of Trimmers (Latest Models)



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- R 3 30000 ohm 5 W.
- R 4 5000 ohm 5 W.
- R 5 2500 ohm 2 W.
- R 6 10000 ohm 2 W.
- R 7 20000 ohm 2 W.
- R 8 50000 ohm 2 W.
- R 9 10000 ohm 2 W.
- R 10 20000 ohm 2 W.
- R 11 50000 ohm 2 W.
- R 12 2500 ohm 1.0 W.
- R 13 2500 ohm 2 W.
- R 14 8000 ohm 2 W.
- R 15 15000 Trans. Cont.
- R 16 235 ohm 2.0 W.
- R 17 10000 ohm 2 W.
- R 18 50000 ohm 2 W.
- T 1 Antenna R.F. Trans.
- T 2 1st. I.F. Trans.
- T 3 2nd I.F. Trans.
- T 4 3rd I.F. Trans.
- T 5 Osc. Inductors
- T 6 Power Trans.
- T 7 Output Trans.
- L 1 Speaker Field
- L 2 Osc. Tracking Coil
- 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 .05 mf. 240 V.
- C 7 .10 mf. 360 V.
- C 8 2-25 mmf.
- C 9 2-25 mmf.
- C 10 2-25 mmf.
- C 11 2-25 mmf.
- C 12 .05 mf. 180 V.
- C 13 .05 mf. 240 V.
- C 14 .10 mf. 360 V.
- C 15 70-150 mmf.
- C 16 150-250 mmf.
- C 17 150-250 mmf.
- C 18 50 mmf.
- C 19 .25 mf. 360 V.
- C 20 .25 mf. 360 V.
- C 21 2-25 mmf.
- C 22 2-25 mmf.
- C 23 300-600 mmf.
- C 24 40-100 mmf.
- C 25 35 mmf.
- C 26 18 mf. 300 V.
- C 27 .10 mf. 360 V.
- C 28 18 mf. 300 V.
- C 29 .05 mf. 400 V.
- C 30 .05 mf. 600 V.
- C 31 .05 mf. 180 V.
- C 32 .05 mf. 180 V.
- C 33 .05 mf. 180 V.
- C 34 .01 mf. 600 V.
- C 35 .01 mf. 600 V.
- C 36 .01 mf. 600 V.
- C 37 150 ohm 2 W.
- C 38 150 ohm 2 W.
- C 39 150 ohm 2 W.
- C 40 150 ohm 2 W.
- C 41 150 ohm 2 W.
- C 42 150 ohm 2 W.
- C 43 150 ohm 2 W.
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- C 92 150 ohm 2 W.
- C 93 150 ohm 2 W.
- C 94 150 ohm 2 W.
- C 95 150 ohm 2 W.
- C 96 150 ohm 2 W.
- C 97 150 ohm 2 W.
- C 98 150 ohm 2 W.
- C 99 150 ohm 2 W.
- C 100 150 ohm 2 W.

ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

ANT. & OSC. SECTION	POSITION 1	POSITION 2	POSITION 3
STANDARD WAVE (M)	5 9 7 8 11 12 13	5 9 7 8 11 12 13	5 9 7 8 11 12 13
SHORT WAVE (D)	5 9 7 8 11 12 13	5 9 7 8 11 12 13	5 9 7 8 11 12 13
ANT. SECTION	4 3 6 7 9 11 12 13	4 3 6 7 9 11 12 13	4 3 6 7 9 11 12 13
INT. SECTION	4 3 6 7 9 11 12 13	4 3 6 7 9 11 12 13	4 3 6 7 9 11 12 13

CONTACT LOCATIONS 3, 4 AND 10 IN ANT. AND OSC. SECTIONS AND 3 AND 10 IN INT. SECTION ARE BLANK.

MODELS 62-185, 62-187
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Voltage, Socket, Color Code

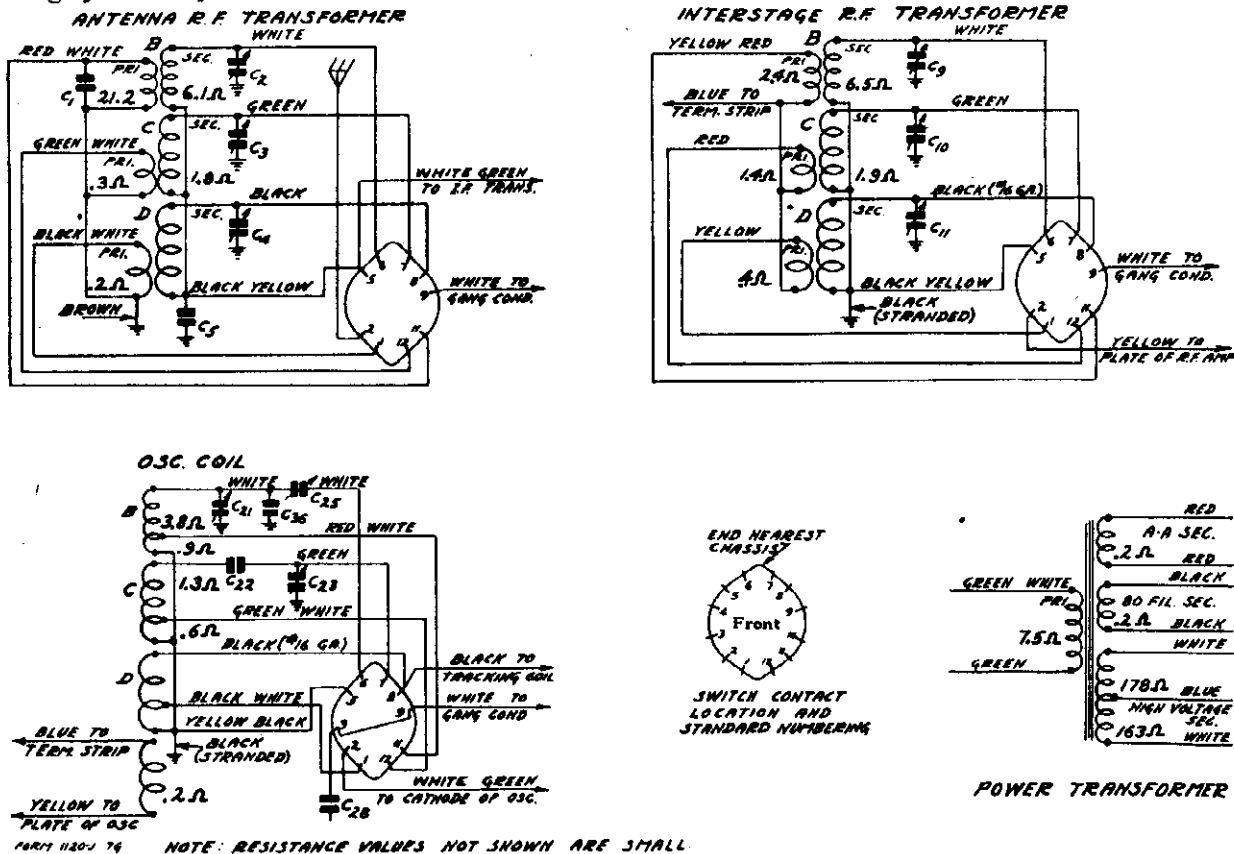


Fig. 5—Color Coding of Coil Wires and D. C. Resistance of Windings
(Also see complete D. C. Resistance List in this Manual)

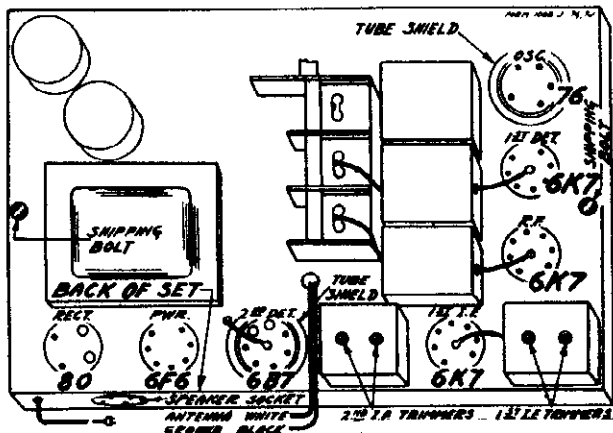


Fig. 6—Location of Tubes

VOLTAGES AT SOCKETS
Line Voltage, 115 - Volume Control at Maximum
Antenna Shorted to Ground

Type of Tube	Function	Heater or Filam't	Plate to Ground	Screen to Ground	Cathode to Ground	Plate M. A.
6K7 (6D6)	R. F.	6.1	230	95	3.0	6.4
6K7 (6D6)	1st Det.	6.1	230	100	9.0	3.2
76	Osc.	6.1	100			5.2
6K7 (6D6)	I. F.	6.1	230	120	3.0	9.
6B7	2nd Det.	6.1	55(1)	40		2.3
6F6 (42)	Power	6.1	215	230	17(2)	30.0
80	Rectifier	4.7				34. per plate

(1) As read with 500,000 ohm meter.
(2) As read across R16

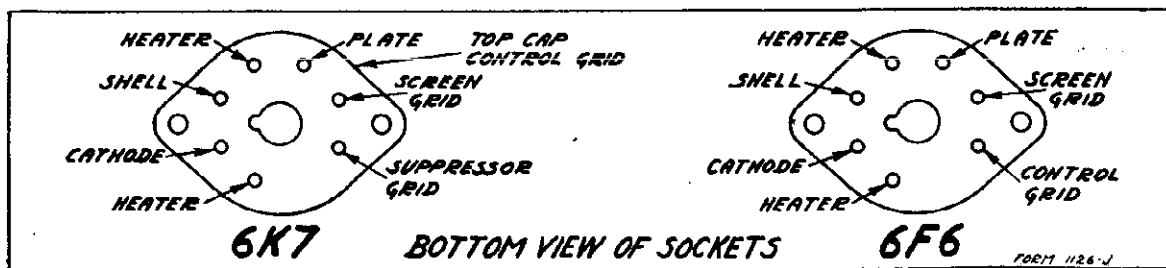


Fig. 7—Metal Tubes—Bottom View of Sockets

MONTGOMERY-WARD & CO.

MODELS 62-185, 62-187 62-190, 62-196

Three Types Alignment, Changes, Data

Circuit

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and oscillator R. F. transformer assemblies...

The hand switch completes connections to the coils in use. It also short circuits the R. F. transformer secondary and oscillator coil of lower frequency not in use.

The antenna transformer with tuned secondary feeds into a type 6K7 R. F. amplifier tube. The output of this tube is fed through the interstage R. F. transformer with tuned secondary into another 6K7 tube which functions as the 1st detector.

A separate type 76 tube is employed in the oscillator circuit. Referring to the oscillator assembly T1, Fig. 2, B, C and D refer to the standard wave, 1st short wave and 2nd short wave oscillator coils respectively. The oscillating circuit is always resonant at 476 KC above the frequency to which the R. F. amplifier is tuned.

The oscillator potential is fed into the cathode circuit of the 6K7 first detector tube. This results in the intermediate or beat frequency of 456 KC being 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.

Selectivity Control—Referring to the 1st I. F. transformer T3 in Fig. 2, it will be noted that there is a coupling winding shown in the illustration below the primary. Refer also to the by-pass arrangement in the penultimate plate circuit of the 6B7.

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. High audio frequencies are by-passed to ground through condenser C33.

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.

In order to allow passage of the higher audio frequencies in the broad position, the capacity of the by-pass condenser in ground is greatly reduced (C33) and the capacity of shield E is increased.

Dual Volume Control—A dual manual volume control is employed. In one section the audio voltage is applied to the 1st audio section of the 6B7 tube is varied (R10). In the other section the R. F. and I. F. bias is varied (R2). The purpose of the latter section is to reduce the sensitivity of the receiver at low volume settings in order to cut down noise pick-up from the variable section R2 is shunted out through contact No. 6 of its range selector. The band selector when in the 2nd short wave position.

A type 6B7 duo diode pentode 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 R. F. and I. F. tubes. The AVC voltage developed across volume control resistor R10 is applied through the movable arm of the control grid and cathodes of the R. F. and I. F. amplifier tubes which employs a type 6F6 output transformer. A type 80 full wave rectifier tube is used in the power unit.

Alignment and Calibration

Correct alignment is extremely important in connection with all wave receivers. The receivers are properly aligned at the factory with precision instruments and readjustment 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, 1100, 600, 5800, 5000, 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. If a station is tuned in with the selectivity control in the broad position and this control is then turned to the sharp position, the station may disappear. This is not an indication that the receiver is out of alignment.

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 mfd. 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—purple dial color).

Turn the selectivity switch to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position. To prevent the leveling off action of the A.V.C. condensers are reached from the top of the chassis and the location is shown in Fig. 6.

Range B Alignment

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

Adjust the oscillator Range B trimmer (C31) until maximum output is obtained. The location of this trimmer is shown in Figs. 3 and 4.

Set the signal generator for 1500 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

There is a lever arm in front of the large gear on the tuning condenser shaft by means of which the position of the station pointer may be adjusted. Set the station pointer at the 1500 KC mark on the dial scale by adjusting this lever arm.

Adjust the interstage Range B trimmer (C9) and antenna Range B trimmer (C2) to maximum.

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.

Switch Contact Location Numbering A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 7. In contact locations not used, the number applying to that particular location is not employed.

Range C Alignment

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—green dial color).

Adjust the oscillator Range C trimmer (C23) until maximum output is obtained. See Figs. 3 and 4 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.

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—red dial color).

Adjust the oscillator Range D trimmer (C24) until maximum output is obtained. See Fig. 3 for location of this trimmer.

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 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.

Then, slowly 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 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.

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.

Metal Tubes

Two types of the new metal tubes are used in this receiver, namely, 6K7 and 6F6. These replace the type 6D6 and 42 glass tubes respectively. The metal tubes operate at the same voltages and are nearly identical in characteristics to the corresponding glass tubes which they replace. In Fig. 7 are shown the metal tube pin positions from a bottom socket view.

The shells of the metal tubes get quite hot and users should be cautioned against touching them.

Servicing R. F. Coil Assemblies

The R. F. transformers and oscillator coil assemblies in this receiver are sold complete with can. This is due to the fact that the trimmer adjustments in the can, and cannot be easily disassembled.

The lead colors and resistances of the various windings in each assembly are shown in Fig. 5.

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 chassis ground lug on this terminal. Be sure to solder back to this lug any leads that were connected to it from including the cathode connection.

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 in can) until the trimmer is clear of the can. After the trimmers are all unsoldered, the coil can be taken out.

Changes in Early Models In the early models of this receiver, the antenna transformer (T1) had two Range B Primary windings as shown in Fig. 8.

The oscillator Range B and C trimmer locations varied in the early and intermediate models of this receiver as shown in Figs. 3 and 4.

Referring to Fig. 2, in the early models of this receiver, contact No. 4 in the interstage section of the band selector was not used. The correct contact arrangement is to short out variable resistor R2 in the second short wave position. In these models the relative positions of resistors R1 and R2 were reversed. The common connection from the suppressor grid and cathodes of the R. F. and I. F. amplifier tubes was connected to the control arm of variable resistor R2. The latter was connected to resistor R1 which was grounded at the other end. The by-pass condenser C5 remains connected as before, to the cathode and suppressor grid connection.

The type 6K7 and 6F6 metal tubes replace the types 6D6 and 42 glass tubes respectively which were used in the early models.

Phonograph Connections

Phonograph connections can be made as shown in Fig. 9. The parts required are shown in the parts list. Knobs for mounting the phono jack and the chassis for mounting the phono jack and phono switch—See Fig. 10.

For mounting the 12 mfd. 21 volt electrolytic condenser use No. 27 drill holes which should be drilled in the side of the chassis directly below the electrolytic condensers. These holes are 1/16" from the bottom, 3/8" and 1/4" from the front of chassis. The ground lug which extends out from the side of the chassis should be bent back into the chassis wall.

Replace the single lug insulated terminal strip (located on the rear panel, directly in back of the band selector switch) with (P-4A59) double lug insulated terminal strip with ground lug. Be sure to solder back to this new terminal strip any leads that were connected to the other terminal strip.

The connections are made by opening the diode return circuit at the one corner. Unsolder the 50,000 ohm resistor R9 (common to the 6B7 detector and from the shielded lead which runs from the control and from the shielded lead which runs from the same lug and the other side to the phono switch—see Fig. 9) Ground the shield to the ground lug of the terminal strip.

The extra shielded lead which is provided should be inserted into a piece of standard sleeving.

Connect this shielded lead from the volume control to the phono switch as shown in Fig. 9. Be sure that the insulated sleeve covering the shielded lead where it passes over the volume control.

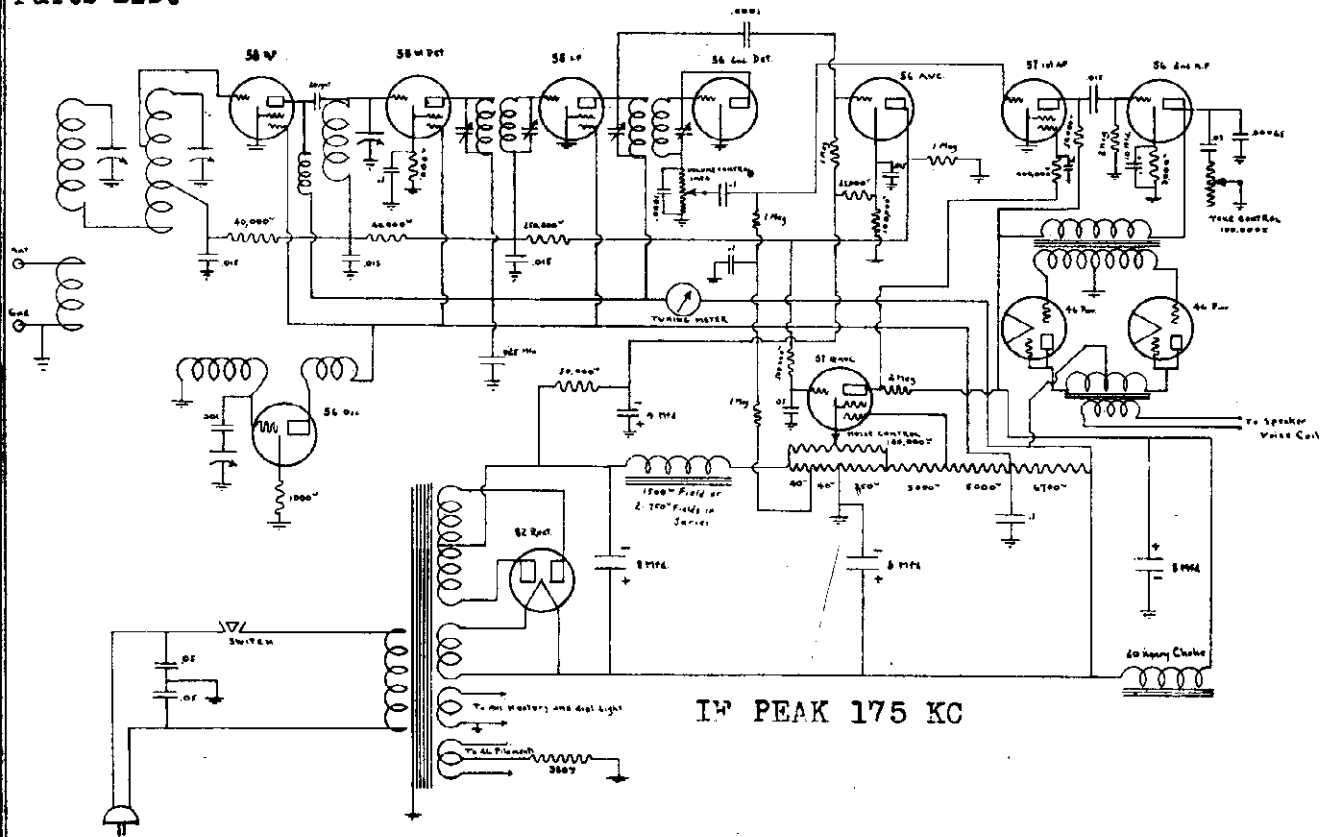
Remove the ground from the cathode terminal of the 6B7 2nd detector tube socket by bending the chassis ground lug on this terminal. Be sure to solder back to this lug any leads that were connected to it from including the cathode connection.

Connect one side of the 12 mfd. 21 volt electrolytic condenser to ground and the other side of that condenser to the cathode of the 6B7 2nd detector tube socket and to the phono switch as shown in Fig. 9. To this terminal, then, the phono switch connect the 900 ohm resistor. The other side of the resistor is connected to ground. Complete the other connections as illustrated in Fig. 9.

A high impedance pickup should be used. If a low impedance pickup 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.

MODEL 62PC64
Schematic, Voltage
Parts List

MONTGOMERY-WARD & CO.



VOLTAGE READINGS

The following voltages should be observed at the points indicated:—

NOTE: In making these readings, a high resistance volt meter should be used, having resistance of at least 1000 ohms per volt.

- Across each field, 75 volts.
- Across entire voltage divider, 215.
- Across first 40 ohm section, 4.
- Across second 40 ohm section, 4.
- Across 350 ohm section, 3.
- Across first 5000 ohm section, 42.
- Across second 5000 ohm section, 42.
- Across 6700 ohm section, 120.

- Across 46 bias resistances, 17½.
- Across filter choke, 1.
- Across second audio bias resistor, 10.
- Across 50,000 ohm A.V.C. filter resistor, 45.
- Across 25,000 ohm A.V.C. Grid resistor, 25.
- Across 100,000 ohm A.V.C. plate resistor, 80.
- From ground to second AF plate, 200.
- From ground to first AF plate, 150.
- From ground to RF and I.F. plates, 200.
- From ground to RF screens, 85.
- From ground to oscillator cathode, 5.
- From ground to first detector cathode, 5.

Replacement Parts List

12 Tube Super-Heterodyne Model 62-PC-64

Supplier: Davison Radio and Television Corporation, Los Angeles, California

Part No.	DESCRIPTION	Unit Per Chassis	Unit Price	Selling Price	Part No.	DESCRIPTION	Unit Per Chassis	Unit Price	Selling Price
PC-641	Power Transformer	1	\$1.75	\$4.38	PC-6422	Resistor—50,000 ohm 1/3 W.	1	\$.06	\$.15
PC-642	Dual 8 Elec. Condenser	1	.75	1.88	PC-6423	Resistor—¼ meg ohm 1/3 W.	1	.06	.15
PC-643	Dual 8-4 Elec. Condenser	1	1.00	2.50	PC-6424	Resistor—½ meg ohm 1/3 W.	1	.06	.15
PC-644	Filter Choke No. 370	1	.21	.52	PC-6425	Resistor—1 meg ohm 1/3 W.	4	.06	.15
PC-645	Toggle Switch	1	.25	.63	PC-6426	Resistor—2 meg ohm 1/3 W.	2	.06	.15
PC-646	Volume Control 1 meg ohm	1	.48	1.20	PC-6427	Resistor—400,000 ohm 1/3 W.	1	.06	.15
PC-647	Tone Control 100,000 ohm	1	.36	.90	PC-6428	Resistor—25,000 ohm 1/3 W.-5%	1	.10	.25
PC-648	Noise Control 100,000 ohm	1	.36	.90	PC-6429	Resistor—50,000 ohm 1/3 W.-5%	1	.10	.25
PC-649	Variable Condenser 4 Gang	1	2.00	5.00	PC-6430	Resistor—100,000 ohm 1/3 W.-5%	1	.10	.25
PC-6410	Intermediate Base No. 140	2	.30	.75	PC-6431	Resistor—350 Candohm Strip	1	.08	.20
PC-6411	Dial Assembly	1	2.00	5.00	PC-6432	Resistor—6 Section Candohm Strip	1	.36	.90
PC-6412	Escutcheon Plate	1	.75	1.88	PC-6433	Condenser .0001-10%	2	.08	.20
PC-6413	Noise Control Escutcheon	1	.25	.63	PC-6434	Condenser .00025-10%	1	.08	.20
PC-6414	Audio Transformer No. 0984	1	.87	2.18	PC-6435	Condenser .001-3%	1	.15	.37
PC-6415	Antenna Coil	1	.40	1.00	PC-6436	Condenser .015	5	.10	.75
PC-6416	Band Pass Coil	1	.40	1.00	PC-6437	Condenser .03	1	.08	.20
PC-6417	Translator Coil	1	.60	1.50	PC-6438	Condenser .05-200 V.	1	.08	.20
PC-6418	Litz Intermediate Coils	2	.40	1.00	PC-6439	Condenser .05-400 V.	2	.08	.20
PC-6419	Resistor—1000 ohm 1/3 W.	2	.06	.15	PC-6440	Condenser .1-200 V.	5	.08	.20
PC-6420	Resistor—3000 ohm 1/3 W.	1	.06	.15	PC-6441	Condenser .25-400 V.	1	.10	.25
PC-6421	Resistor—40,000 ohm 1/3 W.	1	.06	.15	PC-6442	Condenser 10 Mfd.-25 V.	1	.25	.63

MONTGOMERY-WARD & CO.

MODEL 62-199
Schematic, Voltage
Socket, Trimmers
Parts List

VOLTAGES AT SOCKETS
Input 6.3 Volts—Antenna Disconnected at Connector

Type of Tube	Function	Volts at Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
6D6	R. F.	6.2	154	95	3.0	5.2
6C6	1st Det. & Osc.	6.2	160	97	0	3.0
6D6	I. F.	6.2	154	95	3.0	5.2
75	2nd Det. & 1st A. F.	6.2	110	—	1.	.25
41	Power	6.2	143	146	14.	13.0

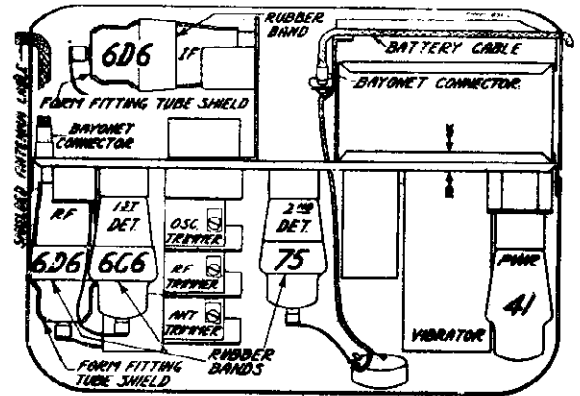


Fig. 2—Location of Tubes and Vibrator

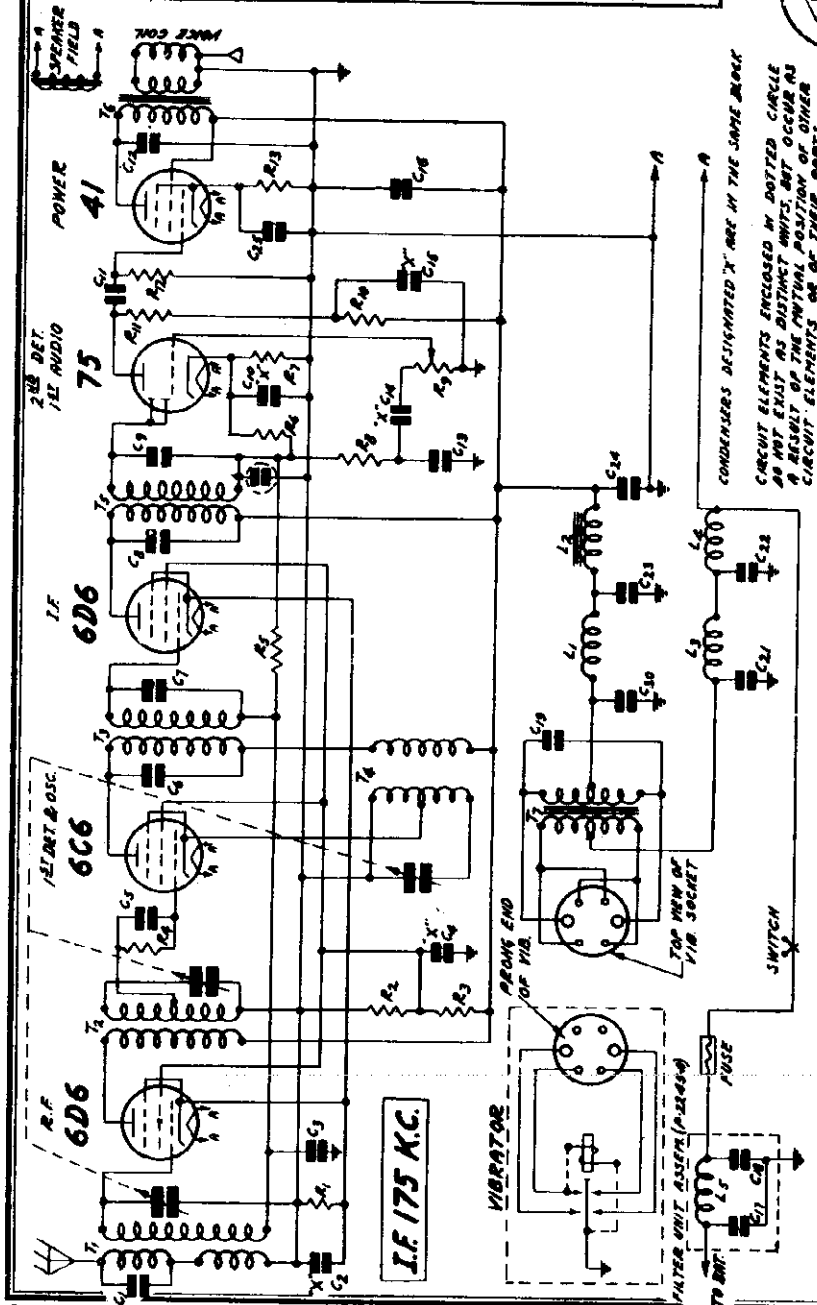


Fig. 1—Schematic Circuit Diagram

- CONDENSERS**
- | | | | | |
|----------|------|----------|---------|--|
| Part No. | Code | Capacity | Voltage | Type |
| P-81814 | C1 | 250 mmf. | 200V. | (Part of Antenna Coil Assembly) |
| | C2 | .50 mf. | 140V. | |
| | C4 | .10 mf. | 140V. | |
| P-8260D | C10 | .25 mf. | 300V. | Bypass Block |
| | C14 | .05 mf. | 300V. | |
| | C15 | .05 mf. | 200V. | |
| | C3 | .05 mf. | | Tubular |
| | C5 | .35 mmf. | | Part of Grid Leak Assembly |
| P-81815 | C6 | 70 mmf. | | Part of 1st I. F. & Osc. Coil Assembly |
| P-81806 | C7 | 70 mmf. | | Part of 2nd I. F. Coil Assembly |
| P-81806 | C8 | 70 mmf. | | |
| P-81815 | C9 | .05 mf. | | |
| P-81114 | C11 | .06 mf. | | |
| P-81814 | C12 | .250 mf. | | |
| P-81132 | C13 | 10 mf. | | |
| | C16 | .01 mf. | | |
| | C17 | .01 mf. | | |
| | C18 | .01 mf. | | |
| P-81120 | C19 | .007 mf. | | In Choke Condenser Unit |
| P-81122 | C20 | .10 mf. | | Tubular |
| P-81121 | C21 | .50 mf. | | Tubular |
| P-81816 | C22 | .002 mf. | | Tubular |
| | C23 | 4.0 mf. | | Moulded |
| P-82002 | C24 | 2.0 mf. | | 250V. Dry Electrolytic Block |
| P-82500 | C25 | 4.0 mf. | | 25V. Dry Electrolytic Block |
- Gang Condenser
- RESISTORS**
- | | | | | |
|-----------|------|-------------|---------|---------------------------|
| Part No. | Code | Resistance | Wattage | Type |
| P-B9431ww | R1 | 350 Ohm | .5 | Flexible Wire Wound |
| P-B95253 | R2 | 25,000 Ohm | .5 | Carbon |
| P-B95103 | R3 | 10,000 Ohm | .5 | Carbon |
| P-A95105 | R4 | 1 Megohm | .2 | Carbon |
| P-A95105 | R5 | 1 Megohm | .2 | Carbon |
| P-A95504 | R6 | 500,000 Ohm | .2 | Carbon |
| P-A94752 | R7 | 7,500 Ohm | .2 | Carbon |
| P-A95104 | R8 | 100,000 Ohm | .2 | Carbon |
| P-96017 | R9 | 2 Megohm | .2 | Volume Control and Switch |
| P-A95503 | R10 | 50,000 Ohm | .2 | Carbon |
| P-A95204 | R11 | 200,000 Ohm | .2 | Carbon |
| P-A95504 | R12 | 500,000 Ohm | .2 | Carbon |
| P-B9481ww | R13 | 80 Ohm | .5 | Flexible Wire Wound |
- CONDENSERS DESIGNATED 'X' ARE IN THE SAME BLOCK**
- 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 OF THEIR PARTS.**

MODEL 62-199
Alignment
Service Notes

MONTGOMERY-WARD & CO.



Fig. 3—Drive Cord "Take-up" Spring
Then bring the cord inside of the drum by way of the turned-in portion of the flange at "B".
Tie the drive tension spring "D" to the loose end of the cord at the point "C", just above the top edge of the lip "B" as shown in the illustration. This should be done so that the lower hook of spring "D" at point "C" will be between $\frac{1}{8}$ " and $\frac{1}{4}$ " from top edge of the turned-in portion of the flange "B" in the flange of the drive drum. After the spring is hooked and the drive turned over several times the tension in the cord will cause this distance to become about $\frac{1}{4}$ ".

Now, by applying a tension on the drive spring "D", hook the other end of the spring into the small hole "E" near the top of the drive drum. Hook spring from the inside out.
After the cord has been put on it may be necessary to calibrate the receiver as explained in the article on condenser alignment.

All of the earlier models did not have drive shaft "take-up" springs. This spring will prevent any tendency toward change of setting should the receiver be subjected to vibration. To insert these springs and fibre washers on the drive shaft proceed as follows:

Remove the station selector knob by pulling it off of the shaft.

Slip the small fibre washer over the shaft and slip the "take-up" spring to the drive shaft as shown in Fig. 3. The chassis may now be replaced into the case in the reverse order of the manner in which it was removed.

Changes in Later Models

In the first models of this receiver a bypass condenser block (P-2800) containing Condensers C13, C14, C15 and C16 was used. Condenser C16 was removed in the later models and added as a separate tubular condenser (P-811321) while the other condensers remained in the block (P-82800-13).

A second condenser change from the earlier models was in the electrolytic filter block (P-82002). In this block section C24 was changed from an 8 mfd., 250 volt to a 2 mfd., 250 volt condenser.

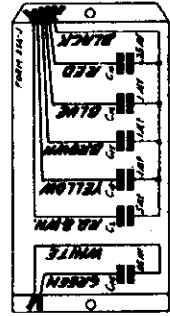


Fig. 6—Condenser Block Internal Wiring
NOTE: SEE SERVICE MANUAL FOR LATER MODELS

Replacing Drive Cord

The drive cord in this receiver may be replaced as follows:

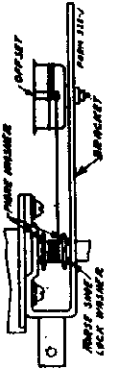


Fig. 3—Cord Drive—Top View
First, remove the chassis from the case as explained on page 4.
Screw the lock washers on the drive shaft to protect the drive cord as shown in Fig. 3. If this is the case, these washers should be put on as follows:
Screw and take off the hose shoe lock washers which hold the drive shaft in position. This may be done with a line jawed, long nose plier.
Now pull the drive shaft out just far enough to permit the two fibre washers to be slipped over the end of the shaft.

Then slip the shaft back into place and replace the hose shoe lock washer.
Knot one end of the new drive cord and with the condenser plates in a completely closed position, slip the drive cord through the smallest "A" in the drive drum as shown in Fig. 4. The knot will then be on the inside of the drum as indicated and bring it up to the drive shaft. Proceed by wrapping it in a clockwise direction from

front) around the drive shaft three and one-quarter turns (front) around the drive shaft three and one-quarter turns around the two fibre washers, progressing toward the front of the chassis. Be sure that the condenser plates are kept in a closed position and that the cord is held tight.

Set the dial indicator drum so that the offset is at the top or a little to the right of the center — see Fig. 4.
Wrap the cord from the drive shaft, once around the offset in the dial indicator drum and then approximately one and one-half turns around the drum itself in a clockwise direction, progressing toward the back.
From the dial indicator drum draw the cord over the lower right hand quarter of drive drum as shown in Fig. 4.

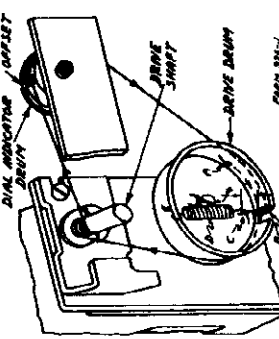


Fig. 4—Cord Drive Replacement

Replacing Volume Control

To remove the volume control and the switch, first pull the knob from the volume control shaft. Next loosen the hexagonal nut on the inside of the case with a flat end wrench. Then unscrew and remove the round knurled nut from the front.
The old volume control and switch connections may now be unscrewed and the new unit put in its place and the leads reconnected.
Fasten the volume control to the case in the reverse order in which it was removed.

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 K. C. with the volume control set at the three-fourths on position. The trimmer is shown in 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.

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.	Item	Code	D.C. Resistance in Ohms
P-537	Antenna Trans. Pk. in Series	T1	17.50
P-538	K. F. Interstage Trans. Pk.	T2	2.21
P-539	K. F. Interstage Trans. Pk. (Center Tap to Ground)	T3	1.32
P-540	L. I. Trans. Primary	T4	100.00
P-541	L. I. Trans. Secondary	T5	100.00
P-542	Oscillator Plate Col. (Grid)	T6	100.00
P-543	Sec. I. F. Trans. Pk.	T7	9.00
P-544	Sec. I. F. Trans. Pk.	T8	100.00
P-545	Power Trans. Pk.	T9	3.36
P-546	Power Trans. Pk.	T10	80.00
P-547	Power Choke Choke	T11	20.00
P-548	"A" Choke	T12	20.00
P-549	Line Choke	T13	Small
P-550	Output Trans. Pk.	T14	Small
P-551	Output Trans. Pk.	T15	Small
P-552	Speaker Field	T16	200.00
P-228	Speaker Field	T17	0.00
		T18	0.00

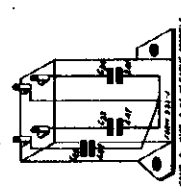


Fig. 7—Electrobric Block Internal Wiring
NOTE: SEE SERVICE MANUAL FOR LATER MODELS

Condenser Alignment
Misalignment or mistaking 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 by any other possible cause. Only the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the standard wave band and an output meter are required for indicating the correct adjustments.

First remove the cover of the box. Leave the antenna and battery cables connected to the chassis.
Disconnect the car antenna and connect antenna cable lead to the lead from the signal generator.
Set the signal generator for 1650 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator adjustment is 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.

Now 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 calibrate the receiver, tune in a station of known frequency at about the center of the dial. Remove the oscilloscope plate and gas. The pointer is held in position by friction. Grasp the pointer at the center and turn it until it points to the frequency of the station being received.

The use of the cut plate type of condenser eliminates the necessity of a 600 K. C. ladder and, therefore, no adjustment at this frequency is required.

Removing Chassis From Case

First unsolder the black, brown, yellow, and green speaker leads which connect to the terminal strip adjacent to the vibrator unit. Next, notice the small length of braided shielding which is soldered to the shielded end of the station selector central shaft. Unsolder this shielding at the top.
Remove the 4 screws which hold the chassis in the case — 2 are in the side and 2 on the speaker panel of the chassis case. (Do not remove the four speaker mounting screws.)
Remove the two control knobs by pulling them off of the shaft.

Next remove the volume control. To do this first loosen the hexagonal nut on the inside of the case with a flat wrench. Then unscrew and remove the round knurled nut from the front.
The chassis may then be taken out.

Replacing Vibrator Unit

The vibrator unit is plugged in in the same manner as a tube. In case of failure, it is really replaced. CAUTION: Plug the vibrator unit into the chassis, must be observed when plugging in vibrator unit.
In replacing the vibrator unit be sure to replace the corrugated cardboard pad, which prevents the unit from working its way out of the socket.

MONTGOMERY-WARD & CO.

MODELS 62-203, 62-208, 62-208, 62-212, 62-217, 62-219
Schematic, Trimmers

Tuning Frequency Range
B Range - - - - - 535 to 1730 KC.
C Range - - - - - 1680 to 4800 KC.
D Range - - - - - 5650 to 16000 KC.

- C11 250 mmf.
- C12 2-25 mmf.
- C13 2-25 mmf.
- C14 2-25 mmf.
- C15 .05 mf. 180 V.
- C16 .25 mf. 180 V.
- C17 2-25 mmf.
- C18 2-25 mmf.
- C19 2-25 mmf.
- C20 2-25 mmf.
- C21 35 mmf.

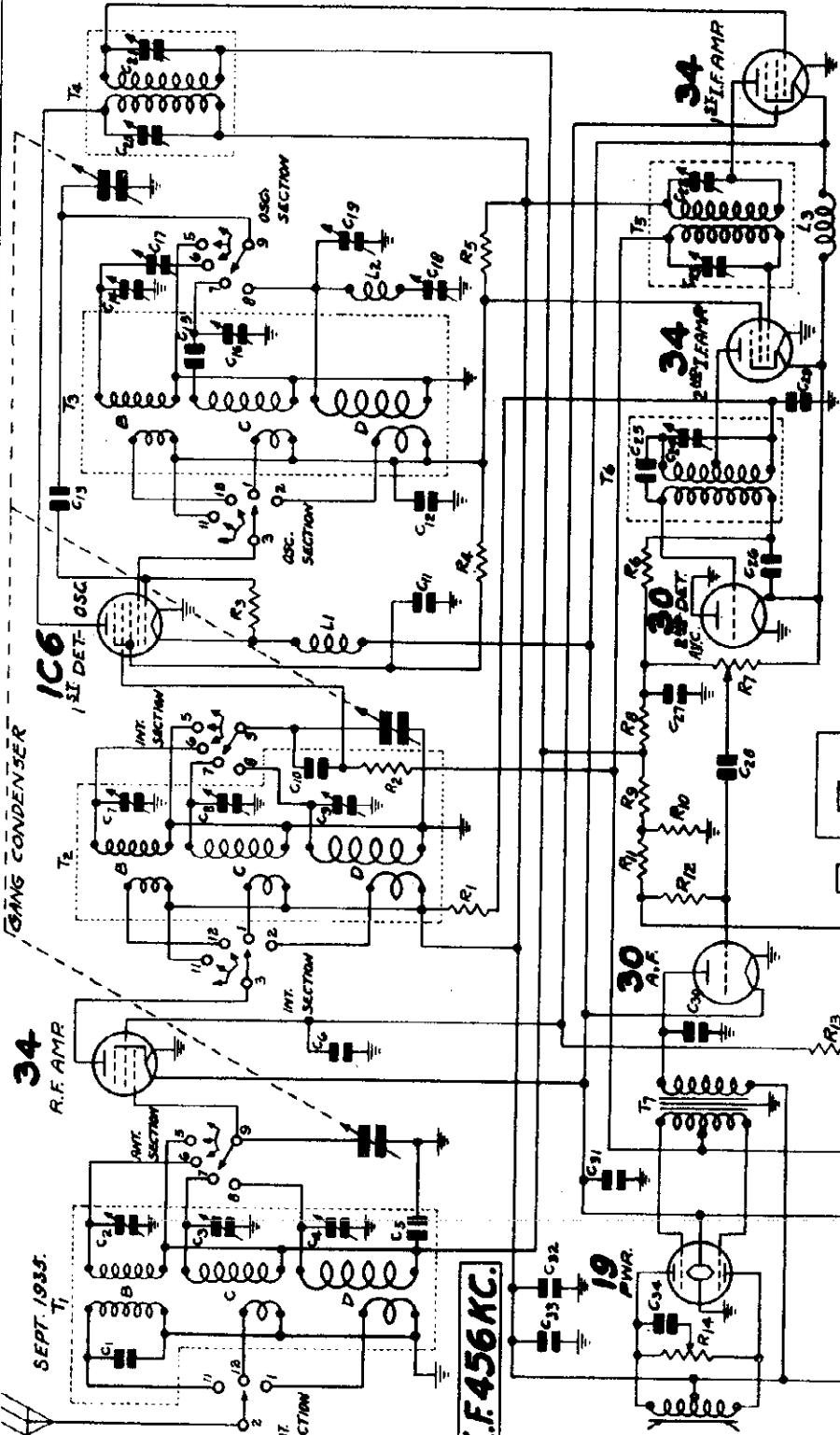
- C11 .05 mf. 180 V.
- C12 .25 mf. 180 V.
- C13 35 mmf.
- C14 2-25 mmf.
- C15 1400 mmf.
- C16 2-25 mmf.
- C17 300-600 mmf.
- C18 40-100 mmf.
- C19 2-25 mmf.
- C20 70-150 mmf.
- C21 70-150 mmf.

- C22 70-150 mmf.
- C23 70-150 mmf.
- C24 40-100 mmf.
- C25 50 mmf.
- C26 100 mmf.
- C27 50 mmf.
- C28 .002 mf. 600 V.
- C29 .05 mf. 180 V.
- C30 250 mmf.
- C31 50 mf. 180 V.
- C32 .25 mf. 180 V.

- C33 20.0 mf. 150 V. Electrolytic
- C34 .05 mf. 240 V.

- R 8 3.0 Megohm .2 W.
- R 9 1.0 Megohm .2 W.
- R10 2.000 Ohm .2 W.
- R11 7.000 Ohm .2 W.
- R12 3.0 Megohm .2 W.
- R13 30.000 Ohm .2 W.
- R14 150.000 Ohm .2 W.

- R 1 1,000 Ohm .2 W.
- R 2 1.0 Megohm .2 W.
- R 3 100,000 Ohm .2 W.
- R 4 5,000 Ohm .2 W.
- R 5 10,000 Ohm .5 W.
- R 6 60,000 Ohm .2 W.
- R 7 1.0 Megohm Vol. Cont.



- T 1 Antenna R.F. Trans.
- T 2 Interstage R.F. Trans.
- T 3 Osc. Inductors
- T 4 1st. I.F. Trans.
- T 5 2nd. I.F. Trans.
- T 6 3rd. I.F. Trans.
- T 7 Push-Pull Input Trans.

- L 1 Single Filament Reactor
- L 2 Osc. Tracking Coil
- L 3 Single Filament Reactor

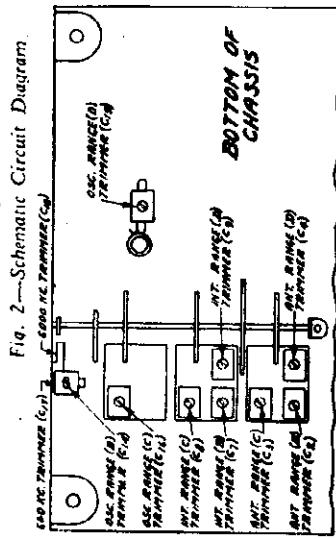


Fig. 2—Schematic Circuit Diagram.

Fig. 9—Arrangement of Trimmers.

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

ARROWS INDICATE CONNECTIONS PRESENT IN B.W.C. SWITCH WHEN IN POSITION SHOWN

	POSITION 1	POSITION 2	POSITION 3
STANDARD WAVE	SHORT WAVE (C)	SHORT WAVE (D)	SHORT WAVE (D)
OSC. A INT. SECTION	1 1 1 2 1 2 3	5 6 7 8 9 11 12 13	5 6 7 8 9 11 12 13
ANT. SECTION	1 1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2	5 6 7 8 9 11 12 12 1 1 1 1 1 1 1 1 1 1 1 1	5 6 7 8 9 11 12 12 1 1 1 1 1 1 1 1 1 1 1 1

Contact Locations 4 and 18 in Osc. & Int. Sections and 3, 4 and 16 in Ant. Section are Blank.

MODELS 62-203, 62-205
62-208, 62-212, 62-217
62-219

MONTGOMERY-WARD & CO.

Voltage, Socket, Data

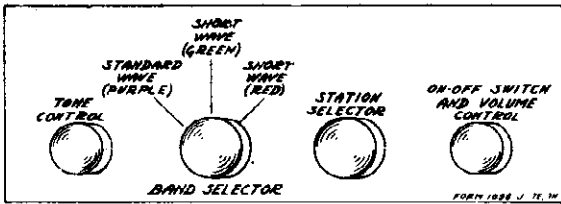


Fig. 1—Arrangement of Controls

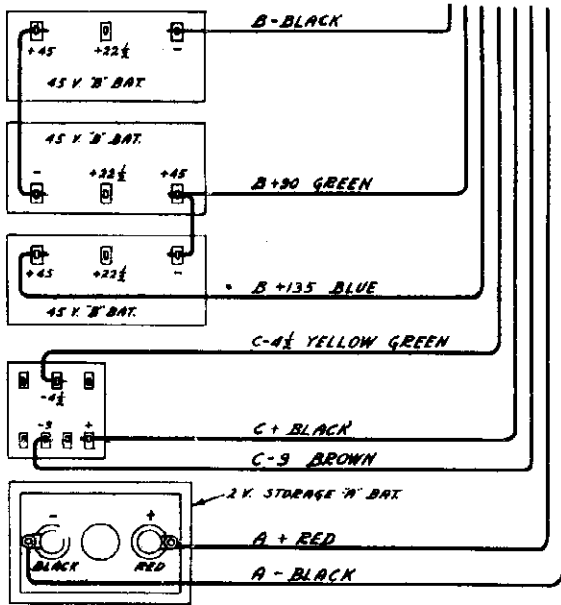


Fig. 3—Complete Battery Wiring Connections

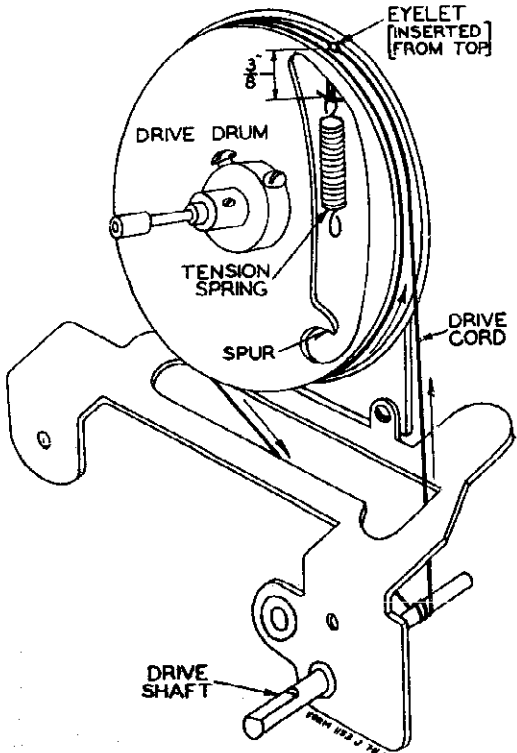


Fig. 12—Drive Cord Replacement

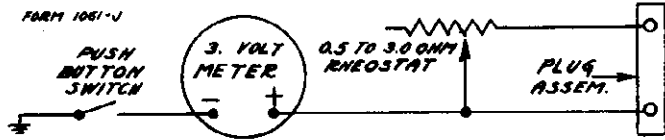


Fig. 6—Schematic Diagram of Voltage Regulator

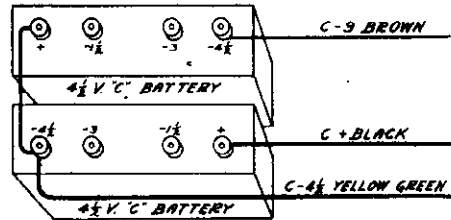


Fig. 4—"C" Battery Connections Using Standard "C" Batteries

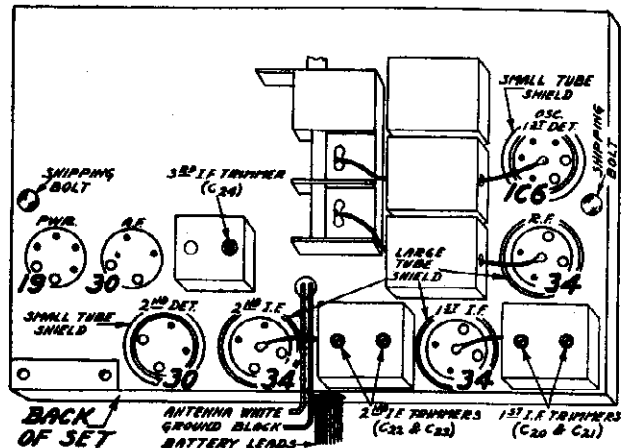


Fig. 10—Tube Arrangement

VOLTAGES AT SOCKETS						
Batteries up to Rated Voltages Ant. Shorted to Ground						
Voltages Read from Negative Fil. Terminal						
Volume Control at Maximum						
Type of Tube	Function	Across Filam't	Plate to Ground	Screen to Ground	Control Grid to Ground	Normal Plate M. A.
34	R. F. Amp.	2.0	135	45		1.8
1C6	1st Detector Oscillator	2.0	135 75(1)	65		2.6 1.8(1)
34	1st I. F. Amp.	2.0	135	45		1.8
34	2nd I. F. Amp.	2.0	133	75	4.5	2.25
30	2nd Detector	2.0				
30	A. F. Amp.	2.0	135			3.0
19	Power Amp.	2.0	135		4.5	1.0 Per Plate

(1) Anode Grid

MONTGOMERY-WARD & CO.

MODELS 62-203, 62-205
62-208, 62-212, 62-217
62-219
Alignment, Drive Cord
Changes, Data

Circuit

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R. F. transformer assemblies and T3 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 three sections of the band switch are designated in the schematic as the antenna, interstage and oscillator sections.

The band switch completes connections to the coils in use. It also shorts circuits the antenna R. F. transformer secondaries, the interstage R. F. transformer primaries and secondaries and the oscillator grid and plate windings of lower frequency, not in use.

The antenna transformer with tuned secondary feeds into a type 34 R. F. amplifier tube. The output of this tube is fed through the interstage R. F. transformer with tuned secondary into the control grid circuit of a 1C6 pentagrid converter tube which functions as the oscillator and 1st detector.

A type 30 tube functions as a diode second detector and as the automatic volume control tube. AVC voltage is applied to the R. F. and 1st I. F. tubes.

The audio voltage developed across the volume control resistor RY is applied to the control grid of the type 30 1st AF tube.

The output stage employs a type 19 tube. This tube is a Class "B" power amplifier and combines 2 triodes in one envelope. A magnetic reproducer is used.

Batteries

"A" Battery and Regulator

This receiver is designed to operate with a 2 volt storage cell, but may be operated with a 3 volt dry "A" battery if used with a voltage regulator. The receiver may also be used with an air cell "A" battery provided a series resistor is used.

3 Volt "A" Battery—The voltage regulator required with this type of battery as illustrated in Fig. 5 is not supplied with the receiver unless specified. This device consists of a rheostat which controls the voltage, a voltmeter for measuring its value as supplied to the receiver, and a small push button switch for turning the voltmeter in and out of the circuit. It has two plug-in terminals at the rear of the chassis. The circuit diagram of the regulator is shown in Fig. 6.

The receiver is shipped from the factory with a jumper between the two socket connections and a three strain over the wicket. This strip must be removed and the jumper taken out as illustrated in Figs. 7 and 8 before the regulator can be inserted as shown in Fig. 5. The jumper is in the "A+" line.

When a new 3 volt "A" battery is inserted, the adjuster knob must be turned to the left hand side to neutralize the battery. The push button must be held in until the voltmeter reads 1.9 to 2 volts. The push button must be held in until the adjustment is completed. Caution the user never to operate the receiver with the adjustment beyond 2 volts.

Air Cell "A" Battery—If an air cell "A" battery is used, a series resistor will be required to reduce the voltage to the proper level of 2 volts for the tube filaments. Although the voltage regulator mentioned above can be used, the series resistor is cheaper and is satisfactory as the voltage of one of these batteries drops very little during the useful life of the battery.

Alignment and Calibration

A signal generator that will provide an accurately calibrated signal at 456, 1730, 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 C-10—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. 10. 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 leveling-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. 10.

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.

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 (C14) until maximum output is obtained. The location of this trimmer is shown in Fig. 9.

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 (C7) and antenna Range B trimmer (C2) to maximum.

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. 9 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 AVC action.

Adjust the oscillator Range C trimmer (C16) until maximum output is obtained. See Fig. 9 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 (C8) 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).

Adjust the oscillator Range D trimmer (C19) until maximum output is obtained. See Fig. 9 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 (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 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 setting 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 (C18) until the peak of greatest intensity is obtained. See Fig. 9 for location of this trimmer.

Use a non-metallic screwdriver for this adjustment.

Tubes

The tubes used in this receiver are of the 2 volt series. The 1C6 is a pentagrid converter tube while the 34's are R. F. Pentodes with the suppressor grid tied internally to the cathode. The 30 tubes are general purpose triodes. The 19 tube consists of two class "B" output tubes in one envelope. All of these tubes 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 over or under these values will be injurious to the tubes or may affect operation of the receiver.

Changes in Early Models

Condenser C15 7 mmf. (not shown in Fig. 2) was added to the oscillator coil assembly in parallel with coilformer Range B trimmer condenser C14. It is not located in all models but only when this change is required for this circuit.

Replacing Drive Cord

Remove the chassis from the cabinet. Take off the station pointer by removing the screw at the center of the dial.

Loosen the two set screws in the collar on the band selector 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 drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 12.

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. 12.

Insert one end of the new drive cord from the inside through the hole in the eyelet in the drive drum.

The end of the cord, which has been inserted through the hole, in 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 half 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 it two and one half times around this shaft as shown in Fig. 12, progressing toward the back of chassis.

Wrap the cord on directly under the drive drum above.

Then bring this cord up to the drive drum until it is up to the hole in the drive drum as shown in the illustration.

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 should be approximately 1/4" from the flange of the drive drum as shown in Fig. 12. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the ear on the drive drum.

Turn the drive shaft back and forth several times. Replace the drive assembly and pointer.

Replace the chassis in the cabinet.

MODELS 62-203, 62-205
62-208, 62-212, 62-217
62-219

MONTGOMERY-WARD & CO.

Resistance Test Parts
Color Coding Data

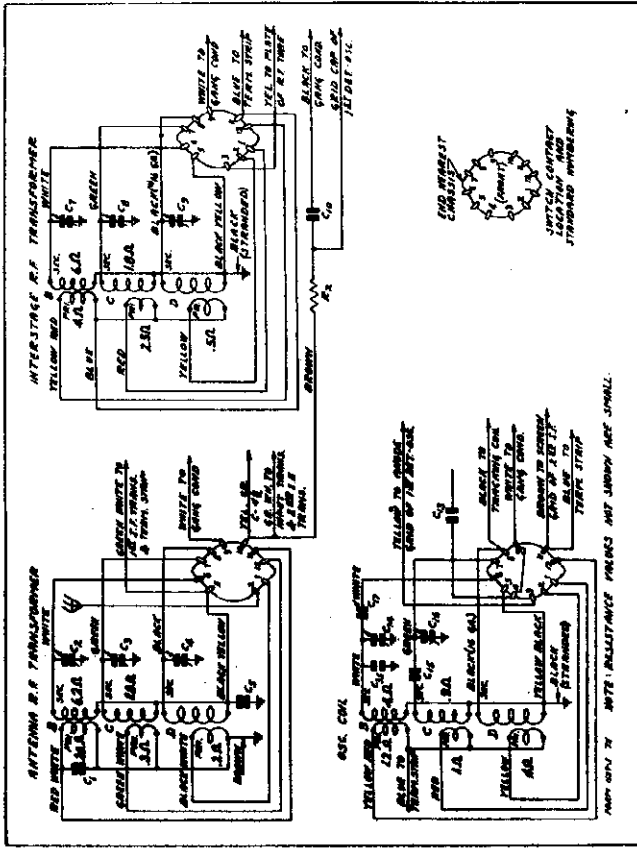


Fig. 11—Color Coding of Coil Wires and D. C. Resistances of Windings (Also See Complete D. C. Resistance List Below)

Part No.	Winding	Code	D. C. Resistance in Ohms
P-9A394	1st I. F. Transformer Primary Winding	T1	31.4
	Secondary Winding	T1	31.4
P-9A395	2nd I. F. Transformer Primary Winding	T5	31.4
	Secondary Winding	T5	31.4
P-9A396	3rd I. F. Transformer Primary Winding	T6	31.4
	Tap to B4		4.0
	Tap to Variable Trimmer		8.2
	Secondary Winding		126.0
P-9A397	Audio Input Transformer Primary Winding	T7	103.0
	Secondary Winding		50.0
	Center Tap to Inside		630.0
	Center Tap to Outside		630.0
*P-1A218	Magnetic Speaker		25.0
	Speaker Coil		300.0
	Center Tap to Inside		25.0
	Center Tap to Outside		300.0
P-9A281	Single Filament Resistor	L1	1.2
P-9A391	High Frequency Oscillator Tracking Coil	L2	0.7
P-9A281	Single Filament Resistor	L1	1.2
P-9A281	Single Filament Resistor	L1	1.2

D. C. Resistance of Windings Refer to Fig. 11.

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-9A116	Antenna R. F. Transformer Range A Primary Winding	T1	20.0
	Range C Primary Winding		0.3
	Range D Primary Winding		0.2
	Range B Secondary Winding		6.2
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
P-9A392	Interstage R. F. Transformer Range B Primary Winding	T2	4.0*
	Range C Primary Winding		2.5
	Range D Primary Winding		0.5
	Range B Secondary Winding		6.0
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
P-9A281	Oscillator Coils	T3	1.2
	Range B Plate Coil		1.9
	Range C Plate Coil		0.4
	Range D Plate Coil		0.9
	Range B Grid Coil		0.9
	Range C Grid Coil		0.9
	Range D Grid Coil		Small

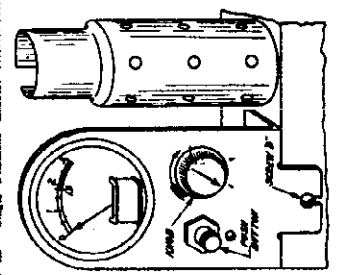
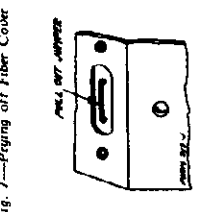
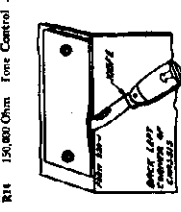
Series 7H—Replacement Parts

OM Part No.	New Part No.	Description	List Price
4439	4439	Two-Leg Terminal Strip (Both legs insulated)	.10
4418	4418	Two-Leg Terminal Strip (Both legs insulated)	.10
4430	4430	Two-Leg Terminal Strip (Both legs insulated)	.10
4449	4449	Single-Leg Terminal Strip (Insulated—Mounting hole in center)	.10
R2427	R2427	Magnetic Speaker	4.50
1A218	1A218	Speaker Cable and Speaker Assembly	4.00
1A218	1A218	Speaker Cable and Speaker Assembly	3.00
1A218	1A218	A-B-C Battery Cable	1.10

OM Part No.	New Part No.	Description	List Price
342	342	Special Fiber Washer with Offset Insulation	.30
1035	1035	Aluminum Knob	.25
1036	1036	Aluminum Knob	.25
1037	1037	Aluminum Knob	.25
1038	1038	Aluminum Knob	.25
1039	1039	Aluminum Knob	.25
1040	1040	Aluminum Knob	.25
1041	1041	Aluminum Knob	.25
1042	1042	Aluminum Knob	.25
1043	1043	Aluminum Knob	.25
1044	1044	Aluminum Knob	.25
1045	1045	Aluminum Knob	.25
1046	1046	Aluminum Knob	.25
1047	1047	Aluminum Knob	.25
1048	1048	Aluminum Knob	.25
1049	1049	Aluminum Knob	.25
1050	1050	Aluminum Knob	.25
1051	1051	Aluminum Knob	.25
1052	1052	Aluminum Knob	.25
1053	1053	Aluminum Knob	.25
1054	1054	Aluminum Knob	.25
1055	1055	Aluminum Knob	.25
1056	1056	Aluminum Knob	.25
1057	1057	Aluminum Knob	.25
1058	1058	Aluminum Knob	.25
1059	1059	Aluminum Knob	.25
1060	1060	Aluminum Knob	.25
1061	1061	Aluminum Knob	.25
1062	1062	Aluminum Knob	.25
1063	1063	Aluminum Knob	.25
1064	1064	Aluminum Knob	.25
1065	1065	Aluminum Knob	.25
1066	1066	Aluminum Knob	.25
1067	1067	Aluminum Knob	.25
1068	1068	Aluminum Knob	.25
1069	1069	Aluminum Knob	.25
1070	1070	Aluminum Knob	.25
1071	1071	Aluminum Knob	.25
1072	1072	Aluminum Knob	.25
1073	1073	Aluminum Knob	.25
1074	1074	Aluminum Knob	.25
1075	1075	Aluminum Knob	.25
1076	1076	Aluminum Knob	.25
1077	1077	Aluminum Knob	.25
1078	1078	Aluminum Knob	.25
1079	1079	Aluminum Knob	.25
1080	1080	Aluminum Knob	.25
1081	1081	Aluminum Knob	.25
1082	1082	Aluminum Knob	.25
1083	1083	Aluminum Knob	.25
1084	1084	Aluminum Knob	.25
1085	1085	Aluminum Knob	.25
1086	1086	Aluminum Knob	.25
1087	1087	Aluminum Knob	.25
1088	1088	Aluminum Knob	.25
1089	1089	Aluminum Knob	.25
1090	1090	Aluminum Knob	.25
1091	1091	Aluminum Knob	.25
1092	1092	Aluminum Knob	.25
1093	1093	Aluminum Knob	.25
1094	1094	Aluminum Knob	.25
1095	1095	Aluminum Knob	.25
1096	1096	Aluminum Knob	.25
1097	1097	Aluminum Knob	.25
1098	1098	Aluminum Knob	.25
1099	1099	Aluminum Knob	.25
1100	1100	Aluminum Knob	.25

OM Part No.	New Part No.	Description	List Price
2883	2883	Coil Support and Binding Assembly	.45
1931	1931	Drive Shaft Washer	.15
1932	1932	Drive Shaft Washer	.15
1933	1933	Drive Shaft Washer	.15
1934	1934	Drive Shaft Washer	.15
1935	1935	Drive Shaft Washer	.15
1936	1936	Drive Shaft Washer	.15
1937	1937	Drive Shaft Washer	.15
1938	1938	Drive Shaft Washer	.15
1939	1939	Drive Shaft Washer	.15
1940	1940	Drive Shaft Washer	.15
1941	1941	Drive Shaft Washer	.15
1942	1942	Drive Shaft Washer	.15
1943	1943	Drive Shaft Washer	.15
1944	1944	Drive Shaft Washer	.15
1945	1945	Drive Shaft Washer	.15
1946	1946	Drive Shaft Washer	.15
1947	1947	Drive Shaft Washer	.15
1948	1948	Drive Shaft Washer	.15
1949	1949	Drive Shaft Washer	.15
1950	1950	Drive Shaft Washer	.15
1951	1951	Drive Shaft Washer	.15
1952	1952	Drive Shaft Washer	.15
1953	1953	Drive Shaft Washer	.15
1954	1954	Drive Shaft Washer	.15
1955	1955	Drive Shaft Washer	.15
1956	1956	Drive Shaft Washer	.15
1957	1957	Drive Shaft Washer	.15
1958	1958	Drive Shaft Washer	.15
1959	1959	Drive Shaft Washer	.15
1960	1960	Drive Shaft Washer	.15
1961	1961	Drive Shaft Washer	.15
1962	1962	Drive Shaft Washer	.15
1963	1963	Drive Shaft Washer	.15
1964	1964	Drive Shaft Washer	.15
1965	1965	Drive Shaft Washer	.15
1966	1966	Drive Shaft Washer	.15
1967	1967	Drive Shaft Washer	.15
1968	1968	Drive Shaft Washer	.15
1969	1969	Drive Shaft Washer	.15
1970	1970	Drive Shaft Washer	.15
1971	1971	Drive Shaft Washer	.15
1972	1972	Drive Shaft Washer	.15
1973	1973	Drive Shaft Washer	.15
1974	1974	Drive Shaft Washer	.15
1975	1975	Drive Shaft Washer	.15
1976	1976	Drive Shaft Washer	.15
1977	1977	Drive Shaft Washer	.15
1978	1978	Drive Shaft Washer	.15
1979	1979	Drive Shaft Washer	.15
1980	1980	Drive Shaft Washer	.15
1981	1981	Drive Shaft Washer	.15
1982	1982	Drive Shaft Washer	.15
1983	1983	Drive Shaft Washer	.15
1984	1984	Drive Shaft Washer	.15
1985	1985	Drive Shaft Washer	.15
1986	1986	Drive Shaft Washer	.15
1987	1987	Drive Shaft Washer	.15
1988	1988	Drive Shaft Washer	.15
1989	1989	Drive Shaft Washer	.15
1990	1990	Drive Shaft Washer	.15
1991	1991	Drive Shaft Washer	.15
1992	1992	Drive Shaft Washer	.15
1993	1993	Drive Shaft Washer	.15
1994	1994	Drive Shaft Washer	.15
1995	1995	Drive Shaft Washer	.15
1996	1996	Drive Shaft Washer	.15
1997	1997	Drive Shaft Washer	.15
1998	1998	Drive Shaft Washer	.15
1999	1999	Drive Shaft Washer	.15
2000	2000	Drive Shaft Washer	.15

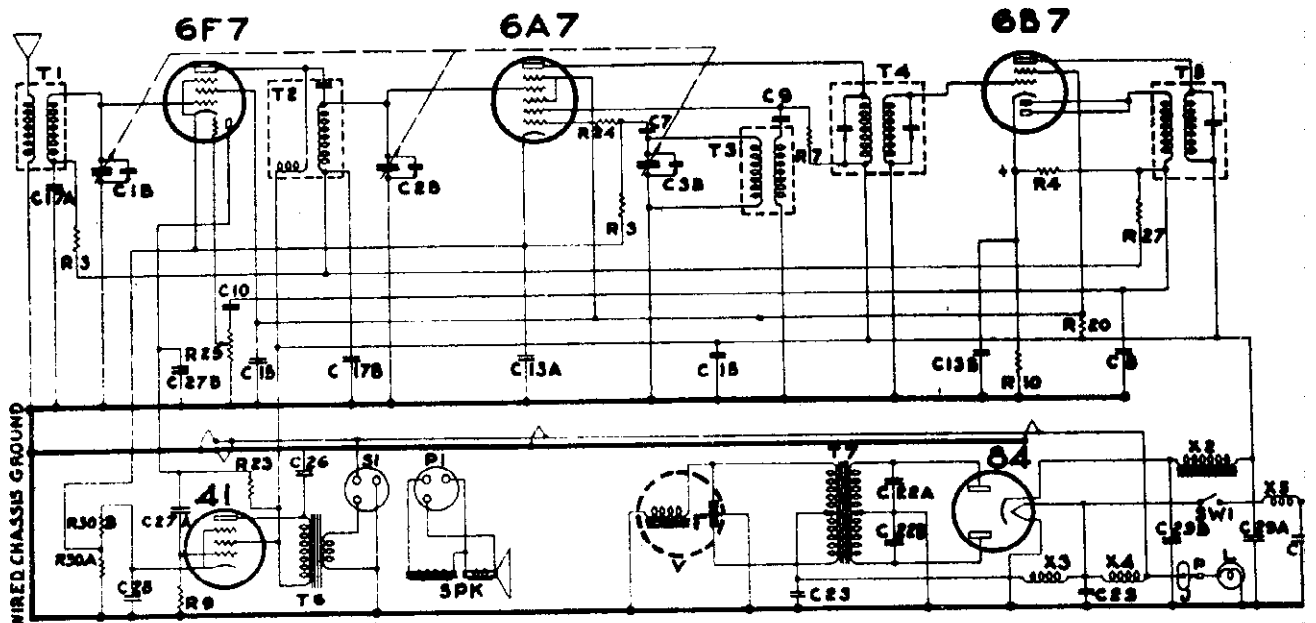
OM Part No.	New Part No.	Description	List Price
9A316	9A316	Antenna R. F. Transformer	12.50
9A317	9A317	Interstage R. F. Transformer	12.50
9A318	9A318	1st I. F. Transformer	12.50
9A319	9A319	2nd I. F. Transformer	12.50
9A320	9A320	3rd I. F. Transformer	12.50
9A321	9A321	Audio Input Transformer	12.50
9A322	9A322	Single Filament Resistor	1.20
9A323	9A323	High Frequency Oscillator Tracking Coil	2.25
9A324	9A324	Single Filament Resistor	1.20



NOBLITT SPARKS INDUSTRIES

MODEL 7
Schematic, Voltage
Resistances, Parts

ARVIN CAR RADIO ~ MODEL 7



RESISTORS				CONDENSERS				CHOKES & TRANSFORMERS				MISCELLANEOUS UNITS			
QTY	WV	PART NO	PRICE	QTY	WV	PART NO	PRICE	QTY	TYPE	PART NO	PRICE	SYMBOL	DESCRIPTION	PART NO	PRICE
1	1000	10	17-2048	20	25	250M	17-3011	20	3B	18A	1.00	SPK	DYNAMIC SPEAKER	17-4231	1.00
2	1000	10	17-2048	20	25	250M	17-3011	20	3B	18A	1.00	SW	VOLUME CONTROL SWITCH - SEE R28	17-4787	1.00
4	1000	10	17-2048	20	25	250M	17-3011	20	3B	18A	1.00	J	DIAL LIGHT JACK	17-4787	1.00
1	1000	10	17-2048	20	25	250M	17-3011	20	3B	18A	1.00	P	DIAL LIGHT CONNECTING PIN	17-4787	1.00
1	1000	10	17-2048	20	25	250M	17-3011	20	3B	18A	1.00	P	SPEAKER SOCKET	17-4787	1.00
1	1000	10	17-2048	20	25	250M	17-3011	20	3B	18A	1.00	P	SPEAKER PLUG	17-4787	1.00
1	1000	10	17-2048	20	25	250M	17-3011	20	3B	18A	1.00	L	DIAL LIGHT 8-8 VOLT	17-4787	1.00
1	1000	10	17-2048	20	25	250M	17-3011	20	3B	18A	1.00	L	AMMETER CONNECTION	17-4787	1.00

SOCKET VOLTAGES

Make voltage tests with at least 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Triode Plate	Anode Grid 1500 KC	Osc. Grid 1500 Kc
6F7	6	220	100	2.3	50	—	—
6A7	6	220	100	2.3	—	175	5 to 10
6B7	6	220	100	3.5	—	—	—
41	6	205	220	18	—	—	—
84	6	230 (A. C.)	—	230	—	—	—

POINT TO POINT RESISTANCES

All readings taken to ground unless otherwise specified. Readings taken with all tubes, vibrator and speaker removed from set.

6F7	6A7	6B7
+ Heater	+ Heater	+ Heater
- Heater	- Heater	- Heater
Plate to B+	Plate to B+	Plate to B+
Screen to B+	Screen to B+	Screen to B+
Cathode	Anode Grid to B+	Cathode
Control Grid	Oscillator Grid	Control Grid
Triode Grid	Cathode	Diodes
Triode Plate to B+	Control Grid	

COIL RESISTANCES

Ant. Primary	13	Oscillator Primary	2	Second I. F. Secondary	120	Speaker Field Coil	5.5
Ant. Secondary	5	Oscillator Secondary	4	Output Trans. Primary	625	Speaker Voice Coil	3
R. F. Primary	100	First I. F. Primary	82	Output Trans. Secondary	0.5	"B" Filter Choke	165
R. F. Secondary	5	Second I. F. Primary	120	Power Trans. Secondary	361		

MODEL 7

Parts, Changes

NOBLITT SPARKS INDUSTRIES

MODEL 7

MISCELLANEOUS

PART NO.	DESCRIPTION	PRICE
17-4294	Spark Plug Suppressor	.09
17-4295	Distributor Suppressor	.50
17-4701	Generator Condenser	.50
00-4743	Dome Light Filter	.50
00-4529	Ground Clamps	.10
17-4772	Dial Light 6-8 Volts (Screw Base)	.15
17-4732	Vibrator (4 prong)	4.00
17-4235	6" Speaker Cone Assembly (in carton)	1.20
17-4231	6" Speaker Assembly	4.00
23-4490	Stud and Nut (Set Mounting)	.10
12-565		
29-4684	Carton	.60
17-2048	6A7 Socket	.15
17-2049	6B7 Socket	.15
17-2045	41 Socket	.15
17-2047	84 Socket	.15
17-4790	6F7 Socket	.15
17-4736	Vibrator Socket	.15
10-4804	Speaker Front Screw, per dozen	.10
10-4810	Flex Shaft Set Screw, per dozen	.10
10-4811	No. 8x1/4 Self Tapping Screw, Hex Head, per dozen	.10
10-4844	No. 8x5/16 Self Tapping Screw, Binding Head, dozen	.10
29-4850	Worm Gear Drive Assembly	1.00
17-4152-3	Volume Control, 500M ohms	1.00
17-4760	Speaker Plug (3 Prong)	.15
17-4797	Dial Light Pin Jack	.10
17-4857	Dial Light (Bayonet Base)	.15

RESISTORS

17-2060	50,000 ohm Resistor, 1/4 watt	.20
17-2065	1000 ohm Resistor, 1/4 watt	.20
17-2088	500 ohm Resistor, 1/4 watt	.20
17-2072	20,000 ohm Resistor, 1/4 watt	.20
17-2080	1 Megohm Resistor, 1/4 watt	.20
17-3011	250,000 ohm Resistor, 1/4 watt	.20
17-4722	25,000 ohm Resistor, 1/4 watt	.25
17-2068	100,000 ohm Resistor, 1/4 watt	.20
17-2069	200,000 ohm Resistor, 1/4 watt	.20
17-4788	2 Megohm Resistor, 1/4 watt	.20
17-3031	Muter 3 Tap Candohm Resistor	.35

CONDENSERS

17-2063	.002-600 Volt Mica Condenser	.20
17-4702	.05-160 Volt Condenser	.30
17-4731	.05-.05-160 Volt Condenser	.35
17-4193	.02-.02-1000 Volt Condenser	.60
17-4708	.5-15 Volt Condenser	.45
17-4712	.10-10-15 Volt Condenser	.75
17-4714	.15-400 Volt Condenser	.55
17-4759	.005-600 Volt Mica Condenser	.25
17-4292	.001-600 Volt Mica Condenser	.20
17-2211	.0005-600 Volt Mica Condenser	.20
17-2064	.0001-600 Volt Mica Condenser	.20
17-4798	3 Gang Variable Condenser	4.00
17-4785	.0005-.01-600 Volt Dual Condenser	.50
17-4786	12 mfd 25 Volt Condenser	1.00
17-4787	2 & 6 mfd 450 V. Filter Condenser	1.25

TRANSFORMERS & COILS

PART NO.	DESCRIPTION	PRICE
00-4792	Radio Frequency Coil	\$1.00
00-4791	Antenna Coil	.90
00-4793	Oscillator Coil	.85
00-4794	1st Intermediate Frequency Transformer	1.75
00-4795	2nd Intermediate Frequency Transformer	1.75
00-4757	Output Transformer	1.50
00-4796	Power Transformer	3.00
00-4754	"B" Filter Choke	1.30
00-4516	"A" Filament Choke	.40

REMOTE CONTROL PARTS

29-4673	Remote Control Without Bracket or Housing	\$2.75
29-4582	Metal Housing	.25
29-4533	Eye Bolt and Nut	.10
29-4534	Strap	.05
29-4539	Dial Glass	.15
29-4539	Steering Column Bracket	.20
29-4527	Tuning Knob—Black Bakelite	.10
29-4528	Switch Key Shank (less knob) (7-17-17A-27-37)	.05
34-4540	Key Retaining Spring (7-17-17A-27-37)	.05

FLEXIBLE SHAFTS

00-4641	Condenser Drive 6" length	.45
00-4642	Condenser Drive 9" length	.50
00-4643	Condenser Drive 12" length	.60
00-4644	Condenser Drive 15" length	.70
00-4645	Condenser Drive 18" length	.85
00-4649	Condenser Drive 21" length	.95
00-4646	Condenser Drive 24" length	1.00
00-4647	Condenser Drive 30" length	1.20
00-4648	Condenser Drive 36" length	1.40
00-4651	Volume Control Drive 6" length	.45
00-4652	Volume Control Drive 9" length	.50
00-4653	Volume Control Drive 12" length	.60
00-4654	Volume Control Drive 15" length	.70
00-4655	Volume Control Drive 18" length	.85
00-4659	Volume Control Drive 21" length	.95
00-4656	Volume Control Drive 24" length	1.00
00-4657	Volume Control Drive 30" length	1.20
00-4658	Volume Control Drive 36" length	1.40

DATE: May 23, 1935

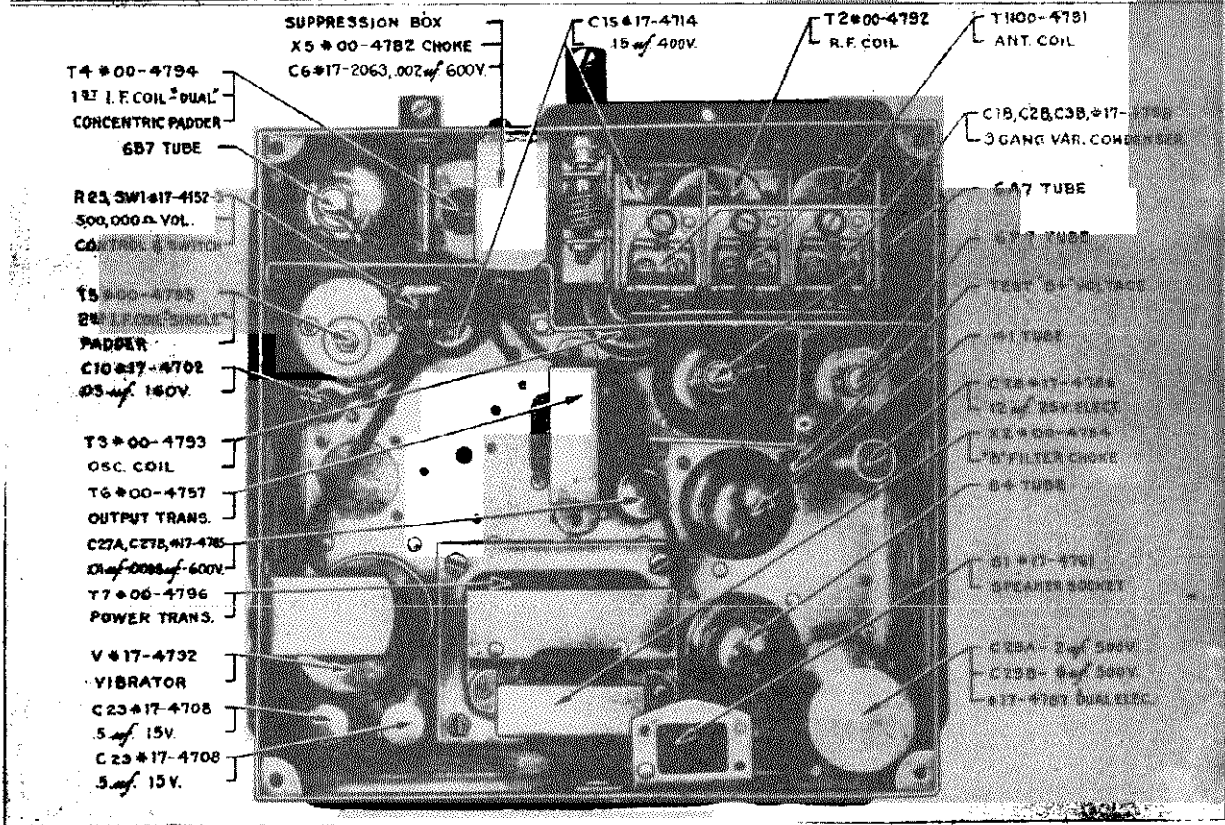
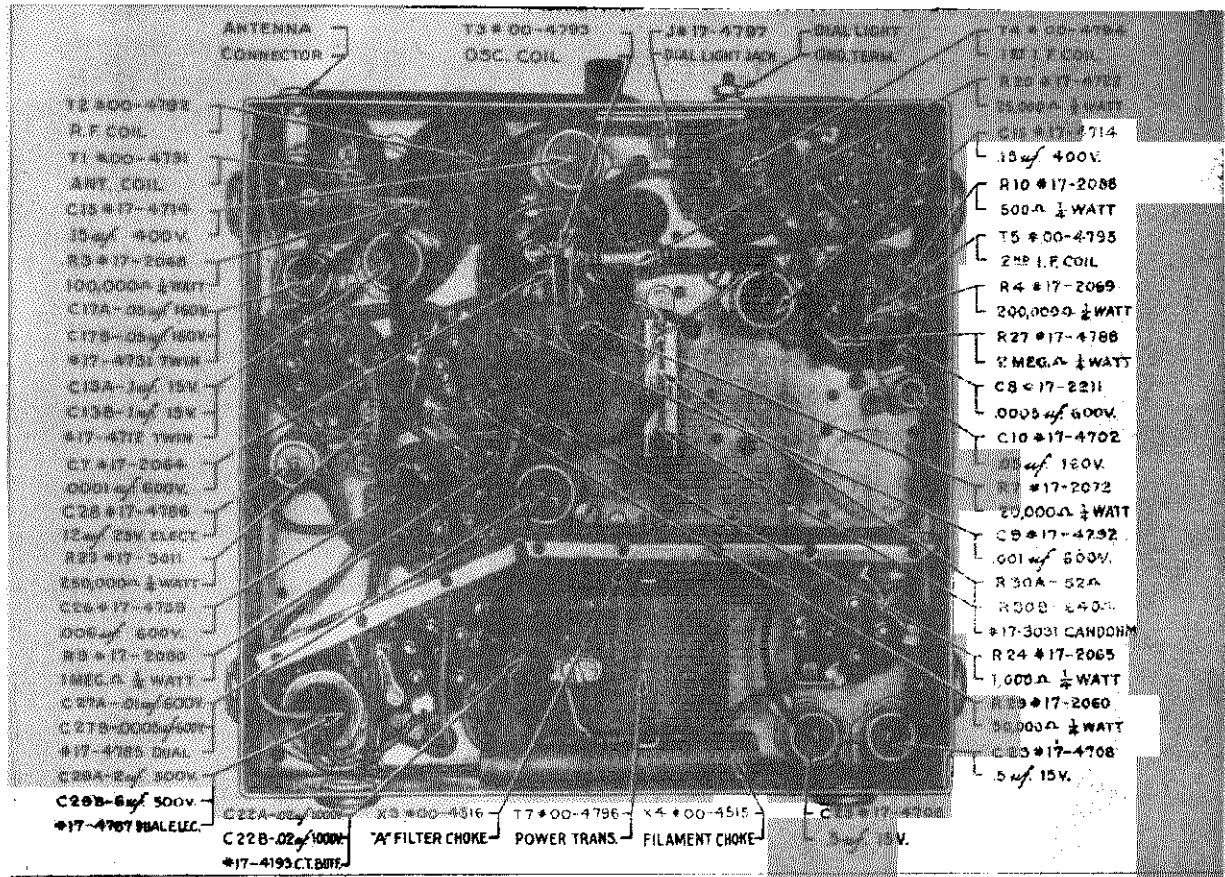
MODEL NO. 7

SUBJECT: Circuit Changes, Model 7

- R14—200 ohm 1/4 watt resistor has been added in power pack across vibrator points. to speaker plug socket, part No. 17-4447 (4 prong).
- R3—100,000 ohm 1/4 watt (17-2068) resistor in 6A7 No. 1 grid circuit has been changed to R29—50,000 ohm 1/4 watt (17-2060).
- Dial light, part No. 17-2145 (with screw base), has been changed to dial light, part No. 17-4857 (with bayonet base).
- Speaker plug socket, part No. 17-4761 (3 prong), has been changed
- Ammeter cable, part No. 00-4778-1, has been added. List Price, \$.70.
- Fuse, part No. 17-2228, has been added. List Price, \$.05.
- It was found in the field that in some instances motor noise entered the receiver where the local-distance plug and tone control plug were attached. A change in the mechanical design which eliminated this difficulty was made beginning with those sets from which the louvers were omitted.

NOBLITT SPARKS INDUSTRIES

MODEL 7 Chassis Layout



1935 Receivers
Installation Data

NOBLITT SPARKS INDUSTRIES

INSTALLATION PROCEDURE FOR 1935 ARVIN CAR RADIOS

There are several things which should be done **CAREFULLY** as a car radio is being installed. Care in making the original installation will pay for itself, particularly if you find it necessary to do additional work because of motor noise.

Some of the major points often overlooked are:

1. The set must be well grounded at the place where it is mounted. Scrape the paint off around the mounting holes drilled in the car so the nut and washer will make contact with a clean, bright surface.

In some cases where the bulkhead is padded on both sides, it will be necessary to run a piece of shielding from one of the mounting bolts to some **NEAR-BY** point where a good ground can be made.

2. In the case of a roof antenna, the antenna lead should be shielded continuously from the set to a point as far up the corner post as possible. Unless the set is mounted on the opposite side of the car from which the antenna lead comes down, the shielded lead supplied will be sufficient. Solder the antenna lead to the shielded lead supplied, tape neatly, and take up any slack by pulling the shielded lead out through the shielding on the connector end. Cut off the excess wire and solder the bakelite button back in place. Push the shielding as far up the corner post as possible and ground the shielding at the point where it enters the corner post.
3. In the case of under-car or running-board antenna, the antenna should preferably be installed so it will clear the car by a few inches. This distance will be governed by a sensible allowance for road clearance, depending on the type of antenna used. It is good practice to shield the antenna lead continuously from the set to a point close to the antenna, grounding the shielding wherever convenient.
4. When installing the remote control, and excess length of tone control cable, and in installing the No. 37, the local-long distance cable as well, should be neatly coiled and taped in place up under the dash out of sight. It is desirable to ground the shielding on these cables at this point also.
5. In some cars a metal tube—supplying the windshield wiper—goes up a corner post. This should be grounded as near the corner post as possible.
6. When installing the dome light filter and generator condenser, be sure that each unit has a good, clean ground connection.
7. When the receiver has been completely installed, turn the set on and tune in a station whose frequency is known. If necessary, remove the small screw in the center of the dial face and with a toothpick or other small implement turn the pointer to the correct frequency. Replace the small screw.

Start the motor (remember that exhaust gasses are dangerous in closed garages) to determine whether the installation is picking up motor noise.

The 1935 Arvin Car Radio is so constructed that on the majority of new cars spark-plug suppressors are not necessary. However, on some of the older cars as well as a couple of the more popular new ones, suppressors will be necessary to eliminate motor noise. These suppressors can be obtained from your jobber.

Some general instructions are given here any one or combination of which has been found very useful in the elimination of motor noise which can be classified as of two kinds:

1. The so-called "feed-back" and radiation, which is audible when the aerial of the set is disconnected.
 2. Antenna Pick-up, or motor noise that is heard when the aerial is connected.
- I. If motor noise is heard with the antenna disconnected, try the following, leaving the antenna disconnected until the noise is remedied:

First: Run a bonding wire from the dial light and tone control cable shielding of the remote control to the set itself, thus insuring a good ground for the shielding on that cable. It can be determined whether or not this cable is bringing in motor noise by pulling out the plug where it plugs into the set. If the motor noise decreases, it will be necessary to ground this cable as it is bringing in motor noise.

Second: Place an ammeter condenser on the ammeter of the car.

Third: Place a condenser on the ignition switch.

Fourth: Peen out the rotor of the distributor or build up the rotor with solder until the gap between the rotor and the distributor cap is .008 of an inch.

Fifth: If the primary lead to the coil and the distributor run through the same conduit as the spark-plug wires themselves, remove these primary wires from the conduit and keep them as far away as possible from the spark-plugs or high tension wires.

Sixth: Inspect the distributor points, and if they are badly pitted, replace and reset.

Seventh: On Ford V-8 installation, the generator condenser, furnished with each set should be placed on the distributor.

- II. For the second kind of motor noise, namely Antenna Pick-up, that is, when the antenna is connected to the set, the following methods may be tried for its elimination:

First: Change location of the dome light filter to the dome light itself.

Second: Place condenser on ammeter.

Third: If the coil is on the passenger side of the dash, shield the high tension lead running from the coil to the distributor and ground this shielding at the point where it passes through the bulkhead.

Fourth: Ground the motor to the frame on each side of the motor.

Fifth: Bond the choke and throttle control rods to the chassis of the car with flexible wire or bonding material.

Sixth: Ground the steering column post to the instrument panel.

Seventh: Ground brake and clutch pedals on motor side of bulkhead to some metal part of the dash.

Eighth: On some cars you will find that the battery lead from the battery to the starting motor radiates through the foot board and any person directly over the battery lead will carry that radiation directly to the antenna. This difficulty may be overcome by placing a copper screen under the floor mat, and grounding this screen to the frame of the car.

NOBLITT SPARKS INDUSTRIES

MODEL 16
Voltage
Test Date

MODEL 16 SOCKET VOLTAGES

Make voltage tests with 1666 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltages. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Anode Grid 1500 KC	Osc. Grid 1500 KC
78	6.0	230	100	4.5	0	—	—
6A7	6.0	240	100	4.5	0	180	5-10
78	6.0	240	100	7.0	—	—	—
75	6.0	85	—	1.5	—	—	—
41	6.0	235	240	18.5	—	—	—
84	6.0	235 (AC)	—	235	—	—	—

MODEL 16 POINT TO POINT RESISTANCE CHECK

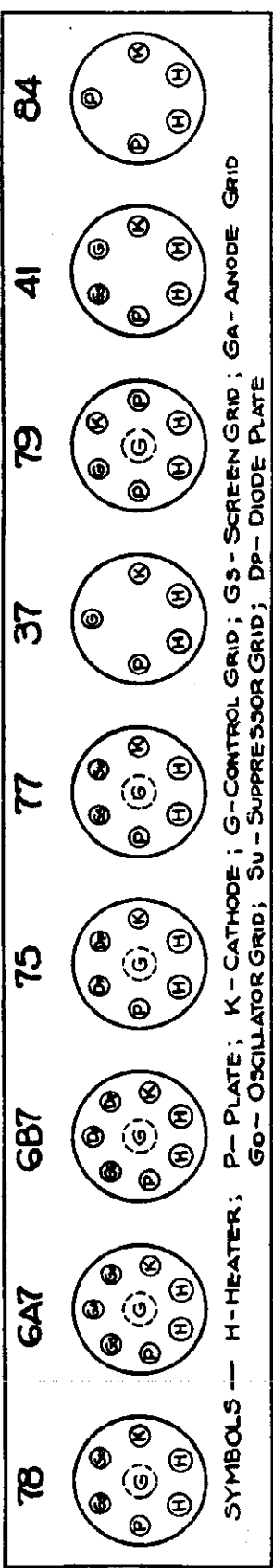
All readings to ground unless otherwise specified. Readings taken with all tubes removed from set and R. F. chassis and speaker disconnected from power pack unit and R. F. chassis.

1st 6D6 78	2nd 6D6 41	84
+ Heater.....Inf.	+ Heater.....Inf.	Oscillator Primary..... 2 ohms
- Heater.....0	- Heater.....0	Oscillator Secondary..... 3 ohms
Plate to B.....100	Plate to B.....90	First I. F. Primary..... 82 ohms
Screen Grid to B.....30,000	Screen Grid to B.....30,000	First I. F. Secondary..... 82 ohms
Suppressor Grid.....0	Suppressor Grid.....0	Second I. F. Primary..... 90 ohms
Cathode.....260	Cathode.....2,000	Second I. F. Secondary..... 90 ohms
Control Grid.....1,250,000	Control Grid.....82	Primary Output Transformer.....650 ohms
6A7	75	79
+ Heater.....Inf.	+ Heater.....0	+ Heater.....0
- Heater.....82	- Heater.....0	- Heater.....0
Screen Grid to B.....30,000	Plate.....0	Plate.....190
Anode Grid to B.....20,000	Plate to B.....250,000	Plate.....220
Oscillator Grid.....100,260	Diodes.....150,000	Plate to Plate.....410
Cathode.....260	Cathode.....5,000	Cathode.....Inf.*
Control Grid.....1,150,000	Control Grid.....0 to 250,000	

Coil Resistances Model 16

Ant. Primary..... 13 ohms
Ant. Secondary..... 5 ohms
R. F. Primary.....100 ohms
R. F. Secondary..... 5 ohms
Oscillator Primary..... 2 ohms
Oscillator Secondary..... 3 ohms
First I. F. Primary..... 82 ohms
First I. F. Secondary..... 82 ohms
Second I. F. Primary..... 90 ohms
Second I. F. Secondary..... 90 ohms
Primary Output Transformer.....650 ohms

LOOKING AT BOTTOM OF TUBE SOCKETS



SYMBOLS -- H-HEATER; P- PLATE; K - CATHODE; G - CONTROL GRID; G3 - SCREEN GRID; GA - ANODE GRID
G0 - OSCILLATOR GRID; Su - SUPPRESSOR GRID; Dp - DIODE PLATE

MODEL 16

**Installation Data
Parts List**

NOBLITT SPARKS INDUSTRIES

GENERAL MECHANICAL PARTS

00-4213-1 Antenna Cable Assembly.....
 00-4215 Battery Cable Assembly.....
 00-4216 Pilot Light Wire Assembly.....
 29-4525 Remote Control Assembly.....
 29-4525-A Remote Control Body Assembly.....
 29-4525-B Steering Column Bracket.....
 29-4525-D Steering Column Bracket Strap.....
 29-4525-K Pilot Light Bulb.....
 29-4525-L Control Knob and Set Screw.....
 29-4525-M Key.....
 00-4333 2 1/2" Flexible Shaft Assembly.....
 00-4330 12" Flexible Shaft Assembly (Special Order).....
 00-4331 15" Flexible Shaft Assembly (Special Order).....
 00-4332 18" Flexible Shaft Assembly (Special Order).....
 00-4334 30" Flexible Shaft Assembly (Special Order).....
 00-4335 36" Flexible Shaft Assembly (Special Order).....
 17-2228 Fuse.....
 17-2262 4-Prong Mounting Plug (with cover).....
 17-2263 5-Prong Mounting Plug (with cover).....
 00-4371 Antenna & Battery Cable Connectors (complete set).....
 17-4226 Shielded Loom (yard).....
 17-4294 Speaker (6" Dynamic).....
 17-4295 Spark Plug Suppressor.....
 17-4152-1 Distributor Suppressor.....
 29-3026 Volume Control Switch.....
 29-2169-C Tube Shield Assembly.....
 17-2050 Vibrator and (Rubber Casing .10).....
 17-2052 Tube Type 6D6.....
 17-2053 Tube Type 78.....
 17-2054 Tube Type 75.....
 17-2056 Tube Type 41.....
 17-2057 Tube Type 84.....
 Case (complete).....
 Accessories.....
 Set and Tubes.....
 Power Pack.....
 17-2225 Generator Condenser.....
 17-4296 Ammeter Condenser.....

INSTALLATION OF AIRPLANE CONTROL IN ASH TRAY COMPARTMENT IN 1934 DODGES AND PLYMOUTHS

This control is designed to fit either on the steering column or in the ash tray compartment. A chromium-plated panel is furnished for this ash tray mounting.

On the 1934 Dodges and Plymouths there is a wide bracket directly behind this ash tray that interferes with the shafts of the remote control. It is impossible to run the shafts around the control, for that causes too sharp a bend in the cables and so they bind.

This condition can be easily remedied by locating the control with the chromium plate attached in the hole left by the ash tray on the panel. Remove the key from the control and mark through the key hole on to the bracket. With this center located, measure one-half inch above and three-sixteenths of an inch to the right of this first mark, and locate the center of the second hole.

Drill a three-eighths inch hole at both places. Run the two flexible shafts through these holes from the rear and fasten them onto the remote control. Then fasten the control on the dash with the bracket furnished and hook the other end of the shafts into the radio set as described in the instructions.

* * * * *

INSTALLATION OF TONE CONTROL ON ARVIN MODEL 16 RECEIVERS

When a customer desires a lower pitch in this set, connect together the two external speaker leads. Obtain two phone tips similar to the one on the dial light lead, and put one of these on each end of a 2.5 inch piece of wire. Slip a small piece of rubber tubing over each phone tip, or use tape. Then plug the two tips -- one into each of the external speaker connections.

This will give the set's tone a greater depth, which is desirable in some cases.

CHOKES

00-2178E See diagram for description.....
 00-2178-F See diagram for description.....
 00-4141 See diagram for description.....

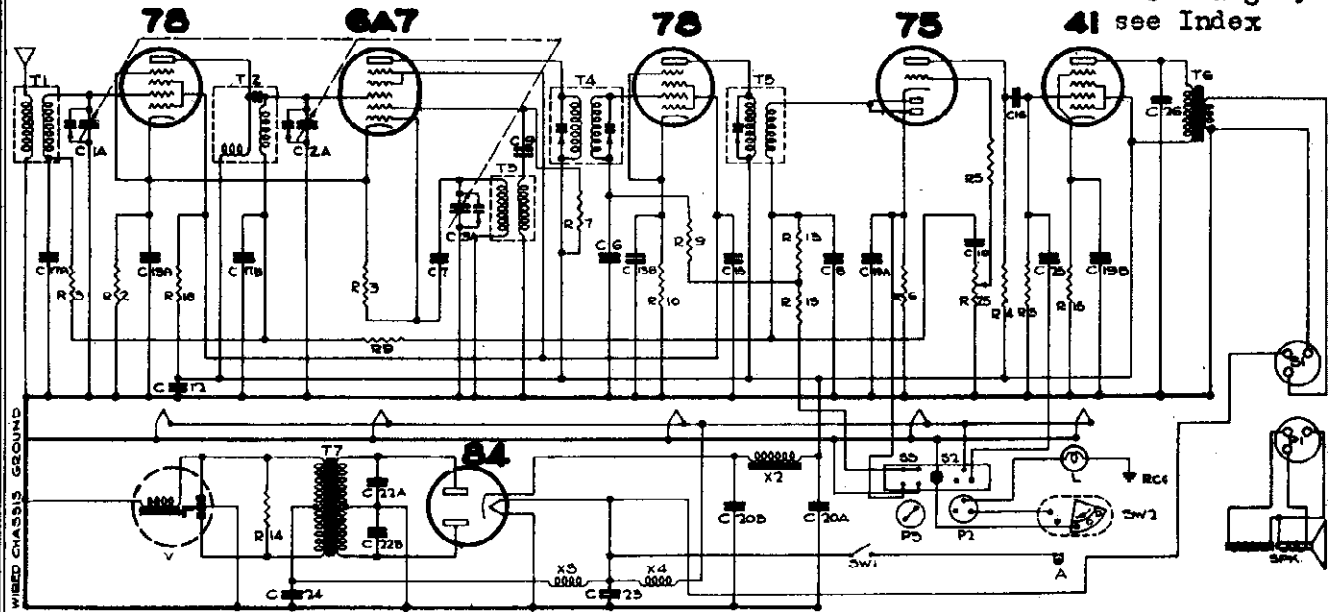
NOBLITT SPARKS INDUSTRIES

MODEL 17
Schematic, Voltage
Resistances, Parts

I.F. PEAK = 175 KC

ARVIN CAR RADIO - MODEL 17

For Changes,
41 see Index



RESISTORS				CONDENSERS				CHOKES & TRANSFORMERS				MISCELLANEOUS UNITS			
QTY	VAL	PART NO	PRICE	QTY	VAL	PART NO	PRICE	QTY	TYPE	PART NO	PRICE	QTY	DESCRIPTION	PART NO	
1	7.420	1/4	17-4782	.20	18	5.0M	17-4730	.25	1	ANTENNA	00-4610	.80	SPK	SPEAKER	17-471
2	1.00M	1/4	17-7048	.20	20	20	17-4731	.25	2	RADIO FREQUENCY OSCILLATOR	00-4611	1.00	EC-6	VIBRATOR	17-471
3	300M	1/4	17-7049	.20	21	10	17-4732	.25	3	FIRST I.F.	00-4612	.80	EC-8	GROUND	17-471
4	500M	1/4	17-7070	.20	22	10	17-4733	.25	4	SECOND I.F.	00-4617	1.75	SW1	VOLUME CONTROL SWITCH	17-471
5	500M	1/4	17-7071	.20	23	10	17-4734	.25	5	OUTPUT POWER	00-4614	1.50	SW2	TOUCH CONTROL SWITCH	17-471
6	20M	1/4	17-7072	.20	24	300M KC	17-452	1.00	6	ANTENNA	00-4787	1.50	S1	SPEAKER SOCKET	17-478
7	1M	1/4	17-7080	.20	25	300M KC	17-452	1.00	7	ANTENNA	00-4788	2.00	S2	DIAL LITE TONE SOCKET	17-478
8	1M	1/4	17-7080	.20	26	300M KC	17-452	1.00	8	ANTENNA	00-4789	2.00	S3	LOC. DIST. CONTROL SOCKET	17-478
9	1M	1/4	17-7080	.20	27	300M KC	17-452	1.00	9	ANTENNA	00-4790	2.00	S4	DIAL LITE TONE SOCKET	17-478
10	1M	1/4	17-7080	.20	28	300M KC	17-452	1.00	10	ANTENNA	00-4791	2.00	S5	DIAL LITE TONE SOCKET	17-478
11	1M	1/4	17-7080	.20	29	300M KC	17-452	1.00	11	ANTENNA	00-4792	2.00	S6	DIAL LITE TONE SOCKET	17-478
12	1M	1/4	17-7080	.20	30	300M KC	17-452	1.00	12	ANTENNA	00-4793	2.00	S7	DIAL LITE TONE SOCKET	17-478
13	1M	1/4	17-7080	.20	31	300M KC	17-452	1.00	13	ANTENNA	00-4794	2.00	S8	DIAL LITE TONE SOCKET	17-478
14	1M	1/4	17-7080	.20	32	300M KC	17-452	1.00	14	ANTENNA	00-4795	2.00	S9	DIAL LITE TONE SOCKET	17-478
15	1M	1/4	17-7080	.20	33	300M KC	17-452	1.00	15	ANTENNA	00-4796	2.00	S10	DIAL LITE TONE SOCKET	17-478
16	1M	1/4	17-7080	.20	34	300M KC	17-452	1.00	16	ANTENNA	00-4797	2.00	S11	DIAL LITE TONE SOCKET	17-478
17	1M	1/4	17-7080	.20	35	300M KC	17-452	1.00	17	ANTENNA	00-4798	2.00	S12	DIAL LITE TONE SOCKET	17-478
18	1M	1/4	17-7080	.20	36	300M KC	17-452	1.00	18	ANTENNA	00-4799	2.00	S13	DIAL LITE TONE SOCKET	17-478
19	1M	1/4	17-7080	.20	37	300M KC	17-452	1.00	19	ANTENNA	00-4800	2.00	S14	DIAL LITE TONE SOCKET	17-478

SOCKET VOLTAGES

Make voltage tests with at least 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Anode Grid 1500 KC	Osc. Grid 1500 KC
78	5.8	220	70	3.3	3.3	—	—
6A7	5.8	220	70	3.3	—	175	5-10
78	5.8	220	70	2.5	2.5	—	—
75	5.8	115	—	1.5	—	—	—
41	5.8	208	220	14.0	—	—	—
84	5.8	230 (AC)	—	225	—	—	—

POINT TO POINT RESISTANCES

All readings taken to ground unless otherwise specified. Readings taken with all tubes, vibrator and speaker removed from set.

78 (R. F.)	6A7	78 (I. F.)	41
+ Heater Inf.	+ Heater Inf.	+ Heater Inf.	+ Heater Inf.
- Heater 0	- Heater 0	- Heater 0	- Heater 0
Plate to B+ 113	Plate to B+ 115	Plate to B+ 85	Plate to B+ 625
Screen to B+ 50,000	Screen to B+ 50,000	Screen to B+ 50,000	Screen to B+ 0
Suppressor Grid 400	Oscillator Grid 100,400	Suppressor Grid 500	Cathode 500
Cathode 400	Cathode 400	Cathode 500	Control Grid 500,000
†Control Grid 1,250,000	†Control Grid 1,150,000	†Control Grid 1,075,000	
75		84	
+ Heater Inf.		+ Heater Inf.	
- Heater 0		- Heater 0	
Plate to B+ 200,000		Plate 196	
Cathode 5,000		Plate to Plate 361	
†Diodes 150,000		Cathode to B+ 165	
Control Grid V. C. on 1,000,000			
Control Grid V. C. off 500,000			

COIL RESISTANCES

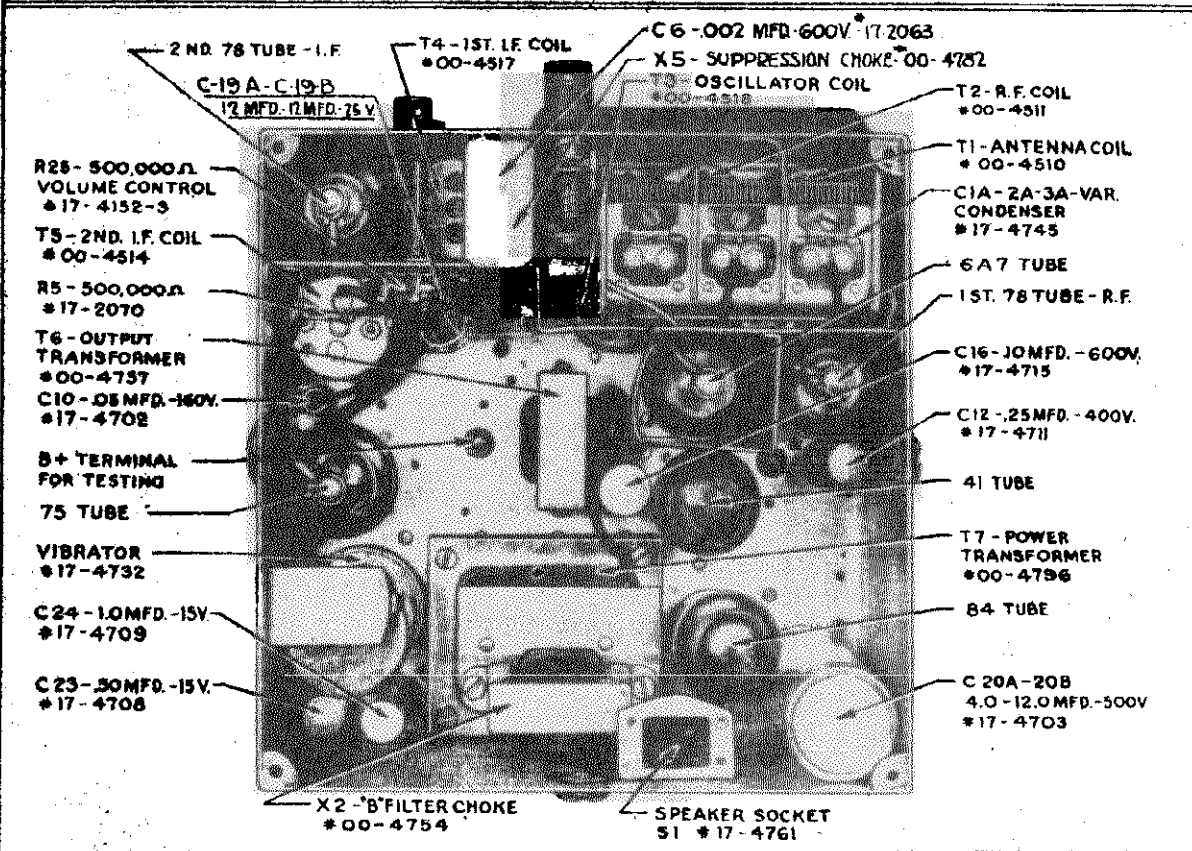
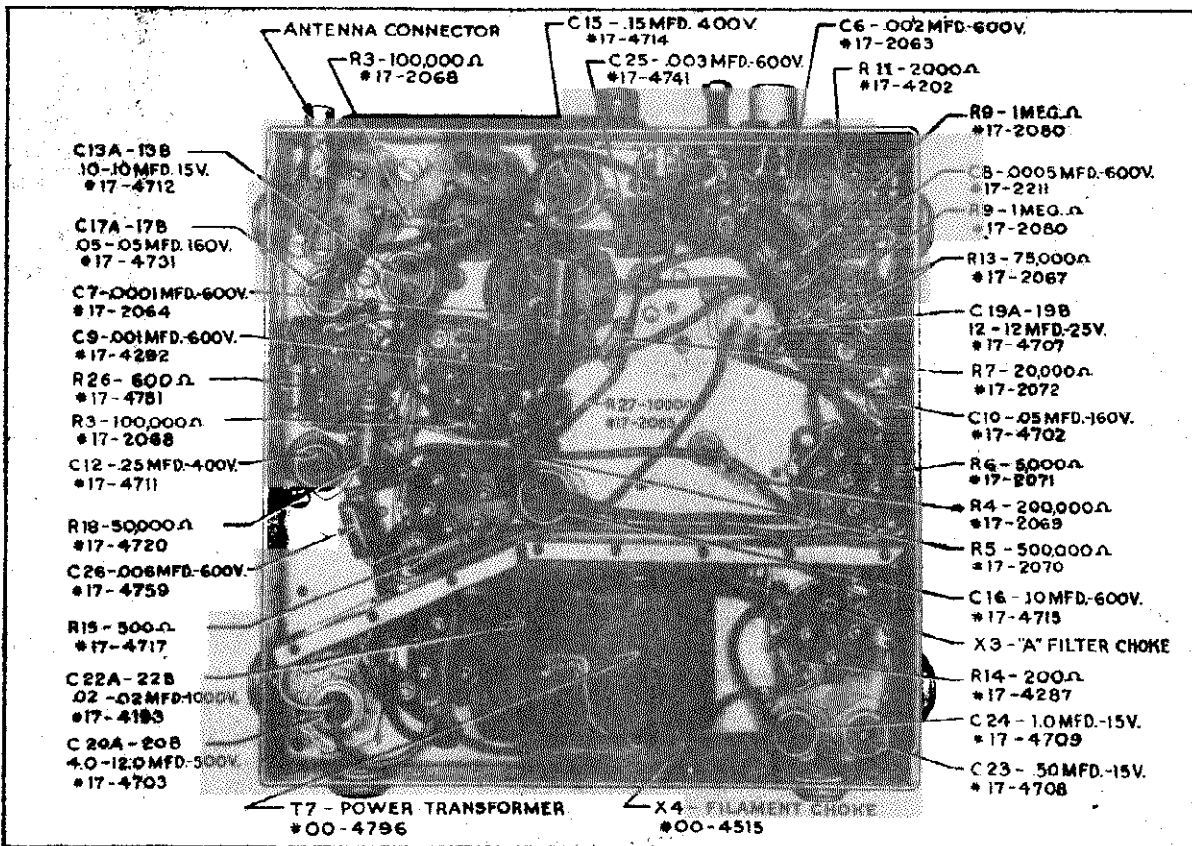
Ant. Primary 12.0	Oscillator Primary 3.0	Second I. F. Primary 85.0	Power Transformer Secondary {165} {196} 361
Ant. Secondary 4.0	Oscillator Secondary 1.5	Second I. F. Secondary 85.0	Speaker Field Coil 5.0
R. F. Primary 113.0	First I. F. Primary 115.0	Output Transformer Primary 625	Speaker Voice Coil 3.0
R. F. Secondary 4.0	First I. F. Secondary 115.0	Output Transformer Secondary 0.5	"B" Filter Choke 165

† Readings given for sensitivity switch in "Local" position, for "Distance" add 5000 ohms.

MODEL 17

Chassis Layouts

NOBLITT SPARKS INDUSTRIES



NOBLITT SPARKS INDUSTRIES

MODELS 17, 27

Changes

MODEL NO. 17

1. R3—100,000 ohm $\frac{1}{4}$ watt (17-2068) resistor in 6A7 No. 1 grid circuit has been changed to R29—50,000 ohm $\frac{1}{4}$ watt (17-2060).
2. R24—1,000 ohm $\frac{1}{4}$ watt resistor has been inserted in 6A7 No. 1 grid circuit.
3. R2—400 ohm $\frac{1}{4}$ watt resistor has been changed to R10—500 ohm $\frac{1}{4}$ watt. Allowable variations on R2 was from 200 to 600 ohms. Allowable variation on R10 is from 400 to 600 ohms.
4. R10—500 ohm $\frac{1}{4}$ watt resistor on cathode of 78 tube has been changed to R28—1,500 ohm $\frac{1}{4}$ watt.
5. C12 and C26 capacitors have been combined into one dual condenser, part No. 17-4742, .006 mfd 800 volt (lead with red dot is .006 mfd unit) and .25 mfd 400 volt.
6. X5 suppression choke, 00-4782, has been added in "A" line.

MODEL NO. 27

1. R3—100,000 ohm $\frac{1}{4}$ watt (17-2068) resistor in 6A7 No. 1 grid circuit has been changed to R29—50,000 ohm $\frac{1}{4}$ watt (17-2060).
2. R24—1,000 ohm $\frac{1}{4}$ watt resistor has been inserted in 6A7 No. 1 grid circuit.
3. R2—400 ohm $\frac{1}{4}$ watt resistor has been changed to R10—500 ohm $\frac{1}{4}$ watt. Allowable variation on R2 was from 200 to 600 ohms. Allowable variation on R10 is from 400 to 600 ohms.
4. R10—500 ohm $\frac{1}{4}$ watt resistor on cathode of 78 tube has been changed to R28—1,500 ohm $\frac{1}{4}$ watt.
5. C12 and C26 capacitors have been combined into one dual condenser, part No. 17-4742, .006 mfd 800 volt (lead with red dot is .006 mfd unit) and .25 mfd 400 volt.
6. X5 suppression choke, 004782, has been added in "A" line.
7. C6—.002 mfd mica condenser has been inserted ahead of X5 suppression choke and connected from battery side of X5 to ground.
8. Power transformer, 00-4747. Part number has been changed to 00-4746.
9. Dial light, part No. 17-2145 (with screw base), has been changed to dial light, part No. 17-4857 (with bayonet base).
10. Speaker plug socket, 17-4761 (3 prong), has been changed to speaker plug socket, 17-4447 (4 prong).

7. C6—.002 mfd mica condenser has been inserted ahead of X5 suppression choke and connected from battery side of X5 to ground.
8. Dial light, part No. 17-2145 (with screw base), has been changed to dial light, part No. 17-4857 (with bayonet base).
9. Speaker plug socket, 17-4761 (3 prong), has been changed to speaker plug socket, 17-4447 (4 prong).
10. Ammeter cable, 00-4778-1, has been added. List Price, \$.70.
Note: On Model 17A this cable is shorter and carries part No. 00-4778-2. List Price, \$.65.
11. Fuse, 17-2228, has been added. List Price, \$.05.
12. It was found in the field that in some instances motor noise entered the receiver where the local-distance plug and tone control plug were attached. A change in the mechanical design which eliminated this difficulty was made beginning with those sets from which the louvers were omitted.
11. Ammeter cable, 00-4778-1, has been added. List Price, \$.70.
12. Fuse, 17-2228, has been added. List Price, \$.05.
13. Beginning with serial No. D44011H the type 75 tube was replaced with a 6B7, triode connected.
14. C25—.003 mfd 600 volt condenser was changed to C26—.006 mfd 600 volt.
15. Beginning with serial No. E45219H, the triode connection on the 6B7 was changed to a pentode connection, and changes as per paragraphs 16, 17, and 18 were made.
16. C12—.25 mfd 400 volt condenser was added as a screen by-pass from screen of 6B7 tube to ground.
17. R9—1 megohm $\frac{1}{4}$ watt resistor was added as a screen dropping resistor from +B to screen of 6B7 tube.
18. C26—.006 mfd 600 volt condenser was changed to C25—.003 mfd 600 volt.
19. Under conditions outlined in paragraph 15, voltages on the 6B7 are as follows (using a 1333 ohm per volt meter): Plate 60, Screen 30, cathode 1.7.
20. It was found in the field that in some instances motor noise entered the receiver where the local-distance plug and tone control plug were attached. A change in the mechanical design which eliminated this difficulty was made beginning with those sets from which the louvers were omitted.

MODEL 35
Above Serial E31577H
Voltage, Resistances

NOBLITT SPARKS INDUSTRIES

Note: The following values are correct for all Model 35 Arvin Car Radios, beginning with and including Serial No. E31577H.

MODEL 35 SOCKET VOLTAGES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heater	Plate	Screen	Cathode	Suppressor	Control
78	6.3	250	60	1.6	2.2	*2.0
77	6.3	250	60	2.2	2.2	*2.2
6B7	6.3	250	60	1.6	—	*1.4
79	6.3	135	—	1.6	—	*1.6
41	6.3	245	250	18	—	*18
41	6.3	245	250	18	—	*18
37	6.3	60	—	0	—	*6—1500 KC
84	6.3	275 (AC)	—	255	—	—

* Measured with vacuum tube voltmeter only.

MODEL 35 POINT TO POINT RESISTANCE CHECK

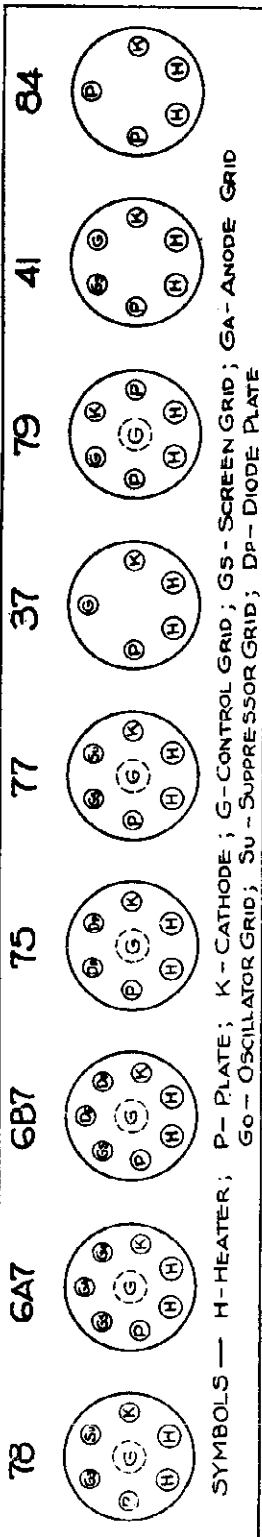
All readings to ground unless otherwise specified. Readings taken with all tubes, vibrator and speaker removed from set and R. F. chassis disconnected from power pack unit.

Tube	Heater	Plate	Screen	Cathode	Suppressor	Control
78	Inf.	0	0	0	0	0
77	Inf.	0	0	0	0	0
6B7	Inf.	0	0	0	0	0
41	Inf.	0	0	0	0	0
37	Inf.	0	0	0	0	0
84	Inf.	0	0	0	0	0

COIL RESISTANCES

Ant. Primary	2
Ant. Secondary	6
R. F. Primary	.50
R. F. Secondary	.6
Osc. Primary	.2
Osc. Secondary	.7
Voice Coil	.35

LOOKING AT BOTTOM OF TUBE SOCKETS

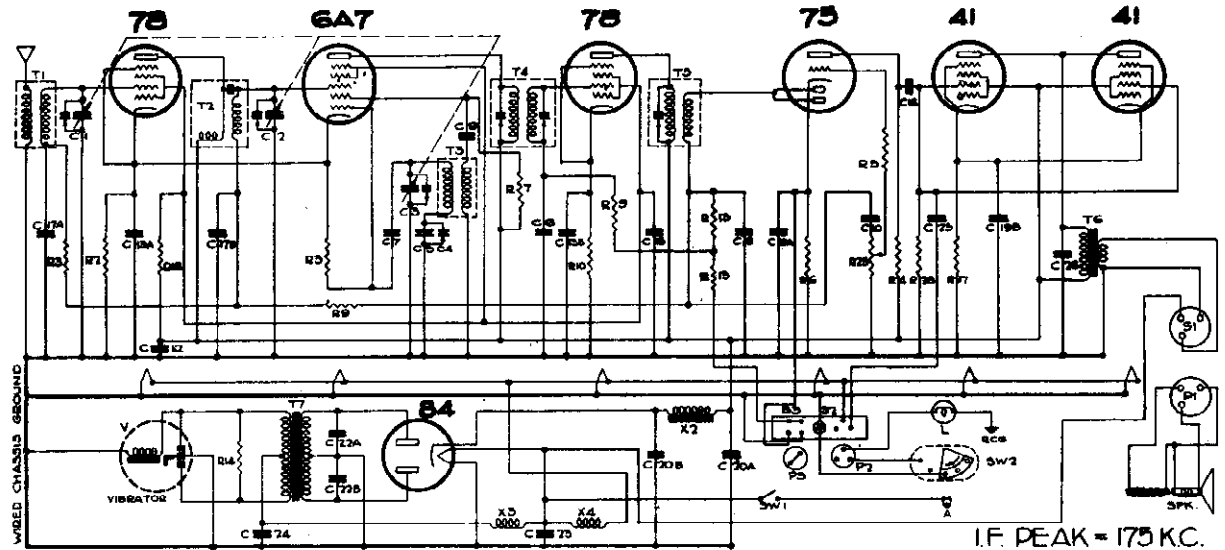


SYMBOLS — H-HEATER; P- PLATE; K- CATHODE; G- CONTROL GRID; GS- SCREEN GRID; GA- ANODE GRID; Su - OSCILLATOR GRID; Os - SUPPRESSOR GRID; DP- DIODE PLATE

NOBLITT SPARKS INDUSTRIES

MODEL 27
Schematic, Voltage
Resistances, Parts

ARVIN CAR RADIO - MODEL 27



RESISTORS			CONDENSERS			CHOKES AND TRANSFORMERS			MISCELLANEOUS UNITS						
Q	PART NO	PRICE	C	CAPACITY	VOLT PART NO PRICE	C	CAPACITY	VOLT PART NO PRICE	T X	TYPE	PART NO PRICE	SYMBOL	DESCRIPTION	PART NO PRICE	
1	5000	.10	1	5 MMS TUNING	17-4725 4.50	17	10	100	17-4715 20	1	ANTENNA	00-4810 .50	SPK	SPEAKER	17-4735 0.50
2	1000	.10	2	10 MMS TUNING	17-4726 4.50	17A	100	150	17-4716 20	2	RADIO FREQUENCY OSCILLATOR	00-4811 1.00	V	VIBRATOR	17-4736 1.00
3	2000	.10	3	20 MMS TUNING	17-4727 4.50	17B	100	150	17-4717 20	3	FIRST I.F.	00-4812 .85	12 C 6	12 C 6 V REMOTE CONTROL SOCKET	17-4737 1.00
4	3000	.10	4	30 MMS TUNING	17-4728 4.50	17C	100	150	17-4718 20	4	SECOND I.F.	00-4813 1.75	SW1	VOLUME CONTROL SWITCH	17-4738 .50
5	4000	.10	5	40 MMS TUNING	17-4729 4.50	17D	100	150	17-4719 20	5	DET. & A.F.	00-4814 1.75	SW2	LOC. DIST. CONTROL SWITCH	17-4739 .50
6	5000	.10	6	50 MMS TUNING	17-4730 4.50	17E	100	150	17-4720 20	6	OUTPUT	00-4815 1.50	3 1	TONE SOCKET	17-4740 .50
7	6000	.10	7	60 MMS TUNING	17-4731 4.50	17F	100	150	17-4721 20	7	POWER	00-4816 3.00	3 2	DIAL LITE - TONE SOCKET	17-4741 .50
8	7000	.10	8	70 MMS TUNING	17-4732 4.50	17G	100	150	17-4722 20	8	100 OHM INPUT CHOKES	00-4817 .40	3 3	LOC. DIST. CONTROL SOCKET	17-4742 .50
9	8000	.10	9	80 MMS TUNING	17-4733 4.50	17H	100	150	17-4723 20	9	250 OHM INPUT CHOKES	00-4818 .40	3 4	SPEAKER PLUG	17-4743 .50
10	9000	.10	10	90 MMS TUNING	17-4734 4.50	17I	100	150	17-4724 20	10	500 OHM INPUT CHOKES	00-4819 .40	3 5	DIAL LITE - TONE PLUG	17-4744 .50
11	10000	.10	11	100 MMS TUNING	17-4735 4.50	17J	100	150	17-4725 20	11	1000 OHM INPUT CHOKES	00-4820 .40	3 6	LOC. DIST. CONTROL PLUG	17-4745 .50
12	11000	.10	12	110 MMS TUNING	17-4736 4.50	17K	100	150	17-4726 20	12	2500 OHM INPUT CHOKES	00-4821 .40	3 7	DIAL LITE - 6-8 VOLT ARMATURE CONNECTION	17-4746 .50
13	12000	.10	13	120 MMS TUNING	17-4737 4.50	17L	100	150	17-4727 20	13	5000 OHM INPUT CHOKES	00-4822 .40	3 8		
14	13000	.10	14	130 MMS TUNING	17-4738 4.50	17M	100	150	17-4728 20	14	10000 OHM INPUT CHOKES	00-4823 .40	3 9		
15	14000	.10	15	140 MMS TUNING	17-4739 4.50	17N	100	150	17-4729 20	15	20000 OHM INPUT CHOKES	00-4824 .40	3 10		
16	15000	.10	16	150 MMS TUNING	17-4740 4.50	17O	100	150	17-4730 20	16	50000 OHM INPUT CHOKES	00-4825 .40	3 11		
17	16000	.10	17	160 MMS TUNING	17-4741 4.50	17P	100	150	17-4731 20	17	100000 OHM INPUT CHOKES	00-4826 .40	3 12		
18	17000	.10	18	170 MMS TUNING	17-4742 4.50	17Q	100	150	17-4732 20	18	200000 OHM INPUT CHOKES	00-4827 .40	3 13		
19	18000	.10	19	180 MMS TUNING	17-4743 4.50	17R	100	150	17-4733 20	19	500000 OHM INPUT CHOKES	00-4828 .40	3 14		
20	19000	.10	20	190 MMS TUNING	17-4744 4.50	17S	100	150	17-4734 20	20	1000000 OHM INPUT CHOKES	00-4829 .40	3 15		
21	20000	.10	21	200 MMS TUNING	17-4745 4.50	17T	100	150	17-4735 20	21	2000000 OHM INPUT CHOKES	00-4830 .40	3 16		
22	21000	.10	22	210 MMS TUNING	17-4746 4.50	17U	100	150	17-4736 20	22	5000000 OHM INPUT CHOKES	00-4831 .40	3 17		
23	22000	.10	23	220 MMS TUNING	17-4747 4.50	17V	100	150	17-4737 20	23	10000000 OHM INPUT CHOKES	00-4832 .40	3 18		
24	23000	.10	24	230 MMS TUNING	17-4748 4.50	17W	100	150	17-4738 20	24	20000000 OHM INPUT CHOKES	00-4833 .40	3 19		
25	24000	.10	25	240 MMS TUNING	17-4749 4.50	17X	100	150	17-4739 20	25	50000000 OHM INPUT CHOKES	00-4834 .40	3 20		
26	25000	.10	26	250 MMS TUNING	17-4750 4.50	17Y	100	150	17-4740 20	26	100000000 OHM INPUT CHOKES	00-4835 .40	3 21		
27	26000	.10	27	260 MMS TUNING	17-4751 4.50	17Z	100	150	17-4741 20	27	200000000 OHM INPUT CHOKES	00-4836 .40	3 22		
28	27000	.10	28	270 MMS TUNING	17-4752 4.50	17AA	100	150	17-4742 20	28	500000000 OHM INPUT CHOKES	00-4837 .40	3 23		
29	28000	.10	29	280 MMS TUNING	17-4753 4.50	17AB	100	150	17-4743 20	29	1000000000 OHM INPUT CHOKES	00-4838 .40	3 24		
30	29000	.10	30	290 MMS TUNING	17-4754 4.50	17AC	100	150	17-4744 20	30	2000000000 OHM INPUT CHOKES	00-4839 .40	3 25		

SOCKET VOLTAGES

Make voltage tests with at least 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Anode Grid 1500 KC	Osc. Grid 1500 KC
7B	5.8	235	75	4.2	4.2	—	—
6A7	5.8	235	75	4.2	—	170	5-10
7B	5.8	235	75	3.3	3.3	—	—
75	5.8	120	—	1.7	—	—	—
41	5.8	220	235	13.0	—	—	—
41	5.8	220	235	13.0	—	—	—
84	5.8	260 (AC)	—	245	—	—	—

POINT TO POINT RESISTANCES

All readings taken to ground unless otherwise specified. Readings taken with all tubes, vibrator and speaker removed from set.

7B (R. F.)	6A7	7B (I. F.)	75
+ Heater Inf.	+ Heater Inf.	+ Heater Inf.	+ Heater Inf.
- Heater 0	- Heater 0	- Heater 0	- Heater 0
Plate to B+ 115	Plate to B+ 115	Plate to B+ 85	Plate to B+ 200,000
Screen to B+ 50,000	Screen to B+ 50,000	Screen to B+ 50,000	Plate to B+ 150,000
Anode to B+ 20,000	Anode to B+ 20,000	Suppressor Grid 500	Cathode 5000
Oscillator Grid 100,400	Oscillator Grid 100,400	Cathode 500	Control Grid V. C. on 1,000,000
Cathode 400	Cathode 400	Control Grid 1,075,000	Control Grid V. C. off 500,000
Control Grid 1,250,000	Control Grid 1,150,000		
41	41	84	
+ Heater Inf.	+ Heater Inf.	+ Heater Inf.	
- Heater 0	- Heater 0	- Heater 0	
Plate to B+ 330	Plate to B+ 330	Plate to B+ 240	
Screen to B+ 0	Screen to B+ 0	Plate to Plate 210	
Cathode 250	Cathode 250	Plate to Plate 450	
Control Grid 250,000	Control Grid 250,000	Cathode to B+ 165	

† Add 5000 Ω to these readings when sensitivity switch is on "Distance" position.

COIL RESISTANCES

Ant. Primary 12.0	Oscillator Primary 3.0	Second I. F. Primary 85.0	Power Transformer Secondary 240-CT-210=450
Ant. Secondary 4.0	Oscillator Secondary 1.5	Second I. F. Secondary 85.0	"B" Filter Choke 165
R. F. Primary 113.0	First I. F. Primary 115.0	Output Transformer Primary 350	Speaker Field Coil 4.0
R. F. Secondary 4.0	First I. F. Secondary 115.0	Output Transformer Secondary ..... .05	Speaker Voice Coil 3.0

MODEL 27
Chassis Layouts

NOBLITT SPARKS INDUSTRIES

C15 #17-4714
15 MFD. 400V.
C7 #17-4714
100M MFD. 500V.
T3 #00-4811
OSCILLATOR COIL
C8 #17-4292
501MFD. 500V.
6A7 TUBE
T2 #00-4811
RADIO FREQUENCY COIL

ANTENNA CONNECTOR
T1 #00-4810
ANTENNA COIL
R2 #17-2068
100M.A. 1/4 WATT
C19A-C19B #17-4718
12-12 MFD. 25V.
C17A-C17B #17-4731
0.1 MFD. 150V.
7B TUBE

R16 #17-4763
250M.A. 1/4 WATT
R24 #17-4781
500 A. 1/4 WATT
R25 #17-4782
500M.A. 1/4 WATT
R1 #17-2068
100M.A. 1/4 WATT

R23 #17-3011
250M.A. 1/4 WATT
C16 #17-4716
0.1MFD. 500V.
C12 #17-4711
25MFD. 400V.

C26 #17-4759
005 MFD. 500V.
4-1 TUBES

B4 TUBE

C20A-C20B #17-4703
4-12 MFD. ELECT. 500V.

X3 #00-4518
"A" INPUT CHOKE

C22A-C22B #17-4193
02 - 02 MFD. 1000V.

C6 #17-2063
002 MFD. 500V.

X5 #00-4782
SUPPRESSION CHOKE

T4 #00-4817
1ST IF TRANS.
7B TUBE

C19A-C19B #17-4707
12-12 MFD. ELECT. 25V.

R25 #17-4182-3
500M.A. VOL. CONT.

R5 #17-2070
500M.A. 1/4 WATT

T8 #00-4514
2ND. IF TRANS.

C4 #17-4726
.00022 MFD. PAD.

C10 #17-4702
.05 MFD. 160V.

T6 #00-4766
OUTPUT TRANS.

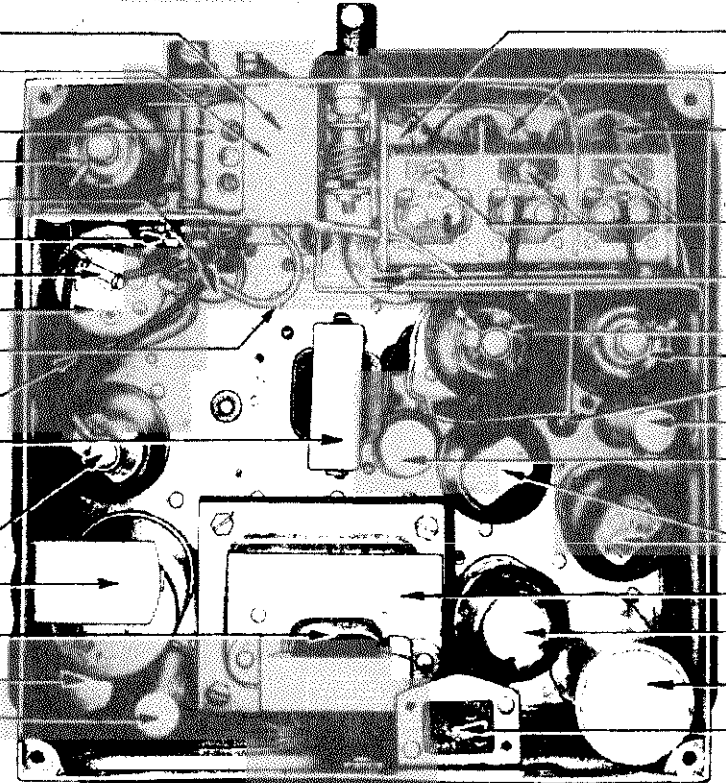
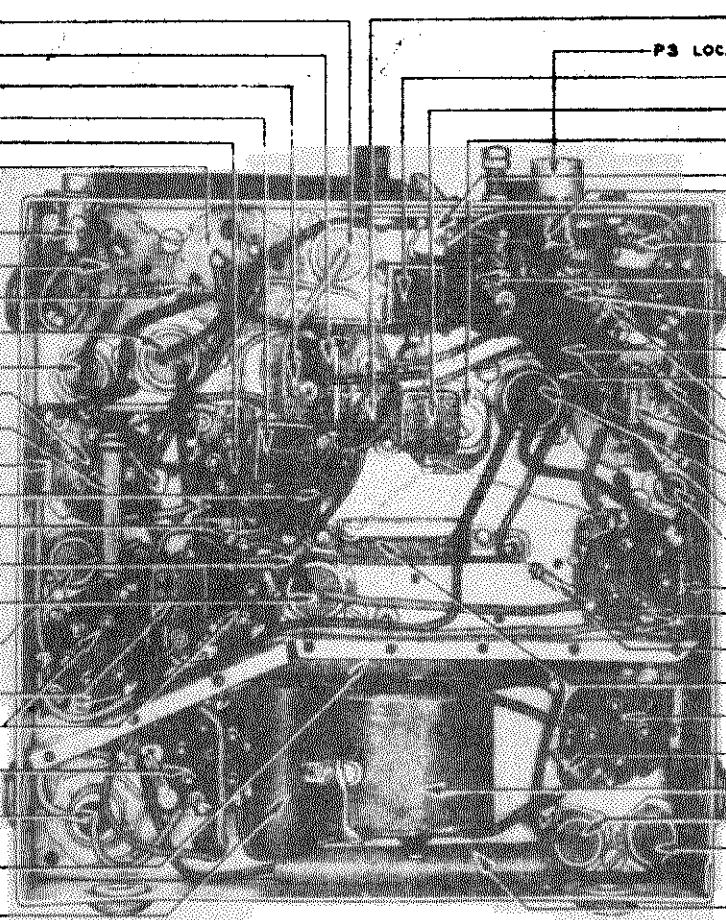
75 TUBE

V #17-4732
VIBRATOR

X2 #00-4784
"B" FILTER CHOKE

C23 #17-4708
.5 MFD. 15V.

C24 #17-4709
1.0 MFD. 15V.



RT #17-8072
20MA. 1/4 WATT

P3 LOCAL-DISTANCE CONTROL PLUG
C25 #17-4741
003 MFD. 500V.

C5 #17-4700
001MFD. 500V.

C3 #17-4725
002 MFD. 500V.

32 TONE-PILOT
S3 LOCAL-DISTANCE CONTROL PLUG

R11 #17-4202
2000A. 1/4 WATT

T4 #00-4817
1ST. IF TRANS.

C9 #17-2083
002 MFD. 500V.

C8 #17-2211
0005 MFD. 500V.

R13 #17-2087
75M.A. 1/4 WATT

C19A-C19B #17-4707
12-12 MFD. ELECT. 25V.

T5 #00-4774
2ND. IF TRANS.

C10 #17-4702
08 MFD. 160V.

R8 #17-2071
5000A. 1/4 WATT

75 TUBE

R4 #17-2068
200M.A. 1/4 WATT

R17 #17-4719
250A. 2 WATT

V #17-4732
VIBRATOR

R14 #17-4287
200A. 1/4 WATT

T7 #00-4746
POWER TRANSFORMER

C24 #17-4708
1.0 MFD. 15V.

C23 #17-4708
.5 MFD. 15V.

X4 #00-4315
FILAMENT CHOKE

C18 #17-4714
15MFD. 400V.

T2 #00-4511
RADIO FREQUENCY COIL

T1 #00-4810
ANTENNA COIL

C1-C2-C3 #17-4725
3 GANG TUNING COND.

T3 #00-4512
OSCILLATOR COIL

6A7 TUBE

7B TUBE

TEST +B HERE

C12 #17-4711
25 MFD. 400V.

C16 #17-4715
1 MFD. 500V.

4-1 TUBES

T7 #00-4746
POWER TRANSFORMER

84 TUBE

C20A-C20B #17-4703
4-12 MFD. ELECT. 500V.

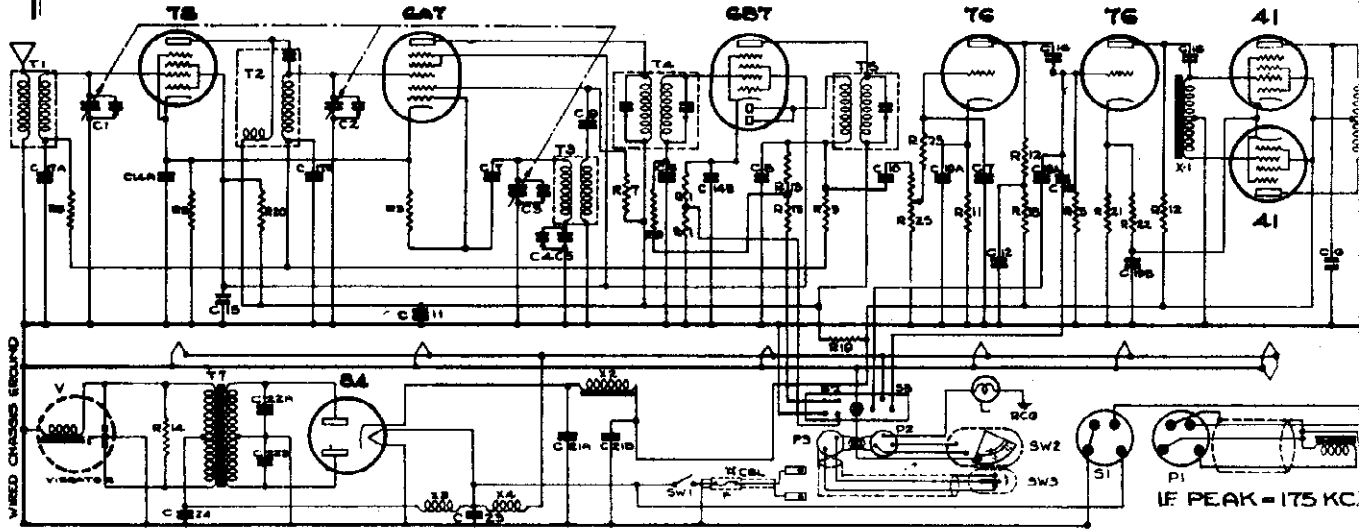
S1 #17-4761
SPEAKER SOCKET

NOBLITT SPARKS INDUSTRIES

MODEL 37
Schematic, Voltage
Resistances, Parts

SCHEMATIC CIRCUIT DIAGRAM
ARVIN CAR RADIO MODEL-37

For Changes,
see Index



RESISTORS				CONDENSERS				CHOKES & TRANSFORMERS				MISCELLANEOUS UNITS						
QTY	VAL	PART NO	PRICE	QTY	VAL	PART NO	PRICE	QTY	VAL	PART NO	PRICE	QTY	TYPE	PART NO	PRICE	DESCRIPTION	PART NO	
1	250	WT-4167	20	10	50M	WT-2720	35	1	3 50M	WT-4728	40	1	ANTENNA	00-2510	90	SPK	SPEAKER	WT-4284
2	500	WT-4782	20	10	5M	WT-4721	35	1	3 50M	WT-4728	40	1	RADIO FREQUENCY	00-2511	100	VIB	VIBRATOR	WT-4757
3	1000	WT-2088	20	20	50M	WT-4722	35	1	1.00025	WT-4728	40	2	OSCILLATOR	00-2512	85	BCC	REMOTE CONTROL GROUND	
4	500	WT-2070	20	20	100	WT-4723	35	1	6.002	WT-4728	40	2	FIRST IF	00-2513	115	SW 1	VOLUME CONTROL SWITCH	WT-4720
5	20M	WT-2072	20	20	300	WT-4724	30	1	6.001	WT-4728	40	2	SECOND IF	00-2514	115	SW 2	TO NE CONTROL SWITCH	WT-4721
6	10M	WT-2073	20	20	3000	WT-2011	30	1	6.002	WT-4728	40	2	OUTPUT	00-2515	155	SW 3	LOCAL-DISTANCE SWITCH	WT-4722
7	10M	WT-2074	20	20	3000	WT-2011	30	1	6.001	WT-4728	40	2	POWER	00-2516	300	S-1	SPEAKER SOCKET	WT-4427
8	10M	WT-2075	20	20	3000	WT-2011	30	1	6.002	WT-4728	40	2	POWER	00-2517	300	S-2	DIAL-LITE TONE SOCKET	WT-4375
9	10M	WT-2076	20	20	3000	WT-2011	30	1	6.001	WT-4728	40	2	POWER	00-2518	300	S-3	LOCAL-DIST CONTROL SOCKET	WT-4376
10	10M	WT-2077	20	20	3000	WT-2011	30	1	6.002	WT-4728	40	2	POWER	00-2519	300	P-1	SPEAKER PLUG	WT-4428
11	10M	WT-2078	20	20	3000	WT-2011	30	1	6.001	WT-4728	40	2	POWER	00-2520	300	P-2	DIAL-LITE-TONE PLUG	WT-4377
12	10M	WT-2079	20	20	3000	WT-2011	30	1	6.002	WT-4728	40	2	POWER	00-2521	300	P-3	LOCAL-DIST CONTROL PLUG	WT-4378
13	10M	WT-2080	20	20	3000	WT-2011	30	1	6.001	WT-4728	40	2	POWER	00-2522	300	L	DIAL-LITE 5-0 VOLT	WT-4429
14	10M	WT-2081	20	20	3000	WT-2011	30	1	6.002	WT-4728	40	2	POWER	00-2523	300	F	FUSE -20 AMPERE	WT-4430
15	10M	WT-2082	20	20	3000	WT-2011	30	1	6.001	WT-4728	40	2	POWER	00-2524	300	WCB	'A' CARBLS	00-4700
16	10M	WT-2083	20	20	3000	WT-2011	30	1	6.002	WT-4728	40	2	POWER	00-2525	300			
17	10M	WT-2084	20	20	3000	WT-2011	30	1	6.001	WT-4728	40	2	POWER	00-2526	300			

SOCKET VOLTAGES

Make voltage tests with at least 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Anode Grid 1500 KC	Sec. Grid 1500 KC
78	5.8	170	75	4.0	4.2	—	—
6A7	5.8	170	75	4.0	—	135	5-10
6B7	5.8	170	75	2.0	—	—	—
1st 76	5.8	100	—	4.7	—	—	—
2nd 76	5.8	165	—	5.3	—	—	—
41	5.8	230	235	18.0	—	—	—
41	5.8	230	235	18.0	—	—	—
84	5.8	260 (AC)	—	245	—	—	—

POINT TO POINT RESISTANCES

All readings taken to ground unless otherwise specified. Readings taken with all tubes, vibrator and speaker removed from set.

78 + Heater Inf. - Heater 0 Plate to B+ 5,113 Screen to B+ 30,000 Suppressor Grid 400 Cathode 400 ‡Control Grid 1,250,250	6A7 + Heater Inf. - Heater 0 Plate to B+ 5,095 Screen to B+ 30,000 Anode Grid to B+ 25,000 Oscillator Grid 100,400 Cathode 400 ‡Control Grid 1,150,250	6B7 + Heater Inf. - Heater 0 Plate to B+ 5,085 Screen to B+ 30,000 ‡Diodes 150,250 Cathode 500 ‡Control Grid 1,075,250	1st 76 + Heater Inf. - Heater 0 Plate to B+ 60,000 Cathode 2,400 Control Grid V. C. on 750,000 Control Grid V. C. off 500,000	2nd 76 + Heater Inf. - Heater 0 Plate to B+ 10,000 Cathode 100 Control Grid 500,000	41 + Heater Inf. - Heater 0 Plate to B+ 250 Screen to B+ 0 Cathode 400 Control Grid 750	41 + Heater Inf. - Heater 0 Plate to B+ 220 Screen to B+ 0 Cathode 400 Control Grid 680	84 + Heater Inf. - Heater 0 Plate 240 Plate 210 Plate to Plate 450 Cathode to B+ 165
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‡ Add 250 Ω to these readings when sensitivity switch is on "Distance" position.

COIL RESISTANCES

Ant. Primary 12.0	Oscillator Secondary 1.5	Output Transformer Primary 250-CT-220=470	"B" Filter Choke 750-CT-680=1
Ant. Secondary 4.0	First I. F. Primary 93.0	Output Transformer Secondary 0.4	Speaker Field Coil
R. F. Primary 113.0	Second I. F. Primary 85.0	Power Transformer Secondary 240-CT-210=400	Speaker Voice Coil
R. F. Secondary 4.0	Second I. F. Secondary 85.0		
Oscillator Primary 3.0			

MODEL 37

Chassis Layouts

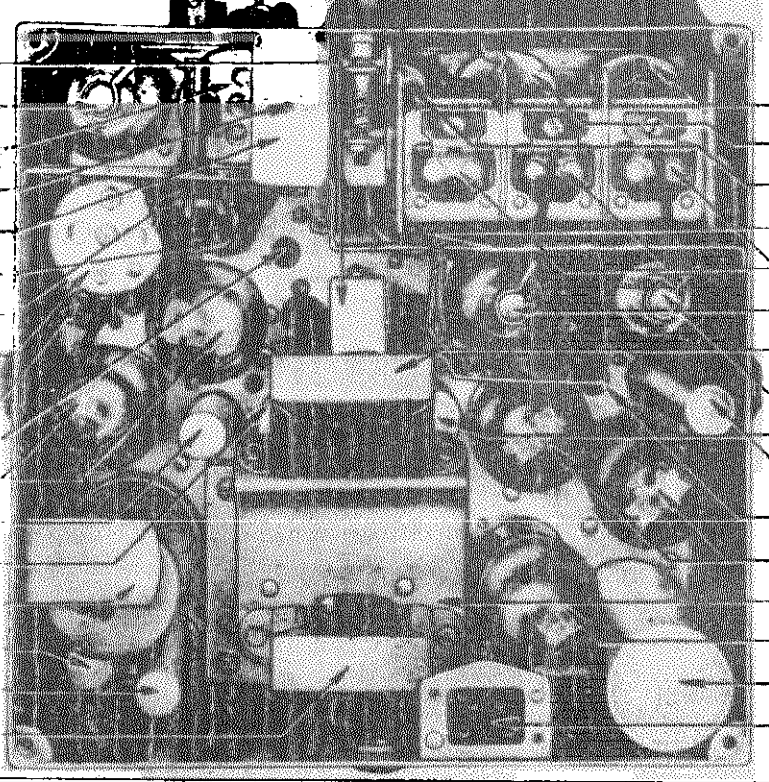
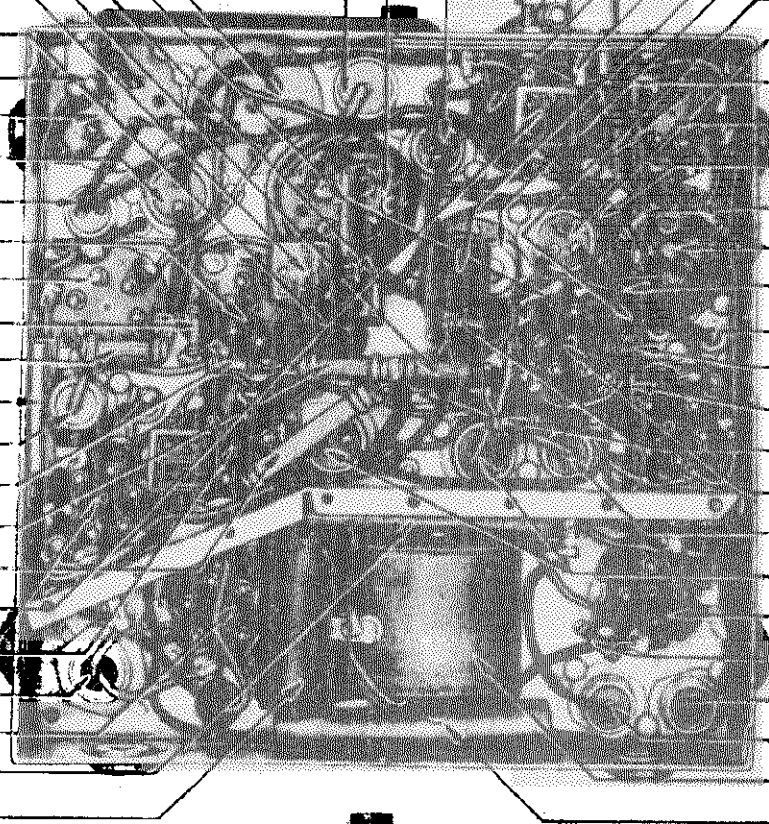
NOBLITT SPARKS INDUSTRIES

- T2 #00-4311
R.F. COIL
- C7 #17-2064
100M MFD. 600V.
- R7 #17-2072
20M.A. 1/4 WATT
- R18 #17-4720
50M.A. 1/2 WATT
- C9 #17-4292
.001 MFD. 600V.
- R24 #17-2065
1000.A. 1/4 WATT
- ANTENNA CONNECTOR
- T1 #00-4310
ANT. COIL
- C14A-C14B #17-6713
1-.25 MFD. 15V.
- C17A-C17B #17-4721
.05-.05 MFD. 150V.
- 6A7 TUBE
MIXER
- 76 TUBE
R.F. AMPLIFIER
- R8 #17-4722
400.A. 1/4 WATT
- R20 #17-4722
25M.A. 1/2 WATT
- R19 #17-4721
5M.A. 2 WATT
- C11 #17-4710
4.0 MFD. 400V.
- R3 #17-2052
100M.A. 1/4 WATT
- RE1 #17-4723
100.A. 1/2 WATT
- RE2 #17-4724
300.A. 1 WATT
- C8 #17-2053
.002 MFD. 500V.
- 41 TUBES
POWER AMPLIFIER
- C21A-C21B #17-4719
12-12 MFD. 500V.
- 84 TUBE
RECTIFIER
- X2 #00-4316
"A" INPUT CHOKE
- C18A-C18B #17-4193
.02-DR MFD. 1000V.

- T6 #00-4755
OUTPUT TRANS.
- 6B7 TUBE
IF AMP. -DET.
- T4 #00-4313
1ST IF TRANS.
- C6 #17-2053
002 MFD. 600V.
- X5 #00-4752
SUPPRESSION CHOKE
- C19A-C19B #17-4707
12-12 MFD. 25V.
- R22 #17-4182-3
500M.A. VOL. CONT.
- T5 #00-4314
2ND. IF TRANS.
- C10 #17-4702
.03 MFD. 160V.
- C4 #17-4726
OSC. SER. PAD.
- 75 TUBES
1ST. AND 2ND. A.F.
- C12 #17-4711
.25 MFD. 400V.
- C16 #17-4715
.1 MFD. 600V.
- V #17-4732
VIBRATOR
- C23 #17-4709
.5 MFD. 15V.
- C24 #17-4709
1.0 MFD. 15V.
- X3 #00-4754
"B" FILTER CHOKE

- T4 #00-4313
1ST IF TRANS.
- 82-E-3 #17-4378
LOCAL DISTANCE-TONE-PILOT
- C5 #17-4708
1100M MFD. 600V.
- C4 #17-4725
220 M MFD. PADDER
- C8 #17-2211
500 M MFD. 600V.
- C18A-C18B #17-4707
12-12 MFD. 25V.
- R1 #17-4767
250.A. 1/4 WATT
- 6B7 TUBE
2ND. IF AMP.-DET.
- R9 #17-2080
1 MEG. 1/4 WATT
- R13 #17-2067
70M.A. 1/4 WATT
- T3 #00-4312
2ND. IF TRANS.
- R23 #17-2011
250M.A. 1/4 WATT
- C19 #17-4702
.05 MFD. 160V.
- R11 #17-4202
2 M.A. 1/4 WATT
- R5 #17-2070
3 MEG. 1/4 WATT
- R12 #17-4275
10,000.A. 1/4 WATT
- 76 TUBES
1ST. AND 2ND. A.F.
- C18 #17-4711
.25 MFD. 400V.
- C15 #17-4715
.1 MFD. 600V.
- V #17-4732
VIBRATOR
- R14 #17-4267
200.A. 1/4 WATT
- C23 #17-4709
.5 MFD. 15V.
- C24 #17-4709
1.0 MFD. 15V.
- T7 #00-4747
POWER TRANS.
- X4 #00-4315
FILAMENT CHOKE.

- T1 #00-4310
ANT. COIL
- T2 #00-4311
R.F. COIL
- C15 #17-4714
.15 MFD. 400V.
- T3 #00-4312
OSCILLATOR COIL
- C1-C2-C3 #17-4720
3 GANG VARIABLE
- 6A7 TUBE
MIXER
- X1 #00-4753
AUDIO INPUT CHOKE
- 76 TUBE
RF AMPLIFIER
- C16 #17-4715
.1 MFD. 600V.
- C11 #17-4710
4.0 MFD. 400V.
- TEST TB HERE
- 41 TUBES
POWER AMPLIFIER
- T7 #00-4747
POWER TRANS.
- 84 TUBE
RECTIFIER
- C21A-C21B #17-4719
12-12 MFD. 500V.
- S1 #17-4487
SPEAKER SOCKET



NOBLITT SPARKS INDUSTRIES

MODELS 17, 17A, 27, 37
Alignment, Parts
MODEL 37
Change a

MODELS 17-17A-27-37

MODEL NO. 37

1. R3—100,000 ohm 1/4 watt (17-2068) resistor in 6A7 No. 1 grid circuit has been changed to R29—50,000 ohm 1/4 watt (17-2060).

2. R24—1,000 ohm 1/4 watt resistor has been inserted in 6A7 No. 1 grid circuit.

3. R2—400 ohm 1/4 watt resistor has been changed to R26—600 ohm 1/4 watt. Allowable variation on R2 was from 200 to 600 ohms. Allowable variation on R26 is from 500 to 700 ohms.

4. X5 suppression choke, 00-4782, has been added in "A" line.

1. Remove front cover, connect oscillator to grid cap of 6A7 tube. Set to 175 K. C. (Set volume control full on for all adjustments.) Adjust output of oscillator until output meter begins to read.

2. With a screwdriver adjust the 2nd. I. F. trimmer for maximum output.

3. Adjust 1st. I. F. trimmers (inside screw and outer box nut also) for maximum output.

4. Connect oscillator to antenna lead; set to 1400 K. C.

5. Turn variable condenser fully out of mesh; set dial pointer to 1620 K. C. Then turn control knob until pointer is at 140.

6. Adjust oscillator trimmer until signal is received. Then adjust R. F. and antenna trimmers for maximum output.

7. Set sensitivity control in "full sensitivity position." Set dial to 600 K. C. Adjust series padder for maximum hiss. (Circuit noise.)

8. Connect set to car aerial and tune in a very weak station 120 to 150 on dial. Adjust antenna trimmer only.

5. C6—.002 mfd mica condenser has been inserted ahead of X5 suppression choke and connected from battery side of X5 to ground.

6. Dial light, part No. 17-2145 (with screw base), has been changed to dial light, part No. 17-4857 (with bayonet base).

7. Battery cable assembly, 00-4200-2. Part number changed to 00-4776.

8. It was found in the field that in some instances motor noise entered the receiver where the local-distance plug and tone control plug were attached. A change in the mechanical design which eliminated this difficulty was made beginning with those sets from which the louvers were omitted.

SPECIAL NOTE:

All 1935 Arvin Car Radios may be balanced for a maximum of 1720 kilocycles to cover some of the police bands in that region. The following procedure is necessary:

1. Rotate condenser fully out of mesh. Connect oscillator to antenna lead and set to 1720 K. C.

2. Adjust oscillator trimmer until maximum signal is obtained.

3. Set oscillator input to 1400 K. C. and turn dial until signal is tuned in.

4. Adjust R. F. and antenna trimmer for maximum output.

For remainder of balancing procedure follow instructions exactly as directed for standard adjustment in 7 and 8. With adjustment for 1720 K. C. maximum, the dial will not read accurately for all frequencies above 1000 kilocycles.

MISCELLANEOUS

PART NO.	DESCRIPTION	PRICE
17-4294	Spark Plug Suppressor	.50
17-4295	Distributor Suppressor	.50
17-4701	Generator Condenser	.50
00-4748	Diode Light Filter	.10
00-4829	Ground Clamps	.10
17-4722	Val Light, 6.3 Volts	.18
17-4723	Volume Control (in carton)	1.90
17-4286	8" Speaker Cone Assembly (in carton)	1.20
17-4232	Speaker Assembly (17)	4.50
17-4233	Speaker Assembly (27)	5.50
17-4234	Speaker Assembly (37)	8.50
17-4237	Speaker Assembly (17A)	4.50
23-4490	Stud and Nut (Set Mounting)	.10
12-5658	Stud and Nut (Speaker Mounting) Model 37	.15
23-4057	Carton—17 or 27	.60
23-4245	Carton—37	.95
20-4664	78 Socket	.15
23-4665	6A7 Socket	.15
17-2043	6B7 Socket	.15
17-2048	75 Socket	.15
17-2049	41 Socket	.15
17-2044	84 Socket	.15
17-2045	16 Socket	.15
17-2047	16 Socket	.15
17-4784	Volume Control	.16
17-4806	Volume Control	.16
10-4810	Flange, for screw, per dozen	.10
10-4811	Flange, for screw, per dozen	.10
10-4814	No. 8 1/2 Self Tapping Screw, Hex Head, Per dozen	.10
10-4844	No. 8x5/16 Self Tapping Screw, Binding Head, Per dozen	.10
23-4860	Worm Gear Drive Assembly	1.00

REMOTE CONTROL PARTS

23-4679	Remote Control (17A) Without Bracket or Housing	2.75
23-4678	Remote Control (17) Without Bracket or Housing	2.75
23-4648	Remote Control (37) Without Bracket or Housing	2.75
23-4651	Remote Control (27) Without Bracket or Housing	2.75
23-4652	Streamline Housing (27—37)	.80
23-4653	Streamline Housing (Model 17 only)	.25
23-4654	Size Bolt and Nut	.08
23-4655	Tuning Knob—Walnut Bakelite	.10
23-4656	Tuning Knob—Ivory	.10
23-4657	Local Distance or Tone Control Knob	.10
23-4658	Dial Glass	.15
23-4659	Steering Column Bracket	.15
23-4656	Porcelain Taupe Tente Tuning Knob (17A)	.10

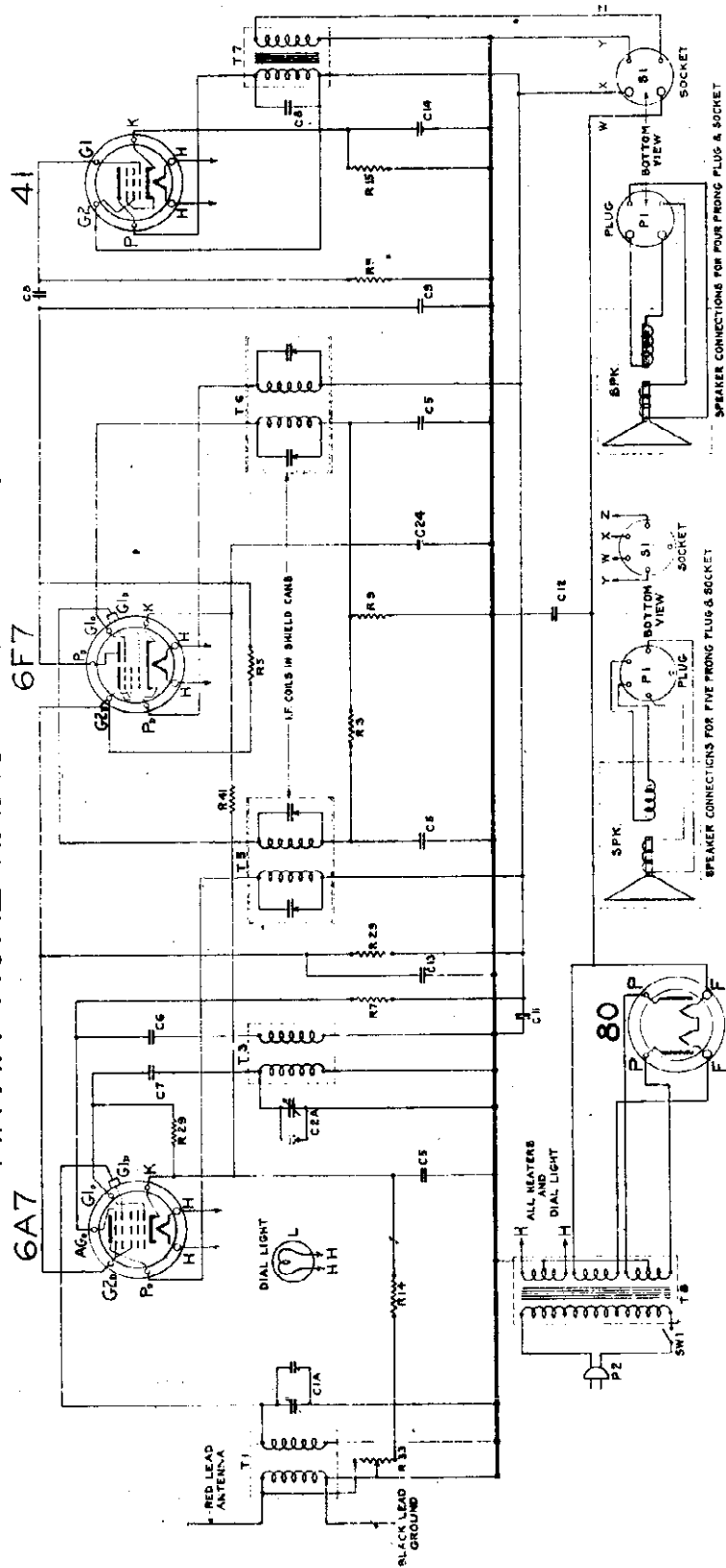
FLEXIBLE SHAFTS

00-4641	Condenser Drive 6" length	.45
00-4642	Condenser Drive 9" length	.60
00-4643	Condenser Drive 12" length	.60
00-4644	Condenser Drive 15" length	.70
00-4645	Condenser Drive 18" length	.85
00-4646	Condenser Drive 21" length	.95
00-4647	Condenser Drive 24" length	1.00
00-4648	Condenser Drive 30" length	1.20
00-4649	Condenser Drive 36" length	1.40
00-4651	Volume Control Drive 6" length	.45
00-4652	Volume Control Drive 9" length	.60
00-4653	Volume Control Drive 12" length	.60
00-4654	Volume Control Drive 15" length	.70
00-4655	Volume Control Drive 18" length	.85
00-4656	Volume Control Drive 21" length	.95
00-4657	Volume Control Drive 24" length	1.00
00-4658	Volume Control Drive 30" length	1.20
00-4659	Volume Control Drive 36" length	1.40

MODEL 41
Schematic, Parts

NOBLITT SPARKS INDUSTRIES

SCHEMATIC CIRCUIT DIAGRAM
ARVIN HOME RADIO ~ MODEL 41



RESISTORS		CONDENSERS		CHOKES & TRANSFORMERS		MISCELLANEOUS UNITS	
R OHMS/W	PART NO/PRICE	C CAPACITY	VOLT PART NO/PRICE	T TYPE	PART NO/PRICE	SYMBOL	DESCRIPTION
1	100 M 1/4 17-2068	21	2 GANG TUNING	1	ANTENNA COIL	SPK	DYNAMIC SPEAKER
2	100 M 1/4 17-2070	22	05 TINY	2	OSCILLATOR	SW 1	VOLUME CONTROL SWITCH (SEE R 33)
3	500 M 1/4 17-2072	23	600 MICA	3	FIRST I.F. COIL	P 1	SPEAKER SOCKET
4	20 M 1/4 17-2072	24	600 MICA	4	SECOND I.F. COIL	L	DIAL LIGHT PLUG (FURNISHED WITH SPK)
5	1 MEG 1/4 17-2080	25	500 MICA	5	OUTPUT TRANSF.	PE	POWER CORD PLUG
6	1 MEG 1/4 17-2080	26	475 ELECT	6	POWER TRANSF.		
7	200 M 1/4 17-4387	27	475 ELECT	7	CHOKES		
8	500 M 1/4 17-4117	28	475 ELECT	8	CHOKES		
9	100 M 1/4 17-4117	29	150 PAPER	9	CHOKES		
10	100 M 1/4 17-4117	30	150 PAPER	10	CHOKES		
11	100 M 1/4 17-4117	31	150 PAPER	11	CHOKES		
12	100 M 1/4 17-4117	32	150 PAPER	12	CHOKES		
13	100 M 1/4 17-4117	33	150 PAPER	13	CHOKES		
14	100 M 1/4 17-4117	34	150 PAPER	14	CHOKES		
15	100 M 1/4 17-4117	35	150 PAPER	15	CHOKES		
16	100 M 1/4 17-4117	36	150 PAPER	16	CHOKES		
17	100 M 1/4 17-4117	37	150 PAPER	17	CHOKES		
18	100 M 1/4 17-4117	38	150 PAPER	18	CHOKES		
19	100 M 1/4 17-4117	39	150 PAPER	19	CHOKES		
20	100 M 1/4 17-4117	40	150 PAPER	20	CHOKES		
I.F. PEAK 456 K.C. BALANCE 1500 K.C.							

NOBLITT SPARKS INDUSTRIES

MODEL 45
Above Serial E403561
Voltage, Resistances

NOTE: The following values are correct for all Arvin Car Radios, Model 35, beginning with and including Serial No. E403561.

MODEL 45 SOCKET VOLTAGES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control
78	6.3	250	60	1.6	2.2	*2.0
77	6.3	250	60	2.2	2.2	*2.2
78	6.3	250	60	1.6	1.6	*1.4
37	6.3	60	—	0	—	*6—1500 KC
75	6.3	135	—	1.3	—	*1.3
75	6.3	135	—	1.3	—	*1.3
41	6.3	245	250	18	—	*18
41	6.3	245	250	18	—	*18
84	6.3	275 (AC)	—	255	—	—

* Measured with vacuum tube voltmeter only.

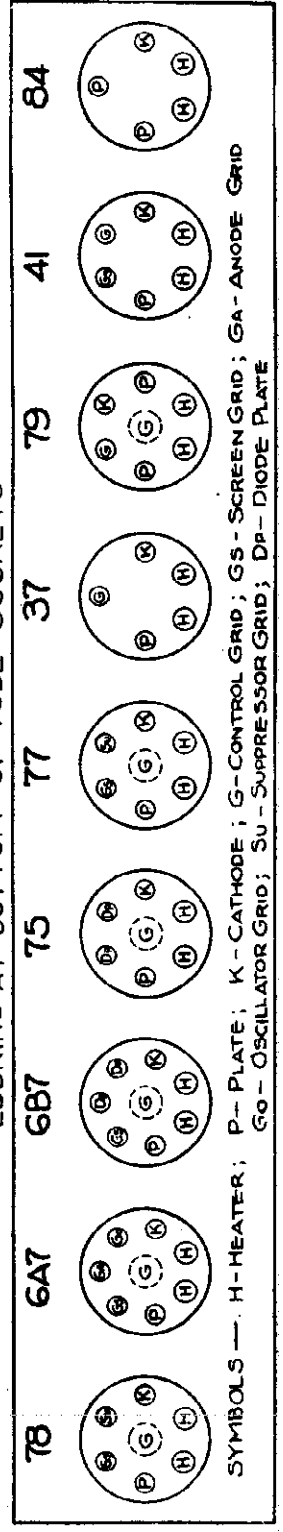
MODEL 45 POINT TO POINT RESISTANCE CHECK

All readings to ground unless otherwise specified. Readings taken with all tubes, vibrator and speaker removed from set and R. F. chassis disconnected from power pack unit.

1st 78	+ Heater	Inf.	3rd 78	+ Heater	Inf.
+ Heater	Inf.	+ Heater	+ Heater	Inf.	37
- Heater	0	- Heater	- Heater	0	+ Heater
Plate to B+	50	Plate to B+	Plate to B+	100	- Heater
Screen Grid to B+	25,000	Screen Grid to B+	Screen Grid to B+	25,000	Plate to B+
Suppressor Grid	500	Suppressor Grid	Suppressor Grid	500	Control Grid
Cathode	500	Cathode	Cathode	500	Cathode
Control Grid	1,600,000	Control Grid	Control Grid	1,500,000	
75	+ Heater	Inf.	75	+ Heater	Inf.
+ Heater	Inf.	+ Heater	+ Heater	Inf.	41
- Heater	0	- Heater	- Heater	0	+ Heater
Plate to B+	250,000	Plate to B+	Plate to B+	250,000	Plate to B+
Screen Grid to B+	500,000	Screen Grid to B+	Screen Grid to B+	500,000	Screen Grid to B+
Diode	500,000	Diode	Diode	530,000	Control Grid
Control Grid	508,000	Control Grid	Control Grid	530,000	Control Grid
Cathode	2500	Cathode	Cathode	2500	Cathode
Control Grid	8000	Control Grid	Control Grid	500,000	
84	+ Heater	Inf.	V. C. on	500,000	
+ Heater	Inf.	V. C. off	V. C. off	250,000	
- Heater	150				
Plate	190				
Plate	160				
Plate to Plate	350				
Cathode	Inf.				

COIL RESISTANCES	
1st I. F. Primary	100
1st I. F. Secondary	100
2nd I. F. Primary	82
2nd I. F. Secondary	82
Primary Output Transformer	600
Voice Coil	35

LOOKING AT BOTTOM OF TUBE SOCKETS

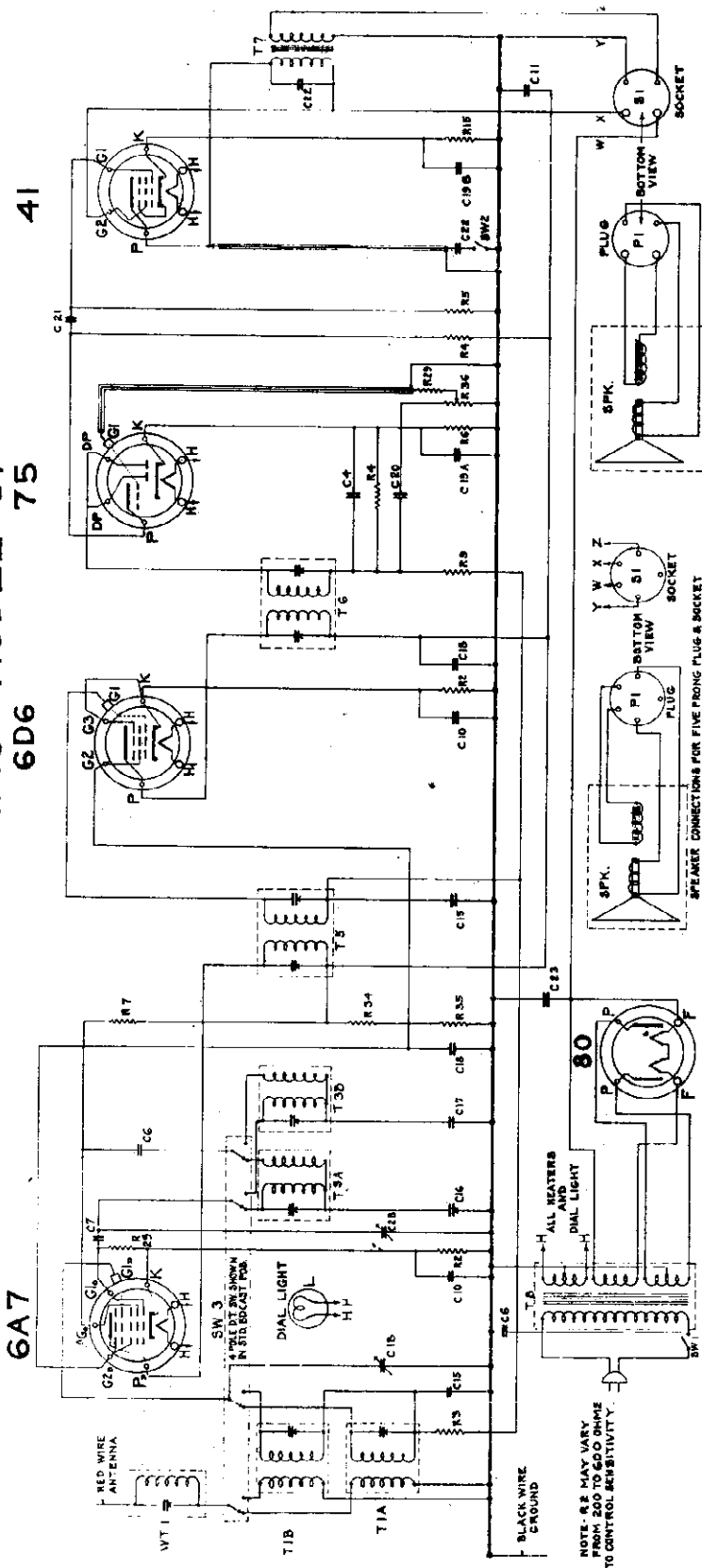


SYMBOLS — H-HEATER; P-PLATE; K-CATHODE; G-CONTROL GRID; GS-SCREEN GRID; GA-ANODE GRID
GO-Oscillator Grid; Su-SUPPRESSOR GRID; DP-Diode Plate

MODEL 51
Schematic, Parts

NOBLITT SPARKS INDUSTRIES

SCHEMATIC CIRCUIT DIAGRAM
ARVIN HOME RADIO ~ MODEL 51
6D6

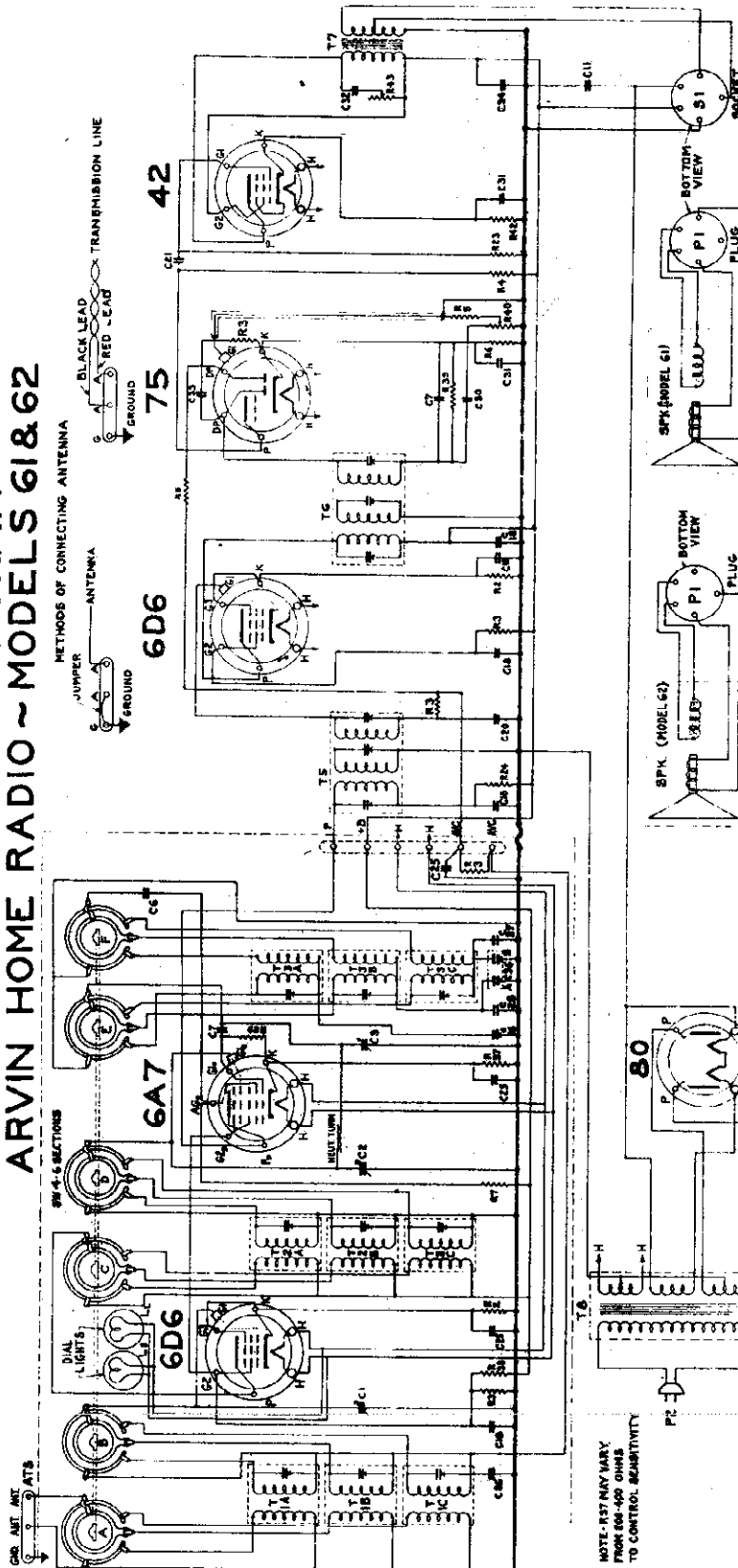


NOTE: 88 MAY VARY FROM 200 TO 500 OHMS TO CONTROL SENSITIVITY.

RESISTORS		CONDENSERS		CHOKES & TRANSFORMERS		MISCELLANEOUS UNITS	
R OHMS	W PART NO PRICE	C CAPACITY	VOLT PART NO PRICE	T TYPE	W PART NO PRICE	SYMBOL	DESCRIPTION
1	400 1/4 17-4762	1B	2 GANG	1	TRANSFORMERS	WT 1	WAVE TRAP
2	100 1/4 17-4032	2B	TUNING	1A	120 BOOST ANT. COIL	SPK	DYNAMIC SPEAKER
3	200 1/4 17-4032	3B	5000 MICA	1B	5 W. ANT. COIL	SW 1	VOLUME CONTROL SWITCH (SEE R34)
4	500 1/4 17-2070	4	500 MICA	2	5 W. ANT. COIL	PI	SPEAKER SOCKET
5	500 1/4 17-2070	5	500 MICA	3A	120 BOOST ANT. COIL	P2	SPEAKER PLUG (FURNISHED WITH SPK)
6	500 1/4 17-2070	6	500 MICA	4	5 W. ANT. COIL	P1	POWER COIL PLUG
7	500 1/4 17-2070	7	500 MICA	5	5 W. ANT. COIL	SW 2	TOPE CONTROL SWITCH
8	500 1/4 17-2070	8	500 MICA	6	5 W. ANT. COIL	SW 3	BAND SWITCH
9	500 1/4 17-2070	9	500 MICA	7	5 W. ANT. COIL		
10	500 1/4 17-2070	10	500 MICA	8	5 W. ANT. COIL		
11	500 1/4 17-2070	11	500 MICA				
12	500 1/4 17-2070	12	500 MICA				
13	500 1/4 17-2070	13	500 MICA				
14	500 1/4 17-2070	14	500 MICA				
15	500 1/4 17-2070	15	500 MICA				
16	500 1/4 17-2070	16	500 MICA				
17	500 1/4 17-2070	17	500 MICA				
18	500 1/4 17-2070	18	500 MICA				
19	500 1/4 17-2070	19	500 MICA				
20	500 1/4 17-2070	20	500 MICA				

NOBLITT SPARKS INDUSTRIES

SCHEMATIC CIRCUIT DIAGRAM
ARVIN HOME RADIO ~ MODELS 61 & 62

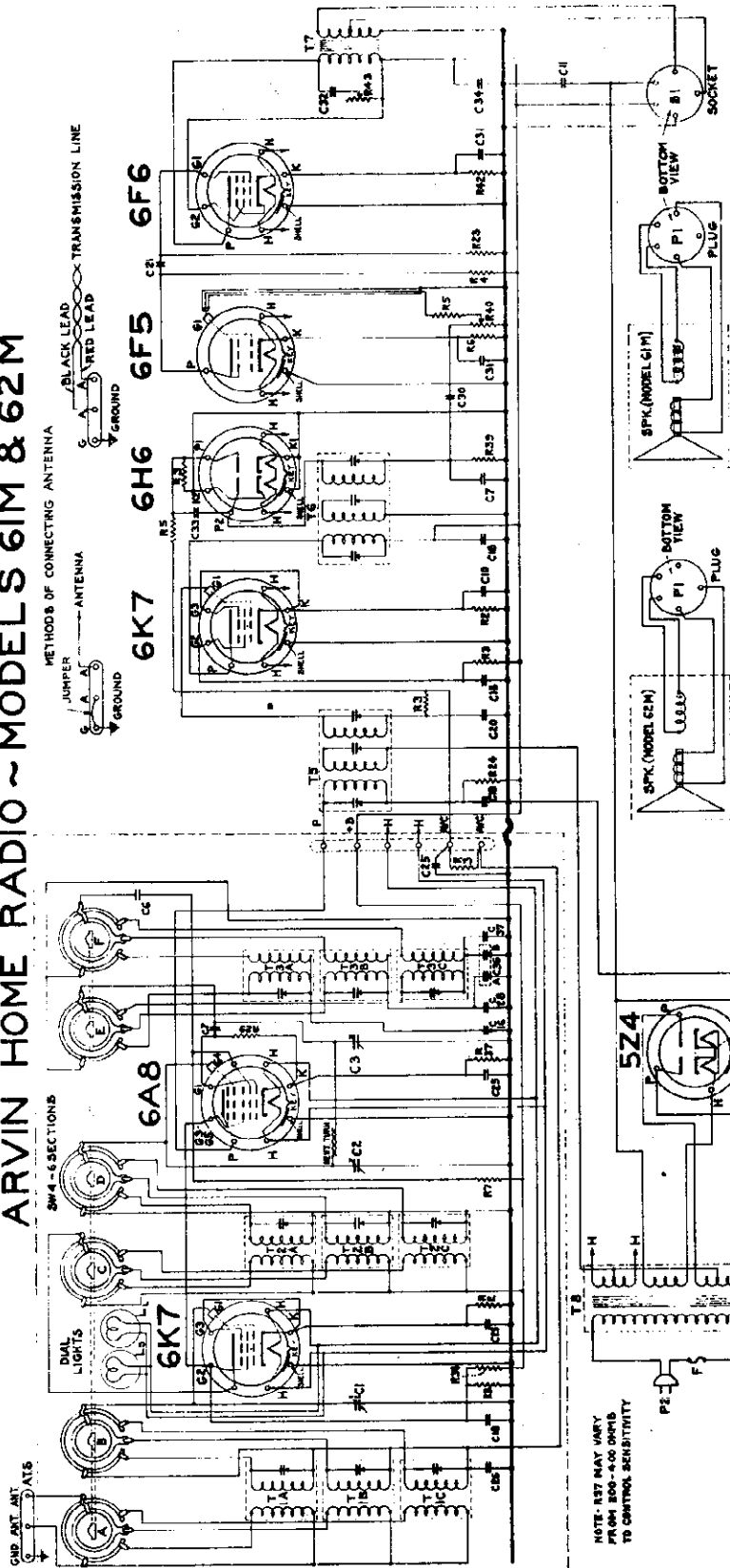


RESISTORS		CONDENSERS		CHOKES & TRANSFORMERS		MISCELLANEOUS UNITS	
PART NO	PRICE	PART NO	PRICE	PART NO	PRICE	PART NO	PRICE
1	400 1/4W 475	1	3 GANG	1	A	1	17-13031
2	100M 1/2W 200	2	5 GANG	2	B	2	17-13031
3	50M 1/2W 200	3	10 GANG	3	C	3	17-13031
4	25M 1/2W 200	4	15 GANG	4	D	4	17-13031
5	10M 1/2W 200	5	20 GANG	5	E	5	17-13031
6	5M 1/2W 200	6	25 GANG	6	F	6	17-13031
7	2.5M 1/2W 200	7	30 GANG	7	G	7	17-13031
8	1.5M 1/2W 200	8	35 GANG	8	H	8	17-13031
9	1.0M 1/2W 200	9	40 GANG	9	I	9	17-13031
10	750K 1/2W 200	10	45 GANG	10	J	10	17-13031
11	500K 1/2W 200	11	50 GANG	11	K	11	17-13031
12	300K 1/2W 200	12	55 GANG	12	L	12	17-13031
13	200K 1/2W 200	13	60 GANG	13	M	13	17-13031
14	150K 1/2W 200	14	65 GANG	14	N	14	17-13031
15	100K 1/2W 200	15	70 GANG	15	O	15	17-13031
16	75K 1/2W 200	16	75 GANG	16	P	16	17-13031
17	50K 1/2W 200	17	80 GANG	17	Q	17	17-13031
18	30K 1/2W 200	18	85 GANG	18	R	18	17-13031
19	20K 1/2W 200	19	90 GANG	19	S	19	17-13031
20	15K 1/2W 200	20	95 GANG	20	T	20	17-13031
21	10K 1/2W 200	21	100 GANG	21	U	21	17-13031
22	7.5K 1/2W 200	22	105 GANG	22	V	22	17-13031
23	5K 1/2W 200	23	110 GANG	23	W	23	17-13031
24	3.5K 1/2W 200	24	115 GANG	24	X	24	17-13031
25	2.5K 1/2W 200	25	120 GANG	25	Y	25	17-13031
26	1.5K 1/2W 200	26	125 GANG	26	Z	26	17-13031
27	1.0K 1/2W 200	27	130 GANG	27	AA	27	17-13031
28	750 1/2W 200	28	135 GANG	28	AB	28	17-13031
29	500 1/2W 200	29	140 GANG	29	AC	29	17-13031
30	300 1/2W 200	30	145 GANG	30	AD	30	17-13031
31	200 1/2W 200	31	150 GANG	31	AE	31	17-13031
32	150 1/2W 200	32	155 GANG	32	AF	32	17-13031
33	100 1/2W 200	33	160 GANG	33	AG	33	17-13031
34	75 1/2W 200	34	165 GANG	34	AH	34	17-13031
35	50 1/2W 200	35	170 GANG	35	AI	35	17-13031
36	30 1/2W 200	36	175 GANG	36	AJ	36	17-13031
37	20 1/2W 200	37	180 GANG	37	AK	37	17-13031
38	15 1/2W 200	38	185 GANG	38	AL	38	17-13031
39	10 1/2W 200	39	190 GANG	39	AM	39	17-13031
40	7.5 1/2W 200	40	195 GANG	40	AN	40	17-13031
41	5 1/2W 200	41	200 GANG	41	AO	41	17-13031
42	3.5 1/2W 200	42	205 GANG	42	AP	42	17-13031
43	2.5 1/2W 200	43	210 GANG	43	AQ	43	17-13031
44	1.5 1/2W 200	44	215 GANG	44	AR	44	17-13031
45	1.0 1/2W 200	45	220 GANG	45	AS	45	17-13031
46	750 1/2W 200	46	225 GANG	46	AT	46	17-13031
47	500 1/2W 200	47	230 GANG	47	AU	47	17-13031
48	300 1/2W 200	48	235 GANG	48	AV	48	17-13031
49	200 1/2W 200	49	240 GANG	49	AW	49	17-13031
50	150 1/2W 200	50	245 GANG	50	AX	50	17-13031
51	100 1/2W 200	51	250 GANG	51	AY	51	17-13031
52	75 1/2W 200	52	255 GANG	52	AZ	52	17-13031
53	50 1/2W 200	53	260 GANG	53	BA	53	17-13031
54	30 1/2W 200	54	265 GANG	54	BB	54	17-13031
55	20 1/2W 200	55	270 GANG	55	BC	55	17-13031
56	15 1/2W 200	56	275 GANG	56	BD	56	17-13031
57	10 1/2W 200	57	280 GANG	57	BE	57	17-13031
58	7.5 1/2W 200	58	285 GANG	58	BF	58	17-13031
59	5 1/2W 200	59	290 GANG	59	BG	59	17-13031
60	3.5 1/2W 200	60	295 GANG	60	BH	60	17-13031
61	2.5 1/2W 200	61	300 GANG	61	BI	61	17-13031
62	1.5 1/2W 200	62	305 GANG	62	BJ	62	17-13031
63	1.0 1/2W 200	63	310 GANG	63	BK	63	17-13031
64	750 1/2W 200	64	315 GANG	64	BL	64	17-13031
65	500 1/2W 200	65	320 GANG	65	BM	65	17-13031
66	300 1/2W 200	66	325 GANG	66	BN	66	17-13031
67	200 1/2W 200	67	330 GANG	67	BO	67	17-13031
68	150 1/2W 200	68	335 GANG	68	BP	68	17-13031
69	100 1/2W 200	69	340 GANG	69	BQ	69	17-13031
70	75 1/2W 200	70	345 GANG	70	BR	70	17-13031
71	50 1/2W 200	71	350 GANG	71	BS	71	17-13031
72	30 1/2W 200	72	355 GANG	72	BT	72	17-13031
73	20 1/2W 200	73	360 GANG	73	BV	73	17-13031
74	15 1/2W 200	74	365 GANG	74	BW	74	17-13031
75	10 1/2W 200	75	370 GANG	75	BX	75	17-13031
76	7.5 1/2W 200	76	375 GANG	76	BY	76	17-13031
77	5 1/2W 200	77	380 GANG	77	BZ	77	17-13031
78	3.5 1/2W 200	78	385 GANG	78	CA	78	17-13031
79	2.5 1/2W 200	79	390 GANG	79	CB	79	17-13031
80	1.5 1/2W 200	80	395 GANG	80	CC	80	17-13031
81	1.0 1/2W 200	81	400 GANG	81	CD	81	17-13031
82	750 1/2W 200	82	405 GANG	82	CE	82	17-13031
83	500 1/2W 200	83	410 GANG	83	CF	83	17-13031
84	300 1/2W 200	84	415 GANG	84	CG	84	17-13031
85	200 1/2W 200	85	420 GANG	85	CH	85	17-13031
86	150 1/2W 200	86	425 GANG	86	CI	86	17-13031
87	100 1/2W 200	87	430 GANG	87	CJ	87	17-13031
88	75 1/2W 200	88	435 GANG	88	CK	88	17-13031
89	50 1/2W 200	89	440 GANG	89	CL	89	17-13031
90	30 1/2W 200	90	445 GANG	90	CM	90	17-13031
91	20 1/2W 200	91	450 GANG	91	CN	91	17-13031
92	15 1/2W 200	92	455 GANG	92	CO	92	17-13031
93	10 1/2W 200	93	460 GANG	93	CP	93	17-13031
94	7.5 1/2W 200	94	465 GANG	94	CQ	94	17-13031
95	5 1/2W 200	95	470 GANG	95	CR	95	17-13031
96	3.5 1/2W 200	96	475 GANG	96	CS	96	17-13031
97	2.5 1/2W 200	97	480 GANG	97	CT	97	17-13031
98	1.5 1/2W 200	98	485 GANG	98	CU	98	17-13031
99	1.0 1/2W 200	99	490 GANG	99	CV	99	17-13031
100	750 1/2W 200	100	495 GANG	100	CW	100	17-13031

MODELS 61M, 62M
Schematic, Parts

NOBLITT SPARKS INDUSTRIES

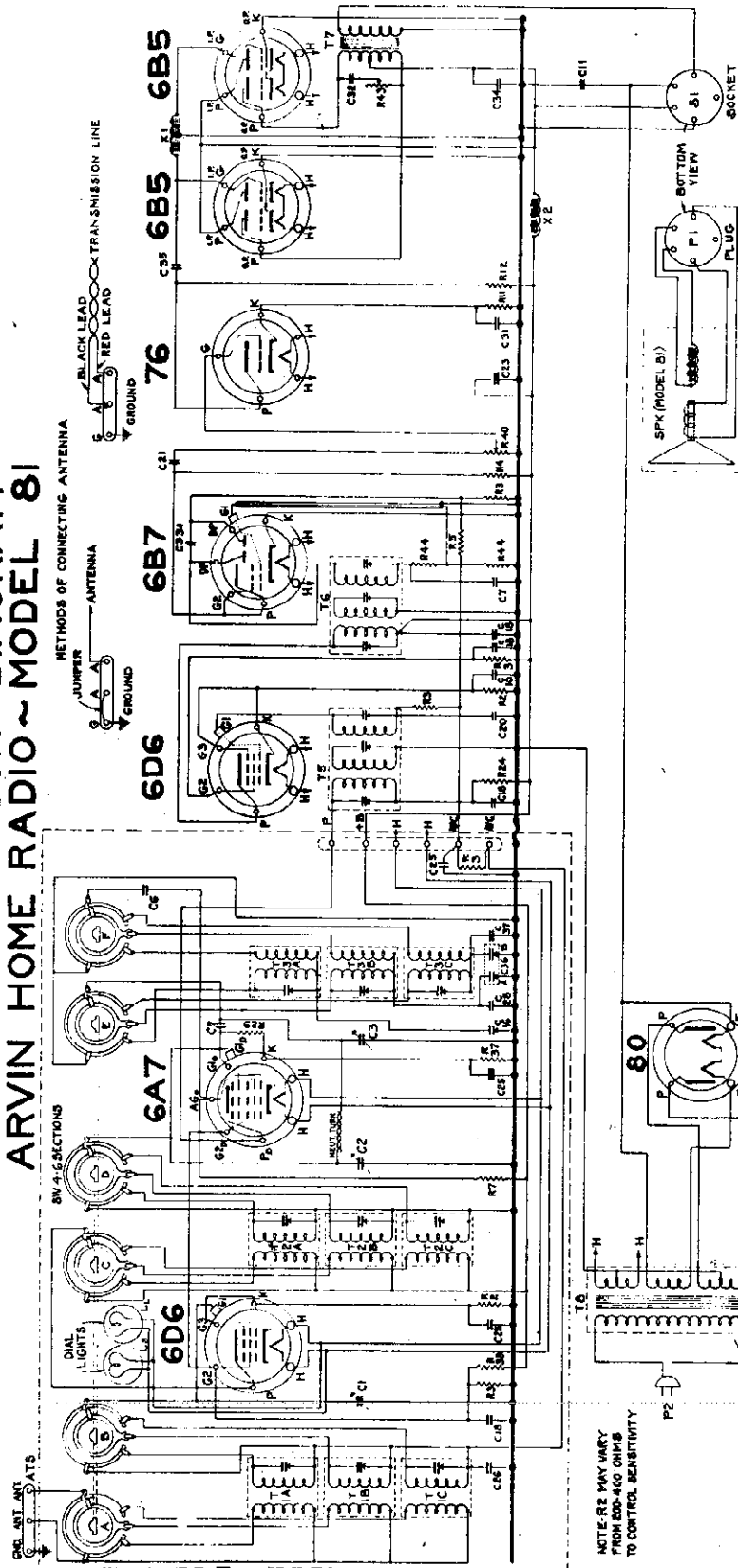
SCHEMATIC CIRCUIT DIAGRAM
ARVIN HOME RADIO ~ MODELS 61M & 62M



RESISTORS		CONDENSERS		CHOKES & TRANSFORMERS		MISCELLANEOUS UNITS		
PART NO.	PRICE	PART NO.	PRICE	PART NO.	PRICE	DESCRIPTION	PART NO.	PRICE
1	400	1	3 BAND TUNING	1	TRANSFORMER	SPK.	17-1313	
2	100M	2	100M MICA	2	1.5-15 M. C. ANT. COIL	SW1	17-1327A	
3	500M	3	500M MICA	3	1.5-15 M. C. ANT. COIL	PI	17-13101	
4	20M	4	20M MICA	4	1.5-15 M. C. RF COIL	PI	17-13101	
5	100M	5	100M MICA	5	1.5-15 M. C. RF COIL	PI	17-13101	
6	500M	6	500M MICA	6	1.5-15 M. C. RF COIL	PI	17-13101	
7	20M	7	20M MICA	7	1.5-15 M. C. RF COIL	PI	17-13101	
8	100M	8	100M MICA	8	1.5-15 M. C. RF COIL	PI	17-13101	
9	500M	9	500M MICA	9	1.5-15 M. C. RF COIL	PI	17-13101	
10	20M	10	20M MICA	10	1.5-15 M. C. RF COIL	PI	17-13101	
11	100M	11	100M MICA	11	1.5-15 M. C. RF COIL	PI	17-13101	
12	500M	12	500M MICA	12	1.5-15 M. C. RF COIL	PI	17-13101	
13	20M	13	20M MICA	13	1.5-15 M. C. RF COIL	PI	17-13101	
14	100M	14	100M MICA	14	1.5-15 M. C. RF COIL	PI	17-13101	
15	500M	15	500M MICA	15	1.5-15 M. C. RF COIL	PI	17-13101	
16	20M	16	20M MICA	16	1.5-15 M. C. RF COIL	PI	17-13101	
17	100M	17	100M MICA	17	1.5-15 M. C. RF COIL	PI	17-13101	
18	500M	18	500M MICA	18	1.5-15 M. C. RF COIL	PI	17-13101	
19	20M	19	20M MICA	19	1.5-15 M. C. RF COIL	PI	17-13101	
20	100M	20	100M MICA	20	1.5-15 M. C. RF COIL	PI	17-13101	
21	500M	21	500M MICA	21	1.5-15 M. C. RF COIL	PI	17-13101	
22	20M	22	20M MICA	22	1.5-15 M. C. RF COIL	PI	17-13101	
23	100M	23	100M MICA	23	1.5-15 M. C. RF COIL	PI	17-13101	
24	500M	24	500M MICA	24	1.5-15 M. C. RF COIL	PI	17-13101	
25	20M	25	20M MICA	25	1.5-15 M. C. RF COIL	PI	17-13101	
26	100M	26	100M MICA	26	1.5-15 M. C. RF COIL	PI	17-13101	
27	500M	27	500M MICA	27	1.5-15 M. C. RF COIL	PI	17-13101	
28	20M	28	20M MICA	28	1.5-15 M. C. RF COIL	PI	17-13101	
29	100M	29	100M MICA	29	1.5-15 M. C. RF COIL	PI	17-13101	
30	500M	30	500M MICA	30	1.5-15 M. C. RF COIL	PI	17-13101	
31	20M	31	20M MICA	31	1.5-15 M. C. RF COIL	PI	17-13101	
32	100M	32	100M MICA	32	1.5-15 M. C. RF COIL	PI	17-13101	
33	500M	33	500M MICA	33	1.5-15 M. C. RF COIL	PI	17-13101	
34	20M	34	20M MICA	34	1.5-15 M. C. RF COIL	PI	17-13101	
35	100M	35	100M MICA	35	1.5-15 M. C. RF COIL	PI	17-13101	
36	500M	36	500M MICA	36	1.5-15 M. C. RF COIL	PI	17-13101	
37	20M	37	20M MICA	37	1.5-15 M. C. RF COIL	PI	17-13101	
38	100M	38	100M MICA	38	1.5-15 M. C. RF COIL	PI	17-13101	
39	500M	39	500M MICA	39	1.5-15 M. C. RF COIL	PI	17-13101	
40	20M	40	20M MICA	40	1.5-15 M. C. RF COIL	PI	17-13101	
41	100M	41	100M MICA	41	1.5-15 M. C. RF COIL	PI	17-13101	
42	500M	42	500M MICA	42	1.5-15 M. C. RF COIL	PI	17-13101	
43	20M	43	20M MICA	43	1.5-15 M. C. RF COIL	PI	17-13101	
44	100M	44	100M MICA	44	1.5-15 M. C. RF COIL	PI	17-13101	
45	500M	45	500M MICA	45	1.5-15 M. C. RF COIL	PI	17-13101	
46	20M	46	20M MICA	46	1.5-15 M. C. RF COIL	PI	17-13101	
47	100M	47	100M MICA	47	1.5-15 M. C. RF COIL	PI	17-13101	
48	500M	48	500M MICA	48	1.5-15 M. C. RF COIL	PI	17-13101	
49	20M	49	20M MICA	49	1.5-15 M. C. RF COIL	PI	17-13101	
50	100M	50	100M MICA	50	1.5-15 M. C. RF COIL	PI	17-13101	
51	500M	51	500M MICA	51	1.5-15 M. C. RF COIL	PI	17-13101	
52	20M	52	20M MICA	52	1.5-15 M. C. RF COIL	PI	17-13101	
53	100M	53	100M MICA	53	1.5-15 M. C. RF COIL	PI	17-13101	
54	500M	54	500M MICA	54	1.5-15 M. C. RF COIL	PI	17-13101	
55	20M	55	20M MICA	55	1.5-15 M. C. RF COIL	PI	17-13101	
56	100M	56	100M MICA	56	1.5-15 M. C. RF COIL	PI	17-13101	
57	500M	57	500M MICA	57	1.5-15 M. C. RF COIL	PI	17-13101	
58	20M	58	20M MICA	58	1.5-15 M. C. RF COIL	PI	17-13101	
59	100M	59	100M MICA	59	1.5-15 M. C. RF COIL	PI	17-13101	
60	500M	60	500M MICA	60	1.5-15 M. C. RF COIL	PI	17-13101	
61	20M	61	20M MICA	61	1.5-15 M. C. RF COIL	PI	17-13101	
62	100M	62	100M MICA	62	1.5-15 M. C. RF COIL	PI	17-13101	
63	500M	63	500M MICA	63	1.5-15 M. C. RF COIL	PI	17-13101	
64	20M	64	20M MICA	64	1.5-15 M. C. RF COIL	PI	17-13101	
65	100M	65	100M MICA	65	1.5-15 M. C. RF COIL	PI	17-13101	
66	500M	66	500M MICA	66	1.5-15 M. C. RF COIL	PI	17-13101	
67	20M	67	20M MICA	67	1.5-15 M. C. RF COIL	PI	17-13101	
68	100M	68	100M MICA	68	1.5-15 M. C. RF COIL	PI	17-13101	
69	500M	69	500M MICA	69	1.5-15 M. C. RF COIL	PI	17-13101	
70	20M	70	20M MICA	70	1.5-15 M. C. RF COIL	PI	17-13101	
71	100M	71	100M MICA	71	1.5-15 M. C. RF COIL	PI	17-13101	
72	500M	72	500M MICA	72	1.5-15 M. C. RF COIL	PI	17-13101	
73	20M	73	20M MICA	73	1.5-15 M. C. RF COIL	PI	17-13101	
74	100M	74	100M MICA	74	1.5-15 M. C. RF COIL	PI	17-13101	
75	500M	75	500M MICA	75	1.5-15 M. C. RF COIL	PI	17-13101	
76	20M	76	20M MICA	76	1.5-15 M. C. RF COIL	PI	17-13101	
77	100M	77	100M MICA	77	1.5-15 M. C. RF COIL	PI	17-13101	
78	500M	78	500M MICA	78	1.5-15 M. C. RF COIL	PI	17-13101	
79	20M	79	20M MICA	79	1.5-15 M. C. RF COIL	PI	17-13101	
80	100M	80	100M MICA	80	1.5-15 M. C. RF COIL	PI	17-13101	
81	500M	81	500M MICA	81	1.5-15 M. C. RF COIL	PI	17-13101	
82	20M	82	20M MICA	82	1.5-15 M. C. RF COIL	PI	17-13101	
83	100M	83	100M MICA	83	1.5-15 M. C. RF COIL	PI	17-13101	
84	500M	84	500M MICA	84	1.5-15 M. C. RF COIL	PI	17-13101	
85	20M	85	20M MICA	85	1.5-15 M. C. RF COIL	PI	17-13101	
86	100M	86	100M MICA	86	1.5-15 M. C. RF COIL	PI	17-13101	
87	500M	87	500M MICA	87	1.5-15 M. C. RF COIL	PI	17-13101	
88	20M	88	20M MICA	88	1.5-15 M. C. RF COIL	PI	17-13101	
89	100M	89	100M MICA	89	1.5-15 M. C. RF COIL	PI	17-13101	
90	500M	90	500M MICA	90	1.5-15 M. C. RF COIL	PI	17-13101	
91	20M	91	20M MICA	91	1.5-15 M. C. RF COIL	PI	17-13101	
92	100M	92	100M MICA	92	1.5-15 M. C. RF COIL	PI	17-13101	
93	500M	93	500M MICA	93	1.5-15 M. C. RF COIL	PI	17-13101	
94	20M	94	20M MICA	94	1.5-15 M. C. RF COIL	PI	17-13101	
95	100M	95	100M MICA	95	1.5-15 M. C. RF COIL	PI	17-13101	
96	500M	96	500M MICA	96	1.5-15 M. C. RF COIL	PI	17-13101	
97	20M	97	20M MICA	97	1.5-15 M. C. RF COIL	PI	17-13101	
98	100M	98	100M MICA	98	1.5-15 M. C. RF COIL	PI	17-13101	
99	500M	99	500M MICA	99	1.5-15 M. C. RF COIL	PI	17-13101	
100	20M	100	20M MICA	100	1.5-15 M. C. RF COIL	PI	17-13101	

NOBLITT SPARKS INDUSTRIES

SCHEMATIC CIRCUIT DIAGRAM
ARVIN HOME RADIO ~ MODEL 81

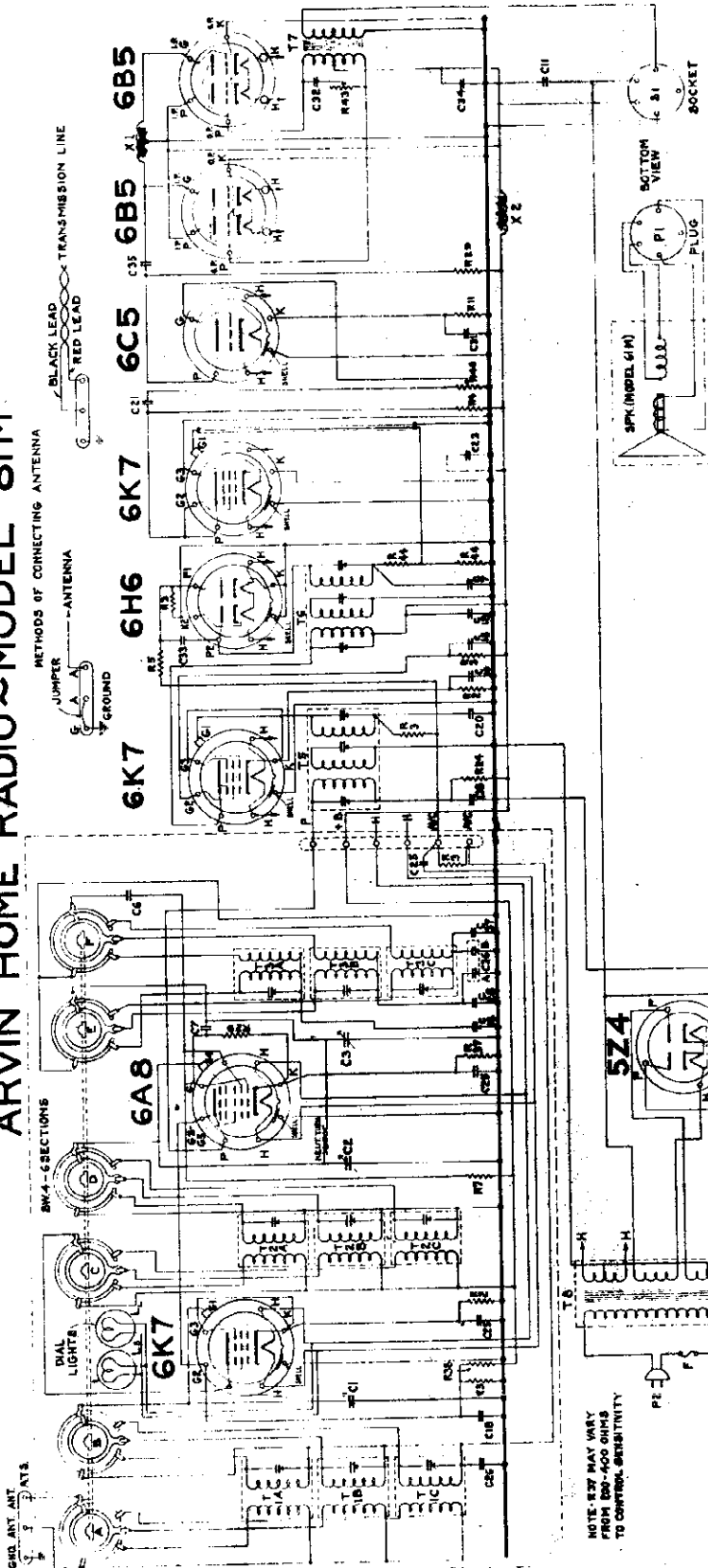


RESISTORS		CONDENSERS		CHOKES & TRANSFORMERS		MISCELLANEOUS UNITS	
R (OHMS) W. PART NO.	R (OHMS) W. PART NO.	C (CAPACITY) W. PART NO.	C (CAPACITY) W. PART NO.	T (TYPE)	SPK.	SW.	SYNCH. CONTROL & POWER SWITCH (METERS)
1 400 1/2 W. 17-4762	24 100 1/2 W. 17-2065	1 3 GANG TUNING 17-13000	24 100 1/2 W. 17-2065	1 100 1/2 W. 17-14000	1 100 1/2 W. 17-14000	1 100 1/2 W. 17-14000	1 100 1/2 W. 17-13064
2 100 1/2 W. 17-2065	25 100 1/2 W. 17-2065	2 100 1/2 W. 17-2065	25 100 1/2 W. 17-2065	2 100 1/2 W. 17-14000	2 100 1/2 W. 17-14000	2 100 1/2 W. 17-14000	2 100 1/2 W. 17-13101
3 100 1/2 W. 17-2065	26 100 1/2 W. 17-2065	3 100 1/2 W. 17-2065	26 100 1/2 W. 17-2065	3 100 1/2 W. 17-14000	3 100 1/2 W. 17-14000	3 100 1/2 W. 17-14000	3 100 1/2 W. 17-14153
4 100 1/2 W. 17-2065	27 100 1/2 W. 17-2065	4 100 1/2 W. 17-2065	27 100 1/2 W. 17-2065	4 100 1/2 W. 17-14000	4 100 1/2 W. 17-14000	4 100 1/2 W. 17-14000	4 100 1/2 W. 17-14153
5 100 1/2 W. 17-2065	28 100 1/2 W. 17-2065	5 100 1/2 W. 17-2065	28 100 1/2 W. 17-2065	5 100 1/2 W. 17-14000	5 100 1/2 W. 17-14000	5 100 1/2 W. 17-14000	5 100 1/2 W. 17-14153
6 100 1/2 W. 17-2065	29 100 1/2 W. 17-2065	6 100 1/2 W. 17-2065	29 100 1/2 W. 17-2065	6 100 1/2 W. 17-14000	6 100 1/2 W. 17-14000	6 100 1/2 W. 17-14000	6 100 1/2 W. 17-14153
7 100 1/2 W. 17-2065	30 100 1/2 W. 17-2065	7 100 1/2 W. 17-2065	30 100 1/2 W. 17-2065	7 100 1/2 W. 17-14000	7 100 1/2 W. 17-14000	7 100 1/2 W. 17-14000	7 100 1/2 W. 17-14153
8 100 1/2 W. 17-2065	31 100 1/2 W. 17-2065	8 100 1/2 W. 17-2065	31 100 1/2 W. 17-2065	8 100 1/2 W. 17-14000	8 100 1/2 W. 17-14000	8 100 1/2 W. 17-14000	8 100 1/2 W. 17-14153
9 100 1/2 W. 17-2065	32 100 1/2 W. 17-2065	9 100 1/2 W. 17-2065	32 100 1/2 W. 17-2065	9 100 1/2 W. 17-14000	9 100 1/2 W. 17-14000	9 100 1/2 W. 17-14000	9 100 1/2 W. 17-14153
10 100 1/2 W. 17-2065	33 100 1/2 W. 17-2065	10 100 1/2 W. 17-2065	33 100 1/2 W. 17-2065	10 100 1/2 W. 17-14000	10 100 1/2 W. 17-14000	10 100 1/2 W. 17-14000	10 100 1/2 W. 17-14153
11 100 1/2 W. 17-2065	34 100 1/2 W. 17-2065	11 100 1/2 W. 17-2065	34 100 1/2 W. 17-2065	11 100 1/2 W. 17-14000	11 100 1/2 W. 17-14000	11 100 1/2 W. 17-14000	11 100 1/2 W. 17-14153
12 100 1/2 W. 17-2065	35 100 1/2 W. 17-2065	12 100 1/2 W. 17-2065	35 100 1/2 W. 17-2065	12 100 1/2 W. 17-14000	12 100 1/2 W. 17-14000	12 100 1/2 W. 17-14000	12 100 1/2 W. 17-14153
13 100 1/2 W. 17-2065	36 100 1/2 W. 17-2065	13 100 1/2 W. 17-2065	36 100 1/2 W. 17-2065	13 100 1/2 W. 17-14000	13 100 1/2 W. 17-14000	13 100 1/2 W. 17-14000	13 100 1/2 W. 17-14153
14 100 1/2 W. 17-2065	37 100 1/2 W. 17-2065	14 100 1/2 W. 17-2065	37 100 1/2 W. 17-2065	14 100 1/2 W. 17-14000	14 100 1/2 W. 17-14000	14 100 1/2 W. 17-14000	14 100 1/2 W. 17-14153
15 100 1/2 W. 17-2065	38 100 1/2 W. 17-2065	15 100 1/2 W. 17-2065	38 100 1/2 W. 17-2065	15 100 1/2 W. 17-14000	15 100 1/2 W. 17-14000	15 100 1/2 W. 17-14000	15 100 1/2 W. 17-14153
16 100 1/2 W. 17-2065	39 100 1/2 W. 17-2065	16 100 1/2 W. 17-2065	39 100 1/2 W. 17-2065	16 100 1/2 W. 17-14000	16 100 1/2 W. 17-14000	16 100 1/2 W. 17-14000	16 100 1/2 W. 17-14153
17 100 1/2 W. 17-2065	40 100 1/2 W. 17-2065	17 100 1/2 W. 17-2065	40 100 1/2 W. 17-2065	17 100 1/2 W. 17-14000	17 100 1/2 W. 17-14000	17 100 1/2 W. 17-14000	17 100 1/2 W. 17-14153
18 100 1/2 W. 17-2065	41 100 1/2 W. 17-2065	18 100 1/2 W. 17-2065	41 100 1/2 W. 17-2065	18 100 1/2 W. 17-14000	18 100 1/2 W. 17-14000	18 100 1/2 W. 17-14000	18 100 1/2 W. 17-14153
19 100 1/2 W. 17-2065	42 100 1/2 W. 17-2065	19 100 1/2 W. 17-2065	42 100 1/2 W. 17-2065	19 100 1/2 W. 17-14000	19 100 1/2 W. 17-14000	19 100 1/2 W. 17-14000	19 100 1/2 W. 17-14153
20 100 1/2 W. 17-2065	43 100 1/2 W. 17-2065	20 100 1/2 W. 17-2065	43 100 1/2 W. 17-2065	20 100 1/2 W. 17-14000	20 100 1/2 W. 17-14000	20 100 1/2 W. 17-14000	20 100 1/2 W. 17-14153
21 100 1/2 W. 17-2065	44 100 1/2 W. 17-2065	21 100 1/2 W. 17-2065	44 100 1/2 W. 17-2065	21 100 1/2 W. 17-14000	21 100 1/2 W. 17-14000	21 100 1/2 W. 17-14000	21 100 1/2 W. 17-14153
22 100 1/2 W. 17-2065	45 100 1/2 W. 17-2065	22 100 1/2 W. 17-2065	45 100 1/2 W. 17-2065	22 100 1/2 W. 17-14000	22 100 1/2 W. 17-14000	22 100 1/2 W. 17-14000	22 100 1/2 W. 17-14153
23 100 1/2 W. 17-2065	46 100 1/2 W. 17-2065	23 100 1/2 W. 17-2065	46 100 1/2 W. 17-2065	23 100 1/2 W. 17-14000	23 100 1/2 W. 17-14000	23 100 1/2 W. 17-14000	23 100 1/2 W. 17-14153

MODEL 81M
Schematic, Parts

NOBLITT SPARKS INDUSTRIES

SCHEMATIC CIRCUIT DIAGRAM
ARVIN HOME RADIO ~ MODEL 81M



RELISTORS		CONDENSERS		CHOKES & TRANSFORMERS		MISCELLANEOUS UNITS	
PT. NO.	PRICE	PT. NO.	PRICE	PT. NO.	PRICE	PT. NO.	PRICE
1	1/4 17-4162	1	3 GANG	1	150 17-1400C	1	17-1366A
2	1/4 17-4162	2	TUNING	2	150 17-1401E	2	17-1366A
3	1/4 17-4162	3	500 MICA	3	150 17-1402	3	17-1366A
4	1/4 17-4162	4	500 MICA	4	150 17-1403	4	17-1366A
5	1/4 17-4162	5	500 MICA	5	150 17-1404	5	17-1366A
6	1/4 17-4162	6	500 MICA	6	150 17-1405	6	17-1366A
7	1/4 17-4162	7	500 MICA	7	150 17-1406	7	17-1366A
8	1/4 17-4162	8	500 MICA	8	150 17-1407	8	17-1366A
9	1/4 17-4162	9	500 MICA	9	150 17-1408	9	17-1366A
10	1/4 17-4162	10	500 MICA	10	150 17-1409	10	17-1366A
11	1/4 17-4162	11	500 MICA	11	150 17-1410	11	17-1366A
12	1/4 17-4162	12	500 MICA	12	150 17-1411	12	17-1366A
13	1/4 17-4162	13	500 MICA	13	150 17-1412	13	17-1366A
14	1/4 17-4162	14	500 MICA	14	150 17-1413	14	17-1366A
15	1/4 17-4162	15	500 MICA	15	150 17-1414	15	17-1366A
16	1/4 17-4162	16	500 MICA	16	150 17-1415	16	17-1366A
17	1/4 17-4162	17	500 MICA	17	150 17-1416	17	17-1366A
18	1/4 17-4162	18	500 MICA	18	150 17-1417	18	17-1366A
19	1/4 17-4162	19	500 MICA	19	150 17-1418	19	17-1366A
20	1/4 17-4162	20	500 MICA	20	150 17-1419	20	17-1366A
21	1/4 17-4162	21	500 MICA	21	150 17-1420	21	17-1366A
22	1/4 17-4162	22	500 MICA	22	150 17-1421	22	17-1366A
23	1/4 17-4162	23	500 MICA	23	150 17-1422	23	17-1366A
24	1/4 17-4162	24	500 MICA	24	150 17-1423	24	17-1366A
25	1/4 17-4162	25	500 MICA	25	150 17-1424	25	17-1366A
26	1/4 17-4162	26	500 MICA	26	150 17-1425	26	17-1366A
27	1/4 17-4162	27	500 MICA	27	150 17-1426	27	17-1366A
28	1/4 17-4162	28	500 MICA	28	150 17-1427	28	17-1366A
29	1/4 17-4162	29	500 MICA	29	150 17-1428	29	17-1366A
30	1/4 17-4162	30	500 MICA	30	150 17-1429	30	17-1366A
31	1/4 17-4162	31	500 MICA	31	150 17-1430	31	17-1366A
32	1/4 17-4162	32	500 MICA	32	150 17-1431	32	17-1366A
33	1/4 17-4162	33	500 MICA	33	150 17-1432	33	17-1366A
34	1/4 17-4162	34	500 MICA	34	150 17-1433	34	17-1366A
35	1/4 17-4162	35	500 MICA	35	150 17-1434	35	17-1366A
36	1/4 17-4162	36	500 MICA	36	150 17-1435	36	17-1366A
37	1/4 17-4162	37	500 MICA	37	150 17-1436	37	17-1366A
38	1/4 17-4162	38	500 MICA	38	150 17-1437	38	17-1366A
39	1/4 17-4162	39	500 MICA	39	150 17-1438	39	17-1366A
40	1/4 17-4162	40	500 MICA	40	150 17-1439	40	17-1366A
41	1/4 17-4162	41	500 MICA	41	150 17-1440	41	17-1366A
42	1/4 17-4162	42	500 MICA	42	150 17-1441	42	17-1366A
43	1/4 17-4162	43	500 MICA	43	150 17-1442	43	17-1366A
44	1/4 17-4162	44	500 MICA	44	150 17-1443	44	17-1366A
45	1/4 17-4162	45	500 MICA	45	150 17-1444	45	17-1366A
46	1/4 17-4162	46	500 MICA	46	150 17-1445	46	17-1366A
47	1/4 17-4162	47	500 MICA	47	150 17-1446	47	17-1366A
48	1/4 17-4162	48	500 MICA	48	150 17-1447	48	17-1366A
49	1/4 17-4162	49	500 MICA	49	150 17-1448	49	17-1366A
50	1/4 17-4162	50	500 MICA	50	150 17-1449	50	17-1366A
51	1/4 17-4162	51	500 MICA	51	150 17-1450	51	17-1366A
52	1/4 17-4162	52	500 MICA	52	150 17-1451	52	17-1366A
53	1/4 17-4162	53	500 MICA	53	150 17-1452	53	17-1366A
54	1/4 17-4162	54	500 MICA	54	150 17-1453	54	17-1366A
55	1/4 17-4162	55	500 MICA	55	150 17-1454	55	17-1366A
56	1/4 17-4162	56	500 MICA	56	150 17-1455	56	17-1366A
57	1/4 17-4162	57	500 MICA	57	150 17-1456	57	17-1366A
58	1/4 17-4162	58	500 MICA	58	150 17-1457	58	17-1366A
59	1/4 17-4162	59	500 MICA	59	150 17-1458	59	17-1366A
60	1/4 17-4162	60	500 MICA	60	150 17-1459	60	17-1366A
61	1/4 17-4162	61	500 MICA	61	150 17-1460	61	17-1366A
62	1/4 17-4162	62	500 MICA	62	150 17-1461	62	17-1366A
63	1/4 17-4162	63	500 MICA	63	150 17-1462	63	17-1366A
64	1/4 17-4162	64	500 MICA	64	150 17-1463	64	17-1366A
65	1/4 17-4162	65	500 MICA	65	150 17-1464	65	17-1366A
66	1/4 17-4162	66	500 MICA	66	150 17-1465	66	17-1366A
67	1/4 17-4162	67	500 MICA	67	150 17-1466	67	17-1366A
68	1/4 17-4162	68	500 MICA	68	150 17-1467	68	17-1366A
69	1/4 17-4162	69	500 MICA	69	150 17-1468	69	17-1366A
70	1/4 17-4162	70	500 MICA	70	150 17-1469	70	17-1366A
71	1/4 17-4162	71	500 MICA	71	150 17-1470	71	17-1366A
72	1/4 17-4162	72	500 MICA	72	150 17-1471	72	17-1366A
73	1/4 17-4162	73	500 MICA	73	150 17-1472	73	17-1366A
74	1/4 17-4162	74	500 MICA	74	150 17-1473	74	17-1366A
75	1/4 17-4162	75	500 MICA	75	150 17-1474	75	17-1366A
76	1/4 17-4162	76	500 MICA	76	150 17-1475	76	17-1366A
77	1/4 17-4162	77	500 MICA	77	150 17-1476	77	17-1366A
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83	1/4 17-4162	83	500 MICA	83	150 17-1482	83	17-1366A
84	1/4 17-4162	84	500 MICA	84	150 17-1483	84	17-1366A
85	1/4 17-4162	85	500 MICA	85	150 17-1484	85	17-1366A
86	1/4 17-4162	86	500 MICA	86	150 17-1485	86	17-1366A
87	1/4 17-4162	87	500 MICA	87	150 17-1486	87	17-1366A
88	1/4 17-4162	88	500 MICA	88	150 17-1487	88	17-1366A
89	1/4 17-4162	89	500 MICA	89	150 17-1488	89	17-1366A
90	1/4 17-4162	90	500 MICA	90	150 17-1489	90	17-1366A
91	1/4 17-4162	91	500 MICA	91	150 17-1490	91	17-1366A
92	1/4 17-4162	92	500 MICA	92	150 17-1491	92	17-1366A
93	1/4 17-4162	93	500 MICA	93	150 17-1492	93	17-1366A
94	1/4 17-4162	94	500 MICA	94	150 17-1493	94	17-1366A
95	1/4 17-4162	95	500 MICA	95	150 17-1494	95	17-1366A
96	1/4 17-4162	96	500 MICA	96	150 17-1495	96	17-1366A
97	1/4 17-4162	97	500 MICA	97	150 17-1496	97	17-1366A
98	1/4 17-4162	98	500 MICA	98	150 17-1497	98	17-1366A
99	1/4 17-4162	99	500 MICA	99	150 17-1498	99	17-1366A
100	1/4 17-4162	100	500 MICA	100	150 17-1499	100	17-1366A

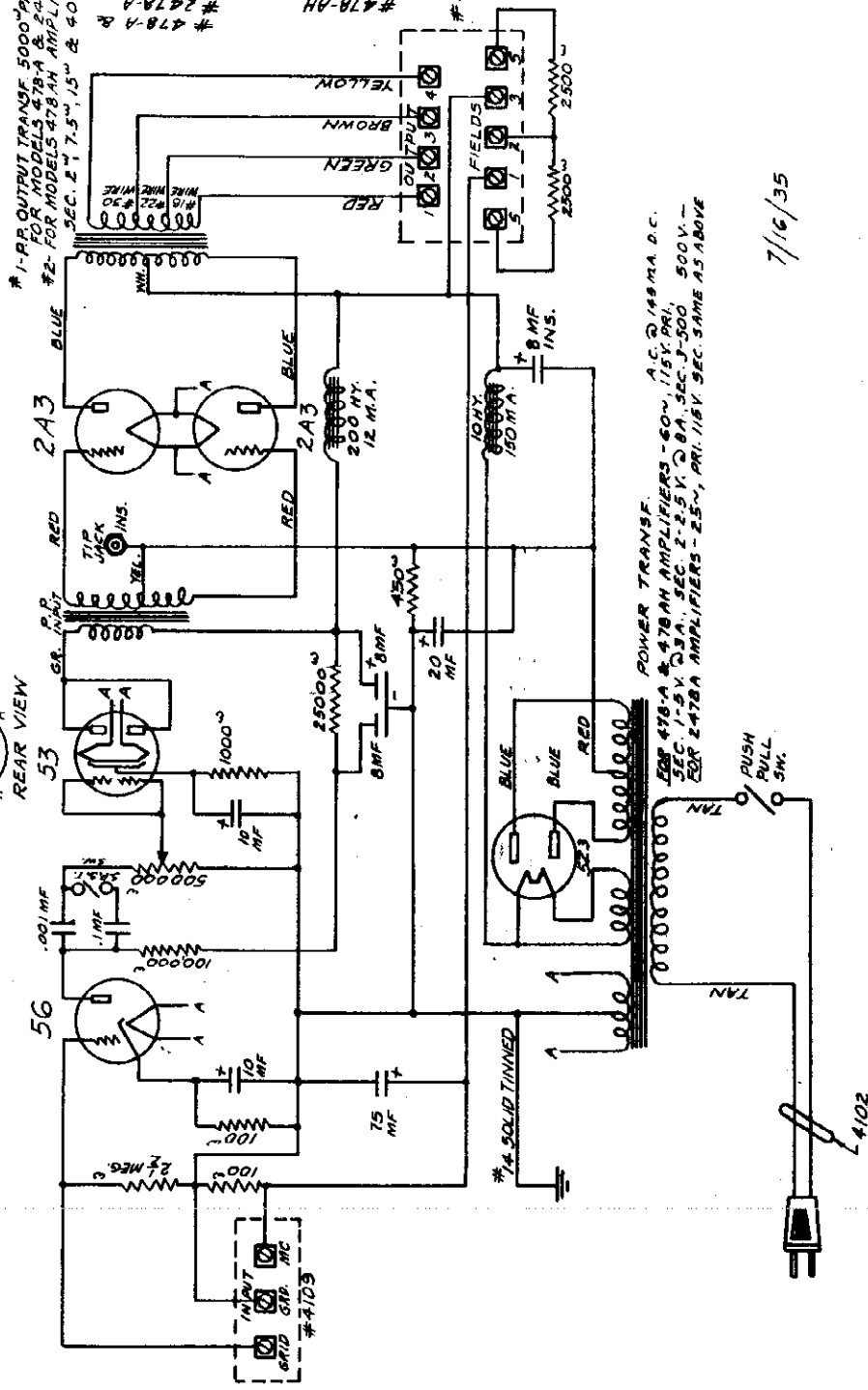
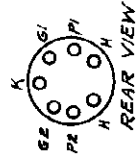
OPERADIO MFG. CO.

#1-PP OUTPUT TRANSF. 5000 P.P.I., SEC. 2 \times 7.5" 1.5" & 500 ω
 FOR MODELS 478-A & 478-AH AMPLIF. C.S.
 #2- FOR MODELS 478-AH AMPLIFIER, 5000 P.P.I. -
 SEC. 2 \times 7.5" 1.5" & 4000 ω

#1 AMPLIFIER	
OUTPUT CONNECTIONS	OHMS
TERMINALS	2
1 & 2	7.5
1 & 3	1.5
1 & 4	500

#2 AMPLIFIER	
OUTPUT CONNECTIONS	OHMS
TERMINALS	2
1 & 2	7.5
1 & 3	1.5
1 & 4	4000

FIELD CONNECTIONS	
TERMINALS	OHMS
1 & 2	2500
2 & 3	2500
STRAP 3	WHEN
1 & 2	ARE NOT USED
STRAP 5 & 3	WHEN
2 & 3	ARE NOT USED

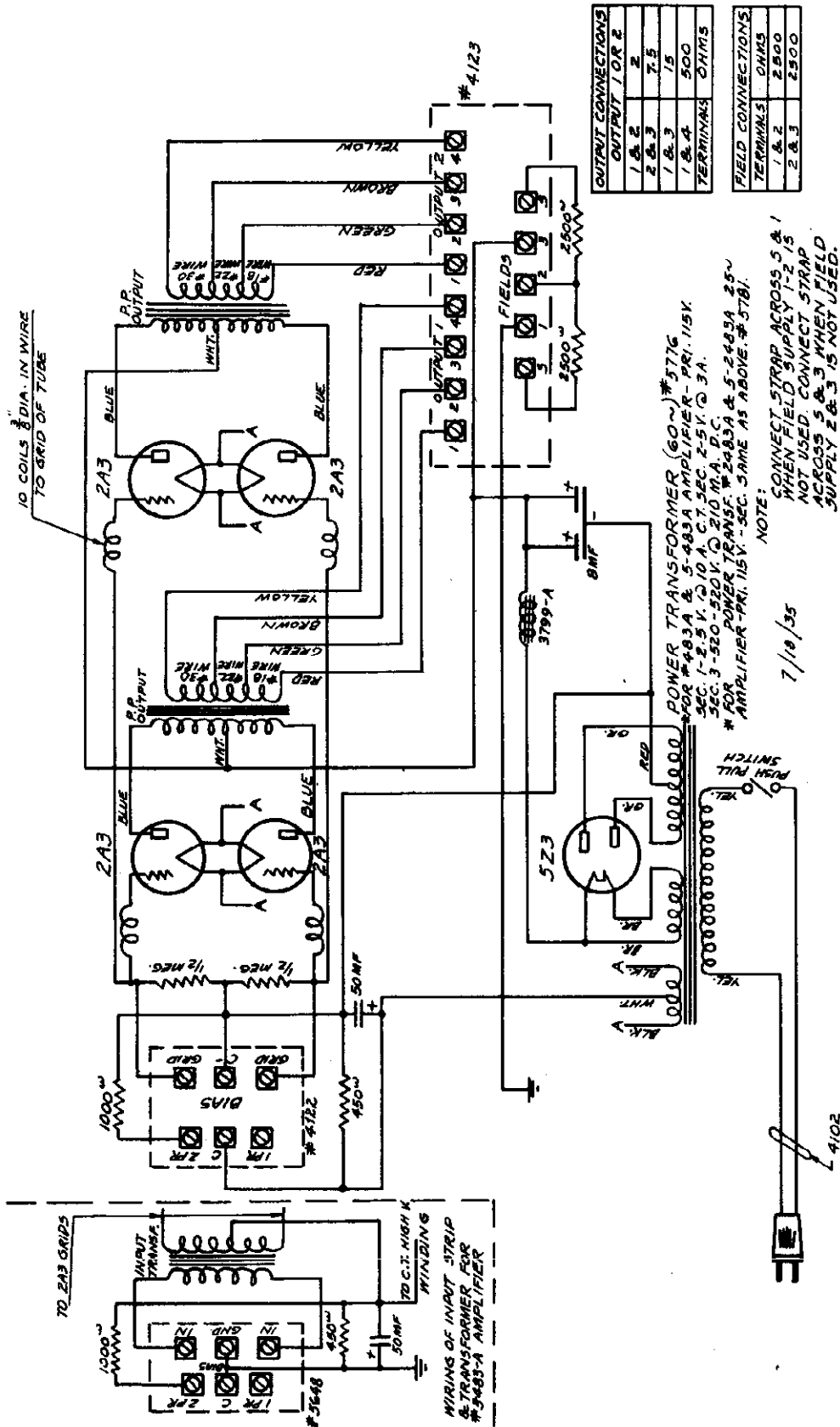


POWER TRANSF. A.C. 0.148 MA. D.C.
 FOR 478-A & 478-AH AMPLIFIERS - 60V. 115V. P.P.I.
 SEC. 1-5 V. 3A. SEC. 2-2.5 V. 0.8A. SEC. 3-500
 FOR 2478-A AMPLIFIERS - 25V. P.P.I. 115V. SEC. SAME AS ABOVE

7/16/35

MODEL 483-A, 2483-A,
5-483-A, 5-2483-A
Schematic

OPERADIO MFG. CO.

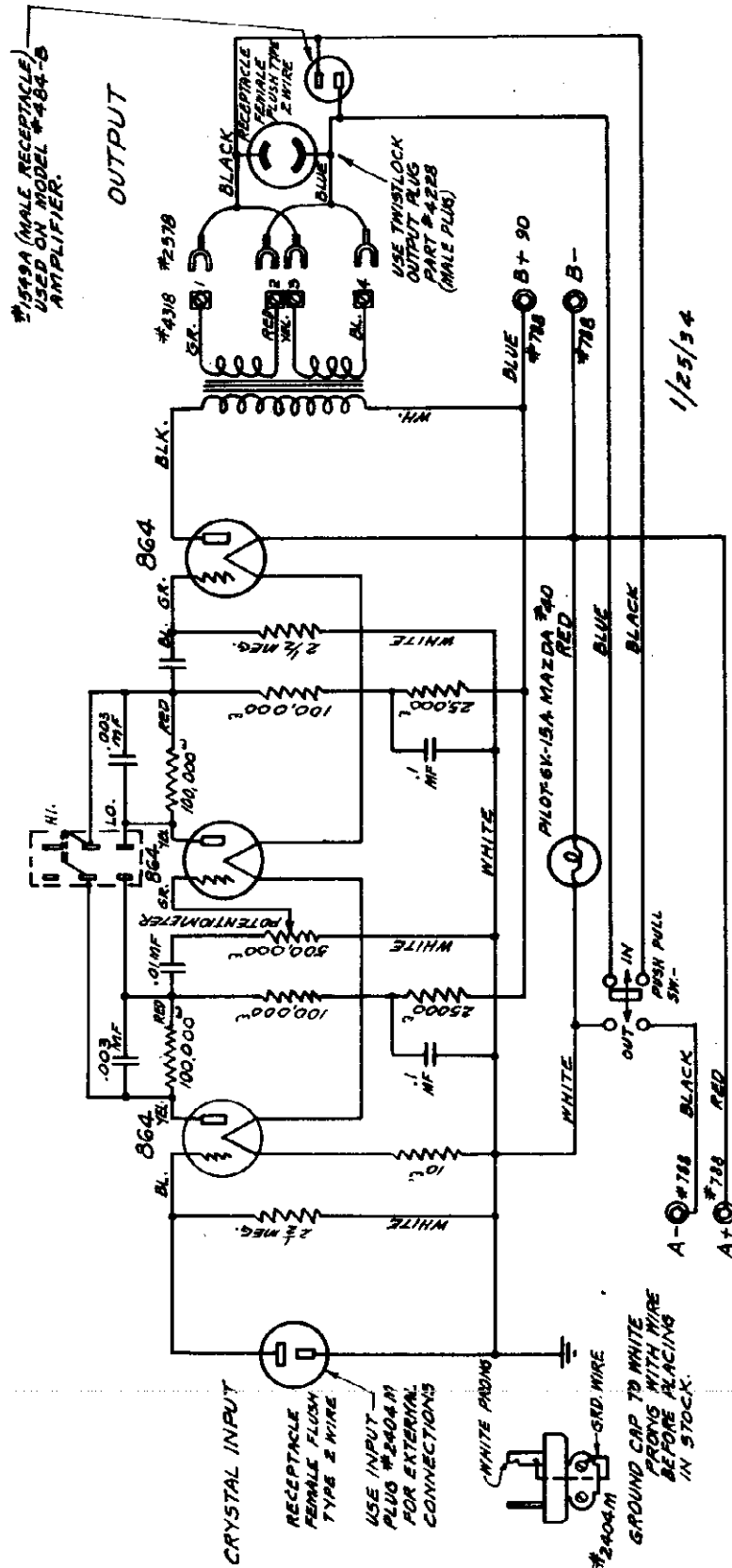


OUTPUT CONNECTIONS	
OUTPUT 1 OR 2	TERMINALS
1 & 2	0HMS
2 & 3	7.5
1 & 3	15
1 & 4	500
TERMINALS 0HMS	

FIELD CONNECTIONS	
TERMINALS	OHMS
1 & 2	2500
2 & 3	2500

OPERADIO MFG. CO.

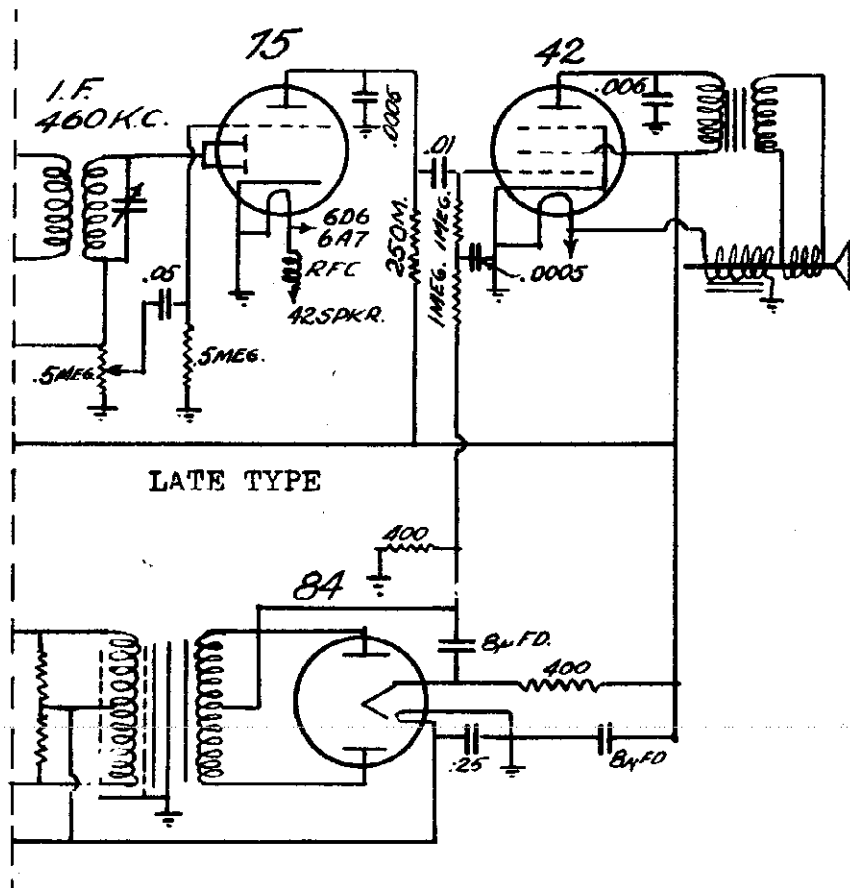
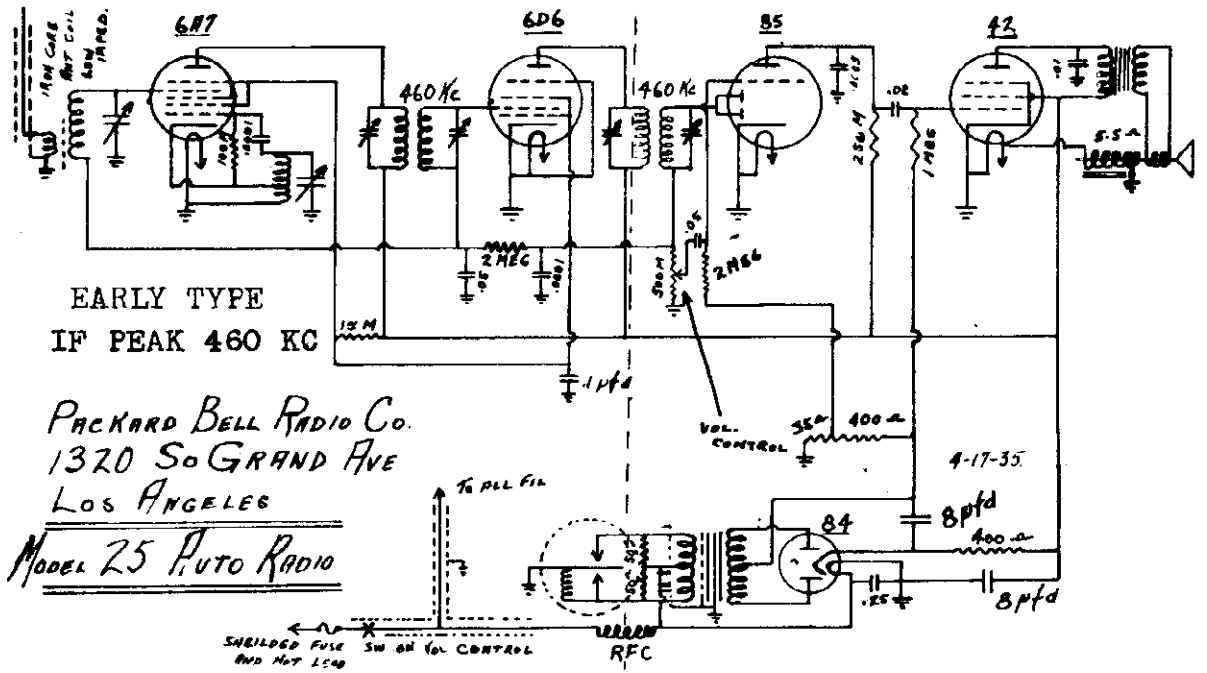
MODELS 484, 484-A
484-B
Schematic



CONNECT BLACK WIRES TO TERMS. 1 & 3 } 50 OHM
 BLUE } OUTPUT
 CONNECT BOTH BLACK WIRES TO TERM. 1 } FOR
 BLUE } 200 OHM
 " } JUMPER WIRE TO " 2 & 3 } OUTPUT

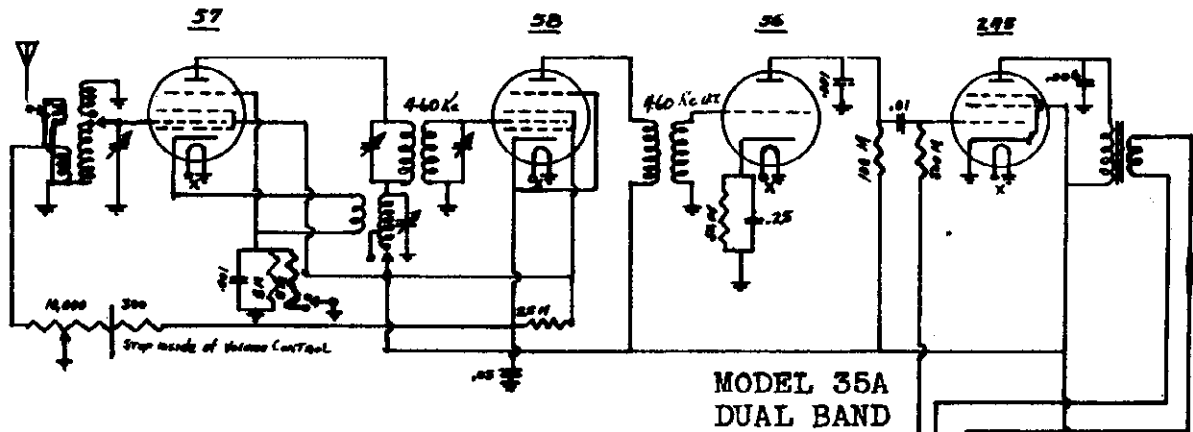
PACKARD-BELL CO.

MODEL 25
Early, Lat
Schematic

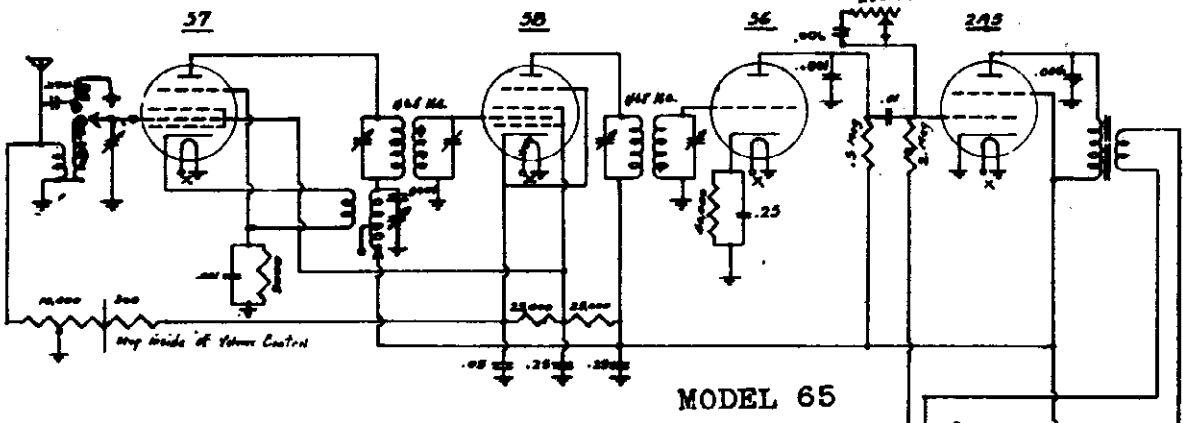
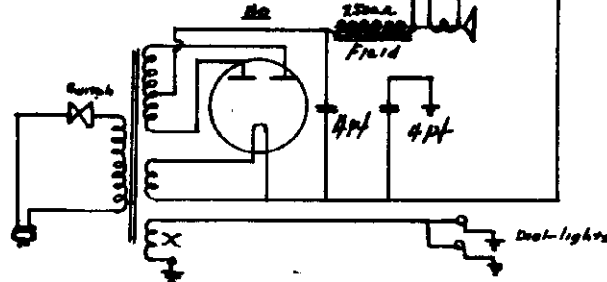


MODEL 35A
MODEL 65
Schematics

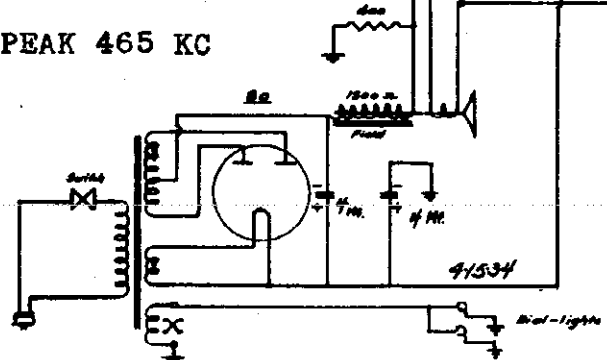
PACKARD-BELL CO.



MODEL 35A
DUAL BAND
IF PEAK 460 KC

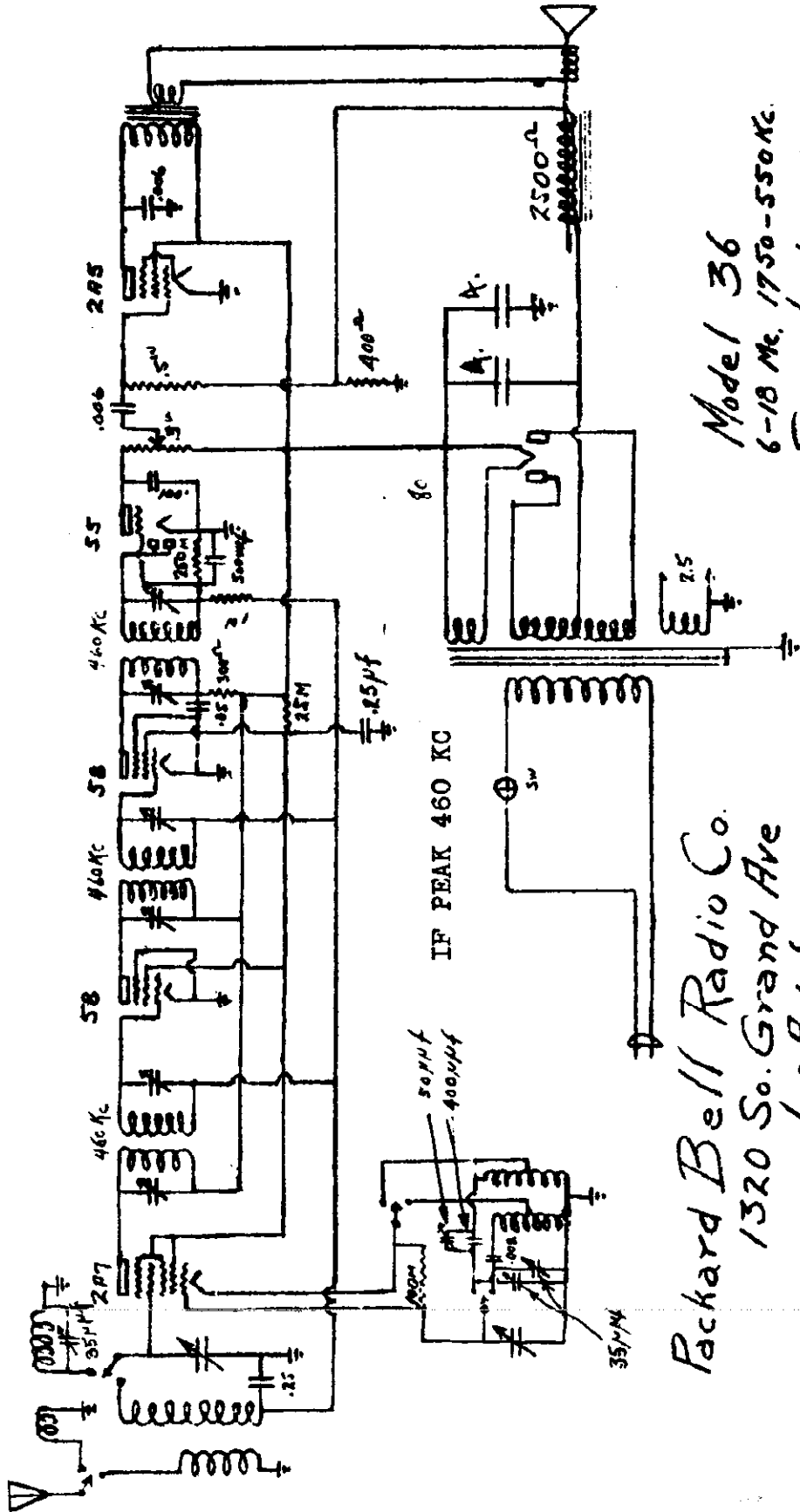


MODEL 65
IF PEAK 465 KC



PACKARD-BELL CO.

MODEL 36
Schematic

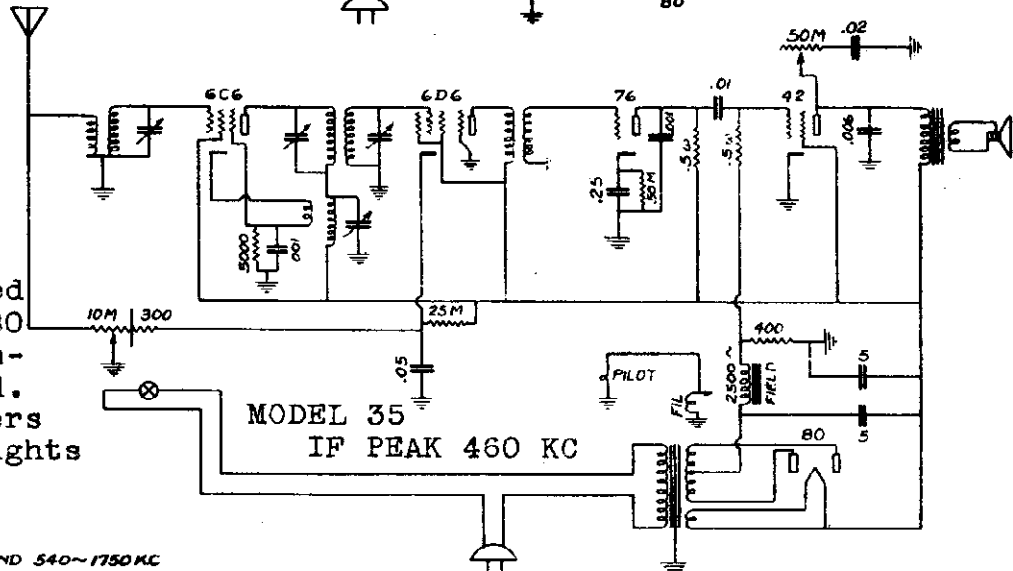
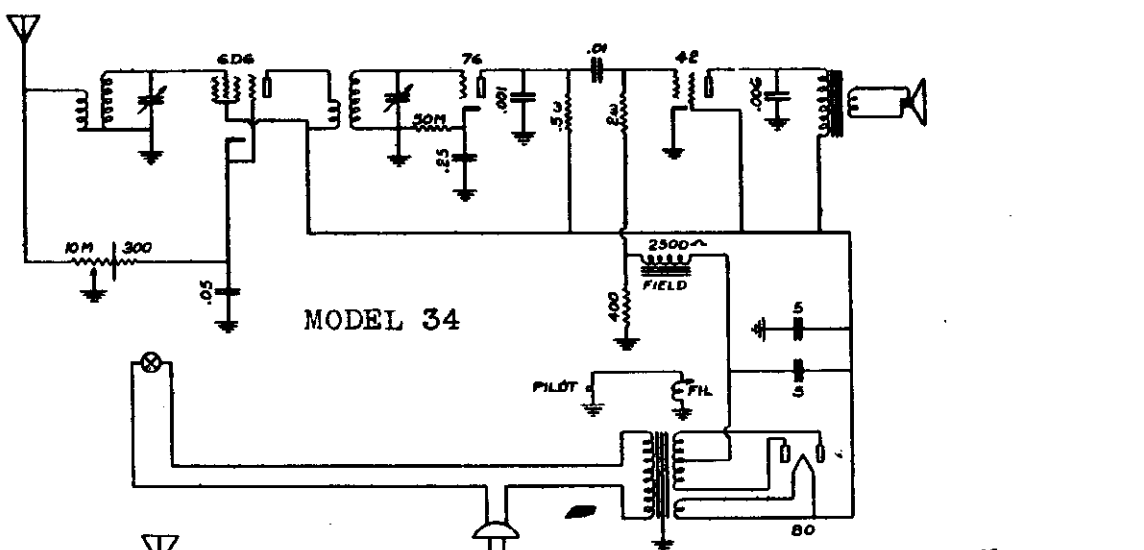


*Model 36
6-18 Mc. 1750-550 Kc.
Superheterodyne*

*Packard Bell Radio Co.
1320 So. Grand Ave
Los Angeles.*

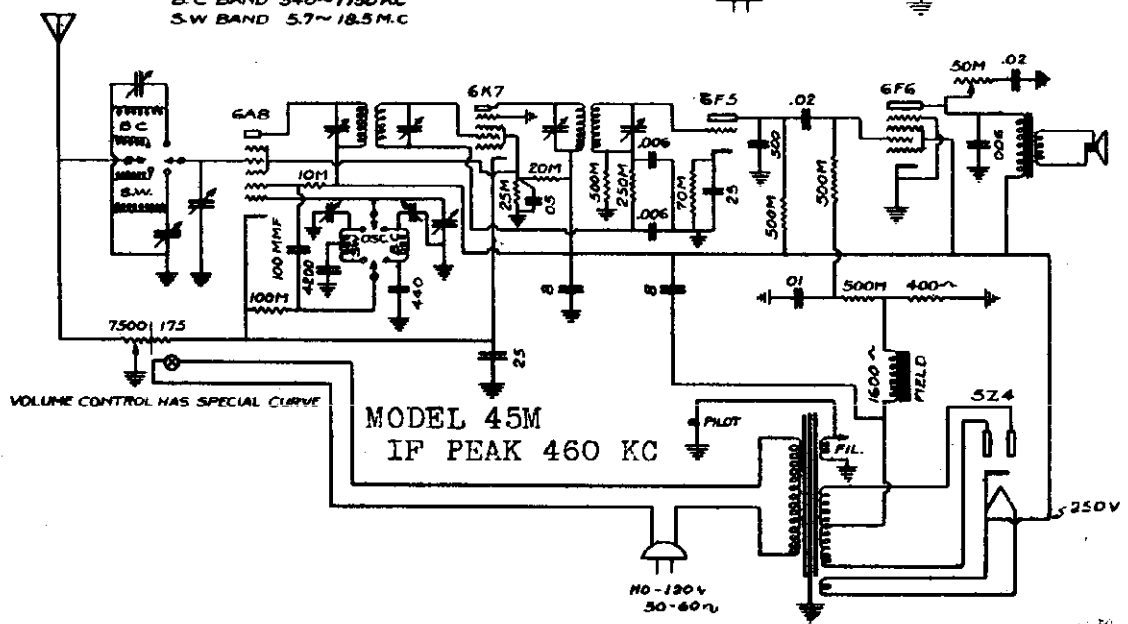
PACKARD-BELL CO.

MODEL 34
 MODEL 35
 MODEL 45M
 Schematics



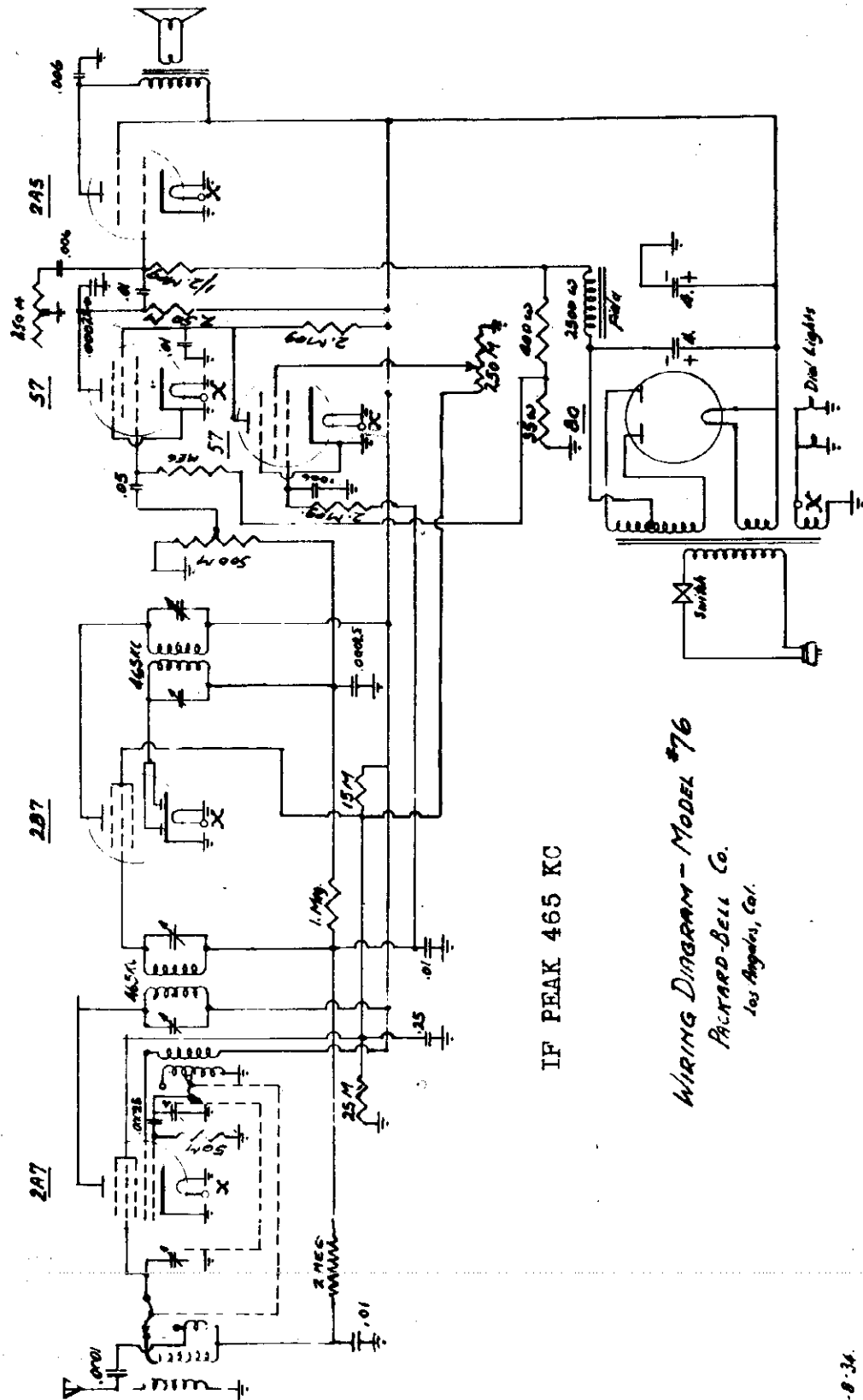
Early model used 57, 58, 56, 2A5, 80 Had no tone control. Used 4mfd. filter condensers and two dial lights

B. C BAND 540~1750 KC
 S.W BAND 5.7~18.5 M.C



VOLUME CONTROL HAS SPECIAL CURVE

PACKARD-BELL CO.



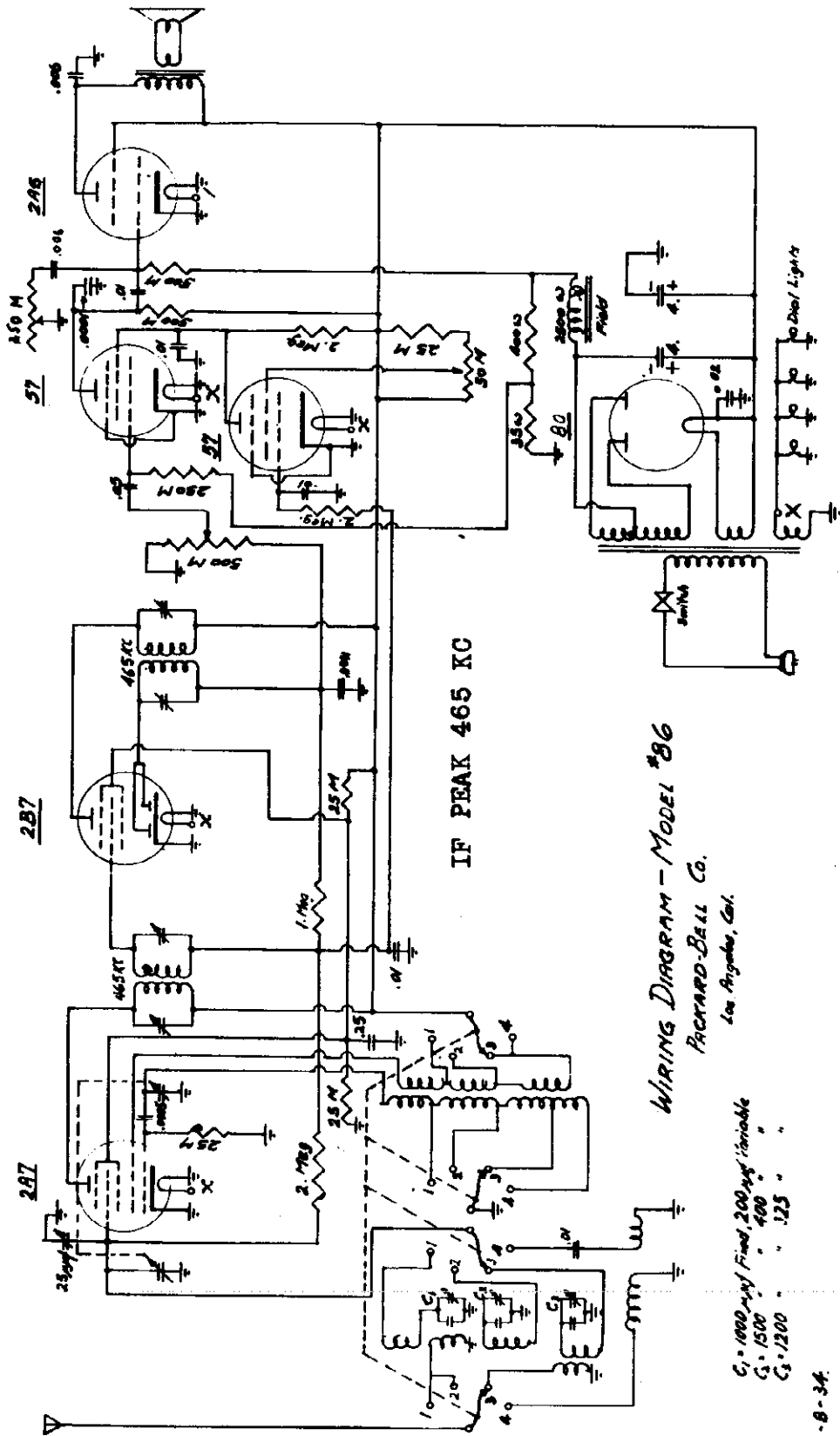
IF PEAK 465 KC

WIRING DIAGRAM - MODEL #76
PACKARD-BELL Co.
Los Angeles, Cal.

6-8-34

MODEL 86
Schematic

PACKARD-BELL CO.

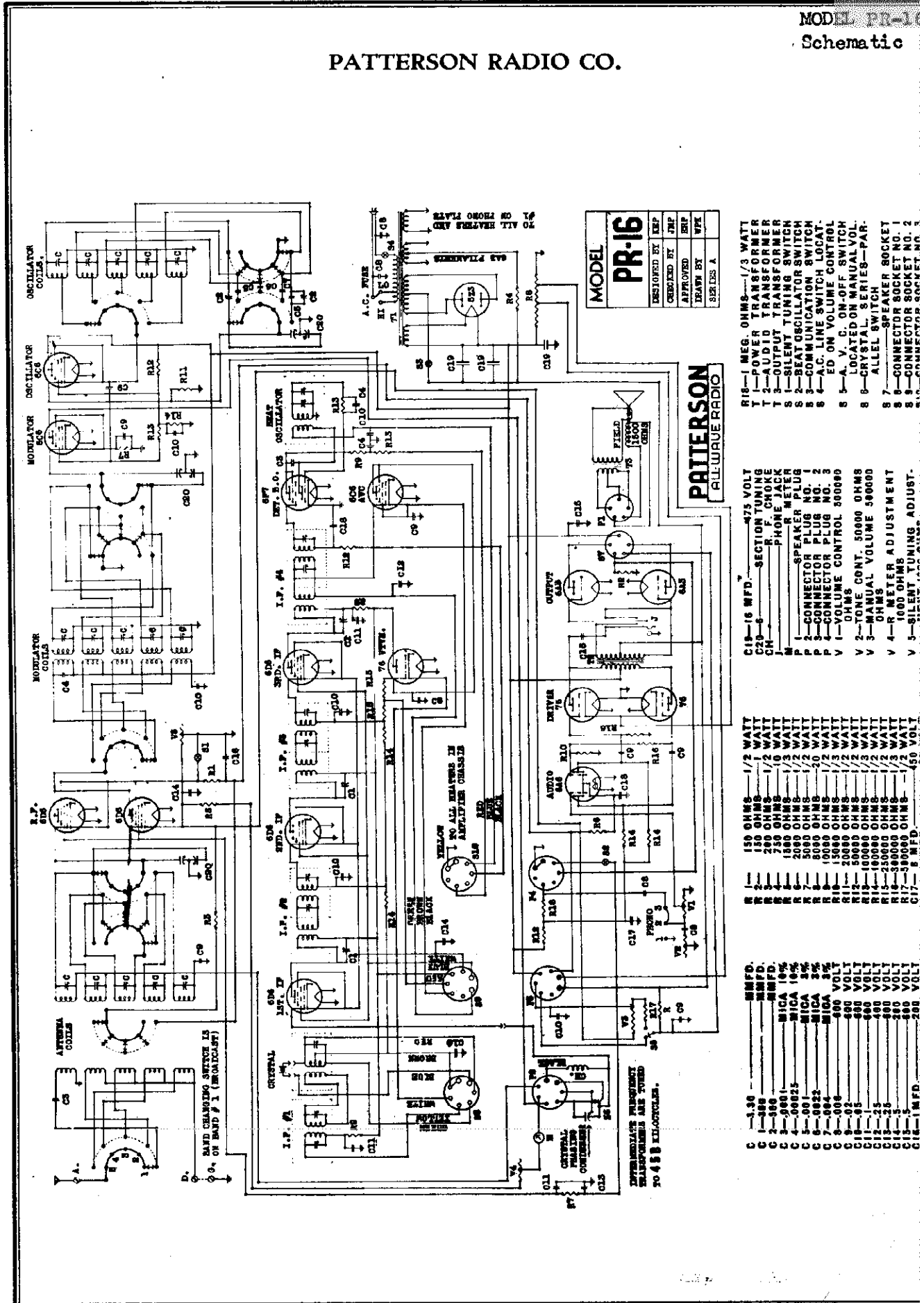


WIRING DIAGRAM - MODEL #86
 PACKARD-BELL CO.
 Los Angeles, Cal.

- C₁ - 1000 μF Fixed, 200 VDC variable
- C₂ - 1500 " " " " "
- C₃ - 1200 " " " " "

6-8-34

PATTERSON RADIO CO.



MODEL PR-16
 DESIGNED BY JEP
 CREATED BY JWP
 APPROVED SEP
 DRAWN BY WPK
 SERIES A

PATTERSON
 ALL-WAVE RADIO

- R18-1 MEG. OHMS-1/3 WATT
- T1-POWER TRANSFORMER
- T2-AUDIO TRANSFORMER
- T3-OUTPUT TRANSFORMER
- S1-SILENT TUNING SWITCH
- S2-SEAT OSCILLATOR SWITCH
- S3-COMMUNICATION SWITCH
- S4-A.C. LINE SWITCH
- S5-A. V. C. ON-OFF SWITCH
- S6-LOCATED ON MANUAL VOL.
- S7-CRYSTAL SWITCH-PAR-
- S8-ALLEN SWITCH
- S9-SPEAKER SOCKET
- S10-CONNECTOR SOCKET NO. 1
- S11-CONNECTOR SOCKET NO. 2
- S12-CONNECTOR SOCKET NO. 3

- C19-16 MF.
- C20-4
- C21-6
- C22-6
- C23-6
- C24-6
- C25-6
- C26-6
- C27-6
- C28-6
- C29-6
- C30-6
- C31-6
- C32-6
- C33-6
- C34-6
- C35-6
- C36-6
- C37-6
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- C99-6
- C100-6

- R1-150 OHMS
- R2-150 OHMS
- R3-150 OHMS
- R4-150 OHMS
- R5-150 OHMS
- R6-150 OHMS
- R7-150 OHMS
- R8-150 OHMS
- R9-150 OHMS
- R10-150 OHMS
- R11-150 OHMS
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- R14-150 OHMS
- R15-150 OHMS
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- R94-150 OHMS
- R95-150 OHMS
- R96-150 OHMS
- R97-150 OHMS
- R98-150 OHMS
- R99-150 OHMS
- R100-150 OHMS

- C1-1.30 MF.
- C2-1.30 MF.
- C3-1.30 MF.
- C4-1.30 MF.
- C5-1.30 MF.
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- C97-1.30 MF.
- C98-1.30 MF.
- C99-1.30 MF.
- C100-1.30 MF.

MODELS 186AW, 286AW, 386AW
 MODELS 1106AW, 2106AW, 3106AW
 MODELS 1126AW, 2126AW, 3126AW
 Trimmers, Alignment, Part 1

PATTERSON RADIO CO.

Service Notes 8-10-12 Tube Models—Series B—1936

The following instructions are intended for the use of experienced dealers and radio service men in locating and correcting difficulties which may occasionally arise in receiver operation. They are not intended for use of the average set owner. Do not attempt any adjustments unless thoroughly qualified and equipped with the special instruments required.

SET LAYOUT—The coil and switch assembly is identical in all three models. The frequency bands covered are also identical. Figure 2 shows the layout of coils and trimmer condensers for the various frequency bands.

- A - BROADCAST ANTENNA COIL
- B - BROADCAST MODULATOR COIL
- C - BROADCAST OSCILLATOR AND TRIMMER
- D - 2 BAND ANTENNA COIL
- E - 2 BAND MODULATOR AND TRIMMER
- F - 2 BAND OSCILLATOR AND TRIMMER
- G - 3 BAND ANTENNA AND TRIMMER
- H - 3 BAND MODULATOR AND TRIMMER
- J - 3 BAND OSCILLATOR AND TRIMMER
- K - 4 BAND ANTENNA AND TRIMMER
- L - 4 BAND MODULATOR AND TRIMMER
- M - 4 BAND OSCILLATOR AND TRIMMER
- N - ANTENNA BROADCAST TRIMMER
- P - MODULATOR BROADCAST TRIMMER
- R - 2 BAND ANTENNA TRIMMER
- S - 4 BAND OSCILLATOR VARIABLE PADDER
- T - 4 BAND ANTENNA PADDER
- U - 4 BAND MODULATOR PADDER
- V - BROADCAST OSCILLATOR PADDER
- S1 - MODULATOR GRID SHORT OUT SECTION
- S2 - MODULATOR GRID SECTION
- S3 - MODULATOR PLATE SECTION
- S4 - ANTENNA SILENT TUNING AND BIAS SECTION
- S5 - ANTENNA SECTION
- S6 - ANTENNA GRID SECTION
- S7 - ANTENNA GRID SHORT OUT SECTION
- S8 - OSCILLATOR PLATE SECTION
- S9 - OSCILLATOR GRID SECTION
- S10 - OSCILLATOR GRID SHORT OUT SECTION

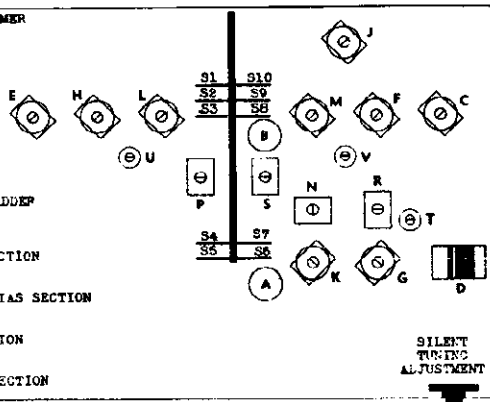


FIG. 2—ADJUSTMENTS FOR REALIGNMENT

Looking down into bottom of chassis, as shown in Figure 2, it will be noted that, with the exception of broadcast antenna and modulator coils, and No. 2 band antenna coil, trimmers are located directly on the coil terminals, and the low frequency pads, where required, are adjacent to the coil involved. The switch sections, as shown in the figure, perform the following functions:

- S6 - Switches RF grid coils.
- S7 - Shorts out RF grid coils not in use.
- S8 - Switches oscillator plate coils.
- S9 - Switches oscillator grid coils.
- S10 - Shorts out oscillator grid coils not in use.
- S5 - Switches antenna coils.
- S4 - "Kills" silent tuning in all models. Lowers bias on IF and RF in 10 and 12 tube models on all bands except BC.
- S3 - Switches modulator plate coils.
- S2 - Switches modulator grid coils.
- S1 - Shorts out modulator grid coils not in use.

ALIGNMENT OF I. F. AMPLIFIER

NOTE: Frequency bands referred to in the following instructions are:

- 1st Band—Broadcast 1500-550 K.C.
- 2nd Band—4.5-1.6 megacycles
- 3rd Band—12-4.5 megacycles
- 4th Band—20-11.5 megacycles

In these and the following instructions for alignment the term "voltmeter" shall be understood to mean "vacuum tube voltmeter" and the term "voltmeter indicates resonance" shall be understood to mean that the vacuum tube voltmeter shows greatest swing toward zero.

MODELS 86AW-186AW-286AW-386AW (8 TUBES)

Turn band selector switch to 2nd band position. Place service oscillator in operation on 458 K.C. Connect grid of voltmeter to A.V.C. Bus and ground of voltmeter to chassis ground. A convenient place to connect the A.V.C. Bus is at the junction of the 14 megohm resistor and the by-pass condenser located at the bottom of the chassis directly below 4th band antenna coil. Remove grid clips from 6B7, 6D6 1st I.F. and 6A7. Apply output oscillator to grid of 6B7 and adjust trimmers on rear I.F. transformer until voltmeter indicates resonance. Replace grid clip and shield cap on 6B7 and apply oscillator output to grid of 6D6 and adjust trimmers on center I.F. transformer until voltmeter indicates resonance decreasing the oscillator output, if necessary, in order to obtain a good readable indication on voltmeter. Replace grid clip and shield cap on 6D6 and apply oscillator output to grid of 6A7. Adjust trimmers on front I.F. transformer until voltmeter indicates resonance. Now reduce oscillator output and with oscillator input still applied to grid of 6A7 carefully recheck all adjustments in the same order in which they were initially made. This completes the alignment of the I.F. amplifier.

MODELS 106AW-1106AW-2106AW-3106AW (10 TUBES) AND 126AW-1126AW-2106AW-3126AW (12 TUBES)

As these models use a separate automatic volume control tube 6C6 and a linear power detector (76) it is advisable to make an inspection of the system used in order to understand its operation and to intelligently analyze and correct such troubles as may arise.

Referring to the circuit diagram (it may be advisable to draw out a skeleton diagram showing the A.V.C. system only) it will be noted that the third I.F. transformer has two secondary windings, one tuned which feeds the grid of the power detector (76) and one untuned which feeds the grid of the 6C6, A.V.C. tube. The grid return of the latter coil returns to the negative side of the power supply. The grid of the 6C6 is then at all times approximately 120-170 volts negative with respect to the chassis. The cathode of the 6C6 returns to the 50 ohm resistance (R) in the negative side of power supply. The voltage drop across this resistor furnishes the necessary grid bias for the tube. The plate of the 6C6 is connected to ground through a 500,000 ohm resistor (R 15) and V 1. The screen of the 6C6 is connected to the cathode and the suppressor is connected to the plate. It is evident, then, that we have a 6C6 connected as a triode and operating as a very sensitive D.C. amplifier. Its grid return is connected to the most negative point of the power supply, its cathode connected to a point slightly less negative (difference due to voltage drop across resistance R) and its plate connected to ground through resistance R 15 and V 1.

When no signal is applied to the grid the tube is biased to cut off and no current flows through R 15. A voltmeter connected from plate to ground will show no reading. When a signal is applied to the grid of the tube, current does flow through the plate resistor R 15 and a voltmeter connected from plate to ground will show various readings, the amount of voltage shown depending upon the drop across R 15 due to the current flowing through it. The current flowing through R 15 depends entirely upon the strength of the signal applied to the grid of the 6C6. It is this voltage drop across R 15 which is utilized for the A.V.C. voltage. The A.V.C. bus, therefore, is connected to the plate of the 6C6 tube. It is also well to remember that the grid clip of the 6C6 is "hot" with respect to the chassis.

To align intermediate frequency amplifier, remove grid clips from 6A7 and 6D6's, 1st and 2nd I.F. tubes. Place service oscillator in operation on 458 kilocycles. Connect voltmeter grid lead to plate prong on socket of 6C6 and ground lead to chassis ground. Turn band selector switch to 2nd band position. Apply oscillator signal to 6D6 2nd I.F. tube (the one farthest toward back of chassis), adjust trimmer on side next to 6C6 of rear I.F. transformer until voltmeter indicates resonance. Do not attempt to adjust the other trimmer at this time. Replace grid clip and shield cap on 6D6 and apply oscillator signal to grid of 6D6 1st I.F. tube and adjust trimmers of center I.F. transformer until voltmeter indicates resonance, reducing oscillator output, as necessary, to obtain a good readable indication. Replace grid clip and shield cap and apply oscillator output to grid of 6A7 and adjust trimmers of front I.F. transformer until voltmeter indicates resonance. Now further reduce oscillator output and with oscillator output still applied to grid of 6A7 check each adjustment in the order in which they were made. Now adjust the trimmer on the rear I.F. transformer, farthest away from 6C6 until the noise level is maximum and the voltmeter makes a slight dip away from resonance. This completes the alignment of the I.F. amplifier.

CALIBRATION OF VARIOUS BANDS—ALL MODELS

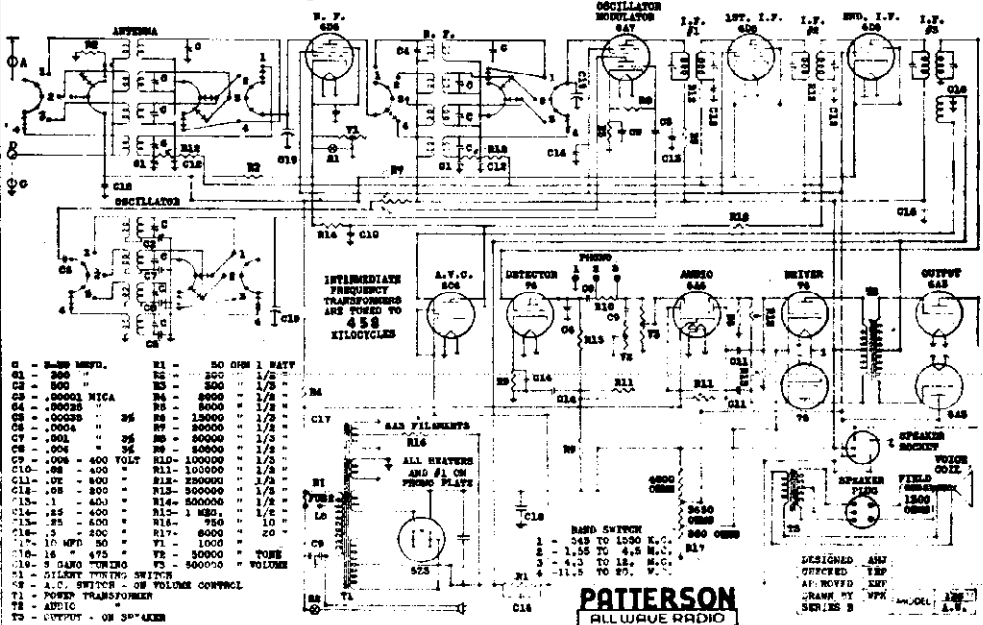
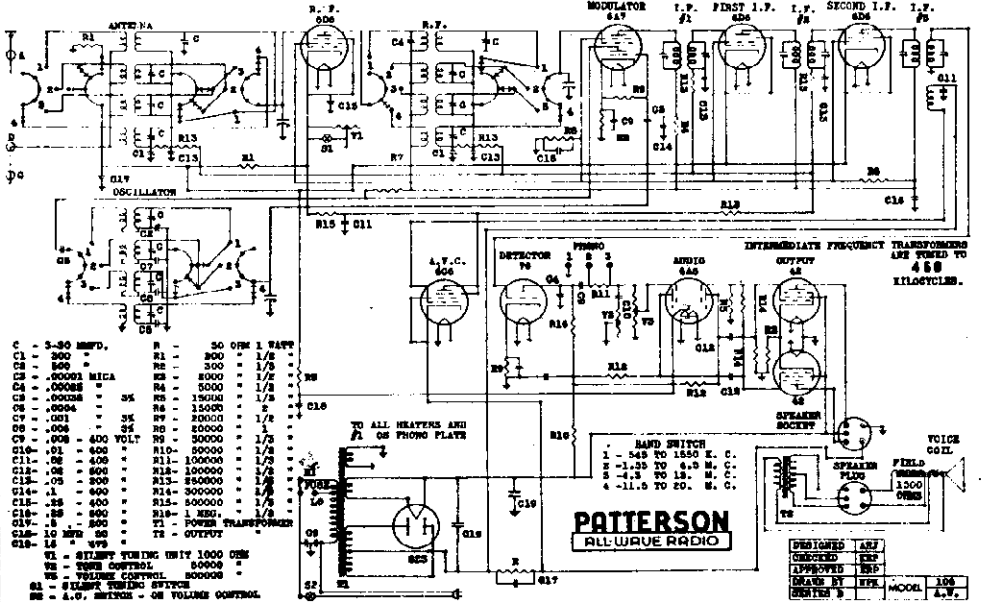
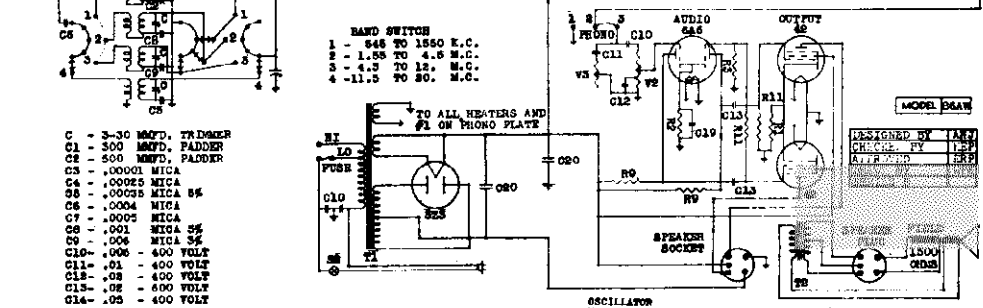
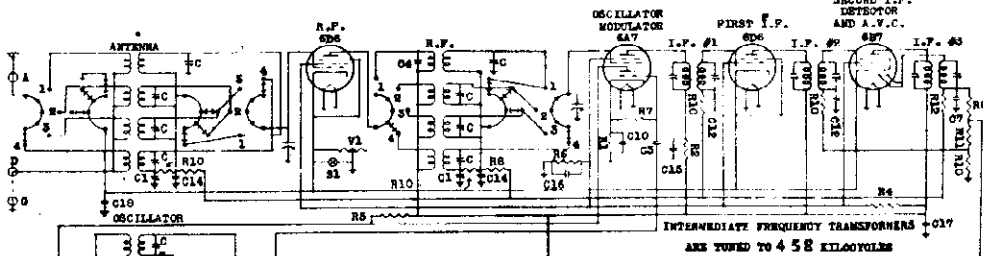
Broadcast Band—1500 - 550 K.C. Connect voltmeter to A.V.C. bus and chassis ground as described under Intermediate Amplifier Alignment. Turn band selector switch to broadcast position. Throw switch for silent tuning to the downward position. Place service oscillator in operation at 1400 K.C. Turn set dial to 1400 K.C. and adjust oscillator trimmer until voltmeter indicates resonance. Now adjust modulator and antenna trimmers, in turn, until voltmeter indicates resonance in each case. Turn set dial to 600 K.C. and set service oscillator at 600 K.C. Adjust oscillator low frequency pad for resonance. Now turn set dial back to 1400 K.C. and set service oscillator at 1400 K.C. Carefully correct oscillator trimmer setting and without moving the dial setting verify and correct the setting of the modulator and R.F. trimmers.

Second Band—4.5 - 1.6 megacycles. Turn band selector switch to second band position. Place high frequency oscillator in operation.

Schematics

PATTERSON RADIO CO.

MODELS 186AW, 286AW, 386AW
1106AW, 2106AW, 3106A
1126AW, 2126AW, 3126A



- C16 - .1 - 400 VOLT
- C17 - .25 - 400 VOLT
- C18 - .25 - 600 VOLT
- C19 - .5 - 200 VOLT
- C20 - 10 MFD 50 VOLT
- C21 - 16 MFD 25 VOLT
- T1 - POWER TRANSFORMER
- T2 - OUTPUT - ON SPEAKER
- R1 - 300 OHM 1/2 WATT
- R2 - 5000 OHM 1/2 WATT
- R3 - 15000 OHM 1/2 WATT
- R4 - 10000 OHM 1/2 WATT
- R5 - 20000 OHM 1/2 WATT
- R6 - 20000 OHM 1 WATT
- R7 - 50000 OHM 1/2 WATT
- R8 - 100000 OHM 1/2 WATT
- R9 - 100000 OHM 1/2 WATT
- R10 - 250000 OHM 1/2 WATT
- R11 - 300000 OHM 1/2 WATT
- R12 - 1 MEG. OHM 1/2 WATT
- R13 - SILENT TUNING SWITCH
- R14 - A.C. SWITCH-ON VOLUME CONTROL
- R15 - SILENT TUNING CONTROL-1000 OHMS
- R16 - VOLUME CONTROL -500000 OHM
- R17 - TONE CONTROL -50000 OHM

- C - 3-30 MFD. TRIMMER
- C1 - 500 MFD. PADDER
- C2 - 500 MFD. PADDER
- C3 - .00001 MICA
- C4 - .00025 MICA
- C5 - .00025 MICA 5K
- C6 - .0004 MICA
- C7 - .0005 MICA
- C8 - .001 MICA 5K
- C9 - .004 MICA 5K
- C10 - .005 - 400 VOLT
- C11 - .01 - 400 VOLT
- C12 - .02 - 400 VOLT
- C13 - .02 - 600 VOLT
- C14 - .05 - 400 VOLT

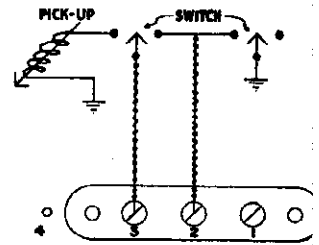
- C - 3-30 MFD.
- C1 - 500
- C2 - 500
- C3 - .00001 MICA
- C4 - .00025 MICA
- C5 - .00025 MICA 5K
- C6 - .0004 MICA
- C7 - .001 MICA 5K
- C8 - .004 MICA 5K
- C9 - .005 - 400 VOLT
- C10 - .01 - 400 VOLT
- C11 - .02 - 400 VOLT
- C12 - .02 - 600 VOLT
- C13 - .02 - 400 VOLT
- C14 - .05 - 400 VOLT
- R1 - 300 OHM 1/2 WATT
- R2 - 500
- R3 - 15000
- R4 - 10000
- R5 - 20000
- R6 - 20000
- R7 - 50000
- R8 - 100000
- R9 - 100000
- R10 - 250000
- R11 - 300000
- R12 - 1 MEG.
- R13 - SILENT TUNING SWITCH
- R14 - A.C. SWITCH-ON VOLUME CONTROL
- R15 - SILENT TUNING CONTROL-1000 OHMS
- R16 - VOLUME CONTROL -500000 OHM
- R17 - TONE CONTROL -50000 OHM

- C - 3-30 MFD.
- C1 - 500
- C2 - 500
- C3 - .00001 MICA
- C4 - .00025 MICA
- C5 - .00025 MICA 5K
- C6 - .0004 MICA
- C7 - .001 MICA 5K
- C8 - .004 MICA 5K
- C9 - .005 - 400 VOLT
- C10 - .01 - 400 VOLT
- C11 - .02 - 400 VOLT
- C12 - .02 - 600 VOLT
- C13 - .02 - 400 VOLT
- C14 - .05 - 400 VOLT
- R1 - 300 OHM 1/2 WATT
- R2 - 500
- R3 - 15000
- R4 - 10000
- R5 - 20000
- R6 - 20000
- R7 - 50000
- R8 - 100000
- R9 - 100000
- R10 - 250000
- R11 - 300000
- R12 - 1 MEG.
- R13 - SILENT TUNING SWITCH
- R14 - A.C. SWITCH-ON VOLUME CONTROL
- R15 - SILENT TUNING CONTROL-1000 OHMS
- R16 - VOLUME CONTROL -500000 OHM
- R17 - TONE CONTROL -50000 OHM

MODELS
186AW
286AW
386AW

PHONO-PICKUP

Connect all sets, 8-10-12 in same manner. Remove jumper which connects terminal No. 2 and No. 3. Standard High Impedance pickup must be used. It is essential the leads from terminals No. 2 and No. 3 be shielded and grounded to chassis at No. 1 which hole is provided in a chassis for this purpose. On side of pickup unit must also be grounded.



MODELS
1106AW
2106AW
3106AW

This is accomplished by soldering one lead of the unit to the shielded cable mentioned above. If slight hum occurs try reversing pickup leads. Terminal No. 1 is used when it is desired to install light in the phono section of the cabinet. Use only a 1/2 watt lamp running on lead from terminal No. 1 to one side of the lamp socket and ground the other side by connecting to shielded cable in same method as grounding the pickup. Switch used must be two pole, double throw and connected as shown, grounding one pole to shielded cable, same as in above method.

MODELS
1126AW
2126AW
3126AW

MODELS 186AW, 266AW, 386AW
 MODELS 1106AW, 2106AW, 3106AW
 MODELS 1126AW, 2126AW, 3126AW

PATTERSON RADIO CO.

Voltages, Alignment, Part 2

Parts Lists

at 4 megacycles. Turn set dial to 4 megacycles. Turn modulator trimmer full in. Adjust oscillator trimmer until resonance with H.F. oscillator signal is indicated. Without moving dial, open the modulator trimmer until voltmeter indicates resonance and then in the same manner adjust antenna trimmer for resonance. Verify dial setting and carefully readjust modulator and R.F. trimmers.

Third Band—12 . 4.5 megacycles. Turn band selector switch to 3rd band position. Place H.F. oscillator in operation at 12 megacycles. Turn dial to 12 megacycles. Adjust trimmers in exactly the same manner as described for 2nd band.

Fourth Band—20 . 11.5 megacycles. Turn band selector switch to 4th band position. Place H.F. oscillator in operation at 20 megacycles. Turn set dial to 20 megacycles. Turn modulator trimmer full in and tighten screw on modulator L.F. pad. Adjust oscillator trimmer until voltmeter indicates resonance with H.F. oscillator signal. Without moving dial setting adjust modulator and antenna low frequency pads for resonance. Reset dial and H.F. oscillator to 20 megacycles and verify setting of modulator and antenna trimmers.

VOLTAGES

The following tables show representative voltages at various points in normal sets:

All Voltages Measured Under The Following Conditions:
 No signal-tune on 110-115 V. Control Inoperative. All volt-
 side. Line volts 115, 60 cycles. ages from various points to
 Band Change Switch in B.C. chassis ground measured with
 Band Position—Silent Tuning voltmeter 1000 ohms per volt.

8 TUBE SET

	Plate	Screen	Cathode	Suppressor	
RF	6D6	+250	+80	0	Tied to Cathode Osc. Plate
Mod. Osc.	6A7	+215	+80	+2.4	+140
1 IF	6D6	+230	+80	0	Tied to Cathode
2 IF	6B7	+230	+80	0	
1 Audio	6A6	+150*	+4.0		
2 Audio	42	+230	+235	+16.5	
	42	+230	+235	+16.5	

* Each plate measured through 100,000 ohm plate resistor.

ELECTROLYTIC CONDENSERS

	Center to Ground	Can to Ground
Grounded	+240	0
Insulated	+240	-165 or 120
Speaker Field	Hot Side to Ground	-165 or 120

10 TUBE SET

	Plate	Screen	Cathode	Suppressor	
RF	6D6	+240	+78	0	Tied to Cathode Osc. Plate
Mod. Osc.	6A7	+220	+78	+2.4	+160
1 IF	6D6	+240	+78	+2.6	Tied to Cathode
2 IF	6D6	+240	+78	+2.6	Tied to Cathode
2 Det.	76	+30*	+1.5*		
Inverter	6A6	+120†	+3.6		
Output	42	+240	+245	+16	
Output	42	+240	+245	+16	
AVC	6C6	0	-170 or	Tied to Tied to Plate	Control Grid
			-120	Screen	-175 or -125

* Voltages not accurately measurable due to 1 Meg. plate resistor.
 † Each plate measured through 100,000 ohm plate resistor.

ELECTROLYTIC CONDENSERS

	Center to Ground	Can to Ground
Grounded	+245	0
Insulated	+245	-175 or 125
Speaker Field	Hot Side to Ground	-175 or 125

12 TUBE SET

	Plate	Screen	Cathode	Suppressor	
RF	6D6	+250	+100	0	Tied to Cathode Osc. Plate
Mod. Osc.	6A7	+230	+100	+3.3	+170
1 IF	6D6	+250	+100	+3.25	Tied to Cathode
2 IF	6D6	+250	+100	+3.25	Tied to Cathode
2 Det.	76	+40*	+1.75*		
Inverter	6A6	+135†	+4.2		
Driver	76	+245	+11.5		
Driver	76	+245	+11.5		
Output	2A3	+245	-75 C.T.Fil.		Control Grids
Output	2A3	+245	-75 C.T.Fil.		-150
AVC	6C6	0	-150	Tied to Tied to Plate	-155
				Screen	

* Voltages not accurately measurable due to 1 Meg. plate resistor.
 † Each plate measured through 100,000 ohm plate resistor.

ELECTROLYTIC CONDENSERS

	Center to Ground	Can to Ground
Grounded	+250	0
Insulated	+250	-155
Speaker Field	Hot Side to Ground	-155

PARTS PRICE LIST NO. 502—SERIES B REPLACEMENT PARTS

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

F.O.B. LOS ANGELES

AUGUST 1, 1935

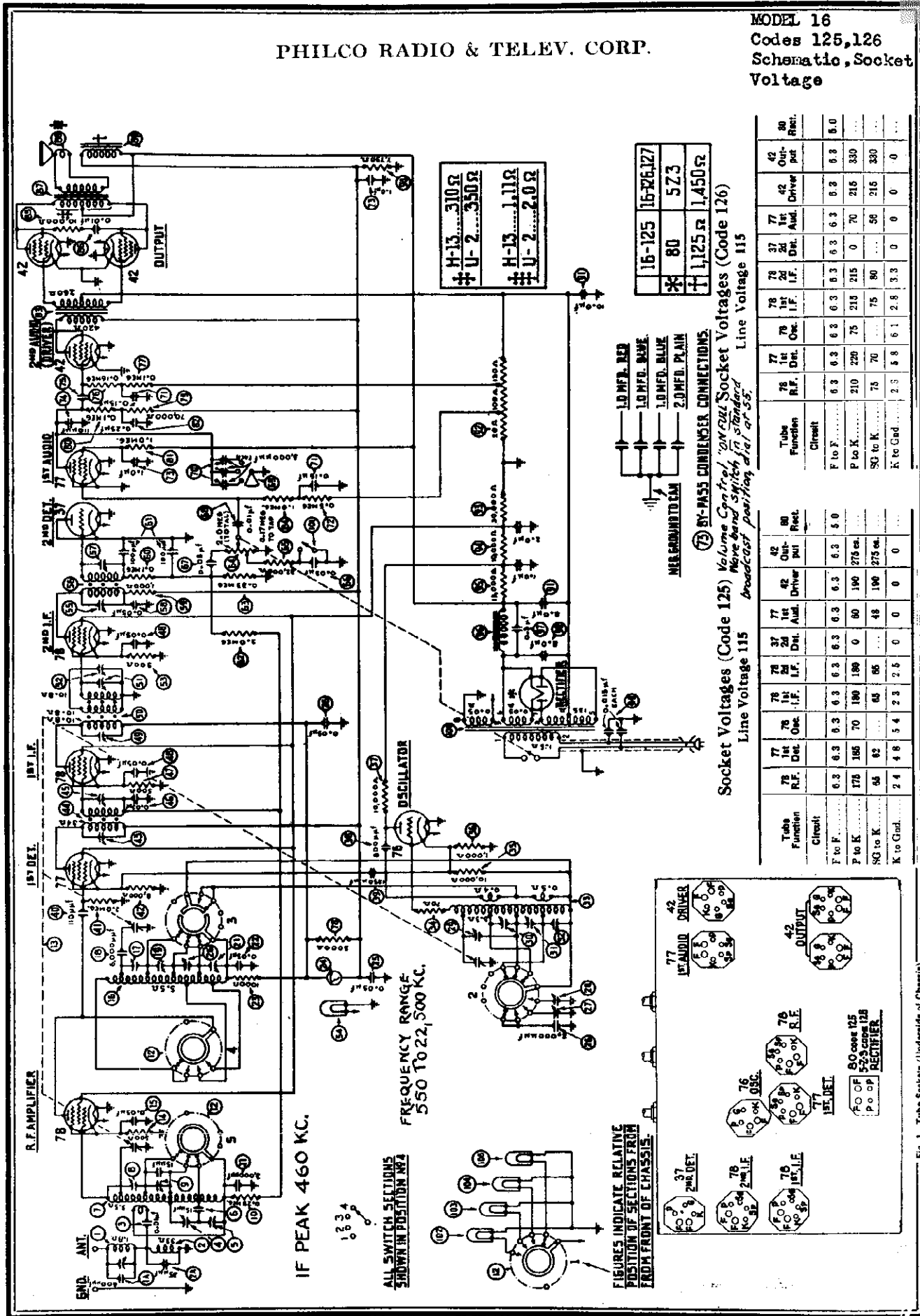
Part No.	DESCRIPTION	List Price
720	Antenna-Doublet Plate A. D. G.	.18
721	A. C. Cord and Plug	.35
722	Audio Transformer	2.85
723	Band Changer Disc with Rod—Complete	1.80
724	Band Changer Screw (Flat Head)	.07
725	Band Changer Bakelite Washer	.05
726	Cap—Screen Grid (Per C)	1.00
727	Condenser 8 Mid.—450 Volt (in Can)	1.00
728	Condenser 16 Mid.—475 Volt (in Can)	1.25
729	Condenser 10 Mid.—25 Volt (Tubular)	.60
730	Condenser .006 —400 Volt	.15
731	Condenser .02 —400 Volt	.15
732	Condenser .05 —400 Volt	.15
733	Condenser .1 —400 Volt	.20
734	Condenser .25 —400 Volt	.25
735	Condenser .5 —200 Volt	.55
736	Condenser 3-30 MMFD.—Trimmer	.15
737	Condenser 300 MMFD.—Padder	.45
738	Condenser 500 MMFD.—Padder	.50
739	Condenser—Mica .0001—10%	.15
740	Condenser—Mica .00025—10%	.15
741	Condenser—Mica .0004—10%	.15
742	Condenser—Mica .0004—3%	.20
743	Condenser—Mica .001—3%	.20
744	Condenser—3 Gang Variable	3.40
745	Coil—B. C. Antenna	1.50
746	Coil—2—3—4 Band Antenna	.75
747	Coil—Broadcast R. F.	1.50
748	Coil—2—3—4 Band R. F.	.75
749	Coil—All Oscillator	1.00
750	Control—Volume	1.10
751	Control—Tone	.80
752	Control Silent Tuning	.30
753	Dial Disc and Scale	.80
754	Dial Scale Only	.35
755	Dial Drive Vernier Complete	1.25
756	Dial Light—Red Marker	.05
757	Dial Light Socket	.10
758	Dial Lamp—6 Volt	.14
759	Escutcheon Plate	.40
760	Fuse Block	.20
761	Fuse only—2 Amp.	.05
762	Intermediates—Coil only	.40
763	I. F. Trimmer	.35

Part No.	DESCRIPTION	List Price
764	I. F. Shield Can	.15
765	Knob—Large Wood	.15
766	Knob—Small Wood	.12
767	Phone Plate	.18
768	Phono Motor	24.00
769	Phone Pickup—Complete	16.80
770	Resistor—Vitreous Enamel—750 Ohm—10 Watt	.50
771	Resistor—Vitreous Enamel—8000 Ohm—20 Watt	1.30
772	Resistor—Carbon—1/3 Watt—Any Value	.20
773	Resistor—Carbon—1/2 Watt—Any Value	.20
774	Resistor—Carbon—1 Watt—Any Value	.20
775	Resistor—Carbon—2 Watt—Any Value	.25
776	Socket—Tube—4—5—6—7 Prong	2.50
777	Switch—Band Change	.24
778	Switch—Silent Tuning	.24
779	Speaker—8" Complete—1500 Ohm Field	10.00
780	Speaker—12" Complete—1500 Ohm Field	17.50
781	Speaker Field Coil—8"—1500 Ohm	1.90
782	Speaker Field Coil—12"—1500 Ohm	4.00
783	Speaker Bucking Coil	.30
784	Speaker Output Transformer—8 & 10	1.90
785	Speaker Output Transformer—12	1.90
786	Speaker Cone and Voice Coil—8"	2.60
787	Speaker Cone and Voice Coil—12"	4.00
788	Speaker Cord and Plug	.35
789	Tube—76	.30
790	Tube—5Z3	1.20
791	Tube—6A3	1.35
792	Tube—6A6	1.35
793	Tube—6A7	1.30
794	Tube—6C6	1.10
795	Tube—6D6	1.00
796	Transformer—Power 110-130 Volt 50-100 Cycle—8 & 10	7.35
797	Transformer—Power 110-130 Volt 50-100 Cycle—12	9.75
798	Transformer—Power 110-130 Volt 25 Cycle—8 & 10	11.00
799	Transformer—Power 110-130 Volt 25 Cycle—12	14.65
800	Transformer—Power Universal—110-125 220-250 Volt 50-100 Cycle—8 & 10	9.90
801	Transformer—Power Universal—110-125 220-250 Volt 50-100 Cycle—12	14.60
802	Transformer Switch for Universal	1.20
803	Transformer—Audio Input	3.25
804	Transformer—Filter Choke	1.25

In Ordering Be Sure to Mention Part Number

PHILCO RADIO & TELEV. CORP.

MODEL 16
Codes 125, 126
Schematic, Socket Voltage

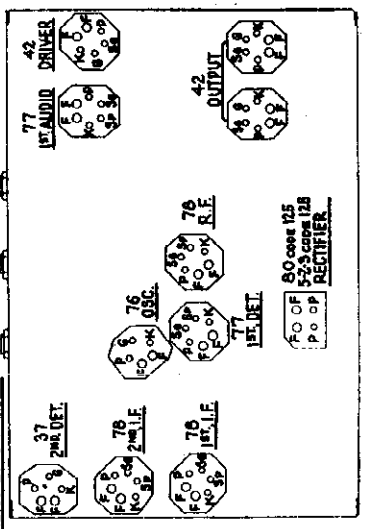


# H-13	310Ω
# U-2	350Ω
# H-13	1,11Ω
# U-2	2.0Ω

16-125	16-26,127
80	5Z3
1,125Ω	1,450Ω

Socket Voltages (Code 125) Volume Control *on Chassis* Socket Voltages (Code 126) Line Voltage 115
May be used with standard broadcast power line of 65.

Tube	Function	Circuit	78 R.F. Det.	77 1st Det.	76 2nd I.F. Amp.	77 1st A.F. Amp.	42 500KHz Driver	42 500KHz Rect.	80 500KHz Filter
78	R.F. Det.	0.3 0.3	0.3 0.3	0.3 0.3	0.3 0.3	0.3 0.3	0.3 0.3	0.3 0.3	0.3 0.3
77	1st Det.	175 185	70 180	180 0	60 190	275 ea.	275 ea.	275 ea.	275 ea.
76	2nd I.F. Amp.	64 62	65 65	2.5 0	2.5 0	2.5 0	2.5 0	2.5 0	2.5 0
42	500KHz Driver	2.4 4.8	5.4 2.3	2.5 0	2.5 0	2.5 0	2.5 0	2.5 0	2.5 0
42	500KHz Rect.	0.3 0.3	0.3 0.3	0.3 0.3	0.3 0.3	0.3 0.3	0.3 0.3	0.3 0.3	0.3 0.3
80	500KHz Filter	0.3 0.3	0.3 0.3	0.3 0.3	0.3 0.3	0.3 0.3	0.3 0.3	0.3 0.3	0.3 0.3



FIGURES INDICATE RELATIVE POSITION OF SECTIONS FROM FRONT OF CHASSIS.

Fig. 1 - Tube Sockets (Underside of Chassis)

MODEL 16
Codes 125,126,127
Alignment, Trimmers

PHILCO RADIO & TELEV. CORP.

Adjusting Compensating Condensers

Model 16 (Codes 125, 126, 127)

Adjustment of I. F.

1. Remove the antenna connection from the receiver, disconnect the grid clip from the first detector (type 77 tube), and connect the "ANT" output terminal of the Model 048 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 048 or 025 tester to the plate prongs of the two output 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 broadcast band, wave band switch to extreme left, 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. Using the Philco fibre adjusting screw driver, part No. 27-7059, adjust the I. F. compensating condensers in the following order to give maximum reading in the output meter: ②, ③, ④, ⑤, ⑥, ⑦, ⑧. (Fig. 4).

Adjustment of Wave-Trap

1. Connect the signal generator leads to the antenna and ground terminals of the receiver. Replace the grid clip on the first detector grid cap.
2. Set the wave-band switch of the receiver to the extreme left (broadcast position) (Range No. 1, 550-1500 K.C.), and turn the station selector to 550 K.C.
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.

Adjustment of High Frequency Padders

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 Range 4 (extreme right) 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 padder wrench, part No. 3164, adjust the oscillator, R.F. and antenna padders for maximum reading in the output meter and in the order mentioned. These padders

are numbered ⑨, ⑩ and ⑪, respectively in figure No. 4. To make certain that the adjustment has been correctly made check the sixth harmonic at 21.6 M.C. on the dial.

3. Turn the wave-band switch to Range 3 (4.1-10.0 M.C.) and adjust the tuning dial to 7.2 M.C. (the second harmonic of the 3600 K.C. signal). Adjust the oscillator, R.F. and antenna padders (⑩, ⑪ and ⑨, respectively) for maximum output. Check the calibration of the dial at the upper portion of the third band by tuning in the image of the 10.8 M.C. signal at approximately 9.9 on the dial. (If there is an appreciable error in calibration at this point, readjust padder ⑩ for maximum output. Return the dial to the 7.2 M.C. position, tuning for maximum output. Readjust padders ⑩ and ⑨.)

4. Turn the wave-band switch to scale No. 2 (1.5-4.0 M.C.) and tune in the fundamental frequency from the signal generator at 3.6 M.C. Adjust padders ⑩, ⑪ and ⑨ for maximum output.

5. At this point it will again be necessary to make use of 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 station selector dial to 1.5 M.C. (Range 2) and adjust the signal generator to the same frequency (1500 K.C.). Adjust padder ⑪ (nut).

6. Turn the wave-band switch to Range No. 1 (broadcast band) and set the dial at 1500 K.C. Adjust the signal generator to this frequency and adjust padders ⑩, ⑪ and ⑨ for maximum output.

7. Tune the receiver and the signal generator to 600 K.C. and adjust padder ⑩ (screw) for maximum output.

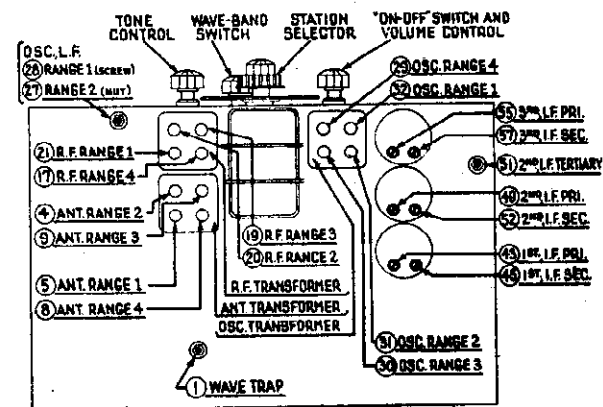


Fig. 4—Locations of Compensating Condensers

Power Transformer Data Line Voltage 120

Terminals	A.C. Volts	Circuit	Color of Leads
1-2	120	Primary	White
3-5	*720	Plates of Rectifier	Yellow
6-7	5.0	Filament of Rectifier	Blue
8-9	0.3	Filaments	Black
4	...	Center Tap of 3-5	Yellow-Green Tracer

*780 in code 126

PHILCO RADIO & TELEV. CORP.

MODEL 16
Codes 125, 126
Chassis, Parts

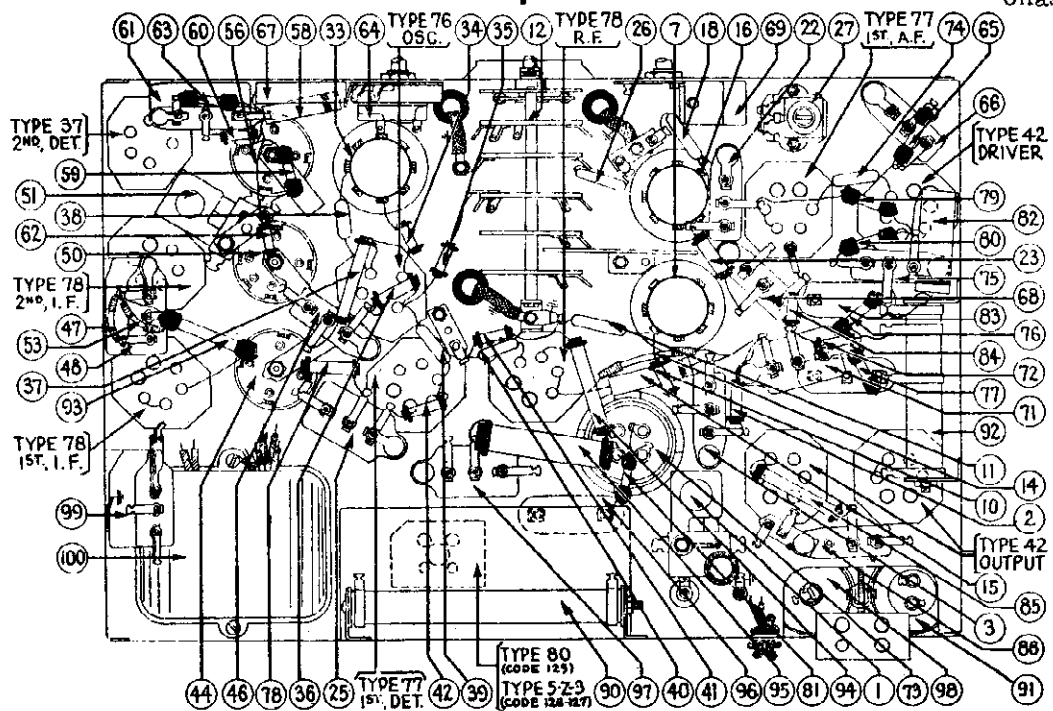


Fig. 3—Underside of Chassis, showing Parts

REPLACEMENT PARTS—MODEL 16—CODES 125 AND 126

No. on Diagram	Description	Part No.	List Price	No. on Diagram	Description	Part No.	List Price	
1	Wave Trap.....	38-6049	\$0.30	61	Condenser (.03 Mfd. Bakelite Block).....	8318 F	.....
2	Condenser (.0006 Mfd. Mica).....	30-1041	.35	62	Condenser (.05 Mfd. Tubular).....	30-4020	\$0.35	
3	Antenna Choke Assembly.....	32-1514	.30	63	Condenser (.01 Mfd. Bakelite Block).....	3903 G	.25	
4	Condenser (.00035 Mfd. Mica).....	30-1044	.35	64	Tone Control.....	30-4204	.75	
5	Condenser (.01 Mfd. Bakelite Block).....	3903 N	.25	65	Condensers (Trade #9).....	Part of 69	.....
6	Compensating Condenser (Ant. Band 2).....	Part of 31-6026	.....	66	Condenser (.15 Mfd. Bakelite Block).....	6287 F	.40
7	Compensating Condenser (Ant. Band 1).....	Part of 31-6026	.....	67	Resistor (.5 Meg.) (Yellow-White-Yellow).....	4517	.20
8	Condenser (.00015 Mfd. Mica).....	30-1030	.35	68	Condenser (Electrolytic—1, 1.2 Mfd.).....	30-2078	2.45	
9	Ant. Transformer.....	32-1467	.....	69	Condenser (.00011 Mfd. Mica).....	30-1031	.35
10	Compensating Condenser (Ant. Band 4).....	Part of 31-6026	.....	70	Condenser (.05 Mfd. Bakelite Block).....	3615 AD	.35
11	Compensating Condenser (Ant. Band 3).....	Part of 31-6026	.....	71	Resistor (100,000 ohms) (Brown-Blue-Yellow).....	5331	.20
12	Condenser (.00015 Mfd. Mica).....	30-1030	.35	72	Resistor (.1 Meg.) (White-White-Orange).....	4411	.20	
13	Resistor (.25 Meg.) (Red-Yellow-Yellow).....	4410	.20	73	Resistor (5000 ohms) (Green-Black-Red).....	5310	.20	
14	Condenser (.003 Mfd. Mica).....	7301	.45	74	Resistor (7000 ohms) (White-Black-Orange).....	5385	.20	
15	Wave Band Switch.....	42-1079	\$3.50	75	Resistor (.1 Meg.) (White-White-Orange).....	4411	.20	
16	Tuning Condenser Assembly.....	31-1350	\$6.50	76	Resistor (1 Meg.) (Brown-Black-Green).....	4409	.30	
17	Resistor (500 ohms Flexible Wirewound).....	6977	.20	77	Condenser (.25 Mfd. Tubular).....	30-4146	.40	
18	Condenser (.05 Mfd. Tubular).....	30-4020	.35	78	Audio Transformer.....	32-7057	2.75	
19	R.F. Transformer.....	32-1468	2.30	79	Resistor (1 Meg.) (Brown-Black-Green).....	33-1096	.20	
20	Compensating Condenser (I.F.; Band 4).....	Part of 31-6026	.....	80	Resistor (10000 ohms).....	3524	.20
21	Condenser (.006 Mfd. Mica).....	30-1043	.60	81	Condenser (.01 Mfd. Bakelite Block).....	3903 F	.25	
22	Compensating Condenser (R.F.; Band 3).....	Part of 31-6026	82	Output Transformer.....	(H-13)	32-7078	1.40
23	Compensating Condenser (R.F.; Band 2).....	Part of 31-6026	.....	83	Voice Coil and Cone Assembly (U-2).....	35-3061	1.40
24	Compensating Condenser (R.F.; Band 1).....	Part of 31-6026	.....	84	Field Coil and Pot Assembly (U-2).....	35-3088	8.00
25	Condenser (.05 Mfd. Bakelite Block).....	3615 B1	.35	85	Field Coil and Pot Assembly (H-13).....	36-3104	2.70	
26	Resistor (1000 ohms) (Brown-Black-Red).....	5837	.20	86	Resistor (B.C. Wirewound 7750 ohms).....	33-3020	.25	
27	Shadowmeter.....	45-2028	2.50	87	Condenser (Electrolytic—8 & 10 Mfd.).....	30-2046 (code 125) 30-2040 (code 126)	1.80 1.85	
28	Condenser (.05 Mfd. Twin Bakelite Block).....	3615 BS	.40	88	Resistor (Voltage Divider—20 ohms, 100 ohms, 150 ohms).....	33-3081	.20	
29	Condenser (.002 Mfd. Mica).....	30-1042	.40	89	Resistor (30000 ohms) (Orange-Black-Orange).....	7830	.30	
30	Compensating Condenser (Osc. I.F.; Range 2).....	31-6028	.85	90	Resistor (10000 ohms) (Brown-Black-Orange).....	3524	.20	
31	Compensating Condenser (Osc. I.F.; Range 1).....	31-6026	.85	91	Resistor (13000 ohms) (Brown-Orange-Orange) (3-watt).....	6450	.40	
32	Compensating Condenser (Osc. H.F.; Range 3).....	31-6026	.85	92	Filter Choke.....	32-7050	2.20	
33	Compensating Condenser (Osc. H.F.; Range 2).....	31-6026	.85	93	Condenser (.3 Mfd. Bakelite Block).....	6287 F	.40	
34	Compensating Condenser (Osc. H.F.; Range 1).....	31-6026	.85	94	Condenser (Electrolytic—8 Mfd.).....	30-2023* (code 125) 30-2011 (code 126)	1.10 1.40	
35	Oscillator Transformer.....	32-1469	2.40	95	Condenser (.015 Mfd. Twin).....	3783 E	.40	
36	Resistor (20 ohms) (Violet-Black-Black).....	33-1129	.20	96	Power Transformer 60 Cycle 115 Volts (code 125).....	32-7291	7.00	
37	Resistor (10000 ohms) (Brown-Black-Orange).....	33-1000	.20	97	Power Transformer 25 Cycle 115 Volts (code 125).....	32-7202	9.25	
38	Resistor (1000 ohms) (Brown-Black-Red).....	5837	.20	98	Power Transformer 60 Cycle 115 Volts (code 126).....	32-7283	7.00	
39	Resistor (10000 ohms) (Brown-Black-Red).....	5837	.20	99	Power Transformer 25 Cycle 115 Volts (code 126).....	32-7284	.....
40	Condenser (.0008 Mfd. Mica).....	5878	.35	100	Bass Compensation Switch (Toggle Type).....	3253	.45	
41	Condenser (.00125 Mfd. Mica).....	5878	.35	101	Pilot Lamp (Dial Section).....	34-3031	.45	
42	Condenser (.00011 Mfd. Mica).....	4519	.35	102	Pilot Lamp (Dial Section).....	34-3031	.45	
43	Resistor (2 Meg.) (Red-Black-Green).....	33-1025	.20	103	Pilot Lamp (Dial Section).....	34-3031	.45	
44	Resistor (8000 ohms) (Gray-Black-Red).....	33-1137	.20	104	Tube Sockets (4 Prong).....	7544	.12	
45	Compensating Condenser (1st I.F. Pri.).....	Part of 69	.....	105	Tube Socket (6 Prong).....	27-6013	.11
46	1st I.F. Transformer.....	32-1188	.65	106	Tube Socket (6 Prong).....	7547	.11	
47	Compensating Condenser (1st I.F. Sec.).....	Part of 69	.....	107	Speaker Socket.....	7528	.10
48	Condenser (.05 Mfd. Bakelite Block).....	3615 AA	.35	108	Tube Shield (Short Type).....	28-1107	.10	
49	Resistor (500 ohms Flexible Wirewound).....	6977	.20	109	Tube Shield (Tall Type).....	28-1820	.04	
50	Condenser (.05 Mfd. Twin Bakelite Block).....	3615 AJ	.40	110	Dial Assembly.....	37-5064	.50	
51	Compensating Condenser (2nd I.F. Pri.).....	Part of 69	.....	111	Dial Scale.....	W 1358A	2.60 C
52	2nd I.F. Transformer.....	32-1470	.45	112	Chassis Mounting Screw (code 125).....	W 1346	.60 C	
53	Compensating Condenser (2nd I.F. Tertiary).....	04000B	.45	113	Chassis Mounting Foot.....	27-4116	.05	
54	Compensating Condenser (2nd I.F. Sec.).....	Part of 69	.....	114	Chassis Mounting Foot Plate.....	27-7407	.35 C
55	Resistor (500 ohms Flexible Wirewound).....	6977	.20	115	Chassis Mounting Washer.....	29-2089	.35 C	
56	Pilot Lamp for Shadowmeter.....	Part of 69	.....	116	Knob (Waveband Switch, code 126).....	27-4051	.10
57	Compensating Condenser (3rd I.F. Pri.).....	Part of 69	.....	117	Knob (Volume Control and Tone Control).....	27-4052	.10
58	3rd I.F. Transformer.....	32-1188	.65	118	Knob (Station Selector).....	27-4139	.10	
59	Compensating Condenser (3rd I.F. Sec.).....	Part of 69	.....	119	Knob (Fine Tuning Control).....	27-4140	.10
60	Condenser (.05 Mfd. Tubular).....	30-4123	.35	120	Bass Compensation Switch Plate.....	28-2415	.05	
61	Resistor (1000 ohms) (Brown-Black-Red).....	5837	.20					
62	Resistor (.1 Meg.) (White-White-Orange).....	6099	.20					
63	Condenser (.001 Mfd. Twin Bakelite Block).....	3038 B	.35					
64	Resistor (2 Meg.) (Red-Black-Green).....	33-1025	.20					
65	Resistor (30000 ohms) (Orange-Orange-Yellow).....	6046	.20					
66	Volume Control (30000 ohms total) & On-Off Switch.....	33-5022	1.45					
67	Resistor (32000 ohms) (Orange-Red-Orange).....	6279	.20					

*31-6026: list price \$0.85.

*After Run No. 5: 30-2025, list price \$1.35.

MODELS 39, 39-A
Voltage, Socket
Trimmers, Alignment

PHILCO RADIO & TELEV. CORP.

Models 39 and 39-A

(Battery Operated—Standard and Short Wave)

PHILCO Models 39 and 39-A are battery-operated radio receivers covering two ranges of frequencies: (1) 550 to 1720 kilocycles, which includes standard broadcasts and some police stations; and (2) 5.5 to 16.0 megacycles (5500 to 16000 kilocycles) which includes the majority of American and foreign Short-wave broadcasting stations.

Model 39 is operated from a two-volt storage battery (Philco 172-R) and a special combination dry B and C battery unit (Philco P-968). The latter is to be connected to the receiver by inserting the plug at the end of the battery cable (attached to chassis) into the socket on the dry battery unit.

Model 39-A is to be operated from a dry A battery (Philco type P-896). The 39-A is also supplied with an additional tube, type 6, used as a "Ballast" tube to keep the voltage on the other tube filaments at a constantly correct voltage. The B and C battery unit, type P-968, is the same for Model 39-A as for Model 39.

The socket for the ballast tube exists in both Model 39 and 39-A chassis but in Model 39, the two filament prong holes are shorted by a metal jumper. This jumper must be left in place at all times on Model 39; on Model 39-A it is removed and replaced by the type 6 ballast tube.

Tubes Used—Type 1C6 detector oscillator, type 34 intermediate frequency, type 30 2d detector and A. V. C., type 32 1st audio, type 30 driver and type 19 output (class B).

Current Consumption—A battery: 670 M.A.; B battery: 19 M.A. **Intermediate Frequency**—460 K.C.

Tube Socket Voltages obtained with PHILCO 025 Tester (All Voltages Measured to Ground)

	1C6	34	30	32	30	19
Plate.....	130	130	....	45	130	130
Screen Grid.....	66	66	....	30	....	130
Osc. Plate.....	112	....	....	....	....	....

Above voltages obtained by use of Philco type 025 Circuit Tester or 048 All-purpose Tester. Both of these units incorporate a high-resistance voltmeter. Tests made by applying test prods to socket terminals underneath chassis (see Fig. 1).

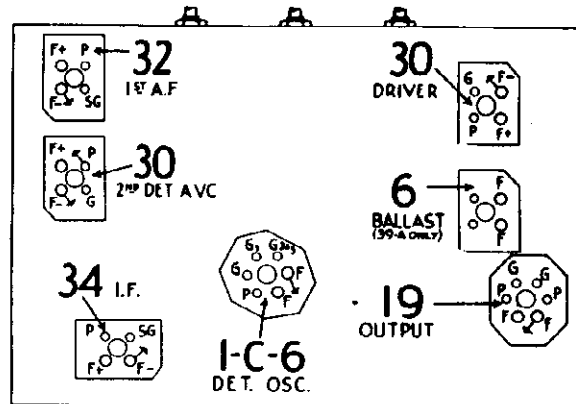


FIG. 1—Bottom View of Tube Sockets for making Voltage Tests

Adjusting Compensating Condensers

The adjustment of compensating condensers in Model 39 requires the use of a signal generator capable of producing a signal on standard broadcast frequencies, and another for the short-waves or high frequencies. For the former 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 091 has a fundamental frequency of 3600 K. C. (3.6 M. C.) any harmonic (multiple) 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 contacts of the type 19 output tube.

Adjustments are then made in the following order; positions of all compensators (except number ① visible in Fig. 4) are shown in Fig. 2.

Adjustment of the Intermediate Frequency

Remove the grid clip from the type 1C6 tube and connect the "ANT." output terminal of the 024 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 39) and with the receiver and signal generator turned on, the wave band switch at left and dial at 600

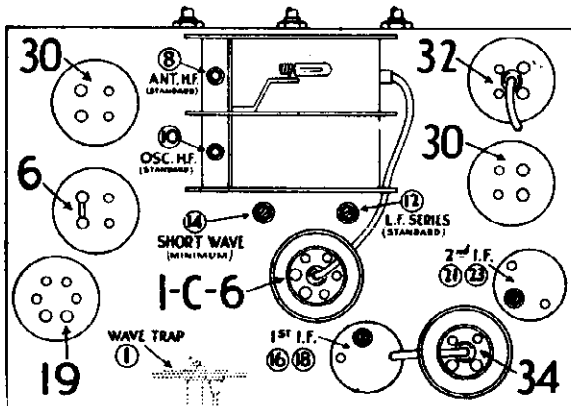


FIG. 2—Locations of Compensating Condensers

PHILCO RADIO & TELEV. CORP.

I. F.—460 K. C.

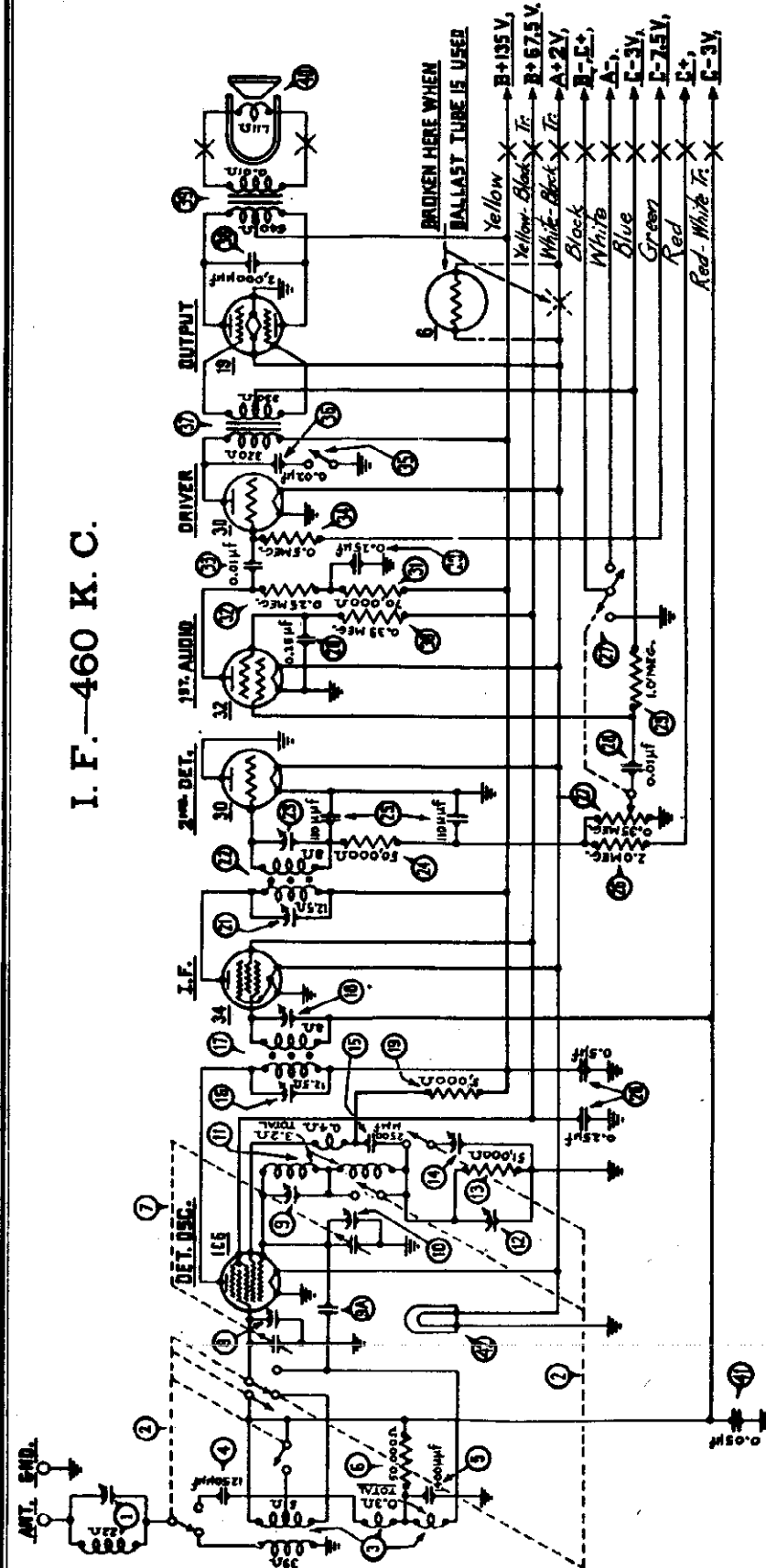


FIG. 3—Schematic Wiring Diagram

Color code of connections from battery cable to plug. "A" battery leads do not come to plug but are brought out of cable just above plug, and polarity marked on metal tag on each lead.

MODELS 39, 39-A
Alignment, Part 2
Chassis, Parts

PHILCO RADIO & TELEV. CORP.

K. C., adjust each of the I. F. compensating condensers in turn, to give maximum response in the output meter. If the needle on the meter goes off scale, turn back the attenuator on the signal generator. The two pairs of I. F. compensating condensers are located one pair at the top of each of the two I. F. transformer shields. These are the two metal "cans" near the rear corner of the chassis. Each of the I. F. 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 Figs. 2 and 3 are ⑩, ⑪, ⑫ and ⑬.

Adjustment of the Wave Trap

Replace the grid clip upon the Deflector-Oscillator tube (Type 1C6). Connect the output leads from the 024 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 (left position) and the Station Selector at the low frequency (600 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 Figs. 2 and 4. It is reached from the rear of the chassis, by inserting the fibre wrench through the hole near rear center of sub-base.

Adjustments for Standard Waves

H. F. end: Set signal generator at 1500 K. C. and dial at 150 (lower scale). Now adjust condensers ⑥ (Antenna) and ⑩ (Oscillator H. F.) to get maximum response. These condensers are located on the tuning condenser assembly and visible in Fig. 2.

L. F. (series): Turn dial to 60 and set signal generator at 600. Adjust condenser ⑫ for maximum output. This is reached from the top, through hole in chassis at rear of tuning condenser (see Fig. 2).

Adjustment of Short-Wave Compensators

The crystal controlled signal generator is used for these adjustments. Connect its leads to antenna and ground posts

of set. Turn the wave band switch to the right, and the 091 signal generator "on." H. F. or maximum: Turn the dial of the set to about half way between 14 and 15 megacycles (top scale) and you should there pick up the 4th harmonic (14.4) of the 3.6 M. C. signal. Adjust the S. W. (maximum) compensator ⑭ (see Fig. 4) to give maximum response in the output meter. This compensator is reached from underneath the chassis.

S. W. (minimum): 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 ⑱ (S. W. series) for maximum response. This condenser is reached from above, through hole in top of chassis (see Fig. 2).

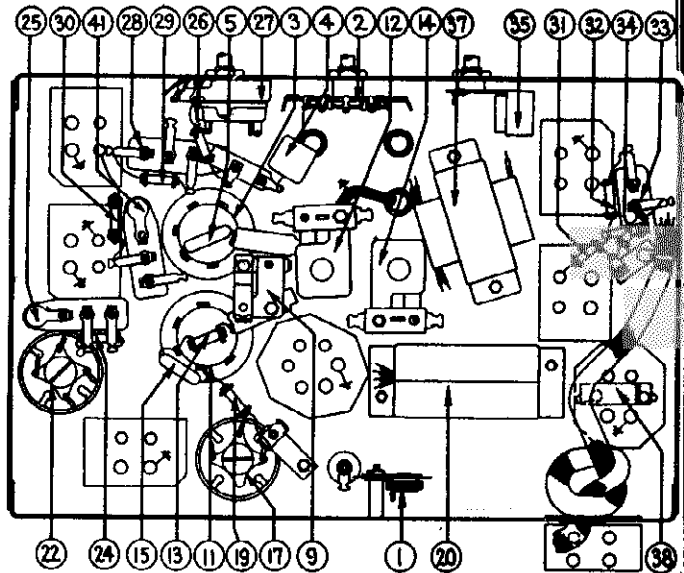


FIG. 4—Bottom View of Chassis

Replacement Parts—Model 39

Nos. on Fig. 3 & 4	Description	Part No.	List Price
①	Wave Trap.....	38-5994	\$0.30
②	Wave Band Switch.....	42-1092	.90
③	Antenna Transformer.....	32-1548	1.50
④	Condenser (.00125 mfd. mica).....	5888	.35
⑤	Condenser (.0014 mfd. mica).....	7007	.35
⑥	Resistor (50000 ohms) (Green-Brown-Orange).....	6098	.20
⑦	Tuning Condenser Assembly.....	31-1440	.....
⑧	Compensating Condenser (Ant.).....	Part of ⑦	.....
⑨	Compensating Condenser (S. W. Maximum).....	04000-V	.20
⑩	Condenser (capacity from twisted wires).....	.....	.....
⑪	Compensating Condenser (Osc. H. F. Bdcst).....	Part of ⑦	.....
⑫	Oscillator Transformer.....	32-1549	1.00
⑬	Compensating Condenser (Osc. L. F. Bdcst).....	04000-S	.35
⑭	Resistor (50000 ohms) (Green-Brown-Orange).....	6098	.20
⑮	Compensating Condenser (Short-wave Minimum).....	04000-R	.45
⑯	Condenser (.0025 mfd. mica).....	7006	.40
⑰	Compensating Condenser (1st I. F. pri.).....	Part of ⑰	.....
⑱	1st I. F. Transformer.....	32-1550	1.75
⑲	Compensating Condenser (1st I. F. sec.).....	Part of ⑱	.....
⑳	Resistor (5000 ohms) (Green-Black-Red).....	6096	.20
㉑	Condenser (Metal Case, 4 sec.: .5, .25, .25, .25 mfd.).....	30-4253	1.20
㉒	Compensating Condenser (2nd I. F. pri.).....	Part of ㉒	.....
㉓	2nd I. F. Transformer.....	32-1551	1.65
㉔	Compensating Condenser (2nd I. F. sec.).....	Part of ㉔	.....
㉕	Resistor (50,000 ohms) (Green-Brown-Orange).....	6098	.20
㉖	Condenser (.001 mfd. twin bakelite block).....	8035-C	.25
㉗	Resistor (2 meg.) (Red-Black-Green).....	33-1025	.20
㉘	Volume Control & On-Off Switch.....	33-5020	1.45

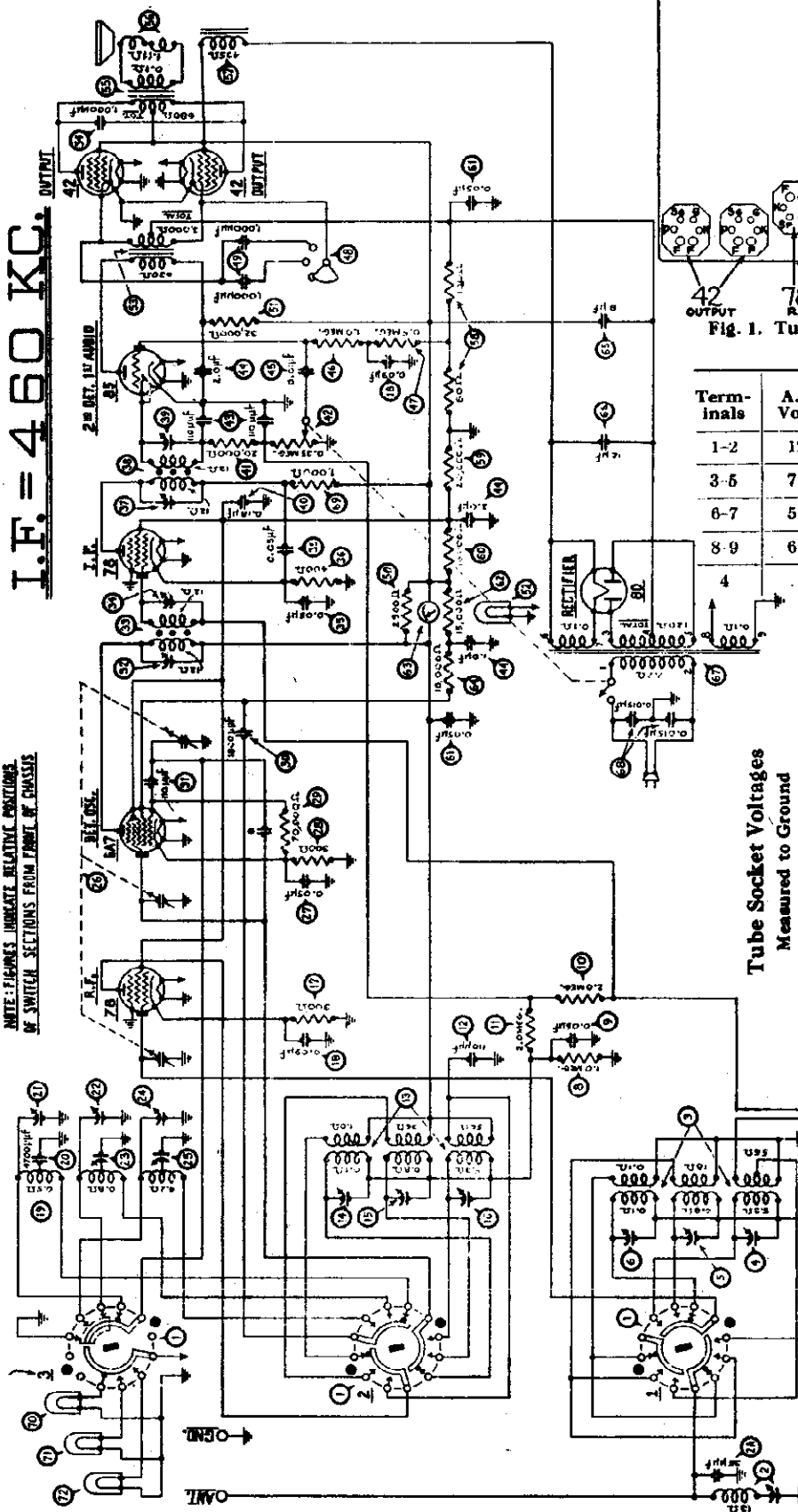
Nos. on Fig. 3 & 4	Description	Part No.	List Price
㉙	Condenser (.01 mfd. bakelite block).....	3903-AD	\$0.25
㉚	Resistor (1 meg.) (Brown-Black-Green).....	33-1006	.20
㉛	Resistor (330000 ohms) (Orange-Orange-Yellow).....	6046	.20
㉜	Resistor (70000 ohms) (Violet-Black-Orange).....	33-1115	.20
㉝	Resistor (.25 meg.) (Red-Yellow-Yellow).....	33-1097	.20
㉞	Condenser (.01 mfd. bakelite block).....	3903-AD	.25
㉟	Resistor (5 meg.) (Yellow-White-Yellow).....	6097	.20
㊱	Tone Control (2 pt.).....	30-4251	.50
㊲	Condenser (in tone control).....	Part of ㊲	.....
㊳	Audio Transformer.....	7233	1.80
㊴	Condenser (.002 mfd. tubular).....	30-4177	.25
㊵	Output Transformer.....	32-7286	1.60
㊶	Cone & Voice Coil Assembly (KR-7 Speaker).....	36-3159	.80
㊷	Condenser (.05 mfd. bakelite block).....	3615-BC	.35
㊸	Pilot Lamp (dial).....	5316	.23
㊹	Dial Assembly.....	31-1471	.40
㊺	Tube Shield (fits over base).....	8005	.10
㊻	Tube Shield (fits inside base).....	28-1107	.10
㊼	Tube Socket (4-prong).....	7545	.11
㊽	Tube Socket (6-prong).....	7547	.11
㊾	Chassis Mounting Screw.....	W-567	per C 3.00
㊿	Chassis Mounting Washer (30-B).....	5058	per C .85
1	Chassis Mounting Washer (30-F).....	W-315A	per C .50
2	Chassis Mounting Washer (rubber).....	5189	.04
3	Knob.....	27-4052	.10
4	Battery Cable Assembly (with plug).....	41-3118	2.25
5	Ballast Tube Jumper Wire.....	28-8061	.014

*Do not show in Fig. 4.

PHILCO RADIO & TELEV. CORP.

Fig. 2. Schematic Diagram of Model 97

NOTE: Condenser marked with an asterisk (*) is not a separate part, but simply a capacity obtained by two wires twisted together.



I.F. = 460 KC.

NOTE: FIGURES INDICATE RELATIVE POSITIONS OF SWITCH SECTIONS FROM FRONT OF CHASSIS.

NOTE: ALL SWITCH SECTIONS SHOWN IN POSITION NO. 2

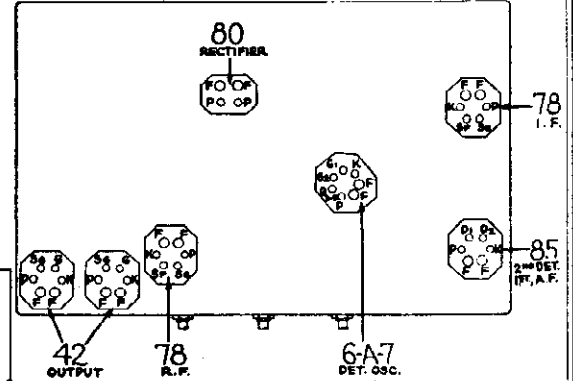


Fig. 1. Tube Sockets as viewed from bottom. Power Transformer Data

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 Point	78 R.F.	6A7 Det. Osc.	78 I.F.	85 2d Det.	42 Output
P	257	257	265	105	260
SG	97	97	97	...	270
K	2.3	2.6	3	...	...

6A7, G₁ = -14; G₂ = 179.

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 55; waveband switch counter-clockwise (band 1). Use Fig. 1 for test points.

MODEL 97

**Alignment, Trimmers
Data**

PHILCO RADIO & TELEV. CORP.

Tubes Used: 1 type 78, R.F.; 1 type 6A7, Detector-Oscillator; 1 type 78, I.F.; 1 type 85, 2d Detector and 1st A.F.; 2 type 42 Output; 1 type 80 Rectifier.

Frequency Range: 540-18000 Kilocycles continuous. Divided into three bands, selectable by 3-point waveband switch.

Coverage of Each Band: Band 1, 550-1750 K.C.; Band 2, 1750-5750 K.C.; Band 3, 5750-18000 K.C. (5.75 to 18.0 megacycles).

Tuning Drive: Dual planetary, ball bearing, non-slip cord from tuning shaft to dial shaft. 80 to 1 ratio for slow-speed tuning.

Tuning Meter: Shadow Tuning Meter. Pilot lamp for each waveband. Waveband switch automatically connects for use the lamp illuminating the scale in use only.

Tone Control: 3-position, with fixed bass compensation.

Intermediate Frequency: 460 K.C.

Power Consumption: 90 watts.

The adjustment of the compensating condensers in Model 97 requires a signal generator covering the broadcast and police bands, and also one capable of producing a signal at certain 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 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 broadcast band, wave band switch to extreme left (clockwise), and have 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 ② and ③ (2d I.F.) for maximum reading in the output meter, and then condensers ① and ④ (1st I.F.).

Adjustment of Wave-Trap

1. Connect the signal generator leads to the antenna and ground terminals of the receiver. Replace the grid clip on the 6A7 grid cap.

2. Set the wave-band switch of the receiver to the extreme left (broadcast position) (Range No. 1, 540-1750 K.C.), and turn the station selector to 550 K.C.

3. With the signal generator in operation at 460 K.C., adjust the wave-trap ② 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 Range 3 (extreme right) 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 ⑩, ⑪ and ⑫, respectively in figure No. 2.

3. Turn the wave-band switch to Range 2 (police bands, 1.75 to 5.8 M.C.) and adjust the tuning dial to 3.6 M.C. (the fundamental signal of the signal generator). Adjust the oscillator, R.F. and antenna compensators (⑬, ⑭ and ⑮, respectively) for maximum output.

5. At this point it will again be necessary to make use of the broadcast type signal generator Models 024, 048A or equivalent. Connect the output of this signal generator to the antenna and ground terminals of the chassis. Turn the station selector dial to 1.8 M.C. (Range 2) and adjust the signal generator to the same frequency (1800 K.C.). Adjust compensator ⑯ (nut) for maximum output.

6. Turn the wave-band switch to Range No. 1 (broadcast band) and set the dial at 1600 K.C. Set the signal generator at this frequency and adjust compensators ⑰, ⑱ and ⑲ for maximum output.

7. Tune the receiver and the signal generator to 600 K.C. and adjust compensator ⑳ (screw) for maximum output.

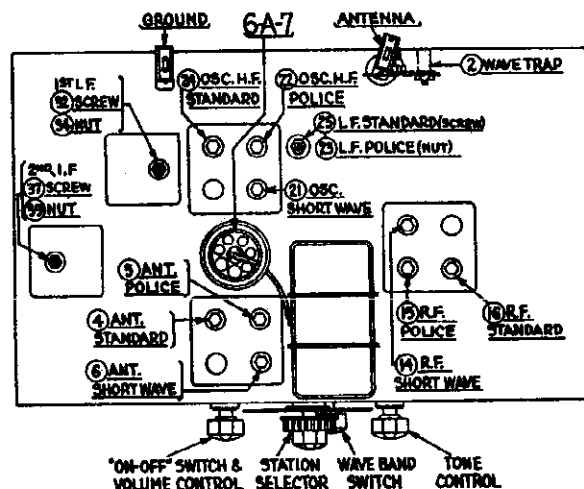


Fig. 4. Locations of Compensating Condensers

PHILCO RADIO & TELEV. CORP.

MODEL 97
Chassis, Parts

Replacement Parts—Model 97

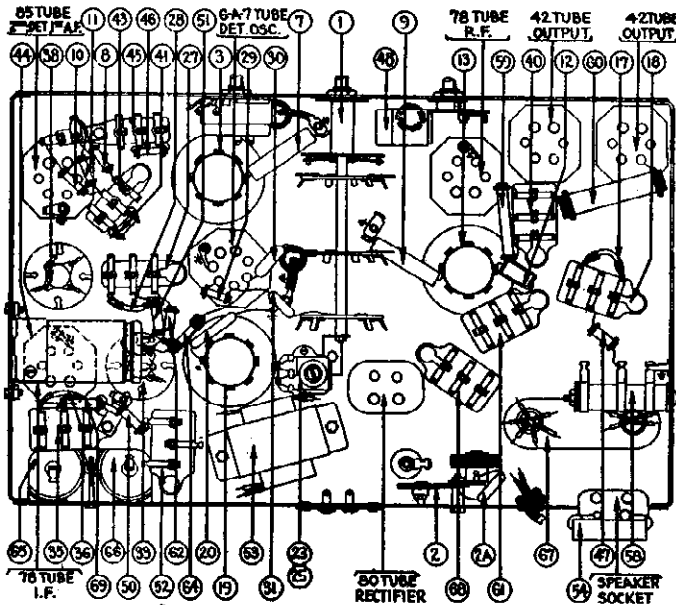


Fig. 3. Bottom View of Chassis

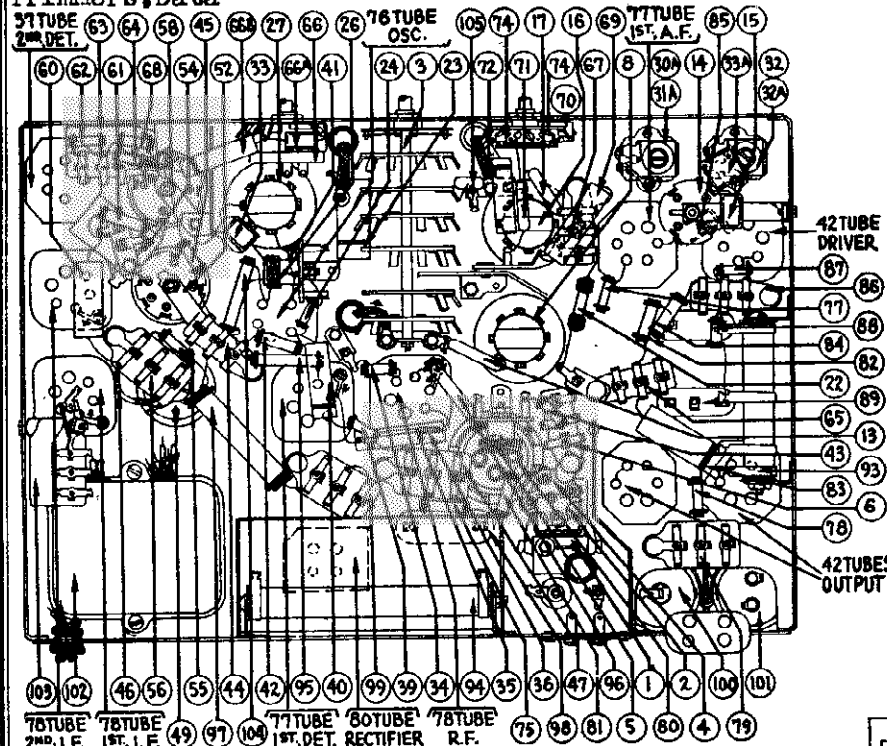
Description		Part No.	List Price
1	Waveband Switch.....	42-1104	\$2.50
2	Wavetrap.....	38-6718	1.00
3	Condenser (.000035 Mfd. Mica).....	30-1044	.35
4	Antenna Transformer.....	32-1635	3.00
5	Compensating Condenser (Antenna, Standard).....	Part of 5	.....
6	Compensating Condenser (Antenna, Police Band).....	Part of 5	.....
7	Compensating Condenser (Antenna, Short Wave).....	Part of 5	.....
8	Condenser (.05 Mfd. Tubular).....	30-4020	.35
9	Resistor (1 Meg.) (Brown, Black, Green).....	33-1096	.20
10	Condenser (.05 Mfd. Tubular).....	30-4020	.35
11	Resistor (2 Meg.) (Red, Black, Green).....	33-1172	.20
12	Resistor (2 Meg.) (Red, Black, Green).....	33-1172	.20
13	Condenser (.00011 Mfd. Mica).....	30-1031	.35
14	R.F. Transformer.....	32-1636	3.25
15	Compensating Condenser (R.F., Short Wave).....	Part of 15	.....
16	Compensating Condenser (R.F., Police Band).....	Part of 15	.....
17	Compensating Condenser (R.F., Standard).....	Part of 15	.....
18	Resistor (300 ohms Flexible) (Orange, Black, Brown).....	33-3010	.20
19	Condenser (.09 Mfd. Twin Bakelite Block).....	4989-DG	.40
20	Oscillator Transformer.....	32-1637	2.50
21	Condenser (.0047 Mfd. Mica).....	30-1052	.60
22	Compensating Condenser (OSC., Short Wave).....	Part of 22	.....
23	Compensating Condenser (OSC., H.F. Police).....	Part of 23	.....
24	Compensating Condenser (OSC., L.F. Police).....	Part of 23	.....
25	Compensating Condenser (OSC., L.F. Police).....	Part of 23	.....
26	Compensating Condenser (OSC., H.F. Standard).....	Part of 26	.....
27	Compensating Condenser (OSC., L.F. Standard).....	Part of 26	.....
28	Tuning Condenser Assembly.....	31-1518	6.75
29	Condenser (.05 Mfd. Bakelite Block).....	3615-SG	.35
30	Resistor (300 ohms Flexible) (Orange, Black, Brown).....	33-3010	.20
31	Resistor (7000 ohms) (Violet, Black, Orange).....	33-1164	.20
32	Condenser (.0018 Mfd. Mica).....	6018	.40
33	Condenser (.00011 Mfd. Mica).....	30-1031	\$0.35
34	Compensating Condenser (1st I.F. Pri.).....	Part of 34	.....
35	First I.F. Transformer.....	32-1631	1.60
36	Compensating Condenser (1st I.F. Sec.).....	Part of 36	.....
37	Condenser (.05 Mfd. Twin Bakelite Block).....	3615-DU	.40
38	Resistor (400 ohms Flexible) (Yellow, Black, Brown).....	33-3016	.20
39	Compensating Condenser (2nd I.F. Pri.).....	Part of 39	.....
40	2nd I.F. Transformer.....	32-1632	1.60
41	Compensating Condenser (2nd I.F. Sec.).....	Part of 41	.....
42	Condenser (.18 Mfd. Bakelite Block).....	4989-DG	.40
43	Resistor (20000 ohms) (Red, Black, Orange).....	33-1130	.20
44	Volume Control (350000 ohms) & On-Off Switch.....	33-5102	1.45
45	Condenser (.00011 Mfd. Twin Bakelite Block).....	8035-DG	.25
46	Condenser (Electrolytic: 2 Mfd., 2 Mfd., 1 Mfd.).....	30-2114	2.25
47	Condenser (.01 Mfd. Bakelite Block).....	3903-SU	.25
48	Resistor (1 Meg.) (Brown, Black, Green).....	33-1171	.20
49	Resistor (.5 Meg.) (Yellow, White, Yellow).....	33-1169	.20
50	Tone Control.....	30-4311	.65
51	Condensers in Tone Control.....	Part of 51	.....
52	Resistor (2900 ohms) (Red, White, Red).....	5309	.20
53	Resistor (32000 ohms) (Orange, Red, Orange).....	3525	.20
54	Pilot Lamp.....	Part of 54	.....
55	Condenser (.25 Mfd. Bakelite Block).....	6287-P	.40
56	Audio Transformer.....	32-7372	2.50
57	Condenser (.001 Mfd. Tubular).....	30-4201	.25
58	Output Transformer (on Speaker).....	2585	1.55
59	Speaker Cone & Voice Coil Assembly.....	{ K-31 36-3174 H-21 02825	.80 1.20
60	Speaker Field Coil.....	{ K-31 36-3463 H-21 36-3461	3.75 3.75
61	B-C Resistor (Wire-Wound 100 ohm, 60 ohms).....	33-3208	.20
62	Resistor (20000 ohms) (Red, Black, Orange).....	33-1130	.20
63	Resistor (16000 ohms) (Brown, Blue, Orange).....	33-1201	.35
64	Condenser (.05 Mfd. Twin Bakelite Block).....	3615-DG	.40
65	Resistor (15000 ohms) (Brown, Green, Orange).....	6208	.20
66	Shadow Tuning Meter.....	45-2028	2.50
67	Resistor (10000 ohms) (Brown, Black, Orange).....	4412	.20
68	Condenser (Electrolytic—8 Mfd.).....	30-2025	1.35
69	Condenser (Electrolytic—12 Mfd.).....	30-2117	1.50
70	Power Transformer, 115 Volts, 60 Cycles.....	32-7369	8.00
	115 Volts, 25 Cycles.....	32-7370	8.25
	230 Volts, 60 Cycles.....	32-7371	7.75
71	Condenser (.015 Mfd. Twin Bakelite Block).....	3793-DG	.40
72	Resistor (1000 ohms) (Brown, Black, Red).....	5837	.20
73	Dial Lamp (Standard Band).....	34-2031	.12
74	Dial Lamp (Police Band).....	34-2031	.12
75	Dial Lamp (Short-wave Band).....	34-2031	.12
76	Dial Assembly.....	31-1513	.75
77	Knob (Tone Control, Volume Control).....	27-4052	.10
78	Knob (Waveband).....	27-4051	.10
79	Knob (Station Select).....	27-4139	.10
80	Knob (Fine Tuning).....	27-4140	.10
81	Tube Shield Body.....	28-1107	.10
82	Tube Shield Base.....	28-1110	.04
83	Pilot Lamp Assembly.....	38-6075	.15
84	4 Prong Tube Socket.....	27-6006	.10
85	6 Prong Tube Socket.....	27-6020	.11
86	7 Prong Tube Socket.....	27-6012	.10
87	Electric Cord and Plug.....	L-943A	.60
88	Speaker Socket.....	27-6018	.10
89	Chassis Mtg. Screw (97-X).....	W-1345-A	2.75C
90	Chassis Mtg. Screw (97-B).....	W-1346-A	.60C
91	Chassis Mtg. Foot (Rubber).....	27-4116	.05
92	Chassis Mtg. Foot Plate.....	27-7497	.35C
93	Chassis Mtg. Washer.....	28-2089	.35C
94	Bezel.....	27-4120	.15

†Omitted after Run 3. Not shown in Fig. 2.
‡In Model 97-A (25 cycles) this is Part No. 30-2026.

MODEL 116-B (Code 121)

Chassis, Socket, Voltage PHILCO RADIO & TELEV. CORP.

Trimmers, Data



Power Transformer Data

Terminals	A.C. Volts	Current	Circuit	Color
1-2	120	.....	Primary	White
3-5	720	123 M.A.	Secondary	Yellow
6-7	5.0	2.0 A.	Fil. Rect.	Blue
8-9	6.3	5.0 A.	Filaments	Black
4	...	.....	Center Tap of 3-5	Yellow, Green Tracer

Fig. 4 Bottom View of Chassis
Tube Socket Voltages
Measured to Ground—Line Voltage 115

Tube Point	78 R.F.	77 1st Det.	76 Osc.	78 1st I.F.	78 2d I.F.	37 2d Det.	77 1st A.F.	42 Driver	42 Out-put
P	187	202	75	193	199	0	67	192	279
SG	74	74	...	74	74	..	52	192	279
K	1.8	5.4	5.0	1.8	5.1	...	...	...	...

80 Rect. Cathode—290V.

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 standard broadcast (band 4). Use Fig. 1 for test points. H-13 Speaker used.

Type Circuit: Superheterodyne, with push-pull pentodes connected as triodes in output; output 10 watts; built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

Power Supply: Alternating Current. Voltage and frequency as specified on chassis nameplate.

Tubes Used: Eleven (11) Total: 1 type 78 R.F., 1 type 77 1st detector, 1 type 76 oscillator, 2 type 78 I.F., 1 type 37 2nd detector, 1 type 77 1st audio, 1 type 42 driver, 2 type 42 output, 1 type 80 rectifier.

Wave Bands: Five—(1) Shortwave, daytime; (2) Shortwave, night-time; (3) Police and amateur; (4) Standard Broadcast; (5) Longwave (weather forecasts).

Frequency Ranges: Band (1)—9.7-22.5 Megacycles; Band (2)—4.1-10.0 Megacycles; Band (3)—1.5-4.1 Megacycles; Band (4)—540 to 1500 K.C.; Band (5)—150-390 K.C.

Program Control: 5 positions: (1) Mellow, (2) Brilliant, (3) Speech, (4) Normal, (5) noise reducing. Last two positions recommended for foreign short wave stations.

Tuning Meter: Shadow type tuning meter, mounted directly above scale.

Waveband Indicator: Glowing arrow on tuning scale shifts to proper scale when waveband switch is turned.

Automatic Volume Control: Fully effective on all stations.

Bass Compensation: Automatic: Effective when needed.

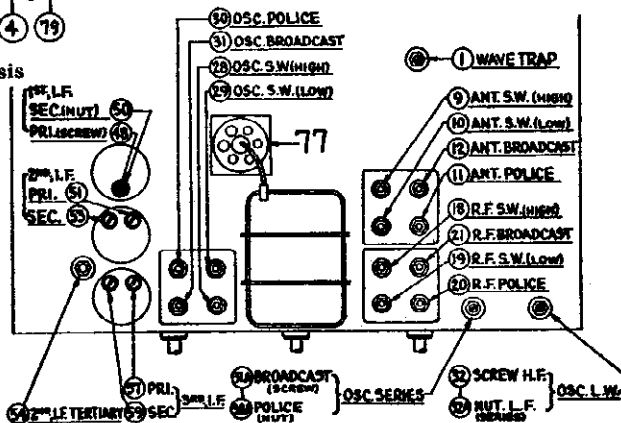


Fig. 2. Locations of Compensating Condensers

Tuning Drive: Dual planetary, ball bearing. 80 to 1 ratio for slow-speed tuning, 10 to 1 for main drive.

Intermediate Frequency: 460 K.C.

Power Consumption: 100 watts.

Speaker: Type H-13.

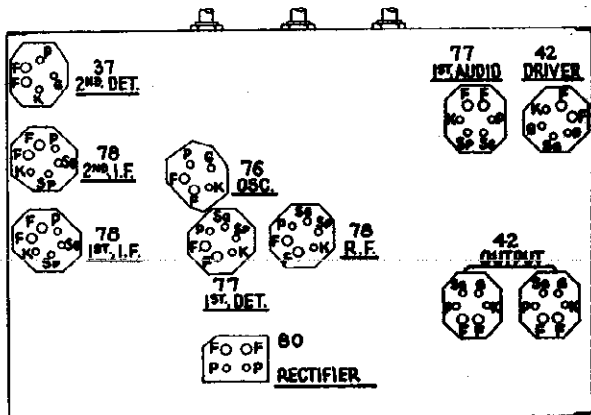


Fig. 1. Tube Sockets as viewed from bottom

MODEL 116-B (Code 121)

Alignment, Parts

PHILCO RADIO & TELEV. CORP.

Adjustment of compensating condensers in Model 116 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 20000 K.C. will be 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 locations of the various compensating condensers is shown in Fig. 2. Connect the output meter to the plate contacts of the output tubes (using the adapters provided with the "025") and set it at the 0-30 volt range.

I.F.—Set the Signal Generator at 460 K.C., and attach its antenna lead to the grid cap of the 77 1st detector tube (having removed the grid clip from the tube). Connect the ground terminal of the Signal Generator to the ground terminal of the set. Turn on the set; turn the waveband switch to standard broadcast (second position from left) and set dial at 55. Turn condenser (2nd I.F. tertiary) all the way down before adjusting the other I.F. Compensators. Now with the fibre screwdriver, adjust condensers (3rd I.F.), (2nd I.F.), and then (1st I.F.) until maximum reading is obtained in the output meter. Turn down the "attenuator" on the signal generator if the output meter needle goes off the scale. Now adjust condenser (2nd I.F. tertiary for maximum reading).

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 77 tube cap. With the signal generator operating at 460 K.C. and the set controls adjusted as for I.F., adjust wavetrap (1) until the minimum reading is obtained in the output meter.

SHORTWAVE (DAYTIME BAND)—Turn wave band switch to the shortwave (daytime) position (extreme right). Set signal generator at 18 megacycles and dial of set at 18.0 (top scale). Now adjust the oscillator, Antenna, and R.F. shortwave compensators in turn, for maximum reading. These are (2), (3) and (4) respectively.

SHORTWAVE (NIGHT-TIME BAND)—Turn the waveband switch to position 4 (counting from the left). Set the signal generator and receiver at 9.5 megacycles and adjust the oscillator, antenna and R.F. compensators respectively, in this band for maximum reading. These are (5), (6) and (7).

POLICE AND AMATEUR BAND—Turn the waveband switch to position 3. Set the dial and signal generator at 4.0 megacycles and adjust condensers (8), (9) and (10) respectively for maximum reading.

Set the signal generator at 1600 K.C. and turn the dial to 1.6. Adjust condenser (11a) (nut), oscillator police series, to maximum reading.

STANDARD BROADCAST BAND—Turn the waveband switch to position 2 (from left). Set the dial and signal generator at 1500 K.C. and adjust condensers (12), (13) and (14) for maximum reading.

Set the dial and signal generator at 600 K.C. and adjust condenser (15a) (screw), broadcast series, for maximum reading.

LONGWAVE BAND—Turn waveband switch to position 1 (left). Set the dial and signal generator at 340 K.C. and adjust condenser (16) (screw) to maximum. This is the upper end of the longwave (low frequency) band. Finally, set the dial and signal generator at 175 K.C. and adjust condenser (17a) (nut) for maximum reading. This is the lower end of the longwave band.

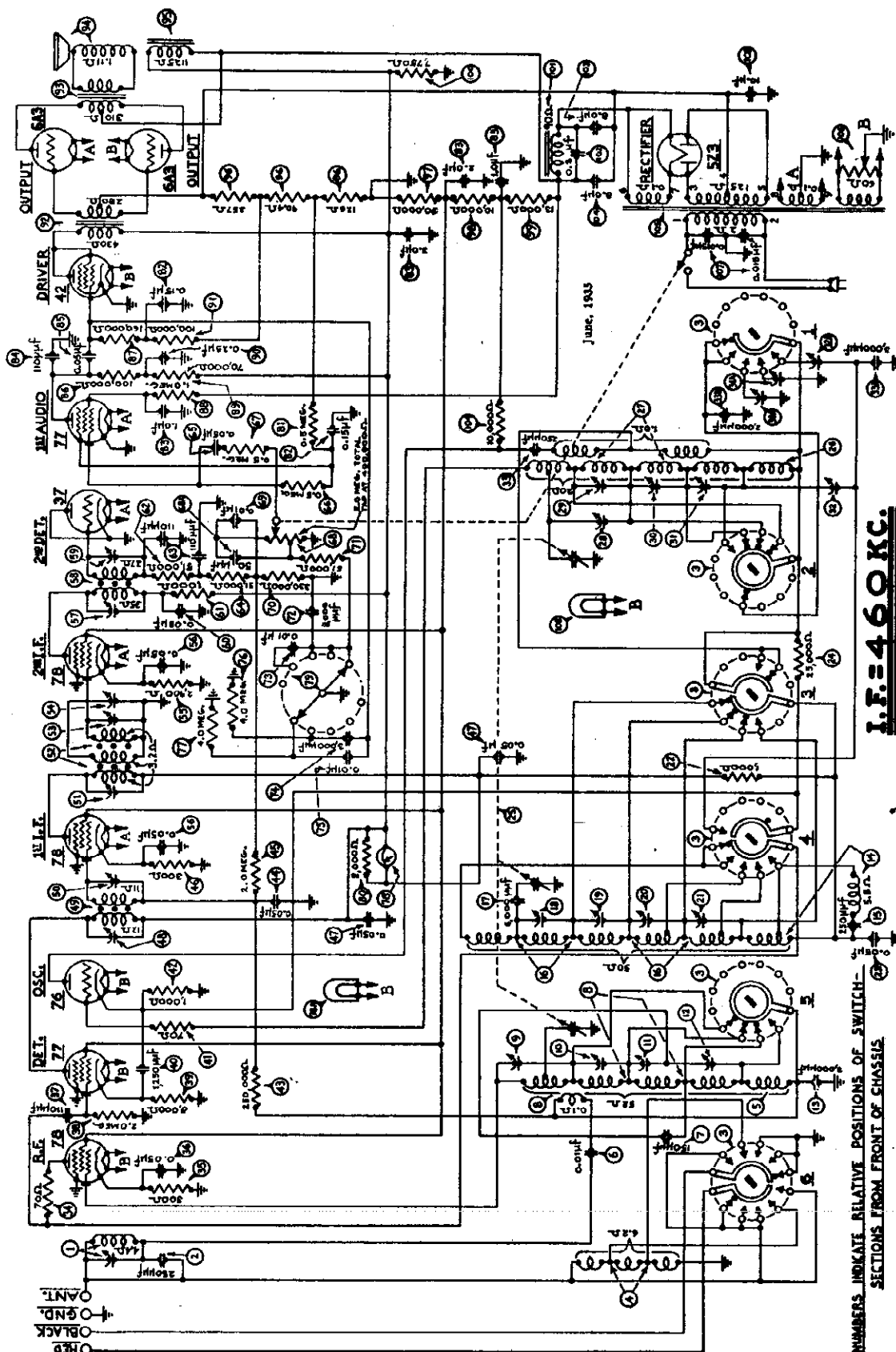
Description	Part No.	List Price
Wave Trap	38-8889	\$1.00
Condenser (.00025 Mfd. Mica)	30-1032	.35
Waveband Switch	43-1118	2.00
Transmission Line Transformer	32-1808	1.00
Antenna Transformer (Long Wave)	32-1729	.55
Condenser (.01 Mfd. Bakelite Block)	3903-SU	.25
Condenser (.00015 Mfd. Mica)	320-1036	.35
Antenna Transformer (Standard, Police, Shortwave)	32-1735	3.00
Compensating Condenser (Ant. S.W. High Band)	Part of (1)	
Compensating Condenser (Ant. S.W. Low Band)	Part of (1)	
Compensating Condenser (Ant. Police)	Part of (1)	
Compensating Condenser (Ant. Standard)	Part of (1)	
Condenser (.003 Mfd. Mica)	7301	.45
R. F. Transformer (Long Wave)	32-1730	1.25
Condenser (.00025 Mfd. Mica)	30-1032	.35
R. F. Transformer (Standard, Police, S.W.)	32-1468	2.50
Condenser (.002 Mfd. Mica)	30-1042	.40
Compensating Condenser (R.F. Shortwave (High Band))	Part of (2)	
Compensating Condenser (R.F. Shortwave (Low Band))	Part of (2)	
Compensating Condenser (R.F. Police)	Part of (2)	
Compensating Condenser (R.F. Standard)	Part of (2)	
Resistor (1000 ohms) (Brown-Black-Red)	5827	.20
Condenser (.05 Mfd. Tubular)	30-4122	.35
Resistor (25000 ohms) (Red-Green-Orange)	32-1013	.20
Tuning Condenser Assembly	31-1606	5.50
Oscillator Transformer (Long Wave)	32-1731	.55
Oscillator Transformer (Standard, Police, Shortwave)	32-1734	2.50
Compensating Condenser (Osc. S.W., High Band)	Part of (3)	
Compensating Condenser (Osc. S.W., Low Band)	Part of (3)	
Compensating Condenser (Osc. Police)	Part of (3)	
Compensating Condenser (Osc. Police Series)	Part of (3)	.70
Compensating Condenser (Osc. Standard)	Part of (3)	
Compensating Condenser (Osc. Standard Series)	Part of (3)	.70
Compensating Condenser (Osc. Longwave)	31-8050	.40
Compensating Condenser (Osc. Longwave Series)	31-8050	.40
Condenser (.00025 Mfd. Mica)	5858	.35
Condenser (.003 Mfd. Mica)	30-1028	.60
Resistor (70 ohms) (Violet-Black-Black)	33-1139	.20
Resistor (300 ohms Flexible) (Orange-Black-Brown)	32-3010	.30
Condenser (.05 Mfd. Tubular)	30-4020	.35
Condenser (.00011 Mfd. Tubular)	*30-4340	.25
Resistor (2 Megs.) (Red-Black-Green)	*33-1025	.20
Resistor (8000 ohms) (Gray-Black-Red)	33-1114	.20
Condenser (.00125 Mfd. Tubular)	30-4356	.25
Resistor (70 ohms) (Violet-Black-Black)	32-1129	.20
Resistor (1000 ohms) (Brown-Black-Red)	5827	.20
Resistor (240000 ohms) (Red-Yellow-Yellow)	32-1097	.30
Condenser (.05 Mfd. Bakelite Block)	3418-SG	.35
Resistor (2 Megs.) (Red-Black-Green)	32-1025	90.30
Resistor (300 ohms Flexible) (Orange-Black-Black)	32-3010	.20
Condenser (.05 Mfd. Twin Bakelite Block)	3615-DG	.40
Compensating Condenser (1st I.F. Primary)	Part of (4)	
First I.F. Transformer	32-1642	2.00
Compensating Condenser (1st I.F. Secondary)	Part of (4)	
Compensating Condenser (2nd I.F. Primary)	Part of (4)	.45
Second I.F. Transformer	32-1724	1.25
Compensating Condenser (2nd I.F. Secondary)	Part of (4)	.45
Compensating Condenser (2nd I.F. Tertiary)	04000R	.85
Resistor (2900 ohms) (Red-White-Red)	6309	.30
Condenser (.05 Mfd. Twin Bakelite Block)	3615-DG	.40

Compensating Condenser (3rd I.F. Primary)	Part of (5)	.45
3rd I.F. Transformer	32-1188	.65
Compensating Condenser (3rd I.F. Secondary)	Part of (5)	.45
Condenser (.08 Mfd. Tubular)	30-4123	.35
Resistor (1000 ohms) (Brown-Black-Red)	5827	.20
Resistor (51000 ohms) (Green-Brown-Orange)	32-1163	.30
Condenser (.00011 Mfd. Twin Bakelite Block)	8025-DG	.25
Resistor (51000 ohms) (Green-Brown-Orange)	32-1163	.30
Condenser (.01 Mfd. Bakelite Block)	3903-SU	.25
Volume Control and On-Off Switch (See Note Below)	32-5022	1.45
Condenser (.00005 Mfd. Mica)	30-1029	.35
Condenser (.05 Mfd. Tubular)	30-4020	.35
Resistor (80000 ohms) (Blue-Black-Orange)	32-1181	.20
Resistor (330000 ohms) (Orange-Orange-Yellow)	32-1300	.20
Condenser (.004 Mfd. Tubular)	30-4185	.40
Condenser (.004 Mfd. Tubular)	30-4185	.40
Condenser (.003 Mfd. Mica)	30-1028	.60
Condenser (.01 Mfd. Tubular)	30-4189	.30
Pilot Lamp (Shadow Tuning Meter)	Part of (6)	
Tune Control Switch	42-1119	.55
Resistor (2000 ohms) (Red-Black-Red)	0924	.20
Shadow Tuning Meter	45-3063	2.50
Resistor (1 Meg.) (Brown-Black-Green)	32-1066	.20
Resistor (500000 ohms) (Yellow-White-Yellow)	0007	.20
Condenser (.15 Mfd. Twin Bakelite Block)	6287-DG	4.00
Condenser (Electrolytic—1 Mfd., 3 Mfd., 2 Mfd., 1 Mfd.)	30-3121	2.50
Resistor (1 Meg.) (Brown-Black-Green)	4400	.20
Resistor (70000 ohms) (Violet-Black-Orange)	5825	.20
Condenser (.25 Mfd. Tubular)	30-4134	.45
Resistor (100000 ohms) (White-White-Yellow)	4411	.20
Condenser (.00011 Mfd. Mica)	30-1061	.35
Condenser (.05 Mfd. Bakelite Block)	3418-SU	.35
Resistor (160000 ohms) (Brown-Blue-Orange)	32-1191	.20
Resistor (100000 ohms) (White-White-Yellow)	32-1166	.20
Audio Transformer	32-7077	2.75
Output Transformer	32-7078	1.40
Cone and Voice Coil Assembly (H-13)	02625	1.20
Field Coil & Pot Assembly (H-13)	36-3104	2.70
B.C. Resistor (Wirewound) (20 ohms, 110 ohms, 180 ohms)	22-3021	.30
Resistor (Wirewound) (7750 ohms)	32-3020	.35
Resistor (30000 ohms) (Orange-Black-Orange)	7234	.30
Resistor (10000 ohms) (Brown-Black-Orange)	5824	.30
Resistor (13000 ohms) (Brown-Orange-Orange)	6420	.40
Filter Choke	32-7084	2.30
Condenser (.3 Mfd. Bakelite Block)	*3267-DU	4.00
Condenser (Electrolytic, 8 Mfd.)	1130-3028	1.35
Condenser (Electrolytic, 8 Mfd., 10 Mfd.)	30-3045	1.80
Power Transformer (115 V., 60 Cycles)	32-7201	7.00
Power Transformer (115 V., 25 Cycles)	32-7202	6.75
Power Transformer (230 V., 50 Cycles)	32-7203	6.75
Condenser (.015 Mfd. Twin Bakelite Block)	3705-DG	.40
Resistor (10000 ohms) (Brown-Black-Orange)	5824	.30
Condenser (.002 Mfd. Mica)	30-1042	.40
Pilot Lamp (Dial)	24-3020	.15
Condenser (.006 Mfd. Tubular) (Not shown in Fig. 4)	30-4128	.35
Condenser (.006 Mfd. Tubular) (Not shown in Fig. 4)	30-4128	.35

*Mounted on top of chassis.
 †Mounted inside (3).
 **In 25-cycle model, this is part No. 04887.
 ††In 25-cycle model, this is part No. 30-3026.
 Note: Volume Control is 2 meg., tapped at 400,000 ohms.

PHILCO RADIO & TELEV. CORP.

MODEL 116-X (Code 122)
Schematic



June, 1935

I.F. = 460 KC.

Schematic Diagram of Model 116-122

ALL SWITCH-SECTIONS SHOWN IN POSITION NO. 1.

NUMBERS INDICATE RELATIVE POSITIONS OF SWITCH-SECTIONS FROM FRONT OF CHASSIS.

RED
BLACK
GND.
ANT.

MODEL 116-X (Code 122)
Voltage, Chassis, Socket, PHILCO RADIO & TELEV. CORP.
Parts, Data

Model 116X (Code 122)

Type Circuit: Superheterodyne. Push-pull, 6A3 tubes, in output, 15 watts. Built in connections for Philco All-wave Aerial. Aerial Selector operated by waveband switch.

Power Supply: Alternating Current. Voltage and frequency as specified on chassis nameplate.

Tubes Used: Eleven Total: 1 type 78 R.F., 1 type 77 1st detector, 1 type 76 Oscillator, 2 type 78 I.F., 1 type 37 2nd Detector, 1 type 77 1st Audio, 1 type 42 Driver, 2 type 6A3 Output.

Wave Bands: Five—(1) Shortwave, daytime; (2) Short-wave, night-time; (3) Police and amateur; (4) Standard broadcast; (5) Longwave (weather forecasts).

Frequency Ranges: Band (1)—9.7-22.5 Megacycles; Band (2)—4.1-10.0 Megacycles; Band (3)—1.5-4.1 Megacycles; Band (4)—540 to 1500 K.C.; Band (5)—150-390 K.C.

Program Control: 5 positions: (1) Mellow, (2) Brilliant, (3) Speech, (4) Normal, (5) Noise-reducing. Last two positions recommended for foreign short wave stations.

Tuning Meter: Shadow type tuning meter, mounted directly above scale.

Waveband Indicator: Glowing arrow on tuning scale shifts to proper scale when waveband switch is turned.

Automatic Volume Control: Fully effective on all stations.

Potentiometer: To compensate for differences in characteristics of 6A3 tubes. Adjust for minimum low-pitched hum when set in operation, volume at minimum.

Acoustic Clarifiers: Three: mounted on inclined sounding board with speaker.

Bass Compensation: Automatic, effective when needed.
Speaker: Type U-9 (High-fidelity).
Tuning Drive: Dual Planetary, ball-bearing. 80 to 1 ratio for slow-speed tuning, 10 to 1 for main drive.
Intermediate Frequency: 460 K.C.
Power Consumption: 135 watts.

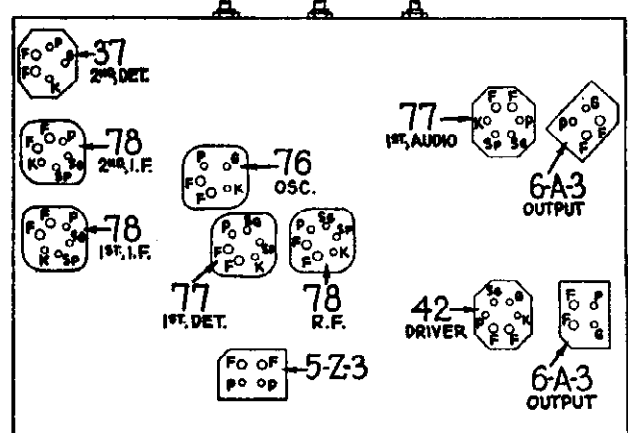


Fig. 1. Tube Sockets as viewed from bottom

Tube Socket Voltages
 (Line Voltage 115) All Voltages Measured to Ground

Tube Point	78 R.F.	77 1st Det.	76 Osc.	78 1st I.F.	78 2d I.F.	37 2d Det.	77 1st A.F.	42 Driver	6A3 Output	5Z3
P	207	215	98	208	212	0	95	220	320	...
SG	89	89	...	89	89	..	72	220	320	...
K	2.2	5.2	5.2	2.1	6.4	0	...	...	...	340

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 at standard broadcast. Use Fig. 1 for test points. U-9 Speaker used.

Power Transformer Data

Terminals	A.C. Volts	Current	Circuit	Color of Leads
1-2	120	.....	Primary	White
3-5	830	170 M. A.	Secondary	Yellow
6-7	5.0	3.0 A.	Rectifier Filament	Blue
8-9	6.3	2.7 A.	Filaments	Black
4	...	.....	Center Tap of 3-5	Yellow, Green Tracer

Compensating Condensers
 Adjustment same as Model 116 Code 121
 (Refer to Bulletin No. 222)

Replacement Parts Model 116 (122)
 Note: All parts on schematic and base view numbered from ① to ④ inclusive are the same as used on model 116B (121). Refer to Bulletin No. 222. Parts subsequent to 64 are listed herewith.

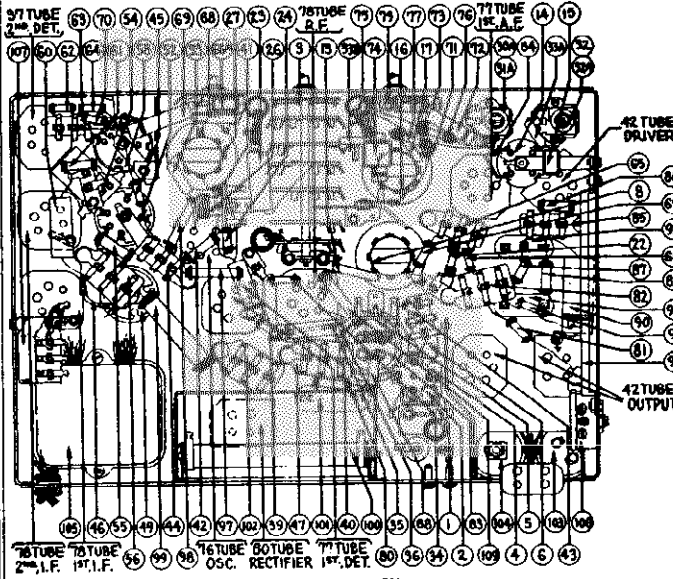


Fig. 2. Base View

Description	Part No.	List Price
Condenser (.05 Mfd. Bakelite Block)	3615-SU	\$0.35
Resistor (.5 Meg.) (Yellow-White-Yellow)	6097	.20
Resistor (.5 Meg.) (Yellow-White-Yellow)	6097	.20

Description	Part No.	List Price
Volume Control and On-Off Switch	33-5110	\$1.45
Condenser (.0005 Mfd. Mica)	30-1029	.35
Condenser (.01 Mfd. Tubular)	30-4169	.30
Resistor (330000 ohms) (Orange-Orange-Yellow)	33-1200	.20
Resistor (51000 ohms) (Green-Brown-Orange)	6098	.20
Condenser (.008 Mfd. Tubular)	30-4112	.25
Condenser (.01 Mfd. Tubular)	30-4189	.30
Condenser (.003 Mfd. Mica)	30-1028	.60
Condenser (.01 Mfd. Tubular)	30-4169	.30
Resistor (4 Meg.) (Yellow-Black-Green)	6010	.30
Resistor (4 Meg.) (Yellow-Black-Green)	6010	.30
Shadow Tuning Meter	45-2063	2.50
Pilot Lamp for Shadow Tuning Meter	Part of ②	
Tone Control Switch	42-1119	.50
Resistor (2000 ohms) (Red-White-Red)	6094	.20
Resistor (.5 Meg.) (Yellow-White-Yellow)	6097	.20
Condenser (15 Mfd. Twin Bakelite Block)	6287-DU	2.40
Condenser (Electrolytic) (1 Mfd., 3 Mfd., 2 Mfd., 1 Mfd.)	30-2121	2.50
Condenser (.00011 Mfd. Mica)	30-1031	.35
Condenser (.05 Mfd. Bakelite Block)	3615-SU	.35
Resistor (100000 ohms) (White-White-Yellow)	4411	.20
Resistor (160000 ohms) (Brown-Blue-Yellow)	33-1191	.20
Resistor (1 Meg.) (Brown-Black-Green)	4409	.20
Resistor (70000 ohms) (Violet-Black-Orange)	5585	.20
Condenser (.25 Mfd. Tubular)	30-4134	.45
Resistor (100000 ohms) (White-White-Orange)	6099	.20
Audio Transformer	32-7447	3.00
Output Transformer (On Speaker)	32-7446	1.75
Cone & Voice Coil Assembly (U-9)	36-3381	1.75
Field Coil & Pot Assembly (U-9)	36-3068	8.00
Resistor (Wirewound, Flat Type—17.6, 90.4, 267 ohms)	33-3212	.55
Resistor (30000 ohms) (Orange-Black-Orange)	7926	.20
Resistor (10000 ohms) (Brown-Black-Orange)	3824	.20
Resistor (13000 ohms) (Brown-Orange-Orange)	6450	.40
Resistor (7750 ohms, Wirewound Porcelain Tube)	32-3020	.25
Filter Choke	32-7056	2.20
Condenser (.3 Mfd. Bakelite Block)	6287-DU	.40
Condenser (Electrolytic) (8 Mfd., 10 Mfd.)	30-2123	1.80
Condenser (Electrolytic) (8 Mfd.)	30-2011	1.40
Power Transformer (115 Volts, 60 Cycles)	32-7431	7.50
Power Transformer (115 Volts, 25 Cycles)	32-7432	12.00
Power Transformer (230 Volts, 50 Cycles)	32-7433	8.75
Potentiometer	35-5111	.70
Condenser (.015 Mfd. Twin Bakelite Block)	3793-DG	.40
Pilot Lamp (Dial Scales)	34-3004	.60
4-Prong Socket (6A3 Tubes)	27-0044	.10

PHILCO RADIO & TELEV. CORP. MODEL 201 (Code 121) Schematic, Parts

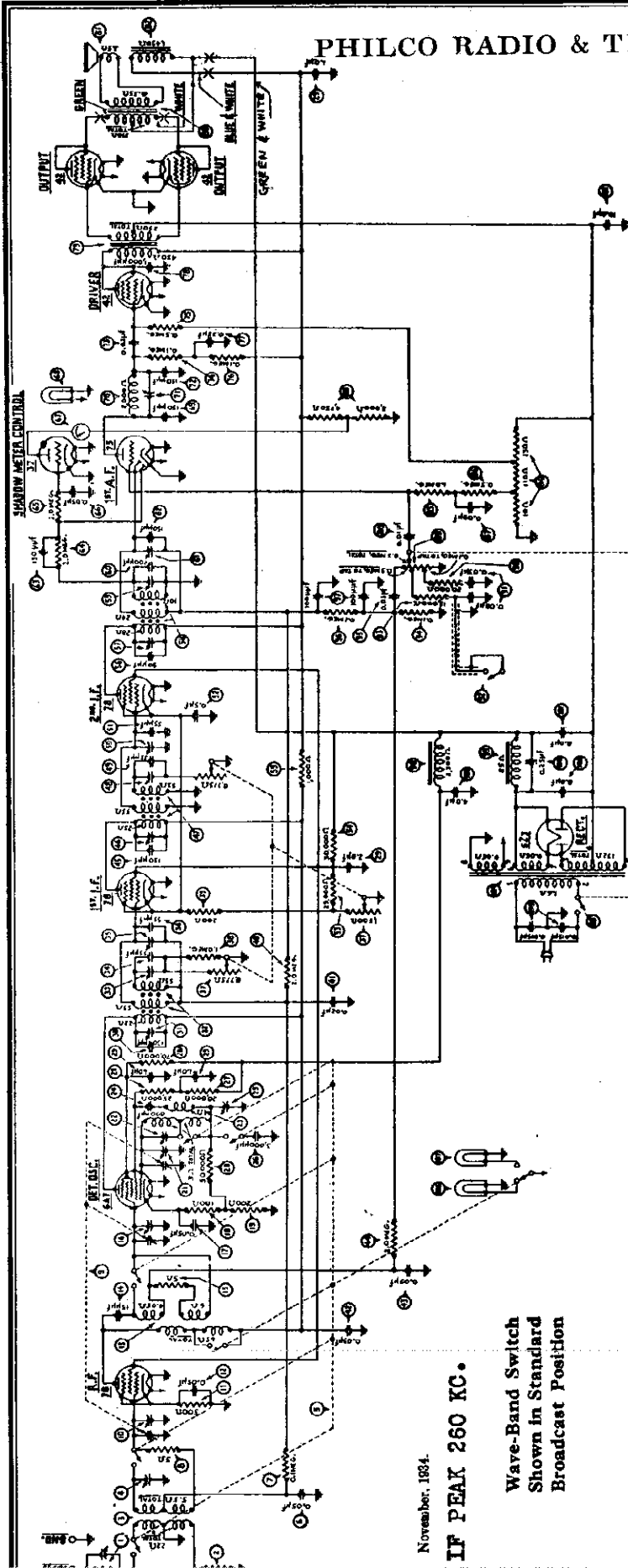


Fig. 2—Model 201 (Code 121) Wiring Diagram

1	Wave Trap	28-8248
2	Resistor (10000 ohms) (Brown-Black-Orange)	33-1000
3	Antenna Transformer	32-1481
4	Compensating Condenser (ANT. S. W.)	04000D
5	Waveband Switch	42-1053
6	Condenser (.05 Mfd. Tubular)	30-4020
7	Resistor (.1 Meg.) (White-White-Yellow)	6099
8	Resistor (5 ohms Flexible Wire-wound)	33-3186
9	Tuning Condenser Assembly	31-1379
10	Compensating Condenser (ANT.)	Part of 5
11	Resistor (500 ohms Flexible Wire-wound)	6477
12	Condenser (.05 Mfd. Tubular)	30-4020
13	Detector Transformer	32-1482
14	Condenser (.00015 Mica)	30-1030
15	Resistor (5 Ohms Flexible Wire-wound)	33-3186
16	Compensating Condenser (DET.)	Part of 2
17	Condenser (.05 Mfd. Tubular)	30-4020
18	Resistor (100 ohms Flexible Wire-wound)	33-3187
19	Resistor (200 ohms Flexible Wire-wound)	7217
20	Resistor (50000 ohms) (Green-Black-Orange)	6088
21	Compensating Condenser (OSC. H. F. Bcast.)	Part of 5
22	Compensating Condenser (OSC. S. W.)	31-6016
23	Oscillator Transformer	32-1504
24	Condenser (.0008 Mfd. Mica)	5878
25	Compensating Condenser (OSC. L. F.)	04000R
26	Condenser (.003 Mfd. Mica)	30-1028
27	Resistor (29000 ohms) (Red-Black-Orange)	6649
28	Resistor (25000 ohms) (Red-Green-Orange)	4516
29	Resistor (70000 ohms) (Violet-Black-Orange)	3542
30	Condenser (Electrolytic—1, 1, 1 and 2 Mfd.)	30-2080
31	Condenser (.03C13 Mfd. Mica)	30-1036
32	Compensating Condenser (1st I. F. Pri.)	Part of 5
33	1st I. F. Transformer	32-1483
34	Compensating Condenser (1st I. F. Tertiary)	04000A
35	Condenser (.003055 Mfd. Mica)	30-1045
36	Compensating Condenser (1st I. F. Sec.)	Part of 5
37	Condenser (.000055 Mfd. Mica)	30-1045
38	Fidelity-Selectivity Control (Wire-wound—8775, 8775 1500 ohms)	33-5083
39	Resistor (1 Meg.) (Brown-Black-Green)	33-1006
40	Resistor (200 ohms Flexible Wire-wound)	7217
41	Resistor (2 Mega.) (Red-Black-Green)	33-1025
42	Condenser (.02 Mfd. Tubular)	30-4113
43	Condenser (.05 Mfd. Tubular)	30-4020
44	Condenser (.05 Mfd. Tubular)	30-4020
45	Resistor (2 Mega.) (Red-Black-Green)	33-1025
46	Condenser (.00013 Mfd. Mica)	30-1036
47	Compensating Condenser (2nd I. F. Pri.)	Part of 5
48	2nd I. F. Transformer	32-1483
49	Compensating Condenser (2nd I. F. Tertiary)	04000A
50	Condenser (.000055 Mfd. Mica)	30-1045
51	Compensating Condenser (2nd I. F. Sec.)	Part of 5
52	Condenser (.000055 Mfd. Mica)	30-1045
53	Condenser (.5 & .25 Mfd. Metal Case) (Includes 2)	30-4229
54	Resistor (25000 ohms) (Red-Green-Orange)	4516
55	Resistor (30000 ohms) (3 watt) (Orange-Black-Orange)	33-1018
56	Resistor (1000 ohms) (Brown-Black-Red)	5837
57	Condenser (.00009 Mfd. Mica)	30-1046
58	Compensating Condenser (3rd I. F. pri.)	Part of 5
59	3rd I. F. Transformer	32-1484
60	Compensating Condenser (3rd I. F. Tertiary)	04000X
61	Condenser (.0002 Mfd. Mica)	30-1047
62	Compensating Condenser (3rd I. F. Sec.)	Part of 5
63	Condenser (.00015 Mfd. Mica)	30-1041
64	Condenser (.00015 Mfd. Mica)	30-1053
65	Resistor (2 Meg.) (Red-Black-Green)	33-1025
66	Resistor (2 Meg.) (Red-Black-Green)	33-1025
67	Condenser (.03 Mfd. Tubular)	30-4025
68	Shadowmeter	45-2028
69	Pilot Lamp (Shadowmeter)	Part of 68
70	Condenser (.00015 Mfd. Mica)	30-1046
71	Filter Trap Coil (10 K.C. Trap)	32-7261
72	Compensating Condenser (10 K.C. Trap)	04000B
73	Condenser (.03015 Mfd. Mica)	30-1041
74	Condenser (.02 Mfd. Tubular)	30-4113
75	Resistor (.1 Meg.) (White-White-Yellow)	6099
76	Resistor (.5 Meg.) (Yellow-White-Yellow)	6097
77	Resistor (.1 Meg.) (White-White-Yellow)	6099
78	Condenser (.25 Mfd. Metal Case)	Part of 68
79	Condenser (.001 Mfd. Tubular)	30-4201
80	Audio Transformer	32-7057
81	Output Transformer (On Speaker)	32-7247
82	Voice Coil & Cone Assembly (U-7)	35-3381
83	Field Coil & Pot Assembly (U-7)	36-3088
84	B. C. Wire-wound Resistor (3000, 4750 ohms)	33-3182
85	Resistor (Wire-wound) (10, 110, 130 ohms)	33-3137
86	Resistor (1 Meg.) (Brown-Black-Green)	33-1096
87	Resistor (.5 Meg.) (Yellow-White-Yellow)	6097
88	Condenser (.09 Mfd. Bakelite Block)	4989D
89	Condenser (.01 Mfd. Bakelite Block)	3903G
90	Volume Control & On-Off Switch	33-5071
91	Resistor (20000 ohms) (Red-Black-Orange)	33-1130
92	Condenser (Bass Compensator)	8323B
93	Bass Compensation Switch	3253
94	Resistor (15000 ohms) (Brown-Green-Orange)	6208
95	Resistor (.1 Meg.) (White-White-Orange)	6099
96	Condenser (.03 Mfd. Tubular)	30-4025
97	Resistor (.1 Meg.) (White-White-Orange)	6099
98	Condenser (.0001 Mfd. Twin Bakelite Block)	8035P
99	Filter Choke	32-7018
100	Filter Choke	32-7056
101	Condenser (.25 Mfd. Bakelite Block)	6287S
102	Condenser (Electrolytic 8 & 10 Mfd.)	30-2046
103	Condenser (Electrolytic 8 Mfd.)	30-2011
104	Condenser (Electrolytic 4 Mfd.)	30-2104
105	Power Transformer (60 Cycle 115 Volts)	32-7255
106	Power Transformer (25 Cycle 115 Volts)	32-7259
107	Condenser (.015 Mfd. Twin Bakelite Block)	3793K
108	Dial Lamp (Standard Band)	34-2040
109	Dial Lamp (Short-wave Band)	34-2040

November, 1934.

IF PEAK 260 KC.

Wave-Band Switch Shown in Standard Broadcast Position

MODEL 201 (Code 121)
Voltage, Socket, Data

PHILCO RADIO & TELEV. CORP.

Tube Socket Voltages

(Line Voltage 115)

	R.F. 78	Det.-Osc. 6A7	1st I.F. 78	2d I.F. 78	Shadow- meter 37	2d Det. 1st A.F. 75	Driver 42	Out- put 42
P-K.....	210	205	205	210	65	115	215	345
SG-K....	120	100 (G1-K=17) (G2-K=145)	115	115			215	345
K-Gnd...	4.2	3.8	7.8	7.8	0	0	0	0

5Z3, F to Center Tap of Power Trans.
Sec.—400 volts

5Z3, F to F—5.0 volts (A.C.)

All other filaments, 6.3 volts (A.C.)

Voltages in table above were obtained by using a high resistance voltmeter and test prods applied to underside of chassis (use Fig. 1). Fidelity control at middle position.

Power Transformer Voltages

Terminals	A.C. Volts	Circuit	Color of Leads
1-2	120	Primary	White
3-5	780	Plates of 5Z3	Yellow
6-7	5.0	Fil. of 5Z3	Blue
8-9	6.3	Filaments	Black
1		Center Tap of 3-5	Yellow Green Tracer

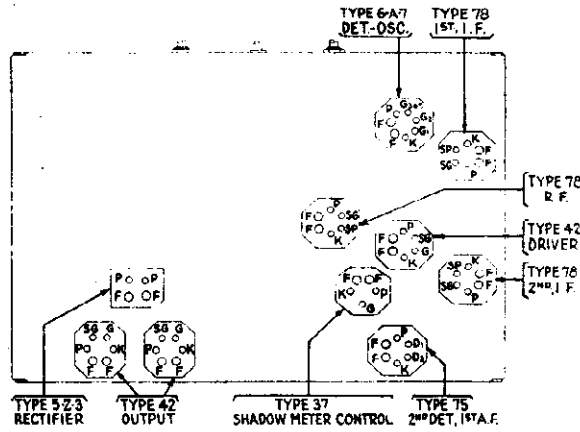


Fig. 1 Tube Sockets as seen from Bottom of Chassis (for Testing Voltages).

Voltages in table above were obtained by using a high resistance voltmeter and test prods applied to underside of chassis (use Fig. 1). Fidelity control at middle position.

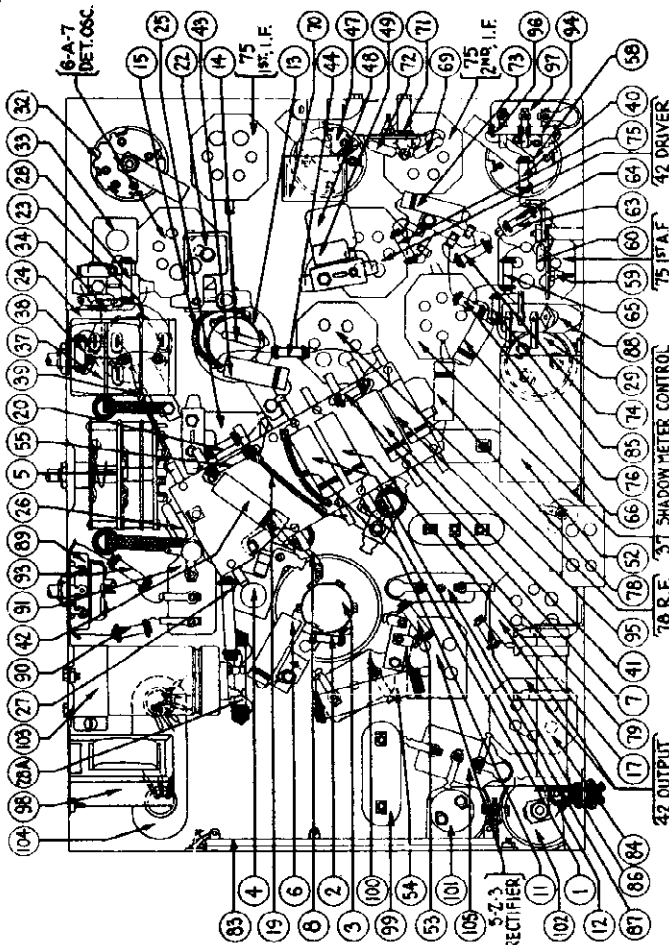


Fig. 3 Bottom View of Chassis, Showing Parts

Model 201

PHILCO Model 201 is a radio receiver incorporating high-fidelity reproduction, the same as in Model 200 (see Service Bulletin No. 201) and also having two frequency ranges, viz.: (1) 540 to 1720 kilocycles, which includes standard broadcasts and some police stations, and (2) 4.2 to 12.0 megacycles which includes the majority of popular short-wave stations. A two-position wave band switch changes reception from one range to the other, and one of the two individual pilot lamps controlled by the wave band switch illuminates whichever scale is in use.

For a description of how high-fidelity reception is accomplished thru the special circuit, speaker, and cabinet used, refer to page 1 of Service Bulletin No. 201. This also describes the "Fidelity-Selectivity" Control which is used in both models, 200 and 201.

Model 201 employs shadow-tuning, bass compensation (turned on or off by a switch on side of cabinet) and automatic volume control. The power consumption is 130 watts. Model 201 is designed for use on alternating current (A.C.) only, of the voltage and frequency specified on the chassis name-plate.

- Dial Assembly..... 31-1205
- Dial Scale..... 27-5046
- Knob (Large)..... 27-4851
- Knob (Small)..... 27-4852
- Tube Shield..... 28-1107
- Tube Socket (4 Prong)..... 25-14
- Tube Socket (5 Prong)..... 27-0013
- Tube Socket (6 Prong)..... 8117
- Tube Socket (7 Prong)..... 27-0005
- Speaker Socket..... 7538
- Chassis Mfg. Screws..... W-108A
- Chassis Mfg. Front..... 27-1116
- Chassis Mfg. Foot Plate..... 27-7407
- AC Cord & Plug Assembly..... L942A
- Bass Compensation Switch Plate..... 25-2415

Adjusting Compensating Condensers in Model 201

The quality performance of this receiver depends to a great extent upon providing a wide channel through the R.F. and I.F. stages to permit the passage of a broadcast signal without cutting of the side bands.

In order to produce this wide tuning band, the set must be carefully and accurately adjusted. These adjustments will be more critical than in the conventional radio, and the procedure will be somewhat more complicated.

In making the adjustments, it is necessary to use an unmodulated signal generator. The PHILCO Model 048 Set Tester or the Model 024 Signal Generator can be readily adapted for this purpose by the installation of a single-pole double-throw switch, and an additional grid leak resistor, as shown in Figure 4. This switch will adapt the signal generator for either a modulated or an unmodulated signal.

With an unmodulated signal, it is not possible to obtain an indication of output by means of the usual form of output meter. An indirect indication can be obtained, however, through the automatic volume control system by connecting a high resistance voltmeter having a scale reading of 0-5 or 0-10 volts across the R.F. cathode resistor R_1 , shown in the wiring diagram Fig. 2. This connection can be made conveniently through the use of leads equipped with test clips. With this arrangement, maximum output at the second detector will be indicated by a minimum reading of the meter, and vice versa. In other words, the action will be just the opposite of an output meter used to measure audio frequency voltage at the power output stage. With no signal applied to the receiver, the bias voltage indicated by the voltmeter, will be approximately 3.5 volts. This voltage will be reduced by the application of a signal to the R.F. or I.F. input circuits.

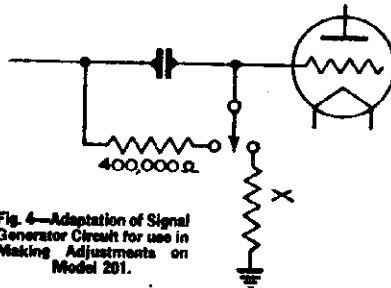


Fig. 4—Adaptation of Signal Generator Circuit for use in Making Adjustments on Model 201.

I. F. ADJUSTMENTS

After preparing the unmodulated signal generator and connecting the voltmeter as directed, proceed as follows:

1. Set the receiver tuning dial at its extreme low frequency position, with the wave-band switch turned to the left (standard broadcast position). Remove the grid clip from the cap of the 6A7 detector-oscillator tube, and connect the signal generator antenna lead in its place. Connect the ground lead from the signal generator to the ground terminal of the chassis. Adjust the signal generator frequency to exactly 260 K. C. Turn the fidelity-selectivity control of the receiver all the way to the left.
2. Adjust the 1st and 2nd I.F. padding condensers C_1 , C_2 , C_3 and C_4 for maximum output (minimum meter reading) in the order mentioned. During these adjustments, the output of the signal generator should be regulated to maintain a voltmeter reading of approximately 2 volts.
3. Connect a 500 Mmf. condenser from the plate of the 2nd I.F. tube to ground, and adjust padder C_5 for maximum output.
4. Connect the 500 Mmf. condenser across the secondary of the 3rd I.F. transformer and adjust C_6 for maximum output.
5. Turn the attenuator on the signal generator to maximum and adjust padder C_7 for minimum width of shadow in the tuning meter.
6. Reduce the output of the signal generator until the voltmeter again reads 2 volts. Turn the fidelity-selectivity control all the way to the right and adjust padders C_8 and C_9 for MINIMUM output (maximum meter reading).
7. Leaving the fidelity-selectivity control in the extreme right hand position and tuning the signal generator through 253 K.C. and 267 K.C., two definite peaks at these points should be noted. The meter readings at these two peaks should be equal, but if not, they can be made equal by readjusting padder C_9 .

WAVE TRAP ADJUSTMENTS

8. Adjust the signal generator to exactly 260 K.C. and connect the output leads to the antenna and ground terminals on the chassis. Replace the grid clip on the type 6A7 tube. Turn the fidelity-selectivity control all the way to the left. Leaving the receiver dial at the extreme low frequency position, adjust padder C_{10} for minimum output.

R. F. ADJUSTMENTS—(BROADCAST RANGE)

9. Insert a 250 Mmf. condenser in series with the antenna lead of the signal generator and the antenna terminal on the receiver chassis. Adjust the signal generator and the receiver to 1500 K.C. Turn the fidelity-selectivity control all the way to the left. Adjust padders C_{11} , C_{12} and C_{13} for maximum output.

10. Adjust the signal generator and the receiver tuning dial to 600 K.C. Adjust padder C_{14} for maximum output, at the same time rocking the tuning condenser in the chassis back and forth to obtain the setting for the highest possible output.

R. F. ADJUSTMENTS—(SHORT WAVE RANGE)

The PHILCO Model 091 Crystal Controlled Oscillator is required for adjusting the compensating condensers for the short wave tuning range.

11. Connect the antenna and ground leads from the signal generator to the corresponding terminals on the chassis, placing a 400 ohm resistor between the antenna lead of the signal generator and the antenna terminal of the set. (Philco No. 33-3016 flexible resistor will be satisfactory.)

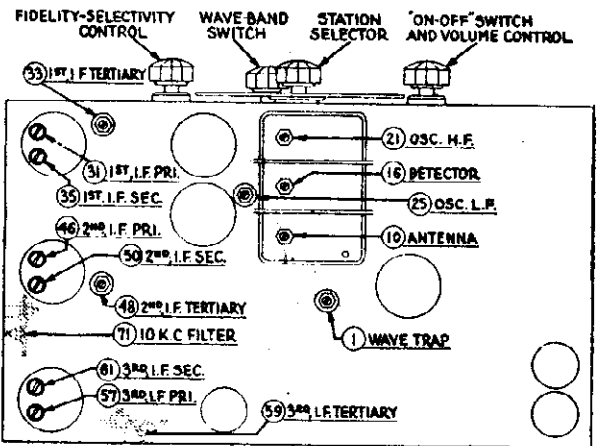


Fig. 5 Location of Adjusting Condensers

12. Turn the wave-band switch to the right and set the receiver dial at 10.8 M.C. Remove the D.C. voltmeter connections from resistor R_1 and connect the output meter to the plates of the power output tubes as in adjusting other types of receivers. Adjust the oscillator padder C_9 and the antenna padder C_{10} for maximum output. These padders are located and adjusted from underneath the chassis and are visible in Fig. 3. When adjusting padder C_{10} two very definite peaks will be found. It is extremely important that the lower capacity setting be used. To make certain that the adjustment has not been made to the image frequency (which would be the case if padder C_{10} were adjusted to the higher capacity setting) turn the receiver dial to approximately 10.3 M.C. at which point the image frequency should be heard, but much more weakly than the signal at 10.8 M.C.

ADJUSTMENT OF 10 K.C. FILTER

The 10 K.C. filter in the audio circuit will rarely require readjustment. As the proper adjustment of this padder (C_5 on diagram) requires an accurately calibrated audio oscillator, it should be reset only in the event that it has been tampered with or in cases where it has become necessary to replace one of the elements of this filter. An emergency adjustment of this filter can be made in the following manner:

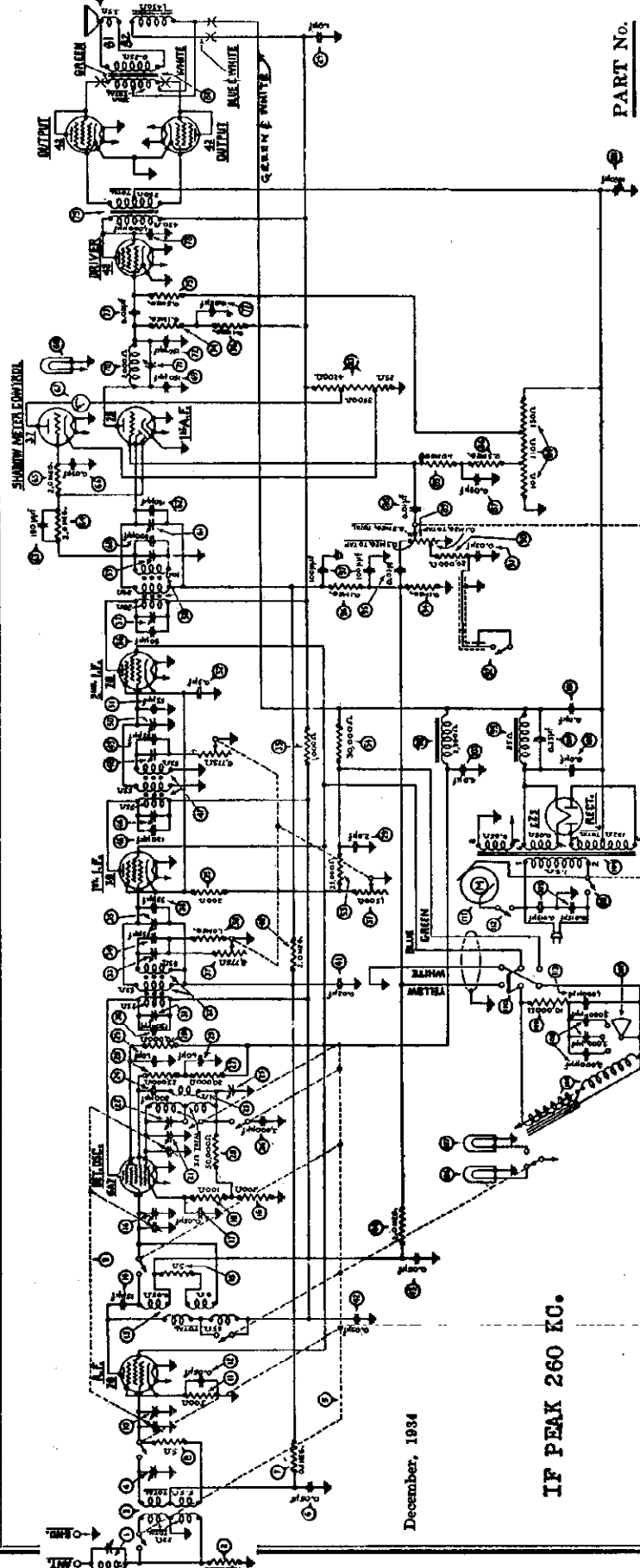
13. Connect the signal generator to the control grid of the type 6A7 tube, leaving the grid clip in place.

14. Leave the output meter connected to the power output circuit as in Paragraph 12.

15. Set the receiver dial at 550 K.C. and wave-band switch at left. At this point, the oscillator in the receiver will be tuned to 310 K.C. The adjustment of the signal generator (switch in unmodulated position) to approximately this same frequency will cause an audible beat note to be heard in the speaker. By means of the signal generator tuning control, reduce the frequency of this beat note until zero beat is reached, at which point the output meter reading will decrease to 0. Turning the receiver dial in either direction will gradually increase the frequency of the audible note so that at 540 or 560 K.C. a 10,000 K.C. note will be heard. At either of these points, the padder C_5 should be adjusted for minimum reading of the output meter.

MODEL 509-X
Schematic Data

PHILCO RADIO & TELEV. CORP.



December, 1934

IF PEAK 260 KC.

Model 509 - Wiring Diagram

PHILCO Model 509-X is a DeLuxe Radio-Phonograph mounted in a cabinet especially designed to promote high-fidelity reproduction. The Radio chassis is practically identical with Model 201 (see Service Bulletin No. 209), which incorporates high-fidelity reproduction and covers both the standard broadcast band (540-1720 K. C.) of frequencies and a major portion (4.2-12 megacycles) of the short-wave band.

For Service Data on the Phonograph and part numbers of the replaceable parts, refer to Service Bulletin No. 168-E on Model 501 Radio Phonograph, which uses the same type pick-up and automatic Record Changer mechanism.

Note that Part (98), Resistor, 15000 ohms (Part 6208) is omitted in Model 509-X; also the value of the condenser (91) in the bass compensator becomes .03 mfd. instead of .07, and a four-point tone control is added for the phonograph. The control knob for this is on the radio control panel.

Also note that the B. C. resistor (89) has an additional tap in Model 509 and the circuit to it has been slightly changed from that shown in wiring diagram of Model 201 (Bulletin 209).

Other parts in Model 509-X, which differ from those in Models 201 and 501 are as follows: Diagram No.102, Electrolytic condenser, part No.30-2014; Diagram No.104, Power Transformer, Part No.32-7259; Diagram No.91, .03 mf. condenser (bass comp.), Part No.8518-F.

PART No.

- (106) Pick-up and Tone Arm Assem 35-2009
- (107) Tone control (4-position) 30-4289
- (108) Condensers in tone control Part of (107)
- (109) Resistor (10,000 ohms) 33-1000
- (110) Radio phonograph switch 42-1053
- (111) Phonograph Motor —
115 volts, 60 cycles 35-1092
115 volts, 25 cycles 35-1095
- (112) Phonograph on-off switch 35-1044
- (113) Condenser (.001 mfd. mica) 30-1007
- Field coil and pot assembly 36-3088
- Voice coil and cone assembly 36-3381
- Output transformer 32-7247

PHILCO RADIO & TELEV. CORP.

MODEL 610
Schematic, Voltage
Data

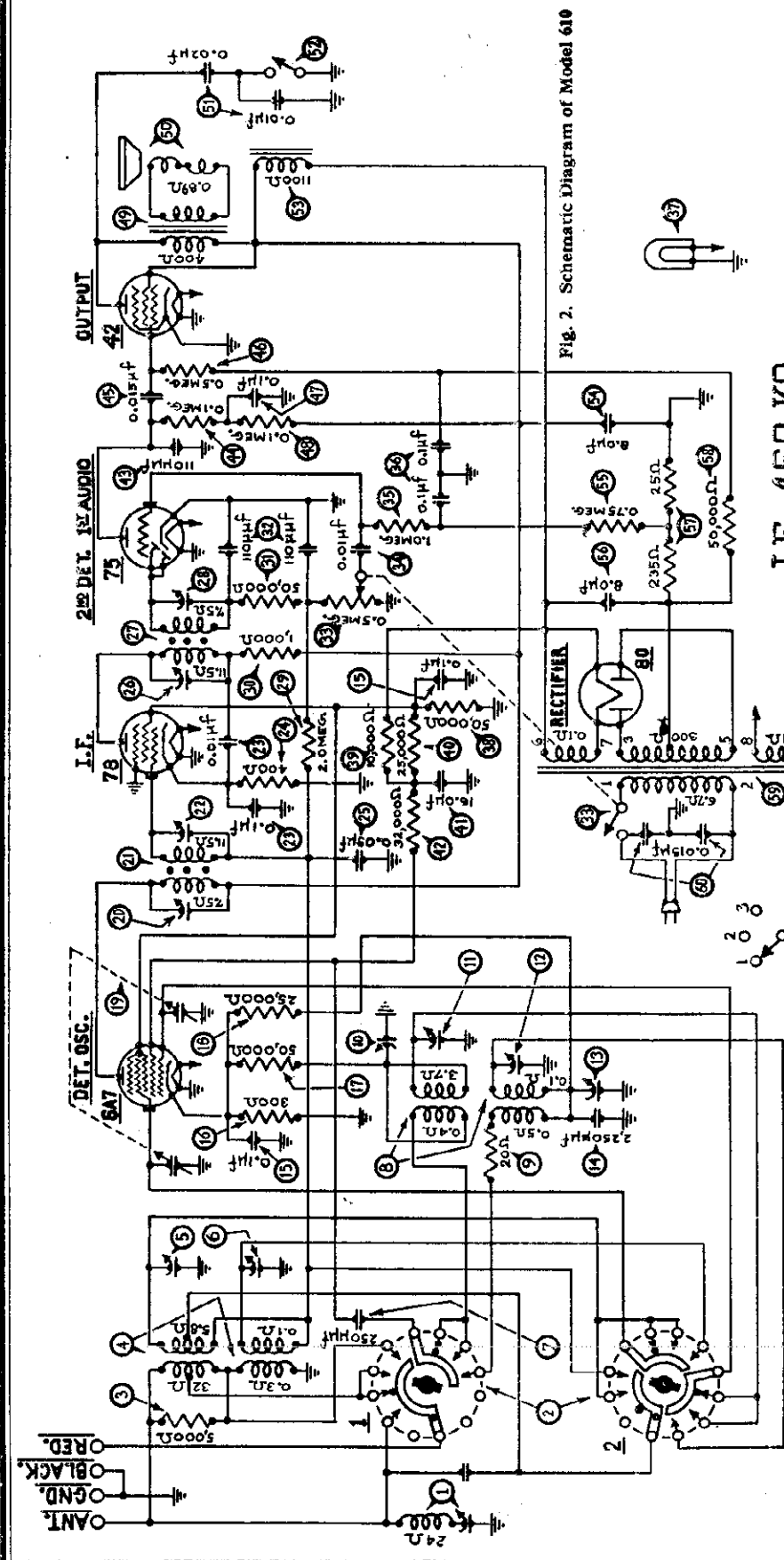


Fig. 2. Schematic Diagram of Model 610

April, 1935

I.F. = 460 KC.

Tube Socket Voltages
Measured to Ground

Tube	6A7 Det. Osc.	78 I.F.	75 2d Det.	42 Output
Point P	255	250	145	238
SG	85	85	...	255
K	2.3	2.5	...	...
6A7: G ₁ = 147				

Above voltages were obtained by using a PHILCO type D25 Circuit Tester (or D48A All-purpose Tester), using test leads applied to underside of chassis. Volume control at maximum; dial at 55; waveband switch counter-clockwise (band 1). Use Fig. 1 for test points.

MEMBERS INDICATE RELATIVE POSITIONS OF ALL SWITCH SECTIONS SHOWN IN POSITION NO. 1
SWITCH SECTIONS FROM FRONT OF CHASSIS
Power Transformer Data

Terminals	A.C. Volts	Current	Circuit	Color
1-2	120	.....	Primary	White
3-5	680	65 M.A.	Secondary	Yellow
6-7	5.0	2.0 A.	Fil. Rect.	Blue
8-9	6.3	2.2 A.	Filaments	Black
4	...	.....	Center Tap of 3-5	Yellow, Green Tracer

MODEL 610
Socket, Trimmers
Alignment, Data

PHILCO RADIO & TELEV. CORP.

Model 610

Type Circuit: Superheterodyne, with pentode output (3 watts); built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

Power Supply: Alternating Current. Voltage and frequency as specified on chassis nameplate.

Tubes Used: 1 type 6A7, Detector-Oscillator; 1 type 78, I.F.; 1 type 75, 2d Detector and 1st A.F.; 1 type 42 Output; 1 type 80 Rectifier.

Wave Bands: Three—(1) standard (with some Police); (2) Police; (3) Short-wave.

Coverage of Each Band: Band 1, 530-1720 K.C.; Band 2, 2300 to 2500 K.C. (2.3-2.5 M.C.); Band 3, 5700-18000 K.C. (5.7 to 18.0 megacycles).

Tuning Drive: Dual planetary, ball bearing. 50 to 1 ratio for slow-speed tuning.

Tone Control: 2-position.

Intermediate Frequency: 460 K.C.

Power Consumption: 54 watts.

The adjustment of the compensating condensers in Model 610 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. The Philco Model 088 All-Wave Signal Generator covers these requirements perfectly. An output meter is also required. Philco Model 025 or 012 unit is recommended. 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 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 30 volt range of the output meter to the plate and cathode of the output tube 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 standard broadcast band, wave band switch to extreme left (clockwise), and have 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 and adjusted by turning the two screws in top. Adjust condensers ② and ③ (2d I.F. primary and secondary) for maximum reading in the output meter, and then condensers ① and ④ (1st I.F. primary and secondary).

Adjustment of Wave-Trap

1. Connect the signal generator leads to the antenna and ground terminals of the receiver. Replace the grid clip on the 6A7 grid cap.

2. With the wave-band switch of the receiver still in the extreme left (broadcast position), turn the station selector to 550 K.C.

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.

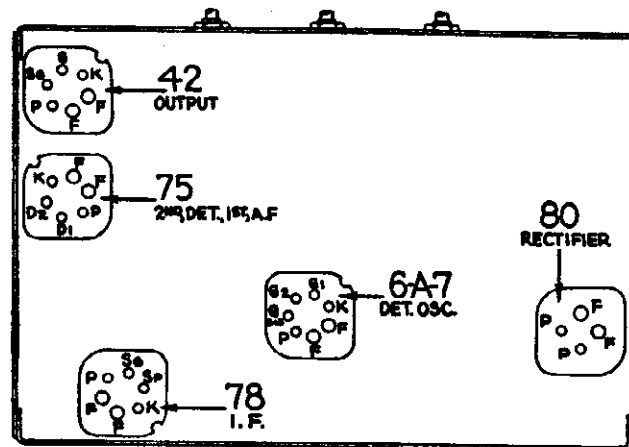


Fig. 1. Tube Sockets as viewed from bottom.

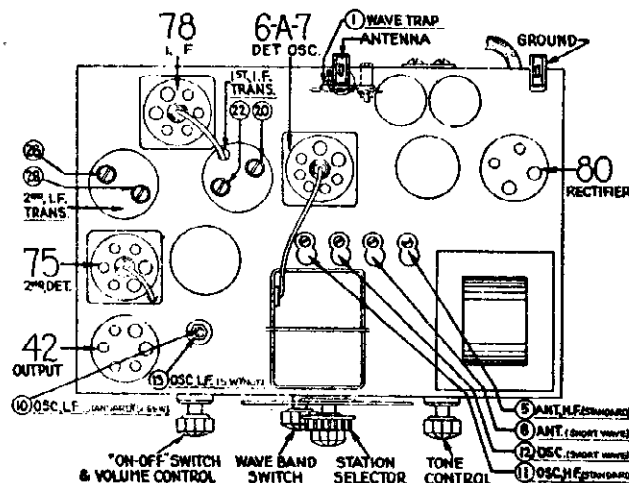


Fig. 2. Locations of Compensating Condensers

Adjustment of High and Low Frequency Compensators

1. With the wave-band switch still at Position No. 1 (broadcast band), set the dial at 1600 K.C. Set the signal generator at this frequency and adjust compensators ① and ② for maximum output. These are the oscillator and antenna "H.F. standard" compensators respectively.

2. Tune the receiver and the signal generator to 600 K.C. and adjust compensator ⑩ (screw) for maximum output. This is the oscillator L.F. standard compensator.

3. Turn the wave-band switch to the extreme right (short-wave band) and adjust the station selector to 18.0 megacycles. By means of the Philco wrench, part No. 3164, adjust the oscillator S.W., and antenna S.W. compensators for maximum reading in the output meter. These are numbered ④ and ③ respectively in figure No. 4.

4. Turn the tuning dial to 7.2 M.C., and adjust condenser ⑨ osc. L.F., (S.W.) (nut) to maximum signal.

PHILCO RADIO & TELEV. CORP.

Replacement Parts—Model 610

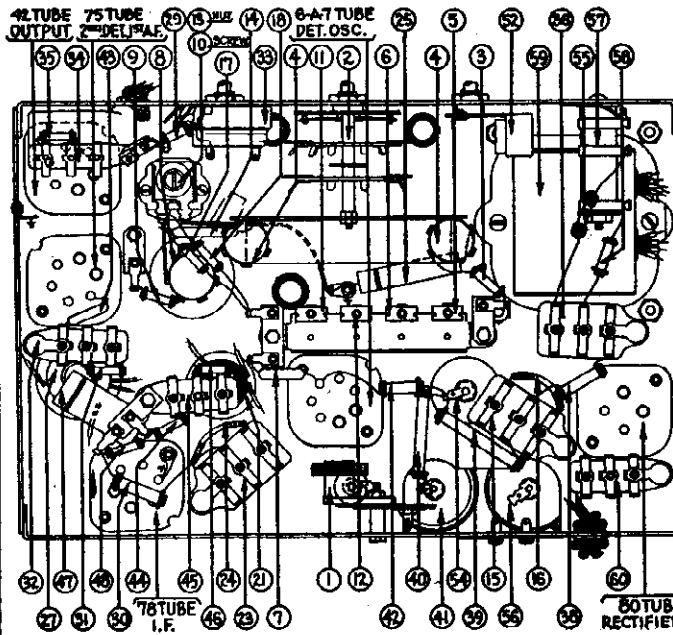


Fig. 3. Bottom View of Chassis

Description	Part No.	List Price
1 Wavetrap.....	3c-6777	\$1.00
2 Waveband Switch.....	42-1112	1.10
3 Resistor (5000 ohms) (Green, Black, Red).....	6096	.20
4 Antenna Transformer.....	32-1669	1.15
5 Compensating Condenser (Antenna, Standard).....	Part of 31-6047	.50
6 Compensating Condenser (Antenna, S.W.).....	Part of 31-6047	.50
7 Condenser (.00025 Mfd. Mica).....	5858	.35
8 Oscillator Transformer.....	32-1670	1.40
9 Resistor (20 ohms) (Red, Black, Black).....	33-1206	.20
10 Compensating Condenser (Osc. L.F. Standard) (Screw).....	Part of 31-6027	.70
11 Compensating Condenser (Osc. H.F., Standard).....	Part of 31-6047	.50
12 Compensating Condenser (Osc. S.W., H.F. End).....	Part of 31-6047	.50
13 Compensating Condenser (Osc. S.W., L.F. End) (Nut).....	Part of 31-6027	.70
14 Condenser (.00225 Mfd. Mica).....	30-1055	.40
15 Condenser (.09 Mfd. Twin Bakelite Block).....	4989-DG	.40
16 Resistor (300 ohms Flexible) (Orange, Black, Brown).....	33-3010	.20
17 Resistor (50000 ohms) (Green, Brown, Orange).....	6098	.20
18 Resistor (25000 ohms) (Red, Green, Orange).....	33-1013	.20
19 Tuning Condenser Assembly.....	31-1528	3.75
20 Compensating Condenser (1st I.F. Primary).....	Part of 27	....
21 1st I.F. Transformer.....	32-1671	1.35
22 Compensating Condenser (1st I.F. Secondary).....	Part of 27	....
23 Condenser (.09 Mfd., and .01 Mfd. Bakelite Block).....	4989-FU	.40
24 Resistor (400 ohms Flexible) (Yellow, Black, Brown).....	33-3016	.20
25 Condenser (.05 Mfd. Tubular).....	30-4020	\$0.35
26 Compensating Condenser (2nd I.F. Primary).....	Part of 27	....
27 2nd I.F. Transformer.....	32-1672	1.35
28 Compensating Condenser (2nd I.F. Secondary).....	Part of 27	....
29 Resistor (2 Megs.) (Red, Black, Green).....	33-1025	.20
30 Resistor (1000 ohms) (Brown, Black, Red).....	5837	.20
31 Resistor (50000 ohms) (Green, Brown, Orange).....	6098	.20
32 Condenser (.00011 Twin Bakelite Block).....	8035-DG	.25
33 Volume Control & On-Off Switch.....	33-5106	.85
34 Condenser (.01 Mfd. Bakelite Block).....	3903-SU	.25
35 Resistor (1 Meg.) (Brown, Black, Green).....	33-1096	.20
36 Condenser (.1 Mfd. Twin Bakelite Block).....	4989-DG	.40
37 Pilot Lamp.....	34-2064	.09
38 Resistor (50000 ohms) (Green, Brown, Orange).....	4237	.20
39 Resistor (10000 ohms) (Brown, Black, Orange).....	3524	.20
40 Resistor (25000 ohms) (Red, Green, Orange).....	3656	.20
41 Condenser (Electrolytic—16 Mfd.).....	30-2118	1.65
42 Resistor (32000 ohms) (Orange, Red, Orange).....	5279	.20
43 Condenser (.00011 Mfd. Mica).....	30-1031	.35
44 Resistor (.1 Meg.) (Brown, Black, Green).....	6099	.20
45 Condenser (.015 Mfd. Bakelite Block).....	3793-SU	.35
46 Resistor (.5 Meg.) (Yellow, White, Yellow).....	6097	.20
47 Condenser (.1 Mfd. Tubular).....	30-4170	.35
48 Resistor (.1 Meg.) (White, White, Yellow).....	6099	.20
49 Output Transformer.....	32-7019	1.25
50 Cone & Voice Coil Assembly (P-27 Speaker).....	02861	.65
51 Condensers (in Tone Control).....	Part of 52	....
52 Tone Control.....	30-4318	.50
53 Field Coil & Pot Assembly (P-27 Speaker).....	36-3341	2.75
54 Condenser (Electrolytic—8 Mfd.).....	30-2025	1.35
55 Resistor (75000 ohms) (Violet, Green, Yellow) (1/2 Watt).....	33-1203	.20
56 Condenser (Electrolytic) (8 Mfd.).....	30-2025	1.35
57 Resistor (B.C. Wire-wound, 235 ohms, 25 ohms).....	33-3037	.20
58 Resistor (50000 ohms) (Green, Brown, Orange).....	6098	.20
59 Power Transformer (110 volts 60 cycles) (110 volts 25 cycles) (230 volts 50 cycles).....	32-7381 32-7382 32-7383	4.00 6.25 4.50
60 Condenser (.015 Mfd. Twin Bakelite Block).....	3793-DG	.40
Dial Assembly.....	31-1539	.30
Tube Shield Body.....	28-2726	.10
Tube Shield Base.....	28-2725	.03
Four Prong Socket.....	27-6034	.10
Six Prong Socket.....	27-6036	.11
Seven Prong Socket.....	27-6037	.11
Knob (Station Selector).....	27-4206	.12
Knob (Fine Tuning).....	27-4207	.10
Knob (Volume, Waveband and Tone Control).....	27-4208	.10
Bezel.....	27-2928	.35
Bezel Glass.....	27-7887	.60

MODEL 611

Parts, Alignment

PHILCO RADIO & TELEV. CORP.

REPLACEMENT PARTS—MODEL 611

Nos. in Figs. 3 & 4	Description	Part No.	List Price
①	Wave Trap.....	38-6850	\$1.10
②	Condenser (.0014 Mfd. Mica).....	7007	.30
③	Waveband Switch.....	42-1112	1.10
④	Condenser—Capacity Obtained by Twisted Wires.....		
⑤	Resistor (5000 ohms) (Green, Black, Red).....	33-1001	.20
⑥	Antenna Transformer.....	32-1781	1.15
⑦	Compensating Condenser (Antenna, Standard).....	Part of 31-8047	
⑧	Compensating Condenser (Antenna S.W.).....	Part of 31-8047	.50
⑨	Condenser (.00025 Mfd. Mica).....	6858	.25
⑩	Resistor (20 ohms) (Red, Black, Black).....	33-1206	.20
⑪	Oscillator Transformer.....	32-1831	1.50
⑫	Compensating Condenser (Osc. L.F. Standard).....	Part of 31-6027	.70
⑬	Compensating Condenser (Osc. H.F. Standard).....	Part of 31-6047	.50
⑭	Compensating Condenser (Osc. S.W. H.F. End).....	Part of 31-6047	.50
⑮	Compensating Condenser (Osc. S.W. L.F. End).....	Part of 31-6027	.70
⑯	Condenser (.00225 Mfd. Mica).....	30-1055	.40
⑰	Tuning Condenser Assembly.....	31-1528	3.75
⑱	Resistor (120000 ohms) (Brown, Red, Yellow).....	33-1128	.20
⑲	Resistor (120000 ohms) (Brown, Red, Yellow).....	33-1128	.20
⑳	Resistor (200 ohms Flexible) (Red, Black, Black).....	7217	.20
㉑	Condenser (.1 Mfd. Twin Bakelite Block).....	4989-DG	.40
㉒	Condenser (.05 Mfd. Tubular).....	30-4020	.20
㉓	Compensating Condenser (1st I.F. Primary).....	Part of ④	
㉔	1st I.F. Transformer.....	32-1671	1.35
㉕	Compensating Condenser (1st I.F. Secondary).....	Part of ④	
㉖	Resistor (300 ohms Flexible) (Orange, Black, Black).....	33-3010	.20
㉗	Condenser (.1 Mfd. .01 Mfd. Bakelite Block).....	4989-FU	.40
㉘	Pilot Lamp.....	34-2068	.18
㉙	Compensating Condenser (2d I.F. Primary).....	Part of ④	
㉚	2d I.F. Transformer.....	32-1672	1.35
㉛	Compensating Condenser (2d I.F. Secondary).....	Part of ④	
㉜	Resistor (1000 ohms) (Brown, Black, Red).....	5837	.20
㉝	Resistor (2 Megs.) (Red, Black, Green).....	33-1025	.20
㉞	Resistor (50000 ohms) (Green, Brown, Orange).....	6098	.20
㉟	Condenser (.00011 Mfd. Twin Bakelite Block).....	3035-DU	.25
㊱	Condenser (.00011 Mfd. Mica).....	30-1031	.20
㊲	Condenser (.15 Mfd. Twin Bakelite Block).....	6287-DU	.40
㊳	Condenser (.01 Mfd. Bakelite Block).....	3903-SU	.25
㊴	Volume Control & On-Off Switch.....	33-6114	1.45
㊵	Resistor (50000 ohms) (Green, Brown, Orange).....	4237	\$0.20
㊶	Resistor (13000 ohms) (Brown, Orange, Orange).....	3766	.20
㊷	Resistor (15000 ohms) (Brown, Green, Orange).....	5278	.20
㊸	Resistor (70000 ohms) (Violet, Black, Orange).....	33-1115	.20
㊹	Resistor (240000 ohms) (Red, Yellow, Yellow).....	33-1097	.20
㊺	Condenser (.015 Mfd. Bakelite Block).....	3793-SU	.35
㊻	Resistor (.5 Meg.) (Yellow, White, Yellow).....	6097	.20
㊼	Tone Control.....	30-4345	.50
㊽	Resistor (400 ohms Flexible) (Yellow, Black, Black).....	33-3016	.20
㊾	Condenser (Electrolytic—10 Mfd., 10 Mfd.).....	30-2125	1.20
㊿	Condenser (.02 Mfd. Tubular).....	30-4215	.20
1	Output Transformer.....	32-7395	1.10
2	Cone & Voice Coil Assembly (S-15 Speaker).....	36-3157	.80
3	Field Coil & Pot Assembly (S-15 Speaker).....	36-3519	2.80
4	Resistor (20 ohms Flexible) (Red, Black, Black).....	33-1206	.20
5	Condenser (.25 Mfd. Tubular).....	30-4146	.25
6	Resistor (1 Meg.) (Brown, Black, Green).....	33-1096	.20
7	Resistor (.5 Meg.) (Yellow, White, Yellow).....	6097	.20
8	Condenser (Electrolytic, 16 Mfd.).....	30-2124	.75
9	Condenser (Electrolytic, 16 Mfd.).....	30-2124	.75
10	Filter Choke.....	32-7018	1.50
11	Filter Choke.....	32-7452	.90
12	Resistor (15 ohms, 130 ohms—Wirewound).....	33-3213	.50
13	Condenser (.05 Mfd. Bakelite Block).....	3615-SU	.35
14	Dial Scale.....	27-5097	.25
15	Dial Hub and Set Screw Assembly.....	31-1550	.15
16	Dial Spring Clamp.....	28-2837	.10
17	Knob (Tone, Volume).....	27-4208	.10
18	Knob (Waveband).....	27-4219	.10
19	Knob (Station Selector).....	27-4206	.12
20	Knob (Fine Tuning).....	27-4207	.10
21	Socket (6 Prong).....	27-6036	.11
22	Socket (7 Prong).....	27-6037	.11
23	Bezel.....	28-2928	.35
24	Bezel Glass.....	27-2887	.60
25	Chassis Mtg. Screw.....	W-1498A	1.60 per C
26	Chassis Mtg. Washer.....	27-4198	.01
27	Tube Shield Body.....	28-2726	.10
28	Tube Shield Base.....	28-2725	.08

**Adjustment of High and Low
Frequency Compensators**

1. With the wave-band switch still at Position No. 1 (broadcast band), set the dial at 1500 K.C. Set the signal generator at 1.5 M. C. and adjust compensators ⑬ and ⑭ for maximum output. These are the oscillator and antenna "H.F. standard" compensators respectively.

2. Tune the receiver and the signal generator to 600 K.C. and adjust compensator ⑮ (screw) for maximum output. This is the oscillator L.F. standard compensator.

3. Turn the wave-band switch to the extreme right (short-wave band) and adjust the station selector to 18.0 megacycles. Set the signal generator at 18.0 megacycles. Now adjust the oscillator S.W., and antenna S.W. compensators for maximum reading in the output meter. These are numbered ⑯ and ⑰ respectively in figure No. 2.

4. Turn the tuning dial to 6.0 M.C., set the signal generator at 6.0 M.C., and adjust condenser ⑱ osc. L.F., (S.W.) (nut) to maximum signal.

Specifications

Type Circuit: Superheterodyne, with pentode output; built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

Power Supply: 115 volts, Alternating or Direct Current.

Tubes Used: 1 type 6A7, Detector-Oscillator; 1 type 78, I.F.; 1 type 75, 2d Detector and 1st A.F.; 1 type 43 Output; 1 type 25Z5 Rectifier.

Wave Bands: Three—(1) Standard (with some Police); (2) Police; (3) Short-wave.

Coverage of Each Band: Band 1, 530-1720 K.C.; Band 2, 2300 to 2500 K.C. (2.3-2.5 M.C.); Band 3, 5700-18000 K.C. (5.7 to 18.0 megacycles).

Tuning Drive: Dual gear drive, ball bearing. 50 to 1 ratio for slow-speed tuning. 6 to 1 on main drive.

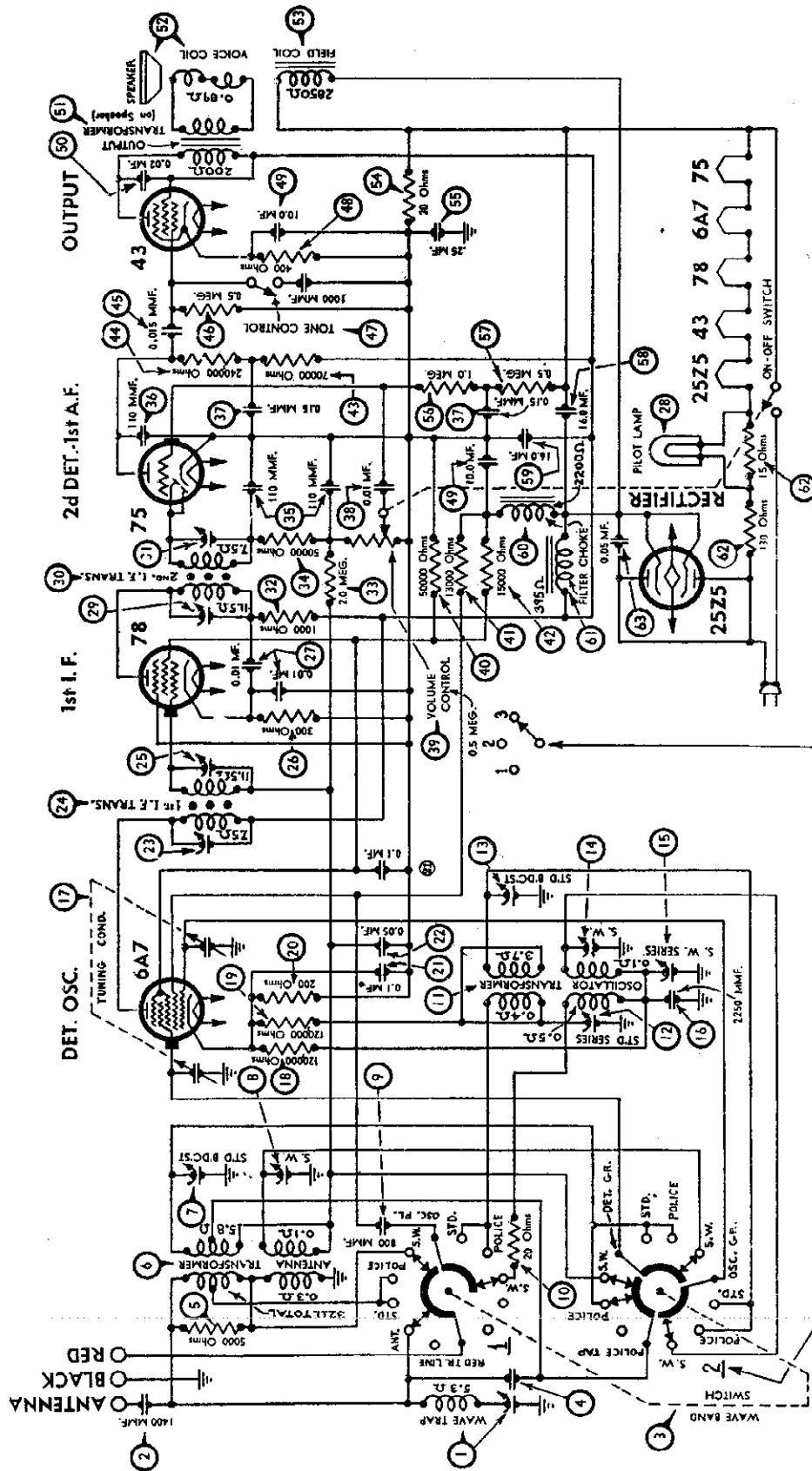
Tone Control: 2-position.

Intermediate Frequency: 460 K.C.

Power Consumption: 50 watts.

Speaker: 611-B (Baby Grand): P-28; 611-F (Console): S-15.

PHILCO RADIO & TELEV. CORP.



All Switch Sections Shown
in Position No. 3

August 1935

Numbers Indicate Relative Positions
of Switch Sections
as Seen from Front of Chassis

Fig. 3 — Schematic Diagram of Model 61 I

Note 1: Cathode condenser of 78 tube (lower portion of 37) is .1 mfd.
instead of .01 mfd. shown above.

Note 2: Condenser 38 is .00025 mfd. instead of .0008 mfd. as shown above.

MODEL 611
 Alignment, Part 2
 Chassis, Socket, Trimmers PHILCO RADIO & TELEV. CORP.

ADJUSTING COMPENSATING CONDENSERS

The adjustment of the compensating condensers in Model 611 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. The Philco Model 088 All-Wave Signal Generator covers these requirements perfectly. An output meter is also required. Philco Model 025 or 012 unit is recommended. The location of all compensating condensers is shown in Fig. 2.

Adjustment of I. F.

1. Remove the antenna connection from the receiver. Remove the grid clip from the first detector (type 6A7 tube), and attach the "ANT" output lead from the signal generator to the grid cap of this tube.

2. Connect the output meter to the plate and cathode of the output tube by means of the adapters provided with the "025" or to the two bottom prongs of the speaker plug. Set it at the 0-30 volt range.

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 standard broadcast band, wave band switch to extreme left (clockwise), and have 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 and adjusted by turning the two screws in top. Adjust condensers ② and ③ (2d I.F. primary and secondary) for maximum reading in the output meter, and then condensers ④ and ⑤ (1st I.F. primary and secondary).

Adjustment of Wave-Trap

1. Connect the signal generator leads to the antenna and ground terminals of the receiver. Replace the grid clip on the 6A7 grid cap.

2. With the wave-band switch of the receiver still in the extreme left (broadcast position), turn the station selector to 550 K.C.

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 wave-trap compensator is reached from rear of chassis.

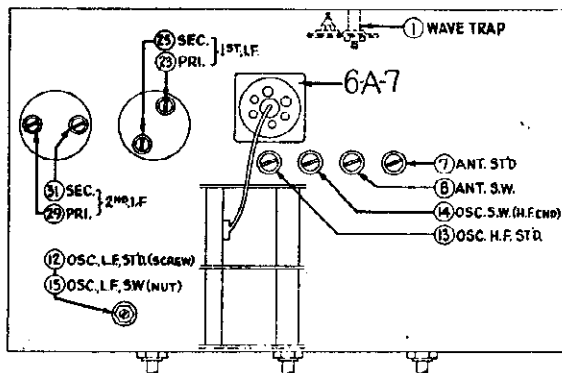


Fig. 2. Locations of Compensating Condensers

Tube Socket Voltages (Measured at 115 volts A.C.)

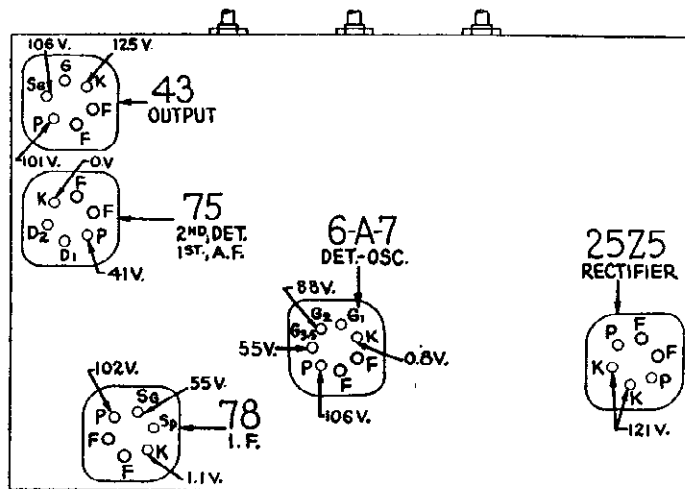
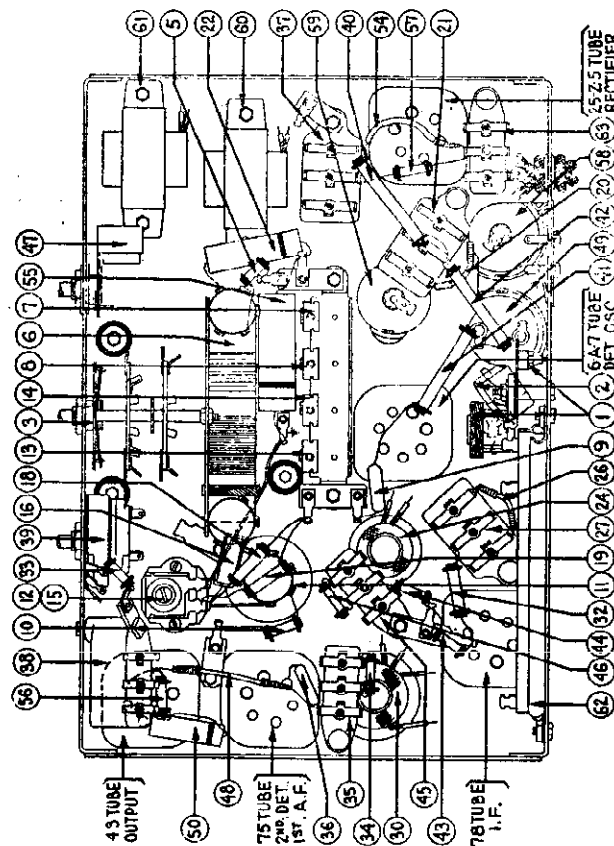


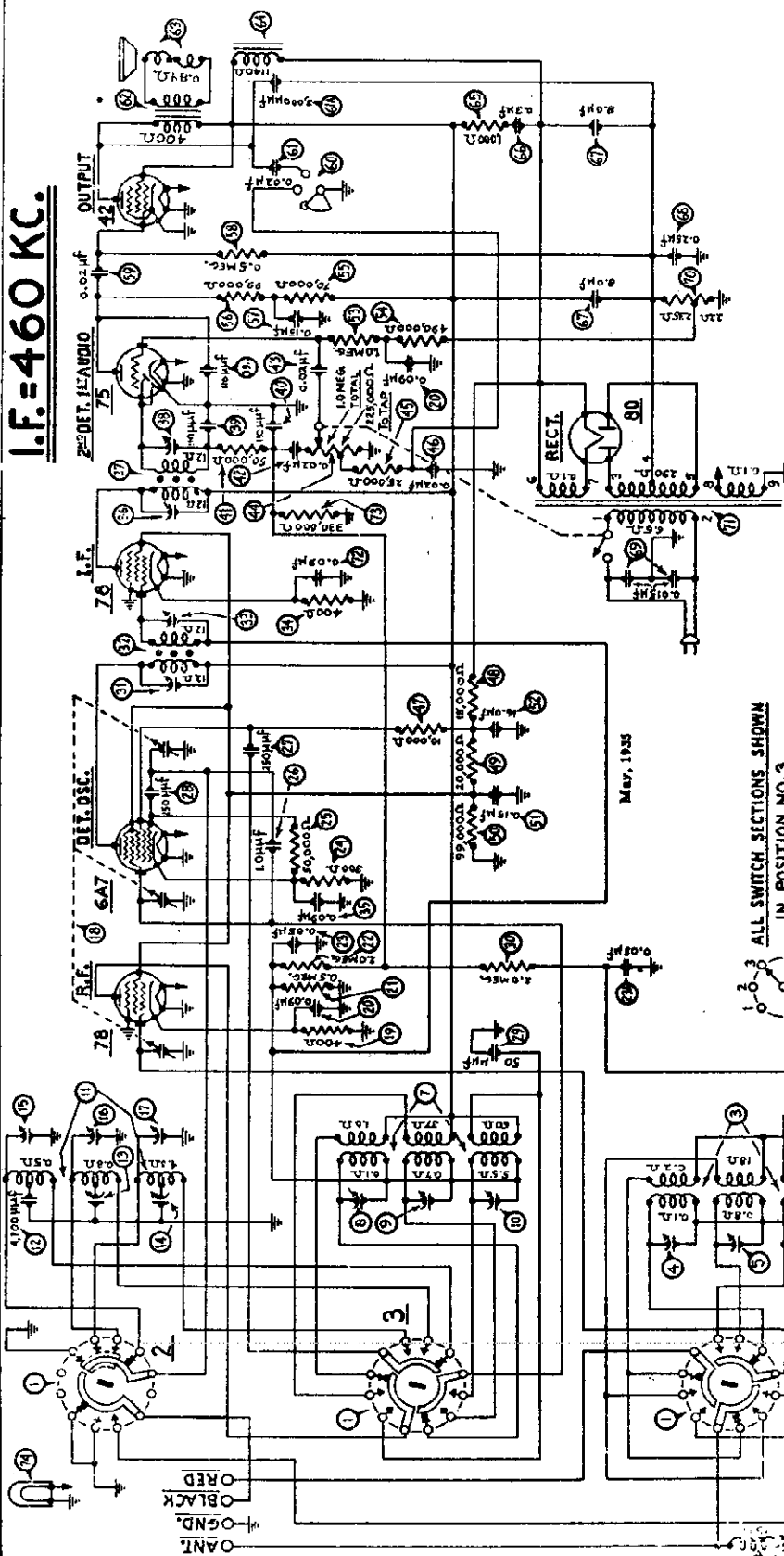
Fig. 1. Tube Sockets as viewed from bottom.

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). S-15 Speaker used.



PHILCO RADIO & TELEV. CORP.

MODEL 620
Schematic
Voltage, Data



Power Transformer Data

Terminals	A.C. Volts	Current	Circuit	Color
1-2	120	.....	Primary	White
3-5	680	65 M.A.	Secondary	Yellow
6-7	5.0	2.0 A.	Fil. Rect.	Blue
8-9	6.3	2.0 A.	Filaments	Black
4	...	.....	Center Tap of 3-5	Yellow, Green Tracer

Tube Socket Voltages Measured to Ground

Tube Point	78 R.F.	6A7 Det. Osc.	78 I.F.	75 2d Det.	42 Output
P	258	258	258	153	243
SG	95	95	95	...	258
K	2.65	2.5	2.85	...	...

6A7: G₁ & = 173

NUMBERS INDICATE RELATIVE POSITIONS OF SWITCH SECTIONS FROM FRONT OF CHASSIS

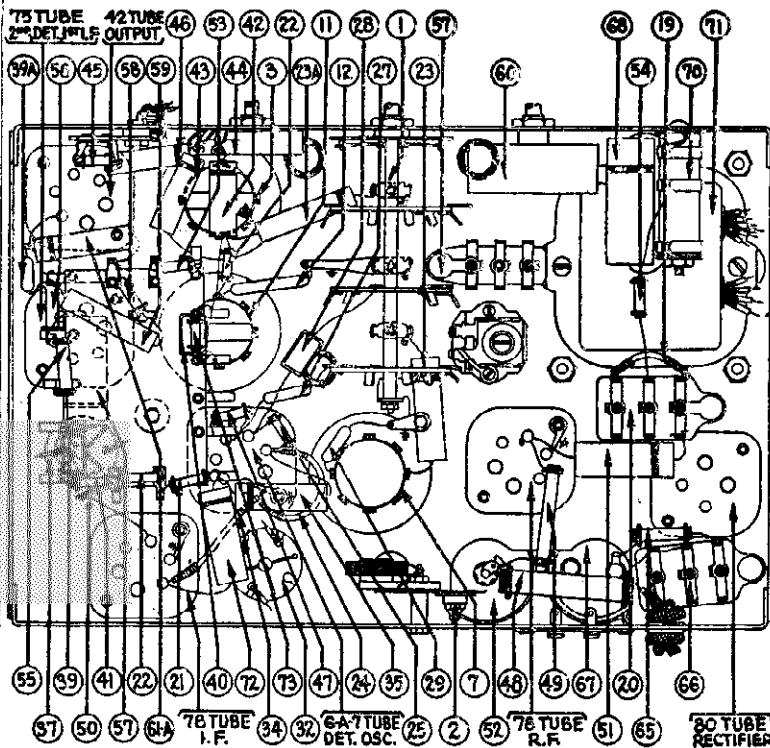
Model 620

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 53; wavelength switch counter-clockwise (band 1). Use Fig. 1 for test points. Line voltage 115 volts.

Fig. 3. Schematic Diagram of Model 620

MODEL 620
Chassis, Parts

PHILCO RADIO & TELEV. CORP.



Replacement Parts Model 620

Description	Part No.	List Price
Dial Scale.....	27-5098	.25
Dial Hub and Set Screw.....	31-1550	.15
Dial Front Spring.....	28-2837	.10
Knob (Station Selector).....	27-4206	.12
Knob (Fine Tuning).....	27-4207	.10
Knob (Waveband).....	27-4219	.10
Knob (Tone, Volume).....	27-4208	.10
Tube Shield.....	28-2726	.10
Tube Shield Base.....	28-2725	.03
Tube Socket (4 Prong).....	27-6034	.10
Tube Socket (6 Prong).....	27-6036	.11
Tube Socket (7 Prong).....	27-6037	.11
Speaker Plug Socket.....	27-6033	.08
Chassis Mtg. Screw.....	W-1495	1.50 per C.
Chassis Mtg. Washer (Rubber).....	27-4198	.01
Electric Cord and Plug.....	L-943-A	.60
Bezel.....	28-2928	.35
Bezel Glass.....	27-7887	.60

Fig. 4. Bottom View of Chassis

Description	Part No.	List Price	Description	Part No.	List Price
1 Waveband Switch.....	42-1107	\$1.75	37 2nd I.F. Transformer.....	32-1647	2.25
2 Wavetrap.....	38-6850	1.10	38 Compensating Condenser (2nd I.F. Sec.).....	Part of 37	....
3 Antenna Transformer.....	32-1699	3.00	39 Condenser (.00011 Mfd. Mica).....	30-1031	.35
4 Compensating Condenser (Ant. S.W.).....	Part of 3	....	39A Condenser (.00011 Mfd. Mica).....	30-1031	.35
5 Compensating Condenser (Ant. Police).....	Part of 3	....	40 Condenser (.00011 Mfd. Mica).....	30-1031	.35
6 Compensating Condenser (Ant. Standard).....	Part of 3	....	41 Resistor (50000 ohms) (Green, Brown, Orange).....	6098	.20
7 R. F. Transformer.....	32-1636	3.25	42 Condenser (.02 Mfd. Tubular).....	30-4215	.30
8 Compensating Condenser (R.F. Short-Wave).....	Part of 7	....	43 Condenser (.02 Mfd. Tubular).....	30-4215	.30
9 Compensating Condenser (R.F. Police).....	Part of 7	....	44 Volume Control and On-Off Switch.....	33-5105	1.45
10 Compensating Condenser (R.F. Standard).....	Part of 7	....	45 Resistor (25000 ohms) (Red, Green, Orange).....	33-1013	.20
11 Oscillator Transformer.....	32-1637	2.50	46 Condenser (.02 Mfd. Tubular).....	30-4215	.30
12 Condenser (.0047 Mfd. Mica).....	30-1032	.60	47 Resistor (10000 ohms) (Brown, Black, Orange).....	4412	.20
13 Compensating Condenser (Osc. Police).....	Part of 11	....	48 Resistor (15000 ohms) (Brown, Green, Orange).....	5718	.35
14 Compensating Condenser (Osc. H.F. Standard).....	Part of 11	....	49 Resistor (20000 ohms) (Red, Black, Orange).....	6649	.20
15 Compensating Condenser (Osc. S.W.).....	Part of 11	....	50 Resistor (99000 ohms) (White, White, Yellow).....	4411	.20
16 Compensating Condenser (Osc. L.F. Police) Part of 17	31-6027	....	51 Condenser (.15 Mfd. Tubular).....	30-4191	.35
17 Compensating Condenser (Osc. L.F. Standard) Part of 16	31-6027	....	52 Condenser (16 Mfd. Electrolytic).....	30-2118	1.65
18 Tuning Condenser Assembly.....	31-1526	2.75	53 Resistor (1 Meg.) (Brown, Black, Green).....	33-1096	.20
19 Resistor (400 ohms Flexible) (Yellow, Black, Brown).....	33-3016	.20	54 Resistor (.5 meg.) (Yellow, White, Yellow).....	6097	.20
20 Condenser (.09 Mfd. Twin Bakelite Block).....	4989-DG	.40	55 Resistor (70000 ohms) (Violet, Black, Orange).....	5385	.20
21 Resistor (.5 Meg.) (Yellow, White, Yellow).....	6097	.20	56 Resistor (99000 ohms) (White, White, Yellow).....	6099	.20
22 Resistor (2 Megs.) (Red, Black, Green).....	33-1025	.20	57 Condenser (.1 Mfd. Tubular).....	30-4122	.35
23 Condenser (.05 Mfd. Tubular).....	30-4020	.35	58 Resistor (.5 meg.) (Yellow, White, Yellow).....	6097	.20
23A Condenser (.05 Mfd. Tubular).....	30-4020	.35	59 Condenser (.02 Mfd. Tubular).....	30-4113	.30
24 Resistor (300 ohms Flexible) (Orange, Black, Brown).....	33-3010	.20	60 Tone Control.....	30-4316	.75
25 Resistor (50000 ohms) (Green, Brown, Orange).....	6098	.20	61 Condenser in Tone Control.....	Part of 60	....
26 Condenser (1 Mmf.).....	Part of 23	....	61A Condenser (.003 Mfd. Tubular).....	30-4042	.25
27 Condenser (.00025 Mfd. Mica).....	30-1032	.35	62 Output Transformer.....	32-7019	1.25
28 Condenser (.00015 Mfd. Mica).....	30-1033	.35	63 Voice Coil & Cone Assembly (S-14 Speaker).....	36-3157	.80
29 Condenser (.00005 Mfd. Mica).....	30-1029	.35	64 Field Coil & Pot Assembly (S-14 Speaker).....	36-3495	2.75
30 Resistor (2 Megs.) (Red, Black, Green).....	33-1025	.20	65 Resistor (1000 ohms) (Brown, Black, Red).....	5837	.20
31 Compensating Condenser (1st I.F. Primary).....	Part of 32	....	66 Condenser (.3 Mfd. Bakelite Block).....	6287-DU	.40
32 1st I.F. Transformer.....	32-1646	\$2.25	67 Condenser (8 Mfd. & 8 Mfd. Electrolytic).....	30-2079	2.40
33 Compensating Condenser (1st I.F. Secondary).....	Part of 32	....	68 Condenser (.25 Mfd. Tubular).....	30-4146	.40
34 Resistor (400 ohms Flexible) (Yellow, Black, Brown).....	33-3016	.20	69 Condenser (.015 Mfd. Bakelite Block).....	3793-DG	.40
35 Condenser (.1 Mfd. Tubular).....	30-4122	.35	70 Resistor (BC Wirewound, 22 ohms, 235 ohms).....	33-3037	.20
36 Compensating Condenser (2nd I.F. Pri.).....	Part of 37	....	71 Power Transformer (115 Volts 60 Cycles).....	32-7381	4.00
			(115 Volts 25 Cycles).....	32-7382	6.25
			(230 Volts 50 Cycles).....	33-7383	6.50
			72 Condenser (.1 Mfd. Tubular).....	30-4122	.35
			73 Resistor (330,000 ohms) (Orange, Orange, Yellow).....	33-1200	.20
			74 Pilot Lamp.....	34-2064	.09

PHILCO RADIO & TELEV. CORP.

MODEL 620
Alignment, Data
Socket, Trimmers

Model 620

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 wave-band switch.

Power Supply: Alternating Current. Voltage and frequency as specified on chassis nameplate.

Tubes Used: 1 type 78, R.F.; 1 type 6A7, Detector-Oscillator; 1 type 78, I.F.; 1 type 75, 2d Detector and 1st A.F.; 1 type 42 Output; 1 type 80 Rectifier.

Wave Bands: Three—(1) standard (with some Police); (2) Police, Aircraft and Amateur; (3) Short-wave.

Coverage of Each Band: Band 1, 540-1720 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: 65 watts.

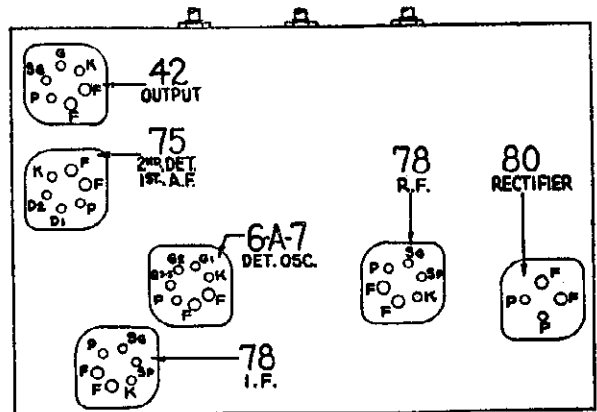


Fig. 1. Tube Sockets as viewed from bottom.

Adjusting Compensating Condensers

The adjustment of the compensating condensers in Model 620 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. Or you can use 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. 2. An output meter is also needed, such as in Philco Model 025.

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 broadcast 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 80 volt range of the output meter in the Philco 048A or 025 unit to the plate and cathode of the output tube 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 standard broadcast band, wave band switch to extreme left (clockwise), and have 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. The primary is adjusted by turning the screw in top and the secondary by the nut. Adjust condensers ⑭ and ⑮ (2d I.F. primary and secondary) for maximum reading in the output meter, and then condensers ⑯ and ⑰ (1st I.F. primary and secondary).

Adjustment of Wave-Trap

1. Connect the signal generator leads to the antenna and ground terminals of the receiver. Replace the grid clip on the 6A7 grid cap.

2. With the wave-band switch of the receiver still in the extreme left (standard band), (540-1720 K.C.), turn the station selector to 55.

3. With the signal generator in operation at 460 K.C., adjust the wave-trap ② 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.

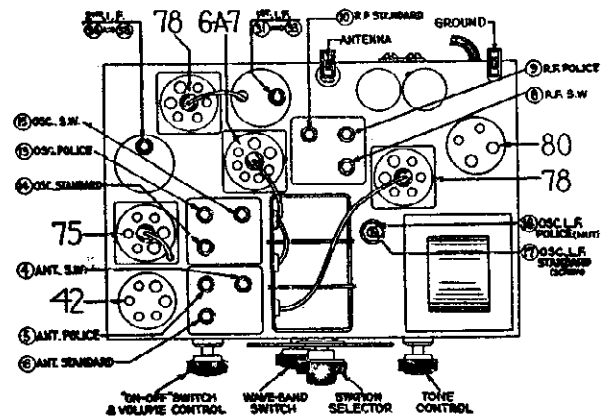


Fig. 2. Locations of Compensating Condensers
Adjustment of High and Low
Frequency Compensators

1. With the wave-band switch still at Range No. 1 (broadcast band), set the dial at 1700 K.C. Set the signal generator at this frequency and adjust compensators ⑭, ⑮ and ⑯ for maximum output. These are the oscillator, antenna, and R.F. "standard" compensators respectively.

2. Tune the receiver and the signal generator to 600 K.C. and adjust compensator ⑰ (screw) for maximum output. This is the oscillator L.F. standard compensator.

3. Turn the waveband switch to the second (middle) position. Set the dial at 3.6 M.C., at which point the fundamental of the 091 signal will be heard. If the Model 088 signal generator is being used, set it at 3.6 M.C. Adjust compensators ⑱, ⑲ and ⑳ in succession. These are the oscillator antenna and R.F. police band adjustments.

4. Turn the tuning dial to 1.8 M.C., and set the signal generator (Model 024 or Model 088) at 1800 K.C. Adjust compensator ⑳ (Osc. L.F., police) (nut) to maximum signal.

5. Turn the wave-band switch to Band 3 (extreme right) and adjust the station selector to 18.0 megacycles. Set the signal generator at 18 M.C. By means of the Philco wrench, part No. 3164, adjust the oscillator S.W., antenna S.W. and R.F. S.W. compensators for maximum reading in the output meter. These are numbered ⑲, ⑲ and ⑲ respectively in figure No. 2.

MODEL 623
Chassis, Parts

PHILCO RADIO & TELEV. CORP.

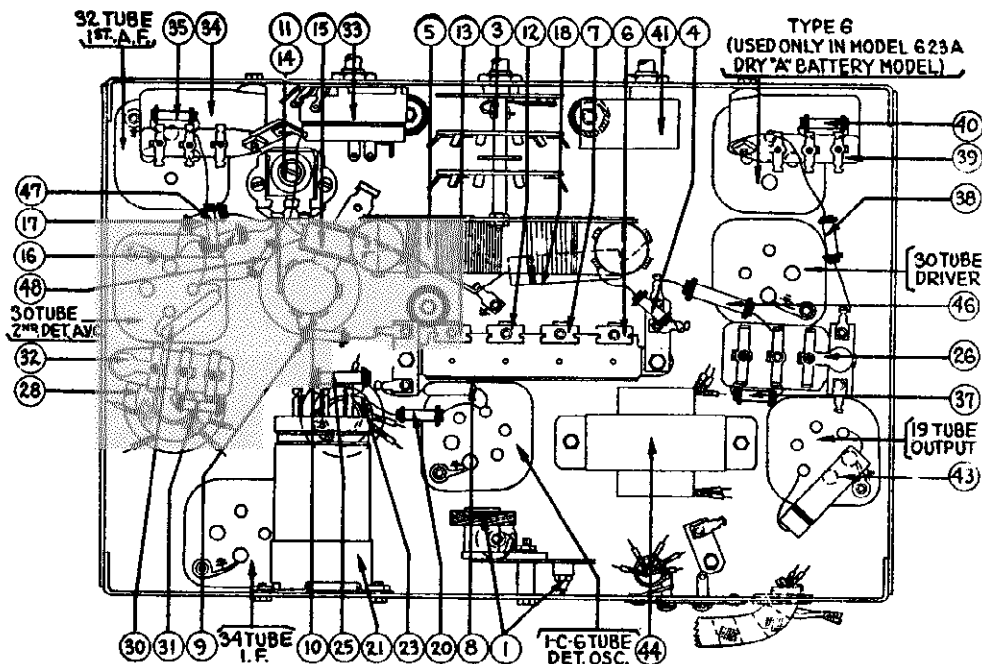


Fig. 4

Replacement Parts—Model 623

Nos. in Figs. 3 & 4			Nos. in Figs. 3 & 4				
	Description	Part No.	List Price	Description	Part No.	List Price	
①	Wave Trap.....	38-8860	\$1.10	③	Resistor (330000 ohms) (Orange, Orange, Yellow).....	33-1200	\$0.20
②	Condenser (Capacity obtained by Twisted Wires).....			④	Resistor (250000 ohms) (Red, Yellow, Yellow).....	33-1097	.20
③	Waveband Switch.....	42-1112	1.10	⑤	Condenser (.01 Mfd. Bakelite Block).....	3903-SU	.25
④	Resistor (10000 ohms) (Brown, Black, Orange).....	33-1000	.20	⑥	Resistor (.5 Meg.) (Yellow, White, Yellow).....	6097	.20
⑤	Antenna Transformer.....	32-1669	1.15	⑦	Tone Control.....	30-4344	.50
⑥	Compensating Condenser (Ant. Standard).....	Part of ③		⑧	Audio Transformer (On Top of Chassis).....	32-7454	1.60
⑦	Compensating Condenser (Ant. S.W.).....	Part of ③	.50	⑨	Condenser (.002 Mfd. Tubular).....	30-4177	.25
⑧	Condenser (.00025 Mfd. Mica).....	30-1032	.35	⑩	Output Transformer (On Chassis).....	32-7453	1.50
⑨	Resistor (20 ohms) (Red, Black, Black).....	33-1206	.20	⑪	Cone & Voice Coil Assembly (KR-8 Speaker).....	36-3159	.80
⑩	Oscillator Transformer.....	32-1831	1.50	⑫	Resistor (1000 ohms) (Brown, Black, Red).....	5837	.20
⑪	Compensating Condenser (Osc. L.F. Standard).....	Part of ③	.70	⑬	Resistor (2 Meg.) (Red, Black, Green).....	33-1025	.20
⑫	Compensating Condenser (Osc. S.W., H.F. End).....	Part of ③	.50	⑭	Resistor (2 Meg.) (Red, Black, Green).....	33-1025	.20
⑬	Compensating Condenser (Osc. H.F. Standard).....	Part of ③	.50	⑮	Condenser (.00015 Mfd. Mica).....	30-1033	.35
⑭	Compensating Condenser (Osc. S.W. Series).....	Part of ③	.70	⑯	Resistor (.5 Meg.) (Yellow, White, Yellow).....	6097	.20
⑮	Condenser (.00225 Mfd. Mica).....	30-1055	.40		Dial Scale.....	27-5097	.25
⑯	Resistor (25000 ohms) (Red, Green, Orange).....	33-1018	.30		Dial Hub Assembly.....	31-1550	.15
⑰	Resistor (25000 ohms) (Red, Green, Orange).....	33-1018	.20		Dial Spring Clamp.....	28-2837	.10
⑱	Condenser (.05 Mfd. Tubular).....	30-4020	.35	‡	Bezel (623-B).....	278-3163	.50
⑲	Tuning Condenser Assembly.....	31-1526	2.75	‡‡	Bezel Glass (623-B).....	227-8006	.55
⑳	Resistor (5000 ohms) (Green, Black, Red).....	6096	.20		Tube Socket (4-Prong).....	27-6044	.10
㉑	Condenser (Electrolytic) (4 Mfd., 8 Mfd., 2 Mfd.).....	30-2127	1.50		Tube Socket (6-Prong).....	27-6036	.11
㉒	Compensating Condenser (1st I.F. Primary).....	Part of ③			Tube Shield (Round).....	8005	.10
㉓	1st I.F. Transformer.....	32-1793	1.35		Tube Shield Base (Round).....	8004	.01
㉔	Compensating Condenser (1st I.F. Secondary).....	Part of ③			Tube Shield (Square).....	28-2726	.10
㉕	Resistor (2000 ohms) (Red, Black, Red).....	33-1028	.20		Tube Shield Base (Square).....	28-2725	.03
㉖	Condenser (.15 Mfd. Bakelite Block).....	6287-SQ	.35		Knob (Waveband).....	27-4219	.10
㉗	Compensating Condenser (2nd I.F. Primary).....	Part of ③			Knob (Tone, Volume).....	27-4206	.10
㉘	2nd I.F. Transformer.....	32-1672	1.35		Knob (Station Selector).....	27-4206	.12
㉙	Compensating Condenser (2nd I.F. Secondary).....	Part of ③			Knob (Slow Speed).....	27-4207	.10
㉚	Condenser (.006 Mfd. Mica).....	6359	.60		Chassis Mtg. Screw.....	W-1496A	1.60 C.
㉛	Resistor (50000 ohms) (Green, Brown, Orange).....	6098	.20		Chassis Mtg. Washer (Rubber).....	27-4198	.01
㉜	Condenser (.00011 Mfd. Twin Bakelite Block).....	8035-DG	.25		Chassis Mtg. Bumper (Rubber).....	27-4197	2.50 per C.
㉝	Volume Control and On-Off Switch.....	33-5115	1.45		Battery Cable.....	41-3143	1.25
㉞	Condenser (.01 Mfd. Bakelite Block).....	3903-SU	.25		Ballast Tube Socket Jumper Wire.....	28-6061	.014
㉟	Resistor (1 Meg.) (Brown, Black, Orange).....	33-1096	.20		‡‡‡-F Bezel.....	28-3164	.50
㊱	Pilot Lamp.....	34-2055	.35		‡‡‡-F Bezel Glass.....	27-8007	.55

*Not shown in Fig 4

MODEL 623

Alignment, Data

PHILCO RADIO & TELEV. CORP.

Model 623

Adjusting Compensating Condensers

General Specifications

Type Circuit: Superheterodyne, with Class B output; built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

Power Supply: Battery operated; Model 623 uses a 2-volt storage battery (Philco 172-R). Model 623-A uses dry A battery (Philco P-896). Both sets use a dry combination "B" & "C" battery unit (Philco P-9068). This has a socket into which the plug on the battery cable attached to chassis is to be inserted.

Tubes Used: 1 type 1C6, Detector-Oscillator; 1 type 34, I.F.; 1 type 30, 2d Detector and A.V.C.; 1 type 32 1st A.F.; 1 type 30, driver; 1 type 19 output. Model 623-A has also a ballast tube, type 6, to maintain constant filament voltage on all tubes. The socket for this tube exists in both 623 and 623-A chassis, but in the former, the type 6 tube is not used, and the filament contacts of the socket are shorted by a metal jumper.

Wave Bands: Three—(1) Standard (with some Police); (2) Police; (3) Short-wave.

Coverage of Each Band: Band 1, 530-1720 K.C.; Band 2, 2300 to 2500 K.C. (2.3-2.5 M.C.); Band 3, 5700-18,000 K.C. (5.7 to 18.0 megacycles).

Tuning Drive: Dual gear drive, ball bearing. 50 to 1 ratio for slow-speed tuning, 6 to 1 on main shaft.

Tone Control: 2-Position.

Intermediate Frequency: 460 K.C.

Current Consumption: A battery, .67A; B battery, 19 M.A.

The adjustment of the compensating condensers in Model 623 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. The Philco Model 088 All-Wave Signal Generator covers these requirements perfectly. An output meter is also required. Philco Model 025 or 012 unit is recommended. The location of all compensating condensers is shown in Fig. 2.

Adjustment of I.F.

1. Remove the antenna connection from the receiver, disconnect the grid clip from the first detector (type 1C6 tube), and connect the "ANT" output terminal of the 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 "025" output meter adapter leads to the plate and one filament contact of the type 30 driver tube. Set it at the 0-30 volt range.

Adjustment of High and Low

Frequency Compensators

1. With the wave-band switch still at Position No. 1 (broadcast band), set the dial at 150 K.C. Set the signal generator at 1.5 M.C. and adjust compensators ⑩ and ⑪ for maximum output. These are the oscillator and antenna "H.F. standard" compensators respectively.

2. Tune the receiver and the signal generator to 600 K.C. and adjust compensator ⑫ (screw) for maximum output. This is the oscillator standard series (L.F.) compensator.

3. Turn the wave-band switch to the extreme right (short-wave band) and adjust the station selector to 18.0 megacycles. Set the signal generator at 18 M.C. Adjust the oscillator S.W., and antenna S.W. compensators for maximum reading in the output meter. These are numbered ⑬ and ⑭ respectively in figure No. 2.

4. Turn the tuning dial to 6.0 M.C., set the signal generator at 6.0 M.C., and adjust condenser ⑮ osc. series (S.W.) (nut) to maximum signal.

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 standard broadcast band, wave band switch to extreme left (clockwise), and have 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 and adjusted by turning the two screws in top. Adjust condensers ⑯ and ⑰ (2d I.F. primary and secondary) for maximum reading in the output meter, and then condensers ⑱ and ⑲ (1st I.F. primary and secondary).

Adjustment of Wave-Trap

1. Connect the signal generator leads to the antenna and ground terminals of the receiver. Replace the grid clip on the 1C6 grid cap.

2. With the wave-band switch of the receiver still in the extreme left (broadcast position), turn the station selector to 550 K.C.

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 wave-trap compensator is reached from rear of chassis.

MODEL 630

Voltage, Trimmers
Chassis, Alignment
Data

PHILCO RADIO & TELEV. CORP.

Type Circuit: Superheterodyne, with preselector R.F. amplifier, and pentode output (5 watts); built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

Power Supply: Alternating Current. Voltage and frequency as specified on chassis nameplate.

Tubes Used: 1 type 78, R.F.; 1 type 6A7, Detector-Oscillator; 1 type 78, I.F.; 1 type 75, 2d Detector and 1st A.F.; 1 type 42 Output; 1 type 80 Rectifier.

Wave Bands: Three—(1) standard (with some Police); (2) Police, Aircraft and Amateur; (3) Short-wave.

Coverage of Each Band: Band 1, 540-1720 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: 70 watts.

Tube Socket Voltages
Measured to Ground

Tube	78 R.F.	6A7 Det. Osc.	78 I.F.	75 2d Det.	42 Output
Point P	245	245	245	188	298
SG	102	102	102	...	311
K	2 7	2.6	2.6	...	...
6A7: G ₁ & G ₂ = 175					

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 55; waveband switch counter-clockwise (band 1). Use Fig. 1 for test points. Line voltage 115 volts.

Adjustment of High and Low
Frequency Compensators

1. With the wave-band switch still at Range No. 1 (broadcast band), set the dial at 1700 K.C. Set the signal generator at this frequency and adjust compensators ⑬, ⑭ and ⑮ for maximum output. These are the oscillator, antenna, and R.F. "standard" compensators respectively.

2. Tune the receiver and the signal generator to 600 K.C. and adjust compensator ⑯ (screw) for maximum output. This is the oscillator L.F. standard compensator.

3. Turn the waveband switch to the second (middle) position. Set the dial at 3.6 M.C. at which point the fundamental of the 091 signal will be heard. If the Model 088 Signal Generator is being used, set it at 3.6 M.C. Adjust condensers ⑱, ⑲ and ⑳ in succession. These are the oscillator, antenna and R.F. police band adjustments.

4. Turn the tuning dial to 1.8 M.C., and set the signal generator (Model 026 or Model 088) at 1800 K.C. Adjust condenser ㉑ (Osc. L.F., police) (nut), to maximum signal.

5. Turn the wave-band switch to Band 3 (extreme right) and adjust the station selector to 18.0 megacycles. Set the signal generator at 18 M.C. By means of the Philco wrench, part No. 3164, adjust the oscillator S.W., antenna S.W. and R.F. S.W. compensators for maximum reading in the output meter. These are numbered ㉒, ㉓ and ㉔ respectively in figure No. 2.

Power Transformer Data

Terminals	A.C. Volts	Current	Circuit	Color
1-2	120	.....	Primary	White
3-5	746	78 M.A.	Secondary	Yellow
6-7	5.0	2.0 A.	Fil. Rect.	Blue
8-9	6.3	2.25 A.	Filaments	Black
4	...	.....	Center Tap of 3-5	Yellow, Green Tracer

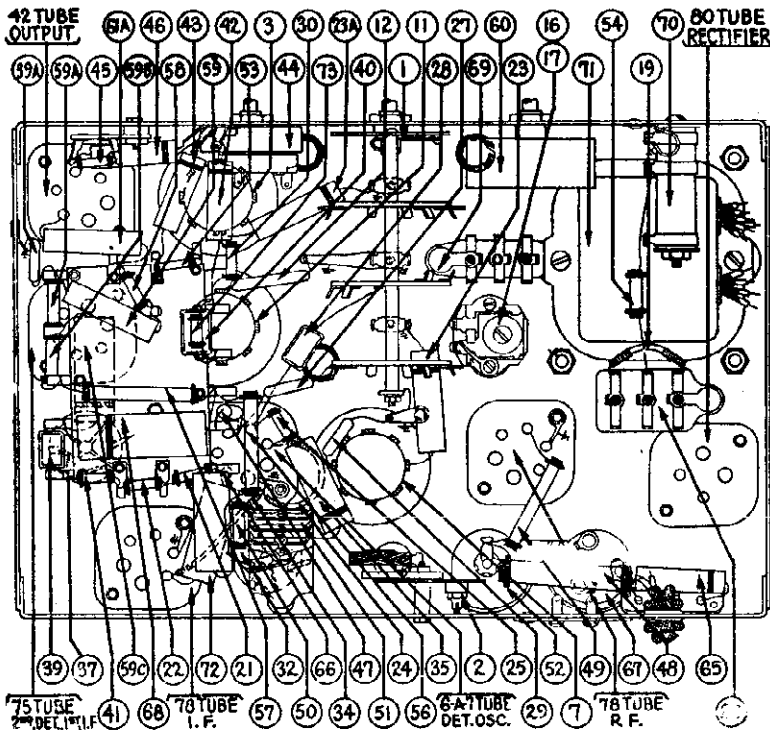


Fig. 4. Bottom View of Chassis

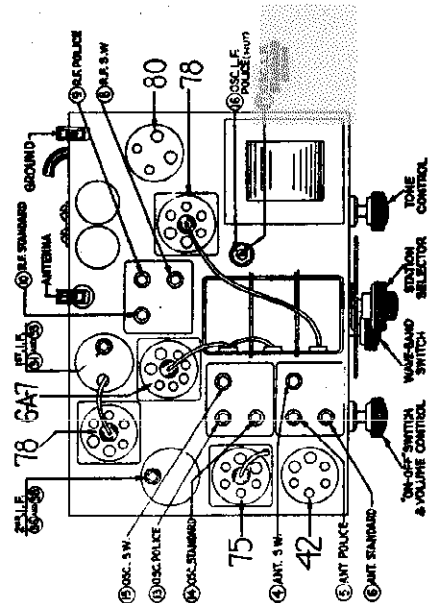


Fig. 2. Location of Compensating Condensers

PHILCO RADIO & TELEV. CORP.

MODEL 630
Alignment, Part 2
Socket, Parts

Replacement Parts—Model 630

Description	Part No.	List Price
① Wave Band Switch.....	42-1107	\$1.75
② Wavetrap.....	38-6850	1.10
③ Antenna Transformer.....	32-1699	3.00
④ Compensating Condenser (Ant. S.W.).....	Part of ④	.....
⑤ Compensating Condenser (Ant. Police).....	Part of ⑤	.....
⑥ Compensating Condenser (Ant. Standard).....	Part of ⑥	.....
⑦ R. F. Transformer.....	32-1636	3.25
⑧ Compensating Condenser (R.F. Short-Wave).....	Part of ⑧	.....
⑨ Compensating Condenser (R.F. Police).....	Part of ⑨	.....
⑩ Compensating Condenser (R.F. Standard).....	Part of ⑩	.....
⑪ Oscillator Transformer.....	32-1637	2.50
⑫ Condenser (.0047 Mfd. Mica).....	30-1052	.60
⑬ Compensating Condenser (Osc. Police).....	Part of ⑬	.....
⑭ Compensating Condenser (Osc. H. F. Standard).....	Part of ⑭	.....
⑮ Compensating Condenser (Osc. S. W.).....	Part of ⑮	.....
⑯ Compensating Condenser (Osc. L.F. Police) Part of 31-6027	Part of 31-6027	.70
⑰ Compensating Condenser (Osc. L.F. Standard)		
⑱ Tuning Condenser Assembly.....	31-1526	2.75
⑲ Resistor (400 ohms Flexible) (Yellow, Black, Brown).....	33-3016	.20
⑳ Condenser (.09 Mfd. Twin Bakelite Block).....	4989-DG	.40
㉑ Resistor (.5 Meg.) (Yellow, White, Yellow).....	6097	.20
㉒ Resistor (2 Megs.) (Red, Black, Green).....	33-1025	.20
㉓ Condenser (.05 Mfd. Tubular).....	30-4020	.35
㉔a Condenser (.05 Mfd. Tubular).....	30-4020	.35
㉔b Resistor (300 ohms Flexible) (Orange, Black, Brown).....	33-3010	.20
㉕ Resistor (50000 ohms) (Green, Brown, Orange).....	6098	.20
㉖ Condenser (1 Mmfd.).....	Part of ㉖	.....
㉗ Condenser (.00025 Mfd. Mica).....	30-1032	.35
㉘ Condenser (.00015 Mfd. Mica).....	30-1033	.35
㉙ Condenser (.00005 Mfd. Mica).....	30-1029	.35
㉚ Resistor (2 Megs.) (Red, Black, Green).....	33-1025	.20
㉛ Compensating Condenser (1st I.F. Primary).....	Part of ㉛	.....
㉜ 1st I.F. Transformer.....	32-1646	\$2.25
㉝ Compensating Condenser (1st I.F. Secondary).....	Part of ㉝	.....
㉞ Resistor (400 ohms Flexible) (Yellow, Black, Brown).....	33-3016	.20
㉟ Condenser (.1 Mfd. Tubular).....	30-4122	.35
㊱ Compensating Condenser (2nd I.F. Pri.).....	Part of ㊱	.....
㊲ 2nd I.F. Transformer.....	32-1647	2.25
㊳ Compensating Condenser (2nd I.F. Sec.).....	Part of ㊳	.....
㊴ Condenser (.00011 Mfd. Mica).....	30-1031	.35
㊴a Condenser (.00011 Mfd. Mica).....	30-1031	.35
㊴b Condenser (.00011 Mfd. Mica).....	30-1031	.35
㊵ Resistor (50000 ohms) (Green, Brown, Orange).....	6098	.20
㊶ Condenser (.02 Mfd. Tubular).....	30-4215	.30
㊶a Condenser (.02 Mfd. Tubular).....	30-4215	.30
㊷ Volume Control and On-Off Switch.....	33-5105	1.45
㊸ Resistor (20000 ohms) (Red, Black, Orange).....	33-1178	.20
㊸a Condenser (.02 Mfd. Tubular).....	30-4215	.30
㊸b Resistor (10000 ohms) (Brown, Black, Orange).....	4412	.20
㊸c Resistor (15000 ohms) (Brown, Black, Orange).....	5718	.35
㊸d Resistor (20000 ohms) (Red, Black, Orange).....	6649*	.20
㊸e Resistor (99000 ohms) (White, White, Orange).....	6099†	.20
㊸f Condenser (.3 Mfd. Bakelite Block).....	6287-DG	.40
㊸g Condenser (.16 Mfd. Electrolytic).....	30-2118	1.65
㊸h Resistor (1 Meg.) (Brown, Black, Green).....	33-1096	.20
㊸i Resistor (99000 ohms) (White, White, Orange).....	6099	.20
㊸j Shadow Tuning Meter.....	45-2086	2.00
㊸k Resistor (4000 ohms) (Yellow, Black, Red).....	33-1040	.20
㊸l Resistor (4000 ohms) (Yellow, Black, Red).....	7832	.20
㊸m Resistor (.5 meg.) (Yellow, White, Yellow).....	6097	.20
㊸n Condenser (.02 Mfd. Tubular).....	30-4113	.30
㊸o Resistor (70000 ohms) (Violet, Black, Orange).....	5385	.20
㊸p Resistor (99000 ohms) (White, White, Orange).....	6099	.20
㊸q Condenser (.1 Mfd. Tubular).....	30-4122	.35
㊸r Tone Control (3 position).....	30-4332	.75
㊸s Condenser in Tone Control.....	Part of ㊸s	.....
㊸t Condenser (.003 Mfd. Tubular).....	30-4042	.25
㊸u Output Transformer.....	32-7178	1.60
㊸v Voice Coil & Cone Assembly (K-32).....	36-3159	.80
㊸w Field Coil & Pot Assembly (K-32).....	36-3498	3.25
㊸x Condenser (.05 Mfd. Tubular).....	30-4020	.35
㊸y Condenser (.05 Mfd. Tubular).....	30-4020	.35
㊸z Condenser (8 Mfd., 8 Mfd., 10 Mfd. Electrolytic).....	36-2073	2.15
㊹ Pilot Lamp (Shadow Tuning Meter).....	Part of ㊹	.....
㊹a Condenser (.015 Mfd. Twin Bakelite Block).....	3793-DG	.40
㊹b Resistor (BC Wirewound -21 ohms, 263 ohms).....	33-3069	.25

㊹c Power Transformer (115 Volts 60 Cycles).....	32-7384	5.50
..... (115 Volts 25 Cycles).....	32-7385	7.75
..... (230 Volts 50 Cycles).....	33-7386	5.75
㊹d Condenser (.1 Mfd. Tubular).....	30-4122	.35
㊹e Resistor (330,000 ohms) (Orange, Orange, Yellow).....	33-1200	.20
㊹f Pilot Lamp.....	34-2064	.09

*After Run 2, this is 10000 ohms Part 3524.
†After Run 2, this is 20000 ohms Part 6650

Adjusting Compensating Condensers

The adjustment of the compensating condensers in Model 630 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. Or you can use 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. 2. An output meter is also needed, such as in Philco Model 025

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 broadcast 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 30 volt range of the output meter in the Philco 048A or 025 unit to the plate and cathode of the output tube 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 standard broadcast band, wave band switch to extreme left (clockwise), and have 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. The primary is adjusted by turning the screw in top and the secondary by the nut. Adjust condensers ㉞ and ㉟ (2d I.F. primary and secondary) for maximum reading in the output meter, and then condensers ㉜ and ㉝ (1st I.F. primary and secondary).

Adjustment of Wave-Trap

1. Connect the signal generator leads to the antenna and ground terminals of the receiver. Replace the grid clip on the 6A7 grid cap.
2. With the wave-band switch of the receiver still in the extreme left (standard band), (540-1720 K.C.), turn the station selector to 53.
3. With the signal generator in operation at 460 K.C., adjust the wave-trap ㉚ condenser until a MINIMUM reading is obtained on the output meter. The Philco file wrench, part No. 3164, is used for this adjustment. The wave-trap compensator is reached from rear of chassis.

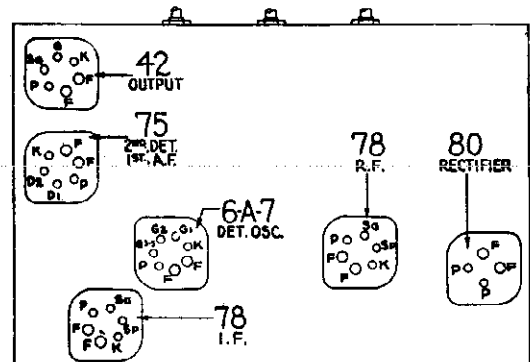


Fig. 1. Tube Sockets as viewed from bottom

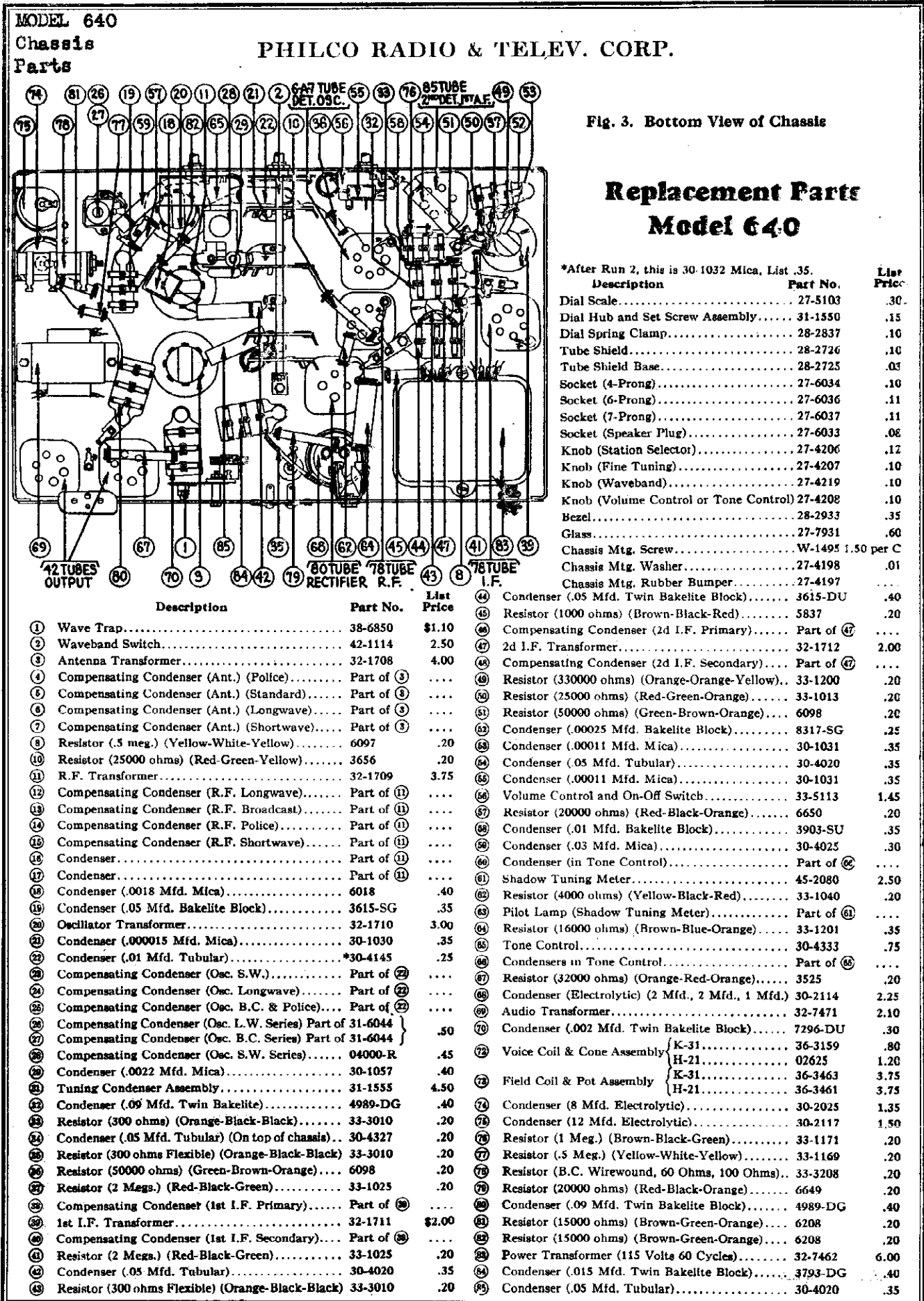


Fig. 3. Bottom View of Chassis

Replacement Parts Model 640

Description	Part No.	List Price
Dial Scale	27-5103	.30
Dial Hub and Set Screw Assembly	31-1550	.15
Dial Spring Clamp	28-2837	.10
Tube Shield	28-2726	.10
Tube Shield Base	28-2725	.03
Socket (4-Prong)	27-6034	.10
Socket (6-Prong)	27-6036	.11
Socket (7-Prong)	27-6037	.11
Socket (Speaker Plug)	27-6033	.08
Knob (Station Selector)	27-4206	.12
Knob (Fine Tuning)	27-4207	.10
Knob (Waveband)	27-4219	.10
Knob (Volume Control or Tone Control)	27-4208	.10
Bezel	28-2933	.35
Glass	27-7931	.60
Chassis Mtg. Screw	W-1495	1.50 per C
Chassis Mtg. Washer	27-4198	.01
Chassis Mtg. Rubber Bumper	27-4197	.....
Condenser (.05 Mfd. Twin Bakelite Block)	3615-DU	.40
Resistor (1000 ohms) (Brown-Black-Red)	5837	.20
Compensating Condenser (2d I.F. Primary)	Part of 47	.....
2d I.F. Transformer	32-1712	2.00
Compensating Condenser (2d I.F. Secondary)	Part of 47	.....
Resistor (33000 ohms) (Orange-Orange-Yellow)	33-1200	.20
Resistor (25000 ohms) (Red-Green-Orange)	33-1013	.20
Resistor (50000 ohms) (Green-Brown-Orange)	6098	.20
Condenser (.00025 Mfd. Bakelite Block)	8317-SG	.25
Condenser (.00011 Mfd. Mica)	30-1031	.35
Condenser (.05 Mfd. Tubular)	30-4020	.35
Condenser (.00011 Mfd. Mica)	30-1031	.35
Volume Control and On-Off Switch	33-5113	1.45
Resistor (20000 ohms) (Red-Black-Orange)	6650	.20
Condenser (.01 Mfd. Bakelite Block)	3903-SU	.35
Condenser (.03 Mfd. Mica)	30-4025	.30
Condenser (in Tone Control)	Part of 66	.....
Shadow Tuning Meter	45-2080	2.50
Resistor (4000 ohms) (Yellow-Black-Red)	33-1040	.20
Pilot Lamp (Shadow Tuning Meter)	Part of 61	.....
Resistor (16000 ohms) (Brown-Blue-Orange)	33-1201	.35
Tone Control	30-4333	.75
Condensers in Tone Control	Part of 66	.....
Resistor (32000 ohms) (Orange-Red-Orange)	3525	.20
Condenser (Electrolytic) (2 Mfd., 2 Mfd., 1 Mfd.)	30-2114	2.25
Audio Transformer	32-7471	2.10
Condenser (.002 Mfd. Twin Bakelite Block)	7296-DU	.30
Voice Coil & Cone Assembly	{ K-31 36-3159 .80 H-21 02625 1.20	
Field Coil & Pot Assembly	{ K-31 36-3463 3.75 H-21 36-3461 3.75	
Condenser (8 Mfd. Electrolytic)	30-2025	1.35
Condenser (12 Mfd. Electrolytic)	30-2117	1.50
Resistor (1 Meg.) (Brown-Black-Green)	33-1171	.20
Resistor (.5 Meg.) (Yellow-White-Yellow)	33-1169	.20
Resistor (B.C. Wirewound, 60 Ohms, 100 Ohms)	33-3208	.20
Resistor (20000 ohms) (Red-Black-Orange)	6649	.20
Condenser (.09 Mfd. Twin Bakelite Block)	4989-DG	.40
Resistor (15000 ohms) (Brown-Green-Orange)	6208	.20
Resistor (15000 ohms) (Brown-Green-Orange)	6208	.20
Power Transformer (115 Volts 60 Cycles)	32-7462	6.00
Condenser (.015 Mfd. Twin Bakelite Block)	3793-DG	.40
Condenser (.05 Mfd. Tubular)	30-4020	.35

Description	Part No.	List Price
Wave Trap	38-6850	\$1.10
Waveband Switch	42-1114	2.50
Antenna Transformer	32-1708	4.00
Compensating Condenser (Ant.) (Police)	Part of 3	.....
Compensating Condenser (Ant.) (Standard)	Part of 3	.....
Compensating Condenser (Ant.) (Longwave)	Part of 3	.....
Compensating Condenser (Ant.) (Shortwave)	Part of 3	.....
Resistor (.3 meg.) (Yellow-White-Yellow)	6097	.20
Resistor (25000 ohms) (Red-Green-Yellow)	3656	.20
R.F. Transformer	32-1709	3.75
Compensating Condenser (R.F. Longwave)	Part of 11	.....
Compensating Condenser (R.F. Broadcast)	Part of 11	.....
Compensating Condenser (R.F. Police)	Part of 11	.....
Compensating Condenser (R.F. Shortwave)	Part of 11	.....
Condenser	Part of 11	.....
Condenser	Part of 11	.....
Condenser (.0018 Mfd. Mica)	6018	.40
Condenser (.05 Mfd. Bakelite Block)	3615-SG	.35
Oscillator Transformer	32-1710	3.00
Condenser (.000015 Mfd. Mica)	30-1030	.35
Condenser (.01 Mfd. Tubular)	*30-4145	.25
Compensating Condenser (Osc. S.W.)	Part of 22	.....
Compensating Condenser (Osc. Longwave)	Part of 22	.....
Compensating Condenser (Osc. B.C. & Police)	Part of 22	.....
Compensating Condenser (Osc. L.W. Series) Part of 31-6044	} .50	
Compensating Condenser (Osc. B.C. Series) Part of 31-6044		
Compensating Condenser (Osc. S.W. Series)	04000-R	.45
Condenser (.0022 Mfd. Mica)	30-1057	.40
Tuning Condenser Assembly	31-1555	4.50
Condenser (.09 Mfd. Twin Bakelite)	4989-DG	.40
Resistor (300 ohms) (Orange-Black-Black)	33-3010	.20
Condenser (.05 Mfd. Tubular) (On top of chassis)	30-4327	.20
Resistor (300 ohms Flexible) (Orange-Black-Black)	33-3010	.20
Resistor (50000 ohms) (Green-Brown-Orange)	6098	.20
Resistor (2 Megs.) (Red-Black-Green)	33-1025	.20
Compensating Condenser (1st I.F. Primary)	Part of 30	.....
1st I.F. Transformer	32-1711	\$2.00
Compensating Condenser (1st I.F. Secondary)	Part of 30	.....
Resistor (2 Megs.) (Red-Black-Green)	33-1025	.20
Condenser (.05 Mfd. Tubular)	30-4020	.35
Resistor (300 ohms Flexible) (Orange-Black-Black)	33-3010	.20

PHILCO RADIO & TELEV. CORP.

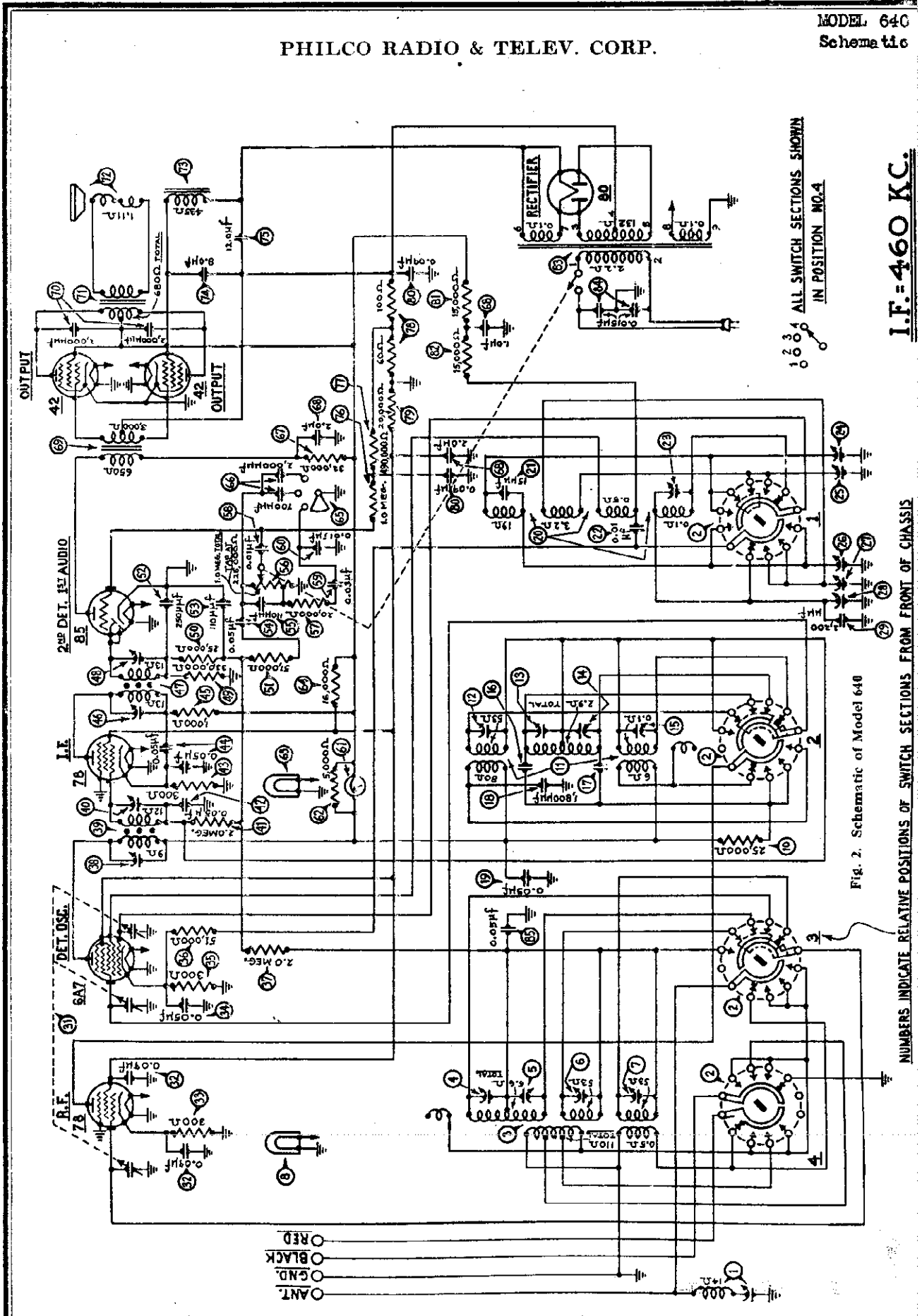


Fig. 2. Schematic of Model 640

NUMBERS INDICATE RELATIVE POSITIONS OF SWITCH SECTIONS FROM FRONT OF CHASSIS

I.F. = 460 KC.

MODEL 640
 Socket, Voltage
 Trimmers, Alignment

PHILCO RADIO & TELEV. CORP.

Model 640

Type Circuit: Superheterodyne, with preselector R.F. amplifier, and push-pull output (7 watts); built in connections for Philco All wave aerial; aerial selector built into and operated by wave-band switch.

Power Supply: Alternating Current. Voltage and frequency as specified on chassis nameplate.

Tubes Used: 1 type 78, R.F.; 1 type 6A7, Detector-Oscillator; 1 type 78, I.F.; 1 type 85, 2d Detector and 1st A.F.; 2 type 42 Push-Pull Output; 1 type 80 Rectifier.

Wave Bands: Four: (1) Long-wave (U. S. Weather Forecasts); (2) Standard (with some Police); (3) Police; (4) Short-wave.

Coverage of Each Band: Band 1, 145 to 390 K.C.; Band 2, 540-1720 K.C.; Band 3, 2.2 to 2.6 M.C.; Band 4, 5800-18000 K.C. (5.8 to 18.0 megacycles).

Tuning Drive: Dual planetary, ball bearing. 80 to 1 ratio for slow-speed tuning, 10 to 1 on main shaft.

Tone Control: 4-position, with bass compensation effective in first position (counter-clockwise).

Intermediate Frequency: 460 K.C.

Power Consumption: 85 watts.

Speaker: 640B (Code 121); K-31, 640X (Code 122); H-21.

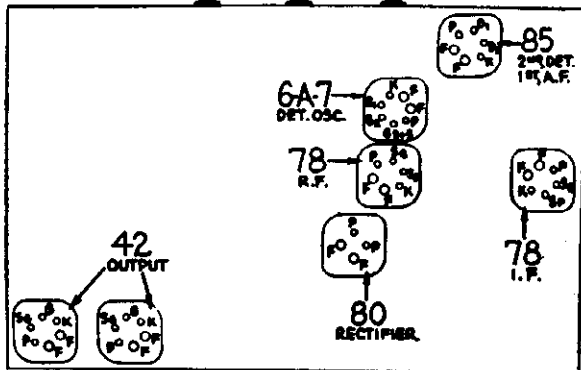


Fig. 1. Tube Sockets as viewed from bottom.
 Power Transformer Data

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 (Line Voltage 115)
 Measured to Ground**

Tube	78 R.F.	6A7 Det. Osc.	78 I.F.	85 2d Det.	42 Output
Point P	71	240	242	102	240
SG	91	91	91		250
K	2.1	2.2	2.3		

6A7: G₁ & G₂ = 102V. 80 Fil.—Gnd.: 300V.

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 at standard broadcast. Use Fig. 1 for test points. Type K-31 speaker employed.

Adjustment of compensating condensers in Model 640 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 20000 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 locations of the various compensating condensers is shown in Fig. 2. Connect the output meter to the plate contacts of the 42 output tubes (using the adapters provided with the "025") and set it at the 0-30 volt range.

I.F.—Set the Signal Generator at 460 K.C., and attach its antenna lead to the grid cap of the 6A7 tube on the Model 640 (having removed the grid clip from the tube). Connect the ground terminal of the Signal Generator to the ground terminal of the set. Turn on the set, turn the waveband switch to second position (standard) and set dial at 55. Now with the fibre screwdriver, adjust condensers (46) and (47) (2d. I.F.) and then (48) and (49) (1st I.F.) until maximum reading is obtained in the output meter. Turn down the "attenuator" on the signal generator if the output meter needle goes off the scale.

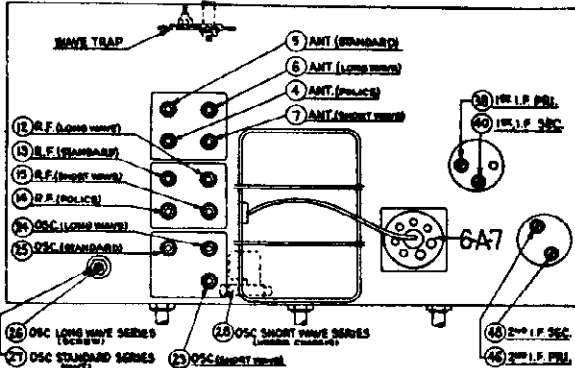


Fig. 2. Locations of Compensating Condensers

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 adjusted as for I.F., adjust wavetrap (1) until the minimum reading is obtained in the out-put meter.

SHORTWAVE—Turn waveband switch to position 4 (extreme right). Set signal generator at 18 megacycles and dial of set at 18.0 (top scale). Now adjust the oscillator, R.F., and Antenna compensators in turn, for maximum reading. These are (2), (4) and (7) respectively.

Turn the dial to 6.0 M.C., set the signal generator at 6.0 M.C., and adjust condenser (3) for maximum reading. This compensator is located underneath the chassis and reached from underneath. (See Fig. 3).

STANDARD WAVE—Turn waveband switch to position 2 (standard broadcast), set signal generator at 1500 and dial of set at 150. Now adjust the oscillator, R.F., and antenna "Standard" condensers. These are (5), (13) and (8) respectively.

Now turn the dial to 60, set signal generator at 600 and adjust condenser (20) (oscillator standard-series) (nut) for maximum reading.

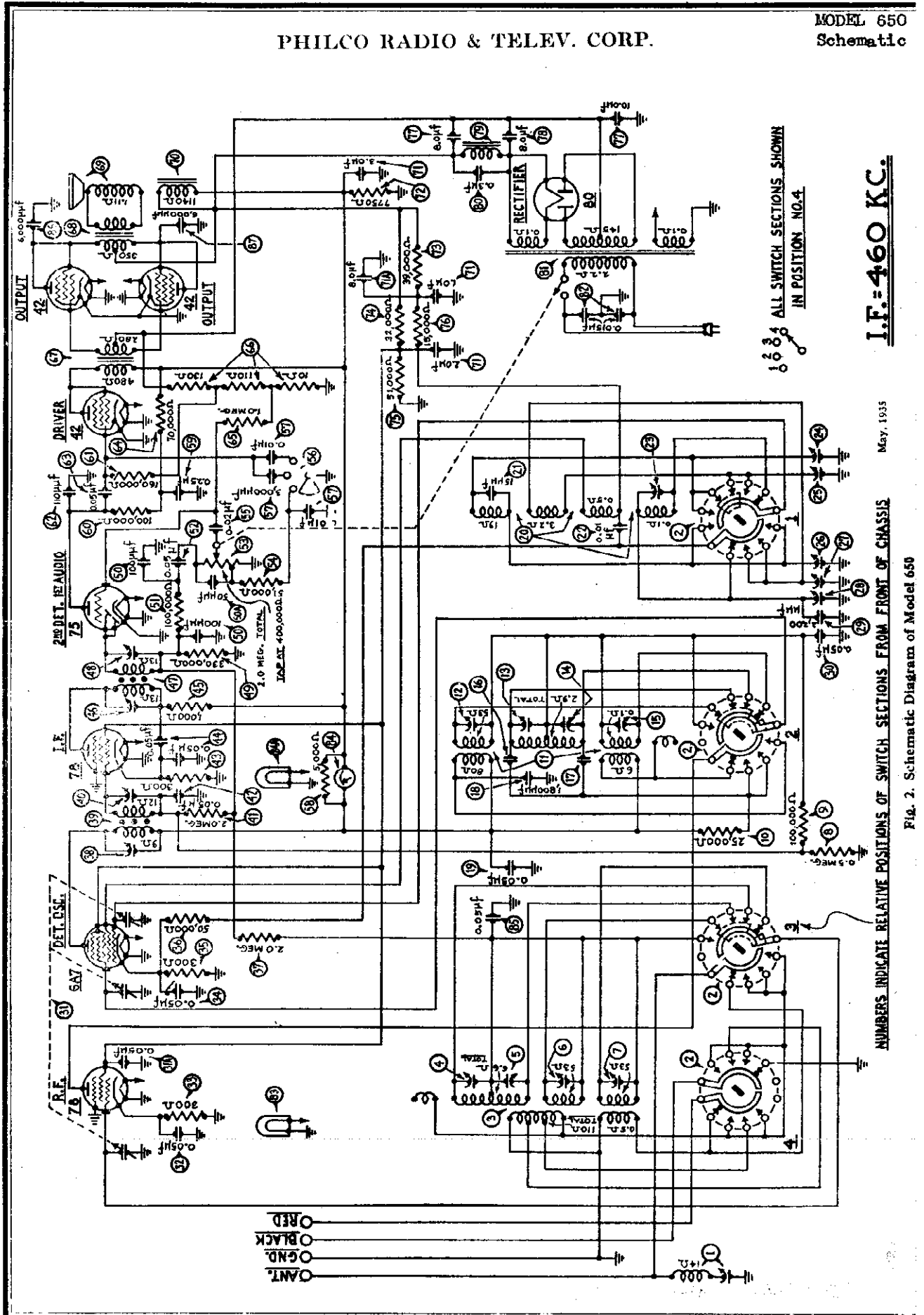
POLICE BAND—Turn waveband switch to position 3 from left (police band); set dial at 2.4 and signal generator at 2400 K.C. Adjust condensers (16) and (9) for maximum reading. (Antenna and R.F. Police.)

LONG WAVE (Weather) BAND—Turn waveband switch to position 1 (left) (Longwave). Set dial at 35 and signal generator at 350 K.C. Adjust condensers (40), (19) and (5) (oscillator, R.F., and Antenna Longwave) for maximum reading.

Turn dial to 17, signal generator to 170 and adjust condenser (2) (longwave series) (screw) for maximum reading

PHILCO RADIO & TELEV. CORP.

MODEL 650
Schematic



ALL SWITCH SECTIONS SHOWN
IN POSITION NO. 4

I.F. = 460 KC.

May, 1935

NUMBERS INDICATE RELATIVE POSITIONS OF SWITCH SECTIONS FROM FRONT OF CHASSIS

Fig. 2. Schematic Diagram of Model 650

- ANT.
- GND.
- BLACK
- RED

MODEL 650

Alignment, Trimmers
Voltage, Data

PHILCO RADIO & TELEV. CORP.

Adjusting Compensating Condensers

Adjustment of compensating condensers in Model 650 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 20000 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 locations of the various compensating condensers is shown in Fig. 2. Connect the output meter to the plate contacts of the 42 output tubes (using the adapters provided with the "025") and set it at the 0-30 volt range.

I.F.—Set the Signal Generator at 460 K.C., and attach its antenna lead to the grid cap of the 6A7 tube on the Model 650 (having removed the grid clip from the tube). Connect the ground terminal of the Signal Generator to the ground terminal of the set. Turn on the set, turn the waveband switch to second position (standard) and set dial at 55. Now with the fibre screwdriver, adjust condensers ② and ③ (2d I.F.) and then ④ and ⑤ (1st I.F.) until maximum reading is obtained in the output meter. Turn down the "attenuator" on the signal generator if the output meter needle goes off the scale.

Tube Socket Voltages (Line Voltage 115) Measured to Ground

Tube	78 R.F.	6A7 Det. Osc.	78 I.F.	75 2d Det.	42 Driver	42 Output
Point P	55	200	200	115	200	300
SG	90	90	90	...	200	300
K	2.2	2.3	2.6	...	...	...

6A7: G₂ & G₁ = 155

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. Type K-17 speaker employed.

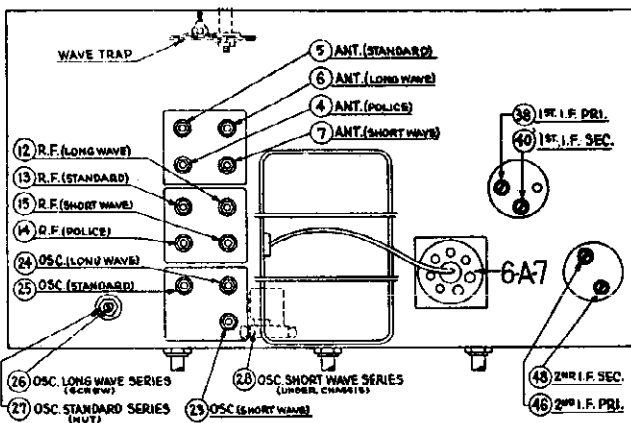


Fig. 2. Locations of Compensating Condensers

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 adjusted as for I.F., adjust wavetrap ① until the minimum reading is obtained in the out-put meter.

SHORTWAVE—Turn waveband switch to position 4 (extreme right). Set signal generator at 18 megacycles and dial of set at 18.0 (top scale). Now adjust the oscillator, R.F., and Antenna compensators in turn, for maximum reading. These are ②, ③ and ⑦ respectively.

Turn the dial to 6.0 M.C., set the signal generator at 6.0 M.C., and adjust condenser ④ for maximum reading. This compensator is located underneath the chassis and reached from underneath. (See Fig. 3).

STANDARD WAVE—Turn waveband switch to position 2 (standard broadcast), set signal generator at 1500 and dial of set at 150. Now adjust the oscillator, R.F., and antenna "Standard" condensers. These are ⑤, ⑥ and ⑧ respectively.

Now turn the dial to 60, set signal generator at 600 and adjust condenser ⑦ (oscillator standard-series) (nut) for maximum reading.

POLICE BAND—Turn waveband switch to position 3 from left (police band); set dial at 2.4 and signal generator at 2400 K.C. Adjust condensers ④ and ⑤ for maximum reading. (Antenna and R.F. Police.)

LONG WAVE (Weather) BAND—Turn waveband switch to position 1 (left) (Longwave). Set dial at 35 and signal generator at 350 K.C. Adjust condensers ②, ③ and ⑧ (oscillator, R.F., and Antenna Longwave) for maximum reading.

Turn dial to 17, signal generator to 170 and adjust condenser ⑥ (longwave series) (screw) for maximum reading.

Type Circuit: Superheterodyne, with preselector R.F. amplifier, and push-pull pentode output (10 watts); built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

Power Supply: Alternating Current. Voltage and frequency as specified on chassis nameplate.

Tubes Used: 1 type 78, R.F.; 1 type 6A7, Detector-Oscillator; 1 type 78, I.F.; 1 type 75, 2d Detector and 1st A.F.; 1 type 42 Driver; 2 type 42 Push-Pull Output; 1 type 60 Rectifier.

Wave Bands: Four: (1) Long-wave (U.S. Weather Forecasts); (2) Standard (with some Police); (3) Police; (4) Short-wave.

Coverage of Each Band: Band 1, 145 to 390 K.C.; Band 2, 540-1720 K.C.; Band 3, 2.2 to 2.6 M.C.; Band 4, 5800-18000 K.C. (5.8 to 18.0 megacycles).

Tuning Drive: Dual planetary, ball bearing. 80 to 1 ratio for slow-speed tuning.

Tone Control: 4-position, with bass compensation effective in first position (counter-clockwise).

Intermediate Frequency: 460 K.C.

Power Consumption: 98 watts.

Speaker: 650B (Code 121); K-17, 650X, 650MX, 650-H, (Code 122); H-13.

PHILCO RADIO & TELEV. CORP.

MODEL 650
Chassis, Socket
Parts, Data

Replacement Parts—Model 650

Description	Part No.	List Price
1 Wave Trap.....	38-6850	\$1.10
2 Waveband Switch.....	42-1114	2.50
3 Antenna Transformer.....	32-1708	4.00
4 Compensating Condenser (Ant.) (Police).....	Part of 3	.....
5 Compensating Condenser (Ant.) (Standard).....	Part of 3	.....
6 Compensating Condenser (Ant.) (Longwave).....	Part of 3	.....
7 Compensating Condenser (Ant.) (Shortwave).....	Part of 3	.....
8 Resistor (.5 meg.) (Yellow-White-Yellow).....	6097	.20
9 Resistor (100000 ohms) (White-White-Yellow).....	6099	.20
10 Resistor (25000 ohms) (Red-Green-Yellow).....	3636	.20
11 R.F. Transformer.....	32-1709	3.75
12 Compensating Condenser (R.F. Longwave).....	Part of 11	.....
13 Compensating Condenser (R.F. Broadcast).....	Part of 11	.....
14 Compensating Condenser (R.F. Police).....	Part of 11	.....
15 Compensating Condenser (R.F. Shortwave).....	Part of 11	.....
16 Condenser.....	Part of 11	.....
17 Condenser.....	Part of 11	.....
18 Condenser (.0018 Mfd. Mica).....	6018	.40
19 Condenser (.05 Mfd. Bakelite Block).....	3615-SG	.35
20 Oscillator Transformer.....	32-1710	3.00
21 Condenser (.00015 Mfd. Mica).....	30-1030	.35
22 Condenser (.01 Mfd. Tubular).....	*30-4145	.25
23 Compensating Condenser (Osc. S.W.).....	Part of 22	.....
24 Compensating Condenser (Osc. Longwave).....	Part of 22	.....
25 Compensating Condenser (Osc. B.C. & Police).....	Part of 22	.....
26 Compensating Condenser (Osc. L.W. Series) Part of.....	31-6044	.50
27 Compensating Condenser (Osc. B.C. Series) Part of.....	31-6044	.50
28 Compensating Condenser (Osc. S.W. Series).....	04000-R	.45
29 Condenser (.0022 Mfd. Mica).....	30-1057	.40
30 Condenser (.05 Mfd. Tubular).....	30-4020	.35
31 Tuning Condenser Assembly.....	31-1555	4.50
32 Condenser (.05 Mfd. Bakelite Block).....	3615-SC	.35
33 Condenser (.05 Mfd. Tubular).....	30-4020	.35
34 Resistor (300 ohms) (Orange-Black-Black).....	33-3010	.20
35 Condenser (.05 Mfd. Tubular) (On top of chassis).....	30-4327	.20
36 Resistor (300 ohms Flexible) (Orange-Black-Black).....	33-3010	.20
37 Resistor (50000 ohms) (Green-Brown-Orange).....	6098	.20
38 Resistor (2 Megs.) (Red-Black-Green).....	33-1025	.20
39 Compensating Condenser (1st I.F. Primary).....	Part of 30	.....
40 1st I.F. Transformer.....	32-1711	2.00
41 Compensating Condenser (1st I.F. Secondary).....	Part of 30	.....
42 Resistor (2 Megs.) (Red-Black-Green).....	33-1025	\$0.20
43 Condenser (.05 Mfd. Tubular).....	30-4020	.35
44 Resistor (300 ohms Flexible) (Orange-Black-Black).....	33-3010	.20
45 Condenser (.05 Mfd. Twin Bakelite Block).....	3615-DU	.40
46 Resistor (1000 ohms) (Brown-Black-Red).....	5837	.20
47 Compensating Condenser (2d I.F. Primary).....	Part of 37	.....
48 2d I.F. Transformer.....	32-1712	2.00
49 Compensating Condenser (2d I.F. Secondary).....	Part of 37	.....
50 Resistor (330000 ohms) (Orange-Orange-Yellow).....	33-1200	.20
51 Condenser (.00011 Mfd. Twin Bakelite Block).....	8035-DG	.25
52 Condenser (.00005 Mfd. Mica) (Not shown Fig. 3).....	30-1029	.35
53 Resistor (100000 ohms) (White-White-Orange).....	6099	.20
54 Condenser (.05 Mfd. Tubular).....	30-4020	.35

55 Volume Control and On-Off Switch.....	33-5108	1.45
56 Resistor (51000 ohms) (Green-Brown-Orange).....	6098	.20
57 Condenser (.02 Mfd. Tubular).....	30-4113	.30
58 Tone Control.....	30-4343	.75
59 Condensers in Tone Control.....	Part of 58	.....
60 Resistor (5000 ohms) (Green-Black-Red).....	5310	.30
61 Condenser (.25 Mfd. Tubular).....	30-4134	.40
62 Resistor (100000 ohms) (White-White-Orange).....	6099	.20
63 Resistor (160000 ohms) (Brown-Blue-Yellow).....	33-1191	.20
64 Condenser (.00011 Mfd. Mica).....	30-1031	.35
65 Condenser (.05 Mfd. Bakelite Block).....	3615-SU	.35
66 Resistor (70000 ohms) (Violet-Black-Orange).....	5385	.20
67 Resistor (1 Meg.) (Brown-Black-Green).....	33-1096	.20
68 B.C. Resistor (Wirewound) (10 ohms, 110 ohms, 130 ohms).....	33-3137	.30
69 Input Transformer.....	32-7114	2.00
70 Output Transformer.....	32-7078	1.40
71 Cone and Voice Coil Assembly (H-13).....	02625	1.20
72 Cone and Voice Coil Assembly (K-17).....	02996	.80
73 Field Coil and Pot Assembly (H-13 or K-17).....	36-3104	2.70
74 Condenser (Electrolytic—3 Mfd., 1 Mfd., 2 Mfd.).....	30-2122	1.65
75 Resistor (Wirewound) (7750 ohms).....	33-3211	1.60
76 Resistor (39000 ohms) (Orange-White-Orange).....	33-1027	.30
77 Resistor (32000 ohms) (Orange-Red-Orange).....	33-1026	.30
78 Resistor (51000 ohms) (Green-Brown-Orange).....	4237	.20
79 Resistor (15000 ohms) (Brown-Green-Orange).....	6208	.20
80 Condenser (Electrolytic—8 Mfd., 10 Mfd.).....	30-2045	1.60
81 Condenser (Electrolytic—8 Mfd.).....	130-2025	1.10
82 Filter Choke.....	32-7415	1.60
83 Condenser (.3 Mfd. Bakelite Block).....	*6287-DU	.40
84 Power Transformer.....	110 Volts 60 Cycles..... 32-7402 110 Volts 25 Cycles..... 32-7403 230 Volts 50 Cycles..... 32-7404	4.50 9.00 7.50
85 Condenser (.015 Mfd. Twin Bakelite Block).....	3793-DG	.40
86 Pilot Lamp (Dial).....	34-2064	.60
87 Shadow Tuning Meter.....	**45-2086	2.00
88 Pilot Lamp (Shadowmeter).....	Part of 87	.....
89 Condenser (.05 Mfd. Tubular).....	30-4020	.35
90 Condenser (.006 Mfd. Tubular).....	30-4125	.25
91 Condenser (.006 Mfd. Tubular).....	30-4125	.25

* Omitted after Run 5.

† In Model 650A (115 Volts 25 Cycles) this is part No. 04357, List .75.

‡ In Code 122 (650X, 650MX, 650H) this is part No. 30-2014, List 1.50.

** In Code 122 (650X, 650MX, 650H) this is part No. 45-2082.

* After Run 2, this is 30-1032 mica, List .35.

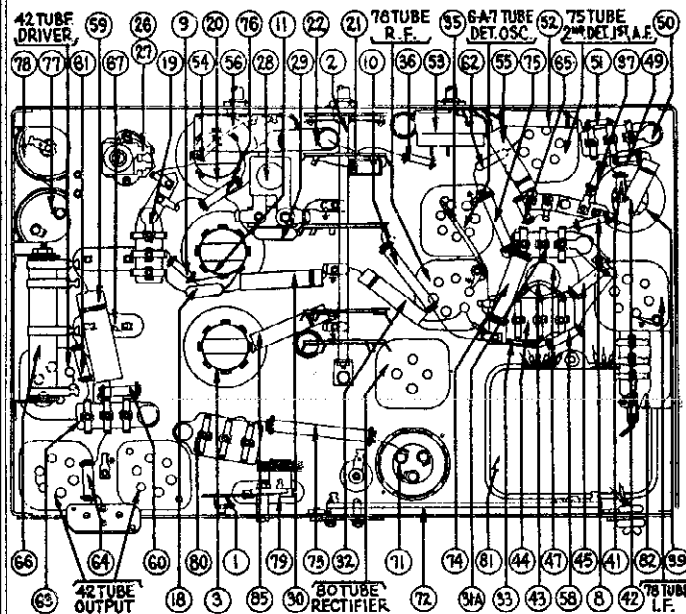


Fig. 3. Bottom View of Chassis

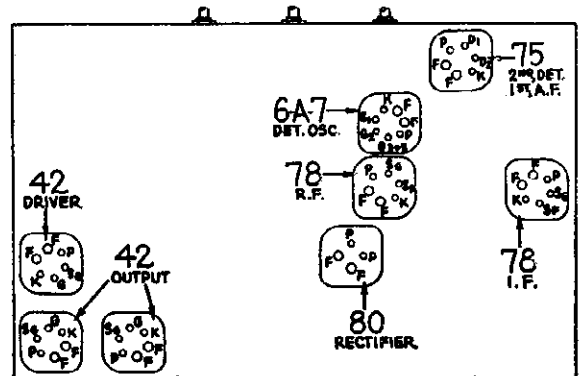


Fig. 1. Tube Sockets as viewed from bottom.

Power Transformer Data

Terminals	A.C. Volts	Current	Circuit	Color
1-2	120	.....	Primary	White
3-5	760	140 M.A.	Secondary	Yellow
6-7	5.0	2.0 A.	Fil. Rect.	Blue
8-9	6.3	3.75 A.	Filaments	Black
4	...	.....	Center Tap of 3-5	Yellow, Green Tracer

MODEL 660
Alignment
Trimmers

PHILCO RADIO & TELEV. CORP.

ADJUSTING COMPENSATING CONDENSERS

Adjustment of compensating condensers in Model 660 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. (all fundamental frequencies) will be 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 locations of the various compensating condensers are shown in Fig. 2. Connect the output meter to the plate contacts of the output tubes (using the adapters provided with the "025") and set it at the 0-30 volt range.

I.F.—Set the Signal Generator at 460 K.C., and attach its antenna lead to the grid cap of the 77 1st detector tube (having removed the grid clip from the tube). Connect the ground terminal of the Signal Generator to the ground terminal of the set. Turn on the set, turn the waveband switch to standard broadcast (second position from left) and set dial at 60. Turn condenser ① (2nd I.F. tertiary) all the way down before adjusting the other I.F. Compensators. Now with the fibre screwdriver, adjust condensers ② and ③ (3rd I.F.), ④ and ⑤ (2nd I.F.), and then ⑥ and ⑦ (1st I.F.) until maximum reading is obtained in the output meter. Turn down the "attenuator" on the signal generator if the output meter needle goes off the scale. Now adjust condenser ⑧ (2nd I.F. tertiary) for maximum reading.

WAVE TRAP—Connect the Signal Generator antenna lead to the grid cap of the 78 R.F. tube. Replace the grid clip on the 77 tube cap. With the signal generator operating at 460 K.C. and the set controls adjusted as for I.F., adjust wavetraps ⑨ until the minimum reading is obtained in the output meter.

SHORTWAVE—Turn wave band switch to the shortwave position (extreme right). Set signal generator at 18 megacycles and dial of set at 18.0 (top scale). Now adjust the oscillator, Antenna, and R.F. shortwave compensators in turn, for maximum reading. These are ⑩, ⑪ and ⑫ respectively.

POLICE AND AMATEUR BAND—Turn the waveband switch to position 3 (from left). Set the dial and signal generator at 4.5 megacycles and adjust condensers ⑬, ⑭ and ⑮ respectively for maximum reading.

Set the signal generator at 1800 K.C. and turn the dial to 1.8. Adjust condenser ⑯ (nut), oscillator police series, to maximum reading.

STANDARD BROADCAST BAND—Turn the waveband switch to position 2 (from left). Set the dial and signal generator at 1500 K.C. and adjust condensers ⑰, ⑱ and ⑲ for maximum reading.

Set the dial and signal generator at 600 K.C. and adjust condenser ⑳ (screw), broadcast series, for maximum reading.

LONGWAVE BAND—Turn waveband switch to position 1 (left). Set the dial and signal generator at 340 K.C. and adjust condenser ㉑ (screw) to maximum. Then adjust ㉒ and ㉓ for maximum reading. Finally, set the dial and signal generator at 175 K.C. and adjust condenser ㉔ (nut) for maximum reading. This is the longwave series compensator.

General Specifications

Type Circuit: Superheterodyne, with push-pull pentodes connected as triodes in output; output 10 watts; built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

Power Supply: Alternating Current. Voltage and frequency as specified on chassis nameplate.

Tubes Used: Ten (10) Total: 1 type 78 R.F., 1 type 77 1st detector, 1 type 76 oscillator, 2 type 78 I.F., 1 type 75 2nd detector 1st audio, 1 type 42 driver, 2 type 42 output, 1 type 80 rectifier.

Wave Bands: Four—(1) Shortwave; (2) Police and amateur; (3) Standard Broadcast; (4) Longwave (weather forecasts).

Frequency Ranges: Band (1)—5.7-18.0 Megacycles; Band (2)—1.75-5.8 Megacycles; Band (3)—540 to 1750 K.C.; Band (4)—150-390 K.C.

Program Control: 4 positions: (1) Mellow, (2) Brilliant, (3) Normal, (4) Noise reducing. Last two positions recommended for foreign short wave stations.

Tuning Meter: Shadow type tuning meter, mounted directly above scale.

Waveband Indicator: Glowing arrow on tuning scale shifts to proper scale when waveband switch is turned.

Automatic Volume Control: Fully effective on all stations.

Bass Compensation: Automatic: Effective on first two positions of program control, with volume control turned down.

Tuning Drive: Dual planetary, ball bearing. 80 to 1 ratio for slow-speed tuning, 10 to 1 on main knob.

Intermediate Frequency: 460 K.C.

Power Consumption: 90 watts.

Speaker: Type H-13.

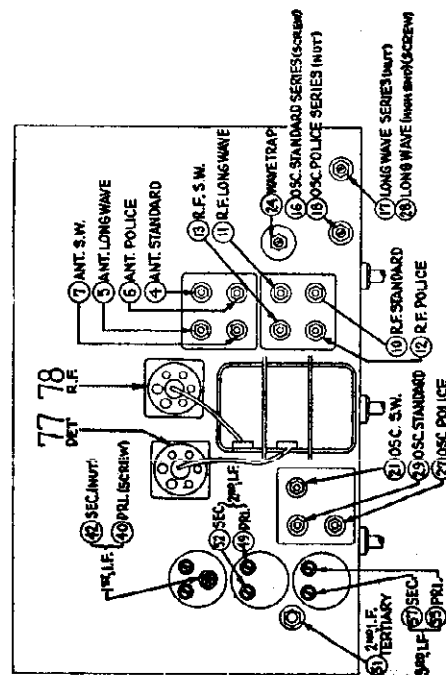


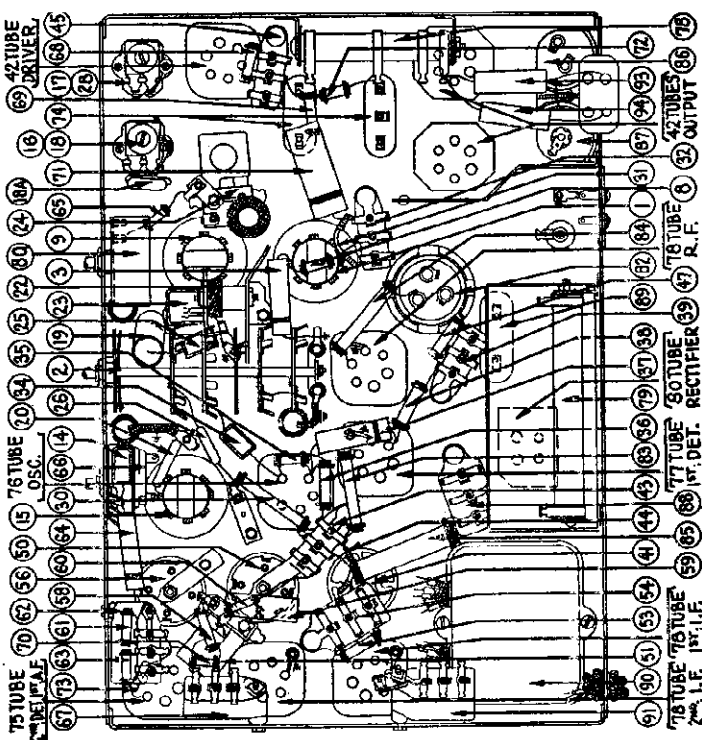
Fig. 2. Location of Compensating Condensers

MODEL 660
Socket, Chassis
Parts List

PHILCO RADIO & TELEV. CORP.

REPLACEMENT PARTS—MODEL 660

Antenna Transformer	32-1750	\$3.25
Waveband Switch	42-1120	2.50
Condenser (.05 Mfd. Tubular)	30-4020	.35
Compensating Condenser (Ant. Standard)	Part of ①	
Compensating Condenser (Ant. Longwave)	Part of ①	
Compensating Condenser (Ant. Police)	Part of ①	
Compensating Condenser (Ant. Shortwave)	Part of ①	
Resistor (1 Meg.) (White, White, Orange)	4411	3.00
R. F. Transformer	32-1751	3.00
Compensating Condenser (R. F. Standard)	Part of ①	
Compensating Condenser (R. F. Longwave)	Part of ①	
Compensating Condenser (R. F. Police)	Part of ①	
Compensating Condenser (R. F. Shortwave)	Part of ①	
Condenser (.0005 Mfd. Mica)	30-1025	.85
Oscillator Transformer	32-1752	2.25
Compensating Condenser (Standard Series)	Part of 31-6027	.45
Compensating Condenser (Longwave Series)	Part of 31-6054	.45
Condenser (.00041 Mfd. Mica)	30-1000	.70
Compensating Condenser (Use Police Series)	Part of 31-6027	.70
Condenser (.05 Mfd. Tubular)	30-4123	.35
Condenser (.0052 Mfd. Mica)	30-1053	.55
Compensating Condenser (Use Shortwave)	Part of ①	
R. F. Choke	32-1745	.35
Condenser (.007 Mfd. Mica)	5883	.25
Wave Trap	32-6850	1.10
Condenser (.00011 Mfd. Mica)	30-1021	.35
Condenser (.00025 Mfd. Mica)	30-1032	.35
Compensating Condenser (Use Police)	Part of ①	
Compensating Condenser (Longwave H. F. End)	Part of 31-6054	.45
Compensating Condenser (Use Standard)	Part of ①	
Resistor (10000 ohms) (Brown, Black, Orange)	3524	.20
Resistor (300 ohms Flexible) (Orange, Black, Black)	33-3010	.20
Condenser (.05 Mfd. Bakelite Block)	3015-SG	.35
Tuning Condenser Assembly	31-1609	6.50
Condenser (.00011 Mfd. Mica)	30-1031	.35
Resistor (51000 ohms) (Green, Brown, Orange)	6098	.20
Resistor (1000 ohms) (Brown, Black, Red)	5837	.20
Condenser (.00125 Mfd. Tubular)	30-4336	.25
Resistor (8000 ohms) (Gray, Black, Red)	5638	.20
Condenser (.05 Mfd. Bakelite Block)	3015-SG	.35
Compensating Condenser (1st I. F. Primary)	Part of ①	
1st I. F. Transformer	32-1642	2.00
Compensating Condenser (1st I. F. Secondary)	Part of ①	
Condenser (.05 Mfd. Bakelite Block)	3015-SG	.35
Resistor (300 ohms Flexible) (Orange, Black, Black)	32-3010	.20
Condenser (.05 Mfd. Bakelite Block)	3015-SU	.35
Shadow Tuning Meter	245-2083	2.50
Resistor (2000 ohms) (Red, Black, Red)	6084	.20
Pilot Lamp (Shadow Tuning Meter)	Part of ①	
Compensating Condenser (2nd I. F. Primary)	Part of 31-6028	.85
2nd I. F. Transformer	32-1724	1.85
Compensating Condenser (2nd I. F. Secondary)	04000-R	.45
Resistor (2500 ohms) (Red, Green, Red)	Part of 31-6028	.85
Condenser (.05 Mfd. Twin Bakelite Block)	7775	.20
Compensating Condenser (3rd I. F. Primary)	3015-DG	.40
Compensating Condenser (3rd I. F. Secondary)	Part of 31-6003	.45
Third I. F. Transformer	32-1188	.65
Compensating Condenser (3rd I. F. Secondary)	Part of 31-6003	.45
Resistor (1000 ohms) (Brown, Black, Red)	5837	.20
Condenser (.05 Mfd. Tubular)	30-4123	\$0.35
Resistor (2 Mega.) (Red, Black, Green)	33-1025	.20
Resistor (330000 ohms) (Orange, Orange, Yellow)	23-1200	.20
Condenser (.00011 Mfd. Twin Bakelite Block)	8035-DG	.20
Resistor (1 Meg.) (White, White, Yellow)	6090	.20
Condenser (.05 Mfd. Tubular)	30-4020	.35
Resistor (50000 ohms) (Green, Brown, Orange)	6096	.20
Volume Control & On-Off Switch	33-5110	1.45
Condenser (.01 Mfd. Bakelite Block)	3008-SU	.25
Resistor (1 Meg.) (White, White, Yellow)	6090	.20
Resistor (70000 ohms) (Violet, Black, Orange)	5358	.20
Resistor (1 Meg.) (Brown, Black, Green)	33-1086	.20
Condenser (.25 Mfd. Tubular)	30-4124	.45
Resistor (180000 ohms) (Brown, Blue, Orange)	33-1191	.20
Condenser (.00011 Mfd. Mica)	30-1021	.35
Audio Transformer	32-7067	2.75
Output Transformer	32-7078	1.40
Cone & Voice Coil Assembly (H-18)	02625	1.20
Field Coil & Pot Assembly (H-13)	34-3104	2.70
Resistor (B. C. Wirewound) (10 ohms, 110 ohms, 180 ohms)	33-3187	.30
Resistor (Wirewound, 7750 ohms)	33-2020	.35
Tone Control	30-4343	.75
Condenser in Tone Control	Part of ①	
Condenser (Electrolytic) (3 Mfd., 2 Mfd., 1 Mfd.)	30-3122	1.85
Resistor (30000 ohms) (Orange, Black, Orange)	7530	.20
Resistor (10000 ohms) (Brown, Black, Orange)	3524	.20
Resistor (13000 ohms) (Brown, Orange, Orange)	6480	.40
Condenser (Electrolytic) (8 Mfd., 10 Mfd.)	30-3045	1.80
Condenser (.3 Mfd. Bakelite Block)	30-3025	1.35
Filter Choke	3287-DG	.40
Power Transformer 115 Volts 80 Cycles	32-7056	2.20
115 Volts 25 Cycles	32-7440	6.00
230 Volts 50 Cycles	32-7441	8.75
32-7442	6.75	
Condenser (.015 Mfd. Twin Bakelite Block)	3793-DG	.40
Pilot Lamp (Dial)	34-2089	.15
Condenser (.006 Mfd. Tubular)	30-4123	.25
Condenser (.006 Mfd. Tubular)	30-4123	.25



Tube Socket and Power Transformer Voltages
Line Voltage 115

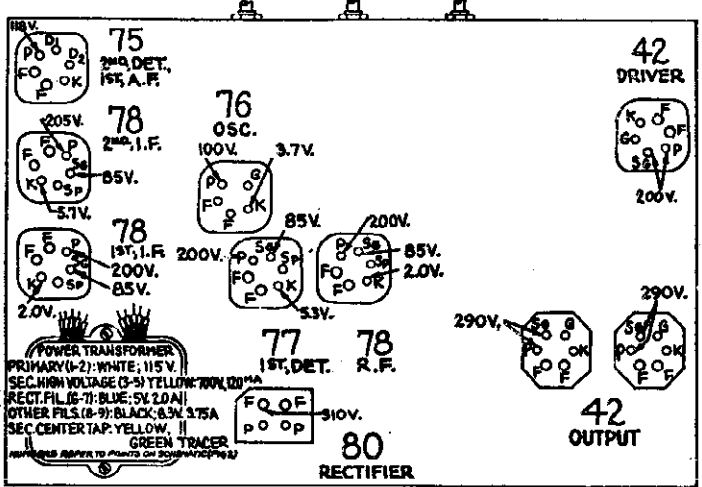
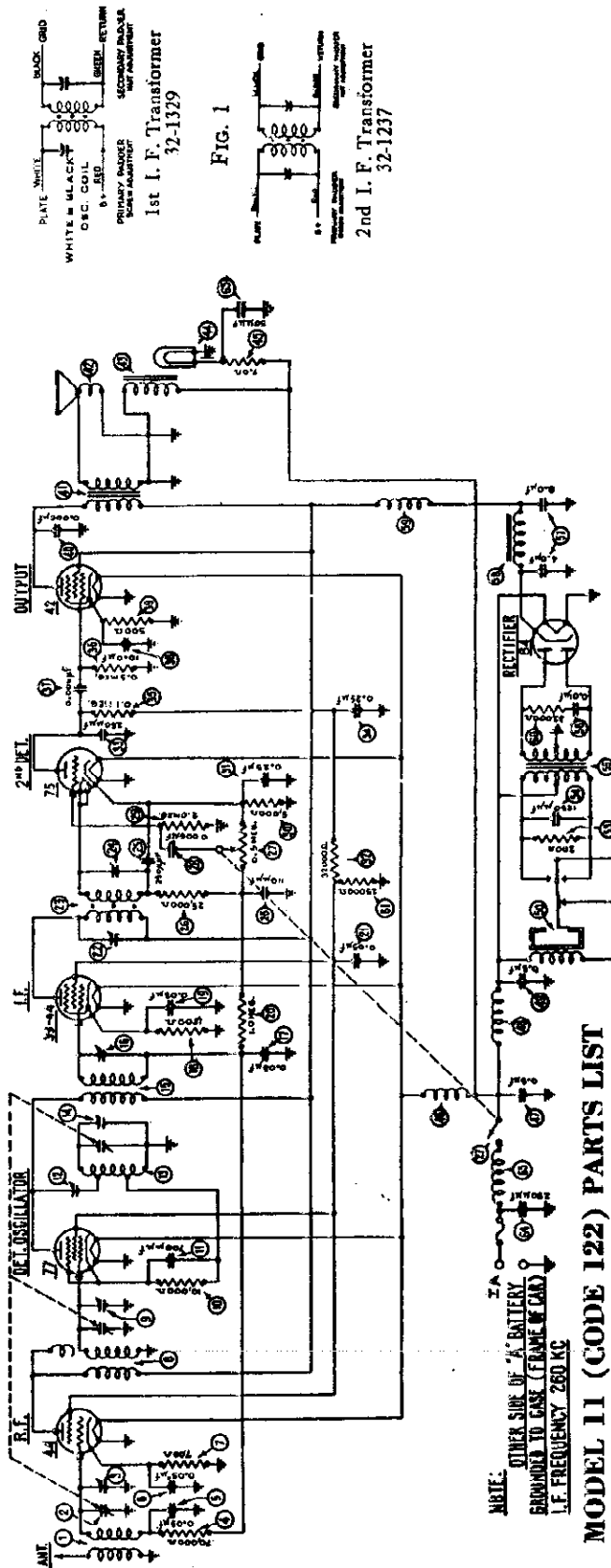


Fig. 1. Sockets as Viewed from Bottom

Socket voltages (measured to ground) obtained at points indicated by arrows. Above voltages were obtained by using a PHILCO type 025 Circuit Tester (or 048A All-purpose Tester), using test prods applied to sockets on underside of chassis. Volume control at minimum; dial at 60; waveband switch at standard broadcast (2d position from left). H-13 Speaker used.

PHILCO RADIO & TELEV. CORP.

MODEL 11 (Code 122)
Schematic, Chassis
Parts List
Transformer Data



MODEL 11 (CODE 122) PARTS LIST

- NOTE: OTHER SIDE OF "A" BATTERY BOUND TO CASE (FRAME W/LOAD) I.F. FREQUENCY 260 KC
- 1 Antenna Transformer..... 32-1331
 - 2 Tuning Condenser..... 31-1189
 - 3 1st Padder (in tun. cond.)..... 30-4146
 - 4 Resistor (70,000 ohms)..... 33-1115
 - 5 Condenser (.03 mfd.)..... 30-4025
 - 6 Condenser (.05 mfd.)..... 30-4020
 - 7 Resistor (700 ohms)..... 6443
 - 8 R. F. Transformer..... 32-1332
 - 9 2nd Padder (in tun. cond.)..... 33-1000
 - 10 Resistor (10,000 ohms)..... 33-1000
 - 11 Condenser (.0007 mfd.)..... 5863
 - 12 Padder (Pri. 1st I. F. Tran.)..... 32-1333
 - 13 Oscillator Transformer..... 32-1329
 - 14 1st I. F. Transformer..... 32-1329
 - 15 Padder (Sec. 1st I. F. Tran.)..... 30-4025
 - 16 Resistor (1500 ohms)..... 33-3047
 - 17 Condenser (.05 mfd.)..... 30-4020
 - 18 Resistor (1,000,000 ohms)..... 33-1098
 - 19 Condenser (.05 mfd.)..... 30-4020
 - 20 Padder (Pri. 2nd I. F. Tran.)..... 32-1327
 - 21 2nd I. F. Transformer..... 32-1327
 - 22 Padder (Sec. 2nd I. F. Tran.)..... 30-1032
 - 23 Condenser (.00025 mfd.)..... 30-1031
 - 24 Condenser (.00011 mfd.)..... 33-1013
 - 25 Resistor (25,000 ohms)..... 33-1013
 - 26 Vol. Con. & Switch Asm..... 38-5554
 - 27 Condenser (.006 mfd.)..... 30-4125
 - 28 Antenna Transformer..... 32-1331
 - 29 Tuning Condenser..... 31-1189
 - 30 1st Padder (in tun. cond.)..... 30-4146
 - 31 Resistor (70,000 ohms)..... 33-1115
 - 32 Condenser (.03 mfd.)..... 30-4025
 - 33 Condenser (.05 mfd.)..... 30-4020
 - 34 Resistor (700 ohms)..... 6443
 - 35 R. F. Transformer..... 32-1332
 - 36 2nd Padder (in tun. cond.)..... 33-1000
 - 37 Resistor (10,000 ohms)..... 33-1000
 - 38 Condenser (.0007 mfd.)..... 5863
 - 39 Padder (Pri. 1st I. F. Tran.)..... 32-1333
 - 40 Oscillator Transformer..... 32-1329
 - 41 1st I. F. Transformer..... 32-1329
 - 42 Padder (Sec. 1st I. F. Tran.)..... 30-4025
 - 43 Resistor (1500 ohms)..... 33-3047
 - 44 Condenser (.05 mfd.)..... 30-4020
 - 45 Resistor (1,000,000 ohms)..... 33-1098
 - 46 Condenser (.05 mfd.)..... 30-4020
 - 47 Padder (Pri. 2nd I. F. Tran.)..... 32-1327
 - 48 2nd I. F. Transformer..... 32-1327
 - 49 Padder (Sec. 2nd I. F. Tran.)..... 30-1032
 - 50 Condenser (.00025 mfd.)..... 30-1031
 - 51 Condenser (.00011 mfd.)..... 33-1013
 - 52 Resistor (25,000 ohms)..... 33-1013
 - 53 Vol. Con. & Switch Asm..... 38-5554
 - 54 Condenser (.006 mfd.)..... 30-4125
 - 55 "B" Choke..... 32-7215
 - 56 R. F. Choke..... 32-1281
 - 57 Resistor (25,000 ohms)..... 33-1013
 - 58 Resistor (25,000 ohms)..... 33-1013
 - 59 Condenser (.00005 mfd.)..... 30-1029
 - 60 Condenser (.00025 mfd.)..... 30-1032
 - 61 "A" Choke..... 32-1374
 - 62 Spark Plug Resistor..... 33-1015
 - 63 Distributor Resistor..... 33-1113E
 - 64 Interference Condenser..... 30-4007
 - 65 Nuts (mounting)..... W55A
 - 66 Battery Cable..... 38-5298
 - 67 Acorn Nut..... W821
 - 68 Fuse..... 7227
 - 69 Fuse Insulator..... 27-7131
 - 70 Stud..... 28-6086
 - 71 Bracket..... 6035
 - 72 Strap..... 04344
 - 73 Strap Pad..... 6206
 - 74 Knob..... 27-4058
 - 75 Glass..... 27-7325
 - 76 Gasket (for glass)..... 27-7309
 - 77 Pointer..... 28-1957
 - 78 Face Assembly..... 42-175
 - 79 Control Housing Cover..... 29-7094
 - 80 Control Unit Assembly..... 42-5107

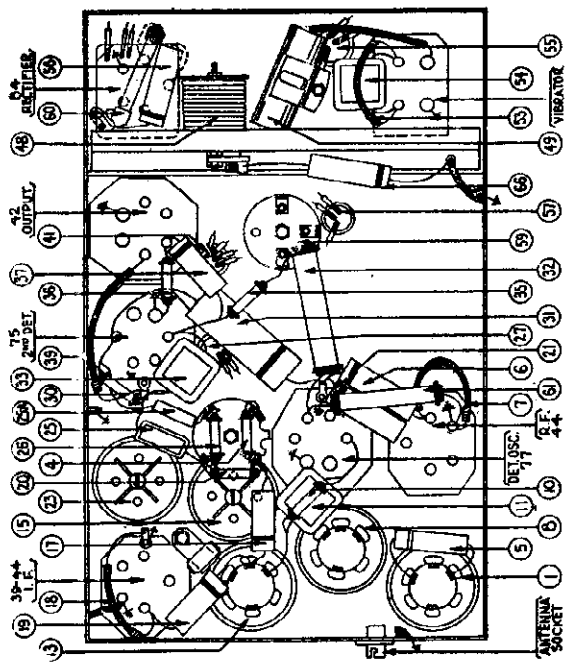


FIG. 4

MODEL 11 (Code 122)
Alignment, Socket
Trimmers

PHILCO RADIO & TELEV. CORP.

MODEL 11 (CODE 122) RECEIVER

THE PHILCO auto radio Model 11 (Code 122) is a new Philco development in single-unit automobile radio. It is compact, easy to install and will give exceptional performance.

A superheterodyne, using six of the latest tubes designed for automobile radio, it has a genuine Philco electro-dynamic speaker, the same type that is used in many of the larger home radio receivers. A three-section tuning condenser giving improved selectivity, remarkable sensitivity and tone, inherently quiet circuits and other improvements make this model one of the outstanding and most popular automobile radios.

Added to this, the ease of installation characteristic of this model (only one unit to install, one lead to the antenna and one lead to the ammeter) and the handy, attractive steering-column control which makes this model universal in its use are additional features which make the Model 11 a very desirable one for the dealer and for the owner.

I. F. TRANSFORMER AND PADDERS

The new style I. F. transformer complete with padders is used in the Model 11 (Code 122).

The padders are placed in the top of the shield can above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1329 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

MODEL 11 (CODE 122) ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver. Remove the grid cap terminal from the 77 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 77 tube. (See Fig. 2.) The output meter must be connected.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders ② and ③ are adjusted first (Figs. 2 and 3). Turn the adjusting screw ② all the way in. A metal screwdriver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut ③ with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw ④ for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

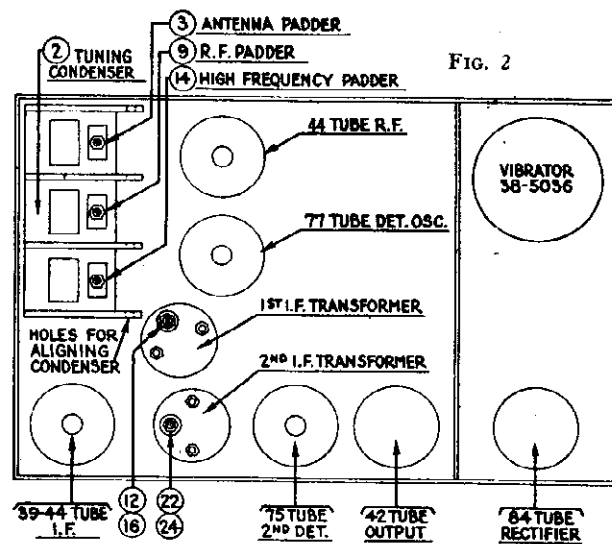


FIG. 2

Repeat the above procedure with the condensers ② and ③.

After padding the I. F. stages, remove the generator lead from the 77 tube and reconnect the grid lead to the 77 tube. Set the generator to 1600 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder ④ until the maximum reading is obtained in the output meter. This is the true setting for 1600 K. C., 160 on the dial scale.

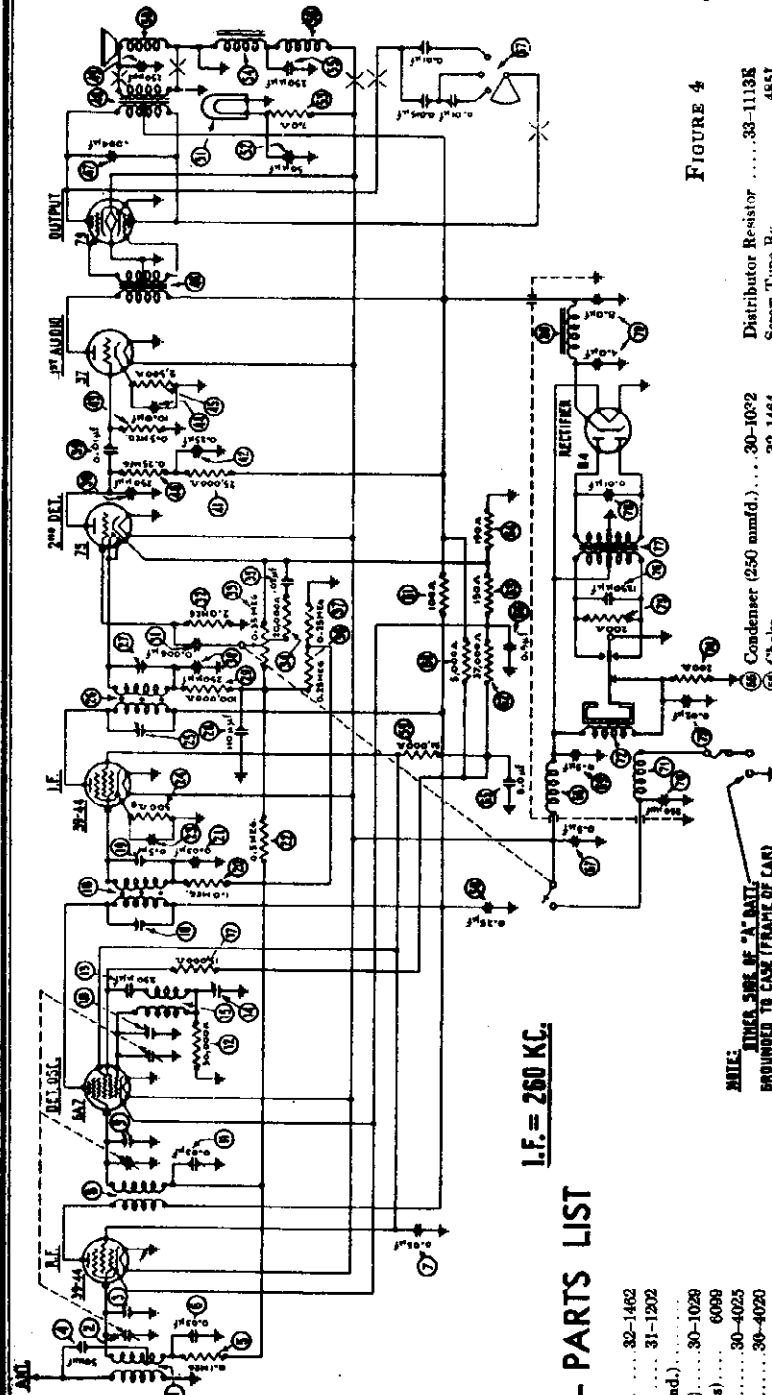
Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder ② and the antenna padder ③ are next adjusted for the maximum reading on the output meter.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

NOVEMBER, 1934

PHILCO RADIO & TELEV. CORP.

MODEL 802
Schematic
Parts List



MODEL 802 — PARTS LIST

- ① Antenna Transformer..... 32-1462
- ② Tuning Condenser..... 31-1202
- ③ 1st Padder (in tun. cond.).....
- ④ Condenser (80 mmfd.)..... 30-1029
- ⑤ Resistor (100,000 ohms)..... 6099
- ⑥ Condenser (.03 mfd.)..... 30-4025
- ⑦ Condenser (.05 mfd.)..... 30-4020
- ⑧ R. F. Transformer..... 32-1463
- ⑨ 2nd Padder (in tun. cond.).....
- ⑩ 3rd Padder (in tun. cond.).....
- ⑪ Condenser (.03 mfd.)..... 30-4025
- ⑫ Resistor (50,000 ohms)..... 6098
- ⑬ Condenser (250 mmfd.)..... 30-82
- ⑭ Padder..... 30-6012
- ⑮ Oscillator Transformer..... 32-1222
- ⑯ Padder (Pri. 1st I. F. Trans.)..... 6208
- ⑰ Resistor (15,000 ohms)..... 32-1471
- ⑱ First I. F. Transformer..... 33-1096
- ⑲ Padder (Sec. 1st I. F. Trans.)..... 30-4025
- ⑳ Condenser (.03 mfd.)..... 6097
- ㉑ Resistor (500,000 ohms)..... 30-4058
- ㉒ Resistor (500 ohms)..... 6977
- ㉓ Padder (Pri. 2nd I. F. Trans.).....
- ㉔ Second I. F. Transformer..... 32-1449
- ㉕ Padder (Sec. 2nd I. F. Trans.).....
- ㉖ Condenser (110 mmfd.)..... 30-1031
- ㉗ Resistor (100,000 ohms)..... 6099
- ㉘ Condenser (250 mmfd.)..... 30-1032
- ㉙ Condenser (.006 mfd.)..... 30-4125
- ㉚ Resistor (2,000,000 ohms)..... 33-1025

FIGURE 4

- ②④ Distributor Resistor..... 33-11138
- ②⑤ Screw Type Re..... 4551
- ②⑥ Interference Con..... M75
- ②⑦ Stud..... W55A
- ②⑧ Ammeter Cable..... 38-5296
- ②⑨ Speaker Cable..... 41-3112
- ②⑩ Antenna Lead..... 38-6181
- ②⑪ Acorn Nut..... W881
- ②⑫ Fuse..... 7227
- ②⑬ Fuse Insulator..... 27-7131
- ②⑭ Control Assembly..... 42-3236
- ②⑮ Bracket (Control)..... 6035
- ②⑯ Strap (Control)..... 04344
- ②⑰ Knob..... 27-4058
- ②⑱ Knob Spring..... 28-1738
- ②⑲ Glass Gasket..... 27-7325
- ②⑳ Pointer..... 28-1957
- ㉑ Flexible Shaft..... 28-8208
- ㉒ Face Assembly..... 42-3234
- ㉓ Control Cover..... 28-7037
- ㉔ 4-prong Socket..... 27-6004
- ㉕ 5-prong Socket..... 27-6014
- ㉖ 6-prong Socket..... 27-6020
- ㉗ 7-prong Socket..... 27-6008
- ㉘ Auto Radio Lock Switch..... 42-1078
- ②① Condenser (250 mmfd.)..... 30-1032
- ②② Choke..... 32-1464
- ②③ Tone Control..... 30-4206
- ②④ Condenser (.25 mfd.)..... 30-4134
- ②⑤ Resistor (51,000 ohms)..... 4237
- ②⑥ Resistor (5000 ohms)..... 33-1070
- ②⑦ Resistor (100 ohms)..... 33-3023
- ②⑧ Resistor (37,000 ohms)..... 33-1098
- ②⑨ Resistor (150 ohms)..... 33-3045
- ②⑩ Resistor (150 ohms)..... 33-3045
- ②⑪ Condenser (.5 mfd.)..... 30-4135
- ②⑫ Condenser (.5 mfd.)..... 30-4018
- ②⑬ Condenser (.5 mfd.)..... 30-4015
- ②⑭ Vibrator Choke..... 32-1474
- ②⑮ Condenser (.5 mfd.)..... 30-4047
- ②⑯ Condenser (250 mmfd.)..... 32-1466
- ②⑰ "A" Choke..... 32-1466
- ②⑱ Vibrator..... 38-5036
- ②⑲ Condenser (.02 mfd.)..... 30-4039
- ②⑳ Resistor (200 ohms)..... 7217
- ㉑ Resistor (200 ohms)..... 5856
- ㉒ Power Transformer..... 32-7096
- ㉓ Condenser (.01 mfd.)..... 30-4051
- ㉔ Filter Condenser (4-8 mfd.)..... 30-2015
- ㉕ "B" Choke..... 32-7104
- ㉖ Spark Plug Resistors..... 33-1015E
- ②⑳ Vol. Cont. & Sw. Assembly..... 38-5851
- ㉑ Resistor (20,000 ohms)..... 33-1130
- ㉒ Condenser (.02 mfd.)..... 30-4215
- ㉓ Resistor (250,000 ohms)..... 33-1097
- ㉔ Resistor (250,000 ohms)..... 33-1097
- ㉕ Condenser (250 mmfd.)..... 30-1032
- ㉖ Condenser (.01 mfd.)..... 30-4145
- ㉗ Resistor (250,000 ohms)..... 33-1097
- ㉘ Resistor (25,000 ohms)..... 33-1013
- ㉙ Condenser (.25 mfd.)..... 30-4135
- ㉚ Resistor (500,000 ohms)..... 6097
- ㉛ Condenser (10 mfd.)..... 30-4135
- ㉜ Resistor (2500 ohms)..... 33-1100
- ㉝ Input Transformer..... 32-7208
- ㉞ Condenser (.004 mfd.)..... 30-4185
- ㉟ Output Transformer..... 32-7205
- ㊱ Condenser (250 mmfd.)..... 30-1032
- ㊲ Cone & Voice Cbl..... 34-2040
- ㊳ Pilot Lamp..... 30-2040
- ㊴ Condenser (50 mmfd.)..... 30-1029
- ㊵ Resistor (7 ohms)..... 33-3130
- ㊶ Field Coil Assembly..... 02795

MODEL 805

PHILCO RADIO & TELEV. CORP.

Alignment
Socket, Trimmers

I. F. TRANSFORMER AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

The padders are placed in the top of the shield can, one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1650 for the first I. F. stage and 32-1651 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

MODEL 805 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and set up for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the cover from the Receiver and disconnect the grid clip from the 78 tube, I. F. stage. (For location see Fig. 2)

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 78 tube, and ground the shield to the Receiver housing.

Connect one lead from the output meter to the plate of the 41 tube and the other lead to the Receiver housing. The Receiver volume control must be turned to approximately full volume, and the attenuator in the generator set for a half-scale reading of the output meter.

The secondary nut padder ② must be adjusted for maximum reading in the output meter. Then adjust the primary screw padder ① for maximum reading.

Remove the generator lead from the 78 tube and reconnect the grid clip.

Disconnect the grid clip from the 6A7 tube, and connect the generator lead to the grid cap of this tube. The secondary nut padder ③ must be adjusted for maximum reading in the output meter. Then adjust the primary screw padder ④ for maximum reading.

Readjust padders ⑤ and ⑥ for maximum reading on the output meter.

After padding the second I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid clip. Adjust the generator to 1600 K. C., and then connect the generator lead to the antenna lead, using a 150 mmfd. condenser in series between the two leads. Ground the shield to the Receiver housing.

Turn the Tuning Condenser Plates fully out of mesh.

With the tuning condenser in this position, adjust the high-frequency padder ⑩ until the maximum reading is obtained in the output meter. This is the true setting for 1600 K. C., 160 on the dial scale. Adjust the padders ⑪ and ⑫ in the same manner.

Turn the tuning condenser plates in mesh to approximately 580 on the dial scale, and adjust the signal generator to 580 K. C. Roll the tuning condenser and adjust the series padder ⑬ for the maximum meter reading.

Readjust the padder ⑭ at 1600 K. C.

Tune the condenser to 1400 K. C. and adjust the padders ⑮ and ⑯ for the maximum reading.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver will be adjusted properly.

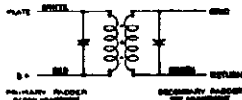


FIGURE 1

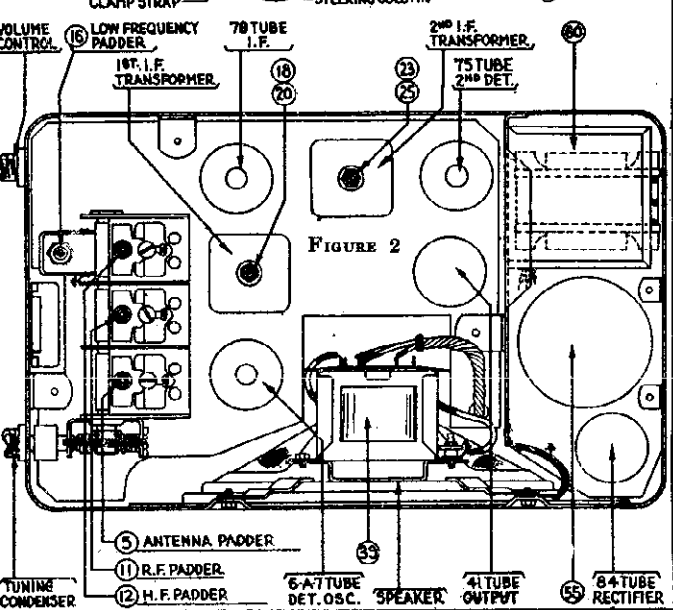
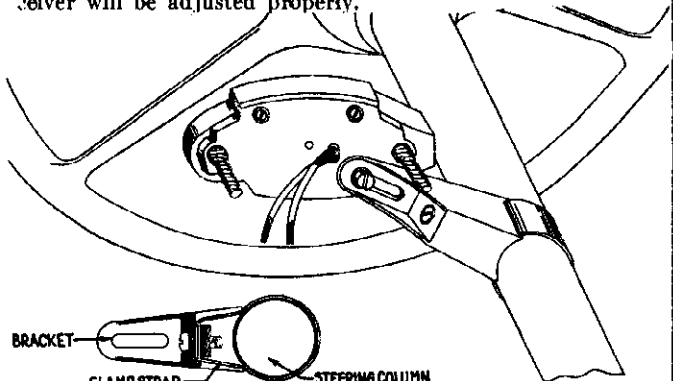
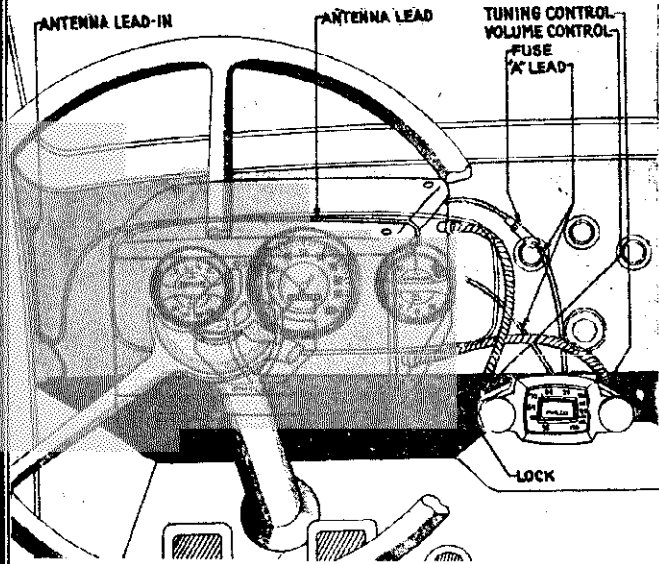
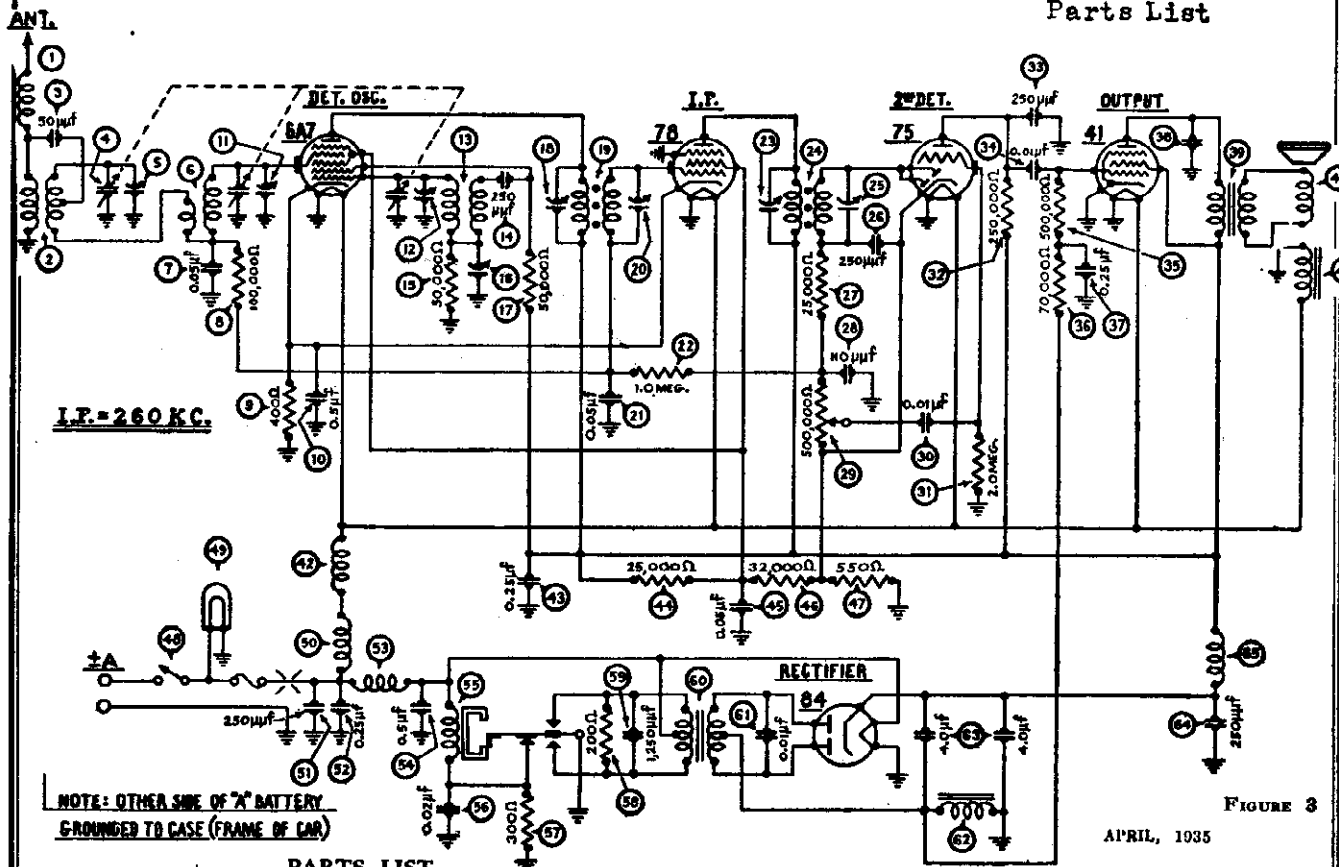


FIGURE 2



PHILCO RADIO & TELEVISION CORP.

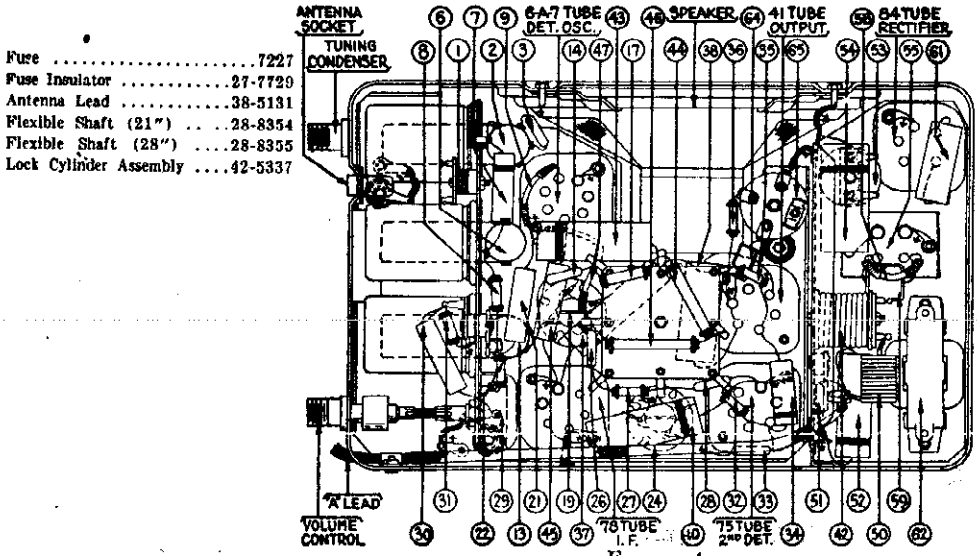
MODEL 805
Schematic, Chassis
Parts List



PARTS LIST

No.	Description	Part No.
1	Antenna Choke	32-1372
2	Antenna Transformer	32-1655
3	Condenser (50 mmfd.)	4587
4	Tuning Condenser	31-1483
5	First Padder (on tun. cond.)	
6	R. F. Transformer	32-1656
7	Condenser (.05 mfd.)	30-4020
8	Resistor (100,000 ohms)	8099
9	Resistor (400 ohms)	33-3016
10	Condenser (.5 mfd.)	30-4227
11	Second Padder (on tun. cond.)	
12	Third Padder (on tun. cond.)	
13	Oscilla. Transformer	32-1657
14	Condenser (250 mmfd.)	30-1032
15	Resistor (50,000 ohms)	33-1163
16	Fourth Padder (on tun. cond.)	
17	Resistor (50,000 ohms)	6098
18	Padder (Pri. 1st I. F. Trans.)	
19	First I. F. Transformer	32-1650
20	Padder (Sec. 1st I. F. Trans.)	
21	Condenser (.05 mfd.)	30-4020
22	Resistor (1,000,000 ohms)	33-1096
23	Padder (Pri. 2nd I. F. Trans.)	
24	Second I. F. Transformer	32-1651
25	Padder (Sec. 2nd I. F. Trans.)	
26	Condenser (250 mmfd.)	30-1032
27	Resistor (25,000 ohms)	33-1013
28	Condenser (110 mmfd.)	30-1031
29	Volume Control (500,000 ohms)	38-8635
30	Condenser (.01 mfd.)	30-4124
31	Resistor (2,000,000 ohms)	33-1025
32	Resistor (250,000 ohms)	33-1097
33	Condenser (250 mmfd.)	30-1032
34	Condenser (.01 mfd.)	30-4169
35	Resistor (500,000 ohms)	8097
36	Resistor (70,000 ohms)	33-1115
37	Condenser (.25 mfd.)	30-4146
38	Condenser (8000 mmfd.)	30-4317

39	Output Transformer	32-7011
40	Cone and Voice Coil	36-3406
41	Field Coil Assembly	36-3405
42	"A" Choke	32-1377
43	Condenser (.25 mfd.)	30-4134
44	Resistor (25,000 ohms)	3856
45	Condenser (.05 mfd.)	30-4020
46	Resistor (32,000 ohms)	3525
47	Resistor (550 ohms)	33-3031
48	On-Off Switch Assembly	42-5336
49	Pilot Lamp	34-2039
50	"A" Choke	32-1644
51	Condenser (250 mmfd.)	30-1032
52	Condenser (.25 mfd.)	30-4146
53	Vibrator Choke	32-1625
54	Condenser (.5 mfd.)	30-4227
55	Vibrator	38-5036
56	Condenser (.02 mfd.)	30-1039
57	Resistor (300 ohms)	33-3010
58	Resistor (200 ohms)	7217
59	Condenser (1250 mmfd.)	5886
60	Power Transformer	32-7352
61	Condenser (.01 mfd.)	30-4051
62	Filter Choke	32-7351
63	Filter Condenser (4-4 mfd.)	30-2115
64	Condenser (250 mmfd.)	30-1032
65	"B" Choke	32-1281
66	Control Assembly	42-5331
67	Glass and Dial Assembly	27-7835
68	Pointer Assembly	42-5335
69	Bezel Plate	28-7108
70	Knobs	27-4187
71	Keys	28-2782
72	Control Mtg. Bracket (dash)	20-2773
73	Control Mtg. Bracket (steering)	6035
74	Steering Mtg. Kit (28")	45-1133
75	Studs (Set Mtg.)	28-6272
76	Nuts (Set Mtg.)	W98A
77	Spark Plug Resistor	33-1199
78	Distributor Resistor	23-1196
79	Interference Condenser	30-4007



MODEL 806
Alignment, Socket
Trimmers

PHILCO RADIO & TELEV. CORP.

I. F. TRANSFORMER AND PADDERS

The first I. F. transformer is assembled complete with padding condensers. The second I. F. transformer is assembled complete with a padding condenser, two resistors and two mica condensers.

The padders are placed in the top of the shield can, one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1621 for the first I. F. stage and 32-1622 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

MODEL 806 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and set up for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the cover from the Receiver and disconnect the grid clip from the 78 tube, I. F. stage. (For location see Fig. 2.)

Set up the signal generator and adjust it to exactly 260 K.C. Connect the generator lead to the grid cap of the 78 tube, and ground the shield to the Receiver housing.

Connect one lead from the output meter to the plate of the 41 tube and the other lead to the Receiver housing. The Receiver volume control must be turned to approximately full volume, and the attenuator in the generator set for a half-scale reading of the output meter.

The secondary nut padder ② must be adjusted for maximum reading in the output meter. Then adjust the primary screw padder ① for maximum reading.

Remove the generator lead from the 78 tube and reconnect the grid clip.

Disconnect the grid clip from the 6A7 tube, and connect the generator lead to the grid cap of this tube. The secondary nut padder ③ must be adjusted for maximum reading in the output meter. Then adjust the primary screw padder ④ for maximum reading.

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid clip. Adjust the generator to 1580 K.C., and then connect the generator lead to the antenna lead, using a 200 mmfd. condenser in series between the two leads. Ground the shield to the Receiver housing.

Turn the tuning condenser plates fully out of mesh. Place a slip of paper, .006 inch thick between stator plates and the heel of the rotor plates. Turn the rotor plates back until they just strike the paper.

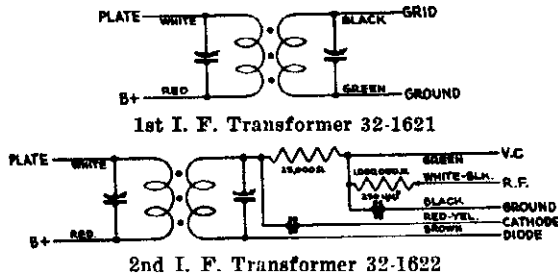


FIG. 1

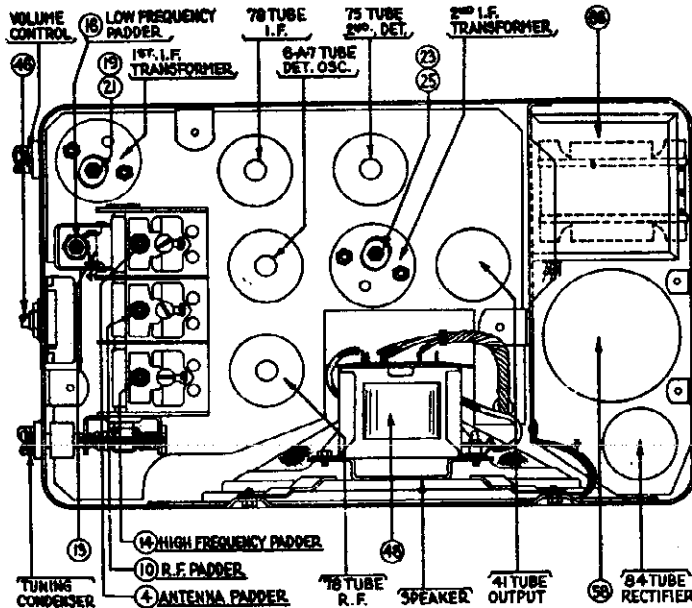
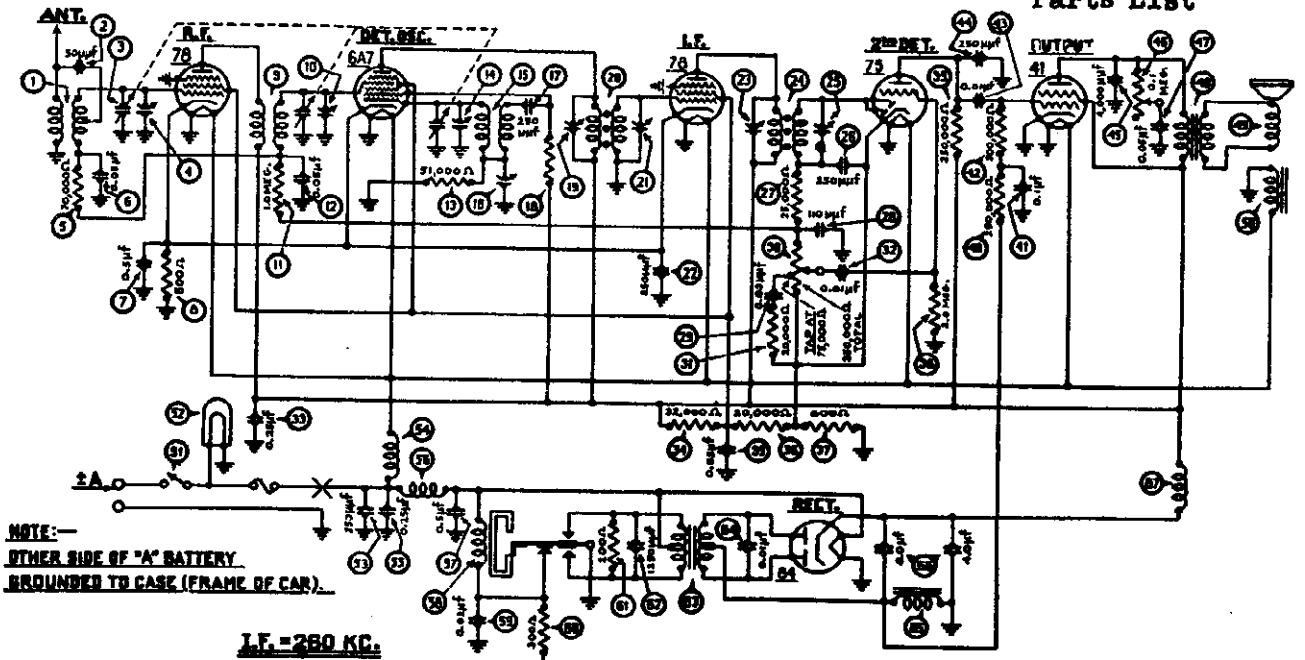


FIG. 2

PHILCO RADIO & TELEV. CORP.

MODEL 806
Schematic, Chassis
Parts List



NOTE:—
OTHER SIDE OF "A" BATTERY
GROUNDED TO CASE (FRAME OF CAR).

I.F. = 455 KC.

Fig. 3

MARCH, 1935

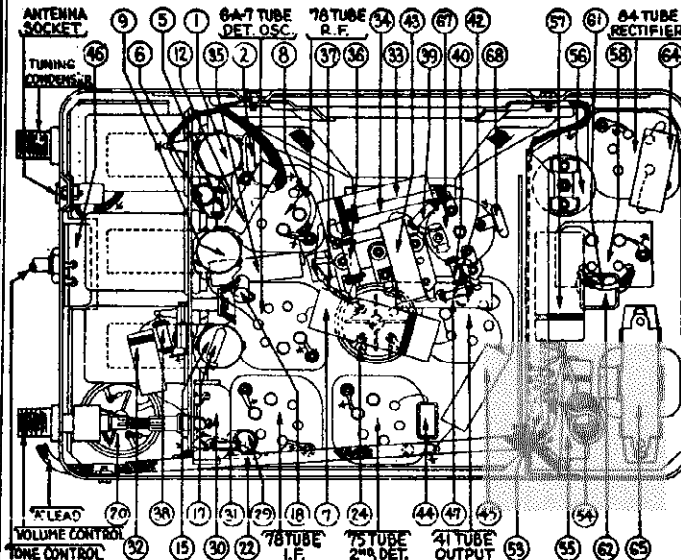


FIG. 4

MODEL 806 PARTS LIST

No. Shown on Schematic	Description	Part No.	No. Shown on Schematic	Description	Part No.
1	Antenna Transformer.....	32-1618	40	Condenser (4000 mmfd.).....	30-4185
2	Condenser (50 mmfd.).....	4587	41	Tone Control.....	33-5101
3	Tuning Condenser.....	31-1483	42	Condenser (.05 mfd.).....	30-4012
4	First Padder (on tun. cond.).....		43	Output Transformer.....	32-7019
5	Resistor (70,000 ohms).....	33-1115	44	Cone & Voice Coil.....	36-3406
6	Condenser (.05 mfd.).....	30-4020	45	Field coil Assembly.....	36-3405
7	Condenser (.5 mfd.).....	30-4227	46	"On" & "Off" Switch Asm.....	42-5336
8	Resistor (800 ohms).....	33-3209	47	Pilot Lamp.....	34-2030
9	R. F. Transformer.....	32-1619	48	Condenser (250 mmfd.).....	30-1032
10	Second Padder (on tun. cond.).....		49	"A" Choke.....	32-1644
11	Resistor (1,000,000 ohms).....	33-1096	50	Condenser (.25 mfd.).....	30-4148
12	Condenser (.05 mfd.).....	30-4020	51	Vibrator Choke.....	32-1625
13	Resistor (51,000 ohms).....	6098	52	Condenser (.5 mfd.).....	30-4227
14	Third Padder (on tun. cond.).....		53	Vibrator.....	38-5036
15	Oscillator Transformer.....	32-1620	54	Condenser (.02 mfd.).....	30-4039
16	Fourth Padder (on tun. cond.).....		55	Resistor (800 ohms).....	33-3010
17	Condenser (250 mmfd.).....	30-1032	56	Resistor (200 ohms).....	7217
18	Resistor (51,000 ohms).....	33-1163	57	Condenser (1250 mmfd.).....	5896
19	Padder (Pri. 1st I. F. Tran.).....		58	Power Transformers.....	32-7352
20	First I. F. Transformer.....	32-1621	59	Condenser (.01 mfd.).....	30-4051
21	Padder (Sec. 1st I. F. Tran.).....		60	Filter Choke.....	32-7351
22	Condenser (250 mmfd.).....	30-1032	61	Filter Condenser.....	30-2100
23	Padder (Pri. 2nd I. F. Tran.).....		62	R. F. Choke.....	32-1348
24	Second I. F. Transformer.....	32-1622	63	Condenser (250 mmfd.).....	30-1032
25	Padder (Sec. 2nd I. F. Tran.).....		64	Control Assembly.....	42-5331
26	Condenser (250 mmfd.).....	30-1032	65	Glass and Dial.....	27-7835
27	Resistor (25,000 ohms).....	33-1013	66	Pointer Assembly.....	42-5335
28	Condenser (110 mmfd.).....	30-1031	67	Bezel Plate.....	28-7108
29	Condenser (.03 mfd.).....	30-4025	68	Knobs.....	27-4187
30	Vol. (on. & Coupling Asm.).....	38-6605	69	Control Mounting Bracket.....	29-2773
31	Resistor (20,000 ohms).....	33-1178	70	Keys.....	28-2782
32	Condenser (.01 mfd.).....	30-4169	71	Studs (Set Mtg.).....	28-6272
33	Condenser (.25 mfd.).....	30-4134	72	Nuts (Set Mtg.).....	W86A
34	Resistor (32,000 ohms).....	3525	73	Spark Plug Resistors.....	33-1195
35	Condenser (.05 mfd.).....	30-4020	74	Distributor Resistor.....	33-1196
36	Resistor (20,000 ohms).....	6650	75	Interference Condensers.....	30-4007
37	Resistor (800 ohms).....	33-3207	76	Fuse.....	7227
38	Resistor (2,000,000 ohms).....	33-1025	77	Fuse Insulator.....	27-7729
39	Resistor (250,000 ohms).....	33-1097	78	Antenna Lead.....	38-5131
40	Resistor (250,000 ohms).....	33-1097	79	Flexible Shaft (21").....	28-8354
41	Condenser (.1 mfd.).....	30-4122	80	Flexible Shaft (28").....	28-8355
42	Resistor (500,000 ohms).....	6097	81	Lock Cylinder Assembly.....	42-5337
43	Condenser (.01 mfd.).....	30-4145	82	28" Shaft Kit.....	45-1133
44	Condenser (250 mmfd.).....	30-1032			

With the tuning condenser in this position, adjust the high-frequency padder (14) until the maximum reading is obtained in the output meter. This is the true setting for 1580 K.C., 158 on the dial scale. Adjust the padders (19) and (4) in the same manner.

Remove the paper and turn the tuning condenser plates in mesh to approximately 60 on the dial scale, and adjust the signal generator to 600 K.C. Roll the tuning condenser and adjust the series padder (16) for the maximum meter reading.

Readjust the padder (14) at 1580 K.C. Tune the condenser to 1400 K.C. and adjust the padders (19) and (4) for the maximum reading.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver will be adjusted properly.

NOTE—A condenser, (25), Part No. 30-1032 (250 mmfd.), has been added to the Receiver. One side is connected between the choke (57) and the 4 mfd. section of (26), and the other side to ground.

MODEL 808
Installation Data

PHILCO RADIO & TELEV. CORP.

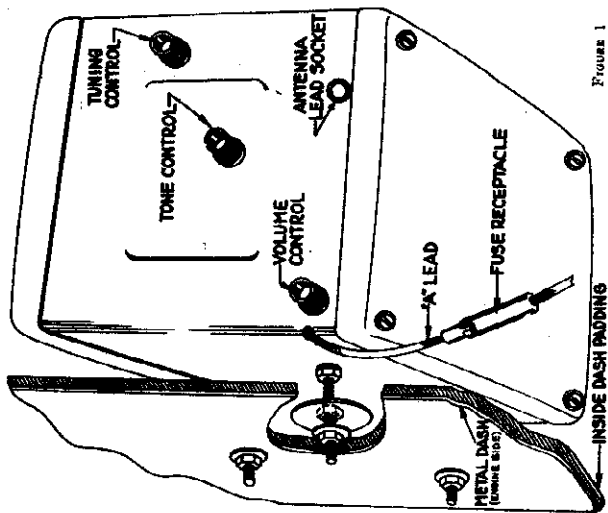


FIGURE 1
The contact end of the rotor. Place the metal end of the rotor on a steel block and pound or hammer it with a small machinist's hammer. Dress the end with a file so that it retains its original shape. The rotor should not brush or wipe the contacts, but should just clear them.

STANDARD SUPPRESSION—The standard spark plug resistors (95-1196) can be installed on the spark plugs of practically all cars. Likewise the distributor resistor (86-1196) can be connected in the high tension center lead to the distributor.

Disconnect the high tension leads to the spark plugs. Cut off the terminal end of the lead and screw the small rib-type resistor on the lead. The resistor can then be snapped on the terminal of the spark plug. To avoid confusion when the leads cannot be identified easily, install the resistor and make all connections on one lead at a time.

Remove the coil to distributor high tension lead from the distributor head and cut the lead two inches from the end. Screw the resistor to the short end and then screw the resistor into the main lead. Reconnect the terminal end of the lead to the distributor.

In case the spark plugs are not equipped with a suitable terminal, the standard ferrules can be obtained and placed on the plugs. Cars equipped with twin ignition require a spark plug resistor on each plug. Cars equipped with two ignition coils require two distributor resistors.

Two interference condensers are furnished — one must be connected to the generator side of the cut-out, the other to the battery side of the primary of the ignition coil or to the ignition switch. The condenser bracket must be fastened securely to a grounded metal part of the generator usually can be fastened to the housing under the same screw that holds the cut-out, while the coil condenser can usually be fastened under the coil mounting bolts.

In some cases, it may be necessary to connect an additional condenser to the ammeter or to the dome light lead at the corner post.

OPERATION

The full range tone control knob is on the control unit. Adjust this control to the tone most pleasing. Speech is clearest when the control is set for "brilliant" — while orchestras will usually sound best when the control is set for a deeper tone.

Another use of the tone control is as a static modulator. When driving through an extremely noisy location, the tone control should be set for mellow or deep. This will reduce the harsh, rasping static.

Except on very weak signals, the automatic volume control maintains the same volume level while driving along without continually manipulating the manual volume control, cuts out external interference, counteracts fading and prevents biasing of local stations while tuning. It is virtually impossible, however, to maintain satisfactory reception while driving under bridges or in places where are totally shielded, known as dead spots.

The Receiver should be turned off by turning the volume control knob counter-clockwise until the switch clicks "off". The control can then be locked with the key.

INSTALLATION

control coupling end must be towards the control unit. Cardboard templates are furnished so that the mounting bolt hole locations can be easily and accurately marked on the dash.

The dash on some 1935 cars is drilled for two Receiver mounting bolts. An extra set of bolt holes is provided in the Receiver housing for installation in these cars.

Before installing the Receiver, turn the volume control coupling counter-clockwise as far as it will go.

CONTROL UNIT—The control unit can be fastened to the bottom edge of the instrument board or on the steering column. Figure 2 shows how the control and the mounting bracket must be assembled on the steering column. Figure 3 shows a typical installation of the control on the instrument board. When used in this manner, bolt the "L" bracket to the rear of the control. Drill two holes in the instrument board flange in the desired location and fasten the bracket securely to the instrument board.

Unlock the control unit and turn the volume control knob clockwise half a turn. Seat the volume control shaft end in the proper coupling on the Receiver housing and fasten the shaft casing nut securely. The volume control must be turned counter-clockwise as far as it will go. Then remove the knob and loosen the set screw in the shaft end. Turn the shaft counter-clockwise until the switch in the control head snaps "off." Tighten the set screw and replace the knob.

The tuning control and tone control flexible shafts must be coupled in their respective housings on the Receiver housing. The length casing nuts must be securely tightened. Fig. 1 and Fig. 2 show the locations of the shaft housings on the Receiver housing.

In case the control unit is mounted on the steering column and the Receiver is installed at the extreme right of the dash, it will be necessary to replace the shaft with 21" flexible shafts with 3/8" shafts and extend the "A" lead. A special kit, Part No. 45-1338 can be obtained in exchange for the standard shafts.

CABLE CONNECTIONS—Place the fuse and fuse indicator in the metal fuse housing in the control "A" lead. Couple this to the short Receiver lead and then connect the other "A" lead to the ammeter stud on the rear of the instrument board.

The speaker cable must be connected into the socket on the speaker housing. The antenna lead must be connected to its socket on the end of the Receiver housing. (See Figures 1 and 2).

FLEXIBLE SHAFT ADJUSTMENTS—With the Receiver turned on for operation, tune in a broadcast station of known frequency. Remove the knob and loosen the set screws on the shaft end. Turn the shaft until the control pointer indicates the proper channel (add 0 to the channel number for frequency in kilocycles). Tighten the set screws and replace the knob.

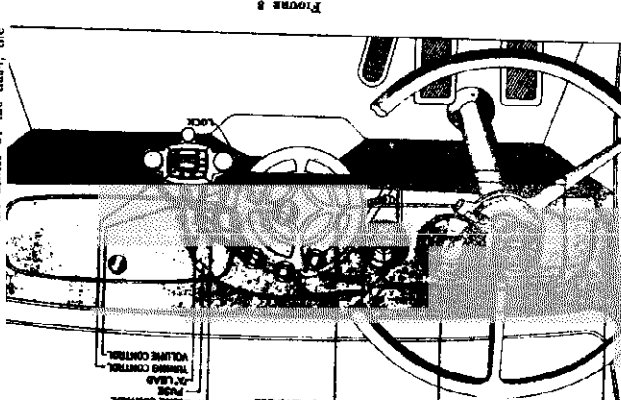
GENERAL

ANTENNA—In cars equipped with a top antenna, the antenna lead-in is usually brought down one of the windshield pillars and coiled behind the cow' trim panel. In such cases, the antenna lead (Receiver) must be spliced to the antenna lead-in as close as possible to the corner post and the shield pigtail on the lead grounded.

In cars having an all metal top, the Philco special under-car antenna should be installed (Part No. 45-1188 Kit). The shielded lead-in must be spliced to the shielded antenna lead and the shielding grounded. In all cases, cut off all excess lead-in, tape the splice and keep the lead-in out of the motor compartment.

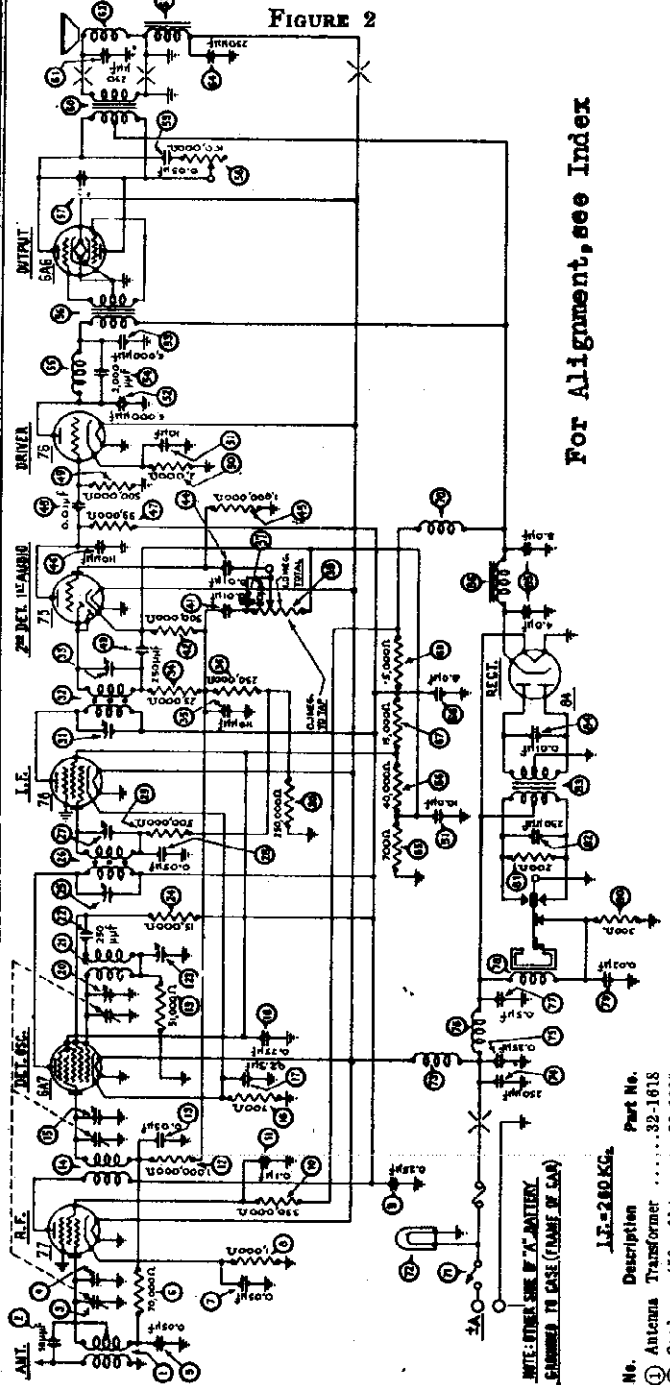
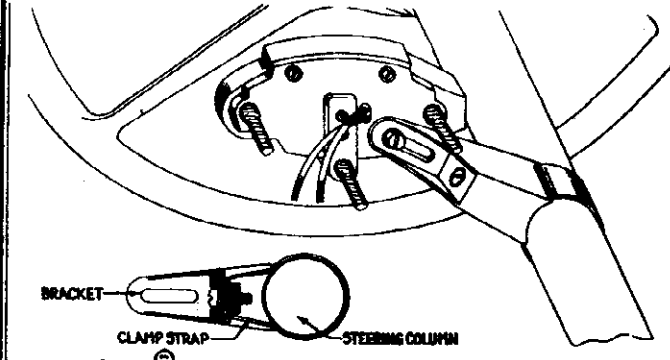
RECEIVER AND SPEAKER INSTALLATION—The Receiver and Speaker must be installed under the cowl on the dash. Be sure that in the location selected, there is ample foot room and that they do not in any way interfere with the operation of the control pedals and ventilators. The Receiver can be installed on the right side of the dash, in the center or on the left side, above the steering column, while the Speaker can be installed on one side of the Receiver. Fig. 3 shows a typical installation with the Receiver on the left side.

The standard mounting for the Receiver is with three studs. Figure 1 shows a detailed view of the Receiver installed on the right side of the dash, using three studs for mounting the Receiver. When installed on the right side or the left side, the control coupling end of the Receiver must be towards the center of the dash. When installed in the center of the dash, the



PHILCO RADIO & TELEV. CORP.

MODEL 808
Schematic
Parts, Note



For Alignment, see Index

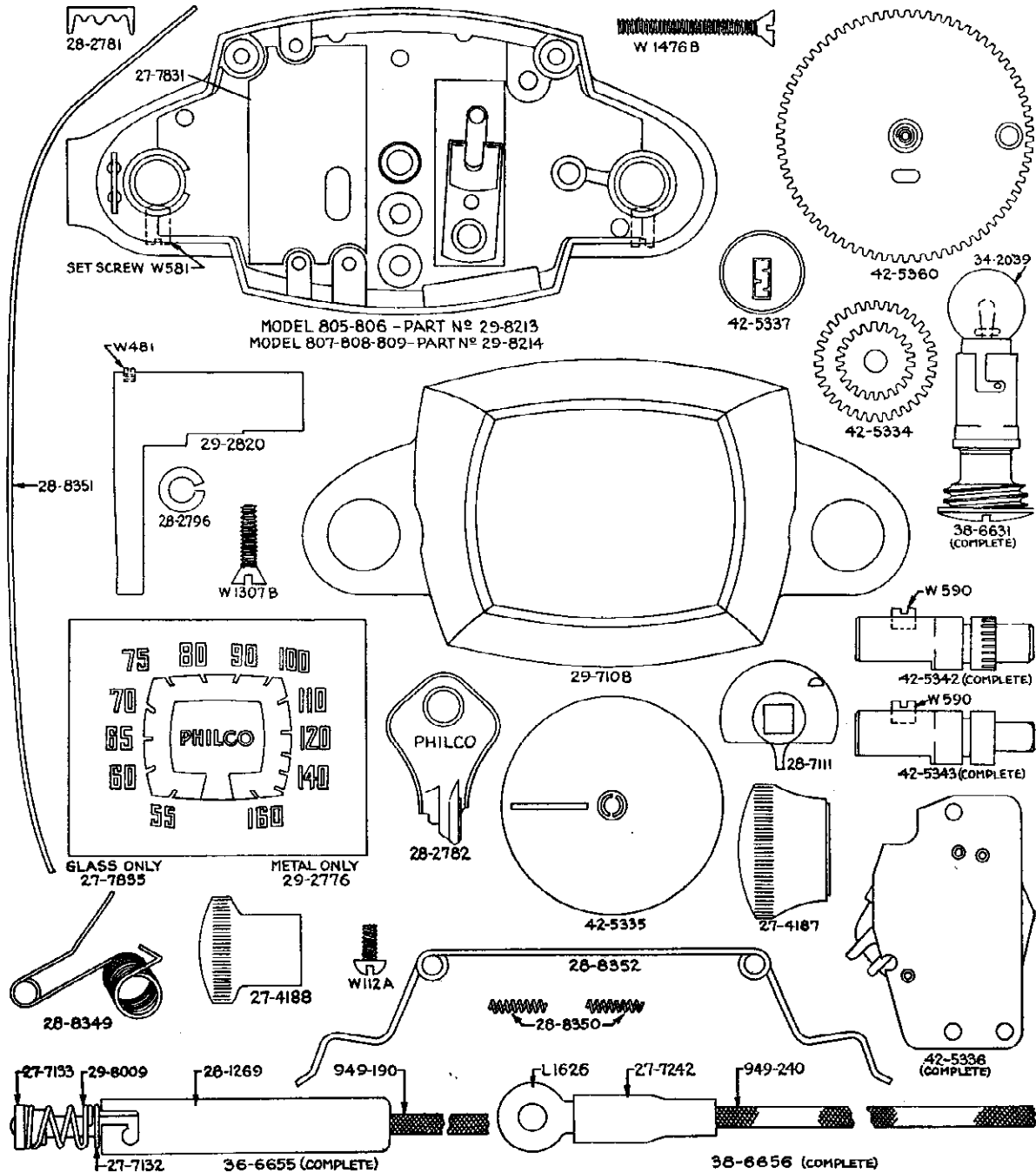
MODEL 808 — PARTS LIST

No.	Description	Part No.
1	Antenna Transformer	32-1618
2	Condenser (.50 mfd.)	30-1028
3	Tuning Condens. (on tun. cond.)	31-1490
4	Condenser (.05 mfd.)	30-4020
5	Resistor (70,000 ohms)	33-1115
6	Condenser (.05 mfd.)	30-4020
7	Resistor (1000 ohms)	33-3017
8	Condenser (.25 mfd.)	30-4134
9	Resistor (330,000 ohms)	33-1200
10	Condenser (.1 mfd.)	30-4170
11	Resistor (1,000,000 ohms)	33-1036
12	Condenser (.05 mfd.)	30-4020
13	R. F. Transformer	32-1619
14	Second Pad (on tun. cond.)	35-1097
15	Resistor (.700 ohms)	33-8443
16	Condenser (.25 mfd.)	30-4146
17	Resistor (51,000 ohms)	33-4518
18	Third Pad (on tun. cond.)	35-1097
19	Oscillator Transformer	32-1620
20	Condenser (.250 mfd.)	30-1032
21	Condenser (250 mfd.)	30-1032
22	Fourth Pad (on tun. cond.)	33-1177
23	Resistor (15,000 ohms)	33-1177
24	Antenna choke	Part No. 32-1372 has been added to the Receiver. This is connected in series with the antenna lead, and the antenna transformer 1 and condenser 5.
25	A Filter Choke	Part No. 32-1438 has been added to the Receiver. This is connected in series with one side of Choke 29 and the tube filament.
26	A	and the other side of Choke 29 and the tube filament.
27	Resistor (15,000 ohms)	33-1177
28	Resistor (110 mfd.)	30-1031
29	Resistor (700 ohms)	33-1044
30	Resistor (40,000 ohms)	33-1044
31	Resistor (.02 mfd.)	30-4039
32	Resistor (300 ohms)	30-3010
33	Resistor (200 ohms)	30-3010
34	Output Transformer	32-7355
35	Condenser (.25 mfd.)	30-1032
36	Core and Voice Coil	36-3441
37	Field Coil Assembly	36-3454
38	Condenser (.01 mfd.)	30-4031
39	Condenser (250 mfd.)	30-1032
40	Resistor (700 ohms)	33-1044
41	Resistor (40,000 ohms)	33-1044
42	Antenna Choke	32-1372
43	Antenna Lead	38-0131
44	Lock Cylinder Assembly	42-5337
45	Control Shaft 21"	28-8354
46	Control Shaft 28"	28-8355
47	Tone Control Shaft (21")	28-8356
48	Tone Control Shaft (28")	28-8358
49	Resistor (15,000 ohms)	32-7278
50	Condenser (8 mfd.)	30-2110
51	Resistor (5000 ohms)	33-5326
52	R. F. Choke	32-7358
53	On and Off Switch	42-5336
54	Pilot Lamp	34-2039
55	"A" Choke	32-1644
56	Condenser (250 mfd.)	30-1032
57	Condenser (.25 mfd.)	30-4148
58	Vibrator Choke	32-1607
59	Condenser (.5 mfd.)	30-4237
60	Vibrator	33-5036
61	Resistor (.02 mfd.)	30-4039
62	Resistor (300 ohms)	30-3010
63	Resistor (200 ohms)	30-3010
64	Output Transformer	32-7355
65	Core and Voice Coil	36-3441
66	Field Coil Assembly	36-3454
67	Condenser (.01 mfd.)	30-4031
68	Condenser (250 mfd.)	30-1032
69	Resistor (700 ohms)	33-1044
70	Resistor (40,000 ohms)	33-1044
71	Resistor (15,000 ohms)	32-7278
72	Condenser (8 mfd.)	30-2110
73	Resistor (5000 ohms)	33-5326
74	R. F. Choke	32-7358
75	On and Off Switch	42-5336
76	Pilot Lamp	34-2039
77	"A" Choke	32-1644
78	Condenser (250 mfd.)	30-1032
79	Condenser (.25 mfd.)	30-4148
80	Vibrator Choke	32-1607
81	Condenser (.5 mfd.)	30-4237
82	Vibrator	33-5036
83	Resistor (.02 mfd.)	30-4039
84	Resistor (300 ohms)	30-3010
85	Resistor (200 ohms)	30-3010
86	Output Transformer	32-7355
87	Core and Voice Coil	36-3441
88	Field Coil Assembly	36-3454
89	Condenser (.01 mfd.)	30-4031
90	Condenser (250 mfd.)	30-1032
91	Resistor (700 ohms)	33-1044
92	Resistor (40,000 ohms)	33-1044
93	Antenna Choke	32-1372
94	Antenna Lead	38-0131
95	Lock Cylinder Assembly	42-5337
96	Control Shaft 21"	28-8354
97	Control Shaft 28"	28-8355
98	Tone Control Shaft (21")	28-8356
99	Tone Control Shaft (28")	28-8358

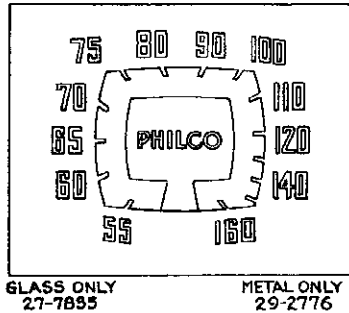
MODELS 805,806,808,809
Parts Details,Parts

PHILCO RADIO & TELEV. CORP.

Control Unit Assembly — Models 805, 806, 807, 808 and 809



MODEL 805-806 - PART No 29-8213
MODEL 807-808-809 - PART No 29-8214



Part No.	Description	Part No.	Description	Part No.	Description
L-1626	Sleeve	28-2782	Key	29-8214	Control Housing and Set Screw (807-808-809)
W-112A	Screw (bracket mtg.)	28-7111	Switch Operating Disc	34-2039	Pilot Lamp
W-481	Set Screw	28-8349	Spring (anti back lash)	38-6631	Pilot Lamp Assembly
W-581	Set Screw	28-8350	Spring (Lock)	38-6655	Fuse Terminal Assembly
W-590	Set Screw	28-8351	Spring (glass holder)	38-6658	Ammeter Lead Assembly
W-1807B	Screw (lone control mtg.)	28-8352	Spring (shaft retaining)	42-5331	Complete Control (805-806)
W-1476B	Screw (control cover mtg.)	28-8354	Flexible Shaft (21")	42-5332	Complete Control (806-809)
27-4187	Tuning and Volume Control Knob	28-8355	Flexible Shaft (28")	42-5334	Intermediate Gear and Shaft
27-4188	Tone Control Knob	28-8356	Tone Control Shaft (21")	42-5335	Pointer disc assembly
27-7132	Washer	28-8358	Tone Control Shaft (28")	42-5336	Switch and bracket assembly
27-7133	Contact	29-2776	Glass Holder	42-5337	Lock cylinder assembly
27-7831	Insulator	29-2820	Tone Control Shaft Mtg. Bracket	42-5342	Tuning Shaft and Set Screw
27-7835	Glass and Dial	29-7108	Control Cover	42-5344	Volume Shaft and Set Screw
28-1269	Fuse Housing	29-8009	Spring (fuse housing assembly)	42-5361	Pointer gear and stop assembly
28-2781	Lock Indexing Plate	29-8213	Control Housing and Set Screw (805-806)	949-240	Wire

PHILCO RADIO & TELEV. CORP.

MODEL 809
Schematic
Chassis, Parts

- Condenser (250 mmfd.) 30-1032
- Antenna Choke 32-1637
- Condenser (250 mmfd.) 30-1032
- Condenser (250 mmfd.) 30-1032
- Condenser (250 mmfd.) 30-1032
- Control Assembly 42-5332
- Glass and Dial 27-7835
- Pointer Assembly 42-5335
- Bezel Plate 28-7108
- Knobs (Tuning-Volume) 27-4187
- Knob (Tone Control) 27-4052
- Stud (Spher Mtg.) 6122
- Control Mounting Bracket 29-2773
- Keys 28-2782
- Studs (Set Mtg.) 28-6298
- Nuts (Set Mtg.) W88A
- Spark Plug Resistors 33-1195
- Distributor Resistor 33-1196
- Interference Condensers 30-4007
- Fuse 7217
- Fuse Insulator 27-7729
- Antenna Lead 38-5131
- Flexible Shaft (21") 28-8554
- Flexible Shaft (28") 28-8555
- Tone Control Shaft (21") 28-8556
- Tone Control Shaft (28") 28-8558
- Lock Cylinder Assembly 42-5337
- 28" Shaft Kit 45-1133

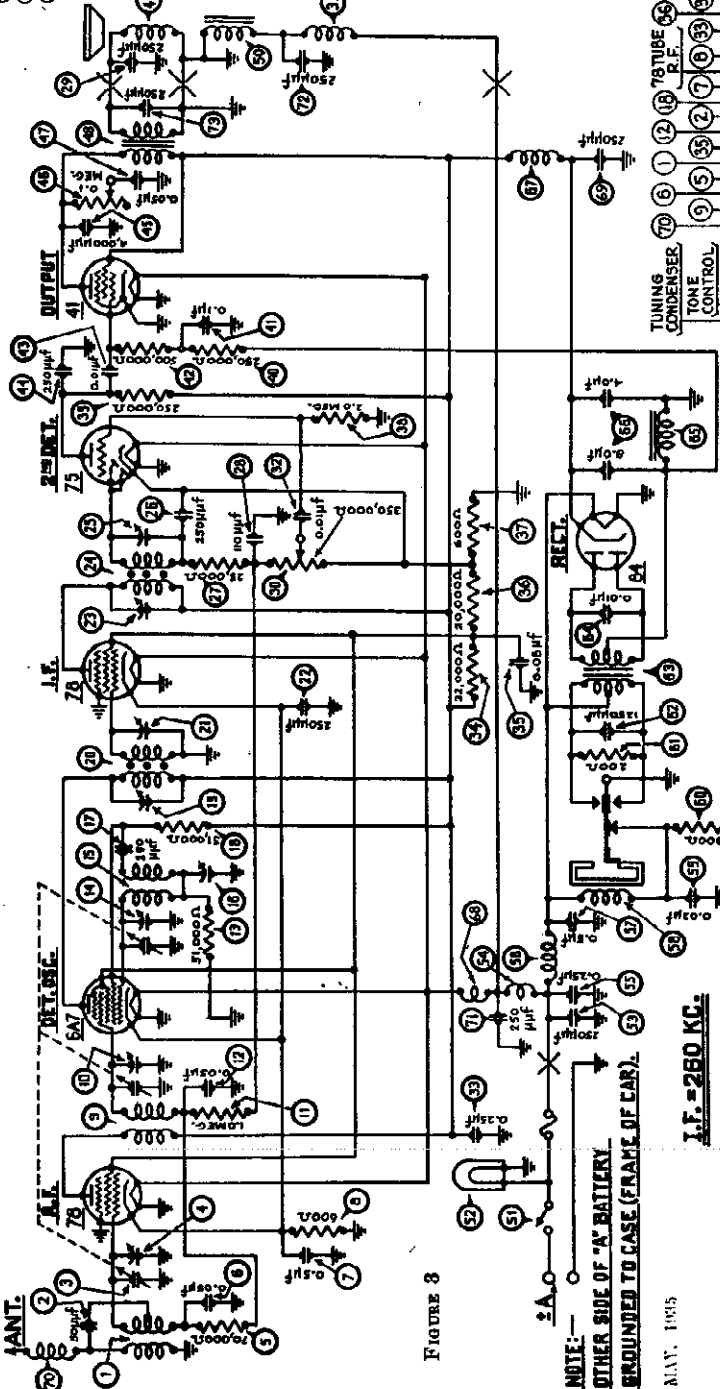


FIGURE 3

NOTE: OTHER SIDE OF "A" BATTERY BOUNDED TO CASE (FRAME OF CAB).

MAY, 1945

I.F. = 260 KC.
PARTS LIST

- Antenna Transformer 32-1618
- Condenser (50 mmfd.) 4587
- Tuning Condenser 31-1483
- First Padder (on tun. cond.) 33-1115
- Resistor (70,000 ohms) 30-4020
- Condenser (.05 mfd.) 30-4227
- Condenser (.5 mfd.) 33-3209
- Resistor (600 ohms) 32-1616
- R. F. Transformer (on tun. cond.) 33-1096
- Resistor (1,000,000 ohms) 30-4020
- Condenser (.05 mfd.) 6098
- Resistor (51,000 ohms) 32-1620
- Third Padder (on tun. cond.) 30-1032
- Oscillator Transformer 33-1153
- Fourth Padder (on tun. cond.) 30-1032
- Resistor (51,000 ohms) 32-1621
- Padder (Pri. 1st I. F. Tran.) 30-4145
- First I. F. Transformer 30-1032
- Padder (Sec. 1st I. F. Tran.) 30-1032
- Condenser (250 mmfd.) 32-1622
- Condenser (Pri. 2nd I. F. Tran.) 32-1622
- Second I. F. Transformer 30-1032
- Padder (Sec. 2nd I. F. Tran.) 30-1032
- Condenser (250 mmfd.) 30-1032
- Resistor (25,000 ohms) 33-1018
- First Padder (on tun. cond.) 30-1031
- Condenser (110 mmfd.) 30-1032
- Condenser (250 mmfd.) 30-1032
- Vol. Con. & Coupling Assn. 38-6605
- Choke 32-1464
- R. F. Transformer 30-4169
- Condenser (.01 mfd.) 30-4134
- Condenser (.25 mfd.) 3525
- Resistor (32,000 ohms) 30-4020
- Condenser (.05 mfd.) 33-3207
- Resistor (20,000 ohms) 33-1025
- Resistor (2,000,000 ohms) 33-1097
- Resistor (600 ohms) 33-1097
- Resistor (250,000 ohms) 30-4122
- Condenser (.1 mfd.) 30-4051
- Resistor (500,000 ohms) 30-2109
- Condenser (.01 mfd.) 30-4145
- Condenser (250 mmfd.) 30-1032
- Padder 32-1622
- Condenser (4000 mmfd.) 30-4185
- Tone Control 33-5101
- Condenser (.05 mfd.) 30-4012
- Output Transformer 2598
- Cone & Voice Coil 36-3139
- Field-coil Assembly 02735
- "On" & "Off" Switch Assm. 42-5336
- Pilot Lamp 34-2039
- Condenser (250 mmfd.) 30-1032
- "A" Choke 32-1644
- Condenser (.25 mfd.) 30-4146
- Vibrator Choke 32-1377
- Condenser (.5 mfd.) 30-4227
- Vibrator 38-5036
- Condenser (.02 mfd.) 30-4038
- Resistor (300 ohms) 33-3010
- Resistor (200 ohms) 32-7352
- Power Transformer 5886
- Condenser (1250 mmfd.) 30-4051
- Filter Choke 32-7351
- Filter Capacitor 30-2109
- R. F. Choke 32-1348
- "A" Choke 32-1438

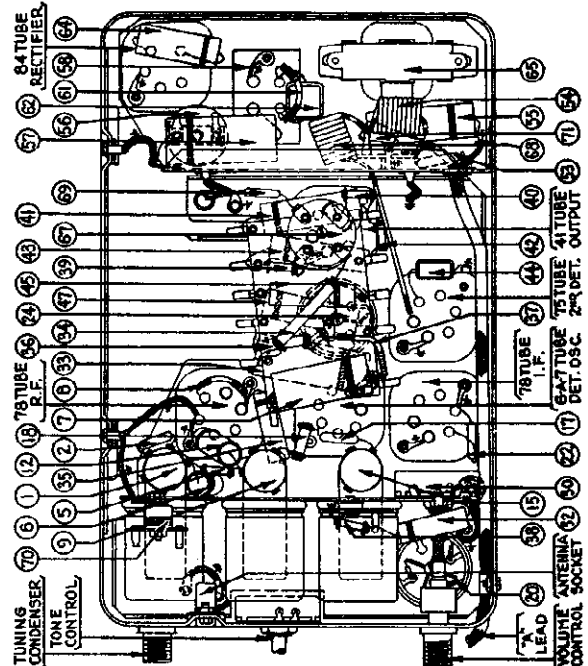


FIGURE 4

MODELS 808, 809
Trimmers, Alignment

PHILCO RADIO & TELEV. CORP.

I. F. Transformer and Padders (Models 808-809)

The first I. F. transformer is assembled complete with padding condensers. The second I. F. transformer is assembled complete with padding condensers and a network of resistors and mica condensers.

The padders are placed in the top of the shield can, one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figures 5-6-7).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 5.

If replacements are ever necessary, replace the entire coil assembly 32-1621 for the first I. F. stage and 32-1630 (Model 808) and 32-1622 (Model 809) for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

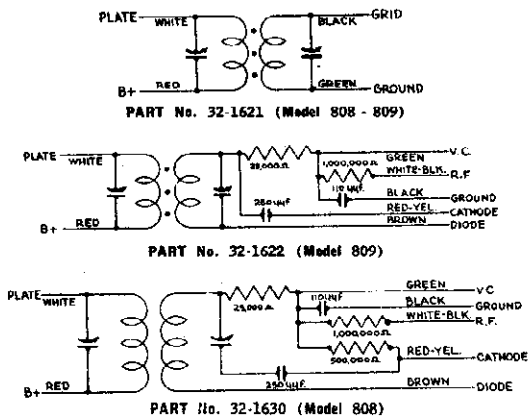


FIGURE 5

Model 808 Adjustments

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The PHILCO SET TESTER 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and set up for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the cover from the Receiver and disconnect the grid clip from the 78 tube, I. F. stage. (For location see Fig. 6).

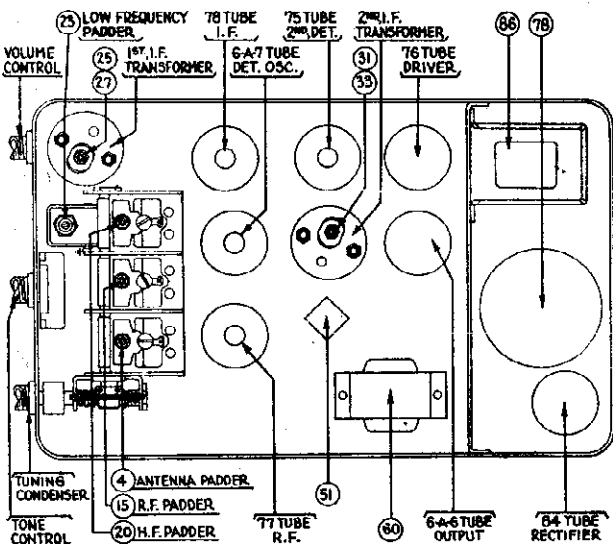


FIGURE 6

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 78 tube, and ground the shield to the Receiver housing.

Connect one lead from the output meter to the plate of the output tube and the other lead to the Receiver housing. The Receiver volume control must be turned to approximately full volume, and the attenuator in the generator set for a half-scale reading of the output meter.

1. The secondary nut padder (31) must be adjusted for maximum reading in the output meter. Then adjust the primary screw padder (27) for maximum reading.

2. Remove the generator lead from the 78 tube and reconnect the grid clip.

3. Disconnect the grid clip from the 6A7 tube and connect the generator lead to the grid cap of this tube. The secondary nut padder (31) must be adjusted for maximum reading in the output meter. Then adjust the primary screw padder (27) for maximum reading.

4. After padding the first I. F. stage remove the generator lead from the 6A7 tube and reconnect the grid clip. Adjust the generator to 1600 K. C. and then connect the generator lead to the antenna lead, using a 150 mmfd. condenser in series between the two leads, ground the shield to the Receiver housing.

5. Turn the tuning condenser out of mesh as far as it will go. With the tuning condenser in this position adjust the high frequency padder (20) until the maximum reading is obtained in the output meter. This is the true setting for 1600 K. C. 160 on the dial scale. Adjust the padders (31) and (27) in the same manner.

6. Turn the tuning condenser plates in mesh to approximately 580 on the dial scale and adjust the signal generator to 580 K. C. Roll the tuning condenser and adjust the series padder (4) for maximum reading.

7. Readjust padder (20) at 1600 K. C.

8. Turn the condenser to 1400 K. C. and adjust the padders (31) and (27) for maximum reading.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator has been used, the Receiver will be adjusted properly.

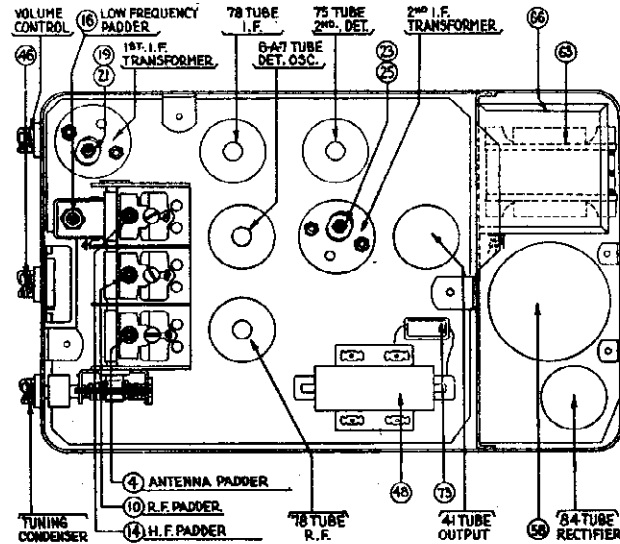


FIGURE 7

Model 809 Adjustments

Adjustments for the Model 809 are practically the same as for the Model 808. (For location of padders, See Fig. 7).

In step 1 — adjust the secondary nut padder (31) and the primary screw padder (27)

In step 3 — adjust the secondary nut padders (31) and the primary screw padder (27)

In step 5 — adjust padders (31), (27) and (20)

In step 6 — adjust padder (4)

In step 7 — adjust padder (20)

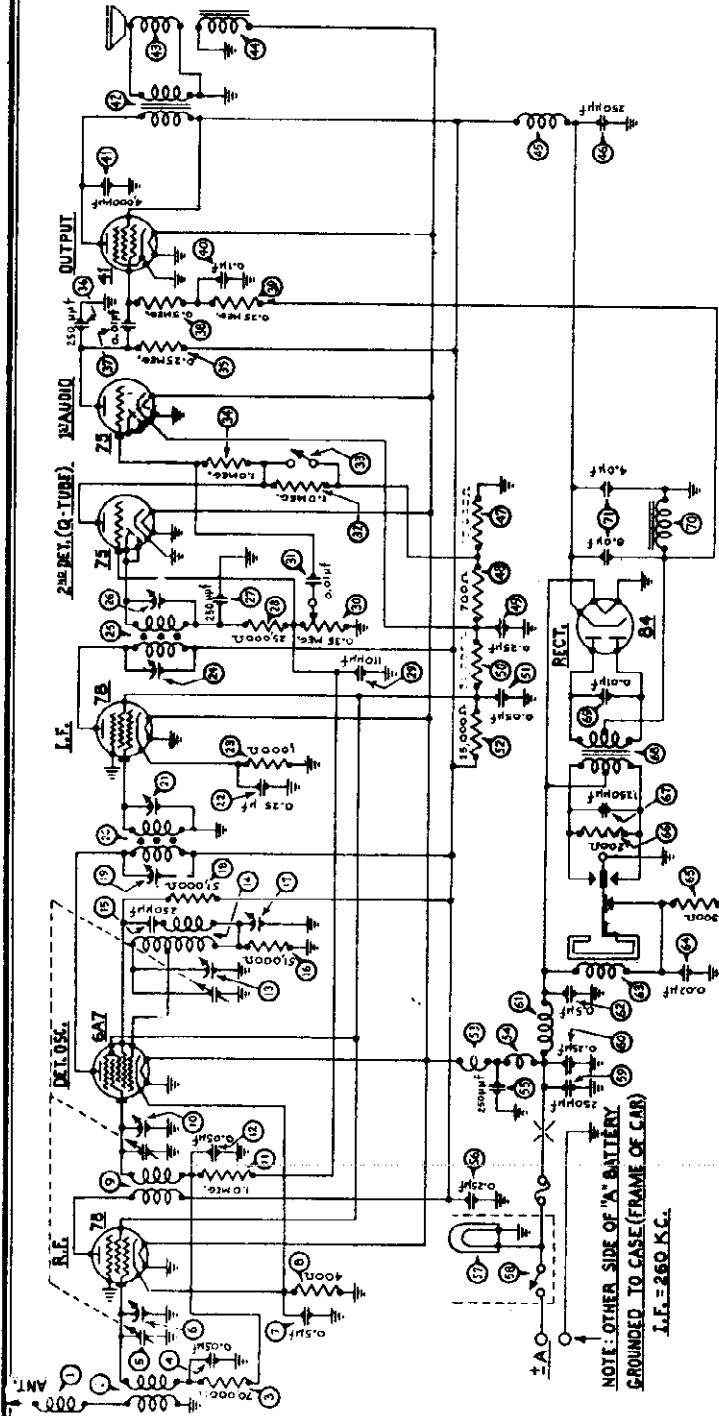
In step 8 — adjust padders (31) and (27)

PHILCO RADIO & TELEV. CORP.

MODEL 810-PV
Schematic, Chassis
MODELS 810PA, 810PB, 810P

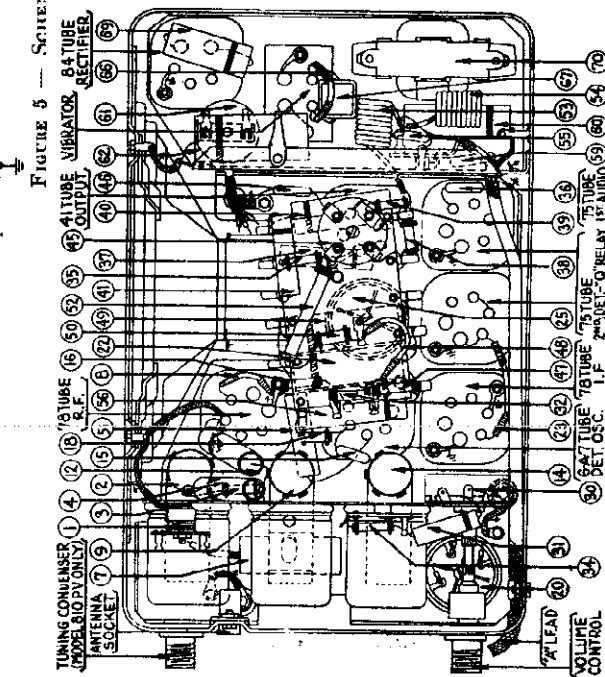
Parts List

- Condenser (250 mmfd.) ... 40-1032
- Resistor (10,000 ohms) ... 4412
- Resistor (700 ohms) ... 33-3019
- Condenser (.25 mfd.) ... 30-4146
- Resistor (25,000 ohms) ... 4516
- Condenser (.05 mfd.) ... 30-4020
- Resistor (25,000 ohms) ... 3658
- "A" Choke ... 32-1348
- "A" Choke ... 32-1644
- Condenser (250 mmfd.) ... 30-1032
- Condenser (.25 mfd.) ... 30-4146
- Vibrator Choke ... 32-1377
- Condenser (.5 mfd.) ... 30-4227
- Vibrator ... 38-5087
- Condenser (.02 mfd.) ... 30-4071
- Resistor (800 ohms) ... 33-3010
- Resistor (200 ohms) ... 7217
- Condenser (125.0 mmfd.) ... 5886
- Power Transformer ... 32-7552
- Condenser (.01 mfd.) ... 30-4051
- Filter Choke ... 32-7331
- Filter Condenser (4-8 mfd.) 30-2109
- Crystal (Model 810PA) ... 1875 K. C.
- Receiver Range 1585 K.C. to 1665 K.C. ... 45-2101
- 1970 K. C.
- Receiver Range 1690 K.C. to 1760 K.C. ... 45-2102
- Crystal (Model 810PB)
- 2410 K. C.
- Receiver Range 2100 K.C. to 2200 K.C. ... 45-2103
- 2310 K. C.
- Receiver Range 2200 K.C. to 2300 K.C. ... 45-2104
- 2610 K. C.
- Receiver Range 2300 K.C. to 2400 K.C. ... 45-2105
- 2710 K. C.
- Receiver Range 2400 K.C. to 2500 K.C. ... 45-2106
- Receiver Mig. Bracket ... 29-1791
- Receiver Mig. Plate ... 29-1792
- Mig. Bolt ... W1316A
- Nut ... W55A
- Control Mig. Strap ... 04344
- Control Mig. Bracket ... 6083
- Key ... 6091
- Dial (Model 810PV only) ... 27-3126
- Knobs ... 27-4058
- Screws (Cover Mtx.) ... W374B
- Fuse ... 7227



- 15 Padler (Pri. 1st I. F. Transf.) ...
- 16 First I. F. Transformer ... 32-1621
- 17 Padler (Sec. 1st I. F. Transf.) ...
- 18 Resistor (.25 mfd.) ... 30-4146
- 19 Condenser (1,000 ohms) ... 33-3017
- 20 Padler (Pri. 2nd I. F. Transf.) ...
- 21 Second I. F. Transformer ... 32-1022
- 22 Padler (Sec. 2nd I. F. Transf.) ...
- 23 Condenser (250 mmfd.) ... 30-1032
- 24 Resistor (25,000 ohms) ... 33-1013
- 25 Condenser (110 mmfd.) ... 30-1031
- 26 Volume Control (350,000 ohms) ... 38-0605
- 27 Condenser (.01 mfd.) ... 30-4169
- 28 Resistor (1,000,000 ohms) ... 33-1096
- 29 Switch ... 3253
- 30 Resistor (1,000,000 ohms) ... 33-1096
- 31 Resistor (250,000 ohms) ... 33-1097
- 32 Condenser (.5 mfd.) ... 30-1032
- 33 Resistor (300,000 ohms) ... 30-4145
- 34 Resistor (250,000 ohms) ... 6097
- 35 Resistor (51,000 ohms) ... 33-1097
- 36 Condenser (.1 mfd.) ... 30-4122
- 37 Condenser (4000 mmfd.) ... 30-4185
- 38 Output Transformer ... 32-7019
- 39 Core and Voice Coil ... 30-3406
- 40 Field Coil Assembly ... 30-3405

- FIGURE 5 — SCHEMATIC — MODEL 810PV
- | No. | Description | Part No. |
|-----|-----------------------------------|----------|
| 1 | Antenna Choke | 32-1573 |
| 2 | Antenna Transformer | 32-1778 |
| 3 | Resistor (70,000 ohms) | 33-1115 |
| 4 | Condenser (.05 mfd.) | 30-4020 |
| 5 | Tuning Condenser | 31-1595 |
| 6 | First Padler (on tun. cond.) | ... |
| 7 | Condenser (.5 mfd.) | 30-1227 |
| 8 | Resistor (400 ohms) | 33-2016 |
| 9 | R. F. Transformer | 32-1779 |
| 10 | Second Padler (on tun. cond.) | ... |
| 11 | Resistor (1,000,000 ohms) | 33-1096 |
| 12 | Condenser (.05 mfd.) | 30-4020 |
| 13 | Third Padler (on tun. cond.) | ... |
| 14 | (810PA & PB) 6s Diode Transformer | 32-1804 |
| 15 | (810PV) Oscillator Transformer | 32-1780 |
| 16 | (810PA & PB) Condenser (50 mmfd.) | 30-1029 |
| 17 | (810 PV) Condenser (250 Mmfd.) | 30-1032 |
| 18 | Resistor (51,000 ohms) | 6098 |
| 19 | Fourth Padler (on tun. cond.) | ... |
| 20 | Resistor (51,000 ohms) | 6098 |



MODELS 810PA, 810PB, 810PV
Data, Alignment

PHILCO RADIO & TELEV. CORP.

On the Model 810PA (Lower Frequency band) adjust the series paddler (4) for maximum output reading and on the Model 810PB (Upper Frequency band) adjust the high frequency paddler (5) in the same manner. Do not fire the primary winding of the transformer for the maximum output. After this is obtained, back off the adjusting nut a half turn.

After completing these adjustments, recheck all the pads. This time the adjustments will be made on the control or better still, test some from the power transformer connected to the Receiver antenna lead through a 200 mfd. dummy antenna. Recheck the paddlers (4), (5), (6) and (7) on the going condenser. Using the same signal, adjust the second and first I. F. paddlers for maximum output.

DO NOT OPEN THE CRYSTAL HOLDER. It is for easy replacement only. The crystal holder is not to be removed. After cleaning, the crystal must not be touched by the fingers. Use a clean cloth for handling.

ADJUSTMENTS — MODEL 810PV

Remove the grid lead from the 78 I. F. amplifier tube. Connect a 280 K. C. signal to the grid of the amplifier tube and adjust the paddlers (4) and (5) on the second I. F. transformer for maximum output. Reconnect the grid lead.

In a like manner, connect the 260 K. C. signal to the grid of the 6A7 detector oscillator tube and adjust the paddlers on the first I. F. transformer.

R. F. — Connect a 2600 K. C. signal to the grid of the 78 I. F. amplifier tube. Set the tuning condenser at minimum capacity, using a strip of bond paper as a gauge under the heel of the rotor plates.

Adjust the first detector and oscillator paddlers (4) and (5) for maximum output.

Reset the signal generator for a 1000 K. C. signal. Tune in the signal and roll the variable condenser while adjusting the oscillator series paddlers (6).

Recheck the oscillator paddler adjustment at 2000 K. C. Connect the signal generator to the Receiver antenna lead using a 200 mfd. condenser dummy antenna and adjust the antenna paddler (7) at 2600 K. C.

The Model 810PV is a variable Auto Radio Receiver with a frequency range of 1500 K. C. to 2600 K. C. and is calibrated only between 1075 K. C. and 1750 K. C. and between 2100 K. C. and 2500 K. C., since these are the conventional emergency police bands. The Model 810PV has an intermediate frequency of 260 K. C. and does not employ crystal control.

The Receiver must be set up for operation and the volume control set at maximum. The Receiver "Q" switch must be in the off position, cutting out the carrier relay circuit. Use a quality modulated oscillator or signal generator for the test signal, with an output meter connected across the output stage. The signal from the signal generator should be attenuated so that the output signal is just sufficient to actuate the output meter. The signal should not be strong enough to operate the automatic volume control.

I. F. — The padding condensers are placed in the top of the I. F. coil shield can. The primary paddler is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary paddler is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield.

RANGE OF RECEIVER	PART NO. CRYSTAL
1500-1685 K. C.	45-2191
1670 K. C.	45-2102
2100-2200 K. C.	45-2106
2210-2300 K. C.	45-2108
2300-2400 K. C.	45-2109
2400-2500 K. C.	45-2105

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. The transmitter frequency of the crystal used is 2710 K. C., the difference is 260 K. C., which is the frequency to which the I. F. amplifier I. F. and first I. F. paddlers for maximum output must be tuned.

The Receivers are carefully adjusted to no readjustments except when the transmitter frequency is changed. When the Receiver has operated for several hours.

The Receiver must be set up for operation and the volume control set at maximum. The Receiver "Q" switch must be in the off position, cutting out the carrier relay circuit. Use a quality modulated oscillator or signal generator for the test signal, with an output meter connected across the output stage. The signal from the signal generator should be attenuated so that the output signal is just sufficient to actuate the output meter. The signal should not be strong enough to operate the automatic volume control.

I. F. STAGES.— The padding condensers are placed in the top of the I. F. coil shield can. The primary paddler is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary paddler is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield.

Remove the grid lead from the 78 I. F. amplifier tube. The signal generator must be set exactly on the proper frequency for the test signal. Adjust the paddlers (4), (5) on the second I. F. transformer for maximum output. Reconnect the grid lead.

In the same manner, connect the signal generator output to the grid of the 6A7 detector oscillator tube and adjust the paddlers (6) and (7) on the first I. F. transformer.

Check the adjustments of the second I. F. transformer and the first I. F. transformer.

R. F. — Tune the signal generator to the frequency of the transmitter and connect the output of the generator to the Receiver antenna lead, through a 200 mfd. dummy antenna.

The variable condenser is placed in place with the set screws. Adjust these and tune the variable condenser to the correct frequency. If the crystal oscillator circuit does not function at first, loosen the paddler (6) on the oscillator section of the tuning condenser and also the series paddler (4) if the oscillator output is low, it can be increased by adjusting the paddler (4) for the higher frequencies and the paddler (6) for the lower frequencies.

Adjust the R. F. and detector paddlers (4) and (5) for maximum output. If after adjusting, they are loose, back out the tuning condenser slightly — or if they are too tight, turn the condenser in slightly. Then readjust the paddlers.

Both the R. F. stage and the first detector section of the modulator stage are all made in one unit. The modulator stage has a "Q" circuit. In addition to this, the Receiver also has a "Q" circuit. The function of this circuit is to completely silence the Receiver when tuned off carrier, or when the carrier goes off the air. The correct values of the resistor network have been determined and used for satisfactory city operation where it is desired to exclude street car noises, etc. A switch is provided to connect the Receiver to the antenna when the signal is weak, when in the "Q" circuit. The "Q" circuit cut-off sensitivity can be obtained with the conventional squelch circuit. The "Q" relay circuit operates on a carrier field strength equivalent to approximately 3 microvolts in the antenna. A carrier below this strength is almost always of insufficient strength to give satisfactory reception, especially in noisy locations.

DYNAMIC SPEAKER A full powered electro-dynamic speaker is built to give purity of reproduction and excellent tonal quality. The speaker is especially designed to give the best reproduction of the voice frequencies. The Receiver and speaker are capable of detecting considerably greater undistorted output than is normally required.

POWER SUPPLY The power supply is self contained and is not polarized. The Receiver can be installed in any location without requiring battery connections. Philco's full-wave Vibrator (one of the latest in the industry) is used in successful operation, during the past three years) is used.

These models are without peer and are the most modern police Receivers obtainable. They represent the best design, engineering and production skill in the industry.

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ADJUSTMENTS
MODELS 810PA AND 810PB

The fixed frequency Auto Radio Receivers are identical, except for the crystals used to obtain the various oscillator frequencies.

The Receivers, when used with the proper crystals, can be adjusted for any specified frequency between the limits of 1675 K. C. and 1750 K. C. (Model 810PA) and 2100 K. C. and 2500 K. C. (Model 810PB). Six crystals are used to obtain these frequencies. The crystal frequency, however, is no indication of the Receiver frequency adjustment.

The frequency of the crystal required for any Receiver frequency within the range of frequencies quoted above, is between 210 K. C. and 310 K. C. higher than the desired frequency. The crystal frequencies, together with the frequency coverage of the Receiver, with each crystal, are:

All are single unit Receivers, housed in 7 1/2 inch containers 11 inches long by 7 1/2 inches wide by 7 inches deep. All corners are rounded, the chassis, housing and covers are all steel and are plated to prevent rusting. They are given an exterior black wrinkle finish.

The Receivers are furnished with metal mounting brackets. One bracket is bolted to the inside of the dash, the other bracket is fastened to back of the Receiver. The Receiver bracket engages on the dash bracket and is fastened by a single Phillips screw. This makes the installation of the Receiver on the location of the Receiver in the car.

The volume control and (in case of 810PV) the tuning control shaft, the "A" in the antenna connectors are located on one end of the housing. The shafts are the rapid coupling type with the locking gland nut at the Receiver end. The "A" battery and antenna connections are the quick, detachable bayonet locking type, with the "A" fuse placed in the "A" lead.

The Receiver chassis is shock mounted with well known shock absorbers. The tuning condenser is mounted on a rubber bushing. The tuning condenser is mounted on a rubber bushing.

The condenser drive gear ratio (Model 810PA) is 1:61. This eliminates practically all back lash and due to the high gear ratio this high gear ratio also makes accurate tuning much easier.

A steering column control unit, with illuminated dial (substituted for the Model 810PV) is used.

SUPERHETERO. A superheterodyne circuit is used for the DYNE RANGE 810PA, also the 810PB and PB. The frequency converter of Model 810PV is in one bowl. The oscillator and I. F. circuits are designed to reduce frequency drift to a minimum. The Models 810PA and 810PB, the fixed frequency Receivers, can be furnished adjusted for any one particular frequency within the limits of the regular police band, i.e. the Model PA covers from 1675 K. C. to 1750 K. C. and the Model PB covers from 2100 K. C. to 2500 K. C.

A crystal oscillator is employed in the Model 810PA and 810PB. The crystal is naturally built the oscillator, on the required frequency, and is responsible, in a large measure, for the greatly improved performance of this Receiver.

The tubes used in the 810PV and 810PA and 810PB are:

7 1/2 Tube Tuned R. F. Amplifier with A. V. C.
6A7 Tube First Detector-Oscillator Modulator with A. V. C.
78 Tube I. F. Amplifier.
75 Tube Second Detector and "Q" Relay Stage.

HOUSING, FINISHING. All are single unit Receivers, housed in 7 1/2 inch containers 11 inches long by 7 1/2 inches wide by 7 inches deep. All corners are rounded, the chassis, housing and covers are all steel and are plated to prevent rusting. They are given an exterior black wrinkle finish.

MOUNTING BRACKETS. The Receivers are furnished with metal mounting brackets. One bracket is bolted to the inside of the dash, the other bracket is fastened to back of the Receiver. The Receiver bracket engages on the dash bracket and is fastened by a single Phillips screw. This makes the installation of the Receiver on the location of the Receiver in the car.

CONTROL SHAFTS. The volume control and (in case of 810PV) the tuning control shaft, the "A" in the antenna connectors are located on one end of the housing. The shafts are the rapid coupling type with the locking gland nut at the Receiver end. The "A" battery and antenna connections are the quick, detachable bayonet locking type, with the "A" fuse placed in the "A" lead.

FLOATING CHASSIS AND CONDENSER. The Receiver chassis is shock mounted with well known shock absorbers. The tuning condenser is mounted on a rubber bushing. The tuning condenser is mounted on a rubber bushing.

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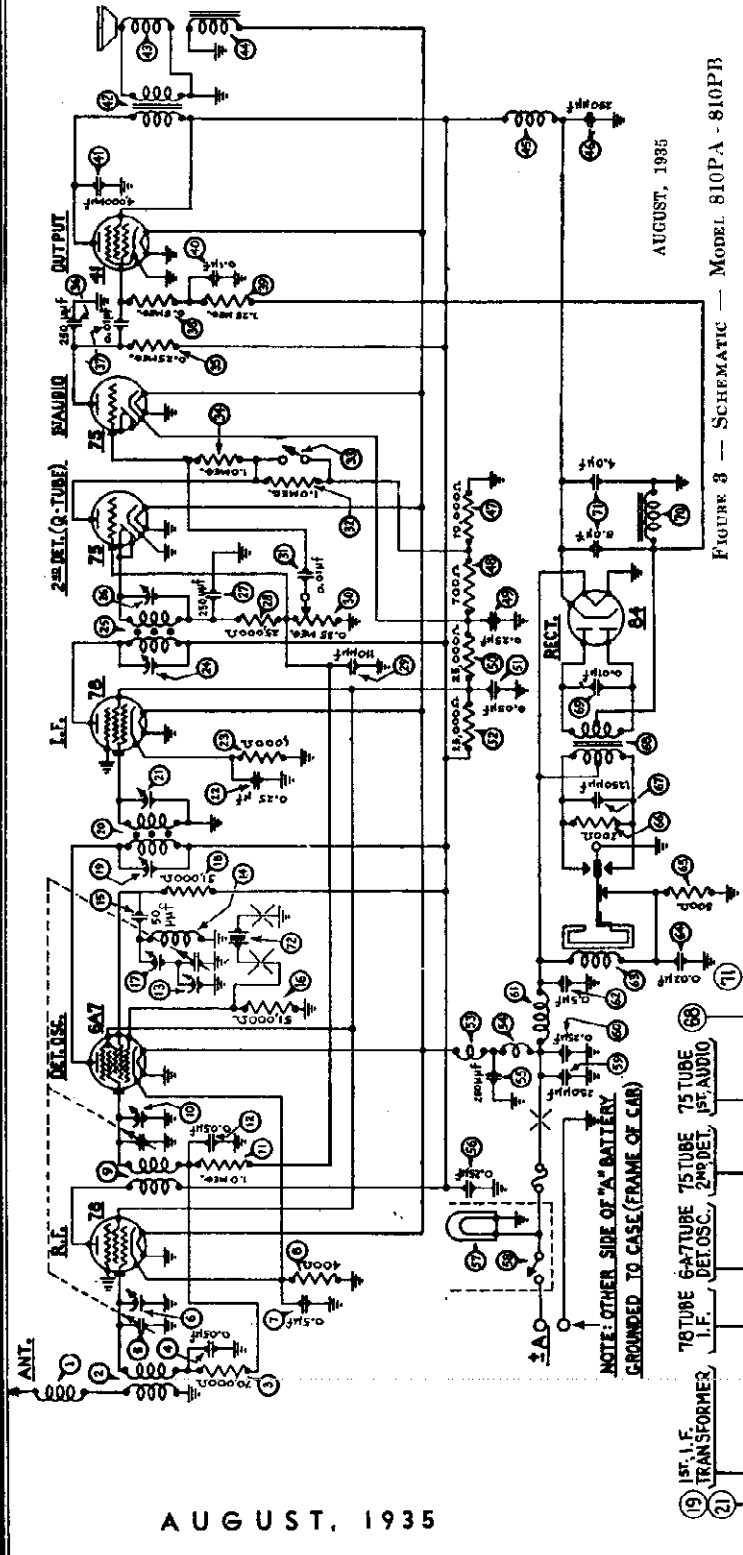
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A crystal oscillator is employed in the Model 810PA and 810PB. The crystal is naturally built the oscillator, on the required frequency, and is responsible, in a large measure, for the greatly improved performance of this Receiver.

PHILCO RADIO & TELEV. CORP.

MODELS 810PA, 810PB
Schematic, Trimmers
Data

FOR PARTS LIST SEE INDEX



AUGUST, 1935

FIGURE 3 — SCHEMATIC — MODEL 810PA - 810PB

I. F. TRANSFORMERS

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figures 1 and 2.

If replacements are ever necessary, replace the entire coil assembly 32-1621 for the first I. F. stage and 32-1622 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

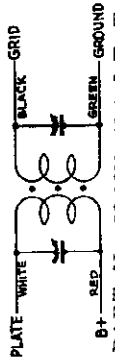


FIGURE 1—PART No. 32-1621 (1st I. F. Transformer)

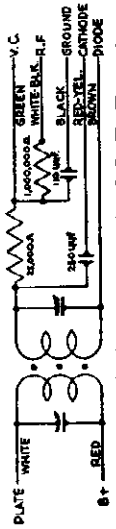


FIGURE 2—PART No. 32-1622 (2nd I. F. Transformer)

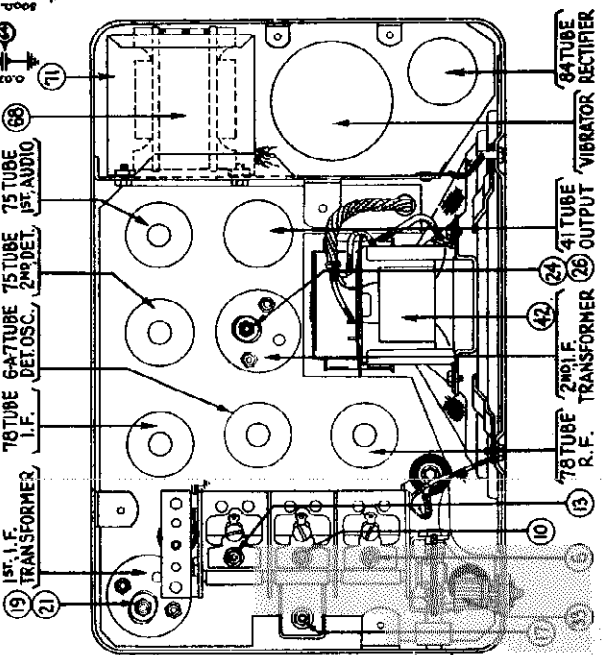


FIGURE 4 — TOP VIEW

AUGUST, 1935

**MODEL FT-6
Alignment
Socket, Trimmers**

PHILCO RADIO & TELEV. CORP.

MODEL FT-6 RECEIVER

THE new Ford auto radio incorporates new advanced principles of circuit and tube design. A totally new idea in sound distribution and musical fidelity is built into a dynamic speaker located above the occupants' heads in the header-bar of the car. Other features of the set are two-unit construction with separate speaker, highly developed Automatic Volume Control, illuminated custom-built instrument panel control, mounting in the ash receptacle opening.

The Receiver is mounted directly above the steering column out of sight and out of the way.

I. F. TRANSFORMER AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1329 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

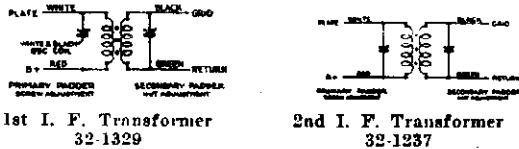


FIG. 1

MODEL FT-6 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to re-adjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The PHILCO Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and set up for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the cover from the Receiver and disconnect the grid clip from the 77 tube. (For location see Fig. 2.)

Set up the signal generator and adjust it to exactly 260 K.C. Connect the generator lead to the grid cap of the 77 tube, and ground the shield to the Receiver housing.

Connect one lead from the output meter to the plate of the 42 tube and the other lead to the receiver housing. The Receiver volume control must be turned to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The primary screw padders ② and ③ must be screwed all the way in. (Figs. 2 and 3.) The secondary nut padders ④ and ⑤ must then be adjusted. These padders should be adjusted for maximum reading on the output meter.

The screw padders ⑥ and ⑦ must be adjusted next.

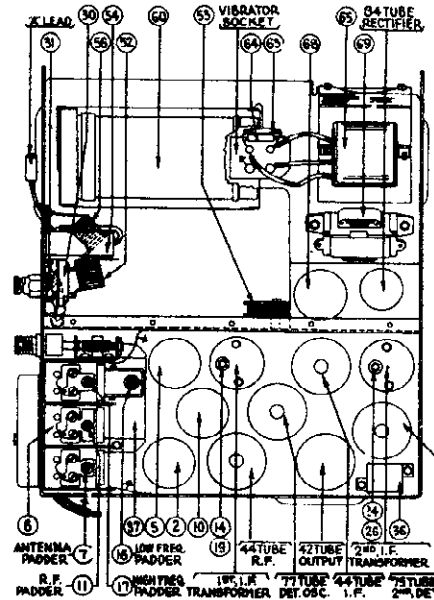


FIG. 2

Adjust the screw on each padder for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable. Turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

After padding the I. F. stages, remove the generator lead from the 77 tube and reconnect the grid clip to the 77 tube. Adjust the generator to 1580 K.C. and then connect the generator lead to the antenna lead. Ground the shield to the receiver housing.

Using a piece of paper approximately .006 inch in thickness, place it under the heel of the tuning condenser between the stator and rotor plates and turn the tuning condenser until the rotor plates strike this paper.

With the tuning condenser in this position, adjust the high-frequency padder ⑥ until the maximum reading is obtained in the output meter. This is the true setting for 1580 K.C., 158 on the dial scale. Adjust condensers ⑩ and ⑪ in the same manner.

Remove the paper and turn the tuning condenser plates in mesh to approximately 60 on the scale, and adjust the signal generator to 600 K.C. Roll the tuning condenser and adjust the series padder ⑦ for the maximum meter reading.

Readjust the padder ⑦ at 1580 K.C.

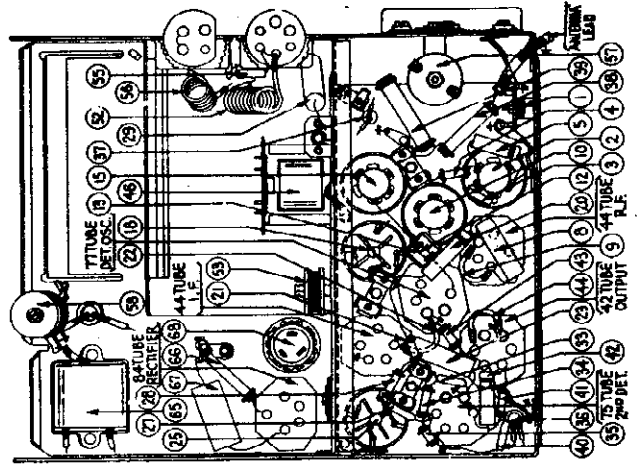
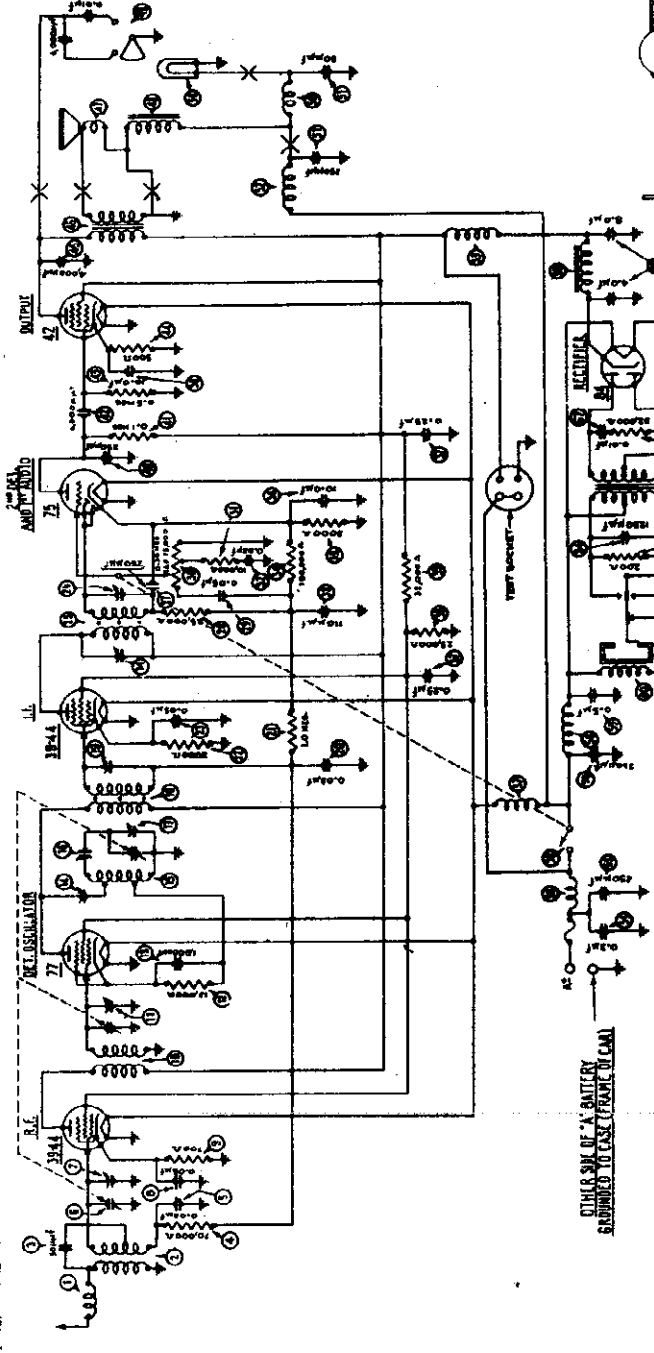
Tune the gang to 1400 K.C. and adjust padders ⑩ and ⑪ to maximum.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the receiver will be adjusted properly.

PHILCO RADIO & TELEV. CORP.

MODEL FT-6
Schematic
Chassis View
Parts List

- 4-prong Socket 27-6006
- 5-prong Socket 27-6014
- 6-prong Socket 27-6020
- Spark Plug Resistor 33-1015
- Spark Plug Terminal 28-6179
- Interference Cond. (Gen.) 30-4181
- Interference Cond. (Dist.) 30-4176
- Fac. Assembly 42-5302
- Glass for Control 27-7757
- Knobs 27-4171
- Pointer 28-2605
- Flexible Shaft (Tuning) 28-8331
- Flexible Shaft (Volume) 28-8332
- Anemeter Cable 38-5749
- Fuse 7227
- Fuse Insulator 27-7131
- Antenna Lead L1741
- "T" Bolt (set mounting) 28-8161
- Nut (set mounting) W518A
- Speaker Cable 41-3125
- Tow Strap 36-3432
- "U" Clamp Control Mfg. 29-2669



- 30-4243 Tone Control
- 34-2039 Pilot Lamp
- 30-1032 Condenser (250 mmfd.)
- 32-1374 Choke
- 32-1078 R. F. Choke
- 30-4018 Condenser (.5 mfd.)
- 30-1032 Condenser (250 mmfd.)
- 32-1374 "A" Choke
- 32-1368 "A" Choke
- 32-1367 Vibrator Choke
- 30-4227 Condenser (.5 mfd.)
- 38-5036 Vibrator
- 30-4039 Resistor (.02 mfd.)
- 7217 Resistor (200 ohms)
- 5886 Resistor (200 ohms)
- 32-7232 Condenser (1250 mmfd.)
- 5525 Resistor (32,000 ohms)
- 30-4051 Condenser (.01 mfd.)
- 30-2030 Filter Condenser (4-8 mfd.)
- 32-7233 "B" Choke
- 30-1031 Condenser (110 mmfd.)

- 30-4243 Tone Control
- 34-2039 Pilot Lamp
- 30-1032 Condenser (250 mmfd.)
- 32-1374 Choke
- 32-1078 R. F. Choke
- 30-4018 Condenser (.5 mfd.)
- 30-1032 Condenser (250 mmfd.)
- 32-1374 "A" Choke
- 32-1368 "A" Choke
- 32-1367 Vibrator Choke
- 30-4227 Condenser (.5 mfd.)
- 38-5036 Vibrator
- 30-4039 Resistor (.02 mfd.)
- 7217 Resistor (200 ohms)
- 5886 Resistor (200 ohms)
- 32-7232 Condenser (1250 mmfd.)
- 5525 Resistor (32,000 ohms)
- 30-4051 Condenser (.01 mfd.)
- 30-2030 Filter Condenser (4-8 mfd.)
- 32-7233 "B" Choke
- 30-1031 Condenser (110 mmfd.)

- 30-4243 Tone Control
- 34-2039 Pilot Lamp
- 30-1032 Condenser (250 mmfd.)
- 32-1374 Choke
- 32-1078 R. F. Choke
- 30-4018 Condenser (.5 mfd.)
- 30-1032 Condenser (250 mmfd.)
- 32-1374 "A" Choke
- 32-1368 "A" Choke
- 32-1367 Vibrator Choke
- 30-4227 Condenser (.5 mfd.)
- 38-5036 Vibrator
- 30-4039 Resistor (.02 mfd.)
- 7217 Resistor (200 ohms)
- 5886 Resistor (200 ohms)
- 32-7232 Condenser (1250 mmfd.)
- 5525 Resistor (32,000 ohms)
- 30-4051 Condenser (.01 mfd.)
- 30-2030 Filter Condenser (4-8 mfd.)
- 32-7233 "B" Choke
- 30-1031 Condenser (110 mmfd.)

- 30-4243 Tone Control
- 34-2039 Pilot Lamp
- 30-1032 Condenser (250 mmfd.)
- 32-1374 Choke
- 32-1078 R. F. Choke
- 30-4018 Condenser (.5 mfd.)
- 30-1032 Condenser (250 mmfd.)
- 32-1374 "A" Choke
- 32-1368 "A" Choke
- 32-1367 Vibrator Choke
- 30-4227 Condenser (.5 mfd.)
- 38-5036 Vibrator
- 30-4039 Resistor (.02 mfd.)
- 7217 Resistor (200 ohms)
- 5886 Resistor (200 ohms)
- 32-7232 Condenser (1250 mmfd.)
- 5525 Resistor (32,000 ohms)
- 30-4051 Condenser (.01 mfd.)
- 30-2030 Filter Condenser (4-8 mfd.)
- 32-7233 "B" Choke
- 30-1031 Condenser (110 mmfd.)

MODEL FT-6 PARTS LIST

INTERMEDIATE FREQUENCY 250 K.C.

FIG. 3

Schematic Part No.	Description	Part No.	Description	Part No.	Description
1	Antenna Choke	32-1372	Padder (Pri. 2nd I. F. Trans.)	30-4243	Tone Control
2	Antenna Transformer	32-1535	Second I. F. Transformer	34-2039	Pilot Lamp
3	Condenser (50 mmfd.)	30-1028	Padder (Sec. 2nd I. F. Trans.)	30-1032	Condenser (250 mmfd.)
4	Resistor (70,000 ohms)	33-1115	Resistor (25,000 ohms)	33-1013	Resistor (25,000 ohms)
5	Condenser (.05 mfd.)	30-4026	Condenser (.05 mfd.)	30-4026	Condenser (.5 mfd.)
6	Tuning Condenser	30-4025	Vol. Con. & Switch Asm.	33-5067	Condenser (250 mmfd.)
7	1st Padder (on tun. cond.)	30-1438	Resistor (10,000 ohms)	33-1000	"A" Choke
8	Condenser (.05 mfd.)	30-4020	Condenser (.03 mfd.)	30-4025	"A" Choke
9	R. F. Transformer	4443	Condenser (110 mmfd.)	30-1031	Vibrator Choke
10	2nd Padder (on tun. cond.)	32-1536	Resistor (190,000 ohms)	33-1116	Condenser (.5 mfd.)
11	Resistor (11,000 ohms)	33-1104	Resistor (5000 ohms)	9086	Vibrator
12	Condenser (1000 mmfd.)	30-1007	Condenser (10-10 mfd.)	30-2076	Resistor (200 ohms)
13	Oscillator Transformer	32-1537	Resistor (25,000 ohms)	3656	Resistor (200 ohms)
14	4th Padder (on tun. cond.)	32-1329	Condenser (250 mmfd.)	3525	Condenser (1250 mmfd.)
15	First I. F. Transformer	32-1328	Resistor (1 meg.)	6099	Resistor (32,000 ohms)
16	Condenser (.03 mfd.)	80-4025	Condenser (6000 mmfd.)	30-4125	Condenser (.01 mfd.)
17	Resistor (2000 ohms)	33-3048	Resistor (.5 meg.)	9087	Filter Condenser (4-8 mfd.)
18	Resistor (2000 ohms)	33-3048	Resistor (500 ohms)	33-3031	Condenser (4000 mmfd.)
19	Resistor (2000 ohms)	33-3048	Condenser (.03 mfd.)	32-7247	Output Transformer
20	Resistor (2000 ohms)	33-3048	Resistor (1.0 meg.)	92861	Cone and Voice Coil
21	Resistor (2000 ohms)	33-3048	Resistor (2000 ohms)	92861	Field Coil Assembly
22	Resistor (2000 ohms)	33-3048	Condenser (.01 mfd.)	92861	

FIG. 4

**MODEL FT-9 Ford
Alignment, Data
Chassis, Trimmers**

PHILCO RADIO & TELEV. CORP.

FORD PHILCO RADIO MODEL FT9

**I. F. Transformers and Padders
Model FT9**

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 Fig. 2).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

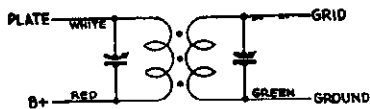


FIGURE 1

If replacements are ever necessary, replace the entire coil assembly, 32-1928 for the first I. F. stage and 32-1929 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

Model FT9 Adjustments

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments to the Model FT9 are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A 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.

The tone control should be turned to the brilliant position.

I. F. — Adjust the signal generator to 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.

Adjust the secondary screw padder 25 on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder 23 for maximum reading. (See Fig. 2 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. Adjust the secondary screw padder 26 on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder 24 for maximum reading. (See Figure 2 for location of padders).

HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube. Adjust the signal generator to 1600 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.

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 15 until the maximum reading is obtained on the output meter. This is the true setting for 1600 K. C., 160 on the dial scale.

LOW FREQUENCY — Turn the tuning condenser plates in mesh to approximately 580 K. C., 58 on the dial scale and adjust the signal generator to 580 K. C. Roll the tuning condenser and adjust the low frequency padder screw 17 for maximum reading on the output meter.

HIGH FREQUENCY RE-ADJUSTMENT — Turn the tuning condenser plates out of mesh as far as they will go and adjust the signal generator to 1600 K. C. Then adjust the high frequency padder 16 again for maximum reading on the output meter.

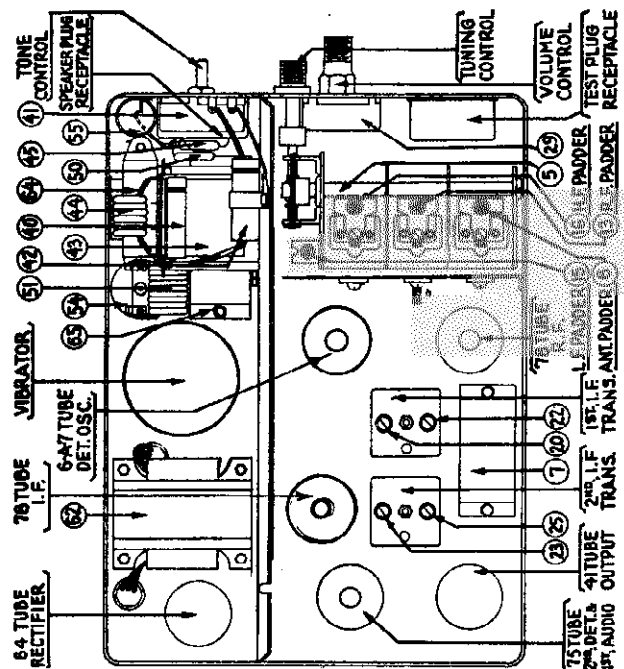


FIGURE 2 — FT9 Top View

ANTENNA — Connect the generator lead to the antenna lead using a 125 mmfd. condenser in series between the two leads. Turn the tuning condenser to 1400 K. C. and set the generator for 1400 K. C. Adjust the padders 15 and 16 for maximum reading on the output meter.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator has been used, the Receiver will be adjusted properly.

NOTE: 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. The signal generator output lead should be connected to a wire placed near the car antenna but not connected to it.

NOVEMBER, 1935

PHILCO RADIO & TELEV. CORP.

MODEL FT-9 Ford
Schematic, Chassis
Parts List

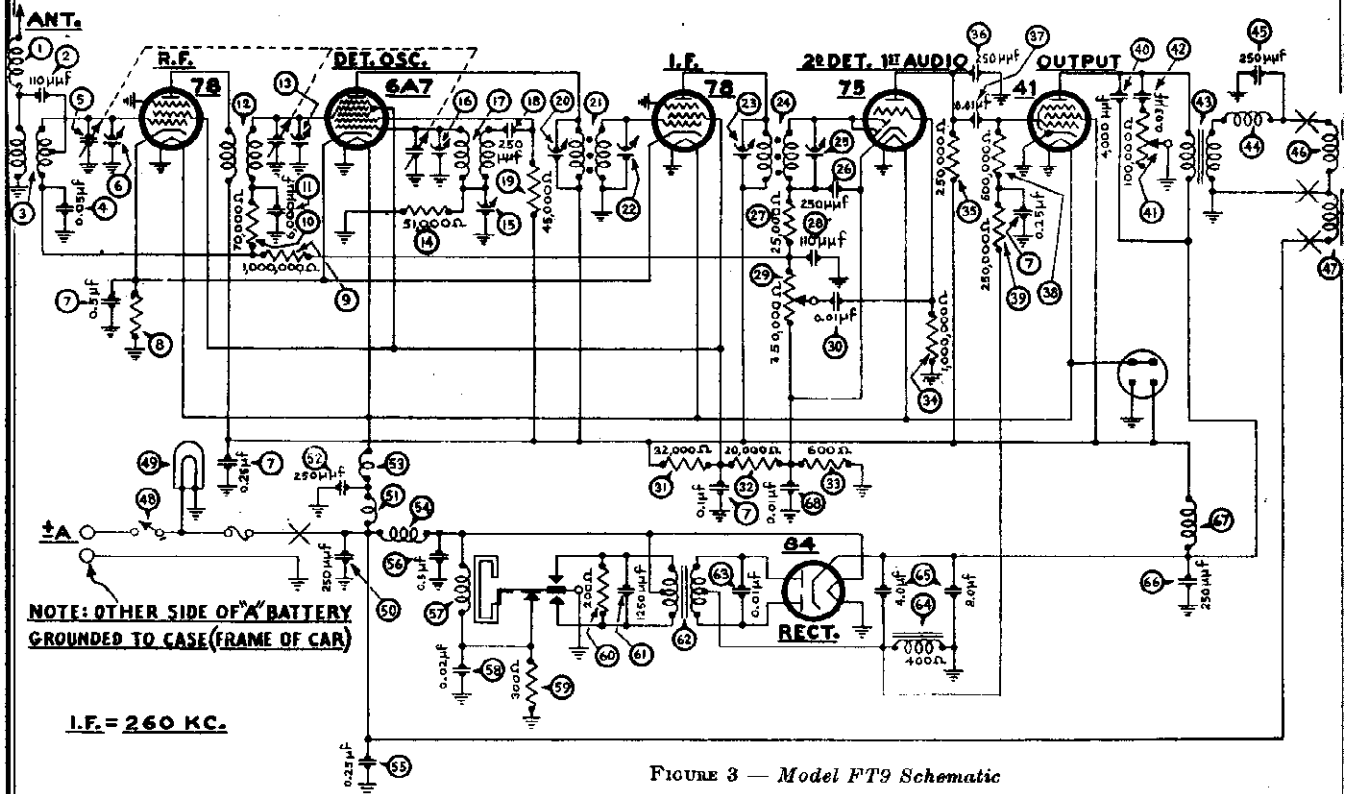


FIGURE 3 — Model FT9 Schematic

MODEL FT-9 — PARTS LIST

No.	Description	Part No.	No.	Description	Part No.
1	Tone Control	33-5101	1	Antenna Choke	33-7219
2	Condenser (.03 mfd.)	30-4380	2	Condenser (110 mmfd.)	30-1031
3	Output Transformer	32-7495	3	Antenna Transformer	32-1939
4	Choke	32-1644	4	Condenser (.05 mfd.)	30-4020
5	Condenser (250 mmfd.)	30-1032	5	Tuning Condenser	31-1674
6	Cone and Voice Coil	36-3526	6	First Padder (on tun. cond.)	Condenser
7	Field Coil Assembly	32-0236	7	.1-.25-.25-.5 mfd.)	30-4374
8	On and Off Switch	42-5422	8	Resistor (400 ohms)	33-1211
9	Pilot Lamp	34-2039	9	Resistor (1,000,000 ohms)	33-1096
10	Condenser (350 mmfd.)	30-1032	10	Resistor (70,000 ohms)	33-1113
11	"A" Choke	32-1644	11	Condenser (6000 mmfd.)	30-4125
12	Condenser (250 mmfd.)	30-1032	12	R. F. Transformer	32-1926
13	Choke	32-1930	13	Second Padder (on tun. cond.)	Resistor (51,000 ohms)
14	Vibrator Choke	32-1968	14	Low Frequency Padder	31-6066
15	Condenser (.25 mfd.)	30-4146	15	Third Padder (on tun. cond.)	Oscillator Transformer
16	Condenser (.5 mfd.)	30-4047	16	Condenser (250 mmfd.)	30-1032
17	Vibrator	38-5030	17	Resistor (45,000 ohms)	5256
18	Condenser (.02 mfd.)	30-4039	18	Padder (Pri 1st I.F. transf.)	First I. F. Transformer
19	Resistor (300 ohms)	33-3130	19	Condenser (250 mmfd.)	30-1032
20	Resistor (200 ohms)	33-1210	20	R. F. Choke	32-1932
21	Condenser (1250 mmfd.)	5886	21	Condenser (.01 mfd.)	30-4124
22	Power Transformer	32-7488	22	Four-hole Socket	27-6044
23	Condenser (.01 mfd.)	30-4381	23	Five-hole socket	27-6035
24	Filter Choke	32-7491	24	Six-hole Socket	27-6036
25	Filter Condenser	30-2134	25	Seven-hole Socket	27-6037
26	Condenser (250 mmfd.)	30-1032	26	Tuning and Volume Shaft	28-8435
27	R. F. Transformer	32-1926	27	Pilot Lamp Assembly	38-7217
28	Condenser (.01 mfd.)	30-4124	28	Glass	27-7757
29	Four-hole Socket	27-6044	29	Face Assembly	28-3444
30	Five-hole socket	27-6035	30	Pointer	28-2605
31	Six-hole Socket	27-6036	31	Knob	27-4240
32	Seven-hole Socket	27-6037	32	"U" Clamp (control mtg.)	20-2609
33	Condenser (.01 mfd.)	30-4146	33	Wing Nut (control mtg.)	W1321
34	Resistor (32,000 ohms)	33-1096	34	Tee Bolt (set mtg.)	28-6161
35	Resistor (20,000 ohms)	6650	35	Nut (set mtg.)	W518A
36	Resistor (600 ohms)	33-1212			
37	Resistor (1,000,000 ohms)	33-1096			
38	Resistor (250,000 ohms)	33-1097			
39	Condenser (250 mmfd.)	30-1032			
40	Condenser (.01 mfd.)	30-4146			
41	Resistor (500,000 ohms)	6097			
42	Resistor (250,000 ohms)	33-1097			
43	Condenser (4000 mmfd.)	30-4185			

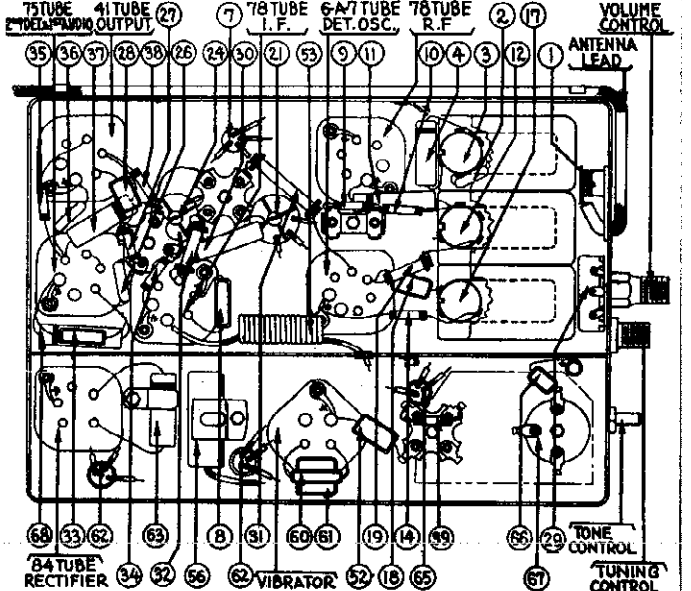
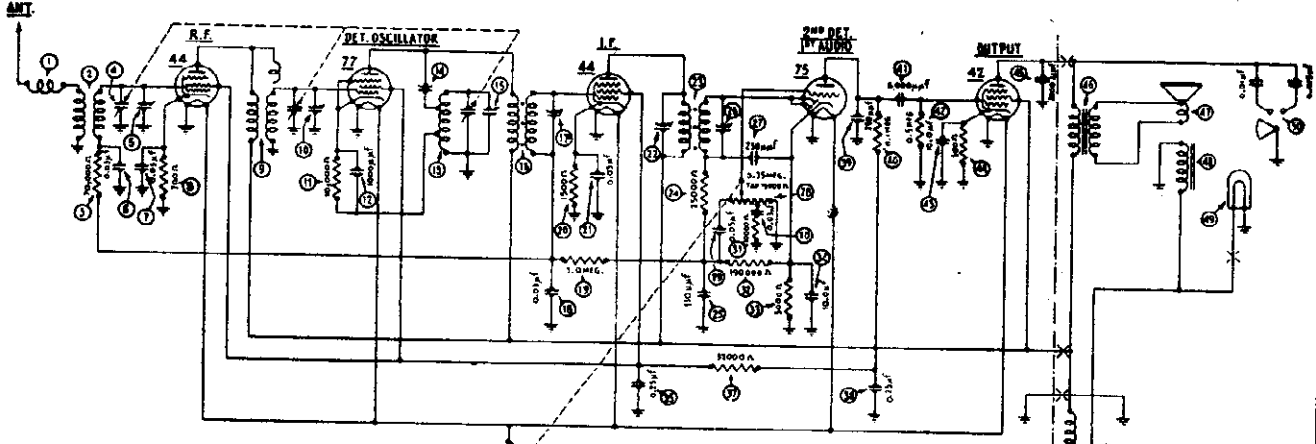


FIGURE 4 — Model FT9 Base View

No.	Description	Part No.	No.	Description	Part No.
1	Fuse	7227	1	Dome Light Condenser	30-4388
2	Fuse Insulator	27-7729	2	Oil Gauge Condenser	30-4307
3	Distributor Condenser	30-4176	3	Speaker Cable	11-3167
4	Generator Condenser	30-4181	4	Tow Strap	36-3432
5	Gas gauge Condenser	30-4387	5	Antenna Lead	L-1921
			6	Receiver Housing	38-1567

MODEL G (Code 122)
Dodge, Chrysler

PHILCO RADIO & TELEV. CORP. Plymouth
Schematic, Chassis, Parts



I.F. 260 KC.

OTHER SIDE OF "A" BATTERY
TERMINAL TO CASE (FRAME OF CAR)

ALL THESE PARTS WITHIN RECEIVER HOUSING
ALL THESE PARTS WITHIN SPEAKER HOUSING

FIGURE 10

Model G - Code 122

- 1 Antenna Choke 32-1372
- 2 Antenna Transformer..... 32-1331
- 3 Resistor (70,000 ohms).... 33-1115
- 4 Tuning Condenser 31-1214
- 5 First Padder (on Tun. Cond.).....
- 6 Condenser (.03 mfd.)..... 30-4025
- 7 Condenser (.05 mfd.)..... 30-4020
- 8 Resistor (700 ohms)..... 6443
- 9 R. F. Transformer..... 32-1332
- 10 Second Padder (on Tun. Cond.).....
- 11 Resistor (10,000 ohms).... 33-1000
- 12 Condenser (1000 mmfd.)... 33-1007
- 13 Oscillator Transformer... 32-1333
- 14 Padder (Pri. 1st I. F. Trans.).....
- 15 Third Padder (on Tun. Cond.).....
- 16 First I. F. Transformer... 32-1329
- 17 Padder (Sec. 2nd I. F. Trans.).....
- 18 Condenser (.03 mfd.)..... 30-4025
- 19 Resistor (1,000,000 ohms)... 33-1006
- 20 Resistor (1500 ohms)..... 33-3047
- 21 Condenser (.05 mfd.)..... 30-4020
- 22 Padder (Pri. 2nd I. F. Trans.).....
- 23 Second I. F. Transformer... 32-1237
- 24 Resistor (25,000 ohms).... 33-1013
- 25 Condenser (.00011 mfd.)... 30-1031
- 26 Padder (Sec. 2nd I. F. Trans.).....
- 27 Condenser (.00025 mfd.)... 30-1032
- 28 Volume Control and Switch Assembly..... 33-5067
- 29 Condenser (.05 mfd.)..... 30-4020
- 30 Condenser (.03 mfd.)..... 30-4025
- 31 Resistor (10,000 ohms).... 33-1000
- 32 Resistor (100,000 ohms)... 33-1116
- 33 Resistor (5000 ohms)..... 6046
- 34 Condenser (10 mfd.)..... 30-2076
- 35 Condenser (.25 mfd.)..... 30-4126
- 36 Resistor (32,000 ohms).... 3525
- 37 Condenser (.25 mfd.)..... 30-4126
- 38 Condenser (.00025 mfd.)... 30-1032
- 39 Resistor (100,000 ohms)... 6099
- 40 Condenser (.006 mfd.)..... 30-4125
- 41 Resistor (500,000 ohms)... 6097
- 42 Condenser (10 mfd.)..... 30-2076
- 43 Resistor (500 ohms)..... 33-3031
- 44 Condenser (.004 mfd.)..... 30-4185
- 45 Output Transformer..... 32-7042
- 46 Gane and Voire Coil..... 30-3157
- 47 Field Coil Assembly..... 28-3097
- 48 Pilot Lamp..... 34-2031
- 49 Tune Control..... 30-4189
- 50 Condenser (.00005 mfd.)... 30-1029
- 51 Condenser (.00005 mfd.)... 30-1029
- 52 "A" Choke..... 32-1432
- 53 Vibrator Choke..... 32-1260
- 54 Condenser (.5 mfd.)..... 30-4047
- 55 Condenser (.5 mfd.)..... 30-4015
- 56 Vibrator..... 34-3036
- 57 Condenser (.05 mfd.)..... 30-4039
- 58 Resistor (200 ohms)..... 7217

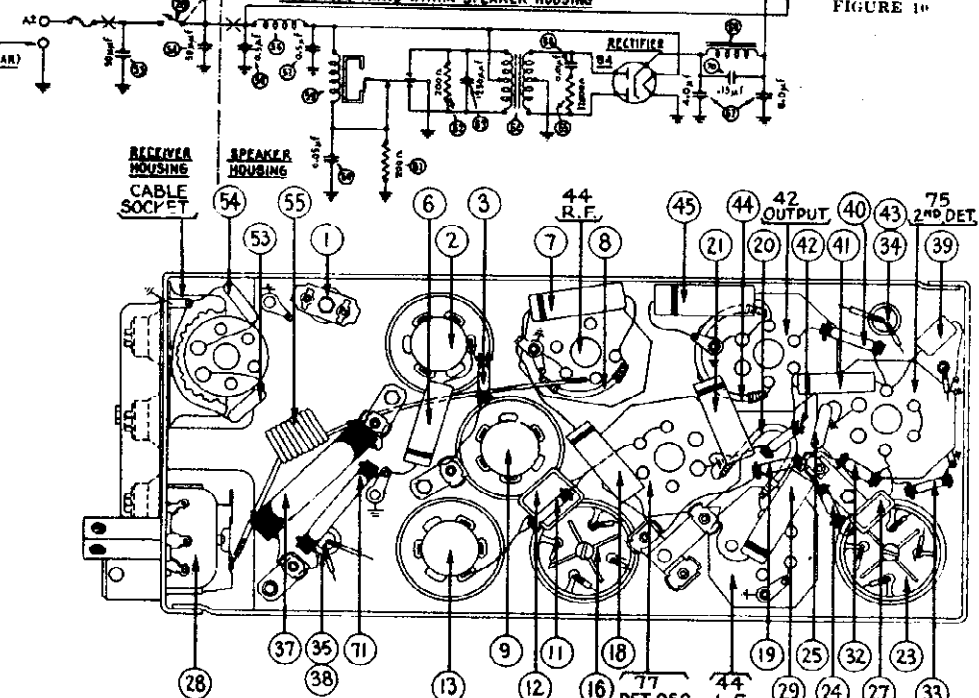


Figure 11

- 59 Resistor (200 ohms)..... 7217
- 60 Condenser (.00125 mfd.)... 5886
- 61 Power Transformer..... 32-7253
- 62 Resistor (3 2,000 ohms)... 3525
- 63 Condenser (.01 mfd.)..... 30-4051
- 64 Filter (condenser (4-8 mfd.)... 30-2030
- 65 Filter Choke..... 32-7254
- 66 R. F. Choke..... 32-1260
- 67 Condenser (.15 mfd.)..... 30-4191
- 68 Resistor (25,000 ohms)... 3656
- 69 Resistor (25,000 ohms)... 33-1015
- 70 Distributor Resistor..... 33-1113E
- 71 1 mfd. Condenser..... 4522S
- 72 1/2 mfd. Condenser..... 30-4007
- 73 Glass for Control..... 27-7325
- 74 Speaker Mounting Plate... 29-1790
- 75 Receiver Mounting Plate... 29-1792
- 76 Receiver Mounting Bracket 29-1848
- 77 Carriage Bolt..... W-1316A
- 78 Fuse..... 7227
- 79 Fuse Insulator..... 27-7131
- 80 PLYMOUTH MODEL G-Code 122
- 81 Items 1 to 11 and next five are identical for
- 82 Plymouth Model G-Code 122. See following
- 83 items for additional accessories:
- 84 Dial Assembly..... 42-5204
- 85 Pointer..... 28-1763
- 86 Control Assembly..... 42-5197
- 87 Knobs—Volume..... 27-4084
- 88 Knobs—Tuning..... 27-4083
- 89 Knob Springs..... 28-1738
- 90 Bezel Assembly..... 42-5115
- 91 Interconnecting Cable... 41-3065
- 92 Ammeter Cable..... 38-5704
- 93 Terminal..... L-1626
- 94 Flexible Shaft—Tuning... 28-8188
- 95 Flexible Shaft—Volume... 28-8198
- 96 Speaker Mounting Plate... 29-1790
- 97 Speaker Mounting Bracket 29-1791
- 98 Receiver Mounting Plate... 29-1792
- 99 Receiver Mounting Bracket 29-1848
- 100 Carriage Bolt..... W-1316A
- 101 Fuse..... 7227
- 102 Fuse Insulator..... 27-7131

Dodge Model G-Code 122
Above items are identical for
Dodge Model G-Code 122. See
following items for additional
accessories:

CHRYSLER MODEL G-Code 122
Items 1 to 11 and next five are
identical for Chrysler Model G,
Code 122. See following items
for additional accessories:

Note 1. Adjust the High Frequency padders (15) at 1600 K. C.
Note 2. A 25,000 ohm resistor, part number 3656, (71) on the parts list and base lead for the R. F. Osc. and I. F. tubes and the other end is grounded.

MODEL G (Code 122)
 PHILCO RADIO & TELEV. CORP. Chrysler Code CU & CV
 Airflow Custom-Built
 Installation Data

Installation Instructions - Chrysler Model - Codes CU and CV

THESE instructions have been carefully prepared for your use in installing the Chrysler Airflow Custom Bu Radio by Philco in the 1934 Chrysler Airflow Model — Code CU-CV cars. Read thoroughly, then follow t instructions carefully in every detail.

Speaker Installation

Refer to Figure 1. This gives detailed dimensions for the location and drilling of the holes in the instrument board reinforcing brace on which the speaker will be mounted. Dimensions shown are along the surface of the brace. The speaker mounting brackets must be bolted to the sides of the speaker. To do this, place the speaker on the bench face down with the tone control knob on the right-hand side, attaching the brackets as follows: The smallest angle bracket must be bolted to the side towards you, the longest angle bracket to the left side with the part having the elongated hole directed

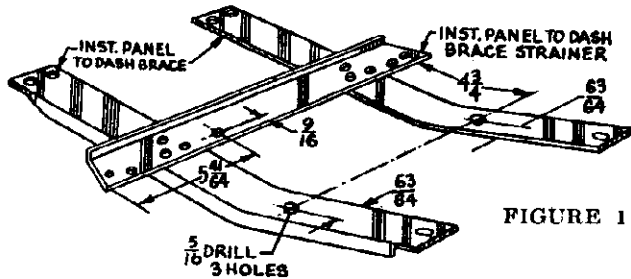


FIGURE 1

away from the speaker. The other bracket must be bolted to the right-hand side of the speaker with the part having the elongated hole turned under the speaker. Refer to Figure 2. The speaker should now be mounted in the car, placing it between the right-hand instrument board brace and the emergency brake control, locating the elongated holes in the speaker mounting brackets over the holes previously drilled in the braces. Bolt it securely in place with the three cadmium plated 1/4—20 bolts and nuts supplied for this purpose. Be sure to use lockwashers under the nuts. The left, lower corner of the right cowl ventilator fly screen will interfere with the speaker. This may be remedied by bending this corner out of the way with a pair of pliers.

Instrument

Panel Control

Remove the right hand ash receiver assembly. Remove the knobs from the control assembly by pulling them off the control head shafts. Then loosen the set screws in front that secure the flexible control shafts in place and the set screws in the rear of the housing that secure the control shaft housings in place. Remove the shaft assemblies from the control head. Install the control head in the instrument panel and fasten securely, using the U-shaped clamp supplied for this purpose, together with the nut and lockwasher. See Figure 3.

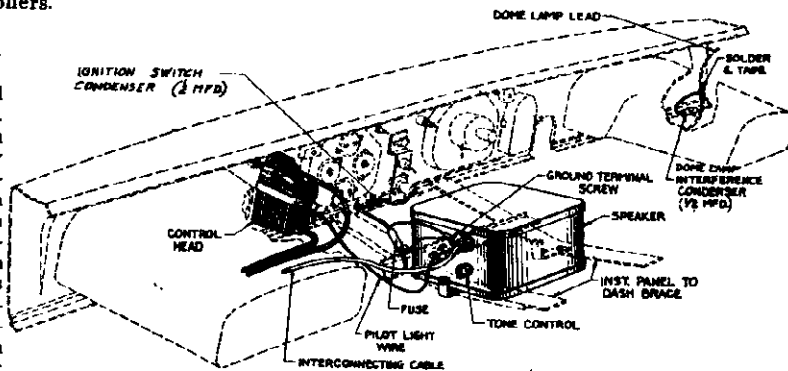


FIGURE 2

Receiver and Cable Installation

Before placing the Receiver in the under-carriage mounting box, the flexible cable housing set screws in the collars must be placed in position so they will be accessible from the top.

Wrap the cardboard liner around the Receiver, bending it on the scored lines. Then place the Receiver in the undercarriage box with the shaft coupling collars and plug receptacle in line with their respective holes in the end of the box. The rectangular cardboard liner must be placed between the Receiver and the blank end of the box.

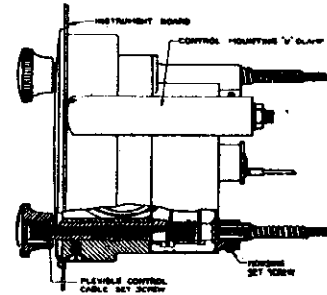


FIGURE 3

Connecting Remote Control Cables to the Receiver

1. Place the grommet caps and rubber grommets on the control shaft housings in the same manner in which they are assembled on the speaker cable. Insert the shafts in their respective couplings on the Receiver and tighten the housing retaining set screws. Secure the grommet caps to the mounting box with the 8-32 screws provided for this purpose. Be sure to use a fibre washer and a lockwasher under the head of each screw.

2. Install the six-hole plug in its receptacle in the Receiver, grounding the eye terminal on the end of the shield pigtail box with 8-32 screws, using a fibre washer and a lockwasher under the head of each screw. (The fibre washers are for the purpose of water-proofing). Then secure the grommet cap to the cable cover plate.

3. Place the rubber gasket around the edge of the box and then put the cover on, forcing it well down on the box, being certain that the ends of the gasket butt together to insure a water-tight assembly.

4. Remove the right cowl quarter-kick-pad. Then run the cables along

the body side rail under the floor board and up through the opening in the floor board riser provided for the speedometer cable. See Fig. 4. In bodies where the hole in the toeboard riser is not large enough or obstructed and will not permit the passage of the plug on the speaker end of the cable it will be necessary to remove the floorboard and make a 1/2" slot in the toeboard riser into the speedometer cable channel to allow the cables to be assembled in place. Do not attempt to remove the plug from the end of the cable. Fasten them in the clips provided in the frame channel adjacent to the speedometer cable. Plug the four hole plug into its receptacle in the speaker. Place the volume control cable (with the red mark)

MODEL G (Code 122)

Chrysler Code CU & CV PHILCO RADIO & TELEV. CORP. Parts List
 Airflow Custom-Built

Installation Data, Part 2
 Parts List

INSTALLATION INSTRUCTIONS - CHRYSLER MODEL -

in the top of the control head and the tuning control cable (unpainted) in the bottom. Securely tighten the cable housing retaining set screws in the rear of the control head and then tighten the shaft retaining set screws in the control head shafts. Then replace the cowl quarter kick-pad.

5. Figure 5 shows the method of mounting the radio receiver under the right-hand front seat stool mounting bolt with the 1-3/4" x 5/16" bolt provided in the radio package. The front bracket is secured to the floorboard using the bolt removed from where the rear bracket is mounted.

Before tightening the receiver in place, be sure that the cover is flush with the floorboard. If the wood shim that is between the floorboard and the frame mounting bracket interferes, the interfering part may be removed by the use of a wood chisel.

6. See Figure 6. Secure the control and speaker cables by means of the clip provided for this purpose.

7. The antenna lead wire from the roof will be found in the under body side rail and should be connected to the antenna lead branch of the speaker cable, as shown in Figure 5. Make a twisted splice, using plenty of tape to insure a water tight joint, grounding the eye terminal on the end of the antenna lead pigtail to the body side rail.

Battery Connections

Connect the battery lead to the fuse terminal of the ammeter. Place the fuse and fuse insulator in the metal fuse housing of the battery cable and connect it to the small bayonet fuse connector which branches out of the speaker cable close to the speaker. The three shield terminals must be connected under the grounding screw provided for this purpose near the speaker receptacle.

Adjustment

Turn on the Receiver and tune in a station whose frequency in kilocycles is known. (The numbers on the dial represent channel numbers which with the addition of a cipher become the frequency numbers). Loosen the set screw on the front of the tuning control shaft without detuning the Receiver. Turn the shaft until the indicator points to the correct number on the dial. Tighten the set screw securely and then replace the knobs on the shafts.

Motor Interference Suppression

Cut the elbow terminals from the spark plug cables and screw on the moulded bakelite elbow suppressors. Connect the suppressors to the spark plugs. Cut off the end of the distributor center lead cable and screw the straight molded

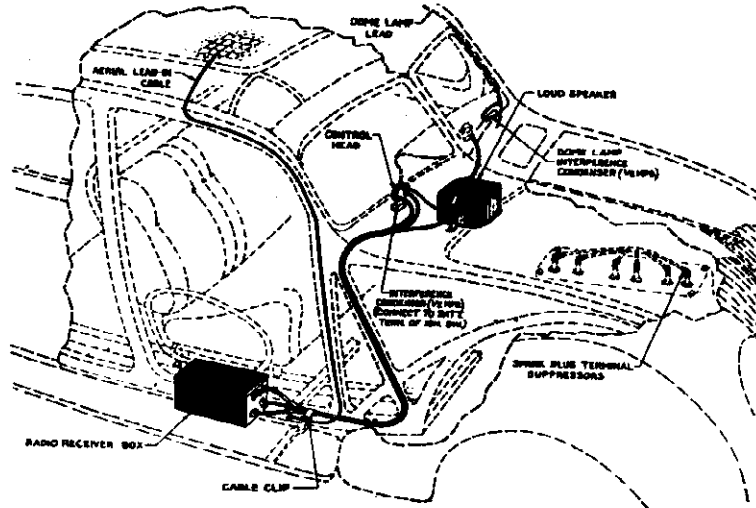


FIGURE 4

resistor into the lead. Then plug this into the distributor cap. Install a one microfarad by-pass condenser on the generator. Mount it on the generator frame under the screw that holds the generator relay in place. Connect the condenser lead under the screw that connects the generator battery lead to the relay. (See Figures 7 and 8).

There may be some interference caused by an excessive gap between the distributor rotor and the high tension contacts. This can be overcome by lengthening the contact end of the rotor.

The following procedure should be carefully followed: Remove the distributor cap and chalk the inside faces of the stationary contacts. Remove the rotor and place the contact end on a small anvil or steel block. Peen or hammer the end carefully with a small machinist's hammer. Replace the rotor and the cap, then turn the motor over a few times, using the starter only. After a few revolutions, examine the distributor cap to see if the rotor has scraped or touched any of the stationary contacts in the cap. If so, dress lightly with a fine file. Repeat the above operation until the rotor just clears the contacts.

Occasionally you may find a distributor cap which is out of round or with a short electrode. This condition does not affect the operation of the car, but sometimes makes satisfactory elimination impossible. If such a condition is found, take the defective cap to the nearest United Motors Service Station and exchange it for a new one.

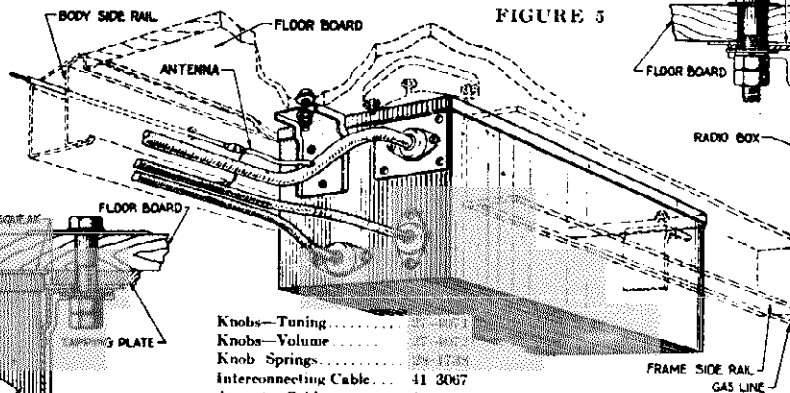


FIGURE 5

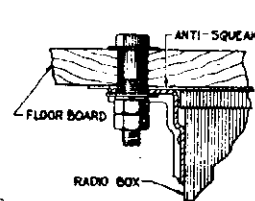


FIGURE 6

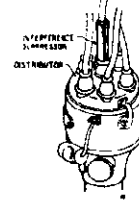


FIGURE 7

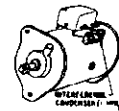


FIGURE 8

Knobs—Tuning	.....	41-3007
Knobs—Volume	.....	38-5206
Knob Springs	.....	28-8218
Interconnecting Cable	.....	28-8219
Ammeter Cable	.....	7227
Flexible Shaft—Tuning	.....	27-7131
Flexible Shaft—Volume	.....	29-1847
Fuse	.....	29-1846
Fuse Insulator	.....	29-1851
Speaker Mounting Bracket	.....	29-1808
Speaker Mounting Bracket	.....
Speaker Mounting Bracket	.....
"U" Clamp	.....
Spark Plug Resistor	.....	33-1015
Distributor Resistor	.....	33-1113E
1/2 mfd. Condenser	.....	30-4007
Front Cover	.....	28-1767
Dial and Drum Assembly	.....	42-5202
Control Assembly	.....	42-5193
Cable Spring	.....	28-8203

Items 1 to 71 of the Parts List shown with the schematic diagram of Model G (Code 122) are identical for Model G (Code 122) Chrysler Code CU and CV. See items at left for additional accessories.

MODEL G (Code 122)
 PHILCO RADIO & TELEV. CORP. DeSoto Code SE
 Airflow Custom-Built
Installation Instructions - DeSoto Model - Code SE

THESE INSTRUCTIONS have been carefully prepared for your use in installing the De Soto Airflow Custom-Built Radio by 1 in the 1934 De Soto Airflow Model — Code SE cars. Read thoroughly then follow the instructions carefully in every detail. Carefully unpack the carton and check the contents with the material packing list. Examine the parts and compare with illustrations given in these instructions so that you may become familiar with them and thus make the installation easy and quickly.

Speaker Installation

Refer to Figure 1. This gives detailed dimensions for the location and drilling of the holes in the instrument board reinforcing brace on which the speaker will be mounted. Dimensions shown are along the surface of the brace. The speaker mounting brackets must be bolted to the sides of the speaker. To do this, place the speaker on the bench face down with the tone control knob on the right-hand side, attaching the brackets as follows: The smallest angle bracket must be bolted to the side towards you, the longest angle bracket to the left side with the part having the elongated hole directed

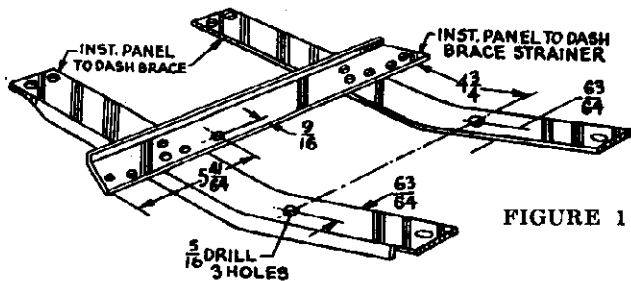


FIGURE 1

away from the speaker. The other bracket must be bolted to the right-hand side of the speaker with the part having the elongated hole turned under the speaker. Refer to Figure 2. The speaker should now be mounted in the car, placing it between the right-hand instrument board brace and the emergency brake control, locating the elongated holes in the speaker mounting brackets over the holes previously drilled in the braces. Bolt it securely in place with the three cadmium plated 1/4-20 bolts and nuts supplied for this purpose. Be sure to use lockwashers under the nuts. The left, lower corner of the right cowl ventilator fly screen will interfere with the speaker. This may be remedied by bending this corner out of the way with a pair of pliers.

Instrument Panel Control

Remove the De Soto medallion plate from the center of the instrument panel. To do this, it is necessary to remove the two retaining nuts from the back of the instrument panel.

Remove the knobs from the control assembly by pulling them off the control head shafts. Then loosen the set screws in front that secure the flexible control shafts in place and the set screws in the rear of the housing that secure the control shaft housings in place. Remove the shaft assemblies from the control head. Install the control head in the instrument panel and fasten securely, using the U-shaped clamp supplied for this purpose, together with the nuts and lockwashers. See Figure 3.

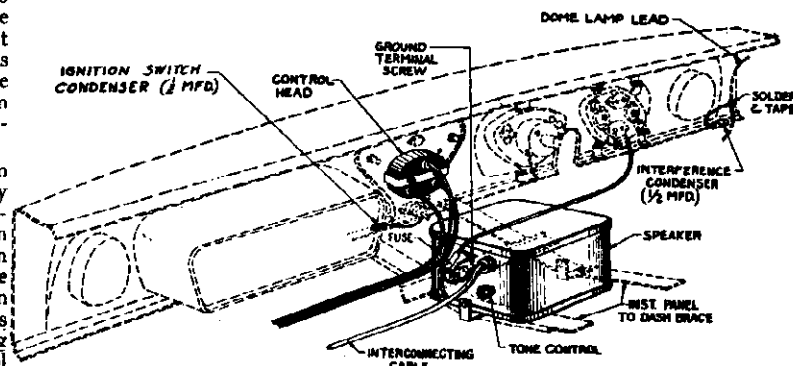


FIGURE 2

Receiver and Cable Installation

Before placing the Receiver in the under-carriage mounting box, the flexible cable housing set screws in the collars must be placed in position so they will be accessible from the top.

Wrap the cardboard liner around the Receiver, bending it over the scored lines. Then place the Receiver in the undercarriage box with the shaft coupling collars and plug receptacle in line with their respective holes in the end of the box. The rectangular cardboard liner must be placed between the Receiver and the blank end of the box.

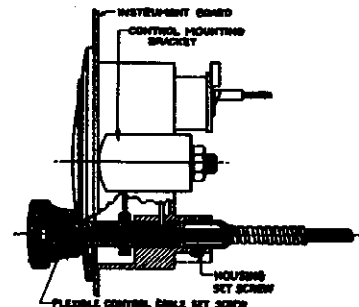


FIGURE 3

Connecting Remote Control Cables to the Receiver

1. Place the grommet caps and rubber grommets on the control shaft housings in the same manner in which they are assembled on the speaker cable. Insert the shafts in their respective couplings on the Receiver and tighten the housing retaining set screws. Secure the grommet caps to the mounting box with the 8-32 screws provided for this purpose. Be sure to use a fibre washer and a lockwasher under the head of each screw.

2. Install the six-hole plug in its receptacle in the Receiver, grounding the eye terminal on the end of the shield pigtail under one of the Receiver cover screws. Secure the cable cover plate to the box with 8-32 screws, using a fibre washer and a lockwasher under the head of each screw. (The fibre washers are for the purpose of water-proofing). Then secure the grommet cap to the cable cover plate.

3. Place the rubber gasket around the edge of the box and then put the cover on, forcing it well down on the box, being certain that the ends of the gasket butt together to insure a water-tight assembly.

4. Remove the right cowl quarter kick-pad. Then run the cables along the body side rail under the floor board and up through the opening in the floor board riser provided for the speedometer cable. See Fig. 4. In bodies where the hole in the toeboard riser is not large enough or obstructed and will not permit the passage of the plug on the speaker end of the cable it will be necessary to remove the floorboard and make a 1/2" slot in the toeboard riser into the speedometer cable channel to allow the cables to be assembled in place. Do not attempt to remove the plug from the end of the cable. Fasten them in the clips provided

MODEL G (Code 122)

DeSoto Code SE

Airflow Custom-Built

PHILCO RADIO & TELEV. CORP.

Installation Data, Part 2

In the frame channel adjacent to the speedometer cable. Plug the four-hole plug into its receptacle in the speaker. Place the volume control cable (with the red mark) in the left-hand side of the control head and the tuning control cable (unpainted in the right-hand side. Securely tighten the cable housing, retaining set screws in the rear of the control head and then tighten the shaft retaining set screws in the control head shafts. Then replace the cowl quarter kick pad.

5. Figure 5 shows the method of mounting the radio receiver under the right-hand front seat stool mounting bolt with the 1-3/4" x 5/16" bolt provided in the radio package. The front bracket is secured to the floorboard using the bolt removed from where the rear bracket is mounted.

Before tightening the receiver in place, be sure that the cover is flush with the floorboard. If the wood shim that is between the floorboard and the frame mounting bracket interferes, the interfering part may be removed by the use of

6. See Figure 6. Secure the control and speaker cables by means of the clip provided for this purpose.

7. The antenna lead wire from the roof will be found in the under body side rail and should be connected to the antenna lead branch of the speaker cable, as shown in Figure 5. Make a twisted splice, using plenty of tape to insure a water tight joint, grounding the eye terminal on the end of the antenna lead pigtail to the body side rail.

Battery Connections

Connect the battery lead to the fuse terminal of the ammeter. Place the fuse and the fuse insulator in the metal fuse housing of the battery cable and connect it to the small bayonet fuse connector which branches out of the speaker cable close to the speaker. The three shield terminals must be connected under the grounding screw provided for this purpose near the speaker receptacle.

Adjustment

Turn on the Receiver and tune in a station whose frequency in kilocycles is known. (The numbers on the dial represent channel numbers which with the addition of a cipher become the frequency numbers). Loosen the set screw on the front of the tuning control shaft without detuning the Receiver. Turn the shaft until the indicator points to the correct number on the dial. Tighten the set screw securely and then replace the knobs on the shafts.

Motor Interference Suppression

Cut the elbow terminals from the spark plug cables and screw on the moulded bakelite elbow suppressors. Connect

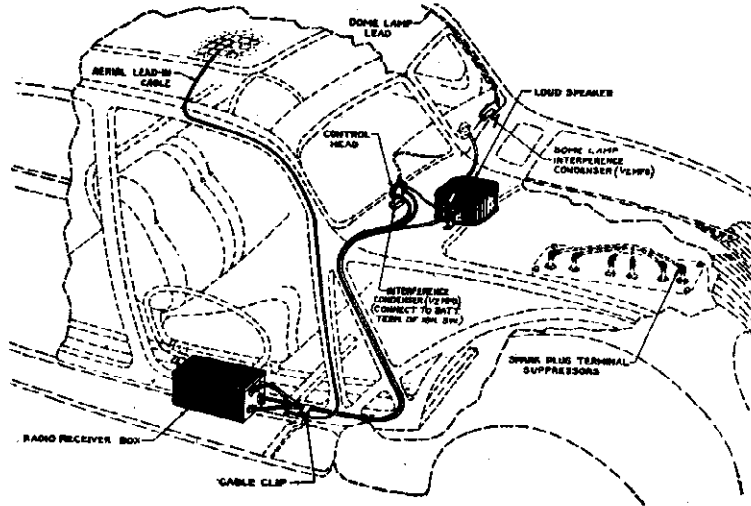


FIGURE 4

the suppressors to the spark plugs. Cut off the end of the distributor center lead cable and screw the straight molded resistor into the lead. Then plug this into the distributor cap. Install a one microfarad by-pass condenser on the generator. Mount it on the generator frame under the screw that holds the generator relay in place. Connect the condenser lead under the screw that connects the generator battery lead to the relay. (See Figures 7 and 8).

There may be some interference caused by an excessive gap between the distributor rotor and the high tension contacts. This can be overcome by lengthening the contact end of the rotor.

The following procedure should be carefully followed: Remove the distributor cap and chalk the inside faces of the stationary contacts. Remove the rotor and place the contact end on a small anvil or steel block. Peen or hammer the end carefully with a small machinist's hammer. Replace the rotor and the cap, then turn the motor over a few times, using the starter only. After a few revolutions, examine the distributor cap to see if the rotor has scraped or touched any of the stationary contacts in the cap. If so, dress lightly with a fine file. Repeat the above operation until the rotor just clears the contacts.

Occasionally you may find a distributor cap which is out of round or with a short electrode. This condition does not affect the operation of the car, but sometimes makes satisfactory elimination impossible. If such a condition is found, take the defective cap to the nearest United Motors Service Station and exchange it for a new one.

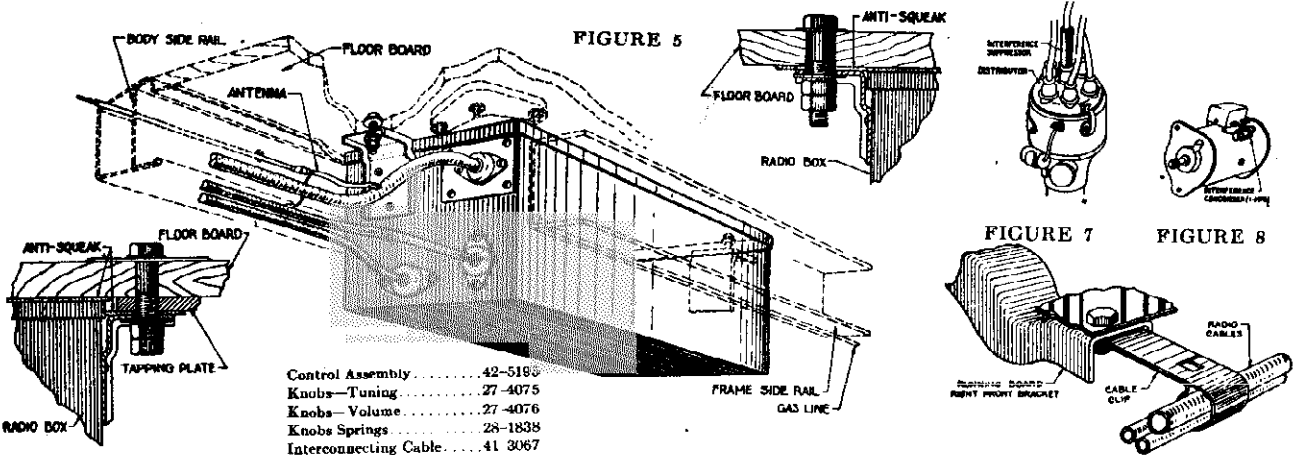


FIGURE 5

FIGURE 7

FIGURE 8

FIGURE 6

Items 1 to 71 of the Parts List shown with the schematic diagram of Model G (Code 122) are identical for Model G (Code 122) DeSoto Code SE. See items at left for additional accessories.

Control Assembly	42-5185
Knobs—Tuning	27-4075
Knobs—Volume	27-4076
Knobs Springs	28-1838
Interconnecting Cable	41-3067
Ammeter Cable	34-3298
Flexible Shaft—Tuning	28-8201
Flexible Shaft—Volume	28-8202
Fuse	7227
Fuse Insulator	27-7131
Speaker Mounting Bracket	29-1447
Speaker Mounting Bracket	29-1418
Speaker Mounting Bracket	29-18-1
"U" Clamp	29-1795
Spark Plug Resistor	33-1015
Distributor Resistor	33-1113E
1/2 mfd. Condenser	30-4007
Glass for Control	27-7325
Bezel Assembly	42-5115
Dial Assembly	42-5200
Pointer	28-2094

PHILCO RADIO & TELEV. CORP. MODEL CT-2 Chrysler

INSTALLATION INSTRUCTIONS
Plymouth Model Code PJ De Soto Model Code BF
Dodge Model Code DU Chrysler Model Code C-4
Chrysler Model Code CZ

THESE INSTRUCTIONS have been prepared for your use in installing the DeLuxe Custom-Built Rad. Read thru thoroughly, then follow the instructions carefully in every detail when making the installation. Carefully unpack the cartons and check the contents with the materials packing lists. Examine the parts and compare them with illustrations given in these instructions so that you may become familiar with them and thus make the installation easily and quickly.

This new DeLuxe Custom Built radio mounts on the dash above the steering column.

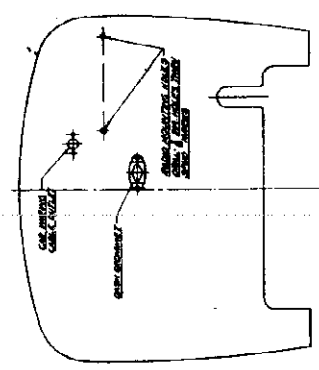


FIGURE 1

Receiver Installation

- 1 Remove the car lighting fuse from the back of the ammeter.
- 2 Drill two 1/8" holes in the dash. Refer to Figure 1 for the location of the center punch marks on the dash. After drilling, remove the paint from the dash for a distance of 1/4" around the holes to insure good ground contact.
- 3 The two 1/8" "T" bolts supplied in the radio package must be placed in these holes in the dash from the inside of the car. Put the washers and nuts on the ends of the bolts, but do not tighten.
- 4 Pull forward on the knob of the ash receiver to remove it. It is also necessary to take out the ash receiver wind deflector. This can be done after removing the three retaining nuts.
- 5 The shielded antenna lead supplied in the radio package must be connected to the car antenna lead-in that comes down the front left-hand corner post. The bare ends of the two leads must be twisted together and taped. Make the splice as close as possible to the corner post.

The shield pig-tail of the antenna lead must be grounded to the cowl. To do this, drill a 1/8" hole in the cowl in front of the hood line. Use an #22 bolt and connect the pig-tail to the nut. (See Figure 4).

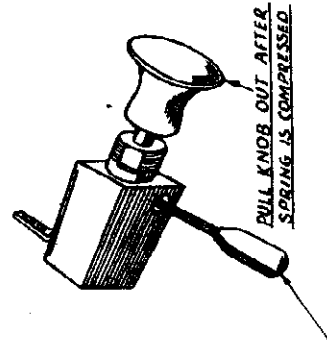


FIGURE 2

For Plymouth Model, Code PJ Only

- 1 Remove the short auxiliary brace from between the lower part of the instrument panel and the mechanism that supports the cowl ventilator regulator mechanism.
- 2 Remove the head lamp switch. Pull the control knob out all the way. There is a small hole in the top of the switch, close to the instrument panel. Insert a small screwdriver into this hole and pry the knob out. Then, using the screwdriver, pull on the knob and thereby free the shaft. Remove the switch retaining nut on the front of the instrument panel. The switch can now be moved out of the way. DO NOT disconnect the wires attached to the switch.

- 6 Before installing the Receiver, place the gear shift lever in "LO" position. Slide the Receiver into place above the steering column, hook the "T" bolts in the lug on the side of the Receiver housing and then tighten the "J" bolt nuts on the engine side.
- 7 Connect the antenna lead in its receptacle on the end of the Receiver housing (See Figure 9).

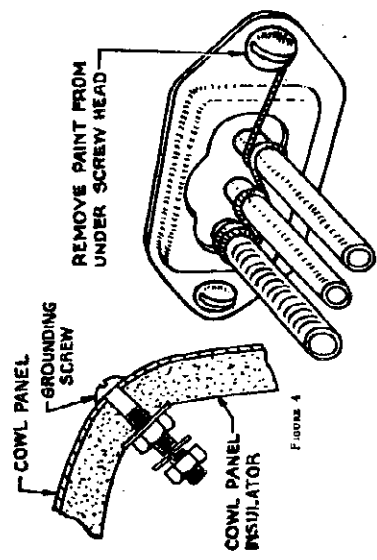


FIGURE 4

For Plymouth Model, Code PJ Only
 Replace the auxiliary brace and the headlight switch referred to in the special Plymouth instructions under "Receiver Installation."

Motor Interference Suppression

- 1 Cut the elbow terminals from the spark plug cables and screw on the shielded bakelite elbow suppressor terminals.
- 2 Screw the straight molded resistor on the end of the distributor center lead cable.
- 3 Plug this into the distributor cap.
- 4 Install a one mid. by-pass condenser on the generator. Mount it on the generator terminal screw and hold the cap on the generator plate. Connect the condenser lead to the screw that connects the battery lead to the relay.
- 5 Connect a 1/2 mid. condenser to the dome light lead as close as possible to the point where it enters the right front corner post. This connection must be soldered and taped.
- 6 Drill a 1/8" hole in the cowl in front of the hood line close to the corner post. Fasten the dome light condenser to the under side of the cowl using the #22 bolt and nut furnished for this purpose.
- 7 Ground the steering column to the dash. There is a hole in the steering column near the dash opening seal for a No. 8 - 1/4" self-tapping screw. Scrape the paint off around this hole, and then insert the screw with the two hole terminal, steering column dash seal in place. The other end must be fastened to the steering column with a No. 8 - 1/4" self-tapping screw.
- 8 If there is no hole in the steering column near the dash opening seal for a No. 8 - 1/4" self-tapping screw, scrape the paint from the column near the dash opening seal, solder on a piece of the No. 14 bare stranded wire supplied and ground this wire under one of the screws that hold the steering column dash seal in place.
- 9 Ground the speedometer cable, oil line and temperature indicator tube where they enter the dash under one of the ground cap screws with the No. 14 stranded wire provided. (See Figure 6).
- 10 Replace the car lighting fuse - test the lights and horn.

11 An additional 1/2 mid. condenser may at times be used to advantage. Mount this condenser on the bottom ledge of the instrument board and connect it to one of the terminals of the ammeter or ignition switch directly behind the instrument panel.

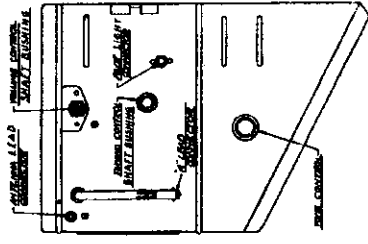


FIGURE 5

Control Installation

- 1 Install the control unit on the instrument panel, fitting it in the opening left by the removal of the ash receiver.
- 2 Fasten the control in place by means of the "U" clamp and nuts.
- 3 The volume control flexible shaft is on the left and must be coupled in the upper shaft bushing on the end of the Receiver housing (See Figure 9). The knurled shaft nut must be tightened securely.
- 4 Before connecting the tuning condenser flexible shaft, use a small screw driver and turn the variable condenser coupling in the Receiver in a counter-clockwise direction as far as it will go.
- 5 Turn the right-hand (tuning control) knob so that the pointer indicates "40" on the dial.
- 6 The tuning control flexible shaft must be coupled in the proper shaft bushing on the end of the Receiver housing (see Figure 9). The knurled shaft nut must be tightened securely.
- 7 Connect the terminal on the pilot light wire to its receptacle on the end of the Receiver housing (see Figure 9).

Power Connections

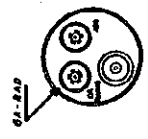
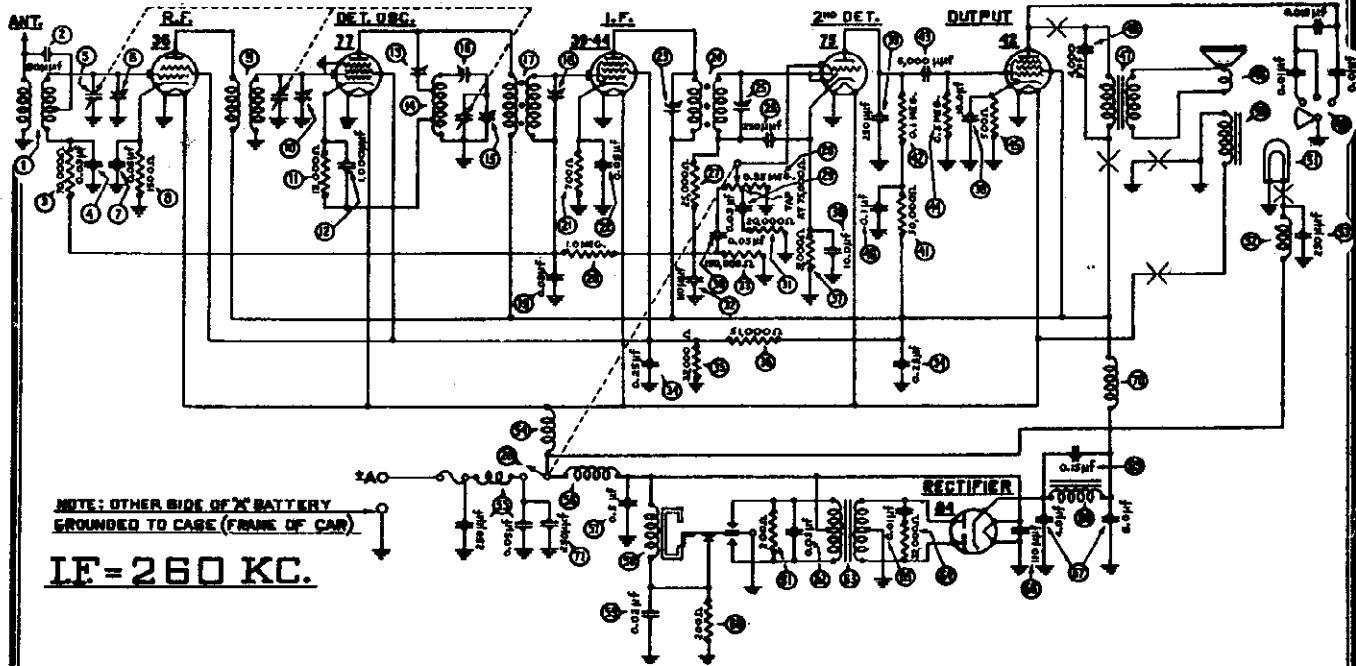


FIGURE 5

- 1 Connect the terminal end of the "A" lead to the switch terminal GA-RAD. Refer to Figure 6, showing the back of the ignition switch.
- 2 Place the fuse and fuse insulator in the small metal fuse housing on the end of the "A" lead and connect it to the short Receiver "A" lead (see Figure 9).

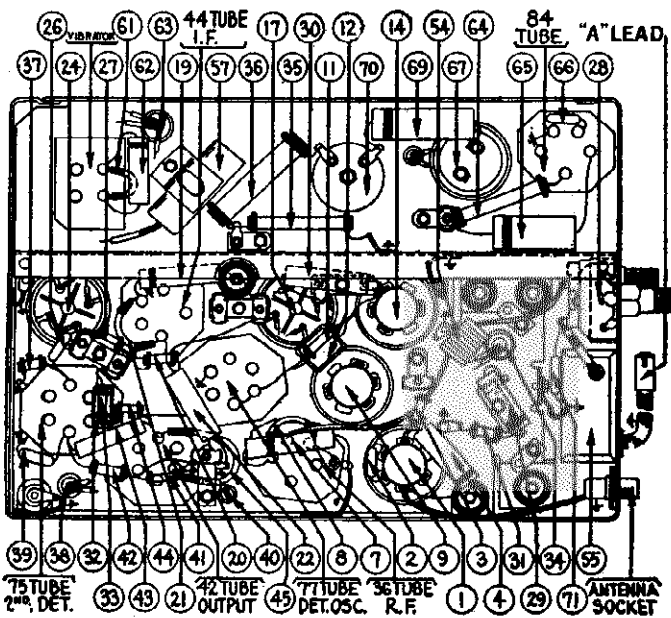
Note: See auto index vol. II for various indexing of several cars for this page 2-13

MODEL CT-2 Chrysler
 MODEL CT-5 DeSoto SG, PHILCO RADIO & TELEV. CORP.
 Plymouth Code PJ SF
 Dodge Code DU
 Chrysler Code CZ,C-G
 Schematic, Chassis, Parts



Parts List - CT-2 Chrysler De Luxe Custom Built Radio

- | | |
|--|--|
| 1 Antenna Transformer..... 32-1535 | 44 Condenser (6000 mmfd.)..... 30-4125 |
| 2 Condenser (50 mmfd.)..... 30-1029 | 45 Resistor (.5 meg.)..... 6097 |
| 3 Resistor (70,000 ohms)..... 33-1115 | 46 Resistor (500 ohms)..... 33-3031 |
| 4 Condenser (.03 mfd.)..... 30-4025 | 47 Condenser (4000 mmfd.)..... 30-4185 |
| 5 Tuning Condenser..... 31-1425 | 48 Output Transformer..... 2598 |
| 6 1st Padder (on tun. cond.)..... | 49 Cone & Voice Coil..... 36-3159 |
| 7 Condenser (.05 mfd.)..... 30-4020 | 50 Tone Control..... 30-4138 |
| 8 Resistor (1500 ohms)..... 33-3047 | 51 Field Coil Assembly..... 02795 |
| 9 R. F. Transformer..... 32-1536 | 52 Pilot Lamp..... 34-2036 |
| 10 2nd Padder (on tun. cond.)..... | 53 Choke..... 32-1374 |
| 11 Resistor (11,000 ohms)..... 33-1194 | 54 Condenser (250 mmfd.)..... 30-1032 |
| 12 Condenser (1000 mmfd.)..... 30-1007 | 55 "A" Choke..... 32-1374 |
| 13 Padder (Pri. 1st I. F. Tran.)..... | 56 Interference Filter..... 32-1534 |
| 14 Oscillator Transformer..... 32-1537 | 57 Vibrator Choke..... 32-1563 |
| 15 3rd Padder (on tun. cond.)..... | 58 Condenser (.5 mfd.)..... 30-4015 |
| 16 4th Padder (on tun. cond.)..... | 59 Vibrator..... 38-5036 |
| 17 First I. F. Transformer..... 32-1538 | 60 Condenser (.02 mfd.)..... 30-4039 |
| 18 Padder (Sec. 1st I. F. Tran.)..... | 61 Resistor (200 ohms)..... 7217 |
| 19 Condenser (.03 mfd.)..... 30-4025 | 62 Resistor (200 ohms)..... 7217 |
| 20 Resistor (1 meg.)..... 33-1096 | 63 Condenser (.03 mfd.)..... 30-4025 |
| 21 Resistor (700 ohms)..... 6443 | 64 Power Transformer..... 32-7315 |
| 22 Condenser (.05 mfd.)..... 30-4020 | 65 Resistor (32,000 ohms)..... 3525 |
| 23 Padder (Pri. 2nd I. F. Tran.)..... | 66 Condenser (.01 mfd.)..... 30-4051 |
| 24 Second I. F. Transformer..... 32-1449 | 67 Condenser (110 mmfd.)..... 30-1031 |
| 25 Padder (Sec. 2nd I. F. Tran.)..... | 68 Filter Cond. (4-8 mfd.)..... 30-2107 |
| 26 Condenser (250 mmfd.)..... 30-1032 | 69 "B" Choke..... 32-7254 |
| 27 Resistor (25,000 ohms)..... 33-1181 | 70 Condenser (.15 mfd.)..... 30-4191 |
| 28 Vol. Con. & Switch Asm. 33-5088 | 71 R. F. Choke..... 32-1530 |
| 29 Condenser (.03 mfd.)..... 30-4025 | 72 Condenser (250 mmfd.)..... 30-1032 |
| 30 Condenser (.05 mfd.)..... 30-4020 | *Ground Clip..... 28-2488 |
| 31 Resistor (20,000 ohms)..... 33-1130 | Spark Plug Resistor..... 33-1015 |
| 32 Condenser (110 mmfd.)..... 30-1031 | Distributor Resistor..... 33-1113 |
| 33 Resistor (190,000 ohms)..... 33-1116 | Interference Cond. (1 mfd.)..... 4522 |
| 34 Condenser (.25-.25 mfd.)..... 30-4231 | Interference Cond. (1/2 mfd.)..... 30-4007 |
| 35 Resistor (32,000 ohms)..... 3525 | *"T" Bolt (Set Mtg.)..... 28-6161 |
| 36 Resistor (51,000 ohms)..... 5888 | *Nut (Set Mtg.)..... W518 |
| 37 Resistor (5,000 ohms)..... 6096 | Fuse..... 7227 |
| 38 Condenser (10-10 mfd.)..... 30-2076 | Fuse Insulator..... 27-7729 |
| 39 Condenser (250 mmfd.)..... 30-1032 | *Antenna Lead..... 38-6355 |
| 40 Condenser (.1 mfd.)..... 30-4170 | *"A" Lead..... 38-6351 |
| 41 Resistor (50,000 ohms)..... 6098 | *"U" Clamp (Control Mtg.)..... 29-1705 |
| 42 Resistor (.1 meg.)..... 6099 | *Nut (Control Mtg.)..... W317A |



- | | |
|--|--|
| Glass..... 27-7325 | *Knob (Plymouth DeLuxe)..... 27-4156 |
| *Face Assembly (Chrysler)..... 28-2500 | *Knob (Dodge)..... 27-4155 |
| *Face Assembly (Plymouth)..... 28-2498 | *Knob (DeSoto)..... 27-4153 |
| *Face Assembly (Dodge)..... 28-2496 | *Flex. Shaft (Tun.) (Dodge)..... 28-8319 |
| *Face Assembly (DeSoto)..... 28-2497 | *Flex. Shaft (Vol.) (Dodge)..... 28-8320 |
| *Pointer (Chrysler)..... 28-2503 | *Flex. Shaft (Tun.) (Plym., DeSoto, Chrysler)..... 28-8317 |
| *Pointer (Plymouth)..... 28-2505 | *Flex. Shaft (Vol.) (Plym., DeSoto, Chrysler)..... 28-8318 |
| *Pointer (Dodge)..... 28-2506 | |
| *Pointer (DeSoto)..... 28-2504 | |
| *Knob (Chrysler)..... 27-4163 | |
| *Knob (Plymouth Economy)..... 27-4156 | |

PHILCO RADIO & TELEV. CORP.

MODEL CT-5 DeLuxo
Chrysler Airflow,
Installation Data

Installation Instructions - Chrysler Airflow Models - Codes C-1, C-2 and C-

THESE INSTRUCTIONS have been prepared for your use in installing the DeLuxo Custom-Built Radio. Read through thoroughly, then follow the instructions carefully in every detail when making the installation.

Carefully unpack the cartons and check the contents with the material packing lists so that you may become familiar with all the parts and thereby make the installation easily and quickly.

This new DeLuxo Custom-Built Radio is mounted on a special bracket under the cowl on the left-hand side. The speaker is mounted on the "H" shaped instrument board to dash brace.

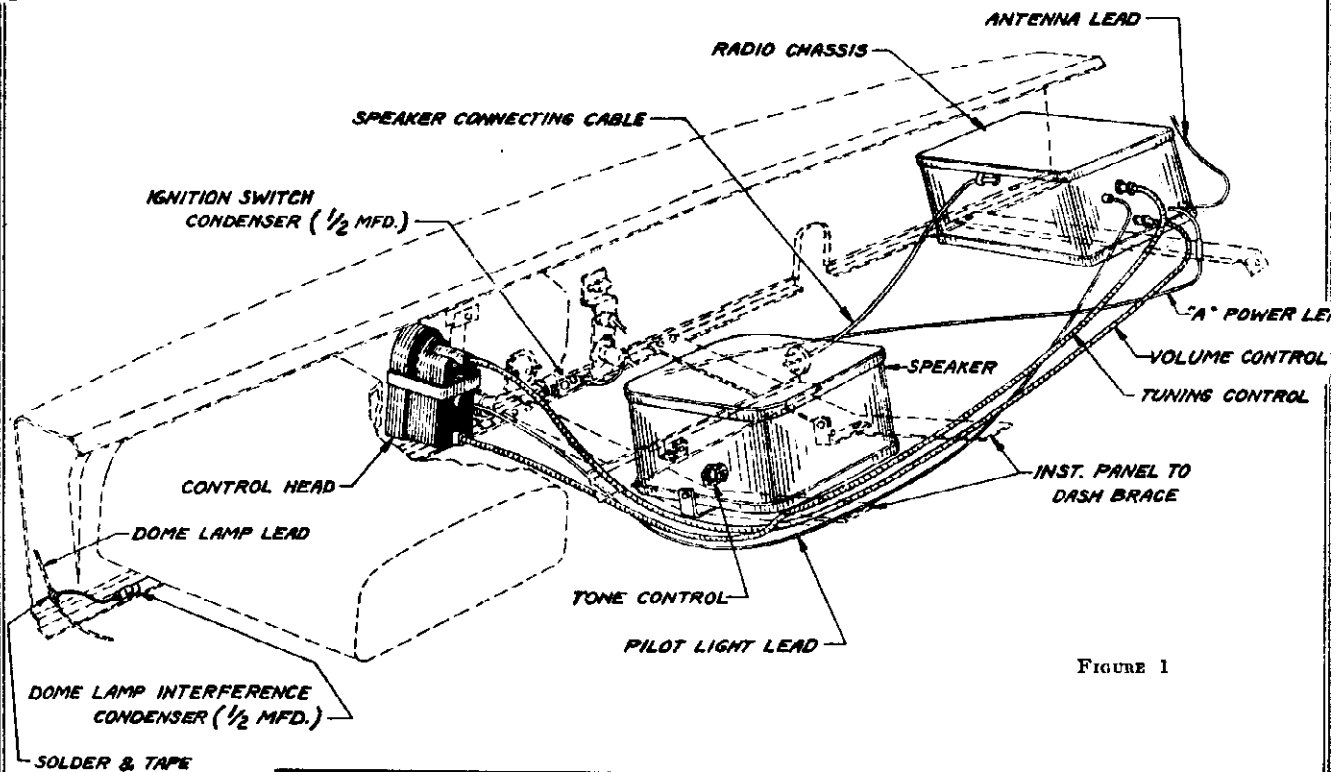


FIGURE 1

**FOR CHRYSLER AIRFLOW MODELS
CODE C-2 and C-3 ONLY**

Antenna Lead

The shielded antenna lead must be connected to the car antenna lead-in that comes down the front left-hand corner post. The bare ends of the two leads must be twisted together and taped. Make the splice as close as possible to the corner post. The shield pig-tail of the antenna lead must be grounded.

Receiver Installation
(See Figure 1)

1. Remove the car lighting fuse from the back of the ammeter.
2. Bolt the Receiver fast to the special set-mounting bracket so that when installed in the car,

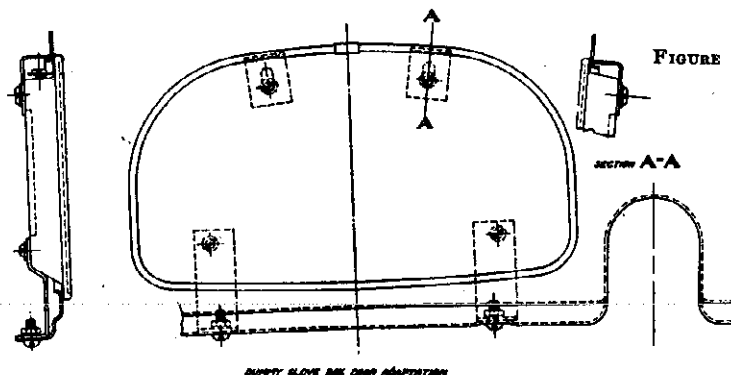


FIGURE 2

Remove the left hand glove compartment, door, hinge and fastener. Replace the glove compartment door and fasten with the four special adaptor brackets. See Figure 2.

the control coupling end of the Receiver faces the dash of the car. The bracket, together with the nuts and lockwashers are provided in the accessory kits.

3. Drill a 1/4" hole in the flange of the instrument board 6 1/8" to the left of the steering column opening in the instrument board.

4. Rest the flat part of the Receiver mounting bracket on the flange of the instrument board over the hole just drilled and place the 3/8" 10-32 bolt through the hole in the flange of the instrument panel and the Receiver mounting bracket. Put on the nut but do not tighten at this time.

**MODEL CT-5 DeLuxe
Chrysler Airflow,
Installation Data**

PHILCO RADIO & TELEV. CORP.

The tone control knob is on the right hand side of the speaker housing (see Figure 1). It should be adjusted to the tone most pleasing. There are four (4) positions: brilliant, bright, mellow and deep. Speech is clearest when in brilliant or brilliant, while usually orchestras will sound best on bright or mellow.

Another use of the tone control is as a static modifier. When driving through extremely noisy locations, the tone can be raised through extremely mellow or deep. This will subdue the harsh, rasping static.

Except on very weak signals, the automatic volume control maintains the same volume level while driving along without continually manipulating the manual volume control, cuts out external interferences, conserves fueling and prevents blanking of local stations while tuning. It is virtually impossible, however, to maintain satisfactory reception while driving under conditions in places which are totally shielded, known as "dead spots."

IMPORTANT: When turning off the Receiver, be sure the volume control is turned counter-clockwise until a click is heard and the dial light goes out, otherwise the Receiver will continue to operate and discharge the battery.

REMOVE SCREW FROM UNDER PRINT HEAD

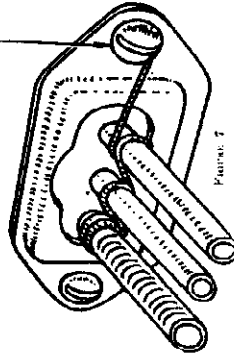


FIGURE 7

Items 1 to 72 of the Parts List for PT-5 Packard DeLuxe Custom Built Model 120 are identical for the CT-5 DeLuxe Custom Built Radio for Chrysler Airflow, Codes C-1, C-2 and C-3.

See the items listed below, for additional accessories.

3-ohm	27-1101
5-ohm	27-1102
10-ohm	27-1103
20-ohm	27-1104
50-ohm	27-1105
100-ohm	27-1106
200-ohm	27-1107
500-ohm	27-1108
1000-ohm	27-1109
2000-ohm	27-1110
5000-ohm	27-1111
10000-ohm	27-1112
20000-ohm	27-1113
50000-ohm	27-1114
100000-ohm	27-1115
200000-ohm	27-1116
500000-ohm	27-1117
1000000-ohm	27-1118
2000000-ohm	27-1119
5000000-ohm	27-1120
10000000-ohm	27-1121
20000000-ohm	27-1122
50000000-ohm	27-1123
100000000-ohm	27-1124
200000000-ohm	27-1125
500000000-ohm	27-1126
1000000000-ohm	27-1127
2000000000-ohm	27-1128
5000000000-ohm	27-1129
10000000000-ohm	27-1130
20000000000-ohm	27-1131
50000000000-ohm	27-1132
100000000000-ohm	27-1133
200000000000-ohm	27-1134
500000000000-ohm	27-1135
1000000000000-ohm	27-1136
2000000000000-ohm	27-1137
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200000000000000-ohm	27-1143
500000000000000-ohm	27-1144
1000000000000000-ohm	27-1145
2000000000000000-ohm	27-1146
5000000000000000-ohm	27-1147
10000000000000000-ohm	27-1148
20000000000000000-ohm	27-1149
50000000000000000-ohm	27-1150
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2000000000000000000000-ohm	27-1164
5000000000000000000000-ohm	27-1165
10000000000000000000000-ohm	27-1166
20000000000000000000000-ohm	27-1167
50000000000000000000000-ohm	27-1168
100000000000000000000000-ohm	27-1169
200000000000000000000000-ohm	27-1170
500000000000000000000000-ohm	27-1171
1000000000000000000000000-ohm	27-1172

8. Ground the oil line and temperature indicator tube where they enter the dash under one of the ground cap screws with the No. 14 stranded wire (see Figure 7).

9. Replace the car lighting fuse — least the lights and horn. An additional 1/2 amp. condenser may be used to advantage at times. Mount this condenser on the bottom ledge of the instrument board and connect it to one of the terminals of the ammeter or ignition switch behind the instrument board.

CODE C-2 and C-3 ONLY

11. In case there is any motor interference in Code C-2 or C-3 cars, caused by an excessive gap between the distributor rotor and the high tension contacts in the distributor head, this can be overcome by extending the metal end of the plug to the distributor cap.

Follow this procedure carefully: Remove the distributor cap and check the inside face of the stationary contacts. Remove the rotor and place the contact end on a small brass or steel block. Then or hammer the end carefully with a small mechanics' hammer. Replace the rotor and the cap and then turn the motor over with the ignition turned off.

After a few revolutions, examine the distributor cap to see if the rotor has scraped or touched any of the stationary contacts in the cap. If so, treat lightly with a fine file.

Ignition Switch

When the ignition switch key is in its center position all circuits are disconnected and locked.

When the switch key is turned to the left, the gas gauge registers and the battery supply is connected to the radio. When the key is turned to the right, the gas gauge registers and the battery supply is connected to the ignition circuit and to the radio.

Operating Instructions

To operate the Receiver, the ignition key must first be turned either to the right or to the left, as described above. The volume knob on the radio control is a combination switch and volume control. Turn the volume control knob clockwise. The first range is the normal range. Turn the knob to the right, it is the manual volume control.

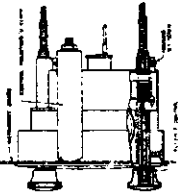


FIGURE 6

With the volume control turned on half way, allow the tubes to heat up. Then turn the lower knob (the station selector) to tune in the various programs. The numbers on the dial represent channel numbers which, with the addition of "PT" to the number, correspond to the frequency in kilocycles. Adjust the volume to a suitable level and select the desired program. Since the Receiver is extremely selective, it is of the utmost importance that the Receiver be tuned right on the station. Careless tuning off to one side, even though the signal is still heard, results in very poor tone quality and very meagre reception.

Installation Instructions — Chrysler Airflow Models — Codes C-1, C-2 and C-3

CODE C-2 and C-3 ONLY

In Code C-2 and C-3 cars, connect the terminal end of the "A" lead to the four terminal of the ammeter.

Place the fuse and fuse-injector in the small metal fuse housing on the end of the "A" lead and connect it to the short Receiver "A" lead.

FIGURE 5

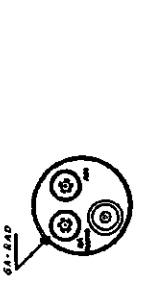


FIGURE 5

Motor Interference Suppression

1. Cut the elbow terminals from the spark plug cables and secure them to the engine block.

2. Screw the straight molded resistor on the distributor end of the distributor center lead cable.

3. Plug this into the distributor cap.

4. Install a one amp. by-pass condenser on the generator. Mount it on the generator frame under the screw that holds the generator relay in place. Connect the condenser lead under the screw that connects the battery lead to the relay.

5. Connect a 1/2 mfd. condenser to the dome light lead as close as possible to the point where it enters the right front corner post. This connection must be soldered and taped. Drill a hole in the corner post and insert the condenser from where it joins the wire on the right side. Solder the lead from around the hole and fasten the condenser to the flange with an 8-32 bolt and nut.

6. Ground the steering column to the dash. There is a hole in the steering column near the dash opening seal for a No. 8-32 self-tapping screw. Scrape the paint off around this hole. Using the bare stranded wire with the two eye terminals, one terminal of the wire is inserted into the hole and fastened to the steering column dash seal plate. The other terminal is fastened to the steering column with a No. 8-32 self-tapping screw.

7. If there is no hole in the steering column near the dash opening seal for a No. 8-32 self-tapping screw, scrape the paint from the column near the dash opening seal, solder a piece of the No. 14 bare stranded wire and ground this under one of the screws that holds the steering column dash and in place.

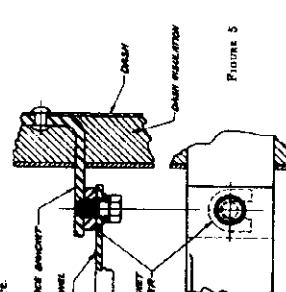


FIGURE 5

8. Raise the Receiver as high as the switch lock-down cable permits and mark the location for the bolt hole on the dash.

9. Drill a 1/2" hole through the dash.

10. Mount the Receiver on the dash, then the mounting bracket screws to the dash. The nut must be on the right side of the instrument board.

Speaker Installation

1. Refer to Figure 3 which shows the location of the holes in the reinforcing lever on which the speaker is to be mounted.

2. The speaker mounting brackets must be bolted to the side of the speaker before it is installed in the car.

3. Place the speaker on the work bench, face down with the tone control knob to the right. The small angle bracket with the cage nut must be bolted to the side nearest you. The speaker with the part having the elongated hole directed towards the speaker. The third bracket must be bolted to the right-hand side of the speaker with the cage nut turned under the speaker.

4. Loosen the bolt on the right hand bracket at the dash to which it is attached the instrument board reinforcing brace. Slip the "U" shim (formed in the accessory kit) between the brace and the bracket and then tighten the bolt. (See Figure 6).

5. Place the speaker on the instrument board, face down with the three 1/2" No. 20 bolts, nuts and lock-washers.

6. The Receiver connecting cable must be plugged into its receptacle in the speaker.

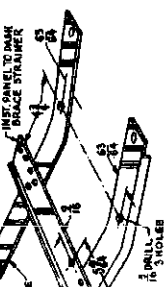


FIGURE 6

Control Installation

1. Install the control unit on the instrument board, fitting it in the opening left by the removal of the ash receptacle.

2. Fasten the control head in place by means of the "U" clamp and nuts (see Figure 6).

3. The volume control flexible shaft is at the top and must be coupled in the lower shaft bushing on the end of the Receiver housing (see Figure 4). The knurled shaft nut must be tightened securely.

4. Before connecting the tuning condenser flexible shaft, use a small screw driver and turn the variable condenser coupling with the Receiver in a counter-clockwise direction as far as it can go.

5. Turn the bottom (tuning control) knob so that the indicator points to "85" on the dial.

6. The tuning control flexible shaft must be coupled in the proper shaft bushing on the end of the Receiver housing (see Figure 4). The knurled shaft nut must be tightened securely.

7. Connect the terminal on the pilot light wire to its receptacle on the end of the Receiver housing (see Figure 4).

8. Connect the antenna lead to its receptacle on the end of the Receiver housing (see Figure 4).

Power Connections

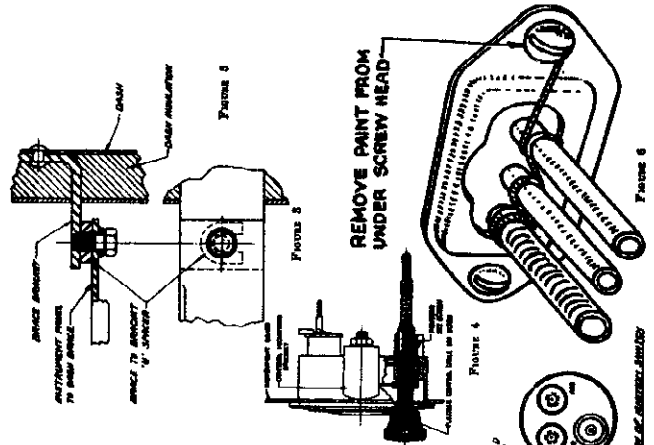
For installations in Code C-1 cars, connect the terminal end of the "A" lead to the terminal marked "A-AD." Refer to Figure 4 showing the back of the ignition switch.

SGPHILCO RADIO & TELEV. CORP. DeSoto Airflow Code SG
MODEL CT-5 DeLuxe
Installation Data

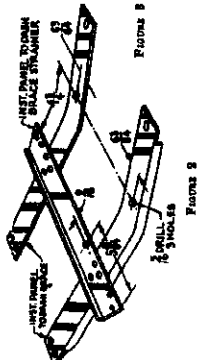
- Connect a 1/4 mfd. condenser to the dome light lead as close as possible to the point where it enters the right front corner post. This connection must be soldered and taped. Drill a hole in the corner post for the condenser lead. Run the condenser lead from around the hole and fasten the condenser to the dash with a 9-32 bolt and nut.
- Ground the steering column to the dash. There is a hole in the steering column near the dash opening seal for a No. 8-32 self-tapping screw. Scrape the paint off around this hole. Cut the bare stranded wire with the two-eye terminals. Place one terminal under one of the screws that holds the steering column to the dash. The other terminal is connected to the steering column with a No. 8-32 self-tapping screw.
- If there is no hole in the steering column near the dash opening seal for a No. 8-32 self-tapping screw, scrape the paint from the column near the dash opening seal, under a piece of the No. 14 bare stranded wire and ground the wire under one of the screws that holds the steering column to the dash and in place.
- Ground the oil line and temperature indicator tube where they enter the car near the front cowl with the ground cap screws with the No. 14 stranded wire (see Figure 9).
- Replace the rear lighting fuse - test the lights and horn.
- An additional 1/4 mfd. condenser may be used to advantage at times. Mount this condenser on the bottom ledge of the instrument housing. Connect one terminal to the terminal of the ammeter or ignition switch behind the instrument board.

Ignition Switch

When the ignition switch key is in its center position all circuits are disconnected and locked. When the switch key is turned to the left, the gas gauge registers and the battery supply is connected to the motor. When the key is turned to the right, the gas gauge registers and the battery supply is connected to the ignition circuit and the motor.



- Loosen the bolt on the right-hand bracket at the dash to which is attached the instrument board reinforcing brace. Slip the "U" pin (provided in the accessory kit) between the bracket and the brace and then tighten the bolt. (See Figure 8).
- Place the speaker on the instrument board brace face down with the tone control to the right and securely fasten with the three 1/4" No. 20 bolts, nuts and lockwashers.
- The Receiver connecting cable must be plugged into its receptacle in the speaker.



Control Installation

- Install the control unit on the instrument board, fitting it in the opening left by the removal of the dash receptacle.
- Fasten the control head in place by means of the "U" pin and nut. (See Figure 4).
- The volume control flexible shaft is on the left and must be fastened to the control knob. The shaft nut must be tightened securely.
- Before connecting the tuning condenser flexible shaft, use a small screw driver and turn the variable condenser coupling in the Receiver in a counter-clockwise direction as far as it will go.
- Turn the right-hand (tuning control) knob so that the pointer indicates "50" on the dial.
- The tuning control flexible shaft must be coupled in the proper shaft bushing on the end of the Receiver housing (see Figure 1). The knurled shaft nut must be tightened securely.
- Connect the terminal on the pilot light wire to its receptacle on the end of the Receiver housing (see Figure 1).
- Connect the antenna lead to its receptacle on the end of the Receiver housing (see Figure 1).

Power Connections

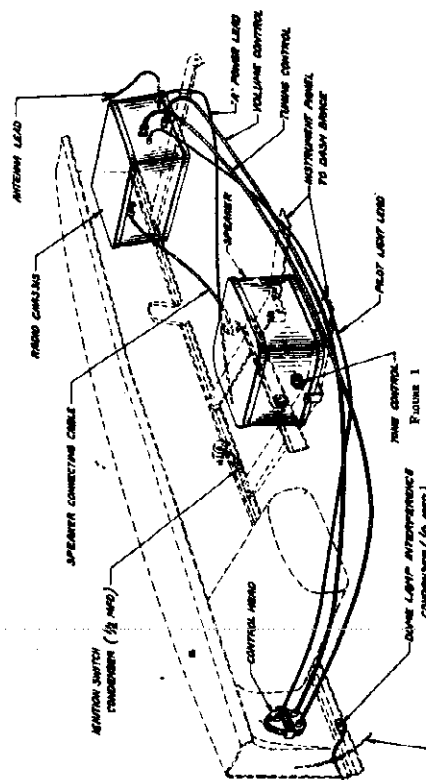
- Connect the terminal end of the "A" lead to the switch terminal GA-RAD. Refer to Figure 5 showing the back of the ignition switch.
- Place the fuse and fuse insulator in the small metal fuse housing on the end of the "A" lead and connect it to the "short Receiver" "A" lead.

Motor Interference Suppression

- Cut the above terminals from the spark plug cables and screw on the molded bakelite elbow suppressor terminals. Snap the resistors on the plug terminals.
- Screw the straight molded resistor on the distributor end of the distributor center lead cable.
- Plug this into the distributor cap.
- Install a one mfd. by-pass condenser on the generator. Mount it on the generator frame under the screw that holds the generator relay in place. Connect the condenser lead under the screw that connects the battery lead to the relay. GA-220

Installation Instructions - DeSoto Airflow Model - Code SG

These instructions have been prepared for your use in installing the DeLuxe Custom-Built Radio. Read through thoroughly, then follow the instructions carefully in every detail when making the installation. Carefully unpack the cartons and check the contents with the material parking lists so that you may become familiar with all the parts and thereby make the installation easily and quickly. This new DeLuxe Custom-Built Radio is mounted on a special bracket under the cowl on the left-hand side. The speaker is mounted on the "H" shaped instrument board to dash brace.



- Remove the car lighting fuse from the back of the ammeter.
- Boil the Receiver tank to the special set-mounting bracket so that when installed in the car, the control coupling end of the Receiver faces the dash of the car. The bracket together with the nuts and lockwashers are provided in the accessory kit.
- Drill a 1/4" hole in the fange of the instrument board 66" to the left of the starting column opening in the instrument board.
- Rest the flat part of the Receiver mounting bracket on the fange of the instrument board over the hole just drilled and place the 3/8" 10-32 bolt through the hole in the fange of the instrument board and the Receiver mounting bracket. Put the nut on the bolt and tighten the nut. Do not tighten the nut too tight. The nut should be tight enough to hold the bracket in place. The nut should be tight enough to hold the bracket in place. The nut should be tight enough to hold the bracket in place.

Speaker Installation

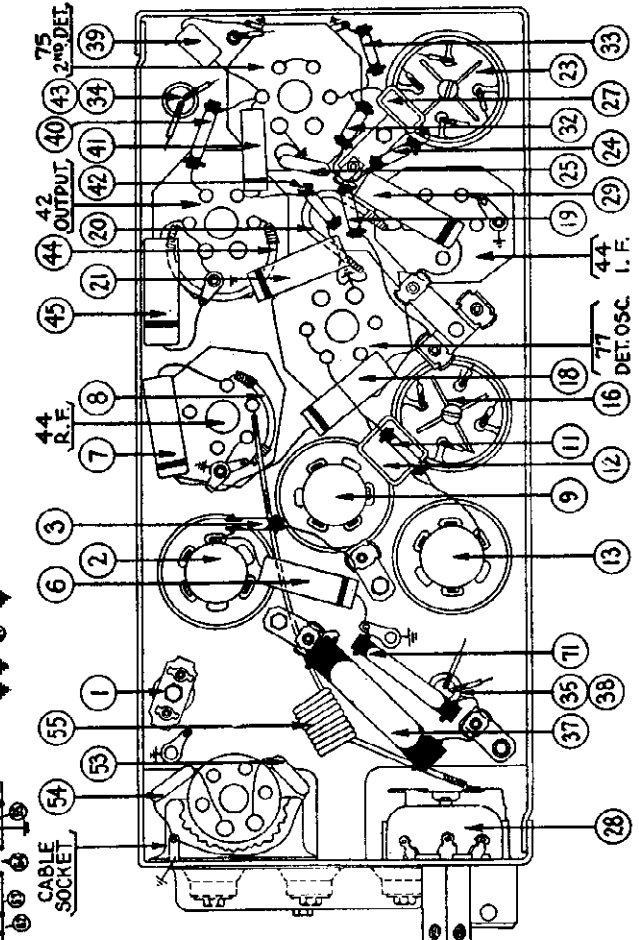
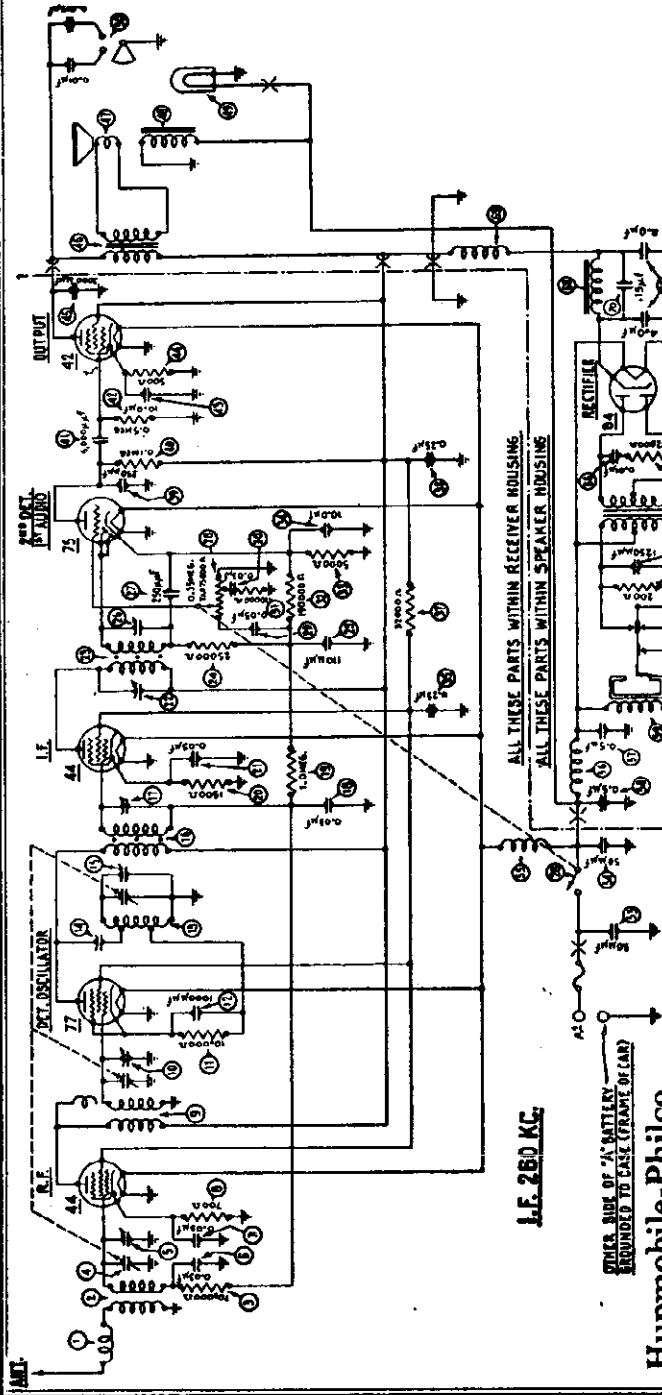
- Refer to Figure 2 which shows the location of the holes in the reinforcing brace on which the speaker is to be mounted.
- The speaker mounting brackets must be bolted to the sides of the speaker before it is installed in the car.
- Place the speaker on the work bench, face down with the tone control knob to the right. The small angle bracket with the cage nut must be bolted to the side nearest you. The angle bracket with the cage nut must be bolted to the side nearest you. The angle bracket with the cage nut must be bolted to the side nearest you. The angle bracket with the cage nut must be bolted to the side nearest you.

Items 1 to 71 of the Parts List for CT-5 Chrysler DeLuxe Custom Built Set

*U. S. Custom Control Mfg. Co. (Chrysler)	27-4187
*U. S. Custom Control Mfg. Co. (Chrysler)	27-4188
*U. S. Custom Control Mfg. Co. (Chrysler)	27-4189
*U. S. Custom Control Mfg. Co. (Chrysler)	27-4190
*U. S. Custom Control Mfg. Co. (Chrysler)	27-4191
*U. S. Custom Control Mfg. Co. (Chrysler)	27-4192
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*U. S. Custom Control Mfg. Co. (Chrysler)	27-4220
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*U. S. Custom Control Mfg. Co. (Chrysler)	27-4223
*U. S. Custom Control Mfg. Co. (Chrysler)	27-4224
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*U. S. Custom Control Mfg. Co. (Chrysler)	27-4258
*U. S. Custom Control Mfg. Co. (Chrysler)	27-4259
*U. S. Custom Control Mfg. Co. (Chrysler)	27-4260

MODEL G (Code 122) Hup
 For J, F & W Cars PHILCO RADIO & TELEV. CORP.
 Schematic, Chassis, Parts

- ③ Vibrator..... 38-5026
- ④ Condenser (.02 mfd.)..... 30-4039
- ⑤ Resistor (200 ohms)..... 7217
- ⑥ Resistor (200 ohms)..... 5886
- ⑦ Power Transformer..... 32-7253
- ⑧ Resistor (32,000 ohms)..... 3525
- ⑨ Condenser (.01 mfd.)..... 30-4051
- ⑩ Filter Condenser (4-8 mfd.)..... 30-2030
- ⑪ Filter Choke..... 32-7254
- ⑫ R. F. Choke..... 32-1260
- ⑬ Condenser (.15 mfd.)..... 30-4191
- ⑭ Resistor (25,000 ohms)..... 3636
- ⑮ Glass for Control..... 27-7325
- ⑯ Fuse Assembly..... 42-5208
- ⑰ Pointer..... 28-1793
- ⑱ Knobs..... 27-4091
- ⑲ Interconnecting Cable..... 41-3087
- ⑳ Ammeter Cable..... 38-5833
- ㉑ Flexible Shaft—Tuning..... 28-8276
- ㉒ Flexible Shaft—Volume..... 28-8227
- ㉓ Receiver Mounting Plate..... 29-1792
- ㉔ Receiver Mounting Bracket..... 29-1848
- ㉕ Carriage Bolt..... W-1316A
- ㉖ Fuse..... 7227
- ㉗ Fuse Insulator..... 27-7131
- ㉘ Stud (Speaker Mfg.)..... 6122
- ㉙ Screw (Speaker Mfg.)..... W-1312A
- ㉚ Spark Plug Resistor..... 33-1015
- ㉛ Distributor Resistor..... 4351
- ㉜ Interference Condenser..... 30-4007



Note 1. Adjust the High Frequency padders (15) at 1600 K. C.
 Note 2. A 25,000 ohm resistor, part number 3636, (21) on the parts list and base view has been added for the Receiver. One end is connected to the screen grid lead to the R. F. Osc. and I. F. tubes and the other end is grounded.

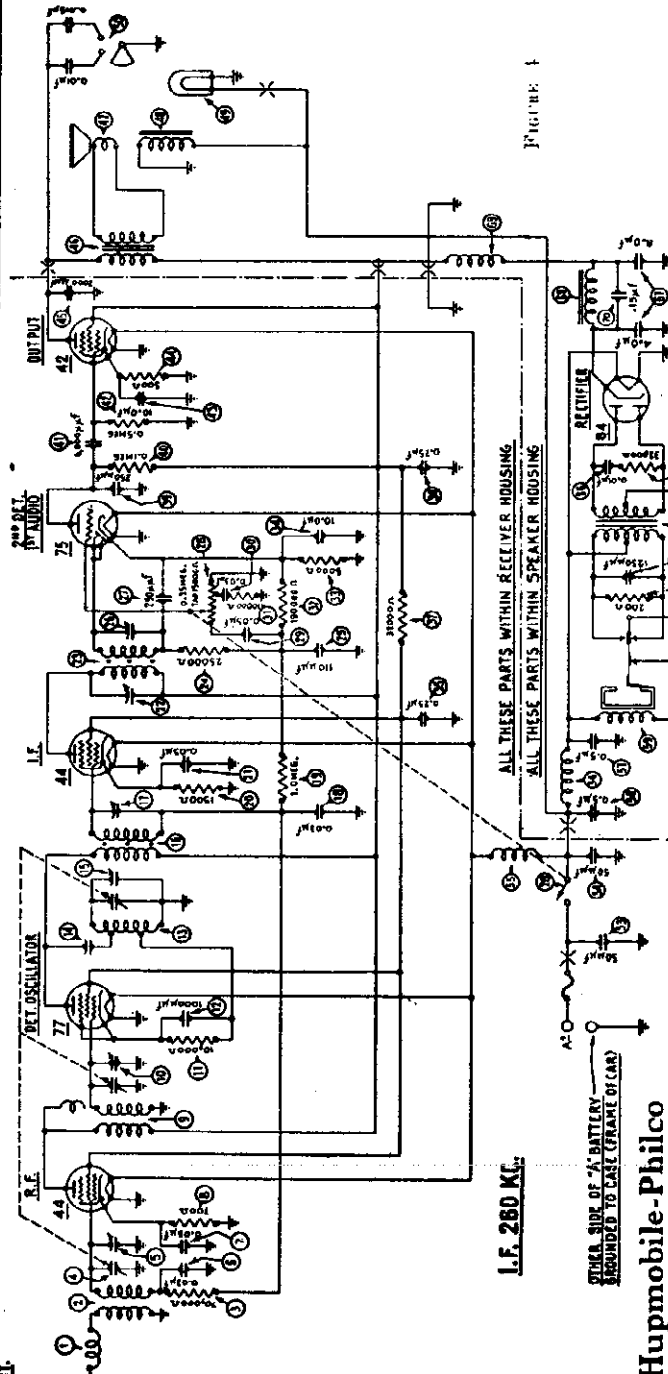
- ② Condenser (.00025 mfd.)..... 30-1032
- ③ Volume Control and Switch Assembly..... 33-0087
- ④ Condenser (.05 mfd.)..... 30-4020
- ⑤ Condenser (.03 mfd.)..... 30-4025
- ⑥ Resistor (10,000 ohms)..... 32-1000
- ⑦ Resistor (180,000 ohms)..... 33-1116
- ⑧ Resistor (5000 ohms)..... 6098
- ⑨ Condenser (.10 mfd.)..... 30-2076
- ⑩ Condenser (.25 mfd.)..... 30-4126
- ⑪ Resistor (32,000 ohms)..... 3525
- ⑫ Condenser (.25 mfd.)..... 30-4126
- ⑬ Condenser (.00025 mfd.)..... 30-1032
- ⑭ Resistor (100,000 ohms)..... 6090
- ⑮ Condenser (.006 mfd.)..... 30-4125
- ⑯ Resistor (500,000 ohms)..... 6097
- ⑰ Condenser (.500 ohms)..... 33-3031
- ⑱ Condenser (.004 mfd.)..... 30-4185
- ⑲ Output Transformer..... 32-7042
- ㉑ Cone and Voice Coil..... 36-3167
- ㉒ Field Coil Assembly..... 36-3097
- ㉓ Pilot Lamp..... 34-2031
- ㉔ Tone Control..... 30-4189
- ㉕ Condenser (.00005 mfd.)..... 30-1029
- ㉖ Condenser (.00005 mfd.)..... 30-1029
- ㉗ "A" Choke..... 32-1432
- ㉘ Vibrator Choke..... 32-1240
- ㉙ Condenser (.5 mfd.)..... 30-4047
- ㉚ Condenser (.5 mfd.)..... 30-4015

- OTHER SIDE OF "A" BATTERY (GROUND TO CASE (FRAME GEAR))
- I. F. 260 KC
- Hupmobile-Philco
 Code 122
- Model G Parts List
- ① Antenna Choke..... 32-1372
 - ② Antenna Transformer..... 32-1331
 - ③ Resistor (70,000 ohms)..... 33-1115
 - ④ Tuning Condenser..... 31-1214
 - ⑤ First Padder (on Tun. Cond.)..... 30-4025
 - ⑥ Condenser (.03 mfd.)..... 30-4020
 - ⑦ Condenser (.05 mfd.)..... 6443
 - ⑧ R. F. Transformer..... 32-1332
 - ⑨ Second Padder (on Tun. Cond.)..... 33-1000
 - ⑩ Resistor (10,000 ohms)..... 33-1007
 - ⑪ Condenser (1000 mfd.)..... 33-1007
 - ⑫ Oscillator Transformer..... 32-1333
 - ⑬ Padder (Pri. 1st I. F. Trans.)..... 32-1329
 - ⑭ Third Padder (on Tun. Cond.)..... 30-4025
 - ⑮ First I. F. Transformer..... 32-1329
 - ⑯ Padder (Sec. 2nd I. F. Trans.)..... 30-4025
 - ⑰ Condenser (.03 mfd.)..... 33-1096
 - ⑱ Resistor (1,000,000 ohms)..... 33-3048
 - ⑲ Resistor (2000 ohms)..... 33-3048
 - ㉑ Condenser (.06 mfd.)..... 30-4020
 - ㉒ Padder (Pri. 2nd I. F. Trans.)..... 32-1237
 - ㉓ Second I. F. Transformer..... 32-1237
 - ㉔ Resistor (25,000 ohms)..... 33-1013
 - ㉕ Condenser (.00011 mfd.)..... 30-1081
 - ㉖ Padder (Sec. 2nd I. F. Trans.)..... 30-4015

PHILCO RADIO & TELEV. CORP.

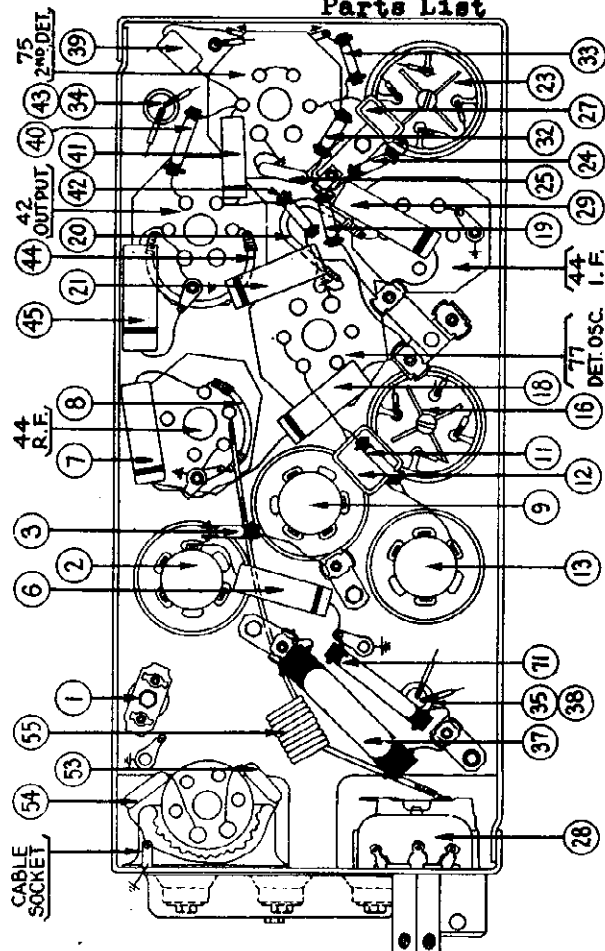
MODEL G, Hupmobile
For J, T, & W Cars
Schematic, Chassis
Parts List

- 32-1260 Vibrator Choke
- 30-4047 Condenser (.5 mfd.)
- 30-4015 Condenser (.5 mfd.)
- 38-3036 Vibrator
- 30-4039 Condenser (.05 mfd.)
- 7217 Resistor (200 ohms)
- 39486 Condenser (.00125 mfd.)
- 32-72-3 Power Transformer
- 3525 Resistor (32,000 ohms)
- 30-4051 Condenser (.01 mfd.)
- 30-2030 Filter Condenser (4-8 mfd.)
- 32-7254 Filter Choke
- 32-1260 R. F. Choke
- 30-4191 Condenser (.15 mfd.)
- 3636 Resistor (25,000 ohms)
- 27-7325 Glass for Control
- 42-5125 Face Assembly
- 28-1793 Pointer
- 27-4091 Knobs
- 41-3047 Interconnecting Cable
- 38-5833 Ammeter Cable
- 28-8226 Flexible Shaft—Tuning
- 28-8227 Flexible Shaft—Volume
- 29-1792 Receiver Mounting Plate
- 29-1848 Receiver Mounting Bracket
- W-1316A Carriage Bolt
- 7227 Fuse
- 27-7131 Fuse Insulator
- 6122 Stud (Speaker Mtg.)
- W-1312A Screw (Speaker Mtg.)



L.F. 260 Kc.
OTHER SIDE OF "A" BATTERY
GROUND TO CASE (FRONT OF CAR)

FIGURE 1



Note 1. Adjust the High Frequency padders (15) at 1600 K. C.
Note 2. A 25,000 ohm resistor, part-number 3656, (11) on the parts list and base view has been added to the Receiver. One end is connected to the screen grid lead for the R. F. Osc. and I. F. tubes and the other end is grounded.

Hupmobile-Philco
Model G Parts List

- 1 Antenna Choke
- 2 Antenna Transformer
- 3 Resistor (70,000 ohms)
- 4 Tuning Condenser
- 5 First Padder (on Tun. Cond.)
- 6 Condenser (.03 mfd.)
- 7 Condenser (.05 mfd.)
- 8 Resistor (700 ohms)
- 9 R. F. Transformer
- 10 Second Padder (on Tun. Cond.)
- 11 Resistor (10,000 ohms)
- 12 Condenser (1000 mmfd.)
- 13 Padder (Pri. 1st I. F. Trans.)
- 14 Third Padder (on Tun. Cond.)
- 15 First I. F. Transformer
- 16 Padder (Sec. 2nd I. F. Trans.)
- 17 Condenser (.03 mfd.)
- 18 Resistor (1,000,000 ohms)
- 19 Resistor (1500 ohms)
- 20 Condenser (.06 mfd.)
- 21 Padder (Pri. 2nd I. F. Trans.)
- 22 Second I. F. Transformer
- 23 Resistor (25,000 ohms)
- 24 Condenser (.00011 mfd.)
- 25 Padder (Sec. 2nd I. F. Trans.)
- 26 Condenser (.00025 mfd.)
- 27 "A" Choke
- 28 "A" Choke
- 29 Field Coil Assembly
- 30 Pilot Lamp
- 31 Tone Control
- 32 Condenser (.00005 mfd.)
- 33 Condenser (.00005 mfd.)
- 34 "A" Choke
- 35 "A" Choke
- 36 "A" Choke
- 37 "A" Choke
- 38 "A" Choke
- 39 "A" Choke
- 40 "A" Choke
- 41 "A" Choke
- 42 "A" Choke
- 43 "A" Choke
- 44 "A" Choke
- 45 "A" Choke
- 46 "A" Choke
- 47 "A" Choke
- 48 "A" Choke
- 49 "A" Choke
- 50 "A" Choke
- 51 "A" Choke
- 52 "A" Choke
- 53 "A" Choke
- 54 "A" Choke
- 55 "A" Choke
- 56 "A" Choke
- 57 "A" Choke
- 58 "A" Choke
- 59 "A" Choke
- 60 "A" Choke
- 61 "A" Choke
- 62 "A" Choke
- 63 "A" Choke
- 64 "A" Choke
- 65 "A" Choke
- 66 "A" Choke
- 67 "A" Choke
- 68 "A" Choke
- 69 "A" Choke
- 70 "A" Choke
- 71 "A" Choke
- 72 "A" Choke
- 73 "A" Choke
- 74 "A" Choke
- 75 "A" Choke
- 76 "A" Choke
- 77 "A" Choke

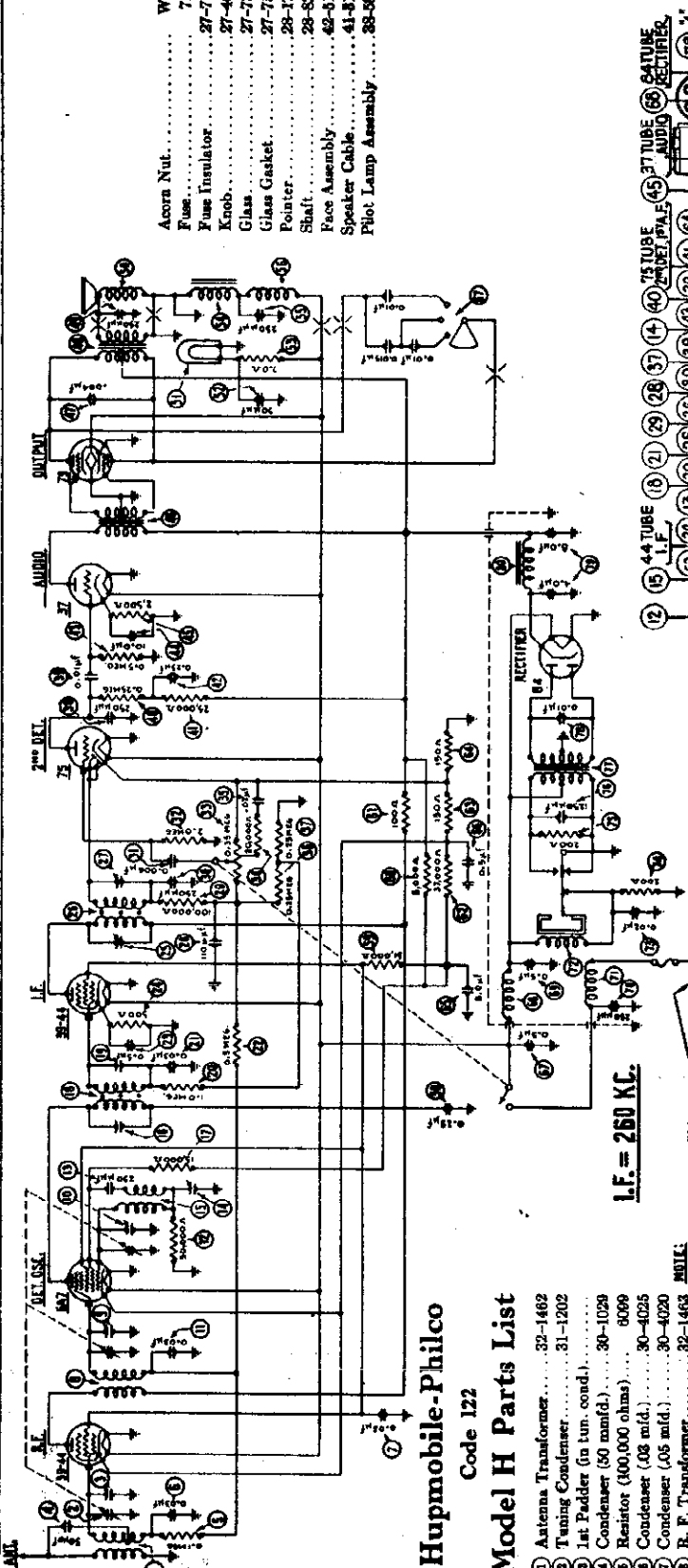
MODEL H (Code 122) Hup

For J, T & W Cars

PHILCO RADIO & TELEV. CORP.

Schematic, Chassis, Parts

- Acorn Nut..... W321
- Fuse..... 7227
- Fuse Insulator..... 27-7131
- Knob..... 27-4091
- Glass..... 27-7325
- Glass Gasket..... 27-7509
- Pointer..... 28-1793
- Shaft..... 28-8214
- Face Assembly..... 42-8125
- Speaker Cable..... 41-8113
- Pilot Lamp Assembly..... 38-5889



I.F. = 250 KC.

NOTE: OTHER SIDE OF "A" BATT. BRUNGLED TO CASE (FRAME OF CAR)

Hupmobile-Philco
Code 122
Model H Parts List

- 1 Antenna Transformer..... 32-1462
- 2 Tuning Condenser..... 31-1202
- 3 1st Padder (in tun. cond.)..... 30-1029
- 4 Resistor (400,000 ohms)..... 8096
- 5 Condenser (.03 mfd.)..... 30-4025
- 6 Condenser (.05 mfd.)..... 30-4020
- 7 R. F. Transformer..... 32-1463
- 8 2nd Padder (in tun. cond.)..... 30-4025
- 9 Condenser (.03 mfd.)..... 30-4025
- 10 Resistor (50,000 ohms)..... 6098
- 11 Condenser (250 mmfd.)..... 30-882
- 12 Padder..... 30-8012
- 13 Oscillator Transformer..... 32-1222
- 14 Padder (Pri. 1st I. F. Trans.)..... 6208
- 15 Resistor (15,000 ohms)..... 32-1471
- 16 First I. F. Transformer..... 32-1096
- 17 Padder (Sec. 1st I. F. Trans.)..... 30-4025
- 18 Resistor (1,000,000 ohms)..... 6017
- 19 Condenser (.03 mfd.)..... 30-4025
- 20 Resistor (500,000 ohms)..... 30-4058
- 21 Condenser (.5 mfd.)..... 6077
- 22 Resistor (500 ohms)..... 6077
- 23 Padder (Pri. 2nd I. F. Trans.)..... 32-1449
- 24 Second I. F. Transformer..... 32-1031
- 25 Padder (Sec. 2nd I. F. Trans.)..... 6096
- 26 Condenser (.110 mmfd.)..... 30-1031
- 27 Resistor (100,000 ohms)..... 30-1032
- 28 Condenser (250 mmfd.)..... 30-1032
- 29 Condenser (.006 mfd.)..... 30-4125
- 30 Resistor (2,000,000 ohms)..... 33-1063
- 31 Vol. Cont. & Sw. Assembly..... 38-6851
- 32 Resistor (20,000 ohms)..... 33-1130
- 33 Condenser (.02 mfd.)..... 30-4215
- 34 Resistor (100 ohms)..... 33-3023
- 35 Resistor (37,000 ohms)..... 38-1098
- 36 Resistor (150 ohms)..... 33-3045
- 37 Resistor (150 ohms)..... 33-3045
- 38 Condenser (.8 mfd.)..... 30-4135
- 39 Resistor (5 mfd.)..... 30-4018
- 40 Condenser (.5 mfd.)..... 30-4015
- 41 Resistor (500,000 ohms)..... 6097
- 42 Resistor (10 mfd.)..... 30-4135
- 43 Resistor (2,500 ohms)..... 33-1100
- 44 Input Transformer..... 32-7206
- 45 Condenser (.004 mfd.)..... 30-4185
- 46 Output Transformer..... 32-7205
- 47 Condenser (250 mmfd.)..... 30-1032
- 48 Cone & Voice Coil..... 36-3139
- 49 Pilot Lamp..... 34-2040
- 50 Resistor (200 ohms)..... 7217
- 51 Resistor (200 ohms)..... 3886
- 52 Power Transformer..... 32-7098
- 53 Condenser (1250 mmfd.)..... 30-4051
- 54 Filter Condenser (.01 mfd.)..... 30-2015
- 55 "B" Chokes..... 28-7104
- 56 Interference Condenser..... 4522S
- 57 Studs (Rec. Mtg.)..... 28-6098
- 58 Nuts (mounting)..... W35
- 59 Battery Cable..... 38-5296
- 60 Antenna Lead..... 38-5674

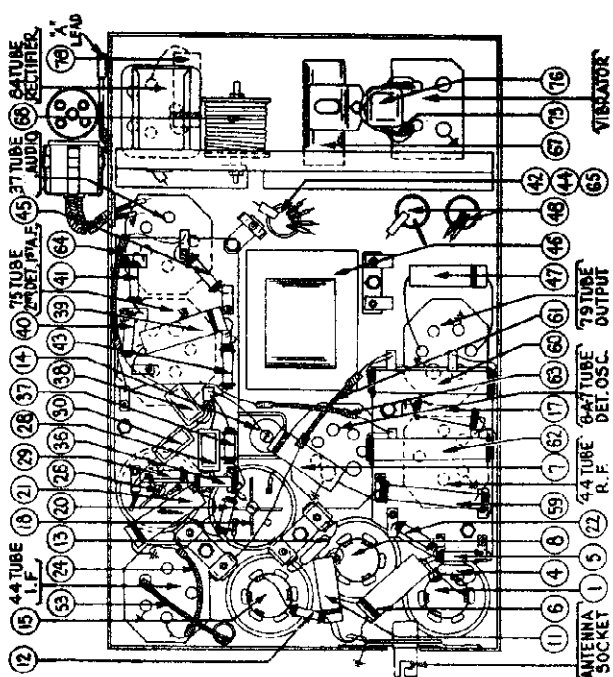
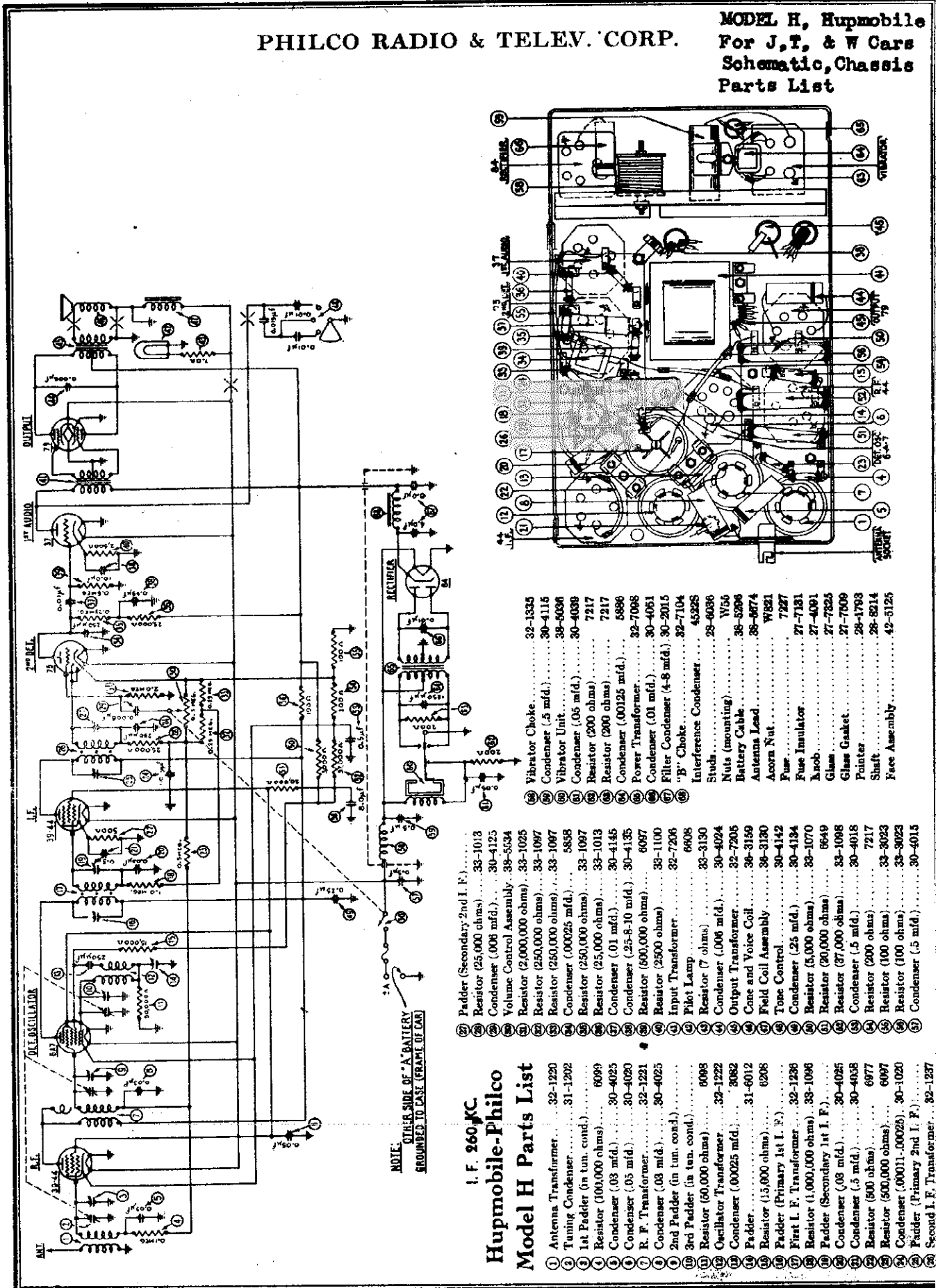


FIGURE 7

PHILCO RADIO & TELEV. CORP.

MODEL H, Hupmobile
For J, T, & W Cars
Schematic, Chassis
Parts List



- 27 Padder (Secondary 2nd I. F.)..... 33-1013
- 28 Resistor (25,000 ohms)..... 30-4125
- 29 Resistor (.005 mfd.)..... 30-4125
- 30 Volume Control Assembly..... 38-5634
- 31 Resistor (2,000,000 ohms)..... 33-1025
- 32 Resistor (250,000 ohms)..... 33-1097
- 33 Resistor (250,000 ohms)..... 33-1097
- 34 Resistor (250,000 ohms)..... 33-1097
- 35 Resistor (250,000 ohms)..... 33-1097
- 36 Resistor (25,000 ohms)..... 30-4145
- 37 Resistor (.01 mfd.)..... 30-4145
- 38 Resistor (25-6-10 mfd.)..... 30-4135
- 39 Resistor (500,000 ohms)..... 6097
- 40 Resistor (2500 ohms)..... 33-1100
- 41 Input Transformer..... 32-7206
- 42 Pilot Lamp..... 6908
- 43 Resistor (7 ohms)..... 33-3130
- 44 Resistor (.006 mfd.)..... 30-4024
- 45 Output Transformer..... 32-7205
- 46 Cone and Voice Coil..... 36-3159
- 47 Field Coil Assembly..... 36-3130
- 48 Tone Control..... 30-4142
- 49 Resistor (25 mfd.)..... 30-4134
- 50 Resistor (5,000 ohms)..... 33-1070
- 51 Resistor (30,000 ohms)..... 6649
- 52 Resistor (37,000 ohms)..... 33-1098
- 53 Resistor (.5 mfd.)..... 30-4015
- 54 Resistor (200 ohms)..... 7217
- 55 Resistor (100 ohms)..... 33-3023
- 56 Resistor (100 ohms)..... 33-3023
- 57 Resistor (.5 mfd.)..... 30-4015

- 1 Antenna Transformer..... 32-1220
- 2 Tuning Condenser..... 31-1202
- 3 1st Padder (in tun. cond.)..... 6099
- 4 Resistor (100,000 ohms)..... 30-4025
- 5 Resistor (100,000 ohms)..... 30-4025
- 6 Resistor (100,000 ohms)..... 30-4025
- 7 R. F. Transformer..... 32-1221
- 8 Resistor (100,000 ohms)..... 30-4025
- 9 2nd Padder (in tun. cond.)..... 6098
- 10 3rd Padder (in tun. cond.)..... 6098
- 11 Resistor (50,000 ohms)..... 32-1222
- 12 Oscillator Transformer..... 3082
- 13 Resistor (100,000 ohms)..... 30-4025
- 14 Padder..... 31-6012
- 15 Resistor (15,000 ohms)..... 6208
- 16 Padder (Primary 1st I. F.)..... 32-1226
- 17 First I. F. Transformer..... 33-1096
- 18 Resistor (1,000,000 ohms)..... 30-4025
- 19 Padder (Secondary 1st I. F.)..... 6977
- 20 Resistor (500 ohms)..... 6977
- 21 Resistor (500,000 ohms)..... 6097
- 22 Resistor (500,000 ohms)..... 6097
- 23 Padder (Primary 2nd I. F.)..... 30-1020
- 24 Second I. F. Transformer..... 32-1227

- 32-1335
- 30-4115
- 38-5036
- 30-4038
- 7217
- 5896
- 32-7088
- 30-4051
- 30-2015
- 32-7104
- 45328
- 25-4036
- W55
- 38-5296
- 38-6774
- W821
- 7227
- 27-7131
- 27-4091
- 27-7523
- 27-7509
- 28-1793
- 28-8214
- 42-5125

PHILCO RADIO & TELEV. CORP.

MODEL R Hupmobile
For J, T & W Cars
Schematic, Chassis
Parts List

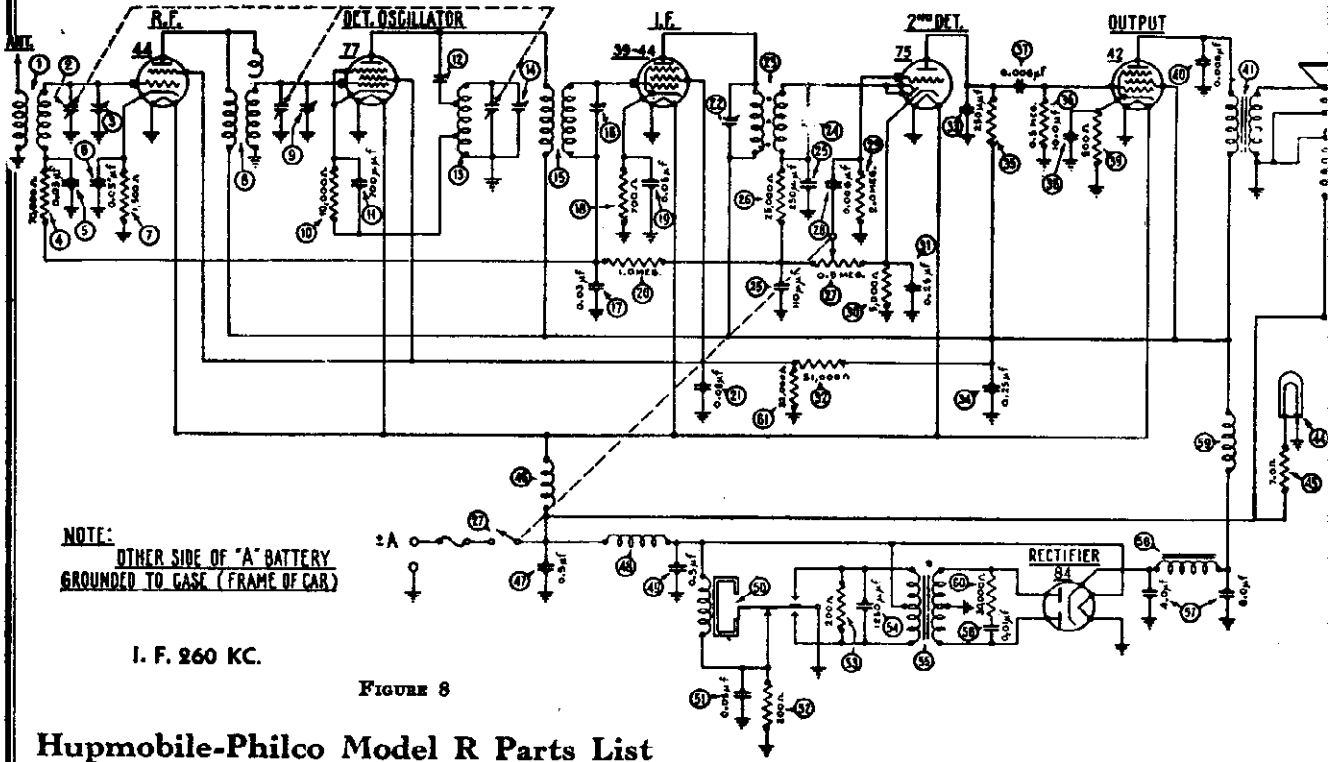


FIGURE 8

Hupmobile-Philco Model R Parts List

① Antenna Transformer..... 32-1331	③⑤ Resistor (100,000 ohms)..... 6090
② Tuning Condenser..... 31-1164	③⑥ Resistor (500,000 ohms)..... 6007
③ 1st Padder (on tun. cond.).....	③⑦ Condenser (.006 mfd.)..... 30-4125
④ Resistor (70,000 ohms)..... 33-1115	③⑧ Condenser (10 mfd.)..... 30-2072
⑤ Condenser (.03 mfd.)..... 30-4025	③⑨ Resistor (500 ohms)..... 33-3031
⑥ Condenser (.05 mfd.)..... 30-4020	④① Condenser (.006 mfd.)..... 30-4024
⑦ Resistor (1500 ohms)..... 33-3047	④② Output Transformer..... 32-7214
⑧ R. F. Transformer..... 32-1332	④③ Cone & Voice Coil..... 02861
⑨ 2nd Padder (on tun. cond.).....	④④ Field Coil Assembly..... 36-3007
⑩ Resistor (10,000 ohms)..... 33-1000	④⑤ Pilot Light..... 6608
⑪ Condenser (.0007 mfd.)..... 5863	④⑥ Resistor (7 ohms)..... 33-3035
⑫ Padder (Pri. 1st I. F. Tran.).....	④⑦ "A" Choke..... 32-1286
⑬ Oscillator Transformer..... 32-1333	④⑧ Condenser (.5 mfd.)..... 30-4047
⑭ 3rd Padder (on tun. cond.).....	④⑨ Vibrator Choke..... 32-1235
⑮ 1st I. F. Transformer..... 32-1329	④⑩ Condenser (.5 mfd.)..... 30-4147
⑯ Padder (Sec. 1st I. F. Tran.).....	④⑪ Vibrator Unit..... 38-5036
⑰ Condenser (.03 mfd.)..... 30-4025	④⑫ Condenser (.05 mfd.)..... 30-4039
⑱ Resistor (700 ohms)..... 6443	④⑬ Resistor (200 ohms)..... 7217
⑲ Condenser (.05 mfd.)..... 30-4020	④⑭ Resistor (200 ohms)..... 7217
⑳ Resistor (1,000,000 ohms)..... 33-1096	④⑮ Condenser (.00125 mfd.)..... 5886
㉑ Condenser (.05 mfd.)..... 30-4020	④⑯ Power Transformer..... 32-7216
㉒ Padders (Prim. 2nd I. F.).....	④⑰ Condenser (.01 mfd.)..... 30-4051
㉓ 2nd I. F. Transformer..... 32-1237	④⑱ Condenser (4-.8. mfd.)..... 30-2072
㉔ Padder (Sec. I. F. Tran.).....	④⑲ "B" Choke..... 32-7215
㉕ Cond. (.00011-.00025 mfd.)..... 30-1020	④⑳ R F Choke..... 32-1281
㉖ Resistor (25,000 ohms)..... 33-1013	④㉑ Resistor (30,000 ohms)..... 7836
㉗ Vol. Con. & Switch Asam..... 38-5534	④㉒ Resistor (32,000 ohms)..... 3525
㉘ Condenser (.006 mfd.)..... 30-4125	④㉓ Spark Plug Resistor..... 33-1015
㉙ Resistor (2,000,000 ohms)..... 33-1025	④㉔ Distributor Resistor..... 4851
㉚ Resistor (500 ohms)..... 6096	④㉕ Interference Cond. (1/2 mfd.)..... 30-4007
㉛ Condenser (.25 mfd.)..... 30-4143	④㉖ Facc Assembly..... 42-5206
㉜ Resistor (51,000 ohms)..... 5868	④㉗ Glass for Control..... 27-7325
㉝ Condenser (.00025 mfd.)..... 3082	④㉘ Pointer..... 28-1957
㉞ Condenser (.25 mfd.)..... 04360	④㉙ Knobs..... 27-4091
Stud..... 28-6036	Fuse..... 7227
Battery Cable..... 38-5833	Fuse Insulator..... 27-7131
Nut..... W55A	Shafts..... 28-8214
Antenna Lead..... 38-5882	

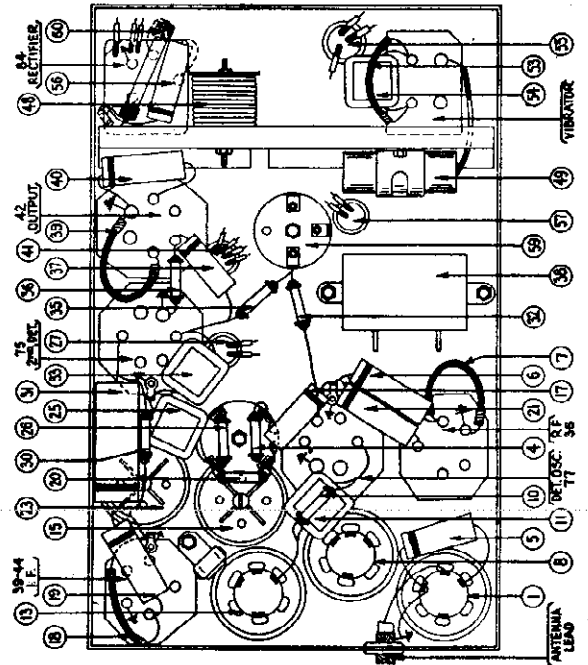
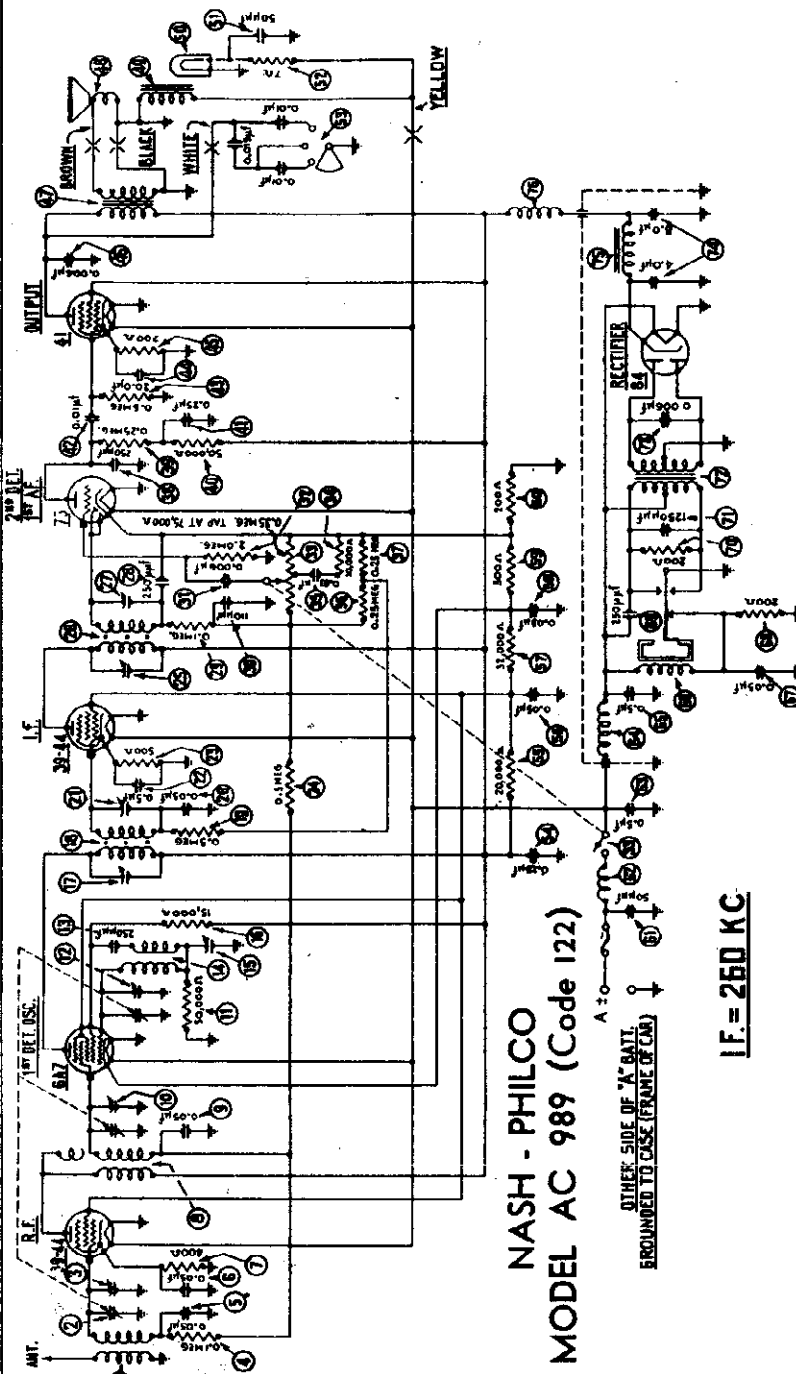


FIGURE 9

MODEL D

Nash AC-989 (Code 122 PHILCO RADIO & TELEV. CORP.
Schematic, Parts List



NASH - PHILCO
MODEL AC 989 (Code 122)

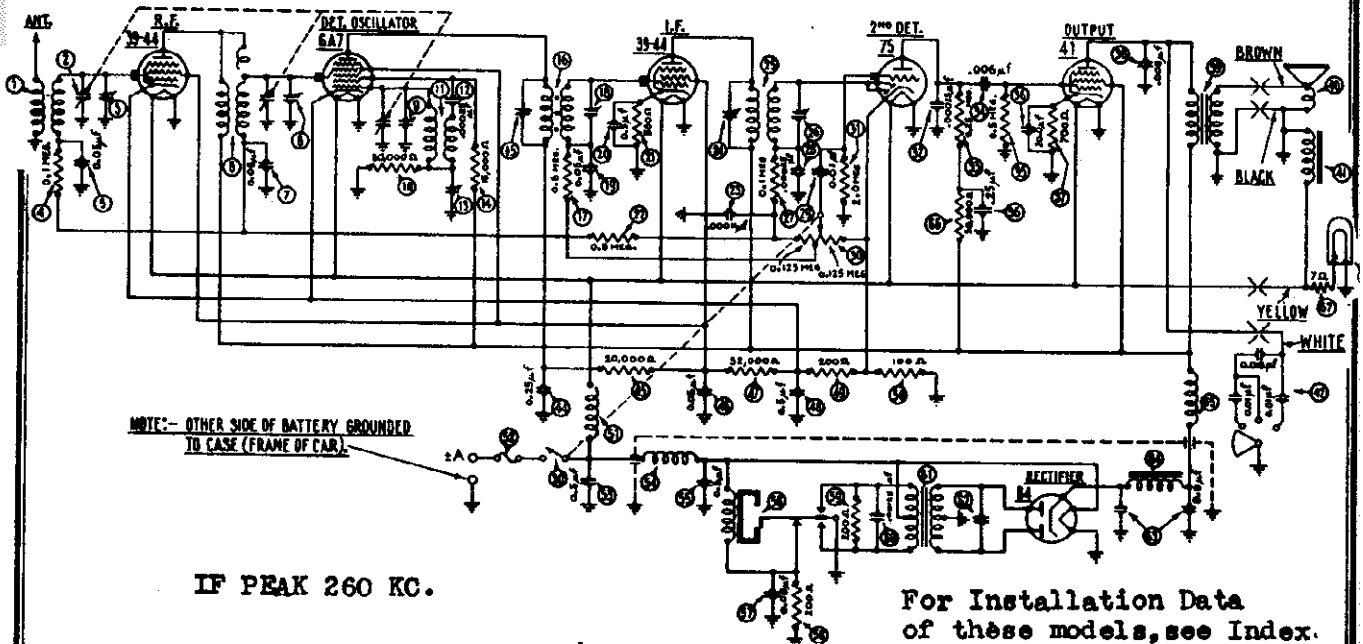
OTHER SIDE OF 'A' BATT.
BROUNDED TO CASE (FRAME OF CH)

IF = 260 KC

- | | | | |
|--|---------|-------------------------------------|---------|
| 1 Antenna Transformer..... | 32-1220 | 70 Resistor (200 ohms)..... | 7217 |
| 2 Tuning Condenser..... | 31-1083 | 71 Condenser (.00125 mfd.)..... | 3886 |
| 3 First Padder (in tun. cond.)..... | 6099 | 72 Power Transformer..... | 32-7181 |
| 4 Resistor (100,000 ohms)..... | 30-4020 | 73 Condenser (.006 mfd.)..... | 30-4024 |
| 5 Condenser (.05 mfd.)..... | 30-4020 | 74 Filter Condenser (4-8 mfd.)..... | 30-2015 |
| 6 Condenser (.05 mfd.)..... | 33-3016 | 75 R. F. Transformer..... | 32-7104 |
| 7 R. F. Transformer..... | 32-1221 | 76 R. F. Choke..... | 32-1261 |
| 8 Condenser (.05 mfd.)..... | 30-4020 | 77 Spark Plug Resistors..... | 33-1101 |
| 9 Resistor (50,000 ohms)..... | 6068 | 78 Spark Plug Resistors..... | 33-1102 |
| 10 Third Padder (in tun. cond.)..... | 30-1032 | 79 Distributor Resistor..... | 33-1103 |
| 11 Condenser (.00025 mfd.)..... | 32-1222 | 80 Interference Condenser..... | 30-4007 |
| 12 Oscillator Transformer..... | 040005 | 81 Studs..... | W55A |
| 13 Padder (15,000 ohms)..... | 6208 | 82 Nuts (mounting)..... | 38-5396 |
| 14 Padder (Pri. 1st I. F. Trans.)..... | 4237 | 83 Battery Cable..... | 38-5331 |
| 15 First I. F. Transformer..... | 32-1236 | 84 Acorn Nut..... | W821 |
| 16 Resistor (500,000 ohms)..... | 6097 | 85 Dial..... | 27-5034 |
| 17 Padder (Sec. 1st I. F. Trans.)..... | 30-4058 | 86 Knob (volume)..... | 27-4045 |
| 18 Condenser (.05 mfd.)..... | 30-4020 | 87 Knob (tuning)..... | 08064 |
| 19 Condenser (.5 mfd.)..... | 30-4058 | 88 Flexible Shaft (volume)..... | 28-8182 |
| 20 Resistor (500 ohms)..... | 6977 | 89 Flexible Shaft (tuning)..... | 28-8181 |
| 21 Padder (Pri. 2nd I. F. Trans.)..... | 32-1237 | | |
| 22 Second I. F. Transformer..... | 32-1237 | 90 Output Transformer..... | 32-7102 |
| 23 Padder (Sec. 2nd I. F. Trans.)..... | 30-1032 | 91 Cone and Voice Coil..... | 38-3139 |
| 24 Resistor (100,000 ohms)..... | 6099 | 92 Field Coil Assembly..... | 34-3130 |
| 25 Condenser (.00011 mfd.)..... | 30-1031 | 93 Pilot Lamp..... | 34-2039 |
| 26 Condenser (.006 mfd.)..... | 30-4125 | 94 Condenser (.00005 mfd.)..... | 30-1029 |
| 27 Resistor (2,000,000 ohms)..... | 33-1025 | 95 Resistor (7 ohms)..... | 33-3035 |
| 28 Resistor (10,000 ohms)..... | 33-1097 | 96 Tone Control..... | 30-4056 |
| 29 Condenser (.03 mfd.)..... | 30-4025 | 97 Condenser (.25 mfd.)..... | 04360 |
| 30 Vol. Control & S.W. Assembly..... | 38-5935 | 98 Resistor (20,000 ohms)..... | 6640 |
| 31 Resistor (500,000 ohms)..... | 30-1082 | 99 Condenser (.05 mfd.)..... | 30-4020 |
| 32 Resistor (250,000 ohms)..... | 33-1097 | 100 Resistor (32,000 ohms)..... | 3525 |
| 33 Resistor (500,000 ohms)..... | 30-1082 | 101 Condenser (.05 mfd.)..... | 30-4020 |
| 34 Padder..... | 040005 | 102 Resistor (500 ohms)..... | 6977 |
| 35 Resistor (15,000 ohms)..... | 6208 | 103 Resistor (200 ohms)..... | 7217 |
| 36 Padder (Pri. 1st I. F. Trans.)..... | 4237 | 104 Condenser (.00005 mfd.)..... | 30-1029 |
| 37 First I. F. Transformer..... | 32-1236 | 105 Choke..... | 32-1374 |
| 38 Resistor (500,000 ohms)..... | 6097 | 106 Condenser (.5 mfd.)..... | 30-4061 |
| 39 Condenser (.05 mfd.)..... | 30-4020 | 107 Vibrator Choke..... | 32-1259 |
| 40 Padder (Sec. 1st I. F. Trans.)..... | 30-4058 | 108 Condenser (.5 mfd.)..... | 30-4061 |
| 41 Resistor (500 ohms)..... | 6977 | 109 Resistor (200 ohms)..... | 38-3036 |
| 42 Condenser (.5 mfd.)..... | 30-4058 | 110 Resistor (500 ohms)..... | 30-4029 |
| 43 Resistor (500 ohms)..... | 6977 | 111 Resistor (200 ohms)..... | 7217 |
| 44 Condenser (.004 mfd.)..... | 30-4185 | 112 Condenser (.00025 mfd.)..... | 3858 |

MODELS C & D Nash (AC-989)
Schematic, Parts

PHILCO RADIO & TELEV. CORP MODEL AC-206 Studebaker
MODEL ME Pierce-Arrow



IF PEAK 260 KC.

For Installation Data of these models, see Index.

① Antenna Transformer..... 32-1220	②② Resistor (500,000 ohms)..... 6097	④④ Pilot Lamp..... 6808	⑥④ B Chokes..... 32-7038
② Tuning Condenser..... 31-1083	②③ Condenser (.00011 mfd.)... 4519	④④ Condenser (.25 mfd.)..... 04360	⑥⑤ R. F. Chokes..... 32-1078
③ 1st Padder (in tuning cond.).....	②④ Padder (prim. 2nd I.F.)... 31-6008	④⑤ Resistor (20,000 ohms)..... 6049	⑥⑥ Resistor (50,000 ohms)..... 4237
④ Resistor (100,000 ohms)..... 6099	②⑤ I.F. Transformer (2nd)..... 32-1237	④⑥ Condenser (.05 mfd.)..... 30-4020	⑥⑦ Resistor (7 ohms)..... 5110
⑤ Condenser (.05 mfd.)..... 30-4020	②⑥ Padder (secondary 2nd I.F.).. 31-6008	④⑦ Resistor (32,000 ohms)..... 3525	Spark Plug Resistors..... 4531
⑥ R.F. Transformer..... 32-1221	②⑦ Resistor (100,000 ohms).... 6099	④⑧ Condenser (.5 mfd.)..... 30-4048	Distributor Resistor..... 4546
⑦ Condenser (.05 mfd.)..... 30-4020	②⑧ Condenser (.00025 mfd.).... 3082	④⑨ Resistor (200 ohms)..... 7217	Screw Type Resistor..... 4851
⑧ 2nd Padder (in tuning cond.).....	②⑨ Condenser (.01 mfd.)..... 30-4051	④⑩ Resistor (100 ohms)..... 7838	Interference Condenser..... 30-4007
⑨ 3rd Padder (in tuning cond.).....	③⑩ Vol. Control Assembly..... 38-5280	⑤① A Choke..... 32-1268	Dial..... 27-5022
⑩ Resistor (50,000 ohms)..... 6098	③① Resistor (2,000,000 ohms).... 33-1025	⑤② 15 Amp. Fuse..... 7227	Studs—4 1/2" Special..... 28-6102
⑪ Oscillator Transformer..... 32-1222	③② Condenser (.00025 mfd.).... 5858	⑤③ Condenser (.5 mfd.)..... 30-4061	Nuts (mounting)..... W55
⑫ Condenser (.00025 mfd.).... 3082	③③ Resistor (250,000 ohms).... 3768	⑤④ Vibrator Choke..... 32-1259	Knob..... 03064
⑬ Padder..... 040005	③④ Condenser (.006 mfd.)..... 30-4024	⑤⑤ Condenser (.5 mfd.)..... 30-4061	Battery Cable..... 38-5296
⑭ Resistor (15,000 ohms)..... 6208	③⑤ Resistor (600,000 ohms).... 6097	⑤⑥ Vibrator..... 38-5086	Antenna Lead..... 38-5131
⑮ Padder (prim. 1st I.F.)... 31-6007	③⑥ Condenser (20 mfd.; 25 mfd.).. 30-4065	⑤⑦ Condenser (.05 mfd.).... 30-4039	Instrument Panel Control..... 42-5088
⑯ I.F. Transformer (1st)..... 32-1236	③⑦ Resistor (700 ohms)..... 33-3019	⑤⑧ Resistor (200 ohms)..... 7217	Acorn Nut..... W821
⑰ Resistor (500,000 ohms).... 6097	③⑧ Condenser (.006 mfd.)..... 30-4024	⑤⑨ Resistor (200 ohms)..... 7217	De Luxe Control Assembly..... 42-5097
⑱ Padder (secondary 1st I.F.).. 31-6007	③⑨ Output Transformer..... 32-7102	⑥① Condenser (.00125 mfd.)... 5886	Standard Control Assembly..... 42-5101
⑲ Condenser (.05 mfd.)..... 30-4020	④① Cone and Coil..... 36-3020	⑥② Power Transformer..... 32-7131	Steering Col. Control Assem..... 42-5096
⑳ Condenser (.5 mfd.)..... 30-4058	④② Field Coil Assembly..... 36-3130	⑥③ Condenser (.006 mfd.).... 30-4024	Gasket..... 27-7290
㉑ Resistor (500 ohms)..... 6977	④③ Tone Control..... 30-4056	⑥④ Filter Condenser..... 30-2015	Nash Control Plate..... 28-7025

Above is Model D Nash-Philco (AC-989). Model C Nash-Philco (AC-989) is similar except that a 42 output tube is used and resistor #37 is 550 ohms, part number 6977.

Studebaker Model AC-206.

This is same as above and is available with 42 output tube and resistor #37 changed to 550 ohms, part number 6977. Items 1 to 67 in above list are identical for Model AC-206. See following items for additional accessories

Spark Plug Resistors..... 4531	Distributor Resistor..... 4546	Screw Type Resistor..... 4851	Interference Condenser..... 30-4007	Dial..... 27-5022	Studs..... 28-6036	Nuts (mounting)..... W55	Knobs..... 03064	Battery Cable..... 38-5296	Antenna Lead..... 38-5161	Instrument Panel Control..... 42-5088	Acorn Nut..... W821	Steering Column Control..... 42-5087
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Pierce-Arrow Model ME

This is same as above except a 42 tube is used in the output and resistor #37 is changed to 550 ohms, part number 6977. Also volume control assembly's part number is changed to 38-5511. Other numbered items in above list are identical for the Model ME. See items below for additional accessories.

Spark Plug Resistors..... 33-1015	Distributor Resistor..... 33-1049	Screw Type Resistor..... 4851	Interference Condenser..... 4522	Studs (Set Mtg.)..... 28-6036	Nuts (Mounting)..... W55A	Battery Cable..... 38-5296	Antenna Lead..... 38-5131	Fuse Insulator..... 27-7131	Speaker (Model A15)..... 36-1048	Stud (Model A15)..... 28-6132	Wood Block (Spkr. Mtg.)..... 27-7359	Speaker Back Plate..... 27-7360	Cardboard & Felt Assem..... 2697A	Control Unit Assembly.....	Right Hand Mtg. (Walnut)..... 42-5126	Left Hand Mtg. (Walnut)..... 42-5127	Right Hand Mtg. (Black)..... 42-5128	Left Hand Mtg. (Black)..... 42-5129	Knobs (Black)..... 27-4058	Knobs (Walnut)..... 27-4066	Tuning and Volume Shaft Assembly, 28" Long..... 28-6206	Face Assembly..... 42-5120	Pointer..... 28-1805	Face Gasket..... 27-7331	Glass..... 27-7325	Glass Gasket..... 27-7327	Gasket (Pane. to Casting)..... 27-7346	Speaker Cable Assembly..... 41-3069
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MODELS C & D

Nash AC-989

Nash AC-989 (Code 122)

Installation Data

PHILCO RADIO & TELEV. CORP.

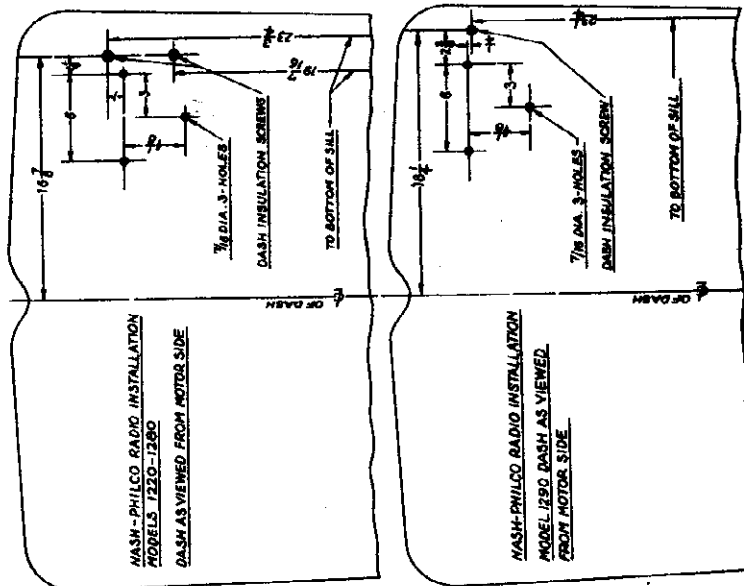


FIGURE 3

and then examine the rotor arm and the stationary electrodes to be sure that the steel arm is not striking the stationary electrodes.

To judge whether or not the rotor has been lengthened sufficiently, place a thick layer of chalk on each of the stationary electrodes. If there is evidence of the rotor touching the stationary electrodes, file off about .001 inch and recheck.

After the one end of the rotor arm has been peened, repeat the procedure with the other end. When both ends of the rotor have been properly peened, replace the rotor and distributor cap.

If there is a tendency for the motor to lops or roll at idling speed, remove the spark plugs and set the gaps to .080 inch. It may be necessary to change slightly the carburetor idle adjustment.

Ignition and Generator Interference Suppression

Install spark plug resistors on all spark plugs. On the right side of the motor the spark plug porcelain are covered with a rubber sleeve. When the sleeves are replaced, make sure that they are pushed down far enough to completely cover the porcelain on the plugs. Dipping the rubber sleeves in gasoline will make this operation very easy.

Cut the coil to distributor high tension lead about one inch from the distributor head and install the screw type suppressor.

Install a by-pass condenser on the generator and connect the condenser lead to the generator side of the cutout relay. The condenser must be fastened in place under the relay mounting screw.

The other by-pass condenser must be mounted behind the instrument board and the lead connected to the ammeter. Fasten the condenser mounting bracket under one of the instrument mounting screws. On some cars, this condenser may be more effective when connected to the dome light wire. In such cases, the condenser lead must be spliced to the dome light wire at the right pillar post and the condenser inserted on the instrument board flange.

Ordinarily these operations will eliminate all ignition interference. Should there still be some objectionable interference, the distributor rotor arms must be peened out in order to minimize the sparking in the distributor head. Both ends of the rotor must be peened.

Peening the Rotor Arm

Place one end of the rotor on a steel block and peen with a small machinist's hammer, extending it for the first trial about .005 inch. Great care must be taken in performing the operation to make sure the rotor arm itself does not strike the stationary electrodes. Repeat this operation until there is just sufficient clearance (.002 inch to .003 inch) between the end of the rotor arm and the stationary electrodes in the distributor cap. Dress the end of the rotor with a file to its original shape. Without turning on the ignition, press the starter

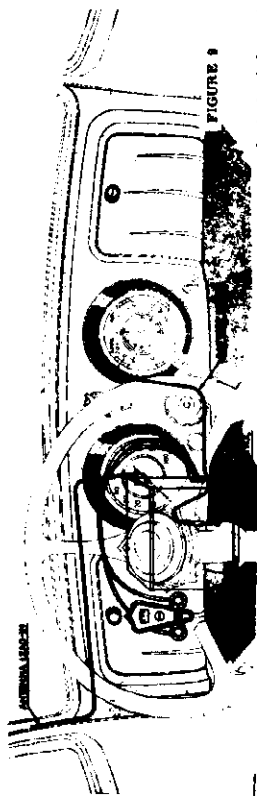


FIGURE 4

The black lead coming from the back of the control unit is the pilot light lead, which must be connected under the pilot light terminal screw head on the speaker panel.

Connecting Control Shafts

The flexible shafts are coupled to the control unit when shipped from the factory. The right-hand knob on the control is the tuning control; the left-hand knob is the volume control and switch. The volume control must be locked with the key at the control. The flexible shafts should be dressed above the steering column dash bracket towards the center of the car and then curved down and around to the couplings on the Receiver. Loosen the small set screws and the clamp screws on the shaft couplings and clamp brackets. The volume control and switch in the Receiver must be turned all the way off (counter clockwise). The volume control coupling is the one nearest the front edge of the Receiver. The tuning control coupling is nearest the dash.

Seat the casings and shafts in the brackets and shaft couplings. Loosen the bracket mounting screws sufficiently so that the shafts and couplings are correctly aligned. Then tighten the casing clamp screws and the coupling set screws, and finally tighten the bracket mounting screws.

Battery Connections (SEE FIG. 2)

Connect the battery cable to the Receiver. The small end at the Receiver must be plugged into the fuse housing receptacle on the battery lead. The other end of the battery lead must be connected to the ammeter and the cable dressed up out of the way. Be sure the fuse and fuse insulator are placed in the fuse housing before connecting the cable to the Receiver.

Antenna Lead (SEE FIG. 2)

A shielded antenna lead is provided for connecting the Receiver to the roof antenna. This lead must be plugged into the bayonet type receptacle on the side of the Receiver. Splice the antenna lead-in as close as possible to the left front pillar, cutting off all the excess car lead-in. The shield pig-tail must be grounded to the flange of the instrument board.

Lining Up The Receiver

The dial in the control is calibrated in channel numbers, which with the addition of a cipher indicate the frequencies in kilocycles, i.e. 70 on the dial represents 700 kilocycles.

Tune in a broadcast station of known frequency and then loosen the coupling screws on the tuning shaft. Turn the dial to the proper number and tighten set screws again. Then recheck the dial setting.

THESE INSTRUCTIONS have been carefully prepared for your use in installing the Model D Nash-Philco automobile radio Receiver in the 1935 model Nash cars. Read thoroughly, then follow the instructions carefully in every detail.

Antenna

The antenna lead in the 1935 Nash closed cars is brought down the left front pillar post and is coiled behind the left cowl trim panels.

Receiver Location and Installation

Refer to Figure 1 which gives detailed dimensions for the location of the holes to be drilled in all models. These dimensions are shown from the engine side of the dash. On all current model cars, the carburetor air cleaner and silencer should be removed until the Receiver is bolted in place. This will facilitate drilling the holes in the dash.

On all 1930 models the Receiver must be spaced away from the dash approximately two inches to clear all pulleys and cables. On the 1920 and 1920 models the Receiver should be spaced far enough away from the dash to give ample clearance for the speaker cover flange and keep the Receiver in a vertical position.

In fastening the studs to the Receiver the lock washer is placed between the Receiver and the shoulder on the bolt. The large flat washer is used against the padding on the inside of the dash. Extra nuts are furnished to be used as spacers. Mount the Receiver with the control shaft couplings towards the center of the car and with the speaker facing down. See Figure 2. On the 1920 and 1930 models the throttle control wire should be disconnected to facilitate installation.

Instrument Board Control

A dummy door is provided with cutouts in which the control unit is mounted. Remove the standard door from the instrument board by taking out the two stove bolts at the bottom and loosening the nut on the rear of the cigar lighter. Disconnect the lighter wire at the fuse block. On cars not equipped with a cigar lighter the door is fastened in place with a knob and stove bolts. Install the control door on the instrument board. The greatest care must be used so as not to mar or scratch the finish.

When no provision is made in a car for instrument board mounting, a steering column control assembly may be secured from your distributor or the Nash Factory. This assembly is furnished with an adjustable strap and bracket and may be mounted to the right side or above the steering column. In assembling the strap and bracket be sure that the round nut clinched on the strap is against the steering column. This will prevent the round nut from being torn from the strap.

PHILCO RADIO & TELEV. CORP. MODEL AC-206 Studebaker
MODEL AC-236 Studebaker

Installation Data

4. Insert the car key in the lock cylinder and crush in the same manner that you crush the standard lock, with pliers or vise.

5. Assemble the dial and spring on the cylinder. Push down the retaining spring and replace the lock in the same relative position that it had when removed. With the key in the lock push the lock back, working the lock pin in place in the slot in the lock bar in back of the lock. Push the lock in until the retaining spring snaps in place.

6. Reassemble the control on the panel.

Steering Column Control Unit

For installation in Studebaker cars prior to the 1934 models a special steering column control kit is available,

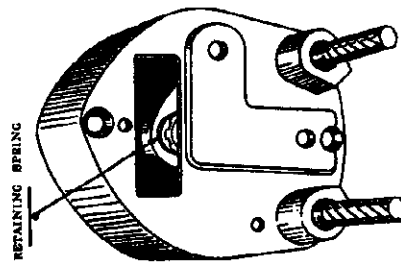


FIGURE 2

Receiver Location and Installation

Refer to Fig. 1 showing the location of the holes in the dash. Locate one of the holes and mark with a sharp punch; then use the template furnished with the Receiver to locate the remaining two holes. These holes should be drilled with a 7/16" drill.

Install the Receiver with the control connections to the left side of the car with the speaker facing down. (see Fig. 3)

Control Unit

The control unit is mounted on a panel which replaces the dummy door on the left side of the instrument board. These panels are held in place by means of four small metal tabs which pass through corresponding slots in the instrument board proper and are bent to one side. Care should be taken to fasten this panel securely so it does not rattle or mar the finish.

The control is furnished with a blank lock cylinder which must be crushed to match the car keys. This operation must be completed before the control is installed on the instrument board.

Instructions for Fitting Car Key to Control Lock

1. Remove the knobs and take off the control unit from the door.
2. Remove the hex-head screw in the rear and take out the pilot lamp bracket.
3. Reach in through the oblong opening in the back of the control unit with a medium size screw driver and press down on the brass retaining lock spring, at the same time working the lock cylinder forward. (See Fig. 2).

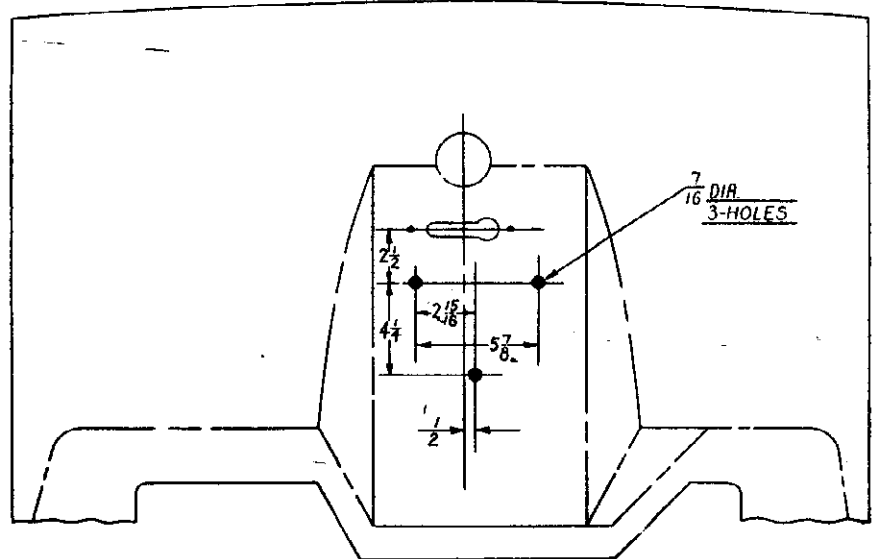


FIGURE 1

Studebaker Stock No. AC-207. This kit includes a steering column control unit with the proper length flexible shafts and all the necessary hardware for installation on the steering column.

Control Shaft Installation

Turn the volume control (lower knob in panel mounting, left hand knob in steering column mounting) to a position where the key will lock it. Loosen the set screws in both shaft couplings and connect the volume control shaft to the rear coupling (nearest the dash). Then connect the tuning control shaft in the front coupling (nearest the front seat) and tighten all the set screws. **Battery Cable Connection (See Fig. 3)**

Connect the battery cable to the Receiver by means of the fuse housing connector which fastens by inserting and making a slight turn clockwise, the other end must be connected to the right side of the ammeter and the cable dressed up behind the Receiver. Be sure the fuse and fuse insulator are placed in the fuse housing before the battery cable is connected to the Receiver.

The antenna cable must be plugged into the receptacle on the left side of the Receiver near the top and run along the instrument board to the left hand windshield post where it must be connected to the car antenna lead and the shielding grounded. Connect the black wire from the dial light on the control unit under the screw on the lower left side of the speaker face.

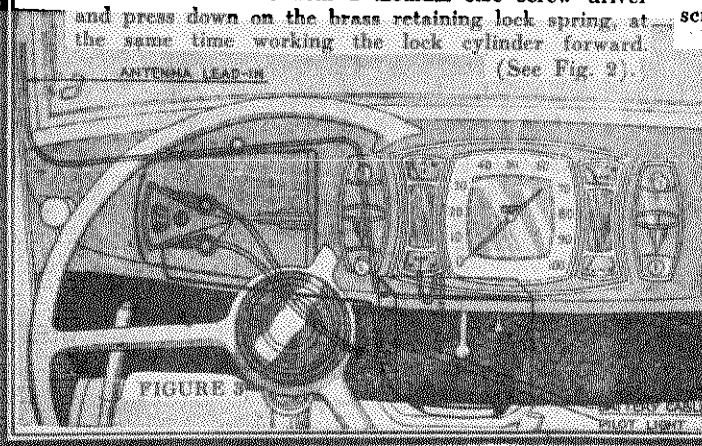


FIGURE 3

MODEL ME Pierce-Arrow
Installation Data

PHILCO RADIO & TELEV. CORP.

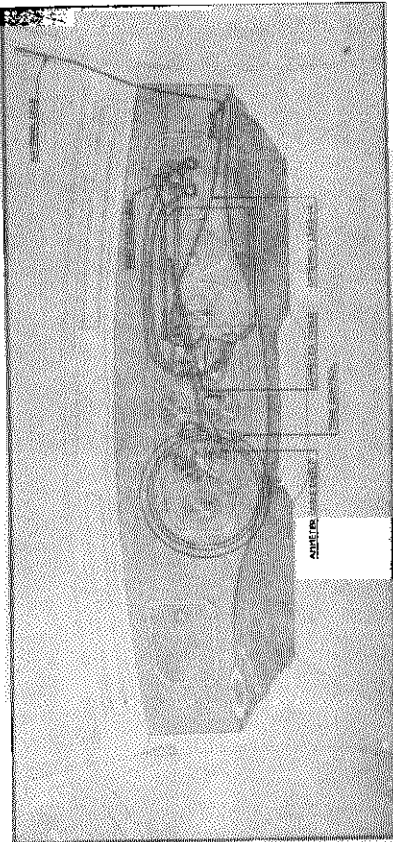


FIGURE 3. Right-Hand Installation

fringe of the instrument board with a small bolt and knob from the right-hand control shaft and loosen the set screw found there. Turn the shaft until the indicator points to the correct number on the dial. Then tighten the set screw and replace the knob. A finer adjustment can be made if this is done on a station between 1000 and 1500 kilocycles.

Wind the dial light wire around the flexible shafts and insert the pilot light connector in the hole in the Receiver housing just above the flexible shaft bushings.

Ignition and Generator Interference Suppression
Two interference condensers are supplied — one must be fastened under the inside generator relay leg and the lead connected to the battery side of the relay. The second condenser must be fastened under an ignition coil mounting screw and the lead connected to the ammeter side of the coil.

Cut the spark plug terminals from the spark plug wires and screw on the spark plug resistors and snap them in place. Cut each distributor-to-coil high-tension wire about 1" from the distributor and screw into it a distributor resistor. Then screw the distributor end of the lead into the resistor and plug into the distributor cap again. Remove the distributor rotor to reduce sparking at this point. Place the end of the rotor on a flat steel block andpeen with a machinists hammer. Both ends must be treated with a double coil system. The more care taken on this operation the better the interference elimination will be. Chalk the end of the rotor each time it is peened to gauge the clearance. See that all high-tension wires entering the distributor cap are seated properly.

These operations should give good elimination; however, in severe cases, all rods and tubes entering the dash should be bound together and grounded to the metal dash. Speaker, antenna and ammeter cables should be dressed and fastened in the position which gives the least motor interference.

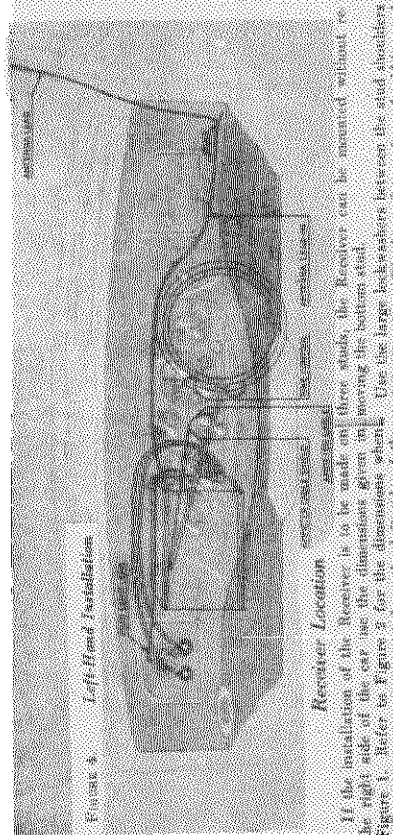


FIGURE 4. Left-Hand Installation

fringe of the instrument board with a small bolt and knob from the right-hand control shaft and loosen the set screw found there. Turn the shaft until the indicator points to the correct number on the dial. Then tighten the set screw and replace the knob. A finer adjustment can be made if this is done on a station between 1000 and 1500 kilocycles.

Wind the dial light wire around the flexible shafts and insert the pilot light connector in the hole in the Receiver housing just above the flexible shaft bushings.

Ignition and Generator Interference Suppression
Two interference condensers are supplied — one must be fastened under the inside generator relay leg and the lead connected to the battery side of the relay. The second condenser must be fastened under an ignition coil mounting screw and the lead connected to the ammeter side of the coil.

Cut the spark plug terminals from the spark plug wires and screw on the spark plug resistors and snap them in place. Cut each distributor-to-coil high-tension wire about 1" from the distributor and screw into it a distributor resistor. Then screw the distributor end of the lead into the resistor and plug into the distributor cap again. Remove the distributor rotor to reduce sparking at this point. Place the end of the rotor on a flat steel block andpeen with a machinists hammer. Both ends must be treated with a double coil system. The more care taken on this operation the better the interference elimination will be. Chalk the end of the rotor each time it is peened to gauge the clearance. See that all high-tension wires entering the distributor cap are seated properly.

These operations should give good elimination; however, in severe cases, all rods and tubes entering the dash should be bound together and grounded to the metal dash. Speaker, antenna and ammeter cables should be dressed and fastened in the position which gives the least motor interference.

Speaker Location

The speaker is mounted with the tone control towards the center of the car. Extra long bolts and a block wood are provided so that the speaker can be given in squarely on the dash. The hole locations are given in Figure 1 and Figure 2.

The felt edge on the round cardboard should be placed next to the rim of the speaker housing and the circular piece of fibre placed in back of cardboard with the cut-out toward the center of the car. The felt and fibre improve the tone of the speaker and keep out dust and must be used.

Wiring Connections

Refer to Figure 3 or 4 as Required
The antenna shielded lead-in should be soldered and taped to the car antenna lead. This lead-in is provided with a plug-in connection which fits into a female connector on the side of the Receiver. The shield pigtail on the end of this lead-in must be grounded to the

Glove Box Door Control

Since the glove box door has already been removed, attach the radio control and dress the flexible control shafts and dial light wire over the top of the Receiver. Refer to Fig. 3 or Fig. 4 as required.

Control Shaft Installation

The flexible shafts each have a split end which engages a pin in the bushing in the Receiver. The right-hand control knob is the station selector. The end of the station selector shaft must be coupled (plugged-in) to the bushing nearest the rubber mounting washers on the end of the Receiver housing. Line up the split end of the shaft with the pin and push it in as far as it will go. Tighten the set screws on the shaft housing bushings. The same procedure must be followed for the left-hand (Switch and Volume Control) shaft.

Turn on the Receiver and tune in a station whose frequency in kilocycles is known. (The numbers on the dial represent channel numbers which, with the addition of a cipher, become the frequency numbers). Pull the

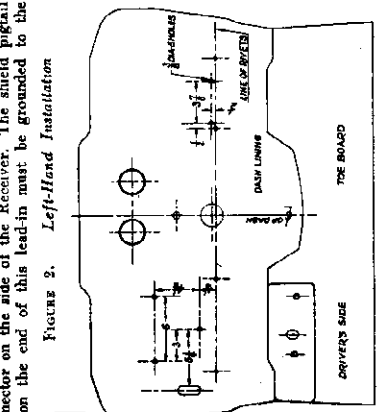


FIGURE 3. Left-Hand Installation

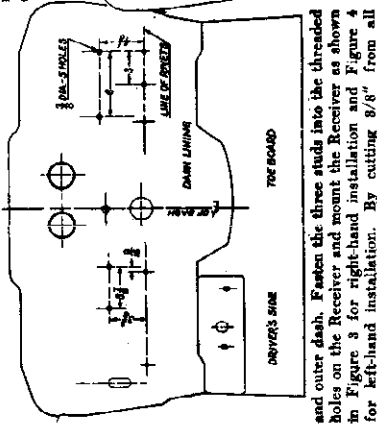


FIGURE 4. Right-Hand Installation

Locate and drill the three 7/16" holes from the inside of the dash, in accordance with Figure 1 or Figure 2 as required. The holes must be located accurately, otherwise there is danger of drilling through the windshield wiper tube which is located between the inner and outer dash. Fasten the three studs into the threaded holes on the Receiver and mount the Receiver as shown in Figure 3 for right-hand installation and Figure 4 for left-hand installation. By cutting 3/8" from all

PHILCO RADIO & TELEV. CORP.

MODEL J Nash (AC-118)
Lafayette 110
Installation Data

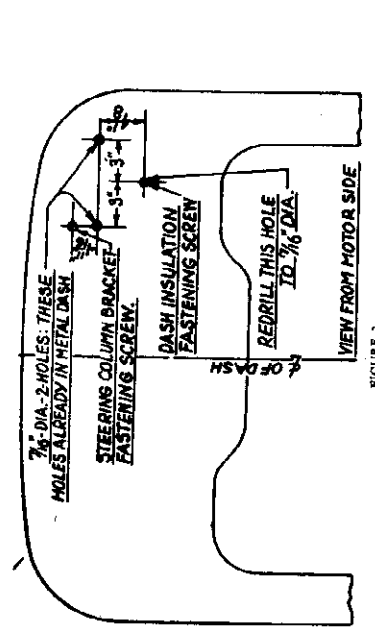


FIGURE 2

port and the condenser mounted on the instrument board flange.

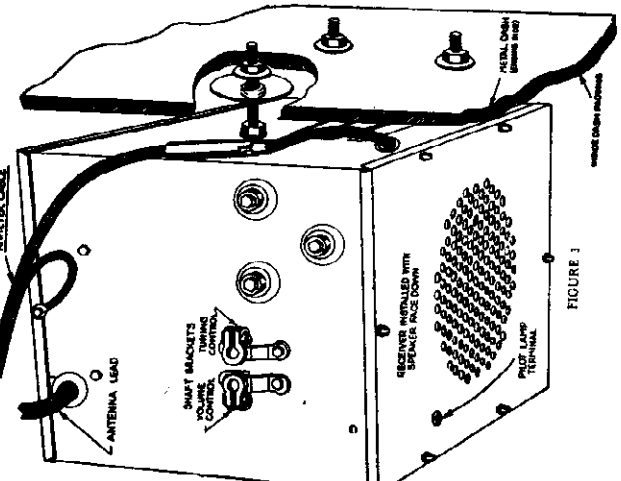


FIGURE 3

aligned. Then tighten the clamp screws and the coupling set screws, and finally tighten the bracket mounting screws.

Battery Connections
Insert the fuse and fuse insulator in the fuse receptacle and connect to the Receiver battery lead as shown in Fig. 3. Connect the black-white lead of the battery cable to the battery side of the ammeter.

The black lead at each end of the battery cable is the shield lead which must be grounded to the back of the instrument panel and under one of the nuts on the Receiver housing. Exercise care when making these connections. The cable must be dressed and secured in place.

The black lead coming from the rear of the control unit must be plugged into the pilot lamp terminal on the speaker panel.

Antenna Lead

Splice the antenna lead in as close as possible to the corner post, dressing it in place above or in back of the Receiver. The shield on the lead must be grounded close to the corner post.

The dial in the control is calibrated in channel numbers, which with the addition of a cipher indicate the frequencies in kilocycles, i.e., 70 on the dial represents 700 kilocycles.

Tune in a broadcast station of known frequency and then loosen the coupling screws on the tuning shaft. Turn the dial to the proper number and tighten set screw again. Then re-check the dial setting.

Ignition and Generator Interference Suppression

A spark plug resistor must be installed on each spark plug. Cut off the angle snap-on terminal from the high-tension lead and screw the spark plug resistor into the lead as far as it will go. Snap the resistor on the spark plug. Cut the distributor-to-coil lead from the distributor and screw distributor resistor into the lead. Then screw the end of the lead into the resistor and reconnect to the distributor.

Install a by-pass condenser on the generator and connect the condenser lead to the generator side of the cut-out relay. The condenser must be fastened in place under the relay mounting screw.

The second condenser must be fastened under the left coil mounting screw and the lead connected to the same side of the coil primary. In some cars it may be necessary to connect a condenser to the dome light wire. The condenser lead must be spliced to the dome light wire at the right pillar

on the bolt. The large flat washer must be placed against the padding on the inside of the dash. Mount the Receiver with the control shaft couplings toward the center of the car and with the speaker facing down. See Fig. 3.

Slip the radio in place, and screw the studs into the holes in the Receiver housing from the outside of the dash. This operation can be made easier if the end of the studs entering the set are slightly tapered.

After the radio is installed, the steering column must be returned to its original position and tightened.

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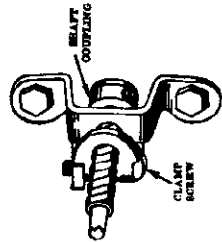


FIGURE 4

REDRILL THESE HOLES TO 3/16"

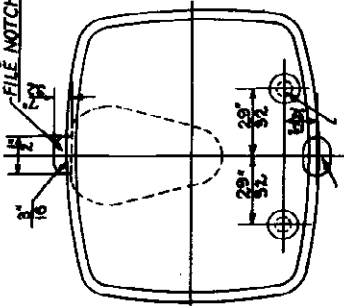


FIGURE 5

These instructions have been carefully prepared for your use in installing the Model "J" Nash Philco automobile radio Receiver in the 1934 Model LaFayette cars. Read thoroughly, then follow the instructions carefully in every detail.

Antenna
The antenna lead in the 1934 Lafayette closed cars is brought down the left front pillar post and is coiled behind the left cowl trim panel.

Instrument Board Control
The instrument board control can be installed more conveniently if this is done as the first operation.

Remove the left dummy ash receptacle door by removing the three nuts behind the instrument panel. Refer to Fig. 1 for dimensions. Pass a piece of paper 1 1/2" wide, 3 1/2" long, over the two lower holes. Pierce holes through the paper with a pencil and draw a center line between them. Drop a vertical line down 18/64" from the center of these holes and mark with a center punch. Drill a 1/16" hole. Remove the paper and elongate the hole horizontally with a round file as shown in Fig. 1. The control shaft holes should now be enlarged with a 3/16" drill. With the file notch at the top of the hole, move the horns on Fig. 5. Remove the horns, remove the control board casing and the set of the instrument board. Mount the cover plate and assemble with the two flat-head machine screws. Dress the flexible control shafts over the top of the instrument board-to-dash bracket.

Receiver Location and Installation

Holes for the two top mounting studs are provided in the metal dash. The single hole on the bottom is occupied by a padding fastening bolt. The locations of these holes are shown in Fig. 3. On certain bodies these holes must be drilled downward a half inch. Install the mounting studs in the dash holes. Drop the steering column to its lowest position by loosening the two bolts on the steering column bracket. This will facilitate the installation of the radio behind the steering column.

In fastening the studs to the Receiver, the lock washer must be placed between the Receiver and the shoulder

Connecting Control Shafts

The flexible shafts are coupled to the control unit when shipped from the factory. The right-hand knob on the control is the tuning control—the left-hand knob is the volume control and switch. The volume control must be locked with the key at the control. The flexible shafts should be dressed above the center of the board-to-dash bracket towards the center of the car and then curved down and around to the couplings on the Receiver. Loosen the small set screws, and the clamp screws on the shaft couplings and clamp brackets. See Fig. 4. The volume control and switch in the Receiver must be turned all the way off (counter-clockwise). The volume control coupling is the one nearest the front edge of the Receiver. The tuning control coupling is nearest the dash.

Seat the casings and shafts in the brackets and shaft couplings. Loosen the bracket mounting screws sufficiently so that the shafts and couplings are correctly

MODEL Junior AC-236 Stud **MODEL J Nash (AC-1289)**
MODEL J Nash (AC-1189 PHILCO RADIO & TELEV. CORP. Schematic, Parts List
Lafayette 110 Series

Model J Nash-Philco Lafayette 110 Series Model AC-1189
 Items 1 to 61 in the list at the left are identical for Model AC-1189. See following items for additional accessories.

- Spark Plug Resistors.....33-1101
- Distributor Resistor.....33-1103
- Screw-Type Resistor.....4851
- Interference Condenser.....30-4007
- Dial.....27-5041
- 4-Prong Socket.....27-6008
- 5-Prong Socket.....27-6014
- 6-Prong Socket.....6417
- Studs.....28-6036
- Nuts (Mounting).....W55
- Knob.....03094
- Battery Cable.....38-5296
- Instrument Panel Control.....42-5169
- Fuse.....7227
- Fuse Insulator.....27-7131
- Keys.....6091

Model J Nash-Philco Model AC-1289
 Items 1 to 61 in the list at the left are identical for Model AC-1289. See following items for additional accessories.

- Ins. Panel Control Deluxe.....42-5183
- Ins. Panel Con. Standard.....42-5182
- Fuse.....7227
- Fuse Insulator.....27-7131
- Keys.....6091
- 4-Prong Socket.....27-6008
- 5-Prong Socket.....27-6014
- 6-Prong Socket.....6417
- Spark Plug Resistors.....33-1101
- Distributor Resistor.....33-1103
- Screw-Type Resistor.....4851
- Interference Condenser.....30-4007
- Dial.....27-5041
- Studs.....28-6036
- Nuts (Mounting).....W55
- Knob.....03094
- Battery Cable.....38-5296

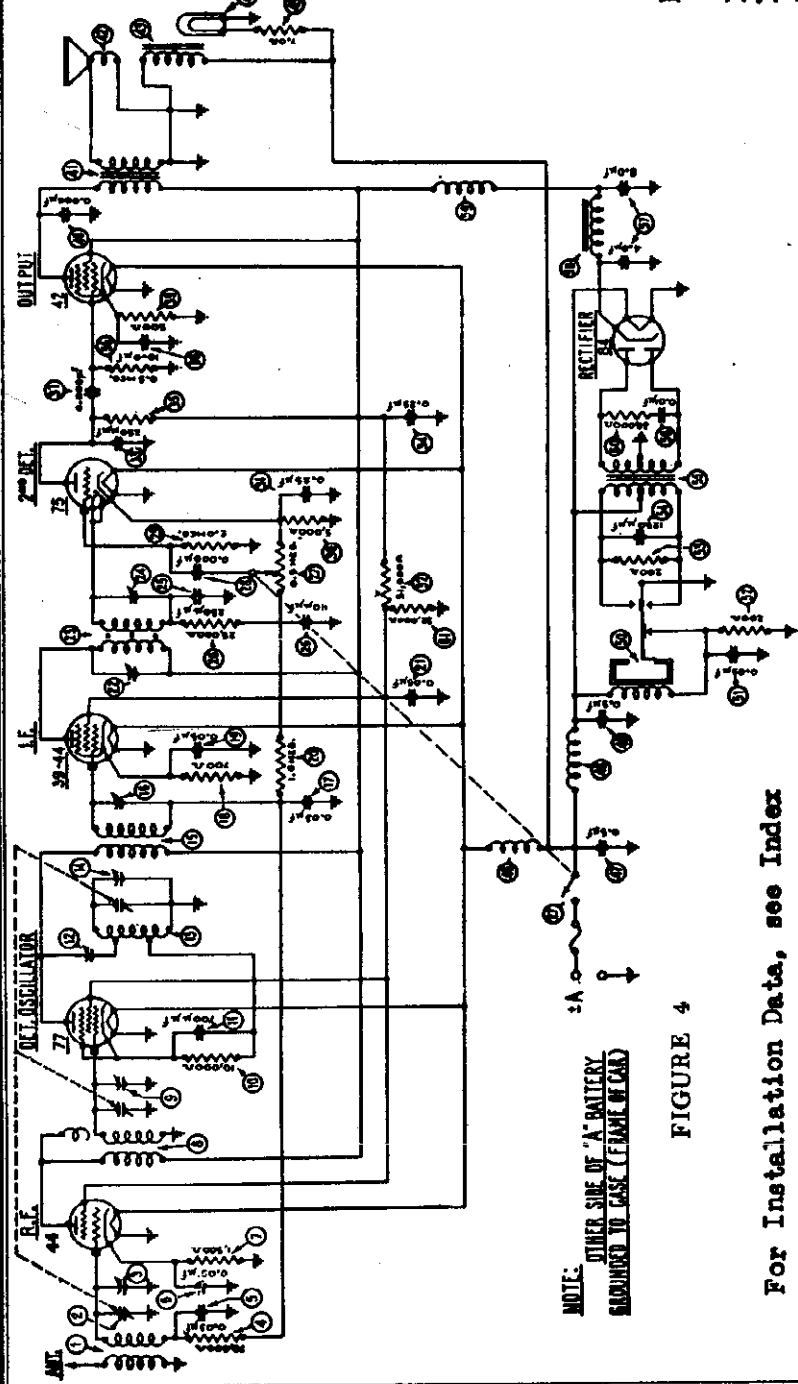


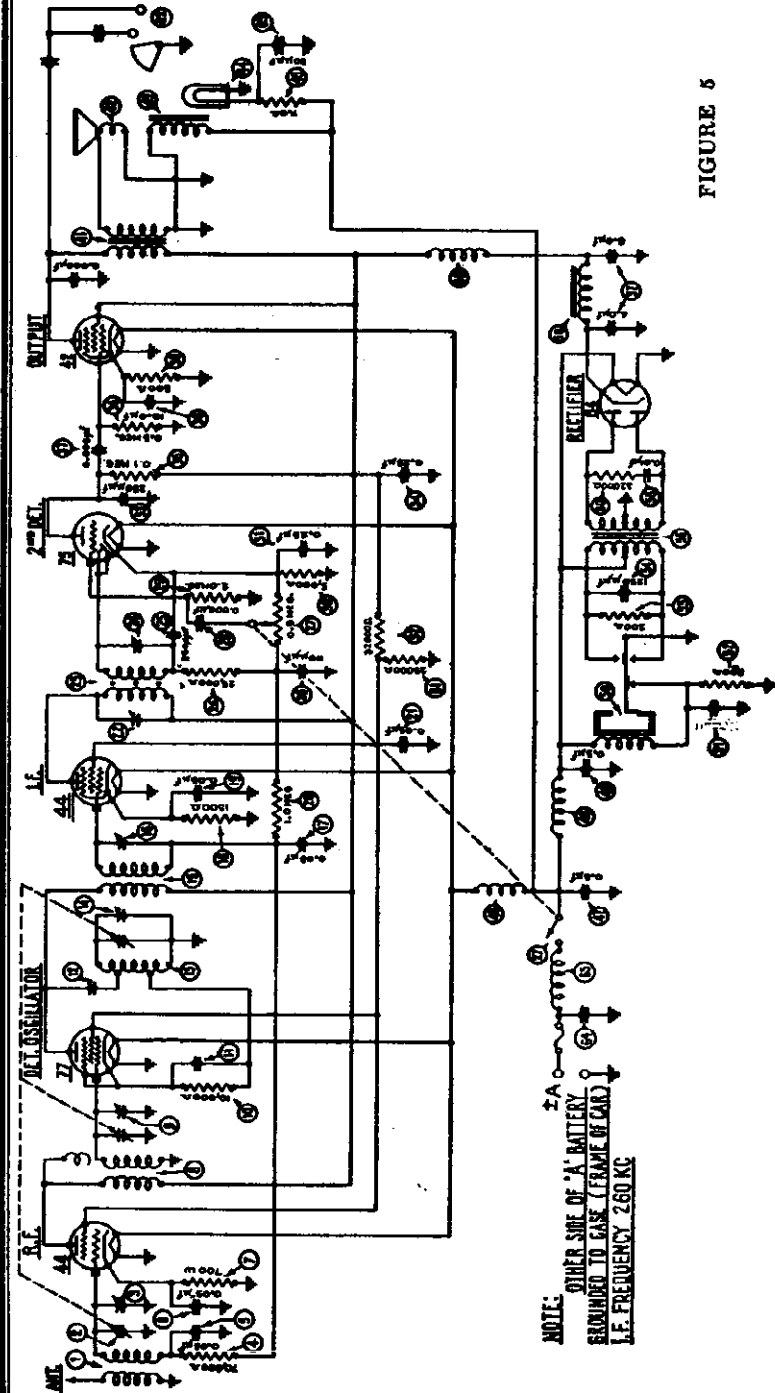
FIGURE 4

For Installation Data, see Index

STUDEBAKER JUNIOR MODEL AC-236 PARTS LIST

- 1 Antenna Transformer.....32-1331
- 2 Tuning Condenser.....31-1149
- 3 1st Padder (on tun. cond.).....33-1115
- 4 Resistor (70,000 ohms).....30-4026
- 5 Condenser (.08 mfd.).....30-4020
- 6 Condenser (.05 mfd.).....33-3047
- 7 Resistor (1500 ohms).....32-1332
- 8 2nd Padder (on tun. cond.).....33-1000
- 9 Resistor (10,000 ohms).....5983
- 10 Condenser (.0007 mfd.).....5983
- 11 Padder (Pri. 1st I. F. Tran.).....32-1333
- 12 Oscillator Transformer.....32-1329
- 13 3rd Padder (on tun. cond.).....30-4025
- 14 1st I. F. Transformer.....6443
- 15 Padder (Sec. 1st I. F. Tran.).....6443
- 16 Condenser (.03 mfd.).....30-4025
- 17 Resistor (700 ohms).....6443
- 18 Condenser (.06 mfd.).....30-4020
- 19 Resistor (1,000,000 ohms).....33-1006
- 20 Condenser (.006 mfd.).....30-4024
- 21 Condenser (.05 mfd.).....30-4020
- 22 Paddlers (Prim. 2nd I. F.).....22-1287
- 23 2nd I. F. Transformer.....33-1913
- 24 Padder (Sec. 2nd I. F. Tran.).....33-3035
- 25 Cond. (.00011-00025 mfd.).....32-1268
- 26 Resistor (25,000 ohms).....30-4047
- 27 Vol. Con. & Switch Assm.32-1235
- 28 Condenser (.006 mfd.).....30-4125
- 29 Resistor (2,000,000 ohms).....32-1025
- 30 Resistor (5000 ohms).....33-1001
- 31 Condenser (.25 mfd.).....30-4146
- 32 Resistor (51,000 ohms).....5983
- 33 Condenser (.00025 mfd.).....3062
- 34 Condenser (.25 mfd.).....6099
- 35 Resistor (100,000 ohms).....6099
- 36 Resistor (600,000 ohms).....6097
- 37 Padder (Sec. 1st I. F. Tran.).....30-4126
- 38 Condenser (.06 mfd.).....7440
- 39 Resistor (600 ohms).....33-3031
- 40 Condenser (.006 mfd.).....30-4024
- 41 Output Transformer.....32-7214
- 42 Core & Voice Coil.....02861
- 43 Field Coil Assembly.....36-3097
- 44 Pilot Light.....6608
- 45 Resistor (7 ohms).....33-3035
- 46 "A" Choke.....32-1268
- 47 Condenser (.5 mfd.).....30-4047
- 48 Vibrator Choke.....32-1235
- 49 Condenser (.5 mfd.).....30-4147
- 50 Vibrator Unit.....38-5036
- 51 Condenser (.05 mfd.).....30-4038
- 52 Resistor (200 ohms).....7217
- 53 Resistor (200 ohms).....7217
- 54 Condenser (.00125 mfd.).....5898
- 55 Power Transformer.....32-7216
- 56 Condenser (.01 mfd.).....30-4031
- 57 Condenser (.4-8. mfd.).....30-2072
- 58 "B" Choke.....32-7215
- 59 R. F. Choke.....32-1281
- 60 Resistor (30,000 ohms).....7886
- 61 Resistor (32,000 ohms).....3525
- 62 Spark Plug Resistor.....4531
- 63 Distributor Resistor.....4546
- 64 Screw Type Resistor.....4851
- 65 Interference Condenser.....30-4007
- 66 Dial.....27-6090
- 67 Stud.....28-6036
- 68 Nut (mounting).....W56A
- 69 Knob (tuning).....08334
- 70 Knob (volume).....09896
- 71 Battery Cable.....38-5296
- 72 Acorn Nut.....W821
- 73 Fuse.....7227
- 74 Fuse Insulator.....27-7131
- 75 4-Prong Socket.....27-6008
- 76 5-Prong Socket.....27-6014
- 77 6-Prong Socket.....6417
- 78 Instrument Panel Control.....42-5169
- 79 Steering Column Control.....42-5166

MODEL Q Nash (AC-1089)
 PHILCO RADIO & TELEV. CORP For Lafayette 110 Ser.
 Schematic, Parts List



NOTE: OTHER SIDE OF 'A' BATTERY
 MOUNTED TO CASE (FRAME OF CAB.)
 I.F. FREQUENCY 260 KC

FIGURE 5

NASH - PHILCO MODEL AC 1089 PARTS LIST

1 Antenna Transformer.....	32-1331	29 Resistor (7 ohms).....	32-3035
2 Tuning Condenser.....	31-1340	30 "A" Choke.....	32-1402
3 1st Padder (in tun. cond.).....	33-1115	31 Condenser (.5 mfd.).....	30-1194
4 Resistor (70,000 ohms).....	30-4025	32 Vibrator Choke.....	32-1235
5 Condenser (.03 mfd.).....	30-4026	33 Condenser (.5 mfd.).....	30-4015
6 Condenser (.05 mfd.).....	30-4020	34 Vibrator.....	28-5206
7 Resistor (700 ohms).....	6443	35 Condenser (.02 mfd.).....	30-4039
8 R. F. Transformer.....	32-1332	36 Resistor (200 ohms).....	7217
9 2nd Padder (in tun. cond.).....	32-1000	37 Resistor (200 ohms).....	7217
10 Resistor (10,000 ohms).....	30-1032	38 Condenser (.00125 mfd.).....	5886
11 Condenser (.00025 mfd.).....	30-1032	39 Power Transformer.....	32-7216
12 Padder (Pri. 1st I. F. Tran.).....	32-1333	40 Condenser (.01 mfd.).....	30-4051
13 Oscillator Transformer.....	32-1333	41 Condenser (25 mfd.).....	04360
14 1st I. F. Transformer.....	32-1329	42 Resistor (100,000 ohms).....	6099
15 Padder (Sec. 1st I. F. Tran.).....	30-4025	43 Resistor (500,000 ohms).....	6097
16 Condenser (.03 mfd.).....	33-3048	44 Condenser (.008 mfd.).....	30-4125
17 Resistor (2000 ohms).....	30-4020	45 Resistor (10 mfd.).....	30-2072
18 Condenser (.05 mfd.).....	33-1096	46 Resistor (500 ohms).....	33-3031
19 Resistor (1,000,000 ohms).....	30-4020	47 Output Transformer.....	32-7245
20 Condenser (.05 mfd.).....	30-4020	48 Case & Voice Coil.....	36-3157
21 Padder (Pri. 2nd I. F. Tran.).....	34-2031	49 Field Coil Assembly.....	36-3046
22 Spark Plug Resistors.....	33-1101	50 "A" Choke.....	32-1474
23 Distributor Resistor.....	33-1102	51 2nd I. F. Transformer.....	32-1237
24 Interference Condenser.....	30-4007	52 Padder (Sec. 2nd I. F. Tran.).....	30-1032
25 Nuts (mounting).....	W1554	53 Condenser (.00011 mfd.).....	30-1031
26 Battery Cable.....	28-5206	54 Resistor (25,000 ohms).....	33-1013
27 Acorn Nut.....	W521	55 Vol. Con. & Switch Assem.....	38-5806
28 Fuse.....	7227	56 Condenser (.008 mfd.).....	30-4125
29 Fuse Insulator.....	27-7131	57 Resistor (2,000,000 ohms).....	32-1025
30 Studs.....	28-0396	58 Resistor (5000 ohms).....	6066
31 Knob.....	08004	59 Condenser (.25 mfd.).....	30-4146
32 Dial.....	27-5041	60 Resistor (32,000 ohms).....	3525
33 Antenna Lead.....	28-5131	61 Condenser (.00025 mfd.).....	3092
34 4-prong Socket.....	27-6016	62 Condenser (25 mfd.).....	04360
35 5-prong Socket.....	27-6014	63 Resistor (100,000 ohms).....	6099
36 6-prong Socket.....	27-6020	64 Resistor (500,000 ohms).....	6097
37 Shaft (volume).....	28-5133	65 Condenser (.008 mfd.).....	30-4125
38 Shaft (tuning).....	28-5131	66 Resistor (10 mfd.).....	30-2072

MODEL Q Nash (AC-1089)
For Lafayette 110 PHILCO RADIO & TELEV. CORP.
Installation Data

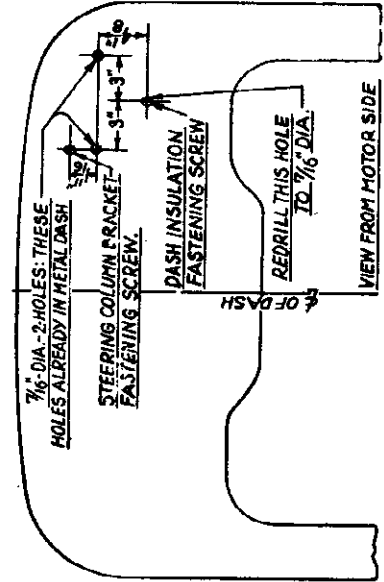


FIGURE 2

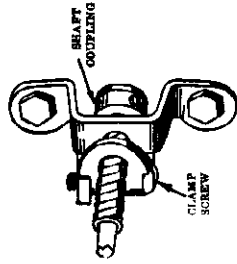


FIGURE 3

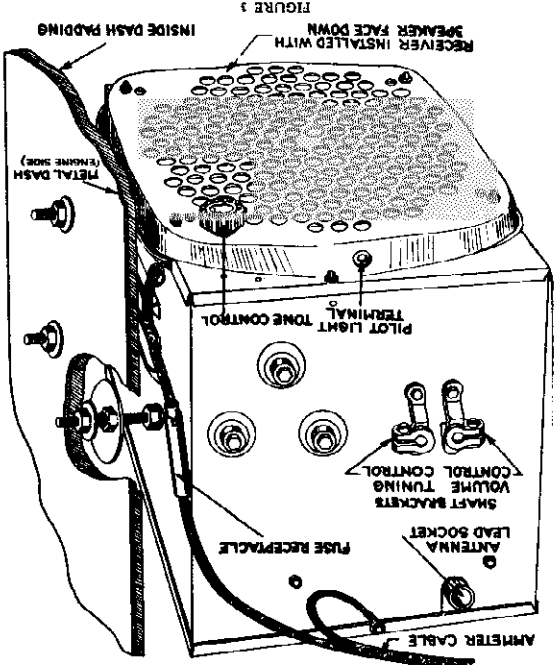


FIGURE 4

aligned. Then tighten the coupling clamp screws and the coupling set screws, and finally tighten the bracket mounting screws.

Battery Connections

Insert the fuse and fuse insulator in the fuse receptacle and connect to the Receiver battery lead as shown in Fig. 3. Connect the black-white lead of the battery cable to the battery side of the ammeter.

The black lead at each end of the battery cable is the shield lead which must be grounded to the back of the instrument panel and under housing. Exercise care when making these connections. The cable must be dressed and secured in place.

The black lead coming from the rear of the control unit must be plugged into the pilot lamp terminal on the speaker panel.

Antenna Lead

Splice the antenna lead in as close as possible to the corner post, dressing it in place above or in back of the Receiver. The shield on the lead must be grounded close to the corner post.

General Installation Instructions
FOR 110 SERIES LAFAYETTE CARS
 Sold Exclusively by Nash Dealers
 Custom Built by Philco

These instructions have been carefully prepared for your use in installing the Model Q Nash-Philco automobile radio Receiver in the 1934 Model Lafayette cars. Read thoroughly, then follow the instructions carefully in every detail.

Antenna

The antenna lead in the 1934 Lafayette closed cars is brought down the left front pillar post and is coiled behind the left cowl trim panel.

Instrument Board Control

The instrument board control can be installed more conveniently if this is done as the first operation.

Remove the left dummy ash receptacle door by removing the three nuts behind the instrument panel. Refer to Fig. 1 for dimensions. Paste a piece of paper 1 1/2" wide, 3 1/2" long, over the two lower holes. Pierce holes through the paper with a pencil and draw a center line between them. Drop a vertical line down 18/82" from the center of these holes and mark with a center punch. Drill a 3/16" hole. Remove the paper and elongate the hole horizontally with a round file, as shown on Fig. 1. The control shaft holes should now be enlarged with a 3/16" drill. With a round file, notch the top of the large hole, as shown on Fig. 1. Remove the burrs. Assemble the felt washer between the control head casting and the back of the instrument board. Mount the cover plate and assemble with the two flat-head machine screws. Dress the flexible control shafts over the top of the instrument board-to-dash bracket.

Receiver Location and Installation

Holes for the two top mounting studs are provided in the metal dash. The single hole on the bottom is occupied by a padding fastening bolt. The locations of these holes are shown in Fig. 2. On certain bodies these holes must be slotted downward a half inch. Install the mounting studs in the dash holes. Drop the steering column to its lowest position by loosening the two bolts on the steering column bracket. This will facilitate the installation of the radio behind the steering column.

In fastening the studs to the Receiver, the lock washer must be placed between the Receiver and the shoulder

on the bolt. The large flat washer must be placed against the padding on the inside of the dash. Mount the Receiver with the control shaft couplings toward the center of the car and with the speaker facing down. See Fig. 3.

Slip the radio in place, and screw the studs into the holes in the Receiver housing from the outside of the dash. This operation can be made easier if the end of the studs entering the set are slightly tapered.

After the radio is installed, the steering column must be returned to its original position and tightened.

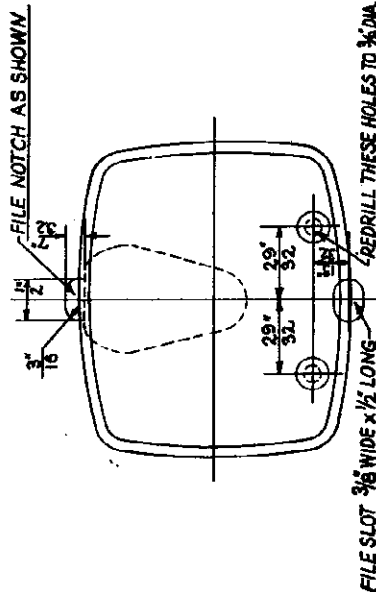


FIGURE 1

Connecting Control Shafts

The flexible shafts are coupled to the control unit when shipped from the factory. The right-hand knob on the control is the tuning control—the left-hand knob is the volume control and switch. The volume control must be locked with the key at the control. The flexible shafts should be dressed above the instrument board-to-dash bracket towards the center of the car and then curved down and around to the couplings on the Receiver. Loosen the small set screws and the clamp screws on the shaft couplings and clamp brackets. See Fig. 4. The volume control and switch in the Receiver must be turned all the way off (counter clockwise). The volume control coupling is the one nearest the front edge of the Receiver. The tuning control coupling is nearest the dash.

Seat the casings and shafts in the brackets and shaft couplings. Loosen the bracket mounting screws sufficiently so that the shafts and couplings are correctly

PHILCO RADIO & TELEV. CORP.

MODEL PA Packard
Schematic, Chassis
Wiring, Parts List

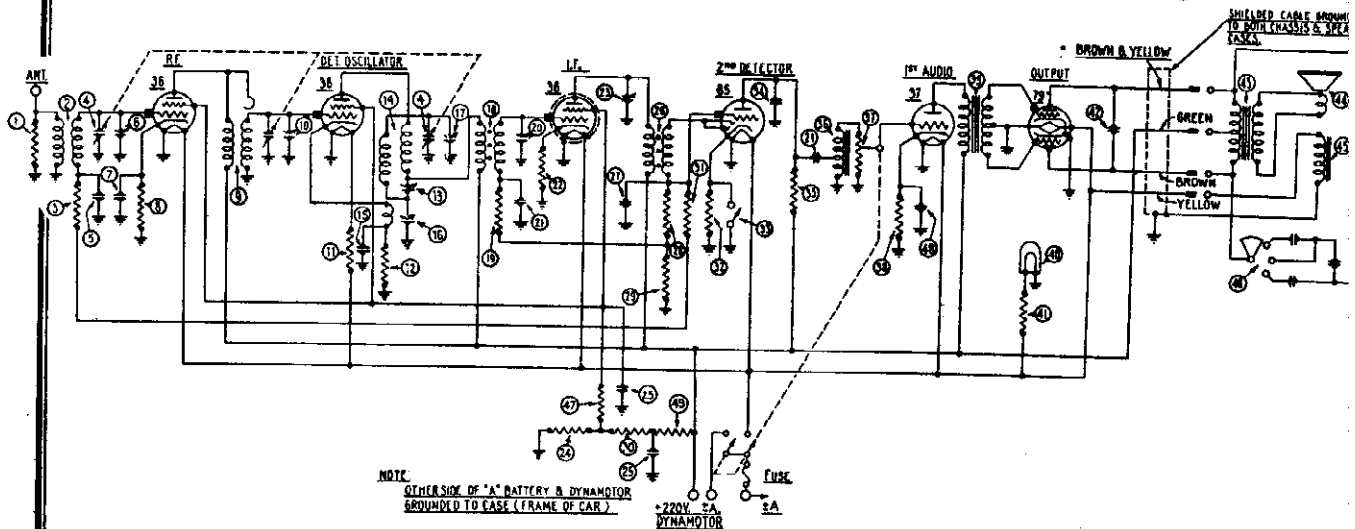


DIAGRAM C

MODEL PA PARTS LIST

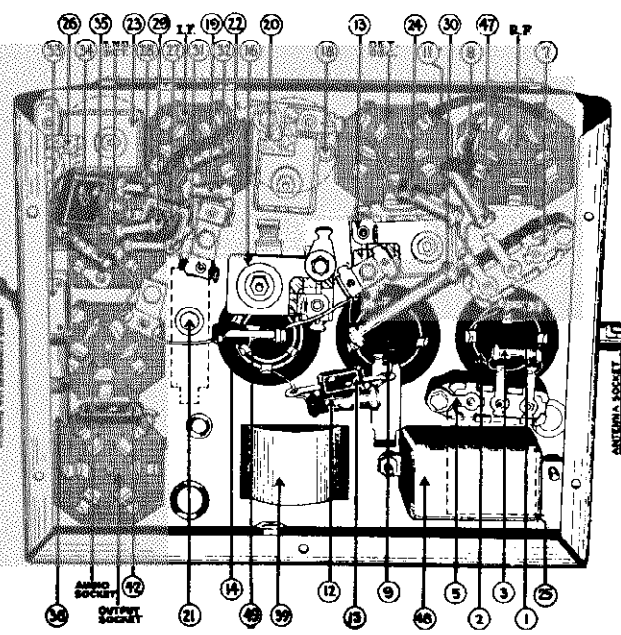


DIAGRAM D

No. in Figs. 1 and 2	Description	Part No.	No. in Figs. 1 and 2	Description	Part No.
1	Resistor (5,000 ohm)	6076	29	Resistor (100,000 ohm)	608
2	Antenna Coil	06914	30	Resistor (20,000 ohm)	664
3	Resistor (100,000 ohm)	6099	31	Resistor (500,000 ohm)	608
4	Tuning Condenser	04308	32	Resistor (5,000 ohm)	609
5	By-pass Condenser (.05 mfd.)	3615-AN	33	Switch	546
6	Compensator section on tuning condenser	3615-AY	34	Condenser (.00125 mfd.)	588
7	By-pass Condenser	3615-AY	35	Resistor (50,000 ohm)	451
8	Resistor (500 ohm)	6977	36	Audio Transformer	755
9	R. F. Transformer	06915	37	Volume Control	752
10	Compensator section on tuning condenser	04000-S	38	Resistor (2,500 ohm)	777
11	Resistor (2.7 ohm)	6511	39	Input Transformer	765
12	Resistor (13,000 ohm)	8267	40	Pilot Lamp	660
13	Compensator	04000-J	41	Resistor (7 ohm)	5111
14	Oscillator Coil	06916	42	Condenser (.06 mfd.)	635
15	Condenser (.0007 mfd.)	4520	43	Output Transformer	251
16	Compensating Condenser	04000-S	44	Speaker Coil and Cone	0282
17	Compensator section on tuning condenser	04000-S	45	Speaker Field Pot	0279
18	First I. F. Transformer	06932	46	Tone Control	0590
19	Resistor (500,000 ohm)	6097	47	Resistor (25,000 ohm)	451
20	Compensating Cond.	04000-X	48	Condenser	777
21	Condenser (.05 mfd., .15 mfd.)	08091	49	Resistor (8,000 ohm)	783
22	Resistor (500 ohm)	6977	50	Dial	825
23	Compensating Cond.	04000-X	51	Battery Cable	41-365
24	Resistor (20,000 ohm)	6650	52	Antenna Lead	38-516
25	Cond. (.5 mfd., .25 mfd.)	06088	53	Packard Dynamotor	41-100
26	Second I. F. Transformer	05970	54	Key	609
27	Condenser (.00025 mfd.)	3082	55	Studs	28-608
28	Resistor (100,000 ohm)	6099	56	Nuts (Studs)	W-5
			57	Spark Plug Resistor	33-101
			58	Distributor Resistor	33-101
			59	Spark Plug Terminals	28-605
			60	Interference Condenser	452

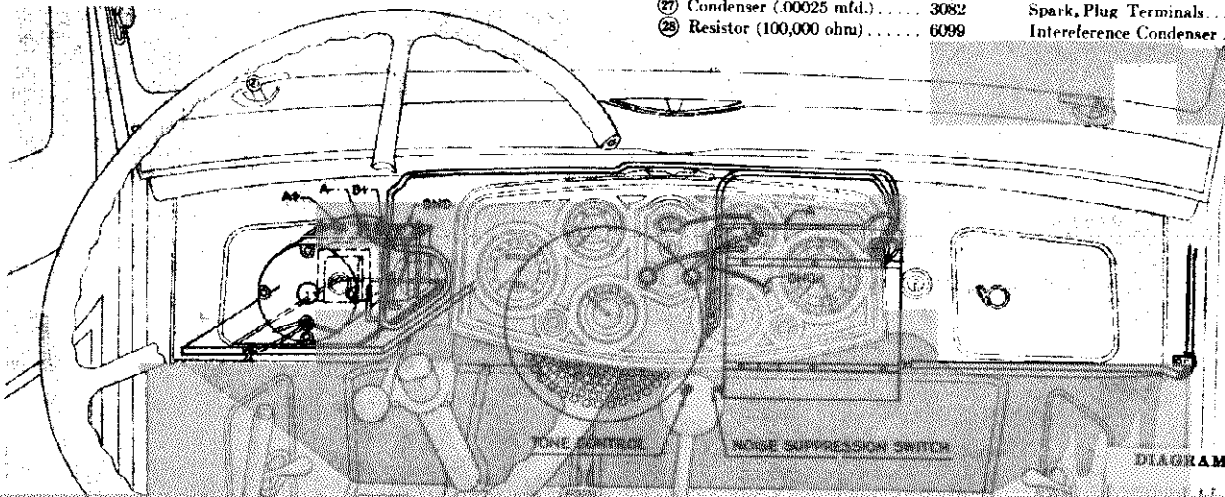


DIAGRAM B

MODEL PA Packard Installation Data

PHILCO RADIO & TELEV. CORP.

to mount a condenser in the coil bracket, using the right front coil mounting screw as a means of attachment. The condenser can be installed by passing the condenser lead through the coil hole provided in the coil bracket and attaching to one of the terminals on the lower side of the coil to which a brass strip is fastened. Replace the unit when the condenser is removed through the channel. Loosen the second condenser under outside generator relay mounting screw and connect wire to the battery terminal of relay.

On eight-cylinder cars it will generally be best to locate the first condenser under the clock clamp screw with the wire fastened to the antenna side of ignition switch. The generator condenser is then mounted as before.

Cut off the spark plug terminal wire from the high tension unit, after which the small round nuts (furnished with spark plugs and the resistors strapped in place. Cut distributor to coil high tension wire about one inch from distributor lead and insert screw-type distributor resistors. Wire the distributor resistors in the following order: the resistor between coil and distributor will sometimes be unnecessary, thus tending to improve throttling and idling. In all cases, however, spark plug gap should be increased from the standard .025" to .030". Spark plugs with built-in resistors can be used in place of the detachable type if desired, in which case the terminals on the spark plug wires are not cut off.

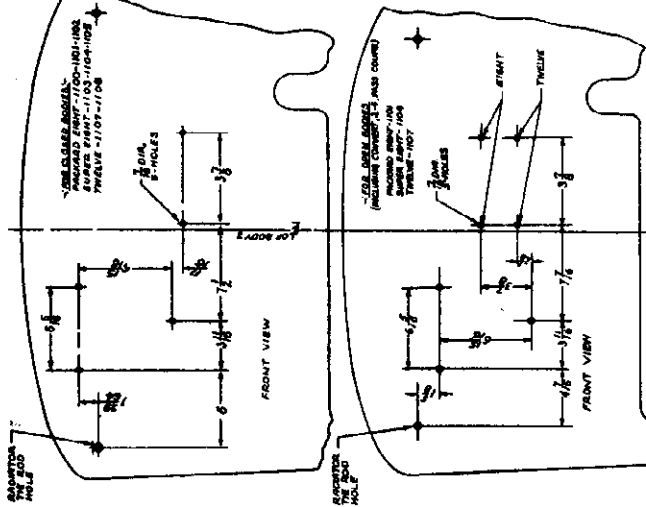
To check for ignition interference, disconnect the antenna from car. Turn on receiver and observe the speaker volume. If the volume drops when the spark plug control is in the electrical system of the car when the volume control is about three-fourths open and the lock-down distance switch pointing to rear of car, carefully relocate speaker cable and battery cable to a point where the noise is reduced to a minimum. If relocation of these two cables does not practically eliminate ignition interference, it will then be advisable to peer the distributor rotor arm.

Feeding the Rotor Arm Place the ends of the rotor on a steel block and peen with a small machinist hammer, extending them about .005". Both ends must be so treated with a double coil screw.

The greatest care must be taken in performing the operation to make sure the rotor arm itself does not strike the stationary contacts after the rotor and cap have been replaced without turning on the ignition key, peen the rotor arm and the rotor arm at the contact points to be sure that the end part of the arm is not striking the stationary contacts.

Start the motor again and the volume of noise should now be down to a minimum. If not, relocate the speaker and battery cables slightly. If generator interference is encountered, it can usually be eliminated by cleaning the commutator and reworking the brushes. This noise can easily be isolated by speeding up the engine and setting off ignition to make sure it is not responsible.

Connect the antenna lead to the receiver, lock-down noise and relocate speaker and battery cables if necessary.



PACKARD DE LUXE RADIO—Installation Dash Layout for Packard Models 1100, 1101, 1102, 1103, 1104, 1107, 1108

of high voltage to ground. This man-made static cannot be eliminated by any receiver, but its effects will be minimized if the dial is set by turning in the rotor arm and plugged along with the radio signal, and a stationary powerful local noise less amplification, thus enabling it to ride over unwanted noises.

When turning off the receiver be sure the left-hand knob is turned counter-clockwise until a definite click is heard, otherwise the receiver may continue to operate and run down the battery.

Dynamotor

The dynamotor is so designed that it can be installed in the left-hand glove compartment. Pull the dynamotor cable through the hole in the upper corner of the box and connect the white lead of this cable to the "A" terminal of the dynamotor. The blue lead must be shielded by the cable wrapped under the left-hand terminal strip.

Slide the complete unit into the glove compartment, making sure that the rubber mat is not doubled up and that the cables are dressed neatly in place. The dynamotor grounding strip must be securely attached to the instrument board and a convenient mount is easily provided by replacing the left-hand screw that holds the glove compartment to the panel with a longer one.

On open models the rubber mat must be removed to permit the dynamotor to slide through the glove compartment door. Following the installation of the dynamotor as previously described, the rubber mat can be attached to the dynamotor in the glove compartment, replacing the rivets with small screws.

Femion and Generator Interference Suppression On the twelve-cylinder cars provision has been made

Control Shaft Installation

Remove the front cover plate from the receiver. Turn the left-hand knob (volume control) to a point where the key will lock it freely in position. Insert this shaft and control knob right-hand receiver. Note on the front of control knob right-hand receiver. Note on the front of control knob right-hand receiver. Note on the front of control knob right-hand receiver.

Battery Cable Location and Connections

Plug the cable into the receptacle at the front of the receiver and run the battery portion sharply upwards to the rear above the instrument board and follow this recess to the left-side glove compartment, where the dynamotor cable passes into the glove compartment through a hole located near the forward edge of the box. The "A" or two-wire cable should be run to the antenna, keeping it as close to the instrument board as possible. Connect the free wire (small closed terminal) to the discharge side of the sumner and the shield (equipped with spark terminal—wire marked "GND") should be connected to the black wire from the left-hand clamp screw. Connect the black wire from the left-hand clamp screw to the left-hand terminal on the face of the receiver. The speaker cable is plugged into the receptacle on the speaker and the ground tabs on the cable are fastened under a screw head on the receiver and speaker. The antenna lead-in should then be plugged into the receiver, the cable being carried along the dash in the rear of the right glove compartment, using the glove compartment rear bracket as a means of support. This lead-in should be plugged to the antenna lead-in, which will be found behind and taped back of the coil trim panel. Any excess cable should be cut off, using enough lead in to make a neat installation. The lead-in provided with the receiver must be connected with the antenna lead-in, which should be wrapped around the antenna lead-in shield and carefully taped.

Operating Instructions

The receiver is placed in operation by turning the left-hand knob on the control head in a clockwise position. After tubes have been warmed up a minute or so, resonance will be indicated by a rushing sound, and any station within range can be tuned in by manipulating the right-hand knob, after which the volume is set to the desired level with the left. The small snap switch on the left end of the receiver cabinet should be pulled to the rear (towards the front seat) for maximum sensitivity when operating in the country or quiet part of the city. When driving close to the broadcast station being received, the volume control should be turned to the "mute" position. The best results are often obtained by lowering the switch forward.

Ordinarily the tone control (on the loud speaker) should be fully opened by turning in a clockwise direction and then turned back (counter-clockwise) one or two notches, which will give the best compromise between tonal brilliancy and minimum noise. When operating extremely noisy parts of the city, however (as when following a street car), it will sometimes be advisable to turn this control in a clockwise direction as far as it will go. When operating in the immediate vicinity of a power line or ear tracks, tramping or snapping noises are quite likely to be a nuisance, due to leakage

These instructions are intended to assist you when installing the Packard De Luxe Car Radio and should be carefully read before starting work. The installation should be completed as follows:

Antenna

All enclosed cars manufactured after January 1, 1935, are equipped with a roof type antenna, the lead-in from which is brought down inside the right pillar post and coiled behind the coil trim panel. Antennas suitable for open and convertible cars can be secured from the Factory on special orders and are easily installed by snapping in place. Detailed information on these units can be secured by writing the Accessory Division of Packard Motor Car Company.

Receiver and Speaker Location

Refer to the diagram "A" showing location of the holes to be drilled in the instrument panel. The holes and mark with a sharp punch; then use the template furnished to locate the speaker, drilling with 7/16 inch drill. On Packard Twelve models you may find it difficult to locate and drill the speaker holes from the motor side of the dash, and if so, this work can be done from the body side, providing care is taken to avoid cutting the vacuum and oil lines.

On Packard Eight models the receiver must be spaced out enough to allow the speedometer cable to pass behind it. This can be accomplished by pinning two or three washers on the lower mounting stud before the receiver is mounted, using the larger washer furnished next to the mounting stud.

Control Unit

On cars where provision has been made to mount the control unit in the instrument panel a finish plate is used to fill the opening. Remove this plate by loosening the three hold-down clamps at the rear of the instrument panel. The radio control unit can then be put in place (using the gasket formerly provided for the plate) and secured by the three hold-down clamps.

Notes

Note—As the finish on instrument panels varies with different models of Packard cars, it may be desirable to match the finish plate of the radio control unit to the panel in which it is to be installed. The various instrument panels and finish plates to match the various control units in the instrument panel, it should be located on the steering column, either at the right side of the post or in a vertical position directly above it. A generally satisfactory location is to the right, approximately six inches below the steering wheel hub. Cut off the metal strap to proper length and mount bracket, using the long machine screw with one turn of friction tape between column and strap. Mount control unit on brackets in a vertical position.

Tuning Up Receiver

As the tuning dial is calibrated in kilocycles, it may be necessary to line it up with the receiver, so stations may be tuned in at the proper points, this being accomplished as follows: Set the tuning dial to line up with the extra division below 130 and insert a blunt-pointed wire or match through the small hole located at the back of the control unit close to the tuning knob. Next carefully adjust the tuning knob to the next extra division below 130 and turn the knob to the extra counter-clockwise limit and release the tuning dial. It should now line up and can be checked by tuning in stations whose operating frequency is known.

PHILCO RADIO & TELEV. CORP.

MODEL PB Packard
Schematic, Chassis
Parts List, Socket

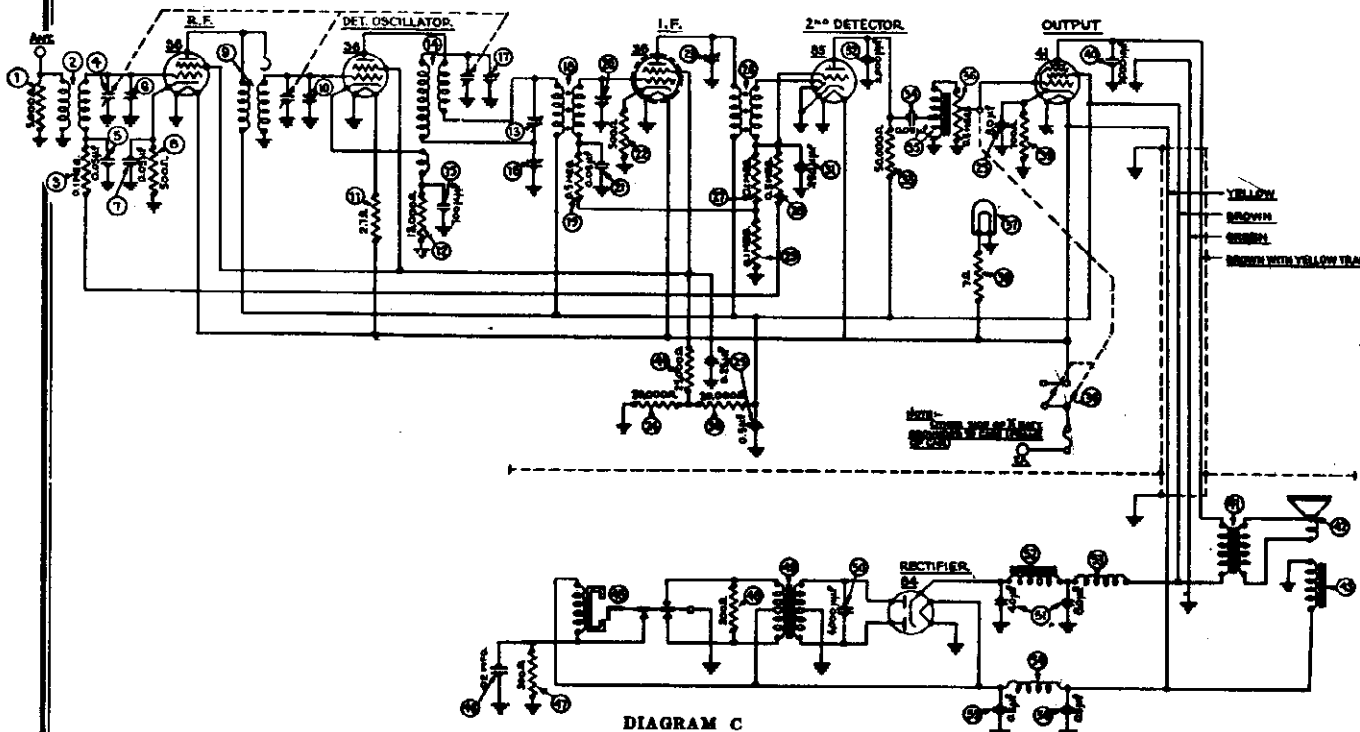


DIAGRAM C

MODEL PB PARTS LIST

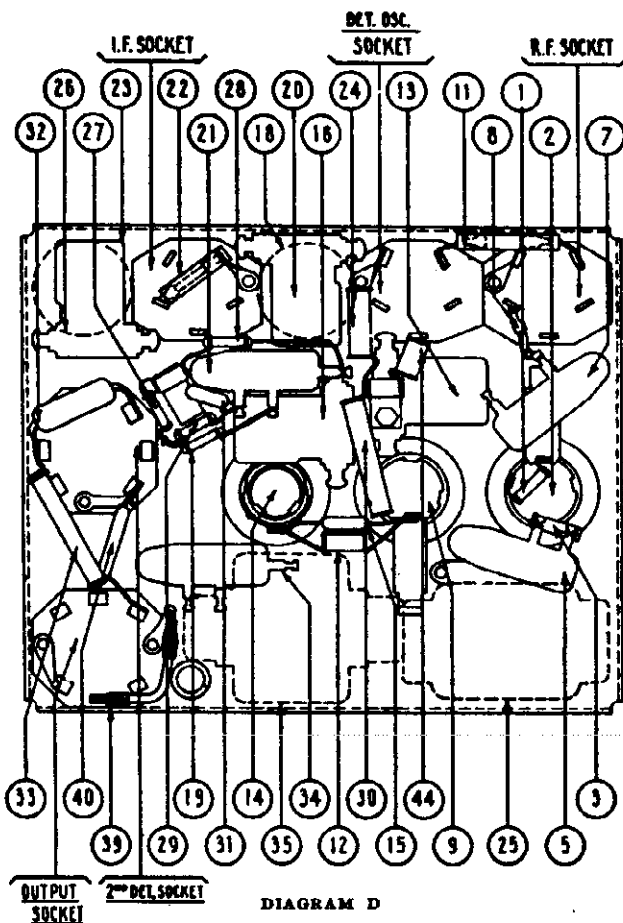


DIAGRAM D

No. in Diagrams C & D	Description	Part No.	No. in Diagrams C & D	Description	Part No.
1	Resistor (5,000 ohm).....	6096	34	Condenser (.00 mfd.).....	4989-1
2	Antenna Transformer.....	32-1197	35	Audio Transformer.....	753
3	Resistor (100,000 ohm).....	8099	36	Volume Control (500,000 ohm) and switch.....	752
4	Tuning Condenser.....	04308	37	Pilot Lamp.....	600
5	By-pass Condenser (.06 mfd.).....	3615-AN	38	Resistor (7 ohm).....	511
6	R. F. Transformer.....	32-1198	39	Resistor (700 ohm).....	644
7	By-pass Condenser (.06 mfd.).....	3615-AT	40	Condenser (.002 mfd.).....	685
8	Resistor (500 ohm).....	6977	41	Output Transformer.....	256
9	Detector Coil.....	03915	42	Cone and Coil.....	36-302
10	Compensator section on tuning condenser.....		43	Field Coil.....	33-314
11	Resistor (2.7 ohm).....	6511	44	Resistor (25,000 ohm).....	451
12	Resistor (13,000 ohm).....	8267	45	Vibrator.....	38-503
13	Compensating Cond.	04000-J	46	Condenser (.05 mfd.).....	30-408
14	Oscillator Coil.....	06916	47	Resistor (200 ohm).....	721
15	Condenser (.0007 mfd.).....	4520	48	Resistor (200 ohm).....	721
16	Compensating Cond.	04000-S	49	Power Transformer.....	32-711
17	Compensator section on tuning condenser.....		50	Condenser (.006 mfd.).....	636
18	First I. F. Transformer.....	06932	51	Filter Condenser (4 mfd., 8 mfd.).....	30-203
19	Resistor (500,000 ohm).....	6097	52	Filter Choke.....	32-711
20	Compensating Cond.	04000-X	53	R. F. Choke.....	32-108
21	Condenser (.05 mfd.).....	3615-AK	54	"A" Choke.....	32-125
22	Resistor (500 ohm).....	6977	55	Condenser (.5 mfd.).....	30-401
23	Compensating Cond.	04000-X	56	Condenser (.5 mfd.).....	30-401
24	Resistor (20,000 ohm).....	6650	57	Fuse (15A.).....	722
25	Condenser (.25 mfd., .5 mfd., 8 mfd.).....	04354	58	Dial.....	825
26	Second I. F. Transformer.....	05970	59	"A" Battery Lead.....	41-304
27	Resistor (100,000 ohm).....	8099	60	Speaker Power Cable.....	41-304
28	Resistor (500,000 ohm).....	6097	61	Antenna Lead.....	38-516
29	Resistor (100,000 ohm).....	8099	62	Key.....	609
30	Resistor (20,000 ohm).....	6649	63	Nuts.....	28-608
31	Condenser (.00025 mfd.).....	3082	64	Nuts (Studs).....	W-5
32	Condenser (.0002 mfd.).....	4069	65	Spark Plug Resistor.....	33-101
33	Resistor (50,000 ohm).....	4237	66	Distributor Resistor.....	33-101
			67	Spark Plug Terminal.....	28-605
			68	Interference Condenser.....	452

MODEL PB Packard
Installation Data

PHILCO RADIO & TELEV. CORP.

PACKARD STANDARD CAR RADIO GENERAL INSTALLATION INSTRUCTIONS

Antennas
All closed cars manufactured after January 1, 1933, are equipped with a roof-type antenna, the lead-in from which is brought down inside the right front pillar post and coiled behind the cowl trim panel.

Antennas suitable for open and convertible jobs can be secured from the Factory on special orders and are easily installed by snapping in place. Detailed information on these units can be secured by writing the Accessory Division of the Packard Motor Car Company.

On earlier cars that are not equipped with a roof antenna, the undercar type can be used with a reduction in efficiency of approximately 85 per cent.

Installation Preparations

Although it is not really necessary to remove the right-hand glove compartment, some will find it an advantage to take it out until the installation is completed.

Receiver and Speaker Location

Refer to the cuts showing location of the holes to be drilled. Locate one of the receiver stud holes and mark with a sharp pencil; then use the template furnished to locate the remaining two holes. Use the same procedure for the speaker, drilling with 7/16-inch drill. On Packard and Twelve models, you may find it difficult to locate and drill the speaker holes from the motor side of the dash, and if so, this work can be done from the body side, provided care is taken to avoid cutting the vacuum and oil lines.

On Packard Eight models, the receiver must be spaced out enough to allow the speedometer cable to pass behind it. This can be accomplished by placing two or three flat washers on the lower mounting stud before bolting in place, using the large washer furnished, next to the insulating material.

Instrument Board Control Unit

On cars where provision has been made to mount the control unit in the instrument panel, a finish plate is used to fill the opening. Remove this plate by loosening the three hold-down clamps at the rear of the instrument panel. The radio control unit can then be put in place (using the gasket formerly provided for the plate) and secured by the three hold-down clamps.

Notes—As the finish on instrument panels varies with different models of Packard cars, it may be desirable to match the finish plate of the radio control unit to the panel. The Packard Motor Car Company can supply control unit finish plates to match the various instrument panels.

Steering Column Control Unit

When no provision has been made to mount the control head in the instrument panel, a special unit should be obtained from the Accessory Division. This should

be located on the steering column, either at the right side of the post or in a vertical position directly above it. A generally satisfactory location is to the right approximately six inches below the steering wheel hub. Cut off the metal strap to proper length and mount bracket, using the long machine screw with one turn of friction tape between column and strap. Mount control unit on bracket in a vertical position.

Fasten the two flexible shafts to the bottom edge of the instrument panel with a small clamp, this being so located as to make the best appearance and provide the smoothest operation. Cover these flexible shafts and the dial light wire with the small piece of loom (supplied with set) to prevent the shafts coming in contact with the ammeter terminals in the instrument board.

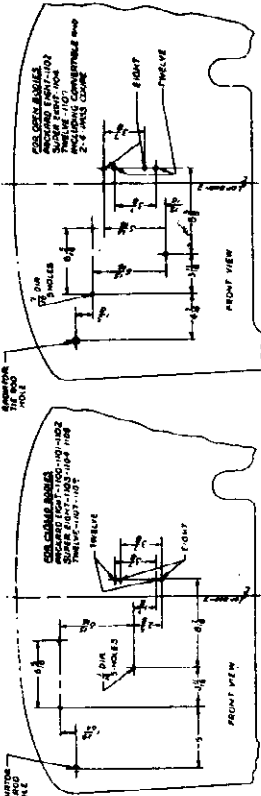
Control Shaft Installation

Remove the front cover plate from the receiver. Turn the left-hand knob (volume control) to a point where the key will lock it firmly in position. Insert the shaft and conduit into the left-hand receptacle on the front of receiver and tighten set screw. Next turn the dial to line up with the extra division below 100 and turn the condenser unit so the plates are completely out of mesh, at which point the screw in the brass cap should be accessible. Next insert the tuning shaft and conduit in the right-hand receptacle on front of receiver, locking them in position with their respective set screws.

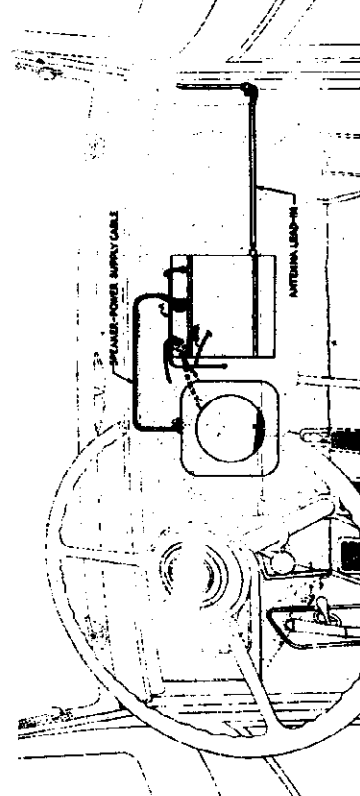
Battery Cable Location and Connections

Plug the cable into the receptacle at the front of the receiver and run the speaker cable over to that unit, plugging it in top. The "A" or two-wire cable should be run to the ammeter, keeping it as close to the instrument board as possible. Connect the hot wire (small closed terminal) to the discharge side of the ammeter and the shield (equipped with spade terminal) should be grounded under the lower clock clamp screw. Connect the black wire from the dial light on the control unit to the fainstock terminal on the face of the receiver. The ground tab on the cable is fastened under a screw head on the receiver. The detachable part of the antenna lead-in should then be attached to the shielded wire that comes down through the right-hand pillar post after the latter has been cut to the proper dimension. Ordinarily the splice should be made fairly close to the pillar post, with one shield telescoping over the other and snugly connected after the splice has been properly taped to prevent any likelihood of short circuits. The lead is then carried up over the glove box and down on the left-hand side, where it is attached to the receiver lead by means of the bayonet lock.

Notes—On bodies where the antenna lead-in has not been provided with a grounded shield, it will be necessary to remove the cowl trim panel, so the shield of the detachable antenna lead-in can be grounded as close to the pillar post as possible.



RADIO INSTALLATION DASH LAYOUT FOR PACKARD MODELS 100-110-1102-1108-1104-1105-1107-1108



Listening Receiver

As the tuning dial is calibrated in kilocycles, it may be necessary to line it up with the receiver, so stations may be tuned in at the proper point, this being accomplished as follows:
Set the tuning dial to line up with the extra division below 150 and insert a blunt-pointed wire or match through the small hole located at the back of the control unit. Next carefully press the tuning dial out of mesh with the gear, and while holding it so, turn the knob to the extreme counter-clockwise limit and release the tuning dial. It should now line up and can be selected by turning in stations whose operating frequency is known.

Operating Instructions

The receiver is placed in operation by turning the left-hand knob on the control head in a clockwise position. After tubes have been warmed up, a minute or

so, resonance will be indicated by a rushing sound. Any station within range can be tuned in by manipulating the right-hand knob, after which the volume is set to the desired level with the left.
When operating in the immediate vicinity of a power line or car tracks, crackling or snapping noises are quite likely to be in evidence, due to leakage of high voltage to ground. This man-made static cannot be eliminated by any receiver, but its effects will be minimized if the set is set to bring in the most powerful local station. Man-made as well as natural static is amplified along with the radio signal, and naturally the powerful local station needs less amplification, thus enabling it to ride over unwanted noises.

When turning off the receiver be sure the left-hand knob is turned counter-clockwise until a definite click is heard, otherwise the receiver may continue to operate and run down the battery.

PHILCO RADIO & TELEV. CORP.

MODEL PHD Packard Schematic, Chassis Socket, Parts

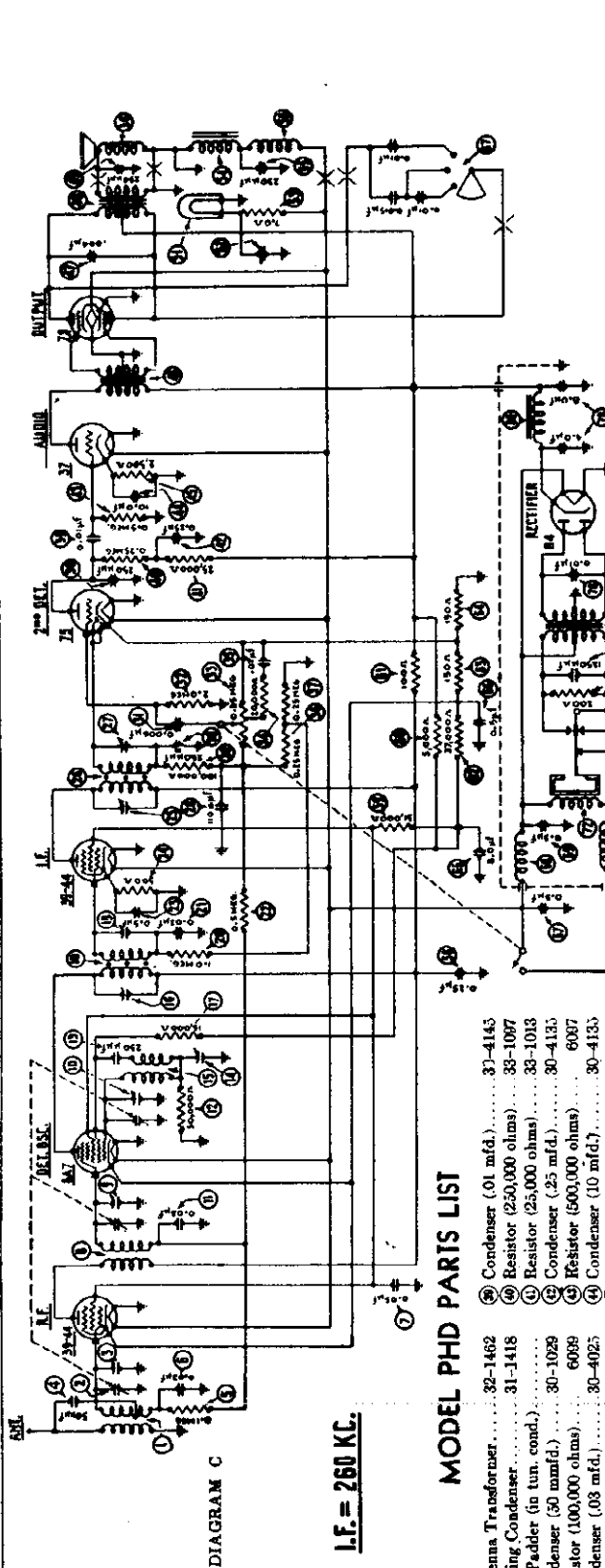


DIAGRAM C

I.F. = 260 KC.

MODEL PHD PARTS LIST

- | | | | |
|----|--------------------------------|---------|---------|
| 1 | Antenna Transformer | 32-1462 | 37-4145 |
| 2 | Tuning Condenser | 31-1418 | 33-1097 |
| 3 | 1st Padder (in tun. cond.) | 30-1013 | 33-1013 |
| 4 | Condenser (50 mfd.) | 30-1029 | 30-4135 |
| 5 | Resistor (100,000 ohms) | 6099 | 6097 |
| 6 | Condenser (.03 mfd.) | 30-4025 | 30-4135 |
| 7 | Condenser (.05 mfd.) | 30-4020 | 33-1100 |
| 8 | R. F. Transformer | 32-1483 | 32-7205 |
| 9 | 2nd Padder (in tun. cond.) | 30-4025 | 30-4185 |
| 10 | 3rd Padder (in tun. cond.) | 30-4025 | 32-7205 |
| 11 | Condenser (.03 mfd.) | 6098 | 30-1032 |
| 12 | Resistor (50,000 ohms) | 6098 | 36-3159 |
| 13 | Condenser (250 mfd.) | 30-1032 | 34-2040 |
| 14 | Padder | 33-6012 | 30-1032 |
| 15 | Oscillator Transformer | 32-1252 | 33-3130 |
| 16 | Padder (Pri. 1st I. F. Trans.) | 6208 | 02795 |
| 17 | Resistor (15,000 ohms) | 6208 | 30-1032 |
| 18 | First I. F. Transformer | 32-1471 | 32-1464 |
| 19 | Padder (Sec. 1st I. F. Trans.) | 6097 | 30-4208 |
| 20 | Resistor (1,000,000 ohms) | 33-1096 | 30-4134 |
| 21 | Condenser (.03 mfd.) | 30-4025 | 33-1070 |
| 22 | Resistor (500,000 ohms) | 6097 | 33-3023 |
| 23 | Condenser (.5 mfd.) | 30-4038 | 33-1098 |
| 24 | Resistor (500 ohms) | 6977 | 33-3045 |
| 25 | Padder (Pri. 2nd I. F. Trans.) | 32-1449 | 33-3045 |
| 26 | Second I. F. Transformer | 32-1449 | 33-3045 |
| 27 | Padder (Sec. 2nd I. F. Trans.) | 30-1031 | 33-3045 |
| 28 | Condenser (110 mfd.) | 30-1031 | 33-3045 |
| 29 | Resistor (100,000 ohms) | 6099 | 30-4048 |
| 30 | Condenser (250 mfd.) | 30-1032 | 30-4015 |
| 31 | Condenser (.006 mfd.) | 30-4125 | 92-1474 |
| 32 | Resistor (2,000,000 ohms) | 33-1025 | 30-4047 |
| 33 | Vol. Cont. & Sw. Assembly | 38-6022 | 32-1466 |
| 34 | Resistor (20,000 ohms) | 33-1180 | 32-1466 |
| 35 | Condenser (.02 mfd.) | 30-4215 | 38-5036 |
| 36 | Resistor (250,000 ohms) | 33-1087 | 30-4039 |
| 37 | Resistor (250,000 ohms) | 33-1087 | 7217 |
| 38 | Condenser (250 mfd.) | 30-1032 | 7217 |
| 39 | Condenser (250 mfd.) | 30-1032 | 5696 |

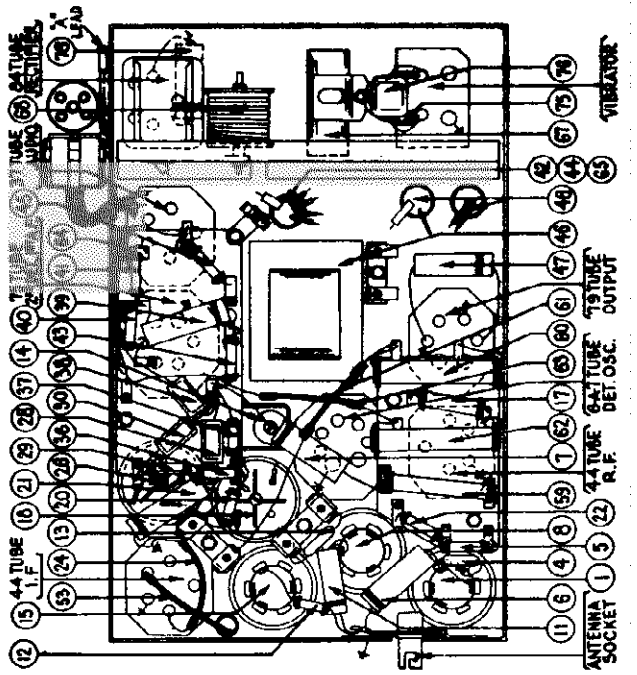


DIAGRAM D

NOTE: OTHER SIDE OF "A" PARTS LISTED IN CASE (FRAME OF CASE)

- | | | |
|----|-----------------------------|----------|
| 71 | Power Transformer | 32-7008 |
| 72 | Condenser (.01 mfd.) | 30-4051 |
| 73 | Filter Condenser (4-8 mfd.) | 30-2015 |
| 74 | "B" Choke | 32-7104 |
| 75 | Dial | 27-5022 |
| 76 | Antenna Lead | 39-5131 |
| 77 | Mounting Studs | 28-6231 |
| 78 | Mounting Nuts | W55A |
| 79 | Spark Plug Resistor | 33-1015E |
| 80 | Distributor Resistor | 4851E |
| 81 | Interference Condenser | 30-1007 |
| 82 | Spark Plug Terminals | 28-6033 |
| 83 | 4 Hole Socket | 27-5006 |
| 84 | 5 Hole Socket | 27-6014 |
| 85 | 6 Hole Socket | 27-5020 |
| 86 | 7 Hole Socket | 27-6005 |
| 87 | Knobs | 27-1146 |
| 88 | Knob Springs | 28-1738 |
| 89 | "A" Switch Assembly | 38-6023 |
| 90 | "A" Switch | 42-1080 |

**MODEL PHD Packard
Installation Data**

PHILCO RADIO & TELEV. CORP.

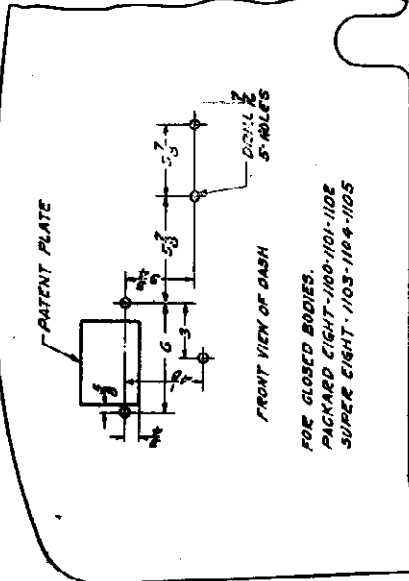
On the twelve-cylinder cars, provision has been made to mount a condenser on the coil bracket, using the right front coil mounting screw as a means of attachment. The condenser can be installed by passing the condenser lead through the hole provided in the coil bracket and attaching to the terminal on the lower side of the coil to which a brass strip is fastened. Replace the unit and tighten nuts, making certain that the condenser case is grounded through the enamel. Locate the second condenser under outside generator relay mounting screw and connect the lead to the battery terminal of relay.

On eight-cylinder cars it will generally be best to locate the first condenser under the lower instrument light housing screw with the wire fastened to the ammeter side of the ignition switch.

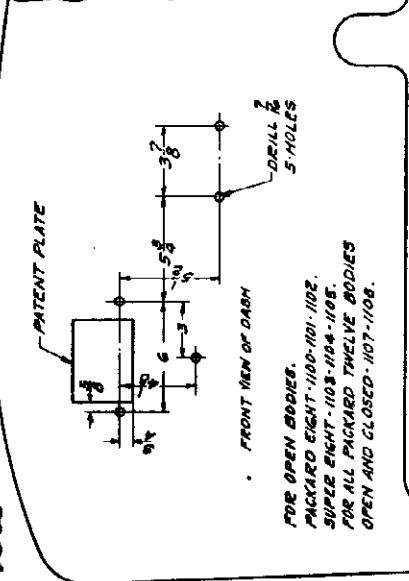
The generator condenser is then mounted as previously described.

All Twelfth Series, twelve-cylinder cars are equipped with resistors as standard equipment, it being only necessary to install the two coil wire resistors provided with the set. On eight-cylinder models and non-current models, cut off the spark plug terminals from the high tension wires and screw on the resistor units, after which the small round nuts (furnished with the set) can be screwed onto the spark plugs and the resistors snapped in place. Cut distributor to coil inch from distributor head and insert "screw in" type distributor resistors. When the rest of the installation is carefully made, the resistors will sometimes be unnecessary between the coil and distributor.

In all cases, however, the spark plug gap should be increased from the standard .025" to .030". To check for ignition interference, disconnect the antenna lead-in from the set. Turn on Receiver and start the engine. If there is any noise coming through the speaker from the electrical system of the car when the volume control is about three-fourths open and the dial set between stations, carefully relocate speaker and battery cables to a point where the noise is reduced to a minimum. If relocation of these cables does not practically eliminate the ignition disturbances, it will then be advisable to open the distributor arm.

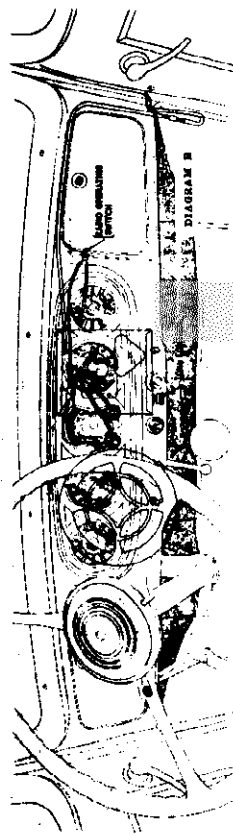


**FRONT VIEW OF DASH
FOR CLOSED BODIES
PACKARD EIGHT-1100-1101-1102
SUPER EIGHT-1103-1104-1105**



**FRONT VIEW OF DASH
FOR OPEN BODIES
PACKARD EIGHT-1100-1101-1102
SUPER EIGHT-1103-1104-1105
OPEN AND CLOSED-1107-1108**

**DIAGRAM A
DE LUXE RADIO—Installation Dash Layout for Packard Models
1100, 1101, 1102, 1103, 1105, 1107, 1108**



Holes are provided in the dash for radio installation on all Twelfth Series Packard cars. These holes are plugged with snap buttons which can easily be removed with a screw driver. The inside dash liner is not punched and before making the installation corresponding holes should be cut through the cardboard dash liner with a knife.

For dash drilling information on cars previous to Twelfth Series, refer to the diagram "A", showing installation of the long column control unit is required. receiver stud holes and mark with a sharp punch; then use the template furnished to locate the remaining two holes. Use the same procedure for the speaker, drilling with 7/16 drill. On Packard Twelve models you may find it difficult to locate and drill the speaker holes from the motor side of the dash and, if so, this work can be done from the body side, providing care is taken to avoid cutting the vacuum and oil lines.

On Packard Eight models the Receiver must be spaced out enough to allow the speedometer cable to pass behind it. This can be accomplished by placing two or three flat washers on the lower mounting stud before bolting in place, using the larger washer furnished, next to the insulating material. The felt baffle should be mounted on the studs between the speaker and dash. On twelve cylinder cars previous to Twelfth Series it is necessary to cut away a portion of the speaker rim to provide clearance for the vacuum connection on the dash.

Control Unit
On Eleventh and Twelfth Series cars, where provision has been made to mount the control unit in the instrument panel, a finish plate is used to fill the opening. Remove this plate by loosening the hold-down clamps at the rear of the instrument panel. The radio control unit can then be put in place (using the gasket provided for the plate) and secured by the same fastening clamps.

When no provision has been made to mount the control unit in the instrument panel, it should be located on the steering column, either at the right side of the post or in a vertical position directly above it. A generally satisfactory location is to the right, approximately six inches below the steering wheel hub. Cut off the metal strap to the proper length and mount bracket, using the long machine screw with one turn of friction tape between column and strap. Mount control unit on bracket in a vertical position.

The radio locking switch on the Twelfth Series Receiver should be located in the right glove compartment-receptacle on the speaker. The antenna lead-in should be plugged into the "A" cable in a small tubular housing and is very plainly marked.

The radio fuse is located in the "A" cable in a small tubular housing and is very plainly marked.

Control Shaft Installation
The timing control knob is on the right of the control panel — the combination switch and volume control knob is on the left. The flexible control shafts are coupled to the short shafts in the control panel on which the knobs are placed.

Insert the flexible control cables into the proper shaft housing bracket on the Receiver. Turn the knobs until female coupling in the Receiver so that the pin in the female end is fully engaged in the slotted male end.

Tighten the shaft housing fastening nuts which hold the control cables in place on the Receiver. **Isocoupler:** Be sure the couplers are attached to the proper couplings on the Receiver. The volume control shaft operated by left knob engages with the coupling nearest the Receiver and to the left.

On installing the control shafts on non-current models, where a special control head is used provided with a lock, insert the cables in their proper position in the Receiver as outlined above.

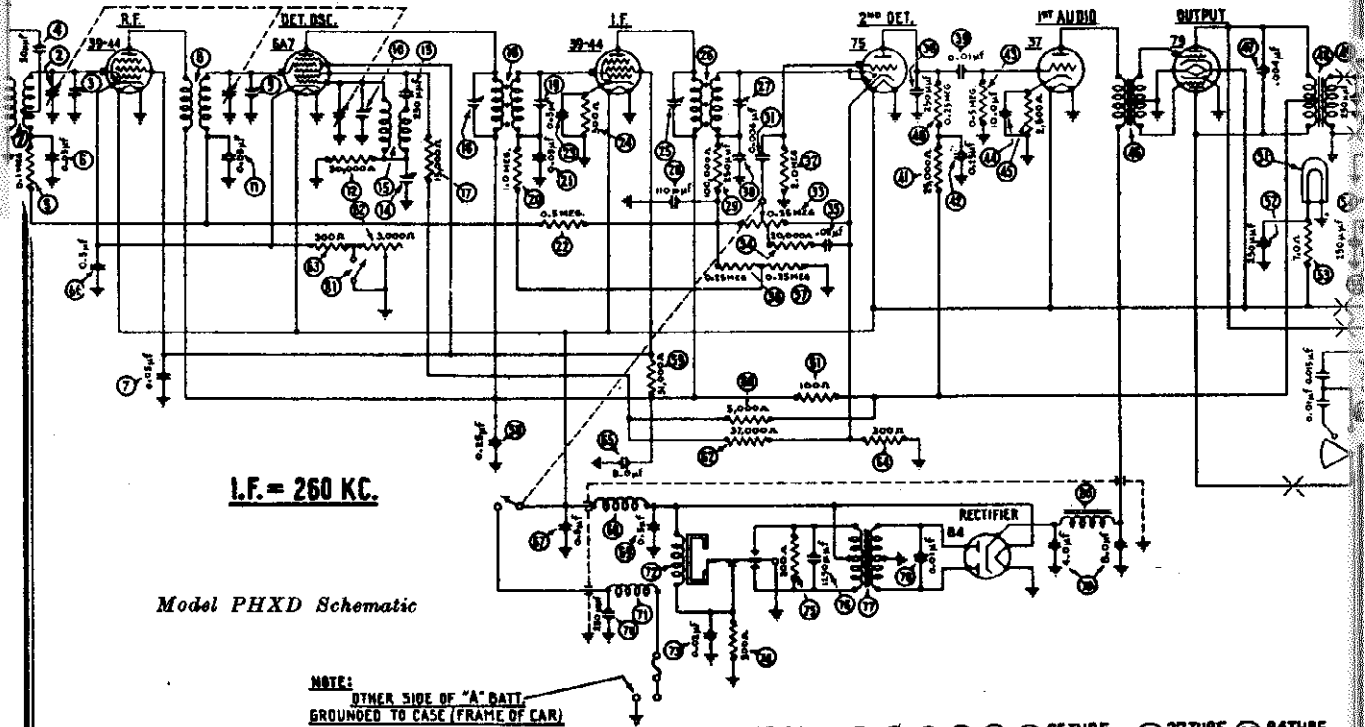
Remove the left-hand knob and loosen the set screw in the knob shaft. Turn this shaft to a point where the key will lock it firmly in position and retighten the set screw.

Battery Cable Location and Connections
(SEE DIAGRAM "B")

The "A" or two-wire cable should be run over the top of the set to the ammeter. **Notes:** On Twelfth Series installations this lead is provided with a switch to be mounted in the wall of the right glove compartment with the control accessible from the inside. Connect the feed wire (small eyelet terminals) to the discharge side of the ammeter. Connect the black wire from the dial light on the control unit to the small jack terminal on the end of the Receiver.

PHILCO RADIO & TELEV. CORP.

MODEL PHXD Packard
Schematic, Chassis
Parts List



Model PHXD Schematic

MODEL PHXD PARTS LIST

No.	Description	Part No.	Description	Part No.
1	Antenn. Transformer	32-1462	Resistor (250,000 ohms)	33-1097
2	Tuning Condenser	31-1418	Resistor (25,000 ohms)	33-1013
3	First Padder (on tun. cond.)	30-1029	Condenser (.25 mfd.)	30-4135
4	Condenser (50 mmfd.)	30-1029	Resistor (500,000 ohms)	32-6097
5	Resistor (100,000 ohms)	6099	Condenser (10 mfd.)	30-4135
6	Condenser (.03 mfd.)	30-4025	Resistor (2500 ohms)	33-1100
7	Condenser (.05 mfd.)	30-4020	Input Transformers	32-7206
8	R. F. Transformer	32-1463	Condenser (.004 mfd.)	30-4185
9	Second Padder (on tun. cond.)	30-1032	Output Transformer	32-7205
10	Third Padder (on tun. cond.)	30-1032	Condenser (250 mmfd.)	30-1032
11	Condenser (.03 mfd.)	30-4025	Con. & Voice Coil	30-3159
12	Resistor (50,000 ohms)	6098	Pilot Lamp	34-2040
13	Condenser (250 mmfd.)	30-1032	Condenser (250 mmfd.)	30-1032
14	Padder	31-6012	Resistor (10 ohms)	33-3130
15	Oscillator Transformer	32-1222	Field Coil Assembly	30-2795
16	Padder (Pri. 1st I. F. Trans.)	30-1032	Condenser (250 mmfd.)	30-1032
17	Resistor (15,000 ohms)	8208	Choke	32-1464
18	First I. F. Transformer	32-1471	Tone Control	30-4208
19	Padder (Sec. 1st I. F. Trans.)	30-4134	Condenser (.25 mfd.)	30-4134
20	Resistor (1,000,000 ohms)	33-1098	Resistor (51,000 ohms)	32-4237
21	Condenser (.03 mfd.)	30-4025	Resistor (5000 ohms)	33-1070
22	Resistor (500,000 ohms)	6097	Resistor (100 ohms)	33-3023
23	Condenser (.5 mfd.)	30-4058	Resistor (37,000 ohms)	33-1098
24	Resistor (500 ohms)	6971	Resistor (300 ohms)	33-3121
25	Padder (Pri. 2nd I. F. Trans.)	30-4135	Resistor (300 ohms)	33-3121
26	Second I. F. Transformer	32-1495	Condenser (8 mfd.)	30-4135
27	Padder (Sec. 2nd I. F. Trans.)	30-4048	Condenser (.5 mfd.)	30-4048
28	Condenser (110 mmfd.)	30-1031	Condenser (.5 mfd.)	30-4015
29	Resistor (100,000 ohms)	6099	Vibrator Choke	32-1474
30	Condenser (250 mmfd.)	30-1032	Condenser (.5 mfd.)	30-4210
31	Condenser (.006 mfd.)	30-4125	Interference Filter	32-1466
32	Resistor (2,000,000 ohms)	33-1025	Interference Filter	32-1466
33	Vol. Cont. & Sw. Assembly	38-6022	Vibrator	38-5036
34	Resistor (20,000 ohms)	33-1130	Condenser (.02 mfd.)	30-4059
35	Condenser (.02 mfd.)	30-4215	Resistor (300 ohms)	33-3010
36	Resistor (250,000 ohms)	33-1097	Resistor (200 ohms)	7217
37	Resistor (250,000 ohms)	33-1097	Condenser (1250 mmfd.)	5886
38	Condenser (250 mmfd.)	30-1032	Power Transformer	32-7098
39	Condenser (.01 mfd.)	30-4145	Condenser (.01 mfd.)	30-4051

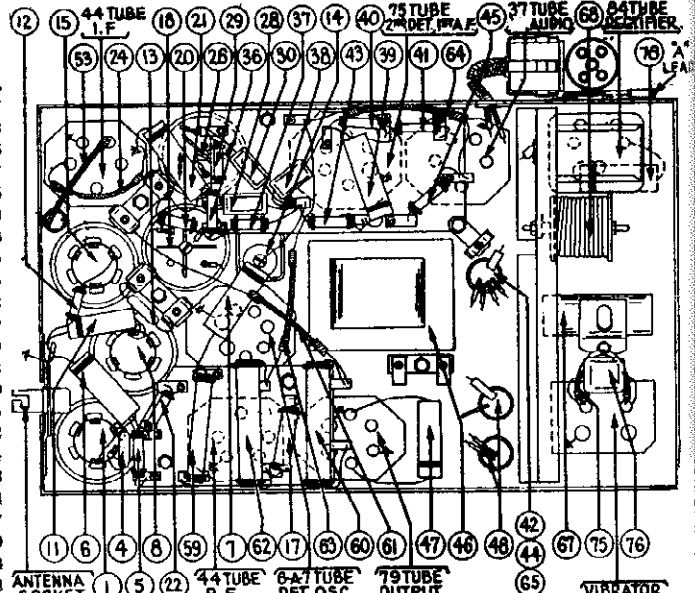


FIGURE 2 — Model PHXD Base View

No.	Description	Part No.	Description	Part No.
70	Filter Condenser (4-8 mfd.)	30-2015	Spark Plug Terminals	28-6053
71	"B" Choke	32-7104	4 Hole Socket	27-6008
72	Sensitivity Control Switch	42-1140	5 Hole Socket	27-6014
73	Sensitivity Control	33-5130	6 Hole Socket	27-6026
74	Dial	27-5070	7 Hole Socket	27-6005
75	Antenna Lead	38-5131	Knobs	27-4146
76	Mounting Studs	38-6231	Knob Springs	28-1738
	Mounting Nuts	W55A	"A" Cable and Switch Assembly	38-6023
	Spark Plug Resistor	33-1015E	"A" Switch	42-1080
	Distributor Resistor	4851E	Flexible Shaft (Tun.)	28-8263
	Interference Condenser	4522S	Flexible Shaft (Vol.)	28-8269
	Interference Condenser	30-4007	Receiver Housing	29-2285

Note: A choke, Part Number 32-1374 has been added. This is connected in series between Pilot Lamp (51) and Condenser (32) and Resistor (33).

**MODEL PHXD Packard
Socket, Trimmers
Alignment**

PHILCO RADIO & TELEV. CORP.

**I. F. Transformers and Padders
Model PHXD**

The I. F. transformers are assembled complete with padding condensers. The padders are placed in the top of the shield can, one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figure 8).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 7.

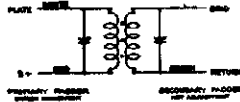


FIGURE 7

If replacements are ever necessary, replace the entire coil assembly, 32-1471 for the first I. F. stage and 32-1449 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

Model PHXD Adjustments

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments to the Model PHXD are required, the procedure given below must be followed in detail.

Equipment

Full 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 one of the plates of the type 79 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.

The sensitivity switch must be in the "distance" position. The tone control should be turned to the brilliant position.

Remove the cover from the Receiver. The antenna lead must be disconnected.

I. F.—Adjust the signal generator to exactly 260 K. C. Connect the generator lead to the grid cap of the 39-44 I. F. tube, in series with a .1 mfd. condenser.

Adjust the secondary nut padder (9) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (10) for maximum reading. (See Figure 8 for location of padders). Note the maximum reading obtained and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off. This adjustment is critical.

Remove the generator lead from the 39-44 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser. Adjust the secondary nut padder (9) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw

padder (10) for maximum reading. (See Figure 8 for location of padders). Note the maximum reading obtained and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off. This adjustment is critical.

HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube. Adjust the signal generator to 1500 K. C., and then connect the generator lead to the grid cap of the 39-44 R. F. tube in series with a .1 mfd. condenser.

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 until they strike against the paper. With the tuning condenser in this position, adjust the high frequency padder (9) and the R. F. padder (10) until the maximum reading is obtained on the output meter. This is the true setting for the 1500 K. C., 150 on the dial scale.

LOW FREQUENCY—Turn the tuning condenser plates in mesh to approximately 580 K. C., 58 on the dial scale and adjust the signal generator to 580 K. C. Roll the tuning condenser and adjust the low frequency padder (10) for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT—Next turn the tuning condenser plates out of mesh to 1500 K. C., 150 on the dial scale, and adjust the signal generator to 1500 K. C. Then adjust the high frequency padder (9) for maximum reading on the output meter.

ANTENNA AND R. F.—Connect the generator lead to the antenna lead using a 200 mmfd. condenser in series between the two leads and the .1 mfd. condenser. Turn the tuning condenser to 1400 K. C., and set the generator for 1400 K. C. Adjust the padders (9) and (10) for maximum reading on the output meter.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator has been used, the Receiver will be adjusted properly.

NOTE: 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. The signal generator output lead should be connected to a wire placed near the car antenna but not connected to it.

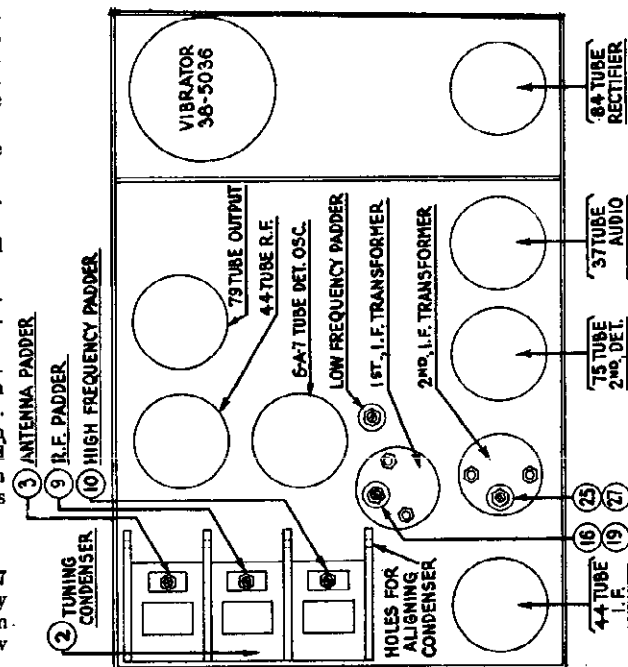
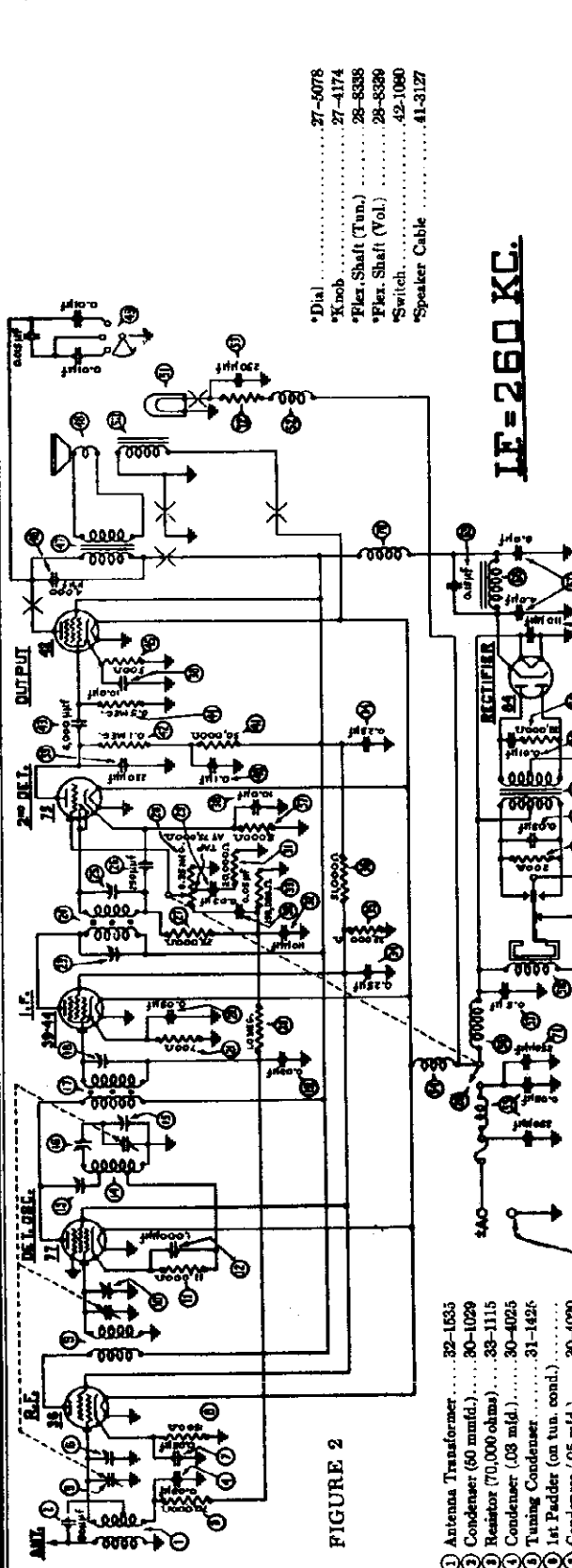


FIGURE 8 — Model PHXD—Top View

MODEL PT-5 Packard Model 120 Cars
 Schematic, Socket, Chassis Parts List
 PHILCO RADIO & TELEV. CORP. MODEL CT-5 Chrysler Codes C1, C2 & C



- *Dial 27-5078
- *Knob 27-4174
- *Flex. Shaft (Tun.) 28-8388
- *Flex. Shaft (Vol.) 28-8389
- *Switch 42-1060
- *Speaker Cable 41-3127

FIGURE 2

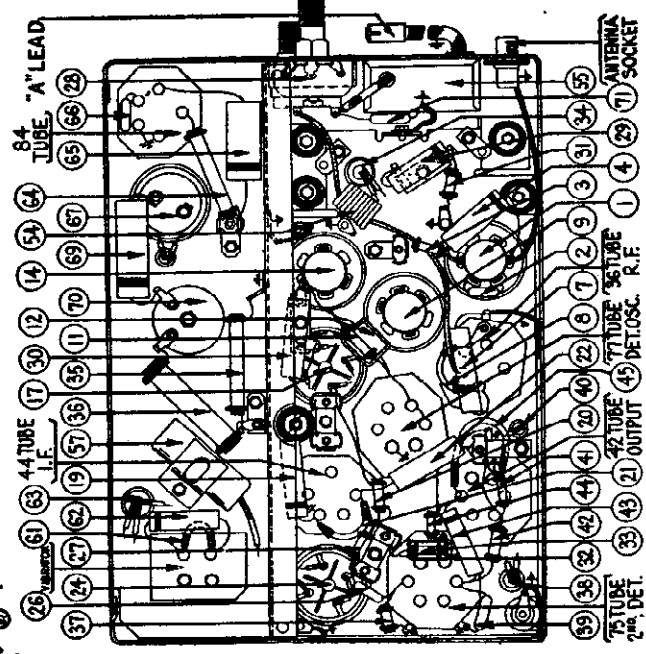


FIGURE 3

- (1) Antenna Transformer 32-1635
- (2) Condenser (50 mmfd.) 30-1029
- (3) Resistor (70,000 ohms) 33-1115
- (4) Condenser (.03 mfd.) 30-4025
- (5) Tuning Condenser 31-1426
- (6) 1st Padder (on tun. cond.) 30-4020
- (7) Condenser (.05 mfd.) 33-3047
- (8) R. F. Transformer 32-1536
- (9) 2nd Padder (on tun. cond.) 33-1194
- (10) Resistor (11,000 ohms) 33-1194
- (11) Condenser (1000 mmfd.) 30-1007
- (12) Padder (Pri. 1st I. F. Tran.) 32-1537
- (13) Oscillator Transformer 32-1537
- (14) 3rd Padder (on tun. cond.) 30-4025
- (15) 4th Padder (on tun. cond.) 30-4020
- (16) First I. F. Transformer 32-1538
- (17) Padder (Sec. 1st I. F. Tran.) 30-4025
- (18) Condenser (.03 mfd.) 33-1098
- (19) Resistor (1 meg.) 33-1098
- (20) Resistor (700 ohms) 6443
- (21) Condenser (.05 mfd.) 30-4020
- (22) Padder (Pri. 2nd I. F. Tran.) 30-4020
- (23) Second I. F. Transformer 32-1449
- (24) Padder (Sec. 2nd I. F. Tran.) 30-1032
- (25) Condenser (250 mmfd.) 33-1161
- (26) Val. Co. & Switch Assm. 33-5088
- (27) Condenser (.03 mfd.) 30-4025
- (28) Condenser (.05 mfd.) 33-1130
- (29) Resistor (20,000 ohms) 30-1031
- (30) Condenser (110 mmfd.) 33-1116
- (31) Resistor (190,000 ohms) 38-5086
- (32) Condenser (.25-.25 mfd.) 30-4231
- (33) Resistor (32,000 ohms) 3325
- (34) Resistor (51,000 ohms) 5988
- (35) Resistor (5,000 ohms) 6096
- (36) Condenser (10-10 mfd.) 30-2076
- (37) Condenser (250 mmfd.) 30-1032
- (38) Oscillator Transformer 30-4170
- (39) Resistor (50,000 ohms) 6098
- (40) Resistor (.1 meg.) 6099
- (41) Condenser (6000 mmfd.) 30-4125
- (42) Resistor (.5 meg.) 33-3081
- (43) Resistor (500 ohms) 30-4136
- (44) Condenser (4000 mmfd.) 2598
- (45) Output Transformer 36-3159
- (46) Cone & Voice Coil 30-4127
- (47) Tone Control 02795
- (48) Field Coil Assembly 34-2040
- (49) Pilot Lamp 32-1374
- (50) Choke 30-1032
- (51) Condenser (250 mmfd.) 32-1374
- (52) "A" Choke 32-1534
- (53) Interference Filter 32-1563
- (54) Vibrator Choke 30-4015
- (55) Condenser (.5 mfd.) 30-4015
- (56) Vibrator 30-4039
- (57) Condenser (.02 mfd.) 7217
- (58) Resistor (200 ohms) 7217
- (59) Resistor (200 ohms) 7217
- (60) Resistor (200 ohms) 7217
- (61) Condenser (.03 mfd.) 30-4025
- (62) Power Transformer 32-7815
- (63) Resistor (32,000 ohms) 3525
- (64) Condenser (.01 mfd.) 30-4051
- (65) Condenser (110 mmfd.) 30-1081
- (66) Filter Cond. (4-8 mfd.) 30-2107
- (67) "B" Choke 32-7954
- (68) Condenser (.15 mfd.) 30-4191
- (69) R. F. Choke 32-1530
- (70) Condenser (250 mmfd.) 30-1032
- (71) Resistor (7 ohms) 33-3130
- (72) Resistor (7 ohms) 28-2488
- (73) Ground Clip 33-1015
- (74) Spark Plug Resistor 4851
- (75) Distributor Resistor 4851
- (76) Interference Cond. (1 mfd.) 4822
- (77) Interference Cond. (1/2 mfd.) 30-4007
- (78) "T" Bolt (Set Mtg.) 28-8268
- (79) "N" Bolt (Set Mtg.) W515A
- (80) Fuse 7227
- (81) Fuse Insulator 37-7729
- (82) Antenna Lead 38-5131
- (83) "A" Lead 38-6488

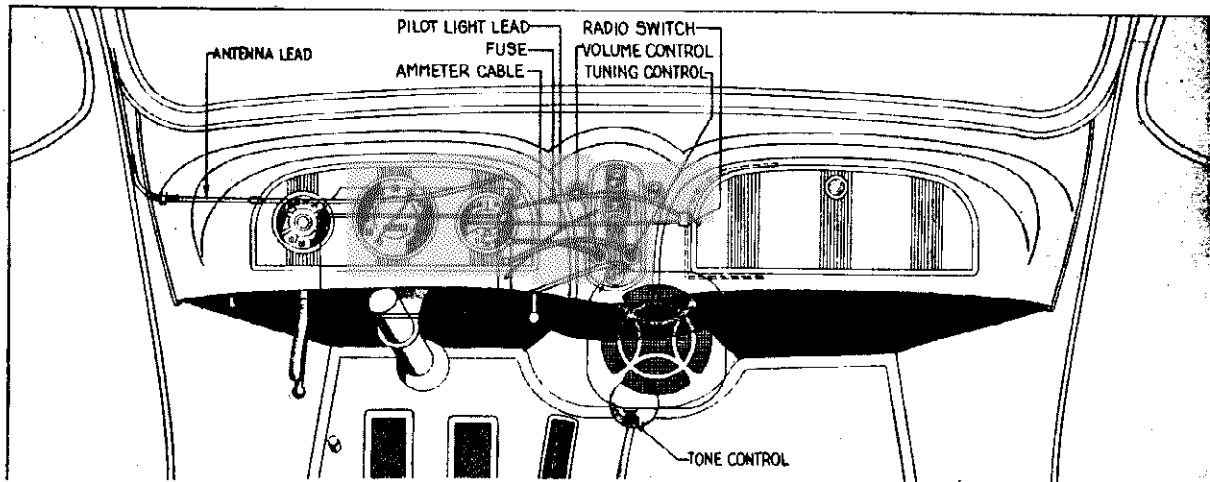
Parts List - PT-5 Packard De Luxe Custom Built Radio Model 120

For Installation Data, see Index

MODEL PT-5 Packard
Model 120 Cars
Installation Data

PHILCO RADIO & TELEV. CORP.

PACKARD CUSTOM CAR RADIO - - MODEL 120 GENERAL INSTALLATION INSTRUCTIONS



Receiver and Speaker Location

(SEE FIGURE 1)

Holes are provided in the dash for radio installation in all model 120 Packard cars. These holes are plugged with snap buttons which can be removed easily with a screw driver. The inside dash liner is not punched, so before making the installation, corresponding holes should be cut or drilled through the cardboard dash liner. Two T bolts are used to fasten the Receiver in place.

Install the Receiver above the steering column. Screw the two studs into the back of the speaker and locate it near the center of the dash, a few inches above the top of the toe boards, with the tone control down. **NOTE:** After the Receiver has been securely fastened in place be sure to dress the speedometer cable, avoiding all sharp bends.

Control Unit

On Model 120 cars, provision has been made to install the control unit in the ash receptacle opening. Remove the ash receptacle and cut the upper and lower wire hinges. This permits the removal of the wire hinge as well as the upper ash receptacle cover. Fasten the radio control unit in place, using the starter button and ignition switch fastening studs.

The black dial light lead coming from the rear of the control must be connected to the small jack terminal in the end of the Receiver housing.

Control Shafts

The flexible shaft on the left of the control is the volume control shaft and must be coupled in the shaft bushing nearest the dash, on the end of the Receiver housing. After the shaft has been properly seated, the knurled casing nut must be securely tightened.

Next couple the tuning control flexible shaft in the proper coupling on the Receiver and tighten the casing nut.

Cable Connections

There is a hole in the wall of the right glove compartment for installing the radio control locking switch. After installing the switch, place the "A" fuse and insulator in the fuse housing and connect it to the Receiver "A" lead. Connect the eyelet terminal of the lead to the discharge side of the ammeter. Locking the compartment provides a means of locking the radio when the occasion demands.

Connect the speaker cable plug in the receptacle on the side of the speaker housing.

The antenna lead must be spliced to the car antenna lead-in as close to the corner post as possible. All excess lead-in must be cut off and the splice taped. The shield pigtail must be wrapped around the lead-in shielding and carefully taped. Connect the antenna lead in its receptacle on the end of the Receiver housing.

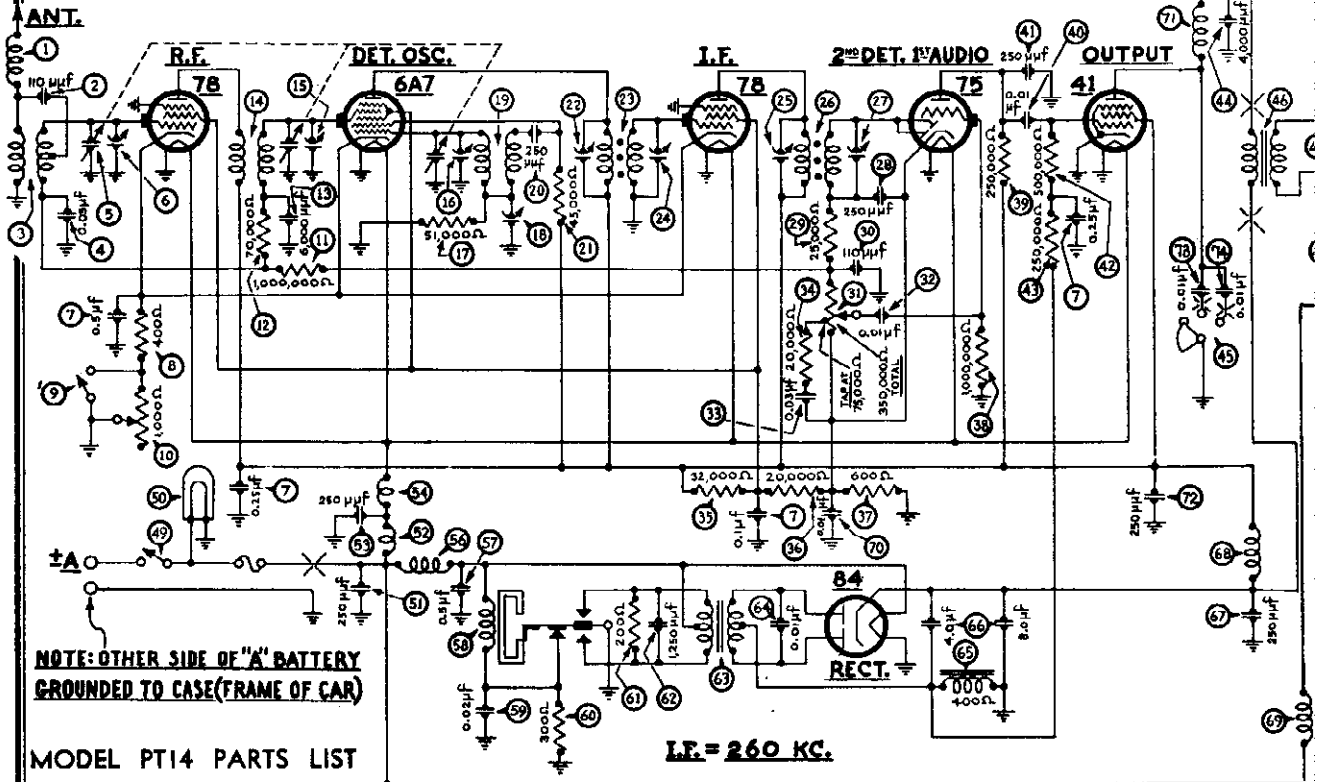
Generator and Motor Interference Suppression

Cut the distributor-to-coil high tension lead about two inches from the distributor cap and insert the screw-in type resistor in the lead.

Using a piece of emery cloth, clean the speedometer and ignition coil cable at the dash where it enters the motor compartment. Solder the end of the braided strap to the oil pressure gauge line tubing and wind the braided strap tightly around each of the tubes and cables coming through the dash at this point. The braid must then be soldered to pressure gauge tubing again and the eyelet in the braided strap grounded to the dash. The toe board-to-dash fastening screw, directly above the point where these cables come through the dash, furnishes a convenient place to ground the braid.

PHILCO RADIO & TELEV. CORP.

MODEL PT-14 Packar
Schematic, Chassis
Parts List



NOTE: OTHER SIDE OF "A" BATTERY
GROUNDED TO CASE (FRAME OF CAR)

MODEL PT14 PARTS LIST

LF = 260 KC.

no.	Description	Part No.
1	Antenna Choke	38-7210
2	Condenser (110 mmfd.)	30-1031
3	Antenna Transformer	32-1934
4	Condenser (.05 mfd.)	30-1020
5	Tuning Condenser	31-1674
6	First padder (on tun. cond.)	30-4125
7	Condenser (.1-25-25-5 mfd.)	30-4375
8	Resistor (400 ohms)	33-1211
9	Sensitivity Control Switch	42-1140
10	Sensitivity Control	33-5129
11	Resistor (1,000,000 ohms)	33-1096
12	Resistor (70,000 ohms)	33-1115
13	Condenser (6000 mmfd.)	30-4125
14	R. F. Transformer	32-1926
15	Second Padder (on tun. cond.)	30-4125
16	Third Padder (on tun. cond.)	30-4125
17	Resistor (51,000 ohms)	30-6098
18	Low Frequency Padder	31-6066
19	Oscillator Transformer	32-1927
20	Condenser (250 mmfd.)	30-1032
21	Resistor (45,000 ohms)	33-5256
22	Padder (Pri. 1st I. F. Trans.)	30-1032
23	First I. F. Transformer	32-1928
24	Padder (Sec. 1st I. F. Trans.)	30-1032
25	Padder (Pri. 2nd I. F. Trans.)	30-1032
26	Second I. F. Transformer	32-1929
27	Padder (Sec. 2nd I. F. Trans.)	30-1032
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-1013
30	Condenser (110 mmfd.)	30-1031
31	Volume Control (850,000 ohms)	33-5121
32	Condenser (.01 mfd.)	30-4124
33	Condenser (.03 mfd.)	30-4025
34	Resistor (30,000 ohms)	33-1178
35	Resistor (32,000 ohms)	33-5255
36	Resistor (20,000 ohms)	33-5649
37	Resistor (600 ohms)	33-1212
38	Resistor (1,000,000 ohms)	33-1096
39	Resistor (250,000 ohms)	33-1097
40	Condenser (.01 mfd.)	30-4145
41	Condenser (250 mfd.)	30-1032
42	Resistor (500,000 ohms)	33-6097
43	Resistor (250,000 ohms)	33-1097
44	Condenser (4000 mmfd.)	30-4185
45	Tone Control Switch	42-1139
46	Output Transformer (Dash) Speaker)	2598
47	Output Transformer (Header Bar Speaker)	32-7507
48	Cone and Voice Coil (Dash) Speaker)	36-3159
49	Cone & Voice Coil (Header Bar Speaker)	36-3526
50	Field Coil Assembly (Dash) Speaker)	02795
51	Field Coil Assembly (Header Bar Speaker)	32-9236
52	On and Off Switch	42-5362
53	Pilot Lamp	34-2040
54	Condenser (250 mmfd.)	30-1032
55	"A" Choke	32-1644
56	Condenser (250 mmfd.)	30-1032
57	Choke	32-1930
58	Condenser (.5 mfd.)	30-4047
59	Vibrator Choke	32-1933
60	Condenser (.5 mfd.)	30-4047
61	Vibrator	38-5036
62	Condenser (.02 mfd.)	30-4039
63	Resistor (300 ohms)	33-3130
64	Resistor (200 ohms)	33-1210
65	Condenser (1250 mfd.)	5886
66	Power Transformer	32-7488
67	Condenser (.01 mfd.)	30-4381
68	Filter Choke	32-7491
69	Filter Condenser 4-8 mfd.)	30-2134
70	Condenser (250 mmfd.)	30-1032
71	R. F. Choke	32-1932
72	"A" Choke	32-1464
73	Condenser (.01 mfd.)	30-4124
74	Choke	32-1382

Figure 3 - Model PT14 Schematic

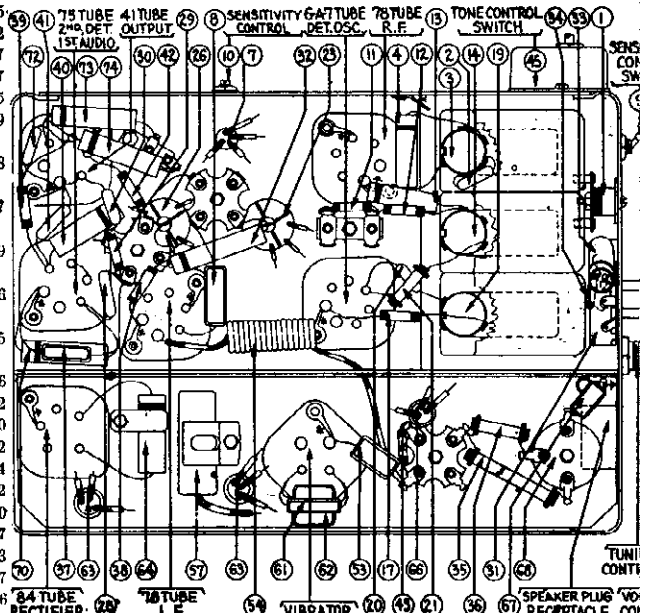


Figure 4 - Model PT14 Base View

- 72 Condenser (250 mmfd.) ... 30-1032
- 73 Condenser (.01 mfd.) ... 30-4051
- 74 Condenser (.01 mfd.) ... 30-4051

MODEL PT-14 Packard Alignment, Socket Trimmers

PHILCO RADIO & TELEV. CORP.

I. F. Transformers and Padders

Model PT14

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 Fig. 6).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 5.

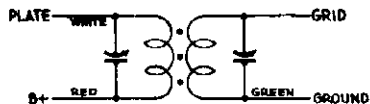


FIGURE 5

If replacements are ever necessary, replace the entire coil assembly, 32-1928 for the first I. F. stage and 32-1929 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

Model PT14 Adjustments

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments to the Model PT14 are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A 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.

The sensitivity switch must be in the "distance" position. The tone control should be turned to the brilliant position.

Remove the cover from the Receiver. The antenna lead must be disconnected.

I. F. — Adjust the signal generator to 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.

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 Fig. 6 for location of padders).

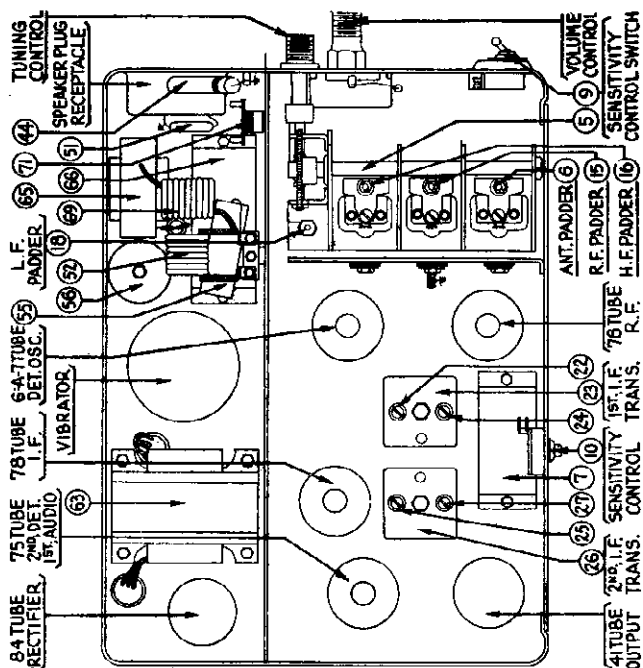
Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser. 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 (23) for maximum reading. (See Figure 6 for location of padders).

ANTENNA — Connect the generator lead to the antenna lead using a 230 mmfd. condenser in series between the two leads and the .1 mfd. condenser. Turn the tuning condenser to 1400 K. C. and set the generator for 1400 K. C. Adjust the padders (25) and (26) for maximum reading on the output meter.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator has been used, the Receiver will be adjusted properly.

NOTE: 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. The signal generator output lead should be connected to a wire placed near the car antenna but not connected to it.



HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube. Adjust the signal generator to 1600 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.

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 (25) and the R. F. padder (26) until the maximum reading is obtained on the output meter. This is the true setting for 1600 K. C., 160 on the dial scale.

LOW FREQUENCY — Turn the tuning condenser plates in mesh to approximately 580 K. C., 58 on the dial scale and adjust the signal generator to 580 K. C. Roll the tuning condenser and adjust the low frequency padder (23) for maximum reading on the output meter.

HIGH FREQUENCY RE-ADJUSTMENT — Turn the tuning condenser plates out of mesh as far as they will go and adjust the signal generator to 1600 K. C. Then adjust the high frequency padder (25) again for maximum reading on the output meter.

MODEL AC-266 Studebaker
 PHILCO RADIO & TELEV. CORP. MODEL MT-3 Pierce
 MODEL RT-3 Reo DeLuxe
 Schematic, Socket, Parts

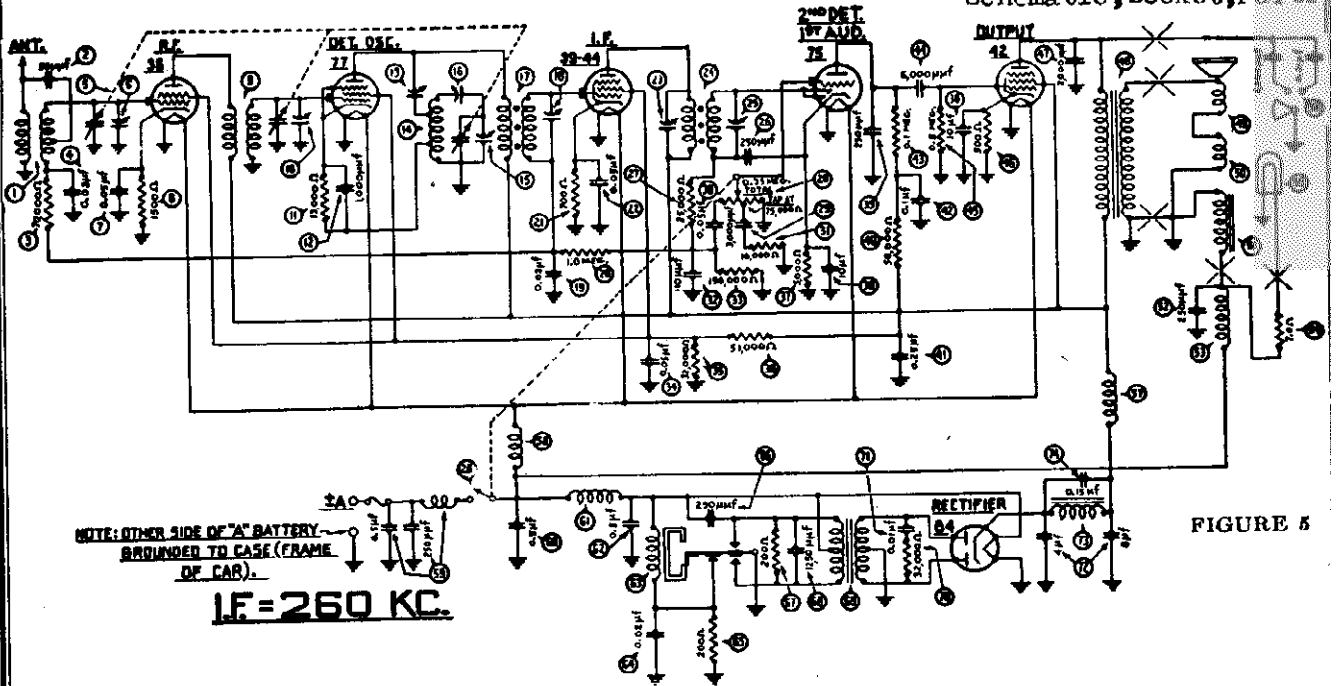


FIGURE 5

PARTS LIST ST3 - STUDEBAKER DE LUXE MODEL AC-266

- | | |
|--|---------------------------------------|
| ① Antenna Transformer..... 32-1535 | ④① Condenser (.25 mfd.)..... 04360 |
| ② Condenser (50 mmfd.)..... 30-1029 | ④② Condenser (.1 mfd.)..... 30-4170 |
| ③ Resistor (70,000 ohms)..... 33-1115 | ④③ Resistor (1 meg.)..... 6099 |
| ④ Condenser (.03 mfd.)..... 30-4025 | ④④ Condenser (6000 mmfd.)... 30-4125 |
| ⑤ Tuning Condenser..... 31-1419 | ④⑤ Resistor (.5 meg.)..... 6097 |
| ⑥ 1st Padder (on tun. cond.)..... | ④⑥ Resistor (500 ohms)..... 33-3031 |
| ⑦ Condenser (.05 mfd.)..... 30-4020 | ④⑦ Condenser (2000 mmfd.)... 30-4177 |
| ⑧ Resistor (1500 ohms)..... 33-3047 | ④⑧ Output Transformer..... 32-7318 |
| ⑨ R. F. Transformer..... 32-1536 | ④⑨ Cone & Voice Coil..... 45-2062 |
| ⑩ 2nd Padder (on tun. cond.)..... | ④⑩ Bucking Coil..... 45-2066 |
| ⑪ Resistor (11,000 ohms)..... 33-1194 | ④⑪ Field Coil..... 45-2065 |
| ⑫ Condenser (1000 mmfd.)..... 5215 | ④⑫ Condenser (250 mmfd.)... 30-1032 |
| ⑬ Padder (Pri. 1st I. F. Tran.)..... | ④⑬ Choke..... 32-1374 |
| ⑭ Oscillator Transformer..... 32-1537 | ④⑭ Resistor (7 ohms)..... 33-3035 |
| ⑮ 3rd Padder (on tun. cond.)..... | ④⑮ Pilot Lamp..... 34-2040 |
| ⑯ 4th Padder (on tun. cond.)..... | ④⑯ Tone Control..... 30-4243 |
| ⑰ 1st I. F. Transformer..... 32-1538 | ④⑰ Choke..... 32-1539 |
| ⑱ Padder (Sec. 1st I. F. Tran.)..... | ④⑱ "A" Choke..... 32-1282 |
| ⑲ Condenser (.03 mfd.)..... 30-4025 | ④⑲ Interference Filter..... 32-1544 |
| ⑳ Resistor (1 meg.)..... 33-1171 | ④⑳ Condenser (.5 mfd.)..... 30-4210 |
| ㉑ Resistor (700 ohms)..... 6443 | ⑤① Vibrator Choke..... 32-1281 |
| ㉒ Condenser (.05 mfd.)..... 30-4020 | ⑤② Condenser (.5 mfd.)..... 30-4047 |
| ㉓ Padder (Pri. 2nd I. F. Tran.)..... | ⑤③ Vibrator..... 38-5036 |
| ㉔ 2nd I. F. Transformer..... 32-1449 | ⑤④ Condenser (.02 mfd.)... 30-4039 |
| ㉕ Padder (Sec. 2nd I. F. Tran.)..... | ⑤⑤ Resistor (200 ohms)..... 7217 |
| ㉖ Condenser (250 mmfd.)..... 30-1032 | ⑤⑥ Condenser (250 mmfd.)... 30-1032 |
| ㉗ Resistor (25,000 ohms)..... 33-1161 | ⑤⑦ Resistor (200 ohms)..... 7217 |
| ㉘ Vol. Con. & Switch Assm..... 38-6297 | ⑤⑧ Condenser (1250 mmfd.)... 5886 |
| ㉙ Condenser (3000 mmfd.)... 30-4042 | ⑤⑨ Power Transformer..... 32-7216 |
| ㉚ Condenser (.05 mfd.)..... 30-4020 | ⑤⑩ Resistor (32,000 ohms).... 3525 |
| ㉛ Resistor (10,000 ohms).... 33-1000 | ⑤⑪ Condenser (.01 mfd.)... 30-4051 |
| ㉜ Condenser (110 mmfd.)... 30-1031 | ⑤⑫ Filter Cond. (4-8 mfd.)... 30-2105 |
| ㉝ Resistor (190,000 ohms).... 33-1116 | ⑤⑬ Filter Choke..... 32-7215 |
| ㉞ Condenser (.05 mfd.)..... 30-4020 | ⑤⑭ Condenser (.15 mfd.)... 30-4191 |
| ㉟ Resistor (32,000 ohms).... 3525 | ⑤⑮ Antenna Choke..... 32-1372 |
| ① Resistor (51,000 ohms).... 5868 | *Spark Plug Resistor..... 33-1192 |
| ② Resistor (5000 ohms)..... 33-1155 | Distributor Resistor..... 4851 |
| ③ Condenser (10-10 mfd.)... 30-2106 | Interference Condenser... 30-4007 |
| ④ Condenser (250 mmfd.)... 30-1032 | 5-prong Socket..... 27-6006 |
| ⑤ Resistor (50,000 ohms).... 33-1163 | 6-prong Socket..... 27-6014 |

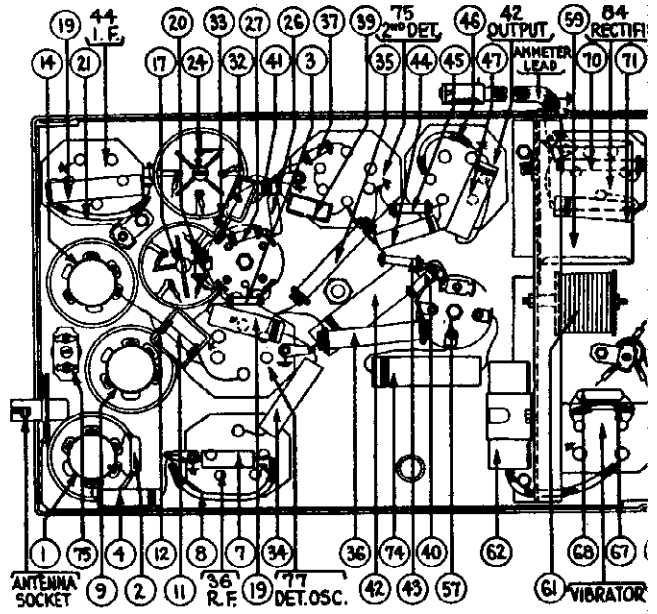


FIGURE 6

- | | |
|------------------------------|--|
| 6-prong Socket..... 27-6020 | *Knob..... 27-408 |
| Antenna Lead..... 38-5131 | Knob (tone control)..... 0306 |
| *Ammeter Lead..... 38-6339 | *Lock (Less Keys)..... 28-816 |
| *Stud..... 28-6231 | *Speaker Cable (speaker end) 38-335 |
| Nuts (set mtg.)..... W55A | *Knob (President)..... 27-405 |
| *Flexible Shaft..... 28-8336 | *Flexible Shaft (President).... 28-828 |
| *Dial..... 27-5073 | |

An Antenna Choke, Part No. 32-1372 ⑤⑮ on the Parts List and Base View has been added. This is connected in series with the Antenna Lead and the Antenna Transformer ① and Condenser ②.

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, Phila. Chicago, or San Francisco.

**MODEL AC-266 Studebaker
Installation Data**

PHILCO RADIO & TELEV. CORP.

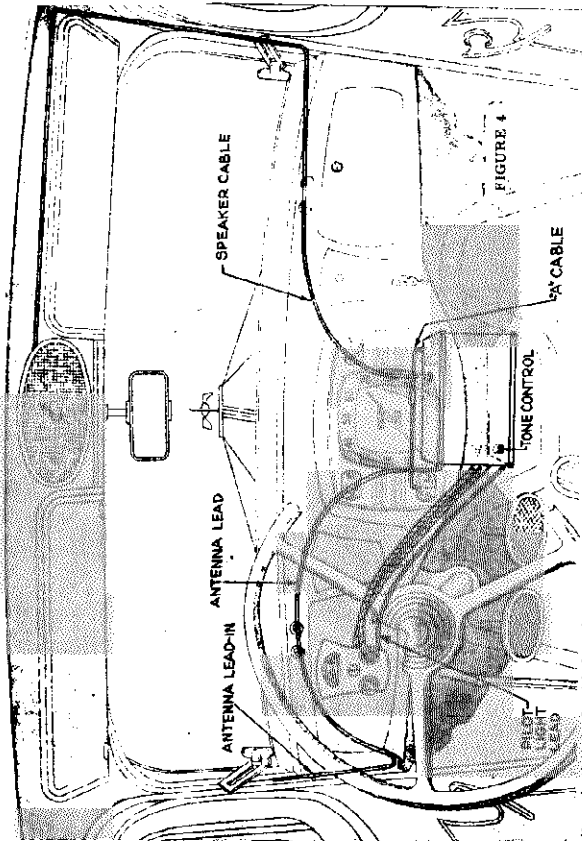


FIGURE 1

(left hand) to the rear coupling on the end of the Receiver. Be sure the control unit is properly seated and then tighten the knurled casing retaining screw. Connect the tuning control shaft in a like manner to the front coupling.

The black lead coming from the back of control must be coupled to the short connector that branches from the speaker cable at the plug.

"A" Or Battery Cable (See Figure 4)

Connect the "A" or battery cable to the Receiver lead. The fuse housing connector couples by inserting the small end and making a slight turn clockwise. The other end of the cable must be connected to the right side of the armature. The shield pigtail at each end of the cable must be grounded.

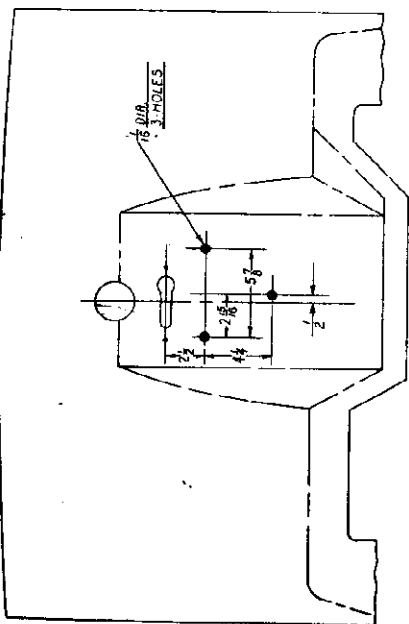


FIGURE 2

Antenna

All closed cars manufactured after July 1, 1931, are equipped with the roof-type antenna. The lead-in is brought down the left windshield post and is coiled up behind the left cowling trim panel. An antenna designed especially for convertible models can be secured from the Studebaker factory through the Accessory Division.

Receiver Location and Installation

Refer to Fig. 1 showing the location of the holes in the dash. Locate one of the holes and mark with a sharp punch; then use the template furnished with the Receiver to locate the remaining two holes. These holes should be drilled with a 7/16" drill.

Install the Receiver with the control connections to the left side of this car. (See Fig. 4).

Control Unit

The control unit is mounted on a panel which replaces the dummy door on the left side of the instrument board. This door is held in place by means of three bolts (one at each end and one at the bottom). Care should be taken to fasten the control panel securely so it does not rattle.

The control is furnished with a blue lock which must be cranked to match the car keys. This operation must be completed before the control is installed on the instrument board.

Instructions for Fitting Car Key to Control Lock

1. Remove the knobs and take off the control unit from the panel.
2. Remove the pilot lamp socket assembly in the rear of the control.
3. Reach in through the opening in the back of the control unit with a medium size screw driver and press down on the brass retaining lock springs at the same time working the lock cylinder forward. (See Fig. 2).
4. Insert the car key in the lock cylinder and crush in the same manner that you crush the standard lock, with pliers or vice.
5. Assemble the dial and spring on the cylinder. Push down the retaining spring and replace the lock in the same relative position that it was in before. Push the key in the lock and push the lock back, working the lock into the hole in the lock bar in back of the lock. Push the lock in until the retaining spring snaps in place.
6. Reassemble the control on the panel.

Control Shaft Installation

The control must be unlocked so that the volume control shaft is free. Then connect the volume control flexible shaft

Control Adjustments

Turn the left-hand (volume control) knob counter-clockwise to the "off" position. Pull off the knob and loosen the set screw on the shaft. Turn the shaft until it can be locked in place with the control lock. Tighten the set screw securely and replace the knob.

This adjustment must be made so that the radio can be turned "off" and the control locked.

The right hand knob is the tuning control knob. With the Receiver turned on, tune in a station whose frequency in kilocycles is known. The numbers on the dial represent frequency in kilocycles with the last "0" omitted. With the known station accurately tuned in, pull off the knob and loosen the set screw. Then turn the shaft until the proper frequency is set on the dial. Tighten the set screw securely and replace the knob.

The ends of the speaker cable are equipped with small tip connectors which plug into the sockets on the side of the speaker. The sockets are marked with green, yellow and blue paint to correspond with the colors of the speaker cable leads. The leads must be connected to the sockets of corresponding colors.

The speaker must be fastened in the opening provided with four self tapping screws (see fig. 3 and 4). The connections on the speaker must be down so that they cannot be pulled out by any strain on the cable.

The grille and bezel must next be fastened in place. The location of the four screw holes is shown in Fig. 3. The cardboard spacer must be placed between the grille and the headlining.

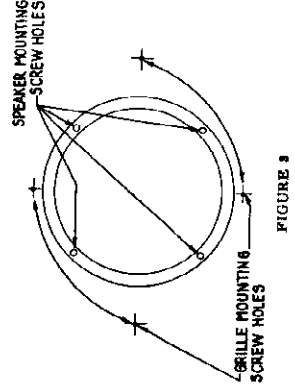


FIGURE 3

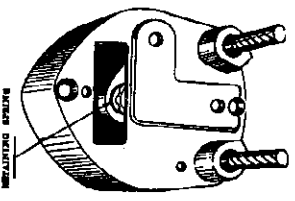


FIGURE 4

under a convenient screw and the cable dressed up behind the Receiver. Be sure the fuse and fuse insulator are in place in the fuse housing before the cable is connected.

Antenna Lead

The antenna lead must be connected in the receptacle on the left end of the Receiver near the top of the instrument board to the left-hand windshield post. The lead must be spliced to the car antenna lead-in. Solder and tape the splice. The shield pigtail must be grounded. Cut off the excess lead-in before making the splice.

Speaker Cable and Speaker Installation (Fig. 3 and 4)

Determine the location of the metal frame for mounting the speaker in the center above the windshield. (See Fig. 4). This can be felt thru the headlining. Then slit the headlining vertically and horizontally inside the frame. Carefully cut away the headlining to within one inch of the frame. This will make a circular hole two inches smaller in diameter than the speaker.

Connect the speaker cable plug in the socket on the lid of the Receiver and then fish the cable up the right windshield post. To do this, first feed a piece of iron or fish wire across the header and down the right windshield post. A piece of

iron wire is used to pull the cable through the hole in the windshield post.

PHILCO RADIO & TELEV. CORP. (Part No. 5485) MODEL RT-3 Reo DeLuxe

Installation Data, Parts "A" Lead

THESE INSTRUCTIONS have been carefully prepared for your use in installing the Reo DeLuxe Radio (Part No. 5485) in the 1935 Reo cars. Read thoroughly, then follow the instructions carefully in every detail.

Antenna

All Reo closed cars manufactured after January 1, 1935, are equipped with a roof type antenna. The lead-in is brought down the right-hand windshield post and is coiled behind the right cowl trim panel.

Receiver Location and Installation

Install the Receiver above the steering column on the left hand side of the car, allowing adequate foot clearance at the

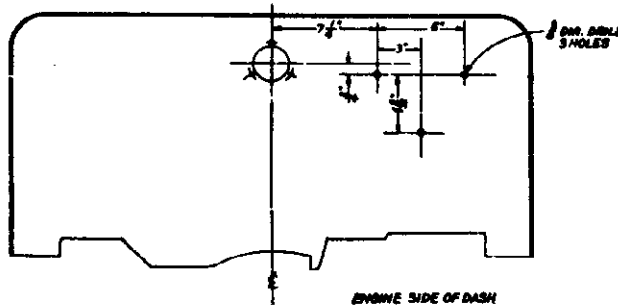


FIGURE 1

pedals. Refer to Figure 1 for the location of the bolt holes in the dash and drill three 3/8" holes. Assemble the bolts and fasten the Receiver securely to the dash. The control end of the Receiver must face the center of the car.

Control Unit

In 1935 cars, provision has been made to install the control unit in the ash receptacle opening in the instrument board. Unscrew the ash receptacle door knob to release the face plate. This exposes the two bolts which hold the two clamp brackets against the back of the instrument board. Remove these and take out the ash receptacle.

Fasten the radio control unit in place on the instrument board. Place the "U" clamp over the studs on the back of the control and tighten the wing nuts to draw the control flush with instrument board. (See Figure 2).

Control Shafts

The flexible shaft on the right of the control is the tuning control shaft. This must be coupled in the shaft bushing nearest the dash, on the end of the Receiver housing. After the shaft has been properly seated, the knurled casing nut must be securely tightened.

Next couple the volume control shaft in the proper bushing on the Receiver and tighten the knurled casing nut.

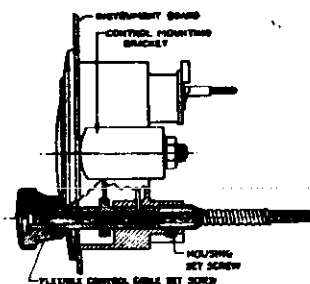


FIGURE 2

The black lead coming from the back of the control unit must be coupled to the short connector on the lead branching from the speaker cable plug.

Place the "A" fuse and insulator in the fuse housing and connect it to the Receiver "A" lead. Connect the eyelet terminal of the lead to the right side of the ammeter.

Antenna Lead

The antenna lead must be spliced to the car antenna lead-in as close to the right corner post as possible. All excess lead-in must be cut off and the splice soldered and taped. Dress the lead along the instrument board and over the top of the glove compartment. The shield pigtail must be grounded under a

Speaker Cable and Speaker Installation

Determine the location of the opening for mounting the speaker in the center above the windshield. This can be felt through the headlining. Then slit the headlining vertically and horizontally inside the frame. Carefully cut away the headlining to within one inch of the opening. This will make a circular hole two inches smaller in diameter than the opening.

Connect the speaker cable plug in the socket on the lid of the Receiver and then fish the cable up the left windshield post. A fish wire is tacked to the headlining trim panel and is used to pull the speaker cable up the left pillar. A piece of cotton sleeving or tow strap is furnished with each set. This must be slipped over the end of the three wires on the cable and then drawn tight with the fingers. Fasten to the wire and then carefully pull the wire and cable up the post, across the header and out the speaker opening.

The ends of the speaker cable are equipped with small tip connectors which plug into the sockets on the side of the speaker. The sockets are marked with green, yellow and black paint to correspond with the colors of the speaker cable leads. The leads must be connected to the sockets of corresponding colors.

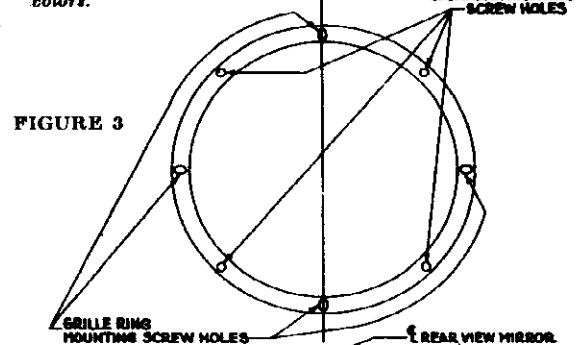


FIGURE 3

The speaker must be fastened in the speaker opening with wood screws. In mounting the speaker, be sure to mount it with the slotted holes in a vertical line with rear view mirror. The connections on the speaker must be down so that they cannot be pulled out by any strain on the cable. (See Figure 3).

The speaker grille and bezel must next be fastened in place, using four chrome plated oval head wood screws as furnished. The cardboard spacer must be placed between the grille and the headlining.

Items 1 to 75 of the Parts List for the Studebaker ST-3, DeLuxe Model AC-266 are identical for Reo DeLuxe Model RT-3. See the items below for additional accessories.

6 prong Socket.....	27-8020
Antenna Lead.....	38-5131
*Ammeter Lead.....	38-6795
Stud (Set Mtg.).....	28-6231
Nuts (set mtg.).....	W55A
*Flexible Shaft (Tuning).....	28-8317
*Flexible Shaft (Volume).....	28-8318
*Pointer.....	28-2510

Spark Plug Resistor.....	33-1101
Distributor Resistor.....	33-1113
Interference Condenser.....	30-4007
4-prong Socket.....	27-8008
5-prong Socket.....	27-6014
Knob.....	27-4182
Knob (tone control).....	03064
*Speaker Cable (speaker end).....	41-3128
*Tow Strap.....	36-3403
Glass.....	27-7325
*Face Assembly.....	28-2206
"U" Clamp.....	29-1705
Nuts (Control Mtg.).....	W317A

MODEL MT-3 DeLuxe
Pierce Arrow 1935
Installation Data

PHILCO RADIO & TELEV. CORP.

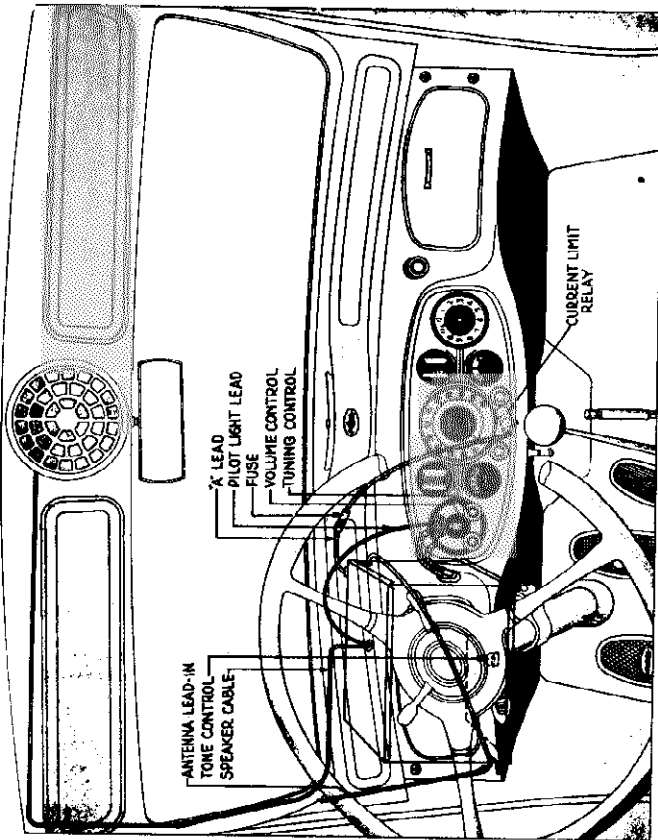


FIGURE 2

Speaker Cable and Speaker Installation

(OPEN CARS)

In open cars, the speaker location is in the right kick pad, under the cowl. The speaker mounting block can be felt thru the carpet of the kick pad. Cut the carpet vertically and horizontally inside the block and carefully trim the carpet to the edge of the cardboard circle under the carpet. Connect the speaker cable to the Receiver and then run the cable over and down inside the right kick pad. Connect the cable to the speaker as described under Speaker Cable and Speaker Installation for closed cars. Fasten the speaker to the mounting block with wood screws and then install the grille and bezel.

Connections

Connect the terminal end of the "A" lead to the left side of the current limit relay. Place the fuse and fuse insulator in the fuse housing and connect it to the Receiver lead.

The pilot light lead coming from the back of the control must be coupled to the short connector that branches from the speaker cable at the plug. The antenna lead must be connected to its receptacle in the end of the Receiver housing and dressed in place.

Flexible Shafts

Connect the tuning control flexible shaft (right hand) to the rear coupling on the end of the Receiver. Be sure the coupling is properly seated and then tighten the knurled casing nut. Next connect the volume control shaft in a like manner to the front coupling.

two studs on the back of the instrument board, using the medallion, nuts and washers. Replace the knobs on the control shafts. See Figures 2 and 3.

Speaker Cable and Speaker Installation

(CLOSED CARS)

Determine the location of the opening for mounting the speaker in the center above the windshield. This can be felt through the headlining. Silt the headlining vertically and horizontally and carefully cut away the headlining to within one inch of the opening. This will make a circular hole two inches smaller in diameter than the opening.

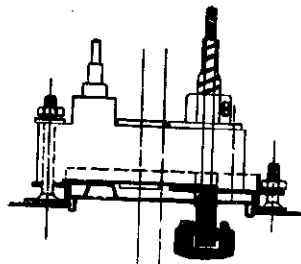


FIGURE 3

Connect the speaker cable plug in the socket on the lid of the Receiver and then fish the cable up the left windshield post. A fish cord is tacked to the headlining trim panel and is used to pull the speaker cable up the left pillar. A piece of cotton sleeving on tow strap is furnished with each set. This must be slipped over the end of the cable and then drawn tight with the fingers. Fasten to the cord and then carefully pull the cord and cable up the post, across the header and out the speaker opening.

The ends of the speaker cable are equipped with small tip connectors which plug into the sockets on the side of the speaker. The sockets are marked with green, yellow and black paint to correspond with the colors of the speaker cable leads. The leads must be connected to the sockets of corresponding colors. The connections on the speaker must be down so that they cannot be pulled out easily.

Fasten the speaker in the opening with wood screws and then install the speaker grille and bezel.

Spark Plug Resistor	28-1015	Washers	28-434
Distributor Resistor	28-1015	Volume Shaft	28-434
Interference Condenser	27-4014	Knob	27-3084
5-prong Socket	27-4020	Knob (tone control)	27-3084
8-prong Socket	27-4020	Speaker Cable (speaker end)	28-2820
Antenna Lead	28-0131	Volume Shaft	28-434
Speaker Lead	28-4045	Tow Strap	28-4308
Nuts, set size	28-4038		

These instructions have been carefully prepared for your use in installing the Pierce-Arrow Philco Auto Radio, with EAR LEVEL RECEPTION, Model MT-3, in the 1935 Series Pierce-Arrow cars. Read the instructions carefully and be sure you understand each step of the installation before proceeding with the work.

Antenna

All closed cars of the 1935 series are equipped with a roof-type antenna. The antenna lead-in is coiled behind the left cowl trim panel. In the 1935 series open cars, the antenna is in the roof and the lead-in coiled behind the rumble seat left side kick pad.

The shielded antenna lead must be connected to the car lead-in as close as possible to the corner post. Splice the bare ends together and then solder and tape the connection. Cut off all the excess lead-in, and ground the shield pigtail under a convenient screwhead.

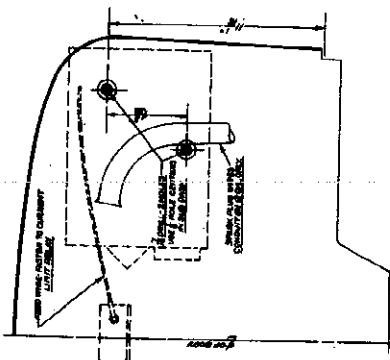


FIGURE 1

Receiver Location

Refer to Figure 1 for the location of the 1 1/2" hole in the dash. These holes must be enlarged to 7/16". Fasten the studs to the Receiver housing and then mount it on the dash with the control end of the Receiver facing the center of the car.

Control Unit

Take off the two nuts and spacers and remove the medallion plate from the left side of the instrument board. Remove the knobs from the control unit and then install it in the opening. Fasten it in place on the

Items 1 to 75 of the Parts List for the Studbaker ST-3, Deluxe Model AO-266 are identical Pierce-Arrow Deluxe Model MT-3. See the items on the right for additional accessories.

Control Adjustments

The right-hand knob is the tuning control knob. With the Receiver turned on, tune in a station whose frequency in kilocycles is known. The numbers on the dial represent the frequency in kilocycles with the last "0" omitted. With the known station accurately tuned in, pull off the knob and loosen the set screw (See Fig. 2). Then turn the shaft until the proper frequency is indicated on the dial. Tighten the set screw securely and replace the knob.

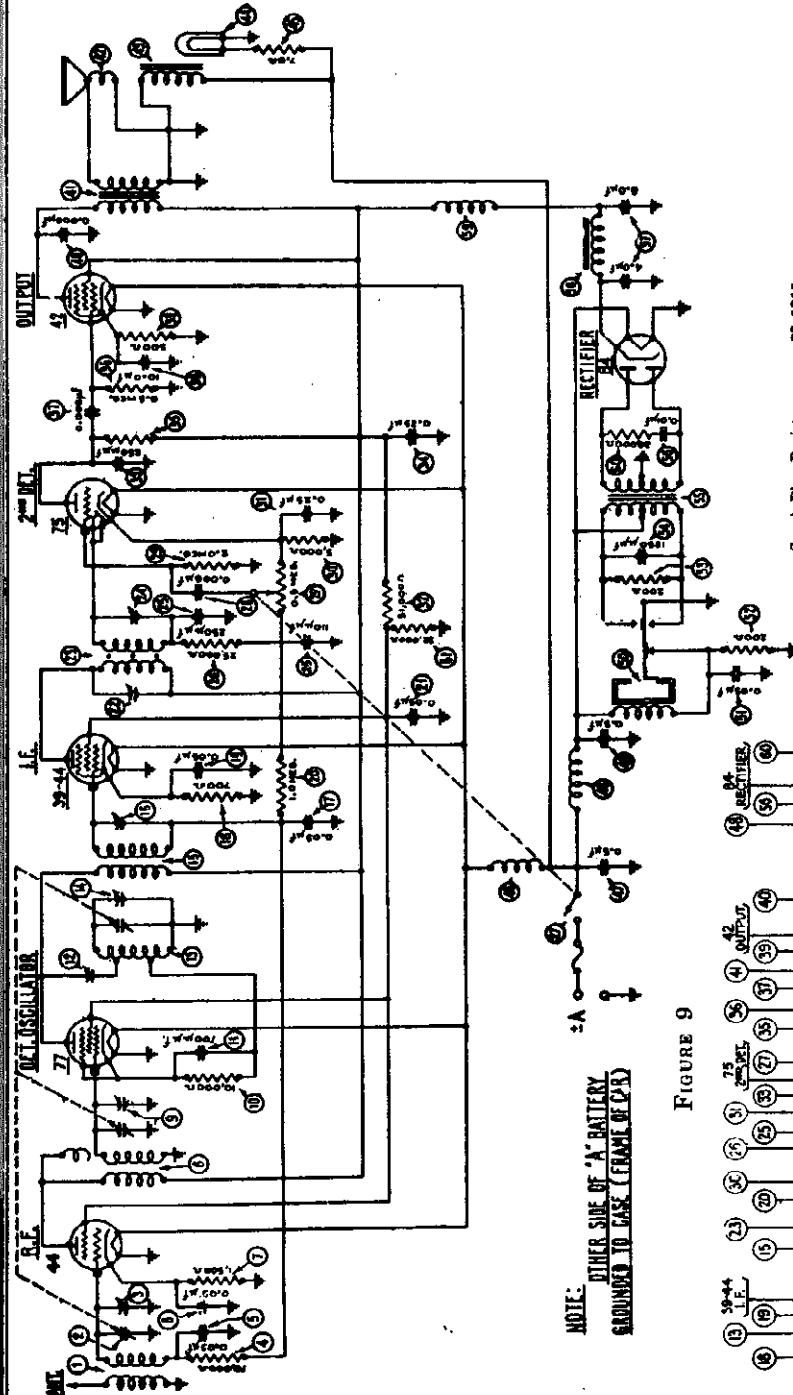
Ignition and Generator Interference Suppression

Two interference condensers are supplied — one must be fastened under the inside generator relay leg and the lead connected to the battery side of the relay. The second condenser must be fastened under an ignition coil mounting screw and the lead connected to the armature side of the coil.

Cut the spark plug terminals from the spark plug wires and screw on the spark plug resistors and snap them in place on the spark plug terminals. Cut each distributor-to-coil high-tension wire about 1" from the distributor and screw into it a distributor resistor. Then screw the distributor end of the lead into the resistor and plug into the distributor cap again.

PHILCO RADIO & TELEV. CORP.

MODEL R
Schematic, Chassis
Parts List



NOTE:
OTHER SIDE OF 'A' BATTERY
SHOWN TO FACE (FRONT OF CASE)

Spark Plug Resistor.....	33-1015
Distributor Resistor.....	33-1113E
Screw Type Resistor.....	4851
Interference Cond. (.4 mfd.).....	30-4007
Interference Cond. (1 mfd.).....	4522
Face Assembly.....	42-5176
Glass for Control.....	27-7826
Pointer.....	26-1901
Control Assembly.....	42-5174
Knobs.....	27-4058
Knob Spring.....	26-1728
Base Assembly.....	42-5115
Battery Cable.....	38-5704
Stand.....	28-9036
Net.....	W55
4-prong Socket.....	27-8006
5-prong Socket.....	27-6014
6-prong Socket.....	6417
Antenna Lead.....	38-5703
Fuse.....	7227
Fuse Insulator.....	27-7131
Shafts.....	28-9234

FIGURE 9

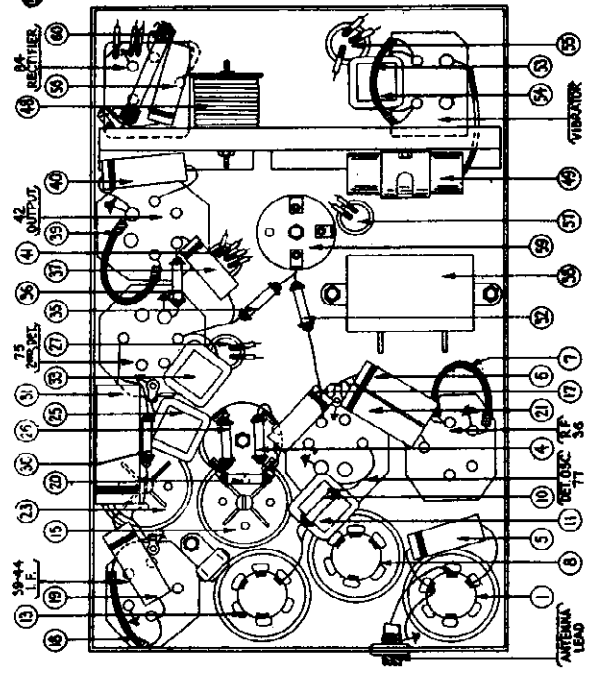


FIGURE 10

1	Antenna Transformer.....	32-1331
2	Tuning Condenser.....	31-1164
3	1st Padder (on tun. cond.).....	33-1115
4	Resistor (70,000 ohms).....	30-4025
5	Condenser (.03 mfd.).....	30-4020
6	Condenser (.05 mfd.).....	33-3047
7	Resistor (1500 ohms).....	32-1332
8	R. F. Transformer.....	33-1000
9	2nd Padder (on tun. cond.).....	5863
10	Resistor (10,000 ohms).....	32-1332
11	Condenser (.0007 mfd.).....	32-1329
12	Padder (Pri. 1st I. F. Tran.).....	30-4025
13	Oscillator Transformer.....	6443
14	3rd Padder (on tun. cond.).....	30-4020
15	1st I. F. Transformer.....	33-1036
16	Padder (Sec. 1st I. F. Tran.).....	30-4020
17	Condenser (.03 mfd.).....	32-1237
18	Resistor (700 ohms).....	30-1020
19	Condenser (.05 mfd.).....	33-1013
20	Resistor (1,000,000 ohms).....	33-5058
21	Condenser (.036 mfd.).....	30-4125
22	Resistor (2,000,000 ohms).....	32-1025
23	Resistor (9000 ohms).....	6006
24	Condenser (.25 mfd.).....	30-4146
25	Resistor (51,000 ohms).....	5869
26	Condenser (.00025 mfd.).....	3062
27	Condenser (.25 mfd.).....	04390
28	Resistor (100,000 ohms).....	6099
29	Resistor (500,000 ohms).....	6037
30	Condenser (.008 mfd.).....	30-4125
31	Condenser (10 mfd.).....	7440
32	Resistor (500 ohms).....	33-3031
33	Condenser (.006 mfd.).....	30-4024
34	Output Transformer.....	32-7214
35	Coil & Voice Coil.....	02981
36	Field Coil Assembly.....	38-3097
37	Pilot Light.....	6606
38	Resistor (7 ohms).....	33-3035
39	"A" Choke.....	32-1295
40	Condenser (.5 mfd.).....	30-4047
41	Vibrator Choke.....	32-1235
42	Condenser (.5 mfd.).....	30-4147
43	Vibrator Unit.....	38-5036
44	Condenser (.05 mfd.).....	30-4039
45	Resistor (200 ohms).....	7217
46	Resistor (.00136 mfd.).....	5886
47	Power Transformer.....	32-7216
48	Condenser (.01 mfd.).....	30-4051
49	Condenser (4-8 mfd.).....	30-2072
50	"B" Choke.....	32-7215
51	R. F. Choke.....	32-1281
52	Resistor (30,000 ohms).....	7836
53	Resistor (32,000 ohms).....	8225

MODEL R
Installation Data PHILCO RADIO & TELEV. CORP.

Installation Instructions - Standard Model - Part No. 628808

These instructions have been carefully prepared for your use in installing the Standard Custom-Built Model R Radio, by Philco. Read thoroughly, then follow the instructions carefully in every detail. Carefully unpack the cartons and check the contents with the material packing lists. Examine the parts and compare them with illustrations given in these instructions so that you may become familiar with them and thus make the installation easy and quick.

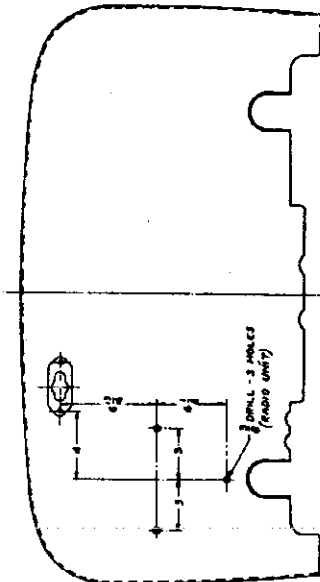


FIGURE 1

Receiver Location

Refer to Figure 1, which gives detailed dimensions for the location and drilling of the holes in the dash. All dimensions are shown from the engine side of the dash. Remove the paint from the dash for $\frac{3}{8}$ " around the holes to insure good ground contact. After drilling the holes, install the three mounting studs in the back of the Receiver so that when the Receiver is mounted in the car, the control cables will come out toward the center and the speaker will face toward the toe boards. Before installing, the three spacing nuts should be put on the mounting studs, so that there will be $\frac{3}{16}$ " spacing between the Receiver and the dash lining. (See Figure 2 and 3).

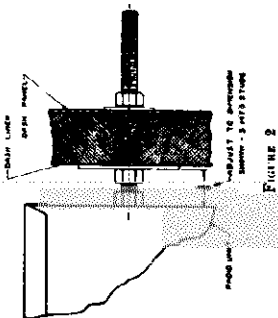


FIGURE 2

Antenna Lead

Splice the shielded Receiver antenna lead to the car lead-in as close as possible to windshield pillar post, cutting off all excessive lead-in. Tape this connection securely. All unshielded lead-in must be pushed back up the windshield pillar. The shielding pigtail must be grounded to the body (vow) panel as close as possible to the "A" pillar. Drill a $\frac{1}{8}$ " hole where the hood overlaps and use the 8-32 bolt, washers, and nuts supplied for this purpose. Remove the paint from around the hole, to secure a good ground connection. (See Figure 4)

Ammeter Lead

Place the fuse and fuse insulator in the metal fuse holder and connect it to the black and white wire coming from the back of the Receiver. Determine the correct length for connection to the ammeter output terminal, cut the wire and strip the insulation, then solder on the eye terminal and connect it to the ammeter output terminal.

Instrument Panel Control

Remove the ash receiver from the panel with an upward pull. Remove the ash receiver base from the panel by compressing the retaining tabs at the bottom of the base assembly. This can be done best by using a screwdriver and working from in back of the instrument panel. While pushing up on an end tab, pull the base forward and it will come out.

Loosen the two (2) screws which secure the instrument board brace to the instrument assembly can be slid forward then. Next, loosen the bolts on the brace in back of the instrument panel and remove the toggle spring. Slide the entire assembly forward and remove. Figure 6 gives the details of the ash receiver assembly while Figure 8 gives an enlarged view of the section A in Figure 5. Be sure to tighten all bolts and screws that were loosened for this operation.

Loosen the car lighting switch to permit more working space. While this operation is not absolutely necessary, it makes the following operation easier.

Push the flexible shafts of the control through the opening in the panel and install the control unit in this opening.

The "U" retaining clamp must be placed over the studs on the back of the control and the hex-nuts tightened to draw the control base flush with the instrument panel. (See Figure 7). Replace and tighten the car lighting switch.

The knob on the left of the control is the switch and the volume control. Its cable should be installed in the flexible cable coupling bushing on the Receiver nearest the dash. The right-hand knob is the tuning control. The flexible cable from this point, should be installed in the other control coupling bushing.

The set screws on the coupling bushings must be loosened sufficiently to allow the shaft

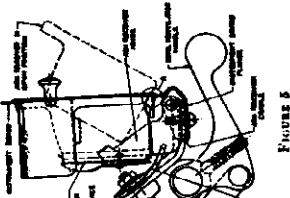


FIGURE 5

housings and couplings to be properly seated. After the shafts have been coupled, tighten the set screws again. The dial light connector should now be pushed into its receptacle on the speaker panel.

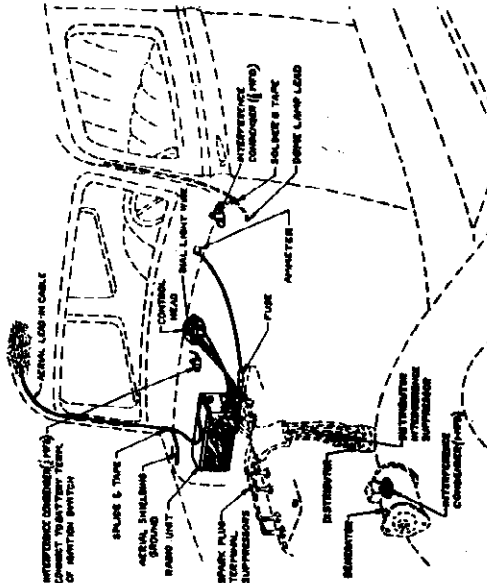


FIGURE 3

Adjustment
Turn on the Receiver and tune in a station whose frequency in kilocycles is known. (The numbers on the dial represent channel numbers which, with the addition of a cipher, become the frequency numbers.) Pull the knob from the right-hand control shaft and loosen the set screw found there. See Figure 7. Turn the shaft until the indicator points to the correct number on the dial. Then tighten the set screw and replace the knob

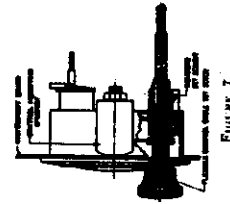


FIGURE 7

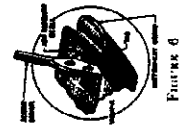
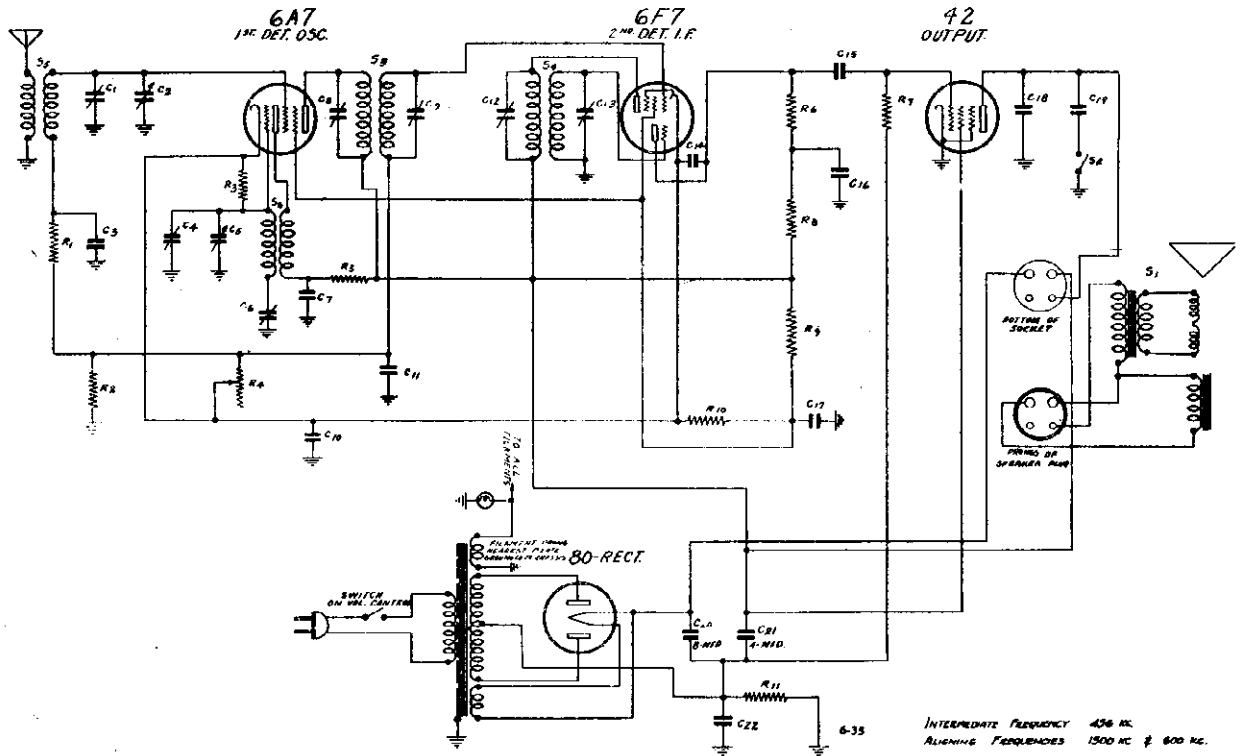


FIGURE 6

PILOT RADIO CORP.

MODEL 41
Schematic, Voltage
Alignment, Socket
Trimmers

SCHMATIC DIAGRAM PILOT MODEL No. 41



INTERMEDIATE FREQUENCY 456 KC.
ALIGNING FREQUENCIES 1500 KC. & 800 KC.

Model 41 Broadcast Receiver

Range: 170 Meters—550 Meters (1,770 kc.—345 kc.)

REALIGNMENT: Should the receiver require realignment, the outlined procedure 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 .002 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. 3 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. Adjust 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.

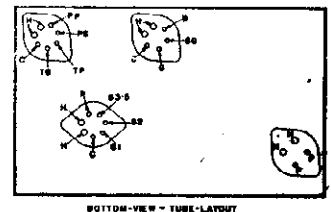
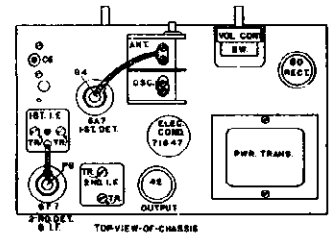
Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

DESIGNATION	PART NO.	DESCRIPTION
C1, C4		TRIMMERS IN GANG COND.
C2, C3	71676	2 GANG COND.
C3, C10, C17	22055 M	.1-200K. PAPER TUBULAR
C6	71508 A	300-300MMFD PAPPER
C7, C15	22055 C	.05-600V. PAPER TUBULAR
C8, C9		TRIMMERS IN 1 ST I.F. TRANS.
C11, C12		TRIMMERS IN 2 ND I.F. TRANS.
C13	22056 F	.25-300V. PAPER TUBULAR
C14	22726	6002 MFD. MICA
C16	22055 AD	.1-600K. PAPER TUBULAR
C18	22055 U	.01-1000V. PAPER TUBULAR
C19	22055 V	.03-1000V. PAPER TUBULAR
C20-C21	71687	400MM. 500V. PAPER COND.
C22	22055 S	.5-200K. PAPER TUBULAR

DESIGNATION	PART NO.	DESCRIPTION
R1	15031	100MM. 2W WATT
R2	15028	1.0M-500K. 2.5 WATT
R3, R8	15164	500MM. 5W WATT
R4	71652	250. CENTRAL SWITCH
R5, R10	15074	100MM. 500K. 2.5 WATT
R6	15171	500MM. 500K. 2.5 WATT
R7	15077	250MM. 500K. 2.5 WATT
R9	15126	25.000-500K. 5 WATT
R11	15067	250-500K. 1 WATT

DESIGNATION	PART NO.	DESCRIPTION
S1	40775	SPEAKER 1000 OHM FIELD
S2	71657	TWICE CONTROL SWITCH
S3	70736-A	1ST I.F. TRANS.
S4	70737-A	2 ND I.F. TRANS.
S5	71685	AMP. COIL
S6	71701	OSC. COIL



VOLTAGES MEASURED AT TUBE SOCKETS

	Dec. Osc.	Amp. Dec.	Audio Output
PLATE	220	220	210
SCREEN	66	66	237
CATHODE	18	18	*16
FILAMENT	6.3	6.3	6.3

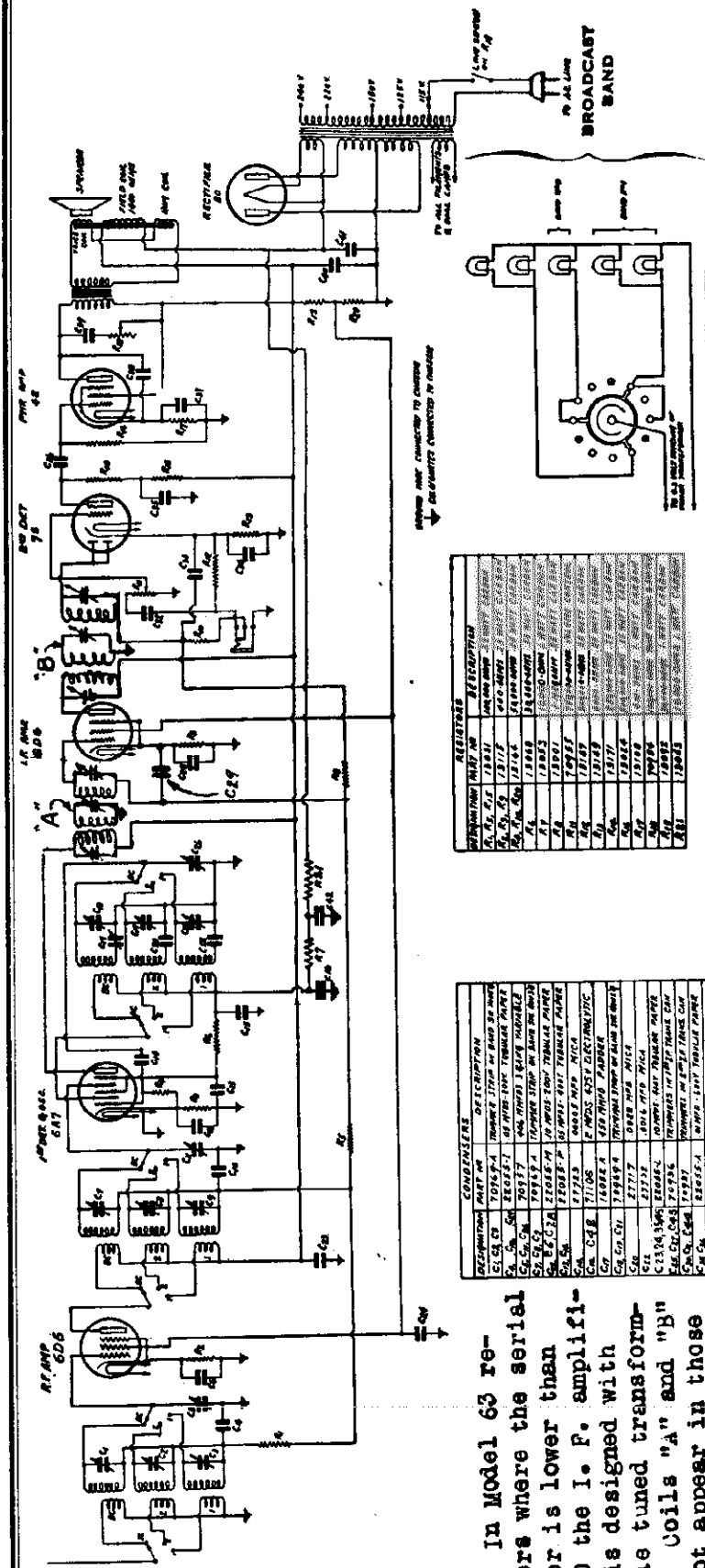
Speaker field volts—85 volts.
Anode grid of 6A7—150 volts.
Triode plate of 6F7—95 volts.
Plate and screen voltages measured to cathode.
Cathode voltages measured to chassis frame.

Rectifier 80
335 Volts D.C. from Filament to transformer center tap.

4.9
*Measured across 250 ohm resistor, R-11. Measurements made with voltmeter of 1,000 ohms per volt.

PILOT RADIO CORP.

MODEL 63
Schematic, Voltage



IF PEAK 456 KC

RESISTOR	WATTAGE	RESISTANCE	DESCRIPTION
R1	1/2	100K	100,000 OHM
R2	1/2	100K	100,000 OHM
R3	1/2	100K	100,000 OHM
R4	1/2	100K	100,000 OHM
R5	1/2	100K	100,000 OHM
R6	1/2	100K	100,000 OHM
R7	1/2	100K	100,000 OHM
R8	1/2	100K	100,000 OHM
R9	1/2	100K	100,000 OHM
R10	1/2	100K	100,000 OHM
R11	1/2	100K	100,000 OHM
R12	1/2	100K	100,000 OHM
R13	1/2	100K	100,000 OHM
R14	1/2	100K	100,000 OHM
R15	1/2	100K	100,000 OHM
R16	1/2	100K	100,000 OHM
R17	1/2	100K	100,000 OHM
R18	1/2	100K	100,000 OHM
R19	1/2	100K	100,000 OHM
R20	1/2	100K	100,000 OHM
R21	1/2	100K	100,000 OHM
R22	1/2	100K	100,000 OHM
R23	1/2	100K	100,000 OHM
R24	1/2	100K	100,000 OHM
R25	1/2	100K	100,000 OHM
R26	1/2	100K	100,000 OHM
R27	1/2	100K	100,000 OHM
R28	1/2	100K	100,000 OHM
R29	1/2	100K	100,000 OHM
R30	1/2	100K	100,000 OHM
R31	1/2	100K	100,000 OHM
R32	1/2	100K	100,000 OHM
R33	1/2	100K	100,000 OHM
R34	1/2	100K	100,000 OHM
R35	1/2	100K	100,000 OHM
R36	1/2	100K	100,000 OHM
R37	1/2	100K	100,000 OHM
R38	1/2	100K	100,000 OHM
R39	1/2	100K	100,000 OHM
R40	1/2	100K	100,000 OHM
R41	1/2	100K	100,000 OHM
R42	1/2	100K	100,000 OHM
R43	1/2	100K	100,000 OHM
R44	1/2	100K	100,000 OHM
R45	1/2	100K	100,000 OHM
R46	1/2	100K	100,000 OHM
R47	1/2	100K	100,000 OHM
R48	1/2	100K	100,000 OHM
R49	1/2	100K	100,000 OHM
R50	1/2	100K	100,000 OHM

CONDENSER	DESCRIPTION
C1	100 P.F. 50V
C2	100 P.F. 50V
C3	100 P.F. 50V
C4	100 P.F. 50V
C5	100 P.F. 50V
C6	100 P.F. 50V
C7	100 P.F. 50V
C8	100 P.F. 50V
C9	100 P.F. 50V
C10	100 P.F. 50V
C11	100 P.F. 50V
C12	100 P.F. 50V
C13	100 P.F. 50V
C14	100 P.F. 50V
C15	100 P.F. 50V
C16	100 P.F. 50V
C17	100 P.F. 50V
C18	100 P.F. 50V
C19	100 P.F. 50V
C20	100 P.F. 50V
C21	100 P.F. 50V
C22	100 P.F. 50V
C23	100 P.F. 50V
C24	100 P.F. 50V
C25	100 P.F. 50V
C26	100 P.F. 50V
C27	100 P.F. 50V
C28	100 P.F. 50V
C29	100 P.F. 50V
C30	100 P.F. 50V
C31	100 P.F. 50V
C32	100 P.F. 50V
C33	100 P.F. 50V
C34	100 P.F. 50V
C35	100 P.F. 50V
C36	100 P.F. 50V
C37	100 P.F. 50V
C38	100 P.F. 50V
C39	100 P.F. 50V
C40	100 P.F. 50V
C41	100 P.F. 50V
C42	100 P.F. 50V
C43	100 P.F. 50V
C44	100 P.F. 50V
C45	100 P.F. 50V
C46	100 P.F. 50V
C47	100 P.F. 50V
C48	100 P.F. 50V
C49	100 P.F. 50V
C50	100 P.F. 50V

Note. In Model 63 receivers where the serial number is lower than 20000 the I. F. amplifier is designed with double tuned transformers. Coils "A" and "B" do not appear in those chassis.

RECEIVER DESCRIPTION

Operating Voltage—115, 125, 150, 220, 240 volts, Alternating Current.
 Frequency Rating —50 to 60 cycles.
 Power Consumption—70 Watts.
 Tubes
 — 1 type 6A7
 2 type 6D6
 1 type 75
 1 type 42
 1 type 80
 Circuit
 —One stage of Tuned Radio Frequency amplification for all frequencies, electron-coupled oscillator-modulator, diode detector, class "A" pentode output stage, automatic volume control.
 Wavelength Range —From 550 meters to 16 meters (545 kc to 18,800 kc).
 Undistorted power output—3 watts.
 Intermediate Frequency — 456 kc.
 Tube Functions —Type 6D6: R. F. amplifier for all bands.

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.

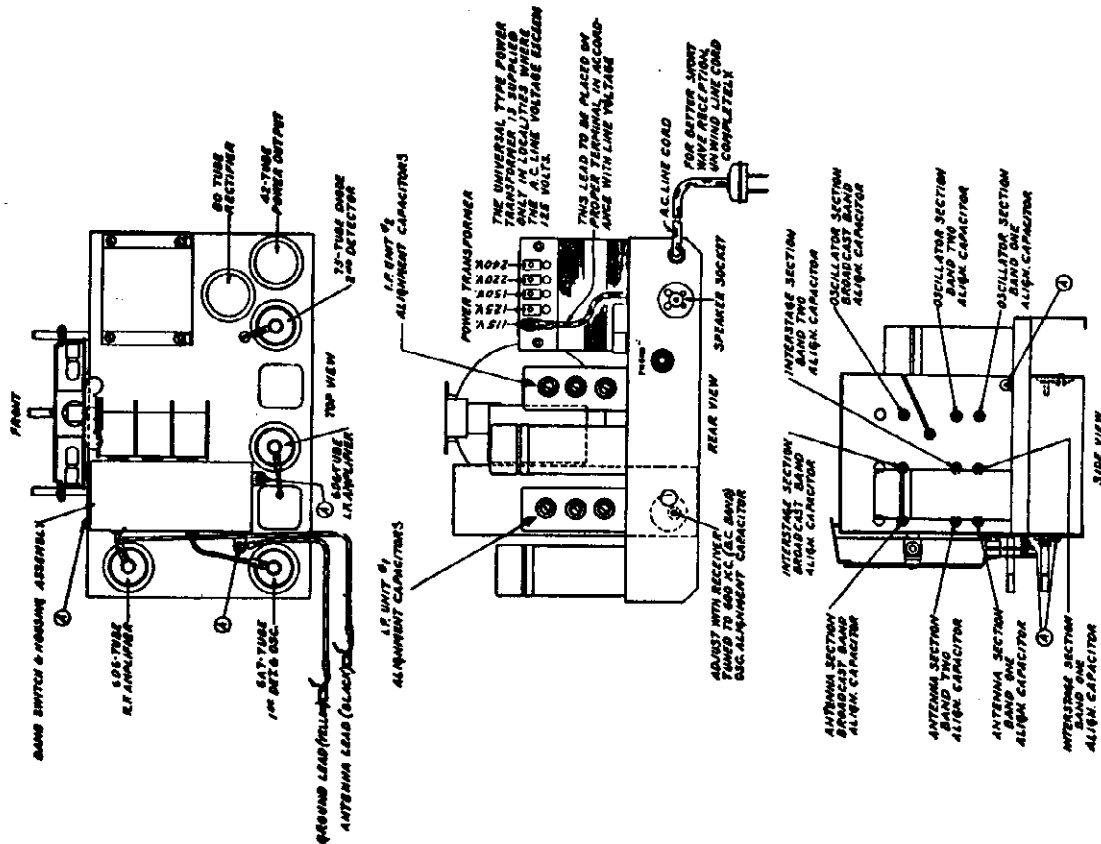
RECTIFIER R.F. OSC. DET. I.F. DIODE DET. POWER PENTODE
 Type 80 Type 6D6 Type 6A7 Type 6D6 Type 75 Type 42
 Plate 235 235 235 120* 210
 Cathode 4 4.5 4 1.5 14.
 Screen 90 90 90
 Filament 6.3 6.3 6.3 6.3 6.3

*Voltages measured through 250,000 ohm plate resistor.
 Speaker field voltage 110 volts. All plate voltages measured to cathode.
 All screen voltages measured to cathode. All cathode voltages measured to filament.

MODEL 63
Socket, Trimmers
Alignment

PILOT RADIO CORP.

SERVICE INFORMATION SHEET



"PILOT" MODEL NO. 63 SUPERHETERODYNE RECEIVER
FREQUENCY RANGE - 18,800 KC TO 545 KC (16 METERS TO 550 METERS)

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 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 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 .002 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. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1400 kc. mark. Adjust the broadcast band oscillator trimmer (See illustration on Service Information Sheet) 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 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 1400 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 this broadcast with the exception of the adjustment of the padder condenser. The alignment frequencies are as follows:
Band 2: 49 Meters (6,100 kc.)
Band 1: 16.8 Meters—(17,800 kc.)

When aligning Band 2, set the Band Selector Switch in the position marked "Band 2." Set the tuning control pointer at the 49 meter mark. Set the external oscillator at 49 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 16.8 meter mark. Set the external oscillator at 16.8 meters. Adjust the oscillator section alignment capacitor on Band 1 for maximum output.

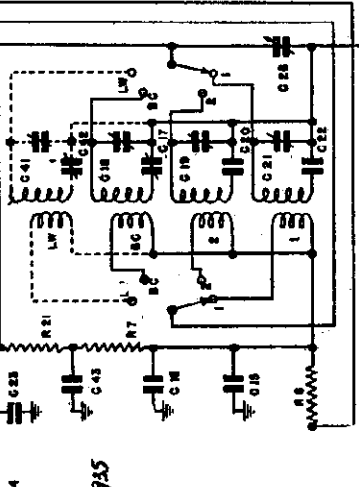
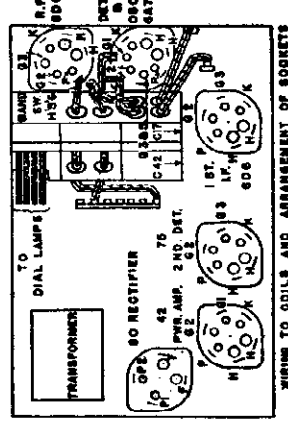
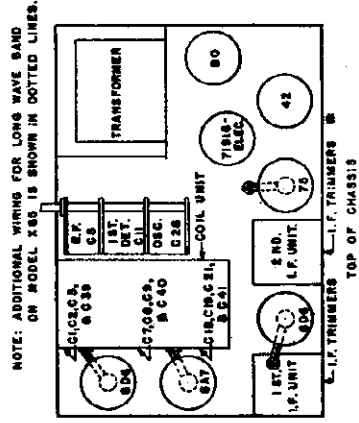
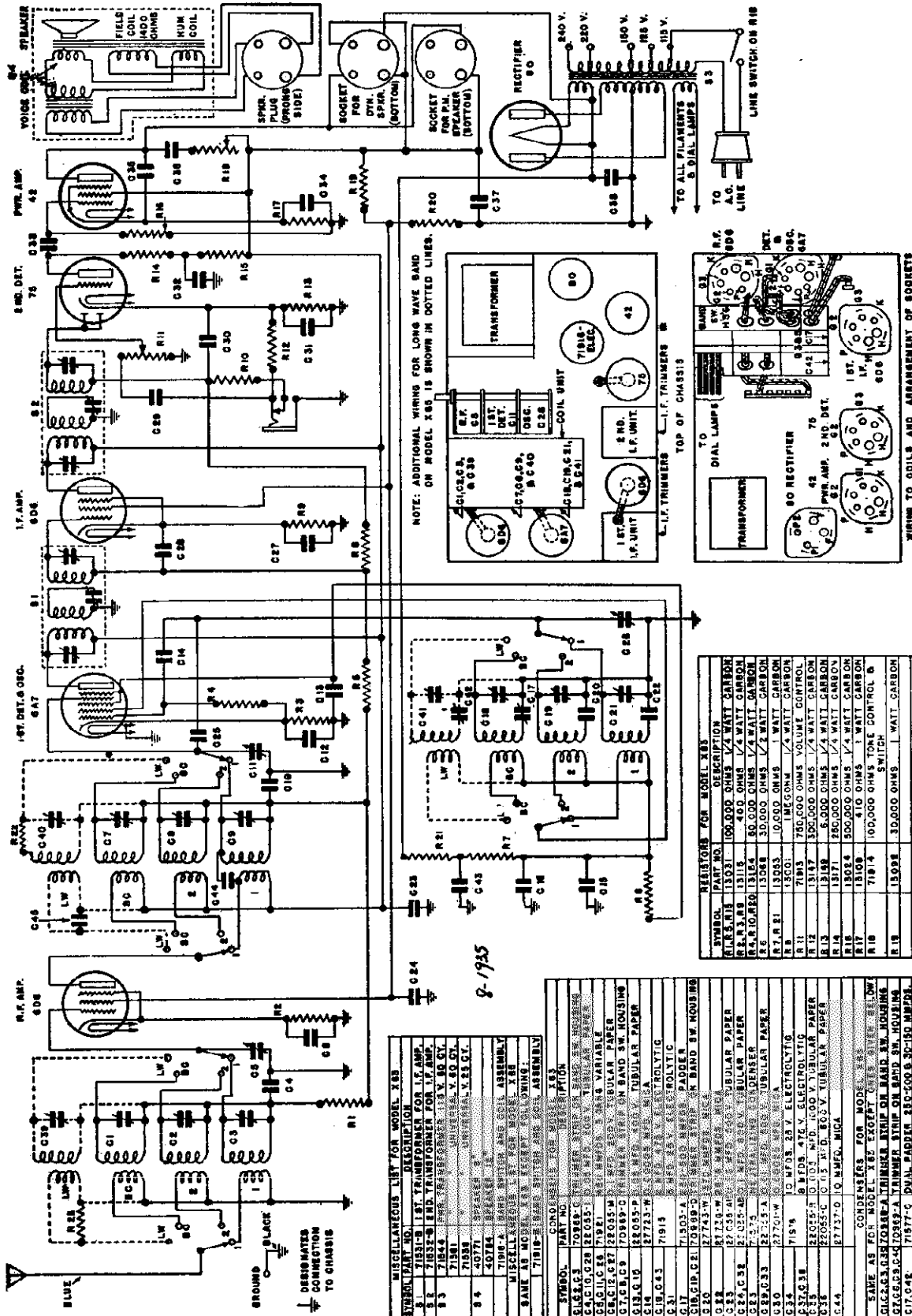
Proceed next to align the interstage section of Band 1. In doing this, it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonance peak. Next align the antenna section for maximum sensitivity.

REMOVAL OF BAND SELECTOR SWITCH ASSEMBLY: Should it be necessary to remove the switch assembly, this is easily done by removing the screws marked "A." on the Service Information Sheet. Before doing this, however, it is essential to uncoil the leads between the switch and the chassis. Also remove the screw beneath the Dial Drive Assembly, which secures the dial assembly to the chassis.

It is advisable to realign the receiver after reinstalling the switch assembly.

PILOT RADIO CORP.

MODELS X-63, X-68
Schematic, Socket
Trimmers



RESISTORS FOR MODEL X-63

SYMBOL	PART NO.	DESCRIPTION
R1	1301	100,000 OHMS 1/2 WATT CARBON
R2	1311	400 OHMS 1/4 WATT CARBON
R3	1312	400 OHMS 1/4 WATT CARBON
R4	1313	400 OHMS 1/4 WATT CARBON
R5	1314	400 OHMS 1/4 WATT CARBON
R6	1315	400 OHMS 1/4 WATT CARBON
R7	1316	400 OHMS 1/4 WATT CARBON
R8	1317	400 OHMS 1/4 WATT CARBON
R9	1318	400 OHMS 1/4 WATT CARBON
R10	1319	400 OHMS 1/4 WATT CARBON
R11	1320	400 OHMS 1/4 WATT CARBON
R12	1321	400 OHMS 1/4 WATT CARBON
R13	1322	400 OHMS 1/4 WATT CARBON
R14	1323	400 OHMS 1/4 WATT CARBON
R15	1324	400 OHMS 1/4 WATT CARBON
R16	1325	400 OHMS 1/4 WATT CARBON
R17	1326	400 OHMS 1/4 WATT CARBON
R18	1327	400 OHMS 1/4 WATT CARBON
R19	1328	400 OHMS 1/4 WATT CARBON
R20	1329	400 OHMS 1/4 WATT CARBON

RESISTORS FOR MODEL X-68

SYMBOL	PART NO.	DESCRIPTION
R1	1301	100,000 OHMS 1/2 WATT CARBON
R2	1311	400 OHMS 1/4 WATT CARBON
R3	1312	400 OHMS 1/4 WATT CARBON
R4	1313	400 OHMS 1/4 WATT CARBON
R5	1314	400 OHMS 1/4 WATT CARBON
R6	1315	400 OHMS 1/4 WATT CARBON
R7	1316	400 OHMS 1/4 WATT CARBON
R8	1317	400 OHMS 1/4 WATT CARBON
R9	1318	400 OHMS 1/4 WATT CARBON
R10	1319	400 OHMS 1/4 WATT CARBON
R11	1320	400 OHMS 1/4 WATT CARBON
R12	1321	400 OHMS 1/4 WATT CARBON
R13	1322	400 OHMS 1/4 WATT CARBON
R14	1323	400 OHMS 1/4 WATT CARBON
R15	1324	400 OHMS 1/4 WATT CARBON
R16	1325	400 OHMS 1/4 WATT CARBON
R17	1326	400 OHMS 1/4 WATT CARBON
R18	1327	400 OHMS 1/4 WATT CARBON
R19	1328	400 OHMS 1/4 WATT CARBON
R20	1329	400 OHMS 1/4 WATT CARBON

CONDENSERS FOR MODEL X-63

SYMBOL	PART NO.	DESCRIPTION
C1	2085	50 P.F. 50 V. ELECTROLYTIC
C2	2086	50 P.F. 50 V. ELECTROLYTIC
C3	2087	50 P.F. 50 V. ELECTROLYTIC
C4	2088	50 P.F. 50 V. ELECTROLYTIC
C5	2089	50 P.F. 50 V. ELECTROLYTIC
C6	2090	50 P.F. 50 V. ELECTROLYTIC
C7	2091	50 P.F. 50 V. ELECTROLYTIC
C8	2092	50 P.F. 50 V. ELECTROLYTIC
C9	2093	50 P.F. 50 V. ELECTROLYTIC
C10	2094	50 P.F. 50 V. ELECTROLYTIC
C11	2095	50 P.F. 50 V. ELECTROLYTIC
C12	2096	50 P.F. 50 V. ELECTROLYTIC
C13	2097	50 P.F. 50 V. ELECTROLYTIC
C14	2098	50 P.F. 50 V. ELECTROLYTIC
C15	2099	50 P.F. 50 V. ELECTROLYTIC
C16	2100	50 P.F. 50 V. ELECTROLYTIC
C17	2101	50 P.F. 50 V. ELECTROLYTIC
C18	2102	50 P.F. 50 V. ELECTROLYTIC
C19	2103	50 P.F. 50 V. ELECTROLYTIC
C20	2104	50 P.F. 50 V. ELECTROLYTIC
C21	2105	50 P.F. 50 V. ELECTROLYTIC
C22	2106	50 P.F. 50 V. ELECTROLYTIC
C23	2107	50 P.F. 50 V. ELECTROLYTIC
C24	2108	50 P.F. 50 V. ELECTROLYTIC
C25	2109	50 P.F. 50 V. ELECTROLYTIC
C26	2110	50 P.F. 50 V. ELECTROLYTIC
C27	2111	50 P.F. 50 V. ELECTROLYTIC
C28	2112	50 P.F. 50 V. ELECTROLYTIC

CONDENSERS FOR MODEL X-68

SYMBOL	PART NO.	DESCRIPTION
C1	2085	50 P.F. 50 V. ELECTROLYTIC
C2	2086	50 P.F. 50 V. ELECTROLYTIC
C3	2087	50 P.F. 50 V. ELECTROLYTIC
C4	2088	50 P.F. 50 V. ELECTROLYTIC
C5	2089	50 P.F. 50 V. ELECTROLYTIC
C6	2090	50 P.F. 50 V. ELECTROLYTIC
C7	2091	50 P.F. 50 V. ELECTROLYTIC
C8	2092	50 P.F. 50 V. ELECTROLYTIC
C9	2093	50 P.F. 50 V. ELECTROLYTIC
C10	2094	50 P.F. 50 V. ELECTROLYTIC
C11	2095	50 P.F. 50 V. ELECTROLYTIC
C12	2096	50 P.F. 50 V. ELECTROLYTIC
C13	2097	50 P.F. 50 V. ELECTROLYTIC
C14	2098	50 P.F. 50 V. ELECTROLYTIC
C15	2099	50 P.F. 50 V. ELECTROLYTIC
C16	2100	50 P.F. 50 V. ELECTROLYTIC
C17	2101	50 P.F. 50 V. ELECTROLYTIC
C18	2102	50 P.F. 50 V. ELECTROLYTIC
C19	2103	50 P.F. 50 V. ELECTROLYTIC
C20	2104	50 P.F. 50 V. ELECTROLYTIC
C21	2105	50 P.F. 50 V. ELECTROLYTIC
C22	2106	50 P.F. 50 V. ELECTROLYTIC
C23	2107	50 P.F. 50 V. ELECTROLYTIC
C24	2108	50 P.F. 50 V. ELECTROLYTIC
C25	2109	50 P.F. 50 V. ELECTROLYTIC
C26	2110	50 P.F. 50 V. ELECTROLYTIC
C27	2111	50 P.F. 50 V. ELECTROLYTIC
C28	2112	50 P.F. 50 V. ELECTROLYTIC

Wavelength Range—From 550 meters to 16 meters (545 kc. to 18,800 kc.).
Undistorted power output—3 watts.
Intermediate Frequency—456 kc.

MODELS X-63, X-65

Voltage, Parts Alignment

PILOT RADIO CORP.

TUBE SOCKETS

Part No.	
70927	4-Prong Bakelite Base Tube Socket
70863	6-Prong Bakelite Base Tube Socket
70864	7-Prong Bakelite Base Tube Socket

REALIGNMENT: Should the receiver require realignment, the outlined procedure 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 X65 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 X65 an additional padder for the Highband 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.

TUBE SHIELDS

70865	Tube Shield Base
71857	Tube Shield Base, Long 4 1/4"
71858	Tube Shield Base, Short 3 3/8"

Part No. SWITCHES AND CONTROLS

71914	Tone Control and Switch
71913	Volume Control
70953-A	Volume Control Escutcheon
71620	Small Knob with Dot
71977	Large Set Screw Knob
70950	Phonograph Jack

SPEAKER AND PARTS

40771	8" Dynamic Speaker
40784	12" Dynamic Speaker
70509	Steel Speaker Mounting Bushing
70002	Rubber Grommet

PAPER CONDENSERS

22055-A	.01 mfd. 600 Volt
22055-C	.05 mfd. 600 Volt
22055-I	.05 mfd. 200 Volt
22055-M	.1 mfd. 200 Volt
22055-P	.05 mfd. 400 Volt
22055-R	.005 mfd. 1000 Volt
22055-AB	.1 mfd. 600 Volt
22055-AH	.25 mfd. 500 Volt

POWER TRANSFORMER

71381	Replacement Unit
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TUNING EQUIPMENT

71531-B	1st I.F. Transformer
71532-B	2nd I.F. Transformer
71921	3-Gang Tuning Condenser
71910-A	Band Switch and Coil Assembly completely mounted in shield, with gang condenser, for Model X-63
71910-B	Band Switch Assembly as above for Model X-65
70918	Dial Escutcheon
70910-2	Dial Crystal
70919	Dial Crystal Retaining Ring
71911	2-Speed Dial Drive Mechanism
70998	Dial Drive Disc
71539-K	Dial Scale and Holder Assembly Model X-63
71539-L	Dial Scale and Holder Assembly Model X-65
70934	Pointer
642	Pointer Holding Screw
71056	Pointer Spacing Washer
70933-B	Band Switch Escutcheon Model X-63
70933-J	Band Switch Escutcheon Model X-65
71282	Dial Light Bulb—Bayonet Base 6.3 Volts

MICA CONDENSERS

27701	.00025 mfd.
27723-O	.00005 mfd.
27737-O	.00001 mfd.
27743	.00137 mfd. Padding Condensers
27744	.00287 mfd. Padding Condensers

CARBON RESISTANCE

1/4 Watt All Resistance Values
1/2 Watt All Resistance Values

PADDING CONDENSERS

71503-A	.00025—.0005 mfd. Model X-63
71577-C	.00003—.00015 mfd. and .00025—.0005 mfd. Dual Type Model X-65

ELECTROLYTIC CONDENSERS

71915	2-2 mfd. 475 Volt and 5 mfd. 25 Volts
71916	8-8 mfd. 475 Volt and 10 mfd. 25 Volts

LINE CORD

70885	Cord without Plug
70003	American Type Plug
70889	European Type Plug
71341	British Type Plug

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.

	R. F. Type 6D6	OSC. DET. Type 6A7	I. F. Type 6D6	DIODE DET. Type 75	POWER PENT. Type 42	RECTIFIER Type 80
Plate	250	250**	250	100*	225	225
Cathode	3.5	4	3.5	1.5	15	15
Screen	90	90	90		250	
Filament	6.3	6.3	6.3	6.3		

*Voltages measured through 250,000 ohm plate resistor.
**Anode grid of 6A7 tube 160 volts.
Speaker field voltage 100 volts. All plate voltages measured to ground. All screen voltages measured to ground. All cathode voltages measured to ground.

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. 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. 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 the 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.

The above alignment positions refer to the Model X-63 only, which is calibrated in frequency. The alignment points for the Model X-65, which is calibrated in meters only, is as follows:

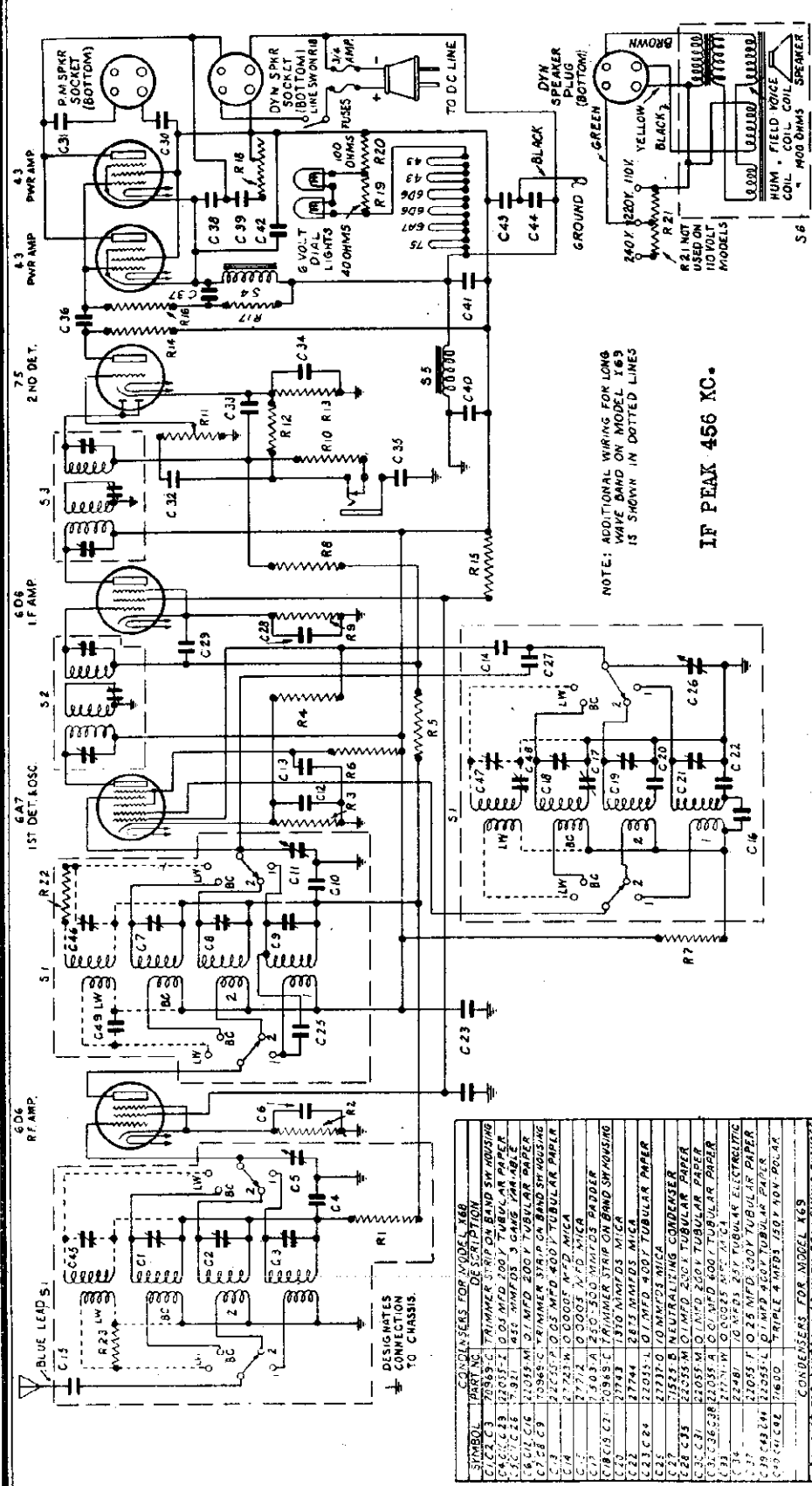
High Band	Align at 750 meters. Pad at 2,000 meters.
Broadcast	Align at 200 meters. Pad at 500 meters.
Band 2	Align at 49 meters.
Band 1	Align at 17 meters.

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.

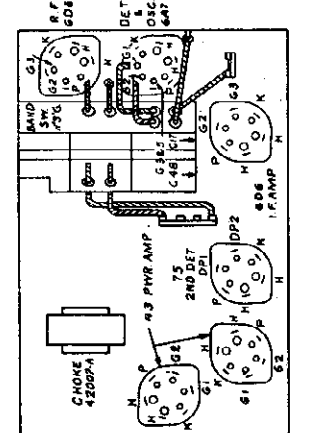
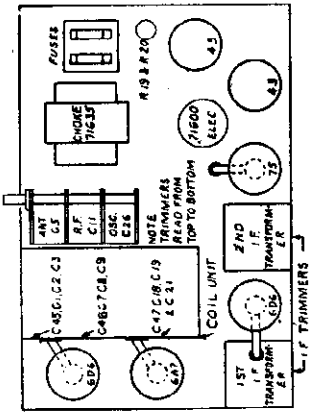
PILOT RADIO CORP.

MODELS X-68, X-69
Schematic, Socket
Trimmers



NOTE: ADDITIONAL WIRING FOR LONG WAVE BAND ON MODEL 165 IS SHOWN IN DOTTED LINES

IF PEAK 456 KC.

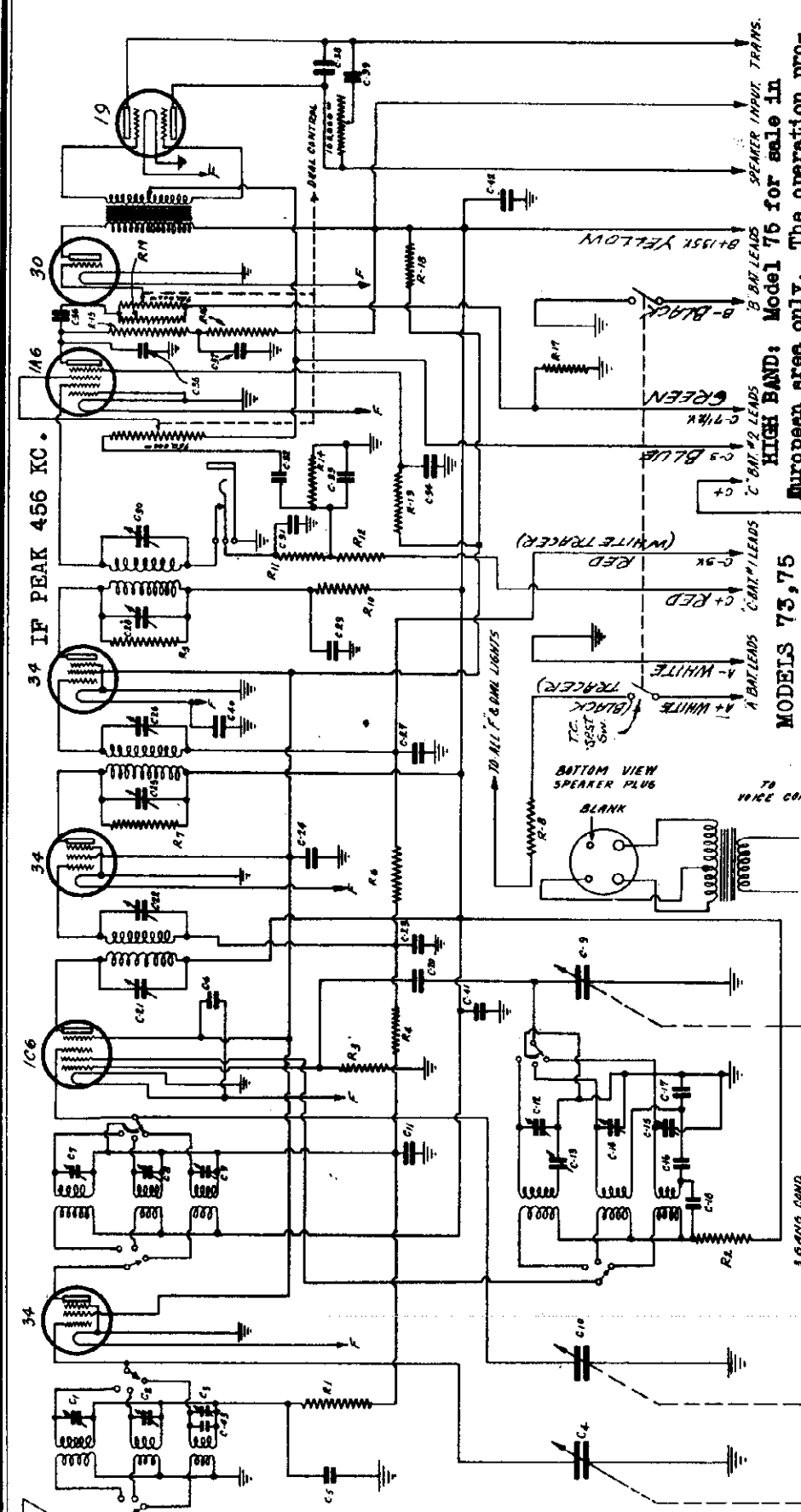


SYMBOL	PART NO.	DESCRIPTION
R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20	100,000 OHMS 1/4 WATT CARBON	RESISTORS FOR MODEL X-68
C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27	2,000 OHMS 1/4 WATT CARBON	RESISTORS FOR MODEL X-69
S1, S2, S3, S4, S5, S6, S7	50,000 OHMS 1/4 WATT CARBON	RESISTORS FOR MODEL X-69
C19, C20, C21, C22, C23, C24, C25, C26, C27	50,000 OHMS 1/4 WATT CARBON	RESISTORS FOR MODEL X-69
R19, R20	100,000 OHMS 1/4 WATT CARBON	RESISTORS FOR MODEL X-69
S6	50,000 OHMS 1/4 WATT CARBON	RESISTORS FOR MODEL X-69

SYMBOL	PART NO.	DESCRIPTION
C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27	2,000 OHMS 1/4 WATT CARBON	RESISTORS FOR MODEL X-68
S1, S2, S3, S4, S5, S6, S7	50,000 OHMS 1/4 WATT CARBON	RESISTORS FOR MODEL X-69
C19, C20, C21, C22, C23, C24, C25, C26, C27	50,000 OHMS 1/4 WATT CARBON	RESISTORS FOR MODEL X-69
R19, R20	100,000 OHMS 1/4 WATT CARBON	RESISTORS FOR MODEL X-69
S6	50,000 OHMS 1/4 WATT CARBON	RESISTORS FOR MODEL X-69

WIRING TO COILS AND ARRANGEMENT OF SOCKETS

PILOT RADIO CORP.



HIGH BAND: Model 76 for sale in European area only. The operation procedure of the high band section is similar to that of the broadcast and short wave ranges. To operate this receiver on the high-band, rotate the band switch knob to the position marked **HIGH BAND** on the band switch escutcheon.

MODELS 73, 75

CONNECT TO "A" ON BAT.

NOTE THIS DWG. REVISED FROM DWG. NO. 25094-9 DATED 7/31/34 (PARAPH IN UPPER LEFT CORNER)

ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED MUST BE HELD TO A TOLERANCE OF ± .005

GROSS WEIGHT _____ POUNDS

NET WEIGHT _____ POUNDS

INCLUDING SCRAP _____ POUNDS

ALTERATIONS: R-17 HAS IN OTHER SIZE TO CORRECT SPEAKER PLUG

DESCRIPTION	PILOT NO.	DESCRIPTION
19A1	19A1	100 OHM 1/2 WATT CARBON
19A2	19A2	100 OHM 1/2 WATT CARBON
19A3	19A3	100 OHM 1/2 WATT CARBON
19A4	19A4	100 OHM 1/2 WATT CARBON
19A5	19A5	100 OHM 1/2 WATT CARBON
19A6	19A6	100 OHM 1/2 WATT CARBON
19A7	19A7	100 OHM 1/2 WATT CARBON
19A8	19A8	100 OHM 1/2 WATT CARBON
19A9	19A9	100 OHM 1/2 WATT CARBON
19A10	19A10	100 OHM 1/2 WATT CARBON
19A11	19A11	100 OHM 1/2 WATT CARBON
19A12	19A12	100 OHM 1/2 WATT CARBON
19A13	19A13	100 OHM 1/2 WATT CARBON
19A14	19A14	100 OHM 1/2 WATT CARBON
19A15	19A15	100 OHM 1/2 WATT CARBON
19A16	19A16	100 OHM 1/2 WATT CARBON
19A17	19A17	100 OHM 1/2 WATT CARBON
19A18	19A18	100 OHM 1/2 WATT CARBON

CONDENSERS	PART NO.	DESCRIPTION
C-1	20987	100 P.F. 50 V. WAX
C-2	20988	100 P.F. 50 V. WAX
C-3	20989	100 P.F. 50 V. WAX
C-4	20990	100 P.F. 50 V. WAX
C-5	20991	100 P.F. 50 V. WAX
C-6	20992	100 P.F. 50 V. WAX
C-7	20993	100 P.F. 50 V. WAX
C-8	20994	100 P.F. 50 V. WAX
C-9	20995	100 P.F. 50 V. WAX
C-10	20996	100 P.F. 50 V. WAX
C-11	20997	100 P.F. 50 V. WAX
C-12	20998	100 P.F. 50 V. WAX
C-13	20999	100 P.F. 50 V. WAX
C-14	21000	100 P.F. 50 V. WAX
C-15	21001	100 P.F. 50 V. WAX
C-16	21002	100 P.F. 50 V. WAX
C-17	21003	100 P.F. 50 V. WAX
C-18	21004	100 P.F. 50 V. WAX
C-19	21005	100 P.F. 50 V. WAX
C-20	21006	100 P.F. 50 V. WAX
C-21	21007	100 P.F. 50 V. WAX
C-22	21008	100 P.F. 50 V. WAX
C-23	21009	100 P.F. 50 V. WAX
C-24	21010	100 P.F. 50 V. WAX
C-25	21011	100 P.F. 50 V. WAX
C-26	21012	100 P.F. 50 V. WAX
C-27	21013	100 P.F. 50 V. WAX
C-28	21014	100 P.F. 50 V. WAX
C-29	21015	100 P.F. 50 V. WAX
C-30	21016	100 P.F. 50 V. WAX
C-31	21017	100 P.F. 50 V. WAX
C-32	21018	100 P.F. 50 V. WAX
C-33	21019	100 P.F. 50 V. WAX
C-34	21020	100 P.F. 50 V. WAX
C-35	21021	100 P.F. 50 V. WAX
C-36	21022	100 P.F. 50 V. WAX

PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.

7 TUBE AIR CELL RES. (CARBON) DAMPING MODEL 73

MATERIAL: NONE
SCALE: E.F.
DRAWN BY: E.F.
CHECKED BY: E.F.
APPROVED BY: E.F.

DATE: 1/31/35
Dwg. No. 25094-9

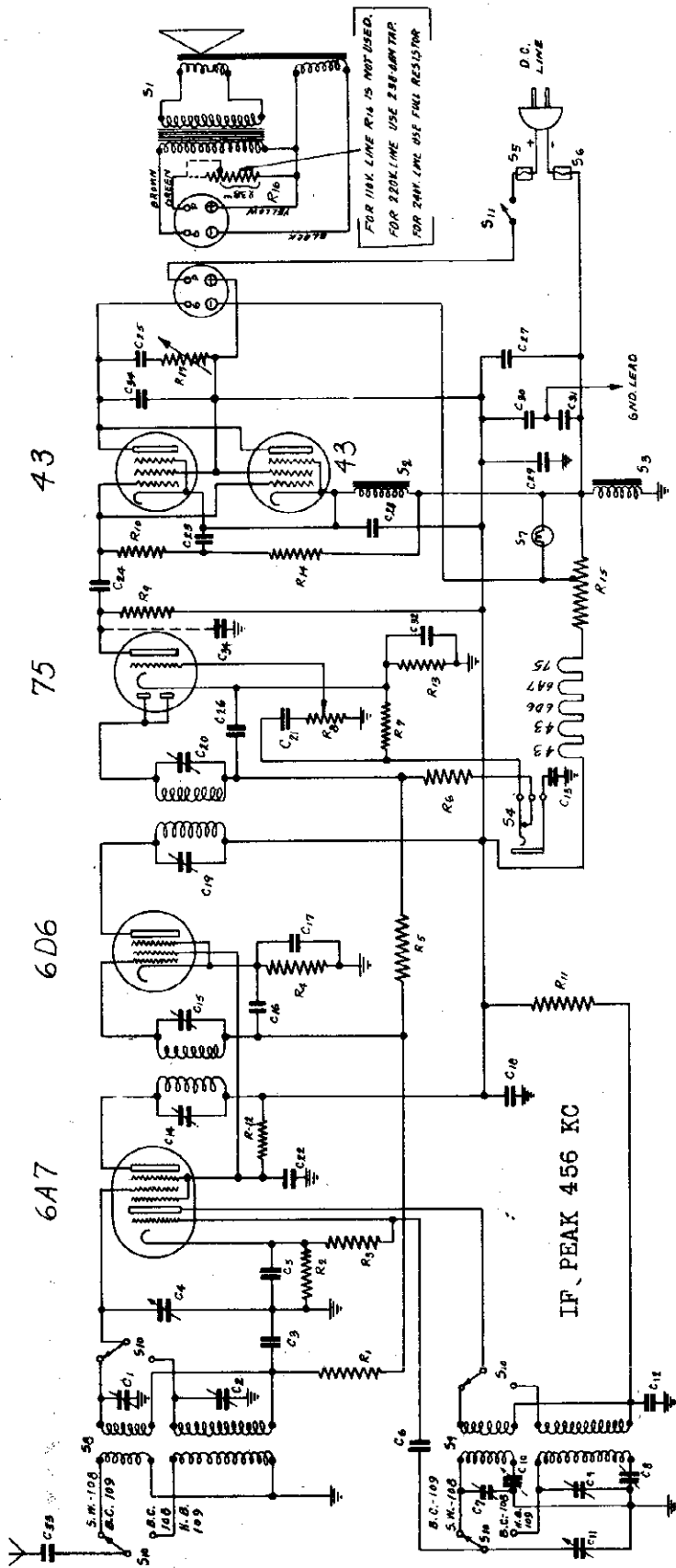
CLASSIFICATION: **Model 73**

THIS PRINT SUPERSEDES ALL OTHERS PRIOR TO _____

DO NOT SCALE THIS PRINT

MODELS 108, 109
Schematic

PILOT RADIO CORP.



REVISIONS FOR MAKING 109 REC.

R 2	13151	400 OHMS .25 WATT
S 8	71175	500 OHM .5 WATT
S 9	71174	OSC. COIL
C 2, C 10	71079C	250 OHM .5 WATT
C 34	2 1712	500 OHM .5 WATT

MISC

DESIGNATION	PART NO.	DESCRIPTION
S 1	10705	SPEER 100 WATT-PAR #15
S 2	71635	FILTER CHOKES 20 TOROIDAL
S 3	42207	FILTER CHOKES
S 4	70740	PHONO JACK
S 5, S 6	70553 B	1000 OHM .5 WATT
S 7	70422 B	DIAL LAMP 4-2V .5 WATT
S 8	71169	ANT. COIL
S 9	71170	OSC. COIL
S 10	71172	BAND SWITCH
S 11	44-71211	LINE SWITCH (MFG. TYPED)

RESISTORS

DESIGNATION	PART NO.	DESCRIPTION
R 1, R 4	13031	100 OHMS .25 WATT
R 2	13151	400 OHMS .25 WATT
R 3, R 6	13164	500 OHMS .25 WATT
R 5	13061	1000 OHMS .25 WATT
R 7	13147	300 OHMS .25 WATT
R 8	71211	250 OHM 500 WATT CARBON
R 9	13029	250 OHMS .25 WATT
R 10, R 11	13024	500 OHMS .25 WATT
R 12	13073	300 OHMS .5 WATT
R 13	13149	600 OHMS .25 WATT
R 14	13116	12,000 OHMS .25 WATT
R 15	71401	100 OHMS TAPER 1/4 W 20 WATT
R 16	71029	250 OHMS TAPER 1/4 W 20 WATT
R 17	71634	10,000 OHMS TAPER CONTROL

CONDENSERS

DESIGNATION	PART NO.	DESCRIPTION
C 2, C 3, C 4	71168	TRIMMER IN BAND SW.
C 5, C 6, C 7	22055-J	0.01 MFD 250 VDC PAPER
C 8, C 9	71181	20 MFD 50V 50% MFD
C 10	27723	50 MFD 50V MICA
C 11	6052 A	SINGLE PAPER
C 12	27734	5000 MFD 50V MICA
C 13, C 14, C 15	22055-M	0.01 MFD 250 VDC PAPER
C 16, C 17	71116	TRIMMER 1/4 W
C 18, C 19	22055-N	1 MFD 50V PAPER
C 20, C 21	70737	TRIMMER 200 I.C.
C 22	22055-A	0.01 MFD 250 VDC PAPER
C 23	22055-F	2.5 MFD 50V PAPER
C 24, C 25	22055-L	1 MFD 50V PAPER
C 26, C 27	27718	500 MFD 50V MICA
C 28, C 29	71600	TRIMMER 4 MFD 50V I.C.
C 30	22481	5 MFD 25V 500 VDC MFD

PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y., U. S. A.
SCHEMATIC DRAWING
MODEL 108-109

REVISIONS FOR MAKING 109 REC.
DATE 3/15/44
DRAWN BY [Signature]
CHECKED BY [Signature]
APPROVED BY [Signature]

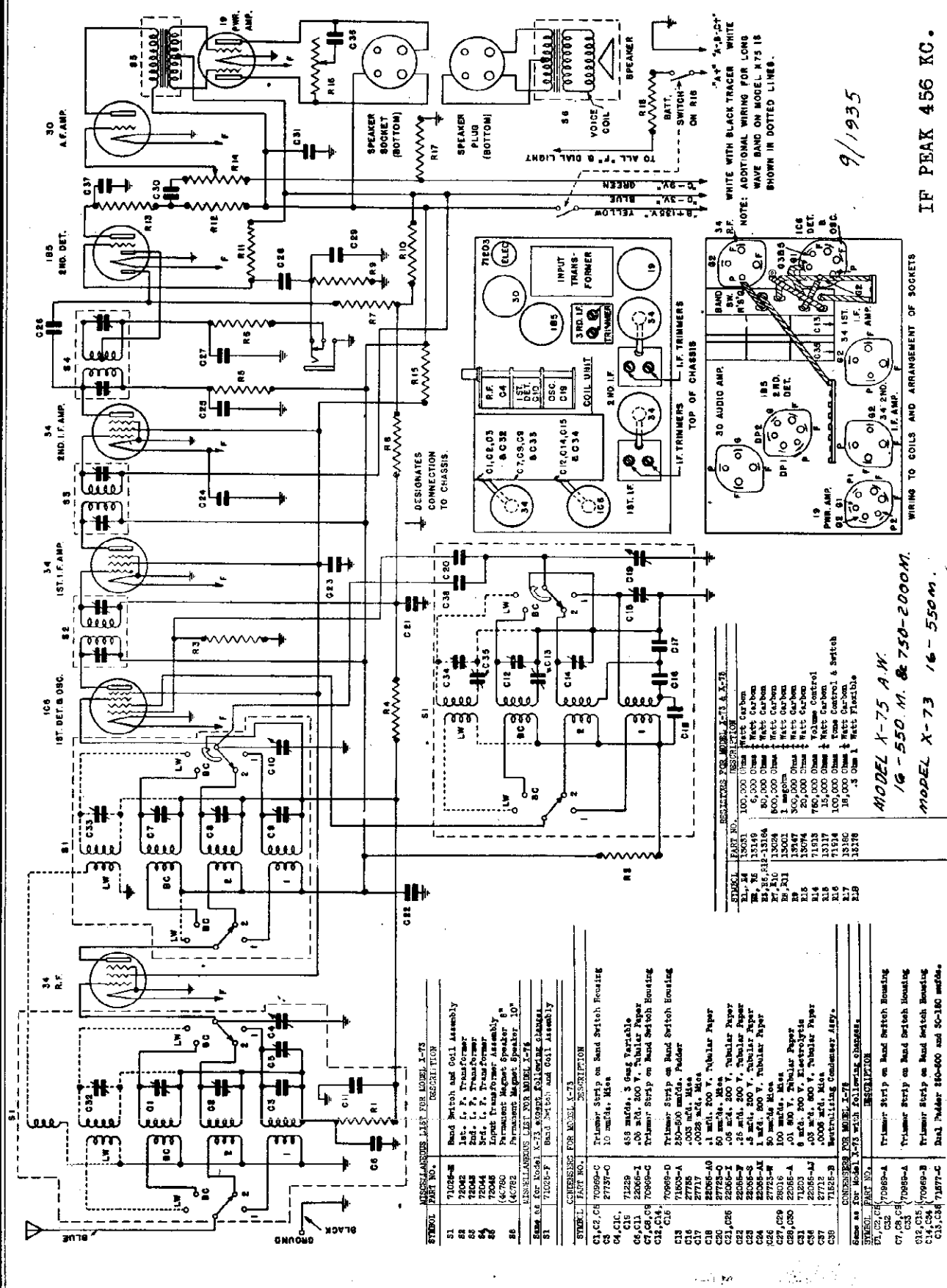
ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED
MUST BE HELD TO A TOLERANCE OF ±.005

NET WEIGHT	WHIT PER PCS	LB	RAW MATERIAL
ALTERATION	LENGTH	WIDTH	THICK
FINISH			

THIS PRINT SUPERSEDES ALL OTHERS
PRIOR TO [Signature]
Model 108
109
DO NOT SCALE THIS PRINT

PILOT RADIO CORP.

MODELS X-73, X-75
Schematic, Socket
Trimmers



IF PEAK 456 KC.

WIRING TO COILS AND ARRANGEMENT OF SOCKETS

MODEL X-75 A.W.
16 - 550 M. & 750-2000M.
MODEL X-73 16 - 550 M.

RESISTORS FOR MODEL X-73

STANDARD PART NO.	DESCRIPTION
R1	100,000 Ohms
R2	100,000 Ohms
R3	100,000 Ohms
R4	100,000 Ohms
R5	100,000 Ohms
R6	100,000 Ohms
R7	100,000 Ohms
R8	100,000 Ohms
R9	100,000 Ohms
R10	100,000 Ohms
R11	100,000 Ohms
R12	100,000 Ohms
R13	100,000 Ohms
R14	100,000 Ohms
R15	100,000 Ohms
R16	100,000 Ohms
R17	100,000 Ohms
R18	100,000 Ohms

CONDENSERS FOR MODEL X-73

STANDARD PART NO.	DESCRIPTION
C1	500 p.f. Mica
C2	500 p.f. Mica
C3	500 p.f. Mica
C4	500 p.f. Mica
C5	500 p.f. Mica
C6	500 p.f. Mica
C7	500 p.f. Mica
C8	500 p.f. Mica
C9	500 p.f. Mica
C10	500 p.f. Mica
C11	500 p.f. Mica
C12	500 p.f. Mica
C13	500 p.f. Mica
C14	500 p.f. Mica
C15	500 p.f. Mica
C16	500 p.f. Mica
C17	500 p.f. Mica
C18	500 p.f. Mica
C19	500 p.f. Mica
C20	500 p.f. Mica
C21	500 p.f. Mica
C22	500 p.f. Mica
C23	500 p.f. Mica
C24	500 p.f. Mica
C25	500 p.f. Mica
C26	500 p.f. Mica
C27	500 p.f. Mica
C28	500 p.f. Mica
C29	500 p.f. Mica
C30	500 p.f. Mica
C31	500 p.f. Mica
C32	500 p.f. Mica
C33	500 p.f. Mica
C34	500 p.f. Mica
C35	500 p.f. Mica
C36	500 p.f. Mica
C37	500 p.f. Mica
C38	500 p.f. Mica

MECHANICAL PARTS FOR MODEL X-73

STANDARD PART NO.	DESCRIPTION
S1	Band Switch and Coil Assembly
S2	1st. I. F. Transformer
S3	2nd. I. F. Transformer
S4	3rd. I. F. Transformer
S5	Input Transformer Assembly
S6	Permanent Magnet Speaker 8"
S7	Permanent Magnet Speaker 10"
S8	Permanent Magnet Speaker 12"
S9	Permanent Magnet Speaker 14"
S10	Permanent Magnet Speaker 16"
S11	Permanent Magnet Speaker 18"
S12	Permanent Magnet Speaker 20"
S13	Permanent Magnet Speaker 22"
S14	Permanent Magnet Speaker 24"
S15	Permanent Magnet Speaker 26"
S16	Permanent Magnet Speaker 28"
S17	Permanent Magnet Speaker 30"
S18	Permanent Magnet Speaker 32"
S19	Permanent Magnet Speaker 34"
S20	Permanent Magnet Speaker 36"
S21	Permanent Magnet Speaker 38"
S22	Permanent Magnet Speaker 40"
S23	Permanent Magnet Speaker 42"
S24	Permanent Magnet Speaker 44"
S25	Permanent Magnet Speaker 46"
S26	Permanent Magnet Speaker 48"
S27	Permanent Magnet Speaker 50"
S28	Permanent Magnet Speaker 52"
S29	Permanent Magnet Speaker 54"
S30	Permanent Magnet Speaker 56"
S31	Permanent Magnet Speaker 58"
S32	Permanent Magnet Speaker 60"
S33	Permanent Magnet Speaker 62"
S34	Permanent Magnet Speaker 64"
S35	Permanent Magnet Speaker 66"
S36	Permanent Magnet Speaker 68"
S37	Permanent Magnet Speaker 70"
S38	Permanent Magnet Speaker 72"
S39	Permanent Magnet Speaker 74"
S40	Permanent Magnet Speaker 76"
S41	Permanent Magnet Speaker 78"
S42	Permanent Magnet Speaker 80"
S43	Permanent Magnet Speaker 82"
S44	Permanent Magnet Speaker 84"
S45	Permanent Magnet Speaker 86"
S46	Permanent Magnet Speaker 88"
S47	Permanent Magnet Speaker 90"
S48	Permanent Magnet Speaker 92"
S49	Permanent Magnet Speaker 94"
S50	Permanent Magnet Speaker 96"
S51	Permanent Magnet Speaker 98"
S52	Permanent Magnet Speaker 100"

MODELS X-73, X-75
Voltage, Parts
Alignment

PILOT RADIO CORP.

SERVICE INFORMATION

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

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. 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. 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 34 tube in the 2nd I. F. Amplifier through .002 mfd. fixed condenser. Connect the ground lead of the external oscillator to the receiver ground lead. 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. 3 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the 34 2nd I. F. amplifier tube and connect it in the same manner to the control grid of the 34 1st I. F. amplifier tube. Now rotate each adjustment screw on I. F. Unit No. 2 for maximum output. Following this, connect the external oscillator leads to the control grid of the 1C6 tube. Adjust each trimmer on the 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 across the control grid of the 1C6 tube.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Set the Band Selector 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.

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 1400 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. The alignment frequencies are as follows:

- Band 2: 49 Meters (6,100 kc.)
- Band 1: 16.8 Meters—(17,800 kc.)

When aligning Band 2, set the Band Selector Switch in the position marked "Band 2." Set the tuning control pointer at the 49 meter mark. Set the external oscillator at 49 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 16.8 meter mark. Set the external oscillator at 16.8 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.

REMOVAL OF BAND SELECTOR SWITCH ASSEMBLY: Should it be necessary to remove the switch assembly, this is easily done by removing the screws which hold it in place, and unbolting the leads between the switch and the chassis. Also remove the screw beneath the Dial Drive Assembly, which secures the dial assembly to 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.

CHARACTERISTICS

Batteries Required: One Eveready Air Cell or 2.2-volt storage battery, three 45-volt B batteries, one 7½-volt C battery, and one 4½-volt C battery.

Tubes: Three 34's, one 1C6, one 1A6, one 19, and one 30.

Wavelength Range: Model 73—16 to 370 meters (18,800 to 747 kc.)

Model 75—16 to 370 meters and 770 to 2,000 meters. (18,800 to 747 kc. and 400 to 150 kc.)

(EXPORT ONLY)

Undistorted Power Output: 1.9 watts.

I. F. Alignment Frequency: 456 kc.
Circuit: All-wave superheterodyne, with one stage of R. F. on all bands.

Output: Class B amplifier.

Air Cell Life: When operating a Pilot 73 or 75, the No. SA-600 Air Cell will have a total operating life of at least 750 hours.

TABLE OF VOLTAGE MEASUREMENTS

	R.F. No. 34	Int. Det. No. 1C6	1st I. F. No. 34	2nd I. F. No. 34
Plate Volts	145	145	145	130
Screen Volts	65	65	65	65
fil. Volts	2.2	2.2	2.2	2.2

	Det. No. 1A6	Driver No. 30	"B" Amp. No. 19
Plate Volts	50*	135	145 both plates
Screen Volts	28**		
fil. Volts	2.2	2.2	2.2

* Measured through .25 meg. plate resistor.
 ** Measured through 20,000-ohm resistor.

- Note 1: All voltages are measured to chassis frame.
- Note 2: These measurements should be made with 145 volts B battery.
- Note 3: Anode grid of 1C6 should show 115 volts.

List of Replacement Parts for Pilot Models X73 & X75

TUBE SOCKETS

- Part No. 70927 4-prong bakelite-base tube socket.
- 70863 6-prong bakelite-base tube socket.

TUBE SHIELDS

- 70861 Tube shield base, 1½ in. diameter.
- 71125 Tube shield base, 1½ in. diameter.
- 70801-B Small tube shield, 3¼ in. long
- 71126 Large tube shield, 4½ in. long
- 70802 Tube shield cover for above.

SPEAKER AND PARTS

- 40780 8-in. permanent magnet speaker.
- 40782 10-in. permanent magnet speaker.
- 70709 Steel speaker mounting bushing.
- 70002 Rubber grommet for speaker mounting.

AUDIO TRANSFORMERS

- 71112 A. F. transformer.

TUNING EQUIPMENT

- 70936-B 1st I. F. transformer.
- 70936-B 2nd I. F. transformer.
- 71129 3rd I. F. transformer.
- 71229 3-gang tuning condenser.
- 71027E Band switch and coil assembly completely mounted in shield, with 3-gang condenser, for Model 73.

- 71027-F Band switch assembly, as above, for Model 75.
- 70918 Dial escutcheon.
- 70910 Dial Crystal.
- 70919 Dial crystal retaining ring.
- 71028 2-speed dial driving mechanism.
- 70998 Dial drive disc.
- 71000-A Dial scale and holder assembly.
- 70934 Pointer.
- 642 Pointer holding screw.
- 71056 Spacing Washer.
- 70953-B Band switch escutcheon for Model 73.
- 70953-C Band switch escutcheon for Model 75.
- 70432-B Dial light bulb, screw base, 2. volts, 60 ma. Part No. 71150

SWITCHES AND CONTROLS

- 71127 Tone control and switch
- 71111 Dual volume control.
- 70953-A Volume control escutcheon.
- 71619 Small knob.
- 71620 Small knob with dot.
- 71618 Large tuning knob.
- 70950 Phonograph jack.

PAPER CONDENSERS

- 22055-I .05 mfd., 200v.
- 22055-M .10 mfd., 200v.
- 22055-F .25 mfd., 200v.
- 22055-S .50 mfd., 200v.
- 22055-P .05 mfd., 400v.
- 22055-A .01 mfd., 600v.

MICA CONDENSERS

- 27737-O .000010 mfd.
- 27735 .00300 mfd.
- 27717 .002800 mfd.
- 27723-O .000070 mfd.
- 28016 .000100 mfd.
- 27726 .000200 mfd.
- 27704 .002000 mfd.

ELECTROLYTIC CONDENSER

- 71203 Electrolytic condenser.

PADDING CONDENSER

- 71503-A .000450 mfd. max.

WIRE WOUND RESISTOR

- 13178 .3 ohm, 1 watt.

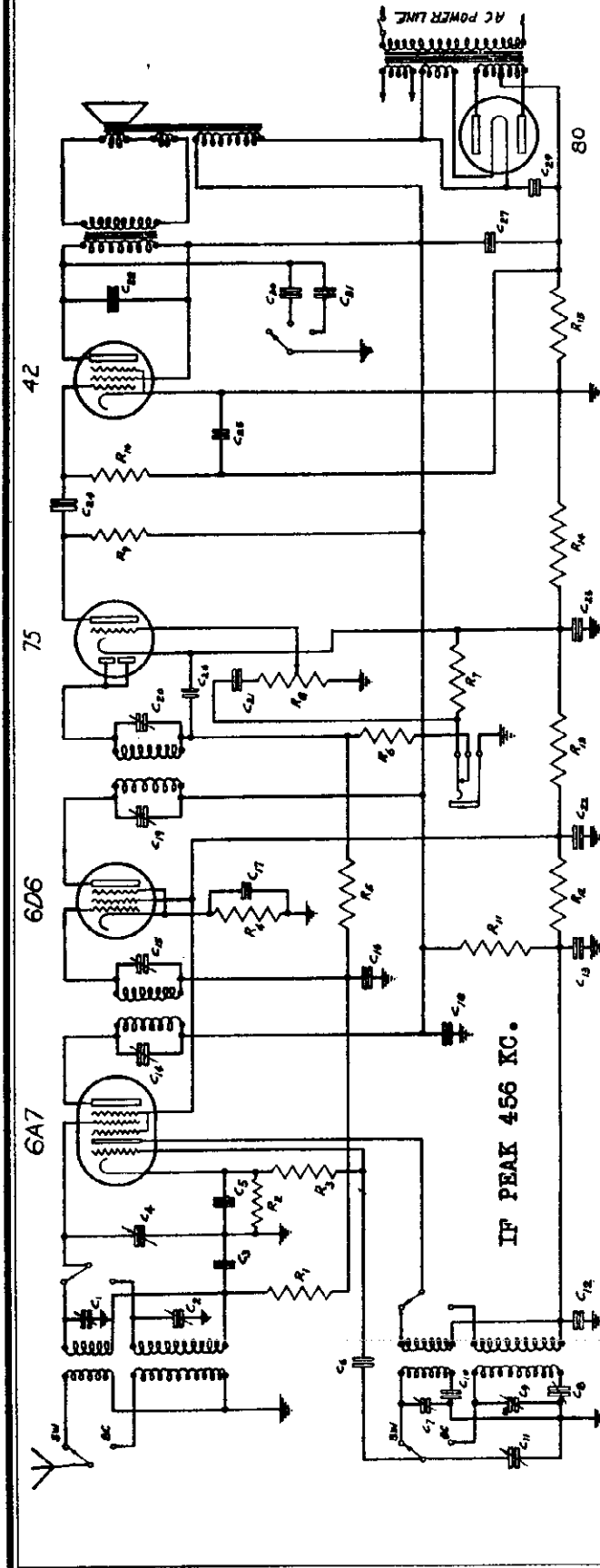
CARBON RESISTORS

- ¼-watt, all resistance values.
- ½-watt, all resistance values.

BATTERY CABLE

- 71110 Battery cable.

PILOT RADIO CORP.



RECEIVER DESCRIPTION

Operating Voltages—115, 125, 150, 220, 240 volts, Alternating Current.
 Frequency Rating —50 to 60 cycles.
 Power Consumption—60 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.
 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. I. F. DIODE DET. PENTODE RECTIFIER
 Type 6A7 Type 6D6 Type 75 Type 42 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	6.3

* Voltages measured through 250,000 ohm plate resistor.
 ** Voltages measured through 250,000 ohm plate resistor.
 *** Speaker field voltage 90 volts. All plate voltages measured to cathode.

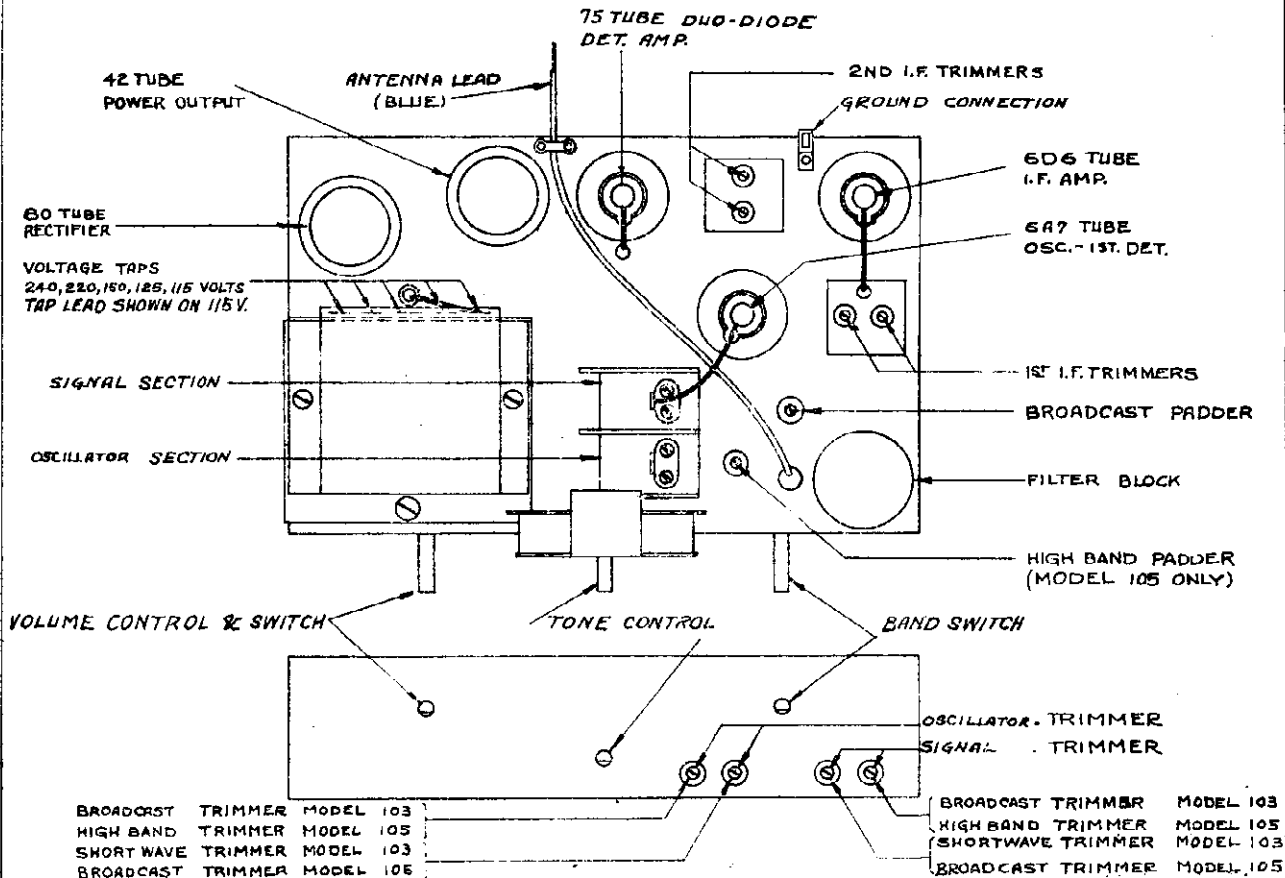
RESISTORS	RESISTOR	DESCRIPTION
R1	13037	100,000 OHMS .25 WATT.
R2, R4	13116	400 OHMS .25 WATT.
R3, R5	13164	50,000 OHMS .25 WATT.
R6	13001	1,000,000 OHMS .25 WATT.
R7	13147	300,000 OHMS .25 WATT.
R8	13171	750,000 OHMS .25 WATT.
R9	13024	500,000 OHMS .25 WATT.
R10	13073	3000 OHMS .5 WATT.
R11	13129	15,000 OHMS .25 WATT.
R12	13140	30,000 OHMS .25 WATT.
R13	13130	420 OHMS .25 WATT.
R15	13089	250 OHMS .1 WATT.

CONDENSERS	PART NO.	DESCRIPTION
C1, C2, C3	7116B	TRIMMER ON BAND SW.
C4, C5, C6	22035-T	.05 MFD. 200V. PAPER
C7, C8	7110	2.5 MFD. COND. 105V. PAPER
C9	27723	50 MICRO. MFD. MICA
C10	7605E-A	SINGLE PADDER
C11	27734	6000 MICRO. MFD. MICA
C12	22055-P	.05 MFD. 200V. PAPER
C13	71215	4 MFD. 450V. ELEC.
C14	7116 G	TRIMMER 100 V. I. F.
C15	70337	TRIMMER 250 V. I. F.
C16	22055-A	.01 MFD. 200V. PAPER
C17	22055-F	.25 MFD. 200V. PAPER
C18	22055-S	.5 MFD. 200V. PAPER
C19	27713	500 MICRO. MFD. MICA
C20	71044-B	500 MICRO. MFD. MICA
C21	22055-R	.005 MFD. 1000V. AMBRO
C22	22055-U	.01 MFD. 1000V. PAPER
C23	22055-V	.03 MFD. 1000V. PAPER
C24	22055-Y	.05 MFD. 100V. PAPER

All screen voltages measured to cathode. All cathode voltages measured to chassis frame.
 ** Grid bias voltage for No. 42 tube obtained across R-15 (250 ohms resistor).
 *** Filament to chassis ground 315 Volts D. C.
 Anode grid of 6A7 to cathode—175 Volts.

MODELS 103, 105
Socket, Trimmers
Alignment

PILOT RADIO CORP.



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 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 .002 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. 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 490 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.

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. 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 HIGH BAND ALIGNMENT: Procedure in the Model 105 is similar to the Broadcast section of that receiver. Align at 375 kc. Adjust the padder at 160 kc.

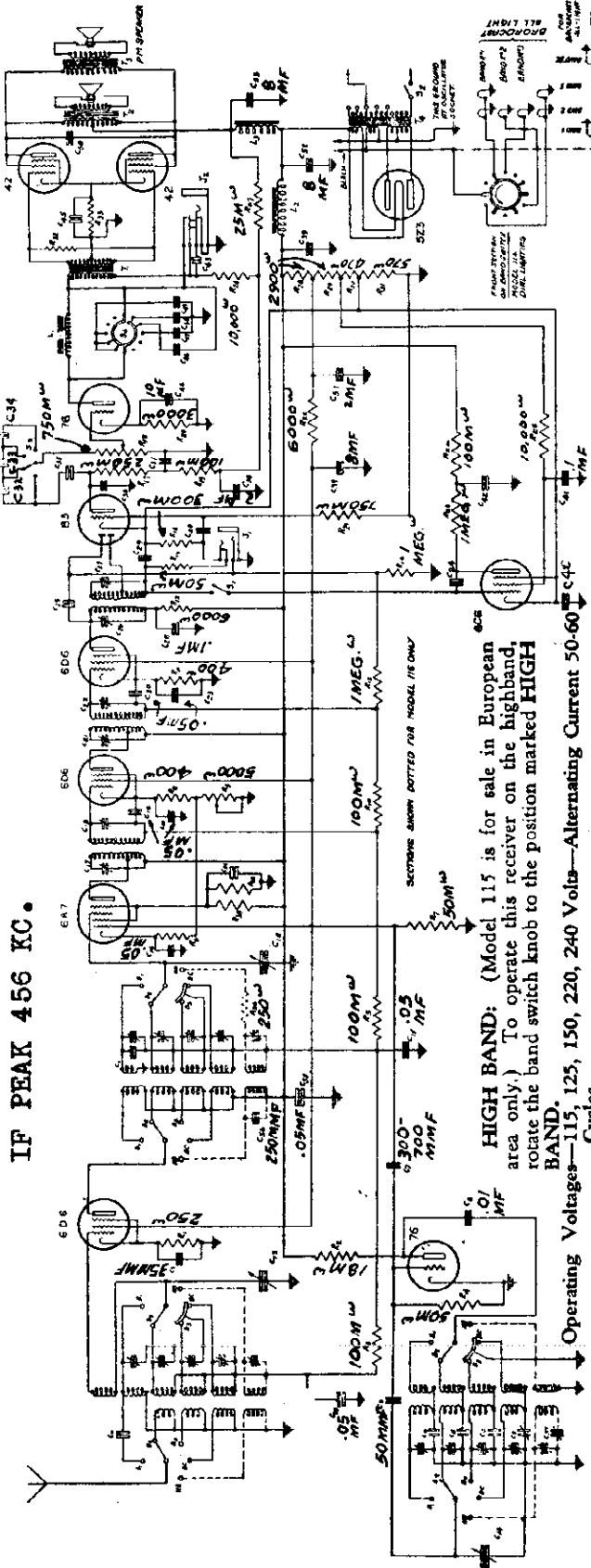
Should it be necessary to remove the band switch assembly, it is advisable to realign the receiver after reinstalling.

MODEL 103 SHORTWAVE—BROADCAST RECEIVER. The Model 103 is a Shortwave and Broadcast receiver. The Shortwave band embraces all of the internationally assigned Shortwave transmission frequencies from 18800 kc. to 5700 kc., (16 meters to 52.6 meters). The Broadcast band includes all frequencies from 1680 kc. to 545 kc., (178.5 meters to 550 meters).

MODEL 105 HIGHBAND—BROADCAST RECEIVER: (For sale in European area only). The Model 105 is a Highband and Broadcast receiver. The Highband range extends from 380 kc. to 140 kc., (789 meters to 2142 meters). The operation procedure of the Model 105 is similar to the Model 103 except for the Band Switch position. To operate this receiver on the Highband section, rotate the Band Switch knob to the counter-clockwise position. With this knob in the clockwise position, the receiver will function on the standard broadcast band. The Highband calibration may be observed on the lower portion of the dial scale.

PILOT RADIO CORP.

MODELS 114, 115
Schematic, Voltage



HIGH BAND: (Model 115 is for sale in European area only.) To operate this receiver on the highband, rotate the band switch knob to the position marked **HIGH BAND.** Operating Voltages—115, 125, 150, 220, 240 Volts—Alternating Current 50-60 Cycles.

DESCRIPTION	CONDENSERS	RESISTORS	REVISIONS	REVISIONS	REVISIONS	REVISIONS	REVISIONS
C1	500MFD 250V	500K	1/178	1/178	1/178	1/178	1/178
C2	500MFD 250V	500K	1/178	1/178	1/178	1/178	1/178
C3	500MFD 250V	500K	1/178	1/178	1/178	1/178	1/178
C4	500MFD 250V	500K	1/178	1/178	1/178	1/178	1/178
C5	500MFD 250V	500K	1/178	1/178	1/178	1/178	1/178
C6	500MFD 250V	500K	1/178	1/178	1/178	1/178	1/178
C7	500MFD 250V	500K	1/178	1/178	1/178	1/178	1/178
C8	500MFD 250V	500K	1/178	1/178	1/178	1/178	1/178
C9	500MFD 250V	500K	1/178	1/178	1/178	1/178	1/178
C10	500MFD 250V	500K	1/178	1/178	1/178	1/178	1/178
R1	100M	100M	1/178	1/178	1/178	1/178	1/178
R2	100M	100M	1/178	1/178	1/178	1/178	1/178
R3	100M	100M	1/178	1/178	1/178	1/178	1/178
R4	100M	100M	1/178	1/178	1/178	1/178	1/178
R5	100M	100M	1/178	1/178	1/178	1/178	1/178
R6	100M	100M	1/178	1/178	1/178	1/178	1/178
R7	100M	100M	1/178	1/178	1/178	1/178	1/178
R8	100M	100M	1/178	1/178	1/178	1/178	1/178
R9	100M	100M	1/178	1/178	1/178	1/178	1/178
R10	100M	100M	1/178	1/178	1/178	1/178	1/178

The D. C. Voltages measure at the tube sockets of the set should be read with a high resistance voltmeter of at least 1,000 ohms per volt.

Power Consumption—120 Watts.	Tubes	Wavelength range—From 12.7 to 550 meters (23,560 kc. to 545 kc.)	Undistorted power output—12 Watts.	I. F.	Type of circuit	A. V. C.	Line Volts=115
1-6A7	1-6C6	2-76	1-5Z3	76	Oscillator	76	Class
3-6D6	1-85	2-42		145	1st. I. F. Amp.	145	2nd. I. F. Amp.
				0	6D6	0	6D6
				252	252	252	210
				2.5	2.65	3.2	3.2
				90	74	89	89
				6.3	6.3	6.3	6.3
							6C6
							Rectifier
							5Z3
							20
							375***
							375***
							8.7
							8.7

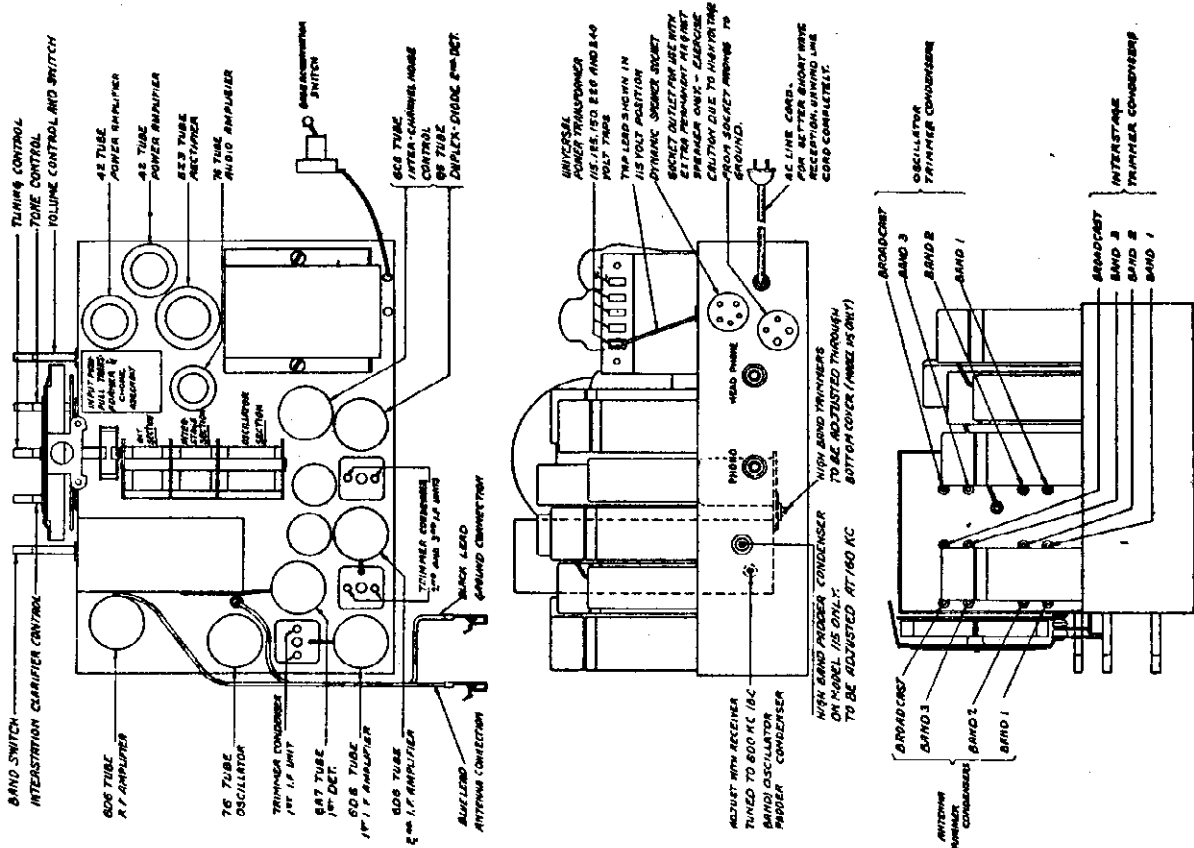
Plate 105*
Cathode 22**
Screen 10.5
Filament 6.3

Audio Driver 76
Detector 85
Diode 105*
Class 6C6
"A Prime Audio Output" 42
Channel Clarifier 42
Inter Channel Clarifier 20
Rectifier 5Z3
2nd. I. F. Amp. 6D6
1st. I. F. Amp. 252
Oscillator 76

* Voltages measured through plate resistor.
** Measured on 100V Scale.
*** A. C. Voltage plate to chassis.
Speaker field voltage-volts. All plate voltages measure to cathode. All screen voltage measure to cathode. All cathode voltages measure to chassis.

MODELS 114, 115
Alignment, Socket
Trimmers

PILOT RADIO CORP.



CHASSIS ILLUSTRATION PILOT MODELS 114-115

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.
 Unscrew the base accentuator switch on the side of the cabinet.
 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 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.

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. The inter-chassis clarifier should be turned off. (Knob in maximum counter-clockwise position.) Connect the antenna lead of the external oscillator to the control grid of the 6D6 tube in the 2nd I. F. Amplifier through .002 mfd. fixed condenser. Connect the ground lead of the external oscillator to the receiver ground lead. 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. 3 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the 6D6 2nd I. F. amplifier tube and connect it in the same manner to the control grid of the 6D6 1st I. F. amplifier tube. Now rotate each adjustment screw on I. F. Unit No. 2 for maximum output. Following this, connect the external oscillator leads to the control grid of the 6A7 tube. Adjust each trimmer on the 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 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. Set 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 section of the band switch, under the chassis. Set the external oscillator at 600 kc. Rotate the receiver tuning control until 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 3—67.38 meters—4,450 kc.
 Band 2—30.04 meters—9,980 kc.
 Band 1—13. meters—23,000 kc.

When aligning Band 3, set the Band Switch in the position marked Band 3. Rotate the tuning condenser to the extreme high frequency end of the range. Set the external oscillator at 4450 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.

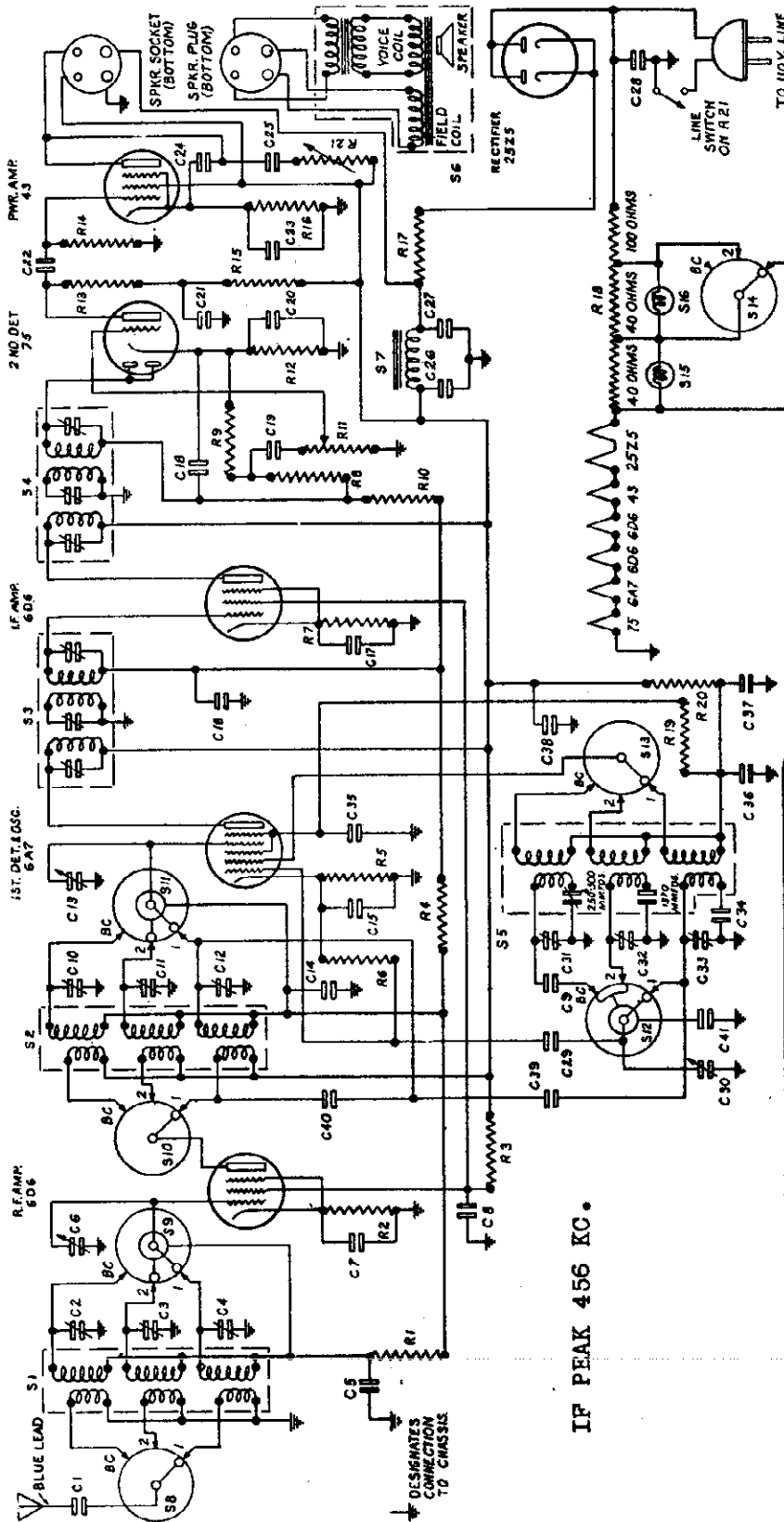
Align Band 2 in a similar manner. The alignment frequency is 9980 kc. (30.04 meters). The alignment of Band 1 requires greater care due to the higher frequencies covered by this band. The alignment frequency is 23000 kc. or 13 meters. Set the external oscillator at 13 meters. Rotate the tuning condenser of the receiver until the dial pointer is co-incident with the 13 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.

THE HIGHBAND ALIGNMENT procedure in the Model 115 is similar to that of the broadcast. Turn the Band Switch to the High Band position. The alignment frequency is 375 kc. Adjust the padder condenser at 150 kc.

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.

PILOT RADIO CORP.



IF PEAK 456 KC.

DESIGNATION	PART NO.	DESCRIPTION
S1	72078	ANTENNA COIL
S2	72077	DETECTOR COIL
S3	71679	1ST I.F. TRANSFORMER
S4	71678	2ND I.F. TRANSFORMER
S5	72079	OSCILLATOR COIL
S6	40785	SPEAKER
S7	71685	FILTER CHOKE - 450 OHMS
S8, S9, S10, S11	12113	BAND SWITCH
S12, S13	70425-B	PILOT LIGHT - 6.3V 0.3 AMP
S14, S15, S16	70425-B	PILOT LIGHT - 6.3V 0.3 AMP

DESIGNATION	PART NO.	DESCRIPTION
R1, R4	13037	100,000 OHMS 1/4 WATT CARBON
R2, R3, R7	13118	500 OHMS 1/4 WATT CARBON
R3, R19	13143	6,000 OHMS 1/4 WATT CARBON
R6, R8, R13	13144	50,000 OHMS 1/4 WATT CARBON
R3	13147	500,000 OHMS 1/4 WATT CARBON
R10	13051	1MILE OHM 1/4 WATT CARBON
R11, R12, R15	12637	750,000 OHMS TELETYPE CONTROL
R16	13116	150,000 OHMS 1/4 WATT CARBON
R17, R24	13164	200 OHMS 1/4 WATT CARBON
R18	13173	50 OHMS 1/4 WATT CARBON
R1	71683	140 OHMS TAPS 100 OHMS 15 WATTS 40 OHMS 6 WATTS 40 OHMS
R20	13073	3,000 OHMS 1/2 WATT CARBON
R21	24690	100,000 OHMS TONE CONTROL AND SWITCH
R22	10944	

DESIGNATION	PART NO.	DESCRIPTION
C1	27772	0.0005 MFD. MICA
C2, C3, C4	71674	5 GANG TRIMMER STRIP
C5, C11, C16	22055-1	0.05 MFD 200 V PAPER
C6, C17, C18	71650	3 GANG VARIABLE
C7, C13, C17	22055-M	0.1 MFD 200V PAPER
C8, C25	22055-P	0.05 MFD 400V PAPER
C9, C41	22055-N	0.01 MFD 400V PAPER
C10, C11, C12	71674	5 GANG TRIMMER STRIP
C18	27201-W	0.0005 MFD MICA
C19, C21, C22	27205-A	0.01 MFD 600 V PAPER
C20, C23	71675	10-10 MFD 25 ELECTROLYTIC
C24, C28	22055-S	0.2 MFD 150 V 650 V
C26	22055-S	0.2 MFD 150 V ELECTROLYTIC
C27	76140	35 MFD
C29	71674	5 GANG TRIMMER STRIP
C30	27242	0.001 MFD MICA
C31	22055-P	0.05 MFD 200V PAPER
C32	71523-A	NEUTRALIZING
C33	27237-D	10 MFD 50V MICA

MODEL 123
Voltage, Parts
Alignment

PILOT RADIO CORP.

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 Mc.—(17,800 kc) and of Band 2, 6 Meters.

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 6 meters.

NOTE: Should it be necessary to remove any part of the band switch assembly, it is advisable to realign the receiver after reassembly.

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 lines, 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.

	R.F. AMP.	OSC-1st DET.	I.F. AMP.	2nd DET.	AUDIO OUTPUT	DUAL RECTIFIER
PLATE	6D6	6A7	6D6	75	43	25Z5
SCREEN	96	96	96	45*	91	—
CATHODE	80	65	80	—	95	—
FILAMENT	2.6	2.25	2.6	.5	12.5	120 ⁰⁰
	6.3	6.3	6.3	6.3	25	25

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 118 volts.
Anode Grid of 6A7 81 volts.
e Measured through Plate Resistor.
e₀ Cathode to chassis.

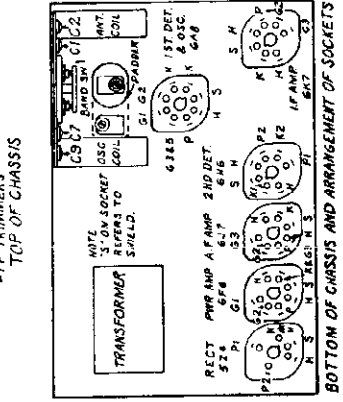
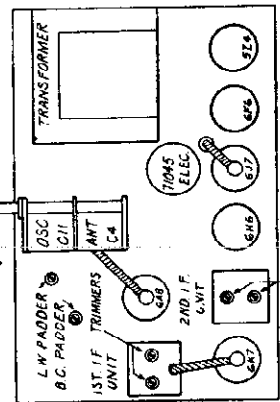
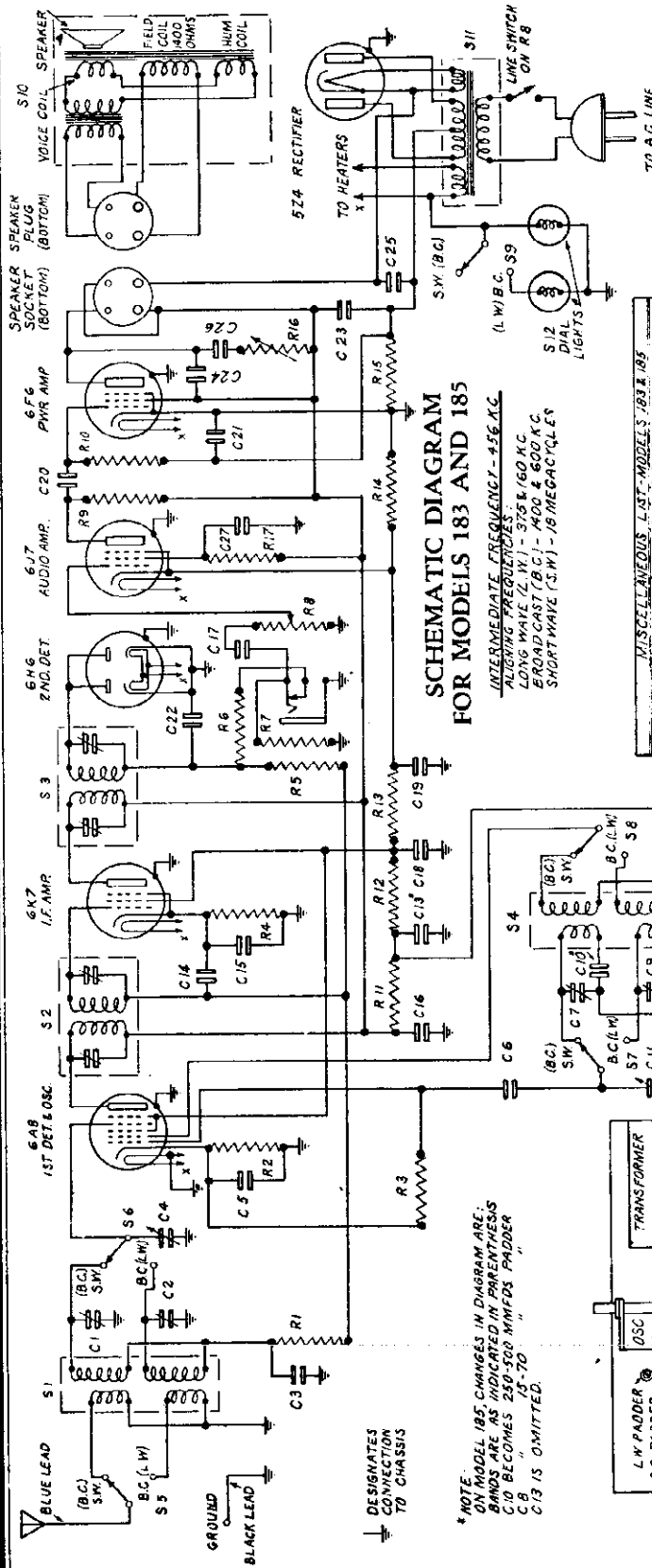
NOTE: These measurements should be made with the volume control turned to the right, and with the tuning adjusted at "No signal" position on dial.

Power Consumption	50 Watts
Line Volts	110-125 volts A.C.-D.C.
I. F. Frequency	456 Kc.
Power Output	1 Watt

LIST OF REPLACEMENT PARTS FOR PILOT MODEL 123

Part No.	Part No.	DESCRIPTION
70927	70931-B	4-prong bakelite-base tube socket
70863	71145	6-prong bakelite-base tube socket
70864	70933-H	7-prong bakelite-base tube socket
		ESCTUCHEON PLATES
		Band switch escutcheon plate
		Dial escutcheon plate
		Tone control escutcheon plate
		PAPER CONDENSERS
71877	22055-I	.05 mfd., 200 volts
71878	22055-M	.1 mfd., 200 volts
70865	22055-P	.05 mfd., 400 volts
	22055-L	.1 mfd., 400 volts
	22055-A	.01 mfd., 600 volts
	22055-R	.005 mfd., 1000 volts
		NEUTRALIZING CONDENSER
40789	71525	Neutralizing condenser assembly
		MICA ASSEMBLY
71679		.0005 mfd.
71678		.00001 mfd.
71650		.00005 mfd.
71703		.0023 mfd.
71725		.00015 mfd.
71704-A		
71178		
642		
71076		
71183		
70422-B		
19627		
		CARBON RESISTORS
		1/2-watt all resistance values
		1/2-watt all resistance values
		WIRE-WOUND RESISTOR
71652	71683	Wire-wound resistor
70974		
70935		
		TRIMMER CONDENSERS
71674	71674	Triple trimmer
		ELECTROLYTIC CONDENSER
71675		10-10 mfd.
71676		20-16.8 mfd.
		CHOKES
71735		Oscillator coil complete with can Model 123
71736		R. F. coil complete with can Model 123
71737		Antenna coil complete with can Model 123 42007-B Choke coil
		SWITCHES AND CONTROLS
71619		Band switch assembly for Model 123
71620		Tone control and switch
71691		Volume control
		KNOBES
71619		Knob for volume and tone controls
71620		Knob for band switch control
71691		Knob for tuning control
		COILS
71735		Oscillator coil complete with can Model 123
71736		R. F. coil complete with can Model 123
71737		Antenna coil complete with can Model 123 42007-B Choke coil

PILOT RADIO CORP.



MODELS 183, 185
Voltage, Parts
Alignment

PILOT RADIO CORP.

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, re-connect 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 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 clip. The I.F. align-

ment 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 through a .002 mfd. condenser. Adjust the tuning control pointer at the 1400 KC mark. Adjust the broadcast band oscillator trimmer to the 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, except that the padder condenser does not require adjustment. 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.

LONG-WAVE ALIGNMENT: Procedure in the Model 185 is similar to the Broadcast section of this 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 re-installing.

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—60 Watts.

Tubes —1 type 6A8
 1 type 6K7
 1 type 6H6
 1 type 6J7
 1 type 6E6
 1 type 3Z4

Circuit —Electron-coupled oscillator-modulator, diode detector, Class "A" pentode output stage, automatic volume control.

Wavelength Range—Model 183—16.2 meters to 32.6 meters.
 178 meters to 550 meters.

Model 185—178 meters to 550 meters.
EXCEPT ONLY 789 meters to 2142 meters.

Undistorted power output—3 watts.

Intermediate Frequency—456 KC.

Tube Functions —Type 6A8: Electron emission control oscillator-detector.
 Type 6K7: I. F. amplifier.

Type 6H6: Duo-diode detector and automatic volume control.

Type 6J7: Audio amplifier.

Type 6E6: Class "A" power pentode.

Type 3Z4: 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.

Occ. Det.	I. F.	Diode Det.	Audio Amp.	Power Pentode	Rectifier
Type 6A8	Type 6K7	Type 6H6	Type 6J7	Type 6E6	Type 3Z4
250**	250	—	70*	225	—
3.5	3.5	—	4.5	16***	—
95	95	—	60*	250	—
6.3	6.3	6.3	6.3	6.3	5.0

*Voltages measured through resistor.

**Anode grid of 6A8 tube, 210 volts.

***Measured across 250 ohm resistor.

Speaker field voltage 100 volts. All plate voltages measured to ground. All screen voltages measured to ground. All cathode voltages measured to ground.

LIST OF REPLACEMENT PARTS FOR PILOT MODELS 183 AND 185

TUBE SOCKETS

Part No.	Description
72080	Socket for 6A8 Tube
72081	Socket for 6K7 Tube
72082	Socket for 6J7 Tube
72083	Socket for 6H6 Tube
72084	Socket for 6E6 Tube
72085	Socket for 3Z4 Tube

TUNING EQUIPMENT

71169	Antenna Coil, Model 183
71173	Antenna Coil, Model 185
71170	Oscillator Coil, Model 183
71174	Oscillator Coil, Model 185
72060	1st I.F. Transformer
72061	2nd I.F. Transformer
72070	2-gang Tuning Condenser
72062	Band switch and Coil Assembly, Model 183
72064	Band switch and Coil Assembly, Model 185

PAPER CONDENSERS

22055-R	.005 mfd. 1,000 Volts	72072
22055-A	.01 mfd. 600 Volts	72183
22055-I	.05 mfd. 200 Volts	72185
22055-P	.05 mfd. 400 Volts	71178
22055-C	.05 mfd. 600 Volts	642
22055-M	.1 mfd. 200 Volts	71056
22055-S	.5 mfd. 200 Volts	71145

MICA CONDENSERS

27701-W	.00025 mfd.	72177
27723-W	.00005 mfd.	72176
27734	.006 mfd.	71211
		71615
		70950
		71282

ELECTROLYTIC CONDENSERS

22418	4. mfd. 450 Volts	71268
22481	10. mfd. 25 Volts	71336
71045	8-.8 mfd. 475 Volts	71238-5

CONTROLS AND SWITCHES

2-speed Dial Driving Mechanism only	71103-A
Dial Drive Disc and Hub	71577-F
Dial Scale, Model 183	
Dial Scale, Model 185	
Pointer	
Pointer Holding Screw	
Pointer Spacing Washer	
Dial Escutcheon	
Dial Crystal	
Control Knob	
Small Knob with White Dot	40775
Volume Control and Switch	70927-B
Tone Control	
Phonograph Jack	
Dial Lamp	

PADDING CONDENSERS

Single Padder, Model 183	
Dual Padded, Model 185	

CARBON RESISTORS

1/4 Watt	
1/2 Watt	
1 Watt	

LOUDSPEAKER

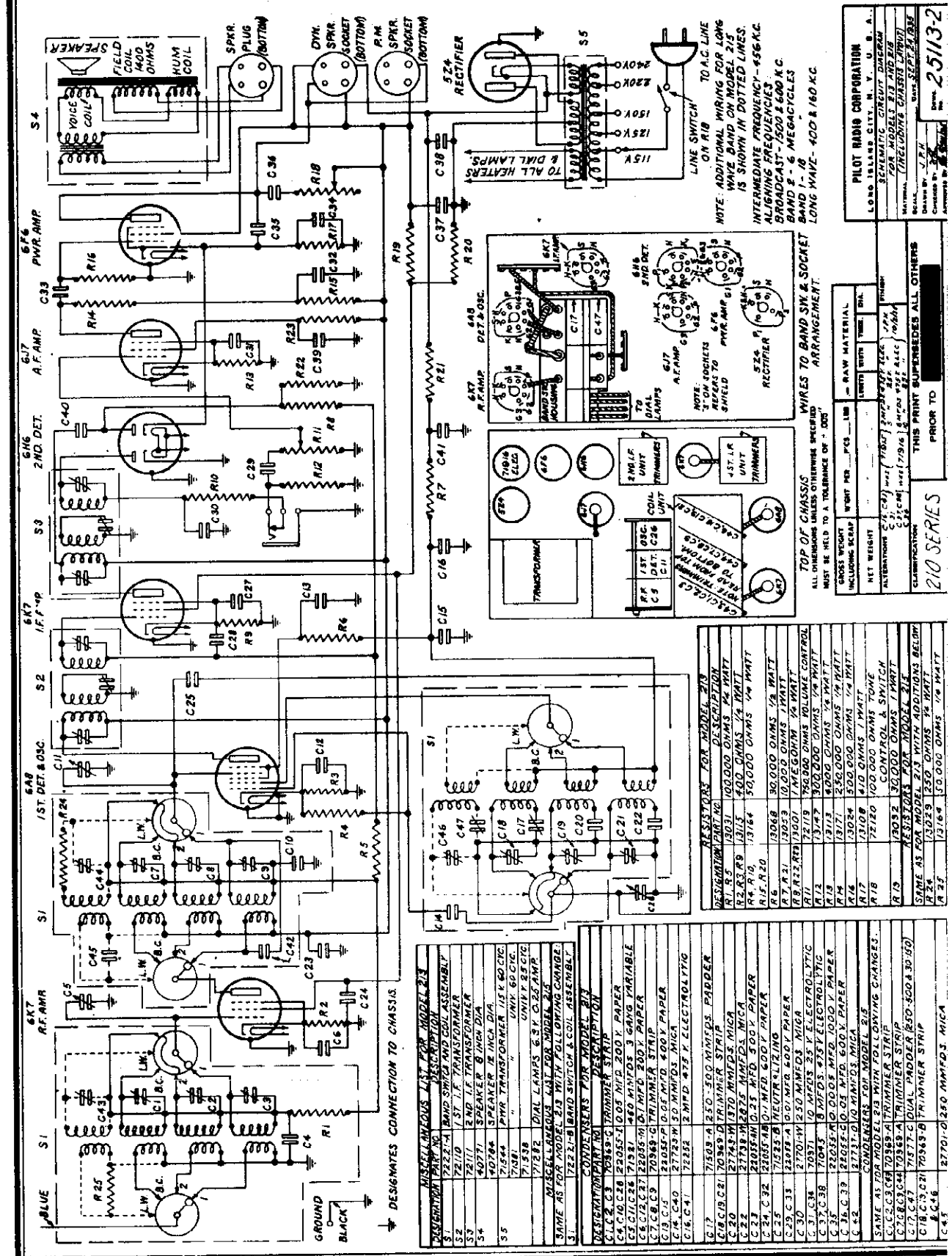
Loudspeaker	40775
Loudspeaker Socket	70927-B
Loudspeaker Plug	

CORD AND PLUG

8 ft Cord	58032
Plug	
Power Transformer, Universal Type, 60 cycles	
Power Transformer, non-adjustable, 60 cycles, 110-125 V.	

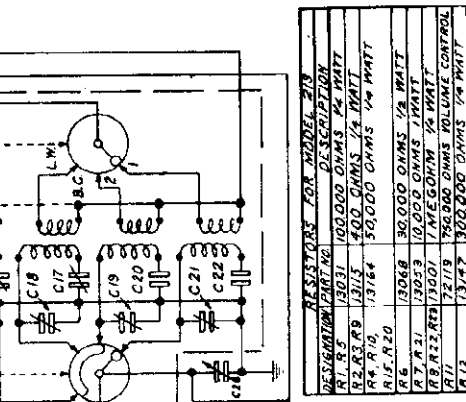
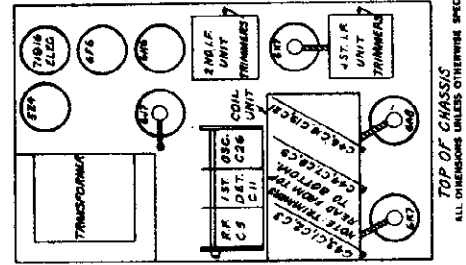
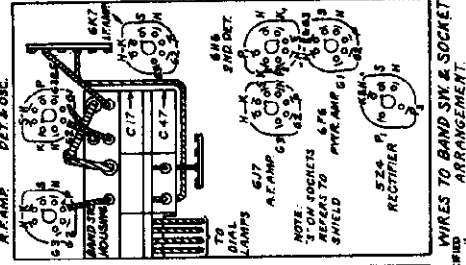
PILOT RADIO CORP.

MODELS 213, 215
Schematic, Socket
Trimmers



524 RECTIFIER
TO ALL HEATERS
TO A.C. LINE
ON RIB

NOTE: ADDITIONAL WIRING FOR LONG WAVE BAND ON MODEL 215 IS SHOWN IN DOTTED LINES.
INTERMEDIATE FREQUENCY - 455 K.C.
ALIGNING FREQUENCIES - 600 K.C.
BROADCAST - 500 & 600 K.C.
BAND 1 - 18
BAND 2 - 6 MEGACYCLES
LONG WAVE - 400 & 160 K.C.



RESISTORS FOR MODEL 213

DESIGNATION	PART NO.	DESCRIPTION
R1	13031	100,000 OHMS 1/2 WATT
R2	13031	100,000 OHMS 1/2 WATT
R3	13113	400 OHMS 1/2 WATT
R4	13164	50,000 OHMS 1/4 WATT
R5	13164	50,000 OHMS 1/4 WATT
R6	13068	30,000 OHMS 1/4 WATT
R7	13029	10,000 OHMS 1/4 WATT
R8	13029	10,000 OHMS 1/4 WATT
R9	13149	300,000 OHMS 1/4 WATT
R10	13113	400 OHMS 1/2 WATT
R11	13113	400 OHMS 1/2 WATT
R12	13171	5,000 OHMS 1/4 WATT
R13	13024	500,000 OHMS 1/4 WATT
R14	13024	500,000 OHMS 1/4 WATT
R15	13024	500,000 OHMS 1/4 WATT
R16	13024	500,000 OHMS 1/4 WATT
R17	13024	500,000 OHMS 1/4 WATT
R18	13024	500,000 OHMS 1/4 WATT
R19	13032	30,000 OHMS 1/2 WATT
R20	13032	30,000 OHMS 1/2 WATT

RESISTORS FOR MODEL 215

DESIGNATION	PART NO.	DESCRIPTION
R1	13029	10,000 OHMS 1/4 WATT
R2	13029	10,000 OHMS 1/4 WATT
R3	13029	10,000 OHMS 1/4 WATT
R4	13029	10,000 OHMS 1/4 WATT
R5	13029	10,000 OHMS 1/4 WATT
R6	13029	10,000 OHMS 1/4 WATT
R7	13029	10,000 OHMS 1/4 WATT
R8	13029	10,000 OHMS 1/4 WATT
R9	13029	10,000 OHMS 1/4 WATT
R10	13029	10,000 OHMS 1/4 WATT
R11	13029	10,000 OHMS 1/4 WATT
R12	13029	10,000 OHMS 1/4 WATT
R13	13029	10,000 OHMS 1/4 WATT
R14	13029	10,000 OHMS 1/4 WATT
R15	13029	10,000 OHMS 1/4 WATT
R16	13029	10,000 OHMS 1/4 WATT
R17	13029	10,000 OHMS 1/4 WATT
R18	13029	10,000 OHMS 1/4 WATT
R19	13029	10,000 OHMS 1/4 WATT
R20	13029	10,000 OHMS 1/4 WATT

Wires to band SW & socket arrangement.
Must be held to a tolerance of .001".
All dimensions unless otherwise specified.

MISCELLANEOUS LIST FOR MODEL 213

DESIGNATION	PART NO.	DESCRIPTION
S1	7222-1-A	BAND SWITCH AND COIL ASSEMBLY
S2	72110	1ST I.F. TRANSFORMER
S3	40771	SPEAKER 2 INCH DIA.
S4	40784	SPKR. PLUG (BOTTOM)
S5	70891	DYN. SPKR. SOCKET (BOTTOM)
S6	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S7	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S8	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S9	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S10	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S11	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S12	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S13	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S14	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S15	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S16	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S17	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S18	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S19	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S20	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.

MISCELLANEOUS LIST FOR MODEL 215

DESIGNATION	PART NO.	DESCRIPTION
S1	7222-1-B	BAND SWITCH & COIL ASSEMBLY
S2	72110	1ST I.F. TRANSFORMER
S3	40771	SPEAKER 2 INCH DIA.
S4	40784	SPKR. PLUG (BOTTOM)
S5	70891	DYN. SPKR. SOCKET (BOTTOM)
S6	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S7	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S8	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S9	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S10	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S11	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S12	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S13	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S14	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S15	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S16	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S17	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S18	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S19	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.
S20	71726	DIAL LAMPS 2 1/2" X 3" 0.25 AMP.

CONDENSERS FOR MODEL 213

DESIGNATION	PART NO.	DESCRIPTION
C1	2701	10 MFDS 35 V. ELECTROLYTIC
C2	2701	10 MFDS 35 V. ELECTROLYTIC
C3	2701	10 MFDS 35 V. ELECTROLYTIC
C4	2701	10 MFDS 35 V. ELECTROLYTIC
C5	2701	10 MFDS 35 V. ELECTROLYTIC
C6	2701	10 MFDS 35 V. ELECTROLYTIC
C7	2701	10 MFDS 35 V. ELECTROLYTIC
C8	2701	10 MFDS 35 V. ELECTROLYTIC
C9	2701	10 MFDS 35 V. ELECTROLYTIC
C10	2701	10 MFDS 35 V. ELECTROLYTIC
C11	2701	10 MFDS 35 V. ELECTROLYTIC
C12	2701	10 MFDS 35 V. ELECTROLYTIC
C13	2701	10 MFDS 35 V. ELECTROLYTIC
C14	2701	10 MFDS 35 V. ELECTROLYTIC
C15	2701	10 MFDS 35 V. ELECTROLYTIC
C16	2701	10 MFDS 35 V. ELECTROLYTIC
C17	2701	10 MFDS 35 V. ELECTROLYTIC
C18	2701	10 MFDS 35 V. ELECTROLYTIC
C19	2701	10 MFDS 35 V. ELECTROLYTIC
C20	2701	10 MFDS 35 V. ELECTROLYTIC
C21	2701	10 MFDS 35 V. ELECTROLYTIC
C22	2701	10 MFDS 35 V. ELECTROLYTIC
C23	2701	10 MFDS 35 V. ELECTROLYTIC
C24	2701	10 MFDS 35 V. ELECTROLYTIC
C25	2701	10 MFDS 35 V. ELECTROLYTIC
C26	2701	10 MFDS 35 V. ELECTROLYTIC
C27	2701	10 MFDS 35 V. ELECTROLYTIC
C28	2701	10 MFDS 35 V. ELECTROLYTIC
C29	2701	10 MFDS 35 V. ELECTROLYTIC
C30	2701	10 MFDS 35 V. ELECTROLYTIC
C31	2701	10 MFDS 35 V. ELECTROLYTIC
C32	2701	10 MFDS 35 V. ELECTROLYTIC
C33	2701	10 MFDS 35 V. ELECTROLYTIC
C34	2701	10 MFDS 35 V. ELECTROLYTIC
C35	2701	10 MFDS 35 V. ELECTROLYTIC
C36	2701	10 MFDS 35 V. ELECTROLYTIC
C37	2701	10 MFDS 35 V. ELECTROLYTIC
C38	2701	10 MFDS 35 V. ELECTROLYTIC
C39	2701	10 MFDS 35 V. ELECTROLYTIC
C40	2701	10 MFDS 35 V. ELECTROLYTIC

CONDENSERS FOR MODEL 215

DESIGNATION	PART NO.	DESCRIPTION
C1	2701	10 MFDS 35 V. ELECTROLYTIC
C2	2701	10 MFDS 35 V. ELECTROLYTIC
C3	2701	10 MFDS 35 V. ELECTROLYTIC
C4	2701	10 MFDS 35 V. ELECTROLYTIC
C5	2701	10 MFDS 35 V. ELECTROLYTIC
C6	2701	10 MFDS 35 V. ELECTROLYTIC
C7	2701	10 MFDS 35 V. ELECTROLYTIC
C8	2701	10 MFDS 35 V. ELECTROLYTIC
C9	2701	10 MFDS 35 V. ELECTROLYTIC
C10	2701	10 MFDS 35 V. ELECTROLYTIC
C11	2701	10 MFDS 35 V. ELECTROLYTIC
C12	2701	10 MFDS 35 V. ELECTROLYTIC
C13	2701	10 MFDS 35 V. ELECTROLYTIC
C14	2701	10 MFDS 35 V. ELECTROLYTIC
C15	2701	10 MFDS 35 V. ELECTROLYTIC
C16	2701	10 MFDS 35 V. ELECTROLYTIC
C17	2701	10 MFDS 35 V. ELECTROLYTIC
C18	2701	10 MFDS 35 V. ELECTROLYTIC
C19	2701	10 MFDS 35 V. ELECTROLYTIC
C20	2701	10 MFDS 35 V. ELECTROLYTIC
C21	2701	10 MFDS 35 V. ELECTROLYTIC
C22	2701	10 MFDS 35 V. ELECTROLYTIC
C23	2701	10 MFDS 35 V. ELECTROLYTIC
C24	2701	10 MFDS 35 V. ELECTROLYTIC
C25	2701	10 MFDS 35 V. ELECTROLYTIC
C26	2701	10 MFDS 35 V. ELECTROLYTIC
C27	2701	10 MFDS 35 V. ELECTROLYTIC
C28	2701	10 MFDS 35 V. ELECTROLYTIC
C29	2701	10 MFDS 35 V. ELECTROLYTIC
C30	2701	10 MFDS 35 V. ELECTROLYTIC
C31	2701	10 MFDS 35 V. ELECTROLYTIC
C32	2701	10 MFDS 35 V. ELECTROLYTIC
C33	2701	10 MFDS 35 V. ELECTROLYTIC
C34	2701	10 MFDS 35 V. ELECTROLYTIC
C35	2701	10 MFDS 35 V. ELECTROLYTIC
C36	2701	10 MFDS 35 V. ELECTROLYTIC
C37	2701	10 MFDS 35 V. ELECTROLYTIC
C38	2701	10 MFDS 35 V. ELECTROLYTIC
C39	2701	10 MFDS 35 V. ELECTROLYTIC
C40	2701	10 MFDS 35 V. ELECTROLYTIC

PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y., U. S. A.
SCHEMATIC CIRCUIT DIAGRAM
FOR MODEL 213 AND 215
NATIONAL PATENT OFFICE
REGISTERED TRADE MARK
DESIGNED BY J. H. ...
MANUFACTURED BY ...

THIS PRINT SUPERSEDES ALL OTHERS
210 SERIES
PRIOR TO [REDACTED]

Wires to band SW & socket arrangement.
Must be held to a tolerance of .001".
All dimensions unless otherwise specified.

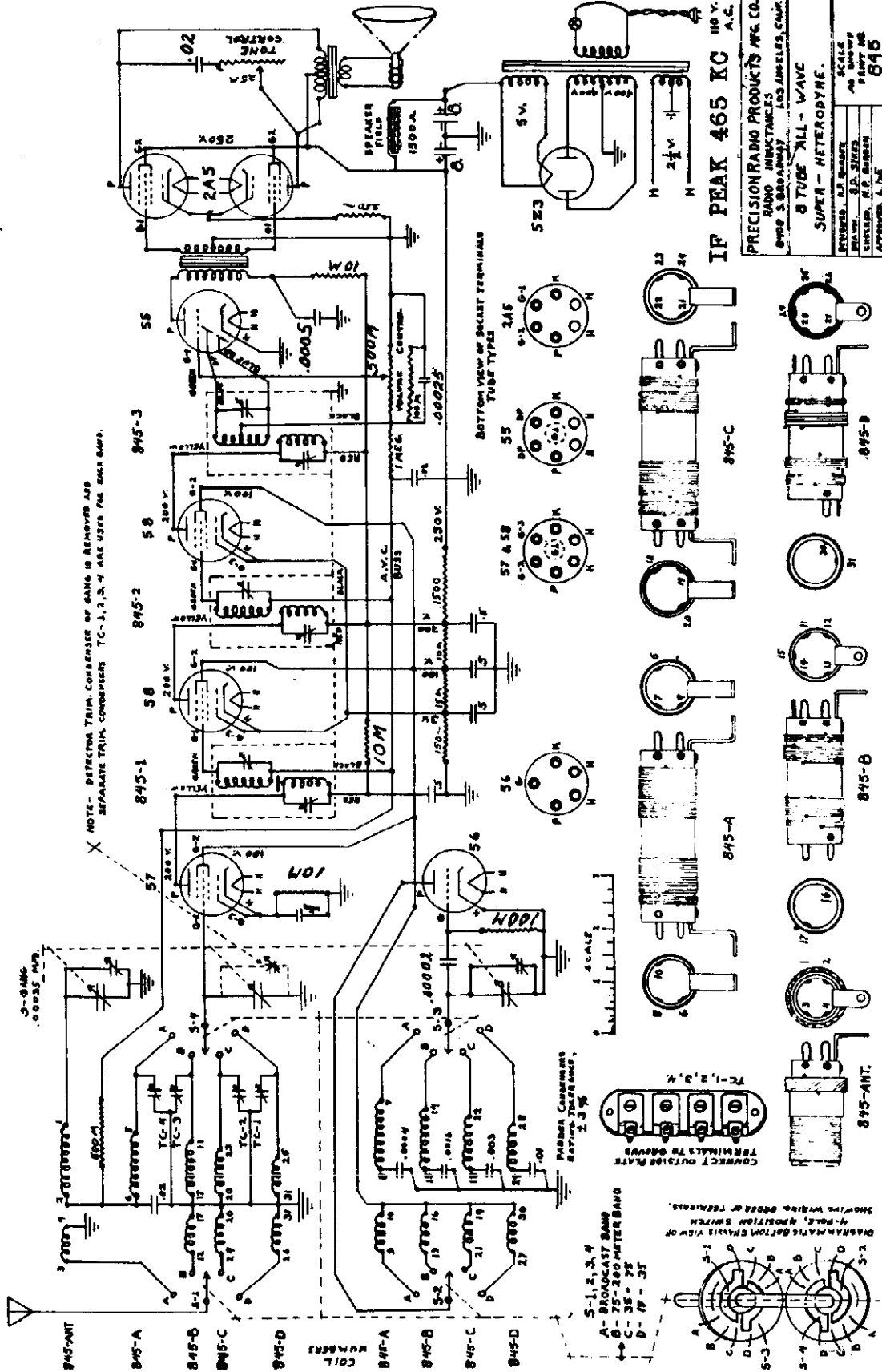
CONDENSERS FOR MODEL 215

DESIGNATION	PART NO.	DESCRIPTION
C1	2701	10 MFDS 35 V. ELECTROLYTIC
C2	2701	10 MFDS 35 V. ELECTROLYTIC
C3	2701	10 MFDS 35 V. ELECTROLYTIC
C4	2701	10 MFDS 35 V. ELECTROLYTIC
C5	2701	10 MFDS 35 V. ELECTROLYTIC
C6	2701	10 MFDS 35 V. ELECTROLYTIC
C7	2701	10 MFDS 35 V. ELECTROLYTIC
C8	2701	10 MFDS 35 V. ELECTROLYTIC
C9	2701	10 MFDS 35 V. ELECTROLYTIC
C10	2701	10 MFDS 35 V. ELECTROLYTIC
C11	2701	10 MFDS 35 V. ELECTROLYTIC
C12	2701	10 MFDS 35 V. ELECTROLYTIC
C13	2701	10 MFDS 35 V. ELECTROLYTIC
C14	2701	10 MFDS 35 V. ELECTROLYTIC
C15	2701	10 MFDS 35 V. ELECTROLYTIC
C16	2701	10 MFDS 35 V. ELECTROLYTIC
C17	2701	10 MFDS 35 V. ELECTROLYTIC
C18	2701	10 MFDS 35 V. ELECTROLYTIC
C19	2701	10 MFDS 35 V. ELECTROLYTIC
C20	2701	10 MFDS 35 V. ELECTROLYTIC
C21	2701	10 MFDS 35 V. ELECTROLYTIC
C22	2701	10 MFDS 35 V. ELECTROLYTIC
C23	2701	10 MFDS 35 V. ELECTROLYTIC
C24	2701	10 MFDS 35 V. ELECTROLYTIC
C25	2701	10 MFDS 35 V. ELECTROLYTIC
C26	2701	10 MFDS 35 V. ELECTROLYTIC
C27	2701	10 MFDS 35 V. ELECTROLYTIC
C28	2701	10 MFDS 35 V. ELECTROLYTIC
C29	2701	10 MFDS 35 V. ELECTROLYTIC
C30	2701	10 MFDS 35 V. ELECTROLYTIC
C31	2701	10 MFDS 35 V. ELECTROLYTIC
C32	2701	10 MFDS 35 V. ELECTROLYTIC
C33	2701	10 MFDS 35 V. ELECTROLYTIC
C34	2701	10 MFDS 35 V. ELECTROLYTIC
C35	2701	10 MFDS 35 V. ELECTROLYTIC
C36	2701	10 MFDS 35 V. ELECTROLYTIC
C37	2701	10 MFDS 35 V. ELECTROLYTIC
C38	2701	10 MFDS 35 V. ELECTROLYTIC
C39	2701	10 MFDS 35 V. ELECTROLYTIC
C40	2701	10 MFDS 35 V. ELECTROLYTIC

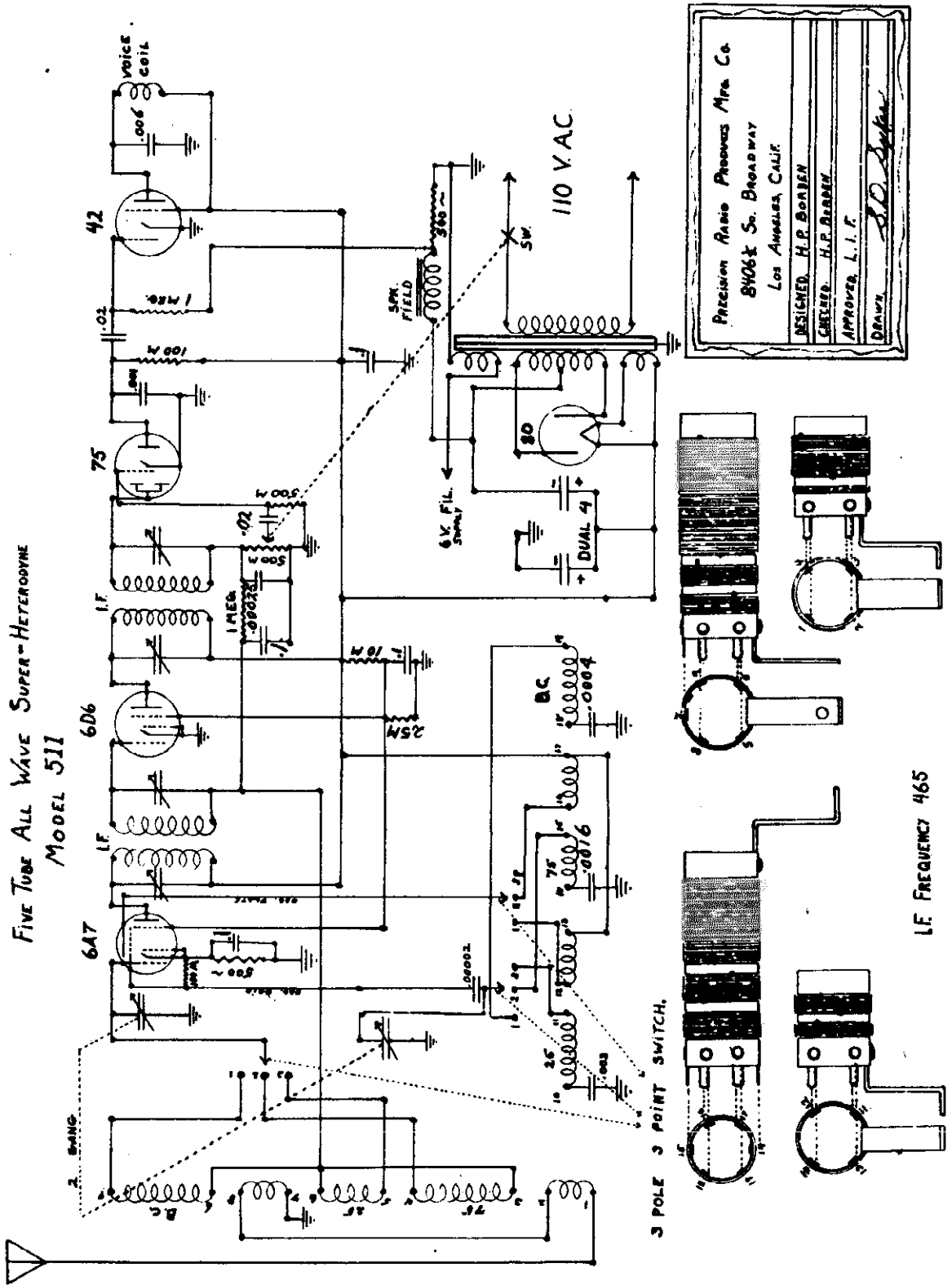
MODEL 8-Tube A-W.

Superhet. PRECISION RADIO PRODUCTS MFG. CO.

Schematic

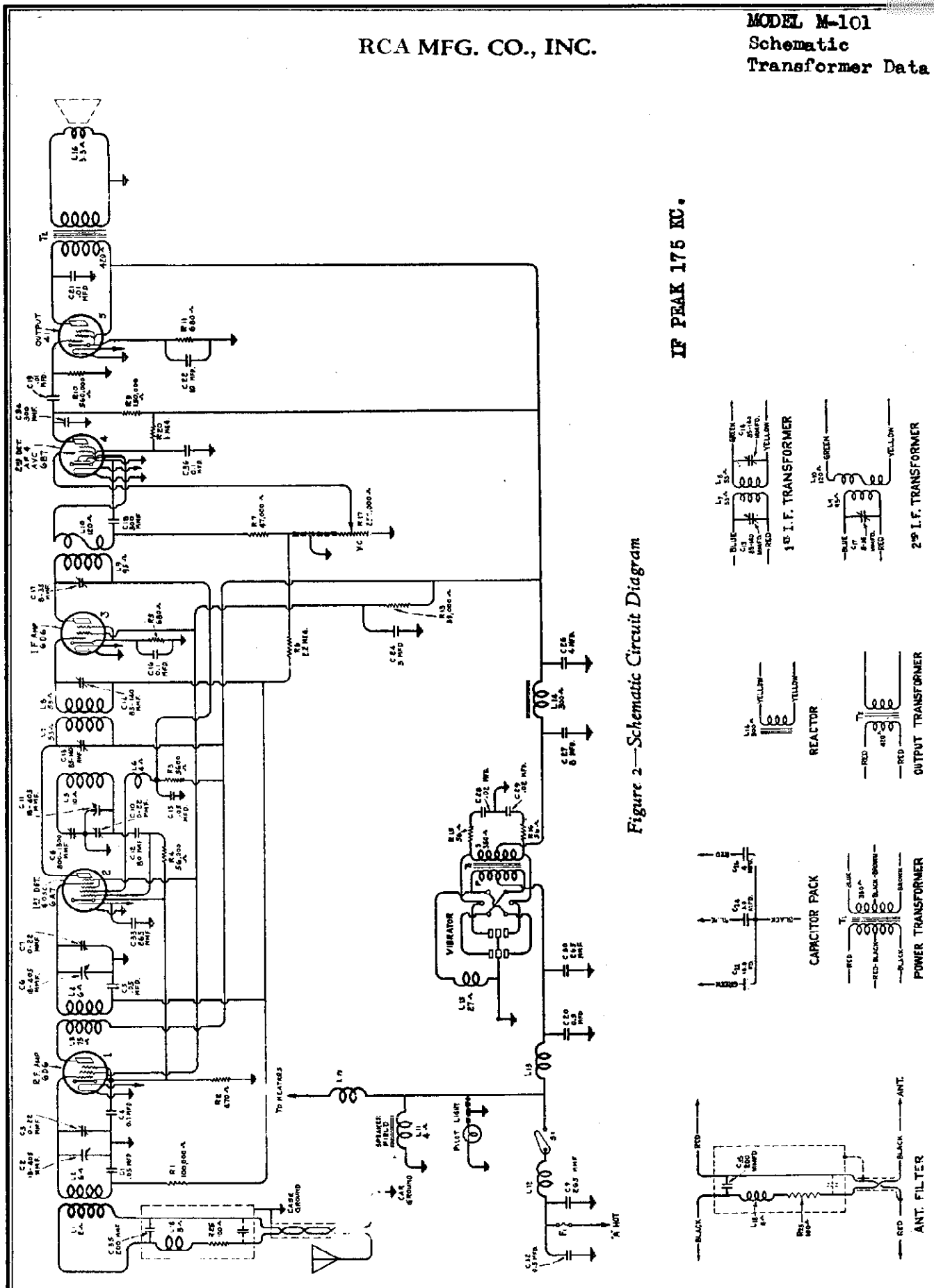


PRECISION RADIO PRODUCTS MFG. CO.



RCA MFG. CO., INC.

MODEL M-101
Schematic
Transformer Data



IF PEAK 175 KC.

Figure 2—Schematic Circuit Diagram

MODEL M-101
Alignment, Voltage
Socket, Trimmers

RCA MFG. CO., INC.

In this receiver the Radiotrons are compactly placed and snugly fitted into tight-gripping sockets to protect against vibration and to insure positive electrical connections. They should be withdrawn by exerting a direct pull on the tube.

To replace the tubes having the form-fitting shields, attach the shield to the tube and orient the grid lead opening in proper relation to the tube base, and insert the tube into its socket so that the shield clamps slide into their correct position on the outer surface of the shield.

CIRCUIT VOLTAGES

The voltages indicated at the socket contacts on Figure 4 will serve to assist in analyzing defective circuit conditions. The values specified should hold within $\pm 20\%$ when the receiver is normally operative. They are actual operating values and do not take into account inaccuracies due to voltmeter resistance. A meter having a multiplier of at least 100 ohms per volt should be used, and the amount of circuit resistance shunted by the meter resistance duly considered when the two are comparable.

SYNCHRONOUS RECTIFIER-VIBRATOR

The vibrator power unit used in this receiver is of rugged design and construction. It 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 to be in defective condition, but a renewal is installed. A convenient plug-in base is provided for effecting a quick replacement.

SPEAKER CONE ALIGNMENT

In the event the cone coil becomes misaligned, it will be necessary to correct its position by an adjustment provided on the speaker assembly. A small round-head brass screw installed on pole piece adjacent to the terminal strip is used to clamp the cone coil mounting. To center the cone, loosen the screw and insert a small 1/8" rod or nail into the hole next to the screw and pry the coil mounting into the position giving normal speaker operation. The screw should then be retightened.

TUNING CONDENSER DRIVE

Smooth control should be obtained over the entire tuning range of the variable condenser. If there is any irregularity noticed, the following corrective steps should be taken:
Check the action of the gear mechanism for presence of binding or backlash at every point within the

(b) Tune each of the trimmer capacitors, C17, C14 and C13, in order. C17 should be set for maximum (peak) output. C14 and C13 should be roughly adjusted for maximum output and then carefully "untuned" so that a flat-topped response is obtained. This may be checked by shifting the external oscillator frequency through a range two kilocycles each side of 175 kc. and noting whether or not the receiver output remains substantially constant.

mechanism within the control unit. To adjust their mechanical relations so that accurate scale calibration obtains—Rotate the station selector knob until the variable tuning capacitor is at full mesh, which will carry the dial pointer to its minimum frequency position; then remove the tuning knob, loosen the set screw in the bushing and rotate the bushing until the pointer sets exactly opposite the last radial line at the low frequency end of the scale. (The line referred to is the second one, counter-clockwise of the 550 kc. mark.)

(b) **General Procedure**—The "Output Indicator" should be attached to the voice coil circuit of the loudspeaker, and for each adjustment, the oscillator output increased until a noticeable registration or glow occurs on the indicator. The signal from the oscillator should be held as low as possible consistent with getting a good indication, with the receiver volume control set at its maximum position. This method of procedure prevents the automatic volume control from affecting the adjustments.

(2) **I. F. ADJUSTMENTS**
Three trimmers are provided in the I-F system, two on the first transformer and one on the second transformer. The locations of the adjustment screws are shown in Figure 4.

(a) Tune the "Full Range Oscillator" to 175 kc. and connect its output to the first detector station selector and chassis ground. Tune the station selector to a point where no signals are received.

(b) Adjust the oscillator trimmer, C10; the detector trimmer, C7, and the I-F trimmer, C3, for maximum (peak) receiver output.

(c) Set the external oscillator to a frequency of 600 kc. and rotate the station selector until this signal is accurately tuned on the receiver. Adjust the oscillator trimmer C8, simultaneously rocking the tuning condenser slowly through the signal until the maximum obtainable output results from the two combined operations. This adjustment should be made irrespective of dial calibration.

(d) Recheck the adjustment of the 1400 kc. oscillator trimmer, as in (b), to correct any reflective errors caused by the procedure of (c).

RADIOTRONS

Under ordinary usage within the ratings specified for voltage supply, tube life will be consistent with that obtained in other applications. Their deterioration and approach to failure is usually evidenced by noisy or intermittent operation, loss of sensitivity and distorted tone quality.

It is not feasible to use the Radiotrons in the receiver sockets, due to likelihood of errors being caused by the associated circuits. Their removal and check with standard tube-testing apparatus is therefore advisable.

LINE-UP ADJUSTMENTS

As in all standard receivers, this instrument must be in correct electrical alignment in order to obtain maximum efficiency and best quality of performance. The circuits should be re-aligned after each major servicing or repair operation, and whenever there are positive indications that the adjustments have deviated

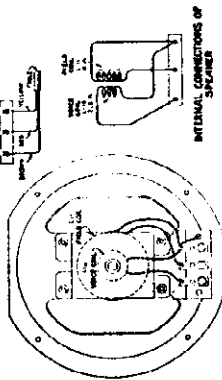


Figure 1—Loudspeaker Wiring

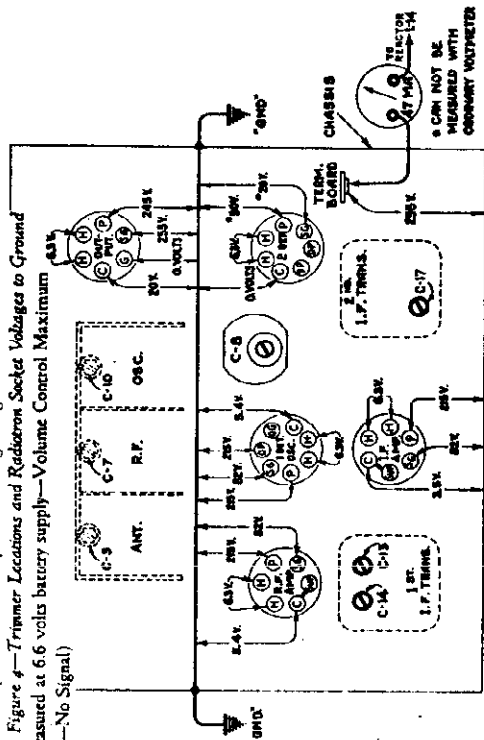
from normal by ordinary usage. These indications will be present together and will have the nature of low sensitivity, poor tone quality, and irregular double-peaked tuning.

The important requirements in re-adjusting the line-up trimmers are the use of proper oscillator and indication equipment and adherence to a definite procedure.

(1) PREPARATORY DETAILS

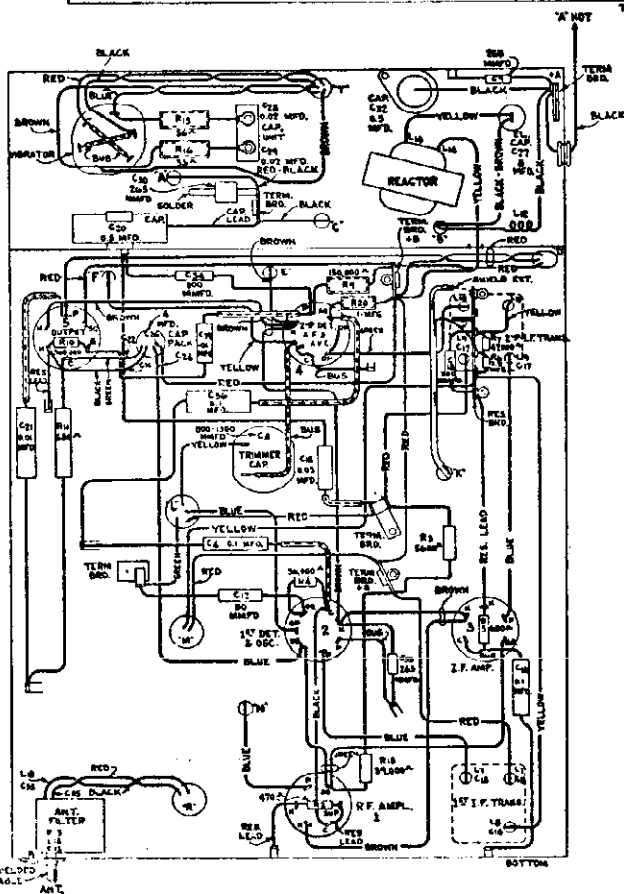
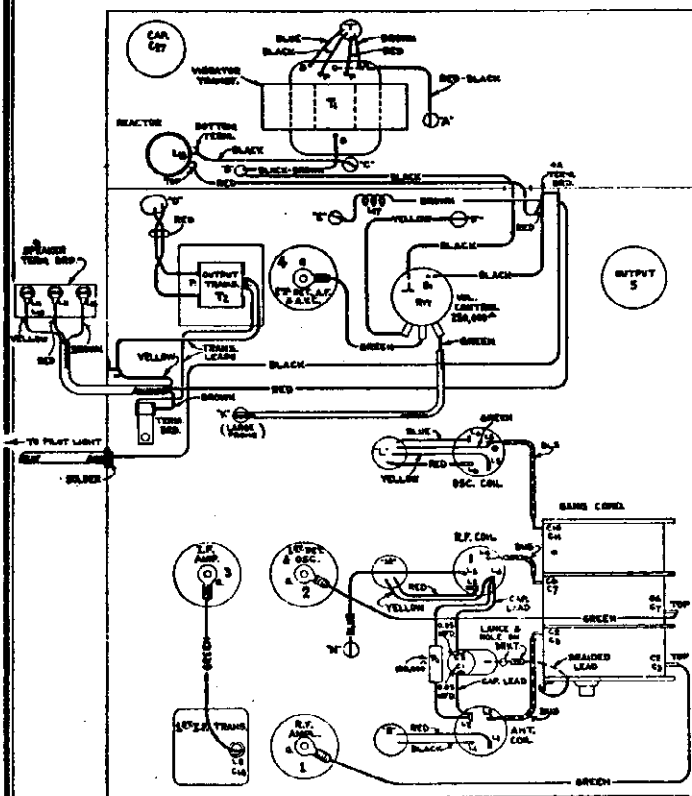
(a) **Dial Calibration**—The tuning condenser flexible shaft operates the dial pointer through a gear.

Figure 4—Trimmer Locations and Radiotron Socket Voltages to Ground (Measured at 6.6 volts battery supply)—Volume Control Maximum



RCA MFG. CO., INC.

MODEL M-101
Chassis Wiring
Service Notes



tuning range. A bind may be due to improper mesh between the small pinion gear and large gears on the rotor shaft. To correct such a condition, remove the coupling on the pinion of the tuning gear, insert a screw-driver through the hole in the case and loosen the two screws holding gear plate. The mesh of the gears should be adjusted to a position which gives smooth operation.

Gear back-lash is prevented by the compressor spring between the large gears on the rotor shaft. To check for this back-lash, rotate the pinion slowly in both directions, observing the free gear (on rotor shaft) carefully to determine if it shifts without turning the rotor.

MISCELLANEOUS SERVICE HINTS

If back-lash is apparent, the large gear assembly should be removed and the free gear moved (against the spring compression) 2 to 3½ teeth in relation to the fixed gear and the assembly slid in place on the shaft and in mesh with the pinion. The set screws should then be securely tightened.

(a) The grounding of the outer end of the antenna lead shield is quite critical, in that ignition interference may be minimized by selecting the proper point of attachment to the car frame, determined by experiment for each individual installation.

(b) In some cars, ignition interference may be introduced through lack of antenna lead shielding. In such cases, a shield should be placed over the exposed section of antenna lead and carried as near as possible to the actual antenna. It should be solidly grounded.

(c) Interference in the form of a grating scratch may arise from static collecting on the front wheels of some cars due to road surface friction in dry weather. The insulation caused by the grease of the wheel hub enables this action to develop. A number of devices are available through automotive supply dealer which are designed to eliminate this type of trouble. They all serve to form a grounding tie between the hub and the axle, and thus drain the static to the frame of the car (ground).

(d) If the flexible tuning shaft is installed so that it protrudes through the insulating coupling at the receiver end and makes intermittent contact with the metal of the pinion gear, some r-f disturbance will result. The shaft should therefore be inserted into the coupling just far enough to be properly secured by the set screw.

(e) The screws holding the chassis to the case must all be in place and tightly installed, inasmuch as they appreciably affect the ground resistance of the assembly and will consequently have a bearing on the amount of ignition noise received.

MODEL M-101
Parts List

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	List Price	Stock No.	Description	List Price
5042	Screw—No. 8-32 1/4 inch headless set screw for station selector or volume control shaft—Package of 10	\$0.25	7869	Cover—Bottom cover of receiver housing assembly	\$0.32
4983	Shaft—Station selector drive shaft	.16	4999	Screw—No. 8-1/2 inch slotted hex head self-capturing screw—Used to assemble housing—Package of 5	.12
4979	Shaft—Volume control drive shaft	.16	MISCELLANEOUS PARTS		
4984	Socket—Dial lamp socket	.16			
4982	Spring—Holding spring for station selector or volume control knob—Package of 10	.26			
4980	Spring—Tension spring—Package of 5	.15			
5000	Bracket—Volume or tuning condenser flexible shaft bracket—Brackets mounted on housing	.30			
4994	Nut—Knurled locking nut for condenser drive or volume control flexible shaft	.10			
7854	Shaft—Tuning condenser—Flexible (setting column) drive shaft—3 1/4 inches long	1.08			
7856	Shaft—Volume control or tuning condenser—Flexible (dash mounting) drive shaft—9 1/2 inches long	.58			
7855	Shaft—Volume control—Flexible (setting column) shaft—28 1/4 inches long	1.00			
4970	Cable—3-conductor reproducer cable	1.02			
9602	Cone—Reproducer one (L16)	.75			
9576	Housing—Reproducer housing—Top cover of receiver	1.08			
9577	Reproducer—Complete (L11, L16)	4.52			
4995	Screw—Reproducer mounting screw—Package of 10	.15			
7868	Case—Receiver housing assembly—Complete	1.76			

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price	Stock No.	Description	List Price
4993	RECEIVER ASSEMBLIES Bumper—Rubber bumper—Used under variable condenser bracket assembly—Package of 5	\$0.25	5132	Resistor—47,000 ohms—Carbon type—1/10 watt (R7)—Package of 5	\$0.75
4244	Cup—Grid contact cap—Package of 5	.20	5029	Resistor—56,000 ohms—Carbon type—1/4 watt (R4)—Package of 5	1.00
4955	Capacitor—Adjustable capacitor (C8)	.48	3118	Resistor—100,000 ohms—Carbon type—1/2 watt (R1)—Package of 5	1.00
5021	Capacitor—80 mmfd. (C12)	.22	4984	Resistor—150,000 ohms—Carbon type—1/2 watt (R3)—Package of 5	1.00
5078	Capacitor—265 mmfd. (C9, C30, C33)	.24	5035	Resistor—560,000 ohms—Carbon type—1/2 watt (R10)—Package of 5	1.00
4248	Capacitor—300 mmfd. (C18, C34)	.22	3033	Resistor—1 megohm—Carbon type—1/2 watt (R20)—Package of 5	1.00
4892	Capacitor—.01 mfd. (C21)	.20	5131	Resistor—2,000,000 ohms—Carbon type—1/10 watt (R6)—Package of 5	1.00
4858	Capacitor—.01 mfd. (C19)	.25	5129	Ring—Radiotron shield ring—Package of 5	.75
4895	Capacitor—.01 mfd. (C4, C16)	.24	3584	Ring—Retaining ring for antenna, r.f. or oscillator coil—Package of 5	.10
4896	Capacitor—.05 mfd. (C15)	.28	3623	Shield—Antenna, r.f. or oscillator coil shield	.40
5019	Capacitor—.5 mfd. (C32)	.42	4953	Shield—Fine intermediate frequency transformer shield	.30
4964	Capacitor—8.0 mfd. (C20)	.46	4956	Shield—Second intermediate frequency transformer shield	.24
4964	Capacitor pack—Comprising two .02 mfd. capacitors (C28, C29)	1.23	5037	Shield—Radiotron shield	.30
5016	Capacitor pack—Comprising two .05 mfd. capacitors (C1, C5)	1.02	4946	Socket—6 contact Radiotron socket	.15
4958	Capacitor pack—Comprising one .3 mfd. 10 mfd. and one .1 mfd. capacitors (C2, C4, C26)	.26	4959	Socket—6 contact vibrator socket	.18
5028	Clamp—Metal clamp with screw—For antenna filter inductor cable—Package of 5	1.34	4947	Socket—3 contact Radiotron socket	.18
5074	Clamp—Radiotron shield clamp	.14	4951	Transformer—Fly intermediate frequency transformer (L7, L8, C15, C14)	1.26
4930	Coil—Antenna coil (L1, L2)	.14	4952	Transformer—Second intermediate frequency transformer (L9, L10, C17)	1.76
4968	Coil—Choke coil (L12)	.74	4957	Transformer—Output transformer (T2)	1.18
4959	Coil—Choke coil (L5 turns—approximately 23 inches—length) (L17)	.14	7859	Transformer—Vibrator transformer (T4)	2.02
6967	Coil—Oscillator coil (L5, L6)	.52	7857	Vibrator—Complete (L15)	5.64
6956	Coil—R. F. coil (L3, L4)	.80	5018	Volume control (R17, S1)	1.00
4948	Condenser—.5 variable tuning condenser (C2, C3, C6 / C10, C11)	3.81	CONTROL BOX ASSEMBLIES		
4954	Filter—Antenna filter (L18, C35, R25)	1.46	4987	Box—Station selector dial bezel	.42
4972	Lead—Power lead with male section of connector—Chassis end	.20	7855	Box—Control box—Complete	3.96
7766	Lead—Power lead with slip and female section of fuse connector	.30	7864	Bracket—Mounting bracket and rear section of control box housing	.30
4966	Lead—Single connector dial lamp lead—With female section of connector—Chassis end	.30	4988	Crystal—Station selector dial crystal	.38
4962	Reactor (L14)	.85	4981	Dial—Station selector dial	.20
4963	Reactor (L13)	.38	4978	Gear—18 tooth intermediate drive gear	.15
5034	Resistor—56 ohms—Carbon type—1/2 watt (R15, R16)—Package of 5	1.00	7862	Housing—Front section of control box housing	.42
5030	Resistor—470 ohms—Carbon type—1/2 watt (R2)—Package of 5	1.00	7863	Housing—Center section of control box housing	.28
5031	Resistor—680 ohms—Carbon type—1/2 watt (R5)—Package of 5	1.00	4990	Indicator—Station selector (pointer) indicator knob—Package of 5	.32
5026	Resistor—630 ohms—Carbon type—1 watt (R11)—Package of 5	1.10	4983	Knob—Station selector or volume control knob—Package of 5	.10
5175	Resistor—5600 ohms—Carbon type—1/2 watt (R3)—Package of 5	1.00	4991	Lamp—Dial lamp—Package of 5	.62
5176	Resistor—30,000 ohms—Carbon type—1 watt (R13)	2.2	7856	Plate—Bearing plate assembly—Comprising station selector shaft, pinion and spring	.74

RCA MFG. CO., INC.

MODEL 105
Schematic
Voltage

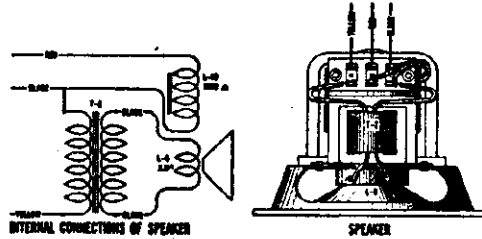
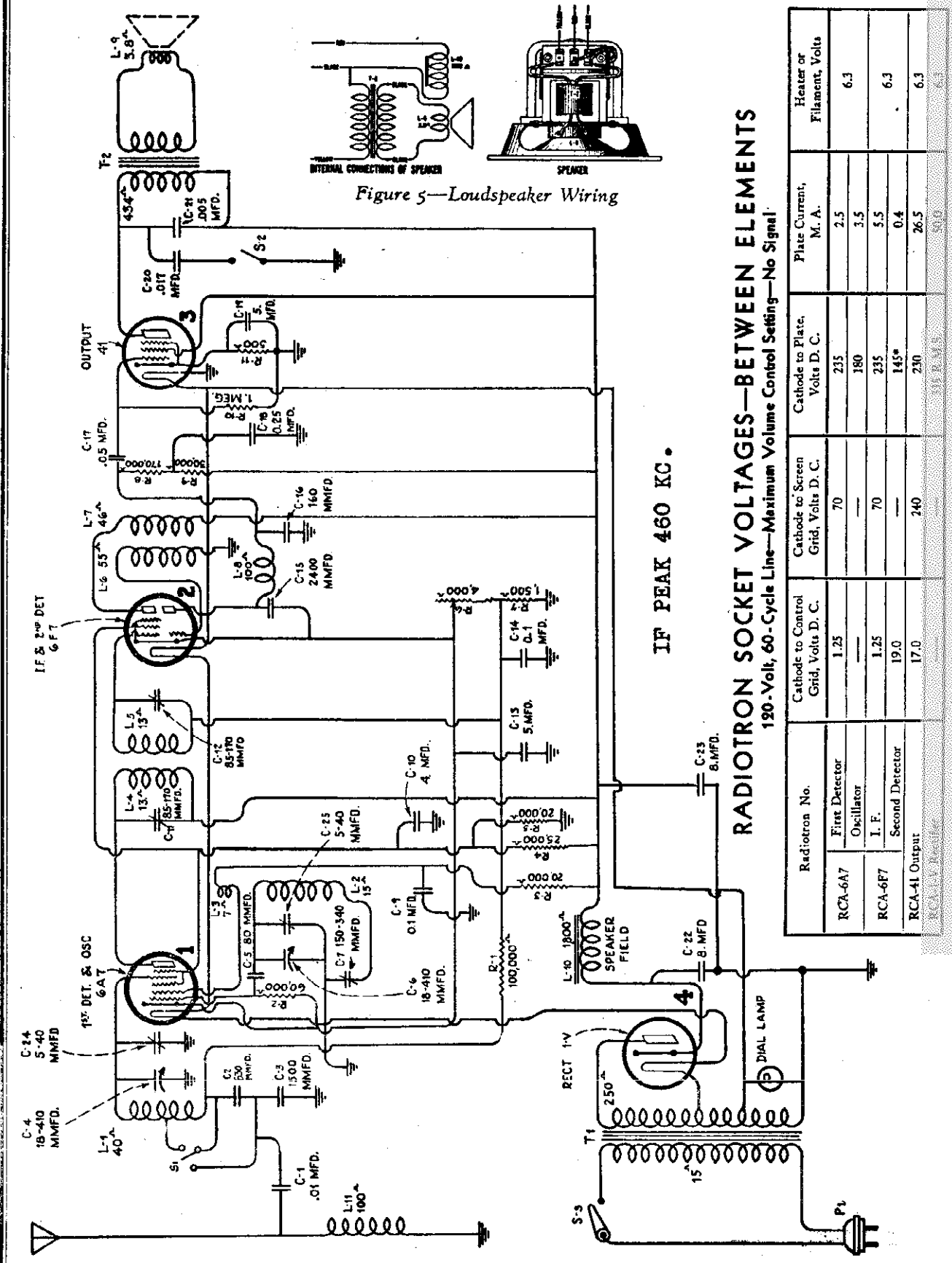


Figure 5—Loudspeaker Wiring

IF PEAK 460 KC.

RADIOTRON SOCKET VOLTAGES—BETWEEN ELEMENTS
120-Volt, 60-Cycle Line—Maximum Volume Control Setting—No Signal

Radiotron No.	Cathode to Control Grid, Volts D. C.	Cathode to Screen Grid, Volts D. C.	Cathode to Plate, Volts D. C.	Plate Current, M. A.	Heater or Filament, Volts
RCA-6A7	1.25	70	235	2.5	6.3
RCA-6F7	1.25	70	180	3.5	6.3
RCA-41 Output	17.0	240	230	0.4	6.3
				26.5	
				50.0	

*Actual voltage elements be measured with ordinary voltmeter

RCA MFG. CO., INC.

MODEL 103
Circuit Data, Socket
Trimmers, Voltage
Alignment, Parts

DESCRIPTION OF ELECTRICAL CIRCUIT

The first stage is a combined detector and oscillator using an RCA Radiotron 6A7. The two functions are obtained through means of individual tuned circuits. On the detector tuning coil a tap is made, so that a portion of the coil can be short-circuited by switch contacts and thus extend the tuning of the receiver to the higher frequency range. The oscillator second harmonic is used to produce the intermediate frequency for the upper tuning range. The oscillator circuit is arranged to have the low-frequency trimmer capacitor attached in series with the inductance, permitting accuracy in its adjustment to be easily secured, and to give a more uniform sensitivity over the tuning range.

In the following stage, the I. F. amplification and final detection take place in the dual-purpose RCA 6F7.

The input section of this tube constitutes a screen-grid I. F. amplifier, with the output elements arranged to perform as a triode detector.

One RCA-41, a Pentode type, is employed in the audio output stage.

The rectifying unit consists of an RCA-1-v, a cathode-type, half-wave tube. Its high voltage is supplied from the power transformer secondary, which is a single winding tapped at various points for furnishing heater current to all Radiotrons of the receiver. The heater of the RCA-41 stage and the pilot lamp are supplied by one section of the secondary winding; and the remaining three heaters are connected series to receive supply from a 19-volt section of the same winding.

Voltage Rating.....	105-125 Volts
Frequency Ratings.....	25-60 or 50-60 Cycles
Power Consumption.....	40 Watts at 115 Volts
Number and Type of Radiotrons.....	1 RCA-6A7, 1 RCA-6F7, 1 RCA-41, 1 RCA-1V—Total 4
Tuning Frequency Ranges.....	540-1500 K. C. and 1600-3500 K. C.
Intermediate Frequency.....	460 K. C.
Maximum Undistorted Output.....	1.9 Watts
Maximum Output.....	3 Watts
Line-up Frequencies.....	460 K. C., 600 K. C. and 1400 K. C.

SERVICE DATA

(1) ALIGNMENT PROCEDURE

Locations of the alignment condensers are indicated on Figure 3. There are five adjustments necessary. Before attempting to align the receiver, the antenna must be disconnected to obviate any interference that may be caused by pickup on a local station. The adjusting should then be performed in order as follows:

- (a) *First I. F. Transformer*—Connect the output of an external oscillator, which is set to produce a 460 KC. signal, from the RCA-6A7 detector grid to chassis-ground. Tune the primary and secondary trimmers C-11 and C-12, respectively, for maximum receiver output.
- (b) *Receiver Oscillator and Detector*—Two adjustments are provided. The first is accomplished by feeding a 1400 KC. signal from an external oscillator into the antenna-ground terminals. Set the tuning dial at 1400, and adjust the two trimmers of the tuning con-

denser for maximum receiver output. For the second oscillator adjustment, a signal of 600 KC. is required from the external source, fed into the antenna-ground connections. The trimmer for this frequency appears on the rear of the chassis. Adjust this trimmer, simultaneously rocking the tuning condenser through the signal, until maximum receiver output is obtained. Reading of the dial should fall within reasonable limits of accuracy at the 600 KC. point.

(2) VOLTAGE READINGS

In Figure 3, voltage values from tube contacts are given as shown. They are the actual operating values and should be checked with the tubes in place. The table of Figure 4 lists the operating voltages and currents, referred to cathode, and measurable by means of a socket adaptor or set analyzer.

REPLACEMENT PARTS

Stock No.	Description	List Price
RECEIVER ASSEMBLIES		
2747	Cap—Contact cap—Package of 5.....	\$0.50
4000	Capacitor—Adjustable capacitor (C7).....	.78
4887	Capacitor—0.0025 mfd. (C15).....	.18
3701	Capacitor—0.01 mfd. (C1).....	.30
4886	Capacitor—0.05 mfd. (C17).....	.20
4885	Capacitor—0.1 mfd. (C14).....	.28
4835	Capacitor—0.1 mfd. (C9).....	.28
3597	Capacitor—0.25 mfd. (C18).....	.40
3459	Capacitor—80 mfd. (C5).....	.44
3865	Capacitor—160 mfd. (C16).....	.30
3933	Capacitor—630 mfd. (C2).....	.32
3873	Capacitor—1500 mfd. (C3).....	.30
6832	Capacitor—4.0 mfd. (C10).....	.85
6787	Capacitor—Comprising one 0.005 mfd. and one 0.017 mfd. capacitors (C20, C21).....	.30
6661	Capacitor pack—Comprising two 5.0 mfd. and two 8.0 mfd. capacitors (C13, C19, C22, C23).....	2.70
6666	Coil—Antenna coil (L1, C1, R1).....	1.08
4018	Coil—Choke coil (L11).....	.90
3857	Coil—Detector choke coil (L8).....	.90
6664	Coil—Oscillator coil (L2, L3).....	.94
6660	Condenser—2-rang variable condenser (C4, C6, C24, C25).....	2.78
4890	Dial—Station selector dial.....	.58
4085	Knob—Station selector knob—Package of 5.....	.60
4884	Insulator—Radiotron Socket Insulator.....	.10
4132	Knob—Volume control, tone control or range switch knob—Package of 5.....	.55
3886	Reflector—Dial light reflector.....	.30
3632	Resistor—500 ohms—Carbon type—1 watt (R11)—Package of 5.....	1.10
3047	Resistor—1,500 ohms—Carbon type—1/4 watt (R7)—Package of 5.....	1.00
3602	Resistor—60,000 ohms—Carbon type—1/4 watt (R2)—Package of 5.....	1.00
6114	Resistor—20,000 ohms—Carbon type—1 watt (R3, R5)—Package of 5.....	1.10
3889	Resistor—25,000 ohms—Carbon type—3 watt (R4).....	\$0.25
3077	Resistor—30,000 ohms—Carbon type—1/4 watt (R9)—Package of 5.....	1.00
3118	Resistor—100,000 ohms—Carbon type—1/4 watt (R1)—Package of 5.....	1.00
3869	Resistor—170,000 ohms—Carbon type—1/4 watt (R8)—Package of 5.....	1.00
3076	Resistor—1 megohm—Carbon type—1/4 watt (R10)—Package of 5.....	1.00
3584	Ring—Oscillator coil retaining ring—Package of 5.....	.40
4087	Screw—Chassis mounting screw and washer—Package of 4.....	.22
6665	Shield—Oscillator coil shield and mounting bracket.....	.34
4104	Shield—Radiotron shield.....	.20
4784	Socket—Dial lamp socket and bracket.....	.26
4784	Socket—4-contact Radiotron socket.....	.15
4785	Socket—6-contact Radiotron socket.....	.15
4787	Socket—7-contact Radiotron socket.....	.15
6668	Switch—Range switch (S1).....	.58
6669	Switch—Tone control switch (S2).....	.50
9464	Transformer—Power transformer—105-125 volts—50-60 cycles (T1).....	3.20
9465	Transformer—Power transformer—105-125 volts—25-40 cycles.....	4.38
9466	Transformer—Power transformer—200-250 volts—50-60 cycles.....	3.28
6662	Transformer—First intermediate frequency transformer (L4, L5, C11, C12).....	2.34
6663	Transformer—Second intermediate frequency transformer (L6, L7).....	1.06
6667	Volume control (R6, S3).....	1.58
REPRODUCER ASSEMBLIES		
9548	Coil assembly—Comprising field coil, magnet and cone support (L10).....	3.08
9588	Cone—Reproducer cone (L9)—Package of 5.....	3.55
9547	Reproducer complete.....	5.45
4803	Transformer—Output transformer.....	1.45

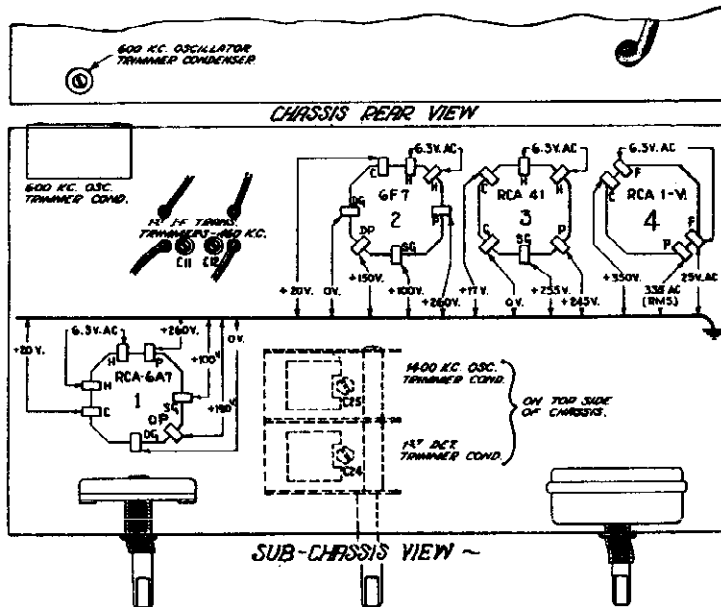


Figure 3—Line-Up Capacitor Locations and Miscellaneous Voltages at Radiotron Sockets, 120-Volt, 60-Cycle Line—Volume Control at Maximum—No Signal

DESCRIPTION OF ELECTRICAL CIRCUIT

The electrical arrangement of the receiver is pictured in the schematic of Figure 2. A corresponding wiring layout is shown in Figure 3, where the actual physical relations of parts and coding of conductors are given.

Five Radiotrons are used, forming the total tube complement around which the superheterodyne circuit is built. In sequence, there is an r-f stage, a dual first detector-oscillator stage, a single i-f stage, a second detector-audio amplifier-a.v.c. stage, and a pentode output stage. Five tuned circuits operate upon the desired signal to strengthen its magnitude and reject the undesired signals and interference.

Current for operation of the receiver is obtained from a standard 6.3 volt storage battery. This current is filtered through several chokes and by-passed to ground by a number of capacitors before being applied to the Radiotron filaments and the high voltage conversion unit. The number and arrangement of the filter elements is such as to gain a very great reduction in the amount of interference conducted into the r-f circuits by the current supply wiring.

The following details elaborate the functions and features of the various stages of the receiver:

Starting at the antenna, an r-f signal is impressed across a special transmission line, which in conjunction with a "noise filter," acts selectively to the entire standard broadcast range and drastically attenuates signals and interference outside the limits of the band (540-1600 kc.). Instead of the ground for the antenna input coil appearing at the usual point on the chassis frame, the low end of the coil is extended as part of the transmission line to the outer termination of the antenna lead-in shield, where it grounds to the frame of the car. With this arrangement, the r-f disturbances circulating in the car frame (ground) do not become mutual to the receiver input. The transmission line section of the antenna lead-in also has characteristics favorable to the operation of the "noise filter." Its length, conductor sizes, insulation, etc., are precisely designed to have a critical capacitance (represented by dotted lines on schematic), which resonates with the inductance of the input system to produce a band-pass filter having an acceptance band between 540 kc. and 1600 kc., and sharply defined cut-off below and above these two limits. By using this antenna filter system and minimizing capacity coupling between primary and secondary of antenna coupling transformer, it is generally possible to dispense with the usual spark plug and distributor suppressors, without encountering serious interference on latest types of cars.

The signal is passed from the input coil by transformer action to the r-f stage control grid. An RCA-6D6 at this point performs the function of an r-f amplifier, its super-control property being adapted as

means of preventing cross-modulation and securing a wide range of automatic volume control. The first (front) section of the tuning condenser is connected to sharply tune the secondary of the antenna coupling transformer.

A second r-f coupling transformer transmits the signal to the following receiver stage, which comprises a combination first detector and local oscillator. The secondary inductance of this transformer is tuned by the second (center) section of the variable capacitor and connects to the detector grid of the RCA-6A7 Radiotron. By proper arrangement of the several elements within this tube, a local oscillator system is established, which generates the correct frequency and causes it to mix with the incoming signal. The difference frequency beat (i-f) of these two combined signals is detected by the tube and transferred by a closely coupled transformer to the intermediate frequency amplifier tube, an RCA-6D6. Both windings of this i-f transformer are tuned by trimmers. The second i-f transformer which joins the RCA-6D6 tube to the second detector stage has only one trimmer, that being in shunt with its primary winding.

The RCA-6B7 second detector stage receives the i-f signal on its diode plates. Detection takes place as a result of the rectifying action of the diodes and develops a current through resistors R7 and R17. The d-c voltage drop in the resistance R7 plus R17 is used for automatically regulating the control grid bias of the r-f and first detector stage, and thus the amplification becomes dependent upon the signal strength. This process (a.v.c.) compensates for fading signals and reduction of signals due to change of antenna direction and shielding effects of buildings, bridges, etc. A smaller portion of the d-c voltage obtained by detection is tapped from the juncture of R7 and R17 and carried to the control grid of the i-f stage. This likewise furnishes automatic volume control.

The audio and d-c components of the detected signal are selected from the manual volume control resistor (R17) by its movable arm, and applied to the control grid of the RCA-6B7; amplification results and the signal passes on to the power output stage. The variable d-c applied to the grid prevents overload. A resistance-capacitance coupling system conveys the signal from the second detector stage to the RCA-41 output tube. In this coupling arrangement, a "speech" control is used for shorting capacitor C34, the effect in the open position being attenuation of the lower frequencies and consequent improvement of speech intelligibility. The circuit composed of R21 and C37 effects the proper fidelity balance.

The power amplifier stage delivers to the loud-speaker a high level audio signal. Correct matching relations between the speaker and output stage are maintained by the output transformer.

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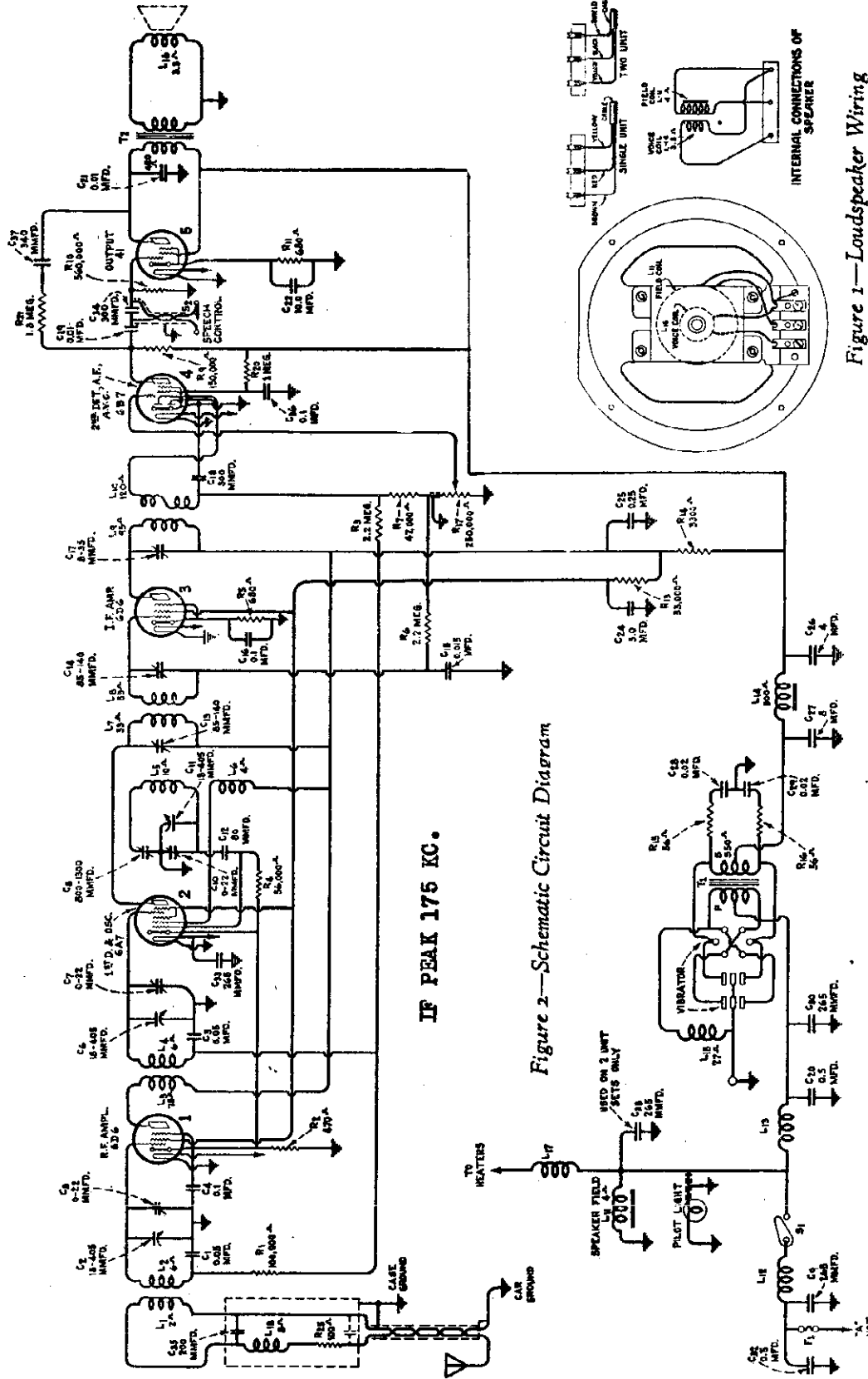


Figure 2—Schematic Circuit Diagram

Figure 1—Loudspeaker Wiring

RCA Model M-104 and G.E. Model D-51 are single-unit receivers, containing the radio chassis, power conversion adjunct and loud speaker in one housing. RCA Model M-108 and G.E. Model D-52 are double-unit receivers, utilizing a chassis and its power conversion equipment similar to those above, assembled in one case, but with the loud speaker mounted individually in a separate case.

MODEL M-104, M-108
Chassis Wiring
Notes

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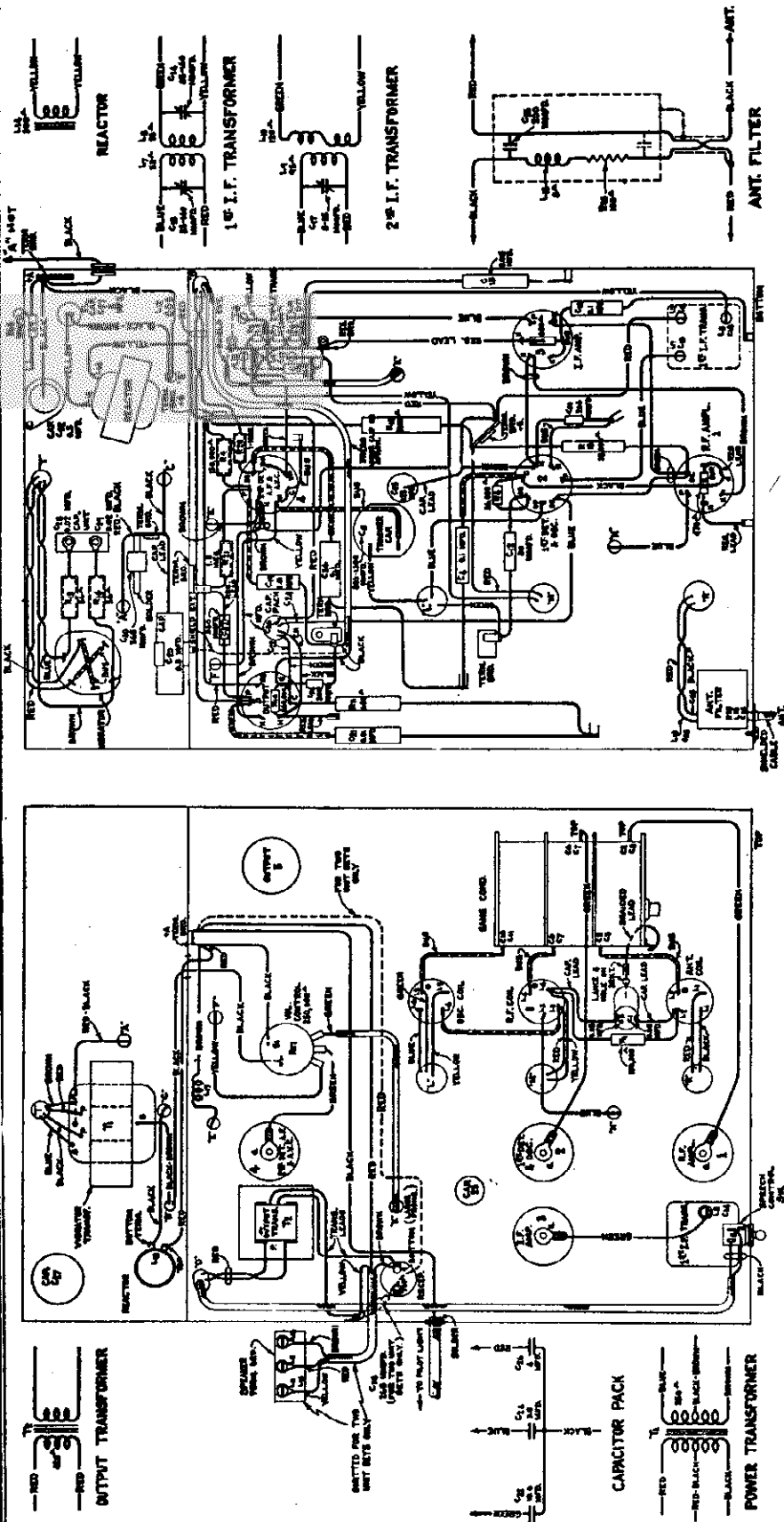


Figure 3—Chassis Wiring Diagram

High voltage for plate and bias supply is generated by inversion, transformation and mechanical rectification; these three functions occurring in the "synchronous rectifier-vibrator." This vibrator is adapted for convenient removability by having its base constructed for "plug-in" mounting. Simple means are provided for correcting the vibrator input to agree with the ground polarity of the car by having the vibrator reversible. The vibrator may be inserted in two possible positions. As normally shipped, it is plugged in to operate with "positive" car ground. On a car having "negative ground," it will be necessary to withdraw the vibrator, rotate the unit 180 degrees and re-insert into the new position.

In this receiver the Radiotrons are compactly placed and snugly fitted into tight-gripping sockets to protect against vibration and to insure positive electrical connections. They should be withdrawn by exerting a direct pull on the tube.

To replace the tubes having the form-fitting shields, attach the shield to the tube and orient the grid lead opening in proper relation to the tube base, and insert the tube into its socket so that the shield clamps slide into their correct position on the outer surface of the shield.

Heater connections of the Radiotrons are wired multiple, and supplied through a carefully filtered system. One heater terminal of each tube is grounded.

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MODEL M-104, M-108
Alignment, Voltage
Socket, Trimmer
Service Notes

(1) PREPARATORY DETAILS

(a) **Dial Calibration**—The tuning-condenser flexible shaft operates the dial pointer through a gear mechanism within the control unit. To adjust their mechanical relations so that accurate scale calibration obtains:—Rotate the station selector knob until the variable tuning capacitor is at full mesh, which will carry the dial pointer to its minimum frequency position; then remove the tuning knob, loosen the set screw in the bushing and rotate the bushing until the pointer sets exactly opposite the lag radial line at the low frequency end of the scale. (The line referred to is the second one counter-clockwise of the 550 kc. mark.)

(b) **General Procedure**—The "Output Indicator" should be attached to the voice coil circuit of the loudspeaker, and for each adjustment, the oscillator output increased until a noticeable registration or glow occurs on the indicator. The signal from the oscillator should be held as low as possible consistent with getting a good indication, with the receiver volume control set at its maximum position. This method of procedure prevents the automatic volume control from affecting the adjustments.

(2) I. F. ADJUSTMENTS

These trimmers are provided in the i.f. system, two on the first transformer and one on the second transformer. The locations of the adjustment screws are shown in Figure 4.

(a) Tune the "Full Range Oscillator" to 175 kc. and connect its output to the first detector control grid and chassis ground. Tune the station selector to a point where no signals are received.

(b) Tune each of the trimmer capacitors, C17, C14 and C13, in order. C17 should be set for maximum (peak) output. C14 and C13 should be roughly adjusted for maximum output and then carefully "trimmed" so that a flat-topped response is obtained. This may be checked by shifting the external oscillator frequency through a range two kilocycles each side of 175 kc. and noting whether or not the receiver output remains substantially constant.

(3) R. F. DETECTOR AND OSCILLATOR ADJUSTMENTS

Three high-frequency adjusting capacitors are provided for alignment at 1400 kc., and one trimmer is used for the low frequency line-up at 600 kc. The "Full Range Oscillator" should be connected to the antenna-ground input at the outer end of the lead-in shield through a 300-ohm series resistance in the antenna side.

TUNING CONDENSER DRIVE

Smooth control should be obtained over the entire tuning range of the variable condenser. If there is any irregularity noticed, the following corrective steps should be taken:

Check the action of the gear mechanism for presence of binding or backlash at every point within the tuning range. A bind may be due to improper mesh between the small pinion gear and large gears on the rotor shaft. To correct such a condition, remove the coupling on the pinion of the tuning gear, insert a screw-driver through the hole in the case and loosen the two screws holding gear plate. The mesh of the gears should be adjusted to a position which gives smooth operation.

Gear backlash is prevented by the compression spring between the large gears on the rotor shaft. To check for this backlash, rotate the pinion slowly in both directions, observing the free gear (on rotor shaft) carefully to determine if it shifts without turning the rotor.

If backlash is apparent, the large gear assembly should be removed and the free gear moved (against the spring compression) 2 to 3/32 inch in relation to the fixed gear and the assembly slid in place on the shaft and in mesh with the pinion. The set screws should then be securely tightened.

CIRCUIT VOLTAGES

The voltages indicated at the socket contacts on Figure 4 will serve to assist in analyzing defective circuit conditions. The values specified should hold within $\pm 20\%$ when the receiver is normally operative. They are actual operating values and do not take into account inaccuracies due to voltmeter resistance. A meter having a multiplier of at least 1000 ohms per volt should be used, and the amount of circuit resistance shunted by the meter resistance duly considered when the two are comparable.

SYNCHRONOUS RECTIFIER-VIBRATOR

The vibrator power unit used in this receiver is of rugged design and construction. It 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 to be in defective condition, but a renewal is irreplaceable. A convenient plug-in base is provided for effecting a quick replacement.

SPEAKER CONE ALIGNMENT

In the event the cone coil becomes mis-aligned, it will be necessary to correct its position by an adjustment provided on the speaker assembly. A small round-head brass screw installed on pole piece adjacent to the terminal strip is used to clamp the cone coil mounting. To center the cone, loosen the screw and insert a small 1/8" rod or nail into the hole next to the screw and pry the coil mounting into the position giving normal speaker operation. The screw should then be retightened.

MISCELLANEOUS SERVICE HINTS

(a) The grounding of the outer end of the antenna input lead is quite critical, in that ignition interference may be minimized by selecting the proper point of attachment to the car frame, determined by experiment for each individual installation.

(b) In some cars, ignition interference may be introduced through lack of antenna lead shielding. In such cases, a shield should be placed over the exposed section of antenna lead and carried as near as possible to the actual antenna. It should be solidly grounded.

(c) Interference in the form of a grating scratch may arise from static collecting on the front wheels of some cars due to road surface friction in dry weather. The insulation caused by the grease of the wheel hub enables this action to develop. A number of devices are available through automotive supply dealers which are designed to eliminate this type of trouble. They all serve to form a grounding tie between the hub and the axle, and thus drain the static to the frame of the car (ground).

(d) If the flexible tuning shaft is installed so that it protrudes through the insulating coupling at the receiver end and makes intermittent contact with the metal of the pinion gear, some r-f disturbance will result. The shaft should therefore be inserted into the coupling just far enough to be properly secured by the set screw.

(e) The screws holding the chassis to the case must all be in place and rigidly installed, inasmuch as they appreciably affect the ground resistance of the assembly and will consequently have a bearing on the amount of ignition noise received.

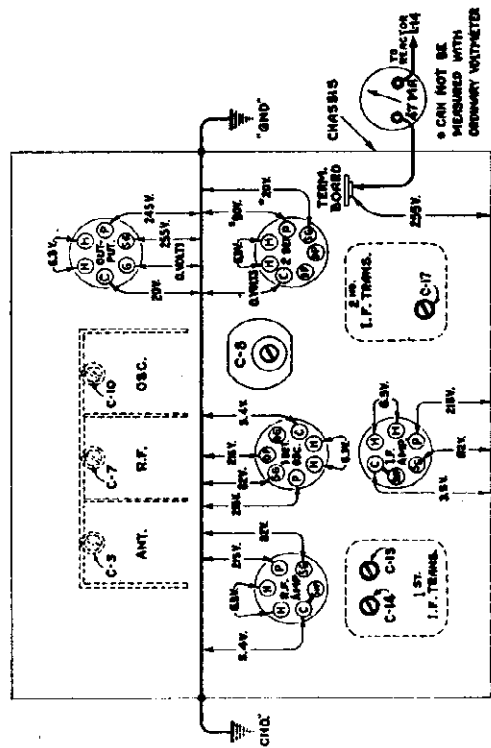


Figure 4—Trimmer Locations and Resistor Socket Voltages to Ground (Measured at 6.6 volts battery supply—Volume Control Maximum—No Signal)

MODELS M-104, M-108
Parts List

RCA MFG. CO., INC.

Stock No.	Description	Stock No.	Description	List Price	List Price
4995	Screw—Reproducer mounting screw—Pack- age of 10	4995	Screw—Reproducer mounting screw—Pack- age of 10	\$0.15	\$0.15
4977	Screw—Reproducer cable pin socket	4977	Screw—Reproducer cable pin socket	.18	.18
7868	HOUSING ASSEMBLIES Case—Receiver housing assembly—Com- plete (M104)	7868	HOUSING ASSEMBLIES Case—Receiver housing assembly—Com- plete (M104)	1.76	1.76
7869	Cover—Bareton cover of receiver housing assembly (M104 and M108)	7869	Cover—Bareton cover of receiver housing assembly (M104 and M108)	.32	.32
7870	Cover—Top cover of receiver housing as- sembly (M104 and M108)	7870	Cover—Top cover of receiver housing as- sembly (M104 and M108)	.26	.26
4999	Screw—No. 8-3/16-inch forced lock head self- locking screw—Used to assemble housing—Package of 5	4999	Screw—No. 8-3/16-inch forced lock head self- locking screw—Used to assemble housing—Package of 5	.12	.12
MISCELLANEOUS PARTS					
4187	Body—Antenna connector body—Package of 10	4187	Body—Antenna connector body—Package of 10	.40	.40
4289	Body—Fuse connector body—Package of 10	4289	Body—Fuse connector body—Package of 10	.35	.35
4288	Cap—Antenna or fuse connector cap—Pack- age of 10	4288	Cap—Antenna or fuse connector cap—Pack- age of 10	.36	.36
4283	Capacitor—0.5 mfd. armature capacitor	4283	Capacitor—0.5 mfd. armature capacitor	.60	.60
5025	Connector—Fuse connector complete	5025	Connector—Fuse connector complete	.40	.40
4973	Coupling—Tuning condenser shaft coupling	4973	Coupling—Tuning condenser shaft coupling	.16	.16
4974	Formaldehyde—Formaldehyde connector ferrule	4974	Formaldehyde—Formaldehyde connector ferrule	.36	.36
4286	Ferrule—Formaldehyde—Package of 10	4286	Ferrule—Formaldehyde—Package of 10	.38	.38
4290	Fuse—15 ampere—Package of 5	4290	Fuse—15 ampere—Package of 5	.40	.40
4976	Insulator—Fuse connector insulator—Pack- age of 10	4976	Insulator—Fuse connector insulator—Pack- age of 10	.35	.35
4975	Lead—Antenna lead assembly	4975	Lead—Antenna lead assembly	.16	.16
3903	Lead—Dial lamp lead—Control box end	3903	Lead—Dial lamp lead—Control box end	.38	.38
4184	Screw—No. 8-3/16-inch headless set- screw for coupling—Package of 20	4184	Screw—No. 8-3/16-inch headless set- screw for coupling—Package of 20	.36	.36
4992	Spring—Antenna or fuse connector spring— Package of 3	4992	Spring—Antenna or fuse connector spring— Package of 3	.30	.30
5014	Suppressor—Diaphenol suppressor	5014	Suppressor—Diaphenol suppressor	.22	.22
5014	Suppressor—Diaphenol suppressor	5014	Suppressor—Diaphenol suppressor	.38	.38

Stock No.	Description	Stock No.	Description	List Price	List Price
5042	Screw—No. 8-3/16-inch headless set-screw for station selector or volume control shaft—Package of 10	5042	Screw—No. 8-3/16-inch headless set-screw for station selector or volume control shaft—Package of 10	\$0.25	\$0.25
4983	Shaft—Station selector drive shaft	4983	Shaft—Station selector drive shaft	.16	.16
4979	Screw—Volume control drive shaft	4979	Screw—Volume control drive shaft	.16	.16
4984	Sockets—Dial lamp socket	4984	Sockets—Dial lamp socket	.26	.26
4982	Spring—Holding spring for station selector or volume control knob—Package of 10	4982	Spring—Holding spring for station selector or volume control knob—Package of 10	.15	.15
4980	Spring—Tension spring—Package of 5	4980	Spring—Tension spring—Package of 5	.30	.30
FLEXIBLE SHAFT ASSEMBLIES					
5000	Bracket—Volume or tuning condenser flexible shaft bracket—Bracket mounted on housing	5000	Bracket—Volume or tuning condenser flexible shaft bracket—Bracket mounted on housing	.10	.10
4984	Nut—Knurled locking nut for condenser driv- ing or volume control flexible shaft	4984	Nut—Knurled locking nut for condenser driv- ing or volume control flexible shaft	1.08	1.08
7854	Shaft—Tuning condenser—Flexible (setting column) drive shaft—3134 inches long	7854	Shaft—Tuning condenser—Flexible (setting column) drive shaft—3134 inches long	.58	.58
7856	Shaft—Volume control or tuning condenser—Flexible (dash mounting) drive shaft—9 3/4 inches long	7856	Shaft—Volume control or tuning condenser—Flexible (dash mounting) drive shaft—9 3/4 inches long	1.00	1.00
7855	Shaft—Volume control—Flexible (setting column) shaft—28 3/4 inches long	7855	Shaft—Volume control—Flexible (setting column) shaft—28 3/4 inches long	1.02	1.02
REPRODUCER ASSEMBLIES					
4970	Cable—3-conductor reproducer cable (M104)	4970	Cable—3-conductor reproducer cable (M104)	.86	.86
5079	Cable—2-conductor shielded—With pin tips—For M108	5079	Cable—2-conductor shielded—With pin tips—For M108	.75	.75
9602	Case—Reproducer cone (L16)	9602	Case—Reproducer cone (L16)	1.08	1.08
9576	Housing—Reproducer housing—Top cover of Receiver for M104	9576	Housing—Reproducer housing—Top cover of Receiver for M104	2.10	2.10
7873	Housing—Reproducer housing complete for M108	7873	Housing—Reproducer housing complete for M108	.35	.35
5133	Pin—Large and small contact pins for repro- ducer cable—Package of 10	5133	Pin—Large and small contact pins for repro- ducer cable—Package of 10	4.32	4.32
9577	Reproducer—Complete (L14, L16)	9577	Reproducer—Complete (L14, L16)		

Stock No.	Description	Stock No.	Description	List Price	List Price
5132	Resistor—47,000 ohms—Carbon type—1/10 watt (R7)—Package of 5	5132	Resistor—47,000 ohms—Carbon type—1/10 watt (R7)—Package of 5	\$0.75	\$0.75
5029	Resistor—56,000 ohms—Carbon type—1/2 watt (R4)—Package of 5	5029	Resistor—56,000 ohms—Carbon type—1/2 watt (R4)—Package of 5	1.00	1.00
3118	Resistor—100,000 ohms—Carbon type—1/2 watt (R1)—Package of 5	3118	Resistor—100,000 ohms—Carbon type—1/2 watt (R1)—Package of 5	1.00	1.00
5027	Resistor—150,000 ohms—Carbon type—1/2 watt (R9)—Package of 5	5027	Resistor—150,000 ohms—Carbon type—1/2 watt (R9)—Package of 5	1.00	1.00
5035	Resistor—560,000 ohms—Carbon type—1/2 watt (R10)—Package of 5	5035	Resistor—560,000 ohms—Carbon type—1/2 watt (R10)—Package of 5	1.00	1.00
3033	Resistor—1 megohm—Carbon type—1/2 watt (R20)—Package of 5	3033	Resistor—1 megohm—Carbon type—1/2 watt (R20)—Package of 5	1.00	1.00
5028	Resistor—1.8 megohm—Carbon type—1/2 watt (R21)—Package of 5	5028	Resistor—1.8 megohm—Carbon type—1/2 watt (R21)—Package of 5	.75	.75
5131	Resistor—2,200,000 ohms—Carbon type—1/10 watt (R3, R6)—Package of 5	5131	Resistor—2,200,000 ohms—Carbon type—1/10 watt (R3, R6)—Package of 5	.10	.10
5129	Ring—Retaining ring for antenna, r.f. or oscillator coil—Package of 5	5129	Ring—Retaining ring for antenna, r.f. or oscillator coil—Package of 5	.40	.40
3584	Shield—Antenna, r.f. or oscillator coil shield—former shield	3584	Shield—Antenna, r.f. or oscillator coil shield— former shield	.30	.30
4953	Shield—First intermediate frequency trans- former shield	4953	Shield—First intermediate frequency trans- former shield	.24	.24
4956	Shield—Second intermediate frequency trans- former shield	4956	Shield—Second intermediate frequency trans- former shield	.30	.30
5037	Shield—Radiation shield	5037	Shield—Radiation shield	.18	.18
4946	Socket—6-contact Radiotron socket	4946	Socket—6-contact Radiotron socket	.18	.18
4959	Socket—7-contact Radiotron socket	4959	Socket—7-contact Radiotron socket	.06	.06
5001	Switch—Speech control switch (S2)	5001	Switch—Speech control switch (S2)	1.26	1.26
4951	Transformer—First intermediate frequency transformer (L7, L8, L3, C14)	4951	Transformer—First intermediate frequency transformer (L7, L8, L3, C14)	1.76	1.76
4952	Transformer—Second intermediate frequency transformer (L9, L10, C17)	4952	Transformer—Second intermediate frequency transformer (L9, L10, C17)	1.48	1.48
4957	Transformer—Output transformer (T2)	4957	Transformer—Output transformer (T2)	2.02	2.02
7857	Vibrator—Vibrator transformer (T1)	7857	Vibrator—Vibrator transformer (T1)	5.64	5.64
5018	Volume control (R17, S1)	5018	Volume control (R17, S1)	1.00	1.00

CONTROL BOX ASSEMBLIES

4987	Bezel—Station selector dial bezel	4987	Bezel—Station selector dial bezel	.42	.42
G7866	Box—Control box—Complete	G7866	Box—Control box—Complete	3.86	3.86
7864	Bracket—Mounting bracket and rear section of control box housing	7864	Bracket—Mounting bracket and rear section of control box housing	.30	.30
4988	Crystal—Station selector dial crystal	4988	Crystal—Station selector dial crystal	.38	.38
G5083	Dial—Station selector dial	G5083	Dial—Station selector dial	.15	.15
4978	Gear—18-tooth intermediate drive gear	4978	Gear—18-tooth intermediate drive gear	.42	.42
7862	Housing—Front section of control box hous- ing	7862	Housing—Front section of control box hous- ing	.28	.28
7863	Housing—Center section of control box housing	7863	Housing—Center section of control box housing	.32	.32
4990	Indicator—Station selector (pointer) indicator	4990	Indicator—Station selector (pointer) indicator	.10	.10
4985	Knob—Station selector or volume control knob—Package of 5	4985	Knob—Station selector or volume control knob—Package of 5	.62	.62
4991	Lamp—Dial lamp—Package of 5	4991	Lamp—Dial lamp—Package of 5	.74	.74
7866	Plate—Bearing plate assembly—Comprising station selector, volume control shaft, station selector shaft, pinion and spring	7866	Plate—Bearing plate assembly—Comprising station selector, volume control shaft, station selector shaft, pinion and spring	1.22	1.22
4986	Screw—Oval filarhead head machine screw—Fastens bracket and center section of con- trol box housing	4986	Screw—Oval filarhead head machine screw—Fastens bracket and center section of con- trol box housing	.25	.25

RCA MFG. CO., INC.

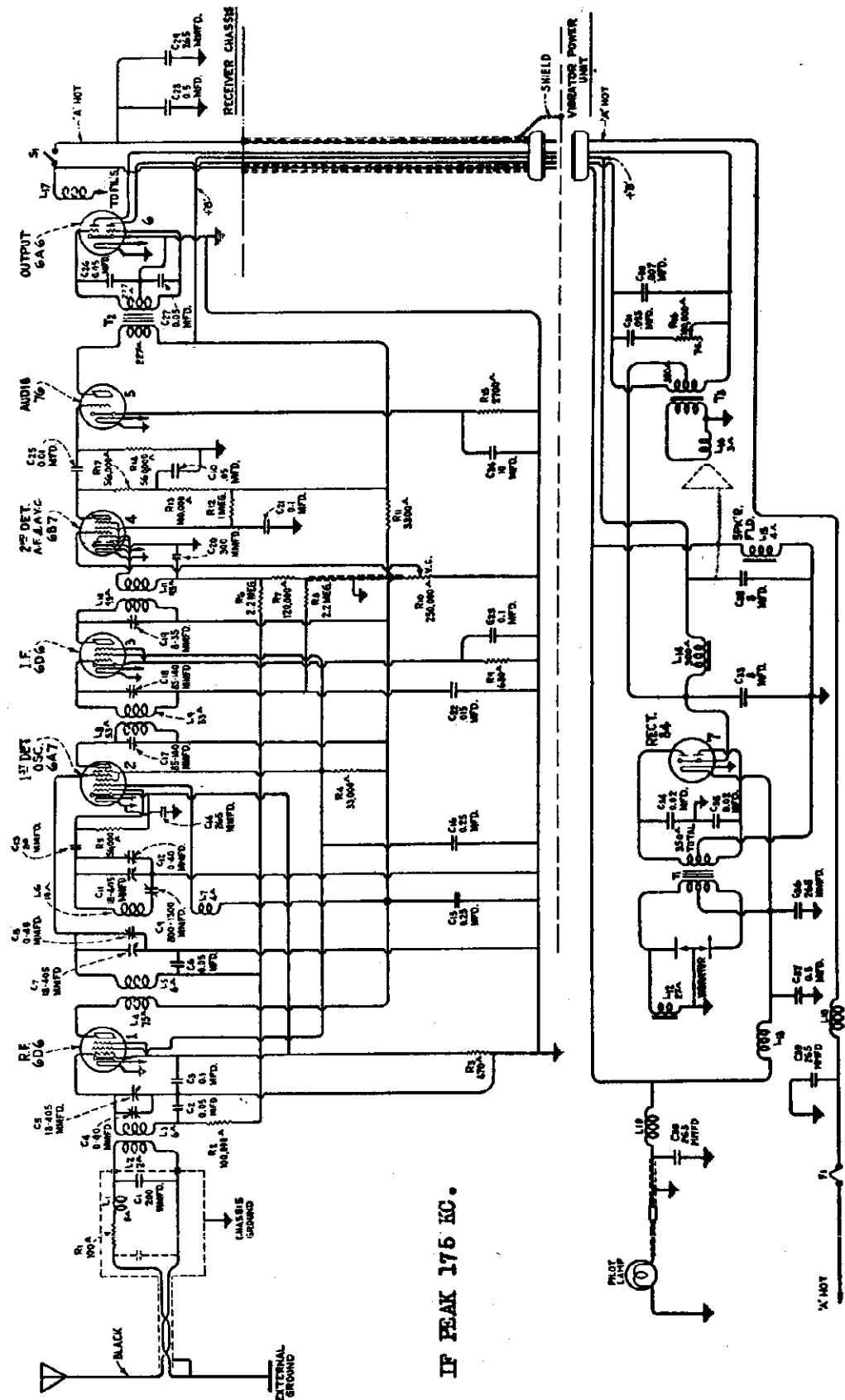


Figure 3—Schematic Circuit Diagram

MODEL M-109
Chassis Wiring

RCA MFG. CO., INC.

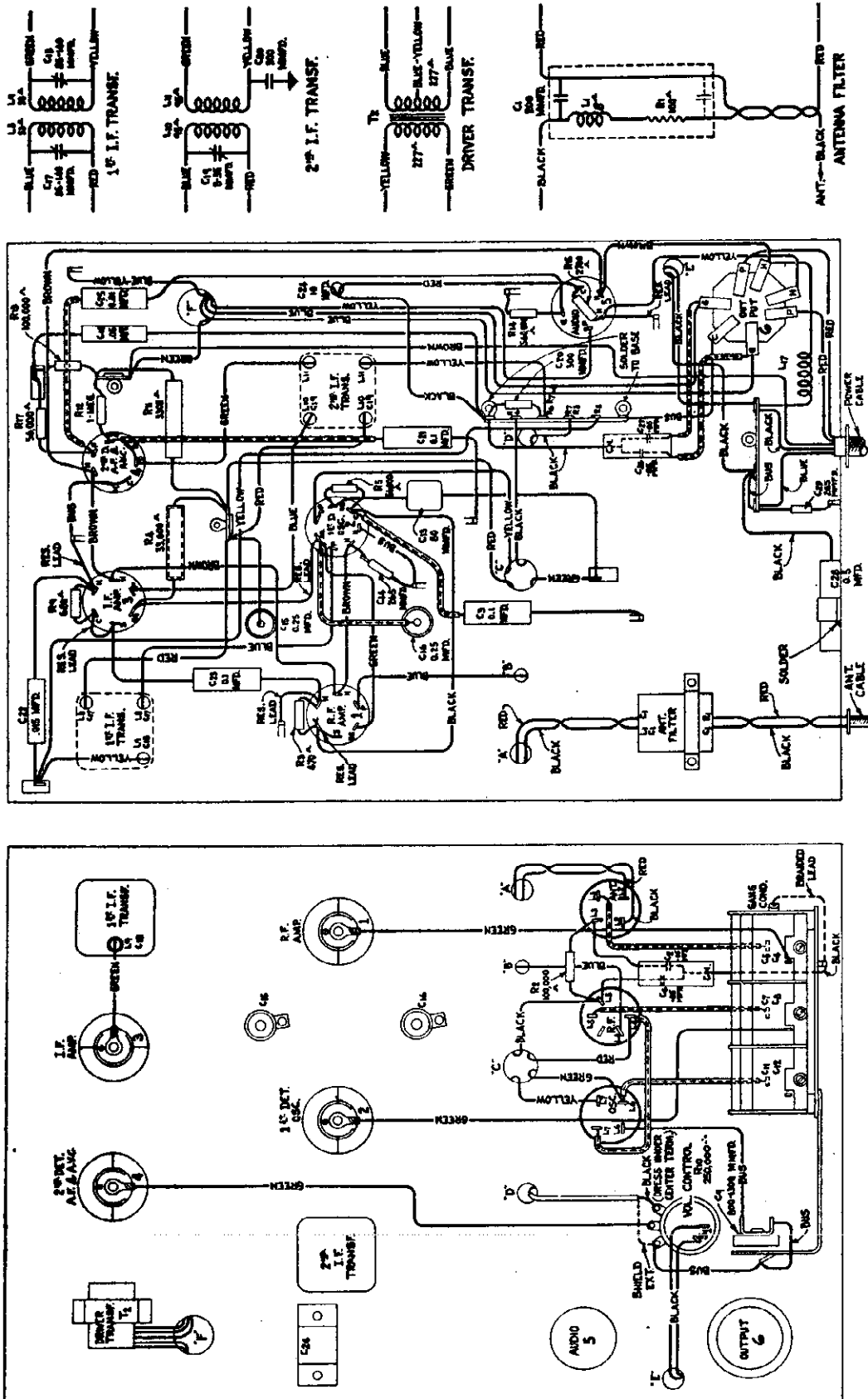


Figure 4—Chassis Wiring Diagram

RCA MFG. CO., INC.

MODEL M-109
Alignment, Notes

Preparatory Details

(a) **Dial Calibration**—The tuning condenser flexible shaft engages a gear system within the control unit which actuates the dial pointer. To adjust the mechanical relations of the variable condenser and the dial pointer so that accurate calibration is obtained:—rotate the station selector knob until the variable capacitor is at full mesh, which will carry the dial pointer to its minimum frequency position; then remove the tuning knob, loosen the set screw in the bushing and rotate the bushing until the pointer sets exactly opposite the last radial line at the low-frequency end of the scale. (The line referred to is the second one counter-clockwise of the 550 kc. marking.)

(b) **General Procedure**—The "Output Indicator" should be attached to the voice coil or speaker input circuit; and for each adjustment, the oscillator output increased until a noticeable registration or glow occurs on the indicator. The signal from the oscillator should be held as low as possible consistent with getting a good indication, with the receiver volume control at its maximum position. This method of procedure prevents the automatic volume control from affecting the adjustments.

I-F Adjustments

Three trimmers are provided in the i-f system. Two are located on the first i-f transformer, and one on the second i-f transformer. Their physical positions are shown in Figure 5. To correct their alignment proceed as follows:

- (a) Connect the output of the "Full Range Oscillator" to the first detector grid and ground, and adjust its frequency to 175 kc. Tune the station selector to a point where no signals are received.
- (b) Tune each of the trimmer capacitors C19, C18 and C17 in order. C19 should be set for maximum (peak) output. C18 and C17 should be roughly adjusted for maximum output and then carefully "trimmed" so that a flat-topped response is obtained. This may be checked by shifting the external oscillator frequency through a range two kilocycles each side of the 175 kc. and noting whether or not the receiver output remains substantially constant.

R. F., Detector and Oscillator Adjustments

Three adjustments are used at the high-frequency end of the tuning range. They are located on the gang condenser as shown by the diagram of Figure 5. One trimmer (C9) is used in the oscillator circuit for alignment at 600 kc., it being located as shown in Figure 5.

The external oscillator should be connected to the antenna-ground input at the outer end of the lead-in shield through a 300-ohm resistor in the antenna side. Tuning should be done as follows:

- (a) Adjust the frequency of the external oscillator to 1400 kc. and turn the station selector until the dial pointer is at the 1400 kc. marking.
- (b) Tune the oscillator high-frequency trimmer, C12, the detector trimmer C8 and the r-f trimmer C4 for maximum receiver output.
- (c) Set the external oscillator to a frequency of 600 kc. and rotate the station selector until this signal is accurately tuned. Then adjust the oscillator trimmer C9, simultaneously rocking the tuning condenser slowly through the signal

until maximum obtainable output results from the two combined operations. This adjustment should be made irrespective of dial calibration.

- (d) Recheck the adjustment of the 1400 kc. oscillator trimmer (C12) as in (b) to correct any reflective errors caused by the procedure of (c).

Tuning Condenser Drive

The coupling of the flexible drive shaft to the variable tuning condenser is through a worm-gear arrangement. Figure 6 shows the two gears and their positions. Smooth operation should be obtained over the entire tuning range. The presence of binding or backlash may cause irregularity in the tuning. To correct these conditions, it will be necessary to remove the chassis from the case and the following procedure applied:—Loosen the two screws behind the condenser drive gear which clamp the worm-gear support plate, and shift the plate upward or downward to change the degree of gear mesh and tension of the spring as required for smooth operation. The screws should then be carefully re-tightened.

Pilot Lamp

A novel type of mounting is provided for the pilot lamp. It consists of a miniature socket attached to a heavy screw which threads into the case of the control unit. The head of this screw is accessible from the underside of the control unit and may be removed with a large screwdriver whenever it becomes necessary to replace the pilot lamp. The power switch should be turned to "off" in order to prevent blowing the fuse if the lamp socket should come in contact with the grounded control case.

Power Unit Interrupter

The mechanical interrupter used in combination with a tube rectifier in the power unit is constructed so as to be conveniently exchanged. Its base is of the "plug-in" type. The adjustments of this device have been correctly set during manufacture by means of special equipment. They should therefore be left undisturbed. In cases of faulty operation, a renewal should be installed.

Speaker Cone Alignment

In the event the cone coil becomes mis-aligned, it will be necessary to correct its centering by an adjustment provided on the speaker assembly. The coil is supported by an external spider. Two round-head brass screws secure its mounting. To center the cone, loosen these two screws and insert a small rod or nail into the hole adjacent to one of these screws and pry the cone mounting into the position which gives normal operation.

Miscellaneous Service Hints

1. The grounding of the outer end of the antenna lead shield is quite critical in that ignition interference may be minimized by selecting the proper point of attachment to the car frame, determined by experiment for each individual installation.

2. In some cars, ignition interference may be introduced through lack of sufficient shielding on the antenna lead-in. In such cases, a shield should be placed over the exposed section of lead and carried as near to the antenna as possible. It should be solidly grounded.

MODEL M-109
Socket, Trimmers
Circuit Notes
Power Unit Wiring

RCA MFG. CO., INC.

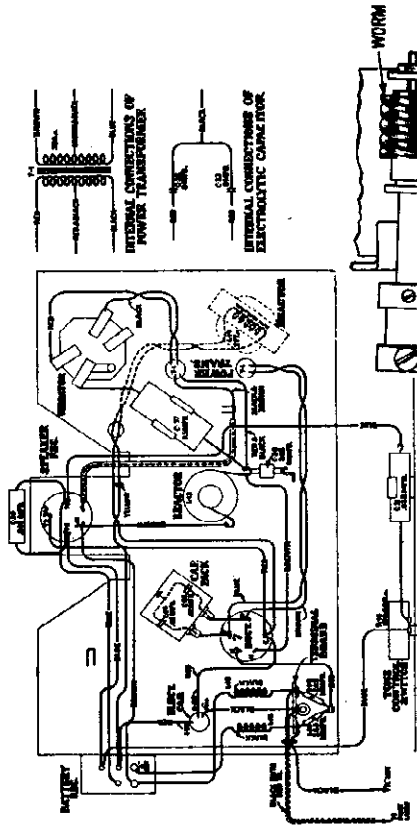


Figure 2—Power Unit Wiring

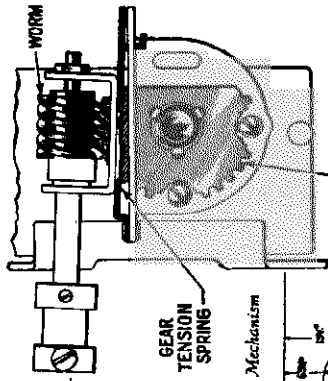


Figure 6—Condenser Drive Mechanism

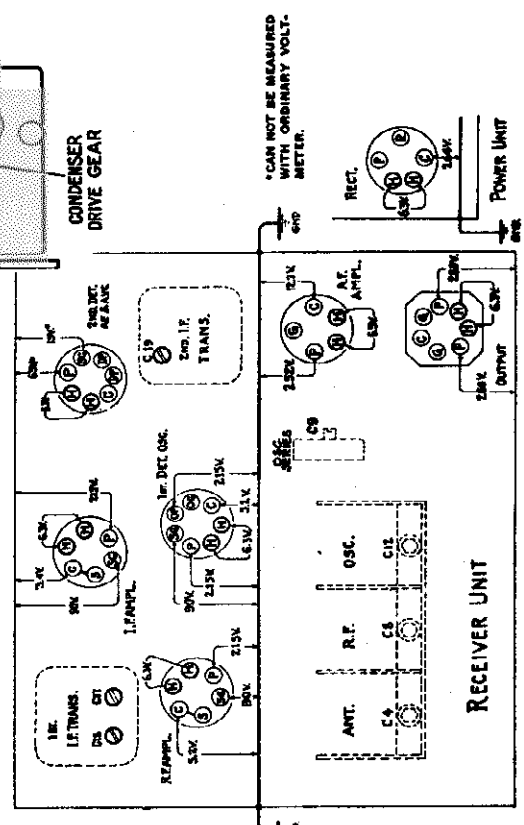


Figure 5—Trimmer Locations and Radiotron Socket Voltages to Ground (Measured at 6.6 volts battery—Volume Control Maximum—No Signal)

DESCRIPTION OF ELECTRICAL CIRCUIT

of these two combined signals is detected by the tube and transmitted by a closely coupled transformer to the intermediate-frequency amplifier tube, an RCA-6D6. Both windings of this i-f transformer are tuned by trimmers. The second i-f transformer which joins the RCA-6D6 to the second detector stage has only one trimmer, that being in shunt with its primary winding. The RCA-6B7 second detector stage receives the i-f signal on its diode plate. Detection takes place as a result of the rectifying action of the diodes and develops a current through the resistors R7 and R10. The d-c voltage drop across the resistance R7 plus R10 is used for automatically regulating the control grid bias of the i-f and first detector stages. The amplification thus becomes dependent upon the signal strength. This process (a.v.c.) compensates for fading signals and tendency toward reduction of signals due to change of antenna direction and shielding effect of buildings, etc. A smaller portion of the d-c voltage obtained by detection is tapped from the junction of R7 and R10 and is carried to the control grid of the i-f stage. This likewise furnishes automatic volume control, but in a smaller degree. The audio and d-c components of the detected signal are selected from the resistor R10 by its movable arm and applied to the control grid of the RCA-6B7. The d-c obtained from the signal and applied to the grid prevents overload as the volume control is advanced. Amplification results and the signal passes on to the audio-driver stage. The RCA-76 Radiotron used as an a-f amplifier is resistance-capacitance coupled to the detector stage output. Its plate is matched to the power output stage by a transformer.

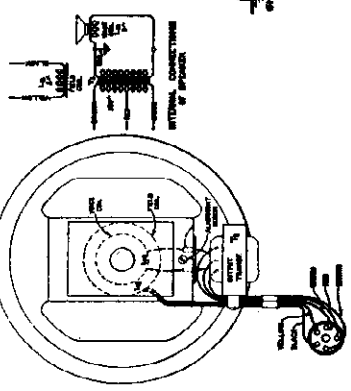


Figure 1—Loudspeaker Wiring

The output stage utilizes an RCA-6A6 tube which performs as a push-pull type. It delivers a high level, high quality signal to the remote loudspeaker unit. The power supply system consists of a mechanical vibrator for interrupting the d-c from the battery in order to transform the current to high voltage, which in turn is rectified by a full-wave tube, an RCA-84. The vibrator used is adapted for convenient removability by having its base constructed for "plug-in" mounting.

The electrical arrangement of the receiver is shown in the schematic of Figure 3. A corresponding wiring layout is shown in Figure 4, where the actual physical relations and coding of conductors are given. The tube line-up in the superheterodyne circuit consists of seven Radiotrons. In sequence, there is an r-f stage, a dual first detector and oscillator stage, a single i-f stage, a combined second detector-audio amplifier-a.v.c. stage, an audio driver stage, a push-pull power output stage, and a full-wave rectifier. There are five circuits which are tuned to the signal desired, to strengthen its magnitude and reject undesired signals and interferences. The following describes the functions of the various stages of the receiver: Beginning at the antenna circuit, there is a special transmission line and "noise filter" circuit, which, in conjunction with the tuned input system, acts selectively to the entire broadcast range and drastically attenuates signals and interferences outside the limits of the band (540-1600 kc.). These properties of the filter circuit and minimizing of primary to secondary capacity coupling in first r-f transformer cause a very great reduction of the ignition noise present when the car is in operation. The ground of the input coil does not appear at the usual point on the chassis frame, but instead is extended as part of the antenna transmission line lead-in to the outer termination of the shield, where it grounds to the frame of the car. This arrangement prevents r-f disturbances which are circulating in the car frame (ground) from becoming mutual to the receiver input. The characteristics of the transmission line section of the antenna lead-in are such as to favor the operation of the noise filter. Its distributed capacitance due to length, conductor sizes, insulation, etc. is of such value as to operate with the inductance and capacitance elements of the input system to obtain a "band-pass" filtering effect. The filter has an acceptance band between 540 kc. and 1600 kc., and sharply defined cut-off below and above these two limits. It is generally possible, because of this input arrangement, to dispense with the usual spark-plug and distributor suppressors without encountering substantial ignition interference on latest types of cars. After passing through the input filter the signal is applied by transformer action to the control grid of the r-f stage. An RCA-6D6 at this point performs the function of an r-f amplifier, its super-control property being adapted as means of preventing cross-modulation and securing a wide range of volume control. The first (front) section of the tuning condenser is connected to sharply tune the secondary of the antenna coupling transformer. A second i-f coupling transformer transmits the signal to the following receiver stage, which comprises a combination first detector and local oscillator. The secondary inductance of this transformer is tuned by the second (center) section of the variable capacitor and connects to the detector grid of the RCA-6A7 Radiotron. The local oscillator circuit is established by manual arrangement of the several elements within this tube. Here the incoming signal is mixed with the local oscillator frequency. The difference frequency beat (i. e.)

MODELS 117,214
Circuit Notes

RCA MFG. CO., INC.

Loud Speaker Data
Voltage, Trimmers
Socket

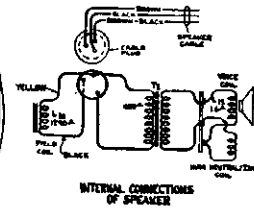
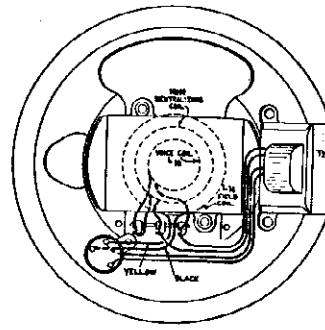
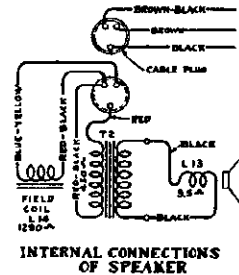
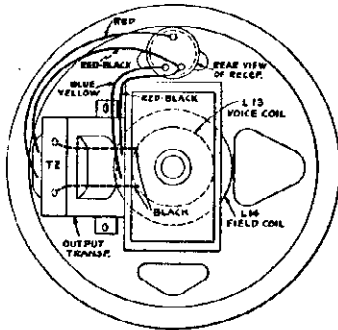


Figure 3—Loudspeaker Wiring (Table Model)

Figure 4—Loudspeaker Wiring (Console Model)

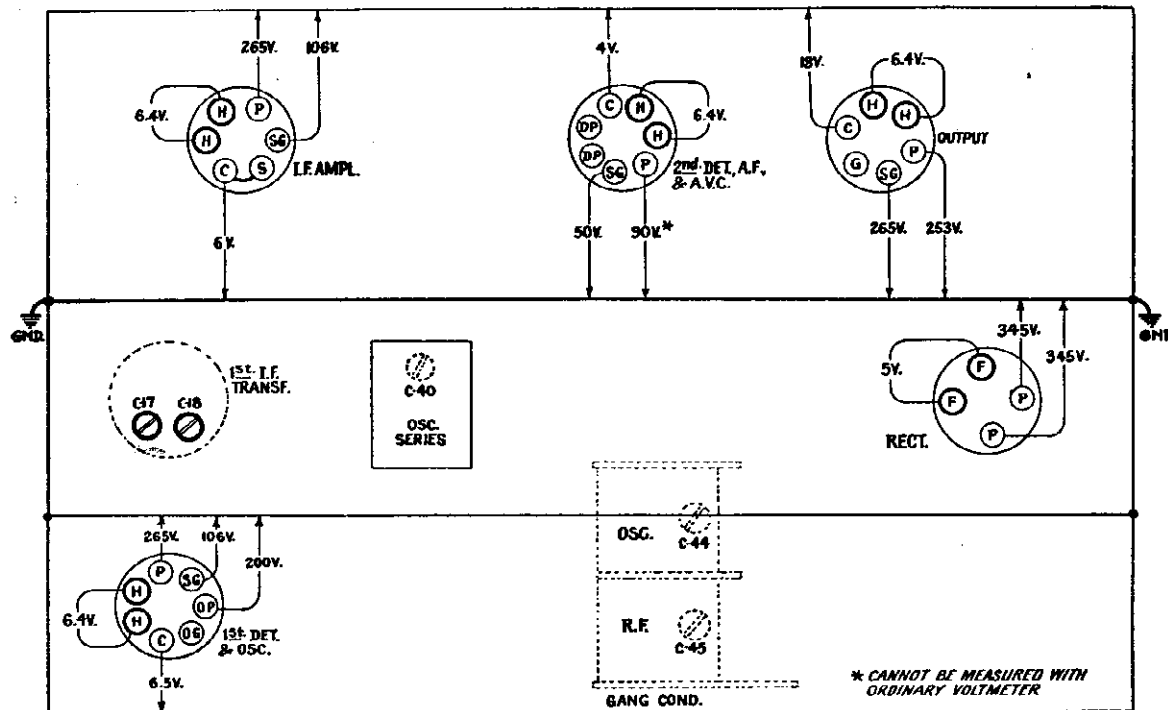


Figure 5—Trimmer Locations and Radiotron Socket Voltages

(Measured at 115 volts line supply—Maximum Volume Control—No Signal)

Five Radiotrons are associated in combination with a Superheterodyne circuit. Two of the Radiotrons are applied so as to obtain plural functions, thereby gaining more than the adequate results normally expected of a five-tube receiver. In the first stage of the circuit an RCA-6A7 pentagrid converter tube is employed as detector and local oscillator, the related external high-frequency circuits consisting of a tuned antenna transformer with a short-wave tap, and a three-winding oscillator coil assembly with changeover switches ganged to the antenna transformer s-w switch. Within the first detector tube, mixing of the signal and oscillator voltages is accomplished through electron coupling, the i-f appearing in the plate circuit.

The i-f system operates at 460 kc. as the basic frequency. The presence of the natural period transformer

at the i-f output should be especially noted. Its use minimizes the number of line-up adjustments.

The combined second detector-audio amplifier-a.v.c. stage utilizes an RCA-6B7, a duplex-diode pentode Radiotron. One diode connects directly to ground, the other is used for detection. Part of the detected signal is filtered to remove the audible fluctuations and is applied to the first and second stages as a means of providing automatic volume control. The audio component of the detected signal is amplified by the RCA-6B7 and conveyed to a resistance-capacitance coupling network.

A power amplifier pentode, RCA-41, is used in the output stage and is coupled by a transformer to the low impedance voice coil of the speaker.

Full-wave rectification is employed in the power-supply stage. The speaker field winding serves in the filter circuit as a reactor.

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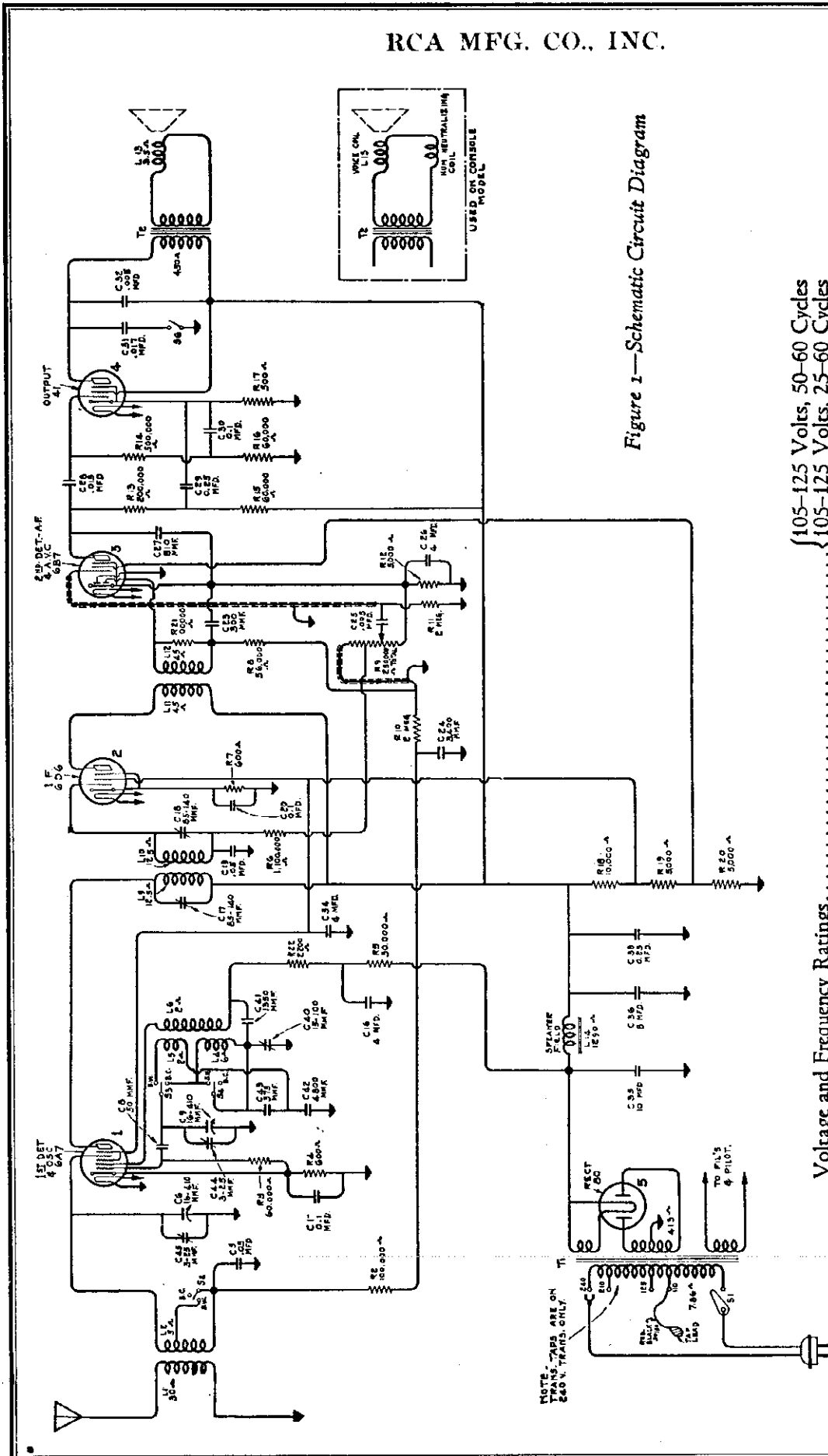
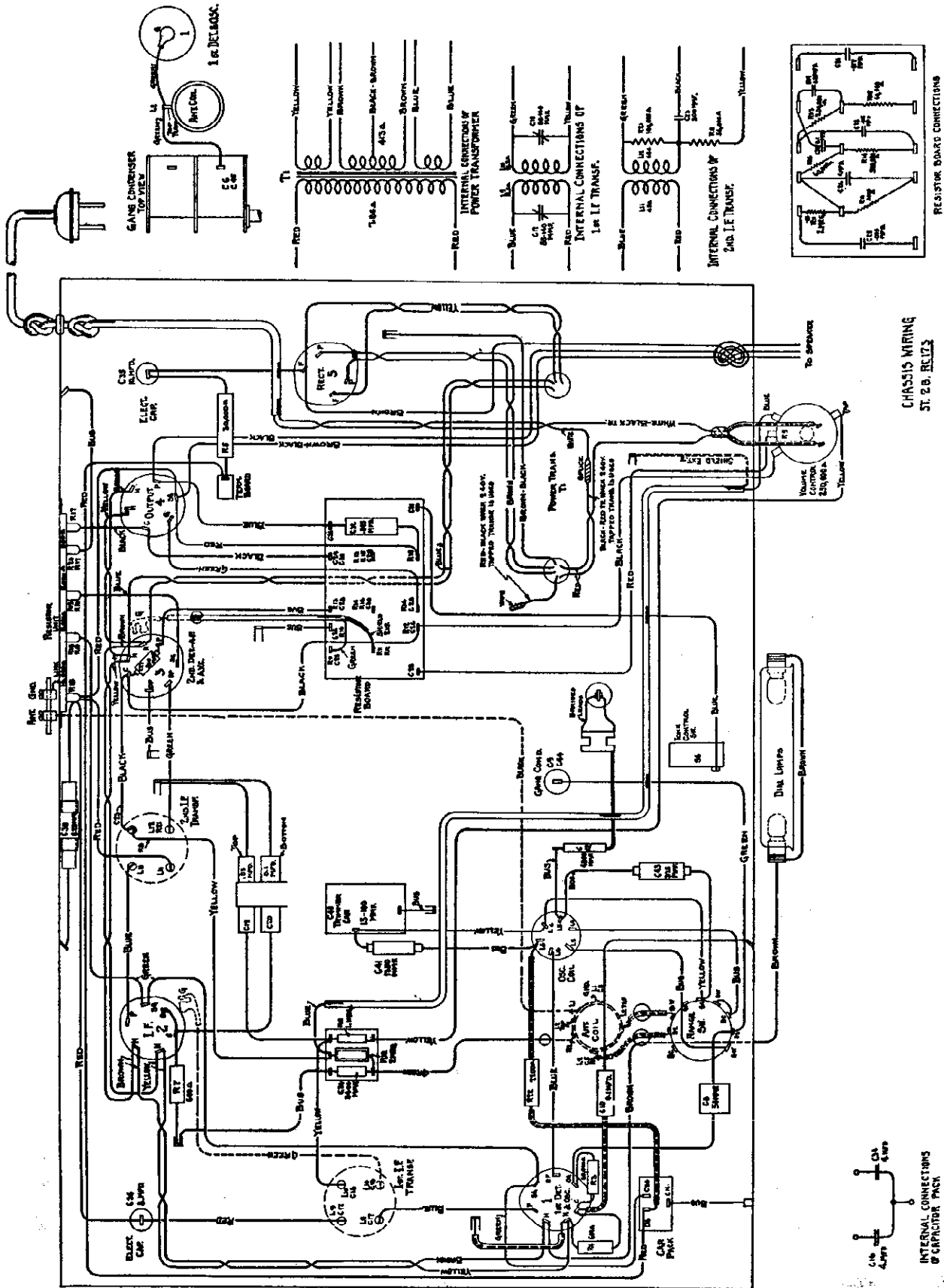


Figure 1—Schematic Circuit Diagram

Voltage and Frequency Ratings.....	105-125 Volts, 50-60 Cycles	80 Watts
Power Consumption.....	105-125 Volts, 25-60 Cycles	
Tuning Frequency Ranges.....	105-125/195-250 Volts, 50-60 Cycles	
Alignment Frequencies.....	540 to 1720 KC. and 2250 to 6850 KC.	
Undistorted Output.....	460 KC. (I.F.), 1720 KC. (R.F. and Oscillator)	
Maximum Output.....	1.75 Watts	
Loudspeaker.....	3.5 Watts	Electrodynamic

MODELS 117,214
Chassis Wiring

RCA MFG. CO., INC.



RCA MFG. CO., INC.

REPLACEMENT PARTS

Stock No.	Description	List Price	Stock No.	Description	List Price
4379	Board—Terminal board—Engraved 'ANT-GND'	\$0.20	7487	Shield—I.F. Radiotron shield	\$0.25
5043	Bracket—First I.F. transformer mounting bracket	.10	3858	Socket—Dial lamp socket assembly	.75
4880	Bracket—Tone control switch mounting bracket	.12	4784	Socket—6-contact Radiotron socket	.15
4744	Bracket—Volume control mounting bracket	.10	4785	Socket—6-contact Radiotron socket	.15
3861	Capacitor—Adjustable capacitor (C40)	.78	4787	Socket—7-contact Radiotron socket	.15
4442	Capacitor—50 mfd. (C8)	.22	4904	Switch—Range switch (S2, S3, S4)	.75
4913	Capacitor—375 mfd. (C43)	.20	4900	Switch—Tone control switch (S6)	.30
5044	Capacitor—810 mfd. (C27)	.24	4901	Transformer—First intermediate frequency transformer (L9, L10, C17, C18)	2.25
4914	Capacitor—1350 mfd. (C51)	.24	4898	Transformer—Second intermediate frequency transformer (L11, L12, R8, R21, C23)	1.50
4881	Capacitor—3400 mfd. (C24)	.20	4897	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	5.55
4912	Capacitor—4800 mfd. (C42)	.38	4899	Transformer—Power transformer—105-125 volts—50-60 cycles (T2)	3.98
4793	Capacitor—0.005 mfd. (C25)	.20		200-240 volts—40-60 cycles	4.05
4868	Capacitor—0.015 mfd. (C32)	.20		CONDENSER DRIVE ASSEMBLIES	
4926	Capacitor—0.015 mfd. (C31)	.25	5048	Dial—Station selector dial	.38
4826	Capacitor—0.05 mfd. (C5, C19)	.50	5046	Drive—Tuning condenser drive assembly—Complete	1.04
4791	Capacitor—0.1 mfd. (C10, C20)	.22	4475	Indicator—Station selector (indicator) pointer	.19
3597	Capacitor—0.25 mfd. (C29, C38)	.40	4340	Lamp—Station selector dial lamp—Package of 5	.60
3796	Capacitor—4.0 mfd. (C26)	.60	3943	Screen—Translucent screen for dial light—Package of 2	.18
4418	Capacitor—8.0 mfd. (C36)	1.05	5047	Shaft—Condenser drive shaft	.22
7190	Capacitor—10.0 mfd. (C35)	1.05	3858	Socket—Station selector dial lamp socket	.26
7589	Capacitor part—Comprising two 4.0 mfd. capacitors (C16, C34)	1.64		REPRODUCER ASSEMBLIES (CONSOLE MODEL)	
4358	Clamp—Capacitor mounting clamp for Colpitts circuit No. 790	.15	9579	Coil—Field coil (L14)	2.10
4903	Coil—Antenna coil (L1, L2, R2, C5)	.58	9533	Cone—Reproducer cone—Moussed and centered on metal housing (L13)	3.50
4902	Coil—Oscillator coil (L4, L5, L6)	1.22	5118	Connector—3-contact, male connector plug for reproducer cable	.25
4886	Condenser—2-gang variable tuning condenser (C6, C9, C44, C45)	3.48	5119	Connector—3-contact, female connector plug for reproducer cable	.25
4790	Volume control (R9, S1)	1.40	9578	Reproducer—Complete	6.58
5045	Lead—Single conductor—Shielded lead from volume control to resistor (R10)	.20	4818	Transformer—Output transformer (T2)	2.15
3118	Resistor—60 ohms—Carbon type— $\frac{1}{4}$ watt (R4, R7)—Package of 5	1.00		REPRODUCER ASSEMBLIES (TABLE MODEL)	
5185	Resistor—200 ohms—Carbon type— $\frac{1}{4}$ watt (R22)—Package of 5	1.00	4915	Cable—3-conductor reproducer cable	.50
4456	Resistor—500 ohms—Carbon type— $\frac{1}{4}$ watt (R12)—Package of 10	2.00	9587	Coil—Field coil, magnet and cone support (L14)	2.18
2240	Resistor—30,000 ohms—Carbon type— $\frac{1}{4}$ watt (R5)	.22	5188	Connector—3-contact, male connector plug for reproducer cable	3.55
3602	Resistor—60,000 ohms—Carbon type— $\frac{1}{4}$ watt (R3, R15, R16)—Package of 5	1.00	5119	Connector—3-contact, female connector plug for reproducer cable	.25
3118	Resistor—100,000 ohms—Carbon type— $\frac{1}{4}$ watt (R2)—Package of 5	1.00	9586	Reproducer—Complete	5.95
3116	Resistor—100,000 ohms—Carbon type— $\frac{1}{4}$ watt (R10)—Package of 5	1.00	4893	Transformer—Output transformer (T2)	1.48
6186	Resistor—1,000,000 ohms—Carbon type— $\frac{1}{4}$ watt (R14)—Package of 2	1.00		MISCELLANEOUS ASSEMBLIES	
4783	Resistor—1,100,000 ohms—Carbon type— $\frac{1}{4}$ watt (R6)—Package of 5	1.00	6755	Bezel—Metal bezel for station selector dial	.50
6242	Resistor—2 megohms—Carbon type— $\frac{1}{4}$ watt (R10, R11)—Package of 5	1.00	4740	Glass—Station selector dial glass	.20
4721	Resistor—Tapped resistor—one 500 ohms, two 5,000 ohms and one 40,000 ohms sections (R17, R18, R19, R20)	1.00	6708	Ring—Retaining ring for dial glass—Package of 5	.80
5584	Ring—Oscillator coil retaining ring—Package of 5	.88	4917	Screw—Chassis mounting screw and washer (for table model)—Package of 4	.15
5049	Slide of 3 I.F. transformer clamp set—No. 6-37— $\frac{1}{4}$ inch—Package of 5	.40	5178	Screw—Chassis mounting screw assembly (for console model)—Package of 4	.15
5186	Shield—Second I.F. transformer shield	.45			
3623	Shield—Oscillator coil shield	.28			
3782	Shield—Second detector Radiotron shield	.36			
3942	Shield—First Detector and output Radiotron shield	.18			

of the dial pointer. It should set exactly on the radial line, adjacent to the dial reading of 540 when the tuning capacitor plates are at full mesh. After connecting the dial pointer, place the receiver in operation and set the selector at 1720 kc., advance the volume control to maximum and turn the range switch to its broadcast position.

(b) Adjust the frequency of the external oscillator to 1720 kc. and regulate its output until a perceptible indication appears on the output trimmer. This indication should be held at a minimum during the adjustments. The trimmers C44 and C45 should then be tuned to the point giving peak receiver output.

(c) Return the test oscillator, setting its frequency to 600 kc. Turn the receiver selector control to the point where the incoming oscillator signal is received best. This point will not always be exactly at 600 on the dial. Then adjust the low-frequency trimmer C40, simultaneously rocking the tuning capacitor slowly through the signal until maximum receiver output results from these combined operations. This adjustment must be made irrespective of dial calibration. It is advisable to repeat the 1720 kc. adjustment of the oscillator trimmer C44 in order to correct for any change caused by the tuning of C40.

Radiotron Socket Voltages

The various normal operating voltages are given on Figure 5. As specified, they are referred to the chassis ground. Accuracy of measurements will be a function of the internal resistance of the voltmeter used. It is advisable to employ a meter having at least 1000 ohms per volt, and for each reading use the highest range, which will give an acceptably accurate reading. General deviations from the values given, due to line voltage difference, should not be taken as indicating a defective condition. The erratic departure from normal of a single value or group of values should form the basis of circuit diagnosis.

Code Interference

In certain localities near to high-powered radiotelegraph stations operating at frequencies in the vicinity of 460 kc., slight code interference may be present. This adverse condition usually occurs over the entire tuning range, the strength of the interference not being affected by changing the station selector. A shielded wave trap, such as Part No. 4539, is adaptable for suppressing interference of this type. It should be connected in series with the antenna lead at the receiver, with its green lead to the antenna and its yellow lead to the antenna terminal. The trap must be accurately tuned to the interfering signal. The shield of the trap should be securely grounded to the receiver chassis.

(1) Line-Up Capacitor Adjustments

This receiver must be in correct electrical alignment in order to obtain maximum efficiency and best quality of performance. The circuits should be realigned after each major service or repair operation, and whenever there are positive indications that the adjustments have deviated from normal by ordinary usage. These indications will be present together and will have the nature of: low sensitivity, poor tone quality and irregular double-peaked tuning.

A definite procedure must be applied in readjusting the line up trimmers. The proper oscillator and indication equipment must also be used. Certain standard service instruments, which are useful for receiver adjustment, have been designed and made available by the manufacturer of this receiver. These are illustrated and described on page 2.

(2) I-F Tuning Adjustments

There are two i-f transformers associated in the intermediate amplifier system. The first of these transformers is tuned by accessible trimmers. The second transformer has a natural tuning inherent to its design. To obtain the correct alignment, proceed as follows:

- Short circuit the antenna and ground terminals and tune the receiver so that no signal is received. Set the volume control to its maximum position. Ground the receiver.
 - Connect the output of the test oscillator between the first detector control grid and chassis ground. Attach an indicating meter, such as is illustrated on page 2, to the speaker circuit.
 - Place the external oscillator into operation at 460 kc. Adjust the output so that a slight registration occurs on the output indicator. The output should be set at as low a value as will give a convenient indication during adjustment; this requirement is important in that the a.v.c. action is voided by such a method. Adjust the secondary and primary trimmers (C13 and C17) of the first i-f transformer for maximum receiver output.
- R-F and Oscillator Adjustments**
- These trimmers are provided, two for adjustment at 1720 kc. and one for oscillator line-up at 600 kc. No adjustments are required on the short-wave bands. Locations of the trimmers are shown on Figure 5. They should be adjusted in the following manner:
- Connect the output of the modulated Full Range Oscillator to the antenna and ground terminals of the receiver. Check the position

MODELS 118, 211
1935 Production
Parts List

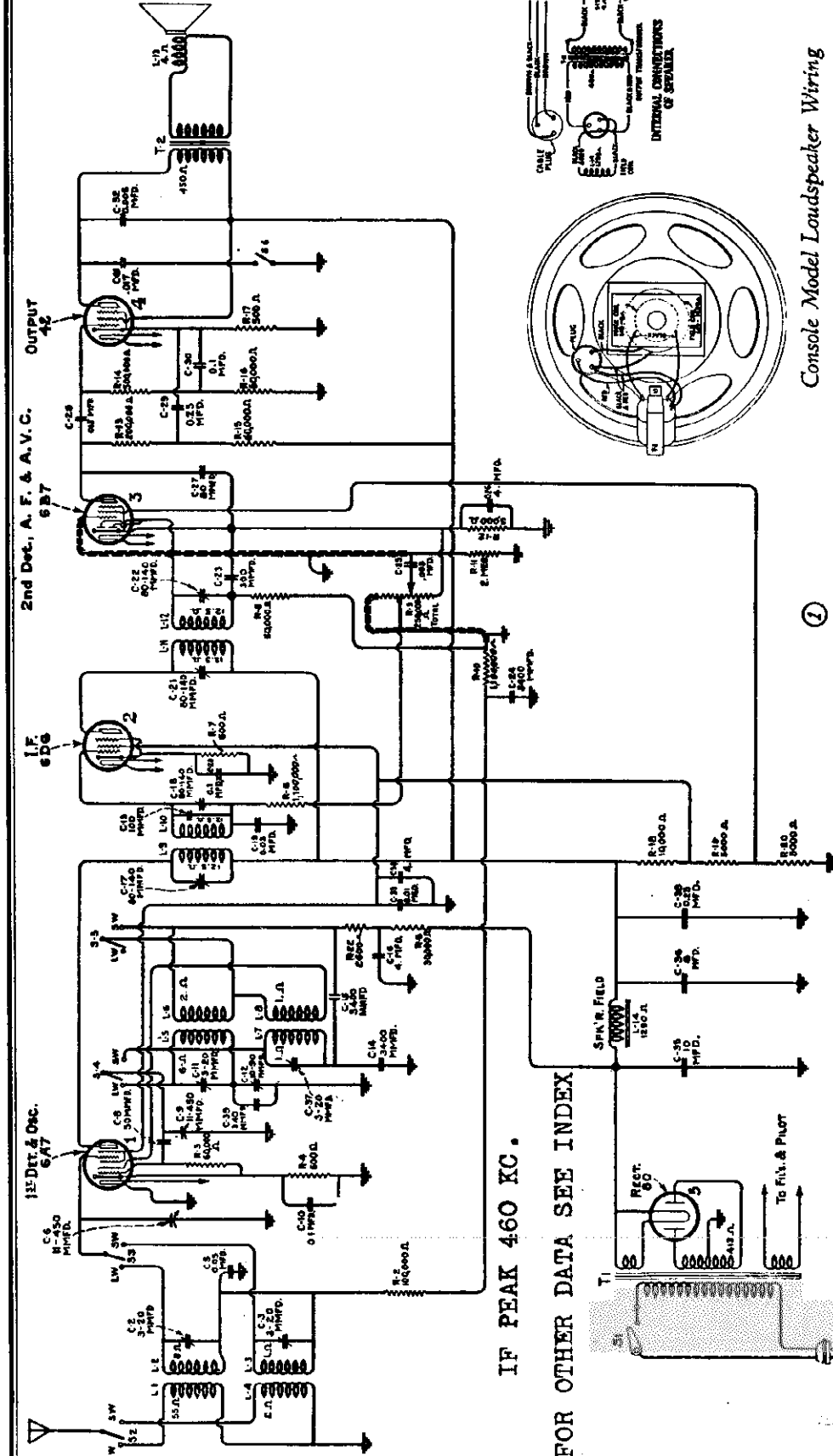
RCA MFG. CO., INC.

REPLACEMENT PARTS—Models 118 and 211 (1935 Production)

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
RECEIVER ASSEMBLIES					
4379	Board—Terminal board—Two terminals and link—Engraved "ANT-GND".....	\$0.20	4433	Transformer—Second intermediate frequency transformer (L11, L12, C21, C22, C23, R8).....	\$2.15
4880	Bracket—Tone control mounting bracket.....	.12	9512	Transformer—Power transformer—105-125 volts—25-40 cycles.....	6.58
4427	Bracket—Volume control mounting bracket.....	.18	9513	Transformer—Power transformer—105-250 volts—40-60 cycles.....	4.85
4244	Cap—Grid contact cap.....	.20	9511	Transformer—Power transformer—105-125 volts—50-60 cycles.....	4.78
3861	Capacitor—Adjustable capacitor—10-100 mmfd. (C12).....	.78	4429	Volume control (R9, S1).....	1.40
4793	Capacitor—0.005 mfd. (C25).....	.20	DRIVE ASSEMBLIES		
4868	Capacitor—0.005 mfd. (C32).....	.20	10194	Ball—Steel ball for condenser drive assembly—Package of 20.....	.25
4883	Capacitor—0.01 mfd. (C33).....	.20	4422	Clutch—Condenser drive clutch assembly complete.....	1.00
4792	Capacitor—0.015 mfd. (C28).....	.22	4474	Dial—Station selector dial (table model).....	.76
4752	Capacitor—0.017 mfd. (C31).....	.26	4450	Dial—Station selector dial (console model).....	.52
4836	Capacitor—0.05 mfd. (C5, C19).....	.30	4434	Drive—Tuning condenser drive assembly.....	2.42
4442	Capacitor—50 mmfd. (C8).....	.22	4340	Lamp—Dial lamp—Package of 5.....	.60
4509	Capacitor—80 mmfd. (C27).....	.15	4363	Pointer—Station selector pointer (console model).....	.18
4791	Capacitor—0.1 mfd. (C10, C20, C30).....	.24	4475	Pointer—Station selector pointer (table model).....	.18
3597	Capacitor—0.25 mfd. (C29, C38).....	.40	3943	Screen—Translucent screen for dial lamps—Package of 2.....	.18
4811	Capacitor—340 mmfd. (C39).....	.25	3529	Socket—Dial lamp socket.....	.32
4439	Capacitor—3400 mmfd. (C14).....	.35	REPRODUCER ASSEMBLIES (TABLE MODEL)		
4881	Capacitor—3400 mmfd. (C15, C24).....	.20	4915	Cable—3-conductor reproducer cable—Complete with 3-contact female connector plug.....	.50
3796	Capacitor—4.0 mfd. (C26).....	.60	9587	Coil—Field coil magnet and cone support (L14).....	2.18
4428	Capacitor—8.0 mfd. (C36).....	1.05	9588	Cone—Reproducer cone (L13)—Package of 5.....	3.55
7790	Capacitor—10.0 mfd. (C35).....	1.05	5118	Connector—3-contact male connector plug for reproducer.....	.25
7589	Capacitor pack—Comprising two 4.0 mfd. capacitors (C16, C34).....	1.64	5119	Connector—3-contact female connector plug for reproducer cable.....	.25
4358	Clamp—Electrolytic capacitor mounting clamp.....	.15	9586	Reproducer—Complete.....	5.95
5087	Coil—Antenna coil (L1, L2, L3; L4, C2, C3).....	1.86	4893	Transformer—Output transformer (T2).....	1.48
5089	Coil—Oscillator coil (L5, L6, L7, L8, C11, C37).....	1.90	REPRODUCER ASSEMBLIES (CONSOLE MODEL)		
4504	Condenser—2-gang variable tuning condenser (C6, C9).....	2.78	9590	Coil—Field coil magnet and cone support (L14).....	4.20
4788	Insulator—Radiotron socket insulator—Package of 5.....	.20	8935	Cone—Reproducer cone (L13)—Package of 5.....	5.25
3708	Resistor—600 ohms—Carbon type—¼ watt (R4, R7)—Package of 5.....	1.00	9589	Reproducer—Complete.....	8.20
4812	Resistor—2600 ohms—Carbon type—¼ watt (R22)—Package of 5.....	1.00	4892	Transformer—Output transformer (T2).....	1.30
4436	Resistor—5000 ohms—Carbon type—¼ watt (R12)—Package of 10.....	2.00	MISCELLANEOUS ASSEMBLIES		
2240	Resistor—30,000 ohms—Carbon type—1 watt (R5).....	.22	6840	Escutcheon—Station selector escutcheon—Console model.....	.56
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R3, R8, R15, R16)—Package of 5.....	1.00	6706	Escutcheon—Station selector escutcheon—Table model.....	.42
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R2)—Package of 5.....	1.00	6614	Glass—Station selector dial glass—Console model.....	.30
3116	Resistor—200,000 ohms—Carbon type—¼ watt (R13)—Package of 5.....	1.00	6707	Glass—Station selector dial glass—Table model.....	.20
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R14)—Package of 5.....	1.00	4449	Knob—Station selector, range switch, tone control switch or volume control knob—Package of 5.....	.60
4783	Resistor—1,100,000 ohms—Carbon type—¼ watt (R6, R10)—Package of 5.....	1.00	6615	Ring—Spring retaining ring for dial glass—Console model—Package of 5.....	.34
6242	Resistor—2 megohms—Carbon type—¼ watt (R11)—Package of 5.....	1.00	6708	Ring—Spring retaining ring for dial glass—Table model—Package of 5.....	.44
4721	Resistor—Tapped resistor—One 10,000 ohm, two 5,000 ohm and one 500 ohm section (R17, R18, R19, R20).....	.88	4685	Screw—Chassis mounting screw assembly—Comprising four screws, four spacers, four lockwashers, four washers and eight cushions (for console model).....	.40
4521	Shield—Antenna, r-f or oscillator coil shield.....	.42	4446	Screw—Chassis mounting screw assembly—Comprising four screws, four spacers, four lockwashers, four washers and eight cushions (for table model).....	.28
3942	Shield—First detector-oscillator Radiotron shield.....	.18			
7487	Shield—I.F. Radiotron shield.....	.25			
3782	Shield—Second detector Radiotron shield.....	.26			
4784	Socket—4-contact Radiotron socket.....	.15			
4785	Socket—6-contact output Radiotron socket.....	.15			
4786	Socket—6-contact i-f Radiotron socket.....	.15			
4787	Socket—7-contact Radiotron socket.....	.15			
5088	Switch—Range switch (S2, S3, S4, S5, SW, LW).....	1.35			
5052	Switch—Tone control switch (S6).....	.30			
4431	Transformer—First intermediate frequency transformer (L9, L10, C13, C17, C18).....	2.28			

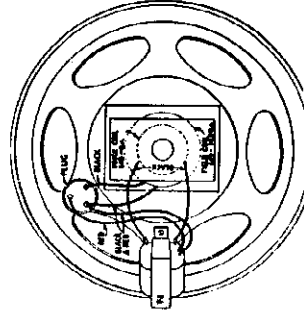
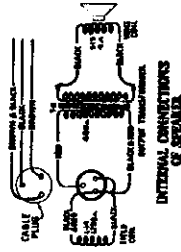
RCA MFG. CO., INC.

MODELS 118, 211
1935 Production
Schematic, Voltages
Speaker Wiring

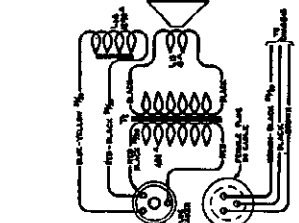
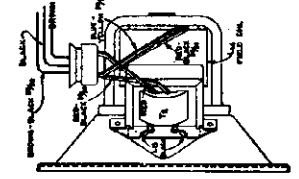


IF PEAK 460 KC.

FOR OTHER DATA SEE INDEX



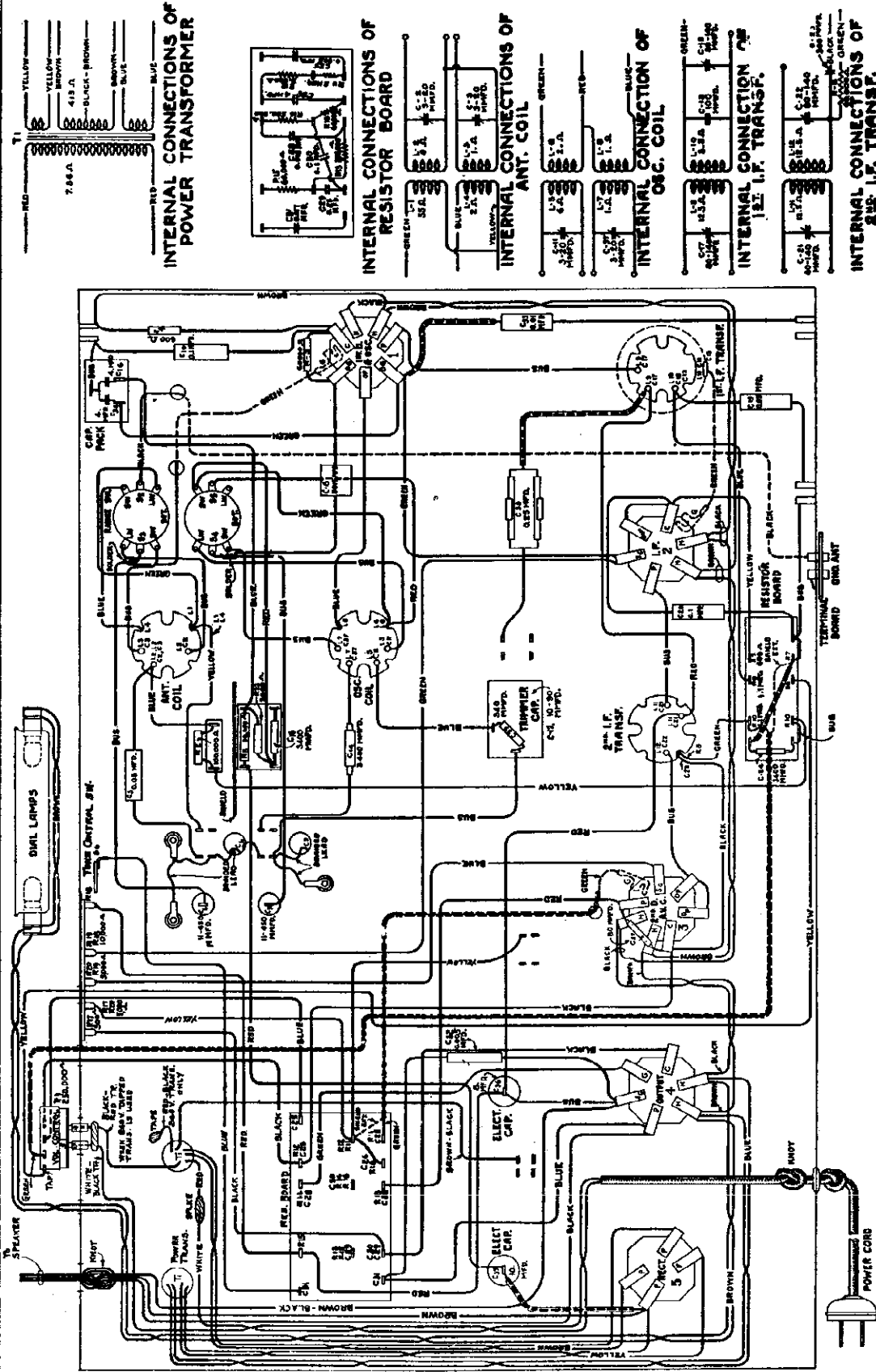
Console Model Loudspeaker Wiring



Radiatron	Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Plate Current, M. A.	Heater Volts, A. C.
Detector	6.0	105	265	3.5	6.3
Oscillator	6.0	105	220	4.5	6.3
RCA-6D6 I. F.	3.0	50*	265	9.0	6.3
RCA-6B7 2nd Det.	16.5	265	245	30.0	6.3
RCA-42 Power	—	—	690	64.0	5.0

MODELS 118,211
Chassis Wiring

RCA MFG. CO., INC.



Wiring Diagram
Model 118 and Model 211 (1935 Production)

Recently manufactured receivers of Models 118 and 211 contain a number of modifications in circuit and assembly. These changes appear in the following data and on the schematic and wiring diagrams. The major items affected are the speaker cable connection, type of Radiotron in output stage, band switch and voltage divider system.

RCA MFG. CO., INC.

MODEL 119
 Trimmers, Socket
 Voltage, Alignment
 Circuit Data

In the first stage of the circuit, an RCA-6A7 pentagrid converter tube is employed as an r-f amplifier and local oscillator, the related external high-frequency circuits consisting of a tuned antenna transformer with a short-wave tap. The oscillator second harmonic is used for the short-wave position. Within the first detector tube, mixing of signal and oscillator voltages is accomplished through electron coupling, the i-f appearing in the plate circuit.

The i-f system operates at 460 kc. as the basic frequency. The presence of the natural period transformer at the i-f output should be especially noted. Its use minimizes the number of line-up adjustments.

The combined second detector—audio amplifier—a.v.c. stage, utilizes an RCA-6B7, a duplex-diode pentode Radiotron. One diode connects directly to ground, the other is used for detection. Part of the detected signal is filtered to remove the audible fluctuations and is applied to the first and second stages as a means of providing automatic volume control. The audio component of the detected signal is amplified by the RCA-6B7 and conveyed to a resistance-capacitance coupling network.

A power-amplifier pentode, RCA-41, is used in the output stage and is coupled by a transformer to the low impedance voice-coil of the speaker.

Full-wave rectification is employed in the power-supply stage. The speaker field winding serves in the filter circuit as a reactor.

(2) I-F Tuning Adjustments:

There are two i-f transformers associated in the intermediate amplifier system. The first of these transformers is tuned by accessible trimmers. The second transformer has a natural tuning inherent to its design and does not require adjustment. To obtain the correct alignment proceed as follows:

- (a) Short circuit the antenna and ground terminal and tune the receiver so that no signal is received. Set the volume control to its maximum position. Ground the receiver.
- (b) Connect the output of the test oscillator between the first detector control grid and chassis ground. Attach an indicating meter, such as is illustrated on page 2, to the speaker circuit.
- (c) Place the external oscillator into operation at 460 kc. Adjust the output so that a slight registration occurs on the output indicator. The output should be set at as low a value as will give a convenient indication during adjustment. This requirement is important in that the a.v.c. action is voided by such a method. Adjust the secondary and primary trimmers (C18 and C17) of the first i-f transformer for maximum receiver output.

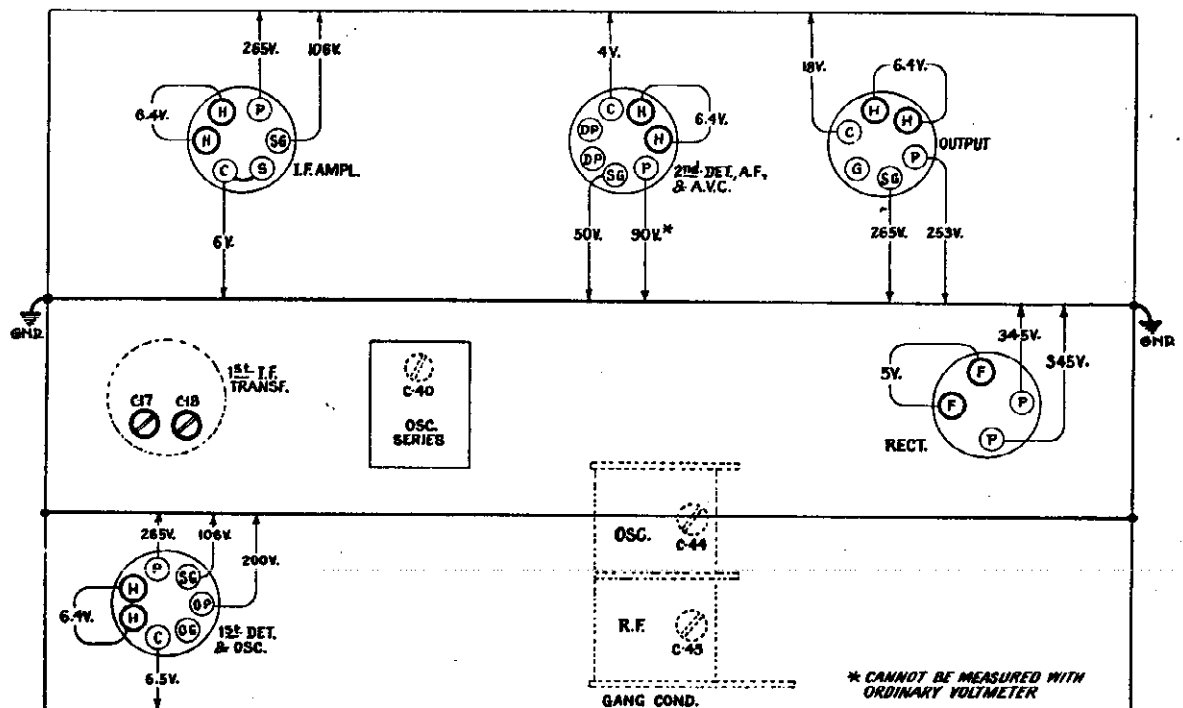


Figure 3—Trimmer Locations and Radiotron Socket Voltages (Measured at 115 volts A. C. Supply—Maximum Volume Control—No Signal)

MODEL 119
Alignment, Part 2
Speaker Wiring

RCA MFG. CO., INC.

REPLACEMENT PARTS

Stock No.	Description	List Price	Stock No.	Description	List Price
4379	RECEIVER ASSEMBLIES		3942	Shield—First Detector and output Radiotron shield	\$0.18
4244	Board—Terminal board—Engraved "ANT-GND"	\$0.20	3782	Shield—Second Detector Radiotron shield	.26
3861	Cap—Contact cap.	.20	7487	Shield—I.F. Radiotron shield	.25
5094	Capacitor—Adjustable capacitor (C40)	.78	5186	Shield—Flux I.F. transformer shield	.28
5151	Capacitor—50 mfd. (C3)	.20	4908	Shield—Second I.F. transformer shield	.45
5044	Capacitor—320 mfd. (C11)	.20	3658	Socket—Dial lamp socket	.26
4881	Capacitor—810 mfd. (C27)	.20	4784	Socket—4-contact Radiotron socket	.15
4793	Capacitor—3400 mfd. (C24)	.20	4785	Socket—6-contact Radiotron socket	.15
4868	Capacitor—0.005 mfd. (C25)	.20	4786	Socket—6-contact Radiotron socket	.15
4792	Capacitor—0.015 mfd. (C28)	.22	4787	Socket—7-contact Radiotron socket	.15
4906	Capacitor—0.017 mfd. (C31)	.25	5053	Switch—Range switch (S2)	.50
4844	Capacitor—0.05 mfd. (C5, C19)	.30	4905	Switch—Tone control switch (S5)	.30
3597	Capacitor—0.1 mfd. (C10, C20, C30)	.22	4900	Transformer—First intermediate frequency transformer (L9, L10, C17, C18)	2.25
3796	Capacitor—0.25 mfd. (C39, C38)	.40	4901	Transformer—Second intermediate frequency transformer (L11, L12, C23, R8, R21)	1.50
4428	Capacitor—4.0 mfd. (C26)	.60	4888	Transformer—Power transformer—405-125 volts—25-50 cycles	5.55
7790	Capacitor—8.0 mfd. (C36)	1.05	4897	Transformer—Power transformer—405-125 volts—50-60 cycles (T1)	3.98
7589	Capacitor—10.0 mfd. (C35)	1.05	4899	Transformer—Power transformer—105-125/200-240 volts—40-60 cycles	4.05
4358	Capacitor pack—Comprising two 4.0 mfd. capacitors (C16, C34)	1.64	4429	Volume control (R9, S1)	1.40
5051	Clamp—Capacitor mounting clamp for Stock No. 4428 and No. 7790	1.28			
5050	Coil—Antenna coil (L1, L2, C5, R2)	.56		REPRODUCER ASSEMBLIES	
4896	Coil—Oscillator coil (L4, L6)	3.48	4915	Cable—3 conductor reproducer cable—Complete with 3-contact female connector	.50
3708	Condenser—2-gang variable tuning condenser (C6, C9, C44, C45)	1.00	9587	Coil—Field coil, magnet and cone support (L14)	2.18
4435	Resistor—500 ohms—Carbon type—1/4 watt (R1, R7)—Package of 5	2.00	9588	Cone—Reproducer cone (L13)—Package of 5	3.55
2740	Resistor—5000 ohms—Carbon type—1/4 watt (R12)—Package of 10	.22	5118	Connector—3-contact male connector for reproducer cable	.25
3602	Resistor—30,000 ohms—Carbon type—1/4 watt (R5)	1.00	5119	Connector—3-contact female connector for reproducer cable	.25
3118	Resistor—60,000 ohms—Carbon type—1/4 watt (R3, R4, R10)—Package of 5	1.00	9586	Reproducer—Complete	5.95
3116	Resistor—100,000 ohms—Carbon type—1/4 watt (R2)—Package of 5	1.00	4893	Transformer—Output transformer (T2)	1.48
6186	Resistor—200,000 ohms—Carbon type—1/4 watt (R13)—Package of 5	1.00		MISCELLANEOUS ASSEMBLY	
4783	Resistor—500,000 ohms—Carbon type—1/4 watt (R14)—Package of 5	1.00	5111	Dial—Station selector dial scale	.32
6242	Resistor—1,000,000 ohms—Carbon type—1/4 watt (R16)—Package of 5	1.00	4132	Knob—Station selector knob—Package of 5	.55
4721	Resistor—2 megohms—Carbon type—1/4 watt (R10, R11)—Package of 5	1.00	4449	Knob—Volume control range switch, or cone control knob—Package of 5	.60
3584	Resistor—Tapped resistor—One 500-ohm two 5,000 ohm, and one 10,000 ohm sections (R17, R18, R19, R20)	.86	4340	Lamp—Station selector dial lamp—Package of 5	.15
3623	Ring—Oscillator coil retaining ring	.40	4909	Pointer—Station selector pointer	.30
	Shield—Oscillator coil shield	.30	3085	Reflector—Station selector dial reflector	.15
			4917	Screw—Chassis mounting screw—Complete with one washer and one washer—Package of 4	.30

to the point where the incoming oscillator signal is received best. This point will not always be exactly at 600 on the dial. Then adjust the low-frequency trimmer, C40, simultaneously rocking the tuning capacitor slowly through the signal until maximum receiver output results from these combined operations. This adjustment must be made irrespective of dial calibration. It is advisable to repeat the 1720 kc. adjustment of the oscillator trimmer C44, in order to correct for any change caused by the tuning of C40.

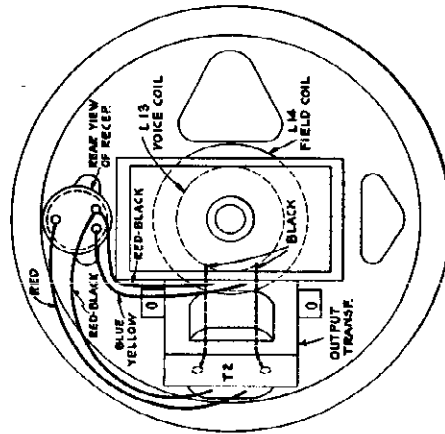
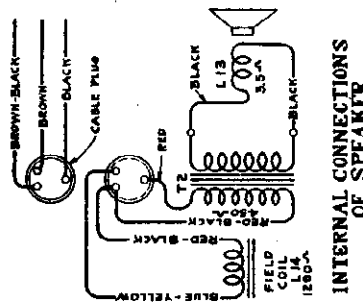
Rediotron Socket Voltages

The various normal operating voltages are given on Figure 3. As specified, they are referred to the chassis ground. Accuracy of measurements will be a function of the internal resistance of the voltmeter used. It is advisable to employ a meter having at least 10,000 ohms per volt, and for each reading use the highest range which will give an acceptably accurate reading. General deviations from the values given, due to line voltage difference, should not be taken as indicating a defective condition. The erratic departure from normal of a single value or group of values should form the basis of circuit diagnosis.

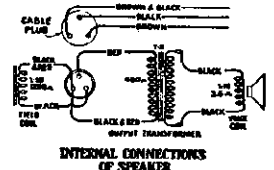
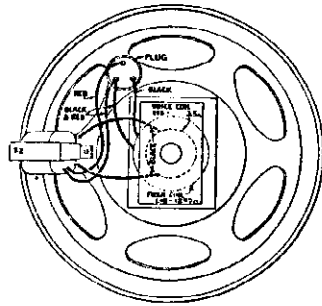
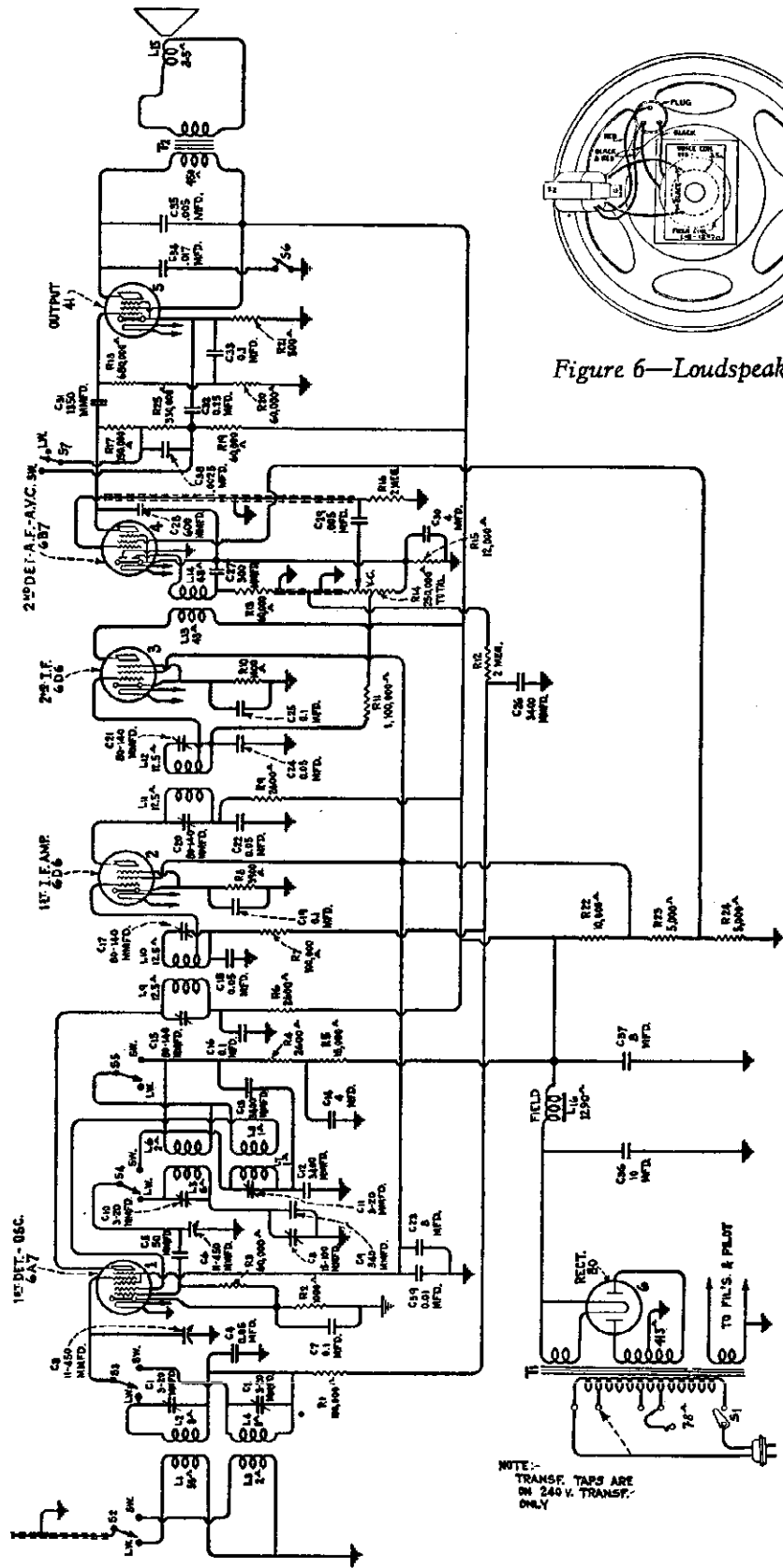
R. F. and Oscillator Adjustments:

Three trimmers are provided, two for adjustment at 1720 kc. and one for oscillator line-up at 600 kc. No adjustments are required on the short-wave bands. Locations of the trimmers are shown on Figure 3. They should be adjusted in the following manner:

- Connect the output of the modulated Full Range Oscillator to the antenna and ground terminals of the receiver. Check the position of the dial pointer. It should set exactly on the radial line adjacent to the dial reading of 540 when the tuning capacitor places are at full mesh. After correcting the dial pointer, place the receiver in operation and set the selector at 1720 kc., advance the volume control to maximum and turn the range switch to its broadcast position.
- Adjust the frequency of the external oscillator to 1720 kc. and regulate its output until a perceptible indication appears on the output indicator. This indication should be held at a minimum during the adjustments. The trimmers C44 and C45 should then be tuned to the point giving peak receiver output.
- Re-tune the test oscillator, setting its frequency to 600 kc. Turn the receiver selector control



RCA MFG. CO., INC.



Console Model

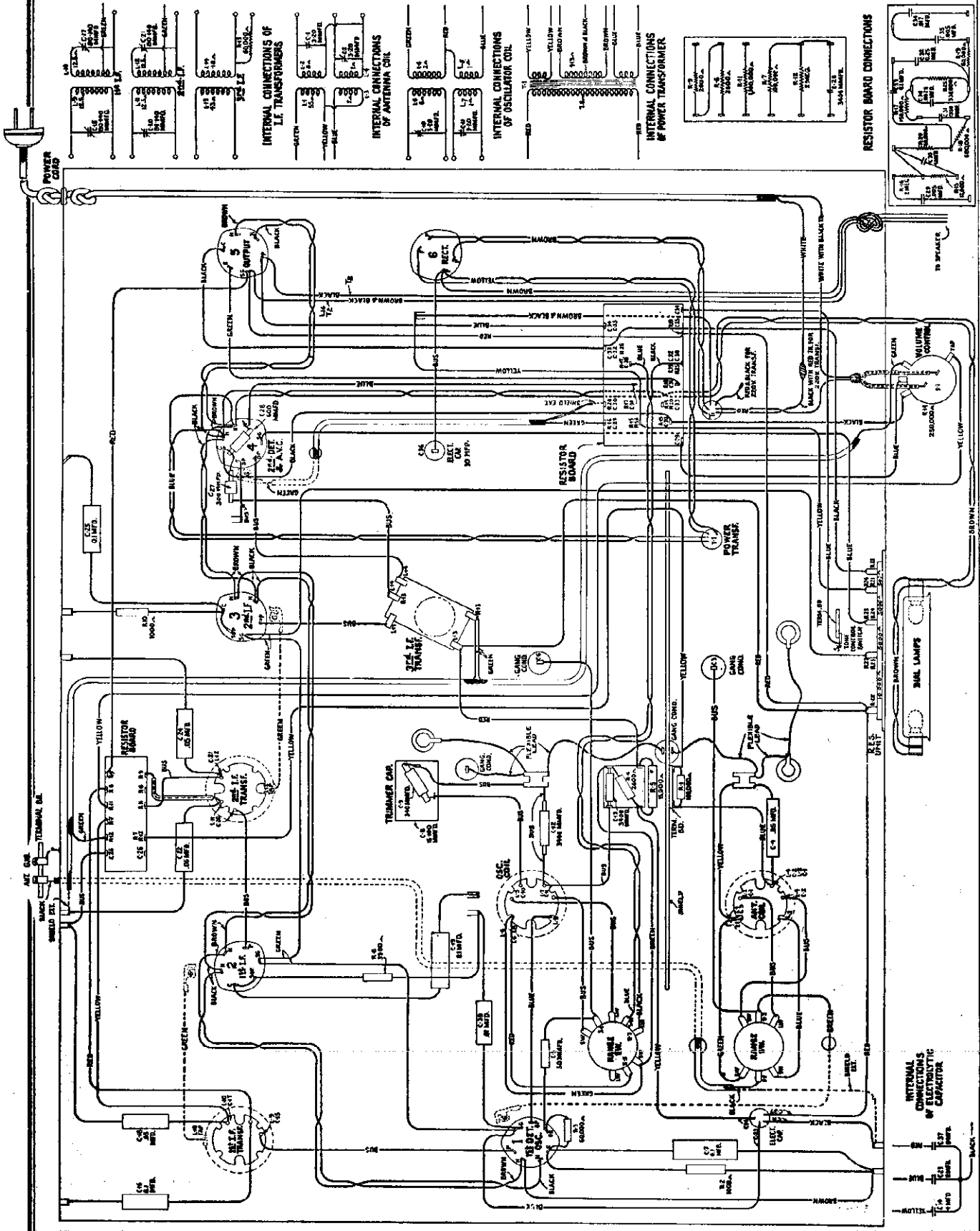
Figure 6—Loudspeaker Wiring

Voltage and Frequency Ratings	{ 105-125 Volts, 50-60 Cycles 105-125 Volts, 2.5-60 Cycles 105-125/200-250 Volts, 50-60 Cycles
Power Consumption.....	.....85 Watts
Tuning Frequency Ranges.....	.....540 KC.-1720 KC. and 5400 KC.-18,000 KC.
Alignment Frequencies	460 KC. (I.F.), 600 KC. (Osc.) and 1720 KC. (Osc. and Det.)
Undistorted Output.....	.....1.75 Watts
Maximum Output.....	.....3.5 Watts

NOTE:-
TRANSF. TAPS ARE
RE 240 V. TRANSF.
ONLY

MODELS 125,225
Chassis Wiring

RCA MFG. CO., INC.



RCA MFG. CO., INC.

MODELS 125,225
Alignment
Transformer Data

The circuit embodied in this receiver is of the superheterodyne type. Its layout is shown schematically in Figure 3. Two ranges of tuning are provided by two separate sets of coils. A tuned transformer is employed to couple the antenna system into the first detector tube which is an RCA-6A7. This tube also serves by the coordinate arrangement of its elements, to generate the local oscillation required for superheterodyne operation. The local oscillation is modulated with the incoming signal by the mutual effect of the tube elements on the electron flow. The difference beat frequency of these two signals is amplified by this same tube and delivered to the i-f amplifier system. There are two Radiotron 6D6 tubes used for i-f amplification. These transformers intercept these tubes. The primaries and secondaries of two of these transformers are resonated to the intermediate frequency (450 kc.). The third i-f transformer has no adjustable capacitors; its natural tuning is such as to obtain the desired selectivity and efficiency. Diode detection is performed in an RCA-6B7 tube; a diode diode pentode. The signal from the i-f system is applied to one of the diodes of the tube, where detection takes place. The remaining diode is tied solidly to ground.

A voltage having the character of an audio wave superimposed upon a constant d-c is developed by the detector process across the manual volume control resistor R14. The d-c portion of this voltage, which is dependent upon the strength of the carrier of the signal being received, is used to automatically regulate the control grid bias voltages of the first detector and the i-f amplifier stages. Maximum control is used on the detector and first i-f, while a reduced amount of control is applied to the second i-f. A portion of the audio component of the detected voltage appearing across the manual volume control is carried through the variable arm of a blocking condenser to the control grid of the RCA-6B7, which simultaneously functions to provide audio amplification. The audio signal is conducted from the detector through a resistance-capacitance network. At this point there is provision for changing the audio response of the receiver, so that proper results will be obtained in both the long-wave and the short-wave bands. As shown on the schematic, the switch S7 operates so that for long-wave reception the plate resistor R17, while for short-wave reception the resistor-condenser combination is shorted out. The output tube delivers a high-level high-quality signal to the electro-dynamic loudspeaker through an efficiently designed matching transformer. A two-point tone control consisting of a small capacitor and a single pole switch is connected in the plate circuit of the RCA-41 output tube.

(2) Circuit Voltages
Refer to Figure 2. The voltages indicated at the various socket contacts are measured to the chassis.

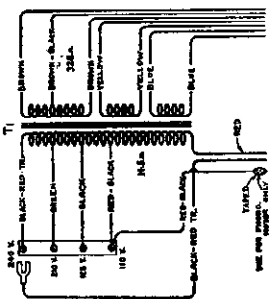


Figure 5—Universal Transformer Connections

They represent the values which apply to a receiver in normal operating condition at the specified supply voltage. At other voltages, a consistent difference will be perceptible for all readings. Such a general deviation, due to line voltage, should not be judged as a sign of defective circuit conditions, but rather the erratic measurement used as a basis for the circuit analysis.

Accuracy of the voltage measurements will be a function of the internal resistance of the voltmeter used. It is advisable to employ a meter having at least 1000 ohms per volt and for each reading use the highest range which will give an acceptably accurate reading.

(3) **Code Interference**
In certain localities near to high-powered radiotelegraph stations operating at frequencies in the vicinity of 450 kc., slight code interference may be present on both bands of the receiver. This adverse condition usually occurs over the entire tuning range of each band, and is not affected by change of tuning. To overcome this interference, a shielded wave trap, such as part No. 4539, should be installed. This trap consists of a parallel resonant circuit, tuned by two trimmer capacitors. It should be connected in series with the antenna input lead at the receiver. The connections should be arranged so that a minimum of exposed (unshielded) lead is left between the trap and the band switch or the shielded input lead of the receiver. The trap is mountable by means of two holes provided in the chassis between the first i-f transformer shield and the oscillator coil shield. The can of the trap should be securely grounded. The trimmers must be accurately tuned to suppress the undesired station.

(4) **950-Volt Transformer Connections**
The 220-110 volt, 50-60 cycle transformer furnished with some instruments has taps for a variety of voltages. These taps are located on the transformer assembly, and are accessible without removing the chassis from the cabinet. A schematic of the transformer with colors of its leads is shown in Figure 5.

- (b) Feed the test oscillator output to the control grid of the first detector. Connect an output indicator to the voice coil circuit. Regulate the oscillator output control, so that a slight indication occurs on the indicating instrument.
- (c) Adjust the secondary and primary trimmers of the second i-f transformer for maximum (peak) output. Then tune the first i-f transformer in a similar manner. The oscillator output should be maintained at as low a level as will give a good output indication. This will keep the signal from being affected by the a.v.c. action of the receiver. A slight improvement in line-up may be obtained by repeating the above procedure, since there is an interlocking effect between the several tuned circuits.

R-F and Oscillator Adjustments

The trimmer capacitor locations for the r-f and oscillator stages are indicated on Figure 2. Their adjustments should be performed as follows:

- (a) Attach the oscillator output to the antenna-ground terminals of the receiver.
- (b) Check the dial pointer and correct its position if necessary. It should be coincident with the dial marking adjacent to 540 when the gang condenser plates are in full mesh.
- (c) With the external oscillator tuned to 1720 kc., and its output adjusted for the critical minimum at full volume control, set the station selector switch to its right position and adjust the trimmers C10 and C11 on Figure 2 to give maximum (peak) receiver output. Then shift the oscillator frequency to 600 kc., and tune in this signal on the receiver. Adjust the oscillator trimmer, C8, simultaneously rocking the tuning condenser slowly through the signal until the maximum output obtainable results from the two combined operations. The dial calibration should be disregarded for this adjustment. The oscillator trimmer, C10 should be retuned at 1720 kc. to correct for any change caused by the 600 kc. adjustment.
- (d) Turn the receiver range switch to its left (short-wave) position and set the station selector at the 18 megacycle dial marking. Tune the test oscillator to 18,000 kc. and regulate its output to produce a noticeable indication at the receiver output. Adjust C2 and C11 of the antenna and oscillator coils for maximum receiver output. There will be two positions of the trimmers which give maximum signal. On the oscillator, the position of minimum capacitance is correct; whereas the position of maximum capacitance is proper on the antenna trimmer. The latter should be made while slowly rocking the variable tuning condenser through the signal.

It is important in making the foregoing adjustments to have the receiver operating at maximum sensitivity and using as low an input as will give an accurate output indication. This procedure will obviate the broadness of tuning apparent from the effect of automatic volume control.

(1) **Line-Up Adjustments**
Maximum efficiency and best quality of performance will only be obtained when the circuits are in proper alignment. Trimmer capacitors are provided at accessible locations on the receiver chassis for accurately realigning the circuits when they have deviated from normal. Incorrect alignment is usually evidenced by low sensitivity, poor quality and irregular double-peaked tuning.

It is important in re-adjusting the line-up trimmers to use proper oscillator and indicator apparatus. Certain standard service instruments, which are useful in making these adjustments, have been devised and made available to the service man by the manufacturer of this receiver. They are illustrated and described on page 2.

Preliminary Tests

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 circuit (r-f oscillator or i-f) from the "Full-Range Oscillator", and inserting the "Tuning Wand" into the coils 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 connected into the opposite end. By inserting the brass cylinder end into the center of a particular coil, through the opening provided in the top of the shield as shown in Figure 4, the inductance of the coil is lowered, and therefore, the resonant frequency is increased. Placing the other end (iron filing core) into the coil raises the inductance and conversely decreases the resonant frequency. Thus it is apparent, that if the circuits are in exact resonance with the standard signal of the "Full-Range Oscillator", the insertion of either end of the wand will cause a reduction of receiver output; whereas if the circuits are not in tune or resonance with the incoming signal, one end will bring about an increase of the signal and the other end will cause a decrease. When an increase in signal is obtained with the iron filed end of the wand, an increase of the inductance and decrease in frequency of resonance is indicated. The trimmer condenser associated with the circuit under test will therefore require adjustment so as to increase its capacitance. The reverse occurs when a gain in signal is obtained when using the brass cylinder end of the wand.

Changes Indicated By Wand

Wand	Signal	Trimmer
{Iron.....}	{Decrease}	{None}
{Brass.....}	{Increase}	{Decrease}
{Iron.....}	{Decrease}	{Increase}
{Brass.....}	{Increase}	{None}

The following procedure should be applied:

i-f Tuning Adjustments

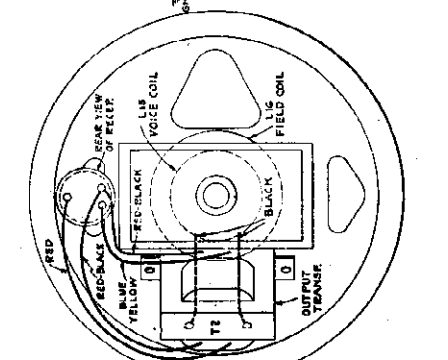
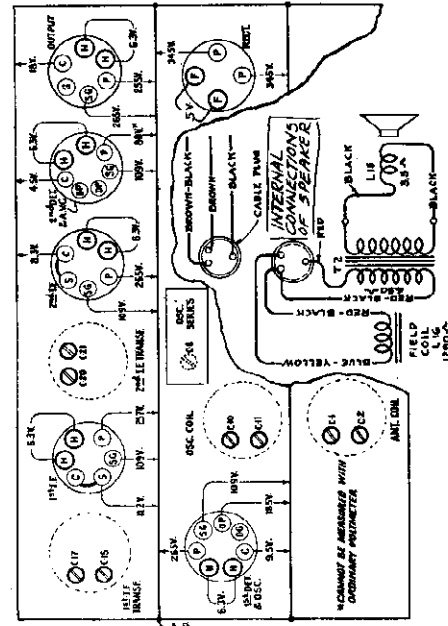
The four i-f trimmer screws shown on Figure 2 must be tuned to 450 kc., as explained below:

- (a) Short circuit the antenna and ground terminals of the receiver to prevent external signal pickup. Set the volume control to maximum and attach a good ground connection to the receiver.

MODELS 125,225
Socket, Trimmers
Voltage, Parts
Speaker Wiring

RCA MFG. CO., INC.

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
RECEIVER ASSEMBLIES					
4880	Bracket—Tone control switch mounting bracket.....	\$0.12	5109	Resistor—12,000 ohms—Carbon type— $\frac{1}{4}$ watt (R15)—Package of 5.....	\$1.00
4427	Bracket—Volume control mounting bracket.....	.18	5114	Resistor—15,000 ohms—Carbon type— $\frac{1}{4}$ watt (R5).....	.72
4358	Bracket—Electrolytic capacitor bracket for capacitor No. 7790.....	.15	3602	Resistor—60,000 ohms—Carbon type— $\frac{1}{4}$ watt (R3, R19, R20)—Package of 5.....	1.00
4693	Bracket—Electrolytic capacitor bracket for capacitor No. 5101.....	.15	3118	Resistor—100,000 ohms—Carbon type— $\frac{1}{4}$ watt (R1, R7)—Package of 5.....	1.00
3864	Capacitor—Adjustable trimmer capacitor (C8).....	.20	5027	Resistor—150,000 ohms—Carbon type— $\frac{1}{4}$ watt (R17)—Package of 5.....	1.00
5094	Capacitor—50 mmfd. (C5).....	.20	5108	Resistor—330,000 ohms—Carbon type— $\frac{1}{4}$ watt (R18)—Package of 5.....	1.00
3981	Capacitor—300 mmfd. (C27).....	.30	5110	Resistor—680,000 ohms—Carbon type— $\frac{1}{4}$ watt (R11)—Package of 5.....	1.00
4811	Capacitor—340 mmfd. (C9).....	.25	4783	Resistor—1,100,000 ohms—Carbon type— $\frac{1}{4}$ watt (R11)—Package of 5.....	1.00
4210	Capacitor—600 mmfd. (C28).....	.25	6242	Resistor—2 megohms—Carbon type— $\frac{1}{4}$ watt (R12, R16)—Package of 5.....	1.00
5115	Capacitor—1350 mmfd. (C31).....	.25	4721	Resistor—Tapped—One 500, one 10,000 and two 5000 ohm sections (R21, R22, R23, R24).....	.88
4439	Capacitor—3400 mmfd. (C12).....	.35	4521	Shield—Antenna, I.F. or oscillator coil shield.....	.42
4881	Capacitor—3400 mmfd. (C13, C26).....	.20	3942	Shield—First detector and output Radiotron shield.....	.18
5107	Capacitor—0.0025 mfd. (C38).....	.16	3782	Shield—Second detector Radiotron shield.....	.26
4793	Capacitor—0.005 mfd. (C29).....	.20	7487	Shield—L.F. Radiotron shield.....	.25
4868	Capacitor—0.005 mfd. (C35).....	.20	4784	Socket—1-contact Radiotron socket.....	.15
4906	Capacitor—0.017 mfd. (C34).....	.25	4785	Socket—6-contact Radiotron socket.....	.15
4883	Capacitor—0.01 mfd. (C39).....	.20	4786	Socket—6-contact Radiotron socket.....	.15
4836	Capacitor—0.05 mfd. (C4, C18, C24).....	.30	4787	Socket—7-contact Radiotron socket.....	.15
4886	Capacitor—0.05 mfd. (C22).....	.22	4379	Strip—Terminal strip—Engraved "ANT-GND".....	.20
4841	Capacitor—0.1 mfd. (C7, C19, C25, C33).....	.20	5100	Switch—Range switch (S2, S3, S4, S5, S7).....	1.20
4885	Capacitor—0.1 mfd. (C16).....	.28	5052	Switch—Tone control switch (S6).....	.30
3597	Capacitor—0.25 mfd. (C32).....	.40	9512	Transformer—Power transformer—105-125 volts—25-40 cycles.....	6.58
3796	Capacitor—4.0 mfd. (C30).....	.60	9513	Transformer—Power transformer—105-125/210-240 volts—40-60 cycles.....	4.85
7790	Capacitor—10.0 mfd. (C36).....	1.05	9511	Transformer—Power transformer—105-125 volts—50-60 cycles (T1).....	4.78
5101	Capacitor pack—Comprising two 8 mfd. and one 4 mfd. sections (C14, C23, C37).....	2.14	5102	Transformer—First intermediate frequency transformer (L9, L10, C15, C17).....	1.98
5087	Coil—Antenna coil (L1, L2, L3, L4, C1, C2).....	1.86	5103	Transformer—Second intermediate frequency transformer (L11, L12, C20, C21).....	1.98
5089	Coil—Oscillator coil (L5, L6, L7, L8, C10, C11).....	1.90	5105	Transformer—Third intermediate frequency transformer (L13, L14, R13).....	1.65
4504	Condenser—2-gang tuning condenser (C3, C6).....	2.78	4429	Volume control (R14, S1).....	1.90
5104	Lead—Shielded—Single conductor—From range switch to antenna terminal board.....	.30			
5106	Lead—Shielded—2-conductor—From volume control to third I.F. transformer and resistor board.....	.40			
5112	Resistor—1000 ohms—Carbon type— $\frac{1}{4}$ watt (R2, R10)—Package of 5.....	1.00			
4812	Resistor—2600 ohms—Carbon type— $\frac{1}{4}$ watt (R4, R6, R9)—Package of 5.....	1.00			
5113	Resistor—3900 ohms—Carbon type— $\frac{1}{4}$ watt (R8)—Package of 5.....	1.00			



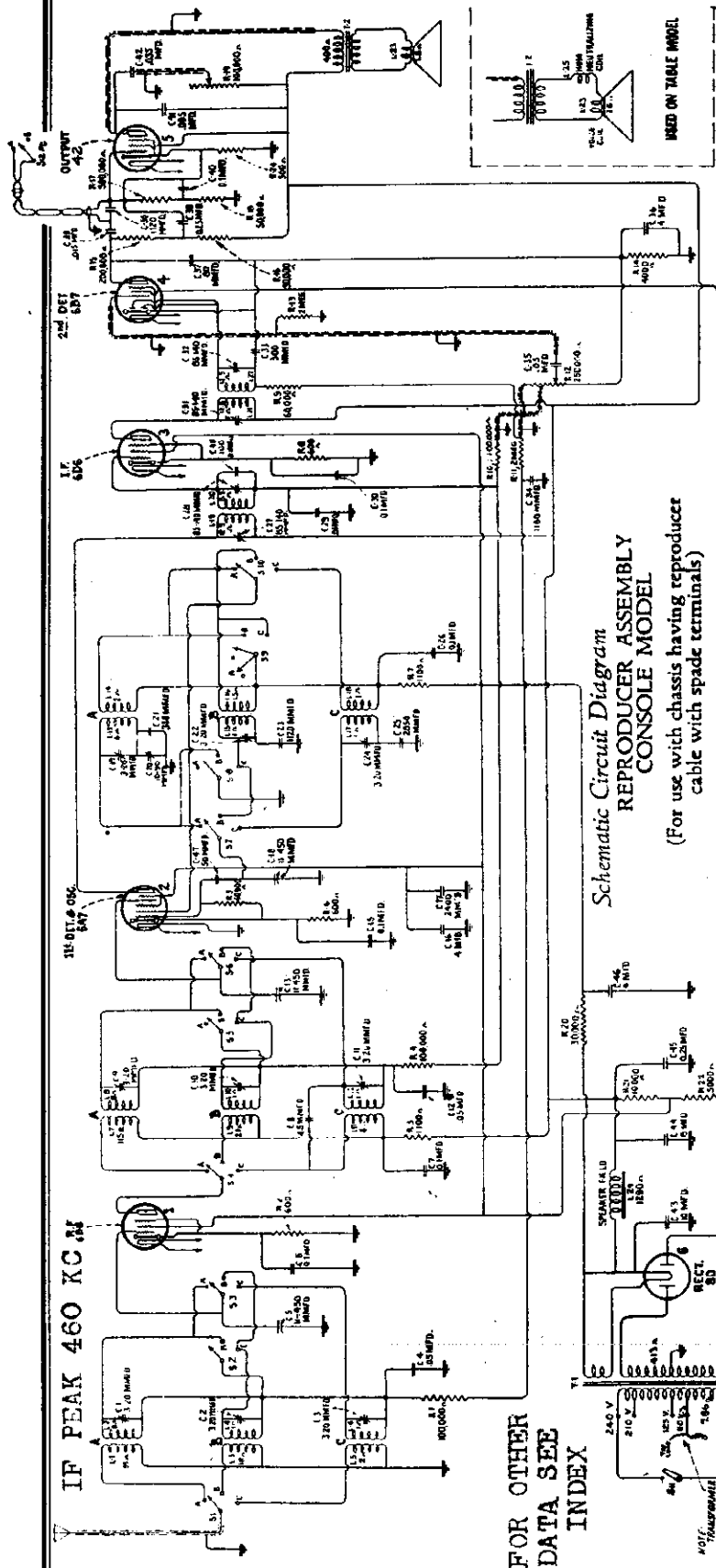
Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
CONDENSER DRIVE ASSEMBLIES					
4450	Dial—Station selector dial—Console model.....	\$0.52	8935	Cone—Reproducer cone (L15)—Package of 5.....	\$5.25
4474	Dial—Station selector dial—Table model.....	.76	5118	Plug—3-contact plug—Male section for reproducer cable.....	.25
4434	Drive—Tuning condenser drive assembly—Complex.....	2.42	5119	Plug—3-contact plug—Female section for reproducer cable.....	.25
4475	Indicator—Station selector (pointer) indicator—Table model.....	.18	9589	Reproducer—Complete.....	8.20
4363	Indicator—Station selector (pointer) indicator—Console model.....	.18	4892	Transformer—Output transformer (T2).....	1.30
4340	Lamp—Dial lamp—Package of 5.....	.60	MISCELLANEOUS ASSEMBLIES		
3943	Screen—Translucent screen for dial light—Package of 2.....	.18	6755	Bezel—Station selector dial escutcheon bezel—Table model.....	.50
3529	Socket—Dial lamp socket.....	.32	6840	Bezel—Station selector dial escutcheon bezel—Console model.....	.56
REPRODUCER ASSEMBLIES TABLE MODEL					
4915	Cable—3-conductor reproducer cable.....	.50	6707	Glass—Station selector dial glass—Table model.....	.20
9587	Coil—Field coil, magnet and cone support (L16).....	2.18	6514	Glass—Station selector dial glass—Console model.....	.30
9588	Cone—Reproducer cone (L15)—Package of 5.....	3.55	4449	Knob—Station selector, volume control, band switch or cone control knob—Package of 5.....	.60
5118	Plug—3-contact plug—Male section for reproducer cable.....	.25	6708	Ring—Spring retaining ring for dial glass—Table model—Package of 5.....	.44
5119	Plug—3-contact plug—Female section for reproducer cable.....	.25	6615	Ring—Spring retaining ring for dial glass—Console model—Package of 5.....	.34
9586	Reproducer—Complete.....	5.95	4446	Screw—Chassis mounting assembly—Comprising four screws, four spacers, eight cushions, four washers and four lockwashers—For cable model.....	.28
4893	Transformer—Output transformer (T2).....	1.48	5184	Screw—Chassis mounting assembly—Comprising one screw, one spacer, two cushions, one washer and one lockwasher—Package of 4—For console model.....	.28
REPRODUCER ASSEMBLIES CONSOLE MODEL					
4915	Cable—3-conductor reproducer cable.....	.50			
9590	Coil—Field coil, magnet and cone support (L16).....	4.20			

Radio	Model	Max. Volts	Max. Current	Cathode to Ground Volts, D.C.	Screen Grid to Ground Volts, D.C.	Plate to Control Volt. D.C.
Radiotron	Oscillator	—	4.5	—	—	185
	Detector	6.3	1.6	9.5	109	265
	RCA-6A7	6.3	2.2	11.2	109	257
	RCA-6DK First I.F.	6.3	6.6	8.3	109	265
	RCA-6DS Second I.F.	6.3	0.3	4.5	119	80
	RCA-6BT Second Dc.	6.3	30.0	18.0	265	255
	RCA-41 Power	5.0	68.0	—	—	345/345
	RCA-40 Rectifier	—	—	—	—	—

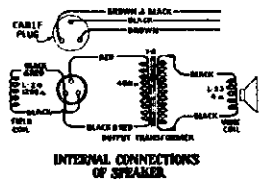
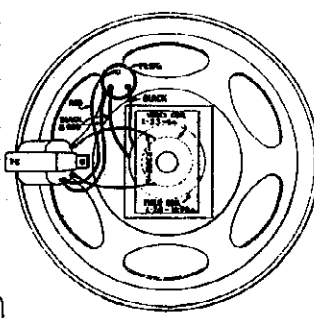
*Calculated from —B.

RCA MFG. CO., INC.

MODELS 128,226
1935 Production
Schematic, Parts
Speaker Wiring



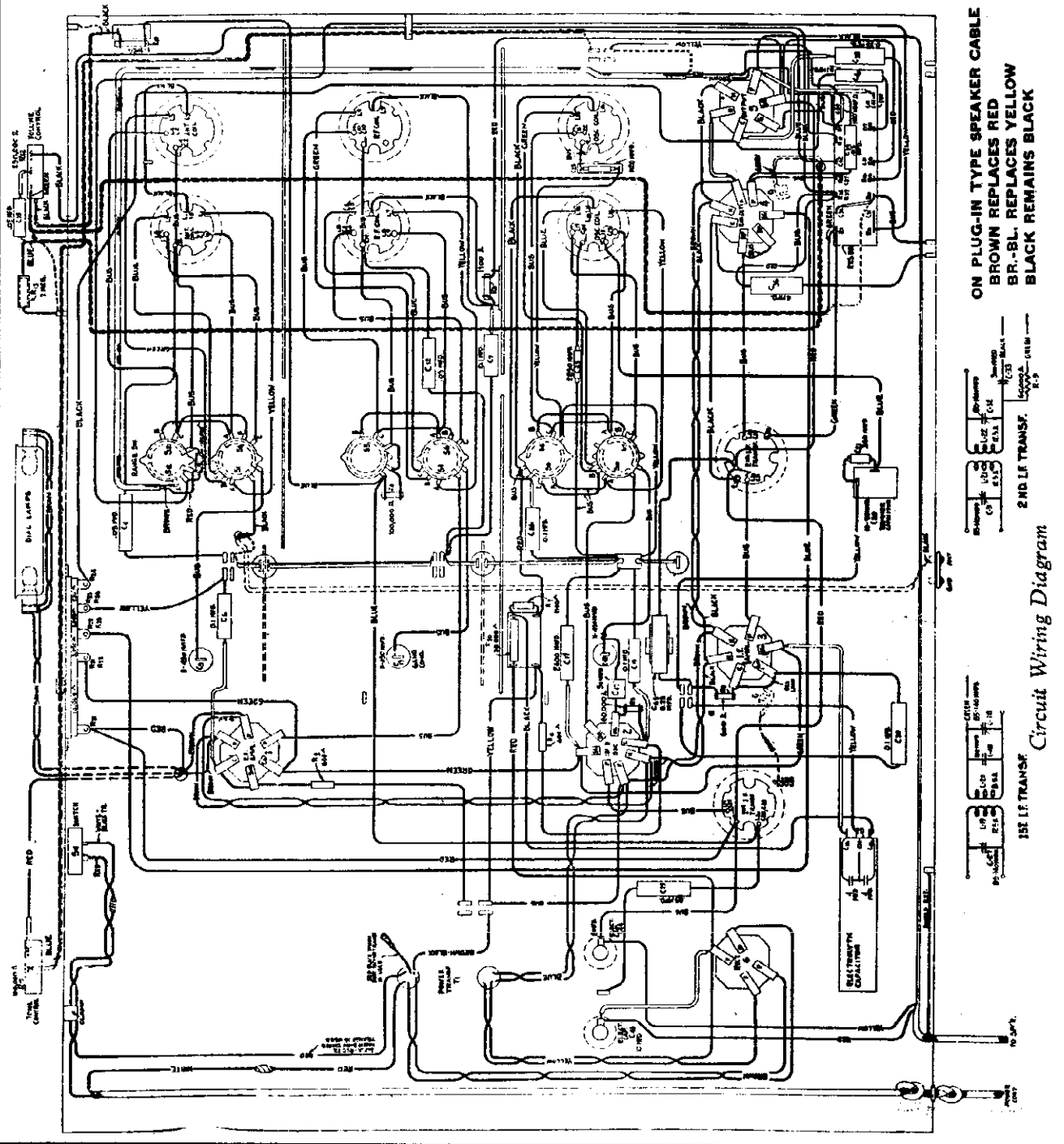
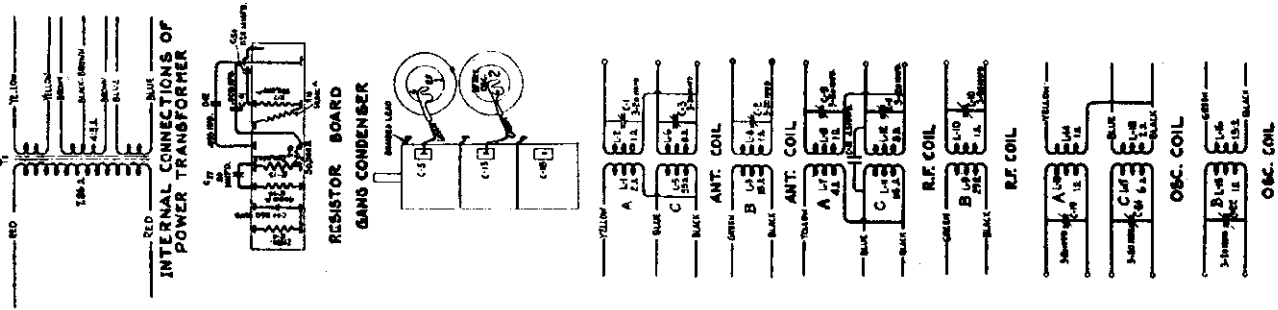
Stock No.	DESCRIPTION	List Price	Part No.
4526	REPRODUCER ASSEMBLY TABLE MODEL	\$0.32	4634
5085	Cable—3-conductor—Reproducer cable with spade terminals		4728
9579	Cable—3-conductor reproducer cable with female connector	.45	4473
9533	Coil—Field coil only	2.10	4526
5118	Cone—Reproducer cone mounted and centered on housing	3.50	9460
5119	Connector—3-contact male connector for reproducer	.25	8935
7818	Connector—3-contact female connector for reproducer cable	.25	9527
9578	Reproducer complete—For use with chassis having reproducer cable with spade terminals	6.58	4472
4818	Reproducer complete—For use with chassis having cable with connector	6.58	
4792	Transformer—Output transformer	2.15	
	Capacitor—.015 mfd. (C39)	.22	4892
	Capacitor—1120 mfd. (C50)		
	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S12)		
	Board—Terminal board assembly		
	Cable—3-conductor with spade terminals		
	Coil—Field coil, magnet and cone support (L24)		
	Cone—Reproducer cone (L23)—Package of 5		
	Reproducer—Complete		
	Transformer—Output transformer (T2)		
	REPRODUCER ASSEMBLY CONSOLE MODEL		
	(For use with chassis having reproducer cable with connector)		
	Cable—3-conductor reproducer cable complete with female connector		
	Connector—3-contact male connector for reproducer		
	Connector—3-contact female connector for reproducer cable		
	Coil—Field coil, magnet and cone support (L24)		
	Cone—Reproducer cone (L23)—Package of 5		
	Reproducer complete		
	Transformer—Output transformer (T2)		



Console Model Loudspeaker (with cable plug)

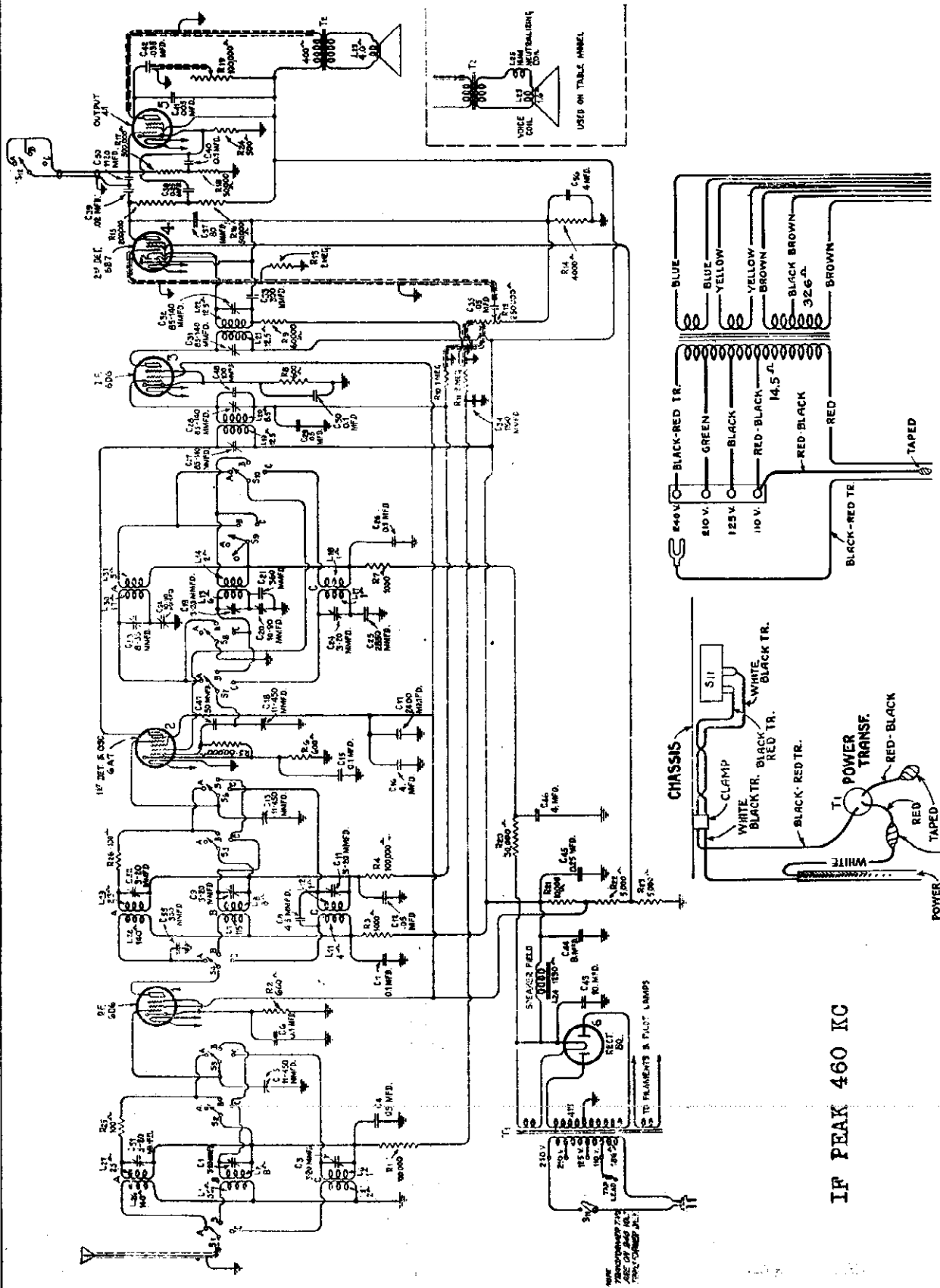
MODELS 128,226
1935 Production
Chassis Wiring

RCA MFG. CO., INC.



RCA MFG. CO., INC.

MODELS 128E, 224E
Schematic
Transformer Data.



INTERNAL CONNECTIONS OF POWER TRANS.

Figure 5—Universal Transformer Connections

MODELS 128E, 224E
Chassis Wiring

RCA MFG. CO., INC.

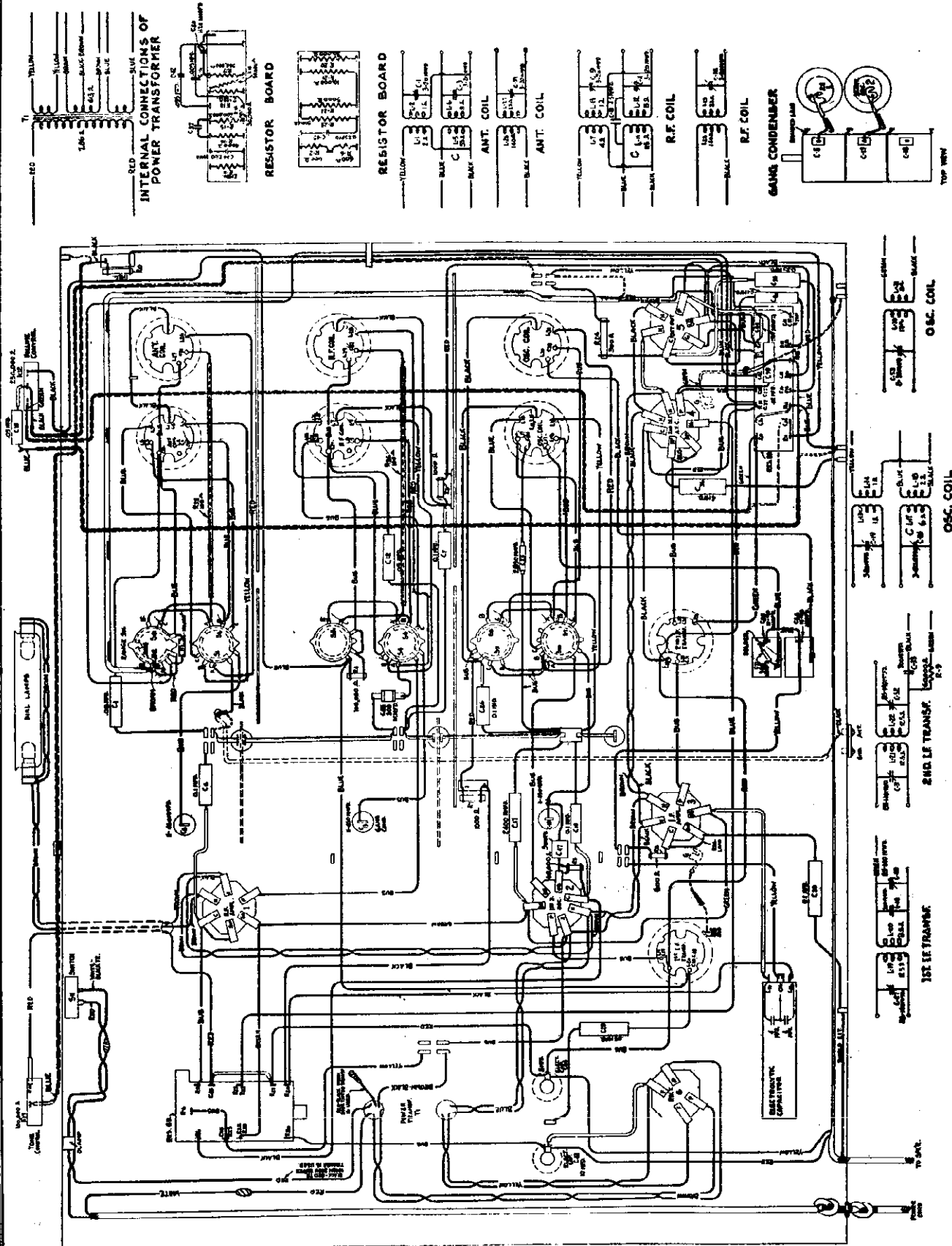


Figure 2—Chassis Wiring Diagram

RCA MFG. CO., INC.

MODELS 128E, 224E
Trimmers, Socket
Voltage, Speakers

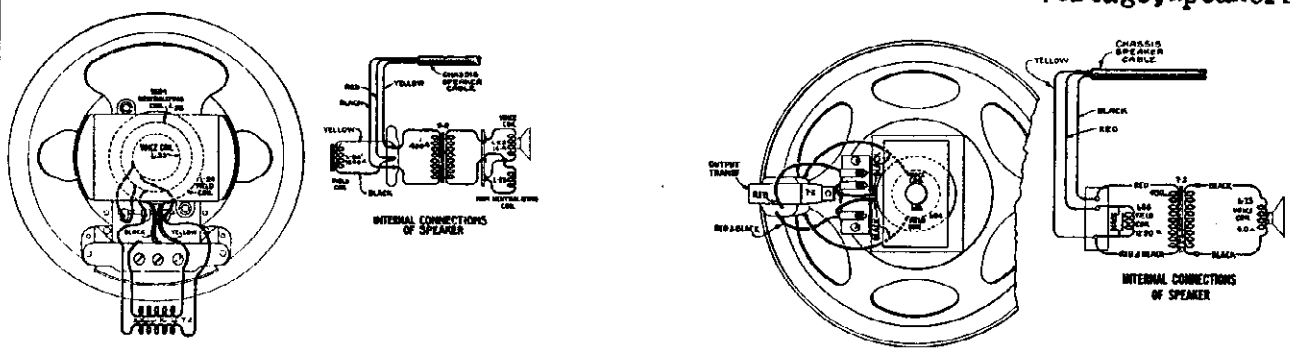


Figure 3—Table Loudspeaker Wiring

Figure 4—Console Loudspeaker Wiring

600 K.C. TRIMMER → (1)
175 K.C. TRIMMER → (2)

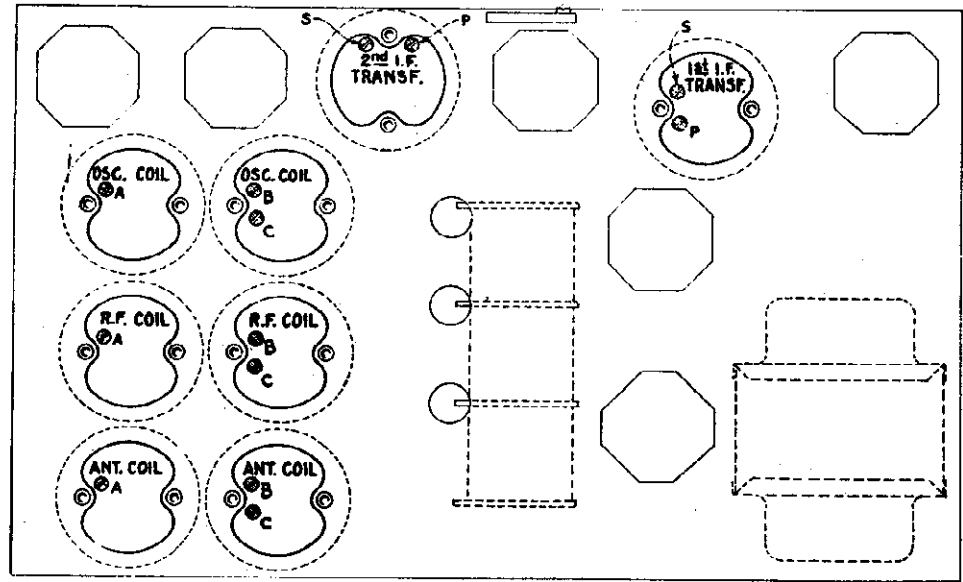
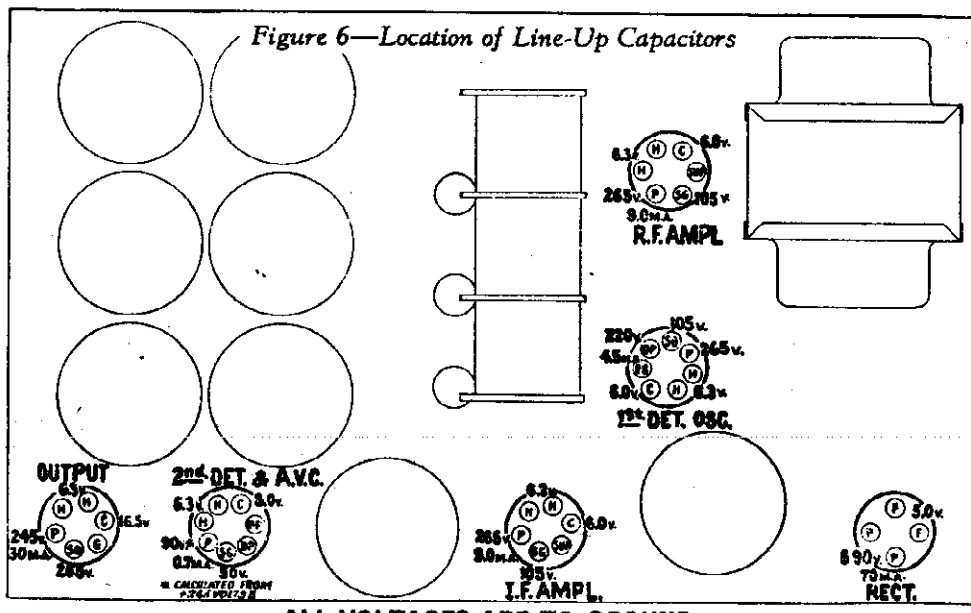


Figure 6—Location of Line-Up Capacitors



ALL VOLTAGES ARE TO GROUND

Figure 7—Tube Socket Voltages

MODELS 128E, 224E
Alignment, Voltage

RCA MFG. CO., INC.

- (c) Check for the image signal, which should be received at approximately 17,080 K. C. on the dial. It may be necessary to increase the external oscillator output for this check.
- (d) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA 6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.
- (e) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

- Band "A"**
- (a) Set the Band Switch at "A."
 - (b) Tune the external oscillator to 410 K. C., set the dial pointer at 410 K. C. and adjust the oscillator detector and R. F. trimmers for maximum output.
 - (c) Shift the external oscillator frequency to 175 K. C. Tune in the 175 K. C. signal irrespective of scale calibration and adjust the series trimmer, the external oscillator to be connected between the antenna and ground terminals of the receiver and the capacitor. Then readjust at 410 K. C. as described in (b).

- Band "B"**
- (a) Set the Band Switch at "B."
 - (b) Tune the external oscillator to 1720 K. C., set the dial pointer at 1720 K. C. and adjust the oscillator detector and R. F. trimmers for maximum output.
 - (c) Shift the external oscillator frequency to 600 K. C. Tune in the 600 K. C. signal, irrespective of scale calibration, and adjust the series trimmers, located on rear apron of chassis for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1720 K. C. as described in (b).

- Band "C"**
- (a) Set the Band Switch at "C."
 - (b) Tune the external oscillator to 48,000 K. C., set the pointer at 48 M. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(4) POWER TRANSFORMER CONNECTIONS

The 220-volt power transformer furnished with some instruments includes taps for operating on 110-volt lines. Figure 5 shows the schematic circuit of the transformer and the proper voltage to be applied to the various taps. The taps are located on the power transformer assembly and are accessible without removing the chassis from the cabinet.

(5) VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if low-resistance meters are used, such allowances must be made:

RADIOTRON SOCKET VOLTAGES

115-Volt A. C. Line—No Signal—Volume Control Maximum

RADIOTRON NUMBER	CATHODE TO GROUND, VOLTS, D. C.	SCREEN GRID TO GROUND, VOLTS, D. C.	PLATE TO GROUND, VOLTS, D. C.	PLATE CURRENT, M. A.	HEATER VOLTS, A. C.
RCA-6D6-R, F.	6.0	105	265	9.0	6.3
RCA-6A7	Dtc.	105	265	3.5	6.3
	Osc.	—	220	4.5	
RCA-6D6-I, F.	6.0	105	265	9.0	6.3
RCA-6B7—2nd Detector	3.0	50	90*	0.7	6.3
RCA-41—Power	16.5	265	245	30.0	6.3
RCA-80—Rectifier	—	—	690 (RMS)	70.0	5.0

* Voltage calculated from 265 V. + B.

(3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F. oscillator and first detector adjustments are required in Bands "A," "B," and "C." Three are required in Band "C."

To properly align the various bands each band must be aligned individually in the order given. This is done by adjusting the R. F. oscillator and first detector trimmers for maximum output. The preliminary set-up requires marked 175 K. C. on the external oscillator to be connected between the antenna and ground terminals of the receiver and the capacitor. Then readjust at 410 K. C. as described in (b). The volume control must be set at its maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The dial pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of Band "A," while the other end should point to within 1/4 inch of the horizontal line at the highest frequency end of Band "A."

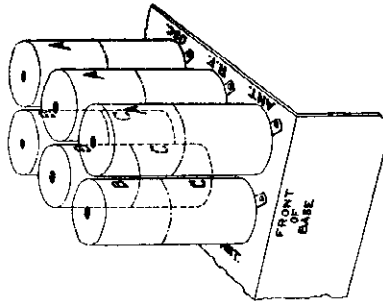


Figure 8—Location of Coils in Shields

Figure 6 shows the location of the trimmers for each band. Care must be exercised to merely adjust the trimmers of the band under test.

Checking with Tuning Wand

Before making any R. F. oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a helical rod having a brass cylinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance, while inserting the iron end increases its inductance. From this, it is seen that unless the trimmer adjustment for a particular coil is perfect at alignment frequencies, inserting one end of the wand may increase the output of a particular signal. A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 8. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 and the signal tuned in, and the output indicator should be connected across the voice coil of the loudspeaker. Then the tuning wand would be inserted, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

(2) I. F. TUNING CAPACITOR ADJUSTMENTS

This receiver has one I. F. stage that employs two transformers in conjunction with four adjustable capacitors. These capacitors may require adjustment, being tuned to 460 K. C.

A detailed procedure for making this adjustment follows:

- (a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.
- (b) Place the oscillator in operation at 460 K. C. Place the receiver in operation and adjust the station selector until a point is reached (Band B) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.
- (c) Refer to Figure 6. Adjust each trimmer of the I. F. transformers until a maximum output is obtained. Go over the adjustments a second time.

RCA MFG. CO., INC.

REPLACEMENT PARTS

Stock No.	Description	List Price	Stock No.	Description	List Price	Stock No.	Description	List Price
4427	Bracket—Volume control or tone control mounting bracket.	\$0.18	9511	Transformer—Power transformer—105-125 volts—50-60 cycles (T1).	\$4.78	4526	REPRODUCER ASSEMBLY TABLE MODEL	\$0.32
2747	Cap—Conic cap—Package of 5.	.50	9512	Transformer—Power transformer—105-125 volts—25-40 cycles.	6.58	7818	Cable—3-conductor—Reproducer cable.	6.58
3861	Capacitor—Adjustable trimmer capacitor (C20).	.78	9513	Transformer—Power transformer—105-250 volts—40-60 cycles.	4.85		Reproducer complete.	
4442	Capacitor—50 mmfd. (C47).	.22	4519	Volume control (R12).	1.25	4473	Board—Terminal board assembly.	.25
4662	Capacitor—80 mmfd. (C37).	.28		DRIVE ASSEMBLIES		9460	Cofl—Field coil, magnet and cone support (L24).	5.00
4413	Capacitor—360 mmfd. (C21).	.22	4362	Arm—Band indicator operating arm.	.78	8935	Cone—Reproducer cone (L23)—Package of 5.	5.25
4634	Capacitor—1120 mmfd. (C50).	.35	10194	Ball—Steel ball for condenser drive assembly—Package of 20.	2.5	9527	Reproducer—Complete.	8.00
4515	Capacitor—1160 mmfd. (C54).	.22	4422	Clutch—Clutch drive assembly for variable condenser drive.	.88	4472	Transformer—Output transformer (T2).	1.40
4670	Capacitor—2250 mmfd. (C14).	.30	4510	Drive—Tuning condenser drive assembly.	2.42	4677	Brzd—Station selector dial (escutcheon) bezel.	.56
4523	Capacitor—2400 mmfd. (C17).	.26	4361	Indicator—Band indicator (celluloid).	.12	6614	Glas—Station selector dial glass.	.30
4524	Capacitor—2850 mmfd. (C25).	.35	4732	Scale—Station selector dial scale.	.40	4520	Indicator—Station selector indicator pointer.	.18
4435	Capacitor—0.05 mfd. (C39).	.25	3943	Screen—Dial light screen (celluloid)—Package of 2.	.18	4449	Knob—Station selector, volume control, tone control, range switch or operating switch knob—Package of 5.	.60
4518	Capacitor—0.05 mfd. (C35).	.52	3983	Screw—Number 6-32-5/32 square head set screws for band indicator operating arm—Package of 10.	1.00	4678	Ring—Dial glass retaining ring—Package of 5.	.34
4417	Capacitor—0.05 mfd. (C4, C12, C79).	.25	4669	Screw—Number 8-32-5/32 set screws for variable condenser drive assembly—Package of 40.	1.00	4527	Screw—Chassis mounting screw assembly comprising 4 spacers, 4 screws, 4 lock washers, 4 washers, 8 cushions—For table model.	.40
3877	Capacitor—0.1 mfd. (C40).	.32	4377	Spring—Band indicator and arm tension spring—Package of 5.	.25	4685	Screw—Chassis mounting screw assembly—Comprising 4 spacers, 4 screws, 4 lock washers, 4 washers and 8 cushions—For console model.	.40
4415	Capacitor—0.1 mfd. (C6, C15, C30).	.30	4378	Sud—Band indicator operating arm stud—Package of 5.	2.5	4632	Screw—Number 8-32-7/16 headless set screw for knobs—Package of 10.	2.5
4645	Capacitor—0.1 mfd. (C7, C26).	.40						
3597	Capacitor—0.25 mfd. (C38, C45).	.70						
4525	Capacitor—4.0 mfd. (C36).	1.05						
4428	Capacitor—8.0 mfd. (C44).	1.05						
7790	Capacitor—10.0 mfd. (C43).	1.05						
4692	Capacitor pack—Comprising one 0.035 mfd and one 0.005 mfd capacitors (C41, C42).	.30						
7589	Capacitor pack—Comprising two 4.0 mfd capacitors (C16, C46).	1.64						
4358	Clamp—Electrolytic capacitor mounting clamp.	.15						
4734	Coil—Antenna coil "A" (L26, L27, C51).	3.05						
7803	Coil—Antenna coil "B & C" (L1, L2, L5, L6, C1, C3).	1.82						
4751	Coil—Detector coil "A" (L28, L29, C52).	2.38						
7805	Coil—Detector coil "B & C" (L7, L8, L11, L12, C8, C9, C11).	2.15						
7807	Coil—Oscillator coil "B & C" (L13, L14, L17, L18, C19, C24).	1.67						
4733	Coil—Oscillator coil "A" (L30, L31, C53).	3.05						
7801	Condenser—3 gang variable tuning condenser (C5, C13, C16).	4.42						
4340	Lamp—Dial lamp—Package of 5.	.60						
3632	Resistor—500 ohms—Carbon type—1 watt (R24)—Package of 5.	1.10						
3218	Resistor—500 ohms—Carbon type—1/4 watt (R2, R6, R8)—Package of 5.	\$1.00						
4370	Resistor—1000 ohms—Carbon type—1/4 watt (R3, R7)—Package of 10.	2.00						
3897	Resistor—4000 ohms—Carbon type—1/4 watt (R14)—Package of 5.	1.00						
6318	Resistor—10,000 ohms (R21).	.80						
3114	Resistor—50,000 ohms—Carbon type—1/4 watt (R16, R18)—Package of 5.	1.00						
3602	Resistor—90,000 ohms—Carbon type—1/4 watt (R5)—Package of 5.	1.00						
3118	Resistor—100,000 ohms—Carbon type—1/4 watt (R1, R4)—Package of 5.	1.00						
3116	Resistor—500,000 ohms—Carbon type—1/4 watt (R15)—Package of 5.	1.00						
6186	Resistor—2,000,000 ohms—Carbon type—1/4 watt (R17)—Package of 5.	1.00						
3033	Resistor—4 megohms—Carbon type—1/4 watt (R10)—Package of 5.	1.00						
6242	Resistor—2 megohms—Carbon type—1/4 watt (R11, R13)—Package of 5.	1.00						
3413	Resistor—5000 ohms—Carbon type—1/2 watt (R2, R23)—Package of 5.	1.00						
4513	Resistor—30,000 ohms—Carbon type—3 watts (R20).	.25						
4521	Shield—Antenna R. F. or oscillator coil shield.	.70						
4145	Shield—Fixer detector or output Radiotron shield.	1.05						
4103	Shield—1, F. amplifier Radiotron shield.	1.05						
6955	Shield—R. F. amplifier Radiotron shield.	.30						
3782	Shield—Second detector Radiotron shield.	.32						
3529	Socket—Dial lamp socket.	.30						
3859	Socket—4-contact Radiotron socket.	.40						
6676	Socket—6-contact output Radiotron socket.	.40						
7485	Socket—6-contact Radiotron socket.	.38						
3572	Socket—7-contact Radiotron socket.	.40						
4379	Strip—Antenna terminal engraved "ANT-GND".	.20						
4684	Switch—Operating switch (S11).	.45						
4728	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10).	4.32						
4517	Tone control (R19).	.90						
4431	Transformer—Five intermediate frequency transformer (L19, L20, C27, C28, C29).	2.28						
4433	Transformer—Second intermediate frequency transformer (L21, L22, C31, C32, C33, R9).	2.15						

MODEL ACR-136
Parts List

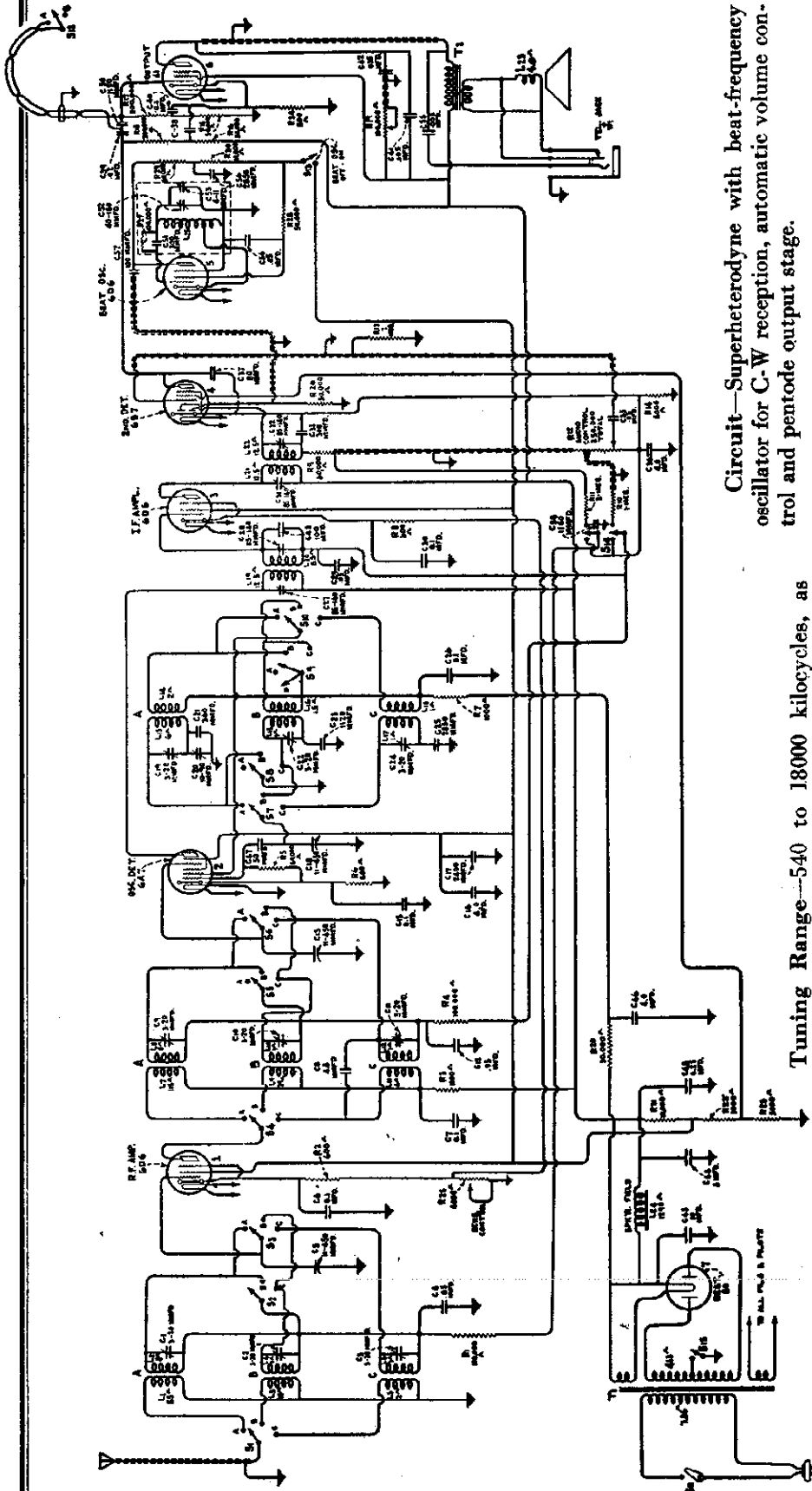
RCA MFG. CO., INC.

REPLACEMENT PARTS

Stock No.	Description	List Price	Stock No.	Description	List Price	Stock No.	Description	List Price
4427	Bracket—Volume control or tone control mounting bracket.	\$0.18	9512	Transformer—Power transformer 105-125 volts, 25-40 cycles.	\$6.58	4524	Capacitor—2650 mmfd. (C56)	\$0.35
2747	Cap.—Contact cap.—Package of 5.	.50	9513	Transformer—Power transformer—105-250 volts—40-60 cycles.	4.85	4755	Coil—Bast coil—Oscillator assembly—Complete (R27, C51, C52, C53, L25)	7.28
3861	Capacitor—Adjustable trimmer capacitor (C20)	.78	4519	Volume control (R12)	1.25	3381	Resistor—10,000 ohms—Carbon type— $\frac{1}{4}$ watt (R30)—Package of 5	1.00
4442	Capacitor—50 mmfd. (C47)	.22	4362	Arm—Band indicator operating arm.	.28	3114	Resistor—50,000 ohms—Carbon type— $\frac{1}{4}$ watt (R26, R28, R29)—Package of 5	1.00
4662	Capacitor—80 mmfd. (C37)	.24	10194	Ball—Steel ball for variable condenser drive assembly—Package of 20.	.25	6955	Shield—Oscillator Radiotron shield.	.25
4513	Capacitor—360 mmfd. (C21)	.22	4422	Clutch—Tuning condenser drive clutch assembly—Comprising drive shaft, balls, ring, spring and washers assembled.	.40	7485	Socket—6-contact Radiotron socket.	.40
4412	Capacitor—1120 mmfd. (C23)	.25	4724	Dial—Station selector dial.	2.45	REPRODUCER ASSEMBLY		
4515	Capacitor—1160 mmfd. (C34)	.22	7799	Drive—Variable tuning condenser drive assembly—Complete.	.96	4418	Board—Terminal board assembly.	.25
4523	Capacitor—2400 mmfd. (C17)	.26	4364	Gear—Spring gear assembly complete with sub piston, gear cover and spring.	.12	9331	Coil—Field coil, magnet and cone support (L24)	2.75
4524	Capacitor—2450 mmfd. (C25)	.35	4861	Indicator—Band indicator—Celluloid.	.18	9492	Coils—Reproducer cone (L23)—Package of 5.	3.70
4824	Capacitor—905 mfd. (C35)	.55	4520	Pointer—Station selector main pointer—Large.	2.45	9514	Reproducer—Complete.	6.00
4435	Capacitor—92 mfd. (C39)	.25	4725	Pointer—Station selector vernier pointer—Small.	.22	4505	Transformer—Output transformer (T2)	1.55
4417	Capacitor—95 mfd. (C4, C12, C29)	.25	4377	Spring—Band indicator and arm tension spring—Package of 5.	.25	4447	Shield—Terminal board shield.	.18
3877	Capacitor—1 mfd. (C10)	.30	4360	Stem—Pointer stem assembly.	.35	MISCELLANEOUS ASSEMBLY		
4415	Capacitor—1 mfd. (C6, C15, C30)	.25	4378	Stud—Band indicator operating arm stud—Package of 5.	.25	4757	Bracket—Station selector dial glass.	.30
4645	Capacitor—1 mfd. (C7, C36)	.25	3993	Screw—No. 6-32 $\frac{1}{2}$ " square head set screw for variable condenser drive assembly—Package of 10.	.25	6614	Knob—Station selector knob—Package of 5.	.75
3597	Capacitor—25 mfd. (C43)	.40	4377	Spring—Band indicator and arm tension spring—Package of 5.	.25	4823	Knob—Volume control, tone control, sensitivity control, oscillator switch, range switch or AVC switch knob—Package of 5.	.55
4525	Capacitor—1.0 mfd. (C36)	.70	4360	Stem—Pointer stem assembly.	.35	4132	Ring—Dial glass retaining ring—Package of 5.	.34
4423	Capacitor—8 mfd. (C44)	1.05	4378	Stud—Band indicator operating arm stud—Package of 5.	.25	6615	Screw—Number 8-32 $\frac{1}{2}$ " headless set screw for knob—Package of 10.	.25
7790	Capacitor—10 mfd. (C43)	1.06	2747	Cap.—Contact cap.—Package of 5.	.50	4726	Rheostat—Sensitivity control rheostat (R25, S11)	1.42
4692	Capacitor pack—Comprising one 0.035 mfd. and one 0.005 mfd. capacitors (C41, C42) capacitors (C16, C46)	1.64	3690	Capacitor—.05 mfd. (C54)	.25	4756	Jack—Phone jack (J1)	1.44
7589	Capacitor pack—Comprising two 4.0 mfd. capacitors (C16, C46)	1.65	3794	Capacitor—100 mmfd. (C37)	.30	4758	Switch—Standby switch (S15)	.95
4458	Coil—Antenna coil "A" (L1, L2, L3, L4, L5, L6)	1.82	4379	Strip—Antenna terminal engraved "ANT-GND"	.20	4727	Switch—AVC control switch (S14)	1.44
4516	Coil—Antenna coil "B" (L7, L8, L9, L10, C10)	1.65	4684	Switch—Oscillator switch (S13)	.45			
4514	Coil—Detector coil "B" (L9, L10, C10)	1.65	4512	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10)	3.42			
7805	Coil—Detector coil "A-C" (L7, L8, L11, L12, C8, C9, C11)	2.15	4517	Tone control (R19)	.90			
7807	Coil—Oscillator coil "A-C" (L13, L14, L17, L18, C19, C24)	1.62	4431	Transformer—First intermediate frequency transformer (L19, L20, C27, C28, C48)	2.28			
4511	Coil—Oscillator coil "B" (L15, L16, C22)	1.52	4433	Transformer—Second intermediate frequency transformer (L21, L22, C31, C32, C33, R9)	2.15			
7801	Condenser—3-rungs variable tuning condenser (C5, C18, C18)	4.42	4721	Resistor—Tapped resistor—One 10,000 ohm, two 5000 ohm and one 500 ohm section (R21, R22, R23, R24)	.80			
4340	Lamp—Dial lamp—Package of 5.	.60	9511	Transformer—Power transformer 105-125 volts, 50-60 cycles (T1)	4.78			
3632	Resistor—500 ohms—Carbon type—1 watt (R24)—Package of 5.	1.10						

RCA MFG. CO., INC.

MODEL ACR-136
Schematic, Data



Circuit—Superheterodyne with beat-frequency oscillator for C-W reception, automatic volume control and pentode output stage.

Power-Supply Ratings—See rating symbol on chassis.

Symbol	Voltage	Frequency (cycles)
A	105-125	50-60
B	105-125	25-60
C	100-130/195-250	50-60

As shipped from factory, instruments rated "C" are connected for 225-250 volts unless prominently specified otherwise on chassis. Any of these, however, can be converted for operation at 100-117, 117-130 or 195-225 volts when required. (See A-C Line Voltages in Part II.)

Power Consumption—85 watts.

Tuning Range—540 to 18000 kilocycles, as follows:

Band	Limits (kc.)	Services
A	540-1720	Standard Broadcast—Police Calls
B	1720-5400	Amateur—Police Calls—Aviation
C	5400-18000	Amateur—S-W Broadcast—Aviation

Intermediate Frequency—460 kilocycles.
Power Output—1.9 watts (undistorted); 3.5 watts (maximum).

Loudspeaker—Electrodynamic (voice-coil impedance 4 ohms).

IF PEAK 460 KC.

MODEL ACR-136
Chassis Wiring

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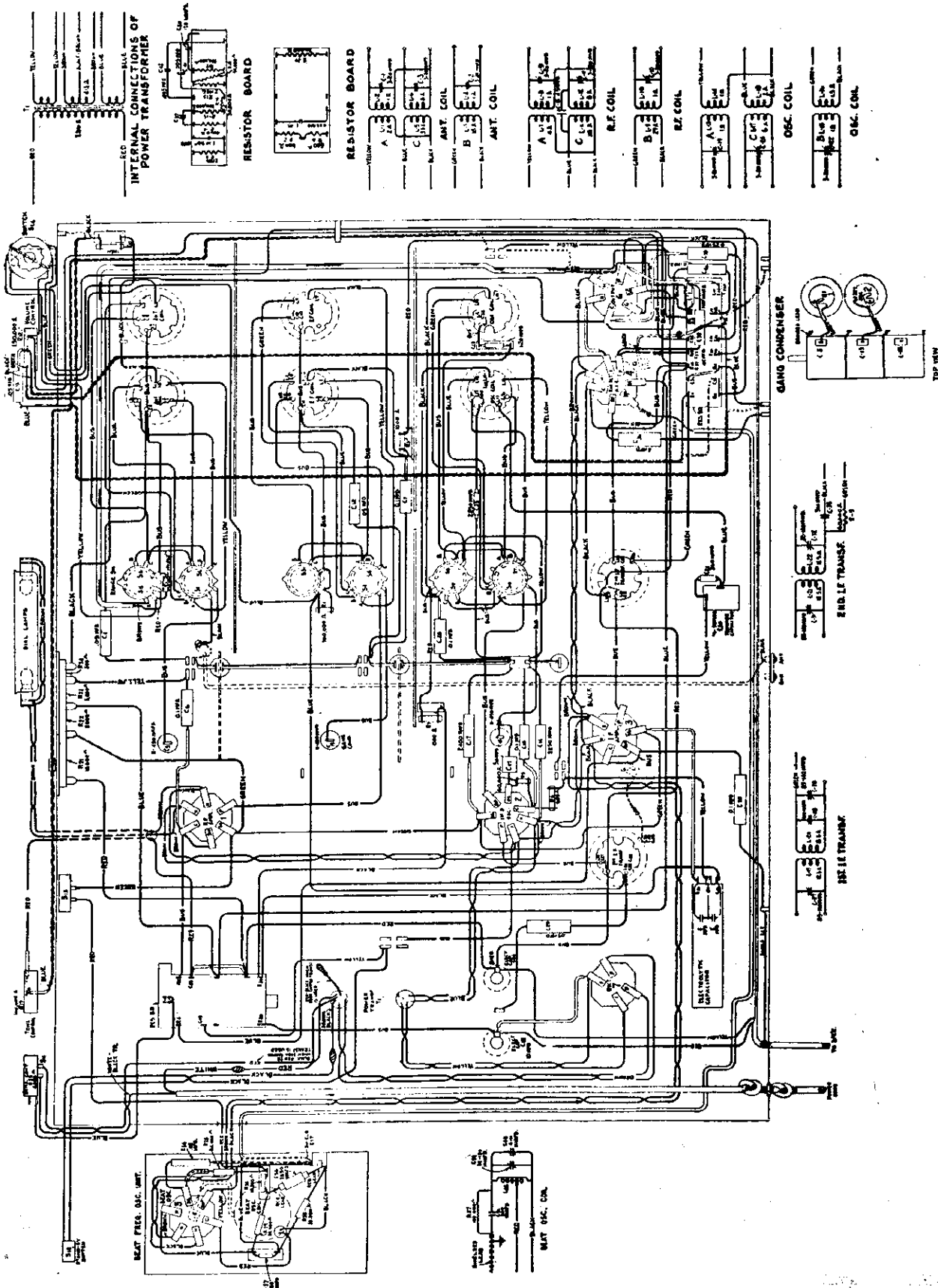


Figure 3—Chassis Wiring Diagram

Alignment Procedure

This receiver, of course, was aligned at the factory, but should be checked regularly (preferably once every six months) to insure best possible results. Adjustments when necessary can be performed easily since all trimmer capacitors are accessible through openings in the external case as shown in Figure 6. If desired, however, the chassis can be withdrawn upon removal of the front panel and four mounting screws.

Equipment

Good equipment is prerequisite to satisfactory alignment. A modulated r-f oscillator having an adequate frequency range such as No. 9050, an output meter or simply an output indicator such as No. 4317, and a non-metallic screwdriver such as No. 4160 are three very necessary items. The process can be greatly facilitated through use of tuning wand No. 6679. The parts to which these numbers apply were designed by the manufacturer of this receiver for use by its authorized servicemen. Such parts, however, can be purchased by radio amateur or engineers through the regular commercial channels. Brief descriptions and net prices of those items are shown on page 15.

I-F Alignment

Both the primary and the secondary circuits of the two coupling transformers for the i-f stage are tuned. Thus, four trimmers may require adjustment to the nominal intermediate frequency—460 kilocycles. To effect these adjustments, refer to Figure 6 and proceed as follows:

1. Connect a modulated oscillator so that its output is impressed between the grid of the first detector and ground.
2. Connect an output indicator across the voice coil of the loudspeaker or an output meter across the secondary of the output transformer with the loud-speaker voice coil open-circuited.
3. Remove the antenna lead-in connection from the rear (ANT-GND) terminal board. Apply power to receiver, turn volume and sensitivity controls fully clockwise (for maximum output) and set tuning control to any point in band A where no signal is received.
4. Place the oscillator in operation at 460 kilocycles and adjust its output control to a position just sufficient to actuate the output meter or indicator.
5. Adjust each of the four trimmer capacitors in turn for maximum output, reducing the input from the oscillator in order to maintain a suitable reading at all times. It will be advisable to go over these adjustments again to make certain that each circuit is exactly peaked rather than merely approximately correct. When an i-f alignment has been made, always follow with the r-f adjustments, as an interlocking effect is usually incurred.

- (c) Shift test oscillator frequency to 600 kilocycles and center the needle in the negative half of the actual dial center. The output should be adjusted to maximum output while rocking the tuning capacitor.
- (d) Re-adjust at 1720 kilocycles as described in (b).
6. Set range switch at "B".
- (a) Tighten the r-f amplifier and first detector trimmers to maximum output. The quarter-wave trimmer capacitors should be adjusted toward three-quarters of the total travel.
- (b) Shift test oscillator frequency to 5160 kilocycles, set dial pointer at 5160 kilocycles and adjust oscillator trimmer for maximum output. Set the trimmer at the first peak obtained while increasing the capacitance from "minimum" position.
- (c) Check for the image signal at approximately 4240 kilocycles on dial (increasing the test oscillator output trimmer if adjusted correctly in accordance with paragraph (b)).
- (d) Reset dial pointer to 5160 kilocycles and reduce the capacitance of the tuning capacitor until the detector is tuned to the same frequency as the oscillator and the RCA-6A7 tube is blocked. Now, increase the trimmer capacitance while rocking the tuning capacitor until maximum output is attained.
- (e) Adjust the r-f amplifier trimmer for maximum output. It is not necessary to rock the tuning capacitor during this adjustment.

R-F Alignment

The r-f amplifier, oscillator and first detector stages include a total of four trimmers in band A and totals of three trimmers each in bands B and C. These bands should be aligned individually and in alphabetical sequence. Care must be used to avoid disturbing the adjustments of trimmers not involved in the band under test. Nominal line-up frequencies for band A are 600 and 1720 kilocycles, while bands B and C are aligned at 5160 and 18000 kilocycles, respectively. For these adjustments, refer to Figure 6 and proceed as follows:

1. Check setting of dial pointer and adjust if necessary. With tuning capacitor plates fully meshed, one end of the pointer should point exactly toward

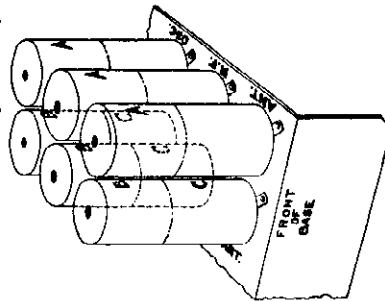


Figure 7—Locations of R.F. Coils

the horizontal line at the low-frequency end of band A while the other end should point to within 1/64-inch of the horizontal line at the high-frequency end of that band.

2. Connect a modulated oscillator to the antenna (ANT) and ground (GND) terminals of the receiver.
3. Connect an output indicator across the voice coil of the loudspeaker or an output meter across the secondary of the output transformer with the loud-speaker voice coil open-circuited.
4. Apply power to receiver and turn volume and sensitivity controls fully clockwise (for maximum output).
5. Set range switch at "A":
 - (a) Adjust oscillator series capacitor (accessible from rear of case) to approximately the center of its range.
 - (b) Place test oscillator in operation at 1720 kilocycles, set dial pointer at 1720 kilocycles and adjust the three trimmers designated by the letter "A" (Figure 6) for maximum output.

7. Set range switch at "C":
 - (a) Follow the same procedure as for band B (6) except use a test frequency of 18000 kilocycles and check for the image signal at 17,080 kilocycles.
- During these adjustments, always leave the sensitivity and volume controls of the receiver at "maximum." To maintain a suitable output, reduce the test-oscillator input as necessary. In the high-frequency bands, it may be found necessary to disconnect the test oscillator and place it at an appreciable distance from the receiver.

Tuning Wand—This tool permits checking the accuracy of r-f alignment without disturbing any of the trimmer adjustment screws. It consists of a bakelite rod with a brass cylinder at one end and iron laminations at the other end. An opening is provided in the top surface of each shield in the r-f assembly (see Figure 7) for inserting the wand. Obviously, the inductance of any coil will be lowered when the brass end is inserted and will be raised upon insertion of the iron end. The trimmer setting is correct when the output at alignment frequencies is decreased alike by each end of the wand. If either end causes an increase in output, it is evident that the associated trimmer requires adjustment.

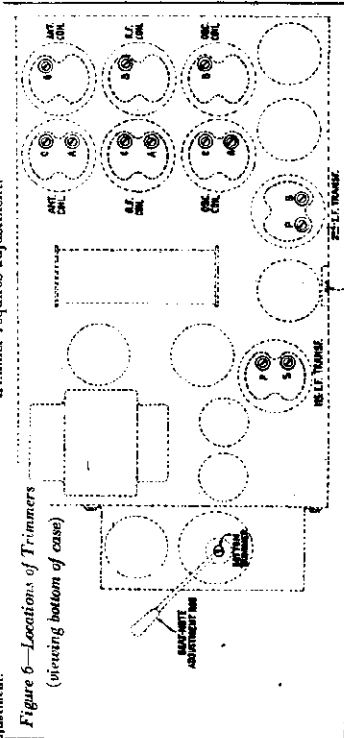


Figure 6—Locations of Trimmers (viewing bottom of case)

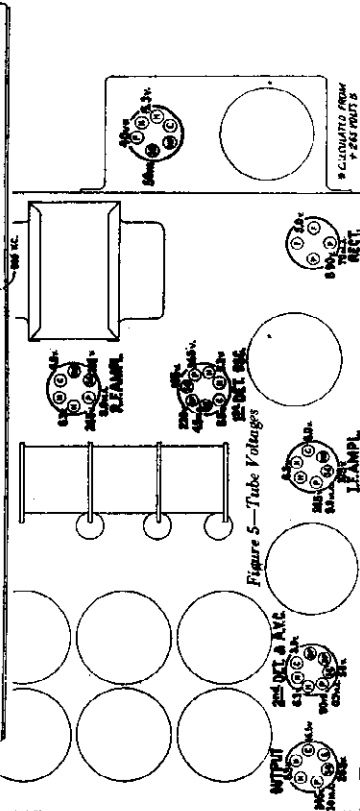


Figure 5—Tube Voltages

MODEL ACR-136

Circuit Data

Voltage, Transformer Data

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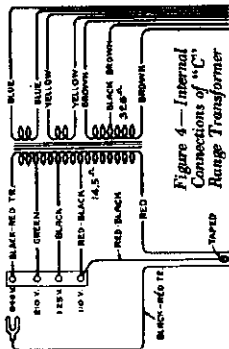
The i-f signal generated by the beat oscillator for c-w reception also is applied to the input of the second detector. As mentioned in the foregoing section, the variable capacitor operated by the horizontal rod in the case is actually a series control which permits adjustment of the oscillator output frequency over a very limited range on either side of the receiver intermediate frequency. The latter is connected in parallel with the main tuning capacitor for the oscillator stage—also a variable air-dielectric unit accessible for adjustment by means of a screwdriver through an opening in bottom of case. Both capacitors together with the oscillator tuning coil are contained inside a single shield.

In addition to detection, the succeeding stage also performs functions of automatic volume control and audio-frequency amplification. Diode detection is employed to avoid distortion and provide automatic volume control. The i-f signal is applied between the cathode and diode plate elements of the tube and the volume control, which is in series with this circuit, assumes a negative d-c potential of an amplitude that varies directly in accordance with the strength of the original r-f carrier. By returning this potential or portion thereof to the grids of the r-f amplifier, first detector and i-f amplifier, these tubes are biased in varying degree to compensate for fluctuations in

All power voltages are obtained from a full-wave rectifier and filter system connected to the a-c line. The loudspeaker field coil is excited from this system and serves therein as a filter reactor.

A tone control circuit consisting of a variable resistor and a fixed capacitor in series is connected across the primary of the output transformer. The sensitivity control is a variable resistor common to the cathode circuit of the r-f and i-f amplifiers for alteration of self-bias produced by the combined plate currents for those tubes.

A-C Line Voltages



Tube Voltages

The following voltages are normal at the tube sockets when the receiver is operating at 115 volts a-c line, with no incoming r-f signal, with the volume and sensitivity controls at "maximum" (both turned fully clockwise), and with the automatic volume control switch turned to the "on" position. Such voltages, of course, were measured with high-resistance meters. If low-resistance meters are used in checking, therefore, allowances must be made for meter-current drain. See Figure 5.

Radioisot Type Number	Cathode to Ground (Volts)	Screen Grid to Ground (Volts)	Plate to Ground (Volts)	Plate Current (M. A.)	Heater Voltage
RCA-4D6 (R-F Amplifier)	6.0	105	265	9.0	6.3
RCA-4A7 (1st Detector)	6.0	105	265	3.5	6.3
RCA-4D6 (i-f Amplifier)	6.0	105	265	9.0	6.3
RCA-4D6 (Beat Oscillator)	3.0	50	90*	0.7	6.3
RCA-4B7 (2nd Detector)	16.5	265	245	30.0	6.3
RCA-41 (Output)	—	—	690	70.0	5.0
(r-m-a)				Total	

* Difficult to measure—Calculated from 265 Volts (+B).

As in all superheterodynes, the first detector is actually a mixer stage, combining the incoming r-f carrier with an unmodulated sinusoidal voltage pro-

duced by a local oscillator. The oscillator plate circuit, being tuned by the third section of the gang capacitor, maintains a constant frequency difference from the transmitted signal throughout the entire tuning range. Thus, a difference or beat frequency is developed when any signal is received which is the same at each position of exact resonance. In this

the beat frequency set up in the first detector carries the same modulation as the original r-f signal and is commonly termed the intermediate frequency. Since this intermediate frequency is constant for all r-f carriers, the next (i-f amplifier) stage utilizes fixed tuning. Its grid circuit is coupled to the first detector

through a transformer. The oscillator plate circuit, being tuned by the third section of the gang capacitor, maintains a constant frequency difference from the transmitted signal throughout the entire tuning range. Thus, a difference or beat frequency is developed when any signal is received which is the same at each position of exact resonance. In this

Tube Voltages

As noted under Electrical Specifications in Part I, this receiver is manufactured in three a-c line ratings designated as A, B and C, respectively. The first two models (A and B) cover a single-voltage range (105 to 125 volts), whereas the third or "C" model is operable in either of four ranges (100 to 117, 117 to 130, 195 to 225 and 225 to 230), three taps being provided on the primary of the power transformer. Internal connections of the transformer are shown in Figure 4. All taps are brought out to a terminal board on the top of the transformer and may be interchanged without removing the chassis from its case.

The following voltages are normal at the tube sockets when the receiver is operating at 115 volts a-c line, with no incoming r-f signal, with the volume and sensitivity controls at "maximum" (both turned fully clockwise), and with the automatic volume control switch turned to the "on" position. Such voltages, of course, were measured with high-resistance meters. If low-resistance meters are used in checking, therefore, allowances must be made for meter-current drain. See Figure 5.

Circuit Description

Before attempting to align or otherwise adjust this receiver, it is advisable to form a general knowledge of the circuit arrangement. A schematic diagram of the complete circuit is shown in Figure 1 (frontpiece). Figure 2 illustrates the arrangement of wiring which interconnects the radio chassis, loudspeaker and front-panel controls while the wiring layout of the radio chassis independently is detailed in Figure 3.

A signal upon entering the receiver passes through a shielded lead to the antenna coupling transformer, the secondary of which is tuned by one section of the three-gang variable capacitor, and is thence impressed upon the grid of the r-f amplifier—a stage of pre-selection used primarily for reducing image-frequency interference to a negligible value. The output of this stage is transformer coupled to the grid circuit of the first detector which also is tuned to the signal frequency by the second unit of the gang capacitor.

As in all superheterodynes, the first detector is actually a mixer stage, combining the incoming r-f carrier with an unmodulated sinusoidal voltage pro-

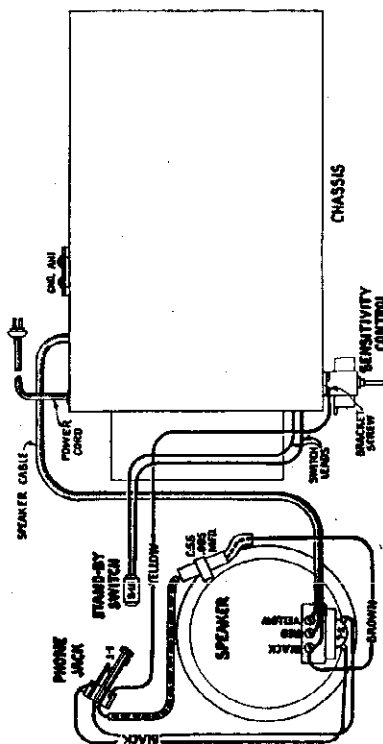


Figure 2—Assembly Wiring Diagram

duced by a local oscillator. The oscillator plate circuit, being tuned by the third section of the gang capacitor, maintains a constant frequency difference from the transmitted signal throughout the entire tuning range. Thus, a difference or beat frequency is developed when any signal is received which is the same at each position of exact resonance. In this

RCA MFG. CO., INC.

MODELS 143, 242, 243
1935 Production
Schematic, Speakers

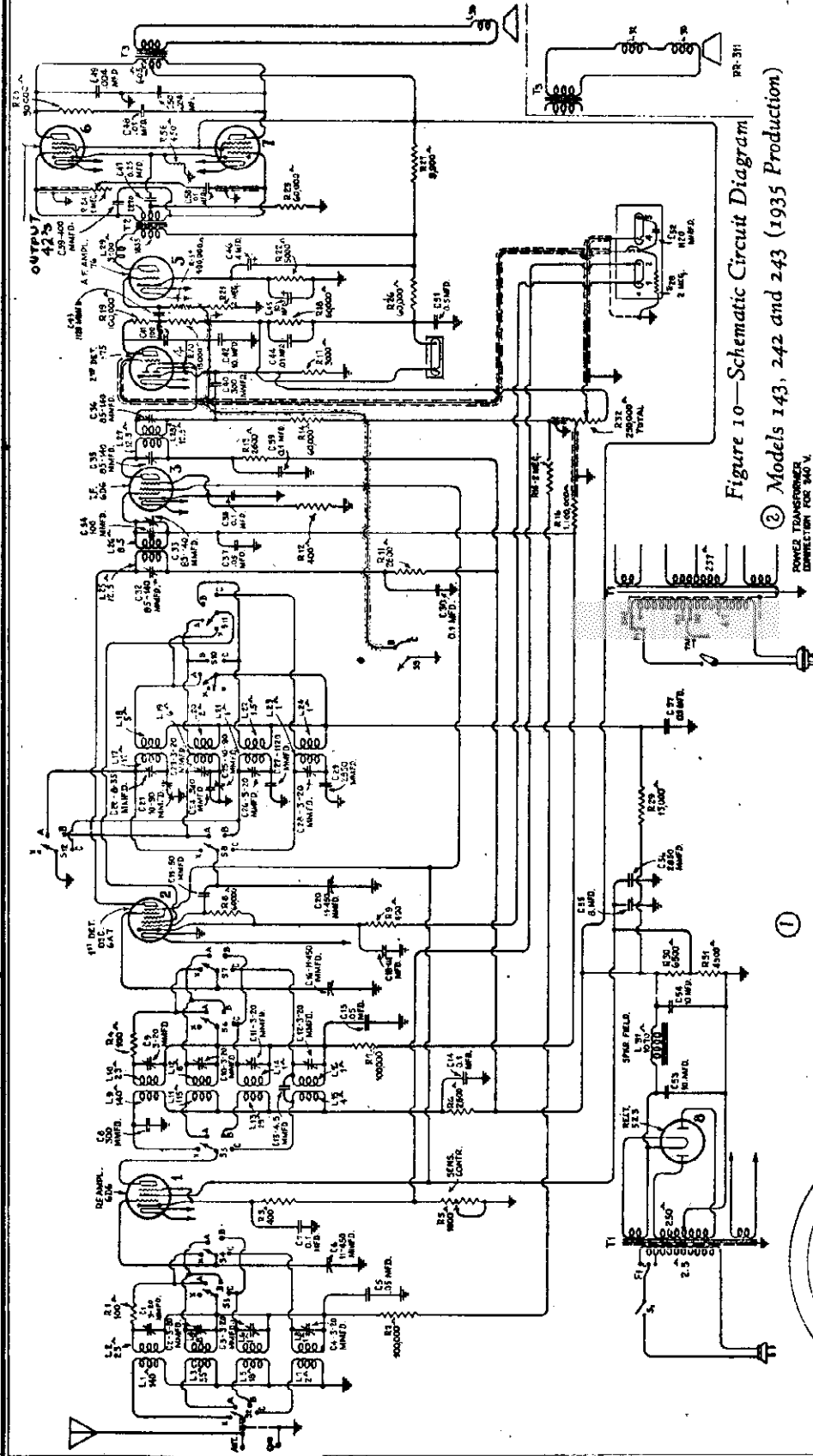


Figure 10—Schematic Circuit Diagram
Models 143, 242 and 243 (1935 Production)

IF PEAK 460 KC.

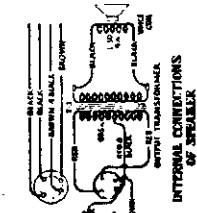


Figure 6—Console Loudspeaker Wiring—
With Cable Plug

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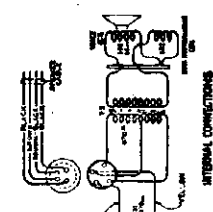
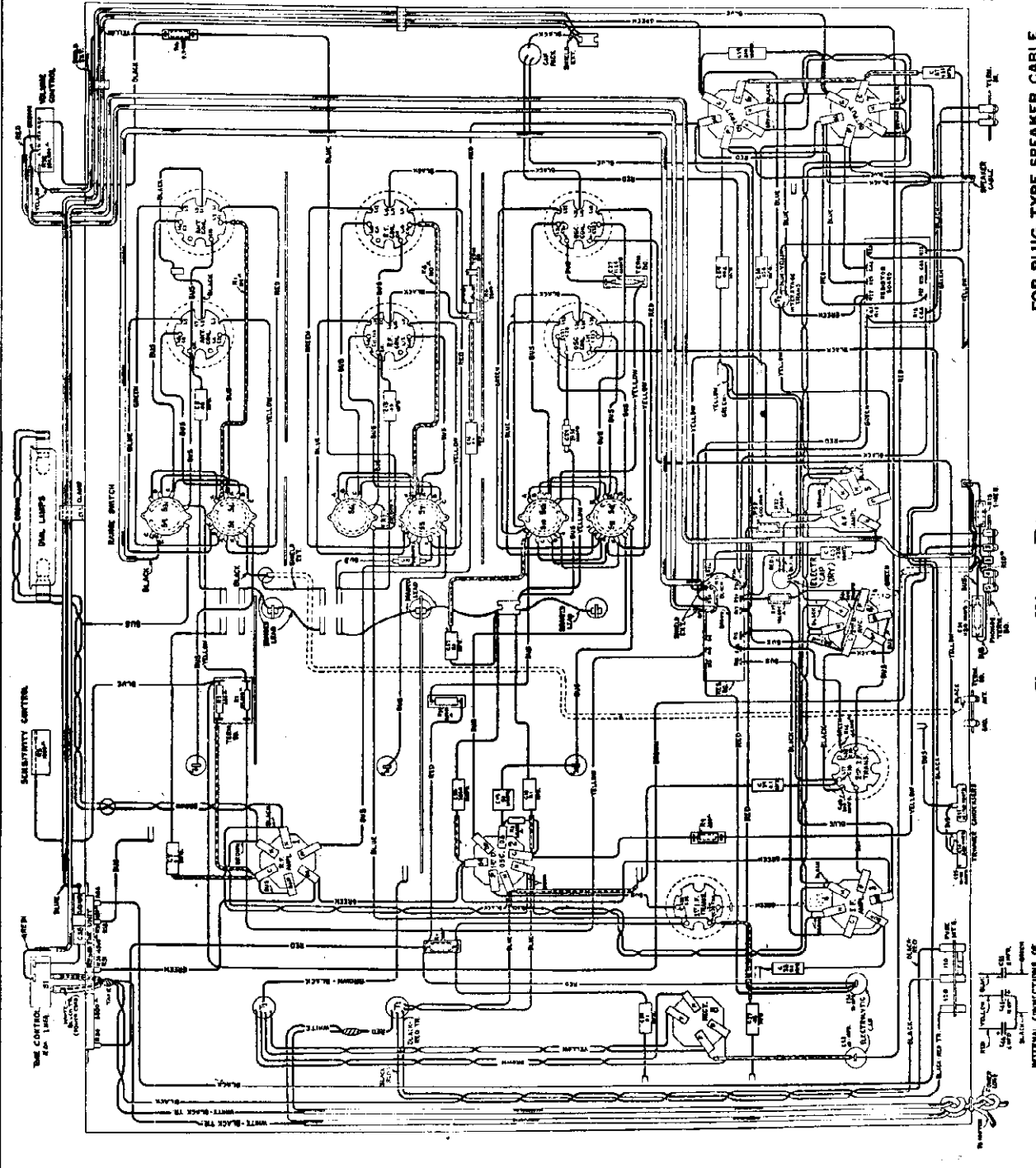
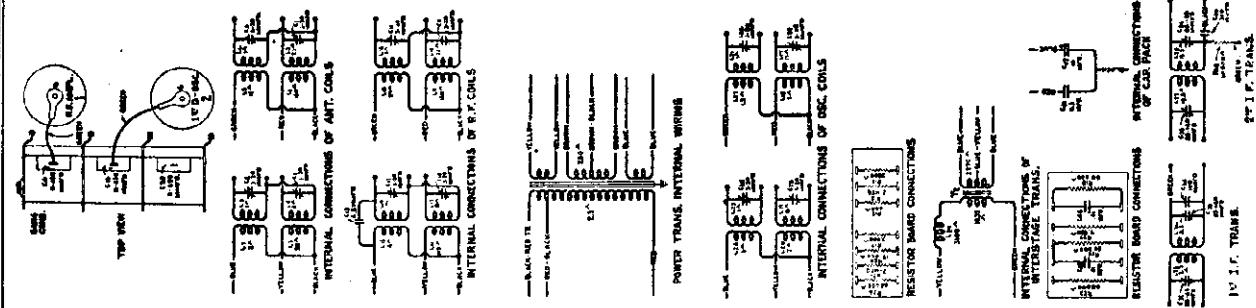


Figure 7—Table Loudspeaker Wiring—
With Cable Plug

MODELS 143, 242, 243
1935 Production
Chassis Wiring

RCA MFG. CO., INC.



FOR PLUG TYPE SPEAKER CABLE
 BROWN REPLACES RED
 BLACK REPLACES BLUE
 BR-BL REPLACES BLACK

Figure 11—Chassis Wiring Diagram
 Models 143, 242 and 243 (1935 Production)

RCA MFG. CO., INC.

REPLACEMENT PARTS—Models 143, 242 and 243 (1935 Production)

Stock No.	Description	List Price	Stock No.	Description	List Price	Stock No.	Description	List Price	Stock No.	Description	List Price
4632	RECEIVER ASSEMBLIES		3950	Shield—1, F. amplifier Radiotron shield.	\$0.26	4377	Spring—Band indicator and arm tension spring—Package of 5.	\$0.25			
4379	Board—Terminal board—Two terminals and link—For changing fidelity.	20	4521	Shield—1, F. amplifier shield.	.42	4722	Pinion—Vernier pointer pinion—Station selector pointer arm.	.18			
4427	Board—Antenna terminal board.	.18	4663	Shield—Oscillator coil wiring shield—Shields oscillator coil wiring from K. F. coil—Complete with terminal board, clamp and resistor.	.32	4378	Stud—Band indicator operating arm stud—Package of 5.	.25			
4244	Cap—Contact cap—Package of 5.	.20	4664	Shield—Oscillator wiring shield—Shields oscillator coil wiring from R. F. coil—Complete with terminal strip and resistor.	.36		REPRODUCER ASSEMBLY (TABLE MODEL)				
3661	Capacitor—Oscillator trimmer capacitor (C1, C2, C5).	.78	4630	Shield—R. F. coil wiring shield with two resistors and terminal board.	.36	5038	Cable—4-conductor—Reproducer cable with female connector plug.	.60			
4633	Capacitor—50 mmfd. (C19).	.25	4665	Shield—R. F. coil wiring shield with two resistors and terminal board.	.50	9334	Coil—Field coil (L31).	1.90			
4635	Capacitor—100 mmfd. (C41).	.25	3529	Socket—Dial lamp socket.	.32	9333	Cone—Cone mounted and centered on housing (L30).	3.50			
4248	Capacitor—300 mmfd. (C8).	.22	4784	Socket—4-contact Radiotron socket.	.15	5039	Connector—4-prong male connector for reproducer cable.	.25			
4183	Capacitor—340 mmfd. (C24).	.25	4786	Socket—5-contact Radiotron socket.	.15	5040	Connector—4-prong female connector for reproducer cable.	.25			
4412	Capacitor—400 mmfd. (C27).	.25	4787	Socket—6-contact Radiotron socket.	.15	9393	Reproducer complete.	7.50			
4409	Capacitor—1120 mmfd. (C43).	.35	4817	Switch—Range switch (S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12).	3.32	9335	Transformer—Output transformer (T3).	1.50			
4634	Capacitor—1120 mmfd. (C52).	.35	4818	Transformer—First intermediate frequency transformer (L23, L26, C32, C33, C34).	1.42		REPRODUCER ASSEMBLY (CONSOLE MODEL)				
4524	Capacitor—2850 mmfd. (C29).	.34	9305	Transformer—Power transformer—105-125 volts—50-60 cycles (T1).	2.28	5038	Cable—4-conductor—Reproducer cable with female connector plug.	.50			
4615	Capacitor—2850 mmfd. (C56).	.34	9306	Transformer—Power transformer—105-125 volts—25-40 cycles.	6.35	9391	Coil—Field coil magnet and cone support (L31).	4.00			
4623	Capacitor—0.004 mfd. (C49, C50).	.28	9307	Transformer—Power transformer—105-125 volts—40-60 cycles.	8.90	8969	Cone—Reproducer cone (L30)—Package of 5.	6.35			
3787	Capacitor—0.01 mfd. (C48).	.30	4433	Transformer—Second intermediate frequency transformer (L27, L28, C35, C36, C40, R19).	2.15	5039	Connector—4-prong male connector for reproducer cable.	.25			
4212	Capacitor—0.01 mfd. (C44).	.30	4620	Transformer and reactor—Interstage transformer and reactor (T2, L29).	2.98	5040	Connector—4-prong female connector for reproducer cable.	.25			
4624	Capacitor—0.01 mfd. (C58).	.54	4809	Volume control (R32).	1.45	9392	Reproducer complete.	8.00			
4836	Capacitor—0.05 mfd. (C5, C15, C37).	.30		DRIVE ASSEMBLIES		5041	Transformer—Output transformer (T3).	1.40			
4791	Capacitor—0.1 mfd. (C7, C18, C38).	.24	4362	Arm—Band indicator operating arm.	.28		MISCELLANEOUS PARTS				
4685	Capacitor—0.1 mfd. (C14, C30, C39, C57).	.28	10194	Ball—Steel ball for variable condenser drive assembly—Package of 20.	2.5	4677	Beam—Metal bezel (excitron) for station selector dial.	.56			
4840	Capacitor—0.25 mfd. (C47).	.30	4412	Clutch—Timing condenser drive clutch assembly—Comprising drive shaft, balls, ring, spring and washer assembled.	1.00	4621	Dial—Station selector dial.	.65			
7790	Capacitor—10 mfd. (C53, C54).	1.05	7799	Drive—Variable tuning condenser drive complete.	2.45	4895	Excitron—Station selector excitron and cathoid crystal.	.55			
4619	Capacitor pack—Comprising one .4 mfd., one 10 mfd. capacitor (C42, C51).	1.44	4827	Gear—Spring gear assembly complete with hub, pinion, gear, cover and spring.	1.25	6614	Glass—Station selector dial glass.	.30			
4626	Capacitor pack—Comprising one .4 mfd., one 10 mfd. and one 8 mfd. capacitor (C45, C46, C55).	2.82	4704	Indicator—Band indicator—Cathoid.	.12	4449	Knob—Station selector dial knob.	.60			
4338	Clamp—Electrolytic capacitor clamp—For capacitor Stock No. 7790.	.15	4367	Indicator—Station selector vernier pointer—Small.	.15	4678	Lamp—Dial lamp—Package of 5.	.60			
4693	Clamp—Electrolytic capacitor clamp—For capacitor Stock No. 4626.	1.82	4520	Indicator—Station selector main pointer—Large.	.18	4446	Ring—Retaining ring for dial glass—Package of 5.	.35			
7810	Coil—Antenna coil "Band B-X" (L1, L2, L5, L6, C1, C3).	2.10	3943	Screen—Translucent screen for dial light—Package of 2.	.18		Screw assembly—Chassis mounting screw assembly—Comprising four screws, four lockwashers, four washers, four spacers and eight cushions—For cable model.	.28			
7803	Coil—Antenna coil "Band A-C" (L3, L4, L7, L8, C2, C4).	1.82	3993	Screw—No. 6-32/32" square head set screw for band indicator operating arm of condenser drive—Package of 10.	.25		Screw—No. 8-32 1/4" headless set screw for knobs—Package of 10.	.25			
7808	Coil—Detector coil "Band X-B" (L9, L10, L13, L14, C9, C11).	2.05									
7805	Coil—Detector coil "Band A-C" (L11, L12, L15, L16, C10, C12, C13).	2.15									
7807	Coil—Oscillator coil "Band A-C" (L19, L20, L23, L24, C2, C3, C8).	1.62									

Use on same model
© RCA 1935

**MODEL 236-B
Alignment
Parts List**

RCA MFG. CO., INC.

REPLACEMENT PARTS

Stock No.	Description	List Price	Stock No.	Description	List Price
2747	RECEIVER ASSEMBLIES		4588	Transformer—Third intermediate frequency transformer (L14, L15)	\$2.15
4498	Cap—Control cap—Package of 5	\$0.50	4533	Transformer pack—Audio transformer pack—Comprising driver and output transformer (T1, T2)	3.98
4442	Capacitor—8 mfd. (C18)	1.25	4535	Volume control (R9)	1.40
3981	Capacitor—50 mfd. (C10)	.22		REPRODUCER ASSEMBLIES	
3981	Capacitor—300 mfd. (C25)	.30		Cable—2-conductor reproducer cable	.38
4413	Capacitor—360 mfd. (C16)	.22	4541	Cone—Reproducer cone (L16)	1.88
2749	Capacitor—2400 mfd. (C26)	.35	9432	Magnet—Cone housing and magnet assembly	8.98
4801	Capacitor—2400 mfd. (C31, C32)	.50	7819	Reproducer complete	12.18
4529	Capacitor—2650 mfd. (C33)	.32	4234	Rivet—Cone mounting rivet—Package of 100	.66
4858	Capacitor—0.01 mfd. (C29)	.25		DRIVE ASSEMBLY	
4518	Capacitor—0.05 mfd. (C7, C19, C23, C24)	.52	4996	Dial—Station selector dial	.75
4856	Capacitor—0.05 mfd. (C5, C19, C23, C24)	.30	4798	Drive—Variable tuning condenser drive assembly complete	1.50
4906	Capacitor—0.017 mfd. (C30)	.25	4363	Pointer—Station selector pointer	.18
4791	Capacitor—0.1 mfd. (C8, C28)	.24	4689	Screw—No. 8-32-5/32 square head set screw for condenser drive—Package of 10	.25
4840	Capacitor—0.25 mfd. (C7)	.30	4997	Shaft—Condenser drive shaft	.28
3861	Capacitor—Adjustable trimmer capacitor (C17)	.78		MISCELLANEOUS ASSEMBLIES	
4796	Coil—Antenna coil (L4, L5, R1, C4)	2.30	4895	Bezel—Metal bezel (facehook) and crystal for station selector drive	.55
4800	Coil—Oscillator coil (L8, L9, C35)	1.90	4289	Body—Fuse connector body—Package of 10	.35
4504	Condenser—2-gang variable tuning condenser (C6, C9)	2.78	7867	Cable—8-conductor battery cable complete	.78
4370	Resistor—1,000 ohms—Carbon type—1/4 watt (R2, R7)—Package of 5	1.00	4288	Cap.—Fuse connector cap—Package of 10	.16
3602	Resistor—60,000 ohms—Carbon type—1/4 watt (R1, R4, R6)—Package of 5	1.00	6515	Connector—Fuse connector complete	.38
3118	Resistor—100,000 ohms—Carbon type—1/4 watt (R1, R4, R6)—Package of 5	1.00	4290	Ferrule—Fuse connector ferrule and bushing—Package of 10	.40
3744	Resistor—250,000 ohms—Carbon type—1/4 watt (R11, R12)—Package of 5	1.00	3748	Fuse—0.5 ampere—Package of 5	.35
6186	Resistor—500,000 ohms—Carbon type—1/4 watt (R13)—Package of 5	1.00		Insulator—Fuse connector insulator—Package of 10	.60
6242	Resistor—2 megohms—Carbon type—1/4 watt (R8, R10)—Package of 5	1.00	4449	Knob—Station selector, volume control, cone or battery switch knob—Package of 5	.80
4521	Shield—Antenna, oscillator or I. F. transformer shield	.42		Resistor—0.38 ohm—Fixed type—Filament aires (R15)—Package of 5	.52
7487	Shield—Second detector Radiotron shield—“AVC”	.25	4638	Screw—Chassis mounting screw assembly—Comprising eight cushions, four screws, four washers, four lockwashers and four spacers	.25
3942	Shield—First detector and oscillator Radiotron shield	.18	3238	Screw—6-40-1/2" knurled head—Set screw for operating switch knob No. 3088—Package of 10	1.50
3056	Shield—First I. F. second I. F. first audio Radiotron shield—Package of 2	.40	4613	Screw—8-32-3/4" headless set screw for station selector volume control or cone or range switch knob—Package of 10	.30
4794	Socket—4-contact Radiotron socket	.15	4284	Spring—Fuse connector spring—Package of 10	.25
4794	Socket—4-contact audio amplifier—Radiotron socket	.15	4797	Switch—Operating switch	1.50
4786	Socket—6-contact detector-oscillator Radiotron socket	.15	4285	Washer—Fuse connector insulating washer—Package of 10	.22
4785	Socket—6-contact output Radiotron socket	.62			
4798	Switch—Tone control switch (S3)	.62			
4431	Transformer—First intermediate transformer (L10, L11, C3, C4, C15)	2.28			
7840	Transformer—Second intermediate transformer (L12, L13, C20, C21, C22)	2.35			

SERVICE DATA

(1) Line-Up Capacitor Adjustments
To properly align this receiver, it is essential that a modulated R. F. oscillator of suitable frequency range such as Stock No. 9050, an output indicator, Stock No. 4317, and an alignment tool, Stock No. 4160, be available. Figure 4 shows the location of the various line-up capacitors.

I. F. Tuning Adjustments

The I. F. amplifier comprises two stages which have three transformers. The third transformer is tuned so that only a total of four tuned circuits are used. Refer to Figure 4 and proceed as follows:

- Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.
- Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output indicator across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight glow is obtained in the output indicator.
- Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. The third transformer is untuned and does not require adjusting. Keep the oscillator output at a low value so that only a slight glow is obtained in the output indicator at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. alignment.

R. F. and Oscillator Adjustments

The important points to remember are the need for using the minimum oscillator output to obtain an indication in the output device with the volume control at its maximum position and the manner of obtaining the proper high-frequency oscillator and detector adjustments.

The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the top of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the dial pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 540

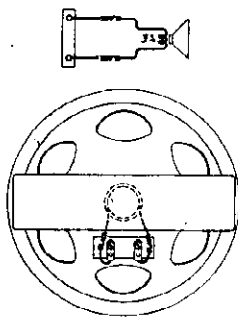


Figure 3—Loudspeaker Wiring

(b) Then set the Test Oscillator at 1720 K. C., the dial pointer at 1720, and adjust the oscillator output so that a slight glow will be obtained in the output indicator when the volume control is at its maximum position. Adjust the two trimmers under the two R. F. coils, see Figure 4, until a maximum output is obtained. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor, accessible from the top of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1720 K. C. adjustment.

(3) Voltage and Current Measurements

Voltage and current values listed in the following table and indicated at the Radiotron socket contacts on Figure 4 form a reference basis for test of the receiver. It is to be noted that all voltages are given with respect to chassis-ground, excepting those appearing across the filaments (F-F). The values shown are obtainable when the receiver is in normal operating condition. They do not take into account inaccuracies caused by current consumed in the voltmeter used for the tests; the lower the voltmeter resistance, the lower the degree of accuracy. Allowances must therefore be made, dependent upon the type of test instrument used, for the loading effect of the voltmeter on the circuit.

MODEL 236-B
Chassis Wiring

RCA MFG. CO., INC.

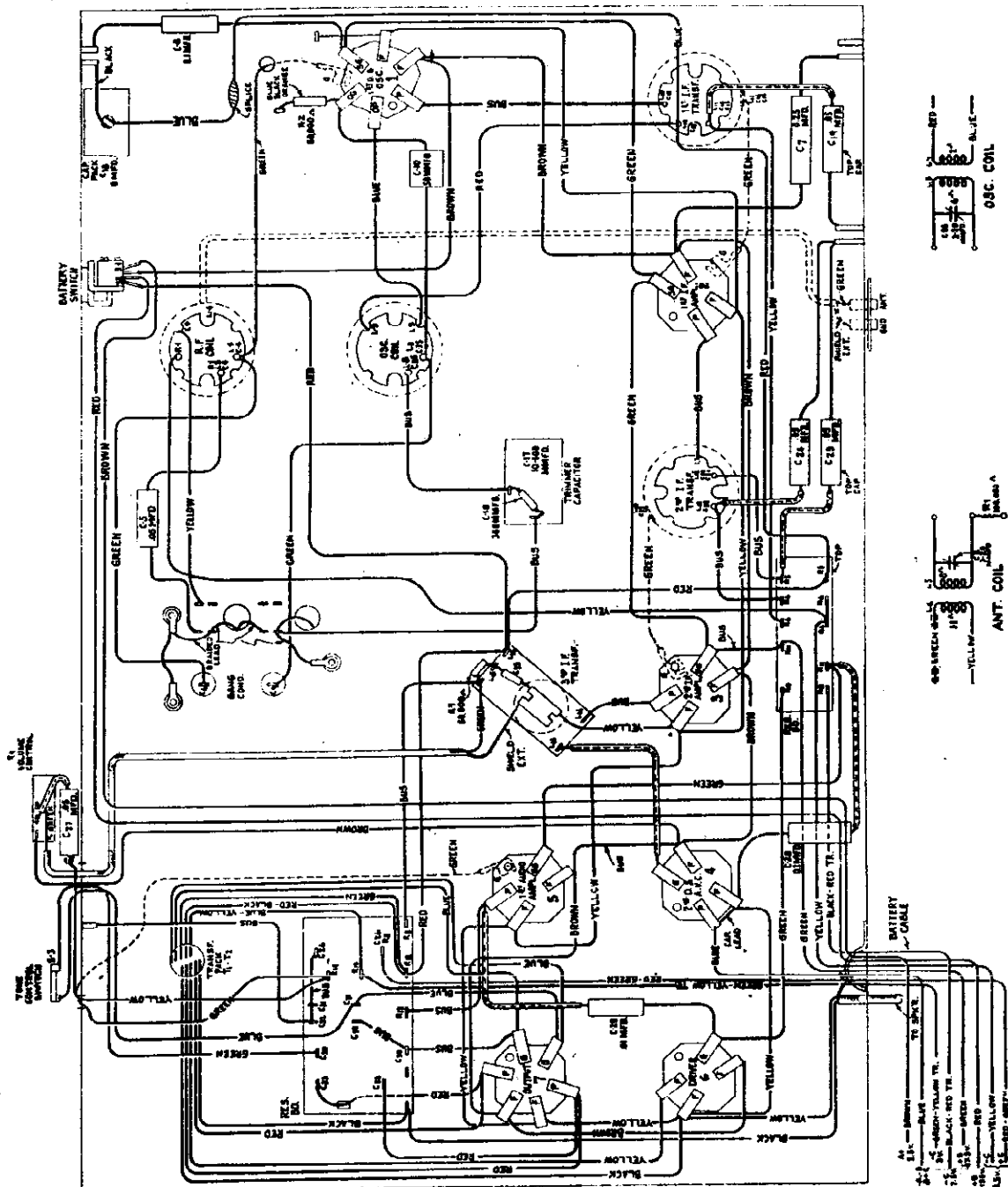
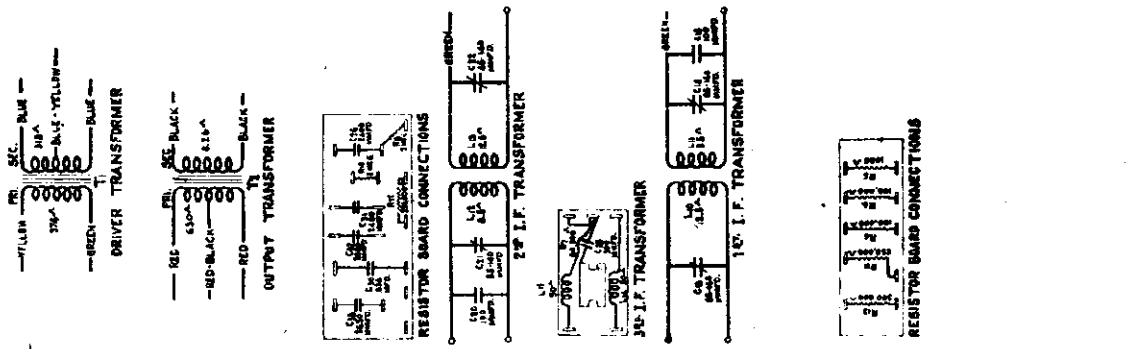
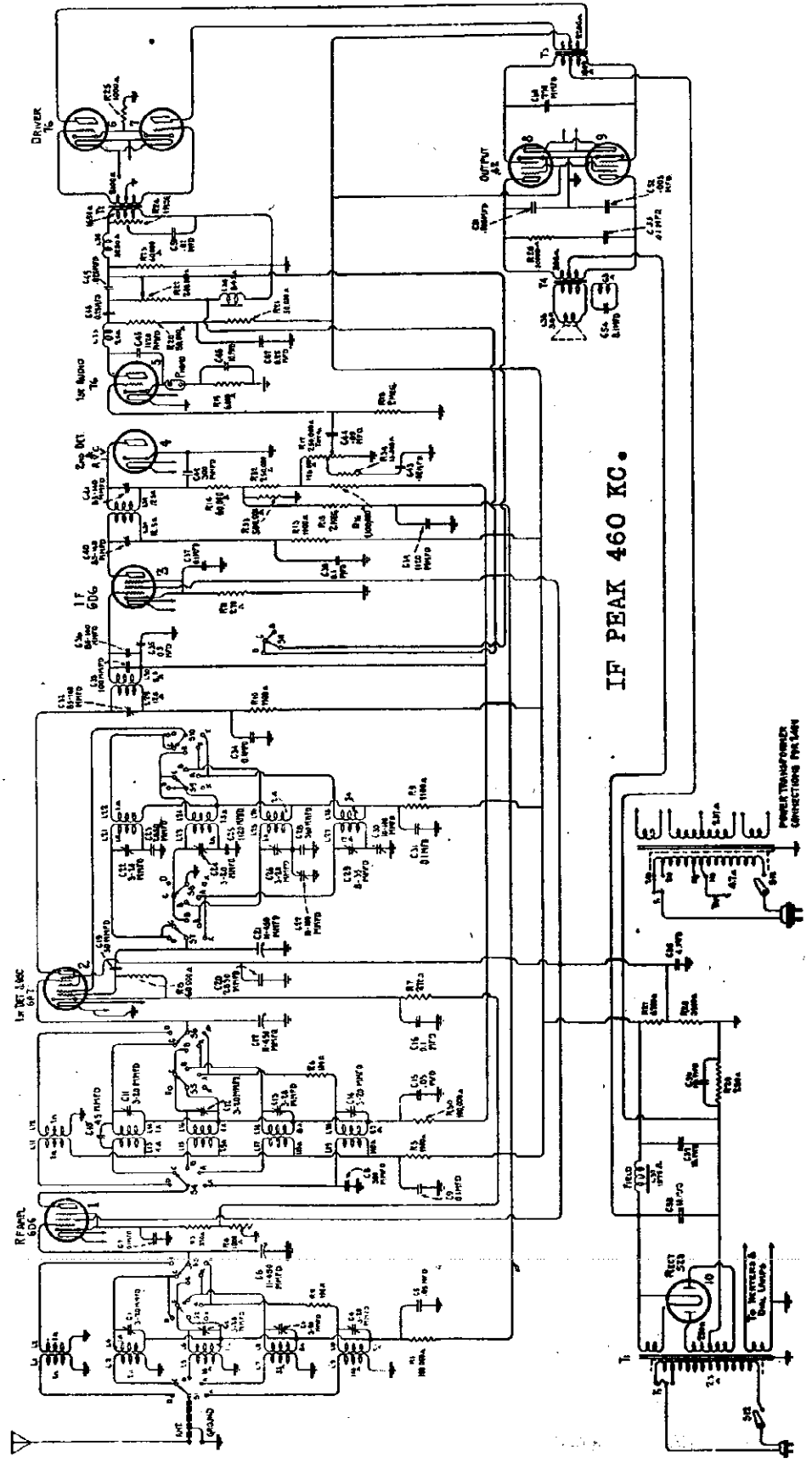


Figure 2—Chassis Wiring Diagram

RCA MFG. CO., INC.

SUPPLEMENT to RCA VICTOR MODEL 262 SERVICE NOTES

Late production of the RCA Victor Model 262 uses Radiotron RCA-1-V as the second detector instead of Radiotron RCA-76. The changes in the schematic and chassis wiring diagrams are shown on this and the reverse page.

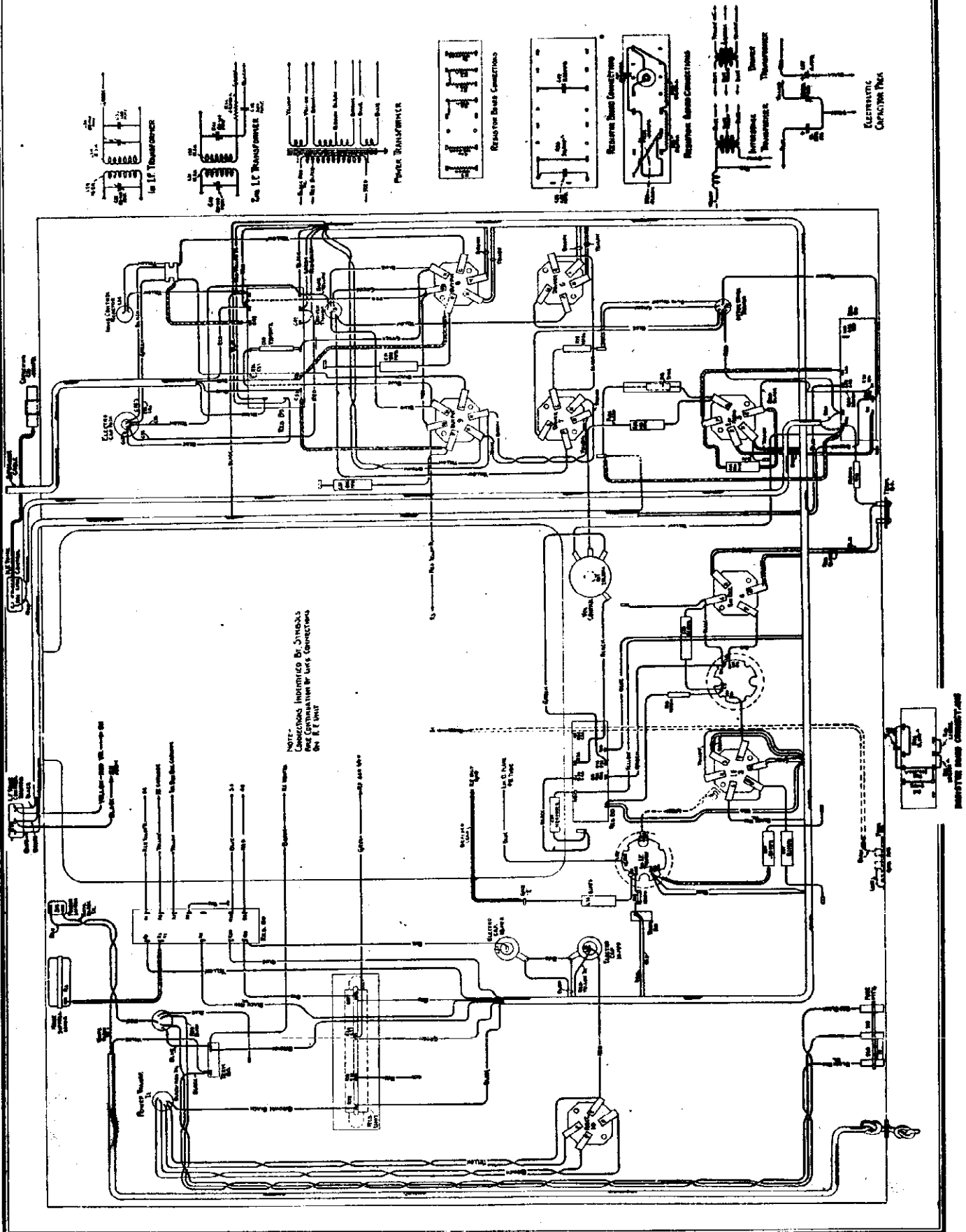


IF PEAK 460 KC.

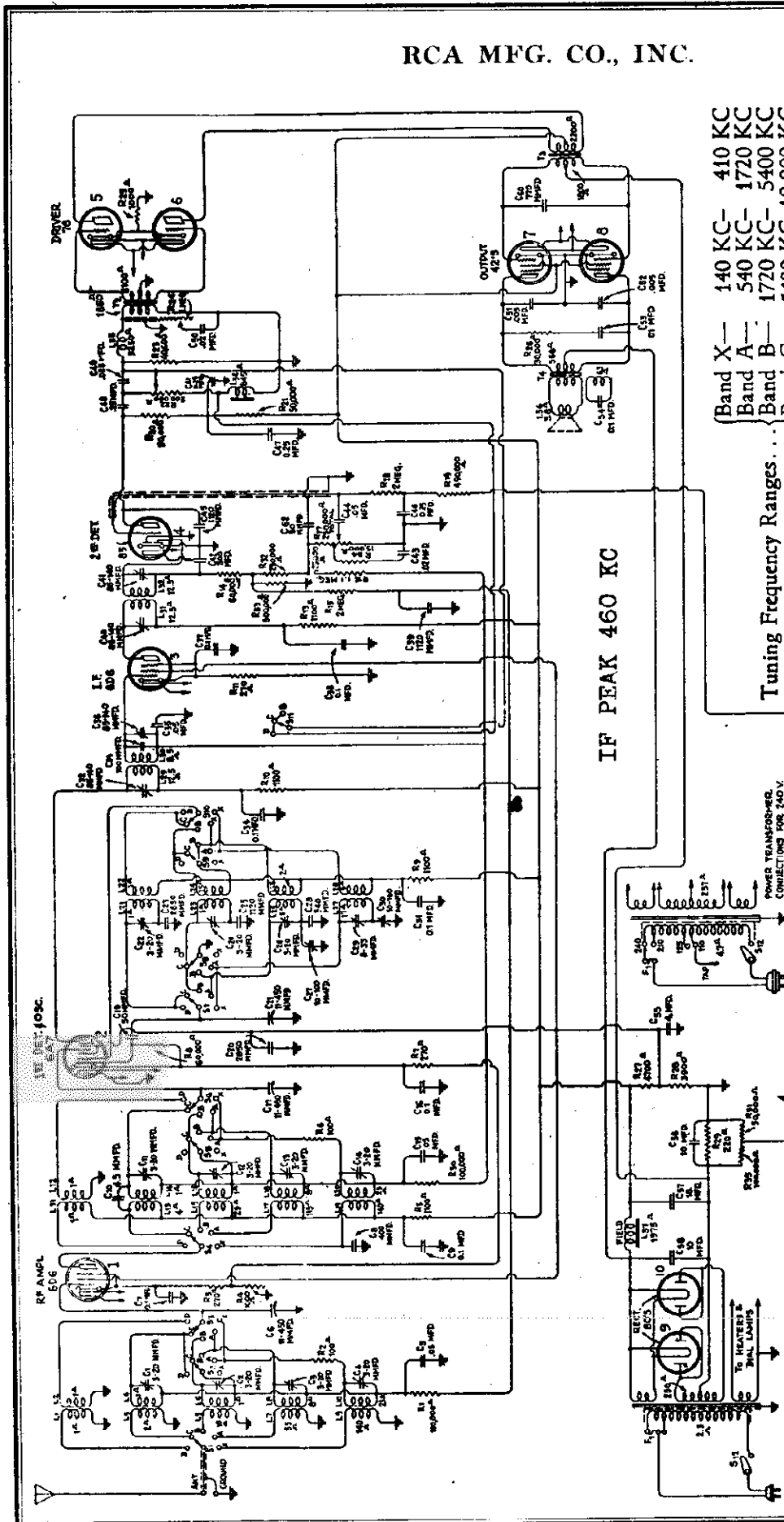
Schematic Circuit Diagram

MODEL 262
Late Production
Chassis Wiring

RCA MFG. CO., INC.



RCA MFG. CO., INC.



- { Band X — 140 KC — 410 KC
- { Band A — 540 KC — 1720 KC
- { Band B — 1720 KC — 5400 KC
- { Band C — 5400 KC — 18,000 KC
- { Band D — 18,000 KC — 36,000 KC

Tuning Frequency Ranges

Figure 3—Schematic Circuit Diagram

Voltage Ratings	105-125 Volts
Frequency Ratings	25-60 Cycles and 50-60 Cycles
Power Consumption	130 Watts at 125 Volts, 50 Cycles; 130 Watts at 125 Volts, 25 Cycles
Number and Type of Radiotrons	2 RCA-6D6, 1 RCA-6A7, 2 RCA-76, 1 RCA-85, 2 RCA-42, 2 RCA-80—Total, 10
Line-up Frequencies	175 KC, 410 KC, 460 KC, 600 KC, 1720 KC, 5160 KC, and 18,000 KC
Maximum Undistorted Output	7 Watts
Maximum Output	14 Watts

MODELS 262, 263

1935 Production

RCA MFG. CO., INC.

R-F. Unit Wiring Diagram
Speaker Data

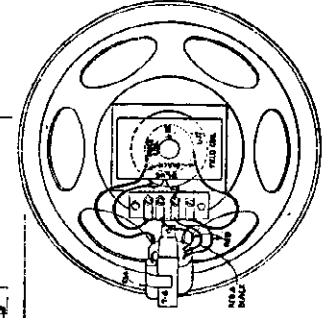
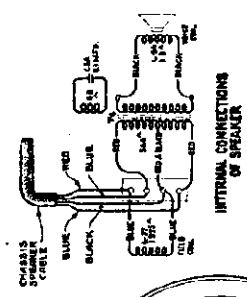
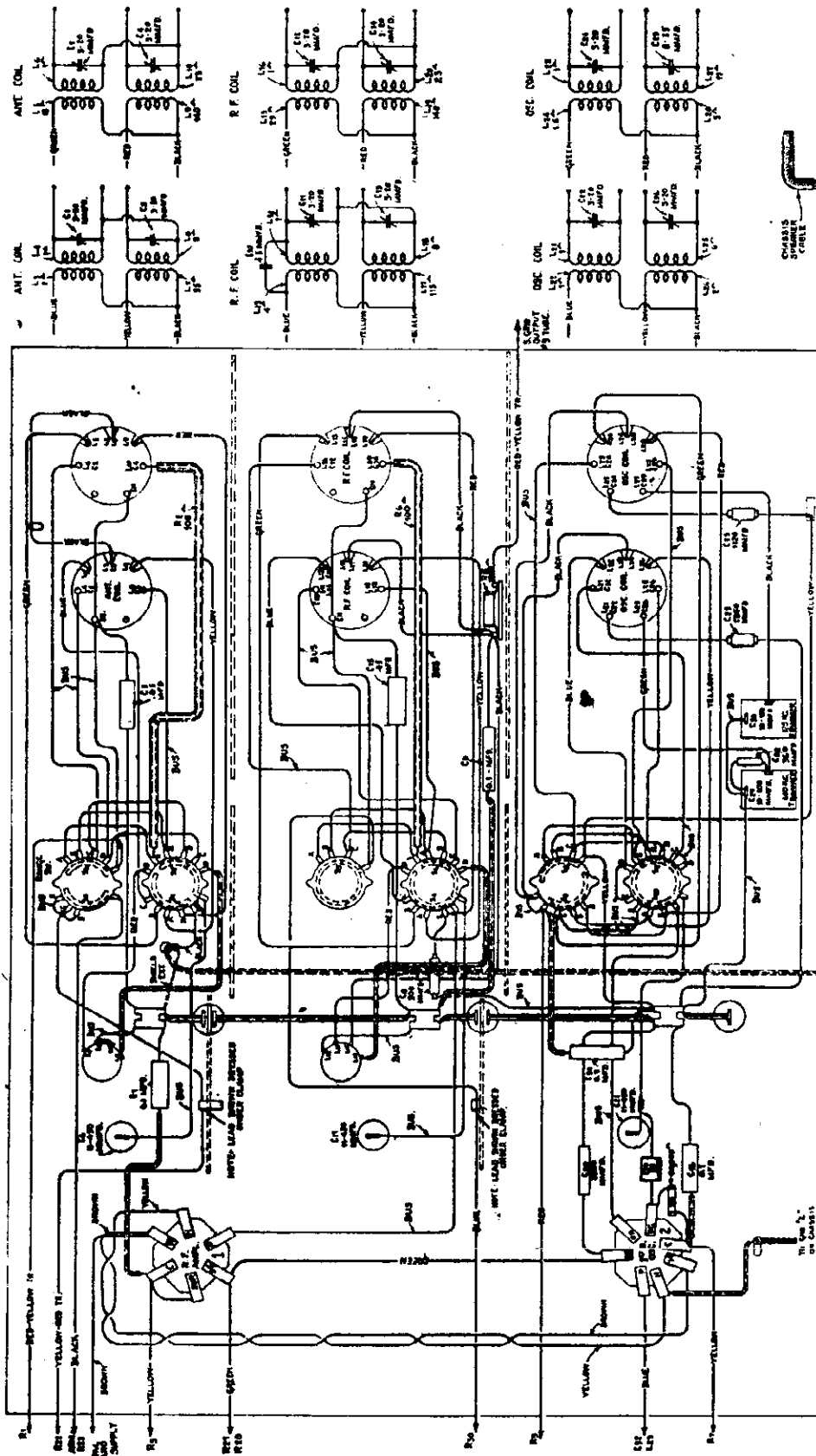


Figure 5—R. F. Unit Wiring Diagram

Figure 1—Loudspeaker Wiring—Without Plug

Figure 2—Loudspeaker Wiring for Plug-In Type

MODELS 262, 263
1935 Production
Socket, Voltage

RCA MFG. CO., INC.

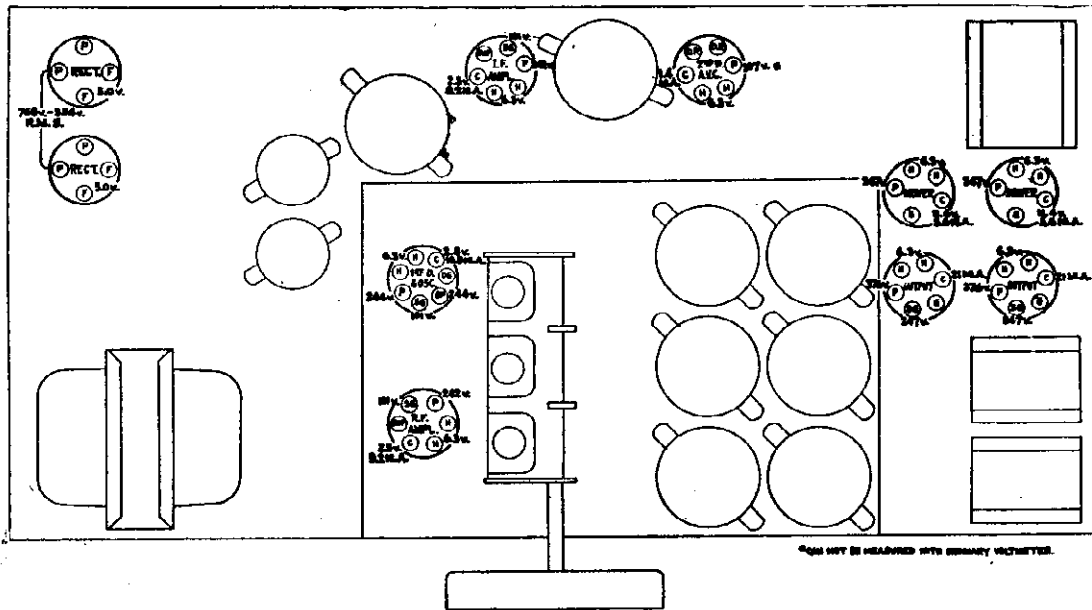


Figure 8—Radiotron Socket Voltages

RADIOTRON SOCKET VOLTAGES

120-Volt A. C. Input—Volume and Sensitivity Controls Maximum—Band Switch at "A"—No Signal

Radiotron Type and Purpose	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.
RCA-6D6—R. F.	2.5	101	242	9.2	6.3
RCA-6A7	Detector	101	244	10.9	6.3
	Oscillator	—	244	•	6.3
RCA-6D6—I. F.	2.5	101	242	9.2	6.3
RCA-85—2nd Det. AVC	0	—	107*	1.4	6.3
RCA-76—Driver	11.4	—	247	5.6	6.3
RCA-76—Driver	11.4	—	247	5.6	6.3
RCA-42—Power	0	247	376	21.0	6.3
RCA-42—Power	0	247	376	21.0	6.3
RCA-80—Rectifier	—	—	768/384 R. M. S.	56.0	5.0
RCA-80—Rectifier	—	—		56.0	5.0

*Cannot be measured with ordinary voltmeter.

MODELS 262, 263 1935 Production Alignment, Dial Data

RCA MFG. CO., INC.

(c) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

Band "D"

No adjustments are required for Band "D".

(4) MAGNETIC PICKUP CONNECTIONS

A convenient point for attachment of a phonograph turntable exists at the RCA-85 second detector stage, where such an input may be connected between the control grid cap and ground. A switching arrangement should be provided for disconnecting or shorting the antenna input to prevent the reception of radio signals when the record adjunct is being used. It will be necessary to provide an external volume control for the phonograph. The wiring should be well shielded to prevent "hum" pickup.

(5) ADJUSTMENT OF DIAL VERNIER MECHANISM

A small vernier indicator is provided for giving a simple means of band spread. Under normal conditions, adjustment of this mechanism will not be required. However, in event the initial adjustment is not satisfactory or adjustment is required because of replacement, the following procedure should be used:

- Remove the chassis from the cabinet to a place convenient for work.
- Check the tension on the vernier hand by pushing it in a counter-clockwise direction. There should be tension against such a push. If this tension does not exist, the action of the hand may be erratic and possibly fail to return to the same position for a particular station.
- Pull off the long hand with a pair of long-nose pliers.
- Straighten the lugs that hold the dial in place. Then remove the dial "vernier" hand and stem gear together.
- Then remove the "vernier" hand from the stem gear.
- Turn the dial to each extreme and to its center position and check the backlash of the back gear (closest to reflector). There should be definite backlash in each direction at each of these three positions.
- If this backlash is not obtained, it will be necessary to re-adjust the position of the gears. Loosen the lock-screw located above the center set of gears and move the adjoining gear assembly in or out of mesh as required.
- After making sure there is backlash at the three check points mentioned, turn the outside gear in a clockwise direction $1\frac{1}{2}$ turns.

(c) Shift the external oscillator to 175 KC. Tune in the 175 KC signal irrespective of scale calibration and adjust the series trimmer marked 175 KC on Figure 7 for maximum output, at the same time rocking the variable tuning capacitor.

Band "A"

- Set the band switch at "A."
- Tune the external oscillator to 1720 KC, set the pointer at 1720 KC and adjust the oscillator, detector and R. F. trimmers for maximum output.
- Shift the external oscillator to 600 KC. Tune in the 600 KC signal irrespective of scale calibration and adjust the series trimmer, marked 600 KC on Figure 7, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1720 KC as described in (a).

Band "B"

- Set the band switch at "B."
- Tune the external oscillator to 5160 KC, and set the pointer at 5160 KC. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.
- Check for the image signal, which will be received at approximately 4240 on the dial if the oscillator trimmer has been set correctly in accordance with paragraph (b).
- It will probably be necessary to increase the external oscillator output for this check.
- Reset the dial to 5160 KC and peak the antenna and detector trimmers for maximum output.

Band "C"

- Set the band switch at "C."
- Tune the external oscillator to 18,000 KC, and set the pointer at 18 M. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacity from minimum to maximum.
- Check for the image signal, which should be received at approximately 17,060 on the dial. It may be necessary to increase the external oscillator output for this check.
- Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is received for maximum output.

(a) Connect the output of an external oscillator tuned to 460 KC between the first detector grid and ground. Connect the output inductor across the voice coil of the loudspeaker.

(b) Place the oscillator in operation at 460 KC. Place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 7. Adjust each trimmer of the I. F. transformers until a maximum output is obtained. Go over the adjustments a second time.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and oscillator adjustments due to interlocking which always occurs.

(3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F. oscillator and first detector adjustments are required in Bands "A" and "X." Three are required in Bands "B" and "C." None are required in Band "D."

To properly align the various bands, each band must be aligned individually. The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver and the output indicator across the voice coil of the loudspeaker. The volume control must be at its maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high-frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The dial pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end of the pointer should be toward the horizontal line at the lowest frequency end of Band "A," while the other end should point to within $1/64$ inch of the horizontal line at the highest frequency end of band "A."

Figure 7 shows the location of the trimmers for each band. Care must be exercised to only adjust the trimmers in the band under test.

Band "Y"

- Set the band switch at "X."
- Tune the external oscillator to 410 KC, set the pointer at 410 KC and adjust the oscillator, detector and R. F. trimmers for maximum output.

SERVICE DATA

(1) LINE-UP PROCEDURE

The line-up procedure for these receivers is somewhat involved and it is important that these instructions be carefully followed when making adjustments. Properly aligned, they have outstanding performance, otherwise, poor reception may be experienced.

Equipment

To align this receiver, proper test equipment must be used. This consists of a modulated R. F. oscillator having proper frequency range, an output indicator, an alignment coil and a tuning wand. These parts have been developed by the manufacturer of this receiver for use by service men to duplicate the original factory adjustments.

Checking with Tuning Wand

Before making any R. F. oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a bakelite rod having a brass cylinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance, while inserting the iron end increases its inductance. From this, it is seen that unless the trimmer adjustment for a particular coil is correctly adjusted, inserting one end of the wand may increase the output of a particular signal. A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 6. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 KC and the signal tuned in. The output indicator should be connected across the voice coil of the loudspeaker. Then insert the tuning wand, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when either end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is out of alignment. An increase in the trimmer capacitance would be the proper remedy.

(2) I. F. TUNING CAPACITOR ADJUSTMENTS

There is one I. F. stage with two I. F. transformers in the receiver. A total of four adjustable capacitors are used, two on each transformer. The transformers are both peaked at 460 KC.

A detailed procedure for making this adjustment follows:

MODELS 262, 263
1935 Production
Trimmers, Data

RCA MFG. CO., INC.

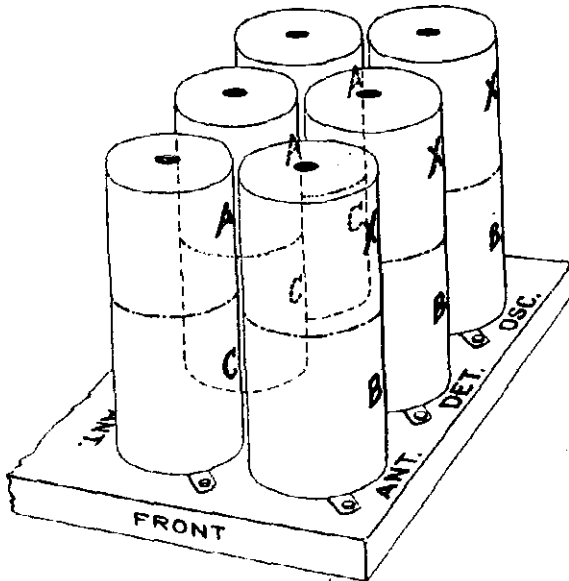


Figure 6—Location of Coils in Shields

Hold it at this position and replace the stem gear.

- (i) Turn the dial throughout its range. If the gears become noisy, move the gear further toward the reflector edges described in (g).
- (j) Replace the dial scale, making sure the hole clears the spindle.
- (k) Replace the vernier hand. It should point at zero when the tuning capacitor is fully meshed.
- (l) Replace the large hand. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of Band "A" when the tuning capacitor is fully meshed.

The above covers the proper manner of making adjustments, assuming all parts are in normal condition. Of course, if any part is defective, it must be replaced. The spring gear may be checked by turning it until the spring is tight and unwinding it slowly. It should unwind $4\frac{1}{4}$ turns.

(6) HUM INDUCTION

In chassis of early manufacture (models with a type-76 or 1-v second detector), a slight "buzz" or "hum" will often be encountered. In order to reduce this interference the following steps should be taken:

(1) Remove the connections of the red with yellow tracer lead from the 10 mfd. electrolytic capacitor (C-56) and from the lug on the resistor board where it terminates. In place of this conductor, install a new one that will be outside of the chassis cable, carried along the front side of the chassis, similar to the red lead connecting the corresponding points on the wiring diagram of Figure 4.

(2) Connect the grounding lead from the second detector cathode to a ground point nearer the detector socket.

(3) The secondary leads of the interstage transformer connecting to the driver stage, should be kept away from the heater prongs and heater wiring. It is desirable to shorten these leads as much as possible.

(4) It is important that the heater leads of the audio stages of the receiver be carefully twisted.

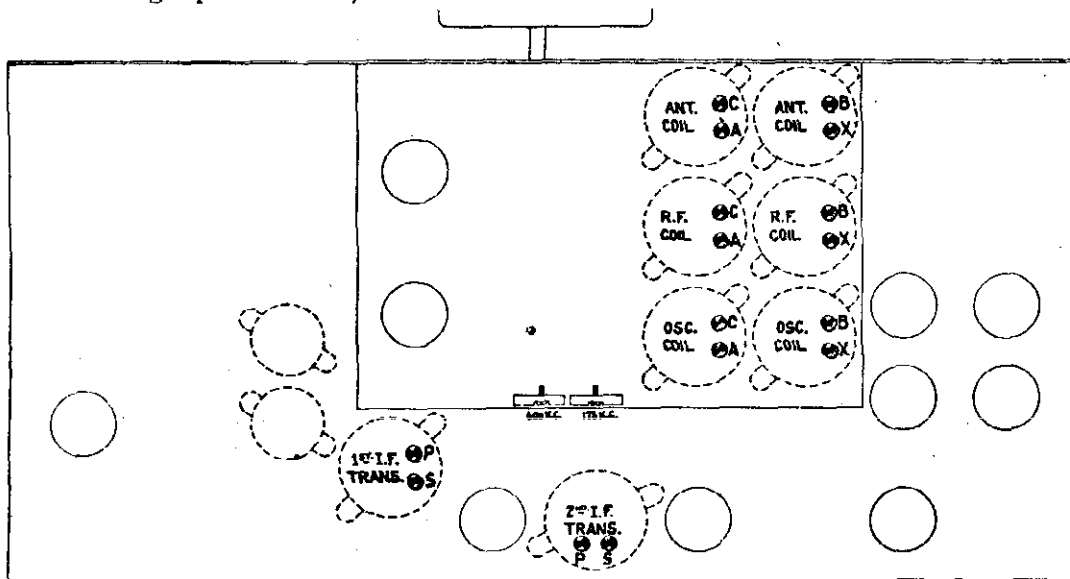


Figure 7—Location of Trimmer Capacitors

RCA MFG. CO., INC.

REPLACEMENT PARTS

Stock No.	Description	List Price	Stock No.	Description	List Price	Stock No.	Description	List Price	Stock No.	Description	List Price
4372	RECEIVER ASSEMBLIES		4412	Capacitor—1.120 mmfd. (C25)	\$0.25	7799	Drive—Variable tuning condenser drive assembly complete	\$2.45			
4683	Bracket—Base tone control mounting bracket	\$0.20	4524	Capacitor—2.950 mmfd. (C23)	.35	4827	Gear—Spring gear assembly complete with hub, pinion, gear cover and spring	1.25			
4406	Bracket—Volume control mounting bracket	.25	4835	Capacitor—0.05 mfd. (C5, C15)	.30	4704	Indicator—Band indicator—Celluloid beveled—D. C. B. A. X.	.42			
4316	Capacitor—50 mmfd. (C62)—Package of 5	1.25	4841	Capacitor—0.1 mfd. (C7, C16)	.22	4360	Pinion—Vernier pointer pinion	.35			
3794	Capacitor—100 mmfd.—Located on first I.F. transformer (C35)	.30	4855	Capacitor—0.1 mfd. (C9, C31)	.28	4363	Pointer—Station selector main (large) pointer	.16			
3981	Capacitor—300 mmfd.—Located on second I.F. transformer (C42)	.30	3861	Clamp—Antenna lead clamp and screw—Package of 10	.40	4367	Pointer—Station selector vernier (small) pointer	.15			
4668	Capacitor—770 mmfd. (C60)	.35	4410	Coil—Antenna coil—Band "D" (L1, L2)	.70	3943	Screen—Celluloid screen for dial light—Package of 2	.18			
4409	Capacitor—1120 mmfd. (C39, C45)	.35	7803	Coil—Antenna coil—Band B-C (L3, L4, L7, L8, C1, C3)	1.82	3993	Screw—No. 6-32-5/32" square head set screw for band indicator operating arm or variable condenser drive—Package of 10	.25			
4838	Capacitor—0.005 mfd. (C51, C52)	.20	7810	Coil—Antenna coil—Band X-B (L5, L6, L9, L10, C2, C4)	2.10	4377	Spring—Band indicator and arm tension spring—Package of 5	.25			
3787	Capacitor—0.01 mfd. (C53)	.30	7805	Coil—Detector coil—Band A-C (L13, L14, L17, L18, C13)	2.15	4378	Stud—Band indicator operating arm stud—Package of 5	.25			
4652	Capacitor—0.02 mfd. (C43)	.60	7808	Coil—Detector coil—Band X-B (L15, L16, L19, L20, C12, C14)	2.05						
4835	Capacitor—0.05 mfd. (C35)	.30	4421	Coil—Detector coil—Band D (L11, L12)	.70						
4694	Capacitor—0.05 mfd. (C44)	.30	7807	Coil—Oscillator coil—Band A-C (L21, L22, L25, L26, C22, C26)	1.62	5084	Cable—Main cable	1.35			
3765	Capacitor—0.025 mfd. (C49)	.34	7809	Coil—Oscillator coil—Band X-B (L23, L24, L27, L28, C24, C28)	1.70	5083	Cable—4-conductor—Reproducer cable	.60			
4841	Capacitor—0.1 mfd. (C34, C37)	.22	4806	Condenser—3-gang variable tuning condenser (C6, C17, C21)	5.64	4655	Cable—Shielded cable—From low-frequency tone control to resistor boards	.58			
3397	Capacitor—0.25 mfd. (C46, C47, C61)	.40	4340	Lamp—Dial lamp—Package of 5	6.60	5039	Plug—4-contact male plug for reproducer cable	.25			
3702	Capacitor—0.25 mfd. (C48)	.42	4834	Resistor—1100 ohms—Carbon type—1/4 watt (R9)—Package of 5	1.00	5040	Plug—4-contact female plug for reproducer cable	.25			
7790	Capacitor—10. mfd. (C38)	1.05	3602	Resistor—60,000 ohms—Carbon type—1/4 watt (R8)—Package of 5	1.00						
7788	Capacitor—18 mfd. (C57)	1.10	4416	Resistor—100 ohms—Flexible type (R2, R6)—Package of 10	1.50	4645	Capacitor—0.1 mfd.—Located on output transformers (C54)	.25			
483*	Capacitor pack—Comprising one 10. mfd. and one 4. mfd. capacitor (C55, C56)—Package of 10	2.40	4656	Screw—Chassis mounting screw assembly—Comprising one bushing, one washer, one lockwasher, one nut (four sets required to mount chassis)	20	9583	Coil—Field coil, magnet and cone support (L37)	5.20			
4420	Clamp—Antenna lead clamp and screw—Package of 10	.40	4742	Shield—Antenna, detector or oscillator coil shield	1.00	8969	Cone—Reproducer cone (L36)—Package of 5	6.35			
4358	Clamp—Mounting clamp for capacitor—Stock No. 7788 or No. 7790	.15	3682	Shield—First detector-oscillator Radiotron shield	4.05	9582	Reproducer—Reproducer complete	9.00			
7806	Coil—Fix audio plate choke (L33)	.30	3683	Shield—Radiotron shield top	2.28	6999	Screen—Dust (dust) screen—Package of 6	.12			
4371	Cover—Fuse mount cover	.15	4235	Shield—R. F. amplifier Radiotron shield	2.15	5080	Transformer—Output transformer and capacitor (T4, C54)	1.60			
1090*	Fuse—3 ampere—Package of 5	.40	4786	Socket—6-contact R. F. amplifier Radiotron socket	2.85						
3376	Mount—Fuse mount—105-115 volt operation	.40	4787	Socket—7-contact fine detector-oscillator Radiotron socket	6.35						
4694	Mount—Fuse mount for 200-250 volt operation	.35	7836	Switch—Ratchet switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11)	8.90						
7784	Reactor—Tone control reactor (L34)	1.30									
6135	Resistor—270 ohms—Carbon type—1/4 watt (R3, R7, R11)—Package of 5	1.00									
4687	Resistor—1000 ohms—Carbon type—1/4 watt (R25)—Package of 10	2.00									
4834	Resistor—1100 ohms—Carbon type—1/4 watt (R9, R10, R13)—Package of 5	1.00									
4833	Resistor—490,000 ohms—Carbon type—1/4 watt (R19)—Package of 5	1.00									
3998	Resistor—15,000 ohms—Carbon type—1/4 watt (R34)—Package of 5	1.00									
6143	Resistor—40,000 ohms—Carbon type—1/4 watt (R23)—Package of 5	1.00									
3114	Resistor—50,000 ohms—Carbon type—1/4 watt (R31)—Package of 5	1.00									
3602	Resistor—60,000 ohms—Carbon type—1/4 watt (R14)—Package of 5	1.00									
3116	Resistor—100,000 ohms—Carbon type—1/4 watt (R1, R30, R35)—Package of 5	1.00									
			4362	Arm—Band indicator operating arm	.28						
			10194	Ball—Steel ball for variable condenser drive assembly—Package of 20	2.5						
			4472	Clutch—Tuning condenser drive clutch assembly—Comprising drive shaft, balls, ring, spring and washer—Assembled	.88						
			4455	Dial—Station selector dial	.60						

*Used in some models.

MODEL 322 Duo
Parts List

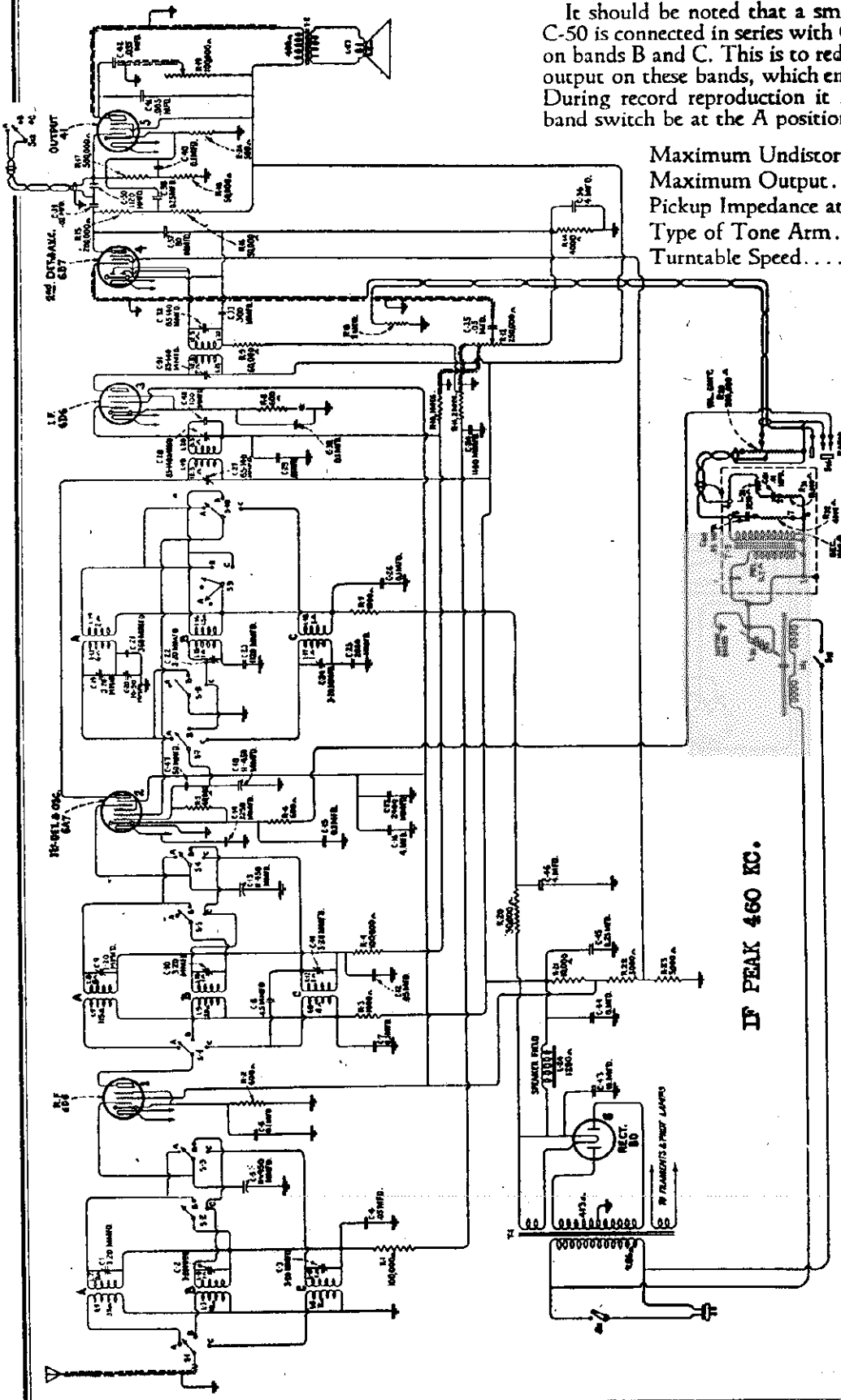
RCA MFG. CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price	Stock No.	Description	List Price	Stock No.	Description	List Price	Stock No.	Description	List Price
427	RECEIVER ASSEMBLIES Bracket—Volume control or tone control mounting bracket.	\$0.18	6186	Resistor—500,000 ohms—Carbon type—K watt (R17)—Package of 5.	\$1.00	4577	MOTOR ASSEMBLIES Connector—Male section two-prong motor connector plug.	\$0.30	3994	SWITCH ASSEMBLIES Cover—Motor switch cover.	\$0.26
4729	Cable—2-conductor shielded—From range switch to resistor board.	.20	3033	Resistor—Megohm—Carbon type—K watt (R10)—Package of 5.	1.00	8989	Motor—105-125 volt—60 cycle motor complete.	18.52	10184	Plugs—Automatic brake latch plate—Package of 5.	.40
2747	Cap—Contact cap—Package of 5.	.50	6242	Resistor—2 megohms—Carbon type—K watt (R11, R13)—Package of 5.	1.00	8990	Motor—105-125 volt—50 cycle motor complete.	18.52	10174	Springs—Automatic brake springs—Package of 4.	.50
3861	Capacitor—Adjustable trimmer capacitor (C20).	.78	3413	Resistor—500 ohms—Carbon type—K watt (R22, R23)—Package of 5.	1.00	8991	Motor—105-125 volt—40 cycle motor complete.	23.36	6896	Switch—Eccentric automatic switch complete.	2.50
4442	Capacitor—80 mfd. (C37).	.24	4513	Resistor—30,000 ohms—Carbon type—3 watt (R20).	.25	8992	Motor—105-125 volt—25 cycle motor complete.	23.36	3322	Switch—Motor switch (S15).	.75
4662	Capacitor—360 mfd. (C21).	.22	4521	Shield—Antenna R. F. or oscillator coil shield.	.42	8993	Rotor and shaft—For 105-125 volt—60 cycle motor.	7.00	7084	TURNABLE ASSEMBLIES Cover—Turnable cover.	.40
4412	Capacitor—1120 mfd. (C23).	.25	3942	Shield—First detector or output Radiotron shield.	.18	8995	Rotor and shaft—For 105-125 volt—50 cycle motor.	7.00	7838	Turnable complete.	2.15
4634	Capacitor—1120 mfd. (C30).	.35	7487	Shield—1. F. amplifier Radiotron shield.	.30	8999	Rotor and shaft—For 105-125 volt—75 cycle motor.	8.00	3166	MISCELLANEOUS ASSEMBLIES Bolt—Reproducer mounting assembly—Coil plug 2 bolts, 2 nuts, 2 lockwashers and 1 plate.	.50
4515	Capacitor—1160 mfd. (C34).	.30	4705	Shield—R. F. amplifier Radiotron shield.	.25	8994	Spindle—Turnable spindle with fibre gear for 60 cycle motor.	4.75	4677	Bezel—Station selector (secundum) bezel.	.90
4670	Capacitor—2.50 (C14).	.26	3782	Shield—Second detector Radiotron shield.	.26	3430	Cable—2-conductor motor cable with section of connector plug—From receiver chassis to motor cord connector.	5.50	4696	Cable—2-conductor shielded cable with g.l. and female section of connector—From receiver chassis to volume control cable connector.	.95
4524	Capacitor—2400 mfd. (C17).	.35	3529	Socket—Dial lamp socket.	.32	8994	Spindle—Turnable spindle with fibre gear for 60 cycle motor.	4.75	4695	Cable—5-conductor shielded with male section of connector plug—From phonograph volume control to tape transformer.	1.05
4524	Capacitor—2850 mfd. (C25).	.52	3859	Socket—4 contact Radiotron socket.	.40	8996	Spindle—Turnable spindle with fibre gear for 50 cycle motor.	4.75	7843	Connector—Female section (4-contact) of connector for cable Stock No. 4695.	.48
4518	Capacitor—05 mfd. (C35).	.25	7485	Socket—6 contact Radiotron socket.	.40	9001	Spindle—Turnable spindle with fibre gear for 25 cycle motor.	.18	4573	Connector—Female section (2-contact) of connector plug for cable Stock No. 4696.	.30
4417	Capacitor—05 mfd. (C41, C42, C29).	.25	3572	Socket—7 contact Radiotron socket.	.38	3817	Stud—Motor mounting stud—Package of 3.	5.50	6614	Glass—Station selector dial glass.	.30
3877	Capacitor—1 mfd (C40).	.32	4379	Strip—Antenna terminal engraved "ANT-GND".	4.32	3398	Motor mounting—Spring and washer assembly—Comprising 7 cup washers, 4 springs and 1 "C" washer.	.48	3829	Knob—Photograph volume control knob—Package of 5.	1.10
4415	Capacitor—1 mfd (C6, C15, C30).	.30	4684	Switch—Operating switch (S11).	.20	7842	PICKUP AND ARM ASSEMBLIES Arm—Pickup arm complete, less secoundum and pickup.	4.75	4449	Knob—Station selector volume control, range switch or operating switch knob—Package of 5.	.60
4645	Capacitor—1 mfd (C7, C26).	.25	4728	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10).	4.32	3417	Armature—Pickup armature.	7.72	6123	Plugs—Male section (4-prong) of phonograph volume control and laput transformer cable plug.	.30
3597	Capacitor—2.5 mfd. (C38, C45).	.40	4517	Transformer—First intermediate frequency transformer (L19, L20, C27, C28, C48).	4.78	3385	Coil—Pickup housing coil (L30).	.50	3396	Receptacle—Needle receptacle.	.52
4525	Capacitor—4.0 mfd. (C26).	.70	4517	Transformer—Second intermediate frequency transformer (L21, L22, C31, C32, C33, R9).	4.78	3386	Cover—Pickup cover.	.18	4678	Ring—Dial retaining ring—Package of 5.	.34
4428	Capacitor—8 mfd. (C44).	1.05	4517	Transformer—Power transformer—105-125 volt, 30-80 cycles (T1).	2.15	3521	Cover—Magnetic pickup back cover.	1.10	4593	Screw—8-32-3/16" headless set screw for knob No. 3829—Package of 10.	.52
4692	Capacitor—10 mfd. (C43).	1.05	4433	Transformer—Power transformer—105-250 volt—60-80 cycles.	1.25	3418	Cushions—Pickup rubber cushions—Comprising one driver and two spacers cushions and one damper spring set.	3.516	4698	Screw—Chassis mounting screw assembly—Comprising 1 screw, 1 lockwasher, 1 washer, 2 cushions and 1 spacer.	.45
7589	Capacitor Pack—Comprising two 4, 4 mfd. capacitors (C16, C46).	1.64	9511	Transformer—Power transformer—105-125 volt, 30-80 cycles (T1).	2.28	3516	Dampers—Comprising one upper and one lower damper—Located in bottom of pickup base.	4.00	3391	Suspension spring and washer assembly—For motor board—Comprising 1 bolt, 1 top spring, 1 lower spring, 1 cup washer, 1 lockwasher and 1 nut.	.50
4358	Coil—Antenna coil "PB" (L3, L4, C2).	1.65	9512	Transformer—Power transformer—105-125 volt, 25-80 cycles.	4.32	3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets.	.46	7844	Transformer—Photograph liput transformer pack for one 4000 ohm and one 13,000 ohm resistor, one .01 mfd. and one .05 mfd. capacitor (T5, L31, R31, R32, C50, C51).	5.36
7803	Coil—Antenna coil "B & SW" (L1, L2, L5, L6, C1, C3).	1.82	9513	Transformer—Power transformer—105-250 volt—60-80 cycles.	4.85	3389	Rod—Automatic brake trip rod with lock nut and one lower bearing.	4.00	6766	Volume control—Photograph volume control (R30, S16).	2.28
4514	Coil—Detector coil "B & SW" (L7, L8, L1, L3, C9, C14).	2.15	4519	Volume control (R12).	1.25	3387	Screw assembly—Pickup screw, one nut and one washer—10 sets.	.40			
7807	Coil—Oscillator coil "PB" (L13, L14, L17, L18, C19, C24).	1.62				3388	Screw—Pickup cover mounting screw—Package of 10.	.60			
4511	Coil—Oscillator coil "PB" (L15, L16, C22, C25, C13, C18).	1.52				3419	Screw—Pickup cover mounting screw—Package of 10.	.40			
7801	Condenser—2 gang variable tuning condenser (C1, C13, C18).	.60									
4340	Lamp—Dial lamp—Package of 5.	1.10									
3632	Resistor—500 ohms—Carbon type—1 watt (R24)—Package of 5.	1.00									
3218	Resistor—600 ohms—Carbon type—1/4 watt (R2, R3, R9)—Package of 5.	1.00									
4370	Resistor—1000 ohms—Carbon type—1/4 watt (R3, R7)—Package of 10.	2.00									
3997	Resistor—400 ohms—Carbon type—1/4 watt (R14)—Package of 5.	1.80									
6318	Resistor—10,000 ohms (R21).	1.00									
3114	Resistor—50,000 ohms—Carbon type—1/4 watt (R16, R16)—Package of 5.	1.00									
3602	Resistor—60,000 ohms—Carbon type—1/4 watt (R5)—Package of 5.	1.00									
3118	Resistor—100,000 ohms—Carbon type—1/4 watt (R1, R4)—Package of 5.	1.00									
3115	Resistor—200,000 ohms—Carbon type—1/4 watt (R13)—Package of 5.	1.00									

RCA MFG. CO., INC.



It should be noted that a small coupling capacitor C-50 is connected in series with C-39 during operation on bands B and C. This is to reduce the low frequency output on these bands, which ensures better operation. During record reproduction it is important that the band switch be at the A position.

Maximum Undistorted Output . . . 1.9 Watts
 Maximum Output 3.5 Watts
 Pickup Impedance at 1000 Cycles . . . 7 Ohms
 Type of Tone Arm Inertia
 Turntable Speed 78 R. P. M. Only

IF PEAK 460 KC.

ELECTRICAL SPECIFICATIONS

- Voltage Rating 105-125 Volts and 105-130/200-250 Volts (Double Range Transformer)
- Frequency Rating 25, 30, 40, 50 and 60 Cycles
- Power Consumption 130 Watts (60 Cycles)
- Type and Number of Radiotrons 2 RCA-6D6, 1 RCA-6A7, 1 RCA-6B7, 1 RCA-41, 1 RCA-80—Total, 6
 - { Band A—540 K. C.—1720 K. C. C.
 - { Band B—1720 K. C.—5400 K. C. C.
 - { Band C—5400 K. C.—18000 K. C. C.
- Tuning Frequency Range

MODEL 322 Duo
Chassis Wiring

RCA MFG. CO., INC.

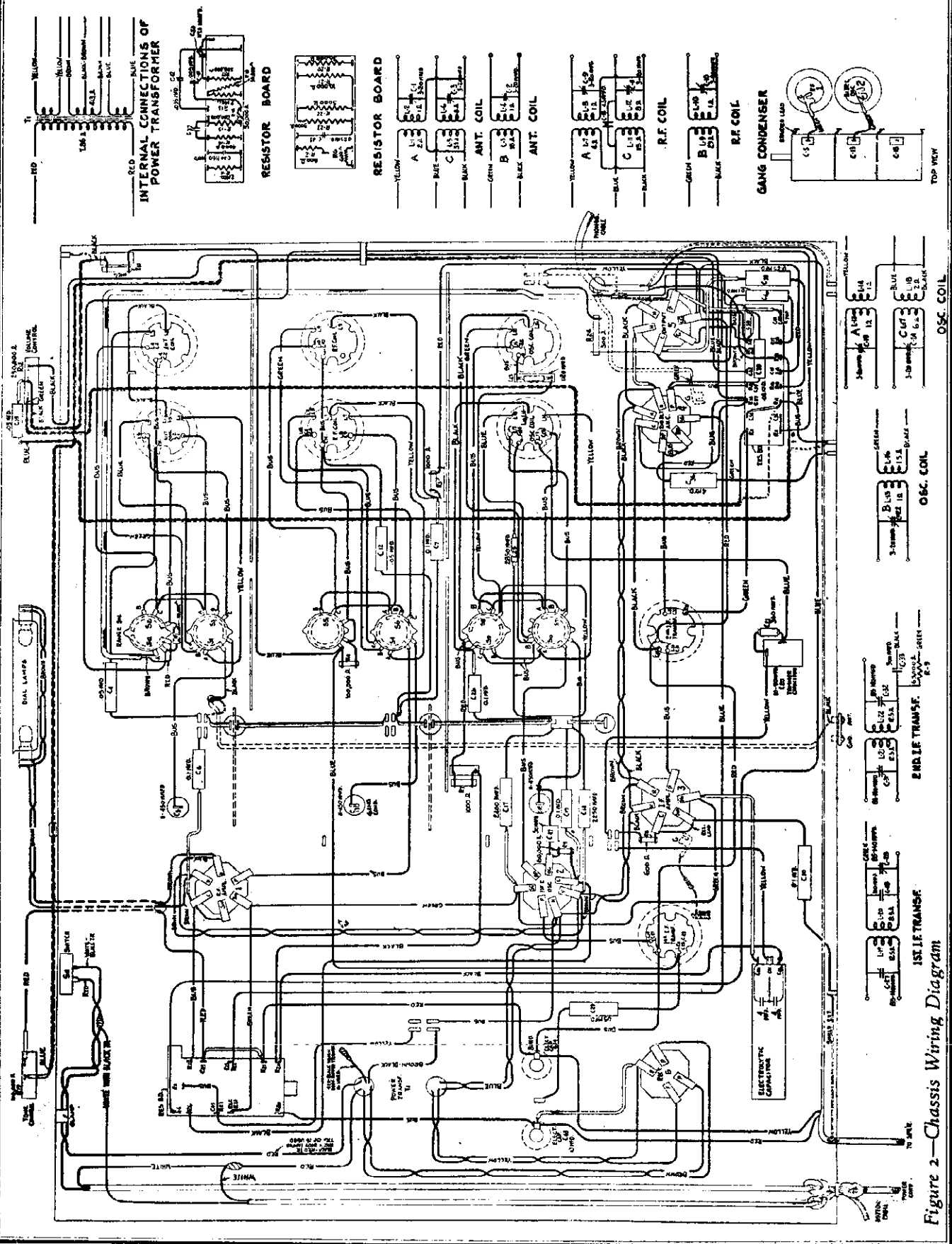
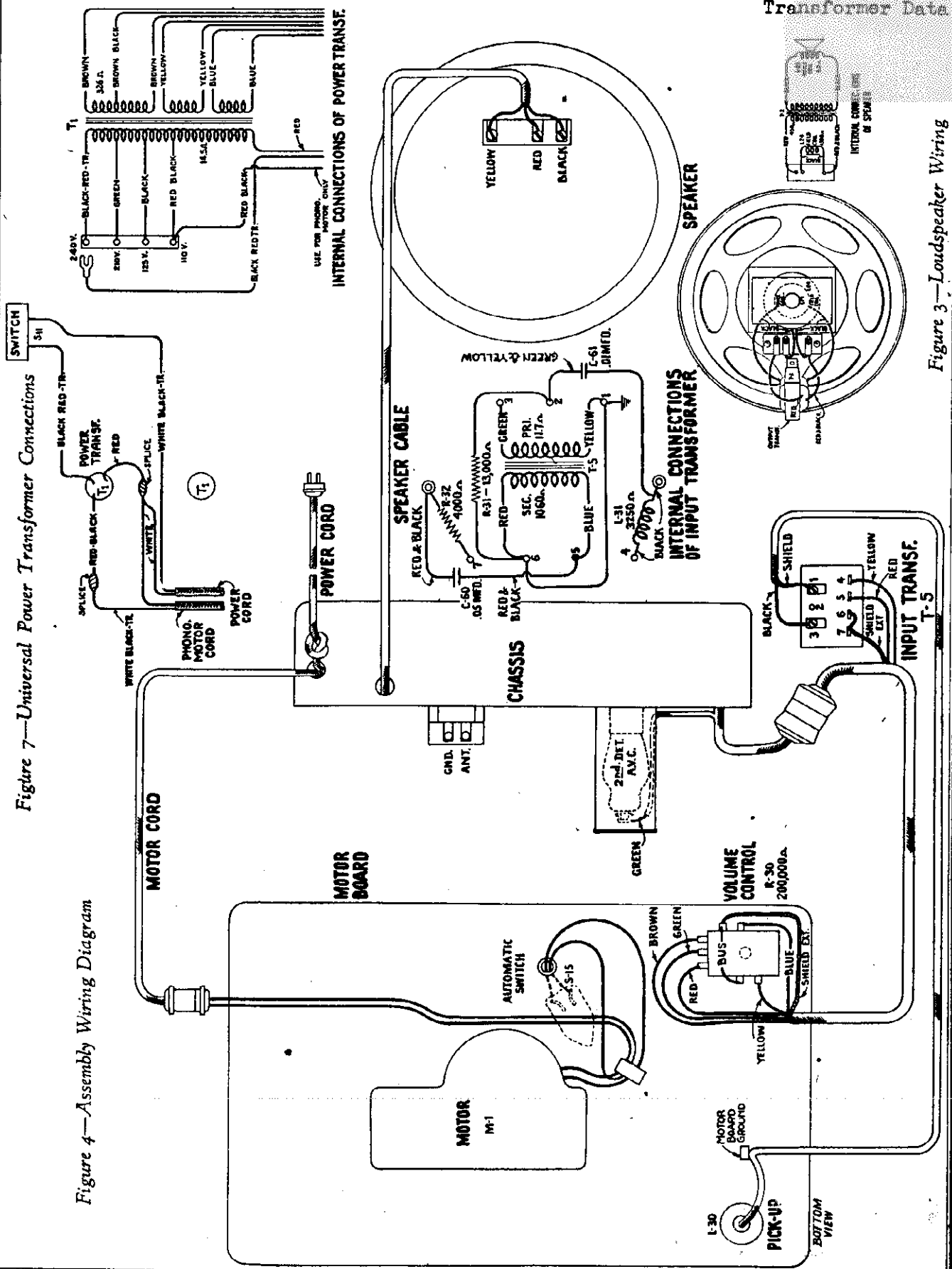


Figure 2—Chassis Wiring Diagram

RCA MFG. CO., INC.

MODEL 322 Duo
Assembly Wiring
Transformer Data



**MODEL 322 Duo
Alignment
Trimmers**

RCA MFG. CO., INC.

(4) POWER TRANSFORMER CONNECTIONS

The 220-volt power transformer furnished with some instruments includes taps for operating on 110-volt lines. Figure 6 shows the schematic circuit of the transformer and the proper voltage to be applied to the various taps. The taps are located on the power transformer assembly and are accessible without removing the chassis from the cabinet.

(5) VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if low-resistance meters are used, such allowances must be made. Figure 8 shows the actual voltage at each socket contact.

(6) SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

(c) Check for the image signal, which should be received at approximately 4,240 K. C. on the dial. It will be necessary to increase the external oscillator output for this check.

(d) The antenna and detector trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

Band "C"

(a) Set the Band Switch at "C."
(b) Tune the external oscillator to 48,000 K. C., set the pointer at 18 M. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

(d) Reduce the capacity of the detector trimmer while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(e) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The dial pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of band "A," while the other end should point to within 1/8 inch of the horizontal line at the highest frequency end of band "A."

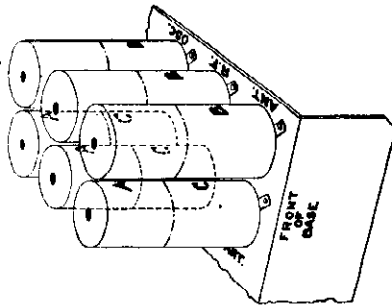


Figure 5—Location of Coils in Shields

Figure 6 shows the location of the trimmers for each band. Care must be exercised to merely adjust the trimmers in the band under test.

Band "A"

- (a) Set the Band Switch at "A."
- (b) Tune the external oscillator to 1,720 K. C., set the pointer at 1,720 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.
- (c) Shift the external oscillator frequency to 600 K. C. Tune in the 600 K. C. signal, irrespective of scale calibration, and adjust the series trimmers, located on rear apron of chassis, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1,720 K. C. as described in (b).

Band "B"

- (a) Set the Band Switch at "B."
- (b) Tune the external oscillator to 5,160 K. C., and set the pointer at 5,160 K. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 5. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1,720 and the signal tuned in, and the output indicator should be connected across the voice coil of the loudspeaker. Then the tuning wand would be inserted, first one end and then the other end, into the top of the three transformers at the front of the R. F. assembly, facing the trimmer where it is evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

(3) I. F. TUNING CAPACITOR ADJUSTMENTS

This receiver has one I. F. stage, which uses two transformers. The transformers are all peaked at 460 K. C.

A detailed procedure for making this adjustment follows:

- (a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.
- (b) Place the oscillator in operation and adjust the station selector until a point is reached (band A) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.
- (c) Refer to Figure 6. Adjust each trimmer of the I. F. transformers until a maximum output is obtained. Go over the adjustments a second time.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and oscillator adjustments due to interlocking which always occurs.

(3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in band "A." Three are required in bands "B" and "C."

To properly align the various bands, each band must be aligned individually. The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver and the output indicator must be connected across the voice coil of the loudspeaker. The volume control must be at its maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high-frequency bands, it may be necessary to disconnect

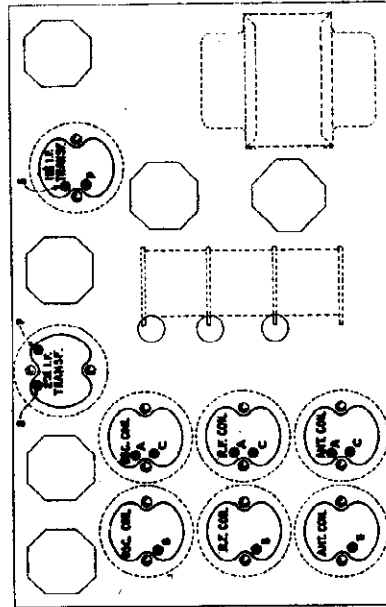


Figure 6—Location of Line-up Capacitors

RCA MFG. CO., INC.

MODEL 322 Duo
Pickup Data
Voltage, Socket

In assembling, it may be desirable to check the armature air gap by means of a Small Hole Gauge. This air gap should be .009" for each side of the

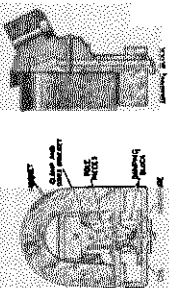


Figure 9—Details of Magnetic Pickup

armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

(7) REPLACING MAGNET COIL, PIVOT RUBBERS, ARMATURE OR DAMPING BLOCK
In order to replace a defective coil or the hardened pivot rubbers (see Figure 9), it is necessary to proceed as follows:

- (a) Remove the pickup cover by removing the center holding screw and needle screw.
- (b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

(d) Remove screws A and B, Figure 10, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

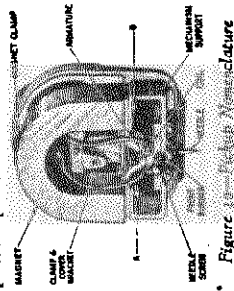


Figure 10—Pickup Mechanism

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure 10), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

(8) REPLACING THE DAMPING BLOCK

If it is desired to replace the damping block, it may be done in the following manner:

- (a) Disassemble the pickup as described under the preceding section.
- (b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.
- (c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.
- (d) Insert the armature through the new block so that it occupies the same position as that of the

old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 11, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place,



Figure 11—Special Soldering Iron Tip

as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the air gap as explained under (h), section (7).

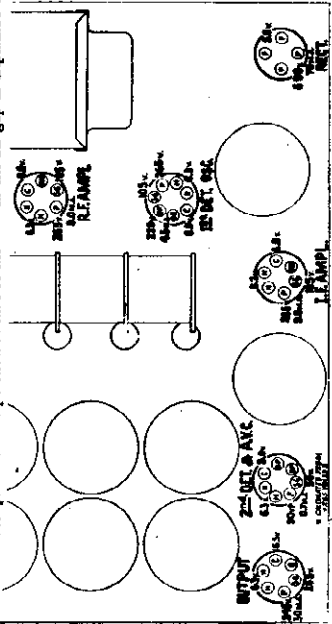


Figure 8
Tube Socket Voltages

ALL D. C. VOLTAGES ARE TO GROUND

RADIOTRON SOCKET VOLTAGES

115-Volt A. C. Line—No Signal—Volume Control Maximum

Radiotron Number	Cathode to Ground, Volts, D. C.	Screen Grid to Ground, Volts, D. C.	Plate to Ground, Volts, D. C.	Plate Current, M. A.	Heater Volts, A. C.
RCA-6D6—R. F.	6.0	105	265	9.0	6.3
RCA-6A7	6.0	105	265	3.5	6.3
	—	—	220	4.5	
RCA-6D6—I. F.	6.0	105	265	9.0	6.3
RCA-6B7—2nd Detector	3.0	50	90*	0.7	6.3
RCA-41—Power	16.5	265	245	30.0	6.3
RCA-80—Rectifier	—	—	690 (RMS—P to P)	70.0	5.0

* Voltage calculated from 265 V. + B.

**MODEL 322-E Duo
Parts List**

RCA MFG. CO., INC.

REPLACEMENT PARTS

Stock No.	Description	List Price	Stock No.	Description	List Price	Stock No.	Description	List Price	Stock No.	Description	List Price
4427	RECEIVER ASSEMBLIES Bracket—Volume control or zone control mounting bracket.	\$0.18	4577	MOTOR ASSEMBLIES Connector—Male section two-prong motor connector plug.	\$0.30	3994	SWITCH ASSEMBLIES Cover—Motor switch cover.	\$0.25	7843	MISCELLANEOUS ASSEMBLIES Bolt—5-conductors shielded with male section of connector plug—From phonograph volume control to input transformer.	1.05
4729	Cable—2-conductor shielded—From range switch to receiver board.	20	8989	Motor—105-125 volts—60 cycle motor complete.	18.52	10184	Plate—Automatic brake latch plate—Package of 5.	.40	4153	Connector—Female section (4-contacts) of connector for cable Stock No. 4695.	.48
2747	Cap—Contact cap—Package of 5.	.50	8990	Motor—105-125 volts—50 cycle motor complete.	18.52	10174	Springs—Automatic brake springs—Package of 4.	.50	4573	Connector—Female section (2-contacts) of connector for cable Stock No. 4696.	.30
3861	Capacitor—Adjustable trimmer capacitor (C20).	.78	8991	Motor—105-125 volts—40 cycle motor complete.	23.36	6896	Switch—Eccentric automatic switch complete.	2.50	6614	Glass—Station selector dial glass.	1.10
4442	Capacitor—50 mmfd. (C47).	.22	8992	Motor—105-125 volts—25 cycle motor complete.	23.36	3321	Switch—Motor switch (S15).	.75	4449	Knob—Phonograph volume control knob—switch or operating switch knob—Package of 5.	.60
4413	Capacitor—80 mmfd. (C37).	.24	8993	Motor and shaft—For 105-125 volt—60 cycle motor and shaft—For 105-125 volt—50 cycle motor.	7.00	7084	Cover—Turntable cover.	.40	6123	Plug—Male section (4-prong) of phonograph volume control and input transformer cable plug.	.30
4634	Capacitor—1120 mmfd. (C50).	.35	8995	Motor and shaft—For 105-125 volt—50 cycle motor.	7.00	7838	Turntable complete.	2.15	4678	Receptacle—Needle receptacle.	.52
4575	Capacitor—1160 mmfd. (C34).	.35	8999	Motor and shaft—For 105-125 volt—25 cycle motor.	8.00	8999	Turntable complete.	2.15	4993	Ring—Dial retaining ring—Package of 5.	.34
4610	Capacitor—2250 (C14).	.30	8994	Motor—30,000 ohms—Carbon type—3 watt (R20).	45	8994	Motor—30,000 ohms—Carbon type—3 watt (R22, R23).	45	4698	Screw—Chassis mounting screw assembly—Comprising 1 screw, 1 lockwasher, 1 washer, 2 cushions and 1 spacer.	.45
4523	Capacitor—2400 mmfd. (C17).	.26	8995	Shield—Antenna R. F. or oscillator coil shield.	25	8995	Motor—105-125 volts—40 cycle motor complete.	23.36	3391	Suspension spring and washer assembly—For motor board—Comprising 1 bolt, 1 top spring, 1 bottom spring, 2 cup washers, 1 C washer and 1 nut.	.50
4324	Capacitor—2850 mmfd. (C25).	.25	4521	Shield—Antenna R. F. or oscillator coil shield.	42	8996	Motor—105-125 volts—50 cycle motor complete.	23.36	7844	Transformer—Phonograph input transformer pack comprising one transformer, one reactor, one 15,000 ohm and one 15,000 ohm resistor, one 100,000 ohm and one 25,000 ohm capacitor (R5, L31, L33, R32, C60, C61).	5.98
4333	Capacitor—50 mfd. (C39).	.25	3942	Shield—First detector or output Radiotron shield.	25	8997	Motor—105-125 volts—50 cycle motor complete.	23.36	6766	Volume control—Phonograph volume control (R30, S16).	2.28
4417	Capacitor—50 mfd. (C35).	.24	7487	Shield—R. F. amplifier Radiotron shield.	.18	8998	Motor—105-125 volts—50 cycle motor complete.	23.36			
3877	Capacitor—1 mfd. (C40).	.32	3782	Shield—Second detector Radiotron shield.	.26	8999	Motor—105-125 volts—50 cycle motor complete.	23.36			
4415	Capacitor—1 mfd. (C5, C15, C30).	.32	3529	Sockets—Dial lamp sockets.	.32	8994	Motor—105-125 volts—40 cycle motor complete.	23.36			
3597	Capacitor—1 mfd. (C7, C26).	.25	6676	Sockets—5-contact Radiotron sockets.	.40	8996	Motor—105-125 volts—50 cycle motor complete.	23.36			
4525	Capacitor—4.0 mfd. (C36, C45).	.70	7485	Sockets—6-contact Radiotron sockets.	.40	9001	Motor—105-125 volts—50 cycle motor complete.	23.36			
4418	Capacitor—8 mfd. (C44).	1.05	3572	Sockets—7-contact Radiotron sockets.	.38	3817	Motor mounting stud—Package of 3.	.18			
7790	Capacitor—10 mfd. (C43).	1.05	4379	Strip—Antenna terminal engraved "ANT-GND".	.45	3398	Motor mounting spring and washer assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer.	.48			
4692	Capacitor pack—Comprising one 0.035 mfd. and one 0.005 mfd. capacitors (C41, C42).	30	4684	Switch—Operating switch (S11).	.20		PICKUP AND ARM ASSEMBLIES Arm—Pickup arm complete, less excitechton and pickup.	2.28			
4358	Clamp—Electrolytic capacitor mounting clamp.	1.64	4728	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10).	4.37	7842	Arm—Pickup arm complete, less excitechton and pickup.	2.28			
4734	Coil—Antenna coil "A" (L26, L27, C51).	1.64	4517	Tone control (R19).	.90	3417	Armature—Pickup armature.	2.15			
7803	Coil—Antenna coil "B & SW" (L7, L8, L6, C1, C3).	1.82	4431	Transformer—First intermediate frequency transformer (L19, L20, C27, C28, C48).	2.28	6346	Back—Pickup housing back.	4.75			
4751	Coil—Detector coil "A" (L28, L29, C52).	1.82	4433	Transformer—Second intermediate frequency transformer (L21, L22, C31, C32, C33, R9).	2.15	3385	Coil—Pickup coil (L30).	.50			
7805	Coil—Detector coil "B & SW" (L7, L8, L11, L12, C8, C9, C11).	2.38	9511	Transformer—Power transformer 105-125 volts 50-60 cycles (T1).	4.78	3386	Cover—Pickup cover.	.56			
7807	Coil—Oscillator coil "B & SW" (L13, L14, L17, L18, C19, C24).	2.15	9512	Transformer—Power transformer 105-125 volts 25-40 cycles.	6.58	3521	Cushions—Pickup rubber cushions—Comprising one damper and two spacer cushions and one damper bushing—5 sets.	1.10			
4733	Coil—Oscillator coil "A" (L50, L51, C53).	3.05	4519	Volume control (R12).	1.25	3418	Damper assembly—Comprising one upper and one lower damper, one upper bushing and one lower bearing—Located in bottom of pickup base.	.14			
7801	Condensers—2 gang variable tuning condenser (C3, C13, C18).	4.42	4362	Arm—Band indicator operating arm.	.28	3990	Excitechton—Pickup arm excitechton complete with mounting rivets.	.46			
4340	Lamp—Dial lamp—Package of 5.	.60	10191	Ball—Steel ball for condenser drive assembly—Package of 20.	.25	6335	Pickup—Pickup unit complete.	4.00			
3218	Resistor—500 ohms—Carbon type—1/2 watt (R24)—Package of 5.	1.10	4422	Clutch—Clutch drive assembly for variable condenser.	.88	3389	Rod—Automatic brake trip rod with lock nut—Package of 5.	.40			
4370	Resistor—600 ohms—Carbon type—1/2 watt (R2, R6, R8)—Package of 5.	1.00	4732	Dial—Station selector dial.	.40	3387	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer—10 sets.	.40			
3997	Resistor—1000 ohms—Carbon type—1/2 watt (R3, R7)—Package of 10.	2.00	4704	Indicator—Band indicator (celluloid).	.12	3388	Screw—Pickup needle holding screw—Package of 10.	.60			
6318	Resistor—4000 ohms—Carbon type—1/2 watt (R14)—Package of 5.	1.00	3943	Screen—Dial light screen (celluloid)—Package of 10.	.18	3419	Screw—Pickup cover mounting screw—Package of 10.	.40			
3114	Resistor—10,000 ohms (R21).	1.00	3993	Screw—Number 6-32-5/32" square head set screws for band indicator operating arm—Package of 10.	.25		REPRODUCER ASSEMBLY Board—Terminal board assembly.	.26			
3602	Resistor—50,000 ohms—Carbon type—1/2 watt (R16, R18)—Package of 5.	1.00	4669	Screw—Number 8-32-5/32" set screw for variable condenser drive assembly—Package of 10.	.25	4473	Coil—Field coil, magnet and cone support (L24).	6.00			
3118	Resistor—100,000 ohms—Carbon type—1/2 watt (R1, R4)—Package of 5.	1.00	4377	Spring—Band indicator and arm tension spring—Package of 5.	2.5	9335	Cone—Reproducer cone (L23)—Package of 5.	5.25			
3116	Resistor—200,000 ohms—Carbon type—1/2 watt (R15)—Package of 5.	1.00	4378	Strip—Band indicator operating arm stud—Package of 5.	2.5	9327	Reproducer—Complete.	8.00			

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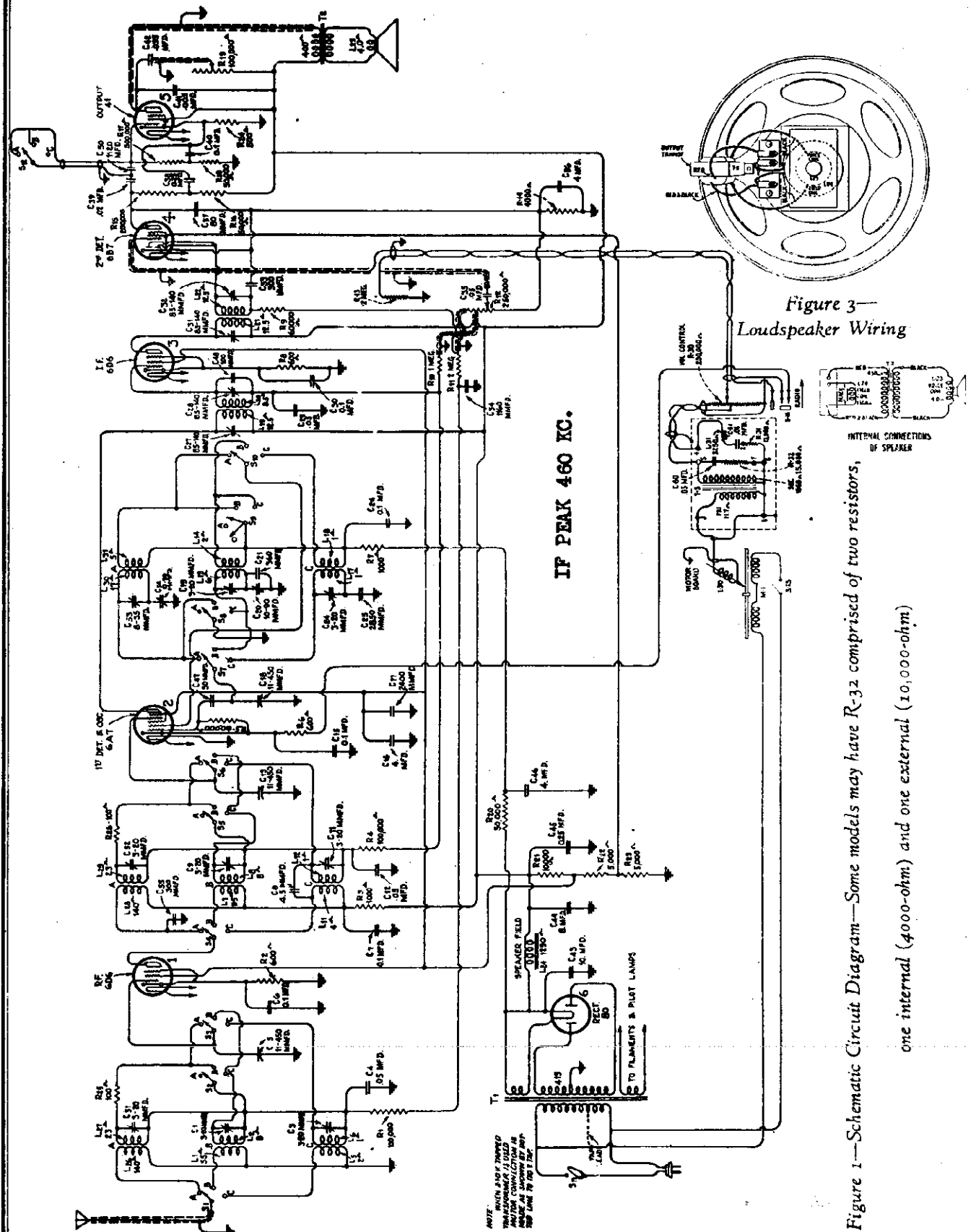
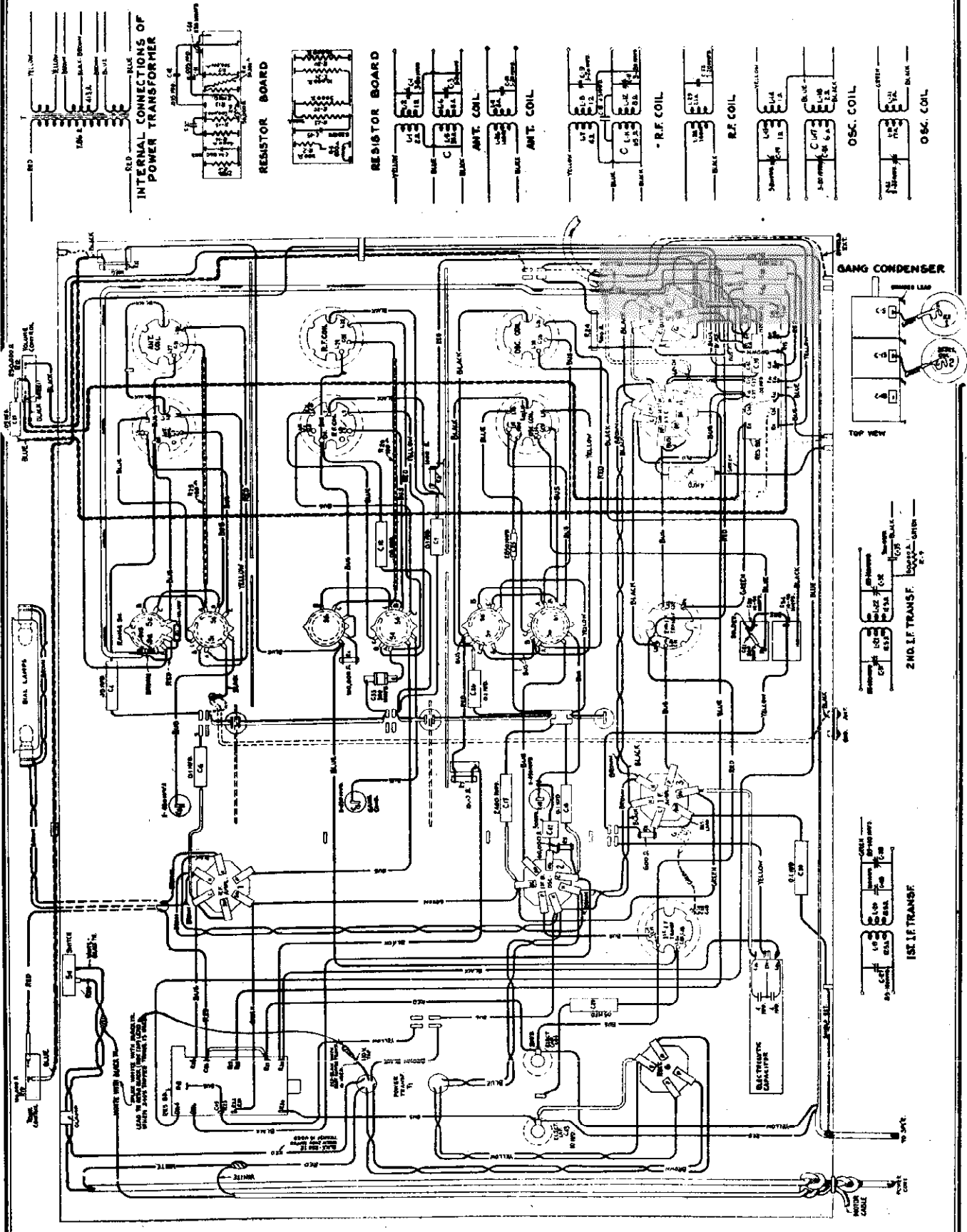


Figure 1—Schematic Circuit Diagram—Some models may have R-32 comprised of two resistors, one internal (4000-ohm) and one external (10,000-ohm)

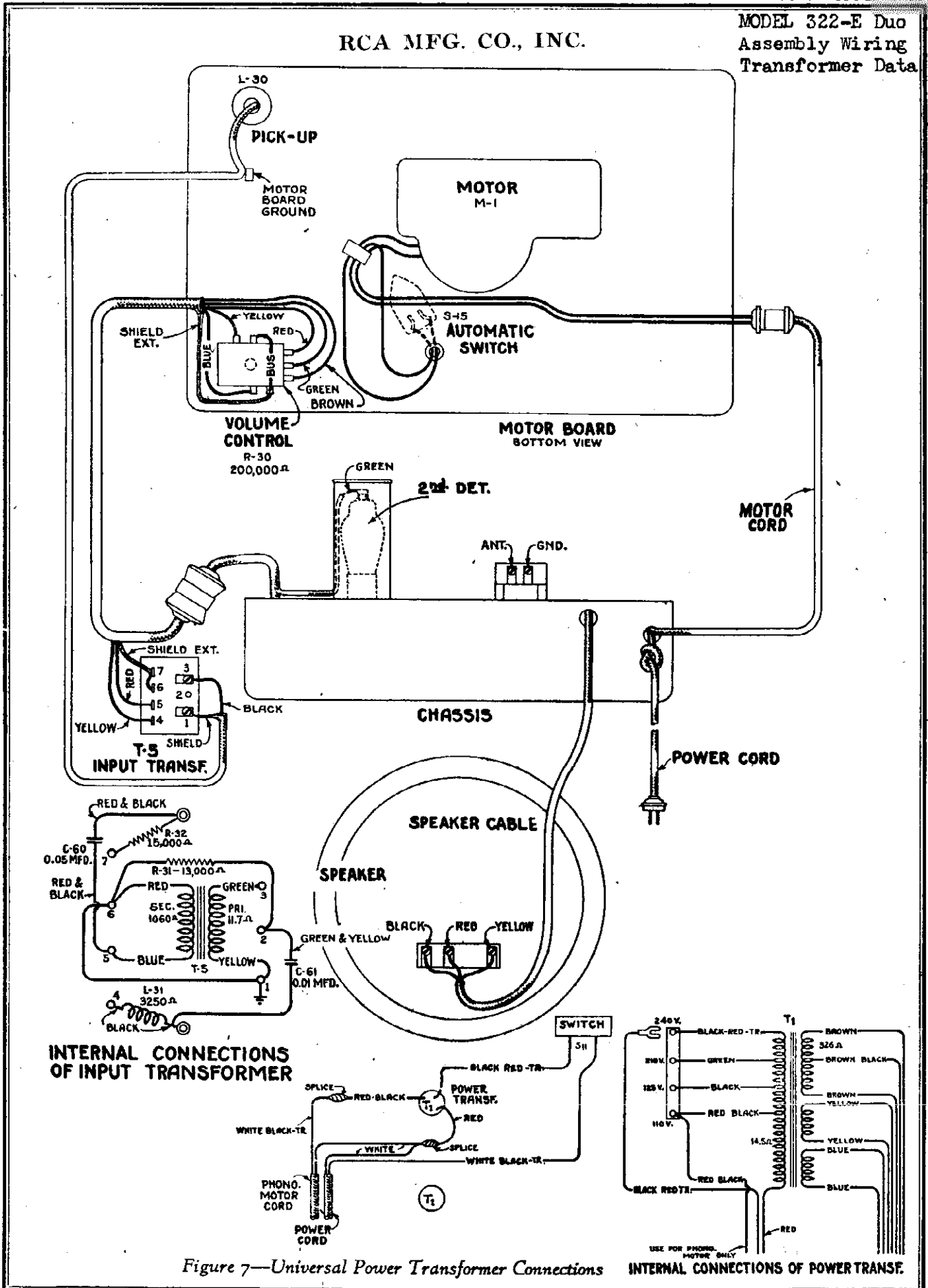
MODEL 322-E Duo
Chassis Wiring

RCA MFG. CO., INC.



RCA MFG. CO., INC.

MODEL 322-E Duo
Assembly Wiring
Transformer Data



**MODEL 322-E Duo
Trimmers
Alignment**

RCA MFG. CO., INC.

(4) POWER TRANSFORMER CONNECTIONS

The 220-volt power transformer furnishes with some instruments includes taps for operating on 110-volt lines. Figure 6 shows the schematic circuit of the transformer and the proper voltage to be applied to the various taps. The taps are located on the power transformer assembly and are accessible without removing the chassis from the cabinet.

(5) VOLTAGE READINGS

The voltages on page 10 are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if low-resistance meters are used, such allowances must be made. Figure 8 shows the actual voltage at each socket contact.

(6) SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency response characteristic is substantially flat from 50 to 5,000 cycles.

(c) Shift the external oscillator frequency to 600 K. C. Tune in the 600 K. C. signal, irrespective of scale calibration, and adjust the series trimmers, located on rear apron of chassis, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1,720 K. C. as described in (b).

Band "C"

(a) Set the Band Switch at "C."
(b) Tune the external oscillator to 18,000 K. C., and set the pointer at 18 M. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

(d) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(e) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

high-frequency band, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The dial pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of band "B," while the other end should point to within 1/8 inch of the horizontal line at the highest frequency end of band "B."

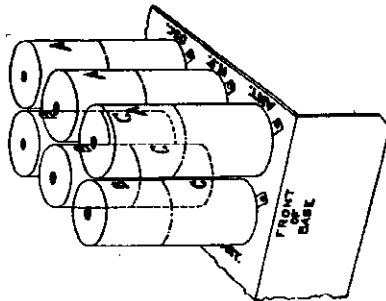


Figure 5—Location of Coils in Shields.

Figure 6 shows the location of the trimmers for each band. Care must be exercised to merely adjust the trimmers in the band under test.

Band "A"

(a) Set the Band Switch at "A."
(b) Tune the external oscillator to 410 K. C., set the dial pointer at 410 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(c) Shift the external oscillator frequency to 175 K. C. Tune in the 175 K. C. signal irrespective of scale calibration and adjust the series trimmer, marked 175 K. C. on Figure 6, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 410 K. C. as described in (b).

Band "B"

(a) Set the Band Switch at "A."
(b) Tune the external oscillator to 1,720 K. C., set the pointer at 1,720 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 5. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 and the signal turned in, and the output indicator should be connected across the voice coil of the loudspeaker. Then the tuning wand would be inserted, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

(2) I. F. TUNING CAPACITOR ADJUSTMENTS

This receiver has one I. F. stage, which uses two transformers. The transformers are all peaked at 460 K. C.

A detailed procedure for making this adjustment follows:

- (a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.
- (b) Place the oscillator in operation at 460 K. C. Place the receiver in operation and adjust the station selector until a point is reached (band B) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 6. Adjust each trimmer of the I. F. transformers until a maximum output is obtained. Go over the adjustments a second time.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and oscillator adjustments due to interlocking which always occurs.

(3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in bands "A and B." Three are required in band "C."

To properly align the various bands, each band must be aligned individually. The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver and the output indicator must be connected across the voice coil of the loudspeaker. The volume control must be at its maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the

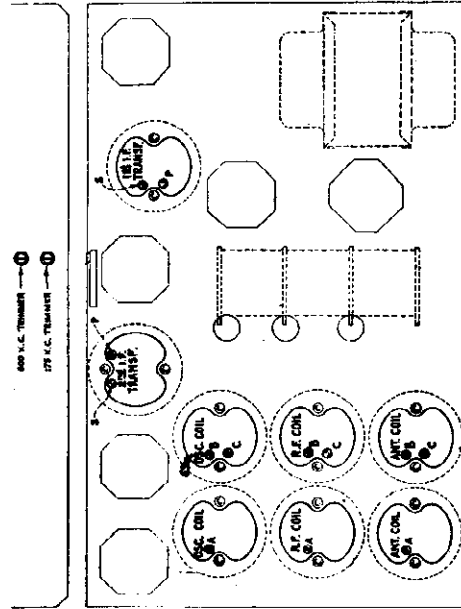
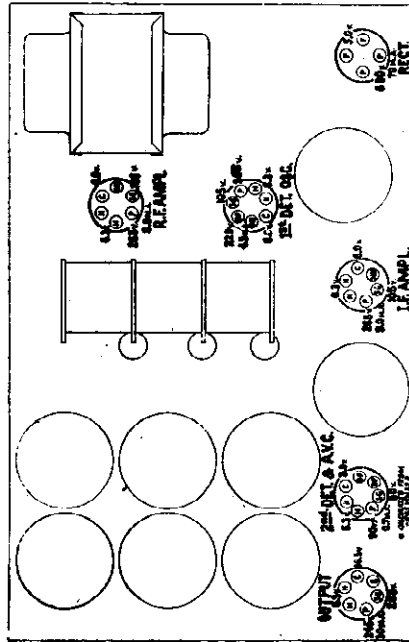


Figure 6—Location of Line-up Capacitors

RCA MFG. CO., INC.

MODEL 322-E Duo
Pickup Data
Voltage, Socket



ALL D. C. VOLTAGES ARE TO GROUND

Figure 8—Tube Socket Voltages

RADIOTRON SOCKET VOLTAGES

115 Volt A. C. Line—No Signal—Volume Control Maximum

Radiotron Number	Cathode to Ground, Volts, D. C.	Screen Grid to Ground, Volts, D. C.	Plate to Ground, Volts, D. C.	Plate Current, M. A.	Heater Volts, A. C.
RCA-8D6—R. F.	6.0	105	265	9.0	6.3
RCA-6A7	Det.	105	265	3.5	6.3
	Osc.	—	220	4.5	
RCA-8D6—I. F.	6.0	105	265	9.0	6.3
RCA-6B7—2nd Detector	3.0	50	90*	0.7	6.3
RCA-41—Power	16.5	265	245	30.0	6.3
RCA-80—Rectifier	—	—	690 (RMS—P to F)	70.0	5.0

*Voltage calculated from 265 v. + B.

the same time, the metal dust cover must be placed in position.

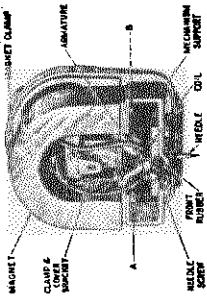


Figure 10—Pickup Mechanism

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure 10) and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

If it is desired to replace the damping block, it may be done in the following manner:

- (a) Disassemble the pickup as described under the preceding section.
- (b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.
- (c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.
- (d) Insert the armature through the new block so that it occupies the same position as that of the old.

Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.



Figure 11—Special Soldering Iron Tip

After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 11, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler-Gauge. This air gap should be .009" on each side of the

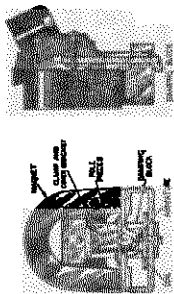


Figure 9—Details of Magnetic Pickup

armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

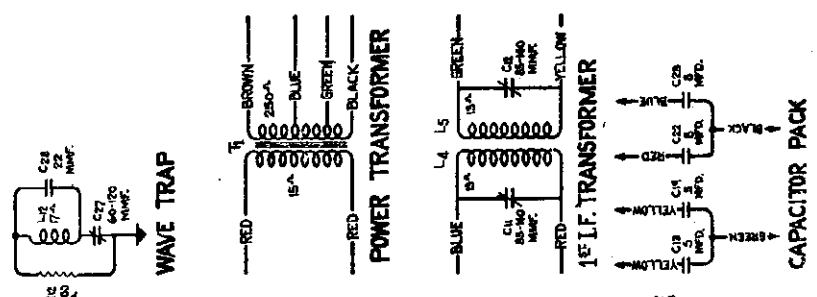
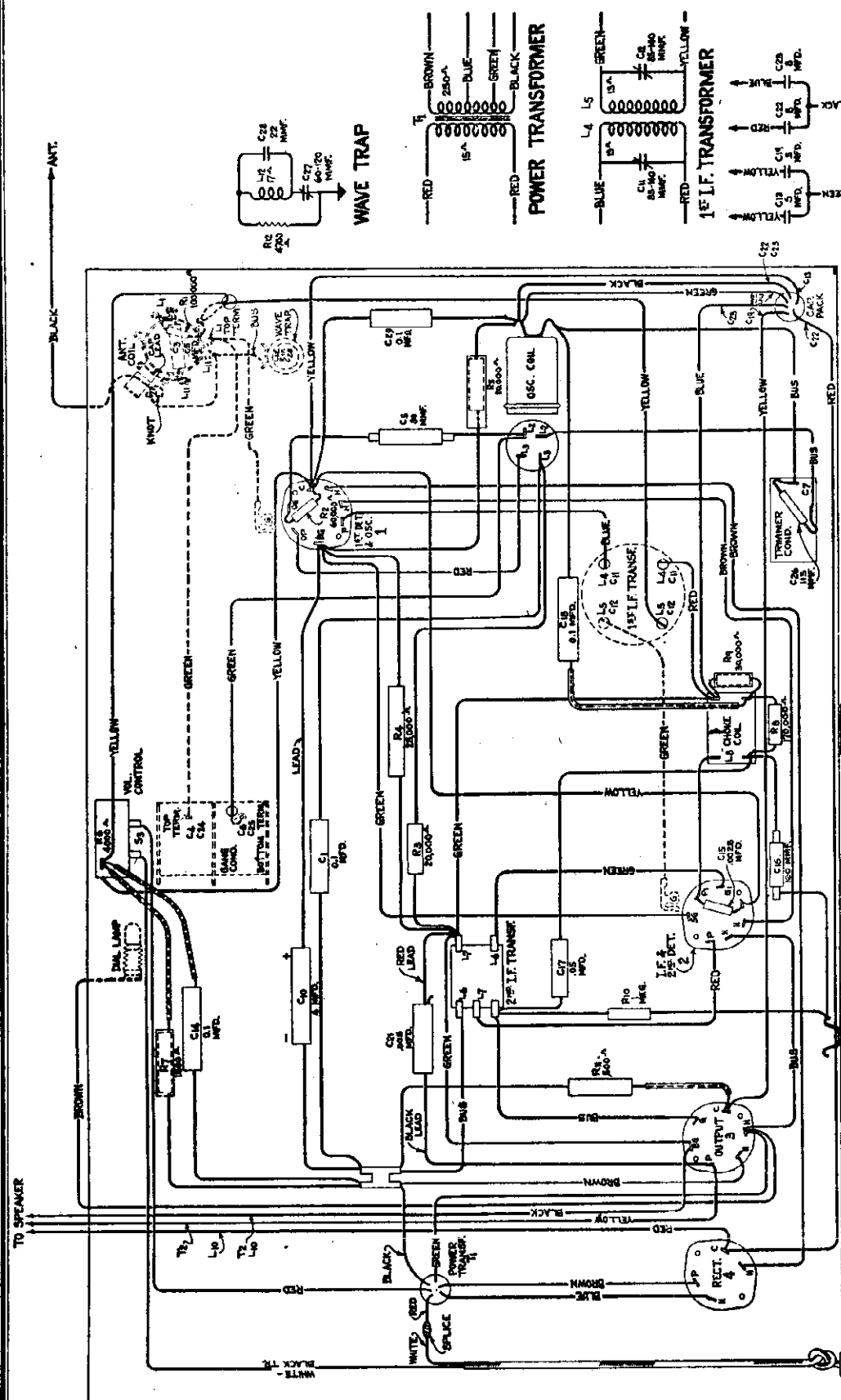
(7) REPLACING MAGNET COIL, PIVOT RUBBERS, ARMATURE OR DAMPING BLOCK

In order to replace a defective coil or the hardened pivot rubbers (see Figure 9), it is necessary to proceed as follows:

- (a) Remove the pickup cover by removing the center holding screw and needle screw.
- (b) Remove the pickup magnet and the magnet clamp by pulling them forward.
- (c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.
- (d) Remove screws A and B, Figure 10, and then remove the mechanism assembly from the pole pieces.
- (e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.
- (f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.
- (g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At

MODELS T4-8, T4-9
Chassis Wiring

RCA MFG. CO., INC.



- Tuning Range..... 540-1720 kc.
- Intermediate Frequency..... 460 kc.
- Alignment Frequencies..... 460 kc. (i.f.), 600 kc. (det., osc.), 1720 kc. (det., osc.)
- Voltage and Frequency Ratings.....
 - 105-125 volts, 50-60 cycles
 - 105-125 volts, 25-60 cycles
 - 200-250 volts, 50-60 cycles
- Power Consumption..... 1.75 watts
- Undistorted Audio Output..... 2.50 watts
- Maximum Audio Output..... 2.50 watts
- Loudspeaker..... 6 inch, Electrodynamic

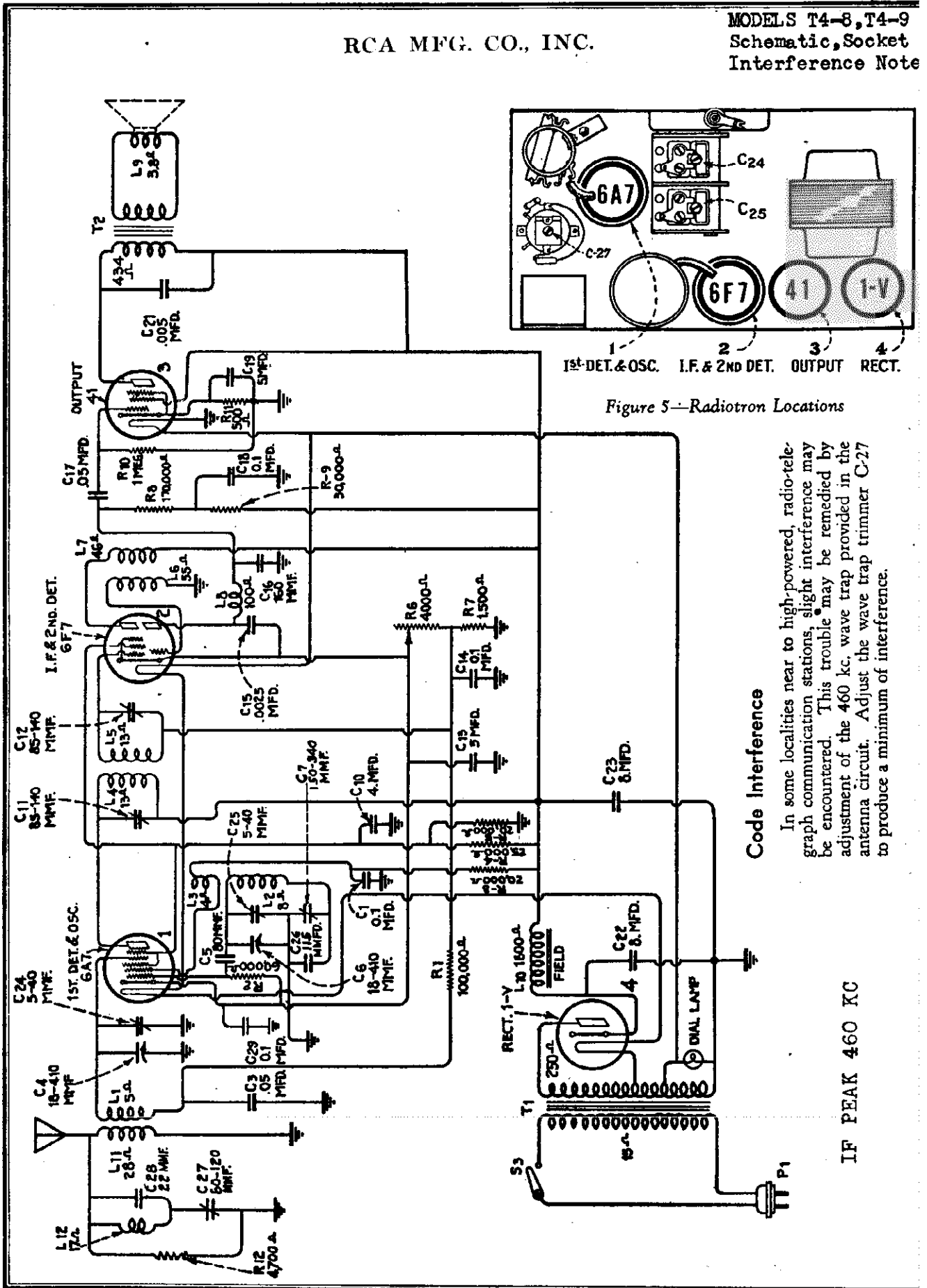


Figure 5 - Radiotron Locations

Code Interference

In some localities near to high-powered, radio-telegraph communication stations, slight interference may be encountered. This trouble may be remedied by adjustment of the 460 kc. wave trap provided in the antenna circuit. Adjust the wave trap trimmer C-27 to produce a minimum of interference.

IF PEAK 460 KC

MODELS T4-8, T4-9
Alignment, Trimmers
Voltage

RCA MFG. CO., INC.

Alignment Procedure

Five aligning trimmers are provided, the physical locations of which are indicated on Figure 3. These trimmers are accurately adjusted during manufacturing tests and should remain in proper alignment indefinitely unless affected by abnormal conditions of temperature or humidity, or unless they have been altered for service purposes. Loss of sensitivity, improper tone quality and poor selectivity usually indicate necessity for re-alignment.

The correct performance of the receiver can only be obtained when the aligning has been done with adequate and reliable apparatus. Such test apparatus as may be required for this operation should be in the hands of a skilled service engineer. The manufacturer of this receiver has available for sale through its distributors and dealers, a complete assortment of service test equipment. The instruments needed for alignment operations are illustrated and described on a separate page of this booklet.

An oscillator or signal generator is required as a source of the standard alignment frequencies recommended under Electrical Specifications. Visual indication of receiver output during the adjustments is very advantageous and may be accomplished by use of a Cathode Ray Oscillograph such as the RCA Victor Stock No. 9545. The method of alignment is explained in the instruction booklet for this instrument. Where an oscillograph is not available, an RCA Victor Neon Type Output Indicator may be used with good

results. It should be connected to the voice coil circuit of the loudspeaker so as to be actuated by the audio signal voltage.

The following method of procedure should be followed in adjusting the various trimmer capacitors:—

- (1) **Intermediate Frequency Amplifier**—The first i-f transformer has two trimmers identified as C-11 and C-12 on the diagram, Figure 3. Each must be tuned to 460 kc. by feeding a signal of this frequency from the Full Range Oscillator into the RCA-6A7 control grid and chassis-ground and adjusting both trimmers to the point giving maximum output. The oscillator output and the receiver volume control should be regulated so as to produce a sensitive indication on the receiver output indicator. If interference is noticed from strong local stations during these adjustments, the station selector should be tuned to a point at which they will be subdued.
- (2) **Detector and Oscillator**—A total of three adjustments are necessary on the detector and oscillator coil systems. Two of these are to be made at 1720 kc. and the other at 600 kc. The 1720 kc. trimmers are mounted on the variable tuning condenser and are accessible from the top of the chassis. The 600 kc. trimmer, which is associated with the oscillator system, is located on the rear apron of the chassis as shown by Figure 3. To align these

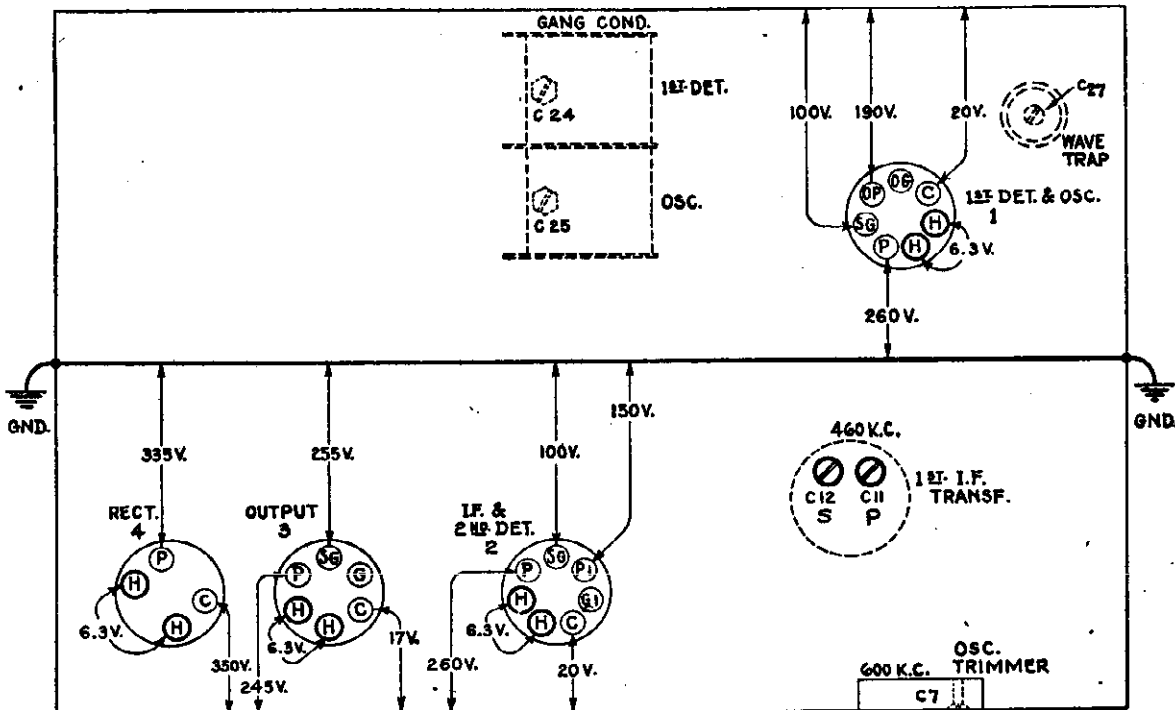


Figure 3—Trimmer Locations and Radiotron Socket Voltages to Chassis Measured at 120 volts A-C Supply—No Signal — Volume Control Maximum

various trimmers, after correcting the i-f alignment, proceed in the following manner. Supply a 1720 kc. signal from the standard oscillator to the receiver input (ant-gnd) terminals and accurately set the station selector to the 1720 kc. dial marking. (If for any reason, the dial pointer has slipped or been misplaced on the tuning shaft, it should be checked for proper calibration at full mesh of the variable condenser. With the station selector set to 1400 kc. adjust the trimmers C-25 and C-24 so that each produces maximum (peak) receiver output. Then shift the test oscillator frequency to 600 kc. and tune this standard signal on the receiver, disregarding the dial reading at which it is received. Adjust the 600 kc. oscillator trimmer C-7, simultaneously rocking the variable gang condenser backward and forward through the signal so

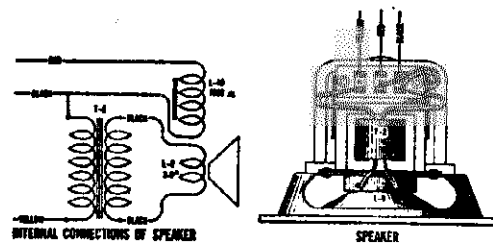


Figure 4—Loudspeaker Wiring

that maximum receiver output results from the combined operations. The point at which maximum output is obtained will not always be exactly at 600 kc. on the dial. The error should be disregarded. It is advisable to repeat the adjustments of C-24 and C-25 as explained above to correct for any reflective changes brought about by the adjustment of C-7.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

STOCK No.	DESCRIPTION	LIST PRICE	STOCK No.	DESCRIPTION	LIST PRICE
RECEIVER ASSEMBLIES					
4244	Cap—Grid contact cap—Package of 5....	\$0.20	3602	Resistor—60,000 ohms—Carbon type—1/4 watt (R2)—Package of 5.....	\$1.00
4000	Capacitor—Adjustable capacitor (C7)....	.78	3118	Resistor—100,000 ohms—Carbon type—1/4 watt (R1)—Package of 5.....	1.00
3459	Capacitor—80 mmfd. (C5).....	.44	3869	Resistor—170,000 ohms—Carbon type—1/2 watt (R8)—Package of 5.....	1.00
11302	Capacitor—115 mmfd. (C26).....	.15	3076	Resistor—1 megohm—Carbon type—1/2 watt (R10)—Package of 5.....	1.00
3865	Capacitor—160 mmfd. (C16).....	.30	3584	Ring—Oscillator coil shield ring—Package of 5.....	.40
5107	Capacitor—0.0025 mfd. (C15).....	.16	6665	Shield—Oscillator coil shield and bracket assembly.....	.34
6787	Capacitor—0.005 mfd. (C21).....	.30	3942	Shield—I. F. and second detector Radiotron shield.....	.18
4836	Capacitor—0.05 mfd. (C3).....	.30	8098	Socket—Dial lamp socket.....	.10
4886	Capacitor—0.05 mfd. (C17).....	.20	11187	Transformer—First intermediate frequency transformer (L4, L5, C11, C12).....	1.72
4835	Capacitor—0.1 mfd. (C1).....	.28	6663	Transformer—Second intermediate frequency transformer (L6, L7).....	1.06
4885	Capacitor—0.1 mfd. (C14, C18).....	.28	9465	Transformer—Power transformer—105-125 volts—25-50 cycles.....	4.38
4841	Capacitor—0.1 mfd. (C29).....	.22	9464	Transformer—Power transformer—105-125 volts—50-60 cycles (T1).....	3.20
6832	Capacitor—4.0 mfd. (C10).....	.85	9466	Transformer—Power transformer—200-250 volts—50-60 cycles.....	3.28
6661	Capacitor pack—Comprising two 5.0 mfd. and two 8.0 mfd. capacitors (C13, C19, C22, C23).....	2.70	11224	Trap—Wave trap (R12, L12, C27, C28).....	.90
5051	Coil—Antenna coil (L1, L11, C3, R1)....	1.28	REPRODUCER ASSEMBLIES		
3857	Coil—Choke coil (L8).....	.90	9548	Coil assembly—Comprising field coil, magnet and cone support (L10).....	\$3.08
5050	Coil—Oscillator coil (L2, L3).....	.56	9588	Cone—Reproducer cone—(L9)—Package of 5.....	3.55
6660	Condenser—Two-gang variable tuning condenser (C4, C6, C24, C25).....	2.78	9547	Reproducer—Complete.....	5.45
6667	Volume control (R6, S3).....	1.58	4447	Shield—Terminal board shield for reproducer.....	.18
11301	Dial—Station selector dial.....	.40	4803	Transformer—Output transformer (T2)...	1.45
4340	Lamp—Dial lamp—Package of 5.....	.60			
3632	Resistor—500 ohms—Carbon type—1 watt (R11)—Package of 5.....	1.10			
3047	Resistor—1500 ohms—Carbon type—1/2 watt (R7)—Package of 5.....	1.00			
6114	Resistor—20,000 ohms—Carbon type—1 watt (R3, R5)—Package of 5.....	1.10			
3889	Resistor—25,000 ohms—Carbon type—3 watt (R4).....	.25			
3077	Resistor—30,000 ohms—Carbon type—1/2 watt (R9)—Package of 5.....	1.00			

MODEL T4-10
 Socket, Alignment
 Parts List, Data

RCA MFG. CO., INC.

SERVICE DATA

Two trimmer capacitors are mounted on the variable tuning condenser for alignment purposes. Their exact locations and identifications are given by Figure 3. It will be necessary to re-adjust these capacitors only when they have become altered from their original alignment by reason of change of parts for service purposes, effects of extreme climate, or possibly because of tampering. Poor all-round performance is the general indication of improper alignment.

To re-align the receiver, proceed as follows:—

- (1) Place the receiver in operation with a standard signal generator (RCA Victor Stock No. 9595) connected to its antenna terminal. Correct the "zero" setting of the tuning knob so that it reads "0" when turned to its extreme left or full mesh of the variable condenser.
- (2) Set the trimmer screws so that they are approximately equal at their medium capacity. This may be done by turning each the same number of turns from their maximum positions.
- (3) Tune the external test oscillator to 1700 kc. and rotate the station selector until it is received. Adjust the output of the oscillator and volume control of the receiver to give the desired output level. It is advisable to use an output indicator attached to the speaker circuit. An RCA Stock No. 4317 Output Indicator is especially suitable.
- (4) Adjust the two trimmers C-3 and C-14, at the same time observing the output indicator, until the maximum (peak) receiver output is obtained.

Radiotron Socket Voltages

The voltages indicated from the socket contacts to the chassis on Figure 3 will serve to assist in analyzing defective circuit conditions when existent. Each value specified should hold within $\pm 20\%$ when the receiver is normally operative at the rated voltage. Variations in excess of this limit will usually be indicative of a faulty part. If all readings are incorrect, trouble should be investigated in the rectifier system. Defects occurring at other points in the circuits will affect a single or group of measurements related to that section.

Readings given are actual operating values and do not take into account measurement inaccuracies due to internal voltmeter resistance. A meter having a

resistance of at least 1000 ohms per volt should be used. The amount of circuit resistance which shunts the meter will determine the accuracy obtained, the error increasing as the former becomes comparable to or less than the latter.

Antenna-Ground

The circuit of the receiver is arranged in such manner that the chassis is at negative high voltage. The usual ground connection is therefore omitted and the chassis mounted so that it is insulated. The r-f circuit to ground is by way of the negative d-c lead or neutral a-c lead.

Interference present on the power supply line may occasionally attain a bothersome level in the receiver. When being operated on a.c., some reduction of this noise may be brought about by reversal of the power plug. For more serious interference, either from an a-c or d-c line, an external ground should be made to the receiver chassis through a small series condenser (.001 mfd, 200 volts). The length of the grounding lead should be kept to an absolute minimum.

Power Cord

The resistance element of the power lead will produce a noticeable amount of heat while the receiver is in operation. This heating should not be regarded as abnormal. No changes should be made in the length of the cord. In case of failure, it should be replaced in its entirety by a standard part.

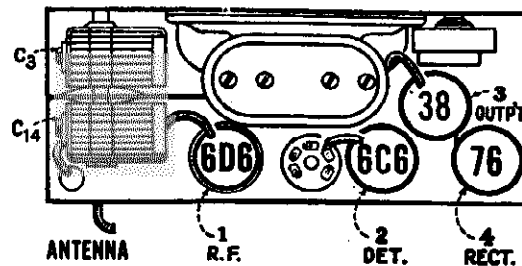


Figure 4—Tube Location Layout

STOCK No.	DESCRIPTION	LIST PRICE	STOCK No.	DESCRIPTION	LIST PRICE
RECEIVER ASSEMBLIES					
4244	Cap—Grid contact cap—Package of 5....	\$0.20	3998	Resistor—15,000 ohm—Carbon type—1/4 watt (R3)—Package of 5.....	\$1.00
11135	Capacitor—265 mmfd. (C8).....	.15	5108	Resistor—330,000 ohm—Carbon type—1/4 watt (R2)—Package of 5.....	1.00
5107	Capacitor—.0025 mfd. (C9).....	.16	11172	Resistor—470,000 ohm—Carbon type—1/4 watt (R5)—Package of 5.....	1.00
5005	Capacitor—.0035 mfd. (C11).....	.16	3033	Resistor—1 megohm—Carbon type—1/4 watt (R6)—Package of 5.....	1.00
4858	Capacitor—.01 mfd. (C1).....	.25	11151	Resistor—2.2 megohm—Carbon type—1/4 watt (R4)—Package of 5.....	1.00
4836	Capacitor—.05 mfd. (C4).....	.30	5129	Ring—Radiotron shield ring—Package of 5	.10
4841	Capacitor—.1 mfd. (C7).....	.22	11267	Shield—Radiotron shield.....	.15
11268	Capacitor pack—Comprising two 4.0 mfd. capacitors (C12, C13).....	.80	REPRODUCER ASSEMBLIES		
7956	Capacitor pack—Comprising two 5.0 mfd. capacitors (C6, C10).....	.80	9471	Cone—Reproducer cone—Package of 5...	3.50
6821	Coil—Detector coil (L4, L5, L6).....	.96	7713	Mechanism—Reproducer mechanism—Complete.....	3.72
11261	Coil—RF coil (L1, L2, L3).....	1.00	9470	Reproducer—Complete (L7).....	4.62
11260	Condenser—Two-gang variable tuning condenser (C2, C3, C5, C14).....	1.75	7712	Support—Cone support.....	.50
11263	Volume control (R1, S1).....	.88			
11267	Cord—Power cord—315 ohms (R8).....	1.00			
3537	Reactor—Filter reactor (L8).....	1.10			
4408	Resistor—1500 ohm—Carbon type—1/4 watt (R7)—Package of 10.....	2.00			

RCA MFG. CO., INC.

MODEL T4-10
Schematic, Voltage
Trimmers

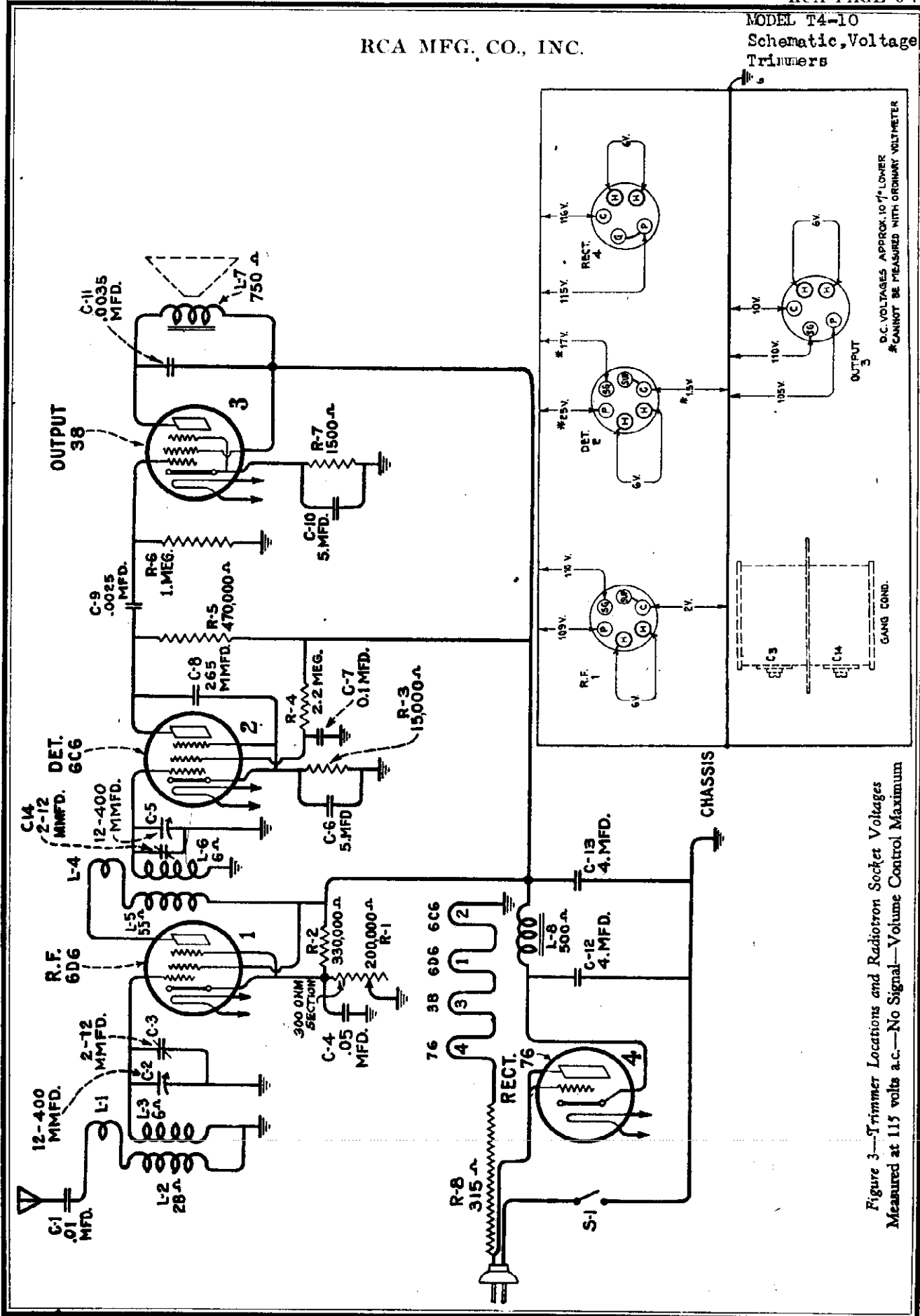
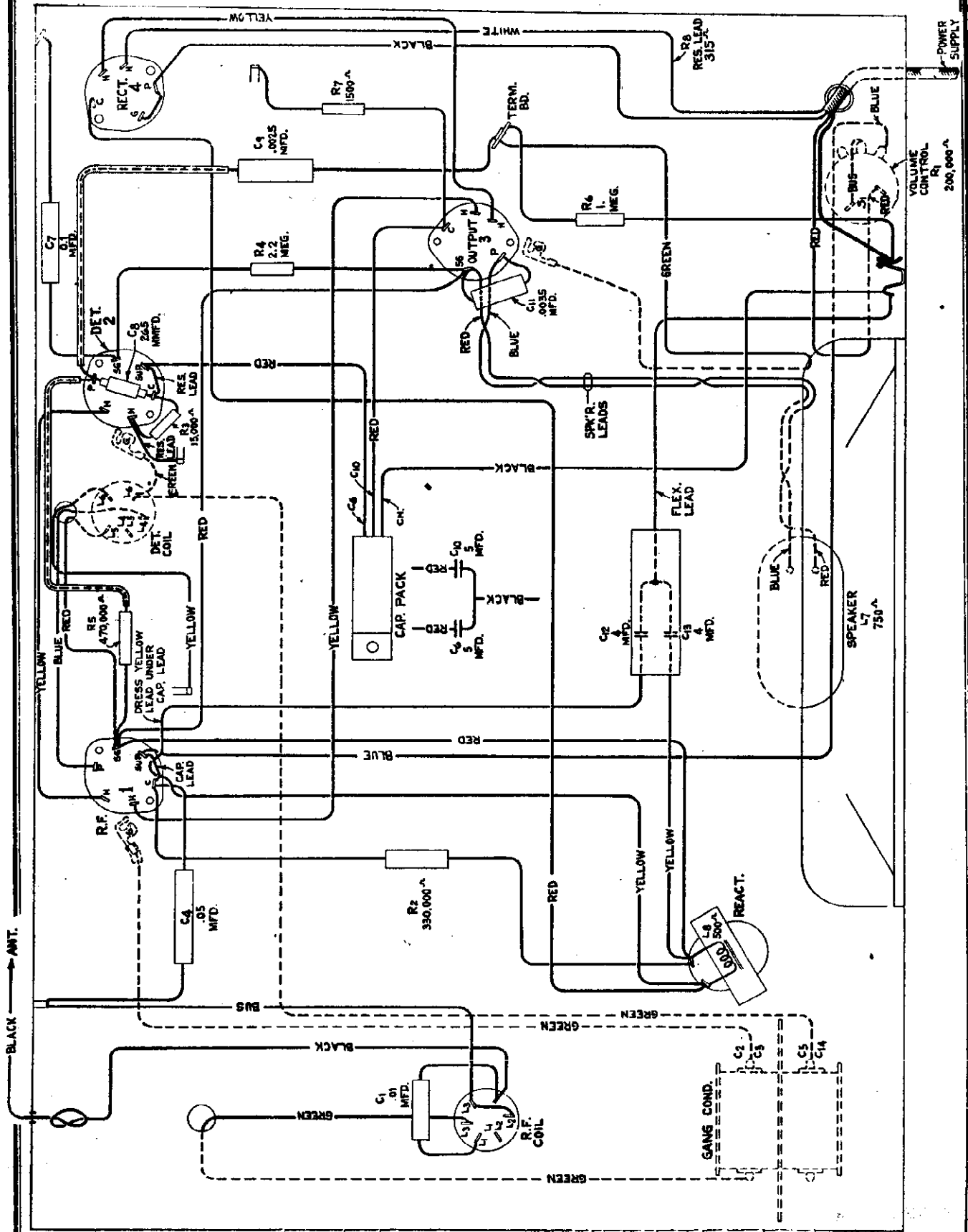


Figure 3—Trimmer Locations and Radiotron Socket Voltages Measured at 115 volts a.c.—No Signal—Volume Control Maximum

D.C. VOLTAGES APPROX. 10% LOWER
*CANNOT BE MEASURED WITH ORDINARY VOLTMETER

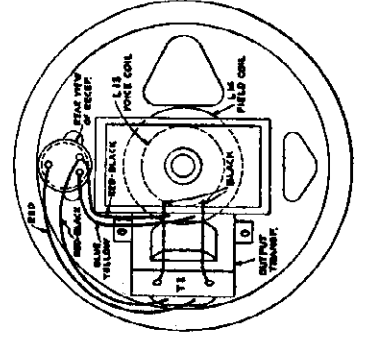
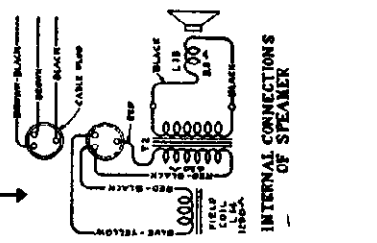
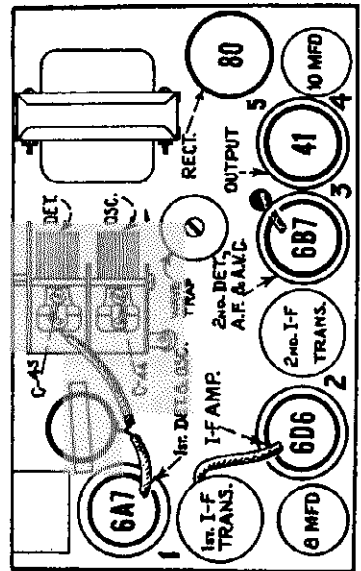
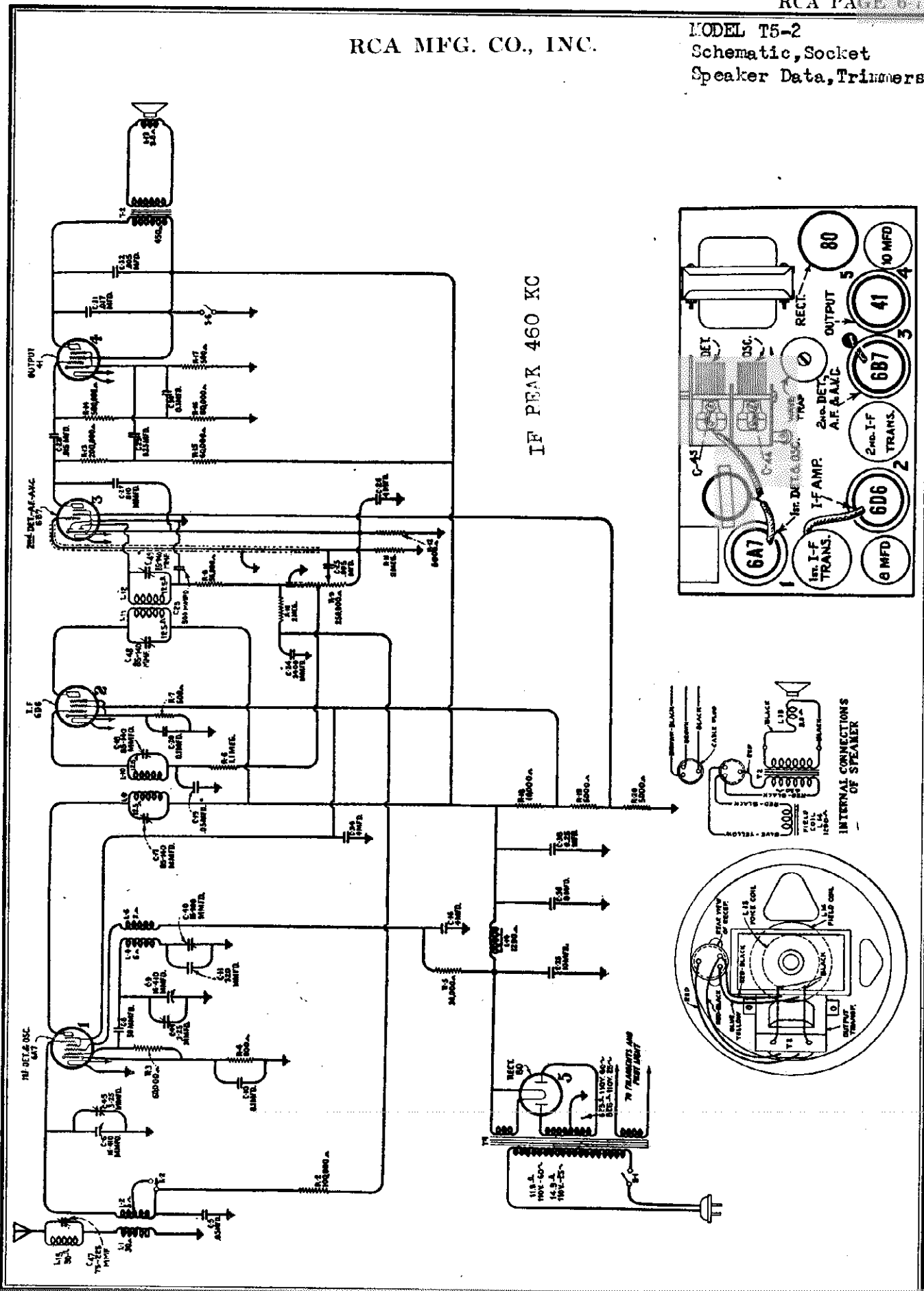
MODEL T4-10
Chassis Wiring

RCA MFG. CO., INC.



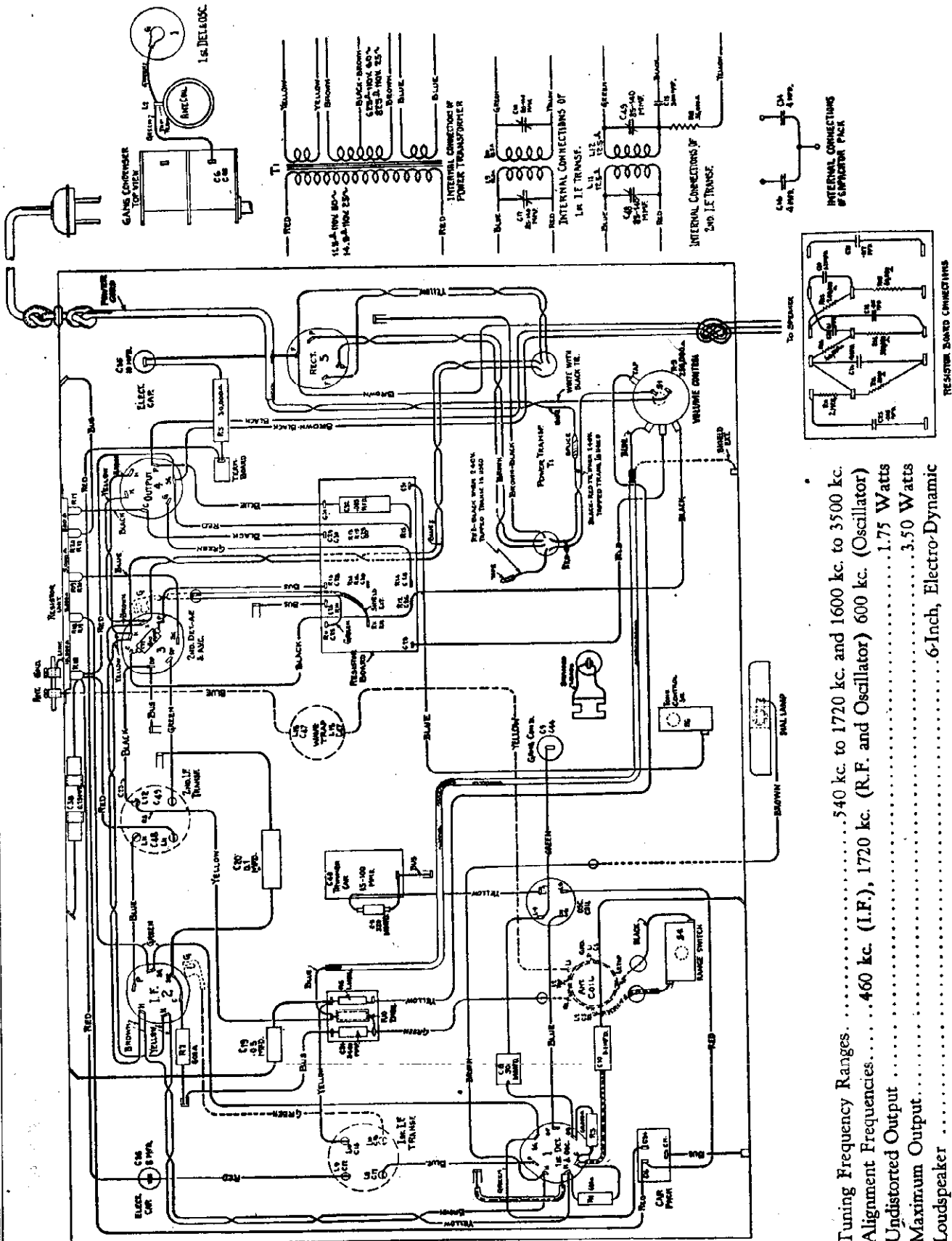
RCA MFG. CO., INC.

MODEL T5-2
Schematic, Socket
Speaker Data, Trimmers



MODEL T5-2
Chassis Wiring

RCA MFG. CO., INC.



- Tuning Frequency Ranges.....540 kc. to 1720 kc. and 1600 kc. to 3500 kc.
- Alignment Frequencies.....460 kc. (I.F.), 1720 kc. (R.F. and Oscillator) 600 kc. (Oscillator)
- Undistorted Output.....1.75 Watts
- Maximum Output.....3.50 Watts
- Loudspeaker.....6-Inch, Electro-Dynamic

SERVICE DATA

ALIGNMENT PROCEDURE

This receiver must be in correct electrical alignment in order to obtain maximum efficiency and best quality of performance. The circuits should be realigned after each major service or repair operation, and whenever there are positive indications that the adjustments have deviated from normal by ordinary usage. These indications will be present together and will have the nature of: low sensitivity, poor tone quality and irregular double-peaked tuning.

I-F Tuning Adjustments

There are two i-f transformers associated in the intermediate amplifier system. They are both tuned by accessible trimmers. To obtain the correct alignment proceed as follows:

- Short circuit the antenna and ground terminals and tune the receiver so that no signal is received. Set the volume control to its maximum position. Ground the receiver.
- Connect the output of the test oscillator between the first detector control grid and chassis ground. Attach an indicating meter, such as is illustrated, to the speaker circuit.
- Place the external oscillator into operation at 460 kc. Adjust the output so that a slight registration occurs on the output indicator. The output should be set at as low a value as will give a convenient indication during adjustment;

this requirement is important in that the a.v.c. action is voided by such a method. Adjust the trimmers, C-49, C-48, C-18 and C-17 in order, for maximum receiver output.

R-F and Oscillator Adjustments

Three trimmers are provided, two for adjustment at 1720 kc. and one for oscillator line-up at 600 kc. No adjustments are required on the medium wave band. Locations of the trimmers are shown on Figure 3. They should be adjusted in the following manner:

- Connect the output of the modulated Full Range Oscillator to the antenna and ground terminals of the receiver. Check the position of the dial pointer. It should set exactly on the radial line, adjacent to the dial reading of 540 when the tuning capacitor plates are at full mesh. After correcting the dial pointer, place the receiver in operation and set the selector at 1720 kc., advance the volume control to maximum and turn the range switch to its broadcast position.
- Adjust the frequency of the external oscillator to 1720 kc. and regulate its output until a perceptible indication appears on the output indicator. This indication should be held at a minimum during the adjustments. The trimmers C44 and C45 should then be tuned to the point giving peak receiver output.
- Re-tune the test oscillator, setting its frequency

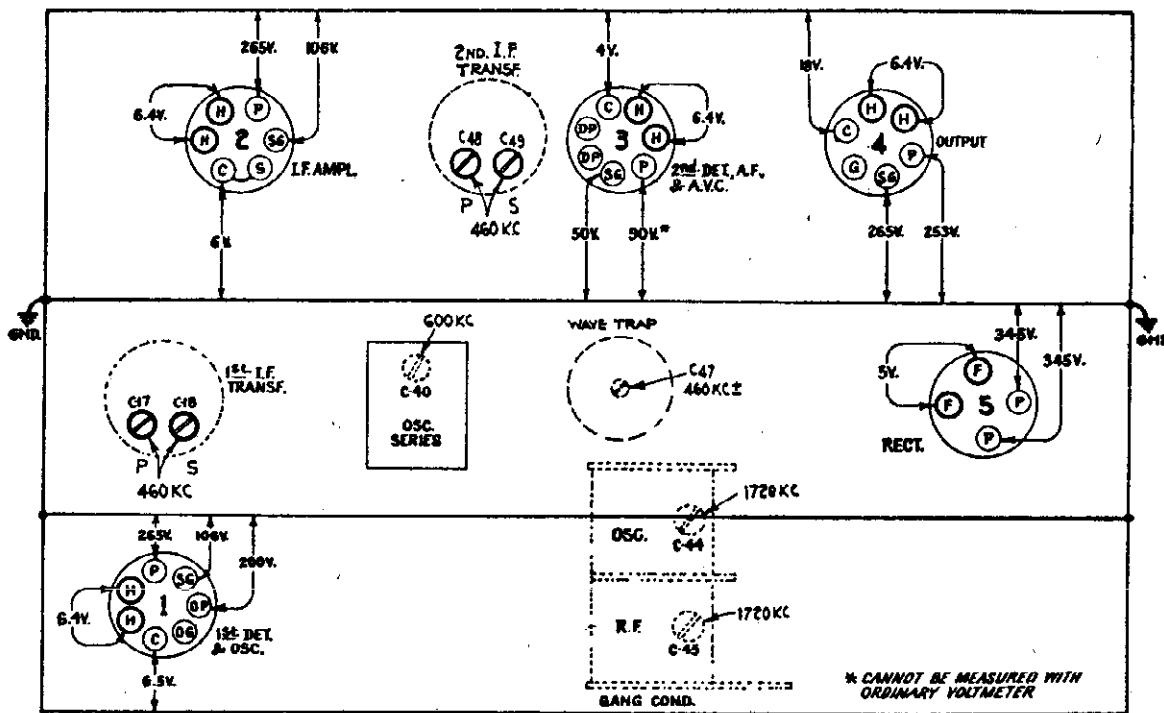


Figure 3—Trimmer Locations and Radiotron Socket Voltages (Measured at 115 volts A. C. Supply—Maximum Volume Control—No Signal)

MODEL T5-2

Alignment, Part 2
Parts List

RCA MFG. CO., INC

to 600 kc. Turn the receiver selector control to the point where the incoming oscillator signal is received best. This point will not always be exactly at 600 on the dial. Then adjust the low-frequency trimmer, C40, simultaneously rocking the tuning capacitor slowly through the signal until maximum receiver output results from these combined operations. This adjustment must be made irrespective of dial calibration. It is advisable to repeat the 1720 kc. adjustment of the oscillator trimmer C44, in order to correct for any change caused by the tuning of C40.

Wave Trap Adjustment

With receiver in operation using its normal antenna, tune the station selector to the point at which the

intermediate-wave interference is most intense. Then adjust the wave-trap trimmer to the point which cause maximum suppression of the interference.

RADIOTRON SOCKET VOLTAGES

The various normal operating voltages are given on Figure 3. As specified, they are referred to the chassis ground. Accuracy of measurements will be a function of the internal resistance of the voltmeter used. It is advisable to employ a meter having at least 1000 ohms per volt, and for each reading use the highest range which will give an acceptably accurate reading. General deviations from the values given, due to line voltage difference, should not be taken as indicating a defective condition. The erratic departure from normal of a single value or group of values should form the basis of circuit diagnosis.

T 5-2 REPLACEMENT PARTS

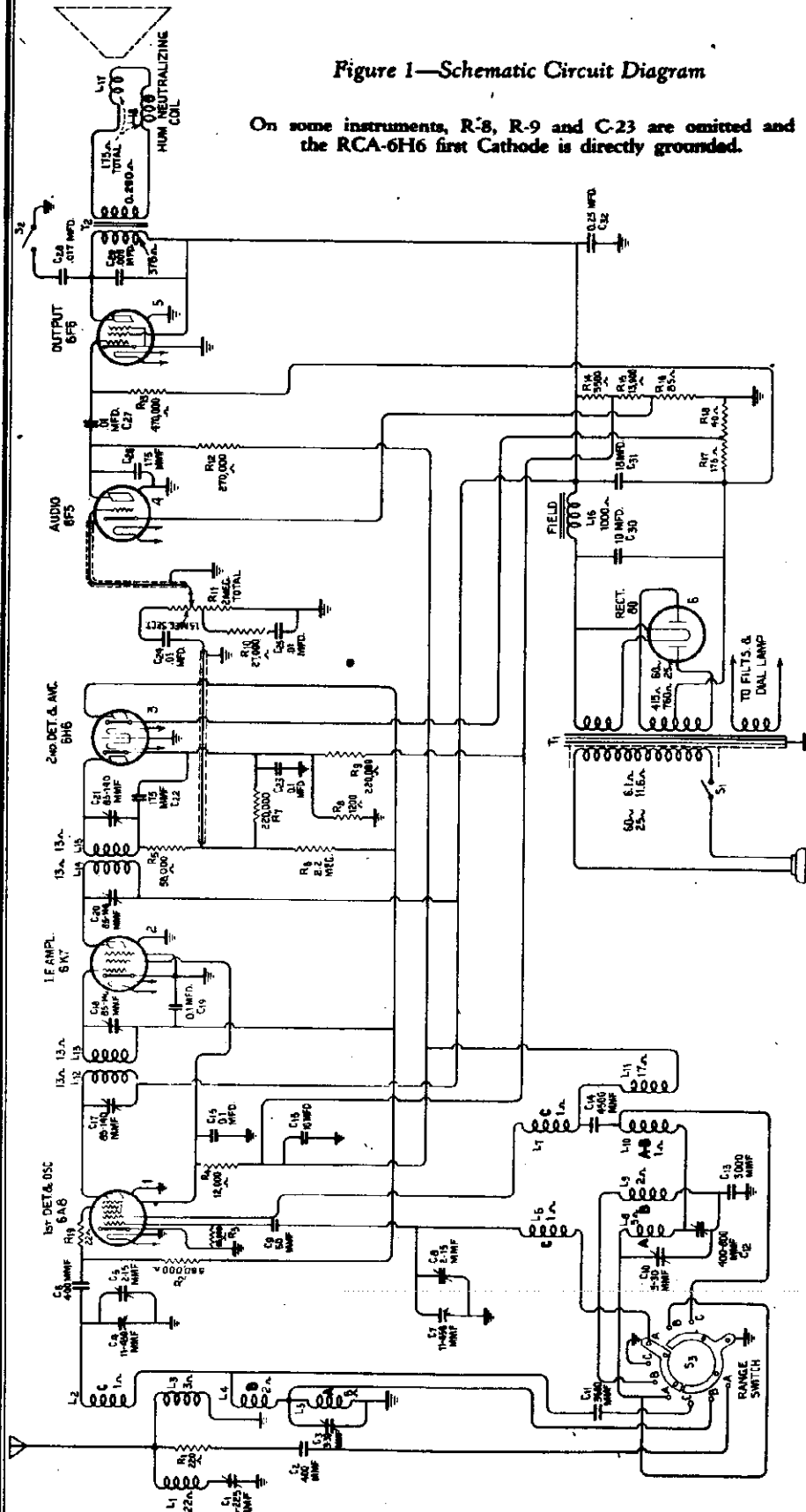
Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

STOCK No.	DESCRIPTION	LIST PRICE	STOCK No.	DESCRIPTION	LIST PRICE
RECEIVER ASSEMBLIES					
4244	Cap—Contact cap—Package of 5.....	\$0.20	3584	Ring—Oscillator coil retaining ring—Pack- age of 5.....	\$0.40
3861	Capacitor—Adjustable capacitor (C40)....	.78	3623	Shield—Oscillator coil shield.....	.30
5094	Capacitor—50 MMfd. (C8).....	.20	3942	Shield—First detector and output Radiotron shield.....	.18
5151	Capacitor—320 MMfd. (C11).....	.20	3782	Shield—Second detector Radiotron shield..	.26
4297	Capacitor—400 MMfd. (C27).....	.30	7487	Shield—I.F. Radiotron shield.....	.25
4881	Capacitor—3400 MMfd. (C24).....	.20	5186	Shield—I.F. Transformer shield.....	.28
4868	Capacitor—0.005 Mfd. (C25, C32).....	.20	3878	Socket—Dial lamp socket.....	.26
11315	Capacitor—0.015 Mfd. (C28).....	.20	4784	Socket—4-contact Radiotron socket.....	.15
4906	Capacitor—0.017 Mfd. (C31).....	.25	4785	Socket—6-contact output Radiotron socket.	.15
4836	Capacitor—0.05 Mfd. (C5, C19).....	.30	4786	Socket—6-contact Radiotron socket.....	.15
4841	Capacitor—0.1 Mfd. (C10, C20, C30)....	.22	4787	Socket—7-contact Radiotron socket.....	.15
3597	Capacitor—0.25 Mfd. (C29, C38).....	.40	5053	Switch—Range switch (S2).....	.50
3796	Capacitor—4.0 Mfd. (C26).....	.60	4905	Switch—Tone control switch (S6).....	.30
4428	Capacitor—8.0 Mfd. (C36).....	1.05	4900	Transformer—First intermediate frequency transformer—(L9, L10, C17, C18).....	2.25
7790	Capacitor—10.0 Mfd. (C35).....	1.05	11477	Transformer—Second intermediate fre- quency transformer (L11, L12, C23, C48, C49, R8).....	2.02
7589	Capacitor Pack—Comprising two 4.0 Mfd. capacitors (C16, C34).....	1.64	4898	Transformer—Power transformer—105-125 volts—25-60 cycles.....	5.55
4358	Clamp—Capacitor mounting clamp for Stock No. 4428 and No. 7790.....	.15	4897	Transformer—Power transformer—105-125 volts—50-60 cycles (T1).....	3.98
5051	Coil—Antenna coil (L1, L2, C5, R2)....	1.28	4899	Transformer—Power transformer—105- 125/200-240 volts—40-60 cycles.....	4.05
5050	Coil—Oscillator coil (L4, L6).....	.56	11479	Trap—Wave trap (L15, C47).....	1.02
11475	Condenser—2-gang variable tuning con- denser (C6, C9, C44, C45).....	3.25	4429	Volume Control—(R9, S1).....	1.40
11476	Drive—Variable condenser drive.....	.65	REPRODUCER ASSEMBLIES		
3708	Resistor—600 Ohm—Carbon type—1/4 watt (R4, R7)—Package of 5.....	1.00	9587	Coil—Field coil, magnet and cone support (L14).....	2.18
4436	Resistor—5000 Ohm—Carbon type—1/4 watt (R12)—Package of 10.....	2.00	9788	Cone—Reproducer cone (L13)—Package of 5.....	3.55
2240	Resistor—30,000 Ohm—Carbon type—1 watt (R5).....	.22	5118	Connector—3-contact male connector for reproducer cable.....	.25
3602	Resistor—60,000 Ohm—Carbon type—1/4 watt (R3, R15, R16)—Package of 5....	1.00	5119	Connector—3-contact female connector for reproducer cable.....	.25
3118	Resistor—100,000 Ohm—Carbon type—1/4 watt (R2)—Package of 5.....	1.00	9586	Reproducer—Complete.....	5.95
3116	Resistor—200,000 Ohm—Carbon type—1/4 watt (R13)—Package of 5.....	1.00	4893	Transformer—Output transformer (T2)...	1.48
6186	Resistor—500,000 Ohm—Carbon type—1/4 watt (R14)—Package of 5.....	1.00	MISCELLANEOUS ASSEMBLIES		
4783	Resistor—1,100,000 Ohm—Carbon type— 1/4 watt (R6)—Package of 5.....	1.00	5111	Dial—Station selector dial scale.....	.32
6242	Resistor—2 Megohm—Carbon type—1/4 watt (R10, R11)—Package of 5.....	1.00	11478	Indicator—Station selector indicator pointer	.12
4721	Resistor—Tapped resistor—One 500 Ohm, two 5,000 Ohm, and one 10,000 Ohm sections (R17, R18, R19, R20).....	.88	4340	Lamp—Station selector dial lamp—Package of 5.....	.60

RCA MFG. CO., INC.

Figure 1—Schematic Circuit Diagram

On some instruments, R-8, R-9 and C-23 are omitted and the RCA-6H6 first Cathode is directly grounded.



IF PEAK 460 KC

ALIGNMENT FREQUENCIES

- Band A.....600 kc. (osc.), 1400 kc. (osc., ant.)
- Band B.....None required
- Band C.....18000 kc. (osc., ant.)

FREQUENCY RANGES

- Band A.....540—1625 kc.
- Band B.....1625—5700 kc.
- Band C.....5700—18000 kc.

Intermediate Frequency..... 460 kc.

POWER SUPPLY RATINGS

- Rating A.....105—125 volts, 50—60 cycles, 85 watts
- Rating B.....105—125 volts, 25—60 cycles, 90 watts
- Rating C.....100—130/140—160/195—250 volts, 40—60 cycles, 85 watts

POWER OUTPUT

- Undistorted.....2.0 watts
- Maximum.....4.5 watts

LOUDSPEAKER

- Type.....Electrodynamic
- Voice Coil Impedance.....2.25 ohms—400 cycles

RCA MFG. CO., INC.

MODELS T6-1, C6-2
Circuit Data, Socket
Alignment

Circuit Arrangement

The conventional Superheterodyne type of circuit, consisting of 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 consists of a single primary and three series connected secondary windings to provide the three ranges of tuning. The oscillator coil system is similarly wound on a single form. A range selector switch (S-3) is used for connecting the various sections of these two coil systems into the circuit to provide operation on the band desired. The coils are tuned by a variable two-section gang condenser having trimmer capacitors in shunt with each section. There are additional trimmer capacitors across the section of each coil used for Band "A." A series trimmer is also associated with the Band "A" oscillator coil.

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 double diode tube. The audio frequency recovered 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 R-7, is applied as automatic control grid bias to the first detector and i-f tubes through a suitable resistance filter circuit. The second (auxiliary) 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 R-6, R-7 and R-8, 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

is obtained when the alignment of the receiver can only be obtained when the alignment is performed with adequate and reliable test apparatus. The manufacturer of this instrument has a complete assortment of such service equipment available. This equipment may be purchased from authorized distributors and dealers.

An oscillator (signal generator) is required as a source of the specified alignment frequencies. Visual indication of receiver output during the adjustment is necessary to enable the serviceman to obtain an accuracy of alignment which is not possible by listening to the signal. The RCA Victor Stock No. 9195 Full Range Oscillator and the RCA Victor Stock No. 4117 Neon Output Indicator are especially suitable and fulfill the above requirements.

The following procedure should be followed 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 4. Each must be aligned to a basic frequency of 460 kc. To do this, attach the Output Indicator across the voice coil circuit or across the output transformer primary. Connect the output of the test oscillator between the control grid of the RCA-6AS first detector tube and chassis ground. 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 either from local broadcast stations or the heterodyne oscillator. Increase the output of the test oscillator until a slight indication is apparent on the output indicator. Then adjust the two trimmers of the second i-f transformer to produce maximum (peak) indicated receiver output. Then, adjust the two trimmers 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 trimmers a second time to assure that the interaction between them has not disturbed the original adjustment.

The correct performance of the receiver can only be obtained when the alignment is performed with adequate and reliable test apparatus. The manufacturer of this instrument has a complete assortment of such service equipment available. This equipment may be purchased from authorized distributors and dealers.

An oscillator (signal generator) is required as a source of the specified alignment frequencies. Visual indication of receiver output during the adjustment is necessary to enable the serviceman to obtain an accuracy of alignment which is not possible by listening to the signal. The RCA Victor Stock No. 9195 Full Range Oscillator and the RCA Victor Stock No. 4117 Neon Output Indicator are especially suitable and fulfill the above requirements.

R-F Trimmer Adjustments

The two trimmers which are at all times directly in shunt with the variable tuning condenser necessitate that the high-frequency range (Band C) be aligned first. The range selector switch should, therefore, be turned to its Band C position for the first adjustment. The Output Indicator should be left connected to the output system. Attach the output terminals of the test oscillator to the antenna and ground terminals of the receiver input.

Calibrate the dial by rotating the tuning control until the variable condenser plates are in their full mesh (maximum capacity) position and adjusting the dial pointer so that its end points to the horizontal graduation (530 kc.) at the low frequency end of the Band A scale.

Proceed further as follows:
(a) Adjust the test oscillator to 18,000 kc. and set the receiver tuning control to a dial reading of 18,000 kc.

(b) Regulate the output of the test oscillator until a slight indication is perceptible at the receiver output. Then adjust the trimmer 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 oscillator will be 460 kc. below the signal frequency at this adjustment point.)

(c) Adjust the trimmer of the antenna section of the variable condenser, simultaneously rocking the receiver tuning control backward and forward through the 18,000 kc. input signal, until maximum receiver output results from these combined operations. Rocking of the variable condenser will prevent inaccurate adjustment which would otherwise be caused by the interaction between the heterodyne oscillator circuit and the antenna tuned circuit.

(d) Change the receiver range selector to its Band A position and set the receiver tuning control to a dial reading of 1400 kc. Tune the test oscillator to this same frequency and regulate its output to produce a slight indication on the receiver output indicating device.

(e) Adjust the high frequency trimmers of the Band A oscillator and antenna coils, C-10 and C-3 respectively, to the points at which each produces maximum indicated receiver output.

(f) 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.

(g) Tune the low frequency trimmer, C-12, of the oscillator Band A 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 C-10 and C-3 should be corrected at 1400 kc. to compensate for any changes caused by the adjustment of the low frequency oscillator coil trimmer.

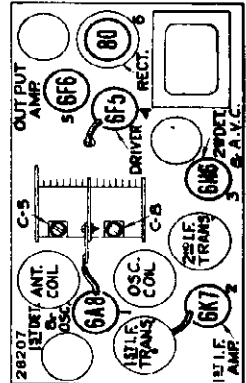


Figure 3—Radiotron and Coil Locations

SERVICE DATA

Alignment Procedure

Precise alignment is vital to the proper functioning of this receiver. There are four trimming adjustments provided in the i-f system, three in the oscillator coil system and two in the antenna coil system. Each of these trimmers have 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 various diagrams of this bulletin contain such information as will be needed to isolate causes for defective operation when such a condition develops. Ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles, such as R-3, L-2, C-1, etc., are provided for reference between the diagrams and the replacement parts list. Locating of the parts in the schematic circuit is facilitated by the fact that the numerical titles increase from left to right on the diagram. The coils, reactors, and transformer windings are rated in terms of their d-c resistances only, and when the resistance is less than one ohm, no rating is given.

MODELS T6-1, C6-2
Voltage, Data
Parts List

RCA MFG. CO., INC.

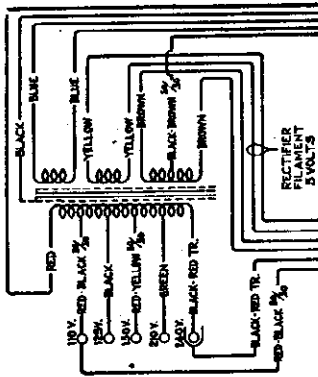


Figure 6—Universal Transformer

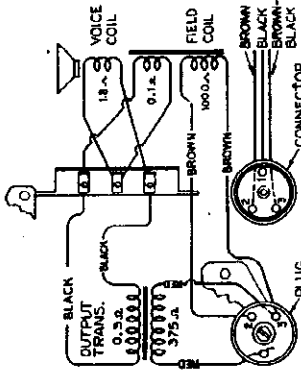
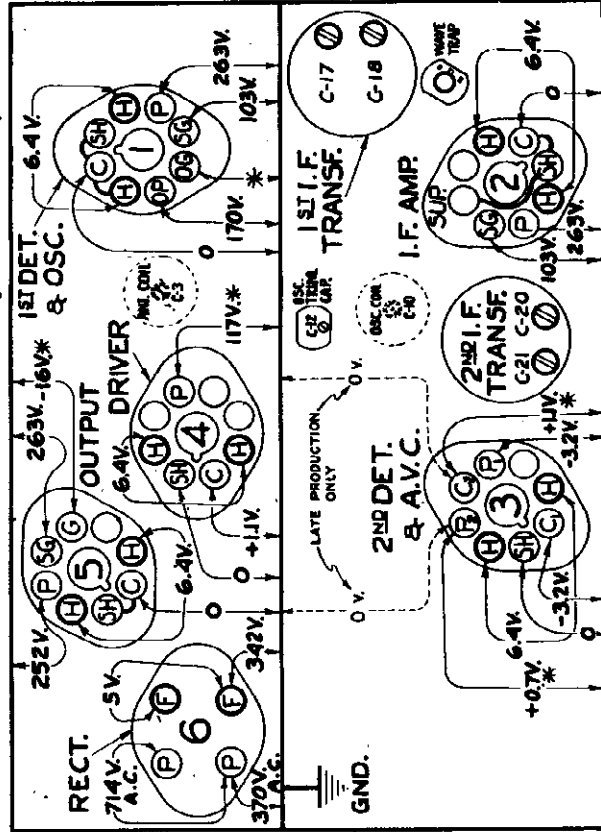


Figure 5—Loudspeaker Wiring



(*) CANNOT BE MEASURED WITH ORDINARY VOLTMETER

Figure 4—Radiotron Schematic Diagram
Measured at 115 volts, 60 cycle supply—No signal being received

NOTES

(1) Beat notes or heterodyning (whistles) may be encountered in some instances on these receivers due to excessive antenna capacitance. This condition may be corrected by reducing the size of the antenna or by inserting a 150 mmfd capacitor in series with the antenna lead. This may be accomplished in the receiver by removing the bus lead which connects from the antenna terminal to the wave trap inductance L-1 and inserting the condenser between these points.

STOCK NO.	DESCRIPTION	LIST PRICE	STOCK NO.	DESCRIPTION	LIST PRICE
3137	RECEIVER ASSEMBLIES		3066	Resistor—12,000 Ohms—Carbon type—1 watt—1/4" Dia.—Package of 5	1.10
11465	Bushing—Variable tuning condenser mounting bushing—Package of 3	\$0.45	11400	Resistor—37,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	1.00
11459	Capacitor—Adjustable capacitor—(C12)	.76	3029	Resistor—35,000 Ohms—Carbon type—1/4 watt—(R5)—Package of 5	1.00
116-3	Capacitor—50 MMfd—(C9)	.18	5138	Resistor—270,000 Ohms—Carbon type—1/4 watt—(R3)—Package of 5	1.00
116-4	Capacitor—400 MMfd—(C2, C6)	.25	11453	Resistor—270,000 Ohms—Carbon type—1/10 watt—(R17)—Package of 5	.75
116-2	Capacitor—3000 MMfd—(C13)	.36	11452	Resistor—470,000 Ohms—Carbon type—1/10 watt—(R17)—Package of 5	.75
116-1	Capacitor—1800 MMfd—(C14)	.48	11397	Resistor—450,000 Ohms—Carbon type—1/10 watt—(R2)—Package of 5	.75
4868	Capacitor—50 MMfd—(C19)	.20	11626	Resistor—2.2 Megohms—Carbon type—1/10 watt—(R2)—Package of 5	.75
11395	Capacitor—0.1 Mfd—(C34)	.25	11603	Shield—Antenna or oscillator coil shield	1.00
4858	Capacitor—0.1 Mfd—(C3, C37)	.25	11390	Shield—Intermediate frequency transformer	.26
4906	Capacitor—0.17 Mfd—(C28)	.22	11383	Shield—Rectifier Radiotron shield	.25
4841	Capacitor—0.1 Mfd—(C19, C33)*	.22	11614	Spring—Coil spring for large gears on variable tuning condenser—Package of 10	.20
11414	Capacitor—0.1 Mfd—(C15)	.25	11616	Switch—Range switch—(S1)	.70
5170	Capacitor—0.25 Mfd—(C32)	.35	11460	Switch—Range switch—(S1)	.95
11387	Capacitor—10 Mfd—(C16)	1.08	3138	Terminal—Antenna terminal board, with clip	.14
11490	Capacitor—18 Mfd—(C10)	1.08	11388	Transformer—First intermediate frequency transformer—(L12, L13, C17, C18)	1.90
11417	Coil—Antenna coil—(L1, L4, L5, C1, R1)	1.08	11389	Transformer—Second intermediate frequency transformer—(L14, L15, C20, C21, C22, C23)	3.02
11618	Coil—Oscillator coil—(L6, L7, L8, L9, L10, L11, C10)	2.22	11458	Transformer—Power transformer—100-125 volts—50-60 cycles—(T1)	4.85
11611	Condenser—Two-gang variable tuning condenser—(C4, C5, C7, C8)	3.80	11585	Transformer—Power transformer—100-130, 140-160, 195-210 volts—40-60 cycles	7.00
11615	Dial—Station selector dial	.60	11384	Transformer—Power transformer—100-130, 140-160, 195-210 volts—40-60 cycles	5.95
11613	Driver—Variable tuning condenser drive	1.00	11391	Trap—Wave trap—(L1, C1)	1.22
11376	Excitech—Station selector excitech and crystal	1.00	11237	Volume Control—(R11)	1.20
11619	Foot—Phonograph mounting foot and bracket	.70		REPRODUCER ASSEMBLIES	
11396	Induction Station selector indicator pointer	.25	11232	Board—Terminal board assembly	.18
5226	Lamp—Dial lamp—Package of 5	.70	11231	Bolt—Yoke and core assembly bolt and nut	.16
11466	Resistor—Voltage divider resistor—comprising one 3500 ohm, one 13000 ohm, one 85 ohm, one .40 ohm, and one 175 ohm sections—(R14, R15, R16, R17, R18)	.95	8060	Bracket—Output transformer mounting bracket	.14
11624	Resistor—22 Ohms—Flexible type—completing plate with contact tap—(R19)	.22	11257	Clamp—One center suspension clamping nut and screw assembly—Package of 5	.25
11520	Resistor—100 Ohms—Carbon type—1/10 watt—(R3)*—Package of 5	.75	11470	Coil—Field coil—(L16)	2.16
11231	Bolt—Yoke and core assembly bolt and nut	1.00	11469	Coil—Neutralizing coil—(L18)	.20
8060	Bracket—Output transformer mounting bracket	.14	11258	Core—Reproducer core—(L17)—Package of 5	3.50
11257	Clamp—One center suspension clamping nut and screw assembly—Package of 5	.25	5118	Connector—Three contact male connector for reproducer	.25
11459	Coil—Field coil—(L16)	2.16	5119	Connector—Three contact female connector for reproducer cable	.25
11258	Core—Reproducer core—(L17)—Package of 5	3.50	9622	Reproducer—Complete	7.16
5118	Connector—Three contact male connector for reproducer	.25	11253	Transformer—Output transformer—(T2)	6.85
5119	Connector—Three contact female connector for reproducer cable	.25	11230	Washer—Binder board "C" washer—used to hold field coil assembly—Package of 5	1.56
9622	Reproducer—Complete	7.16		REPRODUCER ASSEMBLIES	
11253	Transformer—Output transformer—(T2)	6.85	11232	Board—Terminal board assembly	.18
11230	Washer—Binder board "C" washer—used to hold field coil assembly—Package of 5	1.56		REPRODUCER ASSEMBLIES	
			11232	Board—Terminal board assembly	.18

Wave-Trap Adjustment

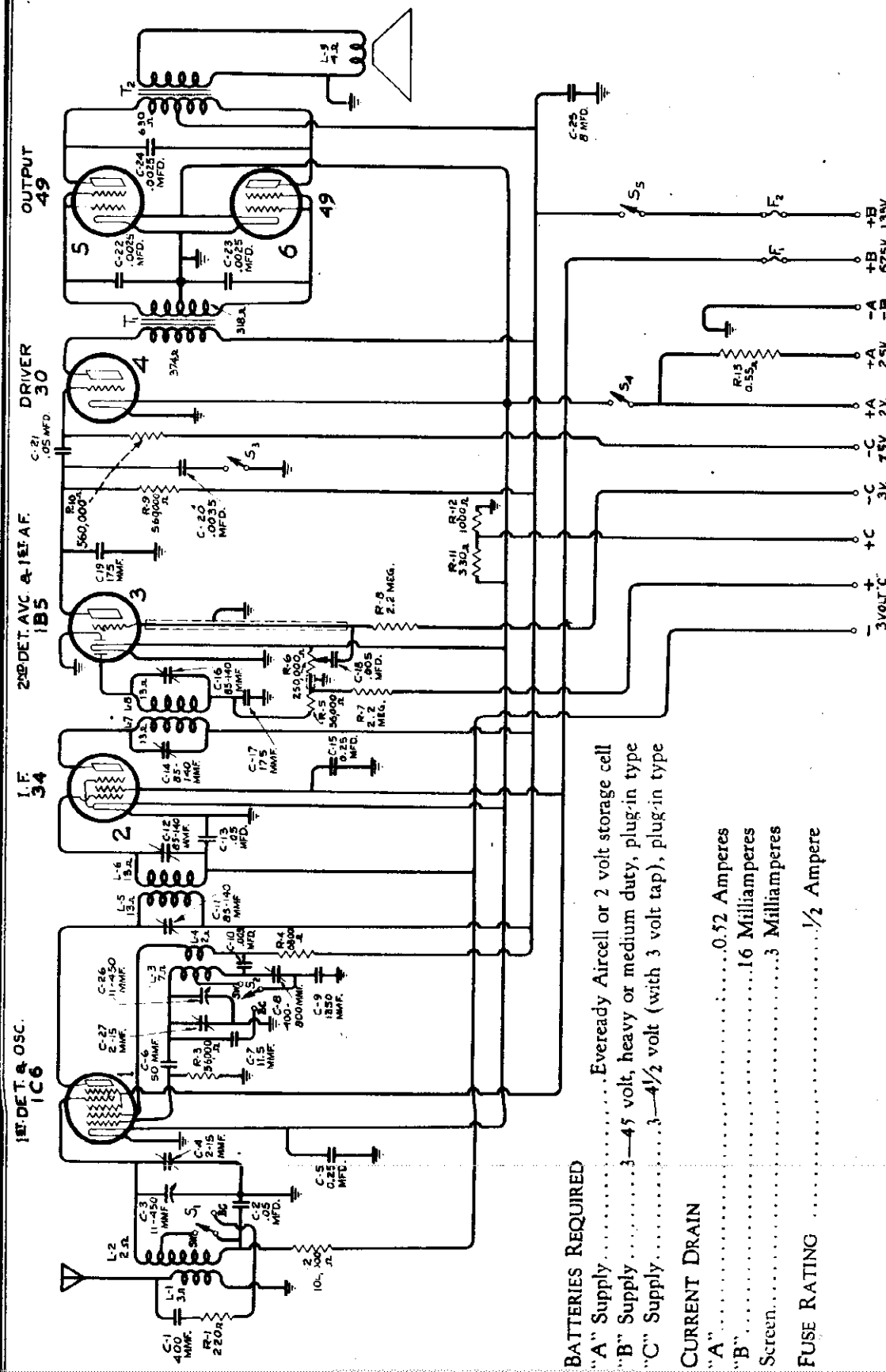
With the receiver in operation using its normal antenna, tune station selector to the point at which the intermediate frequency interference is most intense. Then adjust the wave trap trimmer to the point which causes maximum suppression of the interference.

Universal Transformer

The special transformer used on some receivers of this type is adaptable to several ranges of voltage as shown under Rating C of Electrical Specifications. Its schematic and wiring are shown by Figure 6. Terminal points are provided at the top of the transformer case for changing the primary connections to suit the voltage available. Note that a 110-volt tap is brought out separately for supplying a phonograph motor.

RCA MFG. CO., INC.

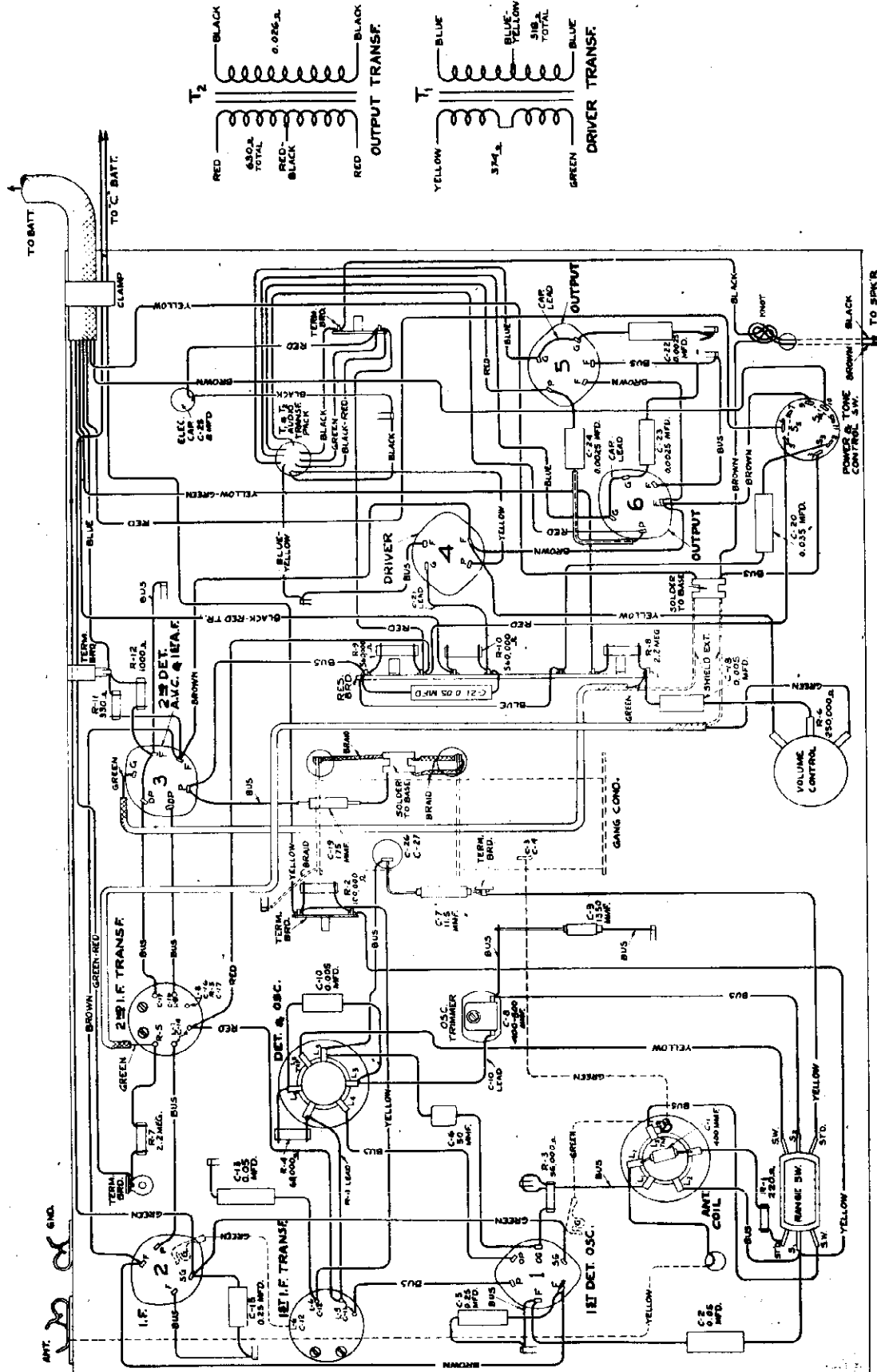
MODELS BT6-3, BC6-4, BT6-10
Schematic



- BATTERIES REQUIRED**
 "A" Supply Eveready Aircell or 2 volt storage cell
 "B" Supply 3-4 1/2 volt, heavy or medium duty, plug-in type
 "C" Supply 3-4 1/2 volt (with 3 volt tap), plug-in type
- CURRENT DRAIN**
 "A" 0.52 Amperes
 "B" 16 Milliamperes
 Screen 3 Milliamperes
- FUSE RATING** 1/2 Ampere
- FREQUENCY RANGES**
 Broadcast 540-1850 kc.
 Shortwave 1850-6900 kc.
 Intermediate Frequency None required
- ALIGNMENT FREQUENCIES**
 Broadcast 600 kc. (osc.), 1720 kc. (osc., ant.)
 Shortwave None required
- POWER OUTPUT**
 Undistorted 1.2 Watts
 Maximum 2.2 Watts
- INTERMEDIATE FREQUENCY** 460 kc.

MODELS BT6-3, BC6-4, BT6-10
Chassis Wiring

RCA MFG. CO., INC.



RCA MFG. CO., INC.

MODELS BT6-3, BC6-4, BT6-10
Circuit & Alignment Data
Socket, Voltage

tively, tuning each to the point producing maximum indicated receiver output.
(d) Shift the oscillator frequency to 600 kc. and tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. The oscillator series trimmer, C-8, should then be adjusted, simultaneously rocking the receiver tuning backward and forward through the signal until maximum receiver output results from the combined operations. The adjustment of C-27 should be repeated as in (c) to correct for any change in its alignment due to the adjustment of C-8.

Radiotron Socket Voltages

Voltage values indicated at the Radiotron socket contacts on Figure 4 form a reference basis for test of the receiver. It is to be noted that all voltages are given in respect to chassis-ground excepting those appearing across the heaters (H-H). The values shown are obtainable when the receiver is in normal operating condition. They do not take into account inaccuracies caused by current consumed in the voltmeter used for the tests. The lower the meter resistance, the lower will be the degree of accuracy. Allowances must therefore be made, dependent upon the type of test instrument used, for the loading effect of the voltmeter on the circuit.

and connect it between the control grid cap of the first detector tube (RCA 1C6) and chassis-ground. Allow its tuning to remain at 460 kc. Tune the receiver to avoid interference as in (a).
(d) Adjust the trimmers, C-12 and C-11, of the first i-f transformer for maximum (peak) receiver output. This completes the i-f transformer adjustments.

R-F Adjustments

(a) Check the calibration of the dial scale by rotating the tuning control until the variable condenser plates are in full mesh. (Maximum capacity). This will carry the dial pointer to its minimum frequency position. Then adjust the dial pointer until it points to the horizontal line at the low frequency end of the broadcast band scale.
(b) Connect the output of test oscillator to the antenna-ground terminals of the receiver. Adjust the receiver range switch to its "Broadcast" position. Tune the oscillator to 1720 kc. Allow the output indicator to remain attached to the receiver output.
(c) Tune the receiver so that the dial reading is 1720 kc. Then adjust the oscillator and antenna coil trimmers, C-27 and C-4 respectively.

Circuit Arrangement

which occurs in resistor R-6, due to signal detection, is used for automatic volume control by varying the control grid bias on the first detector and i-f tubes.
Resonance capacitance coupling is used between the RCA 1B5 and the RCA-30 driver tube. A high-frequency tone control, consisting of a switch in series with a condenser, is shunted across the plate circuit of the RCA 1B5. In the closed position of the switch, the high a-f frequencies are reduced.
The power output stage is arranged for Class "B" operation. The high level of power afforded, is fed to the permanent magnet, dynamic speaker through a step-down transformer.
Battery "On-off" control is by means of a double pole switch, one side of which is in the +A lead; the other side being in the 135 volt, +B lead. Two +A leads are provided in order to permit operation from either a standard 2 volt storage cell or an "Eveready 2.5 volt Aircell". A resistor (R-13) is in series with the +A, 2.5 volt lead to drop the voltage to the proper value. Fuse protection is incorporated in the screen and plate supply leads from the "B" batteries.

The conventional Superheterodyne circuit is used. The first stage combines the local oscillator and first detector functions in one tube, an RCA 1C6. Coils of the detector input and oscillator are tuned by a two-section variable condenser and are aligned by a total of three adjustable trimmers. Each coil is tapped so that a portion of it may be shorted by the band switch in order to extend the tuning range to the higher frequencies. The oscillator operates at a fundamental frequency which is at all times above the incoming signal by 460 kc.
An RCA 14 is employed as i-f amplifier. Its input and output are employed by transformers to the first detector and second detector, respectively. Each transformer has both its secondary and primary windings tuned to 460 kc. by adjustable trimmer capacitors.
The modulated signal as obtained from the output of the i-f system is detected by a diode of the RCA 1B5. Audio developed by such detection in the diode load resistor, R-6, is selected by the variable arm of the volume control (R-6) and passed on to the a-f system for amplification and final reproduction. The d.c.

SERVICE DATA

Alignment Procedure

There are a total of seven trimmer adjustments provided. Four of these are located in the i-f system and the remainder are associated with the antenna and oscillator coils. They are precisely adjusted at the

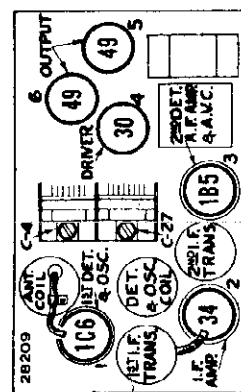


Figure 3—Radiotron and Coil Locations

factory to give the correct performance. Their settings should remain intact indefinitely when the receiver is used under ordinary conditions, however, necessity for readjustment may occasionally occur from continued extremes of climate, tampering, purport alteration for service purposes, or after repairs have been made to the i-f or i-f tuned circuits. Improper alignment usually causes the receiver to be insensitive, non-selective, and sub-normal in respect to tone quality. Such indications will usually exist simultaneously.
In re-adjusting the trimmers to their normal settings, it is quite important to apply a definite pro-

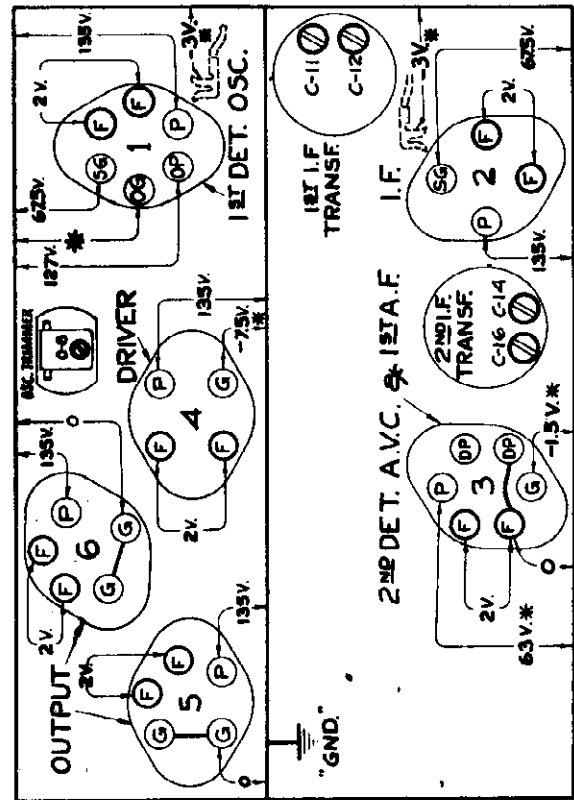


Figure 4—Radiotron Socket Voltages and Trimmer Locations Measured at Normal Battery Voltages. No Signal Being Received

MODELS BT6-3, BC6-4, BT6-10
Battery Connections
Parts List

RCA MFG. CO., INC.

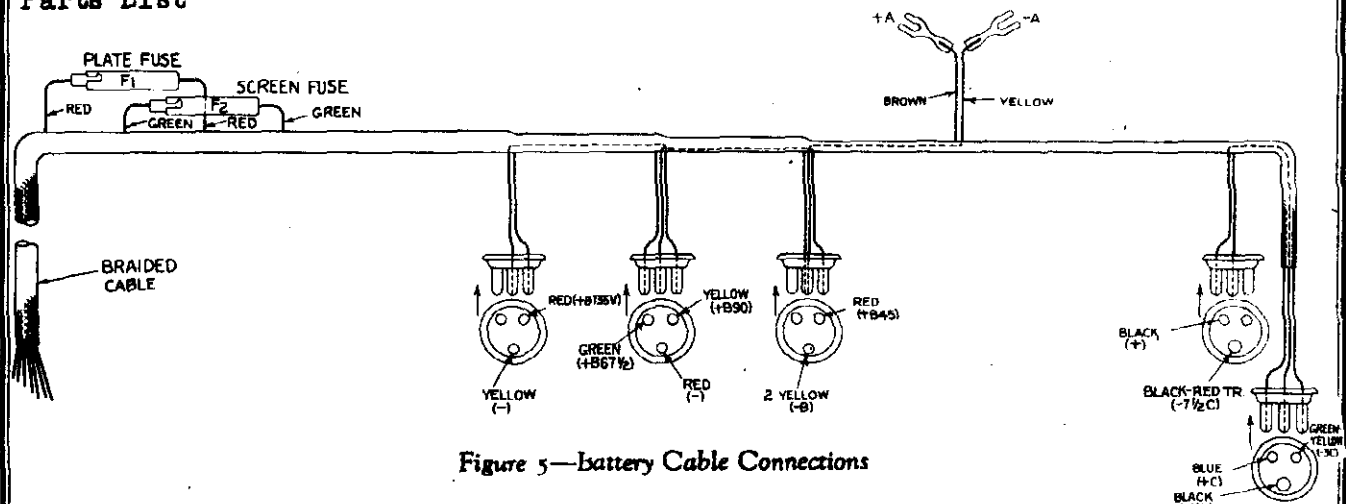


Figure 5—Battery Cable Connections

STOCK No.	DESCRIPTION	LIST PRICE	STOCK No.	DESCRIPTION	LIST PRICE
RECEIVER ASSEMBLIES					
11465	Capacitor—Adjustable capacitor—(C-8)...	\$0.48	11593	Transformer—Second intermediate frequency transformer—(L7, L8, C14, C16, C17, R5).....	2.75
11450	Capacitor—11.5 MMfd.—(C7).....	.14	11589	Volume Control—(R6).....	.85
11289	Capacitor—50 MMfd.—(C6).....	.26	MISCELLANEOUS ASSEMBLIES		
5116	Capacitor—175 MMfd.—(C19).....	.18	4289	Body—Fuse connector body—Package of 10.....	.35
11171	Capacitor—400 MMfd.—(C1).....	.22	4288	Cap—Fuse connector cap—Package of 10.....	.36
11597	Capacitor—13.50 MMfd.—(C9).....	.22	6516	Connector—Fuse connector—complete... ..	.16
5107	Capacitor—.0025 Mfd.—(C22, C23, C24).....	.16	11340	Connector—Three contact male connector with three small prongs—for "B" battery connections.....	.24
5005	Capacitor—.0035 Mfd.—(C20).....	.16	11341	Connector—Three contact male connector with two small and one large prong—for "C" battery connection.....	.24
4868	Capacitor—.005 Mfd.—(C10, C18).....	.20	11627	Dial—Station selector dial.....	.32
4836	Capacitor—.05 Mfd.—(C2, C13, C21).....	.30	4286	Ferrule—Fuse connector ferrule and bushing—Package of 10.....	.38
4840	Capacitor—.025 Mfd.—(C5, C15).....	.30	3748	Fuse—1/2 Ampere fuse—(F1, F2)—Package of 5.....	.40
11595	Capacitor—8 Mfd.—(C25).....	1.04	4290	Insulator—Fuse connector insulator—Package of 10.....	.35
11590	Coil—Antenna coil—(L1, L2).....	1.70	11587	Resistor—0.55 Ohms—Flexible type, complete with terminal (R13).....	.24
11463	Coil—Oscillator coil—(L3, L4).....	1.65	4284	Spring—Fuse connector spring—Package of 10.....	.30
11457	Condenser—Two gang variable tuning condenser—(C3, C4, C26, C27).....	3.46	4285	Washer—Fuse connector insulating washer—Package of 10.....	.22
11467	Indicator—Station selector indicator pointer.....	.10	REPRODUCER ASSEMBLIES (Table Models BT 6-3, BT 6-10)		
11174	Resistor—220 Ohms—Carbon type—1/4 watt—(R1)—Package of 5.....	1.00	9539	Cone—Reproducer cone—(L9)—Package of 5.....	4.30
11296	Resistor—330 Ohms—Carbon type—1/4 watt—(R11)—Package of 5.....	1.00	9540	Magnet Assembly—Comprising cone bracket, core, and magnet.....	5.72
5112	Resistor—1000 Ohms—Carbon type—1/4 watt—(R12)—Package of 5.....	1.00	9538	Reproducer—Complete.....	7.65
11454	Resistor—6800 Ohms—Carbon type—1/4 watt—(R4)—Package of 5.....	1.00	REPRODUCER ASSEMBLIES (Console Model BC 6-4)		
5029	Resistor—56,000 Ohms—Carbon type—1/4 watt—(R3)—Package of 5.....	1.00	9432	Cone—Reproducer cone—complete with voice coil—(L9).....	1.88
3118	Resistor—100,000 Ohms—Carbon type—1/4 watt—(R2)—Package of 5.....	1.00	7820	Magnet—Cone housing and magnet assembly.....	8.98
5035	Resistor—560,000 Ohms—Carbon type—1/4 watt—(R9, R10)—Package of 5.....	1.00	7819	Reproducer—Complete.....	12.18
11626	Resistor—2.2 Megohms—Carbon type—1/4 watt—(R7, R8)—Package of 5.....	1.00			
11464	Shield—Antenna or oscillator coil shield.....	.25			
3682	Shield—First or Second detector Radiotron shield.....	.22			
3056	Shield—Intermediate frequency Radiotron shield—Package of 2.....	.40			
11390	Shield—Intermediate frequency transformer shield.....	.25			
11461	Switch—Range switch—(S1, S2).....	.56			
11588	Switch—Tone control and power switch—(S3, S4, S5).....	.90			
5238	Terminal—Antenna terminal board with clip, insulation strip and rivets.....	.14			
11594	Transformer—Audio driver and output transformer pack—(T1, T2).....	4.10			
11592	Transformer—First intermediate frequency transformer—(L5, L6, C11, C12).....	2.55			

RCA MFG. CO., INC.

MODEL T6-9
Schematic
Socket

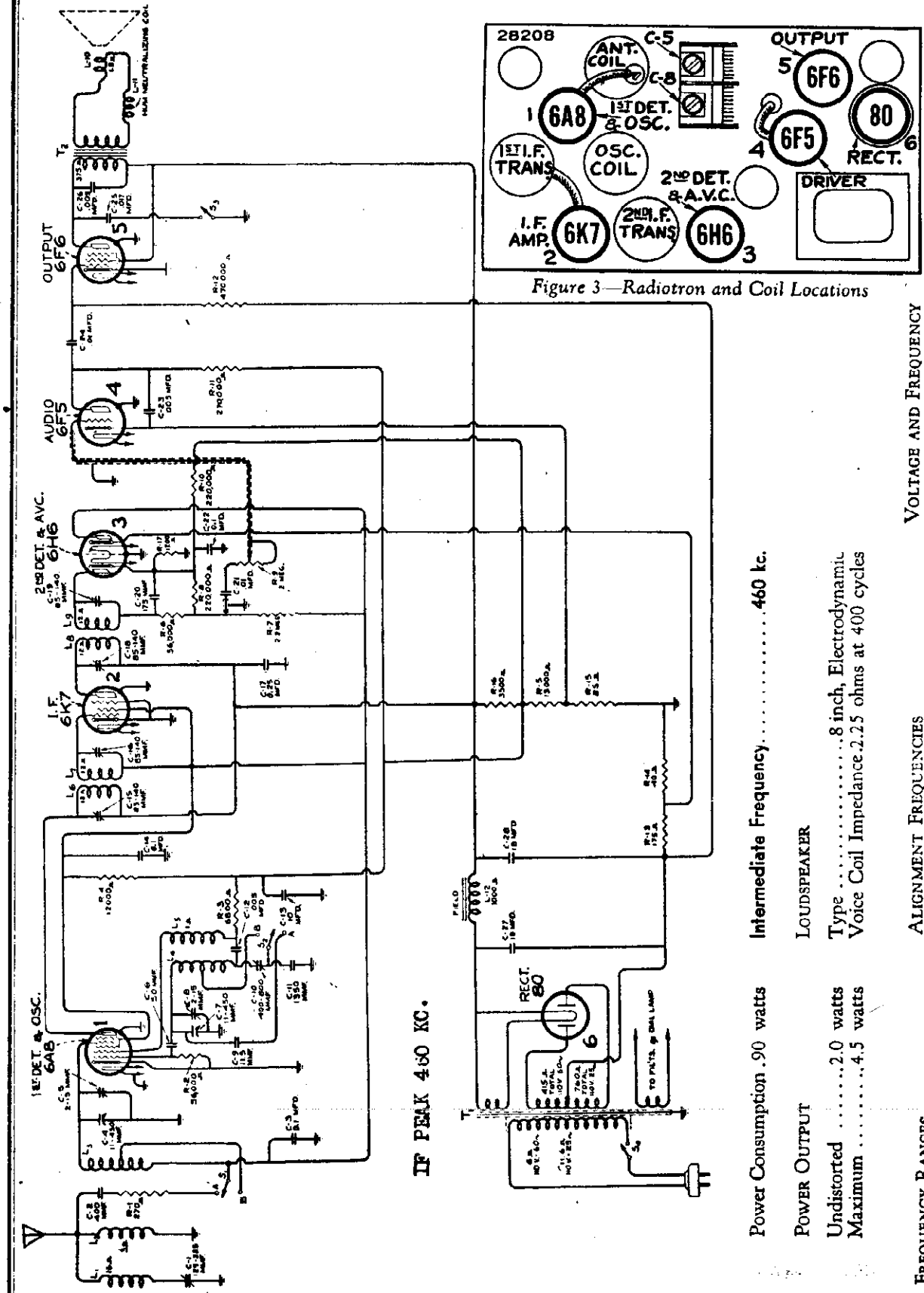


Figure 3—Radiotron and Coil Locations

IF PEAK 460 KC.

Power Consumption .90 watts Intermediate Frequency.....460 kc.

LOUDSPEAKER

Type8 inch, Electrodynamic
Voice Coil Impedance 2.25 ohms at 400 cycles

POWER OUTPUT

Undistorted2.0 watts
Maximum4.5 watts

FREQUENCY RANGES

Broadcast Band (A) : 540-1850 kc.
Shortwave Band (B) : 1850-6900 kc.

ALIGNMENT FREQUENCIES

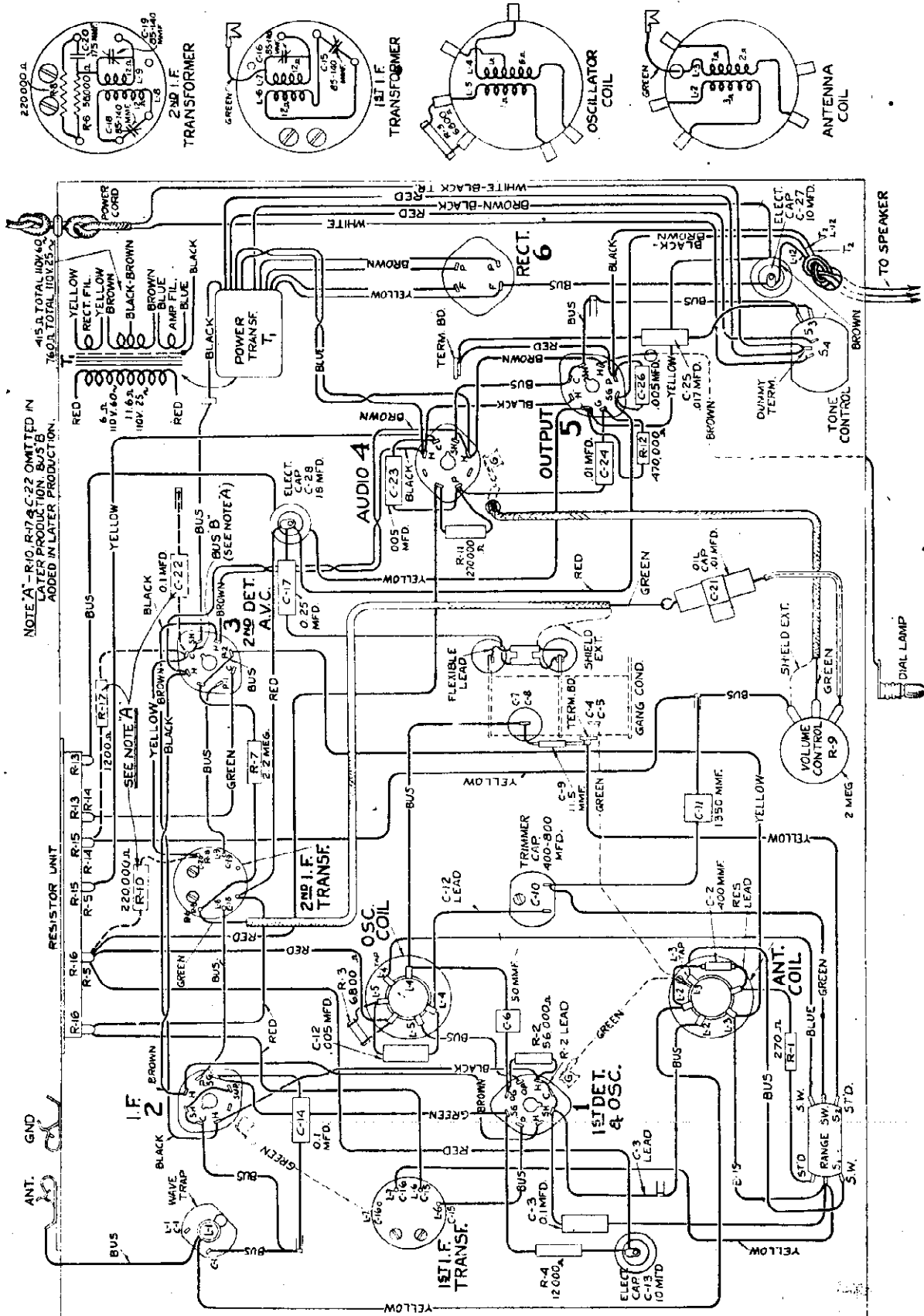
Broadcast Band (A)600 kc. and 1720 kc.
Shortwave Band (B) No Adjustments Required

VOLTAGE AND FREQUENCY

Rating A 105-125 volts, 50-60 cycles
Rating B 105-125 volts, 25-60 cycles
Rating C 100-130/140-160/195-250 volts, 40-60 cycles

MODEL T6-9
Chassis Wiring

RCA MFG. CO., INC.



NOTE A - R-10, R-17 & C-22 OMITTED IN LATER PRODUCTION. BUS B ADDED IN LATER PRODUCTION.

SEE NOTE A

Figure 2—Chassis Wiring Diagram

RCA MFG. CO., INC.

The first detector and oscillator functions are accomplished in a single tube, an RCA-6A8. The input of this tube is coupled to the antenna through a tuned transformer. A shunt (series tuned) wave-trap is connected across the primary of this transformer to prevent signals of intermediate frequency (460 kc) from being introduced into the first stage as interference. The two-section gang condenser which tunes the antenna transformer secondary and the heterodyne oscillator coil has adjustable trimmers for use in obtaining exact alignment. Each of these coils is tapped so that the range switch increases the range of tuning by decreasing the amount of inductance.

The intermediate frequency stage is coupled to the RCA-6A8 and to the RCA-6H6 second detector by means of tuned transformers. These transformers are adjusted to resonance at 460 kc. by means of trimmers.

The modulated signal as obtained from the output of the i-f system is detected by the RCA-6H6 double diode tube. Audio frequency secured by this process is passed on 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 R-8, is applied as automatic control grid bias to the first detector and i-f tubes through a suitable resistance filter. The second diode of the RCA-6H6 is used to supply residual bias for the controlled tubes under conditions of little or no signal. This auxiliary diode, under such conditions, draws current which flows through resistors R-7, R-8 and R-10, 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. The cathode and anode of the signal-a.v.c. diode have positive potential in respect to chassis-ground and cathodes of the a.v.c.-controlled tubes when no signal is being received.

Manual volume control is by means of an acoustically tapered potentiometer connected as a variable coupling element between the output of the second detector and the first audio control grid. After amplification by the RCA-6F5, the audio signal is transmitted by resistance-capacitance coupling to the input of the RCA-6F6 power output stage which in turn is transformer-coupled to the dynamic speaker. High-frequency tone control is provided by means of a shunt capacitor across the plate circuit of the output tube, which may be cut in or out of the circuit with a control switch (S3).

The power supply system consists of a RCA-80 rectifier tube which is supplied from an efficiently designed power transformer and which works into a suitable filter. The various potentials required for the plate, screen, control grid, and cathode circuits are obtained from the output of the filter on a resistance-divider system. The electrodynamic loudspeaker field coil is used as a filter reactor.

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation when 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 R-3, L-2, C-1, etc., are provided for reference between the illustrations and the

Replacement Parts List. The coils, reactors, and transformer windings are rated in terms of their d-c resistances only, and when the resistance is less than one ohm, no rating is given.

Alignment Procedure

There are three alignment trimmers provided in the antenna transformer and oscillator coil tuned circuit and four are used in the i-f system. All of these have been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions of climate or have been altered for service purposes. 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. These instruments are illustrated and described on a separate page of this book.

An oscillator (signal generator), such as the RCA Stock No. 9595, is required as a source of the specific alignment frequencies. Visual indication of receive output during the adjustment is necessary and should be accomplished by the use of an indicator such as the RCA Victor Stock No. 4317 Neon Output Indicator.

The following method of procedure should be followed in adjusting the various trimmer capacitors:

I-F Trimmer Adjustment

The four trimmers of the two i-f transformers are located as shown by Figure 4. Each trimmer must be aligned to a basic frequency of 460 kc. To do this, attach the output indicator across the voice coil or across the output transformer primary. Connect the output of the test oscillator between the control grid of the RCA-6A8 and chassis-ground. 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 either from local broadcast stations or from the heterodyne oscillator. Increase the output of the test oscillator until a slight indication is present on the output indicator. Then, adjust the two trimmers of the second i-f transformer to produce maximum (peak) indicated receiver output. Then, adjust the two trimmers of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. During the adjustments, regulate the test oscillator output so that the indication is always as low as possible. By doing so, the broadness of tuning due to a.v.c. will be avoided. It is advisable to repeat the adjustment of all i-f trimmers to assure that the interaction between them has not disturbed the original adjustment.

Simultaneously rocking the tuning control backward and forward through the signal until maximum receiver output results from these combined operations. The adjustment at 1720 kc. should then be repeated to correct for any change which may have been caused by the oscillator series trimmer adjustment.

MODEL T6-9
Alignment, Part 2
Voltage, Parts
Speaker & Transformer Data

RCA MFG. CO., INC.

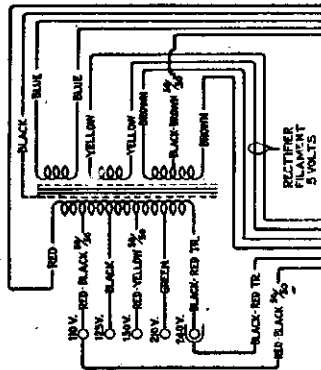


Figure 6—Universal Transformer
 Primary Resistance—23 ohms, Total
 Secondary Resistance—48 ohms, Total

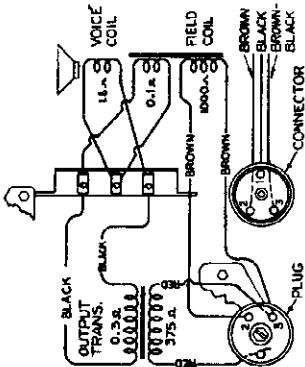


Figure 5—Loudspeaker Wiring

T6-9 REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	Description	List Price	Stock No.	Description	List Price
11468	Bracket—Dial mounting bracket	\$0.14	11626	Resistor—32 Megohms—Carbon type—1/4	1.00
11469	Capacitor—Adjustable capacitor—(C10)	0.48	11464	Shield—Antenna coil shield	.27
11470	Capacitor—11.5 Mmfd. (C9)	.14	11390	Shield—Intermediate frequency transformer	.20
11289	Capacitor—10 Mmfd. (C5)	.26	11383	Shield—Radiation shield	.25
14297	Capacitor—400 Mmfd. (C2)	.30	14461	Switch—Range switch (S1, S2)	.56
14439	Capacitor—150 Mmfd. (C11)	.26	7238	Terminal—Antenna terminal board assembly	.14
4838	Capacitor—0.005 Mfd. (C12, C23, C26)	.20	11460	Transformer—Antenna terminal board assembly	.95
4624	Capacitor—0.01 Mfd. (C14)	.18	11478	Transformer—Power transformer—105-125	3.02
11451	Capacitor—0.017 Mfd. (C25)	.18	11585	Transformer—Power transformer—105-125	4.85
11414	Capacitor—0.1 Mfd. (C14)	.22	11784	Transformer—Power transformer—105-125	7.00
4841	Capacitor—0.1 Mfd. (C3, C22*)	.22	11391	Transformer—Power transformer—100-130/	1.01
5170	Capacitor—0.25 Mfd. (C17)	.25	14016/19/210	Transformer—Power transformer—100-130/	1.22
11587	Capacitor—10 Mfd. (C13)	.86	Trap—Wave trap (L1, C1)	1.22	
11589	Capacitor—10 Mfd. (C27)	.86	Volume Control (R9)	.85	
1212	Capacitor—18 Mfd. (C21)	1.10			
11463	Coil—Antenna coil (C4)	1.85			
11457	Coil—Oscillator coil (L4, L5)	1.85			
11583	Condenser—Two-gang variable tuning con-				
11584	Condenser—Two-gang variable tuning con-				
11585	Condenser—Two-gang variable tuning con-				
11586	Condenser—Two-gang variable tuning con-				
11466	Dial—Dial scale	3.46			
6135	Indicator—Station selector indicator pointer	.40			
11283	Ramp—Dial lamp—Package of 5	.10			
11466	Ramp—Dial lamp—Package of 5	.70			
	87 ohm, one 40 ohm and one 175 ohm				
	impedance, 13,000 ohms				
	Resistor—270 Ohms—Carbon type—1/4	.95			
	wait (R1)	1.00			
	Resistor—1200 Ohms—Carbon type—1/4	1.00			
	wait (R3)	1.00			
	Resistor—12,000 Ohms—Carbon type—1/4	1.00			
	wait (R4)	1.10			
	Resistor—16,000 Ohms—Carbon type—1/4	1.00			
	wait (R2)	1.00			
	Resistor—270,000 Ohms—Carbon type—1/4	.75			
	1/10 watt (R11)	75			
	1/10 watt (R12)	75			
	Resistor—220,000 Ohms—Carbon type—1/4	1.00			
	wait (R10*)				
	Board—Terminal board assembly with two				
	Bole—Yoke support assembly bolt and nut	.18			
	Bracket—Output transformer mounting	.16			
	Bracket	.14			
	Clamp—Cone criner suspension clamping	.25			
	nut and screw assembly—Package of 5	2.16			
	Coil—Field coil (L12)	2.16			
	Coil—Neutralizing coil (L11)	3.10			
	Capacitor—Reproducer cone (L10)—Package	.25			
	for reproducer	.25			
	Connector—Three-conduct female connector	.25			
	for reproducer cable	.25			
	Reproducer—Complete	6.85			
	Transformer—Output transformer (T2)	1.56			
	Washer—Antenna board C washer—Used	1.56			
	to hold field coil assembly—Package of 5	.18			

* C-12, R-10 and R-17 used in some models

Radiotron Socket Voltages

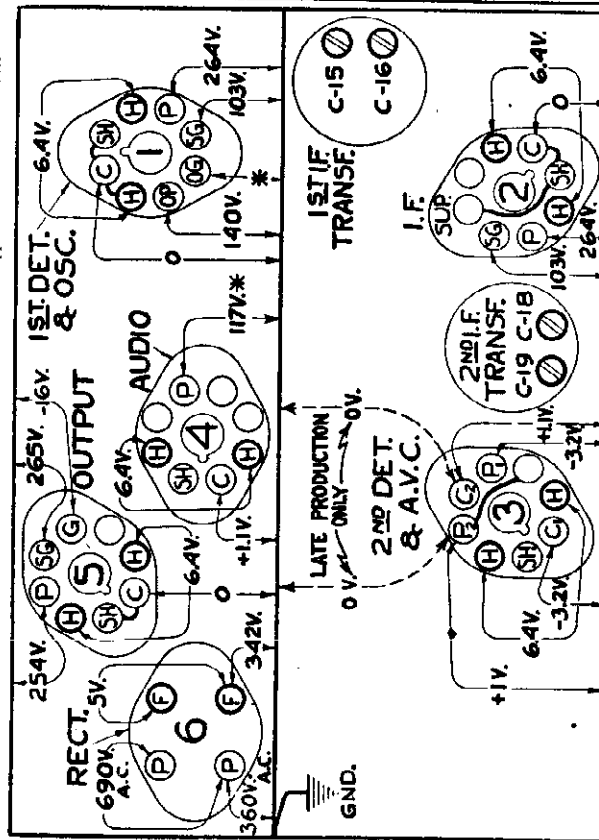
Voltage values indicated at the Radiotron socket contacts on Figure 4 form a reference basis for test of the receiver. It is to be noted that all voltages are given with respect to chassis ground, excepting those appearing across the heaters (H-H). The values shown are obtainable when the receiver is in normal operating condition with all tubes intact. They do not take into account inaccuracy caused by the resistance of the voltmeter used for the tests, the lower the voltmeter resistance, the lower the degree of accuracy. Allowances must, therefore, be made, dependent upon the type of test instrument used, for the loading effect of the voltmeter on the circuit.

Wave-Trap Adjustment

With the receiver in operation using its normal antenna, tune station selector to the point at which the intermediate frequency interference is most intense. Then adjust the wave trap trimmer to the point which causes maximum suppression of the interference.

R.F. Trimmer Adjustment

Calibrate the tuning dial by setting pointer to horizontal line at low frequency end of broadcast band scale while variable condenser is at maximum capacity. The output indicator should be left connected to the output system. Attach the output of the test oscillator between the antenna and ground terminals of the receiver input. Adjust the oscillator to 1720 kc, and set the receiver tuning control to a dial reading of 1720 kc. Leave the volume control of the receiver at its maximum position. Make sure that the range selector is at its broadcast position. Regulate the output of the test oscillator until a slight indication is perceptible at the receiver output. Then adjust the two trimmers of the oscillator and antenna transformer coils (mounted on the variable condenser) so that each produces maximum (peak) receiver output. After this maximum has been accurately obtained, shift the test oscillator to 600 kc. Tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then adjust the receiver oscillator series trimmer, simult-

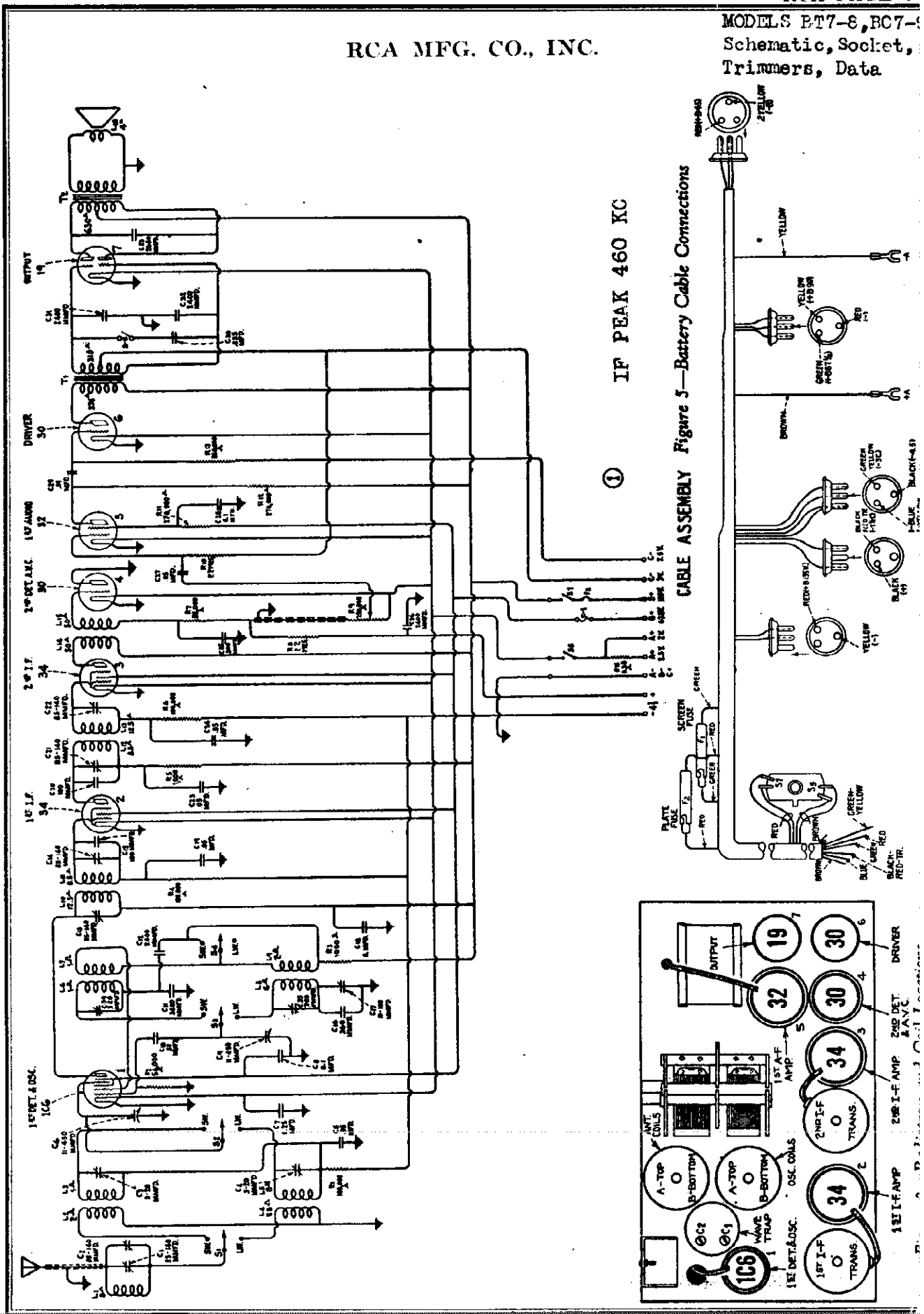


(*) CANNOT BE MEASURED WITH ORDINARY VOLTMETER

Figure 4—Radiotron Socket Voltages
 Measured at 115 volts, 60 cycle supply—No signal being received

RCA MFG. CO., INC.

MODELS ET7-8, BC7-8
Schematic, Socket,
Trimmers, Data



MODELS BT7-8, BC7-9
Parts, Circuit Data
Alignment Data

RCA MFG. CO., INC.

Total "A" Battery Current..... 0.68 Amperes
Maximum "B" Battery Current..... 21 M. A.
Tuning Ranges..... 540-1720 kc. and 5400-18000 kc.
Maximum Undistorted Output..... 1.2 Watts
Maximum Output..... 2.2 Watts
Line-up Frequencies..... 460 kc., 600 kc., 1720 kc., and 18000 kc.

DESCRIPTION OF ELECTRICAL CIRCUIT

The circuit is of the superheterodyne type and consists of a combined oscillator-detector stage, two i-f amplifying stages, a combined, second detector and automatic volume control, a two-stage audio amplifier and a Class "B" output stage. A two-pole operating switch opens the "A" and "B" battery leads when the switch is turned to the "off" position.

The signal enters the receiver through a shielded antenna lead and is applied through the antenna transformer to the grid circuit of the first detector which also serves as the local oscillator for producing a signal, 460 kc. higher in frequency than the incoming signal. The combined signals after passing through the first detector produce the i-f signal.

The volume control selects the desired amount of audio signal from the drop across R-9 and applies it to the grid circuit of the first audio stage, RCA-32. The output of the first audio stage is resistance coupled to the grid circuit of the RCA-30 driver stage, which is transformer coupled to the Class "B" output stage. The output stage utilizes the twin amplifier Radiotron RCA-19, which has two separate sets of elements and eliminates the necessity of having two

SERVICE DATA

output so that, with the receiver volume control at maximum, a slight glow is obtained in the output indicator.

(c) Adjust the secondary and primary of the second i-f transformer and then the first i-f transformers until a maximum deflection is obtained. The third transformer is untuned and does not require adjusting. Keep the oscillator output at a low value so that only a slight glow is obtained in the output indicator at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the i-f alignment.

(d) Connect Test Oscillator to antenna ground terminals. Adjust wave trap trimmer, C-1, to give minimum receiver output.

R-F and Oscillator Adjustments

The important points to remember are the need for using the minimum oscillator output to obtain an indi-

ALIGNMENT PROCEDURE

To properly align this receiver, it is essential that a modulated R. F. oscillator of suitable frequency range such as Stock No. 9393, an output indicator, Stock No. 4317, and an alignment tool, Stock No. 4160, be available. Figure 4 shows the location of the various line-up capacitors.

I-F Tuning Adjustments

The i-f amplifier comprises two stages including three transformers. The third transformer is untuned so that only a total of four circuits are to be adjusted. Refer to Figure 4 and proceed as follows:

- (a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard.
- (b) Set the volume control at maximum and connect a ground to the ground terminal.
- (c) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output indicator across the voice coil of the loudspeaker and adjust the oscillator

BT 7-8 and BC 7-9
REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price	Stock No.	Description	List Price
4427	Bracket—Volume control or tone control	30 18	4538	Query transformer (L12, L13, C20, C21, C22)	\$1.35
4244	Cap—Grid contact cap.—Package of 5	20		Transformer—Third intermediate frequency transformer (L14, L15, R7, C45)	2 15
3861	Capacitor—Adjustable capacitor (C17)	78		DRIVE ASSEMBLIES	.50
11289	Capacitor—50 MMfd (C10)	26	10194	Ball-Split ball—Package of five clutch as	1.00
3794	Capacitor—100 MMfd (C15, C20)	30	4422	Washer—Comprising shaft, ball, ring spring and washer—Assembled	.72
3981	Capacitor—100 MMfd (C15)	32		Dial—Station selector dial	2.42
4413	Capacitor—360 MMfd (C11, C13, C12)	35	11342	Drive—Variable tuning condenser drive assembly—Complete	1.15
3793	Capacitor—2400 MMfd (C26)	35	4586	Indicator—Station selector indicator pointer	.25
4129	Capacitor—3400 MMfd (C33)	35	4520	Screw—No. 8-32 Xg. 1/2" (C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C61, C62, C63, C64, C65, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85, C86, C87, C88, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C99, C100)	1.15
4439	Capacitor—0.035 Mfd (C19)	18	4669	Condenser drive assembly—Package of 10	4.30
4883	Capacitor—0.01 Mfd (C27)	30		REPRODUCER ASSEMBLIES	7.65
4815	Capacitor—0.01 Mfd (C27)	30		(TABLE MODEL—BT 7.8)	
4816	Capacitor—0.01 Mfd (C28)	30	9339	Control—Reproducer cone—Package of 5	4.30
4840	Capacitor—0.1 Mfd (C7)	0.00	9140	Magnet and magnet—Comprising cone bracket	1.72
11344	Coil—Antenna coil (L2, L3, L4, L5, C1, C4)	1.92	9338	Reproducer—Complete—(L16)	7.65
4432	Coil—Oscillator coil (L6, L7, L8, L9, C34, C35)	1.65		REPRODUCER ASSEMBLIES	
4339	Coil and shield assembly—Antenna, trap circuit	2.05		(CONSULE MODEL—BC 7.9)	
4604	Control—Two-tap variable tuning condenser (C6, C9)	2.78	9432	Control—Voice coil (L19), cone—Complete with assembly	1.88
11338	Volume control—(R9)	1.00	7820	Magnet—Cone housing and magnet assembly—Complete—(L16)	8.98
9029	Resistor—16,000 Ohms—Carbon type—1/4 Watt—(R5)	1.00	7819	Reproducer—Complete—(L16)	11.18
3118	Resistor—82,000 Ohms—Carbon type—1/4 Watt—(R2, R3, R4, R6)	1.00		MISCELLANEOUS ASSEMBLIES	
11323	Resistor—170,000 Ohms—Carbon type—1/4 Watt—(R11, R12)	1.00	11343	Cable—Main battery cable complete with three stock \$11340 connectors, two stock \$11341 connectors, two stock \$5116 fuse clips, one stock \$3748 fuse—each	3 55
1031	Resistor—500,000 Ohms—Carbon type—1/4 Watt—(R13)	1.00	6516	Connector—Fuse connector—Complete with contact prongs—For "B" battery connection	16
11151	Resistor—23 Megohms—Carbon type—1/4 Watt—(R8, R9)	1.00	11340	Connector—3 contact male connector with two small and one large prong for "C" battery connections	24
4521	Shield—Antenna shield, for intermediate frequency detector, oscillator	42	11341	Connector—3 contact male connector with two small and one large prong for "C" battery connections	24
1942	Shield—First detector, oscillator	18	11337	Eucathion—On-on operating switch	6176
7487	Shield—Second detector	25	6176	Eucathion—Off-on operating switch	50
1016	Shield—First or second intermediate frequency, or first audio Radiotron shield—Package of 2	40	6448	Fuse—Station selector dial glass	10
4132	Socket—Contact first audio Radiotron	28	3088	Knob—Operating switch knob and screw—Package of 5	30
6980	Socket—Contact intermediate frequency, second detector or driver Radiotron socket	20	4449	Knob—Station selector, volume control, tone control range switch knob—Package of 5	50
4232	Socket—Contact first detector, oscillator Radiotron socket	35	4644	Resistor—35 Ohm—(R17)—Package of 10	80
4931	Socket—Contact output Radiotron socket	30	4678	Ring—Dial glass retaining ring—Package of 5	34
11339	Switch—One-way switch—less knob (stock \$1085) and eucathion (stock \$6176)—(S1, S7)	40	3328	Screw—No. 6-40 1/2" Knurled head screw for knob, stock 1088—Package of 10	25
4437	Switch—Range switch (S1, S2, S3, S4)	80	4941	Screw—Chassis mounting screw assembly—Console Model	30
4933	Transformer—Audio transformer pack comprising driver and output transformer (T1, T2)	1 38	4446	Screw—Chassis mounting screw assembly—Table Model	28
4431	Transformer—First intermediate frequency transformer (L10, L11, C13, C14, C15)	2 38	4613	Screw—No. 8-32 1/2" headless screw for station selector volume control, tone control switch, or range switch knob—Package of 10	28
7040	Transformer—Second intermediate frequency transformer				

RCA MFG. CO., INC.

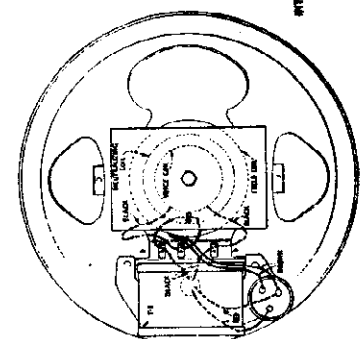
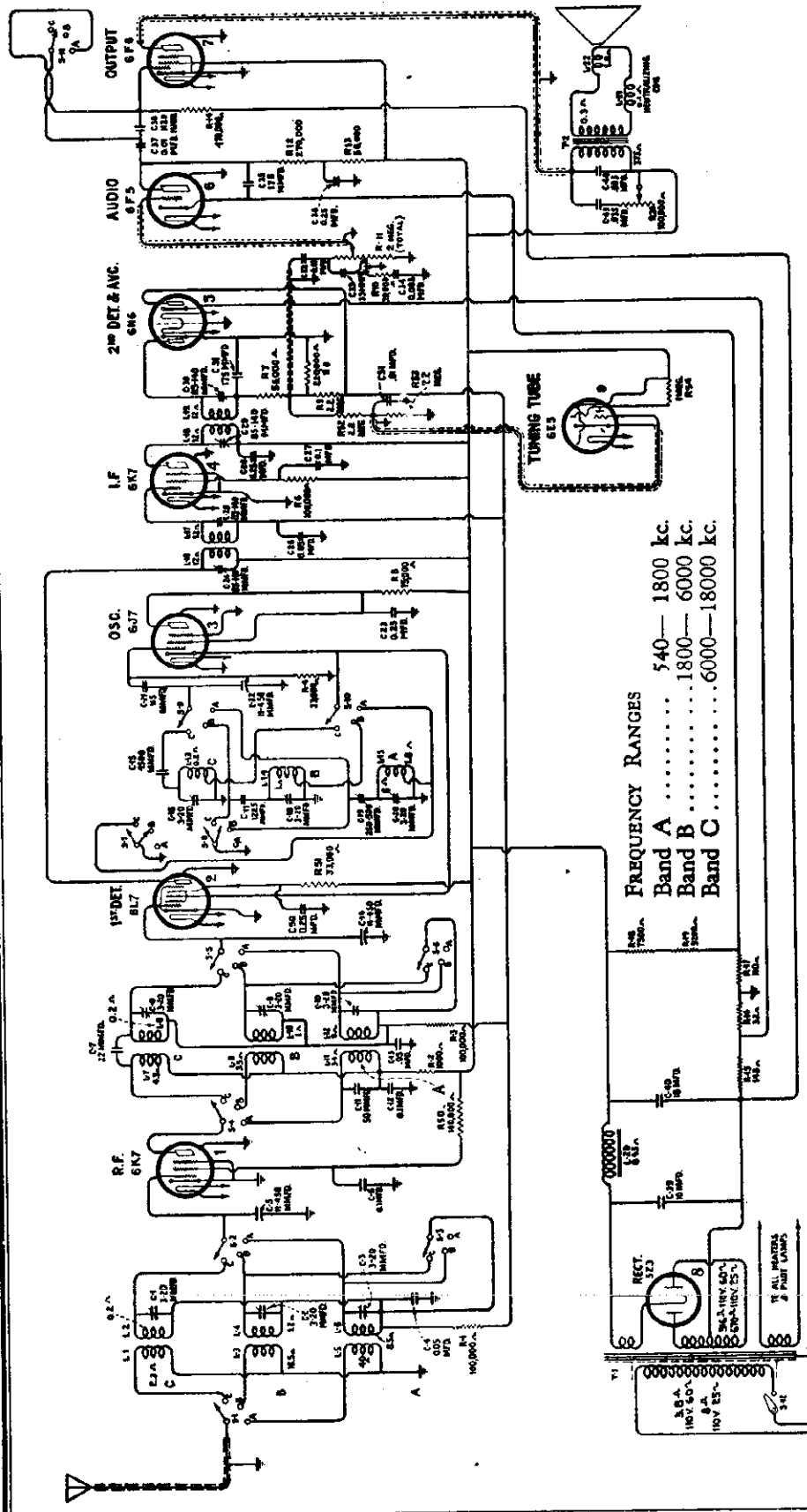


Figure 3—Loudspeaker Wiring

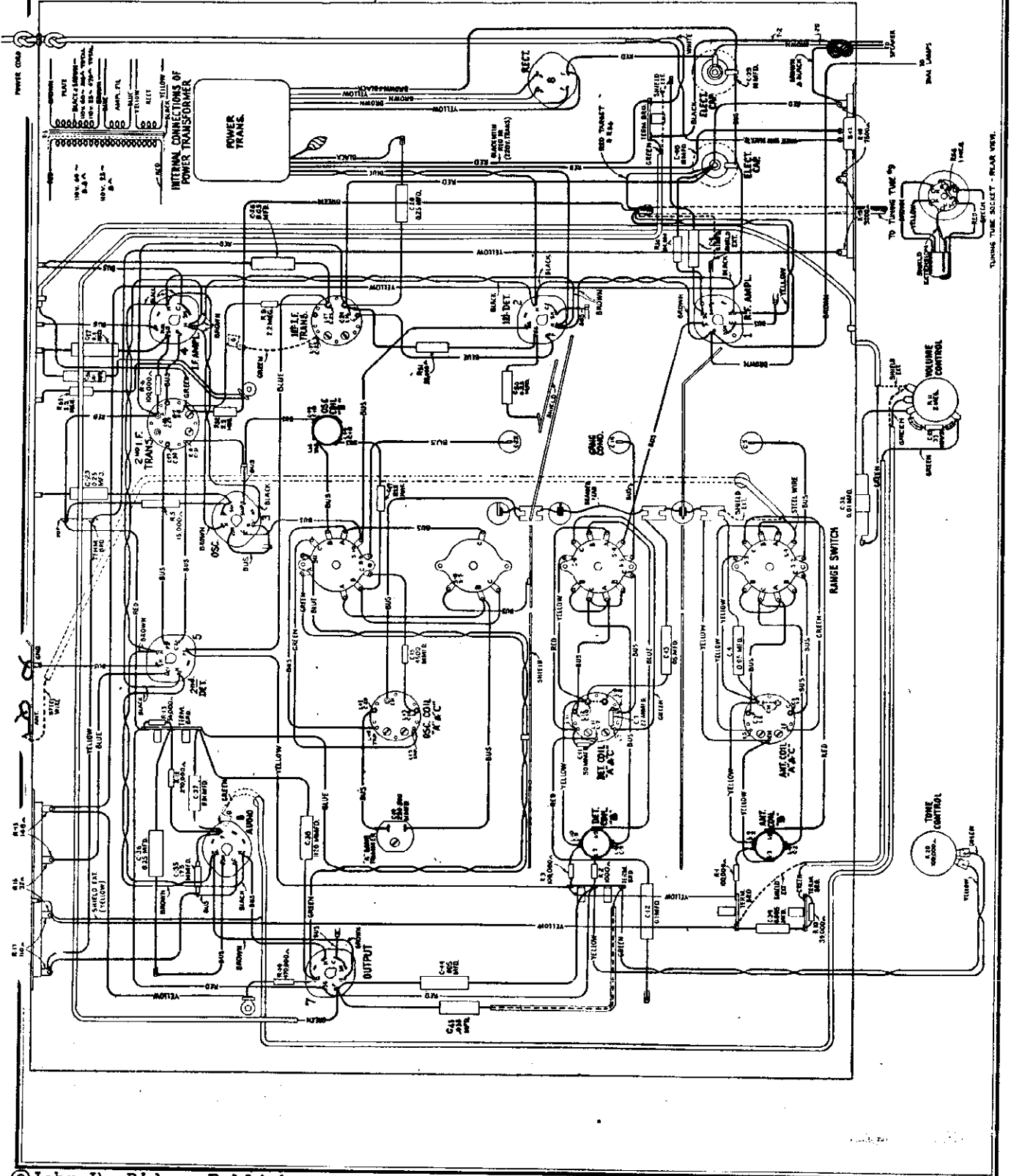
FREQUENCY RANGES

Band A	540—1800 kc.
Band B	1800—6000 kc.
Band C	6000—18000 kc.

Power Consumption	105 watts
Undistorted Output	2 watts
Maximum Output	4 1/2 watts
Loudspeaker	12 inch, Electrodynamic
Voice Coil Impedance	2 1/4 ohms at 400 cycles
Intermediate Frequency	460 kc.
ALIGNMENT FREQUENCIES	
Band A	600 kc. (osc), 1720 kc. (osc, ant, det)
Band B	6132 kc. (osc, ant, det)
Band C	18000 kc. (osc, ant, det)

MODEL C9-4
Chassis Wiring

RCA MFG. CO., INC.



RCA MFG. CO., INC.

MODEL C9-4
Trimmers, Socket
Alignment Connections

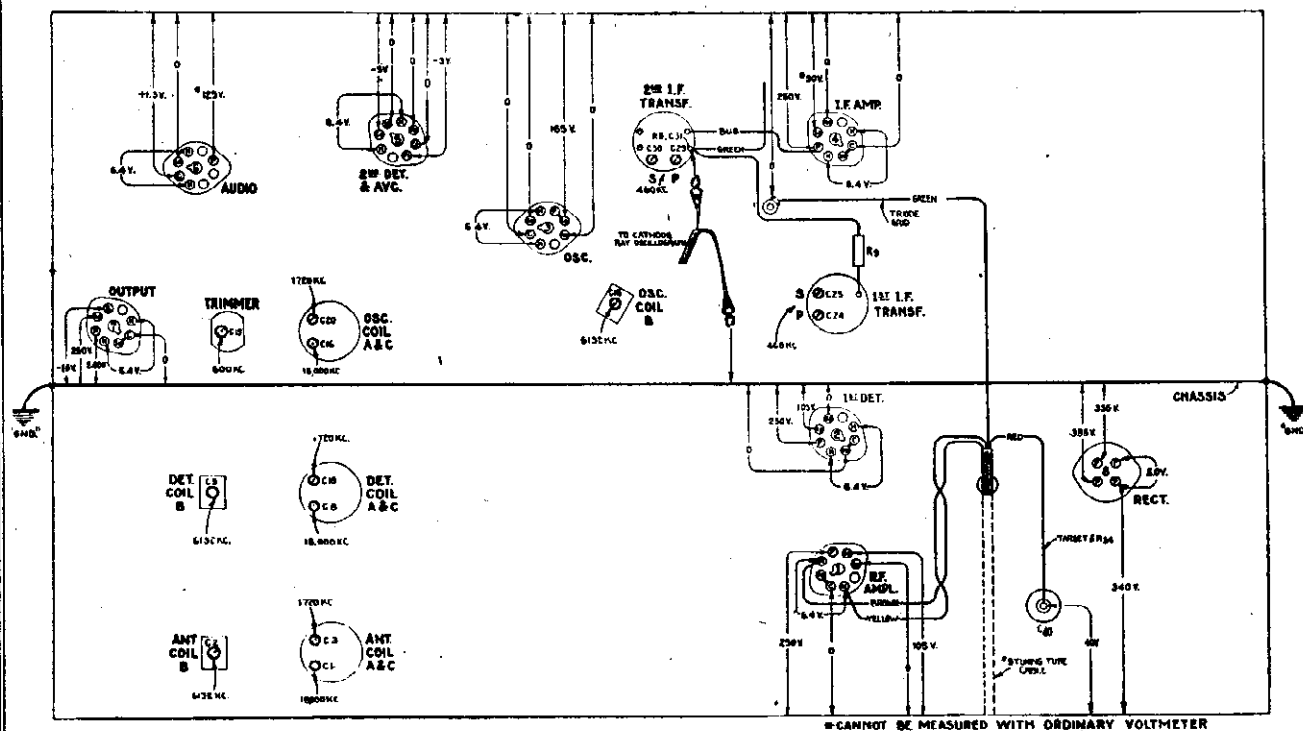


Figure 6—Trimmer Locations and Radiotron Socket Voltages Measured at 115 volts A.C.—No Signal—Volume Control Maximum

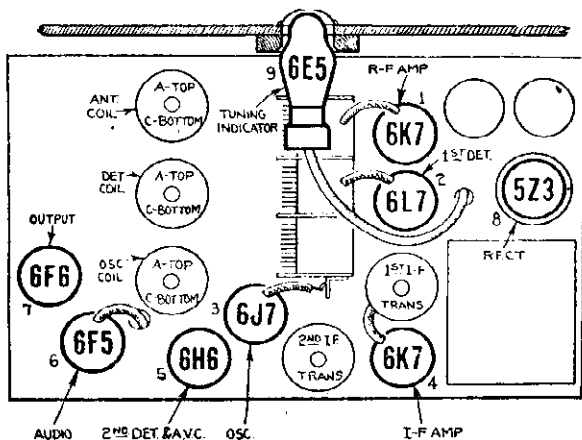


Figure 4—Coil and Radiotron Locations

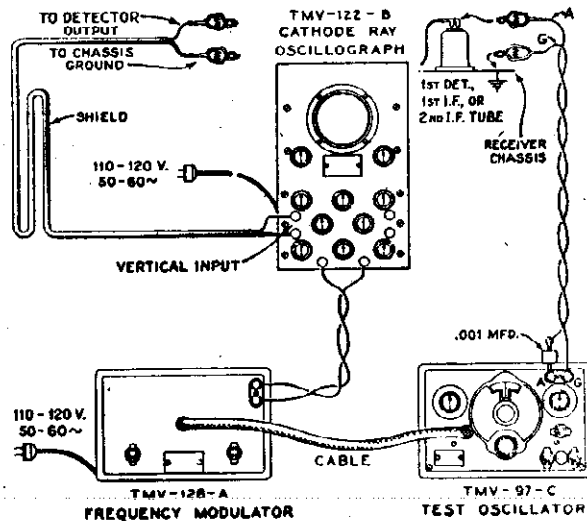


Figure 5—Alignment Apparatus Connections

MODEL C9-4
Alignment

RCA MFG. CO., INC.

SERVICE DATA

The various diagrams of this booklet contain such information as will be needed for servicing the receiver. The ratings of all resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. The coils, reactors and transformer windings are rated in terms of their d-c resistances only and where the value is less than one ohm, no rating is given. Identification titles such as R-3, L-2, C-1, etc., are provided for reference between the illustrations and replacement parts list.

Alignment Procedure

There are a total of fourteen adjustments necessary for obtaining proper alignment when such a process becomes necessary. Four of these are involved with the i-f system and the remainder are associated with the antenna, first detector and oscillator coils.

Correct performance of the receiver can only be obtained when the trimmer adjustments have been made by a skilled service man with the use of adequate and reliable test equipment. Such apparatus as may be required for this particular instrument is illustrated and described on a separate page of this booklet.

Two methods of alignment are applicable. One utilizes a Cathode-Ray Oscillograph as a means of output indication and the other follows former procedure where a glow type indicator or meter is used. The oscillographic method is much to be preferred, since greater accuracy is possible from the type of indication afforded. There are no approximations necessary as with the meter or aural method, but each adjustment can be made with excellent precision. Both methods are hereinafter outlined so that alignment operations may be made according to the equipment available.

It is wise to determine the necessity for alignment as well as the direction of misalignment before making adjustments. The RCA Tuning Wand is an instrument designed particularly for such a purpose.

The Tuning Wand consists of a bakelite rod having a small brass cylinder at one end and a core of finely divided iron at the other. It may be inserted into a tuned coil while a signal of the normal resonant frequency is being applied to the antenna terminals of the tuning circuit. The iron core of the Wand. The presence of either end of the Wand will cause a change in tuning which will be indicated at the receiver output as an increase or decrease in signal level. If there is a decrease of output when either end is inserted, the tuning is correct and will require no adjustment. However, should there be an increase of output due to the iron core and decrease with the brass cylinder, an increase in inductance or capacitance with the tuning circuit is indicated. The correct adjustment of the trimmer involved should therefore be increased accordingly. If the brass cylinder end causes an increase in output, while the iron end causes a decrease, reduction of inductance will be necessary to place the circuit in alignment. This is equivalent to decreasing the trimmer concerned. The following tabulation gives the various changes and the adjustments required:

WAND	SIGNAL	TRIMMER
{Iron.....}	{Decrease}	{None}
{Iron.....}	{Decrease}	{None}
{Brass.....}	{Increase}	{Decrease}
{Brass.....}	{Decrease}	{Decrease}
{Iron.....}	{Increase}	{Increase}

(1) CATHODE-RAY ALIGNMENT Equipment

A standard source of the specified alignment frequencies is required. Such a source should consist of an RCA Full Range Oscillator, Stock No. 9595. Output indication should be by means of an RCA Stock No. 9545 Cathode-Ray Oscillograph. An RCA Stock No. 9558 Frequency Modulator will be needed to sweep the generated signal and synchronize it with the oscillograph in order to make possible the visual representation of the resonant characteristic of the circuit being tuned on the cathode-ray fluorescent screen.

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. The last transformer must be aligned first and the first transformer aligned secondly. For such a process, it is necessary to feed the output of the Full Range Oscillator to the stages in their order of alignment, adjusting the trimmer of each transformer and observing the effect at the second detector output on the Cathode-Ray Oscillograph. The proper point of connection of the Oscillograph is with the vertical "high" input terminal attached to the junction of R-7, R-8 and R-9 as illustrated in Figure 6, and with the "0" or ground terminal to the chassis. The "Ext. Sync." terminals of the Oscillograph should be connected to the Frequency Modulator as shown by Figure 5. A .001 mfd. capacitor installed in series with the Oscillator "Ant." lead will prevent the voltage of the stage under alignment from becoming upset. The vertical "A" amplifier should be "On" for the ensuing adjustments and the gain control kept at its maximum position. For each adjustment, the Oscillator output need be regulated so that the image obtained on the Oscillograph screen will be of sufficient size as to be accurately observable. Proceed further as follows:—

(a) Place the receiver, Oscillograph and test Oscillator in operation. Set the receiver range switch to Band "A" and tune the station selector to a point where no interference will be picked up, shorting the antenna and ground terminals if necessary. Set the Oscillograph horizontal "B" amplifier to "Tuning" and control its gain so that the luminous spot sweeps a straight line trace completely across the screen. Place the tuning control to "Int." Adjust the intensity and focusing controls of the Oscillograph to produce the correct size and strength of the spot.

(b) Attach the output of the test Oscillator between the control grid cap of the RCA-6K7 i-f tube and chassis ground as shown typically by Figure 5. Tune the Oscillator to 460 kc. and set its modulation switch to "On." Regulate its output until the signal produces a wave pattern on the Oscillograph screen, adjusting the Oscillograph controls to give the desired number of cycles. Cause the image to stand still on the screen by manipulation of the frequency and synchronizing controls. Then carefully tune the two trimmers C-29 and C-30 of the second i-f transformer to produce maximum amplitude (vertical deflection) of the oscillographic image. Under this condition the transformer will be

sharply resonated to 460 kc.

(c) The Frequency Modulator should then be placed in operation and interconnected with the Full Range Oscillator by means of the special shielded patch cord. Figure 5 shows the proper arrangement. Set the Frequency Modulator sweep range switch to its "Lo" position and turn the Oscillator modulation switch to "Off." Change the tuning control of the Oscillograph to "Ext." and place the range switch to its No. 2 position. Then carefully shift the tuning of the Oscillator so as to increase its frequency, until two distinct and similar waves appear on the Oscillograph screen and become exactly coincident at their highest points. These curves will be found to occur at an Oscillator setting of approximately 540 kc. They will be identical in shape but appearing in reversed positions. Adjust the frequency control of the Oscillograph in order to cause the waves to conform with the above requirements and to make them remain motionless on the screen. This will require a setting of approximately 1/2 clockwise rotation of the frequency control. The trimmers C-29 and C-30 should then be re-adjusted so that the two curves move together and become exactly coincident throughout their lengths, maintaining the maximum amplitude at which this condition can be brought about.

(d) Leaving the equipment connected and adjusted as in (c), change the Oscillator output to the control grid cap of the RCA-6L7 first detector tube. Then adjust the first i-f transformer trimmers C-24 and C-25 so that the forward and reverse waves appearing on the Oscillograph coincide throughout their lengths and have maximum amplitude. The shape of the composite wave obtained from this operation is a true representation of the overall tuning characteristic of the i-f system. Each trimmer of the entire group should then be checked to assure that it is in correct alignment as indicated by the degree of coincidence and relative amplitude of the image on the Oscillograph screen.

R-F Trimmer Adjustments

Locations of the various antenna, detector and oscillator coil trimmers are shown by Figure 6. The test Oscillator should be removed from connection with the i-f system and its output connected to the antenna-ground terminals of the receiver. No changes are to be made in the connections of the Oscillograph at the second detector. During the following adjustments, the Oscillator output should be regulated as often as is necessary to keep the oscillographic image as low as is practically observable. Adherence to such a procedure will obviate the broadness of tuning that would result from a.v.c. action on a stronger signal. Proceed with the adjustments as follows:—

Calibration

Set the receiver range switch to Band A and rotate the station selector until the tuning condenser plates are in full mesh (maximum capacitance). Then move the main dial pointer until it points exactly to the horizontal line at the low frequency end of the Band A scale.

Band A

(a) With the receiver range switch in its Band A position, tune the station selector until the dial pointer is at a reading of 1770 kc. Adjust the test Oscillator to 1770 kc. (modulation "On" and Frequency Modulator disconnected) and increase its output to produce a registration on the Oscillograph. Carefully align the oscillator, detector and antenna trimmers C-20, C-10 and C-3 respectively, so that each brings about maximum amplitude of output as shown by the wave on the Oscillograph. It will be necessary to have the tuning control of the Oscillograph on "Int." for this operation. After each trimmer has been peaked, the Oscillograph tuning control should be set to "Ext." and the Frequency Modulator placed into operation with its connections to the Oscillator and Oscillograph made in accordance with Figure 5. Turn the modulation switch of the Oscillator to "Off" and return the Oscillator (increase frequency) until the forward and reverse waves show on the Oscillograph and become coincident at their highest points. Adjust the trimmers C-20, C-10 and C-3 again, setting each to the point which produces the best coincidence and maximum amplitude of the wave images.

(b) Remove the Frequency Modulator cable from the Oscillator and shift the signal frequency to 600 kc. Place the modulation switch to "On." Tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then insert the Frequency Modulator plug and return the Oscillator (modulation "Off") until the two similar forward and reverse waves appear on the screen. For this adjustment it is advisable to shift the Oscillator to its 200-400 kc. range and use the third harmonic of the generated signal in order to obtain the desired range of sweep. The oscillator series trimmer C-19 should then be adjusted to produce maximum amplitude of the images. No rocking will be necessary on the station selector inasmuch as the signal frequency is being "wobbled" by the Frequency Modulator to produce the same effect. After completing this adjustment the trimmer C-20 should be re-aligned as in (a) to correct for any change brought about by the adjustment of C-19.

Band B

(a) Advance the receiver range switch to its Band B position and tune the station selector to a dial reading of 6132 kc. Set the test Oscillator to this same frequency (modulation "On" and Frequency Modulator disconnected) and increase its output until a suitable indication is apparent on the Oscillograph. The Oscillograph should be adjusted for "Int." tuning. Then adjust the oscillator trimmer C-18 to the point at which maximum amplitude of the image is obtained. Two points will be found for this trimmer which give such a maximum. The one of least capacitance is correct and should be used. This can be checked by tuning the "image" signal which will be received at 6112 kc. on the dial if the adjustment of C-18 has

MODEL T10-1
Trimmers, Socket

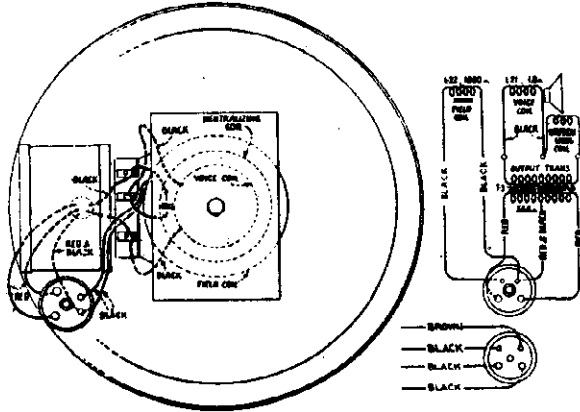


Figure 3—Loudspeaker Wiring

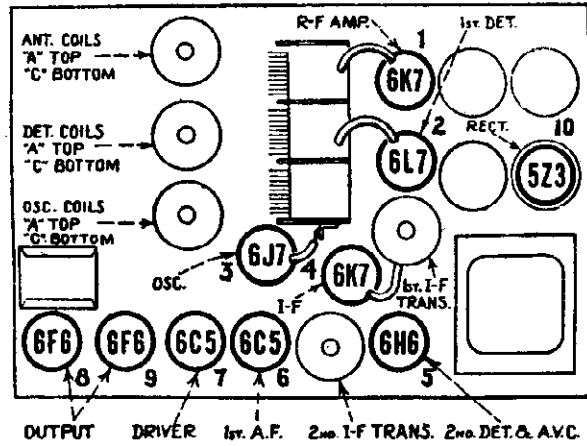


Figure 4—Coil and Radiotron Locations

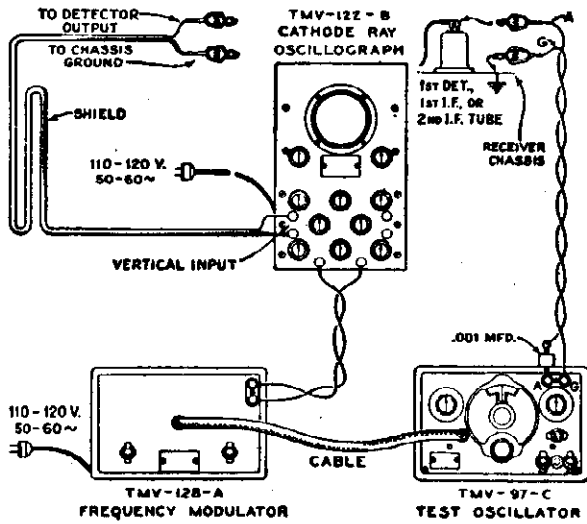


Figure 5—Alignment Apparatus Connections

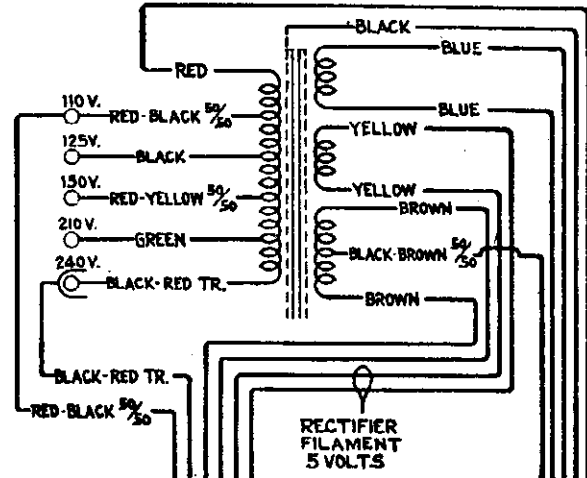


Figure 7—Universal Power Transformer Connections

Pri. Res.—7.42 ohms, total
Sec. Res.—274 ohms, total

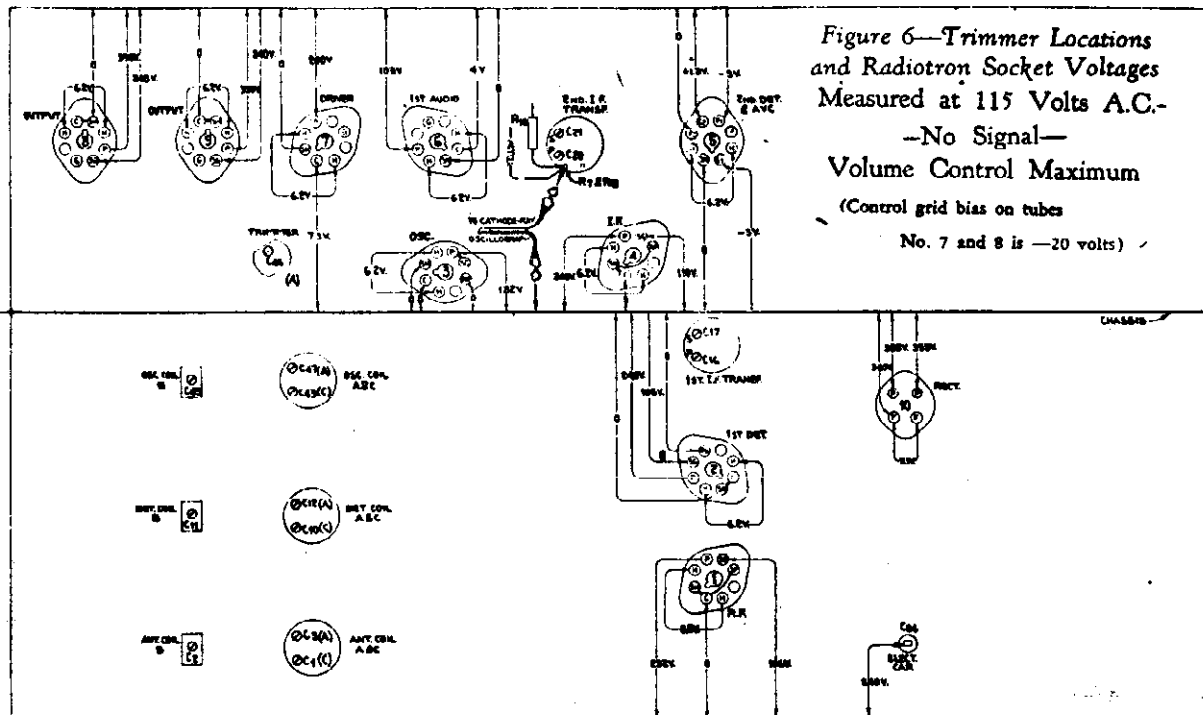
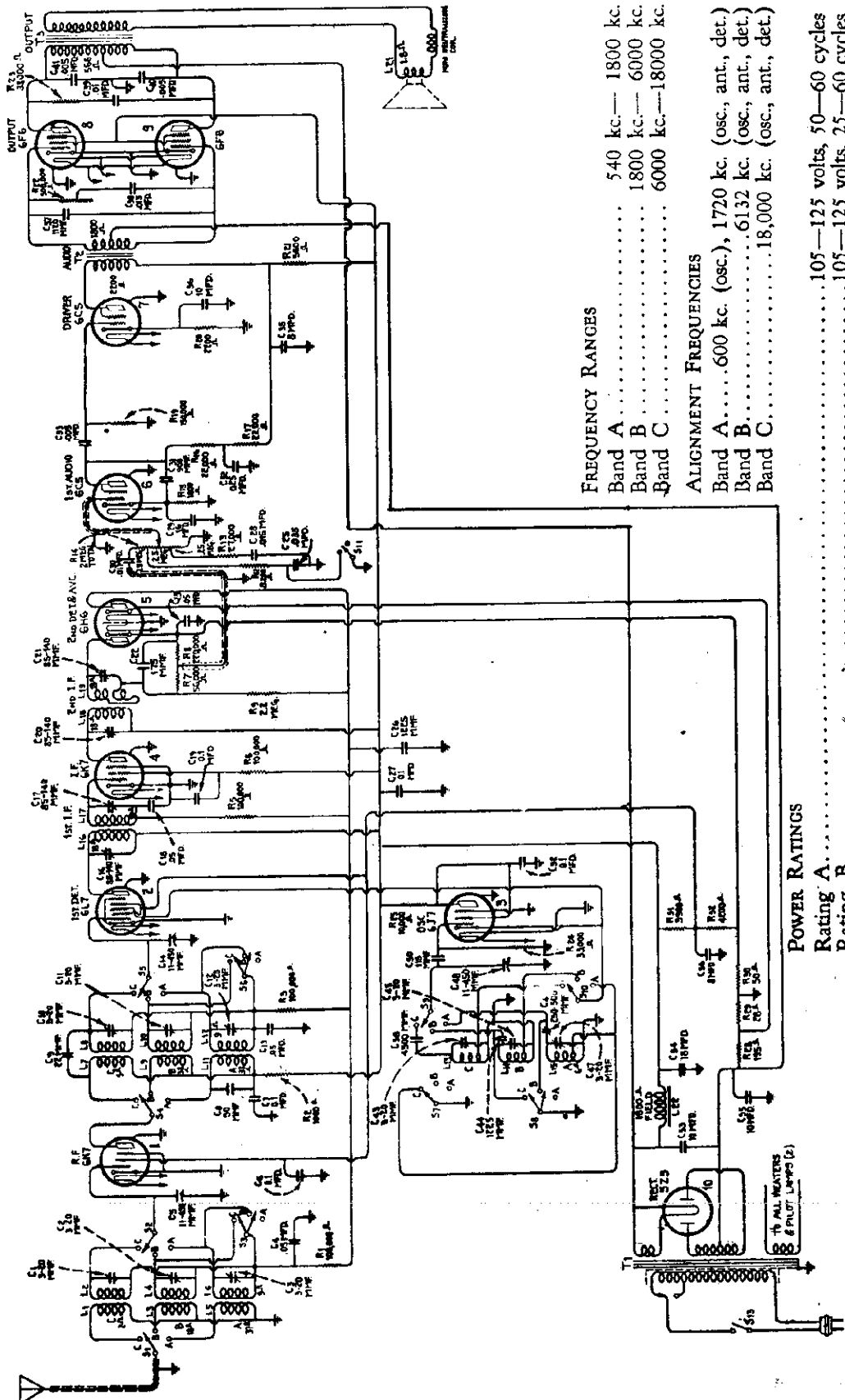


Figure 6—Trimmer Locations
and Radiotron Socket Voltages
Measured at 115 Volts A.C.—
—No Signal—
Volume Control Maximum
(Control grid bias on tubes
No. 7 and 8 is —20 volts)

RCA MFG. CO., INC.



FREQUENCY RANGES

Band A	540 kc.—1800 kc.
Band B	1800 kc.—6000 kc.
Band C	6000 kc.—18000 kc.

ALIGNMENT FREQUENCIES

Band A	600 kc. (osc., ant., det.)
Band B	6132 kc. (osc., ant., det.)
Band C	18,000 kc. (osc., ant., det.)

POWER RATINGS

Rating A	105—125 volts, 50—60 cycles
Rating B	105—125 volts, 25—60 cycles
Rating C	100—130/140—160/195—250 volts, 40—60 cycles
Power Consumption	135 watts

MISCELLANEOUS

Loudspeaker	Electrodynamic—8 inch
Voice Coil Impedance	2.25 ohms at 400 cycles
Intermediate Frequency	460 kc.

POWER TRANSFORMER
Pri. Res. 335 ohms (60 cycle)
Sec. Res. 470 ohms (25 cycle)
5.4 ohms

MODEL T10-7
Alignment
Parts List

RCA MFG. CO., INC.

REPLACEMENT PARTS

Inset on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

STOCK No.	DESCRIPTION	LIST PRICE	STOCK No.	DESCRIPTION	LIST PRICE
RECEIVER ASSEMBLIES					
4427	Bracket—High or low frequency tone control or volume control mounting bracket.	\$0.18	11315	Capacitor—0.015 Mfd.—(C38).....	.20
7237	Bushing—Variable condenser mounting bushing assembly—Package of 3.....	.43	4836	Capacitor—0.01 Mfd.—(CA, C19, C18, C23).....	.30
11223	Capacitor—Adjustable capacitor—(C46).....	.46	4885	Capacitor—0.1 Mfd.—(C7, C19, C27, C52).....	.28
11292	Capacitor—22 MMfd.—(C9).....	.24	4841	Capacitor—0.1 Mfd.—(C6).....	.22
11289	Capacitor—50 MMfd.—(C8).....	.26	5170	Capacitor—0.25 Mfd.—(C32).....	.27
11291	Capacitor—115 MMfd.—(C70).....	.24	11203	Capacitor—10 Mfd.—(C13).....	1.18
3784	Capacitor—900 MMfd.—(C31).....	.30	5212	Capacitor—18 Mfd.—(C34).....	1.16
4409	Capacitor—1120 MMfd.—(C37).....	.37	11217	Capacitor Pack—Comprising one 16 Mfd., two 10 Mfd., and two 8 Mfd. capacitors—(C29, C35, C36, C35, C36).....	1.85
11288	Capacitor—1225 MMfd.—(C44).....	.30	11201	Clamp—Cable clamp—located near variable tuning condenser—Package of 5.....	.20
11316	Capacitor—1225 MMfd.—(C26).....	.40	11272	Clamp—Cable clamp—located above antenna terminal.....	.10
11287	Capacitor—4500 MMfd.—(C58).....	.30	4693	Clamp—Electrolytic capacitor clamp—for stock #11215.....	.15
4907	Capacitor—0.005 Mfd.—(C40, C41).....	.20	11211	Transformer—Power transformer—105-125 volts—40-60 cycles.....	4.88
4868	Capacitor—0.005 Mfd.—(C33).....	.20	DRIVE ASSEMBLIES		
4624	Capacitor—0.01 Mfd.—(C30).....	.54	4362	Arm—Band indicator operating arm.....	80.28
4937	Capacitor—0.01 Mfd.—(C39).....	.25	10194	Ball—Steel ball—Package of 20.....	.25
7215	Coil—Antenna coil—A and C bands—(L1, L2, L3, L6, C1, C3).....	2.32	4422	Clutch—Tuning condenser drive clutch assembly—comprising drive shaft, balls, ring, spring and washers assembled.....	1.00
7245	Coil—Antenna coil—B band—(L3, L4, C3).....	1.78	11375	Dial—Station selector dial scale.....	.68
7216	Coil—Detector coil—A and C bands—(L7, L8, L11, L12, C10, C12).....	2.34	11227	Drive—Variable tuning condenser drive complex—less dial scale.....	2.08
7246	Coil—Detector coil—B band—(L9, L10, C11).....	1.62	11228	Gear—Vernier pointer drive gear.....	.42
7217	Coil—Oscillator coil—A and C bands—(L11, L15, C43, C47).....	2.20	4827	Gear—Spring gear assembly.....	1.27
7247	Coil—Oscillator coil—B band—(L14, C45).....	1.44	11303	Indicator—Band indicator pointer assembly—comprising indicator, arm, link and stud.....	.20
11277	Compensating Pack—Comprising one 0.015 Mfd., one 0.035 Mfd. capacitor, one 27,000 ohm and one 8200 ohm resistor—(C25, C28, R12, R13).....	.92	4475	Indicator—Station selector indicator.....	.18
11214	Condenser—Three gang variable tuning condenser—(C3, C14, C48).....	4.20	4340	Lamp—Dial lamp—Package of 5.....	.60
11201	Volume Control—(R14).....	1.50	3993	Screw—No. 6-32/32" set screw—for band indicator operating arm—Package of 10.....	.25
11219	Tone Control—High frequency tone control—(R22).....	.90	4669	Screw—No. 8-32/7/16" Square head set screw—for tuning condenser shaft—Package of 10.....	.25
8041	Plate—I. F. or R. F. coil shield lockin plate with screw—Package of 2.....	.12	4377	Spring—Band indicator operating arm spring—Package of 5.....	.25
11220	Resistor—Voltage divider resistor—comprising one 3900 ohm and one 4200 ohm section—(R31, R32).....	.84	4378	Stud—Band indicator operating arm stud assembly—Package of 5.....	.25
11221	Resistor—Voltage divider resistor—comprising one 50 ohm, one 28 ohm and one 195 ohm section—(R28, R29, R30).....	.48	MISCELLANEOUS ASSEMBLIES		
5112	Resistor—1000 Ohm—Carbon type—1/4 Watt—(R2).....	1.00	11337	Escutcheon—Station selector escutcheon.....	.70
3706	Resistor—1800 Ohm—Carbon type—1/4 Watt—(R15).....	1.00	6614	Glass—Station selector dial glass.....	.30
5119	Resistor—2200 Ohm—Carbon type—1/4 Watt—(R20).....	1.00	11346	Knob—Station selector knob—Package of 5.....	.75
5173	Resistor—5600 Ohm—Carbon type—1/2 Watt—(R21).....	1.00	11347	Knob—Volume control, range switch, tone control or power switch knob—Package of 5.....	.75
2731	Resistor—10,000 Ohm—Carbon type—1 Watt—(R25).....	1.10	4678	Ring—Spring retaining ring for station selector dial glass—Package of 5.....	.34
11301	Resistor—22,000 Ohm—Carbon type—1/4 Watt—(R16, R17).....	1.00	11210	Screw—Chassis mounting screw assembly—Package of 4.....	.28
11300	Resistor—33,000 Ohm—Carbon type—1/10 Watt—(R24).....	.75	11348	Screw—No. 8-32/7/16" Headless cupped point set screw for knob, stock #11346—Package of 10.....	.32
5033	Resistor—33,000 Ohm—Carbon type—1 Watt—(R23).....	1.10	11340	Spring—Retaining spring for knob, stock #11347—Package of 5.....	.15
3118	Resistor—30,000 Ohm—Carbon type—1/4 Watt—(R1, R3, R5, R6).....	1.00	REPRODUCER ASSEMBLIES		
5027	Resistor—150,000 Ohm—Carbon type—1/4 Watt—(R19).....	1.00	11232	Board—Terminal board with two lead wire clips.....	.18
11151	Resistor—2.2 Megohms—Carbon type—1/4 Watt—(R9).....	1.00	11231	Bolt—Yoke and core assembly bolt and nut.....	.16
5249	Shield—R. F. coil shield.....	.20	8060	Bracket—Mounting bracket for output transformer and connector.....	.14
11273	Shield—Radiotron shield.....	.22	11304	Cable—Reproducer cable—complete with female connector.....	.80
5250	Shield—I. F. Transformer shield.....	.22	11234	Coil—Field Coil—(L22).....	2.15
11222	Socket—Dial lamp socket.....	.18	11233	Coil—Neutralizing coil.....	.30
4794	Socket—4 contact Radiotron socket.....	.15	11237	Cone—Reproducer cone (L21)—Package of 5.....	3.50
11197	Socket—6 contact Radiotron socket.....	.14	7040	Connector—4-prong female connector socket for reproducer cable.....	.25
11198	Socket—7 contact Radiotron socket.....	.15	7039	Connector—4-prong male connector plug for reproducer.....	.25
7224	Switch—Low frequency tone control switch and power switch—(S11, S13).....	1.00	11257	Clamp—Cone center suspension clamping nut and screw assembly—Package of 5.....	.25
11236	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10).....	2.44	9617	Reproducer—Complete.....	6.60
5238	Terminal—Antenna terminal assembly.....	.14	11229	Transformer—Output transformer—(T3).....	1.86
11218	Transformer—Audio driver transformer—(T2).....	2.58	11230	Washer—Binders band "C" washer—used to hold field coil securely—Package of 5.....	.18
11216	Transformer—First intermediate frequency transformer—(L16, L17, G16, C17).....	2.15	SERVICE DATA		
11217	Transformer—Second intermediate frequency transformer—(L18, L19, C20, C21, C22, R7, R8).....	3.10	Alignment Procedure		
11213	Transformer—Power transformer—105-125-150-210-250 volts—40-60 cycles.....	5.10	Ten alignment trimmers are provided in the r-f, first detector and oscillator tuning system and four are used in the i-f system. All of these are accurately adjusted during manufacture and should remain in proper alignment unless affected by abnormal conditions of climate or have been altered by other means. Loss of sensitivity, improper tone quality and poor selectivity are the usual indications of improper alignment.		
11212	Transformer—Power transformer—105-125 volts—40-60 cycles.....	7.18	Correct performance of the receiver can only be obtained when the trimmer adjustments have been made by a skilled service man with the use of adequate and reliable test equipment. Such apparatus as may be required for alignment of this particular instrument is illustrated and described on a separate page of this booklet.		

Correct performance of the receiver can only be obtained when the trimmer adjustments have been made by a skilled service man with the use of adequate and reliable test equipment. Such apparatus as may be required for alignment of this particular instrument is illustrated and described on a separate page of this booklet.

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It is wise to determine the necessity for alignment as well as the direction of misalignment before making adjustments. The RCA Tuning Wand is an instrument designed particularly for such a purpose.

CATHODE-RAY ALIGNMENT

Equipment
A standard source of alignment frequencies is required. Such a source should consist of an RCA Full Range Oscillator, Stock No. 9595. Output indication should be by means of an RCA Stock No. 9545 Cathode-Ray Oscillograph. An RCA Stock No. 9558 Frequency Modulator will be needed to sweep the generated signal and synchronize it with the Oscillograph in order to obtain visual representation of the resonant characteristic of the circuit being tuned on the cathode-ray fluorescent screen.

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. The last transformer must be aligned firstly and the first transformer aligned secondly. For such a process, it is necessary to feed the output of the Full Range Oscillator to the stages in their order of alignment, adjusting the trimmers of each transformer and observing the effect at the second detector output on the Cathode-Ray Oscillograph. The proper point of connection of the Oscillograph is with its vertical "high" input terminal attached to the junction of R-7 and R-8, as illustrated in Figure 6, and with the "0" or ground terminal to the chassis. The "Ext. Sync." terminals of the Oscillograph should be connected to the Frequency Modulator as shown by Figure 5. A .001 mfd. capacitor installed in series with the Oscillator "Ant." lead will prevent the voltages of the stage under alignment from becoming upset. The vertical "A" amplifier should be "On" for the ensuing adjustments and its gain control kept at maximum. For each adjustment, the Oscillator output must be regulated so that the image obtained on the Oscillograph screen will be of the minimum size convenient for accurate observation. Proceed further as follows:—

(a) Place the receiver, Oscillograph and test Oscillator in operation. Set the receiver range switch to Band "A" and tune the station selector to a point where no interference will be encountered from signal pickup or from the RCA-6J7 oscillator, removing the tube if necessary. Set the Oscillograph horizontal "B" amplifier to "Timing" and control its gain so that the luminescent spot sweeps a straight line trace completely across the screen. Place the tuning control to "Int." Adjust the intensity and focusing controls of the Oscillograph to produce the correct size and strength of spot.

(b) Attach the output of the test Oscillator between the control grid cap of the RCA-6K7 i-f tube and chassis ground as shown typically by Figure 5. Tune the Oscillator to 460 kc. and set its modulation switch to "On." Regulate its output until the signal produces a wave pattern on the Oscillograph screen, adjusting the Oscillograph controls to give a shape which is convenient for peak indications. Cause the image to stand still on the screen by manipulation of the frequency and synchronizing controls. Then carefully tune the two trimmers C-20 and C-21 of the second i-f transformer to produce maximum amplitude (vertical deflection) of the oscillographic image. Under this condition the transformer will be sharply resonated to 460 kc.

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation when 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 R-3, L-2, C-1, etc., are provided for reference between the illustrations and the Replacement Parts List. The coils, reactors, and transformer windings are rated in terms of their d.c. resistances only and where the resistance is less than one ohm, no rating is given.

Band B—This band must be aligned at 6132 kc. by tuning the test Oscillator to the 6132 kc. dial marking. Then turn the station selector C-41 to produce maximum output using the setting of least capacitance which causes the "image" to be checked by tuning the receiver to 5212 kc. at which point the 6132 kc. signal will be heard if the trimmer C-45 has been properly set to the position of least capacitance for maximum (peak) output. It may be necessary to increase the Oscillator output for this check. No adjustments are to be made. Return the station selector to the 6132 kc. dial marking and trim capacitors C-11 and C-2 for maximum receiver output. No other adjustments are necessary on Band B.

Band C—Change the receiver so that it is operative and the dial reads 18,000 kc. on the "C" Band. Tune the test Oscillator to this same frequency. Then adjust the oscillator trimmer C-43 to produce maximum (peak) output. Two positions of this trimmer will be found which conform with this requirement. The one of least capacitance is correct. Check for the presence of "image" response at 17,000 kc. by shifting the receiver tuning. If it is received at such a point, the trimmer C-43 has been correctly adjusted during this check. No adjustments are to be made on 18,000 kc. dial marking. Tune the receiver back to the 18,000 kc. dial marking, readjust C-43 if necessary, and then use the detector and antenna capacitors C-10 and C-1 for maximum receiver output. No further adjustments are necessary.

Radioelectron Socket Voltages

The voltage values indicated from the Radioelectron socket contacts to chassis on Figure 6 will serve to assist in the location of causes for faulty operation. Each value as specified should hold within $\pm 20\%$ when the receiver is normally operative at its rated supply voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuit. The voltages given are actual operating values and do not allow for inaccuracies which may be caused by the loading effect of a voltmeter's internal resistance. This resistance should be duly considered for all readings. The amount of contact resistance shunting the meter during measurement will determine the accuracy to be obtained, the error increasing as the meter resistance becomes comparable to or less than the circuit resistance. For the majority of readings, a meter having an internal resistance of 1000 ohms per volt will be satisfactory when the range used for each reading is chosen as high as possible consistent with good readability.

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 7. Terminal connections 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.

tion "On" and Frequency Modulator (disconnect) and regulate its output to the level required for convenient observation. Adjust the trimmer C-43 to the point producing maximum output as indicated on the Oscillograph. Check for the presence of the proper "image" signal by tuning the receiver to 17,000 kc. The 18,000 kc. signal of the Oscillator will be received at this point if the adjustment of C-43 has been properly made by using the position of least capacitance which gives maximum receiver output. It may be necessary to increase the output of the Oscillator in order to get an indication of the "image". No adjustments should be made during this check.

(b) Return the receiver tuning to 18,000 kc., re-align C-43 if necessary, and then adjust the detector and antenna trimmers, C-10 and C-1, for maximum signal output as evidenced by the oscillographic image. No further adjustments are to be made on this band.

ALIGNMENT WITH OUTPUT METER

To align the receiver by means of an output indicator other than a Cathode Ray Oscillograph will require the use of a standard test Oscillator such as that recommended above, for the source of signals and means of indication for the output. The RCA Neon Output Indicator, Stock No. 4317, will be found very satisfactory for such use. It should be connected across the voice coil circuit of the loudspeaker or across the output transformer primary.

I-F Alignment

Connect the test Oscillator to the control grid cap of the i-f tube. Advance the voice control of the receiver to its full-on position. Tune the test Oscillator accurately to 440 kc. and align the trimmer C-20 and C-21 to give maximum receiver output. Regulate the Oscillator output during this adjustment so that the output indication is as small as can be conveniently observed. After completing the adjustments of these trimmers, re-connect the Oscillator so that it will feed into the control grid circuit of the RCA-6L7 first detector. Then tune the first i-f transformer trimmer C-16 and C-17 for maximum receiver output.

R-F Alignment

After completing the i-f adjustments, it is advisable to correct the line-up of the circuits ahead of the first detector. The test Oscillator should be connected to the antenna-ground terminals of the receiver and the manual volume control turned to its maximum position. For each adjustment, the Oscillator output should be maintained as low as possible in order to avoid broadness of tuning which would result from a.v.c. action on a stronger signal.

Band A—This band should be aligned by supplying a 1720 kc. signal to the receiver, tuning the station selector to a dial reading of 1720 and adjusting the trimmers C-47, C-12 and C-3 to produce maximum receiver output. The Oscillator should then be shifted to 600 kc. and the receiver tuned to resonate this signal, disregarding the reading at which it is best received. Trimmer C-40 must then be adjusted, simultaneously while rocking the station selector backward and forward through the station selector until the maximum output results from the combined operations. C-47 should be rechecked to assure that its adjustment has not changed because of the trimming of C-40.

sary to have the timing control of the Oscillograph on "Int." for this operation. After each trimmer has been peaked, the Oscillograph timing control should be set to "Ext." and the Frequency Modulator placed into operation with its connections to the Oscillator and Oscillograph made in accordance with Figure 5. Turn the modulation switch of the Oscillator to "Off" and return the Oscillator (increase frequency) until the forward and reverse waves show on the Oscillograph and become coincident at their highest points. Adjust the trimmers C-47, C-12 and C-3 again, setting each to the point which produces the best coincidence and maximum amplitude of the wave images.

(b) Remove the Frequency Modulator cable from the Oscillator and shift the signal frequency to 600 kc. Place the modulation switch to "On". Tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then insert the Frequency Modulator plug and return the Oscillator (modulation "Off") to the two similar forward and reverse waves appear on the screen. For this adjustment, it is advisable to shift the Oscillator to its 200-400 kc. range using the third harmonic of the generated signal in order to obtain the desired range of sweep. The oscillator series trimmer, C-46, should then be adjusted to produce maximum amplitude of the images. No rocking will be necessary on the station selector inasmuch as the signal frequency is being "wobbled" by the Frequency Modulator to produce the same effect. After completing this adjustment, the trimmer C-47 should be realigned as in (a) to correct for any change brought about by the adjustment of C-46.

BAND B

(a) Advance the receiver range switch to its Band B position and tune the station selector to a dial reading of 6132 kc. Set the test Oscillator to this same frequency (modulation "On" and Frequency Modulator disconnected) and increase its output until a suitable indication is apparent on the Oscillograph. The Oscillograph should be adjusted for "Int." tuning. Then adjust the oscillator trimmer, C-45, to the point at which maximum amplitude of the image is obtained. Two positions will be found for this trimmer which gives such a maximum. The one of least capacitance is correct and should be used. This can be checked by tuning the "image" signal, which will be received at 5212 kc. on the dial if the adjustment of C-45 has been properly made. An increase in test Oscillator output may be necessary for this test. Its frequency should not be changed from 6132 kc. nor any trimmer adjustments made on the receiver.

(b) Return the station selector to the 6132 kc. reading and align the detector, and antenna coil trimmers, C-11 and C-2 respectively, for maximum (peak) output as shown by the Oscillograph. No further adjustments are to be made on this band.

BAND C

(a) Turn the range switch of the receiver to its Band C position and tune the station selector until the dial pointer reads 18,000 kc. Set the test Oscillator to the same frequency (modula-

(c) The Frequency Modulator should then be placed in operation and interconnected with the Full Range Oscillator by means of the special shielded patch cord. Figure 5 shows the proper arrangement. Set the Frequency Modulator sweep range switch to its "Lo" position and turn the Oscillator modulation switch to "Off". Change the timing control of the Oscillograph to "Ext." and place the range switch in its No. 2 position. Then carefully shift the tuning of the Oscillator to 440 kc. and its frequency, until two distinct and similar waves appear on the Oscillograph screen and become coincident at their highest points. This coincidence will be found to occur at an Oscillator setting of approximately 540 kc. The curves will be identical in shape but appearing in reversed positions. Adjust the frequency control of the Oscillator in order to cause the waves to conform with the above requirement and to make them remain motionless on the screen. This will require a setting of approximately 1/2 clockwise rotation of the frequency control. The trimmers C-20 and C-21 should then be re-adjusted so that the two curves move together and become exactly coincident throughout their length, maintaining the maximum amplitude at which this condition can be brought about.

(d) Leaving the equipment connected and adjusted as in (c), change the Oscillator output to the control grid cap of the RCA-6L7 first detector tube. Then adjust the first i-f transformer trimmers C-16 and C-17 so that the forward and reverse waves appearing on the Oscillograph coincide throughout their length and have maximum amplitude. The shape of the composite wave obtained from this operation is a true representation of the overall tuning characteristic of the i-f system.

R-F Trimmer Adjustments

Locations of the various antennas, detector and oscillator coil trimmers are shown by Figure 6. The test Oscillator should be connected to the antenna-ground terminals of the receiver. No changes are to be made in the connections of the Oscillograph at the second detector. During the following adjustments, the Oscillator output should be regulated as often as is necessary to keep the oscillographic image as low as is practically observable. Adherence to this procedure will obviate the broadness of tuning that would result from a.v.c. action on a stronger signal. Proceed with the adjustments as follows:—

CALIBRATION

Set the receiver range switch to Band A and rotate the station selector until the tuning condenser plates are in full mesh (maximum capacitance). Then move the main dial pointer until it points exactly to the horizontal line at the low frequency end of the Band A scale. Correct the setting of the vernier second hand pointer to read zero.

BAND A

(a) With the receiver range switch in its Band A position, tune the station selector until the dial pointer is at a reading of 1720 kc. Adjust the test Oscillator to 1720 kc. (modulation "On" and Frequency Modulator disconnected) and increase its output to produce a registration on the Oscillograph. Carefully align the oscillator, detector and antenna trimmers, C-47, C-12 and C-3 respectively, so that each brings about maximum amplitude of output as shown by the wave on the Oscillograph. It will be necessary

RCA MFG. CO., INC.

MODEL T4-10
Schematic, Voltage
Trimners

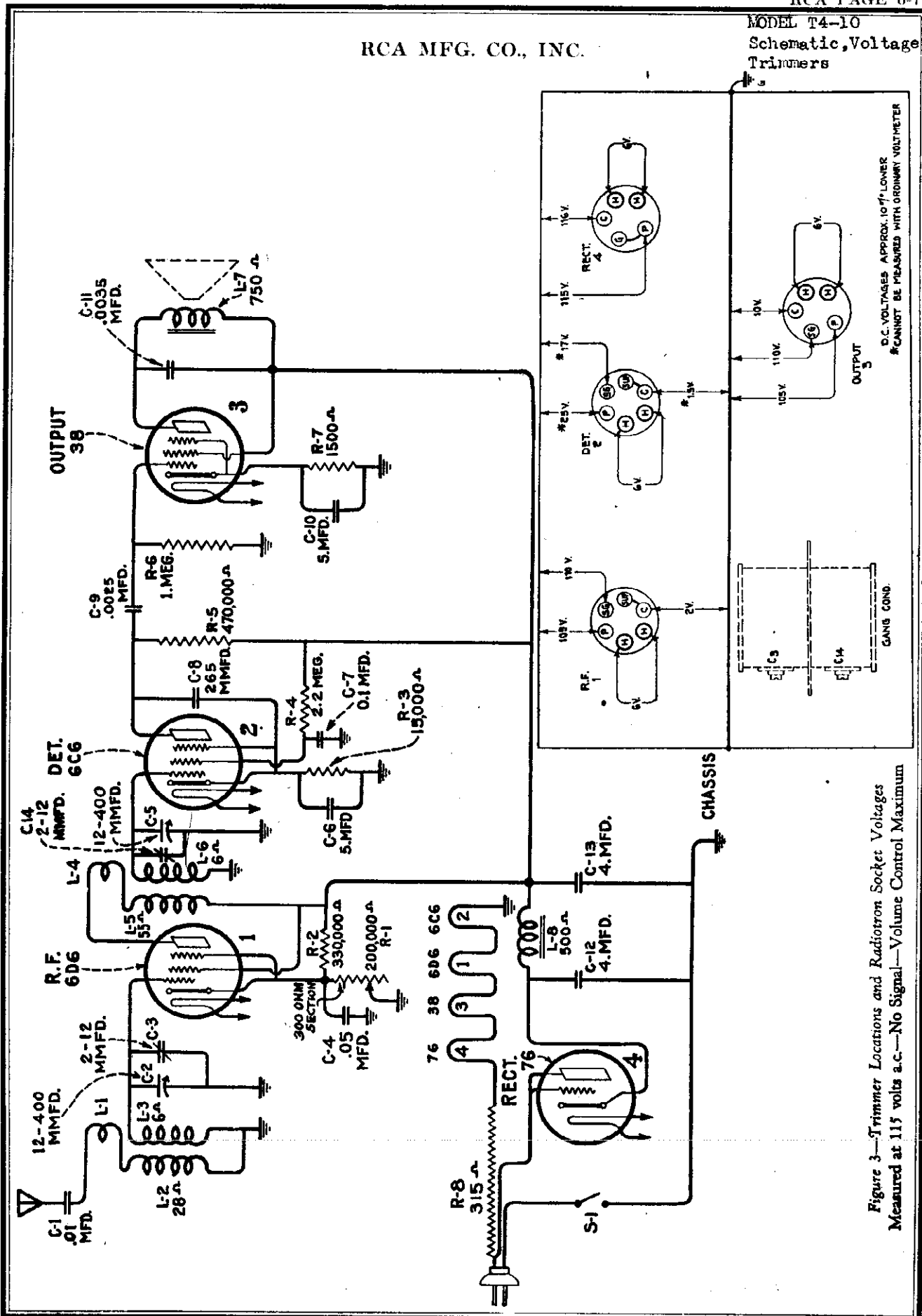
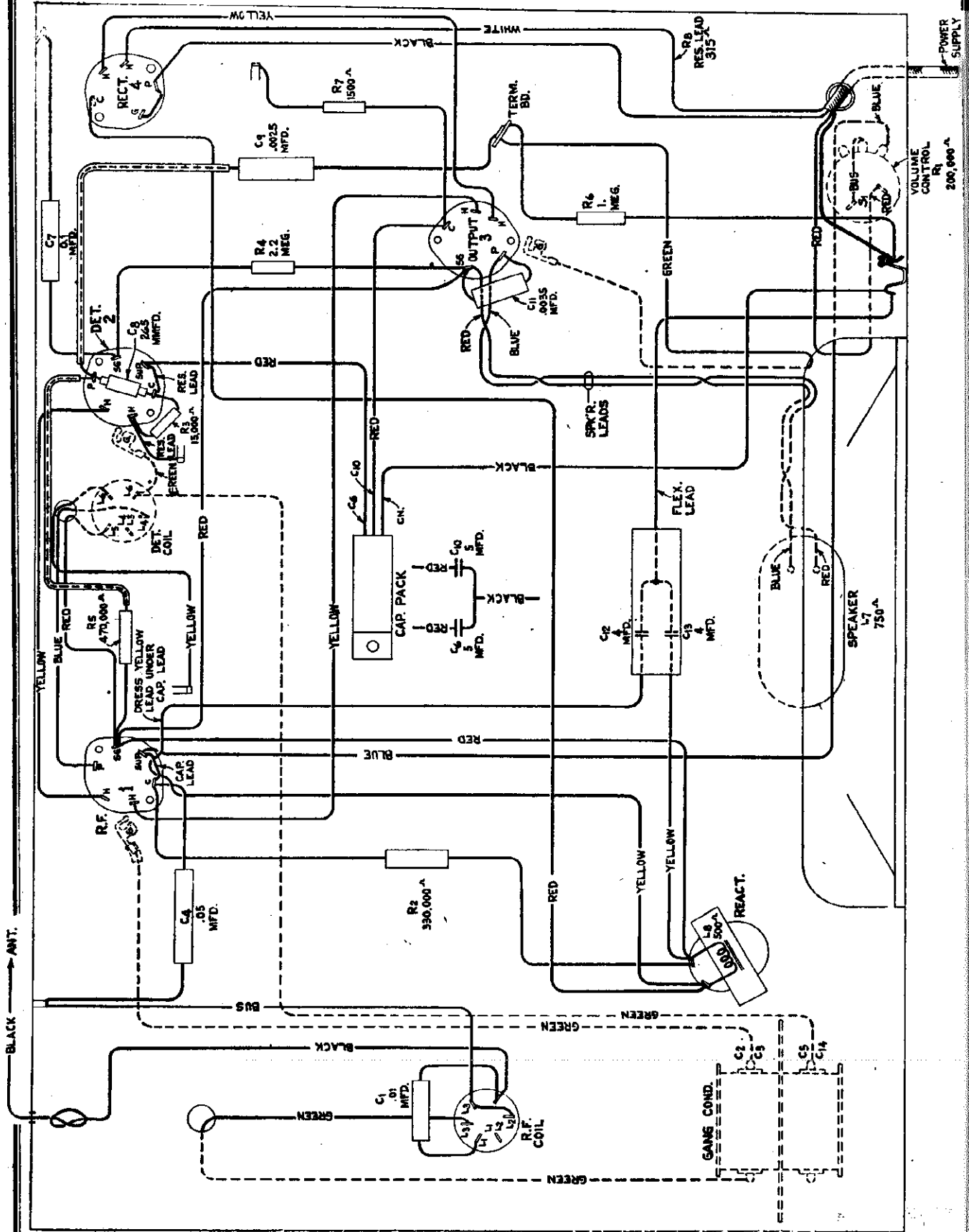


Figure 3—Trimmer Locations and Radiotron Socket Voltages Measured at 115 volts a.c.—No Signal—Volume Control Maximum

D.C. VOLTAGES APPROX. 10% LOWER
CANNOT BE MEASURED WITH ORDINARY VOLTMETER

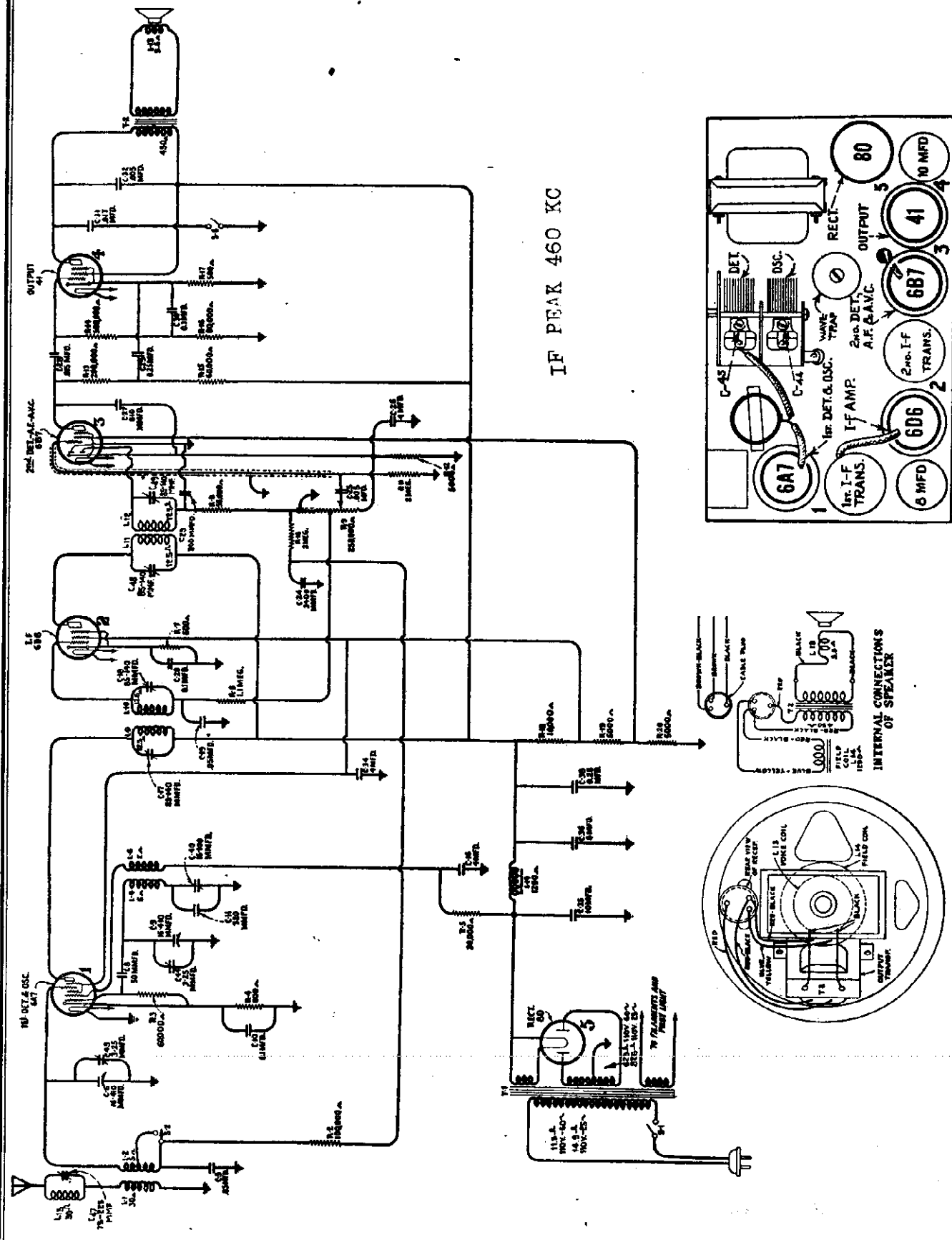
MODEL T4-10
Chassis Wiring

RCA MFG. CO., INC.



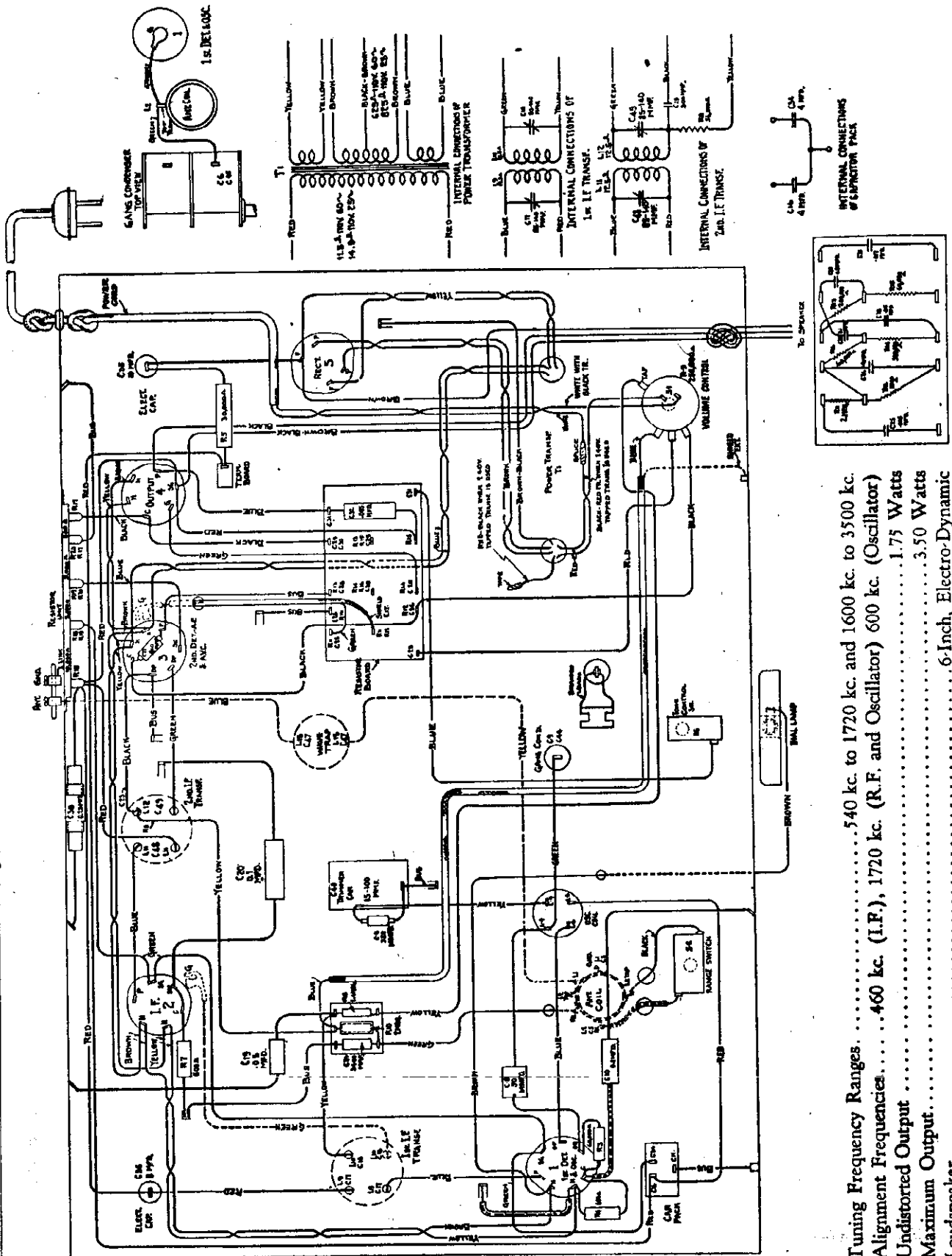
RCA MFG. CO., INC.

MODEL T5-2
Schematic, Socket
Speaker Data, Trimmers



MODEL T5-2
Chassis Wiring

RCA MFG. CO., INC.



- Tuning Frequency Ranges 540 kc. to 1720 kc. and 1600 kc. to 3500 kc.
- Alignment Frequencies 460 kc. (I.F.), 1720 kc. (R.F. and Oscillator) 600 kc. (Oscillator)
- Undistorted Output 1.75 Watts
- Maximum Output 3.50 Watts
- Loudspeaker 6-Inch, Electro-Dynamic

RCA MFG. CO., INC.

MODEL T5-2
Alignment
Trimmers, Voltages

SERVICE DATA

ALIGNMENT PROCEDURE

This receiver must be in correct electrical alignment in order to obtain maximum efficiency and best quality of performance. The circuits should be realigned after each major service or repair operation, and whenever there are positive indications that the adjustments have deviated from normal by ordinary usage. These indications will be present together and will have the nature of: low sensitivity, poor tone quality and irregular double-peaked tuning.

I-F Tuning Adjustments

There are two i-f transformers associated in the intermediate amplifier system. They are both tuned by accessible trimmers. To obtain the correct alignment proceed as follows:

- Short circuit the antenna and ground terminals and tune the receiver so that no signal is received. Set the volume control to its maximum position. Ground the receiver.
- Connect the output of the test oscillator between the first detector control grid and chassis ground. Attach an indicating meter, such as is illustrated, to the speaker circuit.
- Place the external oscillator into operation at 460 kc. Adjust the output so that a slight registration occurs on the output indicator. The output should be set at as low a value as will give a convenient indication during adjustment;

this requirement is important in that the a.v.c. action is voided by such a method. Adjust the trimmers, C-49, C-48, C-18 and C-17 in order, for maximum receiver output.

R-F and Oscillator Adjustments

Three trimmers are provided, two for adjustment at 1720 kc. and one for oscillator line-up at 600 kc. No adjustments are required on the medium wave band. Locations of the trimmers are shown on Figure 3. They should be adjusted in the following manner:

- Connect the output of the modulated Full Range Oscillator to the antenna and ground terminals of the receiver. Check the position of the dial pointer. It should set exactly on the radial line, adjacent to the dial reading of 340 when the tuning capacitor plates are at full mesh. After correcting the dial pointer, place the receiver in operation and set the selector at 1720 kc., advance the volume control to maximum and turn the range switch to its broadcast position.
- Adjust the frequency of the external oscillator to 1720 kc. and regulate its output until a perceptible indication appears on the output indicator. This indication should be held at a minimum during the adjustments. The trimmers C44 and C45 should then be tuned to the point giving peak receiver output.
- Re-tune the test oscillator, setting its frequency

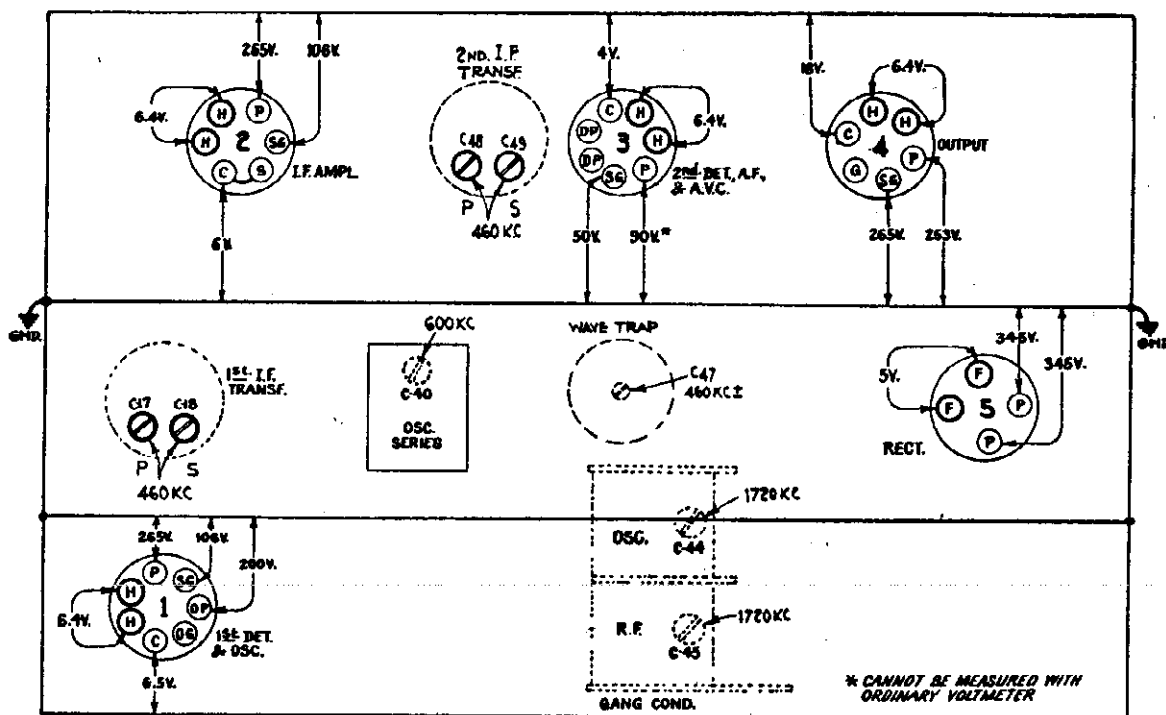


Figure 3—Trimmer Locations and Radiotron Socket Voltages (Measured at 115 volts A. C. Supply—Maximum Volume Control—No Signal)

* CANNOT BE MEASURED WITH ORDINARY VOLTMETER

MODEL T5-2
Alignment, Part 2
Parts List

RCA MFG. CO., INC

to 600 kc. Turn the receiver selector control to the point where the incoming oscillator signal is received best. This point will not always be exactly at 600 on the dial. Then adjust the low-frequency trimmer, C40, simultaneously rocking the tuning capacitor slowly through the signal until maximum receiver output results from these combined operations. This adjustment must be made irrespective of dial calibration. It is advisable to repeat the 1720 kc. adjustment of the oscillator trimmer C44, in order to correct for any change caused by the tuning of C40.

Wave Trap Adjustment

With receiver in operation using its normal antenna, tune the station selector to the point at which the

intermediate-wave interference is most intense. Then adjust the wave-trap trimmer to the point which cause maximum suppression of the interference.

RADIOTRON SOCKET VOLTAGES

The various normal operating voltages are given on Figure 3. As specified, they are referred to the chassis ground. Accuracy of measurements will be a function of the internal resistance of the voltmeter used. It is advisable to employ a meter having at least 1000 ohms per volt, and for each reading use the highest range which will give an acceptably accurate reading. General deviations from the values given, due to line voltage difference, should not be taken as indicating a defective condition. The erratic departure from normal of a single value or group of values should form the basis of circuit diagnosis.

T 5-2 REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

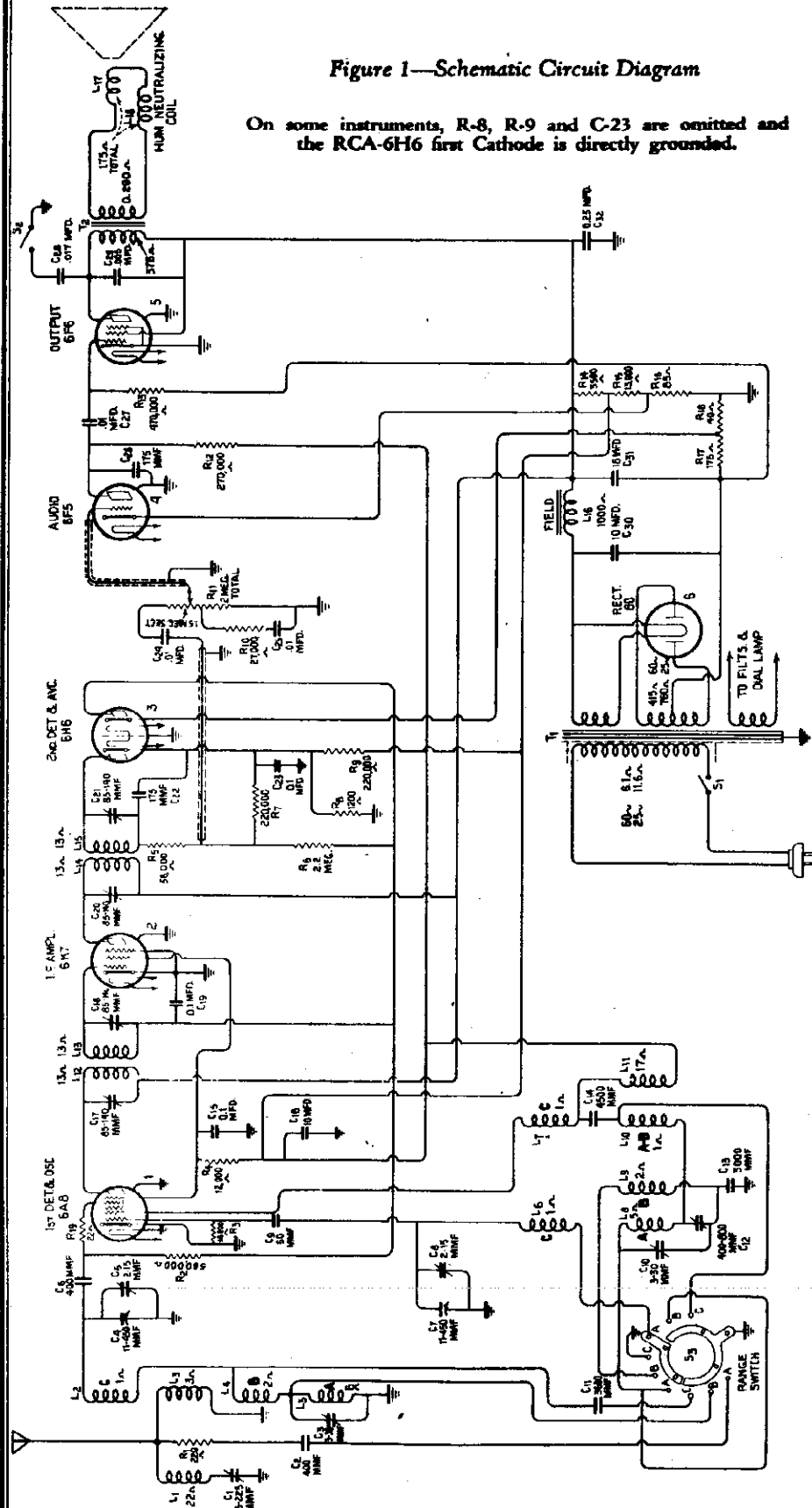
STOCK No.	DESCRIPTION	LIST PRICE	STOCK No.	DESCRIPTION	LIST PRICE
RECEIVER ASSEMBLIES					
4244	Cap—Contact cap—Package of 5.....	\$0.20	3584	Ring—Oscillator coil retaining ring—Pack- age of 5.....	\$0.40
3861	Capacitor—Adjustable capacitor (C40)....	.78	3623	Shield—Oscillator coil shield.....	.30
5094	Capacitor—50 MMfd. (C8).....	.20	3942	Shield—First detector and output Radiotron shield.....	.18
5151	Capacitor—320 MMfd. (C11).....	.20	3782	Shield—Second detector Radiotron shield..	.26
4297	Capacitor—400 MMfd. (C27).....	.30	7487	Shield—I.F. Radiotron shield.....	.25
4881	Capacitor—3400 MMfd. (C24).....	.20	5186	Shield—I.F. Transformer shield.....	.28
4868	Capacitor—0.005 Mfd. (C25, C32).....	.20	3858	Socket—Dial lamp socket.....	.26
11315	Capacitor—0.015 Mfd. (C28).....	.20	4784	Socket—4-contact Radiotron socket.....	.15
4906	Capacitor—0.017 Mfd. (C31).....	.25	4785	Socket—6-contact output Radiotron socket.	.15
4836	Capacitor—0.05 Mfd. (C5, C19).....	.30	4786	Socket—6-contact Radiotron socket.....	.15
4841	Capacitor—0.1 Mfd. (C10, C20, C30)....	.22	4787	Socket—7-contact Radiotron socket.....	.15
3597	Capacitor—0.25 Mfd. (C29, C38).....	.40	5053	Switch—Range switch (S2).....	.50
3796	Capacitor—4.0 Mfd. (C26).....	.60	4905	Switch—Tone control switch (S6).....	.30
4428	Capacitor—8.0 Mfd. (C36).....	1.05	4900	Transformer—First intermediate frequency transformer—(L9, L10, C17, C18).....	2.25
7790	Capacitor—10.0 Mfd. (C35).....	1.05	11477	Transformer—Second intermediate fre- quency transformer (L11, L12, C23, C48, C49, R8).....	2.02
7589	Capacitor Pack—Comprising two 4.0 Mfd. capacitors (C16, C34).....	1.64	4898	Transformer—Power transformer—105-125 volts—25-60 cycles.....	5.55
4358	Clamp—Capacitor mounting clamp for Stock No. 4428 and No. 7790.....	.15	4897	Transformer—Power transformer—105-125 volts—50-60 cycles (T1).....	3.98
5051	Coil—Antenna coil (L1, L2, C5, R2).....	1.28	4899	Transformer—Power transformer—105- 125/200-240 volts—40-60 cycles.....	4.05
5050	Coil—Oscillator coil (L4, L6).....	.56	11479	Trap—Wave trap (L15, C47).....	1.02
11475	Condenser—2-gang variable tuning con- denser (C6, C9, C44, C45).....	3.25	4429	Volume Control—(R9, S1).....	1.40
11476	Drive—Variable condenser drive.....	.65	REPRODUCER ASSEMBLIES		
3708	Resistor—600 Ohm—Carbon type—1/4 watt (R4, R7)—Package of 5.....	1.00	9587	Coil—Field coil, magnet and cone support (L14).....	2.18
4436	Resistor—5000 Ohm—Carbon type—1/4 watt (R12)—Package of 10.....	2.00	9588	Cone—Reproducer cone (L13)—Package of 5.....	3.55
2240	Resistor—30,000 Ohm—Carbon type—1 watt (R5).....	.22	5118	Connector—3-contact male connector for reproducer cable.....	.25
3602	Resistor—60,000 Ohm—Carbon type—1/4 watt (R3, R15, R16)—Package of 5....	1.00	5119	Connector—3-contact female connector for reproducer cable.....	.25
3118	Resistor—100,000 Ohm—Carbon type—1/4 watt (R2)—Package of 5.....	1.00	9586	Reproducer—Complete.....	5.95
3116	Resistor—200,000 Ohm—Carbon type—1/4 watt (R13)—Package of 5.....	1.00	4893	Transformer—Output transformer (T2)....	1.48
6186	Resistor—500,000 Ohm—Carbon type—1/4 watt (R14)—Package of 5.....	1.00	MISCELLANEOUS ASSEMBLIES		
4783	Resistor—1,100,000 Ohm—Carbon type— 1/4 watt (R6)—Package of 5.....	1.00	5111	Dial—Station selector dial scale.....	.32
6242	Resistor—2 Megohm—Carbon type—1/4 watt (R10, R11)—Package of 5.....	1.00	11478	Indicator—Station selector indicator pointer	.12
4721	Resistor—Tapped resistor—One 500 Ohm, two 5,000 Ohm, and one 10,000 Ohm sections (R17, R18, R19, R20).....	.88	4340	Lamp—Station selector dial lamp—Package of 5.....	.60

RCA MFG. CO., INC.

Figure 1—Schematic Circuit Diagram

On some instruments, R-8, R-9 and C-23 are omitted and the RCA-6H6 first Cathode is directly grounded.

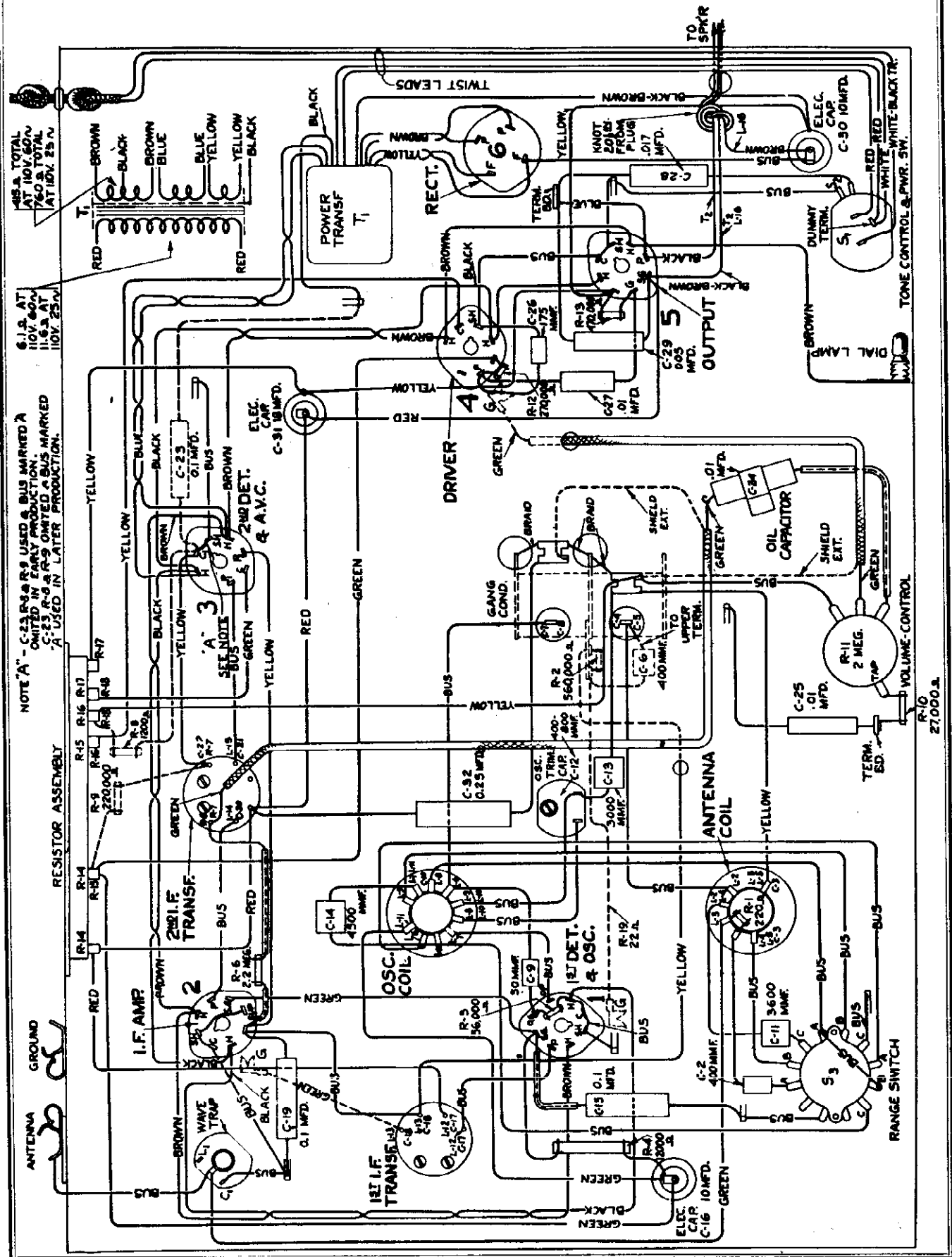
IF PEAK 460 KC



FREQUENCY RANGES	Band A..... 540—1625 kc.	ALIGNMENT FREQUENCIES	Band A..... 600 kc. (osc., ant.)
Band B..... 1625—5700 kc.	Band B..... None required	Band B.....	Band B.....
Band C..... 5700—18000 kc.	Band C..... 18000 kc. (osc., ant.)	Band C.....	Band C.....
Intermediate Frequency..... 460 kc.			
POWER SUPPLY RATINGS			
Rating A..... 105—125 volts, 50—60 cycles, 85 watts			
Rating B..... 105—125 volts, 25—60 cycles, 90 watts			
Rating C..... 100—130/140—160/195—250 volts, 40—60 cycles, 85 watts			
POWER OUTPUT			
Undistorted..... 2.0 watts			
Maximum..... 4.5 watts			
		LOUDSPEAKER	
		Type..... Electrodynamic	
		Voice Coil Impedance..... 2.25 ohms—400 cycles	

MODELS T6-1, C6-2
Chassis Wiring

RCA MFG. CO., INC.



RCA MFG. CO., INC.

MODELS T6-1, C6-2
Circuit Data, Socket
Alignment

Circuit Arrangement

The conventional Superheterodyne type of circuit, consisting of 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 Circuit

The antenna coil system consists of a single primary and three series connected secondary windings to provide the three ranges of tuning. The oscillator coil system is similarly wound on a single form. A range selector switch (S-3) is used for connecting the various sections of these two coil systems into the circuit to provide operation on the band desired. The coils are tuned by a variable two-section gang condenser having trimmer capacitors in shunt with each section. There are additional trimmer capacitors across the section of each coil used for Band "A." A series trimmer is also associated with the Band "A" oscillator coil.

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 double diode tube. 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 R-7, is applied as automatic control grid bias to the first detector and i-f tubes through a suitable resistance filter circuit. The second (auxiliary) 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 R-6, R-7 and R-8, 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

The correct performance of the receiver can only be obtained when the alignment is performed with adequate and reliable test apparatus. The manufacturer of this instrument has a complete assortment of such service equipment available. This equipment may be purchased from authorized distributors and dealers.

An oscillator (signal generator) is required as a source of the specified alignment frequencies. Visual indication of receiver output during the adjustment is necessary to enable the serviceman to obtain an accuracy of alignment which is not possible by listening to the signal. The RCA Victor Stock No. 9594 Full Range Oscillator and the RCA Victor Stock No. 4317 Neon Output Indicator are especially suitable and fulfill the above requirements.

The following procedure should be followed 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 4. Each must be aligned to a basic frequency of 460 kc. To do this, attach the Output Indicator across the voice coil circuit or across the output transformer primary. Connect the output of the test oscillator between the control grid of the RCA-6AS first detector tube and chassis ground. 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 either from local broadcast stations or the heterodyne oscillator. Increase the output of the test oscillator until a slight indication is apparent on the output indicator. Then adjust the two trimmers of the second i-f transformer to produce maximum (peak) indicated receiver output. Then, adjust the two trimmers 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 trimmers a second time to assure that the interaction between them has not disturbed the original adjustment.

R-F Trimmer Adjustments

The two trimmers which are at all times directly in shunt with the variable tuning condenser necessarily cause that the high-frequency range (Band C) be aligned first. The range selector switch should, therefore, be turned to its Band C position for the first adjustment. The Output Indicator should be left connected to the output system. Attach the output terminals of the test oscillator to the antenna and ground terminals of the receiver input.

Calibrate the dial by rotating the tuning control until the variable condenser plates are in their full mesh (maximum capacity) position and adjusting the dial pointer so that its end points to the horizontal graduation (530 kc.) at the low frequency end of the Band A scale.

Proceed further as follows:

- (a) Adjust the test oscillator to 18,000 kc. and set the receiver tuning control to a dial reading of 18,000 kc.
- (b) Regulate the output of the test oscillator until a slight indication is perceptible at the receiver output. Then adjust the trimmer 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 oscillator will be 460 kc. below the signal frequency at this adjustment point.)
- (c) Adjust the trimmer of the antenna section of the variable condenser, simultaneously rocking the receiver tuning control backward and forward through the 18,000 kc. input signal, until maximum receiver output results from these combined operations. Rocking of the variable condenser will prevent inaccurate adjustment which would otherwise be caused by the interaction between the heterodyne oscillator circuit and the antenna tuned circuit.
- (d) Change the receiver range selector to its Band A position and set the receiver tuning control to a dial reading of 1400 kc. Tune the test oscillator to this same frequency and regulate its output to produce a slight indication on the receiver output indicating device.
- (e) Adjust the high frequency trimmers of the Band A oscillator and antenna coils, C-10 and C-3 respectively, to the points at which each produces maximum indicated receiver output. 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.
- (f) Tune the low frequency trimmer, C-12, of the oscillator Band A 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 C-10 and C-3 should be corrected at 1400 kc. to compensate for any changes caused by the adjustment of the low frequency oscillator coil trimmer.

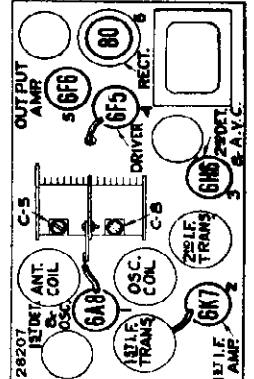


Figure 3—Radiotron and Coil Locations

Alignment Procedure

Precise alignment is vital to the proper functioning of this receiver. There are four trimming adjustments provided in the i-f system, three in the oscillator coil system and two in the antenna coil system. Each of these trimmers have 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.

SERVICE DATA

The various diagrams of this bulletin contain such information as will be needed to isolate causes for defective operation when such a condition develops. Ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles, such as R-3, L-1, C-1, etc., are provided for reference between the diagrams and the replacement parts list. Locating of the parts in the schematic circuit is facilitated by the fact that the numerical titles increase from left to right on the diagram. The coils, reactors, and transformer windings are rated in terms of their d.c. resistances only, and when the resistance is less than one ohm, no rating is given.

MODELS T6-1, C6-2
Voltage, Data
Parts List

RCA MFG. CO., INC.

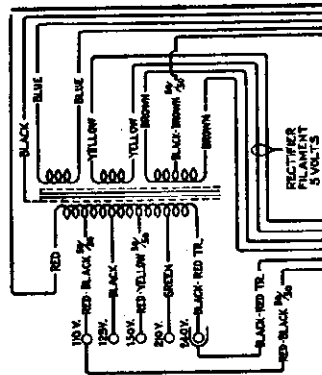


Figure 5—Loudspeaker Wiring

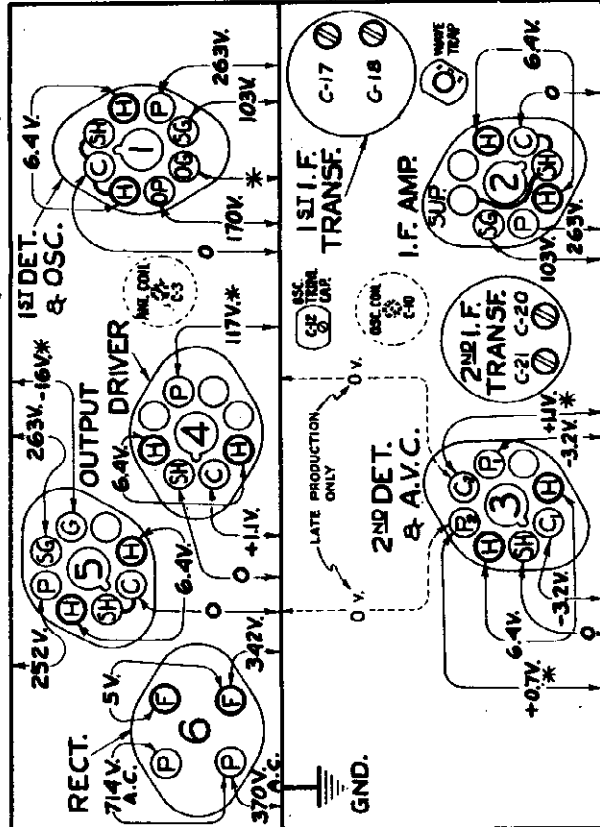


Figure 4—Radiotron Socket Voltages
Measured at 115 volts, 60 cycle supply—No signal being received

NOTES

(1) Beat notes or heterodyning (whistles) may be encountered in some instances on these receivers due to excessive antenna capacitance. This condition may be corrected by reducing the size of the antenna or by inserting a 150 mmfd. capacitor in series with the antenna lead. This may be accomplished in the receiver by removing the bus lead which connects from the antenna terminal to the wave trap inductance L-1 and inserting the condenser between these points.

Stock No.	Description	List Price	Stock No.	Description	List Price
3237	RECEIVER ASSEMBLIES		3066	Resistor—12,000 Ohms—Carbon type—1 watt—(R10)—Package of 5	1.10
11465	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	\$0.43	11400	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	1.00
11269	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.48	3059	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	1.00
11633	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.18	5138	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	1.00
11174	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.36	11453	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.75
11622	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.36	11452	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.75
11287	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.25	11397	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.75
11294	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.25	11626	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.75
11398	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.25	11603	Shield—Antenna or oscillator coil shield	2.6
4828	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.25	11390	Shield—Intermediate frequency transformer shield	2.5
4906	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.22	11383	Shield—Rectifier Radiotron shield	.20
13414	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.22	11614	Spring—Coil spring for large gears on variable tuning condenser—Package of 5	.70
5170	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.25	11615	Switch—Slide switch—(S1)	1.00
11337	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.25	11460	Switch—Slide switch—(S2)	.95
11240	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	1.08	3338	Terminal—Antenna terminal board, with clip	.14
12412	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	1.15	11388	Transformer—First intermediate frequency transformer—(L12, L13, C17, C18)	1.90
11618	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	1.38	11389	Transformer—Second intermediate frequency transformer—(L14, L15, C20, C21, C22, R7)	3.02
11612	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	2.22	11438	Transformer—Power transformer—(T1) volts—10-60 cycles—(T1)	4.85
11615	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	3.80	11585	Transformer—Power transformer—105-125 volts—25-50 cycles	7.00
11613	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	6.00	11584	Transformer—Power transformer—100-130, 140-160, 195-230 volts—40-60 cycles	5.05
11376	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	1.00	11391	Trap—Wave trap—(L11, C1)	1.22
11619	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.70	11237	Volume Control—(R11)	1.20
11396	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.65		REPRODUCER ASSEMBLIES	
5226	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.70	11232	Board—Terminal board assembly	.18
11466	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.70	11231	Board—Yoke and core assembly bolt and nut	.16
11624	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.95	8060	Bracket—Output transformer mounting bracket	.14
11520	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	.22	11257	Clamp—One center suspension clamping nut and screw assembly—Package of 5	.25
11283	Resistor—12,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	1.00	11470	Coil—Field coil—(L16)	2.16
11231	Bolt—Yoke and core assembly bolt and nut	.16	11469	Coil—Neutralizing coil—(L18)	.20
8060	Bracket—Output transformer mounting bracket	.14	11235	Core—Reproducer core—(L17)—Package of 5	3.50
11257	Clamp—One center suspension clamping nut and screw assembly—Package of 5	.25	5118	Core—Reproducer core—(L17)—Package of 5	3.50
11470	Coil—Field coil—(L16)	2.16	5119	Connector—Three contact female connector for reproducer	.25
11469	Coil—Neutralizing coil—(L18)	.20	9631	Reproducer—Complete	6.85
11258	Core—Reproducer core—(L17)—Package of 5	3.50	11253	Transformer—Output transformer—(T2)	1.56
5118	Core—Reproducer core—(L17)—Package of 5	3.50	11230	Washer—Binders board "C" washer—used to hold field coil assembly—Package of 5	.18
5119	Connector—Three contact female connector for reproducer	.25		REPRODUCER ASSEMBLIES	
9631	Reproducer—Complete	6.85	11232	Board—Terminal board assembly	.18
11253	Transformer—Output transformer—(T2)	1.56		Universal Transformer	
11230	Washer—Binders board "C" washer—used to hold field coil assembly—Package of 5	.18			

Wave-Trap Adjustment

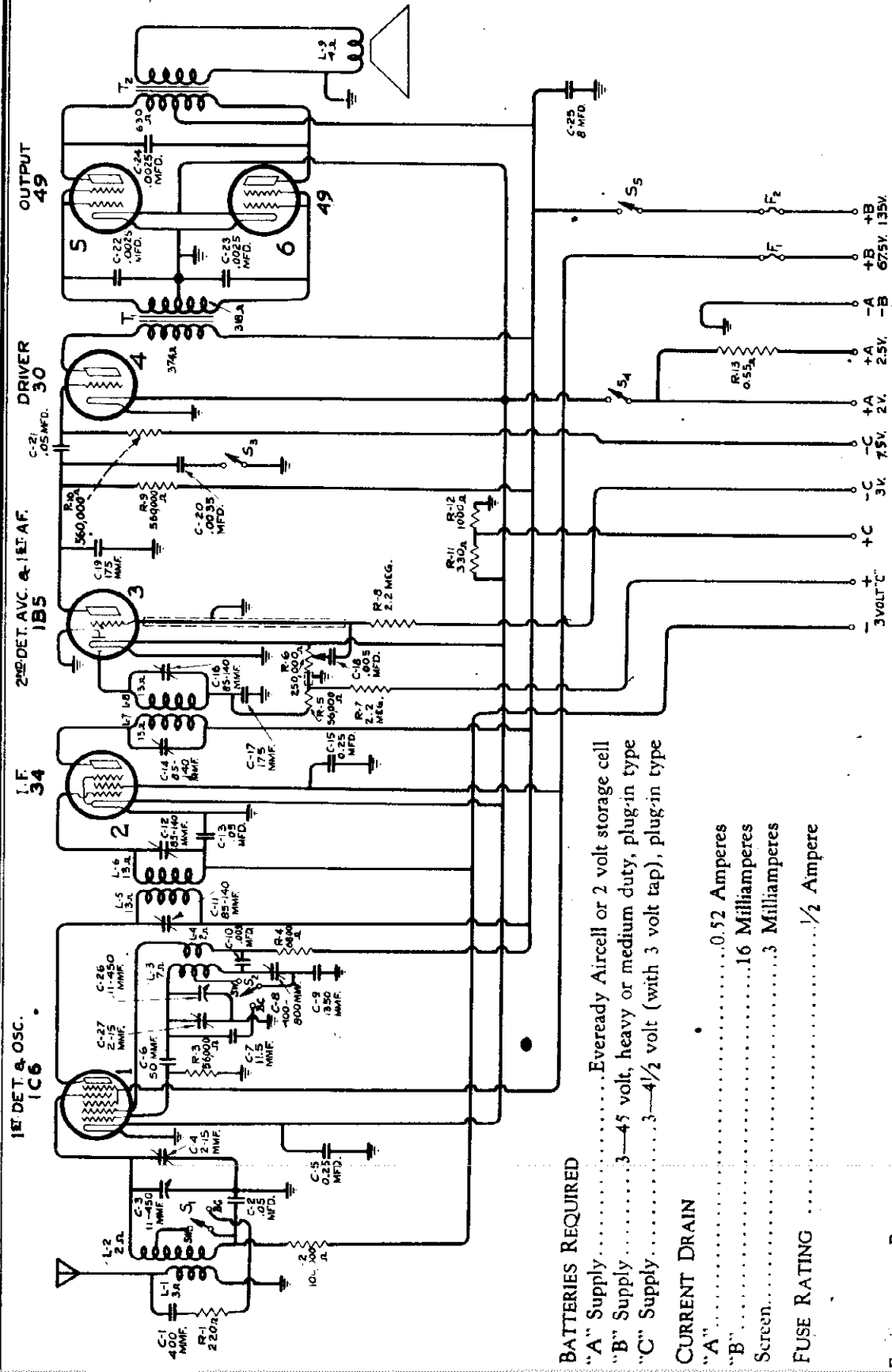
With the receiver in operation using its normal antenna, tune station selector to the point at which the intermediate frequency interference is most intense. Then adjust the wave trap trimmer to the point which causes maximum suppression of the interference.

Universal Transformer

The special transformer used on some receivers of this type is adaptable to several ranges of voltage as given under Rating C of Electrical Specifications. Its schematic and wiring are shown by Figure 6. Terminals are provided at the top of the transformer case for changing the primary connections to suit the voltage available. Note that a 110-volt tap is brought out separately for supplying a phonograph motor.

RCA MFG. CO., INC.

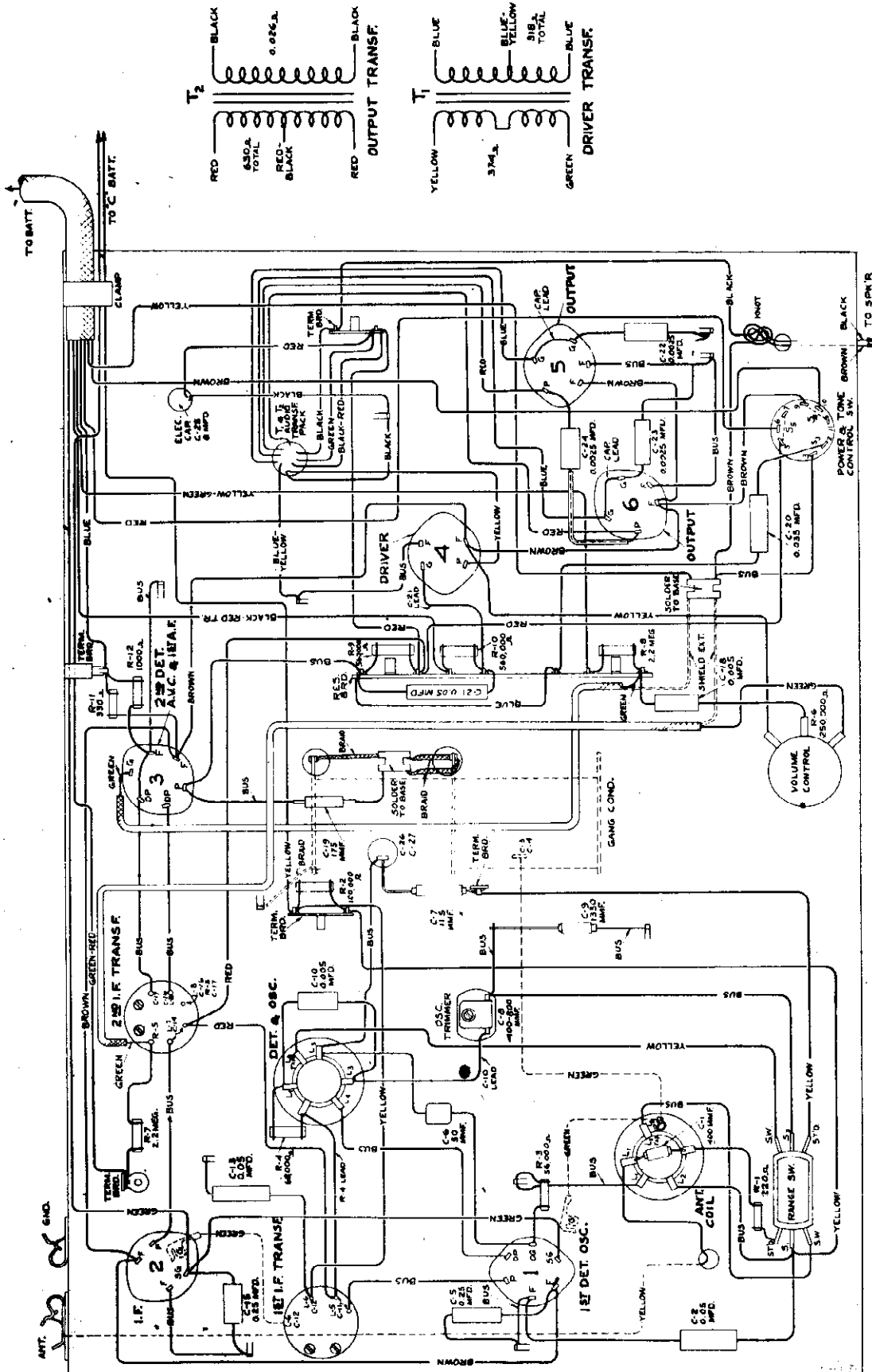
MODELS BT6-3, BC6-4, BT6-1C
Schematic



- BATTERIES REQUIRED**
 "A" Supply Eveready Aircell or 2 volt storage cell
 "B" Supply 3-45 volt, heavy or medium duty, plug-in type
 "C" Supply 3-4 1/2 volt (with 3 volt tap), plug-in type
- CURRENT DRAIN**
 "A" 0.52 Amperes
 "B" 16 Milliampers
 Screen 3 Milliampers
- FUSE RATING** 1/2 Ampere
- FREQUENCY RANGES**
 Broadcast 540-1850 kc.
 Shortwave 1850-6900 kc.
 Intermediate Frequency None required
- ALIGNMENT FREQUENCIES**
 Broadcast 600 kc. (osc.), 1720 kc. (osc. ant.)
 Shortwave None required
- POWER OUTPUT**
 Undistorted 1.2 Watts
 Maximum 2.2 Watts

MODELS BT6-3, BC6-4, BT6-10
Chassis Wiring

RCA MFG. CO., INC.



RCA MFG. CO., INC.

MODELS BT6-3, BC6-4, BT6-10
Circuit & Alignment Data
Socket, Voltage

tively, tuning each to the point producing maximum indicated receiver output.
(d) Shift the oscillator frequency to 600 kc. and tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. The oscillator series trimmer, C-8, should then be adjusted, simultaneously rocking the receiver tuning backward and forward through the signal until maximum receiver output results from the combined operations. The adjustment of C-27 should be repeated as in (c) to correct for any change in its alignment due to the adjustment of C-8.

Radiotron Socket Voltages

Voltage values indicated at the Radiotron socket contacts on Figure 4 form a reference basis for test of the receiver. It is to be noted that all voltages are given in respect to chassis-ground excepting those appearing across the heaters (H-H). The values shown are obtainable when the receiver is in normal operating condition. They do not take into account inaccuracies caused by current consumed in the voltmeter used for the tests. The lower the meter resistance, the lower will be the degree of accuracy. Allowances must therefore be made, dependent upon the type of test instrument used, for the loading effect of the voltmeter on the circuit.

and connect it between the control grid cap of the first detector tube (RCA-106) and chassis-ground. Allow its tuning to remain at 460 kc. Tune the receiver to avoid interference as in (a).
(b) Adjust the trimmers, C-12 and C-11, of the first i-f transformer for maximum (peak) receiver output. This completes the i-f transformer adjustments.

RF Adjustments

(a) Check the calibration of the dial scale by rotating the tuning control until the variable condenser plates are in full mesh. (Maximum capacity) This will carry the dial pointer to its minimum frequency position. Then adjust the dial pointer until it points to the horizontal line at the low frequency end of the broadcast band scale.
(b) Connect the output of test oscillator to the antenna-ground terminals of the receiver. Adjust the receiver range switch to its "Broadcast" position. Tune the oscillator to 1720 kc. Allow the output indicator to remain attached to the receiver output.
(c) Tune the receiver so that the dial reading is 1720 kc. Then adjust the oscillator and antenna coil trimmers, C-27 and C-4 respectively,

which occurs in resistor R-6, due to signal detection, is used for automatic volume control by varying the control grid bias on the first detector and i-f tubes.
Resistance-capacitance coupling is used between the RCA-1B5 and the RCA-30 driver tube. A high-frequency tone control, consisting of a switch in series with a condenser, is shunted across the plate circuit of the RCA-1B5. In the closed position of the switch, the high a-f frequencies are reduced.
The power output stage is arranged for Class "B" operation. The high level of power afforded, is fed to the permanent magnet, dynamic speaker through a step-down transformer.
Battery "On-off" control is by means of a double pole switch, one side of which is in the +A lead, the other side being in the 135 volt, +B lead. Two +A leads are provided in order to permit operation from either a standard 2 volt storage cell or an "Eveready 2.5 volt Aircell". A resistor (R-13) is in series with the +A, 2.5 volt lead to drop the voltage to the proper value. Fuse protection is incorporated in the screen and plate supply leads from the "B" batteries.

Circuit Arrangement

The conventional Superheterodyne circuit is used. The first stage combines the local oscillator and first detector functions in one tube, an RCA-106. Coils of the detector input and oscillator are tuned by a two-section variable condenser and are aligned by a total of three adjustable trimmers. Each coil is tapped so that a portion of it may be shorted by the band switch in order to extend the tuning range to the higher frequencies. The oscillator operates at a fundamental frequency which is at all times above the incoming signal by 460 kc.
An RCA-34 is employed as i-f amplifier. Its input and output are coupled by transformers to the first detector and second detector, respectively. Each transformer has both its secondary and primary windings tuned to 460 kc. by adjustable trimmer capacitors.
The modulated signal as obtained from the output of the i-f system is detected by a diode of the RCA-1B5. Audio developed by such detection in the diode load resistor, R-6, is selected by the variable arm of the volume control (R-6) and passed on to the a-f system for amplification and final reproduction. The d.c.

SERVICE DATA

Alignment Procedure

There are a total of seven trimmer adjustments provided. Four of these are located in the i-f system and the remainder are associated with the antenna and oscillator coils. They are precisely adjusted at the

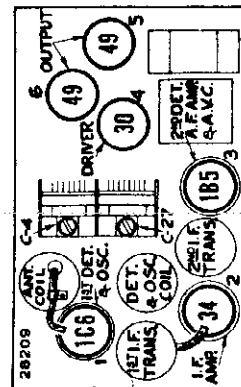
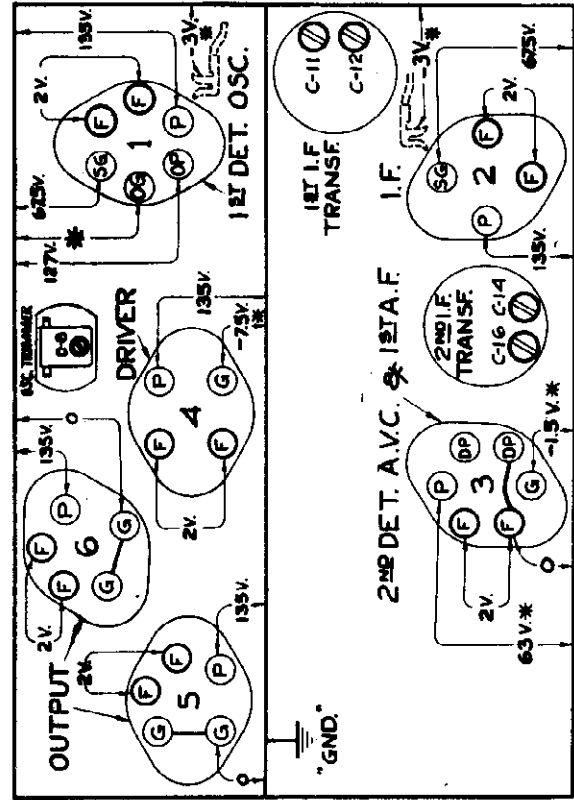


Figure 3—Radiotron and Coil Locations

factory to give the correct performance. Their settings should remain intact indefinitely when the receiver is used under ordinary conditions, however, necessity for readjustment may occasionally occur from continued extremes of climate, tampering, purport alteration for service purposes, or after repairs have been made to the i-f or i-f tuned circuits. Improper alignment usually causes the receiver to be insensitive, non-selective, and sub-normal in respect to tone quality. Such indications will usually exist simultaneously.
In re-adjusting the trimmers to their normal settings, it is quite important to apply a definite procedure



(*) CANNOT BE MEASURED WITH ORDINARY VOLTMETER

Figure 4—Radiotron Socket Voltages and Trimmer Locations Measured at Normal Battery Voltages. No Signal Being Received

MODELS BT6-3, BC6-4, BT6-10
 Battery Connections
 Parts List

RCA MFG. CO., INC.

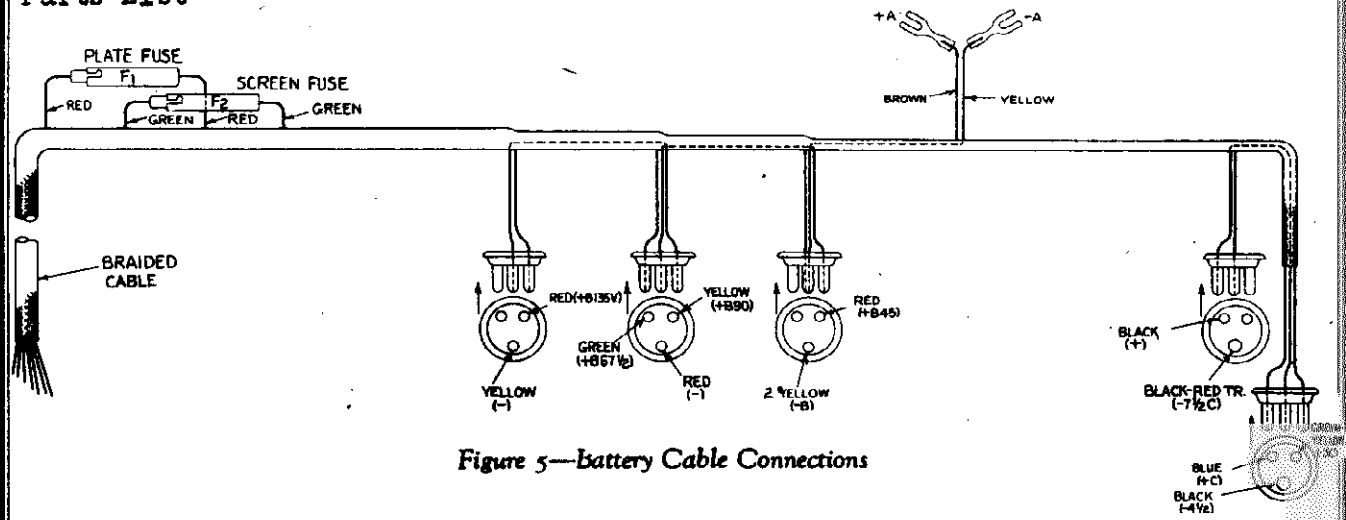


Figure 5—Battery Cable Connections

Stock No.	DESCRIPTION	LIST PRICE	Stock No.	DESCRIPTION	LIST PRICE
RECEIVER ASSEMBLIES					
11465	Capacitor—Adjustable capacitor—(C-8)...	\$0.48	11593	Transformer—Second intermediate frequency transformer—(L7, L8, C14, C16, C17, R5).....	2.75
11450	Capacitor—11.5 MMfd.—(C7).....	.14	11589	Volume Control—(R6).....	.85
11289	Capacitor—50 MMfd.—(C6).....	.26	MISCELLANEOUS ASSEMBLIES		
5116	Capacitor—175 MMfd.—(C19).....	.18	4289	Body—Fuse connector body—Package of 10.....	.35
11171	Capacitor—400 MMfd.—(C1).....	.22	4288	Cap—Fuse connector cap—Package of 10.....	.36
11597	Capacitor—1350 MMfd.—(C9).....	.22	6516	Connector—Fuse connector—complete.....	.16
5107	Capacitor—.0025 Mfd.—(C22, C23, C24).....	.16	11340	Connector—Three contact male connector with three small prongs—for "B" battery connections.....	.24
5005	Capacitor—.0035 Mfd.—(C20).....	.16	11341	Connector—Three contact male connector with two small and one large prong—for "C" battery connection.....	.24
4868	Capacitor—.005 Mfd.—(C10, C18).....	.20	11627	Dial—Station selector dial.....	.32
4836	Capacitor—.05 Mfd.—(C2, C13, C21)...	.30	4286	Ferrule—Fuse connector ferrule and bushing—Package of 10.....	.38
4840	Capacitor—0.25 Mfd.—(C5, C15).....	.30	3748	Fuse—1/2 Ampere fuse—(F1, F2)—Package of 5.....	.40
11595	Capacitor—8 Mfd.—(C25).....	1.04	4290	Insulator—Fuse connector insulator—Package of 10.....	.35
11590	Coil—Antenna coil—(L1, L2).....	1.70	11587	Resistor—0.55 Ohms—Flexible type, complete with terminal (R13).....	.24
11463	Coil—Oscillator coil—(L3, L4).....	1.65	4284	Spring—Fuse connector spring—Package of 10.....	.30
11457	Condenser—Two gang variable tuning condenser—(C3, C4, C26, C27).....	3.46	4285	Washer—Fuse connector insulating washer—Package of 10.....	.22
11467	Indicator—Station selector indicator pointer.....	.10	REPRODUCER ASSEMBLIES (Table Models BT 6-3, BT 6-10)		
11174	Resistor—220 Ohms—Carbon type—1/4 watt—(R1)—Package of 5.....	1.00	9539	Cone—Reproducer cone—(L9)—Package of 5.....	4.30
11296	Resistor—330 Ohms—Carbon type—1/4 watt—(R11)—Package of 5.....	1.00	9540	Magnet Assembly—Comprising cone bracket, core, and magnet.....	5.72
5112	Resistor—1000 Ohms—Carbon type—1/4 watt—(R12)—Package of 5.....	1.00	9538	Reproducer—Complete.....	7.65
11454	Resistor—6800 Ohms—Carbon type—1/4 watt—(R4)—Package of 5.....	1.00	REPRODUCER ASSEMBLIES (Console Model BC 6-4)		
5029	Resistor—56,000 Ohms—Carbon type—1/4 watt—(R3)—Package of 5.....	1.00	9432	Cone—Reproducer cone—complete with voice coil—(L9).....	1.88
3118	Resistor—100,000 Ohms—Carbon type—1/4 watt—(R2)—Package of 5.....	1.00	7820	Magnet—Cone housing and magnet assembly.....	8.98
5035	Resistor—560,000 Ohms—Carbon type—1/4 watt—(R9, R10)—Package of 5.....	1.00	7819	Reproducer—Complete.....	12.18
11626	Resistor—2.2 Megohms—Carbon type—1/4 watt—(R7, R8)—Package of 5.....	1.00			
11464	Shield—Antenna or oscillator coil shield.....	.25			
3682	Shield—First or Second detector Radiotron shield.....	.22			
3056	Shield—Intermediate frequency Radiotron shield—Package of 2.....	.40			
11390	Shield—Intermediate frequency transformer shield.....	.25			
11461	Switch—Range switch—(S1, S2).....	.56			
11588	Switch—Tone control and power switch—(S3, S4, S5).....	.90			
5238	Terminal—Antenna terminal board with clip, insulation strip and rivets.....	.14			
11594	Transformer—Audio driver and output transformer pack—(T1, T2).....	4.10			
11592	Transformer—First intermediate frequency transformer—(L5, L6, C11, C12).....	2.55			

RCA MFG. CO., INC.

MODEL 76-9
Schematic
Socket

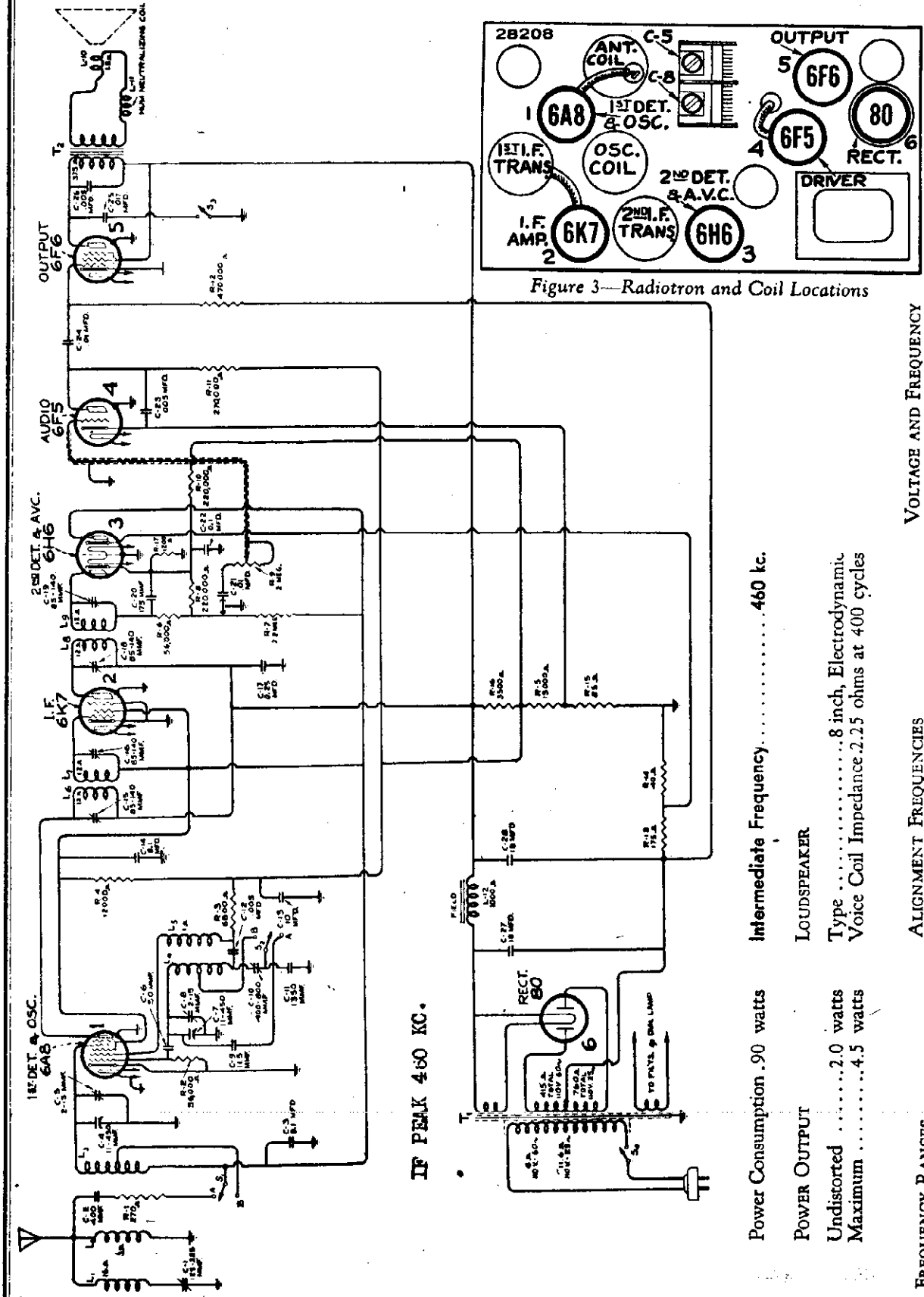


Figure 3—Radiotron and Coil Locations

IF PEAK 460 KC.

Intermediate Frequency.....460 kc.
 Loudspeaker
 Type8 inch, Electrodynamic
 Voice Coil Impedance 2.25 ohms at 400 cycles

VOLTAGE AND FREQUENCY
 Rating A 105-125 volts, 50-60 cycles
 Rating B 105-125 volts, 25-60 cycles
 Rating C 100-130/140-160/195-250 volts, 40-60 cycles

ALIGNMENT FREQUENCIES
 Broadcast Band (A) 600 kc. and 1720 kc.
 Shortwave Band (B) No Adjustments Required

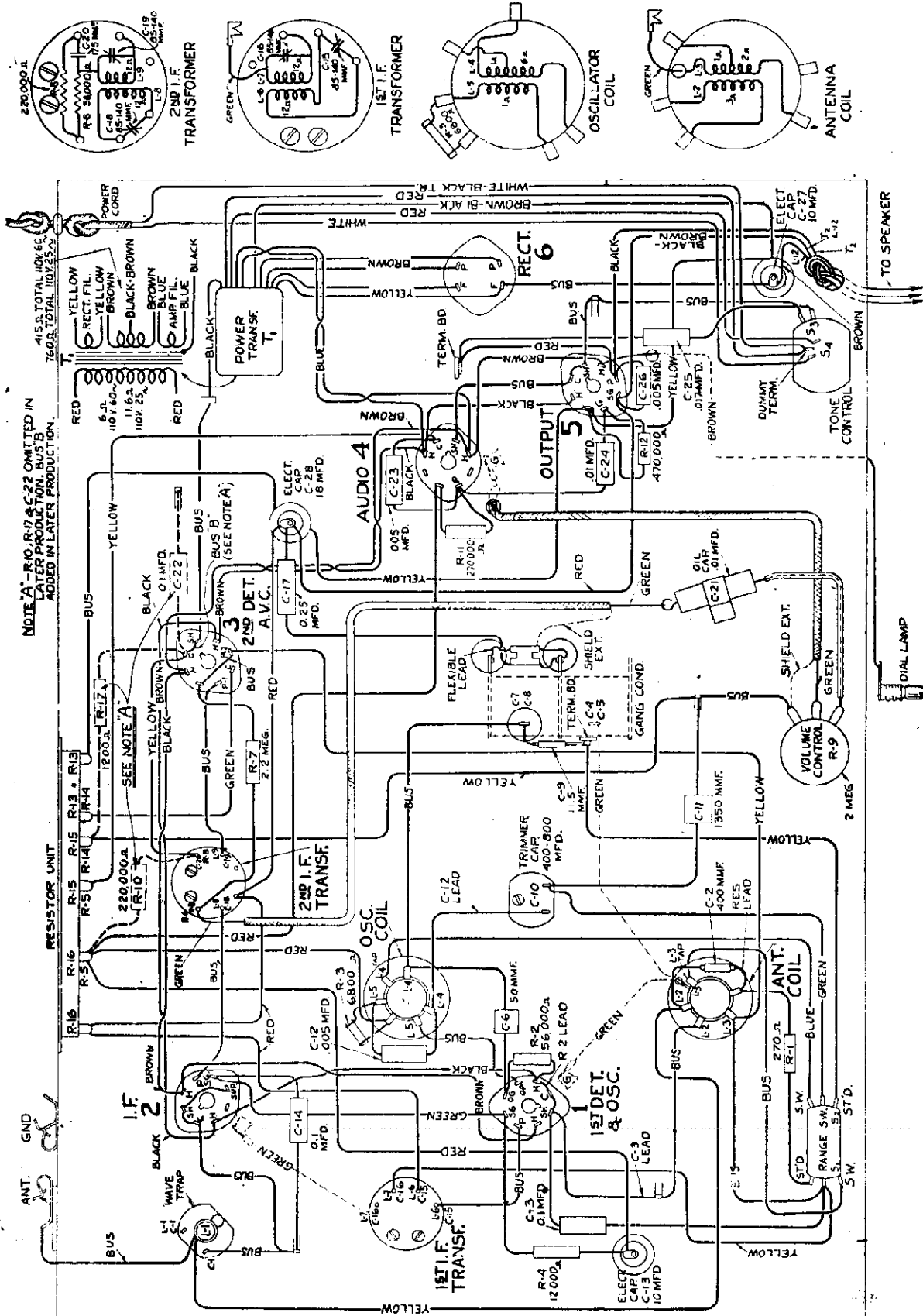
FREQUENCY RANGES
 Broadcast Band (A) 540-1850 kc.
 Shortwave Band (B) 1850-6900 kc.

POWER OUTPUT
 Undistorted 2.0 watts
 Maximum 4.5 watts

POWER CONSUMPTION .90 watts

MODEL T6-9
Chassis Wiring

RCA MFG. CO., INC.



NOTE 'A'-R10, R12, C-22 OMITTED IN LATER PRODUCTION. BUS 'B' ADDED IN LATER PRODUCTION.

Figure 2—Chassis Wiring Diagram

RCA MFG. CO., INC.

The first detector and oscillator functions are accomplished in a single tube, an RCA-6A8. The input of this tube is coupled to the antenna through a tuned transformer. A shunt (series tuned) wave-trap is connected across the primary of this transformer to prevent signals of intermediate frequency (460 kc) from being introduced into the first stage as interference. The two-section gang condenser which tunes the antenna transformer secondary and the heterodyne oscillator coil has adjustable trimmers for use in obtaining exact alignment. Each of these coils is tapped so that the range switch increases the range of tuning by decreasing the amount of inductance.

The intermediate frequency stage is coupled to the RCA-6A8 and to the RCA-6H6 second detector by means of tuned transformers. These transformers are adjusted to resonance at 460 kc. by means of trimmers.

The modulated signal as obtained from the output of the i-f system is detected by the RCA-6H6 double diode tube. Audio frequency secured by this process is passed on 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 R-8, is applied as automatic control grid bias to the first detector and i-f tubes through a suitable resistance filter. The second diode of the RCA-6H6 is used to supply residual bias for the controlled tubes under conditions of little or no signal. This auxiliary diode, under such conditions, draws current which flows through resistors R-7, R-8 and R-10, 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. The cathode and anode of the signal-a.v.c. diode have positive potential in respect to chassis-ground and cathodes of the a.v.c.-controlled tubes when no signal is being received.

Manual volume control is by means of an acoustically tapered potentiometer connected as a variable coupling element between the output of the second detector and the first audio control grid. After amplification by the RCA-6F5, the audio signal is transmitted by resistance-capacitance coupling to the input of the RCA-6F6 power output stage which in turn is transformer-coupled to the dynamic speaker. High-frequency tone control is provided by means of a shunt capacitor across the plate circuit of the output tube, which may be cut in or out of the circuit with a control switch (S3).

The power supply system consists of a RCA-80 rectifier tube which is supplied from an efficiently designed power transformer and which works into a suitable filter. The various potentials required for the plate, screen, control grid, and cathode circuits are obtained from the output of the filter on a resistance-divider system. The electrodynamic loudspeaker field coil is used as a filter reactor.

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation when 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 R-3, L-2, C-1, etc., are provided for reference between the illustrations and the

Replacement Parts List. The coils, reactors, and transformer windings are rated in terms of their d-c resistances only, and when the resistance is less than one ohm, no rating is given.

Alignment Procedure

There are three alignment trimmers provided in the antenna transformer and oscillator coil tuned circuits and four are used in the i-f system. All of these have been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions of climate or have been altered for service purposes. 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. These instruments are illustrated and described on a separate page of this book.

An oscillator (signal generator), such as the RCA Stock No. 9595, is required as a source of the specified alignment frequencies. Visual indication of receive output during the adjustment is necessary and should be accomplished by the use of an indicator such as the RCA Victor Stock No. 4317 Neon Output Indicator.

The following method of procedure should be followed in adjusting the various trimmer capacitors:

I-F Trimmer Adjustment

The four trimmers of the two i-f transformers are located as shown by Figure 4. Each trimmer must be aligned to a basic frequency of 460 kc. To do this, attach the output indicator across the voice coil or across the output transformer primary. Connect the output of the test oscillator between the control grid of the RCA-6A8 and chassis-ground. 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 either from local broadcast stations or from the heterodyne oscillator. Increase the output of the test oscillator until a slight indication is present on the output indicator. Then, adjust the two trimmers of the second i-f transformer to produce maximum (peak) indicated receiver output. Then, adjust the two trimmers of the first i-f transformer for maximum (peak) receive output as shown by the indicating device. During the 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. will be avoided. It is advisable to repeat the adjustment of all i-f trimmers to assure that the interaction between them has not disturbed the original adjustment.

Simultaneously rocking the tuning control backward and forward through the signal until maximum receiver output results from these combined operations. The adjustment at 1720 kc. should then be repeated to correct for any change which may have been caused by the oscillator series trimmer adjustment.

MODEL T6-9
Alignment, Part 2
Voltage, Parts
Speaker & Transformer Data

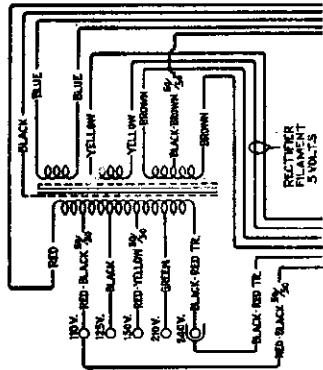


Figure 6—Universal Transformer

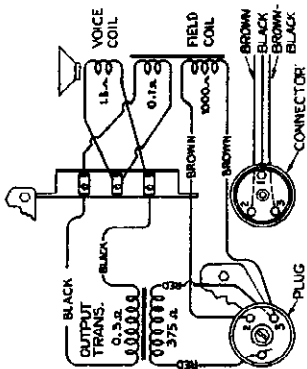


Figure 5—Loudspeaker Wiring

T6-9 REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	Description	Last Price	Stock No.	Description	Last Price
11468	Bracket—Dual mounting bracket	\$0.14	11626	Resistor—2.2 Megohms—Carbon type—1/4 watt (R7)	1.00
11467	Capacitor—Adjustable capacitor—(C10)	.48	11464	Shield—Antenna or oscillator coil shield	.25
11470	Capacitor—11.5 Mmfd (C5)	.14	11390	Shield—Intermediate frequency transformer	.25
11289	Capacitor—40 Mmfd (C6)	.26	11383	Shield—Radiotron shield	.25
4297	Capacitor—400 Mmfd (C3)	.26	4461	Switch—Range switch (S1, S3)	.56
4868	Capacitor—1500 Mmfd (C11)	.26	7238	Terminal—Antenna terminal board assembly	.14
4869	Capacitor—2000 Mmfd (C12, C13, C18)	.26	11460	Tone Co. slip—Tone control and power switch (S3, S4)	.95
4624	Capacitor—0.01 Mfd (C2)	.18	11388	Transformer—First intermediate frequency transformer (L6, L7, C15, C16)	1.90
11414	Capacitor—0.017 Mfd (C3)	.20	11389	Transformer—Second intermediate frequency transformer (L8, L9, C18, C19, C20, R6, R8)	3.02
4841	Capacitor—0.1 Mfd (C14)	.22	11498	Transformer—Power transformer—105:115 volts—25-50 cycles	4.87
11770	Capacitor—0.25 Mfd (C17)	.25	11785	Transformer—Power transformer—105:115 volts—25-50 cycles	7.00
11370	Capacitor—10 Mfd (C13)	.86	11784	Transformer—Power transformer—100:150:140:160/195-230 volts—40-60 cycles	5.07
11371	Capacitor—10 Mfd (C13)	.86	11391	Trap—Wave trap (L1, C1)	1.22
11452	Coil—Antenna coil (A2, L1)	1.85	11479	Volume Control (R5)	.85
11463	Coil—Oscillator coil (L4, L5)	1.85		REPRODUCER ASSEMBLIES	
11457	Condenser—Two-range variable tuning condenser—complete with mounting bushing assembly (C4, C1, C7, C8)	3.46	11332	Board—Terminal board assembly with two lead wires	.18
11583	Dial—Dial scale	.40	11231	Bolt—Yoke and core assembly bolt and nut	.16
11776	Indicator—Station selector indicator pointer	.10	8060	Bracket—Output transformer mounting bracket	.14
11466	Indicator—Volume indicator pointer	.70	11237	Clamp—Cone center suspension clamping nut and screw assembly—Package of 5	.25
6135	Resistor—270 Ohms—Carbon type—1/4 watt (R1)	1.00	11470	Coil—Field coil (L12)	2.16
11283	Resistor—1200 Ohms—Carbon type—1/4 watt (R3)	1.00	11465	Coil—Reproducer cone (L11)	2.20
11454	Resistor—1200 Ohms—Carbon type—1/4 watt (R3)	1.00	11251	Coil—Reproducer cone (L10)	3.70
3066	Resistor—16,000 Ohms—Carbon type—1/4 watt (R2)	1.00	5118	Connector—Three-contact male connector for reproducer	.25
4029	Resistor—270,000 Ohms—Carbon type—1/4 watt (R10)	1.00	5119	Connector—Three-contact female connector for reproducer cable	.25
11455	Resistor—270,000 Ohms—Carbon type—1/4 watt (R10)	1.00	9521	Transformer—Output transformer (T2)	6.87
11472	Resistor—1/10 watt (R11)	.75	11373	Washer—Output board G-washer—Used to hold field coil assembly—Package of 7	1.96
5198	Resistor—250,000 Ohms—Carbon type—1/4 watt (R10*)	1.00	11230		

*C-22, R-10 and R-17 used in some models

Radiotron Socket Voltages

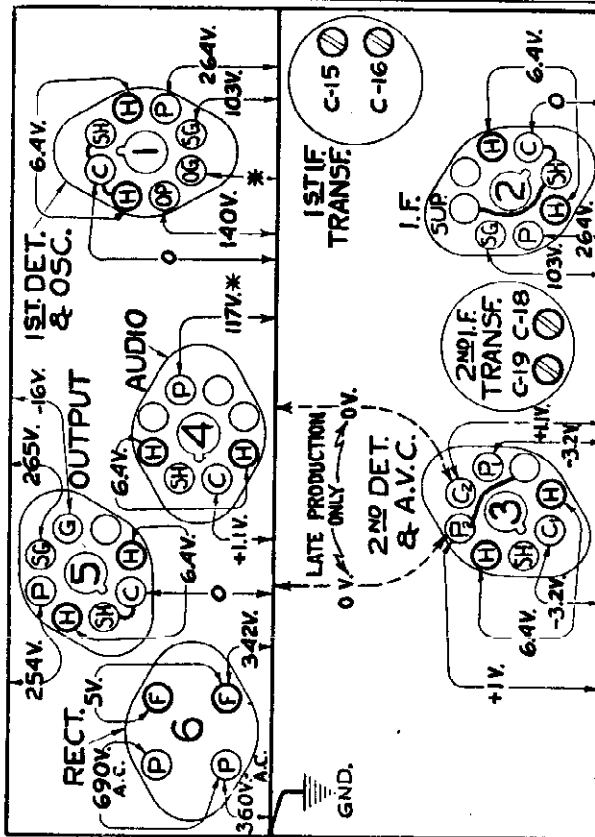
Voltage values indicated at the Radiotron socket contacts on Figure 4 form a reference basis for test of the receiver. It is to be noted that all voltages are given with respect to chassis-ground, excepting those appearing across the heaters (H-H). The values shown are obtainable when the receiver is in normal operating condition with all tubes intact. They do not take into account inaccuracies caused by the resistance of the voltmeter used for the tests, the lower the voltmeter resistance, the lower the degree of accuracy. Allowance must, therefore, be made, dependent upon the type of test instrument used, for the loading effect of the voltmeter on the circuit.

Wave-Trap Adjustment

With the receiver in operation using its normal antenna, tune station selector to the point at which the intermediate frequency interference is most intense. Then adjust the wave trap trimmer to the point which causes maximum suppression of the interference.

R-F Trimmer Adjustment

Calibrate the tuning dial by setting pointer to horizontal line at low frequency end of broadcast band scale while variable condenser is at maximum capacity. The output indicator should be left connected to the output system. Attach the output of the test oscillator between the antenna and ground terminals of the receiver input. Adjust the oscillator to 1720 kc. and set the receiver tuning control to a dial reading of 1720 kc. Leave the volume control of the receiver at its maximum position. Make sure that the range selector is at its broadcast position. Regulate the output of the test oscillator until a slight indication is perceptible at the receiver output. Then adjust the two trimmers of the oscillator and antenna transformer coils (mounted on the variable condenser) so that each produces maximum (peak) receiver output. After this maximum has been accurately obtained, shift the test oscillator to 600 kc. Tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then adjust the receiver oscillator series trimmer, simult-



(*) CANNOT BE MEASURED WITH ORDINARY VOLTMETER

Figure 4—Radiotron Socket Voltages
Measured at 115 volts, 60 cycle supply—No signal being received

MODELS BT7-8, EC7-9
Chassis Wiring

RCA MFG. CO., INC.

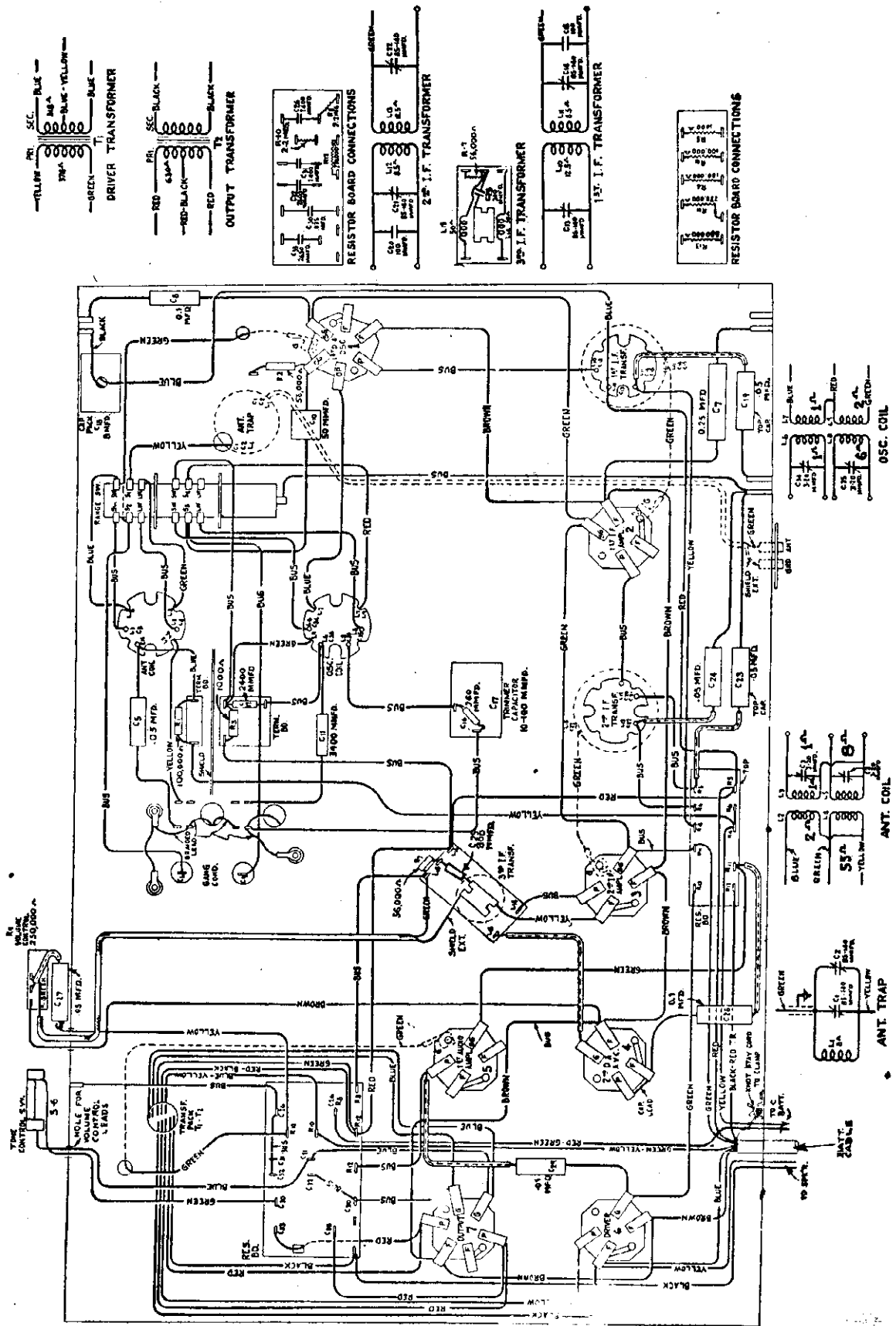


Figure 2—Chassis Wiring Diagram

MODELS BT7-8, BC7-9
Parts, Circuit Data
Alignment Data

RCA MFG. CO., INC.

BT 7-8 and BC 7-9
REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price	Stock No.	Description	List Price
4427	Bracket—Volume control or tone control mounting bracket.	30 18	4738	Supply transformer (L11, L13, C20, C21, C22)	\$2.35
4244	Cap—Grid contact cap—Package of 5.	20		Transformer—Third intermediate frequency transformer (L14, L15, R7, C45)	2 15
3861	Capacitor—Adjustable capacitor (C17)	78		DRIVE ASSEMBLIES	
11289	Capacitor—50 MMfd. (C10)	26	10194	Bull-Stop—Ball—Package of 20	.50
3794	Capacitor—100 MMfd. (C17, C20)	30	4422	Key—Comprising shaft, ball, ring, spring and washer—Assembled.	1 00
3981	Capacitor—300 MMfd. (C1)	32		Dial—Station selector dial.	.72
4601	Capacitor—2400 MMfd. (C12, C31, C32)	50	11342	Driver—Variable tuning condenser drive assembly—Complete	2 42
3749	Capacitor—1400 MMfd. (C16)	35	4786	Indicator—Station selector indicator pointer—No. 632 Mfg. set screw for variable condenser drive assembly—Package of 10	.25
4719	Capacitor—2610 MMfd. (C33)	35		REPRODUCER ASSEMBLIES	
4439	Capacitor—3400 MMfd. (C31)	18		(TABLE MODEL—BT 7-8)	
5196	Capacitor—0.035 Mfd. (C30)	15	9539	Cone—Reproducer cone—Package of 5—(L16)	4 10
4818	Capacitor—0.01 Mfd. (C29)	15	9540	Magnet assembly—Comprising cone bracket, cone and magnet.	5 72
4713	Capacitor—0.05 Mfd. (C7, C19, C21, C24)	30	9518	Reproducer—Complete—(L16)	7 65
4846	Capacitor—0.1 Mfd. (C8, C23)	22		REPRODUCER ASSEMBLIES	
4840	Capacitor—0.25 Mfd. (C7)	30		(CONSOLE MODEL—BC 7-9)	
11344	Coil—Antenna coil (L2, L3, L4, L5, C3, C4)	0 00	9412	Cone—Cone housing and magnet assembly—Complete—(L16)	1 88
4410	Coil—Antenna coil (L2, L3, L4, L5, C3, C4)	1 92	7820	Magnet—Cone housing and magnet assembly—Complete—(L16)	8 98
4432	Coil—Oscillator coil (L6, L7, L8, L9, C34, C35)	1 65	7819	Reproducer—Complete—(L16)	12 18
4739	Coil and shield assembly—Antenna trap	2 05		MISCELLANEOUS ASSEMBLIES	
4504	Condenser—Two gang variable tuning condenser (C6, C9)	2 78		Cable—Main battery cable, complete with three stock #11140 connectors, two stock #11141 connectors, two stock #2616 fuse connectors, two stock #3748 fuses—except, less one stock #11339 switch.	3 55
11318	Volume control—(R9)	1 00	6516	Connectors—Five connector—Contact with three small prongs—for "B" battery control	.16
5112	Resistor—1000 Ohms—Carbon type—1/4 Watt—(R1, R2, R3, R4, R5)	1 00	11340	Connector—3 contact male connector with three small prongs—for "B" battery control	.24
5029	Resistor—36,000 Ohms—Carbon type—1/4 Watt—(R1)	1 00	11341	Connector—1 contact male connector with two small and one large prong for "C" battery connections.	.24
3118	Resistor—100,000 Ohms—Carbon type—1/4 Watt—(R1, R4, R6)	1 00	11337	Eucuchon—Station selector switch	.70
11323	Resistor—370,000 Ohms—Carbon type—1/4 Watt—(R11, R12)	1 00	6176	Eucuchon—Off-on operating switch with eucuchon—Package of 5	50
5035	Resistor—500,000 Ohms—Carbon type—1/4 Watt—(R13)	1 00	3748	Fuse—Time delay—Package of 5	30
11151	Resistor—7.5 Megohms—Carbon type—1/4 Watt—(R10)	1 00	6441	Knob—Station selector dial glass	30
4421	Shield—A—Oscillator intermediate frequency coil shield	42	3088	Knob—Operating switch knob and screw—Package of 5	50
3942	Shield—First detector, oscillator Radiotron shield	18	4449	Knob—Station selector volume control, one or range switch knob—Package of 5	60
7487	Shield—Second detector Radiotron shield	25	4644	Resistor—35 Ohms—Flexible type—1/4 Watt—No. 633 3/4	80
3096	Shield—First or second intermediate frequency or first audio Radiotron shield—Package of 5	40	4678	Ring—Dial glass retaining ring—Package of 5	34
4732	Socket—Contact—first audio Radiotron socket	28	3218	Screw—No. 6-40 1/2" Knurled head screw for knob, stock #308—Package of 10	25
6980	Socket—Contact intermediate frequency, second detector or driver Radiotron socket	20	4945	Screw—Chassis mounting screw assembly—Consult Model	50
4232	Socket—6-contact first detector, oscillator Radiotron socket	31	4446	Screw—Chassis mounting screw assembly—No. 633 3/4	28
4531	Socket—8-contact Radiotron socket	30	4613	Station selector volume control, one contact switch, or range switch knob—Package of 10	25
11319	Switch—Operating switch—less knob (stock #308) and eucuchon (stock #616) (S1, S7)	80			
4437	Switch—Range switch (S1, S2, S3, S4)	2 35			
4733	Transformer—Audio transformer pack comprising driver and output transformer	3 98			
4431	Transformer—First intermediate frequency transformer—(L10, L11, C13, C14, C15)	2 28			
7840	Transformer—Second intermediate frequency transformer—(L12, L13, C20, C21, C22)	2 28			

Total "A" Battery Current..... 0.68 Amperes
Maximum "B" Battery Current..... 21 M. A.
Tuning Ranges..... 140-1720 kc. and 1400-18000 kc.
Maximum Undistorted Output..... 1.2 Watts
Maximum Output..... 2.2 Watts
Line-up Frequencies..... 460 kc., 600 kc., 1720 kc., and 18000 kc.

DESCRIPTION OF ELECTRICAL CIRCUIT

The circuit is of the superheterodyne type and consists of a combined oscillator-detector stage, two i-f amplifying stages, a combined, second detector and automatic volume control, a two-stage audio amplifier and a Class "B" output stage. A two-pole operating switch opens the "A" and "B" battery leads when the switch is turned to the "off" position.

The signal enters the receiver through a shielded antenna lead and is applied through the antenna transformer to the grid circuit of the first detector which also serves as the local oscillator for producing a signal, 460 kc. higher in frequency than the incoming signal. The combined signals after passing through the first detector produce the i-f signal.

The volume control selects the desired amount of audio signal from the drop across R-9 and applies it to the grid circuit of the first audio stage, RCA-32. The output of the first audio stage is resistance coupled to the grid circuit of the RCA-30 driver stage, which is transformer coupled to the Class "B" output stage. The output stage utilizes the twin amplifier Radiotron RCA-19, which has two separate sets of elements and eliminates the necessity of having two

SERVICE DATA

ALIGNMENT PROCEDURE

To properly align this receiver, it is essential that a modulated R. F. oscillator of variable frequency range such as Stock No. 9595, an output indicator, Stock No. 4317, and an alignment tool, Stock No. 4160, be available. Figure 4 shows the location of the various line-up capacitors.

I-F Tuning Adjustments

The i-f amplifier comprises two stages including three transformers. The third transformer is untuned so that only a total of four circuits are to be adjusted. Refer to Figure 4 and proceed as follows:

- Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.
- Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output indicator across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight glow is obtained in the output indicator.
- Adjust the secondary and primary of the second and then the first i-f transformers until a maximum deflection is obtained. The third transformer is untuned and does not require adjusting. Keep the oscillator output at a low value so that only a slight glow is obtained in the output indicator at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the i-f alignment.
- Connect Test Oscillator to antenna-ground terminals. Adjust wave trap trimmer, C-1, to give minimum receiver output.

R-F and Oscillator Adjustments

The important points to remember are the need for using the minimum oscillator output to obtain an ind-

MODELS BT7-8, BC7-9

Alignment, Part 2

Voltage, Trimmers

RCA MFG. CO., INC.

cation in the output device with the volume control at its maximum position and the manner of obtaining the proper high-frequency oscillator and detector adjustments.

The r-f line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 kc. series capacitor, which is accessible from the top of the chassis. Proceed as follows:

- (a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the dial pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 540.
- (b) Then set the receiver band switch to its broadcast position, the Test Oscillator at 1720 kc., and the dial pointer at 1720. Adjust the oscillator output so that a slight glow will be obtained in the output indicator when the volume control is at its maximum position. Adjust the two trimmers, C-35 and C-4, under the two r-f coils, see Figure 4, until a maximum output is obtained. Then shift the Test Oscillator frequency to 600 kc. The trimmer capacitor, C-17, accessible from the top of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1720 kc. adjustment.
- (c) Change the receiver range switch to its high frequency (short wave) position and tune the Station Selector to a dial reading of 18,000 kc. Adjust the Test Oscillator to this same fre-

quency and regulate its output to give a slight indication on the output meter. Then adjust trimmer C-34 to the point giving maximum receiver output. Two points may be found on the trimmer, C-34, which give this maximum. The one of least capacitance is correct and should be used. To assure that this point has been used, tune the receiver to a dial setting of 17,080 kc. and increase the output of the Test Oscillator. The "image" of the 18,000 kc. signal will be received, if the adjustment of C-34 has been properly made. *No adjustments are to be made during the "image" check.*

Return the receiver tuning to 18,000 kc., re-adjust C-34 if necessary, and then tune the antenna trimmer, C-3, simultaneously rocking the tuning control backward and forward through the signal, until maximum output is obtained. Two positions of the trimmer may be found which give this condition—the one of maximum capacitance is correct.

Radiotron Socket Voltages

Voltage and current values indicated at the Radiotron socket contacts on Figure 4 form a reference basis for test of the receiver. It is to be noted that all voltages are given with respect to chassis-ground, excepting those appearing across the filaments (F-F). The values shown are obtainable when the receiver is in normal operating condition. They do not take into account inaccuracies caused by current consumed in the voltmeter used for the tests; the lower the voltmeter resistance, the lower the degree of accuracy.

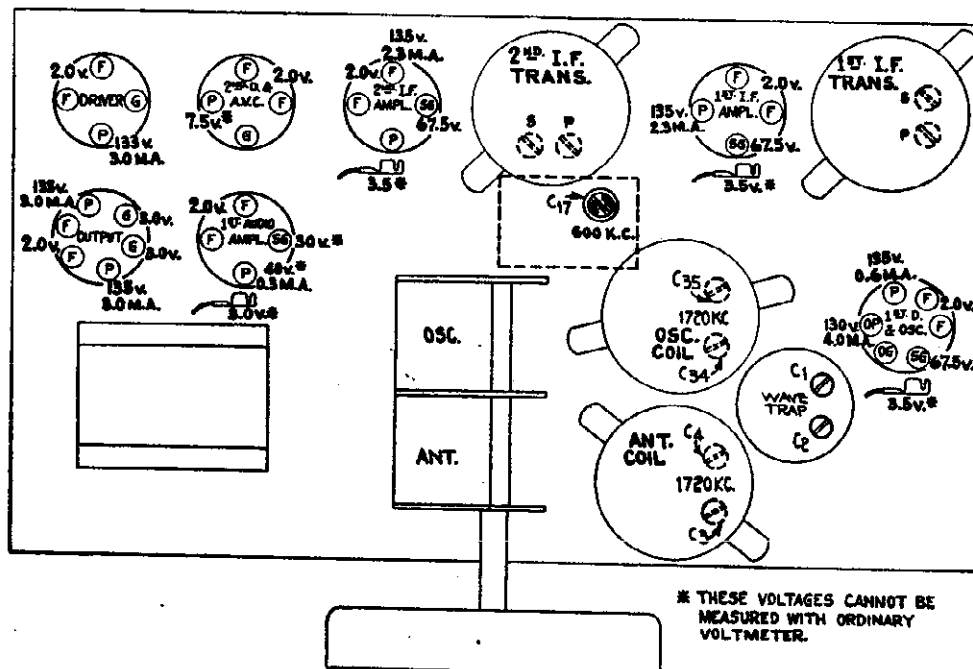
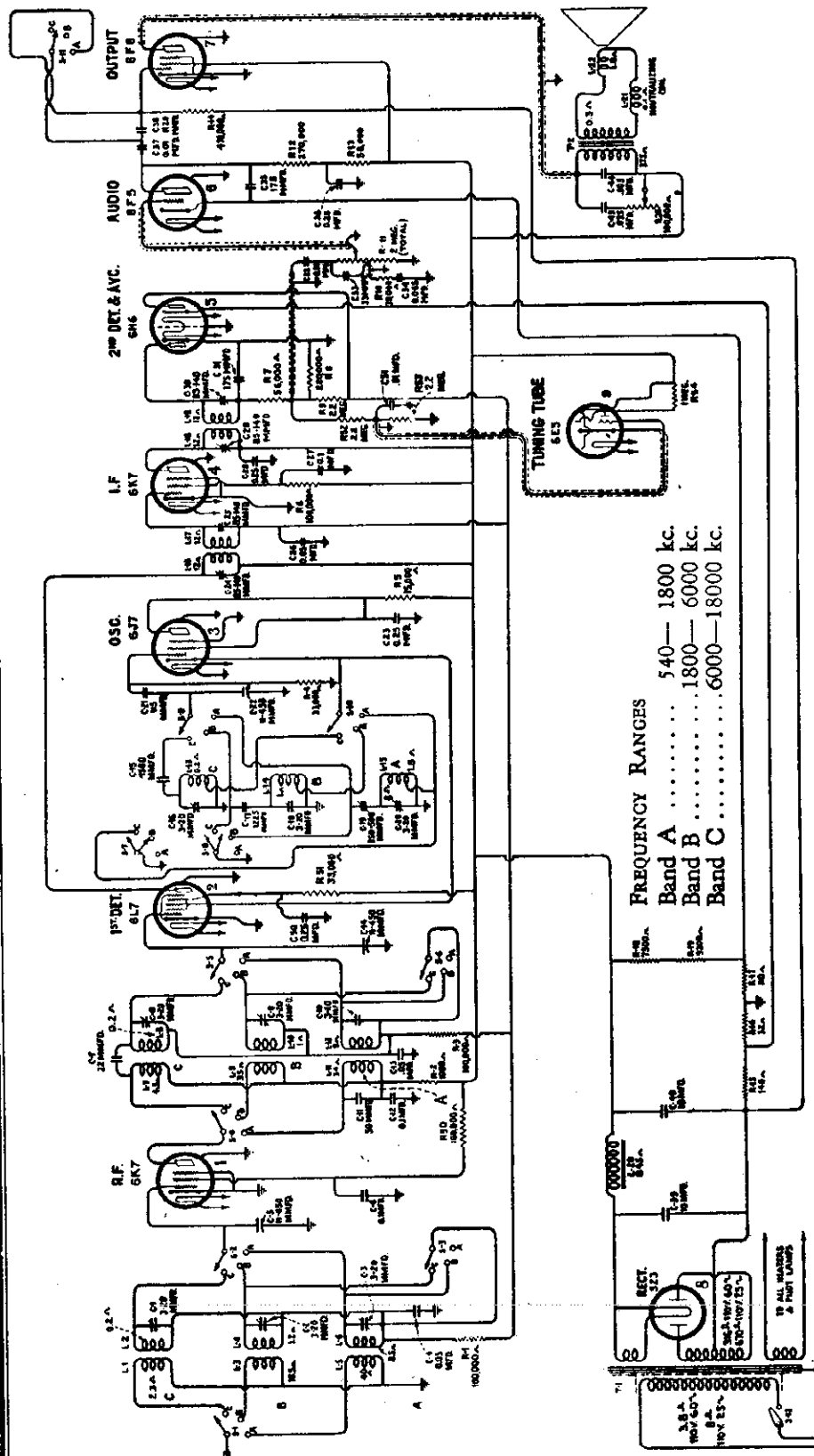


Figure 4—Line-Up Capacitor Locations and Voltage Values at Socket Contacts

Volume Control at Maximum—No Signal—135 Volt "B" Battery—
4.5 and 7.5-Volt Bias Batteries

RCA MFG. CO., INC.

MODEL C9-4
Schematic
Speaker Data



FREQUENCY RANGES

Band A	540—1800 kc.
Band B	1800—6000 kc.
Band C	6000—18000 kc.

Power Consumption	105 watts
Undistorted Output	.2 watts
Maximum Output	4½ watts
Loudspeaker	12 inch, Electrodynamic
Voice Coil Impedance	2¼ ohms at 400 cycles
Intermediate Frequency	460 kc.
ALIGNMENT FREQUENCIES	
Band A	600 kc. (osc), 1720 kc. (osc, ant, det)
Band B	6132 kc. (osc, ant, det)
Band C	18000 kc. (osc, ant, det)

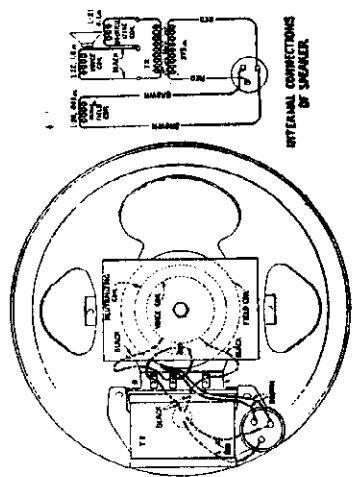
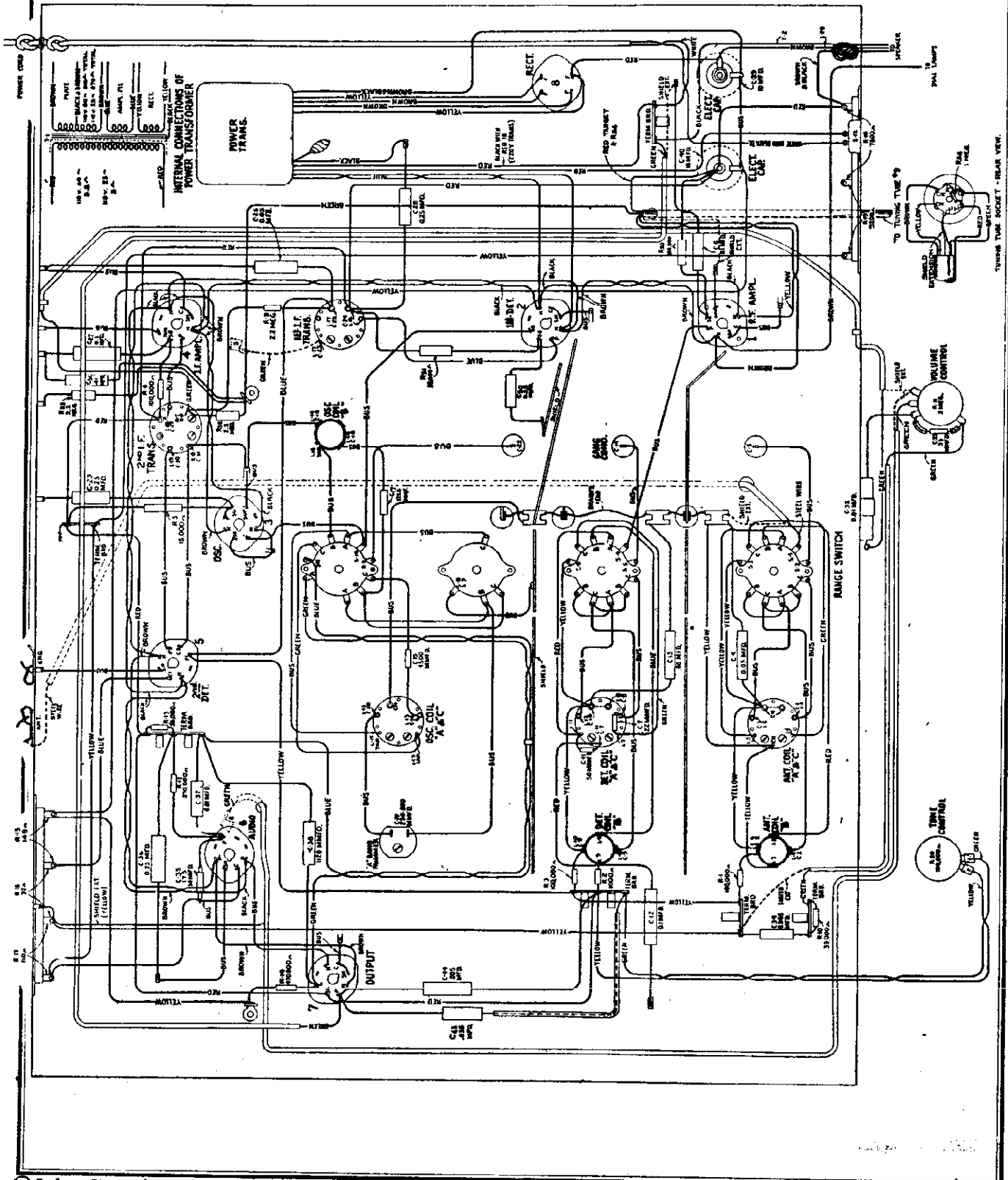


Figure 3—Loudspeaker Wiring

MODEL C9-1
Chassis Wiring

RCA MFG. CO., INC.



RCA MFG. CO., INC.

MODEL C9-4
 Trimmers, Socket
 Alignment Connections

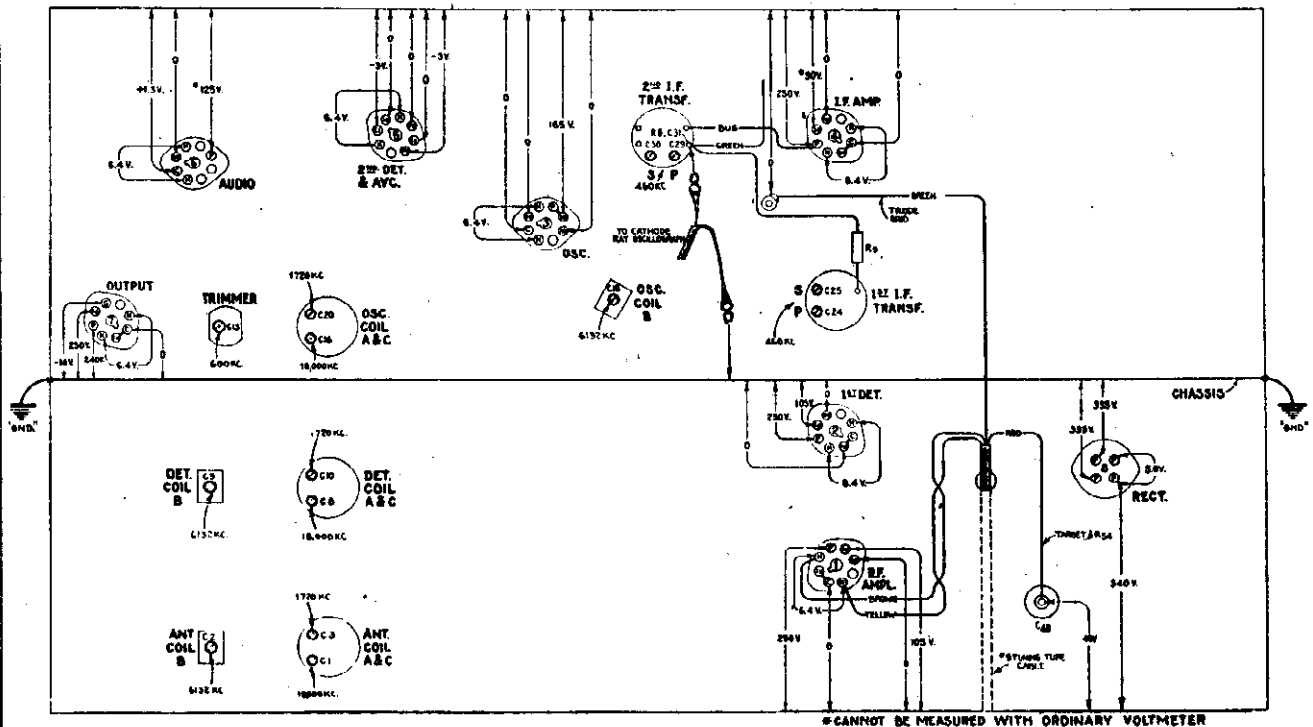


Figure 6—Trimmer Locations and Radiotron Socket Voltages
 Measured at 115 volts A.C.—No Signal—Volume Control Maximum

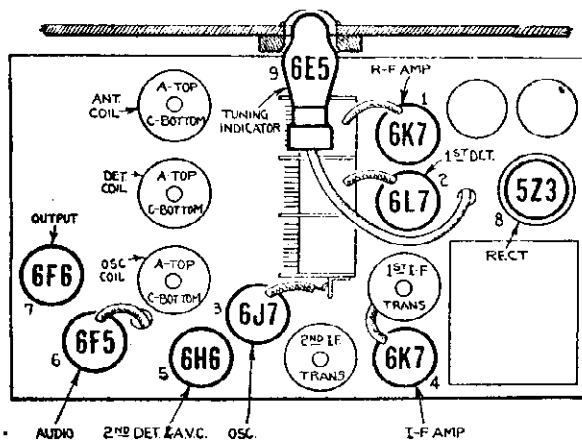


Figure 4—Coil and Radiotron Locations

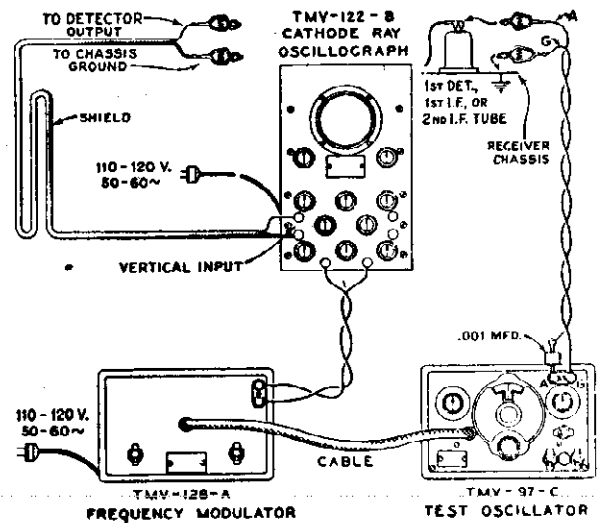


Figure 5—Alignment Apparatus Connections

MODEL C9-4
Alignment

RCA MFG. CO., INC.

(1) CATHODE-RAY ALIGNMENT

A standard source of the specified alignment frequencies is required. Such a source should consist of an RCA Full Range Oscillator, Stock No. 9597. Output indication should be by means of an RCA Stock No. 9545 Cathode-Ray Oscilloscope. An RCA Stock No. 9558 Frequency Modulator will be needed to sweep the generated signal and synchronize it with the Oscilloscope in order to make possible the visual representation of the resonant characteristic of the circuit being tuned on the cathode-ray fluorescent screen.

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. The last transformer must be aligned first and the first transformer aligned secondly. For such a process, it is necessary to feed the output of the Full Range Oscillator to the stages in their order of alignment, adjusting the trimmers of each transformer and observing the effect at the second detector output on the Cathode-Ray Oscilloscope. The proper point of connection of the Oscilloscope is with the vertical "high" input terminal attached to the junction of R-7, K-8 and R-9 as illustrated in Figure 6. The "Ext. Sync." or ground terminal to the chassis with the "0" or ground terminal to the chassis should be connected to the Frequency Modulator as shown by Figure 5. A .001 mfd. capacitor installed in series with the Oscillator "Ant." lead will prevent the voltages of the stage under alignment from becoming upset. The vertical "A" amplifier should be "On" for the ensuing adjustments and the gain control kept at its maximum position. For each adjustment, the Oscillator output need be regulated so that the image obtained on the Oscilloscope screen will be of sufficient size as to be accurately observable. Proceed further as follows:—

- (a) Place the receiver, Oscilloscope and test Oscillator in operation. Set the receiver range switch to Band "A" and tune the station selector to a point where no interference will be picked up, shorting the antenna and ground terminals "B" amplifier to "Timing" and control its gain so that the luminous spot sweeps a straight line trace completely across the screen. Place the tuning control to "Int." Adjust the intensity and focusing controls of the Oscilloscope to produce the correct size and strength of the spot.
- (b) Attach the output of the test Oscillator between the control grid cap of the RCA-6K7 i-f tube and chassis ground as shown typically by Figure 5. Tune the Oscillator to 460 kc. and set its modulation switch to "On." Regulate its output until the signal produces a wave pattern on the Oscilloscope screen, adjusting the Oscilloscope controls to give the desired number of cycles. Cause the image to stand still on the screen by manipulation of the frequency and synchronizing controls. Then carefully tune the two trimmers C-29 and C-30 of the second i-f transformer to produce maximum amplitude (vertical deflection) of the oscillographic image. Under this condition the transformer will be

sharply resonated to 460 kc.

- (c) The Frequency Modulator should then be placed in operation and inter-connected with the Full Range Oscillator by means of the special shielded patch cord. Figure 3 shows the proper arrangement. Set the Frequency Modulator sweep range switch to its "Lo" position and turn the Oscillator modulation switch to "Off." Change the timing control of the Oscilloscope to "Ext." and place the range switch to its No. 2 position. Then carefully vary the tuning of the Oscillator so as to increase its frequency until two distinct and similar waves appear on the Oscilloscope screen and become exactly coincident at their highest points. These curves will be found to occur at an Oscillator setting of approximately 540 kc. They will be identical in shape but appearing in reversed positions. Adjust the frequency control of the Oscilloscope in order to cause the waves to conform with the above requirements and to make them remain non-overlapping on the screen. This will require a setting of approximately 1/2 clockwise rotation of the frequency control. The trimmers C-19 and C-30 should then be readjusted so that the two curves move together and become exactly coincident throughout their lengths, maintaining the maximum amplitude at which this condition can be brought about.

- (d) Leaving the equipment connected and adjusted as in (c), change the Oscillator output to the control grid cap of the RCA-6L7 first detector tube. Then adjust the first i-f transformer trimmers C-24 and C-25 so that the forward and reverse waves appearing on the Oscilloscope coincide throughout their lengths and have maximum amplitude. The shape of the composite wave obtained from this operation is a true representation of the overall tuning characteristic of the i-f system. Each trimmer of the entire group should then be checked to assure that it is in correct alignment as indicated by the degree of coincidence and relative amplitude of the image on the Oscilloscope screen.

R-F Trimmer Adjustments

Locations of the various antenna, detector and oscillator coil trimmers are shown by Figure 6. The test Oscillator should be removed from connection with the i-f system and its output connected to the antenna-ground terminals of the receiver. No changes are to be made in the connections of the Oscilloscope at the second detector. During the following adjustments, the Oscillator output should be regulated as often as necessary to keep the oscillographic image as low as is practically observable. Adherence to such a procedure will obviate the broadness of tuning that would result from a.v.c. action on a stronger signal. Proceed with the adjustments as follows:—

Calibration

Set the receiver range switch to Band A and rotate the station selector until the tuning condenser plates are in full mesh (maximum capacitance). Then move the main dial pointer until it points exactly to the horizontal line at the low frequency end of the Band A scale.

Band A

- (a) With the receiver range switch in its Band A position, tune the station selector until the dial pointer is at a reading of 1720 kc. Adjust the test Oscillator to 1720 kc. (modulation "On" and Frequency Modulator disconnected) and increase its output to produce a registration on the Oscilloscope. Carefully align the oscillator, detector and antenna trimmers C-20, C-10 and C-3 respectively, so that each brings about maximum amplitude of output as shown by the wave on the Oscilloscope. It will be necessary to have the timing control of the Oscilloscope on "Int." for this operation. After each trimmer has been peaked, the Oscilloscope tuning control should be set to "Ext." and the Frequency Modulator placed into operation with its connections to the Oscillator and Oscilloscope made in accordance with Figure 5. Turn the modulation switch of the Oscillator to "Off" and return the Oscillator (increase frequency) until the forward and reverse waves show on the Oscilloscope and become coincident at their highest points. Adjust the trimmers C-20, C-10 and C-3 again, setting each to the point which produces the best coincidence and maximum amplitude of the wave images.

- (b) Remove the Frequency Modulator cable from the Oscillator and shift the signal frequency to 600 kc. Place the modulation switch to "On." Tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then insert the Frequency Modulator plug, and return the Oscillator (modulation "Off") until the two similar forward and reverse waves appear on the screen. For this adjustment, it is advisable to shift the Oscillator to its 200-400 kc. range and use the third harmonic of the generated signal in order to obtain the desired range of sweep. The oscillator series trimmer C-19 should then be adjusted to produce maximum amplitude of the images. No rocking will be necessary on the station selector inasmuch as the signal frequency is being "wobbled" by the Frequency Modulator to produce the same effect. After completing this adjustment the trimmer C-20 should be re-aligned as in (a) to correct for any change brought about by the adjustment of C-19.

Band B

- (a) Advance the receiver range switch to its Band B position and tune the station selector to a dial reading of 6132 kc. Set the test Oscillator to this same frequency (modulation "On" and Frequency Modulator disconnected) and increase its output until a suitable indication is apparent on the Oscilloscope. The Oscilloscope should be adjusted for "Int." tuning. Then adjust the oscillator trimmer C-18 to the point at which maximum amplitude of the image is obtained. Two points will be found for this trimmer which give such a maximum. The one of least capacitance is correct and should be used. This can be checked by tuning the "image" signal, which will be received at 8212 kc. on the dial if the adjustment of C-18 has

SERVICE DATA

The various diagrams of this booklet contain such information as will be needed for servicing the receiver. The ratings of all resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. The coils, reactor and transformer windings are rated in terms of their d-c resistances only and where the value is less than one ohm, no rating is given. Identification titles such as R-3, L-2, C-1, etc., are provided for reference between the illustrations and replacement parts list.

Alignment Procedure

There are a total of fourteen adjustments necessary for obtaining proper alignment when such a process becomes necessary. Four of these are involved with the i-f system and the remainder are associated with the antenna, first detector and oscillator coils.

Correct performance of the receiver can only be obtained when the trimmer adjustments have been made by a skilled service man with the use of adequate and reliable test equipment. Such apparatus as may be required for this particular instrument, is illustrated and described on a separate page of this booklet.

Two methods of alignment are applicable. One utilizes a Cathode-Ray Oscilloscope as a means of output indication and the other follows former procedure where a glow type indicator or meter is used. The oscillographic method is much to be preferred, since greater accuracy is possible from the type of indication afforded. There are no approximations necessary as with the meter or aural method, but each adjustment can be made with excellent precision. Both methods are hereinafter outlined so that alignment operations may be made according to the equipment available.

It is wise to determine the necessity for alignment as well as the direction of misalignment before making adjustments. The RCA Tuning Wand is an instrument designed particularly for such a purpose.

The Tuning Wand consists of a bakelite rod having a small brass cylinder at one end and a core of finely divided iron at the other. It may be inserted into a tuned coil while a station of the normal resonant frequency is being supplied to the circuit. The iron core of the wand is provided at the top of the i-f shield can for reference. The Wand. The presence of either end of the Wand will cause a change in tuning which will be indicated at the receiver output as an increase or decrease in signal level. If there is a decrease of output when either end is inserted, the tuning is correct and will require no adjustment. However, should there be an increase of output due to the iron core and decrease when the cylinder is inserted, an increase in inductance or capacitance is indicated and the tuning must be corrected. The trimmer involved should therefore be increased accordingly. If the brass cylinder end causes an increase in output while the iron end causes a decrease, reduction of inductance will be necessary to place the circuit in alignment. This is equivalent to decreasing the trimmer concerned. The following tabulation gives the various changes and the adjustments required:—

WAND	SIGNAL	TRIMMER
{Brass	Decrease	None
{Iron	Decrease	None
{Brass	Increase	Decrease
{Iron	Increase	Decrease
{Brass	Decrease	Increase
{Iron	Increase	Increase

MODEL T10-1
Trimmers, Socket

RCA MFG. CO., INC.

Voltage, Speaker Data
Transformer Data.

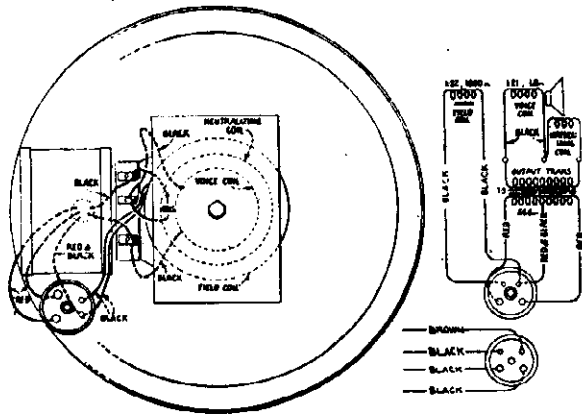


Figure 3—Loudspeaker Wiring

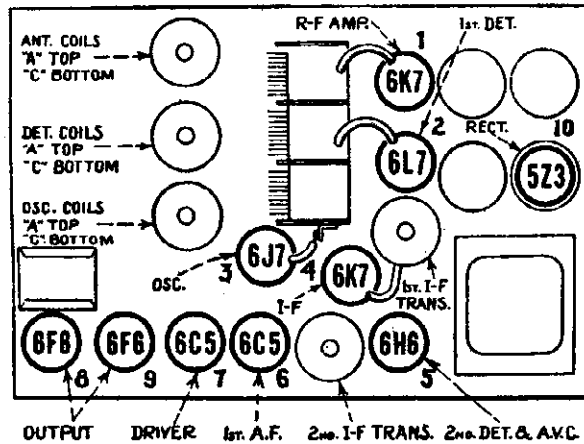


Figure 4—Coil and Radiotron Locations

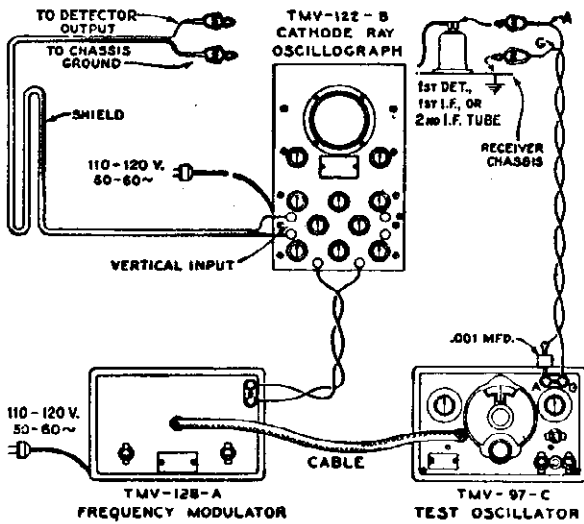


Figure 5—Alignment Apparatus Connections

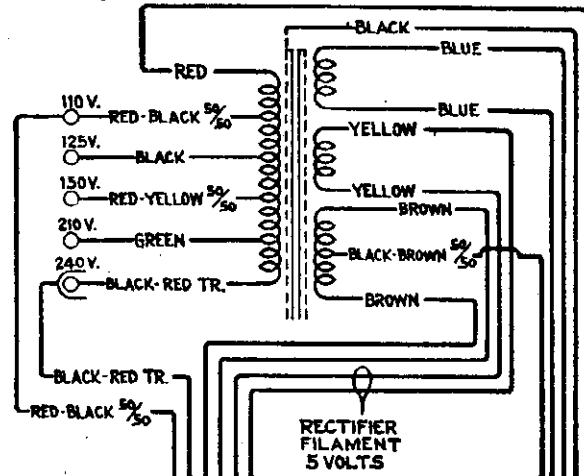


Figure 7—Universal Power Transformer Connections

Pri. Res.—7.42 ohms, total
Sec. Res.—274 ohms, total

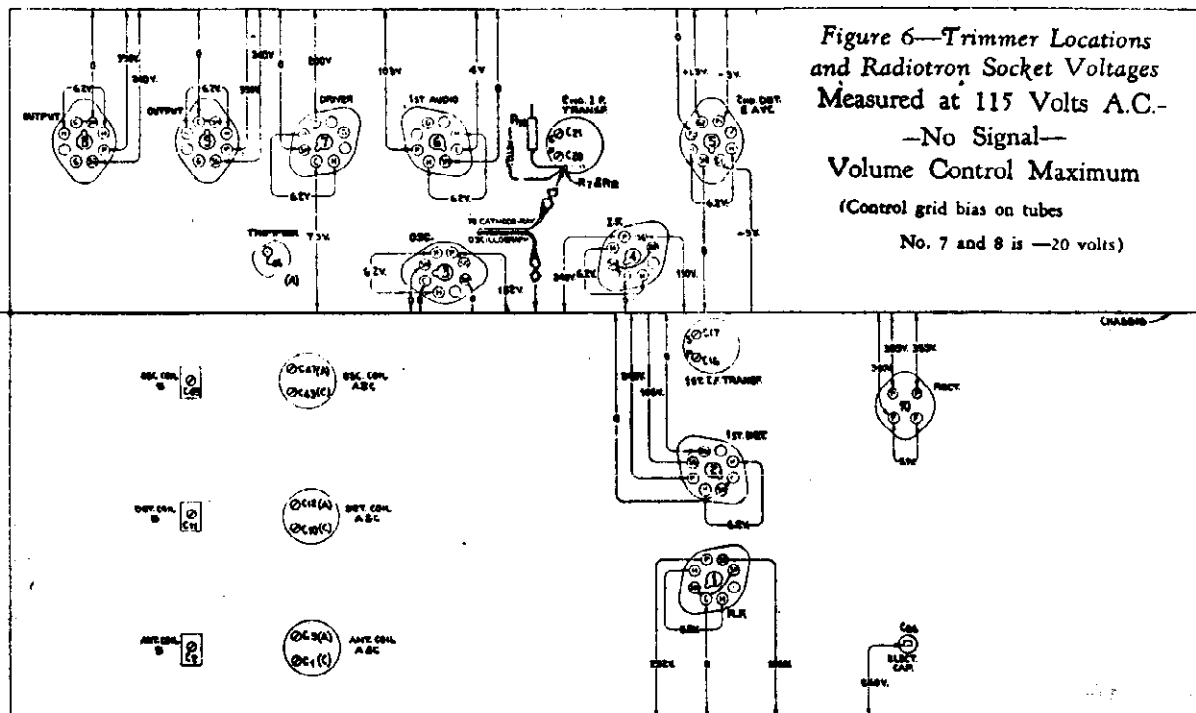
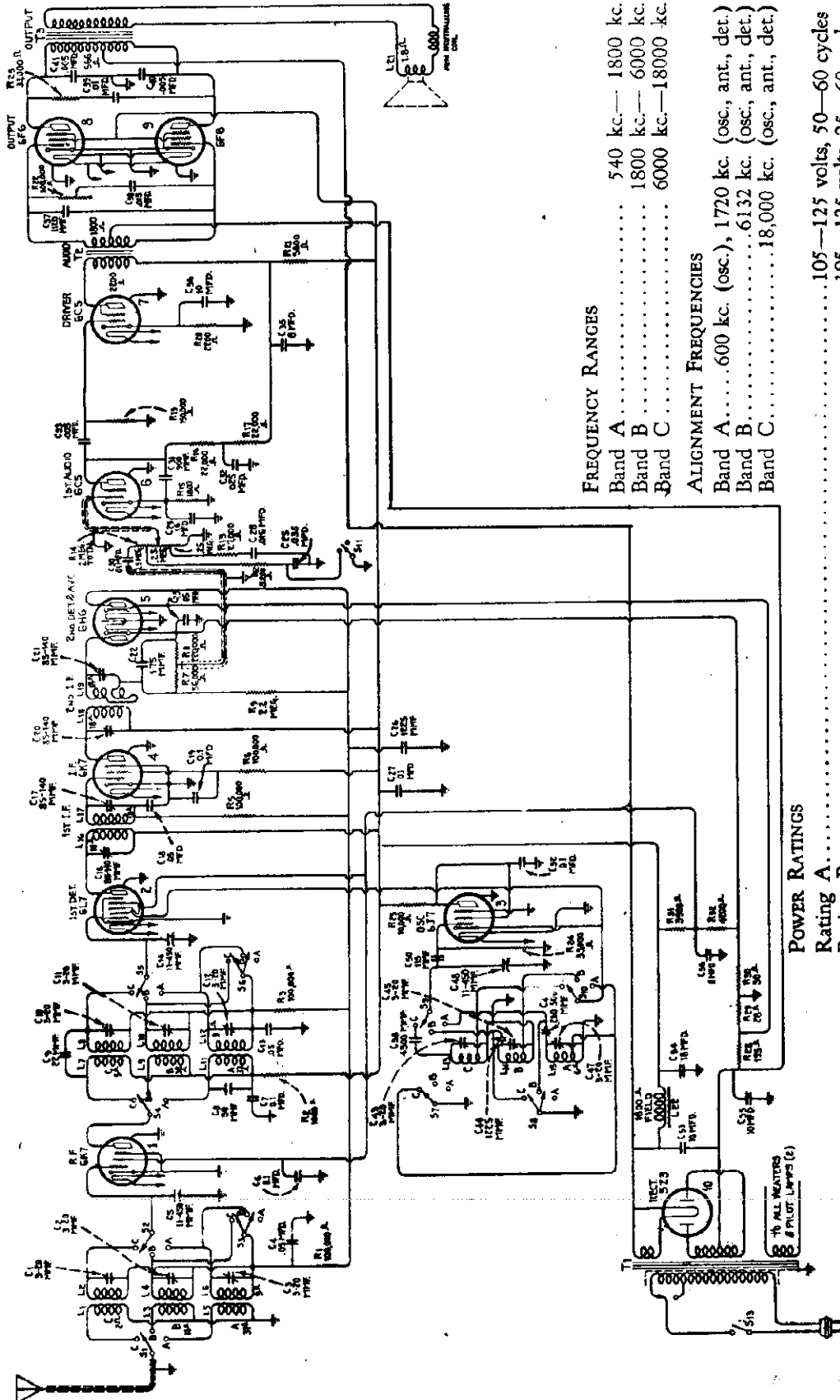


Figure 6—Trimmer Locations
and Radiotron Socket Voltages
Measured at 115 Volts A.C.—
—No Signal—
Volume Control Maximum
(Control grid bias on tubes
No. 7 and 8 is —20 volts)

RCA MFG. CO., INC.



FREQUENCY RANGES

- Band A 540 kc.—1800 kc.
- Band B 1800 kc.—6000 kc.
- Band C 6000 kc.—18000 kc.

ALIGNMENT FREQUENCIES

- Band A 600 kc. (osc.), 1720 kc. (osc. ant., det.)
- Band B 6132 kc. (osc. ant., det.)
- Band C 18,000 kc. (osc. ant., det.)

POWER RATINGS

- Rating A 105—125 volts, 50—60 cycles
- Rating B 105—125 volts, 25—60 cycles
- Rating C 100—130/140—160/195—250 volts, 40—60 cycles
- Power Consumption 135 watts

MISCELLANEOUS

- Undistorted Output 8.5 watts
- Maximum Output 11.5 watts
- Loudspeaker Electrodynamic—8 inch
- Voice Coil Impedance 2.25 ohms at 400 cycles
- Intermediate Frequency 460 kc.

POWER TRANSFORMER

- Pri. Res. 3.8 ohms
- Sec. Res. 33 ohms (60 cycle)
- 5.4 ohms
- 470 ohms (25 cycle)

**MODEL T10-
Alignment
Parts List**

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	LIST PRICE	STOCK No.	DESCRIPTION	LIST PRICE
RECEIVER ASSEMBLIES					
4427	Bracket—High or low frequency tone control or volume control mounting bracket.	\$0.18	11315	Capacitor—0.015 Mfd.—(C38)	.20
5237	Bushing—Variable condenser mounting bushing assembly—Package of 3.	.43	4836	Capacitor—0.05 Mfd.—(C4, C13, C18, C23)	.30
11223	Capacitor—Adjustable capacitor—(C46)	.46	4885	Capacitor—0.1 Mfd.—(C7, C19, C27, C52)	.28
11292	Capacitor—22 MMfd.—(C9)	.24	4841	Capacitor—0.1 Mfd.—(C6)	.22
11289	Capacitor—50 MMfd.—(C8)	.26	5170	Capacitor—0.25 Mfd.—(C32)	.25
11291	Capacitor—1.5 MMfd.—(C70)	.24	11203	Capacitor—10 Mfd.—(C13)	1.18
3784	Capacitor—900 MMfd.—(C31)	.30	5212	Capacitor—18 Mfd.—(C14)	1.16
4409	Capacitor—1120 MMfd.—(C37)	.37	11215	Capacitor Pack—Comprising one 16 Mfd., two 10 Mfd. and two 8 Mfd. capacitors—(C29, C35, C36, C55, C16)	3.85
11288	Capacitor—1225 MMfd.—(C44)	.30	11201	Clamp—Cable clamp—located near variable tuning condenser—Package of 5.	.20
11316	Capacitor—1225 MMfd.—(C26)	.40	11272	Clamp—Cable clamp—located above antenna terminal.	.10
11287	Capacitor—4500 MMfd.—(C58)	.30	4693	Clamp—Electrolytic capacitor clamp—for stock #11215.	.15
4907	Capacitor—0.001 Mfd.—(C40, C41)	.38	11211	Transformer—Power transformer—105-125 volts—30-60 cycles.	4.88
4868	Capacitor—0.005 Mfd.—(C31)	.20	DRIVE ASSEMBLIES		
4624	Capacitor—0.01 Mfd.—(C10)	.54	4362	Arm—Band indicator operating arm.	\$0.28
4937	Capacitor—0.01 Mfd.—(C39)	.25	10194	Ball—Steel ball—Package of 20.	.25
5215	Coil—Antenna coil—A and C Bands—(L1, L2, L3, L6, C1, C3)	2.32	4422	Clutch—Tuning condenser drive clutch assembly—comprising drive shaft, ball, ring, spring and washers assembled.	1.00
5245	Coil—Antenna coil—B band—(L3, L4, C2)	1.78	11377	Dial—Station selector dial scale.	.68
5216	Coil—Detector coil—A and C bands—(L7, L8, L11, L12, C10, C12)	2.34	11227	Drive—Variable tuning condenser drive complete—less dial scale.	2.08
5246	Coil—Detector coil—B band—(L9, L10, C11)	1.62	11228	Gear—Vernier pointer drive gear.	.42
5217	Coil—Oscillator coil—A and C bands—(L13, L17, C43, C47)	2.20	4827	Gear—Spring gear assembly.	1.25
5247	Coil—Oscillator coil—B band—(L14, C45)	1.44	11226	Indicator—Band indicator pointer assembly—comprising indicator, arm, link and stud.	.20
11377	Compensating Pack—Comprising one 0.015 Mfd. one 0.035 Mfd. capacitor, one 27,000 ohm and one 8100 ohm resistor—(C21, C28, R12, R13)	.92	4477	Indicator—Station selector indicator.	.18
11214	Condenser—Three gang variable tuning condenser—(C5, C14, C48)	4.20	4340	Lamp—Dial lamp—Package of 5.	.60
11205	Volume Control—(R14)	1.30	3993	Screw—No. 6-32 x 3/32" set screw—for band indicator operating arm—Package of 10.	.25
11219	Tone Control—High frequency tone control—(R12)	.90	4669	Screw—No. 8-32 x 3/32" set screw for tuning condenser shaft—Package of 10.	.25
8041	Plate—1 P. or R. F. coil shield locking plate with screw—Package of 2.	.12	4377	Spring—Band indicator operating arm spring—Package of 5.	.25
11220	Resistor—Voltage divider resistor—comprising one 3900 ohm and one 4200 ohm section—(R31, R32)	.84	4378	Stud—Band indicator operating arm stud assembly—Package of 5.	.25
11221	Resistor—Voltage divider resistor—comprising one 50 ohm, one 28 ohm and one 195 ohm section—(R28, R29, R30)	.48	MISCELLANEOUS ASSEMBLIES		
5112	Resistor—1000 Ohm—Carbon type—1/4 Watt—(R2)—Package of 5.	1.00	11337	Escutcheon—Station selector escutcheon.	.70
3706	Resistor—1800 Ohm—Carbon type—1/4 Watt—(R15)—Package of 5.	1.00	6614	Glass—Station selector dial glass.	.30
1159	Resistor—2100 Ohm—Carbon type—1/4 Watt—(R20)—Package of 5.	1.00	11346	Knob—Station selector knob—Package of 5.	.75
1175	Resistor—5600 Ohm—Carbon type—1/4 Watt—(R21)—Package of 5.	1.00	11347	Knob—Volume control, range switch, tone control or power switch knob—Package of 5.	.75
2731	Resistor—10,000 Ohm—Carbon type—1 Watt—(R23)—Package of 5.	1.10	4678	Ring—Spring retaining ring for station selector dial glass—Package of 5.	.34
11305	Resistor—22,000 Ohm—Carbon type—1/4 Watt—(R16, R17)—Package of 5.	1.00	11210	Screw—Chassis mounting screw assembly—Package of 4.	.28
11500	Resistor—33,000 Ohm—Carbon type—1/10 Watt—(R24)—Package of 5.	.75	11348	Screw—No. 8-32 x 7/16" Headless capped point, set screw for knob, Stock #11346—Package of 10.	.32
7033	Resistor—33,000 Ohm—Carbon type—1 Watt—(R23)—Package of 5.	1.10	11349	Spring—Retaining spring for knob, stock #11347—Package of 5.	.15
5118	Resistor—100,000 Ohm—Carbon type—1/4 Watt—(R1, R3, R7, R6)—Package of 5.	1.00	REPRODUCER ASSEMBLIES		
5027	Resistor—150,000 Ohm—Carbon type—1/4 Watt—(R19)—Package of 5.	1.00	11232	Board—Terminal board with two lead wire clips.	.18
11151	Resistor—2.2 Megohms—Carbon type—1/4 Watt—(R9)—Package of 5.	1.00	11231	Bolt—Yoke and core assembly bolt and nut.	.16
5249	Shield—R. F. coil shield.	.20	8060	Bracket—Mounting bracket for output transformer and connector.	.14
11273	Shield—Radiotron shield.	.25	11304	Cable—Reproducer cable complete with female connector.	.80
5250	Shield—1. F. transformer shield.	.22	11234	Coil—Field Coil—(L22)	2.17
11222	Socket—Dial lamp socket.	.18	11233	Coil—Neutralizing coil.	.30
4794	Socket—4-contact Radiotron socket.	.15	11235	Cone—Reproducer cone (L21)—Package of 5.	3.50
11197	Socket—5-contact Radiotron socket.	.17	7040	Connector—4-prong female connector socket for reproducer cable.	.25
11198	Socket—7-contact Radiotron socket.	.17	5039	Connector—4-prong male connector plug for reproducer.	.25
7224	Switch—Low frequency tone control switch and power switch—(S11, S13)	1.00	11277	Clamp—Cone center suspension clamping nut and screw assembly—Package of 5.	.25
11236	Switch—Range switch—(S1, S2, S3, S4, S5, S6, S7, S8, S9, S10)	2.44	9617	Reproducer—Complete.	6.60
5238	Terminal—Antenna terminal assembly.	.14	11229	Transformer—Output transformer—(T3)	1.66
11218	Transformer—Audio driver transformer—(T2)	2.78	11230	Washer—Binders board "C" washer—used to hold field coil securely—Package of 5.	.18
11216	Transformer—First intermediate frequency transformer—(L16, L17, C16, C17)	2.15	SERVICE DATA		
11217	Transformer—Second intermediate frequency transformer—(L18, L19, C20, C21, C22, R7, R8)	3.10	Alignment Procedure		
11213	Transformer—Power transformer—105-125-150-210-250 volts—40-60 cycles.	5.10	Ten alignment trimmers are provided in the r-f, first detector and oscillator tuning system and four are used in the i-f system. All of these are accurately adjusted during manufacture and should remain in proper alignment unless affected by abnormal conditions of climate or have been altered by other means. Loss of sensitivity, improper tone quality and poor selectivity are the usual indications of improper alignment.		
11212	Transformer—Power transformer—105-125 volts—25-60 cycles.	7.18	Correct performance of the receiver can only be obtained when the trimmer adjustments have been made by a skilled service man with the use of adequate and reliable test equipment. Such apparatus as may be required for alignment of this particular instrument is illustrated and described on a separate page of this booklet.		

Correct performance of the receiver can only be obtained when the trimmer adjustments have been made by a skilled service man with the use of adequate and reliable test equipment. Such apparatus as may be required for alignment of this particular instrument is illustrated and described on a separate page of this booklet.

Two methods of alignment are applicable. One utilizes a Cathode-Ray Oscillograph as a means of output indication and the other follows former procedure where a glow type indicator or meter is used. The oscillographic method is much to be preferred, since greater accuracy is possible from the type of indication afforded. There are no approximations necessary as with the meter or aural method, but each adjustment can be made with definite precision. Both methods are hereinafter outlined so that alignment operations may be made according to the equipment available.

It is wise to determine the necessity for alignment as well as the direction of misalignment before making adjustments. The RCA Tuning Wand is an instrument designed particularly for such a purpose.

CATHODE-RAY ALIGNMENT

Equipment
A standard source of alignment frequencies is required. Such a source should consist of an RCA Full Range Oscillator, Stock No. 9595. Output indication should be by means of an RCA Stock No. 9558 Cathode-Ray Oscillograph. An RCA Stock No. 9558 Frequency Modulator will be needed to sweep the generated signal and synchronize it with the Oscillograph in order to obtain visual representation of the resonant characteristic of the circuit being tuned on the cathode-ray fluorescent screen.

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. The last transformer must be aligned first and the first transformer aligned secondly. For such a process, it is necessary to feed the output of the Full Range Oscillator to the stages in their order of alignment, adjusting the trimmers of each transformer and observing the effect at the second detector output on the Cathode-Ray Oscillograph. The proper point of connection of the Oscillograph is with its vertical "high" input terminal attached to the junction of R-7 and R-8, as illustrated in Figure 6, and with the "0" or ground terminal to the chassis. The "Ext. Sync." terminals of the Oscillograph should be connected to the Frequency Modulator as shown by Figure 5. A .001 mfd. capacitor installed in series with the Oscillator "Ant." lead will prevent the voltages of the stage under alignment from becoming upset. The vertical "A" amplifier should be "On" for the ensuing adjustments and its gain control kept at maximum. For each adjustment, the Oscillator output must be regulated so that the image obtained on the Oscillograph screen will be of the minimum size convenient for accurate observation. Proceed further as follows:—

(a) Place the receiver, Oscillograph and test Oscillator in operation. Set the receiver range switch to Band "A" and tune the station selector to a point where no interference will be encountered from signal pickup or from the RCA-6J7 oscillator, removing the tube if necessary. Set the Oscillograph horizontal "B" amplifier to "Timing" and control its gain so that the luminous spot sweeps a straight line trace completely across the screen. Place the timing control to "Int." Adjust the intensity and focusing controls of the Oscillograph to produce the correct size and strength of spot.

(b) Attach the output of the test Oscillator between the control grid cap of the RCA-6K7 i-f tube and chassis ground as shown typically by Figure 5. Tune the Oscillator to 460 kc. and set its modulation switch to "On." Regulate its output until the signal produces a wave pattern on the Oscillograph screen, adjusting the Oscillograph controls to give a shape which is convenient for peak indications. Cause the image to stand still on the screen by manipulation of the frequency and synchronizing controls. Then carefully tune the two trimmers C-20 and C-21 of the second i-f transformer to produce maximum amplitude (vertical deflection) of the oscillographic image. Under this condition the transformer will be sharply resonated to 460 kc.

MODEL T10-1

Alignment, Part 2

RCA MFG. CO., INC.

Band B.—This band must be aligned at 6132 kc. by tuning the test Oscillator to the test frequency and turning the station selector to the 6132 kc. dial reading. The station selector should be set to "Ext." and the Frequency Modulator placed into operation and the Oscillator Modulator disconnected. Turn the range switch to "Off" and place the range switch to "On" position. Then carefully shift the tuning of the Oscillator so as to increase its frequency until two distinct and similar waves appear on the Oscillograph screen and become exactly coincident at their highest points. This condition will be found to occur at an Oscillator setting of approximately 340 kc. The curves will be identical in shape but appearing in reversed positions. Adjust the frequency control of the Oscillator in order to cause the waves to conform with the above requirement and to make them remain motionless on the screen. This will require a setting of approximately 1/2 clockwise rotation of the frequency control. The trimmers C-20 and C-21 should then be re-adjusted so that the two curves move together and become exactly coincident throughout their lengths, maintaining the maximum amplitude at which this condition can be brought about.

(d) Leaving the equipment connected and adjusted as in (c), change the Oscillator output to the control grid tap of the RCA-6L7 first detector tube. Then adjust the first i-f transformer trimmers C-16 and C-17 so that the forward and reverse waves appearing on the Oscillograph coincide throughout their lengths and have maximum amplitude. The shape of the composite wave obtained from this operation is a true representation of the overall tuning characteristic of the i-f system.

R-F Trimmer Adjustments

Locations of the various antenna, detector and oscillator coil trimmers are shown by Figure 6. The test Oscillator should be removed from the circuit and the i-f system and its output connected to the antenna ground terminals of the receiver. No changes are to be made in the connections of the Oscillograph at the second detector. During the following adjustments, the Oscillator output should be regulated as often as is necessary to keep the oscillographic image as low as is practically observable. Adherence to this procedure will obviate the broadness of tuning that would result from a.v.c. action on a stronger signal. Proceed with the adjustments as follows:—

CALIBRATION

Set the receiver range switch to Band A and rotate the station selector until the tuning condenser plates are in full mesh (maximum capacitance). Then move the main dial pointer until it points exactly to the horizontal line at the low frequency end of the Band A scale. Correct the setting of the vernier second band pointer to read zero.

BAND A

(a) With the receiver range switch in its Band A position, tune the station selector until the dial pointer is at a reading of 1720 kc. Adjust the test Oscillator to 1720 kc. (modulation "On" and Frequency Modulator disconnected) and increase its output to produce a registration on the Oscillograph. Carefully align the oscillator, detector and antenna trimmers, C-47, C-12 and C-3 respectively, so that each brings about maximum amplitude of output as shown by the wave on the Oscillograph. It will be necessary to have the tuning control of the Oscillator in the "On" position and the Frequency Modulator disconnected. Turn the range switch to "Off" and place the range switch to "On" position. Then carefully shift the tuning of the Oscillator so as to increase its frequency until two distinct and similar waves appear on the Oscillograph screen and become exactly coincident at their highest points. This condition will be found to occur at an Oscillator setting of approximately 340 kc. The curves will be identical in shape but appearing in reversed positions. Adjust the frequency control of the Oscillator in order to cause the waves to conform with the above requirement and to make them remain motionless on the screen. This will require a setting of approximately 1/2 clockwise rotation of the frequency control. The trimmers C-20 and C-21 should then be re-adjusted so that the two curves move together and become exactly coincident throughout their lengths, maintaining the maximum amplitude at which this condition can be brought about.

sary to have the timing control of the Oscillograph on "Int." for this operation. After each tuning control has been peaked, the Oscillograph timing control should be set to "Ext." and the Frequency Modulator placed into operation and the Oscillator Modulator disconnected. Turn the modulation switch of the Oscillator to "Off" and return the Oscillator (increase frequency) until the forward and reverse waves show on the Oscillograph and become coincident at their highest points. Adjust the trimmers C-47, C-12 and C-3 again, setting the dial to the point which produces the best coincidence and maximum amplitude of the wave image.

(b) Remove the Frequency Modulator cable from the Oscillator and shift the signal frequency to 600 kc. Place the modulation switch to "On." Tune the receiver to pick up the signal, disregarding the dial reading at which it is best received. Then insert the Frequency Modulator plug and return the Oscillator (modulation "Off") to the two similar forward and reverse waves appear on the screen. For this adjustment, it is advisable to shift the Oscillator to a 330-430 kc. range using the third harmonic of the generated signal in order to obtain the desired range of sweep. The oscillator trimmer, C-46, should then be adjusted to produce maximum amplitude of the signal. No rocking will be necessary on the station selector such as the signal frequency is being "wobbled" by the Frequency Modulator to produce the same effect. After completing this adjustment, the trimmer C-47 should be realigned as in (a) to correct for any change brought about by the adjustment of C-46.

BAND B

(a) Advance the receiver range switch to its Band B position and tune the station selector to a dial reading of 6132 kc. Set the test Oscillator to this same frequency (modulation "On" and Frequency Modulator disconnected) and increase its output until a suitable indication is apparent on the Oscillograph. The Oscillograph should be adjusted for "Int." tuning. Then adjust the oscillator trimmer, C-45, to the point at which maximum amplitude of the image is obtained. Two positions will be found for this trimmer which gives such a maximum. The one of least capacitance is correct and should be used. This can be checked by tuning the "image" signal, which will be received at 5212 kc. on the dial if the adjustment of C-45 has been properly made. An increase in test Oscillator output may be necessary for this test. Its frequency should not be changed from 6132 kc. nor any trimmer adjustments made on the receiver.

(b) Return the station selector to the 6132 kc. reading and align the detector, and antenna coil trimmers, C-11 and C-2 respectively, for maximum (peak) output as shown by the Oscillograph. No further adjustments are to be made on this band.

BAND C

(a) Turn the range switch of the receiver to its Band C position and tune the station selector until the dial pointer reads 18,000 kc. Set the test Oscillator to the same frequency (modulation "On" and Frequency Modulator disconnected). Turn the range switch to "Off" and place the range switch to "On" position. Then carefully shift the tuning of the Oscillator so as to increase its frequency until two distinct and similar waves appear on the Oscillograph screen and become exactly coincident at their highest points. This condition will be found to occur at an Oscillator setting of approximately 340 kc. The curves will be identical in shape but appearing in reversed positions. Adjust the frequency control of the Oscillator in order to cause the waves to conform with the above requirement and to make them remain motionless on the screen. This will require a setting of approximately 1/2 clockwise rotation of the frequency control. The trimmers C-20 and C-21 should then be re-adjusted so that the two curves move together and become exactly coincident throughout their lengths, maintaining the maximum amplitude at which this condition can be brought about.

tion "On" and Frequency Modulator (disconnected) and regulate its output to the level required for convenient observation. Adjust the trimmer C-43 to the point producing maximum output as indicated on the Oscillograph. Check for the presence of the proper "image" signal by tuning the receiver to 17,060 kc. The 18,000 kc. signal of the Oscillator will be received at this point if the adjustment of C-43 has been properly made by using the position of least capacitance which gives maximum receiver output. It may be necessary to increase the output of the Oscillator in order to get an indication of the "image." No adjustments should be made during this check.

(b) Return the receiver tuning to 18,000 kc., re-align C-43 if necessary, and then adjust the detector and antenna trimmers, C-10 and C-1, for maximum signal output as evidenced by the oscillographic image. No further adjustments are to be made on this band.

ALIGNMENT WITH OUTPUT METER

To align the receiver by means of an output indicator other than a Cathode-Ray Oscillograph will require the use of a standard test Oscillator, such as that recommended above, for the source of signals and means of indication for the output. The RCA Neon Output Indicator, Stock No 4317, will be found very satisfactory for such use. It should be connected across the voice coil circuit of the loudspeaker or across the output transformer primary.

(c) Connect the test Oscillator to the control grid cap of the i-f tube. Advance the volume control of the receiver to its full on position. Tune the test Oscillator accurately to 460 kc. and align the trimmers C-10 and C-21 to give maximum receiver output. Regulate the Oscillator output during this adjustment so that the output indication is as small as can be conveniently observed. After completing the adjustments of these trimmers, re-connect the Oscillator so that it will feed into the control grid circuit of the RCA-6L7 first detector. Then tune the first i-f transformer trimmers C-16 and C-17 for maximum receiver output.

(d) After completing the i-f adjustments, it is advisable to correct the line-up of the circuits ahead of the first detector. The test Oscillator should be connected to the antenna ground terminals of the receiver and the manual volume control turned to its maximum position. For each adjustment, the Oscillator output should be maintained as low as possible in order to avoid broadness of tuning which would result from a.v.c. action on a stronger signal.

R-F Alignment

After completing the i-f adjustments, it is advisable to correct the line-up of the circuits ahead of the first detector. The test Oscillator should be connected to the antenna ground terminals of the receiver and the manual volume control turned to its maximum position. For each adjustment, the Oscillator output should be maintained as low as possible in order to avoid broadness of tuning which would result from a.v.c. action on a stronger signal.

Band A.—This band should be aligned by supplying a 1720 kc. signal to the receiver, tuning the station selector to a dial reading of 1720 kc. and adjusting the trimmers C-47, C-12 and C-3 to produce maximum receiver output. The Oscillator should then be shifted to 600 kc. and the receiver tuned to regenerate this signal, disregarding the reading at which it is best received. Trimmer C-46 must then be adjusted, simultaneously while rocking the station selector backward and forward through the signal until the maximum output results from the combined operations. C-47 should be rechecked to assure that its adjustment has not changed because of the trimming of C-46.

Band B.—This band must be aligned at 6132 kc. by tuning the test Oscillator to the test frequency and turning the station selector to the 6132 kc. dial reading. The station selector should be set to "Ext." and the Frequency Modulator placed into operation and the Oscillator Modulator disconnected. Turn the range switch to "Off" and place the range switch to "On" position. Then carefully shift the tuning of the Oscillator so as to increase its frequency until two distinct and similar waves appear on the Oscillograph screen and become exactly coincident at their highest points. This condition will be found to occur at an Oscillator setting of approximately 340 kc. The curves will be identical in shape but appearing in reversed positions. Adjust the frequency control of the Oscillator in order to cause the waves to conform with the above requirement and to make them remain motionless on the screen. This will require a setting of approximately 1/2 clockwise rotation of the frequency control. The trimmers C-20 and C-21 should then be re-adjusted so that the two curves move together and become exactly coincident throughout their lengths, maintaining the maximum amplitude at which this condition can be brought about.

(d) Leaving the equipment connected and adjusted as in (c), change the Oscillator output to the control grid tap of the RCA-6L7 first detector tube. Then adjust the first i-f transformer trimmers C-16 and C-17 so that the forward and reverse waves appearing on the Oscillograph coincide throughout their lengths and have maximum amplitude. The shape of the composite wave obtained from this operation is a true representation of the overall tuning characteristic of the i-f system.

Radiotron Socket Voltages

The voltage values indicated from the Radiotron socket contacts to chassis on Figure 6 will serve to assist in the location of causes for faulty operation. Each value as specified should hold within $\pm 20\%$ when the receiver is normally operative at its rated supply voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. The voltages given are actual operating values and do not allow for inaccuracies which may be caused by the loading effect of a voltmeter's internal resistance. This resistance should be duly considered for all readings. The amount of "cut" resistance shunting the meter during measurement will determine the accuracy to be obtained, the error increasing as the meter resistance becomes comparable to or less than the circuit resistance. For the majority of readings, a meter having an internal resistance of 1000 ohms per volt will be satisfactory when the range used for each reading is chosen as high as possible consistent with good readability.

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 7. Test 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 photograph motor.

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Circuit Data
Alignment

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using adjustments and its gain control kept at maximum. For each adjustment, the Oscillator output must be regulated so that the image obtained on the Oscillograph screen will be of the minimum size convenient for accurate observation. Proceed further as follows:

(a) Place the receiver, Oscillograph and test Oscillator in operation. Set the receiver range switch to Band "A", and tune the station selector to a point where no interference will be encountered from signal pickup or from the RCA-6J7 oscillator, removing the tube if necessary. Set the Oscillograph horizontal "B" amplifier to "Timing", and control its gain so that the luminous spot sweeps a straight line trace completely across the screen. Place the tuning and focusing controls of the Oscillograph to produce the correct size and strength of spot.

(b) Attach the output of the test Oscillator between the control grid cap of the RCA-6K7 i-f tube and chassis ground as shown typically by Figure 5. Tune the Oscillator to 460 kc. and set its modulation switch to "On". Regulate its output until the signal produces a wave pattern on the Oscillograph screen, adjusting the Oscillograph controls to give a shape which is convenient for peak indications. Cause the image to stand still on the screen by manipulation of the frequency and synchronizing controls. Then carefully tune the two trimmers C-20 and C-21 to maximum amplitude (vertical deflection) of the second i-f transformer to produce maximum amplitude image. Under this condition the transformer will be sharply resonated to 460 kc. The Frequency Modulator should then be placed in operation, and interconnected with the Full Range Oscillator by means of the special shielded patch cord. Figure 5 shows the proper arrangement. Set the Frequency Modulator sweep range switch to its "Lo" position and turn the Oscillator modulation switch to "Off". Change the tuning control of the Oscillograph to "Ext." and place the range switch to its No. 2 position. Then carefully shift the tuning of the Oscillator so as to increase its frequency, until two distinct and similar waves appear on the Oscillograph screen and become exactly coincident at their highest points. This condition will be found to occur at an Oscillator setting of approximately 540 kc. The curves will be identical in shape but appearing in reversed positions. Adjust the frequency control of the Oscillograph in order to cause the waves to conform with the above requirement and to make them remain motionless on the screen. This will require a setting of approximately 1/2 clockwise rotation of the frequency control. The trimmers C-20 and C-21 should then be re-adjusted so that the two curves move together and become exactly coincident throughout their lengths, maintaining the maximum amplitude at which this condition can be brought about.

(c) Leaving the equipment connected and adjusted as in (b), change the Oscillator output to the control grid cap of the RCA-6L7 first detector

with the meter or aural method, but each adjustment can be made with definite precision. Both methods are hereinafter outlined so that alignment operations may be made according to the equipment available. It is wise to determine the necessity for alignment as well as the direction of misalignment before making adjustments. The RCA Tuning Wand is an instrument designed particularly for such a purpose.

The Tuning Wand consists of a bakelite rod having a small brass cylinder at one end and a cone of finely divided iron at the other. It may be inserted into a tuned coil while a signal of the normal resonant frequency is being supplied to such coil to obtain an indication of the tuning. Hints are provided at the top of the r-f shield can. If there is a decrease in tuning which will be indicated if received as an increase when either end is inserted, the tuning is correct and will require no adjustment. However should there be an increase of output due to the iron core and decrease with the brass cylinder, an increase in inductance or capacitance is indicated as necessary to bring the circuit into line. The trimmer involved should therefore be increased accordingly. If the brass cylinder end causes an increase in output, the iron end causes the circuit in alignment. This is equivalent to decreasing the trimmer concerned. The following tabulation gives the various changes and the adjustments required:

	BONAL	TRIMMER
{Bias.....}	Decrease	None
{Iron.....}	Decrease	Decrease
{Bias.....}	Increase	Decrease
{Iron.....}	Increase	Increase

CATHODE-RAY ALIGNMENT

A standard source of alignment frequencies is required. Such a source should consist of an RCA Full Range Oscillator, Stock No. 9195. Output indication should be by means of an RCA Stock No. 9185 Cathode-Ray Oscillograph. An RCA Stock No. 9158 Frequency Modulator will be needed to sweep the generated signal and synchronize it with the Oscillograph in order to obtain visual representation of the resonant characteristic of the circuit being tuned on the cathode-ray fluorescent screen.

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. The last transformer must be aligned first and the first transformer aligned secondly. For such a process, it is necessary to feed the output of the Full Range Oscillator to the stages in their order of alignment, adjusting the trimmers of each transformer and observing the effect at the second detector output on the Cathode-Ray Oscillograph. The proper point of connection of the Oscillograph is with its vertical "high" input terminal attached to the junction of R-7 and R-8, as illustrated in Figure 6, and with the "0" or ground terminal to the chassis. The "Ext. Sync." terminals of the Oscillograph should be connected to the Frequency Modulator as shown by Figure 5. A .001 mfd. capacitor installed in series with the Oscillator "Ext." lead will prevent the voltages of the stage under alignment from becoming upset. The vertical "A" amplifier should be "On" for the en-

bias for these controlled tubes under conditions of little or no signal. This diode, under such conditions, draws current, which flows through resistors R-7, R-8 and R-9, 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. The cathode and anode of the signal-a.v.c. diode have positive potential in respect to chassis-ground and cathodes of the a.v.c. controlled tubes when no signal is being received.

Audio System

Manual volume control of the detected signal is effected by an acoustically tapered potentiometer in the grid circuit of the first a-f stage. This control has three compensating filters connected to two points thereon. These filters effect the correct aural balance at different volume settings. A music-speech switch (low frequency tone control) is associated with one of the compensation filters. The purpose of this control is to make speech reproduction more intelligible and to reduce hum obtained from stray modulation on a carrier. The driver stage of the audio system uses an RCA-6C3 which is resonance coupled to the first a-f tube and transformer coupled to the push-pull power output stage. High-frequency tone control is obtained by use of a condenser and variable resistor in series across the grids of the output tubes. The field coil serves as a reactor in the high voltage filter circuit.

Rectifier

The a-c voltage supplied by the power line is stepped up by the transformer T-1 and applied to the Z3 full wave rectifier for production of high voltage d.c. to be used for plate and bias supply. Simultaneously, a step down takes place in the same transformer to provide the low voltage necessary for heaters. The current obtained from the rectifier is thoroughly filtered by large capacitors and the field coil reactance.

SERVICE DATA

Alignment Procedure

Ten alignment trimmers are provided in the r-f, first detector and oscillator tuning system and four are used in the i-f system. All of these are accurately adjusted during manufacture and should remain in proper alignment unless affected by abnormal conditions of climate or have been altered by other means. Loss of sensitivity, improper tone quality and poor selectivity are the usual indications of improper alignment.

Correct performance of the receiver can only be obtained when the trimmer adjustments have been made by a skilled service man with the use of adequate and reliable test equipment. Such apparatus as may be required for alignment of this particular instrument is illustrated and described on a separate page of this booklet.

Two methods of alignment are applicable. One utilizes a Cathode-Ray Oscillograph as a means of output indication and the other follows former procedure where a glow type indicator or meter is used. The oscillographic method is much to be preferred, since greater accuracy is possible from the type of indication afforded. There are no approximations necessary as

CIRCUIT ARRANGEMENT

The Superheterodyne principle of operation forms the basis of the circuit design. A single, tuned r-f stage is used ahead of the first detector. The functions of oscillator and detector are performed by two separate tubes. One i-f stage is employed and designed to operate at 460 kc. The combined second detector and a.v.c. stage uses an RCA-6H6 double diode. The audio system consists of two single-puller stages working in cascade with a push-pull power output stage. The loudspeaker is an electrodynamic type, receiving its field supply from the rectifier and filter system and simultaneously acting as a filter reactor. Full wave rectification is performed in the RCA-923 tube. The outstanding features of electrical design are concerned with the following:

Tuned Circuits

A total of seven circuits are tuned to provide gain and selectivity to the incoming signal. The variable gang condenser resonates the antenna transformer secondary, the detector transformer secondary and the oscillator coil. Alignment trimmers are included for each of these same circuits. Additional trimmers are used on the i-f transformer, tuning both the secondary and primaries to 460 kc. There are separate groups of antenna, detector and oscillator coils for each of the tuning ranges. They are placed into operation by means of a rugged rotary switch.

First Detector

This stage has unusually good high frequency tuning efficiency. The tube used, an RCA-6L7, is a new herode type. The signal is applied to the first control grid and the oscillator is fed in on a second control grid, a screen grid separating the two. The arrangement of the grids prevents degenerative difficulties, particularly at the higher frequencies. The second grid is direct-connected to the cathode of the oscillator tube and has no d-c bias.

Oscillator

The oscillator circuit is worthy of careful study inasmuch as it is different from the type ordinarily employed. It has self-stabilizing properties which are very advantageous for short wave operation. The generated frequency remains substantially constant when the circuit is affected by variation of line voltage and other similar influences. Output also remains uniform over the individual tuning ranges. The switching of the tuning coils is arranged so as to short these not in use in order to prevent absorption or any reactive effects in the particular band being tuned.

Detector and A.V.C.

The modulated signal as obtained from the output of the i-f system is detected by an RCA-6H6 double diode tube. The audio frequency secured by this process is passed on to the r-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 resistors R-7 and R-8, is applied as automatic control grid bias to the r-f, first detector and i-f tubes through suitable resistance-capacitance filter circuits. The second diode of the RCA-6H6 is used to supply residual

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Band A—This hand should be aligned by supplying a 1720 kc. signal to the receiver, tuning the station selector to a dial reading of 1720 and adjusting the trimmers C-47, C-12 and C-3 to produce maximum receiver output. The Oscillator should then be shifted to 400 kc. and the receiver tuned to receive this signal, disregarding the reading at which it is best received. Trimmer C-46 must then be adjusted, simultaneously while rocking the station selector backward and forward through the signal until the maximum output results from the combined operations. C-47 should be rechecked to assure that its adjustment has not changed because of the trimming of C-46.

Band X—This band must be aligned at 400 kc. and the receiver dial to the same reading. Adjust trimmers C-45, C-11 and C-2 for maximum (peak) receiver output. Then shift the Oscillator to 150 kc. and tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Adjust trimmer C-61, simultaneously rocking the tuning condenser backward and forward through the signal, until maximum receiver output results from the combined operations. Repeat the alignment of C-45 as above to correct for any change which may have been caused by the adjustment of C-61.

Band C—Change the receiver so that it is operative and the dial reads 18,000 kc. on the "C" Band. Tune the test Oscillator to this same frequency. Then adjust the oscillator trimmer C-43 to produce maximum (peak) output. Two positions of this trimmer will be found which conform with this requirement. The one of least capacitance is correct. Check for the presence of "image" response at 17,080 kc. by shifting the receiver tuning. If it is received at such a point, the trimmer C-43 has been correctly adjusted to the right peak. No adjustments are to be made during this check. Tune the receiver back to the 18,000 kc. dial marking, readjust C-43 if necessary, and then tune the detector and antenna capacitor C-10 and C-1 for maximum receiver output. No further adjustments are necessary.

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 7. 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 photograph motor.

ceiver output. It may be necessary to increase the output of the Oscillator in order to get an indication of the "image". No adjustments should be made during this check.

(b) Return the receiver tuning to 18,000 kc., re-align C-43 if necessary, and then adjust the detector and antenna trimmer, C-10 and C-1, for maximum signal output as evidenced by the oscillographic image. No further adjustments are to be made on this band.

ALIGNMENT WITH OUTPUT METER

To align the receiver by means of an output indicator other than a Cathode-Ray Oscillograph, will require the use of a standard test Oscillator, such as that recommended above, for the source of signals and that recommended above, for the source of signals and

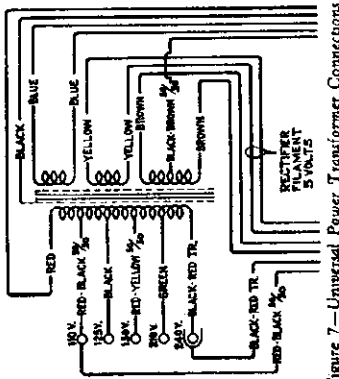


Figure 7—Universal Power Transformer Connections
Pri. Re—742 ohms, total
Sec. Re—274 ohms, total

means of indication for the output. The RCA Neon Output Indicator, Stock No. 4317, will be found very satisfactory for such use. It should be connected across the voice coil circuit of the loudspeaker or across the output transformer primary.

I-F Alignment

Connect the test Oscillator to the control grid cap of the i-f tube. Advance the volume control of the receiver to its "full-on" position. Tune the test Oscillator accurately to 480 kc. and align the trimmers C-20 and C-21 to give maximum receiver output. Regulate the Oscillator output during this adjustment so that the output indication is as small as can be conveniently observed. After completing the adjustments of these trimmers, re-connect the Oscillator so that it will feed into the control grid circuit of the RCA-6L7 first detector. Then tune the first i-f transformer trimmers C-16 and C-17 for maximum receiver output.

R-F Alignment

After completing the i-f adjustments, it is advisable to correct the line-up of the circuits ahead of the first detector. The test Oscillator should be connected to the antenna-ground terminals of the receiver and the manual volume control turned to its maximum position. For each adjustment, the Oscillator output should be maintained as low as possible in order to avoid broadness of tuning which would result from a v.c. action on a stronger signal.

plug and return the Oscillator (modulation "Off") until the two similar forward and reverse waves appear on the screen. For this adjustment, it is advisable to shift the Oscillator to its 200-400 kc. range using the third harmonic of the generated signal in order to obtain the desired range of sweep. The oscillator series trimmer, C-46, should then be adjusted to produce maximum amplitude of the images. No rocking will be necessary on the station selector inasmuch as the signal frequency is being "wobbled" by the frequency Modulator to produce the effect. After completing this adjustment, the trimmer C-47 should be re-aligned as in (a) to correct for any change brought about by the adjustment of C-46.

BAND X

(a) Disconnect the Frequency Modulator and tune the test Oscillator (Modulation "On") to 400 kc. Place the receiver range switch to its Band X position and tune the station selector to 400 kc. Turn Oscillograph tuning control to "Int." Then align trimmers C-45, C-11 and C-2 for maximum indication at the Oscillograph. Place the Frequency Modulator in operation and attach it to the test Oscillator. Change the Oscillograph timing to "Ext." Increase Oscillator frequency (Modulation "Off") until the forward and reverse waves appear and become coincident at their highest point, approximately at 462 kc. These images may be made to remain stationary by manipulation of the Oscillograph range switch (No. 2 position) and frequency control (mid-position). Readjust trimmers C-45, C-11 and C-2 to give maximum amplitude and complete coincidence of the waves.

(b) Change the test Oscillator to 150 kc. (Frequency Modulator disconnected). Tune this signal on the receiver, disregarding the dial reading at which it is best received. Then interconnect the Frequency Modulator and Oscillator. Return the latter to the point at which the two similar waves appear on the screen. Adjust trimmer C-61 for maximum amplitude of the waves. Rocking of the tuning condenser will not be necessary for this operation as such is duplicated by the Frequency Modulator. Re-align C-47 as in (a) to correct for any error caused by the adjustment of C-61.

BAND C

(a) Turn the range switch of the receiver to its Band C position and tune the station selector until the dial pointer reads 18,000 kc. Set the test Oscillator to the same frequency (modulation "On" and Frequency Modulator disconnected) and regulate its output to the level required for convenient observation. Adjust the trimmer C-43 to the point producing maximum output as indicated on the Oscillograph. Check for the presence of the proper "image" signal by tuning the receiver to 17,080 kc. The 18,000 kc. signal of the Oscillator will be received at this point if the adjustment of C-43 has been properly made by using the position of least capacitance which gives maximum re-

tube. Then adjust the first i-f transformer trimmers C-16 and C-17 so that the forward and reverse waves appearing on the Oscillograph coincide throughout their lengths and have maximum amplitude. The shape of the composite wave obtained from this operation is a true representation of the overall tuning characteristic of the i-f system.

R-F Trimmer Adjustments

Locations of the various antenna, detector and oscillator coil trimmers are shown by Figure 6. The test Oscillator should be removed from connection with the i-f system and its output connected to the antenna-ground terminals of the receiver. No changes are to be made in the connections of the Oscillograph at the second detector. During the following adjustments, the Oscillator output should be regulated as often as necessary to keep the oscillographic image as low as is practically observable. Adherence to this procedure will obviate the broadness of tuning that would result from a v.c. action on a stronger signal. Proceed with the adjustments as follows:—

CALIBRATION

Set the receiver range switch to Band A and rotate the station selector until the tuning condenser plates are in full mesh (maximum capacitance). Then move the main dial pointer until it points exactly on the horizontal line at the low frequency end of the Band A scale. Correct the setting of the vernier second hand pointer to read zero.

BAND A

(a) With the receiver range switch in its Band A position, tune the station selector until the dial pointer is at a reading of 1720 kc. Adjust the test Oscillator to 1720 kc. (modulation "On" and Frequency Modulator disconnected) and increase its output to produce a registration on the Oscillograph. Carefully align the oscillator, detector and antenna trimmers, C-47, C-12 and C-3 respectively, so that each brings about maximum amplitude of output as shown by the wave on the Oscillograph. It will be necessary to have the tuning control of the Oscillograph on "Int." for this operation. After each trimmer has been placed, the Oscillograph tuning control should be set to "Ext." and the Frequency Modulator placed into operation with its connections to the Oscillator and Oscillograph made in accordance with Figure 7. Turn the modulation switch of the Oscillator to "Off" and retune the Oscillator (increase frequency) until the forward and reverse waves show on the Oscillograph and become coincident at their highest points. Adjust the trimmers C-47, C-12 and C-3 again, setting each to the point which produces the best coincidence and maximum amplitude of the wave images.

(b) Remove the Frequency Modulator cable from the Oscillator and shift the signal frequency to 400 kc. Place the modulation switch to "On". Tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then tune the Frequency Modulator

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Parts List

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RECEIVER ASSEMBLIES	
4427	Bracket—High or low frequency tone control or volume control mounting bracket. \$0.18
5237	Bushing—Variable condenser mounting bushing assembly—Package of 3. .43
11223	Capacitor—Adjustable capacitor (C46)46
5241	Capacitor—Adjustable capacitor (C61)40
11292	Capacitor—22 MMfd. (C9)24
11289	Capacitor—50 MMfd. (C8)26
11291	Capacitor—115 MMfd. (C50)24
11290	Capacitor—400 MMfd. (C60)27
11269	Capacitor—800 MMfd. (C59)30
3784	Capacitor—900 MMfd. (C31)30
11316	Capacitor—1225 MMfd. (C26)40
11287	Capacitor—4500 MMfd. (C78)30
5107	Capacitor—.0025 Mfd. (C62, C63)16
4907	Capacitor—.0005 Mfd. (C40, C41)38
4868	Capacitor—.0005 Mfd. (C33)20
4624	Capacitor—.01 Mfd. (C30)34
4937	Capacitor—.01 Mfd. (C39)27
11315	Capacitor—.015 Mfd. (C38)20
4836	Capacitor—.05 Mfd. (C4, C13, C18, C23)30
11327	Coil—Oscillator coil—X band—(L14, L23, C45) \$1.44
11277	Compensating Pack—Comprising one 0.015 Mfd., one 0.035 Mfd. capacitor, one 27,000 ohm and one 8200 ohm resistor—(C27, C28, R12, R13)92
11214	Condenser—Three gang variable tuning condenser—(C7, C14, C48)4.20
11205	Volume Control—(R14)1.30
11219	Tone Control—High frequency tone control—(R22)90
8041	Plate—I. F. or R. F. coil shield locking plate with screw—Package of 2.12
11220	Resistor—Voltage divider resistor—comprising one 3900 ohm and one 4200 ohm section—(R31, R32)84
11221	Resistor—Voltage divider resistor—comprising one 50 ohm, one 28 ohm and one 195 ohm section—(R28, R29, R30)48
5112	Resistor—1000 Ohm—Carbon type—1/4 Watt—(R2) —Package of 5.1.00
3706	Resistor—1800 Ohm—Carbon type—1/4 Watt—(R15) —Package of 5.1.00
5159	Resistor—2200 Ohm—Carbon type—1/4 Watt—(R20) —Package of 5.1.00
5175	Resistor—5600 Ohm—Carbon type—1/2 Watt—(R21) —Package of 5.1.00
2731	Resistor—10,000 Ohm—Carbon type—1 Watt—(R25) —Package of 5.1.10
11305	Resistor—22,000 Ohm—Carbon type—1/4 Watt—(R16, R17) —Package of 5.1.00
11300	Resistor—33,000 Ohm—Carbon type—1/10 Watt—(R24) —Package of 5.75
5033	Resistor—33,000 Ohm—Carbon type—1 Watt—(R23) —Package of 5.1.10
3118	Resistor—100,000 Ohm—Carbon type—1/4 Watt—(R1, R3, R5, R6) —Package of 5.1.00
5027	Resistor—170,000 Ohm—Carbon type—1/4 Watt—(R19) —Package of 5.1.00
11151	Resistor—2.2 Megohms—Carbon type—1/4 Watt—(R9) —Package of 5.1.00
5249	Shield—R. F. coil shield.20
11273	Shield—Radiotron shield.27
5250	Shield—I. F. Transformer shield.22
11222	Socket—Dial lamp socket.18
4794	Socket—4-contact Radiotron socket.17
11197	Socket—6-contact Radiotron socket.14
11198	Socket—7-contact Radiotron socket.17
5224	Switch—Low frequency tone control switch and power switch—(S11, S13)1.00
11236	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10)2.44
5238	Terminal—Antenna terminal assembly.14
11218	Transformer—Audio driver transformer—(T2)2.58
11216*	Transformer—First intermediate frequency transformer—(L16, L17, C16, C17)2.15
11217	Transformer—Second intermediate frequency transformer—(L18, L19, C20, C21, C22, R7, R8)3.10
11213	Transformer—Power transformer—105-125-150-210-250 volts—40-60 cycles.5.10
11212	Transformer—Power transformer—105-125 volts—25-60 cycles.7.18
DRIVE ASSEMBLIES	
4362	Arm—Band indicator operating arm.28
4885	Capacitor—.01 Mfd. (C7, C19, C27, C52) \$0.28
4841	Capacitor—.01 Mfd. (C6)22
5170	Capacitor—.025 Mfd. (C32)27
11203	Capacitor—10 Mfd. (C53)1.18
5212	Capacitor—18 Mfd. (C54)1.16
11215	Capacitor pack—Comprising one 16 Mfd., two 10 Mfd., and two 8 Mfd. capacitors (C29, C35, C36, C55, C56)3.85
11201	Clamp—Cable clamp—located near variable tuning condenser—Package of 5.20
11272	Clamp—Cable clamp—located above antenna terminal.10
4693	Clamp—Electrolytic capacitor clamp—for stock #11215.15
5215	Coil—Antenna coil—A and C bands (L1, L2, L5, L6, C1, C3)2.32
11325	Coil—Antenna coil—X band (L3, L4, C2)1.56
5216	Coil—Detector coil—A and C bands (L7, L8, L11, L12, C10, C12)2.34
11326	Coil—Detector coil—X band (L9, L10, C11)1.60
5217	Coil—Oscillator coil—A and C bands (L13, L15, C43, C47)2.20
10194	Ball—Steel ball—Package of 20. \$0.25
4422	Clutch—Tuning condenser drive clutch assembly—comprising drive shaft, balls, ring, spring and washers assembled.1.00
11333	Dial—Station selector dial scale.60
11227	Drive—Variable tuning condenser drive complete—less dial scale.2.08
11229	Gear—Vernier pointer drive gear.42
4827	Gear—Spring gear assembly.1.27
11301	Indicator22
11226	Indicator—Band indicator pointer assembly—comprising indicator, arm, link and stud20
4475	Indicator—Station selector indicator.18
4340	Lamp—Dial lamp—Package of 5.60
3993	Screw—No. 6-32-5/32" set screw—for band indicator operating arm—Package of 10.25
4689	Screw—No. 8-32-5/32" Square head set screw—for tuning condenser shaft—Package of 10.25
4377	Spring—Band indicator operating arm spring—Package of 5.25
4378	Stud—Band indicator operating arm stud assembly—Package of 5.25
MISCELLANEOUS ASSEMBLIES	
11337	Escutcheon—Station selector escutcheon.70
6614	Glass—Station selector dial glass.30
11346	Knob—Station selector knob—Package of 5.75
11347	Knob—Volume control, range switch, tone control or power switch knob—Package of 5.75
4678	Ring—Spring retaining ring for station selector dial glass—Package of 5.34
11210	Screw—Chassis mounting screw assembly—Package of 4.28
11348	Screw—No. 8-32-7/16" Headless, cupped point, set screw for knob, Stock #11346—Package of 10.32
11349	Spring—Retaining spring for knob, stock #11347—Package of 5.15
REPRODUCER ASSEMBLIES	
11232	Board—Terminal board with two lead wire clips18
11231	Bolt—Yoke and core assembly bolt and nut16
8060	Bracket—Mounting bracket for output transformer and connector.14
11304	Cable—Reproducer cable—complete with female connector.80
11234	Coil—Field Coil—(L22)2.15
11233	Coil—Neutralizing coil.30
11235	Cone—Reproducer cone (L21)—Package of 5.3.50
5040	Connector—4-prong female connector socket for reproducer cable.25
5039	Connector—4-prong male connector plug for reproducer.25
11257	Clamp—Cone center suspension clamping nut and screw assembly—Package of 5.25
9617	Reproducer—Complete6.60
11229	Transformer—Output transformer—(T3)1.66
11230	Washer—Binders board "C" washer—used to hold field coil securely—Package of 5.18

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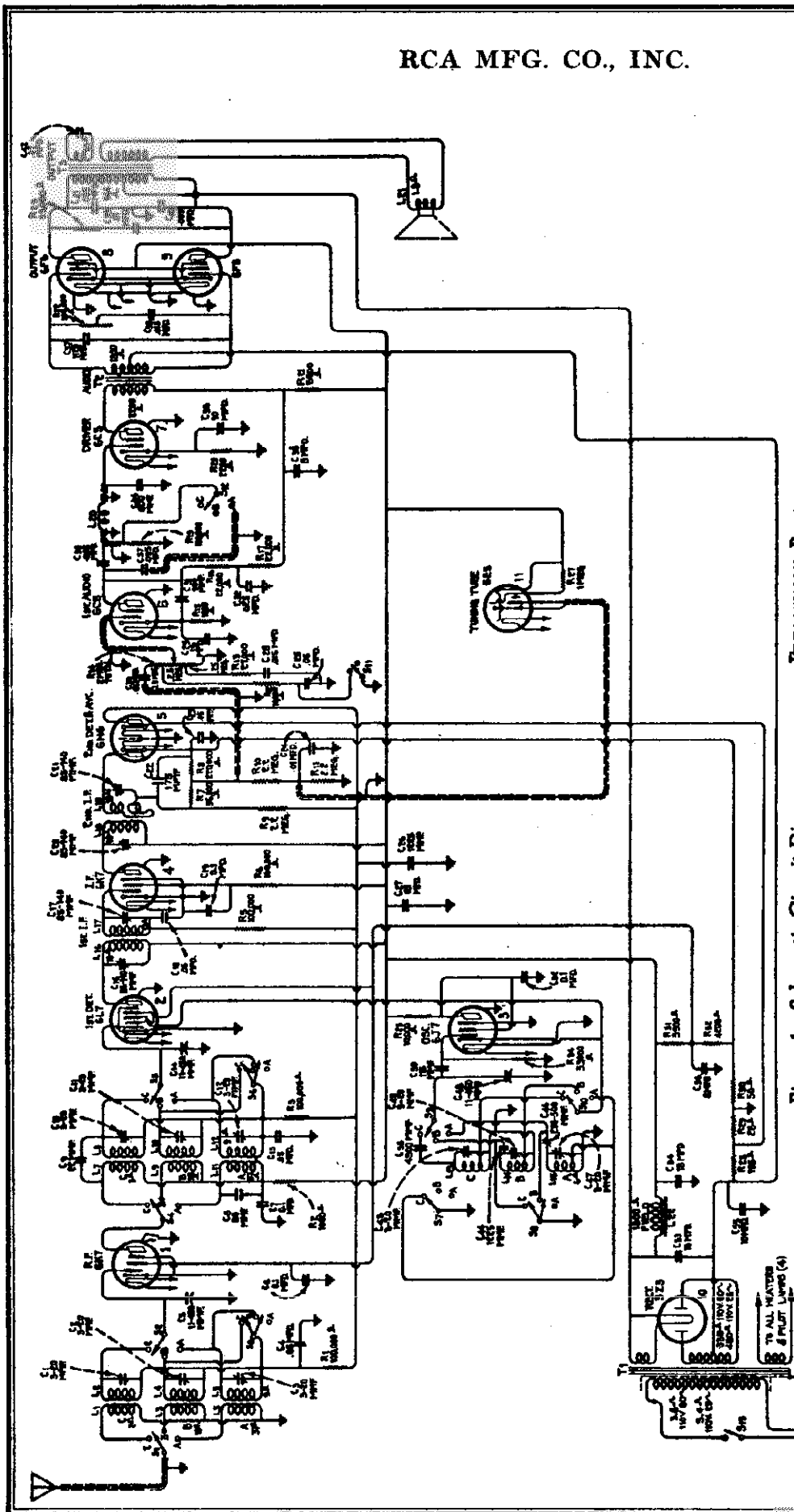
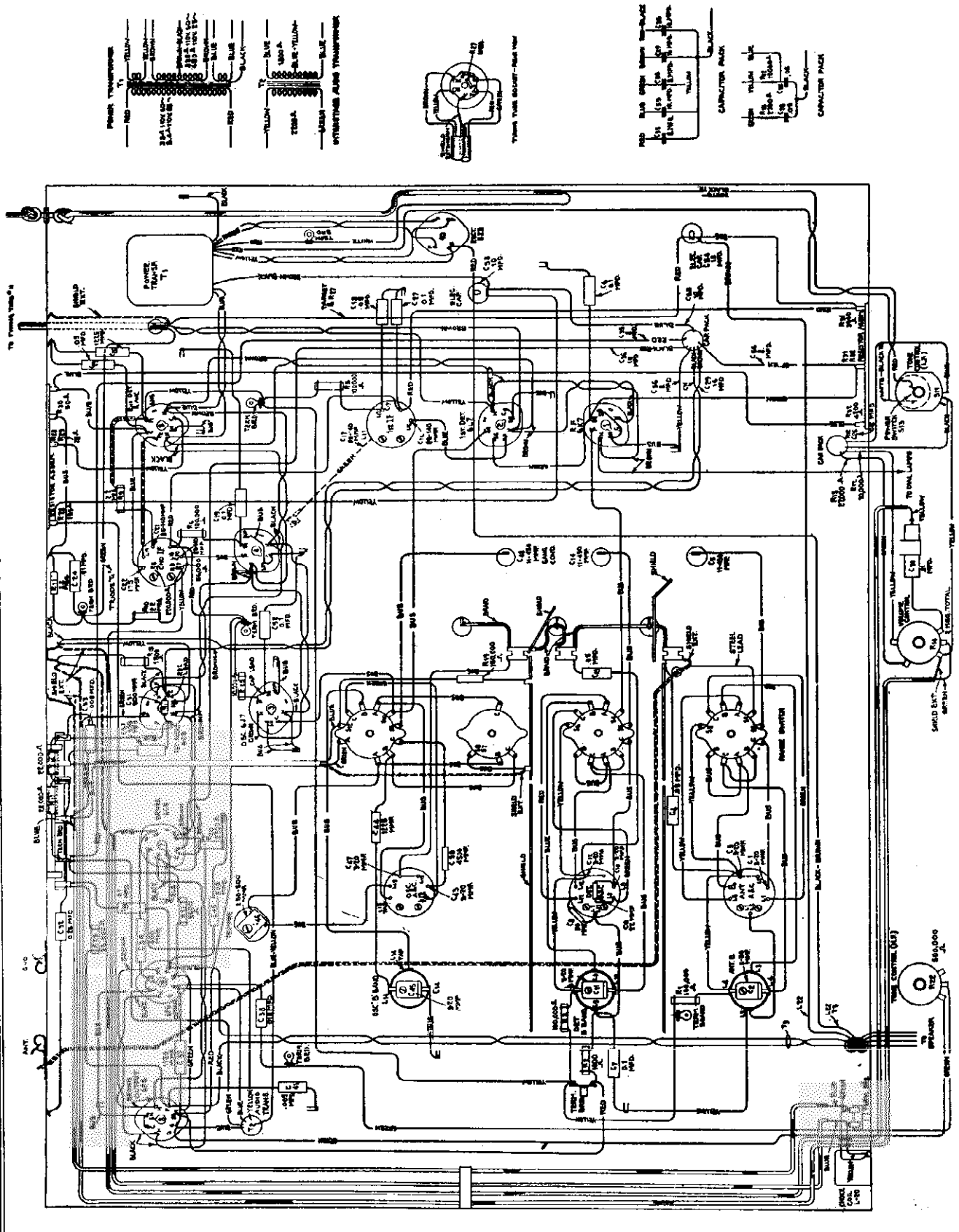


Figure 1—Schematic Circuit Diagram
(On some instruments—C-33 is .005 mfd. and C-37 is removed.)

POWER RATINGS	FREQUENCY RANGES
Rating A.....105—125 volts, 50—60 cycles	Band A.....540 kc.—1800 kc.
Rating B.....105—125 volts, 25—60 cycles	Band B.....1800 kc.—6000 kc.
Rating C.....100—130/140—160/195—250 volts, 40—60 cycles	Band C.....6000 kc.—18000 kc.
Power Consumption.....135 watts	ALIGNMENT FREQUENCIES
MISCELLANEOUS	Band A.....600 kc. (osc.), 1720 kc. (osc. ant., det.)
Undistorted Output.....8.5 watts	Band B.....6132 kc. (osc. ant., det.)
Maximum Output.....11.5 watts	Band C.....18000 kc. (osc. ant., det.)
Intermediate Frequency.....460 kc.	Electrodynamic—12 inch Loudspeaker
	Voice Coil Impedance.....7.5 ohms at 400 cycles

MODEL C11-1
Chassis Wiring

RCA MFG. CO., INC.



MODEL C11-1
Alignment, Part 3
Parts List

RCA MFG. CO., INC.

REPLACEMENT PARTS (Continued)

Stock No.	Description	Part Price	Stock No.	Description	Part Price
5247	Coil—Oscillator coil—B band (L14, C45)	\$1.44	8048	Coupling—Flexible coupling for variable capacitor—(includes indicator shaft)	\$0.70
5214	Condenser—Three gang, variable tuning condenser—(C5, C14, C18)	4.42	11334	Dial—Dial scale with mounting rivets	.71
11205	Volume control—(R14)	1.30	8045	Drive—Drive disc and gear assembly	.46
11219	Tone control—High frequency tone control (R22)	.90	11631	Drive—Tuning condenser drive assembly complete	6.31
5226	Lamp—Fluor. tube—500 mA and locking plate	.70	8044	Excitouchon—Dial excitouchon with vernier	1.08
8041	Fluor. tube—500 mA and locking plate	.12	8046	Gear—Indicator shaft drive gear and vernier roller with one spring	.72
11220	Resistor—Voltage divider resistor—comprising one 3900 Ohm and one 4200 Ohm resistor—(R11, R12)	.84	8070	Gear—Gear sector and band indicator operating link—(link connects to arm on band switch)	.11
11221	Resistor—Voltage divider resistor—comprising one 10 Ohm, one 28 Ohm and one 195 Ohm resistor—(R23, R24, R30)	.48	8071	Link—Coupler with rubber foot spring	.30
1112	Resistor—1000 Ohm—Carbon type—1/4 watt—(R1)	1.00	8049	Pointer—Vernier pointer drive	.55
3706	Resistor—1800 Ohm—Carbon type—1/4 watt—(R13)	1.00	4669	Screw—No. 8-32 1/2" square head set screw—(for variable condenser drive assembly—Package of 10)	.31
1119	Resistor—1200 Ohm—Carbon type—1/4 watt—(R20)	1.00	8047	Spring—Coil spring for indicator shaft drive gear and vernier roller (Stock 89046)	.12
1175	Resistor—1600 Ohm—Carbon type—1/4 watt—(R31)	1.00	8072	Spring—Coil spring for link—Package of 1	.32
2731	Resistor—10,000 Ohm—Carbon type—1 watt—(R30)	1.10	8042	Spring—Band indicator operating arm stud—(Package of 5)	.21
11305	Resistor—1816, R17, Ohm—Carbon type—1/4 watt—(R24, R17)	1.00	REPRODUCER ASSEMBLIES		
11300	Resistor—33,000 Ohm—Carbon type—1/4 watt—(R24)	.75	8059	Board—Reproducer terminal board—(2 ver. minial)	.14
5033	Resistor—33,000 Ohm—Carbon type—1 watt—(R23)	1.10	8060	Bracket—Output transformer mounting bracket	.14
3118	Resistor—100,000 Ohm—Carbon type—1/4 watt—(R1, R3, R7, R6)	1.00	11304	Cable—Reproducer cable—complete with connector	.80
5027	Resistor—10,000 Ohm—Carbon type—1/4 watt—(R10, R11)	1.00	8058	Champ—Mounting clamp—Package of 4	.44
11191	Resistor—22 Megohm—Carbon type—1/2 watt—R9, R10, R11	1.00	11189	Coil—Pilot coil, magnet and cone housing (L22)	10.60
11270	Shield—Choke coil shield	.20	8056	Connector—4-prong male connector plug for reproducer	.15
1249	Shield—R-F coil shield	.20	5039	Connector—4-contact female connector socket for reproducer cable	.25
1273	Shield—Radiofon shield	.22	9420	Reproducer—Complete	.25
1222	Socket—6 contact radiofon socket	.16	11307	Transformer—Output transformer—(T3, C42)	16.32
11197	Socket—7 contact radiofon socket	.14	8073	Transformer—Output transformer—(T3, C42)	3.22
11198	Socket—7 contact radiofon socket	.15	MISCELLANEOUS ASSEMBLIES		
5224	Switch—Low frequency tone control with power switch—(S11, S13)	1.00	5211	Bolt—Speaker mounting bolt assembly—Package of 2	.24
11236	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S12)	2.44	11191	Bracket—Radiofon tuning lamp mounting bracket—less clamp (Stock 81192)	.12
5258	Terminal—Antenna terminal assembly	.14	11319	Cable—Radiofon tuning lamp cable and plug—approximately 2 1/2 long	1.38
11218	Transformer—Audio driver transformer (T1)	2.58	11192	Champ—Radiofon tuning lamp mounting clamp—(Stock 81191)	.12
11216	Transformer—First intermediate frequency transformer—(L16, L17, L18, C17)	2.15	11276	Excitouchon—Radiofon tuning lamp excitouchon	.40
11217	Transformer—Second intermediate frequency transformer—(L18, L19, C18, C21, C22, R7, R8)	3.30	11379	Excitouchon—Station selector excitouchon and crystal	1.08
11213	Transformer—Power Transformer—105/125/150/210/230 volts—40-60 cycles	5.10	11346	Knob—Station selector knob—Package of 5	.71
11212	Transformer—Power transformer—105/125 volts—40-60 cycles	7.18	11347	Knob—Volume control, tone control, power switch or range switch knob—Package of 1	.75
11211	Transformer—Power transformer—(T1)—105/125 volts—40-60 cycles	4.88	11382	Resistor—1 Megohm—Carbon type—1/2 watt (R37)—Package of 5	.75
DRIVE ASSEMBLIES			5210	Screw—Chassis mounting screw assembly—Package of 4	.16
5243	Arm—Band indicator operating arm	.42	11348	Screw—No. 8-32 1/2" Headless cupped point set screw for knob (Stock 811346)	.12
10194	Ball—Steel ball for drive assembly—Package of 20	.25	11181	Shield—Reproducer cover (shield)	.42
8074	Cam—Five position cam for station selector drive assembly	.28	11349	Spring—Retaining spring for knob (Stock 811347)—Package of 1	.15
4422	Clutch—Using condenser drive, clutch assembly—(includes ball, ring, spring and washers assembled)	1.00			

during this check. Tune the receiver back to the 19,000 kc. dial marking, readjust C-43 if necessary, and then tune the detector and antenna capacitors C-10 and C-1 for maximum receiver output. No further adjustments are necessary.

Radiofon Socket Voltages

The voltage values indicated from the Radiofon socket contacts to chassis on Figure 6 will serve to assist in the location of causes for faulty operation. Each value as specified should hold within + 20% when the receiver is normally operative at its rated supply voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. The voltages given are actual operating values and do not allow for inaccuracies which may be caused by the loading effect of a voltmeter's internal resistance. This resistance should be duly considered for all readings. The amount of circuit resistance shunting the meter during measurement will determine the accuracy to be obtained, the error increasing as the meter resistance becomes comparable to or less than the circuit resistance. For the majority of readings, a meter having an internal resistance of 1000 ohms per volt will be satisfactory when the range used for each reading is chosen as high as possible consistent with good readability.

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 7. 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.

receiver output. The Oscillator should then be shifted to 600 kc. and the receiver tuned to resonate this signal, disregarding the reading at which it is best received. Trimmer C-46 must then be adjusted, simultaneously while rocking the station selector backward and forward through the signal until the maximum output results from the combined operations. C-47 should be rechecked to assure that its adjustment has not changed because of the trimming of C-46.

Band B—This band must be aligned at 6132 kc. by tuning the test Oscillator to such a frequency and turning the station selector to the 6132 kc. dial reading. Then tune the trimmer C-45 to produce maximum receiver output, using the setting of least capacitance which causes same. The presence of the proper "image" may be checked by tuning the receiver to 5212 kc. at which point the 6132 kc. signal will be heard if the trimmer C-45 has been properly set to the position of least capacitance for maximum (peak) output. It may be necessary to increase the Oscillator output for this check. No adjustments are to be made. Return the station selector to the 6132 kc. dial marking and trim capacitors C-11 and C-2 for maximum receiver output. No other adjustments are necessary on Band B.

Band C—Change the receiver so that it is operative and the dial reads 19,000 kc. on the "C" Band. Tune the test Oscillator to this same frequency. Then adjust the oscillator trimmer C-43 to produce maximum (peak) output. Two positions of this trimmer will be found which conform with this requirement. The one of least capacitance is correct. Check for the presence of "image" response at 17,080 kc. by shifting the receiver tuning. If it is received at such a point, the trimmer C-43 has been correctly adjusted to the right peak. No adjustments are to be made

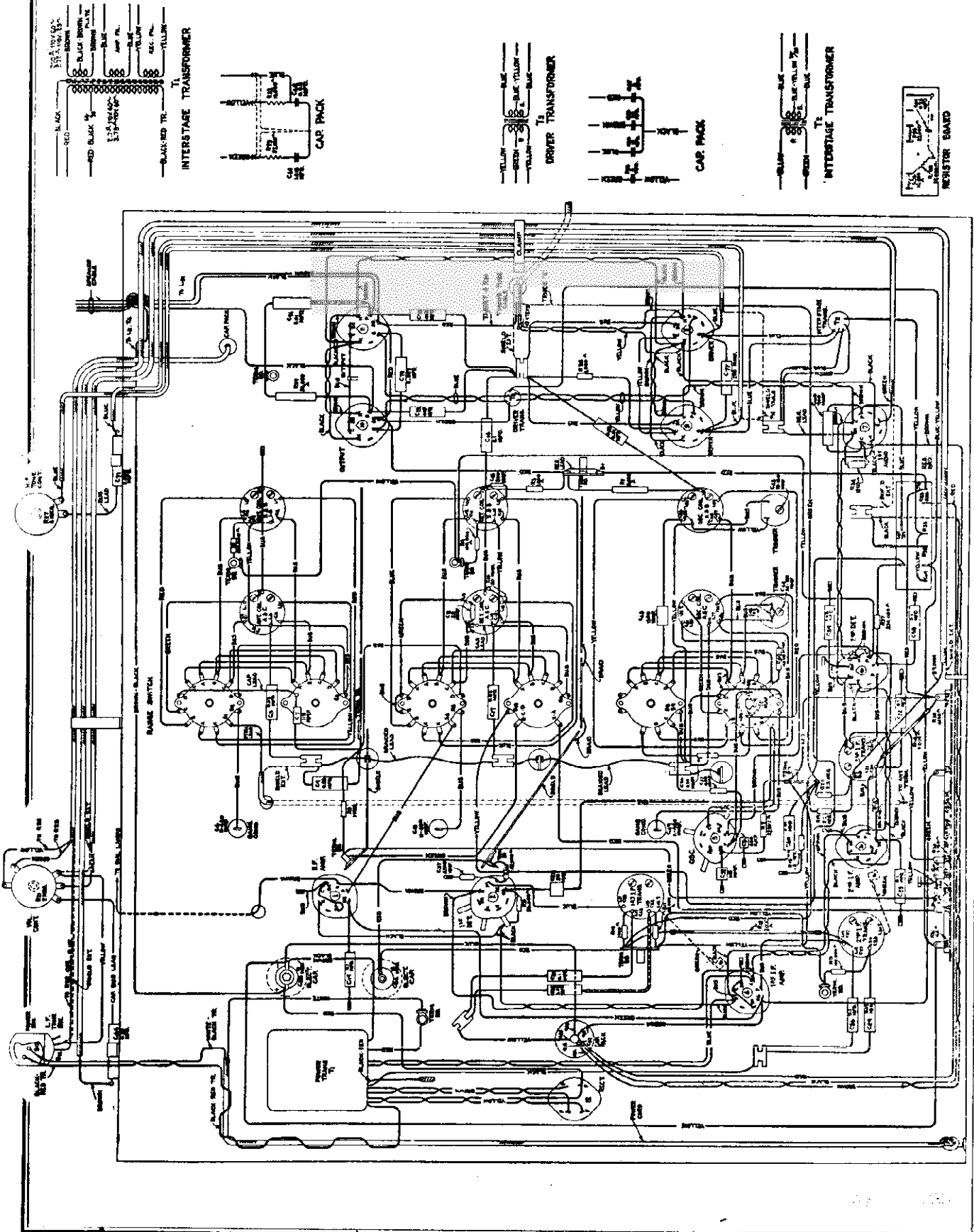
REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	Part Price	Stock No.	Description	Part Price
4437	Bracket—High or low frequency tone control or volume control mounting bracket	\$0.18	5170	Capacitor—0.25 Mfd. (C37)	\$0.21
5237	Bushing—Variable condenser mounting	.45	11203	Capacitor—10 Mfd. (C33)	1.18
11253	Capacitor—Adjustable capacitor (C46)	.46	5212	Capacitor—18 Mfd. (C54)	1.16
11289	Capacitor—22 MMfd. (C6)	.24	11215	Capacitor pack—Comprising one 16 Mfd., one .05 Mfd., C46, C45, C46, C46 capacitors (C59, C55, C56, C55, C56)	3.85
11291	Capacitor—16 MMfd. (C8)	.26	11318	Capacitor pack—Comprising one .015 Mfd. and one 27,000 Ohm resistor (C24, C28, R12, R13)	1.30
13317	Capacitor—115 MMfd. (C50)	.24	11201	Champ—Cable clamp—located near variable tuning condenser—Package of 5	.20
3784	Capacitor—600 MMfd. (C54)	.30	11272	Champ—Cable clamp—located above armature—(C26)	.20
4469	Capacitor—1150 MMfd. (C37)	.35	4693	Champ—Electrolytic capacitor—comp.—for stock 11213	.11
11288	Capacitor—125 MMfd. (C26)	.20	1215	Coil—Antenna coil—A and C bands (L1, L2, L3, L6, C1, C3)	2.32
11283	Capacitor—4500 MMfd. (C40, C41)	.38	5247	Coil—Antenna coil—B band (L3, L4, C2)	1.88
4858	Capacitor—0.05 Mfd. (C33)	.24	11330	Coil—Choke coil (L20)	1.00
4624	Capacitor—0.01 Mfd. (C10)	.27	11216	Coil—Detector coil—A and C bands (L7, L8, L9, C11, C12, C13)	2.34
11319	Capacitor—0.015 Mfd. (C8)	.26	5246	Coil—Detector coil—B band (L9, L10, C11)	1.62
4826	Capacitor—0.01 Mfd. (C4, C13, C18, C21)	.28	5217	Coil—Oscillator coil—A and C bands (L13, L15, C43, C47)	2.20
4883	Capacitor—0.1 Mfd. (C3, C19, C27, C31)	.28			
4841	Capacitor—0.1 Mfd. (C5)	.22			

MODEL C13-2
Chassis Wiring

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MODEL C13-2
Trimmers, Voltages
Circuit Data

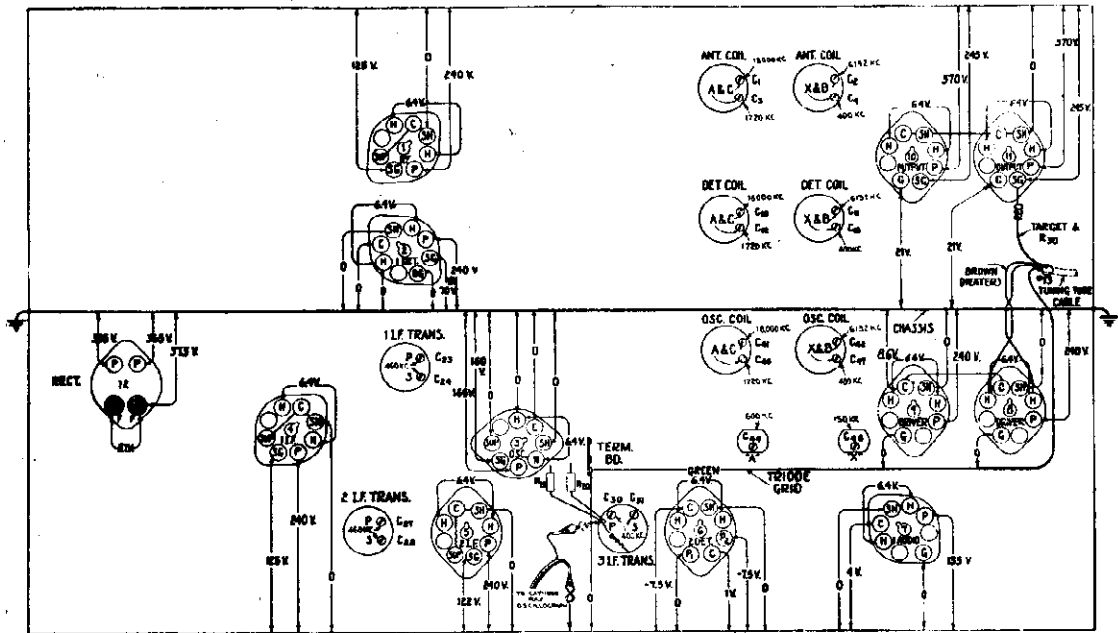


Figure 7—Trimmer Locations and Radiotron Socket Voltages

Measured at 120 volts A.C.—No Signal—All Tubes Intact—Volume Control Maximum—Band Switch on "A"

* Measured on 250 Volt Range of 1000 Ohm Per Volt Meter

GENERAL FEATURES

Metal Tubes

This receiver uses the new metal tubes which are much smaller in size than the corresponding glass types. The high frequency efficiency of these metal tubes is greater because of the shorter lengths of leads, lesser interelectrode capacitance and the more complete shielding of the metallic envelopes. Their rugged construction prevents breakage and reduces microphonic tendencies. The bases and sockets of all types have a standardized arrangement of connecting prongs.

Receiver Chassis

Service convenience has been a controlling factor in the layout of the chassis parts and wiring. The assembly of these various elements is such that the number of conductors is minimized with all important connections being readily accessible. Further accessibility to all parts of the chassis is due to the open construction of the base and mounting supports. Trimmer adjustments are easily reached from the underside of the

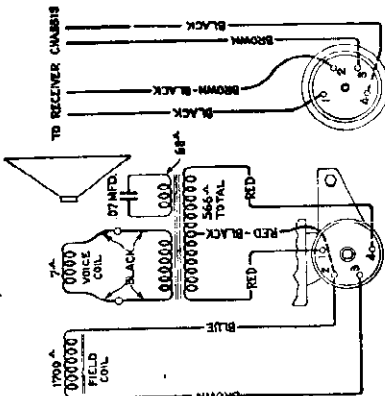


Figure 3—Loudspeaker Schematic and Wiring

chassis. The r.f. detector and oscillator coils are identified by markings on their bases, which for example read "A40" to indicate the Band A, "antenna" and "oscillator" coils.

ELECTRICAL

The circuit is based upon the Superheterodyne principle. The radio frequency and audio frequency amplification are balanced in such manner that the maximum of performance is obtained. The following general items cover the circuit arrangement and notable features involved:—

Tuned Circuits

Six adjustable tuned circuits are used in the i-f system, each resonating at 460 kc. A three section variable condenser tunes the secondary of the antenna transformer; the secondary of the detector input transformer and the oscillator coil on all bands with the exception of D, which has only its detector and oscil-

Dial Drive

The dial drive and station indicator system are of new and unique design. Five individual dial scales, each with full 180 degree band spread, are provided, one for use on each band. The scales are eccentrically arranged on a rotary disc and adapted to operate in conjunction with the band change switch so that as the switch is shifted to a certain band, the corresponding dial scale rotates into position. For other positions of the band switch, a similar scale selection takes place, there being only one scale visible at a time. The driving mechanism for the dial and condenser has tuning ratios of 10 to 1 and 50 to 1. Control may be interchanged between these two ratios by push-in operation of a positive action clutch which is actuated by the tuning knob. From the clutch and ratio controlling mechanism, the dial system interlinks with the tuning mechanism, main dial pointer and vernier dial pointer through means of fibre and brass gears. The ratio of vernier rotation to the main pointer is 20 to 1. An intermediate gear is used in the system to reduce gear backlash. This gear is suspended in position with two tension springs which maintain the proper mesh at all times. A flexible coupling disc is used between the drive and the condenser shaft, permitting the dial drive mechanism to be rigidly mounted to the chassis base.

Tuning Condenser

The variable tuning condenser is supported by a new design of shock-proof mount which has been developed by our engineers to minimize audio-frequency "howl" produced by chassis vibration.

Power Transformer

The transformer is assembled flat against the chassis base which acts as a radiating fin to dissipate the heat developed in the windings. An improved electrostatic shield is used between the primary and secondary windings to reduce a.c. line disturbances and to prevent the receiver from radiating into the line.

Loudspeaker

A super-sensitive 12 inch electrodynamic speaker is employed. It is correctly adapted to the cabinet design to assure the best possible acoustic performance. Electrical connection is made from the speaker to the chassis through a plug and connector attachment, permitting easy removal for servicing.

CIRCUIT

Each tuning range has its own group of r-f and oscillator coils, they being selected as desired by operation of the band-change switch. Trimmer condensers are provided on all of the tuned circuits for use in obtaining precise alignment.

Band D Tuning

Special notice should be taken of the manner of tuning this band. The r-f stage is untuned when the range switch is turned to its Band D position and the signal is fed from the antenna directly to the first detector input circuit. The inductance of this circuit consists of a short length of bus wire to which the antenna lead is tapped at a definite predetermined point. The

MODEL C13-2
Circuit Data, Part 2
Alignment, Socket

RCA MFG. CO., INC.

built in the same glass envelope. The cathode-ray section consists of a conically shaped luminescent screen, upon which a pattern is formed by an effect of the detected signal after said effect has been amplified by the amplifier section which is fed from the detector diode circuit. The size of the pattern is determined by the strength of the signal voltage, so that any change of tuning may be readily observed in order to facilitate tuning to exact resonance.

SERVICE DATA

Equipment

The instruments required for placing this receiver in proper alignment should consist of an RCA Cathode-Ray Oscilloscope, an RCA Full Range Oscillator, an RCA Frequency Modulator, a Tuning Wand and a non-metallic screw driver. These devices are illustrated and described on a separate page of this book. The Cathode-Ray Oscilloscope is to be used as an output indicator to show precisely when the circuits are correctly aligned. The Full Range Oscillator is required as the source of standard alignment signals at the various frequencies. Visual alignment is made possible through use of the Frequency Modulator, which in conjunction with the Oscilloscope and Oscillator, causes the characteristic wave shape of the circuit under test to be formed on the Oscilloscope screen. The necessity for alignment and direction of required change may be tested with a Tuning Wand. It's use is as follows:—

The Tuning Wand, which consists of a bakelite rod having a small brass cylinder installed at one end, and a core of finely divided iron at the other, may be inserted into a tuned coil to obtain an indication of the tuning. With a signal being supplied to the receiver at the alignment frequency of the circuit concerned, each end of the Wand should be placed through the center of the coil. Holes are provided in the rf coil shield for this test. A change in tuning will be produced by the presence of the brass cylinder or iron core and consequent change of receiver output occurs. If there is a decrease of output when either of the two ends are inserted, the tuning is correct and will require no adjustment. However, should there be an increase of output due to the iron core and decrease with the brass cylinder, an increase in inductance or decrease in capacitance is necessary to bring the circuit into alignment. The frequency should therefore be increased accordingly. If the brass cylinder causes an increase in output while the iron end causes a decrease, reduction of inductance will be necessary to bring the circuit into alignment. This will be equivalent to decreasing the trimmer concerned.

Run or Wand Used	Change of Signal Output	Change Radio in Tuning Capacity
{Iron	{Decrease}	.....None
{Iron	{Increase}	.....Decrease
{Iron	{Decrease}	.....Increase
{Iron	{Increase}	.....Decrease
{Iron	{Increase}	.....Increase

coil serves as a filter reactor in conjunction with high capacity electrolytic condensers. Fixed bias voltages are made available at the filter output on a divider system, which is likewise well filtered with large capacitors.

Tuning Indicator

A cathode-ray tube is used as a means of visually indicating when the receiver is accurately tuned to the incoming signal. This tube is of new design and comprises an amplifier section and a cathode-ray section

SERVICE DATA

The various diagrams of this booklet contain such information as will be needed to indicate causes for defective operation. In general, the ratings of the resistors, capacitors, coils, etc. are indicated adjacent to the symbols signifying these parts. Identification titles such as R-1, L-2, C-1, etc., are provided for reference between the illustrations and Replacement Parts List. The coils, resistors and transformer windings are rated in terms of their d.c. resistances. Where the value is not given, the resistance is less than one ohm.

Alignment Procedure

The extensive frequency range of this receiver necessitates a more or less involved method of alignment. However, if the following directions are carefully applied, the normal performance of the instrument will be obtained.

Circuits aligned by use of Cathode-Ray equipment will be as near to perfection as possible, hence this method is to be preferred in all cases. Alignment by other methods is oftentimes an approximation unless extreme care is taken and a good deal of time expended. The oscillographic method is particularly advantageous for trimming the i-f tuned circuits to obtain

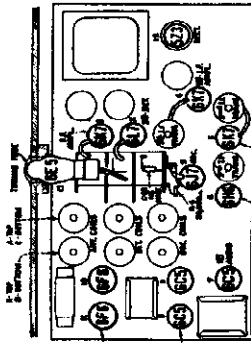


Figure 5—Radiotron and Coil Locations

the utmost in tone quality and at the same time the maximum of selectivity. Procedure to be followed when using a Cathode-Ray Oscilloscope is therefore given in detail. Should this type of equipment be unavailable, a substitute indicator may be used, the procedure necessary being covered on page 12.

ranged in cascade to operate at 460 kc. The transformers have their primaries as well as secondaries tuned by adjustable trimmer capacitors. These trimmers are designed to resist moisture, temperature and other detrimental factors which may affect their adjustments. Litz wire is used for the windings of the third transformer in order to provide the proper efficiency in driving the diode second detector.

Detection and A. V. C.

The modulated signal as obtained from the output of the i-f system is detected by an RCA-6H6 double diode tube. The audio frequency secured by this process is passed on 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 R-18, is applied as automatic control grid bias to the r-f, first detector and i-f tubes through suitable resistance-capacitance filter circuits. The second diode of the RCA-6H6 is used to supply residual bias for these controlled tubes under conditions of little or no signal. This diode, under such conditions, draws current, which flows through R-18, R-19, and R-37, 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. The cathode and the anode of the biasing a.v.c. diode have positive potential in respect to chassis ground and cathodes of the a.v.c. controlled tubes when no signal is being received.

Audio System

Several stages of audio amplification provide excellent fidelity and wide range of volume both for short wave as well as on the standard and long wave bands. The high gain of the system has necessitated thorough shielding and careful manufacture. All wiring, transformers, etc., should always be placed as originally installed if it has been necessary to remove such for service purposes. Hum difficulties are likely to occur if this caution is not observed. Manual volume control is by means of an acoustically tapered potentiometer which conveys the audio output of the second detector to the first a-f amplifier stage. This control has tone compensation produced by filters connected to two points thereon. This gives the correct aural balance at different volume settings. A music-speech switch is provided in one of the volume control filter circuits for use in obtaining good speech intelligibility. On the speech position, the low frequency tones are reduced. A push-pull driver stage is used between the first a.f. and the Class AB output amplifier. A continuously variable high frequency tone control is shunted across the grids of the driver tubes. A sharp, high audio frequency cut-off is obtained by a tertiary winding on the audio output transformer and by the correct design of the driver and interstage transformers. This cut-off feature results in quieter operation by the reduction of high frequency noise, especially on weaker stations.

Rectifier and Filter

An RCA-4Z3 full-wave rectifier tube is employed in the high voltage supply system. The loudspeaker field

total length of this inductive wire from the center of the tuning capacitor to ground represents the secondary of a high frequency autotransformer, while the inductive section included between the antenna lead tap and ground forms the primary. Alteration of the dimensions and position of this wiring will change the tuning and alignment of the circuit, resulting in total

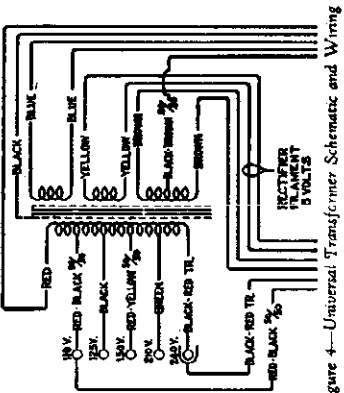


Figure 4—Universal Transformer Schematic and Wiring
En. Res.—489 Ohms, Total
Sec. Res.—167 Ohms, Total

lack of operation or seriously poor operation. It is therefore necessary when servicing to avoid changes in the wiring which includes Band D detector and oscillator i-f circuits unless the arrangement is restored to its exact original condition. Similar caution should be observed when exchanging by-pass condensers in these same circuits, since their values, physical positions, length of leads, quality of dielectric etc. are critical and variations will definitely affect operation of the receiver. The small heater by-pass condensers and ground terminals installed at the tube sockets are very important in this respect.

Oscillator Stage

The heterodyne oscillator circuit used in this receiver is an improved type, having exceptional frequency stability and uniformity of output over its various tuning ranges. It operates on fundamental frequencies which are fed to the first detector heterodyne tube (RCA-6L7) on an auxiliary mixing grid. The oscillator generates a signal which is at all times above the frequency of the incoming signal by 460 kc. As shown by the schematic diagram, the cathode of the oscillator tube is above ground potential for r.f., while the plate is effectively at ground potential. This particular arrangement, together with the plate and screen series resistors, makes the circuit independent of supply voltage variations in regard to stability and uniformity of output. Separate coils are used for each of the tuning ranges. The switching of the different bands is such as to short circuit certain unused coils which would absorb energy from the circuits used.

Intermediate Amplifier

Two stages of i-f amplification comprising three tuned transformers and two RCA-6K7 tubes are ar-

RCA MFG. CO., INC

MODEL C13-2 Alignment, Part 2

Modulator is automatically producing the same effect. After completing this adjustment, the trimmer C-46 should be re-aligned as in (3) to correct for any change in the oscillator high frequency tuning which has been caused by the adjustment of C-44.

Band X

- (a) Disconnect the Frequency Modulator and tune the test Oscillator to a frequency of 400 kc. (Modulation "On"). Place the receiver range switch in its Band X position and turn the station selector until the dial pointer reads 400 kc. Adjust the Oscillograph tuning control to "Int." Then align each of the trimmers C-47, C-13 and C-4 to the point producing maximum output at the Oscillograph. Place the Frequency Modulator in operation and attach it to the Oscillator in the normal manner. Change the Oscillograph timing to "Ext." Increase the frequency of the Oscillator (modulation "Off") until the two waves appear and become coincident at their highest points, approximately at 432 kc. They may be made to remain stationary on the screen by manipulation of the Oscillograph range switch and frequency control. Readjust the three trimmers C-47, C-13 and C-4 to give maximum amplitude and complete coincidence of the waves.
- (b) Change the test Oscillator so that it delivers a signal of 150 kc. with the Frequency Modulator disconnected. Tune this signal on the receiver which has previously been set to Band X, disregarding the dial reading at which the signal is best received. Then interconnect the Frequency Modulator with the Oscillator and retune the latter to the point at which the two similar waves appear on the screen. Adjust the trimmer C-48, for maximum amplitude of the wave images. Rocking of the tuning condenser will not be necessary as the Frequency Modulator duplicates such an operation. Repeat the alignment of C-47 as outlined in (a) to correct for any reflective error brought about by the adjustment of C-48.

Band B

- (a) Advance the receiver range switch to its Band B position and tune the station selector to a dial reading of 6132 kc. Set the test Oscillator to this same frequency (Modulation "On" and Frequency Modulator disconnected) and increase its output until a suitable indication is apparent on the Oscillograph. Then adjust the trimmer C-42 to the point producing the maximum amplitude of the image. Two positions will be found on this trimmer which causes maximum amplitude. The one of least capacitance is correct and should be used. Check for the "image" signal, which will be received at 5242 kc. on the dial if the adjustment of C-42 has been properly made. An increase in Oscillator output may be necessary for this test, however its frequency should not be changed nor any trimmer adjustments made on the receiver.

ing manufacture, hence no alignment will be necessary in this range. Locations of the various antenna, detector and oscillator trimmers are shown on Figure 7. The test Oscillator should be removed from connection with the i-f system and its output attached to the antenna-ground terminals of the receiver. No changes are to be made in the attachment of the Oscillograph at the second detector. During the adjustments, the Oscillator output should be regulated as often as is necessary to keep the oscillographic image as low as is practically observable. Such procedure will obviate apparent broadness of tuning which would result from a.v.c. action on a stronger signal. The sequence of alignment should be Band A, Band X, Band B and Band C. Proceed with the adjustments as follows:—

Calibration

Set the receiver range switch to Band A and rotate the station selector until the tuning capacitor plates are in full mesh (maximum capacity). Then move the main dial pointer until it points exactly to the horizontal line at the low frequency end of the Band A scale. Correct the setting of the vernier second hand pointer to read zero.

Band A

- (a) With the receiver range switch on its Band A position, tune the station selector until the dial pointer is at a reading of 1720 kc. Adjust the Oscillator to 1720 kc. (modulation "On" and Frequency Modulator disconnected) and increase its output to produce a registration on the Oscillograph. Carefully align the oscillator, detector and antenna trimmers, C-46, C-12 and C-3 respectively, so that each brings about maximum amplitude of output as shown by the wave on the Oscillograph. It will be necessary to have the tuning control of the Oscillograph on "Int." for this operation. Then shift the timing control to "Ext." and place the Frequency Modulator into operation with its connections to the Oscillator and Oscillograph as shown on Figure 6. Return the test Oscillator (increase frequency) until the forward and reverse waves show on the Oscillograph and become coincident at their highest points. Adjust the trimmers C-46, C-12 and C-3 again, setting each to the point which produces the best coincidence and maximum amplitude of the images.
- (b) Remove the Frequency Modulator cable from the Oscillator and shift the signal frequency to 400 kc. Tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then insert the Frequency Modulator plug and retune the Oscillator until the similar forward and reverse waves appear on the screen. It is advisable to shift the Oscillator to its 200—400 kc. range and use the third harmonic of the generated sweep in order to obtain the desired range of sweep for this adjustment. The trimmer C-44 should then be adjusted until a point is reached where the waves have the greatest amplitude. It will be unnecessary to rock the tuning condenser for this operation inasmuch as the Frequency

the signal produces a wave pattern on the Oscillograph screen, adjusting the Oscillograph frequency and range controls to give several complete cycles, the amplitude of which will afford an accurate peak indication. Cause the image formed to stand still on the screen by manipulation of the "Sync." control. Use as low a signal output from the Oscillator as can be accurately observed at the Oscillograph. Then tune the two trimmers, C-30 and C-31 of the third i-f transformer to produce maximum amplitude (vertical deflection) of the oscillographic image. Under this condition, the trimmer will be sharply resonated to 460 kc. in operation and interconnect with the Full Range Oscillator by means of the shielded patch cord provided. Figure 6 shows the proper arrangement. Set the Frequency Modulator sweep range switch to its "Lo" position and turn the Oscillator modulation switch to "Off". Change the timing (Sync.) control of the Oscillograph to "Ext." and place the range switch to its No. 2 position. Then shift the tuning of the Oscillator so as to increase its frequency, until two distinct and similar waves appear on the Oscillograph screen and become coincident at their highest points. These curves will be found to occur at an Oscillator setting of approximately 540 kc. They will be identical in shape but appearing in reversed positions. Adjust the frequency control of the Oscillograph in order to cause the waves to conform with these requirements and to make them remain motionless on the screen. This will require a setting of approximately 1/2 clockwise rotation of the frequency control. The trimmers C-30 and C-31 should then be readjusted so that the two curves move together and become exactly coincident throughout their lengths, maintaining the maximum amplitude at which this condition can be brought about.

as above, change the Oscillator output to the control grid cap of the first i-f tube (RCA-6K7). Adjust the two trimmers C-27 and C-23 and reverse waves appearing on the Oscillograph coincide throughout their lengths and have maximum amplitude.

Change the test Oscillator output to the control grid of the first detector tube (RCA-6L7) without disturbing the connections and adjustments of the other apparatus. Then align the trimmers C-23 and C-24 of the first i-f transformer to produce waves of maximum coincidence and maximum amplitude. The shape of the composite wave obtained from this operation is a true representation of the overall tuning characteristic of the i-f system.

- (c) Leaving the equipment connected and adjusted as above, change the Oscillator output to the control grid cap of the first i-f tube (RCA-6K7). Adjust the two trimmers C-27 and C-23 and reverse waves appearing on the Oscillograph coincide throughout their lengths and have maximum amplitude.
- (d) Leaving the equipment connected and adjusted as above, change the Oscillator output to the control grid cap of the first i-f tube (RCA-6K7). Adjust the two trimmers C-27 and C-23 and reverse waves appearing on the Oscillograph coincide throughout their lengths and have maximum amplitude.
- (e) Change the test Oscillator output to the control grid of the first detector tube (RCA-6L7) without disturbing the connections and adjustments of the other apparatus. Then align the trimmers C-23 and C-24 of the first i-f transformer to produce waves of maximum coincidence and maximum amplitude. The shape of the composite wave obtained from this operation is a true representation of the overall tuning characteristic of the i-f system.

ANTENNA DETECTOR AND OSCILLATOR
For Bands A and X, adjustments must be made at the high and low frequency ends of the range. On Bands B and C, alignment is required only at the high frequency end. Band D is permanently adjusted during

I-F TRIMMER ADJUSTMENT

Six trimmers are associated with the three i-f stages. Their locations on the chassis are shown by Figure 7. Each must be aligned to a basic frequency of 460 kc. The last i-f transformer should be adjusted first, the one preceding it second and the operation carried through successive stages until the first transformer has been aligned. For such a process, it is necessary to feed the output of the Full Range Oscillator to the stages in their order of alignment, adjusting the trimmers of each and observing the effect at the second detector output on the Cathode-Ray Oscillograph. The most convenient point for connection of the Oscillograph is at the detector diode lead circuit, with the vertical "Hi" terminals attached to the junction of R-17, R-18 and R-19, and the "Grid" to the chassis. The "Ext. Sync." terminals of the Oscillograph should be connected to the Frequency Modulator as illustrated in Figure 6. A .001 mfd. capacitor installed in series with the Oscillator "Ant." output lead will prevent the voltage constants of the stage being aligned from becoming upset. Proceed further as follows:—

- (a) Place the receiver, Oscillograph and test Oscillator in operation. Set the receiver volume control to maximum and the range switch to Band "A". Tune the station selector to a point where no interference is caused by local stations or the local oscillator, removing the 6Y7 tube if necessary. Turn the Oscillograph vertical "A" amplifier to "On" and advance the vertical gain control to its maximum position. Set the horizontal "B" amplifier to "tuning" and control its gain so that the luminance spot sweeps a trace completely across the screen. Have the timing control adjusted to "Int."
- (b) Attach the output of the test Oscillator to the control grid cap of the second i-f tube (RCA-6K7) and chassis ground. Tune the Oscillator

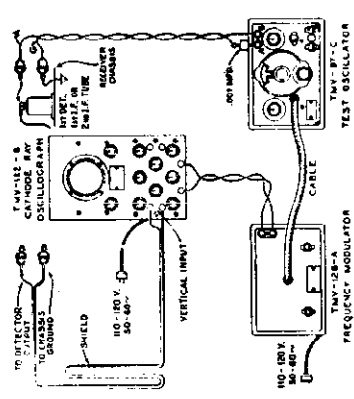


Figure 6—Alignment Apparatus Connections to 460 kc. having its modulation switch turned to "On". Regulate the output control until

MODEL C13-2

Alignment, Part 3

Dial Data, Transformer Data

RCA MFG. CO., INC.

Phonograph Attachment

The audio system of this receiver may be adapted for use in the reproduction of phonograph records by proper connection and arrangement of an external turntable and its associated accessories. The relatively high amplification due to the number of π - π stages employed, necessitates that great care be taken when the circuits are changed for phonograph input. It is recommended that the turntable used be fed directly to the grid circuit of the first audio stage, with suitable switching installed for changing between radio and phonograph operation. Diagrams covering suggested methods of phonograph attachment are given in Figures 9 and 10 with installation details. Hon may possibly be encountered from lack of shielding and improper placement and shielding of the input transformer if these items are not taken care of during re-arrangement of the circuits. All wiring should be installed in a substantial and permanent manner.

Radiofon Socket Voltages

The voltage values indicated from the Radiofon socket contacts to ground on Figure 7 will serve to assist in locating causes for faulty operation when existent. Each value as specified should hold within $\pm 20\%$ when the receiver is normally operative at the rated supply voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. The voltages given on the diagram are actual operating values and do not allow for inaccuracies which may be caused by the loading effect of a voltmeter's internal resistance. This resistance should be duly considered for all readings. The amount of circuit resistance shunting the meter during measurement will determine the accuracy to be obtained, the error increasing as the meter resistance is comparable to or less than the circuit resistance. For the majority of readings, a meter having an internal resistance of 1000 ohms per volt will be satisfactory when the range used for each check is chosen as high as possible consistent with good readability.

Universal Transformer

The wiring of the special transformer used in some models of this receiver is given by Figure 4. This transformer is adaptable to several ranges of voltage, hence, in cases of receiver inoperation, the connections should be checked to assure that they are correct for the voltage being used.



Figure 10—Duo Junior Connections

Arrange connections from Duo Junior output cable to receiver as that completed wiring is in accordance with schematic above. Add two jumpers shown by heavy full lines to Duo Junior Radio-Phono switch. Keep all leads as short as possible and well shielded where indicated.

PARTS REQUIRED
Model R-93—Duo Junior Phonograph

during this check. Return the receiver tuning to 6132 kc., readjust C-26 if necessary, and then tune the detector and antenna coil trimmers, C-11 and C-2 to produce maximum (peak) receiver output as indicated on the glow meter.

BAND C

Turn the receiver range switch to its Band "C" position and set the tuning control to a dial reading of 18,000 kc. Tune the Oscillator to this same frequency. Adjust the oscillator parallel trimmer C-41 to produce maximum receiver output. Two positions of the trimmer will be found which fulfill such a condition. The one of least capacitance is correct. To assure that the right position has been used, check for the "image" of the 18,000 kc. signal which will be received at 17,080 kc. on the dial if C-41 is correctly adjusted. An increase in Oscillator output may be necessary. No trimmer adjustments should be made during this check. Return the receiver tuning to 18,000 kc., readjust C-41 if necessary, and then tune the detector and antenna trimmers C-10 and C-1 to give maximum receiver output.

Dial Adjustment

Figure 8 illustrates the relations of the various parts of the dial mechanism when it is in its A-Broadcast position and the range switch is likewise turned to its Band A setting. In re-assembling the dial after repair, see that the gear are meshed in accordance with the

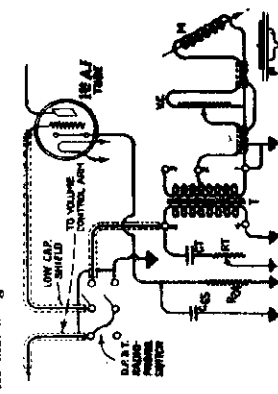


Figure 9—General Phonograph Connections

Change the receiver circuits and add phonograph connections to conform with the above schematic. Thoroughly shield leads where indicated, keeping them clear of a.c. circuits and transformer. Place transformer T so as to obtain minimum lengths of secondary leads and mount it in the position which does not cause hum.

PARTS REQUIRED

- M—Magnetic Pickup Mechanism
- VC—Volume Control
- T—Phono Input Transformer—Stock No. 7467
- P—Phono Turntable
- LI—Low Impedance
- CT—Condenser—.05 μ fd
- RT—Variable Resistor —6 to 10,000 ohms

diagram, at the same time noting that the lever which is attached to the range switch shaft is in the position as above.

A position and tune the selector to a dial reading of 1720 kc. Tune the Oscillator to this same frequency and adjust trimmers C-46, C-12 and C-3 to produce maximum indicated receiver output.

BAND X

Shift the Oscillator to 600 kc. and tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then adjust trimmer C-44, simultaneously rocking the tuning control backward and forward through the signal, until maximum output is obtained from the combined operations. Repeat the alignment of C-46 as in (a) to correct for any change caused by adjustment of C-44.

BAND X

(a) Change the range switch to its Band "X" position. Tune the receiver to read 400 kc. and set the Oscillator to produce this same frequency. Adjust trimmers C-47, C-13 and C-4 to produce maximum receiver output.

(b) Shift the Oscillator frequency to 150 kc. and tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then tune the oscillator series trimmer C-48, simultaneously rocking the tuning control (receiver) backward and forward through the signal, until maximum output results from the combined operations. Repeat the alignment of C-47 as in (a) to correct for any change caused by the adjustment of C-48.

BAND B

Place the receiver range switch in its Band "B" position and tune the station selector to a dial reading of 6132 kc. Set the frequency of the Oscillator to 6132 kc.

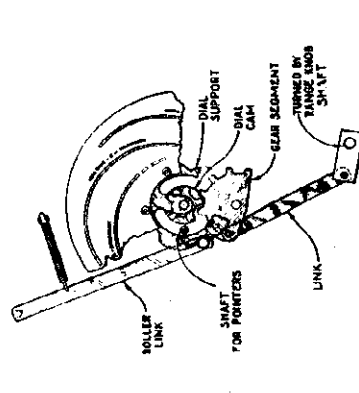


Figure 8—Selector Dial Change Mechanism

Then adjust trimmer C-26 to give maximum receiver output. Two positions may be found which fulfill this condition. The one of least capacitance is correct. To assure that the right peak has been used, tune the receiver to 5212 kc. and increase the Oscillator output. The "image" of 6132 kc. will be received at this point if C-26 has been adjusted to the proper point of maximum output. No trimmer adjustments are to be made

(b) Return the station selector to the 6132 kc. reading and align the detector and antenna trimmers C-11 and C-2 respectively, for maximum (peak) output as shown by the Oscillograph. No further adjustments are to be made on Band B.

BAND C

(a) Turn the range switch of the receiver to its Band C position and tune the station selector until the dial pointer reads 18,000 kc. Set the test Oscillator to this same frequency (Modulation "On" and Frequency Modulator disconnected), regulating its output to the level required for convenient observation. Adjust the trimmer C-41 to the point producing maximum output as indicated on the Oscillograph. Check for the presence of "image" signal by tuning the receiver to 17,080 kc. The 18,000 kc. signal of the Oscillator will be received at this point if the adjustment of C-41 has been properly made, using the position of minimum capacitance giving maximum receiver output. It may be necessary to increase the output of the Oscillator in order to get an indication of the "image". No adjustments should be made during this check.

(b) Return the receiver tuning to 18,000 kc.; re-align C-41 if necessary, and then adjust the detector and antenna trimmers C-10 and C-1 for maximum signal output as evidenced by the oscillographic image. No further adjustments are to be made on Band C.

BAND D

No adjustments are required on this band.

Output Meter Alignment

To align the receiver by other methods than that explained above will require the use of a standard test oscillator, such as the Stock No. 9599, and a suitable output indicator, such as the Stock No. 4317. The indicator should be connected either to the voice coil circuit or across the output transformer primary. For each adjustment, the volume control should be maintained at maximum and the Oscillator output regulated until the indication is barely perceptible. The smaller the amount of signal level will also be below the range of the receiver a.v.c., preventing broadness of tuning.

LF Adjustments—Connect the output of the test Oscillator from the RCA-617 first detector control grid to chassis-ground and adjust its frequency to 440 kc. Tune the receiver to Band "A", setting the station selector at a point where no interference is received from local stations or the local oscillator. Then tune the π - π trimmers C-31, C-30, C-28, C-27, C-24 and C-23 in order, each for maximum indicated receiver output.

R-F Adjustments—Connect the Oscillator output to the antenna-ground terminals of the receiver. Keep the output indicator attached to the receiver output as above. For each adjustment, use the minimum signal which will give a perceptible indication on glow indicator.

BAND A

(a) Set the range switch of the receiver to its Band

RCA MFG. CO., INC.

REPLACEMENT PARTS

Stock No.	Description	List Price	Stock No.	Description	List Price	Stock No.	Description	List Price
4427	Bracket—Low frequency tone control switch, control mounting bracket, frequency tone control	\$0.18	11206	Transformer—Second intermediate frequency transformer—(L19, L20, C37, C38)	1.82	11391	Bracket—Radiotron tuning lamp mounting bracket—Lea clamp	.12
5237	Bushing—Variable capacitor mounting assembly—Package of 3	.43	5230	Transformer—Third intermediate frequency transformer—(L21, L22, C39, C41, C42, R17, R18)	2.76	11392	Clamp—Lea clamp	.12
11255	Cable—Radiotron tuning lamp cable complete with socket	1.20	11205	Volume Control—Complete (R21)	1.30	11193	Cover—Radiotron tuning lamp escutcheon	.40
5241	Capacitor—Adjustable capacitor—(C44, C45)	.40	5243	Arm—Band indicator operating arm	.42	11379	Escutcheon—Station selector escutcheon and crystal	1.08
11286	Capacitor—14 Mfd (C19)	.24	10194	Ball—Steel ball for drive assembly—Package of 20	.25	11346	Knob—Station selector knob—Package of 5	.75
11292	Capacitor—22 Mfd (C20)	.26	8074	Cam—Five position cam—For station selector drive assembly	.28	11347	Knob—Volume control, tone control range switch or power switch knob—Package of 5	.75
11289	Capacitor—50 Mfd (C18, C31)	.24	4422	Clutch—Tuning condenser drive clutch assembly—Comprising drive shaft, balls, spring and washers assembled	1.00	11382	Radiotron—Megohm—Carbon type—1/10 watt—Used tuning tube socket—Package of 1 (R34)	.75
11293	Capacitor—200 Mfd (C7)	.30	8048	Dial—Dial scale with mounting plate, coupling for variable capacitor—Includes dial cover	.70	5210	Screw—Chassis mounting screw assembly—Package of 4	.16
11294	Capacitor—325 Mfd (C8)	.32	8045	Disc—Drive disc and gear assembly	.46	11348	Screw—8-32x7/16" Headless cupped point set screw for knob No. 11346—Package of 10	.32
11295	Capacitor—400 Mfd (C15)	.40	11380	Drive—Tuning condenser drive assembly complete	6.31	11381	Socket—Radiotron tuning tube socket and cover	.45
11296	Capacitor—800 Mfd (C16, C17, C18)	.80	8044	Escutcheon—Dial escutcheon and vernier label	1.08	11349	Spring—Retaining spring for knob (Stock No. 11347)—Package of 5	.15
11297	Capacitor—1300 Mfd (C6, C7)	1.30	8070	Gear—Gear, sector and band indicator operating link—(Link contacts to arm on band switch)	1.00			
11298	Capacitor—4000 Mfd (C9, C10)	4.00	8046	Indicator—Indicator shaft drive gear and vernier idler with one spring	.71			
4841	Capacitor—1 Mfd (C19, C18)	.22	8053	Indicator—Station selector pointer	.12			
4885	Capacitor—1 Mfd (C14, C20, C26, C32, C33)	.22	8051	Link—Complete with roller and spring	.30			
4840	Capacitor—25 Mfd (C9)	.28	8049	Pinion—Vernier pointer drive pinion and shaft—8-32x5/16" Square head set screw for drive assembly—Package of 10	.55			
5197	Capacitor—20 Mfd (C3)	.30	8047	Spring—Coil spring for indicator shaft drive gear and vernier idler (Stock No. 8046)	.12			
5203	Capacitor—10 Mfd (C3)	.40	8052	Spring—Coil spring for link—Package of 5	.32			
5205	Capacitor—10 Mfd (C3)	.40	8042	Sold—Band indicator operating arm stud—Package of 5	.21			
11204	Capacitor Pack—Comprising one 10 Mfd, one 20 Mfd, and two 8 Mfd capacitors—C15, C16, C85, C87	3.44	7211	Book—Reproducer mounting book assembly—Package of 2	.24			
11208	Capacitor Pack—Comprising one 0.15 Mfd and one .05 Mfd capacitor and one 27,000 ohm and one 10,000 ohm resistors—C62, C83, R22, R23	1.32						
11272	Clamp—Cable clamp—Located on top surface of chassis next variable tuning condenser	.10						
4693	Clamp—Electrolytic capacitor mounting clamp—For Stock No. 11204	.15						
5215	Coil—Antenna coil—A and C Bands—(L1, L2, L5, L6, C1, C3)	2.32						
5218	Coil—Antenna coil—X and B Bands—(L3, L4, L7, L8, C2, C4)	2.58						
5216	Coil—Detector coil—A and C Bands—(L1, L2, L5, L6, C1, C3)	2.34						
5219	Coil—Detector coil—X and B Bands—(L3, L4, L7, L8, C2, C4)	2.58						
5217	Coil—Oscillator coil—A and C Bands—(L25, L27, C41, C45)	2.20						
5220	Coil—Oscillator coil—X and B Bands—(L25, L27, C41, C45)	2.24						
5221	Coil—Oscillator coil—D Band—(L24)	.64						
5214	Condenser—(See C49)	4.42						
5226	Lamp—Phot lamp—Package of 5	.70						
80-1	Plate—I.F. or R.F. coil shield backing plate—Package of 2	.12						
5112	Resistor—1000 ohms—Carbon type—1/4 watt (R3, R10, R28)—Package of 5	1.00						
11285	Resistor—1000 ohms—Flexible type—(R12, R16)—Package of 5	1.00						
11283	Resistor—1200 ohms—Carbon type—1/4 watt—(R24)—Package of 5	\$1.00						
3381	Resistor—10,000 ohms—Carbon type—1/4 watt (R25)—Package of 5	1.00						
5114	Resistor—22,000 ohms—Carbon type—1/4 watt (R27)—Package of 5	.22						
8070	Resistor—32,000 ohms—Carbon type—1/4 watt (R23)—Package of 5	1.00						
11305	Resistor—22,000 ohms—Carbon type—1/4 watt (R15)—Package of 5	1.00						
8065	Resistor—37,000 ohms—Carbon type—1/4 watt (R19)—Package of 5	1.00						
5033	Resistor—100,000 ohms—Carbon type—1/4 watt (R20)—Package of 5	1.00						
11300	Resistor—33,000 ohms—Carbon type—1/10 watt (R6)—Package of 5	.75						
11282	Resistor—76,000 ohms—Carbon type—1/10 watt (R7)—Package of 5	.75						
8064	Resistor—82,000 ohms—Carbon type—1/4 watt (R12)—Package of 5	1.00						
3118	Resistor—100,000 ohms—Carbon type—1/4 watt (R8)—Package of 5	1.00						
5198	Resistor—220,000 ohms—Carbon type—1/4 watt (R1, R2, R9)—Package of 5	.75						
3033	Resistor—1 megohm—Carbon type—1/4 watt (R3)—Package of 5	1.00						
42-1	Resistor—5 megohms—Carbon type—1/4 watt (R1, 7)—Package of 5	1.00						
11151	Resistor—5 megohms—Carbon type—1/4 watt (R1, 7)—Package of 5	1.00						
11209	Resistor—Voltage divider resistor—Comprising one 4100 ohm, one 4700 ohm, one 50 ohm, one 33 ohm and one 124 ohm sections—(R31, R32, R33, R36, R38, R39)	1.16						
52-9	Shield—Antenna, Detector or Oscillator shield	.20						
5250	Shield—Intermediate frequency transformer shield	.22						
11273	Shield—Rectifier Radiotron shield	.25						
4794	Socket—4 contact Radiotron socket	.15						
11197	Socket—5 contact Radiotron socket—For first audio or driver radiotron—(6C7)	.14						
11198	Socket—7 contact Radiotron socket—For 6K7, 6F6, or 6F6 radiotrons	1.00						
11278	Socket—7 contact Radiotron Radiotron (6J7) socket	.317						
11279	Socket—7 contact First Detector Radiotron (6L7) socket	.14						
11199	Socket—Dial lamp socket	1.00						
5224	Switch—Low frequency tone control switch and power switch (S12, S14)	3.17						
5225	Switch—Range switch—(S1, S2, S3, S4, S5, S8, S9, S10, S11, S13)	.14						
5238	Tip with insulating armature toward and chip with insulating armature toward and tone control—High frequency tone control—(R17)	1.04						
5232	Transformer—Audio driver transformer—(T3)	2.10						
5228	Transformer—First intermediate frequency transformer—(L17, L18, C23, C24)	3.40						
5234	Transformer—Intermediate Audio transformer	1.80						
8061	Transformer—Power transformer—107/115 volts 50/60 cycles—(T1)	6.75						
8062	Transformer—Power transformer—107/115 volts 25/70 cycles	9.84						
11194	Transformer—Power transformer—107/115/250/210/250 volts 40/60 cycles	7.08						

MODEL C15-3
Parts List

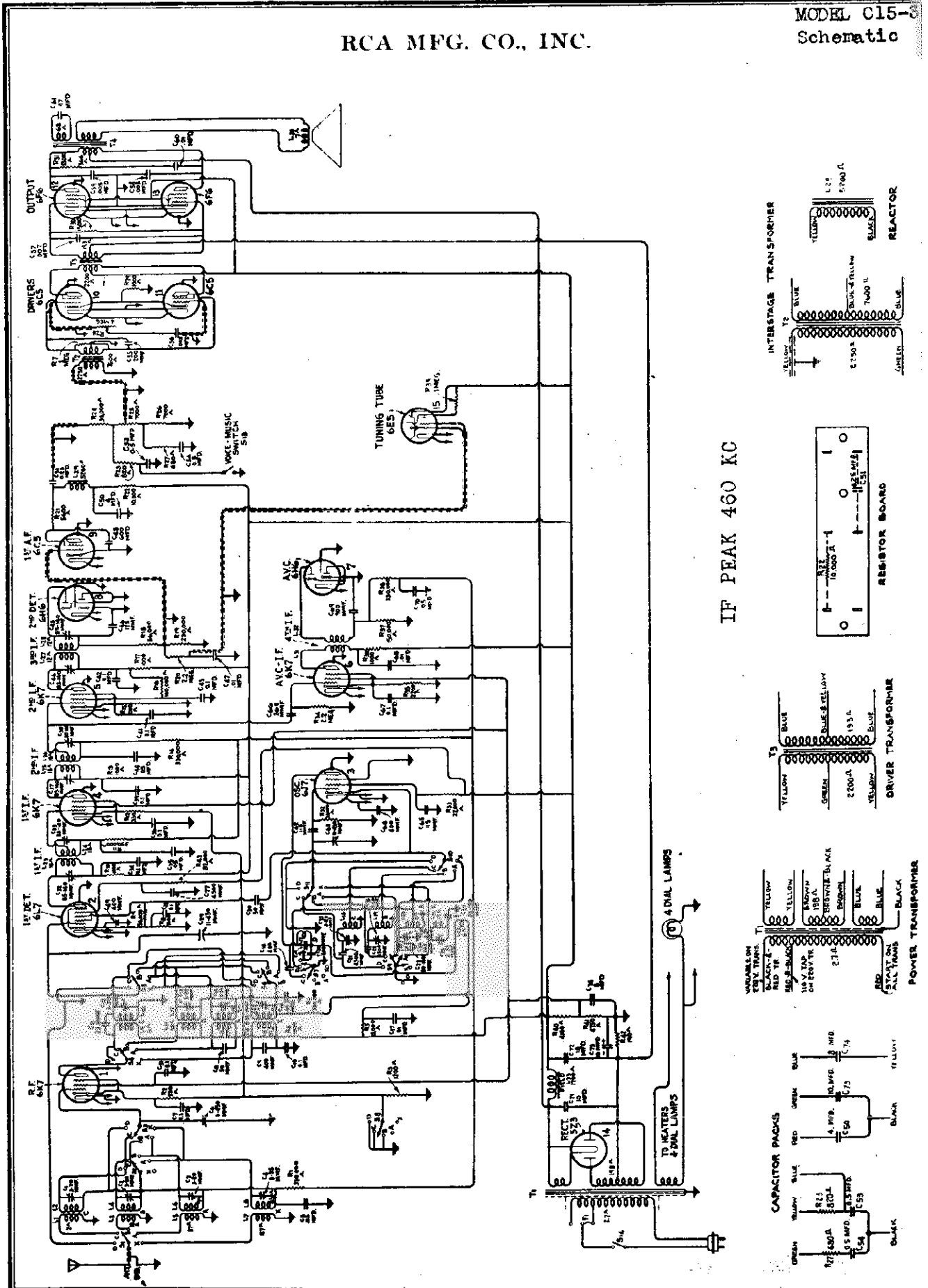
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MODEL C15-3
REPLACEMENT PARTS

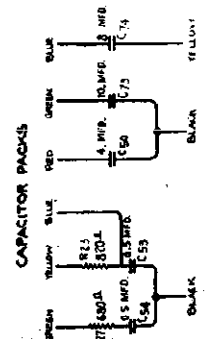
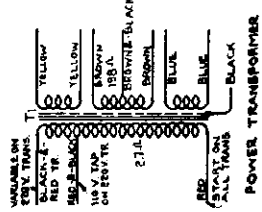
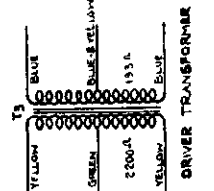
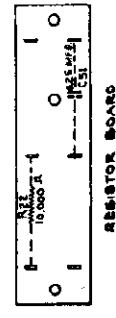
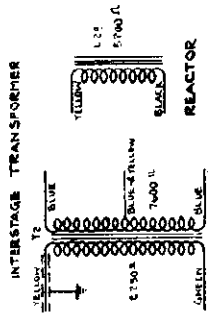
Stock No.	Description	List Price	Stock No.	Description	List Price	Stock No.	Description	List Price	Stock No.	Description	List Price
4427	Bracket—Low frequency tone control switch, volume control or high frequency tone control mounting bracket.	80.18	7220	Coil—Oscillator coil—X and B Bands—L19, L22, C26, C76.	\$2.24	7235	Resistor—Voltage divider resistor—3 sec. ohms (R40, R41, R42)	\$1.15	11380	Drive—Tuning condenser drive assembly complete.	\$6.33
5137	Bushing—Variable capacitor mounting bushing assembly—Package of 5.	45	7214	Condenser—3 gmg variable tuning condenser—C6, C29, C63.	64	7249	Shield—Antenna, detector or oscillator coil shield	20	8044	Escutcheon—Dial escutcheon with vernier scale.	1.06
11295	Cable—Radiotron tuning lamp cable complete with socket.	1.20	7240	Cover—Chassis cover plate.	4.42	7250	Shield—Intermediate frequency transformer shield	22	8045	Green indicator, half drive gear and vernier roller.	.72
11291	Capacitor—Adjustable capacitor—C23, C27	24	11202	Foot—Chassis mounting foot and bracket assembly—Package of 2.	34	11273	Shield—Radiotron shield	25	8070	Green—Clear sector, indicator eye band switch	.15
11286	Capacitor—14 Minid. capacitor—C19.	40	0907	Fuse—3 amperes fuse—F1—Package of 5.	78	4794	Socket—4 contact Radiotron socket—For Radiatron 723	.15	8073	Indicator—Station selector, indicator pointer	.12
11289	Capacitor—10 Minid. capacitor—C8, C30	24	7226	Lamp—Dial lamp—Package of 5.	70	11197	Socket—5 contact Radiotron socket—For Radiatron 6C1	.14	8049	Pinion—Vernier pointer drive pinion and shaft	.55
11291	Capacitor—115 Minid. capacitor—C62, C65	24	7239	Mounting—Fuse mounting for 110 volt instrument	36	11198	Socket—7 contact Radiotron socket—For Radiatron 8K7, 8H6 (and Detector only) or 8F6	.15	4669	Screw—Spacer, head No. 8-32x1/32 set screw—Package of 10.	.25
11291	Capacitor—200 Minid. capacitor—C34.	30	8041	Plate—F or R F coil shield locking plate—Package of 2.	12	11278	Socket—7 contact Radiotron socket—For Radiatron 617 (oscillator)	.20	8047	Spring—Coil spring for indicator shaft drive gear and vernier roller (Stock No. 8046)	.12
11294	Capacitor—400 Minid. capacitor—C9, C18, C30, C49, C64.	25	7233	Reactor—Coupling reactor—L29	2.32	11196	Socket—8 contact Radiotron socket—For Radiatron 617 (first detector)	.14	8072	Spring—Coil spring for link—Package of 5	.32
11299	Capacitor—600 Minid. capacitor—C48.	30	11296	Resistor—1000 ohms—Carbon type—1/4 watt (R2, R17, R35)—Package of 5.	1.00	11199	Socket—Dial lamp socket.	.15	8042	Stator—Band indicator operating arm stud—Package of 1	.25
11335	Capacitor—900 Minid. capacitor—C69.	30	7112	Resistor—1000 ohms—Carbon type—1/4 watt (R4, R10, R17, R25)—Package of 5.	1.00	9224	Switch—Low frequency tone control and power switch—S3, S4, S5, S6, S7, S8, S9, S10, S11.	1.00	8019	Board—Reproducer terminal board (3 terminals)	.14
11287	Capacitor—1300 Minid. capacitor—C32.	30	11283	Resistor—1200 ohms—Carbon type—1/4 watt (R3)—Package of 5.	1.00	7238	Terminal—Antenna terminal, board with clip, insulating strip and rivets.	3.75	8060	Bracket—Output transformer mounting bracket	.14
4818	Capacitor—605 Mid. capacitor—C78, C59	20	4408	Resistor—1500 ohms—Carbon type—1/4 watt (R8)—Package of 10.	2.00	9222	Tone Control—High frequency tone control (R28).	.14	11100	Cable—Reproducer cable—Complete with connector	.50
5148	Capacitor—700 Mid. capacitor—C97.	20	7119	Resistor—2100 ohms—Carbon type—1/4 watt (R37)—Package of 5.	2.00	9228	Transformer—Audio driver transformer—(T3)	1.04	8078	Champ—Cone rim clamp—Package of 4.	.44
4937	Capacitor—01 Mid. capacitor—C60.	25	11298	Resistor—7600 ohms—Carbon type—1 watt (R21)	1.00	7231	Transformer—First intermediate frequency transformer (L13, L24, C32, C33)	2.70	11189	Coil—Field coil, magnet and cone housing (L33)	10.60
4818	Capacitor—01 Mid. capacitor—C17, C47, C68	25	8043	Resistor—10,000 ohms—Carbon type—1/2 watt (R22)	2.2	7234	Transformer—Fourth intermediate frequency transformer (L31, L33)	1.80	8016	Cone—Reproducer cone (L10)	1.53
4836	Capacitor—05 Mid. capacitor—C16, C35, C40, C70	30	3998	Resistor—15,000 ohms—Carbon type—1/4 watt (R30)—Package of 5.	2.5	8061	Transformer—Intervage transformer (T2) volts 50/60 cycles (T1)	3.40	7039	Connector—4 prong male connector plug for reproducer	.25
4841	Capacitor—1 Mid. capacitor—C71, C28, C36, C41, C67	28	7114	Resistor—15,000 ohms—Carbon type—1/4 watt (R5)	1.00	9620	Transformer—Power transformer 109/125 volts 50/60 cycles (T1)	1.70	7040	Connector—4 contact female connector for reproducer cable	.25
4885	Capacitor—1 Mid. capacitor—C10, C34, C39, C42, C43	28	8065	Resistor—27,000 ohms—Carbon type—1/2 watt (R37)—Package of 5.	2.2	11194	Transformer—Power transformer 107/127/150/210/250 volts—40-60 cycles.	9.84	9620	Reproducer—Complete	16.32
3597	Capacitor—25 Mid. capacitor—C51.	40	11300	Resistor—31,000 ohms—Carbon type—1/2 watt (R37)—Package of 5.	1.00	7223	Transformer—Second intermediate frequency transformer (L25, L26, C37, C38, C46, R34)	6.75	8077	Transformer—Output transformer (T4, C61)	3.22
11203	Capacitor—10 Mid. capacitor—C71.	1.18	5033	Resistor—31,000 ohms—Carbon type—1/2 watt (R37)—Package of 5.	1.10	7230	Transformer—Third intermediate frequency transformer (L27, L28, C44, C45, C46, R18, R19)	2.76	5211	Belt—Speaker mounting bolt assembly—Package of 1	.24
7213	Capacitor Pack—Comprising one 4 Mid., one 10 Mid., and one 8 Mid. capacitors—C70, C73, C74.	1.16	11282	Resistor—76,000 ohms—Carbon type—1/2 watt (R37)—Package of 5.	.75	7223	Volume Control—(R24, R23, R26)	2.42	11191	Bracket—Radiotron tuning lamp mounting bracket—less clamp (Stock No. 11193)	.12
7236	Capacitor Pack—Comprising two 5 Mid., one 10 Mid., and one 8 Mid. capacitors—C71, C74, R13, R27.	1.36	8064	Resistor—82,000 ohms—Carbon type—1/2 watt (R37)—Package of 5.	.75	11192	Champ—Radiotron tuning lamp mounting clamp—less bracket (Stock No. 11191)	2.76	11193	Cover—Reproducer cover	.82
4693	Clamp—Electrolytic capacitor mounting clamp (for stock No. 7213).	.15	5145	Resistor—100,000 ohms—Carbon type—1/4 watt (R16)	1.00	11379	Escutcheon—Tuning lamp escutcheon and crystal	1.22	11346	Escutcheon—Station selector escutcheon and crystal	1.08
7215	Coil—Antenna coil—A and C Bands—L1, L2, L3, L6, C1, C3	2.32	7027	Resistor—150,000 ohms—Carbon type—1/4 watt (R16)	1.00	11347	Knob—Volume control, tone control, power switch or range switch knob—Package of 5	.42	11347	Knob—Volume selector knob—Package of 5	.75
7218	Coil—Antenna coil—X and B Bands—L3, L4, L7, L8, C4, C6	2.28	11297	Resistor—330,000 ohms—Carbon type—1/4 watt (R16)	.75	11382	Resistor—1 Megohm—Carbon type—1/10 watt (R39)—Package of 5	.25	11348	Screw—#32-7/16" headless set screw for knob (Stock No. 11345)—Package of 10	.32
7216	Coil—Detector coil—A and C Bands—L9, L10, L13, L14, C12, C14.	2.34	5108	Resistor—330,000 ohms—Carbon type—1/4 watt (R16)	1.00	5210	Screw—Chassis mounting screw assembly—Package of 4	1.00	11381	Socket—Tuning tube socket and cover	.16
7219	Coil—Detector coil—X and B Bands—L11, L12, L15, L16, C13, C15.	2.78	11336	Resistor—1.1 Megohm—Carbon type—1/4 watt (R27)	1.00	11349	Spring—Retaining spring for knob (Stock No. 11347)—Package of 5	.46	11349	Spring—Retaining spring for knob (Stock No. 11347)—Package of 5	.15
7217	Coil—Oscillator coil—A and C Bands—L18, L20, C25, C75.	2.20	8045	Resistor—2.2 Megohm—Carbon type—1/4 watt (R20)—Package of 5.	1.00						

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MODEL C15-0
Schematic

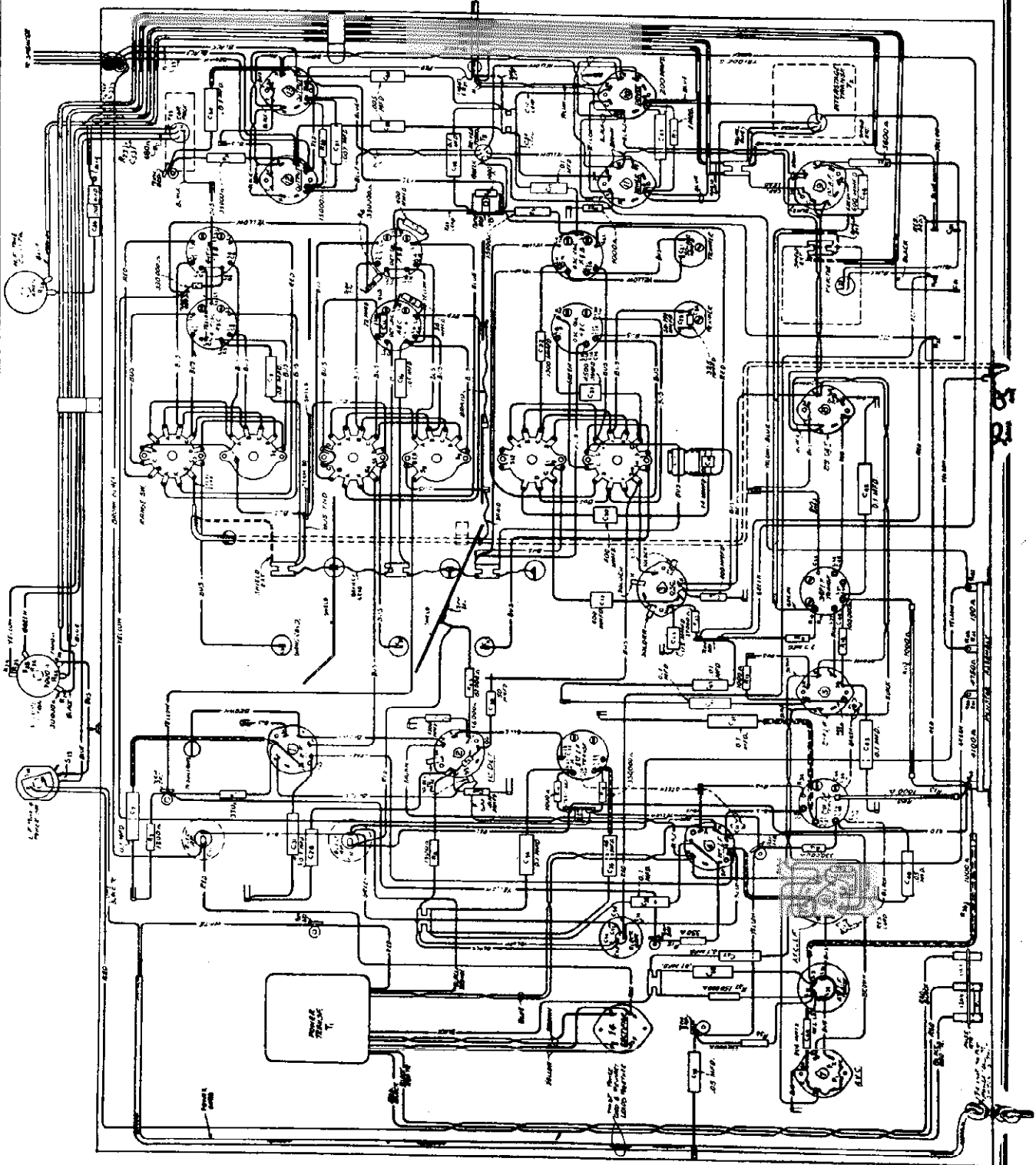


IF PEAK 460 KC



MODEL C15-3
Chassis Wiring

RCA MFG. CO., INC.



MODEL C15-3
Circuit Data
Alignment

RCA MFG. CO., INC.

IF TRIMMER ADJUSTMENT

Six trimmers are associated with the three i-f transformers. Their locations on the chassis are shown by Figure 8. Each must be aligned to a basic frequency of 460 kc. The last i-f transformer should be adjusted first, the one preceding it; second and the operation carried through successive stages until the first transformer has been aligned. For such a process, it is necessary to feed the output of the Full Range Oscillator to the stages in their order of alignment, adjust the trimmers of each and observing the effect at the second detector output on the Cathode-Ray Oscilloscope. The most convenient point for connection of the Oscilloscope is at the control grid of the RCA-6C5 first audio tube, with the vertical "Hi" input terminal attached to the grid connection and the "Gnd" to the chassis. The "Ext Sync" terminals of the Oscilloscope should be connected to the Frequency Modulator as illustrated in Figure 7. A .001 mid. capacitor installed in series with the Oscillator "Ant." output lead will prevent the voltage constants of the stage being aligned from becoming upset. Proceed further as follows:—

(a) Place the receiver, Oscilloscope and test Oscillator in operation. Set the receiver volume control to maximum and the range switch to Band "A". Tune the station selector to a point where no interference is caused by local stations or the local oscillator; removing the 500 tube if necessary. Turn the Oscilloscope vertical "A" amplifier to "On" and advance the vertical gain control to its maximum position. Set the horizontal "B" amplifier to "Timing" and control its gain so that the luminous spot sweeps a trace completely across the screen. Have the tuning control adjusted to "Int."

(b) Attach the output of the test Oscillator to the control grid cap of the second i-f tube (RCA-6K7) and chassis ground. Tune the Oscillator

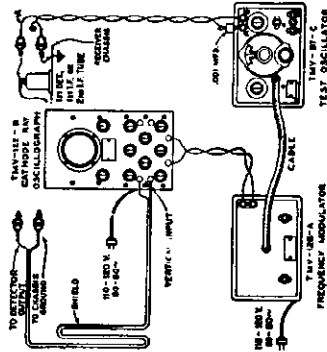


Figure 7—Alignment Apparatus Connections

to 460 kc. having its modulation switch turned to "On". Regulate the output control until the signal produces a wave pattern on the Oscilloscope screen, adjusting the Oscilloscope frequency and range controls to give the desired number of cycles. Cause the image formed to stand still on the screen by manipulation of the "Sync." control. Use as low a signal

Alignment Procedure

The extensive frequency range of this receiver necessitates a more or less involved method of alignment. However, if the following directions are carefully followed, the normal performance of the instrument will be obtained.

Circuits aligned by use of Cathode-Ray equipment will be as near to perfection as possible, hence this method is to be preferred in all cases. Alignment by other methods is sometimes an approximation unless extreme care is taken and a good deal of time expended. The oscillographic method is particularly advantageous for tuning the i-f tuned circuits to obtain maximum tone quality and at the same time the maximum of selectivity. Procedure to be followed when using a Cathode-Ray Oscilloscope is therefore given in detail. Should this type of equipment be unavailable, a substitute indicator may be used, the procedure being the same but without the sweeping operations.

Equipment

The instruments required for placing this receiver in proper alignment should consist of an RCA Cathode-Ray Oscilloscope, an RCA Full Range Oscillator, an RCA Frequency Modulator, a Tuning Wand and an Alignment Tool. All of these devices are illustrated and described on a separate page of this booklet. The Cathode-Ray Oscilloscope is to be used as an output indicator to precisely show when the circuits are correctly aligned. The Full Range Oscillator is required as the source of standard alignment signals at the various frequencies. Visual alignment is made possible through use of the Frequency Modulator, which in conjunction with the Oscilloscope and Oscillator, causes the characteristic wave shape of the circuit under test to be formed on the Oscilloscope screen. Adjustments must be made with an insulated screw driver, the Alignment Tool fitting such a requirement. The necessary for alignment and direction of required change may be tested with the Tuning Wand. Its use is as follows:—

The Tuning Wand, which consists of a bakelite rod having a small brass cylinder installed at one end and a core of finely divided iron at the other, may be inserted into a tuned coil to obtain an indication of the tuning. With a signal being supplied to the receiver at the particular frequency of the circuit concerned, each end of the Wand should be placed through the center of the coil. Holes are provided in the Wand to facilitate the changing of the tuning coil core and consequent change of receiver output occurs. If there is a decrease of output when either of the two ends are inserted, the tuning is correct and will require no adjustment. However, should there be an increase of output due to the iron core and decrease with the brass cylinder, an increase in inductance or capacitance is indicated as necessary to bring the circuit into line. The trimmer involved should be adjusted accordingly. If the output of the circuit under test decreases, an increase of inductance will be necessary to bring the circuit into alignment. This will be equivalent to decreasing the trimmer concerned.

Changes Indicated by Tuning Wand

Wand { Iron	Signal	Titanium
{ Increase	{ Decrease	{ None
{ Decrease	{ Increase	{ Decrease
{ None	{ None	{ Increase

and broadly resonated output, as accomplished in the natural period fourth i-f transformer. A double diode RCA-6H6 receives the signal at i-f frequency from the No. 6 stage and rectifies it in order to obtain the d.c. component required for a.v.c. This component, which develops across resistor R-37, is applied to the control grids of the i-f, first detector and i-f tubes through resistor-condenser filter system. The value of the bias obtained by this process varies with the intensity of the received signal and in turn governs the amplification of the receiver, thereby automatically regulating the output to the same level when there are fading tendencies and similarly when tuning from station to station.

Audio System

Several stages of audio amplification provide excellent fidelity and wide range of volume both for short wave as well as on the standard and long wave bands. The high gain of the system has necessitated thorough shielding and careful manufacture. All wiring, transformers, etc., should always be placed as originally installed if it has been necessary to remove such for service purposes. Hum difficulties are likely to occur if this caution is not observed. Manual volume control is by means of an acoustically tapered potentiometer which conveys the audio output of the first a-f stage to the interstage coupling transformer. This control has tone compensation produced by filter connected to two points thereon. This gives the correct aural balance at different volume settings. A music-spectral switch is provided in one of the volume control filter circuits for use in obtaining good speech intelligibility. On the speech position, the low frequency tones are reduced. A push-pull driver stage is used between the first a.f. and the Class AB output amplifier. A continuously variable high frequency tone control is shunted across the grids of the driver tubes. A sharp, high audio frequency cut-off is obtained by a tertiary winding on the audio output transformer and by the correct design of the driver and interstage transformers. This cut-off feature results in quieter operation by the reduction of high frequency noise, especially on weaker stations.

Rectifier and Filter

An RCA-9ZA full-wave rectifier tube is employed in the high voltage supply system. The loadwater field coil serves as a filter reactor in conjunction with high capacity, electrolytic condensers. Fixed bias voltages are made available at the filter output on a divider system, which is likewise well filtered with large capacitors.

Tuning Indicator

A cathode-ray tube is used as a means of visually indicating when the receiver is accurately tuned to the incoming signal. This tube is of new design and comprises an amplifier section and a cathode-ray section built in the same glass envelope. The cathode-ray section consists of a conically shaped luminous screen, upon which a pattern is formed by an effect of the detected signal after said effect has been amplified by the amplifier section which is fed from the detector diode circuit. The size of the pattern is determined by the strength of the signal voltage, so that any change of tuning may be readily observed in order to facilitate tuning to exact resonance.

Band D Tuning

Special notice should be taken of the manner of tuning this band. The i-f stage is uncoupled when the signal is fed from the antenna directly to the first detector input circuit. The inductance of this circuit consists of a short length of bus wire to which the antenna lead is tapped at a inductive predetermined point. The total weight of this inductive wire from the stator of the tuning capacitor to ground represents the secondary of a high frequency autotransformer, while the inductive section included between the antenna lead tap and ground forms the primary. Alteration of the dimensions and position of this wiring will change the tuning and alignment of the circuit, resulting in total lack of operation or seriously poor operation. It is therefore necessary when wiring to avoid changes in the wiring which includes Band D detector and oscillator i-f circuits unless the arrangement is restored to its exact original condition. Similar caution should be observed when exchanging by-pass condensers in these same circuits, since their values, physical positions, length of leads, quality of dielectric, etc., are critical and variations will definitely affect operation of the receiver. The small heater by-pass condensers and ground terminals installed at the tube sockets are very important in this respect.

Oscillator Stage

The heterodyne oscillator circuit used in this receiver is an improved type, having exceptional frequency stability and uniformity of output over its various tuning ranges. It operates on fundamental frequencies which are fed to the first detector hexode tube (RCA-6L7) on an auxiliary mixing grid. The oscillator generates a signal which is at all times above the frequency of the incoming signal by 460 kc. As shown by the schematic diagram, the cathode of the oscillator tube is above ground potential for i-f, while the plate is effectively at ground potential. This particular arrangement, together with the plate and screen grids, makes the circuit independent of supply voltage variations in regard to stability and uniformity of output. Separate coils are used for each of the tuning ranges. The swamping of the different bands is such as to short circuit certain unused coils which would absorb energy from the circuits used.

Intermediate Amplifier

Two stages of i-f amplification comprising three tuned transformers and two RCA-6K7 tubes are arranged in cascade to operate at 460 kc. The transformers have their primaries as well as secondaries tuned by adjustable trimmer capacitors. These trimmers are designed to maintain constant frequency and other detrimental factors which may affect their operation. Lead wire is used for the windings of the third transformer in order to provide the proper efficiency in driving the diode second detector.

Second Detector

Signal detection is brought about by the rectifying action of the RCA-6H6 double diode tube. Audio signal obtained from the voltage drop across resistor R-19 in the diode circuit, is transferred to the first audio stage by direct coupling. The direct signal component across resistor R-19 is used for bias for the RCA-6C5 first audio tube.

Automatic Volume Control

The a.v.c. operates as a parallel system, being fed from the i-f output through an auxiliary amplifier tube, an RCA-6K7. This stage has an untuned input

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MODEL C15-3
Alignment, Part 2
Cathode-Ray Oscillograph
Images for Alignment

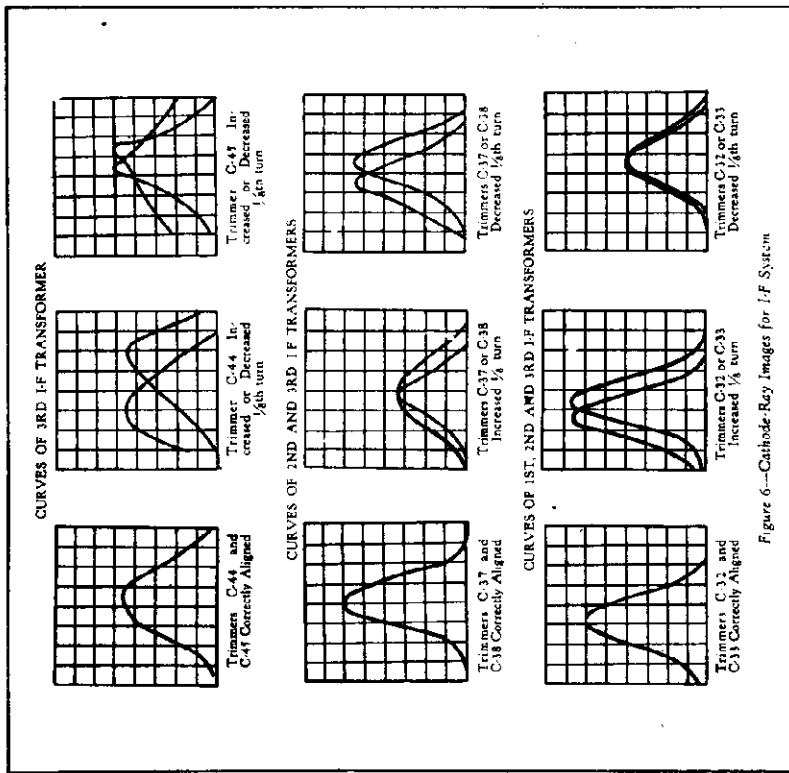


Figure 6.—Cathode-Ray Images for I-F System

Calibration

Set the receiver range switch to Band A and rotate the station selector until the tuning capacitor plates are in full mesh (maximum capacity). Then move the main dial pointer until it points exactly to the horizontal line at the low frequency end of the A scale. Correct the setting of the vernier second hand pointer to read zero.

Band A

- (a) With the receiver range switch on its Band A position, tune the station selector until the dial pointer is at a reading of 1720 kc. Adjust the Oscillator to 1720 kc. (modulation "On" and Frequency Modulator disconnected) and increase its output to produce a registration on the Oscillograph. Carefully align the oscillator, detector and antenna trimmers, C-25, C-14 and C-3 respectively, so that each brings about maximum amplitude of output as shown by the wave on the Oscillograph. It will be necessary to have the tuning control of the Oscillograph on "Int." for this operation. Then shift the tuning control to "Ext." and place the Frequency Modulator into operation with its connections to the Oscillator and Oscillograph as shown on Figure 7. Return the test Oscillator (increase frequency) until the forward and reverse waves show on the Oscillograph and become coincident at their highest point. Adjust the trimmers C-25, C-14 and C-3 again, setting each to the point which produces the best coincidence and maximum amplitude of the images.
 - (b) Remove the Frequency Modulator cable from the Oscillator and shift the signal frequency to 600 kc. Tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then insert the Frequency Modulator plug and return the Oscillator until the two similar forward and reverse waves appear on the screen. It is advisable to shift the Oscillator to its 200-400 kc. range and use the third harmonic of the generated signal in order to obtain the desired range of sweep for this adjustment. The trimmer C-23 should then be adjusted until a point is reached where the waves have the greatest amplitude. It will be unnecessary to rock the tuning condenser for this operation inasmuch as the Frequency Modulator is automatically producing the same effect. After completing this adjustment, the trimmer C-25 should be realigned as in (a) to correct for any change in the oscillator high frequency tuning which has been caused by the adjustment of C-23.
- Band X
- (c) Disconnect the Frequency Modulator and tune the test Oscillator to a frequency of 400 kc. (modulation "On"). Place the receiver range switch in its Band X position and turn the station selector until the dial pointer reads 400 kc. Adjust the Oscillograph tuning control to "Int." Then align each of the trimmers C-26, C-15 and C-4 to the point producing maximum output at the Oscillograph. Place the Frequency Modulator in operation and attach it to the Oscillator in the normal manner. Change the Oscillograph tuning to "Ext." Increase the frequency of the Oscillator (modulation "Off") until the two waves appear and become coincident at their highest points, ap-

output from the Oscillator as can be accurately observed at the Oscillograph. Then tune the two trimmers C-44 and C-41 of the third I-F transformer to produce maximum amplitude (vertical deflection) of the oscillographic image. Under this condition, the transformer will be sharply resonated to 460 kc.

(c) The Frequency Modulator should then be placed in operation and interconnected with the Full Range Oscillator by means of the shielded patch cord provided. Figure 7 shows the proper arrangement. Set the Frequency Modulator sweep range switch to its "Lo" position and turn the Oscillator modulation control of the Oscillograph to "Ext." and place the range switch of the Oscillator so as to increase its frequency, until two distinct and similar waves appear on the Oscillograph screen and become coincident at their highest points. These curves will be found to occur at an Oscillator setting of approximately 540 kc. They will be identical in shape but appearing in reversed positions. Adjust the frequency control of the Oscillograph in order to cause the waves to conform with these requirements and to make them remain motionless on the screen. This will require a tuning of approximately 1/2 clockwise rotation of the frequency control. The trimmers C-44 and C-41 should then be readjusted so that the two curves move together until they become exactly coincident throughout their lengths, maintaining the maximum amplitude at which this condition can be brought about.

(d) Leaving the equipment connected and adjusted as above, change the Oscillator output to the control grid cap of the first I-F tube (RCA-6K7). Adjust the two trimmers C-37 and C-38 of the second I-F transformer until the forward and reverse waves appearing on the Oscillograph coincide throughout their lengths and have maximum amplitude.

(e) Change the test Oscillator output to the control grid of the first detector tube (RCA-6L7) without disturbing the connections and adjustments of the other apparatus. Then align the trimmers C-32 and C-33 of the first I-F transformer to produce waves of maximum coincidence and maximum amplitude. The shape of the composite wave obtained from this operation is a true representation of the over-all tuning characteristic of the I-F system.

ANTENNA, DETECTOR AND OSCILLATOR

For Bands A and X, adjustments must be made at the high and low frequency ends of the range. On Frequency end, Band D is permanently adjusted during manufacture, hence no alignment will be necessary in this range. Locations of the various antenna, detector and oscillator trimmers are shown on Figure 8. The test Oscillator should be removed from connection with the I-F system and its output attached to the antenna-ground terminals of the receiver. No changes are to be made in the attachment of the Oscillograph at the second detector. During the adjustments, the Oscillator output should be regulated as low as is necessary to keep the oscillographic image as low as is practically observable. Such procedure will obviate apparent broadness of tuning which would result from a.v.c. action on a stronger signal. The sequence of alignment should be Band A, Band X, Band B and Band C. Proceed with the adjustments as follows:—

approximately at 462 kc. They may be made to remain stationary on the screen by manipulation of the Oscillograph range switch and frequency control. Readjust the three trimmers C-26, C-15 and C-4 to give maximum amplitude and complete coincidence of the waves.

(b) Change the test Oscillator so that it delivers a signal of 150 kc. with the Frequency Modulator disconnected. Tune this signal on the receiver which has previously been set to Band X, disregarding the dial reading at which the signal is best received. Then interconnect the Frequency Modulator with the Oscillator and return the latter to the point at which the two similar waves appear on the screen. Adjust the trimmer C-27 for maximum amplitude of the wave images. Rocking of the tuning condenser will not be necessary as the Frequency Modulator duplicates such an operation. Repeat the alignment of C-26 as outlined in (a) to correct for any reflective error brought about by the adjustment of C-27.

Band B

- (b) Return the receiver range switch to its Band B position and tune the station selector to a dial reading of 6132 kc. Set the test Oscillator to this same frequency (Modulation "ON" and Frequency Modulator disconnected) and increase its output until a suitable indication is apparent on the Oscillograph. Then adjust the trimmer C-76 to the point producing the maximum amplitude of the image. Two positions will be found on this trimmer which causes maximum amplitude. The one of least capacitance is correct and should be used. Check for the "image" signal, which will be received at 5212 kc. on the dial if the adjustment of C-76 has been properly made. An increase in Oscillator output may be necessary for this test, however its frequency should not be changed nor any trimmer adjustments made on the receiver.
- (b) Return the station selector to the 6132 kc. reading and align the detector and antenna trimmers C-13 and C-2 respectively for maximum (peak) output as shown by the Oscillograph. No further adjustments are to be made on Band B.

**MODEL C15-3
Alignment, Part 3
Phonograph, Dial,
Transformer Notes**

RCA MFG. CO., INC.

minimum lengths of secondary leads and mount it in the position which does not cause hum.

PARTS REQUIRED
 M—Magnetic Pickup
 T—Phono Input Transformer—Stock No. 7445
 P—Phono Turntable—100 ohms
 R—Biasing Resistor—2100 ohms
 C—By-pass Condenser—10 mfd

high amplification due to the number of a-f stages employed necessitates that great care be taken when the circuit is changed for phonograph input. It is recommended that the turntable used be fed directly to the grid circuit of the first audio stage, with suitable switching installed for changing between radio and phonograph operation. Bias of the stage must be maintained by addition of a resistor, to be shunted out for the radio position of the switch. This resistor should be bypassed by a condenser of appropriate rating. Diagrams covering suggested methods of phono-graph attachment are given in Figures 10 and 11 with installation details. Hum may possibly be encountered from lack of shielding and improper placement and shielding of the input transformer if these items are not taken care of during re-arrangement of the circuits. All wiring should be installed in a substantial and permanent manner.

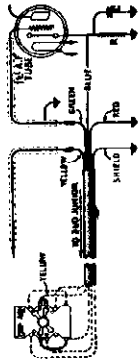


Figure 11—Duo Junior Connections

INSTALLATION

Arrange connections from Duo Junior output cabinet that completed wiring is in accordance with schematic above. Add two jumpers shown by heavy full lines to Duo Junior Radio-Phono switch. Resistor R and capacitor C must be added to receiver circuit to maintain bias. Keep all leads as short as possible and well shielded where indicated.

PARTS REQUIRED
 Model R-93—Duo Junior Phonograph
 R—Biasing Resistor—2100 ohms
 C—By-pass Condenser—10 mfd

ALIGNMENT FREQUENCIES

Band X	150 kc. and 400 kc.
Band A	600 kc. and 1720 kc.
Band B	6132 kc.
Band C	18000 kc.
Band D	now required

Loudspeaker	12 inch, Electrodynamic
Voice Coil Impedance	7.5 ohms at 400 cycles
Intermediate Frequency	460 kc.

Radioion Socket Voltages
 The voltage values indicated from the Radioion socket contacts to ground on Figure 8 will serve to assist in locating causes for faulty operation when present. Each value as specified should hold within 20% when the receiver is normally operative at the rated supply voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuit. The voltages given on the diagram are actual operating values and do not allow for inaccuracies which may be caused by the loading effect of a voltmeter's internal resistance. This resistance should be

Band X	140—410 kc.
Band A	540—1,800 kc.
Band B	1,800—6,000 kc.
Band C	6,000—18,000 kc.
Band D	18,000—60,000 kc.

MISCELLANEOUS
 Power Consumption.....1.47 watts
 Undimmed Output.....10 watts
 Maximum Output.....15 watts

ALIGNMENT FREQUENCIES

Band X	150 kc. and 400 kc.
Band A	600 kc. and 1720 kc.
Band B	6132 kc.
Band C	18000 kc.
Band D	now required

Loudspeaker	12 inch, Electrodynamic
Voice Coil Impedance	7.5 ohms at 400 cycles
Intermediate Frequency	460 kc.

VOLTAGE AND FREQUENCY

Rating A	105—121 volts, 10—60 cycles
Rating B	105—121 volts, 25—60 cycles
Rating C	100—130/140—160/195—250 volts, 40—60 cycles

condenser, main dial pointer and vernier dial pointer through means of fibre and brass gears. The ratio of vernier rotation to the main pointer is 20 to 1. An intermediate gear is used in the system to reduce gear back-lash. This gear is suspended in position with two tension springs which maintain the proper mesh at all times. A flexible coupling disc is used between the drive and the condenser shaft.

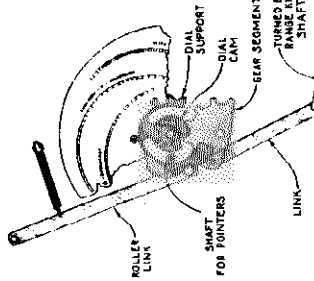


Figure 9—Selector Dial Change Mechanism

Dial Adjustment

Figure 9 illustrates the relations of the various parts of the dial mechanism when it is in its A—Broadcast position and the range switch is likewise turned to its Band A setting. In re-assembling the dial after repair, see that the gears are meshed in accordance with the diagram, at the same time seeing that the lever which is attached to the range switch shaft is in the position as shown.

Phonograph Attachment

The audio system of this receiver may be adapted for use in the reproduction of phonograph records by proper connection and arrangement of an external turntable and its associated accessories. The relatively

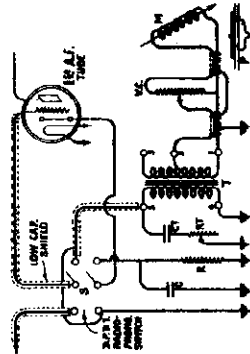


Figure 10—General Phonograph Connections

INSTALLATION

Change the receiver circuits and add phonograph connections to conform with the above schematic. Remove R and capacitor C and install the transformer as directed, keeping these clear of the chassis and transformer. Place transformer T as so to obtain

Band C

(6) Turn the range switch of the receiver to its Band C position and tune the station selector until the dial pointer reads 18,000 kc. Set the test Oscillator to this same frequency (Modulation "On" and Frequency Modulator disconnected), regulating its output to the level required for convenient observation. Adjust the trimmer C-75 to the point producing maximum output as indicated on the Oscillograph. Check for the presence of "image" signals by tuning the receiver to 17,000 kc. The 18,000 kc. signal of the Oscillator will be received at this point if the adjustment of C-75 has been properly made, using the position of minimum capacitance giving maximum receiver output. It may be necessary to increase the output of the Oscillator in order to get an indication of the "image". No adjustments should be made during this check.

(b) Return the receiver tuning to 18,000 kc. re-align C-75 if necessary, and then adjust the detector and antenna trimmers C-12 and C-1 for maximum signal output as evidenced by the oscillographic image. No further adjustments are to be made on Band C.

Band D

No adjustments are required on this band. To align the receiver by other means than those explained in the above procedure will require the use of an output indicator and a suitable test oscillator. The output device should be connected at the receiver output, either to the voice coil circuit or to the output transformer primary. Successive points of connection of the test Oscillator will be identical to those specified for Cathode-Ray alignment, the same test frequencies being used in each case. The process of sweeping the frequency of the test Oscillator with the Frequency Modulator will of course be omitted, instead, the trimmers throughout the system should be adjusted to produce maximum indications at the output. It will be essential to rock the tuning condenser for the low frequency adjustments of Bands X and A, but to cause maximum output rather than the type of indication afforded by the Oscillograph. The receiver volume control must be kept at its maximum setting and for each test the Oscillator output regulated to maintain an indication which will be as small as possible. Under this condition, the receiver will be operating at maximum gain, but receiving only a weak signal of insufficient strength to cause appreciable a.c. action. This requirement is of importance in either method of procedure, since the a.c. will have a definite effect on the indication if a more intense input is used.

Dial Drive

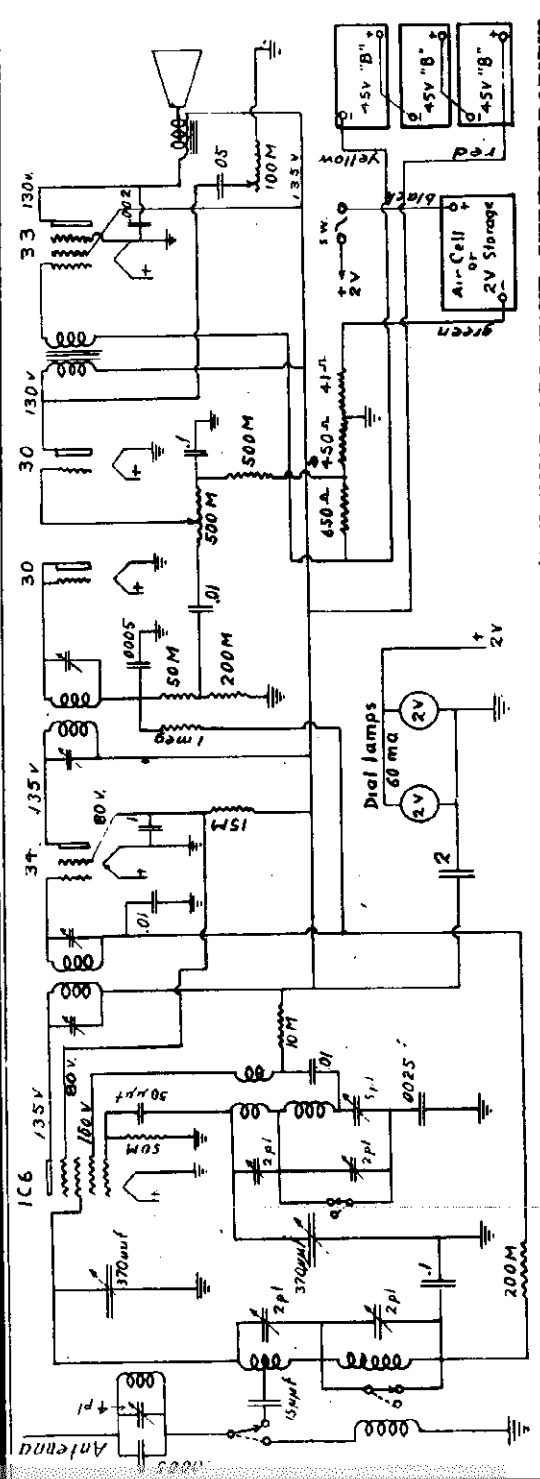
The dial drive and station indicator system are of new and unique design. Five individual dial scales, each with full 180 degree band spread, are provided, one for use on each band. The scales are eccentrically arranged on a rotary disc and adapted to operate in conjunction with the band change switch so that as the switch is shifted to a certain band, the corresponding dial scale rotates into position. For other portions of the band switch, a similar scale selection takes place, there being only one scale visible at a time. The driving mechanism for the dial and condenser has tuning ratios of 10 to 1 and 50 to 1. Control may be interchanged between these two ratios by push-in operation of a positive action clutch which is actuated by the tuning knob. From the clutch and ratio controlling mechanism, the drive system interlinks with the tuning

RADIO CIRCULAR CO.

MODEL 5-Tube Dual
Battery A-W. Superhet.
MODEL 5-Tube Dual
A-C. A-W. Super.
Schematics, Alignment

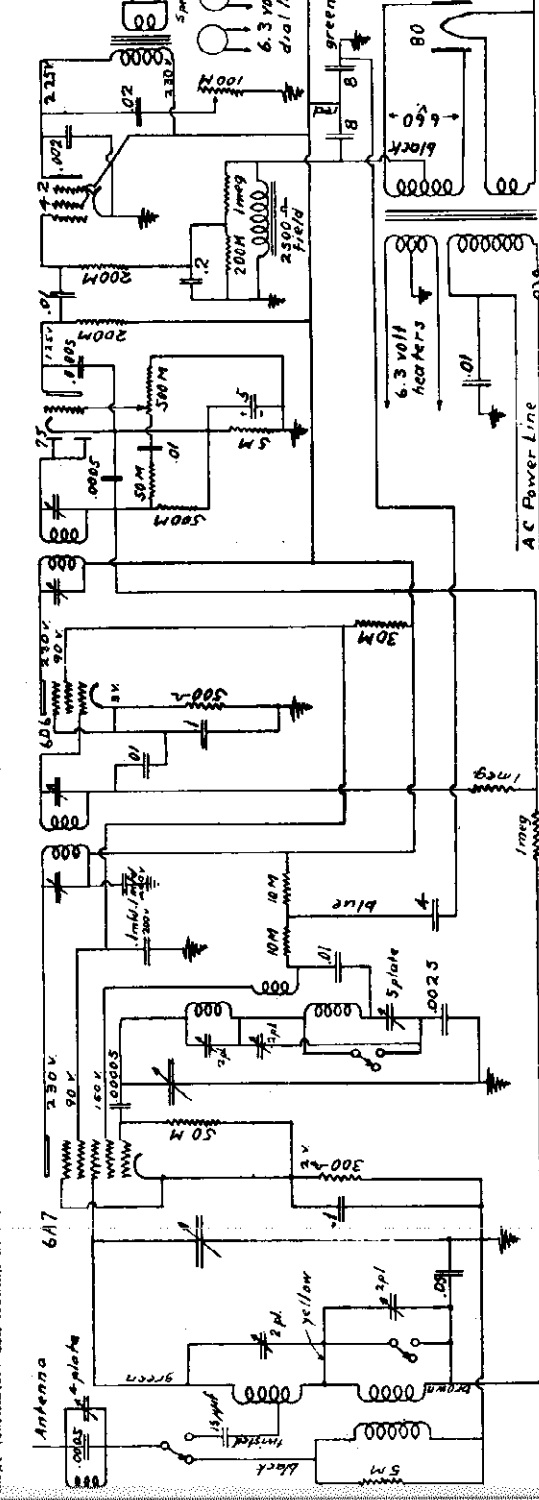
ACE 5-TUBE DUAL
ALL-WAVE SUPERHETRODYNE

The intermediate stages are carefully phased to 456 KC at the factory. Should rephasing be necessary, attach the output lead from a 456 KC test oscillator to the grid cap of the 6A7 tube, keep the signal to a very low audible value and carefully adjust the two trimmer screws in the top of each of the two tall cans to loudest volume. If an output meter is available it should be used across the two black leads at the speaker transformer. An oscillator covering a frequency from 550 KC to 16 MC should be used to rephase the R. F. The test oscillator output is attached to the aerial lead of the set. At all times keep the oscillator signal turned down to a low point of audibility. Trim the short-wave band first, then the broadcast band, setting the dial pointer to a frequency near the high frequency end of the scale in each case. The short-wave oscillator trimmer is located directly across the large (oscillator) coil looking at the under side of the set, and the R. F. short-wave trimmer at the right hand end of this coil. The broadcast band is next trimmed at the high frequency end of the broadcast scale, applying a signal from the oscillator corresponding to the dial setting and adjust the oscillator trimmer connected between the end of the oscillator coil and the porcelain base trimmer. Next trim the Broadcast R. F. by the trimmer connecting to the band switch. The broadcast band is next trimmed at the 550 KC end of the dial by adjusting the porcelain base trimmer at center of chassis until the signal is heard at the correct location on dial.



ACE 5-TUBE BATTERY DUAL ALL-WAVE SUPERHETRODYNE

The intermediate stages are carefully phased to 456 KC at the factory. Should rephasing be necessary, attach the output lead from a 456 KC test oscillator to the grid cap of the 6A7 tube, keep the signal to a very low audible value and carefully adjust the two trimmer screws in the top of each of the two tall cans to loudest volume. If an output meter is available it should be used across the two black leads at the speaker transformer. An oscillator covering a frequency from 550 KC to 16 MC should be used to rephase the R. F. The test oscillator output is attached to the aerial lead of the set. At all times keep the oscillator signal turned down to a low point of audibility. Trim the short-wave band first, then the broadcast band, setting the dial pointer to a frequency near the high frequency end of the scale in each case. The short-wave oscillator trimmer is located directly across the large (oscillator) coil looking at the under side of the set and the R. F. short-wave trimmer at the right hand end of this coil. The broadcast band is next trimmed at the high frequency end of the broadcast scale, applying a signal from the oscillator corresponding to the dial setting and adjust the oscillator trimmer connected between the end of the oscillator coil and the porcelain base trimmer at center of chassis until the signal is heard at the correct location on dial.

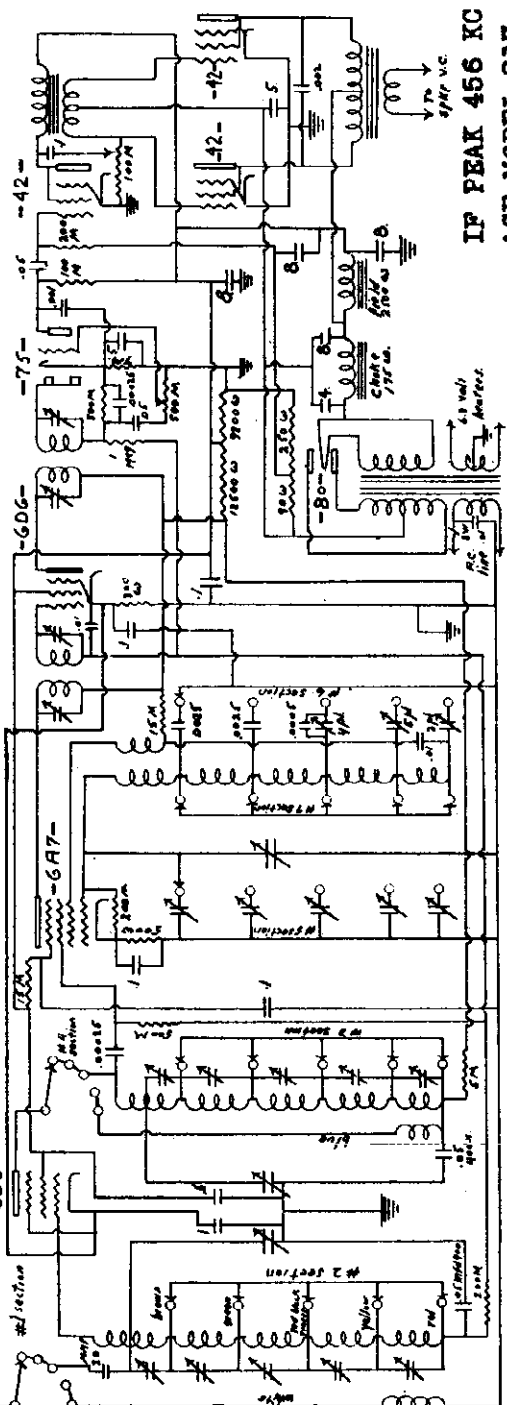


**MODEL 5-Tube AC-DC Dual
A-W. Superheterodyne
MODEL 817**
Schematics, Alignment

RADIO CIRCULAR CO.

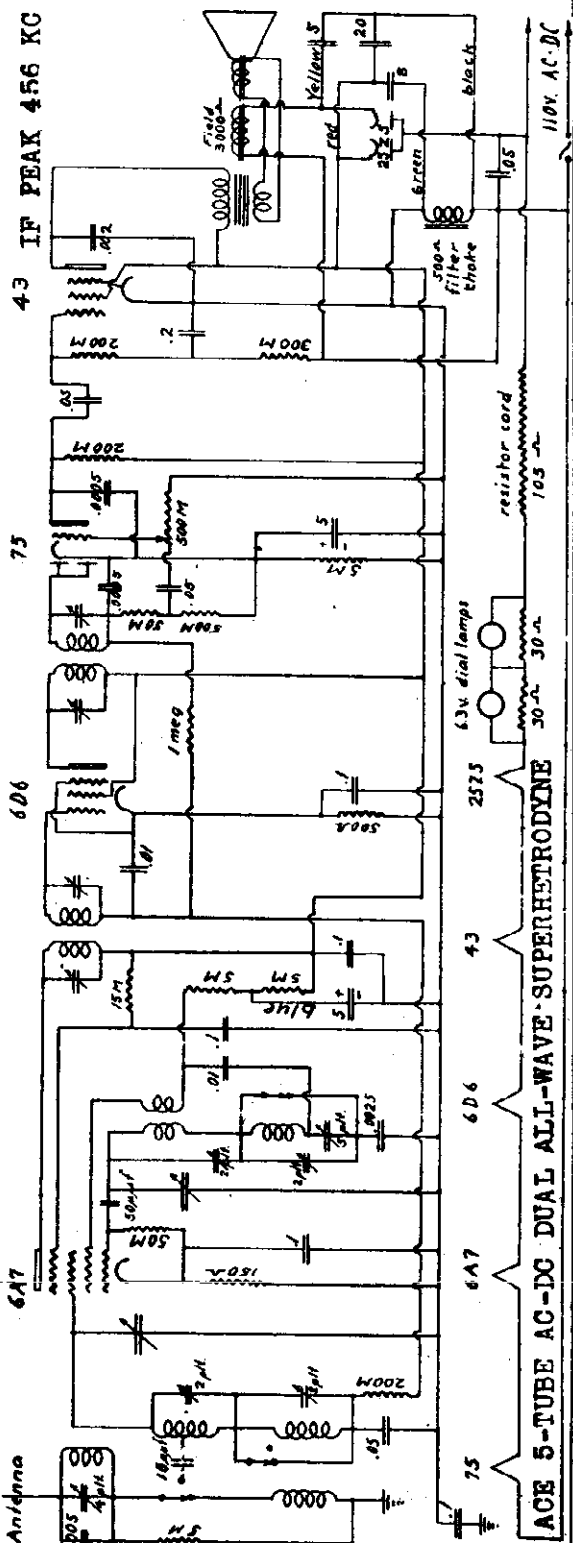
Short-wave oscillator trimmer attaches between the two ends of the oscillator coil located at the right. Broadcast oscillator trimmer is the lower section of the dual trimmer at the end of the chassis. Short-wave R. F. trimmer is at the lower end of the oscillator coil and the broadcast R. F. trimmer is to the left of this same coil.

PHONOGRAPH—Install a single pole double-throw toggle switch in rear of chassis nearest the 75 tube. Disconnect the .01 mfd. condenser from volume control and attach to one side of toggle switch, connect middle terminal of switch to terminal of volume control just disconnected, connect one side of phonograph pickup to remaining terminal of switch and other side to "B" minus.



**IF PEAK 456 KC
ACE MODEL 817**

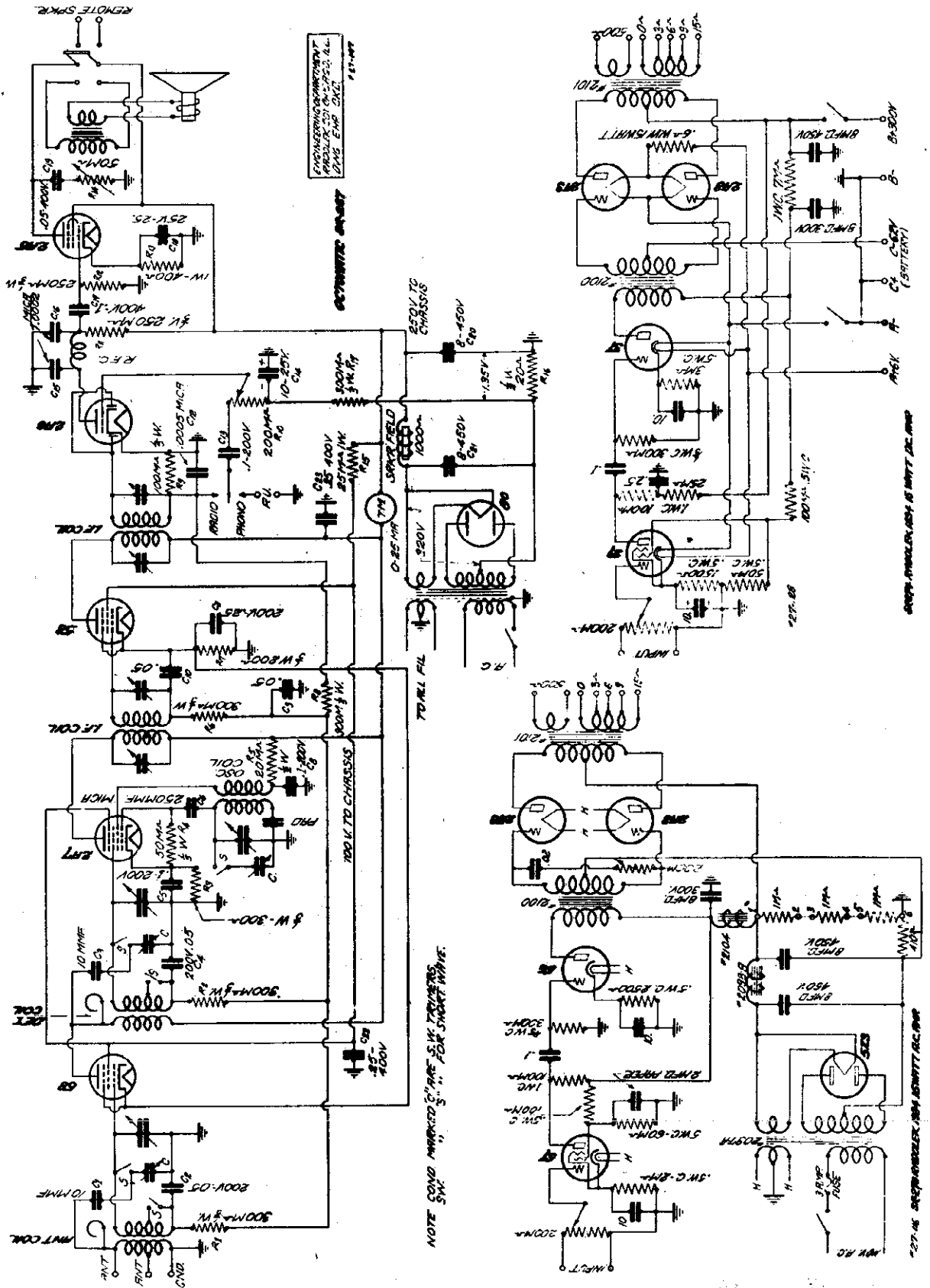
An all-wave oscillator having a range from 100 KC to 20 MC will be necessary to rephase the frequency bands. The oscillator output is attached to the aerial lead of the set and oscillator output kept always at a low audible level. The R. F. coil trimmers are reached through a series of five (5) holes in the side of the R. F. shield cans and correspond to frequency band Nos. 1, 2, 3, 4, and 5 from top down. The oscillator parallel trimmers are seen on the under side of the set when the front of it is raised and are located along side the band justing that series paddler belonging to the particular band being used, i.e., switch, No. 1 being the one nearest the back of chassis and No. 5 nearest the front. The dual porcelain trimmers at back of chassis are series paddlers, the



ACE 5-TUBE AC-DC DUAL ALL-WAVE-SUPERHETERODYNE

RADOLEK CO.

MODEL Octomatic
MODEL 15-Watt A-C. Amplifier
MODEL 15-Watt D-C. Amplifier
Schematics

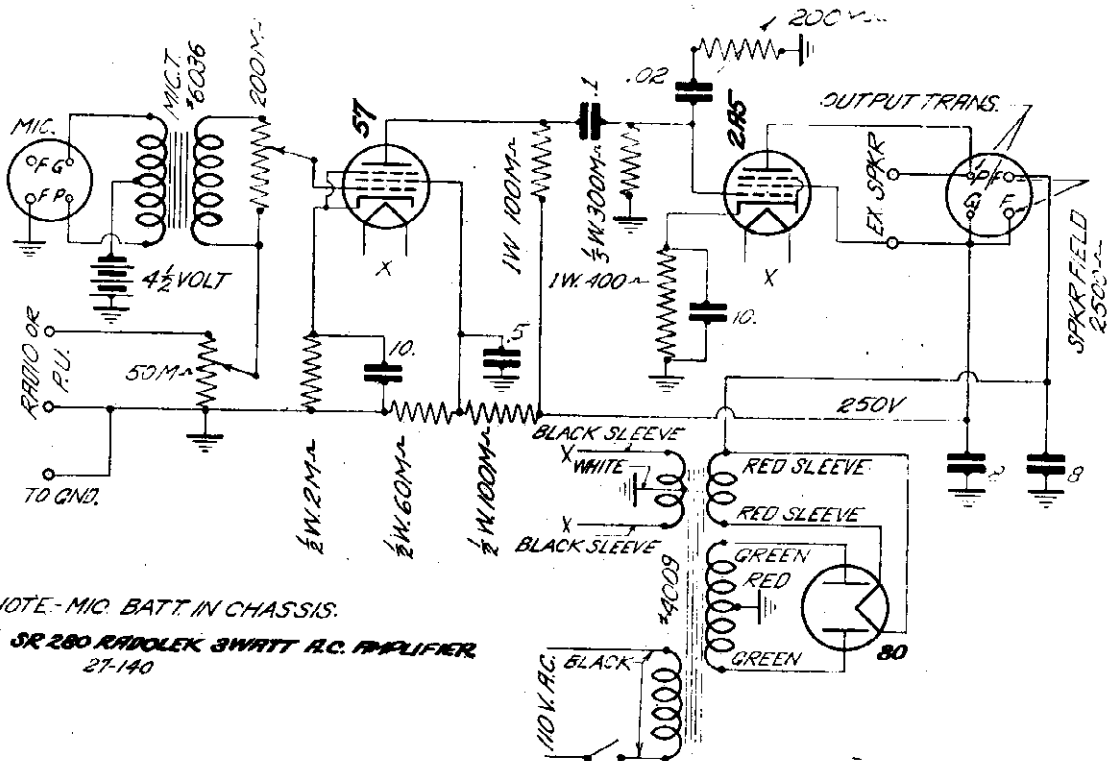


NOTE COND MARKED "P" ARE 5% TOLERANCE
"S" ARE 1% TOLERANCE

©1957 RADOLEK COMPANY, 1500 17TH ST. S.W.

MODEL 3-Watt A-C. Amplifier
 MODEL 30-Watt A-C. Amplifier
 Schematics

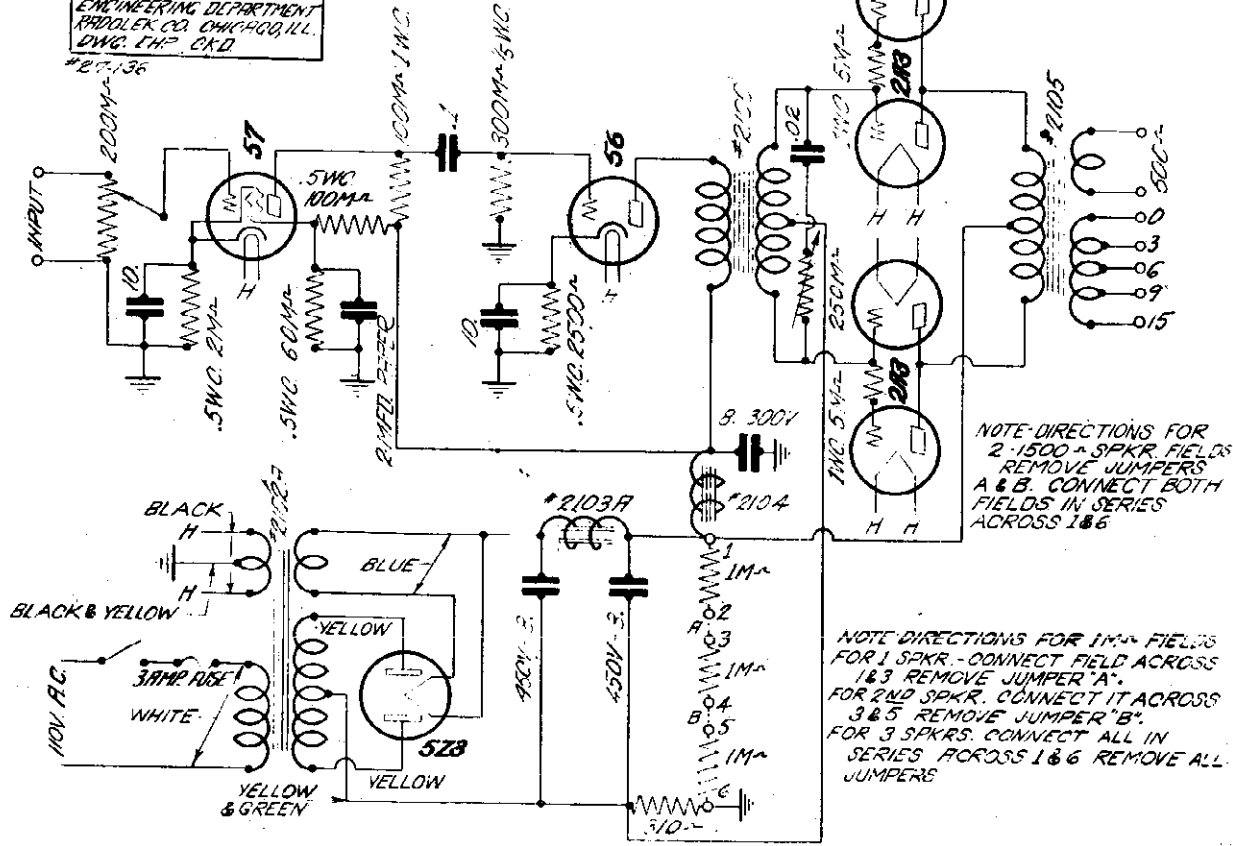
RADOLEK CO.



NOTE - MIC. BATT. IN CHASSIS.
SR 280 RADOLEK 3WATT A.C. AMPLIFIER
 27-140

SR 271 RADOLEK 10 & 30 WATT A.C. AMP

ENGINEERING DEPARTMENT
 RADOLEK CO. CHICAGO, ILL.
 DWG. EHP. CND.
 #27-136



NOTE DIRECTION FOR 2-150V SPKR. FIELDS
 REMOVE JUMPER A & B. CONNECT BOTH FIELDS IN SERIES ACROSS 1 & 6

NOTE DIRECTION FOR 1-250V SPKR. FIELDS
 FOR 1 SPKR. - CONNECT FIELD ACROSS 1 & 3 REMOVE JUMPER A.
 FOR 2ND SPKR. CONNECT IT ACROSS 3 & 5 REMOVE JUMPER B.
 FOR 3 SPKRS. CONNECT ALL IN SERIES ACROSS 1 & 6 REMOVE ALL JUMPERS

REMLER COMPANY, LTD.

MODEL 26
Above Serial 54760
Schematic, Voltage
Alignment

MODEL 26

GENERAL DESCRIPTION:

This five tube superheterodyne is of the universal type and is equipped with a six inch full dynamic speaker and two wave ranges.

The back may be plugged on the chassis after removal from the cabinet for testing and aligning.

INSTALLATION:

The receiver is designed for operation from a power supply of 110 to 125 volts A.C. or D.C. A resistor voltage reducer may be secured for operation from 220 volt sources. The antenna supplied with the receiver should be extended to its full length and connected to the black wire extending from the back of the cabinet. This indoor antenna may be concealed under a rug or along a molding. An outdoor antenna up to one hundred feet in length may be used where the indoor type is not satisfactory.

The antenna and mixer coils are in the aluminum shield at the back of the variable condenser. The mixer coil is trimmed by the back section trimmer. The oscillator coil is within the chassis and is trimmed by the front section trimmer on the variable condenser. The first I.F. transformer is mounted with the oscillator coil and is trimmed by the condensers accessible from the back of the chassis. The second I.F. transformer is also located within the chassis and may be trimmed by the condensers mounted thereon. The intermediate frequency used is 450 kilocycles.

OPERATION:

The knob at the left controls the volume and operates the ON and OFF switch at the extreme left position. The knob on the right is the station selector. The dial is calibrated in hundreds of kilocycles. The lower frequency police band may be tuned in near 17 on the dial with the wave range switch on the back of the cabinet in the L.W., or broadcast, position. When this switch is placed on the S.W. position, a range of from 1700 to 4100 kilocycles is covered by the selector knob. The location of the principal short wave bands are noted in the figure following.

TUBES:

- 6A7 Converter (mixer oscillator)
- 78 I. F. amplifier
- 77 Detector
- 43 Power amplifier
- 25Z5 Rectifier
- Dial light 6-8 volt.

VOLTAGE READINGS: (When operated on A.C.)

Line	120	volts
Filaments:		
43 and 25Z5	24	"
6A7, 78, 77 each	6	"
Across series resistor	54	"

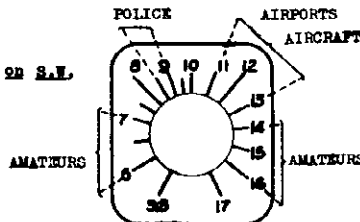
D.C. VOLTAGES - On full volume - No signal

From Chassis to:

25Z5 Rectifier tube cathode	105	volts
43 Power " plate	83	"
43 " " screen grid	92	"
43 " " cathode	12	"
6A7 Mixer Osg. " plate	92	"
6A7 " " screen grid	35	"
6A7 " " cathode	5	"
6A7 " " osg. plate	55	"
78 I.F. " plate	92	"
78 I.F. " screen grid	35	"
78 I.F. " cathode	2	"
77 Detector " plate	36	"
77 " " screen grid	35	"
77 " " cathode	2	"

* Due to small current, meter readings will be inaccurate on detector tube plate.

Short-wave bands with switch on S.W.

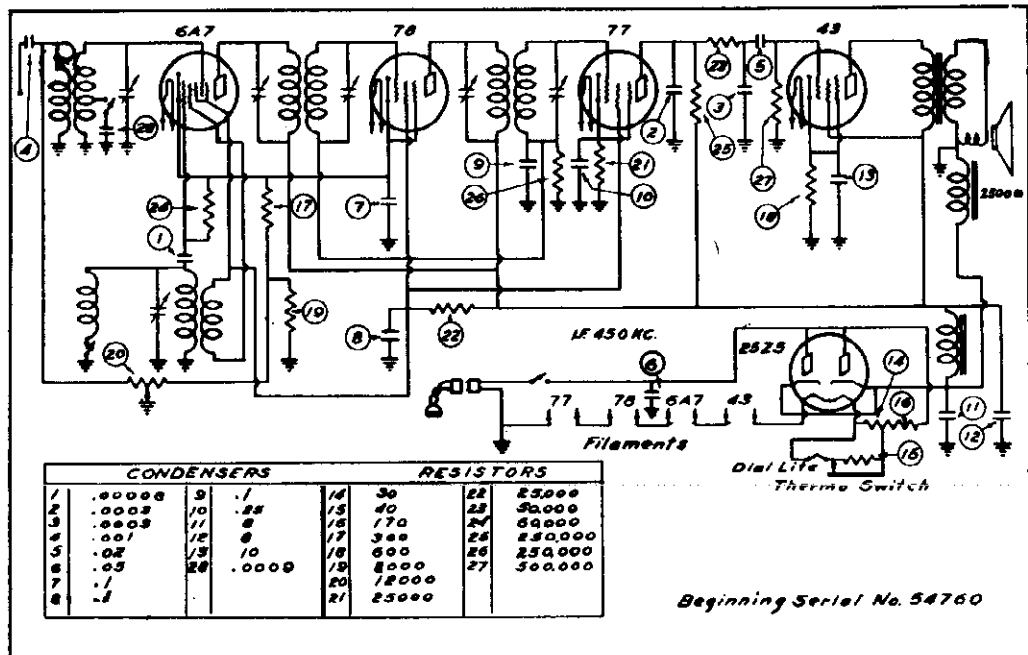


SERVICE DATA:

The plate supply is rectified directly from the power source and the filaments of the tubes are connected in series and through a series resistor to this source. The chassis is directly connected to the power line, and contact between chassis and ground should be avoided.

To take the chassis out of the cabinet - first, remove the knobs, then the back, and finally the hold down screw in the base of the cabinet. To replace tubes it is only necessary to remove the back.

D.C. voltage readings when connected to a D.C. source of 120 volts will be slightly less than those above.



CONDENSERS			RESISTORS			
1	.00005	9	1	30	22	25,000
2	.0002	10	.25	40	23	50,000
3	.0005	11	5	170	24	50,000
4	.001	12	8	17	25	250,000
5	.002	13	10	18	26	250,000
6	.005	14	.0000	19	27	500,000
7	.01	15		20		10,000
8	.1	16		21		25,000

Beginning Serial No. 54760

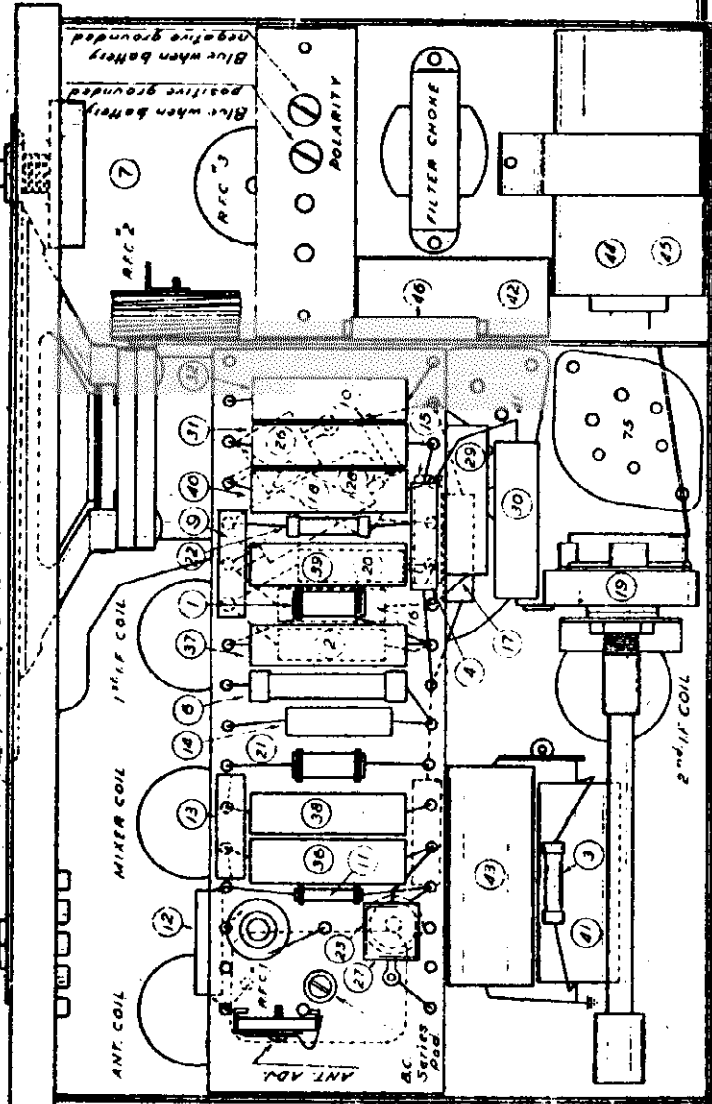
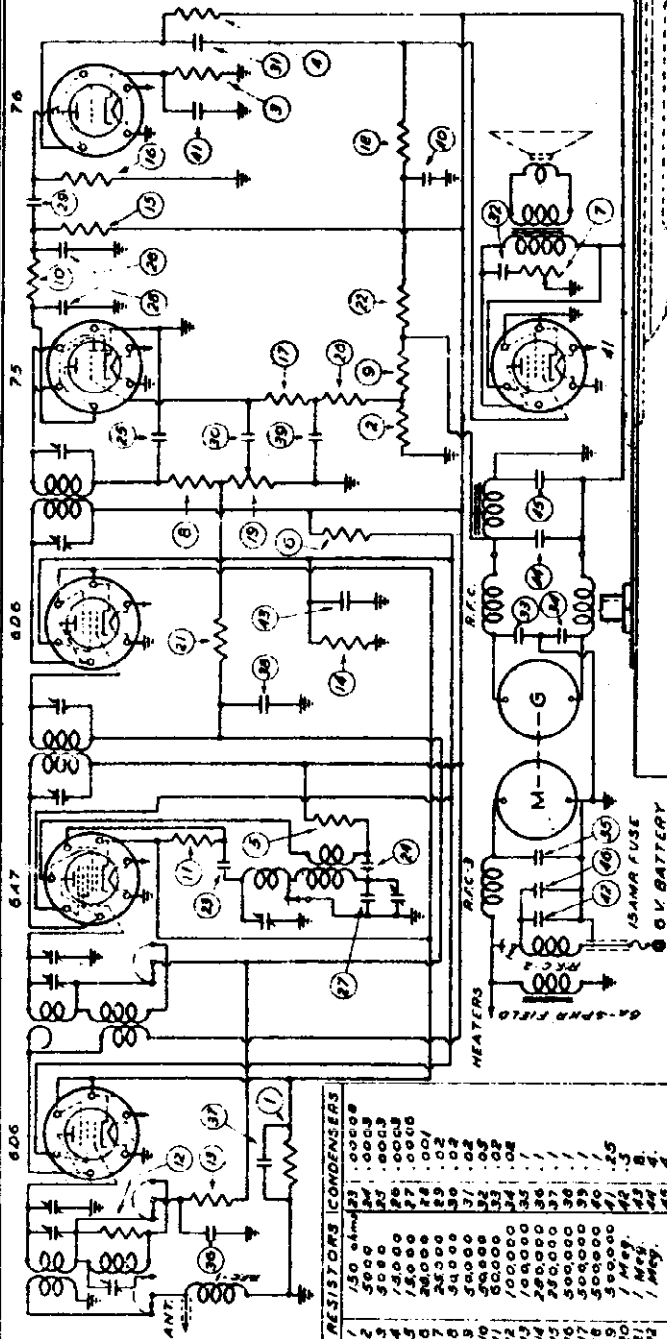
MODEL 36
Schematic, Chassis
Voltage

REMLER COMPANY, LTD.

REMLER

MODEL 36 AUTO RADIO

IF PEAK 250 KC.



RESISTORS (CONDENSERS)	
1	750 ohms
2	500 ohms
3	250 ohms
4	150 ohms
5	100 ohms
6	75 ohms
7	50 ohms
8	35 ohms
9	25 ohms
10	15 ohms
11	10 ohms
12	5 ohms
13	2.5 ohms
14	1.5 ohms
15	1 ohm
16	500,000 ohms
17	500,000 ohms
18	500,000 ohms
19	500,000 ohms
20	500,000 ohms
21	1 meg.
22	1 meg.
23	1 meg.
24	1 meg.
25	1 meg.
26	1 meg.
27	1 meg.
28	1 meg.
29	1 meg.
30	1 meg.
31	1 meg.
32	1 meg.
33	1 meg.
34	1 meg.
35	1 meg.
36	1 meg.
37	1 meg.
38	1 meg.
39	1 meg.
40	1 meg.
41	1 meg.
42	1 meg.
43	1 meg.
44	1 meg.
45	1 meg.
46	1 meg.

VOLTAGE TO CHASSIS-NO SIGNAL	
Plate supply from dynamotor	215 v.
6D8-RF Plate	215
6D6-RF Screen	80
6D6-RF Cathode	3
6A7-Mixer Plate	215
6A7-Mixer Screen	80
6A7-Mixer Cathode	3
6A7-Oscillator Plate	150
6D6-IF Plate	215
6D6-IF Screen	80
6D6-IF Cathode	3
75 -Det.AVC Plate	85
75 -Det.AVC Grid	1.5
76 -AF Plate	155
76 -AF Cathode	9
41 -Power Plate	195
41 -Screen	215v. Grid
	15

REMLER COMPANY, LTD.

MODEL 40
Above Serial 53410
Schematic, Voltage
Alignment

MODEL 40

GENERAL DESCRIPTION:

This radio receiver employs the superheterodyne circuit and utilizes four tubes, two of which are of the double purpose type. It is equipped with a six inch full dynamic speaker and two wave ranges.

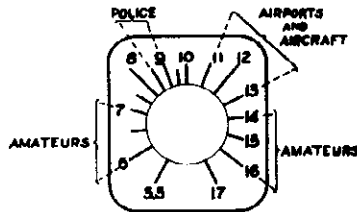
INSTALLATION:

The receiver is designed for operation from an alternating current (A.C.) power supply of 110 to 125 volts, 50 or 60 cycles.

Flexible leads for connecting antenna and ground extend from the back of the cabinet. A good ground connection to the black lead is essential for best performance. This lead should be as short as possible and preferably attached to a water pipe. Two antenna connections are provided. The antenna supplied with the receiver should be connected to the red lead and extended to its full length. It may be concealed under a rug or along a molding. An outdoor antenna up to 100 feet in length may be used when the indoor type is not satisfactory. In rural locations, where a longer antenna may be used, connection to the green wire is recommended.

OPERATION:

The knob at the left controls the volume and operates the ON and OFF switch at the extreme left position. The knob on the right is the station selector. The dial is calibrated in hundreds of kilocycles. The lower frequency police band may be tuned in near 17 on the dial with the wave range switch on the back of the cabinet in the L.W., or broadcast, position. When this switch is placed on the S.W. position, a range of from 1700 to 4100 kilocycles is covered by the selector knob. The location of the principal short wave bands are noted in the figure following.



Short wave bands with switch on S.W.

SERVICE DATA:

The antenna and mixer coils are in the aluminum shield at the back of the variable condenser. The mixer coil is trimmed by the back section trimmer. The oscillator coil is within the chassis and is trimmed by the front section trimmer on the variable condenser. The first I.F. transformer is mounted with the oscillator coil and is trimmed by the condensers accessible from the back of the chassis. The second I.F. transformer is also located within the chassis and may be trimmed by the condensers mounted thereon. The intermediate frequency used is 450 kilocycles.

- Tubes:
- 6A7 Converter (mixer-oscillator)
 - 6F7 I.F. Amplifier and detector
 - 41 Power amplifier
 - 84 Full wave rectifier

A. C. VOLTAGES:

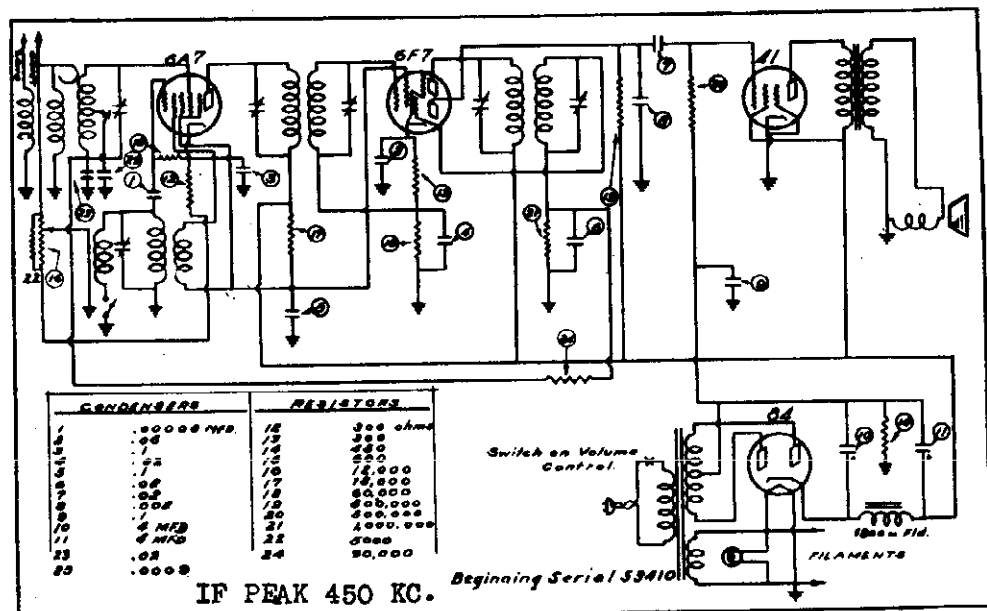
- Line - 120 volts
- Filaments - 6.3 "

D. C. VOLTAGES:

From ground to:

- #84 Rectifier cathode - 330 volts
- #41 Plate - 240 "
- #41 Screen grid - 250 "
- #41 Grid - 20 "
- #6F7 Triode plate - 100 "
- #6F7 Pentode plate - 250 "
- #6F7 Screen grid - 100 "
- #6F7 Cathode - 8 "
- #6F7 Pentode grid - 5 "
- #6A7 Plate - 250 "
- #6A7 Screen grid - 100 "
- #6A7 Oscillator plate - 100 "
- #6A7 Cathode - 3 $\frac{1}{2}$ - 23 volts

Due to current taken by voltmeter used, readings of detector plate and grid voltages may be slightly less than values shown above.



MODEL 42
Above Serial 53968
Schematic, Voltage
Alignment

REMLER COMPANY, LTD.

MODEL 42

This is a six tube superheterodyne receiver with automatic volume control, tone compensator and police call switch. It is designed to operate from a 110 to 125 volt, 50 or 60 cycle, alternating current power supply.

INSTALLATION:

An antenna of from twenty-five to a hundred feet in length should be connected to the blue wire extending from the back of the set. The antenna and lead-in wire should be kept clear of all metal objects such as pipes and wires, and be run in as straight a line as possible. An indoor antenna may be used to receive local stations or where the receiver is used in an isolated wooden building.

A good ground is essential for clearest reception. Connect the black wire at the back of the set to a water or steam pipe. The pipe should first be scraped clean before attaching the ground wire.

CONTROLS:

The knob on the left is the volume control and also operates the ON and OFF switch in the extreme left position.

The selector knob is at the right. The dial is calibrated in hundreds of kilocycles and covers a range of from 540 to 1720 K. C. The lower frequency police band is tuned from 16 to 17 on the dial. Police calls from stations on the higher frequency band may be received by shifting the police call switch on the back of the receiver to the right and tuning from 15 to 17 on the dial. Police radio stations operate intermittently to suit their particular needs and do not operate continuously as do the broadcast stations.

A tone control switch is located on the back of the receiver. When shifted to the right the higher audio frequencies are suppressed and static and interfering noises are reduced.

OPERATION:

With the line plug connected, turn the volume control to the right. The dial lights should light up brightly. Allow about one half minute for the tubes to warm up and slowly turn the selector knob until the desired program is heard. If too loud reduce the volume by turning the volume control to the left. For best quality the selector knob should be adjusted to the center of the range on the dial within which the station is heard and the volume adjusted with the volume control only.

SERVICE DATA:

The following tubes are used in this receiver:

- 6D6 - R. F. amplifier
- 6A7 - Converter (mixer-oscillator)
- 6D6 - I. F. amplifier
- 75 - Diode detector and audio amplifier
- 42 - Output amplifier
- 80 - Rectifier
- Dial lights 6 - 8 volts.

SERVICE DATA - Cont'd.

The antenna and H. F. coils are in the shielding can nearest the front of the chassis and the mixer coil is in the shield within the chassis. The first I. F. transformer and oscillator are mounted in the shield between the 6A7 and 6D6 tubes; while the second I. F. transformer is located on the under side of the chassis. The oscillator trimmer condenser is nearest the back of the variable condenser and the mixer and H. F. trimmers are next in order toward the front of the chassis.

Trimmers for the I. F. transformers are adjustable through holes in the shield can, and on the I. F. transformer within the chassis. The intermediate frequency is 450 K.C. Use a weak signal or oscillator input when adjusting the trimmers. In removing the chassis from the cabinet pry off the knobs with a wooden screw driver with a piece of cardboard against the cabinet and pull off the pointer from the condenser shaft.

Voltage readings for service work follow:

A. C. VOLTAGES:

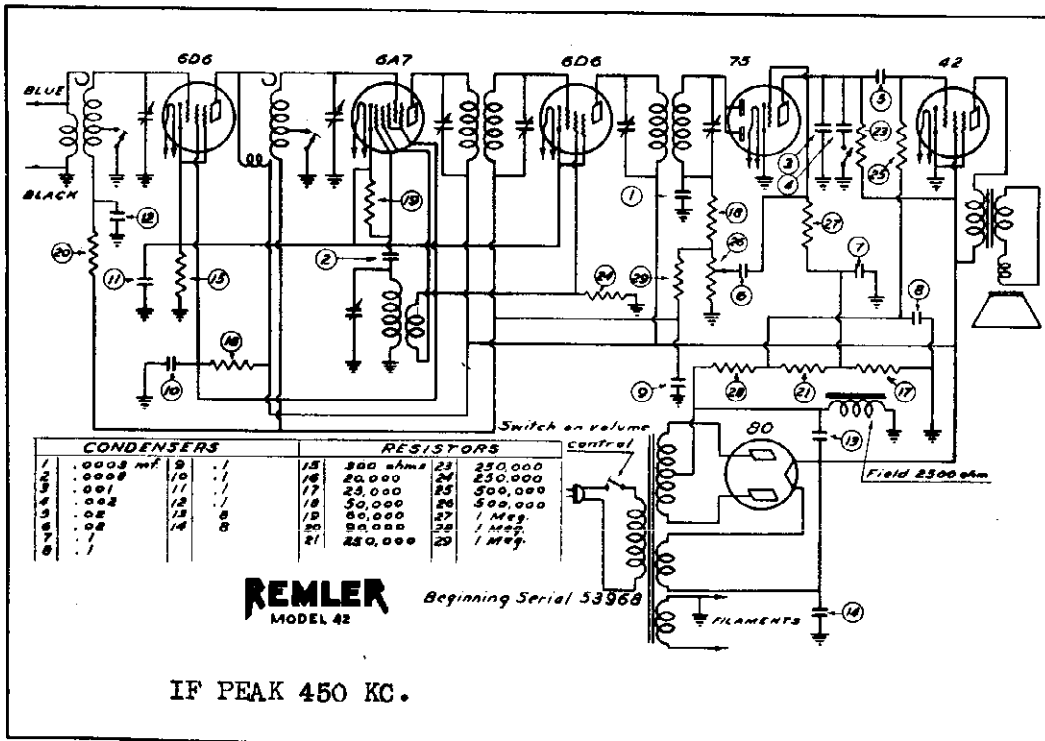
Line	120 volts
Filaments 6A7, 6D6's, 75 and 42	6.3 "
Filaments 80	5.2 "

D. C. VOLTAGES: (no signal)

From ground to:

80 Rectifier filament	270 volts
42 Plate	260 "
42 Screen grid	270 "
42 Grid	15 "
75 Plate	140 "
75 Grid	3 "
6D6 I. F. plate	270 "
6D6 I. F. screen grid	110 "
6D6 I. F. Cathode	5 "
6A7 Plate (mixer)	270 "
6A7 Screen grid	110 "
6A7 Cathode	5 "
6A7 Plate (oscillator)	110 "
6D6 R. F. plate	270 "
6D6 R. F. screen grid	110 "
6D6 R. F. cathode	5 "
Speaker field	180 "

Due to current taken by voltmeter used, readings of 75 and 42 grid voltages will be less than those above.



REMLER
 MODEL 42 Beginning Serial 53968

IF PEAK 450 KC.

MODEL 53
Above Serial 5486
Schematic, Voltage
Alignment

REMLER COMPANY, LTD.

GENERAL DESCRIPTION:

This radio receiver employs the superheterodyne circuit and utilizes five tubes, two of which are of the double purpose type. It is equipped with a six inch full dynamic speaker and receives all police calls.

INSTALLATION:

The receiver is designed for operation from an alternating current (A.C.) power supply of 110 to 125 volts, 50 or 60 cycles.

Flexible leads for connecting antenna and ground extend from the back of the cabinet. A good ground connection to the black lead is essential for best performance. This lead should be as short as possible and preferably attached to a water pipe. Under ordinary conditions an outdoor antenna of approximately 100 feet in length should be connected to the blue wire. Where the receiver is installed near broadcast stations, a shorter antenna may be used to improve selectivity. An antenna longer than 100 feet may be used in rural locations.

OPERATION:

The lower knob controls the volume and operates the ON and OFF switch at the extreme left position. The dial is calibrated in hundreds of kilocycles, that is - a station transmitting on 700 kilocycles is tuned in at 7 on the dial.

The lower frequency police band may be tuned in near 17 on the dial while police calls from stations on the higher frequency band are tuned in from 15 to 16. These stations are on the air intermittently to suit their particular needs and are not operated continuously as are the broadcast stations.

SERVICE DATA:

The antenna and mixer coils are located in the protecting shield on the top of the chassis. The mixer coil is trimmed by the trimmer condenser nearest the back of the variable condenser. The oscillator coil is within the chassis and is trimmed by the front trimmer on the variable condenser.

The I. F. transformers have untuned secondaries and are located within the chassis. The trimmers for the primary windings are attached to the transformers. The intermediate frequency used is 450 K.C.

TUBES:

- 6A7 Converter (mixer-oscillator)
- 6D6 I.F. amplifier
- 53 Diode detector and audio amplifier
- 42 Power amplifier
- 80 Full wave rectifier
- Dial light 3.8 volt

A. C. VOLTAGES:

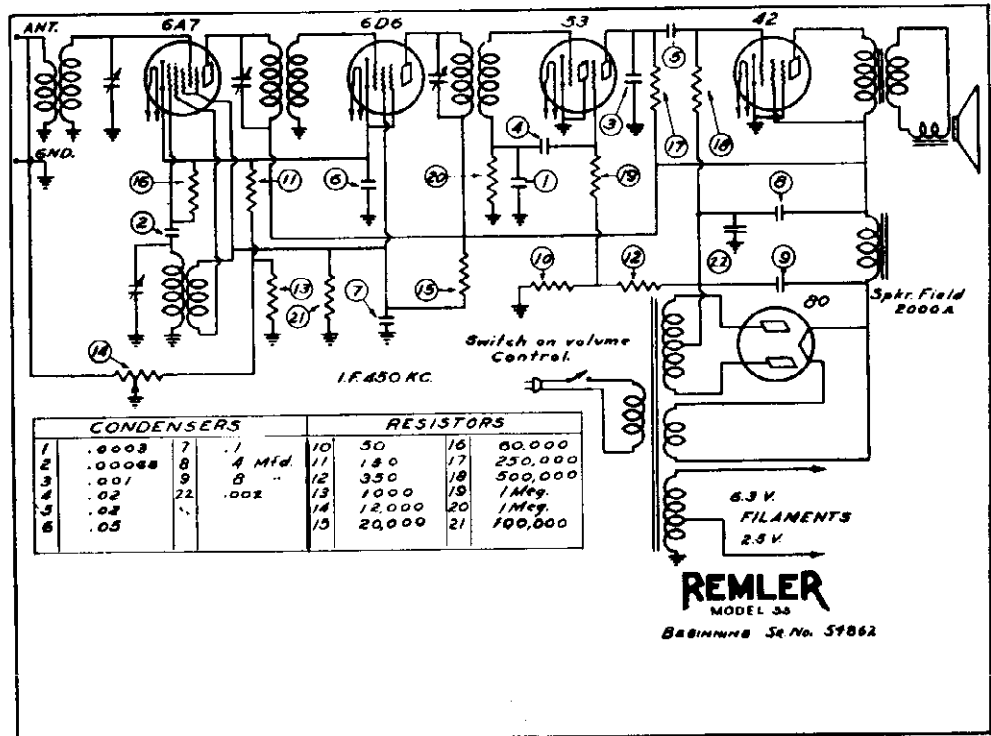
Line	120 volts
Filaments - #80	5 "
#53 and dial light	2.4 "
#42, 6A7 and 6D6	6.2 "

D. C. VOLTAGES: Full volume, no signal

From ground to:

80 Rectifier filament	325 volts
42 Plate	215 "
42 Screen grid	220 "
42 Cathode	0 "
42 Grid	18 "
53 Second section plate	100 "
53 Second section grid	2.5 "
53 Cathode	0 "
6D6 Plate	220 "
6D6 Screen grid	105 "
6D6 Cathode	3 "
6A7 Pentode plate	220 "
6A7 Screen grid	105 "
6A7 Oscillator plate	105 "
6A7 Cathode	3 "

Due to current taken by the voltmeter used, readings of the 42 grid and 53 plate voltages will be less than values shown above.



MODEL 53-C
Above Serial 56208
Schematic, Voltage
Alignment

REMLER COMPANY, LTD.

GENERAL DESCRIPTION:

This radio receiver employs the superheterodyne circuit and utilizes five tubes, one of which is of the double purpose type. It is equipped with a six inch full dynamic speaker and receives all police calls.

INSTALLATION:

The receiver is designed for operation from an alternating current (A.C.) power supply of 110 to 125 volts, 50 or 60 cycles.

Flexible leads for connecting antenna and ground extend from the back of the cabinet. A good ground connection to the black lead is essential for best performance. This lead should be as short as possible and preferably attached to a water pipe. Under ordinary conditions an outdoor antenna of approximately 100 feet in length should be connected to the antenna of approximately 100 feet in length should be connected to the blue wire. Where the receiver is installed near broadcast stations, a shorter antenna may be used to improve selectivity. An antenna longer than 100 feet may be used in rural locations.

OPERATION:

The knob on the left controls the volume and operates the ON and OFF switch at the extreme left position. The dial is calibrated in tens of kilocycles, that is, a station on 700 KC is tuned in at 70 on the dial. The lower frequency police band may be tuned in near 170 on the dial, while police calls from stations on the higher frequency band are tuned in between 150 and 160. These stations are on the air to suit their particular needs and are not operated continuously as are the broadcast stations. The knob on the right operates the tone control.

SERVICE DATA:

The antenna and mixer coils are located in the protecting shield on the top of the chassis. The mixer coil is trimmed by the trimmer condenser nearest the back of the variable condenser. The oscillator coil is within the chassis and is trimmed by the front trimmer on the variable condenser.

The I. F. Transformers are located within the chassis and may be trimmed by the adjusting screws on the rear of the chassis. The intermediate frequency is 450 KC

TUBES:

- 6A7 Converter (mixer-oscillator)
- 6D6 I. F. Amplifier
- 76 Detector
- 42 Power amplifier
- 80 Full wave rectifier
- Dial light 6.3 volt

A. C. VOLTMETER:

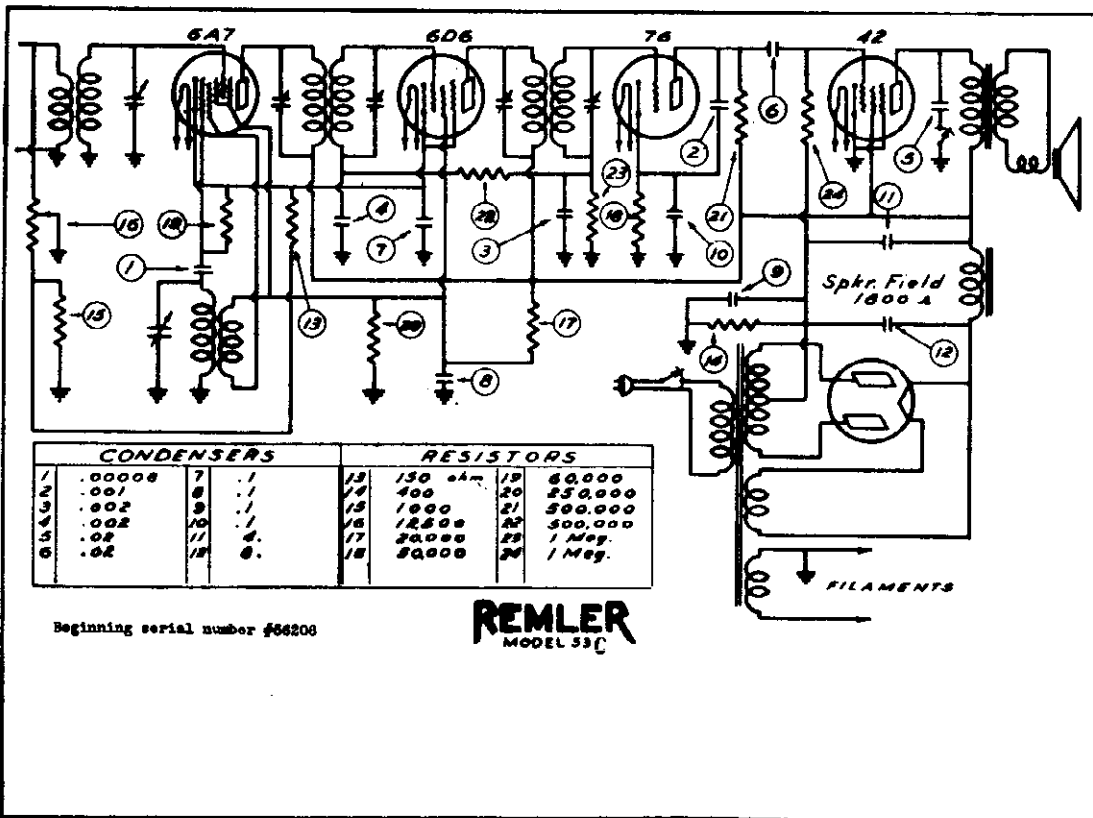
Line	120 volts
Filaments - #80	5.0 "
#42, 6A7, 76, 6D6 and dial light	6.3 "

D. C. VOLTAGES: Full volume, no signal

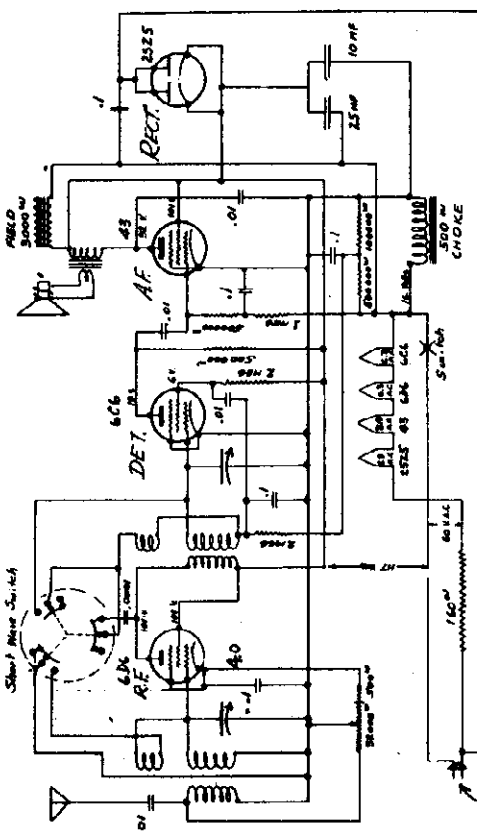
From ground to:

80 Rectifier filament	510 volts
42 Plate	205 "
42 Screen grid	215 "
42 Cathode	0 "
42 Grid	19.5 "
76 Plate	70 "
76 Cathode	8 "
6D6 Plate	215 "
6D6 Screen grid	90 "
6D6 Cathode	2.5 "
6A7 Pentode Plate	215 "
6A7 Screen grid	90 "
6A7 Oscillator plate	90 "
6A7 Cathode	2.5 "

Due to current taken by the voltmeter used, reading of the 42 grid and 76 plate voltages will be less than values shown above.



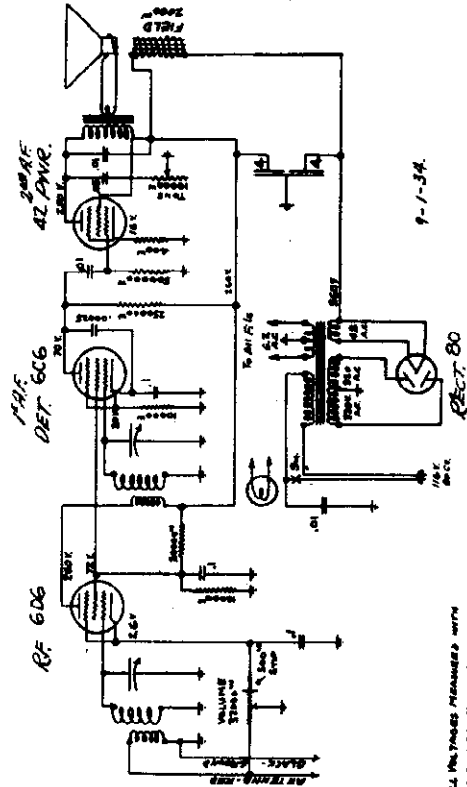
RK RADIO LABORATORIES, INC. MODELS 421, 422, 423, 424
 MODELS 425, 426, 427, 428
 MODELS 521, 522
 Schematics, Voltage



CIRCUIT DIAGRAM
 FOUR TUBE AC-DC RECEIVER
 4-31-34

MODELS 421
 422 423 424

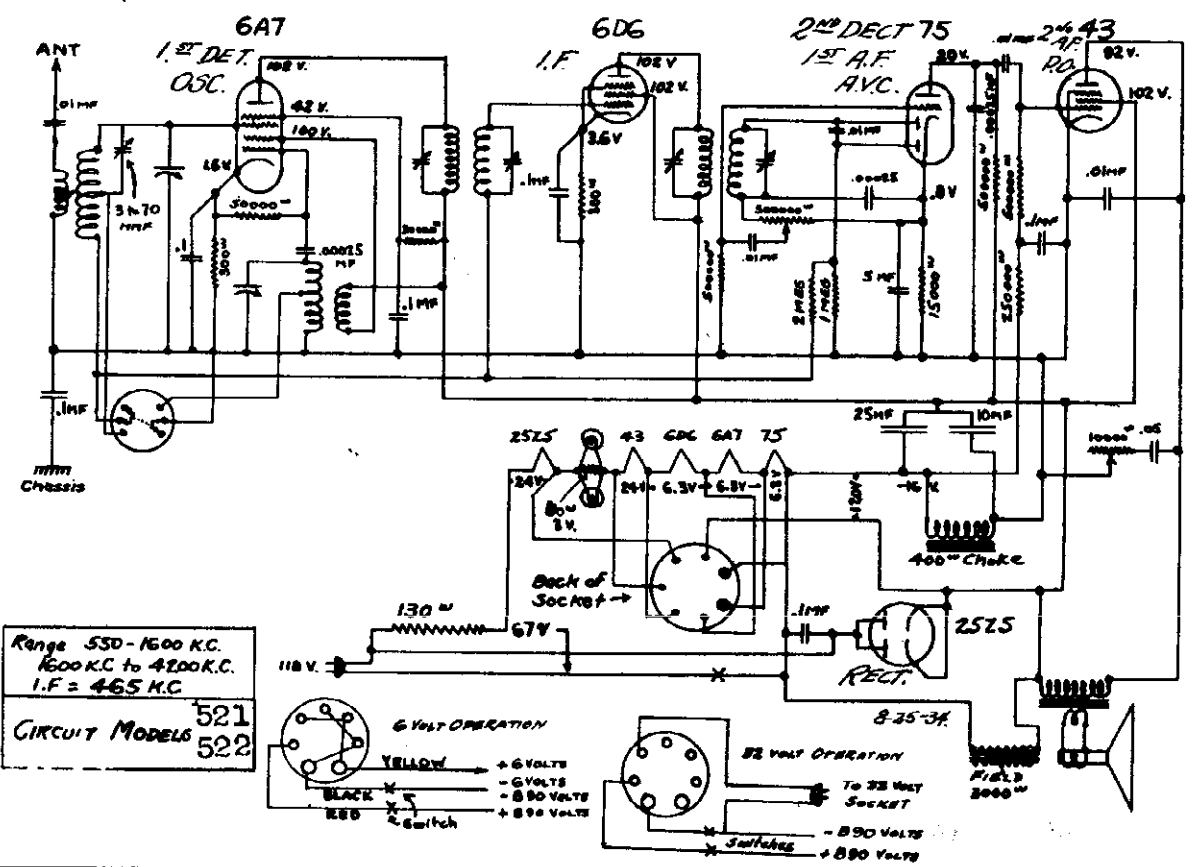
ALL VOLTAGES MEASURED ON 500 OHM LOAD
 IN RESISTOR FOR VOLT METER. LONG METERING
 AT 175 VOLTS, 60 CYCLE A.C. RECOMMENDED. CHECK
 TO BEAT SHOCK FROM AC INDUCTION. AT FULL
 TUNING ONLY TO SIGNAL.



SCHEMATIC DIAGRAM
 4-TUBE A.C.
 500 TO 1750 K.C.

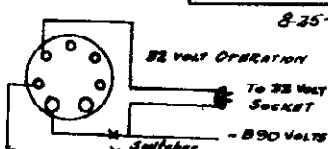
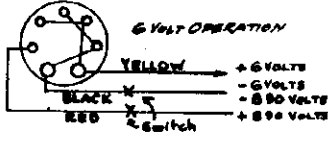
MODELS 425
 426 427 428

ALL VOLTAGES MEASURED WITH
 500 OHM LOAD FOR VOLT METER
 LONG METERING AT 175 VOLTS
 60 CYCLE A.C. RECOMMENDED
 TO BEAT SHOCK FROM AC INDUCTION
 AT FULL TUNING ONLY TO SIGNAL



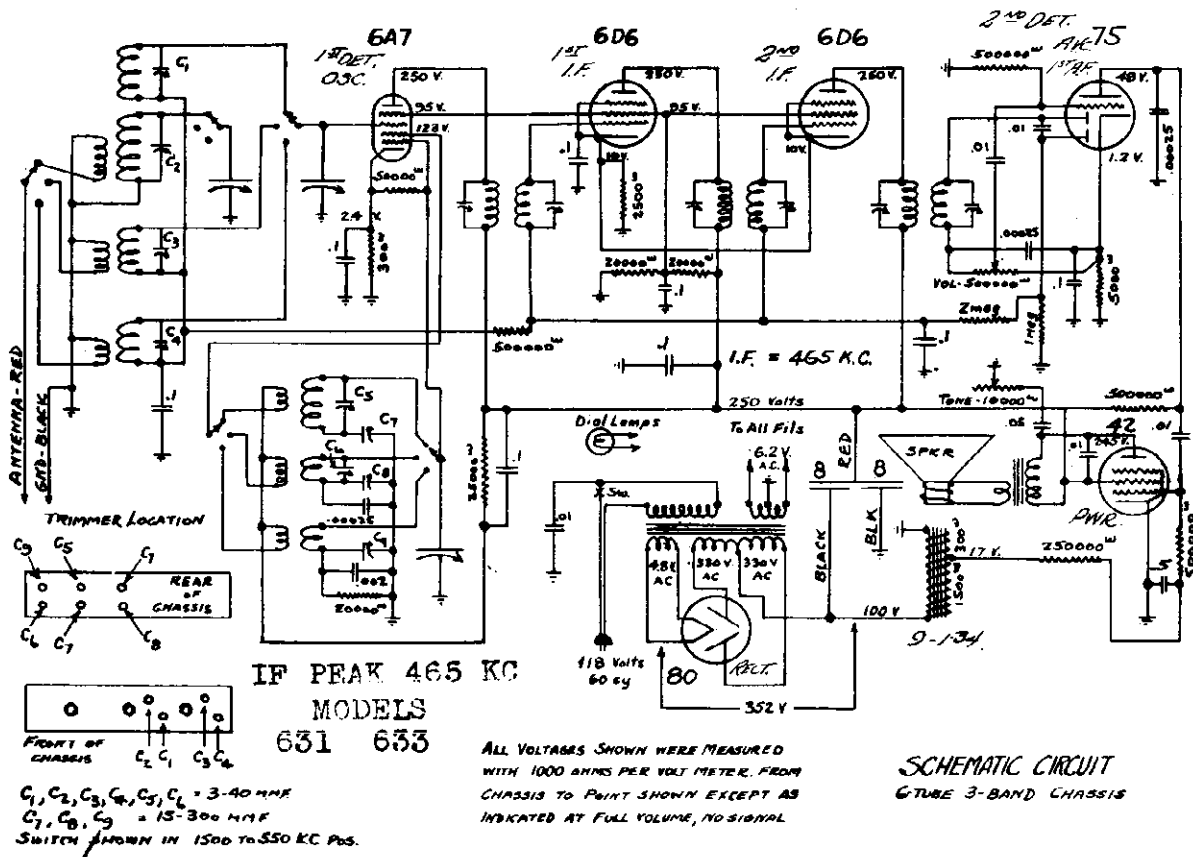
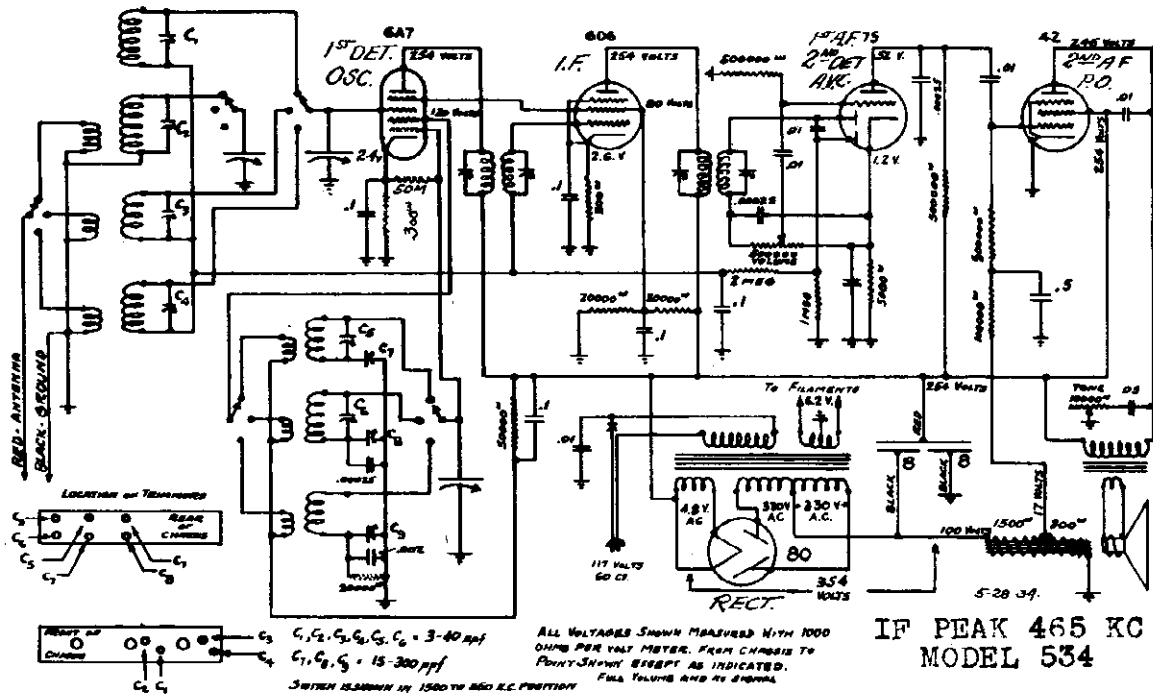
Range 550-1600 K.C.
 1600 K.C. to 4100 K.C.
 I.F. = 465 K.C.

CIRCUIT MODELS 521
 522



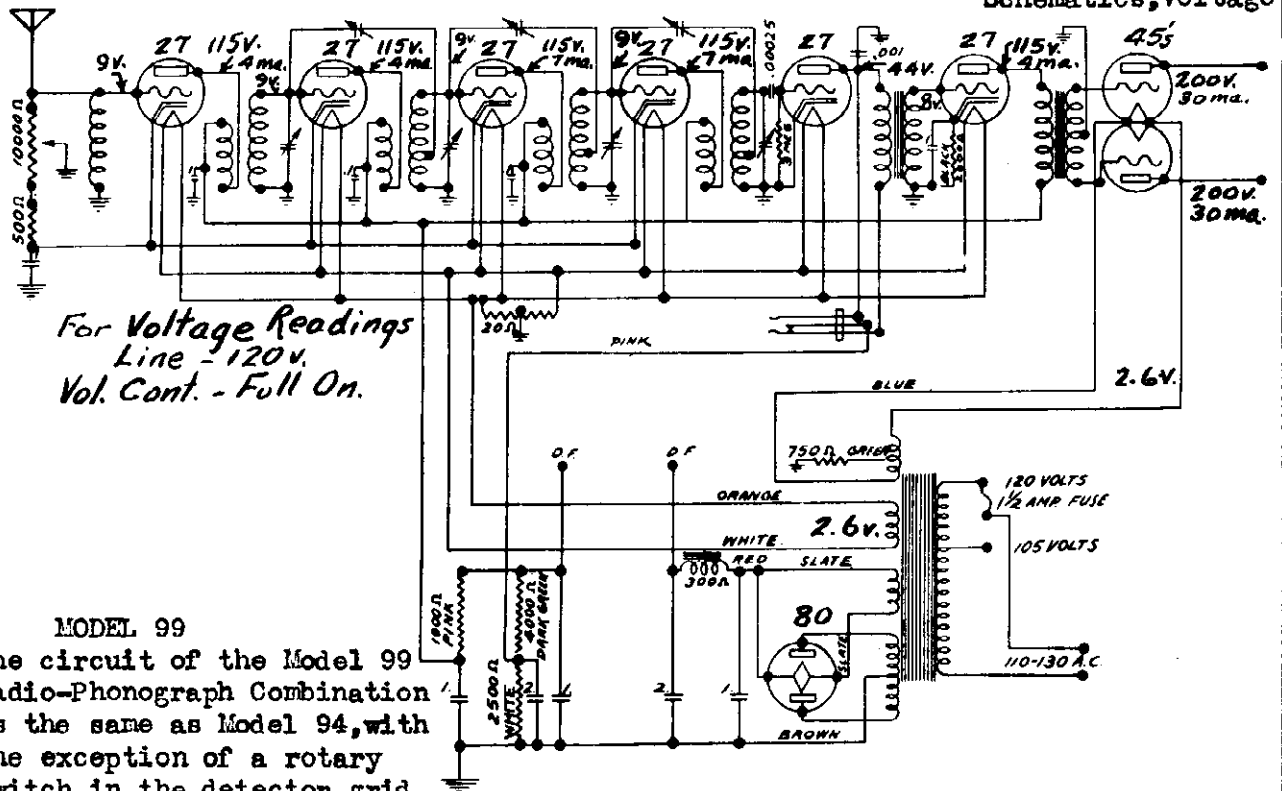
MODEL 534
 MODELS 631, 633
 Schematics, Voltage

RK RADIO LABORATORIES, INC.



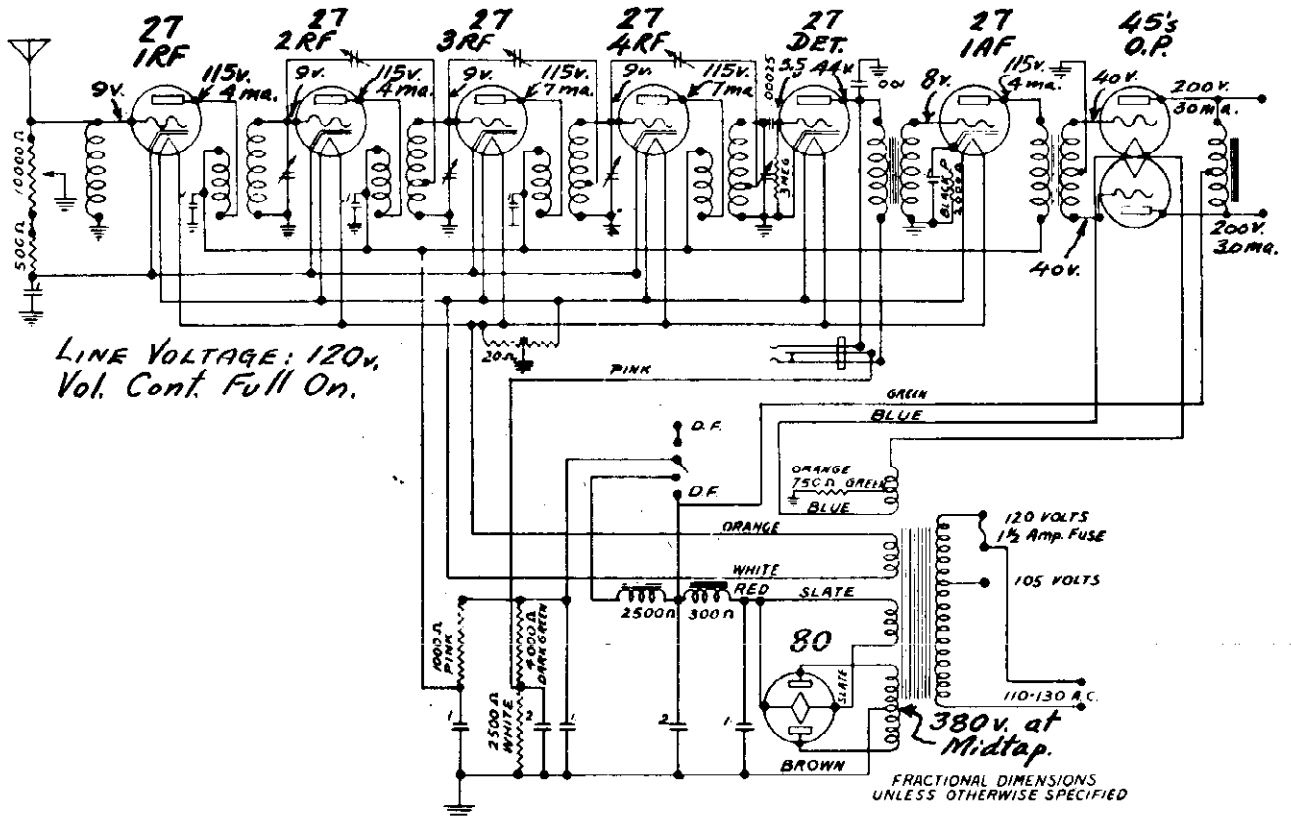
SEARS-ROEBUCK & CO.

MODELS 52, 95
MODELS 53, 54, 94, 99
Schematics, Voltage



MODEL 99
The circuit of the Model 99 Radio-Phonograph Combination is the same as Model 94, with the exception of a rotary switch in the detector grid circuit.

SCHMATIC DIAGRAM
SEARS MODELS 53 AND 54-FACTORY MODEL 94

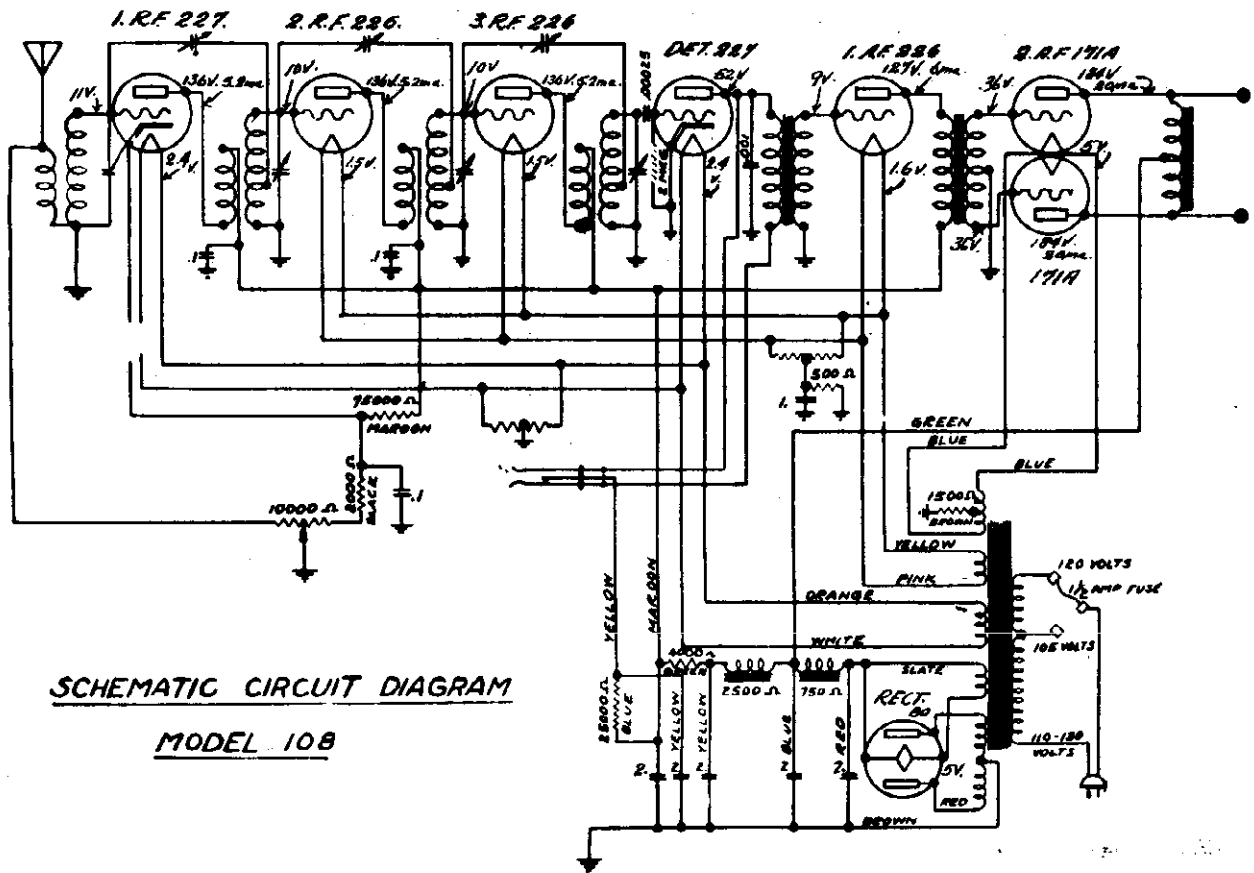
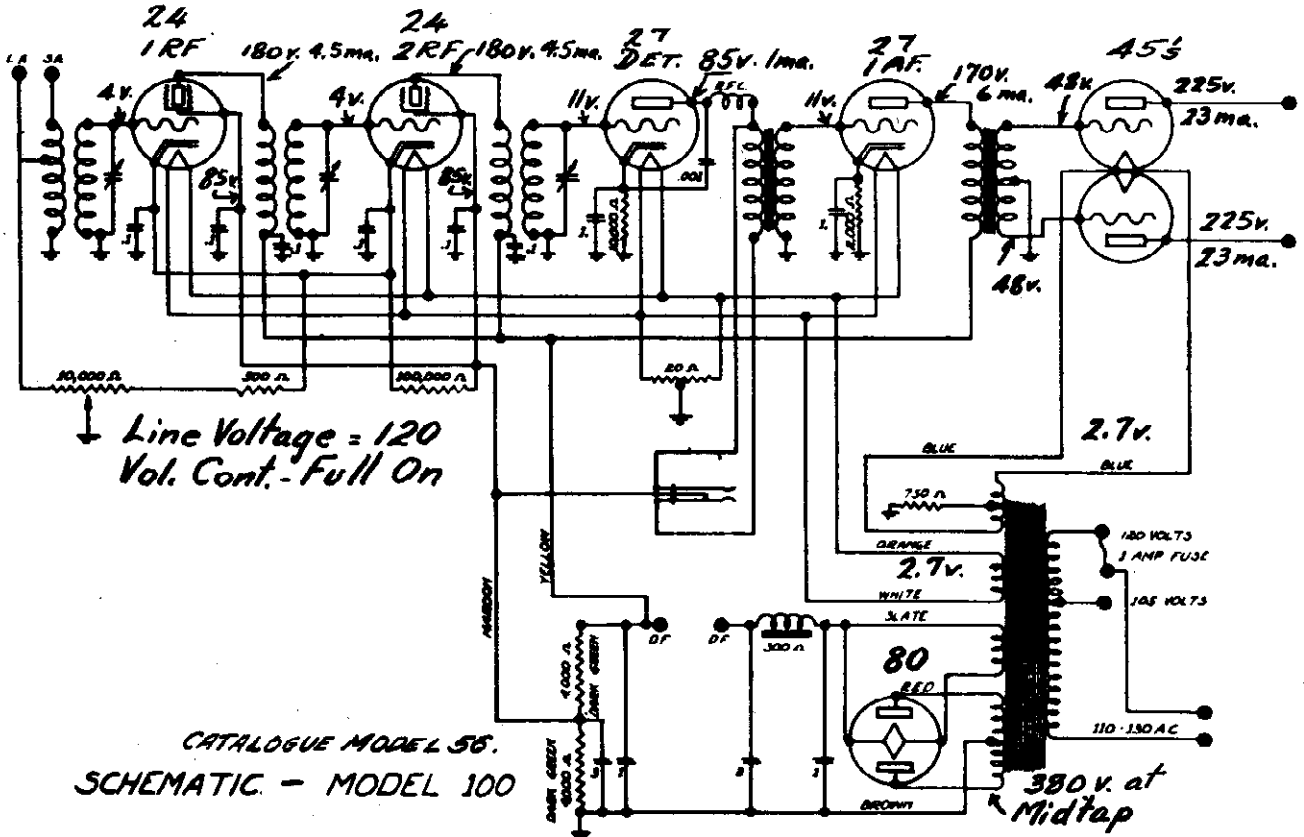


SCHMATIC DIAGRAM
SEARS MODEL 52 FACTORY MODEL 95

FRACTIONAL DIMENSIONS UNLESS OTHERWISE SPECIFIED

MODELS 56,100
MODEL 108
Schematics, Voltage

SEARS-ROEBUCK & CO.



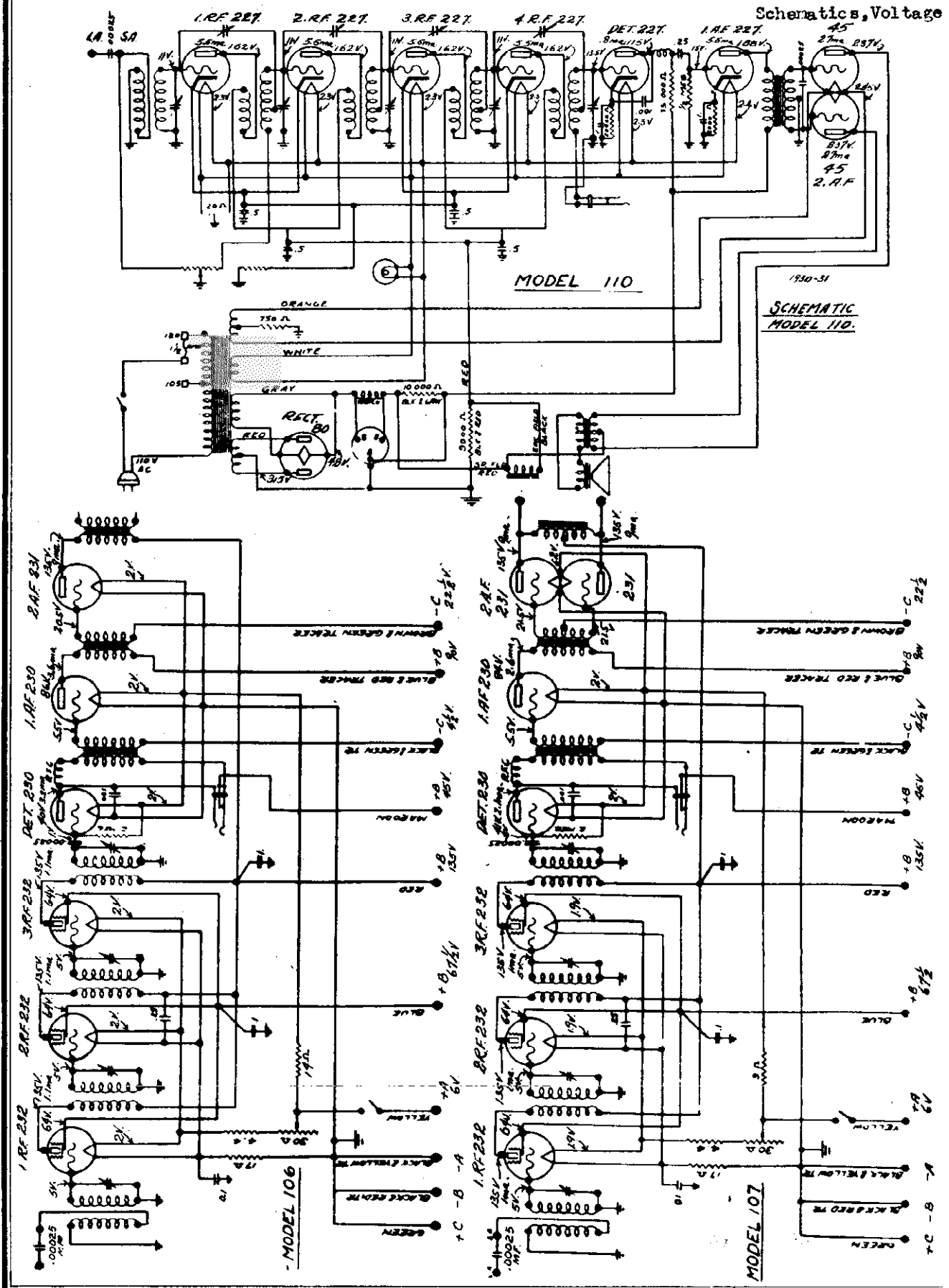
SEARS-ROEBUCK & CO.

MODEL 106

MODEL 107

MODEL 110

Schematics, Voltage



SCHEMATIC MODEL 110.

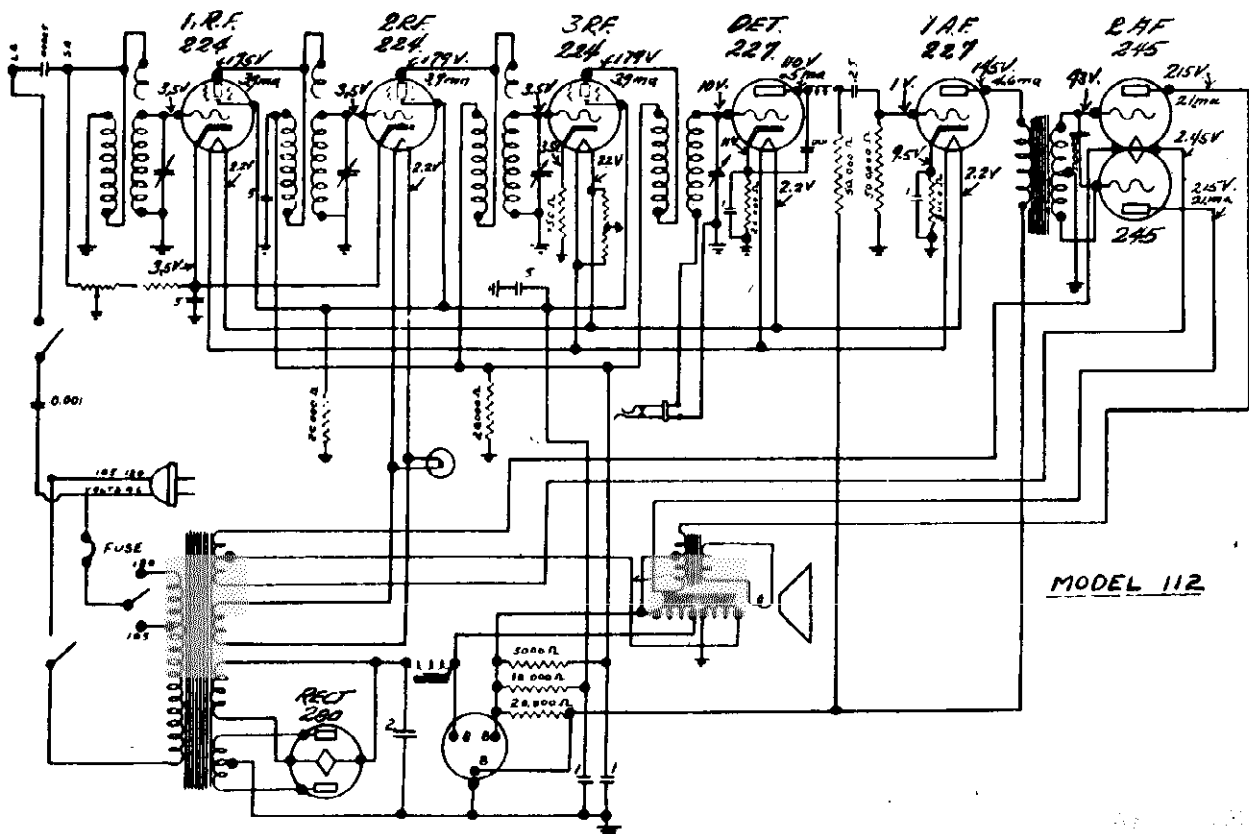
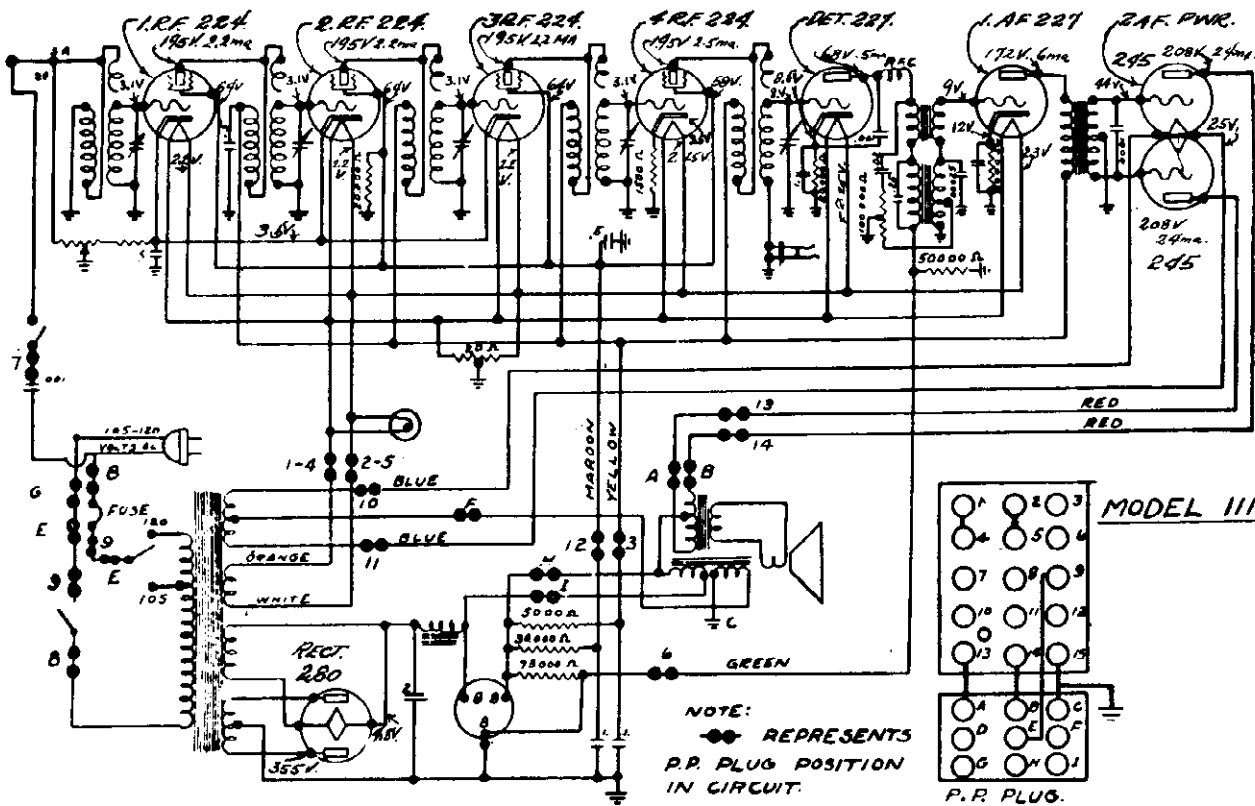
-MODEL 106

MODEL 107

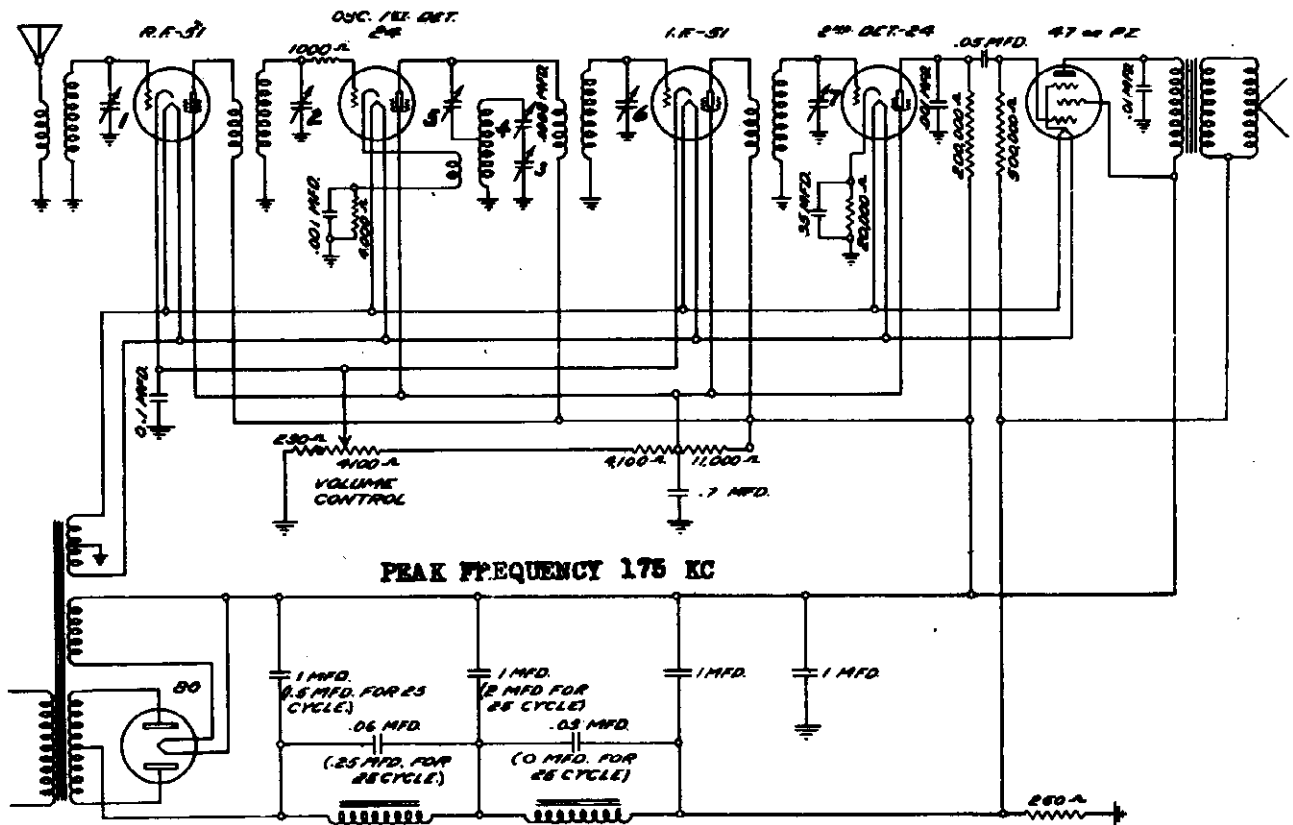
MODEL 111
MODEL 112

SEARS-ROEBUCK & CO.

Schematics, Voltage



SEARS-ROEBUCK & CO.

MODEL 1506
Schematic
Voltage

READING TAKEN WITH WESTON MODEL 565 ANALYZER

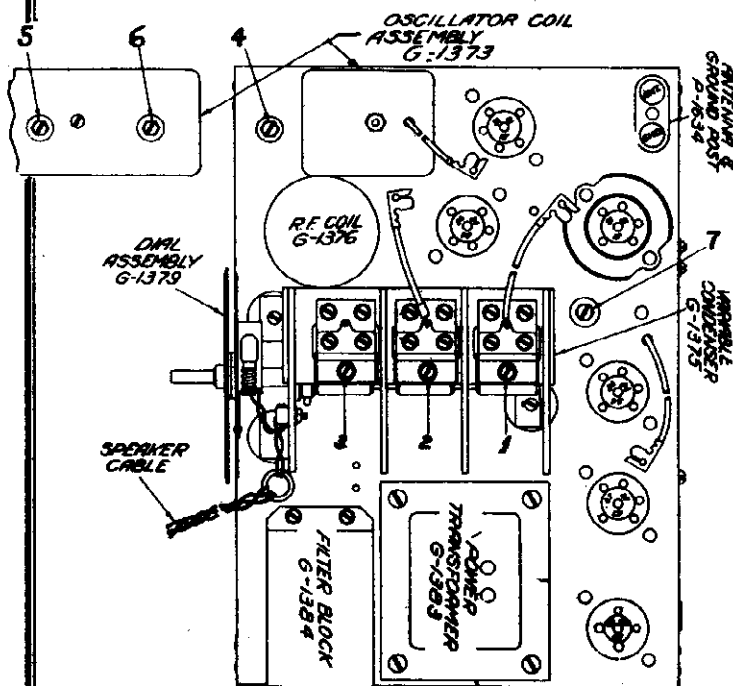
MODEL No.	CUSTOMER				BY			
No.	Stage	Type Tube	"A" Volts	"B" Volts	Cont. Grid Volt	Cath. Volts	S. G. Volts	I _p Norm.
1	R. F.	51	2.15	235	2.4	2.5	80.	5.0
2	Autodyne	24	2.15	225	5.0	6.0	75.	3.0
3	I. F.	51	2.15	230	2.4	2.5	75.	4.0
4	2nd Det.	24	2.15	104	10.	15.	65.	0.6
5	Audio	47	2.25	250	16	0	260	30.
6	Rect.	80	4.4					57.5

Line Voltage 115. Order of Test: 1 Rect., 2 Power, 3 Det., Etc.
Volume Control Position, Full On.

NOTE: Since resistance tolerances in the sets are plus or minus 10% and tubes may vary over 20%, your readings may disagree with the above by plus or minus 30%.

MODEL 1506
Trimmers, Socket
Alignment

SEARS-ROEBUCK & CO.



quency stages, no adjustment of the tuning condenser on the receiver will have any effect, inasmuch as the intermediate frequency stage is fixed tuned.

If your test oscillator is properly designed, it will supply exactly 175 k. c., and when trimmers number 5, 6 and 7 are set for maximum output, they will be correctly adjusted and should be sealed.

Next, disconnect the 175 k. c. test oscillator and connect to the antenna binding post of the receiver, the output lead from your broadcast test oscillator, or tune in a broadcast signal around 1400 k. c., then reset trimmers numbers 2 and 1 respectively for maximum output. This adjustment will track the super-autodyne grid circuit of the R. F. stage.

To check the calibration of the receiver, whether it be high or low, trimmer number 3 should be reset until a station of known high frequency is brought in on the correct dial marking with peak volume. If your broadcast test oscillator is accurately calibrated, it might be used in place of the broadcasting station signal. In this adjustment, a broadcast station or test oscillator signal at about 1400 k. c. should be chosen. The setting of the trimmer at 1400 k. c. is more critical than it would be at 600 k. c.; calibration, therefore more accurate.

The next adjustment is important and not easily explained in writing, so pay close attention to the following instruction. We will now balance the oscillator to the r. f. and first detector stages.

Tune the external broadcast test oscillator and the receiver both to 600 k.c., then slowly increase or decrease the capacity of No. 4 (oscillator padding trimmer), at the same time and continuously tuning back and forth across the signal with the receiver tuning condenser gang. The output meter needle will now be swinging up and down in step with the variation in tuning. Watch the peak of this swinging closely and readjust No. 4 trimmer until the swinging needle reaches its highest peak.

Retune the receiver and broadcast test oscillator to 1400 k.c. and re-check trimmer No. 3 to make sure that the adjustment of No. 4 has not thrown the receiver out of calibration. If it has, then readjust No. 3 until the calibration is correct, (as previously explained), and check on trimmers No. 2 and No. 1, to make sure that the adjustment of No. 4 has not reduced the sensitivity.

READJUSTING TRIMMERS

Number 1 is the antenna trimmer.

Number 2 is the gang condenser trimmer tuning the grid of the Super-autodyne.

Number 3 is the gang condenser trimmer tuning the plate (or oscillator of the super-autodyne).

Number 4 is the oscillator padding trimmer.

Number 5 is the Super-autodyne plate trimmer.

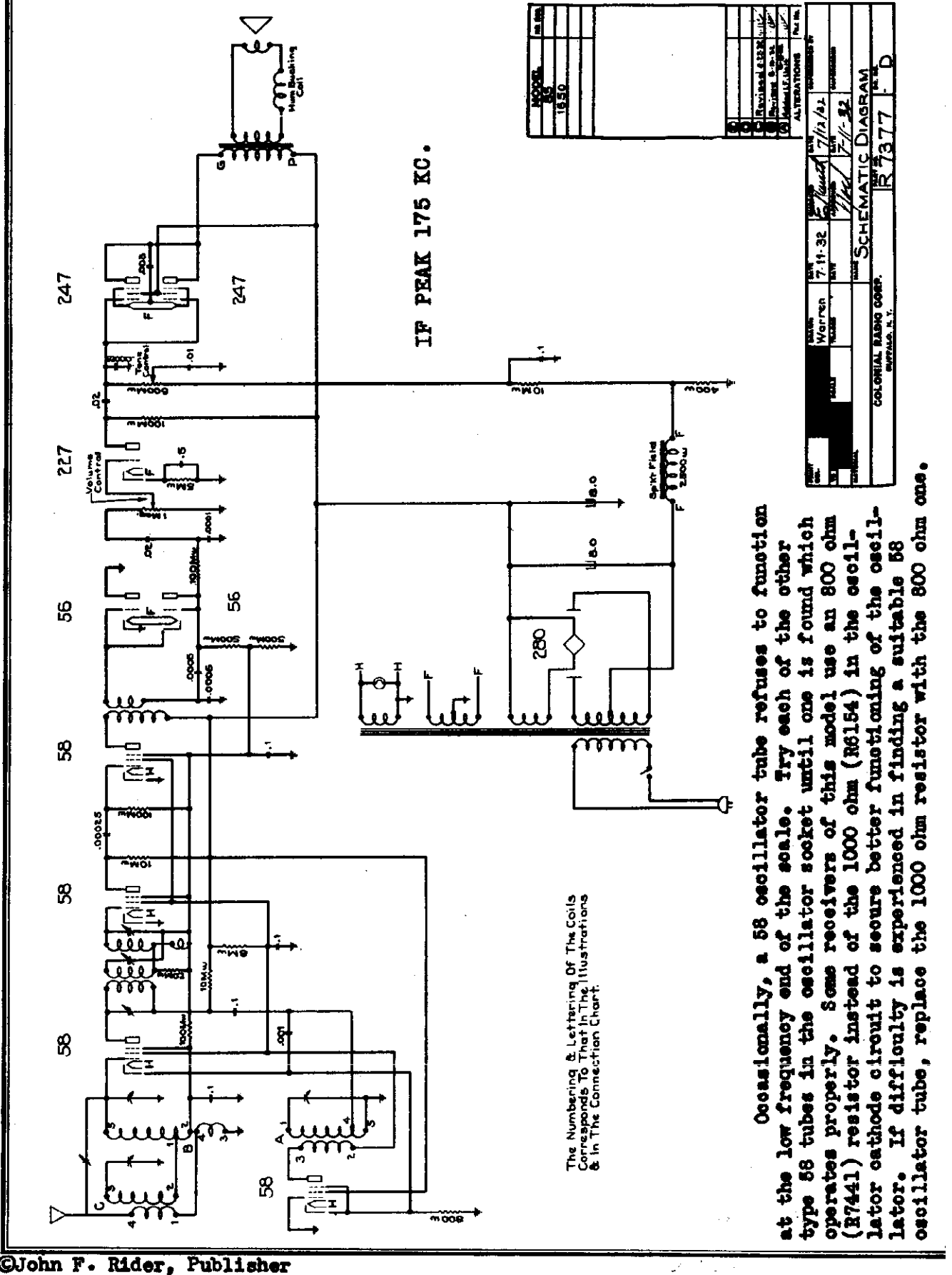
Number 6 is the I. F. grid trimmer.

Number 7 is the second detector grid trimmer.

To readjust the trimmer, it will be necessary that a good design of 175 k. c. oscillator be employed, and that a dependable broadcast test oscillator be on hand so that stages handling intermediate frequency, and those handling radio frequency can be thoroughly checked. It is advisable to use a bakelite screwdriver when making any of these adjustments.

First, connect the 175 k. c. oscillator output leads from the control grid cap of the super-autodyne tube to ground. Do not remove any of the tubes from the sockets, and it is not necessary to disconnect the grid cap clip from the tube. Reset trimmers numbers 5, 6 and 7 for maximum output. While this test oscillator is working into the intermediate fre-

SEARS-ROEBUCK & CO.



Occasionally, a 58 oscillator tube refuses to function at the low frequency end of the scale. Try each of the other type 58 tubes in the oscillator socket until one is found which operates properly. Some receivers of this model use an 800 ohm (R7441) resistor instead of the 1000 ohm (R6154) in the oscillator cathode circuit to secure better functioning of the oscillator. If difficulty is experienced in finding a suitable 58 oscillator tube, replace the 1000 ohm resistor with the 800 ohm one.

MODEL 1650

Voltage

Transformer Data

SEARS-ROEBUCK & CO.

TUBE VOLTAGE and CURRENT CHART

T U B E	PLATE VOLTAGE	SCREEN VOLTAGE	GRID VOLTAGE	PLATE M. A.	SCREEN M. A.
58 - Oscillator	100	220	-15	10	4
58 - Translator	210	100	*	1	.4
58 - 1st I.F.	145	100	*	8	2
58 - 2nd I.F.	220	100	*	10	2.5
227 - 1st A.F.	95	--	-7	1.5	--
247 - Output	215	220	*	11.5	2
280 - Rectifier	Max. d.c. volts = 415 volts			Plate Current 30 m.a. each plate	

* High series resistance.

Control grid readings taken on 150 volt scale of 1000 ohms per volt meter; others on 750 volt scale. Because the A.V.C. action would change voltages and currents, no signal should be received when readings are taken. These are average values. Usually, deviations up to 20% are permissible and do not necessarily indicate a fault. Where series grid resistors prevent grid voltage readings, proper plate current at rated plate voltage will serve as an indication of proper grid bias and normal functioning of the tube. Care must be used when readings are taken with an analyzer since the capacity of the cable may cause the circuit to oscillate and give erratic readings. Usually, touching a finger to the grid or plate will stop oscillation.

POWER TRANSFORMER COLOR CODE

PRIMARY

Green; Black. Stranded wire leads.

RECTIFIER FILAMENT

Red. Solid wire leads.

RECTIFIER PLATE

Red; Blue. Slate center tap.
Stranded wire leads.

R.F. FILAMENTS

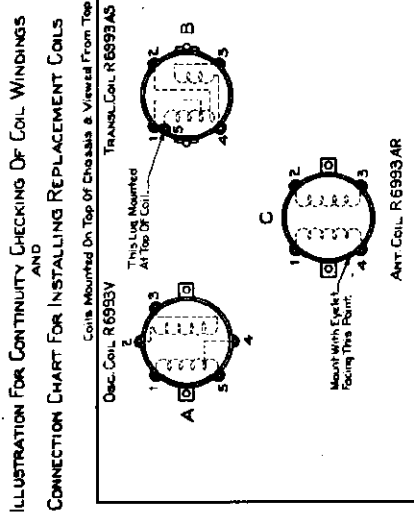
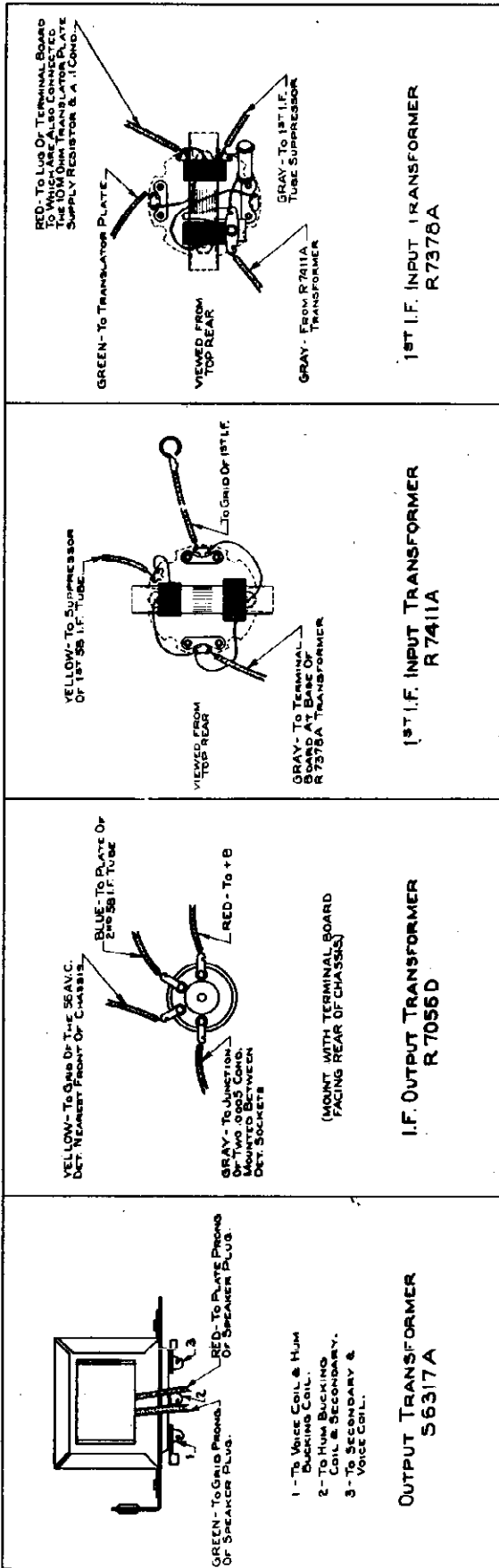
Yellow. Solid wire leads.

A.F. FILAMENTS

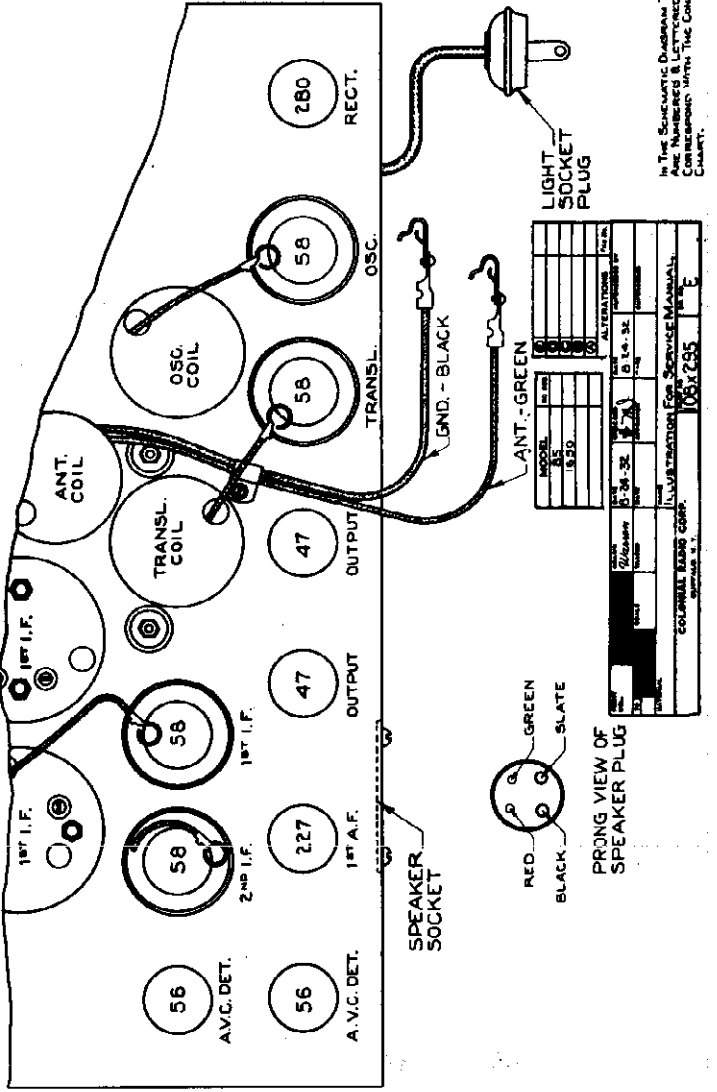
Orange. Solid wire leads.

SEARS-ROEBUCK & CO.

MODEL 1650
Socket, Trimmers
Transformer Data



COIL 'A'
 Lug #1 - To Stator Of #3 Variable Tuning Condenser Unit (Unit Furthest From Dial)
 Lug #2 - To Plate Of Oscillator Tube
 Lug #3 - To Plate Of Detector Tube
 Lug #4 - To Terminal Board To Which Are Also Connected Lugs #5 - A .001 & .1 Condenser.
COIL 'B'
 Lug #1 - To Coil 'C', Lug #2
 Lug #2 - To Terminal Board To Which Are Also Connected A .001 & .1 Condenser.
 Lug #3 - To Chassis
 Lug #4 - To Coil 'C', Lug #1
COIL 'C'
 Lug #1 - To Coil 'B', Lug #4
 Lug #2 - To Stator, Variable Tuning Condenser #1.
 Lug #3 - To Antenna Lead & Inadequate Suppressor Condenser



MODELS 1652,1654
Voltage,Transformer Data

SEARS-ROEBUCK & CO.

TUBE VOLTAGE and CURRENT CHART

T U B E	PLATE VOLTAGE	SCREEN VOLTAGE	GRID VOLTAGE	PLATE M. A.	SCREEN M. A.
58 - Translator	190	85	-9 *	1.5	.1
58 - Oscillator	85	210	-12	10	5
58 - 1st IF	150	95	*	9	2
58 - 2nd IF	215	95	*	9	2
227 - 1st AF	80		*	1.2	
46 - Driver	230		*	5	2
46 - Output	375	+5.5	+5.5	15	
280 - Rectifier	Max. d.c. volts = 375			Plate Current 20m.a. per plate of ea.tube	

* High series resistance.

Control grid readings taken on 150 volt scale of 1000 ohms per volt meter; others on 750 volt scale. Readings should be taken with antenna and ground leads shorted together lest a signal should cause the A.V.C. action to change voltages and currents. These are average values. Usually, deviations up to 20% are permissible and do not necessarily indicate a fault. Where series grid resistors prevent grid voltage readings, proper plate current at rated plate voltage will serve as an indication of proper grid bias and normal functioning of the tube. Care must be used when readings are taken with an analyzer since the capacity of the cable may cause the circuit to oscillate and give erratic readings. Ordinarily, touching a finger to the grid or plate will stop oscillation.

The receiver should be turned on long enough for the speaker field to become hot before taking readings. Readings taken with the field coil cold will have higher values.

TRANSFORMER COLOR CODES

POWER TRANSFORMER

Primary:- Green; Black

Hi-Voltage Secondary:- Red; Blue; Slate center tap, stranded leads.

Rectifier Filaments:- Red. Heavy wire leads.

Secondary "P":- Yellow. Solid wire leads.

Secondary "H":- Orange. Solid wire leads. Brown. Center tap.

CLASS "B" INPUT

Primary:- Blue; Red

Secondary:- Green; Yellow; Slate center tap

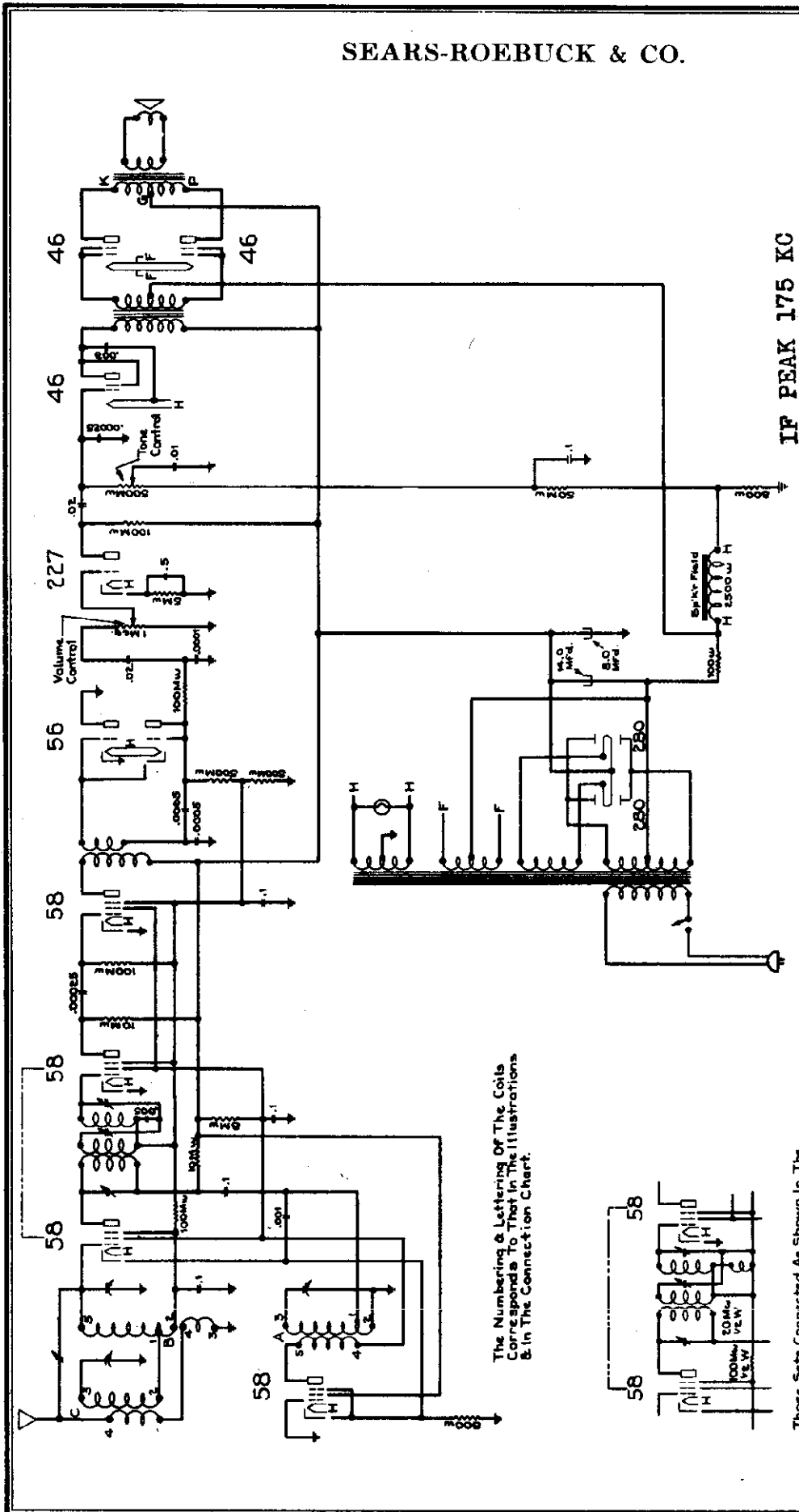
CLASS "B" OUTPUT

Primary:- Green; Blue; Red - center tap

Secondary:- Enamelled wire leads.

SEARS-ROEBUCK & CO.

MODELS 1652, 1654
Schematic



IF PEAK 175 KC

The A.V.C. action should be rendered inoperative when peaking the IF stages. This can be done by connecting a 3 volt battery across R2, with the positive terminal connected to ground and the negative terminal to point (5). R2 is the green resistor with black tip and yellow dot mounted across the 2nd IF tube socket and connected from suppresser to cathode.

The Numbering & Lettering Of The Coils Corresponds To That In The Illustrations A & B In The Connection Chart.

Those Sets Connected As Shown In The Schematic Use R 7725A I.F. Input Transf. Those Connected As In This Sketch (a coil and a 20MΩ resistor in place of the .005 condenser) Use R 7411A I.F. Input Transf.

MODELS 1652, 1654

Socket, Trimmers

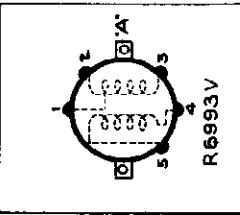
Transformer Data

Coil Data

SEARS-ROEBUCK & CO.

ILLUSTRATION FOR COIL REPLACEMENT AND CONTINUITY CHECKING

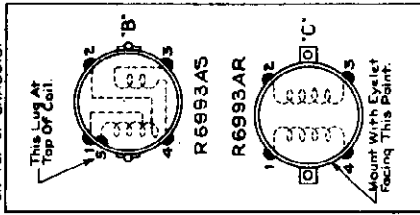
OSC. COIL MOUNTED UNDER CHASSIS



Bottom Of Chassis

COIL 'A'
 LUG #1 TO TERMINAL BOARD TO WHICH ARE ALSO CONNECTED A .001 & 1 CONDENSER.
 LUG #2 TO VARIABLE TUNING CONDENSER FRAME (GND).
 LUG #3 TO STATOR OF #3 VARIABLE TUNING COND. UNIT (UNIT FURTHEST FROM THE DIAL).
 LUG #4 TO 500 OHM SCREEN SUPPLY RESISTOR. 1 COND. & SCREEN OF TRANSLATOR TUBE.
 LUG #5 TO PLATE OF OSCILLATOR TUBE.

ANT. & TRANS. COILS MOUNTED ON TOP OF CHASSIS.



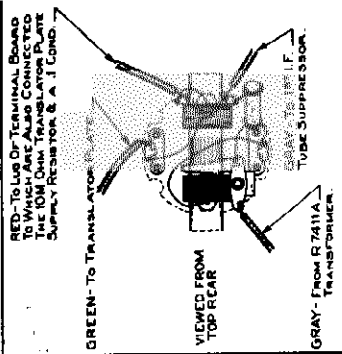
Front Of Chassis

COIL 'B'
 LUG #1 TO COIL 'C'; LUG #2 TO TERM. BOARD TO WHICH ARE ALSO CONNECTED A LEAD TO THE TRANSLATOR SUPPRESSOR; A 100 M OHM RESISTOR & A 1 CONDENSER.
 LUG #4 TO COIL 'C'; LUG #1.

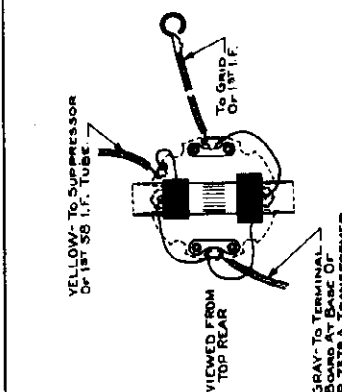
COIL 'C'
 LUG #1 TO COIL 'B'; LUG #4. LUG #2 TO COIL 'B'; LUG #1. LUG #3 TO STATOR, VARIABLE TUNING CONDENSER #1. LUG #4 TO ANTENNA LEAD & IMAGE SUPPRESSOR CONDENSER.

Lug Positions Are Viewed From Top Of Coils. In The Schematic Diagram The Coils Are Numbered & Lettered To Correspond With This Connection Chart.

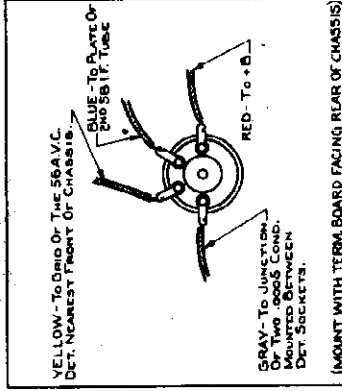
Model	1652	1654
Part No.	6-32	6-32
Rev.	1/14	1/14
Date	10-2-22	10-2-22
Author		
Check		
Illustration For Service Manual	10-152	
Part	E	
Colorial Engrg. Comp.	108-2310	



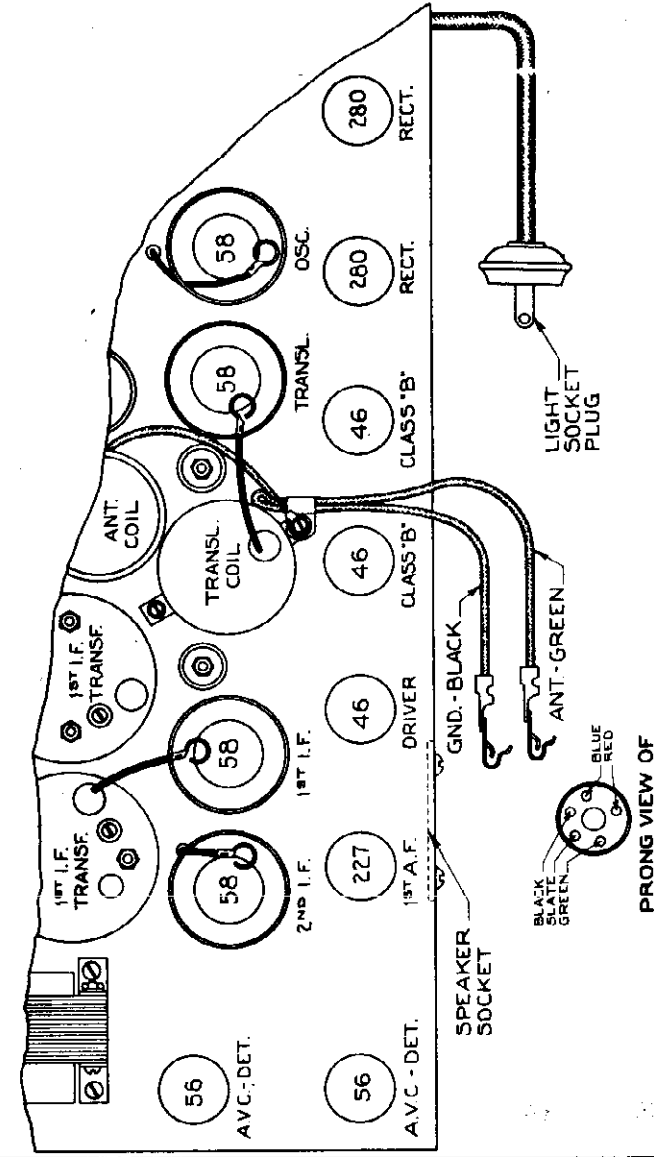
1ST I.F. INPUT TRANSFORMER R 7378 A



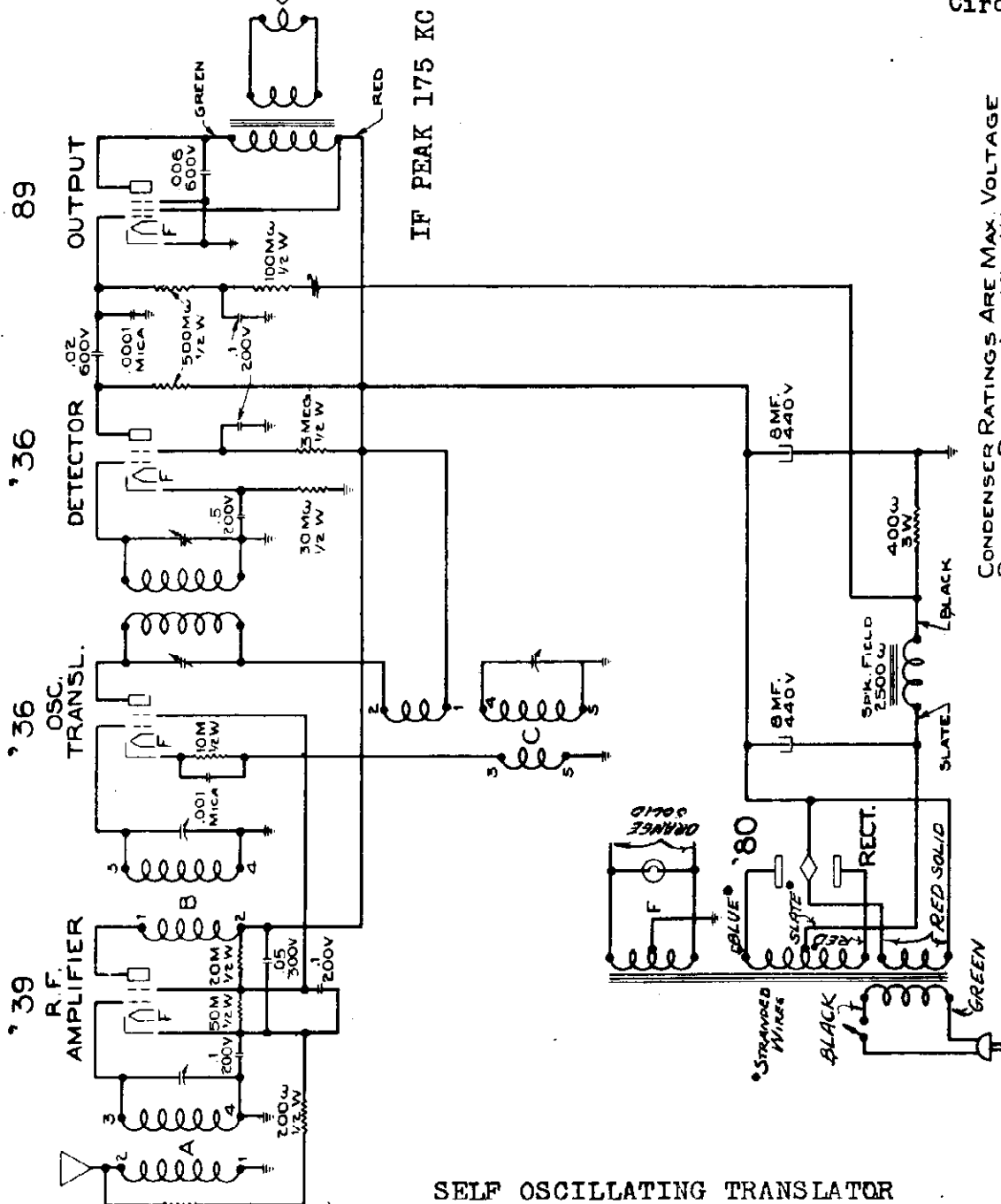
1ST I.F. INPUT TRANSFORMER R 7411 A



I.F. OUTPUT TRANSFORMER R 7056 D



SEARS-ROEBUCK & CO.

MODEL 1660
Schematic
Circuit Data

SELF OSCILLATING TRANSLATOR

Coils (1) and (2) comprise the grid circuit of the 236 oscillating-translator; coils (3), (4) and (5) the plate circuit. The amplified broadcast signal is applied to the grid by coil (1) which is tuned to the broadcast signal's frequency. Because coil (2) and (3) are coupled together through coil (4) feedback occurs and the tube is made to oscillate. The frequency of oscillation, determined by the tuned coil (4), is made 175 kc higher than the frequency of the broadcast signal and of coil (1). Since both the broadcast signal and a frequency 175 kc higher are impressed on the tube's grid, a 175 kc I.F. signal is created in the plate circuit of the tube. This 175 kc signal is selected by the tuned coil (5) and coupled to the detector grid.

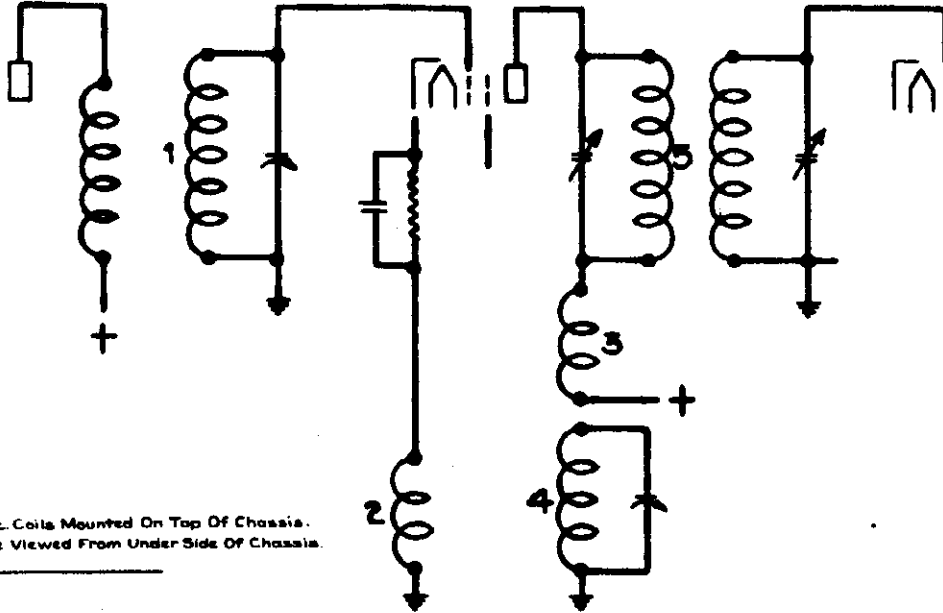
CONDENSER RATINGS ARE MAX. VOLTAGE
RESISTOR RATINGS ARE MIN. WATTAGE
THE COILS ARE NUMBERED & LETTERED TO
CORRESPOND WITH THE CONNECTION CHART.

SCHEMATIC - MODEL 1660

MODEL 1660
 Socket, Trimmers
 Coil Data

SEARS-ROEBUCK & CO.

'39 R.F. AMP. PLATE '36 The Self-Oscillating-Translator '36 DET. GRID



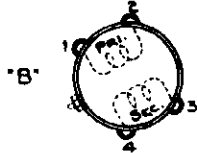
Ant., Transl. & Osc. Coils Mounted On Top Of Chassis.
 Lug Positions Are Viewed From Under Side Of Chassis.

R7746 ANT. COIL ILLUSTRATION FOR COIL REPLACEMENT AND CONTINUITY CHECKING



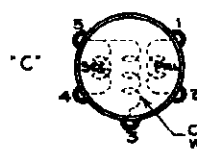
- COIL "A"
- Lug #1 - To Middle Terminal Of Volume Control And Ground Lead.
 - Lug #2 - To Antenna Lead & Volume Control.
 - Lug #3 - To #1 Stator, Variable Tuning Condenser (Stator Nearest Dial)
 - Lug #4 - To Variable Tuning Condenser Frame. (Gnd.)

R7747 TRANSL. COIL



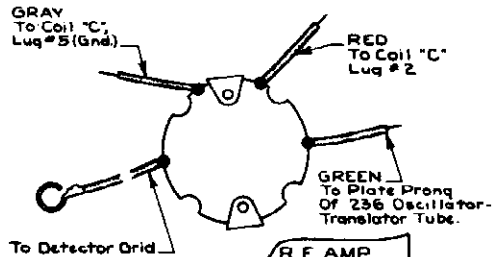
- COIL "B"
- Lug #1 - To Plate Prong Of 259 R.F. Amplifier
 - Lug #2 - To B+
 - Lug #3 - To #2 Stator, Variable Tuning Condenser.
 - Lug #4 - To Variable Tuning Condenser Frame. (Gnd.)

R7714 Osc. COIL



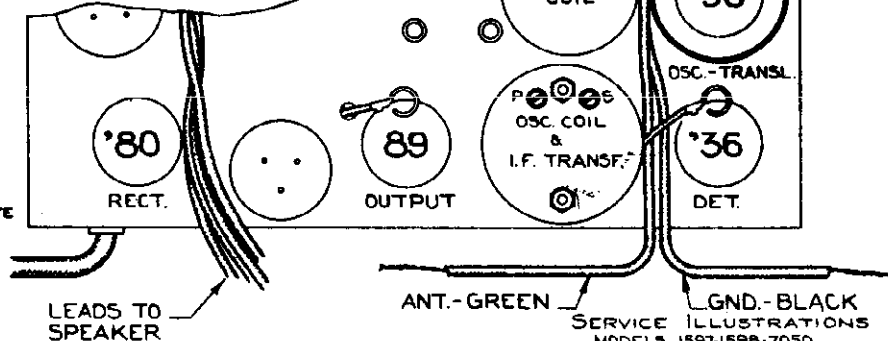
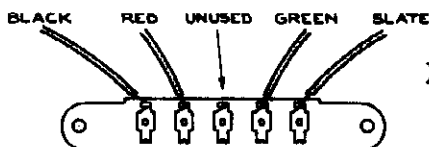
- COIL "C"
- Lug #1 - To Lug Of Terminal Board Nearest It. (B+)
 - Lug #2 - To Red Lead Of R 7713 B I.F. Transformer. (Top Of Chassis)
 - Lug #3 - To 10M Ohm Resistor & .001 Mfd. Condenser Mounted On Rear Plate Of Chassis.
 - Lug #4 - To #3 Stator, Variable Tuning Condenser.
 - Lug #5 - To Ground & To Gray Lead Of R 7713 B I.F. Transformer. (Top Of Chassis)

I.F. TRANSFORMER R 7713 B MOUNTED ON TOP OF R 7714 OSCILLATOR COIL



IN THE SCHEMATIC DIAGRAM THE COILS ARE NUMBERED & LETTERED TO CORRESPOND WITH THIS CONNECTION CHART.

CONNECTIONS TO SPEAKER TERMINAL STRIP VIEWED FROM REAR



SERVICE ILLUSTRATIONS
 MODELS 1597-1598-7050

SEARS-ROEBUCK & CO.

MODEL 1660
Voltage
Hum Data
Alignment

TUBE	Plate Voltage		Screen Voltage		Grid Voltage		Plate m.a.		Screen m.a.	
	Vol. Cont. at Max.	Min.	Vol. Cont. at Max.	Min.	Vol. Cont. at Max.	Min.	Vol. Cont. at Max.	Min.	Vol. Cont. at Max.	Min.
239 - R. F.	155	135	90	90	-3.5	-30	0.5	0	1.4	0
236 - Oco. - Transl.	150	160	85	120	-5.5	-7.5	.6	.8	(a)	-(a)
236 - Detector	65*	75*	25*	25*	-5	-5	.2	.2	(a)	(a)
89 - Output	145	150	160	170	*	*	21	26	4	5
280 - Rectifier	Max. d.c. = 275v.						Plate Current = 20 m.a. per plate			

Speaker field voltage = 100v.(a). Too low to read * - High series resistance Watts = 45

Control grid readings taken on 150 volt scale of 1000 ohms per volt meter; others on 750 volt scale. Readings taken with antenna and ground shorted together and no signal received. These are average values. Ordinarily, deviations up to 20% are permissible and do not necessarily indicate a fault. Where series grid resistors prevent grid voltage readings, proper plate current at the rated plate voltage will serve as an indication of proper grid bias and normal functioning of the tube. Care must be used when readings are taken with an analyzer since the capacity of the cable may cause the circuit to oscillate and give erratic readings. Usually, touching a finger to the grid or plate will stop oscillation. These readings were taken with the speaker field hot. Readings taken when the field is cold will be higher because of the lowered field resistance.

HUM
Occasionally objectionable hum is encountered. Examine the 236 detector tube. Some tubes of this type have a U shaped heater and others have a reversed helix heater. The U shaped heater sometimes causes hum.

If it becomes necessary to align the oscillator-translator and R.F. stages, it should be done at about 1250 kc and then "touched up" at about 1600 kc. Trouble may be experienced if an attempt is made to secure alignment at 1600 kc without having obtained approximate alignment at 1250 kc. At 1600 kc the capacity of the oscillator-translator trimmer may be sufficient to tune the oscillator-translator stage to the same frequency as the R.F. stage, resulting in feedback and violent oscillation.

ALIGNMENT OF THE
OSCILLATOR TRANSLATOR

MODEL 1670
 Trimmers, Socket
 Coil Data
 Transformer Data

SEARS-ROEBUCK & CO.

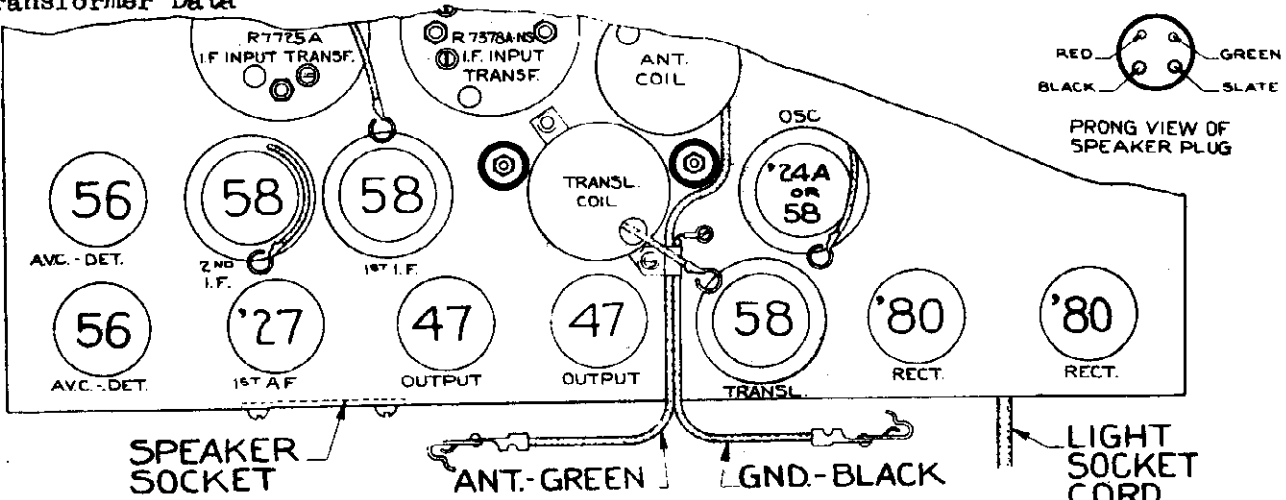
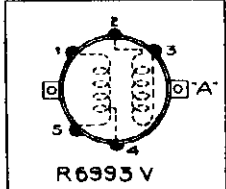


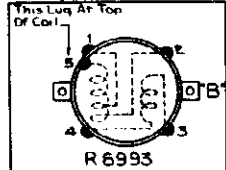
ILLUSTRATION FOR COIL REPLACEMENT
 AND
 CONTINUITY CHECKING

Osc. Coil Mounted Under Chassis



[Bottom Of Chassis]

Ant. & Transl. Coils Mounted On Top Of Chassis



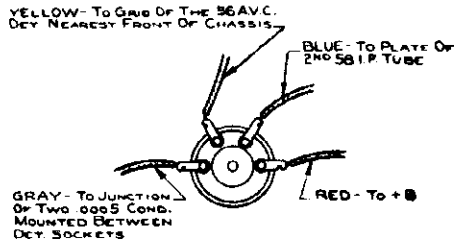
[Front of Chassis]

- COIL "A"**
- Lug #1 To Stator Of #3 Variable Tuning Cond. Unit (Unit Furthest From Dial)
 - Lug #2 To 10 M Ohm Translator & Oscillator Plate Supply Resistor. (When 24A Osc. Is Used)
 - Lug #3 To Screen Of Translator Tube. (When 58 Oscillator Is Used)
 - Lug #4 To Plate Of Oscillator Tube
 - Lug #5 To 1 & .001 Condensers
 - Lug #5 To Variable Tuning Condenser Frame (Gnd.)

- COIL "B"**
- Lug #1 To Coil "A", Lug #2
 - Lug #2 To Lug On Terminal Board
 - Lug #3 Are Also Connected a Lead To The Translator Suppressor, a .00M Ohm Resistor & a .1 Condenser.
 - Lug #4 To Coil "C", Lug #1.
 - Lug #5 To Translator Grid Lead & Stator Of #2 Variable Tuning Condenser Unit.

- COIL "C"**
- Lug #1 To Coil "B", Lug #4.
 - Lug #2 To Coil "B", Lug #1.
 - Lug #3 To Stator Of #1 Variable Tuning Condenser Unit.
 - Lug #4 To Antenna Lead & Image Suppressor Condenser.

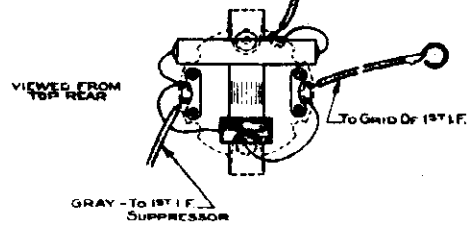
Lug Positions Are Viewed From Top Of Coils.
 In The Schematic Diagram The Coils Are Numbered & Lettered To Correspond With This Connection Chart.



(MOUNT WITH TERMINAL BOARD FACING REAR OF CHASSIS.)

I.F. OUTPUT TRANSFORMER
 R 7056 D

YELLOW - To R-7378A-NS TRANSFORMER



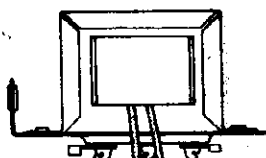
RED - To Lug Of Terminal Board To Which ARE ALSO CONNECTED THE 10M Ohm TRANSLATOR PLATE SUPPLY RESISTOR & A .1 COND.

GREEN - To TRANSLATOR PLATE

VIEWED FROM TOP REAR

GRAY - To 1st I.F. SUPPRESSOR
 YELLOW - To R7725A I.F. TRANSFORMER

1st I.F. INPUT TRANSFORMER
 R7378A-NS



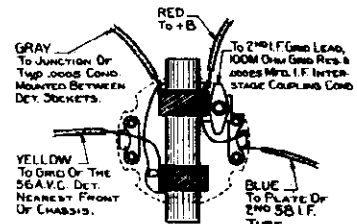
GREEN - To GRID PRONG OF SPEAKER PLUG.
 RED - To PLATE PRONG OF SPEAKER PLUG.

- 1 - To VOICE COIL & HUM BUCKING COIL.
- 2 - To HUM BUCKING COIL & SECONDARY.
- 3 - To SECONDARY & VOICE COIL.

OUTPUT TRANSFORMER
 56317A

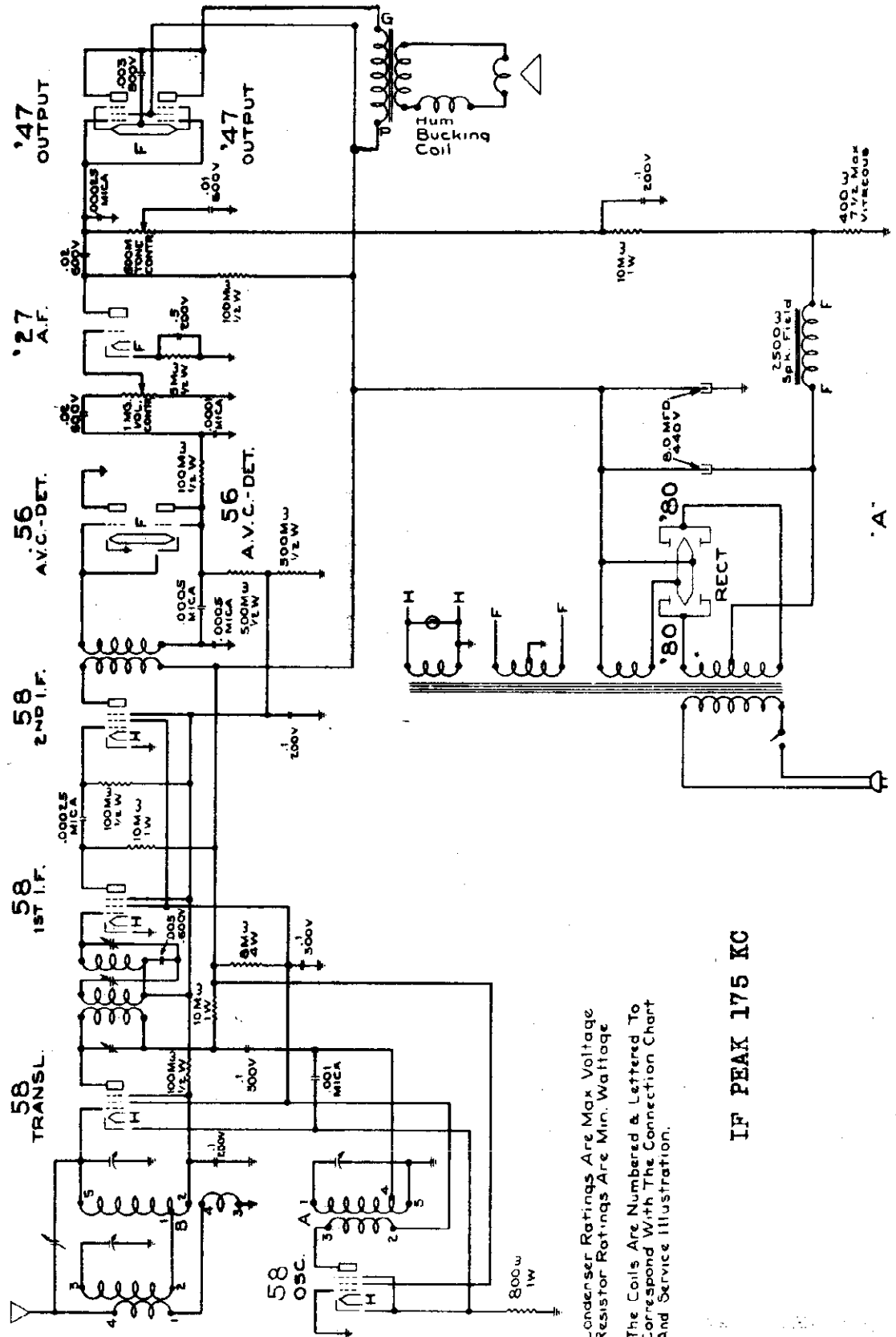
1st I.F. INPUT TRANSFORMER
 R7725A

CONNECTIONS OF R6415R I.F. OUTPUT TRANSFORMER (MOUNTED UNDER CHASSIS)



SEARS-ROEBUCK & CO.

SCHEMATIC - MODEL 1670



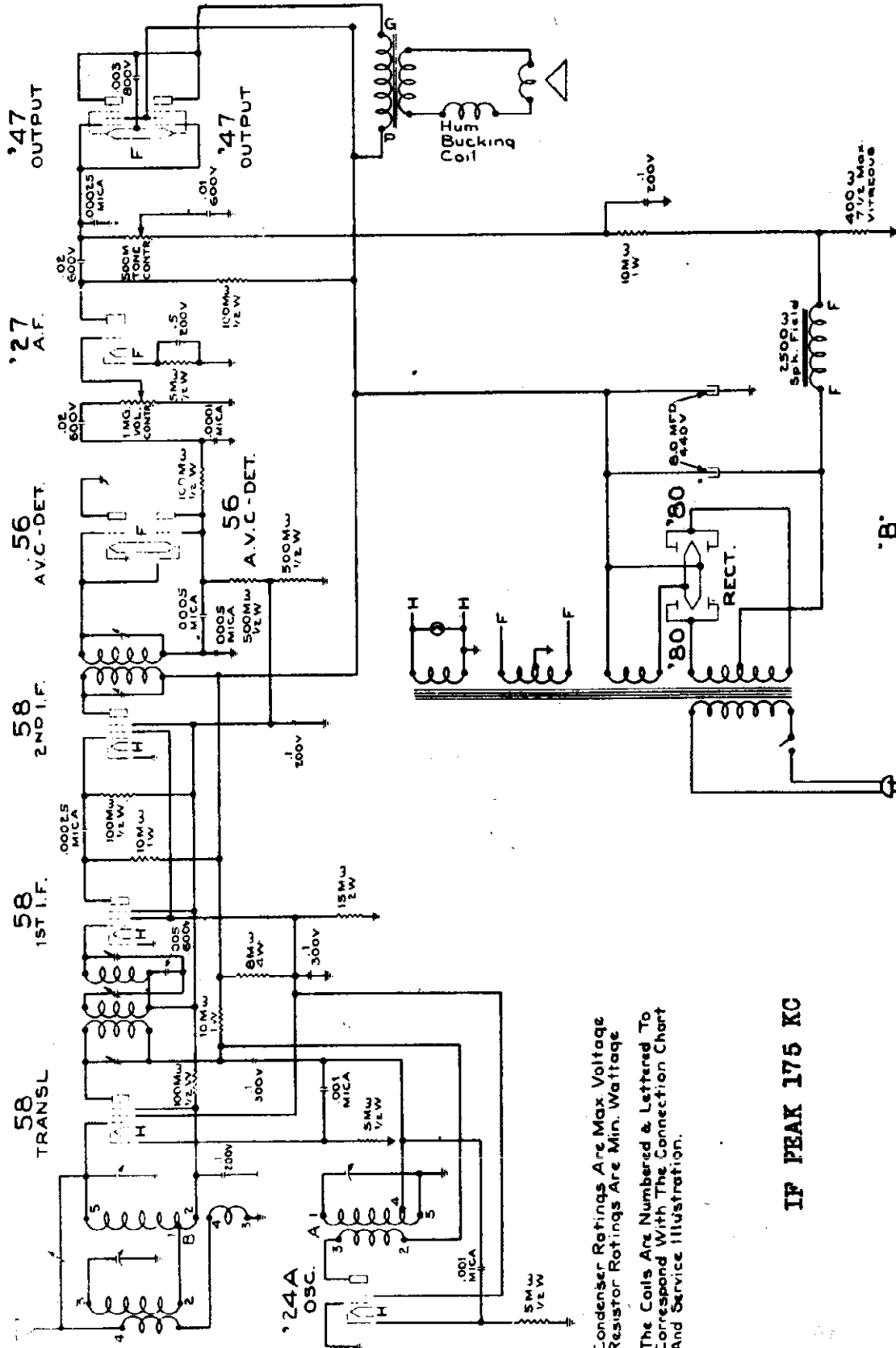
Condenser Ratings Are Max Voltage
Resistor Ratings Are Min. Wattage
The Coils Are Numbered & Lettered To
Correspond With The Connection Chart
And Service Illustration.

IF PEAK 175 KC

MODEL 1670 (Late)
Schematic "B"

SEARS-ROEBUCK & CO.

SCHEMATIC - MODEL 1670



Condenser Ratings Are Max. Voltage
Resistor Ratings Are Min. Wattage
The Coils Are Numbered & Lettered To
Correspond With The Connection Chart
And Service Illustration.

IF PEAK 175 KC

SEARS-ROEBUCK & CO.

MODEL 1670
Voltage
Changes

TUBE VOLTAGE AND CURRENT CHART

T U B E	Plate Voltage	Screen Voltage	Grid Voltage	Plate m.a.	Screen m.a.
58 - Oscillator	90	200	-12.5	8	3
224A- Oscillator	175	90	-10	1.3	.4
58 - Translator (with 58 Oscillator)	190	90	-6*	.9	.3
58 - Translator (with 224A Oscillator)	175	90	-6*	.9	.3
58 - 1st I. F.	115	95	*	7.5	2
58 - 2nd I.F.	210	95	*	8	2
227 - A. F.	70		-6 (Vol. Control At Minimum)	1.3	
247 - Output	200	210	-7 x (-24 Actual)	6.5	1.1
280 - Rectifier Watts = 100	Max. d.c. = 365v.			Plate current = 13m.a. per plate of each tube	

Speaker field voltage = 135v.

* - Reading low because of high series resistance

Model 1670 receivers are eleven tube super-heterodynes, identical in circuit with Model 1650 receivers except that they use two type 280 rectifier tubes.

Original production used a 58 oscillator and a self-tuned I.F. output transformer (R-7056D). Later production receivers have a 224A oscillator and a condenser tuned I.F. output transformer (R-6415R) and are somewhat more selective.

Control grid readings taken on 150 volt scale of 1000 ohms per volt meter; others on 750 volt scale. Readings taken with antenna and ground shorted together and no signal received. These are average values. Ordinarily, deviations up to 20% are permissible and do not necessarily indicate a fault. Where series grid resistors prevent grid voltage readings, proper plate current at the rated plate voltage will serve as an indication of proper grid bias and normal functioning of the tube. Care must be used when readings are taken with an analyzer since the capacity of the cable may cause the circuit to oscillate and give erratic readings. Usually, touching a finger to the grid or plate will stop oscillation. These readings were taken with the speaker field hot. Readings taken when the field is cold will be higher because of the lowered field resistance.

MODELS 1805A,1808A
1826A,1841

SEARS-ROEBUCK & CO.

Alignment

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.
2. Connect the ground lead of the test oscillator to the chassis.
3. Connect the other lead of the test oscillator to the control grid of the 58 IF tube. The grid clip should be left attached to the cap and the tube shield must be in place.
4. Set the test oscillator to 175 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.
5. Change the test oscillator connection to the control grid cap of the 58 translator tube and tune the IF input transformer.
6. In order to secure greater accuracy, repeat the adjustments, starting with the IF output transformer.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

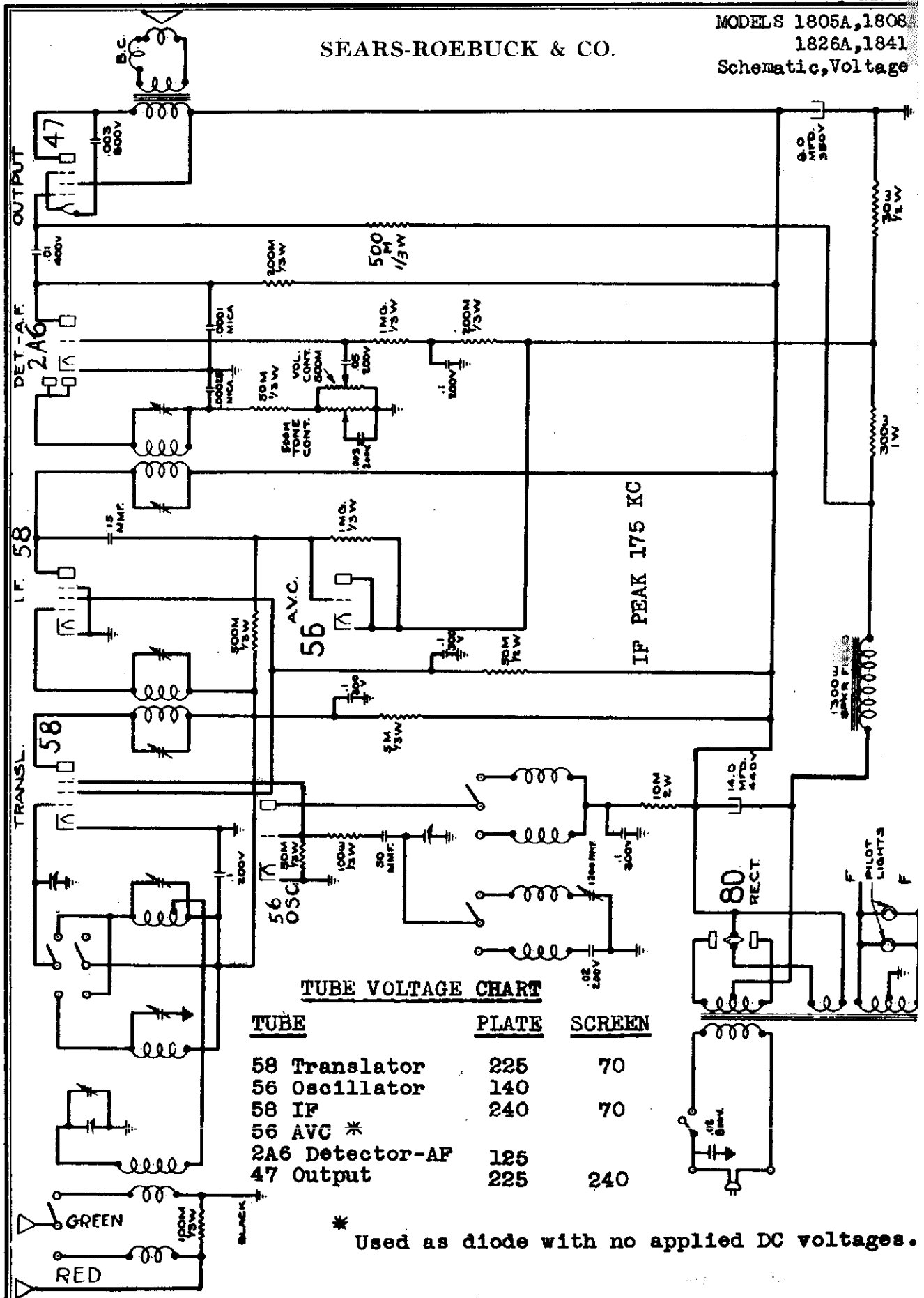
RF Alignment (Broadcast):

1. Couple the output of the test oscillator to the green antenna lead of the set, with the antenna connected.
2. Set the test oscillator to 1740 kc. Its signal should be tuned in when the variable condenser plates are opened all the way. If the signal cannot be reached, the plate and grid leads to the oscillator coil, socket and wave switch, must be moved away from the chassis to reduce their capacity.
3. Set the test oscillator to 1400 kc. and tune in its signal. Then adjust the broadcast translator coil trimmer, mounted within the coil shield (See Service Illustration) and the trimmer on the antenna section of the variable condenser, for maximum output.
4. Set the test oscillator to 600 kc. and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the oscillator paddler, mounted under the chassis, for maximum output.
5. Repeat the 1740 kc. and 1400 kc. adjustments.

Short Wave Alignment:

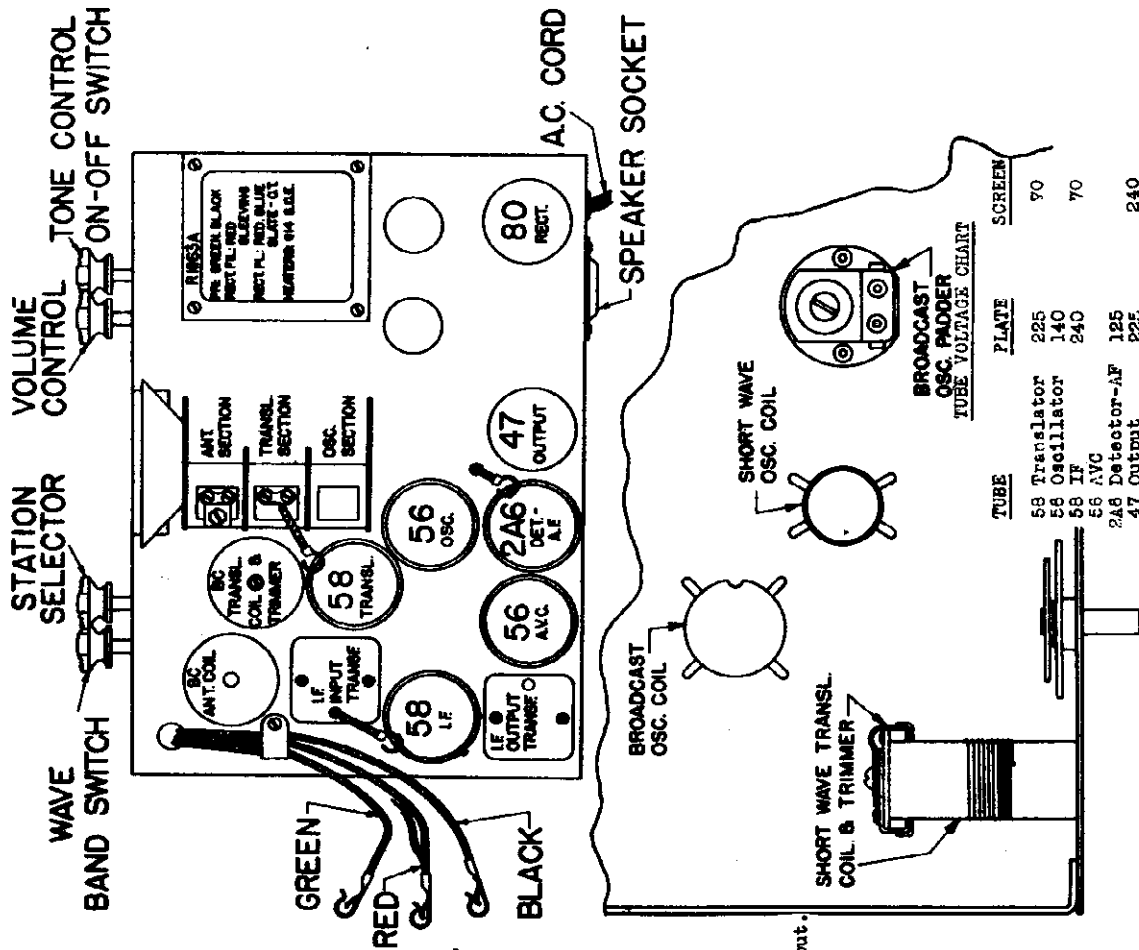
1. Leave the test oscillator loosely coupled to the green antenna lead, as for broadcast alignment.
2. Set the test oscillator to 15000 kc. and adjust the short wave translator coil trimmer for maximum output.

SEARS-ROEBUCK & CO.



MODELS 1809, 1811
1833, 1848
Alignment, Socket
Trimmers, Voltage

SEARS-ROEBUCK & CO.



Used as diode with no applied DC voltages.

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.
2. Connect the ground lead of the test oscillator to the chassis.
3. Connect the other lead of the test oscillator to the control grid of the 58 IF tube. The grid clip should be left attached to the cap and the tube shield must be in place.
4. Set the test oscillator to 175 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.
5. Change the test oscillator connection to the control grid cap of the 58 translator tube and tune the IF input transformer.
6. In order to secure greater accuracy, repeat the adjustments, starting with the IF output transformer.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative. The volume control of the receiver should always be in its full "on" position.

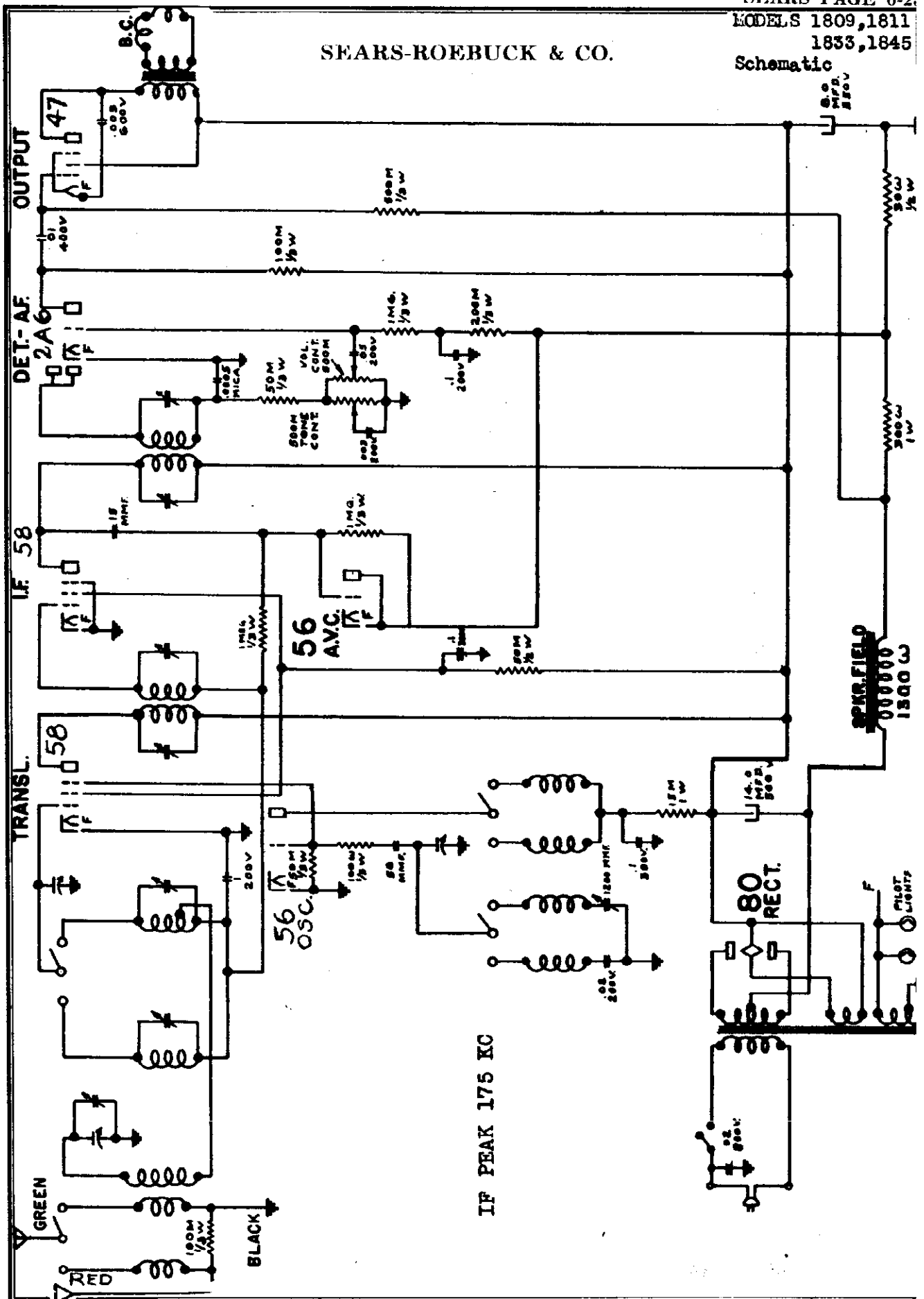
RF Alignment (Broadcast):

1. Couple the output of the test oscillator to the green antenna lead of the set, with the antenna connected.
2. Set the test oscillator to 1725 kc. Its signal should be tuned in when the variable condenser plates are opened all the way. If the signal cannot be reached, the plate and grid leads to the oscillator coil, socket and wave switch, must be moved away from the chassis to reduce their capacity.
3. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the broadcast translator coil trimmer, mounted within the coil shield (See Service Illustration) and the trimmer on the antenna section of the variable condenser, for maximum output.
4. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the oscillator padder, mounted under the chassis, for maximum output.
5. Repeat the 1725 kc and 1400 kc adjustments. Be sure that the receiver volume control is always on full and that the output from the test oscillator is kept to the lowest possible value.

Short Wave Alignment:

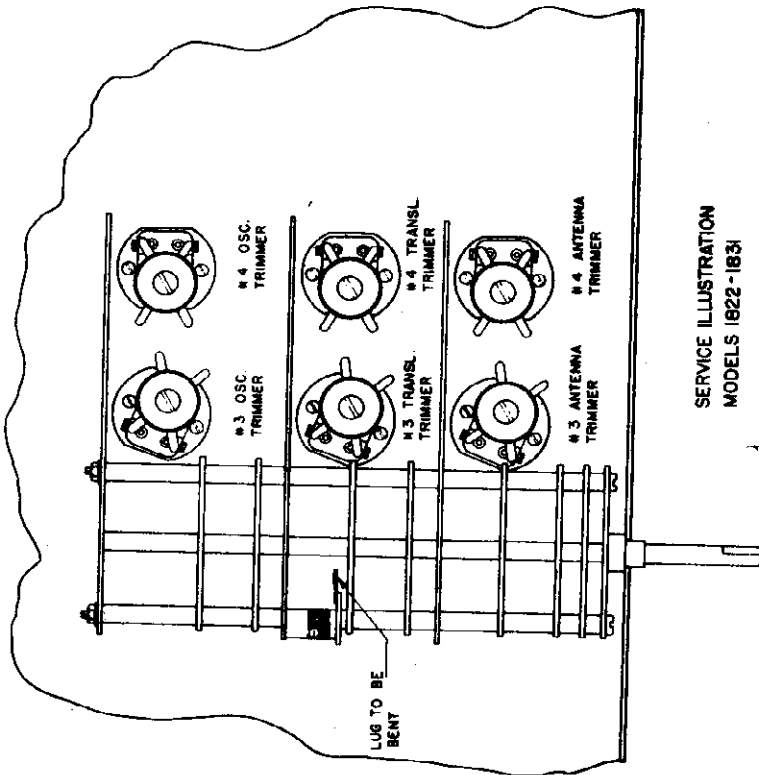
1. Leave the test oscillator loosely coupled to the green antenna lead, as for broadcast alignment.
2. Set the test oscillator to 14,000 kc and adjust the short wave translator coil trimmer for maximum output.
Parts for this model may be ordered from Colonial Radio Corp., 254 Reno St., Buffalo, N. Y.

SEARS-ROEBUCK & CO.

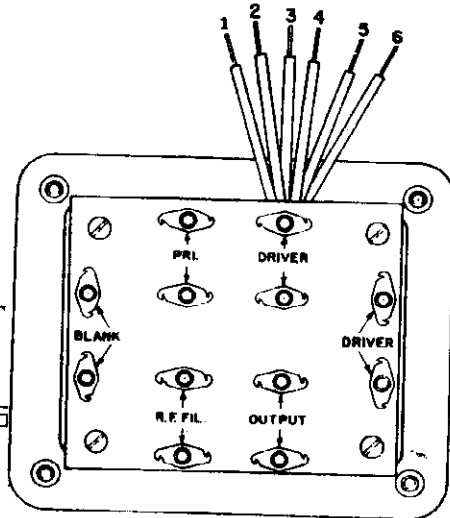


MODELS 1822, 1831
Socket, Trimmers
Transformer Data

SEARS-ROEBUCK & CO.

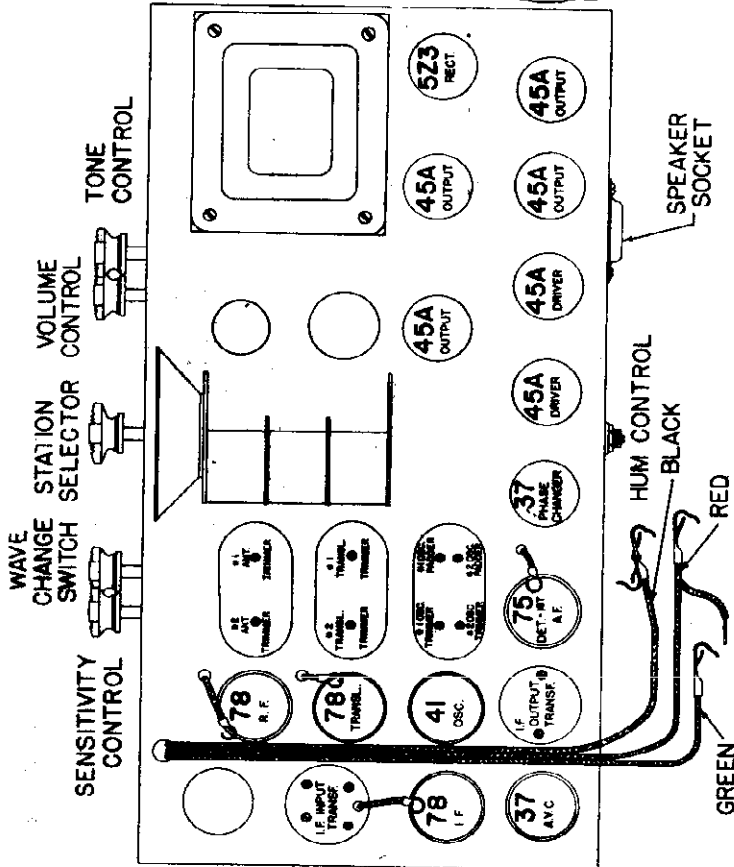


POWER TRANSFORMER
TERMINAL BOARD CONNECTIONS
MODELS 1822-1831

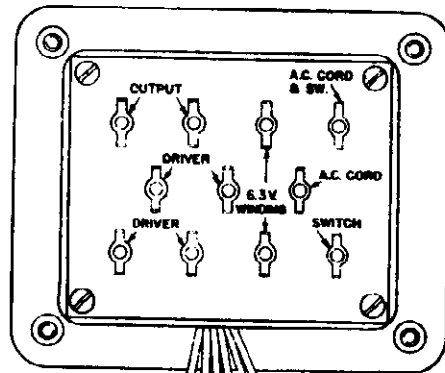


- 1- RED-RECT. PL.
- 2- BLUE-RECT. PL.
- 3- SLATE-RECT. C.T.
- 4- RED TRACER-RECT. FIL.
- 5- RED TRACER-RECT. FIL.
- 6- GREEN TRACER-R.F.-C.T.

SERVICE ILLUSTRATION
MODELS 1822-1831

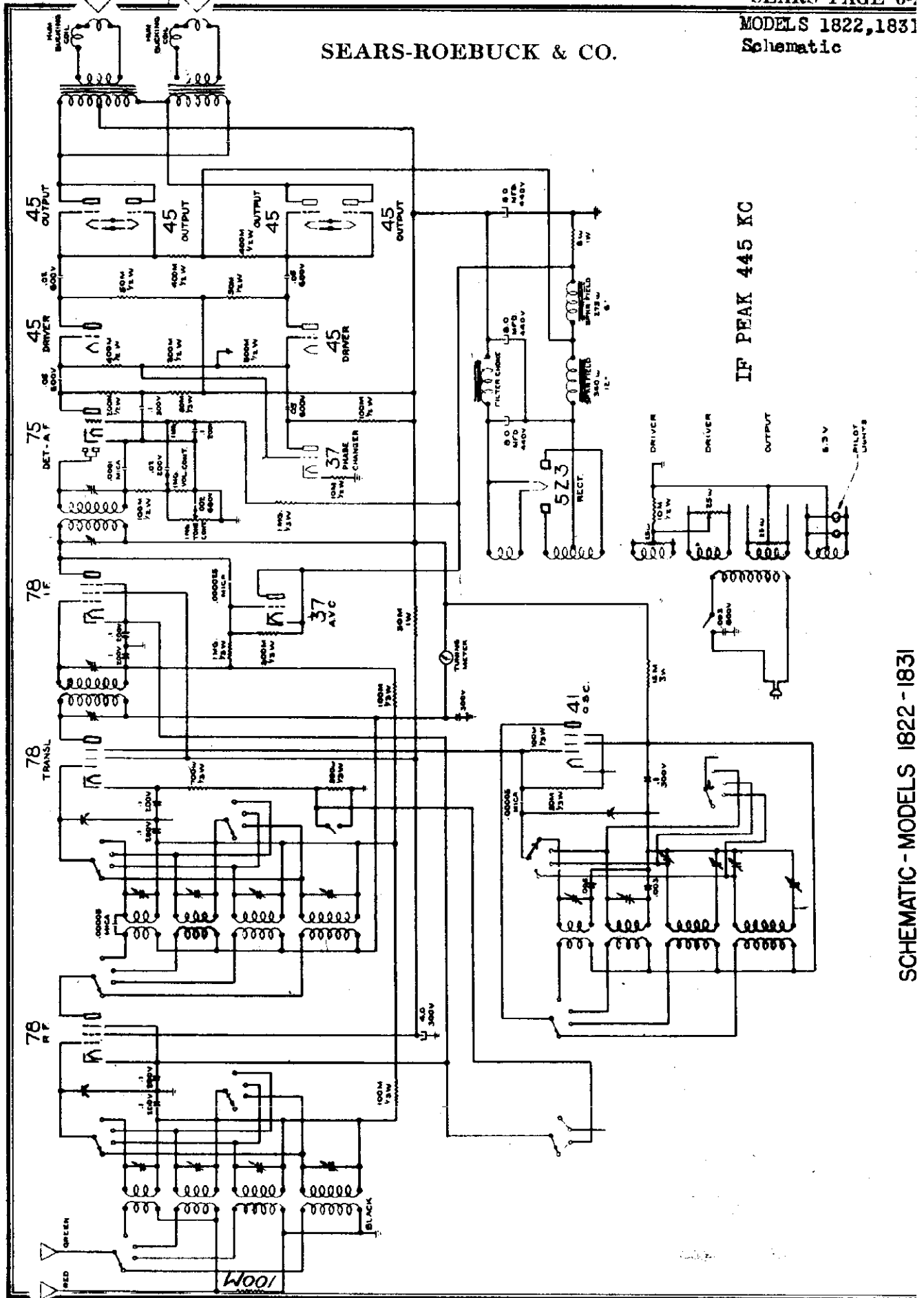


POWER TRANSFORMER
TERMINAL BOARD CONNECTIONS
MODELS 1822-1831



- 1- RED-RECT. PL.
- 2- BLUE-RECT. PL.
- 3- SLATE-RECT. C.T.
- 4- RED TRACER-RECT. FIL.
- 5- RED TRACER-RECT. FIL.
- 6- TAP FOR 6.3V WINDING

SEARS-ROEBUCK & CO.



MODELS 1822, 1831
Alignment, Parts

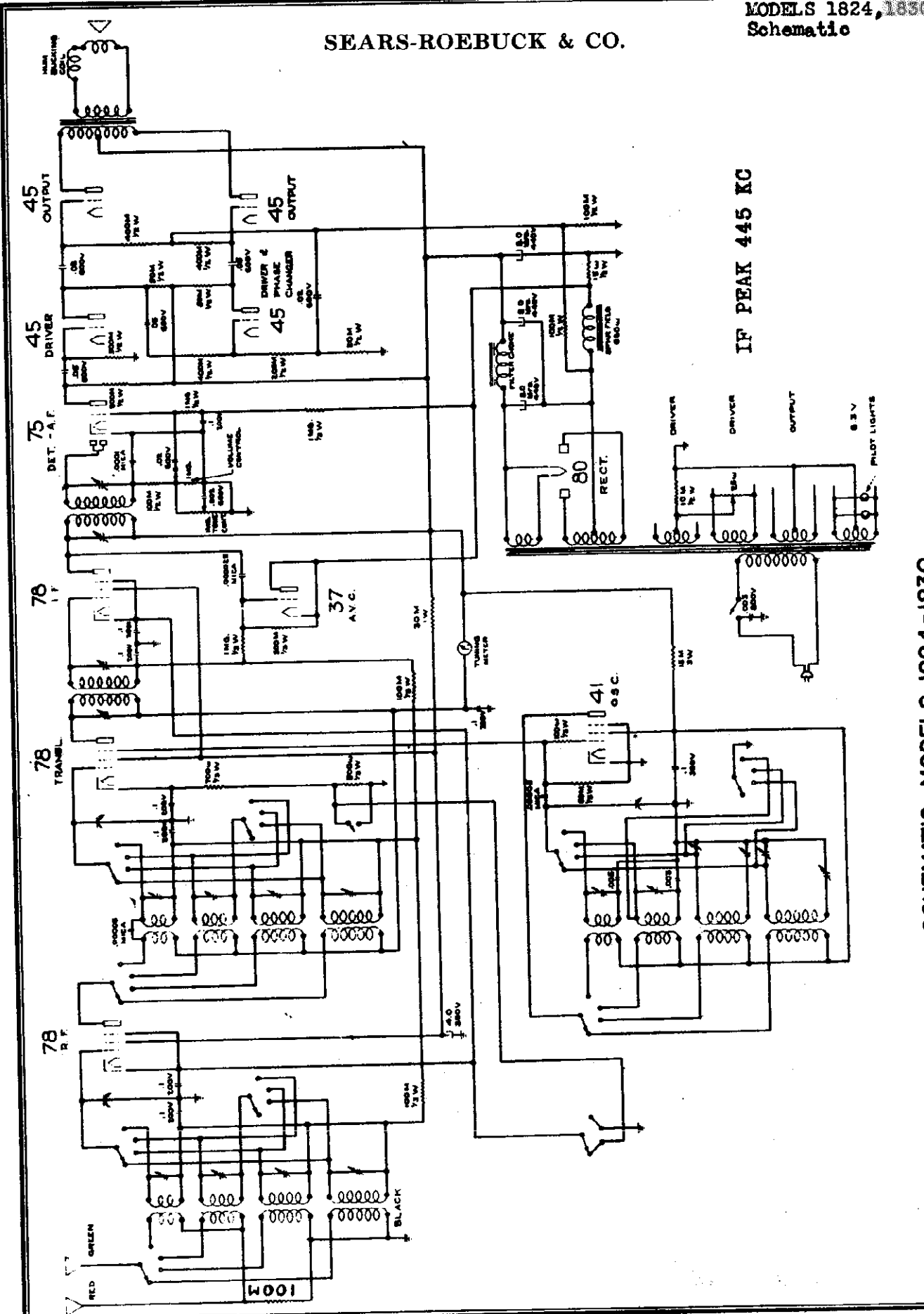
SEARS-ROEBUCK & CO.

- Clip - Black ground lead
- Coil - Antenna, broadcast
- Coil - Oscillator, broadcast
- Coil - Translator, broadcast
- Coil - Antenna, short wave, #2 range
- Coil - Antenna, short wave, #3 range
- Coil - Antenna, short wave, #4 range
- Coil - Oscillator, short wave, #2 range
- Coil - Oscillator, short wave, #3 range
- Coil - Oscillator, short wave, #4 range
- Coil - Translator, short wave, #2 range
- Coil - Translator, short wave, #3 range
- Coil - Translator, short wave, #4 range
- Condenser - Variable, complete with drive
- Condenser - Variable, complete assembly
- Condenser - 8 mfd. electrolytic
- Condenser - 4 mfd. electrolytic
- Condenser - Padding, 1200 mf.
- Condenser - Padding, 475 mf.
- Condenser - Padding, 75 mf.
- Condenser - Trimmer
- Condenser - Trimmer, double
- Condenser - .1 mfd. 500 volts
- Condenser - .1 mfd. 200 volts
- Condenser - .05 mfd. 500 volts
- Condenser - .05 mfd. 200 volts
- Condenser - .05 mfd. 500 volts
- Condenser - .05 mfd. 200 volts
- Condenser - .003 mfd. 500 volts
- Condenser - .003 mfd. 200 volts
- Condenser - .003 mfd. 500 volts
- Condenser - .003 mfd. 200 volts
- Condenser - .001 mfd. mica
- Condenser - .0005 mfd. mica
- Condenser - .00025 mfd. mica
- Control - Tone and volume
- Control - Power supply
- Dial light diffusing disk
- Escutcheon
- Folder - Short wave
- Glass - Escutcheon
- Grumet - Variable condenser mounting
- Indicator - With mounting ring
- Instruction leaflet
- Knob with dot
- Lamp - Pilot
- Lead - Antenna, red
- Lead - Antenna, green
- Lead - Ground, black
- Metals - Tuning
- Reflector
- Reflector - Center tapered
- Resistor - Variable, 25 ohms, hum adjustable
- Resistor - 1 megohm, 1/2 watt carbon
- Resistor - 500 M ohms, 1/2 watt carbon
- Resistor - 500 M ohms, 1/2 watt carbon
- Resistor - 500 M ohms, 1/2 watt carbon
- Resistor - 200 M ohms, 1/2 watt carbon
- Resistor - 100 M ohms, 1/2 watt carbon
- Resistor - 50 M ohms, 1/2 watt carbon
- Resistor - 30 M ohms, 1/2 watt carbon
- Resistor - 10 M ohms, 1/2 watt carbon
- Resistor - 500 ohms, 1/2 watt carbon
- Resistor - 100 ohms, 1/2 watt carbon
- Resistor - 15 M ohms, Gandom
- Resistor - 8 ohms, 1 watt, flexible
- Transformer - IF input
- Transformer - Power - 60 cycle, complete with choke assembly
- Transformer - Power - 25 cycle

- R701B
- R10751
- R10750
- R10752
- R10753
- R10754
- R10755
- R10756
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- R10758
- R10759
- R10760
- R10761
- R10762
- R10763
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- R10998
- R10999
- R11000

- 1. Set the test oscillator to 10 megacycles.**
- 2. Turn the variable condenser plates all the way out. Then adjust the #3 oscillator trimmer for maximum output. As shown in the Service Illustrations, this trimmer is mounted inside of its coil, under the chassis.**
- 3. Set the test oscillator to 9 megacycles and tune in its signal. Then adjust the #5 antenna trimmer and the #3 translator trimmer for maximum output.**
- 4. Set the test oscillator to 4.5 megacycles and tune in its signal. If necessary, shift turns on the antenna and translator coils to secure maximum sensitivity. Be sure to cement the turns in place.**
- 5. If turns have been shifted, repeat the 10 megacycles and the 9 megacycle adjustments, since they will have been affected by shifting of the turns.**
- #4 Band:**
- 1. Set the test oscillator to 19 megacycles.**
- 2. Turn the variable condenser plates all the way out. Then adjust the #4 oscillator trimmer for maximum output.**
- 3. Set the test oscillator to 18 megacycles and tune in its signal. Then adjust the #4 antenna trimmer and the #4 translator trimmer for maximum output.**
- 4. Set the test oscillator to 9 megacycles and tune in its signal. If necessary, shift turns on the antenna and translator coils to secure maximum sensitivity. Be sure to cement the turns in place.**
- 5. If turns have been shifted, repeat the 19 megacycles and the 18 megacycle adjustments, since they will have been affected by shifting of the turns.**
- CAUTION:** Care must be taken during the RF Alignment Procedure. WHAT Alignment is not made at the image frequency. See Service Manual Supplement #13.
- TUBE VOLTAGE CHART**
- | TUBE | PLATE | SCREEN | CATHODE |
|--------------------|-------|--------|---------|
| 78 - RF | 255 | 100 | |
| 41 - Oscillator | 90 | 90 | |
| 78 - IF | 255 | 100 | |
| 78 - AVC | 255 | 100 | |
| 77 - Detector-AP | 115 | | |
| 37 - Phase Changer | 180 | | 12 |
| 45 - Drivers | 180 | | 37 |
| 45 - Output | 255 | | 295 |
| 523 - Rectifier | | | |
- ALIGNMENT PAGES AND PRINT LIST**
- | PAGE NO. | DESCRIPTION |
|----------|------------------------------------|
| R10821 | Base |
| R10822 | Base - Terminal, double |
| R10823 | Base - Terminal, triple |
| R10824 | Base - Terminal, 4 terminals |
| R10780 | Card - Operating, 4 terminals |
| R10789 | Choke - IF plate, #4 range |
| R10793A | Choke - Filter |
| R11045 | Clip - Grid |
| R701A | Clip - Red and green antenna leads |
- The IF stages:**
- 1. Connect the low scale of the output meter across the lead speaker voice coil.**
- 2. Connect the ground lead of the test oscillator to the chassis.**
- 3. Connect the other lead of the test oscillator, through a .1 mfd condenser, to the control grid of the 78 IF tube. The grid clip should be left attached to the cap and the tube shield must be in place.**
- 4. Set the test oscillator to 445 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.**
- 5. Change the test oscillator connection to the control grid cap of the 78 translator tube and tune the IF input transformer.**
- 6. In order to secure greater accuracy repeat the adjustments, starting with the IF output transformer.**
- Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.**
- RF Alignment: #1 Band (Broadcast):**
- 1. Couple the output of the test oscillator to the antenna lead of the set, with the antenna connected.**
- 2. Set the test oscillator to 1520 kc.**
- 3. Turn the variable condenser plates all the way out. Then adjust the #1 oscillator trimmer for maximum output. The locations of all of the trimmers are shown in the Service Illustrations.**
- 4. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the #1 antenna trimmer and the #1 translator trimmer for maximum output.**
- 5. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the #1 oscillator padder for maximum output.**
- 6. Repeat the 1520 kc and 1400 kc adjustments for greater accuracy.**
- #2 Band:**
- 1. Leave the test oscillator coupled to the antenna lead as for broadcast band alignment.**
- 2. Set the test oscillator to 4250 kc.**
- 3. Turn the variable condenser plates all the way out. Then adjust the #2 oscillator trimmer for maximum output.**
- 4. Set the test oscillator to 4000 kc and tune in its signal. Then adjust the #2 antenna trimmer and the #2 translator trimmer for maximum output.**
- 5. Set the test oscillator to 1700 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the #2 oscillator padder for maximum output.**

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100M 0 100M 250V

MODELS 1824, 1830
Alignment, Parts

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.
2. Connect the ground lead of the test oscillator to the chassis.
3. Connect the other lead of the test oscillator, through a 1 mfd condenser, to the control grid of the 7B IF tube. The grid clip should be left attached to the cap and the tube shield must be in place.
4. Set the test oscillator to 445 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.
5. Change the test oscillator connection to the control grid cap of the 7B translator tube and tune the IF input transformer.
6. In order to secure greater accuracy repeat the adjustments, starting with the IF output transformer.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative

RF Alignment: #1 Band (Broadcast):

1. Couple the output of the test oscillator to the antenna lead of the set, with the antenna connected.
2. Set the test oscillator to 1820 kc.

3. Turn the variable condenser plates all the way out. Then adjust the #1 oscillator trimmer for maximum output. The locations of all of the trimmers are shown in the Service Illustrations.

4. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the #1 antenna trimmer and the #1 translator trimmer for maximum output.

5. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the #1 oscillator pad for maximum output.

6. Repeat the 1620 kc and 1400 kc adjustments for greater accuracy.

#2 Band:

1. Leave the test oscillator coupled to the antenna lead as for broadcast band alignment.
2. Set the test oscillator to 4250 kc.

3. Turn the variable condenser plates all the way out. Then adjust the #2 oscillator trimmer for maximum output.

4. Set the test oscillator to 4000 kc and tune in its signal. Then adjust the #2 antenna trimmer and the #2 translator trimmer for maximum output.

5. Set the test oscillator to 1700 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the #2 oscillator pad for maximum output.

#3 Band:

1. Set the test oscillator to 10 megacycles.

2. Turn the variable condenser plates all the way out. Then adjust the #3 oscillator trimmer for maximum output. The locations of all of the trimmers are shown in the Service Illustrations, this trimmer is mounted inside of its coil, under the chassis.

3. Set the test oscillator to 9 megacycles and tune in its signal. Then adjust the #3 antenna trimmer and the #3 translator trimmer for maximum output.

4. Set the test oscillator to 4.5 megacycles and tune in its signal. If necessary, shift turns on the antenna and translator coils to secure maximum sensitivity. Be sure to cement the turns in place.

5. If turns have been shifted, repeat the 10 megacycle and the 9 megacycle adjustments, since they will have been affected by shifting of the turns.

#4 Band:

1. Set the test oscillator to 19 megacycles.
2. Turn the variable condenser plates all the way out. Then adjust the #4 oscillator trimmer for maximum output.

3. Set the test oscillator to 18 megacycles and tune in its signal. Then adjust the #4 antenna trimmer and the #4 translator trimmer for maximum output.

4. Set the test oscillator to 9 megacycles and tune in its signal. If necessary, shift turns on the antenna and translator coils to secure maximum sensitivity. Be sure to cement the turns in place.

5. If turns have been shifted, repeat the 19 megacycle and 18 megacycle adjustments since they will have been affected by shifting of the turns.

CAUTION: Care must be taken during the RF Alignment Procedure, that alignment is not made at the image frequency. See Service Manual Supplement #13.

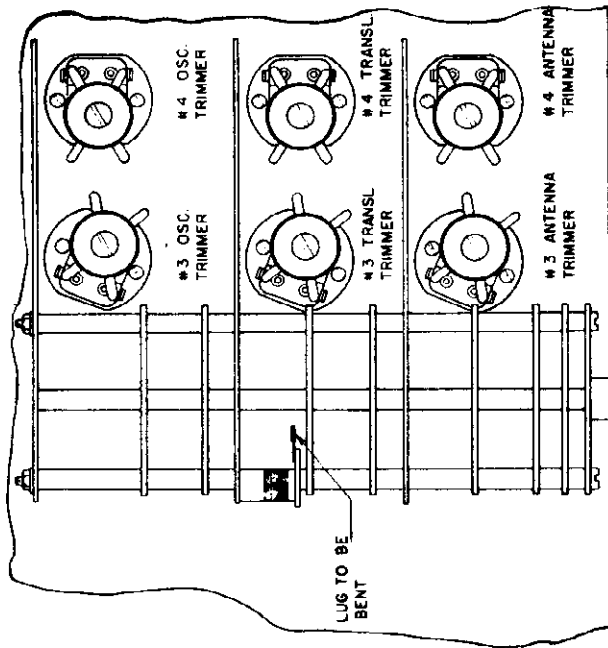
TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube. The Wave Band switch should be in the Broadcast position.

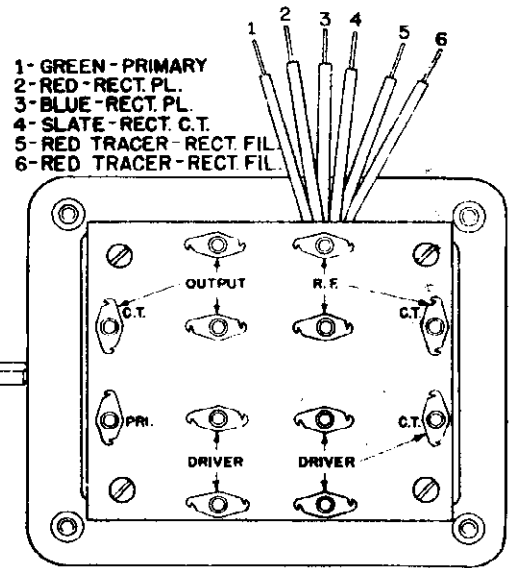
TUBE	PLATE	SCREEN
7B - RF	240	80
7A - Oscillator	96	90
7B - Translator	240	80
7B - AVC	245	80
37 - Detector-IF	Used as diode with no applied DC voltage	
2-4S - Drivers	180	146
2-4S - Output	146	240

- R10731 Coil - Antenna, broadcast
- R6973K Coil - Antenna, short wave, #2 range
- R10933A Coil - Antenna, short wave, #3 range
- R10933D Coil - Antenna, short wave, #4 range
- R10730 Coil - Oscillator, broadcast
- R6973M Coil - Oscillator, short wave, #2 range
- R10933C Coil - Oscillator, short wave, #3 range
- R10933P Coil - Oscillator, short wave, #4 range
- R6973L Coil - Translator, broadcast
- R10933B Coil - Translator, short wave, #2 range
- R10933E Coil - Translator, short wave, #3 range
- R10933H Coil - Translator, short wave, #4 range
- R10732 Choke - Filter
- R10733 Condenser - Variable, with drive assembly
- R10734 Condenser - Padded, 470 mmf.
- R10735 Condenser - Padded, 470 mmf.
- R10736 Condenser - Padded, 75 mmf.
- R10737 Condenser - Trimmer, double
- R10738 Condenser - Trimmer, double
- R6237 Condenser - 4 mfd. dry, electrolytic
- R6444 Condenser - .1 mfd. 200 volts
- R6138 Condenser - .1 mfd. 300 volts
- R6145 Condenser - .05 mfd. 600 volts
- R6761 Condenser - .02 mfd. 600 volts
- R6954 Condenser - .005 mfd. 600 volts
- R10739 Condenser - .003 mfd. 600 volts
- R10738 Condenser - .003 mfd. 600 volts
- R6933 Condenser - .002 mfd. 600 volts
- R4303 Condenser - .001 mfd. mica
- R10794 Condenser - .00095 mfd. mica
- R6711 Condenser - .00095 mfd. mica
- R10740 Control - Tone and Volume
- R6939 Cord - AC line
- R6939 Lamp - Pilot
- R6546B Lead - Antenna, green
- R6487A Lead - Antenna, red
- R6345C Lead - Ground, black
- R10860 Meter - Tuning
- R10462 Pointer
- R10463W Reflector
- R7586 Resistor - 1 megohm, 1/2 watt carbon
- R6823 Resistor - 1 megohm, 1/2 watt carbon
- R7228 Resistor - 500 M ohm, 1/2 watt carbon
- R6179 Resistor - 500 M ohm, 1/2 watt carbon
- R6898 Resistor - 400 M ohm, 1/2 watt carbon
- R6850 Resistor - 200 M ohm, 1/2 watt carbon
- R6819 Resistor - 100 M ohm, 1/2 watt carbon
- R7068 Resistor - 100 M ohm, 1/2 watt carbon
- R6937 Resistor - 50 M ohm, 1/2 watt carbon
- R6488 Resistor - 50 M ohm, 1/2 watt carbon
- R6821 Resistor - 20 M ohm, 1/2 watt carbon
- R10907 Resistor - 15 M ohm, carbon
- R6182 Resistor - 10 M ohm, carbon
- R6037 Resistor - 700 ohms, 1/2 watt carbon
- R10142 Resistor - 500 ohms, 1/2 watt carbon
- R6922 Resistor - 100 ohms, 1/2 watt carbon
- R10752 Resistor - 15 ohms, 1/2 watt, flexible
- R10900 Resistor - 25 ohms, hwm adjuster
- R10494 Rubber - Tube, cushion, chassis mounting
- R10498 Rubber - Washer, cushion, chassis mounting
- R10445A Shaft - Dial drive assembly
- R6935 Shield - Tube base
- R10440 Shield - Tube top
- R10441 Shield - Tube cap
- R6450 Shield - Electrolytic condenser
- R10753A Shield - Coil
- R6315 Shield - Oscillator coil
- R6233 Socket - 4 prong
- R6367 Socket - 5 prong
- R6932 Socket - 5 prong speaker
- R10649 Socket - Pilot Light
- R10607 Speaker
- R10755A Switch - Wave
- R10755 Switch - "On - Off" and Sensitivity

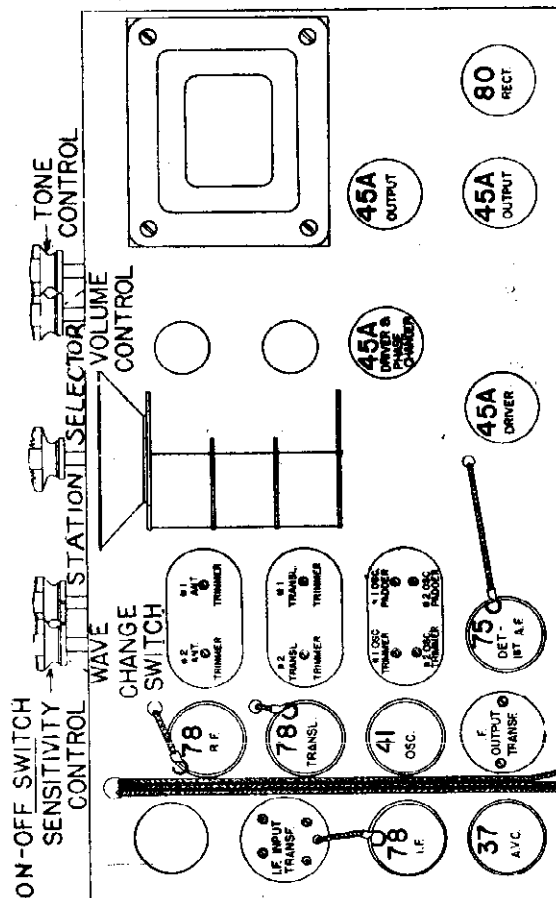
SEARS-ROEBUCK & CO.



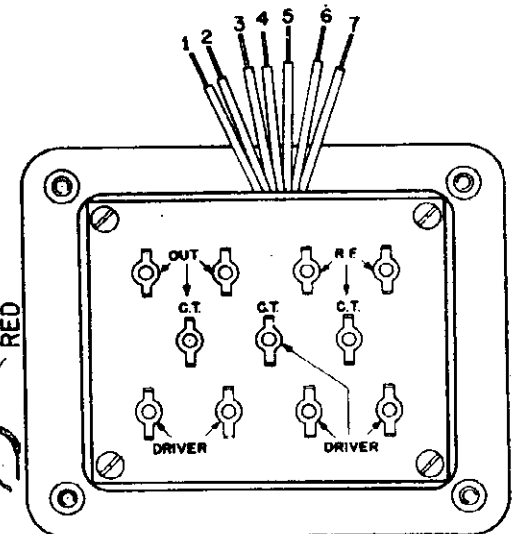
SERVICE ILLUSTRATION
 MODELS 1824-1830



POWER TRANSFORMER
 TERMINAL BOARD CONNECTIONS
 MODELS 1824-1830



POWER TRANSFORMER
 TERMINAL BOARD CONNECTIONS
 MODELS 1824-1830

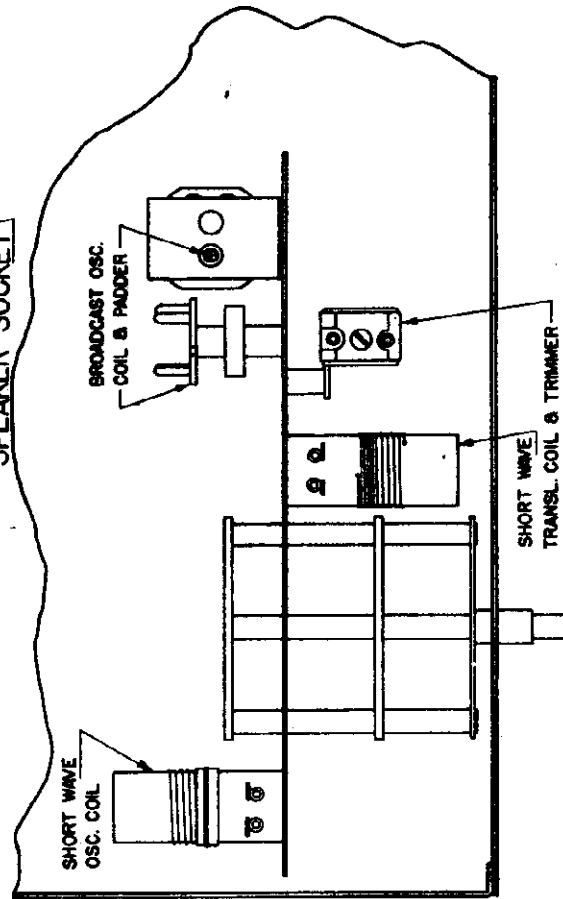
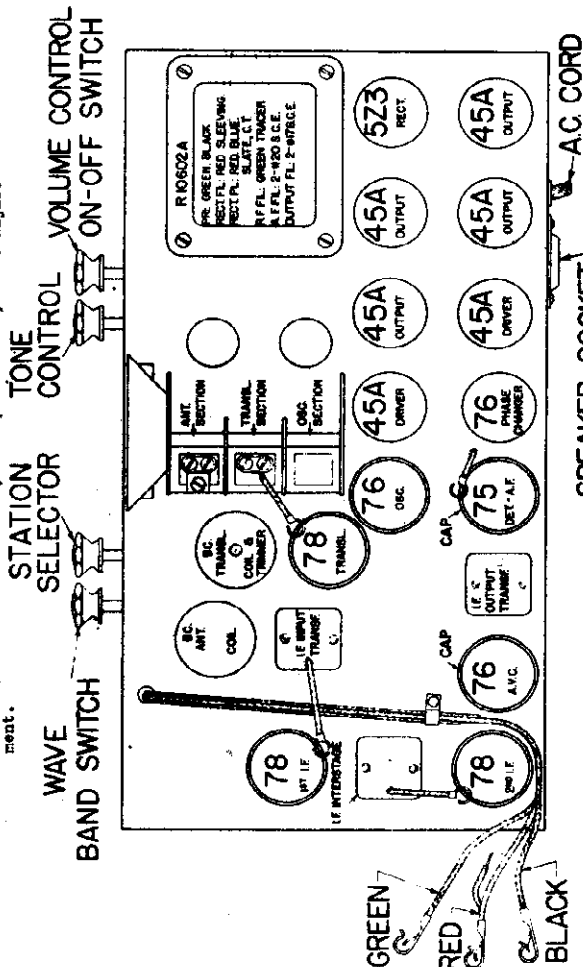


1- GREEN-PRIMARY
 2- BLACK-PRIMARY
 3- RED-RECT PL.
 4- BLUE-RECT PL.
 5- SLATE-RECT.C.T.
 6- RED SLEEVING-RECT.FIL.
 7- RED SLEEVING-RECT.FIL.

MODEL 1825-A
Alignment, Voltage
Socket, Trimmers

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3. Set the test oscillator to 5000 kc and tune in its signal. If necessary, turns may be shifted on the short wave translator coil to secure maximum output. If turns are shifted, it will be necessary to repeat the 15,000 kc adjustment.



ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.
2. Connect the ground lead of the test oscillator to the chassis.
3. Connect the other lead of the test oscillator, through a .1 mfd. condenser, to the control grid of the 78 second IF tube. The grid clip should be left attached to the cap.
4. Set the test oscillator to 175 kc and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustrations.
5. Change the test oscillator connection to the control grid cap of the 78 translator tube and tune the IF input transformer.
6. In order to secure greater accuracy repeat the adjustments, starting with the IF output transformer. Use the lowest possible output from the test oscillator.

The IF stages are resistance-capacity coupled to each other, so that no tuned interstage transformer is used.

RF Alignment Broadcast:

1. Couple the output of the test oscillator to the (green) antenna lead of the set with the antenna connected.
2. Set the test oscillator to 1400 kc and adjust the broadcast translator coil trimmer and the trimmer on the antenna section of the variable condenser for maximum output. The locations of the trimmers are shown in the Service Manual Illustrations.
3. Set the test oscillator to 500 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the oscillator paddler for maximum output.

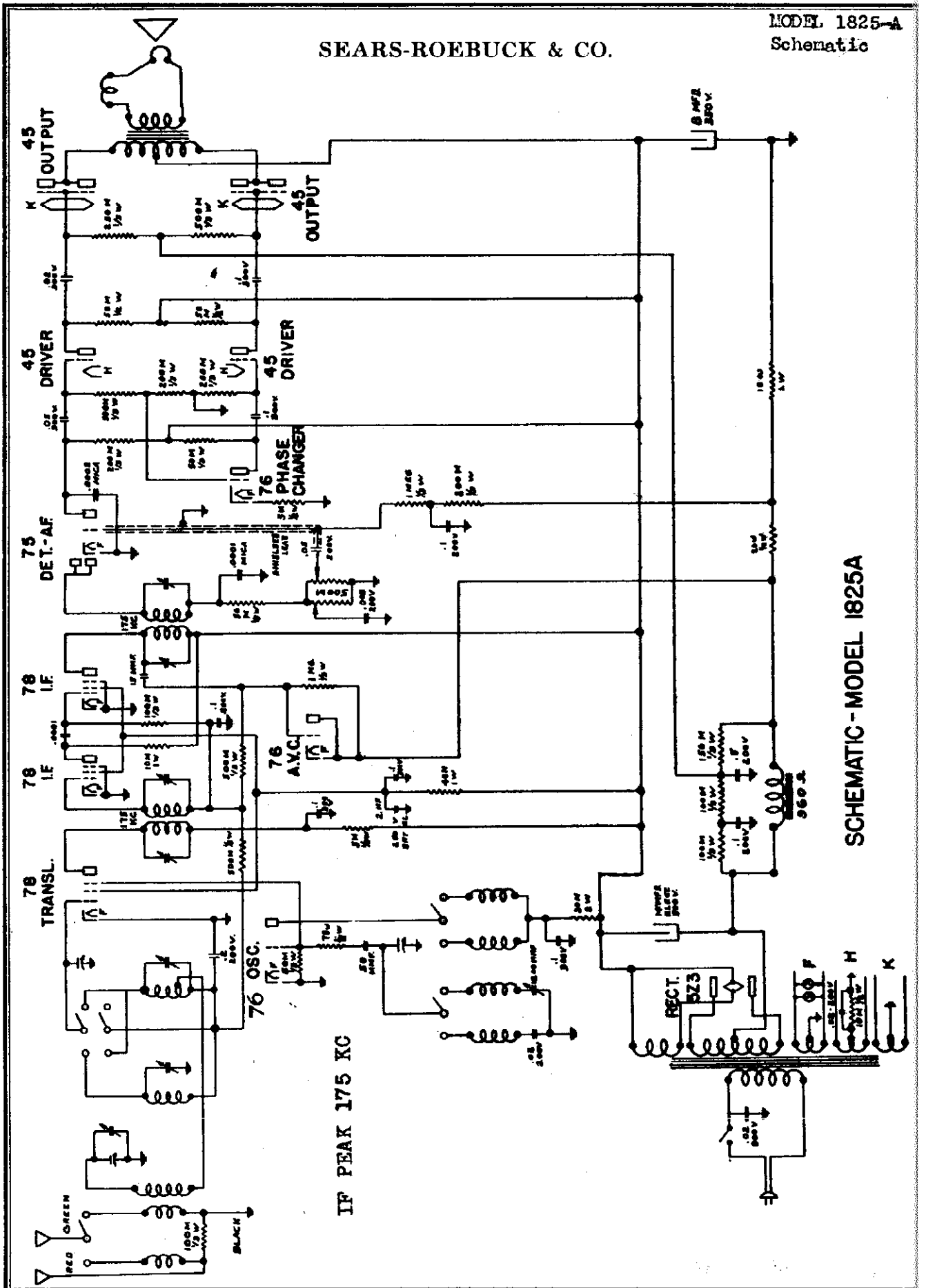
4. Repeat the 1400 kc adjustments to secure greater accuracy. Always use the lowest possible output from the test oscillator.

TUBE	PLATE	SCREEN
78 - Translator	200	90
76 - Oscillator	100	
78 - First IF	175	90
78 - Second IF	215	90
76 - AVC	Used as diode with no applied DC voltage	
75 - Det-IF	100	All readings are to be taken between the chassis and the
76 - Ph. se Changer	130	respective element of each tube.
2-45 - Drivers	150	
4-45 - Output	210	

Short Wave Alignment:

1. Leave the test oscillator loosely coupled to the green antenna lead as for broadcast alignment.
2. Set the test oscillator to 15,000 kc and tune in its signal. Then adjust the short wave translator trimmer for maximum output.

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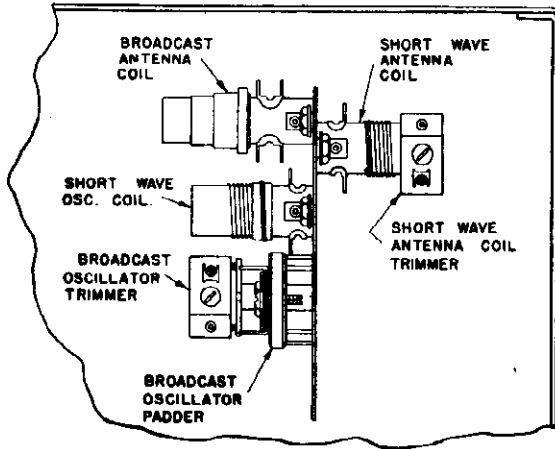
SCHEMATIC - MODEL 1825A

IF PEAK 175 KC

MODEL 1832

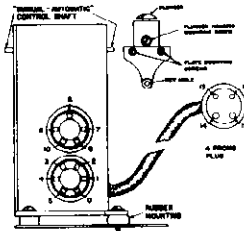
Socket, Trimmers
Clock Unit Tests
Drive Unit Test

SEARS-ROEBUCK & CO.



TEST CHART

These tests are to be made with a continuity meter or ohmmeter except where otherwise indicated. If the "Improper Effect" is "Open Circuit", the trouble may be either in the unit or else may be due to a break in one of the cables, possibly right at the plug. If no such break is apparent, return the unit for repair or replacement to the Radio Manufacturing Company, St. Charles, Ill.



DRIVE UNIT

NOTE: IF FINGER FAILS TO STAY

5 Prong Socket:

Test	Proper Effect	Trouble if Improper Effect is had
#1 contact to #1 finger	Closed Circuit	Open Circuit
#2 contact to #2 finger	Closed Circuit	Open Circuit
#3 contact to #3 finger	Closed Circuit	Open Circuit
#4 contact to #4 finger	Closed Circuit	Open Circuit
#5 contact to #5 finger	Closed Circuit	Open Circuit
#0 contact to #0 finger	Closed Circuit	Open Circuit

TEST WITH FOUR PRONG PLUG IN CHASSIS / 110 VOLTS CONNECTED

5 Prong Socket:

Test	Proper Effect	Trouble if Improper Effect is had
#9 contact to #7	110 v. AC. reading	Open Circuit
#10 contact to #6 (Automatic Control on)	Closed	Open Circuit in Impulse switch

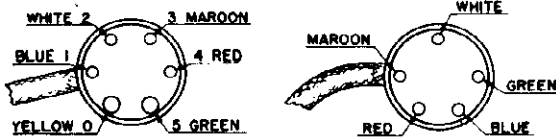
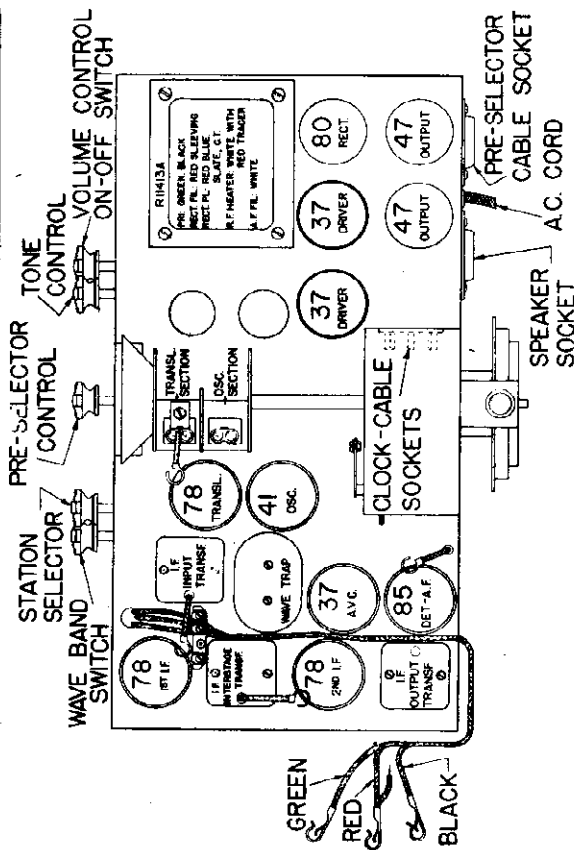
NOTE: TESTS O. K. PUT HUB DOWN, NOT ROTATE

4 Prong Plug:

Test	Proper Effect	Trouble if Improper Effect is had
#13 to #14	Closed Circuit	Open Circuit
#15 to #12 (to test off switch when hub is turned clockwise to end of rotation)	Closed Circuit	Open Circuit
#11 to #14 (with #7 & #9 shorted)	Closed Circuit	Open Circuit

IMPULSE BUTTON

Test	Proper Effect	Trouble if Improper Effect is had
With 4 prong plug in chassis, with 5 & 6 prong plugs out, 110 volts on, and automatic control on, press the impulse button	Hub should oscillate	Defective drive unit



CLOCK PLUGS PRONG VIEWS

CLOCK UNIT TEST CHART

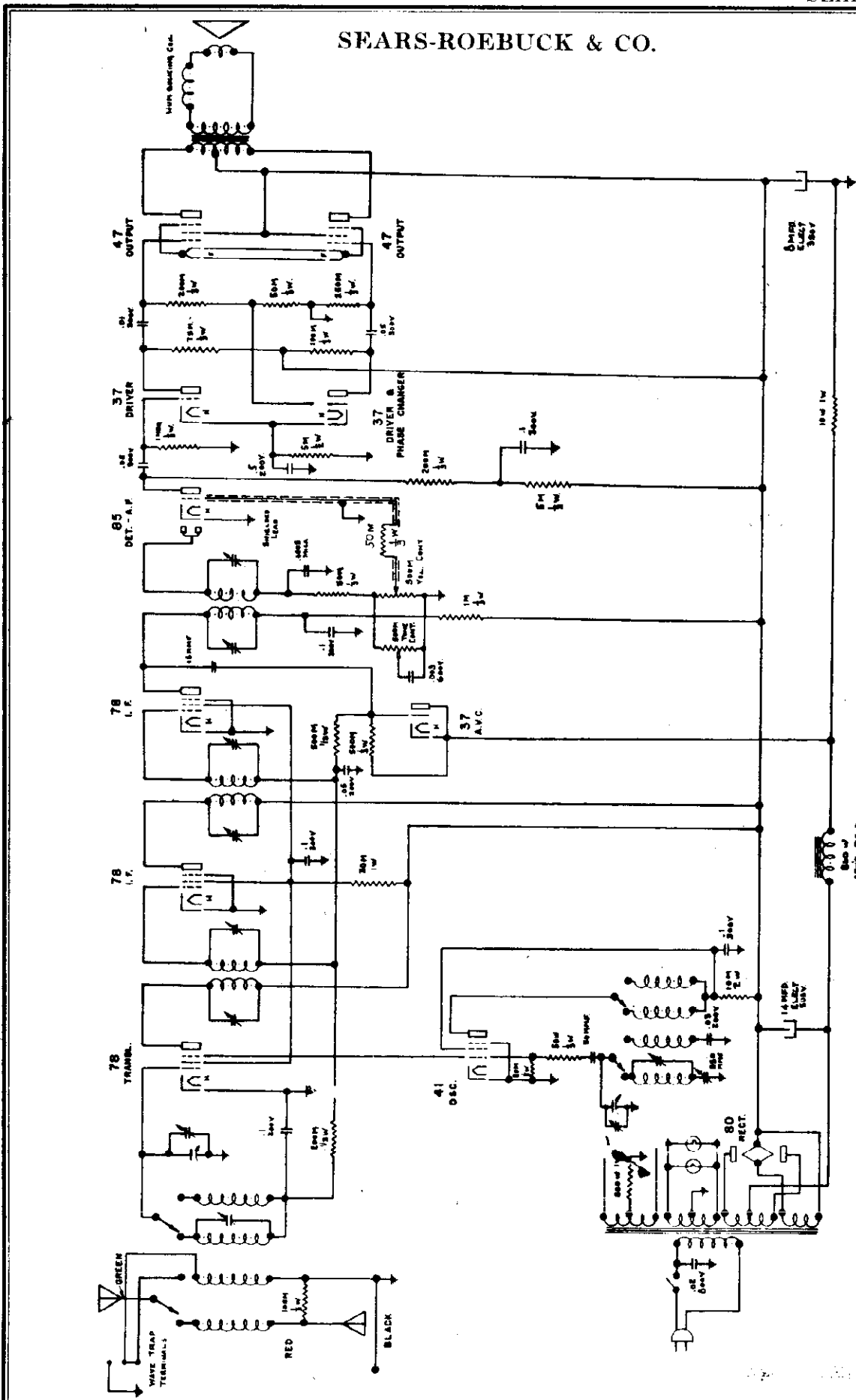
5 Prong Plug:

Test	Proper Effect	Trouble if Improper Effect is had
#1 (blue wire) to case	Closed	Open Circuit
#2 (white wire) to case	Closed	Open Circuit
#3 (maroon wire) to case	Closed	Open Circuit
#4 (red wire) to case	Closed	Open Circuit
#5 (green wire) to case	Closed	Open Circuit
#0 (yellow wire) to case	Closed	Open Circuit

5 Prong Plug:

Test	Proper Effect	Trouble if Improper Effect is had
White to case	Closed	Open Circuit
Maroon to green (with clock about 7 minutes off quarter hour positions and "On-Off" switch in "Off" position).	Closed	Open Circuit or defective switch
Red to blue (with clock on a quarter hour position).	Closed	Open Circuit

SEARS-ROEBUCK & CO.



IF PEAK 480 KC.

SCHEMATIC - MODEL 1832

MODEL 1832**Alignment
Pre-Selector Data****SEARS-ROEBUCK & CO.**ALIGNMENT PROCEDUREThe IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.
2. Connect the ground lead of the test oscillator to the chassis.
3. Connect the other lead of the test oscillator, through a .01 mfd. condenser, to the control grid of the 78 second IF tube. The grid clip should be left attached to the cap.
4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustrations.
5. Change the test oscillator connections to the control grid cap of the 78 first IF tube and tune the IF interstage transformer.
6. Change the test oscillator connection to the control grid cap of the 78 translator tube and tune the IF input transformer.
7. In order to secure greater accuracy, repeat all of the operations, starting with the IF output transformer.

RF Alignment (Broadcast)

1. Before proceeding with the alignment of the receiver the wave trap must be disconnected. Connect a jumper between the yellow wire terminal and the blue wire terminal of the trap and disconnect the white lead from its terminal. Do not forget to reconnect the trap after finishing the alignment of the receiver.
2. Set the test oscillator to 1785 kc.
3. Loosely couple the output of the oscillator to the antenna lead of the set, with the antenna connected.
4. Turn the variable condenser plates all the way out. Then adjust the oscillator trimmer for maximum output. The locations of the trimmers are indicated in the Service Illustrations.
5. Set the test oscillator to 1500 kc and tune in its signal. Then adjust the trimmer on the translator section of the variable for maximum output.
6. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the broadcast oscillator padder for maximum output.
7. Repeat the 1785 kc and 1500 kc adjustments.

Short Wave Alignment:

1. Set the test oscillator to 16 megacycles, leaving it coupled to the set's antenna lead as for broadcast alignment.
2. Turn the wave band switch to the short wave position and tune in the test oscillator signal. Then adjust the trimmer on the short wave antenna coil for maximum output.
3. Set the test oscillator to 6 megacycles and tune in its signal. If necessary turns may be shifted on the short wave antenna coil to secure accurate alignment at this frequency. Should it be found necessary to shift turns, the antenna coil trimmer will have to be readjusted at 16 megacycles after the turns have been shifted.

TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE
78 - Translator	265	80
41 - Oscillator	120	120
78 - First IF	265	80
78 - Second IF	260	80
37 - AVC	Used as diode with no applied DC voltage	
75 - Det-AP	105	
37 - Phase Changer	130	
46 - Drivers	150	
45 - Output	260	

AUTOMATIC PRE-SELECTOR

There are two units comprising the Automatic Pre-selector. One is the clock unit and the other is the Drive Unit, mounted on the chassis. Under no circumstances attempt to take the units apart since special tools and gages are required.

Should the Drive Unit fail to operate properly there are several external adjustments that can be made to it:

1. The OFF finger on the rotating hub at the rear of the Drive Unit should turn the receiver off just as the finger makes contact with the plunger while the hub is turning in a clockwise direction, as one faces the rear of the chassis. If the

finger stops as it touches the plunger but the receiver does not switch off, loosen the hex head screw that positions the OFF finger. The head of this screw is located behind the large knurled turning ring. Also loosen the large knurled locking ring. Then move the OFF finger slightly forward and tighten the hex head screw and the knurled locking ring. If the OFF position still fails to operate properly, loosen the knurled locking ring and the hex head screw again and move the OFF finger backward from its original position. Then re-tighten the ring and screw. Two or three trials may be necessary before the correct position is determined.

2. If the receiver is tuned properly by some of the fingers but is not brought to the peak of resonance by other of the fingers, these fingers may have become shifted slightly and should be reset as described in the Instruction Booklet. If the set is not tuned properly by any of the fingers, the triangular plate at the rear of the unit may have become shifted. To correct this proceed as follows:

Set the pin for the next quarter hour interval to the #3 position. Then turn the hands of the clock so that the receiver is tuned automatically by the #3 finger. When the finger has stopped, insert the key in its key hole in the triangular plate. The tip of the key should enter the hole in the #3 finger without moving the finger. If it fails to do so, loosen the two screws that mount the triangular plate and shift the plate so that the key enters the hole in the finger. Then tighten the plate mounting screws. Care must be taken that the finger does not become moved during the operation. The adjustment should be checked by setting the pin for the next quarter hour interval to the #3 position and again testing for exact alignment between the key hole and the hole in the #3 finger. If the holes line up this time the setting is correct and should be so for all the fingers.

3. When any finger comes to its stop under the plunger the screw head of the plunger should be raised about .01 inches, approximately the thickness of a postal card, above its housing. If the plunger does not raise above its housing, the screw that positions the housing should be loosened. Then reset the housing so that the plunger does raise the required distance above it when pushed by any of the fingers, and re-tighten the screw.

Caution: Do not make this adjustment unless it is necessary since all of the fingers have to be reset slightly when the plunger adjustment is changed.

If the fore-going adjustments fail to correct the trouble the Drive Unit should be tested as indicated in the chart that follows. If these tests show that the unit is defective it should be removed from the chassis. To do so proceed as follows:

1. Remove the receiver chassis from the cabinet.
2. Remove the clip that holds the two plugs in their sockets on the side of the Drive Unit and pull the plugs from their sockets.
3. Loosen the set screws in the Drive Unit end of the coupling.
4. Remove the three screws that hold the unit to its mounting plate.
5. Disconnect the Manual Control Lever and slide the Drive Unit out of the coupling.

Defective units should be returned to the Operadio Manufacturing Company, St. Charles, Ill. for repair or replacement.

The receiver can be operated manually without the Drive Unit by plugging a four prong plug, with grid and plate prongs shorted together, into the four prong socket at the rear of the chassis.

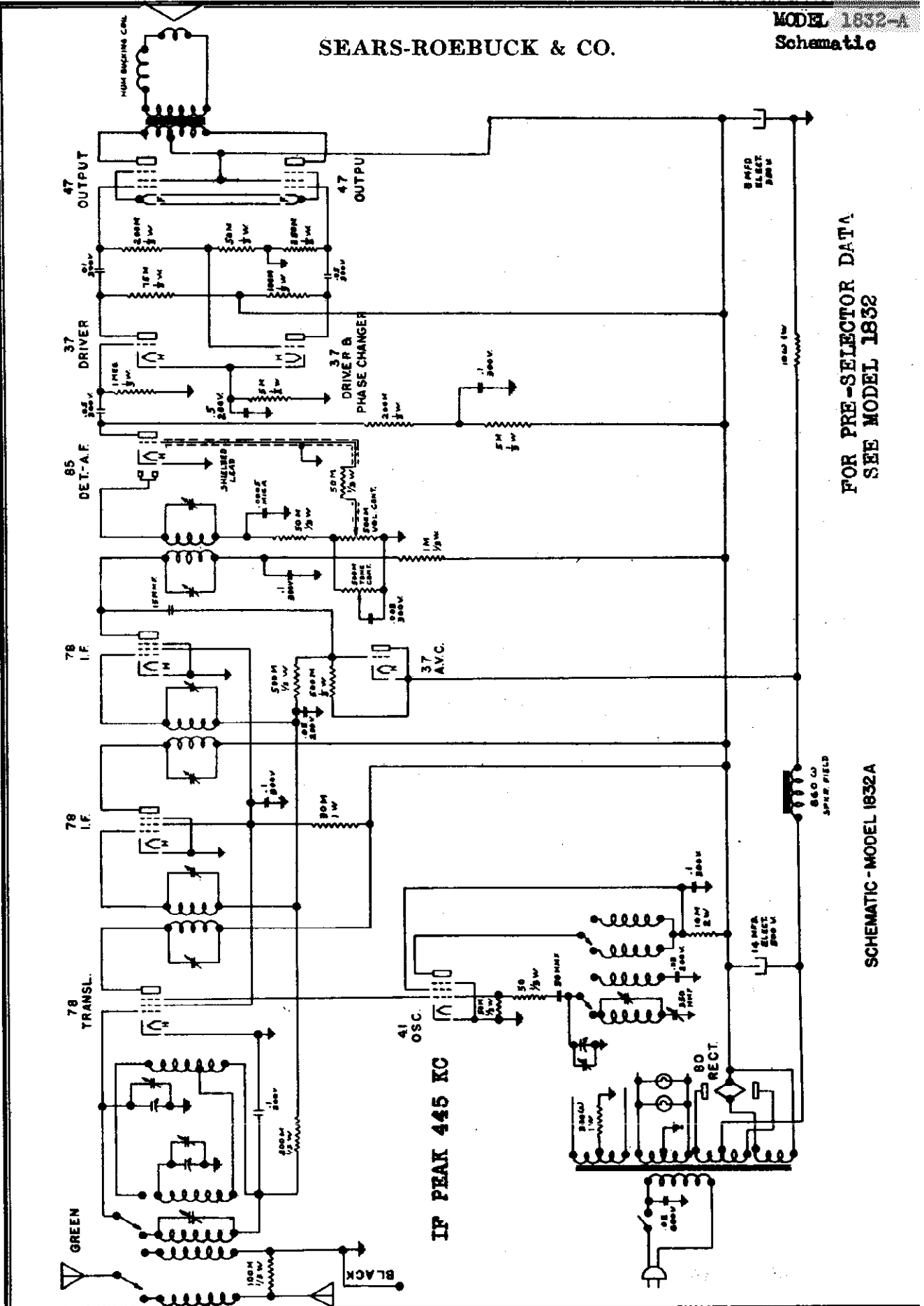
When the new Drive Unit is being mounted, care must be taken that the shafts and coupling line up properly so that the condenser will turn freely. The front mounting foot of the Drive Unit is made of rubber so the necessary alignment adjustment can be had. The two rear feet, which are of steel, should be tightened after the front one has been adjusted.

Turn the variable condenser so that its plates are fully meshed. Then turn the knurled turning ring all the way in the same direction and tighten the set screws in the coupling. If the setting is made correctly, three distinct clicks will be heard when the knurled turning ring is turned all the way in one direction. Three more clicks will be heard at the end of travel in the opposite direction. Turn the Automatic-Manual control shaft on the Drive Unit so that the flat surface of the projection of the shaft faces upward. Turn the control knob on the chassis to the automatic position and connect the lever.

The Clock Unit

If the tests listed in the chart indicate that the Clock Unit is defective it should be removed from the cabinet and returned to the Operadio Company for repair or replacement. Pull the plugs out of the Drive Unit and loosen the clock clamping screw sufficiently to allow the clock to slide out of the front of the cabinet. The receiver can be operated manually even though the Clock Unit is removed. However, the four prong plug from the Drive Unit must be inserted in its socket at the rear of the chassis.

SEARS-ROEBUCK & CO.

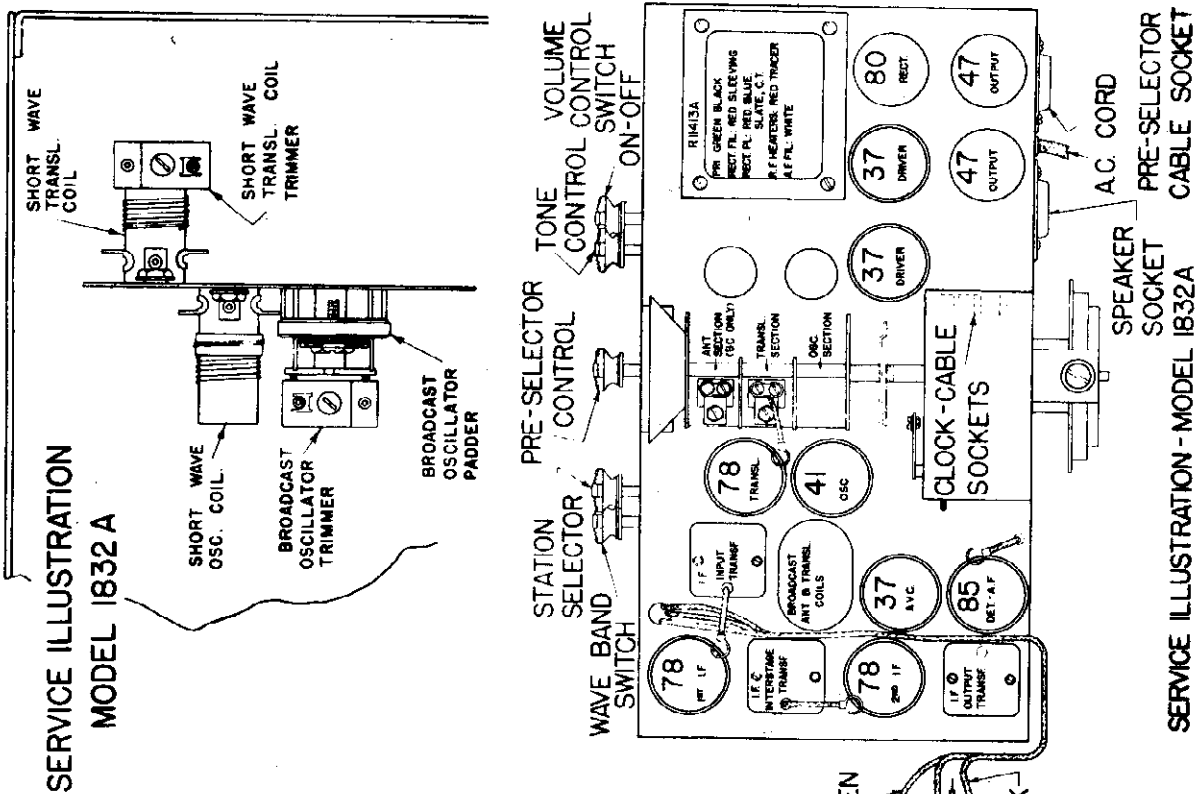


FOR PRE-SELECTOR DATA
SEE MODEL 1832

SCHEMATIC - MODEL 1832A

MODEL 1832-A
Alignment, Socket
Trimmers, Voltage

SEARS-ROEBUCK & CO.



ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.
2. Connect the ground lead of the test oscillator to the chassis.
3. Connect the other lead of the test oscillator, through a .1 mfd. condenser, to the control grid of the 78 second IF tube. The grid clip should be left attached to the cap. Turn the volume control of the receiver to its full "on" position.
4. Set the test oscillator to 445 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustrations.
5. Change the test oscillator connection to the control grid cap of the 78 first IF tube and tune the IF interstage transformer.
6. Change the test oscillator connection to the control grid cap of the 78 translator tube and tune the IF input transformer.
7. In order to secure greater accuracy, repeat all of the operations starting with the IF output transformer. Always use the lowest possible output from the test oscillator.

RF Alignment; Broadcast:

- See Manual #13 for general alignment information. The broadcast band must be aligned before the short wave band.
1. Set the test oscillator to 1750 kc and loosely couple its output to the receiver's antenna lead, with the antenna connected.
 2. Turn the variable condenser plates all the way out. Then adjust the broadcast oscillator trimmer for maximum output. The locations of all of the trimmers are indicated in the Service Illustrations.
 3. Set the test oscillator to 1400 kc and adjust the trimmers on the antenna and translator sections of the variable condenser.
 4. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the broadcast oscillator padder for maximum output.
 5. Repeat the 1750 kc adjustment and then the 1400 kc adjustment, using the lowest possible output from the test oscillator.

Short Wave Alignment:

1. Set the test oscillator to 16 megacycles, leaving it coupled to the receiver's antenna lead as for broadcast alignment.
2. Turn the wave band switch to the short wave position and tune in the test oscillator signal. Then adjust the trimmer on the short wave translator coil for maximum output.

TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE
78 - Translator	255	80
41 - Oscillator	120	120
78 - First IF	255	80
78 - Second IF	250	80
37 - AVC	Used as diode with no applied DC voltage	
75 - 1st-AF	105	
37 - Phase Changer	130	
45 - Driver#1	150	
45 - Output	250	

The audio circuit, including the 85 tube, the two 37 drivers and the two output tubes is such that, in effect, it constitutes a first audio stage leading into a push-pull driver stage, which in turn feeds the push-pull output stage. The phase changing circuit eliminates the need for audio coupling transformers.

The 37 AVC tube, which is used as a diode with plate grounded, is fed from the plate of the 78 second IF tube by means of the 15 mmf. condenser. The voltage drop created across the 500 M ohm resistor, connected between grid and cathode, is used for AVC voltage.

MODEL 1840

Wave Trap Data
Alignment, Voltage

SEARS-ROEBUCK & CO.

2. Set the test oscillator to 1785 kc.
3. Couple the output of the oscillator loosely to the antenna lead of the set with the antenna connected.
4. Turn the variable condenser plates all the way out. Then adjust the oscillator trimmer for maximum output. This trimmer is mounted on the terminal board of the broadcast oscillator coil, as shown in the Service Illustration.

5. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the broadcast oscillator paddler for maximum output. The location of this padding condenser is shown in the Service Illustrations.

6. Repeat the adjustment of the oscillator trimmer at 1785 kilocycles.

7. Set the test oscillator to 1500 kc and tune in its signal. Then adjust the trimmer on the translator section of the variable condenser for maximum output. In some of the receivers, this trimmer has been removed from the variable condenser, in which case this step in the alignment procedure may be omitted.

Short Wave Alignment:

1. Set the test oscillator to 16 megacycles, leaving it coupled to the set's antenna lead as for broadcast alignment.
2. Turn the wave band switch to the short wave position and tune in the test oscillator signal. Then adjust the trimmer on the short wave translator coil for maximum output.
3. Set the test oscillator to 6 megacycles and tune in its signal. If necessary, turns may be shifted on the short wave translator coil to secure accurate alignment on this frequency. Should it be found necessary to shift turns, it will also be necessary to readjust the translator trimmer at 16 megacycles after the turns have been shifted.

TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

TUBE	PLATE	SCREEN
58 - Translator	- 260	95
56 - Oscillator	- 140	
58 - First IF	- 260	95
58 - Second IF	- 265	95
56 - AVC	-	Used as diode with no applied DC voltage.
56 - Detector-AF	-	Used as diode with no applied DC voltage.
57 - Audio	- 95	85
2A5 - Output	- 250	260

WAVE TRAP CONNECTIONS

In locations near the coast, where code interference from ship stations may be experienced, a wave trap can be added (Part #R11098). Some of the receivers already have this wave trap incorporated. It is mounted directly behind the IF output transformer. In receivers in which a trap is not already incorporated, a terminal board is provided so that one can be added, as indicated in Fig. 1.

To adjust the wave trap, proceed as follows:

1. With the wave switch in the BROADCAST position, fully mesh the variable condenser plates.
2. If the interfering signal can be picked up, adjust the two tuning condensers of the wave trap until the interfering signal disappears.
3. If the frequency of the interfering signal is known, the adjustment can be made more quickly and accurately by means of a test oscillator. Set the oscillator to the interfering frequency and couple its output to the antenna lead. The oscillator should be adjusted to give high output. Then adjust the wave trap until the oscillator signal disappears. Usually, the frequency of the interfering signal is very close to 500 kc and this frequency should be used if the interference is not heard at the time of the service call.

The IF Stages:ALIGNMENT PROCEDURE

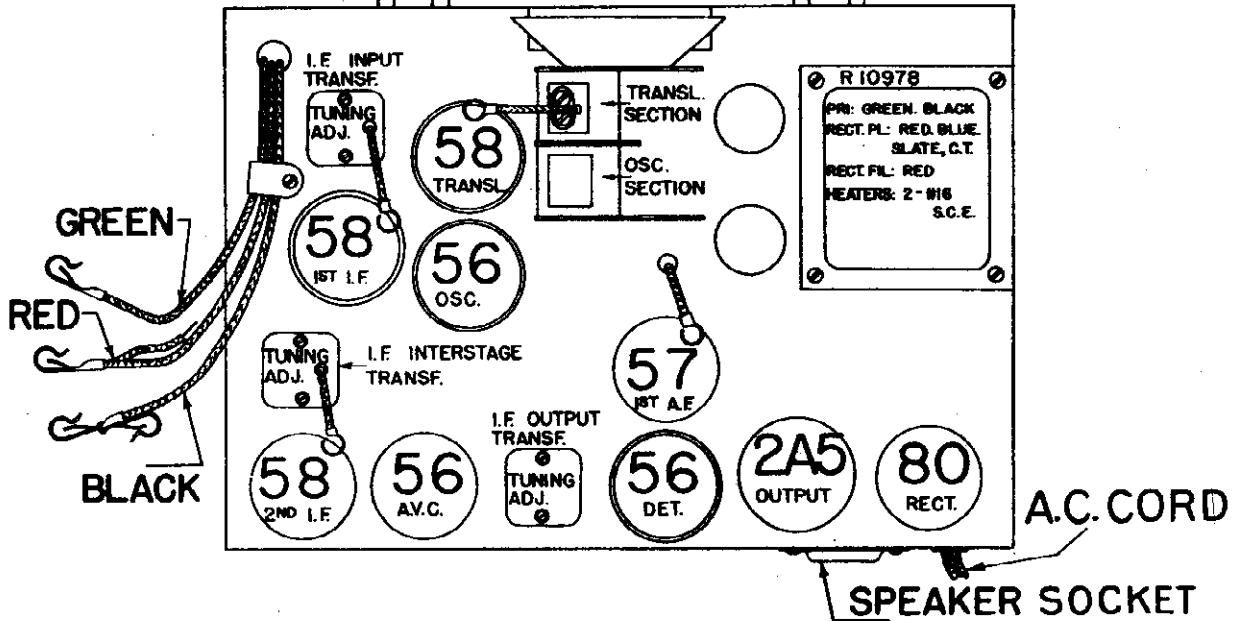
1. Connect the low scale of the output meter across the loud speaker voice coil.
2. Connect the ground lead of the test oscillator to the chassis.
3. Connect the other lead of the test oscillator, through a .1 mfd. condenser, to the control grid of the 58 second IF tube. The grid clip should be left attached to the cap and the tube shield must be in place.
4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.
5. Change the test oscillator connection to the control grid cap of the 58 first IF tube and tune the IF interstage transformer.
6. Change the test oscillator connection to the control grid cap of the 58 translator tube and tune the IF input transformer.

IF Alignment (Broadcast):

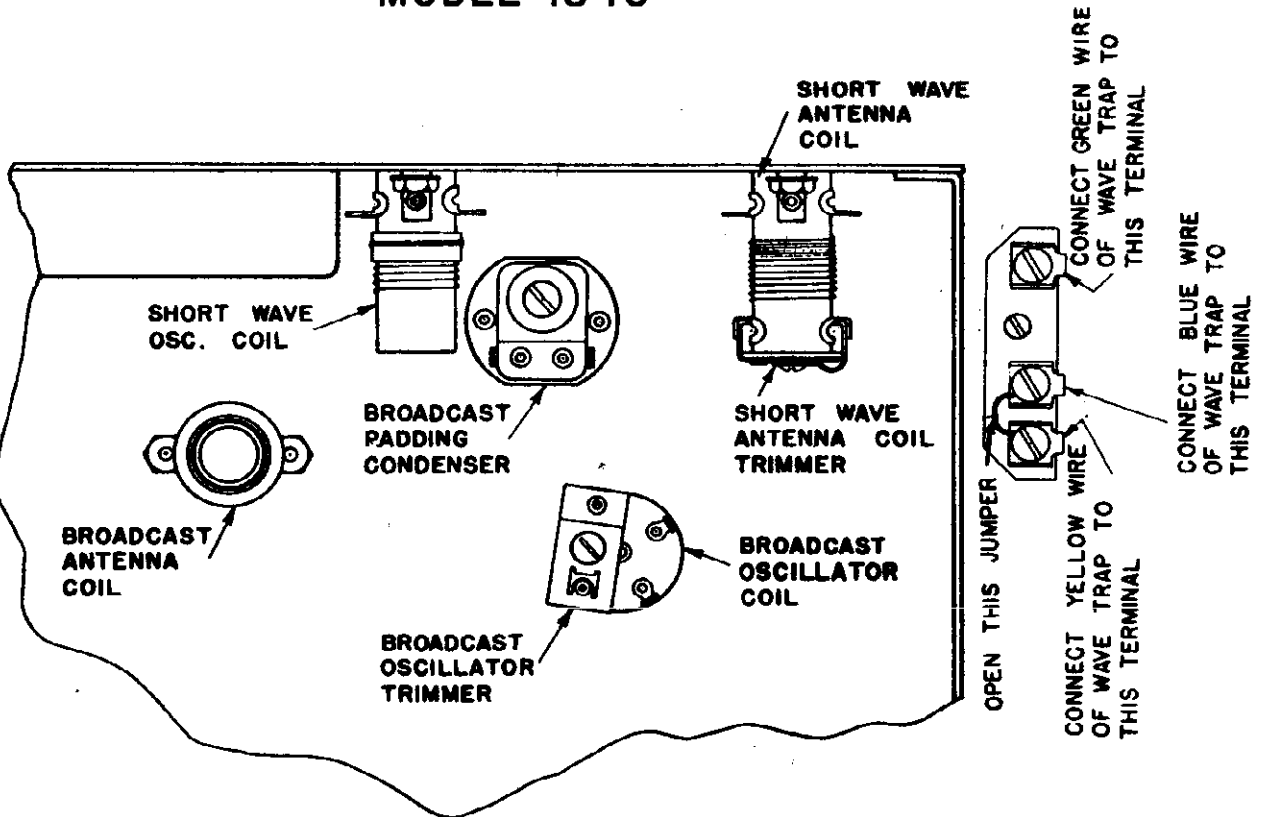
1. Disconnect the wave trap, if one is used. In receivers in which the trap is connected to a screw terminal board, the trap can be disconnected by replacing the jumper between the yellow wire terminal and the blue wire terminal and disconnecting the green lead of the trap from its terminal. In receivers in which the trap has been built in as original equipment, the same thing must be done by connecting a jumper between the blue and yellow leads of the trap and unsoldering the green lead.

SEARS-ROEBUCK & CO.

WAVE CHANGE SWITCH STATION SELECTOR TONE CONTROL VOLUME CONTROL ON-OFF SWITCH

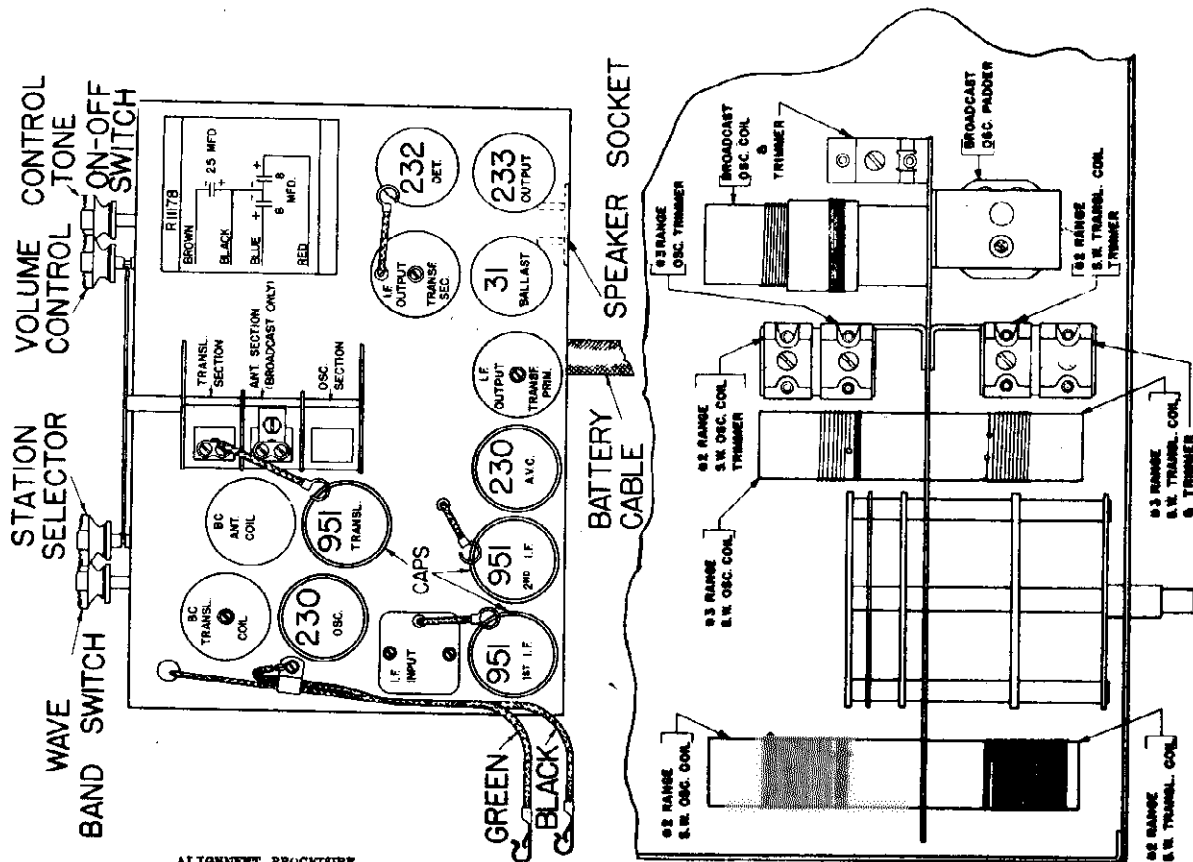


SERVICE ILLUSTRATION -
MODEL 1840



MODEL 1857-A
 Socket, Trimmers
 Alignment, Voltage

SEARS-ROEBUCK & CO.



ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the output meter across the loud speaker terminals.
2. Connect the ground lead of the test oscillator to the chassis.
3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the first IF tube. Leave the grid clips attached to the caps.
4. Set the test oscillator to 175 kc and tune the IF output transformer, primary and secondary. Be sure the volume control is turned all the way on.
5. Change the test oscillator connection to the control grid of the translator tube and tune the IF input transformer.
6. Repeat the adjustments to secure greater accuracy. Start with the IF output transformer.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the receiver inoperative.

Broadcast Alignment; #1 Range:

1. Loosely couple the test oscillator to the antenna lead of the receiver, leaving the antenna connected.
2. Set the test oscillator to 1700 kc.
3. With the wave switch turned to the broadcast position, open the variable condenser plates all the way. Then adjust the broadcast oscillator trimmer for maximum output. The locations of all of the trimmers are shown in the Service Illustrations.
4. Set the test oscillator to 1400 kc and tune in its signal.
5. Adjust the broadcast translator coil trimmer and then the trimmer on the antenna section of the variable condenser for maximum output.
6. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the broadcast oscillator padder for maximum output.
7. Repeat the 1700 kc and 1400 kc adjustments. Always use the lowest possible output from the test oscillator.

Short Wave Alignment; #2 Range:

1. Leave the test oscillator coupled to the set's antenna lead as for broadcast alignment.
2. Open the variable condenser plates all the way and peak the #2 range oscillator trimmer at 5250 kc.
3. Set the test oscillator to 4500 kc and tune in its signal. Then adjust the #2 range translator trimmer for maximum output.
4. Set the test oscillator to 1750 kc and tune in its signal. If necessary, turns may be shifted on the translator coil to secure maximum output. If turns are shifted it will be necessary to repeat the 5250 kc and 4500 kc adjustments.

Short Wave Alignment; #3 Range:

1. Leave the test oscillator coupled to the set's antenna lead as for the lower frequency ranges.
2. Open the variable condenser plates all the way and peak the #3 range oscillator coil trimmer at 15,500 kc.
3. Set the test oscillator to 14,000 kc and tune in its signal. Then adjust the #3 range translator coil trimmer for maximum output.
4. Set the test oscillator to 5225 kc and tune in its signal. If necessary turns may be shifted on the #3 range translator coil to secure maximum output. If turns are shifted it will be necessary to repeat the 15,500 kc and 14,000 kc adjustments.

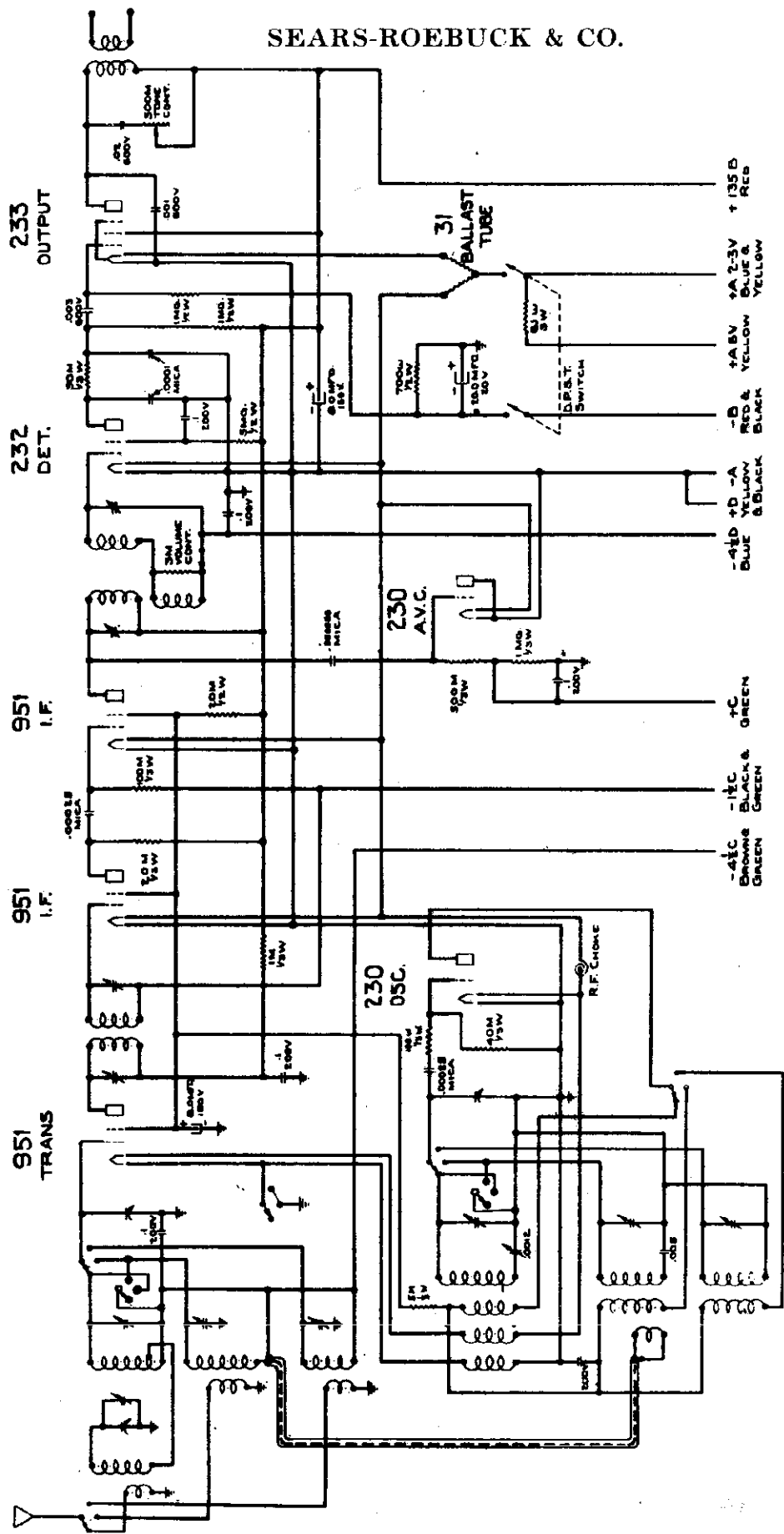
TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

Tube	Plate Voltage	Screen Voltage
951 - Translator	120	50
230 - Oscillator	35	
951 - First IF	90	50
951 - Second IF	120	50
230 - AVC	Used as diode with no applied DC voltages.	
232 - Detector	* - Indicates low reading * due to high series * resistance in circuit	
233 - Output	115	120

MODEL 1857-A
Schematic

SEARS-ROEBUCK & CO.

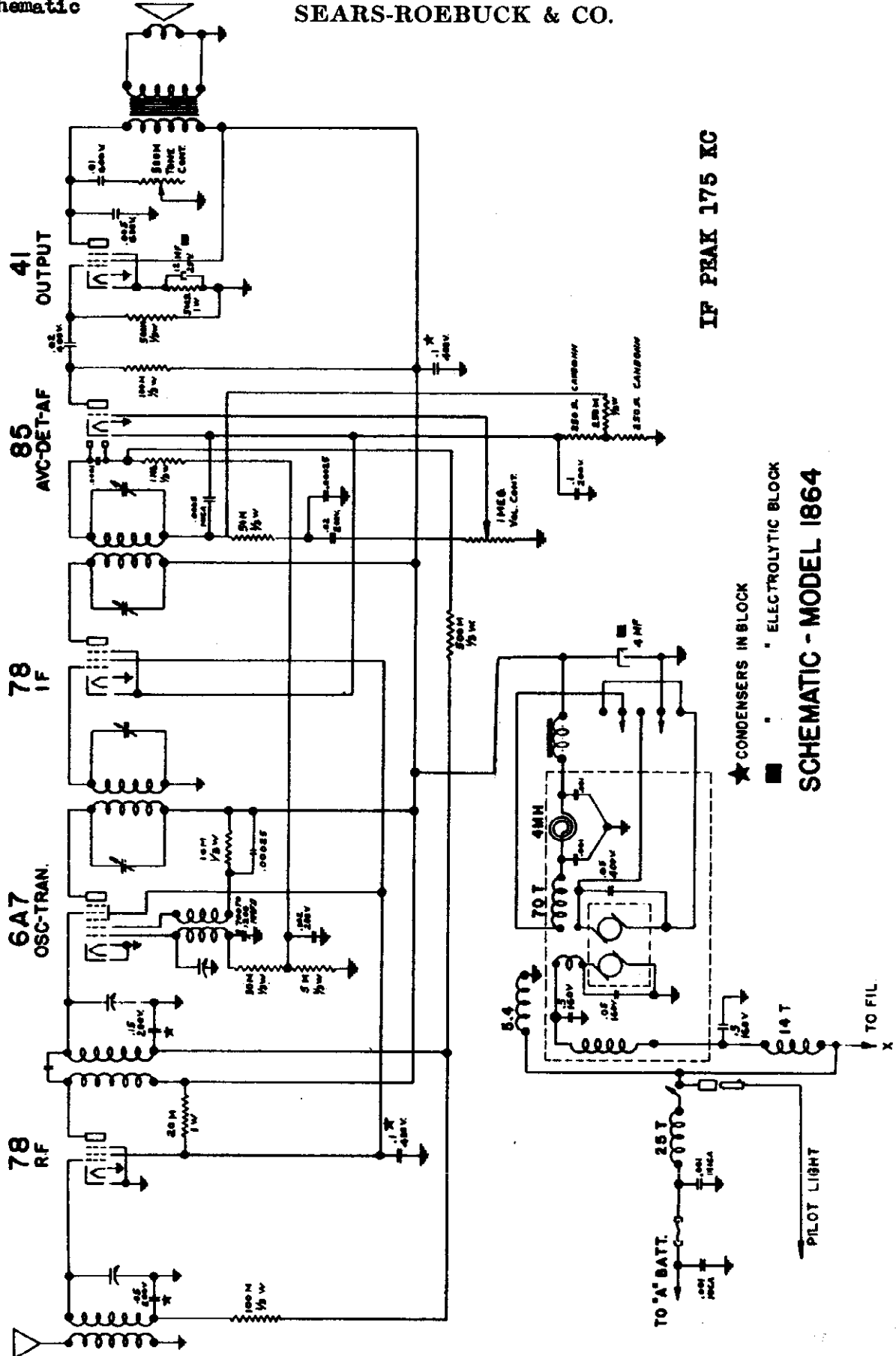


SCHEMATIC - MODEL 1857A

IF PEAK 175 KC

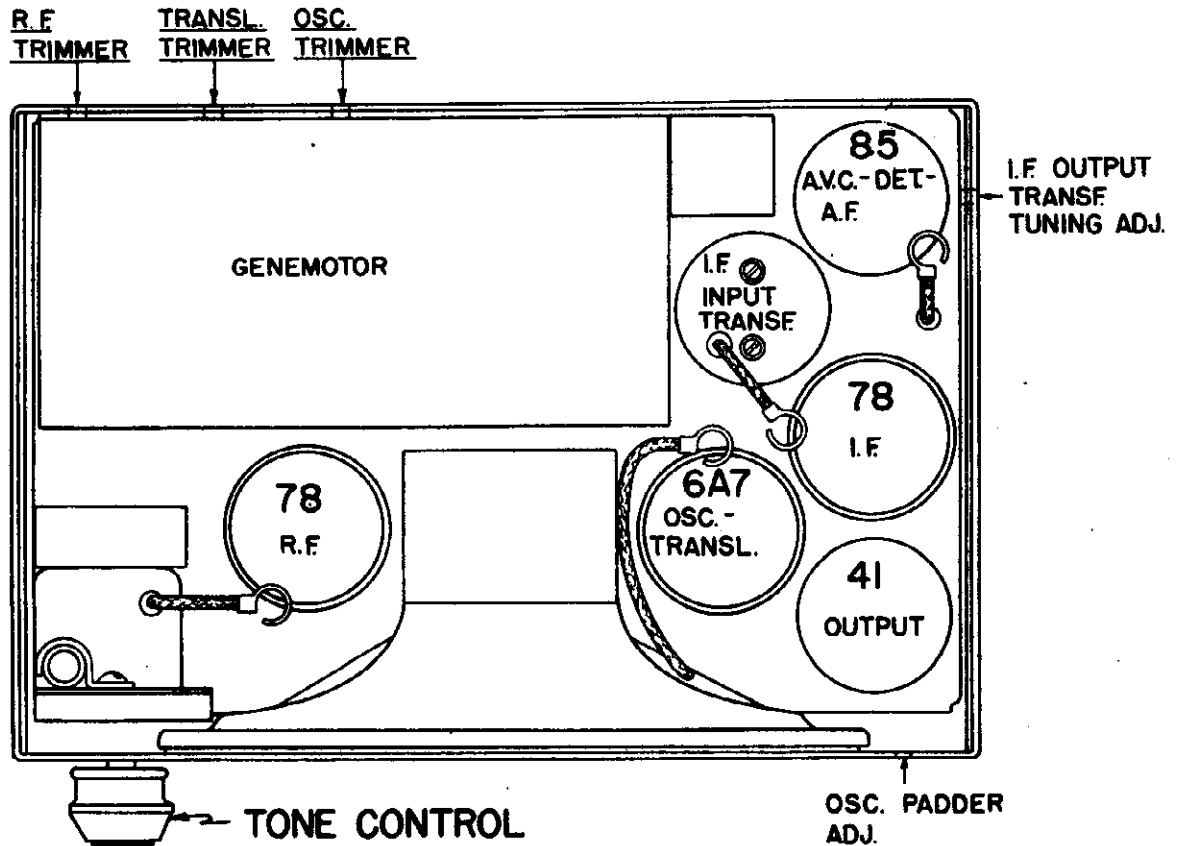
MODEL 1864
Schematic

SEARS-ROEBUCK & CO.



SEARS-ROEBUCK & CO.

MODEL 1864
Alignment
Socket, Trimmers



SERVICE ILLUSTRATION - MODEL 1864

ALIGNMENT PROCEDUREThe IF Stages:

1. Connect the output meter (low voltage scale) across the loud speaker voice coil.
2. Connect the ground lead of the test oscillator to the receiver chassis.
3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the control grid cap of the 78 IF tube, leaving the grid clip attached to the cap.
4. Set the test oscillator to 175 kc and tune the IF output transformer. This transformer is mounted under the hole in the right end of the chassis, as indicated in the Service Illustration.
5. Change the test oscillator connection to the grid of the translator tube and tune the IF input transformer.
6. Repeat the adjustments to secure greater accuracy. The volume control of the receiver should be turned to its full "on" position and the output from the test oscillator kept as low as possible in order to render the AVC action of the set inoperative.

RF Alignment:

1. Connect the test oscillator to the antenna lead through a .0002 mfd. condenser.
2. Set the test oscillator to 1520 kc. Open the variable condenser plates all the way and adjust the oscillator trimmer for maximum output.
3. Set the test oscillator to 1400 kc and adjust the RF and translator trimmers.
4. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the paddler until maximum output is obtained.
5. Repeat the 1520 kc and 1400 kc adjustments. Always leave the receiver's volume control on full and the test oscillator's output at the lowest possible value.

TUBE VOLTAGE CHART

Readings taken with 1000 ohms per volt meter from chassis to indicated tube element.

TUBE	PLATE	SCREEN	OSC. PLATE
78 - RF	230	95	180
6A7 - Osc-Transl	250	95	
78 - IF	230	95	
85 - AVC-Det-AF	85		
41 - Output	230	220	

**MODELS 1904, 1904-A, 1906
1914, 1954, 1964, 1964-A
Alignment, Chassis Layout**

SEARS-ROEBUCK & CO.

In some of the sets, the 40 ohm resistor, R14, is omitted and a grounded center tap on the transformer used instead.

In earlier production, R3 was a 20M ohm, 1/2 watt resistor. In later production, this was changed to a 5K ohm, 1/3 watt resistor. In sets using a 20M ohm resistor, if trouble is experienced due to the set's not operating at the low frequency end of the C Band, which will be due to the oscillator "stalling", replace the 20M ohm resistor with a 5M ohm one.

The coupling between primary and secondary of the IF output transformer is variable and serves as the volume control.

R7 is the resistor which supplies AVC voltage. Residual bias is furnished by R13.

POWER TRANSFORMER COLOR CODE

RECTIFIER PLATE: RED. CENTER TAP, GREEN.
PRIMARY: BLUE.
HEATER: BLACK.

ALIGNMENT PROCEDURE

General:

During all of the alignment procedure, the volume control should be turned either all the way on, or else retarded slightly from the full "top" position, if retarding it is found to sharpen adjustments. The ground lead of the test oscillator should be connected to the chassis through a .1 mfd. condenser. The other lead of the test oscillator is to be connected in the manner described in the procedure. Where connection is made to a control grid cap, it is important to leave the grid clip attached to the grid cap and to leave the tube shields in place. No attempt should be made to "kill" the oscillator section of the 6A7 during the alignment.

The output from the test oscillator always should be kept at the lowest possible value that will give a satisfactory output meter reading, and the coupling between the test oscillator and the receiver should be made as loose as possible. In the case of RF alignment on any of the bands, where the test oscillator is coupled to the antenna lead of the receiver with an antenna connected, alignment will be most accurate if the coupling to the antenna lead is made very loose. (The antenna lead and the oscillator lead separated.) If the test oscillator has a variable control for its power output, it is better to turn this control to its high position and then decrease the signal input to the receiver by decreasing the amount of coupling between the test oscillator and the receiver's antenna lead. If an actual antenna is not used and is replaced by a condenser or resistor, as described in the procedure, the input to the receiver should be kept low by decreasing the power output from the test oscillator.

When peaking the antenna and transformer trimmers, for all wave bands, the variable condenser should be "rocked" back and forth a degree or two while the trimmer is being adjusted. This should not be done when peaking the oscillator trimmers; in this case, the variable condenser is turned so that the plates are completely out of mesh and left in this position during the adjustment. When adjusting the oscillator trimmers, if it is found that two peaks can be obtained, use the one in which the trimmer is screwed further out (less capacity). When adjusting the antenna and transformer trimmers, if two peaks are found, use the adjustment in which the trimmer is screwed in furthest. Note that this is exactly opposite to the procedure for the oscillator trimmers.

Sequence of Alignment:

1. Align IF amplifier.
2. Align short wave, Band C.
3. Align short wave, Band B.
4. Align broadcast, Band A.

IF Alignment:

1. Set the test oscillator to 175 kc and connect its output lead to the control grid cap of the 6A7 tube.
2. Peak the IF output transformer tuning condensers, C13 and C14. These are mounted under the chassis, as shown in the Location of Parts Diagram.
3. Peak the IF input transformer, mounted on top of the chassis.
4. Repeat the adjustments to assure greater accuracy.

RF Alignment; Band C:

1. Loosely couple the output of the test oscillator to the antenna lead of the receiver, leaving the antenna connected. If it is impractical to use an actual antenna, the test oscillator can be connected directly to the antenna lead of the receiver, in series with a 400 ohm resistor and with no antenna connected to the receiver.

2. Set the test oscillator to 14500 kc and tune in its signal. Then adjust C3 for maximum output.

RF Alignment; Band B:

1. Loosely couple the output of the test oscillator to the antenna lead of the receiver, leaving the antenna connected. If it is impractical to use an actual antenna, the test oscillator can be connected directly to the antenna lead of the receiver, in series with a 400 ohm resistor and with no antenna connected to the receiver.

2. Set the test oscillator to 4500 kc and tune in its signal. Then adjust C2 for maximum output.

RF Alignment; Broadcast, Band A:

1. Couple the test oscillator to the antenna lead of the receiver, with the antenna connected; or connect the oscillator directly to the receiver antenna lead, in series with a .00025 mfd. condenser and with no antenna connected.

2. Set the test oscillator to 1400 kc and tune in its signal. Then adjust C1 and the trimmer on the middle section of the variable condenser for maximum output.

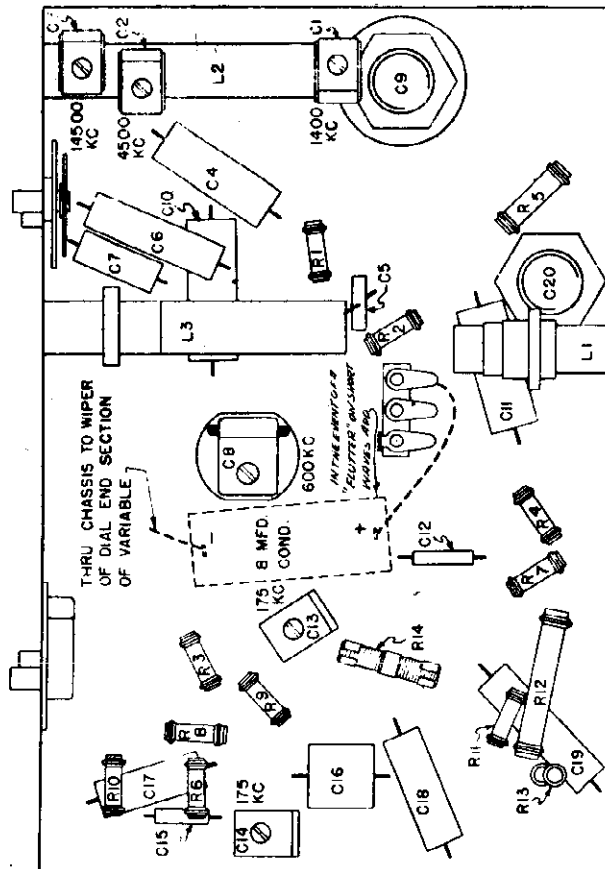
3. Set the test oscillator to 600 kc and tune in its signal. Then adjust the padding condenser, C8, for maximum output. The variable should be "rocked" back and forth a degree or two while making this adjustment.

4. Repeat the 1400 kc adjustment and then the 600 kc adjustment.

FAILURE OF THE VOLUME CONTROL TO REDUCE THE VOLUME SUFFICIENTLY

The Volume Control in these models consists of variable coupling between the primary and secondary of the IF output transformer. It sometimes happens that the movable coil slips on its shaft with the result that the volume cannot be reduced to zero, or else that it passes through zero and then begins to increase again as the Volume Control knob is turned counter clockwise. This condition can be corrected as follows:

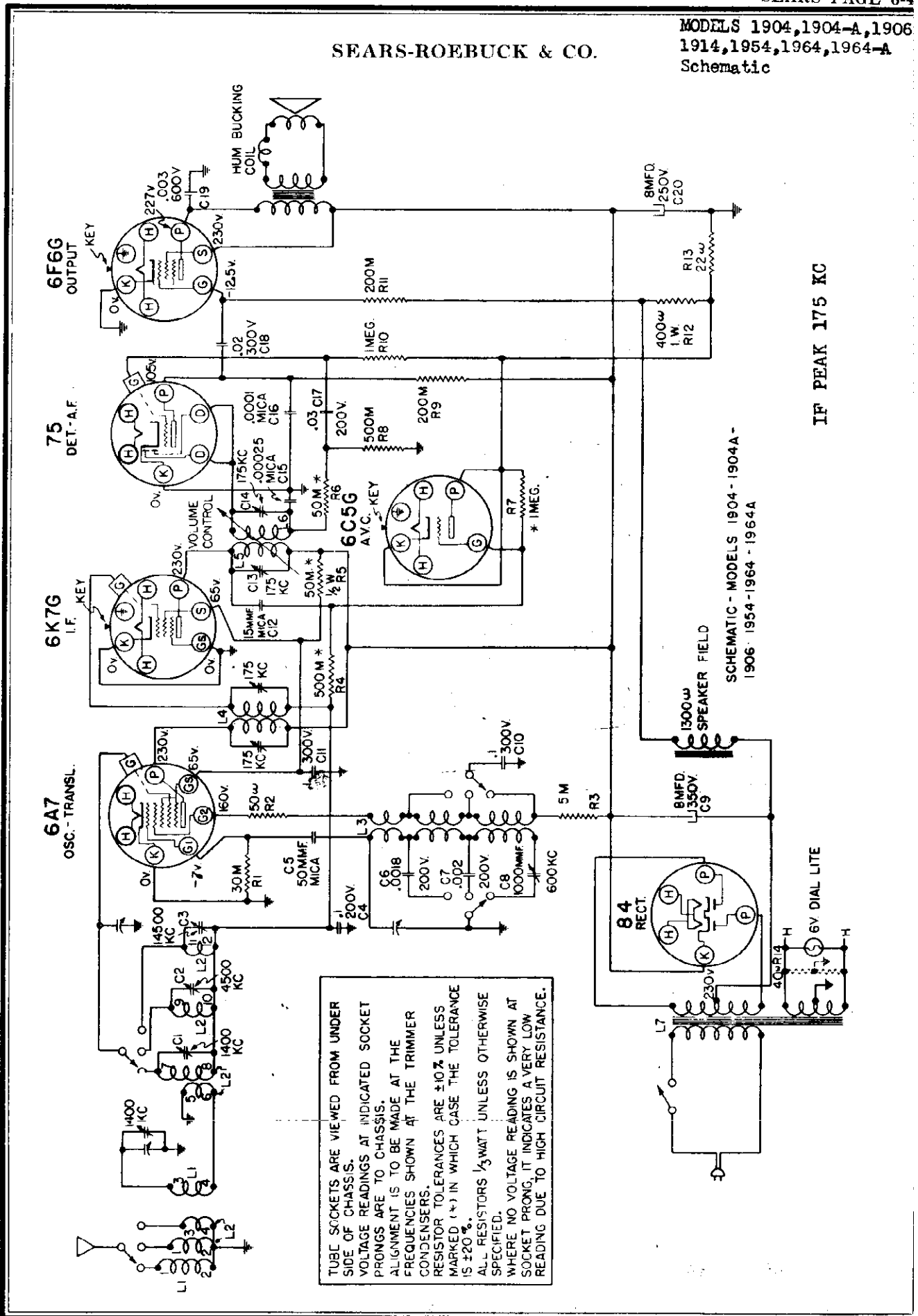
1. Tune in a strong local station.
2. Slightly loosen the set screw that holds the movable coil bracket to the Volume Control shaft, so that the coil can be slipped around the shaft.
3. Turn the Volume Control shaft all the way counter-clockwise.
4. Leaving the shaft in this full counter-clockwise position, slip the movable coil around the shaft to the point of minimum volume.
5. Securely tighten the set screw.
6. If, with the coil turned to the point of minimum volume the volume still is too high, it can be reduced by rearranging the flexible leads. If improperly arranged, the capacity coupling of these leads may prevent a low enough minimum volume. However, it is a simple matter to shift the leads and so reduce the volume.



NOTE L4, L5, L6 ARE MOUNTED ON TOP OF THE CHASSIS.
LOCATIONS OF PARTS - MODELS 1904 - 1904A - 1906-1914-1954-1964-1964A

SEARS-ROEBUCK & CO.

MODELS 1904, 1904-A, 1906
1914, 1954, 1964, 1964-A
Schematic



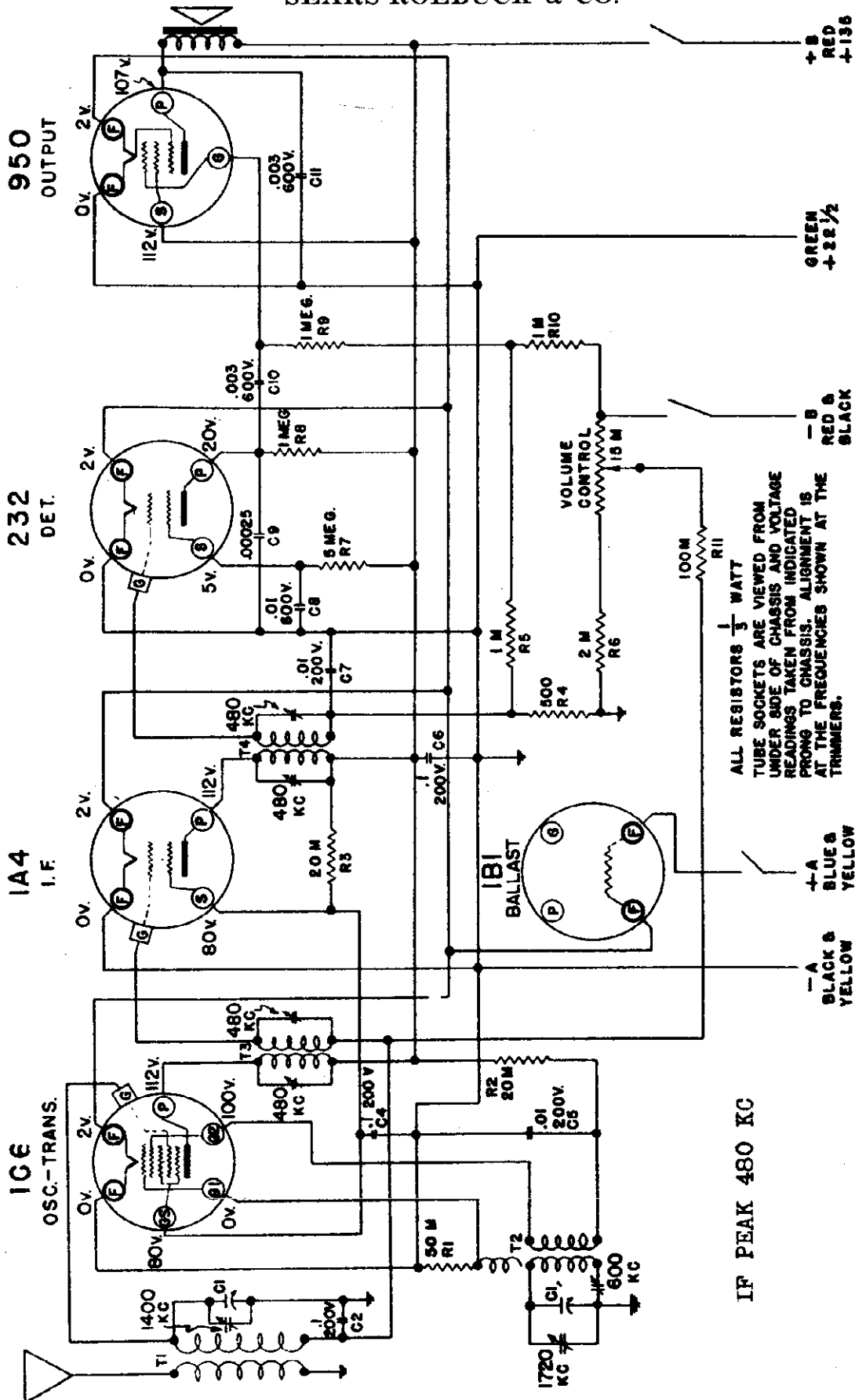
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
RESISTOR TOLERANCES ARE ±10% UNLESS MARKED (*) IN WHICH CASE THE TOLERANCE IS ±20%.
ALL RESISTORS 1/3 WATT UNLESS OTHERWISE SPECIFIED.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING DUE TO HIGH CIRCUIT RESISTANCE.

SCHEMATIC - MODELS 1904 - 1904A - 1906 - 1954 - 1964 - 1964A

IF PEAK 175 KC

MODELS 1920, 1926, 1980
Schematic

SEARS-ROEBUCK & CO.



ALL RESISTORS 1/2 WATT
 TUBE SOCKETS ARE VIEWED FROM
 UNDER SIDE OF CHASSIS AND VOLTAGE
 READINGS TAKEN FROM INDICATED
 PRONG TO CHASSIS. ALIGNMENT IS
 AT THE FREQUENCIES SHOWN AT THE
 TRIMMERS.

-A
 BLACK &
 YELLOW

+A
 BLUE &
 YELLOW

IF PEAK 480 KC

SCHEMATIC - MODELS 1920-1926-1980

SEARS-ROEBUCK & CO.

MODELS 1920, 1926, 1980
Alignment, Chassis
Parts

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the high scale of the output meter across the loud speaker.
2. Connect a 480 kc test oscillator, in series with a .1 mfd. condenser, between the control grid of the 105 and the chassis.
3. Adjust the IF output transformer and the IF input transformer for maximum output. Adjustments should be repeated for greater accuracy.

Broadcast Alignment:

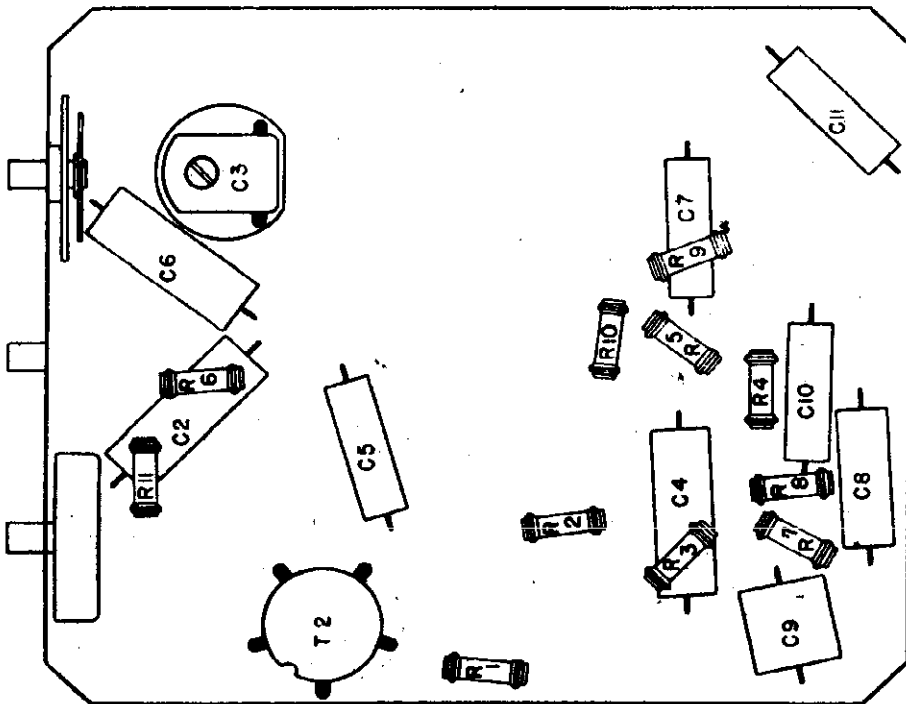
1. The output meter should be left connected as for IF alignment. Loosely couple the test oscillator to the antenna lead of the receiver, leaving the antenna connected.
2. Set the test oscillator to 1720 kc. Open the variable condenser plates all the way and adjust the trimmer on the oscillator section for maximum output. The oscillator section is the one further from the dial.
3. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the trimmer on the other section of the variable condenser for maximum output. The variable should be rocked back and forth a degree or two while making this adjustment.
4. Set the test oscillator to 600 kc and tune in its signal. Then adjust the oscillator padder, C3, for maximum output. The variable should be rocked back and forth a degree or two while making this adjustment.
5. Repeat the 1720 kc and 1400 kc adjustments for greater accuracy.

REPLACE ENT PARTS AND PRICE LIST

FOR

SILVERTONE MODELS 1920, 1926, 1980.

SCHMATIC LOCATION	PART NO.	DESCRIPTION
T1	R8393	Resistor - 5 megohms, 1/5 watt carbon
T2	R7585	Resistor - 1 megohm, 1/3 watt carbon
T3	R7586	Resistor - 100K ohms, 1/3 watt carbon
T4	R6337	Resistor - 50K ohms, 1/5 watt carbon
	R6440	Resistor - 20K ohms, 1/5 watt carbon
	R6334	Resistor - 2M ohms, 1/5 watt carbon
	R6336	Resistor - 1M ohms, 1/3 watt carbon
	R10142	Resistor - 500 ohms, 1/3 watt carbon
C1	R12162	Condenser - Variable, 1920, 1980
C2, C4, C6	R12628	Condenser - Variable, Model 1926
C3	R9975	Condenser - Oscillator padder
C5, C7	R6444	Condenser - .1 mfd., 200 volts
C8	R6432	Condenser - .01 mfd., 200 volts
C9	R7070	Condenser - .01 mfd., 600 volts
C10, C11	R7681	Condenser - .003 mfd., 600 volts
IF Input	R4592	Condenser - .00025 mfd., mica
IF Output	R12163	Control - Volume
	R7	5 megohms, 1/5 watt carbon
	R5, R9	1 megohm, 1/3 watt carbon
	R11	100K ohms, 1/3 watt carbon
	R1	50K ohms, 1/5 watt carbon
	R2, R3	20K ohms, 1/5 watt carbon
	R6	2M ohms, 1/5 watt carbon
	R5, R10	1M ohms, 1/3 watt carbon
	R4	500 ohms, 1/3 watt carbon



NOTE: T1, T3, AND T4 ARE MOUNTED ON TOP OF CHASSIS.

LOCATIONS OF PARTS -
MODELS 1920-1926-1980

SCHMATIC LOCATION	PART NO.	DESCRIPTION
T1	R1062A	Bushing - Rubber
T2	R2160	Cable - Battery
T3	R11043	Clip - Grid
T4	R9975	Coil - Antenna
	R12161	Coil - Oscillator
	R12157A	Transformer - IF Input
	R12162A	Transformer - IF Output

MODELS 1922-A, 1932-A
1982-A, 1992-A

SEARS-ROEBUCK & CO.

Alignment, Socket
Trimmers, Chassis

ALIGNMENT PROCEDURE

General:

During all of the Alignment Procedure, the Volume Control should be turned all the way on and the Tone Control should be turned all the way to the right to its brilliant position. The ground lead of the test oscillator is to be connected to the chassis through a .1 mfd. condenser. This prevents shorting of the grid bias of the tubes. The other lead of the test oscillator is to be connected in the manner described in the procedure. Where connection is made to a control grid cap, it is important to leave the grid clip attached to the grid cap and to leave the tube shields in place. No attempt should be made to "kill" the oscillator section of the 10C during the alignment.

The output from the test oscillator always should be kept at the lowest possible value that will give a satisfactory output reading. During the RF alignment, the coupling between the test oscillator and the antenna lead of the receiver should be made as loose as possible. (The antenna lead and the oscillator lead separated.) If the test oscillator has a variable control for its power output, turn this control to its high position and then decrease the signal input to the receiver by decreasing the amount of coupling between the test oscillator and the receiver's antenna lead. If an actual antenna is not used, and is replaced by a condenser or resistor, as described in the procedure, the input to the receiver should be kept low by decreasing the power output from the test oscillator.

When peaking the antenna and translator trimmers, the variable condenser should be "rocked" back and forth a degree or two while the trimmer is being adjusted. This should not be done when peaking the oscillator trimmers. In this case, the variable condenser is turned so that the plates are completely out of mesh and left in this position during the adjustment. When adjusting the oscillator trimmers, if it is found that two peaks can be obtained, use the one in which the trimmer is screwed further out (less capacity). When adjusting the antenna and translator trimmers, if two peaks are found, use the adjustment in which the trimmer is screwed in furthest. Note that this is exactly opposite to the procedure for the oscillator trimmers.

Sequence Of Alignment:

1. Align IF Amplifier,
2. Align Broadcast Band, Band A
3. Align Short Wave Band, Band B

IF Alignment:

1. Set the test oscillator to 175 kc and connect its output lead to the control grid cap of the 10C tube.
2. Peak the IF input transformer. This is the square can unit on top of the chassis.
3. Peak the IF output transformer secondary. This is the round can unit with the single adjusting screw mounted at the top rear of the chassis.
4. Peak the IF output transformer primary. This trimmer adjustment is C21 in the Location of Parts Diagram.
5. It is advisable to repeat the alignment for greater accuracy.

Broadcast RF Alignment: Band A:

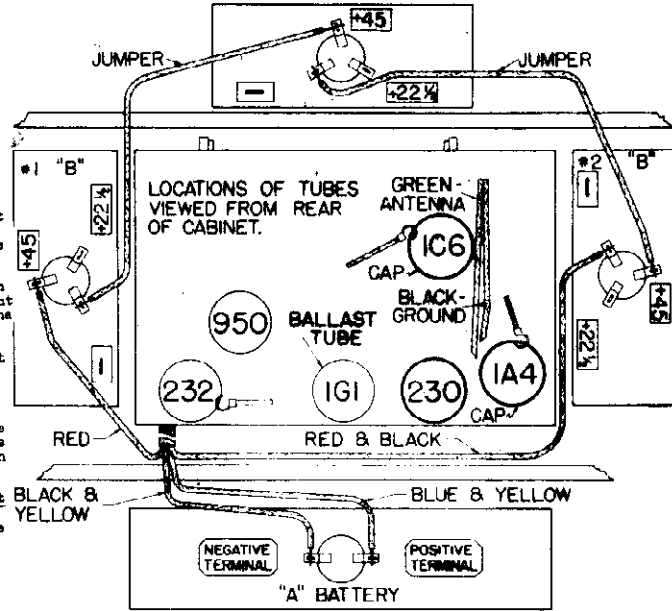
1. Loosely couple the output of the test oscillator to the antenna lead of the receiver, leaving the antenna connected. If it is impractical to use an actual antenna, the test oscillator can be connected, in series with a .00025 mfd. condenser, directly to the antenna lead of the receiver.
2. Set the test oscillator to 1600 kc. Open the variable condenser plates all the way and adjust C2, the Broadcast oscillator trimmer, for maximum output.
3. Set the test oscillator to 1400 kc and tune in its signal. Peak the Broadcast antenna and translator trimmers. The antenna trimmer is the one on the variable condenser section nearest the dial. The translator trimmer is the one in the round can unit mounted next to the square can IF unit on top of the chassis.
4. Set the test oscillator to 800 kc and tune in its signal. Then adjust C6, the Broadcast oscillator paddler. The variable should be "rocked" back and forth a degree or two during the adjustment.
5. Repeat the 1600 and 1400 kc adjustments.

Short Wave RF Alignment: Band B:

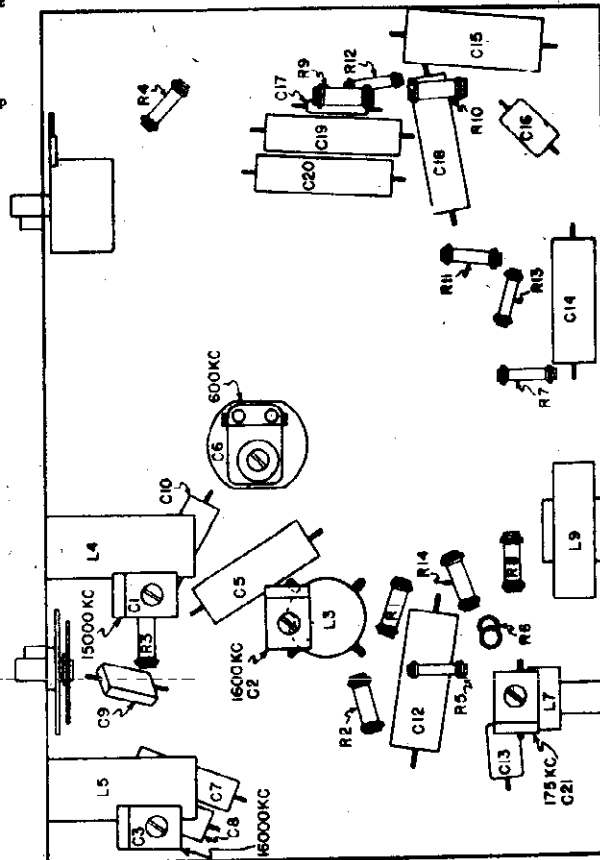
1. Loosely couple the test oscillator to the antenna lead of the receiver, leaving the antenna connected. If it is impractical to use an actual antenna, the test oscillator can be connected, in series with a 400 ohm resistor, directly to the antenna lead of the receiver.
2. Set the test oscillator to 16000 kc. Open the variable condenser plates all the way and peak C3, the Short Wave oscillator trimmer.
3. Set the test oscillator to 15000 kc and tune in its signal. Peak C1, the Short Wave translator trimmer.

Microphonic Howl:

Be sure that the wooden strips, inserted for shipping purposes, are removed from under the chassis. Also be certain that neither the control shafts nor knobs touch the cabinet. The chassis must float freely on its cushion rubber mountings, to prevent microphonics, particularly on Short Waves.



TUBE POSITIONS & BATTERY CONNECTIONS
MODELS - 1922A - 1982A

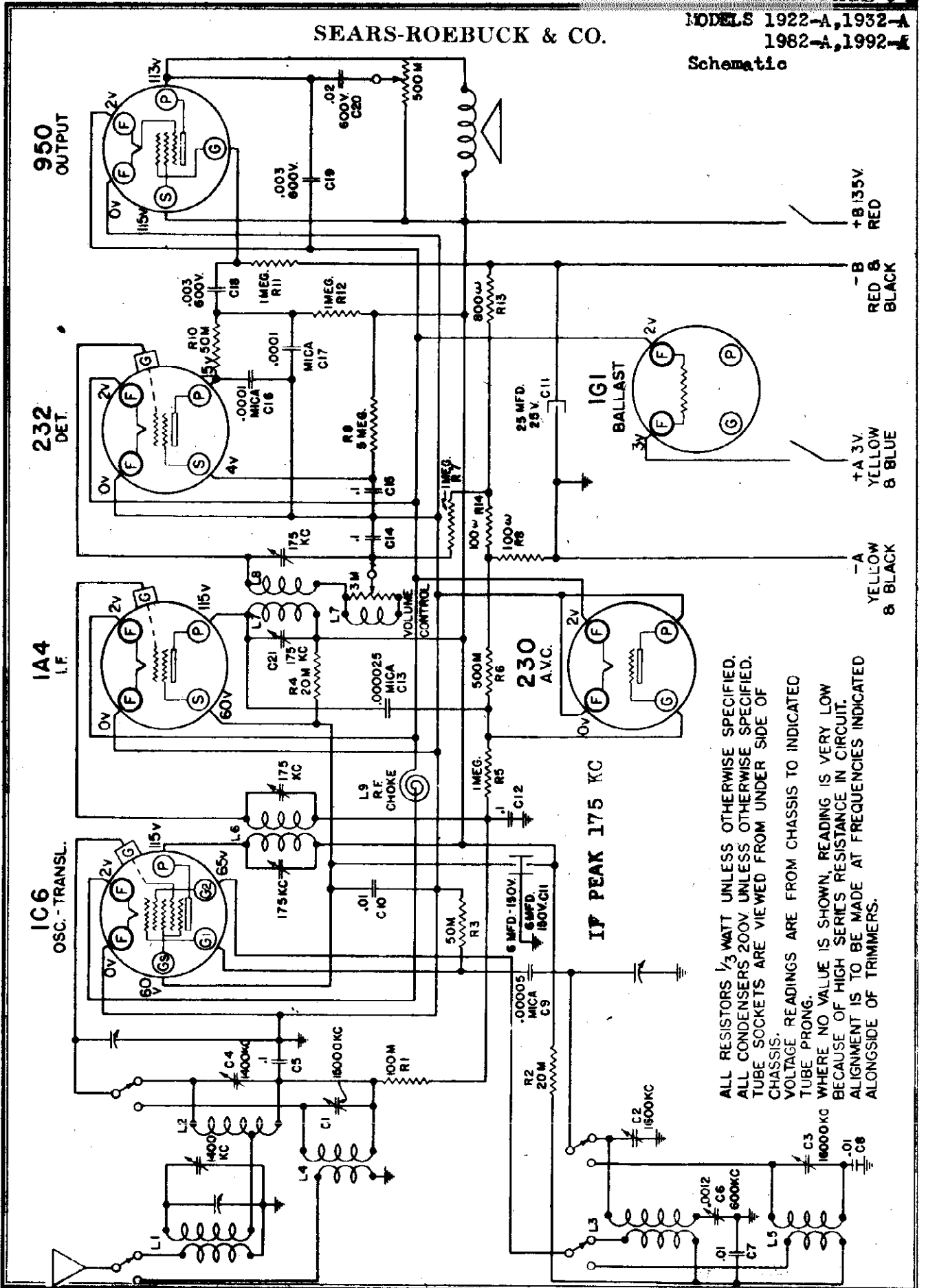


LOCATION OF PARTS - MODELS 1922A - 1932A - 1982A - 1992A

SEARS-ROEBUCK & CO.

MODELS 1922-A, 1932-A
1982-A, 1992-A

Schematic

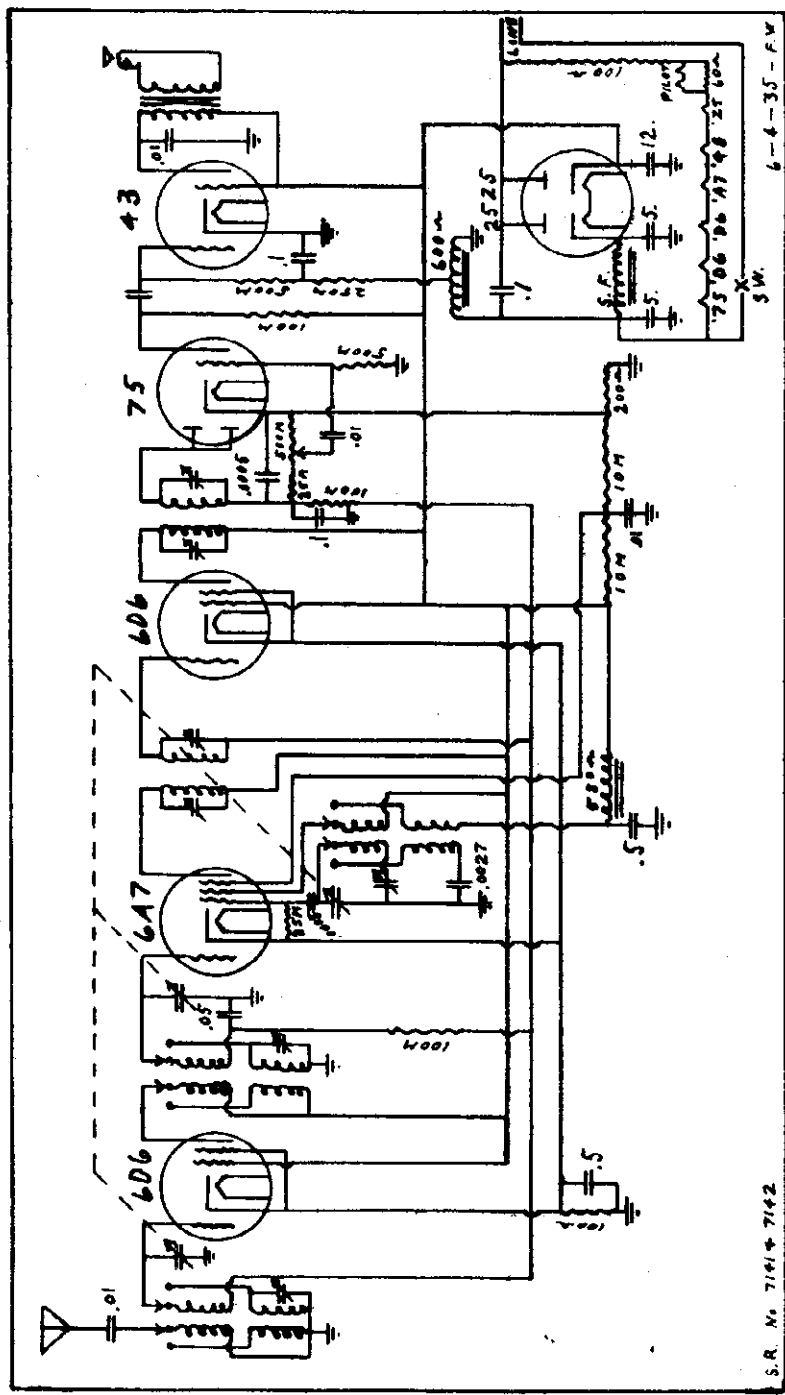


ALL RESISTORS 1/3 WATT UNLESS OTHERWISE SPECIFIED.
 ALL CONDENSERS 200V UNLESS OTHERWISE SPECIFIED.
 TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
 VOLTAGE READINGS ARE FROM CHASSIS TO INDICATED TUBE PRONG.
 WHERE NO VALUE IS SHOWN, READING IS VERY LOW BECAUSE OF HIGH SERIES RESISTANCE IN CIRCUIT.
 ALIGNMENT IS TO BE MADE AT FREQUENCIES INDICATED ALONGSIDE OF TRIMMERS.

- A YELLOW & BLACK
- +A 3V YELLOW & BLUE
- B RED & BLACK
- +B 115V RED

MODELS 7141, 7142
Schematic, Socket
Trimmers, Voltage

SEARS-ROEBUCK & CO.



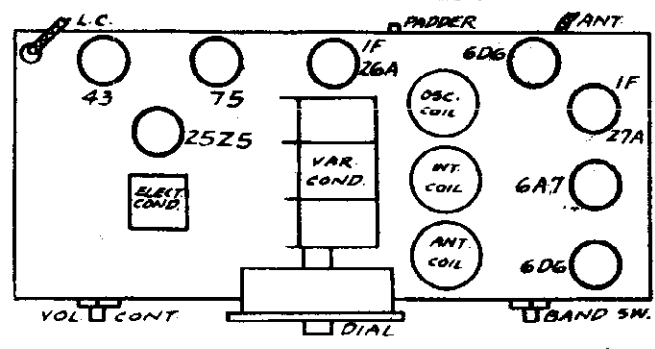
S. R. No. 7141 + 7142

Socket voltages with 1000 ohm per volt D.C. meter - Line voltage 115V.

Type	Position	RF	IF	EG2	EG3	EP
6D6	RF & IF Amp.	6.3	2.2	85	2.2	85
6A7	1st Det. & Oso.	6.3	2.2	35	85	85
75	2nd Det. & AVC	6.3	.8			55
43	Power output	30.	-.4.	85		80

- Oso. plate X - Cathode
- # 43 grid G2 - Screen grid
- F Filament G3 - Suppressor grid
- P - Plate

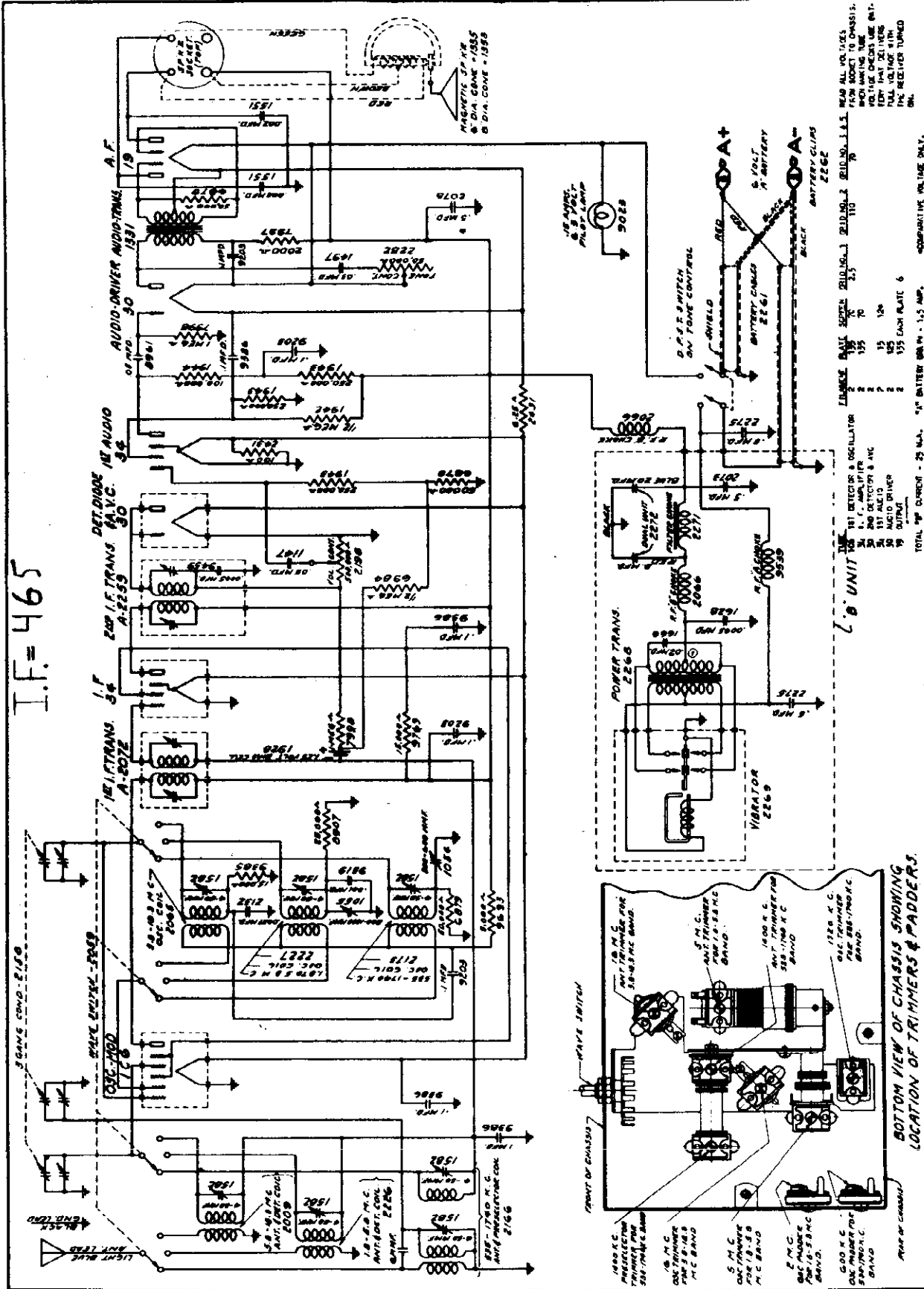
Parts for this model may be ordered from Jobophone Radio Corporation
2611 Indiana Avenue, Chicago, Ill.



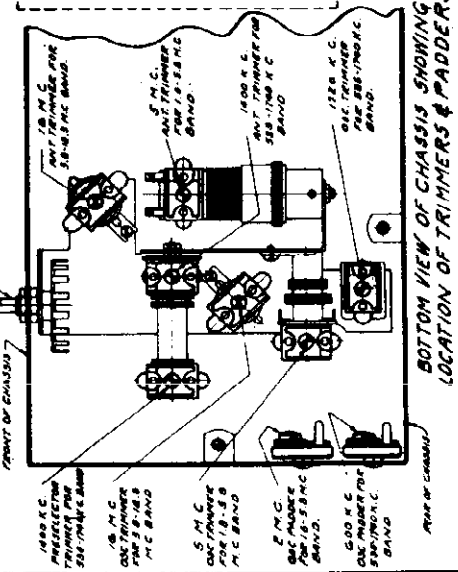
SOCKET LAYOUT

Alignment

1. I-f peaked at 456 kc.
2. Oscillator trimmer (beneath chassis) and gang condenser trimmers adjusted at 1720 kc.
3. Oscillator padding condenser adjusted at 600 kc. Rock tuning condenser.
4. Check alignment at 1400 kc.
5. Check short wave alignment at 12. megacycle



I.F. = 465



READ ALL INSTRUCTIONS
BEFORE MAKING THE
ADJUSTMENTS TO OBTAIN
BEST RESULTS. USE ONLY
THE VOLTAGE INDICATED
ON EACH COMPONENT.
DO NOT TOUCH THE
TUBES WHEN THE SET IS
ON.

COMPONENTS LIST

Label	Value	Notes
1A	150	500 OHM
1B	150	500 OHM
1C	150	500 OHM
1D	150	500 OHM
1E	150	500 OHM
1F	150	500 OHM
1G	150	500 OHM
1H	150	500 OHM
1I	150	500 OHM
1J	150	500 OHM
1K	150	500 OHM
1L	150	500 OHM
1M	150	500 OHM
1N	150	500 OHM
1O	150	500 OHM
1P	150	500 OHM
1Q	150	500 OHM
1R	150	500 OHM
1S	150	500 OHM
1T	150	500 OHM
1U	150	500 OHM
1V	150	500 OHM
1W	150	500 OHM
1X	150	500 OHM
1Y	150	500 OHM
1Z	150	500 OHM
2A	150	500 OHM
2B	150	500 OHM
2C	150	500 OHM
2D	150	500 OHM
2E	150	500 OHM
2F	150	500 OHM
2G	150	500 OHM
2H	150	500 OHM
2I	150	500 OHM
2J	150	500 OHM
2K	150	500 OHM
2L	150	500 OHM
2M	150	500 OHM
2N	150	500 OHM
2O	150	500 OHM
2P	150	500 OHM
2Q	150	500 OHM
2R	150	500 OHM
2S	150	500 OHM
2T	150	500 OHM
2U	150	500 OHM
2V	150	500 OHM
2W	150	500 OHM
2X	150	500 OHM
2Y	150	500 OHM
2Z	150	500 OHM

MODEL 31-B
Alignment
Parts List

SENTINEL RADIO CORP.

PART NUMBER	DESCRIPTION	LIST PRICE	PART NUMBER	DESCRIPTION	LIST PRICE
2166	535-1710 K.C. BAND ANTENNA AND PRESELECTOR COIL	\$1.30	6984	500,000 OHM 1/3 WATT RESISTOR	\$.19
2173	535-1710 K.C. BAND OSCILLATOR COIL	.65	6879	90,000 OHM 1/3 WATT RESISTOR	.19
2226	1.8-5.8 M.C. BAND ANTENNA COIL	.70	9693	5,000 OHM 1/3 WATT RESISTOR	.19
2227	1.8-5.8 M.C. BAND OSCILLATOR COIL	.55	9769	15,000 OHM 1/2 WATT RESISTOR	.19
2009	5.8-18.3 M.C. BAND ANTENNA COIL	.60	8907	25,000 OHM 1/3 WATT RESISTOR	.19
2065	5.8-18.3 M.C. BAND OSCILLATOR COIL	.65	9285	15,000 OHM 1/3 WATT RESISTOR	.19
2072	FIRST I. F. TRANSFORMER	1.35	9431	100 OHM 1/3 WATT RESISTOR	.19
2279	SECOND I. F. TRANSFORMER	1.60	9319	.001 MFD. MOULDED CONDENSER	.21
2282	TONE CONTROL WITH OFF AND ON SWITCH	1.24	9458	.00025 MFD. MOULDED CONDENSER	.21
2198	VOLUME CONTROL	.85	9459	.0005 MFD. MOULDED CONDENSER	.21
2059	WAVE SWITCH	.75	2132	.0027 MFD. MOULDED CONDENSER	.21
2272	8 & 20 MFD. DRY ELECTROLYTIC CONDENSER	1.95	1628	.0015 MFD. MOULDED CONDENSER	.21
2268	POWER TRANSFORMER	2.35	9386	.1 MFD. 200 VOLT CONDENSER	.19
2271	FILTER CHOKE	1.00	9203	.1 MFD. 400 VOLT CONDENSER	.20
2066	R. F. CHOKE	.28	1147	.05 MFD. 200 VOLT CONDENSER	.15
9530	R.F. "A" CHOKE	.15	8961	.05 MFD. 400 VOLT CONDENSER	.19
2269	VIBRATOR	6.00	1551	.002 MFD. 600 VOLT CONDENSER	.18
			1497	.03 MFD. 600 VOLT CONDENSER	.19
			2275	.5 MFD. 100 VOLT CONDENSER	.58
			1666	.03 MFD. 600 VOLT CONDENSER	.18
			2073	.5 MFD. 400 VOLT CONDENSER	.56
			8261	BATTERY CABLE (SINGLE SECTION)	.65

SIX VOLT BATTERY OPERATED
SIX TUBE SUPERHETERODYNE RECEIVER

ALIGNMENT PROCEDURE: REALIGNMENT OF THIS RECEIVER SHOULD NEVER BE NECESSARY UNLESS ONE OF THE OSCILLATOR, ANTENNA, OR R.F. COILS HAS BEEN REPLACED. LACK OF SENSITIVITY, SELECTIVITY, AND POOR TONE QUALITY MAY BE DUE TO ANY ONE OR A COMBINATION OF CAUSES, SUCH AS WEAK OR DEFECTIVE TUBES, BATTERY, OR SPEAKER, INADEQUATE OR EXCESSIVELY LONG ANTENNA, OPEN OR GROUNDED BIAS RESISTOR, BYPASS CONDENSER, ETC. UNDER NO CIRCUMSTANCES SHOULD REALIGNMENT BE ATTEMPTED UNTIL ALL OTHER POSSIBLE SOURCES HAVE BEEN FIRST THOROUGHLY INVESTIGATED AND HAVE BEEN DEFINITELY PROVEN NOT TO BE THE CAUSE. IF AN I.F. TUBE IS REPLACED IT IS ADVISABLE TO REALIGN THE I.F. AMPLIFIER, PARTICULARLY IF THE REPLACEMENT TUBE IS ONE OF A DIFFERENT MANUFACTURE THAN THE ONE IN THE RECEIVER. IT IS IMPORTANT WHEN ALIGNING TO CAREFULLY FOLLOW THE PROCEDURE IN THE ORDER GIVEN, OTHERWISE THE RECEIVER WILL LACK SENSITIVITY AND THE DIAL CALIBRATION WILL BE INCORRECT. IT IS IMPERATIVE THAT AN ACCURATELY CALIBRATED OSCILLATOR BE USED WITH SOME TYPE OF OUTPUT MEASURING DEVICE.

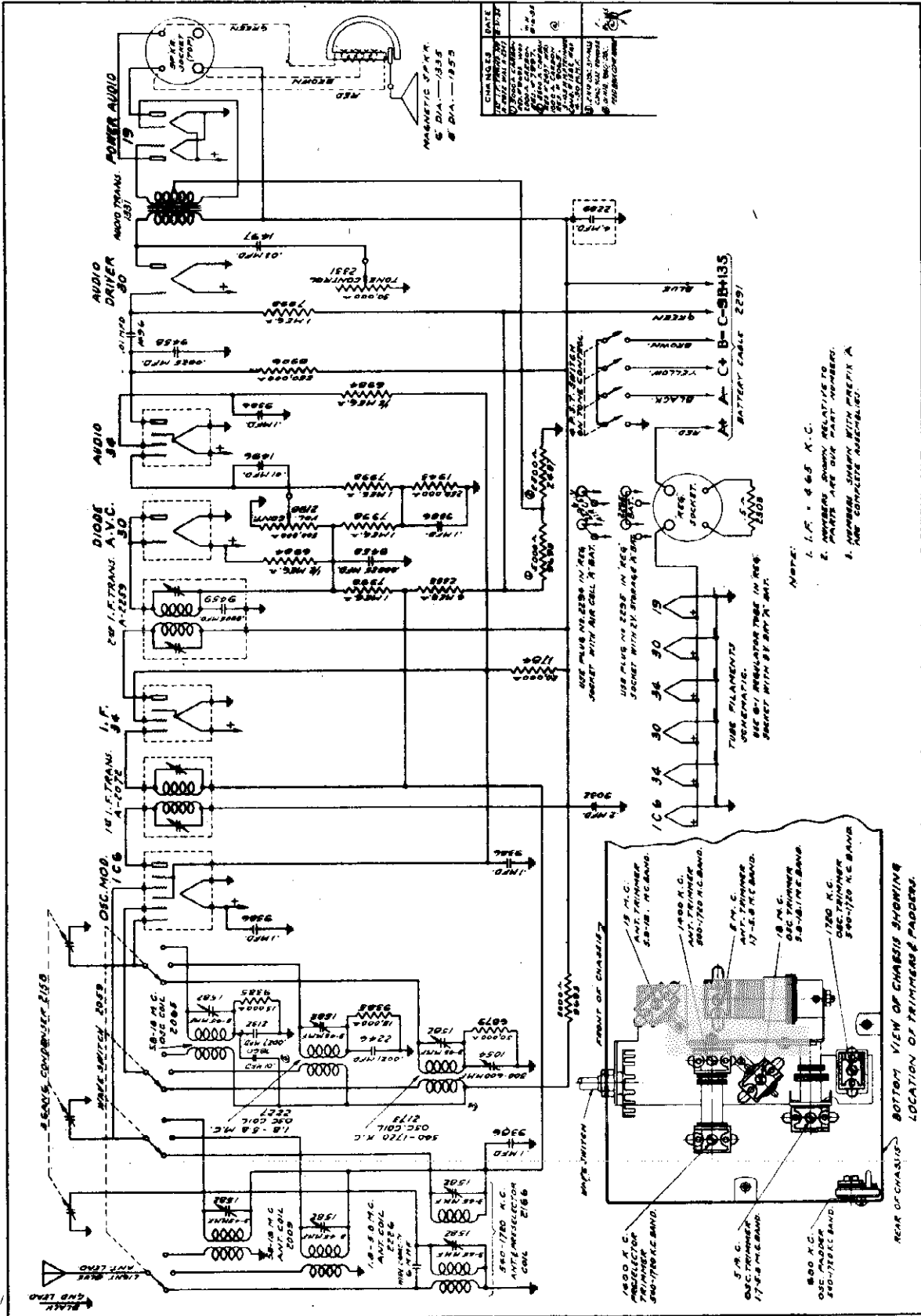
INTERMEDIATE ALIGNMENT:

1. CONNECT THE HIGH SIDE OF THE TEST OSCILLATOR OUTPUT TO THE CONTROL GRID OF THE 106 MODULATOR 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 TEST OSCILLATOR TO THE RECEIVER GROUND.
2. SET THE TEST OSCILLATOR FREQUENCY TO 465 KILOCYCLES (THIS MUST BE ACCURATE).
3. ALIGN THE SECOND INTERMEDIATE TRANSFORMER BY TURNING ONE OF THE TRIMMER SCREWS ACCESSIBLE THROUGH HOLES IN THE TOP OF THE TRANSFORMER SHIELDS 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 FIRST INTERMEDIATE TRANSFORMER IN THE SAME MANNER AS THE SECOND I. F. TRANSFORMER.

TO ALIGN THE VARIABLE CONDENSERS: IT IS IMPORTANT WHEN ALIGNING THE GANG CONDENSER, PADDING AND TRIMMER CONDENSERS TO FOLLOW THE PROCEDURE CAREFULLY, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE PADDING AND TRIMMER CONDENSERS LOCATED UNDERNEATH THE CHASSIS 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 400 OHM RESISTOR TO THE RECEIVER ANTENNA LEAD AND THE LOW SIDE TO THE SET GROUND.
2. PLACE THE BAND SELECTOR SWITCH FOR OPERATION ON THE 18.3 TO 5.8 MEGACYCLE BAND, TUNE THE RECEIVER DIAL TO 16 MEGACYCLES, AND SET THE TEST OSCILLATOR FREQUENCY TO EXACTLY 16 MEGACYCLES. THEN TUNE IN THE 16 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 16 MEGACYCLE OSCILLATOR TRIMMER. WHEN ADJUSTING THIS TRIMMER TWO PEAKS, THE FUNDAMENTAL AND THE IMAGE PEAK, WILL BE NOTICED. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 16 MEGACYCLES. ALWAYS BACK OFF THE TRIMMER TO MINIMUM CAPACITY, THEN SCREW DOWN THE TRIMMER (ADD CAPACITY) UNTIL THE FIRST PEAK WHICH IS THE FUNDAMENTAL AND THE PROPER ONE TO USE IS TUNED IN. IF THE TRIMMER IS SCREWED DOWN BEYOND THE POINT WHERE THE FIRST PEAK IS RECEIVED, THE INCORRECT IMAGE PEAK WILL BE TUNED IN. AFTER COMPLETING ADJUSTMENT OF THE OSCILLATOR TRIMMER AT 16 MEGACYCLES ALWAYS CHECK TO SEE IF THE PROPER PEAK HAS BEEN USED. TO DO THIS LEAVE THE TEST OSCILLATOR FREQUENCY AT 16 MEGACYCLES, INCREASE THE OUTPUT OF THE TEST OSCILLATOR AND TUNE THE RECEIVER DIAL TO APPROXIMATELY 15 MEGACYCLES. THEN VARY THE RECEIVER DIAL SLIGHTLY TO THE RIGHT AND LEFT OF 16 MEGACYCLES, AND IF THE FUNDAMENTAL PEAK WAS USED IN ALIGNING AT 16 MEGACYCLES THE TEST OSCILLATOR SIGNAL WILL BE HEARD AT APPROXIMATELY 15 MEGACYCLES ON THE RECEIVER DIAL. IF IT IS NOT POSSIBLE TO RECEIVE THE SIGNAL, THEN THE FUNDAMENTAL PEAK WAS NOT USED AND THE 16 MEGACYCLE OSCILLATOR TRIMMER MUST BE PROPERLY READJUSTED. AFTER PROPERLY ADJUSTING THE 16 MEGACYCLE OSCILLATOR TRIMMER ADJUST THE 16 MEGACYCLE ANTENNA TRIMMER FOR MAXIMUM 16 MEGACYCLE SENSITIVITY.
3. SET THE BAND SELECTOR SWITCH FOR OPERATION ON THE 1.8 TO 5.8 MEGACYCLE BAND, TUNE THE RECEIVER DIAL, AND SET THE TEST OSCILLATOR FREQUENCY TO EXACTLY 5 MEGACYCLES. BRING IN THE 5 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 5 MEGACYCLE TRIMMER. NEXT ADJUST THE 5 MEGACYCLE ANTENNA TRIMMER FOR MAXIMUM 5 MEGACYCLE RESPONSE.
4. LEAVE THE BAND SELECTOR SWITCH FOR OPERATION ON THE 1.8 TO 5.8 MEGACYCLE BAND AND TUNE THE RECEIVER DIAL AND SET THE TEST OSCILLATOR FREQUENCY TO APPROXIMATELY 2 MEGACYCLES. WHILE ROCKING THE GANG CONDENSER SLIGHTLY TO THE RIGHT AND LEFT, ADJUST THE 2 MEGACYCLE OSCILLATOR PADDING CONDENSER FOR MAXIMUM SENSITIVITY.
5. REPLACE 400 OHM RESISTOR IN SERIES WITH TEST OSCILLATOR LEAD WITH 200 MMFD. CONDENSER, PLACE THE BAND SELECTOR SWITCH FOR OPERATION ON THE 535-1710 KILOCYCLE BAND, AND SET THE TEST OSCILLATOR FREQUENCY TO EXACTLY 1720 KILOCYCLES. ROTATE GANG CONDENSER SO THAT PLATES ARE COMPLETELY OUT OF MESH. ADJUST 1720 KILOCYCLE OSCILLATOR TRIMMER TO BRING IN 1720 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT.
6. WITH BAND SELECTOR SWITCH PLACED FOR OPERATION ON 535-1710 KILOCYCLE BAND, SET THE TEST OSCILLATOR FREQUENCY AND RECEIVER DIAL TO EXACTLY 1400 KILOCYCLES. ADJUST THE 1400 KILOCYCLE PRESELECTOR AND ANTENNA TRIMMERS FOR MAXIMUM 1400 KILOCYCLE SIGNAL SENSITIVITY.
7. LEAVE BAND SELECTOR SWITCH SET FOR OPERATION ON 535-1710 KILOCYCLE BAND AND TUNE RECEIVER DIAL AND SET THE TEST OSCILLATOR TO APPROXIMATELY 600 KILOCYCLES. WHILE ROCKING THE GANG CONDENSER SLIGHTLY TO THE RIGHT AND LEFT ADJUST THE 600 KILOCYCLE OSCILLATOR PADDING FOR MAXIMUM SENSITIVITY.

SENTINEL RADIO CORP.



NO.	DESCRIPTION	DATE
1	ORIGINAL	10-15-35
2	REVISION	11-15-35
3	REVISION	12-15-35
4	REVISION	1-15-36
5	REVISION	2-15-36
6	REVISION	3-15-36
7	REVISION	4-15-36
8	REVISION	5-15-36
9	REVISION	6-15-36
10	REVISION	7-15-36
11	REVISION	8-15-36
12	REVISION	9-15-36

- NOTE:
1. I.F. = 465 K.C.
 2. PARTS SHOWN RELATIVE TO PART NUMBER. PART NUMBERS ARE ON PART NUMBER.
 3. MEMBER SHOWN WITH PREFIX A. NEW COMPLETE ASSEMBLY.

MODEL 35-B

**Alignment
Parts List**

SENTINEL RADIO CORP.

Part Number	Description	List Price	Part Number	Description	List Price
2166	Antenna Coil for the 1720-540 Kilocycle Band	\$1.30	9459	.0005 Mfd. Mica Condenser	.21
2173	Oscillator Coil for the 1720-540 Kilocycle Band	.65	2132	.0027 Mfd. Mica Condenser	.21
2009	5.8 to 18 Megacycle Band Antenna Coil	.60	2246	.0021 Mfd. Mica Condenser	.28
2064	5.8 to 18 Megacycle Band Oscillator Coil	.65	9386	.1 Mfd. 200 Volt Condenser	.19
2226	1.7 to 5.8 Megacycle Band Antenna Coil	.70	9032	.2 Mfd. 200 Volt Condenser	.23
2227	1.7 to 5.8 Megacycle Band Oscillator Coil	.75	1495	.01 Mfd. 600 Volt Condenser	.16
2072	First I. F. Transformer	1.55	1497	.03 Mfd. 600 Volt Condenser	.19
2259	Second I. F. Transformer	1.60	7860	.01 Mfd. 400 Volt Condenser	.17
2158	Three Gang Condenser	3.60	2303	.5 Ohm 1/4 Watt Flexible Resistor	.19
1331	Audio Transformer	1.40	1943	250,000 Ohm 1/3 Watt Resistor Insulated Type	.19
2289	Wet Electrolytic Condenser	.85	2333	6 Meg Ohm 1/3 Watt Resistor	.19
2198	Volume Control	.85	7998	1 Meg Ohm 1/3 Watt Resistor	.19
2331	Tone Control and Off and On Switch	1.25	6984	500,000 Ohm 1/3 Watt Resistor	.19
1074	Padding Condenser	.55	8905	250,000 Ohm 1/3 Watt Resistor	.19
1581	Trimmer Condenser	.21	1784	20,000 Ohm 1/3 Watt Resistor	.19
2297	Plug Marked "Use With Two Volt Battery"	.15	9693	5,000 Ohm 1/3 Watt Resistor	.19
9458	.00025 Mfd. Mica Condenser	.21	9385	15,000 Ohm 1/3 Watt Resistor	.19
			6879	50,000 Ohm 1/3 Watt Resistor	.19
			2437	2,500 Ohm 1/3 Watt Resistor	.19

ALIGNMENT PROCEDURE: Realignment of this receiver should never be necessary unless one of the oscillator, antenna, or I. F. coils has been replaced. Lack of sensitivity, selectivity, and poor tone quality may be due to any one or a combination of causes, such as weak or defective tubes, battery or speaker, inadequate or excessively long antenna, open or grounded bias resistor, bypass condenser, etc. Under no circumstances should realignment be attempted until all other possible sources have been first thoroughly investigated and have been definitely proven not to be the cause.

If an I. F. tube is replaced it is advisable to realign the I. F. amplifier, particularly if the replacement tube is one of a different manufacture than the one in the receiver. It is important when aligning to carefully follow the procedure in the order given, otherwise the receiver will lack sensitivity and the dial calibration will be incorrect.

It is imperative that an accurately calibrated oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the test oscillator output to the control grid of the 1C6 modulator 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 test oscillator to the receiver ground.
 2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).
 3. Align the second intermediate transformer by turning one of the trimmer screws accessible through holes in the top of the transformer shields 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 first intermediate transformer in the same manner as the second I. F. transformer.
- TO ALIGN THE VARIABLE CONDENSER:** It is important when aligning the gang condenser, padding and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The padding and trimmer condensers located underneath the chassis 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 400 ohm resistor to the receiver antenna lead and the low side to the set ground.
2. Place the band selector switch for operation on the 5.8 to 18 megacycle band, tune the receiver dial, and set the test oscillator frequency to exactly 18 megacycles.
Rotate gang condenser so that plates are completely out of mesh and then tune in the 18 megacycle signal to maximum output by adjusting the 18 megacycle oscillator trimmer. When adjusting this trimmer, two peaks, the fundamental and the image peak will be noticed. Care must be taken that the fundamental peak and not the image peak is used for aligning the receiver at 18 megacycles. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 18 megacycles always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 18 megacycles, increase the output of the test oscillator and tune the receiver dial to approximately 17 megacycles, and if the fundamental signal will be heard at approximately 17 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 18 megacycle oscillator trimmer must be properly readjusted.
3. With band selector switch set for operation on 5.8 to 18 megacycle band tune the receiver dial and set test oscillator frequency to exactly 15 megacycles and adjust 15 megacycle antenna trimmer for maximum 15 megacycle signal sensitivity.
4. Place band selector switch for operation on 1.7 to 5.8 megacycle band, tune the receiver dial, and set test oscillator frequency to exactly 5.8 megacycles.
Rotate gang condenser so that plates are completely out of mesh and bring in 5.8 megacycle signal to maximum output by adjusting the 5.8 megacycle oscillator trimmer.
5. Replace the 400 ohm resistor in series with test oscillator lead with a 200 mmfd condenser, place the band selector switch for operation on the 540 to 1720 kilocycle band and set test oscillator frequency to exactly 1720 kilocycles.

6. Rotate gang condenser so that plates are completely out of mesh and bring in the 1720 kilocycle signal to maximum output by adjusting 1720 kilocycle oscillator trimmer.
7. With band selector switch placed for operation on the 540 to 1720 kilocycle band set test oscillator frequency and receiver dial to exactly 1400 kilocycles. Adjust 1400 kilocycle preselector and antenna trimmers for maximum 1400 kilocycle signal sensitivity.
8. Leave band selector switch for operation on 540 to 1720 kilocycle band, tune receiver dial and set test oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator padder for maximum sensitivity.

SENTINEL RADIO CORP.

MODEL 4100-B
Schematic, Voltage
Socket, Alignment

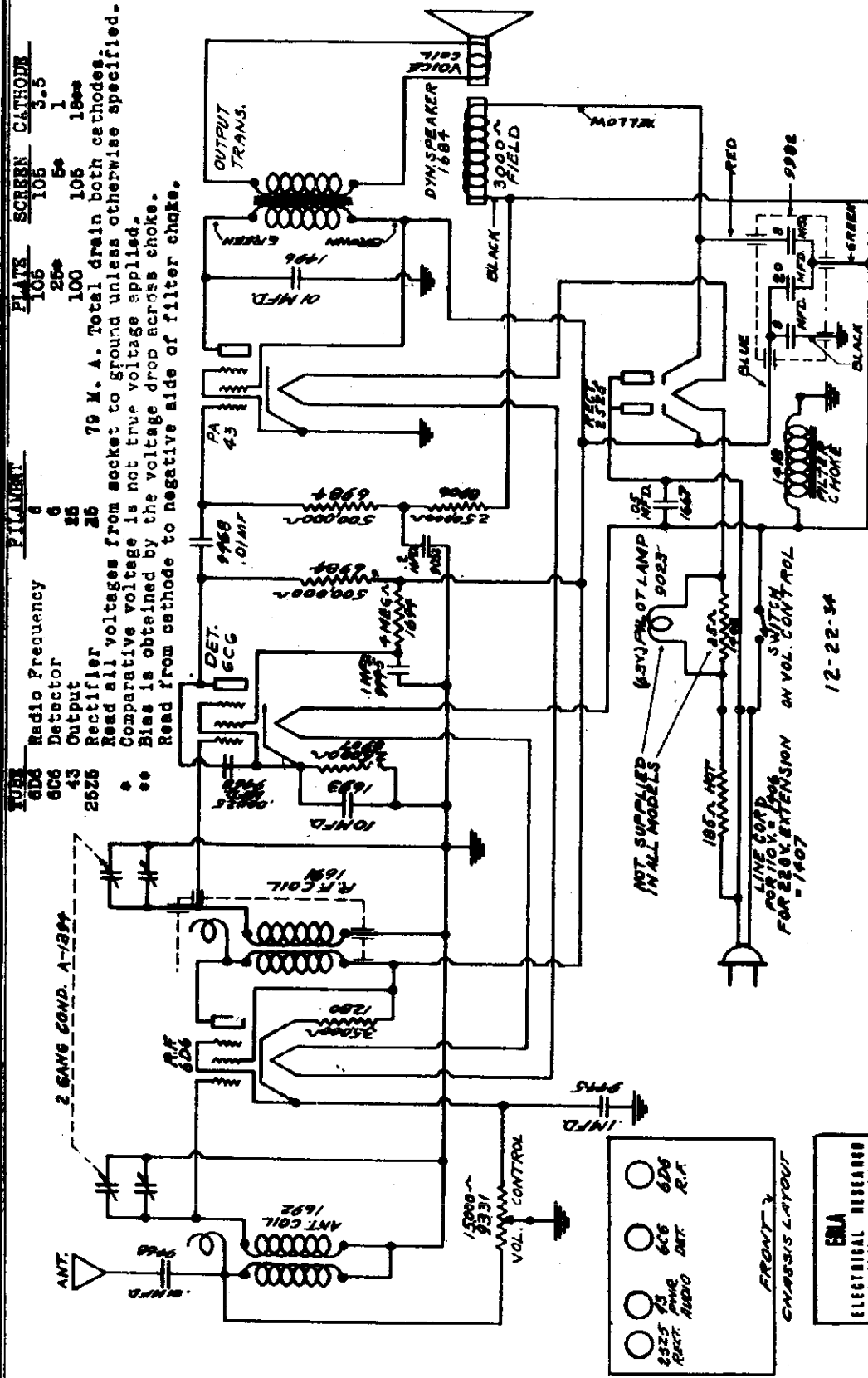


PLATE SCREEN CATHODE

105	105	3.5
25*	5*	1
100	105	18**

79 M. A. Total drain both cathodes.
Read all voltages from socket to ground unless otherwise specified.
Comparative voltage is not true voltage applied.
Bias is obtained by the voltage drop across choke.
Read from cathode to negative side of filter choke.

Radio Frequency
Detector
Output
Rectifier

6
25
25

6C6
43
2525

DO NOT SCALE THIS DRAWING WORK TO DIMENSIONS SHOWN

12-22-34

DIMENSION TOLERANCES	
PERFILING	± .015 IN. ± .01"
SMALL HOLE DRILL	± .015 IN. ± .01"
SMALL HOLE REAM	± .015 IN. ± .01"
SMALL HOLE BORE	± .015 IN. ± .01"
SMALL HOLE LENGTH	± .015 IN. ± .01"
SMALL HOLE DIAMETER	± .015 IN. ± .01"
SMALL HOLE DEPTH	± .015 IN. ± .01"
SMALL HOLE WALL THICKNESS	± .015 IN. ± .01"

MATERIAL

USE IN MODEL 4100B

FINISH

REF.

NOTE:
1. DOTTED LINES DENOTE SHIELDING.
2. ALL NOS. SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
3. NUMBERS SHOWN WITH PREFIX 'A' ARE COMPLETE ASSEMBLIES.

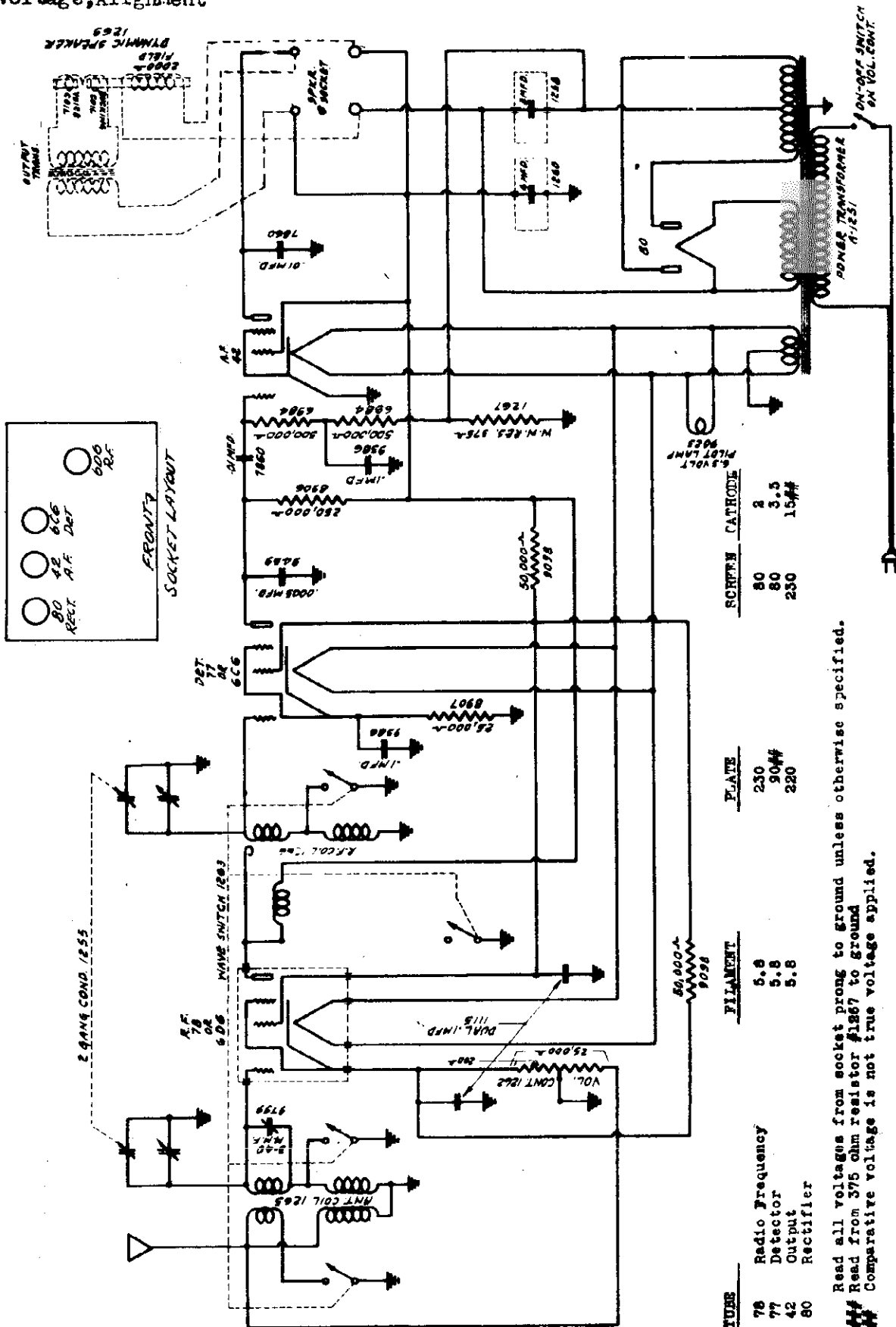
EMA
ELECTRICAL RESEARCH
LABORATORIES, INC. CHICAGO

DATE	REV. T.R.
NO.	REV. 1

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.

MODEL 4500
Schematic, Socket
Voltage, Alignment

SENTINEL RADIO CORP.



TUBE	FILAMENT	PLATE	SCREEN	CATHODE
70 Radio Frequency	5.8	250	80	2
77 Detector	5.8	90	80	3.5
42 Output	5.8	220	250	15
80 Rectifier				

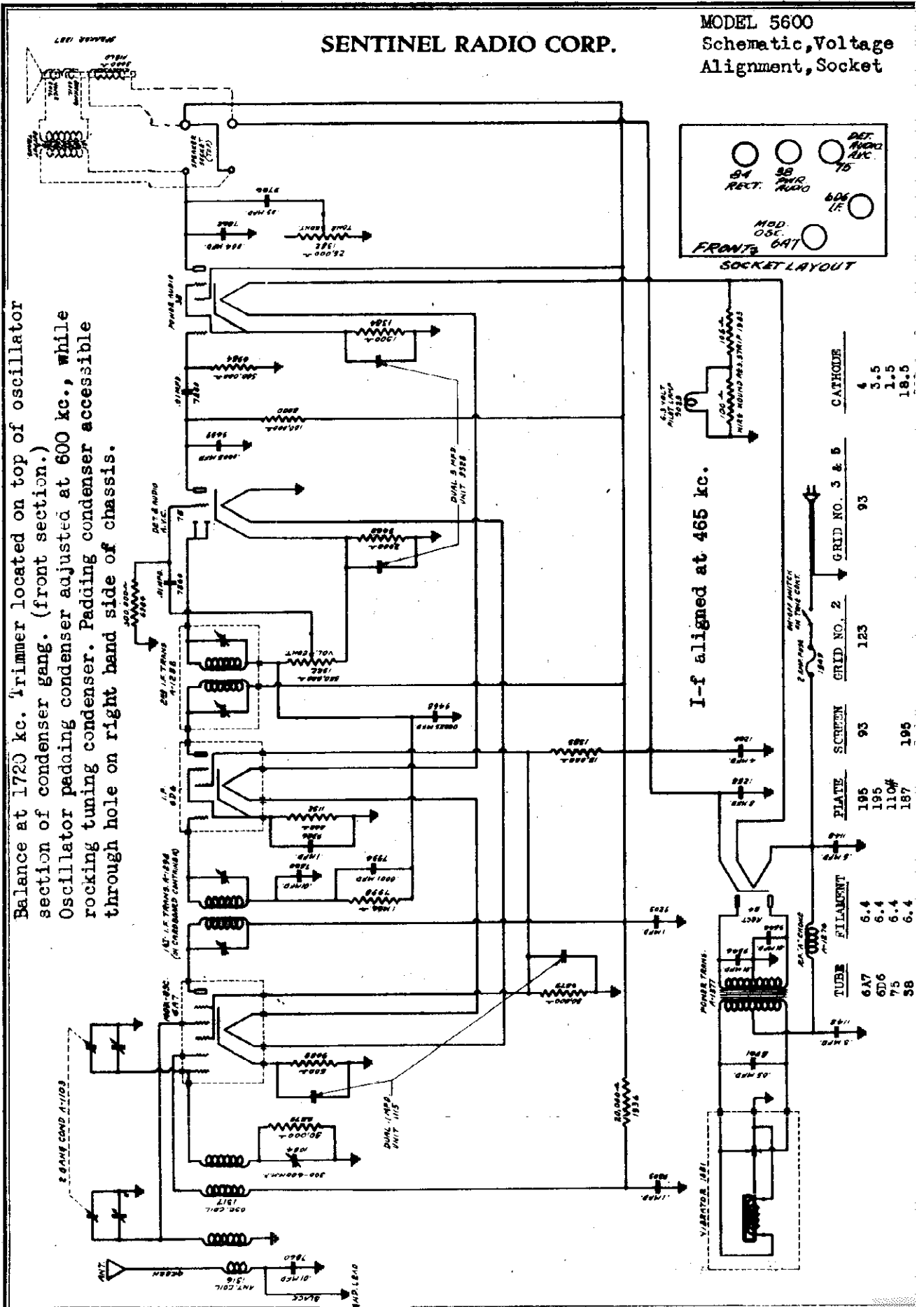
Read all voltages from socket prong to ground unless otherwise specified.
 Read from 375 ohm resistor #1267 to ground
 Comparative voltage is not true voltage applied.

Balance at 1400 kc. Trimmers on top of gang condenser
 Short wave adjustment at 4 mc. Trimmer on top of coil on top of chassis

SENTINEL RADIO CORP.

MODEL 5600
Schematic, Voltage
Alignment, Socket

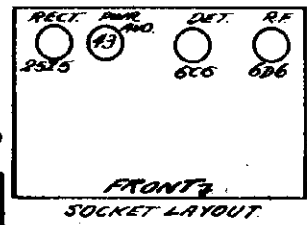
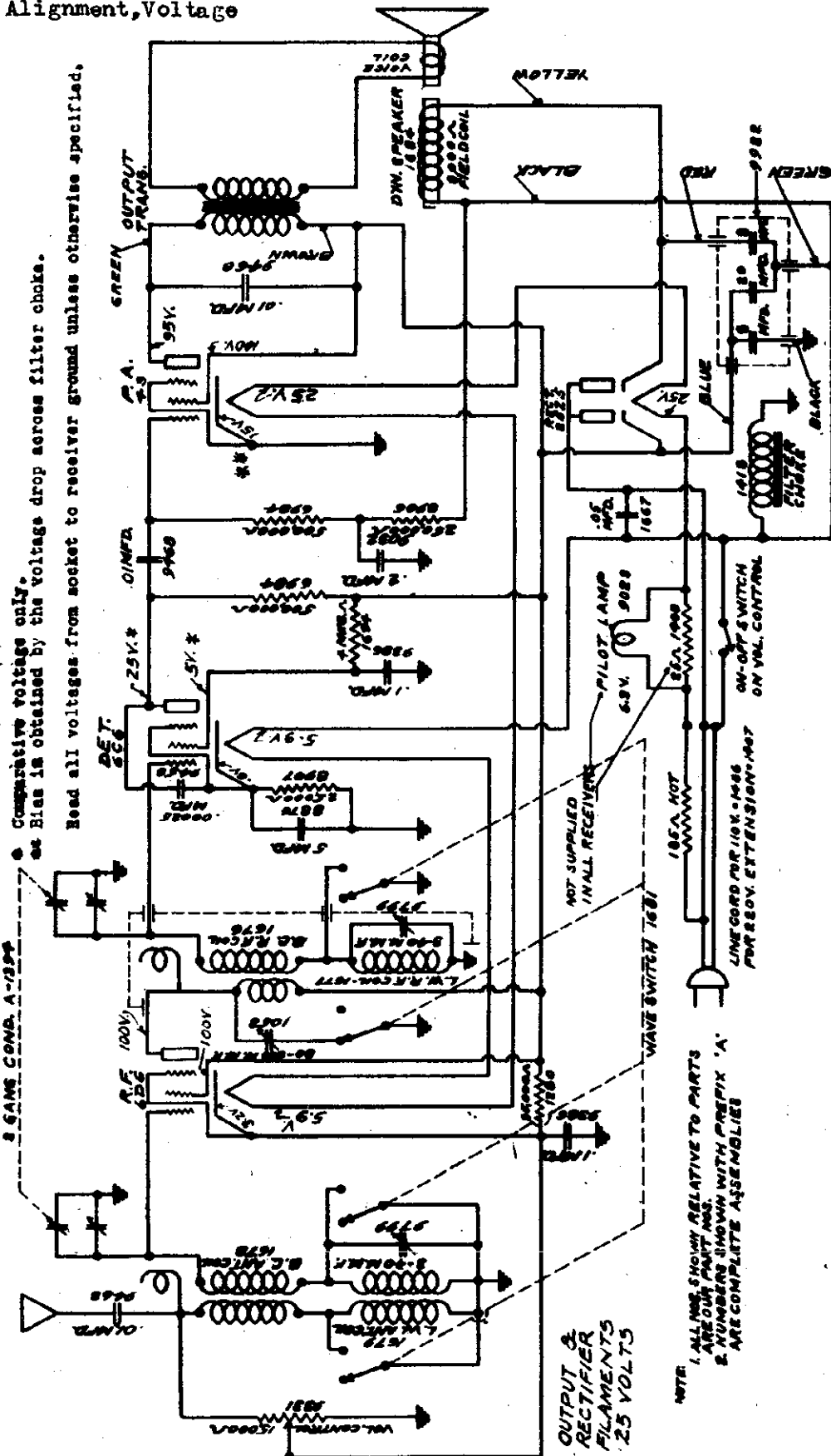
Balance at 1720 kc. Trimmer located on top of oscillator section of condenser gang. (front section.)
Oscillator padding condenser adjusted at 600 kc., while rocking tuning condenser. Padding condenser accessible through hole on right hand side of chassis.



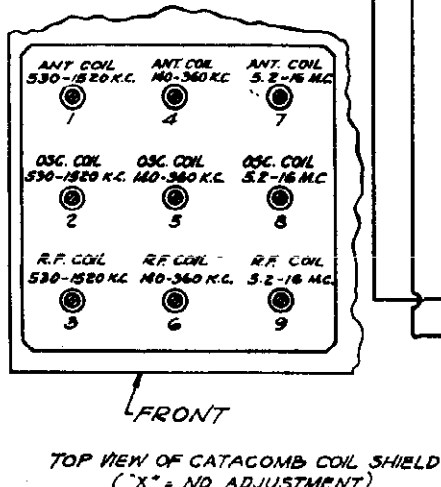
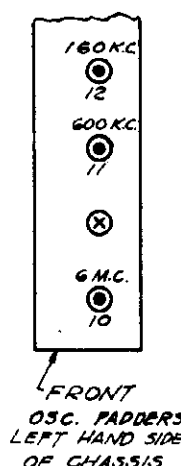
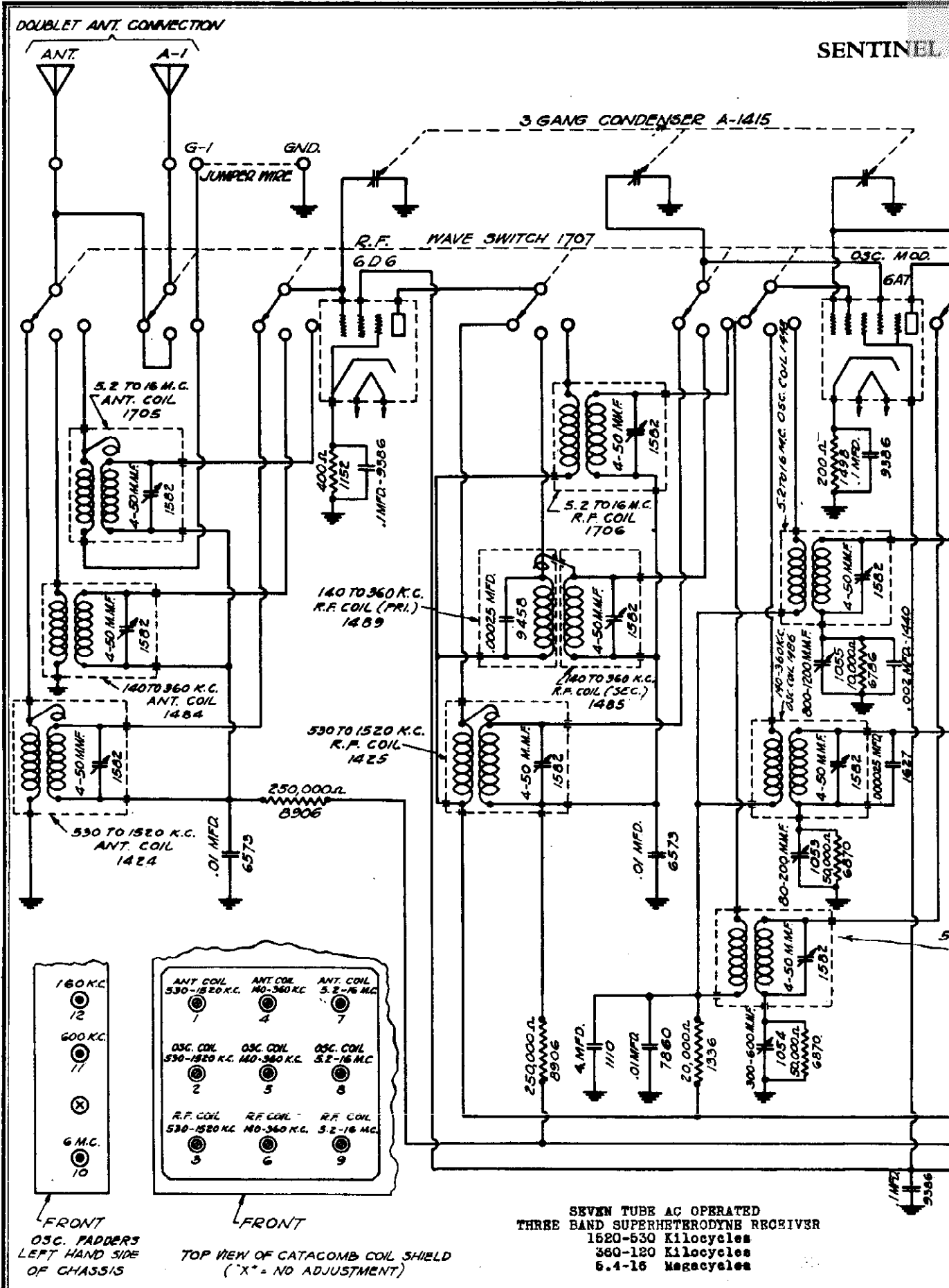
MODEL 4800
Schematic, Socket
Alignment, Voltage

SENTINEL RADIO CORP.

Comparative voltage only.
at Bias is obtained by the voltage drop across filter choke.
Read all voltages from socket to receiver ground unless otherwise specified.



- NOTE: 1. ALL NOS. SHOWN RELATIVE TO PARTS ARE OUT PART NOS.
2. NUMBERS SHOWN WITH PREFIX 'A' ARE COMPLETE ASSEMBLIES
1. Place the band selector switch for operation on the 1500-540 kilocycle band, tune the receiver dial and set the test oscillator frequency to exactly 1400 kilocycles. Next adjust the two trimmer condensers located on top of the gang condenser for maximum 1400 kilocycle signal sensitivity.
 2. Adjust the band selector switch for operation on the 350-140 kilocycle band, set the receiver dial and the test oscillator frequency to EXACTLY 150 kilocycles. Then bring in the 150 kilocycle signal to maximum output by adjusting the trimmer condenser located on hand accessible through the hole in the back of the chassis. If adjustment of this trimmer causes the receiver to oscillate always adjust to the point where oscillation does not occur.
 3. Leave the band selector switch for operation on the same band (350-140 kilocycles) and set the receiver dial and the test oscillator frequency to 340 kilocycles. Bring in this 340 kilocycle signal to maximum output by adjusting the trimmer condenser located on the coil underneath the chassis.
 4. With the band selector switch, the test oscillator frequency, and the receiver dial set at 340 kilocycles, adjust the trimmer condenser mounted on the coil located above the chassis underneath the metal shield for maximum sensitivity.



SEVEN TUBE AC OPERATED
THREE BAND SUPERHETERODYNE RECEIVER
1520-530 Kilocycles
360-120 Kilocycles
5.4-16 Megacycles

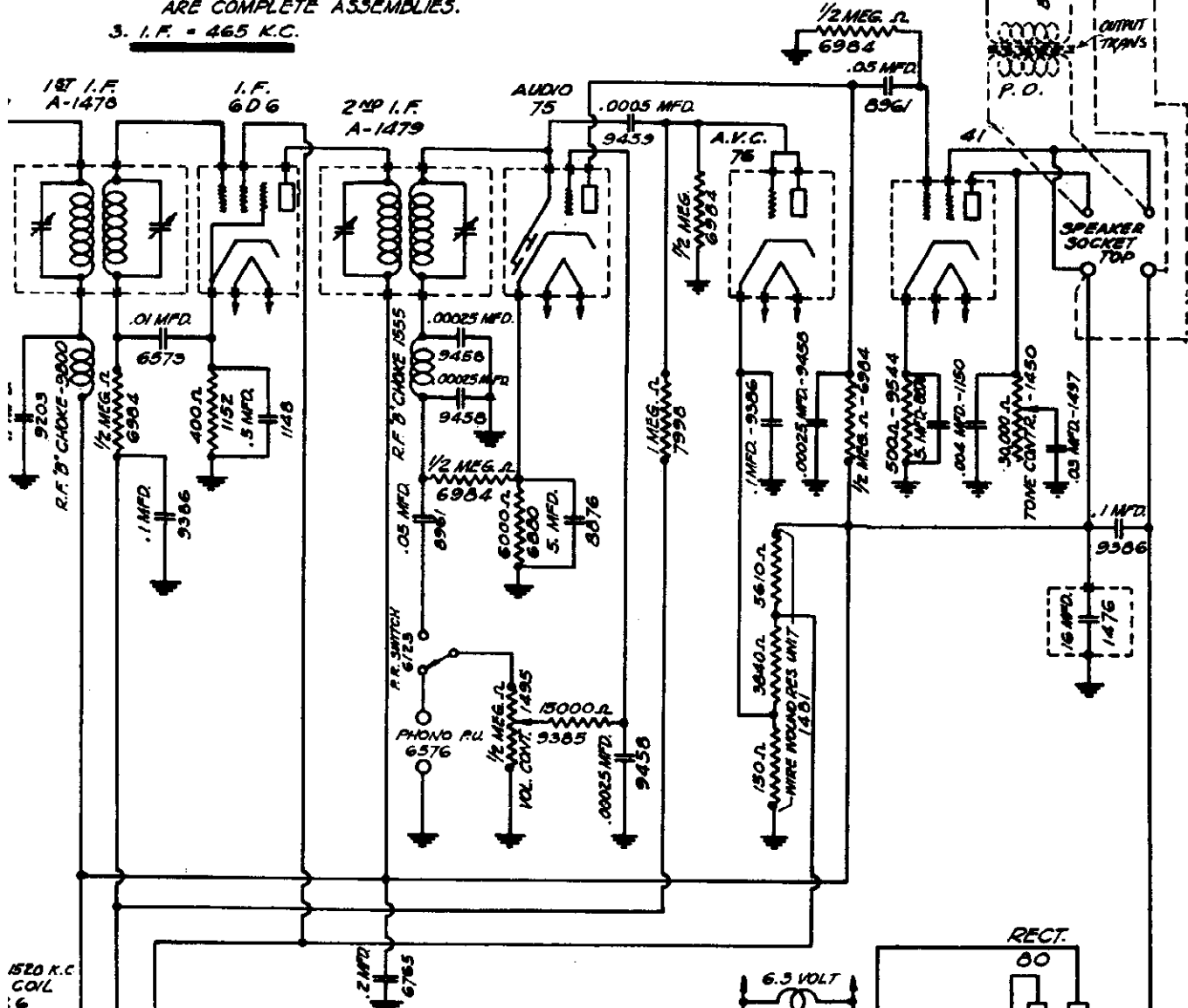
DIO CORP.

MODEL 7200-B
Schematic
Socket

NOTE:

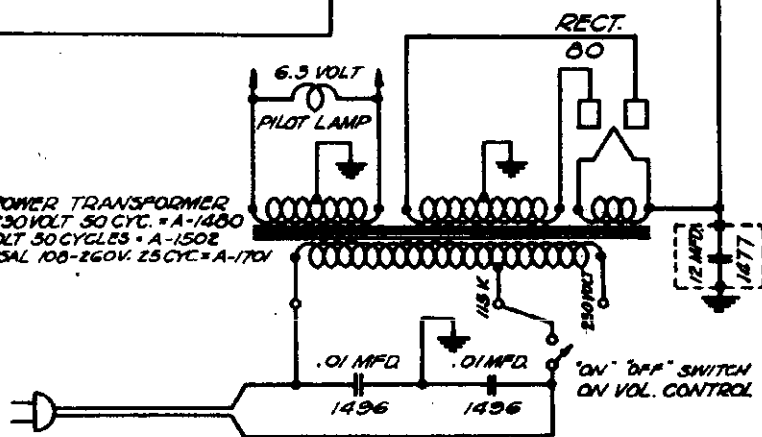
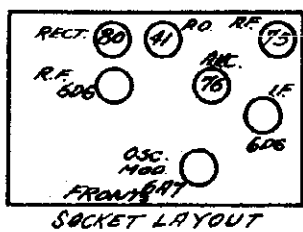
1. ALL NOS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS
2. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.
3. I. F. = 465 K.C.

DYN. SPEAKER
8" DIA. = 1504
10" DIA. = 1671



WIRING DIAGRAM

POWER TRANSFORMER
15-230 VOLT 50 CYC. = A-1480
15 VOLT 50 CYCLES = A-1502
UNIVERSAL 100-260V. 25 CYC. = A-1701



SENTINEL RADIO CORP.

MODEL 7200-B
Alignment
VoltageINTERMEDIATE ALIGNMENT:

Set the test oscillator frequency to 465 kilocycles. (This must be accurate).

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.

Adjust the other intermediate transformer in the same manner.

NOTE: Two type 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.

TO ALIGN THE VARIABLE CONDENSER:

Adjustment of the trimmer condensers located inside of and accessible through the holes found in the top of the catcomb shield (mounted on top and in the left hand front corner of the receiver) and the padding condensers mounted on the left hand side of the chassis, will be referred to by numbers as indicated on the circuit diagram showing the relative location of these trimmers.

1. Connect the high output side of the test oscillator to the receiver antenna post and the ground to the ground post.
2. Place the band selector switch for operation on the 1520 to 535 kilocycle (broadcast) band. Tune the receiver to exactly 1400 kilocycles on the dial and set the test oscillator frequency to EXACTLY 1400 KILOCYCLES. THEN BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER MARKED NO. 2 ON CATACOMB DIAGRAM, after which adjust No. 1 and No. 3 trimmers in the order named for maximum sensitivity.
3. Leave the band selector switch for operation on the broadcast band (1620 to 535 kilocycles) and tune the receiver and set the oscillator to approximately 600 kilocycles. Then adjust the 600 kilocycle padding condenser No. 11, which is located on and accessible through the hole in the left hand side of the chassis, for maximum sensitivity. As this adjustment is quite critical, it is necessary to rock the variable condenser slightly to the right and to the left to find the point of greatest sensitivity.
4. Recheck the alignment at 1400 kilocycles as the 600 kilocycle adjustment may have changed the alignment at 1400 kilocycles.
5. Place the band selector switch for operation on the 360 to 120 kilocycle band and set the oscillator frequency and tune the receiver dial to EXACTLY 350 KILOCYCLES. THEN TUNE IN THIS 350 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING CATACOMB TRIMMER NO. 5, next adjust trimmers No. 4 and 6 for maximum sensitivity.
6. With the band selector switch in the same position, tune the receiver dial and set the oscillator frequency to approximately 150 kilocycles and then while rocking the variable condenser slightly to the right and left, adjust the 150 kilocycle trimmer No. 12 (located on the left hand side of the chassis) for maximum sensitivity.
7. Recheck 350 kilocycle adjustments.
8. Adjust the band selector switch for operation on the 5.4 to 16 megacycle band and tune the receiver dial and set the oscillator frequency to exactly 15 megacycles. When adjusting catcomb trimmer No. 8 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 15 MEGACYCLES. First back off catcomb trimmer No. 8 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 catcomb trimmer No. 8 TO BRING IN THE 15 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 15 megacycles and increase the output of the test oscillator and then tune the receiver dial to approximately 14 megacycles. Vary the receiver dial slightly to the right and left of 14 megacycles and if the fundamental peak was used in aligning at 15 megacycles the test oscillator signal will be heard at approximately 14 megacycles on the set dial. If it is not possible to receive the signal then the fundamental peak was not used and the 15 megacycle adjustment of trimmer No. 8 must be gone over and properly adjusted. After correctly completing catcomb trimmer No. 8 adjustment adjust catcomb trimmers No. 7 and 9 for maximum sensitivity.
9. Leave the band selector switch for operation on 5.4 to 16 megacycle band, set the oscillator frequency and tune the receiver dial to approximately 8 megacycles. While rocking the variable condenser slightly to the right and left, adjust the 8 megacycle trimmer No. 10 (located on the left hand side of the chassis) for maximum sensitivity.
10. Recheck 15 megacycle adjustments.

This completes the alignment and it is recommended that all of the adjustments be gone over again. 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 okay, extreme inaccuracies in the dial calibration, low sensitivity, and poor selectivity are indications that the alignment procedure has not been followed. Should these conditions be apparent, proceed to realign, starting at the IF alignment and carefully follow each step in the order given.

VOLTAGE TABLE

Line Voltage : 115 volt 60 cycle
Volume Control : Full-on
Wave Band : Broadcast

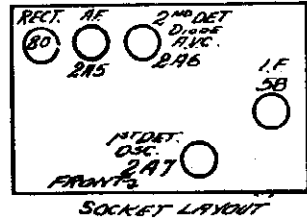
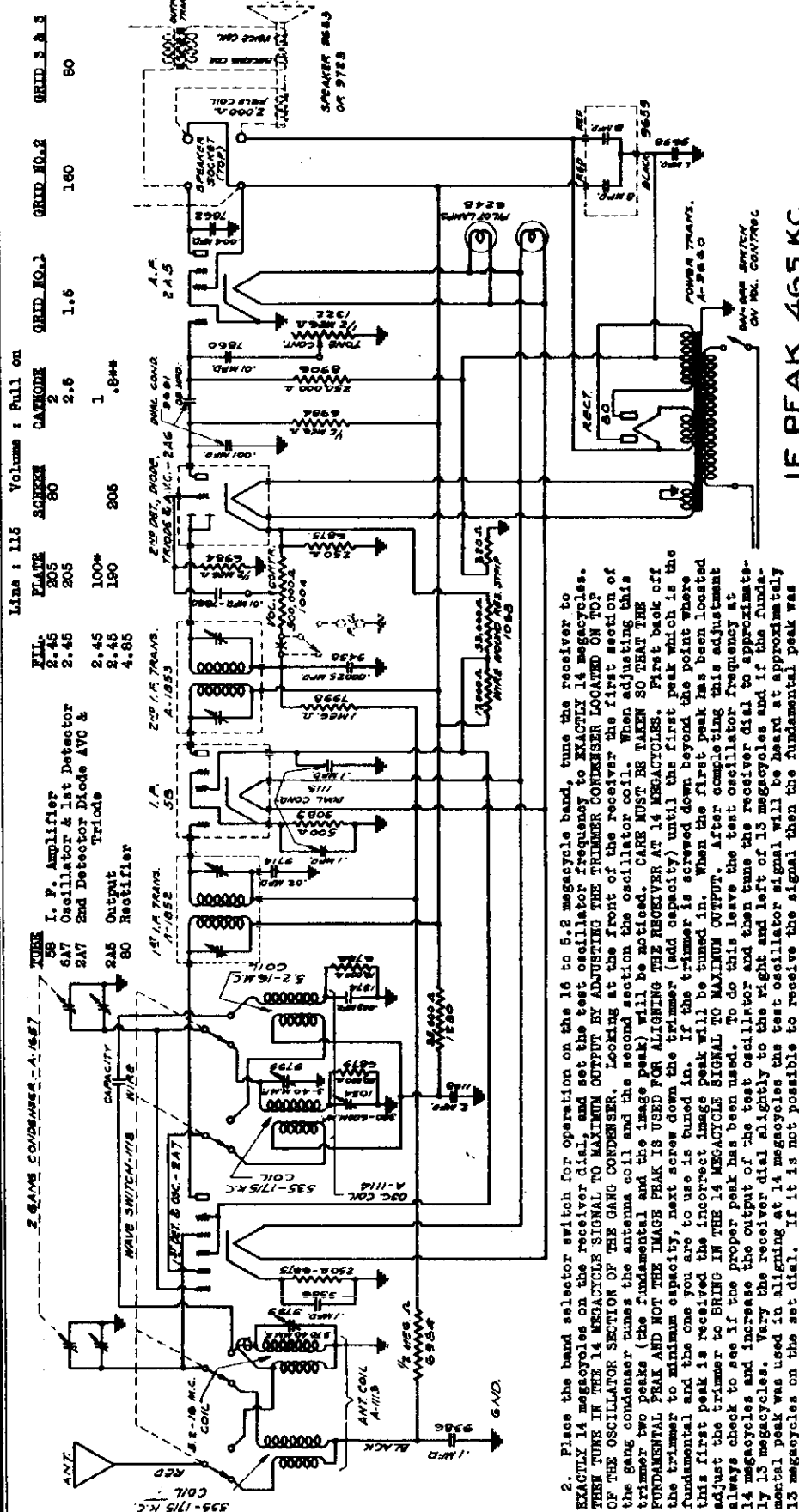
TUBE	FILE	PLATE	SCREEN	CATHODE	GRID NO. 1	GRID NO. 2	GRID NO. 3 & 5
6A7 Oscillator & 1st Detector	6.2	250	94	2.5	4.5	175	94
6D6 Radio Frequency	6.2	250	94	3.4			
6D6 Intermediate Frequency	6.2	250	94	3.2			
75 2nd Detector & 1st Audio	6.2	70s		1.2			
76 Automatic Volume Control	6.2			3.4			
41 Output	6.2	250	94	15			
60 Rectifier	4.3			80 M. A. Total Drain			

* Triode Plate

Read all voltages from socket to chassis with 1000 ohm per volt voltmeter.

MODEL 5700-B
Schematic, Socket
Voltage, Alignment

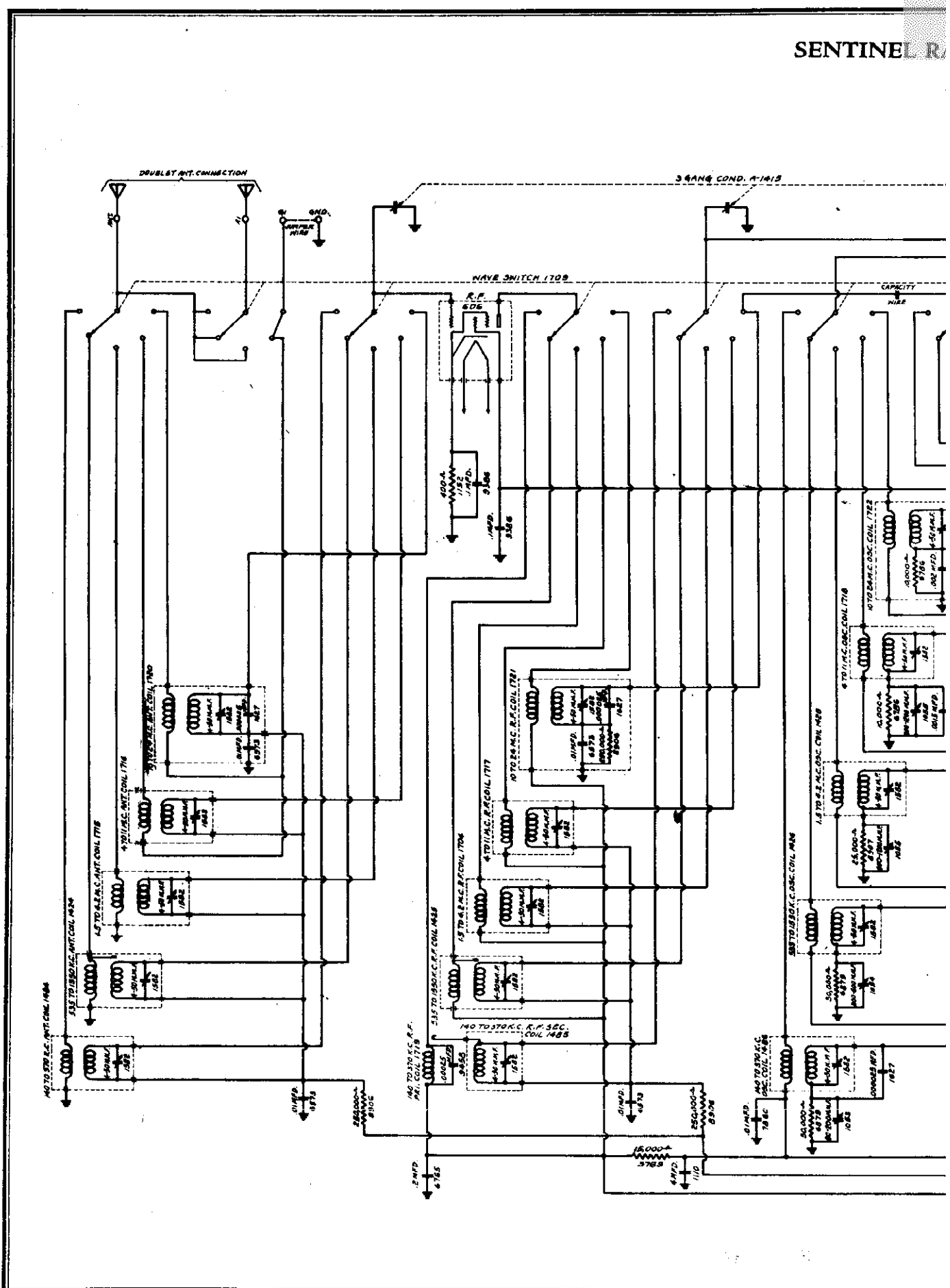
SENTINEL RADIO CORP.



IF. PEAK 465 KC.

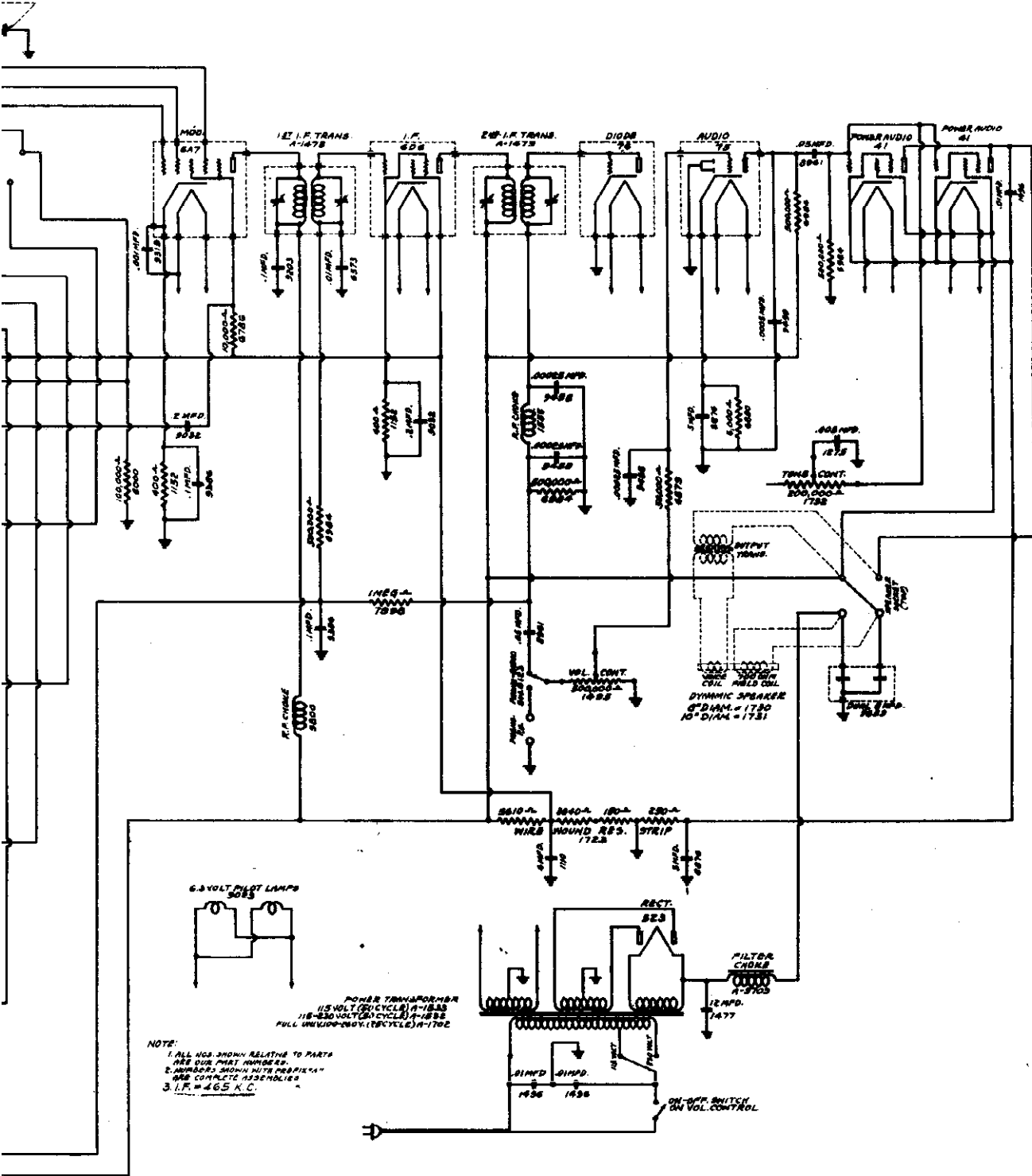
* Triode Plate
** From grid to chassis

- Place the band selector switch for operation on the 16 to 5.2 megacycle band, tune the receiver to EXACTLY 14 megacycles on the receiver dial, and set the test oscillator frequency to EXACTLY 14 megacycles. THEN TUNE 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 first section of the gang condenser tunes the antenna coil and the second section of the oscillator coil. 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 and 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 set 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 must be gone over and properly adjusted.
- Place the band selector switch for operation on the 1715 to 535 kilocycle band, set the oscillator to EXACTLY 1400 kilocycles and tune the receiver dial to EXACTLY 1400 kilocycles. BRING IN THIS 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE SMALL TRIMMER CONDENSER WHICH IS LOCATED UNDERNEATH NEAR THE CENTER AND TOWARDS THE FRONT OF THE CHASSIS.
- Next adjust the trimmer condenser on top of the antenna section of the gang condenser (front section) for maximum 1400 kilocycle signal output.
- Leave the band selector switch for operation on the 1715 to 535 kilocycle band, set the test oscillator frequency to approximately 600 kilocycles, and adjust the receiver dial to approximately 600 kilocycles. Then while rocking the variable condenser slightly to the right and left adjust the 600 kilocycle peaking condenser, which is located below the speaker and accessible through the hole in the front of the chassis for maximum output.
- Recheck the 1400 kilocycle adjustment.
- Place the band selector switch for operation on the 16 to 5.2 megacycle band, tune the receiver dial and set the oscillator frequency to EXACTLY 14 megacycles. Then adjust the trimmer condenser, which is located underneath and near the center of the right hand side of the chassis for maximum 14 megacycle signal output.



MODEL 8200-B
Schematic

IO CORP.



SENTINEL RADIO CORP.

SERVICE NOTES

for the

FIVE BAND

NIGHT TUBE ALL WAVE AC SUPERHETERODYNE RECEIVER

ALIGNMENT PROCEDURE: Realignment of this receiver should never be necessary unless one of the oscillator, antenna, or RF coils has been replaced, and then only the frequency band in which that coil is used will require realignment. Lack of sensitivity, selectivity, and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, inadequate or excessively long antenna, open or grounded bias resistor, bypass condenser, etc. Under no circumstances should realignment be attempted until all other possible sources have been first thoroughly investigated and have definitely proven not to be the cause. If an IP tube is replaced it is advisable to realign the IP amplifier, particularly if the replacement tube is one of a different manufacture than the one in the receiver. IT IS IMPERATIVE THAT AN ACCURATELY CALIBRATED OSCILLATOR BE USED WITH SOME TYPE OF OUTPUT MEASURING DEVICE.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 6A7 oscillator & modulator tube. Leave the grid cap disconnected and connect a 1 meg ohm resistor from the modulator grid to the chassis base.
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 accessible through the holes in the top of the coil shield 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 transformer in the same manner.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning the gang condensers, padder condensers, and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The trimmer and padder condensers will be referred to by number as indicated on the diagram which shows their relative locations on the chassis.

1. Connect the high output side of the test oscillator through a .00025 Mfd. condenser to the set antenna post, and the ground to the set ground.
2. Place the band selector switch for operation on the 10 to 24 megacycle band, tune the receiver dial to EXACTLY 22 MEGACYCLES AND SET THE TEST OSCILLATOR FREQUENCY TO EXACTLY 22 MEGACYCLES. THEN TUNE IN THE 22 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING TRIMMER NO. 14. Next rock the gang condenser slightly to the right and left and adjust trimmers No. 13 and 15 for maximum 22 megacycle signal sensitivity. CARE MUST BE TAKEN SO THAT THE FUNDAMENTAL AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 22 MEGACYCLES. When adjusting trimmer No. 14 always back off the trimmer to minimum capacity and then 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 the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of trimmers No. 14, 13, and 15 always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 22 megacycles, increase the output of the test oscillator, and tune the receiver dial to approximately 21 megacycles. Vary the receiver dial slightly to the right and left of 21 megacycles and if the fundamental peak was used in aligning at 22 megacycles the test oscillator signal will be heard at approximately 21 megacycles on the receiver dial. If it is not possible to receive the signal at approximately 21 megacycles, then the fundamental peak was not used and the 22 megacycle adjustment of trimmers No. 13, 14, and 15 must be gone over and properly adjusted.
3. Place the band selector switch for operation on the 4 to 11 megacycle band and set the receiver dial and the test oscillator frequency to EXACTLY 9.5 MEGACYCLES. When adjusting trimmer No. 10 the fundamental and the image peak will be noticed. CARE MUST BE TAKEN SO THAT THE FUNDAMENTAL AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 9.5 MEGACYCLES. First back off trimmer No. 10 to minimum capacity then screw down the trimmer (add capacity) until the first peak, which is the fundamental and the proper one to use is tuned in. When the first peak has been located adjust trimmer No. 10 TO BRING IN THE 9.5 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT. Next adjust trimmers No. 9 and 11 for maximum 9.5 megacycle sensitivity. After completing adjustment of trimmers No. 10, 11 and 9 always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 9.5 megacycles and increase the test oscillator output. Vary the receiver dial slightly to the right and left of 8.5 megacycles and if the fundamental peak of trimmer No. 10 was used in aligning at 9.5 megacycles the test oscillator signal will be heard at approximately 8 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 9.5 megacycle adjustment of trimmers No. 9, 10, and 11 must be gone over and properly adjusted.
4. Leave the band selector switch for operation on the 4 to 11 megacycle band and tune the receiver and set the test oscillator frequency to approximately 4.5 megacycles. Then while rocking the gang condenser slightly to the right and left adjust padder condenser No. 12 for maximum sensitivity.
5. Place the band selector switch for operation on the 1.5 to 4.2 megacycle band and tune the receiver dial and set the test oscillator frequency to EXACTLY 3.8 MEGACYCLES. THEN BRING IN THE 3.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING TRIMMER NO. 6, after which adjust trimmers No. 5 and 7 for maximum 3.8 megacycle signal sensitivity.
6. With the band selector switch in the same position (1.5 to 4.2 megacycle band) tune the receiver dial and set the test oscillator frequency to approximately 1.6 megacycles. Then while rocking the gang condenser slightly to the right and left, adjust padder condenser No. 8 for maximum 1.6 megacycle signal sensitivity.
7. Adjust the band selector switch for operation on the 1550 to 535 kilocycle band, tune the receiver dial and set the test oscillator frequency to EXACTLY 1400 KILOCYCLES. THEN BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING TRIMMER NO. 2, after which adjust trimmers No. 1 and 3 for maximum sensitivity
8. With the band selector switch set for operation on the 1550 to 535 kilocycle band tune the receiver dial and set the test oscillator frequency to approximately 600 kilocycles. Next while rocking the gang condenser slightly to the right and left adjust padder condenser No. 4 for maximum 600 kilocycle signal response.
9. Place the band selector switch for operation on the 140 to 370 kilocycle band, tune the receiver dial and set the test oscillator frequency to EXACTLY 340 KILOCYCLES. BRING IN THE 340 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING TRIMMER NO. 18, after which adjust trimmers No. 15 and 16 for maximum sensitivity.
10. With the band selector switch set for operation on the 140 to 370 kilocycle band tune the receiver dial and set the test oscillator frequency to approximately 160 kilocycles. While rocking the gang condenser slightly to the right and left adjust trimmer No. 19 for maximum 160 kilocycle signal response.

Alignment of all bands will rarely be necessary. If a coil on any one of the bands should become defective and replacement is necessary, then only the band in which the coil was replaced will require realignment. Wherever complete realignment has been made it is recommended that all of the adjustments be gone over again. 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 okay, then extreme inaccuracies in the dial calibration, low sensitivity, and poor selectivity are indications that the alignment procedure has not been followed. Should these conditions be apparent proceed to realign and carefully follow each step in the order given.

MODEL 8200-B
Voltage, Parts
Trimmers

SENTINEL RADIO CORP.

TUBE		FILAMENT	PLATE	SCREEN	CATHODE	GRID NO. 2	GRID NO. 3 & 5
6A7	Oscillator & Modulator	6.1	225		2.6	65	65
6D6	Radio Frequency	6.1	225	85	2.8		
6D6	Intermediate Frequency	6.1	225	85	2.8		
75	Automatic Volume Control	6.1			3.2		
75	End Detector & Audio	6.1	55*		.8		
41	Output	6.1	220	225	15		
41	Output	6.1	220	225	15		
5Z3	Rectifier	4.8	Total Drain 118 W.A.				

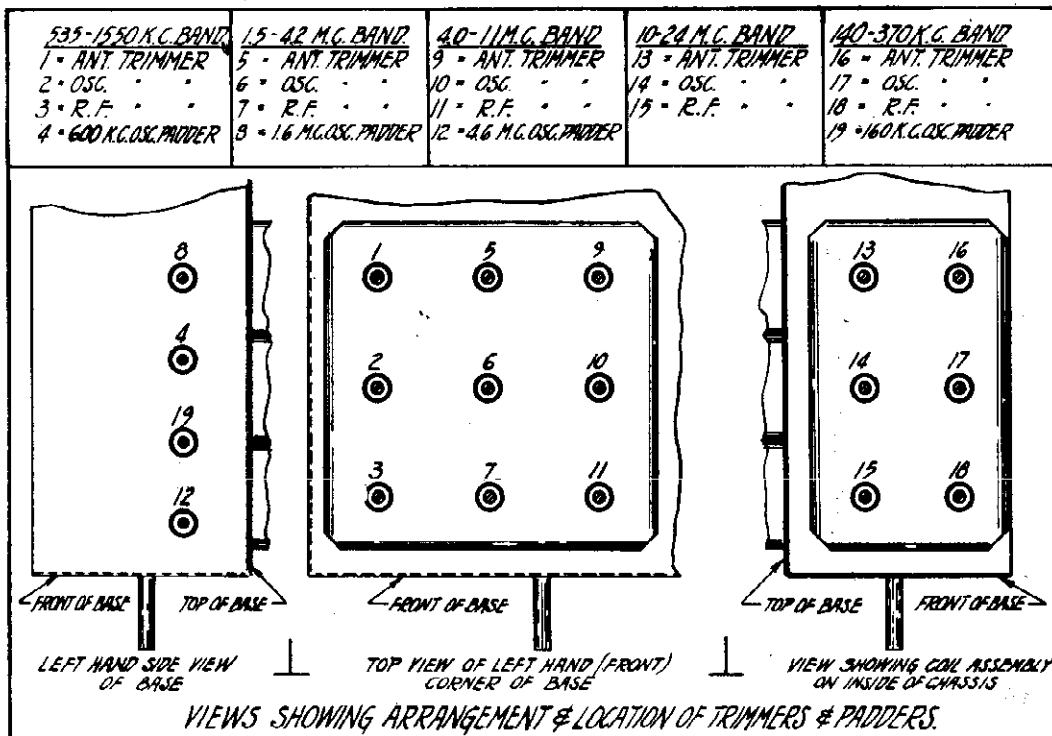
VOLUME CONTROL - FULL ON
WAVE BAND - 535-1550 K.C.
LINE VOLTAGE * 115 VOLTS

* Triode plate comparative voltage.
Read all voltages from socket to chassis with 1000 ohm per volt voltmeter.

PART NUMBER	LIST PRICE	PART NUMBER	LIST PRICE
1424	1560-535 K.C. Band Antenna Coil	1056	Padding Condenser
1425	1550-535 K.C. Band R. F. Coil	1495	Volume Control & Off & On Switch
1426	1550-535 K.C. Band Oscillator Coil	1732	Tone Control
1715	1.5-4.2 M.C. Band Antenna Coil	9800	R. F. Choke
1704	1.5-4.2 M.C. Band R. F. Coil	1555	R. F. Choke
1428	1.5-4.2 M.C. Band Oscillator Coil	9458	.00025 Mfd. Moulded Condenser
1716	4-11 M.C. Band Antenna Coil	9459	.0005 Mfd. Moulded Condenser
1717	4-11 M.C. Band R. F. Coil	9319	.001 Mfd. Moulded Condenser
1718	4-11 M.C. Band Oscillator Coil	1627	.000025 Mfd. Moulded Condenser
1720	10-24 M.C. Band Antenna Coil	1628	.002 Mfd. Moulded Condenser
1721	10-24 M.C. Band R. F. Coil	1629	.001 Mfd. Moulded Condenser
1722	10-24 M.C. Band Oscillator Coil	6765	.2 Mfd. 400 Volt Condenser
1484	140-370 K.C. Band Antenna Coil	9203	.1 Mfd. 400 Volt Condenser
1485	140-370 K.C. Band R. F. Coil	8961	.05 Mfd. 400 Volt Condenser
1719	140-370 K.C. Band R.F. (Pri.) Coil	9386	.1 Mfd. 200 Volt Condenser
1486	140-370 K.C. Band Oscillator Coil	9032	.2 Mfd. 200 Volt Condenser
1478	First I. F. Transformer	6573	.01 Mfd. 200 Volt Condenser
1479	Second I. F. Transformer	1496	.01 Mfd. 800 Volt Condenser
1415	Three Gang Condenser	1275	.005 Mfd. 400 Volt Condenser
1709	Wave Switch	7860	.01 Mfd. 400 Volt Condenser
9659	Dual 8 Mfd. Dry Electrolytic Condenser	1723	Vitreous Enameled Resistor
1477	12 Mfd. Wet Electrolytic Condenser	8906	250,000 Ohm 1/3 Watt Resistor
1110	4 Mfd. Dry Electrolytic Condenser	6879	50,000 Ohm 1/3 Watt Resistor
8876	6 Mfd. Dry Electrolytic Condenser	8907	25,000 Ohm 1/3 Watt Resistor
1532	115 Tapped 230 Volts 50-60 Cycle Power Transformer	6786	10,000 Ohm 1/3 Watt Resistor
1533	115 Volt 50-60 Cycle Power Transformer	9769	15,000 Ohm 1/3 Watt Resistor
1702	Full Universal Power Transformer	8000	100,000 Ohm 1/3 Watt Resistor
9709	Choke	7998	1 Meg Ohm 1/3 Watt Resistor
1420	Antenna end Ground Terminal Post Strip	6984	500,000 Ohm 1/3 Watt Resistor
6576	Phono Jacks	6880	6,000 Ohm 1/3 Watt Resistor
6123	Phono-Radio Switch	1152	400 Ohm 1/3 Watt Resistor
1514	Tuning Dial complete with Glass Glass for above dial	6786	10,000 Ohm 1/3 Watt Resistor
1505	Two Speed Planetary Drive	1730	8" Dynamic Speaker
9023	6.3 Volt .15 Ampere Pilot Light	1731	10" Dynamic Speaker
1582	Trimmer Condenser	1567	Large Bot tom Section Tuning Knob
1054	Padding Condenser	1568	Small Top Section Tuning Knob
1053	Padding Condenser	1571	Tone Control Knob
		1570	Band Selector Switch Knob
		1569	Volume Control Knob

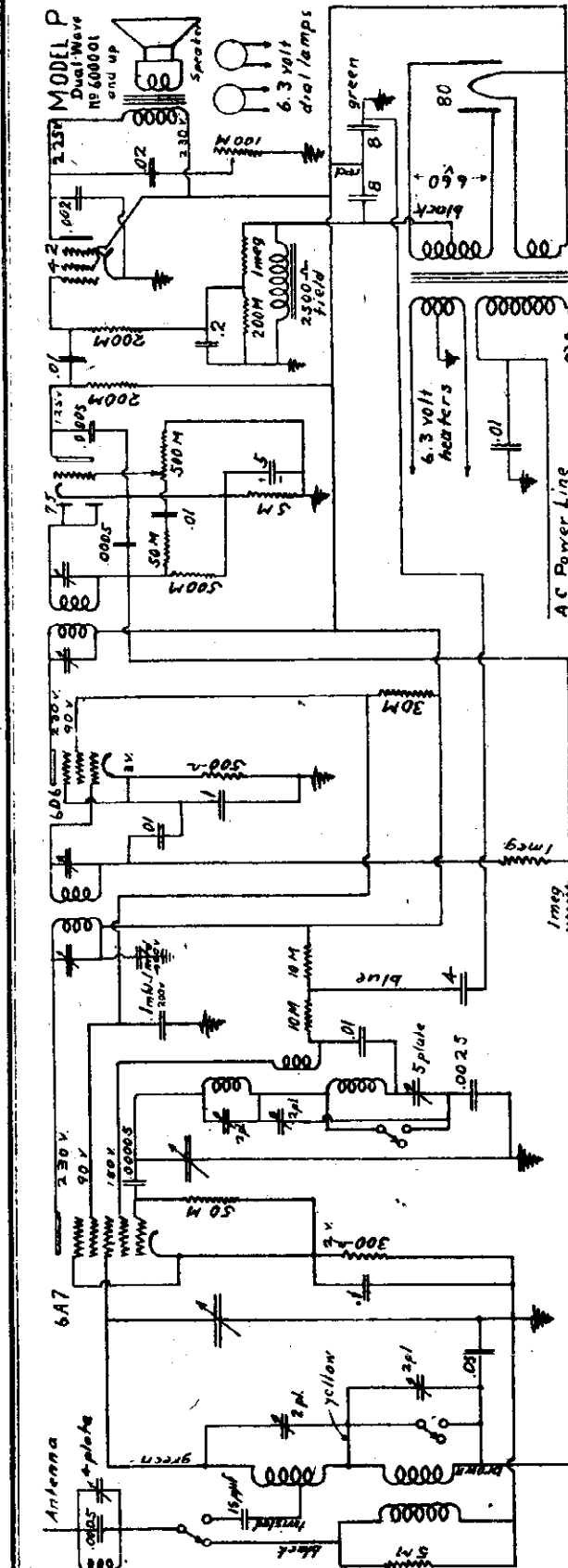
Prices are subject to change without notice.

Part No. 8200-B



SIMPLEX RADIO CO.

MODEL P Dual Band
Above Serial 600001
Schematic, Voltage
Alignment



IF PEAK 466 KC

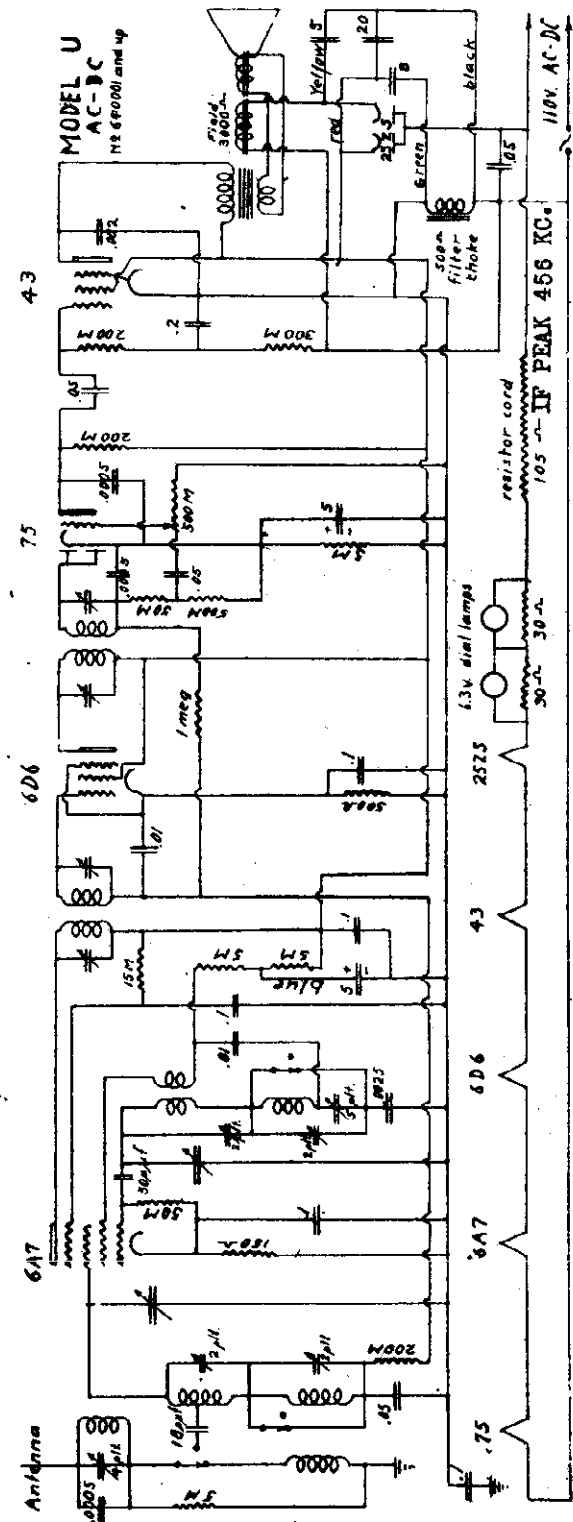
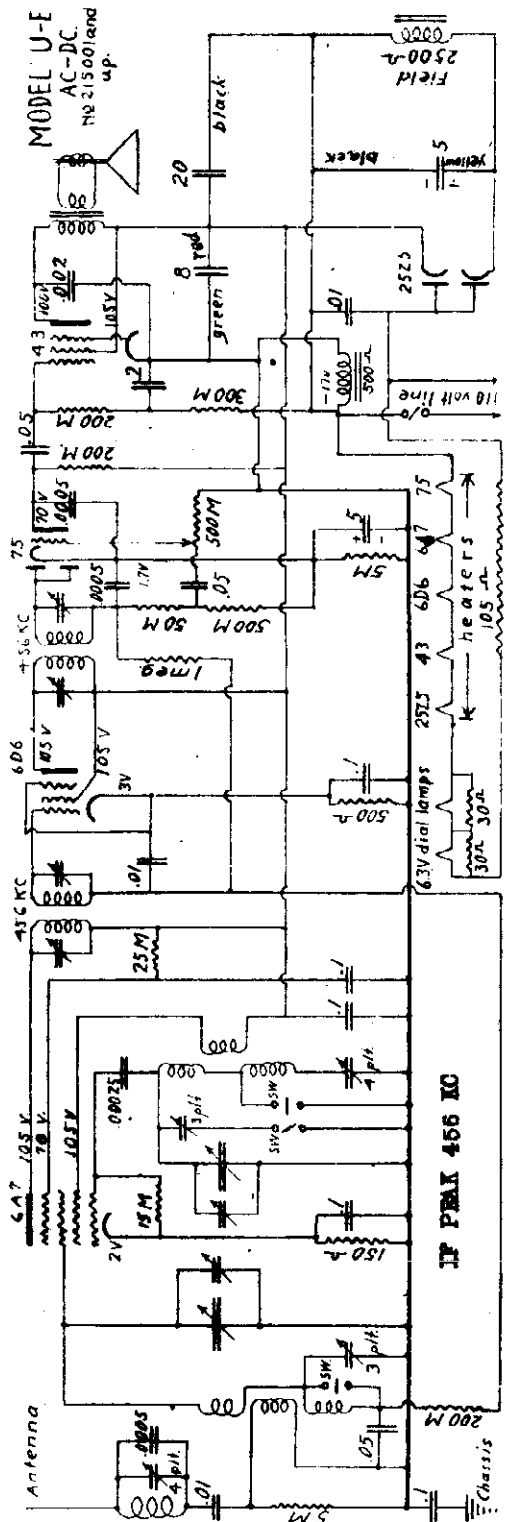
OPERATING INSTRUCTIONS — MODEL P DUAL-BAND — Foreign and Domestic
CAUTION—Do not attempt to operate on current other than that noted on the instrument.
INSTALLATION—A good aerial, 25 to 50 feet long, well away from surrounding metal structures and power lines, is essential for best results. Power noise interferes especially with short-wave reception. If the set is located where power noise is prevalent it may be necessary to install an aerial high above the street and use a “Landscape” lead-in to the set. A good ground connection (water pipe or equivalent) will also contribute to quieter reception.
CONTROL KNOBS—The left hand knob is, initially, the power switch, and thereafter, tone control. The second knob from the left is band selector switch. The third knob from the left is tuning control. The right hand knob is volume control.
SERVICE NOTES—If the radio fails to operate when unpacked, or stops working after a few days, proceed as follows: (1) Have the tubes checked. (2) Remove the chassis from the cabinet and check for loose connections. (3) Have a competent “Radio Service Man” check over entirely. Do not return unless you have made the above tests. This set left the factory carefully inspected.
 The intermediate stages are carefully phased to 466 KC at the factory. Should rephasing be necessary, attach the output lead from a 466 KC test oscillator to the grid cap of the 6A7 tube, keep the signal to a very low audible value and carefully adjust the two trimmer screws in the top of each of the two tall cans to loudspeaker volume. If an output meter is available it should be used across the two black leads at the speaker transformer. An oscillator covering a frequency from 560 KC to 16 MC should be used to rephase the R. F. The test oscillator output is attached to the aerial lead of the set. At all times keep the oscillator signal turned down to a low point of audibility. Trim the short-wave band first, then the broadcast band, setting the dial pointer to a frequency near the high frequency end of the scale in each case. The short-wave oscillator trimmer is located directly across the large (oscillator) coil looking at the under side of the set, and the R. F. short-wave trimmer at the right hand end of this coil. The broadcast band is next trimmed at the high frequency end of the broadcast scale, applying a signal from the oscillator corresponding to the dial setting and adjust the oscillator trimmer connected between the end of the oscillator coil and the porcelain base trimmer. Next trim the Broadcast R. F. by the trimmer connecting to the band switch. The broadcast band is next trimmed at the 560 KC end of the dial by adjusting the porcelain base trimmer at center of chassis until the signal is heard at the correct location on dial.
NOTE—Should it be necessary to write to the factory for parts or information, always give the serial number of the set as stamped on the back of the chassis.
PHONOGRAPH—Install a single pole double-throw toggle switch near the 75 tube, disconnect the .01 mfd. condenser from the volume control and connect to one side of switch, connect the volume control to center terminal of the switch, connect one side of the phonograph pickup to remaining side of the switch and the other side of the pickup to “B” minus.

MODEL U AC-DC
Above Serial 640001
MODEL U-E, AC-DC
Above Serial 215001

SIMPLEX RADIO CO.

Schematics, Voltage Alignment

To rebalance set, remove from cabinet. Intermediates are first balanced by feeding a 456 KC signal into grid of 6A7 tube and adjusting trimmers in top of the two tall cans to greatest volume. Adjust wave trap in rear flange of chassis by turning the trimmer screw until a 456 KC signal applied to the antenna lead cannot be heard. Next, set band switch to broadcast position (counter-clock), turn tuning knob to 1400 KC, feed a 1400 KC signal into antenna lead and adjust trimmers on tuning condenser to greatest volume. Next, set hand switch to long-wave (clockwise), turn tuning knob to 350 KC, feed a 350 KC signal into the antenna lead and adjust the two 3-plate trimmers on the under side of the panel to greatest volume. Turn tuning knob to 150 KC, set test oscillator to this frequency and adjust the 4-plate section of dual trimmer to maximum volume. Repeat the operations at 350 KC and 150 KC until trimming at one frequency does not affect the other.

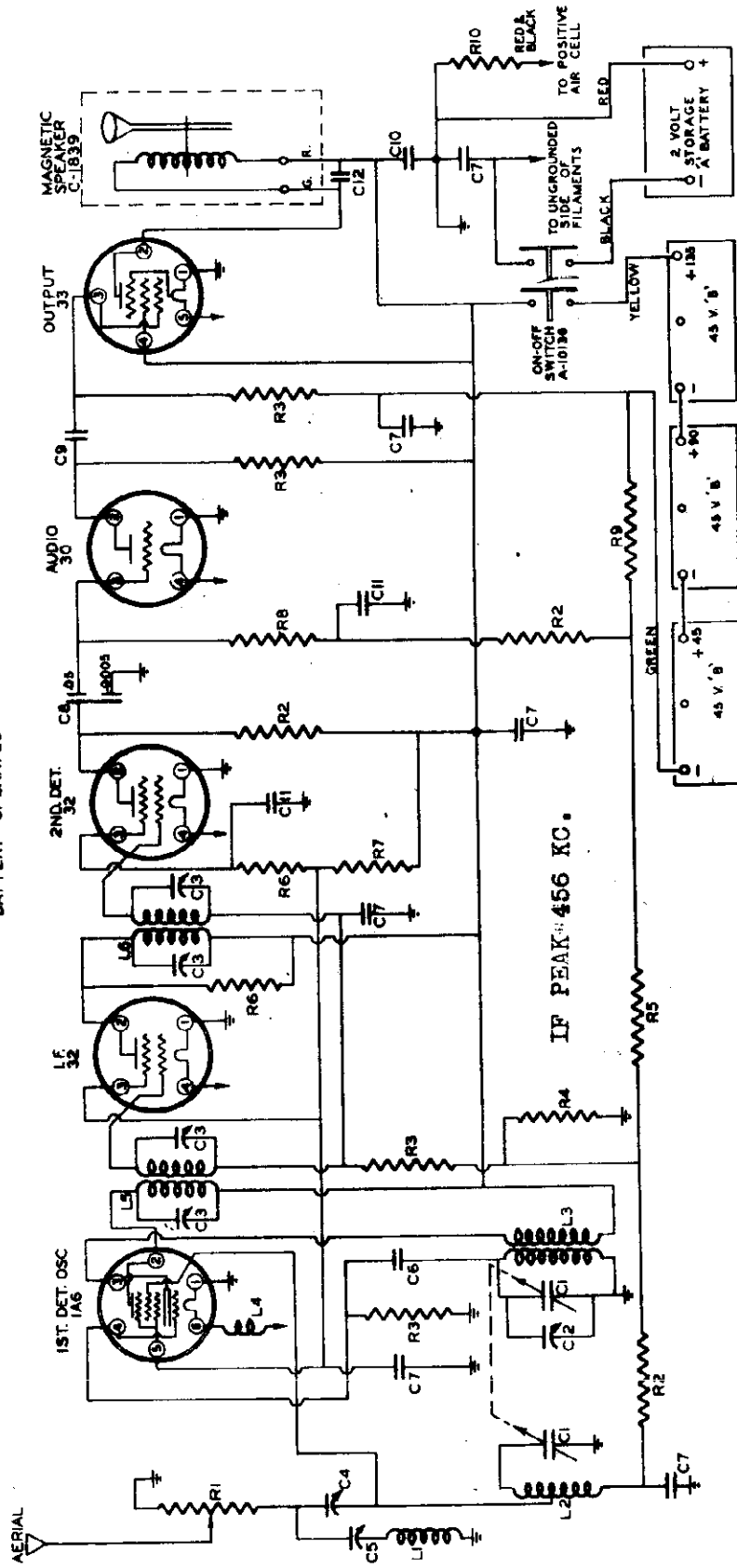


PHONOGRAPH—Install a single pole double-throw toggle switch in rear of chassis nearest the PHONOGRAPH—Install a single pole double-throw toggle switch in rear of chassis nearest the 6D6. Disconnect the .01 µfd. condenser from volume control and attach to one side of toggle switch. Short-wave B. F. trimmer is at the lower end of the oscillator coil and the broadcast B. F. trimmer is to the left of this same coil. connect middle terminal of switch to terminal of volume control just disconnected, connect one side of phonograph pickup to remaining terminal of switch, and other side to "B" minus.

SPARKS-WITHINGTON CO.

MODEL 58
Schematic
Parts Lis

SCHEMATIC DIAGRAM
SPARTON MODEL 58 SUPERHETERODYNE
COUNTRY HOME RECEIVER
BATTERY OPERATED



- | | | | |
|-----------|----------------------------|-----------|--------|
| C1 | VARIABLE CONDENSER | B-5650-1 | 200 V. |
| C2 | ADJUSTABLE CONDENSER | A-10318 | 150 V. |
| C3 | I. F. TRANSFORMER TRIMMERS | A-9919 | 200 V. |
| C4 | ANTENNA TRIMMER | A-7809-2 | 600 V. |
| C5 | EQUALIZING TRIMMER | A-7809-3 | |
| C6 | 00025 MFD. MOLDED | A-5175 | |
| C7 | 2 MFD. 200 V. | A-6669-A | |
| C8 | .05 - .0005 MFD. 200 V. | A-9576 | |
| C9 | .025 MFD. | | 200 V. |
| C10 | 250,000 Ω | | 150 V. |
| C11 | .05 MFD. | | 200 V. |
| C12 | .006 MFD. | | 600 V. |
| R1 | 25,000 Ω | A-10206 | |
| R2 | 250,000 Ω | A-10318 | |
| R3 | 50,000 Ω | B-5737-1 | |
| R4 | 200 Ω | B-5737-4 | |
| R5 | 100 Ω | B-5243-2 | |
| R6 | 500,000 Ω | B-5243-14 | |
| R7 | 25,000 Ω | B-5737-5 | |
| R8 | 100,000 Ω | B-4114-18 | |
| R9 | 750 Ω | B-5737-2 | |
| R10 | .47 Ω | B-5243-8 | |
| L1 | ANT. CHOKE COIL | A-10316 | |
| L2 | NO. 1 R.F. COIL | B-5737-1 | |
| L3 | OSCILLATOR COIL | B-5737-4 | |
| L4 | CATHODE CHOKE | B-5243-2 | |
| L5 | NO. 1 I.F. TRANSFORMER | B-5243-14 | |
| L6 | NO. 2 I.F. TRANSFORMER | B-5737-5 | |
| L7 | 2. MFD. 200 V. | B-4114-18 | |
| L8 | WIREWOUND | B-5737-2 | |
| L9 | WIREWOUND | B-5243-8 | |
| L10 | WIREWOUND | A-10000-3 | |
| A-9750 | | | |
| A-11564 | | | |
| A-10330 | | | |
| A-10401 | | | |
| A-10229-4 | | | |
| A-10356-1 | | | |

MODEL 58
Voltage, Socket
Trimmers

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE OCTOBER 3, 1934

Sparton Model 58 Country Home Superheterodyne (Battery Operated) Schematic Drawing and Voltage-Resistance Chart VOLTAGE-RESISTANCE CHART

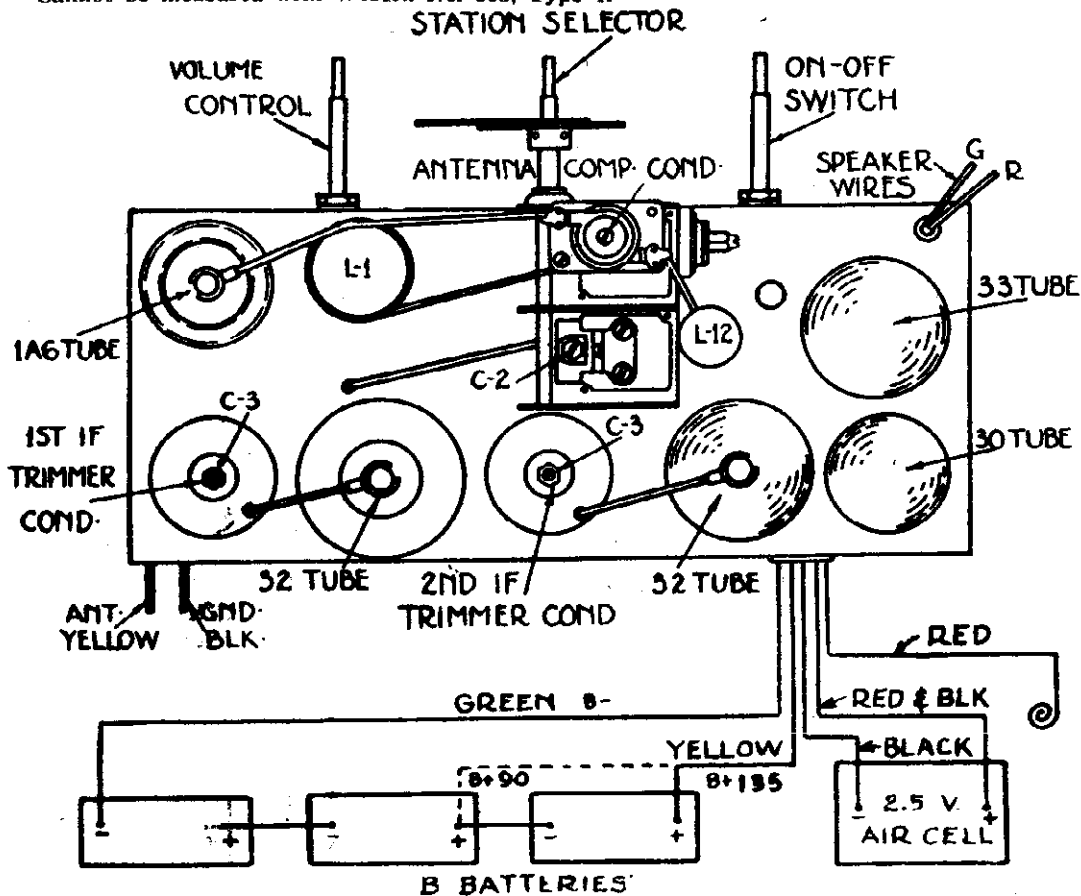
Condition of "A" Battery—Good
Condition of "B" Batteries—Good

Position of Volume Control—Full with Antenna Disconnected

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)							
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Grid Cap
1A6	1st Detector-Oscillator	Volts	2.	115	115	*	50	0	1
		Ohms	0	*	*	65,000	*	0	300,000
32	I-F Amplifier	Volts	2.	120	40	0	---	---	.6
		Ohms	0	*	*	0	---	---	500,000
32	2d Detector-A.V.C.	Volts	2.	25	20	0	---	---	**
		Ohms	0	*	*	0	---	---	500,000
30	1st A. F. Amplifier	Volts	2.	50	1	0	---	---	---
		Ohms	0	*	600,000	0	---	---	---
33	Power Amplifier	Volts	2.	110	5	115	0	---	---
		Ohms	0	*	65,000	*	0	---	---

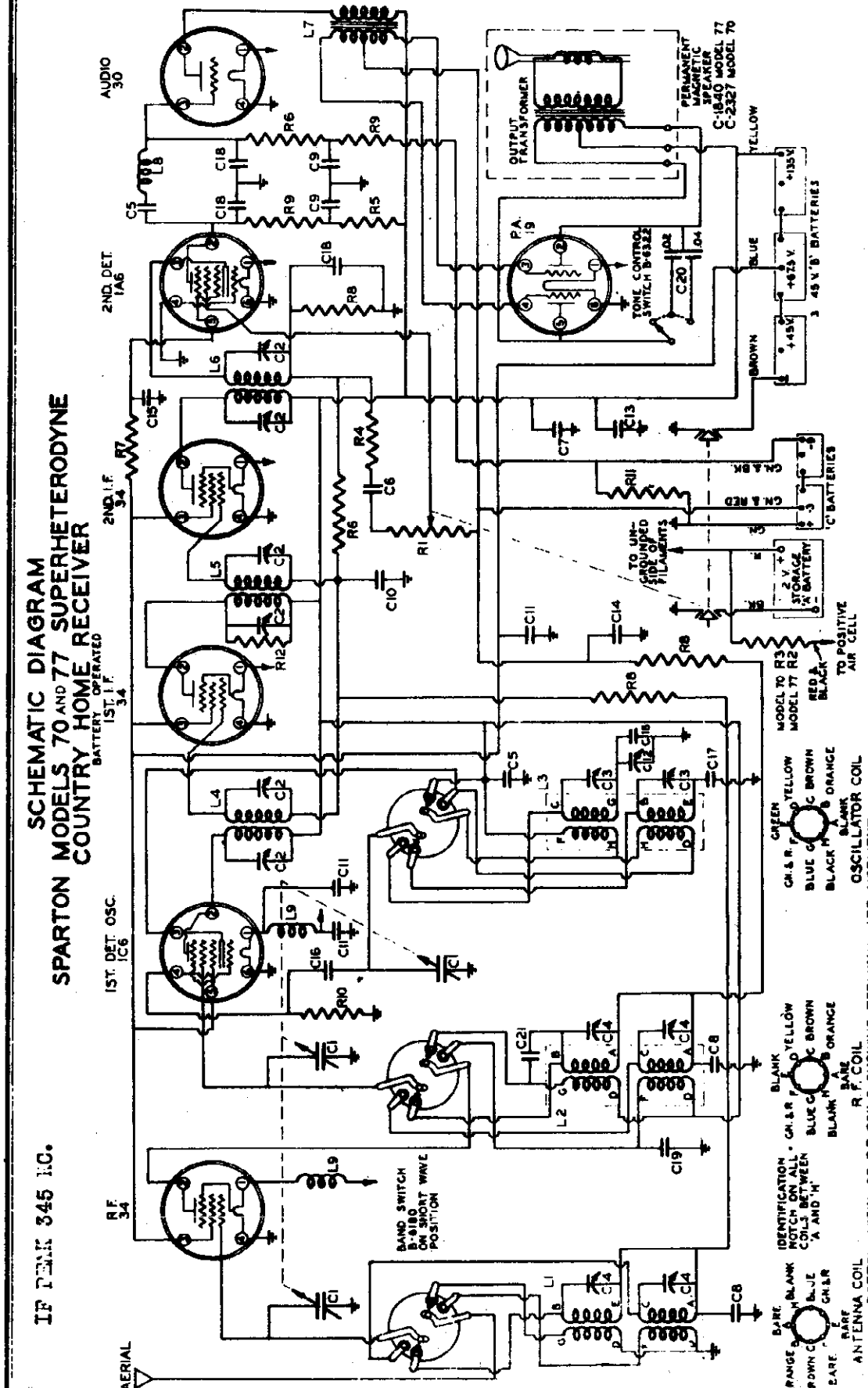
NOTES: Voltage and resistance readings are for schematic diagram shown. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.

* Open **Cannot be measured with Weston No. 665, Type 1.



SPARKS-WITHINGTON CO.

SCHEMATIC DIAGRAM
SPARTON MODELS 70 AND 77 SUPERHETERODYNE
COUNTRY HOME RECEIVER
BATTERY OPERATED



- IDENTIFICATION MARKS ON ALL COILS BETWEEN 'A' AND 'H'
- ORANGE & BLANK
 - BROWN C
 - BLU E
 - GR E
 - BLANK
 - BLU E
 - GR E
- ANTENNA COIL
- A-11231
 - A-11232
 - A-11233
 - A-6313-9
 - A-6313-2
 - A-6313-8
 - A-11574
 - A-3506
 - A-10401
- R.F. COIL
- A-11231
 - A-11232
 - A-11233
 - A-6313-9
 - A-6313-2
 - A-6313-8
 - A-11574
 - A-3506
 - A-10401
- OSCILLATOR COIL
- A-11231
 - A-11232
 - A-11233
 - A-6313-9
 - A-6313-2
 - A-6313-8
 - A-11574
 - A-3506
 - A-10401
- TOP VIEW OF R.F. COILS SHOWING TERMINAL ARRANGEMENT
- B-6212
 - A-11231
 - A-11232
 - A-11233
 - A-6313-9
 - A-6313-2
 - A-6313-8
 - A-11574
 - A-3506
 - A-10401
- OSCILLATOR COIL
- A-11231
 - A-11232
 - A-11233
 - A-6313-9
 - A-6313-2
 - A-6313-8
 - A-11574
 - A-3506
 - A-10401
- RESISTORS
- R1 250,000 Ω
 - R2 39 TO 4 Ω WIREWOUND
 - R3 3 TO 31 Ω WIREWOUND
 - R4 50,000 Ω
 - R5 10,000 Ω
 - R6 10,000 Ω
 - R7 50,000 Ω
 - R8 250,000 Ω
 - R9 100,000 Ω
 - R10 50,000 Ω
 - R11 20,000 Ω
 - R12 100,000 Ω
- WATTS
- 25 W
 - 25 W
 - 25 W
 - 25 W
 - 25 W
 - 25 W
 - 25 W
 - 25 W
 - 25 W
 - 25 W
 - 25 W
- TRANSFORMERS
- A-11231
 - A-11232
 - A-11233
 - A-6313-9
 - A-6313-2
 - A-6313-8
 - A-11574
 - A-3506
 - A-10401
- CONDENSERS
- C1 100-300 MMF. PADDER
 - C2 10 MFD ELECTROLYTIC
 - C3 10 MFD ELECTROLYTIC
 - C4 100 V
 - C5 100 V
 - C6 0.0005 MFD. MOLDED
 - C7 0.0032 MFD. MOLDED
 - C8 0.0025 MFD. MOLDED
 - C9 0.001 MFD. MOLDED
 - C10 0.02-0.04 MFD. 400 V
 - C11 200 V
 - C12 200 V
 - C13 200 V
 - C14 200 V
 - C15 200 V
 - C16 200 V
 - C17 200 V
 - C18 200 V
 - C19 200 V
 - C20 200 V
- OTHER COMPONENTS
- A-7809-5
 - A-11623
 - A-10377
 - A-11301
 - A-5175-1
 - A-7038-B
 - A-9578-5
 - A-9612
 - A-11261
 - A-1000-5
 - A-5737-4
 - B-5737-12
 - B-5737-5
 - B-5737-9
 - B-5737-1
 - B-5737-2
 - B-5458-3
 - B-5458-6
 - R-5458-2

MODELS 70,77
Voltage, Socket
Trimmers

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE NOVEMBER 7, 1933

Sparton Models 70 and 77 Country Home Superheterodyne
(Battery Operated)

Schematic Diagram and Voltage Resistance Chart

VOLTAGE-RESISTANCE CHART

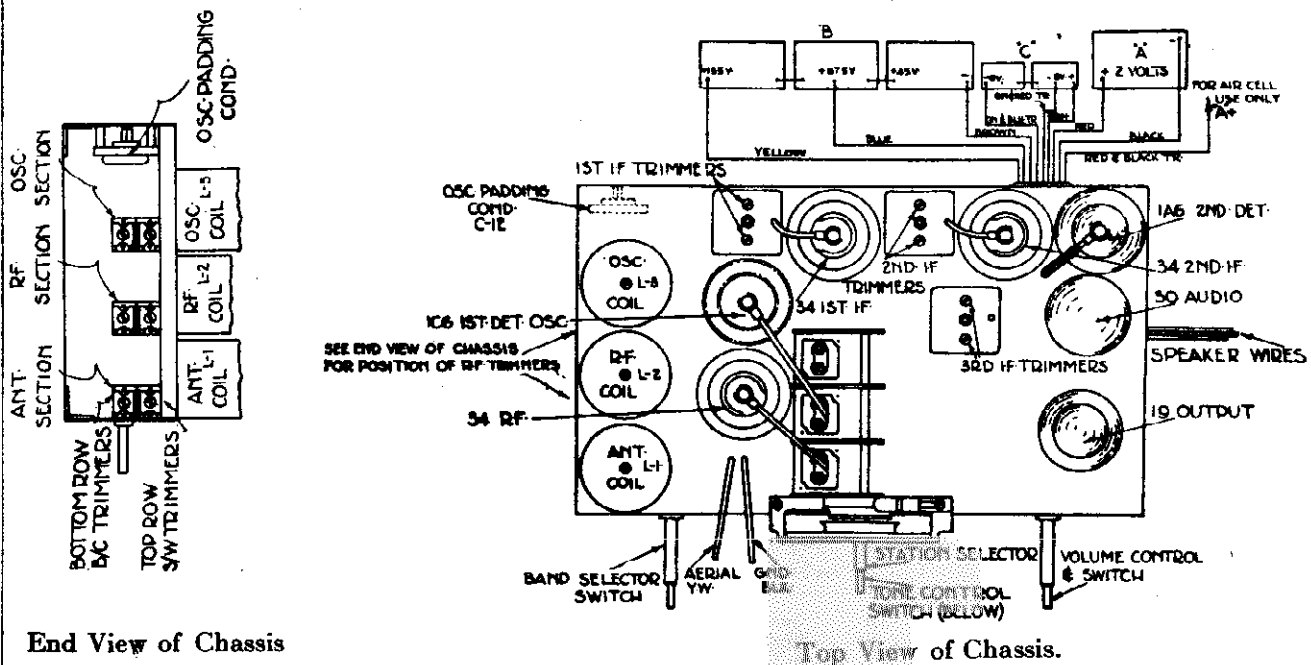
Condition of "A", "B"
and "C" Batteries—Good

Position of Volume Control—Full with Antenna Disconnected
Position of Band Selector Switch—Short-Wave

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)							Grid Cap
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	
34	R. F. Amplifier.	Volts	2.	130	45	0	—	—	1
		Ohms	0	250,000	*	0	—	—	300,000
1C6	First Detector-Oscillator.	Volts	2.	130	130	0	45	0	.5
		Ohms	0	*	*	55,000	*	0	300,000
34	First I. F.-Amplifier.	Volts	2.	130	45	0	—	—	1
		Ohms	0	*	*	0	—	—	600,000
34	Second I. F.-Amplifier.	Volts	2.	135	45	0	—	—	1
		Ohms	0	*	*	0	—	—	600,000
1A6	Second Detector-A. V. C.	Volts	2.	90	0	0	20	0	.5
		Ohms	0	*	300,000	0	*	0	9,000
30	First Audio Amplifier.	Volts	2.	130	1	0	—	—	—
		Ohms	0	*	600,000	0	—	—	—
19	Power Amplifier	Volts	2.	130	1	1	130	0	—
		Ohms	0	*	9,000	9000	*	0	—

NOTES: Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. 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 1.

* Open



CHASSIS DIAGRAM MODELS 70 AND 77

MODELS 134, 136
Voltage Sockets
Trimmers

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE OCTOBER 12, 1934

Sparton Models 134 and 136 A. C. Superheterodyne
Schematic Diagram and Voltage-Resistance Chart
VOLTAGE-RESISTANCE CHART

Line Voltage → 120

Position of Volume Regulator — Full

Position of Tone Control — Full

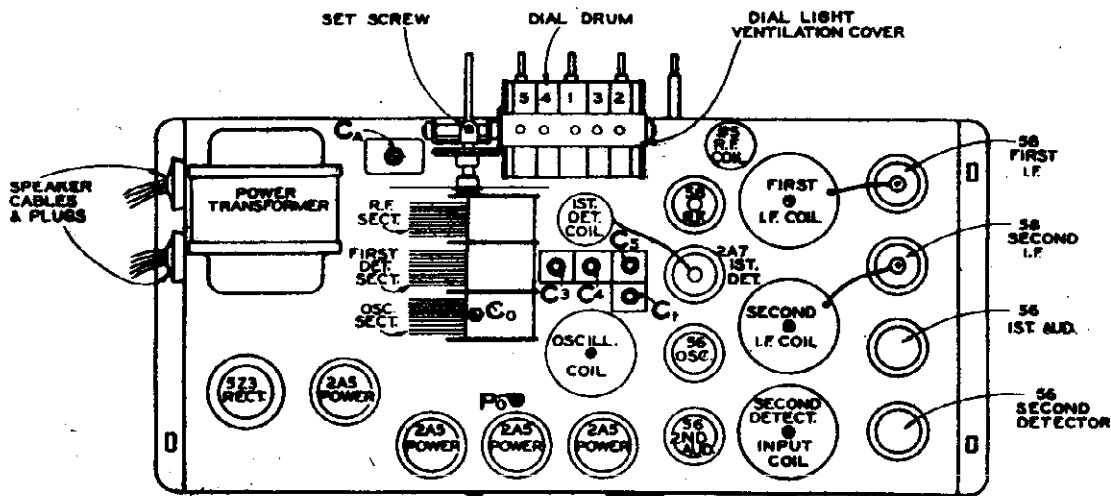
Position of Volume Control — Full with Antenna Disconnected

Position of Band Selector Switch — Broadcast

Position of Inter-Station Noise Suppressor — Full

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Grid Cap
58	R. F. Amplifier	Volts	2.5	220	110	3.8	3.8	0	0	0
		Ohms	0	17,000	4,000	400	400	0	0	0
2A7	Converter	Volts	2.5	220	65	3.8	65	3.8	0	0
		Ohms	0	17,000	13,000	500	25,000	500	0	600,000
56	Oscillator	Volts	2.5	195	38	0	0	0	0	0
		Ohms	0	20,000	25,000	0	0	0	0	0
5R	1st I. F. Amplifier	Volts	2.5	220	110	1.5	1.5	0	0	0.4
		Ohms	0	17,000	4,000	400	400	0	0	750,000
58	2nd I. F. Amplifier	Volts	2.5	300	110	4.5	4.5	0	0	0
		Ohms	0	12,000	4,000	400	400	0	0	0
56	2nd Detector-A. V. C.	Volts	2.5	0	0	0	0	0	0	0
		Ohms	0	300,000	300,000	0	0	0	0	0
56	1st A. F. Amplifier	Volts	2.5	45	0	3.7	0	0	0	0
		Ohms	0	200,000	250,000	5,000	0	0	0	0
56	2nd A. F. Amplifier	Volts	2.5	200	0	8	0	0	0	0
		Ohms	0	37,000	100,000	1,700	0	0	0	0
(4) 2A5	Power Amplifier	Volts	25	330	330	0	20	0	0	0
		Ohms	0	9,000	9,000	1,500	175	0	0	0
5Z3	Rectifier	Volts	480	420	420	480	0	0	0	0
		Ohms	9500	35	35	9500	0	0	0	0

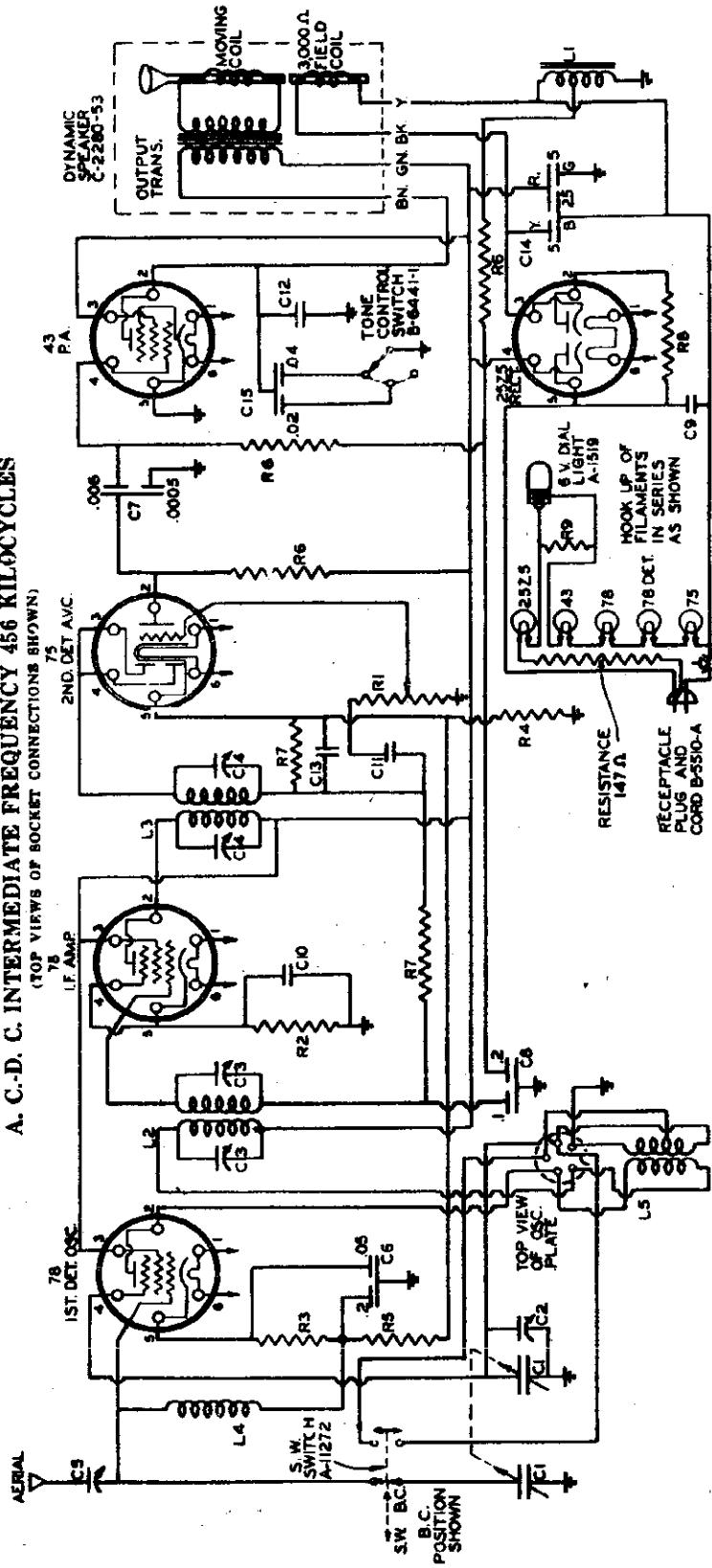
NOTES: Voltage and resistance readings are for schematic diagram shown on back of sheet. Allow 15% ± or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 865, Type 1.



MODELS 134 AND 136 CHASSIS DIAGRAM
(Top View)

SPARKS-WITHINGTON CO.

SPARTON MODEL 506 SUPERHETERODYNE
SPARTON MODEL 594 SUPERHETERODYNE
SCHEMATIC DIAGRAM
A. C. D. C. INTERMEDIATE FREQUENCY 456 KILOCYCLES
(TOP VIEWS OF SOCKET CONNECTIONS SHOWN)



- C1 VARIABLE CONDENSER
- C2 ADJUSTABLE CONDENSER
- C3 NO. 1 IF TRIMMER
- C4 NO. 2 IF TRIMMER
- C5 ANTENNA TRIMMER
- C6 .05-.2 MFD. 100 V
- C7 .006-.0005 MFD. 400 V
- B-5509
- A-11474
- A-9553
- A-11499
- A-11092-7
- A-11092-2
- C8 1-.2 MFD. 100 V
- C9 .025 MFD. 400 V
- C10 1 MFD. 100 V
- C11 .006 MFD. 400 V
- C12 .01 MFD. 200 V
- C13 .0005 MFD. MOLDED
- C14 5-25-5 MFD. ELECTROLYTIC
- C15 .04-.02 MFD. 200 V
- A-11092-6
- A-11092-4
- A-11130-1
- A-11130-4
- A-11130-7
- A-11130-7
- A-11093-1
- A-11093-1
- A-9612-1
- R1 500,000 Ω VOL. CONTROL
- R2 400 Ω WIRE WOUND
- R3 280 Ω WIRE WOUND
- R4 100 Ω WIRE WOUND
- R5 2,200 Ω WIRE WOUND
- R6 300,000 Ω .25 W
- R7 500,000 Ω .25 W
- R8 50 Ω WIRE WOUND
- R9 2.5 Ω WIRE WOUND
- A-11480
- B-5243-30
- B-5243-36
- B-5243-37
- B-5243-13
- B-5737-3
- B-5737-5
- B-6061-1
- A-9647
- L1 TAPPED CHOKE
- L2 NO. 1 IF TRANSFORMER
- L3 NO. 2 IF TRANSFORMER
- L4 PRE SELECTOR COIL
- L5 OSCILLATOR COIL
- A-9566
- A-11476
- A-11477
- A-9601
- A-11504

MODELS 506, 594
Voltage, Socket
Trimmers

SPARKS-WITHINGTON CO.

(First Revision) EFFECTIVE SEPTEMBER 11, 1935

**Sparton Model 506 A. C.-D. C. Superheterodyne
Sparton Model 594 A. C.-D. C. Superheterodyne
Schematic Drawing and Voltage-Resistance Chart**

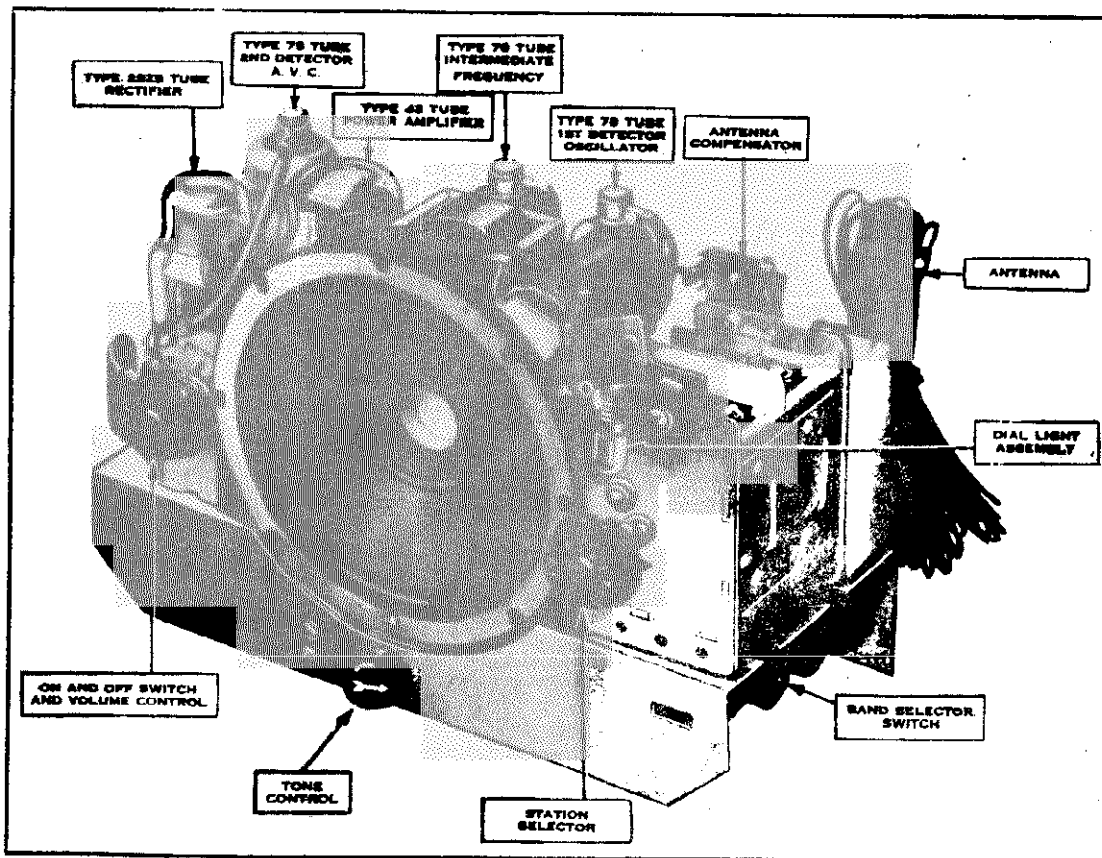
VOLTAGE-RESISTANCE CHART

Line Supply — A. C.
Line Voltage — 119

Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Short-Wave

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)							
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Grid Cap
78	1st Detector-Oscillator	Volts	81	115	115	**	22	31	15
		Ohms	700	70,000	70,000	**	2500	700	2100
78	I-F Amplifier	Volts	81	115	115	4	4	31	**
		Ohms	700	50,000	50,000	300	300	700	1,000,000
75	2d Detector-A.V.C.	Volts	31	**	**	**	**	31	**
		Ohms	700	500,000	500,000	500,000	100	700	500,000
48	Power Amplifier	Volts	81	107	115	**	**	31	—
		Ohms	700	50,000	50,000	500,000	0	700	—
25Z5	Rectifier	Volts	81	118	115	95	116	31	—
		Ohms	700	850	45,000	3500	900	700	—

NOTES: Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. 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 1.
**Cannot be measured with Weston No. 665, Type 1.



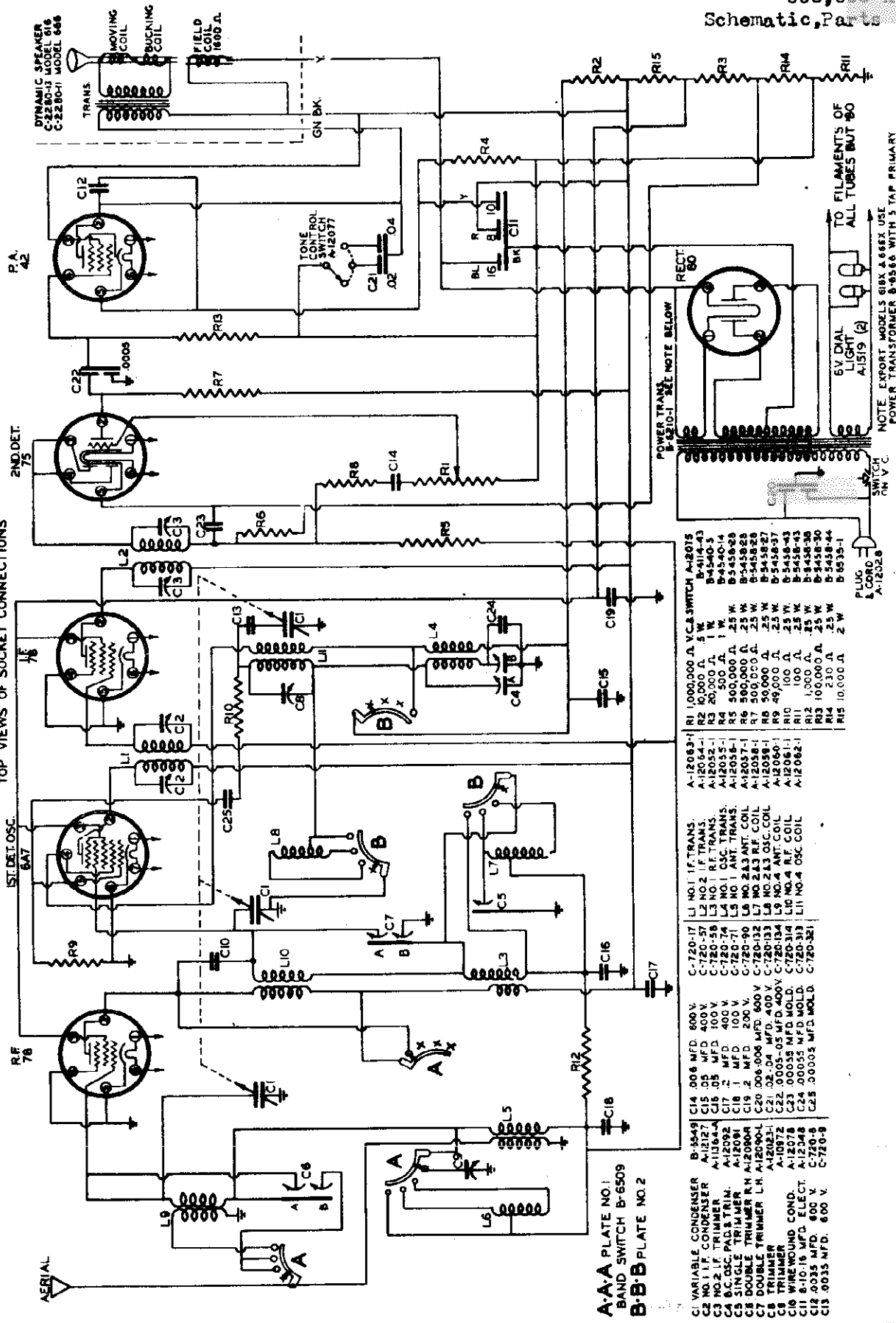
MODEL 594 CHASSIS

SPARKS-WITHINGTON CO.

MODELS 616, 616-X
666, 666-X
Schematic, Parts

SPARTON SUPERHETERODYNE MODELS 616, 616X, 666 & 666X
INTERMEDIATE FREQUENCY 345KC.

TOP VIEWS OF SOCKET CONNECTIONS



POWER TRANS. SEE NOTE BELOW
RECT. 60

TO FILAMENTS OF ALL TUBES BUT 60

5V DIAL LIGHT A-1519 (2)

NOTE: EXPORT MODELS 616X & 666X USE POWER TRANSFORMER B-6566 WITH 5 TAP PRIMARY

R1	1,000,000 Ω	V.C.S. SWITCH	A-12075
R2	10,000 Ω		B-4114-43
R3	20,000 Ω		B-4540-5
R4	500 Ω		B-4540-14
R5	300,000 Ω		B-5458-28
R6	300,000 Ω		B-5458-28
R7	500,000 Ω		B-5458-28
R8	300,000 Ω		B-5458-28
R9	49,000 Ω		B-5458-27
R10	100 Ω		B-5458-43
R11	100 Ω		B-5458-43
R12	1,200 Ω		B-5458-30
R13	100,000 Ω		B-5458-30
R14	230 Ω		B-6535-44
R15	10,000 Ω		B-6535-1

A-12063-1	A-12063-1
A-12064-1	A-12064-1
A-12065-1	A-12065-1
A-12066-1	A-12066-1
A-12067-1	A-12067-1
A-12068-1	A-12068-1
A-12069-1	A-12069-1
A-12070-1	A-12070-1
A-12071-1	A-12071-1
A-12072-1	A-12072-1
A-12073-1	A-12073-1
A-12074-1	A-12074-1
A-12075-1	A-12075-1
A-12076-1	A-12076-1
A-12077-1	A-12077-1
A-12078-1	A-12078-1
A-12079-1	A-12079-1
A-12080-1	A-12080-1
A-12081-1	A-12081-1
A-12082-1	A-12082-1
A-12083-1	A-12083-1
A-12084-1	A-12084-1
A-12085-1	A-12085-1
A-12086-1	A-12086-1
A-12087-1	A-12087-1
A-12088-1	A-12088-1
A-12089-1	A-12089-1
A-12090-1	A-12090-1
A-12091-1	A-12091-1
A-12092-1	A-12092-1
A-12093-1	A-12093-1
A-12094-1	A-12094-1
A-12095-1	A-12095-1
A-12096-1	A-12096-1
A-12097-1	A-12097-1
A-12098-1	A-12098-1
A-12099-1	A-12099-1
A-12100-1	A-12100-1

C1	100 MFD 600 V
C2	100 MFD 400 V
C3	100 MFD 400 V
C4	100 MFD 400 V
C5	100 MFD 400 V
C6	100 MFD 400 V
C7	100 MFD 400 V
C8	100 MFD 400 V
C9	100 MFD 400 V
C10	100 MFD 400 V
C11	100 MFD 400 V
C12	100 MFD 400 V
C13	100 MFD 400 V
C14	100 MFD 400 V
C15	100 MFD 400 V
C16	100 MFD 400 V
C17	100 MFD 400 V
C18	100 MFD 400 V
C19	100 MFD 400 V
C20	100 MFD 400 V
C21	100 MFD 400 V
C22	100 MFD 400 V
C23	100 MFD 400 V
C24	100 MFD 400 V
C25	100 MFD 400 V

L1	100 Ω
L2	100 Ω
L3	100 Ω
L4	100 Ω
L5	100 Ω
L6	100 Ω
L7	100 Ω
L8	100 Ω
L9	100 Ω
L10	100 Ω
L11	100 Ω
L12	100 Ω
L13	100 Ω
L14	100 Ω
L15	100 Ω
L16	100 Ω
L17	100 Ω
L18	100 Ω
L19	100 Ω
L20	100 Ω
L21	100 Ω
L22	100 Ω
L23	100 Ω
L24	100 Ω
L25	100 Ω

A-A PLATE NO. 1
BAND SWITCH B-6509

B-B PLATE NO. 2

MODELS 616, 616-X
666, 666-X
Voltage, Socket
Trimmers

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE SEPTEMBER 11, 1935

**Sparton Superheterodyne Models
616 616-X 666 666-X
Schematic Diagram and Voltage-Resistance Chart**

VOLTAGE-RESISTANCE CHART

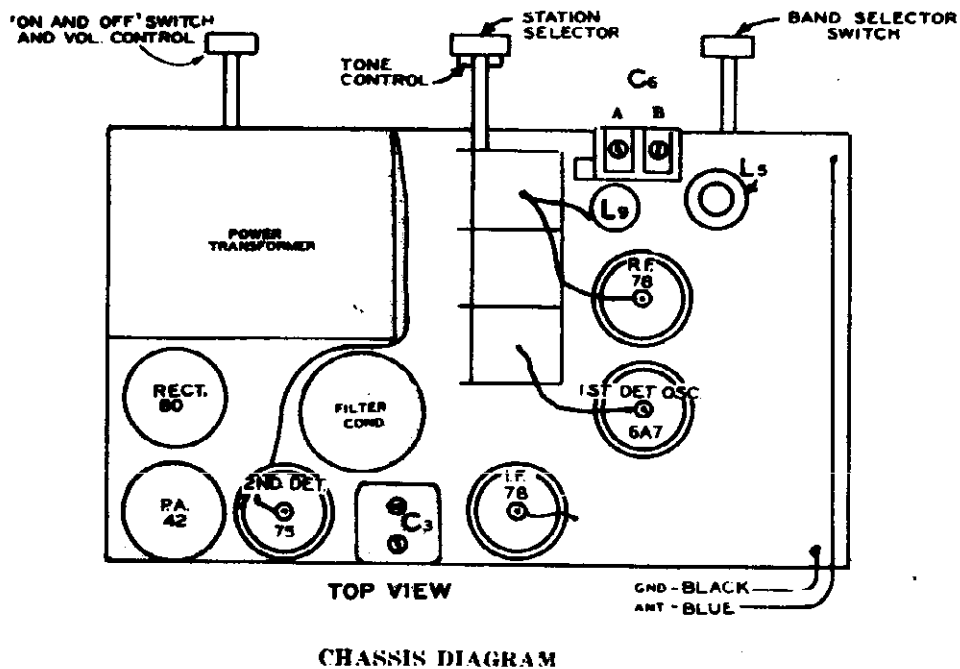
Line Voltage — 119
Position of Tone Control — Full
Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Short-Wave

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Grid Cap
78	R-F Amplifier	Volts	*	310	160	0	0	*	---	**
		Ohms	0	28,000	18,000	0	0	0	---	1,000,000
6A7	1st Detector-Oscillator	Volts	*	300	160	235	7	0	*	**
		Ohms	0	28,000	18,000	38,000	5,000	0	0	1,000,000
78	I-F Amplifier	Volts	*	295	160	0	0	*	---	**
		Ohms	0	28,000	18,000	0	0	0	---	1,000,000
75	2d Detector-A.V.C.	Volts	*	140	**	**	0	*	---	**
		Ohms	0	500,000	600,000	600,000	350	0	---	1,000,000
42	Power Amplifier	Volts	*	280	300	0	18	*	---	---
		Ohms	0	28,000	28,000	135,000	500	0	---	---
80	Rectifier	Volts	440	405	410	440	---	---	---	---
		Ohms	20,000	250	250	30,000	---	---	---	---

NOTES: Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. 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 1.

*Zero or 6.0 volts A. C., depending on twist of filament hook-up wire. When Prong No. 1 reads zero, Prong No. 6 (Prong No. 7 of Type 6A7 Tube) should read 6.0, and vice versa.

**Cannot be measured with Weston No. 665, Type 1.



MODEL 655
Voltage, Socket

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE FEBRUARY 1, 1935

Sparton Model 655 A. C.-D. C. Superheterodyne Schematic Diagram and Voltage-Resistance Chart

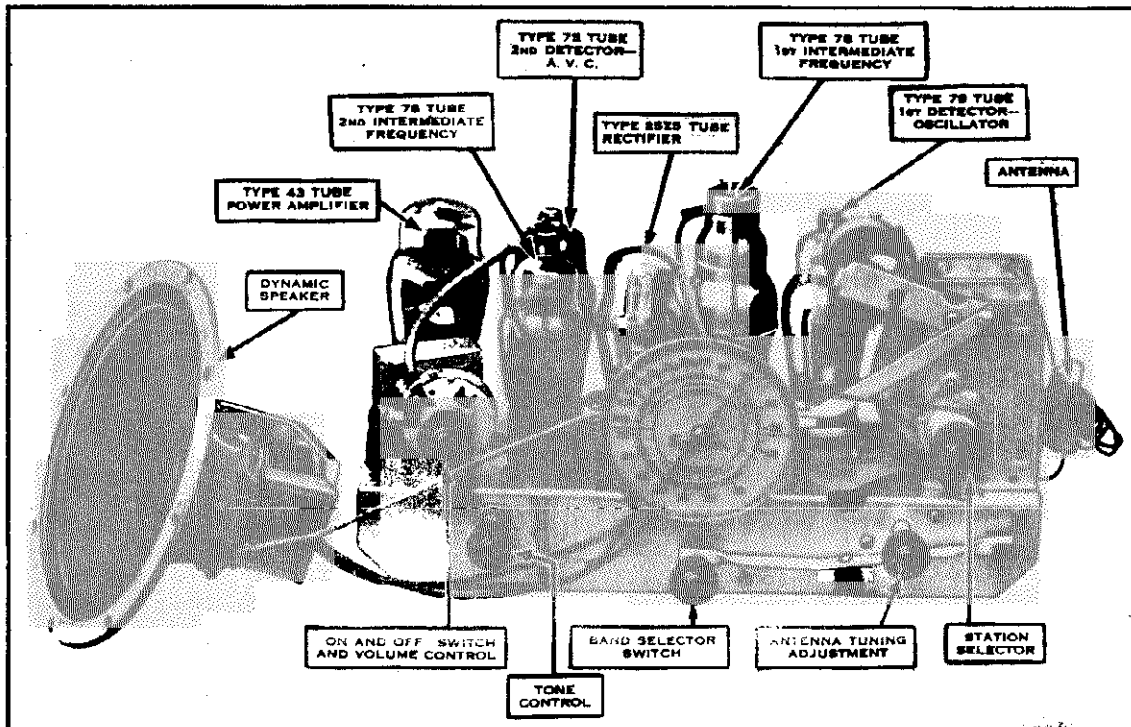
VOLTAGE-RESISTANCE CHART

Line Supply — A. C.
Line Voltage — 119

Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Short-Wave

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)							
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Grid Cap
78	1st. Detector-Oscillator	Volts	29	80	105	0	17.5	29	17.5
		Ohms	700	35,000	20,000	0	2500	700	2400
78	1st I-F Amplifier	Volts	29	105	105	7.5	7.5	29	0
		Ohms	700	20,000	20,000	1700	1700	700	800,000
78	2nd I-F Amplifier	Volts	29	80	100	3.3	3.3	29	0
		Ohms	700	22,000	20,000	600	600	700	800,000
75	2nd Det.-A. V. C.	Volts	29	**	**	**	.64	29	0
		Ohms	700	500,000	500,000	500,000	100	700	250,000
43	Power Amplifier	Volts	29	95	105	**	**	29	---
		Ohms	700	20,000	20,000	750,000	0	700	---
25Z5	Rectifier	Volts	29	28	105	74	30	29	---
		Ohms	700	700	20,000	3000	700	700	---

NOTES: Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. 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 1.
**Cannot be measured with Weston No. 665, Type 1.

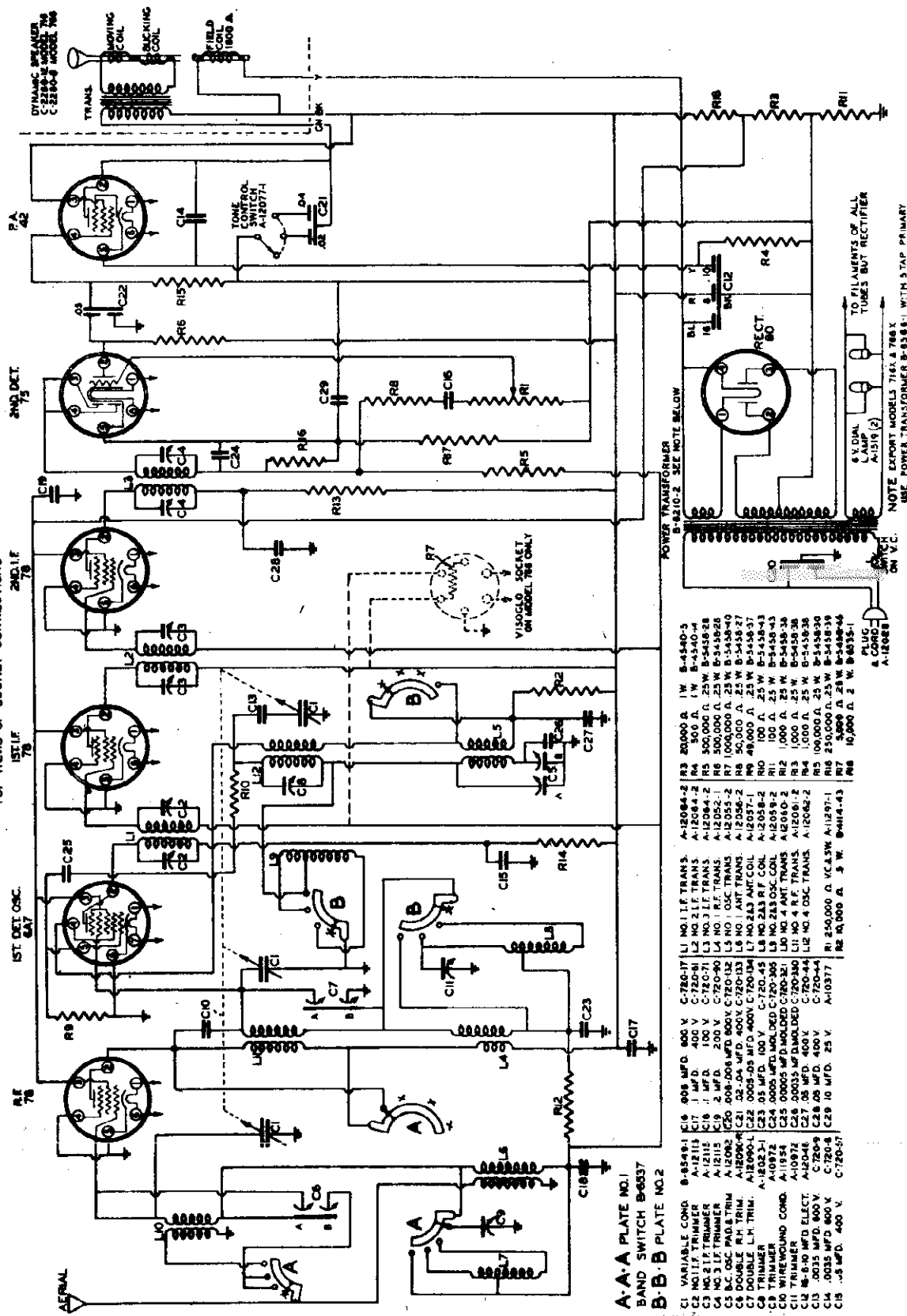


MODEL 655 CHASSIS

SPARKS-WITHINGTON CO.

MODELS 716, 766
766-X, 766-XP, 766-XS
Schematic, Parts

SCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MODELS 716X, 766 & 766 X
INTERMEDIATE FREQUENCY 456 K.C.
TOP VIEWS OF SOCKET CONNECTIONS



A-A PLATE NO.1
BAND SWITCH B-637
B-B PLATE NO.2

- C1 VARIABLE COND. B-8549-1 R16 908 MFD. 400 V. C-720-17 L1 NO. 11 F. TRANS.
- C2 MCLIF TRIMMER A-12115 R17 1000 Ω. C-720-18 L2 NO. 11 F. TRANS.
- C3 MCLIF TRIMMER A-12116 R18 100 Ω. C-720-19 L3 NO. 11 F. TRANS.
- C4 MCLIF TRIMMER A-12117 R19 100 Ω. C-720-20 L4 NO. 11 F. TRANS.
- C5 B.C. PAD & TRIM A-12092 R20 200 V. C-720-21 L5 NO. 11 F. TRANS.
- C6 OSC. PAD & TRIM A-12094 R21 200 V. C-720-22 L6 NO. 11 F. TRANS.
- C7 DOUBLE L.H. TRIM. A-12095-1 R22 200 V. C-720-23 L7 NO. 233 ANT. COIL.
- C8 DOUBLE L.H. TRIM. A-12095-2 R23 200 V. C-720-24 L8 NO. 233 ANT. COIL.
- C9 TRIMMER A-10323-1 C22 0.005-.05 MFD. 400V. C-720-25 L9 NO. 233 OSC. COIL.
- C10 TRIMMER A-10323-2 C23 0.05 MFD. 100 V. C-720-26 L10 NO. 4 ANT. TRANS.
- C11 TRIMMER A-10324 C24 0.005 MFD. MOLDED. C-720-27 L11 NO. 4 ANT. TRANS.
- C12 TRIMMER A-10325 C25 0.005 MFD. MOLDED. C-720-28 L12 NO. 4 OSC. TRANS.
- C13 .0015 MFD. ELECT. C-720-29 R2 250,000 Ω. V.C.A. 3W. A-11297-1
- C14 .0015 MFD. 600 V. C-720-30 R3 10,000 Ω. 5 W. B-4114-43
- C15 .05 MFD. 400 V. C-720-31 R4 10,000 Ω. 2 W. B-4114-43
- C16 .05 MFD. 400 V. C-720-32 R5 10,000 Ω. 2 W. B-4114-43
- C17 .05 MFD. 400 V. C-720-33 R6 10,000 Ω. 2 W. B-4114-43
- C18 .05 MFD. 400 V. C-720-34 R7 10,000 Ω. 2 W. B-4114-43
- C19 2 MFD. C-720-35 R8 100,000 Ω. 2 W. B-4114-43
- C20 0.005 MFD. 400V. C-720-36 R9 300,000 Ω. 2 W. B-4114-43
- C21 .02 Ω. WFD. 400V. C-720-37 R10 100 Ω. 2 W. B-4114-43
- C22 0.005-.05 MFD. 400V. C-720-38 R11 100 Ω. 2 W. B-4114-43
- C23 .05 MFD. 100 V. C-720-39 R12 100 Ω. 2 W. B-4114-43
- C24 0.005 MFD. MOLDED. C-720-40 R13 100,000 Ω. 2 W. B-4114-43
- C25 0.005 MFD. MOLDED. C-720-41 R14 100 Ω. 2 W. B-4114-43
- C26 0.005 MFD. MOLDED. C-720-42 R15 100,000 Ω. 2 W. B-4114-43
- C27 .05 MFD. 400 V. C-720-43 R16 10,000 Ω. 2 W. B-4114-43
- C28 .05 MFD. 400 V. C-720-44 R17 250,000 Ω. 2 W. B-4114-43
- C29 10 MFD. 25 V. C-720-45 R18 3,200 Ω. 2 W. B-4114-43
- C30 .05 MFD. 400 V. C-720-46 R19 10,000 Ω. 2 W. B-4114-43

NOTE: FILAMENTS OF ALL TUBES BUT RECTIFIER TO BE SUPPLIED BY SEPARATE POWER TRANSFORMER B-8538-1 WITH 5-TAP PRIMARY ON V.C.

MODELS 716, 766
766-X, 766-XP, 766-XS
Voltage, Socket
Trimmers, Phonograph Data

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE SEPTEMBER 11, 1934

Sparton Superheterodyne Models

716-X 766 766-X 766-XP 766-XS

Schematic Diagram and Voltage-Resistance Chart

VOLTAGE-RESISTANCE CHART

Line Voltage — 119

Position of Volume Control — Full with Antenna Disconnected

Position of Tone Control — Full

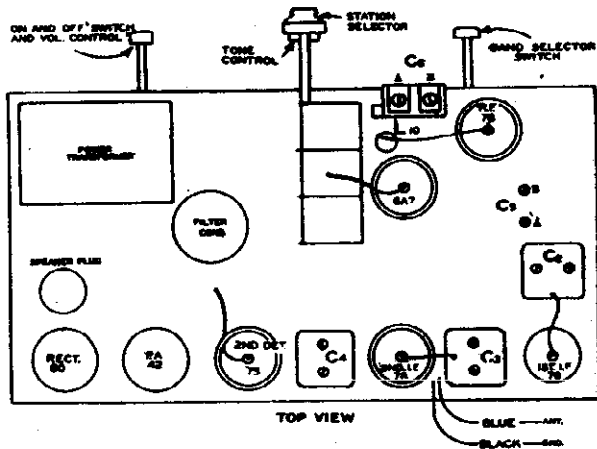
Position of Band Selector Switch — Short-Wave

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Grid Cap
78	R-F Amplifier	Volts	*	275	170	0	0	*	---	**
		Ohms	0	29,000	20,000	0	0	0	---	1,000,000
6A7	Converter	Volts	*	275	170	210	5	3.8	*	**
		Ohms	0	29,000	20,000	40,000	55,000	900	0	1,000,000
78	1st I-F Amplifier	Volts	*	275	170	0	0	*	---	**
		Ohms	0	29,000	20,000	0	0	0	---	1,000,000
78	2d I-F Amplifier	Volts	*	275	170	0	0	*	---	**
		Ohms	0	29,000	20,000	0	0	0	---	1,000,000
75	2d Detector-A.V.C.	Volts	*	**	**	**	**	*	---	**
		Ohms	0	1,000,000	300,000	300,000	5,000	0	---	250,000
42	Power Amplifier	Volts	*	280	170	**	16	*	---	---
		Ohms	0	29,000	29,000	100,000	500	0	---	---
80	Rectifier	Volts	410	365	365	410	---	---	---	---
		Ohms	29,000	250	250	29,000	---	---	---	---

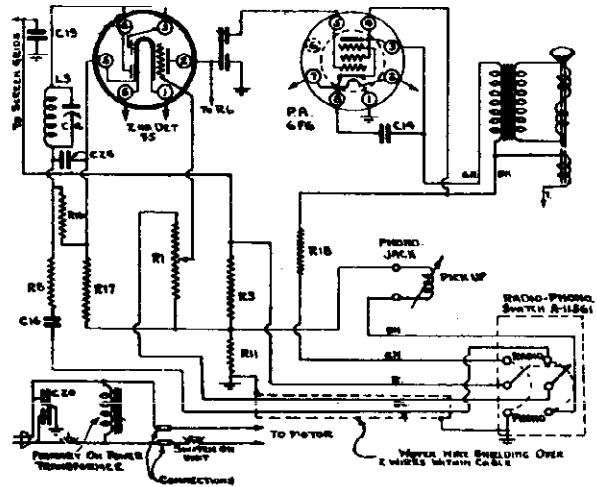
NOTES: Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.

*Zero or 6.0 volts, depending on twist of filament hook-up wire. If Prong No. 1 reads zero, Prong No. 6 (Prong No. 7 of Type 6A7) should read 6.0 volts, and vice versa.

**Cannot be measured with Weston No. 665, Type 1.



CHASSIS DIAGRAM

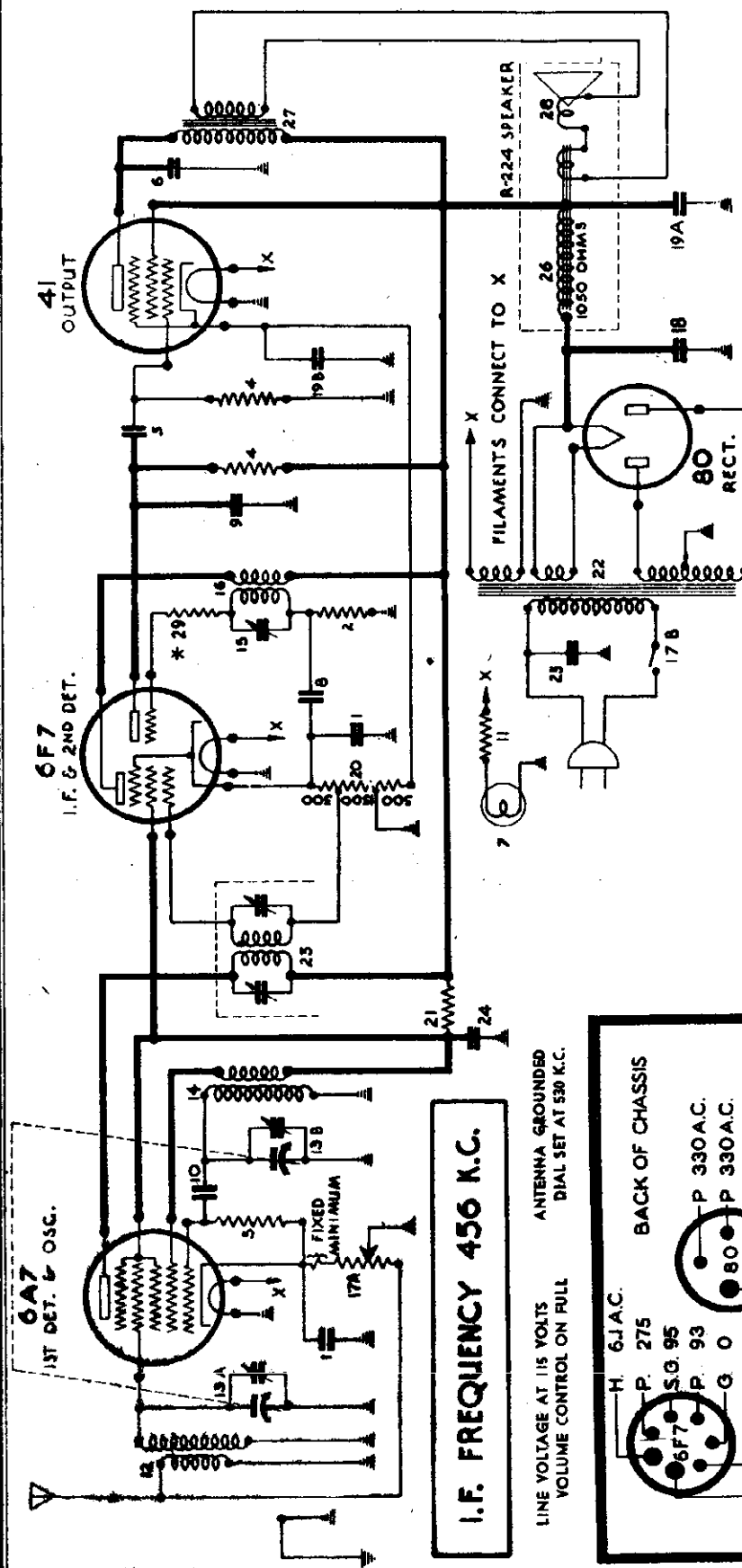


CIRCUIT FOR PHONOGRAPH PICK-UP

Schematic, Socket, Voltage
Parts List

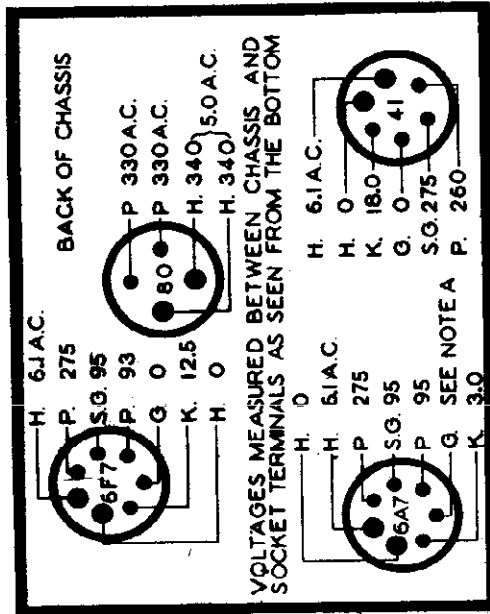
STEWART WARNER CORP.

MODELS 1251 to 1239
Chassis R-123



I.F. FREQUENCY 456 K.C.

LINE VOLTAGE AT 115 VOLTS
VOLUME CONTROL ON FULL
ANTENNA GROUND
DIAL SET AT 530 K.C.



VOLTAGES MEASURED BETWEEN CHASSIS AND SOCKET TERMINALS AS SEEN FROM THE BOTTOM

IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltage. All bias voltages change with position of volume control. Use maximum position. 6F7 Periods Grid Cap to ground 10 volts D.C. Speaker field voltage with coil warm is 65 volts D.C. NOTE A: The oscillator grid voltage with the dial set at 530 K.C. and volume 18 control on full should be approximately 4 volts (300 volt scale).

R-123 PARTS LIST

(SEE OTHER SIDE FOR MISCELLANEOUS PARTS)

Diag. Part No.	Description	List Price
1	1 mfd. 100 volt paper condenser...	.80
2	1.1 megohm, 1/4 w. carbon resistor...	.20
3	.02 mfd. 600 volt paper condenser...	.35
4	510,000 ohm, 1/4 w. carbon resistor...	.20
5	51,000 ohm, 1/4 w. carbon resistor...	.30
6	.01 mfd. 600 volt paper condenser...	.15
7	6.3 volt dial light bulb...	.30
8	.05 mfd. 100 volt paper condenser...	.25
9	.002 mfd. 1000 v. paper condenser...	.25
10	.00026 mfd. mica condenser...	.25
11	10 ohm, flexible resistor...	.80
12	Antenna coil	2.00
13A	Two section gang condenser...	.85
13B	Oscillator coil	.30
14	2nd I.F. trimmer condenser	.60
15	2nd I.F. transformer coil	1.15
16	7500 ohm vol. cont. (with 350 ohm faced minimum) and line switch...	.85
17A	6 mfd. 400 v. wet elec. condenser...	.85
17B	6 mfd. 400 v. wet elec. condenser...	.85
18	83960	
19A	15 mfd. 350 v. dry electro. cond. Model R-123-A only	
19B	10 mfd. 25 v. dry electro. cond. Also see 84399	
20	Metal clad tapped bias resistor	
21	25,000 ohm, 2 watt carbon resistor	
22	Power trans., 115 volts, 60 cycles (Model R-123-A) (See No. 84400 & 84402 for other voltages & freq.)	
23	1st I.F. transformer	
24	1 mfd. 200 volt paper condenser	
25	.012 mfd. 1000 volt shielded paper condenser	
26	Field coil and housing (1050 ohms)	
27	Output transformer	
28	Diagram and shell assembly	
29	2500 ohm, 1/4 watt carbon resistor	
30	5 mfd. 350 v. dry electro. cond. R-123-B & W only	
31	10 mfd. 45 v. dry electro. cond. R-123-B & W only	
32	Power transformer, 115 volts, 25 to 133 cycles (Model R-123-B)	
33	Power transformer 100 to 260 volts. 40 to 133 cycles (Model R-123-W)	
34	6 inch dynamic speaker with output transformer	
35	R-224	

* Diag. No. 29, 2500 ohm resistor is used on small proportion of sets.

MODELS 1231 to 1239
 Chassis R-123
 Circuit Data, Alignment
 Trimmers, Parts List

STEWART WARNER CORP.

STEWART-WARNER MODEL R-123 CHASSIS USED IN RECEIVER MODELS 1231 TO 1239

CIRCUIT DESCRIPTION

The Stewart-Warner Model R-123 Chassis is a four tube superheterodyne, having a tuning range of 530 to 1720 kc. The incoming signal goes to the tuned first detector circuit, and there its frequency is converted to 456 kc. in the 6A7 combination first detector and oscillator tube. This particular frequency is chosen to prevent image frequency interference.

The 456 kc. intermediate frequency signal is amplified by the pentode section of the 6F7 tube. The plate of the pentode section is coupled thru an I. F. transformer to the grid of the triode section, this section operating as the second detector. The triode is then resistance-coupled to the 41 pentode power output tube.

The volume control is double acting. It simultaneously reduces antenna output and increases the bias on the 6A7 tube.

The R-123-A chassis is designed for operation on 105 to 125 volt, 50 to 60 cycle power circuits. The R-123-B Chassis is made for use on 105 to 125 volt, 25 to 133 cycle lines while the R-123-W has a universal power transformer for operation on voltages ranging from 100 to 260 volts and any frequency from 40 to 133 cycles. This universal transformer in the R-123-W has a tapped primary which must be connected for the proper line voltage as shown on the tag attached to the chassis.

CALIBRATION AND ALIGNMENT

TEST EQUIPMENT

A high grade modulated service oscillator and an output meter are absolutely essential in order to properly align the R-123 chassis.

The oscillator should be capable of generating frequencies of 456 and 1400 kc.

PRECAUTIONS

When using your oscillator, do not rely on calibration curves for frequency determination but check the frequencies by comparison with broadcast station signals.

When aligning, keep the oscillator output low so that the second detector does not overload. Use the lowest output meter scale which will provide a steady reading and adjust the oscillator output so that the output meter reads near the center of the scale.

PRELIMINARY STEPS

To align the R-123 Chassis proceed as follows:
 Remove the chassis from cabinet.

Connect the output meter from the 41 plate to chassis through a .25 mfd. condenser. The output meter can be connected across the voice coil terminals on the speaker if the meter is sensitive enough to provide at least half-scale reading.

Turn the volume control to maximum volume position.

TRIMMER LOCATIONS

1. First I. F. transformer trimmers.
2. Second I. F. transformer trimmer.
3. Oscillator calibration trimmer.
4. Detector shunt trimmer.

ALIGNMENT OF THE I. F. AMPLIFIER

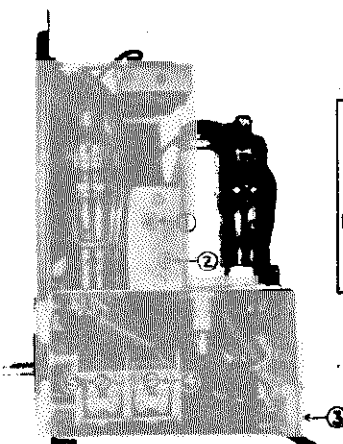
- (a) Set the test oscillator to exactly 456 kc.
- (b) Connect the output leads of the oscillator to the 6A7 control grid and chassis.
- (c) Make certain that no station is tuned in.
- (d) Carefully adjust the I. F. transformer trimmers No. 1, 2 and 3 for maximum output meter reading.
- (e) Repeat the three adjustments, since the adjustment of each trimmer has some effect on the others.

DIAL CALIBRATION

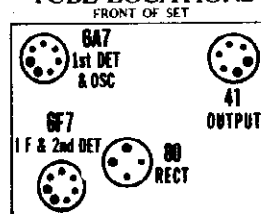
2. Check the position of the dial on the condenser shaft by turning the rotor plates of the gang condenser to full mesh. The dial should then read 530 kc.

3. A broadcast station between 1300 and 1420 kc. should be used to calibrate the dial. If no such station can be heard, you can use a 1400 kc. signal from your oscillator provided its calibration is accurately known. Proceed as follows:

- (a) Tune the receiver dial to the exact frequency reading of the signal (either a station or the oscillator.)
- (b) Carefully adjust the oscillator calibration trimmer No. 4 until the signal may be tuned in with maximum volume at its correct frequency setting.



TUBE LOCATIONS



ALIGNMENT

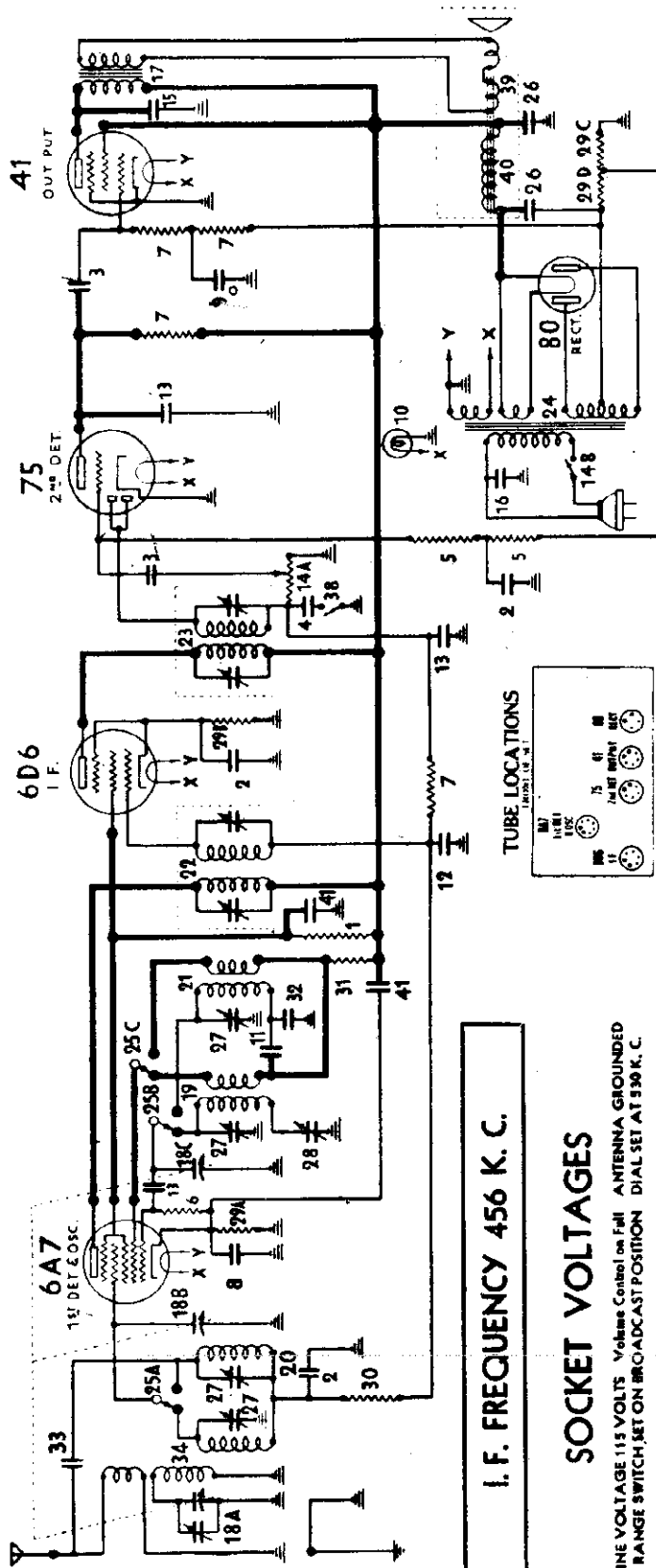
4. (a) Connect a 400 to 500 ohm, 1 watt carbon resistor in series with the test oscillator output and the receiver antenna lead. This resistor is necessary to secure proper alignment of the detector trimmer.
- (b) Ground the receiver chassis and connect the oscillator ground lead to the chassis.
- (c) Set the test oscillator to about 1400 kc. and carefully tune the receiver to the signal.
- (d) Adjust trimmer No. 5 (detector shunt trimmer) for maximum output meter reading.
- (e) Retune the receiver dial to a peak and readjust the trimmer.

MISCELLANEOUS PARTS NOT SHOWN ON CIRCUIT DIAGRAM

Part No.	Description	List Price
17615	Volume Control Mtg. Lock Washer (3/8")	\$0.01
31622	Tuning Dial Set Screw	.02
67034	Volume Control Mtg. Nut (3/8"-32)	.03
67263	No. 6 x 1/4" Self Tapping Screw	.03
81834	Six Prong Tube Socket	.10
81837	Four Prong Tube Socket	.15
81949	Seven Prong Tube Socket	.10
83552	Chassis Mtg. Screw (No. 10 x 3/8" Self Tapping)	.03
83574	Dial Light Socket and Bracket	.15
83578	Escutcheon Mtg. Wood Screw (No. 1 x 1/2" R.H.)	.01
83587	Front Plate Mtg. Screw (No. 8 x 1 1/4" Ornamental Head)	.01
83624	No. 8 x 1/4" Self Tapping Screw	.01
83941	Tuning Dial and Bushing	.40
83945	Volume Control Dial & Bracket	1.10
83970	Escutcheon Plate	.25
84015	Knob Washer (Paper 3/8" O.D.)	.01
84016	Rubber Washer (3/8" O.D.)	.02
84017	Knob (Model 1231)	.14
84130	Metal Front Grill (Model 1235 Only)	.80
84343	Knob (Model 1235 & 1236)	.18
84541	Wave Trap (to Eliminate 456 K.C. Code Interference)	1.00

STEWART WARNER CORP.

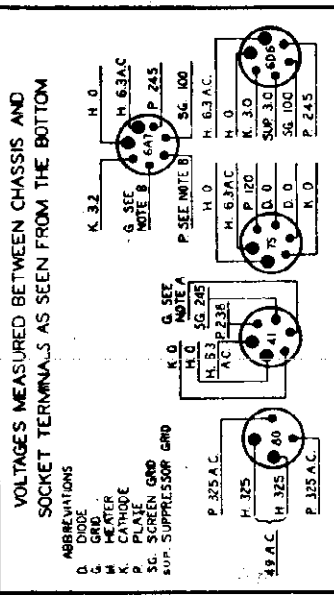
MODELS 1251 to 1259
Chassis R-125
Schematic, Socket
Voltage, Parts



I. F. FREQUENCY 456 K. C.

SOCKET VOLTAGES

LINE VOLTAGE 115 VOLTS Volume Control on Full ANTENNA GROUNDED RANGE SWITCH, SET ON BROADCAST POSITION DIAL SET AT 530 K. C.



IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt. Readings will vary according to the voltage range of meter, being higher for higher range instrument. This variation is most marked for second detector plate voltage.
Speaker field voltage with coil warm is 73 volts D. C.
NOTE A: The actual bias on the 41 output tube is -16.5 volts measured across the metal clad bias resistor 43C and 43D. The grid bias on the 75 2nd detector tube is -1.5 volts measured across the metal clad bias resistor 43C.
NOTE B: The oscillator plate voltage with the range switch on broadcast position and with the dial set at 530 K.C. should be approximately 172 volts. The oscillator grid voltage under similar conditions should be approximately -22 volts.

R-125 PARTS LIST

Disc. Part No.	Description	List Price	Disc. Part No.	Description	List Price
1	62183 30,000 ohm, 1 watt carbon resistor	\$0.20	25-A	81191 Range Switch	\$0.75
2	81630 .1 mfd, 100 volt paper condenser	.30	25-B	16 mfd, 250 volt Wet Electrolytic Condenser	1.50
3	83007 .02 mfd, 600 volt paper condenser	.35	25-C	R. F. Trimmer Condenser (3 to 23 mmfd.)	.15
4	83011 .004 mfd, 600 volt paper condenser	.30	26	Oscillator Padding Trimmer (300-600 mmfd.)	.50
5	83072 510,000 ohm, 1/2 watt carbon resistor	.20	27	300 ohm resistor	.45
6	83080 510,000 ohm, 1/2 watt carbon resistor	.20	28	125 ohm resistor	.20
7	83082 260,000 ohm, 1/2 watt carbon resistor	.20	29-A	10,000 ohm, 1/2 watt carbon resistor	.20
8	83215 .25 mfd, 250 volt paper condenser	.30	29-B	16,000 ohm, 1/2 watt carbon resistor	.20
9	83219 .01 mfd, 600 volt paper condenser	.35	30	16,000 ohm, 1/2 watt carbon resistor	.20
10	83252 .01 mfd, 600 volt paper condenser	.35	31	16,000 ohm, 1/2 watt carbon resistor	.20
11	83253 .01 mfd, 600 volt paper condenser	.35	32	16,000 ohm, 1/2 watt carbon resistor	.20
12	83255 .05 mfd, 100 volt paper condenser	.25	33	Antenna Coupling Condenser (20 mmfd.)	.15
13	83259 .00026 mfd, mollied mica condenser	.25	34	Broadcast Pre-selector Coil Assembly consists of No. 81173 and 81178 coils	1.00
14-A	83551 500,000 ohm volume control and line switch	1.25	81312	Output Transformer (on R-227 12" Speaker)	2.50
15	83706 .006 mfd, 600 volt paper condenser	.35	81404	Phonograph Terminal Strip (R-125-X only)	1.10
16	83976 .012 mfd, 1000 volt oilclad paper condenser	.25	81408	Power Transformer (100 to 310 volts, 25 to 133 excels, R-125-X only)	.32
17	84153 Output transformer (for R-226 8 inch speaker)	2.25	81501	Diaphragm and Shell Assembly for R-226 8" Speaker	2.50
18-A	84174 Three gang variable condenser	3.00	81503	Field Coil and Housing for R-226 8" Speaker	3.75
18-B	84174 Three gang variable condenser	3.00	81506	Speaker	3.25
18-C	84174 Three gang variable condenser	3.00	81507	Field Coil and Housing, for R-227 12" Speaker	4.00
19	81180 Broadcast Oscillator Coil	.60	84601	.25 mfd, 300 volt paper condenser	.50
20	81183 Short Wave Antenna Coil	.50			
21	81185 Short Wave Oscillator Coil	.80			
22	81187 1st I. F. Transformer	1.75			
23	81188 2nd I. F. Transformer	1.75			
24	81189 Power Transformer 115 volts, 60 cycles, R-125-X only (See No. 81108 for other voltages and frequencies)	4.00			

MODELS 1251 to 1259

Chassis R-125

Alignment, Trimmers

STEWART WARNER CORP.

MODEL R-125 CHASSIS (Receiver Models 1251 to 1259)**ALIGNING EQUIPMENT**

Experience has definitely shown that a selective radio chassis such as the Stewart-Warner Model R125 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 K.C., 600 K.C., 1400 K.C., 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 R125 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 (center and blue 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 K.C.
- (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 dial on the condenser shaft by pushing the rotor plates of the gang condenser to full mesh. The dial should then read 530 K.C. Please note that the plates should be pushed with the fingers and not turned by means of the dial for this check.

2. Turn the range switch (right hand knob) to the maximum clockwise position, which is the broadcast setting.

3. Calibrate the set at the high frequency end. Use a broadcast station signal between 1300 and 1420 K.C. to calibrate the receiver dial. If no such station can be heard, you can use a 1400 K.C. 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

4. CONNECT A 400 OR 500 OHM, 1 WATT CARBON RESISTOR IN SERIES WITH THE TEST OSCILLATOR OUTPUT AND THE RECEIVER ANTENNA LEAD. THIS RESISTOR MUST REMAIN CONNECTED FOR ALL BROADCAST AND SHORT WAVE ADJUSTMENTS IN ORDER TO SECURE PROPER ALIGNMENT OF THE ANTENNA STAGE. GROUND THE RECEIVER CHASSIS AND CONNECT THE OSCILLATOR GROUND LEAD TO THE CHASSIS.

5. (a) Set the test oscillator to approximately 1400 K.C. 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 K.C. 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 the trimmer.

(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

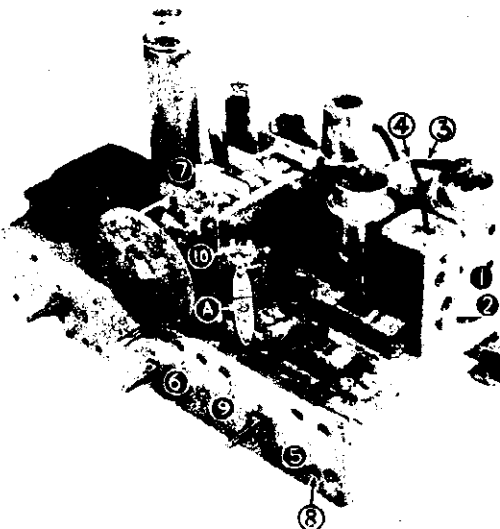
1. Turn the receiver range switch to the short wave band position (counter-clockwise).

2. Adjust the test oscillator to exactly 16,000 K.C. If you cannot obtain this frequency on your oscillator, you may use

the second harmonic of 8000 K.C., the third harmonic of 5333 K.C., or the fourth harmonic of 4000 K.C., all of which will give a 16,000 K.C. signal.

3. (a) Set the receiver dial at 16.0 M.C. on the dial scale and adjust trimmer No. 9 (shortwave range oscillator calibration trimmer) until the signal may be tuned in at the correct dial setting with maximum volume. Usually 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 M.C., 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 $16,000 - 912 = 15,088$ K.C. or approximately 15.1 M.C.) If no signal can be heard at 15.1 M.C. dial setting even with greatly increased test oscillator output, but can be heard at 16.9 M.C. 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 re-adjusting trimmer No. 9, again check to see that the image comes in at 15.1 M.C. dial setting and not at 16.9 M.C. dial setting.

**SHORT WAVE RANGE ALIGNMENT**

4. (a) Tune the set very carefully to the oscillator frequency, 16.0 M.C. for maximum output meter reading.

(b) Adjust trimmer No. 10 (second 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.

IMPORTANT: The antenna coupling condenser marked "A" in the diagram is adjusted to a definite capacity at the factory and should not require any further adjustment. Therefore do not adjust trimmer "A" unless it is found that trimmer No. 10 will not peak or if maximum output is obtained with No. 10 either all the way out or all the way in. If it is necessary to adjust trimmer "A", turn its adjusting screw all the way in and then turn it out just far enough to give a satisfactory peak on No. 10 when trimmer No. 10's adjusting screw is almost all the way out.

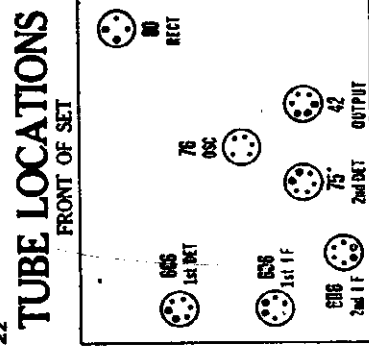
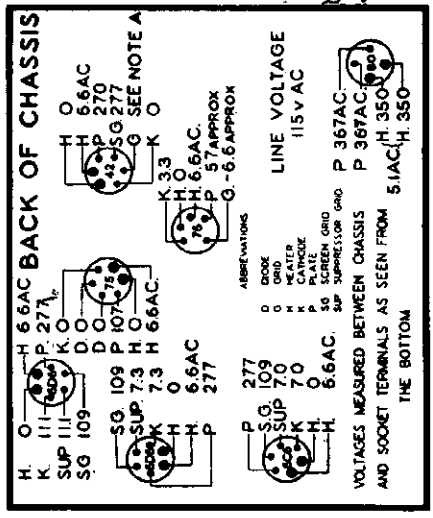
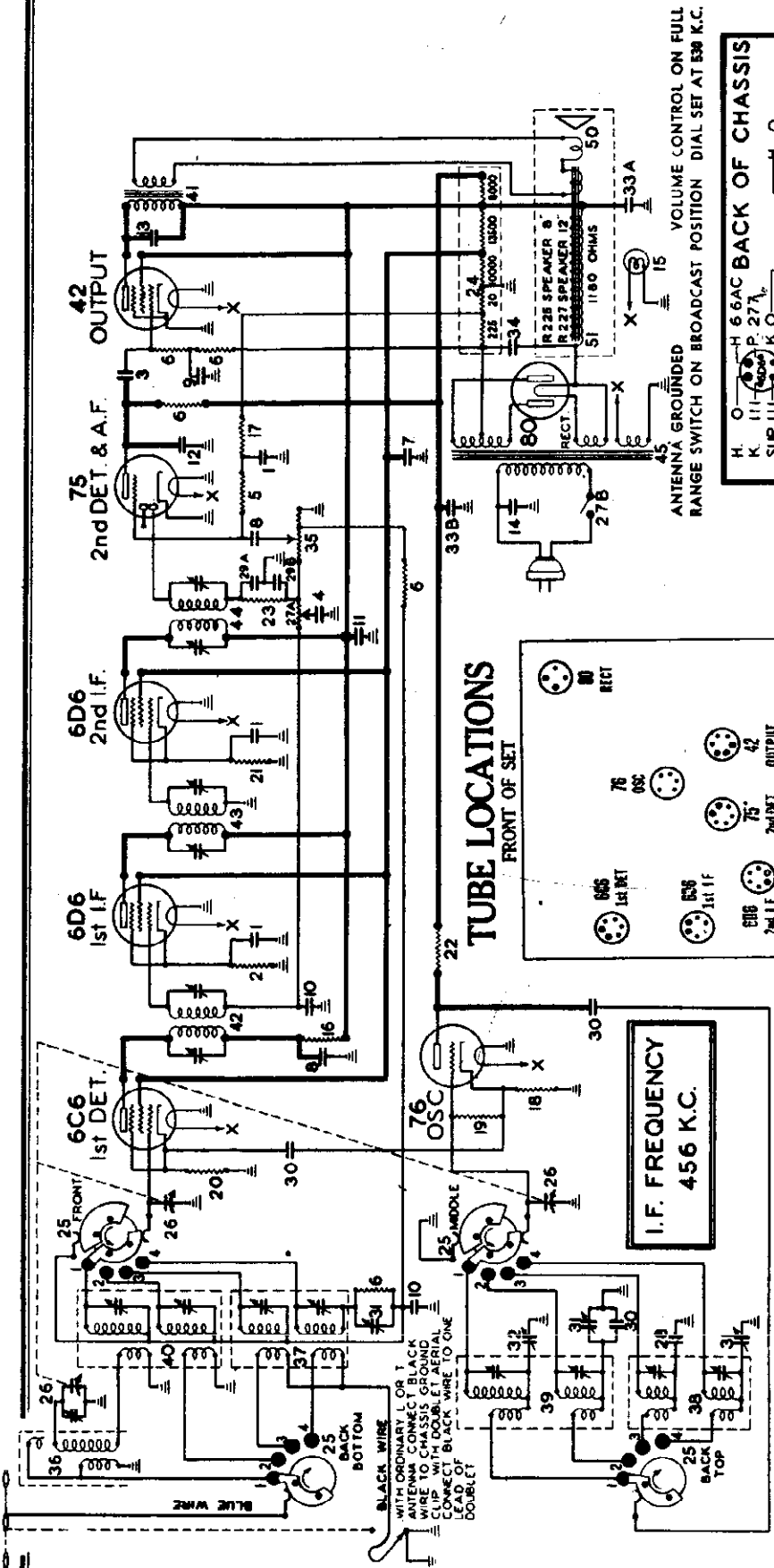
Always readjust No. 10 after adjusting trimmer "A".

(c) Check the adjustment of trimmer No. 10 by tuning the receiver to 15.1 M.C. and noting if the image signal is much weaker than the 16.0 M.C. signal. If the signal at 15.1 M.C. dial setting is equal to or stronger than the 16.0 M.C. signal, trimmer No. 10 is not set to the proper peak and must be reset as in 4 (b) until a re-check shows that the signal at the 16.0 M.C. dial setting is much stronger than that at the 15.1 M.C. image dial setting.

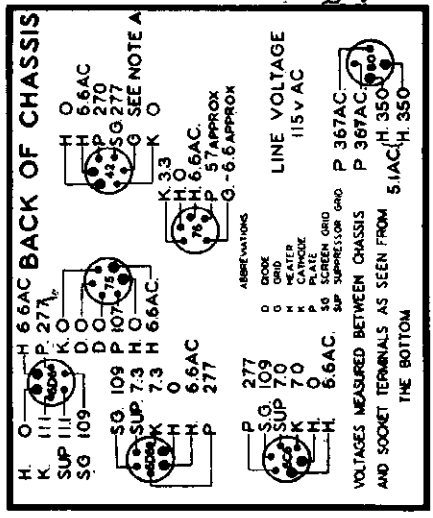
NOTE: To prevent the trimmers from being jarred out of adjustment use Duco Household Cement or some similar product to fasten the trimmer screws in position after completing the alignment. Be careful that you do not apply too much cement because it must not be allowed to run between the trimmer plates.

STEWART WARNER CORP.

MODELS 1261 to 1269
Chassis R-126
Schematic, Socket
Voltage, Parts



Diag. Part No.	Description	Part No.	Description
1	81680 .1 mfd. 100 v. cond.	40	84308 {B.C. 1st det. coil & trimmer}
2	81859 1500 ohm. 1/4 w. res.	41	84312 {No. 2 ant. coil and trimmer}
3	83007 .02 mfd. 600 v. cond.	42	84320 Output transformer
4	83011 .004 mfd. 600 v. cond.	43	84321 1st I.F. trans. (or sub. 84187)
5	83072 510,000 ohm 1/4 w. res.	44	84322 2nd I.F. trans. (or sub. 84187)
6	83082 260,000 ohm 1/4 w. res.	45	84324 3rd I.F. trans. (or sub. 84188)
7	83214 .25 mfd. 250 v. cond.		Power transformer (115 volt 60 cycles) (R-126-A only)
8	83219 .01 mfd. 600 v. cond.		(See 84410 for 100-240 volts)
9	83352 .015 mfd. 600 v. cond.	46	84404 Phono. switch (R-126-X only)
10	83353 .05 mfd. 100 v. cond.	47	84407 Phonograph Terminal Strip
11	83440 .1 mfd. 400 v. cond.		(R-126-X only)
12	83559 .00026 mfd. mica cond.	48	84410 Power trans. (100 to 240 volts, 25 to 133 cycles) (R-126-P & X)
13	83706 .006 mfd. 600 v. cond.	49	84412 Phonograph Terminal Strip
14	83766 .012 mfd. 1000 v. cond.		(R-126-P only)
15	84058 Dial bulb (6-8 volt)	50	84504 Diaphragm and shell asm. for 8" speaker (also see 84506)
16	84199 16,000 ohm. 1/4 w. res.	51	84505 Field coil asm. R-225 speaker
17	84335 1.1 meg. 1/4 w. res.		Diaphragm and shell asm. for R-227 12" speaker
18	84337 510 ohm. 1/4 w. res.		Field coil asm. R-227 speaker
19	84338 11,000 ohm. 1/4 w. res.		{No. 3 ant. coil and trimmer}
20	84339 6,100 ohm. 1/4 w. res.		{No. 3 osc. coil and trimmer}
21	84340 4,000 ohm. 1/4 w. res.		{No. 4 osc. coil and trimmer}
22	84341 31,000 ohm. 1/4 w. res.		{Broadcast osc. coil & trimmer}
			{No. 2 osc. coil and trimmer}



IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.
Speaker field voltage with coil warm is 75 volts.
Note A: The actual bias on the 42 tube is -17.5 V. measured across the 225 and 20 ohm sections of the voltage divider. The grid bias on the 75 tube is -1.4 V. volts measured across the 20 ohm section of the voltage divider.

MODELS 1261 to 1269
Chassis R-126
Circuit Data, Trimmers
Alignment

STEWART WARNER CORP.

STEWART-WARNER MODEL R-126 CHASSIS

CIRCUIT DESCRIPTION

The Stewart-Warner Model R-126 chassis is a sensitive all-wave superheterodyne covering a frequency range from 530 kilocycles to 23 megacycles in four tuning ranges. This range can be selected by means of the range switch. This range switch is used to connect proper coils into the antenna and trimmer condensers, and to connect the proper range oscillator circuit to the oscillator section of the chassis. The range switch can be properly adjusted to give maximum efficiency on every frequency range. The spacing between the two coils wound on each form is sufficient to prevent coupling. To further guard against dead spots due to the absorption effect of the antenna coils, the antenna coils are wound on two separate forms which then circuit all coils of the ranges lower in frequency than the one in use.

Special, electrically symmetrical, antenna coils are employed so that efficient, relatively noise-free, shortwave reception can be obtained. The antenna coils are wound on two separate forms with an additional coupling device between them. These coils are designed so that a standard antenna having a single wire lead-in can be used where the noise level is low on the shortwave ranges. A tuned preselector circuit is used only on the broadcast range to improve selectivity by passing through the circuit only the desired broadcast signal. The 6C5 oscillator tube to produce a 456 kc. intermediate frequency signal. This particular frequency is chosen as the best value for an all-wave receiver, since it reduces image interference on the shortwave ranges. The 456 kc. signal is amplified by the two-stage, high-gain 6C6 detector and amplifier tube. The 6C6 tube is designed to give a voltage drop across the 500,000 ohm volume control. Any selected part of this voltage is impressed on the triode section of the 75 tube.

The triode section of the 75 tube operates as an audio frequency amplifier, which is resistance coupled to the 42 tube. The A.V.C. voltage is secured by smoothing out the modulated D.C. voltage drop across the volume control and applying it to the control grid of the first I.F. tube. To improve the A.V.C. action, part of the voltage is also applied to the control grid of the 6C5 first detector tube.

CALIBRATION AND ALIGNMENT

TEST EQUIPMENT

Experience has definitely shown that a selective radio chassis such as this requires a test set which cannot be properly aligned by ear or on the air. A high impedance, low capacity test oscillator and an output meter 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 4900 kc., or more. This oscillator must provide the range of signal output—very important for proper alignment of the oscillator section. The test set must be capable of accurate adjustment and very strong for use when the receiver is badly out of adjustment or for shortwave alignment where harmonics may be used.

PRECAUTIONS

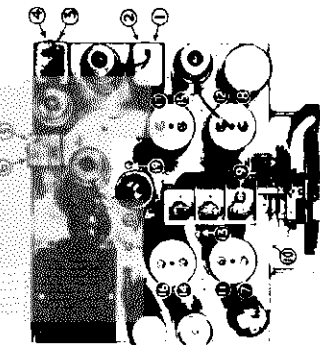
When using your oscillator do not rely on calibration curves for frequency determination but check the frequencies by comparison with broadcast stations and alignment.

At all times during calibration and alignment use the lowest output meter scale which will provide a steady reading and adjust the oscillator output so that the output meter scale reads zero.

For making trimmer adjustments use a ball-bearing aligning tool which has only a small metal screw driver tip. Very important: In aligning all but the I.F. stages it is absolutely necessary to have a 400 to 500 ohm CARBON resistor in series with the antenna lead to the oscillator. Do not omit this resistor or the alignment will be incorrect!

4. Use a broadcast station signal between 1300 and 1420 kc. to calibrate the receiver dial on the broadcast range. If no such station can be heard, you can use a 1400 kc. signal from your own oscillator. The calibration is accurately known.

- (a) Set the receiver dial pointer to the exact frequency setting of the signal reference station on the oscillator.
- (b) Carefully adjust trimmer No. 11 (Range No. 1 broadcast oscillator) until the signal meter shows a peak with the screw farther out. After re-adjusting trimmer No. 11 again check to see that the image comes in at 3100 kc. dial setting.



TRIMMER LOCATIONS

I. F. AMPLIFIER

- 1. 1st I.F. transformer trimmer
- 2. 2nd I.F. transformer trimmer
- 3. 3rd I.F. transformer trimmer
- 4. 4th I.F. transformer trimmer
- 5. 5th I.F. transformer trimmer
- 6. 6th I.F. transformer trimmer

530 TO 1540 K.C. BROADCAST RANGE

- 7. Range No. 1 (Broadcast) oscillator calibration trimmer
- 8. Range No. 1 (Broadcast) detector short trimmer
- 9. Range No. 1 (Broadcast) pre-selector short trimmer
- 10. Range No. 1 (Broadcast) oscillator padding trimmer
- 11. 1500 TO 4900 K.C. SHORTWAVE RANGE
- 12. Range No. 2 oscillator calibration trimmer
- 13. Range No. 2 detector short trimmer
- 14. Range No. 2 oscillator padding trimmer
- 15. Range No. 3 oscillator calibration trimmer
- 16. Range No. 3 detector short trimmer

11.0 TO 23.0 MC. SHORTWAVE RANGE

- 17. Range No. 4 oscillator calibration trimmer
- 18. Range No. 4 detector short trimmer
- 19. Range No. 4 oscillator padding trimmer
- 20. Range No. 4 detector padding trimmer

CALIBRATION AND ALIGNMENT

The following procedure, on the proper adjustment of the various trimmers provided on the chassis, will insure proper alignment and alignment. Calibration consists of the adjustment of the trimmers so that the signals can be received at the proper dial settings. Calibration on the R-126 is made at the high frequency end of the dial. In addition, there is also a calibration procedure for the adjustment of trimmers such that the antenna and oscillator circuits are tuned to give maximum sensitivity. Alignment thus does not concern the dial setting so that it is often only necessary to check calibration. However, it is often necessary to check alignment and frequency end of the dial. This calibration and alignment procedure is independent of all others so that one range may be recalibrated or re-aligned without necessitating going over the trimmer adjustments on any of the other ranges.

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 control grid and grid leak switch (lower center knob) to the broadcast position (dial pointer on black dial scale). Make certain that no station is tuned in.
- 2, 3, 4, 5, and 6 for maximum output meter deflection.
- (c) Carefully adjust the I.F. Transformer trimmer No. 11.
- (d) Check trimmer No. 11 for maximum output meter deflection. The adjustment of each trimmer has some effect on the others.

RANGE NO. 1 (BROADCAST) CALIBRATION

- 1. Check the position of the dial on the condenser shaft by turning the dial to the broadcast position (dial pointer on black dial scale). The dial should then read 530 kc. (The last division at low frequency end of the broadcast range.)
- 2. Leave the range switch in the broadcast position.

(c) To be sure you have not adjusted trimmer No. 11 to the image frequency, check this point by tuning the receiver dial to the image frequency, approximately 3100 kc. If the signal is heard, the trimmer is properly adjusted. The image signal frequency must be the I.F. frequency or in this case approximately 912 = 3088 kc. or approximately 3100 kc. If no signal can be heard at about 3100 kc. dial setting even with greatly increased test oscillator output, trimmer No. 11 is properly adjusted. If a signal is heard at about 3100 kc. dial setting, the screw farther out. After re-adjusting trimmer No. 11 again check to see that the image comes in at 3100 kc. dial setting.

RANGE NO. 2 ALIGNMENT

- 11. (a) Turn the set very carefully to the oscillator signal at 4000 kc. for maximum output meter reading.
- (b) Adjust trimmer No. 12 (range No. 2 detector short trimmer).
- (c) Check the adjustment of trimmer No. 12 by tuning the receiver to the image at about 3100 kc. and noting if the image signal is much weaker than the 4000 kc. signal. If the signal at 3100 kc. dial setting is equal to or stronger than the 4000 kc. signal, trimmer No. 12 is not set to the proper peak. Adjust trimmer No. 12 until the image signal is much weaker than the 4000 kc. signal.
- 12. (a) Set the test oscillator to approximately 1750 kc. and tune the receiver to the signal.
- (b) Adjust trimmer No. 13 (range No. 2 oscillator padding trimmer) to get maximum output meter deflection.
- (c) Return the receiver dial to a peak and readjust the trimmer.
- (d) Continue this procedure of adjusting the trimmer and returning the dial until the output meter reading cannot be further increased.

RANGE NO. 3 CALIBRATION

- 13. Turn the receiver range switch to the range No. 3 position, (dial pointer on green dial scale).
- 14. (a) Adjust the test oscillator to exactly 12,000 kc. If you cannot obtain this frequency on your oscillator, you may use a test oscillator which has this frequency. The harmonic at 4000 kc. or the fourth harmonic of 3000 kc., all of which will give a 12,000 kc. signal.
- (b) Set the receiver dial pointer at exactly 12.0 mc. on the green dial scale and adjust trimmer No. 14 (range No. 3 oscillator calibration trimmer) until the signal is tuned in with maximum volume. Usually there will be two peaks. The proper peak is the one with the higher volume.
- (c) To be sure you have not adjusted trimmer No. 14 to the image frequency, check this point by tuning the receiver dial to the image frequency, approximately 11.1 mc. and see if the image signal can be heard. If no signal can be heard at 11.1 mc. dial setting, you are with greatly increased test oscillator output. If a signal is heard at 11.1 mc. dial setting, the screw farther out. After re-adjusting trimmer No. 14 again check to see that the image comes in at 11.1 mc. dial setting.

RANGE NO. 3 ALIGNMENT

- 15. (a) Tune the set very carefully to the oscillator signal at 12.0 mc. for maximum output meter reading.
- (b) Adjust trimmer No. 15 (range No. 3 detector short trimmer) to a peak. After this is done try to increase the output meter by detuning trimmer No. 15 slightly and returning the receiver dial. Continue detuning trimmer No. 15 and returning the set until maximum output meter deflection is obtained.
- (c) Check the adjustment of trimmer No. 15 by tuning the receiver to the image at 11.1 mc. and noting if the image signal is much weaker than the 12.0 mc. signal. If the image signal at 11.1 mc. dial setting is equal to or stronger than the 12.0 mc. signal, trimmer No. 15 is not set to the proper peak and adjust trimmer No. 15 until the image signal is much weaker than the 12.0 mc. signal. If the image signal is much stronger than the 12.0 mc. signal, trimmer No. 15 is not set to the proper peak and adjust trimmer No. 15 until the image signal is much stronger than the 12.0 mc. signal.

RANGE NO. 2 CALIBRATION

- 9. Turn receiver range switch to the range No. 2 position. (Dial pointer on red dial scale.)
- 10. (a) Adjust the oscillator to exactly 4900 kc.
- (b) Set the receiver dial pointer to exactly 4900 kc. on the red dial scale and adjust trimmer No. 11 (range No. 2 broadcast oscillator) until the signal meter shows a peak with the screw farther out. After re-adjusting trimmer No. 11 again check to see that the image comes in at 3100 kc. dial setting.

STEWART WARNER CORP.

MODELS 1261 to 1269
Chassis R-126
Alignment, Part 2
Parts List
MODELS R-126-P, R-126-X

RANGE NO. 4 CALIBRATION

16. Turn the receiver range switch to the No. 4 position, (dial pointer on purple dial scale).

17. Leave the test oscillator set to exactly 12,000 kc.
(a) Set the receiver dial pointer to exactly 12.0 mc. on the purple dial scale.

(b) Adjust trimmer No. 18 (range No. 4 oscillator padding trimmer) until the signal gives maximum output meter reading.

(c) To be sure that you have not adjusted trimmer No. 18 on the image frequency, tune in the image signal at approximately 11.1 mc. on the receiving dial. If no signal can be heard at 11.1 mc. even with greatly increased test oscillator output, but can be heard at 12.9 mc. dial setting, trimmer No. 18 is evidently adjusted to the image frequency and so must be reset to the proper peak with the trimmer screw farther out. After re-adjusting trimmer No. 18, again check to see that the image comes in at 11.1 mc. dial setting and not at the 12.9 mc. dial setting.

18. (a) Set the test oscillator to exactly 20,000 kc. If your oscillator cannot reach this frequency, use the 2nd harmonic of 10,000 kc., the third harmonic of 6666 kc., the fourth harmonic of 5000 kc., or the fifth harmonic of 4000 kc. all of which will give a 20,000 kc. signal

(b) Set the receiver dial pointer to exactly 20.0 mc. on the purple dial scale.

(c) Adjust trimmer No. 16 (range No. 4 oscillator calibration trimmer) until the signal is tuned in with maximum volume. In adjusting the trimmer, there usually will be two peaks. The proper one is that with the trimmer screw farthest out.

(d) To be sure you have not adjusted trimmer No. 16 to the image frequency, check this point by tuning the receiver dial to the image frequency, approximately 19.1 mc. and see if the image signal can be heard. If no signal can be heard at 19.1 mc. dial setting even with greatly increased test oscillator output, but can be heard at 20.9 mc. dial setting, trimmer No. 16 is evidently improperly adjusted to the image frequency and so must be reset to the proper peak with the screw farther out. After re-adjusting trimmer No. 16 again check to see that the image comes in at 19.1 mc. dial setting and not at 20.9 mc. dial setting.

RANGE NO. 4 ALIGNMENT

19. (a) Tune the set very carefully to the oscillator frequency, 20.0 mc., for maximum output meter reading.

(b) Adjust trimmer No. 17 (range No. 4 detector shunt trimmer) to a peak. After this is done try to increase the output meter reading by detuning trimmer No. 17 slightly and retuning the receiver dial. Continue detuning trimmer No. 17 and retuning the set until maximum output meter deflection is secured.

(c) Check the adjustment of trimmer No. 17 by tuning the receiver to 19.1 mc. and noting if the image signal is much weaker than the 20.0 mc. signal. If the signal at 19.1 mc. dial setting is equal to or stronger than the 20.0 mc. signal, trimmer No. 17 is not set to the proper peak and must be reset as in 19b until a recheck shows that the signal at the 20.0 mc. dial setting is much stronger than that at the 19.1 mc. image dial setting.

20. (a) Set the test oscillator to about 12,000 kc. or use the second harmonic of 6000 kc., the third harmonic of 4000 kc., or the fourth harmonic of 3000 kc., all of which give a 12,000 kc. signal.

(b) Tune the set very carefully to the oscillator signal at 12.0 mc. to get maximum output meter reading.

(c) Adjust trimmer No. 19 (range No. 4 detector padding trimmer) to get maximum output meter deflection.

(d) Retune the receiver dial to a peak and readjust the trimmer.

(e) Continue this procedure of adjusting the trimmer and retuning the receiver until the output meter reading cannot be increased.

(f) Check the adjustment of padding trimmer No. 19 by tuning the receiver dial to the image signal at 11.1 mc. and noting if the image signal is much weaker than the 12 mc. signal. In case the signal at the 11.1 mc. dial setting is equal to or stronger than the signal at 12.0 mc., padding trimmer No. 19 must be re-adjusted to a different peak as in 20 (c), 20 (d) and 20 (e), so that the 11.1 mc. dial setting signal is much weaker than the 12.0 mc. dial setting signal.

NOTE: To prevent the trimmers from being jarred out of adjustment, use Duco Household Cement or some similar product to fasten the trimmer screws in position after completing the alignment. Be careful that you do not apply too much cement because it must not be allowed to run between the trimmer plates.

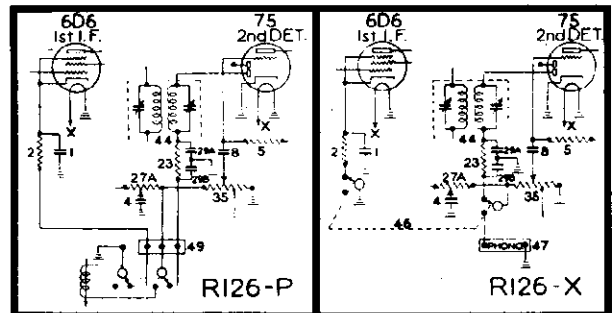
MISCELLANEOUS PARTS NOT SHOWN ON CIRCUIT DIAGRAM

PART No.	DESCRIPTION	LIST PRICE
17615	Lock Washer for range switch.....	.01
67034	Mtg. nut for range switch, tone and volume controls.....	.03
67263	No. 6 x 1/4" hex. head self tapping screw.....	.03
67567	Large terminal lug for No. 84288 wet electrolytic condenser.....	.05
67568	Extruded insulating washer for No. 84288 electrolytic condenser.....	.05
67681	Plain insulating washer for No. 84288 electrolytic condenser.....	.03
67977	Chassis mounting screw (No. 14 self tapping).....	.03
81090	Escutcheon mounting screws (No. 1 x 1/4").....	per 100 .60
81091	Speaker mounting screw (Console models only).....	.01
81214	Set screw (for No. 84430 knob).....	.02
81433	Set screw (for No. 84431 lever knob).....	.10
81723	Ground clip.....	.10
81834	6 prong tube socket.....	.10
81837	4 prong tube socket.....	.15
81951	5 prong tube socket.....	.10
83249	Felt knob washer.....	.01
83318	Rubber grommet for mtg. gang condenser.....	.03
83497	Knob for volume and tone control.....	.20
83560	Tube shield.....	.15
83587	Baffle mounting screw (ornamental head).....	.01
83614	Mtg. nut for No. 84286 Dual electrolytic condenser.....	.03
83668	Mtg. nut for No. 84288 Wet electrolytic condenser.....	.03
84203	2 lug terminal strip.....	.05
84234	Tube shield cap.....	.05
84270	Dial Escutcheon.....	.65
84287	Lock washer for No. 84286 Dual electrolytic condenser.....	.01
84318	Shielded control grid lead and clip.....	.20
84328	Shielded volume control cable.....	.30
84339	Cardboard filter (Models 1261 and 1262 only).....	.03
84405	Knurled nut for phonograph switch.....	.02
84406	Escutcheon for phonograph switch.....	.02
84421	Lock washer for phonograph switch.....	.01
84428	Chassis mounting rubber washer.....	.03
84430	Knob for tuning control.....	.25
84431	Lever knob for range switch.....	.35

MODEL R-126 TUNING DRIVE PARTS

PART No.	DESCRIPTION	LIST PRICE
81108	Shaft Positioning Spring.....	.01
81109	Small Rubber Drive Ring.....	.03
81114	Gear Sector and Dial Disc Set Screw.....	.04
84246	Large Rubber Drive Ring.....	.02
84252	Vernier Drive Shaft with Drive Rings.....	.40
84253	Knob Drive Shaft and Knurled Drive.....	.20
84256	Dial Disc and Bushing.....	.30
84257	Gear Sector and Bushing.....	.20
84258	Dial Pointer and Bracket.....	.50
84259	Dial Light Bracket and Socket.....	.20
84260	Dial, Frame, and Rack Assembly.....	.75
84265	Dial Guide Bracket.....	.15
84272	Front Variable Condenser and Drive Mtg. Bracket.....	.15
84276	Dial only.....	.45

MODEL R126-P AND R126-X
100 TO 260 VOLTS, 25 TO 133 CYCLES



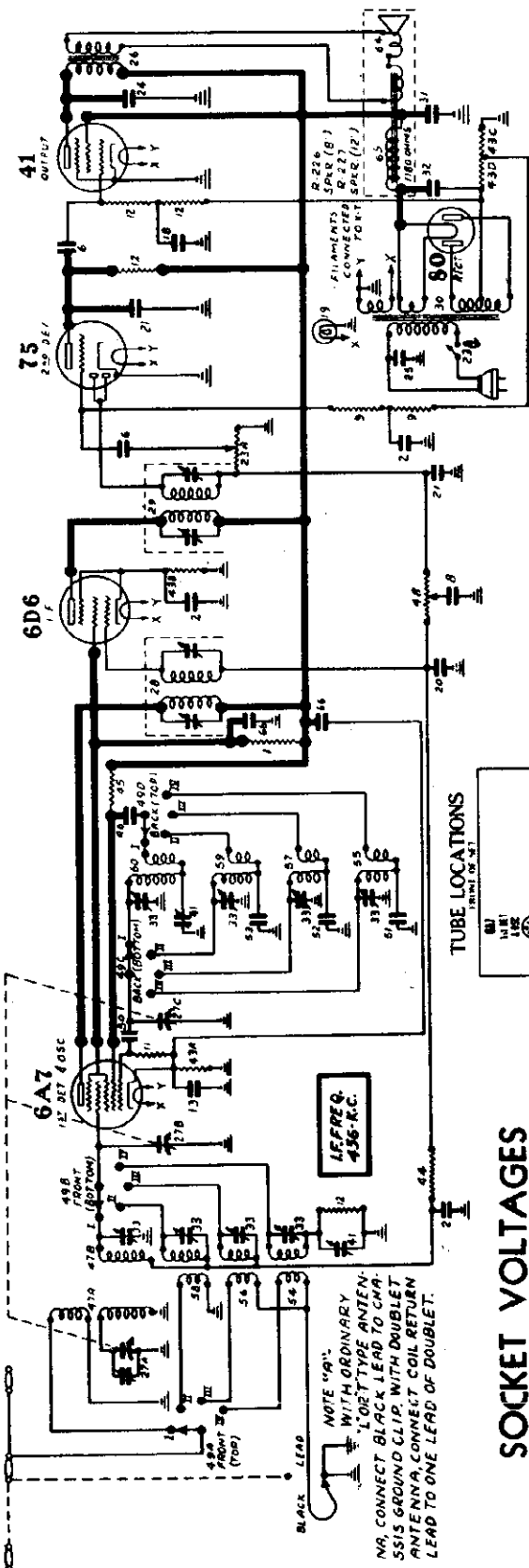
SEE PARTS LIST ON FIRST PAGE FOR PART NUMBERS, DESCRIPTIONS AND PRICES.

PHONOGRAPH AND UNIVERSAL POWER TRANSFORMER CONNECTIONS IN MODEL R-126-P AND R-126-X CHASSIS.

MODELS 1271 to 1279
Chassis R-127
Schematic, Socket
Voltage, Parts

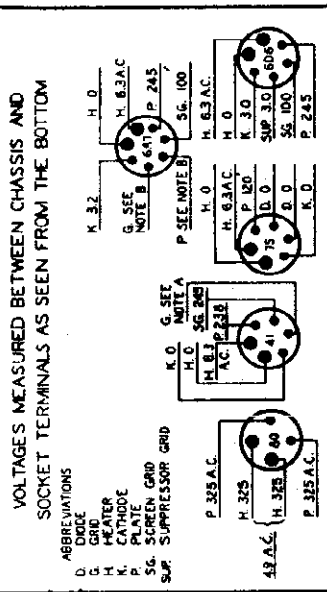
STEWART WARNER CORP.

STEWART-WARNER MODEL R-127 CHASSIS (RECEIVER MODELS 1271 to 1279)



LINE VOLTAGE 115 VOLTS. Volume Control on F.M.I. ANTENNA GROUNDED RANGE SWITCH SET ON BROADCAST POSITION DIAL SET AT 530 K.C.

SOCKET VOLTAGES



NOTE: The actual bias on the 6X4 output tube is -16.5 volts measured across the metal clad bias resistor 40C and 43D. The grid bias on the 75 2nd detector tube is -1.5 volts measured across the metal clad bias resistor 43C.
NOTE B: The oscillator plate voltage with the range switch on broadcast position and with the dial set at 530 K.C. should be approximately 180 volts. The oscillator grid voltage under similar conditions should be approximately -14 volts.

R-127 PARTS LIST

SEE FOURTH PAGE FOR MISCELLANEOUS PARTS

Part No.	Description	List Price
1	6A7 12.5 BT 405C	1.25
2	6D6 12.5 BT 405C	1.25
3	6X4 12.5 BT 405C	1.25
4	6X5 12.5 BT 405C	1.25
5	6X6 12.5 BT 405C	1.25
6	500,000 ohm volume control	.30
7	100,000 ohm range switch	.30
8	16 ohm speaker	.45
9	100,000 ohm resistor	.05
10	500,000 ohm resistor	.05
11	100,000 ohm resistor	.05
12	500,000 ohm resistor	.05
13	100,000 ohm resistor	.05
14	500,000 ohm resistor	.05
15	100,000 ohm resistor	.05
16	500,000 ohm resistor	.05
17	100,000 ohm resistor	.05
18	500,000 ohm resistor	.05
19	100,000 ohm resistor	.05
20	500,000 ohm resistor	.05
21	100,000 ohm resistor	.05
22	500,000 ohm resistor	.05
23	100,000 ohm resistor	.05
24	500,000 ohm resistor	.05
25	100,000 ohm resistor	.05
26	500,000 ohm resistor	.05
27	100,000 ohm resistor	.05
28	500,000 ohm resistor	.05
29	100,000 ohm resistor	.05
30	500,000 ohm resistor	.05
31	100,000 ohm resistor	.05
32	500,000 ohm resistor	.05
33	100,000 ohm resistor	.05
34	500,000 ohm resistor	.05
35	100,000 ohm resistor	.05
36	500,000 ohm resistor	.05
37	100,000 ohm resistor	.05
38	500,000 ohm resistor	.05
39	100,000 ohm resistor	.05
40	500,000 ohm resistor	.05
41	100,000 ohm resistor	.05
42	500,000 ohm resistor	.05
43	100,000 ohm resistor	.05
44	500,000 ohm resistor	.05
45	100,000 ohm resistor	.05
46	500,000 ohm resistor	.05
47	100,000 ohm resistor	.05
48	500,000 ohm resistor	.05
49	100,000 ohm resistor	.05
50	500,000 ohm resistor	.05
51	100,000 ohm resistor	.05
52	500,000 ohm resistor	.05
53	100,000 ohm resistor	.05
54	500,000 ohm resistor	.05
55	100,000 ohm resistor	.05
56	500,000 ohm resistor	.05
57	100,000 ohm resistor	.05
58	500,000 ohm resistor	.05
59	100,000 ohm resistor	.05
60	500,000 ohm resistor	.05
61	100,000 ohm resistor	.05
62	500,000 ohm resistor	.05
63	100,000 ohm resistor	.05
64	500,000 ohm resistor	.05
65	100,000 ohm resistor	.05
66	500,000 ohm resistor	.05
67	100,000 ohm resistor	.05
68	500,000 ohm resistor	.05
69	100,000 ohm resistor	.05
70	500,000 ohm resistor	.05
71	100,000 ohm resistor	.05
72	500,000 ohm resistor	.05
73	100,000 ohm resistor	.05
74	500,000 ohm resistor	.05
75	100,000 ohm resistor	.05
76	500,000 ohm resistor	.05
77	100,000 ohm resistor	.05
78	500,000 ohm resistor	.05
79	100,000 ohm resistor	.05
80	500,000 ohm resistor	.05
81	100,000 ohm resistor	.05
82	500,000 ohm resistor	.05
83	100,000 ohm resistor	.05
84	500,000 ohm resistor	.05
85	100,000 ohm resistor	.05
86	500,000 ohm resistor	.05
87	100,000 ohm resistor	.05
88	500,000 ohm resistor	.05
89	100,000 ohm resistor	.05
90	500,000 ohm resistor	.05
91	100,000 ohm resistor	.05
92	500,000 ohm resistor	.05
93	100,000 ohm resistor	.05
94	500,000 ohm resistor	.05
95	100,000 ohm resistor	.05
96	500,000 ohm resistor	.05
97	100,000 ohm resistor	.05
98	500,000 ohm resistor	.05
99	100,000 ohm resistor	.05
100	500,000 ohm resistor	.05

STEWART WARNER CORP.

MODELS 1271 to 1279 Chassis R-127 Circuit Data, Trimmer Alignment

Service Data for Stewart-Warner R-127 Chassis RECEIVER MODELS 1271 to 1279

- PRELIMINARY STEPS**
- Align the R-127 chassis as shown as follows:
 - Remove the chassis from the cabinet.
 - Transistor the output meter across the primary of the output transformer (center and the other terminal strip).
 - Turn the volume control to maximum volume position.

TRIMMER LOCATIONS

- L. F. AMPLIFIER**
1. 1st. L. F. transformer trimmer
 2. 2nd. L. F. transformer trimmer
 3. 3rd. L. F. transformer trimmer
 4. 4th. L. F. transformer trimmer
 5. 5th. L. F. transformer trimmer
 6. 6th. L. F. transformer trimmer
 7. 7th. L. F. transformer trimmer
 8. 8th. L. F. transformer trimmer
 9. 9th. L. F. transformer trimmer
 10. 10th. L. F. transformer trimmer
 11. 11th. L. F. transformer trimmer
 12. 12th. L. F. transformer trimmer
 13. 13th. L. F. transformer trimmer
 14. 14th. L. F. transformer trimmer
 15. 15th. L. F. transformer trimmer

CIRCUIT DESCRIPTION

The Stewart-Warner Model R127 Chassis is a five tube all wave superheterodyne. It covers a frequency range from 530 to 1700 K.C. in four tuning ranges, which can be selected by means of a range switch. This range switch is used to connect the various oscillator and detector circuits, different coils being used for each range. The use of individual coils results in better performance than they otherwise could give in the tuning range which are used on the chassis.

The R127A Chassis is constructed for use on 105 to 125 volt 50 to 60 cycle power. The R127K is arranged for use on 100 to 266 volt lines at any frequency from 25 to 100 cycles. The universal transformer in the R-127K used for these voltages is of the autotransformer type and has a primary which must be connected to the above on the tag at the chassis.

A special electrically symmetrical antenna coil is employed in this chassis, which is free from wave reception on any additional component of the antenna. The use of the autotransformer type of antenna coil, in conjunction with the antenna and pre-detector coils, results in better performance than they otherwise could give in the tuning range which are used on the chassis.

The oscillator is using the variable capacitor type of oscillator. The oscillator is tuned to the frequency of the broadcast band and pre-detector coil and then tuned to the 647 K.C. calibration and oscillator. The pre-detector coil is tuned to the frequency of the broadcast band and pre-detector coil and then tuned to the 647 K.C. calibration and oscillator. The oscillator is tuned to the frequency of the broadcast band and pre-detector coil and then tuned to the 647 K.C. calibration and oscillator.

The following procedure is divided into the proper adjustment of the various trimmers. Calibration consists of the adjustment of the trimmers so that the signal can be received at the proper dial position. Calibration on the R127 is always made at the high frequency end of the dial. Adjustment consists of adjustment of the trimmer to give maximum sensitivity. Alignment consists of adjustment of the trimmer to give maximum sensitivity. Alignment consists of adjustment of the trimmer to give maximum sensitivity. Alignment consists of adjustment of the trimmer to give maximum sensitivity.

CALIBRATION AND ALIGNMENT OF THE I. F. AMPLIFIER

1. (a) Set the test oscillator to exactly 456 K.C.

2. (b) Connect the output leads of the oscillator to the broadcast band position (right hand knob). Make certain that the stations is tuned in.

3. (c) Gradually adjust the I. F. Transformer trimmer No. 1 until the signal is at maximum volume.

4. (d) Readjust the trimmer until the signal is at maximum volume.

5. (e) Repeat steps 1, 2, 3, and 4.

CALIBRATION AND ALIGNMENT OF MODEL R187 CHASSIS

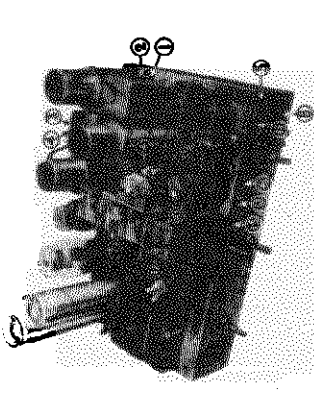
TEST EQUIPMENT

Experience has definitely shown that a selective radio chassis such as the Stewart-Warner Model R187 cannot be properly aligned without the aid of test equipment and a high quality signal source. The oscillator should be capable of generating the frequencies of 456 K.C., 600 K.C., 1200 K.C., and a short wave range according to 4000 K.C. or more. This oscillator must provide a steady range of signal, output—very weak for proper alignment and very strong for the A.V.C. circuit will be used for adjustment and for shortwave alignment where maximum may be used.

PRECAUTIONS

1. When using your oscillator do not set the calibration screw for maximum volume, but adjust the frequency by comparison with broadcast station signal.
2. At all times during calibration and alignment, use the broadcast meter across the primary of the output transformer. Do not use the output meter directly across the output meter leads.
3. For setting the trimmer adjustment use a helical alignment tool which has only a small screw driver tip.
4. **VERY IMPORTANT! BE ALERT! ALWAYS! BUT THE ALIGNMENT LEAD TO THE CALIBRATION TRIMMER DO NOT USE THIS TRIMMER FOR THE ALIGNMENT WILL BE INCORRECT!**

(a) Turn the set dial to the exact frequency setting of the test oscillator. (Range No. 1 broadcast band.) (b) Set the test oscillator to exactly 12,000 K.C. If you use the test oscillator to exactly 12,000 K.C. you may use the second harmonic of 6000 K.C. or the third harmonic of 4000 K.C., or the fourth harmonic of 3000 K.C., all of which will give a 12,000 K.C. signal.



RANGE No. 1 (BROADCAST) ALIGNMENT

4. CONNECT A 400 OHM OR 500 OHM 1 WATT CARBON RESISTOR IN SERIES WITH THE TEST OSCILLATOR OUTPUT AND THE RECEIVER ANTENNA LEAD. THIS RESISTOR MUST REMAIN CONNECTED FOR ALL BROADCAST ALIGNMENT.
5. SET THE TEST OSCILLATOR TO APPROXIMATELY 1400 K.C. AND CHECK THE SIGNAL AT THE HIGH FREQUENCY END OF THE DIAL.
6. ADJUST TRIMMER NO. 1 TO GET MAXIMUM OUTPUT METER DEFLECTION.
7. REPEAT STEPS 5, 6, AND 7.

RANGE No. 2 CALIBRATION

1. Turn receiver range switch to range No. 2 position, which is the third position of the right hand knob when turning it in a clockwise direction.
2. Adjust the oscillator to exactly 4000 K.C.
3. (a) Set the test oscillator to exactly 4000 K.C. and set the volume control to maximum volume.
4. (b) Connect the output leads of the oscillator to the broadcast band position (right hand knob). Make certain that the stations is tuned in.
5. (c) Gradually adjust the I. F. Transformer trimmer No. 1 until the signal is at maximum volume.
6. (d) Readjust the trimmer until the signal is at maximum volume.
7. Repeat steps 3, 4, 5, and 6.

RANGE No. 3 CALIBRATION

1. Turn receiver range switch to range No. 3 position, which is the second position of the right hand knob when turning it in a clockwise direction.
2. Adjust the oscillator to exactly 12,000 K.C. If you use the test oscillator to exactly 12,000 K.C. you may use the second harmonic of 6000 K.C. or the third harmonic of 4000 K.C., or the fourth harmonic of 3000 K.C., all of which will give a 12,000 K.C. signal.
3. (a) Set the receiver dial to 12.0 M.C. on the green dial scale and adjust trimmer No. 11 (Range No. 3 oscillator calibration) until the signal is at maximum volume.
4. (b) Readjust the trimmer until the signal is at maximum volume.
5. (c) Repeat steps 1, 2, 3, and 4.

RANGE No. 4 CALIBRATION

1. Turn the receiver range switch to range No. 4 position, which is the furthest counter-clockwise position.
2. Set the test oscillator to give a 20,000 K.C. signal. If your oscillator cannot reach this frequency, use the 2nd harmonic (10,000 K.C.), the 3rd harmonic (6666.6 K.C.), or the 4th harmonic (5000 K.C.) all of which will give a 20,000 K.C. signal.
3. (a) Set the receiver dial to 20.0 M.C. on the purple dial scale and adjust trimmer No. 13 (Range No. 4 oscillator calibration) until the signal is at maximum volume.
4. (b) Readjust the trimmer until the signal is at maximum volume.
5. (c) Repeat steps 1, 2, 3, and 4.

peak with the set dial to the exact frequency setting of the test oscillator. (Range No. 1 broadcast band.) (b) Set the test oscillator to exactly 12,000 K.C. If you use the test oscillator to exactly 12,000 K.C. you may use the second harmonic of 6000 K.C. or the third harmonic of 4000 K.C., or the fourth harmonic of 3000 K.C., all of which will give a 12,000 K.C. signal.

RANGE No. 2 ALIGNMENT

4. (a) Turn the set very carefully to the oscillator frequency, 12,000 K.C. for maximum output meter reading.
- (b) Adjust trimmer No. 10 (Range No. 2 detector alignment) to a peak.
- (c) Check the adjustment of trimmer No. 10 by tuning the receiver to 3.1 M.C. and noting if the image signal is much weaker than the 4.0 signal. If the signal at 3.1 M.C. dial setting is equal to or stronger than the 4.0 signal, trimmer No. 10 has not set to the proper peak and must be readjusted. The setting of trimmer No. 10 should be such that the image signal setting is much stronger than that at the 3.1 M.C. image dial setting.

RANGE No. 3 CALIBRATION

1. Turn the receiver range switch to range No. 3 position, which is the second position in a clockwise direction.
2. Adjust the test oscillator to exactly 12,000 K.C. If you use the test oscillator to exactly 12,000 K.C. you may use the second harmonic of 6000 K.C. or the third harmonic of 4000 K.C., or the fourth harmonic of 3000 K.C., all of which will give a 12,000 K.C. signal.
3. (a) Set the receiver dial to 12.0 M.C. on the green dial scale and adjust trimmer No. 11 (Range No. 3 oscillator calibration) until the signal is at maximum volume.
4. (b) Readjust the trimmer until the signal is at maximum volume.
5. (c) Repeat steps 1, 2, 3, and 4.

(a) Turn the set very carefully to the oscillator frequency, 12.0 M.C. for maximum output meter deflection in the receiver to 11.1 M.C. and noting if the image signal is much weaker than the 12.0 M.C. signal. If the signal at 11.1 M.C. dial setting is equal to or stronger than the 12.0 M.C. signal, the receiver dial setting is not properly peaked and must be readjusted. The setting of trimmer No. 12 should be such that the image signal setting is much stronger than that at the 11.1 M.C. image dial setting.

RANGE No. 3 ALIGNMENT

4. (a) Tune the set very carefully to the oscillator frequency, 12.0 M.C. for maximum output meter deflection in the receiver to 11.1 M.C. and noting if the image signal is much weaker than the 12.0 M.C. signal. If the signal at 11.1 M.C. dial setting is equal to or stronger than the 12.0 M.C. signal, the receiver dial setting is not properly peaked and must be readjusted. The setting of trimmer No. 12 should be such that the image signal setting is much stronger than that at the 11.1 M.C. image dial setting.

RANGE No. 4 CALIBRATION

1. Turn the receiver range switch to range No. 4 position, which is the furthest counter-clockwise position.
2. Set the test oscillator to give a 20,000 K.C. signal. If your oscillator cannot reach this frequency, use the 2nd harmonic (10,000 K.C.), the 3rd harmonic (6666.6 K.C.), or the 4th harmonic (5000 K.C.) all of which will give a 20,000 K.C. signal.
3. (a) Set the receiver dial to 20.0 M.C. on the purple dial scale and adjust trimmer No. 13 (Range No. 4 oscillator calibration) until the signal is at maximum volume.
4. (b) Readjust the trimmer until the signal is at maximum volume.
5. (c) Repeat steps 1, 2, 3, and 4.

RANGE No. 4 CALIBRATION

1. Turn the receiver range switch to range No. 4 position, which is the furthest counter-clockwise position.
2. Set the test oscillator to give a 20,000 K.C. signal. If your oscillator cannot reach this frequency, use the 2nd harmonic (10,000 K.C.), the 3rd harmonic (6666.6 K.C.), or the 4th harmonic (5000 K.C.) all of which will give a 20,000 K.C. signal.
3. (a) Set the receiver dial to 20.0 M.C. on the purple dial scale and adjust trimmer No. 13 (Range No. 4 oscillator calibration) until the signal is at maximum volume.
4. (b) Readjust the trimmer until the signal is at maximum volume.
5. (c) Repeat steps 1, 2, 3, and 4.

MODELS 1271 to 1279

Alignment, Part 2, Parts

MODEL R-127-X

Data

STEWART WARNER CORP.

(b) To be sure you have not adjusted trimmer No. 13 to the image frequency check this point by setting the receiver dial to the image frequency, approximately 19.1 M.C. and see if the image signal can be heard. If no signal can be heard at 19.1 M.C. dial setting even with greatly increased test oscillator output, but can be heard at 20.9 M.C. dial setting, trimmer No. 13 is evidently improperly adjusted to the image frequency and so must be reset to the proper peak with the screw farther out. After re-adjusting trimmer No. 13 again check to see that the image comes in at 19.1 M.C. dial setting and not at 20.9 M.C. dial setting.

stronger than the signal at 12.0 M.C. dial setting, padding trimmer No. 15 must be re-adjusted to a different peak so that the 11.1 M.C. dial setting signal is much weaker than the 12.0 M.C. dial setting signal.

7. Set the oscillator to exactly 20,000 K.C. and repeat 4 a, 4 b and 4 c.

NOTE: To prevent the trimmers from being jarred out of adjustment use Duco Household Cement or some similar product to fasten the trimmer screws in position after completing the alignment. Be careful that you do not apply too much cement because it must not be allowed to run between the trimmer plates.

RANGE No. 4 ALIGNMENT

4. (a) Tune the set very carefully to the oscillator frequency 20.0 M.C. for maximum output meter reading.

(b) Adjust trimmer No. 14 (Range No. 4 detector shunt trimmer) to a peak. After this is done try to increase the output meter reading value by detuning trimmer No. 14 slightly and retuning receiver dial. Continue detuning trimmer No. 14 and retuning the set until maximum output meter deflection is secured.

(c) Check the adjustment of trimmer No. 14 by tuning the receiver to 19.1 M.C. and noting if the image signal is much weaker than the 20.0 M.C. signal. If the signal at 19.1 M.C. dial setting is equal to or stronger than the 20.0 M.C. signal, trimmer No. 14 is not set to the proper peak and must be reset until a re-check shows that the signal at the 20.0 M.C. dial setting is much stronger than that at the 19.1 M.C. image dial setting.

5. (a) Adjust the test oscillator to 12,000 K.C., or use the second harmonic of 6000 K.C., the third harmonic of 4000 K.C., or the fourth harmonic of 3000 K.C., all of which will give a 12,000 K.C. signal. Carefully tune the dial to the signal at about 12 M.C. on the purple dial scale.

(b) Adjust trimmer No. 15 (Range No. 4 oscillator padding trimmer) for maximum output meter reading and then retune the dial.

(c) Repeat this procedure of adjusting the trimmer and retuning the dial until it does not increase the output meter reading.

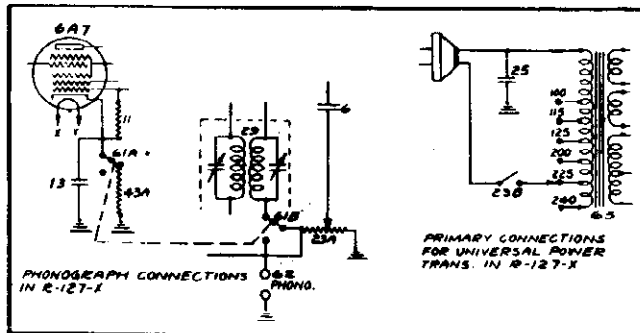
6. Check the adjustment of padding trimmer No. 15 by tuning the receiver dial to the image signal, 11.1 M.C. In case the signal at the 11.1 M.C. dial setting is equal to or

MISCELLANEOUS PARTS NOT SHOWN ON DIAGRAMS

Part No.	DESCRIPTION	List Price
17615	Range Switch, volume control, and tone control lock washer (3/8")	\$0.01
67034	Range Switch, volume control, and tone control mtg. nut (3/8" x .32)	.03
67263	No. 6 x 1/4" self tapping screw	.03
67567	Electrolytic condenser terminal lug (large)	.03
67568	Electrolytic condenser extruded insulating washer	.06
67681	Electrolytic condenser plain insulating washer	.03
81091	Speaker mounting screw (model 1274 only)	.01
81148	3 lug terminal strip	.06
81316	1 lug terminal strip	.04
81723	Ground clip	.10
81834	6 prong tube socket	.10
81837	4 prong tube socket	.15
81949	7 prong tube socket	.10
83249	Felt knob washer	.01
83560	Tube shield	.15
83578	Dial escutcheon screws	.01
83587	Baffle mtg. screws	.01
83668	Electrolytic condenser mtg. nut	.05
83718	Gang condenser mtg. cup washer	.01
83722	Gang condenser mtg. rubber grommet	.05
84203	Two lug terminal strip	.05
84205	Dial light socket and bracket	.25
84213	Dial drive shaft and bearing	.35
84234	Dial face and bushing	.05
84390	Dial face and bushing	.05
84405	Phonograph switch knurled nut (R-127 x only)	.02
84406	Phonograph switch escutcheon (R-127 x only)	.02
84421	Phonograph switch lock washer (R-127 x only)	.01
84428	Rubber chassis mtg. washer	.05
84486	Dial escutcheon	.25
84498	Chassis mtg. screw	.02
84494	Tuning, volume, and tone control knob	.15
84496	Range switch knob	.15

MODEL R127-X CHASSIS

FOR OPERATION ON 100-260 VOLTS, 25 TO 133 CYCLES



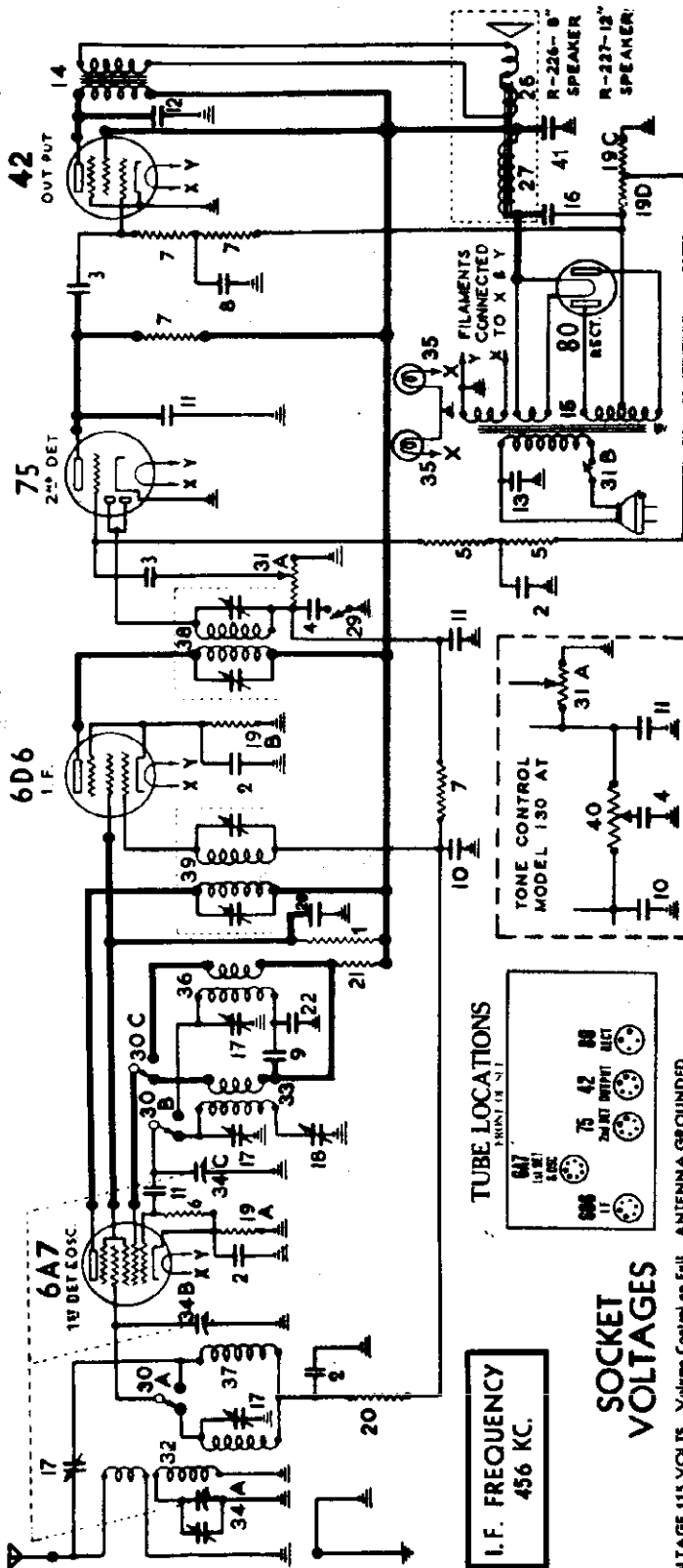
SEE PARTS LIST ON FIRST PAGE FOR PART NUMBERS, DESCRIPTIONS AND PRICES.

PHONOGRAPH AND UNIVERSAL POWER TRANSFORMER CONNECTIONS IN MODEL R127-X

MODELS 1301 to 1309
 Chassis R-130
 Schematic, Voltage
 Socket, Parts List

STEWART WARNER CORP.

STEWART-WARNER MODEL R-130 CHASSIS (RECEIVER MODELS 1301 to 1309)



I.F. FREQUENCY
 456 KC.

SOCKET VOLTAGES

LINE VOLTAGE 115 VOLTS Volume Control on Full ANTENNA GROUNDED RANGE SWITCH SET ON BROADCAST POSITION DIAL SET AT 330 KC.

VOLTAGES MEASURED BETWEEN CHASSIS AND SOCKET TERMINALS AS SEEN FROM THE BOTTOM FRONT OF CHASSIS

ABBREVIATIONS
 G. GROUND
 H. HEATER
 P. CATHODE
 A. GRID
 S. SCREEN
 B. BIAS

NOTE A: The bias on the 42 output tube is -17 volts measured across the modulated bias resistor 19C and 19D. The grid bias on the 75 second detector is -1.5 volts measured across the bias resistor 19C.

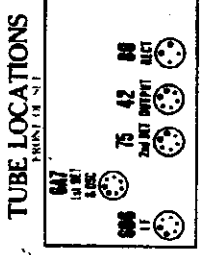
NOTE B: The oscillator plate voltage for the broadcast range setting with the dial set at 330 KC should be approximately 130 volts. The oscillator grid voltage under the same conditions should be about -18 volts.

IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt. Readings will be in error if the resistance of the voltmeter is less than 1000 ohms per volt. This warning is most marked for second detector plate voltage.

Speaker field voltage with coil warm is 70 volts D. C.

NOTE A: The bias on the 42 output tube is -17 volts measured across the modulated bias resistor 19C and 19D. The grid bias on the 75 second detector is -1.5 volts measured across the bias resistor 19C.

NOTE B: The oscillator plate voltage for the broadcast range setting with the dial set at 330 KC should be approximately 130 volts. The oscillator grid voltage under the same conditions should be about -18 volts.

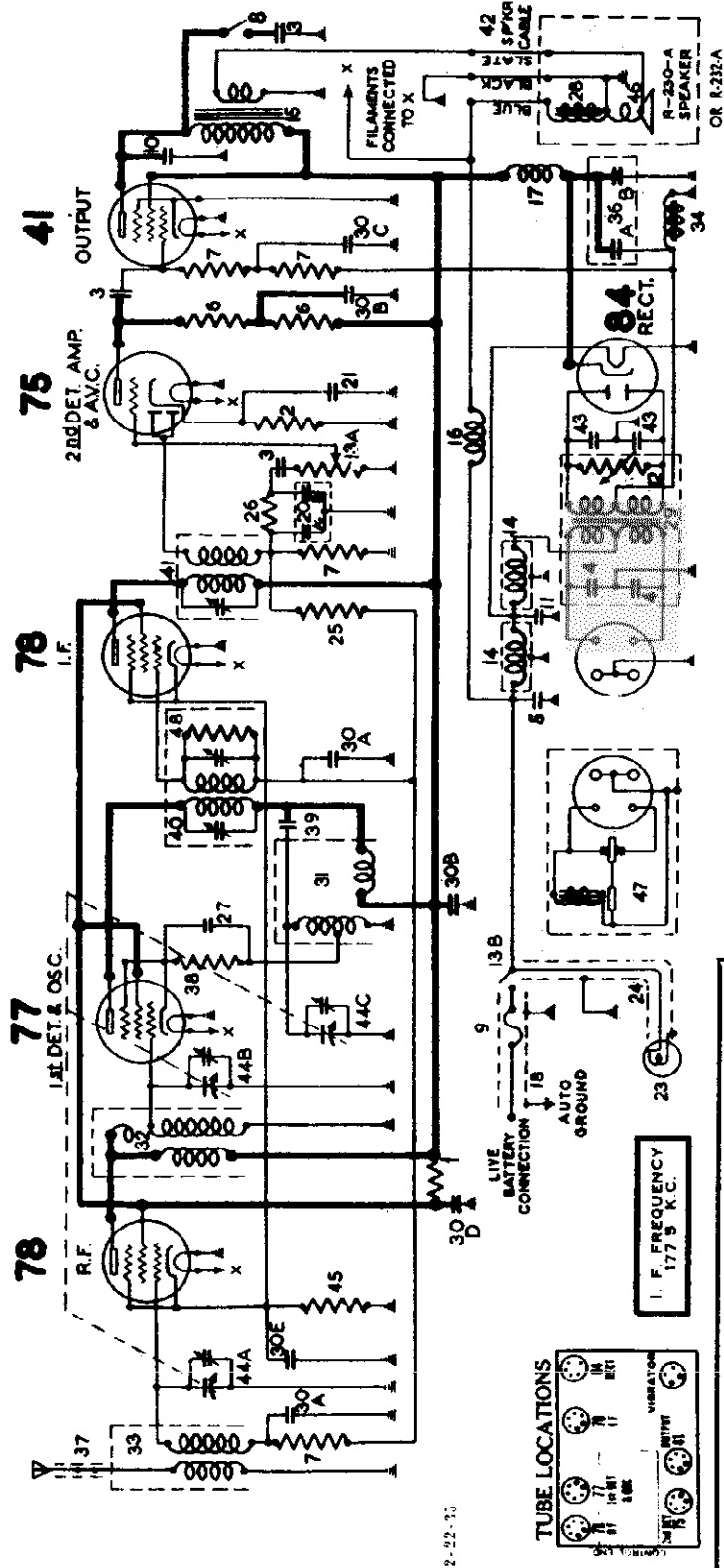


R-130 PARTS LIST

Disc. Part No.	Description	LIST PRICE
1	62182 30,000 ohm, 1 watt carbon resistor.....	.40
2	81630 .1 mfd, 100 volt paper condenser.....	.40
3	83007 .05 mfd, 600 volt paper condenser.....	.40
4	83071 .02 mfd, 600 volt paper condenser.....	.40
5	83072 .01 mfd, 600 volt paper condenser.....	.40
6	83080 510,000 ohm, 1/2 watt carbon resistor.....	.30
7	83082 260,000 ohm, 1/2 watt carbon resistor.....	.30
8	83219 .01 mfd, 600 volt paper condenser.....	.30
9	83252 .015 mfd, 600 volt paper condenser.....	.38
10	83253 .05 mfd, 100 volt paper condenser.....	.30
11	83259 .00026 mfd, molded mica condenser.....	.38
12	83706 .006 mfd, 600 volt paper condenser.....	.38
13	83976 .012 mfd, 1000 volt shilded paper condenser.....	.35
14	84183 Output transformer (for R-226-8 inch speaker) (See 84312 transformer for 12 inch speaker).....	2.25
15	84189 Power trans, 115 volts, 60 cycles, R-130-A only (See 84193 for 115 volt electrolytic coil frequencies).....	4.00
16	84193 16 mfd, 350 volt electrolytic coil.....	1.50
17	84194 R.F. trimmer condenser (3 to 30 mmfd.).....	1.15
18	84195 Oscillator padding trimmer (300-600 mmfd.).....	.40
19A	800 ohm resistor.....	.65
19B	200 ohm resistor.....	.65
19C	828 ohm resistor.....	.65
19D	875 ohm resistor.....	.65
20	84196 110,000 ohm 1/2 watt carbon resistor.....	.40
21	84199 16,000 ohm 1/2 watt carbon resistor.....	.40
22	84200 .005 mfd, molded mica condenser.....	.30
23	84312 Output transformer (on R-227 12" speaker).....	2.50
24	84401 Phonograph terminal strip (R-130-X only).....	1.10
25	84402 133 ohm resistor (R-130-X only).....	.12
26	84504 Diagram and shell assembly (For R-226 8" speaker) (Also see 84506).....	2.50
27	84505 Field coil and housing (For R-226 8" speaker) (Also see 84507).....	2.75
28	84506 Diaphragm and shell assembly (For R-227 12" speaker).....	2.25
29	84601 25 mfd, 500 volt paper condenser.....	.80
29	84757 Tone control switch.....	.35
30	84758 Range switch.....	.75
31A	84759 500,000 ohm volume control and line switch.....	1.25
32	84766 Broadcast preselector coil assembly.....	1.15
33	84769 Broadcast oscillator coil.....	.40
34	84760 Three gang variable condenser.....	4.00
35	84759 6-8 volt dial light bulb.....	.30
36	84763 Short wave oscillator coil.....	.40
37	84766 Short wave antenna coil.....	.40
38	84776 2nd I.F. transformer.....	2.00
39	84777 1st I.F. transformer.....	2.00
40	84942 500,000 ohm Tone Control (AT and XT models only).....	.75
41	85112 15 mfd, 500 volt wet electrolytic cond.....	1.50

STEWART WARNER CORP.

MODELS 1511 to 1519
Chassis R-151
Schematic, Voltage
Socket, Parts List



MODEL R-131 PARTS LIST

Part No.	Description	Part No.	Description	Part No.	Description
1	60,000 ohm 1 watt carbon resistor	30A	.45 mfd. 500 volt paper cond. (green-white)	41	Output transformer with mounting
2	6,000 ohm 1/4 watt carbon resistor	30B	1 mfd. 400 v. paper cond. (red or red-white)	42	500 ohm. 1/2 watt flexible wire resistor
3	67,000 ohm 1/4 watt carbon resistor	30C	.25 mfd. 100 volt paper cond. (green head)	43	100 ohm. 1/2 watt carbon resistor
4	23,000 ohm 1/4 watt carbon resistor	30D	.25 mfd. 100 volt paper cond. (orange head)	44	100 ohm. 1/2 watt carbon resistor
5	23,000 ohm 1/4 watt carbon resistor	30E	.25 mfd. 100 volt paper cond. (white head)	45	100 ohm. 1/2 watt carbon resistor
6	23,000 ohm 1/4 watt carbon resistor	30F	.25 mfd. 100 volt paper cond. (orange head)	46	100 ohm. 1/2 watt carbon resistor
7	23,000 ohm 1/4 watt carbon resistor	30G	.25 mfd. 100 volt paper cond. (orange head)	47	100 ohm. 1/2 watt carbon resistor
8	23,000 ohm 1/4 watt carbon resistor	30H	.25 mfd. 100 volt paper cond. (orange head)	48	100 ohm. 1/2 watt carbon resistor
9	23,000 ohm 1/4 watt carbon resistor	30I	.25 mfd. 100 volt paper cond. (orange head)	49	100 ohm. 1/2 watt carbon resistor
10	23,000 ohm 1/4 watt carbon resistor	30J	.25 mfd. 100 volt paper cond. (orange head)	50	100 ohm. 1/2 watt carbon resistor
11	23,000 ohm 1/4 watt carbon resistor	30K	.25 mfd. 100 volt paper cond. (orange head)	51	100 ohm. 1/2 watt carbon resistor
12	23,000 ohm 1/4 watt carbon resistor	30L	.25 mfd. 100 volt paper cond. (orange head)	52	100 ohm. 1/2 watt carbon resistor
13	23,000 ohm 1/4 watt carbon resistor	30M	.25 mfd. 100 volt paper cond. (orange head)	53	100 ohm. 1/2 watt carbon resistor
14	23,000 ohm 1/4 watt carbon resistor	30N	.25 mfd. 100 volt paper cond. (orange head)	54	100 ohm. 1/2 watt carbon resistor
15	23,000 ohm 1/4 watt carbon resistor	30O	.25 mfd. 100 volt paper cond. (orange head)	55	100 ohm. 1/2 watt carbon resistor
16	23,000 ohm 1/4 watt carbon resistor	30P	.25 mfd. 100 volt paper cond. (orange head)	56	100 ohm. 1/2 watt carbon resistor
17	23,000 ohm 1/4 watt carbon resistor	30Q	.25 mfd. 100 volt paper cond. (orange head)	57	100 ohm. 1/2 watt carbon resistor
18	23,000 ohm 1/4 watt carbon resistor	30R	.25 mfd. 100 volt paper cond. (orange head)	58	100 ohm. 1/2 watt carbon resistor
19	23,000 ohm 1/4 watt carbon resistor	30S	.25 mfd. 100 volt paper cond. (orange head)	59	100 ohm. 1/2 watt carbon resistor
20	23,000 ohm 1/4 watt carbon resistor	30T	.25 mfd. 100 volt paper cond. (orange head)	60	100 ohm. 1/2 watt carbon resistor
21	23,000 ohm 1/4 watt carbon resistor	30U	.25 mfd. 100 volt paper cond. (orange head)	61	100 ohm. 1/2 watt carbon resistor
22	23,000 ohm 1/4 watt carbon resistor	30V	.25 mfd. 100 volt paper cond. (orange head)	62	100 ohm. 1/2 watt carbon resistor
23	23,000 ohm 1/4 watt carbon resistor	30W	.25 mfd. 100 volt paper cond. (orange head)	63	100 ohm. 1/2 watt carbon resistor
24	23,000 ohm 1/4 watt carbon resistor	30X	.25 mfd. 100 volt paper cond. (orange head)	64	100 ohm. 1/2 watt carbon resistor
25	23,000 ohm 1/4 watt carbon resistor	30Y	.25 mfd. 100 volt paper cond. (orange head)	65	100 ohm. 1/2 watt carbon resistor
26	23,000 ohm 1/4 watt carbon resistor	30Z	.25 mfd. 100 volt paper cond. (orange head)	66	100 ohm. 1/2 watt carbon resistor
27	23,000 ohm 1/4 watt carbon resistor	30A	.25 mfd. 100 volt paper cond. (orange head)	67	100 ohm. 1/2 watt carbon resistor
28	23,000 ohm 1/4 watt carbon resistor	30B	.25 mfd. 100 volt paper cond. (orange head)	68	100 ohm. 1/2 watt carbon resistor
29	23,000 ohm 1/4 watt carbon resistor	30C	.25 mfd. 100 volt paper cond. (orange head)	69	100 ohm. 1/2 watt carbon resistor
30	23,000 ohm 1/4 watt carbon resistor	30D	.25 mfd. 100 volt paper cond. (orange head)	70	100 ohm. 1/2 watt carbon resistor
31	23,000 ohm 1/4 watt carbon resistor	30E	.25 mfd. 100 volt paper cond. (orange head)	71	100 ohm. 1/2 watt carbon resistor
32	23,000 ohm 1/4 watt carbon resistor	30F	.25 mfd. 100 volt paper cond. (orange head)	72	100 ohm. 1/2 watt carbon resistor
33	23,000 ohm 1/4 watt carbon resistor	30G	.25 mfd. 100 volt paper cond. (orange head)	73	100 ohm. 1/2 watt carbon resistor
34	23,000 ohm 1/4 watt carbon resistor	30H	.25 mfd. 100 volt paper cond. (orange head)	74	100 ohm. 1/2 watt carbon resistor
35	23,000 ohm 1/4 watt carbon resistor	30I	.25 mfd. 100 volt paper cond. (orange head)	75	100 ohm. 1/2 watt carbon resistor
36	23,000 ohm 1/4 watt carbon resistor	30J	.25 mfd. 100 volt paper cond. (orange head)	76	100 ohm. 1/2 watt carbon resistor
37	23,000 ohm 1/4 watt carbon resistor	30K	.25 mfd. 100 volt paper cond. (orange head)	77	100 ohm. 1/2 watt carbon resistor
38	23,000 ohm 1/4 watt carbon resistor	30L	.25 mfd. 100 volt paper cond. (orange head)	78	100 ohm. 1/2 watt carbon resistor
39	23,000 ohm 1/4 watt carbon resistor	30M	.25 mfd. 100 volt paper cond. (orange head)	79	100 ohm. 1/2 watt carbon resistor
40	23,000 ohm 1/4 watt carbon resistor	30N	.25 mfd. 100 volt paper cond. (orange head)	80	100 ohm. 1/2 watt carbon resistor
41	23,000 ohm 1/4 watt carbon resistor	30O	.25 mfd. 100 volt paper cond. (orange head)	81	100 ohm. 1/2 watt carbon resistor
42	23,000 ohm 1/4 watt carbon resistor	30P	.25 mfd. 100 volt paper cond. (orange head)	82	100 ohm. 1/2 watt carbon resistor
43	23,000 ohm 1/4 watt carbon resistor	30Q	.25 mfd. 100 volt paper cond. (orange head)	83	100 ohm. 1/2 watt carbon resistor
44	23,000 ohm 1/4 watt carbon resistor	30R	.25 mfd. 100 volt paper cond. (orange head)	84	100 ohm. 1/2 watt carbon resistor
45	23,000 ohm 1/4 watt carbon resistor	30S	.25 mfd. 100 volt paper cond. (orange head)	85	100 ohm. 1/2 watt carbon resistor
46	23,000 ohm 1/4 watt carbon resistor	30T	.25 mfd. 100 volt paper cond. (orange head)	86	100 ohm. 1/2 watt carbon resistor
47	23,000 ohm 1/4 watt carbon resistor	30U	.25 mfd. 100 volt paper cond. (orange head)	87	100 ohm. 1/2 watt carbon resistor
48	23,000 ohm 1/4 watt carbon resistor	30V	.25 mfd. 100 volt paper cond. (orange head)	88	100 ohm. 1/2 watt carbon resistor
49	23,000 ohm 1/4 watt carbon resistor	30W	.25 mfd. 100 volt paper cond. (orange head)	89	100 ohm. 1/2 watt carbon resistor
50	23,000 ohm 1/4 watt carbon resistor	30X	.25 mfd. 100 volt paper cond. (orange head)	90	100 ohm. 1/2 watt carbon resistor
51	23,000 ohm 1/4 watt carbon resistor	30Y	.25 mfd. 100 volt paper cond. (orange head)	91	100 ohm. 1/2 watt carbon resistor
52	23,000 ohm 1/4 watt carbon resistor	30Z	.25 mfd. 100 volt paper cond. (orange head)	92	100 ohm. 1/2 watt carbon resistor
53	23,000 ohm 1/4 watt carbon resistor	30A	.25 mfd. 100 volt paper cond. (orange head)	93	100 ohm. 1/2 watt carbon resistor
54	23,000 ohm 1/4 watt carbon resistor	30B	.25 mfd. 100 volt paper cond. (orange head)	94	100 ohm. 1/2 watt carbon resistor
55	23,000 ohm 1/4 watt carbon resistor	30C	.25 mfd. 100 volt paper cond. (orange head)	95	100 ohm. 1/2 watt carbon resistor
56	23,000 ohm 1/4 watt carbon resistor	30D	.25 mfd. 100 volt paper cond. (orange head)	96	100 ohm. 1/2 watt carbon resistor
57	23,000 ohm 1/4 watt carbon resistor	30E	.25 mfd. 100 volt paper cond. (orange head)	97	100 ohm. 1/2 watt carbon resistor
58	23,000 ohm 1/4 watt carbon resistor	30F	.25 mfd. 100 volt paper cond. (orange head)	98	100 ohm. 1/2 watt carbon resistor
59	23,000 ohm 1/4 watt carbon resistor	30G	.25 mfd. 100 volt paper cond. (orange head)	99	100 ohm. 1/2 watt carbon resistor
60	23,000 ohm 1/4 watt carbon resistor	30H	.25 mfd. 100 volt paper cond. (orange head)	100	100 ohm. 1/2 watt carbon resistor

SOCKET VOLTAGES
BOTTOM VIEW OF CHASSIS

IMPORTANT: Use high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon range of meter. Make allowances for battery voltage variations.

NOTE A: The actual bias on the grid of the 41 tube is -25 volts which must be measured from chassis to the ungrounded filter choke terminal. Due to the high resistance of the grid leak, the voltmeter will show only about -1 volt at the grid.

MODELS 1311 to 1319
Alignment, Parts List
Circuit Data,

STEWART WARNER CORP.

SERVICE DATA FOR STEWART-WARNER R-131 CHASSIS

CIRCUIT DESCRIPTION

In the R-131 Chassis, the incoming signal is tuned and amplified in the 78 R.F. stage. 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, using a 78 type tube, and 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. 7. The audio component of this voltage appears across the 500,000 ohm volume control. Any part or all of this audio signal may be impressed on the triode section of the 75 tube where amplification takes place.

The modulated drop across resistor No. 7 is filtered and applied to the grids of the 78 R.F. and I.F. tubes to provide A.V.C.

POWER SUPPLY PROTECTIVE RESISTOR

The filter system and the rectifier tube are protected against breakdown during the warming-up period by the Globar resistor connected across the high voltage secondary of the power transformer (No. 12 in the circuit diagram). This resistor drops rapidly in resistance as the voltage across it rises, so that it acts as a load on the power transformer during the warm-up period and keeps the voltage below the danger point until the tubes are heated and take their normal current. Because of its unique voltage characteristics, the Globar resistor cannot be tested with an ordinary ohmmeter, since it will show a resistance of several megohms.

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 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 should be connected from the 41 plate to ground through a .25 mfd. condenser or across the voice coil, depending upon its sensitivity. A convenient point to connect the 41 plate is the terminal of the tone control switch.

During all calibration and alignment adjustments, keep the volume control full on.

I. F. ALIGNMENT

The I.F. trimmers are located on the top of the I.F. transformers which may be reached by removing the front cover. The modulated oscillator should be set to exactly 177.5 K.C. and connected from the 77 control grid to ground. Adjust the oscillator output to give about half-scale reading of the output meter. Tune the set to make certain that no station or 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 Auto Radio is calibrated in kilocycles, except that the last two zeros have been omitted. Inasmuch as changes in the position of the flexible shafts may cause the calibration to vary, the dial can be calibrated as follows:

Tune in a station of known frequency between 800 and 1100 K.C. Insert a screw driver in the slotted shaft on the rear of the control head. Hold the tuning control knob so that the station remains tuned in properly and by turning the screw driver adjust the dial pointer so that it indicates the station frequency.

If the set is badly out of calibration such that it calibrates correctly at one part of the dial but not at another, it is necessary to adjust the oscillator shunt trimmer as explained below.

The gang condenser trimmers can be reached by removing the back cover. Connect a .00025 mfd. mica condenser in series with the output of the test oscillator and the aerial lead of the receiver. This condenser is absolutely necessary to secure proper alignment of the antenna stage.

Set the test oscillator to exactly 600 K.C. Tune the radio set to maximum volume. Calibrate the dial at the low frequency end by setting the pointer to read exactly 6.0 (600 K.C.).

Set the test oscillator to exactly 1400 K.C. Turn the tuning knob until the dial pointer indicates 14.0 (1400 K.C.) and then adjust the oscillator shunt trimmer (third one from shaft end of the variable condenser) until the signal is received with maximum output. Then adjust the other two gang condenser trimmers as directed under R.F. alignment.

R. F. ALIGNMENT

With the test oscillator set to approximately 1400 K.C., tune the set very carefully for maximum output.

Adjust the output of the 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.

MISCELLANEOUS PARTS NOT SHOWN ON DIAGRAM

Part No.	Description	List Price
12606	Receiver mtg. nut (5/16—18 hex.)	.80
17166	Single hole mtg. nut	.05
81346	1 leg terminal strip	.04
83144	18,000 ohm spark plug suppressor	.35
83148	10,000 ohm distributor suppressor	.35
83242	No. 3 x 1/4" self tapping screws (dark finish for mtg. back cover and casing brackets)	.02
83319	Fuse insulating tube	.02
83624	No. 3 x 1/4" self tapping screw (Cadm. plate for mtg. power transformer)	.01
83711	3 leg terminal strip	.12
83719	Front cover mtg. spade bolt (B-38)	.01
83720	4 leg terminal strip	.08
83721	Battery lead plug rubber grommet	.02
83727	Back cover	.90
83737	Front cover knurled nuts	.06
83771	Receiver mounting stud	.08
83772	Receiver mounting dash support washer	.04
83806	Speaker grill cloth	.12
83892	Variable condenser shaft coupling	.10
83893	Volume control shaft guide bushing	.05
83904	Generator condenser	.70
84853	Front cover assembly	1.00
84855	Dial face (Model 1311)	.20
84869	Case assembly, less covers	3.75
84941	Aluminum vibrator shield assembly	.50
84990	Single hole mtg. plate	.80
85012	Single hole mtg. bolt	.06
85021	Case assembly (less covers) (1314 only)	4.00
85022	Back cover (model 1314)	1.00
85024	Front cover assembly (model 1314)	1.25
85037	Dial face (model 1314)	.20

REMOTE CONTROL HEAD PARTS

Part No.	Description	List Price
15214	Long mtg. strap screw (10/32 x 1 1/4" R.H.M.S.)	.01
84059	Case screw (4-40 x 3/16")	.80
84060	Flexible casing set screw	.02
84067	Steering post mtg. bracket	.25
84068	Steering post mtg. strap	.15
84075	Bezel and glass	.50
84076	Dial light button and socket	.25
84106	Volume control knob	.25
84309	Instrument panel mounting accessories	.15
84554	Complete accessories for installation	5.00

FLEXIBLE SHAFTS

Part No.	Description	List Price
84871	Tuning shaft, 21 inches long	1.50
84873	Volume control shaft, 24 inches long	1.50
84882	Tuning shaft, 36 inches long	2.00
84883	Volume control shaft, 36 inches long	2.00
84886	Tuning shaft, 30 inches long	2.00
84887	Volume control shaft, 30 inches long	2.00

Voltage, Parts List

STEWART WARNER CORP.

MODEL Firestone R-1322
Chassis R-132
Schematic, Socket

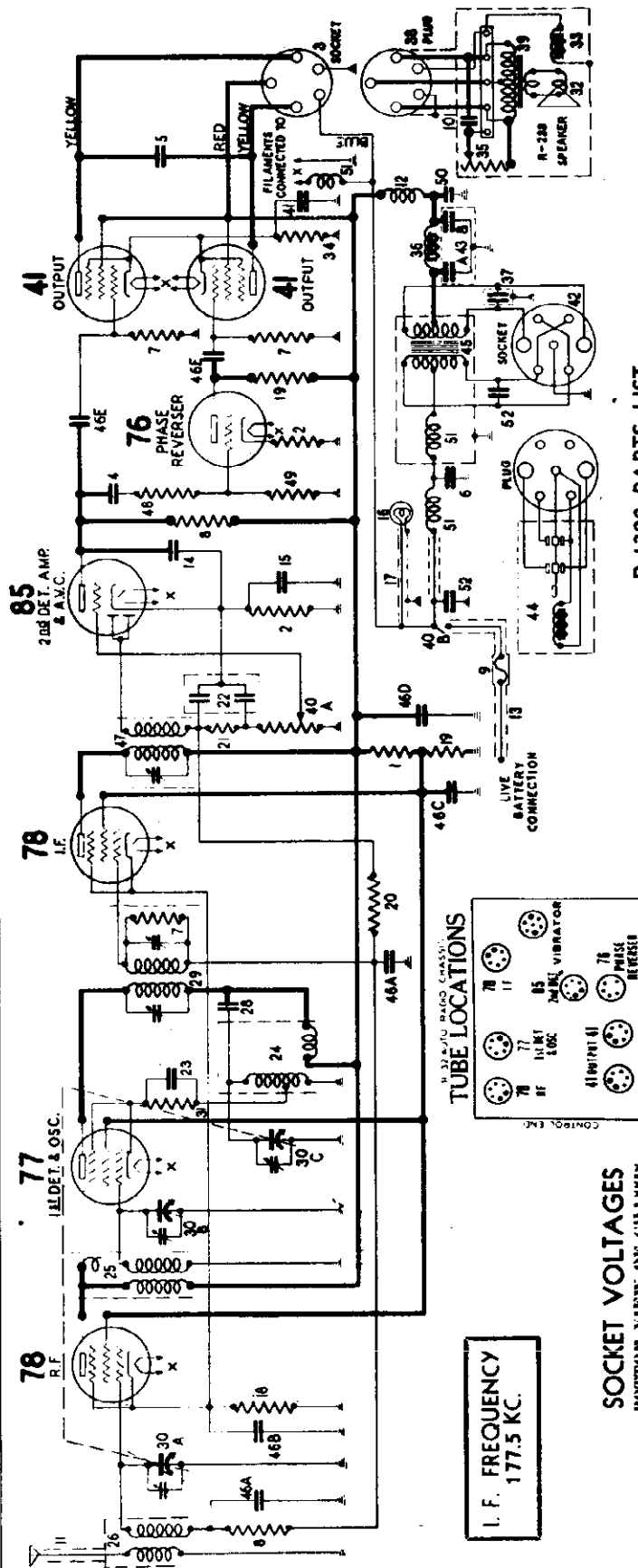
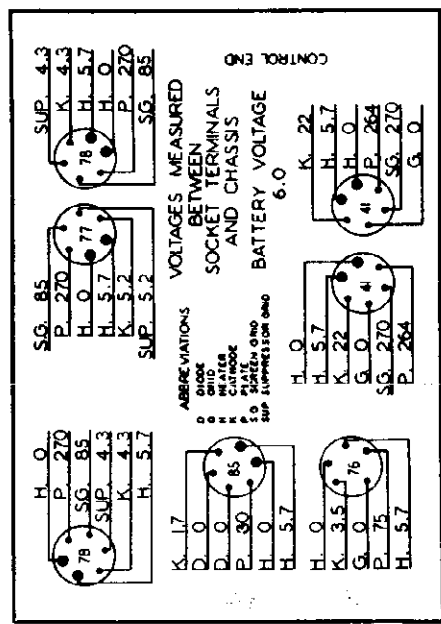


Diagram No.	Part No.	Description	Price
1	66023	60,000 ohm 1 watt carbon resistor	.25
2	67203	2,000 ohm 1/2 watt carbon resistor	.10
3	81951	Speaker socket	.10
4	83007	.02 mfd. 600 volt paper condenser	.35
5	85011	.001 mfd. 600 volt paper condenser	.30
6	83063	.5 mfd. 100 volt paper condenser	.45
7	83073	510,000 ohm 1/2 watt carbon resistor	.15
8	83082	200,000 ohm 1/2 watt carbon resistor	.20
9	83207	15 ampere fuse	.85
10	83213	.01 mfd. 600 volt paper condenser	.20
11	83214	500 ohm 1/2 watt carbon resistor	.10
12	83270	500 ohm 1/2 watt carbon resistor	.10
13	83277	Shielded battery lead and fuse housing	.80
14	83781	.0011 mfd. mica condenser	.22
15	83803	12 mfd. 25 volt dry electrolytic condenser	.80
16	84058	Pilot lamp	.15
17	84099	Pilot light cable	.35
18	84131	400 ohm 1/2 watt resistor	.20
19	84198	110,000 ohm 1/2 watt resistor	.20
20	84235	1.1 meg. 1/2 watt carbon resistor	.30
21	84281	Dual .00026 mfd. mica condenser	.20
22	84311	100,000 ohm 1/2 watt carbon resistor	.15
23	84312	100,000 ohm 1/2 watt carbon resistor	.15
24	84313	100,000 ohm 1/2 watt carbon resistor	.15
25	84322	R. F. coil	1.50
26	84325	Antenna coil	1.50
27	84326	.00007 mfd. mica condenser	.10
28	84328	1st I. F. transformer	3.75
29	84329	2nd I. F. transformer	3.75
30A	84366	(Three gang variable condenser with mounting plate and shaft coupling)	6.00
30B	84366		
30C	84366		

Diagram No.	Part No.	Description	Price
31	83031	10000 ohm 1/2 watt carbon resistor	.30
32	83031	10000 ohm 1/2 watt carbon resistor	.30
33	83031	10000 ohm 1/2 watt carbon resistor	.30
34	83098	Diaphragm and shell assembly	3.35
35	83114	500 ohm 2 watt resistor	.35
36	83179	80,000 ohm tone control	.90
37	83183	Filter choke	1.50
38	83190	.005 mfd. 1,200 volt paper condenser	.35
39	83193	Speaker plug and cable assembly	1.35
40A	83195	Speaker transformer	3.35
40B	83195	250,000 ohm volume control	1.90
41	83216	10 mfd. 50 volt dry electrolytic condenser	.80
42	83217	Vibrator Socket	.15
43	83237	Dual 8 mfd. electrolytic condenser	3.90
44	83243	Vibrator	6.50
45	83256	Power transformer	8.00
46A	83259	.05 mfd. 300 volt cond. (green-white lead)	2.75
46B	83259	.25 mfd. 100 v. cond. (orange lead)	2.50
46C	83259	.1 mfd. 300 v. cond. (white lead)	2.50
46D	83259	.1 mfd. 400 v. cond. (red lead)	2.50
47	85262	2nd I. F. transformer	2.50
48	85265	600,000 ohm 1/2 watt carbon resistor	.30
49	85266	70,000 ohm 1/2 watt carbon resistor	.30
50	85267	.01 mfd. mica condenser	.30
51	85391	R. F. choke assembly	.30
52	85391	.0005 mfd. mica condenser	.35

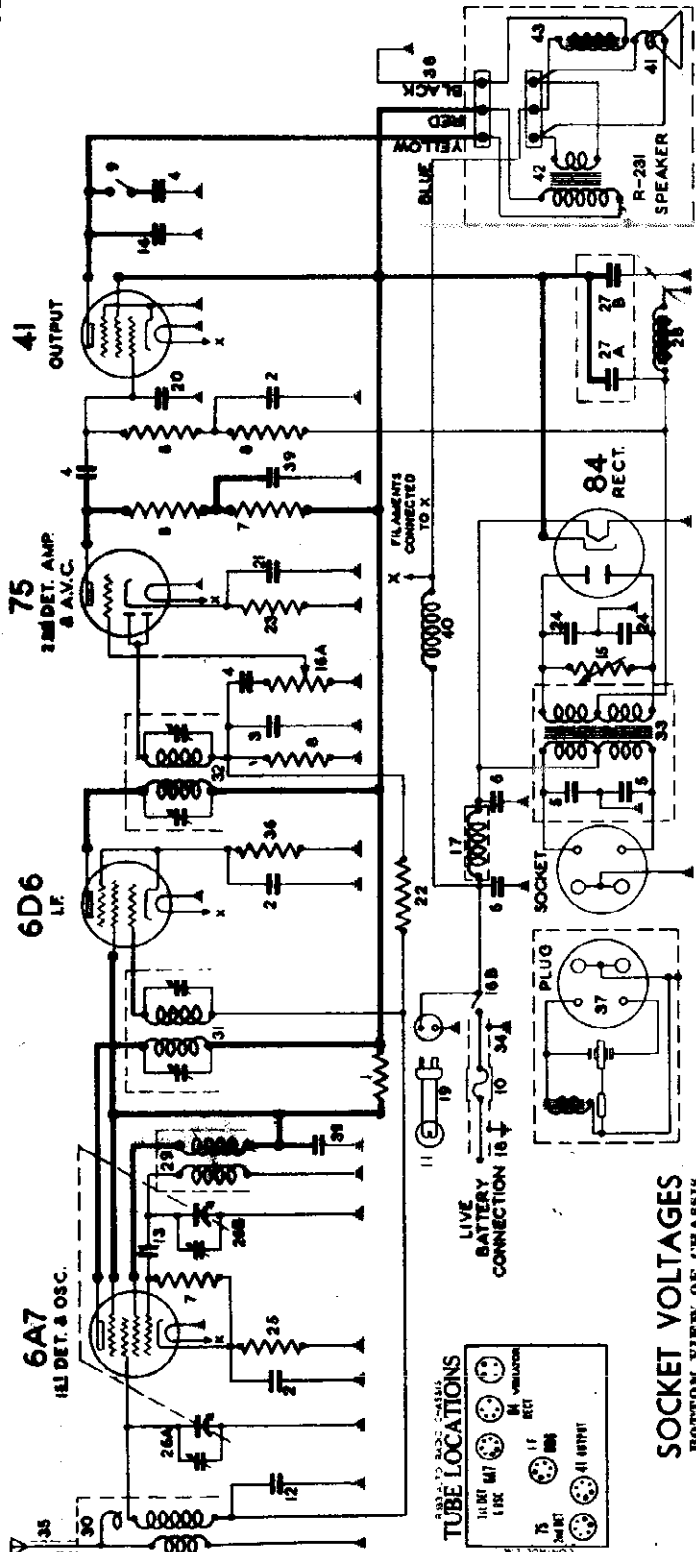
R-1322 PARTS LIST

SOCKET VOLTAGES
BOTTOM VIEW OF CHASSIS



MODEL Firestone R-1332
Chassis R-133
Schematic, Socket
Voltage, Parts List

STEWART WARNER CORP.



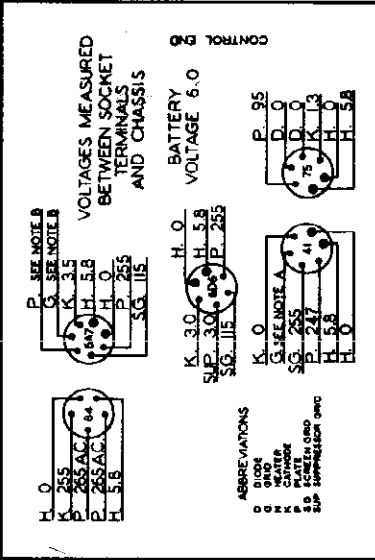
R-1332 PARTS LIST

I.F. FREQUENCY
456 KC.

Qty.	Part No.	Description	Price
1	64975	16,000 ohm 1/2 watt carbon resistor	60.80
2	81639	1 mfd. 100 volt paper condenser	.25
3	81812	.00051 mfd. mica condenser	.35
4	83007	.02 mfd. 600 volt paper condenser	.35
5	83058	.25 mfd. 100 volt paper condenser	.45
6	83065	.5 mfd. 100 volt paper condenser	.50
7	83080	51,000 ohm 1/2 watt resistor	.30
8	83082	200,000 ohm 1/2 watt resistor	.40
9	83179	Tone Control switch	.05
10	83206	Plug	.05
11	83207	Plug	.15
12	83255	.05 mfd. 100 volt paper condenser	.50
13	83559	.00026 mfd. mica condenser	.25
14	83706	.006 mfd. 600 volt condenser	.35
15	83725	0-500,000 glibar resistor	.45
16A	83725	Volume Control	1.20
16B	83730	On-Off Switch	.25
17	83730	R. F. Choke	.40
18	83777	Battery lead and fuse housing	.50
19	83778	Light valve and plug assembly	.30
20	83803	12 mfd. 15 volt electrolytic condenser	.70
21	83803	12 mfd. 15 volt electrolytic condenser	.50
22	84283	1.1 meg. 1/2 watt resistor	.30
23	84284	4000 ohm 1/2 watt resistor	.30
24	84530	.83 mfd. 750 volt paper condenser	.30
25	84588	500 ohm 1/2 watt resistor	.30
26A	84958	Two-gang variable condenser	.40
26B	84958	with shaft coupling	.40
27A	84961	1/4 mfd. 400 volt electrolytic condenser	2.50
27B	84961	1/4 mfd. 400 volt electrolytic condenser	1.38
28	84962	Filter choke	1.38
29	84965	Oscillator coil and shield assembly	1.38
30	84965	Antenna coil and shield assembly	1.38
31	84971	2 mfd. 100 volt paper condenser	2.75
32	84971	2 mfd. 100 volt paper condenser	2.75
33	84972	2 mfd. 100 volt paper condenser	2.75
34	84972	2 mfd. 100 volt paper condenser	2.75
35	84977	Power transformer	3.50
36	84978	Battery lead and cap (to chassis)	.54
37	84979	250 ohm 1/2 watt resistor	.15
38	84985	Vibrator	5.00
39	85037	Speaker cable	.30
40	85039	1 mfd. 500 volt paper condenser	.40
41	85048	Filament R.F. Choke	.28
42	85216	Diaphragm and valve coil assembly	3.00
43	85375	Field coil	1.38

Qty.	Part No.	Description	Price
1	84975	16,000 ohm 1/2 watt carbon resistor	60.80
2	81639	1 mfd. 100 volt paper condenser	.25
3	81812	.00051 mfd. mica condenser	.35
4	83007	.02 mfd. 600 volt paper condenser	.35
5	83058	.25 mfd. 100 volt paper condenser	.45
6	83065	.5 mfd. 100 volt paper condenser	.50
7	83080	51,000 ohm 1/2 watt resistor	.30
8	83082	200,000 ohm 1/2 watt resistor	.40
9	83179	Tone Control switch	.05
10	83206	Plug	.05
11	83207	Plug	.15
12	83255	.05 mfd. 100 volt paper condenser	.50
13	83559	.00026 mfd. mica condenser	.25
14	83706	.006 mfd. 600 volt condenser	.35
15	83725	0-500,000 glibar resistor	.45
16A	83725	Volume Control	1.20
16B	83730	On-Off Switch	.25
17	83730	R. F. Choke	.40
18	83777	Battery lead and fuse housing	.50
19	83778	Light valve and plug assembly	.30
20	83803	12 mfd. 15 volt electrolytic condenser	.70
21	83803	12 mfd. 15 volt electrolytic condenser	.50
22	84283	1.1 meg. 1/2 watt resistor	.30
23	84284	4000 ohm 1/2 watt resistor	.30

SOCKET VOLTAGES
BOTTOM VIEW OF CHASSIS



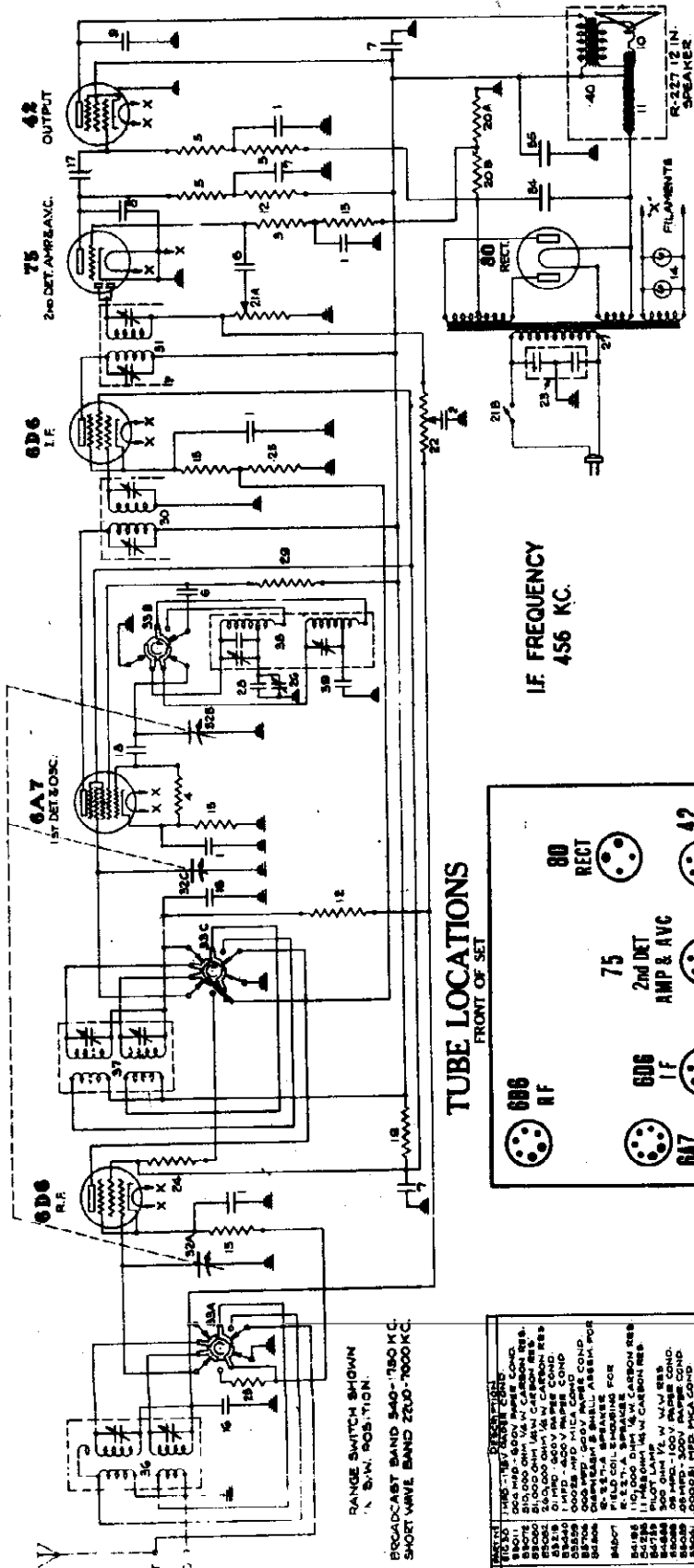
IMPORTANT: Use high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon range of meter. Make allowance for battery voltage variations. The 41 tube is —33 volts which must be measured from chassis to the ungrounded filter choke terminal. Due to the high resistance of the grid leak, the voltmeter will show only about —1 volt at the grid.

NOTE B: The oscillator grid voltage varies from about —3 at 1500 KC. to —5.0 at 530 KC. The oscillator anode voltage may vary from 116 at 1500 KC. to 126 at 530 KC.

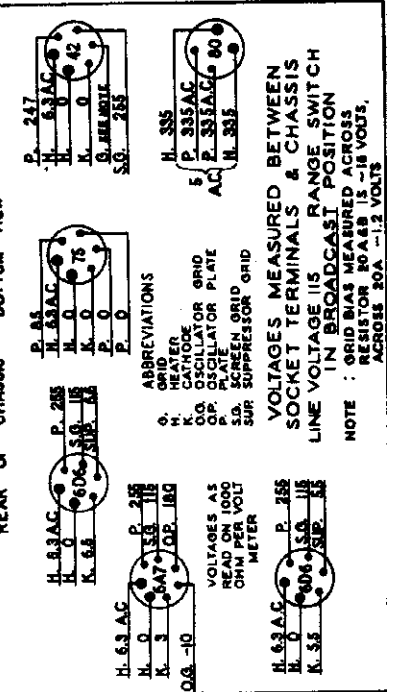
STEWART WARNER CORP.

MODELS 1341 to 1349
Chassis R-134 (Temporary)
Schematic, Voltage, Socket
Trimmers, Parts List

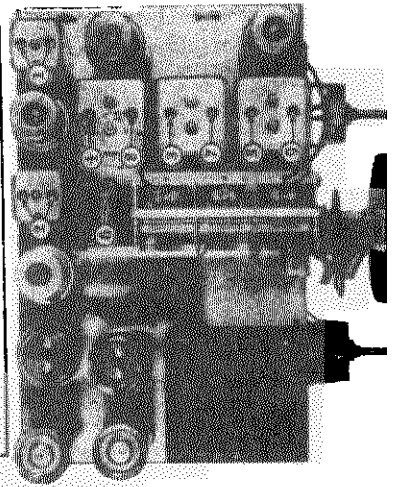
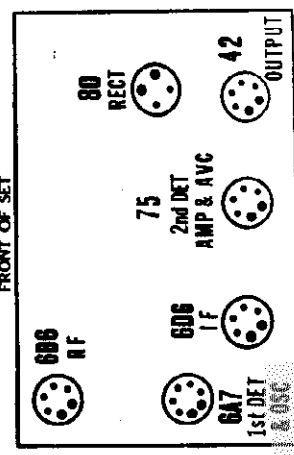
STEWART-WARNER MODEL R-134 CHASSIS (RECEIVER MODELS 1341 to 1349)
(TEMPORARY CIRCUIT DIAGRAM)



SOCKET VOLTAGES
REAR OF CHASSIS - BOTTOM VIEW



TUBE LOCATIONS
FRONT OF SET



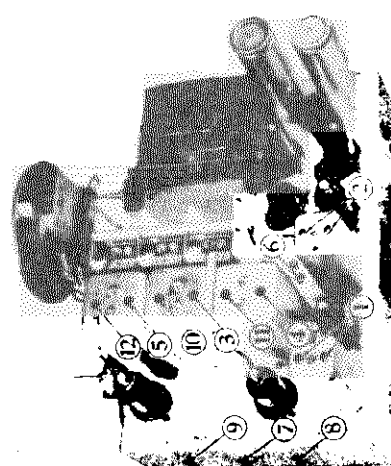
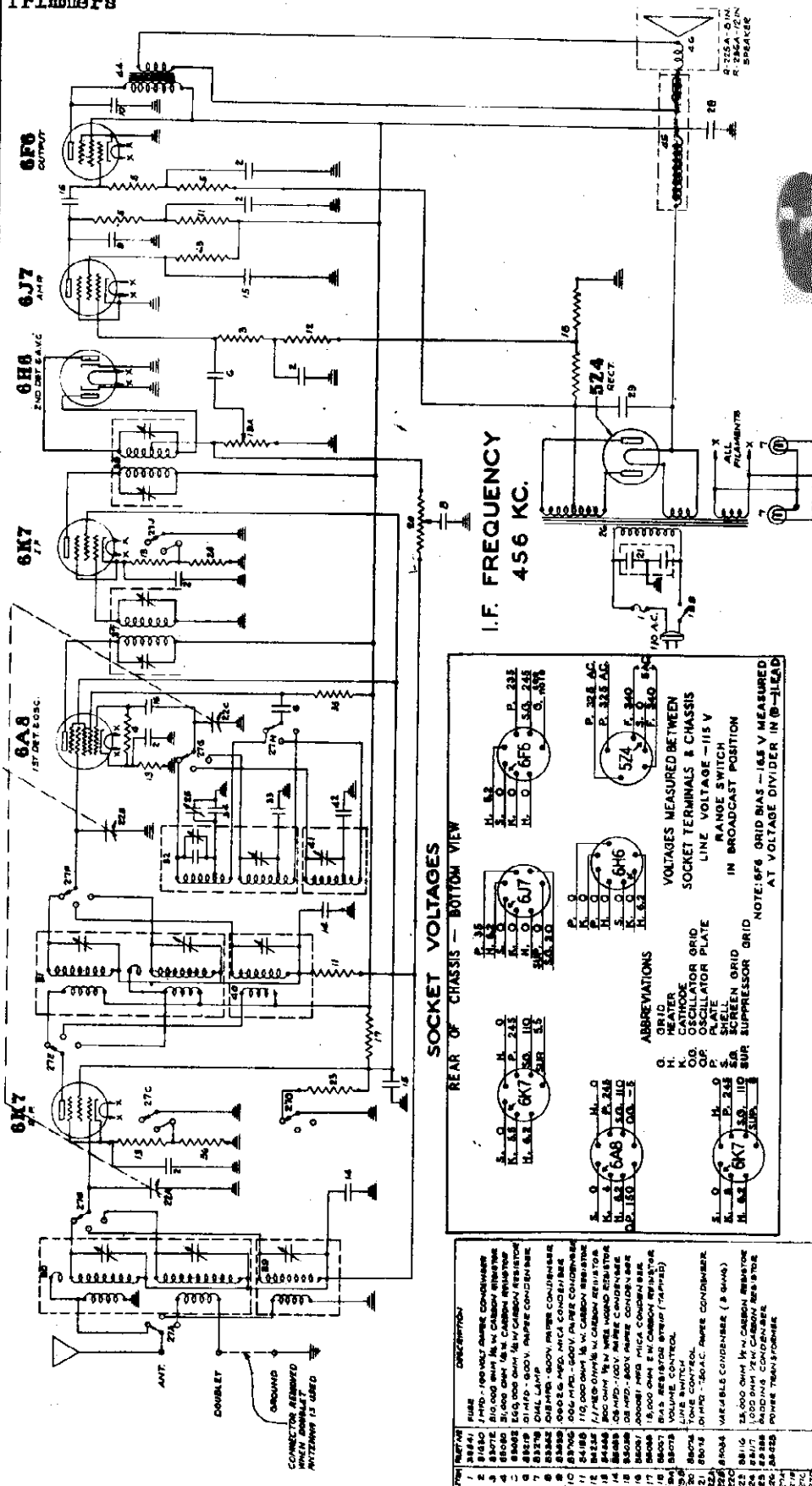
RANGE SWITCH SHOWN
"A" S.W. POSITION.
BROADCAST BAND 540-1750 KC
SHORT WAVE BAND 230-7000 KC

NO.	DESCRIPTION
1	ANTENNA
2	3RD DET. & OSC. TUBE
3	6A7 1ST DET. & OSC. TUBE
4	6D6 2ND DET. AMP & AVC TUBE
5	6B6 2ND DET. AMP & AVC TUBE
6	80 RECT. TUBE
7	42 OUTPUT TUBE
8	6A7 1ST DET. & OSC. TUBE
9	6D6 2ND DET. AMP & AVC TUBE
10	6B6 2ND DET. AMP & AVC TUBE
11	80 RECT. TUBE
12	42 OUTPUT TUBE
13	6A7 1ST DET. & OSC. TUBE
14	6D6 2ND DET. AMP & AVC TUBE
15	6B6 2ND DET. AMP & AVC TUBE
16	80 RECT. TUBE
17	42 OUTPUT TUBE
18	6A7 1ST DET. & OSC. TUBE
19	6D6 2ND DET. AMP & AVC TUBE
20	6B6 2ND DET. AMP & AVC TUBE
21	80 RECT. TUBE
22	42 OUTPUT TUBE
23	6A7 1ST DET. & OSC. TUBE
24	6D6 2ND DET. AMP & AVC TUBE
25	6B6 2ND DET. AMP & AVC TUBE
26	80 RECT. TUBE
27	42 OUTPUT TUBE
28	6A7 1ST DET. & OSC. TUBE
29	6D6 2ND DET. AMP & AVC TUBE
30	6B6 2ND DET. AMP & AVC TUBE
31	80 RECT. TUBE
32	42 OUTPUT TUBE
33	6A7 1ST DET. & OSC. TUBE
34	6D6 2ND DET. AMP & AVC TUBE
35	6B6 2ND DET. AMP & AVC TUBE
36	80 RECT. TUBE
37	42 OUTPUT TUBE
38	6A7 1ST DET. & OSC. TUBE
39	6D6 2ND DET. AMP & AVC TUBE
40	6B6 2ND DET. AMP & AVC TUBE
41	80 RECT. TUBE
42	42 OUTPUT TUBE

- 1. I.F. TRANS. TRIMMERS
- 2. 500 F. TRANS. TRIMMERS
- 3. BROADCAST OSCILLATOR SHUNT TRIMMER
- 4. BROADCAST DETECTOR SHUNT TRIMMER
- 5. BROADCAST ANTENNA SHUNT TRIMMER
- 6. BROADCAST OSCILLATOR SERIES PADDER
- 7. I.F. BAND OSCILLATOR SHUNT TRIMMER
- 8. S.W. BAND DETECTOR SHUNT TRIMMER
- 9. S.W. BAND OSCILLATOR SHUNT TRIMMER

VOLTAGES MEASURED BETWEEN
SOCKET TERMINALS & CHASSIS
LINE VOLTAGE IS RANGE SWITCH
IN BROADCAST POSITION
NOTE: GRID BIAS MEASURED ACROSS
RESISTOR 20 A & B IS -16 VOLTS.
ACROSS 20 A -1.2 VOLTS

MODELS 1361 to 1369
 Chassis R-136 (Temporary) STEWART WARNER CORP.
 Schematic, Socket, Parts
 Trimmers



- TUBE LOCATIONS**
 FRONT OF SET
- 1. 1st I.F. TRANS. TRIMMERS
 - 2. 2nd I.F. TRANS. TRIMMERS
 - 3. BROADCAST OSCILLATOR SHUNT TRIMMER
 - 4. BROADCAST DETECTOR SHUNT TRIMMER
 - 5. BROADCAST ANTENNA SHUNT TRIMMER
 - 6. BROADCAST OSCILLATOR SERIES PADDER
 - 7. BAND NO. 2 OSCILLATOR SHUNT TRIMMER
 - 8. BAND NO. 2 DETECTOR SHUNT TRIMMER
 - 9. BAND NO. 2 ANTENNA SHUNT TRIMMER
 - 10. BAND NO. 3 OSCILLATOR SHUNT TRIMMER
 - 11. BAND NO. 3 DETECTOR SHUNT TRIMMER
 - 12. BAND NO. 3 ANTENNA SHUNT TRIMMER

SOCKET VOLTAGES - BOTTOM VIEW

REAR OF CHASSIS - BOTTOM VIEW

ABBREVIATIONS

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS & CHASSIS

LINE VOLTAGE - 115 V

RANGE SWITCH

IN BROADCAST POSITION

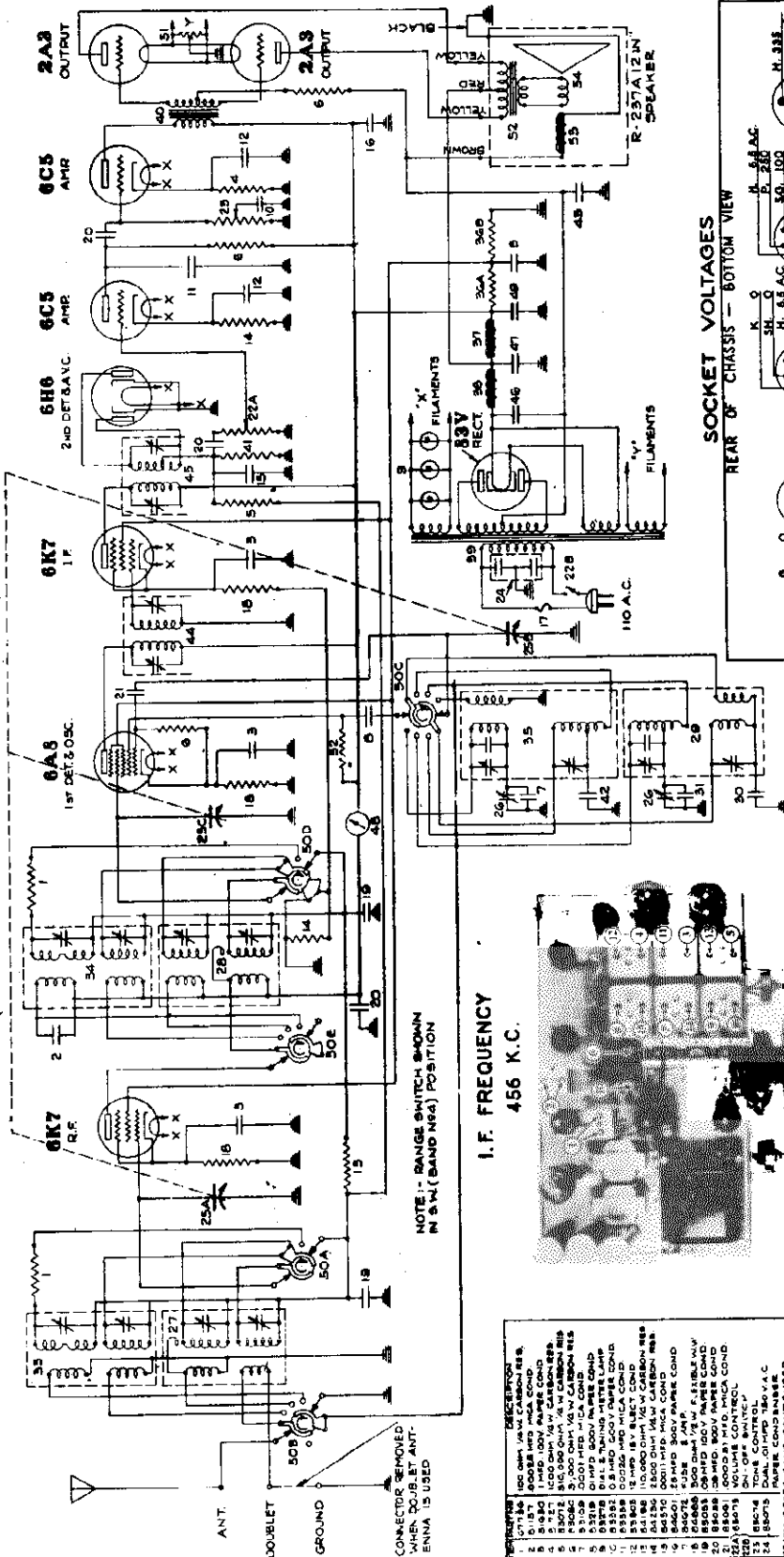
NOTE: 6F6 GRID BIAS - 165 V MEASURED AT VOLTAGE DIVIDER IN B-LEAD

NO.	VALUE	DESCRIPTION
1	100K	RESISTOR
2	100K	RESISTOR
3	100K	RESISTOR
4	100K	RESISTOR
5	100K	RESISTOR
6	100K	RESISTOR
7	100K	RESISTOR
8	100K	RESISTOR
9	100K	RESISTOR
10	100K	RESISTOR
11	100K	RESISTOR
12	100K	RESISTOR
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14	100K	RESISTOR
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22	100K	RESISTOR
23	100K	RESISTOR
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35	100K	RESISTOR
36	100K	RESISTOR
37	100K	RESISTOR
38	100K	RESISTOR
39	100K	RESISTOR
40	100K	RESISTOR
41	100K	RESISTOR
42	100K	RESISTOR
43	100K	RESISTOR
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45	100K	RESISTOR
46	100K	RESISTOR
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92	100K	RESISTOR
93	100K	RESISTOR
94	100K	RESISTOR
95	100K	RESISTOR
96	100K	RESISTOR
97	100K	RESISTOR
98	100K	RESISTOR
99	100K	RESISTOR
100	100K	RESISTOR

STEWART WARNER CORP.

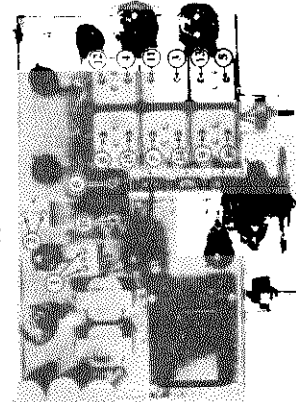
MODELS 1371 to 1379
Chassis R-137 (Temporary)
Schematic, Socket, Parts
Trimmers

STEWART-WARNER MODEL R-137 CHASSIS (RECEIVER MODELS 1371 to 1379)
(TEMPORARY CIRCUIT DIAGRAM)

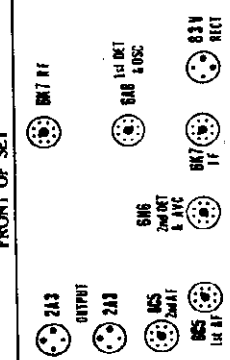


NOTE: RANGE SWITCH SHOWN IN SW. (BAND N64) POSITION

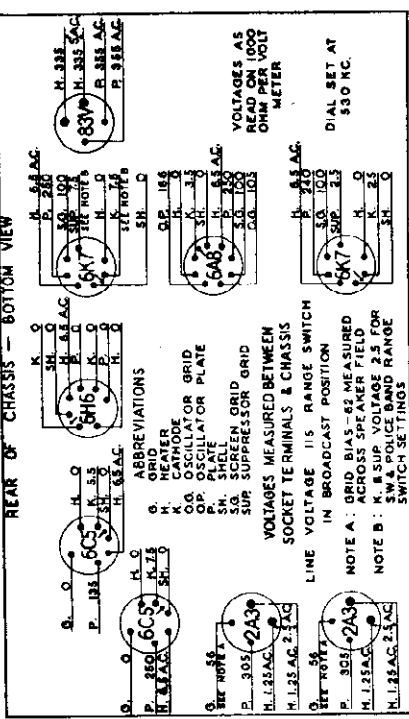
I.F. FREQUENCY
456 K.C.



TUBE LOCATIONS
FRONT OF SET



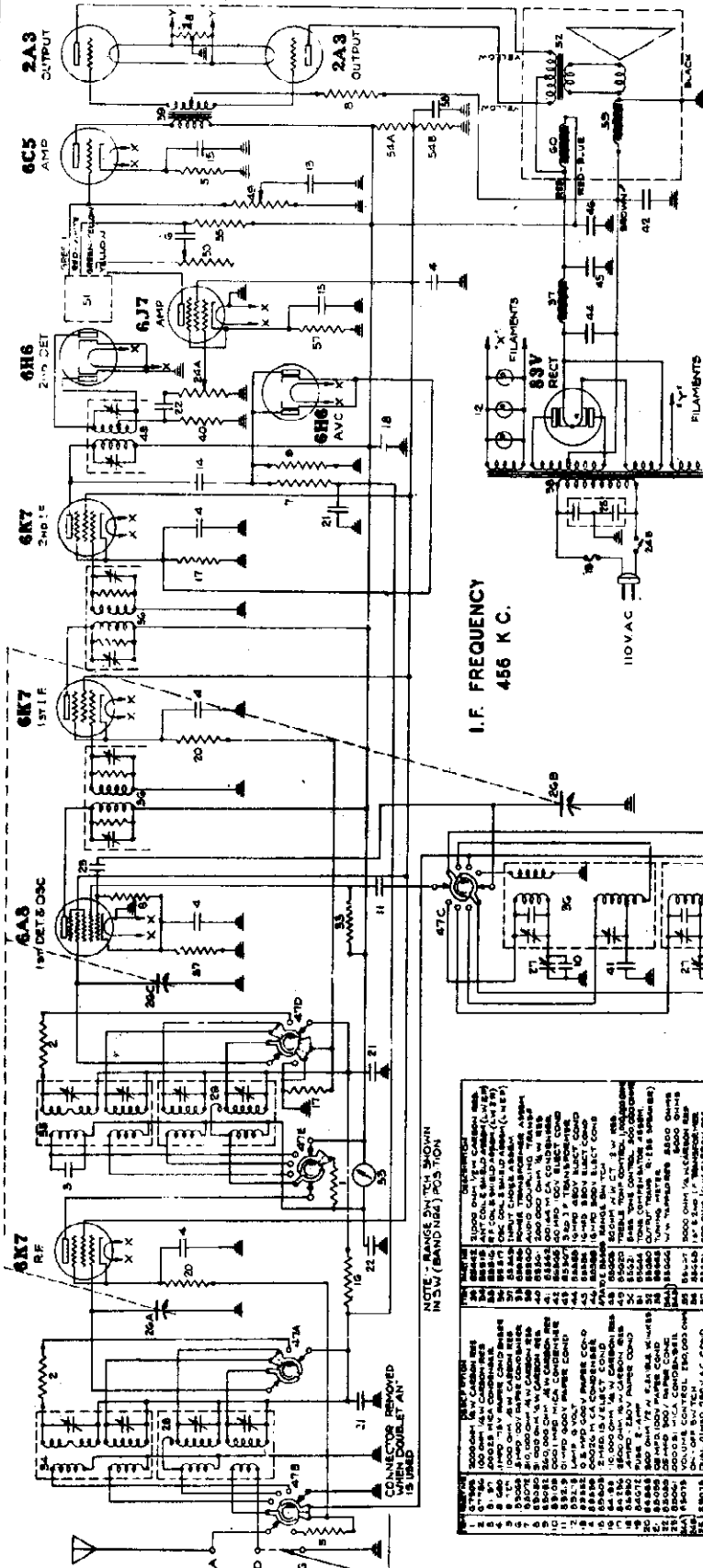
SOCKET VOLTAGES - BOTTOM VIEW



NO.	DESCRIPTION
1	100 OHM 1/2 W. RES.
2	100 OHM 1/2 W. RES.
3	100 OHM 1/2 W. RES.
4	100 OHM 1/2 W. RES.
5	100 OHM 1/2 W. RES.
6	100 OHM 1/2 W. RES.
7	100 OHM 1/2 W. RES.
8	100 OHM 1/2 W. RES.
9	100 OHM 1/2 W. RES.
10	100 OHM 1/2 W. RES.
11	100 OHM 1/2 W. RES.
12	100 OHM 1/2 W. RES.
13	100 OHM 1/2 W. RES.
14	100 OHM 1/2 W. RES.
15	100 OHM 1/2 W. RES.
16	100 OHM 1/2 W. RES.
17	100 OHM 1/2 W. RES.
18	100 OHM 1/2 W. RES.
19	100 OHM 1/2 W. RES.
20	100 OHM 1/2 W. RES.
21	100 OHM 1/2 W. RES.
22	100 OHM 1/2 W. RES.
23	100 OHM 1/2 W. RES.
24	100 OHM 1/2 W. RES.
25	100 OHM 1/2 W. RES.
26	100 OHM 1/2 W. RES.
27	100 OHM 1/2 W. RES.
28	100 OHM 1/2 W. RES.
29	100 OHM 1/2 W. RES.
30	100 OHM 1/2 W. RES.
31	100 OHM 1/2 W. RES.
32	100 OHM 1/2 W. RES.
33	100 OHM 1/2 W. RES.
34	100 OHM 1/2 W. RES.
35	100 OHM 1/2 W. RES.
36	100 OHM 1/2 W. RES.

MODELS 1381 to 1389
Chassis R-138 (Temporary)
Schematic, Socket, Parts
Trimmers

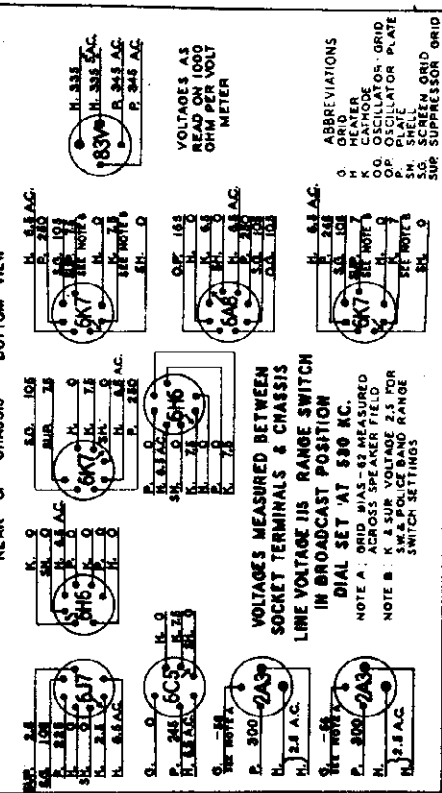
STEWART WARNER CORP.



I.F. FREQUENCY
456 K.C.

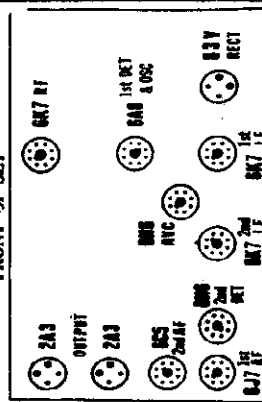
SOCKET VOLTAGES

REAR OF CHASSIS - BOTTOM VIEW

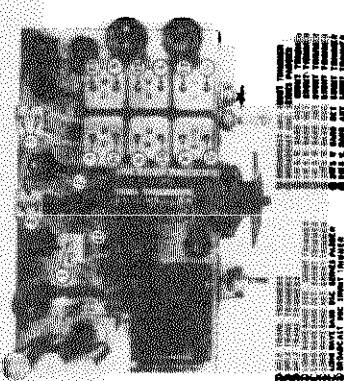


TUBE LOCATIONS

FRONT OF SET



Part No.	Description	Part No.	Description
1	6A3 125T6 DCC	10	500 OHM 1/2 WATT RES
2	6K7 157IF	11	500 OHM 1/2 WATT RES
3	6K7 157IF	12	500 OHM 1/2 WATT RES
4	6K7 157IF	13	500 OHM 1/2 WATT RES
5	6K7 157IF	14	500 OHM 1/2 WATT RES
6	6K7 157IF	15	500 OHM 1/2 WATT RES
7	6K7 157IF	16	500 OHM 1/2 WATT RES
8	6K7 157IF	17	500 OHM 1/2 WATT RES
9	6K7 157IF	18	500 OHM 1/2 WATT RES
10	6K7 157IF	19	500 OHM 1/2 WATT RES
11	6K7 157IF	20	500 OHM 1/2 WATT RES
12	6K7 157IF	21	500 OHM 1/2 WATT RES
13	6K7 157IF	22	500 OHM 1/2 WATT RES
14	6K7 157IF	23	500 OHM 1/2 WATT RES
15	6K7 157IF	24	500 OHM 1/2 WATT RES
16	6K7 157IF	25	500 OHM 1/2 WATT RES
17	6K7 157IF	26	500 OHM 1/2 WATT RES
18	6K7 157IF	27	500 OHM 1/2 WATT RES
19	6K7 157IF	28	500 OHM 1/2 WATT RES
20	6K7 157IF	29	500 OHM 1/2 WATT RES
21	6K7 157IF	30	500 OHM 1/2 WATT RES
22	6K7 157IF	31	500 OHM 1/2 WATT RES
23	6K7 157IF	32	500 OHM 1/2 WATT RES
24	6K7 157IF	33	500 OHM 1/2 WATT RES
25	6K7 157IF	34	500 OHM 1/2 WATT RES
26	6K7 157IF	35	500 OHM 1/2 WATT RES
27	6K7 157IF	36	500 OHM 1/2 WATT RES
28	6K7 157IF	37	500 OHM 1/2 WATT RES
29	6K7 157IF	38	500 OHM 1/2 WATT RES
30	6K7 157IF	39	500 OHM 1/2 WATT RES
31	6K7 157IF	40	500 OHM 1/2 WATT RES
32	6K7 157IF	41	500 OHM 1/2 WATT RES
33	6K7 157IF	42	500 OHM 1/2 WATT RES
34	6K7 157IF	43	500 OHM 1/2 WATT RES
35	6K7 157IF	44	500 OHM 1/2 WATT RES
36	6K7 157IF	45	500 OHM 1/2 WATT RES
37	6K7 157IF	46	500 OHM 1/2 WATT RES
38	6K7 157IF	47	500 OHM 1/2 WATT RES
39	6K7 157IF	48	500 OHM 1/2 WATT RES
40	6K7 157IF	49	500 OHM 1/2 WATT RES
41	6K7 157IF	50	500 OHM 1/2 WATT RES
42	6K7 157IF	51	500 OHM 1/2 WATT RES
43	6K7 157IF	52	500 OHM 1/2 WATT RES
44	6K7 157IF	53	500 OHM 1/2 WATT RES
45	6K7 157IF	54	500 OHM 1/2 WATT RES
46	6K7 157IF	55	500 OHM 1/2 WATT RES
47	6K7 157IF	56	500 OHM 1/2 WATT RES
48	6K7 157IF	57	500 OHM 1/2 WATT RES
49	6K7 157IF	58	500 OHM 1/2 WATT RES
50	6K7 157IF	59	500 OHM 1/2 WATT RES
51	6K7 157IF	60	500 OHM 1/2 WATT RES
52	6K7 157IF	61	500 OHM 1/2 WATT RES
53	6K7 157IF	62	500 OHM 1/2 WATT RES
54	6K7 157IF	63	500 OHM 1/2 WATT RES
55	6K7 157IF	64	500 OHM 1/2 WATT RES
56	6K7 157IF	65	500 OHM 1/2 WATT RES
57	6K7 157IF	66	500 OHM 1/2 WATT RES
58	6K7 157IF	67	500 OHM 1/2 WATT RES
59	6K7 157IF	68	500 OHM 1/2 WATT RES
60	6K7 157IF	69	500 OHM 1/2 WATT RES
61	6K7 157IF	70	500 OHM 1/2 WATT RES
62	6K7 157IF	71	500 OHM 1/2 WATT RES
63	6K7 157IF	72	500 OHM 1/2 WATT RES
64	6K7 157IF	73	500 OHM 1/2 WATT RES
65	6K7 157IF	74	500 OHM 1/2 WATT RES
66	6K7 157IF	75	500 OHM 1/2 WATT RES
67	6K7 157IF	76	500 OHM 1/2 WATT RES
68	6K7 157IF	77	500 OHM 1/2 WATT RES
69	6K7 157IF	78	500 OHM 1/2 WATT RES
70	6K7 157IF	79	500 OHM 1/2 WATT RES
71	6K7 157IF	80	500 OHM 1/2 WATT RES
72	6K7 157IF	81	500 OHM 1/2 WATT RES
73	6K7 157IF	82	500 OHM 1/2 WATT RES
74	6K7 157IF	83	500 OHM 1/2 WATT RES
75	6K7 157IF	84	500 OHM 1/2 WATT RES
76	6K7 157IF	85	500 OHM 1/2 WATT RES
77	6K7 157IF	86	500 OHM 1/2 WATT RES
78	6K7 157IF	87	500 OHM 1/2 WATT RES
79	6K7 157IF	88	500 OHM 1/2 WATT RES
80	6K7 157IF	89	500 OHM 1/2 WATT RES
81	6K7 157IF	90	500 OHM 1/2 WATT RES
82	6K7 157IF	91	500 OHM 1/2 WATT RES
83	6K7 157IF	92	500 OHM 1/2 WATT RES
84	6K7 157IF	93	500 OHM 1/2 WATT RES
85	6K7 157IF	94	500 OHM 1/2 WATT RES
86	6K7 157IF	95	500 OHM 1/2 WATT RES
87	6K7 157IF	96	500 OHM 1/2 WATT RES
88	6K7 157IF	97	500 OHM 1/2 WATT RES
89	6K7 157IF	98	500 OHM 1/2 WATT RES
90	6K7 157IF	99	500 OHM 1/2 WATT RES
91	6K7 157IF	100	500 OHM 1/2 WATT RES



(TEMPORARY CIRCUIT DIAGRAM)

Schematic, Voltage Trimmers, Chassis

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 58L, 58LE, 58T, 58TB, 58W, 58WB

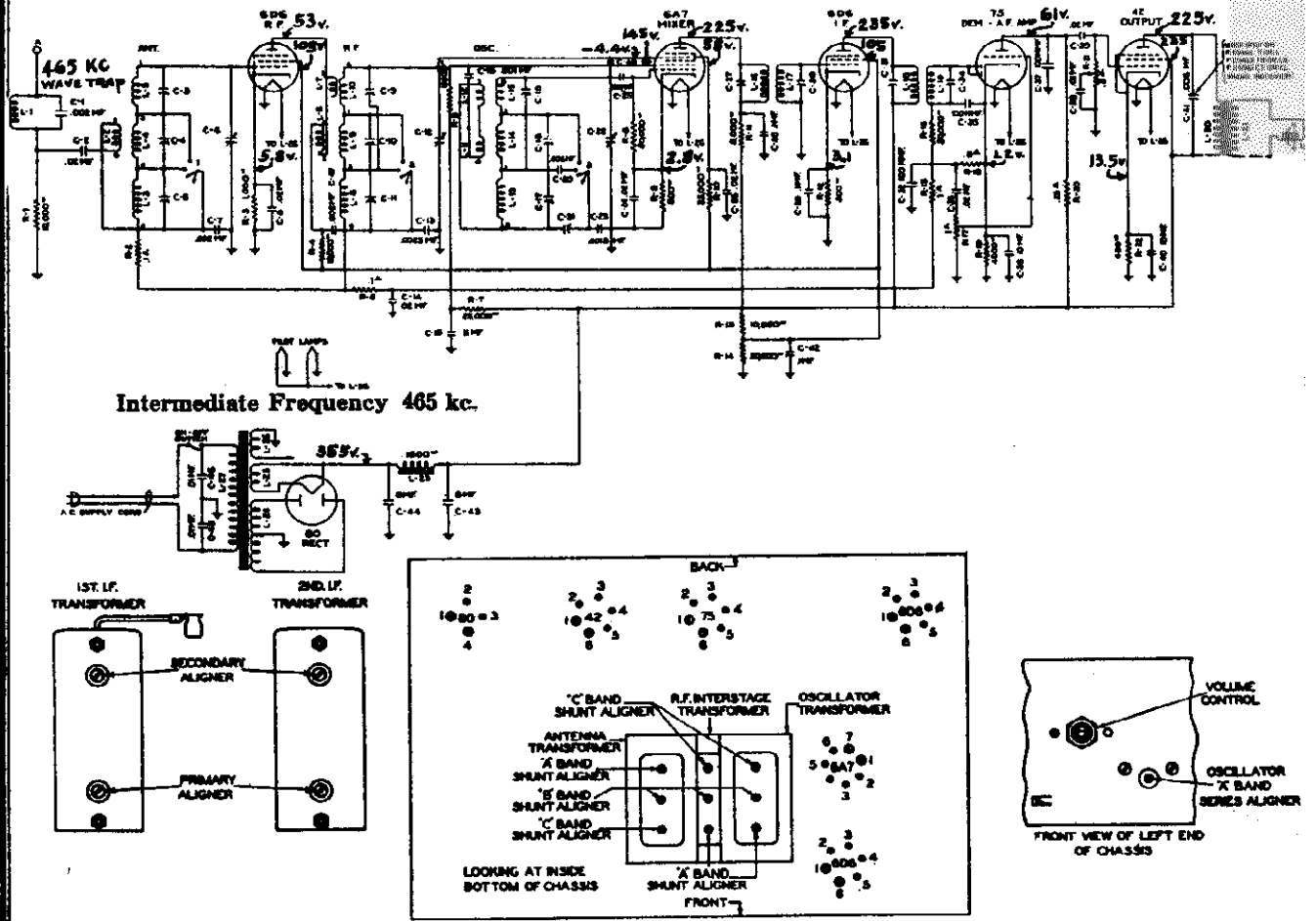


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

NOTE: RUBBER STAMP PC. NO. ON REAR PLANE OF CHASSIS WITH % CHARACTERS

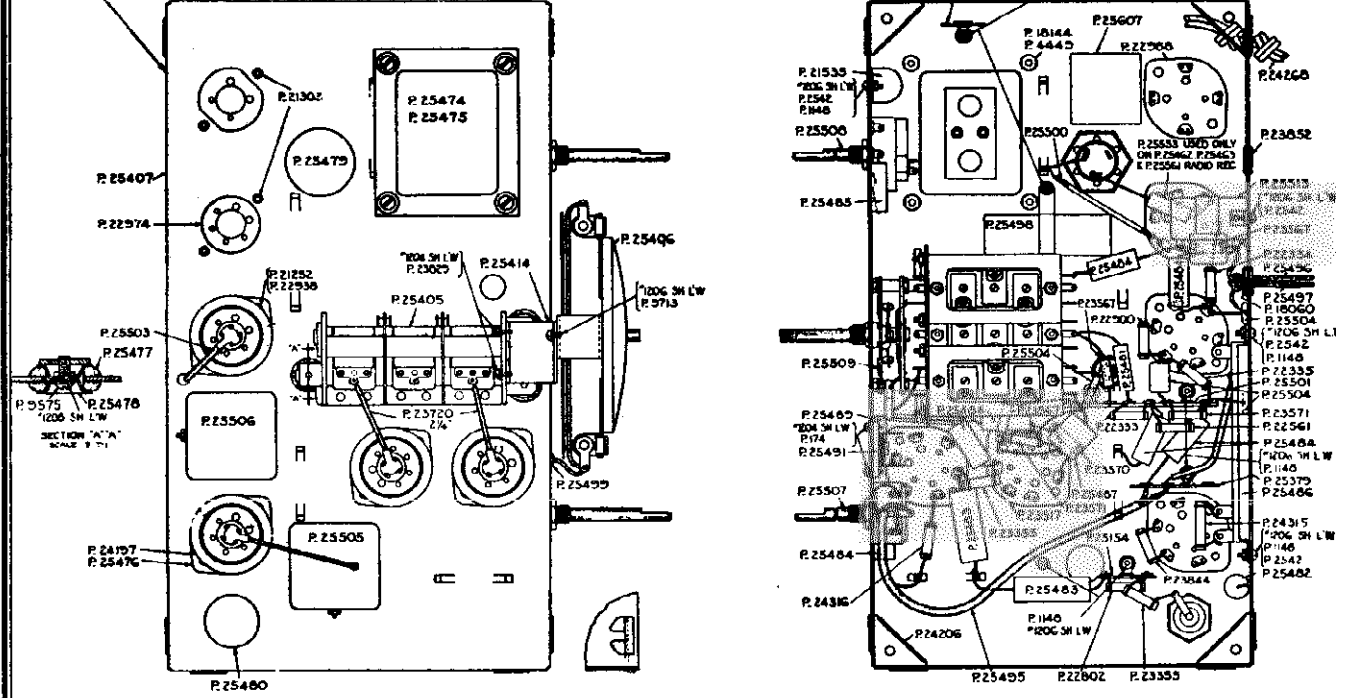
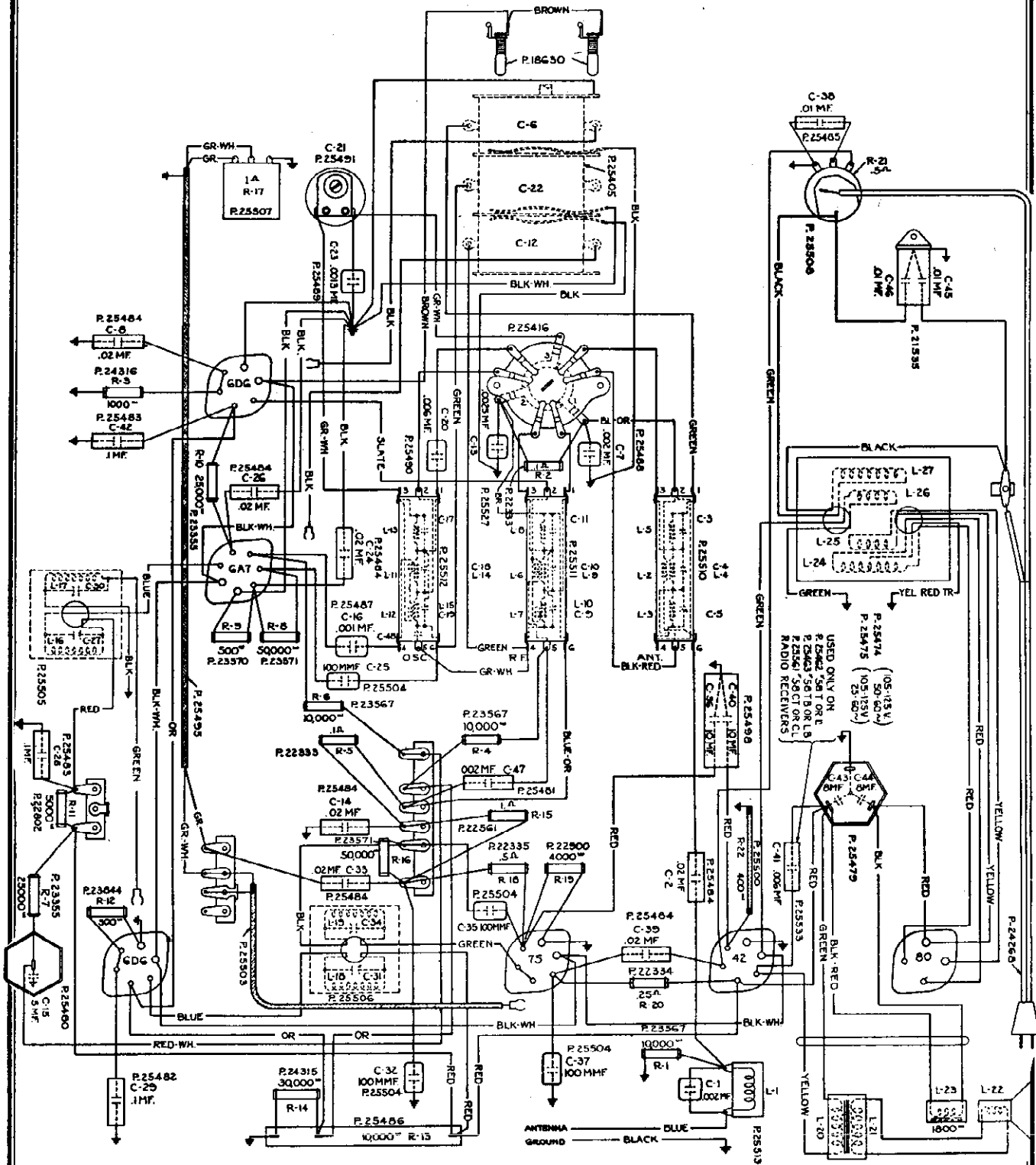


Fig. 3. Chassis Assembly.

MODEL 58 Series
Chassis Wiring
List of Models

STROMBERG-CARLSON TEL. MFG. CO.



No. 58-T	50-60 Cycles	P-25462 Chassis; P-25464 Loud Speaker
No. 58-TB	25-60 Cycles	P-25463 Chassis; P-25464 Loud Speaker
No. 58-L	50-60 Cycles	P-25462 Chassis; P-25464 Loud Speaker
No. 58-LB	25-60 Cycles	P-25463 Chassis; P-25464 Loud Speaker
No. 58-W	50-60 Cycles	P-25604 Chassis; P-25601 Loud Speaker
No. 58-WB	25-60 Cycles	P-25605 Chassis; P-25601 Loud Speaker

ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne
Tuning Ranges	A—54 to 1.7 megacycles; B—1.7 to 5.4 megacycles; C—5.4 to 18 megacycles
Number and Type of Tubes	3 No. 6K7, 1 No. 6A8, 1 No. 6H6, 2 No. 6F6, 1 No. 5Z3
Voltage Rating	105 to 125 volts
Frequency Rating	25-60 cycles and 50-60 cycles
Wattage Rating	105 watts
Intermediate Frequency	465 kc.

APPARATUS SPECIFICATIONS

No. 62 Receiver	50-60 Cycles	P-25432 Chassis; P-25687 Loud Speaker
No. 62-B Receiver	25-60 Cycles	P-25433 Chassis; P-25687 Loud Speaker
No. 63 Receiver	50-60 Cycles	P-25684 Chassis; P-25687 Loud Speaker
No. 63-B Receiver	25-60 Cycles	P-25685 Chassis; P-25687 Loud Speaker

CIRCUIT DESCRIPTION

Eight tubes, A. C. operated, Superheterodyne receiver employing metal tubes and having three tuning ranges. These three tuning ranges cover all the important broadcasts and special service bands of both American and Foreign stations. These receivers are also equipped with a high fidelity control providing high fidelity reception by means of a special band widener device and single unit high fidelity speaker. The No. 63 Receiver chassis is the same as the No. 62 Receiver chassis except for the addition of the Visual Tuning Meter. See P-25675, Installation and Operating Instructions, for properly installing and operating the No. 62 Receiver and P-25768, Installation and Operating Instructions, for properly installing and operating the No. 63 Receiver.

The various tubes in this receiver are used as follows: One of the No. 6K7 tubes functions as an R. F. Amplifier, another No. 6K7 is used in the I. F. Amplifier Stage, and the other No. 6K7 operates as an Audio Driver tube. The No. 6A8 tube is used as an Oscillator and also as a Modulator. The No. 6H6 tube is used as a Demodulator—Automatic Volume Control tube. The audio power output stage uses the two No. 6F6 tubes, and the No. 5Z4 is used as the rectifier in the power supply unit.

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.

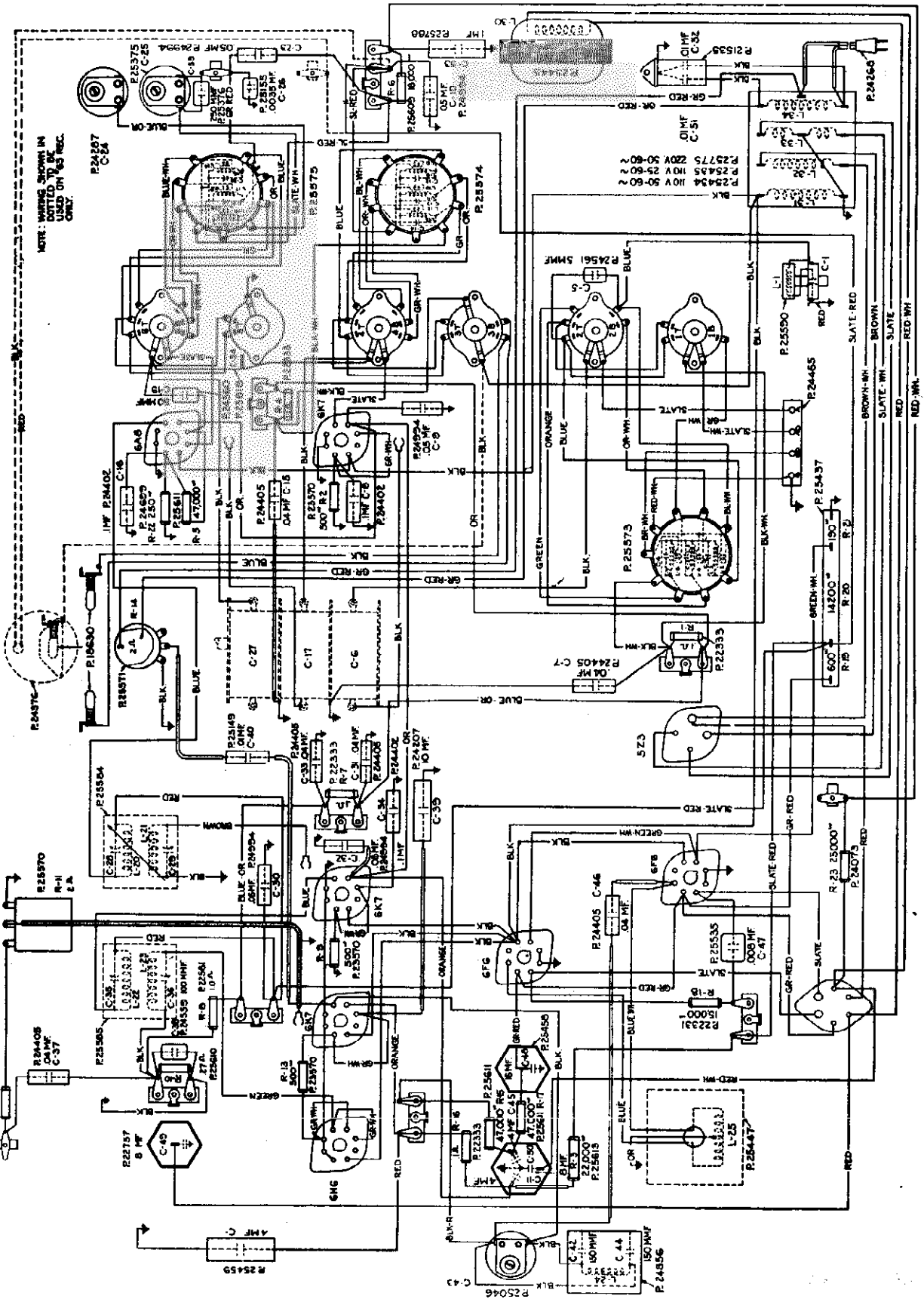
Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts.

Tube	Circuit	Cap.	Terminal Sockets								Heater Voltages Between Terminal Nos. at Volts
			1	2	3	4	5	6	7	8	
6K7	R. F. Amp.	0	0	—	+230	+ 95	+ 3	—	—	+ 3	2-7, 6.3 volts
6A8	Mod.-Osc.	0	0	—	+235	+ 95	0	+150	—	+ 3	2-7, 6.3 volts
6K7	I. F. Amp.	0	0	—	+230	+ 95	+ 3.5	—	—	+ 3.5	2-7, 6.3 volts
6H6	Dem.-A. V. C.	—	0	—	0	0	0	—	—	—	2-7, 6.3 volts
6K7	A. F. Amp.	0	0	—	+ 25	+ 35	+1.5	—	—	+ 1.5	2-7, 6.3 volts
6F6	Output	—	0	0	+250	+260	0	—	0	+16	2-7, 6.3 volts
5Z3	Rectifier	—	+428	405	405	+428	—	—	—	—	1-4, 4.85 volts
Speaker Socket			+260	+400	+430	+430	+260	+260	—	—	

Set tuned to 1000 kc., no signal. A. C. voltages are indicated by italics.

MODELS 62, 63
Chassis Wiring

STROMBERG-CARLSON TEL. MFG. CO.



STROMBERG-CARLSON TEL. MFG. CO.

MODELS 62, 63
Schematic
Chassis Assembly

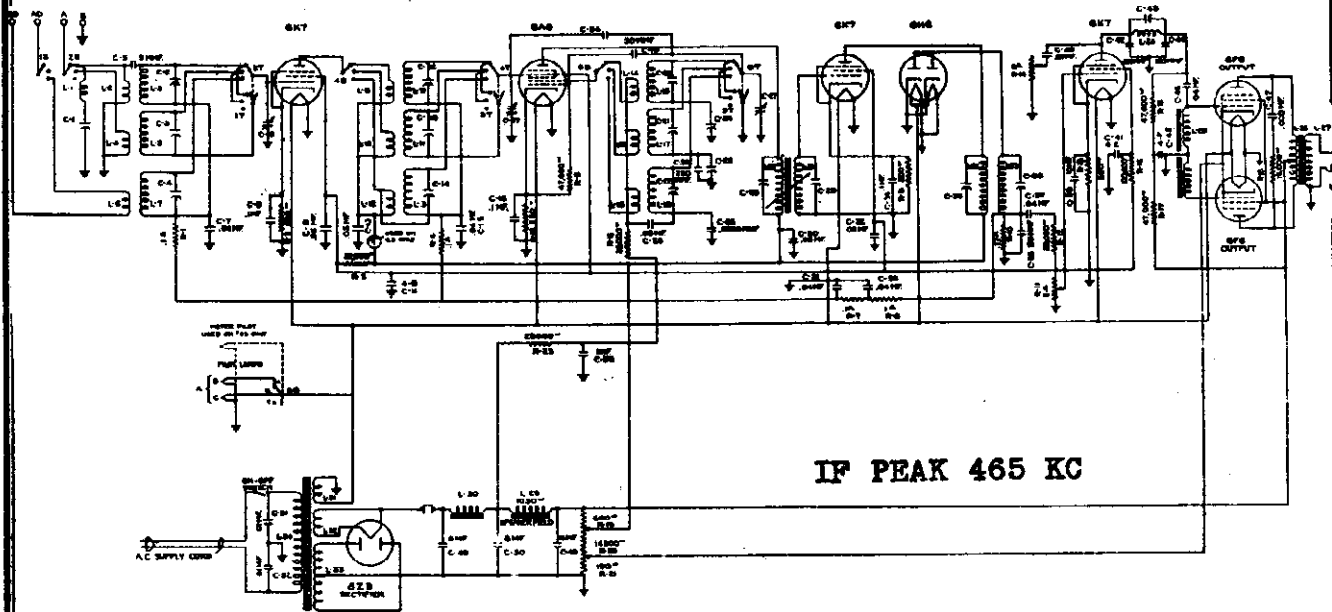


Fig. 2. Schematic Circuit of Receiver.

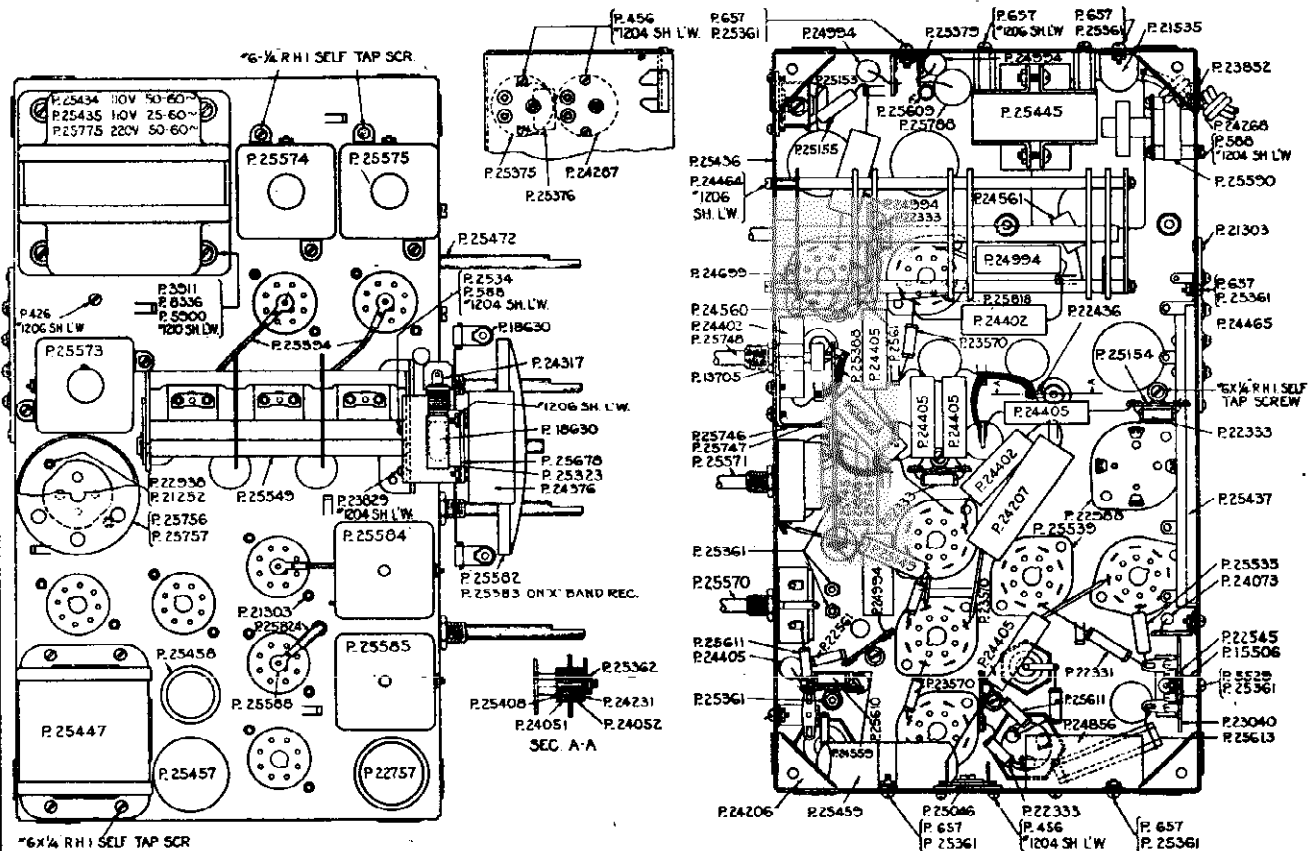


Fig. 3. Chassis Assembly.

MODELS 62, 63
Socket, Trimmers
Parts List

STROMBERG-CARLSON TEL. MFG. CO.

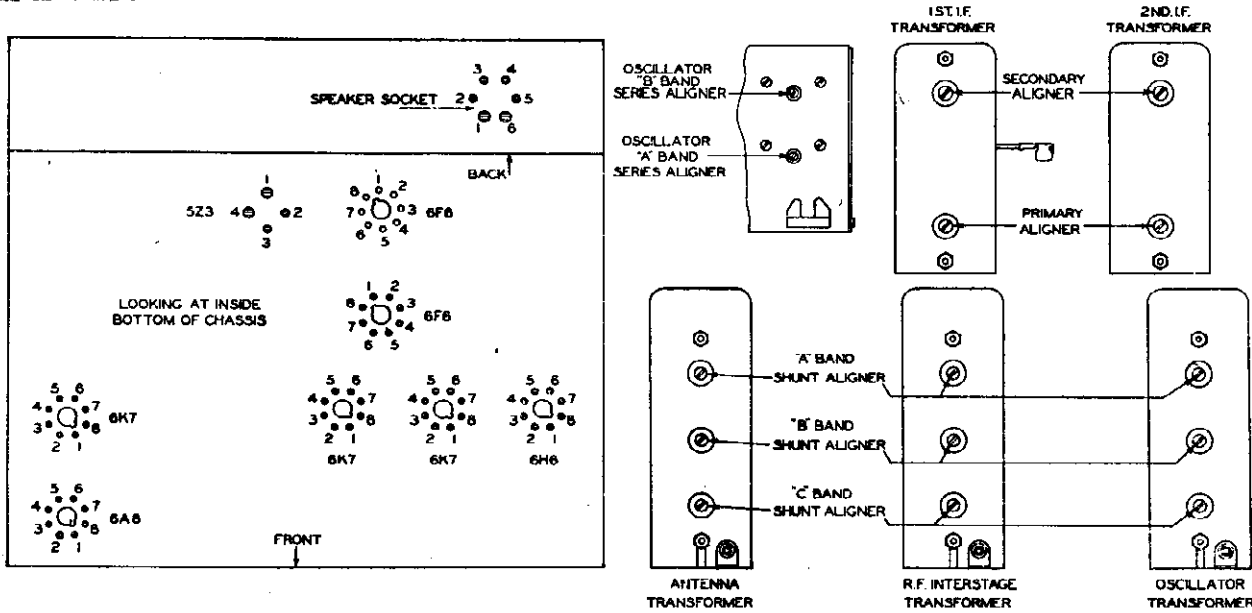


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors. CAUTION—Never Attempt to Align Receiver With Fidelity Control Set At Any Position Other Than the Maximum Counter-Clockwise Position.

Piece Number	Parts	Description of Parts	Required per Receiver	List Price Each
P-24465	Binding Post Assembly	Antenna and Ground	1	.40
P-25746	Bracket	Fidelity Control	1	.10
P-25458	Capacitor	Electrolytic	1	1.35
P-25457	Capacitor	Electrolytic	1	3.05
P-23757	Capacitor	Electrolytic	1	1.55
P-24207	Capacitor	Electrolytic	1	.85
P-25159	Capacitor	Electrolytic	1	.90
P-25788	Capacitor	Electrolytic	1	.95
P-24402	Capacitor	0.1 MF.	3	.45
P-24094	Capacitor	0.05 MF.	6	.45
P-24405	Capacitor	0.04 MF.	6	.45
P-21535	Capacitor	Two, 0.01 MF.	1	.90
P-25149	Capacitor	0.01 MF.	1	.30
P-25535	Capacitor	Type 3, 0.008 MF.	1	.60
P-25155	Capacitor	0.0035 MF.	1	.40
P-25376	Capacitor	Type O, 250 MMF.	1	.25
P-24559	Capacitor	Type O, 100 MMF.	1	.25
P-24560	Capacitor	Type O, 50 MMF.	1	.25
P-21561	Capacitor	Type O, 5 MMF.	1	.20
P-25046	Capacitor	Aligning, 220 MMF.	1	.50
P-24287	Capacitor	Aligning, 525 MMF.	1	.60
P-25375	Capacitor	Aligning, 1350 MMF.	1	1.00
P-25445	Choke Coil Assembly		1	2.75
P-25573	Coil Assembly	Antenna	1	3.75
P-25574	Coil Assembly	R. F. Stage	1	3.75
P-25575	Coil Assembly	Oscillator	1	3.75
P-24268	Cord	A. C. Supply	1	.75
P-25590	Filter Assembly	Antenna Wave Trap	1	.55
P-24856	Filter Assembly	Audio Cut-off Filter	1	2.50
P-18630	Lamp	Pilot	2	.13
P-25747	Lever	Fidelity Control	1	.10
P-25570	Potentiometer	Volume Control	1	.85
P-25571	Potentiometer	Tone Control and "On-Off" Switch	1	1.15
P-24609	Resistor	Type D, 250 ohms.	1	.37
P-23570	Resistor	Type D, 500 ohms.	3	.37
P-22331	Resistor	Type C, 15,000 ohms.	1	.37
P-25600	Resistor	Type C, 18,000 ohms.	1	.37
P-25013	Resistor	Type F, 22,000 ohms.	1	.37
P-24078	Resistor	Type B, 25,000 ohms.	1	.37
P-25611	Resistor	Type D, 47,000 ohms.	4	.37
P-22333	Resistor	Type D, 0.1 megohm	4	.37
P-25610	Resistor	Type D, 0.27 megohm	1	.37
P-22561	Resistor	Type D, 1 megohm	1	.37
P-25487	Resistor	"B" Voltage Divider	1	.60
P-25748	Shaft Assembly	Fidelity Control	1	.50
P-25745	Shoulder Screw	Fidelity Control	1	.05
P-21808	Shoulder Screw	Fidelity Control	1	.05
P-22988	Socket	Tube, 4 Prong	1	.15
P-23040	Socket	Tube, 6 Prong	1	.15
P-23539	Socket	Tube, 8 Prong	7	.15
P-25687	Speaker	High Fidelity Loud Speaker	1	17.75
P-25478	Switch Assembly	Frequency Range	1	3.90
P-25447	Transformer Assembly	Audio Driver Stage	1	4.00
P-25688	Transformer Assembly	Audio Power Output	1	2.90
P-25584	Transformer Assembly	1st I. F.	1	4.28
P-25585	Transformer Assembly	2nd I. F.	1	1.95
P-25434	Transformer	Power, 50-60 Cycles, 110 Volts	1	6.75
P-25435	Transformer	Power, 25-60 Cycles, 110 Volts	1	13.85

Additional Parts used only on the No. 63 Receivers

P-24576	Meter	Visual Tuning	1	2.75
P-18630	Lamp	Pilot	1	.13

STROMBERG-CARLSON TEL. MFG. CO.

Engineering Data
Stromberg-Carlson No. 70 Series Radio Receivers

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY
Rochester, New York

ELECTRICAL SPECIFICATIONS

Table with columns for Type of Circuit, Tuning Range, Type and Number of Tubes, Voltage Rating, Frequency Rating, Writage Rating, Intermediate Frequency.

APPARATUS SPECIFICATIONS

Table listing specifications for various receiver models (No. 70, 70-B, 72, 72-D, 72-B, 74, 74-D, 74-B) including chassis, speaker, and assembly details.

CIRCUIT DESCRIPTION

No. 70 and 72 RECEIVERS
This is a tube, A. C. operated, All-wave superheterodyne, having four tuning ranges. See P-35534, Installation and Operating Instructions, for installation and operating procedure.
One 6BE6 functions as an R. F. high frequency amplifier only on the "C" and "D" bands. On the other two lower bands this tube is shunted out and the tuning system functions as a "bi-resonator" system. The next 6BD is used as an R. F. Amplifier. The remaining two 6BE6 tubes are used as I. F. Amplifiers. The 6A7 is used as a modulator tube only. This is done in order to obtain maximum freedom of detuning coupling between the oscillator and modulator.
The 76 tube functions as the oscillator. One 6C6 tube is used in a vacuum tube voltmeter circuit, resonance being indicated by the meter in the plate circuit of this tube while the other 6C6 tube is used in the automatic noise suppression or "Q" circuit. The 6BT tube acts as a demodulator, automatic volume control tube, and a triode first audio tube.
The No. 42 tube is operated as a triode audio driver tube for the No. 2A3 power output tubes. The 5Z5 tube is the rectifier tube in the power supply.

No. 74 RECEIVER

The arrangement and type of tubes used in this receiver is the same as in the No. 70 and 72 Receivers except for the addition of two more 2A3 tubes in the audio power output stage, and the additional 5Z5 rectifier tube in the power unit of the auditorium type load speaker.

INSTRUCTIONS FOR THE REMOVAL AND REPLACEMENT OF THE TREBLE LOUD SPEAKER USED IN THE NO. 70, NO. 72 AND NO. 74 RECEIVERS

Using the speaker cord and remove the four machine screws holding the speaker to the baffle. Care should be exercised in handling this speaker. Do not drop it face down on a hard surface or the center may be damaged due to the resulting air compression. Later speakers are provided with a stud on the front grid which prevents their being damaged in this manner. This stud may readily be removed from speakers to be used for replacement service, if the baffle is not provided with a hole for its accommodation.
The driving coil leads on these speakers are made of fine aluminum wire in order to reduce the mass to the value necessary for the reproduction of high frequencies. Avoid touching them as they are delicate and easily broken. Do not attempt to blow dust or chips from these speakers with compressed air as lead breakage may result.
The movement of the cone in actual service is only a few thousandths of an inch and is adequately taken care of by the thin aluminum center suspension. Do not force the cone back and forth with the fingers as you would an ordinary dynamic speaker or the center suspension may be damaged.

CENTERING THE DRIVING COIL OF TREBLE SPEAKER

Once the coil is correctly centered, it should never need readjustment. However, in case the center screw should be inadvertently loosened and the adjustment lost, the following instructions are given:
Provide three strips of clean, smooth paper, .008" thick, about 1/4" wide, and about 3" long, for use as spacers. With the cone center clamping screw loosened, insert one end of each of the paper strips in the gap between the outside of the driving coil and the hole in the front plate, spacing the strips equidistantly around the coil. This may easily be done if the ends of the paper are cut to a point and tweezers are used for inserting them. Now, tighten the center clamping screw and "feet" the paper strips by pulling them with the tweezers to determine if any are pinched tightly in the gap. If this is found to be the case, the center screw should be loosened, and the cone moved slightly sideways in a direction to relieve the pinched strip. Then, the screw should be retightened. The coil is considered centered when the three strips are equally free in the gap. Remove the strips by grasping them with the tweezers close to the front plate, rather than by pulling on the end of the strip, otherwise the paper may tear off against the edge of the hole, and thus a piece may be left in the gap. In performing the centering operation, use great care not to damage the driving coil leads.

INSTRUCTIONS FOR THE REMOVAL AND REPLACEMENT OF THE BASS LOUD SPEAKER USED IN THE NO. 70 AND NO. 72 RECEIVERS

After unplugging the cords, remove the housings on each side of the speaker by taking out the necessary retaining screws and lifting off the housings. (In some models, the driving network box is mounted outside the housings and must first be removed.) Then, take off the three clamps holding the cone ring to the baffle board. The four nuts which clamp the speaker to the labyrinth may now be removed with a flat wrench and the speaker lifted out.
In replacing the speaker, see that the cone ring is pushed firmly forward against the baffle, and that the housings are tight against the sides of the cone bracket.

INSTRUCTIONS FOR THE REMOVAL AND REPLACEMENT OF THE AUDITORIUM TYPE BASS LOUD SPEAKER USED IN THE NO. 74 RECEIVER

Two different methods of fastening the bass speaker to the floor of the cabinet have been used in this receiver. In the first method, the mounting screws are inserted from the inside of the cabinet and are screwed into metal sockets mounted in the bottom board. To remove the speaker, the acoustical labyrinth and the upper half of the cone housing must be removed to permit access to the hexagonal heads of the speaker mounting screws. First, remove the following wood screws:

- (a) The six screws passing from the back through the two wooden cleats each side of the speaker, and into the cone housing.
(b) Two screws which fasten the two metal brackets on top half of cone housing to the baffle board.
(c) All screws which secure the labyrinth retaining brackets to the sides and bottom of cabinet.
(d) Two screws which pass through from the front of the baffle (near the bottom) into the labyrinth. The heads of these screws are just behind the lower edge of the skirt at the front of the cabinet.

The treble speaker should now be removed by taking out its four mounting screws, and unplugging the cord from the driving network.

Now, the upper half of the cone housing and the labyrinth may be removed, after unplugging the remaining speaker cords. A wide chisel will be found handy for prying the labyrinth up off the cabinet floor sufficient to obtain a hand hold on them. Have a small box ready to rest the right-hand labyrinth on to keep strain off the cord of the photograph transformer.

Next, remove the four clamps holding the cone bracket to the baffle, and also the four hexagonal headed screws holding the speaker to the floor of the cabinet. The speaker may now be lifted straight up and out over the lower half of the cone housing.

In replacing the speaker, push it forward firmly against the baffle, and note if the foot brackets rest evenly on the cabinet floor. If not, wooden wedges should be placed under them so that the cone bracket will not be strained when the speaker is bolted down. When replacing the labyrinth, see that they are pushed over into firm contact with the ends of the cone housing.

In the second method, which is that used in more recent production, the bass speaker is fastened down by four hexagonal headed screws inserted from the bottom of the cabinet, and threaded into metal bars which clamp down the speaker mounting feet. These screws may be removed by reaching under the cabinet with a wrench. Then, remove the upper half of the cone housing after taking out its four retaining screws. This will expose the two clamps holding the cone bracket to the baffle. After these are removed, and the cords are unplugged, the speaker may be lifted out of the cabinet. In replacing the speaker, observe the same precautions as to wedging the base, if necessary, as were mentioned under the first method.

TO REMOVE RECTIFIER TUBE SHIELD FROM BASS SPEAKER (NO. 74 RECEIVER ONLY)

The tube shield is provided with keyhole mounting slots and is held by spring pressure against its mounting screws, which are left slack. To remove the shield, lift it straight up and then unhook from the mounting screws by pulling toward the left.

REDUCTION OF OUTPUT HUM

The amount of hum in the output of these receivers will be found to vary. This is due to the characteristics of the amount of hum in the output stage. Therefore, if a particular receiver is found to have excessive hum, it is recommended that several No. 2A3 tubes be tried. In this way a suitable set of matched tubes can be obtained which will give minimum hum.

REPLACEMENT PARTS

Parts Used on the Nos. 70, 72, and 74 Receivers:

Table with columns: Part Number, Description of Parts, Quantity, Unit Price, Total Price. Lists various components like capacitors, resistors, tubes, and assemblies.

Parts Used Only on the Nos. 70 and 72 Receivers:

Table listing parts specific to models 70 and 72, including chassis, power supply, and transformer components.

Parts Used Only on the No. 74 Receiver:

Table listing parts specific to model 74, including chassis, power supply, and transformer components.

STROMBERG-CARLSON TEL. MFG. CO.

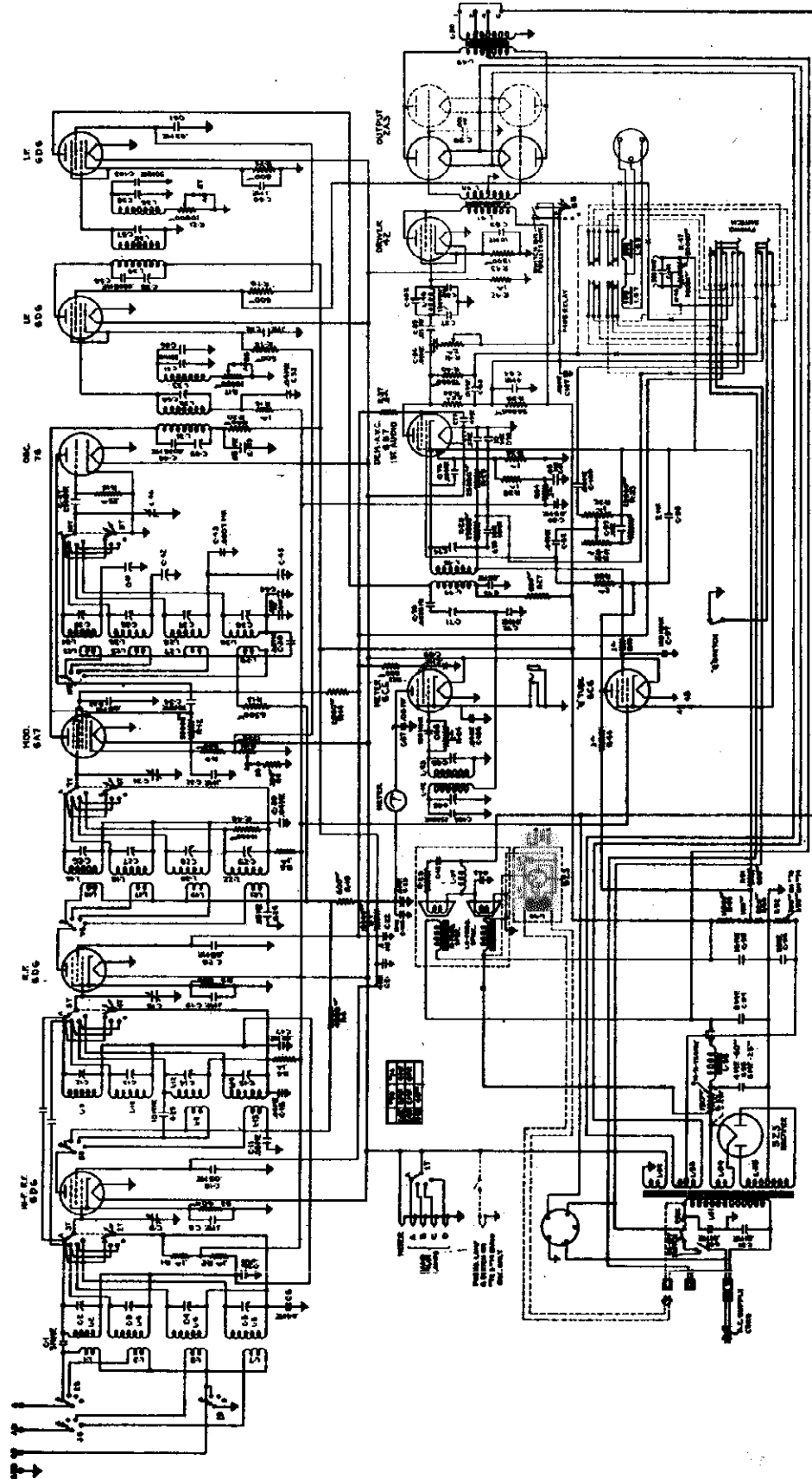


Fig. 2. Schematic Circuit of Receiver.
No. 405 Relay is furnished on special order for Tel-ek-tor equipped receivers.

MODEL 70 Series
Chassis Wiring

STROMBERG-CARLSON TEL. MFG. CO.

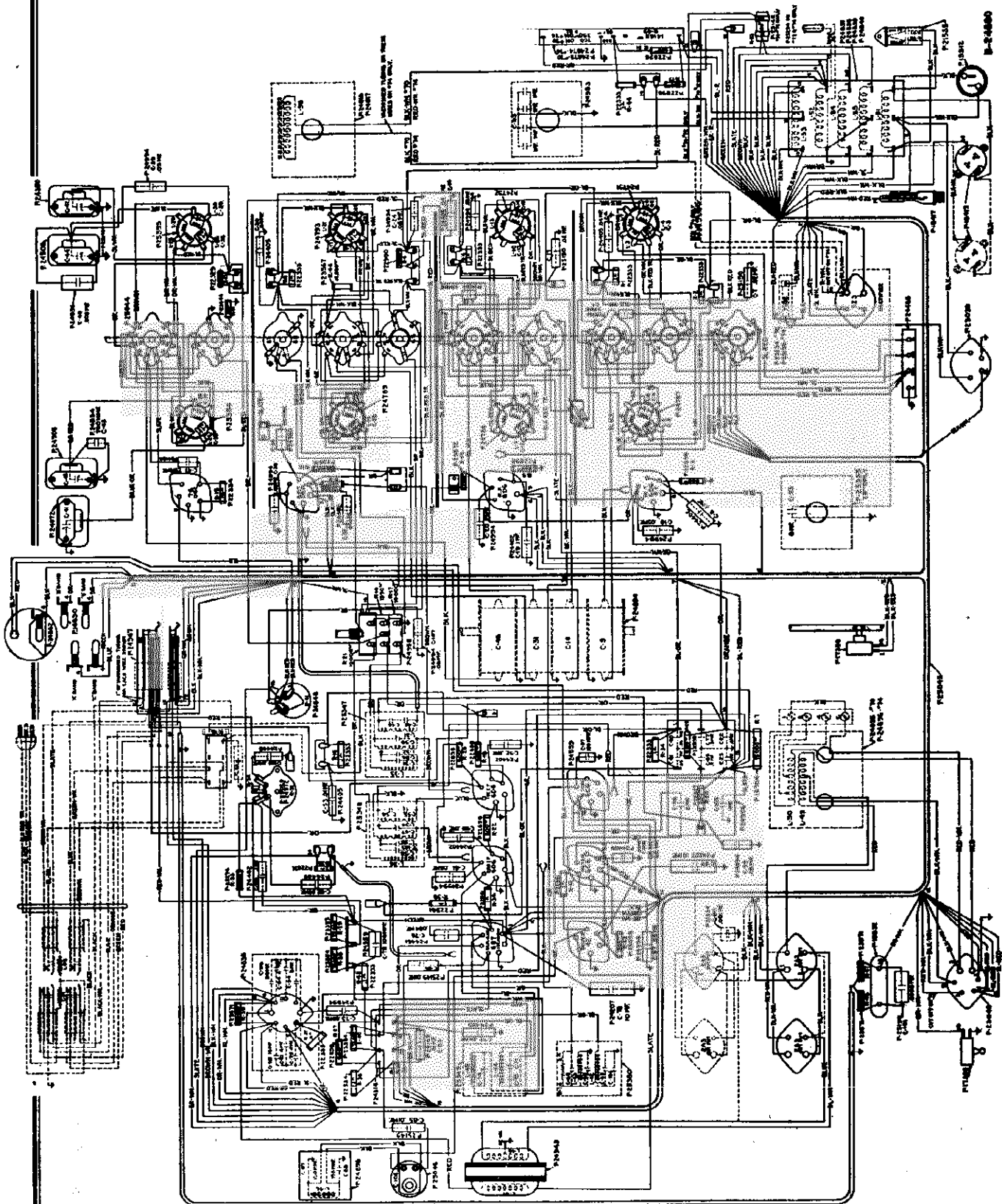


Fig. 3. Wiring Diagram of Chassis.

STROMBERG-CARLSON TEL. MFG. CO. Voltage

MODEL 70 Series

These voltage readings are obtained by measuring between the various tube socket contacts and the base; with the tubes in place. The Receiver is, therefore, in operation when the measurements are made. Fig. 1, shows the terminal layout of the sockets with the proper terminal numbers. The terminals of each socket are numbered, starting with one heater or filament pin and proceeding around the pin circle clockwise to the other heater or filament pin. This is done looking at the bottom of the socket.

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 with a resistance of 1,000 ohms per volt should be used for measuring the D. C. voltages.

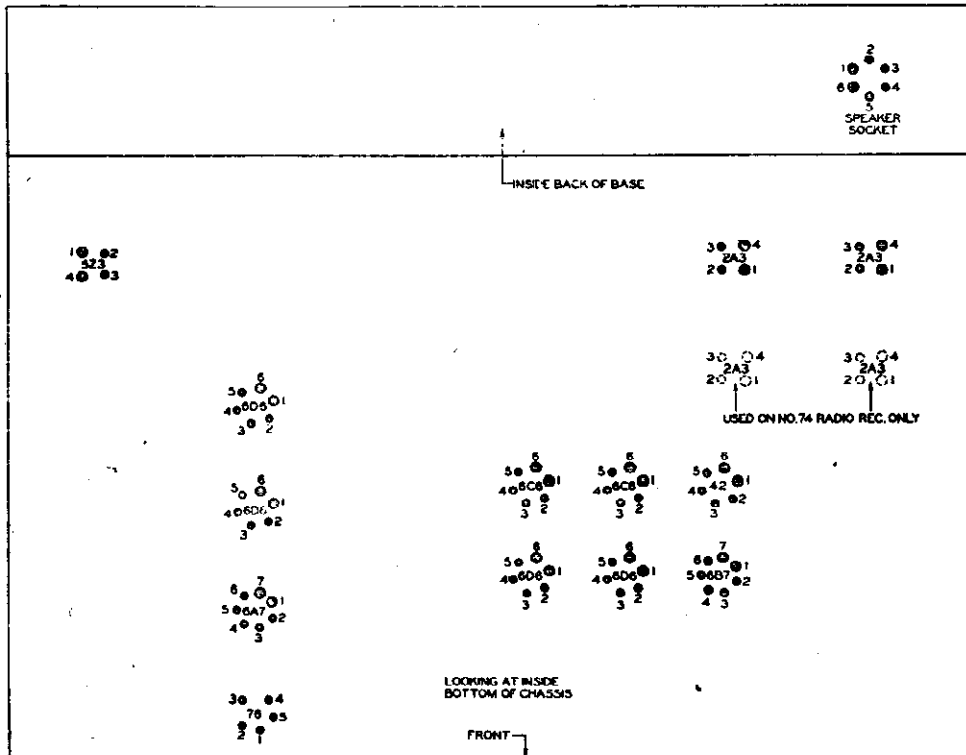


Fig. 1. Terminal Layout for Voltage Measurement Chart

Tube	Circuit	Cap.	Terminals of Sockets							Heater Voltages Between Terminal Nos. at 120 Volts
			1	2	3	4	5	6	7	
6D6	Hi-F, R. F.	0		+200	+ 87	+3.5	+3.5			1-6, 6.3 volts
6D6	R. F. Amp.	0		+220	+ 87	+3.5	+3.5			1-6, 6.31 volts
6A7	Mod.	0		+225	+ 75	+ 75	- 10			1-7, 6.31 volts
76	Osc.	—		+180	-25	0				1-5, 6.31 volts
6D6	1st I. F. Amp.	0		+225	+ 87	+ 10	+ 10			1-6, 6.32 volts
6D6	2nd I. F. Amp.	0		+225	+ 87	+3.5	+3.5			1-6, 6.32 volts
6B7	Dem.-Aud.	3		+130	+ 25	+ 12	0			1-7, 6.32 volts
6C6	"Q"	0		+ 12	+ 12	0	0			1-6, 6.32 volts
6C6	Meter	0		+225	+ 87	0	0			1-6, 6.32 volts
42	2nd Audio	—		+220	+220	0	+ 20			1-6, 6.32 volts
2A3s*	Output	—	+ 60	+375	0	+ 60				1-4, 2.53 volts
5Z3	Rectifier		+410	405	405	+410				1-4, 4.81 volts
Speaker			0	+388	+228	+365	+388	0		

Set tuned to 1000 kc., "A" Band, "Hi" Fidelity Control not operated, "Q" Switch Off, A. C. voltages are indicated by italics

MODEL 70 Series
Trimmers

STROMBERG-CARLSON TEL. MFG. CO.

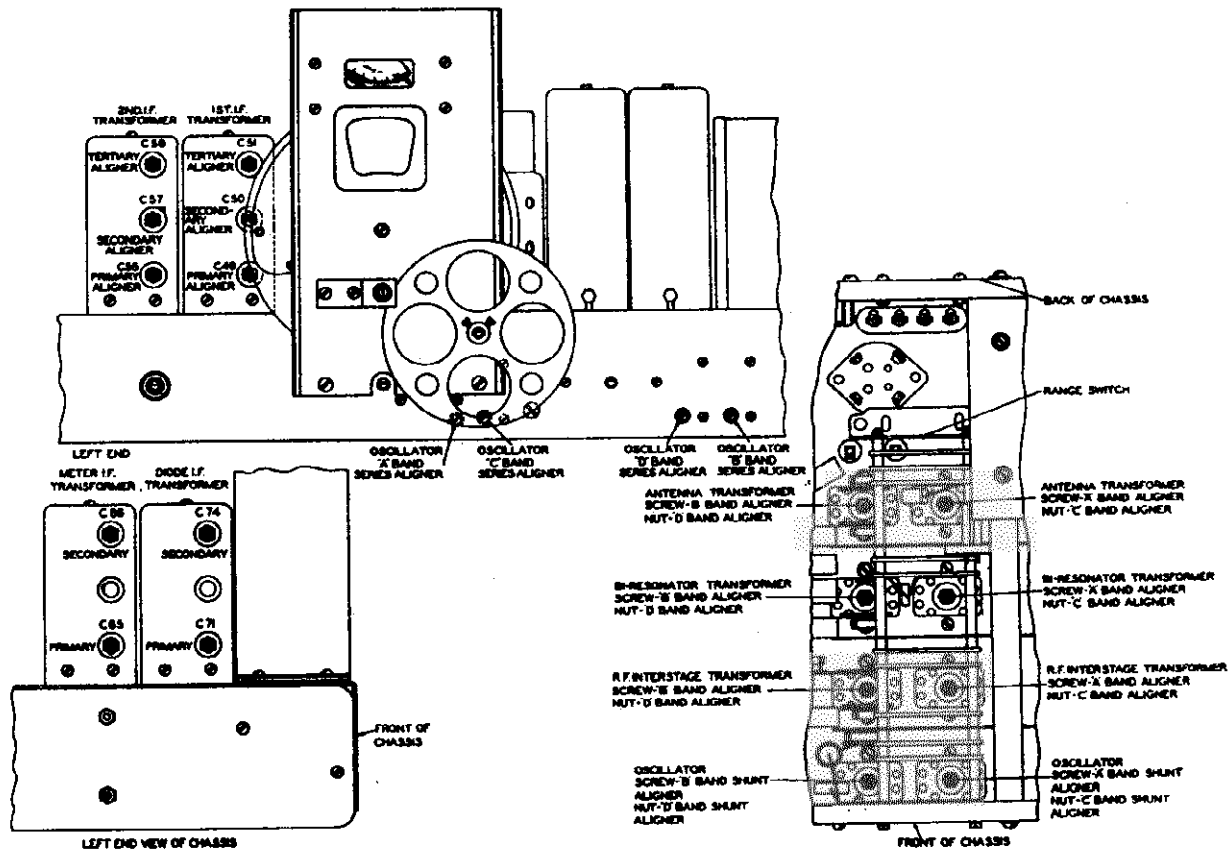


Fig. 5. Showing the Location of the Various Aligning Capacitors. For all R. F., I. F., and Tertiary Circuits.

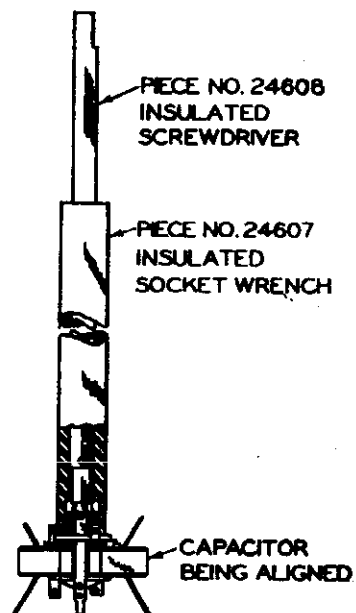


Fig. 6. Showing How the Special Aligning Tools Facilitate Making the Adjustments on the Aligning Capacitors.

STROMBERG-CARLSON TEL. MFG. CO.

Alignment

ALIGNMENT INSTRUCTIONS

The unexcelled performance of a High Fidelity receiver cannot be obtained unless the receiver is properly aligned. In order to obtain this performance, it is necessary that these adjustments be carefully done. In the High Fidelity type of receiver, these adjustments will, of necessity, be more critical than in the standard radio receiver.

In making these adjustments, it is necessary that a good signal generator be used. In conjunction with the use of this signal generator, a good voltage output meter must be used in order to determine when resonance in the various circuits is obtained. An artificial antenna (dummy) of some sort with the high side terminal of the signal generator connected to it should be used. This oscillator should be connected to the high side terminal of the dummy antenna. The oscillator should be connected as closely as possible to this terminal. CAUTION: Because of the different type circuit employed in these receivers for operating the visual tuning meter, it will not be possible to make the aligning adjustments by noting the action of this meter.

1. Remove the chassis from the cabinet but have it near enough to the cabinet so that the cords of the loud speakers will be placed in their normal position. Turn the "Op" position. Make sure that the "Op" position is in the "Op" position, and that the High Fidelity control is set for the normal selectivity position. Set the range switch to the "A" band position, and operate the volume control to the maximum position. Also operate the tone control to the normal position. Connect the ground or low side output terminal of the signal generator to the "Gd" and "Op" binding posts on the receiver chassis. From the remaining terminal of the artificial antenna connect a wire to the "A" and "AD" binding posts on the receiver chassis.

2. R. F. Adjustments.

Noting the various designated aligning capacitors shown in Figure 5, proceed in the following manner for aligning the radio frequency and meter circuits.

- (a) Operate the range switch on the chassis, to the "A" band position (full clockwise rotation). Align the receiver at 1500 Kc., aligning in the following sequence: Oscillator, R. F. Amplifier, "B" Resonator, Antenna.
Align the oscillator's low frequency aligner (series aligning capacitor) at 600 Kc. on this "A" band. Only the oscillator should be aligned at this frequency.
Check the alignment of all the R. F. circuits again at 4 megacycles.
- (b) Operate the range switch on the chassis, one position counter-clockwise from the "A" band position. This will be the position for the "B" band operation.
Align the receiver at 4 megacycles in the same manner as was done for the 1500 Kc. of the "A" band.
Align the oscillator's low frequency aligner (series aligning capacitor) at 1500 Kc. on this "B" band. Only the oscillator should be aligned at this frequency.
Check the alignment of all the R. F. circuits again at 4 megacycles.
- (c) Operate the range switch on the chassis, one position counter-clockwise from the "B" band position. This will be the position for the "C" band operation.
Align the receiver at 10 megacycles in the same manner as was done for the 1500 Kc. of the "A" band.
Align the oscillator's low frequency aligner (series aligning capacitor) at 4 megacycles on this "C" band. Only the oscillator should be aligned at this frequency.
Check the alignment of all the R. F. circuits again at 10 megacycles.
- (d) Operate the range switch on the chassis, one position counter-clockwise from the "C" band position. This will be the position for the "D" band operation.
Align the receiver at 19.3 megacycles in the same manner as was done for the 1500 Kc. of the "A" band.
Align the oscillator's low frequency aligner (series aligning capacitor) at 10 megacycles on this "D" band. Only the oscillator should be aligned at this frequency.
Check the alignment of all the R. F. circuits again at 19.3 megacycles.

NOTE: It will be noted that no instructions are given for aligning the receivers at other than two frequencies for any band. Every receiver is given an exacting check for "tracking" at various frequencies in each band 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.

3. Meter Circuit Adjustment

Adjust the signal generator to 600 Kc. and tune in this signal on the radio receiver. Be sure to tune for the maximum or peak as indicated on the visual meter of the chassis. Before adjusting the aligning capacitors of this circuit, make sure that the volume control is at the maximum volume position and the high fidelity control must be in the normal selectivity position. Also, release the locking nuts of the aligning capacitors. Then adjust the two aligning capacitors of this circuit, obtaining maximum indication on the visual tuning meter. After this adjustment, tighten the lock-nuts of these capacitors.

4. I. F. Alignment

Because of the necessity of obtaining the proper shape of resonance curve of these stages, 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 better to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed.

Set the signal generator to exactly 250 Kc. or 370 Kc., depending upon the intermediate frequency of the particular receiver stamped on the chassis. Operate the range switch of the receiver to the "A" band position. Turn the receiver tuning dial at its extreme low frequency position and operate the tone control to the normal position. Turn the high fidelity control to the normal selectivity position. Never attempt to adjust the I. F. stages with the high fidelity control set at the high fidelity position. Before proceeding with the aligning, remove the 250 micromicrofarad capacitor (artificial antenna) from the signal generator lead and substitute for it a capacitor having a value of at least 0.25 microfarad. Now, connect this lead to the grid cap of the 6D6 tube used in the second I. F. amplifier stage. Do not remove the grid lead from the chassis connecting to this tube. Before attempting to adjust any of the I. F. aligning capacitors, release the locking-nuts and, after completing the adjustment, make sure that these lock-nuts are securely tightened.

- (a) Now, note from Figure 5, the aligning capacitors C-74 and C-71, and adjust these capacitors in the order given for maximum output reading on the output meter.
- (b) Move the signal generator lead and capacitor from the grid cap of the 6D6 tube used in the second I. F. amplifier stage to the grid cap of the 6D6 tube used in the first I. F. amplifier stage and adjust the aligning capacitors C-57 and C-55 (in this sequence), for maximum output reading on the output meter.
- (c) Move the signal generator lead from the grid cap of the first 6D6 tube used in the first I. F. amplifier stage, to the grid cap of the 6A7 tube. Now, adjust the aligning capacitors C-50 and C-49 for maximum output reading on the output meter. This completes the necessary adjustments on the I. F. stages for normal operation of these High Fidelity receivers.

Adjusting the I. F. Tertiary Circuits

In the High Fidelity receiver, some means must be used to obtain that selectivity which will give the necessary band width for High Fidelity reproduction. In these receivers, it will be noted from the schematic diagram that the first and second I. F. transformers are made up of three tuned circuits: the primary, secondary, and a third which we call the tertiary circuit. Included in each tertiary circuit is a variable resistance in series with the coil. Incorporated in these variable resistances is a switch which opens or closes this circuit. When the fidelity control is turned counter-clockwise as far as it is possible, the receiver functions with normal selectivity because the switches (incorporated in the variable resistors) are open. When the fidelity control is operated in the clockwise direction as far as it is possible, minimum resistance is inserted in series with the coil, resulting in the tertiary circuits acting as a heavy load across the secondary circuits, which, of course, results in broader tuning. As the fidelity control is operated in the opposite direction, more resistance is added in series with the tertiary coils which makes these circuits less effective, resulting in greater selectivity.

When the R. F. tertiary circuits are carefully aligned, operate the high fidelity control to the high fidelity position (minimum clockwise rotation). Now note from Figure 5 the location of the aligning capacitors in each tertiary circuit. Then, with the signal generator still set at the intermediate frequency, and its lead connected to the grid cap of the 6A7 tube, adjust these capacitors. Adjust the first I. F. tertiary aligning capacitor, C-51, until a minimum reading is obtained on the output meter. Then, adjust the second I. F. tertiary aligning capacitor, C-53, in the same manner.

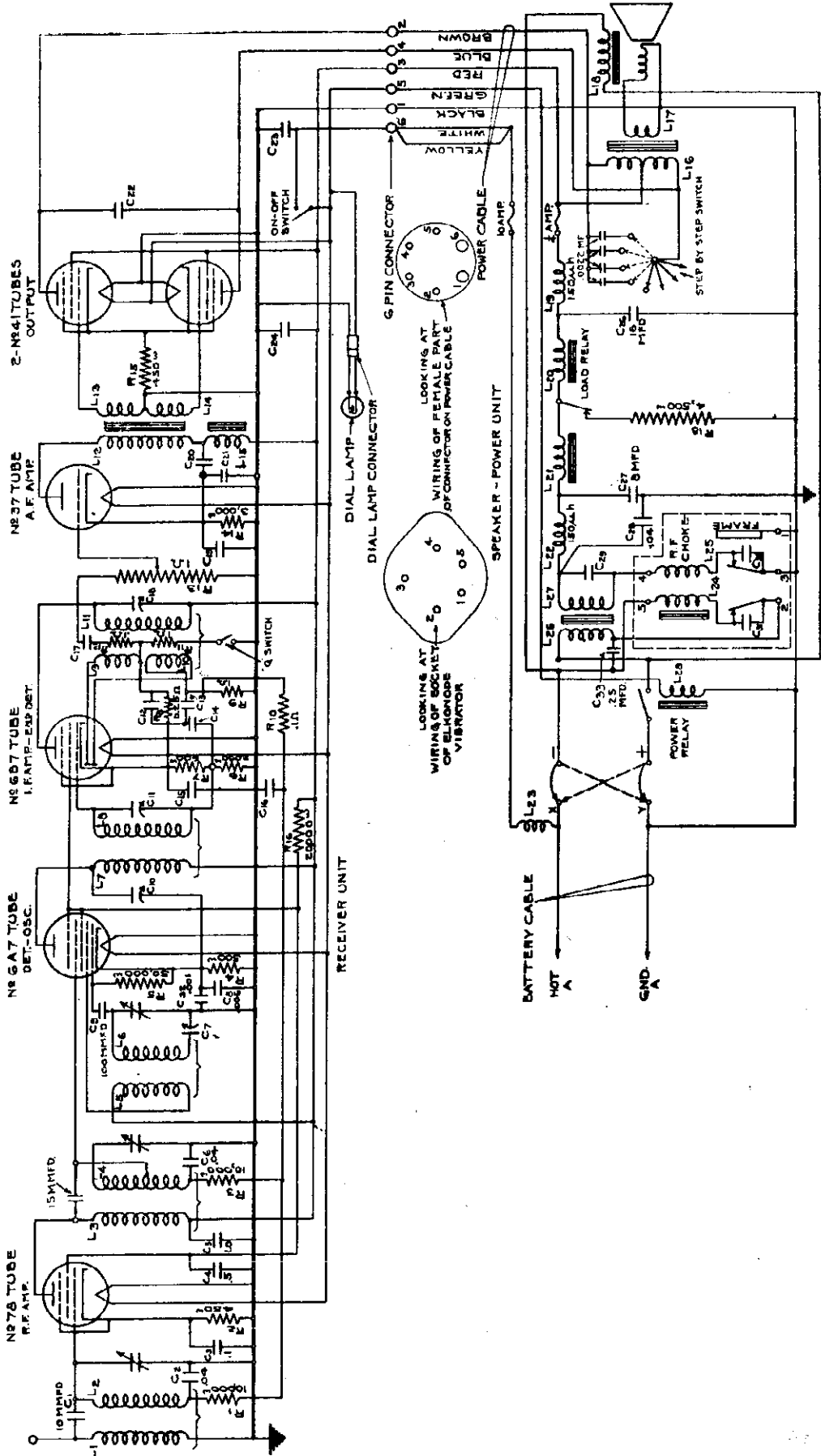
In order to make all these aligning adjustments in the most satisfactory manner, it is recommended that the service man use the special aligning tools manufactured by this company and listed as follows:

- 1—Piece No. 24607 Insulated Aligning Wrench.
- 1—Piece No. 24608 Insulated Aligning Screw Driver.

See Figure 6.

MODEL 33-A
Schematic

STROMBERG-CARLSON TEL. MFG. CO.



STROMBERG-CARLSON TEL. MFG. CO.

MODELS 82, 82-B
Circuit Data
Voltage

Engineering Data

Stromberg-Carlson No. 82 Radio Receiver

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY
Rochester, New York

ELECTRICAL SPECIFICATIONS

Type of Circuit	-----			Superheterodyne
Tuning Ranges	A-520 to 1600 Kc.; B-1500 to 4200 Kc.; C-3700 to 10,000 Kc.; D-8500 to 23,000 Kc.			
Number and Type of Tubes	3 No. 6D6, 1 No. 6A7, 2 No. 76, 3 No. 42, 1 No. 5Z3			
Voltage Rating	-----			105-125 Volts
Frequency Rating	-----			25-60 Cycles and 50-60 Cycles
Wattage Rating	-----			136 Watts
Intermediate Frequency	-----			465 Kc.

APPARATUS SPECIFICATIONS

No. 82 Receiver	-----	50-60 Cycles	-----	P-22723 Chassis; P-22738 Loud Speaker
No. 82-B Receiver	-----	25-60 Cycles	-----	P-22724 Chassis; P-22738 Loud Speaker

CIRCUIT DESCRIPTION

Ten tubes, A. C. operated, All-wave superheterodyne receiver having four tuning ranges. See Pc-25385, Installation and Operating Instructions, for properly installing and operating this receiver.

One No. 6D6 tube functions as an R. F. Amplifier, another No. 6D6 tube is used in the I. F. Amplifier stage and the other No. 6D6 tube operates in the first audio stage which is resistance-coupled to the second audio stage. The No. 6A7 tube is used as a modulator tube only. This is done in order to obtain maximum freedom from detrimental coupling between this modulator and the oscillator tube. One No. 76 tube functions as the oscillator and the other No. 76 tube operates as a Demodulator and Automatic Volume Control tube. One No. 42 tube is operated as a triode audio driver tube for the power output tubes composed of two No. 42 tubes. These output tubes are also connected as triodes. The No. 5Z3 tube is used as the rectifier in the power supply unit.

NORMAL VOLTAGE READINGS

These voltage readings are obtained by measuring between the various tube socket contacts and the base with the tubes in place. 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. The terminals of each socket are numbered, starting with one heater or filament pin and proceeding around the pin circle clockwise to the other heater or filament pin. This is done looking at the bottom of the socket.

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 with a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages.

Tube	Circuit	Cap.	Terminals of Sockets							Heater Voltages Between Terminals Nos. at 120 Volts
			1	2	3	4	5	6	7	
6D6	R. F. Amp.	0		+240	+ 95	+ 4	0			1-6, 6.4 volts
6A7	Mod.	0		+240	+ 95	+ 95	- 2	+3.1	0	1-7, 6.4 volts
76	Osc.	—		+195	+ 30	0				1-5, 6.4 volts
6D6	I. F. Amp.	0		+240	+ 95	+3.5	+3.5			1-7, 6.4 volts
76	Demod.-A. V. C.	—		0	0	0				1-5, 6.4 volts
6D6	1st Audio	0		+ 68	+ 20	+ 1	+ 1			1-6, 6.4 volts
42	2nd Audio	—		+230	+230	0	+ 21			1-6, 6.4 volts
42	Output	—		+390	+390	0	+ 37			1-6, 6.4 volts
5Z3	Rectifier	—	+410	398	398	+410				1-4, 4.75 volts
Speaker Socket			0	+245	+400	+400	+390	0		

Set tuned to 1000 Kc., "A" Band, A. C. voltages are indicated by italics

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 82,82-B
Schematic
Chassis Wiring

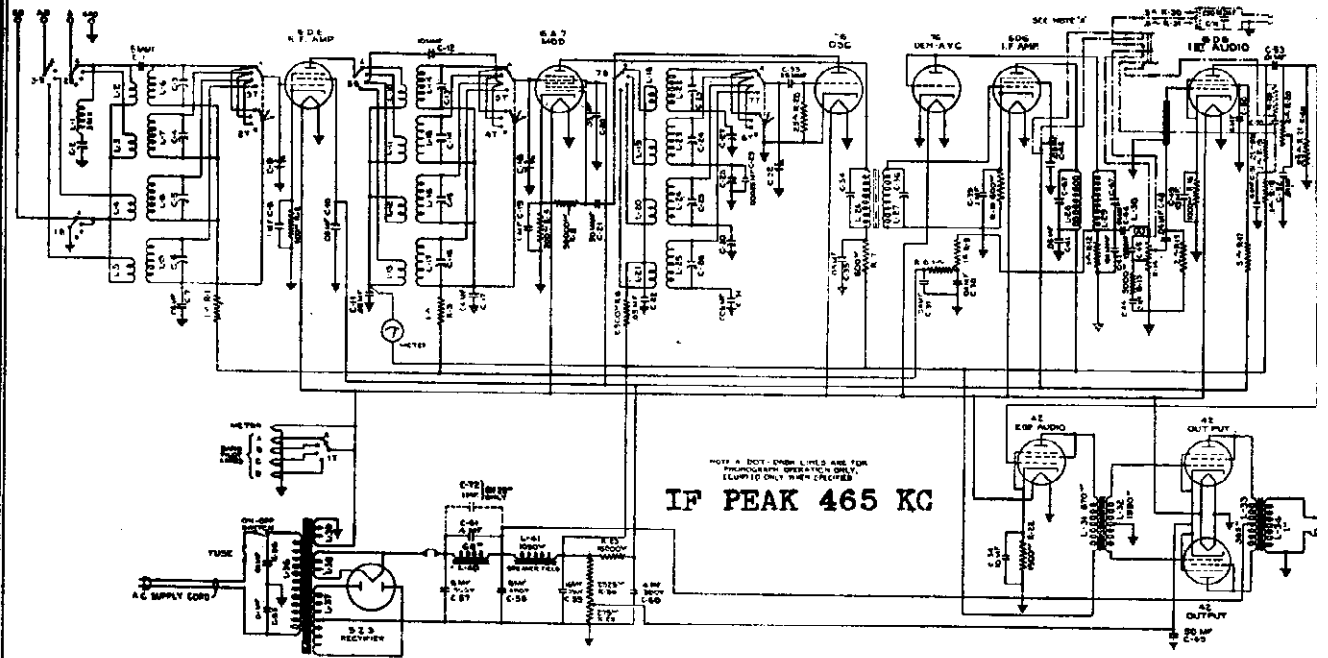


Fig. 2. Schematic Circuit of Receiver.

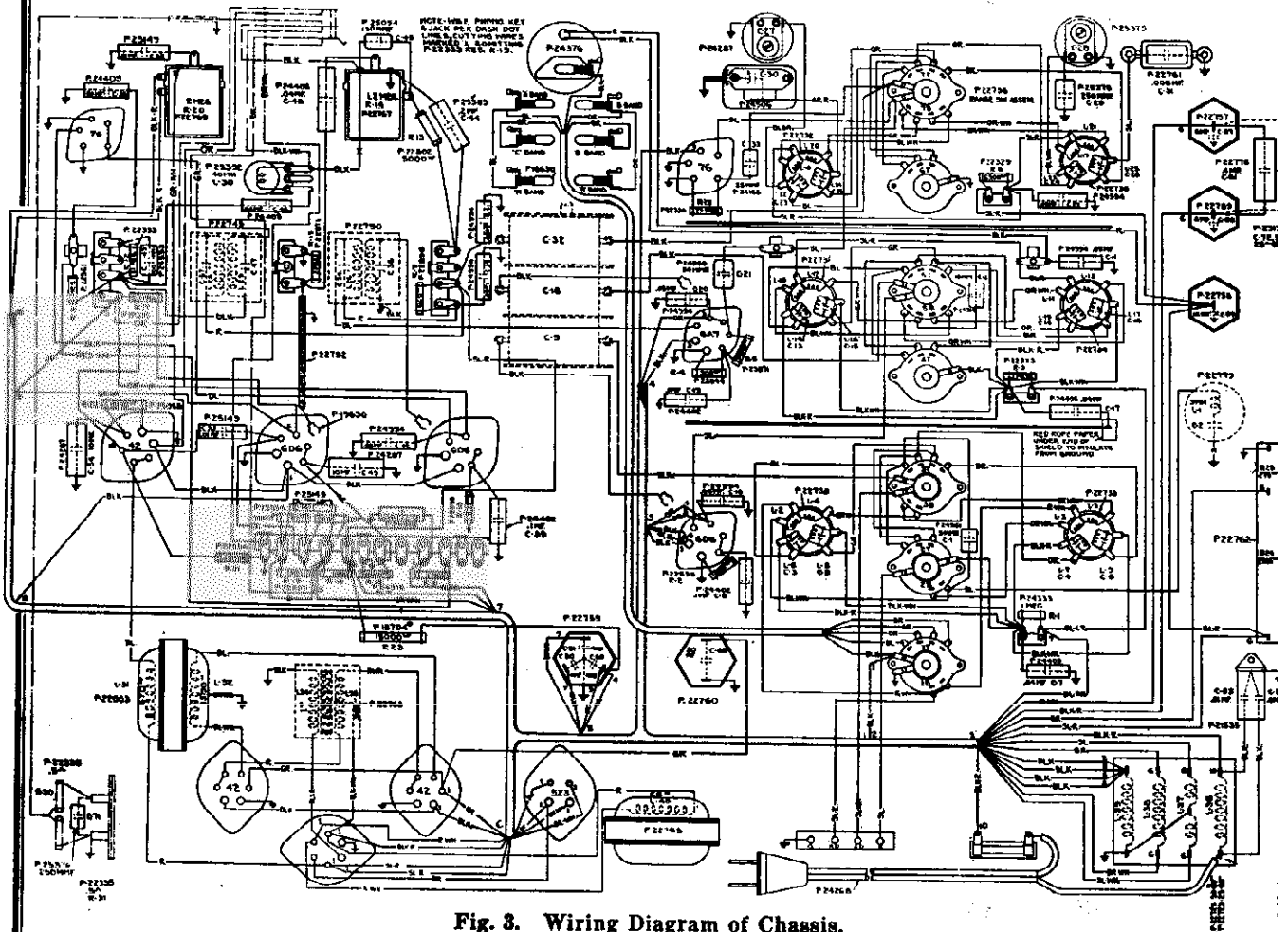


Fig. 3. Wiring Diagram of Chassis.

MODELS 82, 82-B
Socket, Trimmers
Parts List

STROMBERG-CARLSON TEL. MFG. CO.

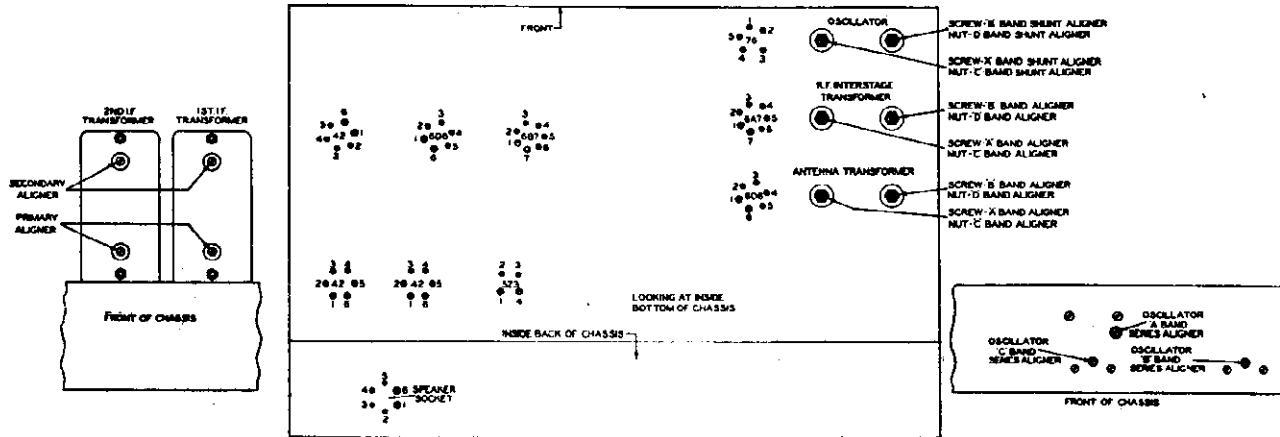


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

REPLACEMENT PARTS

Piece Number	Parts	Description of Parts	Required per Receiver	List Price Each
P-24465	Binding Post Assembly	Antenna and Ground	1	\$.40
P-25159	Capacitor Assembly	Used only on Receivers for 25 Cycles	1	1.00
P-25757	Capacitor	Electrolytic	1	1.50
P-25758	Capacitor	Electrolytic	1	1.50
P-25759	Capacitor	Electrolytic	1	3.00
P-25760	Capacitor	Electrolytic	1	3.50
P-25761	Capacitor	Electrolytic	1	1.50
P-24207	Capacitor	Electrolytic	2	.35
P-25775	Capacitor	0.4 MF	1	.35
P-25329	Capacitor	0.2 MF	1	.75
P-24467	Capacitor	0.1 MF	3	.45
P-24094	Capacitor	0.05 MF	7	.45
P-24465	Capacitor	0.04 MF	6	.45
P-21535	Capacitor	Two, 0.01 MF	1	.50
P-25149	Capacitor	0.01 MF	2	.30
P-25761	Capacitor	Type J, 0.006 MF	1	.75
P-25376	Capacitor	Type O, 250 MMF	1	.25
P-25054	Capacitor	Type O, 150 MMF	1	.25
P-24559	Capacitor	Type O, 100 MMF	1	.25
P-24560	Capacitor	Type O, 50 MMF	1	.25
P-24186	Capacitor	Type O, 25 MMF	1	.25
P-24314	Capacitor	Type O, 10 MMF	1	.25
P-24561	Capacitor	Type O, 5 MMF	1	.20
P-24287	Capacitor	Aligning, 525 MMF	1	.60
P-25375	Capacitor	Aligning, 1350 MMF	1	1.00
P-24504	Capacitor	Aligning, 2500 MMF	1	1.25
P-22765	Choke Coil Assembly		1	3.00
P-22730	Coil Assembly	Antenna, "A" and "C" Bands	1	4.50
P-22731	Coil Assembly	E. F., "A" and "C" Bands	1	4.50
P-22732	Coil Assembly	Oscillator, "A" and "C" Bands	1	4.50
P-22733	Coil Assembly	Antenna, "B" and "D" Bands	1	4.50
P-22734	Coil Assembly	E. F. "B" and "D" Bands	1	4.50
P-22735	Coil Assembly	Oscillator, "B" and "D" Bands	1	4.50
P-25392	Coil Assembly	40 Millihenry	1	1.75
P-24268	Cord	A. C. Supply	1	.75
P-22779	Filter Assembly	Antenna	1	1.00
P-23150	Fuse	2 Amperes	1	.12
P-21094	Fuse Block		1	.20
P-18630	Lamp	Pilot, 6 Volts	7	.13
P-24374	Meter	Visual Tuning	1	2.75
P-22767	Potentiometer	Volume Control	1	1.50
P-22769	Potentiometer	Tone Control and A. C. Switch	1	1.25
P-23644	Resistor	Type D, 300 ohms	1	.37
P-22694	Resistor	Type D, 600 ohms	3	.37
P-24316	Resistor	Type D, 1,000 ohms	1	.37
P-25055	Resistor	Type C, 1,500 ohms	1	.37
P-22602	Resistor	Type D, 5,000 ohms	1	.37
P-22329	Resistor	Type C, 6,500 ohms	1	.37
P-18704	Resistor	Type B, 15,000 ohms	1	.37
P-23571	Resistor	Type D, 50,000 ohms	1	.37
P-22333	Resistor	Type D, 0.1 Megohm	6	.37
P-22334	Resistor	Type D, 0.25 Megohm	2	.37
P-22335	Resistor	Type D, 0.5 Megohm	1	.37
P-22561	Resistor	Type D, 1 Megohm	1	.37
P-22871	Resistor	Type D, 2 Megohm	1	.37
P-22162	Resistor	"B" Voltage Divider	1	.75
P-24023	Socket	Tube, 4 Prong	1	.17
P-23039	Socket	Tube, 5 Prong	2	.17
P-23040	Socket	Tube, 6 Prong	6	.17
P-23642	Socket	Tube, 7 Prong	2	.17
P-22736	Switch Assembly	Frequency Range	1	5.00
P-22803	Transformer Assembly	Audio Driver Stage	1	4.00
P-22750	Transformer Assembly	1st I. F.	1	3.00
P-22749	Transformer Assembly	2nd I. F.	1	2.00
P-22728	Transformer	Power, 50-60 Cycles, 110 Volts	1	11.00
P-22729	Transformer	Power, 25-30 Cycles, 110 Volts	1	20.00

MODELS 83, 83-B
Circuit Data
Voltage

STROMBERG-CARLSON TEL. MFG. CO.

Engineering Data

Stromberg-Carlson No. 83 Radio Receiver

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY

Rochester, New York

ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne
Tuning Ranges	A—520 to 1600 kc.; B—1500 to 4200 kc.; C—3.7 to 10 megacycles; D—8.5 to 23 megacycles
Number and Type of Tubes	3 No. 6K7, 1 No. 6A8, 1 No. 6C5, 1 No. 6H6, 3 No. 6F6, 1 No. 5Z3
Voltage Rating	105 to 125 volts
Frequency Rating	25 to 60 cycles and 50 to 60 cycles
Wattage Rating	135 watts
Intermediate Frequency	465 kc.

APPARATUS SPECIFICATIONS

No. 83 Receiver	50 to 60 Cycles	P-25680 Chassis; P-25683 Loud Speaker
No. 83-B Receiver	25 to 60 Cycles	P-25681 Chassis; P-25683 Loud Speaker

CIRCUIT DESCRIPTION

Ten tubes, A. C. operated, Superheterodyne receiver, equipped with four tuning ranges. These four tuning ranges cover all the important broadcasts and special service bands of both American and Foreign stations. High fidelity reproduction is obtained in this receiver by the use of a special band widener device and a Carpinchoe high fidelity speaker. See P-25701, installation and Operating Instructions, for properly installing and operating this receiver.

The tubes used in this receiver are as follows: One No. 6K7 tube functions as an R. F. Amplifier, another No. 6K7 tube is used in the I. F. Amplifier and the other No. 6K7 tube operates in the First Audio Amplifier. The No. 6A8 tube is used as a Modulator tube only. The No. 6C5 tube is used as the Oscillator tube. The No. 6H6 tube is used as a Demodulator-Automatic Volume Control tube. One No. 6F6 tube is used in the Second Audio Amplifier which drives the two No. 6F6 tubes used in the audio power output stage. The No. 5Z3 tube is the rectifier tube of the power supply unit.

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 the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts.

Tube	Circuit	Cap.	Terminals of Sockets								Heater Voltages Between Terminals Nos. at 120 Volts
			1	2	3	4	5	6	7	8	
6K7	R. F. Amp.	0	0	—	+250	+ 70	+ 3	0	—	+ 3	2-7, 6.4 Volts
6A8	Mod.	0	0	—	+250	+ 70	—	+ 70	—	+ 2.5	2-7, 6.4 Volts
6C5	Osc.	—	0	—	+210	0	—	—	—	—	2-7, 6.4 Volts
6K7	I. F. Amp.	0	0	—	+250	+ 70	+ 3	—	—	+ 3	2-7, 6.4 Volts
6H6	Dem.—A. V. C.	—	0	—	—	—	—	—	—	—	2-7, 6.4 Volts
6K7	1st Audio	0	0	—	+100	+ 35	+ 1	—	—	+ 1	2-7, 6.4 Volts
6F6	2nd Audio	—	0	—	+240	+240	0	—	—	+20	2-7, 6.4 Volts
6F6	Output	—	0	—	+390	+390	0	—	—	+35	2-7, 6.4 Volts
5Z3	Rectifier	—	+410	395	395	+410					1-4, 4.75 Volts
Speaker Socket			0	+250	+410	+410	+395	0			

Set tuned to 1000 kc., no signal. A. C. voltages are indicated by italics.

MODELS 83, 83-B
Chassis Wiring

STROMBERG-CARLSON TEL. MFG. CO.

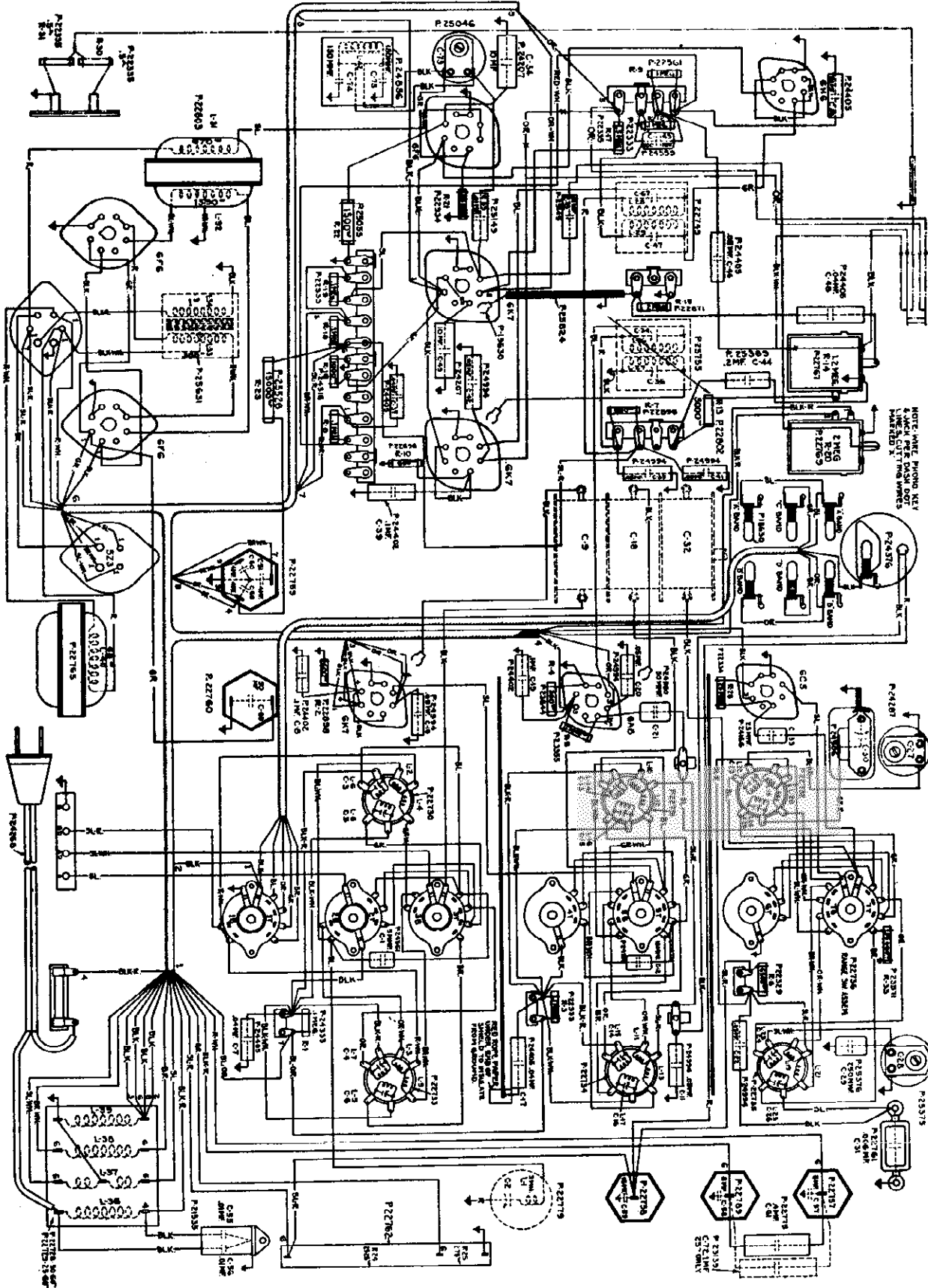


Fig. 4. Wiring Diagram of Chassis.

STROMBERG-CARLSON TEL. MFG. CO.

Schematic
Chassis Assembly

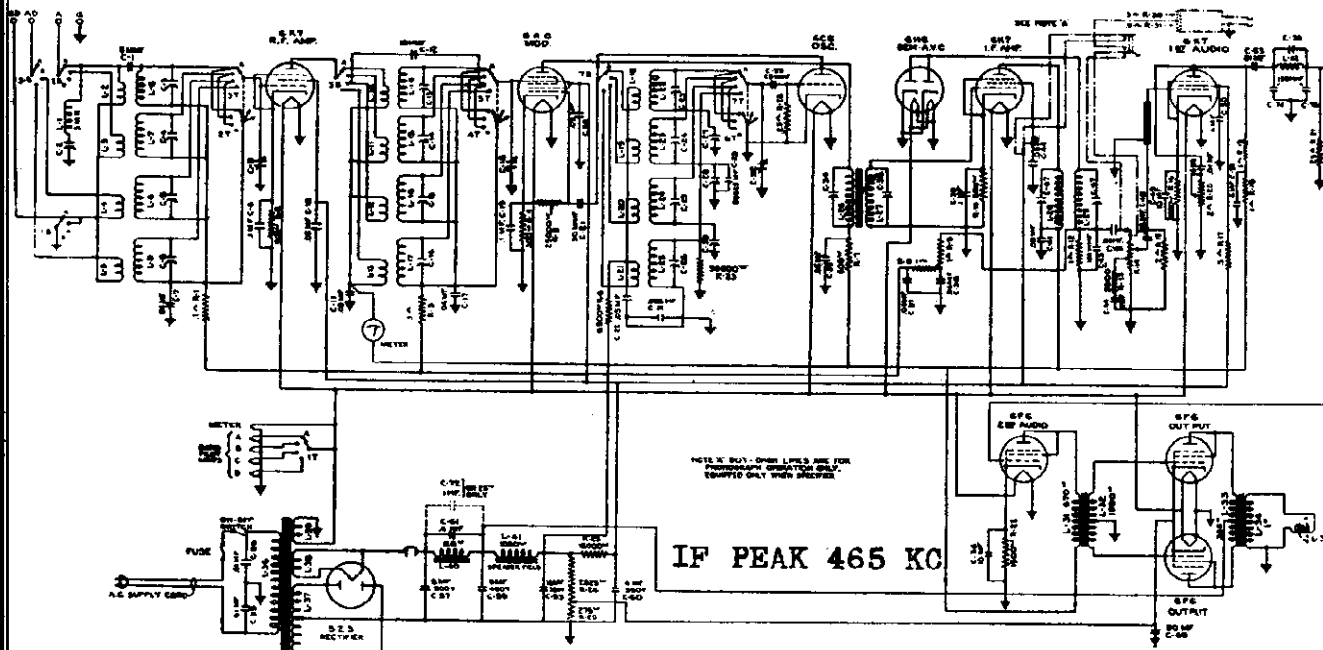


Fig. 2. Schematic Circuit of Receiver.

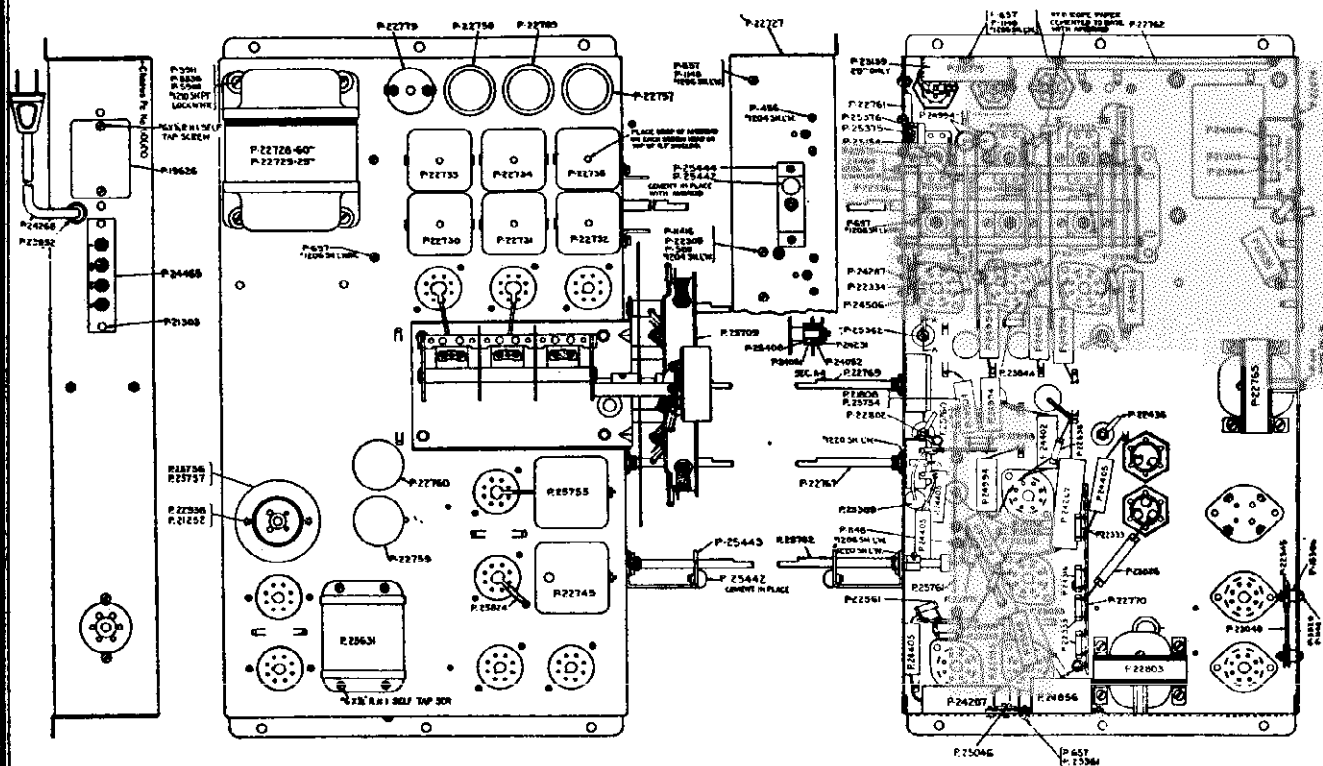


Fig. 3. Chassis Assembly.

MODELS 83, 83-B
Socket, Trimmers
Parts List

STROMBERG-CARLSON TEL. MFG. CO.

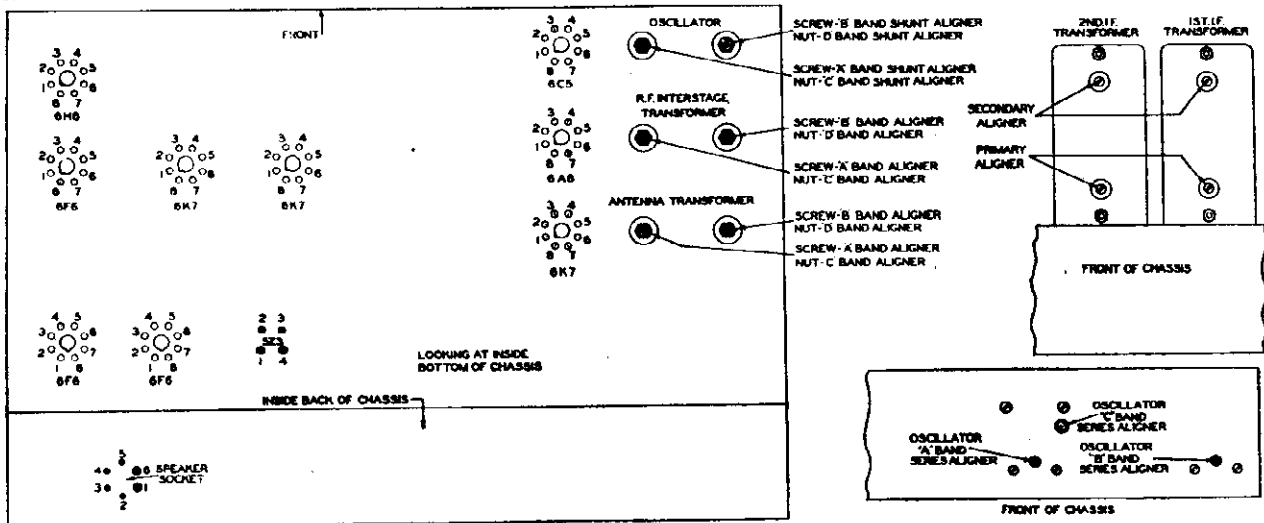
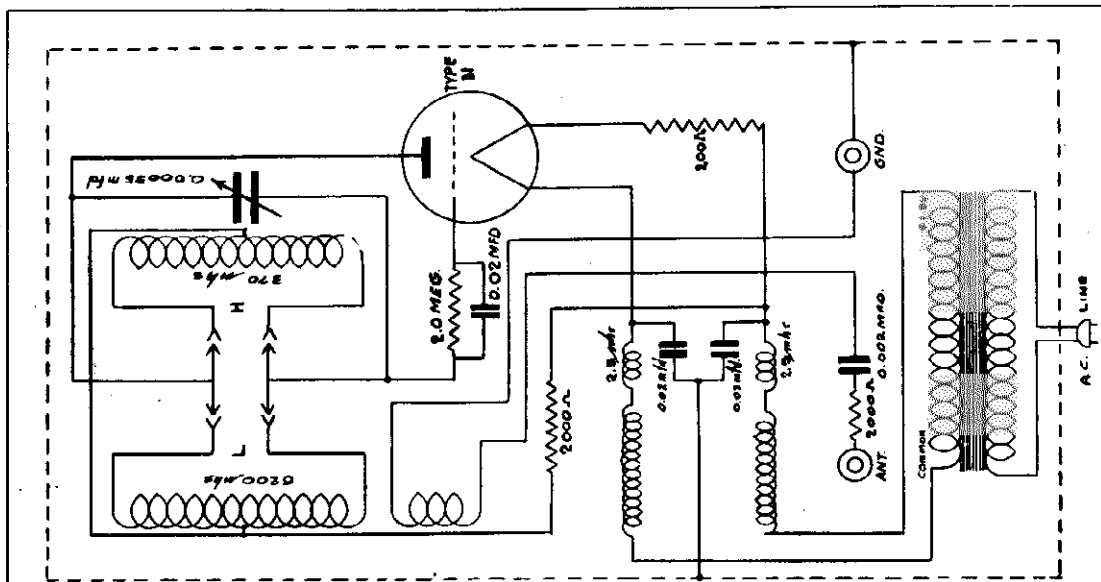


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.
CAUTION—Never Attempt to Align Receiver With Fidelity Control Set At Any Position Other Than the Maximum Counter-Clockwise Position.

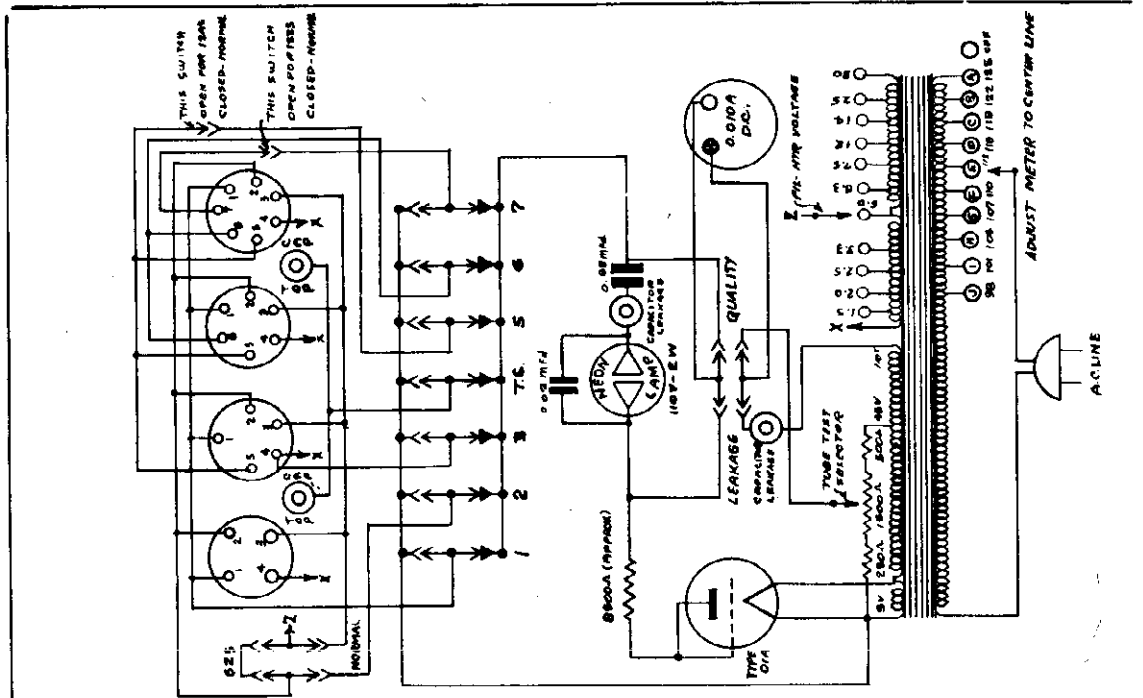
Piece Number	Parts	Description of Parts
P-24465	Blinding Post Assembly	Antenna and Ground
P-22760	Capacitor	Electrolytic
P-22758	Capacitor	Electrolytic
P-22759	Capacitor	Electrolytic
P-22757	Capacitor	Electrolytic
P-22789	Capacitor	Electrolytic
P-24207	Capacitor	Electrolytic, 10 MF., 25v
P-23139	Capacitor	1 MF. (Used only on Receivers for 25-60 cycles)
P-22775	Capacitor	0.4 MF.
P-25389	Capacitor	0.2 MF.
P-24402	Capacitor	0.1 MF.
P-24994	Capacitor	0.05 MF.
P-24405	Capacitor	0.04 MF.
P-21535	Capacitor	Two, 0.01 MF.
P-25149	Capacitor	0.01 MF.
P-22761	Capacitor	0.006 MF.
P-25376	Capacitor	Type O, 250 MMF.
P-24559	Capacitor	Type O, 100 MMF.
P-24590	Capacitor	Type O, 50 MMF.
P-24166	Capacitor	Type O, 25 MMF.
P-24314	Capacitor	Type O, 10 MMF.
P-24561	Capacitor	Type O, 5 MMF.
P-24506	Capacitor	Aligning, 2,500 MMF.
P-25375	Capacitor	Aligning, 1,350 MMF.
P-24287	Capacitor	Aligning, 625 MMF.
P-25046	Capacitor	Aligning, 220 MMF.
P-22765	Choke Coil Assembly	Plate Voltage Supply Filter
P-22730	Coil Assembly	Antenna, "A" and "C" Bands
P-22731	Coil Assembly	R. F., "A" and "C" Bands
P-22732	Coil Assembly	Oscillator, "A" and "C" Bands
P-22733	Coil Assembly	Antenna, "B" and "D" Bands
P-22734	Coil Assembly	R. F., "B" and "D" Bands
P-22735	Coil Assembly	Oscillator, "B" and "D" Bands
P-24268	Cord	A. C. Supply
P-22779	Filter Assembly	Antenna
P-21984	Fuse Block	2 Amperes
P-23150	Fuse	Pilot, 6 Volt
P-18630	Lamp	Visual Tuning
P-24376	Meter	Volume Control
P-22767	Potentiometer	Tone Control and A. C. Switch
P-22769	Potentiometer	Type D, 300 ohms
P-23844	Resistor	Type D, 600 ohms
P-22808	Resistor	Type D, 1,000 ohms
P-24316	Resistor	Type C, 1,500 ohms
P-25055	Resistor	Type D, 5,000 ohms
P-22802	Resistor	Type C, 6,500 ohms
P-22329	Resistor	Type F, 15,000 ohms
P-25526	Resistor	Type D, 25,000 ohms
P-23355	Resistor	Type D, 50,000 ohms
P-23571	Resistor	Type D, 0.1 megohm
P-22333	Resistor	Type D, 0.25 megohm
P-22334	Resistor	Type D, 0.5 megohm
P-22335	Resistor	Type D, 1 megohm
P-22561	Resistor	Type D, 2 megohm
P-22871	Resistor	"R" Voltage Divider
P-22762	Resistor	Rectifier Tube
P-25756	Shield	Tube, 4 Prong
P-22988	Socket	Tube, 6 Prong
P-25040	Socket	Tube, 8 Prong
P-25539	Socket	Frequency Range
P-22736	Switch Assembly	1st I. F.
P-25735	Transformer Assembly	2nd I. F.
P-22749	Transformer Assembly	Audio Driver Stage
P-22803	Transformer Assembly	Audio Power Output
P-25681	Transformer Assembly	Power, 50-60 cycles, 110 volts
P-22728	Transformer	Power, 25-60 cycles, 110 volts

SUPREME INSTRUMENTS CORP.

MODEL 61
MODEL 85-PI
Schematics



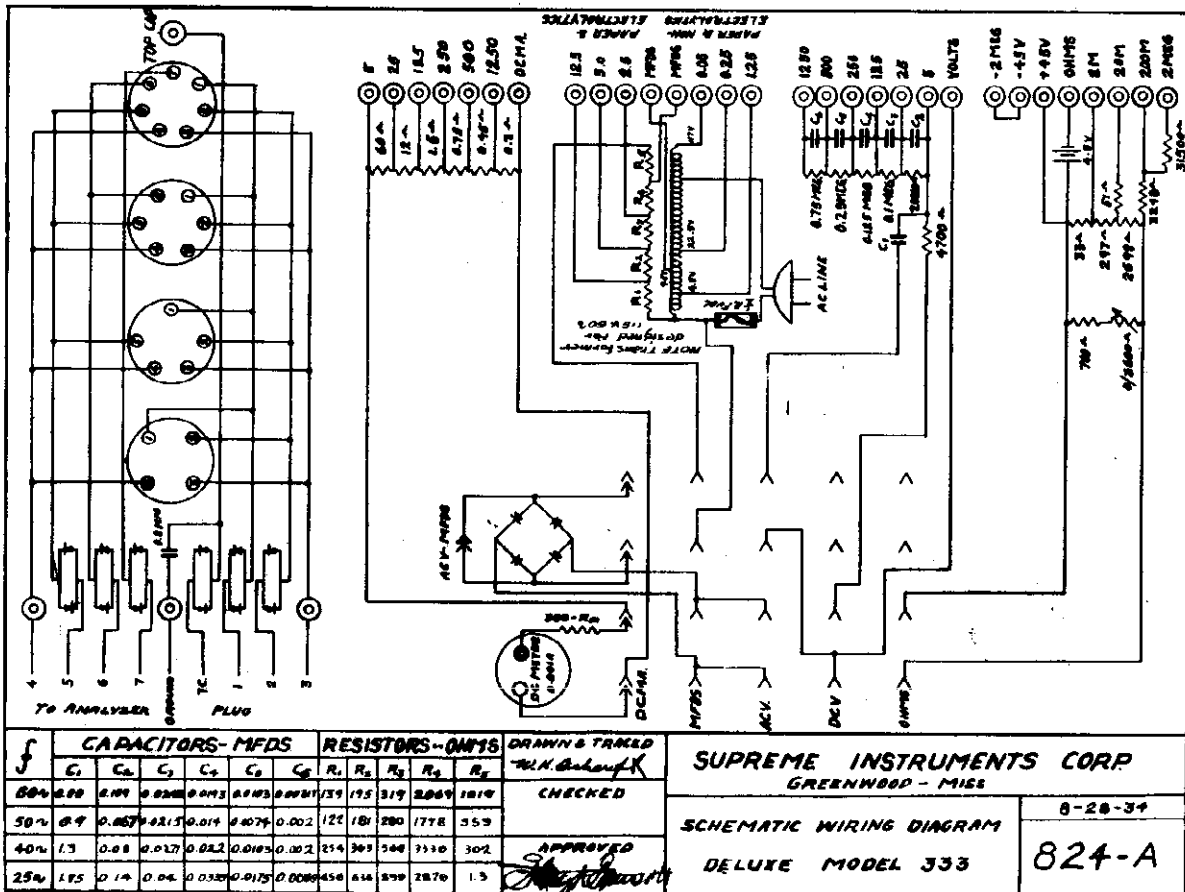
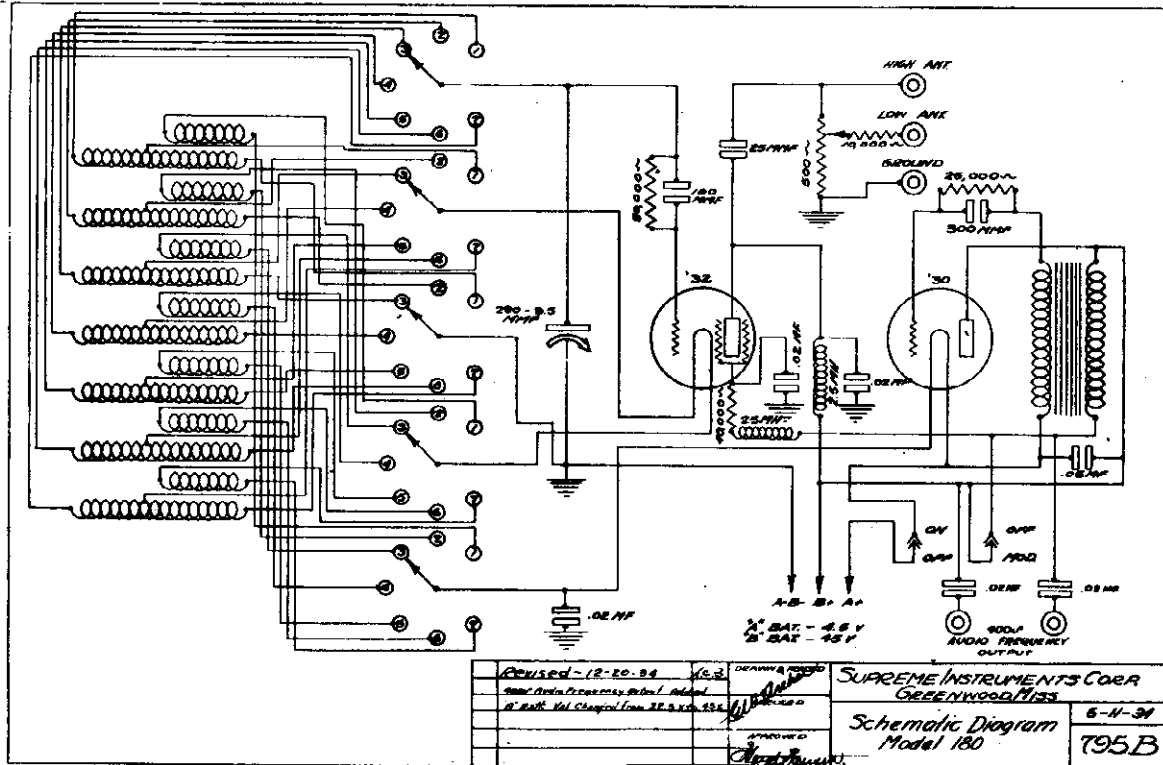
DESIGNED	TRACED	SUPREME INSTRUMENTS CORP. GREENWOOD, MISS.	July 3, 1934
Ascheroff	Buillo		
CHECKED		Schematic Model 61	803A
W. B. Ascheroff			
APPROVED			



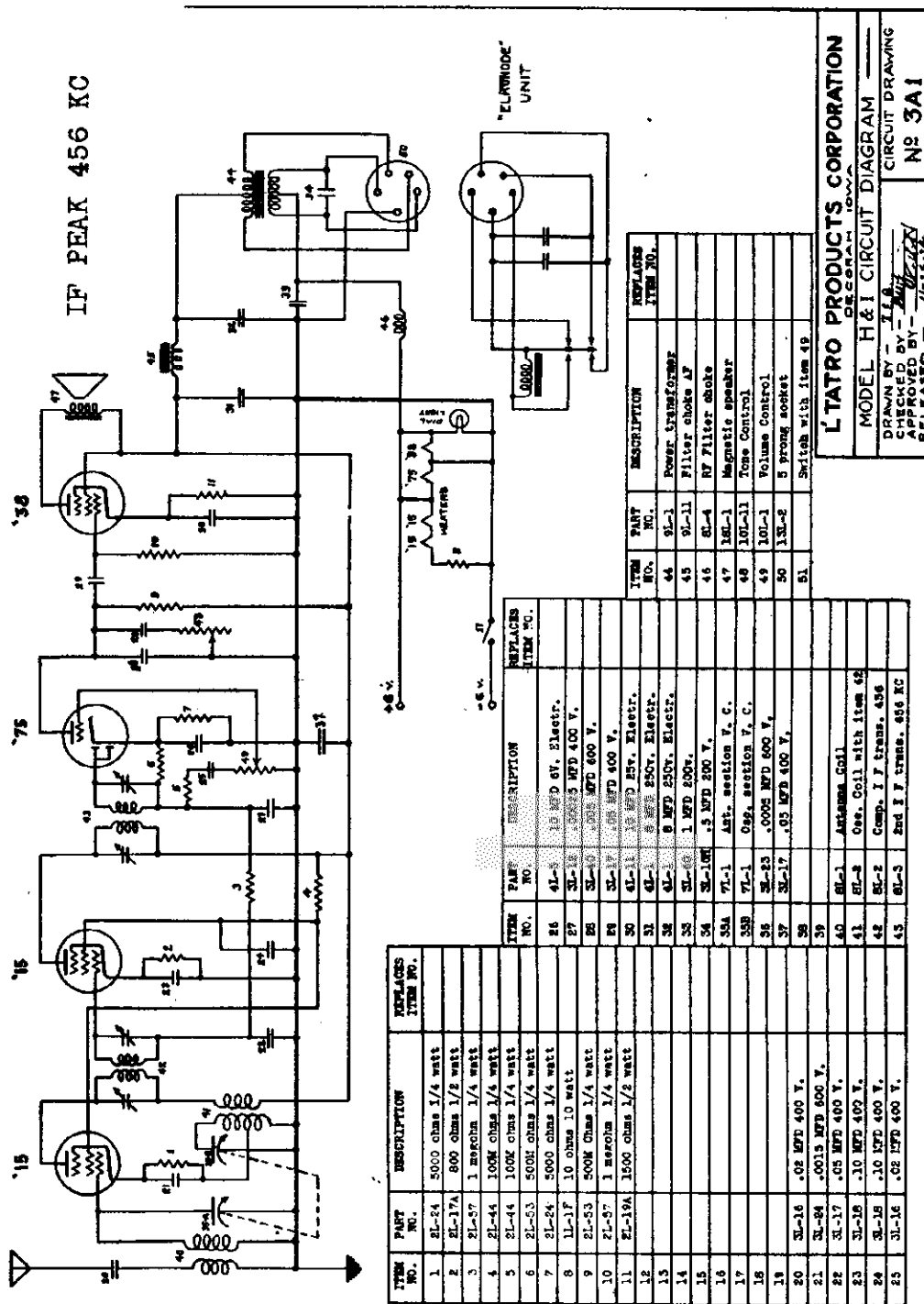
DESIGNED	TRACED	SUPREME INSTRUMENTS CORP. GREENWOOD, MISS.	11-20-34
Ascheroff	Buillo		
CHECKED		SCHEMATIC WIRING DIAGRAM MODEL 85 PL	866A
APPROVED			

MODEL 180
MODEL DeLuxe 333
Schematics

SUPREME INSTRUMENTS CORP.



L. TATRO PRODUCTS CORP.



ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.
1	2L-24	5000 ohms 1/4 watt	
2	2L-17A	800 ohms 1/2 watt	
3	2L-57	1 megohm 1/4 watt	
4	2L-44	100K ohms 1/4 watt	
5	2L-44	100K ohms 1/4 watt	
6	2L-53	500K ohms 1/4 watt	
7	2L-24	5000 ohms 1/4 watt	
8	1L-17	10 ohms 10 watt	
9	2L-53	500K ohms 1/4 watt	
10	2L-57	1 megohm 1/4 watt	
11	2L-19A	1500 ohms 1/2 watt	
12			
13			
14			
15			
16			
17			
18			
19	3L-16	.02 MFD 400 V.	
20	3L-16	.02 MFD 400 V.	
21	3L-84	.0015 MFD 600 V.	
22	3L-17	.05 MFD 400 V.	
23	3L-16	.10 MFD 400 V.	
24	3L-16	.10 MFD 400 V.	
25	3L-16	.02 MFD 400 V.	
26	4L-3	12 MFD 6V. Electr.	
27	3L-3	.00025 MFD 400 V.	
28	3L-3	.00025 MFD 400 V.	
29	3L-3	.00025 MFD 400 V.	
30	4L-11	1.5 MFD 6V. Electr.	
31	4L-11	1.5 MFD 6V. Electr.	
32	4L-11	1.5 MFD 6V. Electr.	
33	4L-11	1.5 MFD 6V. Electr.	
34	4L-11	1.5 MFD 6V. Electr.	
35	4L-11	1.5 MFD 6V. Electr.	
36	4L-11	1.5 MFD 6V. Electr.	
37	4L-11	1.5 MFD 6V. Electr.	
38	4L-11	1.5 MFD 6V. Electr.	
39	4L-11	1.5 MFD 6V. Electr.	
40	4L-11	1.5 MFD 6V. Electr.	
41	4L-11	1.5 MFD 6V. Electr.	
42	4L-11	1.5 MFD 6V. Electr.	
43	4L-11	1.5 MFD 6V. Electr.	
44	4L-11	1.5 MFD 6V. Electr.	
45	4L-11	1.5 MFD 6V. Electr.	
46	4L-11	1.5 MFD 6V. Electr.	
47	4L-11	1.5 MFD 6V. Electr.	
48	4L-11	1.5 MFD 6V. Electr.	
49	4L-11	1.5 MFD 6V. Electr.	
50	4L-11	1.5 MFD 6V. Electr.	
51	4L-11	1.5 MFD 6V. Electr.	

L. TATRO PRODUCTS CORPORATION
MODEL H & I
DRAWN BY - J.M.
CHECKED BY - J.M.
RELEASED - 1-16-54
CIRCUIT DRAWING
NO 3A1

Tube socket voltage readings:

Tube	Use	(a) cathode	screen	*plate
'15	1st det.	3.5 v.	72 v.	154 v.
'15	IF ampl.	1.6 v.	72 v.	154 v.
'75	2nd det.	0.5 v.	(none)	42 v.
'38	Output.	13.5 v.	154 v.	144 v.

(a) measured with a voltmeter having a resistance of 30,000 ohms.
(*) measured with a voltmeter having a resistance of 300,000 ohms.
All measurements made from points indicated to chassis.

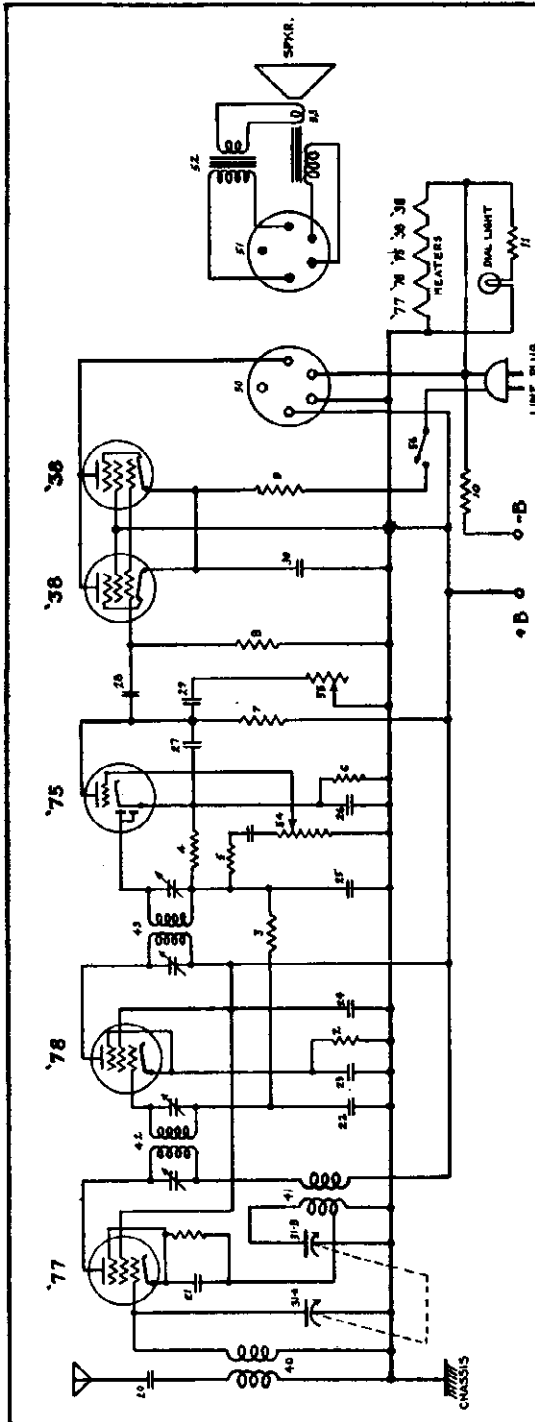
The Model H & I is a low drain highly efficient 4 tube superheterodyne receiver operating from a 6 volt storage battery, and requires no B or C batteries. The six volt current from the battery is converted by means of an efficient rectifying vibrator and power transformer to the high voltage necessary for B and C supply. The two type '15 tube filaments are connected in series so that failure of type '15 filament will cause both type '15 tubes to become inoperative.

The colored "A" battery lead must be connected to the positive terminal of the storage battery, or the set will be inoperative and will draw abnormal battery current.

If all the tubes light and the receiver fails to function, make sure the 'Elkonode' vibrator is operating, and check for defective tubes by substitution in a normally operating receiver. Other suspected faulty parts are also best checked by the substitution method.

MODELS A-525, B-525
Schematic, Voltage
Parts, Data

L. TATRO PRODUCTS CORP.



ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.	ITEM NO.	DESCRIPTION	REPLACES ITEM NO.	ITEM NO.	DESCRIPTION	PART NO.	DESCRIPTION	REPLACES ITEM NO.
1	5E-24	5000 ohm 1/4 watt		50	3E-12	.02 MFD 400 V.	40	5E-1	ANTENNA COIL		
2	5E-13	400 ohm 1/4 watt		21	3E-24	.0015 MFD 500 V.	51	5E-2	OSC. COIL WITH ITEM 4E		
3	5E-27	1 megohm 1/4 watt		22	3E-17	.05 MFD 400 V.	42	5E-3	COMPOSITE IF TRANS. 456		
4	5E-33	5000 ohm 1/4 watt		23	3E-16	.10 MFD 400 V.	43	5E-5	END IF TRANS. 456 RT.		
5	5E-33	5000 ohm 1/4 watt		24	3E-16	.10 MFD 400 V.	44				
6	5E-24	5000 ohm 1/4 watt		25	3E-18	.00025 MFD 400 V.	48				
7	5E-33	5000 ohm 1/4 watt		33	4E-5	10 MFD 6V. electroly.	49				
8	5E-27	1 megohm 1/4 watt		37	3E-23	.0005 MFD 500 V.	47				
9	5E-17A	500 ohm 1/2 watt		38	3E-17	.05 MFD 400 V.	50	13E-4	SPEAKER SOCKET (5 PIN)		
10	1E-27	25 ohm 10 watt		39	3E-40	.005 MFD 500 V.	51	5E-4	SPKR PLUG RT OF ITEM 50		
11	1E-13W	200 ohm 10 watt		50	4E-11	10 MFD 25V. electroly.	52		OUTLINE TRANS. (ITEM 53)		
12				51A	7E-1	ANTENNA SECTION V. C.	53	10E-4	DYNAMIC SPEAKER		
13				51B	7E-1	OSC. SECTION V. C.	54	10E-1	VOLUME CONTROL		
14				58			55	10E-11	TONE CONTROL		
15				53			56		SWITCH, PART OF ITEM 52		
16				34			57				
17				36			58				
18				34			59				

L'TATRO PRODUCTS CORPORATION
DESORAH, IOWA
MODEL A & B CIRCUIT DIAGRAM
DRAWN BY ILL
CHECKED BY JLB
APPROVED BY JLB
RELEASED BY JLB
NO 3A2

The normal I. F. frequency is 456 KC.

The Model A & B chassis is an efficient 5 tube superheterodyne receiver operating from 32 volt farm lighting systems, and employs a 45 volt B battery to increase the output power without the use of transformers or vibrators.

The heaters of the five tubes are connected in series across the 32 volt line. The failure of one filament will therefore cause all the tubes to become inoperative.

If all the tubes light and the receiver fails to operate, make sure that the 45 volt B battery is connected in the proper direction and try reversing the plug connection to the 32 volt line. If the operation is then unsatisfactory check the tubes one at a time in a normal operating receiver, and replace all defective tubes.

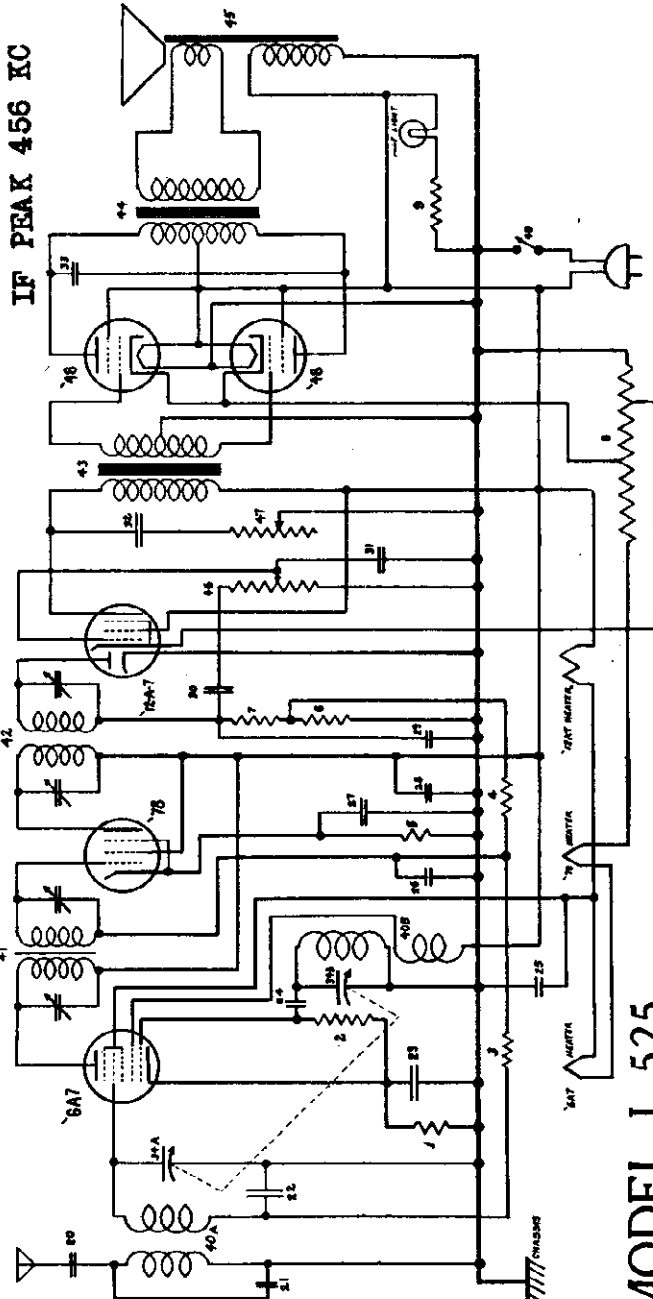
Tube socket voltage readings: (with B battery connected)

Tube	Use	(a) cathode	screen	* plate
'77	1st det.	3.2 v.	77 v.	77 v.
'78	IF ampl.	2.0 v.	77 v.	77 v.
'75	2nd det.	0.5 v.	(none)	38 v.
'38's	Output.	7.0 v.	77 v.	73 v.

(a) measured with a voltmeter having a resistance of 30,000 ohms.
 (*) measured with a voltmeter having a resistance of 300,000 ohms.
 All measurements made from points indicated to chassis.

L. TATRO PRODUCTS CORP.

MODEL L-525
Schematic, Voltage
Parts, Data



Item No.	Part No.	Description	
1	2L-62	110 Ohm	1/4 Watt
2	2L-49	250 M	1/4 Watt
3	2L-49	250 M	1/4 Watt
4	2L-57	1 Meg	1/4 Watt
5	2L-62	110 Ohm	1/4 Watt
6	2L-49	250 M	1/4 Watt
7	2L-49	250 M	1/4 Watt
8	1L-22G	22 Ohm	Wire wound
9	1L-13F	200 Ohm	10 Watt
20	3L-16	.025 Mfd	400 V
21	5L-2	.0001 Mfd	Mica
22	3L-17	.05 Mfd	400 V
23	3L-18	.1 Mfd	400 V
24	5L-2	.0001 Mfd	Mica
25	3L-18	.1 Mfd	400 V
26	3L-17	.05 Mfd	400 V
27	3L-18	.1 Mfd	400 V
28	3L-18	.1 Mfd	400 V
29	3L-12	.00025	400 V

TUBE SOCKET VOLTAGE READINGS TO CHASSIS

Tube	Use	Cathode	Grid	Screen	Plate
6A7	1st Det.	.1 V	0 (Cap)	19V (grid No. 4-5)	32V
78	Oscillator	.1 V	0 (grid No. 1)	32V	32V (grid No. 2)
12A7	2nd Det.	0 (Diode)	0 (Cap)	32V	-5 (diode)
48's	1st A. F. Ampl.	1.5 (Pentode)	0 (Cap)	32V	32V
	Output	3.5			

MODEL L-525

L' TATRO.
PRODUCTS CORPORATION
DECAH IOWA

MODEL L' CIRCUIT DIAGRAM
DRAWING NUMBER 3A6

DRAWN BY *[Signature]*
APPROVED BY *[Signature]*

The Model L Chassis is an efficient 5-tube superheterodyne receiver operating directly from 32-volt farm lighting systems, without the use of "B" batteries, transformer or vibrator.

The heaters of type 6A7, 78 and 12A7 in series with 22 Ohm resistor (item No. 9 above) are connected directly across the 32-volt line. Failure of either tube or the resistor will cause the other tubes to become inoperative. The heaters of the type 48's output tubes are in parallel connection across the 32-volt line. Failure of one tube (48) will not cause the set to become inoperative but will greatly reduce volume.

If all the tubes light and the receiver fails to operate, try reversing the plug connection to the 32-volt line. If the operation is then unsatisfactory, check the tubes one at a time in a normal operating receiver and replace all defective tubes.

All measurements taken with a volt meter having a resistance of 100,000 Ohms and with no signal applied to receiver.

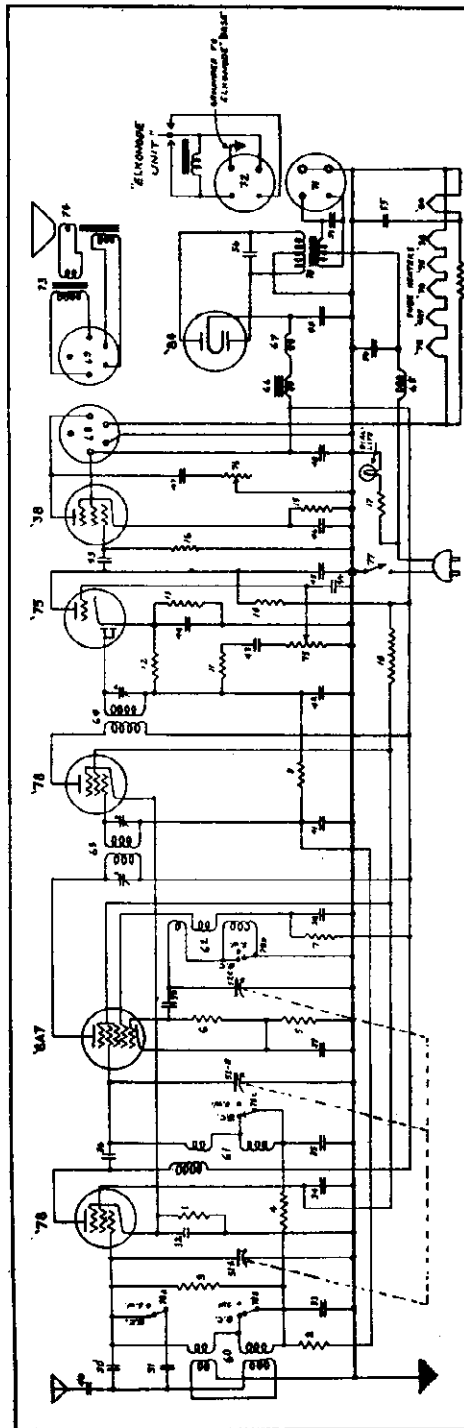
Drawing No. 3A6 shows the complete circuit diagram with itemized parts list. In ordering replacements parts always use the part number shown to facilitate filling orders and to eliminate mistakes and delay.

No adjustments are to be made to any trimmer condenser, either I. F. or R. F. without the aid of a correctly calibrated signal generator used in conjunction with a high resistance output meter connected from plate to plate of the type 48 output tubes.

The normal I. F. frequency is 456 K. C.

MODELS C-625, D-625
Schematic, Voltage
Parts, Data

L. TATRO PRODUCTS CORP.



ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.	ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.	ITEM NO.	PART NO.	DESCRIPTION
1	2E-17A	5000 ohm 1/4 watt		58	3E-48E	1000 WEG 1600 V.		56	3E-48E	1000 WEG 1600 V.
2	2E-19	2500 ohm 1/4 watt		51	3E-1	.00005 mfd		57		
3	2E-44	1000 ohm 1/4 watt		32	3E-16	.10 WEG		58		
4	2E-44	1000 ohm 1/4 watt		33	3E-17	.05 WEG		59		
5	2E-15	4000 ohm 1/4 watt		34	3E-18	.10 WEG		60	6E-5	Antenna coil
6	2E-37	5000 ohm 1/4 watt		35	3E-17	.05 WEG		61	6E-1	Intermediate coil
7	2E-31	5000 ohm 1/4 watt		36	3E-17	.05 WEG		62	6E-7	Oscillator coil
8	2E-19	2500 ohm 1/4 watt		37	3E-18	.10 WEG		63	6E-4	1st IF trans. 175 KC.
9	2E-35	5000 ohm 1/4 watt		38	3E-18	.10 WEG		64	6E-4	2nd IF trans. 175 KC.
10	2E-35	5000 ohm 1/4 watt		39	6E-4	IF choke		65	6E-4	IF choke
11	2E-44	1000 ohm 1/4 watt		40	3E-16	.10 WEG		66	6E-11	IF choke (universal)
12	2E-44	1000 ohm 1/4 watt		41	3E-17	.05 WEG		67	6E-10	IF choke (universal)
13	2E-24	5000 ohm 1/4 watt		42	3E-16	.10 WEG		68	6E-10	IF choke (universal)
14	2E-31	5000 ohm 1/4 watt		43	3E-16	.10 WEG		69	6E-10	IF choke (universal)
15	2E-31	5000 ohm 1/4 watt		44	3E-16	.10 WEG		70	6E-10	IF choke (universal)
16	2E-31	5000 ohm 1/4 watt		45	3E-16	.10 WEG		71	6E-10	IF choke (universal)
17	1E-37	5000 ohm 1/4 watt		46	3E-16	.10 WEG		72	13E-1	Elkonode 1750 SL
18	1E-37	5000 ohm 1/4 watt		47	3E-16	.10 WEG		73	13E-1	Elkonode 1750 SL
19	1E-37	5000 ohm 1/4 watt		48	3E-16	.10 WEG		74	13E-1	Elkonode 1750 SL
20	1E-37	5000 ohm 1/4 watt		49	3E-16	.10 WEG		75	13E-1	Elkonode 1750 SL
21	1E-37	5000 ohm 1/4 watt		50	3E-16	.10 WEG		76	13E-1	Elkonode 1750 SL
22	1E-37	5000 ohm 1/4 watt		51	3E-16	.10 WEG		77	13E-1	Elkonode 1750 SL
23	1E-37	5000 ohm 1/4 watt		52	3E-16	.10 WEG		78	13E-1	Elkonode 1750 SL
24	1E-37	5000 ohm 1/4 watt		53	3E-16	.10 WEG		79	13E-1	Elkonode 1750 SL
25	1E-37	5000 ohm 1/4 watt		54	3E-16	.10 WEG		80	13E-1	Elkonode 1750 SL
26	1E-37	5000 ohm 1/4 watt		55	3E-16	.10 WEG		81	13E-1	Elkonode 1750 SL

L. TATRO PRODUCTS CORPORATION
MODEL C & D CIRCUIT DIAGRAM
DRAWN BY J.A.G.
CHECKED BY E.P.A.
APPROVED BY E.P.A.
DRAWING NO. 3A4
DATE 1-18-34

The normal I. F. frequency is 177.5 KC.

Note: The circuit selector switch wave range designations in the diagram above are reversed, the short wave position should be to the left, and the broadcast position to the right.

Model C & D is an efficient all electric 32 volt 6 tube superheterodyne receiver covering 2 wave ranges and requires no batteries. The thirty-two volt current from the light plant is converted by means of a vibrator, transformer, and rectifier tube to the high voltage necessary for B & C supply. The 75, two 78s, 6A7 and 38 tube filaments are connected in series. Failure of one filament in this series will therefore cause the other four tubes in the string to become inoperative. The 84 tube is fed thru a separate resistor so that failure of its filament may be located immediately.

If all the tubes light and the receiver fails to function, make sure the 'Elkonode' vibrator is operating, and check for defective tubes by substitution in a normally operating receiver. Other suspected faulty parts may also be checked by the substitution method.

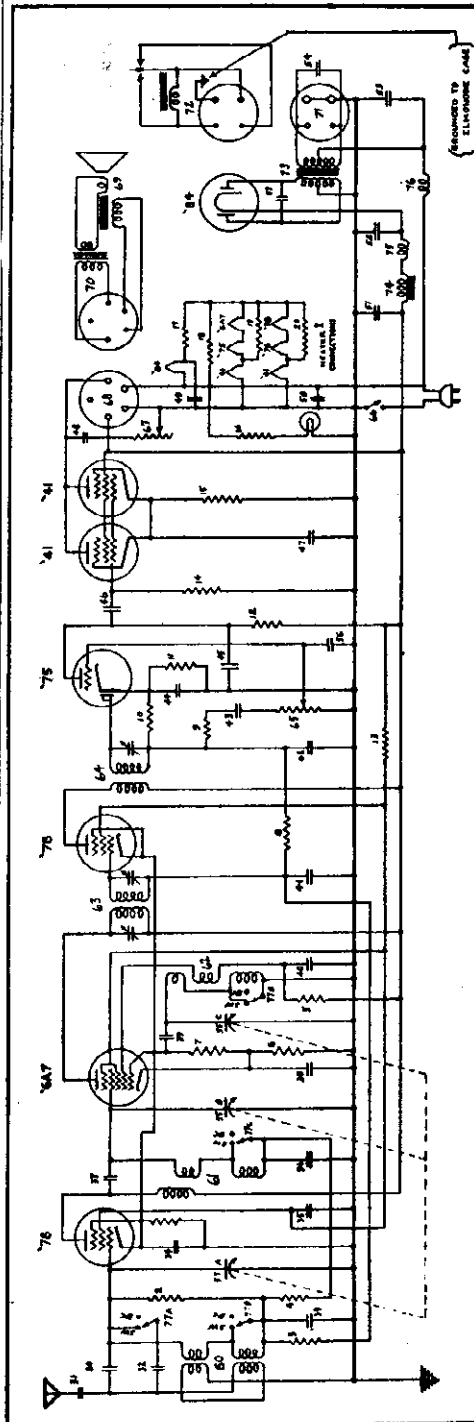
Tube socket voltage readings:

Tube	Use	(a) cathode	(b) screen	(b) plate
'78	RF ampli.	6.0 v.	88.0 v.	210 v.
'6A7	1st det.	3.0 v.	88.0 v.	210 v.
				*155 v.
'78	IF ampli.	6.0 v.	88.0 v.	210 v.
'75	2nd det.	1.05 v.	(none)	52 v.
'38	Output.	22.0 v.	210 v.	202 v.

(a) measured with a voltmeter having a resistance of 30,000 ohms.
(b) measured with a voltmeter having a resistance of 300,000 ohms.
(*) '6A7 anode grid voltage.
All measurements made from point indicated to chassis.

MODEL F-725
Schematic, Voltage
Parts, Data

L. TATRO PRODUCTS CORP.



ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.	TYPE	PART NO.	DESCRIPTION	REPLACES ITEM NO.	TYPE	PART NO.	DESCRIPTION	REPLACES ITEM NO.
1	21-124	500 OHM 1/2 WATT		21				21			
2	21-144	100 OHM 1/2 WATT		21				21			
3	21-145	100 OHM 1/2 WATT		21				21			
4	21-146	100 OHM 1/2 WATT		21				21			
5	21-147	100 OHM 1/2 WATT		21				21			
6	21-148	100 OHM 1/2 WATT		21				21			
7	21-149	100 OHM 1/2 WATT		21				21			
8	21-150	100 OHM 1/2 WATT		21				21			
9	21-151	100 OHM 1/2 WATT		21				21			
10	21-152	100 OHM 1/2 WATT		21				21			
11	21-153	100 OHM 1/2 WATT		21				21			
12	21-154	100 OHM 1/2 WATT		21				21			
13	21-155	100 OHM 1/2 WATT		21				21			
14	21-156	100 OHM 1/2 WATT		21				21			
15	21-157	100 OHM 1/2 WATT		21				21			
16	21-158	100 OHM 1/2 WATT		21				21			
17	21-159	100 OHM 1/2 WATT		21				21			
18	21-160	100 OHM 1/2 WATT		21				21			
19	21-161	100 OHM 1/2 WATT		21				21			
20	21-162	100 OHM 1/2 WATT		21				21			
21	21-163	100 OHM 1/2 WATT		21				21			
22	21-164	100 OHM 1/2 WATT		21				21			
23	21-165	100 OHM 1/2 WATT		21				21			
24	21-166	100 OHM 1/2 WATT		21				21			
25	21-167	100 OHM 1/2 WATT		21				21			
26	21-168	100 OHM 1/2 WATT		21				21			
27	21-169	100 OHM 1/2 WATT		21				21			
28	21-170	100 OHM 1/2 WATT		21				21			
29	21-171	100 OHM 1/2 WATT		21				21			
30	21-172	100 OHM 1/2 WATT		21				21			
31	21-173	100 OHM 1/2 WATT		21				21			
32	21-174	100 OHM 1/2 WATT		21				21			
33	21-175	100 OHM 1/2 WATT		21				21			
34	21-176	100 OHM 1/2 WATT		21				21			
35	21-177	100 OHM 1/2 WATT		21				21			
36	21-178	100 OHM 1/2 WATT		21				21			
37	21-179	100 OHM 1/2 WATT		21				21			
38	21-180	100 OHM 1/2 WATT		21				21			
39	21-181	100 OHM 1/2 WATT		21				21			
40	21-182	100 OHM 1/2 WATT		21				21			
41	21-183	100 OHM 1/2 WATT		21				21			
42	21-184	100 OHM 1/2 WATT		21				21			
43	21-185	100 OHM 1/2 WATT		21				21			
44	21-186	100 OHM 1/2 WATT		21				21			
45	21-187	100 OHM 1/2 WATT		21				21			
46	21-188	100 OHM 1/2 WATT		21				21			
47	21-189	100 OHM 1/2 WATT		21				21			
48	21-190	100 OHM 1/2 WATT		21				21			
49	21-191	100 OHM 1/2 WATT		21				21			
50	21-192	100 OHM 1/2 WATT		21				21			
51	21-193	100 OHM 1/2 WATT		21				21			
52	21-194	100 OHM 1/2 WATT		21				21			
53	21-195	100 OHM 1/2 WATT		21				21			
54	21-196	100 OHM 1/2 WATT		21				21			
55	21-197	100 OHM 1/2 WATT		21				21			
56	21-198	100 OHM 1/2 WATT		21				21			
57	21-199	100 OHM 1/2 WATT		21				21			
58	21-200	100 OHM 1/2 WATT		21				21			
59	21-201	100 OHM 1/2 WATT		21				21			

IF PEAK 177.5 KC

L TATRO PRODUCTS CORPORATION
DES MOINES, IOWA

MODEL F CIRCUIT DIAGRAM
DRAWN BY *[Signature]* DRAWING NO. **3A5**
CHECKED BY *[Signature]*
APPROVED BY *[Signature]*

The Model F is a DeLuxe 7 tube 32 volt receiver of the superheterodyne type covering two wave ranges. It operates from a 32 volt source without the use of B or C batteries. High voltage B supply current is obtained by means of an efficient vibrator used in conjunction with a transformer and rectifier tube. There are two series filament circuits which are connected in parallel, this combination in turn being in series with the type 84 tube with appropriate series and shunt resistors. Failure of any one tube filament will cause the other tube filaments to operate at incorrect voltages, and operation of the receiver with any tube removed is not recommended.

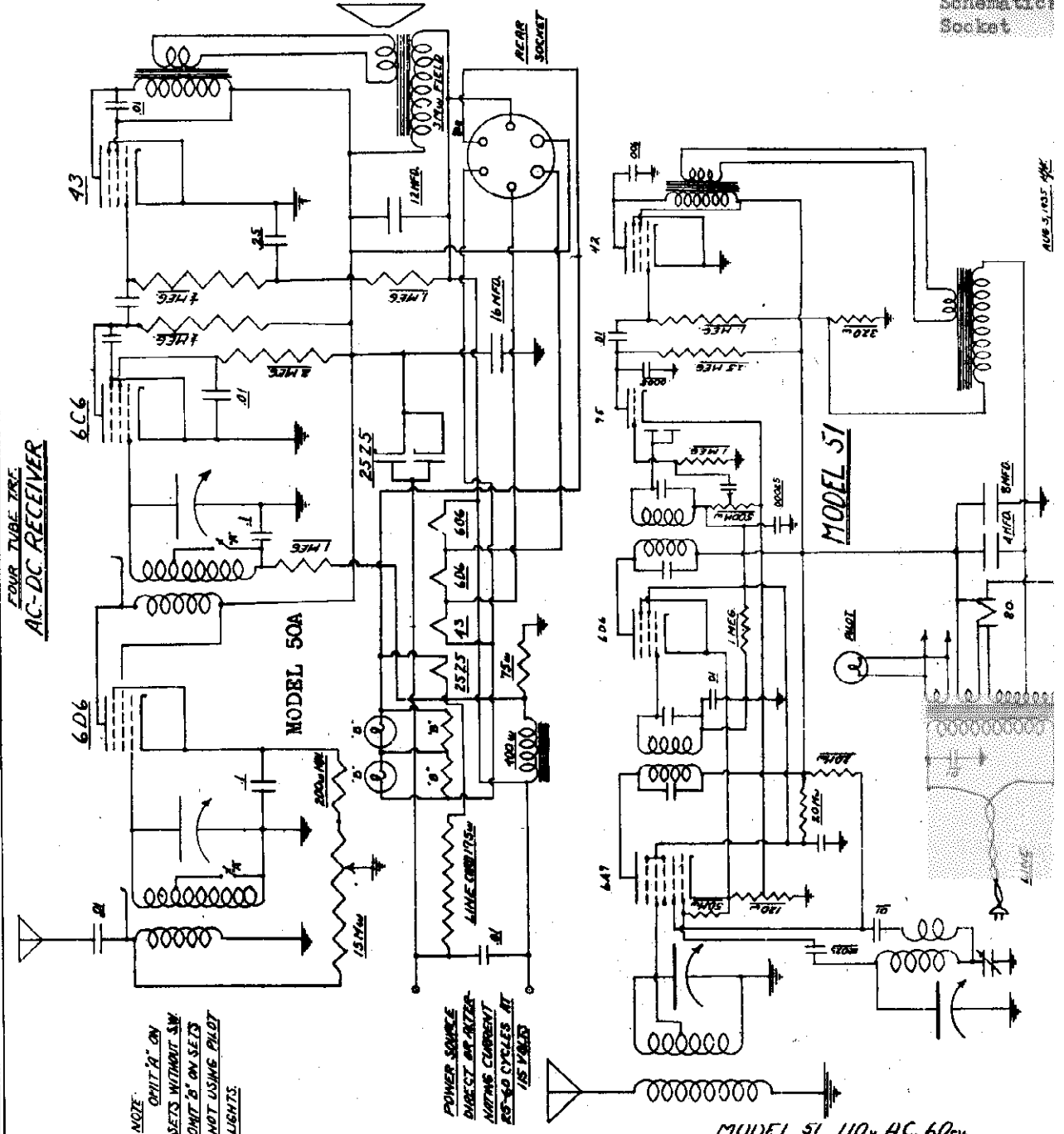
If all the tubes light and the receiver fails to function, make sure the 'Elkonode' vibrator is operating, and check for defective tubes by substitution in a normally operating receiver. Other suspected faulty parts may also be checked by the substitution method.

Tube	Use	(a) cathode	(b) screen	(b) plate
78	RF ampl.	4.5 v.	73.0 v.	190 v.
'6A7	1st det.	2.5 v.	73.0 v.	190 v.
78	IF ampl.	4.5 v.	73.0 v.	190 v.
75	2nd det.	0.9 v.	(none)	48 v.
(2) '41's	Output	16.0 v.	190 v.	187 v.

(a) measured with a voltmeter having a resistance of 30,000 ohms.
 (b) measured with a voltmeter having a resistance of 300,000 ohms.
 (*) '6A7 anode grid voltage.
 All measurements made from point indicated to chassis.

TRAV-LER RADIO & TELEV. CORP.

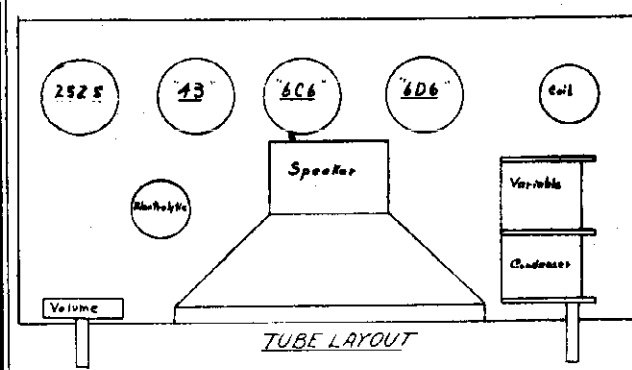
MODEL 50-4
MODEL 51
Schematic
Socket



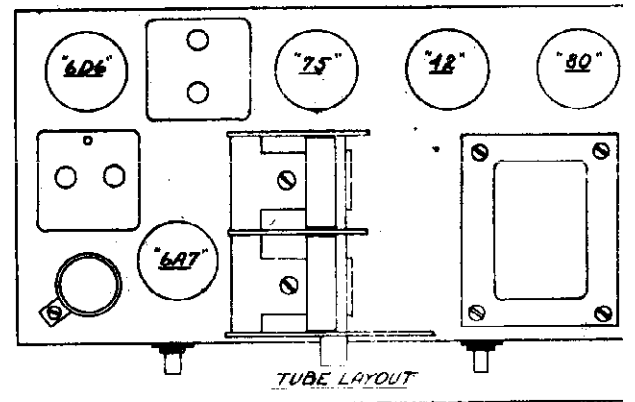
NOTE: UNIT 'A' ON SETS WITHOUT SW NOT USING PILOT LIGHTS.
POWER SOURCE DIRECT OR AFTER-NOON CURRENT 25-60 CYCLES AT 115 VOLTS

MODEL 50A 110V AC or DC 25-60 cy.

MODEL 51 110V AC, 60 cy.



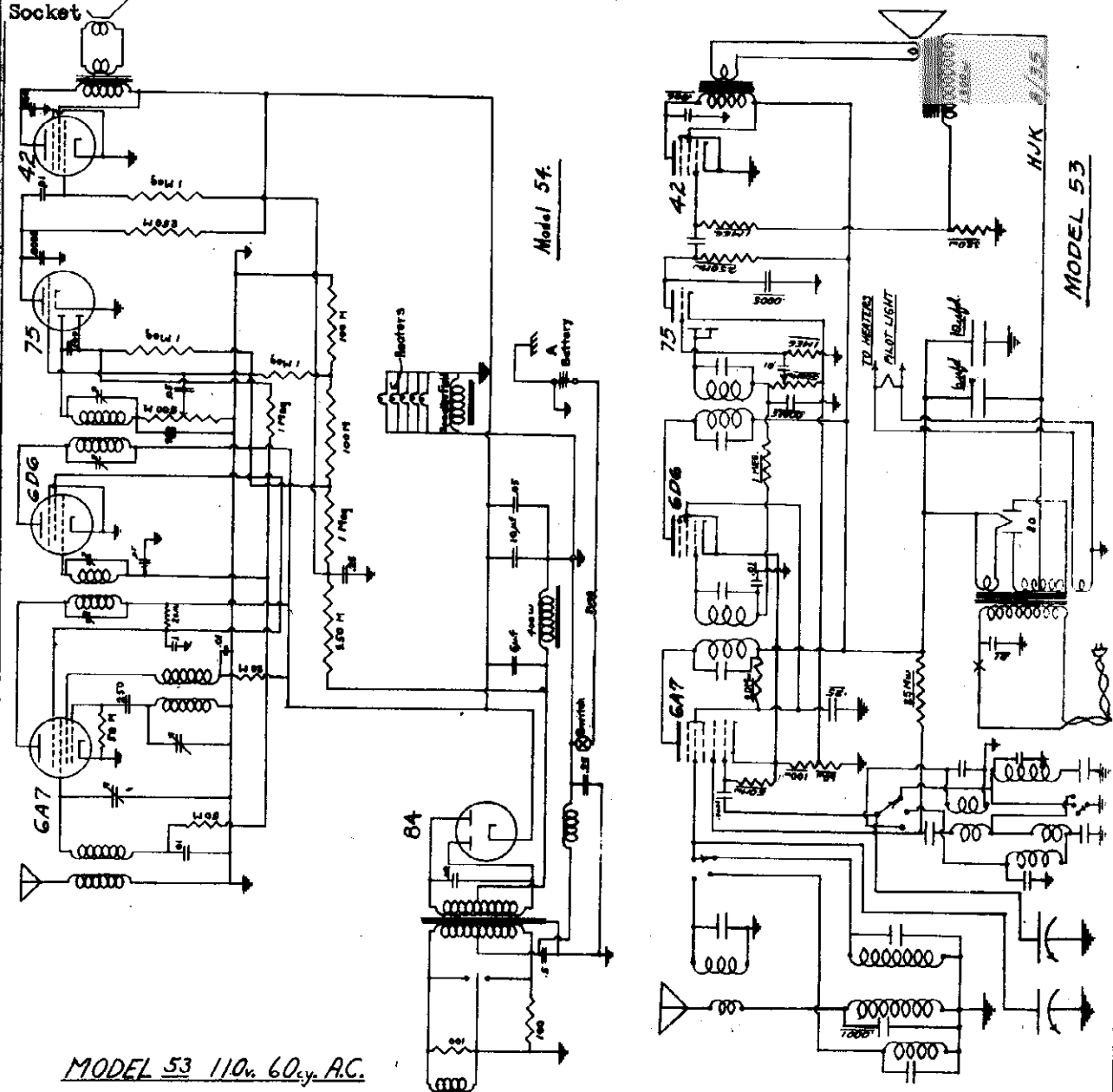
TUBE LAYOUT



TUBE LAYOUT

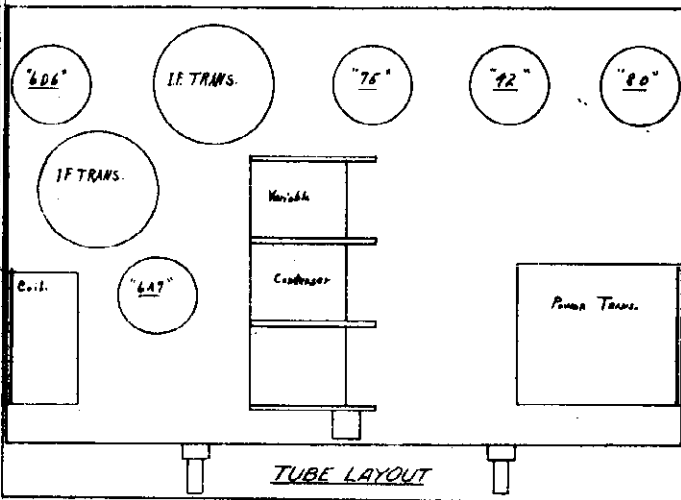
MODEL 53
MODEL 54
Schematics
Socket

TRAV-LER RADIO & TELEV. CORP.

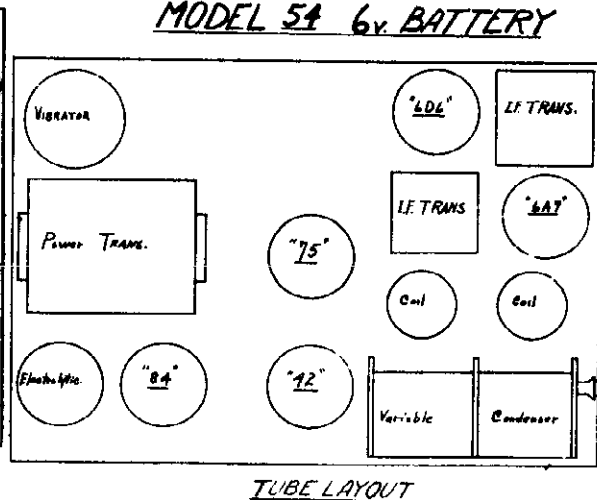


MODEL 53 110v. 60cy. A.C.

MODEL 54 6v. BATTERY



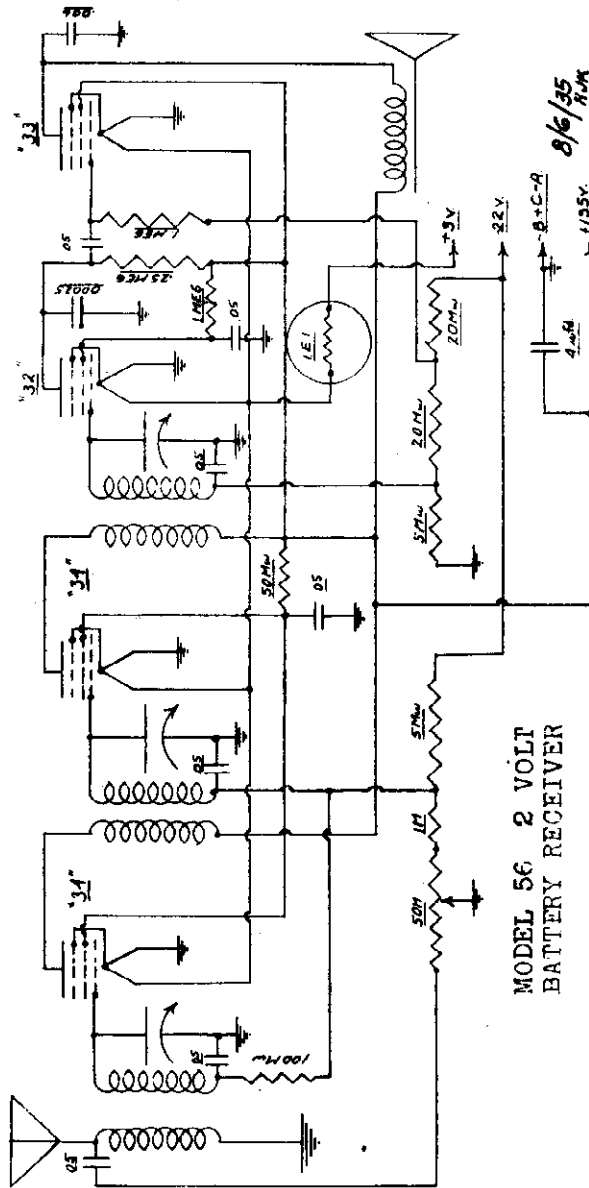
TUBE LAYOUT



TUBE LAYOUT

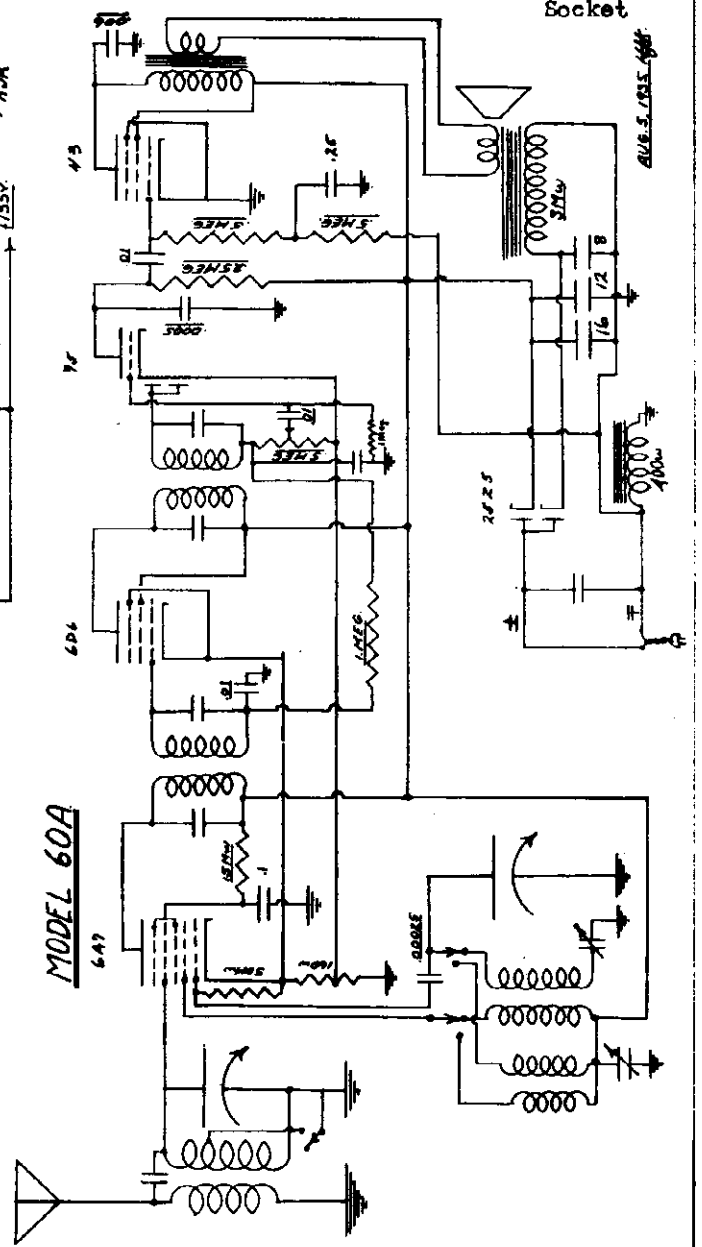
TRAV-LER RADIO & TELEV. CORP.

MODEL 56
MODEL 60-A
Schematics
Socket



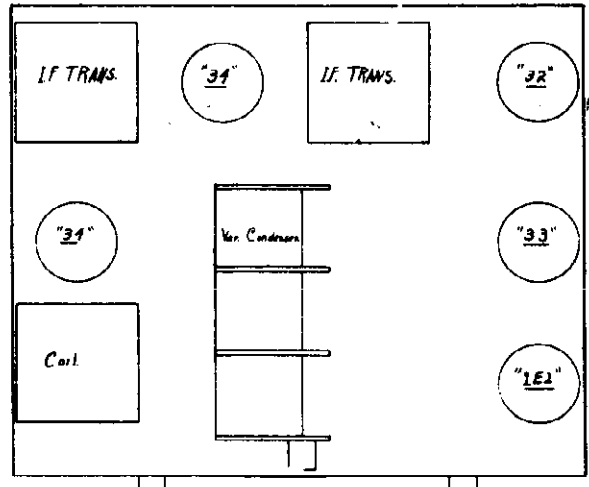
MODEL 56 2 VOLT BATTERY RECEIVER

MODEL 56 BATTERY SET

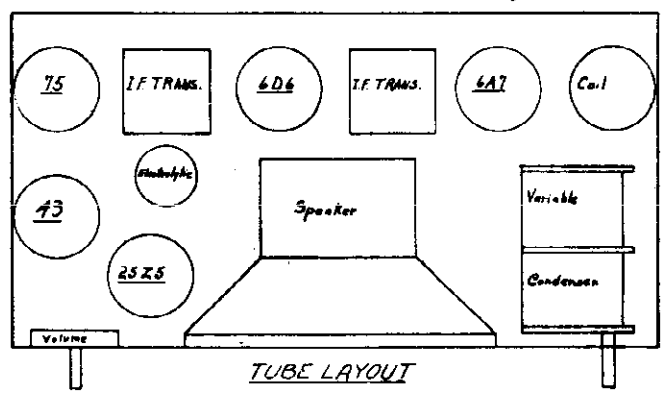


MODEL 60A

MODEL 60A 110 v. 60-25 cy. on D.C.



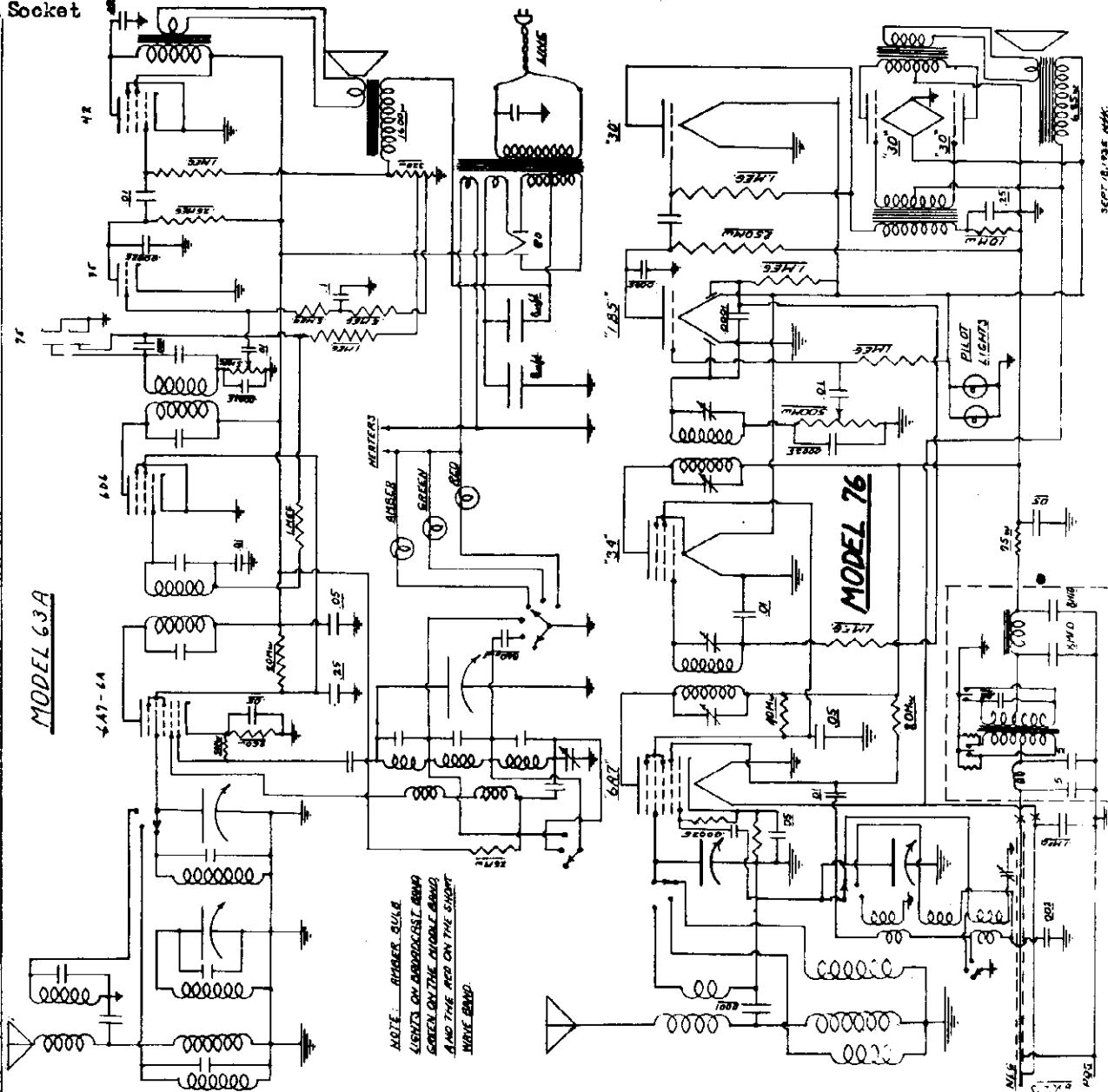
TUBE LAYOUT



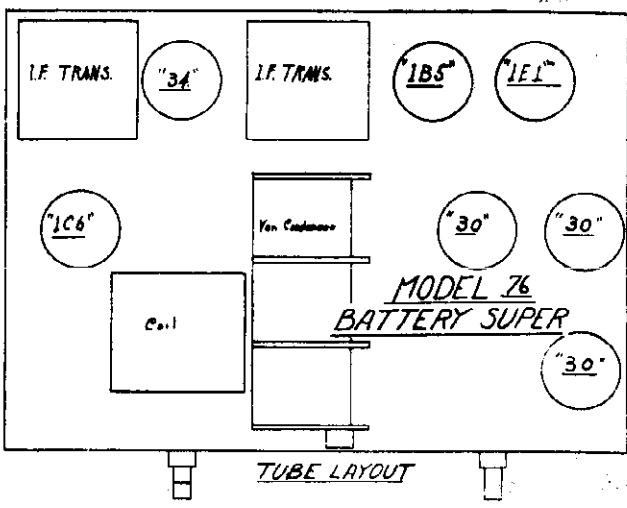
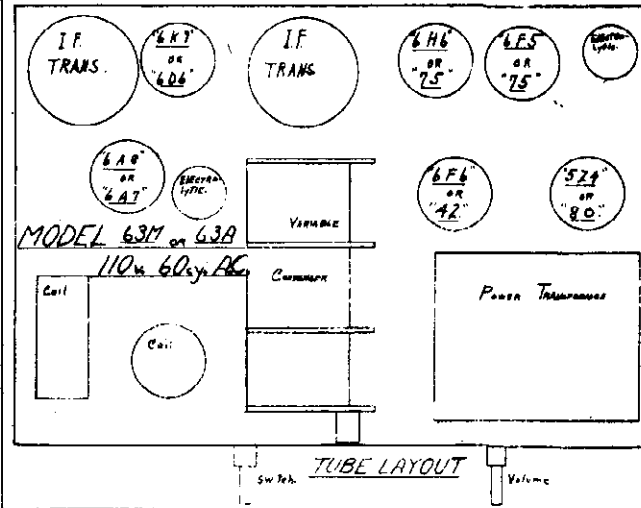
TUBE LAYOUT

MODEL 63-A
 MODEL 76
 Schematics
 Socket

TRAV-LER RADIO & TELEV. CORP.

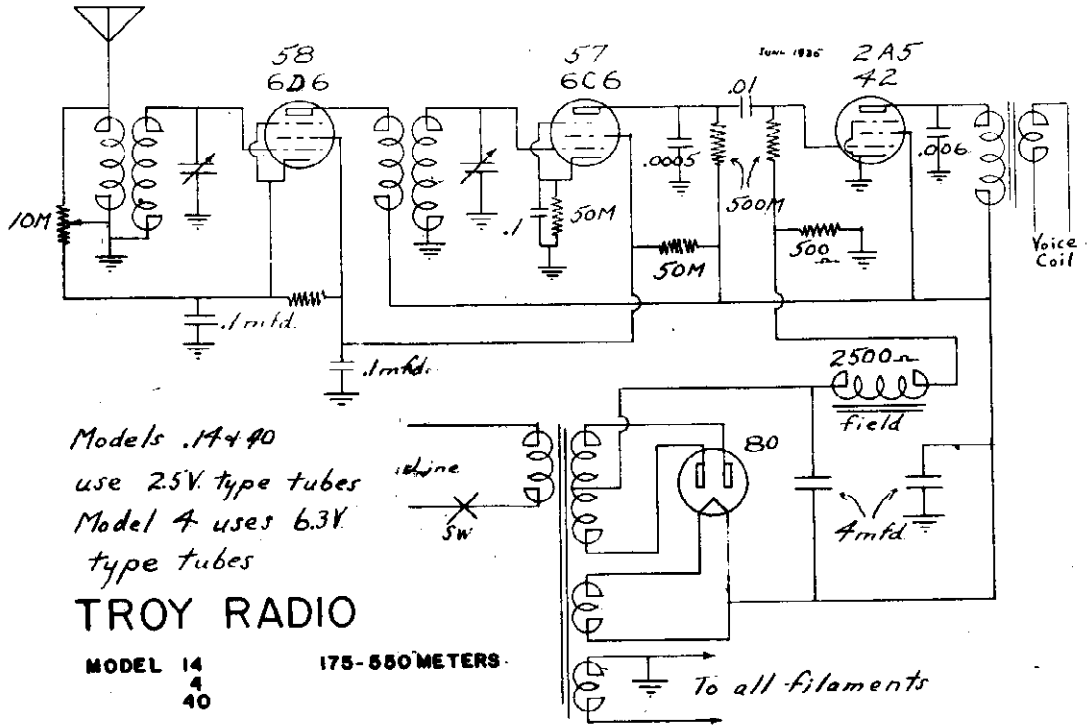


NOTE... RUBBER GULB
 USE ON ADDRESS...
 GREEN ON THE...
 AND THE...
 WAVE BAND



TROY RADIO MFG. CO.

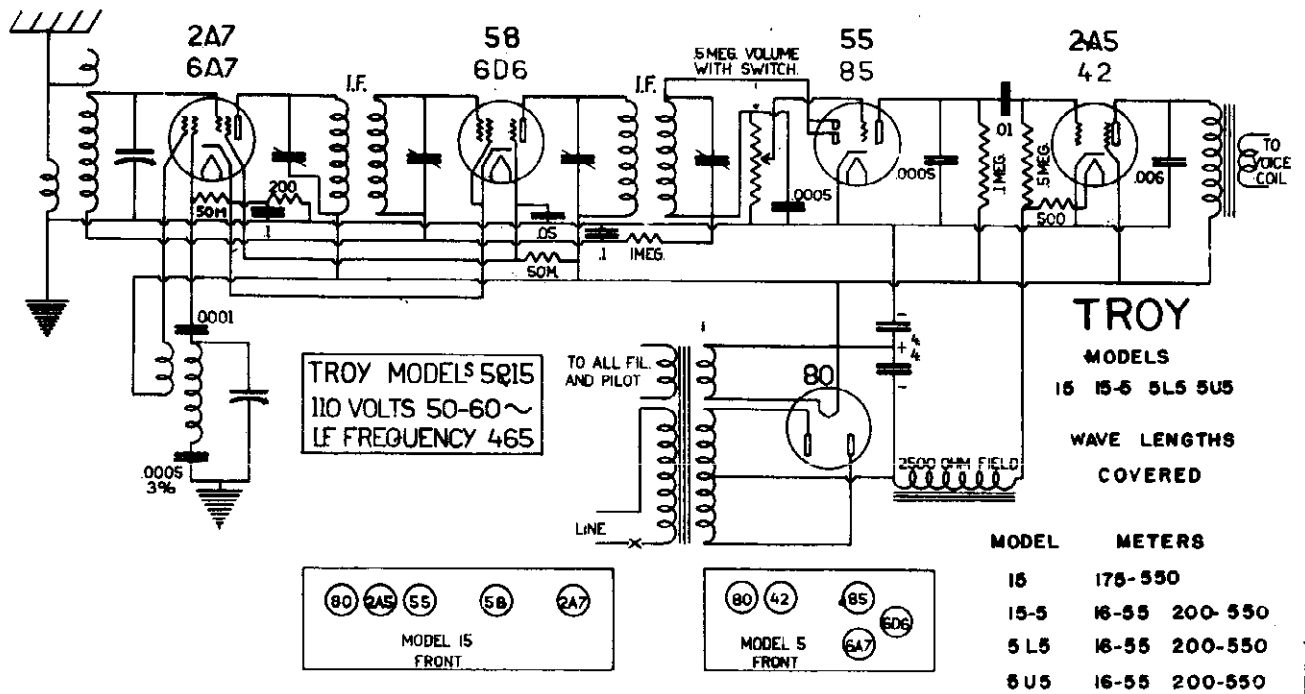
MODELS 4,14,40
 MODELS 5L5,5U5,15,15-5
 Schematics, Socket



Models 14, 40
 use 2.5V. type tubes
 Model 4 uses 6.3V.
 type tubes

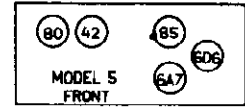
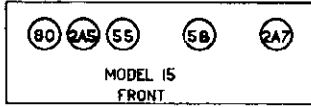
TROY RADIO

MODEL 14 40 175-550 METERS



TROY MODELS 5U5
 110 VOLTS 50-60~
 LF FREQUENCY 465

TROY
 MODELS
 15 15-5 5L5 5U5
 WAVE LENGTHS
 COVERED



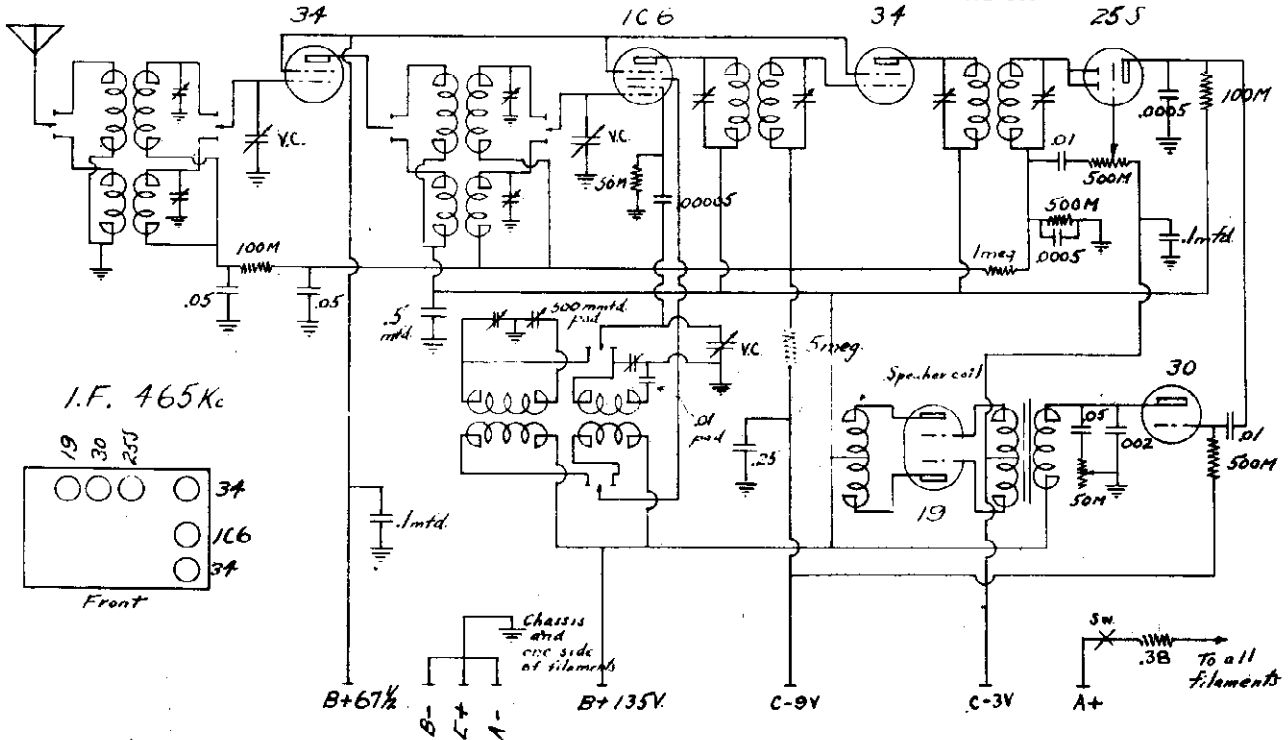
MODEL	METERS
15	175-550
15-5	16-55 200-550
5L5	16-55 200-550
5U5	16-55 200-550

MODELS 62BC, 62BU
 MODELS 62C, 62PC, 62L, 62U
 Schematics, Socket

TROY RADIO MFG. CO.

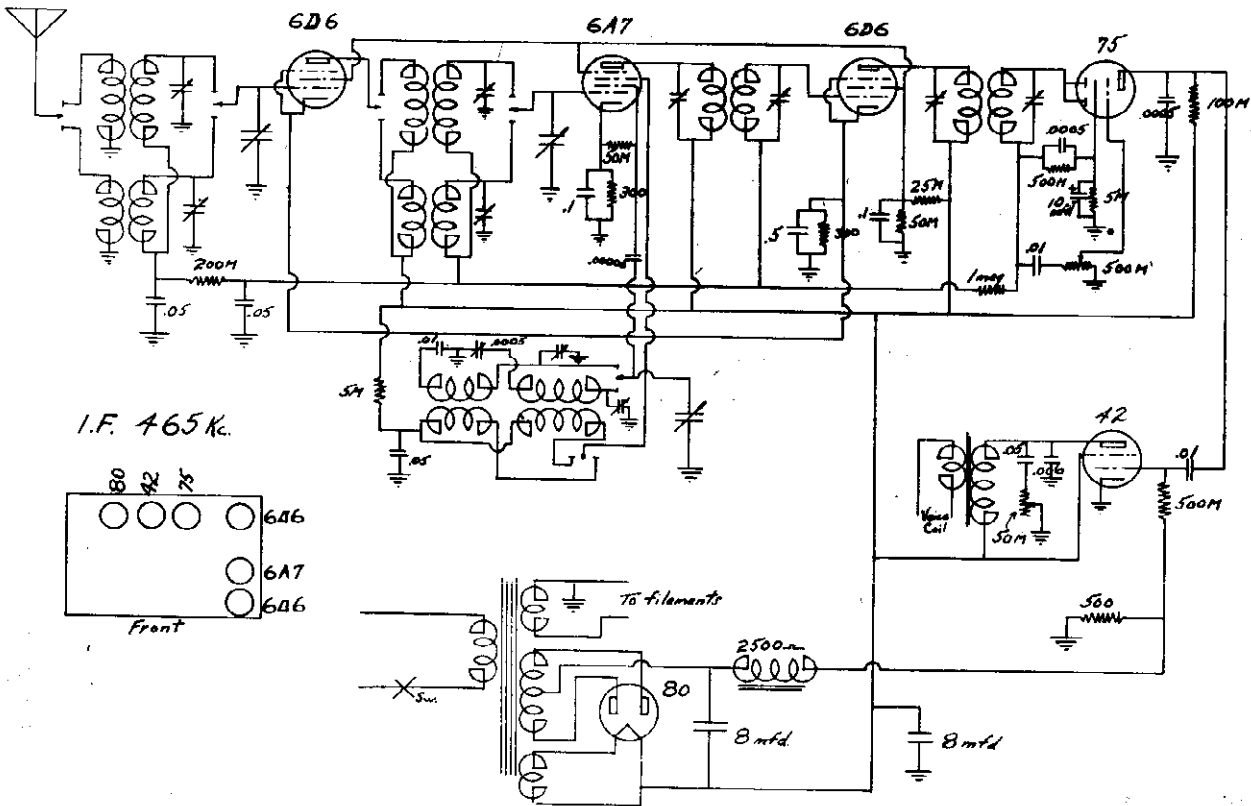
MODELS
 62 BU 62 BC

WAVE LENGTH
 16 - 55
 175-550 METERS
 25 J



MODELS 62L 62U 62C 62PC

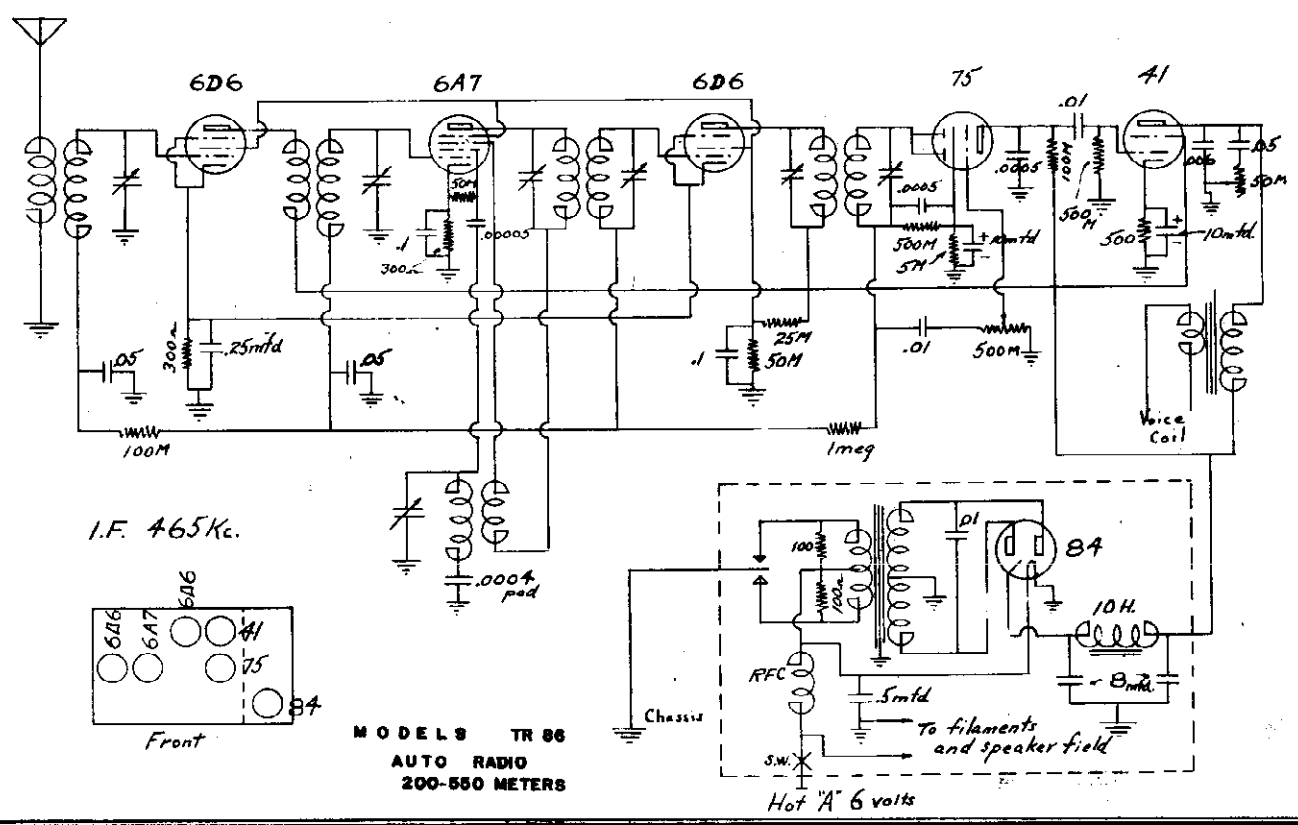
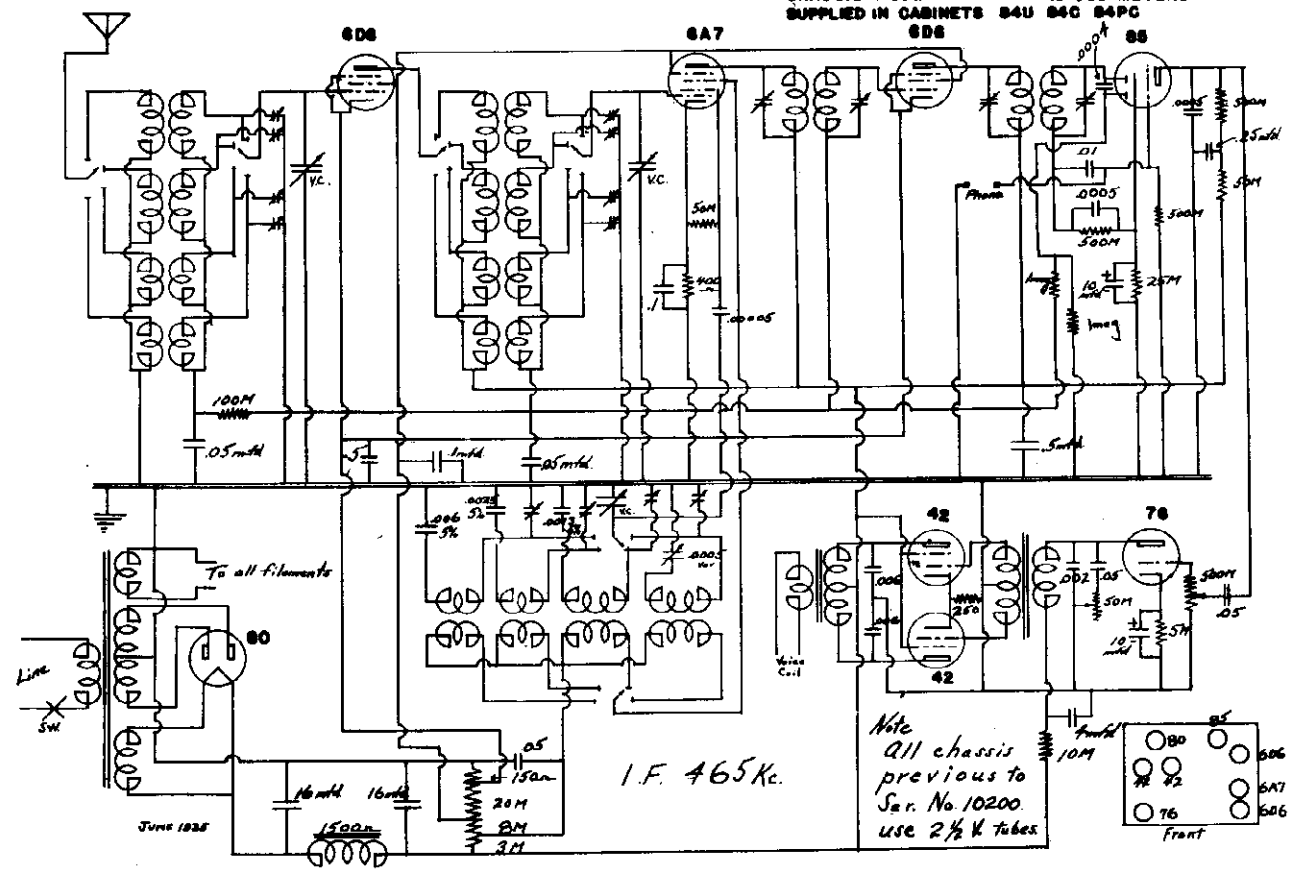
WAVE LENGTH 16-55 175-550 METERS



TROY RADIO MFG. CO.

MODELS 84C, 84PC, 84U
MODEL TR-86
Schematics, Socket

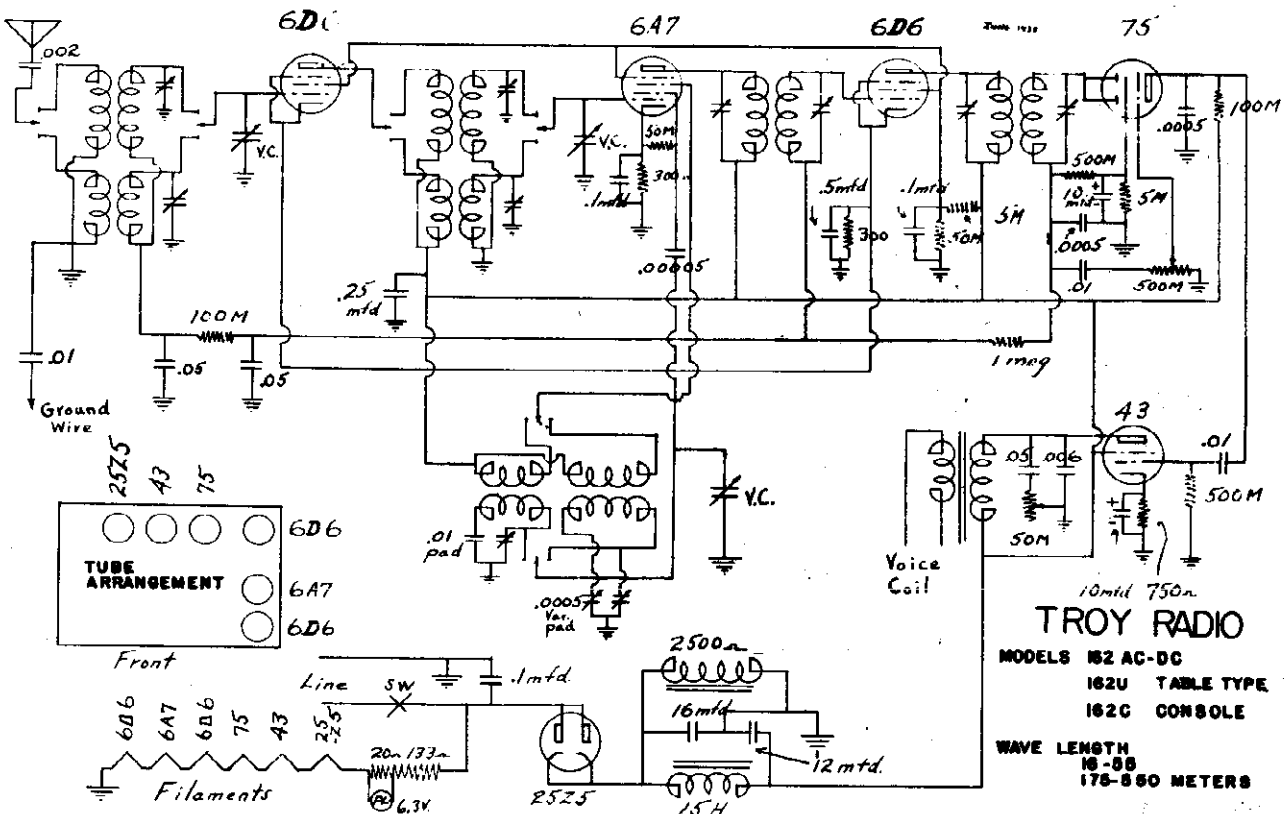
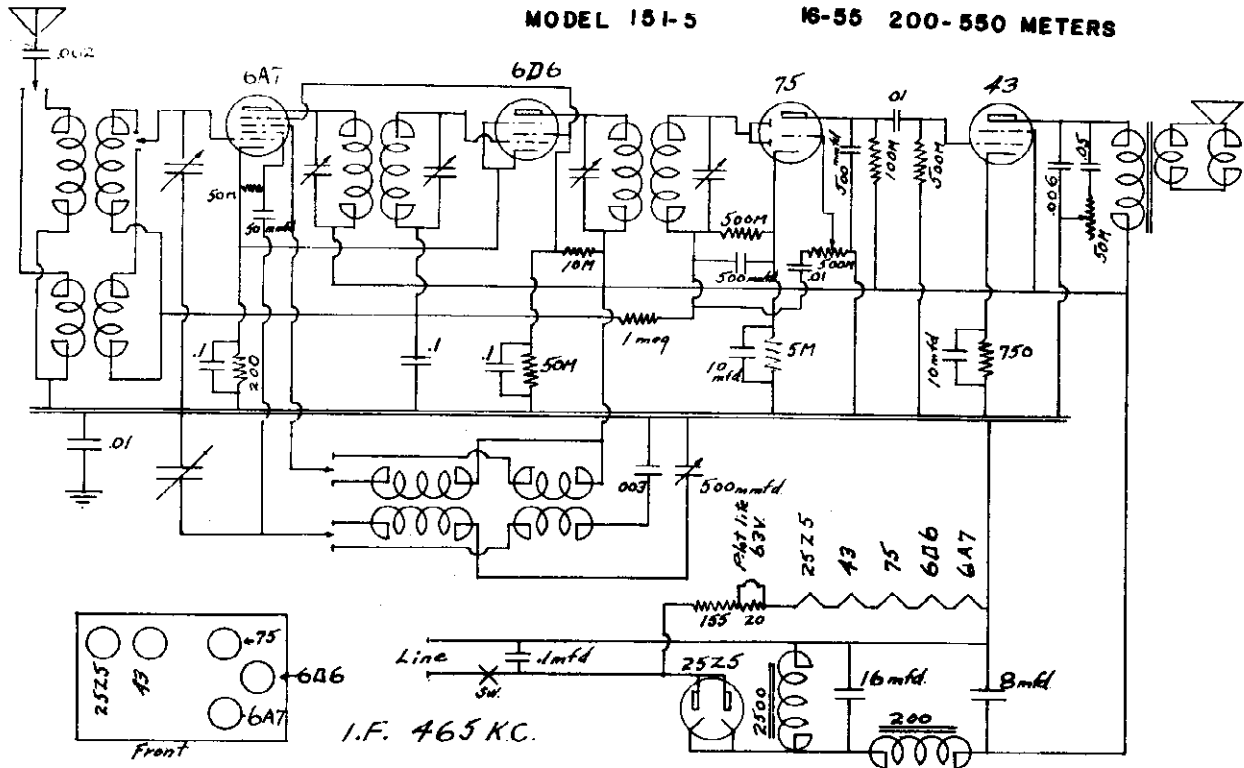
CHASSIS MODEL TR 84 15-550 METERS
SUPPLIED IN CABINETS 84U 84C 84PC



MODEL 151-5
MODELS 1620, 162U
Schematics, Socket

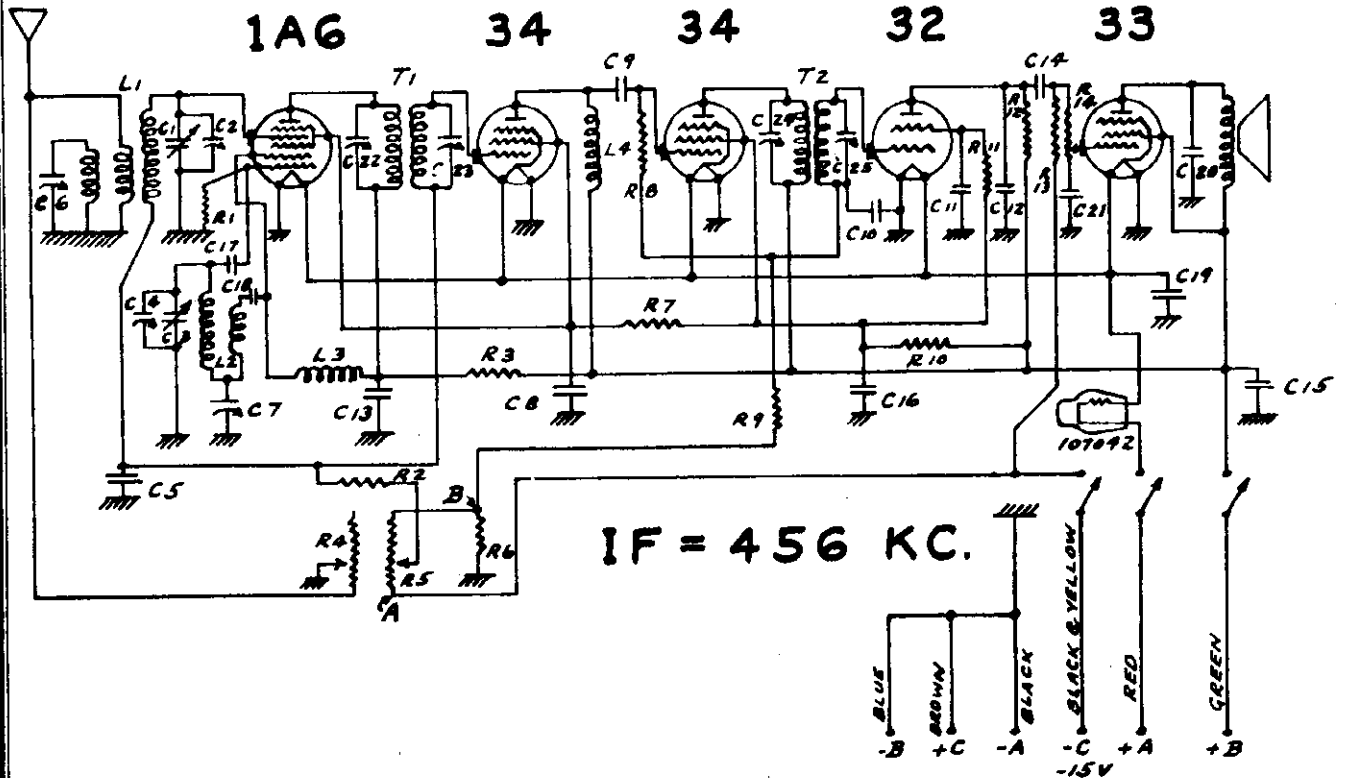
TROY RADIO MFG. CO.

MODEL 151-5 16-55 200-550 METERS



UNITED AMERICAN BOSCH CORP.

SCHEMATIC WIRING DIAGRAM



SERVICE PARTS LIST

Battery Radio Receiver Model 376BT (Table Model)
 Battery Radio Receiver Model 376S (Console Model)
 Battery Radio Receiver Model 376F (Console Model)

Part No.	Dia. #	Description of Parts	Part No.	Dia. #	Description of Parts
		CONDENSERS			RESISTORS
	(C1)			R1	100,000 ohms - 1/4 W
106815	(C2)	Variable condenser with	105278	R2	100,000 ohms - 1/4 W
	(C3)	trimmers	105278	R3	1,000 ohms - 1/4 W
	(C4)		105267	(R4)	10,000 var. vol.
106386	C5	.05 mf - 200 V.	106829	(R5)	control
	(C6)	60-250 mmf	105270	R6	2500 ohms - 1/4 W
106382	(C7)	200-525 mmf	105267	R7	1000 ohms - 1/4 W
106386	C8	.05 mf - 200 V.	105278	R8	100,000 ohms - 1/4 W
106417	C9	.0001 mica	105281	R9	1 meg. - 1/4 W
106386	C10	.05 mf - 200 V.	102875	R10	15,000 ohms - 1/2 W
102497	C11	.25 mf - 200 V.	105281	R11	1 meg. - 1/4 W
106417	C12	.0001 mica	105246	R12	1/2 meg. - 1/4 W
106386	C13	.05 mf - 200 V.	105281	R13	1 meg. - 1/4 W
103659	C14	.005 mf - 350 V.	106823	R14	500,000 var. tone control
107029	(C15)	4 mfd. 250 V.			
Ed-2	(C16)	2 mfd. 250 V.			
101143	C17	.0001 mica			
106386	C18	.05 mf - 200 V.			
106720	C19	1 mfd - 200 V.			
103659	C20	.005 mf - 350 V.			
107043	C21	.0005 mica	107040	L1	Antenna coil assembly
	(C22)		107033	L2	Osc. coil assembly
	(C23)	35-130 mmf- part of	107020	L3	Choke coil assembly
	(C24)	106835	107021	L4	Choke coil assembly
	(C25)		106835	T1-2	I.F. coil assembly

MODELS 376BT, 376F
376S
Socket, Trimmers
Alignment, Voltage

UNITED AMERICAN BOSCH CORP.

- Set dial scale to 840 K.C. and adjust test oscillator output to obtain full scale reading on output meter.
- Adjust wave trap trimmer #16 until a mill or minimum reading of output meter is obtained.
- Connect test oscillator to grid of 1A6 first detector tube #10 and set test oscillator to 1800 K.C.
- Set dial scale to maximum mark beyond 840 K.C. calibration point when gang is almost closed.
- Set scale at 1800 K.C. and adjust #11 to maximum output.
- Connect test oscillator to antenna through a .0005 mfd. condenser and with scale still set at 1800 K.C., adjust #1 and #2 to maximum output.
- Set scale and test oscillator to 800 K.C. and adjust #13 simultaneously, change this adjustment and the station selector of chassis for maximum output.
- With test oscillator and scale set at 1800 K.C., readjust #11 and #18, since previous adjustments may have altered oscillator trimmer setting.
- Check sensitivity across scale. **SOCKET VOLTAGE**

Tube	Series	Filament	Plate	Screen	Grid
55	Output	6.2	135	140	15. (A' to ground)
52	2nd oscillator	6.2	135	13	28. (A' to ground)
53	1st oscillator	6.2	140	70	2.5 (A' to ground)
54	I.P. trimmer	6.2	140	70	2.5 (A' to ground)
51	I.P. trimmer	6.2	140	70	2.5 (A' to ground)
1A6	1st detector	6.2	140	70	2.5 (A' to ground)
	Oscillator		145		Total Iga voltage - 140

Note: The above readings were taken with fresh batteries. Corresponding reductions in output should be expected for older batteries. The bias circuit serves to discharge the battery charge due to use. The bias circuit serves to discharge the battery charge due to use. The bias circuit serves to discharge the battery charge due to use.

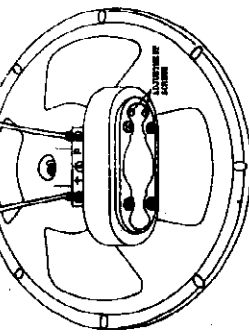


Figure #4
ADJUSTMENT OF VARIOUS TUBES OF THE BATTERY SUPPLY

- With speaker connected to the receiver, volume control on the grid and advance the volume control until the speaker begins to rattle (armature striking pole pieces).
 - Undo the two holes shown in Fig. #4 by piercing the paper label.
 - This adjustment is of the rocker type and one screw must be loosened and the other tightened to adjust the position of the structure. Adjustment should proceed in the same manner as above. An adjustment screwure is found. When this condition is obtained, both screws should be tight.
- The receiver is supplied without batteries. Any one of the following three types of supply may be used.
- Dry Cell Pack:** A ballast tube (#107048) is provided with the receiver to accommodate the voltage drop of the dry cell pack which varies from slightly over 5 volts for a fresh battery to less than 2 volts for a battery near the end of its useful life.
 - Storage Battery Operation:** When using a storage battery, a single cell of a storage battery terminal voltage of 2 volts is important that the ballast tube be replaced by an accessory which serves to short circuit the ballast tube socket terminal. Such an accessory will be supplied as service part #108016. Greater satisfaction will result when using the new low discharge type of battery which has been specifically developed for radio receiver use.
 - Air Cell Operation:** The air cell, unlike the dry cell pack, does not vary greatly in terminal voltage during its useful life, and while the ballast tube may be used, it does not allow the total life of the air cell to be realized because its use results in low filament voltage.
- A service accessory #108010 which consists of a low fixed resistance should be used to replace the ballast tube when using the air cell.
- If the electrolytic condenser #107059 is of the polarized type (#A-3), it should be replaced by a non-polarized filter #107058 M. S.
- IMPORTANT**
The first production lot of the Model 376 was equipped with an M. S. 1 filter. We have found that if these radios are not followed our instructions in making correct "B" battery connections serious damage may result to the receiver.

- Part No.** **Description of Parts**
- CABLES & CABLE ASSEMBLIES**
- 107045 Antenna cable assembly
 - 104445 Cable assembly, brown & black
 - 107841 Cable assembly, brown, black, blue - Model 376S
 - 107845 Cable assembly, black and brown, Model 376F
 - 107479 Cable lead 8' long
 - 107844 Cable lead 9' long
- General Description**
- The American-Bosch Model 376 is a five-tube battery operated superheterodyne receiver. Its circuit includes a detector oscillator, two stages of intermediate frequency amplifier, a second detector and a power pentode output amplifier.
- The tuning range of this receiver extends from 840 to 1850 Kilocycles.

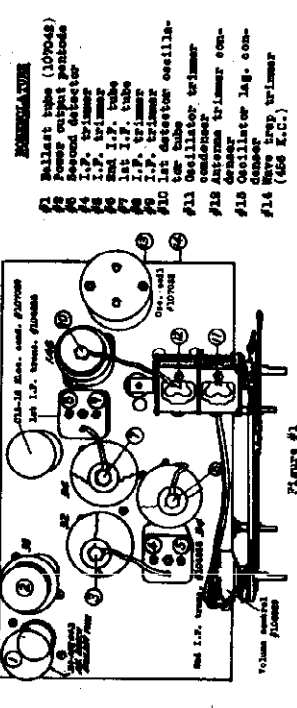


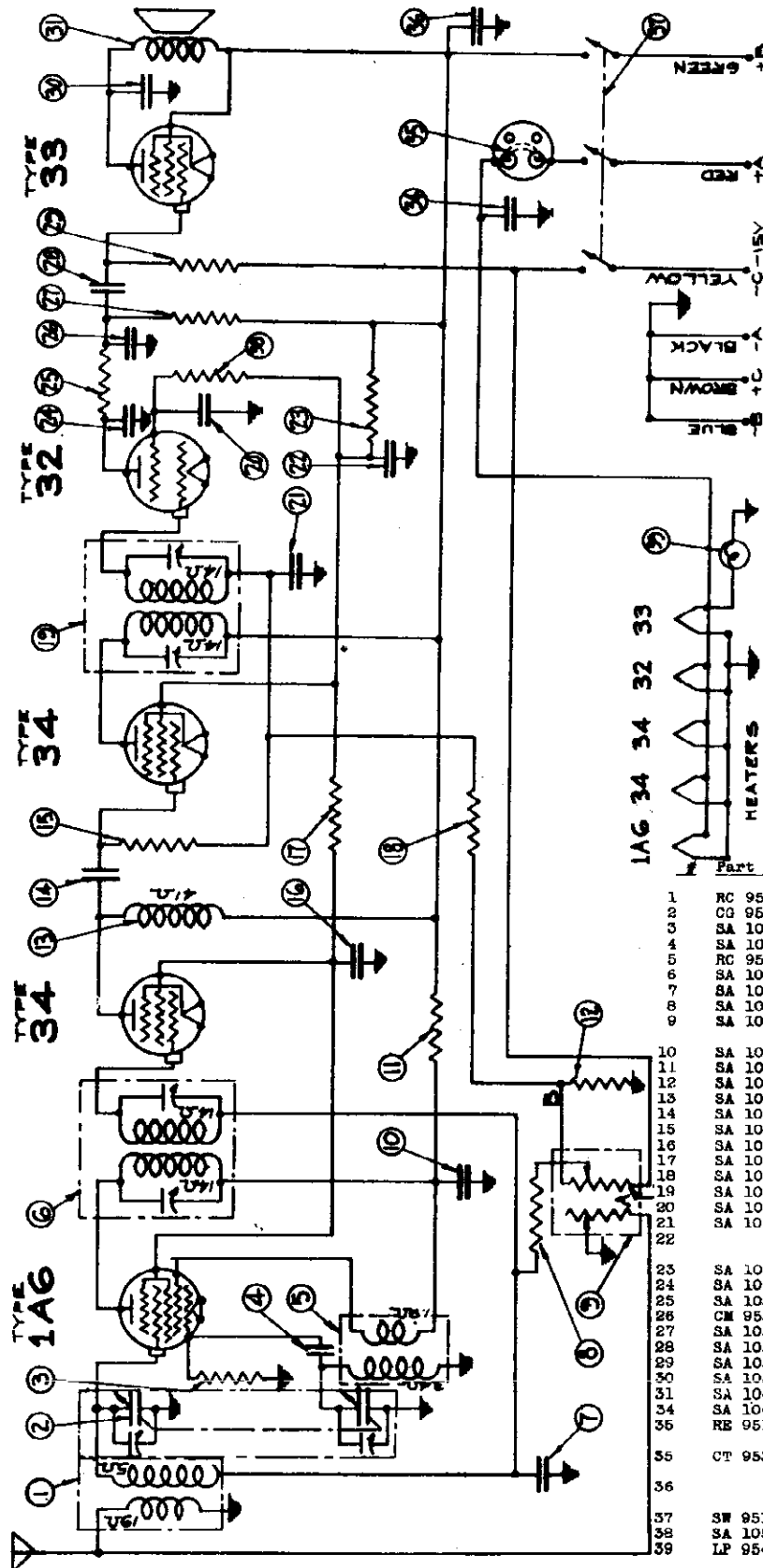
Figure #1
ALIGNMENT INSTRUCTIONS

- To align the Model 376 chassis, it is essential to use a high grade modulated oscillator the output of which can be continuously adjusted to assure freedom from tube overload as individual circuits are brought into alignment.
- The Model 376 uses an improved type of magnetic speaker, the windings of which are directly in the plate circuit of the output tube. The windings are of high impedance and necessitate care in the use of the output meter when aligning the chassis.
- When an output meter of low resistance is connected across the windings of this type of speaker, the power output is materially reduced. For this reason, it is necessary to use an output meter of high sensitivity and a resistance of at least 4,000 ohms.
- Before attempting to align a receiver, the service man should familiarize himself with the receiver chassis and the alignment instructions. A top view of the chassis is shown in Fig. #1, and should be carefully studied before the actual work is started.
- Connect in series with high side of test oscillator leads a blocking condenser of at least .25 mfd. to prevent short circuit of receiver batteries in subsequent aligning operations.
 - Set volume control on full.
 - Tune control should be in bass position.
 - Short circuit antenna and ground leads to prevent local stations from interfering with subsequent aligning operations.
 - Connect output meter across loud speaker terminals (see note above).
 - Set test oscillator to 455 K.C. and adjust its output to produce measurable reading on output meter when test oscillator between frame of chassis and the grid of 54 I.P. tube #1.
 - Adjust #4 and #5 to maximum output, reducing signal oscillator output as stage is brought into resonance.
 - Connect test oscillator to grid of 1A6 tube #10 and adjust #6 and #9 to maximum output.
- ALIGNING WAVE TRAP (DIRECT SIGNAL 455 K.C.)**
- An adjustable wave trap is provided in series with the antenna circuit to prevent interference due to direct transmission of telegraphic signals at the intermediate frequency (455 K.C.).
- With test oscillator still set at 455 K.C., connect oscillator leads to the antenna and ground terminals through a .0005 mfd. antenna condenser.

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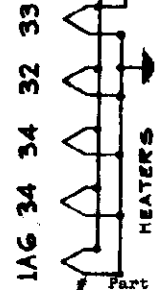
MODEL 385
Schematic, Voltage
Parts

AMERICAN-BOSCH RADIO MODEL 385



TUBE	STAGE	FILE	RES.	W.	BIAS	1A6	32	34	33
33	OUTPUT	62	15K	140	15	TO GROUND			
32	CAPDET	62	15K	12	15	TO GROUND			
34	INT. FREQ.	62	140	TO RES.	TO GROUND				
1A6	INT. FREQ.	62	140	TO RES.	TO GROUND				
1A6	INT. FREQ.	62	140	TO RES.	TO GROUND				
1A6	REGULATOR	62	140	TO RES.	TO GROUND				

SOCKET VOLTAGES



Description of Parts

- | | | |
|----|-----------|---|
| 1 | RC 9546 | Ant. coil assembly |
| 2 | CG 9515 | Variable condenser assy. |
| 3 | SA 105278 | 100,000 ohms, 1/2 W. res. |
| 4 | SA 101143 | .0001 mfd., mica cond. |
| 5 | RC 9547 | Oscillator coil assembly |
| 6 | SA 106835 | I.F. Coil Assembly |
| 7 | SA 106386 | .05 mfd., 200 V. cond. |
| 8 | SA 105278 | 100,000 ohms, 1/2 W. res. |
| 9 | SA 106829 | Dual volume control
(10,000 ohms per unit) |
| 10 | SA 106386 | .05 mfd., 200 V. cond. |
| 11 | SA 105267 | 1000 ohms, 1/2 W. res. |
| 12 | SA 105270 | 2500 ohms, 1/2 W. res. |
| 13 | SA 107021 | Check coil assembly |
| 14 | SA 106417 | .0001 mfd., mica cond. |
| 15 | SA 105278 | 100,000 ohms, 1/2 W. res. |
| 16 | SA 106386 | .05 mfd., 200 V. cond. |
| 17 | SA 105267 | 1000 ohms, 1/2 W. res. |
| 18 | SA 105231 | 1 meg., 1/2 W. res. |
| 19 | SA 106835 | I.F. coil assembly |
| 20 | SA 102497 | .25 mfd., 200 V. cond. |
| 21 | SA 106386 | .05 mfd., 200 V. cond. |
| 22 | | 2 mfd., 200 V. cond.
(part of CE 959) |
| 23 | SA 105254 | 15,000 ohms, 1/2 W. res. |
| 24 | SA 106417 | .0001 mfd., mica cond. |
| 25 | SA 106276 | 50,000 ohms, 1/2 W. res. |
| 26 | CM 955 | .000025 mfd., mica cond. |
| 27 | SA 105246 | 1/2 meg., 1/2 W. resistor |
| 28 | SA 103659 | .005 mfd., 400 V. cond. |
| 29 | SA 105281 | 1 meg., 1/2 W. resistor |
| 30 | SA 103659 | .005 mfd., 400 V. cond. |
| 31 | SA 106918 | Speaker assembly |
| 34 | SA 106720 | 1 mfd., 200 V. condenser |
| 35 | RE 9515 | Adaptor socket resistance
lead |
| 35 | CT 953 | Adaptor socket short circuit
link |
| 36 | | 4 mfd., 200 V. cond.
(part of CE 959) |
| 37 | SW 9513 | Switch assembly |
| 38 | SA 105281 | 1 meg., 1/2 W. resistor |
| 39 | LP 954 | Dial lamp |

INT. FREQ. 463 KC

MODEL 385
Socket, Trimmers
Alignment

UNITED AMERICAN BOSCH CORP.

1. With speaker connected to the receiver, tune in a strong signal and advance the volume control until the speaker begins to rattle (armature striking pole pieces).
2. Uncover the two holes shown in Fig. #2 by piercing the paper label.
3. This adjustment is of the rocker type and one screw must be loosened and the other tightened to adjust the position of the armature. Adjustment should proceed in quarter turn steps until best position of armature is found. When this condition is obtained, both screws should be tight.

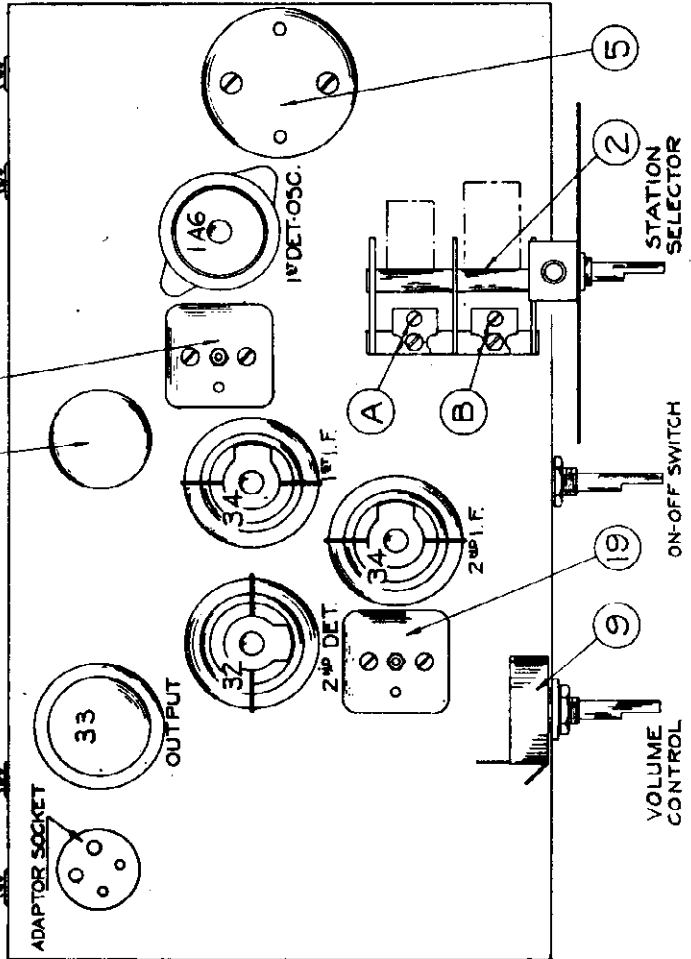
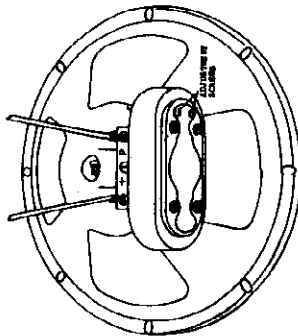
Type and Number of Tubes	1 #1A6, 2 #54, 1 #52, 1 #33 - Total 5
Total "A" Battery Current	.....56 Amperes
Maximum "B" Battery Current	.....29. M. A.
Tuning Range	.....540 to 1620 K. C.
Maximum Undistorted Output	.....7 Watts
Maximum Output	.....9 Watts
Line-Up Frequencies	.....463 K.C., 600 K.C., and 1500 K.C.



Figure No. 2

adjustment. However, if for any reason an adjustment is needed, it may be done as follows:

SPEAKER ADJUSTMENT
 The speaker has been carefully adjusted at the factory and should not require any further attention, as this design has been found to be very stable in maintaining its



LINE-UP CAPACITOR ADJUSTMENTS

To align the chassis, it is essential to use a high grade modulated oscillator, the output of which can be continuously adjusted to assure freedom from tube overload as individual circuits are brought into alignment.

This model uses an improved type of magnetic speaker, the windings of which are directly in the plate circuit of the output tube. The windings are of high impedance and necessitate care in the use of the output meter when aligning the chassis. When an output meter of low resistance is connected across the windings of this type of speaker, the power output is materially reduced. For this reason, it is necessary to use an output meter of high sensitivity and a resistance of at least 4000 Ohms.

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis with the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figures #3 and #4, and should be carefully studied before the actual work is started.

I. F. ADJUSTMENT (463 K.C.)

1. Set volume control on full.
2. Short circuit the antenna and ground leads to prevent local stations from interfering with subsequent aligning operations.
3. Connect output meter across the loud speaker terminals (see note above).
4. Set test oscillator to 463 K.C. and apply test signal to grid of 34 second I.F. tube thru a .25 mfd. blocking condenser and adjust the two trimmers on top of I.F. coil #19 to maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 1A6 detector-oscillator tube and adjust the two trimmers on top of I.F. coil #6 to maximum output.

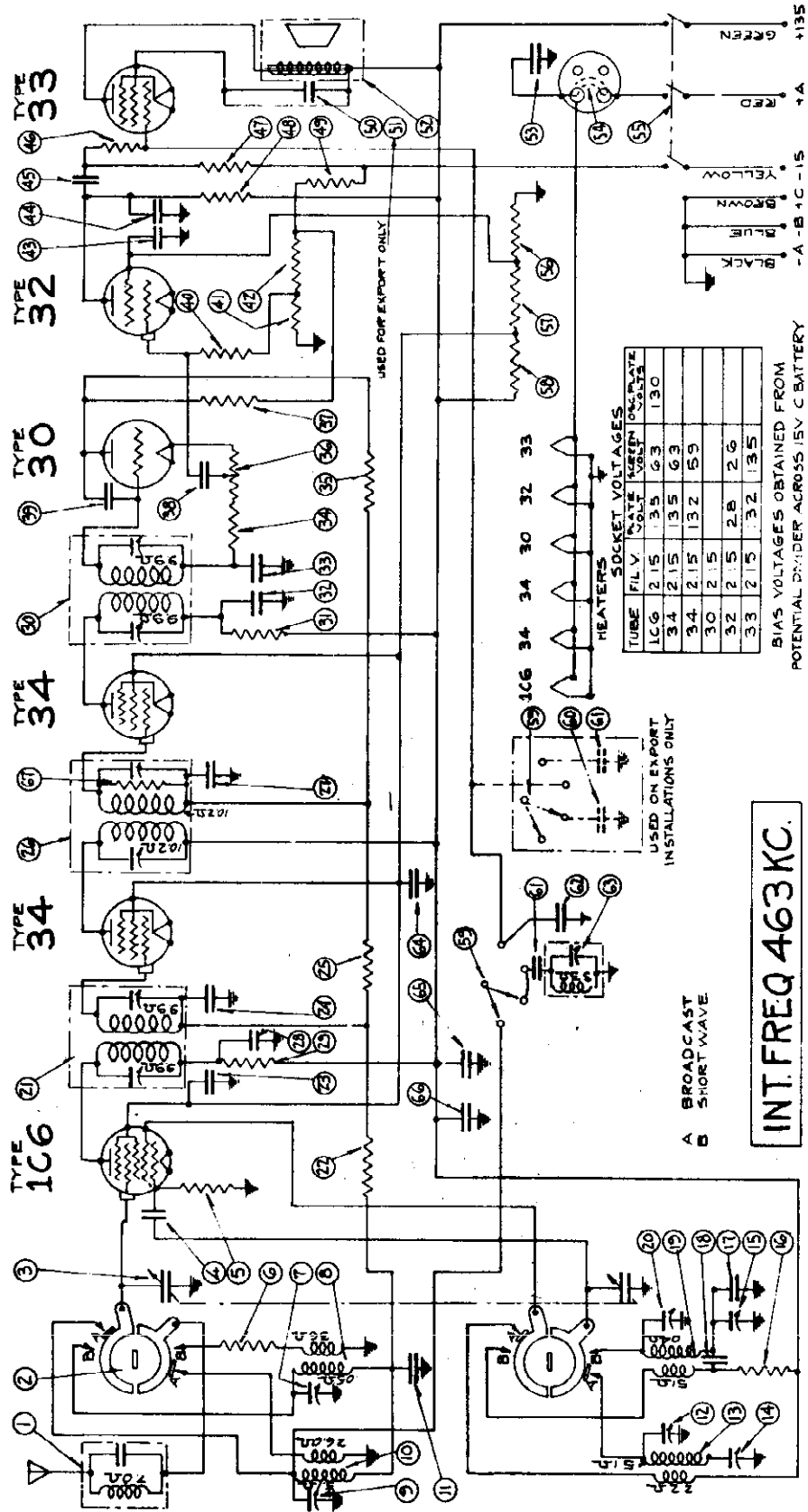
OSCILLATOR AND R.P. ADJUSTMENT

1. Set test oscillator and dial scale to 1500 K.C.
2. With test signal still applied to the grid of 1A6 tube, adjust trimmer "A" to maximum output.
3. Apply test signal to antenna lead of chassis thru a .0002 mfd. condenser and with dial scale still set at 1500 K.C. adjust trimmer "B" to maximum output.
4. Check sensitivity and calibration at several points of dial scale.

UNITED AMERICAN BOSCH CORP.

MODEL 386
Schematic
Voltage

AMERICAN-BOSCH RADIO MODEL 386



MODEL 386

Socket, Trimmers
Alignment

UNITED AMERICAN BOSCH CORP.

ADJUSTMENT OF I.F. (465 K.C.)

1. Set volume control on full.
2. Set tone control (center knob) at right hand or bass position.
3. Connect output meter across speaker terminals through a .5 mfd. series condenser.
4. Connect in series with high side of test oscillator leads a .25 mfd. blocking condenser.
5. Set test oscillator at 465 K.C. and adjust its output to produce measurable reading on output meter when test oscillator leads are connected between frame of chassis and grid of 34 second I.F. tube.
6. Adjust trimmers on I.F. coil #30 to maximum output.
7. Connect test oscillator to grid of 34 first I.F. tube and adjust trimmers on I.F. coil #26 to maximum output.
8. Connect test oscillator to grid of 106 first detector and adjust trimmers on first I.F. coil #21 to maximum output.
9. With test oscillator still connected to grid of 106, readjust trimmers on coils #26 and #30 for greatest sensitivity.

ADJUSTMENT OF BROADCAST BAND

1. With test oscillator on grid of 106 tube, set its output to 1500 K.C.
2. With gang condenser in maximum position, adjust dial pointer until either end is directly over the long horizontal lines on the dial scale.
3. Now set dial pointer to 1500 K.C. and adjust #12 (Fig. #4) to maximum output.
4. Connect test oscillator to antenna through a .0002 mfd. condenser and with dial pointer still set at 1500 K.C., adjust #12 and #9 to maximum output.
5. Set dial pointer and test oscillator to 550 K.C. and adjust #14 to maximum output. Reset dial pointer in either direction from the 550 K.C. mark and readjust #14 until greatest sensitivity is obtained.
6. Return to 1500 K.C. setting and readjust #9 and #12 for maximum output. Check sensitivity and calibration across scale.

ADJUSTMENT OF POLICE BAND

1. Set combination tone control-police switch (center knob) on first or left hand position.
2. Leave wave change switch in standard broadcast position.
3. Set test oscillator at 2400 K.C. and tune in signal at approximately 1600 K.C. on dial scale.
4. Adjust trimmer on coil #63 to maximum output.

ADJUSTMENT OF SHORT-WAVE BAND

1. Set tone control to right-hand or bass position and set wave change switch (lower right-hand knob) to left hand position.
2. Set test oscillator and dial pointer to 16 M.C.
3. Connect test oscillator to antenna through a .0002 mfd. condenser and a 400 ohm resistor in series (this condenser-resistor combination is the approximate equivalent of a short-wave antenna).
4. Adjust trimmer #80 until signal is tuned in.
5. Adjust trimmer #7 and station selector alternately until maximum sensitivity is obtained. (This is necessary as the adjustment of #7 affects the oscillator frequency slightly.)
6. Set test oscillator and dial pointer to 6 M.C. and adjust #15 to maximum output.
7. Check sensitivity across scale.

LINE-UP CAPACITOR ADJUSTMENTS

To align the chassis, it is essential to use a high grade modulated oscillator, the output of which can be continuously adjusted to assure freedom from tube overload as individual circuits are brought into alignment.

This model uses an improved type of magnetic speaker, the windings of which are directly in the plate circuit of the output tube. The windings are of high impedance and necessitate care in the use of the output meter when aligning the chassis.

When an output meter of low resistance is connected across the windings of this type of speaker, the power output is materially reduced. For this reason, it is necessary to use an output meter of high sensitivity and a resistance of at least 4000 ohms.

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 #3 and #4, and should be carefully studied before the actual work is started.

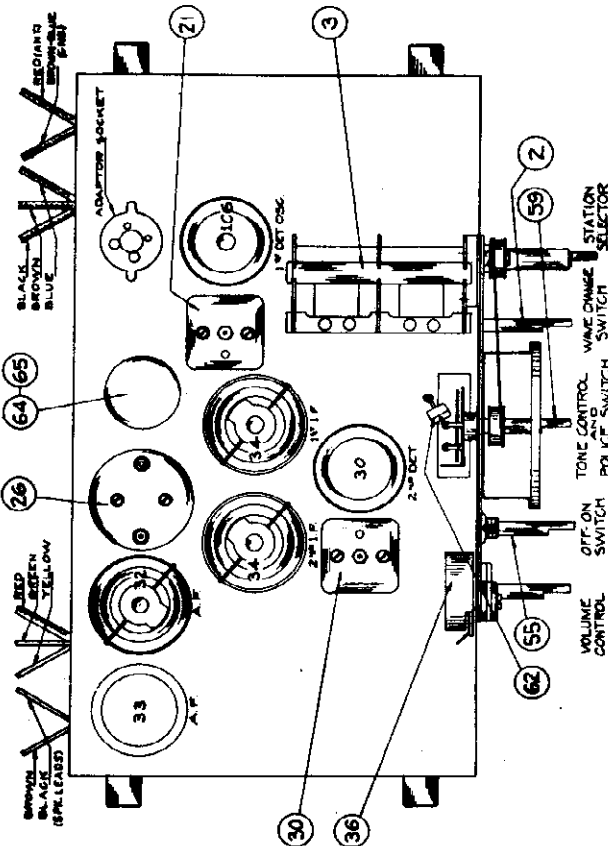
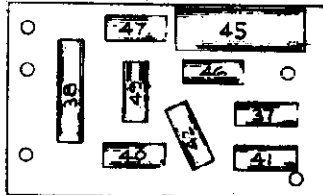
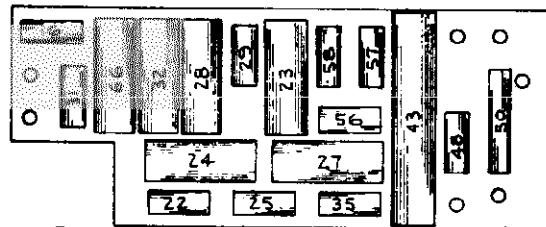


Figure No. 3



71 INSULATION PLATE 15-9548



70 INSULATION PLATE 15-9549

UNITED AMERICAN BOSCH CORP.

MODEL 386
Speaker Data
Trimmers, Parts

Dia. #	Part #	Description of Parts
1	RC 9544	Antenna trap coil assy.
2	SW 9510	Wave switch
3	CG 956	Variable condenser
4	SA 101143	100 mmf. mica condenser
5	SA 105276	50,000 ohms 1/4 W. resistor
6	SA 105255	50 ohms 1/4 W. resistor
7	SA 109090	1.5-10 mmf. condenser
8	RC 9542	S.W. antenna coil
9	CS 9510	1-ε mmf. condenser
10	RC 9540	B.C. antenna coil
11	SA 106386	.05 mfd. 200 V. condenser
12	SA 107503	3-25 mmf. condenser
13	RC 9541	3.C. oscillator coil
14	SA 108001	300-600 mmf. condenser
15	SA 108001	750-1500 mmf. condenser
16	SA 105287	1,000 ohms 1/4 W. resistor
17	SA 103775	1,000 mmf. mica condenser
18	SA 106386	.05 mfd. 200 V. condenser
19	RC 9543	S.W. oscillator coil
20	SA 109090	1.5 - 10 mmf. condenser
21	IC 9514	1st I.F. transformer
22	SA 105276	100,000 ohms 1/4 W. resistor
23	SA 106386	.05 mfd. 200 V. condenser
24	SA 106386	.05 mfd. 200 V. condenser
25	SA 105278	100,000 ohms 1/4 W. resistor
26	IC 9515	2nd I. F. transformer
27	SA 106386	.05 mfd. 200 V. condenser
28	SA 106386	.05 mfd. 200 V. condenser
29	SA 105283	4,000 ohms 1/4 W. resistor
30	IC 9516	Diode transformer
31	SA 105267	1,000 ohms 1/4 W. resistor
32	SA 106386	.05 mfd. 200 V. condenser
33	SA 106417	100 mmf. mica condenser
34	SA 105276	50,000 ohms 1/4 W. resistor
35	SA 105246	0.5 meg. 1/4 W. resistor
36	VR 954	Volume control (500,000 ohms)
37	SA 105281	1 meg. 1/4 W. resistor
38	SA 103659	.005 mmf. 350 V. condenser
39	SA 106417	100 mmf. mica condenser
40	SA 105281	1 meg. 1/4 W. resistor
41	SA 105264	500 ohms 1/4 W. resistor
42	SA 105245	2,000 ohms 1/4 W. resistor
43	SA 102497	.25 mfd. 200 V. condenser
44	SA 106417	100 mmf. mica condenser
45	SA 106386	.05 mfd. 200 V. condenser
46	SA 105246	0.5 meg. 1/4 W. resistor
47	SA 105246	0.5 meg. 1/4 W. resistor
48	SA 105279	250,000 ohms 1/4 W. resistor
49	SA 105249	5,000 ohms 1/4 W. resistor
50	CW 952	.005 mfd. 350 V. condenser
51	SA 105743	.003 mfd. 500 V. condenser
52	SA 106918	Speaker
53	SA 103928	2 mfd. 200 V. condenser
54	SA 106824	Adapter socket jumper
55	SA 106824	Battery switch
56	SA 105275	25,000 ohms 1/4 W. resistor
57	SA 105284	30,000 ohms 1/4 W. resistor
58	SA 105254	15,000 ohms 1/4 W. resistor
59	SW 956	Tone control
60	CW 956	250 mmf. mica condenser
61	CW 954	500 mmf. mica condenser
62	SA 106417	100 mmf. mica condenser
63	RC 9562	Police coil assembly
64	CE 959	2 mfd. 200 V. condenser
65	CE 959	4 mfd. 200 V. condenser
66	SA 106386	.05 mfd. 200 V. condenser
67	RE 9514	350,000 ohms 1/8 W. resistor

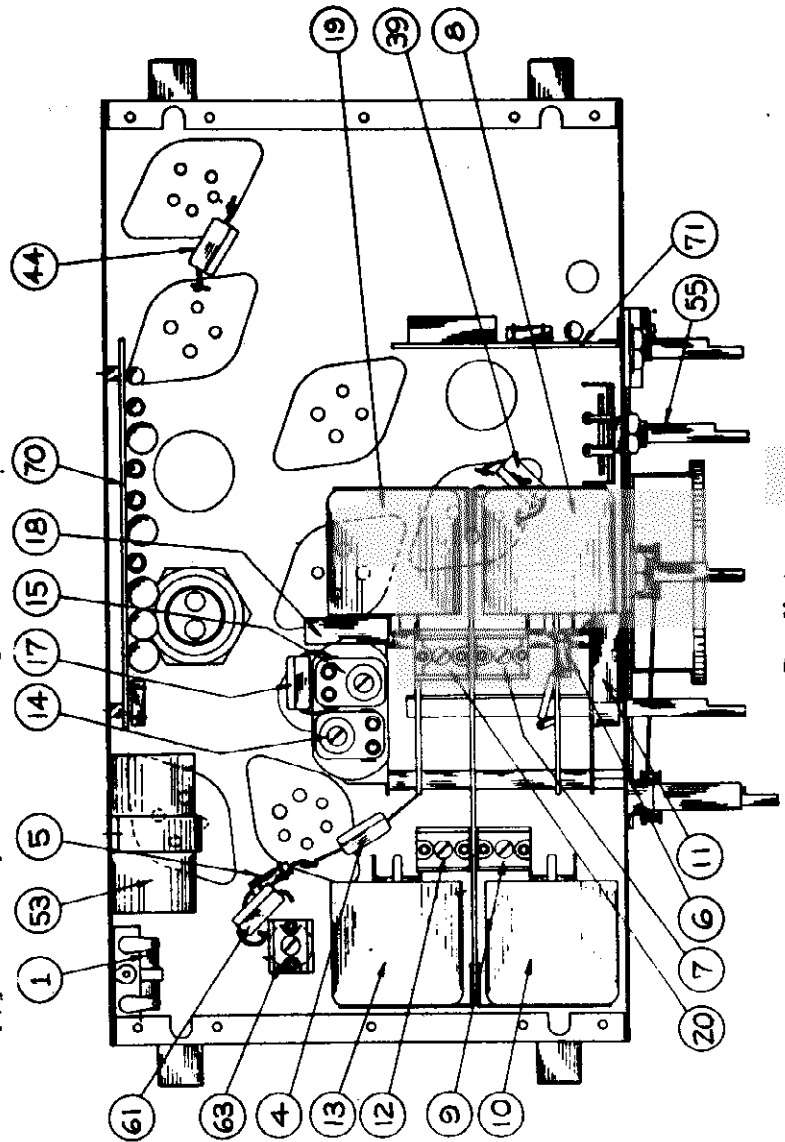


Figure No. 4

SPEAKER ADJUSTMENT

The speaker has been carefully adjusted at the factory and should not require any further attention, as this design has been found to be very stable in maintaining its adjustment. However, if for any reason an adjustment is needed, it may be done as follows:

1. With speaker connected to the receiver, tune in a strong signal and advance the volume control until the speaker begins to rattle (armature striking pole pieces).
2. Uncover the two holes shown in Fig. #2 by piercing the paper label.
3. This adjustment is of the rocker type and one screw must be loosened and the other tightened to adjust the position of the armature. Adjustment should proceed in quarter turn steps until best position of armature is found. When this condition is obtained, both screws should be tight.

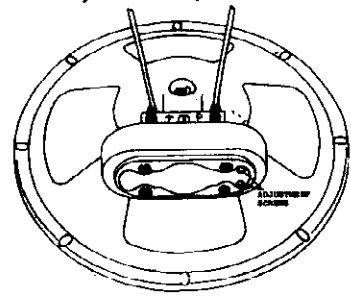


Figure No. 2

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes	1 #106, 2 #34, 1 #30, 1 #32, 1#53 - Total 6
Total "A" Battery Current	620 M.A.
Maximum "B" Battery Current	29 M.A.
Tuning Ranges	530 to 1720 K.C., 2300 to 2600 K.C., 5800 to 19000 K.C.
Maximum Undistorted Output	.7 Watts
Maximum Output	.9 Watts
Line-Up Frequencies	I.F. 463 K.C., 550 K.C., 1500 K.C., 2400 K.C., 6000 K.C., 16000 K.C.

MODEL 04
Schematic
Voltage, Parts

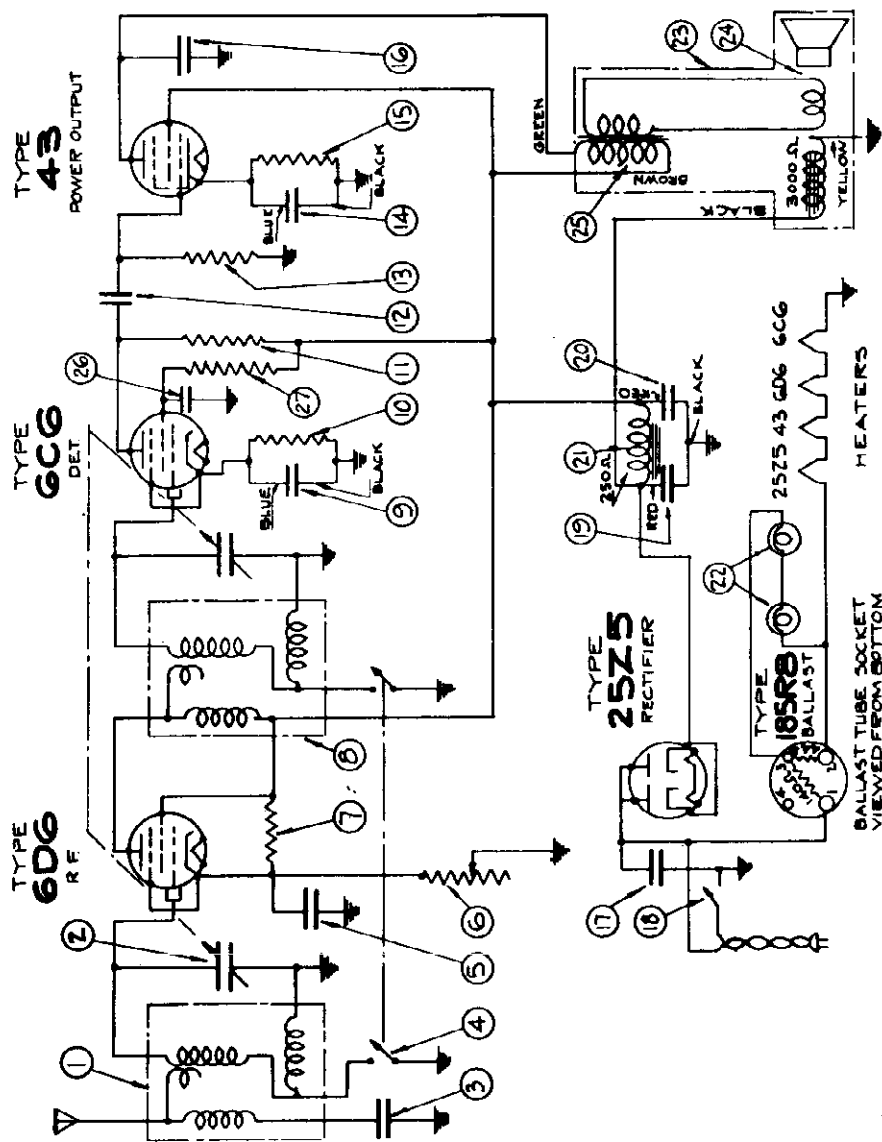
UNITED AMERICAN BOSCH CORP.

AMERICAN-BOSCH RADIO MODEL 04
Four-Tube, Two Band, AC-DC, T. R. F. Receiver

1	ANT COIL ASSY	RC 98712
2	VARI COND (5 GANG)	CG 9573
3	COND. OI	400V SA 106277
4	WAVE CHANGE SW	SW 9832
5	COND. I	500V CW 957A
6	VOL CONT	VR 9575
7	REF 3000.0 μ M	1A 100512
8	R.F. COIL ASSY	RC 92113
9	COND. I	500V SA 105275
10	RES 5000.0 μ M	SA 105275
11	RES 50000.0 μ M	SA 105275
12	COND. OI	400V SA 106277
13	RES 5000.0 μ M	SA 105275
14	COND. I	500V SA 105275
15	COND. I	500V SA 105275
16	COND. OI	400V SA 106277
17	COND. I	200V CW 957A
18	SWITCH (ON-OFF)	PT OF VE 9572
19	COND. I	500V SA 105275
20	COND. I	500V SA 105275
21	COND. I	500V SA 105275
22	CHOKE 150H	CL 9571
23	AMP (1/2) 6-BV	SA-8572
24	SPK (1/2)	SK 9576
25	DIAPHRM COIL ASSY	PT OF SK 9576
26	COND. I	500V SA 105275
27	COND. I	500V SA 105275
28	RES. 500.000 μ M	SA 105275

TUBE STAGE	SOCKET	PLATE	CATH	FL	FL Δ
25Z5 RECTIFIER	117	117			G2
43 POWER OUTPUT	110	100	1A	37	
6CG DET	14	50	1.0	G.0	
6DG R.F.	110	110	G.0	12	

ALL VOLTAGES TAKEN TO BASE PLATE.
LINE VOLTAGE = 115V AC.
* TAKEN WITH 600,000 OHM VOLTMETER.
† TAKE WITH VOLUME CONTROL FULL ON.
‡ FILAMENT VOLTAGES READ TO BASE PLATE.

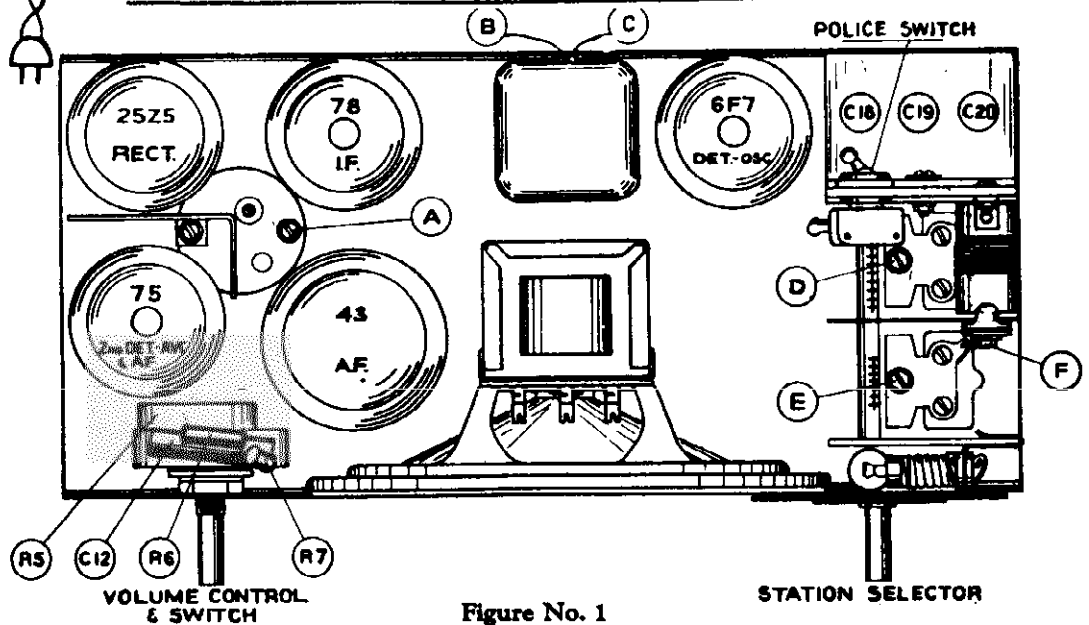
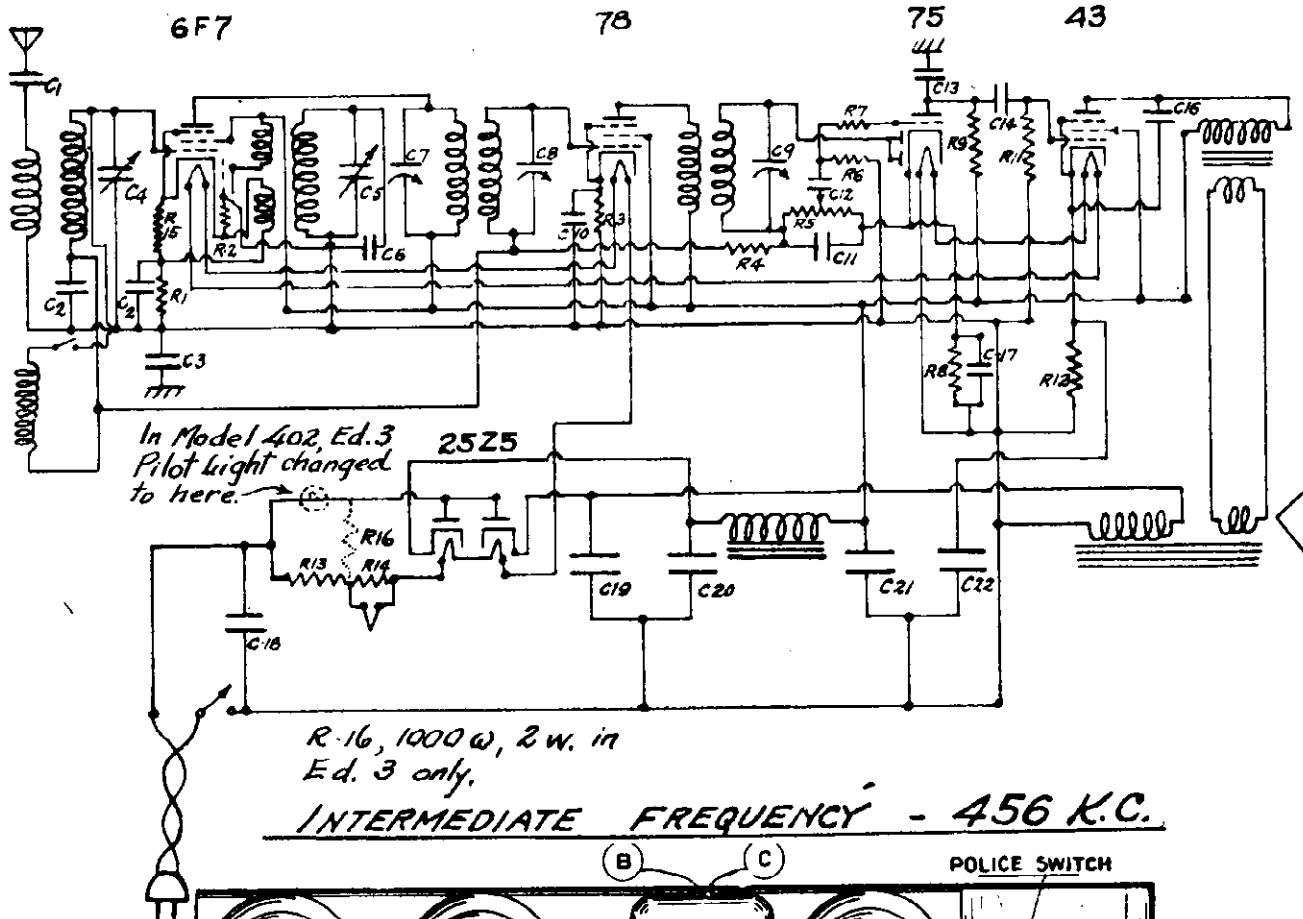


UNITED AMERICAN BOSCH CORP.

MODEL 402
Ed. 1, 2, 3
Schematic, Socket
Trimmers

SERVICE INSTRUCTIONS
for
AMERICAN-BOSCH MODEL 402 RECEIVER

SCHEMATIC WIRING DIAGRAM



MODEL 402

Ed. 1, 2, 3

Alignment, Voltage
Parts, Data

UNITED AMERICAN BOSCH CORP.

SERVICE NOTES

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes	1 #6F7, 1 #78, 1 #75, 1 #45, 1 #25Z5 - Total 5
Power Supply Characteristics	105 to 125 volt, 60 cycle A.C. or D.C.
Power Consumption	45 Watts
Tuning Range	550 to 1750 K.C. and Ed. 2 and Ed. 3 2400 to 2500 K.C.
Maximum Undistorted Output	1 Watt
Line-Up Frequencies	456 K.C., 1500 K.C., 2400 K.C.

GENERAL DESCRIPTION

The Model 402 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 combined second detector - automatic volume control and audio amplifier, a power output stage and a rectifier.

Model 402 Ed. 2 varies from Model 402 Ed. 1 in that it is equipped with a police band.

Model 402 Ed. 3 varies from Model 402 Ed. 2 in that the dial light is connected in the low side of the plate circuit instead of the filament circuit. This will prevent high voltage on the dial light when the receiver is first turned on, for the dial light will not light until the tubes heat up and start to operate. Should any short occur in the plate circuit the dial light will act as a fuse and burn out thus protecting the rectifier tube.

The Model 402 Ed. 1 is designed to operate on frequencies from 550 to 1750 K.C.

The Models 402 Ed. 2 & 3 are designed to operate on the frequencies from 550 to 1750 K.C. and from 2400 to 2500 K.C.

LINE-UP CAPACITOR ADJUSTMENTS

To align the Model 402 chassis, 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 A.V.C. to function, 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

VOLTAGE READINGS

Note: Since no circuits are directly connected to the metal chassis as in the usual A.C. radio sets, it is necessary to measure voltages to the negative side of the circuit designated as "A" on the wiring diagram. A high resistance voltmeter must be used or readings will be inaccurate.

The following voltage readings were taken with the receiver supplied by 115 volts 60 cycle alternating current. Voltage readings will be slightly lower when D.C. is used and will vary with the type of meter used.

I. - A.C. MEASUREMENT

Stage	Tube	Filament	Plate	Screen	Cathode
1st Detector Oscillator	6F7	6.0	115	115	12
I. F.	78	6.0	115	115	2.8
2nd Detector Amplifier	75	5.9	30	-	0.7
Power	45	22	115	115	17
Rectifier	25Z5	25	125	-	-
Line Voltage		115	Dynamic Field	108 Volts	
Power in Watts		47	Filter Choke Drop	8.8 Volts	
Dial Lamp Volts		6.0			
Resistor Strip Volts		47			

II. - D.C. MEASUREMENT

Stage	Tube	Filament	Plate	Screen	Cathode
1st Detector Oscillator	6F7	6.2	102	102	8.7
I. F.	78	5.9	102	102	2.5
2nd Detector Amplifier	75	5.8	27	-	0.6
Power	45	24	102	102	13
Rectifier	25Z5	27	110	-	-
Line Volts		115	Resistance Strip Volts	47	
Dial Lamp Volts		6	Dynamic Field Volts	115	

PARTS LIST MODEL 402

R1	2500 - 1/4 watt	105270
R2	100,000 - 1/4 watt	105278
R3	500 - 1/4 watt	105260
R4	500,000 - 1/4 watt	105246
R5	500,000 variable	105308
R6	1 meg. 1/4 watt	105281
R7	100,000 - 1/4 watt	105278
R8	10,000 - 1/4 watt	105272
R9	500,000 - 1/4 watt	105246
R11	500,000 - 1/4 watt	105248
R12	600 - 1/2 watt	101211
R13	150)	
R14	28)	105319
R15	4,000 - 1/4 watt	105285
C1	.005 - 350 V	105659
C2	.05 - dual	105327
C3	.25 - 200 V	102497
C4	Two gang condenser with trimmers	105728
C5	.0001 mica	101145
C6	.0001 mica	101145
C7		
C8	Mica I.P. trimmers	105721
C9	Mica I.P. trimmers	105318
C10	.05 - 200 V	102493
C11	.0001 mica	101145
C12	.005 - 350 V	105659
C13	.0001 mica	101145
C14	.005 - 350 V	105659
C16	.01 - 500 V	105685
C17	.25 - 200 V	102497
C18	.01 - 500 V	105695
C19	4 M.F. 150 V	
C20	12 M.F. 150 V	
C21	8 M.F. 150 V	105722
C22	5 M.F. 25 V	

COILS AND TRANSFORMERS

SA 105725	Antenna coil assembly
SA 105318	2nd I.F. coil assembly
SA 105721	I.F. detector and oscillator coil assembly
SA 105724	choke coil assembly
SA 107952	Speaker output transformer
SA 107954	Speaker field coil

MAIN ASSEMBLIES

SA 105729	Chassis assembly
RK 107474	Cabinet
SA 106726	Speaker

OSCILLATOR AND R.F. ADJUSTMENT

- Set dial scale to maximum mark beyond the 550 K.C. point with the gang condenser entirely closed.
- Set the test oscillator and dial scale to 1500 K.C. and apply test signal to the antenna of the receiver.
- Adjust the oscillator and antenna alignment condensers "D" and "E" to maximum output.
- Check sensitivity over scale.

**POLICE BAND ADJUSTMENT
On Model 402 Ed. 2 and Ed. 3 only**

- Set the test oscillator to 2400 K.C. and turn the switch of receiver to police band.
- Tune in signal with receiver. (About 1500 K.C.)
- Adjust alignment condenser "F" for maximum output.

MODEL 402 Ed. 2

Service parts for Model 402 Ed. 2 are the same as for Model 402 except for the following parts:

MAIN ASSEMBLY

SA 108002	Chassis assembly
-----------	------------------

MISCELLANEOUS

SA 108049	Dial scale assembly
SA 107972	Switch for police band
SA 107963	Coil for police band

MODEL 402 Ed. 3

Service parts for Model 402 Ed. 3 are the same as for Model 402 except for the following parts:

Dis. #	Part #	Description
R 16	RE 956	1000 ohm 2 W. resistor
C 19)		4 mfd. 150 V. electr. cond.
C 20)	CK 957	12 mfd. 150 V. electr. cond.
C 21)		8 mfd. 150 V. electr. cond.
C 22	CK 958	5 mfd. 25 V. electr. cond.

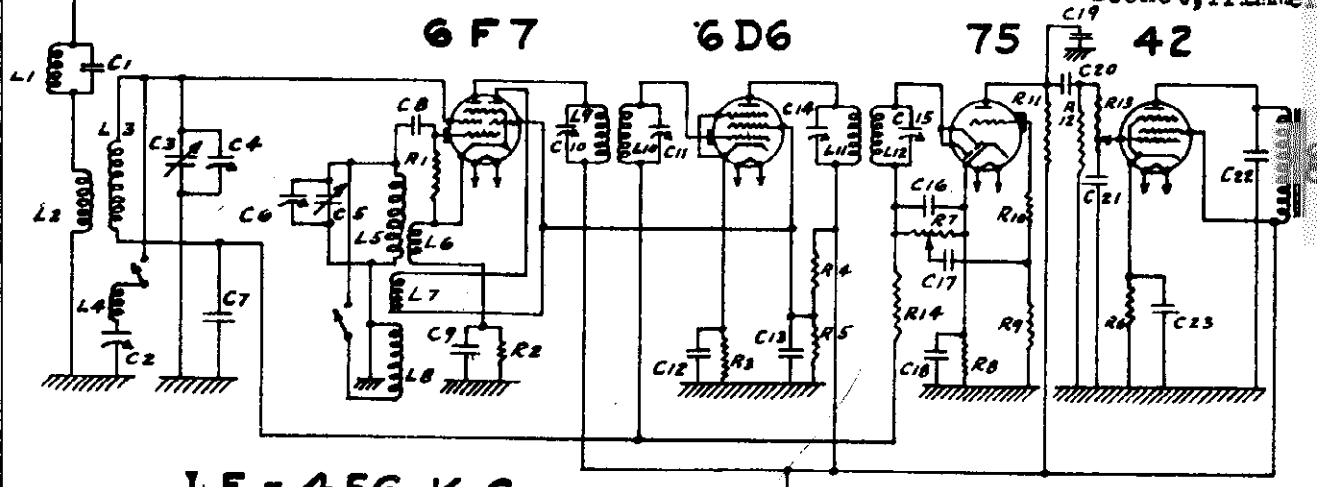
MAIN ASSEMBLY

CH 9522	Chassis assembly
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MISCELLANEOUS

SA 108049	Dial scale assembly
SA 95672	Dial lamp
SA 107972	Switch for police band
SA 107963	Coil for police band

UNITED AMERICAN BOSCH CORP.



I.F. = 456 K.C.
80

SCHEMATIC WIRING DIAGRAM

GENERAL DESCRIPTION

The American-Bosch Model 420 is a five-tube dual wave superheterodyne receiver. This model is for 110 volt 60 cycle operation and the Model 421 is for 110 volt 25 cycle operation.

The tuning range of this receiver is from 540 to 1,600 kilocycles as indicated on the lower portion of the dial scale, and from 1600 to 3600 kilocycles as indicated on the upper portion of the scale.

ELECTRICAL VALUES

R1 100,000 - 1/4 W 105278	C3 Variable gang)	C21 .001 mf 500 V 10640
R2 3,000 - 1/4 W 105271	C4 condenser)	C22 .01 mf 350 V 10250
R3 500 - 1/4 W 105264	C5 with)	C23 10 mfd. 25 V)
R4 12,000)	C6 trimmers)	C24 8 mfd. 475 V) 10728
R5 13,000)	C7 .05 mf - 200 V 106386	C25 8 mfd. 450 V)
R6 600)	C8 .0001 mf mica 101143	C26 .01 mf 500 V 10761
R7 500,000 variable ... 107253	C9 .05 mf 200 V 106386	L1 Wave trap 10743
R8 2,000 - 1/4 W 105245	C10 Part of 107415	L2 Antenna)
R9 1 meg. 1/4 W 105281	C11 Part of 107415	L3 Coil)
R10 100,000 - 1/4 W 105278	C12 .05 mf 200 V 106386	L4 assembly)
R11 100,000 - 1/4 W 105278	C13 .05 mf 200 V 106386	L5 Oscillator)
R12 1/4 meg - 1/4 W 105279	C14 Part of 107416	L6 coil)
R13 1/4 meg - tone cont. 107251	C15 Part of 107416	L7 assembly)
R14 1/2 meg - 1/4 W 105246	C16 .0001 mf. mica 106417	L8)
C1 .0005 mf. mica- part	C17 .005 mf 350 V 103659	L9 1st I. F.)
of 107434	C18 .5 mf 200 V 102499	L10 assembly)
C2 295-525 mmf 107289	C19 .002 mf. 500 V 103852	L11 2nd I.F.)
	C20 .005 mf. 350 V 103659	L12 assembly) 10741

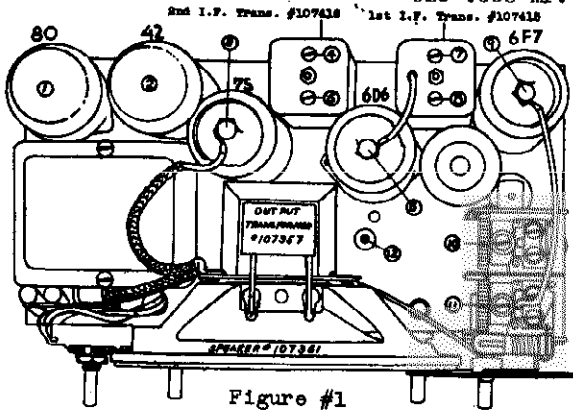


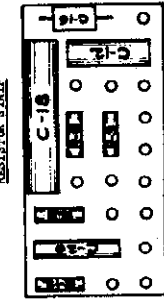
Figure #1

NOMENCLATURE

- #1 Rectifier tube
- #2 Power Pentode output tube
- #3 Second det., A.V.C. and A.F. tube
- #4 I.F. trimmer condenser
- #5 I.F. trimmer condenser
- #6 I.F. tube
- #7 I.F. trimmer condenser
- #8 I.F. trimmer condenser
- #9 Detector oscillator tube
- #10 Oscillator trimmer condenser
- #11 Antenna trimmer condenser
- #12 Police Band Lag. condenser

MODELS 420, 421
Trimmers, Voltage
Alignment, Parts

UNITED AMERICAN BOSCH CORP.



SOCKET VOLTAGES

WIRE	SIZE	FILE	PLATE	SCREEN	CATHODE
60	Rectifier	4.8	577		10.4
61	Rectifier	4.8	543	596	1.28
76	2nd det. AVG. & A.F.	5.2	146	130	4.8
606	L.P. det.	5.2	848	306	4.8
697	Oscillator	6.2	256	306	12.3

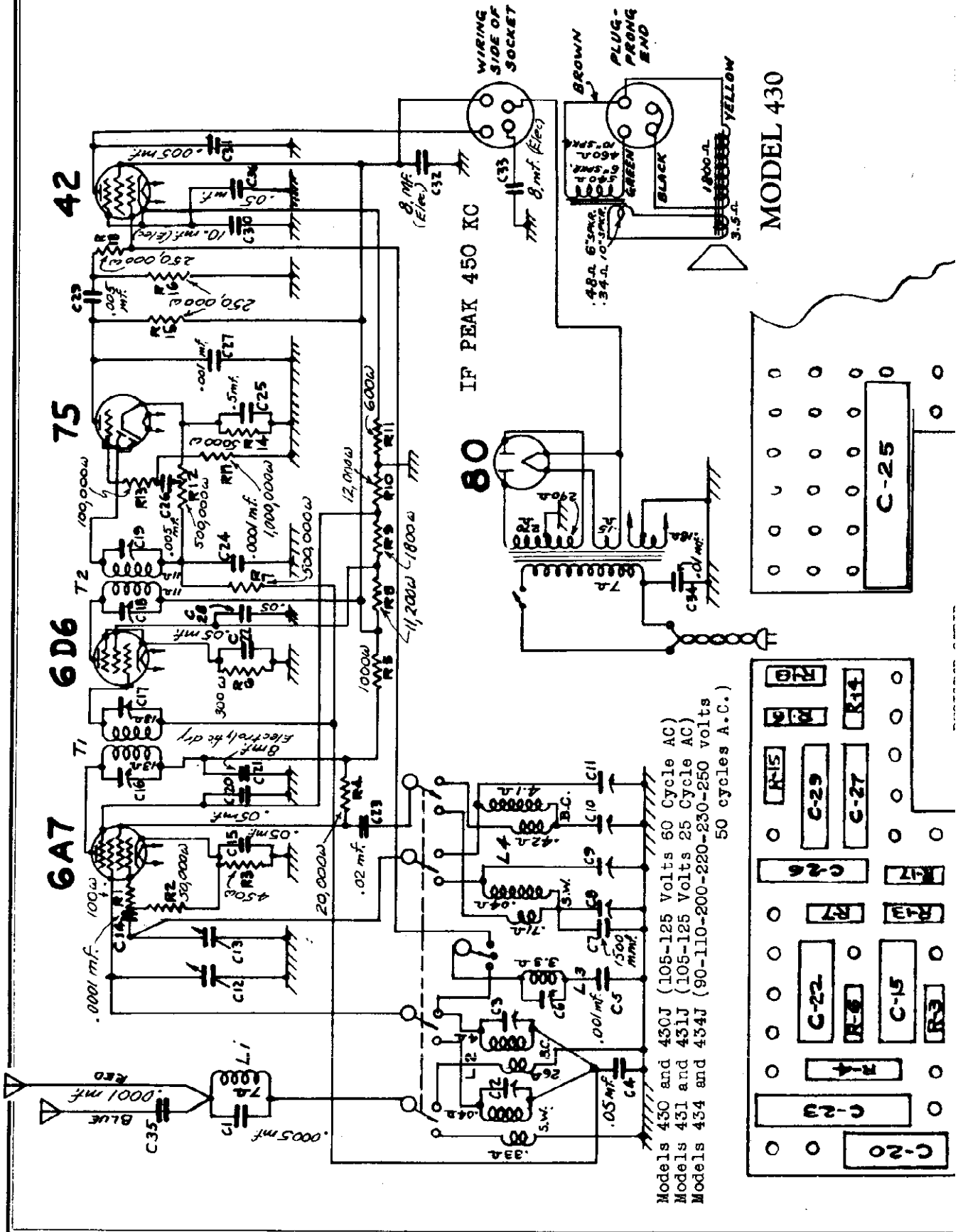
Line voltage = 111

SERVICE PARTS LIST

Model 420 (110 Volt 60 Cycle AC)
Model 421 (110 Volt 25 Cycle AC)

Part No.	Description of Parts	Part No.	Description of Parts
MAIN ASSEMBLIES			
107460	Chassis - Model 420	107202	Resistor strip assembly
107471	Chassis - Model 421	107203	Resistor strip assembly
107481	Speaker	105864	Resistor 500 ohms
107482	Cabinet	105865	Resistor 100,000 ohms
BRACKETS, CLIPS AND CLAMPS			
107166	Bracket - speaker	105870	Resistor 250,000 ohms
COILS			
107414	Antenna coil assembly	105246	Resistor 500,000 ohms
107415	Oscillator coil assembly	105251	Resistor 1 meg.
107416	1st I.F. coil assembly	105271	Resistor 5,000 ohms
107434	Antenna trap coil assembly	CABLES AND CABLE ASSEMBLIES	
CONDENSERS			
107445	Variable condenser assembly, complete	106406	Variable condenser ground cable
107289	Trimmer condenser assembly	104446	Unshielded cable assembly
107446	Buffer condenser	105682	Antenna cable assembly
107447	Variable condenser only	TRANSFORMER	
105869	Condenser .002 - 350 V	107242	Power transformer - Model 420
105870	Condenser .002 - 350 V	107246	Power transformer - Model 421
105871	Condenser .002 - 350 V	MISCELLANEOUS	
105872	Condenser .002 - 350 V	107281	Meter resistance
105873	Condenser .002 - 350 V	107280	Dial scale assembly
105874	Condenser .002 - 350 V	107285	Start & piston assembly - var. cond.
105875	Condenser .002 - 350 V	107286	Volume control
105876	Condenser .002 - 350 V	107287	Volume control
105877	Condenser .002 - 350 V	107288	Switch assembly
105878	Condenser .002 - 350 V	106549	Dial lamp bracket assembly
105879	Condenser .002 - 350 V	106909	Dial lamp
105880	Condenser .001 - 500 V	106910	Dial lamp assembly (shielded)
105881	Condenser .001 - 500 V	106911	Insulation assembly
105882	Condenser .001 - 500 V	106912	Insulation - coil em
105883	Condenser .001 - 500 V	107348	Dial plate
105884	Condenser .001 - 500 V	107349	Label - meter
105885	Condenser .001 - 500 V	107350	Label - power
105886	Condenser .001 - 500 V	107351	Label - speaker
105887	Condenser .001 - 500 V	107352	Label - volume
105888	Condenser .001 - 500 V	107353	Label - volume
105889	Condenser .001 - 500 V	107354	Label - volume
105890	Condenser .001 - 500 V	107355	Label - volume
105891	Condenser .001 - 500 V	107356	Label - volume
105892	Condenser .001 - 500 V	107357	Label - volume
105893	Condenser .001 - 500 V	107358	Label - volume
105894	Condenser .001 - 500 V	107359	Label - volume
105895	Condenser .001 - 500 V	107360	Label - volume
105896	Condenser .001 - 500 V	107361	Label - volume
105897	Condenser .001 - 500 V	107362	Label - volume
105898	Condenser .001 - 500 V	107363	Label - volume
105899	Condenser .001 - 500 V	107364	Label - volume
105900	Condenser .001 - 500 V	107365	Label - volume
105901	Condenser .001 - 500 V	107366	Label - volume
105902	Condenser .001 - 500 V	107367	Label - volume
105903	Condenser .001 - 500 V	107368	Label - volume
105904	Condenser .001 - 500 V	107369	Label - volume
105905	Condenser .001 - 500 V	107370	Label - volume
105906	Condenser .001 - 500 V	107371	Label - volume
105907	Condenser .001 - 500 V	107372	Label - volume
105908	Condenser .001 - 500 V	107373	Label - volume
105909	Condenser .001 - 500 V	107374	Label - volume
105910	Condenser .001 - 500 V	107375	Label - volume
105911	Condenser .001 - 500 V	107376	Label - volume
105912	Condenser .001 - 500 V	107377	Label - volume
105913	Condenser .001 - 500 V	107378	Label - volume
105914	Condenser .001 - 500 V	107379	Label - volume
105915	Condenser .001 - 500 V	107380	Label - volume
105916	Condenser .001 - 500 V	107381	Label - volume
105917	Condenser .001 - 500 V	107382	Label - volume
105918	Condenser .001 - 500 V	107383	Label - volume
105919	Condenser .001 - 500 V	107384	Label - volume
105920	Condenser .001 - 500 V	107385	Label - volume
105921	Condenser .001 - 500 V	107386	Label - volume
105922	Condenser .001 - 500 V	107387	Label - volume
105923	Condenser .001 - 500 V	107388	Label - volume
105924	Condenser .001 - 500 V	107389	Label - volume
105925	Condenser .001 - 500 V	107390	Label - volume
105926	Condenser .001 - 500 V	107391	Label - volume
105927	Condenser .001 - 500 V	107392	Label - volume
105928	Condenser .001 - 500 V	107393	Label - volume
105929	Condenser .001 - 500 V	107394	Label - volume
105930	Condenser .001 - 500 V	107395	Label - volume
105931	Condenser .001 - 500 V	107396	Label - volume
105932	Condenser .001 - 500 V	107397	Label - volume
105933	Condenser .001 - 500 V	107398	Label - volume
105934	Condenser .001 - 500 V	107399	Label - volume
105935	Condenser .001 - 500 V	107400	Label - volume
105936	Condenser .001 - 500 V	107401	Label - volume
105937	Condenser .001 - 500 V	107402	Label - volume
105938	Condenser .001 - 500 V	107403	Label - volume
105939	Condenser .001 - 500 V	107404	Label - volume
105940	Condenser .001 - 500 V	107405	Label - volume
105941	Condenser .001 - 500 V	107406	Label - volume
105942	Condenser .001 - 500 V	107407	Label - volume
105943	Condenser .001 - 500 V	107408	Label - volume
105944	Condenser .001 - 500 V	107409	Label - volume
105945	Condenser .001 - 500 V	107410	Label - volume
105946	Condenser .001 - 500 V	107411	Label - volume
105947	Condenser .001 - 500 V	107412	Label - volume
105948	Condenser .001 - 500 V	107413	Label - volume
105949	Condenser .001 - 500 V	107414	Label - volume
105950	Condenser .001 - 500 V	107415	Label - volume
105951	Condenser .001 - 500 V	107416	Label - volume
105952	Condenser .001 - 500 V	107417	Label - volume
105953	Condenser .001 - 500 V	107418	Label - volume
105954	Condenser .001 - 500 V	107419	Label - volume
105955	Condenser .001 - 500 V	107420	Label - volume
105956	Condenser .001 - 500 V	107421	Label - volume
105957	Condenser .001 - 500 V	107422	Label - volume
105958	Condenser .001 - 500 V	107423	Label - volume
105959	Condenser .001 - 500 V	107424	Label - volume
105960	Condenser .001 - 500 V	107425	Label - volume
105961	Condenser .001 - 500 V	107426	Label - volume
105962	Condenser .001 - 500 V	107427	Label - volume
105963	Condenser .001 - 500 V	107428	Label - volume
105964	Condenser .001 - 500 V	107429	Label - volume
105965	Condenser .001 - 500 V	107430	Label - volume
105966	Condenser .001 - 500 V	107431	Label - volume
105967	Condenser .001 - 500 V	107432	Label - volume
105968	Condenser .001 - 500 V	107433	Label - volume
105969	Condenser .001 - 500 V	107434	Label - volume
105970	Condenser .001 - 500 V	107435	Label - volume
105971	Condenser .001 - 500 V	107436	Label - volume
105972	Condenser .001 - 500 V	107437	Label - volume
105973	Condenser .001 - 500 V	107438	Label - volume
105974	Condenser .001 - 500 V	107439	Label - volume
105975	Condenser .001 - 500 V	107440	Label - volume
105976	Condenser .001 - 500 V	107441	Label - volume
105977	Condenser .001 - 500 V	107442	Label - volume
105978	Condenser .001 - 500 V	107443	Label - volume
105979	Condenser .001 - 500 V	107444	Label - volume
105980	Condenser .001 - 500 V	107445	Label - volume
105981	Condenser .001 - 500 V	107446	Label - volume
105982	Condenser .001 - 500 V	107447	Label - volume
105983	Condenser .001 - 500 V	107448	Label - volume
105984	Condenser .001 - 500 V	107449	Label - volume
105985	Condenser .001 - 500 V	107450	Label - volume
105986	Condenser .001 - 500 V	107451	Label - volume
105987	Condenser .001 - 500 V	107452	Label - volume
105988	Condenser .001 - 500 V	107453	Label - volume
105989	Condenser .001 - 500 V	107454	Label - volume
105990	Condenser .001 - 500 V	107455	Label - volume
105991	Condenser .001 - 500 V	107456	Label - volume
105992	Condenser .001 - 500 V	107457	Label - volume
105993	Condenser .001 - 500 V	107458	Label - volume
105994	Condenser .001 - 500 V	107459	Label - volume
105995	Condenser .001 - 500 V	107460	Label - volume
105996	Condenser .001 - 500 V	107461	Label - volume
105997	Condenser .001 - 500 V	107462	Label - volume
105998	Condenser .001 - 500 V	107463	Label - volume
105999	Condenser .001 - 500 V	107464	Label - volume
106000	Condenser .001 - 500 V	107465	Label - volume
106001	Condenser .001 - 500 V	107466	Label - volume
106002	Condenser .001 - 500 V	107467	Label - volume
106003	Condenser .001 - 500 V	107468	Label - volume
106004	Condenser .001 - 500 V	107469	Label - volume
106005	Condenser .001 - 500 V	107470	Label - volume
106006	Condenser .001 - 500 V	107471	Label - volume
106007	Condenser .001 - 500 V	107472	Label - volume
106008	Condenser .001 - 500 V	107473	Label - volume
106009	Condenser .001 - 500 V	107474	Label - volume
106010	Condenser .001 - 500 V	107475	Label - volume
106011	Condenser .001 - 500 V	107476	Label - volume
106012	Condenser .001 - 500 V	107477	Label - volume
106013	Condenser .001 - 500 V	107478	Label - volume
106014	Condenser .001 - 500 V	107479	Label - volume
106015	Condenser .001 - 500 V	107480	Label - volume
106016	Condenser .001 - 500 V	107481	Label - volume
106017	Condenser .001 - 500 V	107482	Label - volume
106018	Condenser .001 - 500 V	107483	Label - volume
106019	Condenser .001 - 500 V	107484	Label - volume
106020	Condenser .001 - 500 V	107485	Label - volume
106021	Condenser .001 - 500 V	107486	Label - volume
106022	Condenser .001 - 500 V	107487	Label - volume
106023	Condenser .001 - 500 V	107488	Label - volume
106024	Condenser .001 - 500 V	107489	Label - volume
106025	Condenser .001 - 500 V	107490	Label - volume
106026	Condenser .001 - 500 V	107491	Label - volume
106027	Condenser .001 - 500 V	107492	Label - volume
106028	Condenser .001 - 500 V	107493	Label - volume
106029	Condenser .001 - 500 V	107494	Label - volume
106030	Condenser .001 - 500 V	107495	Label - volume
106031	Condenser .001 - 500 V	107496	Label - volume
106032	Condenser .001 - 500 V	107497	Label - volume
106033	Condenser .001 - 500 V	107498	Label - volume
106034	Condenser .001 - 500 V	107499	Label - volume
106035	Condenser .001 - 500 V	107500	Label - volume
106036	Condenser .001 - 500 V	107501	Label - volume
106037	Condenser .001 - 500 V	107502	Label - volume
106038	Condenser .001 - 500 V	107503	Label - volume
106039	Condenser .001 - 500 V	107504	Label - volume
106040	Condenser .001 - 500 V	107505	Label - volume
106041	Condenser .001 - 500 V	107506	Label - volume
106042	Condenser .001 - 500 V	107507	Label - volume
106043	Condenser .001 - 500 V	107508	Label - volume
106044	Condenser .001 - 500 V	107509	Label - volume
106045	Condenser .001 - 500 V	107510	Label - volume
106046	Condenser .001 - 500 V	107511	Label - volume
106047	Condenser .001 - 500 V	107512	Label - volume
106048	Condenser .001 - 500 V	107513	Label - volume
106049	Condenser .001 - 500 V	107514	Label - volume
106050	Condenser .001 - 500 V	107515	Label - volume
106051	Condenser .001 - 500 V	107516	Label - volume
106052	Condenser .001 - 500 V	107517	Label

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Models 450 and 430J (105-125 Volts 60 Cycle AC)
 Models 431 and 431J (105-125 Volts 25 Cycle AC)
 Models 434 and 434J (90-110-200-220-230-250 volts
 50 cycles A.C.)

MODEL 430

MODELS 430, 430J, 430T
431, 431J, 431T
434, 434J, 434T

UNITED AMERICAN BOSCH CORP.

Trimmers, Socket, Parts
Alignment

be carefully studied before the actual work is started.

1. Set volume control on full. ALIGNED THE I.F. 450 K.C.
2. Set tone control (lower center knob) at center position or treble.
3. Connect output meter across voice coil of loud speaker (speaker impedance is 5.6 ohms).
4. Connect in series with high side of the test oscillator output leads a blocking capacitor of at least 500 microfarads and a resistor of 450 kilohms and adjust its value to produce maximum reading on output meter when test oscillator is connected between frame of chassis and grid of 6D6 I.P. amplifier tube #6.
5. Adjust #4 and #5 to maximum output, reducing test oscillator output as stage is brought into resonance.
6. Connect test oscillator to grid of 6A7, 1st detector (#9) and adjust #7 and #8 to maximum output. ALIGNING E.C. OSCILLATOR AND H.F.
7. Set save change switch to broadcast scale position.
8. Set test oscillator to 1600 K.C. and connect to grid of 1st detector tube 6A7 (#9).
9. Set dial scale to maximum mark beyond 540 K.C. calibration point when the gang is entirely closed.
10. Set dial scale at 1600 K.C. and adjust #13 to maximum output.
11. Connect test oscillator to antenna through a .0002 mfd. condenser and with scale still set at 1600 K.C. adjust condensers #15 and #17 to maximum output.
12. Set scale and test oscillator to 800 K.C. and adjust #15 simultaneously changing this adjustment and the station selector of the chassis for maximum output. This type of adjustment is known as "max-mar" and is obtained in the following manner:

Turn receiver with left hand by means of tuning knob and adjust #15 in either direction and then without changing it, tune the receiver through a maximum, noting the value of output meter reading. Change #15 further in same direction, reverse receiver and note reading. If output drops with either of trial turns, reverse direction of turn until no further improvement can be made when either tuning control or #15 are changed. While this procedure may appear difficult, facility can be readily acquired by practice and the operation requires only a few moments.

13. With test oscillator and scale set at 1600 K.C. readjust #15 and #17 since previous operation may have altered oscillator trimmer setting.
14. Check sensitivity across band.

DESCRIPTION OF PARTS

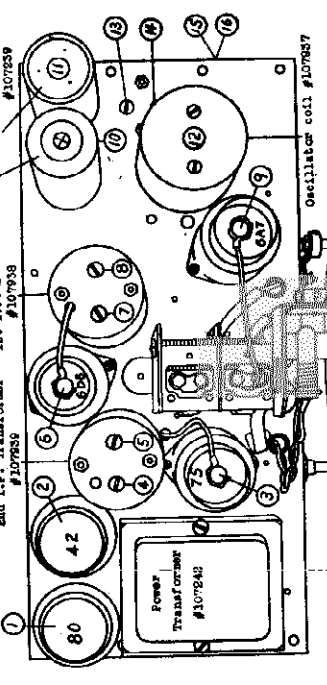
Part No.	Desc.	QTY.	Part of 107434
107925	C1 .0005 mfd. (part of 107434)	1	
108080	C2 Trimmer condenser	1	
108596	C3 .05 mfd. 2 ply - 500 V.	1	
107926	C4 .05 mfd. 2 ply - 500 V.	1	
107928	C5 10-10 mfd. 4 ply - 500 V.	1	
107432	C6 100-5000 mfd. mica	1	
107927	C8 Trimmer condenser (part of 108001)	1	
107929	C9 Trimmer condenser (part of 108001)	1	
107921	C10 Trimmer condenser	1	
104417	C11 .0001 mfd. mica	1	
108596	C12 .05 mfd. 2 ply - 500 V.	1	
104896	C13 Variable condenser gang	1	
107922	C14 .0001 mfd. mica	1	
107923	C15 .05 mfd. 2 ply - 500 V.	1	
107924	C16 .05 mfd. 2 ply - 500 V.	1	
107925	C17 Part of 107928	1	
104896	C18 Part of 107928	1	
104896	C19 .05 mfd. 2 ply - 500 V.	1	
104896	C20 .05 mfd. 2 ply - 500 V.	1	
104896	C21 .05 mfd. 2 ply - 500 V.	1	
104896	C22 .05 mfd. 2 ply - 500 V.	1	
104896	C23 .05 mfd. 2 ply - 500 V.	1	
104896	C24 .05 mfd. 2 ply - 500 V.	1	
104896	C25 .05 mfd. 2 ply - 500 V.	1	
104896	C26 .05 mfd. 2 ply - 500 V.	1	
104896	C27 .05 mfd. 2 ply - 500 V.	1	
104896	C28 .05 mfd. 2 ply - 500 V.	1	
104896	C29 .05 mfd. 2 ply - 500 V.	1	
104896	C30 .05 mfd. 2 ply - 500 V.	1	
104896	C31 .05 mfd. 2 ply - 500 V.	1	
104896	C32 .05 mfd. 2 ply - 500 V.	1	
104896	C33 .05 mfd. 2 ply - 500 V.	1	
104896	C34 .05 mfd. 2 ply - 500 V.	1	
104896	C35 .05 mfd. 2 ply - 500 V.	1	
104896	C36 .05 mfd. 2 ply - 500 V.	1	
104896	C37 .05 mfd. 2 ply - 500 V.	1	
104896	C38 .05 mfd. 2 ply - 500 V.	1	
104896	C39 .05 mfd. 2 ply - 500 V.	1	
104896	C40 .05 mfd. 2 ply - 500 V.	1	
104896	C41 .05 mfd. 2 ply - 500 V.	1	
104896	C42 .05 mfd. 2 ply - 500 V.	1	
104896	C43 .05 mfd. 2 ply - 500 V.	1	
104896	C44 .05 mfd. 2 ply - 500 V.	1	
104896	C45 .05 mfd. 2 ply - 500 V.	1	
104896	C46 .05 mfd. 2 ply - 500 V.	1	
104896	C47 .05 mfd. 2 ply - 500 V.	1	
104896	C48 .05 mfd. 2 ply - 500 V.	1	
104896	C49 .05 mfd. 2 ply - 500 V.	1	
104896	C50 .05 mfd. 2 ply - 500 V.	1	
104896	C51 .05 mfd. 2 ply - 500 V.	1	
104896	C52 .05 mfd. 2 ply - 500 V.	1	
104896	C53 .05 mfd. 2 ply - 500 V.	1	
104896	C54 .05 mfd. 2 ply - 500 V.	1	
104896	C55 .05 mfd. 2 ply - 500 V.	1	
104896	C56 .05 mfd. 2 ply - 500 V.	1	
104896	C57 .05 mfd. 2 ply - 500 V.	1	
104896	C58 .05 mfd. 2 ply - 500 V.	1	
104896	C59 .05 mfd. 2 ply - 500 V.	1	
104896	C60 .05 mfd. 2 ply - 500 V.	1	
104896	C61 .05 mfd. 2 ply - 500 V.	1	
104896	C62 .05 mfd. 2 ply - 500 V.	1	
104896	C63 .05 mfd. 2 ply - 500 V.	1	
104896	C64 .05 mfd. 2 ply - 500 V.	1	
104896	C65 .05 mfd. 2 ply - 500 V.	1	
104896	C66 .05 mfd. 2 ply - 500 V.	1	
104896	C67 .05 mfd. 2 ply - 500 V.	1	
104896	C68 .05 mfd. 2 ply - 500 V.	1	
104896	C69 .05 mfd. 2 ply - 500 V.	1	
104896	C70 .05 mfd. 2 ply - 500 V.	1	
104896	C71 .05 mfd. 2 ply - 500 V.	1	
104896	C72 .05 mfd. 2 ply - 500 V.	1	
104896	C73 .05 mfd. 2 ply - 500 V.	1	
104896	C74 .05 mfd. 2 ply - 500 V.	1	
104896	C75 .05 mfd. 2 ply - 500 V.	1	
104896	C76 .05 mfd. 2 ply - 500 V.	1	
104896	C77 .05 mfd. 2 ply - 500 V.	1	
104896	C78 .05 mfd. 2 ply - 500 V.	1	
104896	C79 .05 mfd. 2 ply - 500 V.	1	
104896	C80 .05 mfd. 2 ply - 500 V.	1	
104896	C81 .05 mfd. 2 ply - 500 V.	1	
104896	C82 .05 mfd. 2 ply - 500 V.	1	
104896	C83 .05 mfd. 2 ply - 500 V.	1	
104896	C84 .05 mfd. 2 ply - 500 V.	1	
104896	C85 .05 mfd. 2 ply - 500 V.	1	
104896	C86 .05 mfd. 2 ply - 500 V.	1	
104896	C87 .05 mfd. 2 ply - 500 V.	1	
104896	C88 .05 mfd. 2 ply - 500 V.	1	
104896	C89 .05 mfd. 2 ply - 500 V.	1	
104896	C90 .05 mfd. 2 ply - 500 V.	1	
104896	C91 .05 mfd. 2 ply - 500 V.	1	
104896	C92 .05 mfd. 2 ply - 500 V.	1	
104896	C93 .05 mfd. 2 ply - 500 V.	1	
104896	C94 .05 mfd. 2 ply - 500 V.	1	
104896	C95 .05 mfd. 2 ply - 500 V.	1	
104896	C96 .05 mfd. 2 ply - 500 V.	1	
104896	C97 .05 mfd. 2 ply - 500 V.	1	
104896	C98 .05 mfd. 2 ply - 500 V.	1	
104896	C99 .05 mfd. 2 ply - 500 V.	1	
104896	C100 .05 mfd. 2 ply - 500 V.	1	

CIRCUIT DESCRIPTION

The American-Bosch Model 430 is a five tube, three band superheterodyne receiver. The tuning range covers a broadcast band extending from 540 to 1750 Kilocycles, a higher frequency police band of 2400 to 2800 K.C. and a short wave broadcast band extending from 5900 to 15,200 Kilocycles.

The circuit consists of a combined detector oscillator (type 6A7); an intermediate frequency amplifier (type 6D6) including four tuned I. F. circuits of the "High Q" type; a combined second detector, A.V.C. and audio stage (type 6B) and a power output pentode (type 6X4).

(C.P. 30 & 32 #107928 (9-10-36, incl. base.)
End I.P. Transformer (C.P. 8 & 9 #107929
#107925

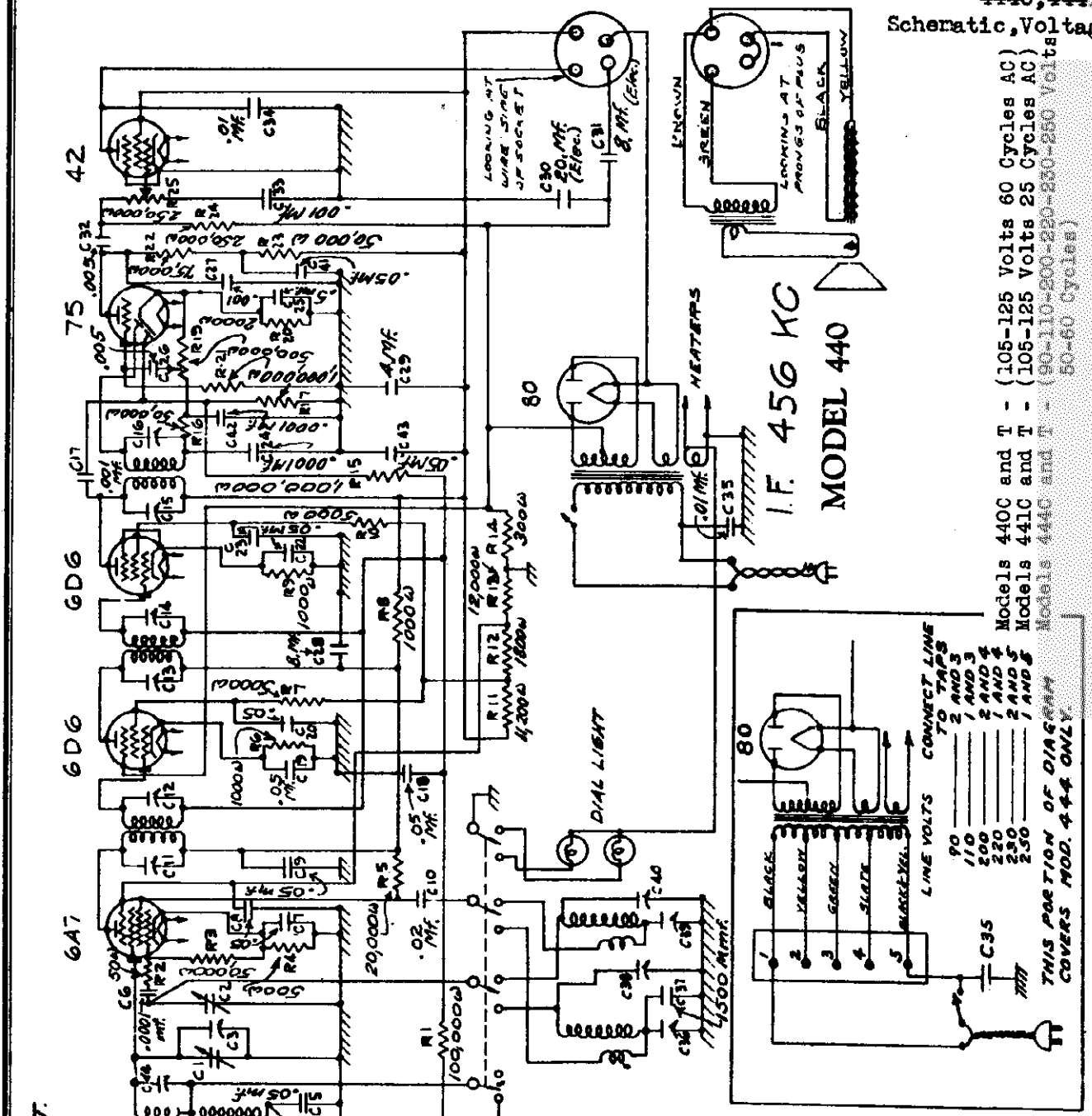


- 1 - Rectifier tube
- 2 - Power output tube
- 3 - End detector A.V.C. and A.P. tube
- 4 - End I.F. trimmers
- 5 - End I.F. trimmers
- 6 - End I.F. trimmers
- 7 - End I.F. trimmers
- 8 - End I.F. trimmers
- 9 - End I.F. trimmers
- 10 - Dry electrolytic condenser.

ALIGNING POLICE BAND

1. Set combination tone control - police band - switch (lower center knob) on first or left hand position.
 2. Leave wave change switch in standard broadcast position.
 3. Set dial scale at 1600 K.C. (this is reception point for 2400 K.C. on range marked "police band").
 4. Set test oscillator to 2400 K.C. and tune in signal with station selector.
 5. Adjust trimmer condenser #19 to maximum output. (Continued on page 1044.)
- ALIGNING E.C. OSCILLATOR AND H.F.
1. Set wave change switch to short wave or lower dial scale position.
 2. Connect test oscillator to antenna through .0002 mfd. and 400 ohm resistor in series (this condenser and resistor is the approximate equivalent of a short wave antenna).
 3. Set test oscillator and dial scale to 16 K.C. (16000 K.C.) and adjust trimmers #14 and #15 to obtain reading on output meter.
 4. Simultaneously adjust station selector and #15 in the same manner as described under "Police Band" of H.C. Alignment (this is necessary because sufficient coupling exists in the 6A7 tube to cause a serious shift in the frequency of the oscillator as #15 is adjusted).
 5. Set test oscillator and dial scale to 6 K.C. (6000 K.C.) and adjust "max-mar" #16.
 6. Repeat operation #4 as operation #5 may have disturbed oscillator adjustment.
 7. Check sensitivity across band. ALIGNING INSTRUCTION
To align the Model 430 chassis, it is essential to use a high grade modulated test oscillator and a sensitive meter. The R. F. signal, fed into the receiver must be "realistic" in that it will cause the A.V.C. to function, making correct alignment impossible. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low signal.
 8. 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 controls. Top and bottom views of the chassis are shown in Figures #1 and #2 and should

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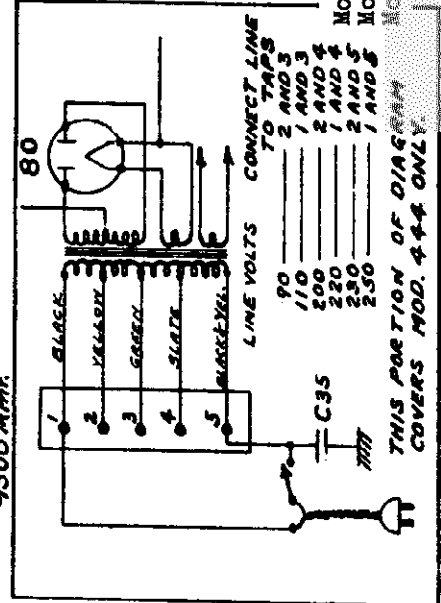


SOCKET VOLTAGES

Stage	Tube	Fil.	Plate	Screen	Cathode
Rectifier	80	4.85	382		
Power output	42	6.1	234	245	18
2nd Detector	75	6.1	126		0.87
1st I.F.	6D6	6.1	245	99	5.6
2nd I.F.	6D6	6.1	245	96	5.6
Oscillator	6A7	6.1	236-136	87	4.7

Note: These values are readings of a high resistance voltmeter from each socket terminal to ground, with the exception of the filament voltages. The values are only approximate and will vary with the line voltage and the type of meter employed. Line voltage = 112.

Models 440C and T - (105-125 Volts 60 Cycles AC)
 Models 441C and T - (105-125 Volts 25 Cycles AC)
 Models 444C and T - (90-110-200-230-250 Volts 50-60 Cycles)



MODELS 440C, 440T
441C, 441T
444C, 444T
Socket, Trimmers
Parts, Alignment

UNITED AMERICAN BOSCH CORP.

3. Adjust #7 (through small hole in right hand rear panel of chassis) until signal appears on scale. If signal disappears, increase signal output from this point until signal appears on scale. If signal disappears, increase signal output from this point until signal appears on scale. This adjustment is to correctly adjust a wave trap installed to block direct transmission of 488 K.C. (usually ship telegraph signals) from antenna to first detector.

4. Set test oscillator to 800 K. C. and adjust #13 in the same manner described above. The purpose of this adjustment is to correctly adjust a second wave trap installed to prevent interference from powerful local police signals.

5. Set test oscillator and station selector to 1400 K.C.

6. Adjust #9 to maximum output.

7. Adjust #9 to maximum output.

8. Set test oscillator and station selector to 800 K. C.

9. Adjust #10 (top screw) to maximum output.

10. Set test oscillator and station selector to 1400 K. C. and readjust #9 and #9 for correct calibration.

C-R.F. ADJUSTMENT (Short Wave Band)

1. Set wave change switch to short wave band position.
2. Set test oscillator and station selector to 15,000 K.C.
3. Adjust #11 until signal is tuned in.
4. Adjust #14 R.F. trimmer condenser (mounted underneath chassis on R.F. coil) to maximum output. (See Fig. #2)
5. Set test oscillator and station selector to 8000 K.C.
6. Adjust #12 (bottom screw) to maximum output.
7. Set test oscillator and station selector to 15,000 K.C. and readjust #11 and #14 trimmer for correct calibration.

This completes the binding up process.

Part No. Dia. & Description of Parts.

Part No.	Dia.	Description of Parts
107256	(C1)	Variable gang with trimmer
107258	(C2)	500 mf. variable
107259	(C3)	500 mf. 500 V.
107260	(C4)	500 mf. 500 V.
107261	(C5)	500 mf. 500 V.
107262	(C6)	500 mf. 500 V.
107263	(C7)	500 mf. 500 V.
107264	(C8)	500 mf. 500 V.
107265	(C9)	500 mf. 500 V.
107266	(C10)	500 mf. 500 V.
107267	(C11)	500 mf. 500 V.
107268	(C12)	500 mf. 500 V.
107269	(C13)	500 mf. 500 V.
107270	(C14)	500 mf. 500 V.
107271	(C15)	500 mf. 500 V.
107272	(C16)	500 mf. 500 V.
107273	(C17)	500 mf. 500 V.
107274	(C18)	500 mf. 500 V.
107275	(C19)	500 mf. 500 V.
107276	(C20)	500 mf. 500 V.
107277	(C21)	500 mf. 500 V.
107278	(C22)	500 mf. 500 V.
107279	(C23)	500 mf. 500 V.
107280	(C24)	500 mf. 500 V.
107281	(C25)	500 mf. 500 V.
107282	(C26)	500 mf. 500 V.
107283	(C27)	500 mf. 500 V.
107284	(C28)	500 mf. 500 V.
107285	(C29)	500 mf. 500 V.
107286	(C30)	500 mf. 500 V.
107287	(C31)	500 mf. 500 V.
107288	(C32)	500 mf. 500 V.
107289	(C33)	500 mf. 500 V.
107290	(C34)	500 mf. 500 V.
107291	(C35)	500 mf. 500 V.
107292	(C36)	500 mf. 500 V.
107293	(C37)	500 mf. 500 V.
107294	(C38)	500 mf. 500 V.
107295	(C39)	500 mf. 500 V.
107296	(C40)	500 mf. 500 V.
107297	(C41)	500 mf. 500 V.
107298	(C42)	500 mf. 500 V.
107299	(C43)	500 mf. 500 V.
107300	(C44)	500 mf. 500 V.

MAIN ASSEMBLIES

107440	Chassis assembly - Models 440C & T
107441	Chassis assembly - Models 441C & T
107442	Chassis assembly - Models 444C & T
107443	Speaker - Model 440C-441C-444C
107444	Speaker - Model 440T-441T-444T
107445	Speaker - Model 440C-441C-444C
107446	Speaker - Model 440T-441T-444T
107447	Cabinet - Models 440C-441C-444C
107448	Cabinet - Models 440T-441T-444T
107449	Line cable
107450	Antenna cable
107451	Ground cable

TRANSFORMERS

107242	Power transformer - 440C, 440T
107243	Power transformer - 441C, 441T
107244	Power transformer - 444C, 444T

COILS

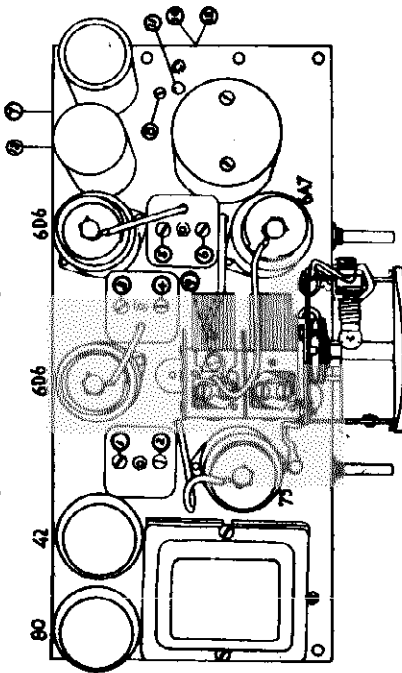
107245	Oscillator coil assembly
107246	I.F. coil assembly #1
107247	I.F. coil assembly #2
107248	I.F. coil assembly #3
107249	I.F. coil assembly #4
107250	Coil spark trap

SPEAKER (107269) PARTS 440C
SPEAKER (107264) PARTS 440T

GENERAL DESCRIPTION

The Model 440 is a six tube, dual wave-band receiver, designed to operate over the frequency range from 1,800 to 540 kilocycles and 15,000 to 6,700 kilocycles. The circuitry comprises an R.F. selector circuit, a combination first detector oscillator, two stages of intermediate frequency amplifier, a combination second detector, A.V.C., and first audio stage, a power output stage and a rectifier tube.

The wave change switch serves to change the electrical circuits to the wave band desired and in addition operates to illuminate the particular dial scale in use.



#1 I.F. trimmer condenser
#2 I.F. trimmer condenser
#3 I.F. trimmer condenser
#4 I.F. trimmer condenser
#5 I.F. trimmer condenser
#6 I.F. trimmer condenser
#7 Wave trap tuning cond. (488 K.C.)
#8 B.B. oscillator trim. condenser
#9 Selector trimmer condenser

#10 B.B. oscillator lag. condenser - top screw
#11 B.B. oscillator trim condenser
#12 B.B. oscillator lag. condenser (bottom screw)
#13 Wave trap tuning condenser (4800 K.C.)
#14 R.F. trimmer condenser - (see Fig. #2)
#15 Wave trap tuning condenser - (see Fig. #2)

To properly align the chassis, it is essential to use a high grade modulated oscillator and a sensitive output meter. The R.F. signal fed into the receiver must be very weak or it will cause the A.V.C. to function making correct alignment impossible. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low signal.

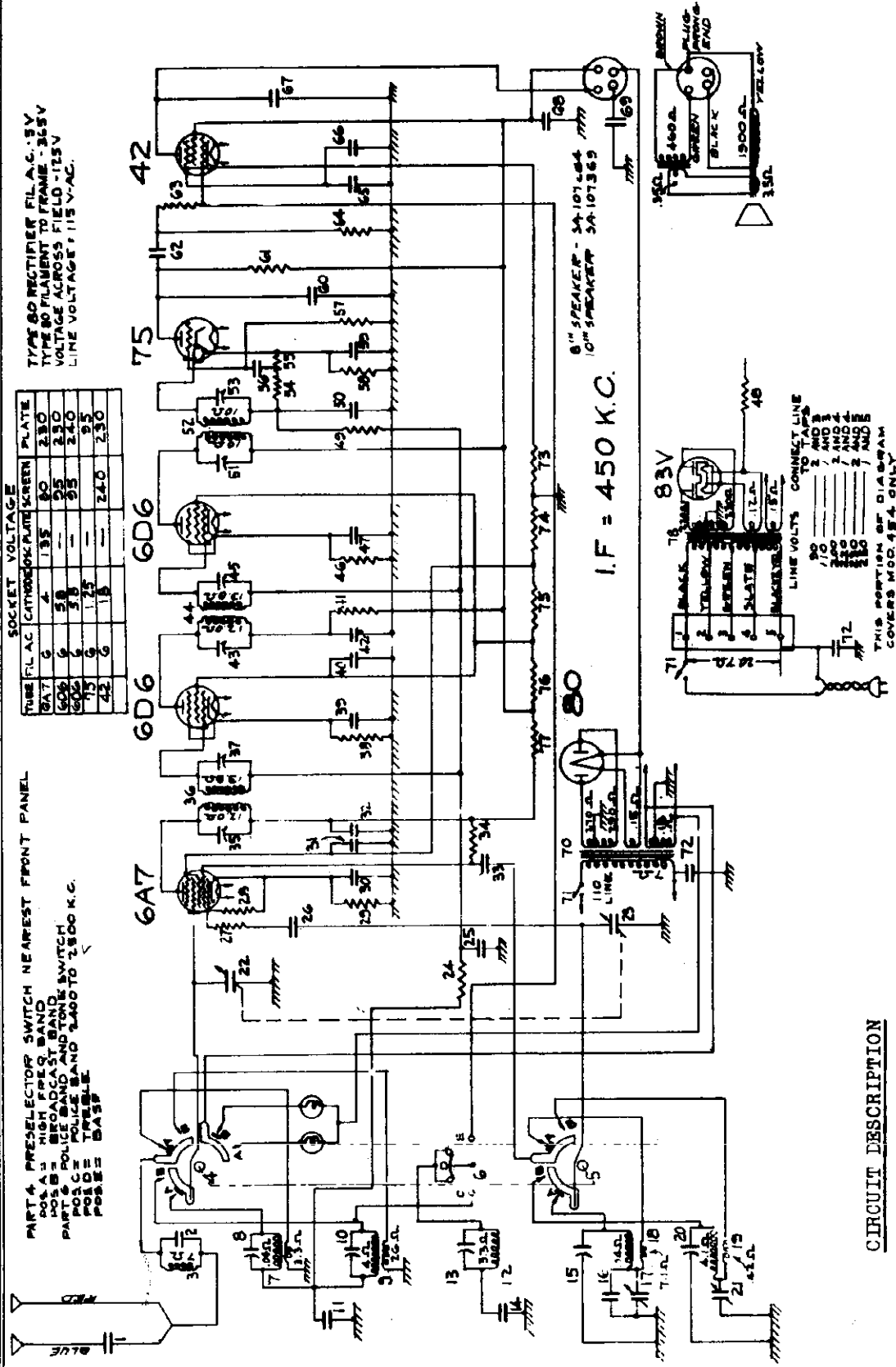
Before attempting to align the chassis, the location of the tubes and the various alignment condensers. A top view of the chassis is shown in Fig. #1 and should be carefully studied before the actual work is started.

A-L.F. ADJUSTMENT

1. Set test oscillator to 488 K. C.
 2. Connect A.C. voltmeter (output meter) across voice coil of speaker.
 3. Connect test oscillator to grid of 2nd I.F. tube (C25 - rear right hand tube) and frame of chassis.
 4. Adjust #1 and #6 to maximum output on output meter.
 5. Connect test oscillator to grid of 1st I.F. tube (C26 - rear right hand tube).
 6. Adjust #5 and #4 to maximum output.
 7. Connect test oscillator to grid of 1st detector (C47).
 8. Adjust #5 and #6 to maximum output.
- This completes the L.F. adjustment.
- E-R.F. ADJUSTMENT (Short Wave Band)
1. Connect test oscillator to antenna and ground leads. Set wave change switch to shortest band position as indicated by the dial light. Set station selector to 1400 K. C.
 2. With test oscillator still adjusted to 488 K.C., increase signal strength of test oscillator until signal is heard in loud speaker.

UNITED AMERICAN BOSCH CORP.

MODELS 450L, 450H
451L, 451H
454L, 454H
Schematic, Voltage

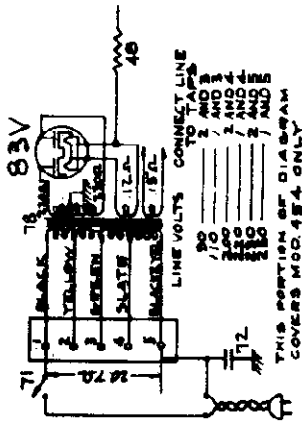
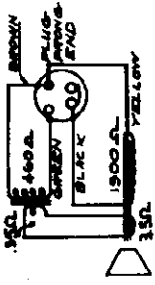


TYPE 80 RECTIFIER FIL. A.C. 5V
TYPE 80 FILAMENT TO FRAME - 265V
VOLTAGE ACROSS FIELD - 115V
LINE VOLTAGE 115 V.-AC.

TUBE	FIL. AC	CATHODE	PLATE	SCREEN
6A7	6	2	135	80
6D6	6	5	230	230
6D6	6	5	230	230
75	6	1	240	95
42	6	1	240	230

PART A PRESELECTOR SWITCH NEAREST FRONT PANEL
PART B HIGH FREQ. BAND
PART C BROADCAST BAND
PART D POLICE BAND AND TONE SWITCH
PART E POLICE BAND 2400 TO 1500 K.C.
PART F TWEBLE
PART G BASS

I.F. = 450 K.C.



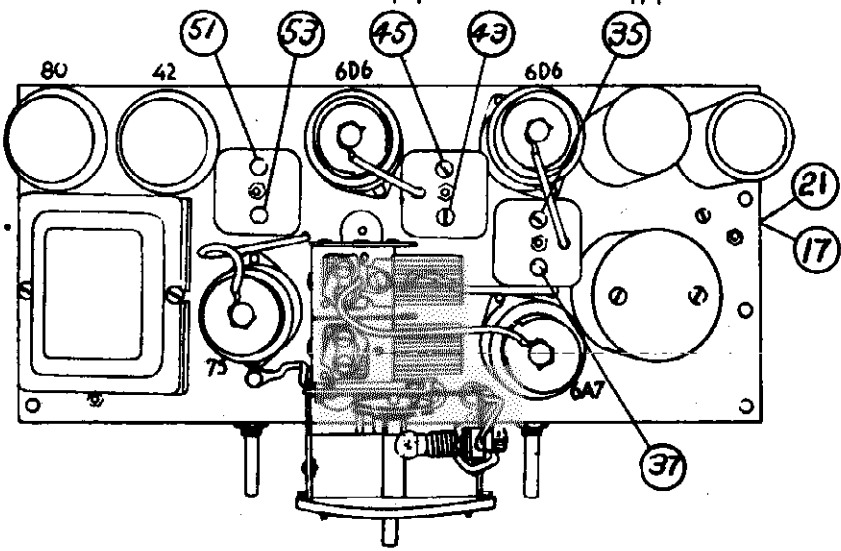
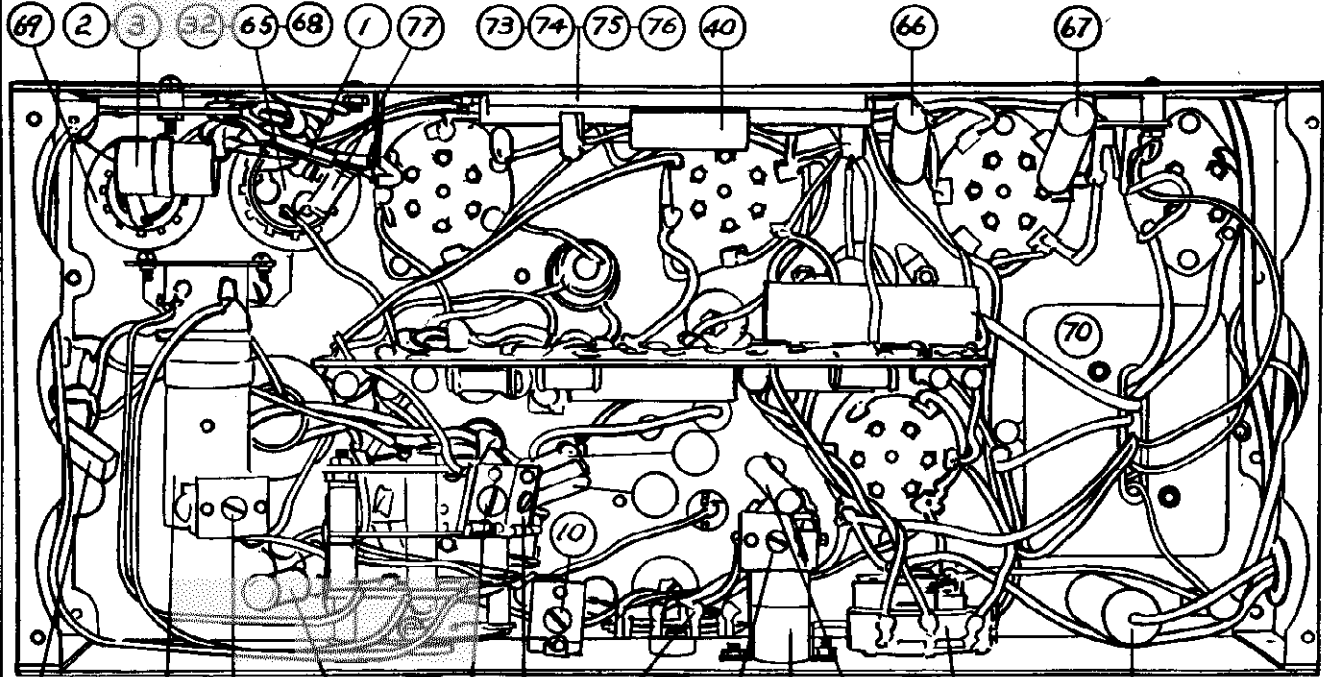
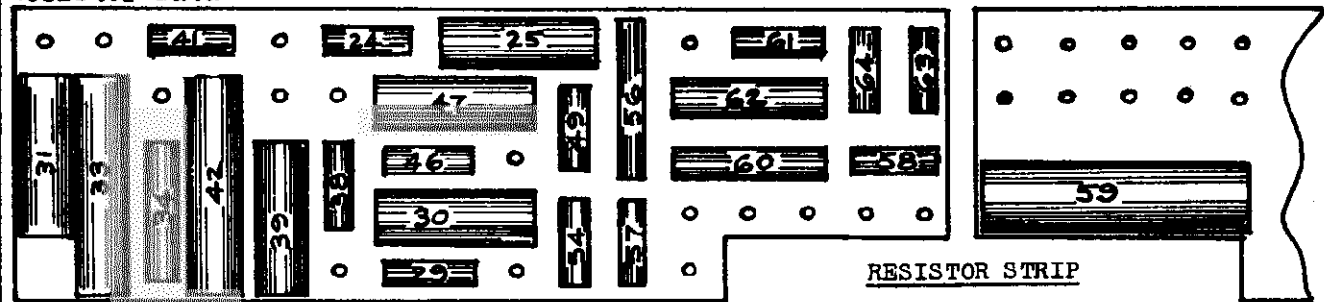
CIRCUIT DESCRIPTION

The Model 450 is a six tube, three band superheterodyne receiver. The tuning range of this receiver covers a broadcast band extending from 540 to 1750 kilocycles, which includes one band of police frequencies, a higher frequency police band of 2200 to 2600 kilocycles and a short wave broadcast band extending from 5900 to 18000 kilocycles. The circuits comprise a R. F. selector circuit, a combination first detector oscillator, two stages of intermediate frequency amplification (450 K.C.) with double tuned circuits coupling each stage, a combination second detector, A.V.C., and first audio stage, a power output stage and a rectifier tube.

MODELS 450L, 450H
451L, 451H
454L, 454H

UNITED AMERICAN BOSCH CORP.

Socket, Trimmers
Resistor Data



Alignment Nomenclature

- #8 Short wave preselector trimmer*
 - #10 Broadcast preselector trimmer*
 - #13 Police preselector trimmer*
 - #15 Short wave oscillator trimmer*
 - #17 Short wave osc. lag (bottom screw)
 - #20 Broadcast oscillator trimmer*
 - #21 Broadcast osc. lag (top screw)
 - #35 First I.F. trimmer
 - #37 First I.F. trimmer
 - #43 Second I.F. trimmer
 - #45 Second I.F. trimmer
 - #51 Third I.F. trimmer
 - #53 Third I.F. trimmer
- * See Figure #2

Figure #1

UNITED AMERICAN BOSCH CORP.

MODELS 450L, 450H
451L, 451H
454L, 454H
Alignment, Parts

1. Set test oscillator to 450 K.C.
2. Connect output meter across voice coil of speaker. (Impedance 3.5 ohms.)
3. Connect in series with high side of test oscillator leads a blocking condenser of at least .25 mfd.
4. Connect test oscillator to grid of 1st I. F. tube (6D5 in rear of condenser gang) and adjust #51 and #52 to maximum output reducing test oscillator as required.
5. Connect test oscillator to grid of 1st I. F. tube (6D5 rear right hand tube) and adjust #45 and #46 to maximum output.
6. Connect test oscillator to grid of 1st detector (6A7 and adjust #56 and #57 to maximum output. This completes the I. F. adjustment.

B - ADJUSTMENT OF BROADCAST BAND

1. Set wave change switch to broadcast scale position.
2. Set test oscillator to 1500 K.C. and connect to grid of 1st detector (6A7).
3. Adjust dial scale to maximum mark beyond 640 K.C. calibration point when the gang is entirely closed.
4. Set dial scale at 1500 K.C. and adjust #20 to maximum output.
5. Connect test oscillator to antenna and ground leads of the receiver (red and brown) through a .0002 mfd. condenser and with scale still set at 1500 K.C. adjust #10 and #90 to maximum output.
6. Set dial scale and test oscillator to 800 K.C. and adjust #21 simultaneously changing this adjustment and the station selector for maximum output. This type of adjustment is known as "max-mar" and is obtained in the following manner:
Tune the receiver with your left hand by means of tuning knob and adjust #21 in either direction and then without changing it, tune the receiver through a maximum noting the value of output meter reading. If output drops with second adjustment reverse direction of this adjustment of #21. Continue this type of trial and error adjustment until no further improvement can be made when either tuning control or #21 is changed. This procedure may appear difficult, facility can be easily acquired and the operation requires only a few moments.
7. With test oscillator and scales set at 1500 K.C. readjust #10 and #20 since previous operations may have altered oscillator trimmer setting.
8. Check sensitivity across band.

C - ADJUSTMENT OF POLICE BAND

1. Set combination tone control - police band switch (lower center knob) on first or left-hand position.
 2. Leave wave change switch on standard broadcast position.
 3. Set dial scale at 1500 K.C. (this is the reception point for 2400 K.C. on range marked "police switch" on dial scale).
 4. Set test oscillator to 2400 K.C. and tune in signal with station selector.
 5. Adjust #13 to maximum output.
- P - ADJUSTMENT OF SHORT-WAVE BAND
1. Set wave change switch to short wave or lower dial scale position.
 2. Connect test oscillator to antenna thru a .0002 mfd. condenser and a 400 ohm re-

ALIGNMENT PROCEDURE

To properly align the receiver, it is essential to use a high grade modulated test oscillator and a sensitive output meter. The A. F. signal fed into the receiver must be relatively weak or it will cause the A.V.C. to function making correct alignment difficult. 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 location of the tubes and the various alignment components. The top and bottom view of the chassis are shown in Figure #1 and #2 and should be carefully studied before the actual work is started.

A - I. F. ADJUSTMENT (450 K.C.)

1. Set test oscillator to 450 K.C.
2. Connect output meter across voice coil of speaker. (Impedance 3.5 ohms.)
3. Connect in series with high side of test oscillator leads a blocking condenser of at least .25 mfd.
4. Connect test oscillator to grid of 1st I. F. tube (6D5 in rear of condenser gang) and adjust #51 and #52 to maximum output reducing test oscillator as required.
5. Connect test oscillator to grid of 1st I. F. tube (6D5 rear right hand tube) and adjust #45 and #46 to maximum output.
6. Connect test oscillator to grid of 1st detector (6A7 and adjust #56 and #57 to maximum output. This completes the I. F. adjustment.

B - ADJUSTMENT OF BROADCAST BAND

1. Set wave change switch to broadcast scale position.
2. Set test oscillator to 1500 K.C. and connect to grid of 1st detector (6A7).
3. Adjust dial scale to maximum mark beyond 640 K.C. calibration point when the gang is entirely closed.
4. Set dial scale at 1500 K.C. and adjust #20 to maximum output.
5. Connect test oscillator to antenna and ground leads of the receiver (red and brown) through a .0002 mfd. condenser and with scale still set at 1500 K.C. adjust #10 and #90 to maximum output.
6. Set dial scale and test oscillator to 800 K.C. and adjust #21 simultaneously changing this adjustment and the station selector for maximum output. This type of adjustment is known as "max-mar" and is obtained in the following manner:
Tune the receiver with your left hand by means of tuning knob and adjust #21 in either direction and then without changing it, tune the receiver through a maximum noting the value of output meter reading. If output drops with second adjustment reverse direction of this adjustment of #21. Continue this type of trial and error adjustment until no further improvement can be made when either tuning control or #21 is changed. This procedure may appear difficult, facility can be easily acquired and the operation requires only a few moments.
7. With test oscillator and scales set at 1500 K.C. readjust #10 and #20 since previous operations may have altered oscillator trimmer setting.
8. Check sensitivity across band.

C - ADJUSTMENT OF POLICE BAND

1. Set combination tone control - police band switch (lower center knob) on first or left-hand position.
 2. Leave wave change switch on standard broadcast position.
 3. Set dial scale at 1500 K.C. (this is the reception point for 2400 K.C. on range marked "police switch" on dial scale).
 4. Set test oscillator to 2400 K.C. and tune in signal with station selector.
 5. Adjust #13 to maximum output.
- P - ADJUSTMENT OF SHORT-WAVE BAND
1. Set wave change switch to short wave or lower dial scale position.
 2. Connect test oscillator to antenna thru a .0002 mfd. condenser and a 400 ohm re-

SERVICE PARTS LIST

Part No.	Dis.	Description of Parts	Part No.	Dis.	Description of Parts
106417	1	100 Mfd. mica	106276	54	1 meg. 1/4 W.
	2	.002 mfd. mica	107951	55	.5 meg. vol. cont.
	3	Trap coil.	103656	56	1.005 mfd. - 5 ply
	4	Pressure switch (part of 107454)	106281	57	1 meg. 1/4 W.
	5	Pressure switch (part of 107454)	106243	58	5000 - 1/4 W.
	6	Top. switch (part of 107454)	106499	59	.5 - 2 ply
107904	7	Top. switch (part of 107454)	108403	60	.001 - 4 ply
	8	H.P. pres. coil (part of 107933)	106279	61	.25 meg. 1/4 W.
	9	H.P. pres. coil (part of 107933)	106569	62	.005 mfd. - 5 ply
	10	B.C. pres. coil - part of 107936	106279	63	.25 meg. 1/4 W.
	11	C-15 mmf.	106279	64	10 mfd. elec. part of 107288
106386	12	.05 - 2 ply	106386	65	10 mfd. elec. part of 107288
106403	13	Police band coil (part of 1065246)	103659	67	.005 - 3 ply
107955	14	.001 - 4 ply	106386	68	8 mfd. elec. dry - part of 107288
107955	15	C-15 mmf.	107239	69	8 mfd. elec. wet
107482	16	1500 mmf. mica	107242	70	Power transformer
	17	1100-2000 mmf. part of 108001	107815	71	On-Off switch part of 107951
	18	H.P. osc. coil (part of 1065246)	72	.01 - 4 ply	
	19	H.P. osc. coil (part of 1065246)	73	500 ohms resistor	
107505	20	C-25 mmf.	74	1200 ohms resistor	
	21	500-600 mmf. part of 108001	75	1200 ohms resistor	
	22	Var. gang part of CG 967	76	1000 - 1/4 W.	
106376	23	1 meg. 1/4 W.	77	Power transformer	
106377	24	.1 meg. 1/4 W.			
107414	25	100 mmf. mica			
106374	26	100 mmf. mica			
106374	27	100 mmf. mica			
106374	28	500,000 1/4 W.			
106374	29	500 - 2 ply			
106386	30	.08 - 2 ply			
106386	31	.08 - 2 ply			
	32	8 mfd. elec. (dry) part of 107288			
106504	33	.02 mfd. - 5 ply			
106815	34	20,000 - 1/2 W.			
	35	.50 mmf. part of 10682A			
	36	I.F. trans. part of 10682A			
	37	35-150 mmf. part of 10682A			
106387	38	100 - 2 ply			
106386	39	.08 - 2 ply			
106387	40	.08 - 2 ply			
106498	41	1000 - 1/4 W.			
	42	.08 - 5 ply			
	43	55-150 mmf.			
	44	I.F. trans. coil - part of 10682A			
	45	35-150 mmf. - part of 10682A			
106387	46	100 1/4 W.			
106386	47	100 - 2 ply			
106386	48	400 - 1/4 W.			
106246	49	5 meg. 1/4 W.			
106417	50	.001 mmf. mica			
	51	30-150 mmf. part of 10682A			
	52	3rd IF coil (part of 10682A)			
	53	30-150 mmf. part of 10682A			

MAIN ASSEMBLIES

CH9512A Chassis assembly - Models 454L & H
CH9517A Chassis assembly - Models 450L & H
CH9511A Chassis assembly - Models 450L, 451L, 454L
107284 Speaker - Models 450H, 451H, 454H
KA 956 Cabinet - Models 450L, 451L, 454L
KA 955 Cabinet - Models 450H, 451H, 454H
* These parts are on IS2650A.

TRANSFORMERS

Power trans. assembly - 450 L&H
Power trans. assembly - 451 L&H
Power trans. assembly - 454 L&H

SPEAKER (107284)

(450L, 451L, 454L)
(450H, 451H, 454H)

CABLES & CABLE ASSEMBLIES

Line cable
Antenna cable - Red
Antenna cable - Blue
Ground cable
Cable for dial pulley

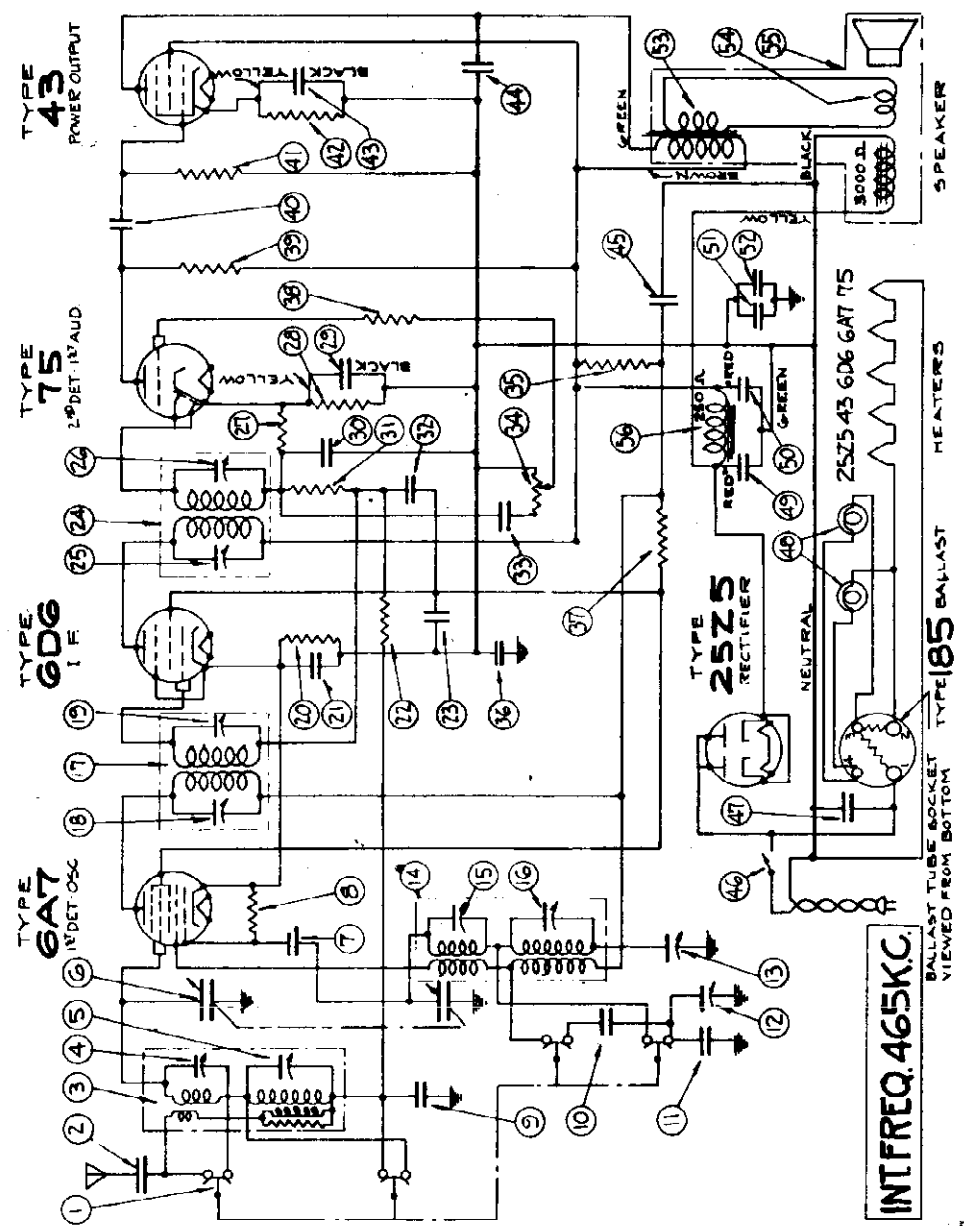
MODEL 05
Schematic, Voltage
Parts

UNITED AMERICAN BOSCH CORP.

AMERICAN-BOSCH RADIO MODEL 05
Five-Tube, Two Band, AC-DC, Superheterodyne Receiver

NO.	DESCRIPTION	QTY.	PART NO.	MANUFACTURER
1	TYPE 6A7 1N DET OSC	1	921	GE
2	TYPE 6D6 I F	1	922	GE
3	TYPE 75 2ND DET 1ST AFD	1	923	GE
4	TYPE 43 POWER OUTPUT	1	924	GE
5	5Y5	1	925	GE
6	5Y5	1	926	GE
7	5Y5	1	927	GE
8	5Y5	1	928	GE
9	5Y5	1	929	GE
10	5Y5	1	930	GE
11	5Y5	1	931	GE
12	5Y5	1	932	GE
13	5Y5	1	933	GE
14	5Y5	1	934	GE
15	5Y5	1	935	GE
16	5Y5	1	936	GE
17	5Y5	1	937	GE
18	5Y5	1	938	GE
19	5Y5	1	939	GE
20	5Y5	1	940	GE
21	5Y5	1	941	GE
22	5Y5	1	942	GE
23	5Y5	1	943	GE
24	5Y5	1	944	GE
25	5Y5	1	945	GE
26	5Y5	1	946	GE
27	5Y5	1	947	GE
28	5Y5	1	948	GE
29	5Y5	1	949	GE
30	5Y5	1	950	GE
31	5Y5	1	951	GE
32	5Y5	1	952	GE
33	5Y5	1	953	GE
34	5Y5	1	954	GE
35	5Y5	1	955	GE
36	5Y5	1	956	GE
37	5Y5	1	957	GE
38	5Y5	1	958	GE
39	5Y5	1	959	GE
40	5Y5	1	960	GE
41	5Y5	1	961	GE
42	5Y5	1	962	GE
43	5Y5	1	963	GE
44	5Y5	1	964	GE
45	5Y5	1	965	GE
46	5Y5	1	966	GE
47	5Y5	1	967	GE
48	5Y5	1	968	GE
49	5Y5	1	969	GE
50	5Y5	1	970	GE
51	5Y5	1	971	GE
52	5Y5	1	972	GE
53	5Y5	1	973	GE
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71	5Y5	1	991	GE
72	5Y5	1	992	GE
73	5Y5	1	993	GE
74	5Y5	1	994	GE
75	5Y5	1	995	GE
76	5Y5	1	996	GE
77	5Y5	1	997	GE
78	5Y5	1	998	GE
79	5Y5	1	999	GE
80	5Y5	1	1000	GE

LINE VOLTAGE 115 AC
NEUTRAL
*READ ON 500,000 OHM VOLTMETER



UNITED AMERICAN BOSCH CORP.

MODELS 460 A,B,R
461 A,B,R
464 A,B,R

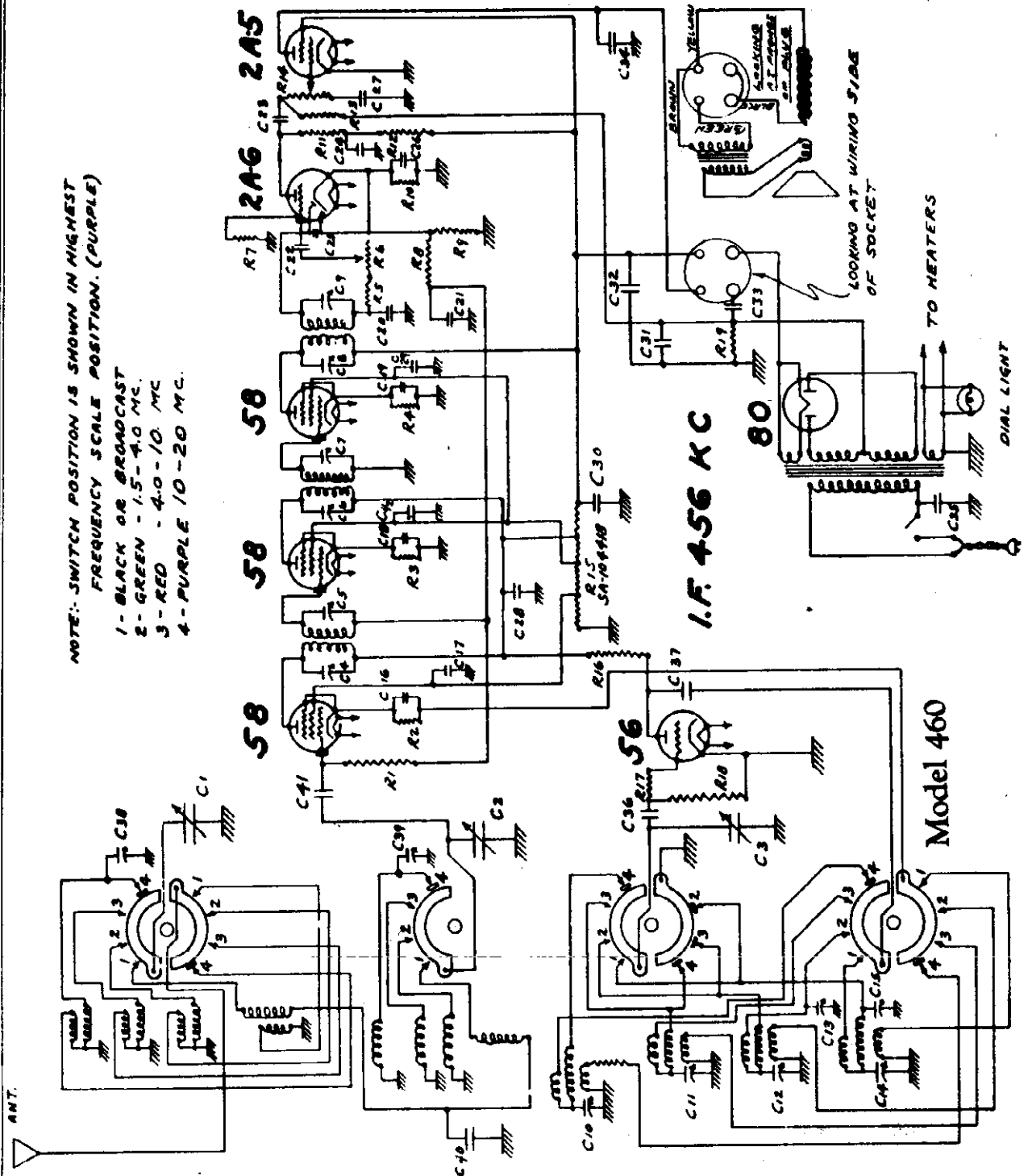
CIRCUIT DESCRIPTION

Ed.1
Circuit Data, Schematic

The Model 460 is a seven tube superheterodyne receiver whose circuit comprises a first detector, an oscillator, two stages of I. F. amplification, a combined double diode second detector and first audio amplifier, a power amplifier and rectifier tube.

Selectivity is provided by a double tuned antenna selector and three double tuned I.F. transformers, comprising eight selective circuits in all. The double tuned antenna selector is important in the broadcast band for reasons well known, and is all the more important on the short wave band in order to prevent "repeat points", that is, reception of the same station at two points on the scale.

NOTE: SWITCH POSITION IS SHOWN IN HIGHEST
FREQUENCY SCALE POSITION. (PURPLE)
1- BLACK OR BROADCAST
2- GREEN - 1.5-4.0 MC.
3- RED - 4.0-10 MC.
4- PURPLE 10-20 MC.



SCHEMATIC WIRING DIAGRAM

MODELS 460 A,B,R
461 A,B,R
464 A,B,R

UNITED AMERICAN BOSCH CORP.

Ed.1
Socket, Trimmers,
Alignment, Voltage
Parts List

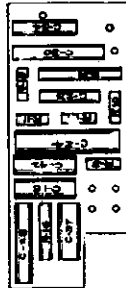
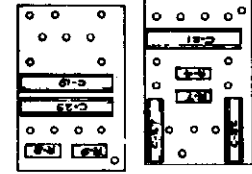


Table with columns: SOCKET NUMBER, PLATE, PARTS, WATTS, and NOTES. It lists various components like resistors and their power ratings.

TRANSFORMERS

Table listing transformer parts including power transformers, intermediate coils, and antenna cables with their respective part numbers.

MAIN ASSEMBLIES

Table listing main assembly parts such as chassis assemblies, chassis assemblies for different models, and speaker assemblies.

RESISTOR STRIPS

Table listing resistor strip parts including sprayers and antenna cable assemblies.

CABLES AND CABLE ASSEMBLIES

Table listing cable and cable assembly parts like line cable assemblies and ground cables.

CONDENSERS

Table listing condenser parts including variable condensers and various types of condensers.

RESISTORS

Table listing resistor parts with their values and wattages.

COILS

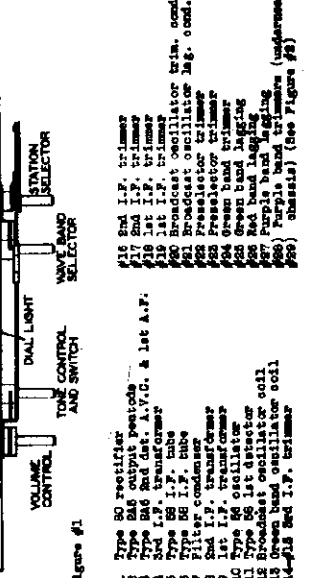
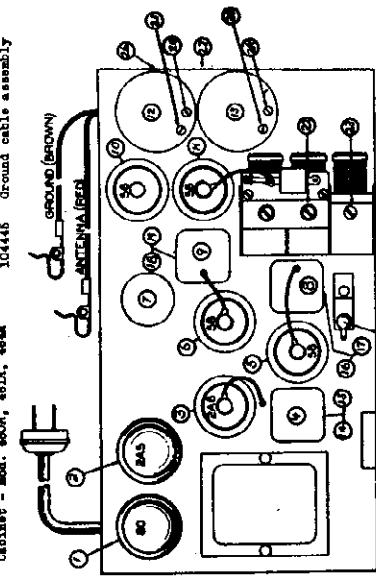
Table listing coil parts including oscillator coils and various types of coils.

TRIMMERS

Table listing trimmer parts like I.F. trimmers and various types of trimmers.

ASSEMBLIES

Table listing various assembly parts like speaker assemblies and antenna assemblies.



- List of component part numbers and descriptions corresponding to the chassis diagram, including various coils, trimmers, and assemblies.

Aligning the chassis. To properly align the Model 460 chassis, it is essential to use a high grade modulated test oscillator and a sensitive output meter. The R. F. signal fed into the receiver must be very weak or it will cause the A.V.C. to function making correct alignment impossible. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low signal.

Aligning the I.F. (460 K.C.). 1. Set test oscillator to 460 K.C. 2. Connect test oscillator to grid of second I.F. tube #6 and adjust #16 and #15 to maximum output, removing test oscillator as required.

Aligning the R. F. 1. Set test oscillator to 1600 K. C. and connect to grid of first detector #11. Place pointer of radio to 1.5 mark on dial. Adjust #90 until signal is tuned in. This adjusting screw is usually designated by a red color dot.

Aligning the A.F. 1. Set test oscillator to 800 K. C. and connect to grid of first detector #11 and adjust #18 and #17 to maximum output. 2. Retrack the above four operations for accuracy.

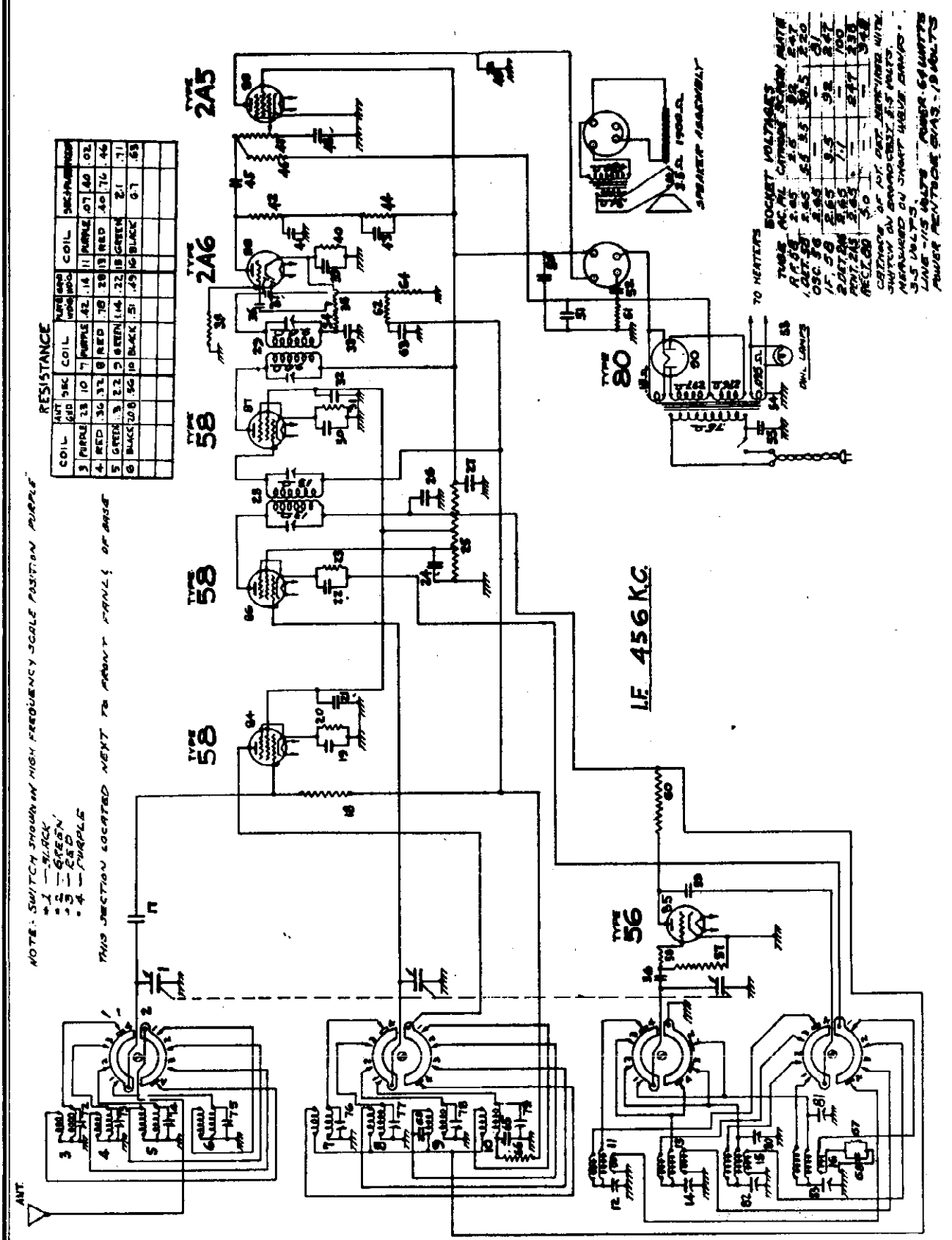
Aligning the Green Band. 1. Set test oscillator to 3600 K.C. and indicator of radio at 3.6 mark on dial. 2. Adjust #64 until signal is tuned in. This trim condenser is usually marked with a red color dot.

Aligning the Red Band. 1. Set test oscillator to 8000 K. C. and observe pointer setting and sensitivity. Slight deviations from calibration can be compensated by manipulating the stiff wires connecting the oscillator coil to switch.

Aligning the Purple Band. 1. Set test oscillator to 20,000 K. C. or if this is not available, then adjust to highest possible frequency, which preferably should be at least 15,000 K. C. Tune set to this frequency and note where set oscillator is received on dial scale.

Increasing the volume. Increase setting of test oscillator until signal generator can be tuned in at two positions on dial (#20 and #19). Then with volume control set at #20 adjust #68 and #69 for maximum output decreasing this signal as signal becomes better tuned. At correct adjustment a very loud signal will be obtained at 20 on dial while a feeble signal or none at all is observed at 19. This is a practical illustration of the effectiveness of the adjustment as outlined in the first part of this description.

MODELS 460 A,B,R
Ed. 2
UNITED AMERICAN BOSCH CORP.
Schematic, Resistance



RESISTANCE

COIL	ANT 58C	COIL	VAR. CAP.	COIL	58	COIL	58	COIL	2A6	COIL	2A5	SEPARATED
3	PURPLE	10	7	PURPLE	42	11	PURPLE	67	40	02		
4	RED	36	32	8	RED	78	20	13	RED	40	74	46
5	GREEN	3	22	2	GREEN	114	22	18	GREEN	21	71	
6	BLACK	0.8	84	10	BLACK	51	45	10	BLACK	67	69	

NOTE: SWITCH SHOWN IN HIGH FREQUENCY SCALE POSITION PURPLE
 * 1 - BLACK
 * 2 - GREEN
 * 3 - RED
 * 4 - PURPLE
 THIS SECTION LOCATED NEXT TO FRONT PANEL OF CASE

TO HEATERS
 SOCKET VOLTAGES
 TUBE AC PL. COMMON SOCKET WITH
 R.F. 58 2.45 2.6 2.6 2.6 2.6
 I. DET. 58 2.45 2.6 2.6 2.6 2.6
 OSC. 58 2.45 2.6 2.6 2.6 2.6
 1F. 58 2.65 2.6 2.6 2.6 2.6
 2A5 2A6 2.65 2.6 2.6 2.6 2.6
 RECT. 2A5 2.65 2.6 2.6 2.6 2.6
 RECT. 2A6 2.65 2.6 2.6 2.6 2.6
 RECT. 50 2.65 2.6 2.6 2.6 2.6
 CATHODE OF 10T DET. HEATERS WITH
 SWITCH ON SEPARATELY 2.5 VOLTS
 MEASURED ON SOCKET VALUE DIMENSIONS
 3-5 VOLTS
 LINE -115 VOLTS - POWER 60 WATTS
 POWER RECTIFIER 2A5 - 18 VOLTS

MODELS 460 A,B,R
Ed.2
Socket, Trimmers
Alignment, Parts

UNITED AMERICAN BOSCH CORP.

Model 460 Ed2 American-Bosch Radio Receiver
CIRCUIT DESCRIPTION

The Model 460 Ed. 2 is a seven-tube superheterodyne all-wave receiver whose circuit comprises an R. F. amplifier stage, a first detector, an oscillator, a stage of I. F. amplification, a combination second detector, A.V.C., and first A. P. amplifier, a power output stage and a rectifier tube. Selectivity is provided by antenna tuning, R. F. stage tuning and four I. F. tuned circuits.

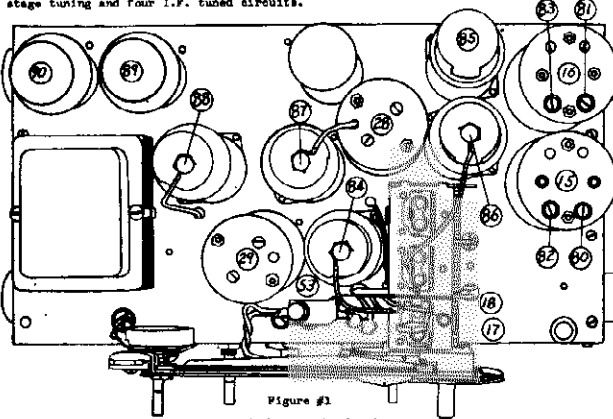


Figure #1

ALIGNMENT NOMENCLATURE

- | | |
|-----------------------------------|--|
| #12 Purple osc. lag condenser | #79 Broadcast R.F. trim condenser |
| #14 Red osc. lag condenser | #30 Green osc. trim condenser |
| #15 Green band osc. coil | #81 Broadcast osc. trim. condenser |
| #16 Broadcast osc. coil | #82 Green osc. lag condenser |
| #28 First I.P. transformer | #83 Broadcast osc. lag condenser |
| #29 Second I.P. transformer | #84 Type 58 R.F. amplifier |
| #72 Purple ant. trim condenser | #56 Type 56 oscillator |
| #73 Red ant. trim condenser | #56 Type 56 first detector |
| #74 Green ant. trim condenser | #57 Type 58 I.F. amplifier |
| #75 Broadcast ant. trim condenser | #85 Type 2A5 2nd detector, A.V.C., lat. A.F. |
| #76 Purple R.F. trim condenser | #86 Type 2A5 power pentode |
| #77 Red R.F. trim condenser | #90 Type 80 rectifier |
| #78 Green R.F. trim condenser | |
- * Trimmers are shown in Fig. #2

ALIGNMENT PROCEDURE

To properly align the Model 460 Ed. 2 receiver, it is essential to use a high grade modulated test oscillator and a sensitive output meter. The R.F. signal fed into the receiver must be relatively weak or it will cause the A.V.C. to function making correct alignment difficult. 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 the various alignment condensers. Top and bottom view of the chassis is shown in the Figures #1 and #2 and should be carefully studied before the actual work is started.

A - ALIGNING THE I.F. (485 K.C.)

- Set test oscillator to 466 K.C.
- Connect test oscillator leads through a .25 mfd. condenser between grid of I. F. tube #87 and frame of the chassis.
- Adjust trimmer on I. F. coil #29 to maximum output, reducing output of test oscillator as required.
- Connect test oscillator to grid of first detector tube #56 and adjust trimmers on I.F. coil #35 to maximum output.

B - ALIGNING THE R.F.

- Set test oscillator to 1500 K. C. and connect to grid of first detector #86. Set station indicator to 1500 K.C.
- Adjust #91 until signal is tuned in. This adjustment screw is designated by a color dot. Having obtained tune at this point set test oscillator and station selector to 800 K. C. and adjust #85 until the signal is tuned in. Now return to 1500 K.C. point with set and test oscillator and readjust #91 to obtain accurate adjustment to scale reading.
- Connect test oscillator to antenna lead, making sure the capacity equivalent of .0002 mfd. is in the circuit.
- Continue setting of 1500 K. C. and adjust #75 and #79 to maximum output. Check sensitivity and calibration at several points on the dial. Receiver should come correctly to kilocycle settings of important broadcasting stations.

C - ALIGNING THE GREEN BAND

- Set test oscillator and station selector to 3600 K.C.
- Adjust #90 until signal is tuned in. This adjustment screw is marked with a color dot.
- Set test oscillator and station selector to 1800 K. C. and adjust #88 to maximum output.
- Return to 3600 K. C. setting and repeat adjustment of #90. In adjusting the 3600 K.C. point, it is possible to obtain two different positions of the trimmer condenser. This denotes merely the plus and minus frequency between the set oscillator and test oscillator which will give the I. F. frequency. The correct setting of the trimmer condenser is the one wherein the adjustment screw is furthest out. In any event, any incorrect setting will always be denoted by lack of sensitivity and calibration when the receiver and test oscillator are tuned to 6000 K.C. (mid-band).
- With station selector and test oscillator both adjusted to 3600 K.C., align the antenna and R.F. circuits by adjusting #78 and #76 to maximum output.

D - ALIGNING THE RED BAND

- Set test oscillator to 8000 K. C. and tune receiver in region of 8000 K. C. on dial scale. Note where signal is tuned in. Next set test oscillator and receiver to 4000 K.C. and adjust #74 (on right side of chassis) until signal is heard.
- Return set and test oscillator to 8000 K. C. and observe pointer setting. Slight deviations from calibration can be compensated by manipulating the stiff wires connecting the oscillator coil #35 to the set.
- With set and test oscillator both adjusted to 8000 K.C., align the antenna and R.F. circuits by adjusting #78 and #77 to maximum output.

E - ALIGNING THE PURPLE BAND

- Set test oscillator to 18,000 K.C. or if this is not available then adjust to highest frequency preferably 15,000 K. C. Turn set to this frequency a 1 observe where signal is received on the dial scale. Then place test oscillator on 10,000 K. C. and adjust #18 (on right side of chassis) until signal is tuned in at 10. (on dial) scale.
- Now return both test oscillator and receiver to 18,000 K. C. Increase setting of test oscillator until signal can be turned in at two points on dial (say 16. and 17.), then with pointer of set at 18. adjust #72 and #76 for maximum output decreasing test signal as signal becomes better tuned. At correct adjustment a very loud signal will be obtained at 16 on the dial while a feeble signal will be observed at 17. This is a practical illustration of the effectiveness of presatiation.

The adjustment instructions just given apply to the Model 460 Ed. 2 receiver which is in reasonable operating condition, but in some manner has been thrown out of adjustment. Obviously, before the radio service man can go through with the instructions given here, he must assure himself that defective tubes, injured parts, such as punctured condensers, shorted variable condensers, opened resistors, damaged high frequency coils, etc., are not such as to cause the set to be inoperative on one or more bands of frequencies.

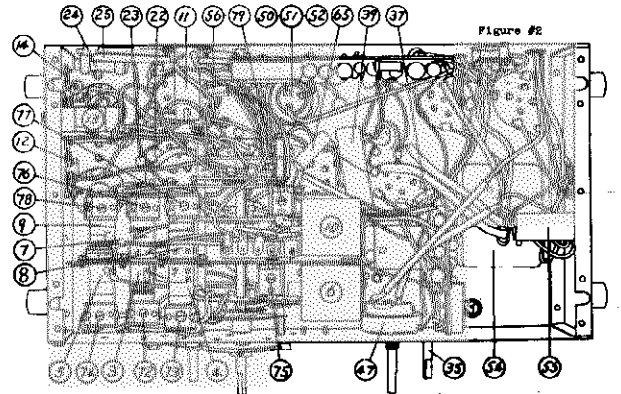


Figure #2

SERVICE PARTS LIST

Model 460 Ed. 2

Part No.	QTY.	Description of Parts	Part No.	QTY.	Description of Parts
108056	1	Variable condenser	108060	108060	80 mf. 25 V.
108057	2	Wave switch	108061	108061	8 mf. 475 V.
108058	5	Ant. Transf. (purple)	98715	53	Dial light
108075	4	Ant. Transf. (red)	108781	54	Power transformer
108076	6	Ant. Transf. (green)	107610	C 55	.01 mf. 500 V.
108079	6	Ant. Transf. (black)	101140	C 54	100 mf. mica
108078	7	R.F. Transf. (purple)	108274	C 57	20,000 ohms
108074	8	R.F. Transf. (red)	100814	C 58	800 ohms
108072	9	R.F. Transf. (green)	108266	RL 33	.05 mf. 90 V.
108070	10	R.F. Transf. (black)	99777	RL 30	25,000 ohms 1 W.
108067	11	Osc. coil (purple)	103062	RL 61	400 ohms 1 W.
108068	12	Comp. condenser	108248	RS 62	.5 megohm
108069	13	Osc. coil (red)	108405	RS 43	.05 mf. 90 V.
108090	14	Comp. condenser	108181	RS 44	1 megohm
108683	15	Osc. assembly (green)	108369	C 66	.05 mf. 90 V.
108684	16	Osc. assembly (black)	108270	RS 65	100,000 ohms
108417	VC 17	100 mf. mica	108272	67	10,000 ohms
108246	VC 18	.05 mf. 90 V.	108386	68	.05 mf. 90 V.
108248	RS 19	.5 megohm	108045	C 69	.0001 mf. mica
108290	RS 20	300 ohms	108062	C 70	400 ohms 1 W.
108306	C 21	.06 mf. 90 V.	107875	71	Power transformer
108368	C 22	.05 mf. 90 V.	107503	72	4-25 mf.
108248	C 23	2000 ohms	107603	74	4-25 mf.
108248	C 24	.05 mf. 90 V.	107603	75	4-25 mf.
104418	C 25	tapped resistor	107503	76	4-25 mf.
108492	RL 26	.05 mf. 250 V.	107503	78	4-25 mf.
108492	RL 27	.05 mf. 250 V.	107503	87	4-25 mf.
108492	RL 28	.05 mf. 250 V.	107503	79	4-25 mf.
109094	29	I.P. transformer	107908	79	4-25 mf.
108296	RL 30	.05 mf. 90 V.	80	70 mf. part of 108321	
108280	RL 31	500 ohms	81	70 mf. part of 108323	
108306	RS 32	.06 mf. 90 V.	88	1500 mf. part of 108321	
101143	IF 33	100 mf. mica	88	1500 mf. part of 108323	
106276	IF 34	50,000 ohms	88	R.F. tube	
108586	RS 35	Vol. Cont. .5 mg.	88	Oscillator tube	
108586	RS 36	.005 mf. 250 V.	88	1st detector tube	
101145	C 37	100 mf. mica	88	I.P. tube	
108281	RS 38	1 megohm	88	2nd detector tube	
108290	C 39	.5 mf. 90 V.	88	Output tube	
108489	RL 40	5000 ohms	80	Rectifier tube	
108494	RL 41	.1 mf. 250 V.			
108279	RL 42	.25 megohm			
108386	RL 43	100 mf. 90 V.			
107843	RL 44	70,000 ohms	107960		
108204	RL 45	.02 mf. 250 V.	107970	Chassis assembly - 460 Ed. 2 A,B,R	
108279	RL 46	.50 mf. mica	107971	Cabinet - Model 460 Ed. 2 A	
108405	RL 47	ids. Cont. .25 mg.	107972	Cabinet - Model 460 Ed. 2 B	
108405	RL 48	.001 mf. 500 V.	107984	Speaker - Model 460 Ed. 2 A & B	
108277	RL 49	.01 mf. 450 V.	107989	Speaker - Model 460 Ed. 2 R	
		4 mf. 450 V.			

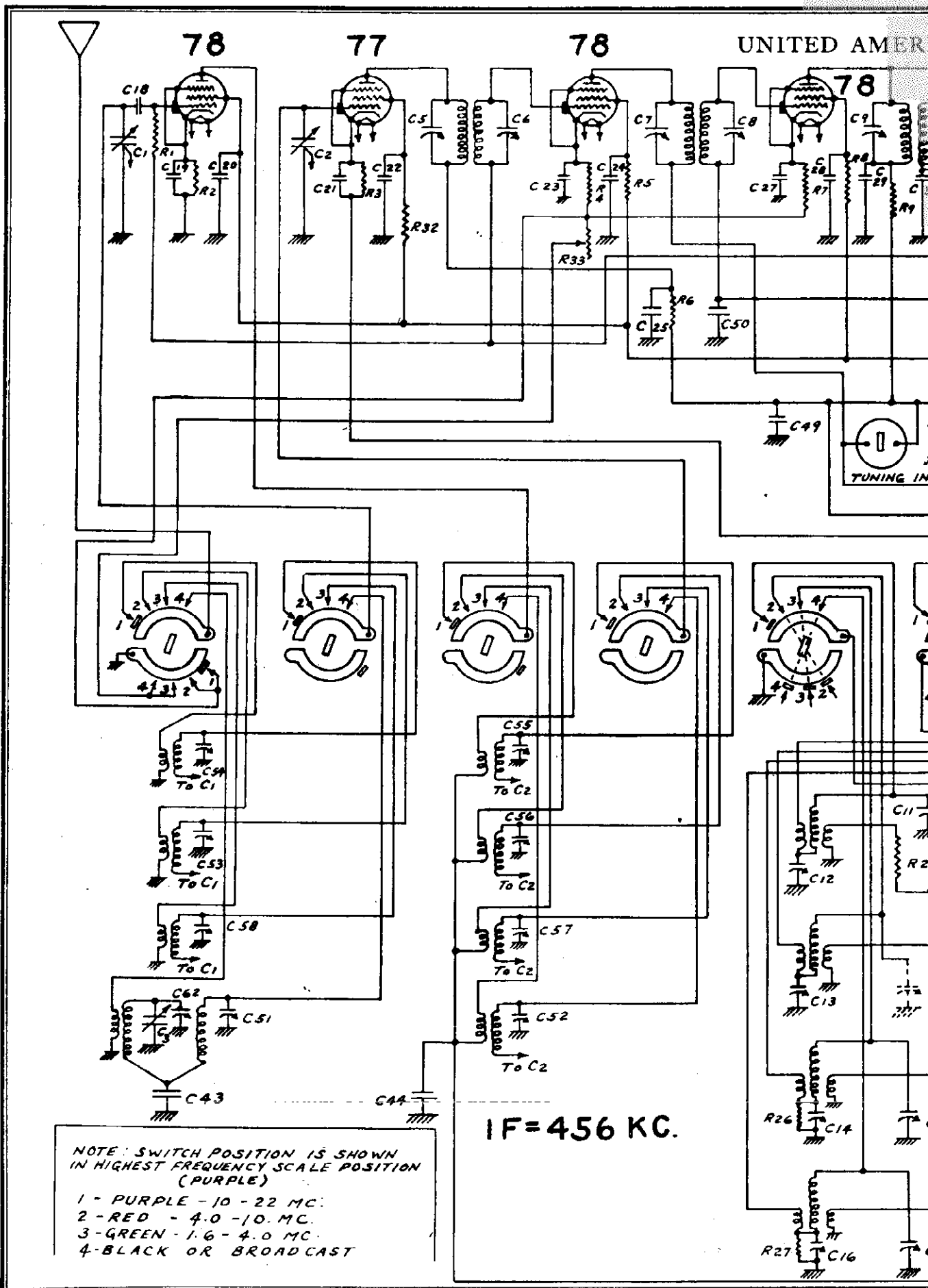
Parts marked "RL" are on Large Resistance Strip.
 Parts marked "RS" are on Small Resistance Strip.
 Parts marked "C" are on chassis.
 Parts marked "VC" are on Variable Condenser.

TRANSFORMERS

- 108781 Power trans. - Model 460 Ed. 2
- SPEAKER (107984) 460 Ed. 2 A
- SPEAKER (107989) 460 Ed. 2 R

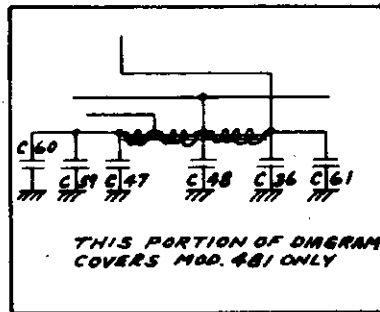
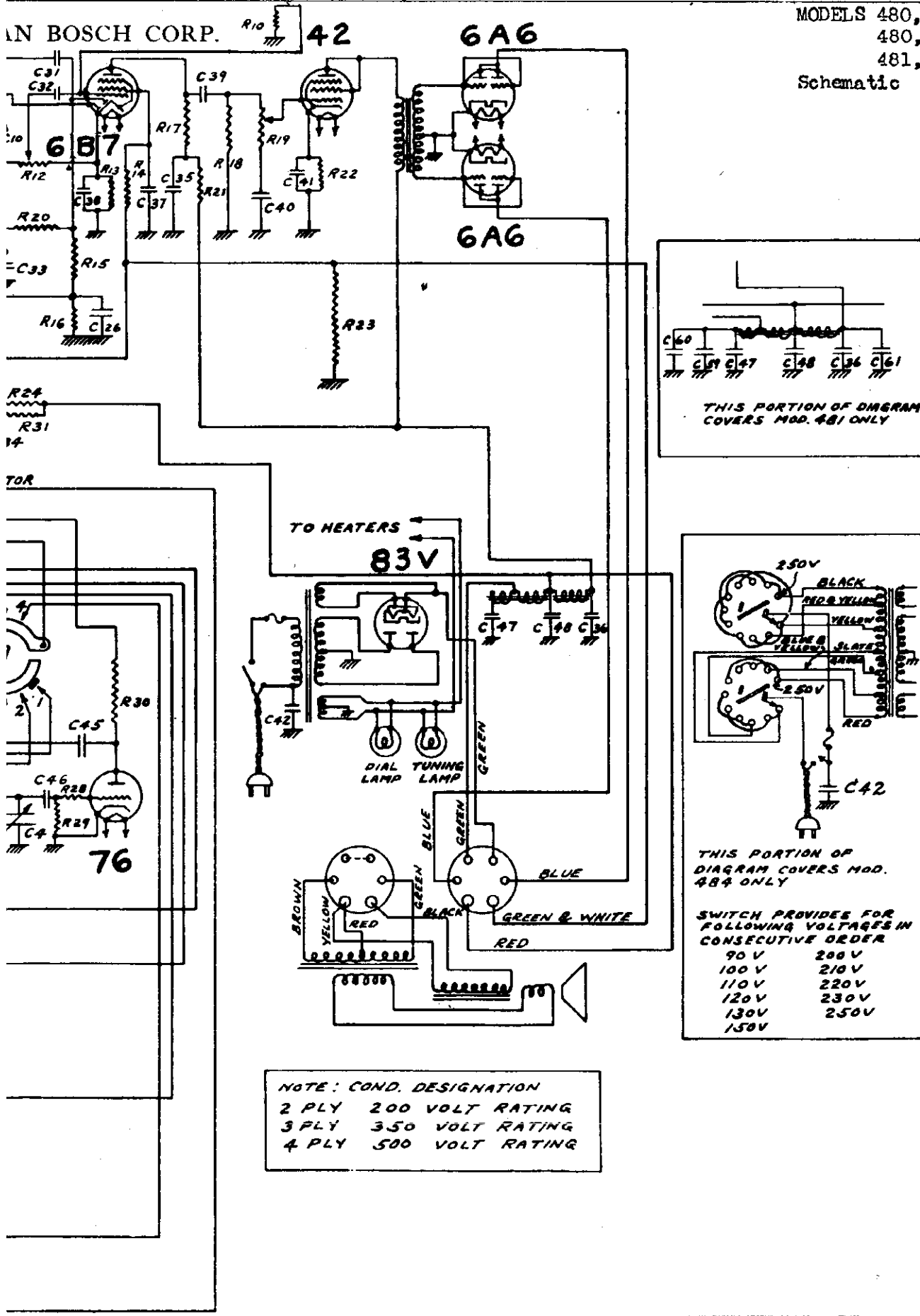


RESISTOR STRIP

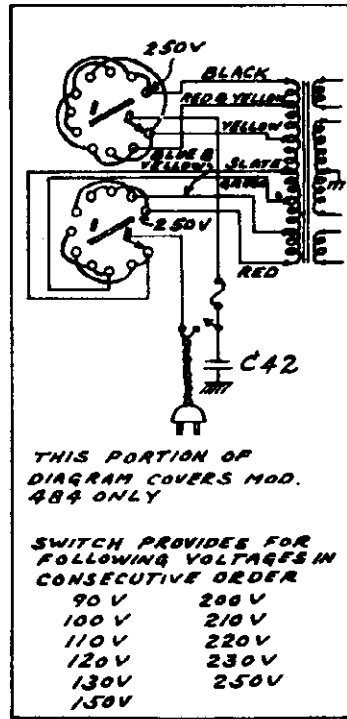


AN BOSCH CORP.

MODELS 480, Ed.1
480, Ed.2
481, 484
Schematic



THIS PORTION OF DIAGRAM COVERS MOD. 481 ONLY



THIS PORTION OF DIAGRAM COVERS MOD. 484 ONLY

- SWITCH PROVIDES FOR FOLLOWING VOLTAGES IN CONSECUTIVE ORDER
- | | |
|-------|-------|
| 90 V | 200 V |
| 100 V | 210 V |
| 110 V | 220 V |
| 120 V | 230 V |
| 130 V | 250 V |
| 150 V | |

NOTE: COND. DESIGNATION
2 PLY 200 VOLT RATING
3 PLY 350 VOLT RATING
4 PLY 500 VOLT RATING

UNITED AMERICAN BOSCH CORP.

MODELS 470 G,U
471 G,U
474 G,U
Schematic, Voltage
Resistor Data

MAIN ASSEMBLIES

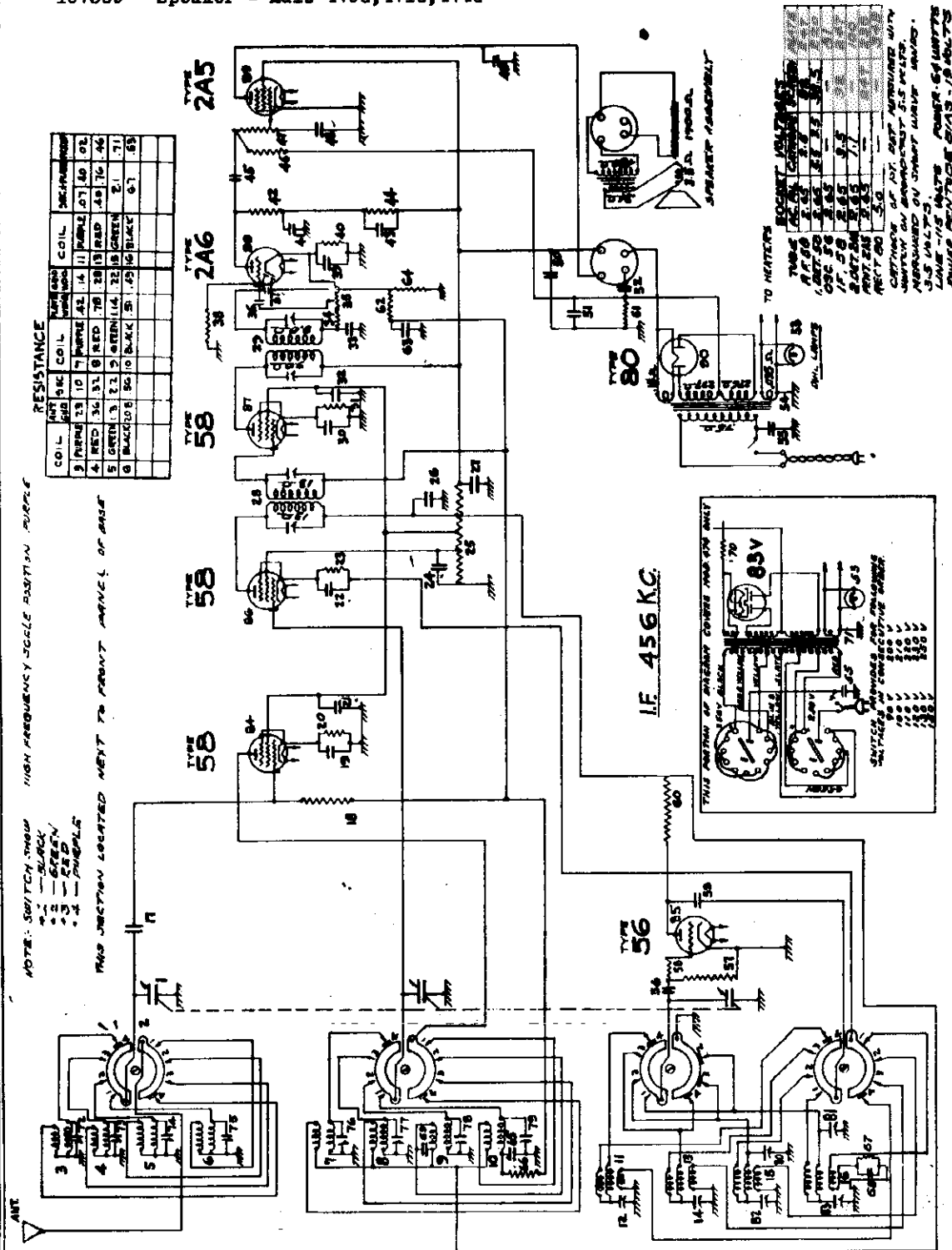
- CH9513A Chassis assembly - 474G & U
- CH9516A Chassis assembly - 471G&U
- CH 959A Chassis assembly - 470G & U
- KA 952 Cabinet - Mdls 470U, 471U, 474U
- KA 953 Cabinet - Mdls 470G, 471G, 474G
- 107284 Speaker - Mdls 470U, 471U, 474U
- 107369 Speaker - Mdls 470G, 471G, 474G

CABLES & CABLE ASSEMBLIES

CB9512 Line cable

TRANSFORMERS

- 105781 Power trans. - Mdls 470G & U
- 106098 Power trans. - Mdls 471G & U
- 107875 Power trans. - Mdls 474G & U



RESISTANCE

COIL	RESISTANCE	COIL	RESISTANCE
1	100K	11	100K
2	10K	12	10K
3	1K	13	1K
4	100	14	100
5	10	15	10
6	1	16	1
7	1000	17	1000
8	10000	18	10000
9	100000	19	100000
10	1000000	20	1000000

TABLE SOCKET VOLTAGES

SOCKET	VOLTAGES
1	100
2	100
3	100
4	100
5	100
6	100
7	100
8	100
9	100
10	100
11	100
12	100
13	100
14	100
15	100
16	100
17	100
18	100
19	100
20	100

FOR OTHER PARTS LISTS AND ALIGNMENT DATA SEE MODEL 460 Ed. 2.

470 G&U 105-125 V. 50-60 cy AC
471 G&U 105-125 V. 25 cy AC
474 G&U 90 - 250 V. 50 cy AC

MODELS 480, Ed.1
480, Ed.2
481, 484
Socket, Trimmers
Alignment, Parts

UNITED AMERICAN BOSCH CORP.

Model 480 Ed1 and 2 American-Bosch Radio Receiver

CIRCUIT DESCRIPTION

The Model 480 is a ten-tube all-wave receiver capable of receiving radiophone transmission in the complete frequency range between 550 kilocycles and 22,000 kilocycles. The receiver is designed to have four wave bands, namely, the Black band which covers the frequency range of 540 to 1550 K.C., the Green band, 1800 to 4000 K.C., the Red band, 4,000 to 10,000 K.C., and the Purple band, 10,000 to 22,000 K.C.

The circuit comprises an R.F. stage, a first detector, an oscillator, two stages of I.F. (455 K. C.), a combination second detector, A.V.C., and first audio stage, an audio driver stage and a power output stage of two tubes in parallel push-pull.

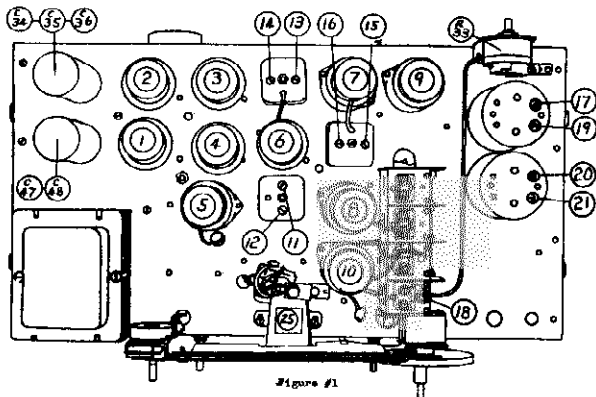


Figure #1

NOMENCLATURE

- #1 6BY rectifier tube
#2 6DE Push-pull output tube
#3 6DE Push-pull output tube
#4 4E driver tube
#5 6BY 2nd det. I.V.C., 1st A.P. tube
#6 7B 2nd I.F. tube
#7 7B 1st I.F. tube
#8 7B 1st detector tube
#9 7B Oscillator tube
#10 7B R.F. amp. tube
#11 3rd I.F. trimmer
#12 3rd I.F. trimmer
#13 3rd I.F. trimmer
#14 3rd I.F. trimmer
#15 1st I.F. trimmer
#16 1st I.F. trimmer
#17 A.V.C. trimmer (color coded)
#18 A.V.C. trimmer
#19 B.B. antenna trimmer
#20 B.B. antenna trimmer
#21 G.B. antenna trimmer
#22 G.B. antenna trimmer
#23 P.D. R.F. trimmer
#24 R.B. R.F. trimmer
#25 G.B. antenna trimmer
#26 G.B. antenna trimmer
#27 G.B. antenna trimmer
#28 G.B. antenna trimmer

ALIGNING THE RECEIVER

To properly align the Model 480 chassis, it is essential to use a high grade modulated test oscillator and a sensitive output meter. The R.F. signal fed into the receiver must be relatively weak or it will cause the A.V.C. to function making a correct alignment difficult. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input 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 the various alignment condensers. Top and bottom views are shown in Fig. #1 and #2 and should be carefully studied before the actual work is started.

A.V.C. ADJUSTMENT (455 K.C.)

- 1. Set test oscillator to 455 K.C.
2. Adjust sensitivity control (rear right-hand corner of chassis) to maximum sensitivity position.
3. Connect output meter across voice coil of speaker.
4. Connect in series with side of test oscillator leads, a .25 mfd. blocking condenser.
5. Connect test oscillator to grid of 2nd I. F. tube #6 and adjust #11 and #12 to maximum output reducing test oscillator signal as required.
6. Connect test oscillator to grid of 1st I. F. tube #7 and adjust #13 and #14 to maximum output.
7. Connect test oscillator to grid of 1st detector tube #8 and adjust #15 and #16 to maximum output.

B-ADJUSTMENT OF BROADCAST BAND

Note: Because of the sensitivity of the receiver, it is difficult to make an accurate R.F. adjustment unless the set sensitivity is reduced. This is accomplished by turning the sensitivity control (R33) so that the set is in its least sensitive position. This sensitive control is operative on the Broadcast and Green bands and is switched out on the Red and Purple bands.

- 1. Set test oscillator and station indicator to 1400 K.C.
2. Connect test oscillator to grid of 1st detector tube #8 and adjust #17 (color coded) until signal is tuned in.
3. Connect test oscillator to antenna and ground leads of the chassis making sure that capacity equivalent of .0005 mfd. is in series with high side of test oscillator leads.
4. Adjust #18 and the two trimmers located underneath the chassis #24 and #25 (see Fig. #2) until signal is correctly tuned in.
5. Set test oscillator and station indicator to 600 K.C. and adjust #19 to maximum output.
6. Return to 1400 K.C. setting and readjust #17 for correct calibration.

C-ADJUSTMENT OF GREEN BAND

- 1. Adjust wave change switch to Green band position and set test oscillator and station indicator to 3600 K.C.
2. Adjust #20 (color coded) until signal is tuned in.

Note: In adjusting the 3600 K.C. point it is possible to obtain two different positions of the trimmer condenser. This denotes, merely, the plus and minus frequencies between the set oscillator and test oscillator which will give the I.F. frequency. The correct setting of the trimmer condenser is the one wherein the adjustment screw is furthest out. In any event, an incorrect setting will always be denoted by lack of sensitivity and incorrect calibration when the receiver and test oscillator are tuned to 3600 K. C. (fold-down).

- 3. Adjust trimmers #20 and #21 to maximum output.
4. Set test oscillator and station indicator to 1800 K.C. and adjust #21 until signal is at maximum.
5. Return to 3600 K.C. setting and readjust #20 for correct calibration.

D-ADJUSTMENT OF RED BAND

- 1. Adjust wave change switch to Red band position.
2. Set test oscillator and station indicator to 9000 K.C.

Note: Underneath the chassis fastened to the back plate is the Red band oscillator coil assembly #22. A Green wire twisted around a Green and White wire will be noticed. This twist serves to make the slight adjustment necessary to bring this band to correct

calibration. If the receiver is not on calibration, an increase or decrease of the twist will serve to readjust the calibration. This adjustment will serve for about one-half a scale division in either way. If the receiver is initially off more than this, it indicates a fault in the oscillator circuit such as a poor or incorrect connection, open resistor, defective oscillator tube or other major fault.

Assuming that the correction can be made, the set is now placed on its proper setting and adjustment is made of the preselector trimmers #26 and #27 for maximum output.

- 3. Set test oscillator and station selector to 5000 K.C. and adjust #23 to maximum output.
4. Return to 9000 K.C. setting and check calibration.

E-ADJUSTMENT OF PURPLE BAND

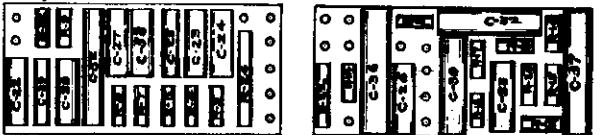
- 1. Adjust wave change switch to Purple band position.
2. Set test oscillator and station indicator to 20,000 K. C. and adjust #24 to maximum output.
3. Adjust #27 and #28 for maximum output.
4. Set test oscillator and station indicator to 18,000 K.C. and adjust #28 until signal is tuned in.
5. Return to 20,000 K.C. setting and recheck #24, #27 and #28.

Note: Make sure that correct adjustment is made at 20,000 K. C. by observing that the image is received at approximately 19,000 K. C. on the dial when the input signal from the test oscillator is increased to force the signal through the selector circuits.

SOCKET VOLTAGES

Table with 5 columns: Tube, Stage, Filament, Plate, Screen, Cathode. Lists voltage requirements for tubes 6BY, 6DE, 4E, 7B, and 7C.

Note: These values are readings of a high resistance voltmeter from each socket terminal to ground with the exception of the filament voltages. The values are only approximate and will vary with the line voltage and the type of meter employed. Line voltage - 115.

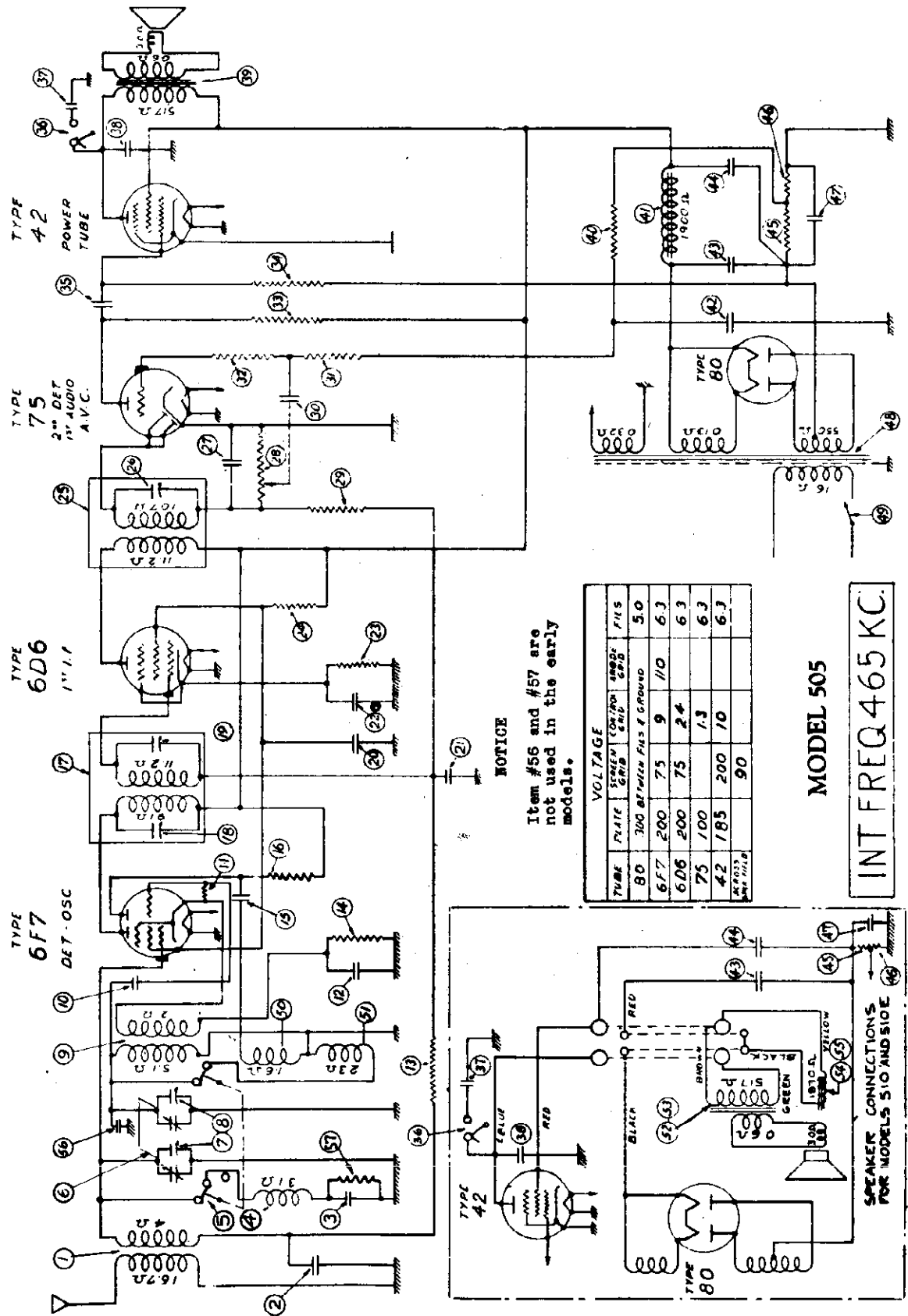


SERVICE PARTS LIST

Comprehensive parts list table with columns for Part No., Dia., Description of Parts, and Part No., Dia., Description of Parts. Includes sections for CONDENSERS, RESISTORS, MAIN ASSEMBLIES, COILS, TRANSFORMERS, and CABLES & CABLE ASSEMBLIES.

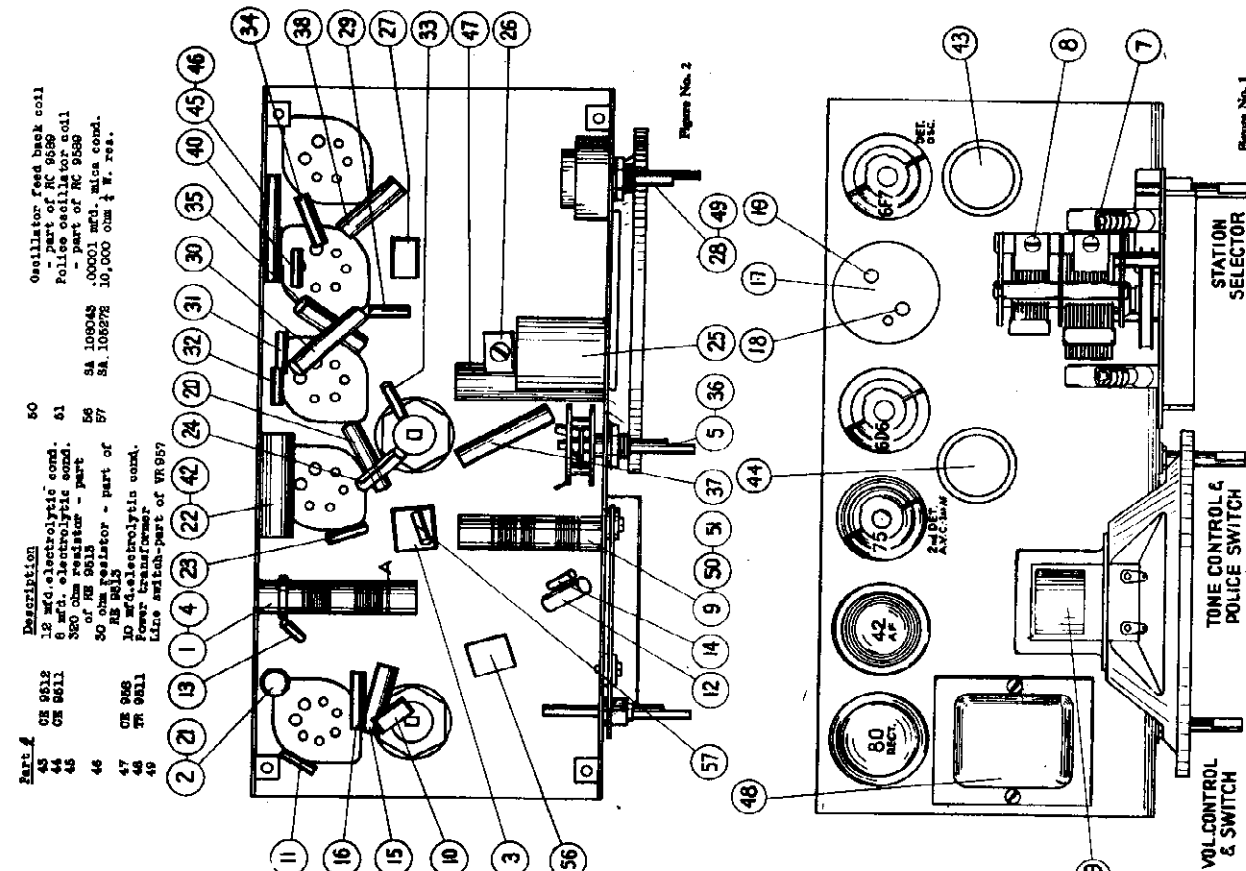
UNITED AMERICAN BOSCH CORP.

MODEL :
Schemat
Voltage



MODEL 505
Socket, Trimmers
Alignment, Parts

UNITED AMERICAN BOSCH CORP.



Part #	Description
43	CR 9512
44	CR 9511
45	CR 9511
46	CR 956
47	TR 9511
48	CR 956
49	CR 956
50	12 mfd. electrolytic cond.
51	8 mfd. electrolytic cond.
52	300 ohm resistor - part of IC 9585
53	30 ohm resistor - part of IC 9585
54	1000 ohm resistor - part of IC 9585
55	1000 ohm resistor - part of IC 9585
56	1000 ohm resistor - part of IC 9585
57	1000 ohm resistor - part of IC 9585

3. Set test oscillator to 465 K.C. and adjust its output to produce maximum reading on output meter when test signal is applied to the grid of the 6X5 detector tube thru a .25 mfd. blocking capacitor. Adjust #26 (see Fig. #2) to maximum output reducing output of test oscillator as required.

4. Apply test signal to grid of 6AV7 first detector-oscillator tube and adjust #18 (see Fig. #1) to maximum output.

5. With test signal on the grid of 6AV7 tube, repeat the above adjustments for greatest sensitivity.

ADJUSTMENT OF BROADCAST BAND

1. Leave test signal on grid of 6AV7 tube and set the test coil to its 465 K.C. position. Adjust dial indicator until either horizontal lines on the dial scale, or the station indicator, are directly over the 1400 K.C. position.

2. Adjust trimmer #19 to maximum output thru a .0002 mfd. condenser and adjust trimmer #7 to maximum output.

ADJUSTMENT OF POLICE BAND

When adjustments are outlined under the broadcast band are completed, the police band requires no adjustment unless the coil has been changed. In this event, the test oscillator and station indicator to 1700 K.C. Apply test signal to antenna lead. The apply test signal to antenna lead. The apply test signal to antenna lead. The apply test signal to antenna lead. The apply test signal to antenna lead.

ADJUSTMENT OF I.P. (465 K.C.)

1. Set volume control on full and turn tone control knob to the right hand position.

2. Connect output meter across voice coil of speaker.

Part #	Description
23	SA 106864
24	SA 106864
25	SA 106864
26	IC 9585
27	SA 106847
28	TR 957
29	SA 106881
30	CR 9512
31	SA 106881
32	SA 106878
33	SA 106878
34	SA 106878
35	CR 9512
36	CR 9512
37	CR 9512
38	CR 9512
39	CR 9512
40	SA 106878
41	SA 106878
42	SA 106878
43	SA 106878
44	SA 106878
45	SA 106878
46	SA 106878
47	SA 106878
48	SA 106878
49	SA 106878
50	SA 106878
51	SA 106878
52	SA 106878
53	SA 106878
54	SA 106878
55	SA 106878
56	SA 106878
57	SA 106878

AMERICAN-BOSCH RADIO MODEL 505
Five Tube, Two Band, Superheterodyne Receiver
ELECTRICAL SPECIFICATIONS

Type and Number of Tubes	1 #6X7, 1 #6X5, 1 #75, 1 #42, 1 #90 - Total 5
Power Supply	105 to 125 volts, 50 to 60 cycles A.C.
Power Consumption	1.5 Watts
Tuning Range	550 to 1600 K.C. and 1520 to 3300 K.C.
Maximum Output	1.5 Watts
Line-Up Frequencies	1.5 Watts I.P. 465 K.C., 1400 K.C.

GENERAL DESCRIPTION

This model is a five-tube, A.C., two-band superheterodyne receiver. It features a combined first amplifier and intermediate frequency amplifier, a tuned circuit 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 the bands, the broadcast band extending from 550 to 1600 K.C. and a police band which extends from 1520 to 3300 K.C.

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade substituted test coil, the output of which can be accurately varied with absence from over-temperature variations. The alignment of the receiver are brought into alignment.

A conventional output meter can be connected across the terminals of the speaker voice coil. The sensitivity of the output meter must be adjusted to give satisfactory reading with a low light signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the various alignment points, and the location of the various controls. The chassis are shown in Fig. #1 and #2 and should be carefully studied before the actual work is started.

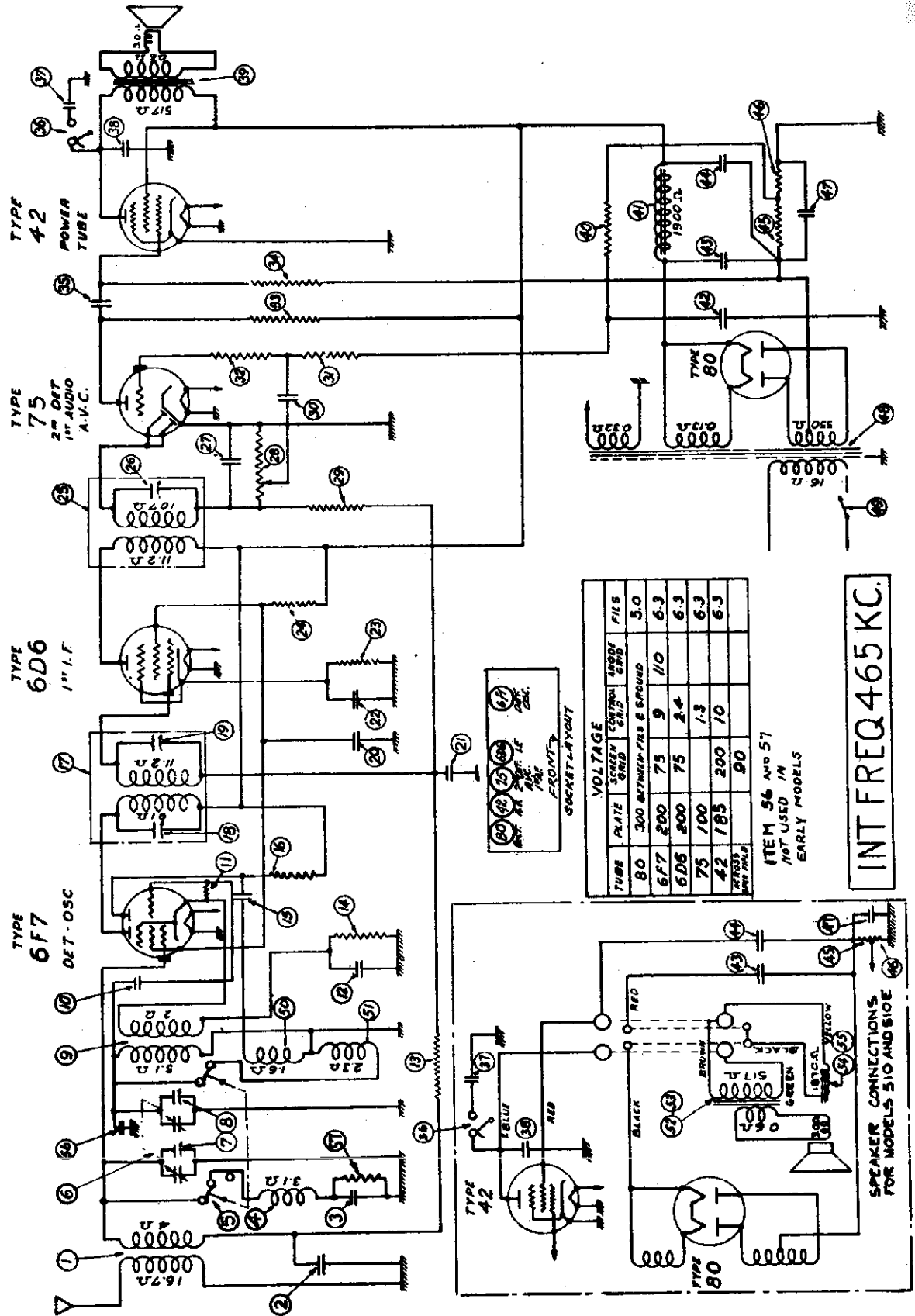
SERVICE PARTS LIST MODEL 505

Part #	Description
1	RC 9588
2	RC 9588
3	CR 956
4	CR 956
5	CR 9512
6	CR 956
7-8	Switch assembly
9	Part of CR 9585
10	Oscillator coil easy.
11	100 mfd. mica condenser
12	50,000 ohm 1/2 W. resistor
13	200 mfd. 200 V. cond.
14	SA 106878
15	SA 106878
16	SA 106878
17	SA 106878
18	SA 106878
19	SA 106878
20	SA 106878
21	SA 106878
22	SA 106878
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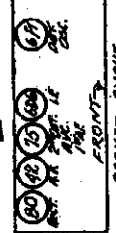
MODELS 510, 510E
Schematic, Voltage
Socket

AMERICAN-BOSCH RADIO MODELS 510-510E

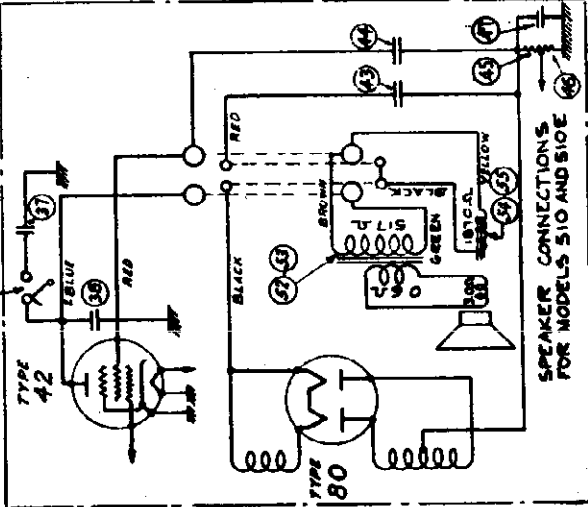


TUBE	PLATE	SCREEN GRID	CONTROL GRID	ARODE GRID	FILES
80	300	BETWEEN P.A.S. & GROUND	10		5.0
6F7	200	75	9	10	6.3
6D6	200	75	2.4		6.3
75	100		1.3		6.3
42	185	200	10		6.3
*ITEMS NOT USED IN EARLY MODELS					

ITEM 56 AND 57
NOT USED IN
EARLY MODELS



INT FREQ 465 KC.



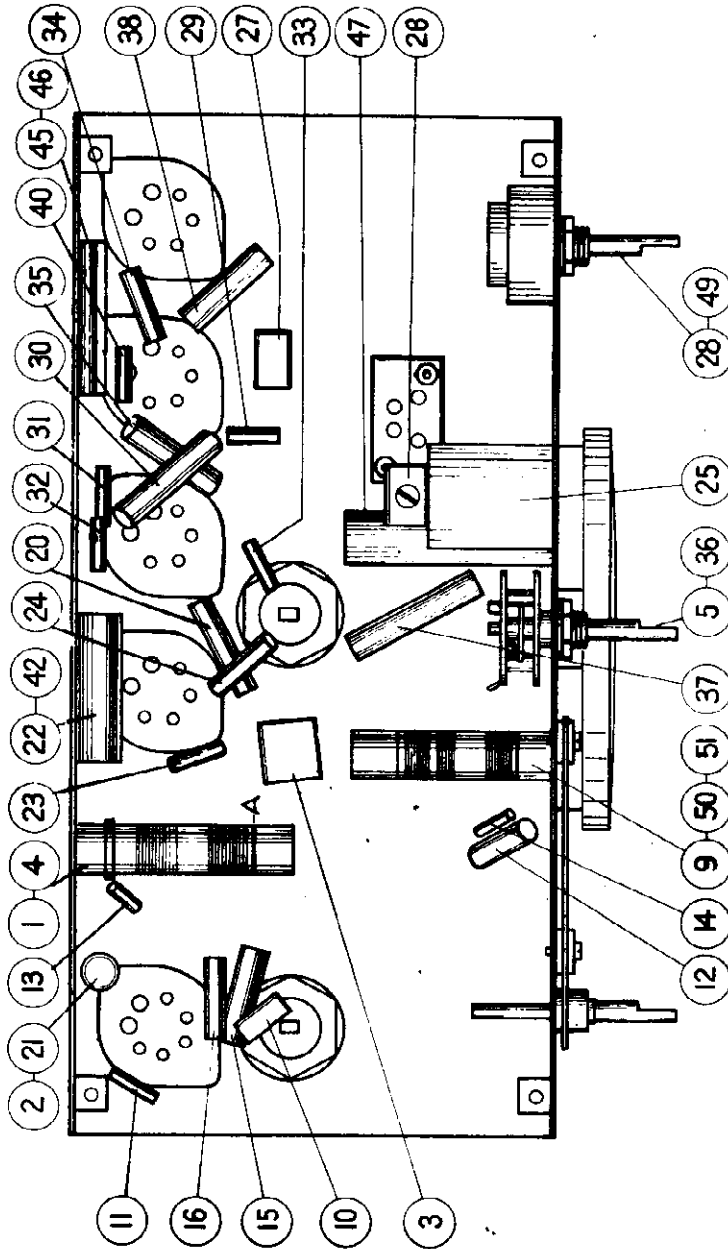
SPEAKER CONNECTIONS
FOR MODELS 510 AND 510E

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, 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. (465 K.C.)

1. Set volume control on full and turn tone control knob to the right hand position.
2. Connect output meter across voice coil
3. Set test oscillator to 465 K.C. and adjust its output to produce a measurable reading on output meter when test oscillator is applied to the grid of the 6D6 I.F. tube thru a .25 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 (see Fig. #1) to maximum output.
6. With test signal still on the grid of the 6F7 tube, repeat the above adjustments for greatest sensitivity.

ADJUSTMENT OF BROADCAST BAND

1. Leave test signal on grid of 6F7 tube and set 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. series condenser and adjust trimmer #7 to maximum output.

ADJUSTMENT OF POLICE BAND

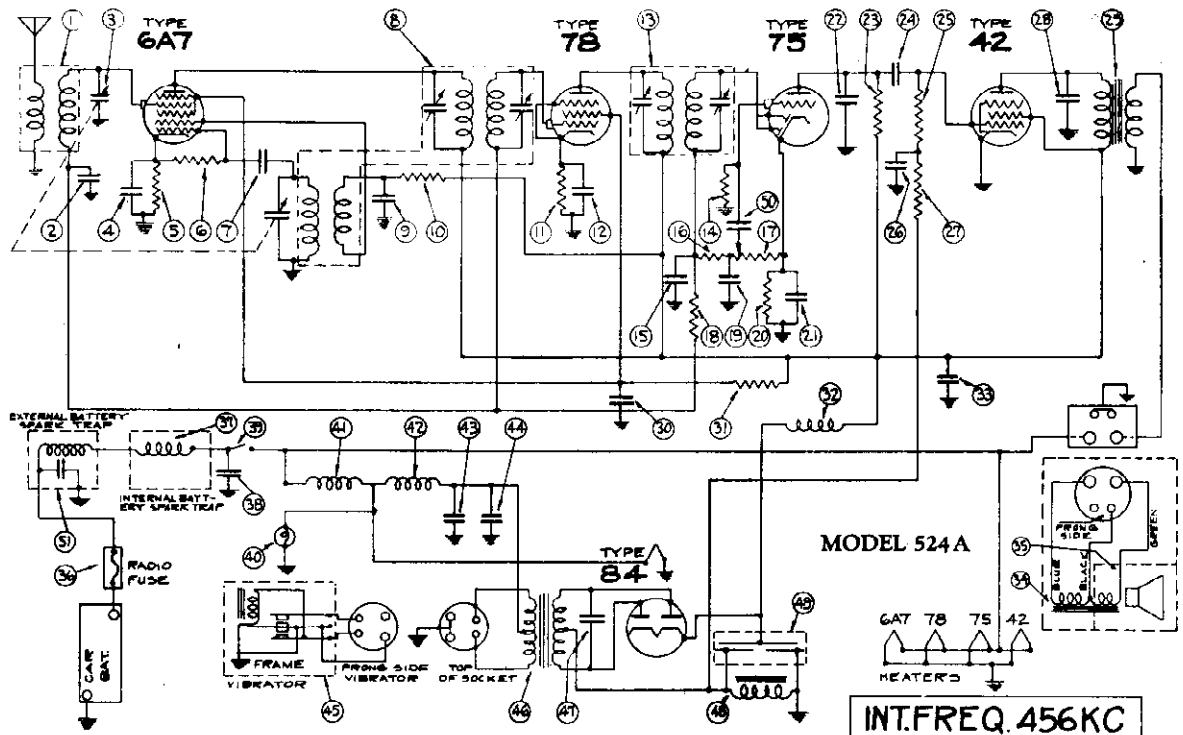
When adjustments as outlined under the broadcast band are completed, the police band requires no adjustment unless the coil has been changed.

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.

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	-----	530 to 1500 K.C. and 1500 to 3300 K.C.
Maximum Undistorted Output	-----	1.5 Watts
Maximum Output	-----	2.8 Watts
Line-Up Frequencies	-----	I.F. 465 K.C., 1400 K.C.

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MODEL 524A
Editions 1,2,2D,2C
Schematic, Voltage
Socket, Trimmers
Resistor Data



REFER TO SKETCHES

WINDING RESISTANCE		
WINDING	PRIMARY RESISTANCE	SECONDARY RESISTANCE
(1) ANT. COIL	2 Ω. C TO D	4 Ω. A TO F
(8) OSCILLATOR	3 Ω. G TO I	4 Ω. H TO J
(13) I.F.	13 Ω. RED TO BLUE	13 Ω. GREEN TO BLACK
(25) OUTPUT	17 Ω. RED TO BLUE	13 Ω. GREEN TO BLACK
(42) POWER	0.3 Ω. BLACK TO GREEN	8 Ω. RED TO BLUE
(45) CHOKE	350 Ω. BLACK TO GND	

SOCKET VOLTAGE

TUBE	STAGE	FIL.	PLATE	CATH.	SCREEN	GRID	CONTROL
6A7	DET. OSC.	6.0	235	5.2	97.0	175	
78	I.F.	6.0	240.5	2.5	98.0		
75	2nd DET.	6.0	146.5	1.5			
84	RECTIFIER	6.0					
42	POWER	6.0	227.5	2.4	3		

NOTE: ALL VOLTAGE READINGS WITH A VOLT METER HAVE A RESISTANCE OF 1000 Ω. PER VOLT.

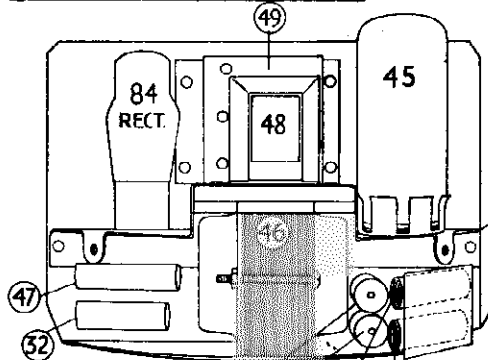


Figure No. 3

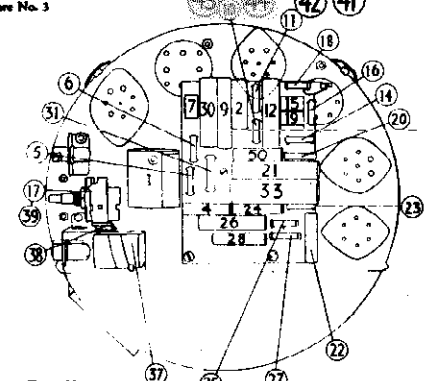


Figure No. 4

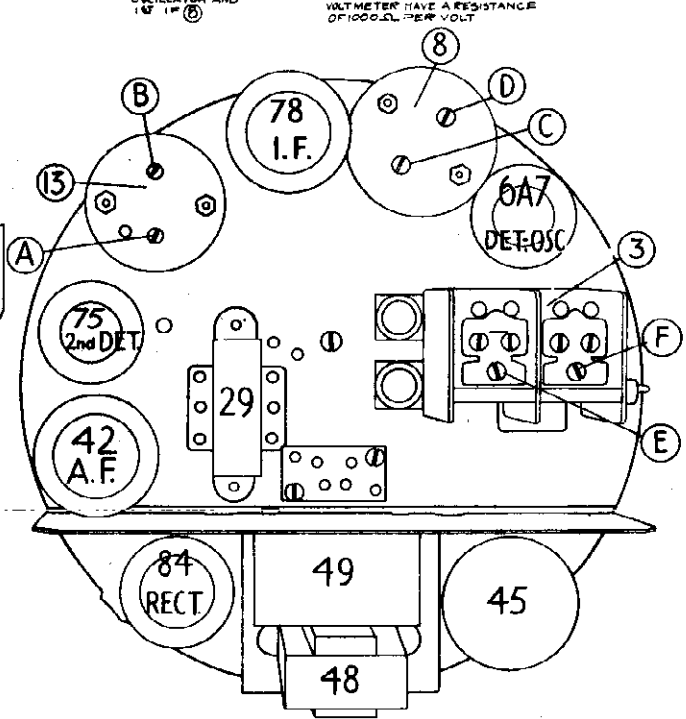


Figure No. 2

MODEL 524A

Editions 1,2,2D,2G
Service Data, Parts
Alignment

UNITED AMERICAN BOSCH CORP.

This is the exact setting of the condenser gang for the receiver oscillator at 1600 K.C. and should be carefully set as the resultant effect on the receiver is directly dependent upon it.

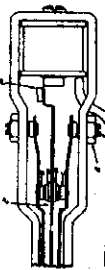


Figure No. 1

- 2. Remove the rubber cover, being careful not to bend the wires at the soldered connection.
3. Lay the vibrator on a piece of white paper so that when viewed from above it appears exactly like in the following drawing.

SERVICE PARTS LIST

Table with 3 columns: Part #, Description of Parts, and Remarks. Lists various electronic components like resistors, capacitors, coils, and tubes.

If the audio and speaker are still dead, the chassis should be removed from its housing.
If the audio and speaker are working correctly, test the remaining tubes and check the voltage at each socket.

LOCATING TROUBLE IN CHASSIS
In locating a short, open or defective unit that results in low or no B voltage, disconnect the power pack from the receiver section by pulling out the vibrator plug.

Check speaker field coil, voice coil and vibrator unit for resistance and continuity.
Check for loose connections at the vibrator plug.

Check for loose connections at the vibrator plug.
Check for loose connections at the vibrator plug.

Check for loose connections at the vibrator plug.
Check for loose connections at the vibrator plug.

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Check for loose connections at the vibrator plug.

AMERICAN-BOSCH CAR-RADIO MODEL 524A

Five-Tube, Superheterodyne Receiver

ELECTRICAL SPECIFICATIONS

- Type and Number of Tubes: 1 6X4, 1 6F7, 1 6W6, 1 6Z4 - total 5 tubes.
Power Output: 5.0 Amperes at 1600 K.C.
Maximum Output: 4 Watts

GENERAL DESCRIPTION

The Model 524A Car-Radio has been designed for convenience and compactness. It is a five-tube, superheterodyne receiver with an automatic volume control.

CIRCUIT DESCRIPTION

The circuit is of the superheterodyne type. It consists of a radio frequency amplifier, a detector and first audio amplifier, a detector and second audio amplifier, and a push-pull output stage.

SERVICE DATA

Check for loose connections at the vibrator plug.
Check for loose connections at the vibrator plug.

SET UNDERLINE AND TUBES DO NOT LINE

Check for loose connections at the vibrator plug.
Check for loose connections at the vibrator plug.

SET UNDERLINE AND TUBES DO NOT LINE

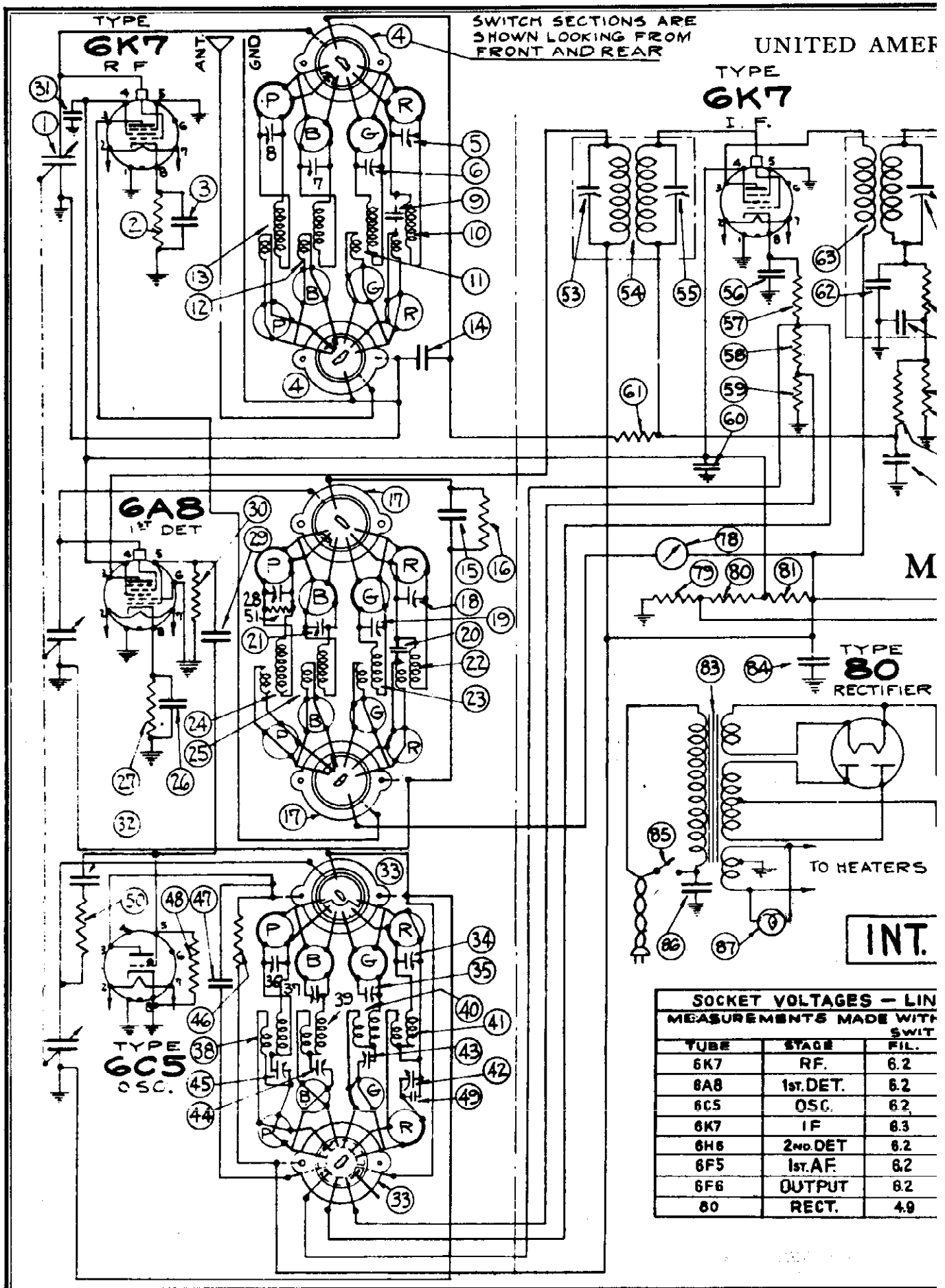
Check for loose connections at the vibrator plug.
Check for loose connections at the vibrator plug.

SET UNDERLINE AND TUBES DO NOT LINE

Check for loose connections at the vibrator plug.
Check for loose connections at the vibrator plug.

SET UNDERLINE AND TUBES DO NOT LINE

Check for loose connections at the vibrator plug.
Check for loose connections at the vibrator plug.



SOCKET VOLTAGES - LIN
MEASUREMENTS MADE WITH SWIT

TUBE	STAGE	FIL.
6K7	RF.	6.2
6A8	1st. DET.	6.2
6C5	OSC.	6.2
6K7	IF.	6.3
6H6	2nd. DET.	6.2
6F5	1st. AF.	6.2
6F6	OUTPUT	6.2
80	RECT.	4.9

IN BOSCH CORP.

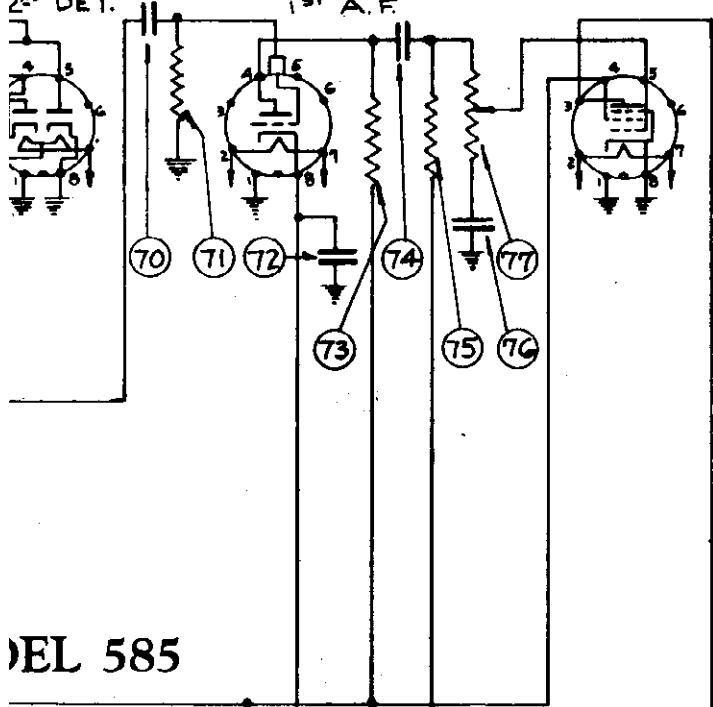
TYPE
5HG
2ND DET.

TYPE
6F5
1ST A.F.

TYPE
6F6
POWER
PENTODE

MODEL 585

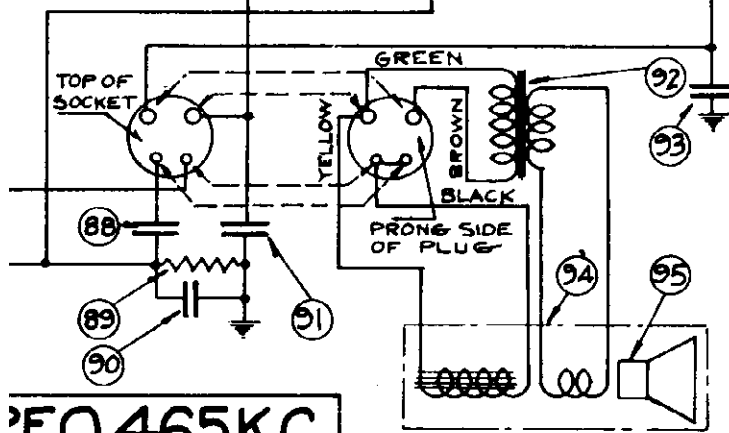
Preliminary
Schematic, Voltage
Resistor Data



FOR PARTS LIST SEE MODELS 585-Y, 585-Z
and the following differences

- | | |
|------|---------------------|
| # 29 | .000065 mfd. mica |
| # 32 | .05 mfd. 200 volt |
| # 60 | .05 mfd. 200 volt |
| # 72 | .05 mfd. 200 volt |
| # 79 | 200 ohms 1/4 watt |
| # 80 | 20,000 ohms 1. watt |
| # 81 | 12,500 ohms 2. watt |
| # 86 | .01 mfd. 600 volt |
| # 88 | 12. mfd. 475 volt |
| # 90 | 12. mfd. 25. volt |

MODEL 585

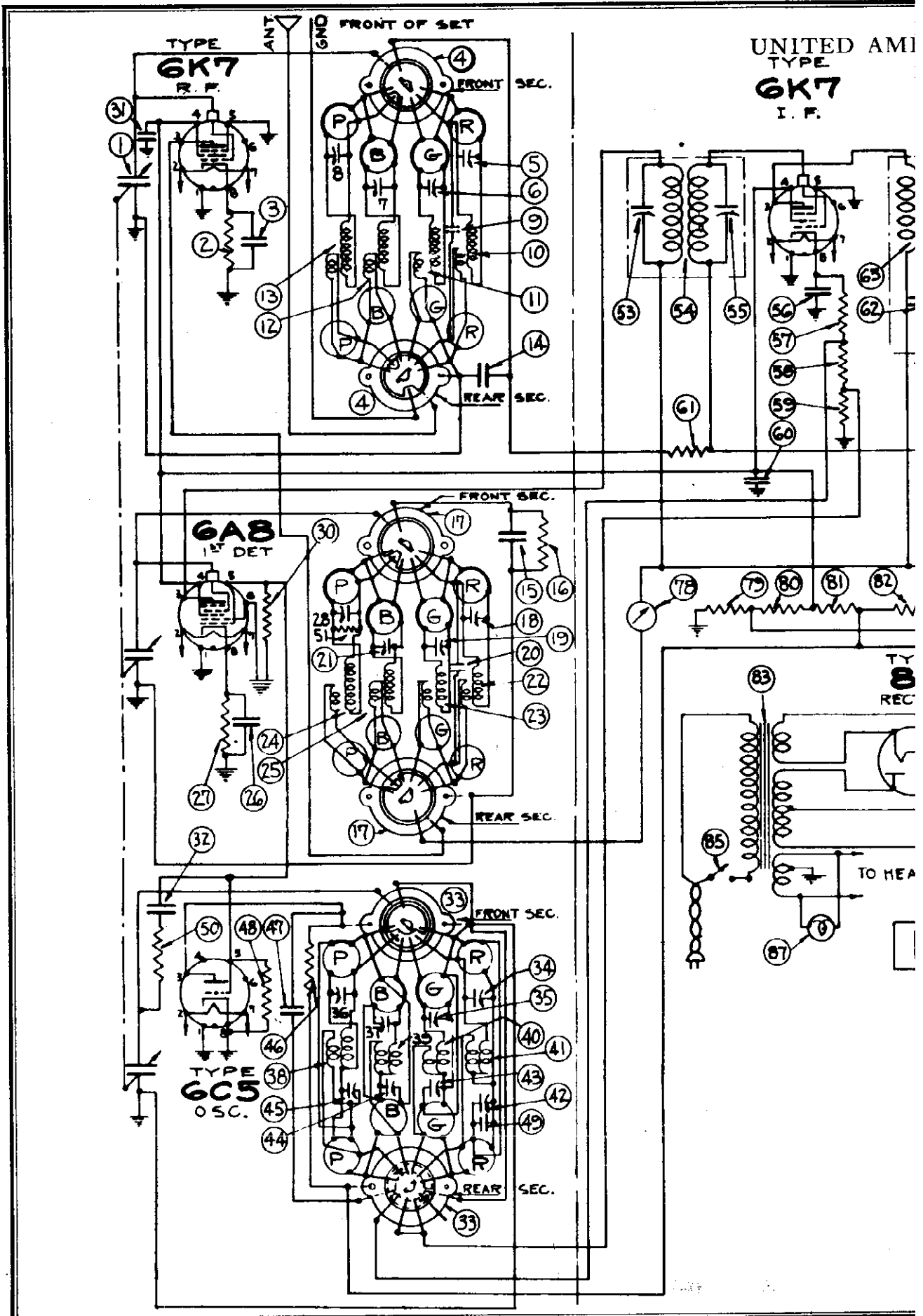


REQ. 465K.C.

5 VOLTS - TAKEN FROM BOTTOM OF SOCKETS
100 OHMS PER VOLT VOLTMETER AND WITH WAVE-CHANGE
BROADCAST BAND POSITION

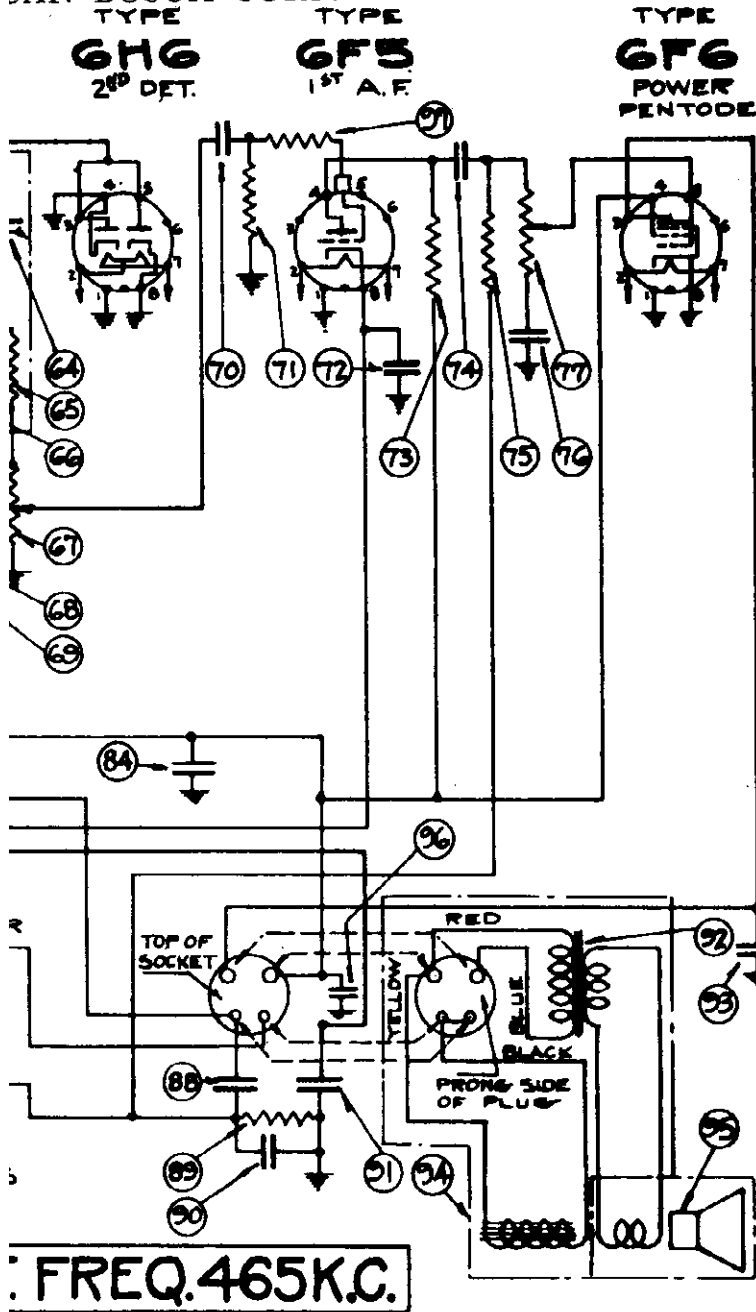
NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.	CATHODE	PIN NOS.
-7	270	3-1	108	4-1	2.6	1-8
-7	230	3-1	108	4-1	4.0	1-8
-7	200	3-1				
-7	265	3-1	105	4-1	5.5	1-8
-7						
-7	108	4-1			1.2	1-8
-7	252	3-1	270	4-1	18.5	ACROSS * 89 RES.
	370					

D.C. RESISTANCE			
MEASURED WITH WAVE-CHANGE SWITCH IN CORRESPONDING BAND POSITION			
COIL	DIA. N°	PRIM.	SEC.
P-ANT.	13	130 ohms	25 ohms
P-RF	24	38 "	25 "
P-OSC.	38	8 "	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.	54	13 "	13 "
2nd. IF.	63	11.5 "	11.5 "
OUTPUT			
TRANS.	92	450 "	5 "
SPKR.			
FIELD		1900 "	
VOICE			
COIL	95	3 "	



DAN BOSCH CORP.

MODELS 585Y, 585Z
Schematic, Voltage
Resistor Data



D.C. RESISTANCE			
MEASURED WITH WAVE-CHANGE SWITCH IN CORRESPONDING BAND POSITION			
COIL	DIAM.	PRIM.	SEC.
P-ANT.	13	130 Ω	25 Ω
P-RF	24	38 "	25 "
P-OSC.	38	8 "	13.5 "
B-ANT.	12	22 "	4 "
B-RF	25	.5 "	4.5 "
B-OSC.	39	1.5 "	3 "
G-ANT.	11	32 "	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.	54	13 "	13 "
2nd. IF.	83	11.5 "	11.5 "
OUTPUT TRANS.	92	450 "	5 "
SPKR. FIELD		1900 "	
VOICE COIL	95	3 "	

MODELS
585 Y
585 Z

SOCKET VOLTAGES - LINE = 115 VOLTS - TAKEN FROM BOTTOM OF SOCKETS									
MEASUREMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE-CHANGE SWITCH IN BROADCAST BAND POSITION									
TUBE	STAGE	FILE	PIN NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.	CATHODE	PIN NOS.
6K7	RF.	82	2-7	270	3-1	108	4-1	2.0	1-8
6A8	1st. DET.	82	2-7	230	3-1	108	4-1	4.0	1-8
6C5	OSC.	82	2-7	200	3-1				
6K7	IF	83	2-7	265	3-1	105	4-1	5.5	1-8
6H6	2nd. DET.	82	2-7						
6F5	1st. AF.	82	2-7	108	4-1			1.2	1-8
6F6	OUTPUT	82	2-7	252	3-1	270	4-1	18.5	MEAS. @ 80 HZ.
80	RECT.	A9		370					

UNITED AMERICAN BOSCH CORP.

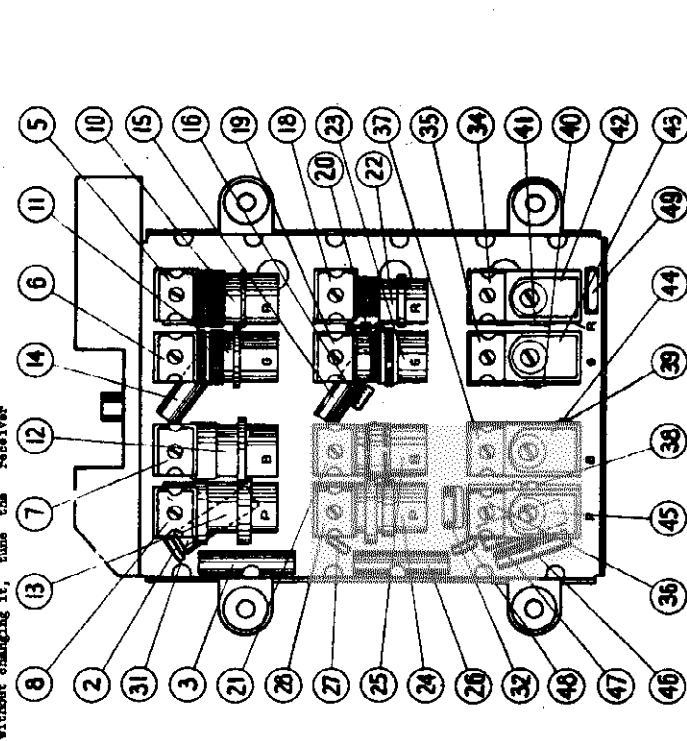
MODELS 585Y, 585Z
Centr-O-Matic Dat
Alignment, Trimmer

turn a maximum, noting reading of the output meter. Change the lag condenser function, the same direction, the output meter and note adjustment. 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 is changed. While this procedure is being followed, the tuning control can be easily acquired by practice and the operation requires only a few minutes.

IMPORTANT: While testing or making repairs on the receiver, the chassis should not be turned upside down. It should be turned on 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 to be defective. If left in this position for long the condenser may be injured.

ADJUSTMENT OF GREEN BAND
Note: In adjusting the Green and Red Bands, a .002 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 Green Band position.
2. Set test oscillator and dial indicator to 5600 K.C. and adjust #35, #19 and #6.
3. Set test oscillator and dial indicator to 1900 K.C. and adjust #43 for maximum output.
4. Return to 5600 K.C. setting and make readjustment of #35, #19 and #6.
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

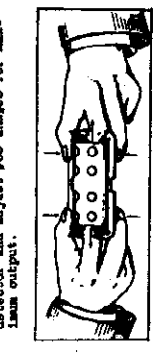
Before attempting to align the receiver, the service man should familiarize himself with the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figures #2, #3 and #4 and should be carefully studied before the actual work is started.
ADJUSTMENT OF I.F. (465 K.C.)
1. Set volume control on full and turn tone control to bass position.
2. Connect output meter across voice coil.
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 6Y I.F. tube thru a .5 mfd. blocking condenser.
4. Adjust trimmer #64 for maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 6A5 first detector and adjust #55 and #65 for maximum output.



ADJUSTMENT OF PURPLE BAND
1. Set wave-change switch to Purple Band position. oscillator and dial indicator to 350 I.C. setting and adjust #46 for maximum output.
2. Apply test signal to antenna terminal of the chassis thru a .002 mfd. series condenser and adjust #56, #68 and #6 for maximum output.
3. Set test oscillator and dial indicator to 150 K.C. and adjust #46 for maximum output.
4. Return to 350 K.C. setting with both test oscillator and dial indicator and repeat adjustment of #56, #68 and #6 for accuracy.
ADJUSTMENT OF BROADCAST BAND
1. Set wave-change switch to the Black or Broadcast Band position. oscillator and dial indicator to 1600 K.C. and adjust #37, #21 and #7 for maximum output.
2. Set test oscillator and dial indicator to 570 K.C. and adjust #44 for maximum output.
3. Return to 1600 K.C. setting and make readjustment of #37, #21 and #7.

REMOVING INDIVIDUAL COIL AND SWITCH SECTIONS OF CENTR-O-MATIC UNIT
If a component part located underneath the switch and coil assemblies of the Centr-O-Matic 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 assembly are located on the back of the "Centr-O-matic" unit and are indicated by X, Y, and Z in Figure #5. Remove the corresponding screws.
5. Each individual section can then be pulled out straight.

Note: On the K.F. section, the plate lead from the 6Y7 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 6G5 socket.
6. After repairs have been made resolder the plate lead mentioned above and reinsert the section into the chassis. To serve that the slotted holes in the switch bracket line up with the round guide pins on the base plate of the "Centr-O-matic" unit. This is important as the switch shaft cannot be inserted if the switch brackets do not line up.
7. Replace the section fastening screws.
8. Resolder the stator and rotor leads on gang condenser.
9. Replace the switch shaft and the stator and rotor leads on the "Centr-O-matic" unit. Be careful that all the switch discs are in the same position. Otherwise the switch shaft will not slide in. **NOTE:** Force the shaft into the switch discs. If contact does not slide in freely, examine the condition of the slot in each switch disc.
10. Before replacing the coil shields, it might be advisable to bend the shields slightly to assure that positive contact is made. To do this hold the shields in position with the thumb and the 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 in the drawing. This will insure that the shields and observe that they fit tightly. In addition to assuring positive contacts, this will also prevent the shields from rattling.



LINEUP CAPACITOR ADJUSTMENTS
To align the circuits of this receiver it is essential to use a high grade solenoid type capacitor. A capacitor which can be continuously varied through the full overlaid when the individual circuits of the receiver are brought into alignment. A conventional capacitor can be connected across the terminals of the speaker and will not insure satisfactory results. The capacitor must be sufficient to give satisfactory reading with a low input signal.

TYPE and Number of Tubes-- 6AV7, 1 6AG5, 1 6BE6, 1 6BE7, 1 6E6--Total 8
Power Supply Transformer ----- 105 to 125 volts, 50 to 60 cycles
Maximum Undistorted Output ----- 2.5 Watts
Maximum Output ----- 3.5 Watts
Tuning Ranges -----
{ Purple Band 120 to 350 K.C.
{ Black Band 540 to 1600 K.C.
{ Green Band 1600 to 8000 K.C.
{ Red Band 8000 to 15000 K.C.
{ I.P.F. 465 K.C., 150 K.C., 350 K.C., 1600 K.C., 570 K.C., 600 K.C., 1000 K.C., 17000 K.C., and 6000 K.C.

MODELS 585Y, 585Z
Socket, Trimmers
Parts List

UNITED AMERICAN BOSCH CORP.

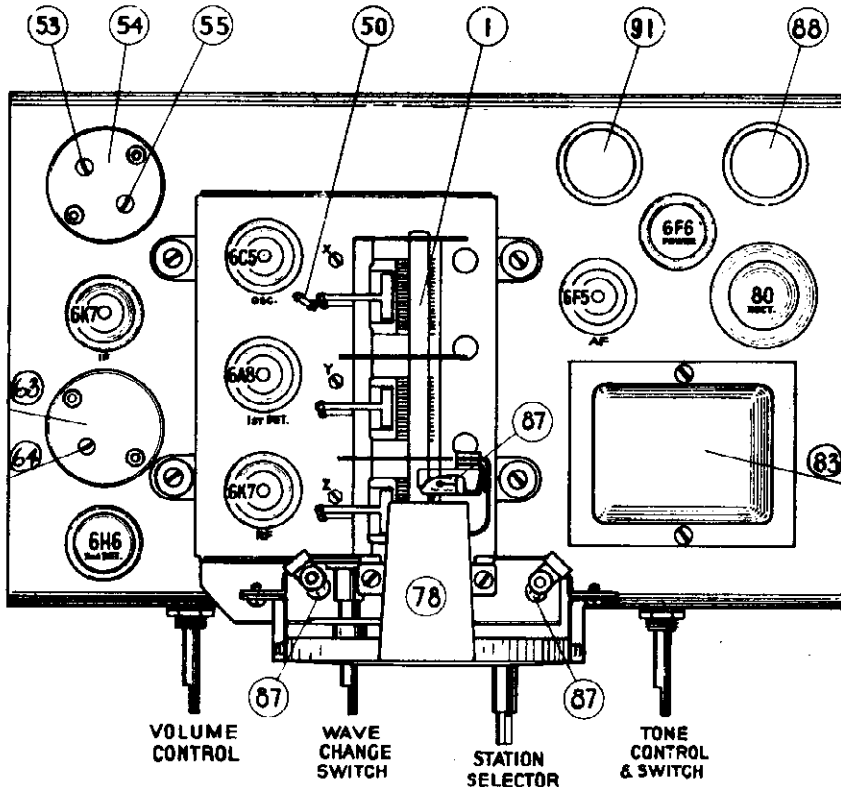


Figure No. 3

MODEL 585Z

Service parts list for Model 585Z same as for Model 585Y except for the following parts:

DIA. #	PART #	DESCRIPTION
94	SK 9512	Speaker complete
95	DM 9565	Diaphragm and coilassy.

MAIN ASSEMBLIES

PART #	DESCRIPTION
KA 9824	Cabinet
SK 9812	Speaker assembly

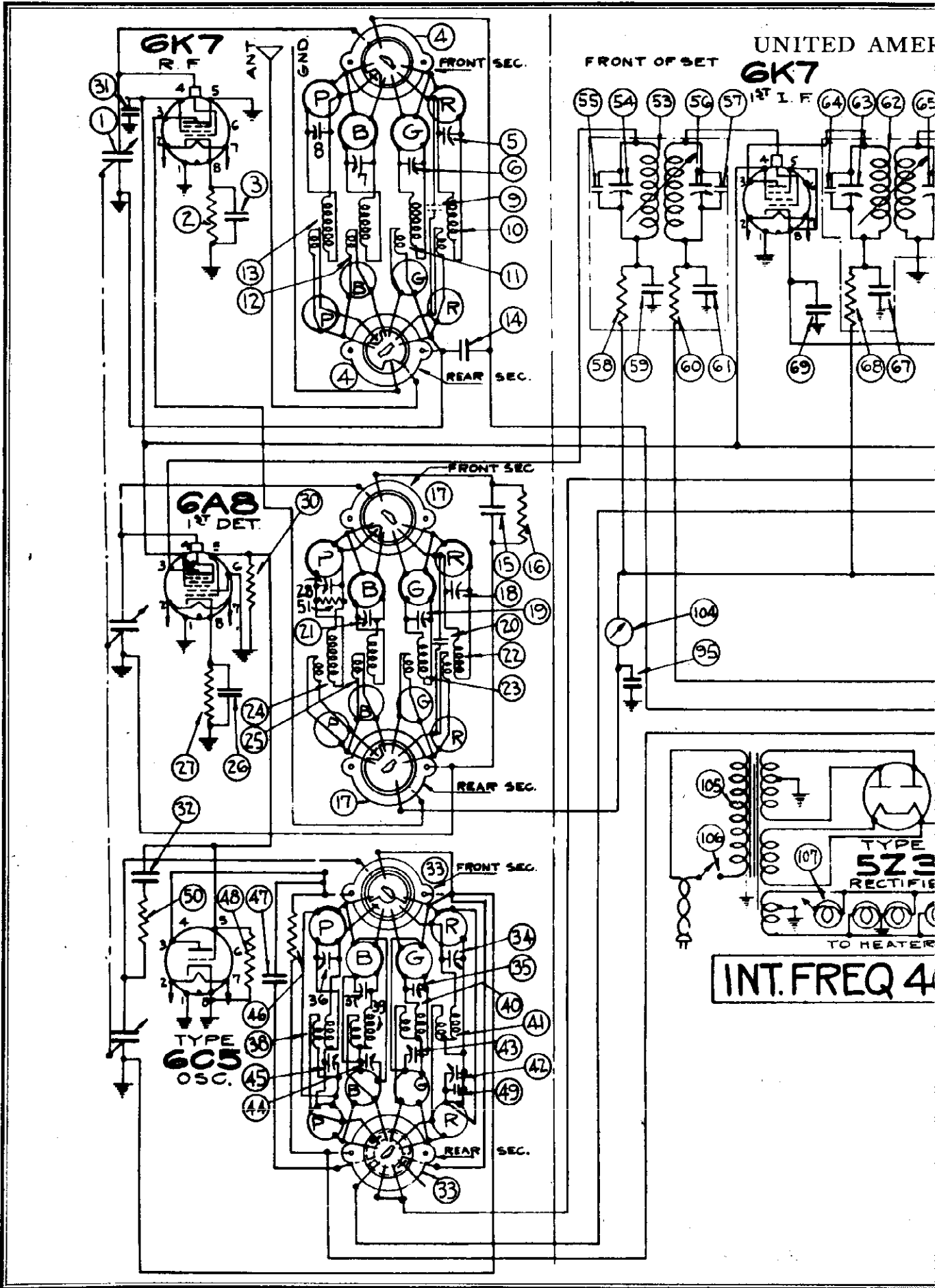
SPEAKER PARTS

DM 956	Diaphragm and coil assembly
FP 101740	Steel plate
FP 102870	Paper washer
CL 9537	Speaker field coil
SA 101735	Core and frame assembly

VR 9512	Tone control (500,000 ohm) and switch
SI 9538	Tuning meter assembly
SA 105260	500 ohm $\frac{1}{2}$ W. resistor
SA 104866	30,000 ohm $\frac{1}{2}$ W. resistor
SA 105615	10,000 ohm 1 W. resistor
SA 9540	7000 ohm 2 W. resistor
	Power transformer

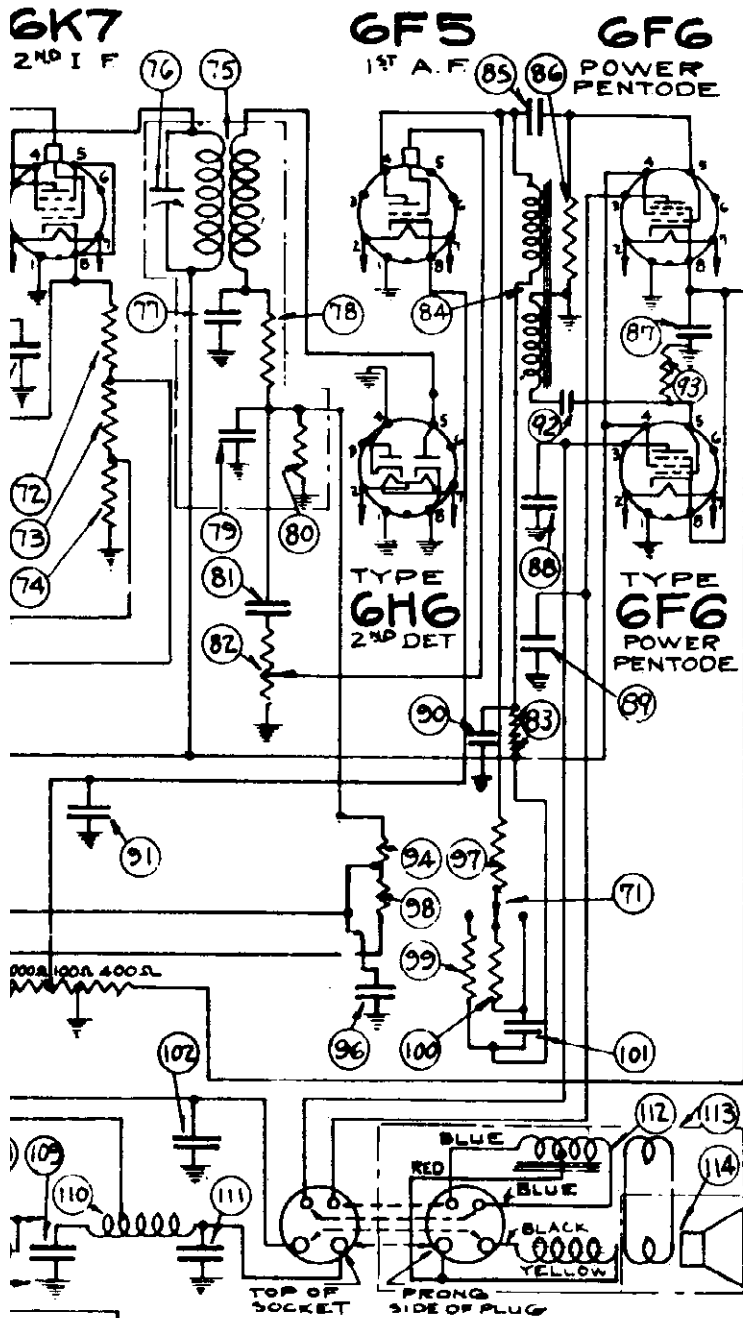
SERVICE PARTS LIST MODEL 585 Y

DIA. #	PART #	DESCRIPTION
42	CG 9527	Oscillator coil assembly (Red Band)
43	RE 9529	300 ohm $\frac{1}{2}$ W. resistor
44	SA 106386	500 ohm $\frac{1}{2}$ W. resistor
45	SW 9524	Antenna "Contr-O-matic" assembly complete with switch, coils and trimmers
46	CS 9511	4 to 25 mfd. antenna trim condenser (Red Band)
47	CS 9511	4 to 25 mfd. antenna trim condenser (Green Band)
48	CS 9511	4 to 25 mfd. antenna trim condenser (Black Band)
49	CS 9511	4 to 25 mfd. antenna trim condenser (Purple Band)
50	RE 9527	Printed pair of wires-part of RC 9571
51	RE 9524	I.P. trimmer-part of IC 9527
52	IC 9527	I.P. transformer
53	IC 9527	I.P. trimmer-part of IC 9527
54	SA 102493	.05 mfd. 200 V. condenser
55	SA 105261	400 ohm $\frac{1}{2}$ W. resistor
56	SA 105267	1000 ohm $\frac{1}{2}$ W. resistor
57	SA 105249	5000 ohm $\frac{1}{2}$ W. resistor
58	SA 102497	.25 mfd. 200 V. condenser
59	SA 105278	100,000 ohm $\frac{1}{2}$ W. resistor
60	SA 105278	50 mfd. mica condenser-part of IC 9537
61	IC 9537	2nd I.P. transformer
62	IC 9537	I.P. trim condenser-part of IC 9537
63	VR 959	Volume control-500,000 ohm
64	RE 9530	1 meg. $\frac{1}{2}$ W. resistor
65	SA 105286	.02 mfd. 200 V. condenser
66	RE 9530	.02 mfd. 400 V. condenser
67	RE 9530	1 meg. $\frac{1}{2}$ W. resistor
68	CK 9515	12 mfd. 25 V. electrolytic condenser
69	SA 105279	250,000 ohm $\frac{1}{2}$ W. resistor
70	SA 105280	.02 mfd. 400 V. condenser
71	SA 9531	250,000 ohm $\frac{1}{2}$ W. resistor
72	SA 105403	.001 mfd. 600 V. condenser
73	VR 9512	Tone control (500,000 ohm) and switch
74	SI 9538	Tuning meter assembly
75	SA 105260	500 ohm $\frac{1}{2}$ W. resistor
76	SA 105260	30,000 ohm $\frac{1}{2}$ W. resistor
77	SA 105260	10,000 ohm 1 W. resistor
78	RE 9540	7000 ohm 2 W. resistor
79	TR 959	Power transformer
80	SA 105492	.05 mfd. 400 V. condenser
81	VR 9512	Tone control - part of dial light (4 used)
82	SA 106808	8 mfd. 475 V. electrolytic condenser-part of CE 954
83	RE 9523	300 ohm resistor
84	RE 9518	20 mfd. 25 V. electrolytic condenser-part of CE 954
85	CE 9518	8 mfd. 500 V. electrolytic condenser
86	TR 9515	Speaker output transformer
87	SA 105659	.005 mfd. 400 V. condenser
88	SK 9511	Speaker - complete
89	SA 107292	Diaphragm and coilassy.
90	SA 107292	4 mfd. 450 V. electrolytic condenser-part of CE 954
91	RE 9524	100,000 ohm $\frac{1}{2}$ W. resistor



AN BOSCH CORP.

MODELS 595M,595P
Schematic,Voltage
Resistor Data



D.C. RESISTANCE			
MEASURED WITH WAVE-CHANGE SWITCH IN CORRESPONDING BAND POSITION			
COIL	DIA. N°	PRIM.	SEC.
P-ANT.	13	130	25
P-RF.	24	36	25
P-OSC.	38	80	13.5
B-ANT.	12	22	4
B-RF.	25	5	4.5
B-OSC.	39	1.5	3
G-ANT.	11	32	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	.08
SPKR.			
FIELD		1900	
VOICE			
COIL	114	2.6	

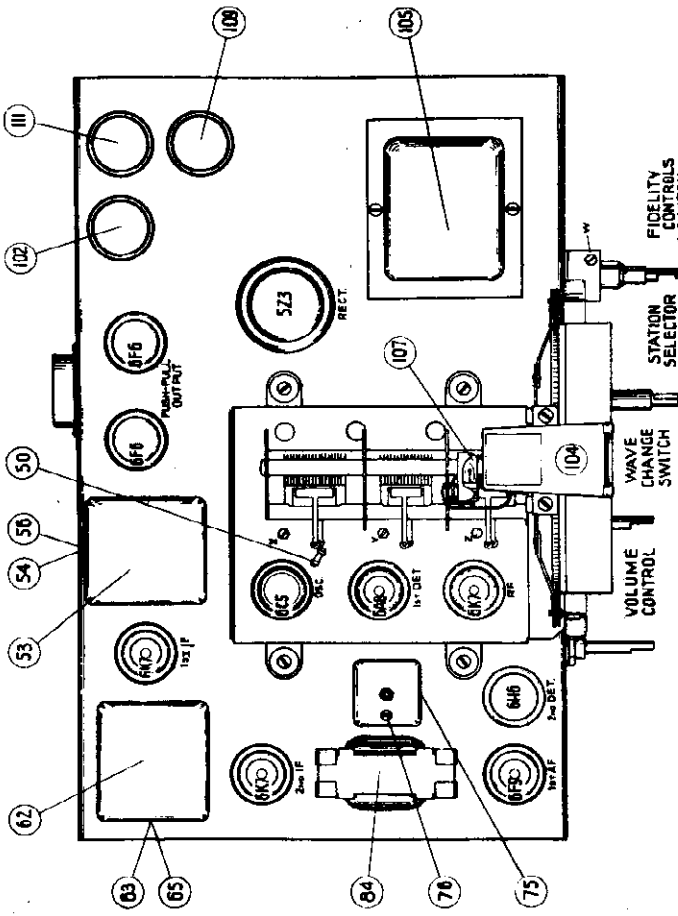
K.C.

SOCKET VOLTAGES - LINE = 115 VOLTS TAKEN FROM BOTTOM OF SOCKETS
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.	CATHODE	PIN NOS.
6K7	RF	6.2	2-7	245	3-1	100	4-1	2.5	1-8
6A8	1st. DET.	6.2	2-7	240	3-1	100	4-1	2.2	1-8
6C5	OSC.	6.2	2-7	200	3-1				
6K7	1st. IF	6.2	2-7	240	3-1	100	4-1	8.0	1-8
6K7	2nd. IF	6.2	2-7	255	3-1	100	4-1	8.0	1-8
6H8	2nd. DET.	6.2	2-7						
6F5	1st. AF.	6.2	2-7	250	4-1			1.75	1-8
6F6	OUTPUT	6.2	2-7	350	3-1	255	4-1	19.5	1-8
6F8	OUTPUT	6.2	2-7	350	3-1	255	4-1	19.5	1-8
5Z3	RECT.	5.1		720					

UNITED AMERICAN BOSCH CORP.

MODELS 595M, 595F
Centr-O-Matic D
Socket, Trimmers
Alignment



infactor, reacting 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 three air venting trimmer condensers, the two counter-clockwise trimmer condensers shown in figures #42 and #43, and #44, and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (495 K.C.)

CAUTION: DO NOT INTERFERE WITH THE I.F. ADJUSTMENT OF THIS RECEIVER EXCEPT AS SET FORTH IN THIS MANUAL. THE USE OF ANY OTHER HIGH GRADE TESTING EQUIPMENT IS AVAILABLE.

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 travel brought about by the expander mechanism is limited by definite stops. To properly set the I.F. transformers, turn the fidelity control to the extreme right or clockwise position. Tighten the drive cords of the variable I.F. transformers until the pulleys on the bottom of the transformers are against the stops in counter-clockwise direction. The I.F. trimmers are adjusted only when the variable selector coils are placed in a particular mechanical position. It is desired 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, turn the fidelity control to the extreme left or counter-clockwise position and turn the stop-screw (indicated by "W" in figure #8), which acts as a stop to limit selectivity, out 1/4 inch. With the fidelity 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 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 2nd I.F. tube (#87) thru a .5 mfd. blocking condenser.
3. Adjust trimmer #76 for maximum output, requiring output of test oscillator as shown in figure #8.
4. Apply test signal to grid of 1st I.F. tube (#87) and adjust #85 and #86 for maximum output.
5. Apply test signal to grid of 1st detector (#69) and adjust #94 and #96 for maximum output.
6. After the above I.F. adjustments have been made, the selectivity control knob (larger of the double lower right-hand knob) to the extreme right or clockwise direction and reset the stop-screw.

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 350 K.C. and apply test signal to antenna terminal of the chassis thru a .0002 mfd. series condenser and adjust #56, #58 and #6 for maximum output.

REMOVING INDIVIDUAL COIL AND SWITCH SECTIONS OF THE CENTR-O-MATIC UNIT.
If a component part located underneath the switch and coil assemblies of the "Centr-O-Matic" unit is to be replaced, the coil or the switch 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 coil sections to the chassis.
3. Undo the stator and rotor leads from the gang condenser.
4. The fastening screws for the switch and coil sections are located on top of the "Centr-O-Matic" unit and are indicated by X, Y, and Z in figure #8. Remove the corresponding screws.
5. Pull out switch section can then be removed from the R.F. section, the plate lead from the 8K7 socket will have to be unhooked from the switch terminal before the section can be removed. On the oscillator section, the plate lead will have to be unhooked from the 6S5 socket repairs have been made reholder 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 "Centr-O-Matic" unit. This is IMPORTANT as the switch shaft cannot be inserted if the switch brackets do not line up.
6. Replace the section retaining screw.
7. Repeat the stator and rotor leads on gang condenser.
8. Replace the switch shaft and the mounting plate 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 the stator ferrite magnet into the switch assembly. The stator ferrite magnet is freshly cleaned the position of the slot in each switch disc.
9. Before replacing the coil shields, it is advisable 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 fingers as shown in figure #9. Stand at the same time apply a little pressure on the sides as indicated by the arrows in the drawing. Then replace the shields and observe that they fit tightly. In addition to assuring positive contact, this will also prevent the shields from rattling.

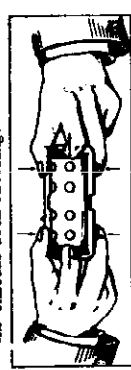


Figure No. 1
LINEUP CAPACITOR ADJUSTMENTS
To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from the receiver when the individual circuits of the receiver are brought into alignment. A conventional output terminal of the speaker voice coil to indicate when the circuits

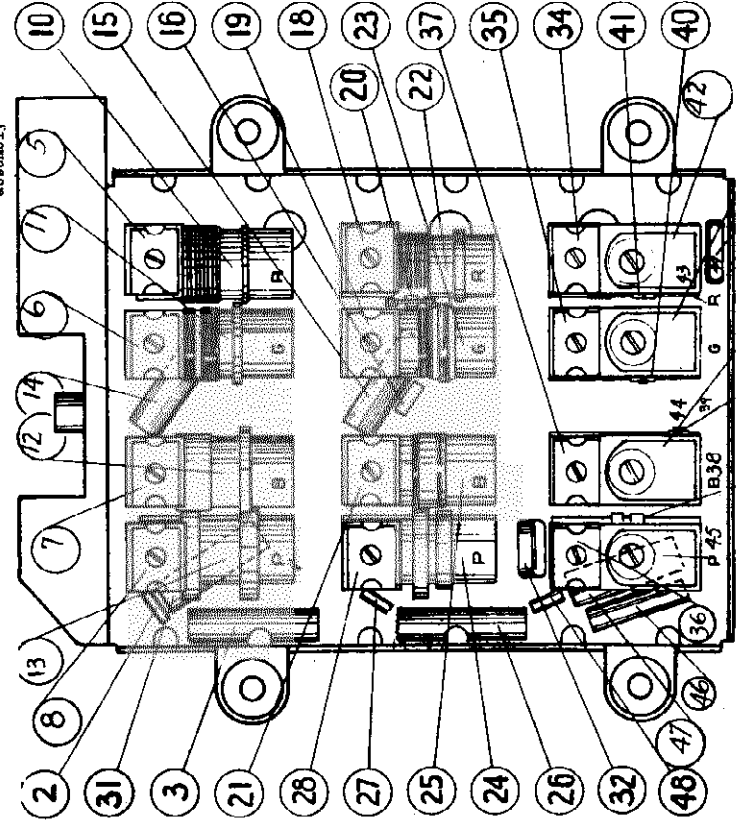
- Figure No. 3**
2. Set test oscillator and dial indicator to 17000 K.C. and adjust #54, #18 and #6 for maximum output.
 3. Set test oscillator and dial indicator to 4000 K.C. and adjust #42 for maximum output.
 4. Return to 17000 K.C. setting and make readjustment of #34, #18 and #6.
- Notes:** The adjustment of the two short-wave oscillator leg condensers (#42 and #43) is best made by the max.-max. method. This is done as follows:
Turn the receiver with the left hand by means of the tuning knob and adjust the leg condenser in either direction and then without changing it, tune the receiver thru a maximum, noting reading of the output meter. Change the leg condenser further in the same direction, return receiver and note reading. If output meter shows a maximum, note reading of the condenser. The adjustment of leg and error adjust-ment until no further improvement can be made when either the tuning control or the leg 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 conden-

4. Return to 350 K.C. setting with both test oscillator and dial indicator and repeat adjustment of #56, #58 and #9 for accuracy.
- ADJUSTMENT OF BROADCAST BAND**
1. Set wave-change switch to White or Red Band position.
 2. Set test oscillator and dial indicator to 1600 K.C. and adjust #37, #21 and #7 for maximum output.
 3. Set test oscillator and dial indicator to 670 K.C. and adjust #44 for maximum output.
 4. Return to 1600 K.C. setting and make readjustment of #37, #21 and #7.
- ADJUSTMENT OF GREEN BAND**
- Notes:** In adjusting the Green and Red Bands, 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 9500 K.C. and adjust #36, #19 and #6 for maximum output.
 3. Set test oscillator and dial indicator to 1900 K.C. and adjust #43 for maximum output.
 4. Return to 9500 K.C. setting and make readjustment of #36, #19 and #6.
- ADJUSTMENT OF RED BAND**

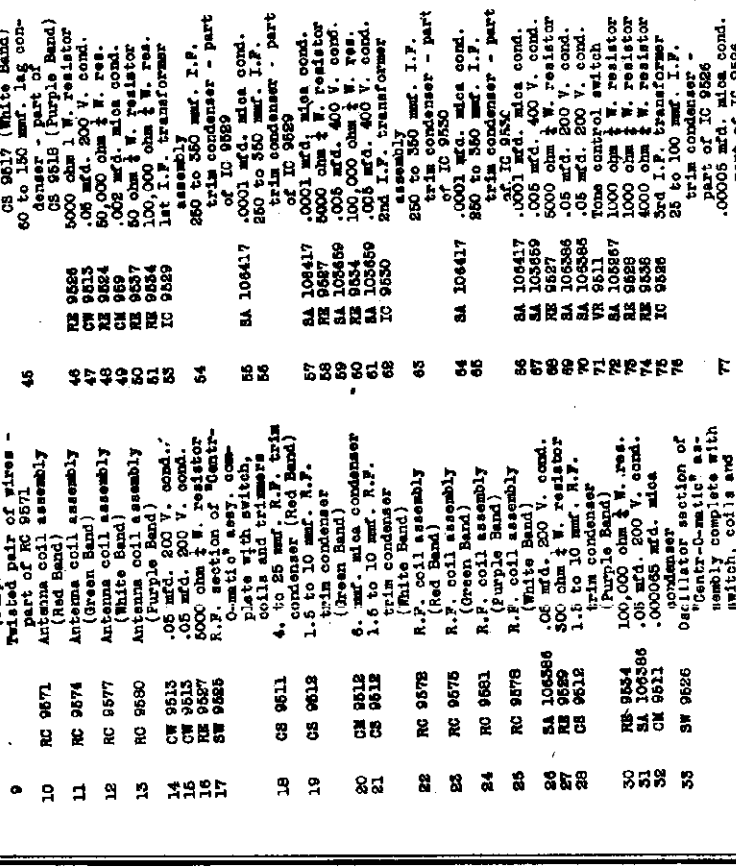
MODELS 595M, 595P
Trimmers, Parts

UNITED AMERICAN BOSCH CORP.

- 10 mfd. 25 V. electrolytic condenser - part of SA 107915.
- .002 mfd. 600 V. cond.
- .002 mfd. 600 V. cond.
- .02 mfd. 400 V. cond.
- 10 mfd. 25 V. electrolytic condenser - part of SA 107915.
- .02 mfd. 400 V. cond.
- 1 meg. 1/2 W. resistor
- .05 mfd. 400 V. cond.
- SA 105281
- SA 105282
- SA 105283
- SA 105284
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- SA 105500



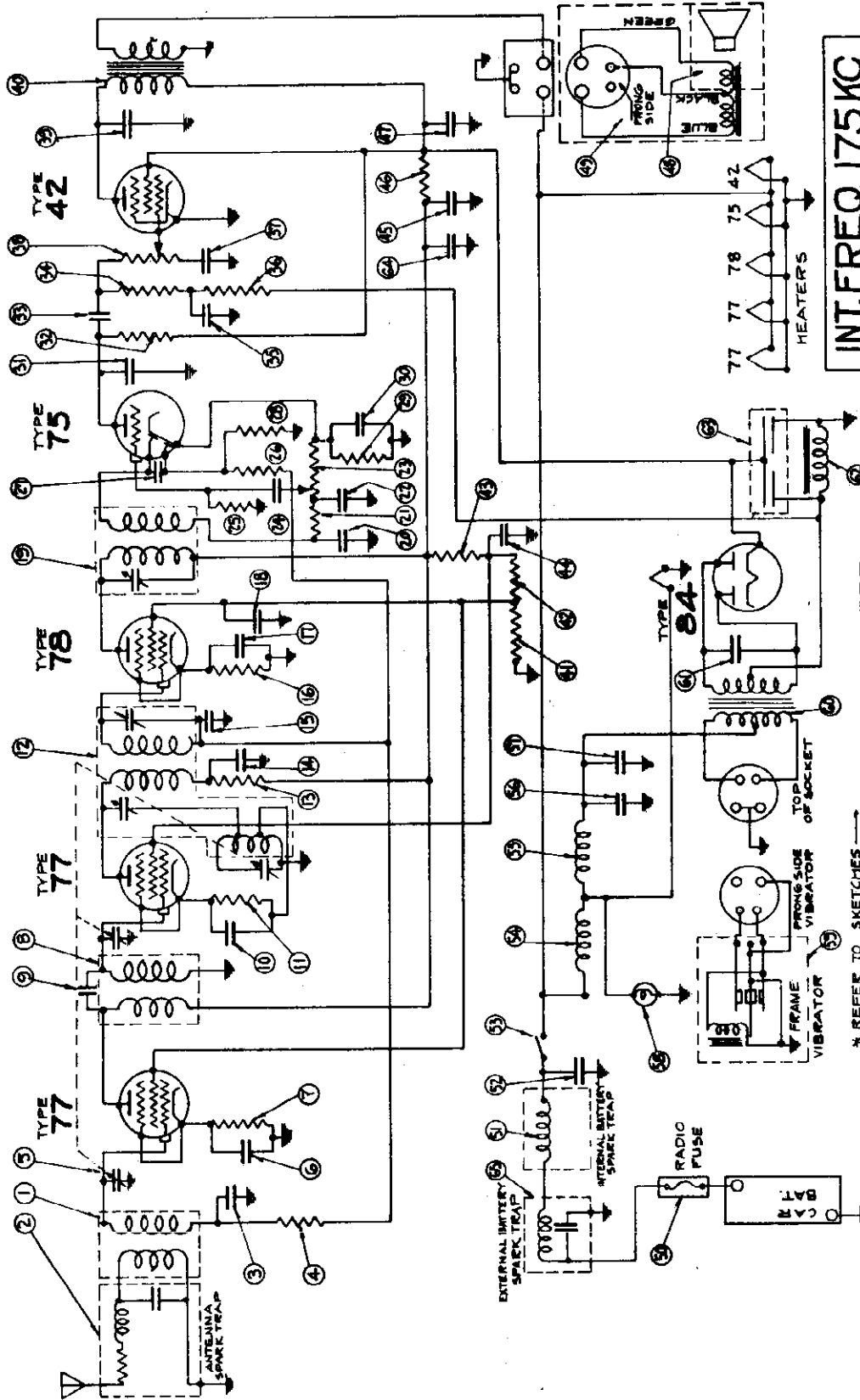
- 8 to 25 mfd. trim condenser - part of RC 9517 (White Band)
- RC 9588
- RC 9579
- RC 9576
- RC 9573
- RC 9570
- RC 9567
- RC 9564
- RC 9561
- RC 9558
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- RC 9021
- RC 9018
- RC 9015
- RC 9012
- RC 9009
- RC 9006
- RC 9003
- RC 9000



Type and Number of Tubes -- 3 #6X7, 1 #6AG, 1 #6CE, 1 #6BE, 1 #6F5, 2 #6T6, 1 #5Z5 - Total 10
 Power Supply
 Power Consumption
 Maximum Undistorted Output
 Maximum Output
 Tuning Ranges
 Line-Up Frequencies -- I.F. 465K.C., 550K.C., 1500K.C., 1800K.C., 5700K.C., 4500K.C., 1800K.C., I.V. 0.003K.C. and 5000K.C.

UNITED AMERICAN BOSCH CORP

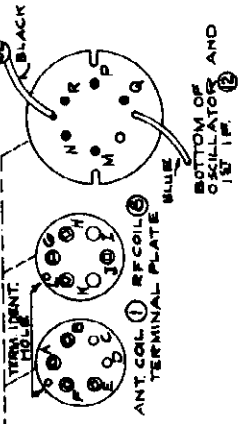
MODEL 634A
Schematic, Voltage
Resistor Data



INT. FREQ. 175 KC

TUBE STAGE	PL.	RATEATH	WIRE	RESISTANCE
77	RF	6.0	18G 1 B	84
77	DET. CK.	6.0	185 2	135
78	IF	6.0	190 G. 5	84
75	2ND DET.	6.0	117 1.5	
42	OUTPUT	6.0	276 C	242
84	RECTIFIER	6.0		

NOTE: ALL VOLTAGE READINGS WITH A VOLT METER HAVING A RESISTANCE OF 1000 Ω PER VOLT



WINDING	PRIMARY RESIST.	RESISTANCE IDENT. A	SECONDARY RESIST.	RESISTANCE IDENT. X
1 ANT. COIL	21 Ω	A TO B	2.5 Ω	E TO F
2 RF COIL	72 Ω	L TO G	4 Ω	H TO J
3 OSCILLATOR	6 Ω	M TO P		
4 2ND IF	70 Ω	R TO BLUE	67 Ω	BLACK TO GREEN
5 1ST IF	90 Ω	RED TO BLUE	86 Ω	GREEN TO BLACK
6 CHOKE	325 Ω	BLACK TO GND		
7 POWER	3 Ω	BLACK TO GREEN	86 Ω	RED TO BLUE

* REFER TO SKETCHES

MODEL 634A
Socket, Trimmers
Alignment, Parts

UNITED AMERICAN BOSCH CORP.

LINE-UP CAPACITOR ADJUSTMENTS

All the adjustable capacitors, commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustment unless a coil or I.F. transformer is changed or the adjustments tampered with in the field. Therefore, DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary, and a high grade modulated test oscillator is available, then proceed as follows and refer to Fig. #2.

1. Set test oscillator to 175 K.C.
2. Set condenser gang to approximately 600 K.C. This will be at a point where the condenser plates are nearly all in mesh.
3. Connect output meter across voice coil of speaker. This may be done by connecting one lead of the output meter to the blue lead of the speaker terminal strip and the other lead to the frame of the chassis. The impedance of the voice coil is 3. ohms.
4. Apply test signal to grid of 78 I.F. tube thru a .5 mfd. blocking condenser and adjust trimmer "A" to maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 77 first detector-oscillator and adjust trimmers "B" and "C" to maximum output.
6. Set test oscillator to 1500 K.C. and rotate condenser gang until the plates are wide open. Place a piece of paper (approx. .016 thk.) between the rotor and stator plates at the bottom of the gang and close the rotor down to this spacing. This is the exact setting of the condenser gang for the receiver oscillator at 1500 K.C. and should be carefully set as the resultant alignment of the receiver is directly dependant upon it.
7. Adjust trimmer "D" to maximum output and then remove the paper gauge.
8. Set test oscillator and condenser gang to 1400 K.C.
9. Apply test signal to grid of 77 R.F. tube and adjust trimmer "E" to maximum output.
10. Apply test signal to antenna lead thru a .0002 mfd. condenser and adjust trimmer "F" to maximum output.
11. Check sensitivity at several points.

The Model 634A Ed. 1 is designed with an internal tuned spark trap in the battery cable to assist in the suppression of ignition interference.

Qty.	Part #	Description of Parts
1	RC 956	Antenna coil assembly
2	CM 952	.00001 mfd. mica cond.
3	SA 106386	.05 mfd. 200 V. cond.
4	SA 106278	100,000 ohms 1/4 W. res.
5	CG 954	Variable condenser assy.
6	SA 106386	.05 mfd. 200 V. cond.
7	SA 106264	500 ohms 1/4 W. res.
8	RC 957	R.F. coil assembly
9	CM 953	.00001 mfd. condenser
10	SA 106362	.002 mfd. 500 V. cond.
11	SA 106247	7500 ohms 1/4 W. res.
12	RC 958	Composite coil assy.
13	SA 106245	2000 ohms 1/4 W. res.
14	SA 106492	.05 mfd. 350 V. cond.
15	SA 106386	.05 mfd. 200 V. cond.
16	SA 106270	2,500 ohms 1/4 W. res.
17	SA 106497	.25 mfd. 200 V. cond.
18	CW 951	.1 mfd. 200 V. cond.
19	IC 951	I.F. coil assembly
20	SA 106417	.0001 mfd. mica cond.
21	SA 106276	50,000 ohms 1/4 W. res.
22	SA 106417	.0001 mfd. mica cond.
23	VR 951	Volume control-500,000 ohms
24	SA 106359	.005 mfd. 350 V. cond.
25	SA 106231	1 meg. 1/4 W. res.
26	SA 106234	1/2 meg. 1/4 W. res.
27	SA 106417	.0001 mfd. mica cond.
28	SA 106246	1/2 meg. 1/4 W. res.
29	SA 106249	5,000 ohms 1/4 W. res.
30	SA 106497	.25 mfd. 200 V. cond.
31	SA 106362	.002 mfd. 500 V. cond.
32	SA 106278	100,000 ohms 1/4 W. res.
33	SA 106359	.005 mfd. 350 V. cond.
34	SA 106279	1/4 meg. 1/4 W. res.
35	CW 951	.1 mfd. 200 V. cond.
36	SA 106279	1/4 meg. 1/4 W. res.
37	SA 106403	.001 mfd. 500 V. cond.
38	VR 952	Tone control-250,000 ohms
39	CW 952	.005 mfd. 500 V. cond.
40	TR 952	Output transformer
41	SA 106277	75,000 ohms 1/4 W. res.
42	SA 106274	20,000 ohms 1/4 W. res.
43	SA 106274	20,000 ohms 1/4 W. res.
44	SA 106492	.05 mfd. 350 V. cond.
45	SA 106492	.25 mfd. 350 V. cond.
46	SA 107672	5,000 ohms 1 W. res.
47	CM 951	.001 mfd. mica cond.
48	DM 951	Spkr. diaphragm & voice coil
49	SK 955	Spkr. with cable & plug
50	FU 951	20 ampere fuse
51	RC 951B	Filter choke coil
52	CM 953	.00005 mfd. mica cond.
53		Switch - part of VR 951
54	SA 106452	Filter choke coil
55	SA 106452	Filter choke coil
56	CW 958	.5 mfd. 200 V. cond.
57	CW 958	.5 mfd. 200 V. cond.
58	SA 106909	Dial light-sor. type base
59	VI 951	Vibrator
60	TR 953	Power transformer
61	SA 106804	.008 mfd. 1600 V. cond.
62	TR 951	B choke
63	CE 951	6. and 10. mfd. elec. cond.
64	CM 951	.001 mfd. mica cond.

The Model 634A Ed. 2 is designed with an additional spark trap connected externally and in series with the battery cable. An 8.5 Ampere antenna spark trap is also provided in the circuit. These two spark traps are used to suppress ignition interference. 3. Make the use of spark plug suppressors unnecessary in most installations. The antenna spark trap is mounted inside of the chassis housing and a new R.F. transformer has been provided to match the impedance of this antenna spark trap.

Type and Number of Tubes 2 #77, 1 #78, 1 #79, 1 #80, 1 #84 - Total 6 and in series with the battery cable.
 Battery Current (6.3 Volt Battery)
 Tuning Range
 Maximum Undistorted Output
 Maximum Output
 Line-Up Frequencies I.F. 175 K.C., 1400 K.C., 1500 K.C.

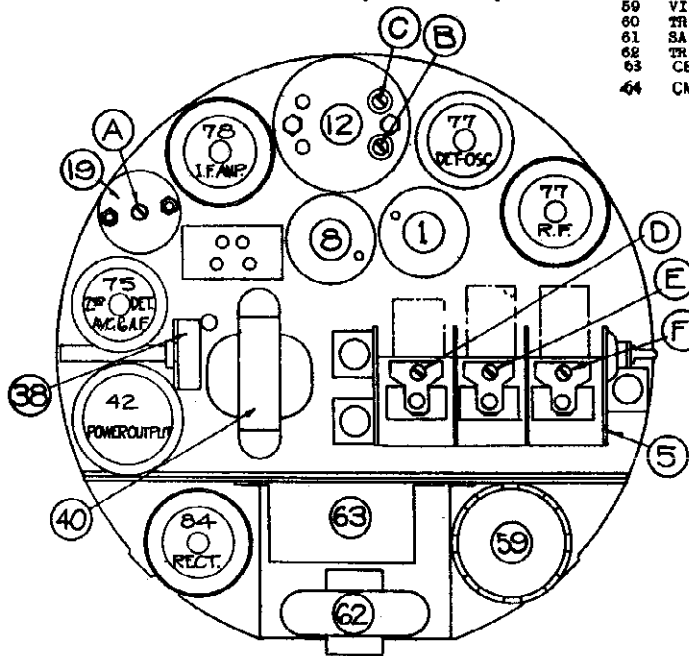


Figure No. 2

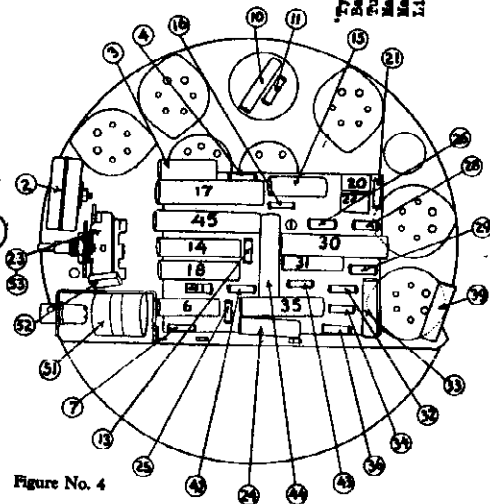


Figure No. 4

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MODEL 626 Delco
Schematic
Voltage

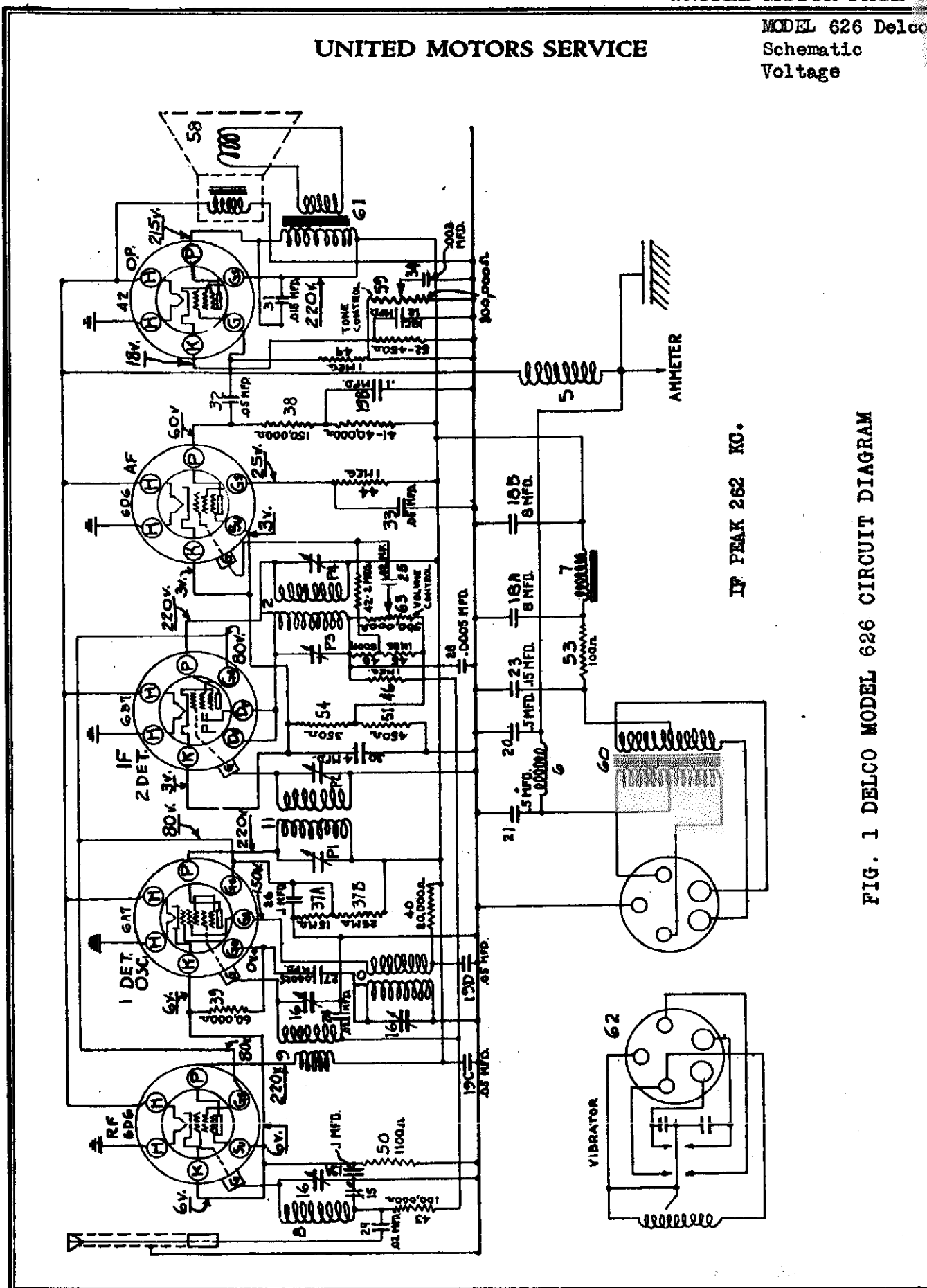


FIG. 1 DELCO MODEL 626 CIRCUIT DIAGRAM

MODEL 626 Delco
Alignment
Circuit Notes

UNITED MOTORS SERVICE

PEAKING PROCEDURE

The only way the circuits of this receiver can be peaked properly is with the use of a calibrated test oscillator and an output meter. The circuits are very carefully adjusted at the factory and do not need any further adjustment unless tampered with in the field or a defective coil has been replaced. It is, therefore, advisable not to attempt any adjustments unless it is definitely known that an adjustment is necessary. This is especially important in connection with the Synchro-Tuning circuit.

Connecting Output Meter

Connect one of the output meter leads to the plate prong of the type 42 output tube. (The plate prong is the first prong to the left of the filament when looking at the bottom of the tube with the filament prongs toward you.) Connect the other output meter lead to the receiver chassis, making sure that the meter is protected with a D.C. blocking condenser connected in series to prevent damage to the meter.

IMPORTANT

Due to the high sensitivity of these receivers, the receiver chassis must be in its case before making any adjustments. This is necessary in order to obtain accurate adjustments and to prevent oscillation due to lack of the shielding effect of the receiver case. Also, the following procedure should be followed closely if the "Synchro-Tuning" circuit is to function properly.

1. Peaking I.F. Stages at 862 K.C.

- 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 6A7 tube, leaving the tube's grid clip in place. (The .5 mfd. condenser is necessary to prevent the oscillator circuit of the receiver from affecting the I.F. adjustments.)
- Set the test oscillator on 862 kilocycles.
- Turn the volume control of the receiver on full.
- Peak each of the I.F. trimmers on the 2nd I.F. coil, Illustration #12 on Fig. 3.
- Then peak each of the trimmers on the 1st I.F. coil, Illustration #11 on Fig. 3.

NOTE: 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.

- 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.)
- Turn the rotor plates of the gang condenser until they are COMPLETELY OUT OF MESH.
- Set the test oscillator on exactly 1540 kilocycles.
- 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. Peaking "ANT." and "R.F." Sections of Gang Condenser at 1400 K.C. and Compensating Condenser at 600 K.C.

- Set the test oscillator on 1400 kilocycles.
- Turn the condenser rotor plates until the 1400 K.C. signal from the test oscillator is tuned in with maximum output.
- 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 1540 K.C. only and any 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" (Illustration #15 on Fig. 3) before installing the receiver on a car.

- Set the test oscillator on 600 kilocycles.
- 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," (Illustration #15 on Fig. 3) for maximum output, rocking the rotor plates of the condenser gang back and forth and adjusting the "antenna compensating condenser" 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." section of the gang condenser has been correctly adjusted according to preceding information it will be necessary 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:

- Tune the receiver to a weak broadcast station between 570 to 640 K.C.
- Peak the "antenna capacity compensating condenser" for maximum output, rocking the receiver dial back and forth 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 in a car.

Delco Synchro-Tuning

The outstanding circuit feature of this receiver is the specially designed antenna circuit which provides more than four times the stage gain of conventional circuits, making it particularly suitable for under car antenna systems required on several 1935 Model cars. Synchro-Tuning differs from other circuits in that the antenna system is actually tuned to resonance at all frequencies instead of just one point in the broadcast band as is the case in other circuits. This results in a greatly increased efficiency and a lower noise level. Synchro-Tuning is accomplished through the use of specially shaped stator plates in the "ANT." section of the condenser gang in collaboration with a very carefully designed antenna circuit which in reality is very simple. The capacity of the antenna system with which the receiver is to be used is immaterial insofar as the tuning of the antenna circuit is concerned. This is because of the use of an "antenna capacity compensating condenser" that can be adjusted for any deficiency or excess of antenna capacity so that the sum total capacity the receiver works with is always the same. It is therefore important that this condenser be adjusted to the car antenna when installing the receiver in a car.

A spark noise filter is employed to prevent ignition interference from affecting the receiver circuits. The elimination of chassis pickup in this manner should make possible the installation of this receiver in the majority of cars without the use of spark plug suppressors.

The receiver may be connected for operation on a car battery with the positive side grounded by simply reversing the two wires connected to the terminal strip located on top of the power transformer.

The "B" power supply utilizes a full wave self-rectifying vibrator of the plug-in type.

A slight voltage delay is used on the detector circuit to assist materially in reducing background noise.

Circuit Operation

Referring to the circuit diagram Figure 1. The antenna is capacity coupled to the antenna coil, which is tuned by the "ANT." section of the gang condenser, and feeds the grid of the 6D6 R.F. amplifier tube. The plate circuit of this tube is inductively coupled to the grid winding feeding the 6A7 tube and tuned by the "R.F." section of the gang condenser. (The 6A7 tube is used as the conventional detector oscillator or pentagrid converter.) The oscillator frequency which is produced due to the reaction between the oscillator grid, plate, and associated circuit constants is tuned by the "OSC." section of the gang condenser. The incoming station frequency and the oscillator frequency are mixed in the 6A7 tube and the resultant frequency which is 862 kilocycles is transformer coupled to the grid of the pentode section of the 6B7 tube and the output of this section of the tube is impressed on the diode plates of this tube for detection and developing A.V.C. voltage. The A.V.C. voltage controls the grid bias of the 6D6 R.F. tube, the control grid of the 6A7 tube and also a part of the developed voltage is used to control the 6D6 audio tube. The audio output of the detector circuit is coupled to the grid of the 6D6 audio amplifier tube and the grid voltage swing is controlled by the volume control. The output of this audio tube is resistance coupled to the grid of type 42 power output pentode.

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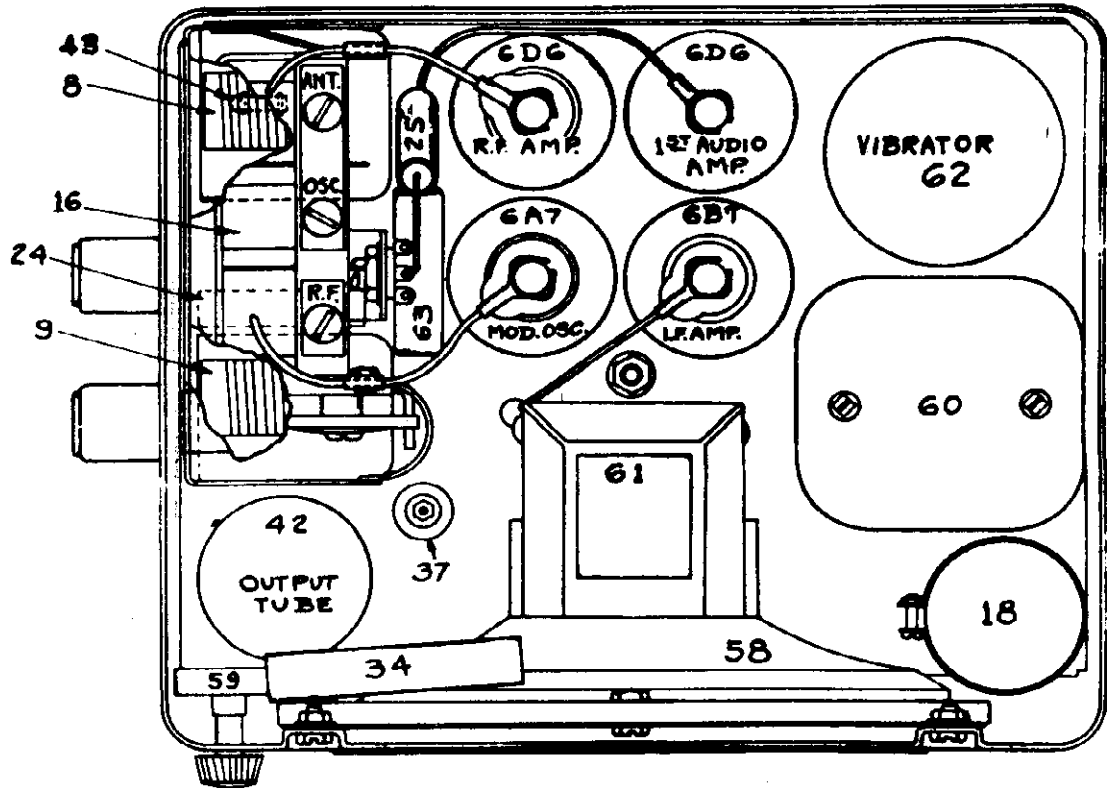


FIG. 2 PARTS LAYOUT--TOP VIEW

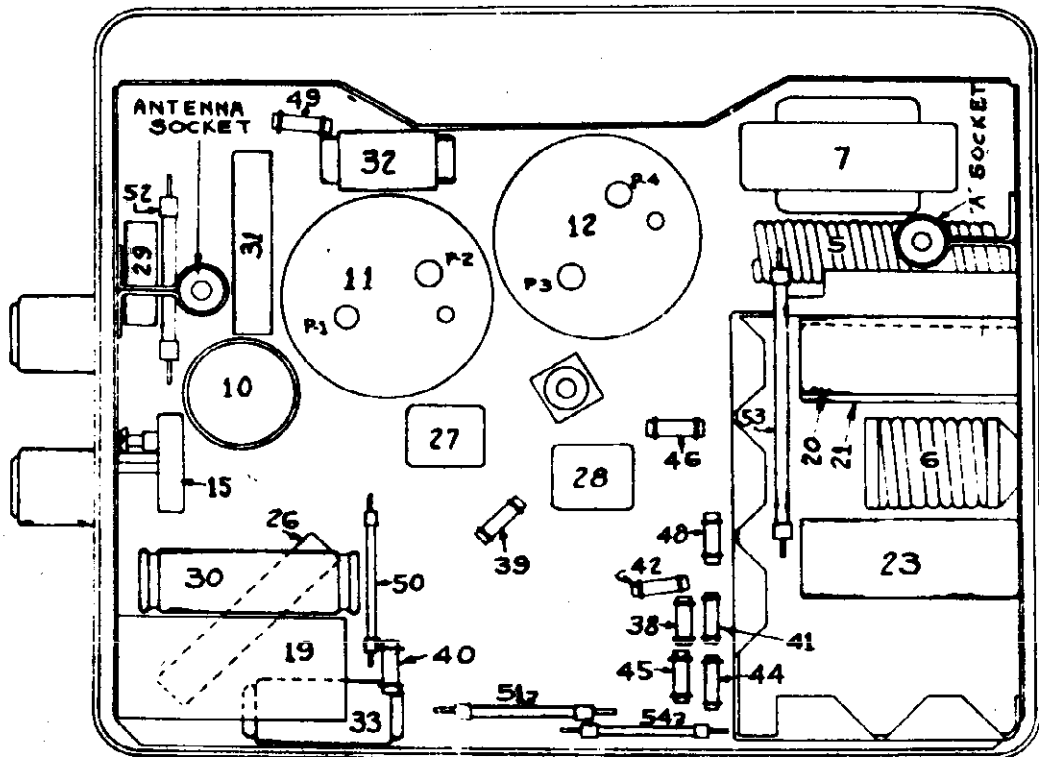


FIG. 3 PARTS LAYOUT--BOTTOM VIEW

MODEL 626 Delco

Parts List

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Part No.	Part Name	Description	Illus. No.	Connector Assy.	"A" power on chassis	
1209786	Connector Assy.			Cap	Ferrule holder	
1836869				Ferrule	Contact	
1838478					Contact	
1209727	Connector Assy.			Ferrule	Antenna on chassis	
1838478				Spring	Contact	
1836878				Washer	Tension	
1843713					Fiber	
1209347	Cord				Speaker	
1209348	Cover				Chassis bottom	
1209349	Cover				Chassis tube lid	
1209350	Cover				Transformer bottom	
1209351	Cover				Transformer top	
5 1209352	Cover		5		Vibrator filter shield	
6 1209639	Grille		6		Speaker front (nickel e d)	
7 1209354	Plug		7		Antenna trimmer cover	
8 1209355	Resistor		8		Voltage divider "ohmite"	37
9	Sec. A		9		15,000 ohms, 2 watt	
10	Sec. B		10		25,000 ohms, 2 watt	
11			11			
12 1208292	Resistor		12		Carbon 150,000 ohms 1/3 watt	38
15 1208320	Resistor		15		Carbon 60,000 ohms 1/4 watt	39
1209405	Resistor				Carbon 20,000 ohms 1/3 watt	40
1208296	Resistor				Carbon 40,000 ohms 1/3 watt	41
1209356	Resistor				Carbon 2 megohms, 1/3 watt	42
1208854	Resistor				Carbon 100,000 ohms 1/3 watt	43
1208232	Resistor				Carbon 1 megohm 1/3 watt	44
1208232	Resistor				Carbon 1 megohm 1/3 watt	45
1208232	Resistor				Carbon 1 megohm 1/3 watt	46
1204138	Resistor				Carbon 500,000 ohms 1/3 watt	48
1208238	Resistor				Carbon 1 megohm 1/3 watt	49
1209357	Resistor				Flexible 1100 ohms 1/2 watt	50
1208110	Resistor				Flexible 450 ohms 1/2 watt	51
1209358	Resistor				Flexible 450 ohms 1 1/2 watt	52
1209359	Resistor				Flexible 100 ohms 3 watt	53
1208802	Resistor				Flexible 350 ohms 1/2 watt	54
1209607	Speaker				Complete unit 6 1/4"	58
1209614	Term. Assy.				Polarity reversing	
1209217	Term. Assy.				Single lug	
1209611	Term. Assy.				Fire lug	
1209747	Term. Assy.				Four lug-on speaker	
1209628	Tone control				Res. 300,000 ohms	59
1209282	Transformer				Vibrator power	60
1209613	Transformer				Output-speaker	61
5039861	Vibrator				Plug-in synchronous	62
1209330	Volume control				Res. 500,000 ohms	63
1209767	Base	Tube shield grounding				
1209334	Bolt	Chassis cover retaining stud				
1209335	Bracket	Volume control mounting				
1209336	Case	Chassis (less covers)				
1209337	Case	Transformer				
1209340	Clamp	Vibrator grounding				
1209341	Clamp	Condenser mtg. (.4 mfd.)				
1209342	Clamp	Elect. cond. mtg.				
1209636	Cloth	Speaker grille				
1209338	Coil	"A" supply filter choke				
1209339	Coil	Vibrator "A" choke				
1209891	Coil	"B" power filter choke				
1209343	Coil	Antenna				
1209344	Coil	R.F.				
1209345	Coil	Oscillator				
1209304	Coil Assy.	1st I.F.				
1209305	Coil Assy.	2nd I.F.				
1209633	Condenser	Antenna compensating				
1209346	Condenser	3 gang tuning				
	Sec. A	Antenna				
	Sec. B	R.F.				
	Sec. C	Oscillator				
1209285	Condenser	Electrolytic block				
	Sec. A	8 mfd., 450 volt				
	Sec. B	8 mfd., 450 volt				
	Sec. C	12 mfd., 25 volt				
209321	Condenser By-pass block					
	Sec. A	.1 mfd., 200 volt				
	Sec. B	.1 mfd., 200 volt				
	Sec. C	.05 mfd. 400 volt				
	Sec. D	.05 mfd. 400 volt				
1209299	Condenser	Metal case .5 mfd. 160 volt				
1209299	Condenser	Metal case .5 mfd. 160 volt				
1209300	Condenser	Metal case .15 mfd. 400 volt				
1209307	Condenser	Tubular .02 mfd. 200 volt				
1209307	Condenser	Tubular .02 mfd. 200 volt				
1209306	Condenser	Tubular .1 mfd. 200 volt				
1209280	Condenser	Molded .00025 mfd.				
1209612	Condenser	Molded .0005 mfd.				
1209310	Condenser	Tubular .02 mfd. 200 volt				
1209324	Condenser	Metal case 4 mfd. 10 volt				
1209325	Condenser	Tubular .015 mfd. 400 volt				
1209313	Condenser	Tubular .05 mfd. 400 volt				
1209308	Condenser	Tubular .05 mfd. 400 volt				
1209627	Condenser	Tubular .003 mfd. 200 volt				

UNITED MOTORS SERVICE, INC.

MODEL 1101 Delco Schematic

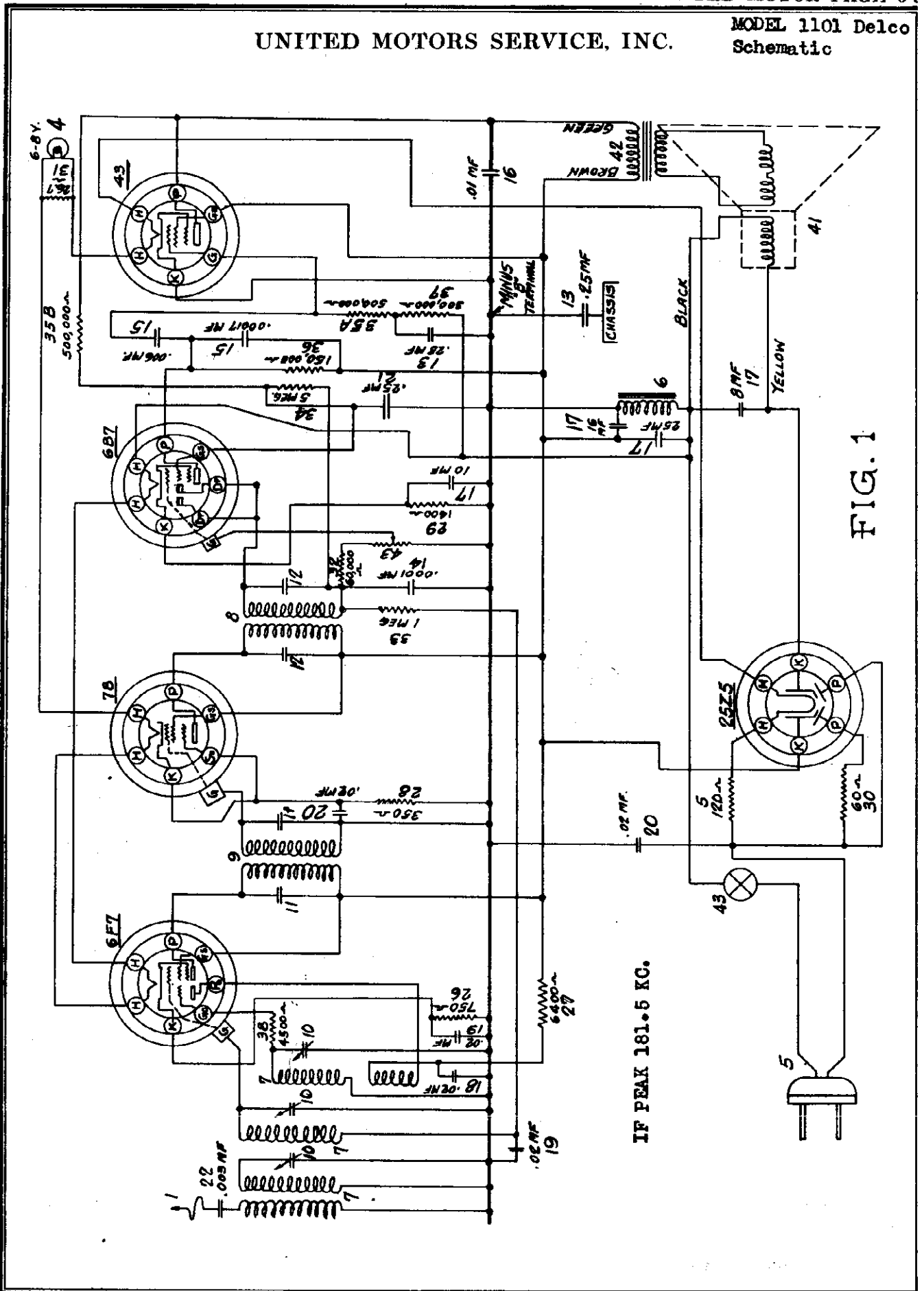


FIG. 1

**MODEL 1101 Delco
Alignment, Data
Socket, Trimmers
Voltage, Parts**

UNITED MOTORS SERVICE, INC.

The chassis employs a 5 tube AC-DC superheterodyne circuit, automatic volume control and an electro-dynamic speaker.

The frequency range is 55-1720 kilocycles, including the full broadcast range and also the first police channels. The intermediate frequency is 181.5 Kilocycles.

METHOD OF BIASING

Referring to the circuit diagram, it will be seen that the 6F7 tube obtains its bias from the cathode resistor illus. #86, by-passed by condenser 19, .02 Mfd.

The 78 I.F. amplifier obtains its bias from the cathode resistor 38.

Bias for the 6B7 audio amplifier is obtained from cathode resistor 29. The effect of this circuit is that a slight bucking bias is applied to the diode section, but a very weak signal soon overcomes this bias and the diode then acts as though there were no bias resistor. The pentode audio amplifier section, however, makes use of this initial bias in resistor 29 and after signal is applied, depending on the strength of the signal, a varying amount of bias will be applied to accommodate the signal from the AVC circuit.

Bias for the type 43 output tube is obtained from the drop across the filter choke 6 and whatever hump component there is remaining is filtered through resistor 37 and bypass condenser 13.

AUTOMATIC VOLUME CONTROL CIRCUIT

Automatic volume control voltage is developed in the diode circuit across resistor 32 in series with volume control 43. This voltage is fed back through filter resistor 33 to the control grid return of the 6F7 modulator section. No automatic volume control is exerted on the intermediate frequency amplifier, type 78 tube.

Connecting Output Meter

Connect one terminal of the output meter to the plate prong of the type 43 output tube and the other terminal to the radio chassis frame. Make sure that the output meter is protected with a series condenser to prevent the D.C. from flowing through the meter circuit. If the meter is not protected, connect a .1 mfd. condenser in series with the lead to the chassis frame.

Peaking I.F. Stages at 181.5 KC

- (a) Connect the antenna of the signal generator to the receiver antenna wire close to where it enters the chassis, through a series condenser, preferably an .02 mfd. The best way to make this connection is with a sharp, pointed prod so that the insulation on the antenna wire is not permanently damaged. The unused dead end of the antenna wire should be rolled up on its reel.
- (b) Connect the ground terminal of the signal generator to the radio chassis frame.
- (c) Set the Signal Generator to exactly 181.5 KC.
- (d) With the Signal Generator set to the lowest useable output level and the radio volume control on full, adjust the four I.F. coil trimmer condenser nuts for maximum signal output. These nuts are accessible through the front flange of the chassis. To make these adjustments a standard 1/4" (across flats) insulated hexagon socket wrench must be used. It may be necessary to move the tuning dial slightly for the best result. Normally the rotor plates should be in mesh with the stator plates. (Approx. 550 KC.) Always make these I.F. adjustments very carefully, going over them several times to insure that the final setting is at resonant frequency.

Peaking Tuning Condenser at 1400 KC

- (a) Connect the antenna terminal of the test oscillator to the receiver antenna through a series condenser--a .0001 mfd. condenser is preferable. Again this connection should be made close to where the antenna wire enters the chassis.
- (b) Connect the ground terminal of the signal generator to the radio chassis frame.
- (c) Set the signal generator to exactly 1720 kilocycles and to the lowest useable volume level, with radio set volume on full.
- (d) Turn the tuning condenser on the radio chassis to 1720--rotor plates entirely out of mesh with stator plates--and adjust oscillator trimmer (on rear of cond. gang) for max. signal.
- (e) Set signal generator to 1400 KC.
- (f) Turn tuning condenser until max. signal is obtained.
- (g) Adjust the remaining two trimmers--antenna & R.F. sections--on the tuning condenser to resonant frequency.

NOTE: It is necessary that these adjustments be gone over several times until no further improvement can be made.

TUBE COMPLIMENT & VOLTAGE CHART

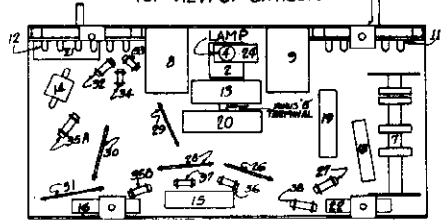
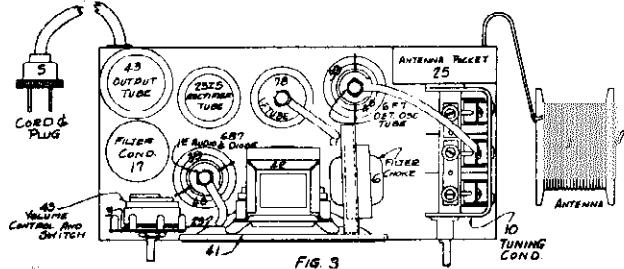
The tube voltages shown below are average readings taken from minus "B" terminal to the tube prong, excepting the heater terminals in which case the voltage drop across the two H prongs is measured. This chart was made while using 115 volt, 60 cycle line. Variations in line voltage will cause the readings to vary slightly.

TUBE BASE DIAGRAM SYMBOLS*

TYPE	FUNCTION	H	P	Gs	Su	G	K	P-Osc.
6F7	Osc-Mod.	6.5	100	100	-	0	5	100
78	IF	6.5	100	100	3	0	3	-
6B7	Diode--AF	6.5	15	15	-	0	1	-
43	Output	27.	98	100	-	-20	0	-
25Z5	Rectifier	27.	-	-	-	-	-100	-

***TUBE BASE DIAGRAM SYMBOLS**

- H - Heater Su - Suppressor Grid K - Cathode
P - Plate G - Control Grid P-Osc - Osc Plate
Gs - Screen Grid

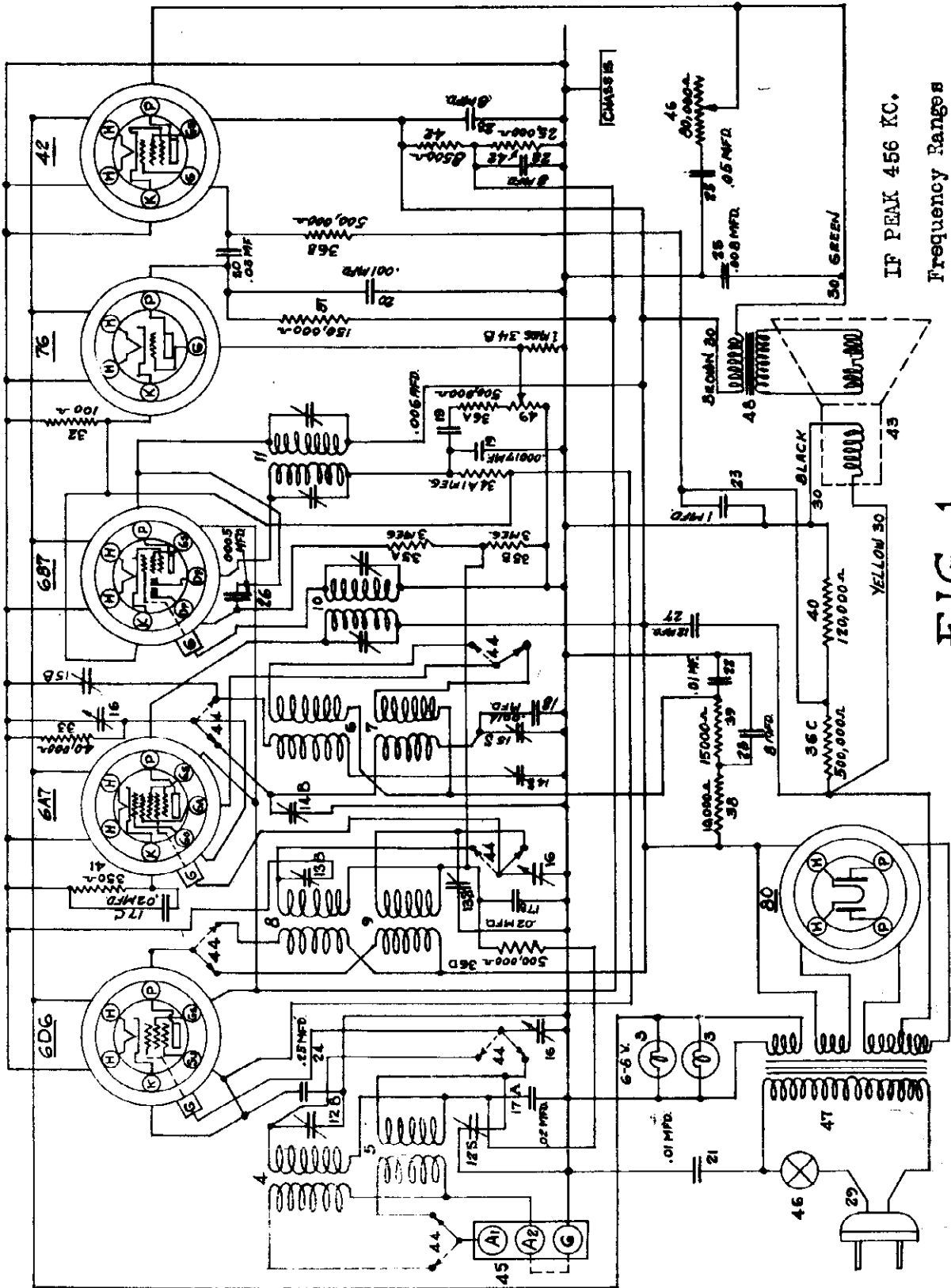


BOTTOM VIEW OF CHASSIS FIG. 2

Part No.	Illus. No.	Part Name	Description
1208766	1	Antenna	15 ft. flexible--coiled
1208767		Base	Tube shield
1208546	2	Bracket	Dial light
1208768	3	Bracket	Volume control
1208769		Bracket	Speaker support
1209000	4	Bulb	Dial light--6-8 volt
1208351	5	Cord & plug	Includes resistor wire
1208775	6	Choke	Filter
1208776		Clamp	Filter condenser
1208777	7	Coil	Antenna
1208778	8	Coil	Diode feeding
1208779	9	Coil	1st I.F.
1208780	10	Condenser	Tuning
1208781	11	Condenser	1st I.F. padding
1208785	12	Condenser	2nd I.F. padding
1208782	13	Condenser	.25 - .25 Mfd. 200 volt
1208983	14	Condenser	.0001 " (Mica)
1208355	15	Condenser	.00017 - .006 Mfd. 200 volt
1208784	16	Condenser	.01 Mfd. 200 volt
1208786	17	Condenser	10. - 8. - 25. - 18. " (filter)
1208787	18	Condenser	.02 Mfd. 200 volt
1208788	19	Condenser	.02 - .02 Mfd. 200 volt
1208789	20	Condenser	.02 - .02 Mfd. 400 volt
1208790	21	Condenser	.25 Mfd. 200 volt
1208558	22	Condenser	.005 Mfd. 200 volt
1208792		Grommet	Tuning condenser
1208793	23	Insulator	Volume control
1208794	24	Insulator	Dial light & bracket
1208795	25	Bracket	Antenna
1208800	26	Resistor	750 ohms (Flex.)
1208007	27	Resistor	4400 "
1208802	28	Resistor	560 "
1208803	29	Resistor	1400 "
1208804	30	Resistor	60 ohm (Flex.) 1/2 watt
1208360	31	Resistor	88.7 ohm (Flex.)
1208320	32	Resistor	60,000 ohm, 1/3 watt
1208144	33	Resistor	1,000,000 ohm, 1/3 watt
1208805	34	Resistor	5,000,000 ohm, 1/3 watt
1204136 35A, 35B		Resistor	800,000 ohms
1207906	36	Resistor	150,000 "
1204139	37	Resistor	500,000 "
1208906	38	Resistor	4800 ohms
1208810	41	Speaker	Assembly
1209002	42	Transformer	Output
1208812	43	Vol. Control	7th switch

1103 Delco
Below Serial 805120
Schematic

UNITED MOTORS SERVICE, INC.
MODELS 1102 Delco
Below Serial 781400

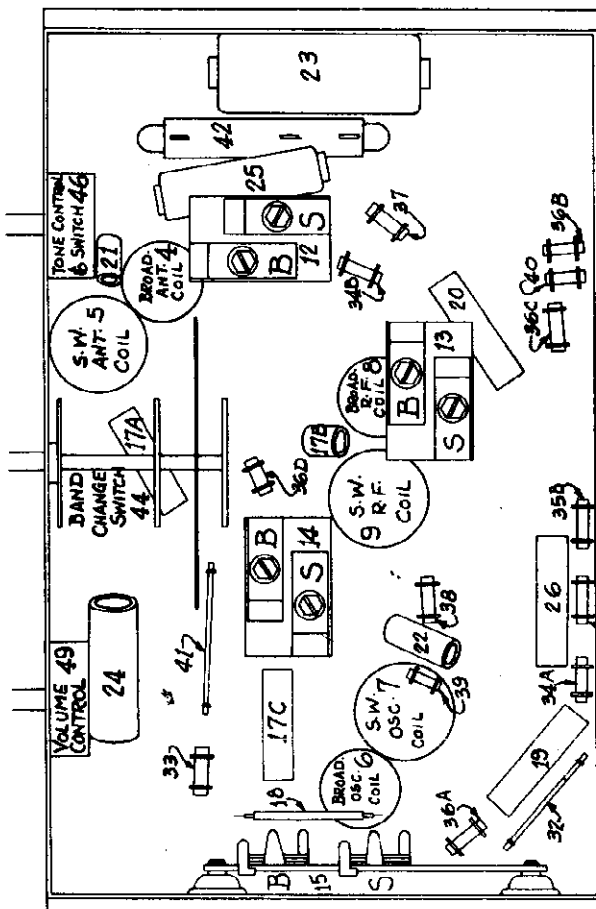
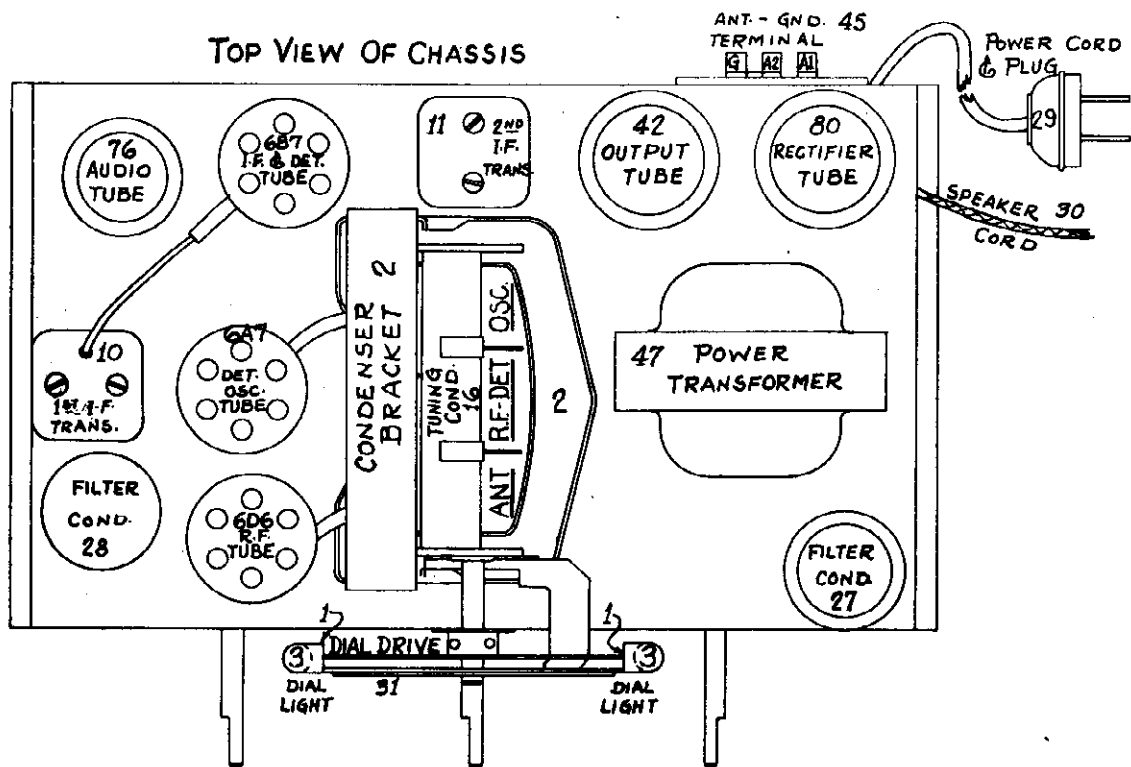


IF PEAK 456 KC.
 Frequency Ranges
 535 - 1750 KC.
 5.5 - 16.0 MC.

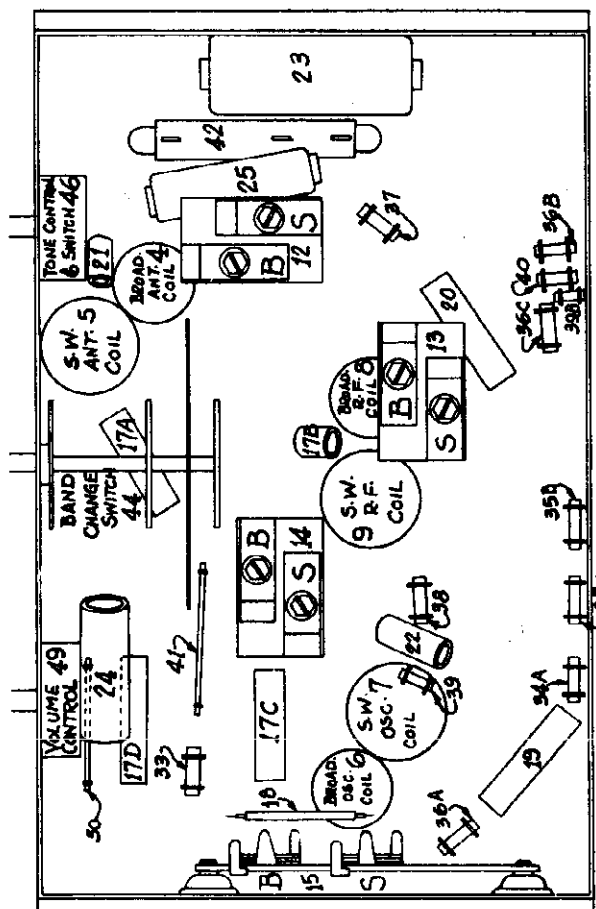
FIG. 1

MODELS 1102, 1103 Delco
Socket, Trimmers
Chassis Layout

TOP VIEW OF CHASSIS



Model 1102 - Below Serial 781400
Model 1103 - Below Serial 805120



Model 1102 - Above Serial 781400
Model 1103 - Above Serial 805120

MODELS 1102, 1103 Delco
 Alignment, Voltage Tables UNITED MOTORS SERVICE, INC.
 Parts List

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate terminal of the type #42 output tube and the other terminal to the radio chassis frame. Make sure that the output meter is protected with a series condenser to prevent the D.C. from flowing through the meter circuit. If the meter is not protected, connect a .1 mfd. condenser in series with the lead to the chassis frame.

Peaking I.F. Stages at 456 Kilocycles

- (a) Connect the antenna of the signal generator to the control grid connection on top of the 6A7 tube, (DO NOT REMOVE grid cap) through a series condenser (.02 mfd.).
- (b) Connect the ground terminal of the signal generator to the radio chassis frame.
- (c) Set the signal generator to exactly 456 kilocycles.
- (d) Set the receiver band change switch to the broadcast (right) position.
- (e) With the signal generator set to the lowest useable output level, and the receiver volume control on full, adjust the I.F. trimmer condensers for maximum output.

To make this adjustment a small insulated screw-driver is required. Always make the I.F. adjustments very carefully and go over them several times to insure that the final setting is at resonant frequency. Rotate selector dial to insure that the alignment has not been made on a broadcast frequency in which case the signal will disappear as the dial is turned.

PEAKING TUNING CONDENSER AT 1400 KILOCYCLES (Broadcast Band)

- (a) Close the receiver tuning condenser plates (556 KC) and set the pointer on the horizontal line.
- (b) Connect the antenna terminal of the signal generator to the receiver antenna terminal through a series condenser (.0008 mfd.)
- (c) Connect the ground terminal of the signal generator to the radio chassis frame.
- (d) Set the signal generator to exactly 1400 kilocycles and to the lowest useable volume level, with the radio set volume on full.
- (e) Turn band change switch to the right hand position (broadcast band).
- (f) Set the tuning control of the receiver to 140 on the dial.
- (g) Adjust the oscillator broadcast shunt trimmer, Illus. #14-B to resonant frequency (greatest swing on output meter).
- (h) Adjust the antenna trimmer, Illus. #13-B, to resonant frequency.

NOTE: It is necessary that these adjustments be gone over several times until no further improvement can be made.

- (j) Set the signal generator to 600 kilocycles.
- (k) Tune the receiver to 80 on the dial and adjust the frequency setting of the signal generator until maximum response is obtained.
- (l) Adjust the series oscillator trimmer 15-B and vary selector dial slightly, not over 1/8" simultaneously until maximum output is obtained.
- (m) Repeat the adjustments at 1400 KC.

PEAKING TUNING CONDENSER AT 15 MEGACYCLES (Short Wave Band)

- (a) Connect the antenna terminal of the signal generator to a receiver antenna terminal through a series carbon resistor (approx. 750 ohms).
- (b) Connect the ground terminal of the signal generator to the radio chassis frame.
- (c) Set the signal generator to exactly 1500 KC (15 megacycles.)
- (d) Turn band change switch to the left hand position (short wave band).
- (e) Set the tuning control of the receiver at 15 on the dial.
- (f) Adjust the oscillator parallel trimmer 14-S, to resonant frequency.
- (g) Adjust the antenna trimmer 12-S, to resonant frequency.
- (h) Adjust the radio frequency trimmer 13-S, and vary selector dial slightly (not over 1/8") simultaneously until maximum output is obtained.

NOTE: It is necessary that these adjustments be gone over very carefully several times until no further improvement can be made. Greater accuracy is required for making short wave adjustments than for the broadcast band.

- (i) Now set the signal generator to 6000 KC.
- (j) Set the receiver dial to 6.
- (k) Adjust the oscillator series trimmer, 15-S, and vary the dial slightly (not over 1/8") simultaneously until maximum output is obtained.
- (l) Repeat the adjustments at 15000 KC.

TUBE COMPLEMENT & VOLTAGE CHART

The tube voltages shown below are average readings taken from chassis to the tube prong. This chart was made while using 115 volt line. Variations in line voltage will cause the readings to vary slightly.

TUBE BASE DIAGRAM SYMBOLS*

TUBE	FUNCTION	H	P	Ga	Su	G	Ga	Go	K
6D6	RF Amp.	6.5	250	125	0	0	-	-	3
6A7	Osc-Mod.	6.5	250	125	-	0	140	15	4.2
6B7	IF & Diode	6.5	250	125	-	0	-	-	3
76	AF Amp.	6.5	25	-	-	0	-	-	3
42	Output	6.5	250	-	-	-18	-	-	0
80	Rectifier	5.1	-	-	-	-	-	-	-

VOLTAGE CHART

(Use only for 1102's above #781400 and 1103's above #806180.)

The tube voltages shown below are average readings taken from chassis to the tube prong. This chart was made while using a line voltage of 115 volts. Variations in line voltage will cause the readings to vary slightly.

TUBE BASE DIAGRAM SYMBOLS *

TUBE	FUNCTION	H	P	Ga	Su	G	Ga	Go	K
6D6	R.F. Amp.	6.5	250	110	2	0	-	-	2
6A7	Osc-Mod.	6.5	250	110	-	0	125	-5	4.0
6B7	IF & Diode	6.5	250	110	-	-3	-	-	0
76	A.F. Amp.	6.5	25	-	-	-3	-	-16	0
42	Output	6.5	250	-	-	-	-	-18	0
80	Rectifier	5.1	-	-	-	-	-	-	-

1208828	4	Coil	Broadcast antenna
1208829	5	Coil	S.W. ant.
1209003	6	Coil	Broadcast oscillator
1208829	7	Coil	S. W. oscillator
1208830	8	Coil	Broadcast R.F.
1208831	9	Coil	S.W. R.F.
1208832	10	Coil	1st I.F.
1208834	11	Coil	2nd I.F.
1208835	12	Condenser	Ant. trimmer--broadcast & S.W.
1208835	13	Condenser	R.F. trimmer--broadcast & S.W.
1209017	14	Condenser	Osc. trimmer--broadcast & S.W.
1209016	15	Condenser	Series osc. trimmer--broadcast & S.W.
1208835	16	Condenser	Tuning
1208840	17A, 17B, 17C	Condenser	.02 Mfd., 200 volt
1208841	18	Condenser	.0014 Mfd., 150v
1208855	19	Condenser	.006-.0017 Mfd., 200 volt
1208898	20	Condenser	.001-.03 Mfd., 400 volt
1208845	21	Condenser	.01 Mfd. (line by-pass), 400 volt
1208844	22	Condenser	.01 Mfd. (osc. plate), 400 volt
1208846	23	Condenser	1. Mfd., 160 volt
1208790	24	Condenser	.25 Mfd., 200 volt
1208128	25	Condenser	.008-.05 Mfd., 400 volt
1208119	26	Condenser	.0005 mfd., 400 volt
1208217	27	"	12 mf. 475 volt
1208218	28	"	.8 -.8-.8. mf. 200-500-450 volt
1208846	29	Cord & Plug	Receiver
1208825	30	Cord	Speaker
1208847	31	Max	Complete with drive assembly
1208845	32	Resistor	100 ohm, flexible
1208296	33	"	40,000 ohms
1208144	34	"	1,000,000 ohms
1208128	35A, 35B	"	5,000,000 ohms
1208128	35A, 35B	"	500,000 ohms
1207905	37	"	120,000 ohms
1208261	38	"	10,000 ohms
1208788	39	"	15,000 ohms
1208262	40	"	120,000 ohms
1208862	41	"	280 ohm, flexible
1208866	42	"	2800-25,000 ohm constant
1208869	43	Speaker	6" (mantel set)
1208869	43	Speaker	8" (console set)
1208870	44	Switch	Band change
1208871	45	Terminal	Ant. & grd.
1208872	46	Tone control	With line switch
1208873	47	Transformer	Power
1208904	48	Transformer	Output 6" speaker
1208905	48	Transformer	Output 8" speaker
1208928	49	Volume control	

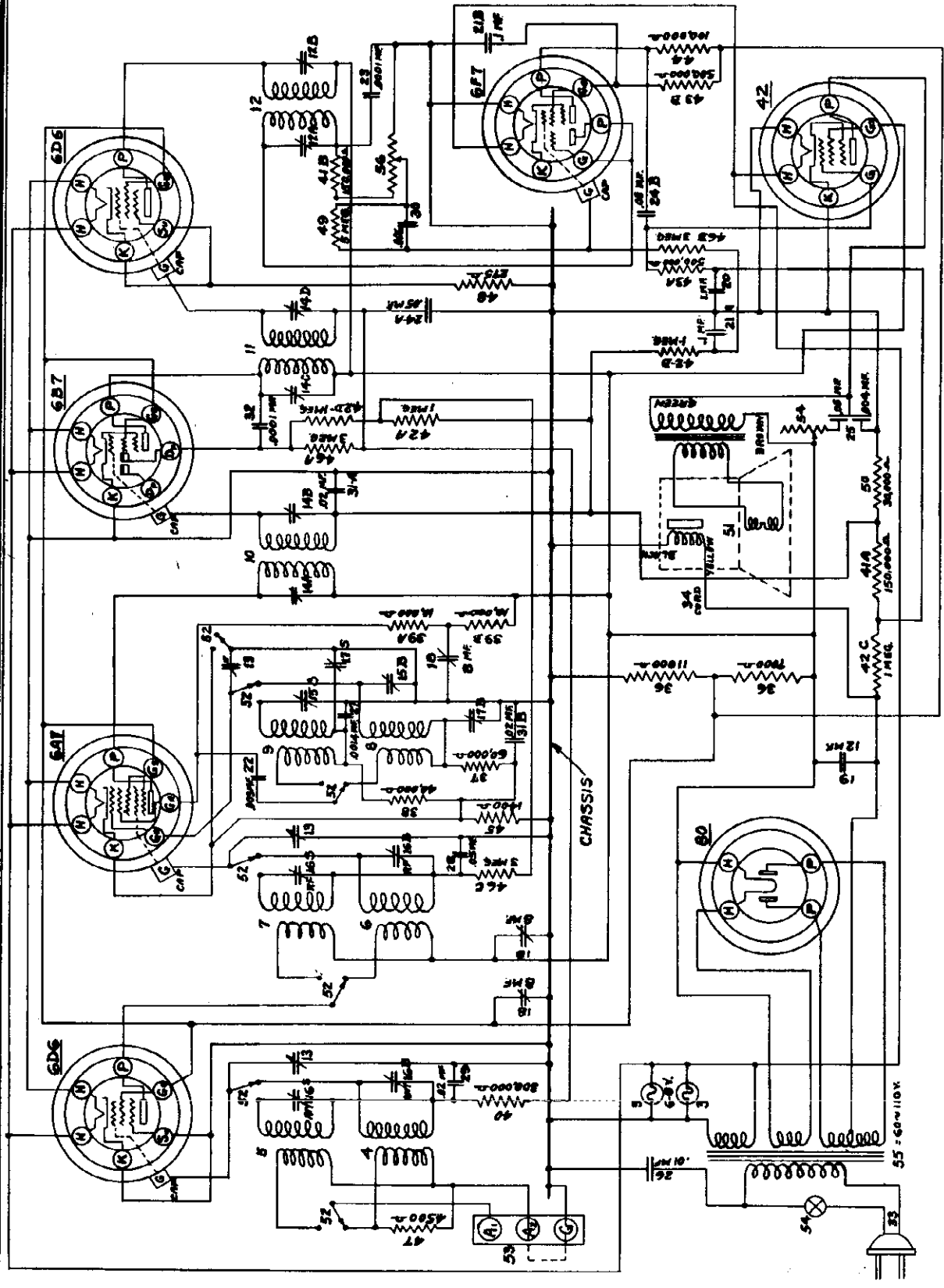
PARTS LIST

The following parts are in Model 1102 - Above Serial 781400, and in Model 1103 - Above Serial 806180.

Part No.	Illus. No.	Part Name	Description
1208840	17D	Condenser	.02 mfd. 200 volt
1208758	39A, 39B	Resistor	15,000 ohm 1/3 watt
1208140	50	Resistor	165 ohm flexible

UNITED MOTORS SERVICE, INC.

MODEL 1104 Delco
Schematic



The frequency ranges covered are 535 to 1735 kilocycles, for the broadcast band and 5.7 to 15.5 megacycles for the short wave band. The intermediate frequency is 456 kilocycles.

MODEL 1104 Delco
Alignment, Voltage
Socket, Trimmers
Chassis, Parts

UNITED MOTORS SERVICE, INC.

Connecting Output Meter

Connect the two terminals of the output meter to the plates of the two type 42 tubes. Make sure that the output meter is protected with a series condenser to prevent the D.C. from flowing through the meter circuit. If the meter is not protected, connect a .1 mfd. condenser in series with the meter.

Peaking I.F. Stages at 456 KC

- (a) Connect the antenna of the signal generator to the receiver control grid connection on top of the 8A7 tube, through a series condenser, (.02 mfd.), leaving the grid cap in place.
- (b) Connect the ground terminal of the signal generator to the receiver chassis frame.
- (c) Turn volume control to full on position.
- (d) Set the Signal Generator to exactly 456 KC and to the lowest useable output with the receiver volume on full.
- (e) Set the receiver band change switch to the right--(Broadcast).
- (f) Adjust I.F. trimmers 12A, 12B, 14D, 14C, 14B and 14A to maximum reading on output meter, in the sequence listed.
- (g) Go over the Adjustments several times till no further improvements can be made.

Peaking Tuning Condenser at 1400 Kilocycles (Broadcast Band)

- (a) Connect antenna of Signal Generator to the antenna terminal on chassis through a series condenser (.0002 mfd.).
- (b) Turn volume control full on, wave change switch to the right (Broadcast).
- (c) Set the signal generator to 1400KC.
- (d) With receiver condenser blades fully engaged (535 KC) check pointer location. It should be exactly parallel with Horizontal line through dial. If it is not, loosen set screws in center of pointer and adjust pointer correctly.
- (e) Set receiver dial pointer to 140.
- (f) Adjust oscillator shunt trimmer #15-B for maximum reading on output meter.
- (g) Now adjust trimmers #Ant. 16B, #RF 16B to maximum output.
- (h) Set receiver pointer to 60.
- (i) Set signal generator to 600 KC.
- (j) Adjust series oscillator trimmer #17B for maximum reading on output meter.
- (k) Repeat c, d, e and f at 1400 KC.

Peaking Tuning Condenser at 16 Megacycles (Short Wave Band)

- (a) Connect signal generator antenna to the receiver antenna terminal through a series resistor (approx. 750 ohm midget-carbon).
- (b) Connect ground terminal of signal generator to the receiver chassis frame.
- (c) Set signal generator to 16000 KC with lowest useable output volume level.
- (d) Set receiver dial to 15, and turn volume on full.
- (e) Change band switch to left--short wave band.
- (f) Adjust oscillator shunt trimmer #15S to Maximum output.
- (g) Adjust trimmers "ant. 16S" and "RF16S" to maximum output. Repeat these adjustments until no further improvement can be made.
- (h) Set signal generator to 8000 KC and the receiver pointer to 6.
- (i) Adjust oscillator series trimmer 17S to maximum output.
- (j) Repeat c, d, e, f and g.

TUBE COMPLIMENT & VOLTAGE CHART

The tube voltages shown below are average readings taken from chassis frame to the tube prong. The chart was made while using 115 volts. Variations in line voltage will cause the readings to vary slightly.

TUBE BASE DIAGRAM SYMBOLS*							
TUBE	FUNCTION	H	P	Gs	Su	G	K
8A7	IF	6.5	225	100	-	-	0
8A7	Use-Mod.	6.5	225	100	-	-	0 Shortwave 150
8B7	1st IF & AVC	6.5	225	100	-	0.3	0
8D6	2nd IF	6.5	225	100	-	-	2
8F7	Diode & AF	6.5	50	25	-	0.5	0
42	Output	6.5	215	25	-	2	0
8D	Rectifier	4.0	0	-	-	-	-

120 Volts across speaker field

***TUBE BASE DIAGRAM SYMBOLS**

H - Heater Su - Suppressor Grid K - Cathode
 P - Plate G - Control Grid P-Osc - Osc Plate
 Gs - Screen Grid

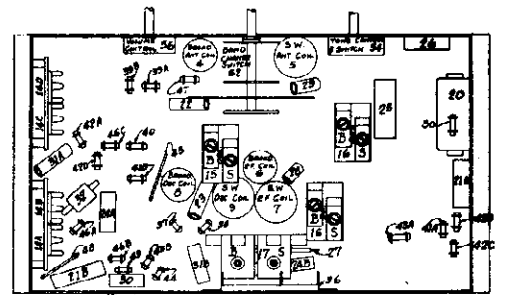


FIG 2 - BOTTOM VIEW OF CHASSIS

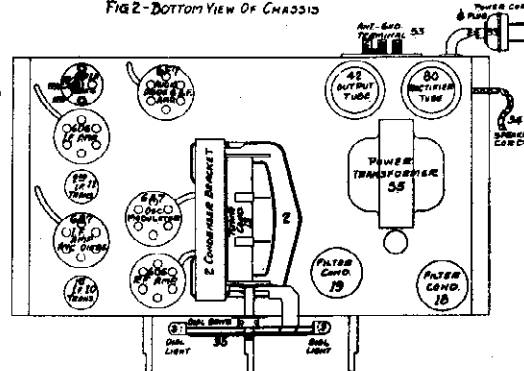


FIG 3 - TOP VIEW OF CHASSIS

1208828	4	Coil	Broadcast antenna
1208829	5	Coil	Short wave antenna
1208830	6	Coil	Broadcast R.F.
1208831	7	Coil	Short wave R.F.
1208803	8	Coil	Broadcast Oscillator
1208829	9	Coil	Short wave osc.
1208835	10	Coil	1st I.F. trans.
1208935	11	Coil	2nd I.F. trans.
1208936	12	Coil	3rd I.F.--Includes trimmers
1208838	13	Condenser	Tuning
1209006	14	Condenser	1st & 2nd I.F. trimmer
1208836	15	Condenser	Trimmer--osc., B.C. & S.W.
1208835	16	Condenser	Trimmer--R.F. & Ant., B.C. & S.W.
1208936	17	Condenser	B.C. & S.W. osc. series
1208316	18	Condenser	2-.8-.8 Mfd., 200,300,400 V.
1208317	18	Condenser	18. Mfd., 475 V.
1208845	20	Condenser	1. Mfd., 160 V.
1208131	21	Condenser	0.1 Mfd., 800 V.
1208942	22	Condenser	0.003 Mfd., 400 V.
1208313	23	Condenser	0.001 Mfd., 200 V.
1208944	24A, 24B	Condenser	0.05 Mfd., 200 V.
1208315	24	Condenser	0.004-0.05 Mfd., 400 V.
1208843	26	Condenser	0.01 Mfd., 400 V.
1208841	27	Condenser	0.0014 Mfd., Mica
1208839	28	Condenser	0.05 Mfd., 200 Volt
1208840	29	Condenser	0.02 Mfd., 200 Volt
1208946	30	Condenser	0.006 Mfd., 200 Volt
1208787	31A, 31B	Condenser	0.02 Mfd., 200 Volt
1208946	32	Condenser	.0001 Mfd., Mica
1208142	33	Cord & plug	A.C.
1208325	34	Cord	Speaker (4 wire)
1208847	35	Dial	Drive assembly
1208848		Dial	Hand or pointer
1208961		Diffuser	Light
1208952		Retainer	Light diffuser
1208849		Knob	Large center
1208850		Knob	Small center
1208861		Knob	Small lower
1208955	36	Resistor	7000-11000 ohm (Candohm)
1208850	37	Resistor	20,000 ohm
1208236	38	"	40,000 "
1208141	39A, 39B	"	10,000 "
1204159	40	"	300,000 "
1208965	41A, 41B	"	180,000 "
1208144	42A, 42B, 42C, 42D	"	"
1208130	43A, 43B	"	1 megohm
1207928	44	"	800,000 ohm
1208805	45	"	100,000 "
1208805	46	"	1400 ohm
1208128	46A, 46B	"	8 megohm
1208906	47	"	4500 ohm
1208125	48	"	275 "
1208805	49	"	5 megohm
1208959	50	"	30,000 ohm
1209019	51	Speaker	Assembly
1208973	52	Switch	Band change
1208871	53	Terminal	Antenna & grd.
1208972	54	Tone control	With line switch
1209013		Transformer	Output
1208974	55	Transformer	Power
1208911		Washer	Insulating (coils)
1208975		Washer	Insulating (18. Mfd. cond.)
1208928	56	Volume control	

UNITED MOTORS SERVICE, INC
 MODELS 3201, 3202 Delco
 Below Serial 800,000
 Schematic, Voltage

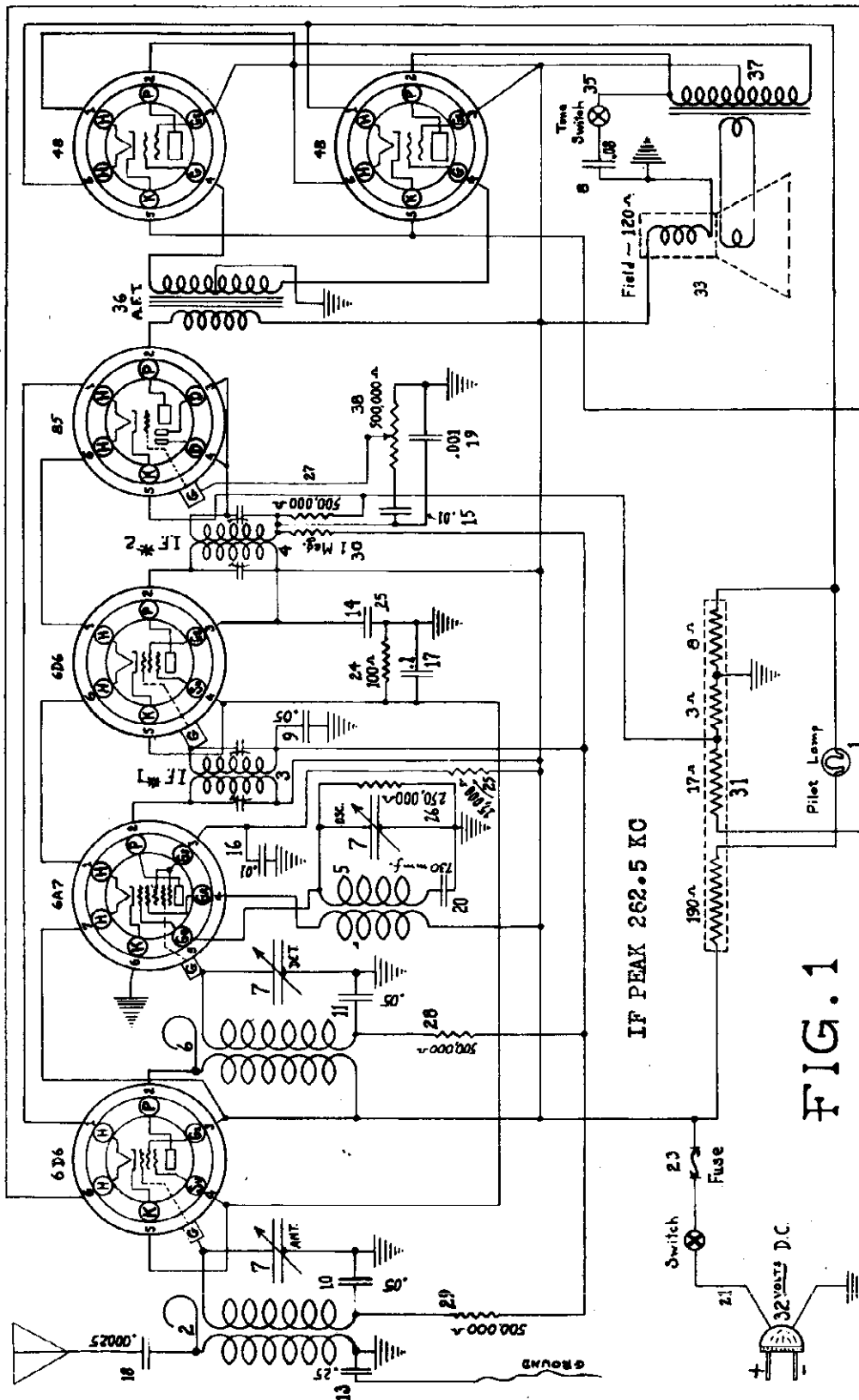


FIG. 1

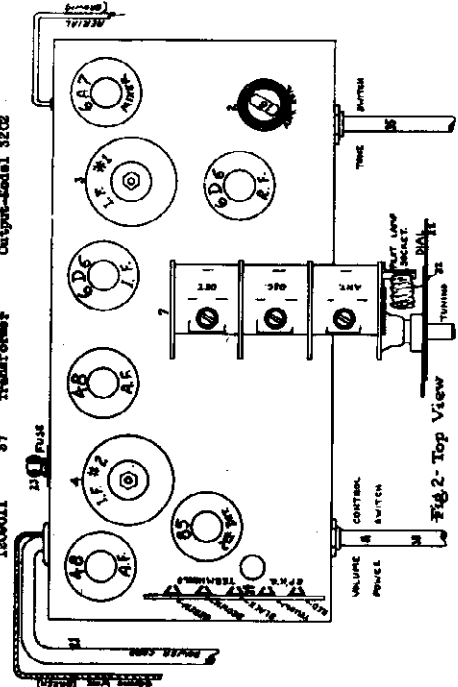
TYPE	FUNCTION	H	P	Gs	Su	G	K	P-OSC.
6D6	R.F. Amp.	6.3	32	32	.5	0	.5	-
6A7	1st Det.-osc.	6.3	32	20	-	0	0	52
6D6	I.F. Amp.	6.3	32	32	.5	0	.5	-
85	2nd Det.-AVC	6.3	30	-	-	0	1	-
48	Power Amp.	26.0	31.5	32	-	0	7	-
48	Power Amp.	26.0	31.5	32	-	0	7	-

Model 3201, table set
 with 6" speaker and
 Model 3202, console
 with 8" speaker

NOTE: The types 6D6, 6A7 and 85 tubes have the heater elements connected in series. If any one of these tube heaters should burn out, the others will fail to light.

MODELS 3201, 3202 Delco
 Below Serial 800,000 UNITED MOTORS SERVICE, INC.
 Alignment, Socket
 Trimmers, Parts

Part No.	Part Name	Description
1808878	Bracket	Pilot light mounting
1808928	Bulb	Dial light 8-8 volt
1808979	Cabinet	Table model #3201
1808980	Cabinet	Console model #3202
1808981	Coil	Antenna
1808761	C-11	1st I.F.
1808982	C-11	2nd I.F.
1808983	C-11	Oscillator
1808984	C-11	Detector
1808985	Condenser	Tuning
1808986	Condenser	.08 Mfd., 200 volt
1808748	Condenser	.08 Mfd., 200 volt
1808987	Condenser	.25 Mfd., 200 volt
1808746	Condenser	.01 Mfd., 200 volt
1808988	Condenser	.1 Mfd., 200 volt
1807750	Condenser	.00085 Mfd.
1808744	Condenser	.001 Mfd., 400 volt
1808745	Condenser	.00075 Mfd.
1808148	Cord & plug	Power
1808990	Dial	Station selector
1806682	Fuse	3 ampere
1806679	Knob	All
1808999	Plate	Neutroheon
1808009	Resistor	100 ohms, 1/3 watt
1808758	Resistor	15,000 ohms, 1/3 watt
1808755	Resistor	850,000 ohms, 1/3 watt
1804158	Resistor	500,000 ohms, 1/3 watt
1808144	Resistor	1,000,000 ohms, 1/3 watt
1808991	Resistor	Tapped caedohm
1808994	Speaker	8" for Table Model 3201
1808995	Speaker	8" for Console Model 3202
1808996	Terminal	Switch
1808997	Terminal	Sp. r-Connection on chassis
1808764	Transformer	Audio
1808998	Vol. Control	Includes switch
1808010	Transformer	Output-Model 3201
1808011	Transformer	Output-Model 3202



Connecting Output Meter

Connect one terminal of the output meter to the plate prong of one of the 48 tubes and the other to the plate prong of the other 48 tube or to the chassis frame. Make sure that the output meter is protected with a chassis condenser to prevent D.C. from flowing through the meter circuit. If the meter is not protected, connect a .1 mfd. condenser in series with the lead to the chassis frame.

Peaking I.F. Stages at 262 1/2 KC

- (a) Connect the output of the signal generator to the grid cap of the 6A7 tube (leave 6A7 grid lead clip in place) and to the chassis frame.
- (b) Turn the tuning condenser until the plates are entirely out of mesh.
- (c) Set the signal generator on 262 1/2 KC and feed this signal through the I.F. stages of the set.
- (d) Peak the I.F. trimmer located on the top of the 1st I.F. coil, Fig. 3. Then peak the trimmer located on the bottom of the same coil, Fig. 3. Due to the detuning effect the primary winding starts over the secondary, it will then be necessary to reset the top trimmer for maximum output.
- (e) Peak the I.F. trimmer located on the top of the 2nd I.F. coil, Fig. 3. Then peak the trimmer located on the bottom of the same coil, Fig. 3. Then reset trimmer on top of the 2nd I.F. coil making all adjustments for maximum output.

NOTE: In the event that the I.F. stages are badly out of alignment at 262 1/2 KC the operation outlined in paragraphs (d) and (e) should be repeated.

TUNING GANG CONDENSER AT 1400 KC

- (a) With the condenser plates completely out of mesh, the 1800 KC indicator line should be exactly in the upper vertical position. If it is not, loosen the two set screws in the selector dial hub and make the necessary adjustment. Then rotate the dial until the 1400 KC indicator line is exactly in the upper vertical position.
- (b) Coil up the antenna lead to within a foot of the chassis and set the oscillator at 1400 KC. Feed the signal generator output into the antenna wire. This may be done by connecting the shielding on the signal generator output lead to the chassis ground wire (green) and by simply wrapping a few turns of the portion of the antenna wire nearest the chassis around the signal generator output lead. This will ordinarily provide sufficient coupling between the signal generator and the antenna circuit of the set. A direct connection with the antenna wire can be made by inserting a pin into the wire close to the chassis. Care should be taken, however, not to permanently damage the insulation.
- (c) Peak the AVC trimmer condenser, Fig. 8, until the oscillator output can be heard in the speaker, then the "Ant." and "Det." trimmers located on the gang tuning condenser, making all adjustments for maximum deflection on the output meter scale. Repeat the adjustment several times until no further improvement can be made.

NOTE: To avoid AVC action and to insure sharp peaking of all trimmers, reduce the signal generator output to the lowest level that will give a reasonable deflection on the output meter scale.

MODELS 3201, 3202 Delco
Above Serial 800,000 UNITED MOTORS SERVICE, INC.
Alignment, Data
Socket, Trimmers, Chassis

GENERAL DESCRIPTION

The Models 3201 and 3202 are both 32 volt 6 tube superheterodyne receivers with A.V.C. The only difference between the two receivers is that the Model 3201 has a table type cabinet and a 6" speaker, while the Model 3202 has a console cabinet and an 8" speaker. The frequency range of these sets is from 540 to 1700 kilocycles.

Power Supply System

The unique feature of these receivers is that the maximum plate or screen voltage used is 32 volts, as the positive lead of the power cord connects directly to the plates and screens of the tubes and the negative lead connects to the chassis.

The filaments of the two type 6D6 tubes, the type 6A7 and the type 85 are connected in series and are lighted by being connected directly across the 32 volt power supply in series with the 18 and 3 ohm sections of the resistor strip (illus. #30, Fig. 1a). The filaments of the two type 48 output tubes are each connected in parallel across the 32 volt power supply in series with the 8 ohm section of the resistor strip (illus. #30, Fig. 1a).

METHOD OF BIASING

The 6D6 R.F. and I.F. tubes obtain their residual bias from a common bias resistor of 100 ohms (illus. #28) and the control grids of both of these tubes receive a negative voltage from the A.V.C. circuit depending on the strength of the signal tuned in. The 6A7 tube has its cathode connected directly to ground and its control grid also receives a negative voltage for grid bias from the A.V.C. circuit when a signal is tuned in. The bias on the 85 tube is obtained by connecting the cathode to a point that is positive with respect to ground and returning the grid circuit to ground through the volume control. The bias on the two type 48 output tubes is also obtained by connecting their cathodes to a positive point with respect to ground and returning the center tap on the input transformer to ground.

CIRCUIT GROUND

DO NOT ground the chassis except through the use of the "GND" terminal of the terminal strip located on back of the chassis. This terminal connects to the chassis frame through a series condenser in order to prevent a short circuit when operating the receiver on a 32 volt system with the positive side grounded.

OSCILLATION

A few receivers below Serial No. 866175 may have a tendency to oscillate due to the lack of capacity by-passing the common bias resistor (illus. #28, Fig. 2a) for the two 6D6 tubes. The majority of these sets were corrected in the field through the use of an additional condenser of a .25 mfd. capacity connected from the 6D6 R.F. tube cathode to the chassis. In cases where this condenser has not been included in the chassis and the receiver oscillates, it will be necessary to connect a part #1808130 condenser from the 6D6 R.F. tube cathode to the chassis. This condenser has been included in production on all sets above Serial #866175 (illus. #17, Fig. 2a) and should eliminate all cases of oscillation from low capacity.

PEAKING PROCEDURE

All of the adjustable condensers, commonly called "trimmer" condensers, are very accurately adjusted at the factory and will not need any further adjustment unless they are tampered with in the field or a defective coil has been replaced. DO NOT attempt to change the setting of any trimmer condensers unless it is definitely known that the adjustment is necessary. If realignment is found necessary, the circuits can be properly adjusted only with the use of a test oscillator and an output meter.

Connecting Output Meter

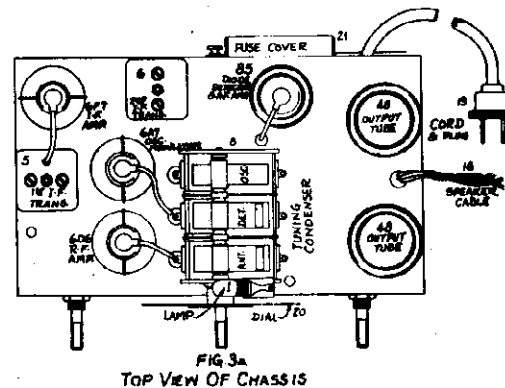
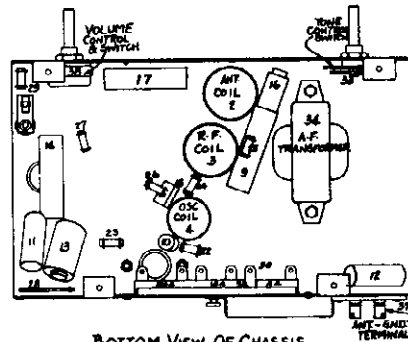
Connect one terminal of the output meter to the plate prong of one of the 48 tubes and the other to the plate prong of the other 48 tube or to the chassis frame. Make sure that the output meter is protected with a series condenser to prevent D.C. from flowing through the meter circuit. If the meter is not protected, connect a .1 mfd. condenser in series with the lead to the chassis frame.

Peaking I.F. Stages at 456 K.C.

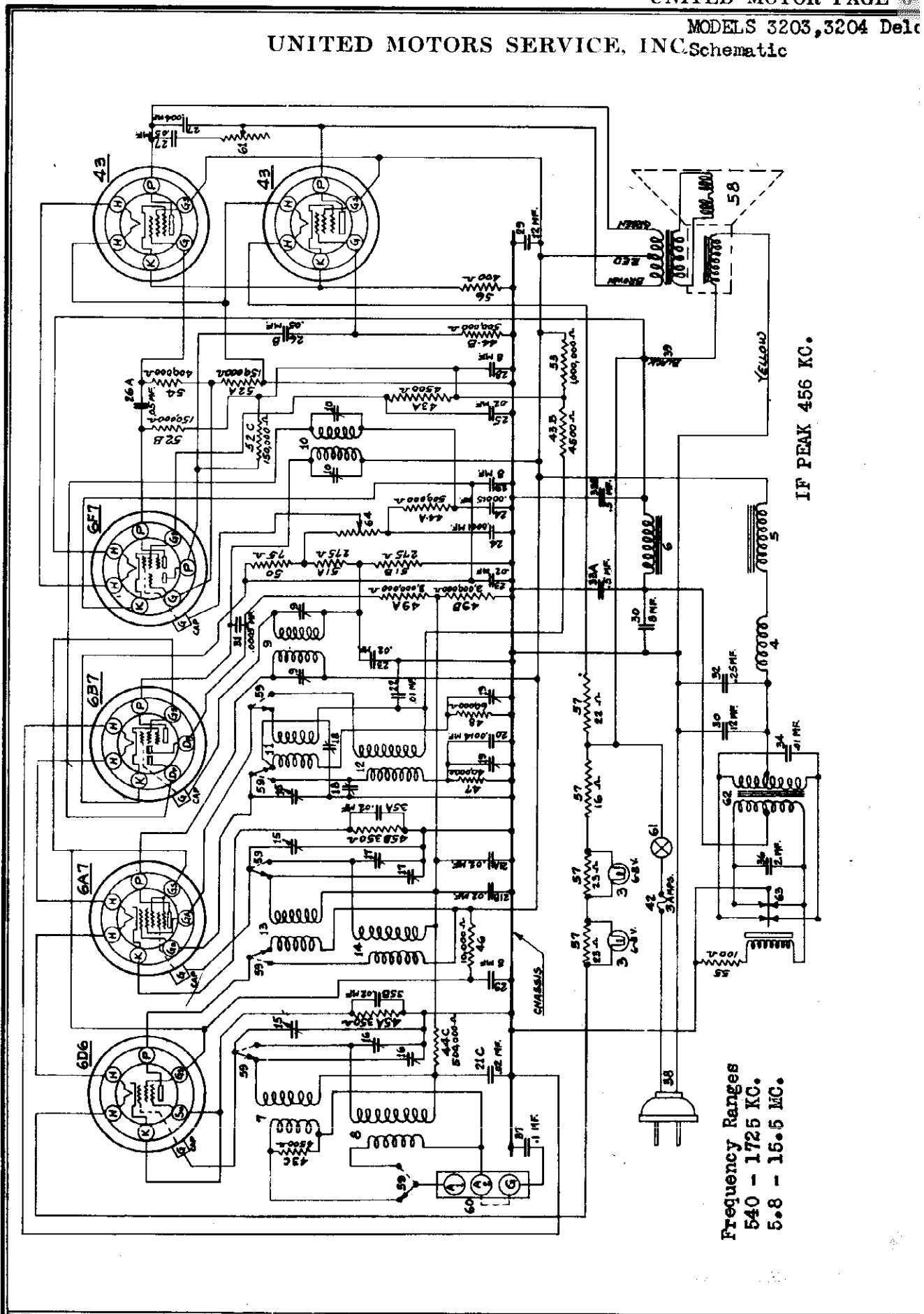
- (a) Connect the output of the test oscillator to the grid cap of the 6A7 tube (leave 6A7 grid lead clip in place) and to the chassis ground.
- (b) Turn the tuning condenser rotor plates until they are completely out of mesh.
- (c) Set the test oscillator on 456 kilocycles.
- (d) Peak the I.F. trimmers located on the top of the 2nd I.F. coil (illus. #8, Fig. 3a) for maximum output.
- (e) Then peak the I.F. trimmers located on the top of the 1st I.F. coil (illus. #6, Fig. 3a) for maximum output.
- (f) In order to insure accurate setting of the I.F. trimmers the above adjustments should be repeated using the lowest test oscillator output that will give a reasonable deflection of the output meter pointer. Make all adjustments for maximum output.

Peaking Gang Condenser at 1400 K.C.

- (a) Connect the output of the test oscillator to the "ANT" and "GND" terminals of the receiver chassis with the ground connection of the oscillator connecting to the "GND" terminal of the receiver chassis.
- (b) Set the receiver dial on 1400 K.C. This position can be determined with the chassis out of the cabinet by moving the dial so that the 1400 K.C. mark is in a vertical position.
- (c) Set the test oscillator on 1400 K.C.
- (d) Adjust the parallel trimmer for the oscillator section (3rd section from receiver dial with the small rotor plates) of the condenser gang for maximum output.
- (e) Then adjust the parallel trimmers for the other two sections of the gang condenser for maximum output.
- (f) To insure accurate setting of the trimmer condensers the above adjustments should be repeated using the lowest test oscillator output that will give a reasonable deflection of the output meter pointer. This is necessary in order to prevent the A.V.C. from leveling out the output as the adjustments are made.
- (g) Place a few drops of Duco Cement over the adjusting screws and trimmer blades to prevent the adjustments from shifting. Do not allow any cement to get on the mica insulators.



UNITED MOTORS SERVICE, INC. Schematic



IF PEAK 456 KC.

Frequency Ranges
540 - 1725 KC.
5.8 - 15.5 MC.

MODELS 3203, 3204 Delco

Alignment, Voltage

UNITED MOTORS SERVICE, INC.

Peaking Output Meter

Connect one terminal of the output meter to the plate terminal of one type 43 output tube and the other to the plate of the other type 43 tube.

Peaking I.F. Stages at 456 KC

- (a) Connect the antenna of the signal generator to the control grid connection on top of the 6A7 tube, (DO NOT remove grid clip) through a series condenser, .02 mfd.
- (b) Connect the ground terminal of the signal generator to the radio chassis frame.
- (c) Set the signal generator to exactly 456 kilocycles.
- (d) With the signal generator set to the lowest useable output level, and the receiver volume control on full, adjust the I.F. trimmer condensers for maximum signal output.

NOTE: The I.F. trimmers are located on top of the I.F. coils and may be adjusted with an insulated screw driver. Always make the adjustments very carefully, going over them several times to insure that the final setting is at resonant frequency.

Peaking Tuning Condenser at 1400 Kilocycles (Broadcast)

- (a) Close the receiver tuning condenser plates (535 KC) and set the selector pointer on the horizontal line.
- (b) Connect the antenna terminal of the signal generator to the receiver antenna terminal through a series condenser (.0002 mfd.).
- (c) Connect the ground terminal of the signal generator to the radio chassis frame.
- (d) Set the signal generator to exactly 1400 KC and to the lowest useable volume level, with the radio set volume on full.
- (e) Turn the receiver band change switch to the right hand position (broadcast band).
- (f) Set the receiver tuning control to 140.
- (g) Adjust the oscillator broadcast shunt trimmer, Illus. 19-B to maximum output.
- (h) Adjust the radio frequency trimmer, Illus. 17-B to maximum output.
- (i) Adjust the antenna trimmer, Illus. 16-B to maximum output.

NOTE: It is necessary that these adjustments be gone over several times until no further improvement can be made.

- (j) Set the signal generator to 600 kilocycles.
- (k) Tune the receiver to 60 on the dial and adjust the signal generator until maximum response is obtained.
- (l) Adjust the series oscillator trimmer #19-B for resonant frequency. Simultaneously rotate station selector (slightly-approx. 1/8 inch) until maximum signal is obtained.

(m) Repeat the adjustments at 1400 KC.

Peaking Tuning Condenser at 15 Megacycles (Short Wave Band)

- (a) Connect the antenna terminal of the signal generator to the receiver antenna terminal through a series carbon resistor (750 ohms + 20%).
- (b) Connect the ground terminal of the signal generator to the radio chassis frame.
- (c) Set the signal generator to exactly 15000 KC (15 megacycles).
- (d) Turn band change switch to the left hand position (short wave band).
- (e) Set the tuning control of the receiver to 15 on the dial.
- (f) Adjust the oscillator parallel trimmer, Illus. 18-S to maximum output.
- (g) Adjust the antenna trimmer, Illus. 16-S to maximum output.
- (h) Adjust the radio frequency trimmer, Illus. 17-S to maximum output

NOTE: It is necessary that these adjustments be gone over very carefully several times until no further improvement can be made. Greater accuracy is required for making short wave adjustments.

- (i) Now set the signal generator to 6000 KC.
- (j) Set the receiver dial to 6.
- (k) Adjust the oscillator series trimmer, Illus. 19-S to maximum output, simultaneously rotate station selector (slightly-approx. 1/8 inch) until maximum signal is obtained.
- (l) Repeat the adjustments at 15000 KC.

TUBE COMPLEMENT & VOLTAGE CHART

The tube voltages shown below are average readings taken from chassis to the tube prong. This chart was made while using 32 volt line. Variations in line voltage will cause the readings to vary slightly.

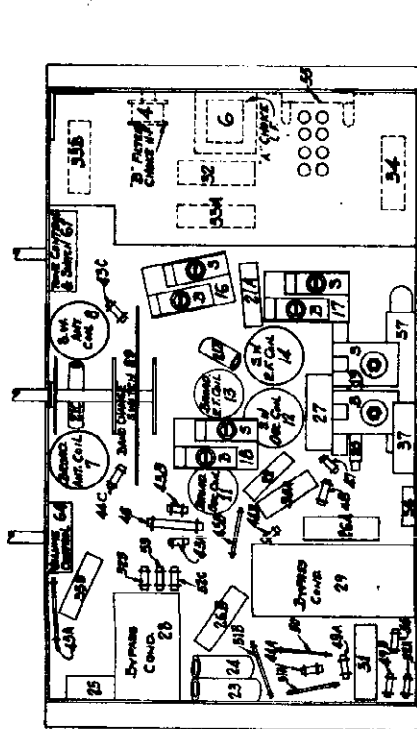
TYPE	TUBE BASE DIAGRAM SYMBOLS*						
	H	F	Gs	Su	Ga	K	
6D6	RF AMP.	6.25	175	110	3	0.	3
6A7	Osc-Mod.	6.25	175	110	0.	6 to 12	4 145
6B7	IF Det. AVC	6.25	175	110	0.	0.	8
6P7	AF Amp. &						
	Inverter	6.25	45	15	0.	0.	6 60
	45 Output	25.75	168	175	0.	0.	30
	43 Output	25.75	168	175	0.	0.	30

*TUBE BASE DIAGRAM SYMBOLS

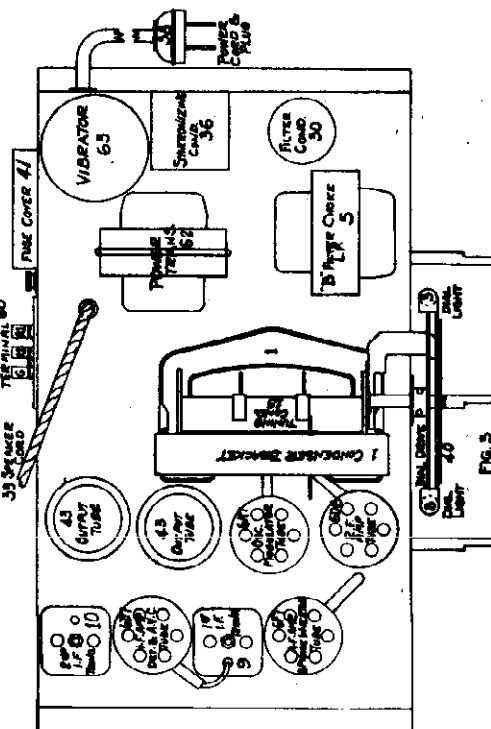
H - Heater
 F - Suppressor
 Gs - Control Grid
 Su - Cathode
 Ga - Anode Grid
 K - Osc Plate
 P - Osc Grid

MODELS 3203, 3204 Delco
 UNITED MOTORS SERVICE, INC Socket, Trimmers
 Chassis, Parts

1208838	16	Condenser	Tuning--3 gang
1208836	16	Condenser	Ant. trimmer--broadcast & S.W.
1208835	17	Condenser	R.F. trimmer--broadcast & S.W.
1208836	18	Condenser	Osc. trimmer "
1208837	19	Condenser	Series osc. trimmer "
1208841	20	Condenser	.0014 mfd.--mica
1208840	21	Condenser	.02 mfd.--200 volt
1208844	22	Condenser	.01 mfd.--400 volt
1208120	23	Condenser	.02-.02 mfd.--200 volt
1208124	24	Condenser	.0001-.00015 mfd.--400 volt
1208136	25	Condenser	.02 mfd.--400 volt
1208135	26	Condenser	.05 mfd.--400 volt
1208315	27	Condenser	.05-.004 mfd.--400 volt
1208890	28	Condenser	8. mfd.--250 volt
1208891	29	Condenser	12.-8.-8. mfd.--250 V., 250 V., 25 V.
1208892	30	Condenser	.0006 mf. 250V., 25V.
1208119	31	"	.25 mf. 300 v.
1208893	32	"	.6 mf. 160 v.
1208894	33	"	.01 mf. 2000 v.
1208896	34	"	.02 mf. 200 v.
1208787	35A, 35B	"	2. mf. 300 v.
1208896	36	"	.1 mf. 400 v.
1208139	37	"	Receiver
1208846	38	Cord & Plug	Speaker
1208897	39	Cord	4500 ohms
1208905	43A, 43B	Resistor	500,000 ohms
1204138	44A, 44B, 44C	"	350 ohms
1208902	45A, 45B	"	10,000 ohms
1208826	47	"	40,000 ohms
1208320	48	"	60,000 ohms
1208123	49A, 49B	"	5,000,000 ohms
1208359	50	"	75 ohms
1206125	51A, 51B	"	275 ohms, Flexible
1207905	52A, 52B, 52C	"	150,000 ohms
1206144	53	"	1,000,000 ohms
1208906	54	"	400,000 ohms
1208907	55	"	100 ohms, candohm
1208908	56	"	400 ohms, candohm
1208909	57	"	23-23-16-22 ohms core-ohm
1208917	58	Speaker	8"-(Mantel set)
1208918	58	Speaker	10"-(console set)
1208870	59	Switch	Band change
1208871	60	Terminal	Ant. & Grd.
1208872	61	Tone control	With on-off switch
1209014	62	Transformer	Output
1208919	62	Transformer	Power
1208920	63	Vibrator	
1208921	63	Vibrator case	
1208922	63	Cap	Screw type--vib. case
1208923	63	Plug	Socket
1208924	64	Vibrator cover	
1208925	64	Vibrator cover base	
1208928	64	Volume control	



BOTTOM VIEW OF CHASSIS
 FIG. 2



TOP VIEW OF CHASSIS
 FIG. 3

1208349	4	Choke	High frequency "B" circuit
1208883	5	Choke	Low frequency "B" circuit
1208884	6	Choke	Low frequency "A" circuit
1208888	7	Coil	Antenna-broadcast
1208829	8	Coil	Antenna-short wave
1208832	9	Coil	1st I.F. assembly
1208834	10	Coil	2nd I.F. assembly
1203003	11	Coil	Oscillator--broadcast
1208828	12	Coil	Oscillator-short wave
1208830	13	Coil	R.F.--broadcast
1208831	14	Coil	R.F.--short wave

MODEL Chevrolet 364441
Alignment, Parts List

UNITED MOTORS SERVICE

1207686	Coil	Antenna	T-1
1207496	Coil	RF - 1st Det.	T-2
1207761	Coil	Oscillator--1st I.F.	T-3
1207752	Coil	2nd I.F.	T-4
1207755	Coil (choke)	R.F. choke	L-1
1207687	Coil (choke)	Power filter	L-2
1207689	Condenser	5 Gang tuning	C-1, A, B, C
1207625	Condenser	Molded .0005 Mfd.	C-2
1207626	Condenser	Molded .000735 Mfd.	C-3
1207799	Condenser	Tubular .02 Mfd.	C-7
1207636	Condenser	Molded .0005 Mfd.	C-8
1207628	Condenser	Tubular .01 Mfd.	C-9
1207690	Condenser	Paper .002 Mfd.	C-10
1207893	Condenser	Molded .003 Mfd.	C-11
1207817	Condenser	Molded .003 Mfd.	C-12
1207901	Condenser	By-pass block	C-15 A to G
	Sec. (A) .1 Mfd., (B) .4 Mfd., (C) .25 Mfd. (D) .15 Mfd. (E) .25 Mfd. (F) 4.0 Mfd. (G) 4.0 Mfd.		
1207689	Condenser	Capacity values same as 1207901	
1207817	Condenser	Molded .003 Mfd.	C-14
1207817	Condenser	Molded .003 Mfd.	C-15
1207817	Condenser	Molded .003 Mfd.	C-16
1207817	Condenser	Molded .003 Mfd.	C-17
1207691	Condenser	Metal case .5 Mfd.	C-18
1207693	Condenser	Metal case .5 Mfd.	C-19
* See paragraph on "CIRCUIT and PART CHANGES"			
1207694	Condenser	Metal Case	C-20
1207625	Condenser	Electrolytic block	C-21 A, B
	Sec. (A) 8.0 Mfd., (B) 8.0 Mfd.		C-22
1207692	Condenser	Paper .02 Mfd.	
1849014	Condenser	Generator .5 Mfd.	
1849161	Condenser	Ammeter .5 Mfd.	
1207720	Resistor	Carbon	R-1A, B, C, D, E
	(Sec. (A) 4200, (B) 400, (C) 1400, (D) 900, (E) 250 ohms.		
1208044	Resistor	Res. 75,000 ohms	R-2
1204135	Resistor	Res. 25,000 ohms	R-3
1204138	Resistor	Res. 500,000 ohms	R-4
1204138	Resistor	Res. 500,000 ohms	R-5
1204138	Resistor	Res. 500,000 ohms	R-6
1204138	Resistor	Res. 500,000 ohms	R-7
1204138	Resistor	Res. 500,000 ohms	R-8
1207831	Resistor	Spark plug 20 M ohms	
1201277	Resistor	Distributor 25 M ohms	
1207866	Coil	6 volt field	
1207799	Condenser	Tone control .02 Mfd	C-7
1207744	Cover	Case back	
1207745	Knob	Tone control	
1207692	Plug	Speaker cord	
1208857	Screw	Ornamental head	
1207798	Tone control	0-50,000 ohms	R-10
1207693	Transformer	Output	T-6

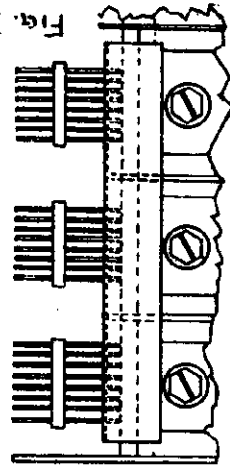
Peaking I.F. Stages at 262 KC

The only way the I.F. stages can be peaked properly is with the use of an oscillator and output meter. Connect the output meter to the plate prongs of the type 69 output tubes.

- (a) Connect the output of the oscillator to the grid cap of the type 36 Detector-Oscillator tube (leave grid cap in place) and to the chassis ground.
- (b) Turn the condenser gang until the plates are entirely out of mesh.
- (c) Set the oscillator on 262 KC and feed this signal through the I.F. stages of the set.
- (d) Peak the I.F. condenser (C-6 on Fig. 4) which is on the I.F. coil located on the bottom of the chassis. Then peak the two condensers (C-4 and C-5 on Fig. 3) located on front of the oscillator I.F. coil, peaking the plate coil condenser C-4 first.
- (e) Set the oscillator output at the lowest level that will give a reasonable scale deflection on the output meter. It should be less than one third of the maximum output available.
- (f) Make all trimmer condenser adjustments for maximum deflection on the output meter scale.

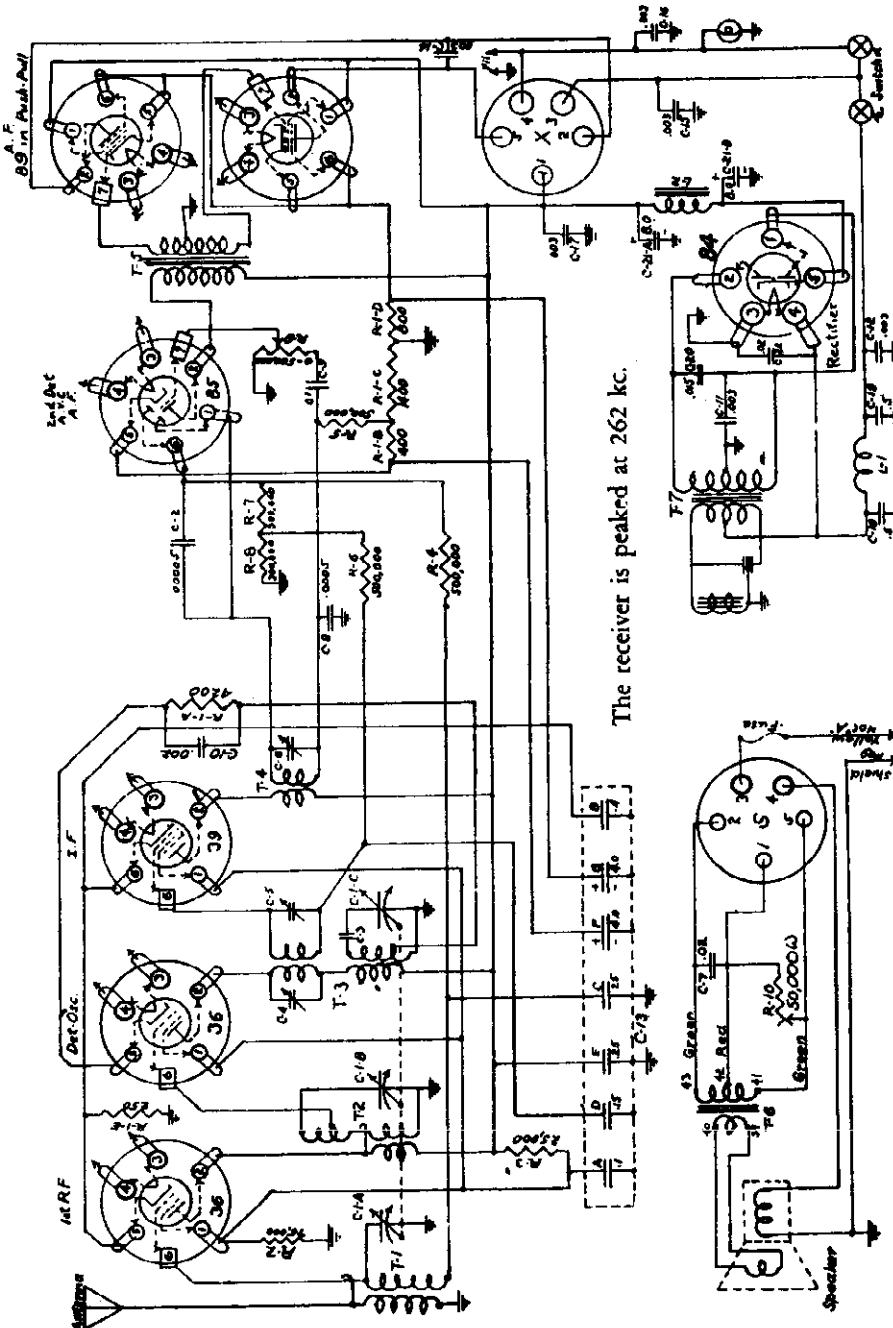
Peaking Gang Condenser at 1400 KC

- (a) Set the oscillator on 1400 KC and connect its output to the antenna connection of the set and to the chassis ground.
- (b) In order that the position of the condenser plates for 1400 KC can be properly determined a metal aligning strip (part #1206431) should be used. This strip is placed over the top edge of the condenser gang as shown in figure 1.
- (c) The condenser plates should be turned until they stop against the aligning strip.
- (d) Place the tube shield (part #1205419) in position around the detector-oscillator tube.
- (e) Peak the parallel trimmers on the top of the condenser gang. The oscillator section (C-1-C figure 3) located next to the volume control should be peaked first.
- (f) To insure sharp peaking of all trimmers reduce the oscillator output to the lowest level that will give a reasonable deflection on the output meter scale, in order to prevent the A.V.C. from leveling out the output.



UNITED MOTORS SERVICE

OSCILLATOR CIRCUIT. If set fails to oscillate entirely or oscillates on one end of the dial only, a new 36 tube should be tried in the oscillator socket. If this does not remedy the trouble, check resistor R-1-A and condensers C-3, located below section C-1-C of the gang condenser, and C-10, located on the resistor strip. Due to the capacity values of C-3 and C-10 being rather critical, they should be tested by replacement. If the above does not remedy the trouble, it may be necessary to replace the oscillator coil.



be removed. The new block has two white leads, both connected to the same section inside the condenser, and one of these leads should be connected to the i-f. cathode and the other to the r-f. cathode. Either lead may be connected to either cathode.

All receivers bearing serial numbers higher than 1,292,774 have a five-ampere fuse in the 6-volt side of the vibrator circuit, between the switch and the L-1 choke. The fuse block is mounted on the trans-vibrator assembly.

It is significant to note the following changes which have been made: In receivers below serial number 1,255,182, either the old or new C-13 condenser block may be used for service; in receivers above serial 1,255,182, condenser block number 1,207,901 MUST be used exclusively. When a new condenser block number 1,207,901 is used for replacement in a receiver below serial 1,255,182, the connecting wire from the cathode of the i-f. tube socket to the

Voltage Chart

The voltage readings given herewith are measured between the respective tube contacts upon the sockets and the chassis.

Tube	Screen	Plate	Heater	Heater	Cathode	Grid	Grid
\$1	\$2	\$3	\$4	\$5	\$6		
RF	100	175	0	6	2.5		
Om.	100	150	0	6	7.5		
I.F.	100	175	0	6	2.5		
Det	2	185	6	0	10.5	O-AVC	
A.F.	175	175	0	6	19.5		19.5
A.F.	175	175	0	6	19.5		19.5
D-ant							190.0

MODEL Chevrolet 364441
Socket, Trimmers
Chassis

UNITED MOTORS SERVICE

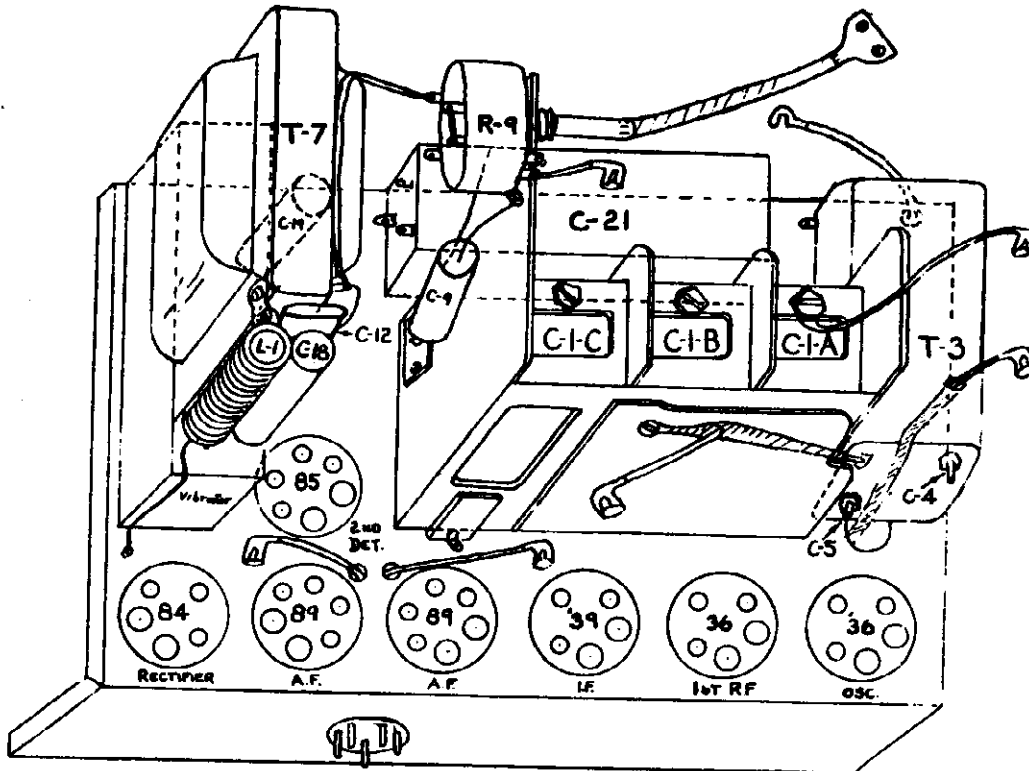


Fig. 3 PARTS LOCATING DIAGRAM

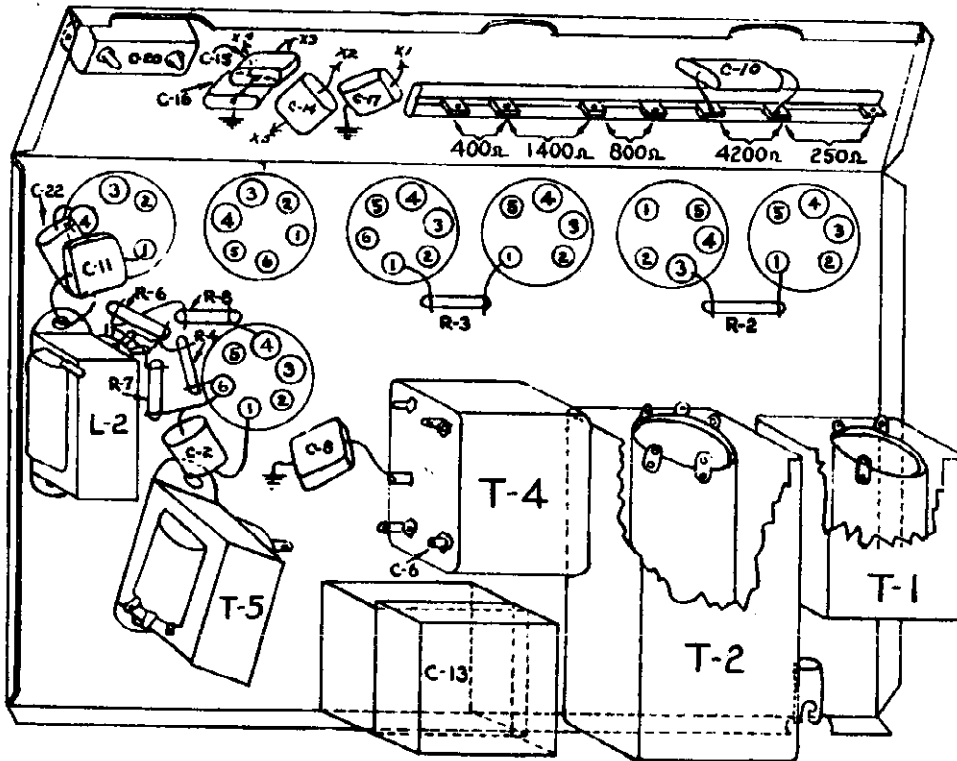


Fig. 4 PARTS LOCATING DIAGRAM

UNITED MOTORS SERVICE

MODEL Buick-Pontiac 544245
 Oldsmobile 393884
 Below Serial 1748809
 Schematic, Voltage

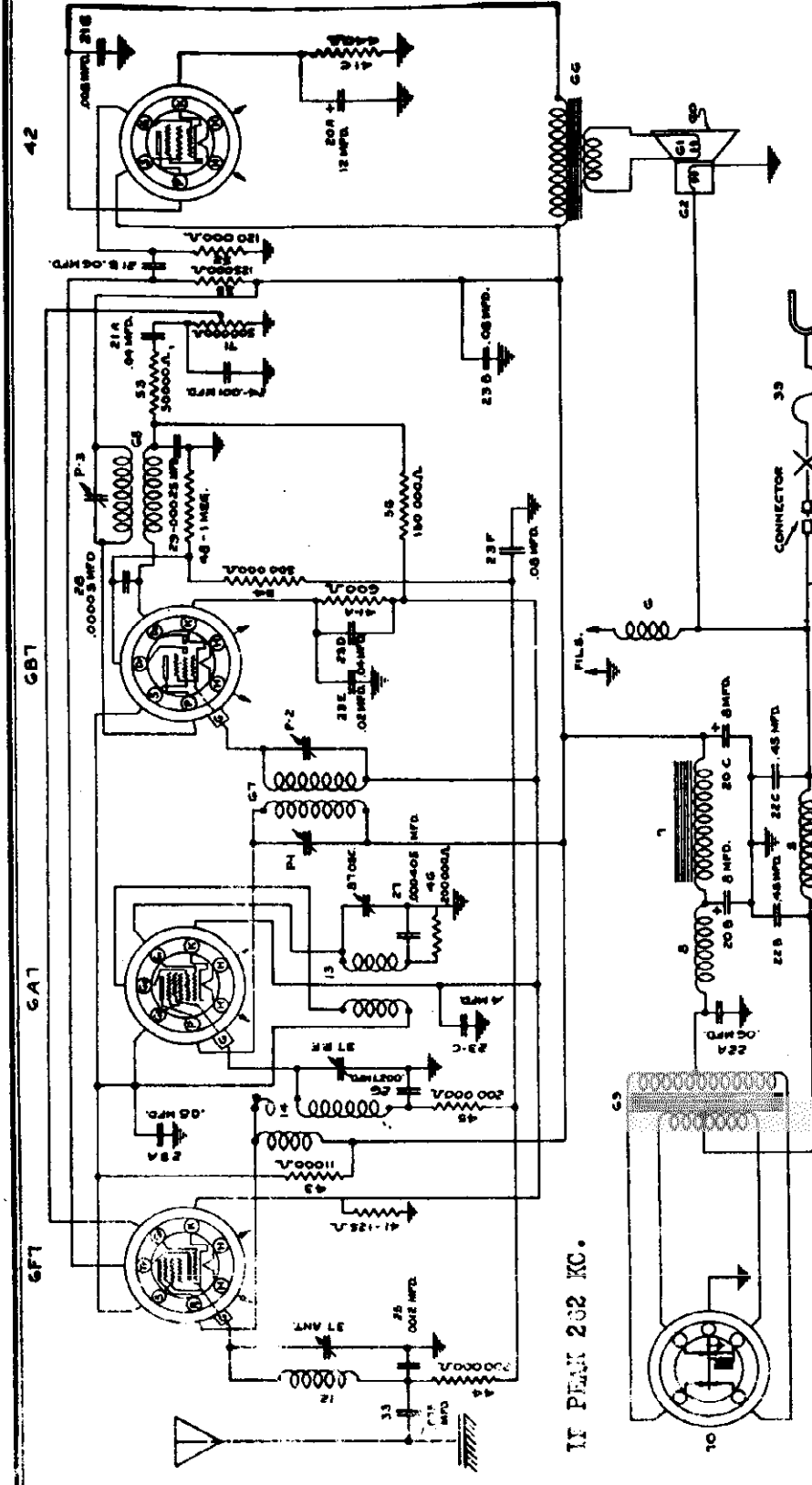


FIG. 1 CIRCUIT DIAGRAM--Below Serial #1748809
 (For Buick, Pontiac Model 544245 and Olds Model 393884)

TUBE BASE DIAGRAM SYMBOLS

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	0	-	-	-	16.0

** 6.9 Volts for sets below serial No. 1748809

UNITED MOTORS SERVICE

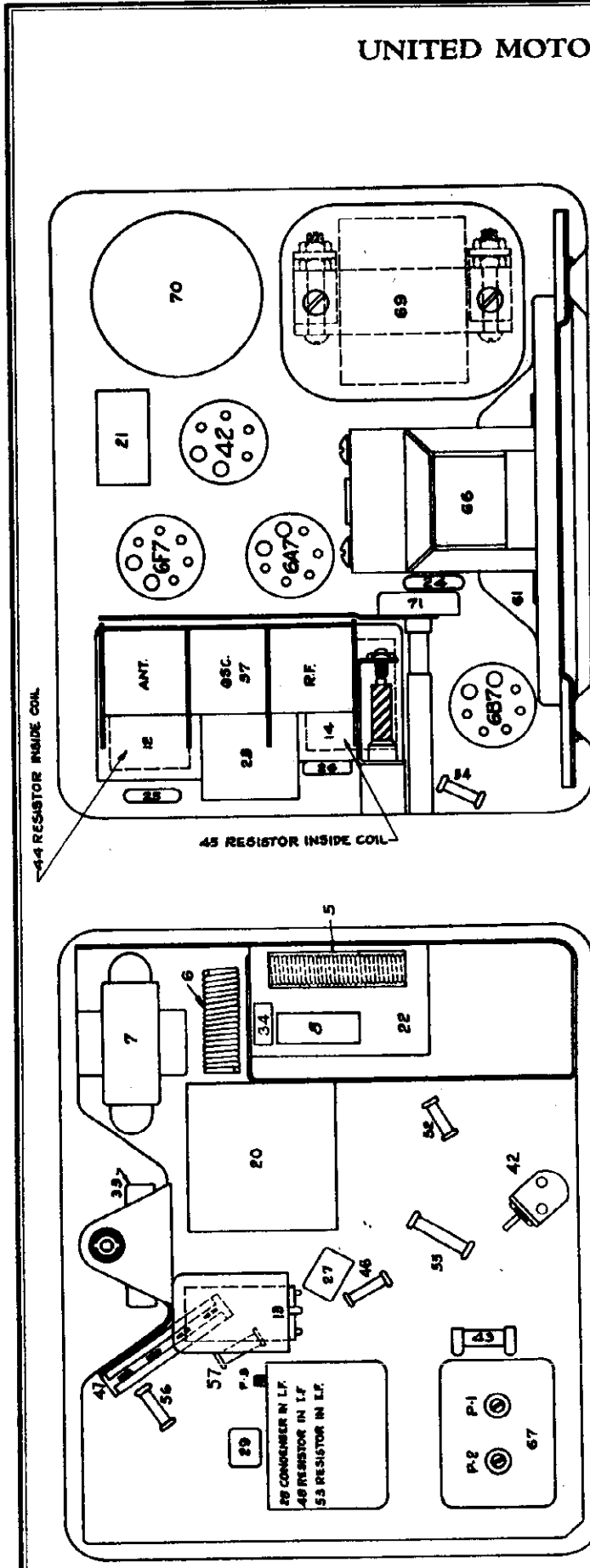


FIG. 2 PARTS LAYOUT - Bottom View

For sets above serial #1748809

For sets below serial #1748809, the following changes should be noted: Parts 34, 42 and 57 are omitted; Part 41 used instead of 47.

FIG. 3 PARTS LAYOUT - Top View

This layout is the same for sets having serial numbers above and below #1748809.

CIRCUIT CHANGES.--- Several circuit changes were made starting at serial #1748809. See Figs. 1, 1A, 2 and 3. It will be noted on some sets that the .008-mf. section (21C) of part #1209048 condenser block has its lead cut off close to the block and a .008-mf. tubular condenser connected from the plate of the 42 tube to ground in its place. This change was made because it was found necessary to change the voltage rating of the .008-mf. section of the condenser block after production started and the tubular condenser used until a new block could be manufactured. The tubular condenser used is part #1209212 and is located beside the filter choke. All the service replacement stock of #1209048 condenser blocks have a .008-mf. section of a higher voltage rating and in installing these blocks in a set where the tubular condenser was used, it will be necessary either to remove the tubular condenser or clip the lead off the .008-mf. section of the block.

**MODEL Buick-Pontiac 544245
Oldsmobile 393884 UNITED MOTORS SERVICE**
Alignment, Circuit Notes
Parts

Connecting Output Meter

Connect one of the terminals of the output meter to the plate prong of the type 42 output tube which can be determined by looking at the bottom of the tube with the filament prongs toward you. The plate prong is the first prong to the right of the filaments. Connect the other terminal of the output meter to receive chassis, making sure that the meter is protected with a series condenser.

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 tube's 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 for the 2nd I.F. coil shown on Figure 2.
- (e) Then peak trimmers P-2 and P-1 of 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 output meter scale deflection. 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 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 tuned 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 (shown on Fig. 2) 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.

Parts List

Part No.	Part Name	Description	Illus. No.
1207683	Cap	Grid connector	
1209080	Case	Chassis (Buick-Pontiac)	
1209081	Case	Chassis (Olds)	
1209045	Clamp	Vibrator holding	
1208077	Clip	Tube shield grinding	
1209039	Coil	R.F. "A" choke	6
1209040	Coil	Tube filament choke	6
1207999	Coil	Power filter choke	7
1209041	Coil	R.F. "B" choke	8
1209042	Coil assy.	Antenna	12
1209043	Coil	Oscillator	13
1209044	Coil assy.	R.F.-1st Det.	14
1209047	Condenser	Electrolytic block	20A,B,C
		Sec. (A) 12 mfd., (B) 8 mfd., (C) 8 mfd.	
1209048	Condenser	By-pass block	21A,B,C
		Sec. (A) .04 mfd., (B) .06 mfd., (C) .008 mfd.	
1209049	Condenser	By-pass block	22A,B,C
		Sec. (A) .06 mfd., (B) .45 mfd., (C) .45 mfd.	
1209050	Condenser	By-pass block	23A,B,C
		Sec. (A), (B), (F), .08 mfd., (C) .4 mfd., (D) .01 mfd., (E) .1 mfd.	
1207874	Condenser	Molded .001 mfd.	24
1209251	Condenser	Molded .00012 mfd.	25
1209052	Condenser	Molded .0027 mfd.	26
1209053	Condenser	Molded .000405 mfd.	27
1209054	Condenser	Molded .00005 mfd.	28
1209055	Condenser	Molded .00025 mfd.	29
1209056	Condenser	Tubular .075 mfd.	33
1209213	Condenser	Tubular .08 mfd.	33
1209055	Condenser	Molded .00025 mfd.	34
1209058	Condenser	3 Gang tuning	37
1209212	Condenser	Tubular .008 mfd.	
1209059	Coupling	Condenser drive	
1209090	Cover	Chassis top (Buick-Pontiac)	
1209094	Cover	Chassis top (Olds)	
1209091	Cover	Tube lid (Buick-Pontiac)	
1209095	Cover	Tube lid (Olds)	
1209046	Coygr	Vibrator trans.	

* Used below serial #1748809 * See "CIRCUIT CHANGES"
* Used above serial #1748809

The "A" supply to the receiver is filtered to prevent any spark interference from affecting the receiver circuits and also makes possible the installation of this receiver without the use of spark plug suppressors.

Delayed automatic volume control is used so that it will not have any effect on the volume of weak stations. A slight delay is also used on the detector circuit to assist materially in reducing background noise.

The vibrator circuit is permanently connected to operate on a car battery with the negative side grounded, as is the case on Buick, Olds and Pontiac automobiles.

The antenna of this receiver is capacity coupled to the grid winding of the antenna coil tuned by the first section of the gang condenser and feeding into the grid of the pentode section of the 6P7 tube, which in this case is used as an R.F. pentode and audio amplifier. The plate circuit of the pentode section of this tube is inductively coupled to the grid winding feeding the 6A7 tube and tuned by the third section of the gang condenser. The 6A7 tube is used as the conventional detector-oscillator. The oscillator frequency which is produced due to the reaction between the oscillator grid and plate and associated circuit constants is tuned by the middle section of the gang condenser. The incoming frequency and the oscillator frequency are mixed in the 6A7 tube and the resultant frequency which is 262 kilocycles is transformer coupled to the grid of the R.F. pentode section of the 6B7 tube and the output of this section of tube is impressed on one of the diode plates of this tube for detection. A.V.C. voltage is produced in the other diode plate circuit and controls the grid bias of the R.F. section of the 6P7 and 6A7 tubes. The audio output of the detector circuit is coupled to the grid of the triode section of the 6P7 tube and the grid voltage swing is controlled by the volume control. The output of this section of the tube is resistance coupled to the grid of the type 42 power output pentode. The plate circuit of this tube is coupled through the output transformer to the speaker voice coil.

*1209068	Resistor	Candohm	41A,B,C
	Sec. (A) 600 ohm, (B) 125 ohms, (C) 440 ohms		
*1209010	Resistor	Candohm 165 ohms	42
1209063	Resistor	"Ohmite" 11,000 ohms	43
1204136	Resistor	Carbon 200,000 ohms	44,45,46
*1209211	Resistor	Candohm	47A,B,C
	Sec. (A) 555 ohms, (B) 615 ohms, (C) 440 ohms		
1208144	Resistor	Carbon 1 megohm	48
1209016	Resistor	Carbon 120,000 ohms	52
1204140	Resistor	Carbon 50,000 ohms	53
1204135	Resistor	Carbon 500,000 ohms	54
1209064	Resistor	Carbon 125,000 ohms	55
1207805	Resistor	Carbon 150,000 ohms	56
*1209016	Resistor	Carbon 120,000 ohms	57
1209071	Speaker assy.	Complete 8 1/2" (S.H.U.)	60
1209072	Speaker assy.	Complete 8 1/2" (Rols)	60
1209073	Transformer	Output (S.H.U.)	66
1209202	Transformer	Output (Rols)	66
1209074	Transformer	1st I.F.	67
1209075	Transformer	2nd I.F.	68
1209076	Transformer	Vibrator	69
5037400	Vibrator	Plug-in type	70
1209078	Volume control	500,000 ohms	71
1209138	Washer	Rubber tuning cond.	
1208513	Washer	Osc. coil mtg.	
1207608	Washer	Rubber I.F. trans. mtg	

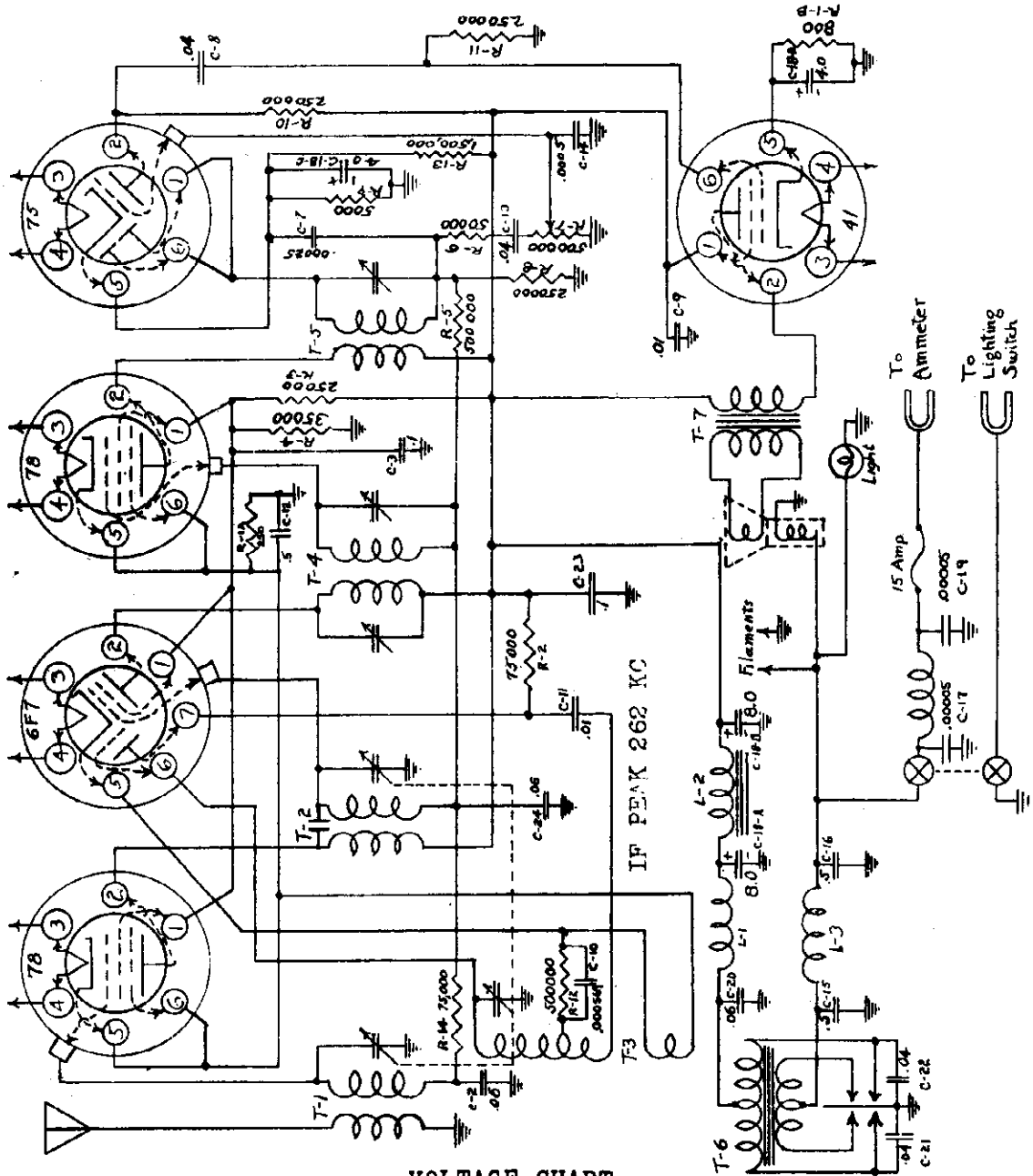
BUICK INSTALLATION PARTS (Special)

1209193	Bracket	Control unit (40 Series only)	
1208568	Spring	Static collector	
1207881	Suppressor	Distributor	
1208557	Tube	Brass-ant. lead	
PONTIAC INSTALLATION PARTS (Special)			
1208568	Shield	Spark coil	
1207821	Suppressor	Distributor	
* Used below serial #1748809 * Used above serial #1748809			
OLDS INSTALLATION PARTS (Special)			
1208561	Clip	Replacement lead	
1208907	Lead	Primary replacement	
1208568	Shield	Spark coil	
1208576	Spring	Static collector	
1208569	Strip	Bonding	
1208560	Strip	Bonding	
1208544	Suppressor	Distributor	
29353	Terminal	Replacement lead	

INSTALLATION PARTS--COMMON ALL SETS

1205686	Adapter	Suppressor	
1849161	Condenser	Ammeter by-pass	
1849014	Condenser	Generator by-pass	
1850429	Condenser	Downlight by-pass	
1203725	Nut	Chassis mtg.	
1207790	Screw	Control unit	
1208542	Shield assy.	Antenna lead	
1208054	Stud	Chassis mtg.	
1208565	Washer	Chassis stud	
1208568	Washer	Speaker stud	

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VOLTAGE CHART

Note: ALL readings are taken from indicated tube prong to chassis frame. Volume control on full.

Tube	#1 Screen	#2 Plate	#3 Fil.	#4 Fil.	#5 Cathode	#6 Grid	#7 Triode Plate
78 R.F.	88	215	6	0	3.4	3.4	
6F7 (Det. (Osc.	88	215	0	6	3.4	-.8	88
78 I.F.	88	215	6	0	3.4	3.4	
75 (2nd Det. (AVC)	0	90	0	6	1.5	0	
41 A.F.	215	180	6	0	16.3	0	

Fig. 2 CHEV. 600566 CIRCUIT DIAGRAM

MODEL Chevrolet 600566

Alignment, Notes

UNITED MOTORS SERVICE, INC.

- (d) Open the condenser plates until they stop solidly against the beveled edge of the block as shown in Fig. 1.
- (e) Peak the parallel trimmers on top of the condenser gang, the oscillator section first at 1400 K.C. for maximum deflection on the output meter.
- (f) To insure sharp peaking of all trimmers reduce the oscillator output to the lowest level that will give a reasonable deflection on the output meter scale.

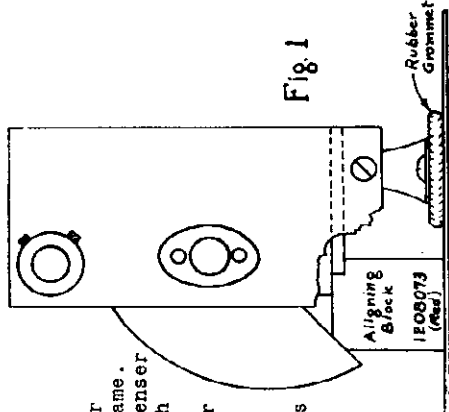


Fig. 1

SERVICE HINTS

The 6F7 tube is a two unit Tube and the oscillator section may cease functioning without affecting the amplifier section of the tube or its reading in a tube checker. If the set does not function, operates weakly or not at all at the 550 end of the dial, remove the grid cap of the 78 I.F. tube and make and break the grid contact several times; if very loud pops occur in the speaker the 687 is probably defective and should be replaced.

The paint should be removed from the dash under the chassis mounting washers in order to provide a good ground for the receiver as no other ground is used. R.F. noise due to the vibrator will appear if good ground connections are not made at the dash.

CAUTION: Care should be taken to see that the set is turned off before attempting to replace the dial light because, if the dial light assembly is removed from the bottom of the control unit while the current to the receiver is left turned on, there is the possibility that a short circuit will occur which will blow out the fuse. The dial light assembly is being changed on the later sets to prevent this.

MOTOR NOISE

In order to totally eliminate spark noise picked up by the antenna when this model is installed, it is necessary that a certain procedure be followed. The engine block and the metal bulkhead must be at the same ground potential. It is suggested that a heavy piece of copper braid approximately 1" wide and .1/16" thick and about 3" long be secured. Insert one end of this braid under the rear cylinder head hold down bolt on the left side of the engine block. Attach the other end of this piece of bonding braid to the metal bulkhead of the car by means of two self-threading screws. The paint should be removed from the metal bulkhead in order to secure a good ground connection. A slight amount of slack should be left in this lead to allow movement of the engine block with respect to the bulkhead.

Peaking I.F. Stages at 262 K.C.

The only way the I.F. stages can be peaked properly is with the use of an oscillator and output meter. Connect the output meter to the plate prongs of the 4l output tube and to the chassis frame. Make sure that the output meter is protected with a series condenser internally; if not, connect a 1/10 mfd. condenser in series with the ground lead to the chassis. The Dayrad #875 Universal Test Meter and Series #51 Volt-Ohmmeter have this protective condenser included in them.

- (a) Connect the output of the oscillator to the grid cap of the 6F7 tube (leave grid cap in place) and to the chassis ground.
- (b) Turn the condenser gang until the plates are entirely out of mesh.
- (c) Set the oscillator on 262 K.C. and feed this signal through the I.F. stages of the set.
- (d) Peak the I.F. trimmer which is on the I.F. coil having only one adjusting screw first. Then peak the two condensers of the 2nd I.F. coil.
- (e) Set the oscillator output at the lowest level that will give a reasonable scale deflection on the output meter. This should be less than half the maximum output available 687 is probably defective and should be replaced.
- (f) Make all trimmer adjustments for maximum deflection on the output meter scale.

Peaking Gang Condenser at 1400 K.C.

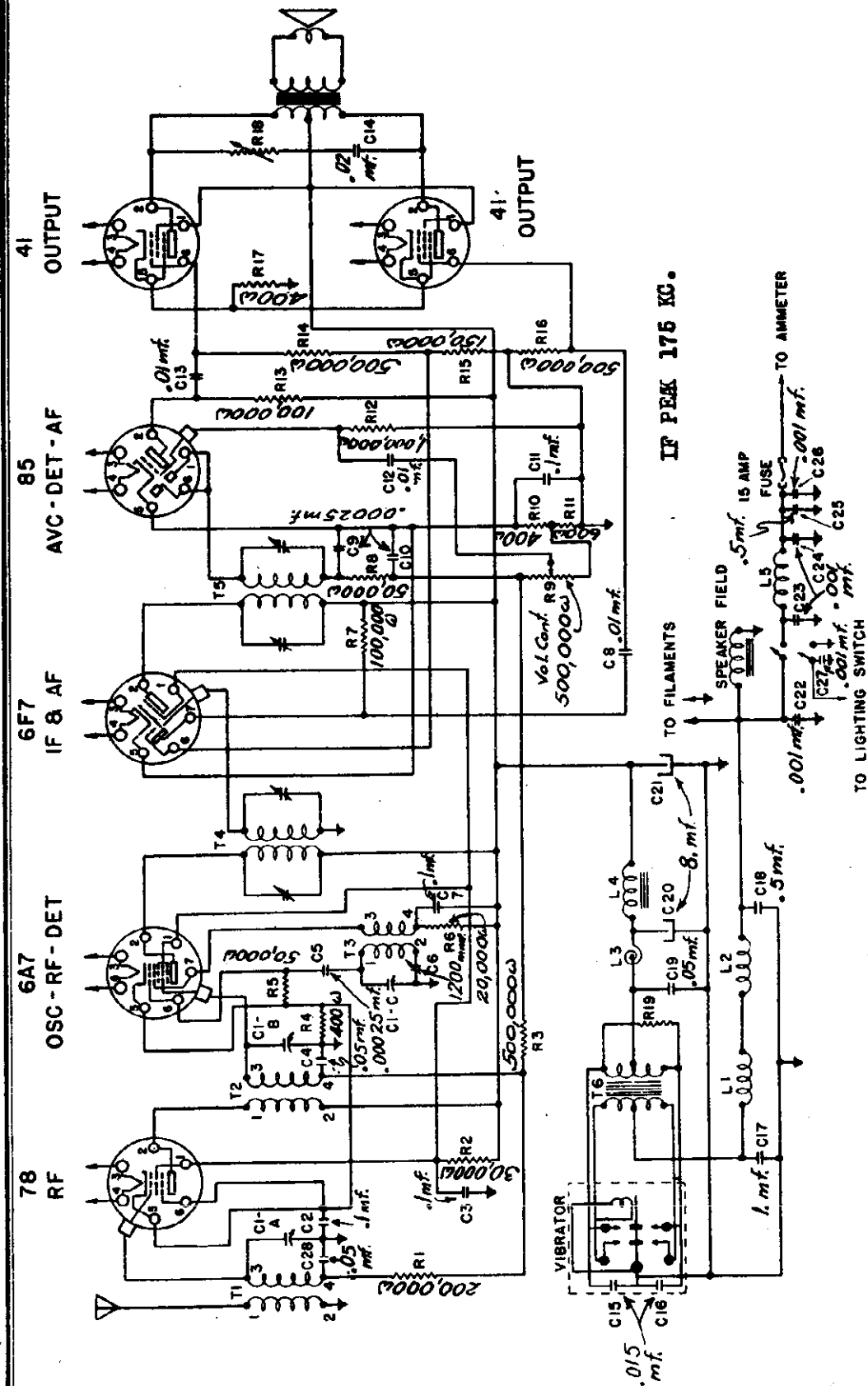
- (a) Connect the output of the oscillator to the antenna connection of the set and to the chassis ground.
- (b) In order that the position of the condenser plates for 1400 K.C. may be accurately determined, a wood calibration block (painted red, part number 1208073) should be used. This block may be used also in peaking all of the U.M.S., 3-0-P, and Chevrolet radios that use the "tubeless rectifier."
- (c) Insert the RED block under the middle section of the gang condenser, so that the largest flat side rests on the chassis base and the square notch stops solidly against the stationary plate support bracket.

NOTE:

Always use the red calibration block when aligning the parallel trimmers on the gang condenser. Do not rely on the logging of the dial to determine the 1400 K.C. setting. When the aligning procedure is completed the logging of the dial may be slightly off and should be re-set.

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Schematic, Voltage



TUBE	#1	#2	#3	#4	#5	#6	#7
78	195	6	0	5	5	0	7
6A7	195	6	0	5	5	0	125
6F7	195	6	0	5	5	0	70
85	0	60	6	0	5	0	0
41	195	190	6	0	16	0	0

All voltage readings taken from chassis to indicated tube prong. 6 volts at tube prongs, which usually requires 6.2 volts at ammeter lead clip.

Important: The speaker cable plug plate must be connected to the chassis to complete the circuit.

MODEL Chevrolet 601038

Parts Locations, Data

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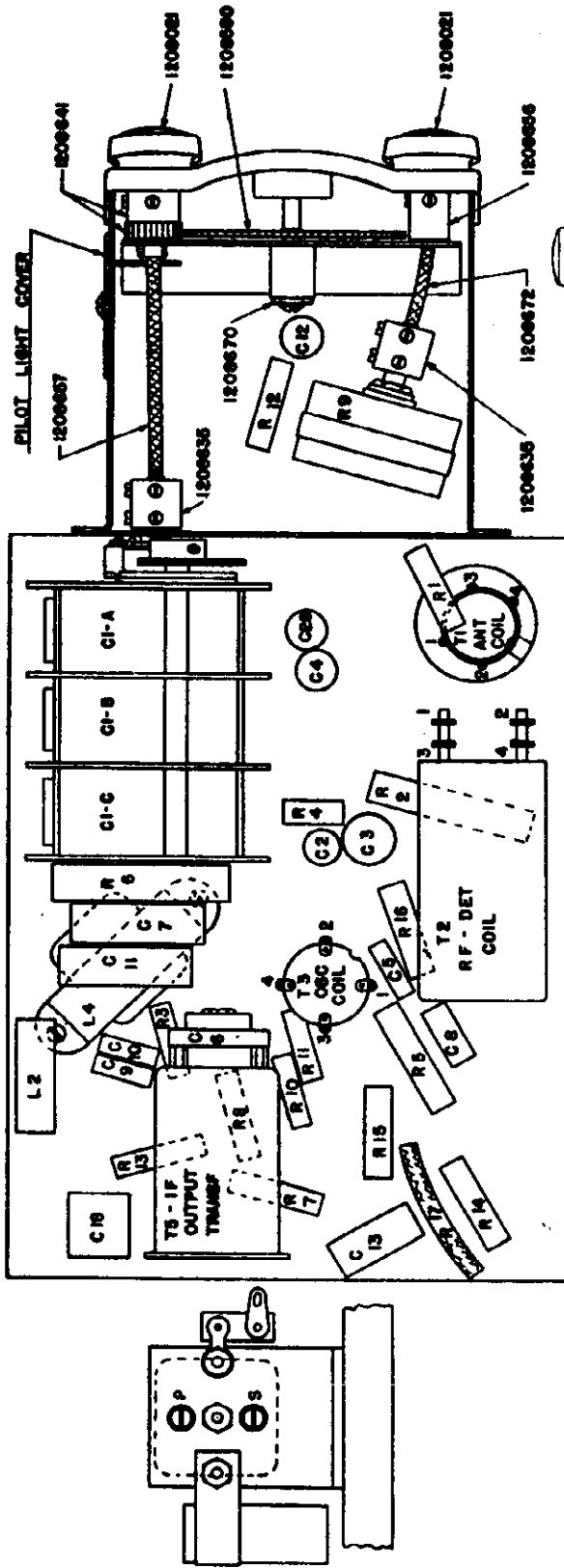


Fig. 7. Location of Parts Under Chassis.

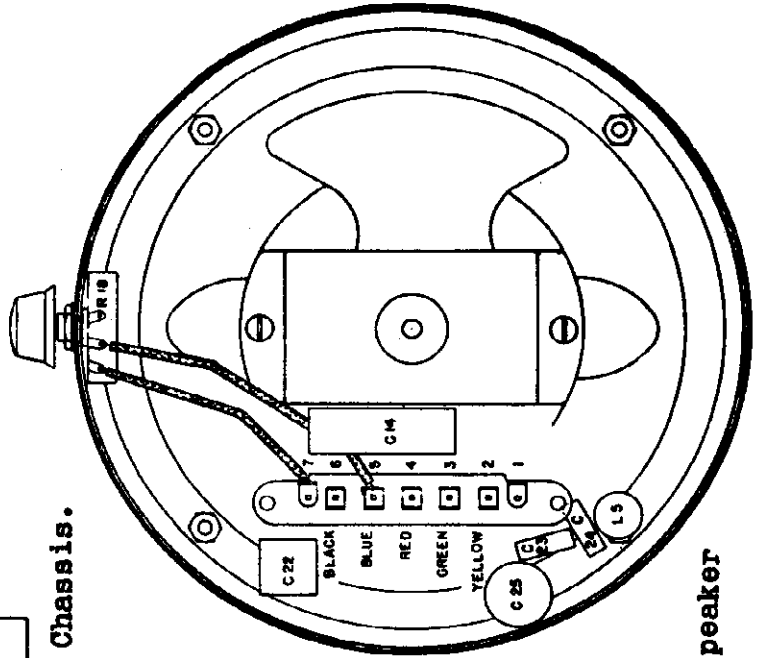


Fig. 5. The Loudspeaker

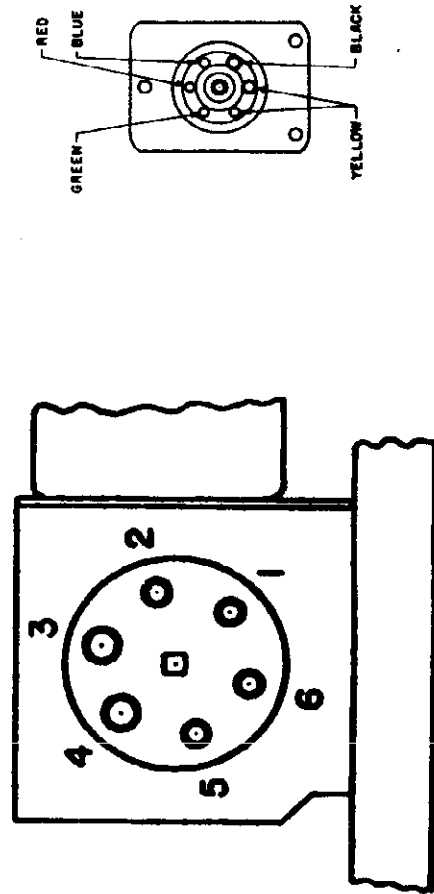


Fig. 4. Speaker Plug in Chassis.

MODEL Chevrolet 601038
UNITED MOTORS SERVICE Alignment, Test Data

THE POWER SUPPLY UNIT.

The power supply unit is of the vibrating reed, synchronous mechanical rectifier type. The vibrator is of the plug-in type. It is sealed and no attempt should be made to repair it. Defective ones should be returned for replacement.

To gain access to the vibrator, remove the five Parker Kalon screws from around the power supply unit case top cover. The cover should then be pulled straight up. Do not attempt to pry up one end. Contacting fingers are riveted around the edges of the cover. These fingers must make tight contact with the power supply unit case in order to prevent radiation of interference from the power supply. The Parker Kalon screws in the top and the bottom covers of the case must be tightened securely to prevent noise radiation.

R19 is a special resistor whose value varies with the voltage applied to it. When the receiver is first turned on, the output voltage tends to become very high until the tubes heat sufficiently to draw their normal load. Under this condition, the value of R19 drops to a comparatively low value, loading the transformer sufficiently to prevent damage. As the tubes become heated, tending further to lower the voltage, the resistance of R19 increases greatly so that it no longer constitutes a load on the power supply.

The power supply unit may be removed from the chassis by taking out the four screws that hold it to the chassis plate and unfastening the red and orange wires that pass through the fibre grommet near the left edge of the set.

The following chart will be helpful in making tests of the power supply unit. A continuity meter or ohmmeter may be used.

Power Supply Unit Test Chart

Note: Tests are to be made with the speaker plugged into the chassis, and the vibrator unit removed. Be sure the speaker plug plate makes contact with the chassis.

TEST (see Fig. 1)	PROPER EFFECT	TROUBLE IF IMPROPER EFFECT IS HAD
#4 to #5	400 ohms.	Defect in power transformer secondary or in R19.
#1 to #3	Very low resistance reading	Defect in power transformer primary
From #1 prong of 41 output tube to #4 or #5 prong of vibrator socket	Approximately 425 ohms.	Defective L3 or L4.
From #1 prong of 41 output to chassis	Open	Shorted C19, C20, or C21.
#2 to chassis	0 resistance	Open ground connection to prong
From #1 or #3 to ground, with speaker plug removed from chassis, tubes removed from sockets, and pilot light removed.	Open	Shorted C17 or C18.

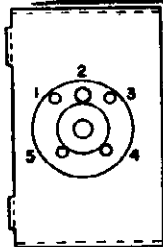


Fig. 1. Vibrator Socket

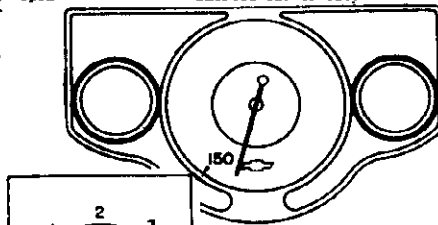


Fig. 3.

Vibrator Test Chart

TEST (see Fig. 2)	PROPER EFFECT	TROUBLE IF IMPROPER EFFECT IS HAD
#2 to #4	Open	Shorted C15. Defective vibrator
#2 to #5	Open	Shorted C16. Defective vibrator
#2 to #3	42 ohms	Defective vibrator
#1 to #3	Open	Defective vibrator
#2 to case	Closed	Defective vibrator

Fig. 2. Vibrator Plug

PILOT LIGHT REPLACEMENT

The pilot light can be made accessible for replacement by removing the two screws in the left side of the control unit housing. The small plate, with the pilot light socket attached, can then be removed. Be sure to turn the set off before attempting to remove the plate

ALIGNMENT

The IF Stages:

1. Connect a low voltage output meter across the transformer secondary in the speaker, or a high voltage meter between the plate prongs of the 41 tubes.

2. Set the test oscillator at 175 kc and connect its output between the control grid of the 6F7 tube and the chassis. Leave the tube shield in place and the grid connection attached to the cap. Adjust the two adjusting screws in T8 for maximum output meter deflection. The output of the test oscillator should be kept at as low a value as possible, in order to render the AVC action inoperative

3. Connect the test oscillator between the 6A7 control grid and the chassis. Adjust the two screws in T4 for maximum output meter deflection. As the meter reading is brought up due to peaking, reduce the test oscillator output so that it is kept at as low a value as possible.

The RF Stages:

(a) Adjusting the Calibration:

- Loosen the four set screws in the variable condenser coupling (1209630 in Fig. 7).
- Fully mesh the condenser plates.
- Turn the Station Selector knob to its low frequency limit, keeping the condenser fully meshed.
- Tighten the set screws in the coupling.
- Turn the Station Selector knob to its high frequency limit. The dial pointer then should barely overlap the lower corner of the Chevrolet insignia on the dial, as shown in Fig. 3. If it does not, remove the knobs and the two bearing inserts that are located in the escutcheon. The escutcheon can then be removed, the dial pointer mounting screw loosened and the dial pointer set correctly. In its correct setting, the dial pointer position coincides with the stop on the large gear.

(b) Peaking the Trimmers:

- Set the test oscillator to exactly 1500 kc and connect its output between the antenna socket contact and the chassis, in series with a .0002 mfd. mica condenser. No other value of condenser should be used.
- With the Station Selector left at its high frequency limit, adjust the three trimmers on the variable condenser for maximum output meter deflection.
- Readjust the test oscillator to 800 kc and tune in its signal.
- Adjust the oscillator padder, C6, by slowly rotating the variable condenser back and forth a degree or two, adjusting the padder at the same time, until maximum output is obtained.
- Since the adjustments are inter-acting to an extent, it is advisable to repeat the entire operation.

CHASSIS UNIT TEST CHART

Note: Tests are to be made with the speaker plug removed from the chassis, the vibrator removed, the tubes removed, and the pilot light bulb removed.

TEST (see Fig. 4)	PROPER EFFECT	TROUBLE IF IMPROPER EFFECT IS HAD
Lighting switch lead to chassis	Open with set switch off; closed with set switch on.	Defect in connector or switch.
#3 to chassis	Open	Short in filament circuit.
#4 to chassis	Open	Short in filament circuit.
#3 to #4	Open with set-switch off; closed with set switch on.	Defect in switch or wiring.
#1 to #1 prong of 41 tubes	Reading	Open circuit
#1 to #2 prong of 6F7	100 ohms	Defective IF output Transformer, T5.
#1 to #2 prong of 6A7	100 ohms	Defective IF input Transformer, T4.
#1 to #2 prong of T8	7 ohms	Defective RF-Detector coil.
#1 to #2 prong of 6B tube	100 M ohms	Defective R13.
#1 to #7 prong of 6F7	100 M ohms	Defective R7.
#1 to #7 prong of 6A7	20 M ohms	Defective R6 or defective oscillator coil, T3.
#1 to #1 prong of T8, 6A7, 6F7	30 M ohms	Defective R2
Antenna socket contact to chassis	18 ohms	Defective antenna coil
Control grid of T8 to ground	Open	Shorted C28 or shorted tuning condenser (C1-A).

MODEL Chevrolet 601038
 Socket, Test Data, Parts UNITED MOTORS SERVICE

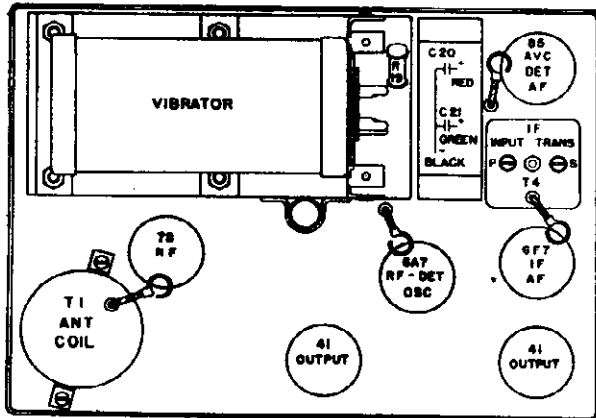


Fig. 8. Tube Positions and Functions.

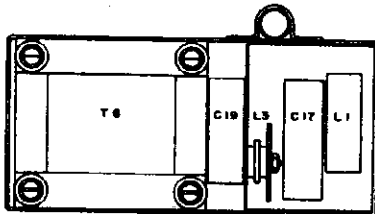


Fig. 9. Location of Parts in Base of Power Supply Unit.

SPEAKER TEST CHART

Notes: These tests are to be made with the speaker plug removed from the chassis.

TEST (see Fig. 8).	PROPER EFFECT	TROUBLE IF IMPROPER EFFECT IS HAD
Case to #6	5 ohm reading	Defective field coil
#6 to #7	0-500 M ohms as Tone Control is turned	Defective Tone Control
"A" clip to #2	Reading	Open L5
"A" clip to shield	Open	Shorted C23, C24, C25, or C26.
#3 to #4	500 ohms	Defect in transformer secondary.
#4 to #5	275 ohms	Defect in transformer secondary.
#3 to #7 with Tone Control in "Brilliant" position	500 M ohms	Shorted C14.
1208884	Choke	RF L-1
1208885	Choke	RF L-2
1208850	Choke	RF L-3
1208887	Choke	Audio L-4
1208888	Choke	RF L-5
*Indicates part mounted in speaker.		
1208824	Clamp	Instrument panel, removable part
1208825	Clamp	Lead lighting switch
1208826	Clamp	To make dual condenser units
1208829	Clip	Grid connection
1208885	Coil	Antenna T-1
1208886	Coil	RF-Detector T-2
1208831	Coil	Oscillator T-3
1208883	CONDENSER	Variable tuning C-1
1208875	Bearing	Drive pinion (A-B-C)
1208878	Bracket	Drive pinion bearing
1208876	Clamp	Drive pinion bearing retaining
1208879	Gear assembly	Rotor driving
1208874	Pinion and Shaft Drive	Drive pinion bearing retaining clamp
1208877	Screws	
1208890	Spring	Coil, rotor driving gear
1208827	SHIELD Ferrule	Antenna lead-in
1838476		Antenna contact
1208892	SHIELD	RF-Detector coil, includes speaker plug and bracket
1208888	SHIELD	Tube, both halves
1208860	Base mounting member	For 1208888
1208859	Clamping ring	For 1208888
1208823	SOCKET Ferrule	Antenna (includes bracket)
1838478	Spring	
1838476	Washer	
1843713		

Part No.	Part Name	Description	Code
1208899	Condenser	.1 mfd. 200 volts	08
1208898	Condenser	.1 mfd. 30 volts	03
1208873	Condenser	.05 mfd. 200 volts	04
1208805	Condenser	.00025 mfd. mica	05
1208897	Condenser	1200 mfd. oscillator pecker	06
1208899	Condenser	.1 mfd. 200 volts	07
1208800	Condenser	.02 mfd. 800 volts	08
1208805	Condenser	.00025 mfd. mica	09
1208805	Condenser	.00025 mfd. mica	C10
1208899	Condenser	.1 mfd. 200 volts	C11
1208801	Condenser	.01 mfd. 200 volts	C12
1208800	Condenser	.01 mfd. 800 volts	C13
1208882	Condenser	.02 mfd. 800 volts	C14
	Condenser	.015 mfd. 1200 volts (enclosed in vibrator unit).	C15
	Condenser	.015 mfd. 1200 volts (enclosed in vibrator unit).	C16
1208804	Condenser	1 mfd. 25 volts	C17
1208803	Condenser	.5 mfd. 160 volts	C18
1208802	Condenser	.05 mfd. 600 volts	C19
1208884	Condenser	8 mfd. dual electrolytic	C20
1208884	Condenser	8 mfd. dual electrolytic	C21
1208885	Condenser	.001 mfd. mica	C22
1208883	Condenser	.001 mfd. mica	C23
1208883	Condenser	.001 mfd. mica	C24
1208889	Condenser	.5 mfd. 200 volts	C25
1208806	Condenser	.001 mfd. mica (built into ammeter lead).	C26
1208806	Condenser	.001 mfd. mica in metal case	C27
1208893	Condenser	.05 mfd. 200 volts	C28
1208893	Control	Tone, 500 M ohms, with nut and washer	R18
1208889	Control	Volume	R9
1208836	Coupling	Flexible shaft to volume control and variable condenser	
1208836	Cover	Power supply bottom	
1208837	Cover	Power supply top	
1208832	Dial glass	Station selector	
1208833	Dial		
1208898	Karutchcon		
120181	Fuse	15 amp.	
1208842	Pointer	Dial	
1208834	Power Supply unit	Complete less vibrator	
1208845	Resistor	200 M ohm, 1/3 watt carbon	R1
1208852	Resistor	50 M ohm, 1 watt carbon	R2
1208844	Resistor	500 M ohm, 1/3 watt carbon	R3
1208850	Resistor	400 ohms, 1/3 watt carbon	R4
1208848	Resistor	50 M ohm, 1/3 watt carbon	R5
1208853	Resistor	20 M ohm, 1 watt carbon	R6
1208847	Resistor	100 M ohm, 1/3 watt carbon	R7
1208848	Resistor	50 M ohm, 1/3 watt carbon	R8
1208850	Resistor	400 ohms, 1/3 watt carbon	R10
1208849	Resistor	400 ohms, 1/3 watt carbon	R11
1208851	Resistor	1 megohm, 1/3 watt carbon	R12
1208847	Resistor	100 M ohms, 1/3 watt carbon	R13
1208844	Resistor	500 M ohms, 1/3 watt carbon	R14
1208848	Resistor	150 M ohms, 1/3 watt carbon	R15
1208844	Resistor	500 M ohms 1/3 watt carbon	R16
1208854	Resistor	400 ohms 2 watts, Flexible	R17
1208843	Resistor	Globar, 1 watt, voltage regulator	R19
1208849	Screen	Toe Board	
1208839	Screw	Case clamping	
1208888	Shaft	Volume control, knob end	
1208857	Shaft	Station selector	
1208872	Shaft	Flexible, volume control	
1208814	Shield	Antenna coil	
1208815	Socket and bracket	Vibrator	
1208816	Socket and bracket	Dial light	
1208861	Socket	7 prong	
1208882	Socket	8 prong	
1208863	Socket	Vibrator	
601105	SPEAKER	Complete with case and cable	
1208866		* Cable, plug and plate	
1208889		* Case	
1208890		* Plug	
1208889		* Screws	
1208891		* Speaker only	
1208887		* Transformer	
1208888			
1208882	Static collector	Universal	T-7
1207900	Suppressor	Distributor	
1208893	Transformer	IF INPUT	T-4
1208894	Transformer	IF output	T-5
1208898	Transformer	Power	T-6
1207424	Lamp	Pilot, 6 to 8 volts	
1208894	LEAD	Lighting switch, complete	
1838869	Cap	For connector of 1208855	
1838476	Ferrule	For connector of 1208828 and 1208855	
1208828	Lead	Chassis end only	
1208855	Lead	Lighting switch end only	
1208897	Lead	With lug and rubber sleeve for 1208855	
1838876	Spring	For connector of 1208828	
1843713	Washer	For connector of 1208828	

MODEL Chevrolet 601574
Parts Layouts

UNITED MOTORS SERVICE

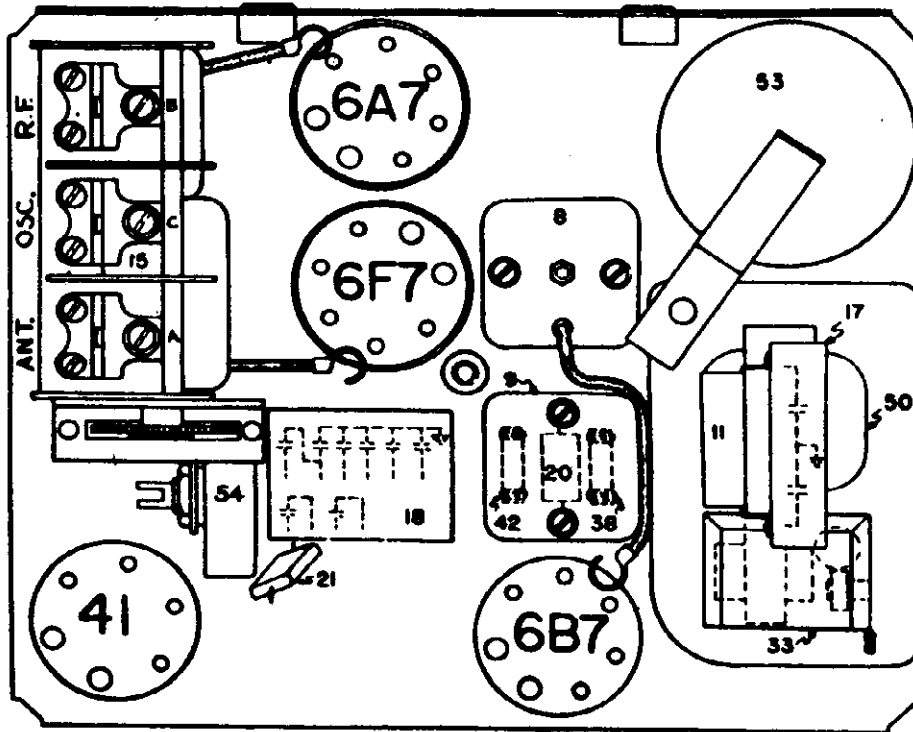


FIG. 2--PARTS LAYOUT--Top View

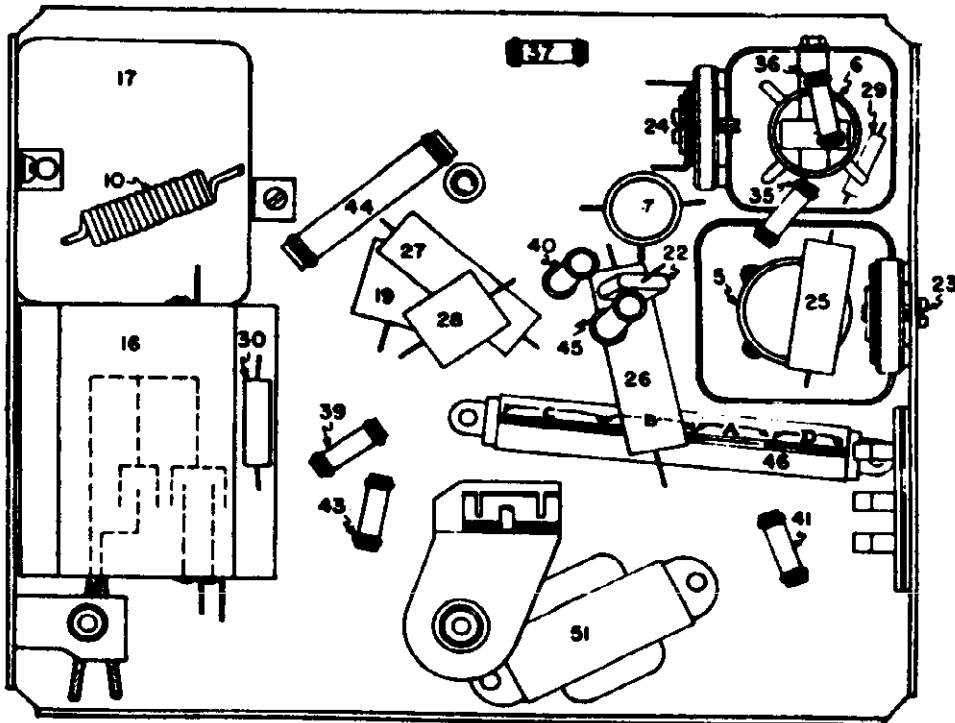


FIG. 3--PARTS LAYOUT--Bottom View

UNITED MOTORS SERVICE

MODEL Chevrolet 601574
Circuit Description

The antenna circuit of this receiver is capacity coupled to the antenna system. This results in exceptionally high gain in the antenna stage and serves to make up for the relative inefficiency of the under-car antennas which are necessary on the all steel top cars. A separate adjustment is provided on the receiver to permit an accurate alignment to the car antenna.

The audio output of the detector circuit is coupled to the triode portion of the 6F7 tube for audio frequency amplification. The pentode section of the same tube is used as a radio frequency amplifier.

The "A" supply to the receiver is filtered to prevent any spark interference from affecting the receiver circuits and makes possible the installation of this receiver without the use of spark plug suppressors.

A plug-in vibrator is used of the full wave self-rectifying type. Its circuit is permanently connected for operation on a car battery with the negative side grounded as is the case on Chevrolet automobiles.

Tone control action is obtained in a unique manner in that one of the voice coil leads present in the speaker cable is also used as a conductor for the tone control circuit. This is done to reduce the number of wires in the speaker cable and has no effect on the voice coil circuit because of the great differences in impedance between the voice coil circuit and the output tube plate circuit.

The output transformer of this receiver is an integral part of the chassis. This is necessary because of space limitations in a "header" speaker.

Circuit Operation

Referring to the Circuit Diagram Figure 1: The antenna system used with this receiver is capacity coupled to the antenna coil. The antenna capacity is accurately matched to the receiver antenna stage, greatest efficiency through the use of an adjustable padding condenser. The antenna coil is tuned by the "ANT" section of the condenser gang and feeds the pentode grid of the 6F7 tube. The output of the pentode portion of the 6F7 tube is capacity coupled to the grid coil tuned by the "R.F." section of the condenser gang feeding the control grid of the 6F7 detector-oscillator tube. The incoming station frequency is then mixed in this tube with the frequency produced by the receiver oscillator circuit which is tuned by the "OSC." section of the condenser gang. A resultant frequency is produced of 175 kilocycles and is inductively coupled to the pentode grid of the 6B7 tube. The output of the pentode section of the 6B7 tube is then impressed on one of the diode plates of this tube for detection purposes through the 2nd I.F. coil. A.V.C. voltage is produced in the other diode plate circuit and controls the grid bias on both the pentode section of the 6F7 tube and the control grid of the 6A7 tube. The audio output of the detector circuit is coupled to the grid of the triode portion of the 6F7 tube and the grid voltage swing is controlled by the volume control. The plate circuit of this section of the tube is resistance coupled to the grid of the 41 output tube. The output of the 41 tube is coupled to the speaker voice coil through the output transformer. Tone control action is obtained by feeding some of the higher frequencies to ground using the voice coil circuit as a conducting medium.

MODEL Chevrolet 601574
Alignment, Parts List

UNITED MOTORS SERVICE

Connecting Output Meter

Connect one of the output meter leads to the plate prong of the type 41 output tube. The plate prong is the first prong on the left of the filament when looking at the bottom of the tube with the filament prongs toward you. Connect the other output meter lead to the receiver chassis, making sure that the meter is protected with a D.C. blocking condenser connected in series to prevent damage to the meter.

IMPORTANT

Due to the high sensitivity of these receivers, the receiver chassis must be in its case before making any adjustments. This is necessary in order to obtain accurate adjustments and to prevent oscillation due to lack of the shielding effect of the receiver case.

Peaking I.F. Stages at 175 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 5A7 tube, leaving the tube's grid clip in place. The .5 mfd. condenser is necessary to prevent the oscillator circuit of the receiver from affecting the I.F. adjustments.
- (b) Set the test oscillator on 175 kilocycles.
- (c) Turn the volume control of the receiver on full.
- (d) Peak each of the I.F. trimmers on the 2nd I.F. coil, illustration #9 on Fig. 2.
- (e) Then peak each of the trimmers on the 1st I.F. coil, illustration #8 on Fig. 2.

NOTE: 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.

Peaking Gang Condenser at 1830 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 1830 kilocycles.
- (d) Adjust the trimmer for the oscillator section of the gang condenser (middle section CAREFULLY for maximum output. Then adjust the trimmers for the "R.F." and "ANT." sections of the gang condenser also for maximum output.

Tracking Oscillator at 540 K.C.

- (a) Turn the condenser plates until they are COMPLETELY IN MESH.
- (b) Set test oscillator at 540 kilocycles. (Leave test oscillator leads connected to antenna and ground of receiver.)
- (c) Adjust the oscillator tracking condenser (illus. #24 on Fig. 3) located on the bottom of the chassis until the 540 K.C. signal is tuned in with maximum output.

Peaking Gang Condenser at 1400 K.C.

- (a) Set the test oscillator at 1400 kilocycles.
- (b) Turn the condenser rotor plates until the 1400 K.C. signal from the test oscillator is tuned in with maximum output.
- (c) Readjust the parallel trimmers for the "R.F." and "ANT." sections of the gang condenser (shown on Fig. 2) for maximum output. DO NOT DISTURB the setting of the "OSC." section of the gang condenser as this is adjusted at 1830 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.

Adjusting Receiver to Car Antenna

NOTE: An antenna compensating condenser is provided in the antenna circuit of this receiver that must be adjusted to the particular car antenna the receiver is to be used on. The test oscillator cannot be used for this adjustment due to the fact that capacity of its output circuit will not match the wide range of antenna capacitances being used. Therefore, it is necessary that the adjustment be made after the receiver is installed on the car and is done in the following manner:

- (a) Tune the receiver to a weak broadcast station on the low frequency end of the dial 550 to 700 K.C.
- (b) Adjust the antenna compensating condenser for maximum response from the broadcast station. This condenser is shown as illustration #23 on Fig. 3 and is located immediately to the rear of the speaker plug on the side of the receiver case.

CHASSIS PARTS

Part No.	Part Name	Description	Illus. No.
1209573	Case	Chassis	
1209574	Case	Power transformer	
1207623	Clip	Grid connector	
1209627	Coil	Antenna	5
1209528	Coil	R.F.	6
1209529	Coil	Oscillator	7
1209544	Coil Assy.	1st I.F.	8
1209544	Coil Assy.	2nd I.F.	9
1209571	Coil	Tube filament choke	10
1209572	Coil	Vibrator "A" choke	11
1209530	Condenser	5 gang tuning	12
	Sec. A	Antenna	
	Sec. B	R.F.	
	Sec. C	Oscillator	
1209531	Condenser	Electrolytic block	13
	Sec. A	16 mfd.	
	Sec. B	8 mfd.	
	Sec. C	8 mfd.	
1209532	Condenser	By-pass block	17
	Sec. A	.5 mfd., 160 volt	
	Sec. B	.5 mfd., 160 volt	
1209533	Condenser	By-pass block	18
	Sec. A	.4 mfd., 160 volt	
	Sec. B	.05 mfd., 200 volt	
	Sec. C	.05 mfd., 160 volt	
	Sec. D	.05 mfd., 160 volt	
	Sec. E	.04 mfd., 200 volt	
	Sec. F	.05 mfd., 400 volt	
	Sec. G	.0075 mfd., 800 volt	
	Sec. H	.06 mfd., 400 volt	
1209555	Condenser	Molded .0025 mfd.	19, 20, 21
1207828	Condenser	Molded .0005 mfd.	22
1209535	Condenser	Antenna compensating	23
1209536	Condenser	Oscillator tracking	24
1207739	Condenser	Tubular .08 mfd., 200 volt	25
1207906	Condenser	Tubular .11 mfd., 160 volt	26, 27
1209537	Condenser	Molded .0075 mfd.	28
1209538	Condenser	Molded .00287 mfd.	29
1209556	Condenser	Molded .0005 mfd.	30
1209577	Connector Assy.	"A" power on chassis	
1238829	Cap	Ferrule holder	
1258478	Ferrule	Contact	
1209578	Connector Assy.	Antenna on chassis	
1238478	Ferrule	Contact	
1238878	Spring	Antenna connector	
1243713	Washer	Antenna connector	
1209557	Connector	Condenser gang shaft	
1209565	Cup	Cond. gang mounting	
120151	Fuse	15 amperes	
1209525	Filter Assy.	"B" power	33
	Sec. A	.08 mfd. condenser	
	Sec. B	R.F. choke	
	Sec. C	Audio choke	
1209568	Grommet	Cond. gang mounting	
1209599	Nut	Hex. #4-32 nickel plated	
110928	Nut	Hex. #6-32 nickel plated	
	Nut	Hex. #6-32 nickel plated	
1209581	Pad	Vibrator clamp	
1204136	Resistor	Carbon 200,000 ohms 1/3 watt	35, 36
1207943	Resistor	Carbon 75,000 ohms 1/3 watt	37
1204138	Resistor	Carbon 500,000 ohms 1/3 watt	38
1204138	Resistor	Carbon 200,000 ohms 1/3 watt	39
1207905	Resistor	Carbon 150,000 ohms 1/3 watt	40, 41, 42
1208232	Resistor	Carbon 1 megohm, 1/3 watt	43
1208259	Resistor	Carbon 30,000 ohms 1 watt	44
1209406	Resistor	Carbon 20,000 ohms 1/3 watt	45
1209542	Resistor	Candohm strip	46
	Sec. A	Res. 110 ohms	
	Sec. B	Res. 800 ohms	
	Sec. C	Res. 950 ohms	
	Sec. D	Res. 440 ohms	
1209570	Transformer	Vibrator power	50
1209546	Transformer	Speaker output	51
2039661	Vibrator	Plug-in synchronous	52
1209540	Volume control	Res. 500,000 ohms	53
1209543	Speaker unit	8" Dynamic	54
1209539	Tone control	Res. 500,000 ohms	55

MODEL B-O-P 980455

Alignment, Service Notes UNITED MOTORS SERVICE

Parts

MOTOR NOISE

In sets of previous designs the use of suppressors was necessary in order to eliminate chassis pickup and had but little effect on the interference picked up by the antenna. The Buick, Pontiac and Olds models 980455 are equipped with special filters for the elimination of chassis pickup, (interference with the antenna disconnected from the set) which makes possible the installation of the set with out the usual spark plug suppressors. Care should be taken to keep the ammeter lead away from any high tension cables because of the intense interference field that exists around them. This lead must be by-passed with a .1 mfd. condenser at the point where it connects to the ammeter.

VIBRATORS

Sometimes a small amount of dirt will lodge between the contacts and result in such high contact resistance that the vibrator will not start. If such is apparently the case, remove the transformer-vibrator from the chassis. Disconnect ONLY the red B plus lead from the iron core choke. Turn the receiver "on" (there must be a connection between the vibrator case and the chassis) and start the vibrator by snapping the red back and forth with a pencil. If the vibrator starts to function, allow it to run without stopping until the dirt has been burned out as indicated by the cessation of brilliant sparking. The vibrator should now start under its own power and should continue to function properly. If the vibrator still fails to start properly, replace the vibrator unit.

Vibrator Noise

Examination of the mechanical construction of the transformer-vibrator assembly will show that the bottom plate of the vibrator case is riveted to the chassis. The transformer-vibrator assembly is fastened to the bottom plate with two Parker Kalon screws through each end of the lid. For complete elimination of vibrator noise it is necessary that the bottom plate of the vibrator assembly make good contact with the vibrator case at all points. Placing screws on all four sides of the bottom plate would make the servicing of the vibrator rather difficult, consequently screws were placed in the ends only. The press fit of the bottom plate must be depended upon to eliminate the vibrator noise.

Do not change a vibrator that is noisy electrically before checking the grounding of the vibrator assembly to its bottom plate. Use a pair of pliers to bend the longest sides of the bottom plate inward just enough to insure a pressure contact with the vibrator assembly at all points.

FAILURES IN TRANSFORMER-VIBRATOR ASSEMBLY

In addition to the actual failure of the vibrator, due to the shorting of the vibrator condensers or burned or poorly adjusted contacts, there are several other defects, which may occur in the transformer-vibrator assembly, which may seemingly point toward the vibrator as the seat of the trouble.

Defective Tubes. A tube, which has shorted internally, may draw an abnormal amount of "B" current. This high current drain on the "B" supply will make the vibrator operate irregularly, and may make it spark, eventually damaging the vibrator by burning the points.

Defective Condensers. The .06 mfd. (C-20) condenser, connected between the power transformer side of the "B" R.F. choke and ground, may become shorted and cause a high current drain which will, in time, ruin the vibrator points. High current drain causes irregular operation of the vibrator.

Defective R.F. "B" Choke. The R.F. "B" choke may become grounded to the transformer case causing high current drain. Such a short circuit will cause irregular operation of the vibrator.

Less Apparent Defects. Some defects occur which point toward the vibrator and which may be cleared by changing the vibrator although the vibrator is not defective. Vibrators which are replaced due to such defects may be turned down by the factory for warranty replacement as the points and vibrator may be in perfect condition. If the vibrator is irregular in operation, check the points for abnormal wear or burning. Check for shorts in the "B" circuit if the points do not show abnormal burning.

6 Volt Terminal Screws on the transformer terminal board occasionally short against the sliding cover.

Broken Strands in the vibrator leads sometimes occur and the frayed end may come in contact with ground or some other terminal causing irregular operation of the vibrator or blown fuses.

Peaking I.F. Stages at 262 K.C.

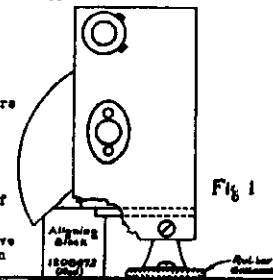
The only way the I.F. stages can be peaked properly is with the use of an oscillator and output meter. Connect the output meter to the plate prong of the 41 output tube and to the chassis frame. Make sure that the output meter is protected with a series condenser internally. If not, connect a 1/10 mfd. condenser in series with the ground lead to the chassis. The Deyard #875 Universal Test Meter and Series #51 Volt-Ohm-meter have this protective condenser included in them.

- (a) Connect the output of the oscillator to the grid cap of the 6F7 tube (leave grid cap in place) and to the chassis ground.
- (b) Turn the condenser gang until the plates are entirely out of mesh.
- (c) Set the oscillator on 262 K.C. and feed this signal through the I.F. stages of the set.
- (d) Peak the I.F. trimmer which is on the I.F. coil having only one adjusting screw first. Then peak the two condensers of the 2nd I.F. coil.

- (e) Set the oscillator output at the lowest level that will give a reasonable scale deflection on the output meter. This should be less than half the maximum output available.
- (f) Make all trimmer adjustments for maximum deflection on the output meter scale.

Peaking Gang Condenser at 1400 K.C.

- (a) Connect the output of the oscillator to the antenna connection of the set and to the chassis ground.
- (b) In order that the position of the condenser plates for 1400 K.C. may be accurately determined, a wood calibration block (painted red, part number 1208073) should be used. This block may be used also in peaking all of the U.M.S., B-O-P, and Chevrolet radios that use the "tubeless rectifier."
- (c) Insert the RED block under the middle section of the gang condenser, so that the largest flat side rests on the chassis base and the square notch steps solidly against the stationary plate support bracket.
- (d) Open the condenser plates until they stop solidly against the beveled edge of the block as shown in Figure (1).
- (e) Peak the parallel trimmers on top of the condenser gang, the oscillator section first at 1400 K.C. for maximum deflection on the output meter.
- (f) To insure sharp peaking of all trimmers reduce the oscillator output to the lowest level that will give a reasonable deflection on the output meter scale.



NOTE--Always use the red calibration block when aligning the parallel trimmers on the gang condenser. Do not rely on the logging of the dial to determine the 1400 K.C. setting. When the aligning procedure is completed the logging of the dial may be slightly off and should be re-set.

SERVICE HINTS

The paint must be removed from the dash under the chassis mounting washers in order to provide a good ground for the receiver as no other ground is used. R. F. noise due to the vibrator will appear if good ground connections are not made at the dash.

The 6F7 tube is a two unit tube and the oscillator section may cease functioning without affecting the amplifier section of the tube or its reading in a tube checker. If the set does not function, operates weakly or not at all at the 550 end of the dial, remove the grid cap of the 76 I.F. tube and make and break the grid contact several times; if very loud pops occur in the speaker the 6F7 is probably defective and should be replaced.

1207990	Antenna	T-1	1207986 (a)	250 ohms	R-100 ohms R-1A&B
1208468	Antenna	T-1	1208044	75,000 ohms	R-2
1207989	R.F.--1st Det.	T-2	1208045	25,000 ohms	R-3
1208469	R.F.--1st Det.	T-2	1208046	35,000 ohms	R-4
1208023	Oscillator	T-3	1204138	500,000 ohms	R-5
1208470	Oscillator	T-3	1204140	50,000 ohms	R-6
1207998	1st I.F.	T-4	1208047	250,000 ohms	R-8
1207997	2nd I.F.	T-5	1208048	5,000 ohms	R-9
1208247	2nd I.F.	T-5	1208047	250,000 ohms	R-10
1207999	Filter	L-2	1208047	250,000 ohms	R-11
1208158	5 Seng tuning	C-1A	1204138	500,000 ohms	R-12
1208028	Tubular .06 mfd.	C-2	1208069	1,500,000 ohms	R-13
1207908	Tubular .1 mfd.	C-3	1204141	75,000 ohms	R-14
1207780	Tubular .0005 mfd.	C-7	1208557	Tube (brass) Ant. lead shield	
1207930	Molded .04 mfd.	C-8	1208157	Volume control/Includes switch	
1207638	Tubular .01 mfd.	C-9	1208204	TRANSFORMER-VIBRATOR ASSEM.	
1208028	Molded .0005 mfd.	C-10	1208187	Bag (small)/Cellophane (to cover vib.)	
1208472	Molded .0005 mfd.	C-10	1208188	Bag (large)/Cellophane (to cover vib.)	
1207488	Tubular .01 mfd.	C-11	1208484	Case & brkt/Vibrator	
1208248	Tubular .5 mfd.	C-12	1208431	Coil (choke R.F. "A")	L-3
1207930	Tubular .04 mfd.	C-13	1208058	Coil (choke R.F. "B")	L-1
1207636	Molded .0005 mfd.	C-14	1208060	Condenser Metal case .5 mfd.	C-15
1208060	Metal case .5 mfd.	C-15	1208060	Condenser Metal case .5 mfd.	C-16
1207908	Tubular .06 mfd.	C-16	1208028	Condenser Tubular .06 mfd.	C-20
1208060	Metal case .5 mfd.	C-17	1208563	Container Vibrator (rubber)	
1207998	Elect. block	C-17	1208060	Insulator Terminal	
1207998	Elect. block	C-18A,B,C&D	1208064	Terminal Transformer	
1207998	Elect. block	C-18A,B,C&D	1208155	Transformer Vibrator power	
1207998	Elect. block	C-18A,B,C&D	1208155	Transformer (large) Inc. C-21 & C-22	
1207998	Elect. block	C-19	1208063	Shield assem. Trans (inc. C-15 & C-16,	
1207998	Elect. block	C-20	1208528	LEAD ASSEMBLY Ammeter (10 amp. fuse)	
1208028	Tubular .06 mfd.	C-23	1208151	LEAD ASSEMBLY Ammeter (10 amp. fuse)	
1208028	Tubular .06 mfd.	C-24	1208441	DRIVE ASSEMBLY Pontiac	
1208552	Molded .0007 mfd.	C-25	1208448	DRIVE ASSEMBLY Olds	
1249014	Generator by-pass		1208443	DRIVE ASSEMBLY	

1249161 Ammeter by-pass
1250489 Dome light
* Used on sets above Serial No. 1257000
** Not required when No. 1208563 coil shield is used

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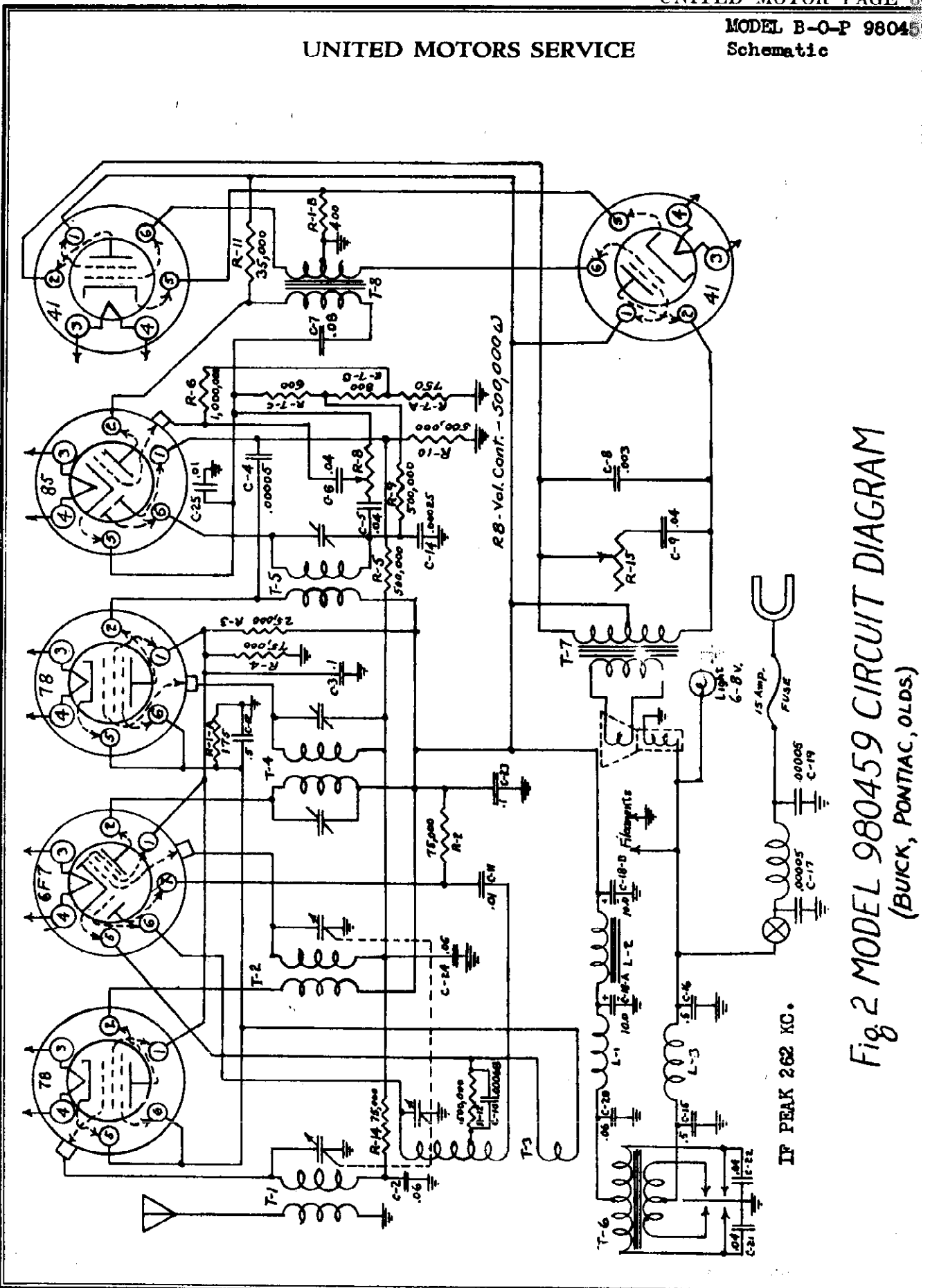


Fig 2 MODEL 980459 CIRCUIT DIAGRAM
(BUICK, PONTIAC, OLDS.)

MODEL B-O-P 980459

Alignment, Voltage
Parts

UNITED MOTORS SERVICE

Peaking I.F. Stages at 262 K.C.

The only way the I.F. stages can be peaked properly is with the use of an oscillator and output meter. Connect the output meter to the plate prongs of the two 41 output tubes. Make sure that the output meter is protected with a series condenser internally. If not, connect a 1/10 mfd. condenser in series with one of the meter leads. The Dayrad #875 Universal Test Meter and Series #51 Volt-Ohmmeter have this protective condenser included in them.

- (a) Connect the output of the oscillator to the grid cap of the 6F7 tube (leave grid cap in place) and to the chassis ground.
- (b) Turn the condenser gang until the plates are entirely out of mesh.
- (c) Set the oscillator on 262 K.C. and feed this signal through the I.F. stages of the set.
- (d) Peak the I.F. trimmer which is on the I.F. coil having only one adjusting screw first. Then peak the two condensers of the 2nd I.F. coil.
- (e) Set the oscillator output at the lowest level that will give a reasonable scale deflection on the output meter. This should be less than half the maximum output available.
- (f) Make all trimmer adjustments for maximum deflection on the output meter scale.

Peaking Gang Condenser at 1400 K.C.

- (a) Connect the output of the oscillator to the antenna connection of the set and to the chassis ground.
- (b) In order that the position of the condenser plates for 1400 K.C. may be accurately determined, a wood calibration block (painted red, part number 1208075) should be used. This block may be used also in peaking all of the U.M.S., B-O-P, and Chevrolet radios that use the "tubeless rectifier."
- (c) Insert the RED block under the middle section of the gang condenser, so that the largest flat side rests on the chassis base and the square notch stops solidly against the stationary plate support bracket.
- (d) Open the condenser plates until they stop solidly against the beveled edge of the block as shown in Fig. (1).
- (e) Peak the parallel trimmers on top of the condenser gang, the oscillator section first at 1400 K.C. for maximum deflection on the output meter.

PEAKING--Cont'd.

(f) To insure sharp peaking of all trimmers reduce the oscillator output to the lowest level that will give a reasonable deflection on the output meter scale.

NOTE: Always use the red calibration block when aligning the parallel trimmers on the gang condenser. Do not rely on the logging of the dial to find the 1400 kc. setting. When the aligning procedure is completed the logging of the dial may be slightly off and should be reset.

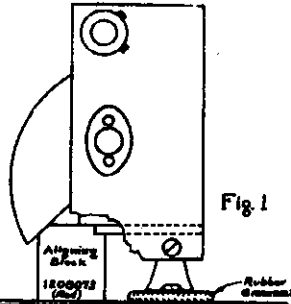


Fig 1

VOLTAGE CHART

Note: ALL readings are taken from indicated tube prong to chassis frame. Volume control on full. Battery supply voltage at exactly 6 volts.

Tube	#1 Screen	#2 Plate	#3 Fil.	#4 Fil.	#5 Cathode	#6 Cond.	#7 Triode Plate
78	85	210	5.9	0	3.2	3.2	
6F7	85	210	0	5.9	3.2	0	90
78	85	210	5.9	0	3.2	3.2	
85	0	85	0	5.9	6.0	0	
41	210	205	5.9	0	16	0	
41	210	205	5.9	0	16	0	

SERVICE HINTS

The paint must be removed from the dash under the chassis mounting washers in order to provide a good ground for the receiver as no other ground is used. R. F. noise due to the vibrator may result if a good ground of the receiver to the car chassis is not provided.

The 6F7 tube is a two unit Tube and the oscillator section may cease functioning without affecting the amplifier section of the tube or its reading in a tube checker. If the set does not function, operates weakly or not at all at the 550 end of the dial, remove the grid cap of the 78 I.F. tube and make and break the grid contact several times; if very loud pops occur in the speaker the 6F7 is probably defective and should be replaced.

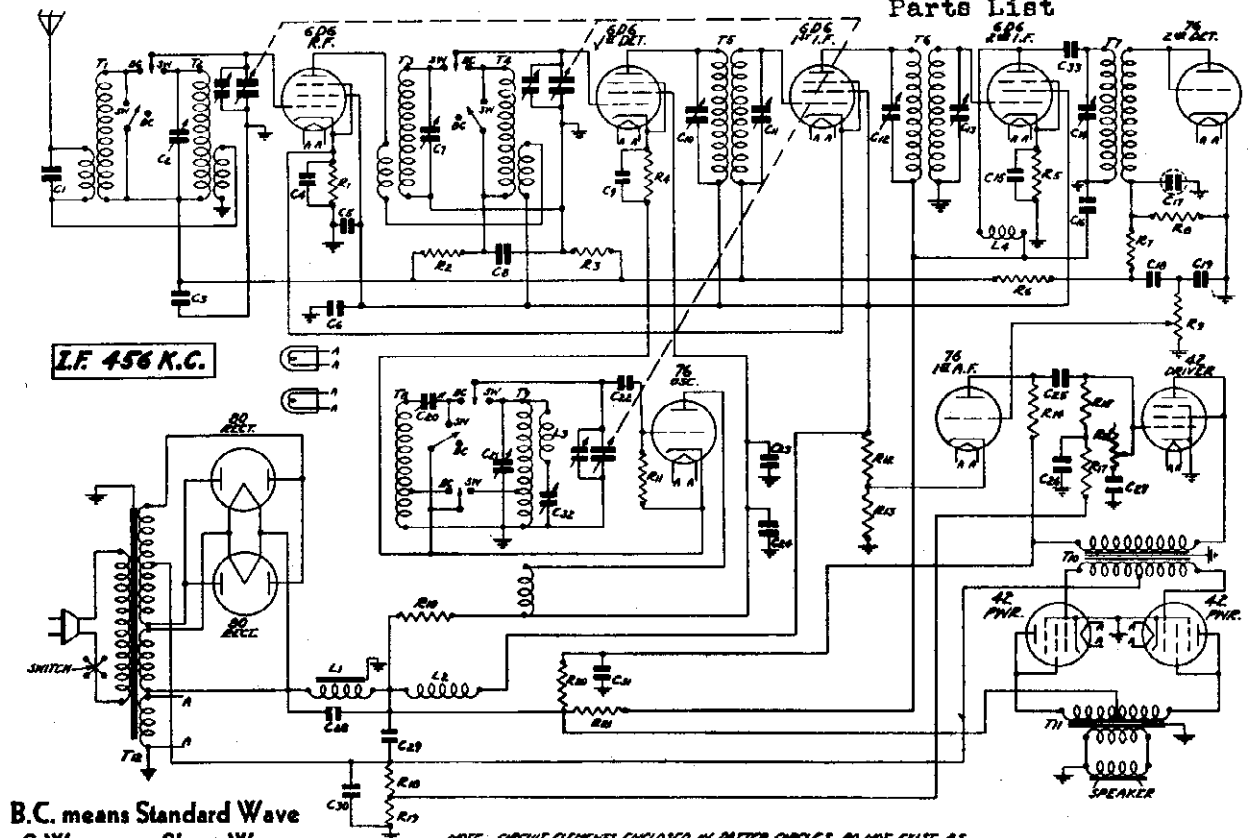
Part No.	Part name	Description	Code
1207990	Coil	Antenna	T-1
*1208468	Coil	Antenna	T-1
1207989	Coil	R.F.--1st Det.	T-2
*1208469	Coil	R.F.--1st Det.	T-2
1208023	Coil	Oscillator	T-3
*1208470	Coil	Oscillator	T-3
1207998	Coil	1st I.F.	T-4
1207997	Coil	2nd I.F.	T-5
*1208553	Coil	2nd I.F.	T-5
1207999	Coil (choke)	Filter	L-E
1208158	Condenser	3 Gang tuning	C-1A, B, C
1208028	Condenser	Tubular .06 mfd.	C-2
1207908	Condenser	Tubular .1 mfd.	C-3
1207625	Condenser	Molded .00005 mfd.	C-4
1207930	Condenser	Tubular .04 mfd.	C-5
1207930	Condenser	Tubular .04 mfd.	C-6
1208261	Condenser	Tubular .08 mfd.	C-7
1207893	Condenser	Molded .003 mfd.	C-8
1207930	Condenser	Tubular .04 mfd.	C-9
1208026	Condenser	Molded .00088 mfd.	C-10
*1208472	Condenser	Molded .000569 mfd.	C-10
1207628	Condenser	Tubular .01 mfd.	C-11
1208242	Condenser	Tubular .5 mfd.	C-12
1208560	Condenser	Molded .0007 mfd.	C-13
1207760	Condenser	Molded .00025 mfd.	C-14
1853060	Condenser	Metal case .5 mfd.	C-15
1853060	Condenser	Metal case .5 mfd.	C-16
*1207625	Condenser	Molded .00005 mfd.	C-17
1206241	Condenser	Electrolytic (a) 10 mfd. (b) 10 mfd.	C-18 A C-18 B
1207625	Condenser	Molded .00005 mfd.	C-19
1208028	Condenser	Tubular .06 mfd.	C-20
1207908	Condenser	Tubular .1 mfd.	C-23
1208028	Condenser	Tubular .06 mfd.	C-24
1207625	Condenser	Tubular .01 mfd.	C-25
1849014	Condenser	Generator by-pass	
1849161	Condenser	Ammeter by-pass	
1850429	Condenser	Dome light	

1208244	resistor (candohm)	(a) 175 ohms (b) 400 ohms	R-1 A
1208044	Resistor	75,000 ohms	R-2 B
1208045	Resistor	85,000 ohms	R-3
1208044	Resistor	75,000 ohms	R-4
1204138	Resistor	500,000 ohms	R-5
1208252	Resistor	1,000,000 ohms	R-6
1208426	Resistor (candohm)	(a) 750 ohms (b) 800 ohms (c) 600 ohms	R-7 A R-9 A
1204138	Resistor	500,000 ohms	
1204138	Resistor	500,000 ohms	R-10
1208046	Resistor	35,000 ohms	R-11
1204138	Resistor	500,000 ohms	R-12
1208044	Resistor	75,000 ohms	R-14
1207621	Resistor	Distributor (Buick, Pontiac)	
1208544	Resistor	Distributor (Olds)	
1208504	TRANSFORMER-VIBRATOR ASSEMBLY		
1208187	Bag (small)	Cellophane (to cover vib.)	
1208188	Bag (large)	Cellophane (to cover vib.)	
1208484	Case & brkt.	Vibrator	
1208431	Coil (choke)	R.F. "A"	L-3
1208056	Coil (choke)	R.F. "B"	L-1
1208153	Transformer	Vibrator power	T-5
5036120	Vib. (large)	Ins. C-21 & C-22	
1208557	Tube (brass)	Ant. shield (Buick)	
1208157	Volume control	500,000 ohms	R-8
1206441	DRIVE ASSEMBLY	Buick (complete)	
1208442	DRIVE ASSEMBLY	Pontiac "	
1208443	DRIVE ASSEMBLY	Olds "	
1208161	Drive cables, brkt. & shaft assembly--	Buick & Olds	
1208447	Drive cables, brkt. & shaft assembly--	Pontiac	
1208544	Escutcheon plate	Buick) NOTE: These plates can be supplied only by B-O-P dealers	
1208445	Escutcheon plate	Pontiac)	
1208446	Escutcheon plate	Olds)	

1208434	Drive case	Includes bracket	
1208537	Dial chart		
1207424	Dial light	6-8 volt	
1208021	Knob	Black bakelite--Buick	
1208250	Knob	Brown bakelite--Olds	
1208546	Knob	Brown bakelite--Pontiac	
1208049	Shield	Ant. coil	
*1208564	Shield	Ant. coil	
1208049	Shield	R.F. coil	
* Used on sets above Serial No. 1557000			
1207918	Shield	Osc. coil	
1208227	Shield assembly	High tension (Pontiac)	
*1208535	Shield assembly	High tension (Olds)	
1208562	Shield assembly	Ignition coil (Olds)	
1208534	Shield assembly	Ignition coil (Pontiac)	
Not required when No. 1208562 coil shield is used			

WELLS-GARDNER & CO.

MODEL 22B5
Chassis 2B
Schematic, Socket, Trimmers
Parts List



B.C. means Standard Wave
S.W. means Short Wave

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

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-A98141ww	R1	140 Ohm		Wire Wound
P-A98204	R2	200,000 Ohm	0.2	Carbon
P-A95105	R3	1.0 Megohm	0.2	Carbon
P-A94252	R4	2,500 Ohm	0.2	Carbon
P-A98401ww	R5	400 Ohm	0.2	Wire Wound
P-A95205	R6	2.0 Megohm	0.2	Carbon
P-A95104	R7	100,000 Ohm	0.2	Carbon
P-A94304	R8	300,000 Ohm	0.2	Carbon
P-96005	R9	2.0 Megohm		Volume Control and Switch
P-E94403	R10	40,000 Ohm	3.0	Carbon
P-A95104	R11	100,000 Ohm	0.2	Carbon
P-98088	R12	4,000 Ohm	2.5	Armored Wire Wound
	R13	390 Ohm	0.5	
	R18	128 Ohm	2.5	
	R19	145 Ohm	3.0	
P-B95608	R14	60,000 Ohm	0.5	Carbon
P-A95608	R15	60,000 Ohm	0.2	Carbon
P-97011	R16	150,000 Ohm		Tone Control
P-A95208	R17	20,000 Ohm	0.2	Carbon
P-98057	R20	4,000 Ohm	4.0	Armored Wire Wound
	R21	6,000 Ohm	2.0	

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-80919	C1	250 mmf	600V	Moulded
P-2102	C2	3-40 mmf		Short Wave Ant. Trimmer
P-81076	C3	0.05 mf	200V	Tubular
P-81111	C4	0.25 mf	200V	Tubular
P-81117	C5	0.25 mf	200V	Tubular
P-81056	C6	6.0 mf	150V	Dry Electrolytic
	C24	2.0 mf	350V	
P-2102	C7	3-40 mmf		Short Wave Inter. Trimmer
P-81076	C8	0.05 mf	200V	Tubular
P-81076	C9	0.05 mf	200V	Tubular
P-2108	C10	150-250 mmf		Double (Part of 1st I. F. Trans. Trimmer)
P-2108	C11	150-250 mmf		Double (Part of 2nd I. F. Trans. Trimmer)
P-2108	C12	150-250 mmf		Double (Part of 2nd I. F. Trans. Trimmer)
P-2108	C13	150-250 mmf		Double (Part of 2nd I. F. Trans. Trimmer)
P-1685	C14	40-100 mmf		3rd I. F. Trans. Pri. Trimmer
P-81076	C15	0.05 mf	200V	Tubular
P-81097	C16	0.10 mf	500V	Tubular
P-81076	C17			Integral Part of 3rd I. F. Assm.
P-81076	C18	0.05 mf	200V	Tubular
P-81081	C19	35 mmf		Wire Capacitor
P-2112	C20	800-500 mmf		Osc. Std. W. Padding Cond.
P-2102	C21	3-40 mmf		Osc. Sho. W. Trimmer
P-81081	C22	35 mmf		Wire Capacitor
P-81118	C23	0.10 mf	400V	Tubular
P-81096	C25	0.25 mf	400V	Tubular
P-81117	C26	25 mf	200V	Tubular
P-81076	C27	0.05 mf	200V	Tubular

Fig. 1—Schematic Circuit Diagram

Aug., 1934

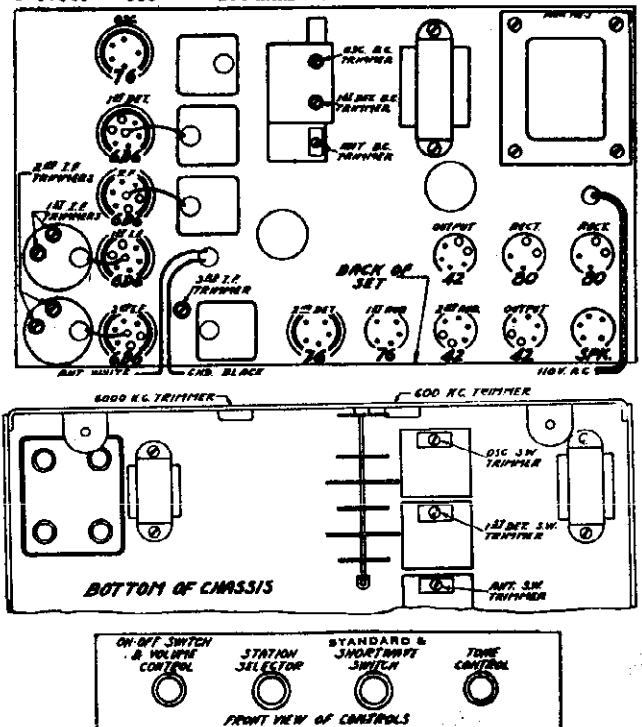


Fig. 2—Location of Tubes, Trimmers and Controls

MODEL 22B5

Chassis 2B

WELLS-GARDNER & CO.

Alignment, Voltage

Resistance Data

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 top panel of the chassis as shown in Fig. 2 and the adjustment screw is reached through a hole in the top panel.

Standard Wave Band Adjustment

The standard-short wave switch should be in the standard wave 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 standard wave 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 standard wave band scale. Retighten the hub set screw. Then adjust the antenna and 1st detector standard wave 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 standard wave band alignment as described above has been made, do not change the adjustment of any of the standard wave 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 standard-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.

Voltages at Sockets
LINE VOLTAGE — 115
ANTENNA SHORTED TO GROUND

Type of Tube	Function	Across Fila. or Heater	Plate to Cath.	Screen to Cathode	Grid to Cath.	Normal Plate M. A.
6D6	R. F.	6.3	105	105	2.8	8.8
6D6	1st Detector	6.3	95	105	10.0	3.3
76	Oscillator	6.3	115		0.0	5.8 ⁽¹⁾ 7.7 ⁽²⁾
6D6	1st I. F.	6.3	260	105	2.8	8.8
6D6	2nd I. F.	6.3	260	105	3.2	7.2
76	2nd Detector	6.3				
76	1st Audio	6.3	170		11.0	1.2
42	Driver Stage	6.3	235	235	18 ⁽³⁾	26.5
42	Output	6.3	350	350	38.0	21.0
80	Rectifier	4.6	435			35.5 per plate

- (1) Switch in Standard Wave position.
- (2) Switch in Short Wave position (No Signal).
- (3) Measured across resistor R19.

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	B. C. Antenna Transformer Primary.....	T1	28.
	B. C. Antenna Transformer Secondary.....	T1	4.9
	S. W. Antenna Transformer Primary.....	T2	.8
	S. W. Antenna Transformer Secondary.....	T2	Small
P-5241	B. C. & S. W. Interstage R. F. Transformer Primaries in series.....	T4	2.9
	B. C. Interstage R. F. Trans. Sec.....	T4	7.8
	S. W. Interstage R. F. Trans. Sec.....	T3	Small
P-5243	1st I. F. Transformer Primary.....	T5	4.8
	1st I. F. Transformer Secondary.....	T5	4.8
P-5244	2nd I. F. Transformer Primary.....	T6	5.
	2nd I. F. Transformer Secondary.....	T6	5.
P-5245	3rd I. F. Transformer Primary.....	T7	12.0
	3rd I. F. Transformer Secondary.....	T7	30.0
P-5183	B. C. Oscillator Grid Coil.....	T8	3.3
	S. W. Oscillator Grid Coil.....	T9	Small
	S. W. Oscillator Plate Coil.....	T9	0.25
P-50653-2B	Audio Input Transformer Primary.....	T10	400.
	Audio Input Transformer Secondary (Center Tap to Inside).....	T10	200.
	Audio Input Transformer Secondary (Center Tap to Outside).....	T10	289.
P-50642A-2B	Audio Output Transformer primary (Center Tap to Inside).....	T11	300.
	Audio Output Transformer Primary (Center Tap to Outside).....	T11	340.
	Audio Output Transformer Secondary.....	T11	.4
P-50620-2B	Power Trans. (115V 60 Cycles) prim. Power Transformer (115V 60 Cycles) H. T. Sec. (Center Tap to Inside).....	T12	150.
	H. T. Sec. (Center Tap to Outside).....	T12	165.
	Power Transformer (115V 60 Cycles) Secondary (80 Filament).....	T12	Small
	Power Transformer (115V 60 Cycles) Secondary A-A (Filament).....	T12	Small
P-50650-2B	Power Choke.....	L1	140.
P-5190	H. F. Oscillator Tracking Coil.....	L3	1.2
P-5246	2nd I. F. Plate Resistor.....	L4	57.
P-1925	Speaker Voice Coil.....	L2	1.6
	Speaker Field Coil.....	L2	5300.

Power Output

The maximum undistorted power output is 15 watts, measured with a 7000 ohm load resistor connected between the plates of the type 42 PWR tubes. The speaker voice coil must be disconnected for this measurement.

Sensitivity

- Standard Wave Band
- Over entire band—2 microvolts absolute
- Short Wave Band
- 6.0 MC—5 microvolts absolute
- 15.0 MC—2 microvolts absolute

WELLS-GARDNER & CO.

Circuit

This model is a standard and short wave receiver with a coverage of 530 to 1740 K. C. on the standard wave band and 5.8 to 18.3 M.C. on the short wave band. Dual band coverage is accomplished by means of dual sets of R. F. and oscillator coils and a three section double throw switch. The various circuits made and broken as this switch is thrown, are indicated in the schematic circuit diagram Fig. 1.

Referring to the antenna transformer in Fig. 1, T1 is the standard wave transformer and T2 the short wave transformer. The two primaries are connected in series. With the switch in the short wave position, the short wave secondary is connected to the grid circuit of the 6D6 R. F. amplifier tube and the standard wave secondary is short circuited. When the switch is in the standard wave position, the short wave secondary circuit is opened up and the standard wave secondary is connected to the grid circuit of the tube. The secondary being used is tuned by the R. F. section of the three gang condenser. A separate variable trimmer condenser C2 is used for the short wave secondary.

The output of the R. F. 6D6 tube is fed through another R. F. transformer with tuned secondary into a second 6D6 tube which functions as the first detector. The first detector section of the three gang condenser is used for tuning this circuit. This interstage R. F. transformer consists of two portions shown as T3 and T4 on the diagram. T3 is the short wave transformer and T4 is the standard wave transformer. The connections to the two portions are made in the same manner as described above for the antenna R. F. transformer. A separate trimmer condenser C7 is used for the short wave secondary.

A type 76 tube is employed in a separate oscillator circuit. Referring to the diagram, T8 is the standard wave oscillator coil and T9 is the short wave oscillator coil. The coil being used is tuned by the oscillator section of the three gang condenser and these circuits are always resonant at 456 K. C. above the frequency to which the R. F. amplifier is tuned. When the switch is in the standard wave position, the connections are completed to the standard wave oscillator coil and the short wave oscillator coil is opened up. When the switch is in the short wave position, the connections are completed to the short wave coil and the standard wave coil is connected between ground and the short wave tap in order to render it ineffective. A separate trimmer condenser C21 is used for the short wave oscillator coil. A 600 K. C. padding condenser C20 is used in conjunction with the standard wave oscillator and a 6000 K. C. padder C32 is used for the short wave oscillator circuit.

The oscillator potential is fed into the cathode circuit of the 6D6 first detector tube. This results in the intermediate or beat frequency of 456 K. C. being present in the plate circuit of this tube.

Two stages of I. F. amplification are employed using two 6D6 tubes. The primaries and secondaries of the first and second I. F. transformers are tuned by small trimmer condensers located in the I. F. coil cans. The primary of the third I. F. transformer is tuned by a trimmer condenser located on the chassis top panel as shown in Fig. 2.

A 76 tube functions as the second detector and also as the automatic volume control tube. This tube operates as a diode or two element rectifier. When the standard and short wave switch is in the standard wave position, A. V. C. voltage is applied to the R. F., 1st Detector and 1st I. F. tubes. In the short wave position A. V. C. voltage is not applied to the 1st detector tube.

A 76 type tube is used in the 1st Audio Stage. The output of this stage is fed through a resistance coupled unit into a Driver Stage which employs a 42 type tube. The output stage uses two 42 type tubes operating in a class A' amplifier circuit.

The power supply in this receiver makes use of two 80 type, full wave rectifying tubes operating in parallel.

It should be noted that with the exception of the 80's all tubes and dial lamps are of the 6 volt type.

MODEL 22B5

Chassis 2B

Circuit Data, Parts

REPAIR PARTS LIST FOR 12 TUBE
SUPERHETERODYNE RECEIVER

When ordering parts be sure and give the part number. Also give the series number which will be found in the License Notice label. If there is a spot of paint on the chassis, give this color.

MISCELLANEOUS
ITEM

P-5176	Sho. W. and Std. W. Antenna R. F. Transformer less can T1, T2.....
P-5241	Sho. W. and Std. W. Interstage R. F. Transformer less can T3, T4.....
P-5183	Oscillator Coil Assembly less can T8, T9.....
P-5245	3rd I. F. Transformer less can T7.....
P-40433	Cans for the above assemblies.....
P-5243	1st I. F. Trans. & Can Assem. T5.....
P-5244	2nd I. F. Trans. & Can Assem. T6.....
P-5190	H. F. Oscillator Tracking Coil L3.....
P-5246	2nd I. F. Plate Reactor L4.....
P-50650	2B Power Choke L1.....
P-50653	2B Input Transformer T10.....
P-50642A	2B Output Transformer T11.....
P-50620	2B Power Transformer 115V 60 Cycle T12.....
P-50652	2B Power Transformer 115V 25 Cycle T12.....
P-50651	2B Power Transformer 115-230V 40-60 Cycle T12.....
P-2025	No. 80 Tube Socket.....
P-1884	No. 42 Tube Socket.....
P-2022	No. 76 Tube Socket.....
P-1885	No. 6D6 Tube Socket.....
P-1637	Speaker Socket.....
P-40445	Tube Shield.....
P-40443	Tube Shield Base.....
P-1925	Speaker.....
P-10320	Glass Crystal.....
P-20875	Crystal Retainer Ring.....
P-2060	Knob, Small.....
P-2062	Knob, Large.....
P-10272	Rubber Chassis Cushion.....
P-20912	Large Double End Pointer.....
P-2101	Band Change Switch.....
P-2012	Pilot Light Bulb.....
P-20905	Condenser Shield.....
P-10369	8" Black Drive Cord (V. C. or T. C. Ind.).....
P-10870	29" Black Drive Cord (Con. Drive).....
P-2126	Pilot Light Socket and Clip Assem.....
P-70702	Cord and Plug Assem.....
P-30342	Grid Cap Only.....
P-1504	8 Lug Terminal Strip.....
P-1421	Single Lug Terminal Strip.....

Voltages

Check the voltages at the sockets to see if the power unit is delivering the correct voltages. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together.

All of the D.C. voltage readings as shown on 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, with the volume at a minimum.

These voltages are typical of the sets but will vary slightly with variations in individual receivers and variations in tube characteristics. All voltages in the chart are taken with a line voltage of 115. Differences in line voltage as well as difference in test equipment used will introduce other variations in the voltage readings.

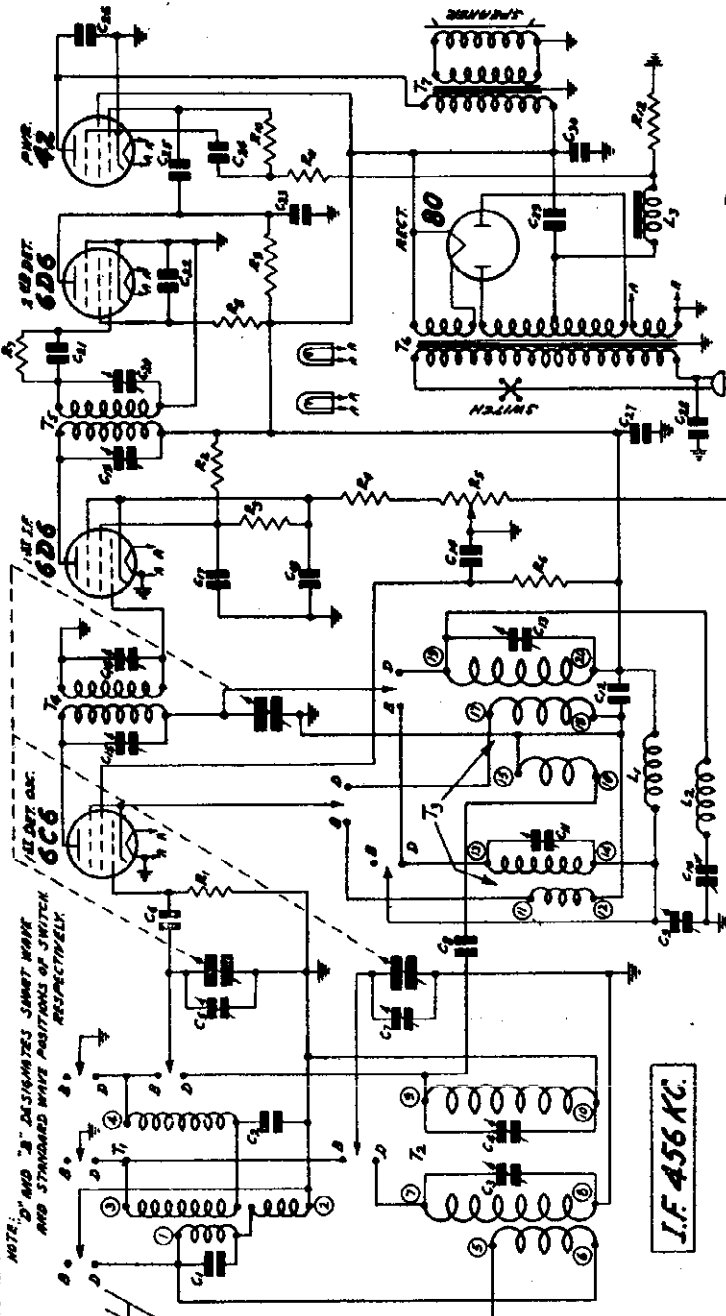
MODEL 5D Series
Schematic, Voltage
Parts

WELLS-GARDNER & CO.

VOLTAGES AT SOCKETS

Input - 115 Volts 60 Cycles		Antenna Shorted to Ground				
Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
6C6	1st Det. & Osc.	6.3	250	175	4.0	8.8
6D6	I. F.	6.3	250	100	4.0	7.0
6D6	2nd Det.	6.3	35	26	0	1.1
42	Output	6.3	230	250	*20.0	28
80	Rectifier	5.0	—	—	—	32.0

Volume control in maximum position.
*Measured across R12.



CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-81817	C1	250 mmf.	250V	Moulded Tubular
P-81076	C2	.05 mmf.	200V	Tubular
P-2278	C3	2.25 mmf.		Trimmer
P-81822	C4	2.25 mmf.		Trimmer
P-81824	C5	Std. Wave Ant. Moulded		Trimmer on Gang Cond. Assem.
P-2283	C6	35 mmf.		Moulded
P-2278	C7	35 mmf.		Trimmer on Gang Cond. Assem.
P-81824	C8	7 mmf.		Moulded
P-2283	C9	300-500 mmf.		Double Trimmer Cond. Assem.
P-2278	C10	40-100 mmf.		(Std. Wave Oscillator Coil Sec.)
P-81824	C11	40-100 mmf.		Trimmer
P-81076	C12	.05 mmf.		400V Tubular
P-2278	C13	.05 mmf.		(Sh. Wave Oscillator Coil Sec.)
P-81076	C14	.05 mmf.		400V Tubular
P-1386	C15	60-120 mmf.		Double Trimmer Cond. Assem. 1st I.F.
P-81813	C16	60-120 mmf.		200V Tubular
P-81814	C17	25 mmf.		140V Tubular
P-81813	C18	25 mmf.		140V Tubular
P-1386	C19	60-120 mmf.		Dbl. Trim. Cond. Assem. 2nd I. F.
P-81821	C20	35 mmf.		Moulded
P-81076	C21	.10 mmf.		400V Tubular
P-81076	C22	.02 mmf.		600V Tubular
P-81066	C23	.01 mmf.		600V Tubular
P-81066	C24	.01 mmf.		600V Tubular
P-81066	C25	.01 mmf.		600V Tubular
P-81066	C26	.01 mmf.		600V Tubular
P-81135	C27	.10 mmf.		400V Tubular
P-81133	C28	.01 mmf.		600V Tubular
P-81004	C29	10.0 mmf.		350V Wet Electrolytic (Insided Mtg.)
P-81004	C30	8.0 mmf.		300V Wet Electrolytic (Grinded Mtg.)
P-82502	C30	3		Section Gang Condenser

RESISTANCE CHART

Part No.	Code	Description	Wattage	Type
P-5266	T1	Std. Wave Ant. Coil Assem. Complete with Can.	3W	Carbon
P-5267	T2	Short Wave Ant. Coil Assem. Complete with Can.	1.0W	Carbon
P-40450	T3	Can for above Assembly.	.5W	Carbon
P-5268	T4	Oscillator Coil Assem. less Can.	.5W	Flexible Wire Wound
P-40433	T5	Can for above Assembly.	.5W	Volume Control and Switch
P-5263	T6	Oscillator Plate Choke Coil	.5W	Carbon
P-5190	L1	High Frequency Oscillator Tracking Coil	.2W	Carbon
P-5271	L2	1st I. F. Coil Assembly. Complete with Can.	2.0W	Carbon
P-5272	L3	2nd I. F. Coil Assembly. Complete with Can.	2.0W	Carbon
P-50657-5D	L4	Output Transformer; 60 cycle, 115 volt.	100,000 ohm	Carbon
P-50654	L5	Power Transformer; 50 cycle, 230 volt.	50,000 ohm	Carbon
P-50663	L6	Power Transformer; 40-60 cycle, 115-230 volts.	100,000 ohm	Carbon
P-50662	L7	Power Transformer; 25 cycle, 115 volt.	50,000 ohm	Carbon
P-98404	R1	300,000 ohm	2.5W	Flexible Wire Wound
P-98403	R2	25,000 ohm	40 ohm	Carbon
P-98403	R3	30,000 ohm	1.0W	Carbon
P-98403	R4	260 ohm	.5W	Carbon
P-98403	R5	16,000 ohm	.5W	Carbon
P-98403	R6	60,000 ohm	.5W	Carbon
P-98403	R7	2 megohm	.5W	Carbon
P-98404	R8	500,000 ohm	.2W	Carbon
P-984104	R9	100,000 ohm	.5W	Carbon
P-984104	R10	50,000 ohm	.5W	Carbon
P-984104	R11	100,000 ohm	.5W	Carbon
P-984104	R12	40 ohm	2.5W	Flexible Wire Wound

Jan., 1935

Sensitivity

- Standard Wave Band
 - 600 KC — 15 microvolts absolute
 - 1500 KC — 10 microvolts absolute
- Short Wave Band
 - 6 MC — 20 microvolts absolute
 - 15 MC — 5 microvolts absolute



Fig 3—Arrangement of Controls

WELLS-GARDNER & CO.

MODEL 5D Series
Alignment, Socket
Trimmers, Resistance
Drive Cord Data, Not

Intermediate Frequency Adjustment

Set the signal generator for 456 KC. The antenna lead of the signal generator should be connected to the grid circuit of the 1st detector on the band switch side of the grid condenser, C8, thru a .05 mfd. condenser. There is a lead which connects the center stator of the tuning condenser and one of the terminals of the band switch. Connect the signal lead to this terminal on the band switch. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator should be at the maximum potentiometer. The volume control should be at the maximum position. Then adjust the four I. F. trimmer condensers until maximum output is obtained. The adjusting screws for the 1st I. F. trimmer condensers are reached thru the two holes at the right hand side of the rear panel of the chassis.

CAUTION—Use an insulated screwdriver for adjusting trimmers to prevent short circuiting to ground. The adjusting screws for the 2nd I. F. trimmer condensers are reached thru the top of the chassis in the round I. F. can—See Fig. 3. The operating instructions for trimmer condensers are covered over by a small cover plate which is held in position by a screw. Loosen this screw until the cover plate can be swung around.

Standard Wave Band Adjustment

Set the standard-wave switch should be in the standard position. Set the signal generator for 1740 K.C. Turn the signal generator in its oscillator connected to the antenna lead of the receiver. Adjust the oscillator standard wave trimmer until maximum output is obtained. This trimmer is on the underside of the chassis and its location is shown in Fig. 2.

Then set the signal generator for 1600 K.C. Turn the rotor until maximum output is obtained. Loosen the set screws which secure the pointer extension shaft and set the pointer to the 1500 K.C. mark on the standard wave band. Turn the standard wave trimmer until maximum output is obtained. The antenna and 1st detector standard wave trimmer condensers are mounted on the tuning condenser. See Fig. 2.

Next set the signal generator for 800 K.C. and adjust through 800 KC padder, C9. The adjusting screw is reached as shown in Fig. 2. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly and reach over this setting, at the same time adjusting the 800 K.C. padder screw until the highest output is obtained.

Short Wave Band Adjustment

CAUTION—After the standard wave band alignment as described above has been made, do not change the adjustment of any of the standard wave 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, 312 K.C. apart. That is, if the receiver is tuned to 16,000 K.C. a 15,000 K.C. signal at approximately 15,912 K.C. This is due to resonance on the fact that a 400 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 obtained. In order that the oscillator in the receiver will be 456 K.C. higher in frequency than the signal.

Turn the short wave switch to the short wave position. Turn the rotor to the full open position. Set the volume control should be at the maximum position. Set the signal generator for 18,000 K.C. Then adjust the oscillator short wave trimmer for maximum output. This trimmer is shown in Fig. 2. If a maximum output peak cannot be reached, it may be due to the fact that the antenna too far. Back off these two trimmer screws two or three turns for maximum output. The oscillator short wave trimmer for maximum output.

Next set the signal generator for 16,500 K.C. Turn the rotor until maximum output is obtained. Then adjust the antenna and 1st detector short wave trimmers for maximum output.

Replacing Drive Cord

Remove chassis from cabinet. Disconnect the tension spring and the old drive cord. Do not allow the glass strips on the drive cord to slip. Using the old cord as a guide, measure off a very nearly equal length of cord for this drive before proceeding to put it on the assembly. This length should be approximately 30 1/4 inches.

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. The condenser rotor plates should be in the completely open position.

See that the eyelet in the hole in the drive drum as shown in Fig. 4. Insert one end of the new drive cord 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 clock wise direction (facing front of chassis) around the drive drum approximately one-fifth turn.

Then wrap the cord around back of the offset in the three bracket as shown by the dotted lines in Fig. 4. Bring this cord up from the drive drum to the eyelet in the eyelet in the chassis in the clockwise direction one-half turn in a clockwise direction until it is just past the eyelet in this drum as illustrated. Cross it over the other cord at this point, as shown in Fig. 4, and continue to wind it around the drive drum in a clockwise direction nearly one complete turn until it is again up to the eyelet in the drum as illustrated.

New insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring.

Then lift the chassis up to the offset in the drive drum. Push the chassis up to the offset in the drive drum. Push the drive drum down to the drive shaft. Wrap it two and one-third times around the drive shaft, as shown in Fig. 4.

Now secure the other end of the tension spring over the spur on the drive drum with a pair of long nose pliers, grip the two ends of the cord just above the tension spring and pull down to take all slack out of the cord.

Replace the chassis in the cabinet.

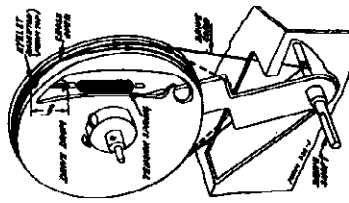


Fig. 4—Drive Cord Replacement

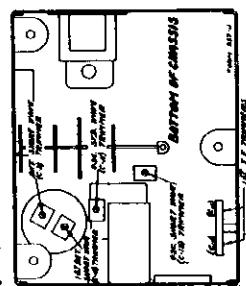
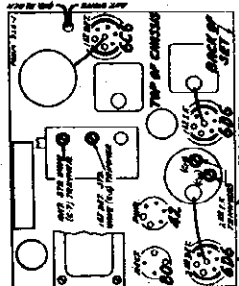
When ordering parts be sure and give the part number. Also give the complete serial number which includes the Series No. and the large letter which is stamped at the left of the rear panel of the chassis base.

REPAIR PARTS LIST

When ordering parts be sure and give the part number. Also give the complete serial number which includes the Series No. and the large letter which is stamped at the left of the rear panel of the chassis base.

Part No.	Item
P-100	Speaker Socket
P-101	4 Tube Socket
P-102	60 Tube Socket
P-103	80 Tube Socket
P-104	Tube Shield (Prints Neck)
P-105	Tube Shield (Prints Neck)
P-106	Tube Shield (Prints Neck)
P-107	Tube Shield (Prints Neck)
P-108	Tube Shield (Prints Neck)
P-109	Tube Shield (Prints Neck)
P-110	Tube Shield (Prints Neck)
P-111	Tube Shield (Prints Neck)
P-112	Tube Shield (Prints Neck)
P-113	Tube Shield (Prints Neck)
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P-193	Tube Shield (Prints Neck)
P-194	Tube Shield (Prints Neck)
P-195	Tube Shield (Prints Neck)
P-196	Tube Shield (Prints Neck)
P-197	Tube Shield (Prints Neck)
P-198	Tube Shield (Prints Neck)
P-199	Tube Shield (Prints Neck)
P-200	Tube Shield (Prints Neck)

Fig. 2—Tubing Arrangement and Location of Trimmers



Next set the signal generator for 6000 K.C. and adjust through 6000 KC padder, C10. The adjusting screw is reached through a hole in the right side 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 6000 K.C. padder screw until the highest output is obtained.

Caution

The can of the wet electrolytic condenser C39 is not at ground potential. Therefore in any work on the chassis care should be taken not to touch this can and any grounded point or to remove the cardboard shim separating the condenser and power transformer.

The oscillator stator section of the gang condenser is "HOT". It will be noted from the circuit diagram shown in Fig. 2 that the oscillator section of the gang condenser is connected to the chassis through the detector-oscillator tube. Care should be taken not to touch this section to ground or to touch the section to any point of lower potential.

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.

A 115-250 Volt, 40-60 cycle Power Transformer is also available for this model.

Replacing Glass Crystal

The glass disk crystal is held in place by means of four screws which form a part of the dial ring. To remove the crystal, first remove the top cover plate. Then turn the dial ring far enough to enable removing the broken crystal.

Place the new crystal in the dial ring frame, putting it behind the lower two metal tabs, which are still in the correct position, and holding it firmly against the dial ring.

BEND THE TOP TWO TABS OVER THE EDGE OF THE CRISTAL GLASS CRYSTAL JUST FAR ENOUGH TO PREVENT THE CRYSTAL FROM FALLING OUT OF THE FRAME. The dial ring may be arbitrarily rotated by forcing the tabs over the edge of the glass.

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.	Item	Code	Ohms	D.C.
256	Double Tuned Antenna Std. W. Coil	T1	20	
257	(1-2) Primary Windings in Series	T2	10	
258	Double Secondary Windings in Series	T3	80	
259	Double Primary Windings	T4	10	
260	(1-3) Secondary Windings	T5	Small	
261	Oscillator Coil	T6	Small	
262	Std. W. Cathode Winding	T7	15	
263	Std. W. Cathode Winding	T8	15	
264	Std. W. Cathode Winding	T9	15	
265	Std. W. Cathode Winding	T10	15	
266	Std. W. Cathode Winding	T11	15	
267	Std. W. Cathode Winding	T12	15	
268	Std. W. Cathode Winding	T13	15	
269	Std. W. Cathode Winding	T14	15	
270	Std. W. Cathode Winding	T15	15	
271	Std. W. Cathode Winding	T16	15	
272	Std. W. Cathode Winding	T17	15	
273	Std. W. Cathode Winding	T18	15	
274	Std. W. Cathode Winding	T19	15	
275	Std. W. Cathode Winding	T20	15	
276	Std. W. Cathode Winding	T21	15	
277	Std. W. Cathode Winding	T22	15	
278	Std. W. Cathode Winding	T23	15	
279	Std. W. Cathode Winding	T24	15	
280	Std. W. Cathode Winding	T25	15	
281	Std. W. Cathode Winding	T26	15	
282	Std. W. Cathode Winding	T27	15	
283	Std. W. Cathode Winding	T28	15	
284	Std. W. Cathode Winding	T29	15	
285	Std. W. Cathode Winding	T30	15	
286	Std. W. Cathode Winding	T31	15	
287	Std. W. Cathode Winding	T32	15	
288	Std. W. Cathode Winding	T33	15	
289	Std. W. Cathode Winding	T34	15	
290	Std. W. Cathode Winding	T35	15	
291	Std. W. Cathode Winding	T36	15	
292	Std. W. Cathode Winding	T37	15	
293	Std. W. Cathode Winding	T38	15	
294	Std. W. Cathode Winding	T39	15	
295	Std. W. Cathode Winding	T40	15	
296	Std. W. Cathode Winding	T41	15	
297	Std. W. Cathode Winding	T42	15	
298	Std. W. Cathode Winding	T43	15	
299	Std. W. Cathode Winding	T44	15	
300	Std. W. Cathode Winding	T45	15	
301	Std. W. Cathode Winding	T46	15	
302	Std. W. Cathode Winding	T47	15	
303	Std. W. Cathode Winding	T48	15	
304	Std. W. Cathode Winding	T49	15	
305	Std. W. Cathode Winding	T50	15	
306	Std. W. Cathode Winding	T51	15	
307	Std. W. Cathode Winding	T52	15	
308	Std. W. Cathode Winding	T53	15	
309	Std. W. Cathode Winding	T54	15	
310	Std. W. Cathode Winding	T55	15	
311	Std. W. Cathode Winding	T56	15	
312	Std. W. Cathode Winding	T57	15	
313	Std. W. Cathode Winding	T58	15	
314	Std. W. Cathode Winding	T59	15	
315	Std. W. Cathode Winding	T60	15	
316	Std. W. Cathode Winding	T61	15	
317	Std. W. Cathode Winding	T62	15	
318	Std. W. Cathode Winding	T63	15	
319	Std. W. Cathode Winding	T64	15	
320	Std. W. Cathode Winding	T65	15	
321	Std. W. Cathode Winding	T66	15	
322	Std. W. Cathode Winding	T67	15	
323	Std. W. Cathode Winding	T68	15	
324	Std. W. Cathode Winding	T69	15	
325	Std. W. Cathode Winding	T70	15	
326	Std. W. Cathode Winding	T71	15	
327	Std. W. Cathode Winding	T72	15	
328	Std. W. Cathode Winding	T73	15	
329	Std. W. Cathode Winding	T74	15	
330	Std. W. Cathode Winding	T75	15	
331	Std. W. Cathode Winding	T76	15	
332	Std. W. Cathode Winding	T77	15	
333	Std. W. Cathode Winding	T78	15	
334	Std. W. Cathode Winding	T79	15	
335	Std. W. Cathode Winding	T80	15	
336	Std. W. Cathode Winding	T81	15	
337	Std. W. Cathode Winding	T82	15	
338	Std. W. Cathode Winding	T83	15	
339	Std. W. Cathode Winding	T84	15	
340	Std. W. Cathode Winding	T85	15	
341	Std. W. Cathode Winding	T86	15	
342	Std. W. Cathode Winding	T87	15	
343	Std. W. Cathode Winding	T88	15	
344	Std. W. Cathode Winding	T89	15	
345	Std. W. Cathode Winding	T90	15	
346	Std. W. Cathode Winding	T91	15	
347	Std. W. Cathode Winding	T92	15	
348	Std. W. Cathode Winding	T93	15	
349	Std. W. Cathode Winding	T94	15	
350	Std. W. Cathode Winding	T95	15	
351	Std. W. Cathode Winding	T96	15	
352	Std. W. Cathode Winding	T97	15	
353	Std. W. Cathode Winding	T98	15	
354	Std. W. Cathode Winding	T99	15	
355	Std. W. Cathode Winding	T100	15	

Volume Control movable arm should be disconnected from ground when measuring Antenna Coil primary.

Std. W. Ant. and Oc. coil measurements.

Band switch position should be in S. W. when making S. W. measurements.

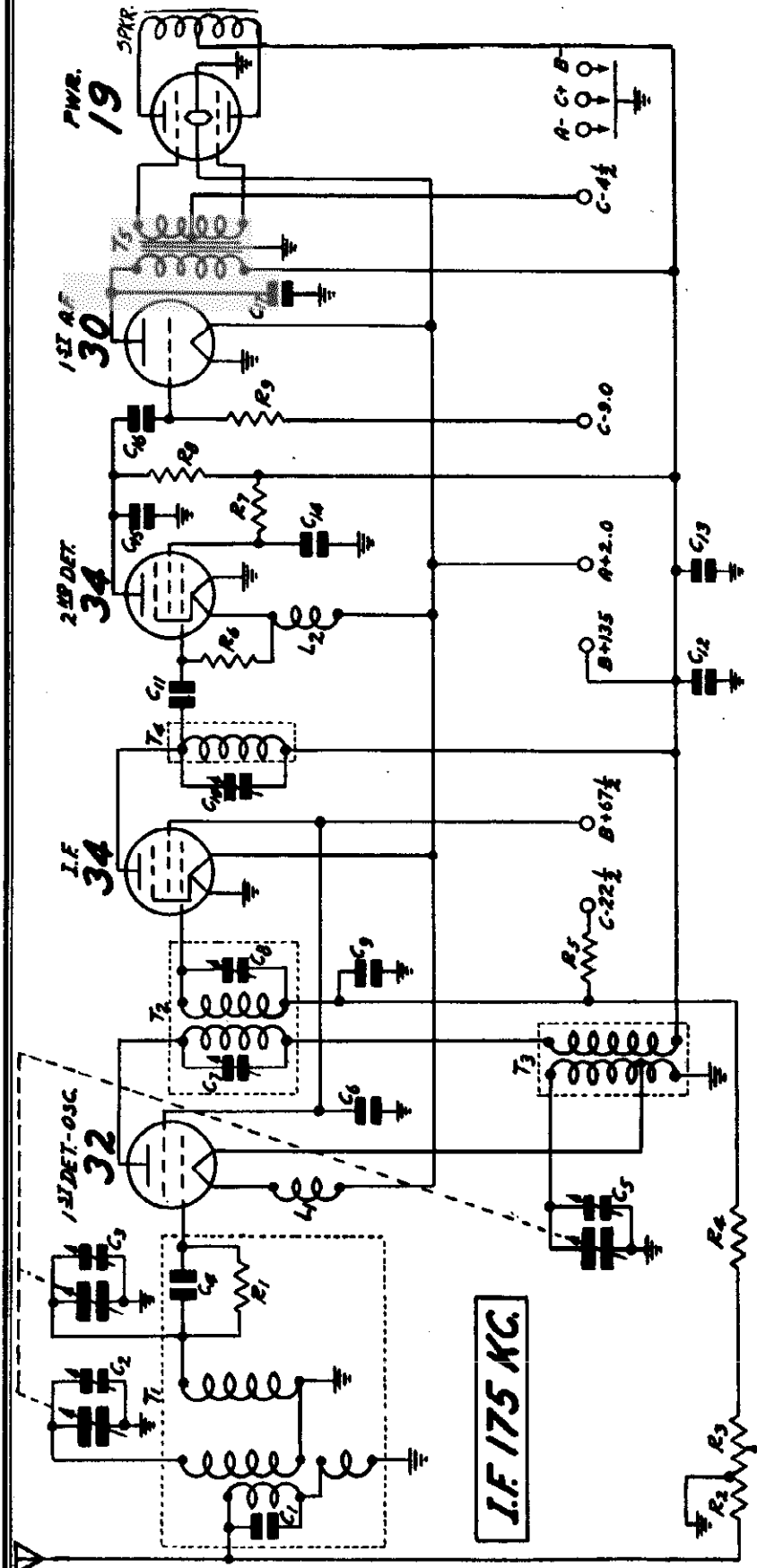
Measurements on and off to ground, will include 2.0 mfd. resistance. To get resistance value shown, measure from hole in top of end I. F. can. to ground.

MODELS 35G510, 35G560

Chassis 5G

Schematic

WELLS - GARDNER & CO.



GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

- C1 150-μMFT TRIMMER
- C2 5-μMFT TRIMMER
- C3 50-μMFT TRIMMER
- C4 35-μMFT TRIMMER
- C5 25-μMFT TRIMMER
- C6 40-100 μMFT DUAL
- C7 20-70 μMFT (P-17A37)
- C8 .05 μMFT 180V
- C9 40-100 μMFT (P-17A38)
- C10 50 μMFT MOULDED
- C11 .10 μMFT 180V
- C12 4.0 μMFT 150V ELECTROLYTIC (P-45X26)
- C13 .002 μMFT
- C14 .006 μMFT 300V
- C15 .002 μMFT 300V
- C16 .006 μMFT 300V
- C17 .002 μMFT 300V
- R1 150 Ω
- R2 50 Ω
- R3 100 Ω
- R4 400 Ω
- R5 100 Ω
- R6 100 Ω
- R7 100 Ω
- R8 100 Ω
- R9 100 Ω
- R10 100 Ω
- R11 100 Ω
- R12 100 Ω
- R13 100 Ω
- R14 100 Ω
- R15 100 Ω
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- R90 100 Ω
- R91 100 Ω
- R92 100 Ω
- R93 100 Ω
- R94 100 Ω
- R95 100 Ω
- R96 100 Ω
- R97 100 Ω
- R98 100 Ω
- R99 100 Ω
- R100 100 Ω
- L1 1.0 MEGOHM .2 W.
- L2 10,000 OHM } VOLUME CONTROL (P-35X26)
- L3 60,000 OHM }
- L4 900 OHM 2 W.
- L5 6,500 OHM .2 W.
- L6 2.0 MEGOHM .2 W.
- L7 1.0 MEGOHM .2 W.
- L8 10,000 OHM } VOLUME CONTROL (P-35X26)
- L9 60,000 OHM }
- L10 900 OHM 2 W.
- L11 6,500 OHM .2 W.
- L12 2.0 MEGOHM .2 W.
- L13 1.0 MEGOHM .2 W.
- L14 10,000 OHM } VOLUME CONTROL (P-35X26)
- L15 60,000 OHM }
- L16 900 OHM 2 W.
- L17 6,500 OHM .2 W.
- L18 2.0 MEGOHM .2 W.
- L19 1.0 MEGOHM .2 W.
- L20 10,000 OHM } VOLUME CONTROL (P-35X26)
- L21 60,000 OHM }
- L22 900 OHM 2 W.
- L23 6,500 OHM .2 W.
- L24 2.0 MEGOHM .2 W.
- L25 1.0 MEGOHM .2 W.
- L26 10,000 OHM } VOLUME CONTROL (P-35X26)
- L27 60,000 OHM }
- L28 900 OHM 2 W.
- L29 6,500 OHM .2 W.
- L30 2.0 MEGOHM .2 W.
- L31 1.0 MEGOHM .2 W.
- L32 10,000 OHM } VOLUME CONTROL (P-35X26)
- L33 60,000 OHM }
- L34 900 OHM 2 W.
- L35 6,500 OHM .2 W.
- L36 2.0 MEGOHM .2 W.
- L37 1.0 MEGOHM .2 W.
- L38 10,000 OHM } VOLUME CONTROL (P-35X26)
- L39 60,000 OHM }
- L40 900 OHM 2 W.
- L41 6,500 OHM .2 W.
- L42 2.0 MEGOHM .2 W.
- L43 1.0 MEGOHM .2 W.
- L44 10,000 OHM } VOLUME CONTROL (P-35X26)
- L45 60,000 OHM }
- L46 900 OHM 2 W.
- L47 6,500 OHM .2 W.
- L48 2.0 MEGOHM .2 W.
- L49 1.0 MEGOHM .2 W.
- L50 10,000 OHM } VOLUME CONTROL (P-35X26)
- L51 60,000 OHM }
- L52 900 OHM 2 W.
- L53 6,500 OHM .2 W.
- L54 2.0 MEGOHM .2 W.
- L55 1.0 MEGOHM .2 W.
- L56 10,000 OHM } VOLUME CONTROL (P-35X26)
- L57 60,000 OHM }
- L58 900 OHM 2 W.
- L59 6,500 OHM .2 W.
- L60 2.0 MEGOHM .2 W.
- L61 1.0 MEGOHM .2 W.
- L62 10,000 OHM } VOLUME CONTROL (P-35X26)
- L63 60,000 OHM }
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- L69 60,000 OHM }
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- L73 1.0 MEGOHM .2 W.
- L74 10,000 OHM } VOLUME CONTROL (P-35X26)
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- L80 10,000 OHM } VOLUME CONTROL (P-35X26)
- L81 60,000 OHM }
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- L86 10,000 OHM } VOLUME CONTROL (P-35X26)
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- L96 2.0 MEGOHM .2 W.
- L97 1.0 MEGOHM .2 W.
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- L422 10,000 OHM } VOLUME CONTROL (P-35X26)
- L423 60,000 OHM }
- L424 900 OHM 2 W.
- L425 6,500 OHM .2 W.
- L426 2.0 MEGOHM .2 W.
- L427 1.0 MEGOHM .2 W.
- L428 10,000 OHM } VOLUME CONTROL (P-35X26)
- L429 60,000 OHM }
- L430 900 OHM 2 W.
- L431 6,500 OHM .2 W.
- L432

WELLS - GARDNER & CO.

MODELS 35G510, 35G560
Chassis 5G
Voltage, Alignment
Battery Data

VOLTAGES AT SOCKETS
Volume Control at Maximum—Antenna Shorted
to Ground. B+135 Volts
Voltage to Chassis

Type Tube	Function	Plate Volts Grid Volts	Screen Grid Volts	Grid Bias Volts	Normal M. P. A.
32	1st Det. & Osc.	20	135	62.5	2.5 (1) 0.2
34	1. F.	20	135	67.5	2.5 (1)
34	2nd Det.	26	50	40 (1)	0
30	1st Audio	20	135		9 (1)
19	Output	20	135		4.5
					Total

(1) With 200,000 ohm potentiometer. (2) With 25,000 ohm potentiometer. (3) Read at 1/2" W.C. battery. (4) Subject to variation.

Replacing Drive Cord

Remove chassis from cabinet. Take off the pointer by removing the screw at the center of the dial. Remove the dial by taking out the six rivets from the dial assembly. Remove the on-off indicator dial by pulling it forward. With the condenser plates in a completely open position, slip the new drive cord thru hole "A" (from the front) in the drive drum. See Fig. 9. Pull the cord thru this hole far enough to tie a knot near the end. Make this knot large enough so that it will not pull back thru the hole. Slip the opposite end of the drive cord thru hole "B" of the drive drum. Now slip the piece of fine tubing (about 1/2" long) over the drive cord and insert about half of this tubing into hole "B" as shown in the illustration. This is important to prevent the cord from being cut. Bring the drive cord down to the drive shaft and wrap the cord in a clockwise direction about two and one-half times around this shaft, progressing toward the front. Bring the cord up from the drive shaft and wrap it around the drive drum approximately one and one-half times in a clockwise direction, progressing toward the front until the cord is up to the turned-in portion of the flange "C". See Fig. 9.

"A" Battery and Regulator This receiver is designed to operate with a 2 volt storage cell, but may be operated with a 3 volt dry "A" battery if used with a voltage regulator. The receiver may also be used with an air cell "A" battery provided a series resistor is used.

3 Volt "A" Battery—The voltage regulator required with this type of battery is illustrated in Fig. 4 and is not supplied with the receiver unless specified. This device consists of a rheostat which controls the voltage, a voltmeter for measuring its value as supplied to the receiver and a small push button switch for cutting the voltmeter in and out of the circuit. It has two prongs at the bottom which plug into the socket in the platform at the rear left corner of the chassis. The circuit diagram of the regulator is shown in Fig. 4.

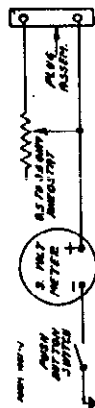


Fig. 4—Schematic Diagram of Voltage Regulator

The receiver is shipped from the factory with a jumper between the two socket connections and a fiber strip over the socket. This strip must be removed and the jumper taken out as illustrated in Figs. 6 and 7 before the regulator can be inserted as shown in Fig. 4. The jumper is in the "A-1" line.



Fig. 6—Prying off Fiber Cover

When a new 3 volt "A" battery is inserted, the adjusting knob must be turned to the left hand position and then turned up until the voltmeter indicates 1.9 to 2 volts. The push button must be held in until the adjustment is completed. Caution the user never to operate the receiver with the adjustment beyond 2 volts.

Air Cell "A" Battery—If an air cell "A" battery is used, a series resistor will be required to reduce the voltage to the proper level of 2 volts for the tube filaments. Although the voltage regulator mentioned above can be used, the series resistor is cheaper and is satisfactory at the voltage of one of these batteries drops very little during the useful life of the battery

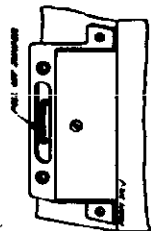


Fig. 7—Removing Jumper Wire

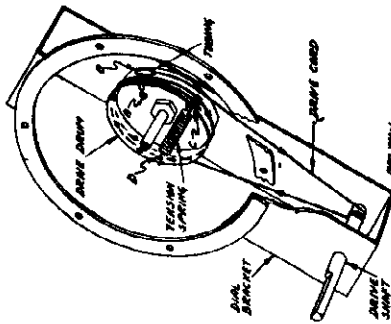


Fig. 9—Replacing Drive Cord

Alignment Procedure and Dial Calibration

Misalignment or mistaking 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 .1 MF condenser to the coil end of the grid leak resistor R1. There is a lead which runs from the center tuning condenser rotor to a lug at the bottom made at the lug on the coil to which this lead is connected.

Connect the ground lead of the receiver to the ground post of the signal generator. Turn the volume control to the maximum position. Then adjust the three 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. 8.

As stated above, use a non-metallic screwdriver to make the adjustment.

1750 KC Adjustment

Set the signal generator for 1750 KC. Turn the rotor of the tuning condenser to the full open position.

Connect the antenna lead of the receiver thru a 250 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 three gang condenser until maximum output is obtained. The location of this trimmer is shown in Fig. 8.

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 1st detector and antenna trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

Dial Calibration

To obtain dial scale calibration tune in an 800 KC 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.

SPECIFICATIONS

Sensitivity	15 Microvolts Absolute
Tuning Range	530 to 1750 KC
Intermediate Frequency	175 KC
Speaker	6" Magnetic

Input Voltages	
"A" Battery	3 Volts (5 Amperes)
"B" Batteries	67 1/2 and 135 Volts
"C" Batteries	4 1/2, 9 and 31 1/2 Volts
Power Output	1 W at (Undistorted)

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 high that the "C" batteries are run down in about the same time as the "B" batteries.

MODELS 35G510, 35G560
Chassis 5G
Socket, Trimmers, Parts
Resistance Data

WELLS - GARDNER & CO.

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 model number and this large letter.

MISCELLANEOUS

Part No.	DESCRIPTION	Selling Price
P-3A64	Type 30 Tube Socket (4 Prong)	.06
P-3A65	Type 34 Tube Socket (4 Prong)	.06
P-3A133	Type 32 Tube Socket (4 Prong)	.06
P-3A110	Type 19 Tube Socket (6 Prong)	.06
P-13X212	Speaker Cable and Socket Assembly	.30
P-13X215	"B" and "C" Battery Cable	.40
P-13X66	"A" Battery Cable	.20
P-13X214	Antenna and Ground Lead Assembly	.14
P-12A217	5" Magnetic Speaker	2.84
P-12A218	8" Magnetic Speaker	3.16
P-17X7	Glass Crystal	.06
P-28X38	Crystal Retainer Ring	.04
P-10A32	Knobs	.10
P-2X38	Felt Washers (for use behind knobs)	.04
P-32X18	Tube Shield Base	.04
P-32X1	Tube Shields	.06
P-8X23	Rubber Chassis Mounting Cushions	.01
P-4A18	Lug Terminal Strip	.04
P-30X14	Grid Clip Only	.01

DIAL ASSEMBLY

Part No.	DESCRIPTION	Selling Price
P-15A36	Dial and Drive Assembly Complete	\$1.30
P-5A28	Drive and Dial Bracket Assembly Only	.32
P-15X37	Indicator Disc and Hub Assembly Only	.12
P-26X203	Drive Shaft Only	.06
P-19X21	Horse Shoe Lockwasher for use on above shaft	.01
P-26X213	Pointer Shaft	.06
P-24X20	Drive Drum	.06
P-28X19	Tension Spring (used in drive drum)	.04
P-10X10	16" Black Drive Cord	doz. .12
P-10X11	10" Black Indicator Cord	doz. .08
P-29X20	Brass Collar and 6-32 x 3/16" Set Screw for securing above Indicator Cord to Shaft of Volume Control and On-Off Switch	.04
P-58X69	Dial Strip	.18
P-15X25	Double End Pointer	.04
P28X34	Indicator Spring	.04
P-19X43	Spring Washer	.04

Following are the D. C. resistances of the various windings in the chassis.

Part No.	DESCRIPTION	Code	D. C. Resistance in Ohms
9A381	Double Tuned Ant. Trans. Pri. (in series)	T1	17.
	Double Tuned Ant. Trans. Sec. (Antenna)	T1	3.5
	Double Tuned Ant. Trans. Sec. (1st Det.)	T1	3.5
9A383	1st I.F. Trans. Primary	T2	80.
	1st I.F. Trans. Secondary	T2	105.
9A382	Oscillator Coil Cathode Winding	T3	2.
	Oscillator Coil Plate Winding	T3	7.
9A384	2nd I.F. Reactor Coil	T4	50.
9A281	Filament Reactor (In 1st Det. Ckt.)	L1	Small
9A281	Filament Reactor (In 2nd Det. Ckt.)	L2	Small
50X11	Audio Transformer Primary	T5	950.
	Audio Transformer Secondary (Center Tap to outside)	T5	600.
	Audio Transformer Secondary (Center Tap to inside)	T5	550.
12A217	Magnetic Speaker (Center Tap to outside)		290.
	Magnetic Speaker (Center Tap to inside)		250.

TRANSFORMERS AND COILS

Part No.	Code	DESCRIPTION	Selling Price
P-9A381	T1	Double Tuned Antenna Transformer Less Can	.80
P-42X23		Transformer Can for above Assembly	.08
P-9A383	T2	1st I.F. Transformer and Can Assembly	.96
P-9A382	T3	Oscillator Coil and Can Assembly	.48
P-9A384	T4	2nd I.F. Reactor Coil and Can Assembly	.84
P-50X11-5G	T5	Push Pull Audio Input Transformer	1.02
P-9A281	L1	Filament Reactor in 1st Det. Circuit	.12
P-9A281	L2	Filament Reactor in 2nd Det. Circuit	.12

RESISTORS

Part No.	Code	Resistance	Watts	Type	Selling Price
P-A95105	R1	1.0 Megohm	0.2	Carbon	.06
P-36X201	R2	10,000 Ohms		Dual Volume Control	.58
	R3	60,000 Ohms			
P-A94901	R4	900 Ohms	0.2	Carbon	.03
P-A94652	R5	6,500 Ohms	0.2	Carbon	.03
P-A95205	R6	2.0 Megohm	0.2	Carbon	.06
P-B94104	R7	100,000 Ohms	0.5	Carbon	.08
P-B94403	R8	40,000 Ohms	0.5	Carbon	.03
P-A95105	R9	1.0 Megohm	0.2	Carbon	.06

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	Selling Price
P-47X55	C1	150 mmf.		Moulded	.08
	C2	Antenna Trimmer—Part of Gang Condenser			
	C3	1st Det. Trimmer—Part of Gang Condenser			
P-47X53	C4	35 mmf.		Moulded	.06
	C5	Oscillator Trimmer—Part of Gang Cond.			
P-46X97	C6	.250 mf.	180	Tubular	.14
P-17A37	C7	40-100 mmf.		1st I.F. Trimmer Cond.	.16
	C8	20-70 mmf.			
P-46X80	C9	.050 mf.	180	Tubular	.08
P-17A38	C10	40-100 mmf.		2nd I.F. Trimmer Cond.	.12
P-47X56	C11	50 mmf.		Moulded	.06
P-46X98	C12	.100 mf.	180	Tubular	.10
P-45X28	C13	4.00 mf.	150	Electrolytic	.40
P-46X96	C14	.100 mf.	180	Tubular	.10
P-46X111	C15	.002 mf.	300	Tubular	.14
P-46X112	C16	.006 mf.	300	Tubular	.08
P-46X111	C17	.002 mf.	300	Tubular	.14
P-14A38		3 Section Gang Condenser			1.80

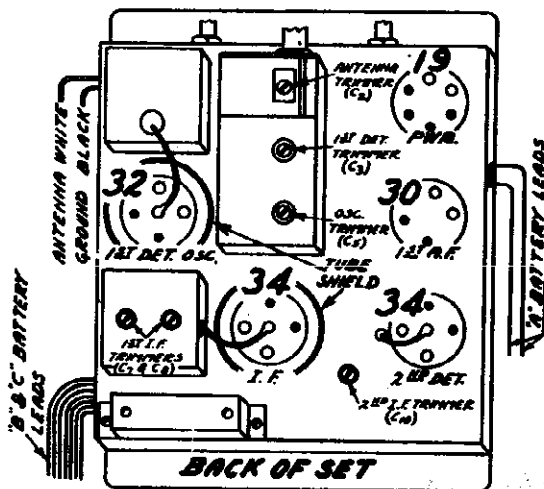


Fig. 8—Tube Arrangement

WELLS-GARDNER & CO.

MODEL 25Y1
Chassis 5Y
Schematic, Voltage
Socket, Trimmers, Parts

VOLTAGES AT SOCKETS						
Input 6.3 Volts—Antenna Disconnected at Connector						
Type of Tube	Function	Volts at Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
6D6	R. F.	6.2	154	95	3.0	5.2
6C6	1st Det. & Osc.	6.2	160	97	0	3.0
6D6	I. F.	6.2	154	95	3.0	5.2
75	2nd Det. & 1st A. F.	6.2	110	—	1.	.25
41	Power	6.2	143	146	14.	13.0

Dec, 1934

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 at the bayonet connector.

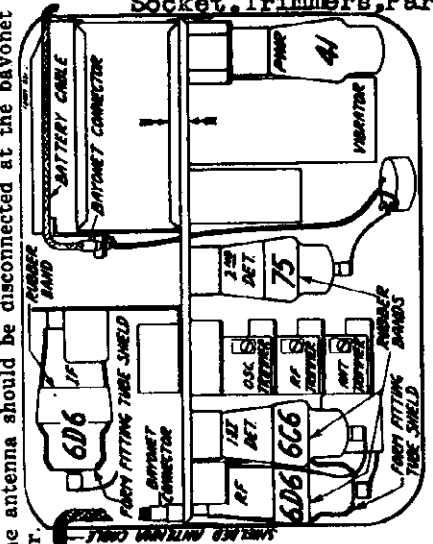


Fig. 2—Location of Tubes and Vibrator

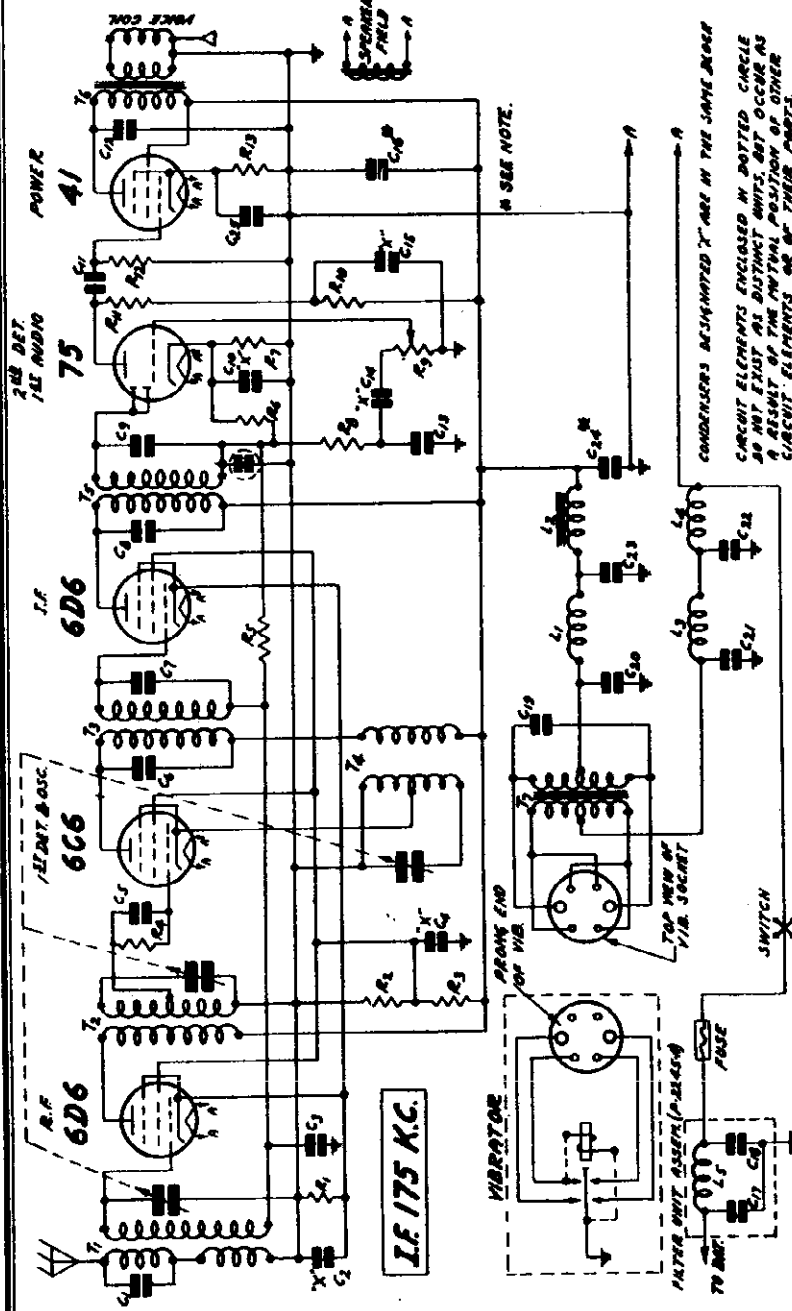


Fig. 1—Schematic Circuit Diagram

Part No.	Code	Resistance	Wattage	Type
P-B9431ww	R1	350 Ohm	.5	Flexible Wire Wound
P-B9233	R2	25,000 Ohm	.5	Carbon
P-B98103	R3	10,000 Ohm	.5	Carbon
P-A95105	R4	1 Megohm	.2	Carbon
P-A95106	R5	1 Megohm	.2	Carbon
P-A95104	R6	500,000 Ohm	.2	Carbon
P-A95104	R7	7,500 Ohm	.2	Carbon
P-A95104	R8	100,000 Ohm	.2	Carbon
P-A95103	R9	2 Megohm	.2	Carbon
P-A95204	R10	50,000 Ohm	.2	Carbon
P-A95204	R11	200,000 Ohm	.2	Carbon
P-B94901ww	R12	500,000 Ohm	.2	Carbon
	R13	800 Ohm	.5	Flexible Wire Wound

Part No.	Code	Capacity	Voltage	Type
P-81814	C1	250 mf.	250V.	Part of Antenna Coil Assembly
	C2	50 mf.	200V.	Bypass Block
	C3	10 mf.	140V.	
	C4	25 mf.	140V.	
P-82600D	C5	100 mf.	200V.	Part of 1st I. F. & Osc. Coil Assembly
	C6	10 mf.	200V.	Part of 2nd I. F. Coil Assembly
	C7	70 mf.	200V.	Part of 1st I. F. & Osc. Coil Assembly
	C8	70 mf.	200V.	Part of 2nd I. F. Coil Assembly
	C9	70 mf.	200V.	Part of 1st I. F. & Osc. Coil Assembly
	C10	70 mf.	200V.	Part of 2nd I. F. Coil Assembly
	C11	.05 mf.	300V.	Tubular
	C12	.05 mf.	300V.	Tubular
	C13	.05 mf.	300V.	Tubular
	C14	.05 mf.	300V.	Tubular
	C15	.05 mf.	300V.	Tubular
	C16	.05 mf.	300V.	Tubular
	C17	.05 mf.	300V.	Tubular
	C18	.05 mf.	300V.	Tubular
	C19	.05 mf.	300V.	Tubular
	C20	.05 mf.	300V.	Tubular
	C21	.05 mf.	300V.	Tubular
	C22	.05 mf.	300V.	Tubular
	C23	4.0 mf.	250V.	Electrolytic Block
	C24	2.0 mf.	250V.	Electrolytic Block
	C25	4.0 mf.	250V.	Electrolytic Block

**MODEL 25Y1
Chassis 5Y**

WELLS-GARDNER & CO.

**Alignment, Resistances
Drive Cord Data**



Fig. 5—Drive "Take-up" Spring
Then bring the cord heads of the drum by way of the turned-in portion of the flange at "B".
The drive tension spring "D" to the loose end of the cord at the point "C" just above the top edge of the lip "B" as shown in the illustration. This should be done by the use of the end of spring "D" at point "C" will be below the top edge of spring "D" in the turn-in portion of the flange "B" in the face of the drum. In several times the tension in the cord will cause this distance to become about "A".
Now, by applying a tension on the drive spring "D" hook the other end of the spring into the small hole "E" near the top of the drive drum. Hook spring from the inside out.
After the cord has been put on it may be necessary to calibrate the receiver as explained in the article on condenser alignment.
All of the earlier models did not have drive shaft "take-up" springs. This spring will prevent any tendency toward change of setting should the receiver be subjected to vibration. To insert these springs and fibre washers on the drive shaft proceed as follows:
Remove the section screw knob by pulling it off of the shaft.
Slip the small fibre washer over the shaft and dip the "take-up" spring to the drive bracket as shown in Fig. 5.
The chassis may now be replaced into the case in the reverse order of the manner in which it was removed.

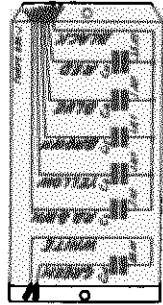


Fig. 6—Condenser Block Internal Wiring

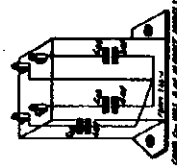


Fig. 7—Electrode Block Internal Wiring

Replacing Drive Cord

The drive cord in this receiver may be replaced as follows:



Fig. 3—Cord Drive—Top View

First remove the chassis from the case as explained on page 4.
Some of the first models did not have two fibre "end" washers on the drive shaft to protect the drive cord as shown in Fig. 3. If this is the case, these washers should be put on as follows:
Separate and take off the horn-shoe lock washer which holds the drive shaft in position. This may be done with a file or a screwdriver.
Now pull the drive shaft out just far enough to permit the two fibre washers to be slipped over the end of the horn-shoe lock washer.
Then slip the shaft back into place and replace the horn-shoe lock washer.
Knot one end of the new drive cord and with the condenser plates in a completely closed position, slip the drive cord through the small hole "A" in the drive drum — see Fig. 5. The knot will then be on the inside of the drum.
Now wrap the cord around the lower half of the drive drum as indicated and bring it up to the drive shaft. Proceed by wrapping it in a clockwise direction (from

front) around the drive shaft three and one-quarter turns between the two fibre washers. Proceeding around the front of the drum, the cord should be kept in a closed position and that the cord is held tight.

Set the dial indicator drum so that the offset is at the top or a little to the right of the center — see Fig. 4.
Wrap the cord from the drive shaft once around the dial indicator drum and then approximately one and one-half turns around the drum itself in a clockwise direction, progressing toward the back.
From the dial indicator drum draw the cord over the lower right hand quarter of drive drum as shown in Fig. 4.

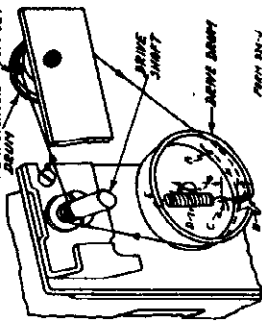


Fig. 4—Cord Drive Replacement

When servicing this receiver, a new vibrator unit should be tried out in the same manner as a new set of tubes would be tried out.

One or more vibrator units should be kept on hand for replacement purposes.

To remove the volume control and the switch, first pull the knobs from the volume control shaft. Next loosen and remove the front unscrew and remove the round knotted nut from the front.

The old volume control and switch connections may now be disconnected and the new unit put in its place and the leads reconnected.

Repeat the volume control to the case in the reverse order in which it was removed.

Replacing Volume Control

When servicing this receiver, a new vibrator unit should be tried out in the same manner as a new set of tubes would be tried out.

One or more vibrator units should be kept on hand for replacement purposes.

To remove the volume control and the switch, first pull the knobs from the volume control shaft. Next loosen and remove the front unscrew and remove the round knotted nut from the front.

The old volume control and switch connections may now be disconnected and the new unit put in its place and the leads reconnected.

Repeat the volume control to the case in the reverse order in which it was removed.

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.	Item	Resistance in Ohms
P-156	Antenna Tuning Coil in Series	71
P-157	Antenna Tuning Coil	1250
P-158	R. F. Intermediate Transformer	21
P-159	Power Transformer	71
P-160	Power Transformer (Cover Top to Outside)	71
P-161	Power Transformer (Cover Top to Outside)	134
P-162	Detector Transformer	900
P-163	Detector Transformer (Total)	1000
P-164	Detector Transformer (Plate Coil)	400
P-165	Detector Transformer (Screen Coil)	400
P-166	Detector Transformer (Grid Coil)	400
P-167	Detector Transformer (Control Coil)	400
P-168	Detector Transformer (Speaker Coil)	400
P-169	Detector Transformer (Speaker Coil)	400
P-170	Detector Transformer (Speaker Coil)	400
P-171	Detector Transformer (Speaker Coil)	400
P-172	Detector Transformer (Speaker Coil)	400
P-173	Detector Transformer (Speaker Coil)	400
P-174	Detector Transformer (Speaker Coil)	400
P-175	Detector Transformer (Speaker Coil)	400
P-176	Detector Transformer (Speaker Coil)	400
P-177	Detector Transformer (Speaker Coil)	400
P-178	Detector Transformer (Speaker Coil)	400
P-179	Detector Transformer (Speaker Coil)	400
P-180	Detector Transformer (Speaker Coil)	400
P-181	Detector Transformer (Speaker Coil)	400
P-182	Detector Transformer (Speaker Coil)	400
P-183	Detector Transformer (Speaker Coil)	400
P-184	Detector Transformer (Speaker Coil)	400
P-185	Detector Transformer (Speaker Coil)	400
P-186	Detector Transformer (Speaker Coil)	400
P-187	Detector Transformer (Speaker Coil)	400
P-188	Detector Transformer (Speaker Coil)	400
P-189	Detector Transformer (Speaker Coil)	400
P-190	Detector Transformer (Speaker Coil)	400
P-191	Detector Transformer (Speaker Coil)	400
P-192	Detector Transformer (Speaker Coil)	400
P-193	Detector Transformer (Speaker Coil)	400
P-194	Detector Transformer (Speaker Coil)	400
P-195	Detector Transformer (Speaker Coil)	400
P-196	Detector Transformer (Speaker Coil)	400
P-197	Detector Transformer (Speaker Coil)	400
P-198	Detector Transformer (Speaker Coil)	400
P-199	Detector Transformer (Speaker Coil)	400
P-200	Detector Transformer (Speaker Coil)	400

When ordering parts be sure and give the part number. Also give the complete serial number which includes the Scribes No.

Part No.	Item
P-185	4th Tube Socket
P-186	5th Tube Socket
P-187	6th Tube Socket
P-188	7th Tube Socket
P-189	8th Tube Socket
P-190	Antenna Coil Assembly
P-191	Antenna Coil Assembly
P-192	Antenna Coil Assembly
P-193	Antenna Coil Assembly
P-194	Antenna Coil Assembly
P-195	Antenna Coil Assembly
P-196	Antenna Coil Assembly
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P-299	Antenna Coil Assembly
P-300	Antenna Coil Assembly

Condenser Alignment

Misalignment or misrouting 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 produce accurately calibrated signals over the standard wave band is required for indicating the effect of adjustments.

First remove the cover of the box. Leave the antenna and battery cables connected to the chassis.

Disconnect the car antenna and connect antenna cable lead to the lead from the signal generator.

Set the signal generator for 1650 K. C. Turn the rotor of the signal generator to the antenna lead from the antenna section 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.

Now 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 calibrate the receiver, tune in a station of known frequency at about the center of the dial. Remove the scratchplate and gas. The pointer is held in position by friction. Grasp the pointer at the center and turn it until it points to the frequency of the station being received.

This use of the cut plate type of condenser eliminates the necessity of a 600 K. C. padder and, therefore, no adjustment at this frequency is required.

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 K. C. with the volume control about three-fourths on. Drop the chassis from the cover. The location of the antenna trimmer is shown in Fig. 2. Turn the adjusting screw of the trimmer clockwise until the signal is at a maximum. **CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.**

Removing Chassis from Case

First, unscrew the black, brown, yellow, and green screws in order which connect the chassis to the vibrator unit. Next, notice the small length of bridled shielding which is soldered to the dial scale and the station selector control shaft. Unsolder this shielding at the lug.

Remove the 4 screws which hold the chassis in the case — 2 are in the side and 2 on the speaker panel of the chassis case. (Do not remove the four speaker mounting screws.)

Remove the two control knobs by pulling them off of the shaft.

Next remove the volume control. To do this first loosen the hexagonal nut on the inside of the case with a flat wrench. Then unscrew and remove the round knotted nut from the front.

The chassis may then be taken out.

Replacing Vibrator Unit

The vibrator unit is plugged in in the same manner as a tube. This unit may, in case of failure, be easily replaced. **CAUTION—Polarity**, as explained in the label on the unit, and in the label on the vibrator unit on the chassis, must be observed when plugging in vibrator unit.

In replacing the vibrator unit be sure to replace the corrugated cardboard pad, which prevents the unit from working its way out of the socket.

WELLS-GARDNER & CO.

MODEL 25YL Chassis 5Y Mounting Notes

Mounting the Receiver

The receiver is mounted by first securing the cover to the car body. The two slots in the chassis box proper are then slipped over the two bolts on the cover (see Figs. 2 and 3) and the chassis is then secured to the cover by means of the four screws provided.

The complete receiver should be held in position in the tentative locations to determine if there is

space available. After a location is chosen, the cover may be removed and held in position to see if it can be attached to the car supports.

Top Mounting

The top mounting or securing of the receiver to the roof of the car is the method of attachment for which this receiver is primarily designed—see Fig. 1 (A). The receiver is very low in height and will mount in back of the car header without obscuring front or rear vision. Less difficulty will be experienced with ignition noise when the set is mounted in this position.

The best position for the receiver is at the center of the header as shown in the illustration, as the controls will then be accessible to the person in either front seat. If mounted at the left side of the header (facing forward) the controls will, of course, be more accessible to the driver. The best position on the header at which to mount the set will be determined in many cases by car devices, including sun visor, rear vision mirror mounting, windshield wiper control, etc.

In Figs. 2 and 3 are shown the details of the roof mounting.

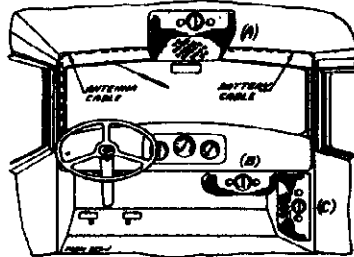


Fig. 1—General Mounting Position

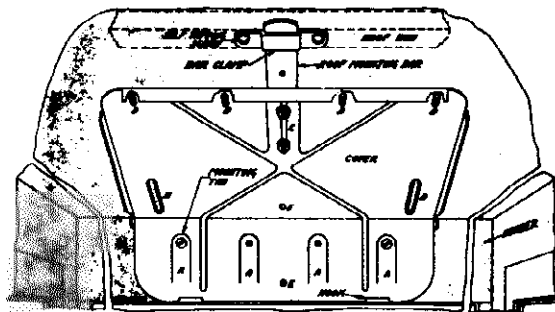


Fig. 2—Mounting Cover to Car Roof

First remove the cover from the box by taking out the four cover screws. The cover may then be removed from the chassis box.

In most cases the cover will be secured to the header of the car and one of the roof bars. The method of fastening it to the bar will depend on the location of the bar. In general it will be necessary to attach the roof mounting bar to the cover at slot C, as shown in Fig. 2. Two 8-32 screws, nuts and lockwashers are provided for this.

Use the holes in the bar which allow it to extend only to the roof bar. As shown in the illustration, the bar is held in position at the bow by means of the bar clamp which is screwed to the bow. If the bar extends beyond the clamp, it may, in some cases, have to be cut off. Two No. 8 screws and lockwashers are provided with the bar clamp. These are self tapping and may be used in either wood or metal. Drill 1/64 inch holes (No. 35 drill) for these screws. Do not deviate more than .005 inch. Care should be taken not to drill through the car roof.

If there is a roof bar over slots C or D, it will not be necessary to use the roof mounting bar. Any two

of the slots D may be used. If the roof bar is curved, do not tighten the covers through slots D enough to bend the cover. Should it be necessary to use slot C, only one screw is then used.

For attachment to the header, two or more of the mounting tabs A shown in Fig. 2 may be employed. If the angle of the header from the perpendicular is less than the angle of the back of the cover, the mounting tab may be bent as shown in Fig. 3 to fit tightly against the header. No. 8 screws and lockwashers are provided. These are self tapping screws and may be used in either wood or metal. Drill 1/64 inch holes (No. 35 drill) for these screws.

In some cases it may be desirable to mount the set away from the header in order to clear car devices. This can be done if there is a roof bar near the header which coincides with slots B. Use the self tapping screws and lockwashers mentioned above. If the header is of cardboard construction it may be necessary to secure the set in this manner.

Before reassembling the receiver to the cover, refer to the articles, "Attaching the Cables" and "Trying Out the Set and Adjusting."

Instrument Panel Mounting

If top mounting cannot be used the receiver may be mounted to the instrument panel as shown in Fig. 1 (B). In general it will be mounted at the right side (facing forward) in order to clear car controls.

Details of this method of mounting are shown in Fig. 4. First remove the cover as explained under "Top Mounting." Then attach the curved bracket to the cover as shown in Fig. 4. Holes E are used—

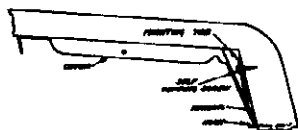


Fig. 3—Mounting Cover to Car Roof—Side View

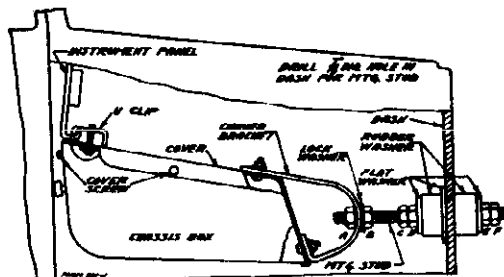


Fig. 4—Details of Instrument Panel Mounting

in Fig. 2. Two 8-32 machine screws, nuts and lockwashers are provided. Reassemble the cover to the chassis box.

Next hold the complete receiver in position under the instrument panel and determine the best mounting position. Consideration should be given to leg room and interference with car controls, including gear shift and hand brake levers, cowl ventilator, glove compartment hinges, etc. Consideration should also be given to whether a hole can be drilled in the dash for the mounting stud at the location chosen.

Another matter to consider is the angle of the front of the box. In general this angle will be less than the angle of the instrument panel—see Fig. 4. The angle of the front of the box should be such that the dash can be easily seen. On the other hand the box should not be down so far at the back that leg room will be materially reduced.

The next step is to locate the mounting stud hole. The vertical position of this hole can vary because of the curved bracket. The horizontal position, however, must be more accurately determined. Place a short pencil or pointed tool through the slot in the curved bracket and mark the dash at the point closest to the bracket. This point should line up with the center line of the chassis box.

Drill a 7/16 inch hole through the dash at this point, care being taken not to drill through any air apparatus, such as vacuum tanks, etc.

Then, again remove the cover. Next, assemble the mounting stud to the curved bracket and to the dash loosely, putting the parts on as shown in Fig. 4.

Most cars of the later models have a hood or up-turned edge at the back of the fenders on the bottom of the instrument panel, as illustrated. If this is the case the front end of the cover is secured to the fange by means of holes D (see Fig. 3) and two U clips, as shown. Two 1 inch 10-32 machine screws and lockwashers are provided. The U clips are tapped.

If the bottom of the instrument panel is straight, the two outer holes D may be used. If the bottom is curved or offset, use any two of the holes D which will not bend the cover. In some cases spacers may be necessary.

In some cars the fange of the instrument panel is flat. In a case of this kind it will be necessary to drill the fange. The front of the cover is then held in position by extending the two No. 10-32 machine screws through holes D and through the two holes drilled in the fange. The same conditions as mentioned above govern the choice of the two holes D. If the set is mounted at the extreme right, it may be necessary to tap the holes in the fange so it is difficult to hold a nut in position.

Next, tighten up the stud mounting. First raise the cover to the desired position. Turn down nut D (see Fig. 4) until it is snug. Then tighten nut C with a wrench. Next tighten down nuts E and F in



Fig. 5—External Wiring Connections

Connect the antenna wire to the lead-in wire from the antenna. Ground the pigtail of the antenna cable shield at the antenna end to a nearby connected ground. Keep the antenna cable as high as possible and as far away from any car wiring as possible.

The unshielded portion of the antenna lead-in may be responsible for interference pick-up, and it may, therefore, in some instances, be necessary to extend the antenna shield as shown in Fig. 6. Any coiled up and excess length of the lead-in from the car antenna should be cut off, and after it is connected to the shielded lead from the receiver, should be tucked back into the corner post so that only the shielded portion will be exposed.

When it is necessary to install an antenna in the car roof, the antenna cable can be connected directly to the roof antenna without being brought down the corner post.

Battery Cable—The battery connection is made at the ammeter. The battery cable is secured to the edge of the car roof and brought down the front corner post in the same manner as described above for the antenna cable. In Fig. 1 this cable is shown on the right side. If the ammeter is on the left side, this cable may be crossed over the top of the chassis and brought down the left corner post.

The battery cable is made up of two portions which are joined together by the fuse receptacle. The long portion of the cable is connected by the bayonet connector at the chassis as shown in Fig. 5. The short portion of this cable has a choke condenser connected to it. This unit is mounted on the back of the instrument panel and is grounded by means of its mounting clamp under a convenient screw-head or nut. Clean the contact surfaces before attaching the clamp as this must be a good ground.

When the receiver is top mounted, the battery cable shield should also be grounded to the car body at a point as close to the chassis as possible. Use a small piece of braided shielding for this.

If the battery cable is not long enough, extend the unshielded lead between the choke condenser unit and the ammeter.

in the same manner. Make final adjustment of the cover position and tighten nuts A and B.

Before reassembling the receiver to the cover, refer to the articles, "Attaching the Cables" and "Trying Out the Set and Adjusting."

Side Mounting

In extreme cases it may be necessary to use side mounting as shown in Fig. 1 (C). In most cars the receiver will be mounted on the right side but can also be mounted on the left if it clears the clutch pedal or other car devices.

The cover is secured to the corner post by using two of the D holes (see Fig. 2). Two self tapping screws and lockwashers are provided. Drill two 1/64 inch holes (No. 35 drill). Longer wood screws may be used if the screws supplied with the receiver are not of sufficient length to get a secure hold in the wood.

The mounting stud is secured to the dash as explained in "Instrument Panel Mounting." In this method of mounting it will be necessary to turn the dial scale-90 degrees as explained in the article on adjustments.

Miscellaneous Mounting

Certain other positions may be used for this receiver, depending on the space available and the construction of the car body. Among these may be mentioned: behind the front seat, between the two front seats, and the shelf in back of the seat in a Coupe.

Attaching the Cables

Top Mounting

Five foot antenna and battery cables are supplied. These may be cut to length if they are too long.

Antenna Cable—This cable is connected at the chassis by means of a bayonet connector in the chassis box as shown in Fig. 5. If the car has a built-in antenna, the lead-in is usually brought to a point under the cowl and it will be most convenient to bring the antenna cable from the receiver down to this location to make the connection.

As illustrated in Fig. 1 (A), this cable is secured along the edge of the car roof, and then brought down the corner post. In many cars it can be concealed behind the header or under the trim and may be run down inside of the corner post, if the latter is below.

In Fig. 1 the antenna cable is shown on the left side as it is brought out of this side of the chassis and the antenna lead-in is usually on this side. However, if the latter is on the right side, the antenna cable can be crossed over the top of the chassis and brought down the right corner post.

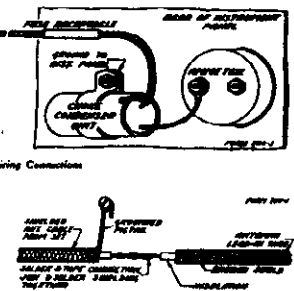


Fig. 6—Extension of Antenna Cable Shield

Instrument Panel Mounting

Antenna Cable—Connect the cable lead to the lead-in from the antenna in the same manner as described for top mounting. Keep this cable as high as possible and as far away from any car wiring as possible. Ground the pigtail of the antenna cable shield at the antenna end.

In some cases the shielded antenna lead from the receiver is not long enough to reach to the column at which the antenna lead-in comes down. Ignition interference may be picked up by the unshielded portion and it may be necessary to extend the shielding of this lead. To do this, cover the lead from the antenna with braided shielding and push this shielding as far up in the corner post at which this lead comes down, as possible. The antenna lead wire should be covered with heavy insulation such as loom to properly separate the shielding from the wire. Connect the two wires together and connect the two shields together, care being taken that no strand of the shield touches the antenna wire—see Fig. 5.

Battery Cable—This lead is connected in the same manner as described for top mounting.

MODELS 26B1, 26B5
Chassis 6B
Schematic, Socket
Parts. Data

WELLS-GARDNER & CO.

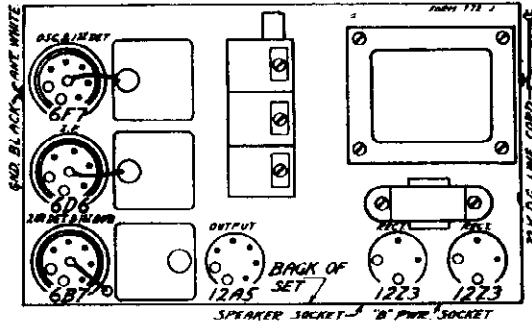


Fig. 2—Arrangement of Tubes

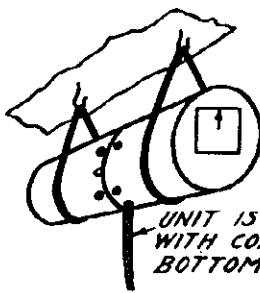
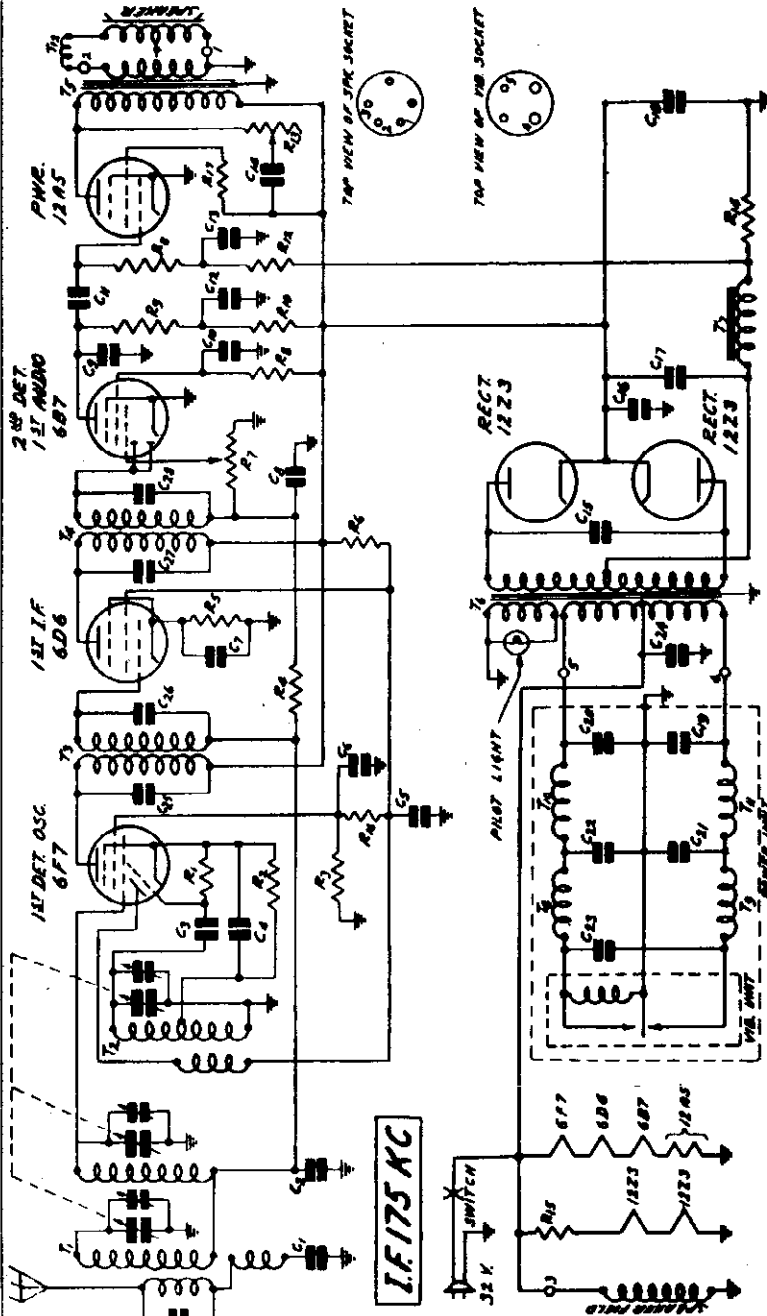
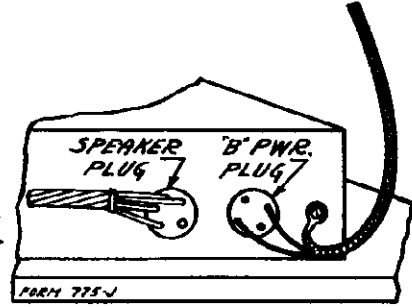


Fig. 3—Method of Installing "B" Power Unit



The numbers on the 2 sockets shown at the right above, correspond with the numbers as shown in the circuit.

Oct, 1934

Fig. 1—Schematic Circuit Diagram

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-80862	C1	.05 Mf.	20V	Tubular
P-80862	C2	.05 Mf.	20V	"
P-81801	C3	35 Mmf.	200V	Wire Capacitor Part of Osc. Assem.
P-80862	C4	.05 Mf.	200V	Tubular
P-80898	C5	.25 Mf.	200V	"
P-81049	C6	.05 Mf.	200V	"
P-81811	C7	.05 Mf.	200V	"
P-81051	C8	100 Mmf.	60V	Wire Capacitor
P-80862	C9	.02 Mf.	200V	Tubular
P-80862	C10	.25 Mf.	200V	"
P-80862	C11	.01 Mf.	200V	"
P-80862	C12	.25 Mf.	200V	"
P-81052	C13	.01 Mf.	140V	"
P-81053	C14	.05 Mf.	400V	"
P-81053	C15	.05 Mf.	160V	"
P-80867	C16	.30 Mf.	400V	"
P-81016	C17	8.0 Mf.	300V	Electrolytic Block
P-80993	C18	8.0 Mf.	300V	"
P-81806	C19	.5 Mf.	140V	Tubular
P-81806	C20	70 Mmf.	140V	Wire Capac. Part of 1st I.F. Assem.
P-81804	C21	45 Mmf.	140V	Wire Capac. Part of 1st I.F. Assem.
P-81808	C22	90 Mmf.	140V	Wire Capac. Part of 2nd I.F. Assem.
P-81810	C23	100 Mmf.	140V	Wire Capac. Part of 2nd I.F. Assem.
P-81812	C24	200 Mmf.	140V	Wire Capac. Part of Ant. Assem.
P-81915	C25	200 Mmf.	140V	Three Gang Condensat.

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-A95104	R1	100,000 Ohm	.2	Carbon
P-A95152	R2	1,500 Ohm	.2	Carbon
P-B94503	R3	30,000 Ohm	.5	Carbon
P-A98705	R4	2 Megohm	.2	Carbon
P-C93702	R5	400 Ohm	.2	Wire Wound
P-98014	R6	7,000 Ohm	1.0	Carbon
P-B94204	R7	500,000 Ohm	5	Volume Control
P-A95303	R8	200,000 Ohm	5	Carbon
P-A95304	R9	60,000 Ohm	.2	Carbon
P-A95304	R10	20,000 Ohm	.2	Carbon
P-A94104	R11	500,000 Ohm	.2	Carbon
P-97011	R12	100,000 Ohm	.2	Carbon
P-98035	R13	150,000 Ohm	2.0	Tone Control
P-98034	R14	450 Ohm	2.0	Wire Wound
P-B95602	R15	25 Ohm	3.0	Wire Wound
P-B95602	R16	6,000 Ohm	.5	Carbon

WELLS-GARDNER & CO.,

MODELS 26B1, 26B5
Chassis 6B
Voltage, Circuit Data
Resistances, Parts

Circuit

This receiver is designed to operate from a power supply source of 32 volts D. C. Six and twelve volt tubes are used. The heaters of these tubes are connected in series across the 32 volt line as shown in Fig. 1. As shown in this illustration, the heaters of the 6F7, 6D6, 6B7 and 12A5 tubes are in one series while the heaters of the two 12Z3 tubes and a 25 ohm resistor are in another series across the 32 volt line. A third connection across the line consists of the speaker field winding. A vibrator unit is used to provide the necessary high voltage which is rectified by the two 12Z3 tubes and then filtered for use in the plate and screen circuits.

A pre-selector stage incorporating two tuned circuits is used. These circuits provide pre-selection of the desired R. F. signal and have a high image rejection ratio. The signal from the pre-selector stage actuates the control grid of the pentode of the 6F7 tube. The latter is a pentode triode tube with the pentode being used as the 1st detector and the triode as an oscillator.

The oscillator circuit is tuned by the cut plate section (section closest to back of chassis) of the gang condenser, and is always resonant at 175 K. C. above the frequency to which the R. F. circuits are tuned. The oscillator potential is fed into the cathode circuit of the 6F7 tube. This results in the intermediate or beat frequency of 175 K. C. being present in the pentode plate circuit of this tube.

One stage of I. F. amplification is employed using a 6D6 tube. Fixed condensers tune the primaries and secondaries of the 1st and 2nd I. F. transformers.

A 6B7 tube is employed as the 2nd detector, A.V.C. tube, and one stage audio amplifier. A.V.C. voltage is applied to the grid circuits of the 1st detector and I. F. tubes. The audio voltage developed across volume control resistor R7 is applied thru the movable arm to the control grid of the pentode section of the 6B7 tube. Resistance coupling is used between the first audio and output stage which employs a 12A5 tube. A dynamic speaker is used.

The receiver uses 1.56 amps. at 32 volts input. The maximum undistorted power output is 1.5 watts, measured with a load impedance of 4000 ohms.

Sensitivity

600 K. C.—25 microvolts absolute.
1500 K. C.—15 microvolts absolute.

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.	Item	Code	D. C. Resistance in Ohms
P-5200	Primaries of Antenna Trans. in Series	T1	Small
	1st Secondary of Antenna Transformer	T1	3.2
	2nd Secondary of Antenna Transformer	T1	2.4
P-5202	Oscillator Plate Coil	T2	2.0
	Oscillator Grid Coil	T2	3.5
P-5221	1st I. F. Transformer Primary	T3	67
	1st I. F. Transformer Secondary	T3	93
P-5203	2nd I. F. Transformer Primary	T4	63
	2nd I. F. Transformer Secondary	T4	63
P-50624	Output Transformer Primary	T5	243
	Output Transformer Secondary and Bucking Coil in Series	T5 & L12	Small
P-50637	"B" Filter Reactor	17	300
P-2147	Speaker Field		97
P-2173	Speaker Voice Coil		Small
P-50626	Power Transformer Primary	T6	3.6
	Center Tap to Inside	T6	4.4
	Center Tap to Outside	T6	
	Power Transformer H. V. Secondary	T6	322
	Center Tap to Inside	T6	350
	Center Tap to Outside	T6	
	Power Transformer Pilot Lamp Sec.	T6	.3
P-2153	Vibrator Unit Magnetizing Coil		1025
	Vibrator Unit Filter Chokes		3.0

VOLTAGES AT SOCKETS

Input 32 Volts—Antenna Shorted to Ground

Type of Tube	Function	Across Filament	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
6F7	1st Det.	6.3	167(1)	90	2.6	7.0(1)
	& Osc.		117(2)		0	2.8(2)
6D6	I. F.	6.3	172	120	3.2	8.2
6B7	2nd Det.	6.3	25	25	7.25	2.0
12A5	Output	12.6	180	180	25	32
12Z3	Rectifier	12.6	225			25

(1) Pentode Section of Tube
(2) Triode Section of Tube

REPAIR PARTS LIST FOR 6 TUBE, 32 VOLT D. C. RECEIVER

When ordering parts be sure and give the part number. Also give the series number which will be found in the License Notice label. If there is a spot of paint on the chassis, give this color.

MISCELLANEOUS

Part No.	ITEM
P-5200	Antenna Transformer Assembly less Can
P-40433	Can for Above Assembly
P-5202	Oscillator Coil and Can Assembly
P-5221	1st I. F. Coil and Can Assembly
P-5203	2nd I. F. Coil and Can Assembly
P-50626	Power Transformer
P-50624A	6B Output Transformer
P-50637	"B" Filter Reactor
P-1885	6D6 Tube Socket
P-1944	6B7 Tube Socket
P-1945	6F7 Tube Socket
P-1946	12A5 Tube Socket
P-2020	12Z3 Tube Socket
P-1637	Speaker Socket
P-2060	Knob, Small
P-2062	Knob, Large
P-10272	Rubber Chassis Cushions
P-40445	Tube Shield
P-40443	Tube Shield Base
P-10320	Glass Crystal
P-20875	Crystal Retainer Ring
P-1421	Single Lug Mtg.
P-2130	Double Insulated Mtg. Lug
P-22912	Large Double End Pointer
P-10337	Celluloid Indicator Disc
P-30342	Grid Cap Only
P-70702	115 Volt Line and Plug Assembly
P-70703	Antenna and Ground Wires
P-2012	Pilot Light Bulbs (6.8 volts)
P-2147	Speaker 6" Mantel
P-2173	Speaker 8" Console
P-10347	Rubber Grommet (Small Gang Con. Mtg.)
P-10296	Rubber Grommet (Large)

"B" POWER UNIT PARTS

P-70770	Shield Cable and Plug
P-40439	Vibrator Shield Can
P-2153	Vibrator Unit
P-5172	R. F. Choke Coils
P-2021	Vibrator Socket
P-10349	Rubber Band (For Mtg. Vib.)
P-20926	Screw Hook (For Mtg. Vib.)
P-81101	C19 .01 Mf. 400V Tubular Condenser
P-81101	C20 .01 Mf. 400V Tubular Condenser
P-80888	C21 .25 Mf. 200V Tubular Condenser
P-80888	C22 .25 Mf. 270V Tubular Condenser
P-81054	C23 .5 Mf. 140V Tubular Condenser

INTERFERENCE ELIMINATION PARTS

Part No.	ITEM
P-91011	Spark Plug Suppressor
P-80933	Dual .5 Mfd. Generator Condenser

MODELS 26B1, 26P5

Alignment, Notes

WELLS-GARDNER & CO.

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 for 1730 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator adjustment is 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.

Now 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.

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.

32 Volt Power Supply

This receiver is designed for use on farms and in those places where the power supply consists of a 32 volt direct current generating plant. The receiver may not be satisfactory on plants which do not use storage batteries.

Line Voltage Range

The receiver will operate satisfactorily within a line voltage range of 27 to 38 volts. If the line voltage runs higher, it will have to be cut down and one method of doing this is to use a series resistor.

Series Resistor

Let us say the line voltage is 40. The receiver uses 1.56 amps. at 32 volts. A resistance of 5.13 ohms, therefore, capable of dissipating 12.5 watts will be required in the receiver line to cut the voltage down to 32. If the line 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.

No Polarity

When inserting the line plug no attention need be paid to polarity.

Servicing Power Unit

Vibrator Unit

The vibrator is mounted inside the "B" power unit. Normally the vibrator will last upward of 1000 hours. However, in the same manner as a tube it may become defective in less time and require replacement.

If the tubes light and by touching the power unit case, no vibration is felt, then the vibrator unit is probably not operating. If the pilot lamp is not lighted this will be a further indication of the same fact.

To replace the vibrator unit in the power supply remove the end of the case on which the label is placed by taking out the four screws which hold the vibrator shield can to the framework. The old vibrator may then be withdrawn and a new unit inserted in the same manner as a tube.

One or more of the vibrator units should be kept on hand for replacement purposes. It is advisable when servicing the receiver, to try one out in the same manner as a new set of tubes would be tried.

Filter Unit

The other side of the power unit case contains the filter unit which is made up of several chokes and condensers as shown in Fig. 1. The purpose of this filter is to prevent high frequency currents from getting out of the power unit case.

Failure in the unit may affect the voltage supply to the power transformer or it may result in radio frequency noise. The chokes and condensers should be tested and replaced, if necessary. A resistance continuity test should be made of the wiring in the unit and to the chassis, using the circuit diagram as a guide.

Hum

If a hum is heard this may be caused by the power unit case touching the speaker frame.

Defective tubes are very often the cause of excessive hum. Try out a complete new set of tubes and note any difference. The hum may be due to external pick-up. Disconnect the antenna and ground and see if the hum disappears.

A faulty power transformer, shorted filter choke, open filter condensers, and defective grid circuits are some of the other causes of excessive hum.

If Microphonic hum or howl is encountered see if the mounting bolts have been loosened or taken out so that the chassis is resting on the rubber cushions. If this does not remedy the condition, try out a new set of tubes.

Eliminating Ignition and Generator Noise

After the receiver 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 suppressor 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.

The generator condenser consists of two .5 mfd. 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 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 only caused when the generating plant is in operation.

Noisy Operation

Noisy operation may be due to a faulty antenna system. The action of the automatic volume control, due to the low pickup, causes the set to operate at its maximum sensitivity, thereby increasing noisy reception due both to external pickup and internal conditions.

The receiver may be partially detuned, causing it to operate at maximum sensitivity. The signal should be very carefully tuned in until it is clearest and strongest.

If the reception is noisy only when the generating plant is in operation, then the noise is due to the latter and several things can be done. There may be loose parts in the generator plant rubbing together. Tighten up all parts and be sure that all parts of the engine are well grounded. Dirty spark plugs may cause noise. Clean and respace the plugs or try out a new set. In some instances it may be necessary to filter the power supply line to the receiver.

If any motor driven devices, such as pumps, are operated from the 32 volt line, the motor may cause noisy reception in the receiver. This can be corrected in most cases by connecting one of the dual .5 mfd. condensers mentioned above across the line at the motor. The common connection to the two condensers which is grounded to the can is grounded externally by mounting the unit on the motor or on a nearby point which is well grounded.

A faulty "B" power unit may cause noisy operation. See Article on "Servicing Power Unit".

WELLS-GARDNER & CO.

MODEL 6C Series Circuit Data, Voltage Alignment

WELLS-GARDNER SERIES 6C

6 Tube, 3 Band Receiver SERVICE MANUAL AND PARTS LIST

Nov. 1944

FORM 6067 (A)

Circuit

Series 6C is a three band receiver with a coverage of 150 to 1600 Kilocycles... The antenna lead from the signal generator is connected to the antenna lead from the receiver through a standard dummy antenna...

The output of this tube is fed into an interstage R.F. transformer... A type 6AV pentagrid converter tube functions as the oscillator and detector... The three oscillator windings are shown to the right of this tube...

A 8P7 duo-diode pentode tube is employed as a

Alignment and Calibration

Correct alignment is extremely important in construction of this receiver... The receiver is shipped from the factory with preliminary alignment and readjustment should not be attempted unless all other possible causes of the fault have first been investigated...

Use a non-metallic screw driver for adjustments... seventeen trimmer potentiometers are used in aligning the R.F. and I.F. circuits as follows: 1. The location of these trimmers is shown in Figs. 1, 2 and 4.

Setting The Pointing

with the condenser plates completely meshed, the pointer should coincide with the last heavy line at this frequency end of the short wave band.

Long Wave Band Adjustment

The antenna lead from the signal generator is connected to the antenna lead from the receiver through a standard dummy antenna. Turn the band switch to the long wave position.

Set the signal generator for a signal of 100 K.C. and tune the tuning condenser rotor back and forth until maximum output is obtained.

Set the signal generator to 500 K.C. and turn the tuning control until the condenser rotor is at the completely open position.

Adjust the oscillator long wave trimmer for maximum output.

Set the signal generator to 300 K.C. and tune in the signal very accurately by turning the tuning control.

Adjust the antenna long wave and interstage long wave trimmers for maximum output.

Check the 145 K.C. padding condenser adjustment. If this has to be readjusted check and readjust again at 300 and 350 K.C. as before.

Standard Wave Band Adjustment

Turn the band switch to the standard wave position. Set the signal generator for a signal of 650 K.C. and tune in the signal very accurately by turning the tuning control.

Adjust the antenna long wave and interstage long wave trimmers for maximum output.

Check the 145 K.C. padding condenser adjustment. If this has to be readjusted check and readjust again at 300 and 350 K.C. as before.

Power Supply

This receiver may be used on a power supply of 40 to 60 volts, 100, 120 or 240 volts.

It is shipped from the factory connected for the voltage as specified on the tag on the power cord of the receiver.

The method of connecting the power transformer for the three voltages as specified is shown in Figure 7.

This receiver covers three bands, the range of each being as follows:

Band Coverage

LONG WAVE 145 to 300 Kilocycles 300 to 700 Kilocycles

STANDARD WAVE 300 to 1500 Kilocycles 350 to 137.4 Meters

SHORT WAVE 2.04 to 16.0 Megacycles 31.4 to 14.7 Meters

Alignment and Calibration (cont.)

Turn the band switch to the short wave position. Set the signal generator to 1000 K.C. and tune in the signal very accurately by turning the tuning control.

Adjust the antenna standard wave and interstage standard wave trimmers for maximum output.

Check the 800 K.C. padding condenser adjustment. If this has to be readjusted check and readjust again at 1500 and 1600 K.C. as before.

Short Wave Band Adjustment

Turn the band switch to the short wave position. Adjust the tuning control until the condenser rotor is at the completely open position.

Set the signal generator to 10.0 megacycles and tune the tuning control until the condenser rotor is at the completely open position.

Adjust the oscillator short wave trimmer for maximum output.

Set the signal generator to 10 megacycles and tune in the signal very accurately by turning the tuning control.

Adjust the antenna and R.F. Short Wave trimmers for maximum output.

Check the 5.0 megacycle padding condenser adjustment. If this has to be readjusted, check and readjust again at 10 megacycles and 15 megacycles as before.

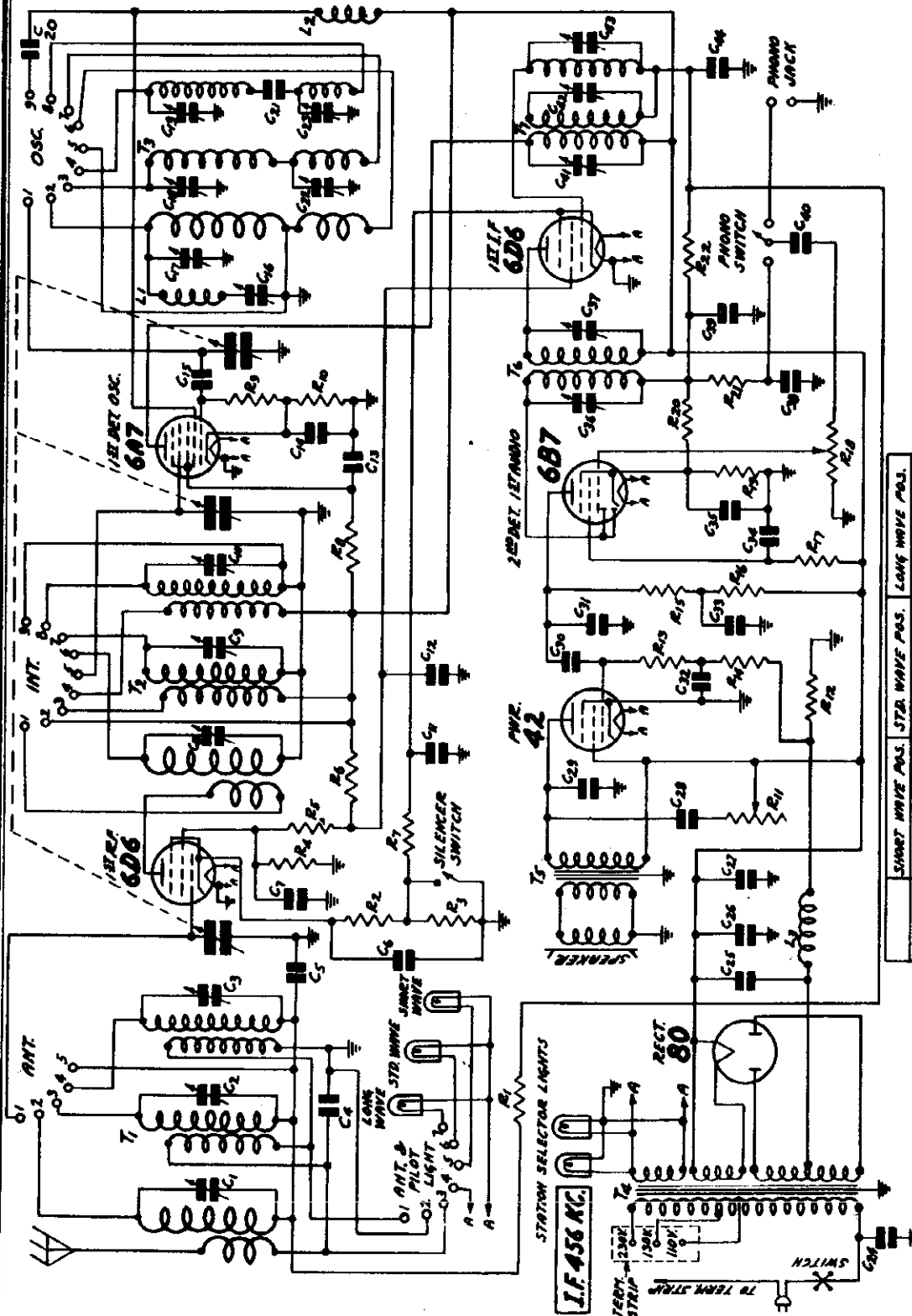
General

Be sure that the adjustments are made in the order given above and be careful not to disturb any of the preceding adjustments.

Table with 5 columns: Type of Tube, Plate to Rotor, Screen Grid to Cathode, Cathode to Grid, Plate to Plate. Rows include 806 R.F., 8A7 1st Det., 806 I.F., 8A7 2nd Det., 8A7 3rd Det., 806 Rectifier, and 11 Plates.

MODEL 6C Series
Schematic

WELLS-GARDNER & CO.,



ARROWS INDICATE CONNECTIONS PRESENT IN SWITCH WHEN IN POSITION SHOWN

ANT. & PILOT LIGHT SECTION	SHORT WAVE POS.	STD. WAVE POS.	LONG WAVE POS.
ANT. SECTION	1 2 3 4 5 ↑ ↑ ↑ ↑ ↑	1 2 3 4 5 6 7 ↑ ↑ ↑ ↑ ↑	1 2 3 4 5 6 7 ↑ ↑ ↑ ↑ ↑
INTERSTAGE SECTION	1 2 3 4 5 6 7 8 ↑ ↑ ↑ ↑ ↑	1 2 3 4 5 6 7 8 ↑ ↑ ↑ ↑ ↑	1 2 3 4 5 6 7 8 ↑ ↑ ↑ ↑ ↑
OSC. SECTION	1 2 3 4 5 6 7 8 ↑ ↑ ↑ ↑ ↑	1 2 3 4 5 6 7 8 ↑ ↑ ↑ ↑ ↑	1 2 3 4 5 6 7 8 ↑ ↑ ↑ ↑ ↑

WELLS-GARDNER & CO.,

MODEL 6C Series Socket, Trimmers Condenser Data, Parts

SERIES 6C Replacement Parts List

MISCELLANEOUS

Table with columns: PART NO., ITEM, CODE, LIST. Lists various components like tube sockets, speaker sockets, and transformers.

RESISTORS

Table with columns: PART NO., CODE, RESISTANCE, TYPE, WATTAGE, LIST. Lists various resistors with their specifications.

RESISTORS - (CONT'D.)

Table with columns: PART NO., CODE, RESISTANCE, TYPE, WATTAGE, LIST. Continuation of resistor list.

CONDENSERS

Table with columns: PART NO., CODE, CAPACITY, VOLTAGE, TYPE, LIST. Lists various capacitors with their specifications.

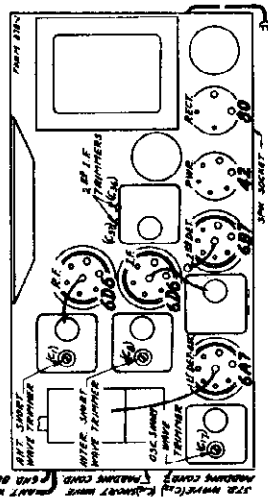


FIG. 1 TUBE ARRANGEMENT AND TRIMMERS AT TOP OF CHASSIS

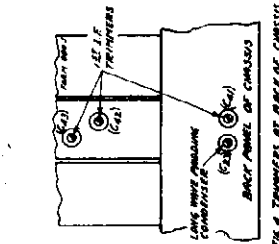


FIG. 2 TRIMMERS AT BACK OF CHASSIS

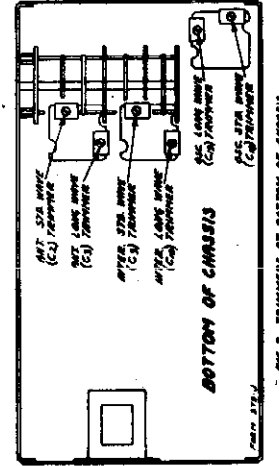


FIG. 3 TRIMMERS AT BOTTOM OF CHASSIS

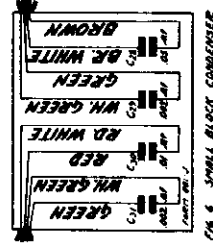


FIG. 4 SMALL BLOCK CONDENSER

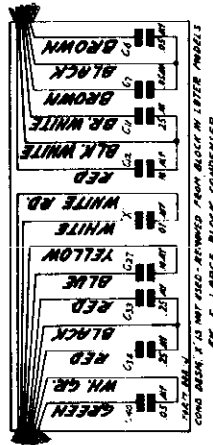


FIG. 5 LARGE BLOCK CONDENSER

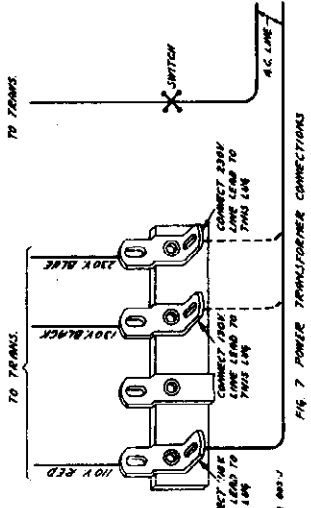


FIG. 7 POWER TRANSFORMER CONNECTIONS

MODELS 27C1, 27C5
Chassis 7C
Schematic, Voltage
Socket, Trimmers

WELLS-GARDNER & CO.,

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-A95104	R1	100,000 Ohm	.2	Carbon
P-A98803	R2	30,000 Ohm	.2	Carbon
P-A95104	R3	100,000 Ohm	.2	Carbon
P-A98602	R4	6,000 Ohm	.2	Carbon
P-B93902	R5	9,000 Ohm	.5	Carbon
P-A95505	R6	5 Megohm	.2	Carbon
P-96012	R7	1 Megohm		Volume Control
P-A95505	R8	5 Megohm	.2	Carbon
P-A94603	R9	60,000 Ohm	.2	Carbon
P-A95104	R10	100,000 Ohm	.2	Carbon
P-A95104	R11	100,000 Ohm	.2	Carbon

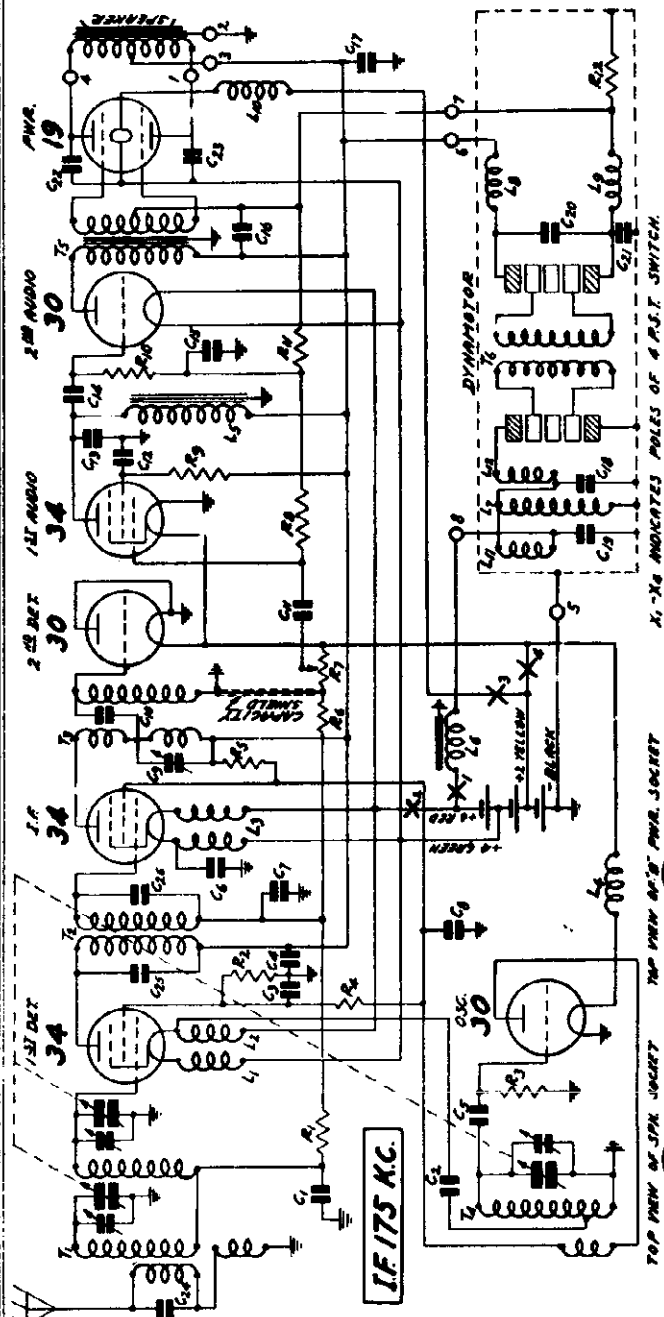


Fig. 1. Schematic Circuit Diagram

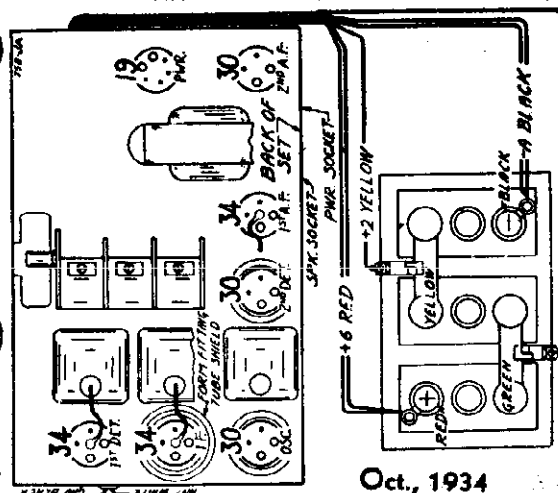


Fig. 2. Location of Tubes and Battery Connections

ANTENNA SHORTED TO GROUND

Type of Tube	Function	Fila-ment Volt.	Plate to Neg. Fila-ment	Screen to Neg. Fila-ment	Grid to Neg. Fila-ment	Normal Plate M. A.
34	1st Detector	2.0	135	55	3.0 av.	1.90
30	Oscillator	2.0	75	70	0.0	3.70
34	I. F.	2.0	135	70	3.0 av.	3.00
30	2nd Detector	2.0	2	2		
34	1st A. F.	2.0	140	65	4.0	2.30
30	2nd A. F.	2.0	135		8.0	3.10
19	Output	2.0	137		6.0	1.00 per plate

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-80862	C1	0.050 Mf.	200V	Tubular
P-80862	C2	0.050 Mf.	200V	Tubular
P-80862	C3	0.050 Mf.	200V	Tubular
P-80864	C4	0.100 Mf.	200V	Tubular
P-81801	C5	35 Mmf.	200V	Tubular
P-80862	C6	0.250 Mf.	200V	Tubular
P-80862	C7	0.050 Mf.	200V	Tubular
P-80988	C8	1.500 Mf.	140V	Tubular
P-1965	C9	70-140 Mmf.		Trimmer
P-81800	C10	50 Mmf.	400V	Cap. Part of 2nd I.F. Coil As.
P-80981	C11	0.010 Mf.	200V	Tubular
P-80988	C12	0.250 Mf.	200V	Tubular
P-80945	C13	500 Mmf.	200V	Moulded
P-80862	C14	0.050 Mf.	200V	Tubular
P-80988	C15	0.250 Mf.	200V	Tubular
P-81014	{C16, C17}	{16.00 Mf., 16.00 Mf.}	200V	Electrolytic Block
P-80914	C22	0.002 Mf.	600V	Tubular
P-80914	C23	0.002 Mf.	600V	Tubular
P-81812	C24	200 Mmf.	Cap. Part of Ant. Assem.	
P-81807	C25	70 Mmf.	Cap. Part of 1st I.F. Coil As.	
P-81805	C26	45 Mmf.	Cap. Part of 1st I.F. Coil As.	

Three Gang Condens-
P-81019

WELLS-GARDNER & CO.

Chassis 7C

Alignment, Resistance

Drive Cord Data

Condenser Alignment

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.

First set the signal generator to a frequency of 175 KC. Connect the antenna lead of the lead 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 KC. 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 KC 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 KC 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.

The use of the cut plate type of condenser eliminates the necessity of a 600 KC padder and no adjustment at this frequency, therefore, is required.

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 Off-On switch 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 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 approxi-

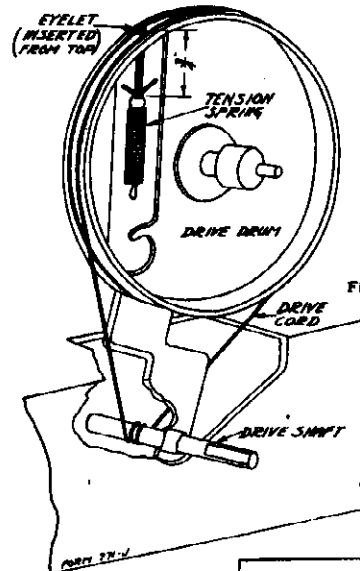


Fig. 4 Drive Cord Replacement.

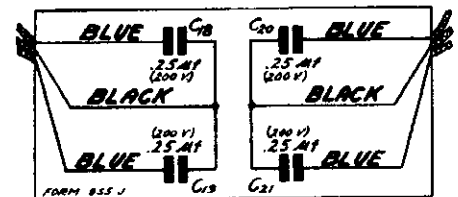


Fig. 3. Four Section Condenser in Power Unit Box

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.	Item	Code	D. C. Resistance in Ohms
P-5200	Double Tuned Antenna Transformer, Primaries in series	T1	20.1
	Double Tuned Antenna Transformer Secondary Preselctor	T1	8.3
	Double Tuned Antenna Transformer Secondary Detector	T1	3.1
P-5160	Oscillator Grid Coil	T4	8.6
	Oscillator Plate Coil	T4	1.6
P-5170	I. F. Coil Primary	T2	89.
	I. F. Coil Secondary	T2	126.
P-5171	I. F. Reactor Coil Plate Winding	T3	99.
	I. F. Reactor Coil Grid Winding	T3	429.
P-5172	Double Filament Reactor Assembly each section	L1, L2	Small
P-5173	Combined Filament Reactor Assembly each section	L3, L4	Small
P-50621	Audio Plate Reactor	L5	4940.
P-50622	Iron Core Isolating Reactor	L6	Small
P-5222	Filament Reactor	L10	Small
P-50625	Audio Transformer Primary	T5	1066.
	Audio Transformer Secondary (center tap to inside)	T5	614.
	Audio Transformer Secondary (center tap to outside)	T5	666.
P-2010	6" Magnetic Speaker (center tap to inside)		260.
	6" Magnetic Speaker (center tap to outside)		300.

WELLS-GARDNER & CO.

MODELS 37G508, 37G566
Chassis 7GM
Schematic, Trimmers
Parts

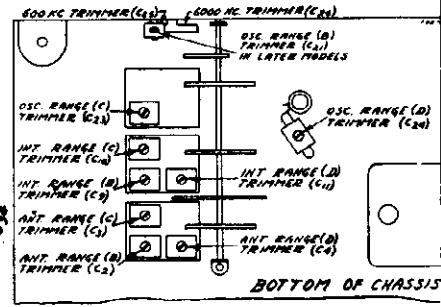
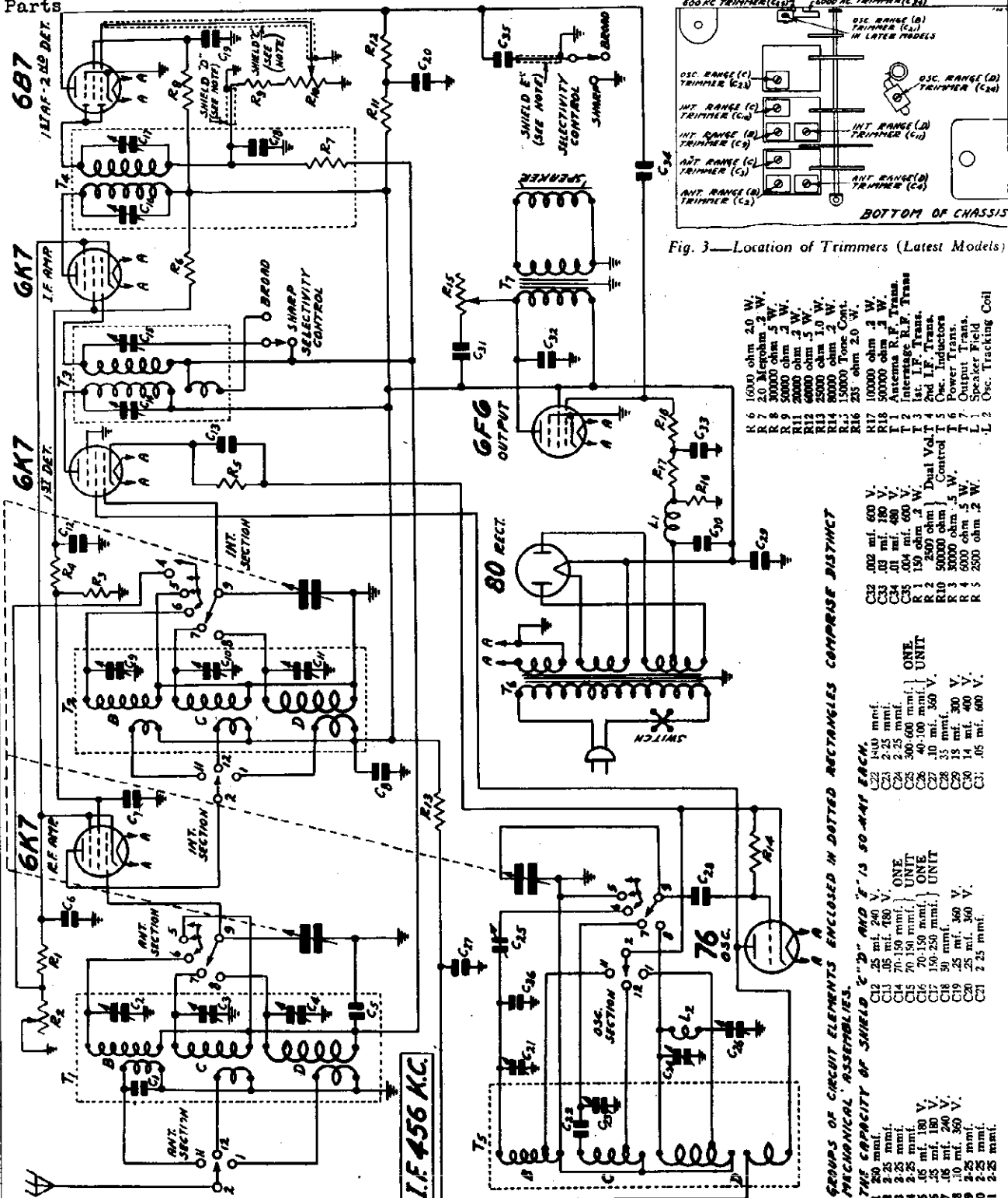


Fig. 3—Location of Trimmers (Latest Models)

- 6 16000 ohm 2.0 W.
- R 7 2.0 Megohm 2 W.
- R 8 30000 ohm .5 W.
- R 9 50000 ohm .5 W.
- R 10 20000 ohm .5 W.
- R 11 20000 ohm .5 W.
- R 12 60000 ohm .5 W.
- R 13 60000 ohm .5 W.
- R 14 20000 ohm .5 W.
- R 15 150000 ohm .5 W.
- R 16 237 ohm 2.0 W.
- R 17 10000 ohm .5 W.
- R 18 10000 ohm .5 W.
- T 1 Antenna R.F. Trans.
- T 2 I.F. Trans.
- T 3 I.F. Trans.
- T 4 2nd I.F. Trans.
- 1 10000 ohm .5 W. Power Trans.
- 2 50000 ohm .5 W. Power Trans.
- 3 6000 ohm .5 W. Output Trans.
- 4 6000 ohm .5 W. Output Trans.
- 5 2500 ohm .5 W. Speaker Field
- 6 Osc. Tracking Coil

- GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
- THE CAPACITY OF SHIELD "D" AND "E" IS 50 MMF EACH.
- C 1 250 mmf.
 - C 2 2.25 mmf.
 - C 3 2.25 mmf.
 - C 4 2.25 mmf.
 - C 5 300-600 mmf. ONE UNIT
 - C 6 70-150 mmf. ONE UNIT
 - C 7 70-150 mmf. ONE UNIT
 - C 8 50 mmf. ONE UNIT
 - C 9 150-250 mmf. ONE UNIT
 - C 10 50 mmf. ONE UNIT
 - C 11 25 mmf. ONE UNIT
 - C 12 25 mmf.
 - C 13 25 mmf.
 - C 14 25 mmf.
 - C 15 25 mmf.
 - C 16 25 mmf.
 - C 17 25 mmf.
 - C 18 25 mmf.
 - C 19 25 mmf.
 - C 20 25 mmf.
 - C 21 25 mmf.
 - C 22 25 mmf.
 - C 23 25 mmf.
 - C 24 25 mmf.
 - C 25 25 mmf.
 - C 26 25 mmf.
 - C 27 25 mmf.
 - C 28 25 mmf.
 - C 29 25 mmf.
 - C 30 25 mmf.
 - C 31 25 mmf.
 - C 32 25 mmf.
 - C 33 25 mmf.

ARROWS INDICATE CONNECTIONS IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1 STANDARD WAVE (B)	POSITION 2 SHORT WAVE (C)	POSITION 3 SHORT WAVE (D)
ANT. & OSC. SECTION	5 6 7 8 9 11 12 12	5 6 7 8 9 11 12 12	5 6 7 8 9 11 12 12
INT. SECTION	4 5 6 7 8 9 11 12 12	4 5 6 7 8 9 11 12 12	4 5 6 7 8 9 11 12 12

CONTACT LOCATIONS 3, 4 AND 10 IN ANT. AND OSC. SECTIONS AND 3 AND 10 IN INT. SECTION ARE BLANK.

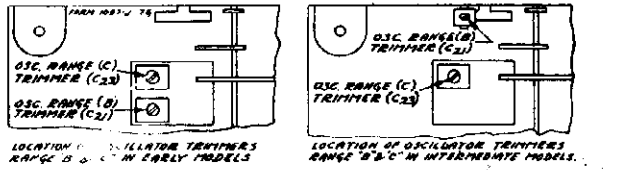


Fig. 4—Oscillator Trimmer Location

WELLS-GARDNER & CO.

MODELS 37G508, 37G566
 Chassis 7GM
 Voltage, Trimmers
 Coil Data, Changes

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 5. In contact locations not used, the number applying to that particular location is not employed.

Changes in Early Models

In the early models of this receiver, the antenna transformer (T1) had two Range B Primary windings as shown in Fig. 8.

The oscillator Range B and C trimmer locations varied in the early and intermediate models of this receiver as shown in Figs. 3 and 4.

Referring to Fig. 2, in the early models of this receiver, contact No. 4 in the interstage section of the band selector was not used. The purpose of this contact arrangement is to short out variable resistor R2 in the second short wave position. In these models the relative positions of resistors R1 and R2 were reversed. The common connection from the suppressor grid and cathodes of the R. F. and I. F. amplifier tubes was connected to the control arm of variable resistor R2. The latter was connected to resistor R1 which was grounded at the other end. The by-pass condenser C6 remains connected as before, to the cathode and suppressor grid connection.

The type 6K7 and 6F6 metal tubes replace the types 6D6 and 42 glass tubes respectively which were used in the early models.

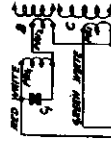


Fig. 8—Antenna Transformer in Early Models

Phonograph Connections

Replace the angle lug insulated terminal strip (located on the rear panel, directly in back of the band selector switch) with (P-4A39) double lug insulated terminal strip with ground lug. Be sure to solder back to this new terminal strip any leads that were connected to the other terminal strip.

The connections are made by opening the diode return circuit at the volume control. Unsolder the 50,000 ohm resistor R9 (covered with saturated steeling in early models) from the lug at the volume control and from the shielded lead which runs from the I. F. transformer. Cut this shielded lead to length and connect to the open lug on the new terminal strip. Connect one side of the 50,000 ohm resistor R9 to the same lug and the other side to the phono switch—see Fig. 9. Ground the shield to the ground lug of the terminal strip.

The extra shielded lead which is provided should be inserted into a piece of saturated sleeving.

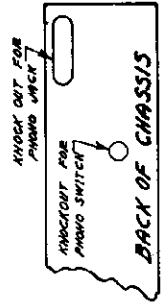


Fig. 10—Location of Phono Knockouts

Servicing R. F. Coil Assemblies

The R. F. transformers and oscillator 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. 5.

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 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 transformer with special power ratings are also available for this model.

Phonograph connections can be made as shown in Fig. 9. 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. 10.

For mounting the 12 mfd. 25 volt dry electrolytic condenser, two No. 27 drill holes should be drilled in the side of the chassis directly below the wet electrolytic condensers. These holes are 1 1/2" from the bottom 3/8" and 3 3/4" from the front of chassis. The ground lug which extends out from the side of the chassis should be bent back into the chassis wall.

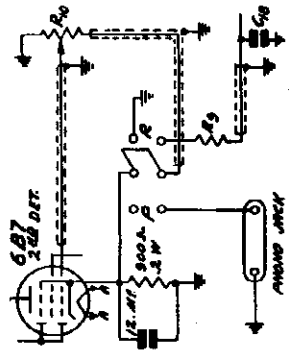


Fig. 9—Phonograph Connections

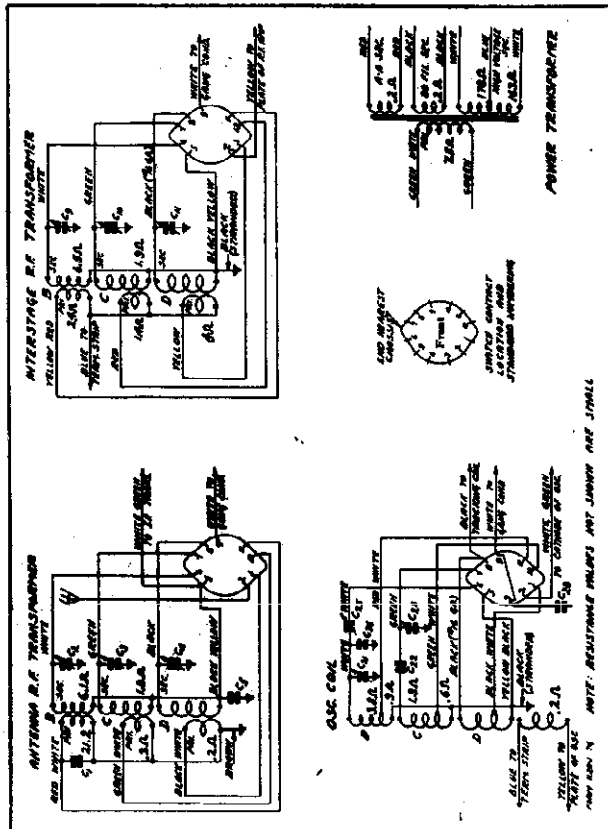


Fig. 5—Color Coding of Coil Wire and D. C. Resistance List in this Manual (Also see complete D. C. Resistance List in this Manual)

VOLTAGES AT SOCKETS
 Line Voltage, 115 - Volume Control at Maximum
 Antenna Shorted to Ground

Type Tube	Function	Heater Filament	Plate to Ground	Screen to Ground	Control to Ground	Max. A. per plate
6K7 (6D6)	R. F.	6.1	230	95	3.0	6.4
6K7 (6D6)	1st Det.	6.1	230	100	9.0	3.2
76	Osc.	6.1	100			5.2
6D (6D6)	I. F.	6.1	230	120	3.0	9
6B7 (6B6)	2nd Det.	6.1	55(0)	40		2.3
6B7 (6B6)	Power	6.1	215	200	17(0)	30.0
(40)	Rectifier	4.7				34

(1) As read with 50,000 ohm meter
 (2) As read across R16

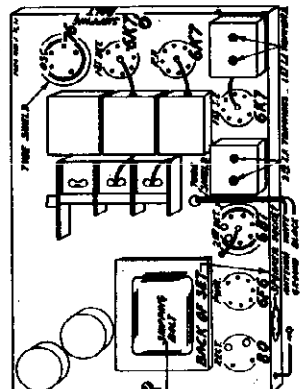


Fig. 6—Location of Tubes

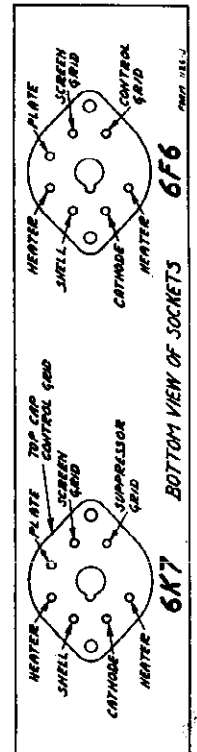


Fig. 7—Metal Tubes—Bottom View of Sockets

MODELS 37G508, 37G566 Chassis 7GM Resistance Data Parts List, Data

WELLS-GARDNER & CO.

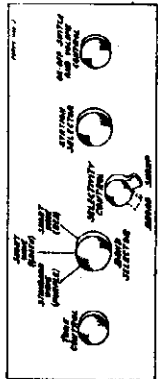


Fig. 1—Arrangement of Controls



Fig. 8—Antenna Transformer in Early Models

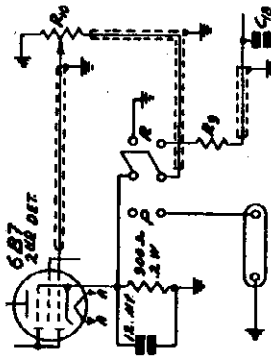


Fig. 9—Photograph Connections

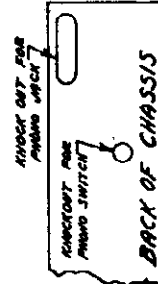


Fig. 10—Location of Phono Knockouts

PHONO ATTACHMENT PARTS

Table with columns: New Part No., Description, List Price. Includes items like Phono Switch (Double Pole Double Throw), Phono Jack, etc.

General Service Data D. C. Resistance of Windings Refer to Fig. 5.

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Table with columns: Part No., Item, D.C. Resistance. Lists various transformer windings and their resistances.

Series 7GM—Replacement Parts

NOTICE—A change has been made in our parts numbering system. Old parts which are used in new receivers will have a new number assigned to them. For your convenience we are listing below the new part number and the corresponding old part number, should there be one. Order by new part number 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 series number and this large letter.

MISCELLANEOUS

Table with columns: Old Part No., Description, List Price. Lists various miscellaneous components like sockets, tubes, and mechanical parts.

TRANSFORMERS AND COILS

Table with columns: Part No., Description, List Price. Lists various transformers and coils used in the receiver.

CONDENSERS

Table with columns: Part No., Description, List Price. Lists various capacitors and condenser components.

DIAL AND DRIVE ASSEMBLY

Table with columns: Part No., Description, List Price. Lists various parts for the dial and drive assembly, including springs, gears, and bearings.

RESISTORS

Table with columns: Part No., Resistance Value, Type, List Price. Lists various resistors used in the circuit.

WELLS-GARDNER & CO.

MODELS 37G508, 37G566
Chassis 7GM
Circuit Data, Alignment

Circuit

This model is a three band receiver with a tuning range in each band as shown in the specifications above. Three band coverage is accomplished by means of three sets of R. F. and oscillator coils and a three section triple throw switch.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R. F. transformer assemblies and T3 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 three sections of the band switch are designated in the schematic as the antenna, interstage and oscillator sections.

The band switch completes connections to the coils in use. It also short circuits the R. F. transformer secondary and oscillator coil of lower frequency not in use.

The antenna transformer with tuned secondary feeds into a type 6K7 R. F. amplifier tube. The output of this tube is fed through the interstage R. F. transformer with tuned secondary into another 6K7 tube which functions as the 1st detector.

A separate type 76 tube is employed in the oscillator circuit. Referring to the oscillator assembly T4, Fig. 2, B, C and D refer to the standard wave, 1st short wave and 2nd short wave oscillator coils respectively. The oscillating circuit is always resonant at 476 KC above the frequency to which the R. F. amplifier is tuned.

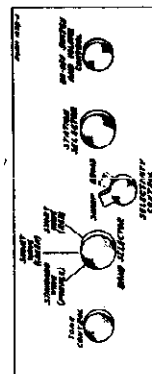


Fig. 1—Arrangement of Controls

The oscillator potential is fed into the cathode circuit of the 6K7 first detector tube. This results in the intermediate or beat frequency of 476 KC being 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.

Selectivity Control—Referring to the 1st I. F. transformer T3 in Fig. 2, it will be noted that there is a coupling winding shown in the illustration below the primary. Refer also to the by-pass arrangement in the pentode plate circuit of the 6B7.

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. High audio frequencies are by-passed to ground through condenser C35.

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.

In order to allow passage of the higher audio frequencies in the broad position, the capacity of the by-pass condenser to ground is greatly reduced (C35 and the capacity of shield E in series).

Dual Volume Control—A dual manual volume control is employed. In one section the audio voltage applied to the 1st audio section of the 6B7 tube is varied (R10). In the other section the R. F. and I. F. bias is varied (R2). The purpose of the latter section is to reduce the sensitivity of the receiver at low volume settings in order to cut down noise pick-up between stations. The variable section R2 is shorted out through contact No. 4 of the interstage section of the band selector when in the 2nd short wave position.

A type 6B7 duo diode pentode 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 R. F. 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 6B7 tube. Resistance coupling is used between the first audio stage and the output stage which employs a type 6F6 output pentode tube. A type 80 full wave rectifier tube is used in the power unit.

Alignment and Calibration

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 476 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—purple dial color). Turn the selectivity switch 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 leveling-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.

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.

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 (C21) until maximum output is obtained. The location of this trimmer is shown in Figs. 3 and 4.

1500 KC Adjustment

Set the signal generator for 1500 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

There is a lever arm in front of the large gear on the tuning condenser shaft, by means of which the position of the station pointer may be adjusted. Set the station pointer at the 1500 KC mark on the dial scale by adjusting this lever arm.

Adjust the interstage Range B trimmer (C9) and antenna Range B trimmer (C2) to maximum.

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

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—green dial color). Adjust the oscillator Range C trimmer (C23) until maximum output is obtained. See Figs. 3 and 4 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 (C5) to maximum. Do not change the setting of the oscillator Range C 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—red dial color). Adjust the oscillator Range D trimmer (C24) 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 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.

Then go back and repeat the procedure as given for the 18,000 KC adjustment. If it is found necessary to make any appreciable change in the setting 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.

Tuning Frequency Range

B Range 535 to 1730 KC
C Range 1715 to 5800 KC
D Range 5750 to 18300 KC

Sensitivity

B Range Average 0.5 Microvolts Absolute
C Range Average 1.0 Microvolts Absolute
D Range Average 2.0 Microvolts Absolute

Power Consumption . 68 Watts (At 115 volts 60 cycles)

Power Output 3 Watts Undistorted

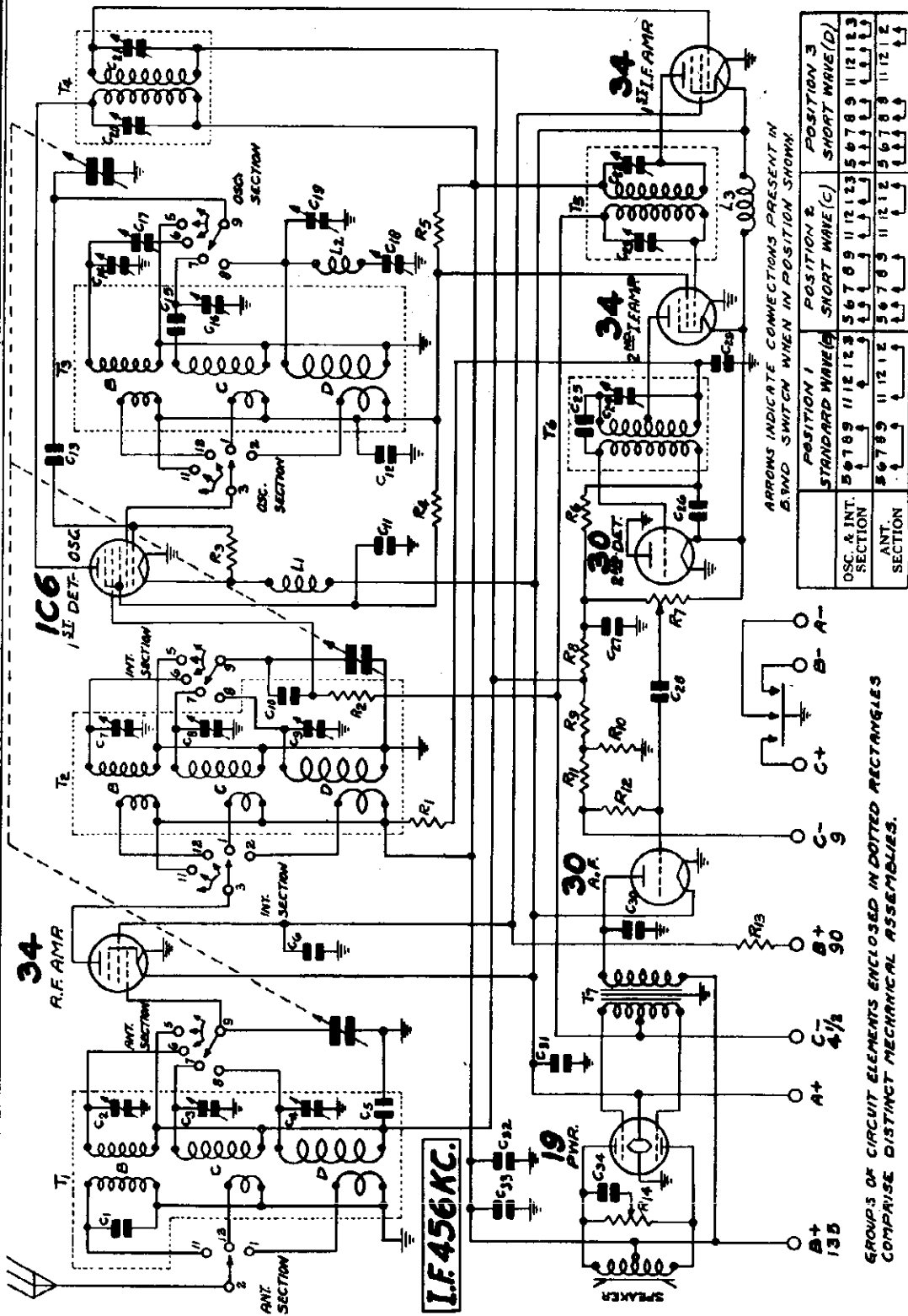
Selectivity . 88 KC Broad at 1000 times Signal (Sharp)

Intermediate Frequency 6" and 8" Dynamic

Speaker 6" and 8" Dynamic

MODELS 37H508, 37H566
Chassis 7H
Schematic

WELLS-GARDNER & CO.



ARROWS INDICATE CONNECTIONS PRESENT IN B AND SWITCH WHEN IN POSITION SHOWN

	POSITION 1	POSITION 2	POSITION 3
OSC. & INT. SECTION	STANDARD WAVE (A)	SHORT WAVE (C)	SHORT WAVE (D)
ANT. SECTION	5 6 7 8 9	11 12 1 2 3	5 6 7 8 9
	1 1 1 1 1	1 1 1 1 1	1 1 1 1 1
	5 6 7 8 9	11 12 1 2 3	5 6 7 8 9
	1 1 1 1 1	1 1 1 1 1	1 1 1 1 1

Contact Locations 4 and 18 in Osc. & Int. Sections and 3, 4 and 18 in Ant. Section are Blank.

- T 3 Osc. Inductors
- T 4 1st. I.F. Trans.
- T 5 2nd. I.F. Trans.
- T 6 3rd. I.F. Trans.
- T 7 Push-Pull Input Trans.
- L 1 Single Filament Reactor
- L 2 Osc. Tracking Coil
- L 3 Single Filament Reactor
- R 8 3.0 Megohm .2 W.
- R 9 1.0 Megohm .2 W.
- R 10 2.000 Ohm .2 W.
- R 11 7.000 Ohm .2 W.
- R 12 3.0 Megohm .2 W.
- R 13 30.000 Ohm .2 W.
- R 14 150.000 Ohm Tone Control
- T 1 Antenna R.F. Trans.
- T 2 Interstage R.F. Trans.
- C 33 20.0 mf. 150 V. Electrolytic
- C 34 .05 mf. 240 V.
- R 1 1.000 Ohm .2 W.
- R 2 1.0 Megohm .2 W.
- R 3 100.000 Ohm .2 W.
- R 4 5.000 Ohm .2 W.
- R 5 60.000 Ohm .2 W.
- R 7 1.0 Megohm Vol. Cont.
- C 22 70-150 mmf.
- C 23 70-150 mmf.
- C 24 40-100 mmf.
- C 25 50 mmf.
- C 26 100 mmf.
- C 27 50 mmf.
- C 28 .002 mf. 600 V.
- C 29 .05 mf. 180 V.
- C 30 250 mmf.
- C 31 25 mf. 180 V.
- C 32 25 mf. 180 V.
- C 11 .05 mf. 180 V.
- C 12 .25 mf. 180 V.
- C 13 35 mmf.
- C 14 2-25 mmf.
- C 15 1.400 mmf.
- C 16 2-25 mmf.
- C 17 90-600 mmf.
- C 18 2-25 mf. 180 V.
- C 19 2-25 mf. 180 V.
- C 20 70-150 mmf.
- C 21 70-150 mmf.
- 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 .25 mf. 180 V.
- C 7 2-25 mmf.
- C 8 2-25 mmf.
- C 9 2-25 mmf.
- C 10 35 mmf.

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

WELLS-GARDNER & CO.

MODEL S 37H508, 37H566
 Chassis 7H
 Voltage, Socket,
 Trimmers, Coil Data

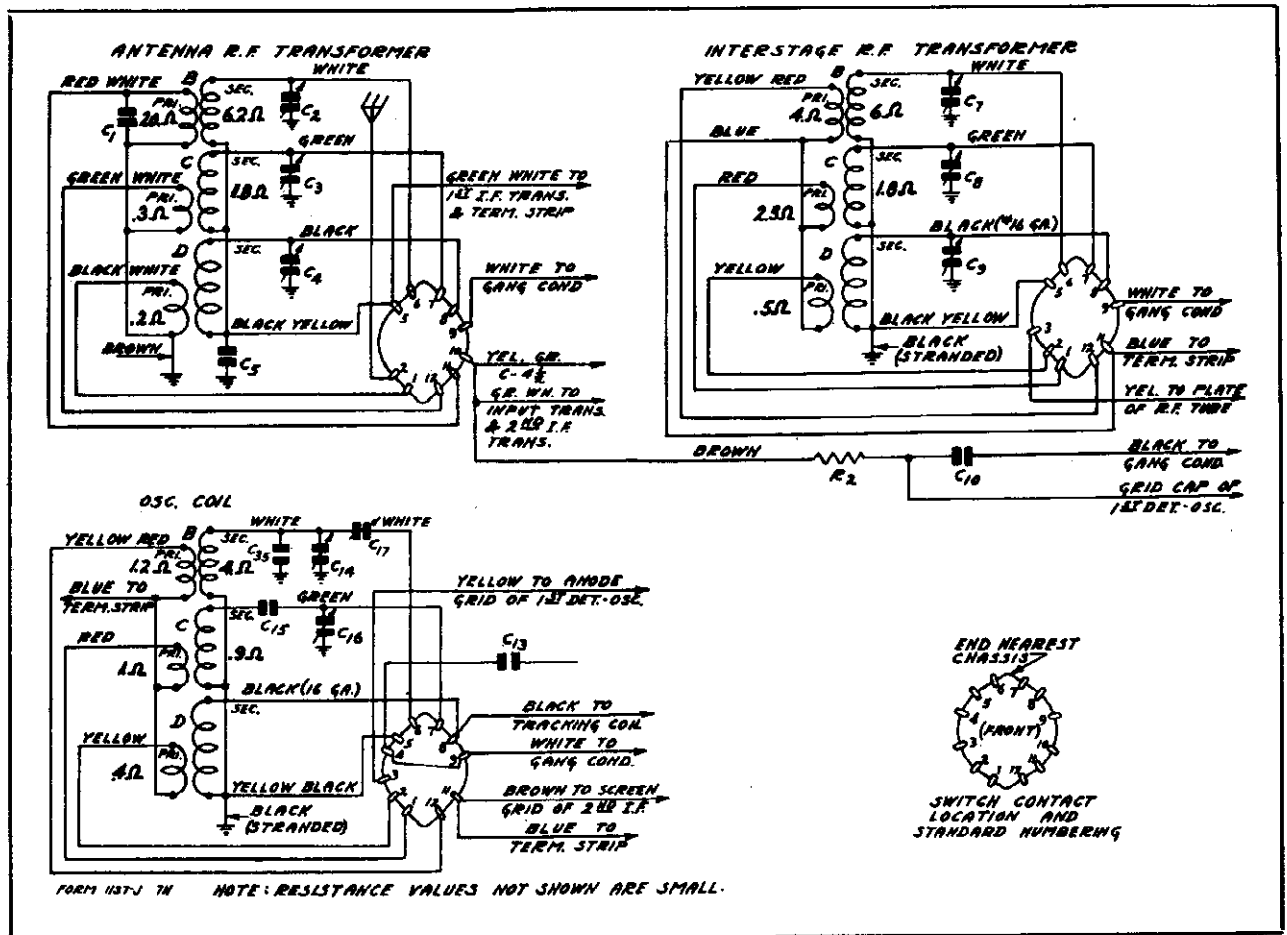


Fig. 11—Color Coding of Coil Wires and D. C. Resistance of Windings (Also See Complete D. C. Resistance List Below)

VOLTAGES AT SOCKETS
 Batteries up to Rated Voltages Ant. Shorted to Ground
 Voltages Read from Negative Fil. Terminal
 Volume Control at Maximum

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Control Grid to Ground	Normal Plate M. A.
34	R. F. Amp.	2.0	135	45		1.8
1C6	1st Detector Oscillator	2.0	135 75(Ω)	65		2.6 1.8(Ω)
34	1st I. F. Amp.	2.0	135	45		1.8
34	2nd I. F. Amp.	2.0	133	75	4.5	2.25
30	2nd Detector	2.0				
30	A. F. Amp.	2.0	135			3.0
19	Power Amp.	2.0	135 ¹		4.5	1.0 (Per Plate)

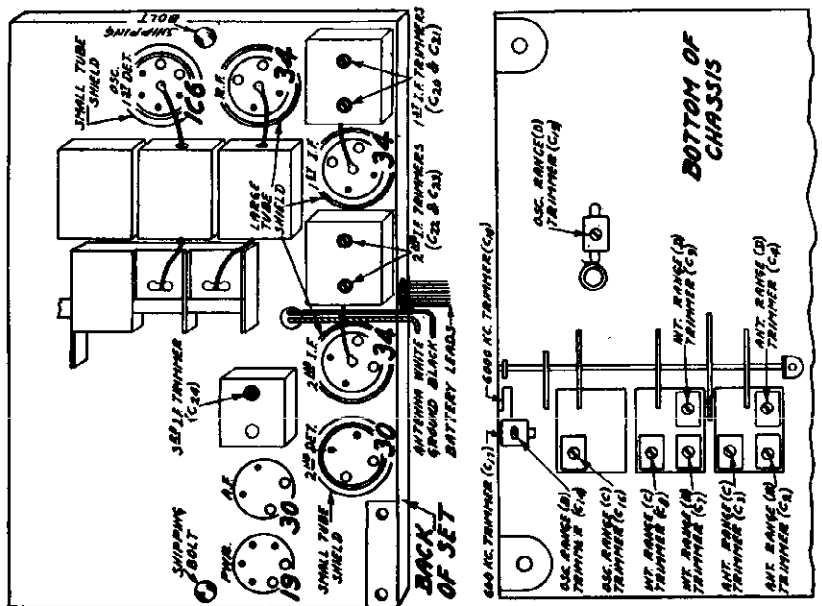


Fig. 9—Arrangement of Trimmers

MODELS 37H508, 37H566
 Chassis 7H
 Drive Cord Data,
 Resistances

WELLS-GARDNER & CO.
Replacing Drive Cord

Take off the station pointer by removing the screw at the center of the dial.

Loosen the two set screws in the collar on the band selector 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 drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 12.

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. 12. 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.

Wrap the cord in a counter clockwise direction (facing front of chassis) around the drive drum approximately one and one half 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 it two and one half times around this shaft as shown in Fig. 12, progressing toward the back of chassis.

Wrap the cord on directly under the drive drum above.

Then bring this cord up to the drive drum until it is up to the hole in the drive drum as shown in the illustration.

Now insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension

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-9A416	Antenna R. F. Transformer	T1	
	Range B Primary Winding		20.0
	Range C Primary Winding		0.3
	Range D Primary Winding		0.2
	Range B Secondary Winding		6.2
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
P-9A392	Interstage R. F. Transformer	T2	
	Range B Primary Winding		4.0
	Range C Primary Winding		2.5
	Range D Primary Winding		0.5
	Range B Secondary Winding		6.0
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
P-9A393	Oscillator Coils	T3	
	Range B Plate Coil		1.2
	Range C Plate Coil		1.0
	Range D Plate Coil		0.4
	Range B Grid Coil		4.0
	Range C Grid Coil		0.9
	Range D Grid Coil		Small

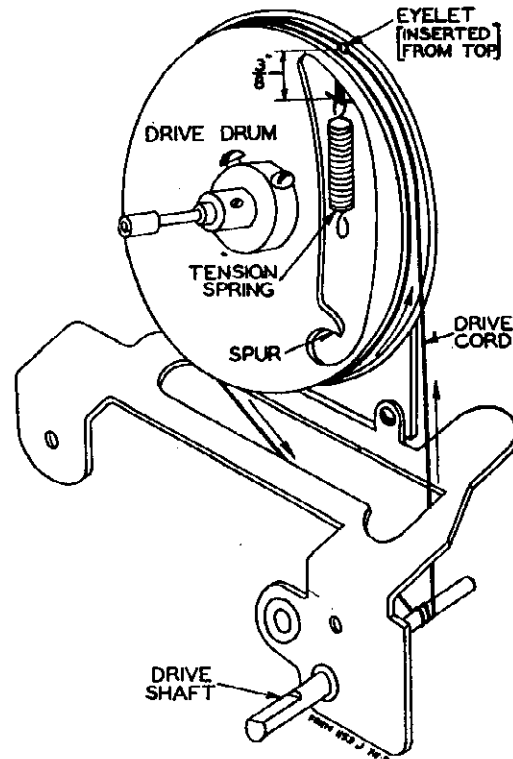


Fig. 12—Drive Cord Replacement

spring. The end of the spring when hanging free should be approximately 3/8" from the flange of the drum as shown in Fig. 12. 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.

Turn the drive shaft back and forth several times.

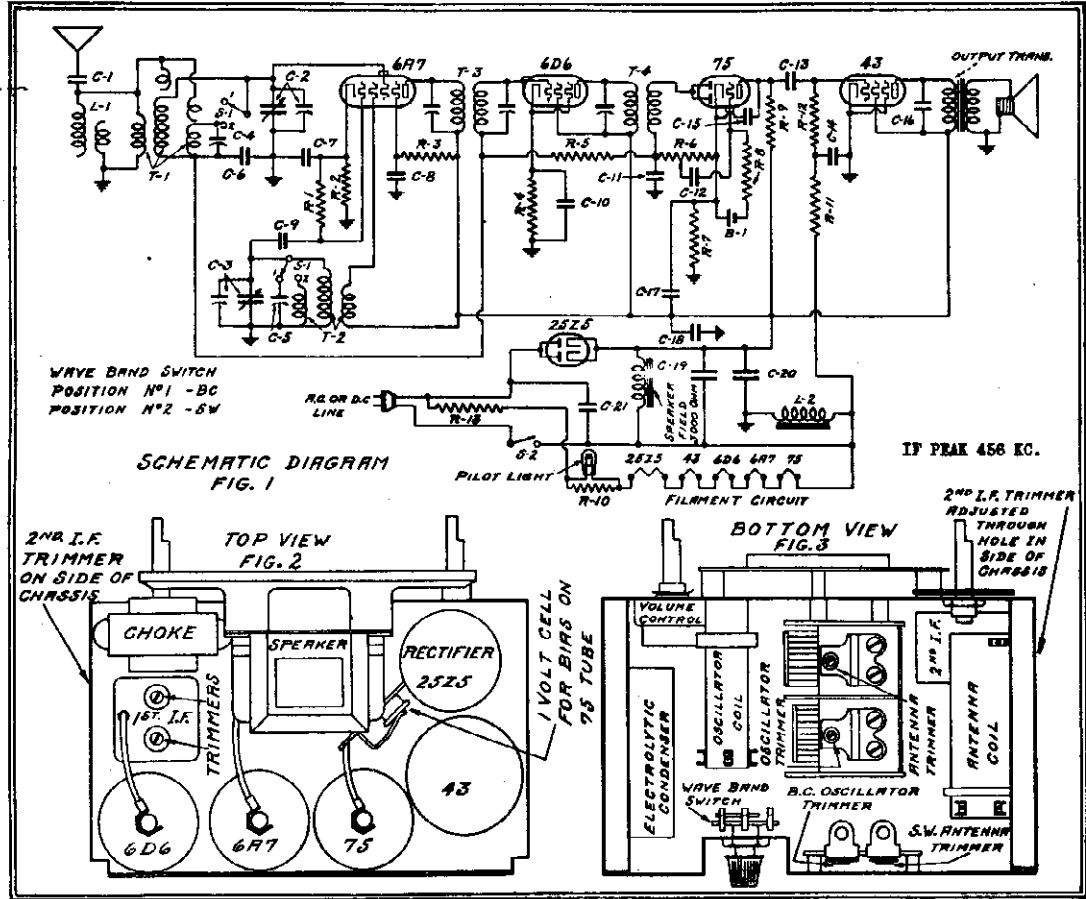
Replace the drive assembly and pointer.

Replace the chassis in the cabinet.

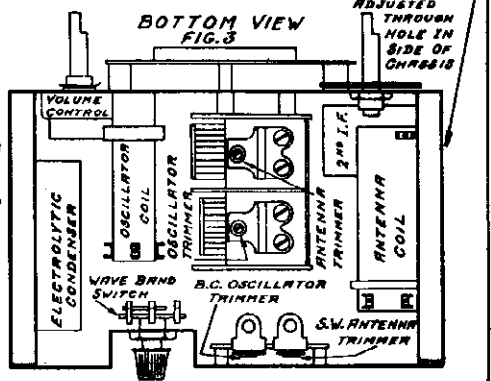
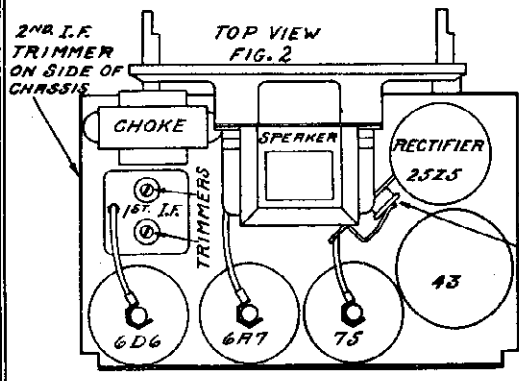
Part No.	Winding	Code	D. C. Resistance in Ohms
P-9A394	1st I. F. Transformer	T4	
	Primary Winding		11.4
	Secondary Winding		11.4
P-9A395	2nd I. F. Transformer	T5	
	Primary Winding		11.4
	Secondary Winding		11.4
P-9A396	3rd I. F. Transformer	T6	
	Primary Winding		
	Tap to B+		8.0
	Tap to Variable Trimmer		8.2
	Secondary Winding		126.0
P-50X11	Audio Input Transformer	T7	
	Primary Winding		1005.0
	Secondary Winding		
	Center Tap to Inside		580.0
	Center Tap to Outside		630.0
*P-12A218	Magnetic Speaker		
	Speaker Coil		
	Center Tap to Inside		273.0
	Center Tap to Outside		300.0
P-9A281	Single Filament Reactor	L1	1.2
P-9A391	High Frequency Oscillator Tracking Coil	L2	0.7
P-9A281	Single Filament Reactor	L3	1.2

WESTINGHOUSE ELEC. & MFG. CO.

MODEL WR-100
Schematic, Socket
Trimmers, Parts



SCHEMATIC DIAGRAM
FIG. 1



REPLACEMENT PARTS

Part No.	DESCRIPTION	PRICE
ZZT-106	Filter choke—500 ohms	.40
EDT-109	Two-band antenna coil with 455 kc wave trap	.75
EDT-200	Two-band oscillator coil	.50
EDT-201	455 kc transformer	.50
EDT-202A	455 kc second I.F. transformer	.50
EDT-202B	50,000 ohm 1/4 watt carbon resistor	.35
CCR-140	500 ohm 1/2 watt wire-wound resistor	.35
ZZR-146	50,000 ohm 1/2 watt carbon resistor	.35
AAE-119	500 ohm 1/2 watt wire-wound resistor	.35
KE-97	1 megohm 1/4 watt carbon resistor	.35
EDR-169	Volume control with line switch—0.5 megohm	.40
FR-79	1,000 ohm 1/4 watt carbon resistor	.14
KE-35	0.5 megohm 1/4 watt carbon resistor	.16
EDR-200	25 ohm wire-wound metal clad resistor	.16
EDW-43	145 ohm, 15 watt resistor wire in line cord	.60
IC-47A	0.0005 mf mica condenser	.16
ZDC-292	Two gang variable condenser	2.50
ZDC-212	Dual trimmer on bakelite strip, 3 to 80 mmf.—each trimmer	.15
AC-4	0.1 mf, 200 volt tubular condenser	.16
BC-12	0.05 mf, 250 volt tubular condenser	.16
EC-94A	0.0001 mf mica condenser	.16
CCC-177	0.01 mf, 200 volt tubular condenser	.16
AC-7A	0.00025 mf mica condenser	.16
EC-34	0.004 mf, 500 volt tubular condenser	.16
EC-19	0.5 mf, 200 volt tubular condenser	.28
BC-18	0.25 mf, 200 volt tubular condenser	.35
ZDC-208	Multiple 8 and 16 mf electrolytic filter condenser—C13—16 mf, 150 volts.	1.80
XXZ-218	Bias cell, one volt	.28
ZDS-102A	Wave-band switch	.28
KE-80B	5" dynamic speaker	2.50
EL-4	Pilot light, 6.5 volt, .15 amp.	.50
ZDW-28	Line cord with built-in resistor wire (R-13)	.40
ZDD-21A	Dial Assembly consists of:	
ZDD-21B	Dial scale and bracket	.50
ZDD-21C	Pyralin drive disc	.35
ZDD-21D	Vernier friction drive	.35
ZDD-21E	Dial crystal	.10
ZDD-21F	Dial pointer	.05

Readings should be taken with a 1,000 ohm-per-centimeter meter. Voltages listed below are from points indicated to ground. Line voltage for these readings was 117 volts, 60 cycles, a.c.

Plate	Screen	Control	On. Plate	FIL
6A7	105	105	105	6
6D6	125	125	125	6
75	45	0	0	6
43	100	0	0	24

Voltage across speaker field (25Z5 cathode to line switch)—125 volts.
Voltage across choke (class to line switch)—90 volts.

MODEL WR-101
Schematic, Changes
Parts

WESTINGHOUSE ELEC. SUPPLY CO.

Production Changes

In early production runs C3 was a 0.03 mf, 200 v. condenser. Later it was changed to a 0.1 mf, 200 v. condenser and subsequently removed entirely from the circuit.

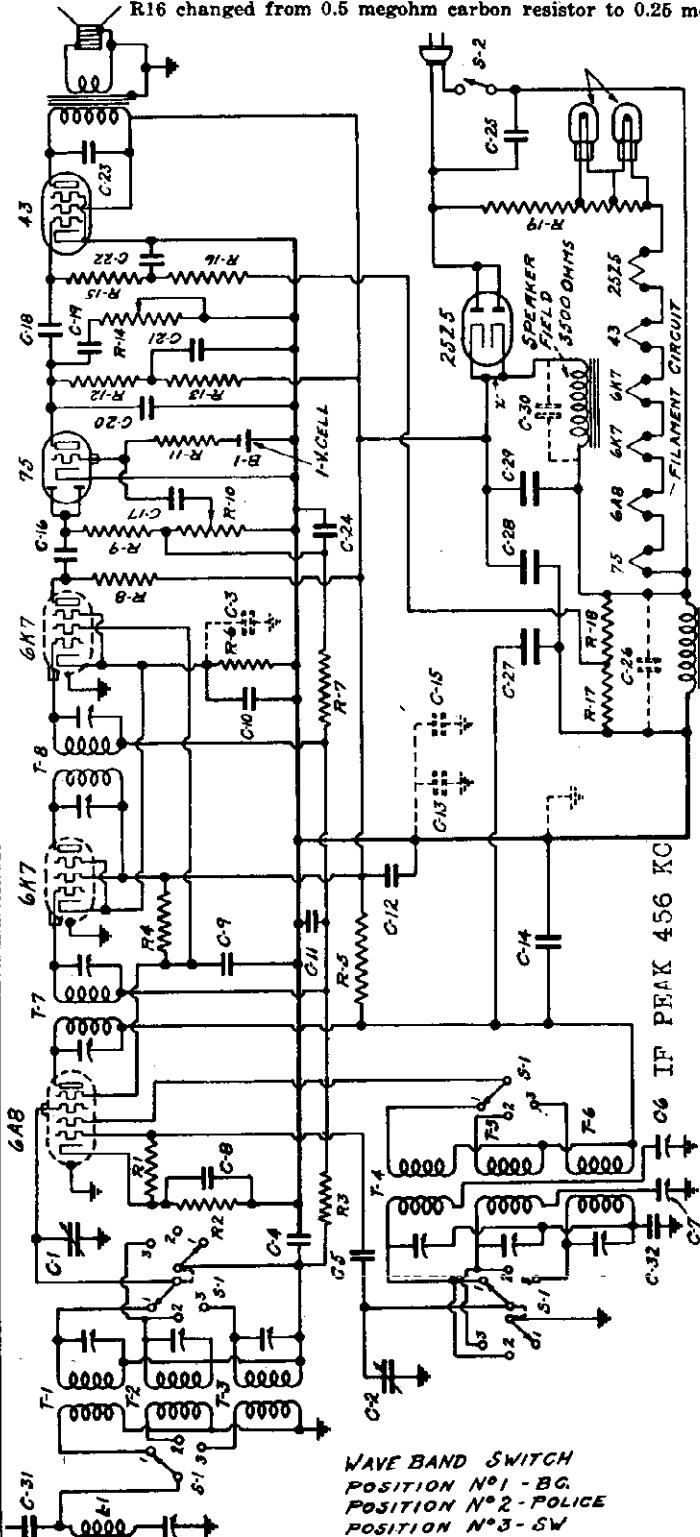
In later production runs, the following changes were made:

C30 added and circuit broken at X; 25Z5 cathodes separated (see schematic). C26 removed.

B minus grounded to chassis. C15 and C13 removed.

R11 changed from 1 megohm carbon resistor to 0.5 megohm, 1/4 watt carbon resistor, our part KR-56.

R16 changed from 0.5 megohm carbon resistor to 0.25 megohm, 1/4 watt carbon resistor, our part KR-55.



- | | | | | |
|-------------------|----------|---------------------------------------|---------------------|--|
| L1 | MMT-149 | 455 kc adjustable wave-trap | ZZC-191B | Seven-section condenser block |
| L2 | ZZT-196 | Filter choke—500 ohms | C8—0.1 mf, 200 v. | C12—0.1 mf, 200 v. |
| T1, T2, T3 | ZZT-192A | Three-band antenna coil assembly | C9—0.1 mf, 200 v. | C13—0.1 mf, 200 v. |
| T4, T5, T6 | ZZT-193 | Three-band oscillator coil assembly | C10—0.2 mf, 200 v. | C14—0.1 mf, 200 v. |
| T7 | ZZT-194 | 455 kc first if transformer | C11—0.05 mf, 200 v. | |
| T8 | ZZT-195 | 456 kc second 1-f transformer | | |
| R1, R8 | KR-53 | 50,000 ohm, 1/4 watt carbon resistor | ZZC-205 | 0.02 mf, 200 v. tubular condenser |
| R2, R3 | FFR-126 | 500 ohm, 1/2 watt wire-wound resistor | AC-7A | 0.00025 mf mica condenser |
| R4 | ZZR-196 | 1 megohm, 1/4 watt carbon resistor | CCC-127 | 0.01 mf, 200 v. tubular condenser |
| R5, R17 | LR-65 | 30,000 ohm, 1/4 watt carbon resistor | ZCC-213 | 0.006 mf, 200 v. tubular condenser |
| R6 | ZZR-197 | 10,000 ohm, 1/4 watt carbon resistor | AAC-114 | 0.001 mf mica condenser |
| R9, R13 | KR-54 | 850 ohm, 1/2 watt wire-wound resistor | BC-13 | 0.25 mf, 200 v. tubular condenser |
| R10, S2 | ZZR-190A | 100,000 ohm, 1/4 watt carbon resistor | ZZC-192A | 4, 8 and 16 mf electrolytic filter condenser block |
| R12 | LR-61 | Volume control with line switch—0.5 | C27—4 mf, 150 v. | C29—16 mf, 150 v. |
| R14 | ZZR-191A | 200,000 ohm, 1/4 watt carbon resistor | C28—8 mf, 150 v. | |
| R15, R16 | KR-55 | 500,000 ohm, 1/4 watt carbon resistor | YC-98A | Tubular 4 mf, 150 v. electrolytic condenser |
| R18 | LR-64 | Tone control—0.25 megohms | ZZC-206 | 0.005 mf mica condenser |
| R19 | ZZR-192A | 5,000 ohm, 1/4 watt carbon resistor | ZZS-128A | 5" dynamic speaker |
| C1, C2 | ZZC-184 | Wire-wound ballast resistor—150 ohms | ZZS-129A | Wave-band switch |
| C3, C4, C21, AC-6 | | Two-gang variable condenser | KL-5 | Pilot light, 6-8 volt, .15 amp. |
| C22, C25 | | 0.1 mf, 200 volt tubular condenser | ZZD-26A | Airplane dial |
| C5 | EC-24A | 0.0001 mf mica condenser | XXZ-213 | Bias cell, one volt |
| C6, C7 | JJC-144C | Dual adjustable padding condenser | ZZZ-209 | Escutcheon with crystal |
| | | C6—250 to 550 mmf. | | |
| | | C7—800 to 1400 mmf. | | |

WESTINGHOUSE ELEC. & MFG. CO.

MODEL WR-101
Alignment
Voltage

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600, 1700, 4500 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.

I-f Alignment

The i-f transformers ZYT-194 and ZYT-195 are located on the top of the chassis. The four trimmers, two for each i-f transformer, are located at the tops of the cans. Set the wave-band switch to broadcast (extreme clockwise position) and rotate variable condenser to minimum. Feed 456 kc to grid of the 6A8 tube and adjust the four i-f trimmers for maximum response. Then feed 456 kc through the antenna and adjust the wave-trap trimmer for *minimum response*. The trimmer is on the wave-trap, which is located on top of the chassis behind the speaker.

Location of Coils

The antenna coils for the three bands are wound on one form and mounted on top of the chassis to the right of the speaker. The three trimmers for these coils are mounted on a bakelite strip above the tubing. The trimmer nearest the speaker is for the short-wave antenna coil. The center trimmer is for the police antenna coil and the trimmer furthest from speaker is for the broadcast antenna coil.

The oscillator coils for the three bands are wound on one form and mounted underneath the chassis deck on the right-hand wall with the trimmers facing out. The trimmer screws are available through three holes in the chassis wall. The trimmer closest to front is for the broadcast oscillator coil, the central trimmer is for the police oscillator coil and the trimmer furthest from front is for the short-wave oscillator coil.

The adjusting screws for the dual padder are also available at the right-hand chassis wall. The screw closer to the front is for the broadcast band and the other is for the police band. The short-wave band has no adjustable padder.

Broadcast Alignment

Set the wave-band switch to broadcast position (extreme clockwise) and dial pointer to 600. Feed 600 kc through antenna lead and adjust broadcast padder (lower row on right wall, closest to front) for maximum response. Set pointer to 1600, feed 1600 kc and adjust the broadcast oscillator trimmer (top row on right wall, closest to front) for maximum response, and then the broadcast antenna trimmer (on antenna coil, furthest from speaker). Return pointer to 600 and rock the variable condenser (rotate condenser back and forth through small arc) while adjusting the broadcast padder for maximum response. If a readjustment is necessary return to 1600 and realign the antenna and oscillator trimmers.

Police Alignment

Set the wave-band switch to police (central position), pointer to 1700 and feed 1700 kc through antenna lead. Adjust police band padder (furthest from front on right wall, lower row) for maximum response. Set pointer to 4500 and feed 4500 kc. Adjust police band oscillator trimmer (central trimmer on right wall, upper row) for maximum response. If two peaks are heard, select the one of minimum capacity (see General Instructions below), then adjust police band antenna trimmer (central one on top) for maximum response, selecting the peak of maximum capacity. Again feed 1700 kc, with pointer at 1700, rock variable condenser and adjust police band padder for maximum response. Realign at 4500 if necessary.

Short-Wave Alignment

Set wave-band switch to counter-clockwise (short-wave) position and pointer at 15 megacycles. Feed 15,000 kc through antenna. Adjust short-wave oscillator trimmer (furthest from front on right wall, top row) for maximum response. If two peaks are obtained, select the one of minimum capacity.

Check all three bands for dead spots or incorrect image responses.

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 trimmers 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.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (cathode of 43 tube). Line voltage for these readings was 117.5 volts, a.c., 60 cycles.

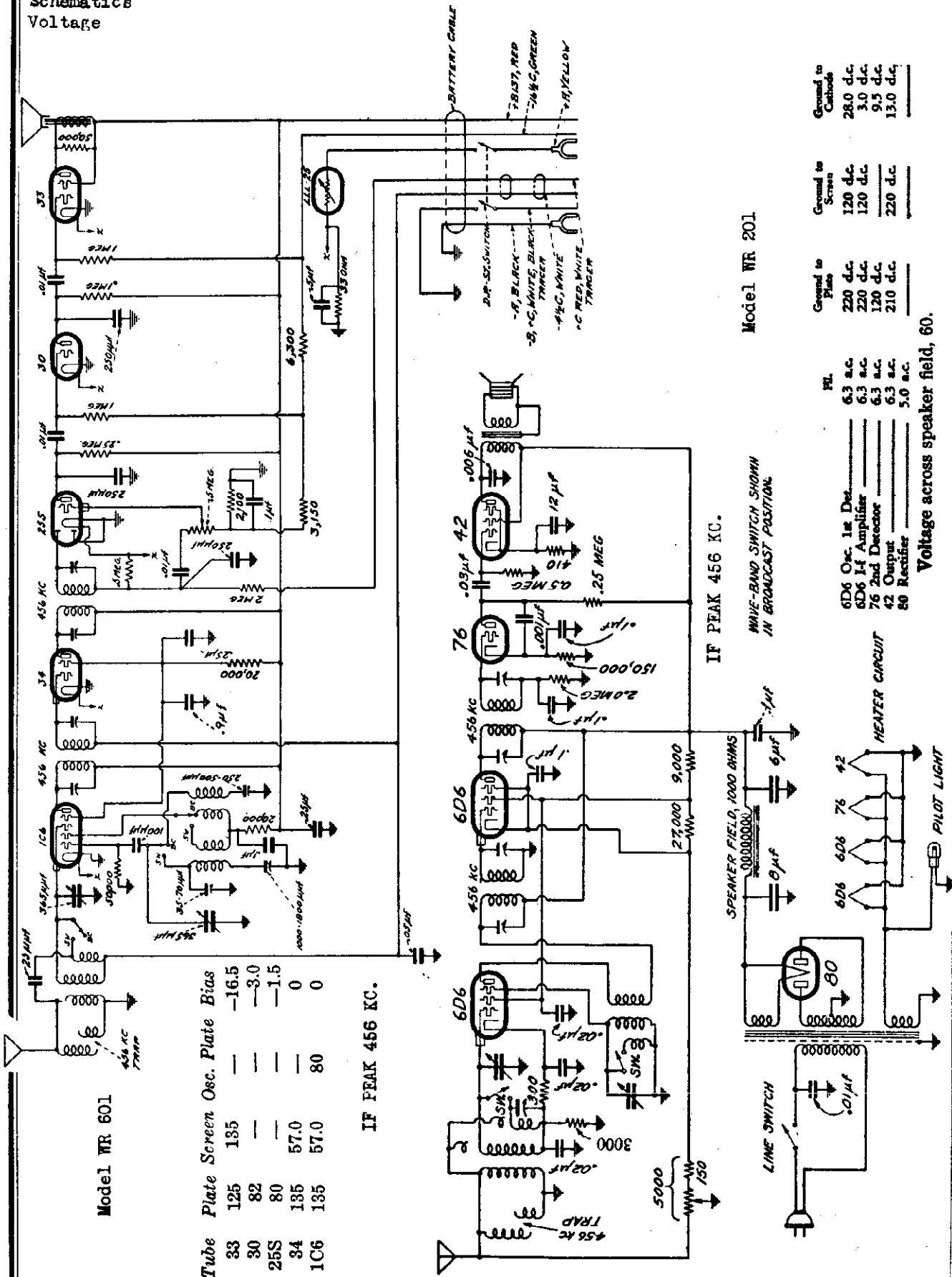
Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A8	82	50	2	82	6
6K7 1st i-f	107	107	5	—	6
6K7 2nd i-f	65	50	5	—	6
75	50	—	0	—	6
43	95	107	0	—	24

Voltage across speaker field (25Z5 cathode to line switch) — 107 volts.

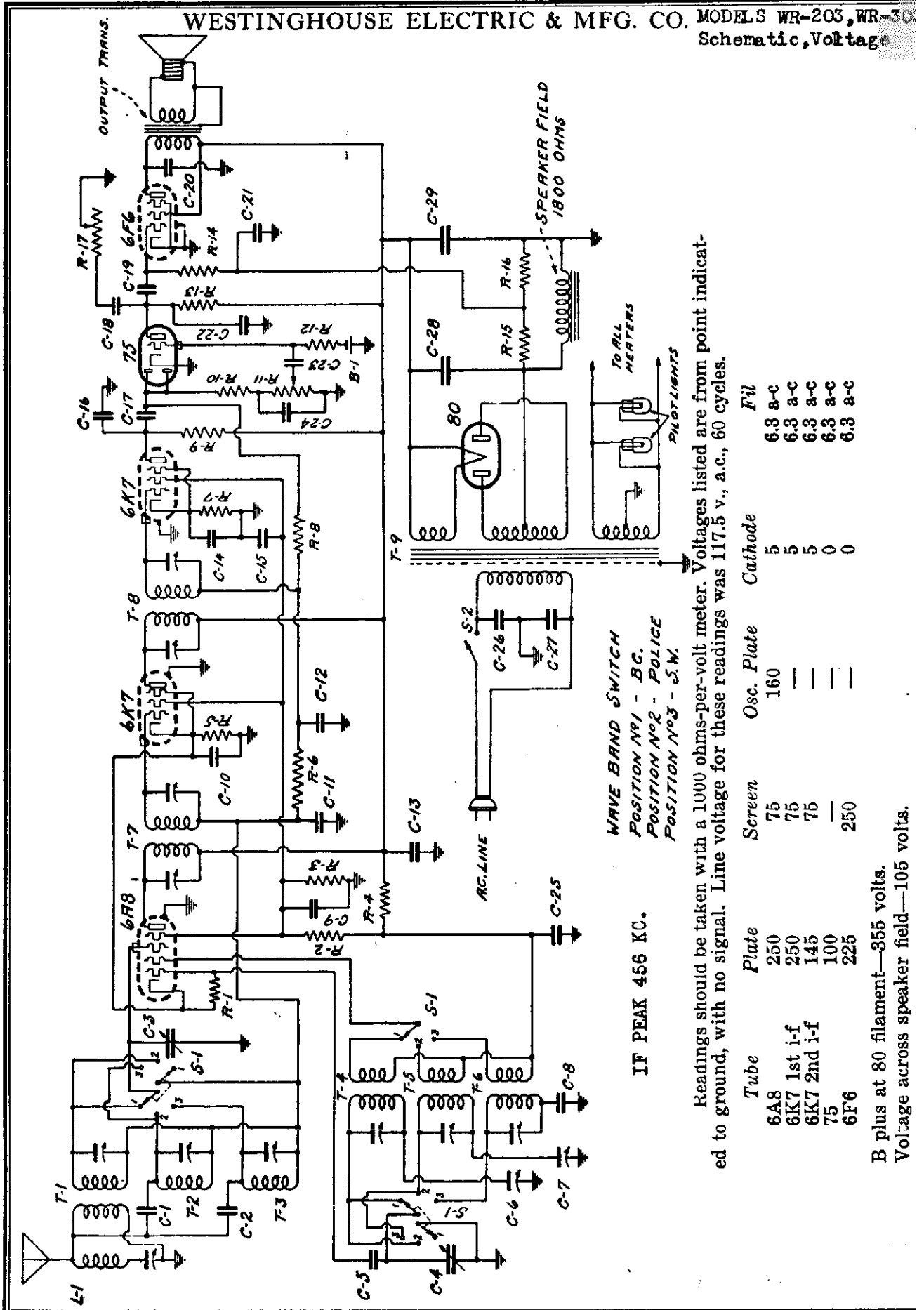
Voltage across choke (43 cathode to line switch) — 22 volts.

WESTINGHOUSE ELEC. SUPPLY CO.

MODEL WR-201
MODEL WR-601
Schematics
Voltage



WESTINGHOUSE ELECTRIC & MFG. CO. MODELS WR-203, WR-301
Schematic, Voltage



IF PEAK 456 KC.

WAVE BAND SWITCH
POSITION NO. 1 - B.C.
POSITION NO. 2 - POLICE
POSITION NO. 3 - S.W.

Headings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to ground, with no signal. Line voltage for these readings was 117.5 v., a.c., 60 cycles.

Tube	Plate	Screen	Osc. Plate	Cathode	Fil
6A8	250	75	160	5	6.3 a-c
6K7 1st i-f	250	75	—	5	6.3 a-c
6K7 2nd i-f	145	75	—	5	6.3 a-c
75	100	—	—	0	6.3 a-c
6F6	225	250	—	0	6.3 a-c

B plus at 80 filament—355 volts.
Voltage across speaker field—105 volts.

MODELS WR-203, WR-303 WESTINGHOUSE ELEC. & MFG. CO.
Alignment, Data, Parts

REPLACEMENT PARTS

PART NO.	DESCRIPTION	Quantity of each in set	PRICE
MMT-149	456 kc tunable wave trap	1	.36
XXT-156	Three band antenna coil assembly	1	1.75
XXT-157	Three band oscillator coil assembly	1	1.75
XXT-188A	456 kc 1st i-f transformer	1	1.15
XXT-189A	456 kc 2nd i-f transformer	1	1.15
XXT-190	Power transformer	1	2.85
XXB-185A	Volume control—25 megohm	1	.80
XXB-186A	Tone control with switch—25 megohm	1	.80
XXB-51	2,500 ohm 1/4 watt carbon resistor	16	.16
KR-53	50,000 " " " "	16	.16
KR-54	100,000 " " " "	16	.16
LR-61	200,000 " " " "	16	.16
XXB-202	210,000 " " " "	16	.16
KR-55	250,000 " " " "	16	.16
KR-56	500,000 " " " "	16	.16
KR-57	1 meg. " " " "	16	.16
XXR-203	1.1 " " " "	16	.16
FFR-126	500 ohm wire-wound resistor—1/2 watt	16	.40
XXB-194	30,000 ohm metal clad wire-wound tapped resistor	1	1.65
XXC-187	Dual 8 mf dry electrolytic condenser	1	1.65
JJC-144D	Dual padding condenser	1	.60
	C6—250 to 600 mmf.		
	C7—300 to 1600 mmf.		
IIC-183A	.000025 mf mica condenser	16	.16
EC-24A	.0001 mf mica condenser	16	.16
AC-7A	.00025 mf mica condenser	16	.16
IC-47	.0005 mf mica condenser	16	.16
XXC-197	.0038 mf mica condenser	25	.25
XXC-207	.005 mf-400 v. tubular condenser	16	.16
ZC-115	.006 mf-1000 v. tubular condenser	16	.16
CCC-127	.01 mf-200 v. tubular condenser	16	.16
KC-58	.01 mf-400 v. tubular condenser	16	.16
EC-12	.05 mf-200 v. tubular condenser	16	.16
XXC-220	Dual .01 mf, 250 volt condenser	30	.30
AC-9	.1 mf-200 v. tubular condenser	16	.16
EEC-132	.1 mf-400 v. tubular condenser	16	.16
EC-13	.25 mf-200 v. tubular condenser	16	.16
XXS-127	6" dynamic speaker	4.25	4.25
ZBS-180	10" dynamic speaker	6.25	6.25
XXS-117A	Wave-band switch	1.10	1.10
KL-6	Pilot light, 6-3 volt, .15 amp.	15	2.10
XXD-25G	Airplane dial	2.10	2.10
XXZ-195	Excitron with crystal	50	.50
XXZ-213	Bias cell, one volt	15	.15

When Ordering Replacement Parts Specify Part Number

ADJUSTMENTS

This receiver was carefully aligned and adjusted at the factory. No one but a serviceman experienced with short-wave receivers should attempt to re-align the receiver.
An oscillator with frequencies of 456, 600, 1600, 1800, 4500 and 15,000 kc. should be used. In addition, an output meter should be used across the voice coil or output transformer for indicating maximum response.

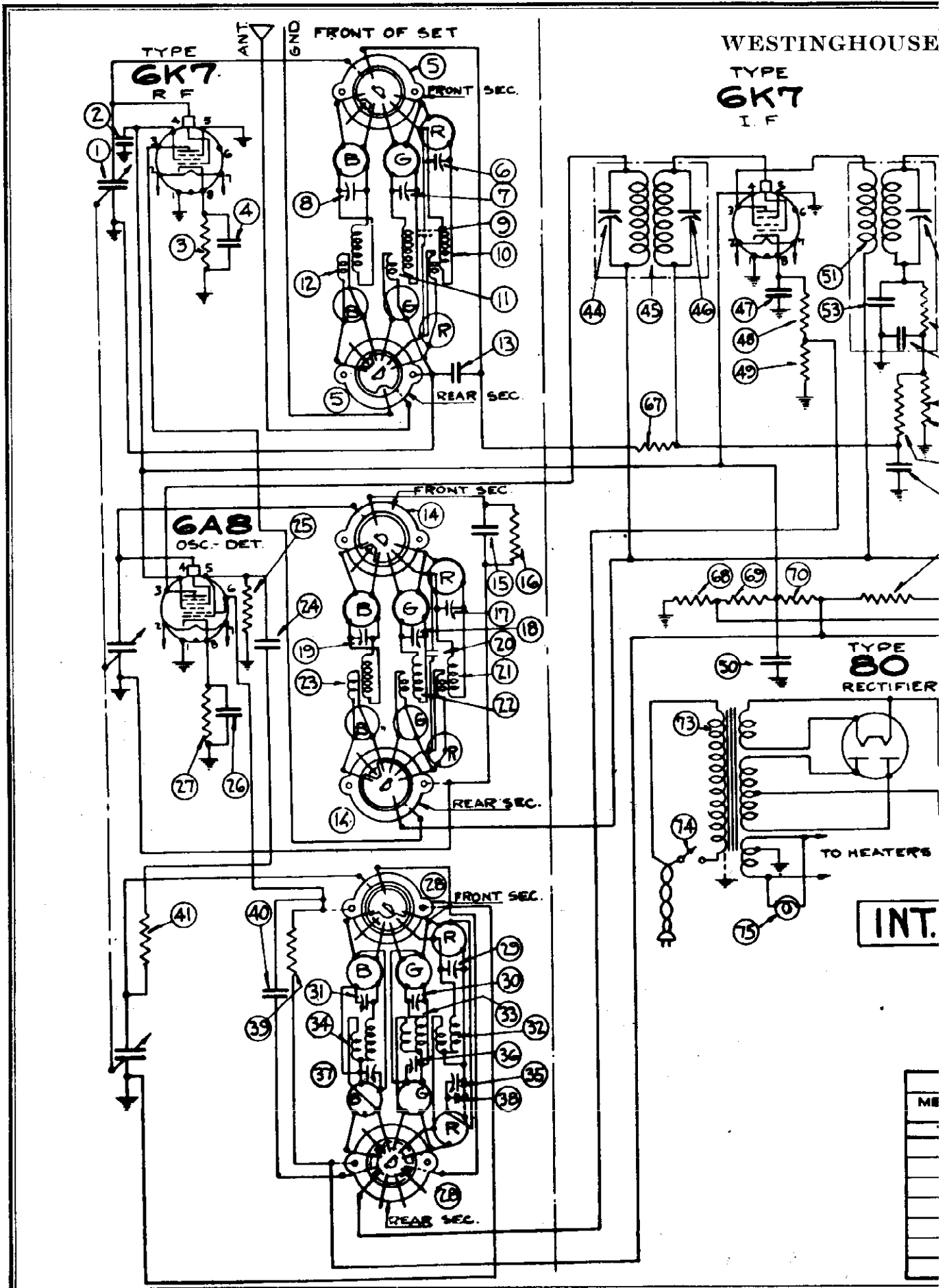
Alignment Procedure:

1. Set variable condenser to minimum and turn wave-band switch to broadcast (clockwise). Introduce a 456 kc. signal on grid of the 6AS tube. Adjust both trimmers of each of the two i-f transformers for maximum deflection on the output meter (maximum response). Repeat the process.
2. Remove 456 kc. signal from 6AS grid and feed it through the antenna. Adjust the 456 kc. interference trap trimmer for minimum response. The trap trimmer is at the rear wall beneath the chassis deck.
3. With pointer at 600 feed 600 kc. through the antenna and adjust the broadcast series padder (headless set-screw, closest to front) for maximum response. Move pointer to 1600, feed 1600 kc., and align the broadcast oscillator (on left row, nearest front) and then the antenna (on right row, furthest from front). Return to 600 kc. and readjust padder, rocking the variable condenser for maximum response. Return to 1600 kc. again and check. (See General Instructions below).
4. Set switch at police-band (central position) and pointer at 1800. Feed 1800 kc. and align police-band series padder (headless set-screw, furthest from front). Move pointer to 4500, feed 4500 kc., and align oscillator (middle one at left) and antenna (middle one at right). Return to 1800 kc. and readjust series padder, rocking for maximum response. Return again to 4500 kc. and check.
5. Set switch at short-wave (counter-clockwise) and pointer at 15 megacycles (the thin line on the dial marking the edge of the 19 meter band). Feed 15,000 kc. and align the short-wave oscillator (furthest from front at left), choosing the minimum capacity peak, and then the antenna (nearest front at right) choosing the maximum capacity peak. The receiver is now completely aligned.

General Instructions

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 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.

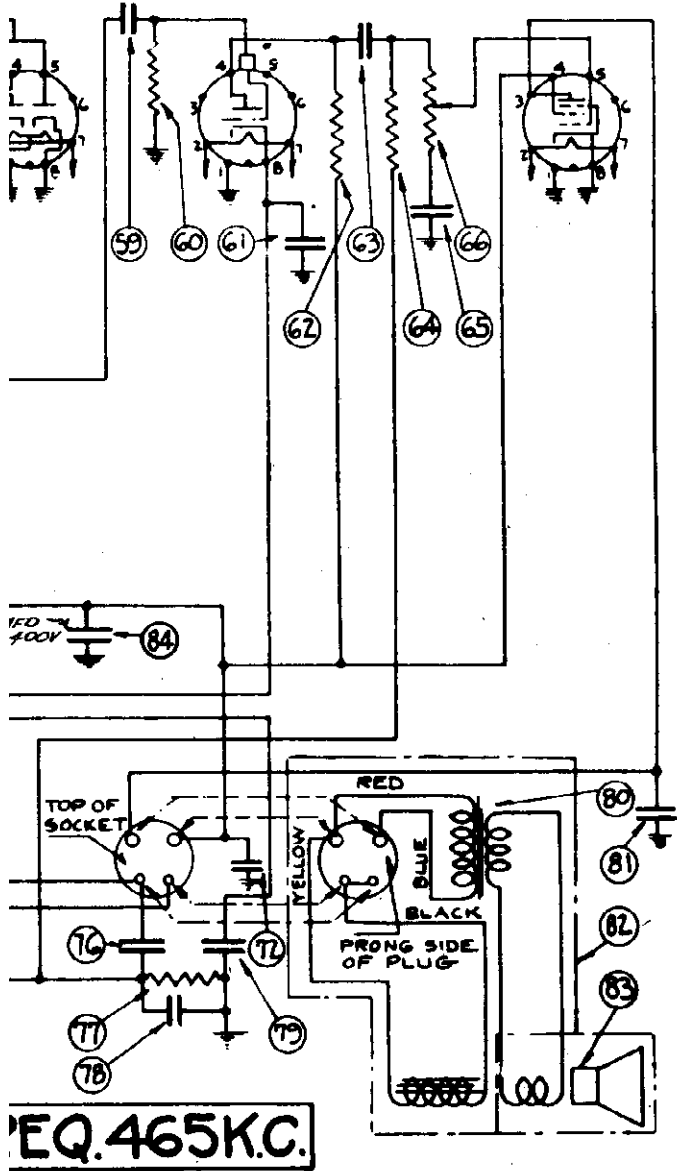
Replacements Should Be Made With Genuine Factory Parts For Best Results



EC. SUPPLY CO.

MODELS WR-204, WR-304
Schematic, Voltage
Resistance Data

TYPE 5H6 2ND DET
TYPE 6F5 1ST A.F.
TYPE 6F6 POWER PENTODE



D.C. RESISTANCE			
MEASURED WITH WAVE-CHANGE SWITCH IN CORRESPONDING BAND POSITION			
COIL	DIA. NO.	PRIM.	SEC.
B-ANT.	12	22	4
B-RF.	23	5	4.5
B-OSC.	34	1.5	3
G-ANT.	11	32	1
G-RF.	22	1.5	1
G-OSC.	33	.5	1
R-ANT.	10	1	.04
R-RF.	21	2	.04
R-OSC.	32	5	.04
1st. IF.	45	13	18
2nd. IF.	51	11.5	11.5
OUTPUT			
TRANS.	80	450	.5
SPKR.			
FIELD		1800	
VOICE			
COIL	83	3	

NET VOLTAGES -- LINE = 115 VOLTS -- TAKEN FROM BOTTOM OF SOCKETS							
ELEMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE-CHANGE SWITCH IN BROADCAST BAND POSITION							
STAGE	FIL.	PIN NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.	CATHODE PIN NOS.
RF.	63	2-7	270	3-1	108	4-1	2.8 1-8
DET.-OSC.	63	2-7	230	3-1			4.0 1-8
IF.	63	2-7	265	3-1	105	4-1	5.5 1-8
2nd. DET.	63	2-7					
1st. A.F.	63	2-7	108	4-1			1.2 1-8
OUTPUT	63	2-7	252	3-1	270	4-1	18.5 ACROSS #77 RES.
RECT.	49		370				

WESTINGHOUSE ELEC. SUPPLY

WESTINGHOUSE RADIO MODELS WR 204 AND WR 304

Seven-Tube, Superheterodyne Receiver

SERVICE NOTES

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes	2 #6K7, 1 #6A8, 1 #6F6, 1 #6F7, 1 #60 Total
Power Supply	105 to 125 volts, 50 to 60 cycles A.C.
Power Consumption	60 Watts
Maximum Undistorted Output	2.5 Watts
Maximum Output	3.5 Watts
Tuning Ranges	(Black Band 540 to 1800 K.C. Green Band 1800 to 6000 K.C. Red Band 6000 to 18500 K.C. (Red Band 6000, 17000K.C., & 6000K.C.)
Line-up Frequencies-I.F. 465K.C., 1600K.C., 570K.C., 570K.C., 17000K.C., & 6000K.C.	

GENERAL DESCRIPTION

This model is a seven-tube, three-band superheterodyne receiver designed for wide side reception and employs the new all-metal tubes.

The circuit employs a high frequency amplifier using the new type 6K7 tube. This is followed by a combined first detector-oscillator circuit employing a 6A8 tube. 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". From the high frequency assembly the energy passes thru an I.F. selective transformer and to an I.F. amplifier tube (type 6K7). From here further selection takes place and the energy is sent to the diode (type 6H6) where second detection takes place and voltages are provided for automatic volume control. A first audio amplifier tube (type 6V6) follows the diode and this is further followed by a pentode power amplifier tube (type 6E6). A type 80 rectifier supplies the direct current for energizing 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. Pull switch shaft out straight.

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.

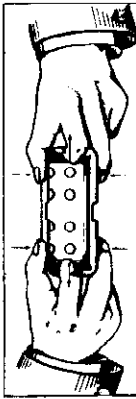


Figure No. 1

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, 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. (465 K.C.)

1. Set volume control on full and turn tone control to the base position.
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 6K7 I.F. tube thru a .5 mfd. blocking condenser.
4. Adjust trimmer #52 to maximum output, reducing output of test oscillator as required.
5. Apply test signal to grid of 6A8 detector-oscillator and adjust #44 and #46 to maximum output.

ADJUSTMENT OF BROADCAST BAND

1. Set wave-change switch to the Black or Broadcast Band position.
2. Set test oscillator and dial indicator to 1600 K.C.
3. Apply test signal to antenna terminal of chassis thru a .0002 mfd. variable condenser and adjust #81, #19 and #6 to maximum output.
4. Set test oscillator and dial indicator to 570 K.C. and adjust #37 to maximum output.
5. Return to 1600 K.C. setting with both test oscillator and dial indicator and

readjust #81, #19 and #6 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 5600 K.C. and adjust #30, #18 and #7 to maximum output.
 3. Set test oscillator and dial indicator to 1900 K.C. and adjust #36 to maximum output.
 4. Return to 5600 K.C. setting and make readjustment of #30, #18 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 K.C. and adjust #28, #17 and #6 to maximum output.
 3. Set test oscillator and dial indicator to 6000 K.C. and adjust #35 to maximum output.
 4. Return to 17000 K.C. setting and make readjustment of #28, #17 and #6.
- Note: The adjustment of the two short-wave oscillator lag condensers (#36 and #35) 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 on the output meter. Change the lag condenser further in the same direction return receiver and note reading. If the output drops with the 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 lagging condenser are changed. While this procedure may appear to be difficult, facility can easily be 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 as the chemicals in the electrolytic filter condensers will come out thru the air vents making the condensers appear to be defective. If the set is left in this position too long the condenser may be injured.

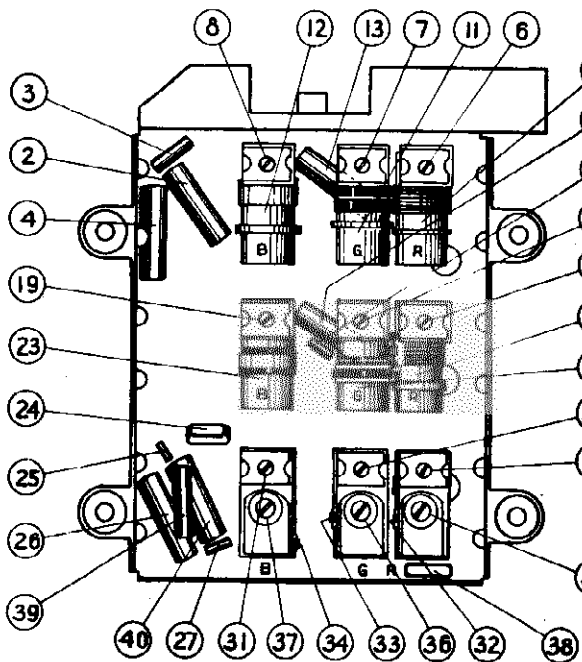


Figure No. 2

DIA.#	PART#	DESCRIPTION	DIA.#	PART#	DESCRIPTION
1	CG 9527	Variable gang condenser	35		900 to 1800 mfd. osc. lag condenser-part of CG 9520 (Red Band)
2	SA 106386	.05 mfd. 200 V. condenser	36		900 to 1800 mfd. osc. lag condenser-part of CG 9520 (Green Band)
3	RE 9529	300 ohm 1/2 W. resistor	37		300 to 600 mfd. oscillator lag condenser-part of CG 9517 (Broadcast Band)
4	SA 106386	.05 mfd. 200 V. condenser	38	GN 959	.002 mfd. mica condenser
5	SW 9527	"Contr-O-matic" unit complete with coils, switch and trimmers	39	RE 9526	5000 ohm 1/2 W. resistor
6	CG 9511	4 to 25 mfd. antenna trim condenser (Red Band)	40	CG 9513	.05 mfd. 200 V. condenser
7	CG 9511	4 to 25 mfd. antenna trim condenser (Green Band)	41	RE 9537	50 ohm 1/2 W. resistor
8	CG 9511	4 to 25 mfd. antenna trim condenser (Broadcast Band)	42		30 to 100 mfd. trim condenser-part of IC 9537
9			43	IC 9527	1st I.F. transformer assembly
10	RC 9571	Antenna coil assembly (Red Band)	44		30 to 100 mfd. trim condenser-part of IC 9537
11	RC 9574	Antenna coil assembly (Green Band)	45	SA 106495	.05 mfd. 200 V. condenser
12	RC 9577	Antenna coil assembly (Broadcast Band)	46	SA 106261	400 ohm 1/2 W. resistor
13	CW 9513	.05 mfd. 200 V. condenser	47	SA 106267	1000 ohm 1/2 W. resistor
14	SW 9500	R.F. unit complete with coils, switch and trimmers	48	SA 102497	25 mfd. 200 V. condenser
15	CG 9513	.05 mfd. 200 V. condenser	49	IC 9537	2nd I.F. transformer assembly
16	RE 9527	5000 ohm 1/2 W. resistor	50		30 to 100 mfd. trim condenser-part of IC 9537
17	CG 9511	4 to 25 mfd. R.F. trim condenser (Red Band)	51		80 mfd. mica condenser - part of IC 9537
18	CG 9512	1.5 to 10. mfd. R.F. trim condenser (Green Band)	52		60,000 ohm 1/2 W. resistor - part of IC 9537
19	CG 9512	1.5 to 10. mfd. R.F. trim condenser (Broadcast Band)	53		100 mfd. mica condenser - part of IC 9537
20	CH 9512	5 mfd. mica condenser	54	VR 959	Volume control (1/2 neg.)
21	RC 9572	R.F. coil assembly (Red Band)	55	RE 9530	1 meg. 1/2 W. resistor
22	RC 9575	R.F. coil assembly (Green Band)	56	SA 106388	.05 mfd. 200 V. condenser
23	RC 9579	R.F. coil assembly (Broadcast Band)	57	CG 9512	.05 mfd. 400 V. condenser
24	SA 106417	.0001 mica condenser	58	RE 9530	1 meg. 1/2 W. resistor
25	RE 9524	50,000 ohm 1/2 W. resistor	59	CG 9515	12. mfd. 25 V. condenser
26	SA 106396	.05 mfd. 200 V. condenser	60	SA 106879	250,000 ohm 1/2 W. resistor
27	RE 9529	300 ohm 1/2 W. resistor	61	CG 9512	.05 mfd. 400 V. condenser
28	SW 9529	Oscillator section of "Contr-O-matic" unit, complete with coils, switch, trim and lag condensers	62	SA 106405	.001 mfd. 600 V. condenser
29	SW 9529	Oscillator section of "Contr-O-matic" unit, complete with coils, switch, trim and lag condensers	63	VR 9512	Tone control (1/2 neg.)
30			64	SA 106278	100,000 ohm 1/2 W. resistor
31			65	SA 106380	300 ohm 1/2 W. resistor
32			66	SA 104986	30,000 ohm 1/2 W. resistor
33			67	SA 101404	15,000 ohm 1/2 W. resistor
34			68	SA 106385	10,000 ohm 2 W. resistor
35			69		4 1/2 mfd. 450 V. elect. condenser-part of CG 954
36			70	TR 959	Power transformer
37			71		Line switch-part of VR9512
38			72	SA 106600	Dial lights 3 V. (3 used)
39			73		6. mfd. 475 V. elect. condenser-part of CG 954
40			74	RE 9528	300 ohm resistor
			75		80. mfd. 25 V. elect. condenser-part of CG 954
			76	CG 9511	8. mfd. 300 V. elect. condenser
			77	TR 9515	Speaker output transformer
			78	SA 106389	.005 mfd. 400 V. condenser
			79	SK 9511	Speaker
			80		

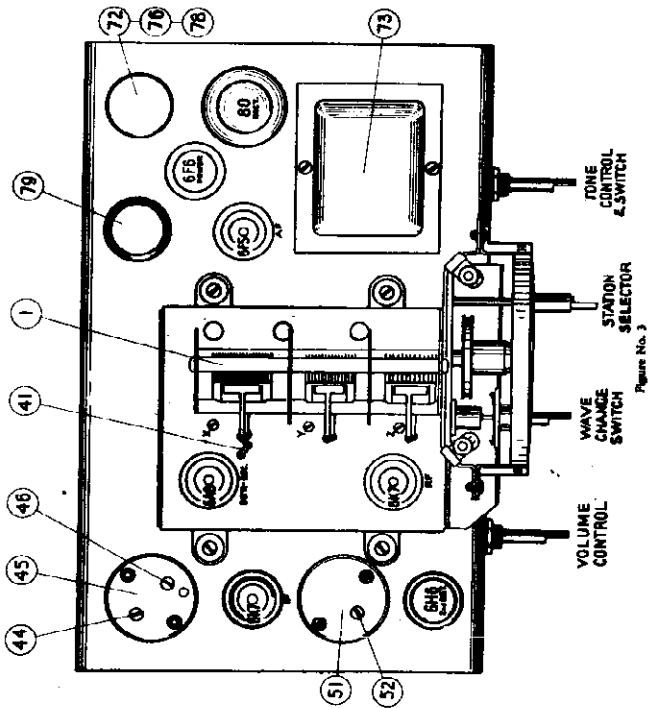


Figure No. 3

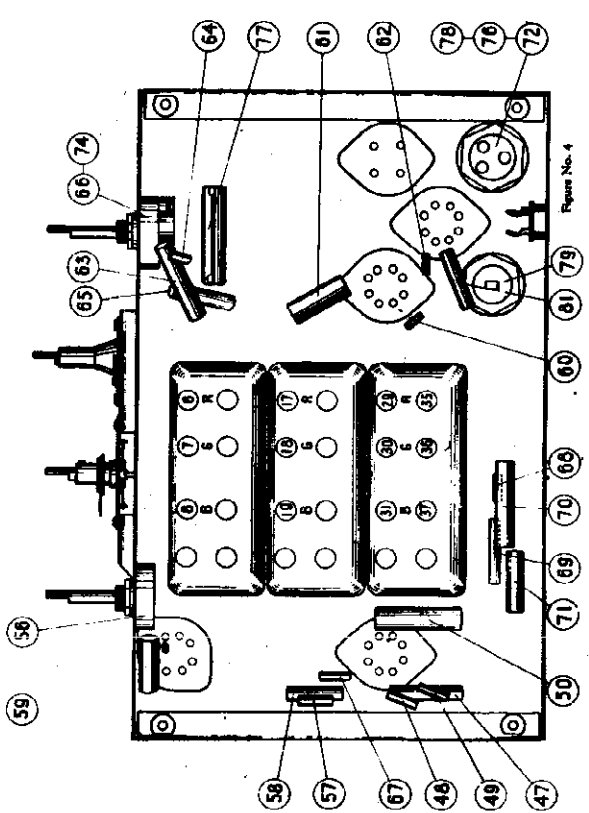
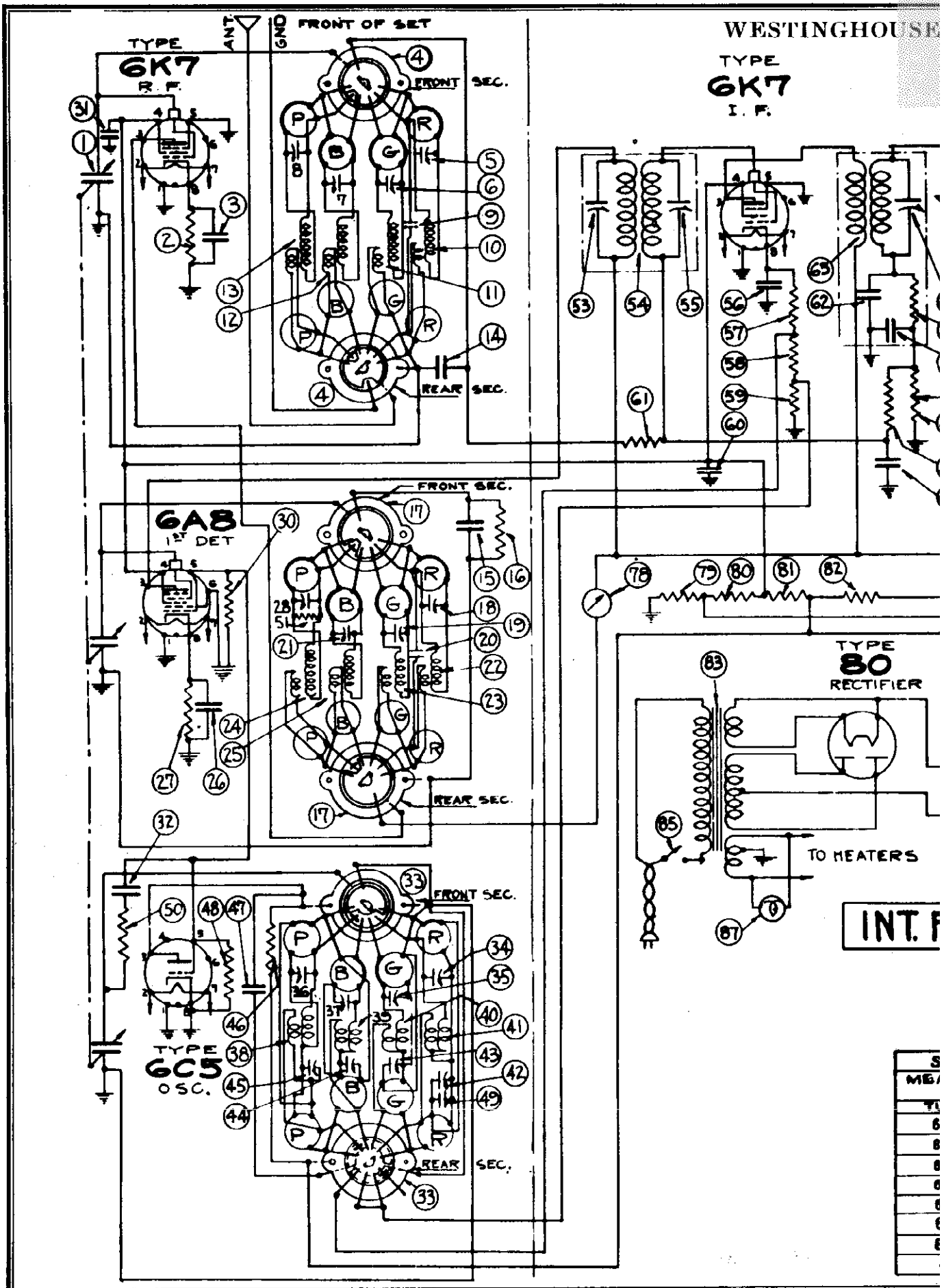


Figure No. 4

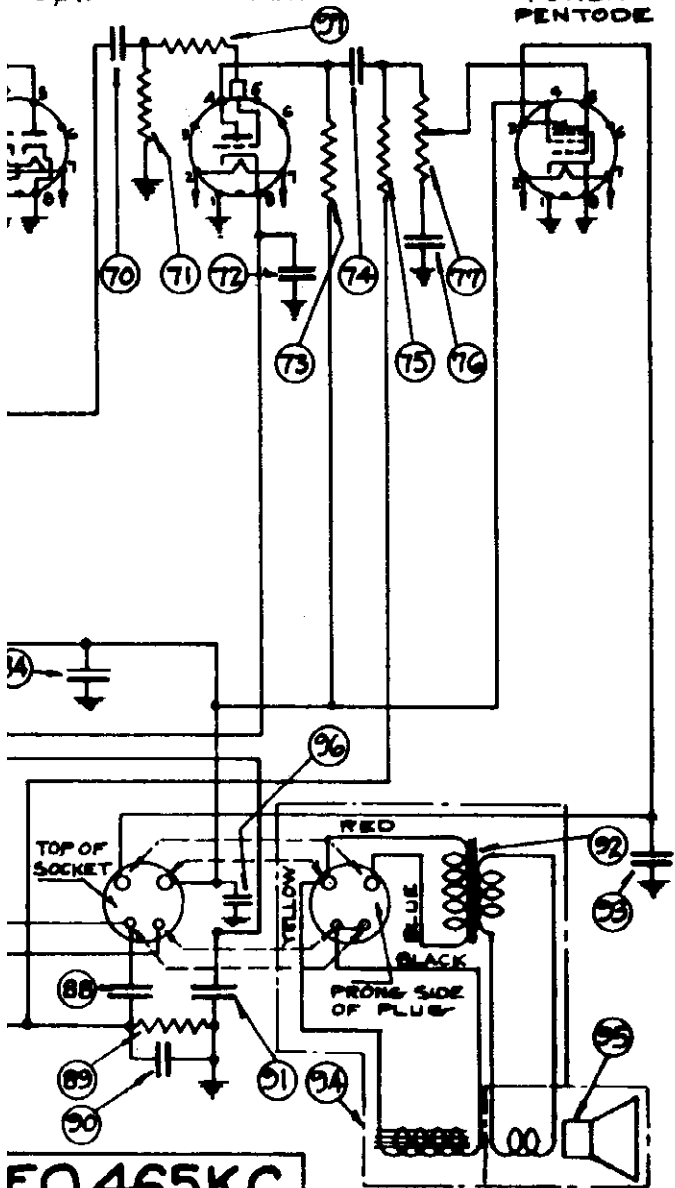


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REC. SUPPLY CO.

MODELS WR-205, WR-305
Schematic, Voltage
Resistance Data

TYPE **H6** 1st DET.
TYPE **6F5** 1st A.F.
TYPE **6F6** POWER PENTODE

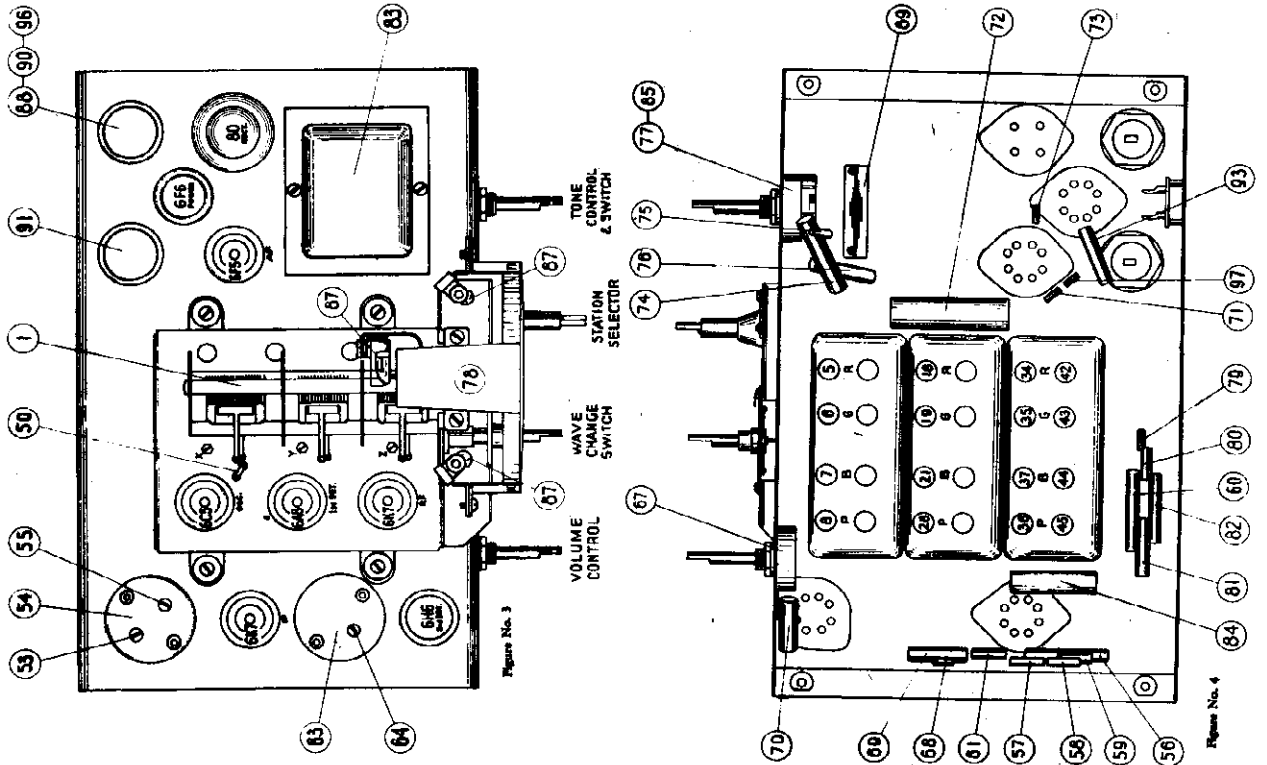


EQ.465K.C.

D.C. RESISTANCE			
MEASURED WITH WAVE-CHANGE SWITCH IN CORRESPONDING BAND POSITION			
COIL	DIA. #	PRIM.	SEC.
P-ANT.	13	130 Ω	25 Ω
P-RF	24	36 "	25 "
P-OSC.	38	8 "	13.5 "
B-ANT.	12	22 "	4 "
B-RF	25	5 "	4.5 "
B-OSC.	39	1.5 "	3 "
G-ANT.	11	32 "	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.	54	13 "	13 "
2nd IF.	63	11.5 "	11.5 "
OUTPUT			
TRANS.	92	450 "	5 "
SPKR.			
FIELD		1800 "	
VOICE			
COIL	95	3 "	

TEST VOLTAGES - LINE = 115 VOLTS - TAKEN FROM BOTTOM OF SOCKETS
ELEMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE-CHANGE SWITCH IN BROADCAST BAND POSITION

STAGE	FIL.	PIN NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.	CATHODE	PIN NOS.
RF.	6.2	2-7	270	3-1	108	4-1	2.8	1-8
1st DET.	6.2	2-7	230	3-1	108	4-1	4.0	1-8
OSC.	6.2	2-7	200	3-1				
1st IF.	6.3	2-7	265	3-1	105	4-1	5.5	1-8
2nd DET.	6.2	2-7						
1st A.F.	6.2	2-7	108	4-1			1.2	1-8
OUTPUT	6.2	2-7	252	3-1	270	4-1	16.5 <small>ACROSS * 89 RES.</small>	
RECT.	A9		370					



WESTINGHOUSE RADIO MODELS WR-205 AND WR-305

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 CHERMICALS IN THE CONDENSATOR LIQUID MAY COME OUT WHEN THE SET IS TURNED UP. IF THIS SET APPEARS TO BE DEFECTIVE, DO NOT TURN THE SET UPSIDE DOWN OR ON ITS SIDE WHILE THE CONDENSATOR IS LIQUID.

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 by turning the tuning knob. When the receiver is tuned out we are. Change the lag condenser current in the same direction, reverse receiver and note reading. If output drops with second adjustment, reverse direction the adjustment of lag condenser. Continue adjustment until the output is at a maximum until no further improvement can be made when either the tuning control or the lag condenser are changed. While this

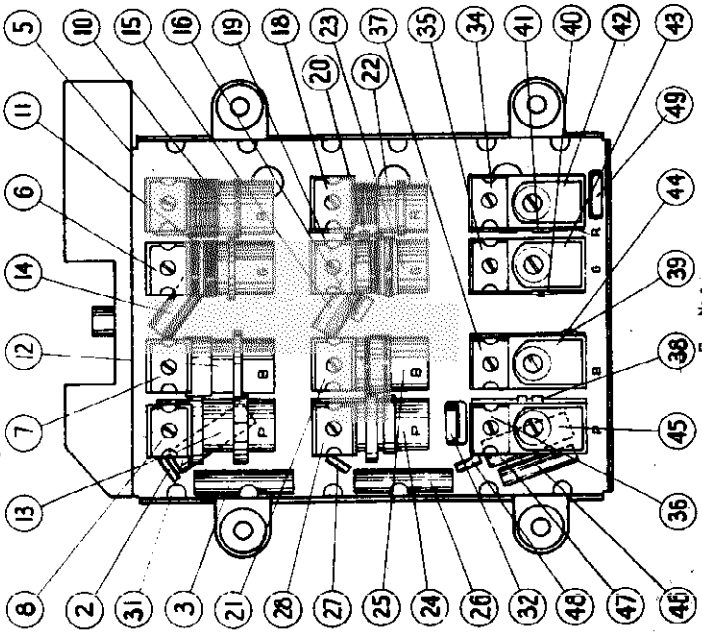


Figure No. 3

MODELS WR-205, WR-200

Alignment, Service Notes Parts List WESTINGHOUSE ELEC. SUPPLY CO.

SERVICE NOTES

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes	2 #6K7, 1 #6A8, 1 #6C6, 1 #6H6, 1 #6P6, 1 #6SF6, 1 #6C0-Total 8
Power Supply	105 to 125 volts, 50 to 60 cycles
Power Consumption	55 Watts
Maximum Undistorted Output	2.5 Watts
Maximum Output	3.3 Watts
Tuning Ranges	(Purple Band 120 to 300 K.C. (Black Band 540 to 1800 K.C. (Green Band 1800 to 6000 K.C. (Red Band 6000 to 18000 K.C. (I.F. 465 K.C., 350 K.C., 150 K.C., 1600 K.C., 570 K.C., 3500 K.C., 1900 K.C., 17000 K.C., and 6000 K.C.)

GENERAL DESCRIPTION

This model is an eight-tube four-band superheterodyne receiver designed for worldwide 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 6C6). These tubes with their associated circuits, (coil variable condenser, trim condensers for R.F. and detector stages, and trim and lag condensers for the oscillator) comprise a complete assembly in compact form separately enclosed from the main chassis. This assembly is known as the "Precision Tuner". From the high frequency assembly the energy passes through an I.F. amplifier tube (type 6K7). From here further selection takes place and the energy is sent to the diode (type 6H6) where second detection takes place and voltages are provided for automatic volume control. A first audio amplifier tube (type 6P6) follows the diode and this is further followed by a pentode power amplifier tube (type 6P6). A type 6C0 rectifier supplies the direct current for energizing 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 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 #2. Remove the corresponding screws.
5. Each individual section can then be pulled out straight.

Notes: 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 6C6 socket.

After repairs have been made resolder the plate leads mentioned above and observe that the slotted holes in the switch bracket line up with the round gull 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.

Replace the section fastening screws. Resolder the stator and rotor leads on gang condenser. 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 the shaft does not slide in freely, examine the position of the slot in each switch disc.

Before replacing the coil shields, it might be advisable to bend the coil shields slightly to assure that positive contact is made. To do this hold

the shield with your two hands using the thumbs and the 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.

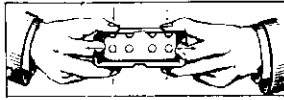


Figure No. 1

LINEUP 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 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. (465 K.C.)

1. Set volume control on full and turn tone control to bass position.
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 6K7 I.F. tube thru a .5 mfd. blocking condenser.
4. Adjust trimmer #64 for maximum output reading of test oscillator as required.
5. Apply test signal to grid of 6A8 first detector and adjust #55 and #56 for maximum output.

ADJUSTMENT OF PURPLE BAND

1. Set wave-change switch to Purple Band position.
2. Set test oscillator and dial indicator to 350 K.C.
3. Apply test signal to antenna terminal of the chassis thru a .0002 mfd. series condenser and adjust #36, #28 and #8 for maximum output.
4. Set test oscillator and dial indicator to 150 K.C. and adjust #45 for maximum output.
5. Return to 350 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 the Black or Broadcast Band position.
2. Set test oscillator and dial indicator to 1000 K.C. and adjust #37, #21 and #7 for maximum output.
3. Set test oscillator and dial indicator to 570 K.C. and adjust #44 for maximum output.
4. Return to 1600 K.C. setting and make readjustment of #37, #21 and #7.

ADJUSTMENT OF GREEN BAND

Notes: In adjusting the Green and Red Bands, a .0008 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 Green Band position.
2. Set test oscillator and dial indicator to 5500 K.C. and adjust #38, #19 and #6 for maximum output.
3. Set test oscillator and dial indicator to 1900 K.C. and adjust #43 for maximum output.
4. Return to 5500 K.C. setting and make readjustment of #38, #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 for maximum output.
3. Set test oscillator and dial indicator to 6000 K.C. and adjust #42 for maximum output.
4. Return to 17000 K.C. setting and make readjustment of #34, #18 and #5.

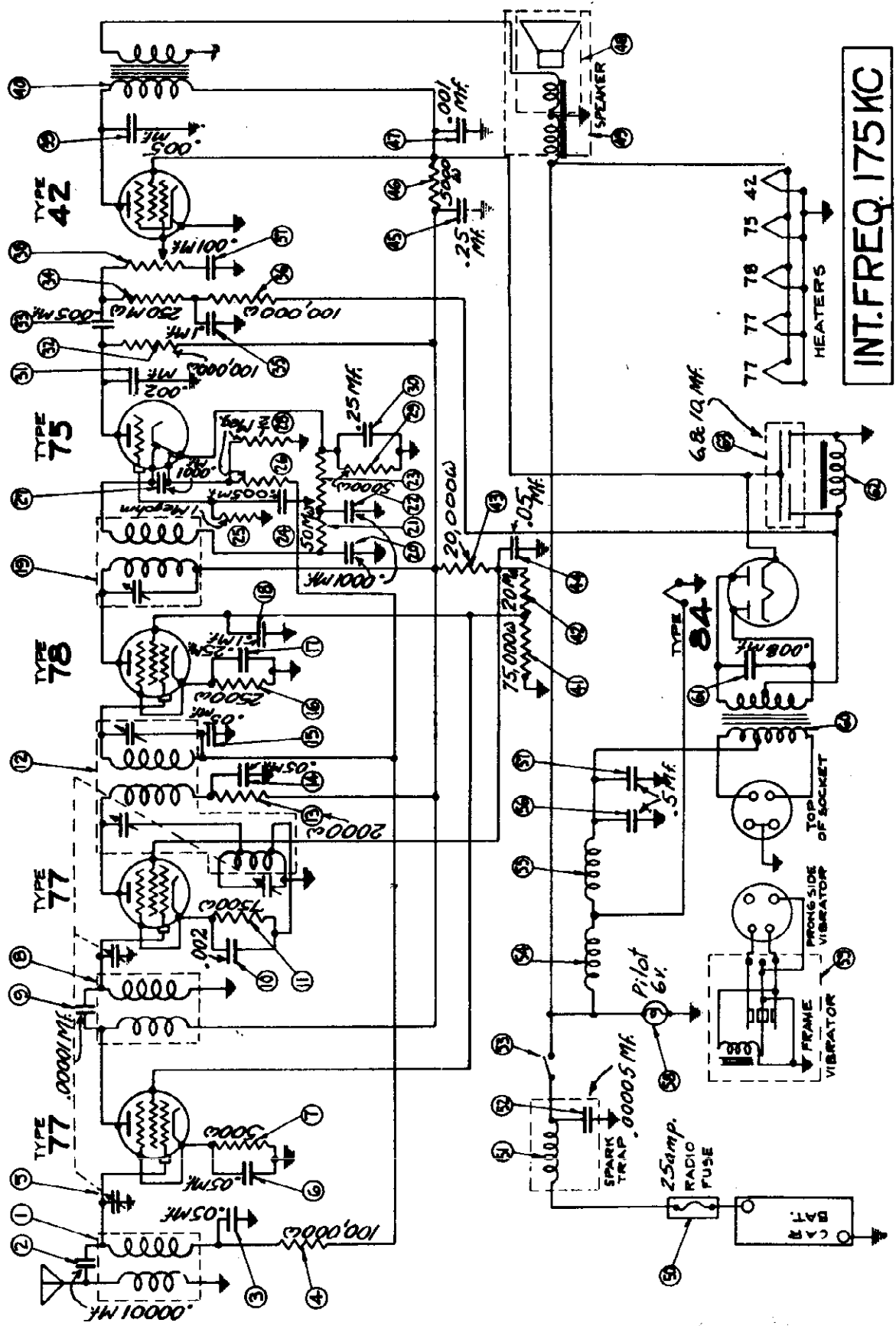
Notes: The adjustment of the two short-wave oscillator lag condensers (#42 and #43) is best made by the max-max. method.

Dis. No.	Part No.	Description of Parts	List Price	No.	Part No.	Description of Parts	List Price
1	CG 9527	Variable condenser assembly	4.28	57	SA 102621	400 ohm 1/4 W. resistor	.80
2	RE 9528	300 ohm 1/4 W. resistor	.10	58	SA 102627	1000 ohm 1/4 W. resistor	.80
3	CG 9529	.05 mfd. 200 V. condenser	.25	59	SA 102649	5000 ohm 1/4 W. resistor	.20
4	SW 9524	Antenna section "Precision Tuner" assembly complete with switch, coils and trimmers	6.75	60	SA 102497	.25 mfd. 200 V. condenser	.55
5	CG 9511	4 to 25 mfd. antenna trim condenser (Red Band)	.62	61	SA 102678	100,000 ohm 1/4 W. resistor	.90
6	CG 9512	4 to 25 mfd. antenna trim condenser (Green Band)	.62	62	IC 9537	50 mfd. mica condenser - part of IC 9537	1.75
7	CG 9513	4 to 25 mfd. antenna trim condenser (Black Band)	.62	63		I.F. trim condenser - part of IC 9537	.64
8	CG 9514	4 to 25 mfd. antenna trim condenser (Purple Band)	.62	64		50,000 ohm 1/4 W. resistor - part of IC 9537	.64
9	CG 9511	Twisted pair of wires - part of CG 9511	.66	65	VR 952	Volume control - 500,000 ohm	1.00
10	CG 9577	Antenna coil assembly (Red Band)	.70	66	RE 9530	1 meg. 1/4 W. resistor	.10
11	CG 9578	Antenna coil assembly (Green Band)	.68	67	SA 102586	.05 mfd. 200 V. condenser	.25
12	CG 9579	Antenna coil assembly (Black Band)	1.10	68	CG 9512	.02 mfd. 400 V. condenser	.20
13	CG 9580	Antenna coil assembly (Purple Band)	1.25	69	RE 9530	1 meg. 1/4 W. resistor	.10
14	CG 9515	.05 mfd. 200 V. condenser	.25	70	CE 9515	12 mfd. electrolytic condenser	.65
15	CG 9515	.05 mfd. 200 V. condenser	.25	71	SA 102579	250,000 ohm 1/4 W. resistor	.20
16	RE 9527	5000 ohm 1/4 W. resistor	.10	72	CG 9515	.02 mfd. 400 V. condenser	.20
17	RE 9528	R.F. assembly (Precision Tuner) with switch, coils and trimmers	6.00	73	RE 9531	250,000 ohm 1/4 W. resistor	.10
18	CG 9511	4 to 25 mfd. R.F. trim condenser (Red Band)	.60	74	SA 102403	300 ohm 1/4 W. resistor	.80
19	CG 9512	1.5 to 10 mfd. R.F. trim condenser (Green Band)	.60	75	VR 9512	Tone control (500,000 ohm)	1.10
20	CG 9513	1.5 to 10 mfd. R.F. trim condenser (Black Band)	.60	76	SI 9538	Tuning meter assembly	2.30
21	CG 9514	1.5 to 10 mfd. R.F. trim condenser (Purple Band)	.60	77	SA 102680	300 ohm 1/4 W. resistor	.20
22	CG 9578	R.F. coil assembly (Red Band)	.70	78	SA 102496	50,000 ohm 1/4 W. resistor	.80
23	CG 9579	R.F. coil assembly (Green Band)	.65	79	SA 102615	10,000 ohm 1/4 W. resistor	.25
24	CG 9580	R.F. coil assembly (Black Band)	1.10	80	CG 9540	7000 ohm 2 W. resistor	.30
25	CG 9581	R.F. coil assembly (Purple Band)	1.15	81	TR 959	Power transformer	5.75
26	SA 102596	.05 mfd. 200 V. condenser	.25	82	SA 102492	.05 mfd. 400 V. condenser	.25
27	CG 9512	1.5 to 10 mfd. R.F. trim condenser (Green Band)	.60	83	CG 9512	10,000 ohm 1/4 W. resistor	.25
28	CG 9513	1.5 to 10 mfd. R.F. trim condenser (Black Band)	.60	84	CW 959	.01 mfd. 600 V. condenser	.40
29	CG 9514	.00005 mfd. mica condenser	.15	85	SA 102609	Dial light (6.3 volt)	.15
30	CG 9511	100,000 ohm 1/4 W. resistor	.10	86	CG 9512	8 mfd. 475 V. section of electrolytic condenser	5.50
31	SA 102586	.05 mfd. 200 V. condenser	.25	87	NR 9523	300 ohm mixer resistor	.50
32	CG 9511	.00005 mfd. mica condenser	.15	88	CG 9512	20 mfd. 25 V. electrolytic condenser - part of CG 954	1.15
33	SW 9524	Oscillator section "Precision Tuner" assembly complete with switch, coils and trimmers	9.75	89	SA 102609	Speaker - complete	7.50
34		1.0 to 10 mfd. trim condenser part of CG 9510 (Red Band)	.94	90	SA 102722	Diaphragm and coil assembly	1.15
35		1.0 to 10 mfd. trim condenser - part of CG 9510 (Green Band)	.94	91	CG 9512	4 mfd. electrolytic condenser - part of CG 954	1.10
36		1.0 to 10 mfd. trim condenser - part of CG 9510 (Purple Band)	.94	92	SA 102609	Speaker - complete	7.50
37		5 to 25 mfd. trim condenser - part of CG 9511 (Black Band)	.94	93	SA 102722	Diaphragm and coil assembly	1.15
38	CG 9526	Oscillator coil assembly (Purple Band)	1.40	94	RE 9534	100,000 ohm 1/4 W. resistor	.10
39	CG 9527	Oscillator coil assembly (Black Band)	1.50				
40	CG 9528	Oscillator coil assembly (Green Band)	1.50				
41	CG 9529	Oscillator coil assembly (Red Band)	1.25				
42		800 to 1600 mfd. lag condenser - part of CG 9510 (Red Band)	.88				
43		800 to 1600 mfd. lag condenser - part of CG 9510 (Green Band)	.88				
44		300 to 600 mfd. lag condenser - part of CG 9510 (Black Band)	.88				
45	RE 9526	9000 ohm 1 W. resistor	.90				
46	CG 9512	.02 mfd. 400 V. condenser	.20				
47	RE 9524	50,000 ohm 1/4 W. resistor	.10				
48	CG 959	.05 mfd. mica condenser	.25				
49	RE 9527	50 ohm 1/4 W. resistor	.10				
50	CG 9512	100 ohm 1/4 W. resistor	.10				
51	CG 9524	I.F. trimmer - part of IC 9527	1.75				
52	IC 9527	1st I.F. transformer	1.75				
53	SA 102493	I.F. trimmer - part of IC 9527	.85				

WESTINGHOUSE ELEC. SUPPLY CO.

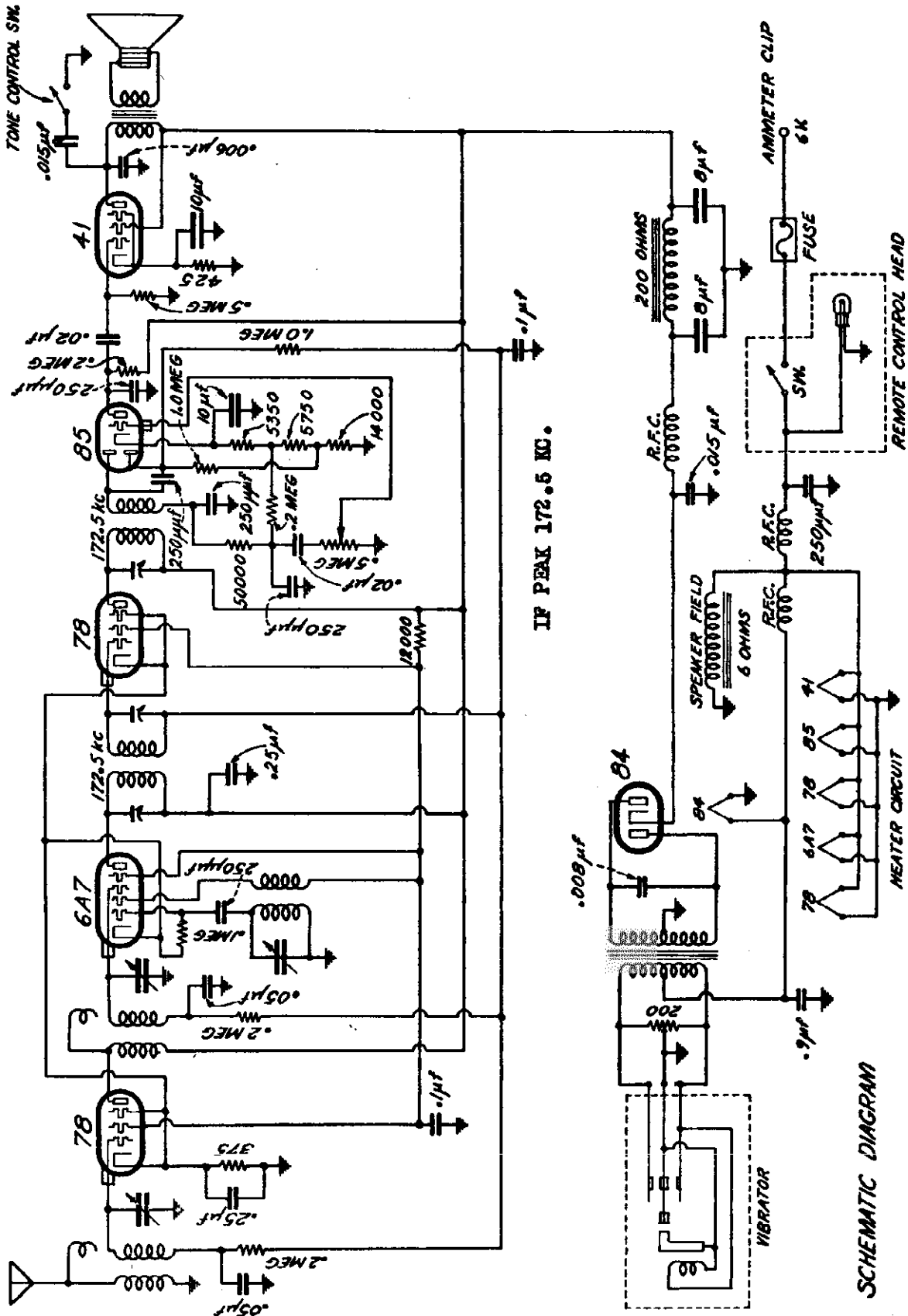
MODEL WR-500

Schematic



MODEL WR-501
Schematic

WESTINGHOUSE ELEC. SUPPLY CO.



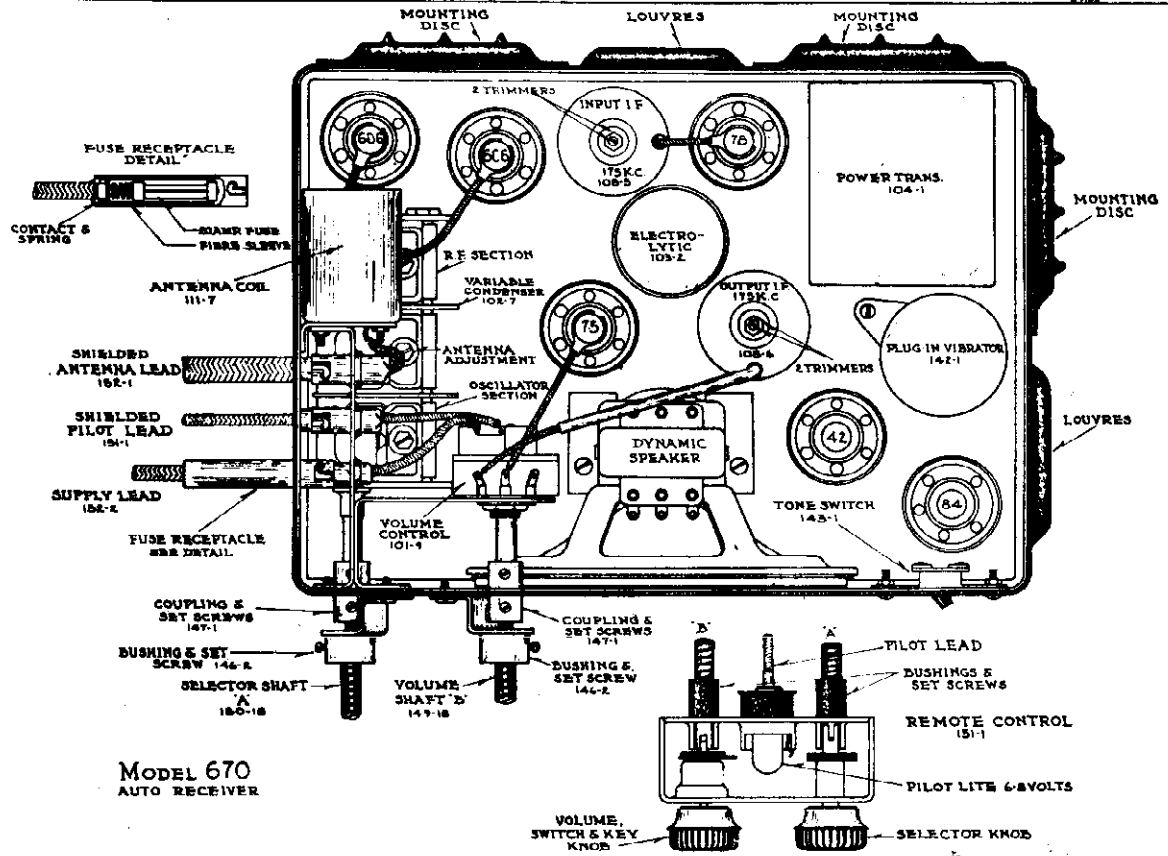
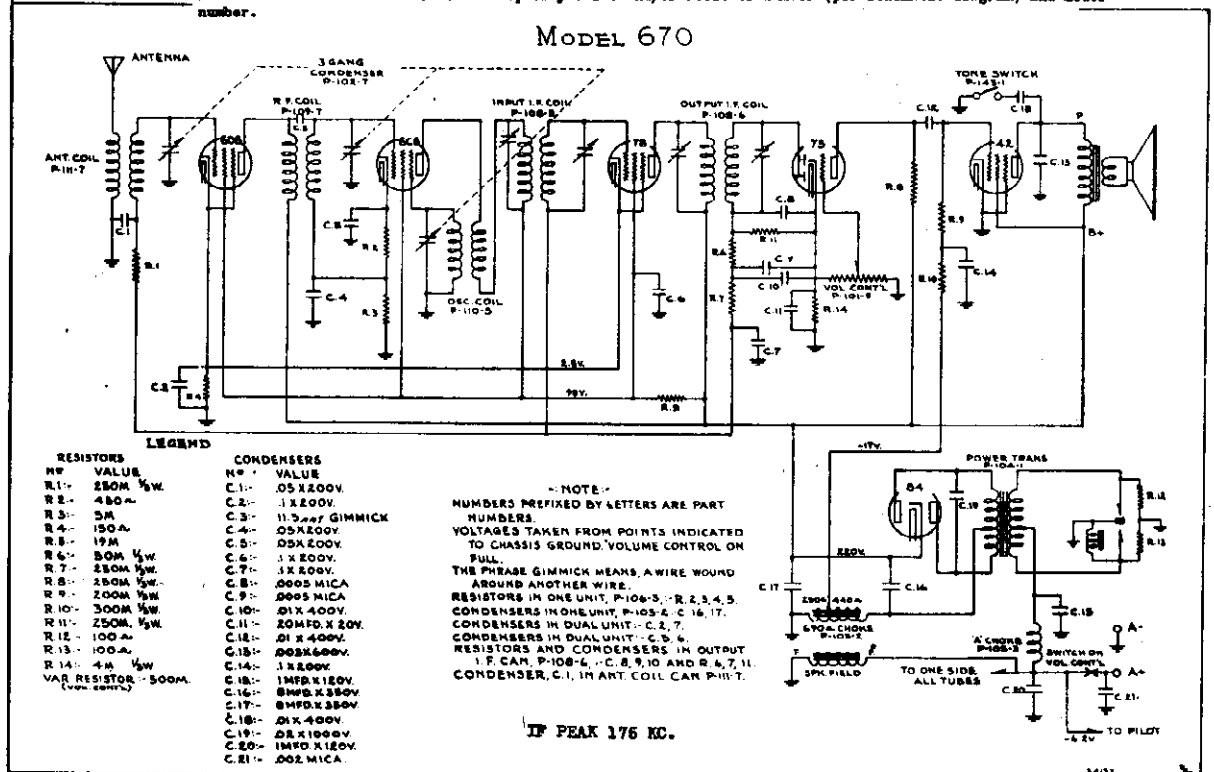
SCHEMATIC DIAGRAM

WESTERN AUTO SUPPLY CO.

MODEL 670
Schematic
Socket, Trimmers

Vibrators can be reconditioned at a cost of \$5.00 each, if the old unit is returned.

All resistors are RMA color coded - specify value and/or resistor number (per schematic diagram) and model number.



MODEL 670

Alignment
Service Notes

WESTERN AUTO SUPPLY CO.

ELIMINATION OF MOTOR NOISE: (Cont'd)

In some few cases, such as Buicks, it is necessary to use screw type suppressors. Cut lead about two inches from distributor and screw one end of suppressor into the wire attached to distributor, screw wire from coil into other end of suppressor.

Generator capacitor, number 14B-1, is connected to generator side of outcut. The ground side of capacitor can be fastened to the generator housing under the same screw that holds the relay housing to generator. In some cases, an additional capacitor, number 14B-1, (obtainable from your dealer) must be installed between the battery side of ignition coil and the car frame.

If after connecting suppressors and condensers as outlined above there is still motor noise, make the following tests:

Shield high tension leads.

Bond flexible shaft leads, such as free wheeling, which run close to distributor, radiating ignition interference which is picked up by the antenna inside of car.

Cars using wooden floor boards, place a grounded copper screen under toe board.

Excessive gap between distributor rotor and high tension contacts, replace with a special radio rotor arm or build up end with solder and dress end with file so that its original shape is retained. The rotor should not brush or wipe the contacts, but should just clear them.

In some cases, such as V-8 Ford, it is necessary to pull battery and primary leads out of special tube which houses high tension leads, shield and ground these leads. Also on V-8 Fords it is necessary to install a capacitor at primary terminal of coil housing.

Additional suppressors can be obtained from your dealer.

The ignition system of car must be kept in good condition.

Fouled plugs or plugs with improperly adjusted gaps will affect the operation of receiver as well as of the automobile. Burned or poorly adjusted breaker points will also impair the performance. It is advisable to advance the generator charging rate in order to compensate for the additional drain of the receiver on car storage battery.

It is sometimes necessary to connect a condenser (14B-3) between the hot side of the dome light switch and ground.

BALANCING SET TO ANTENNA:

When this set has been installed and is ready for operation, it may be found necessary (depending on antenna) to balance set to this antenna. This is accomplished as follows:

With the receiver tuned to a very weak station, about 150 to 140 (1300 to 1400 kilocycles) on the dial, adjust the antenna trimmer with a screw driver until maximum volume is attained. To reach the antenna trimmer remove the plug bottom from the top of the case.

SERVICE NOTES

Should it ever be necessary or desirable to re-align this receiver, the proper method is as follows:

Adjustments can be made with the receiver mounted in the cabinet, being necessary only to remove the top cover.

I.F. ALIGNMENT:

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 175 kilocycles to the grid cap of the 606 tube.
2. Adjust trimming condensers of both input and output I.F. transformers, parts number 10B-5 and 10B-6 (see top view of chassis) to resonance with oscillator, as indicated on an output meter connected across the primary terminals of the speaker input transformer. Maximum deflection on the meter indicates resonance.

Note: Each I.F. transformer trimmer has two adjustments, one nut and one screw, both of which are adjustable through the top of the can.

FREQUENCY ALIGNMENT:

1. Attach oscillator connected in series with a 200 mfd. condenser to the antenna lead and with the variable condenser at its minimum capacity position (extreme right of its rotation) and with an oscillator set at 1550 kilocycles, adjust condenser trimmer of oscillator section (shaft end) to resonance.
2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna and R.F. trimmers to resonance.
3. Check alignment at 1200-1000-800-600-530 kilocycles by setting oscillator to these frequencies and picking up signal by rotating condenser.
4. Bend slotted plates of antenna and R.F. sections only if necessary. **UNDER NO CIRCUMSTANCES BEND PLATES OF OSCILLATOR SECTION.**

NOTES:

Voltages from chassis to different points are indicated on schematic circuit diagram, and should be measured with a volt meter having a resistance of 1000 ohms per volt.

Failure to operate, noisy or weak reception, may be due to defective tubes or poor contact between cap on top of tube and grid clip.

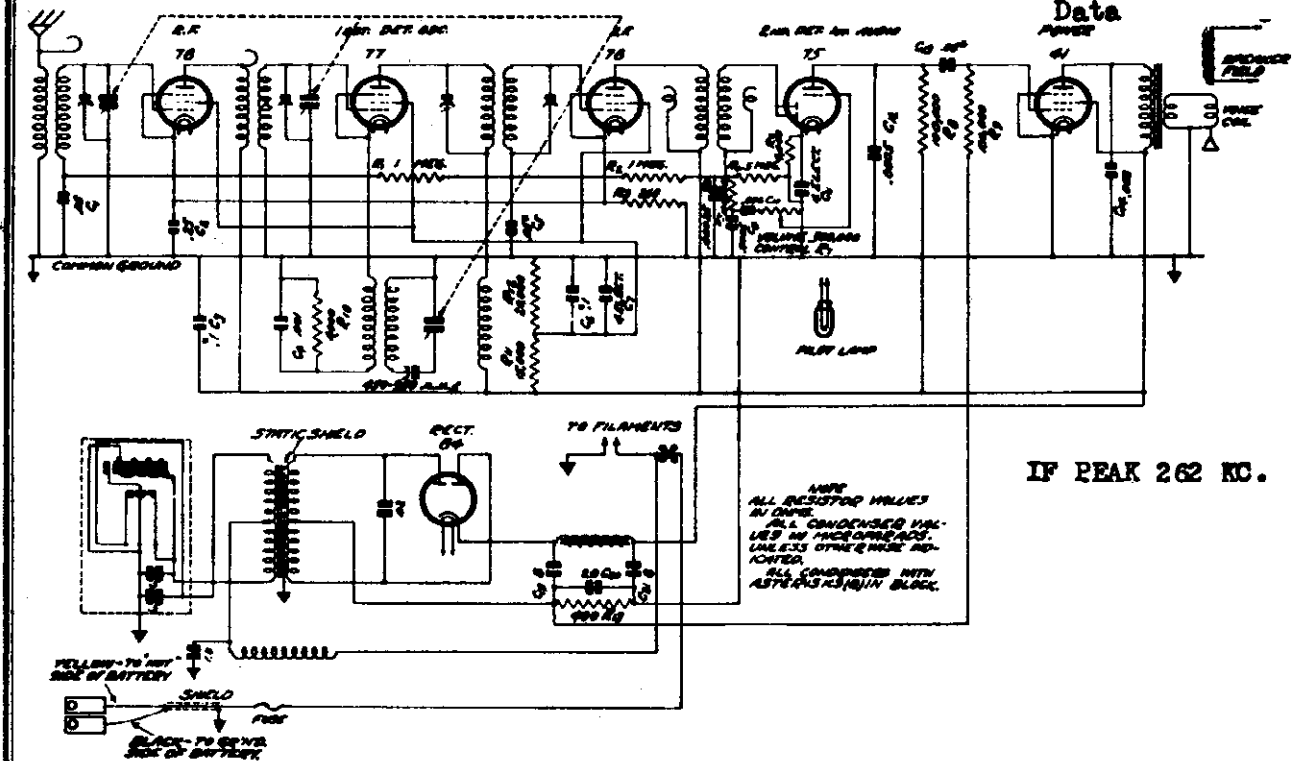
Tubes may be checked by replacing with another tube which is known to be good.

If fuse blows out frequently, and insulating sleeve has been properly placed over fuse, the trouble probably is in the vibrator and vibrator should be replaced.

NEVER ATTEMPT TO ADJUST VIBRATOR POINTS.

WESTERN AUTO SUPPLY CO.

MODEL S-732, S-733
Schematic, Voltage



Circuit

The circuit consists of an antenna stage, a 78 R.F. stage, a 77 1st detector-oscillator stage, a 78 I.F. stage, a 75 dual diode-triode tube, which functions as a diode 2nd-detector and 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 262 K.C. 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. Noise suppression between stations is obtained by the resistor in the cathode circuit of the 75 tube, the drop across which must be overcome before rectification in this tube begins. The manual volume control varies the audio voltage applied to the grid of the 75 tube.

A vibrator interrupts the current through the primary of the power transformer in the power unit. This, together with the turns ratio in this trans-

former, results in the high voltage A.C. being present in the secondary of the transformer. The full wave rectifier tube, filter choke, and filter condensers convert this high voltage A.C. into high voltage DC for the plate and screen circuits.

Current for the receiver is obtained from the car storage battery. In Fig. 11 is shown the condenser block internal wiring.



Fig. 11—Condenser Block—Internal Wiring

Voltages at Sockets

Lower ranges will be necessary for the grid and heater voltages. It is not absolutely necessary to have a high resistance meter for the heater or "A" battery reading.

These voltages will vary with variations in receivers, tubes, test equipment used, and "B" eliminator output voltage.

A thousand ohm-per-volt meter of 0-250 volt range is required for the plate and screen voltages.

Type of Tube	Function	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
78	R. F.	6.1	182	80	3.0 ⁽¹⁾	7.0
77	1st Det. and Osc.	6.1	178	77	5.0 ⁽¹⁾	1.3 ⁽²⁾
78	I. F.	6.1	182	80	3.0 ⁽¹⁾	7.0
75	2nd Det. 1st Audio	6.1	70 ⁽³⁾		1.4 ⁽¹⁾	.35
41	Output	6.1	172.5	176.5	12.5 ⁽¹⁾	16.0
84	Rect.	6.1	205			17.5 per plate

- (1) Cathode to Ground
- (2) Subject to Variation
- (3) Triode Plate to Cathode
- (4) Read Across 600-Ohm Resistor, R13

MODEL S-732, S-733
Alignment, Parts

WESTERN AUTO SUPPLY CO.

Part No.	Code No.	Resistance	Type	List Price
P-91066	R-7	0.500,00 ohm	Values Control and Switch	\$1.15
F-A95104	R-8	100,000 ohm	Carbon	.35
F-A95104	R-9	100,000 ohm	Carbon	.35
F-A94402	R-10	4,000 ohm	Carbon	.30
P-394133	R-11	15,000 ohm	Carbon	.25
P-394133	R-12	20,000 ohm	Carbon	.25
P-394101	R-13	400 ohm	Carbon	.20

Condensers

Part No.	Code No.	Capacity	Voltage	Type	List Price
P-90543	C-1	.05 mfd.	200 V.	Tubular	\$0.30
P-90538	C-2	.25 mfd.	200 V.	Tubular	.35
P-90521-B	C-4	.001 mfd.	600 V.	Molded	.25
P-90937	C-11	4.0 mfd.	in case	Electrolytic Block	1.25
P-90937	C-11	4.0 mfd.	in case	Electrolytic Block	.20
P-90919	C-8	.00025 mfd.	600 V.	Molded	.15
P-90945	C-9	.0005 mfd.	600 V.	Molded	.15
P-90946	C-10	.0005 mfd.	600 V.	Molded	.15
P-90945	C-12	.0005 mfd.	600 V.	Molded	.15
P-90946	C-14	.005 mfd.	600 V.	Molded	.30
P-90924	C-22	800 V.	Tubular Condenser		.25
P-30751A	L	120 V.	Tubular Condenser		.40
P-30751A	Dual	5 mfd., 120 V.	Tubular Condenser		.30

Part No.	Code No.	Capacity	Voltage	Type	List Price
P-60556	C-19	5.0 mfd.	255 V.	Electrolytic Block	2.25
P-60556	C-20	20.0 mfd.	255 V.	Electrolytic Block	2.25
P-60556	C-21	8.0 mfd.	255 V.	Electrolytic Block	2.25
P-60556	C-3	.1 mfd.	200 V.	By-pass Block	1.35
P-60556	C-5	.1 mfd.	200 V.	By-pass Block	1.35
P-60556	C-19	.05 mfd.	200 V.	By-pass Block	1.35
P-1539	600 X. C.	Trimmer Condenser			.45
P-90937	Three-Org.	Variable Condenser			3.00

CONTROL UNIT PARTS

(When Separate Control Unit Is Used)

Part No.	Description	List Price
P-1816	Celluloid Dial Strip	.60
P-1825	Dial Gear and Strip Assembly	.40
P-20599B	Control Unit Bracket	.15
P-20510A	Steering Post Approx.	.30
P-20511	Steering Post Clamp	.15
P-90935	Control Box Cover	.35
P-90925	Cond. Drive Pinion	.15
P-70746	Pilot Lamp Cable, only	.40
P-1415A	Pilot Lamp Socket and Clip	.15
P-15427A	6-8 Volt Pilot Lamp	.25
P-30426	Ornamental Plug	.10
P-30414	Key	.15

CHASSIS PARTS

Part No.	Description	List Price
No. 75 Tube Socket		\$0.10
No. 77 Tube Socket		.10
No. 78 Tube Socket		.10
No. 81 Tube Socket		.10
No. 84 Tube Socket		.10
Single Pin Jack		.10
Tube Shield Assembly		.35
Chassis Box		6.00
Chassis Box Cover		1.10
Shielded Antenna Lead		.40
Shielded "A" Battery Lead		1.15
Interconnector with Condensers in Rubber Boot and Metal Case		6.35
Carboard Blade		.20
15 Amp. Fuse		.30
Electrodynamic Speaker		3.75
Cond. Drive Gear		.35
Volume Control and Drive Bracket		.30
Coak. Drive Plates		.15
Pinion Adjustment Plate		.10
Lock Lever		.10
Tension Spring		.10
Entry Plate Assembly		1.00
Dial Gear and Strip Assembly		.40
Celluloid Dial Strip only		.15
Pilot Lamp Socket and Spring Clip		.10
6-8 Volt Pilot Lamp		.25
Rubber Tube Bumper—Square		.10
Rubber Tube Bumper—Round		.10
Rubber Band for Tube		.10
Filter Choke Assembly		1.80
Power Trans. Assembly		2.90
Antenna R. F. Transformer—Less Can		1.20
Interstage R. F. Transformer—Less Can		1.00
Second I. F. Transformer and Can Assembly		.95
First I. F. and Oscillator Transformer and Can Assembly		2.70
Single Boleoid "A" Choke		.35
Antenna R. F. Can		.15
Interstage R. F. Can		.10

Resistors

Part No.	Resistance	Type	List Price
P-A95105	1 Megohm	Carbon	\$0.25
P-A95105	250 ohm	Carbon	.25
P-394201	250 ohm	Carbon	.25
P-A95104	5 Megohm	Carbon	.25
P-A95104	100,000 ohm	Carbon	.25
P-A94402	4,000 ohm	Carbon	.20

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and leak 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 accurately calibrated signals at and around 262 K.C., the intermediate frequency, and an output indicating meter are desirable.

First set the signal generator at approximately 262 K.C. Connect the antenna lead from the generator to the control grid of the I. F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A.V.C. action. Note from Fig. 10 that the second I.F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262 K.C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Then adjust the two intermediate frequency condensers for maximum output. One

of the I.F. condenser screws is reached through the hole on the top of the 1st I.F. assembly can. The other I.F. condenser screw is reached from the bottom of the sub-panel through a hole at the bottom of this assembly.

Now set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the generator in this instance, connected to the antenna lead of the receiver. Connect the flexible drive shaft to the chassis if it has been disconnected. As explained previously, the dial scale should be at the low frequency end and stop when the rotor is completely in mesh. Then turn the station selector knob until the dial scale is at 1400 K.C.

Then adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section 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 through a hole in the back wall of the sub-panel.

A non-metallic screwdriver is necessary for this adjustment. 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.

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.

Rattle

If rattle is experienced when a signal is being received, it is, in practically all cases, due to mechanical vibration at some point in the chassis. Inspect the chassis and look for a loose tube shield or a loose part at some point which can rattle against another part. When the vibrating part is found, secure it in place in some manner. This can generally be done

with a wedge made of a piece of paper, cardboard or wood. Rattle may, in some instances, be due to a loose cover. If this is the case, remove the cover and bend the edge of the chassis box outward between the screw holes so that the cover will fit tightly when it is put on.

If the Receiver Fails to Operate

"A" Fuse—Check the "A" line fuse in the cable.

"A" Line Open—See if power is being supplied to the speaker, tube heaters, and "B" eliminator.

"B" Eliminator Not Working—See if the "B" eliminator is in proper working order by checking the high voltage points at the tube plate terminals (see Fig. 10).

Antenna and Lead—See if antenna is properly connected to lead-in wire and antenna lead from set. Be sure antenna system is not grounded at any point.

All Tubes Not Inserted—See if all tubes are inserted as per Fig. 8.

Defective Tubes—Try out a new set of tested tubes.

Grid Caps Not Connected—See if all grid caps are properly connected to top of top grid connection tubes.

Variable Condenser Plates Shorted—Check condenser sections in chassis carefully for foreign particles or rotor stator rubbing.

Replacing Drive Cord

The drive cord in this receiver may be replaced as follows:

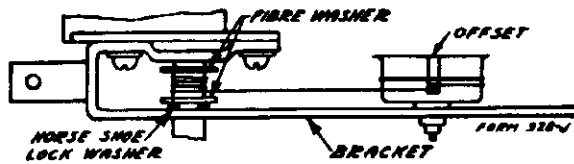


Fig. 3—Cord Drive—Top View

First remove the chassis from the case as explained on page 4.

Some of the first models did not have two fibre "end" washers on the drive shaft to protect the drive cord as shown in Fig. 3. If this is the case, these washers should be put on as follows:

Separate and take off the horse-shoe lock washer which holds the drive shaft in position. This may be done with a fine jawed, long nose plier.

Now pull the drive shaft out just far enough to permit the two fibre washers to be slipped over the end of the shaft.

Then slip the shaft into place and replace the horse-shoe lock washer.

Knot one end of the new drive cord and with the condenser plates in a completely closed position, slip the drive cord through the small hole "A" in the drive drum — see Fig. 4. The knot will then be on the inside of the drum.

Now wrap the cord around the lower half of the drive drum as indicated and bring it up to the drive shaft. Proceed by wrapping it in a clockwise direction (from

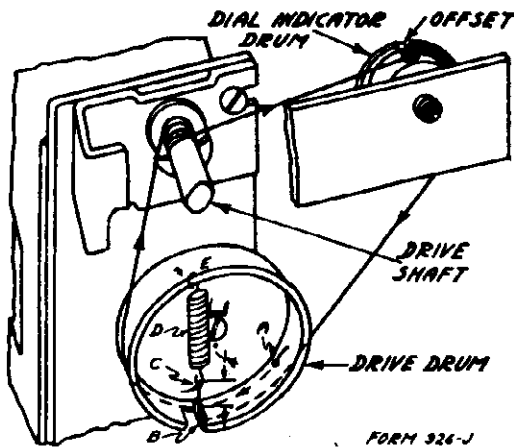


Fig. 4—Cord Drive Replacement

front) around the drive shaft three and one-quarter turns between the two fibre washers, progressing towards the front of the chassis. Be sure that the condenser plates are kept in a closed position and that the cord is held tight.

Set the dial indicator drum so that the offset is at the top or a little to the right of the center — see Fig. 4.

Wrap the cord from the drive shaft once around the offset in the dial indicator drum and then approximately one and one-half turns around the drum itself in a clockwise direction, progressing toward the back.

From the dial indicator drum draw the cord over the lower right hand quarter of drive drum as shown in Fig. 4.

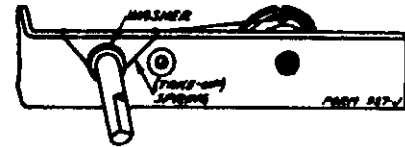


Fig. 5—Drive "Take-up" Spring

Then bring the cord inside of the drum by way of the turned-in portion of the flange at "B".

Tie the drive tension spring "D" to the loose end of the cord at the point "C" just above the top edge of the lip "B" as shown in the illustration. This should be done so that the lower hook of spring "D" at point "C" will be between $\frac{1}{8}$ " and $\frac{1}{4}$ " from top edge of the turned-in portion of the flange "B" in the flange of the drive drum. After the spring is hooked and the drive turned over several times the tension in the cord will cause this distance to become about $\frac{1}{4}$ ".

Now, by applying a tension on the drive spring "D", hook the other end of the spring into the small hole "E" near the top of the drive drum. Hook spring from the inside out.

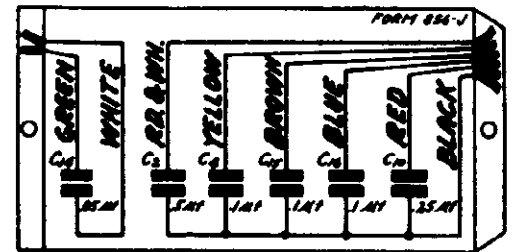
After the cord has been put on it may be necessary to calibrate the receiver as explained in the article on condenser alignment.

All of the earlier models did not have drive shaft "take-up" springs. This spring will prevent any tendency toward change of setting should the receiver be subjected to vibration. To insert these springs and fibre washers on the drive shaft proceed as follows:

Remove the station selector knob by pulling it off of the shaft.

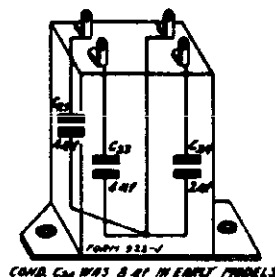
Slip the small fibre washer over the shaft and clip the "take-up" spring to the drive bracket as shown in Fig. 5.

The chassis may now be replaced into the case in the reverse order of the manner in which it was removed.



COND. C₆ REMOVED FROM BLOCK IN LATER MODELS

Fig. 6—Condenser Block Internal Wiring



COND. C₃ WAS 0.4M IN EARLY MODELS

Fig. 7—Electrolytic Block Internal Wiring

MODEL 9-735
Schematic, Voltage
Socket, Trimmers, Parts

WESTERN AUTO SUPPLY CO.

VOLTAGES AT SOCKETS
Input 6.3 Volts—Antenna Disconnected at Connector

Type of Tube	Function	Volts at Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
6D6	R. F.	6.2	154	95	3.0	5.2
6C6	1st Det. & Osc.	6.2	160	97	0	3.0
6D6	I. F.	6.2	154	95	3.0	5.2
75	2nd Det. & 1st A. F.	6.2	110	—	1.	.25
41	Power	6.2	143	146	14.	13.0

Dec, 1934

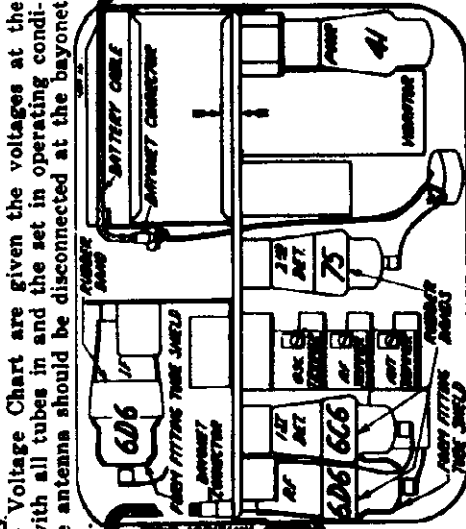
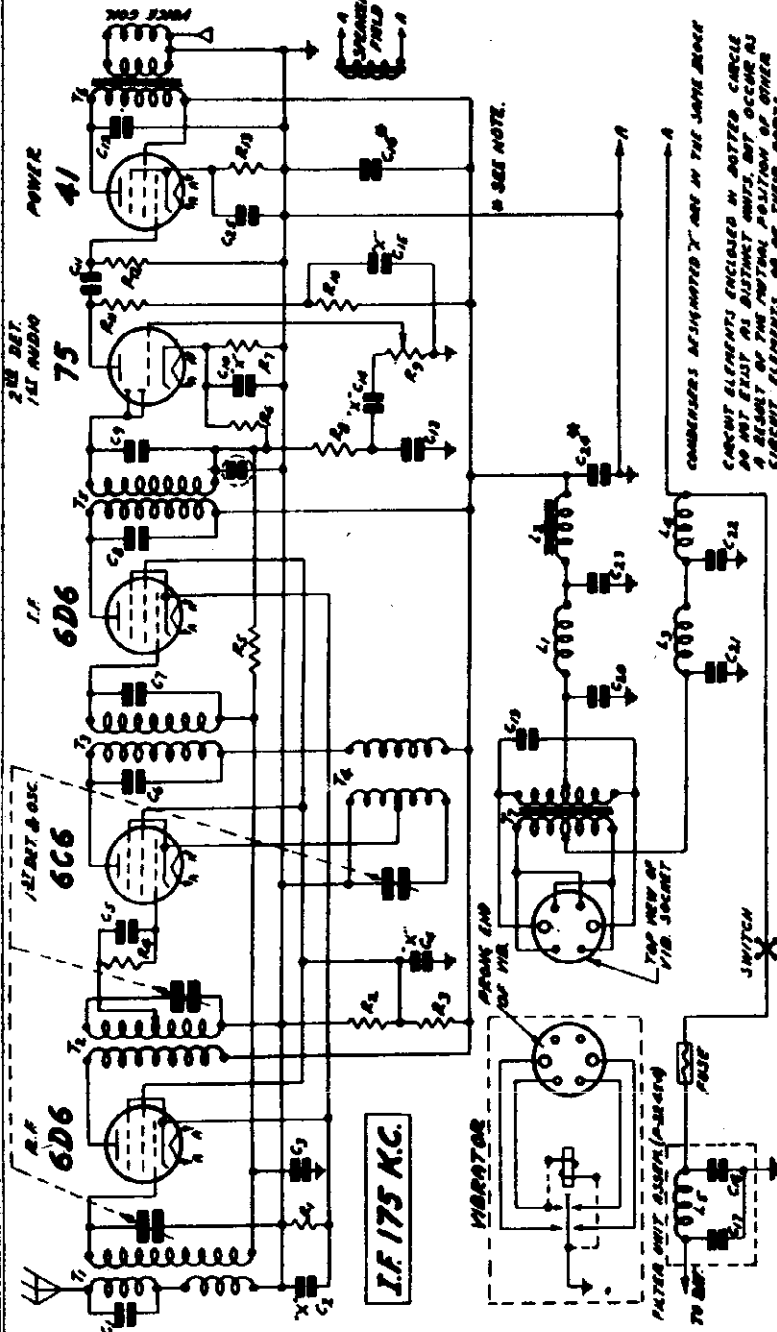


Fig. 2—Location of Tubes and Vibrator

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 at the bayonet connector.

RESISTORS

Part No.	Code	Resistance Wat.	Type
P-B94351ww	R1	350 Ohm	Flexible Wire Wound
P-B95233	R2	25,000 Ohm	Carbon
P-B95103	R3	10,000 Ohm	Carbon
P-A95105	R4	1 Megohm	Carbon
P-A95105	R5	1 Megohm	Carbon
P-A95104	R6	500,000 Ohm	Carbon
P-A94752	R7	7,500 Ohm	Carbon
P-A95104	R8	100,000 Ohm	Carbon
P-A95104	R9	2,000 Ohm	Carbon
P-A95503	R10	50,000 Ohm	Carbon
P-A95204	R11	200,000 Ohm	Carbon
P-A95504	R12	500,000 Ohm	Carbon
P-B94801ww	R13	800 Ohm	Flexible Wire Wound

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-81814	C1	250 mfd.	200V.	Part of Antenna Coil Assembly
P-82600D	C2	50 mfd.	140V.	Bypass Block
	C3	10 mfd.	140V.	Bypass Block
	C4	10 mfd.	200V.	Bypass Block
	C5	25 mfd.	200V.	Bypass Block
	C6	.05 mfd.	200V.	Tubular
	C7	.05 mfd.	200V.	Tubular
	C8	.05 mfd.	200V.	Tubular
	C9	.05 mfd.	200V.	Tubular
	C10	.05 mfd.	200V.	Tubular
	C11	.05 mfd.	200V.	Tubular
	C12	.05 mfd.	200V.	Tubular
	C13	.05 mfd.	200V.	Tubular
	C14	.05 mfd.	200V.	Tubular
	C15	.05 mfd.	200V.	Tubular
	C16	.05 mfd.	200V.	Tubular
	C17	.05 mfd.	200V.	Tubular
	C18	.05 mfd.	200V.	Tubular
	C19	.05 mfd.	200V.	Tubular
	C20	.05 mfd.	200V.	Tubular
	C21	.05 mfd.	200V.	Tubular
	C22	.05 mfd.	200V.	Tubular
	C23	4.0 mfd.	250V.	Dry Electrolytic Block
	C24	2.0 mfd.	25V.	Dry Electrolytic Block
	C25	4.0 mfd.	25V.	Dry Electrolytic Block

CONDENSERS (continued)

Part of 1st I. F. & Osc. Coil Assembly
Part of 2nd I. F. Coil Assembly
Part of Grid Leak Assembly
Part of Antenna Coil Assembly

In the first models of this receiver a bypass condenser block (P-82600) containing condensers C2, C4, C10, C14, C15 and C16 was used. Condenser C16 was removed in the later models and added as a separate tubular condenser (P-81132) while the other condensers remained in the block (P-82600-D).
A second condenser change from the earlier models was in the electrolytic filter block (P-82002). In this block section C24 was changed from an 8 mfd., 250 volt to a 2 mfd., 250 volt condenser.

CONNECTIONS

Part No. Code Capacity Voltage Type

P-81116 C1 250 mfd. 200V. Part of Antenna Coil Assembly

P-81815 C2 50 mfd. 140V. Bypass Block

P-81814 C3 10 mfd. 140V. Bypass Block

P-81806 C4 10 mfd. 200V. Bypass Block

P-81806 C5 25 mfd. 200V. Bypass Block

P-81115 C6 .05 mfd. 200V. Tubular

P-81114 C7 .05 mfd. 200V. Tubular

P-81814 C8 .05 mfd. 200V. Tubular

P-81132 C9 .05 mfd. 200V. Tubular

P-81120 C10 .05 mfd. 200V. Tubular

P-81122 C11 .05 mfd. 200V. Tubular

P-81816 C12 .05 mfd. 200V. Tubular

P-82002 C13 4.0 mfd. 250V. Dry Electrolytic Block

P-82500 C14 2.0 mfd. 25V. Dry Electrolytic Block

P-82500 C15 4.0 mfd. 25V. Dry Electrolytic Block

WESTERN AUTO SUPPLY CO.

MODEL S-735
Alignment, Notes
Test Data, Parts

Condenser Alignment

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 an output meter are required for indicating the effect of adjustments.

First remove the cover of the box. Leave the antenna and battery cables connected to the chassis.

Disconnect the car antenna and connect antenna cable lead to the lead from the signal generator.

Set the signal generator for 1650 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator adjustment is 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.

Now 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 calibrate the receiver, tune in a station of known frequency at about the center of the dial. Remove the escutcheon plate and glass. The pointer is held in position by friction. Grasp the pointer at the center and turn it until it points to the frequency of the station being received.

The use of the cut plate type of condenser eliminates the necessity of a 600 K. C. padder and, therefore, no adjustment at this frequency is required.

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 K. C. with the volume control about three-fourths on. Drop the chassis from the cover. The location of the antenna trimmer is shown in 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.

Removing Chassis From Case

First unsolder the black, brown, yellow, and green speaker leads which connect to the terminal strip adjacent to the vibrator unit. Next, notice the small length of braided shielding which is soldered to the solder lug that is secured to the chassis case between the dial scale and the station selector control shaft. Unsolder this shielding at the lug.

Remove the 4 screws which hold the chassis in the case — 2 are in the side and 2 on the speaker panel of the chassis case. (Do not remove the four speaker mounting screws.)

Remove the two control knobs by pulling them off of the shaft.

Next remove the volume control. To do this first loosen the hexagonal nut on the inside of the case with a flat wrench. Then unscrew and remove the round knurled nut from the front.

The chassis may then be taken out.

Replacing Vibrator Unit

The vibrator unit is plugged in in the same manner as a tube. This unit may, in case of failure, be readily replaced. CAUTION—Polarity, as explained in the label on the unit and in the label on the metal box in the chassis, must be observed when plugging in vibrator unit.

In replacing the vibrator unit be sure to replace the corrugated cardboard pad, which prevents the unit from working its way out of the socket.

When servicing this receiver, a new vibrator unit should be tried out in the same manner as a new set of tubes would be tried out.

One or more vibrator units should be kept on hand for replacement purposes.

Replacing Volume Control

To remove the volume control and the switch, first pull the knob from the volume control shaft. Next loosen the hexagonal nut on the inside of the case with a flat end wrench. Then unscrew and remove the round knurled nut from the front.

The old volume control and switch connections may now be unsoldered and the new unit put in its place and the leads resoldered.

Fasten the volume control to the case in the reverse order in which it was removed.

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.	Item	Code	D.C. Resistance in Ohms
P-5247	Antenna Trans. Pri. in Series	T1	17.50
	Antenna Trans. Sec.	T1	5.25
P-5248	R. F. Interstage Trans. Pri.	T2	2.31
	R. F. Interstage Trans. Sec. (Center Tap to Inside)	T2	3.23
	(Center Tap to Outside)		3.98
P-5249	1st I. F. Trans. Primary	T3	100.00
	1st I. F. Trans. Secondary	T3	100.00
	Oscillator Cathode Coil (Total)	T4	4.50
	Oscillator Plate Coil	T4	9.00
P-5250	2nd I. F. Trans. Pri.	T5	100.00
	2nd I. F. Trans. Sec.	T5	100.00
P-50656	Power Trans. Pri.	T7	0.36
	Power Trans. Sec.	T7	860.00
P-5174	"R" R. F. Choke	L1	1.65
P-50657	Power Choke	L2	390.00
P-5251	"A" Choke	L3	Small
P-5253	Line Choke	L4	Small
P-5252	Choke Coil	L5	Small
P-2228	Output Trans. Pri.	T6	690.00
	Output Trans. Sec. and Voice Coil in Par.		9.00
	Speaker Field		6.99

When ordering parts be sure and give the part number. Also give the complete serial number which includes the Series No.

Part No.	Item
P-1885	6106 Tube Socket
P-1886	6C Tube Socket
P-1775	75 Tube Socket
P-1911	41 Tube Socket
P-5247	Antenna Coil Assembly Less Can
P-40415B	Can for above assembly Part of Gang Condenser Assembly
P-5248	R. F. Interstage Coil Assembly Less Can
P-40447C	Can for above assembly Part of Chassis Assembly
P-5249	1st I. F. and Oscillator Coils and Can Assembly
P-5250	2nd I. F. Coil and Can Assembly
P-2228	Dynamic Speaker
P-10159	Cardboard Baffle for Speaker
P-2229	Vibrator Unit
P-3030	Vibrator Socket
P-50656	Power Transformer
P-5251	R. F. "A" Choke Coil
P-5174	R. F. "R" Choke Coil
P-50657	Power Choke Coil Assembly
P-5253	Filament Choke Coil
P-2220	2 Half Tube Shields with Clamping Ring
P-2240	Grid Leak and Condenser Assembly
P-2224	Knobs
P-20960	Thumb Screws
P-10356	Glass Crystal
P-10361	Gasket for Glass Crystal
P-30342A	Grid Clip only
P-10213	Wide Rubber Bands for Tubes
P-70774	Shielded Antenna Cable
P-70781	"A" Battery Cable
P-1421	Single Lug Terminal Strip
P-2082	Double Insulated Terminal Strip
P-2232	Five Lug Terminal Strip
P-1933	Cinch Terminal Lug
P-20701	Drive Tension Spring
P-20953	Horse-shoe Lock (Washer)
P-2227	Dial Strip
P-20754	Dial Pointer

MODEL S-740
Schematic

WESTERN AUTO SUPPLY CO.

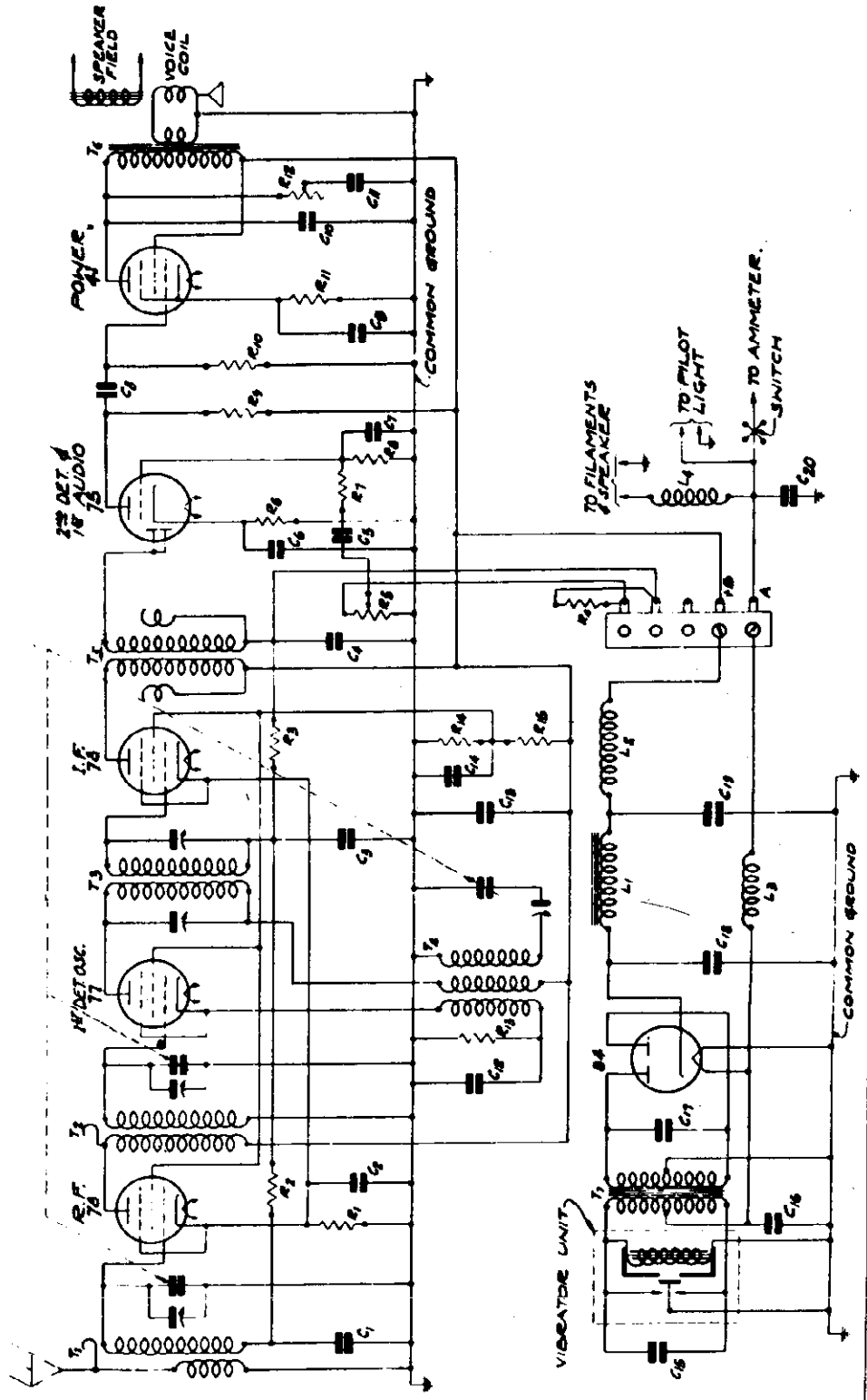
- 1. FILTER CHoke (P-50637)
- 2. R.F. INTERSTAGE COIL (P-5174)
- 3. ELIMINATOR IN CHROME (P-5125)
- 4. R.F. IN CHROME (P-5167)

- 5. ANTENNA COIL (P-5059)
- 6. R.F. INTERSTAGE COIL (P-5058)
- 7. 12.7" A. OSCILLATOR COIL (P-5053)
- 8. 22.5" P. COIL (P-5052)
- 9. OUTPUT TRANS. (P-5053)
- 10. POWER TRANS. (P-5053)

- R₁ 250 OHMS
- R₂ 10 MEG OHM
- R₃ 20 "
- R₄ 250,000 OHM
- R₅ 250,000 OHM
- R₆ 4,000 OHM
- R₇ 10,000 OHM
- R₈ 10,000 OHM
- R₉ 15,000 OHM
- R₁₀ 250,000 OHM
- R₁₁ 50,000 OHM
- R₁₂ 4,000 OHM
- R₁₃ 20,000 OHM
- R₁₄ 15,000 OHM
- R₁₅ 15,000 OHM

- C₁ 0.050 MFD. TUBULAR
- C₂ 0.500 MFD. (BLACK RED-WH)
- C₃ 0.050 MFD. (BLACK GR-WH)
- C₄ 0.0005 MFD. MICA
- C₅ 0.050 MFD. 500V TUBULAR
- C₆ 12,000 MFD. ELECTROLYTIC
- C₇ IN BLOCK WITH C₉
- C₈ 0.00025 MFD. MICA
- C₉ 0.050 MFD. (BLACK GR)
- C₁₀ 0.040 MFD. ELECTROLYTIC
- C₁₁ IN BLOCK WITH C₈
- C₁₂ 0.050 MFD. (BLACK GR)
- C₁₃ 0.0005 MFD. MICA
- C₁₄ 0.050 MFD. (BLACK GR)
- C₁₅ 0.050 MFD. (BLACK GR)
- C₁₆ 1,000 MFD. 120V. TUBULAR
- C₁₇ 0.0005 MFD. MICA
- C₁₈ 0.050 MFD. (BLACK GR)
- C₁₉ 0.050 MFD. (BLACK GR)
- C₂₀ 0.050 MFD. (BLACK GR)
- C₂₁ 0.050 MFD. (BLACK GR)
- C₂₂ 0.050 MFD. (BLACK GR)
- C₂₃ 0.050 MFD. (BLACK GR)
- C₂₄ 0.050 MFD. (BLACK GR)
- C₂₅ 0.050 MFD. (BLACK GR)
- C₂₆ 0.050 MFD. (BLACK GR)
- C₂₇ 0.050 MFD. (BLACK GR)
- C₂₈ 0.050 MFD. (BLACK GR)
- C₂₉ 0.050 MFD. (BLACK GR)
- C₃₀ 0.050 MFD. (BLACK GR)

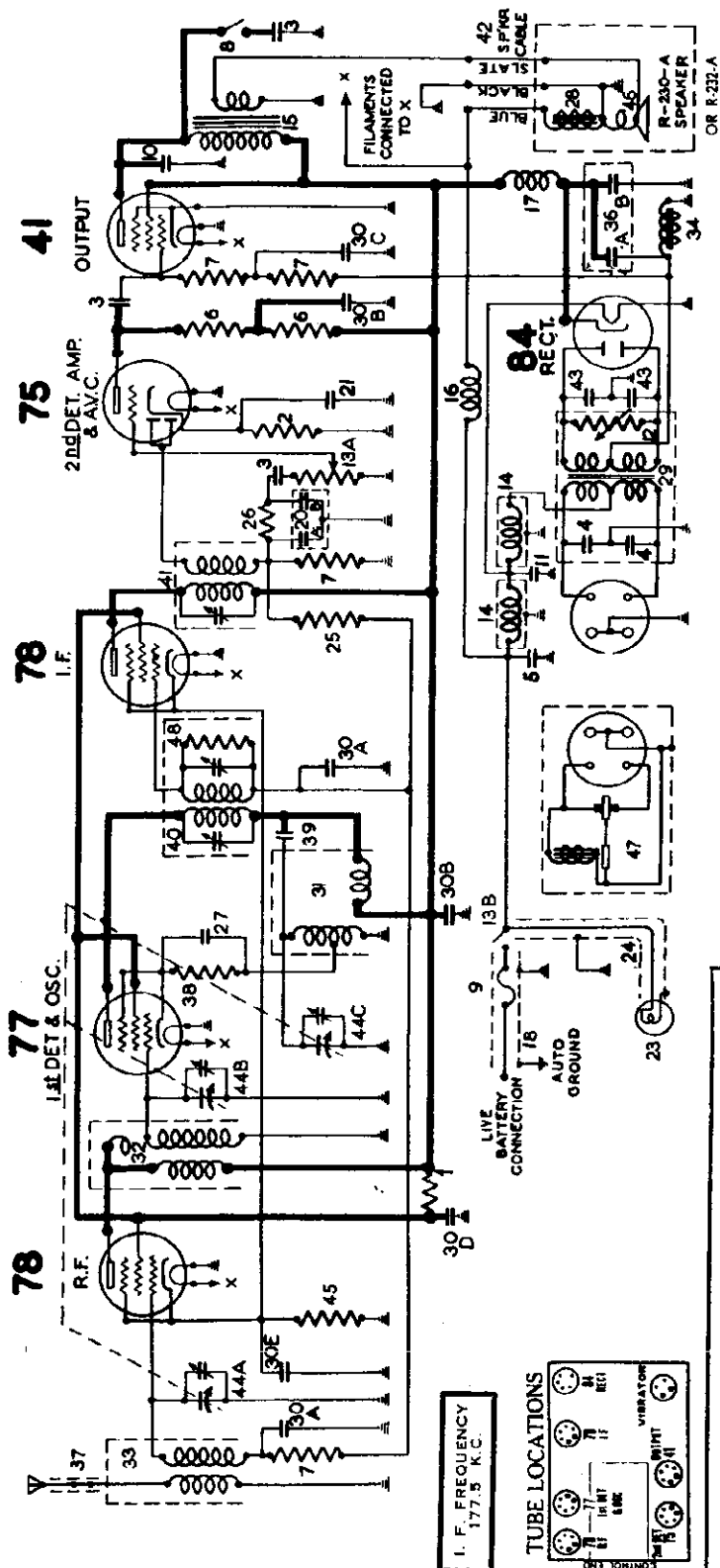
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WESTERN AUTO SUPPLY CO.

MODEL 8-745, 1312
Schematic, Voltage
Socket, Parts List

TRUETONE MODEL 1312



MODEL R-1312 PARTS LIST

Part No.	Description	Price
66023	60,000 ohm 1 watt carbon resistor	\$0.25
67580	6,000 ohm 1/4 watt carbon resistor	.15
83007	.02 mfd. 600 volt paper condenser	.35
83058	.25 mfd. 100 volt paper condenser	.35
83063	.5 mfd. 100 volt paper condenser	.45
83069	51,000 ohm 1/4 watt carbon resistor	.20
83089	200,000 ohm 1/4 watt carbon resistor	.30
83179	100,000 ohm 1/4 watt carbon resistor	.30
83207	100,000 ohm 1/4 watt carbon resistor	.30
83706	1.5 mfd. 100 volt paper condenser	.30
83714	1.5 mfd. 100 volt electrolytic condenser	.30
83725	Special Globe Resistor	.45
83750	Vibrator R.F. Choke	.35
83751	Output transformer	2.60
83762	Filament R.F. choke	.16
83728	(800,000 ohm volume control)	1.90
83770	Line Switch	.40
83777	50 ohm supply R.F. choke	.40
83765	Battery lead and fan housing	.60
83766	Dual .0005 mfd. molded mica condenser	.32
84008	6-8 volt dial light bulb	.15
84099	Dial light cable	.35
84235	1.1 megohm carbon resistor	.20
84238	11,000 ohm 1/4 watt carbon resistor	.20
84282	.001 mfd. molded mica condenser	.25
84791	Field coil and housing (R-230A only)	2.50
84792	Field coil and housing (R-232A only)	2.50
84793	Diaphragm, and shall assembly (R-232A only)	2.10
84798	Power transformer	3.50
50A	.05 mfd. 300 volt paper cond. (green-white)	2.50
30B	.1 mfd. 400 v. paper cond. (red or red-white)	
30C	.25 mfd. 100 volt paper cond. (green lead)	
30D	.35 mfd. 300 volt paper cond. (white lead)	
30E	.5 mfd. 100 volt paper cond. (orange lead)	
84814	Oscillator (O) coil and shield assembly	1.50
84822	R.F. (B) coil and shield assembly	1.50
84823	Antenna (A) coil and shield assembly	1.40
84827	50 ohm supply R.F. choke	1.25
84829	100,000 ohm 1/4 watt electrolytic condenser	2.50
84831	Antenna lead 1/4 watt carbon resistor	.10
84833	.00007 mfd. molded mica condenser	.20
84838	1st. I.F. transformer assembly	2.75
84842	2nd. I.F. transformer assembly	2.60
84845	Speaker cable	.50
84850	.03 mfd. 750 volt paper condenser	.25
84866	Three gang variable condenser with mounting plate and shaft coupling	6.00
300 ohm.	1/2 watt flexible wire resistor	.20
84888	Diaphragm, and shall assembly	2.10
84891	(R-230A only) (Part #8119 for R-232A)	.20
84905	Vibrator	2.50
85000	510,000 ohm 1/4 watt resistor	.20
85051	8000 ohm 1/4 watt carbon resistor	.25
85118	Field coil and housing (R-232A only)	2.50
85119	Diaphragm, and shall assembly (R-232A only)	2.10

SOCKET VOLTAGES

BOTTOM VIEW OF CHASSIS

ABBREVIATIONS THESE VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS

BATTERY VOLTAGE 6.0

IMPORTANT: Use high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon range of meter. Make allowances for battery voltage variations.

NOTE A: The actual bias on the grid of the 41 tube is -23 volts which must be measured from chassis to the ungrounded filter choke terminal. Due to the high resistance of the grid lead, the voltmeter will show only about -1 volt at the grid.

MODEL S-745,1512
Alignment, Parts
Circuit Data

WESTERN AUTO SUPPLY CO.

SERVICE DATA FOR TRUETONE MODEL 1312

CIRCUIT DESCRIPTION

In the R-131 Chassis, the incoming signal is tuned and amplified in the 78 R.F. stage. Further amplification and frequency conversion to 147.5 KC. take place in the 77 combination first detector and oscillator tube.

The 177.5 KC. signal is amplified in the I.F. stage, using a 78 type tube, and 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. 7. The audio component of this voltage appears across the 500,000 ohm volume control. Any part or all of this audio signal may be impressed on the triode section of the 75 tube where amplification takes place.

The modulated drop across resistor No. 7 is filtered and applied to the grids of the 78 R.F. and I.F. tubes to provide A.V.C.

POWER SUPPLY PROTECTIVE RESISTOR

The filter system and the rectifier tube are protected against breakdown during the warming-up period by the Global resistor connected across the high voltage secondary of the power transformer (No. 12 in the circuit diagram). This resistor drops rapidly in resistance as the voltage across it rises, so that it acts as a load on the power transformer during the warm-up period and keeps the voltage below the danger point until the tubes are heated and take their normal current. Because of its unique voltage characteristics, the Global resistor cannot be tested with an ordinary ohmmeter, since it will show a resistance of several megohms.

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 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 should be connected from the 41 plate to ground through a .25 mfd. condenser or across the voice coil, depending upon its sensitivity. A convenient point to connect the 41 plate is the terminal of the tone control switch.

During all calibration and alignment adjustments, keep the volume control full on.

I. F. ALIGNMENT

The I.F. trimmers are located on the top of the I.F. transformers which may be reached by removing the front cover. The modulated oscillator should be set to exactly 177.5 K.C. and connected from the 77 control grid to ground. Adjust the oscillator output to give about half-scale reading of the output meter. Tune the set to make certain that no station or 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 Auto Radio is calibrated in kilocycles, except that the last two zeros have been omitted. Inasmuch as changes in the position of the flexible shafts may cause the calibration to vary, the dial can be calibrated as follows:

Tune in a station of known frequency between 800 and 1100 K.C. Insert a screw driver in the slotted shaft on the rear of the control head. Hold the tuning control knob so that the station remains tuned in properly and by turning the screw driver adjust the dial pointer so that it indicates the station frequency.

If the set is badly out of calibration such that it calibrates correctly at one part of the dial but not at another, it is necessary to adjust the oscillator shunt trimmer as explained below.

The gang condenser trimmers can be reached by removing the back cover. Connect a .00025 mfd. mica condenser in series with the output of the test oscillator and the aerial lead of the receiver. This condenser is absolutely necessary to secure proper alignment of the antenna stage.

Set the test oscillator to exactly 600 K.C. Tune the radio set to maximum volume. Calibrate the dial at the low frequency end by setting the pointer to read exactly 6.0 (600 K.C.).

Set the test oscillator to exactly 1400 K.C. Turn the tuning knob until the dial pointer indicates 14.0 (1400 K.C.) and then adjust the oscillator shunt trimmer (third one from shaft end of the variable condenser) until the signal is received with maximum output. Then adjust the other two gang condenser trimmers as directed under R.F. alignment.

R. F. ALIGNMENT

With the test oscillator set to approximately 1400 K.C., tune the set very carefully for maximum output.

Adjust the output of the 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.

MISCELLANEOUS PARTS NOT SHOWN ON DIAGRAM

Part No.	Description	List Price
12606	Receiver mtg. nut (5/16—18 hex.)	\$6.02
81346	1 lug terminal strip	.01
83114	15,000 ohm spark plug suppressor	.25
83145	10,000 ohm distributor suppressor	.35
83242	No. 8 x 1/2 self tapping screw (dark finish for mtg. back cover and radio brackets)	.02
83319	Fine insulation tube	.02
83623	No. 8 x 1/2 self tapping screw (flat plate for mtg. power transformer)	.01
83711	8 lug terminal strip	.12
83719	Front cover mtg. spade bolt (8-32)	.01
83720	1 lug terminal strip	.02
83721	Battery lead plug rubber grommet	.02
83727	Back cover	.90
83737	Front cover knurled nut	.06
83771	Receiver mounting stud	.06
83772	Receiver mounting dash support washer	.01
83806	Speaker grill cloth	.12
83892	Variable condenser shaft coupling	.10
83893	Volume control shaft guide bushing	.05
83901	Generator condenser	.70
81069	Case assembly, less covers	5.75
81093	Front cover and speaker grill cloth	1.00
81911	Aluminum vibrator shield assembly	.50

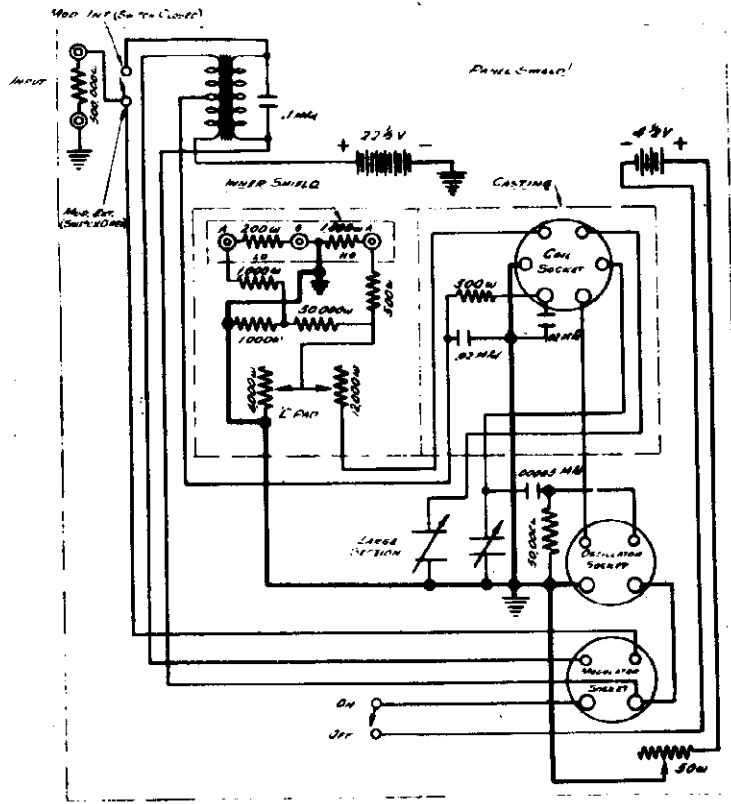
REMOTE CONTROL HEAD PARTS

Part No.	Description	List Price
15210	Long mtg. strap screw (110/32 x 1 1/2" R.H.M.S.)	.01
81059	Case screw (1-10 x 3/16")	See handbook
81060	Flexible casing set screw	.02
81062	Steering post mtg. bracket	.25
81068	Steering post mtg. strap	.15
81073	Bezel and glass	.50
81076	Dial light button and socket	.25
81106	Volume control knob	.25
81309	Instrument panel mounting accessories	.15
81853	Complete accessories for installation	3.00

FLEXIBLE SHAFTS

Part No.	Description	List Price
81873	Tuning shaft, 23 inches long	1.50
81873	Volume control shaft, 23 inches long	1.50
81882	Tuning shaft, 36 inches long	2.00
81883	Volume control shaft, 36 inches long	2.00
81886	Tuning shaft, 30 inches long	2.00
81887	Volume control shaft, 30 inches long	2.00

WESTON ELECTRICAL INSTRUM'T CORP. MODEL 692, Type 1 Oscillator MODEL 780 Capacity Meter Schematics



NOTE: HEAVY LINES SHOW GROUND CONNECTIONS. THIS METHOD OF GROUNDING MUST BE CARRIED OUT EXACTLY AS SHOWN.

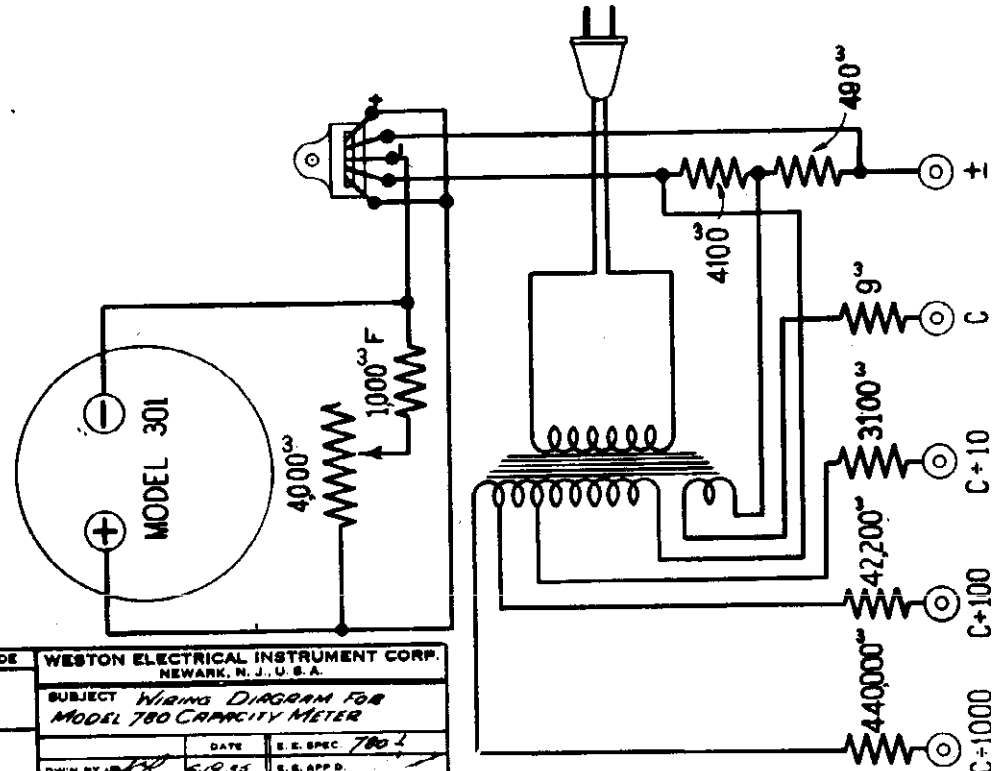
Case Winding CONNECTED TOGETHER PICK UP WINDING PICK UP WINDING GRID WINDING PICK UP WINDING

FEED BACK WINDING VIEW LOOKING AT BOTTOM OF COIL SCHEMATIC DIAGRAM SHOWING CONNECTIONS OF SELF CONTAINED WINDINGS ON THE FOLLOWING PLUS-IN COILS

FEED BACK WINDING VIEW LOOKING AT BOTTOM OF COIL SCHEMATIC DIAGRAM SHOWING CONNECTIONS OF SELF CONTAINED WINDINGS ON THE FOLLOWING PLUS-IN COILS

LOW FREQUENCY D-9378 HIGH FREQUENCY D-9379 BROADCAST D-9380 SHORT WAVE #1 D-9381 SHORT WAVE #2 D-9382 SHORT WAVE #3 D-9383

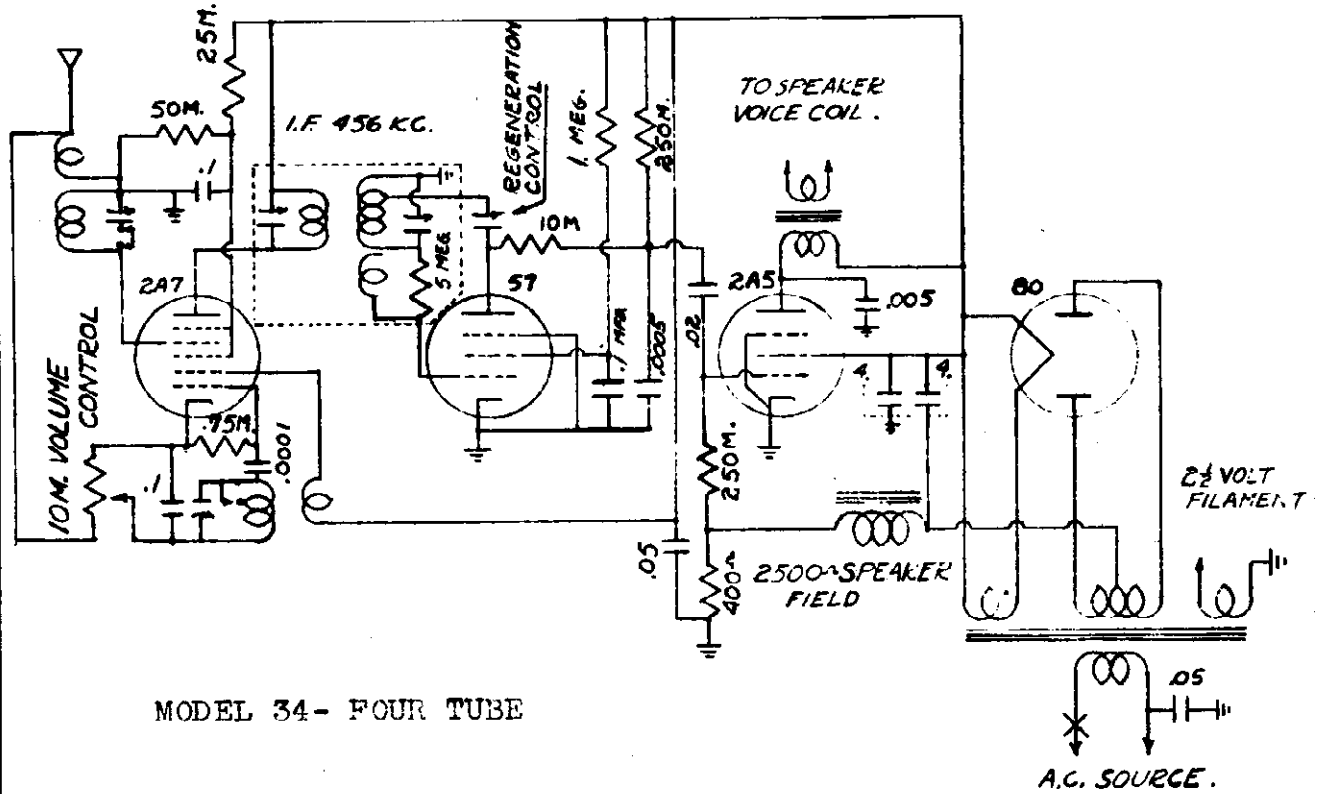
REV. SPEC.	5000	WESTON ELECTRICAL INSTRUMENT CORP. NEWARK, N. J. U. S. A.
SUBJECT: WIRING DIAGRAM FOR MODEL 692 OSCILLATOR TYPE		
REVISIONS	DATE	BY
1	6-9-35	G. G.
2	6-21-35	G. G.



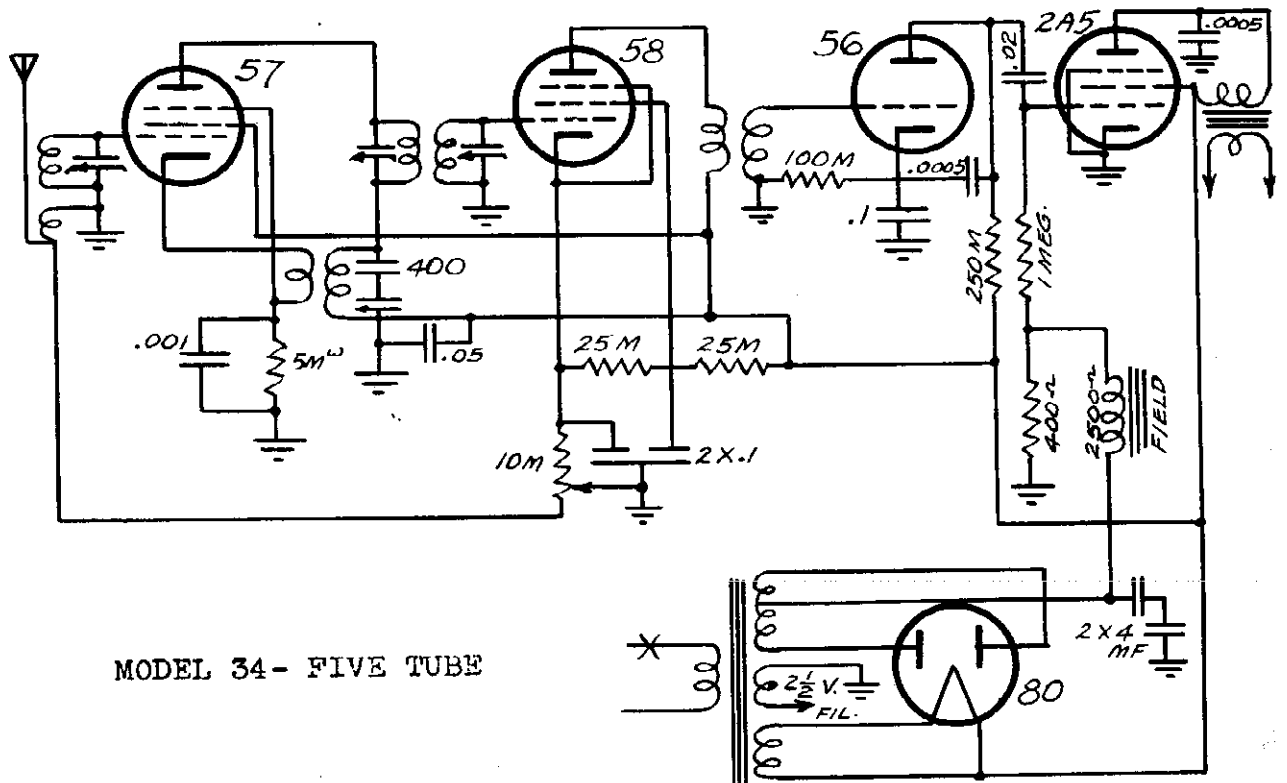
MAT. SPEC.	GRADE	WESTON ELECTRICAL INSTRUMENT CORP. NEWARK, N. J. U. S. A.
SUBJECT: WIRING DIAGRAM FOR MODEL 780 CAPACITY METER		
REMARKS: LOOKING AT BACK OF INSTRUMENT	DATE	E. S. SPEC. 780
FT	PER	N. D.
1000		
DESIGNED BY	DATE	DESIGN APP'D.
CHECKED BY G. G.	6-21-35	

WESTONE RADIO CORP.

MODEL 34, 4-Tubes
 MODEL 34, 5-Tubes
 Schematics

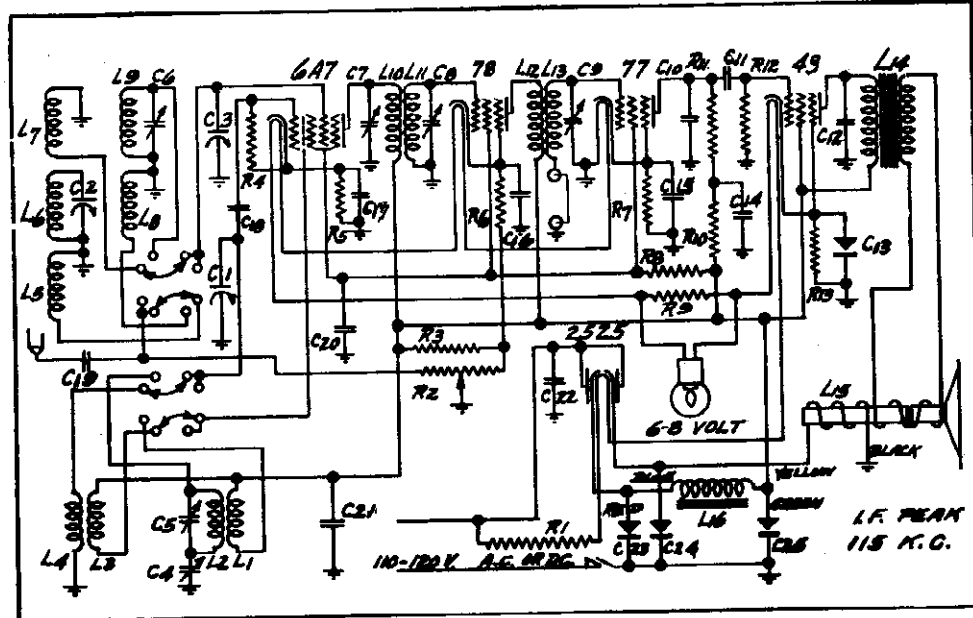


MODEL 34- FOUR TUBE



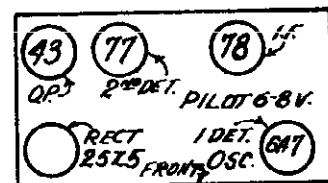
MODEL 34- FIVE TUBE

WILCOX-GAY CORP.



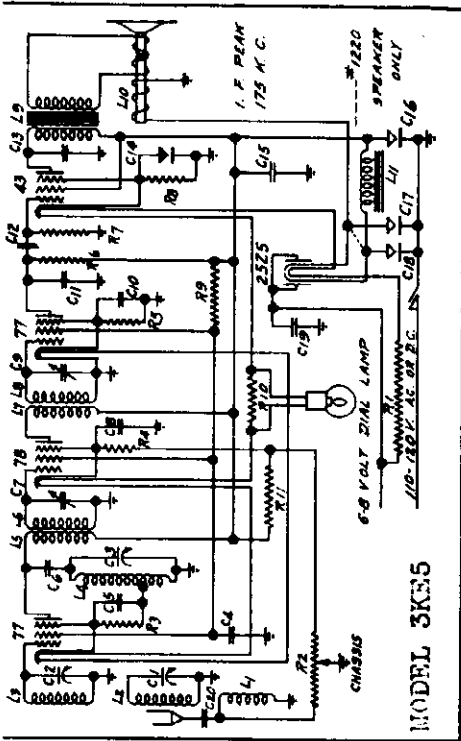
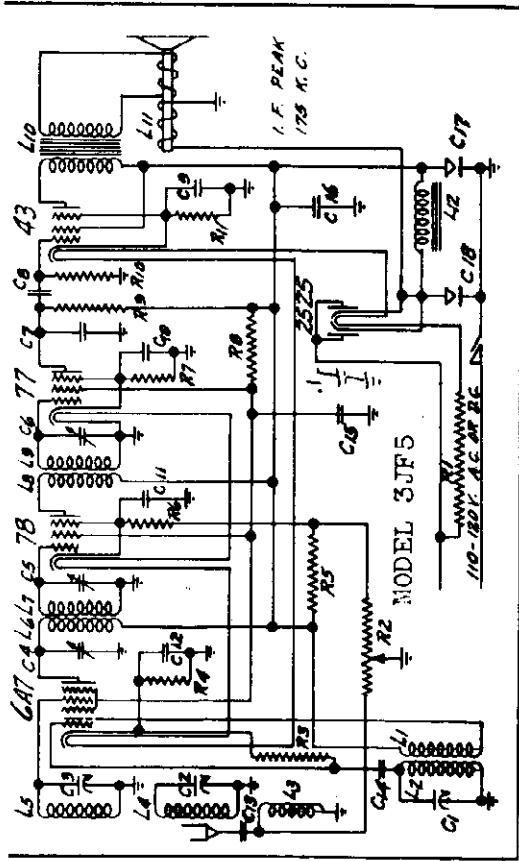
CODE	PART NO.	RESISTORS	CODE	PART NO.	RESISTORS
R1	30-1125	150 Ohm Resistor in Power Cord	C14	75-272A	.1 Mfd. 200 Volt 77 Plate Hum Filter
R2	19-1296	10,000 Ohm Volume Control & Switch	C15	75-267A	5. Mfd. 200 Volt 77 Cathode By-Pass
R3	53-922	75,000 Ohm Resistor I.F. Cathode Feed	C16	75-272A	.1 Mfd. 200 Volt 78 Cathode By-Pass
R4	55-896	50,000 Ohm Resistor Oscillator Grid	C17	75-272A	.1 Mfd. 200 Volt 6A7 Cathode By-Pass
R5	55-1062	250 Ohm Resistor 6A7 Cathode	C18	76-264	.00005 Mfd. Mica Oscillator Grid Condenser
R6	55-1063	500 Ohm Resistor I.F. Cathode	C19	76-265	.001 Mfd. Mica Antenna Series Condenser
R7	53-941	20,000 Ohm Resistor Second Detector Cathode	C20	75-272A	.1 Mfd. 200 Volt Screen By-Pass
R8	55-921	40,000 Ohm Resistor Screen Feed	C21	75-267A	.5 Mfd. 200 Volt B Supply By-Pass
R9	55-1306	20 Ohm Resistor Pilot Light Shunt	C22	75-272A	.1 Mfd. 200 Volt 110 Volt Line By-Pass
R10	55-923	100,000 Ohm 77 Plate Hum Resistor	C23	18-1085	10 Mfd. 150 Volt Dry Electrolytic Cond.
R11	55-924	250,000 Ohm Resistor 77 Plate	C24	18-1085	4 Mfd. 150 Volt Dry Electrolytic Cond.
R12	55-925	500,000 Ohm Resistor Output Grid	C25	18-1085	4 Mfd. 150 Volt Dry Electrolytic Cond.
R13	55-1063	500 Ohm Resistor Output Cathode	INDUCTANCES		
C1	77-833	336 MMFD. Oscillator Section of 3 Gang	L1	17-2015	Long Wave Oscillator Primary
C2	77-833	571 MMFD. Preselector Section of 3 Gang	L2	17-2015	Long Wave Oscillator Secondary
C3	77-833	571 MMFD. Preselector Section of 3 Gang	L3	17-2015	Broadcast Oscillator Primary
C4	78-2006	Long Wave Oscillator Series Trimmer	L4	17-2015	Broadcast Oscillator Secondary
C5	78-1597	Long Wave Oscillator Parallel Trimmer	L5	17-2015	Broadcast Preselector Primary
C6	78-1597	Long Wave Preselector Trimmer	L6	17-2015	Broadcast Preselector First Secondary
C7	78-995	First I.F. Primary Trimmer	L7	17-2015	Broadcast Preselector Second Secondary
C8	78-994	First I.F. Secondary Trimmer	L8	17-2015	Long Wave Preselector Primary
C9	78-788	Second I.F. Trimmer	L9	17-2015	Long Wave Preselector Secondary
C10	76-265	.001 Mfd. Mica 77 Plate By-Pass	L10	17-999	First I.F. Trans. Primary
C11	75-269A	.01 Mfd. 490 Volt Audio Feed Condenser	L11	17-999	First I.F. Trans. Secondary
C12	75-343A	.004 Mfd. Paper Output Plate By-Pass	L12	17-2032	Second I.F. Trans. Primary
C13	18-928	25 Mfd. 25 Volt Output Cathode	L13	17-2032	Second I.F. Trans. Secondary
			L14	64-1260	Single 45 Output Trans.
			L15	64-1260	3000 Ohm Speaker Field
			L16	14-940	20 Henry Filter Choke

Tube	Plate	Screen	Cathode
6A7	106	40	1.
78	106	40	1.5
77	30	40	1.5
45	100	106	15.
Osc. Plate 106, Grid -2.			
Field drop 112 v.			



MODEL 3JF5
MODEL 3KE5
Schematics, Socket
Voltage, Parts

WILCOX-GAY CORP.

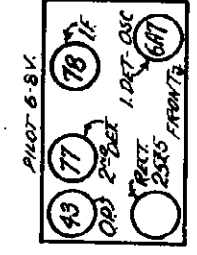


CODE	PART NO.	RESISTORS	INDUCTANCES
R1	20-809	170 Ohm Resistor In Power Cord	
R2	19-1898	10,000 Ohm Volume Control & Switch	
R3	55-096	50,000 Ohm Resistor Oscillator Cathode	
R4	55-1043	250 Ohm Resistor Oscillator Cathode	
R5	55-332	75,000 Ohm Resistor I.F. Cathode Feed	
R6	55-1043	500 Ohm Resistor I.F. Cathode	
R7	55-941	20,000 Ohm Resistor 77 Cathode	
R8	55-819	3,000 Ohm Resistor Screen Cathode	
R9	55-815	500,000 Ohm Resistor Output Plate	
R10	55-815	500,000 Ohm Resistor Output Cathode	
R11	55-1043	500 Ohm Resistor Output Cathode	
C1	77-255	556 Oscillator Section of 5 Gang	
C2	77-255	571 Preset Section of 5 Gang	
C3	77-255	571 Preset Section of 5 Gang	
C4	76-2008	First I.F. Primary Trimmer	
C5	76-2007	Second I.F. Trimmer	
C6	76-2009	First I.F. Secondary	
C7	76-285	Second I.F. Transformer Primary	
C8	75-289A	.01 Mfd. 400 Volt Audio Feed Condenser	
C9	75-289A	.5 Mfd. 200 Volt 45 Cathode By-Pass	
C10	75-272A	.1 Mfd. 200 Volt 77 Cathode By-Pass	
C11	75-272A	.1 Mfd. 200 Volt 78 Cathode By-Pass	
C12	75-272A	.1 Mfd. 200 Volt 8A7 Cathode By-Pass	
C13	76-865	.001 Mfd. mica Antenna Series Condenser	
C14	76-864	.0005 Mfd. mica Oscillator Grid Condenser	
C15	75-272A	.1 Mfd. 200 Volt Screen By-Pass	
C16	75-272A	.1 Mfd. 200 Volt B supply By-Pass	
C17	18-8001	6 Mfd. 150 Volt Dry Electrolytic Condenser	
C18	18-8001	6 Mfd. 150 Volt Dry Electrolytic Condenser	
L1	17-2030	Oscillator Coil Primary	
L2	17-2030	Oscillator Coil Secondary	
L3	17-2019	Presetector Coil Primary	
L4	17-2019	Presetector Coil Secondary	
L5	17-2024	First I.F. Transformer Primary	
L6	17-2024	First I.F. Transformer Secondary	
L7	17-2023	Second I.F. Transformer Primary	
L8	17-2023	Second I.F. Transformer Secondary	
L9	64-2008	Output Transformer for 443 Tube	
L10	64-2008	Output Transformer for 443 Tube	
L11	14-240	20 Henry Choke	

CODE	PART NO.	RESISTORS	INDUCTANCES
R1	183A	.2 Mfd. 200 Volt Second Detector Cathode By-Pass Condenser	
R2	265	.001 Mfd. mica Second Detector Plate Filter Condenser	
R3	281A	.01 Mfd. 100 Volt Audio Feed Condenser	
R4	662	.002 Mfd. mica Output Plate Filter Condenser	
R5	88	25 Mfd. 50 Volt B supply By-Pass Condenser	
R6	887-A	.5 Mfd. 200 Volt B supply By-Pass Condenser	
R7	1068	4 Mfd. 150 Volt Dry Electrolytic Condenser	
R8	1068	4 Mfd. 150 Volt Dry Electrolytic Condenser	
R9	1068	11 Mfd. 250 Volt Dry Electrolytic Condenser	
R10	272A	.1 Mfd. 200 Volt Line By-Pass Condenser	
R11	265	.001 Mfd. mica Antenna Series Condenser	
C1	846	Presetector Primary 178 turns #46 S.S.S.	
C2	846	Presetector First Secondary 133 turns #46 S.S.S.	
C3	846	Presetector Second Secondary 116 turns #46 S.S.S.	
C4	926	Oscillator Coil 45 turns #46 S.S.S.	
C5	926	First I.F. Primary 450 turns #46 S.S.S.	
C6	926	Plate I.F. Secondary, 400 turns #46 S.S.S.	
C7	1172	Second I.F. Primary 500 turns #46 S.S.S.	
C8	1172	Second I.F. Secondary 400 turns #46 S.S.S.	
C9	217	Mica 443 Output Transformer	
C10	240	20 Henry Choke	
L1	846	Presetector Primary 178 turns #46 S.S.S.	
L2	846	Presetector First Secondary 133 turns #46 S.S.S.	
L3	846	Presetector Second Secondary 116 turns #46 S.S.S.	
L4	926	Oscillator Coil 45 turns #46 S.S.S.	
L5	926	First I.F. Primary 450 turns #46 S.S.S.	
L6	926	Plate I.F. Secondary, 400 turns #46 S.S.S.	
L7	1172	Second I.F. Primary 500 turns #46 S.S.S.	
L8	1172	Second I.F. Secondary 400 turns #46 S.S.S.	
L9	217	Mica 443 Output Transformer	
L10	240	20 Henry Choke	

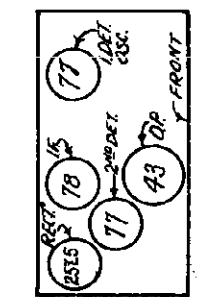
Tube	Plate	Screen	Cathode
6A7	80	60	2.
78	80	60	2.
77	25	60	3
43	70	80	15

Osc. Plate 80, Grid -2.
Field drop 90 v.



Tube	Plate	Screen	Cathode
Mix-Osc	118	65	3.6
I-F	118	65	2.2
2 Det.	77	52	3.2
Output	43	111	17.

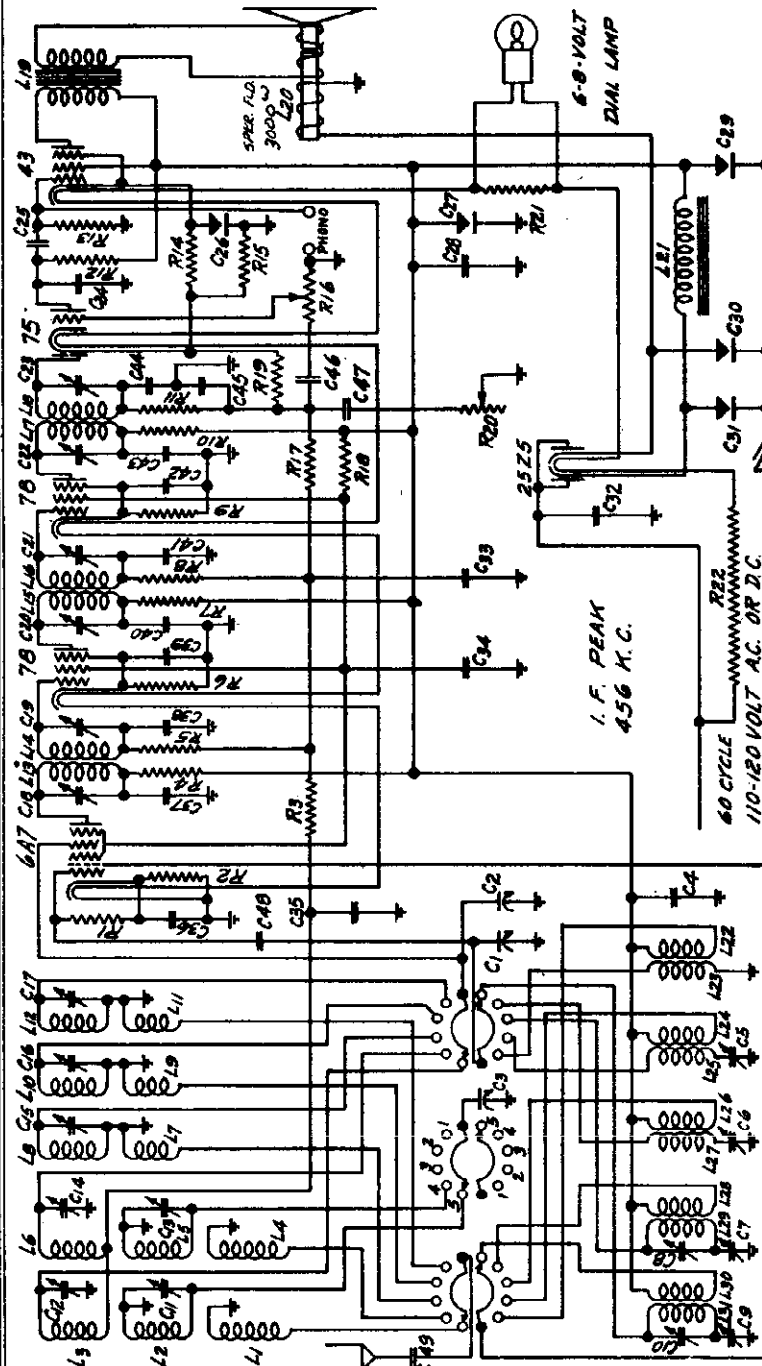
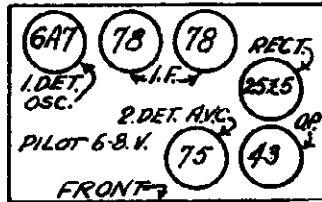
Field drop 155 v.



MODELS 4J6, 4JC6
Schematic, Socket
Voltage, Parts

WILCOX-GAY CORP.

Tube	Plate	Screen	Cathode
6A7	80	70	2
1 IF	72	70	3
2 IF	72	70	3
2 Det	55	-	1
Bat	80	95	12
6A7 P to Grd		95. G to Grd	-6

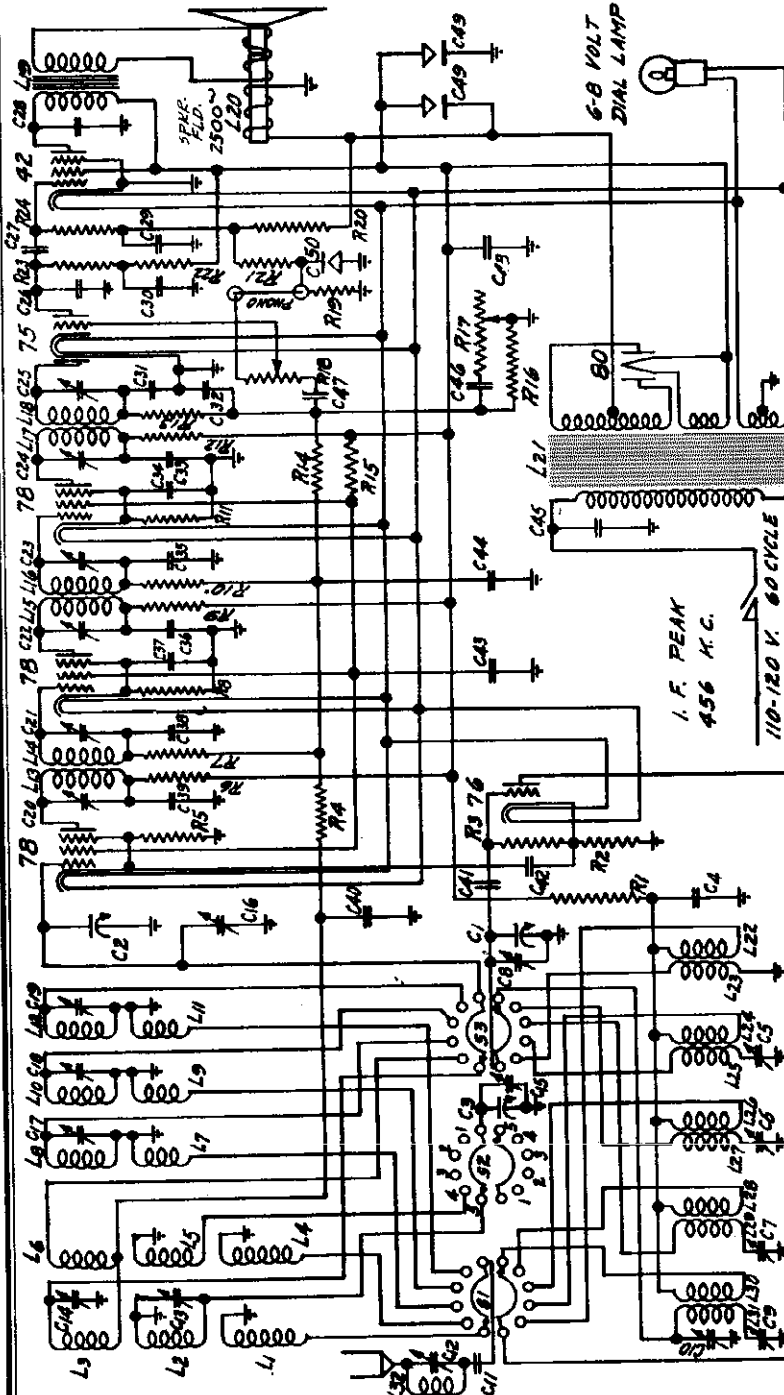
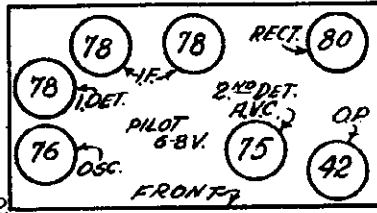


CODE PART NO.	RESISTORS	CONDENSERS	
R1 941	20,000 Ohm Oscillator Grid Resistor	C19 1561	70-120 MFD. First I.P. Secondary
R2 1062	250 Ohm Oscillator Cathode Resistor	C20 1561	70-120 MFD. Second I.P. Primary
R3 923	100,000 Ohm 47 P. Network Resistor	C21 1561	70-120 MFD. Second I.P. Secondary
R4 919	5,000 Ohm 47 P. Plate Isolation Resistor	C22 1561	70-120 MFD. Third I.P. Primary
R5 925	100,000 Ohm First I.P. Grid Isolation Resistor	C23 1561	70-120 MFD. Third I.P. Secondary
R6 1063	500 Ohm First I.P. Cathode Resistor	C24 265	.001 MFD. 75 Plate Filter Condenser
R7 919	5,000 Ohm First I.P. Plate Isolation Resistor	C25 269A	.01 MFD. 400 Volt Audio Feed Condenser
R8 923	100,000 Ohm Second I.P. Grid Isolation Resistor	C26 928	25 MFD. 25 Volt Dry Electrolytic Condenser
R9 1065	500 Ohm Second I.P. Cathode Resistor	C27 1579	4 MFD. 375 Volt Dry Electrolytic Condenser
R10 919	5,000 Ohm Second I.P. Plate Isolation Resistor	C28 846	1 MFD. 400 Volt Supply By-Pass Condenser
R11 898	50,000 Ohm Plate Filter Resistor	C29 1295	4 MFD. 150 Volt Dry Electrolytic Condenser
R12 923	100,000 Ohm 75 Plate Load Resistor	C30 1095	4 MFD. 150 Volt Dry Electrolytic Condenser
R13 925	500,000 Ohm 45 Grid Resistor	C31 1096	10 MFD. 150 Volt Dry Electrolytic Condenser
R14 1063	500,000 Ohm 45 Cathode Resistor	C32 272A	.1 MFD. 400 Volt A.V.C. Network Condenser
R15 1182	40 Ohm 75 Cathode Resistor	C33 272A	.1 MFD. 200 Volt A.V.C. Network By-Pass Condenser
R16 924	500,000 Ohm Volume Control & Switch Resistor	C34 267A	.5 MFD. 300 Volt Screen By-Pass Condenser
R17 926	1 Ohm A.V.C. Network Resistor	C35 269A	.01 MFD. 400 Volt A.V.C. Network Condenser
R18 919	5,000 Ohm R.F. & I.F. Screen Feed Resistor	C36 272A	.1 MFD. 200 Volt 60 Cycle By-Pass Condenser
R19 925	500,000 Ohm A.V.C. Load Resistor	C37 269A	.01 MFD. 400 Volt 75 Grid Feed Condenser
R20 1317	250,000 Ohm Tone Control Resistor	C38 269A	.01 MFD. 400 Volt First I.P. Grid Isolation Condenser
R21 1308	20 Ohm Pilot Light Shunt Resistor	C39 269A	.1 MFD. 200 Volt First I.P. Cathode Resistor
R22 1185	150 Ohm Resistor in Power Cord	C40 269A	.01 MFD. 400 Volt First I.P. Plate Isolation Condenser
		C41 269A	.01 MFD. 400 Volt Second I.P. Grid Isolation Condenser
		C42 269A	.1 MFD. 200 Volt Second I.P. Cathode Resistor
		C43 269A	.01 MFD. 400 Volt Second I.P. Grid Isolation Condenser
		C44 359	.0001 MFD. 100 Volt Plate Filter Condenser
		C45 359	.0001 MFD. 100 Volt Plate Filter Condenser
		C46 269A	.01 MFD. 400 Volt 75 Grid Feed Condenser
		C47 269A	.01 MFD. 400 Volt Tone Control Condenser
		C48 266	.00025 MFD. 100 Volt Oscillator Coupling Condenser
		C49 266	.00025 MFD. 100 Volt Antenna Series Condenser

WILCOX-GAY CORP.

MODEL 4G7
Schematic, Socket
Voltage, Parts

Tube	Plate	Screen	Cathode
1 Det	192	82	6.
Osc.	110	--	2
1 IF	182	82	3
2 IF	180	82	3
2 Det	60	--	--
Output	187	210	--
Output grid	-16.	Field 162	--

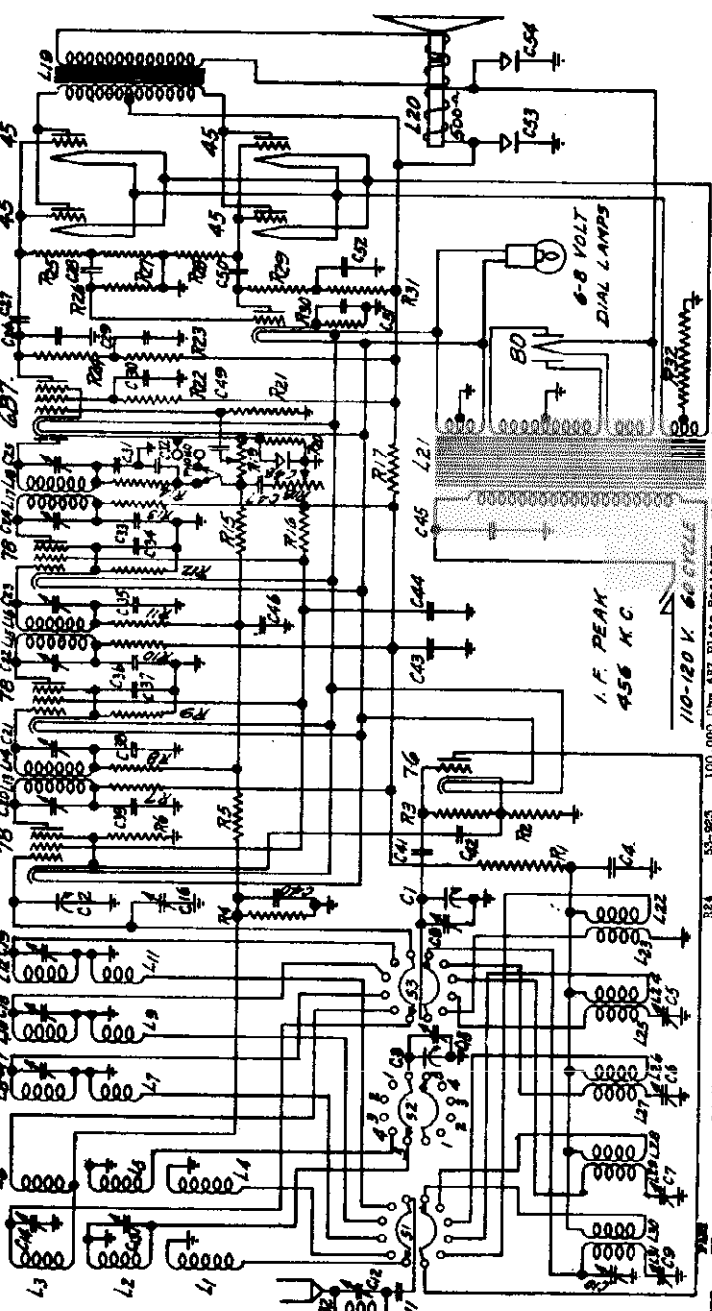
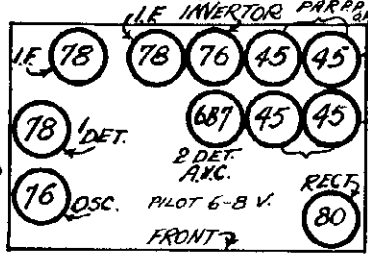


CODE NO.	PART NO.	RESISTORS	CONDENSERS	RESISTORS	CONDENSERS
R1	53-277	10,000 Ohm Oscillator Feed Resistor - Type J		R20	
R2	53-1048	250 Ohm Oscillator Cathode Resistor		R21	
R3	53-941	20,000 Ohm I.F. Cathode Resistor		R22	
R4	53-923	100,000 Ohm A.V.C. Network Resistor		R23	
R5	53-1144	2,000 Ohm First Detector Cathode Resistor		R24	
R6	53-919	5,000 Ohm First Detector Plate Resistor		C1	
R7	53-923	100,000 Ohm First I.F. Grid Isolation Resistor		C2	
R8	53-1065	500 Ohm First I.F. Cathode Resistor		C3	
R9	53-919	5,000 Ohm First I.F. Plate Isolation Resistor		C4	
R10	53-923	100,000 Ohm Second I.F. Grid Isolation Resistor		C5	
R11	53-1065	500 Ohm Second I.F. Cathode Resistor		C6	
R12	53-919	5,000 Ohm Isolation Resistor		C7	
R13	53-908	50,000 Ohm Diode Filter Resistor		C8	
R14	53-926	1 Meg Ohm A.V.C. Network Resistor		C9	
R15	53-921	40,000 Ohm R.F. & I.F. Screen Resistor		C10	
R16	53-923	500,000 Ohm A.V.C. Control Resistor		C11	
R17	19-1517	250,000 Ohm A.V.C. Control Resistor		C12	
R18	19-1291	300,000 Ohm Volume Control & Switch Resistor		C13	
C14			1 Meg Ohm C Bias Network Resistor	C14	
C15			75,000 Ohm C Bias Network Resistor	C15	
C16			100,000 Ohm 75 Plate Hum Resistor	C16	
C17			250,000 Ohm 75 Plate Resistor	C17	
C18			500,000 Ohm 45 Grid Resistor	C18	
C19			CONDENSERS	C19	
C20			16-366 MFD, First Section of 3 Gang Condenser	C20	
C21			16-366 MFD, Second Section of 3 Gang Condenser	C21	
C22			16-366 MFD, Third Section of 3 Gang Condenser	C22	
C23			.1 Mfd., 200 Volt I.F. Oscillator By-Pass Condenser	C23	
C24			1600 MFD, No. 2, 250 Volt, 50 Cycle Electrolytic	C24	
C25			600 MFD, No. 3, 250 Volt, 50 Cycle Electrolytic	C25	
C26			Reciprocal Tri-Trimmer	C26	
C27			450 MFD, No. 4, 500 Volt Oscillator Reciprocal Tri-Trimmer	C27	
C28			No. 4 Band Oscillator Parallel Tri-Trimmer on C-1	C28	
C29			140 MFD, No. 5, 500 Volt Oscillator Reciprocal Tri-Trimmer	C29	
C30			3-30 MFD, No. 6, 500 Volt Reciprocal Tri-Trimmer	C30	
C31			.01 Mfd., 400 Volt Antenna Series Condenser	C31	
C32			900 MFD, Wave Trap Tri-Trimmer	C32	
C33			3-30 MFD, No. 5 Band First Pres-selector Tri-Trimmer	C33	
C34			No. 4 Band First Pres-selector Tri-Trimmer on C-3	C34	
C35			No. 4 Band Second Pres-selector Tri-Trimmer	C35	
C36			3-30 MFD, No. 3 Band Pres-selector Tri-Trimmer	C36	
C37			3-30 MFD, No. 4 Band Pres-selector Tri-Trimmer	C37	
C38			3-30 MFD, No. 5 Band Pres-selector Tri-Trimmer	C38	
C39			70-120 MFD, First I.F. Primary Inductor	C39	
C40			70-120 MFD, Second I.F. Primary Inductor	C40	
C41			70-120 MFD, Third I.F. Primary Inductor	C41	
C42			70-120 MFD, Third I.F. Secondary Inductor	C42	
C43			.001 Mfd. Mica 75 Plate Filter Condenser	C43	
C44			.01 Mfd., 400 Volt Audio Feed Condenser	C44	
C45			.008 Mfd., 600 Volt 45 Plate Filter Condenser	C45	
C46			.2 Mfd., 200 Volt C Bias Network Condenser	C46	
C47			.1 Mfd., 400 Volt 75 Plate Hum Resistor	C47	
C48			.01 Mfd., 400 Volt 75 Plate Filter Condenser	C48	
C49			.0001 Mfd. Mica Diode Filter Condenser	C49	
C50			.0001 Mfd. Mica Diode Filter Condenser	C50	
C51			.0001 Mfd. Mica Diode Filter Condenser	C51	
C52			.0001 Mfd. Mica Diode Filter Condenser	C52	
C53			.0001 Mfd. Mica Diode Filter Condenser	C53	
C54			.0001 Mfd. Mica Diode Filter Condenser	C54	
C55			.0001 Mfd. Mica Diode Filter Condenser	C55	
C56			.0001 Mfd. Mica Diode Filter Condenser	C56	
C57			.0001 Mfd. Mica Diode Filter Condenser	C57	
C58			.0001 Mfd. Mica Diode Filter Condenser	C58	
C59			.0001 Mfd. Mica Diode Filter Condenser	C59	
C60			.0001 Mfd. Mica Diode Filter Condenser	C60	
C61			.0001 Mfd. Mica Diode Filter Condenser	C61	
C62			.0001 Mfd. Mica Diode Filter Condenser	C62	
C63			.0001 Mfd. Mica Diode Filter Condenser	C63	
C64			.0001 Mfd. Mica Diode Filter Condenser	C64	
C65			.0001 Mfd. Mica Diode Filter Condenser	C65	
C66			.0001 Mfd. Mica Diode Filter Condenser	C66	
C67			.0001 Mfd. Mica Diode Filter Condenser	C67	
C68			.0001 Mfd. Mica Diode Filter Condenser	C68	
C69			.0001 Mfd. Mica Diode Filter Condenser	C69	
C70			.0001 Mfd. Mica Diode Filter Condenser	C70	
C71			.0001 Mfd. Mica Diode Filter Condenser	C71	
C72			.0001 Mfd. Mica Diode Filter Condenser	C72	
C73			.0001 Mfd. Mica Diode Filter Condenser	C73	
C74			.0001 Mfd. Mica Diode Filter Condenser	C74	
C75			.0001 Mfd. Mica Diode Filter Condenser	C75	
C76			.0001 Mfd. Mica Diode Filter Condenser	C76	
C77			.0001 Mfd. Mica Diode Filter Condenser	C77	
C78			.0001 Mfd. Mica Diode Filter Condenser	C78	
C79			.0001 Mfd. Mica Diode Filter Condenser	C79	
C80			.0001 Mfd. Mica Diode Filter Condenser	C80	
C81			.0001 Mfd. Mica Diode Filter Condenser	C81	
C82			.0001 Mfd. Mica Diode Filter Condenser	C82	
C83			.0001 Mfd. Mica Diode Filter Condenser	C83	
C84			.0001 Mfd. Mica Diode Filter Condenser	C84	
C85			.0001 Mfd. Mica Diode Filter Condenser	C85	
C86			.0001 Mfd. Mica Diode Filter Condenser	C86	
C87			.0001 Mfd. Mica Diode Filter Condenser	C87	
C88			.0001 Mfd. Mica Diode Filter Condenser	C88	
C89			.0001 Mfd. Mica Diode Filter Condenser	C89	
C90			.0001 Mfd. Mica Diode Filter Condenser	C90	
C91			.0001 Mfd. Mica Diode Filter Condenser	C91	
C92			.0001 Mfd. Mica Diode Filter Condenser	C92	
C93			.0001 Mfd. Mica Diode Filter Condenser	C93	
C94			.0001 Mfd. Mica Diode Filter Condenser	C94	
C95			.0001 Mfd. Mica Diode Filter Condenser	C95	
C96			.0001 Mfd. Mica Diode Filter Condenser	C96	
C97			.0001 Mfd. Mica Diode Filter Condenser	C97	
C98			.0001 Mfd. Mica Diode Filter Condenser	C98	
C99			.0001 Mfd. Mica Diode Filter Condenser	C99	
C100			.0001 Mfd. Mica Diode Filter Condenser	C100	

MODEL 4H11
Schematic, Socket
Voltage, Parts

WILCOX-GAY CORP.

Tube	Plate	Screen	Cathode
Mixer	245	95	8
Osc.	100	--	2
1 IF	235	95	4
2 IF	235	95	4
2 Det.	70	--	1.5
Invert.	52	--	2.25
Output	330	--	--
Field 70 v. Output G-F 20 v.			



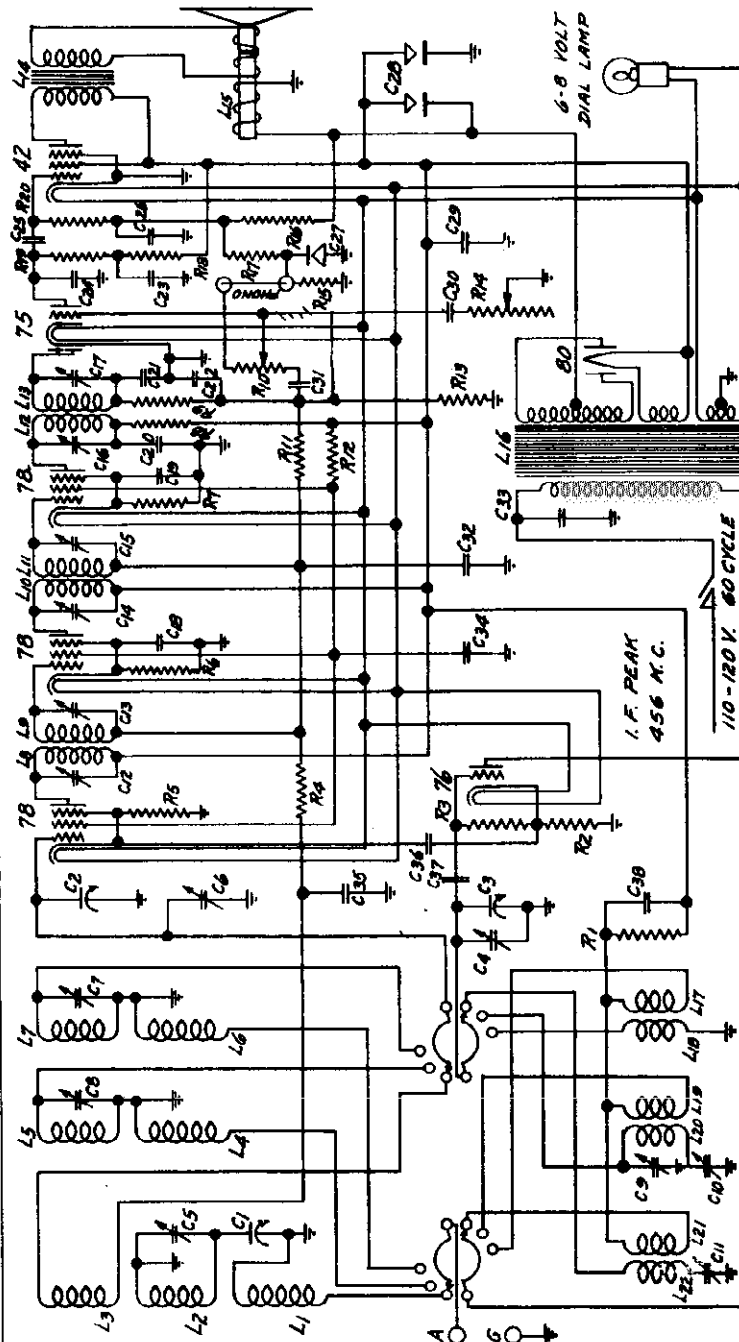
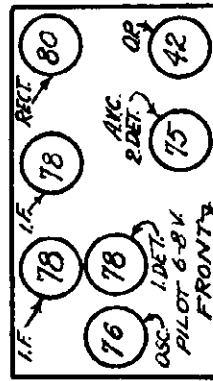
75-869A	.01 MFD.	400 Volt First I.F. Grid Isolation
75-869A	.01 MFD.	400 Volt First Detector Isolation
75-878A	.1 MFD.	200 Volt A.V.C. Network By-Pass Condenser
76-884	.00000 MFD.	Micro Oscillator Coupling Condenser
75-869A	.01 MFD.	400 Volt Oscillator Coupling Condenser
75-886	1. MFD.	400 Volt 500 Supply By-Pass Condenser
75-887A	5. MFD.	200 Volt R.F. & I.F. Screen By-Pass Condenser
75-889A	.01 MFD.	400 Volt Line By-Pass Condenser
75-872A	.1 MFD.	200 Volt A.V.C. Network By-Pass Condenser
75-894	.01 MFD.	400 Volt One Control Condenser 607 Cathode By-Pass Condenser
75-869A	.01 MFD.	400 Volt 807 Grid Feed Condenser
75-869A	.01 MFD.	400 Volt Audio Feed Condenser
75-872A	.1 MFD.	200 Volt Cathode By-Pass Condenser
75-3386A	.1 MFD.	400 Volt 76 Plate Rm Filter Condenser
75-781	.5 MFD.	450 Volt Electrolytic Filter Condenser
75-781	.8 MFD.	450 Volt Electrolytic Filter Condenser

824	53-923	100,000 Ohm 500V Resistor
825	53-925	500,000 Ohm 500V Resistor
826	53-925	500,000 Ohm 500V Resistor
827	53-925	500,000 Ohm 500V Resistor
828	53-925	500,000 Ohm 500V Resistor
829	53-925	500,000 Ohm 500V Resistor
830	53-925	500,000 Ohm 500V Resistor
831	53-925	500,000 Ohm 500V Resistor
832	53-925	500,000 Ohm 500V Resistor
833	53-1419	500 Ohm 45 Cathode Bias Resistor
834	77-1368	5-30 MFD. No. 5 Band Preset-Inductor
835	77-1368	5-30 MFD. No. 4 Band Preset-Inductor
836	77-1368	5-30 MFD. No. 3 Band Preset-Inductor
837	77-1368	5-30 MFD. No. 2 Band Preset-Inductor
838	77-1368	5-30 MFD. No. 1 Band Preset-Inductor
839	77-1368	5-30 MFD. No. 0 Band Preset-Inductor
840	77-1368	5-30 MFD. No. 5 Band Preset-Inductor
841	77-1368	5-30 MFD. No. 4 Band Preset-Inductor
842	77-1368	5-30 MFD. No. 3 Band Preset-Inductor
843	77-1368	5-30 MFD. No. 2 Band Preset-Inductor
844	77-1368	5-30 MFD. No. 1 Band Preset-Inductor
845	77-1368	5-30 MFD. No. 0 Band Preset-Inductor
846	77-1368	5-30 MFD. No. 5 Band Preset-Inductor
847	77-1368	5-30 MFD. No. 4 Band Preset-Inductor
848	77-1368	5-30 MFD. No. 3 Band Preset-Inductor
849	77-1368	5-30 MFD. No. 2 Band Preset-Inductor
850	77-1368	5-30 MFD. No. 1 Band Preset-Inductor
851	77-1368	5-30 MFD. No. 0 Band Preset-Inductor
852	77-1368	5-30 MFD. No. 5 Band Preset-Inductor
853	77-1368	5-30 MFD. No. 4 Band Preset-Inductor
854	77-1368	5-30 MFD. No. 3 Band Preset-Inductor
855	77-1368	5-30 MFD. No. 2 Band Preset-Inductor
856	77-1368	5-30 MFD. No. 1 Band Preset-Inductor
857	77-1368	5-30 MFD. No. 0 Band Preset-Inductor
858	77-1368	5-30 MFD. No. 5 Band Preset-Inductor
859	77-1368	5-30 MFD. No. 4 Band Preset-Inductor
860	77-1368	5-30 MFD. No. 3 Band Preset-Inductor
861	77-1368	5-30 MFD. No. 2 Band Preset-Inductor
862	77-1368	5-30 MFD. No. 1 Band Preset-Inductor
863	77-1368	5-30 MFD. No. 0 Band Preset-Inductor
864	77-1368	5-30 MFD. No. 5 Band Preset-Inductor
865	77-1368	5-30 MFD. No. 4 Band Preset-Inductor
866	77-1368	5-30 MFD. No. 3 Band Preset-Inductor
867	77-1368	5-30 MFD. No. 2 Band Preset-Inductor
868	77-1368	5-30 MFD. No. 1 Band Preset-Inductor
869	77-1368	5-30 MFD. No. 0 Band Preset-Inductor
870	77-1368	5-30 MFD. No. 5 Band Preset-Inductor
871	77-1368	5-30 MFD. No. 4 Band Preset-Inductor
872	77-1368	5-30 MFD. No. 3 Band Preset-Inductor
873	77-1368	5-30 MFD. No. 2 Band Preset-Inductor
874	77-1368	5-30 MFD. No. 1 Band Preset-Inductor
875	77-1368	5-30 MFD. No. 0 Band Preset-Inductor
876	77-1368	5-30 MFD. No. 5 Band Preset-Inductor
877	77-1368	5-30 MFD. No. 4 Band Preset-Inductor
878	77-1368	5-30 MFD. No. 3 Band Preset-Inductor
879	77-1368	5-30 MFD. No. 2 Band Preset-Inductor
880	77-1368	5-30 MFD. No. 1 Band Preset-Inductor
881	77-1368	5-30 MFD. No. 0 Band Preset-Inductor
882	77-1368	5-30 MFD. No. 5 Band Preset-Inductor
883	77-1368	5-30 MFD. No. 4 Band Preset-Inductor
884	77-1368	5-30 MFD. No. 3 Band Preset-Inductor
885	77-1368	5-30 MFD. No. 2 Band Preset-Inductor
886	77-1368	5-30 MFD. No. 1 Band Preset-Inductor
887	77-1368	5-30 MFD. No. 0 Band Preset-Inductor
888	77-1368	5-30 MFD. No. 5 Band Preset-Inductor
889	77-1368	5-30 MFD. No. 4 Band Preset-Inductor
890	77-1368	5-30 MFD. No. 3 Band Preset-Inductor
891	77-1368	5-30 MFD. No. 2 Band Preset-Inductor
892	77-1368	5-30 MFD. No. 1 Band Preset-Inductor
893	77-1368	5-30 MFD. No. 0 Band Preset-Inductor
894	77-1368	5-30 MFD. No. 5 Band Preset-Inductor
895	77-1368	5-30 MFD. No. 4 Band Preset-Inductor
896	77-1368	5-30 MFD. No. 3 Band Preset-Inductor
897	77-1368	5-30 MFD. No. 2 Band Preset-Inductor
898	77-1368	5-30 MFD. No. 1 Band Preset-Inductor
899	77-1368	5-30 MFD. No. 0 Band Preset-Inductor
900	77-1368	5-30 MFD. No. 5 Band Preset-Inductor

WILCOX-GAY CORP.

MODEL 5E7
Schematic, Socket
Voltage, Parts

Tube	Plate	Screen	Cathode
Mixer	200	80	5
Osc	100	--	2
1 IF	190	80	3
2 IF	170	80	3
2 Det	45	--	1
Out	175	190	1
Output Grid to ground			-18V
Field drop	135		



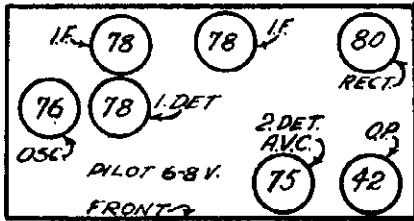
INDUCTANCES

17-2023	Broadcast Preslector Primary
17-2025	Broadcast Preslector First Secondary
17-2025	Broadcast Preslector Second Secondary
17-1668	Police Band Preslector Primary
17-1668	Police Band Preslector Secondary
17-2017	Foreign Band Preslector Primary
17-2017	Foreign Band Preslector Secondary
17-2010	1200 Microhenry First I.F. Primary
17-2010	1200 Microhenry First I.F. Secondary
17-2010	1200 Microhenry Second I.F. Primary
17-2010	1200 Microhenry Second I.F. Secondary
17-2010	1200 Microhenry Third I.F. Primary
17-2010	1200 Microhenry Third I.F. Secondary
64-2003	Single 42 Output Transformer
64-2003	Power Transformer
64-1066	2500 ohm Speaker Field
17-2018	Foreign Band Oscillator Primary
17-2018	Foreign Band Oscillator Secondary
17-1667	Police Band Oscillator Primary
17-1667	Police Band Oscillator Secondary
17-1646	Broadcast Oscillator Primary
17-1646	Broadcast Oscillator Secondary
66-2003	First I.F. Transformer Assembly
66-2003	Second I.F. Transformer Assembly
66-2004	Third I.F. Transformer Assembly

75-269A	.01 MFD. 400 Volt Second I.F. Plate Isolation Condenser
76-339	.0001 MFD. NiCs Diode Filter Condenser
76-339	.0001 MFD. NiCs Diode Filter Condenser
76-339	.0001 MFD. NiCs Diode Filter Condenser
75-1326A	.1 MFD. 400 Volt Second Detest-Condenser
76-265	.001 MFD. 250 Volt Second Detector Plate By-Pass Condenser
76-265	.01 MFD. 400 Volt Audio Feed Condenser
75-183A	.2 MFD. 200 Volt C Bias Network Condenser
18-928	25 MFD. 25 Volt Electrolytic Condenser
18-1274	4-4 MFD. 450 Volt Electrolytic Condenser
75-266	1 MFD. 400 Volt B Supply By-Pass Condenser
75-269A	.01 MFD. Tone Control Condenser
75-269A	.01 MFD. Audio Feed Condenser
75-272A	.1 MFD. 200 Volt A.V.C. Network Condenser
75-269A	.01 MFD. 400 Volt Line By-Pass Condenser
75-272A	.1 MFD. 200 Volt Screen By-Pass Condenser
75-272A	.1 MFD. 200 Volt A.V.C. Network Condenser
75-269A	.01 MFD. 250 Volt Oscillator Coupling Condenser
76-264	.00005 MFD. 180 Oscillator Grid Plate Condenser
75-269A	.01 MFD. 400 Volt Oscillator Plate Condenser
620	16-366 MFD. Second Section of 3 Gang Condenser
621	16-366 MFD. Third Section of 3 Gang Condenser
622	16-366 MFD. First Section of 3 Gang Condenser
623	16-366 MFD. Second Section of 3 Gang Condenser
624	16-366 MFD. Third Section of 3 Gang Condenser
625	3-30 MFD. Foreign Band Preslector Trimmer on C2
626	3-30 MFD. Foreign Band Preslector Trimmer on C2
627	3-30 MFD. Police Band Oscillator Parallel Trimmer
628	1600 MFD. Police Band Oscillator Series Trimmer
629	600 MFD. Broadcast Oscillator Trimmer
630	40,000 ohm Screen Resistor
631	50,000 ohm Screen Resistor
632	19-1517 250,000 ohm Tone Control Resistor
633	5,000 ohm C Bias Network Resistor
634	10,000 ohm C Bias Network Resistor
635	100,000 ohm Second Detector Hum Resistor
636	250,000 ohm Second Detector Plate Resistor
637	.1 MFD. 200 Volt I.F. Cathode By-Pass Capacitor
638	.1 MFD. 250 Volt Second I.F. Cathode By-Pass Capacitor
639	.1 MFD. 250 Volt Second I.F. Cathode By-Pass Capacitor
620	16-366 MFD. Second Section of 3 Gang Condenser
621	16-366 MFD. Third Section of 3 Gang Condenser
622	16-366 MFD. First Section of 3 Gang Condenser
623	16-366 MFD. Second Section of 3 Gang Condenser
624	16-366 MFD. Third Section of 3 Gang Condenser
625	3-30 MFD. Foreign Band Preslector Trimmer on C2
626	3-30 MFD. Foreign Band Preslector Trimmer on C2
627	3-30 MFD. Police Band Oscillator Parallel Trimmer
628	1600 MFD. Police Band Oscillator Series Trimmer
629	600 MFD. Broadcast Oscillator Trimmer
630	40,000 ohm Screen Resistor
631	50,000 ohm Screen Resistor
632	19-1517 250,000 ohm Tone Control Resistor
633	5,000 ohm C Bias Network Resistor
634	10,000 ohm C Bias Network Resistor
635	100,000 ohm Second Detector Hum Resistor
636	250,000 ohm Second Detector Plate Resistor
637	.1 MFD. 200 Volt I.F. Cathode By-Pass Capacitor
638	.1 MFD. 250 Volt Second I.F. Cathode By-Pass Capacitor
639	.1 MFD. 250 Volt Second I.F. Cathode By-Pass Capacitor
620	16-366 MFD. Second Section of 3 Gang Condenser
621	16-366 MFD. Third Section of 3 Gang Condenser
622	16-366 MFD. First Section of 3 Gang Condenser
623	16-366 MFD. Second Section of 3 Gang Condenser
624	16-366 MFD. Third Section of 3 Gang Condenser
625	3-30 MFD. Foreign Band Preslector Trimmer on C2
626	3-30 MFD. Foreign Band Preslector Trimmer on C2
627	3-30 MFD. Police Band Oscillator Parallel Trimmer
628	1600 MFD. Police Band Oscillator Series Trimmer
629	600 MFD. Broadcast Oscillator Trimmer
630	40,000 ohm Screen Resistor
631	50,000 ohm Screen Resistor
632	19-1517 250,000 ohm Tone Control Resistor
633	5,000 ohm C Bias Network Resistor
634	10,000 ohm C Bias Network Resistor
635	100,000 ohm Second Detector Hum Resistor
636	250,000 ohm Second Detector Plate Resistor
637	.1 MFD. 200 Volt I.F. Cathode By-Pass Capacitor
638	.1 MFD. 250 Volt Second I.F. Cathode By-Pass Capacitor
639	.1 MFD. 250 Volt Second I.F. Cathode By-Pass Capacitor
620	16-366 MFD. Second Section of 3 Gang Condenser
621	16-366 MFD. Third Section of 3 Gang Condenser
622	16-366 MFD. First Section of 3 Gang Condenser
623	16-366 MFD. Second Section of 3 Gang Condenser
624	16-366 MFD. Third Section of 3 Gang Condenser
625	3-30 MFD. Foreign Band Preslector Trimmer on C2
626	3-30 MFD. Foreign Band Preslector Trimmer on C2
627	3-30 MFD. Police Band Oscillator Parallel Trimmer
628	1600 MFD. Police Band Oscillator Series Trimmer
629	600 MFD. Broadcast Oscillator Trimmer
630	40,000 ohm Screen Resistor
631	50,000 ohm Screen Resistor
632	19-1517 250,000 ohm Tone Control Resistor
633	5,000 ohm C Bias Network Resistor
634	10,000 ohm C Bias Network Resistor
635	100,000 ohm Second Detector Hum Resistor
636	250,000 ohm Second Detector Plate Resistor
637	.1 MFD. 200 Volt I.F. Cathode By-Pass Capacitor
638	.1 MFD. 250 Volt Second I.F. Cathode By-Pass Capacitor
639	.1 MFD. 250 Volt Second I.F. Cathode By-Pass Capacitor

MODEL 5EA7
Schematic, Socket
Parts List

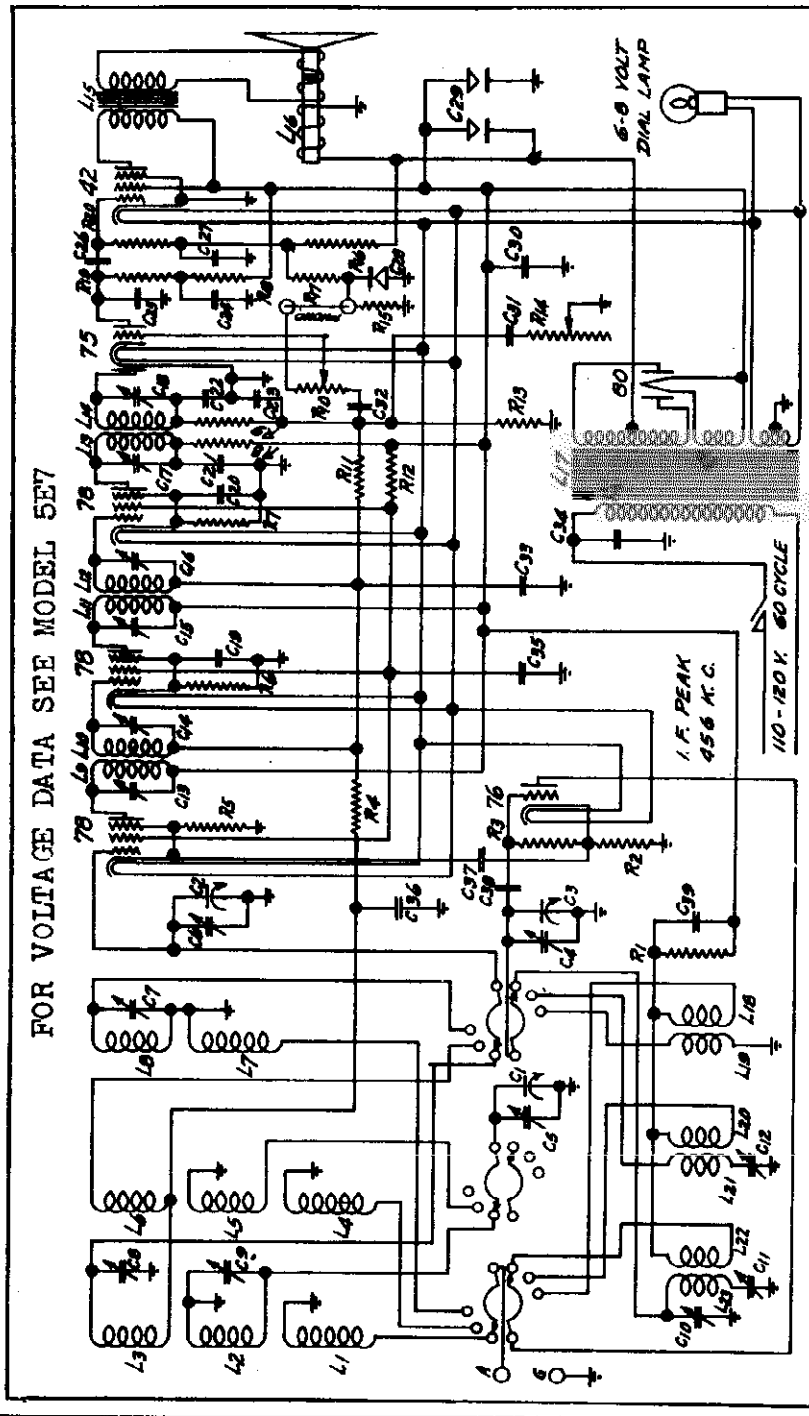
WILCOX-GAY CORP.



L13 17-2010	1200 Microhenry Third I.F. Primary
L14 17-2010	1200 Microhenry Third I.F. Secondary
L15 64-2003	Single 42 Output Transformer
L16 64-2003	2500 Ohm Speaker Field
L17 50-1088	Power Transformer
L18 17-2018	Foreign Band Oscillator Primary
L19 17-2018	Foreign Band Oscillator Secondary
L20 17-1646	Broadcast Band Oscillator Primary
L21 17-1646	Broadcast Band Oscillator Secondary
L22 17-1646	Long Wave Band Oscillator Primary
L23 17-1646	Long Wave Band Oscillator Secondary
68-2003	First I.F. Transformer Assembly
68-2008	Second I.F. Transformer Assembly
68-2004	Third I.F. Transformer Assembly

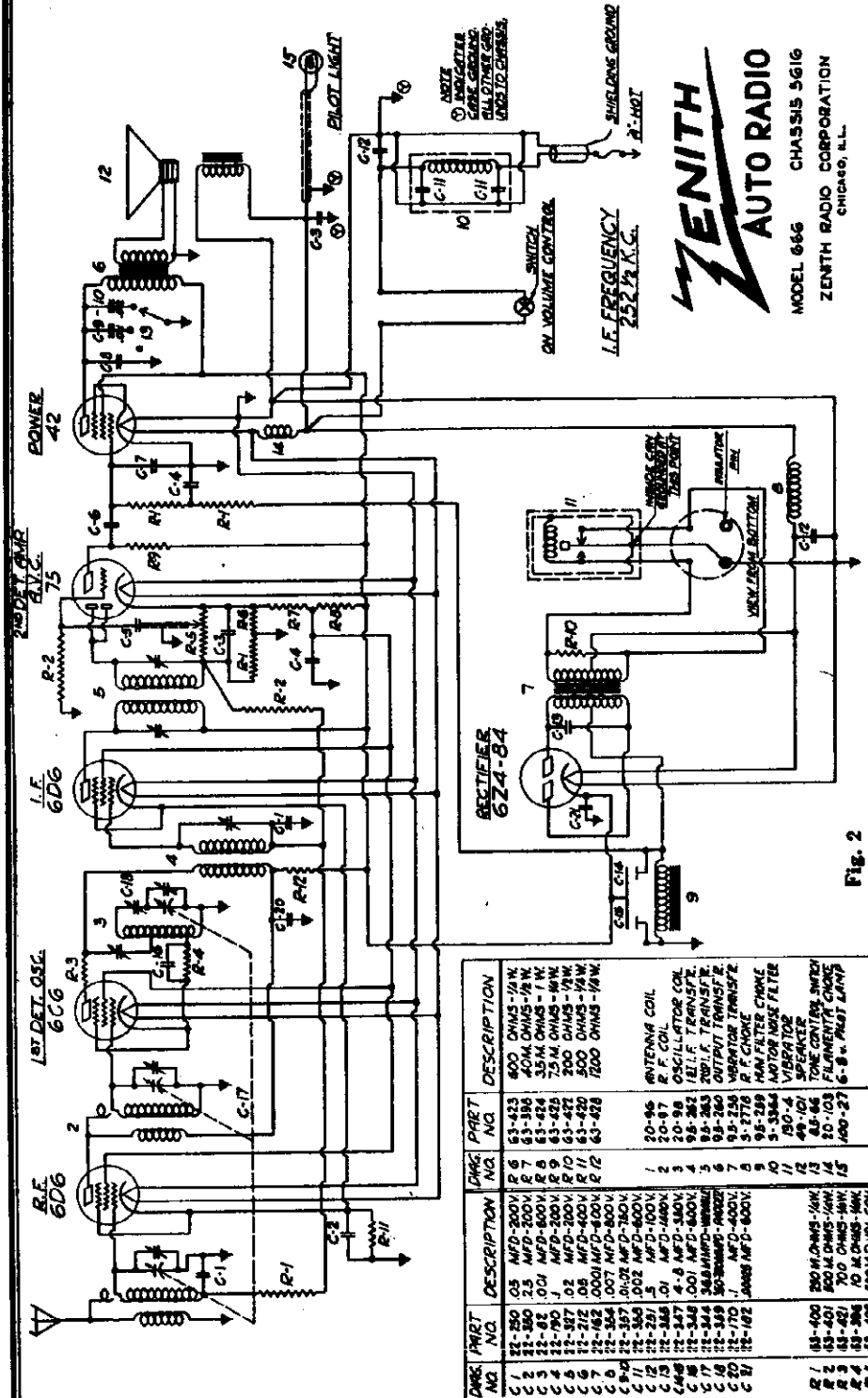
75-2891	.01 MFD. 400 Volt Line By-Pass Condenser
75-272A	.1 MFD. 200 Volt Screen By-Pass Condenser
75-272A	.1 MFD. 200 Volt A.V.C. Net-work By-pass
75-2891	.01 MFD. 400 Volt Oscillator Coupling Condenser
76-284	.00005 MFD. Misc Oscillator Grid Plate Condenser
75-289A	.01 MFD. 400 Volt Oscillator Plate Condenser
INDUCTANCES	
17-2026	Long Wave Band Prescaler Primary
17-2026	Long Wave Band First Prescaler Secondary
17-2026	Long Wave Band Second Prescaler Secondary
17-2025	Broadcast Prescaler Primary
17-2025	Broadcast First Prescaler Secondary
17-2025	Broadcast Second Prescaler Secondary
17-2017	Foreign Band Prescaler Primary
17-2017	Foreign Band First I.F. Secondary
17-2010	1200 Microhenry First I.F. Secondary
17-2010	1200 Microhenry Second I.F. Primary
17-2010	1200 Microhenry Second I.F. Secondary
76-2891	Trimmer
76-1361	70-120 MFD. Second I.F. Secondary
76-1361	Trimmer
76-1361	70-120 MFD. Third I.F. Primary
76-1361	Trimmer
76-1361	70-120 MFD. Third I.F. Secondary
76-1361	Trimmer
75-272A	.1 MFD. 200 Volt First I.F. Cathode By-Pass
75-272A	.1 MFD. 200 Volt Second I.F. Cathode By-Pass
75-289A	.01 MFD. 400 Volt Second I.F. Plate Isolation Condenser
76-239	.0001 MFD. Misc Diode Filter Condenser
76-239	.0001 MFD. Misc Diode Filter Condenser
75-1384A	.1 MFD. 200 Volt Second Detector Filter
76-285	.001 MFD. Misc Second Detector
75-285A	.01 MFD. 400 Volt Audio Feed Condenser
75-1384A	.2 MFD. 200 Volt C Bias Resistor
18-295	25 MFD. 500 Volt Electrolytic Condenser
17-1274	4-4 MFD. 450 Volt Electrolytic Condenser
76-286	1. MFD. 400 Volt 8 Supply By-Pass Condenser
75-286A	.01 MFD. Tone Control Condenser
75-286A	.01 MFD. 200 Volt A.V.C. Net-work Condenser
75-272A	Trimmer
75-285	500,000 ohm Output Grid Resistor
C17	COILS/RES
C18	77-1261 16-50K MFD. First Section of 3 Gang Condenser
C19	77-1261 16-50K MFD. Second Section of 3 Gang Condenser
C20	77-1261 16-50K MFD. Third Section of 3 Gang Condenser
C21	77-1261 16-50K MFD. Foreign Band Parallel Oscillator Prescaler
C22	77-1261 Broadcast First Prescaler
C23	77-1261 Broadcast Second Prescaler
C24	77-1261 Foreign Band Prescaler
C25	77-1261 Parallel Tri-immer
C26	77-1261 Broadcast First Prescaler
C27	77-1261 Long Wave Oscillator
C28	77-1261 Parallel Tri-immer
C29	77-1261 Long Wave Oscillator
C30	77-1261 Long Wave Oscillator
C31	77-1261 Long Wave Oscillator
C32	77-1261 Long Wave Oscillator
C33	77-1261 Long Wave Oscillator
C34	77-1261 Long Wave Oscillator
C35	77-1261 Long Wave Oscillator
C36	77-1261 Long Wave Oscillator
C37	77-1261 Long Wave Oscillator
C38	77-1261 Long Wave Oscillator
C39	77-1261 Long Wave Oscillator
C40	77-1261 Long Wave Oscillator
C41	77-1261 Long Wave Oscillator
C42	77-1261 Long Wave Oscillator
C43	77-1261 Long Wave Oscillator
C44	77-1261 Long Wave Oscillator
C45	77-1261 Long Wave Oscillator
C46	77-1261 Long Wave Oscillator
C47	77-1261 Long Wave Oscillator
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C57	77-1261 Long Wave Oscillator
C58	77-1261 Long Wave Oscillator
C59	77-1261 Long Wave Oscillator

FOR VOLTAGE DATA SEE MODEL 5E7



ZENITH RADIO CORP.

MODEL 666
Schematic
Alignment



I. F. Alignment:
To balance the I. F. Circuit, connect the 252 1/2 K. C. test oscillator signal to the grid of the 6C6 tube through a 0.5 mfd. condenser and to ground. Adjust the 1st I. F. primary trimmer to maximum output from either the speaker or an output meter. Follow in the same manner with the secondary, and the primary and secondary of the 2nd I. F. transformer. This completes the I. F. circuit adjustment.

R. F. Alignment:
1. Next attach the test oscillator thru a 150 mmf. condenser to the antenna and ground leads.
2. Turn condenser plates completely out of mesh.
3. Set test oscillator to 1600 K. C.
4. Adjust the oscillator condenser trimmer (see fig. 1) to approximate resonance at 1600. Disregard dial setting for this operation.
5. Set test oscillator to 1400 K. C. and turn gang condenser to resonance and peak the three trimmers accurately. Now set pointer on dial to 1400 K. C. by turning indicator screw in rear center of head.
6. Set test oscillator to 600 K. C. and tune set to pick up the signal. Rock the dial over this point while adjusting the paddler condenser (see fig. 1) for greatest output.

If the dial is off calibration at the low frequency end after this is done the indicator may be moved slightly in either direction to give a uniform accuracy over the entire scale.



MODEL 666
Voltage, Socket
Trimmers, Parts

ZENITH RADIO CORP.

Tube Operating Voltages:

Position	Tube	BF	EK	EG ¹	EG ²	EG ³	EP
R. F. Amplifier	6D6	5.6	4.1	*	4.1	76	200
1st Det.-Osc.	6C6	5.6	4.5	0	4.5	76	200
I. F. Amplifier	6D6	5.6	4.1	*	4.1	76	200
2nd Det. A. V. C.	75	5.6	1.3	0	0	—	165
Power Amp.	42	5.6	0	3	0	200	192
Rectifier	6Z4	5.6	200	—	—	—	—

f—Filament; k—Cathode; g¹—Control Grid; g²—Suppressor Grid; g³—Screen Grid; p—Plate; *—Depends on applied signal strength. All voltages measured from indicated points to ground. Battery voltage 6 volts. (Check voltages with condenser gang in full mesh.)

RESISTORS (CHASSIS ONLY)

Part Number	Description
63-396	10M Ohm ¼ Watt
63-398	40M Ohm ¼ Watt
63-400	250M Ohm ¼ Watt
63-401	500M Ohm ¼ Watt
63-402	500M Ohm Vol. Control & Switch Assembly
63-420	500 Ohm ¼ Watt
63-421	700 Ohm ¼ Watt
63-422	200 Ohm ¼ Watt
63-423	600 Ohm ¼ Watt
63-424	35M Ohm 1 Watt
63-425	75M Ohm ¼ Watt
63-428	1200 Ohm ¼ Watt

CONDENSERS (CHASSIS ONLY)

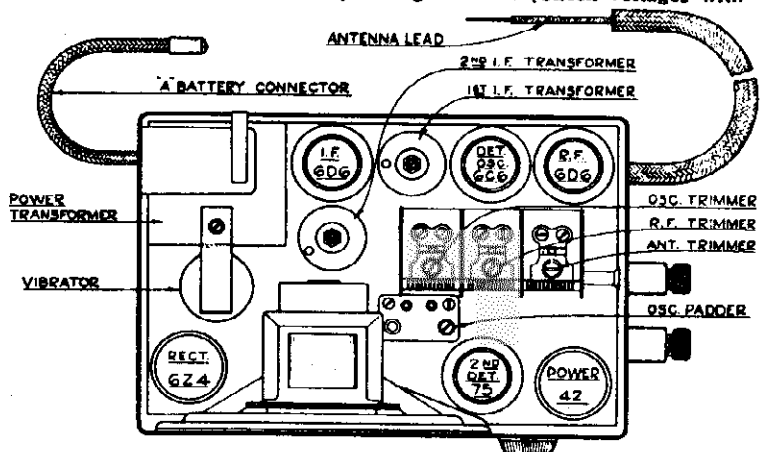
22-82	.001 Mfd. 600 V.
22-102	.0001 Mfd. 600 V.
22-170	.1 Mfd. 400 V.
22-190	.1 Mfd. 200 V.
22-182	.00025 Mfd. 600 V.
22-212	.05 Mfd. 400 V.
22-250	.05 Mfd. 200 V.
22-261	.5 Mfd. 100 V.
22-327	.02 Mfd. 200 V.
22-344	Three-Gang Variable
22-347	4. x 8. Mfd. 350 V.
22-348	.001 Mfd. 600 V.
22-370	.25 Mfd. 120 V.
22-354	.007 Mfd. 750 V.
22-355	.01 Mfd. 1000 V.
22-357	.01 x .02 Mfd. 750 V.
22-358	.002 Mfd. 600 V.
22-359	Padder

MISCELLANEOUS CHASSIS PARTS
COILS AND CHOKES

20-96	Antenna Coil Assembly
20-97	R. F. Coil Assembly
20-98	Oscillator Coil Assembly
20-103	Filament "A" Choke
95-203	1st I. F. Transformer
95-203	2nd I. F. Transformer
8-2778	R. F. Choke
8-3364	Motor Noise Filter
46-101	Tone Control Knob (Knob Spring only, see 80-187)
52-44	"A" Battery Cable
52-59	Antenna Cable
54-78	¼ x 20 Knurled Coupling Shaft Nuts
78-100	Socket 6D6
78-101	Socket 75
78-102	Socket 42
78-113	Socket 6D6
78-114	Socket 6Z4
78-115	Socket Vibrator
40-107	Tone Control Knob Spring
45-40	Tone Control Switch

SPEAKER

49-100	8" Dynamic Speaker (with output transformer)
	Cone & Voice Coil Assemb.
	Field Coil



MISCELLANEOUS CHASSIS PARTS (Contd.)

Part Number	Description
93-125	No. 6 Lock Washers
93-220	Bakelite Washer for Chassis Mtg. Screws
94-185	Rubber Bushing for Chassis Mtg. Screws
95-258	Power Transformer
95-259	Hum Filter Choke
97-75	10/32 x ¼ Wing Screw for Box Cover
114-27	No. 8 x ¼ Chassis Box Screws
198-4	Vibrator
MS-350	Chassis Box Top Cover and Clip Assemb.
24-95	Chassis Box Bottom
MS-356	Chassis Box Body Less Cover and Top
REMOTE CONTROL UNIT	
170-12	Zenith Control Unit (with knobs and mounting brackets—less cable)
7-5	Control Unit Base
26-83	Zenith Dial Scale Assembly
46-117	Volume and Tuning Knobs
52-63	Pilot Lamp Cable and Socket Assemb.
76-154	24" Tuning Control Cables
26-157	24" Volume Control Cables
80-110	Knob Springs
100-27	6-8 V. Pilot Lamp
192-7	Unbreakable Dial Glass

SUPPRESSOR AND MOUNTING PARTS

52-102	.5 Mfd. Ignition Coil Condenser
52-104	.5 Mfd. Generator Coil Condenser
52-44	"A" Battery Cable
57-478	Set Mounting Plate
43-336	15 M Ohm Dist. Suppressor
97-107	10/32 x ¼ RHM Screws (8 used)
93-127	No. 10 Lock Washer (8 used)
93-222	7/16 Lock Washer
93-223	Mounting Bolt Washer
136-5	15 Ampere Fuse
144-14	Mounting Bolt and Nut
198-1	Mounting Plate Gasket

*Speakers are numbered 49-100U, 49-100-R, 49-100-M designating three different types. Therefore, when ordering speaker or speaker parts refer to the number on speaker at all times and order by that part number accordingly.

ZENITH RADIO CORP.

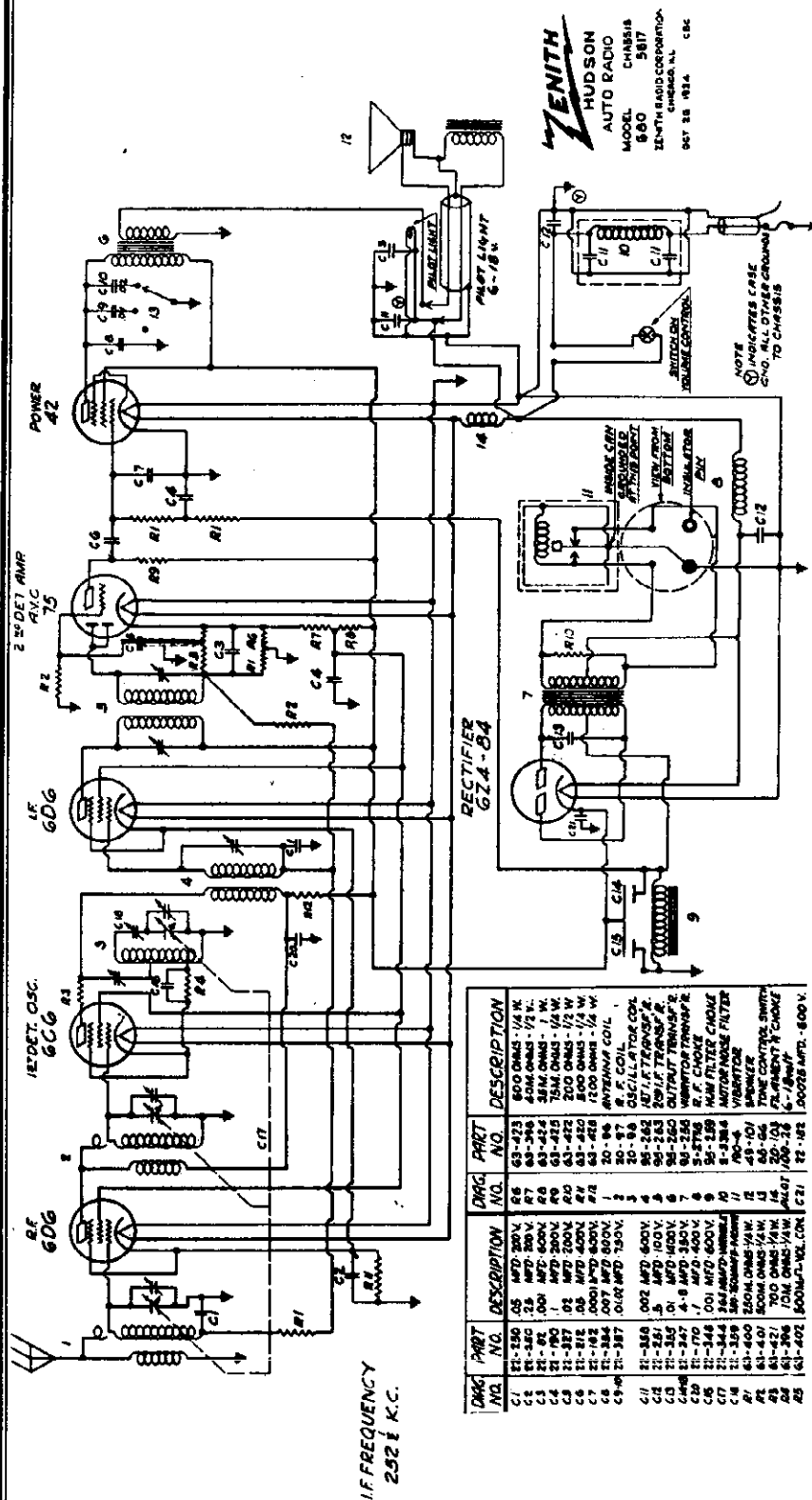


Fig. 2

I. F. Alignment:

To balance the I. F. Circuit, connect the 252 1/2 K. C. test oscillator signal to the grid of the 6C6 tube through a 0.5 mfd. condenser and to ground. Adjust the 1st I. F. primary trimmer to maximum output from either the speaker or an output meter. Follow in the same manner with the secondary, and the primary and secondary of the 2nd I. F. transformer. This completes the I. F. circuit adjustment.

R. F. Alignment:

1. Next attach the test oscillator thru a 150 mmf. condenser to the antenna and ground leads.
2. Turn condenser plates completely out of mesh.
3. Set test oscillator to 1600 K. C.
4. Adjust the oscillator condenser trimmer (see fig. 1) to approximate resonance at 1600. Disregard dial setting for this operation.
5. Set test oscillator to 1400 K. C. and turn gang condenser to resonance and peak the three trimmers accurately.
6. Now set pointer on dial to 1400 K. C. by turning indicator screw from rear of head through pilot light socket hole. Set test oscillator to 600 K. C. and tune set to pick up the signal. Rock the dial over this point while adjusting the paddler condenser (see fig. 1) for greatest output.

If the dial is off calibration at the low frequency end after this is done the indicator may be moved slightly in either direction to give a uniform accuracy over the entire scale.

MODEL 680 Hudson
Voltage, Socket
Trimmers, Parts Voltages:

ZENITH RADIO CORP.

Position	Tube	EF	EK	EG ¹	EG ²	EG ³	EP
R. F. Amplifier	6D6	5.6	4.1	*	4.1	76	200
1st Det.-Osc.	6C6	5.6	4.5	0	4.5	76	200
I. F. Amplifier	6D6	5.6	4.1	*	4.1	76	200
2nd Det. A. V. C.	75	5.6	1.3	0	0	—	165
Power Amp.	42	5.6	0	3	0	200	192
Rectifier	6Z4	5.6	200	—	—	—	—

(—Filament; k—Cathode; g¹—Control Grid; g²—Suppressor Grid; g³—Screen Grid; p—Plate; *—Depends on applied signal strength. All voltages measured from indicated points to ground. Battery voltage 6 volts. (Check voltages with condenser gang in full mesh.)

RESISTORS (CHASSIS ONLY)

Zenith Number	Hudson Number	Description
63-306	48013	10M Ohm ¼ Watt
63-308	48015	40M Ohm ¼ Watt
63-400	48017	250M Ohm ¼ Watt
63-401	48018	500M Ohm ¼ Watt
63-402	48019	500M Ohm Vol. Control & Switch Assembly
63-420	48020	500 Ohm ¼ Watt
63-421	48010	700 Ohm ¼ Watt
63-422	48011	200 Ohm ¼ Watt
63-423	48012	600 Ohm ¼ Watt
63-424	48014	35M Ohm 1 Watt
63-425	48016	75M Ohm ¼ Watt
63-428	48044	1200 Ohm ¼ Watt

CONDENSERS (CHASSIS ONLY)

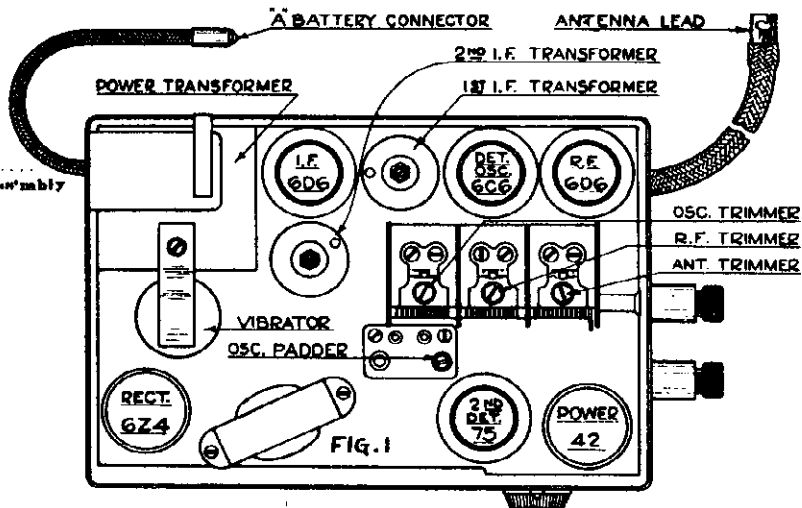
Zenith Number	Hudson Number	Description
22-82	46375	.001 Mfd. 600 V.
22-102	46378	.0001 Mfd. 600 V.
22-170	46370	.1 Mfd. 400 V.
22-190	48021	.1 Mfd. 200 V.
22-182	46353	.00025 Mfd. 600 V.
22-212	48020	.05 Mfd. 400 V.
22-230	46372	.95 Mfd. 300 V.
22-251	46774	.5 Mfd. 100 V.
22-327	48022	.02 Mfd. 200 V.
22-344	48023	Three-Gang Variable
22-347	48024	4. x 8. Mfd. 350 V.
22-348	48025	.001 Mfd. 600 V.
22-350	48026	.25 Mfd. 120 V.
22-354	48027	.007 Mfd. 750 V.
22-355	48028	.01 Mfd. 1400 V.
22-357	48029	.01 x .02 Mfd. 750 V.
22-358	48030	.002 Mfd. 600 V.
22-359	48031	Padder

MISCELLANEOUS CHASSIS PARTS
COILS AND CHOKES

Zenith Number	Hudson Number	Description
20-96	48032	Antenna Coil Assembly
20-97	48033	R. F. Coil Assembly
20-98	48034	Oscillator Coil Assembly
20-105	48035	Filament "A" Choke
95-202	48036	1st I. F. Transformer
95-203	48037	2nd I. F. Transformer
5-2778	48773	R. F. Choke
5-3364	48033	Motor Noise Filter
46-101	48038	Tone Control Knob (Knob Spring only, see 80-107)
52-54	48040	"A" Battery Cable
52-55	48041	Antenna Cable
51-76	48042	¼ x 20 Knurled Coupling Shaft Nuts
78-100	48043	Socket 6D6
78-101	48044	Socket 75
78-102	48045	Socket 42
78-113	48046	Socket 6D6
78-114	48047	Socket 6Z4
78-115	48048	Socket Vibrator
80-107	48049	Tone Control Knob Spring
85-06	48050	Tone Control Switch

SPEAKER

Zenith Number	Hudson Number	Description
*49-101	48052	6" Dynamic Speaker (less output transformer)
	48053	Cone & Voice Coil Assemb. (for 48052 Speaker)
	48054	Field Coil (for 48052 Speaker)
5-3528	48055	Speaker Box and Grill Cloth



Zenith Number	Hudson Number	Description
93-125	48051	No. 6 Lock Washers
93-220	48052	Bakelite Washer for Chassis Mtg. Screws
94-185	48053	Rubber Bushing for Chassis Mtg. Screws
95-254	48054	Power Transformer
95-250	48055	Hum Filter Choke
95-260	48056	Speaker Output Transformer
97-75	48057	10/32 x ¼ Wing Screw for Box Cover
114-27	48058	No. 8 x ¼ Chassis Box Screws
190-4	48059	Vibrator
MS-246	48050	Chassis Box Top Cover and Bushing Assemb.
MS-247	48060	Chassis Box Bottom Cover and Bushing Assemb.
MS-253	48061	Chassis Box Body Less Cover and Top

REMOTE CONTROL UNIT

Zenith Number	Hudson Number	Description
170-11	48060	Hudson Remote Control (less cables)
7-3	45734	Control Unit Bezel & Glass Assembly
26-77	48067	Hudson Dial Scale and Pointer Bushing Assembly
46-72	45740	Volume Control Knob
46-73	45741	Tuning Control Knob (for Spring only, see 80-100)
52-02	48068	Pilot Lamp Cable & Socket Assembly
70-155	48069	Volume Control Coupling & Shaft Assemb.
70-154	48070	Tuning Control Coupling & Shaft Assemb.
80-100	48583	Tuning Knob Spring only
190-28	48071	6 V. - 18 V. Pilot Lamp

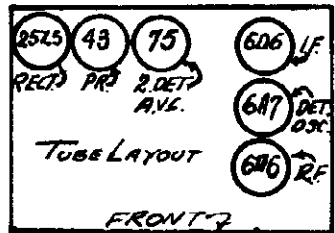
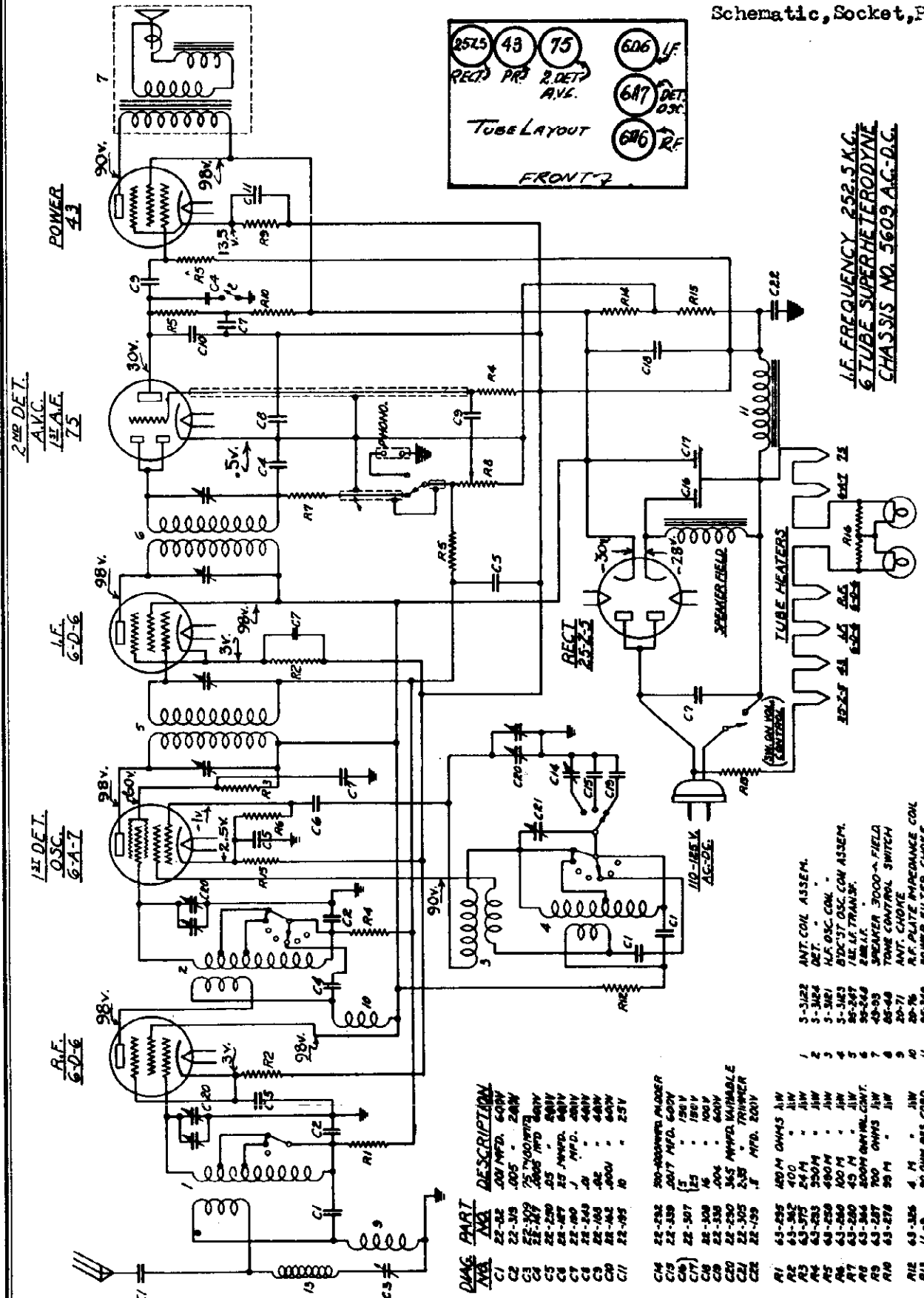
SUPPRESSOR AND SPEAKER MOUNTING PARTS

Zenith Number	Hudson Number	Description
22-200	45923	.5 - 120 V. Coil Condenser
22-202	45990	.5 - 120 V. Generator Condenser
22-282	47974	.05 - 120 V. Condenser
54-77	48072	Hex Nut for Speaker Mtg. Bolt
63-403	47906	1500 Ohm Distributor Suppressor
97-73	48073	Speaker Mtg. Stud
147-21	48074	Wood Spacer Block for Speaker Mtg.

*Speakers are numbered 49-101-U, 49-101-II, 49-101-M designating three different types. Therefore, when ordering speaker or speaker parts refer to the number on speaker at all times and order by that part number accordingly.

ZENITH RADIO CORP.

MODELS 811, 862, 865, 866, 1162
 Chassis 5609 AC-DC
 Schematic, Socket, Parts



I.F. FREQUENCY 252.5 K.C.
 6-TUBE SUPERHETERODYNE
 CHASSIS NO. 5609 AC-DC

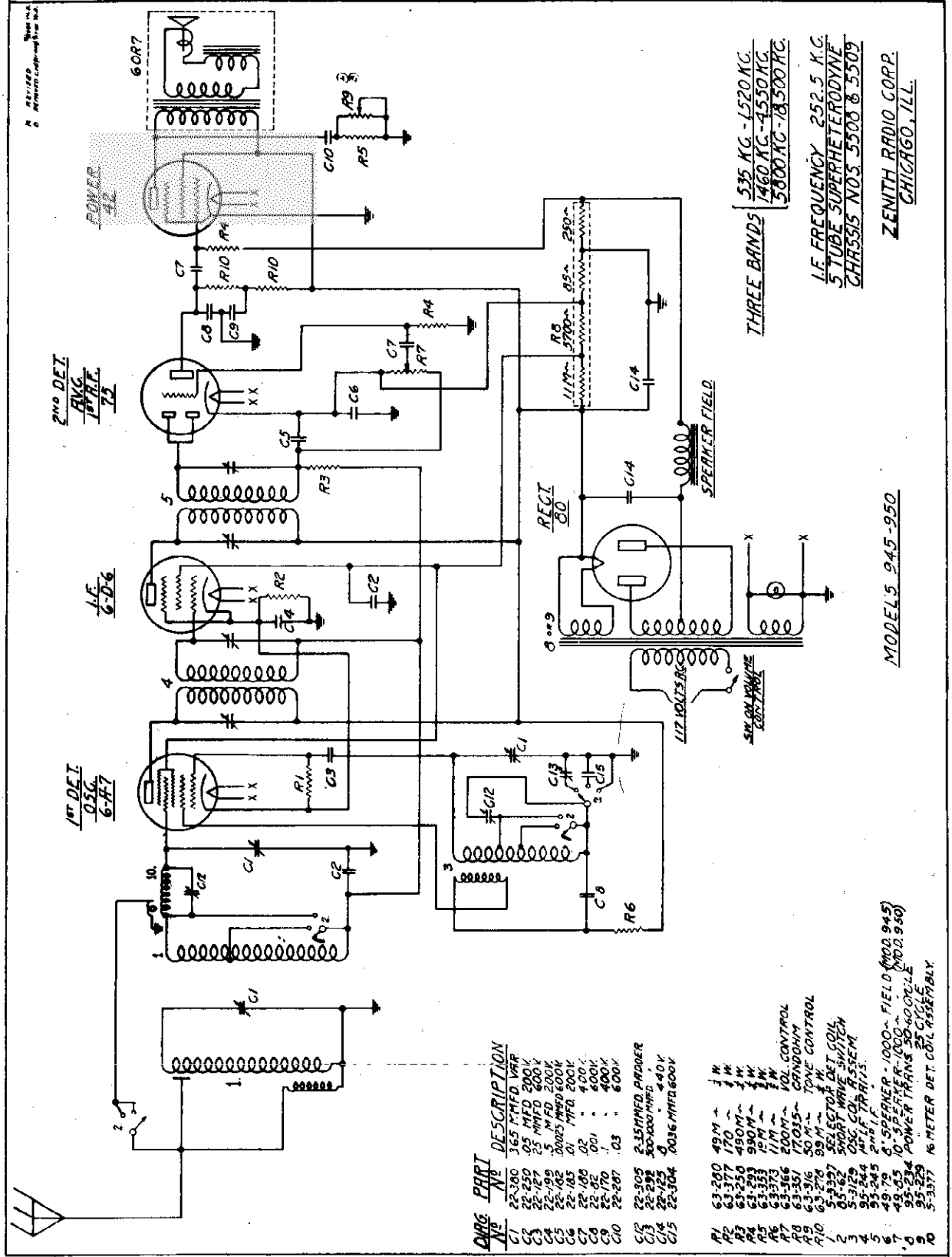
MODELS 811-862-865-866-1162

QAG	PART NO.	DESCRIPTION
C1	22-22	100 MFD. 60V
C2	22-32	.005 - 20V
C3	22-315	75 MFD. 100V
C4	22-317	1000 MFD. 60V
C5	22-259	25 MFD. 60V
C6	22-47	25 MFD. 60V
C7	22-180	1 MFD. 60V
C8	22-243	.02 - 60V
C9	22-165	.02 - 60V
C10	22-42	.001 - 25V
C11	22-195	.01 - 25V
C12	22-232	20-1000V PAPER
C13	22-339	200 MFD. 60V
C14	22-338	200 MFD. 60V
C15	22-307	150 - 150V
C16	22-308	150 - 150V
C17	22-335	100 - 100V
C18	22-336	100 - 100V
C19	22-250	365 MFD. VARIABLE
C20	22-305	2.5M MFD. TRIMMER
C21	22-199	1 - 100V
C22	22-199	1 - 25V
R1	65-235	100 M OHMS 1/2W
R2	65-362	400 - 1/2W
R3	65-375	24 M - 1/2W
R4	65-233	350 M - 1/2W
R5	65-220	400 M - 1/2W
R6	65-260	100 M - 1/2W
R7	65-280	45 M - 1/2W
R8	65-364	500M OHMS 1/2W
R9	65-287	200 M OHMS 1/2W
R10	65-278	200 M - 1/2W
R11	65-326	4 M - 1/2W
R12	11-9	30 OHMS RES. COIL
R13	65-372	20 M OHMS 1/2W
R14	65-344	500 - 1/2W
R15	65-374	50 - 1/2W
R16	65-374	50 - 1/2W

- 3-3122 ANT. COIL ASSEM.
- 3-3124 DET.
- 3-3125 I.F. OSC. COIL
- 3-3126 I.F. OSC. COIL ASSEM.
- 3-3127 I.F. TRANS.
- 3-3128 I.F. TRANS.
- 3-3129 I.F. TRANS.
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- 3-3141 I.F. TRANS.
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- 3-3178 I.F. TRANS.
- 3-3179 I.F. TRANS.
- 3-3180 I.F. TRANS.
- 3-3181 I.F. TRANS.
- 3-3182 I.F. TRANS.
- 3-3183 I.F. TRANS.
- 3-3184 I.F. TRANS.
- 3-3185 I.F. TRANS.
- 3-3186 I.F. TRANS.
- 3-3187 I.F. TRANS.
- 3-3188 I.F. TRANS.
- 3-3189 I.F. TRANS.
- 3-3190 I.F. TRANS.
- 3-3191 I.F. TRANS.
- 3-3192 I.F. TRANS.
- 3-3193 I.F. TRANS.
- 3-3194 I.F. TRANS.
- 3-3195 I.F. TRANS.
- 3-3196 I.F. TRANS.
- 3-3197 I.F. TRANS.
- 3-3198 I.F. TRANS.
- 3-3199 I.F. TRANS.
- 3-3200 I.F. TRANS.

ZENITH RADIO CORP.

MODELS 945, 950
Chassis 5508, 5509
Schematic



THREE BANDS
535 KC. - 1520 KC.
1460 KC. - 4550 KC.
5800 KC. - 18,500 KC.
I.F. FREQUENCY 252.5 K.C.
5 TUBE SUPERHETERODYNE
CHASSIS NOS. 5508 & 5509
ZENITH RADIO CORP.
CHICAGO, ILL.

MODEL 945-950

QTAG NO.	PART NO.	DESCRIPTION
C1	22-300	165 MFD. VAR.
C2	22-230	05 MFD. 200V.
C3	22-160	05 MFD. 500V.
C4	22-160	05 MFD. 500V.
C5	22-185	20025 MFD. 500V.
C6	22-185	01 MFD. 200V.
C7	22-180	02 " 400V.
C8	22-82	001 " 600V.
C9	22-170	1 " 400V.
C10	22-287	03 " 600V.
C11	22-305	2-15 MFD. PADDER
C12	22-232	500-1000 MFD. 400V.
C13	22-125	0 " 400V.
C14	22-125	0 " 400V.
C15	22-304	2036 MFD. 600V.
R1	63-280	49M Ω
R2	63-377	170 Ω
R3	63-250	490M Ω
R4	63-293	990M Ω
R5	63-353	12M Ω
R6	63-373	11M Ω
R7	63-366	200M Ω
R8	63-301	200M Ω
R9	63-316	50M Ω
R10	63-316	50M Ω
1	63-227	921 MCTO. 1/2 NET. COIL
2	63-227	5000T WAVE. WINDING
3	63-227	5000T WAVE. WINDING
4	95-245	1/2 I.F. TRANS.
5	95-245	2nd I.F.
6	49-79	8-SPEAKER - 1000 Ω FIELD (MOD. 945)
7	49-65	10-SPEAKER - 1000 Ω FIELD (MOD. 950)
8	95-234	POWER TRANS. 50-600 CYCLE
9	95-229	25 CYCLE
10	5-357	16 METER DET. COIL ASSEMBLY

MODELS 945, 950
Chassis 5508, 5509
Voltage, Alignment
Socket, Trimmers, Parts

ZENITH RADIO CORP.

PARNS AND PRICES
Chassis #5508 & #5509

MODELS 945, 950

8-3405	Complete Split Second Dial Assembly	\$5.75
26-78	Dial Scale Only	.40
59-27	Special "Z" Pointer	.15
59-32	Split Second Pointer	.10
93-231	Dial Glass Cushion Washer	.05
192-6	Dial Glass	.20

Miscellaneous

49-79	8" Dynamic Speaker for Model 945	\$8.00
	Cone and Voice Coil for Model 945	2.50
	Output Transformer for Model 945	2.00
49-85	Field Coil for Model 945	2.00
	10" Dynamic Speaker for Model 950	8.50
	Cone and Voice Coil for Model 950	3.00
	Output Transformer for Model 950	2.00
57-483	Field Coils for Model 950	2.00
	Dial Escutcheon Plate	.45
78-82	Type 80 Tube Socket	.10
78-100	" 6D6 "	.10
78-101	" 75 "	.10
78-102	" 42 "	.10
78-106	" 6A7 "	.10
85-82	Wave Change Switch	.80
95-229	Power Transformer 25 Cycle	6.50
95-234	Power Transformer 50/60 Cycle	3.75
100-23	6.3 Volt Pilot Lamp	.15
125-131	Coat Tube Shield	.10

Coils, Etc.

95-244	1st I.F. Transformer	1.50
95-245	2nd I.F. Transformer	1.50
9-3129	Oscillator Coil Assembly	1.00
9-3397	Selector Detector Coil Assembly	2.00
9-3377	16 Meter Detector Coil Assembly	.65

Miscellaneous

46-106	Band Selector Knob	.15
46-109	Tuning Control Knob	.10
46-110	Tone Control Knob	.10
46-111	Volume Control Knob	.10

THESE PRICES SUPPESSE ALL OTHER PREVIOUS QUOTATIONS AND ARE SUBJECT TO REGULAR DISCOUNT AND CHANGE WITHOUT NOTICE.

January 31, 1935

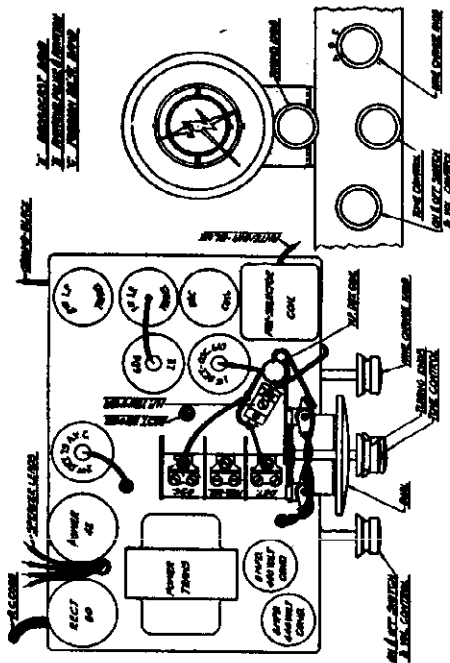
ZENITH RADIO CORPORATION

TUBE	POSITION	RF	IF	Ec1	Ec2	Ec3	Ec4
6A7	1st Det.	5.8	4	0	80	-	260
	Ono.			.6	-	-	210
6D5	I.F.	5.8	5.2	0	80	5.2	260
75	2nd Det.	5.8	1.5	0	-	-	135
42	P.W.R.	5.8	0	-7	260	-	245
80	RECT.	4.5	-	-	-	-	-

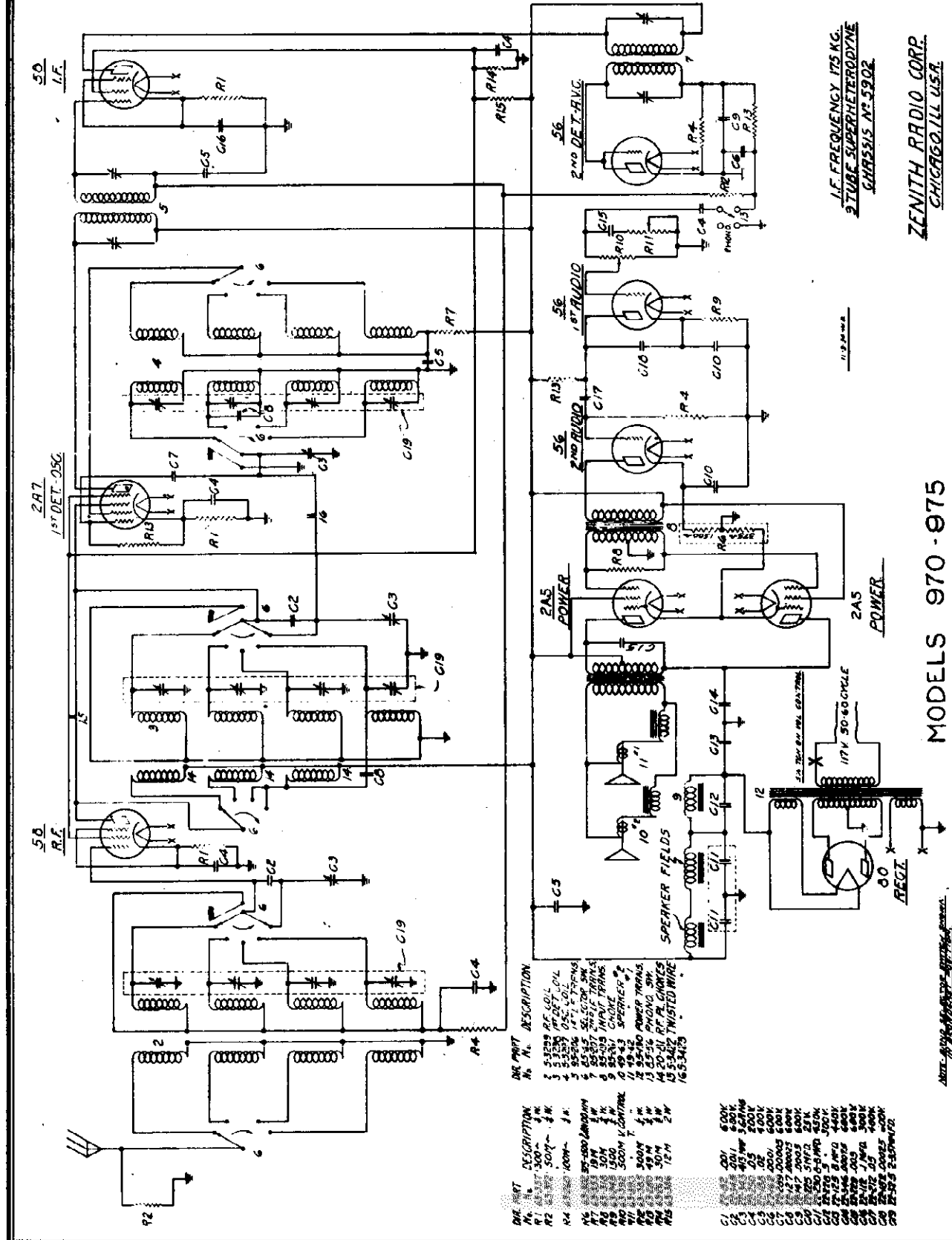
Line Voltage 112
All measurements taken from point indicated to ground, using a 1000 ohm per volt D.C. meter (except filaments).
F - Filament; K - Cathode; G1 - Control Grid; G2 - Screen Grid; G3 - Suppressor Grid; P - Plate

Alignment

1. Balance I.F. transformers at 282.5 K.C. with test oscillator connected to control grid of 6A7 and ground.
2. Turn band switch to C band. Connect test oscillator to antenna and ground leads. Set test oscillator at 15 Megacycles. Adjust oscillator trimmer on gang condenser for correct dial reading.
3. Adjust detector trimmer (located on top of chassis between front section of gang condenser and coil) for maximum output.
4. Turn band switch to A band. Adjust oscillator trimmer (located on right side underneath chassis) for correct dial reading at 1400 K.C. also adjust preselector and detector trimmers on gang for maximum output.
5. Adjust oscillator padder (next to oscillator section of gang on top of chassis) while rocking pointer back and forth past 600 K.C. to the combination giving greatest output.
6. Recheck 1400 K.C.



ZENITH RADIO CORP.



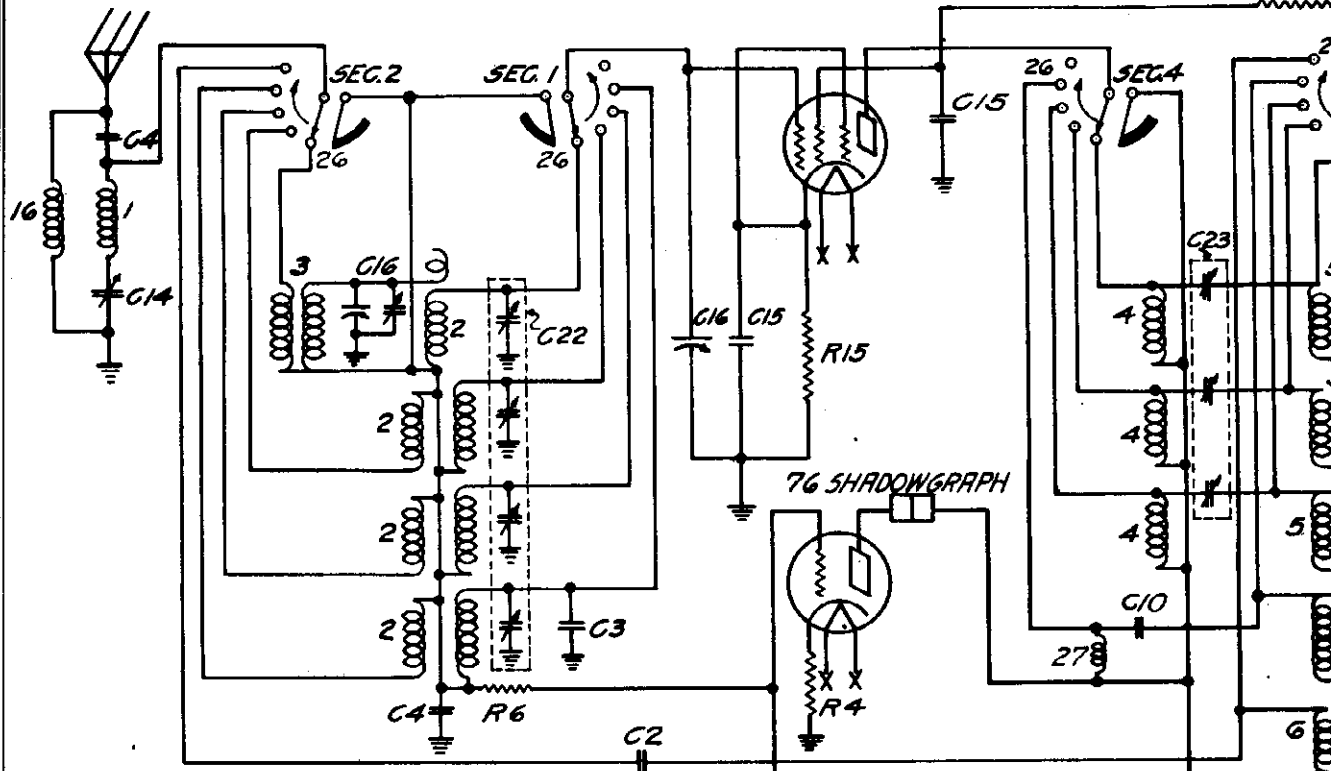
I.F. FREQUENCY 175 KG.
 9 TUBE SUPERHETERODYNE
 CHASSIS NO. 5902

ZENITH RADIO CORP.
 CHICAGO, ILL. U.S.A.

MODELS 970-975

PK. PART	DESCRIPTION	QTY.	RES.	RES.	RES.
R1	500K	1	1/2W	500K	1/2W
R2	500K	1	1/2W	500K	1/2W
R3	500K	1	1/2W	500K	1/2W
R4	500K	1	1/2W	500K	1/2W
R5	500K	1	1/2W	500K	1/2W
R6	500K	1	1/2W	500K	1/2W
R7	500K	1	1/2W	500K	1/2W
R8	500K	1	1/2W	500K	1/2W
R9	500K	1	1/2W	500K	1/2W
R10	500K	1	1/2W	500K	1/2W
R11	500K	1	1/2W	500K	1/2W
R12	500K	1	1/2W	500K	1/2W
R13	500K	1	1/2W	500K	1/2W
R14	500K	1	1/2W	500K	1/2W
R15	500K	1	1/2W	500K	1/2W
R16	500K	1	1/2W	500K	1/2W
R17	500K	1	1/2W	500K	1/2W
R18	500K	1	1/2W	500K	1/2W
R19	500K	1	1/2W	500K	1/2W
C1	500K	1	1/2W	500K	1/2W
C2	500K	1	1/2W	500K	1/2W
C3	500K	1	1/2W	500K	1/2W
C4	500K	1	1/2W	500K	1/2W
C5	500K	1	1/2W	500K	1/2W
C6	500K	1	1/2W	500K	1/2W
C7	500K	1	1/2W	500K	1/2W
C8	500K	1	1/2W	500K	1/2W
C9	500K	1	1/2W	500K	1/2W
C10	500K	1	1/2W	500K	1/2W
C11	500K	1	1/2W	500K	1/2W
C12	500K	1	1/2W	500K	1/2W
C13	500K	1	1/2W	500K	1/2W
C14	500K	1	1/2W	500K	1/2W
C15	500K	1	1/2W	500K	1/2W
C16	500K	1	1/2W	500K	1/2W
C17	500K	1	1/2W	500K	1/2W
C18	500K	1	1/2W	500K	1/2W
C19	500K	1	1/2W	500K	1/2W

6D6
1ST R.F.



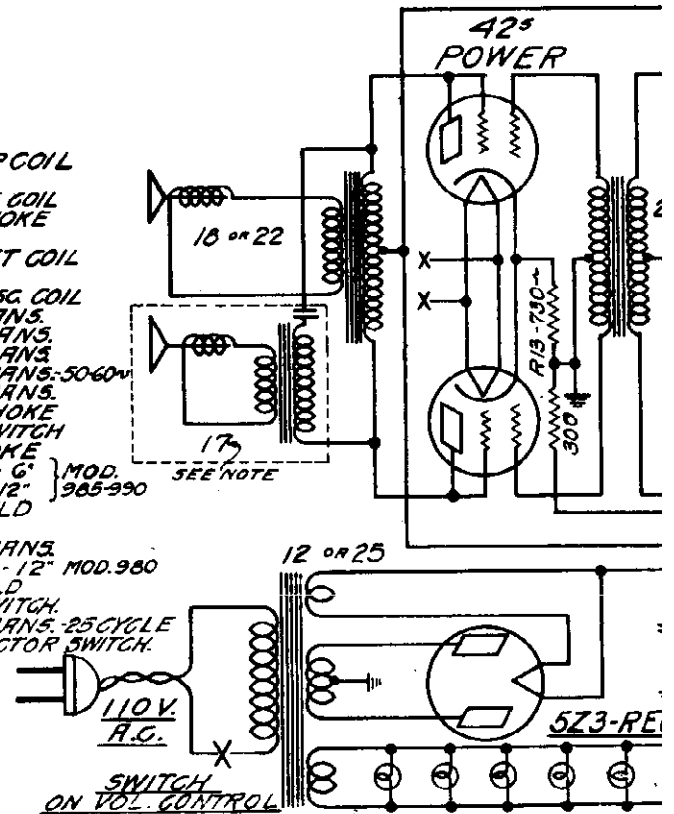
DIAG. No.	PART No.	DESCRIPTION
C1	22-250	.05 - 200V.
C2	22-289	.00005 - 600V.
C3	22-285	.00001 - 600V.
C4	22-185	.01 200V.
C5	22-219	.03 200V.
C6	22-292	300-1000 MMFD.
C7	22-182	.00025 600V.
C8	22-82	.001 600V.
C9	22-212	.05 400V.
C10	22-127	.000025 600V.

C12	22-331	8 500K
C13	22-125	8 440V.
C14	22-284	75-275 MMFD.
C15	22-190	.1 200V.
C16	22-333	4 GANG VAR.
C17	22-341	.00092 - 600V.
C18	22-228	.5 300V.
C19	22-243	.01 400V.
C20	22-342	.0029 600V.
C21	22-147	.0005 600V.
C22	22-325	2-35 MMFD.
C23	22-324	2-35 "
C24	22-323	2-35 "
C25	22-188	.02 400V.

DIAG. No.	PART No.	DESCRIPTION
R19	63-361	5M- 1/2 W.
1	20-64	WAVE TRAP COIL
2	5-3078	R.F. COIL
3	20-85	BAND PASS COIL
4	20-81	R.F. PL. CHOKE
5	5-3537	DET. COIL
6	20-84	7 METER DET. COIL
7	5-3080	OSC. COIL
8	5-3115	7 METER OSC. COIL
9	95-242	1ST I.F. TRANS.
10	95-242	2ND I.F. TRANS.
11	95-243	3RD I.F. TRANS.
12	95-241	POWER TRANS. 50-60V.
13	95-269	AUDIO TRANS.
14	95-240	FILTER CHOKE
15	85-39	PHONO. SWITCH
16	20-88	ANT. CHOKE
17	49-107	SPEAKER - G. } MOD. 985-990
18	49-108	" 12" }
19	49-107	SPKR. FIELD
20	49-108	" "
21	95-268	DRIVER TRANS.
22	49-92	SPEAKER - 12" MOD. 980
23	49-92	SPKR FIELD
24	85-60	TONE C. SWITCH.
25	95-246	POWER TRANS. 25 CYCLE
26	85-58	BAND SELECTOR SWITCH.
27	5-3538	PL. CHOKE.

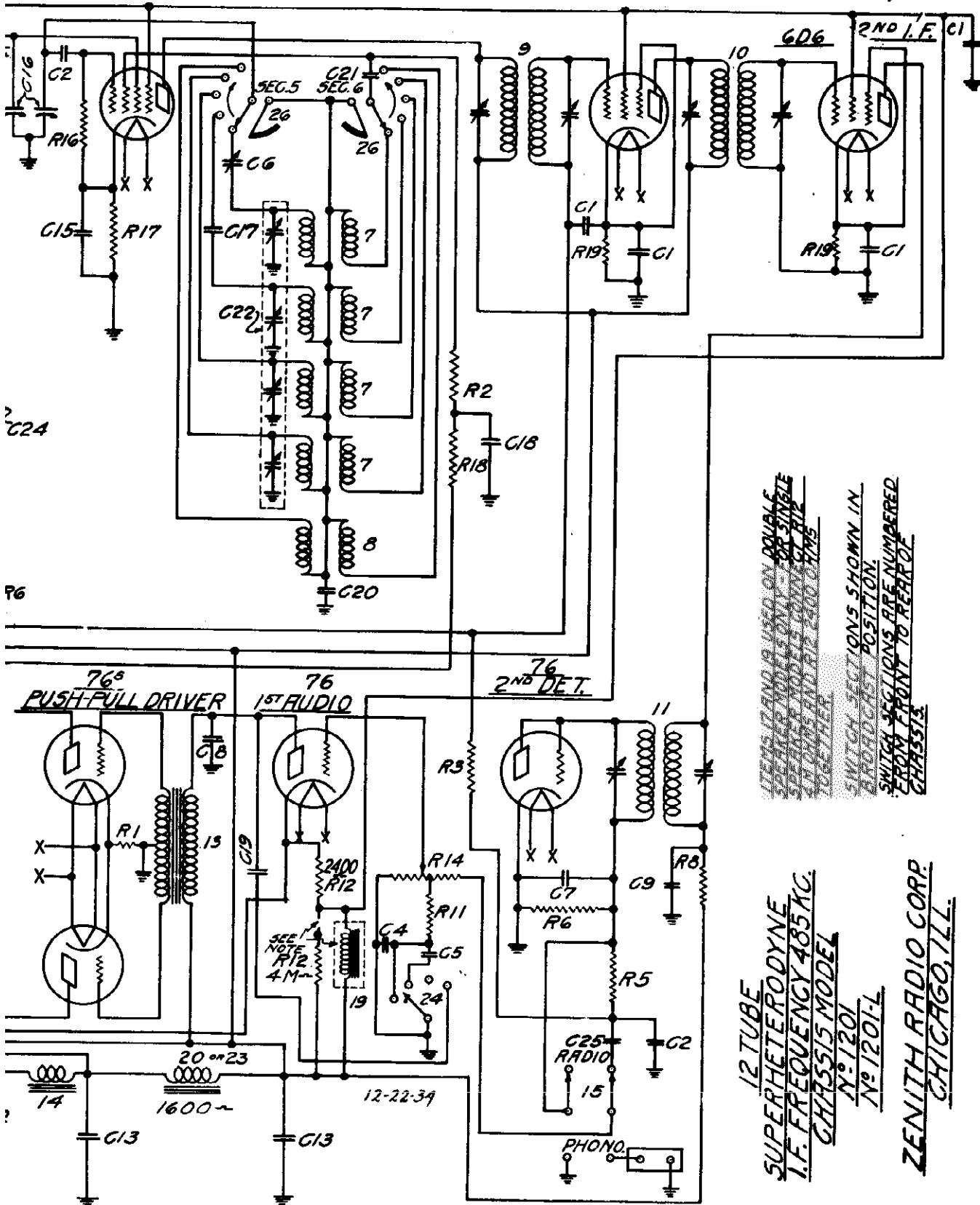
R1	63-238	1000 ~ 1/2 W.
R2	63-291	29 M ~ 1/2 W.
R3	63-258	490 M ~ 1/2 W.
R4	63-410	1200 ~ 1/2 W.
R5	63-281	29 M ~ 1/2 W.
R6	63-278	99 M ~ 1/2 W.

R8	63-245	1500 ~ 1/2 W.
R11	63-261	3900 ~ 1/2 W.
R12	63-431	2400-4000 ~ GRANOHM
R13	63-430	300-730 ~ "
R14	63-384	500M-VOL. CON.
R15	63-377	170 ~ 1/2 W.
R16	63-372	50M ~ 1/2 W.
R17	63-305	160 ~ 1/2 W.
R18	63-388	19M ~ 1/2 W.



O CORP. 6A7 MODEL 980-1201 CHASSIS. 6D6
 1ST DET. OSC. 985-990 1201-L CHASSIS. 1ST I.F.

MODELS 960,985,990
 Chassis 1201,1201A
 Schematic,Parts



~~LIFELINE IS USED ON DOUBLE
 SPEAKER MODELS ONLY -
 FOR SINGLE
 SPEAKER MODELS, THE
 LIFELINE AND THE
 LIFELINE SHOULD BE
 TOGETHER.~~
 SWITCH SECTIONS SHOWN IN
 REAR POSITION.
 SWITCH SECTIONS ARE NUMBERED
 FROM FRONT TO REAR OF
 CHASSIS.

12 TUBE
 SUPERHETERODYNE
 I.F. FREQUENCY 485 KC.
 CHASSIS MODEL
 N° 1201
 N° 1201-L
 ZENITH RADIO CORP.
 CHICAGO, ILL.

MODELS 980, 985, 991
 Chassis 1201, 120L
 Voltage, Socket
 Trimmers

ZENITH RADIO CORP.

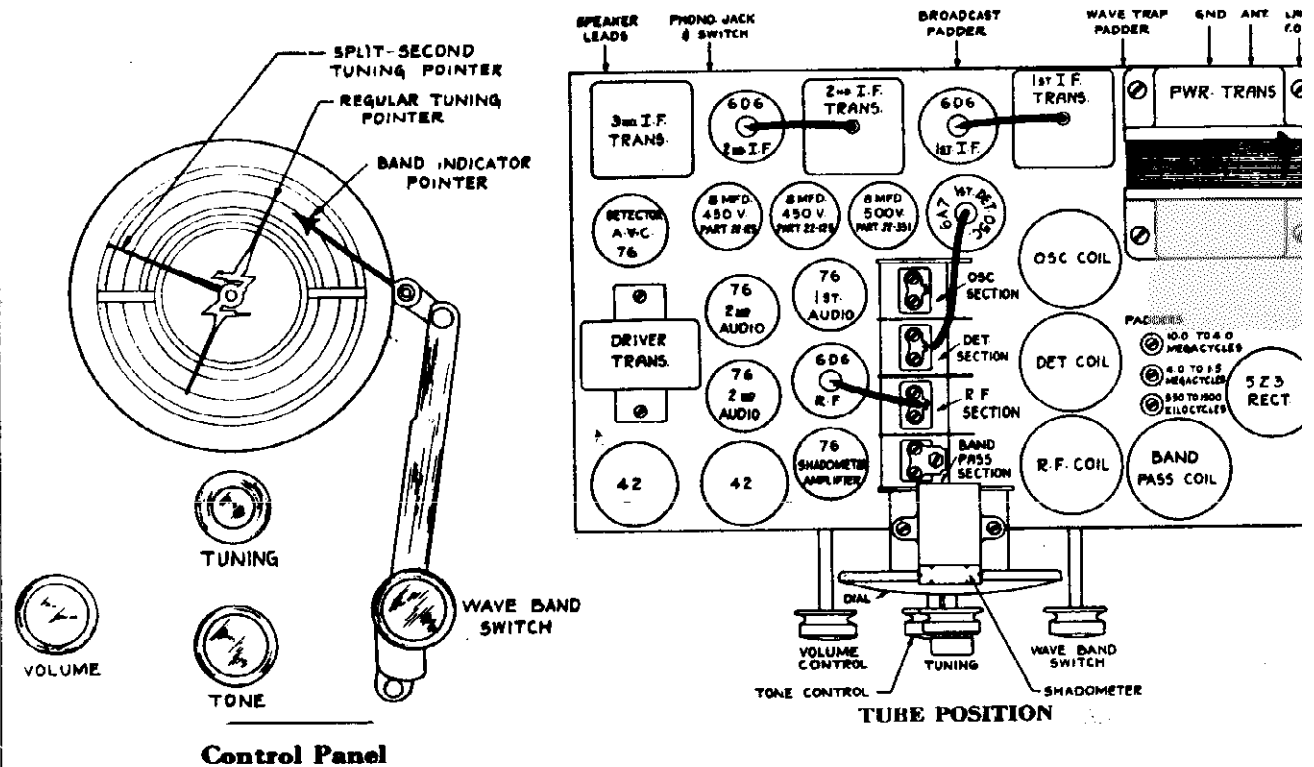
Socket Voltages

TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6D6	R.F.	5.8	1	0	78	1	220
6A7	1st Det.	5.8	1,5	0	86	-	220
	Osc.			-10	-	-	220
6D6	1st I.F.	5.8	7	0	86	7	220
6D6	2nd I.F.	5.8	7	0	86	7	220
76	2nd Det.	5.8	0	0	-	-	0
76	Shadow-meter AMP.	5.8	10	0	-	-	210
76	1st Aud.	5.8	11	0	-	-	210
76	P.P. Driver	5.8	11	0	-	-	220
76	P.P. Driver	5.8	11	0	-	-	220
42	PWR.	5.8	26	0	260	-	260
42	PWR.	5.8	26	0	260	-	260
5Z3	RECT.	4.8	-	-	-	-	-

Line Voltage 110 Volts

Antenna and Ground Disconnected.

f - filament; k - cathode; g1 - control grid; g2 - screen grid; g3 - suppressor grid; p - plate.



MODELS 980, 985, 990

Chassis 1201, 1201A

Alignment, Service Notes

ZENITH RADIO CORP.

Service Bulletin



MODELS

980-985-990

Chassis

1201 - 1201A

SERVICE NOTES

Dial Slips or Binds. Tighten lugs on planetary drive. See that both pointers are free. Make sure gang is squarely lined up with dial.
Off Calibration. Check for loose set screws on dial assembly to condenser shaft. Black pointer may be loose on shaft. Check alignment as outlined in Alignment Procedure.

Four Tons. Defective tubes in audio. One side of push-pull circuit faulty. Check audio and output transformers. See A.T.C. blocking.

Insensitive. Out of alignment, weak tubes or defective by-pass condensers.

Shadowgraph Inoperative. Weak 76 tube, burnt out shadowgraph, open resistor in 76 plate circuit.

Distortion at Medium Volume. Defective 75 tube, defective volume control.

Separate green volume control-lead and speaker-lead close to grid of 48 tube.

Insensitive on Any Short Wave Band. Check alignment, make sure R.F. circuit

is not aligned to image frequency. Change 6A7 tube. Change position of fixed

condensers adjacent to rear section of wave change switch. Location of these

condensers in relation to each other and their distance from the chassis will

affect dial calibration and sensitivity.

Stops Oscillating Around 9 M.C. Change 6A7 tube, leakage in 60 Mfd. or .0029

Mfd. condenser.

A.V.C. Blocks. Shorted resistor on antenna choke. C-14 padder shorted.

Grounded R.F. grid circuit.

Oscillates on Broadcast. Check alignment. Push brown wire away from 6A7

socket. Grounded cathode on 1st I.F. or grounded to 600 K.C. padder. Check

for open by-pass condenser.

Foisy. Shorting plates in gang condenser. Poor contact in band switch. Loose

shields or shield bases. Static shields may be touching leads under gang

condenser.

Overheats. Check pilot light and heater circuits for partial short or ground.

Run on D and E Bands. Antenna lead too close to 4C line or 523 socket short in

6D6 in R.F. socket.

Flutters. Rearrange leads adjacent to 6A7 socket. Open antenna coil. Push

yellow band pass lead away from detector trimmer assembly and yellow choke

leads. Replace 6D6 in R.F. socket.

Oscillates on Short Wave Bands. Make sure brown R.F. grid return lead is

pushed away from 6A7 socket. Check for ground on any A.V.C. lead. Open

by-pass condenser.

Tone Control Inoperative. Loose ground lug on 63-450 capacitor. Defective

condensers in tone control circuit.

Whistles. Rearrange leads in audio circuits. Speaker wires couple with 1st

I.F.

Warning. The wiring to the switch is a part of the tuned circuit on the "F"

band. Do not change the position of any leads.

Alignment

The diagram on page 2 shows position of major components and aligning adjustments. It should be studied carefully before any attempt is made to adjust the various circuits. The Cough-Brengle type is the only commercial service oscillator found practical for this work.

Separate coils are used for each band. Mounted on the coils are individual trimmers that align each band, independent of the other bands.

Connect 485 K.C. service oscillator to grid of 6A7 and chassis ground. Adjust I.F. trimmers on rear of I.F. transformers for strongest signal.

Connect 485 K.C. service oscillator to antenna and ground. Turn dial to 640 K.C. on broadcast band and adjust wave trap trimmer on right rear side of chassis for weakest signal.

Broadcast - "A" Band

Set service oscillator at 1400 K.C., remaining attached to antenna ground posts. Turn dial to same point and adjust #1 trimmer (top one on oscillator coil) to resonance. Adjust #1 R.F. trimmer (top one on R.F. coil); #1 detector trimmer (through hole in chassis base) and band pass trimmer (top front section of gang) all to resonance.

Set service oscillator at 600 K.C. Adjust padder (located in center rear of chassis) for correct dial reading.

Recheck 1400 K.C. alignment.

"B" Band

Set service oscillator at 4 M.C. (still attached to antenna and ground) and adjust trimmer #2 (2nd from top) on oscillator coil for correct dial reading. Adjust #2 R.F. trimmer (2nd from top on R.F. coil) and #2 detector trimmer (center hole through chassis) to resonance.

"C" Band

Loosen #5 detector trimmer (top one on detector coil). Set service oscillator at 10.5 M.C. Adjust #5 oscillator trimmer (third from top on oscillator coil) for correct dial reading. Adjust #5 R.F. trimmer (third from top of R.F. coil) and #5 detector trimmer (rear one through hole in top of chassis). Adjust #5 detector trimmer on coil to resonance.

"D" Band

Tighten #4 detector trimmer (bottom one on detector coil). Set service oscillator at 21 M.C. Adjust #4 oscillator trimmer (bottom one on oscillator coil) for correct dial reading. Adjust #4 R.F. trimmer (lower one on R.F. coil) and #4 detector trimmer (lower one on detector coil) to resonance.

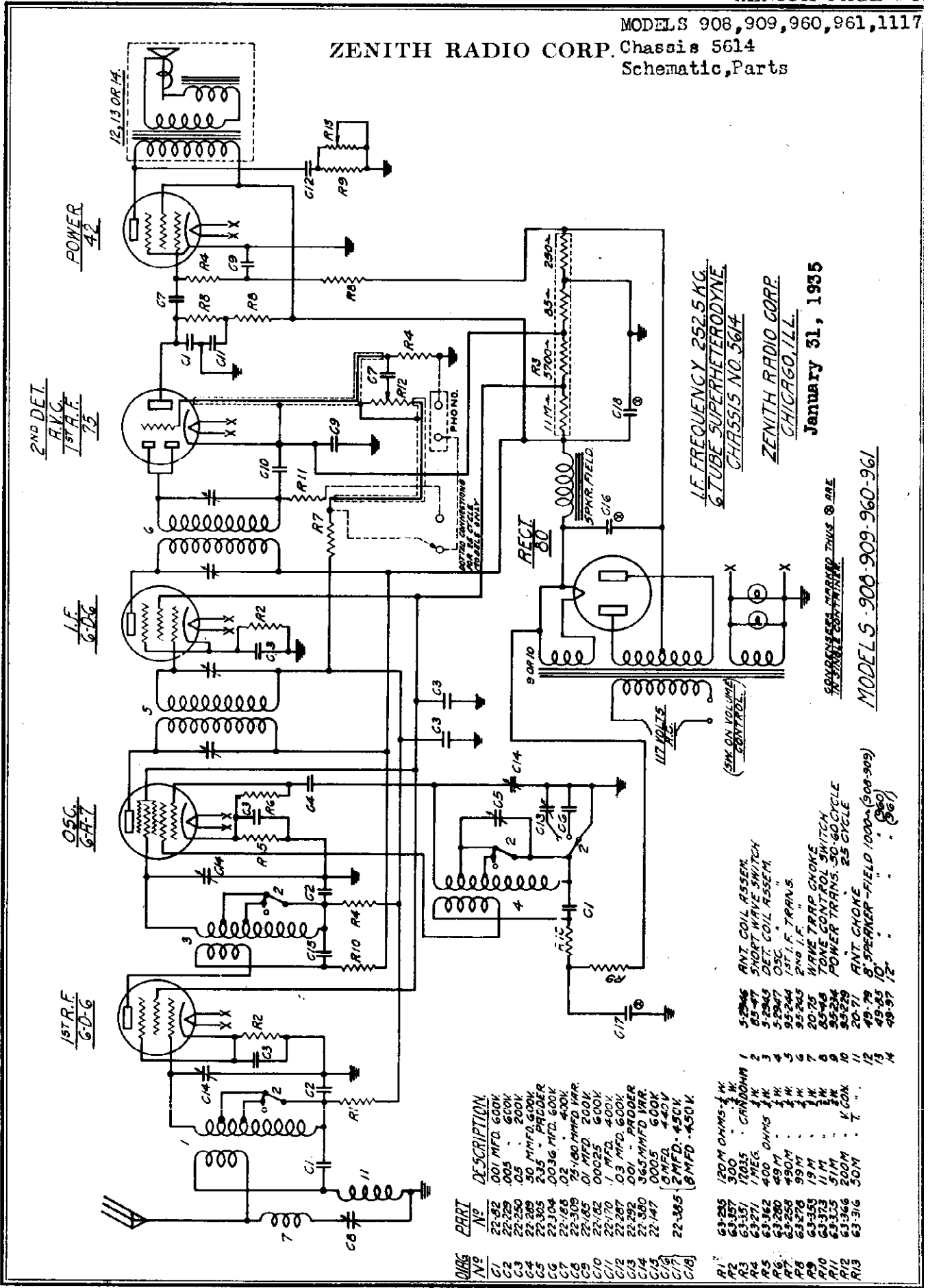
It is very easy to mistake the image frequency for the fundamental on this band. Rotate dial and if shadowmeter narrows at any point, especially at 15 M.C., the band should be rebalanced.

"E" Band

There are no adjustments to be made on this band.

MODELS 908, 909, 960, 961, 1117

ZENITH RADIO CORP. Chassis 5614
Schematic, Parts



2ND DET.
R.V.C.
1ST I.F.
75

I.F.
62.6

OSC.
6.47

1ST I.F.
6.47

I.F. FREQUENCY 252.5 KC.
6 TUBE SUPERHETERODYNE.
CHASSIS NO. 5614

ZENITH RADIO CORP.
CHICAGO, ILL.
January 31, 1935

500V TRANSFORMER THUS @ ARE
IN SINGLE CONTAINER

MODELS 908-909-960-961

PART No	DESCRIPTION
22-82	001 MFD. 600V
22-228	005 " 600V
22-229	005 " 200V
22-250	20 MFD. 600V
22-251	20 MFD. 600V
22-303	2.5 " PADDER
22-304	0036 MFD. 600V
22-568	02 " 400V
22-505	75-180 MFD. VAR.
22-185	01 MFD. 200V
22-170	1 MFD. 400V
22-287	03 MFD. 600V
22-292	001 " PADDER
22-580	365 MFD. VAR.
22-147	0005 " 600V
22-385	0MFD. 450V
22-385	12 MFD. 450V
22-385	18 MFD. 450V

PART No	DESCRIPTION
63-245	120M OHMS. 1/2 W
63-246	300 " " "
63-247	1 MEG. " " "
63-271	4 W " " "
63-280	400 OHMS 1/2 W
63-281	49 M " " "
63-282	490 M " " "
63-270	99 M " " "
63-359	19 M " " "
63-373	11 M " " "
63-375	51 M " " "
63-346	200M " " "
63-316	50M " " "

- 5-2846 ANT. COIL ASSEM.
- 63-47 SHORT WAVE SWITCH
- 5-2845 DET. COIL ASSEM.
- 5-2847 OSC.
- 95-244 2ND I.F. TRANS.
- 95-245 1ST I.F. TRANS.
- 20-75 WAVE TRAP CHOKES
- 65-48 TONE CONTROL SWITCH
- 95-246 POWER TRANS. 30-60 CYCLE
- 95-249 ANT. CHOKES
- 20-71 ANT. CHOKES
- 49-79 8" SPEAKER-FIELD 10000 (500-309)
- 49-84 10" " (850)
- 49-87 12" " (961)

MODELS 908, 909, 960, 961, 1117

Chassis 5614

ZENITH RADIO CORP.

Voltage, Socket, Trimmers, Parts



PARTS AND PRICES
Chassis #5614

MODEL	PRICE
908	\$3.75
960	.40
961	.10
1117	.20

Part Name	Price
Complete Dial Assembly	\$3.75
Dial Scale Only	.40
Split Second Pointer	.10
Special "Z" Pointer	.20
Glass Cushion Washer	.06
Dial Glass	.20
Coils and Chokes	
Antenna Choke	.20
Wave Trap Choke	.25
1st I.F. Transformer	1.50
2nd I.F. Transformer	1.50
Detector Coil Assembly	1.60
Antenna Coil Assembly	\$1.25
Oscillator Coil Assembly	1.00
Miscellaneous	
Band Selector Switch Knob (960-961)	.15
Tuning Control Knob	.10
Tone Control Knob	.10
Volume Control Knob	.10
Band Selector Switch Knob (908)	.15
8" Dynamic Speaker for Model 908	8.00
Cone and Voice Coil for 49-79	2.50
Output Transformer for 49-79	2.00
Field Coil for 49-79	2.00
10" Dynamic Speaker	8.50
Cone and Voice Coil for 49-85	3.00
Output Transformer for 49-85	2.00
Field Coil for 49-85	2.00
Dial Escutcheon Plate	.45
Type 60 Tube Socket	.10
Type 6D6 " "	.10
Type 75 " "	.10
Type 42 " "	.10
Type 6A7 " "	.10
Wave Change Switch	1.10
Phono Switch (25 Cycle only)	.35
All Voltage 25 Cycle Power Transformer	6.50
117 Volt 50/60 Cycle Power Transformer	3.75
Pilot Lamp	.15
Coat Tube Shield	.10

Part Name	Price
S-3421	
26-79	
59-32	
59-33	
93-231	
192-6	
20-71	
20-75	
95-244	
95-245	
S-2957	
S-2955	
S-2953	
46-108	
46-109	
46-110	
46-111	
46-112	
49-79	
49-85	

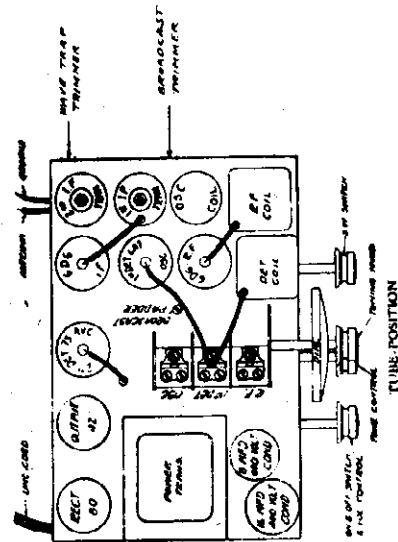
TUBE	POSITION	Zf	Ex	Eg1	Eg2	Eg3	Ep
6D6	R.F.	5.6	2.4	0	70	2.4	200
6A7	1st. Det.	5.6	3	0	70	-	250
	Osc.			3.6	-	-	230
6D6	I.F.	5.6	2.6	0	70	2.6	250
75	2nd. Det.	5.6	1.4	0	-	-	148
	1st Audio				250	-	250
42	PWR.	5.6	0	-6	-	-	300
90	RECT.	4.5	-	-	-	-	300

Line Voltage 112 Antenna and Ground Disconnected

All measurements taken from point indicated to ground, using a 1000 ohm per volt D.C. meter (except heaters).
 F - Filament; K - Cathode; G1 - Control Grid; G2 - Screen Grid; G3 - Suppressor Grid; p - Plate.

Alignment

1. Balance intermediate transformers at 252.5 K.C. with oscillator connected to grid of first detector and ground.
2. Adjust wave trap paddler (located underneath chassis at rear right side) for weakest signal with 252.5 K.C. oscillator connected to aerial and ground.
3. Turn wave band switch clockwise to the highest frequency band. Connect 15,000 K.C. oscillator to aerial and ground. Balance oscillator trimmer on three-gang condenser for correct dial reading at this frequency.
4. Turn wave band switch counter-clockwise to standard broadcast position. Adjust broadcast oscillator trimmer (located underneath chassis at right center) for correct dial reading at 1400 K.C. and balance R.F. and 1st detector trimmers on three-gang condenser for loudest signal.
5. Adjust oscillator paddler (located next to oscillator section of gang on top of chassis) while rocking pointer back and forth past 600 K.C. for combination giving maximum output.
6. Recheck 1400 K.C.



MODELS 4P26, 4T26, 4P51, 4T51

Chassis 5401

ZENITH RADIO CORP.

Voltage, Socket, Trimmers

Alignment, Parts List

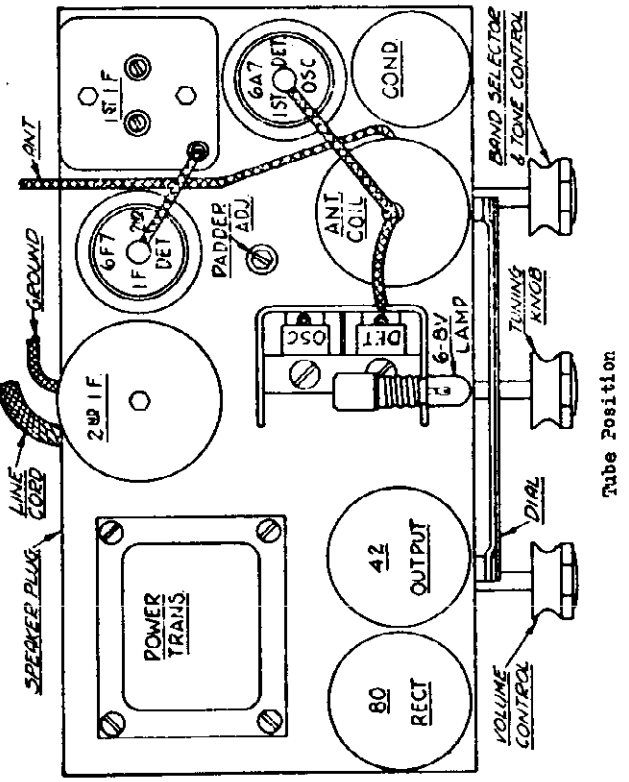
78-103 Type 6F7 Socket (Wafer Type).....	.10
78-106 " 6A7 " .....	.10
78-128 Speaker Plug Socket .....	.10
78-129 Voltage Indicator Socket (25 Cycle only) .....	.10
85-76 Band Selector and Tone Control Switch .....	.35
95-297 115 V., 60 Cycle Power Transformer	2.50
95-296 All Voltage 25 Cycle Power Transformer	4.75
100-23 6.3 V. Pilot Lamp .....	.15
126-191 tube Shield .....	.15
63-258 490 M Ohm 1/2 Watt Resistor .....	.20
63-263 30M " .....	.20
63-265 220 " " .....	.20
63-280 49M " " .....	.20
63-290 260M " " .....	.20
63-293 990M " " .....	.20
63-300 990 " " .....	.20
63-376 190M " " .....	.20
63-455 Volume Control Assembly	1.00
22-147 .0005 Mfd. 500 V. .....	.15
22-162 .0001 " 600 V. .....	.20
22-205 200-500M Mfd. Padder .....	.35
22-229 .005 Mfd. 600 V. .....	.15
22-243 .01 " 400 V. .....	.15
22-250 .05 " 200 V. .....	.20
22-319 .005 " 200 V. .....	.20
22-345 .0011 " 600 V. .....	.15
22-356 .002 " 600 V. .....	.20
22-406 2-Gang Variable	2.50
22-407 2 x 4 x 8 Mfd. 450 V.	1.75
S-3673 Antenna Coil Assembly	1.00
S-3674 Oscillator Coil Assembly .....	.55
S-3760 1st I.F. Transformer Assembly	1.25
95-284 2nd I.F. Transformer Assembly	1.00
20-82 Antenna Choke .....	.25
S-3717 Dial Pointer and Pushing Assembly .....	.25
S-3718 Dial Scale and Frame Assembly .....	.50
46-122 Tuning Knobs .....	.10
49-115 5" Dynamic Speaker (Model 26)	4.50
Core and Voice Coil for 49-115	2.06
Output Transformer for 49-115	1.75
Field Coil for 49-115	1.50
8" Dynamic Speaker for Model 51	6.00
Core and Voice Coil for Model 51	2.50
Output Transformer for Model 51	1.75
Field Coil for Model 51	1.50

TUBE	POSITION	MF	Ek	Eg1	Eg2	Eg3	Ep
6A7	1st. Det.	6.1	27	0	111	-	231
6F7	Osc.			12	-	-	150
	I.F.	6.1	25	0	111	-	231
42	2nd. Det.	6.1	0	0	-	-	195
80	PR.	6.1	0	-15	231	-	219
	RECT.	5	-	-	-	-	231

f - heaters; k - cathode; g1 - control grid; g2 - screen grid; g3 - suppressor grid; p - plate.

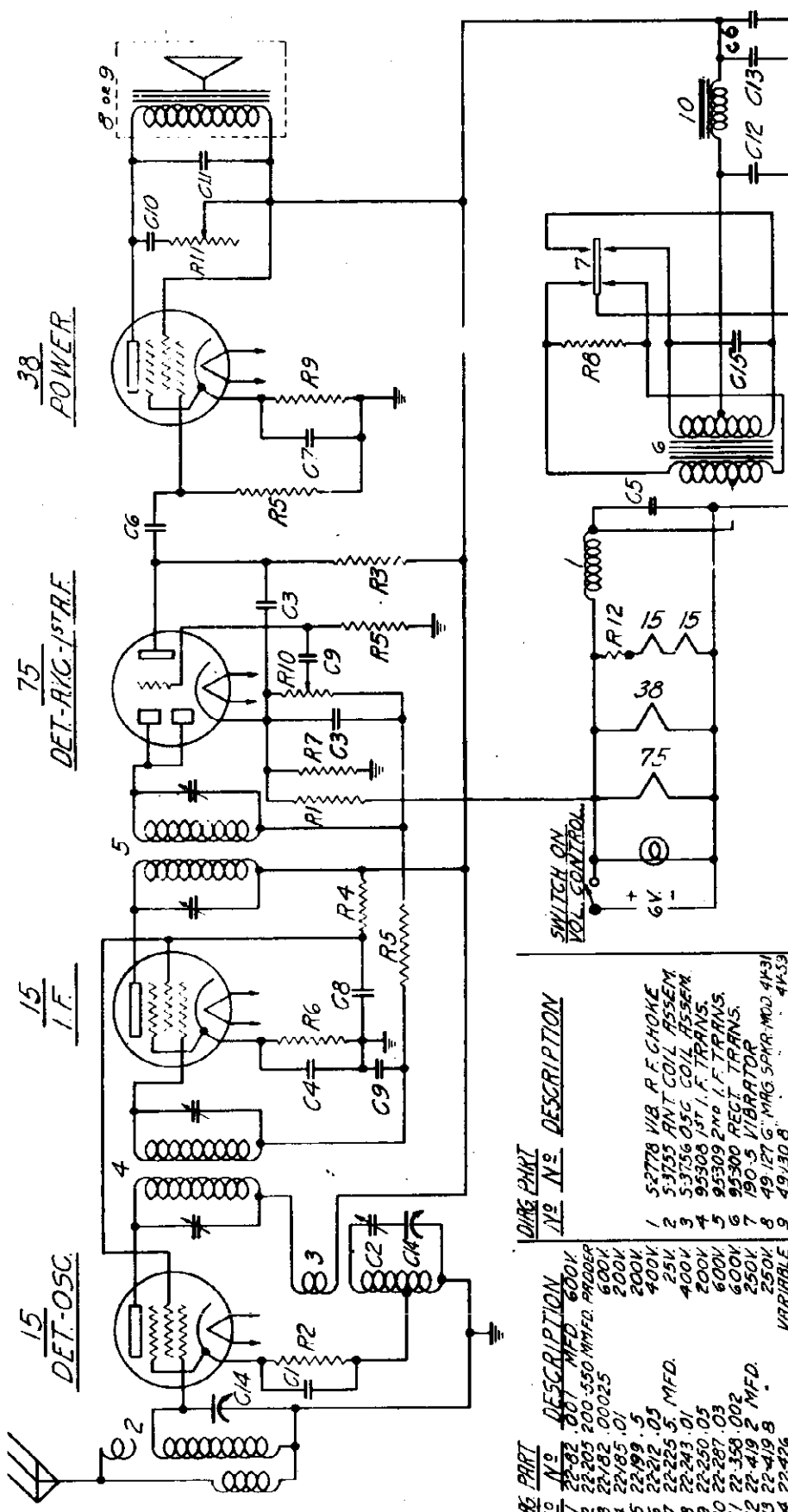
All measurements taken from point indicated to ground, using a 1,000 ohm per volt D.C. meter (except heater).

- Alignment**
- Balance I. F. transformer at 456 K.C.
 - Place switch in left or broadcast position. Set dial pointer at 1500 K.C. and align trimmers on gang to resonance. Align broadcast padder at 540 K.C. slowly rocking pointer past 540 on dial to position giving strongest signal.
- There are no adjustments for the short wave band.



ZENITH RADIO CORP.

MODELS 4V31, 4V59
Chassis 5405
Schematic, Parts



ZENITH
6-22-35
4 TUBE BATTERY SUPERHETERODYNE
I.F. FREQUENCY 456 KC.
CHASSIS No. 5405
MODELS 4V31 - 4V59
TUNING RANGE 550-1700 K C

DIRS PART

NO.	DESCRIPTION	QTY
1	5P778 VIB. R.F. CHOKER	1
2	53755 RMT. COIL ASSEM.	1
3	53756 OSC. COIL ASSEM.	1
4	95506 1ST I.F. TRANS.	1
5	95509 2ND I.F. TRANS.	1
6	95500 RECT. TRANS.	1
7	190.5 VIBRATOR	1
8	49.127 G. MAG. SPKR. MOD. 4K31	1
9	49.150 B	1
10	95298 POWER CHOKER	1

DIRS PART

NO.	DESCRIPTION	QTY
C1	22-22 .001 MFD. 600V	1
C2	22-205 200-550 MFD. PROOF	1
C3	22-182 .00025	1
C4	22-185 .01	1
C5	22-199 .5	1
C6	22-212 .05	1
C7	22-225 5 MFD.	1
C8	22-243 .01	1
C9	22-250 .05	1
C10	22-287 .03	1
C11	22-358 .002	1
C12	22-419 2 MFD.	1
C13	22-419 B	1
C14	22-426	1
C15	22-427 .006	1

MODEL S 4V31, 4V59

Chassis 5405

ZENITH RADIO CORP.

Voltage, Socket, Parts
Trimmers, Alignment

Socket Voltages

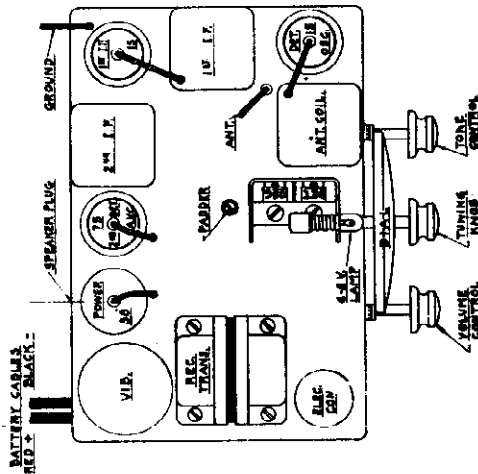
TUBE	POSITION	Bf	Bk	Bg1	Bg2	Bg3	Bp
15	1st Det.	2	8	0	115	-	155
15	I. F.	2	3.5	0	115	-	155
75	2nd Det.	6	1.5	0	-	-	30
38	PRF	6	14	0	155	-	148

Battery - 6 volts
Antenna and ground disconnected.
f - filament; k - cathode; g1 - control grid; g2 - screen grid; g3 - suppressor grid; p - plate.

All measurements taken from point indicated to ground using a 1000 ohm per volt D. C. meter.

Alignment

- (1) Balance intermediate transformers at 456 K.C. with service oscillator connected to grid of 15 first detector and ground.
- (2) Connect service oscillator to antenna and ground.
- (3) Adjust oscillator trimmer on gang condenser for correct dial reading at 1400 K.C.
- (4) Adjust detector trimmer on gang condenser to resonance.
- (5) Adjust oscillator paddler (located in rear of gang) meanwhile rocking pointer past 600 K.C. to combination giving greatest output.
- (6) Repeat operations 3 and 4.



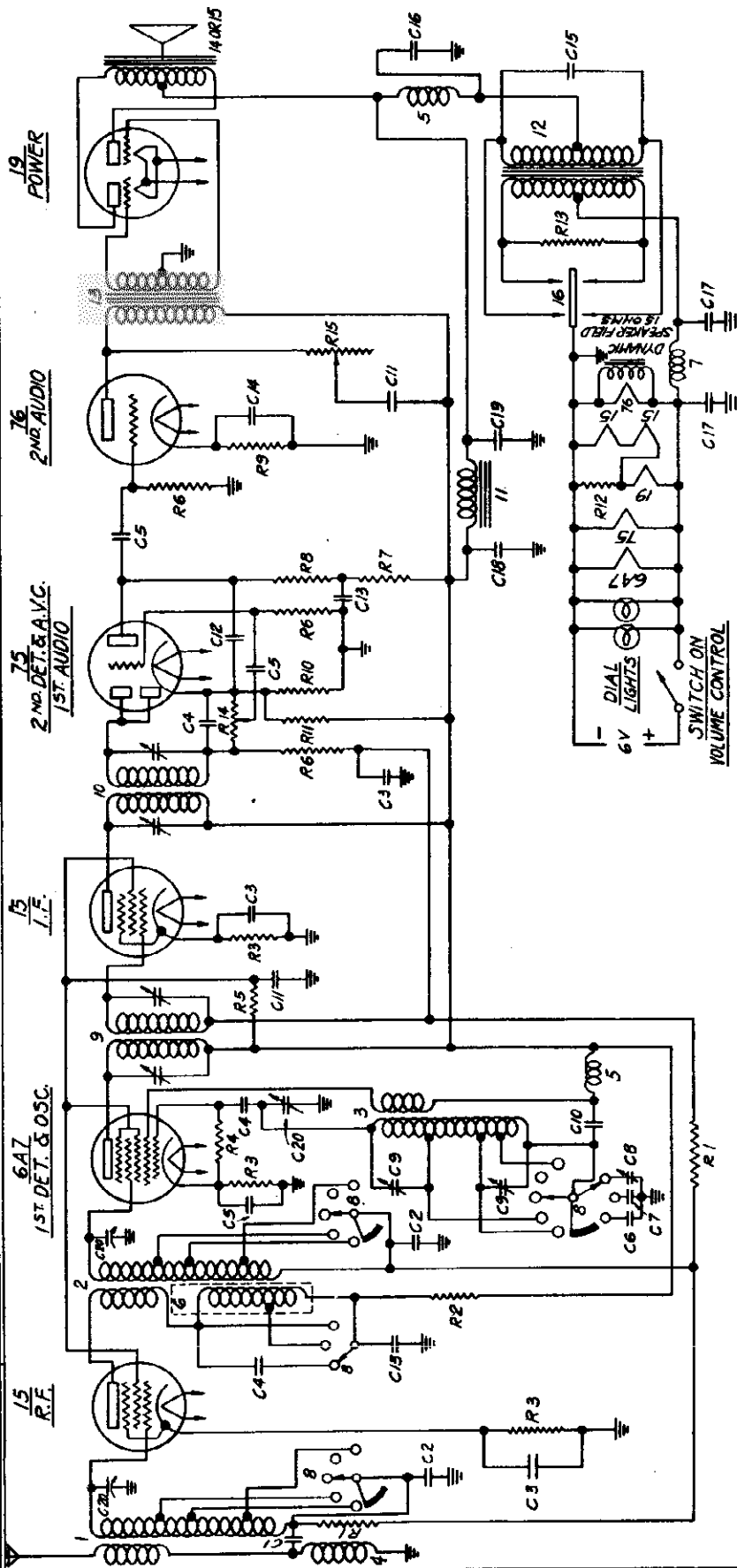
PARTS AND PRICES
Chassis #5405

Models 4-V-31
4-V-59

Part No.	Description	Price
7-7	Dial Assembly	.40
26-96	Dial Glass and Scale Bezel and Mounting Bracket	.50
59-45	Dial Scale	.15
61-38	Dial Pointer and Busing Assembly	.40
76-182	Dial Pulley	.10
80-69	Dial Drive Shaft	.02
94-200	Dial Tension Spring	.10
100-23	Dial Shaft Bushing	.15
132-13	6.3 Volt Dial Lamp	.05
189-2	Dial Glass Retaining Ring	.10
192-11	Retaining Rings	.15
195-5	Dial Glass	.03
	Dial Glass Gasket	.25
	Condensers	
22-82	.001 Mfd. 500 Volts	.12
22-182	.00025 " 500 "	.20
22-186	.01 " 200 "	.35
22-199	.5 " 200 "	.20
22-206	200-550 Mafd. Padder	.55
22-212	.05 Mfd. 400 Volts	.15
22-225	" 25 "	.15
22-243	.01 " 400 "	.15
22-250	.05 " 200 "	.15
22-287	.03 " 500 "	.20
22-358	.002 " 500 "	1.75
22-419	2 X 8 " 250 "	2.00
22-425	2-Gang Variable Condenser	.15
22-427	.006 Mfd. 1200 Volts	.20
	Resistors	
63-238	1 M Ohm 1/2 Watt	.20
63-247	8 M " " "	.20
63-258	490 M " " "	.20
63-261	29 M " " "	.20
63-293	990 M " " "	.20
63-303	700 " " "	.20
63-378	250 " " "	.20
63-394	200 " " "	.20
63-418	1500 " " "	.20
63-468	200 M Volume Control and Switch Assembly	1.00
63-469	50 M Tone Control Assembly	.60
63-476	9.1 Ohm 1/2 Watt	.20
	Coils and Chokes	
95-308	1st I.F. Transformer Assembly	1.25
95-309	2nd I.F. Transformer Assembly	1.25
S-3755	Antenna Coil Assembly	1.25
S-3756	Oscillator Coil Assembly	1.50
S-2778	Vibrator A. F. Choke Assembly	.15

ZENITH RADIO CORP.

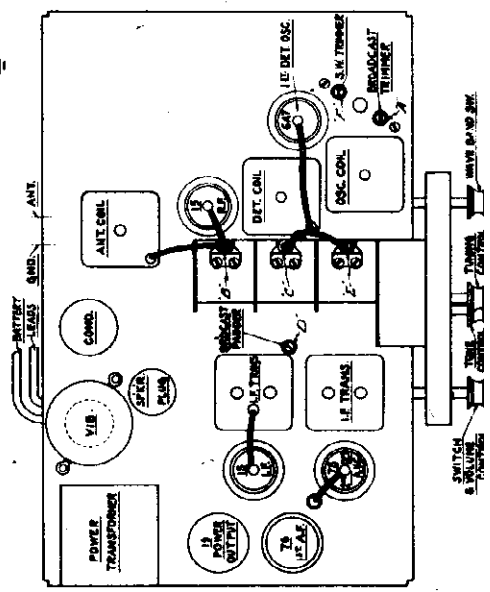
MODELS 6V27, 6V62
Chassis 5621
Schematic, Socket
Trimmers, Parts



3 BAND { 550 KC. - 1780 KC.
2100 KC. - 6800 KC.
7000 KC. - 23000 KC.

I.F. FREQUENCY 456 KC.
6 TUBE BATTERY SUPERHETERODYNE
CHASSIS No 5621

MODELS-6V27, 6V62



DIAG. PART NUMBER	DESCRIPTION	DIAG. PART NUMBER	DESCRIPTION
R1	99 OHMS	C9	22-408 2-35 MMFD. PADDER
R2	5 M	C10	22-82 .001 MFD.
R3	400 M	C11	22-212 .05
R4	280 M	C12	22-182 .00025
R5	1.9 M	C13	22-224 .1
R6	290 M	C14	22-225 .5
R7	260 M	C15	22-437 .5
R8	490 M	C16	22-228 .5
R9	272 M	C17	22-251 .5
R10	238 M	C18	22-432 2
R11	250 M	C19	22-409 456 MMF. VAR. COND.
R12	477 M	C20	22-409 456 MMF. VAR. COND.
R13	200 M	C21	5-3697 ANT. COIL ASSEM.
R14	356 M	C22	5-3699 DET. COIL ASSEM.
R15	458 M	C23	5-3699 OSC. COIL ASSEM.
C1	50 M	C24	20-82 ANT. CHOKE
C2		C25	20-119 ANT. CHOKE
C3		C26	20-119 R.F. CHOKES
C4		C27	20-119 R.F. CHOKES
C5		C28	20-119 R.F. CHOKES
C6		C29	20-119 R.F. CHOKES
C7		C30	20-119 R.F. CHOKES
C8		C31	20-119 R.F. CHOKES
C9		C32	20-119 R.F. CHOKES
C10		C33	20-119 R.F. CHOKES
C11		C34	20-119 R.F. CHOKES
C12		C35	20-119 R.F. CHOKES
C13		C36	20-119 R.F. CHOKES
C14		C37	20-119 R.F. CHOKES
C15		C38	20-119 R.F. CHOKES
C16		C39	20-119 R.F. CHOKES
C17		C40	20-119 R.F. CHOKES
C18		C41	20-119 R.F. CHOKES
C19		C42	20-119 R.F. CHOKES
C20		C43	20-119 R.F. CHOKES
C21		C44	20-119 R.F. CHOKES
C22		C45	20-119 R.F. CHOKES
C23		C46	20-119 R.F. CHOKES
C24		C47	20-119 R.F. CHOKES
C25		C48	20-119 R.F. CHOKES
C26		C49	20-119 R.F. CHOKES
C27		C50	20-119 R.F. CHOKES
C28		C51	20-119 R.F. CHOKES
C29		C52	20-119 R.F. CHOKES
C30		C53	20-119 R.F. CHOKES
C31		C54	20-119 R.F. CHOKES
C32		C55	20-119 R.F. CHOKES
C33		C56	20-119 R.F. CHOKES
C34		C57	20-119 R.F. CHOKES
C35		C58	20-119 R.F. CHOKES
C36		C59	20-119 R.F. CHOKES
C37		C60	20-119 R.F. CHOKES
C38		C61	20-119 R.F. CHOKES
C39		C62	20-119 R.F. CHOKES
C40		C63	20-119 R.F. CHOKES
C41		C64	20-119 R.F. CHOKES
C42		C65	20-119 R.F. CHOKES
C43		C66	20-119 R.F. CHOKES
C44		C67	20-119 R.F. CHOKES
C45		C68	20-119 R.F. CHOKES
C46		C69	20-119 R.F. CHOKES
C47		C70	20-119 R.F. CHOKES
C48		C71	20-119 R.F. CHOKES
C49		C72	20-119 R.F. CHOKES
C50		C73	20-119 R.F. CHOKES
C51		C74	20-119 R.F. CHOKES
C52		C75	20-119 R.F. CHOKES
C53		C76	20-119 R.F. CHOKES
C54		C77	20-119 R.F. CHOKES
C55		C78	20-119 R.F. CHOKES
C56		C79	20-119 R.F. CHOKES
C57		C80	20-119 R.F. CHOKES
C58		C81	20-119 R.F. CHOKES
C59		C82	20-119 R.F. CHOKES
C60		C83	20-119 R.F. CHOKES
C61		C84	20-119 R.F. CHOKES
C62		C85	20-119 R.F. CHOKES
C63		C86	20-119 R.F. CHOKES
C64		C87	20-119 R.F. CHOKES
C65		C88	20-119 R.F. CHOKES
C66		C89	20-119 R.F. CHOKES
C67		C90	20-119 R.F. CHOKES
C68		C91	20-119 R.F. CHOKES
C69		C92	20-119 R.F. CHOKES
C70		C93	20-119 R.F. CHOKES
C71		C94	20-119 R.F. CHOKES
C72		C95	20-119 R.F. CHOKES
C73		C96	20-119 R.F. CHOKES
C74		C97	20-119 R.F. CHOKES
C75		C98	20-119 R.F. CHOKES
C76		C99	20-119 R.F. CHOKES
C77		C100	20-119 R.F. CHOKES

ZENITH RADIO CORP.

MODELS 6V27, 6V62
Chassis 5621
Voltage, Alignment
Parts List

SOCKET VOLTAGES

TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
15	R. F.	2	1.5	0	70	-	125
6A7	Det.-Osc.	6	2	0	150	-	150
15	I. F.	2	2	-1	70	-	150
75	2nd Det.	6	1.5	0	-	-	40
76	1st Audio	6	8	0	-	-	140
19	PR.	2	-	0	-	-	160

Battery Voltage 6 Volts
Antenna and Ground Disconnected

All voltages measured from socket contacts to ground with 1000 ohm per volt

D. C. meter.
F - Filament; K - Cathode; g1 - Control grid; g2 - Screen grid; g3 - Suppressor grid; p - plate.

Alignment

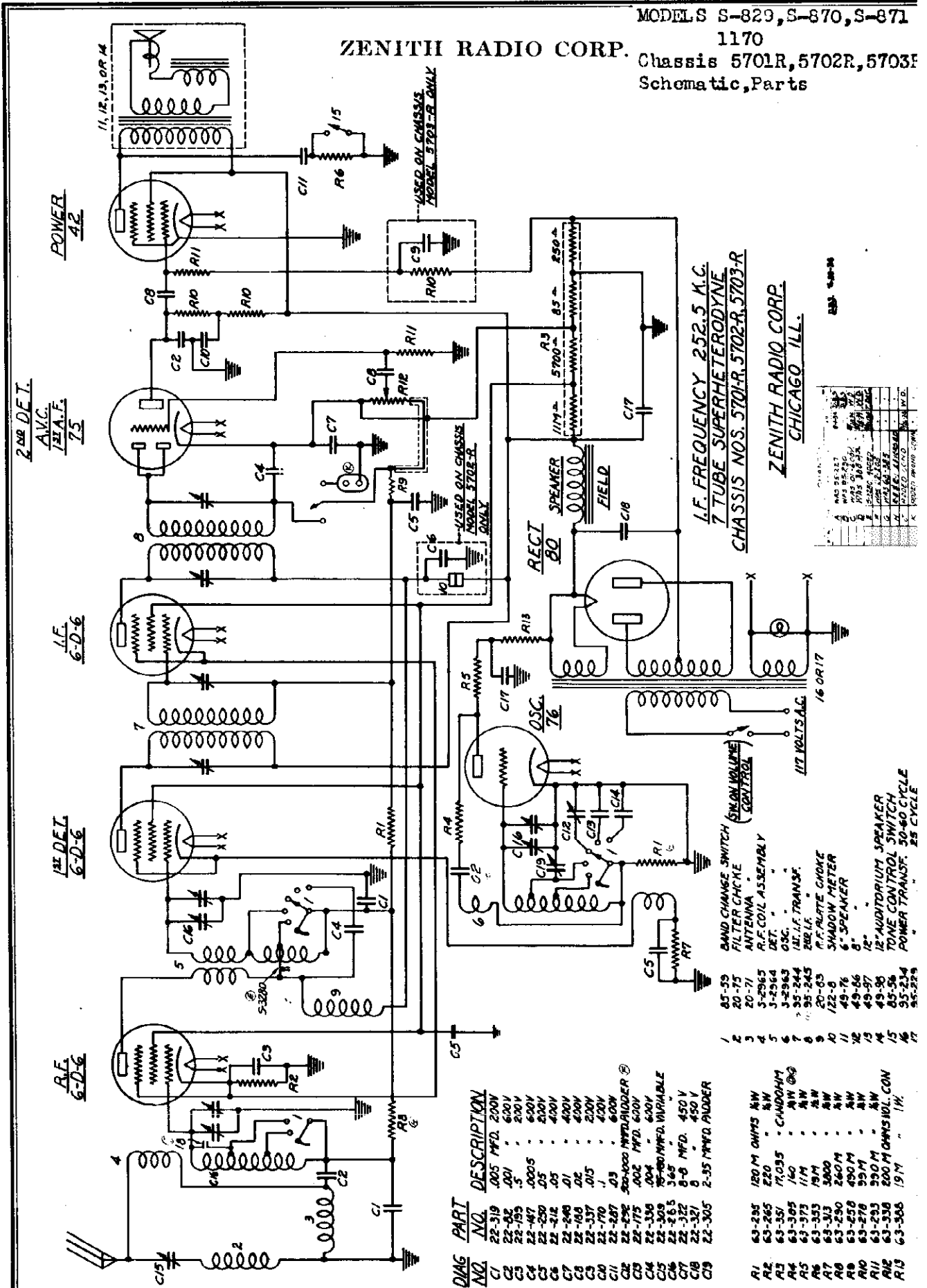
1. Attach service oscillator to grid cap of 6A7 tube and adjust I.F. trimmers at 456 K.C.
2. Place band switch in "A" (Standard broadcast) position and attach 1400 K.C. service oscillator to antenna and ground posts. Set dial indicator to 1400 K.C. and adjust trimmers "A" (Osc.); "B" (I.F.); "C" (Det.) to maximum output.
3. Set service oscillator to 600 K.C. and rock indicator over 600 K.C. on dial of receiver while adjusting standard broadcast padder "D".
4. Repeat operations 2 and 3.
5. Place band switch in "B" or 1st short wave position (2100 - 6600 K.C.) and set white dial pointer on 6 megacycles. Set service oscillator to 6 megacycles and adjust trimmer "B" for maximum output while rocking dial pointer slowly over 6 megacycle division.
6. Place band switch on "C" position (7000-23000 K.C.) and set service oscillator and white dial pointer to 18 megacycles. Adjust trimmer "F" to resonance while rocking dial indicator slowly over 18 megacycle division.
7. Set dial and service oscillator at 9 megacycles and twist or untwist tinned bare wire tuning "loop" (on front section of band switch under chassis) for maximum output.
8. Align standard broadcast band again at 1400 K.C. by adjusting trimmer "A" only. Repeat all eight operations for final accuracy.

TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
7-6	Dial Glass Bezel....						
26-104	Aeroplane Dial Scale. 1.00						
32-7	Dial Drive Belt.....						
34-49	Condenser Shaft Gear. .25						
34-50	Pinion Gear.....						
34-51	Lower Pinion and Gear. .15						
59-40	Special Z Pointer.....						
59-41	Split Second Pointer. .10						
61-34	Drive Pulley.....						
61-35	Shaft Pulley and Sleeve.25						
61-36	Tension Pulley.....						
76-178	Drive Shaft.....						
76-180	Dial Assembly						
80-111	Tension Pulley Shaft.....						
80-112	Dial Spring.....						
83-407	Tension Pulley Spring.....						
100-23	Dial Light Diffusion Strip						
159-11	6.3 V. Pilot Lamp.....						
188-2	Snap Buttons.....						
192-10	Retaining Ring.....						
196-4	Dial Glass.....						
198-1	Dial Glass Gasket.....						
198-1	Dial Reflector.....						
S-3777	Tension Pulley and Spring Assembly.30						

Part No.	Description	Price
20-82	Antenna choke.....	.25
20-88	I. F. Choke.....	.25
20-119	R. F. Plate Choke Assembly.....	.50
95-291	1st I. F. Transformer Assembly.....	1.25
95-292	2nd I. F. " ".....	1.25
S-3697	Antenna Coil Assembly.....	1.00
S-3698	Detector " ".....	.85
S-3699	Oscillator " ".....	.85
19-59	Battery Lead Clip (Positive).....	.15
19-60	" " (Negative).....	.15
45-124	Volume Control Knob.....	.20
46-127	Tone and Tuning Knobs.....	.20
46-132	Band Selector Switch Knob.....	.20
49-131	12" Magnetic Speaker Assembly (Model 62).....	8.00
	Case Assembly for 49-131.....	1.00
	Felt Ring " ".....	.15
	Coil for 49-131.....	1.25
	Motor Drive Assembly for 49-131.....	6.50
	Cord and Plug Assembly for 49-131.....	.75
49-132	6" Magnetic Speaker Assembly (Model 27).....	6.00
	Case Assembly for 49-132.....	.50
	Paper Ring " ".....	.10
	Coil for 49-132.....	1.25
	Motor Drive Assembly for 49-132.....	4.75
	Terminal Strip Cord and Plug Assembly for 49-132.....	1.50
57-511	Four Prong Speaker Plug.....	.25
58-30	Type 75 Wafer Tube Socket.....	.10
78-101	" 6A7 " ".....	.10
78-106	" 76 " ".....	.10
78-109	" 19 " ".....	.10
78-124	Five Prong Speaker Plug Socket.....	.10
78-128	Type 15 Wafer Tube Socket.....	.10
78-139	Vibrator " ".....	.10
78-141	Antenna and Ground Terminal Strip.....	1.50
83-334	Band Selector Switch.....	.75
85-78	Power Choke.....	1.75
95-298	Rectifier Transformer.....	1.25
95-305	Audio Transformer.....	.10
95-311	Tube Shield.....	.15
126-127	Vibrator Shield.....	.15
126-201	Special Zenith Vibrator.....	5.00
190-5		

MODEL S S-829, S-870, S-871
 1170
 Chassis 5701R, 5702R, 5703R
 Schematic, Parts

ZENITH RADIO CORP.



2nd DET.
 AVC.
 7.5

POWER
 4.2

I.F.
 6-D-6

1st DET.
 6-D-6

R.F.
 6-D-6

I.F. FREQUENCY 252.5 K.C.
 7 TUBE SUPERHETERODYNE
 CHASSIS NOS. 5701R, 5702R, 5703R

ZENITH RADIO CORP.
 CHICAGO, ILL.

1	WAS 5701R	WAS 5702R	WAS 5703R
2	WAS 5701R	WAS 5702R	WAS 5703R
3	WAS 5701R	WAS 5702R	WAS 5703R
4	WAS 5701R	WAS 5702R	WAS 5703R
5	WAS 5701R	WAS 5702R	WAS 5703R
6	WAS 5701R	WAS 5702R	WAS 5703R
7	WAS 5701R	WAS 5702R	WAS 5703R
8	WAS 5701R	WAS 5702R	WAS 5703R
9	WAS 5701R	WAS 5702R	WAS 5703R
10	WAS 5701R	WAS 5702R	WAS 5703R
11	WAS 5701R	WAS 5702R	WAS 5703R
12	WAS 5701R	WAS 5702R	WAS 5703R
13	WAS 5701R	WAS 5702R	WAS 5703R
14	WAS 5701R	WAS 5702R	WAS 5703R
15	WAS 5701R	WAS 5702R	WAS 5703R
16	WAS 5701R	WAS 5702R	WAS 5703R
17	WAS 5701R	WAS 5702R	WAS 5703R

DIAG. PART NO.	DESCRIPTION
C1	.005 MFD. 200V
C2	.001 " 500V
C3	.001 " 200V
C4	.0005 " 500V
C5	.01 " 400V
C6	.01 " 400V
C7	.01 " 400V
C8	.01 " 400V
C9	.01 " 400V
C10	.01 " 400V
C11	.01 " 400V
C12	20-1000 MFD. ADJ.
C13	.002 MFD. 600V
C14	.004 " 600V
C15	20-1000 MFD. ADJ.
C16	20-1000 MFD. ADJ.
C17	20-1000 MFD. ADJ.
C18	20-1000 MFD. ADJ.
C19	20-1000 MFD. ADJ.
R1	500 OHMS
R2	100 OHMS
R3	100 OHMS
R4	100 OHMS
R5	100 OHMS
R6	100 OHMS
R7	100 OHMS
R8	100 OHMS
R9	100 OHMS
R10	100 OHMS
R11	100 OHMS
R12	100 OHMS
R13	100 OHMS

- 1 85-59 BAND CHANGE SWITCH
- 2 20-75 FILTER CHOC-KE
- 3 20-71 ANTENNA
- 4 5-2963 R.F. COIL ASSEMBLY
- 5 3-2964 OSC.
- 6 35-244 100% I.F. TRANSF.
- 7 35-245 100% I.F. TRANSF.
- 8 20-63 R.F. TUNING COIL
- 9 122-76 12" AUDITORIUM SPEAKER
- 10 49-76 8" SPEAKER
- 11 49-66 8" SPEAKER
- 12 49-97 12" AUDITORIUM SPEAKER
- 13 49-98 12" AUDITORIUM SPEAKER
- 14 85-59 BAND CHANGE SWITCH
- 15 85-59 BAND CHANGE SWITCH
- 16 85-59 BAND CHANGE SWITCH
- 17 85-59 BAND CHANGE SWITCH

MODELS S-829, S-870, S-871
1170

ZENITH RADIO CORP.

Chassis 5701R, 5702R, 5703R
Voltage, Socket, Trimmers
Alignment

5703R

TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6D6	R.F.	5.4	3	0	76	3	250
6D6	1st. Det.	5.4	6.2	0	76	6.2	250
76	Osc.	5.4	0	0	-	-	165
6D6	I.F.	5.4	6.2	0	76	6.2	250
75	2nd. Det. A.V.C. 1st. Aud.	5.4	1	0	-	-	125
42	PWR	5.4	0	-.5	-	250	240
80	Rect.	4.6	-	-	-	-	-

Line voltage 112

Antenna and Ground Disconnected

F - heaters; K - cathode; G1 - control grid; G2 - screen grid; G3 suppressor grid; P - plate.

Alignment

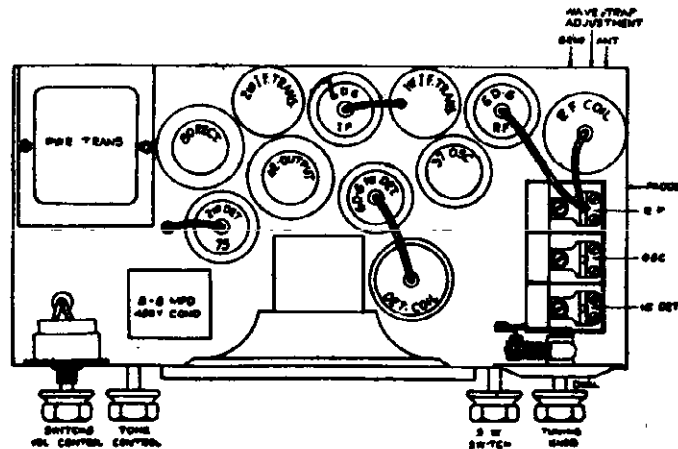
(1) Balance intermediate transformers at 252.5 K.C. with service oscillator connected to grid of first detector and ground.

(2) Adjust wave trap padder (located on rear of chassis at right side) at 252.5 K.C. for weakest signal with service oscillator connected to aerial and ground.

(3) Turn wave band switch clockwise to the highest frequency band. Set service oscillator at 15 megacycle (still connected to aerial and ground). Adjust trimmer on oscillator section of 3-gang condenser for correct dial reading at this frequency.

(4) Turn wave band switch counter-clockwise to standard broadcast. Adjust oscillator trimmer (located underneath chassis next to band switch) for correct dial reading at 1400 K.C. and balance R.F. and 1st detector trimmers on gang condenser for loudest signal at this frequency.

(5) Adjust broadcast oscillator padder (through hole in right side of chassis) at 600 K.C. meanwhile rocking dial pointer past this point on dial, to position giving loudest signal.



Tube Layout

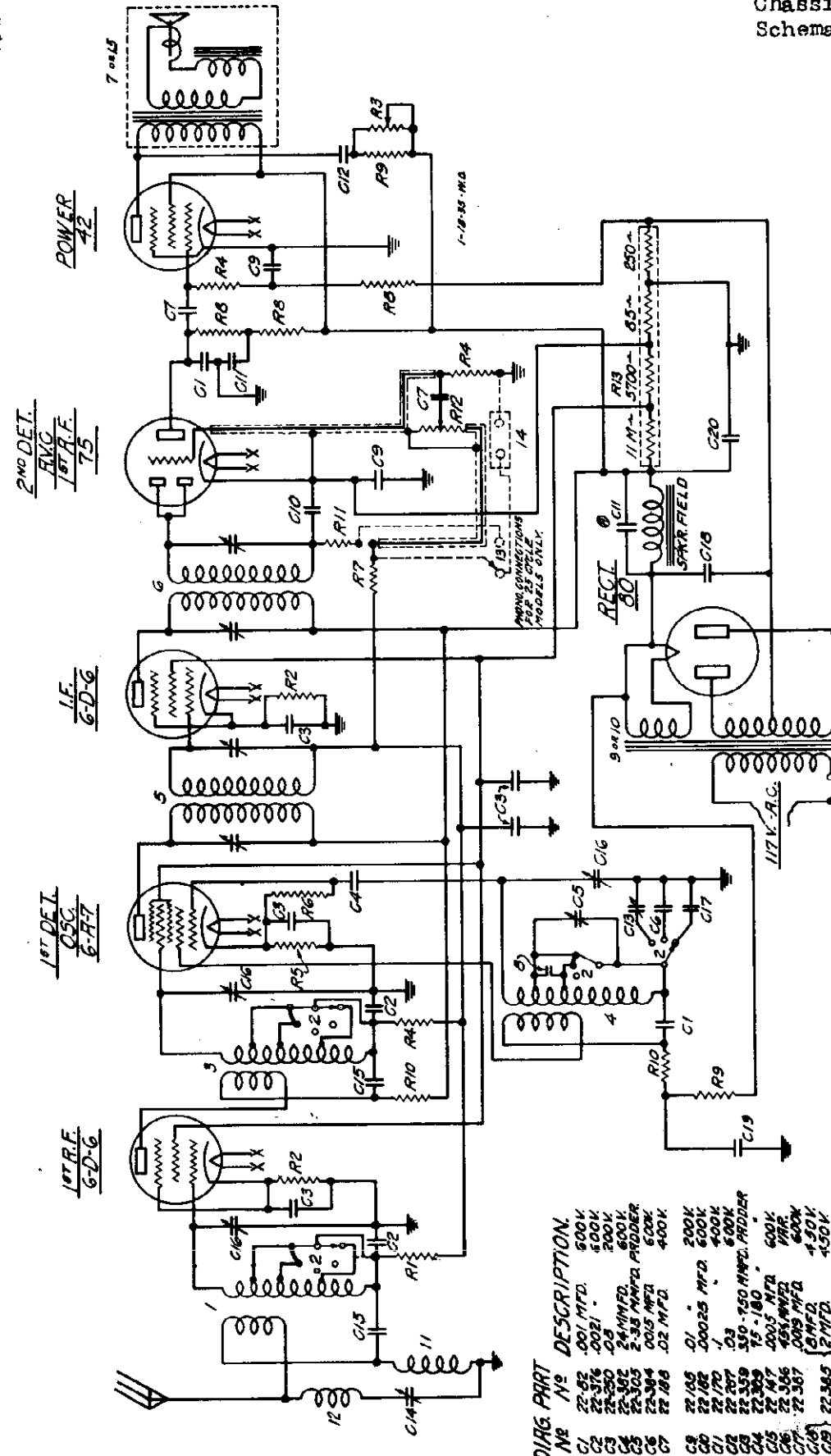
ZENITH RADIO CORP.

1167

Chassis 5618

Schematic, Parts

A 64-40000 1000000



1st DET.
OSC.
6-A7

I.F.
6-D-6

2nd DET.
RVC
1st A.F.
7-5

POWER
A2

DIAG. PART

No.	Description
C1	22-52 .001 MFD. 500V
C2	22-376 .0021 . 500V
C3	22-320 .02 200V
C4	22-302 24MMFD. 600V
C5	22-323 2-3.8 MMFD. PRODDER
C6	22-394 .0015 MFD. 600V
C7	22-188 .02 MFD. 400V
C8	22-198 200K
C9	22-198 200K
C10	22-170 1 600K
C11	22-297 .03 600K
C12	22-319 150-150 MMFD. PRODDER
C13	22-302 400V MFD. 600V
C14	22-302 400V MFD. 600V
C15	22-366 400V MFD. 450V
C16	22-367 400V MFD. 450V
C17	22-365 450V
C18	22-365 450V
C19	22-365 450V
C20	22-365 450V

- 153640 ANT. COIL ASSEMBLY
- 2 63561 SHORT WAVE SWITCH
- 3 73542 DELT. COIL ASSEMBLY
- 4 73536 OSC. 117V. TRANS.
- 5 86-244 117V. TRANS.
- 6 95-245 2nd I.F. TRANS.
- 7 49-78 SPEAKER - 1000-ohm FIELD (S908)
- 8 33565 TWISTED PAIR
- 9 83254 POWER TRANS. 25 CYCLE.
- 10 83229 ANT. CHOKER
- 11 20-71 WAVE TRAP CHOKER
- 12 20-75 PROVO. GRID SWITCH
- 13 83-36 MAGNOLIA
- 14 46-7 T.C. TRANS. (see p. 1)

6-TUBE SUPERHETERODYNE
I.F. FREQUENCY 252.5 KC.
CHASSIS No 5618
ZENITH RADIO CORP.
CHICAGO, ILL.

MODELS 5908 - 5961

MODELS S-908, S-909, S-961
1167
Chassis 5618
Voltage, Socket, Trimmers
Alignment, Parts List

ZENITH RADIO CORP.

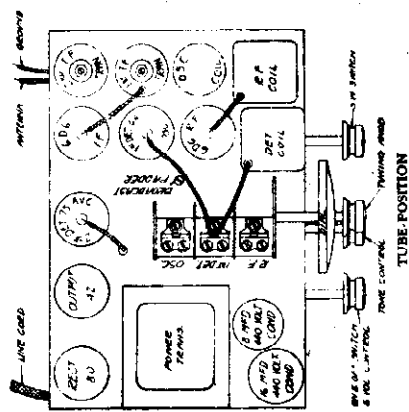
PARTS AND PRICES		Models S-908 909	Models S-961 1167
Chassis 5618			
Dial Assembly			
Complete split second dial assembly			\$3.75
Dial scale only			.40
Split second pointer			.10
Special 2 pointer			.05
Glass cushion washer			.20
Dial glass			.20
Coils and Chokes			
Antenna Choke			.20
Wave trap choke			.25
1st I.F. transformer			1.50
2nd I.F. transformer			1.50
Oscillator coil assembly			1.25
Antenna coil assembly			\$1.75
Detector "			2.00
Miscellaneous			
Band selector switch knob (Models 909, S-961, 1167)			.15
Tuning control knob			.10
Tone control knob			.10
Volume control knob			.10
Band selector switch knob (Model S-908)			.15
8" Dynamic speaker for S-908, 909			8.00
Cone and voice coil for 49-79			2.50
Output transformer for 49-79			2.00
Field coil for 49-79			2.00
12" Dynamic speaker for S-961, 1167			10.00
Cone and voice coil for 49-97			3.25
Output transformer for 49-97			2.00
Field coil for 49-97			2.00
Dial escutcheon plate			.45
Type 80 tube socket			.10
" 6D6 "			.10
" 75 "			.10
" 42 "			.10
" 6A7 "			.10
Phono switch (25 cycle)			.35
Band selector switch			1.10
All voltage, 25 cycle power transformer			6.50
Pilot lamp			.15
Coat tube shield			.10
#95-224 power transformer and mounting plate, 117 V, 60 C.			4.00

Chassis 5618

TUBE	POSITION	EF	EK	EG1	EG2	EG3	EP
6D6	R.F.	5.6	2.4	0	70	2.4	200
	1st. Det.	5.6	3	0	70	-	250
6A7	Osc.	5.6	3	3.6	-	-	290
6D6	I.F.	5.6	2.6	0	70	2.6	250
75	2nd. Det.	5.6	1.4	0	-	-	148
42	1st Audio	5.6	0	-	250	-	250
80	PWR.	5.6	0	-	250	-	-
	RECT.	4.6	-	-	-	-	-

Line Voltage 112
Antenna and Ground Disconnected
All measurements taken from point indicated to ground, using a 1000 ohm per volt D.C. meter (except heaters). F - filament; K - cathode; G1 - control grid; G2 - screen grid; G3 - suppressor grid; P - plate.

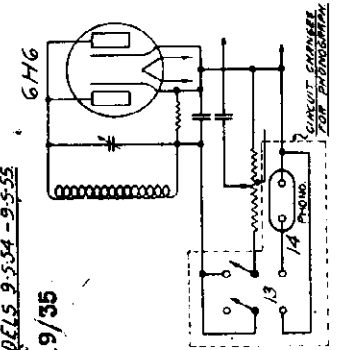
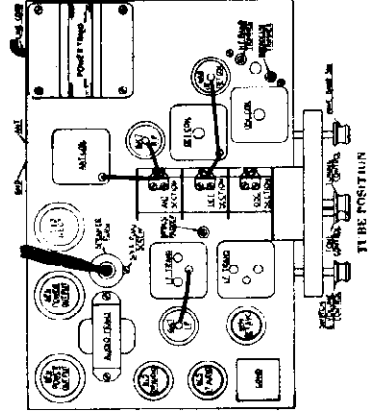
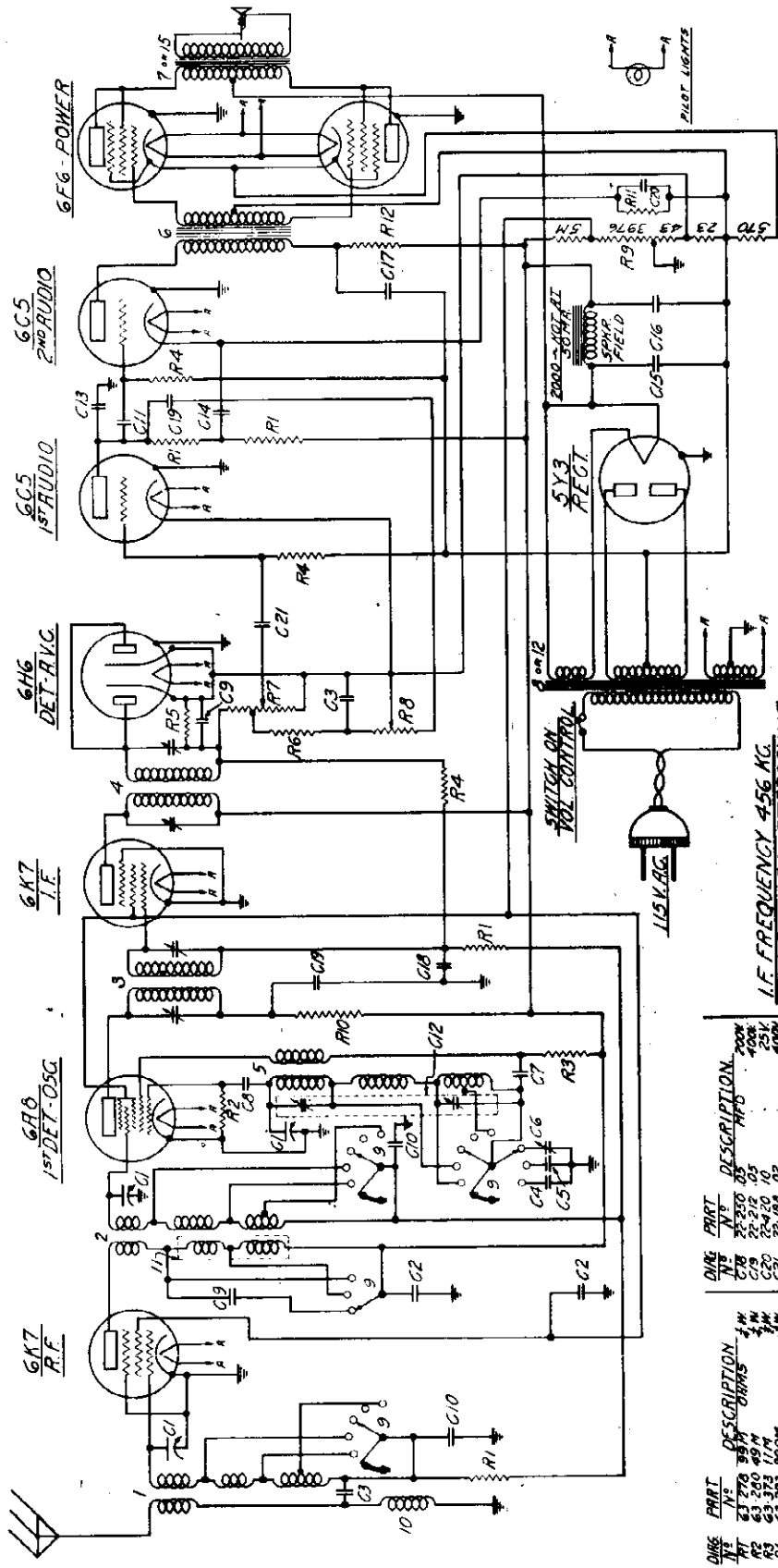
- Alignment**
- Balance intermediate transformers at 252.5 K.C. with oscillator connected to grid of first detector and ground.
 - Adjust wave trap paddler (located underneath chassis at rear right side) for weakest signal with 252.5 K.C. oscillator connected to aerial and ground.
 - Turn wave band switch clockwise to the highest frequency band. Connect 17,500 K.C. oscillator to aerial and ground. Balance oscillator trimmer on three-gang condenser for correct dial reading at this frequency.
 - Turn wave band switch counter-clockwise to standard broadcast position. Adjust broadcast oscillator trimmer (located underneath chassis at right center) for correct dial reading at 1400 K.C. and balance R.F. and 1st detector trimmers on three-gang condenser for loudest signal.
 - Adjust oscillator paddler (located next to oscillator section of gang on top of chassis) while rocking pointer back and forth past 500 K.C. for combination giving maximum output.
 - Recheck 1400 K.C.



• Tube Position

ZENITH RADIO CORP.

MODELS 9-S-30, 9-S-54, 9-S-55
Schematic, Socket, Trimmers
Parts



I.F. FREQUENCY 456 KC.
5TUBE SUPERHETERODYNE
CH 535 N° 5903
MODELS 9-S-30-9-S-55
6/19/35

QWG	PART NO.	DESCRIPTION	QWG	PART NO.	DESCRIPTION
1	22-170	VARIABLE MFD	1	53497	ANT COIL ASSEM
2	22-243	01	2	53498	DET COIL ASSEM
3	22-245	0023	3	53499	OSC COIL ASSEM
4	22-246	0023	4	53500	OSC COIL ASSEM
5	22-247	0023	5	53501	OSC COIL ASSEM
6	22-248	0023	6	53502	OSC COIL ASSEM
7	22-249	0023	7	53503	OSC COIL ASSEM
8	22-250	0023	8	53504	OSC COIL ASSEM
9	22-251	0023	9	53505	OSC COIL ASSEM
10	22-252	0023	10	53506	OSC COIL ASSEM
11	22-253	0023	11	53507	OSC COIL ASSEM
12	22-254	0023	12	53508	OSC COIL ASSEM
13	22-255	0023	13	53509	OSC COIL ASSEM
14	22-256	0023	14	53510	OSC COIL ASSEM
15	22-257	0023	15	53511	OSC COIL ASSEM
16	22-258	0023	16	53512	OSC COIL ASSEM
17	22-259	0023	17	53513	OSC COIL ASSEM
18	22-260	0023	18	53514	OSC COIL ASSEM
19	22-261	0023	19	53515	OSC COIL ASSEM
20	22-262	0023	20	53516	OSC COIL ASSEM
21	22-263	0023	21	53517	OSC COIL ASSEM
22	22-264	0023	22	53518	OSC COIL ASSEM
23	22-265	0023	23	53519	OSC COIL ASSEM
24	22-266	0023	24	53520	OSC COIL ASSEM
25	22-267	0023	25	53521	OSC COIL ASSEM
26	22-268	0023	26	53522	OSC COIL ASSEM
27	22-269	0023	27	53523	OSC COIL ASSEM
28	22-270	0023	28	53524	OSC COIL ASSEM
29	22-271	0023	29	53525	OSC COIL ASSEM
30	22-272	0023	30	53526	OSC COIL ASSEM
31	22-273	0023	31	53527	OSC COIL ASSEM
32	22-274	0023	32	53528	OSC COIL ASSEM
33	22-275	0023	33	53529	OSC COIL ASSEM
34	22-276	0023	34	53530	OSC COIL ASSEM
35	22-277	0023	35	53531	OSC COIL ASSEM
36	22-278	0023	36	53532	OSC COIL ASSEM
37	22-279	0023	37	53533	OSC COIL ASSEM
38	22-280	0023	38	53534	OSC COIL ASSEM
39	22-281	0023	39	53535	OSC COIL ASSEM
40	22-282	0023	40	53536	OSC COIL ASSEM
41	22-283	0023	41	53537	OSC COIL ASSEM
42	22-284	0023	42	53538	OSC COIL ASSEM
43	22-285	0023	43	53539	OSC COIL ASSEM
44	22-286	0023	44	53540	OSC COIL ASSEM
45	22-287	0023	45	53541	OSC COIL ASSEM
46	22-288	0023	46	53542	OSC COIL ASSEM
47	22-289	0023	47	53543	OSC COIL ASSEM
48	22-290	0023	48	53544	OSC COIL ASSEM
49	22-291	0023	49	53545	OSC COIL ASSEM
50	22-292	0023	50	53546	OSC COIL ASSEM
51	22-293	0023	51	53547	OSC COIL ASSEM
52	22-294	0023	52	53548	OSC COIL ASSEM
53	22-295	0023	53	53549	OSC COIL ASSEM
54	22-296	0023	54	53550	OSC COIL ASSEM
55	22-297	0023	55	53551	OSC COIL ASSEM
56	22-298	0023	56	53552	OSC COIL ASSEM
57	22-299	0023	57	53553	OSC COIL ASSEM
58	22-300	0023	58	53554	OSC COIL ASSEM
59	22-301	0023	59	53555	OSC COIL ASSEM
60	22-302	0023	60	53556	OSC COIL ASSEM
61	22-303	0023	61	53557	OSC COIL ASSEM
62	22-304	0023	62	53558	OSC COIL ASSEM
63	22-305	0023	63	53559	OSC COIL ASSEM
64	22-306	0023	64	53560	OSC COIL ASSEM
65	22-307	0023	65	53561	OSC COIL ASSEM
66	22-308	0023	66	53562	OSC COIL ASSEM
67	22-309	0023	67	53563	OSC COIL ASSEM
68	22-310	0023	68	53564	OSC COIL ASSEM
69	22-311	0023	69	53565	OSC COIL ASSEM
70	22-312	0023	70	53566	OSC COIL ASSEM
71	22-313	0023	71	53567	OSC COIL ASSEM
72	22-314	0023	72	53568	OSC COIL ASSEM
73	22-315	0023	73	53569	OSC COIL ASSEM
74	22-316	0023	74	53570	OSC COIL ASSEM
75	22-317	0023	75	53571	OSC COIL ASSEM
76	22-318	0023	76	53572	OSC COIL ASSEM
77	22-319	0023	77	53573	OSC COIL ASSEM
78	22-320	0023	78	53574	OSC COIL ASSEM
79	22-321	0023	79	53575	OSC COIL ASSEM
80	22-322	0023	80	53576	OSC COIL ASSEM
81	22-323	0023	81	53577	OSC COIL ASSEM
82	22-324	0023	82	53578	OSC COIL ASSEM
83	22-325	0023	83	53579	OSC COIL ASSEM
84	22-326	0023	84	53580	OSC COIL ASSEM
85	22-327	0023	85	53581	OSC COIL ASSEM
86	22-328	0023	86	53582	OSC COIL ASSEM
87	22-329	0023	87	53583	OSC COIL ASSEM
88	22-330	0023	88	53584	OSC COIL ASSEM
89	22-331	0023	89	53585	OSC COIL ASSEM
90	22-332	0023	90	53586	OSC COIL ASSEM
91	22-333	0023	91	53587	OSC COIL ASSEM
92	22-334	0023	92	53588	OSC COIL ASSEM
93	22-335	0023	93	53589	OSC COIL ASSEM
94	22-336	0023	94	53590	OSC COIL ASSEM
95	22-337	0023	95	53591	OSC COIL ASSEM
96	22-338	0023	96	53592	OSC COIL ASSEM
97	22-339	0023	97	53593	OSC COIL ASSEM
98	22-340	0023	98	53594	OSC COIL ASSEM
99	22-341	0023	99	53595	OSC COIL ASSEM
100	22-342	0023	100	53596	OSC COIL ASSEM

ZENITH RADIO CORP.
CHICAGO, ILL.

MODELS 9-S-30, 9-S-54, 9-S-55

Voltage, Alignment, Parts ZENITH RADIO CORP.

83-407	Dial Light Diffusion Strip	.....	.05
100-23	6.3 Volt Pilot Lamp	.....	.15
118-10	Band Switch Indicator Lamp	.....	.05
189-11	Snap Switch	.....	.02
186-2	Retainer Ring	.....	.10
196-4	Dial Glass Gasket (part of 87-511)	.....	.50
S-3777	Tension Pulley and Spring Assembly	.....	.30
S-3782	Band Indicator Lever Arm and Bushing Assembly	.....	1.00
S-3783	Coils and Arm Assembly	.....	.15
S-3716	Dial Lamp Socket and Clip Assembly	.....	.25
22-82	.001 Mfd. 600 Volt	.....	.30
22-127	.000025 " 600 "	.....	.30
22-162	.001 " 600 "	.....	.25
22-170	.5 " 400 "	.....	.25
22-188	.02 " 400 "	.....	.15
22-205	200-500 Mfd. Padder	.....	.35
22-212	.05 Mfd. 400 Volt	.....	.80
22-245	.01 " 400 "	.....	.15
22-250	.05 " 200 "	.....	.15
22-289	.00006 " 600 "	.....	.12
22-345	.0011 " 600 "	.....	.15
22-408	2-35 Mfd. Padder	.....	.25
22-409	3-Gang Variable Condenser	.....	5.50
22-410	.003 Mfd. 600 Volt	.....	.40
22-411	.0025 " 600 "	.....	.25
22-412	16 x 4 x 2 Mfd. 450 Volt	..... (domestic only)	3.00
22-438	10. Mfd. 25 Volt	.....	.65
22-438	.5 " 400 "	.....	.80
22-452	.02 " 600 "	.....	.15
22-421	16 x 4 x 2 Mfd. 450 Volt	..... (export only)	3.25
65-240	1900 Ohm 1/2 Watt	..... Resistors	.80
65-278	99 M Ohm 1/2 Watt	.....	.20
65-280	49 M " " " " " "	.....	.20
65-288	19 M " " " " " "	.....	.20
65-293	990 M " " " " " "	.....	.20
65-300	990 M " " " " " "	.....	.20
65-373	11 H " " " " " "	.....	.20
65-449	Carbon Resistor	.....	1.00
63-450	Volume Control and Switch Assembly	..... (domestic only)	1.00
63-451	Tone Control Assembly	.....	.80
63-452	560 M Ohm 1/2 Watt	.....	.20
63-456	990 " " " " " "	.....	.20
63-472	Volume Control and Switch Assembly	..... (export only)	1.00
20-82	Antenna Choke	..... Coils and Chokes	.25
20-119	R. F. Plate Choke Assembly	.....	.50
95-231	1st I.F. Transformer Assembly	.....	1.25
95-232	2nd " " " " " "	.....	1.25
S-3597	Antenna Coil Assembly	.....	1.00
S-3598	Detector Coil Assembly	.....	.85
S-3599	Oscillator Coil Assembly	.....	.35
44-7	Phonograph Jack	..... Miscellaneous	.15
46-123	Band Selector Switch Knob	..... (export only)	.20
46-124	Volume and Tone Control Knob	.....	.20
46-125	Tuning Knob	..... (small)	.15
46-126	" " " " " "	..... (large)	.15
49-120	12" Dynamic Speaker (Models 54 and 55)	.....	10.00
	Cone and Voice Coil for 49-120	.....	3.25
	Field Coil for 49-120	.....	2.00
	Output Transformer for 49-120	.....	2.00
	8" Dynamic Speaker (Model 30)	.....	6.00
	Cone and Voice Coil for 49-126	.....	2.30
	Field Coil for 49-126	.....	2.00
	Output Transformer for 49-126	.....	2.00
49-126			

TUBE	POSITION	1	2	3	4	5	6	7	8	9
6A7	R.F.	0	5 _{ac}	230	95	0	-	5 _{ac}	0	-
6A8	1st Det.	0	5 _{ac}	230	95	0	140	5 _{ac}	0	-
6A7	I.F.	0	5 _{ac}	250	95	0	-	5 _{ac}	0	-
6A6	A.V.C.	0	5 _{ac}	-1	-1	0	-	5 _{ac}	-1	-
6A5	1st Aud.	0	5 _{ac}	22	-	-2	-	5 _{ac}	-2	-
6A5	2nd Aud.	0	5 _{ac}	210	-	-2	-	5 _{ac}	0	-
6F6	PWR.	0	5 _{ac}	350	350	-3	-	5 _{ac}	57	-
6T5	Rect.	0	560	-	350 _{ac}	-	350 _{ac}	-	350	-

Line Voltage 115 Antenna and Ground Disconnected
 Voltages measured from point indicated to ground, using a 1000 ohm per volt meter, except heters. (2 - 7)

Alignment
 The use of an accurately calibrated service oscillator is imperative in the alignment of modern superheterodynes. The alignment procedure is as follows:

- (1) Connect service oscillator to grid of 6A8 and ground. Balance I. F. trimmers at 456 K.C.
- (2) Connect service oscillator to antenna and ground binding posts and set at 6 megacycles. Adjust oscillator trimmer on gang for correct dial reading. (5 megacycles on Band B).
- (3) Set service oscillator and pointer to 21 megacycles and adjust S.V. trimmer through hole in top of chassis for correct dial reading.
- (4) Recheck 6 megacycle adjustment.
- (5) Set service oscillator and pointer to 1700 K.C. (Band A) and adjust broadcast trimmer (through hole in top of chassis) for correct dial reading.
- (6) Set service oscillator at 600 K.C. Adjust broadcast padder (through hole in top of chassis next to I.F. transformer), meanwhile rotating pointer to and fro past 600 K.C. on dial to combination giving greatest output.
- (7) Backjust at 1700 K.C.

Notes: These adjustments affect each other slightly and the entire procedure should be repeated to secure maximum results.

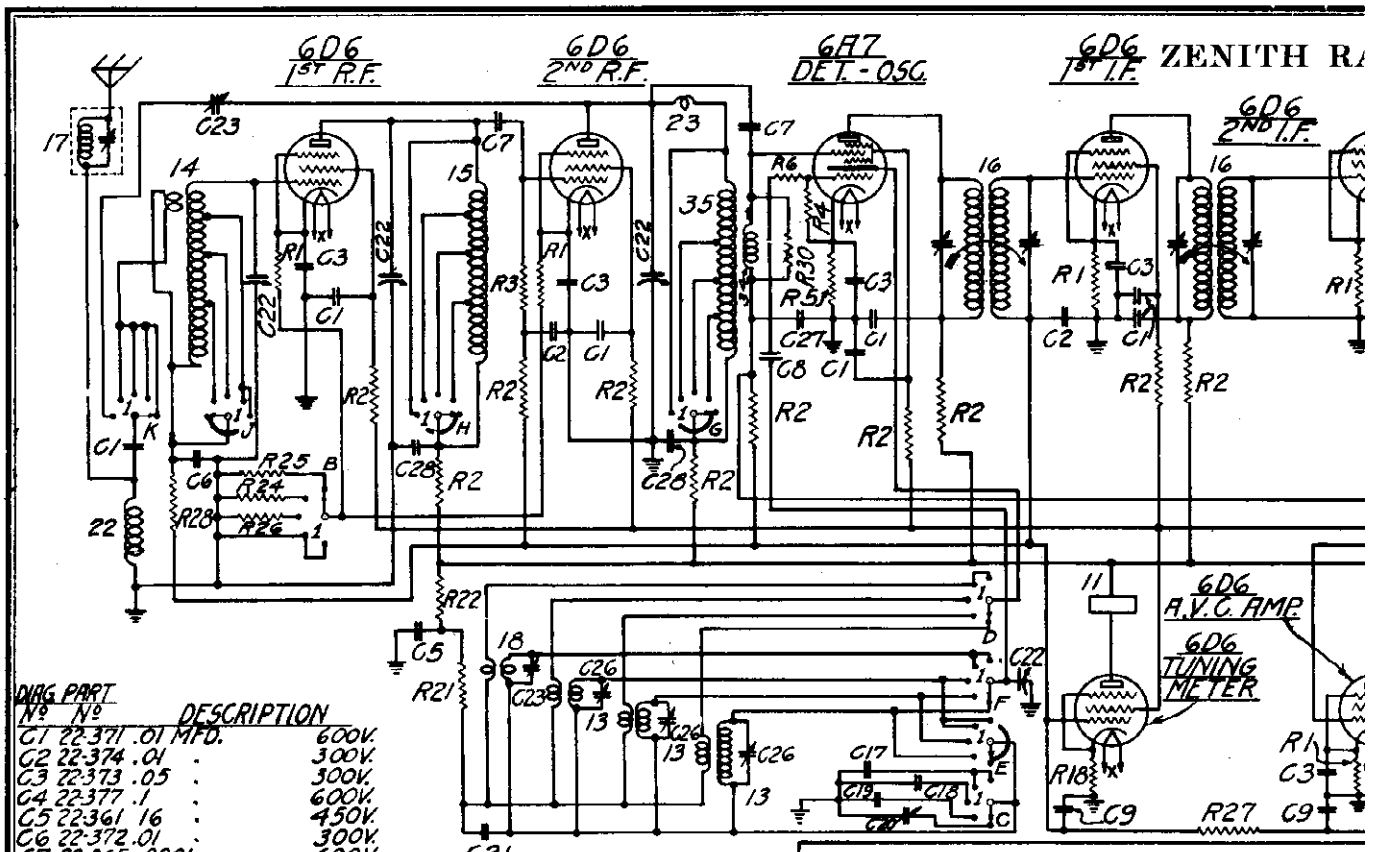
PARTS AND PRICES Models 9-S-30, 9-S-54 and 9-S-55

7-6	Dial Glass Bezel (part of 87-511)	.....	\$1.00
26-94	Aerolane Dial Scale	.....	.20
32-8	Drive Belt	.....	.25
34-49	Condenser Shaft Gear	.....	.05
34-50	Pinion Gear	.....	.15
34-51	Lower Pinion and Gear	..... (furnished with 76-161)	.15
56-44	Planetary Guide Pin	.....	.10
59-40	Special Z Pointer	.....	.25
59-41	Split Second Pointer	.....	.08
61-35	Shaft Pulley and Sleeve	.....	.05
61-36	Shaft Pulley	.....	.05
61-37	Dial Pulley	.....	.05
76-180	Tension Pulley Shaft	.....	1.00
80-111	Dial Spring	.....	.25
80-112	Tension Pulley Spring	.....	.10



BOTTOM VIEW OF SOCKET

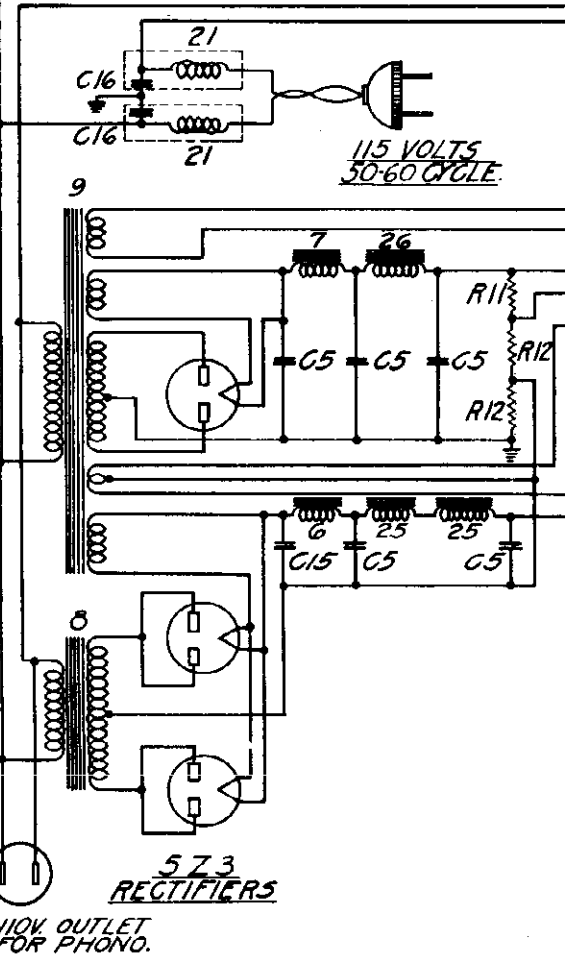




DIAG. PART No.	DESCRIPTION	VALUES
C1 22-371	.01 MFD.	600V.
C2 22-374	.01	300V.
C3 22-373	.05	300V.
C4 22-377	.1	600V.
C5 22-361	.16	450V.
C6 22-372	.01	300V.
C7 22-365	.0001	600V.
C8 22-366	.00035 MFD.	600V.
C9 22-375	.1 MFD.	300V.
C10 22-367	.00005 MFD.	600V.
C11 22-189	20 MFD.	25V.
C12 22-378	.04	600V.
C13 22-362	8 MFD.	300V.
C14 22-225	.5	25V.
C15 22-360	.4	600V.
C16 22-379	.002 MFD.	600V.
C17 22-369	.005	600V.
C18 22-370	.00325	600V.
C19 22-364	.0013	600V.
C20 22-205	200-500 MMFD.	
C21 22-368	.003 MFD.	600V.
C22 22-340	4.52 MMFD.	46 GRING.
C23 22-305	2-35 MMFD.	
C24 22-383		
C25 22-338		
C31-95-266	ORDER BY PART NO.	
C32-95-265	ONLY.	
C33-95-267	SPECIAL TOLERANCES.	
G26 22-381	2-35 MMFD.	
G27 22-199	.5 MFD.	200V.
G28 22-170	.1	400V.⊙

DIAG. PART No.	DESCRIPTION	VALUES
R22 63-407	10M OHMS CANDOHM.	
R23 63-396	10M	1/2 W.
R24 63-180	1M	1/2 W.
R25 63-241	.5M	1/2 W.
R26 63-157	100	1/2 W.
R27 63-290	260 M	1/2 W.
R28 63-410	1500	1/2 W.
R29 63-432	5	CANDOHM
R30 63-280	19 M	1/2 W.

R1 63-362	400 OHMS	1/2 W.
R2 63-416	1400	1/2 W.
R3 63-258	490M.	1/2 W.
R4 63-136	50M.	1/2 W.
R5 63-357	300	1/2 W.
R6 63-411	20	1/2 W.
R7 63-260	100M	1/2 W.
R8 63-412	3500	1/2 W.
R9 63-390	1 MEG. DUAL VOL. CONTROL.	
R10 63-391	TONE	
R11 63-387	4 M OHMS CANDOHM.	
R12 63-389	1M-1857 OHMS CANDOHM.	
R13 63-406	5M OHMS CANDOHM.	
R14 63-413	4 M OHMS	1/2 W.
R15 63-405	330 CANDOHM.	
R16 63-408	500M Q CONTROL.	
R17 63-404	60 OHMS CANDOHM.	
R18 63-246	150 OHMS	1/2 W.
R19 63-414	99M	1/2 W.
R20 63-417	99	1/2 W.
R21 63-415	10 M	1/2 W.
1	85-67 BAND SELECTOR SWITCH.	
2	95-250 DRIVER TRANS.	
3	95-251 LOW BOOST AUDIO TRANS.	
4	95-252 HIGH FREQUENCY	
5	95-253 SPEAKER OUTPUT	
6	95-254 POWER CHOKE	
7	95-255	
8	95-256 OUTPUT B SUPPLY TRANS.	
9	95-257 POWER TRANS.	
10	95-264 3RD I.F. TRANS.	
11	122-9 SHADOWGRAPH.	
12	195-1 SINGLE CONTACT RELAY	
13	53366 OSC. COIL.	
14	53340 ANT. COIL	
15	53341 R.F. COIL	
16	53358 VAR. SELECT. I.F. ASSEM.	
17	20-101 WAVE TRAP	
18	5-3368 H.F. OSC. COIL ASSEM.	
19	20-99 DET. FILTER CHOKE	
20	20-100 UNTUNED I.F. COIL.	
21	5-3367 LINE FILTER COIL.	
22	20-71 ANT. CHOKE	
23	20-104 5-METER DET. COIL	
24	85-69 PHONO. SWITCH.	
25	FIELD SPEAKER 49-102-49-103	
26	9-99	
27	49-99 SPEAKER	
28	49-102 #2	SPEAKER.
29	49-103 #1	
30	85-64 TOGGLE SWITCH.	
34	20-76 R.F. PLATE CHOKE	
35	53498 DET. COIL.	

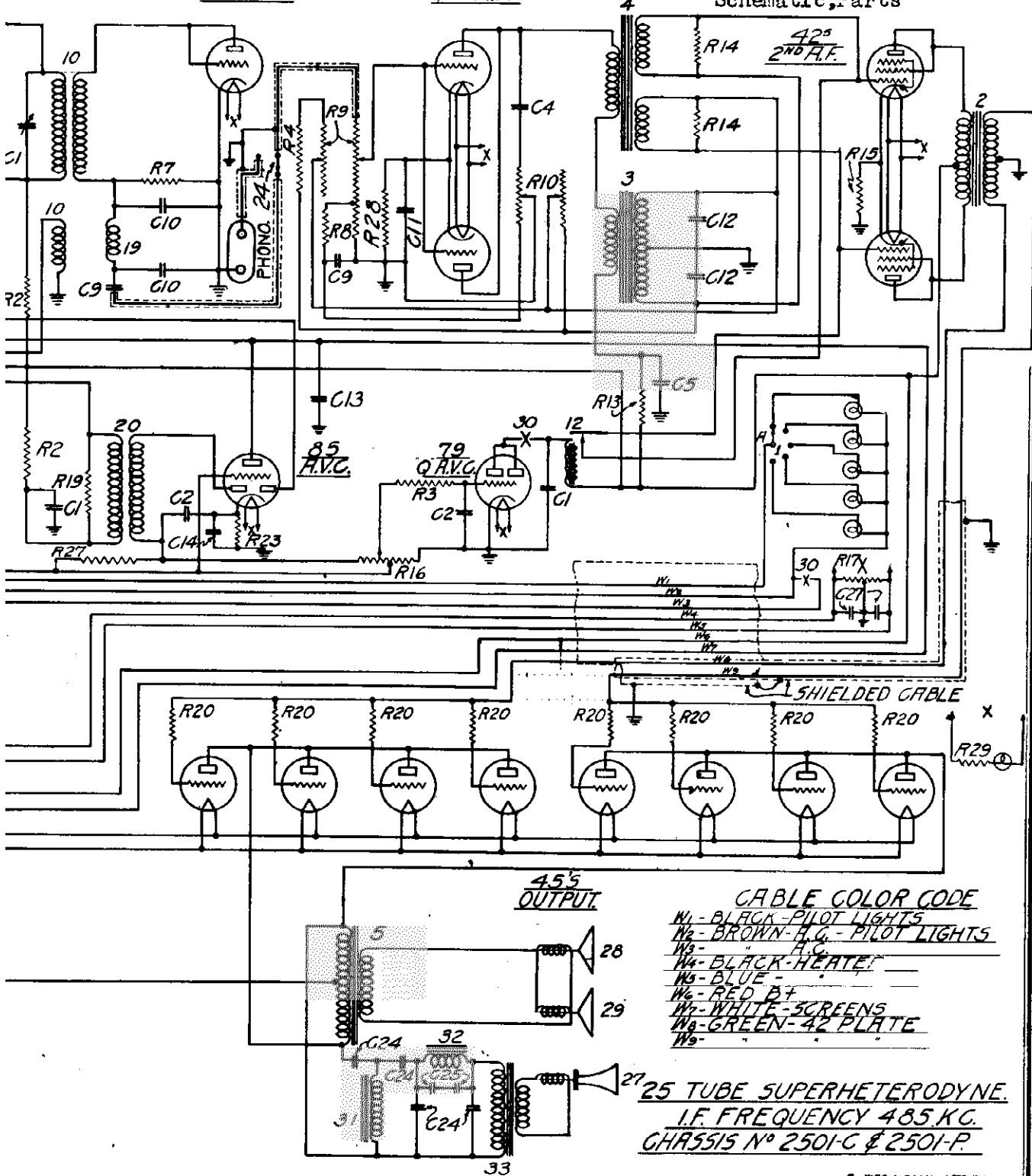


ZENITH CORP.

76
2ND DET.

76.5
1ST I.F.

MODEL S 1000Z, Stratosphere
Chassis 2501-C, 2501-P
Schematic, Parts



CABLE COLOR CODE
 W1 - BLACK - PILOT LIGHTS
 W2 - BROWN - H.C. - PILOT LIGHTS
 W3 - BLACK - H.C.
 W4 - BLACK - HEATER
 W5 - BLUE -
 W6 - RED - P.
 W7 - WHITE - SCREENS
 W8 - GREEN - 42 PLATE
 W9 -

25 TUBE SUPERHETERODYNE.
 I.F. FREQUENCY 485 KC.
 CHASSIS N° 2501-C & 2501-P.

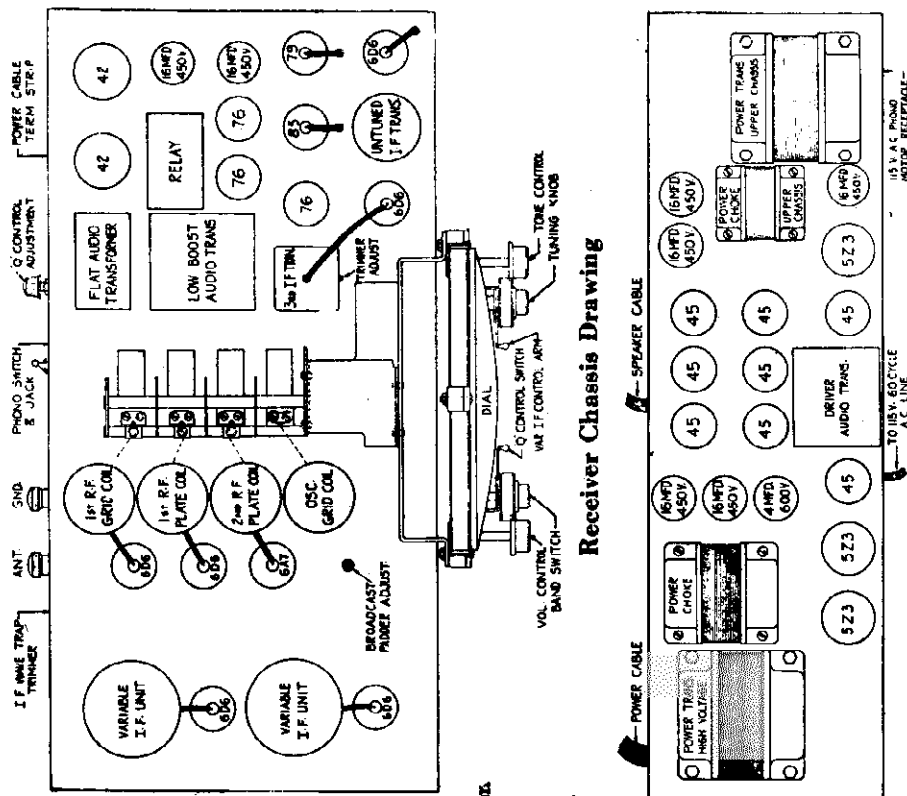
SWITCHES SHOWN IN BROADCAST POSITION

- A. SEC. 1
- B. . . . 2
- C. . . . 3
- D. . . . 6
- E. . . . 5
- F. . . . 4
- G. . . . 7
- H. . . . 8
- J. . . . 9
- K. . . . 10

SECTIONS OF SWITCH IN ALPHABETICAL ORDER FROM FRONT TO REAR OF CHASSIS.

MODEL N° 1000Z
 ZENITH RADIO CORP.
 CHICAGO, ILL.
 U.S.A.
 W.D.-11-19-34

ZENITH RADIO CORP. MODELS 1000Z, Stratosphere
Chassis 2501-C, 2501-P
Service Data, Socket, Trimmer



Receiver Chassis Drawing

Power Pack Chassis Drawing

Antenna Coil - Check for continuity - Red wire through to Green wire - This will include all coils on this form.

These coil readings are given on coils only, disconnected from associating circuits.

Power pack readings taken with set disconnected and yack cold, tubes in sockets.

Both A. C. primary windings #95-256 and #95-257 less than $\frac{1}{2}$ Ohm. 45 and 6 volt winding practically no D.C. resistance, - check for continuity only and check center tap of 45 winding.

523 filament same as above.

523 plate windings 190 Ohms.

Check center tap, approximately $\frac{1}{2}$ of total winding or 50 Ohms.

Filter chokes - #95-255 - 70 Ohms.

Line filter #9-3367 - Check for continuity.

See voltage readings supplement.

SERVICE NOTES

Rams - Defective tubes and check filters - Voltages, etc.

Rams - Weak and Distorted. Check #95-250 transformer for open winding, weak audio if shorted.

400 Inch High, Lacks Low Notes - #95-250 open center tap. #22-225 condenser open 50,000 ohm resistor grounded on tone control to bottom plate. $\frac{1}{2}$ of low boost shorted secondary.

Motorboats On All Bands - #22-228 - .5 condenser to 85 socket open, I. F. shorted, Graph won't narrow and set will distort on edge of carrier.

Weak And Distorted All Bands. 1500 Ohm resistor across #22-189 25-volt 2 Mfd. open.

Blocks Up - Tendency to Slow Motorboat. Check red wire from #63-407 to 10,000 ohm on 5-meter coil for ground. Set seems alive but no signal if this resistor is open.

Set Dead- Check tubes, filters, coils and transformers and I.F. for grounds or open.

Dead - No Radio - Open Phono Switch.

Weak Audio And High Notes - Hum level increases slightly if you pull one push-pull #42 tube. Open secondary on low boost #95-251. Disconnect high boost and tone control circuit before testing.

Tone Control No Effect On Highs. Set flutters as tone control is rotated to bass. Check .1-22 -5770 for open or short.

MODELS 1000Z, Stratosphere
Chassis 2501-C, 2501-P
Circuit Data, Voltage,
Alignment

ZENITH RADIO CORP.

GENERAL INFORMATION

Tubes used are as follows:

- 6D6 First Radio Frequency Amplifier
- 6D6 Second Radio Frequency Amplifier
- 6A7 First Detector and Oscillator
- 6D6 First Intermediate Amplifier
- 6D6 Second Intermediate Amplifier
- 76 Second Detector
- 2 - 76 First Audio Amplifier
- 2 - 42 Push-Pull Second Audio Amplifier
- 6 - 45 Parallel Push-Pull Power Amplifier
- 79 Electron Relay for Q Circuit
- 6D6 Shadowgraph Amplifier
- 85 Automatic Volume Control
- 523 A.V.C. Amplifier
- 2 - 523 Rectifier for Power Amplifier
- 523 Rectifier for remainder for receiver.

CIRCUIT

Radio Frequency Amplifier. This receiver employs two stages of radio frequency amplification using pentode tubes in conjunction with tuned plate circuits resulting in high R. F. gain at all frequencies. The bias voltage on both stages is varied through the band switch to secure stability and preserve maximum gain on all bands. Both stages are used on all bands except the fifth or ultra-high frequency band. Double shielding is employed on the entire R. F. section to prevent signal pick-up by the wiring.

First Detector and Oscillator. A 6A7 tube is used as first detector and oscillator. The input circuit of the first detector is an R.F. choke and a 50,000 ohm resistor in parallel. The input grid of a 6A7 type of tube has a tendency to become positive whenever a strong signal is impressed on it, if there is any appreciable resistance in the grid circuit. The grid return connection of the choke is connected to one diode plate of the 85 A.V.C. tube so that if at any time the input grid of the 6A7 should become positive, due to overload, the diode plate will provide a low D.C. path to ground preventing detector overload distortion.

Intermediate Amplifier. The circuit employed in the two stages of intermediate amplification is conventional. The unusual feature of this portion of the receiver is in the transformers which are so designed that the mechanical coupling and, in turn, the band width or selectivity may be varied continuously without changing the natural period of either primary or secondary coils. This variation of selectivity has no effect on the sensitivity of the receiver.

Delayed Automatic Volume Control. A pick-up winding is incorporated in the third I.F. transformer which feeds I.F. to the control grid of a 6D6 A.V.C. amplifier. The output of this stage is coupled through an untuned transformer to the diode plate of an 85 tube. The plate of the 85 is connected directly to B plus and the control grid to a tap in the diode load resistor. This tube is biased at approximately 10 volts which places a negative bias on the diode plate and no A.V.C. voltage is developed until a signal is tuned in of a strong enough value to swing the diode plate positive. At this point A.V.C. voltage is developed, which in turn makes the grid of the 85 negative and reduces the plate current which reduces the bias and allows still more A.V.C. voltage to be developed. This accumulative action allows excellent automatic control of the stronger signals and eliminates the detrimental effects of A.V.C. on weak signals.

A.V.C. A portion of the resistance load of the 85 diode is incorporated in a potentiometer on the rear of the upper chassis. The arm of this potentiometer is connected to the grids of a 79 tube. The two plates of the 79 are connected in parallel and operate a magnetic relay which short-circuits the grids of the push-pull 42 audio driver stage. When a signal is tuned in the grids of the 79 tube become negative stopping the plate current and the relay opens, allowing the audio system of the receiver to operate. The signal level at which this occurs is determined by the setting of the potentiometer arm. A switch, operated by a lever under the band switch knob on the front panel is in series with the 79 plate circuit and when opened makes the A.V.C. circuit inoperative. The shadowmeter is connected in the plate circuit of a separate 6D6 whose control grid is controlled by the A.V.C. voltage. The amplifying action of this tube allows the shadowmeter to operate on very weak stations.

First Audio and Driver. In order to eliminate any possibility of overloading, two 76 tubes are used in parallel in the first audio stage. Two audio transformers of special design couple the first audio stage to a push-pull driver stage using two 42 tubes. The smaller transformer only handles frequencies above 400 cycles and has a rising high characteristic. The large transformer handles frequencies below 400 cycles and is resonated at 30 cycles. The voltage output of each of these transformers is controlled by the tone control.

The Power Output Stage. This consists of eight 45 tubes connected in parallel push-pull. A push-pull balance is preserved in this stage by using several medium size power tubes rather than a pair of high-power tubes. Also, the voltage requirements are greatly reduced. A 99 ohm resistor is incorporated in the grid circuit of each tube to prevent parasitic oscillation.

Power Supply. There are two rectifying and filtering systems incorporated in the lower power amplifier chassis. One uses a single 523 full wave rectifier and supplies plate current for the upper chassis and bias voltage for the output stage only. The second uses two 523 tubes and supplies plate current for the output stage only. Special electrolytic condensers are used in both power supplies. These condensers will make a slight frying sound while the tubes are heating, unlike the more common type of electrolytic condensers. This is not an indication of deterioration.

Reproducers. There are three dynamic reproducers used. The small one in the center reproduces the higher register above 4000 cycles. A filtering system is used in conjunction with this speaker which prevents the lower frequencies from being reproduced. The two large concentric dynamics handle all frequencies lower than 4000 cycles. Two are necessary to handle the 50% watts output of the power stage without distortion. The leads and connections on all three speakers are color coded so as to insure correct connections and proper phasing. These connections must not be reversed.

Tuning Ranges.

Color	Kilocycles	Megacycles	Meters
Green	535 - 1,550	.83 - 1.55	560 - 190
Orange	1,530 - 4,575	1.53 - 4.57	196 - 65.7
Yellow	3,725 - 11,150	3.72 - 11.15	80.5 - 27
Red	9,500 - 31,600	9.5 - 31.6	31.5 - 9.4
Blue	19,500 - 63,500	19.5 - 63.5	15.3 - 4.7

The high efficiency and unexcelled performance of this receiver has been achieved by the careful selection and high quality of all components. It is therefore most important that when service is required only genuine Zenith parts and tubes be used.

Socket Voltages

TUBE	POSITION	Kf	Ek	Rel	Ag2	Ag3	Ep
6D6	1st R. F.	6.3	10	0	100	10	270
6D6	2nd R. F.	6.3	3	0	100	3	270
6A7	1st Det.	6.3	3	0	100	-	270
	Osc.	-	-	0	-	-	165
6D6	1st I.F.	6.3	3	0	100	3	255
6D6	2nd I.F.	6.3	3	0	100	3	255
76	2nd Det.	6.3	0	0	-	-	0
76	Parallel 1st. Audio	8.5	12	0	-	-	192
42	P.P. Driver	6.3	15	0	-	-	255
45	Power Aud.	2.6	63	0	-	-	330
79	A.V.C.	6.3	0	.5	-	-	240
6D6	Shadowmeter Amplifier	6.3	1.3	0	100	1.3	255
6D6	A.V.C. Amplifier	6.3	3	0	100	3	255
85	A.V.C.	6.3	7	0	-	-	100
523	Rect. Power Amplifier	5	-	-	-	-	-
523	Rect. for Upper Chassis.	5	-	-	-	-	-

Line voltage 112.

Antenna and Ground shorted.

f - filament; k - cathode; gl - control grid; g2 - screen grid; g3 - suppressor grid; p - plate.

Balance Procedures: Caution - Test set thoroughly for defective tubes, antenna and ground, check line voltage and chassis voltages before any attempt is made to re-balance.

Set volume control in full position, fidelity control in selective position, tone control at high position. Output meter usually connected across plates of 45 tubes.

Connect 485 K.C. service oscillator to grid of 6A7 and chassis ground, adjust I.F. transformers to maximum output with minimum signal input. Rotate selectivity control to broad position, I.F. output should remain constant six K.C. plus and minus of 485 K.C.

Set band switch on 550 to 1500 scale, rotate gang to 1400 K.C. Set test oscillator at 1400 and connect to aerial and ground.

Adjust oscillator trimmer screw, top padder screw on oscillator coil, to scale.

Rotate gang to 600 K.C., set test oscillator at 600. Adjust padder inside left front corner of shield can, near oscillator coil, for maximum output.

Rotate gang and padder together near 600 K.C. while making this adjustment. Set pointer to exactly 600 K.C. Re-adjust service oscillator to 1400, rotate gang back to 1400 and re-check for maximum output and scale. The two R. F. and detector gang condenser trimmers should be adjusted to maximum output at 1400 K.C.

The short wave bands are adjusted at 3.5 and 9 and 28 Mcg. Adjust for maximum signal or noise level. Under no circumstances should wires in oscillator and 5-meter circuits be disturbed. Adjust screws following in sequence below 1400 oscillator screw on oscillator coil.

Resistance Checks: The following D. C. resistances are given as help for continuity test, taken with the average type of ohmmeter.

Chassis - Power pack disconnected.

Driver transformer, Part #95-250 - #2685 - Center tap of secondary to each side, numbers, 5 to 4, and 6 to 5 - 675 and 700 Ohms.

Primary - Center tap to each side 460 and 525 Ohms, numbers 2 to 1 and 2 to 3. High Boost, #95-222, with low boost disconnected.

Primary (White wire) (White and black tracer - 200 Ohms)

Secondary - (Blue - 200 Ohm) (Yellow - 150 Ohm)

Secondary - (Red) (White and Red tracer - 200 Ohms.)

Low Boost, #95-251, with high boost and tone control disconnected.

Primary - 650 Ohms.

Secondary center tap to each side 5000 Ohms.

Antenna choke - #80-71 - 15 Ohms.

Wave Trap - #80-101 - 5 Ohms.

Relay - #195-1 - 3000 Ohms.

Detector filter choke - #80-99 - 150 Ohms.

3rd I.F. - #80-100 - (Green - 7 Ohms)

(Red - 3 Ohms)

(Blue - 6.5 Ohms)

(Black) (Green grid cap wire - 3 Ohms.)

High fidelity I.F. - #8-355 - 2 used.

(Green - Brown - 3.2 Ohms.)

(Blue - Red - 3.2 Ohms.)

I.F. Coil - Check Iron Grid cap, green wire to brown wire coming out of bottom of coil 490,000 Ohms. This high resistance is due to series resistor mounted on coil form of 490,000 value. Black to white - Yellow to Blue - 1/2 ohms approximately.

Oscillator Coil -

Brown to Slate - 1/2 Ohm.

Brown to Black - 3.9 Ohm.

Brown to White - 1.5 Ohm.

Red Green tracer to Blue - 4.8 Ohms.

Red Green tracer to Yellow - .8 Ohms.

Red Green tracer to Red - 1.5 Ohms.

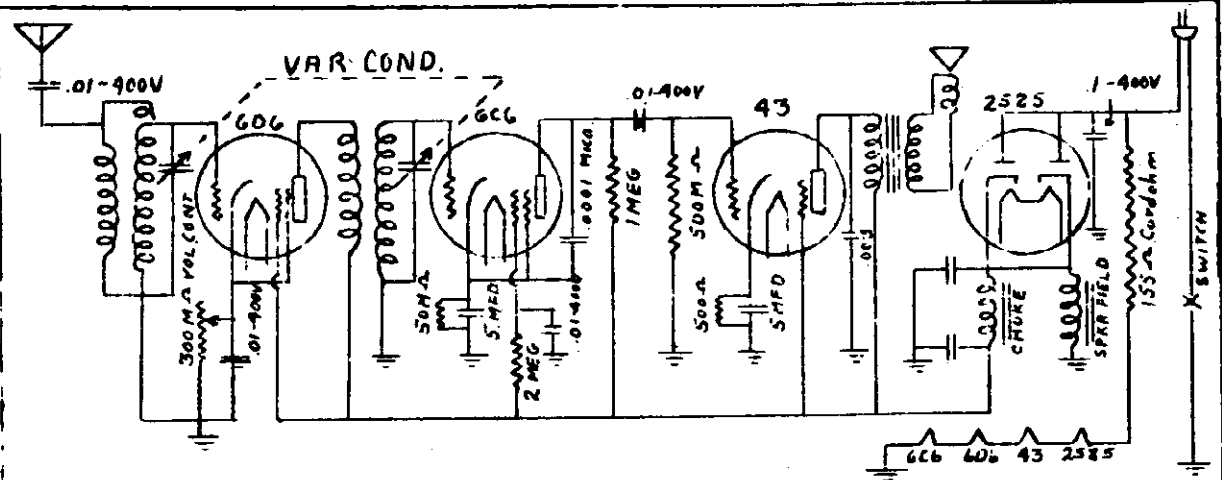
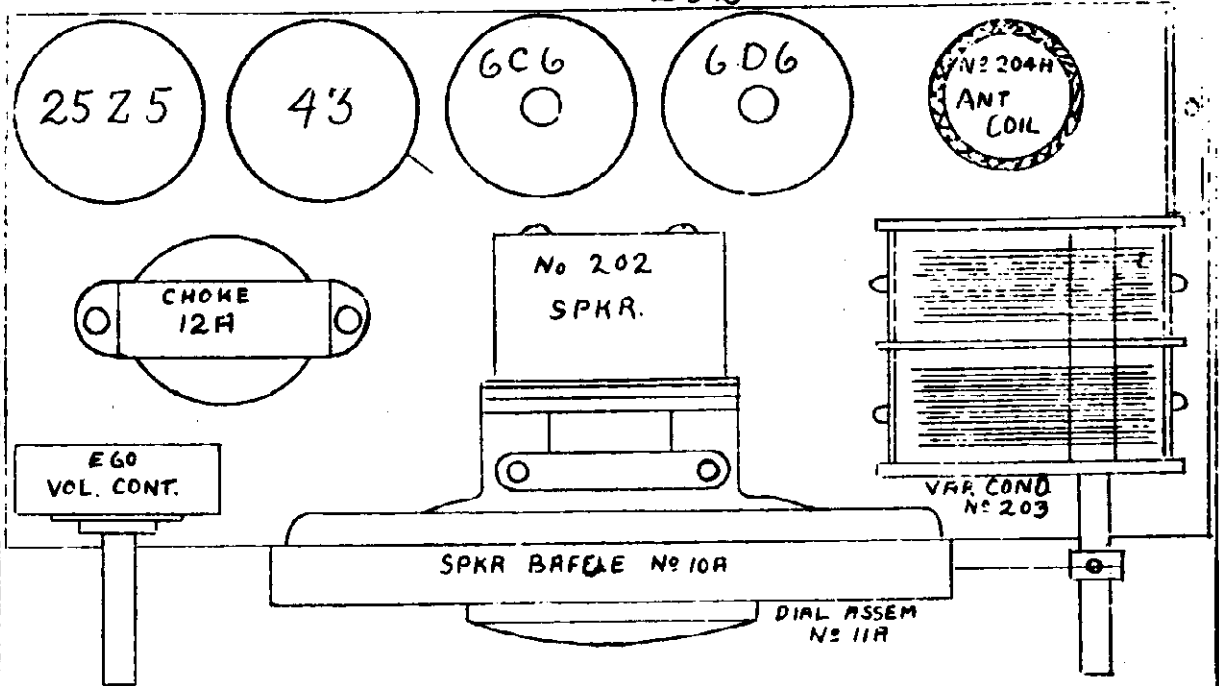
Red to Blue - 3.2 Ohms.

Red to Yellow - 6.8 Ohms.

AETNA

MODEL 252
Schematic
Socket, Voltage

1935 SERIES - AETNA Model - 252



SOCKET VOLTAGES ~

TUBE	POSITION	EF	EK	EG2	EG3	EP
6D6	RF	6.3	2.1	110	2.1	108
6C6	DET.	6.3	1.4	14	1.4	18
43	PR. OUTPUT	25	16	110	—	100

All voltages taken with 1000 ohms per volt D.C. Meter, except Heaters.

LINE VOLTAGE 115 VOLTS

F = Filaments

K = Cathode

G2 = Screen Grid

G3 = Suppressor Grid

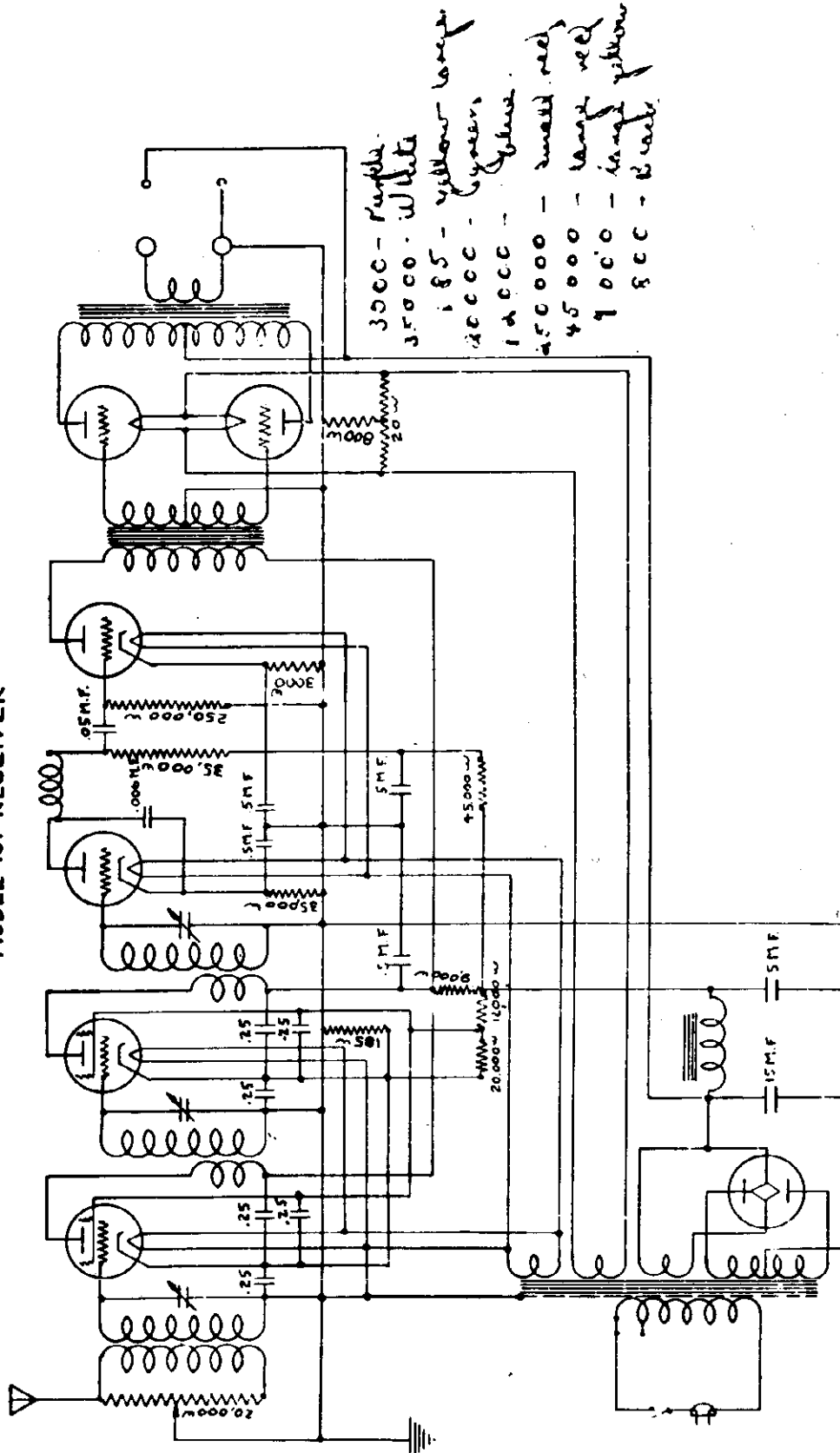
P = Plate

10-5-35-WL

MODEL 101
Schematic

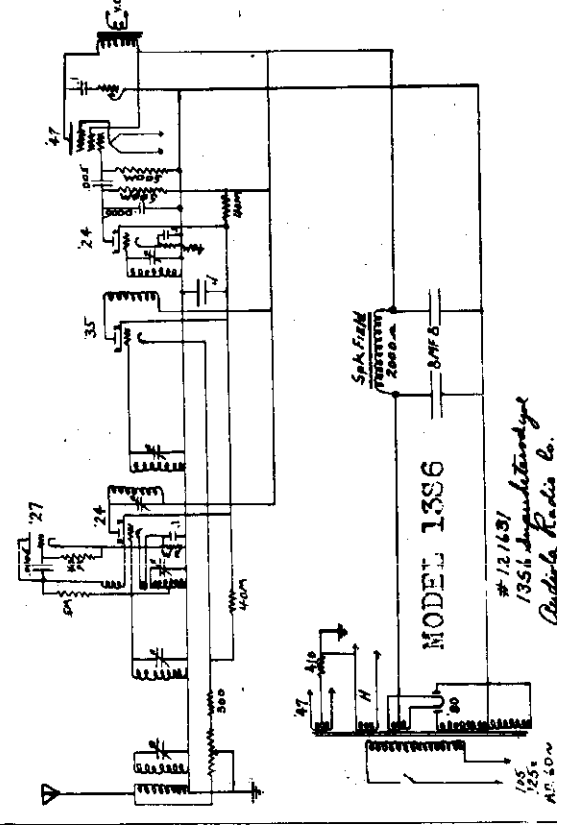
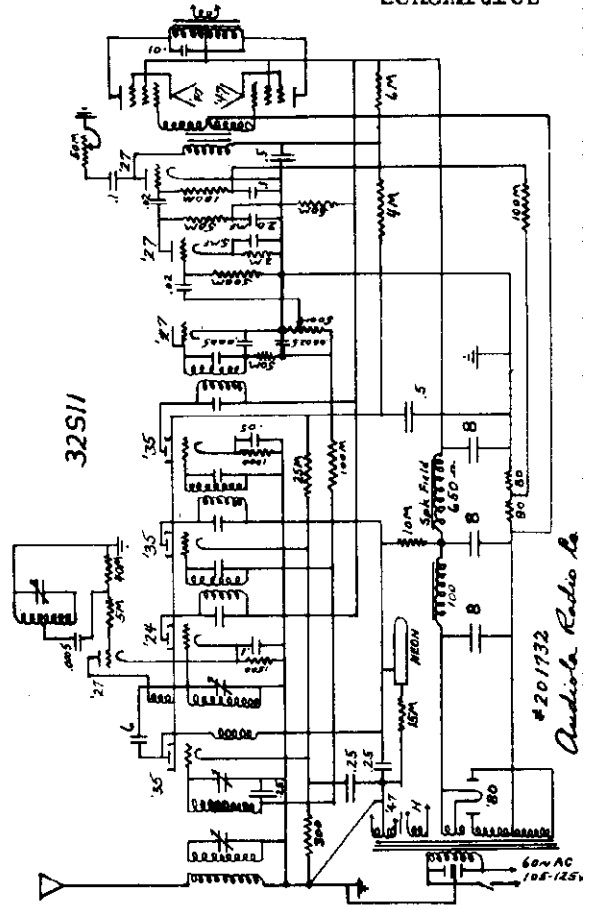
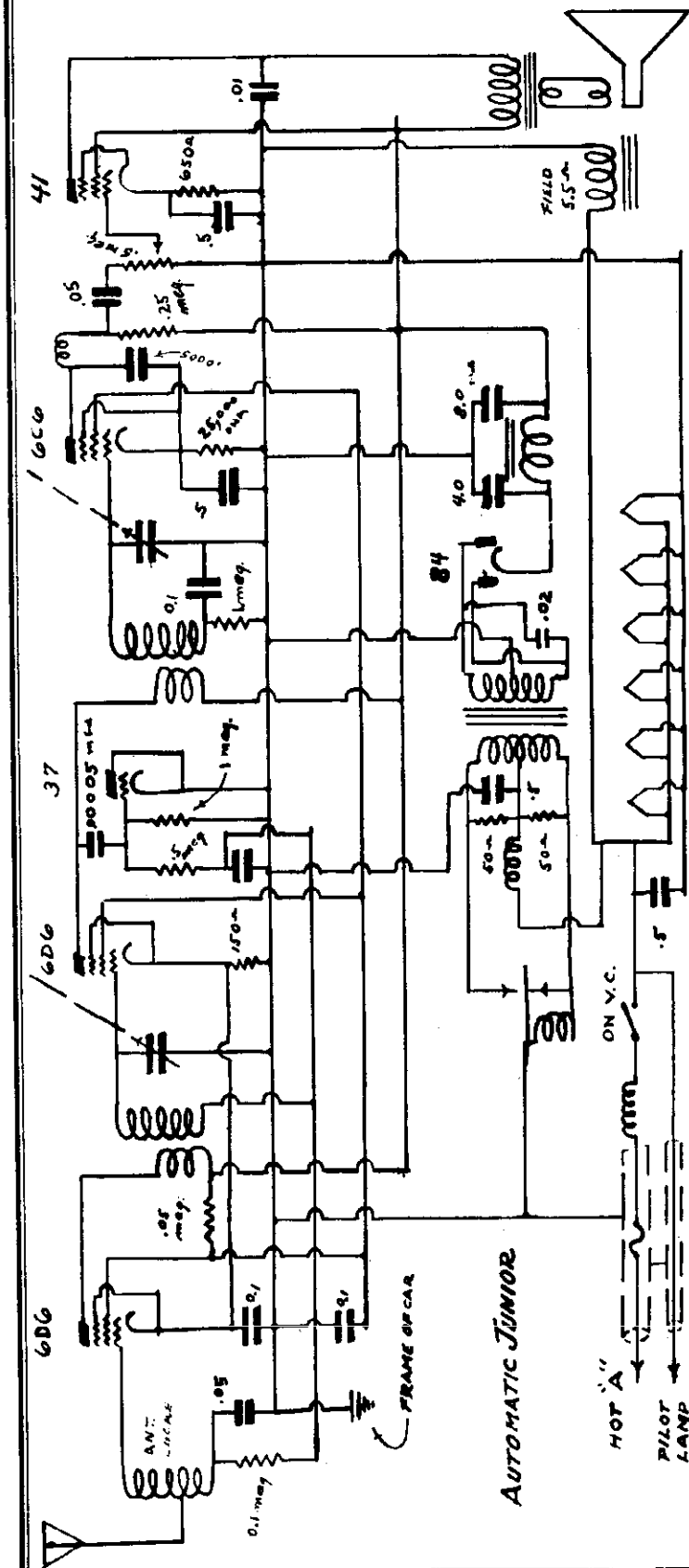
ARIEL RADIO INC.

SCHMATIC DIAGRAM
ARIEL RADIO INC.
MODEL 101 RECEIVER



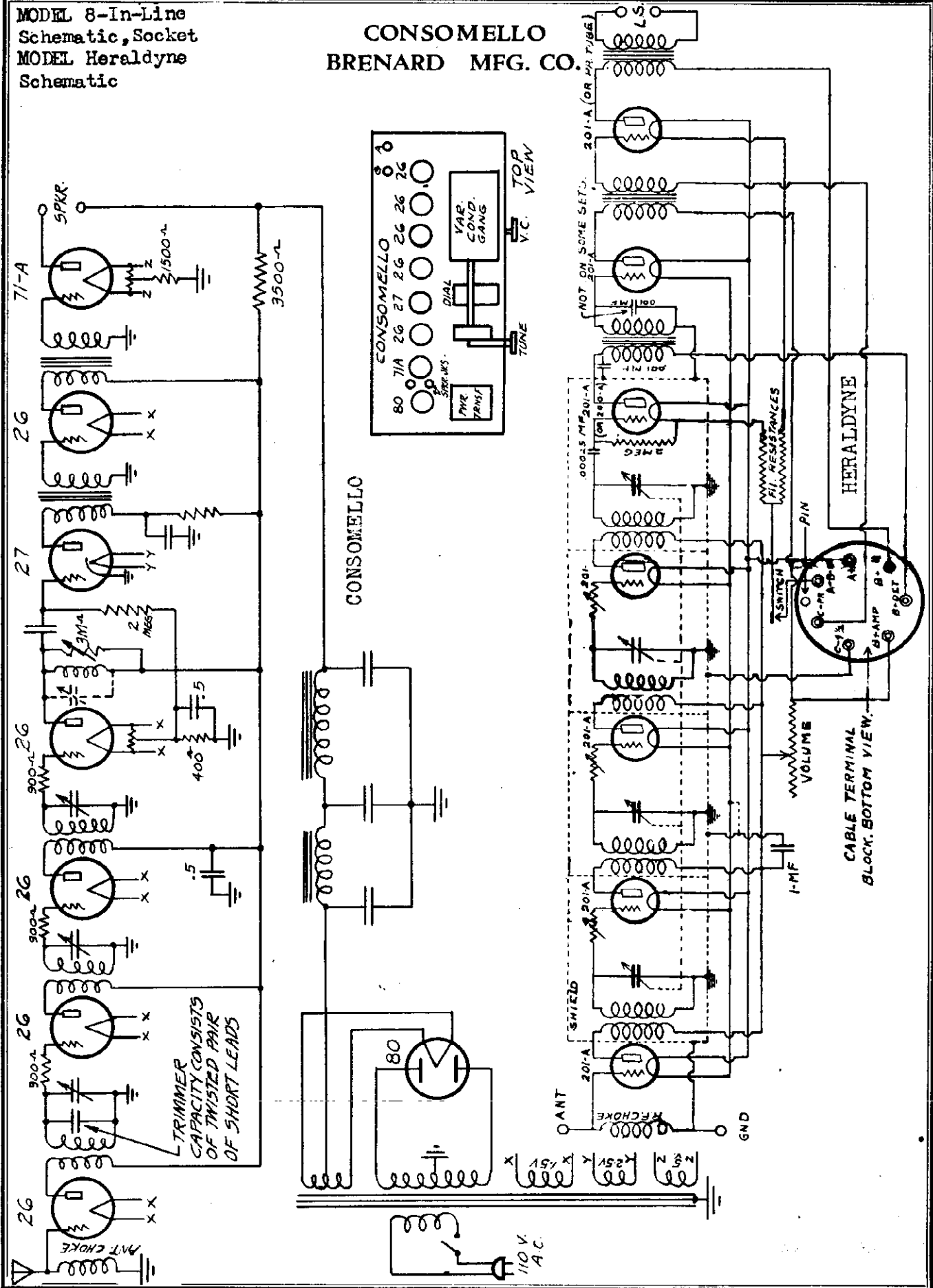
AUTOMATIC RADIO MFG. CO.
AUDIOLA RADIO CO.

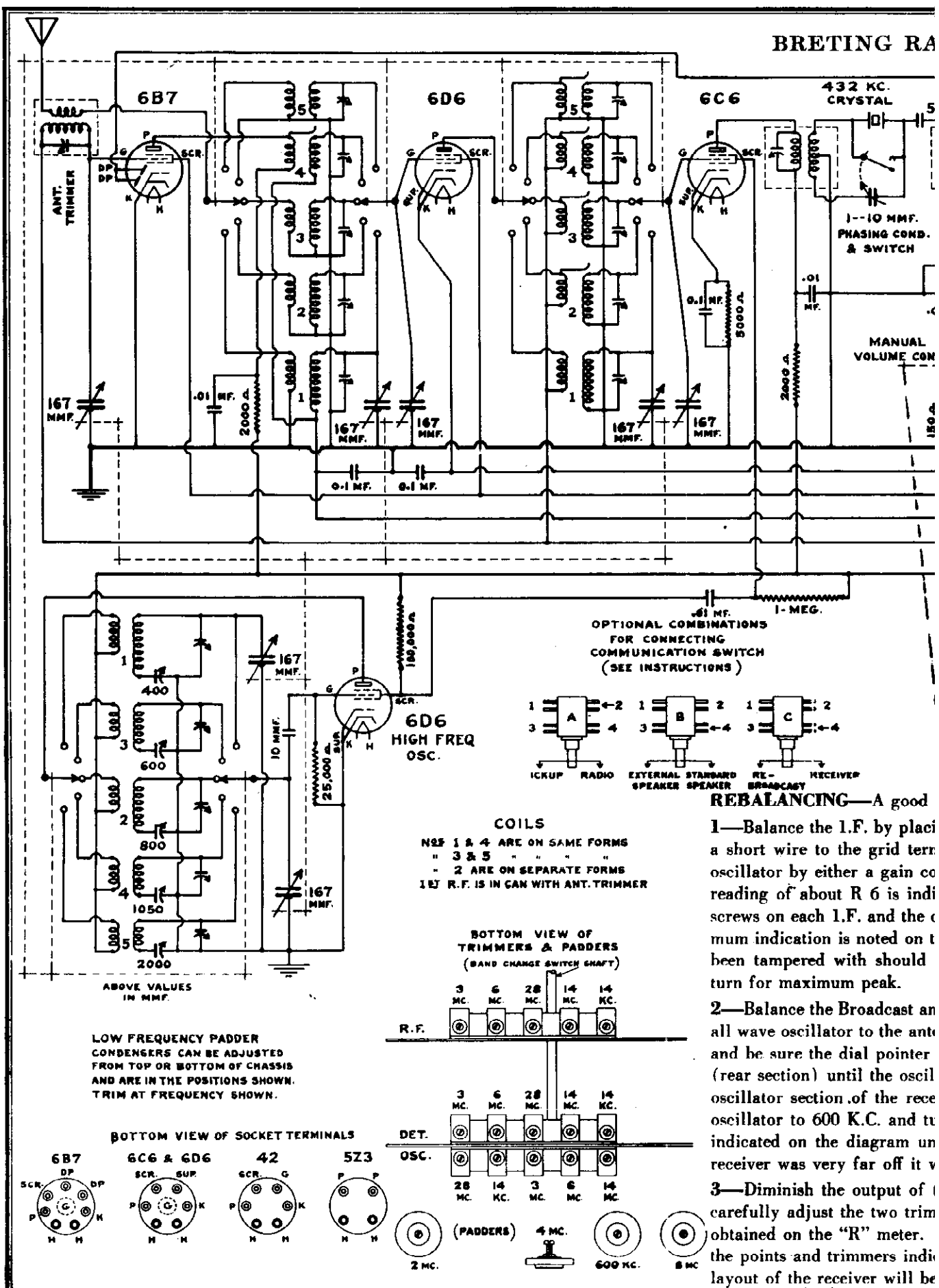
MODEL Junior
MODEL 1356
MODEL 32S11
Schematics



MODEL 8-In-Line
Schematic, Socket
MODEL Heraldryne
Schematic

CONSOMELLO
BRENARD MFG. CO.

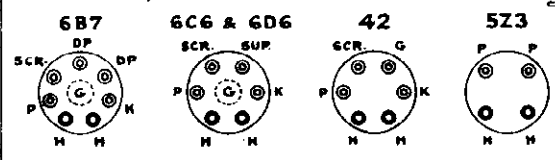




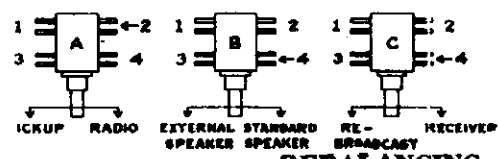
ABOVE VALUES IN MMF.

LOW FREQUENCY PADDERS CONDENSERS CAN BE ADJUSTED FROM TOP OR BOTTOM OF CHASSIS AND ARE IN THE POSITIONS SHOWN. TRIM AT FREQUENCY SHOWN.

BOTTOM VIEW OF SOCKET TERMINALS



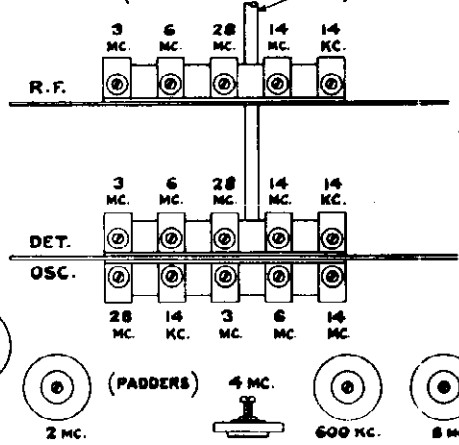
OPTIONAL COMBINATIONS FOR CONNECTING COMMUNICATION SWITCH (SEE INSTRUCTIONS)



COILS

- NOS 1 & 4 ARE ON SAME FORMS
- " 3 & 5 " " " "
- " 2 ARE ON SEPARATE FORMS
- 1&7 R.F. IS IN CAN WITH ANT. TRIMMER

BOTTOM VIEW OF TRIMMERS & PADDERS (BAND CHANGE SWITCH SHAFT)



REBALANCING—A good

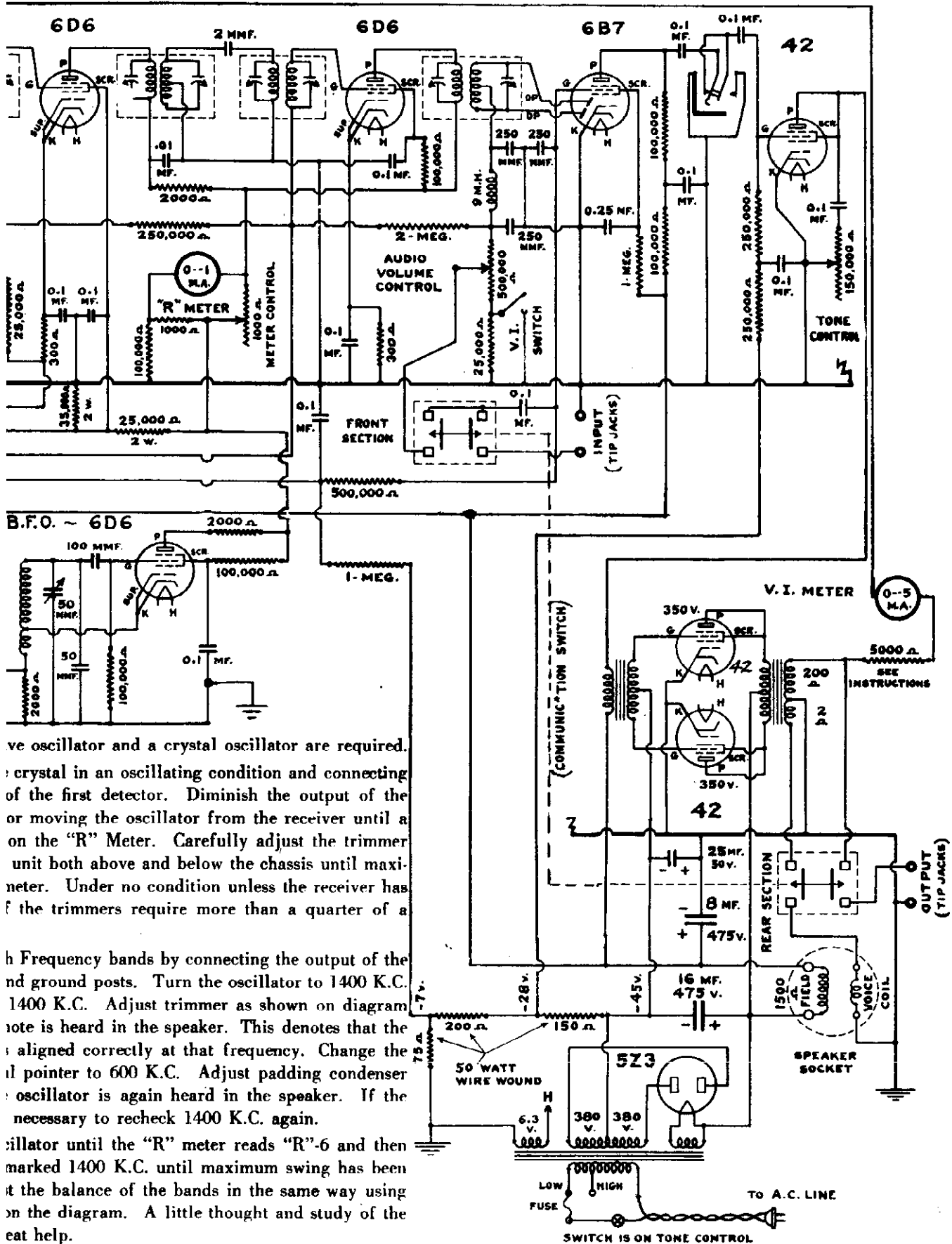
1—Balance the I.F. by placing a short wire to the grid terminal oscillator by either a gain control reading of about R 6 is indicated on the diagram and the maximum indication is noted on the meter. If it has been tampered with should turn for maximum peak.

2—Balance the Broadcast section of an all wave oscillator to the antenna and be sure the dial pointer (rear section) until the oscillator section of the receiver oscillator to 600 K.C. and tune as indicated on the diagram unless the receiver was very far off it will be.

3—Diminish the output of the oscillator section carefully adjust the two trimmers obtained on the "R" meter. The positions and trimmers indicated on the diagram of the receiver will be

... MFG. CO.

MODEL 12
Schematic, Alignment



ve oscillator and a crystal oscillator are required.
 crystal in an oscillating condition and connecting
 of the first detector. Diminish the output of the
 or moving the oscillator from the receiver until a
 on the "R" Meter. Carefully adjust the trimmer
 unit both above and below the chassis until maxi-
 meter. Under no condition unless the receiver has
 the trimmers require more than a quarter of a

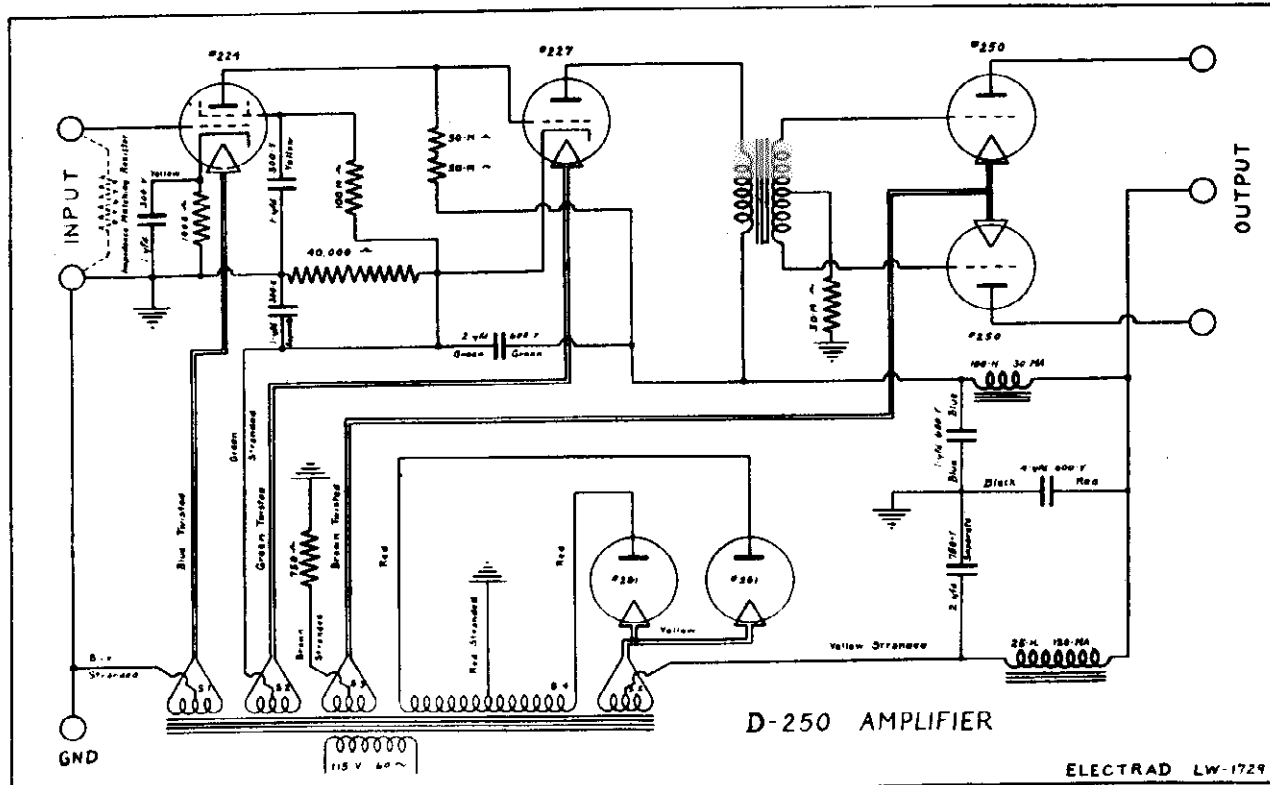
h Frequency bands by connecting the output of the
 nd ground posts. Turn the oscillator to 1400 K.C.
 1400 K.C. Adjust trimmer as shown on diagram
 note is heard in the speaker. This denotes that the
 aligned correctly at that frequency. Change the
 il pointer to 600 K.C. Adjust padding condenser
 oscillator is again heard in the speaker. If the
 necessary to recheck 1400 K.C. again.

illator until the "R" meter reads "R"-6 and then
 marked 1400 K.C. until maximum swing has been
 at the balance of the bands in the same way using
 on the diagram. A little thought and study of the
 eat help.

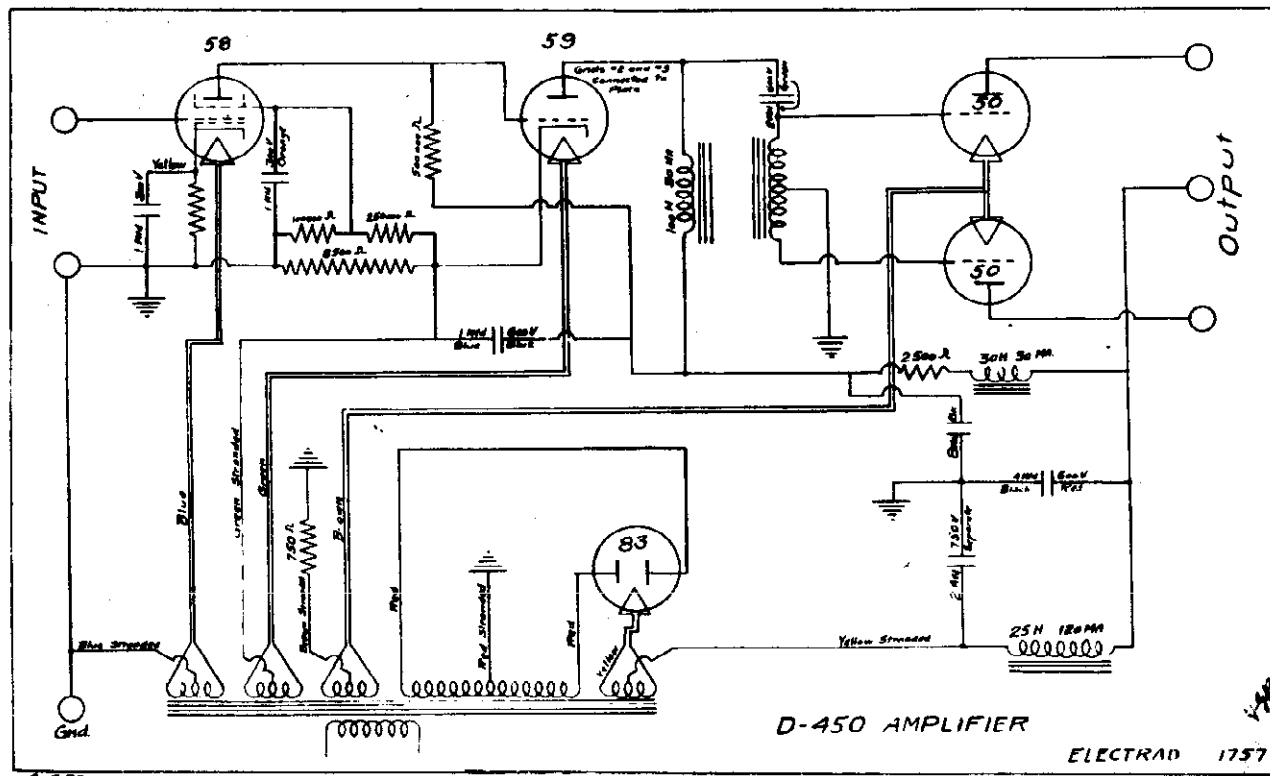
TO A.C. LINE
 SWITCH IS ON TONE CONTROL

ELECTRAD, INC.

MODEL D-250
 MODEL D-450
 Schematics



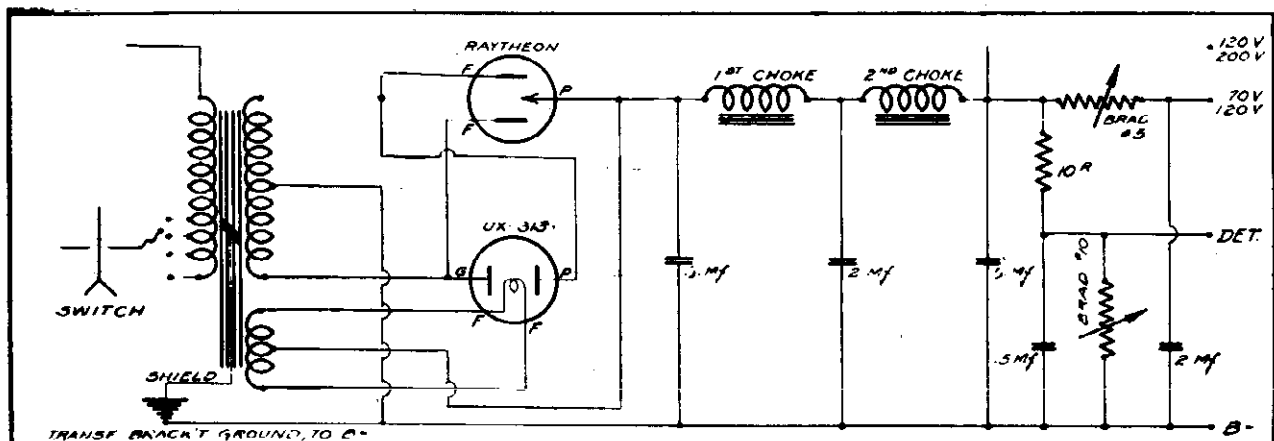
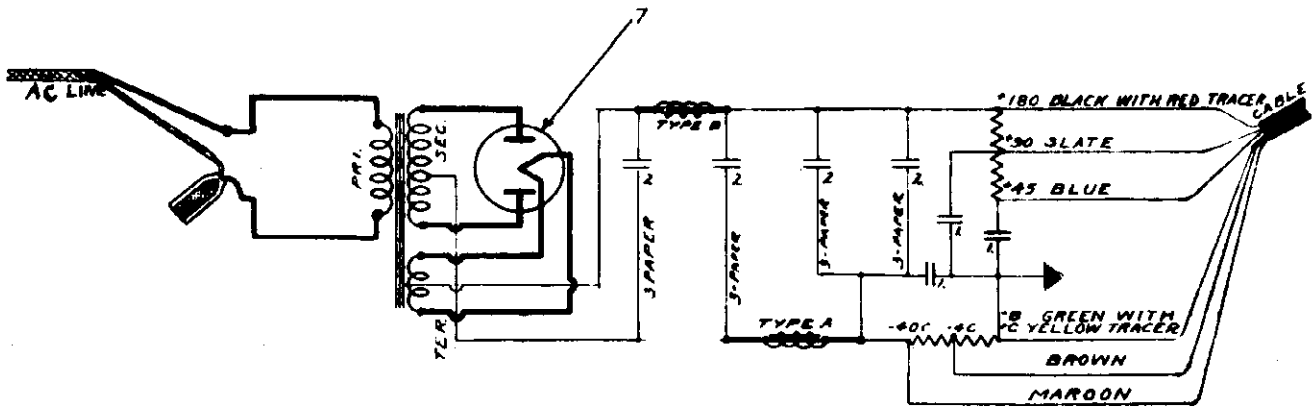
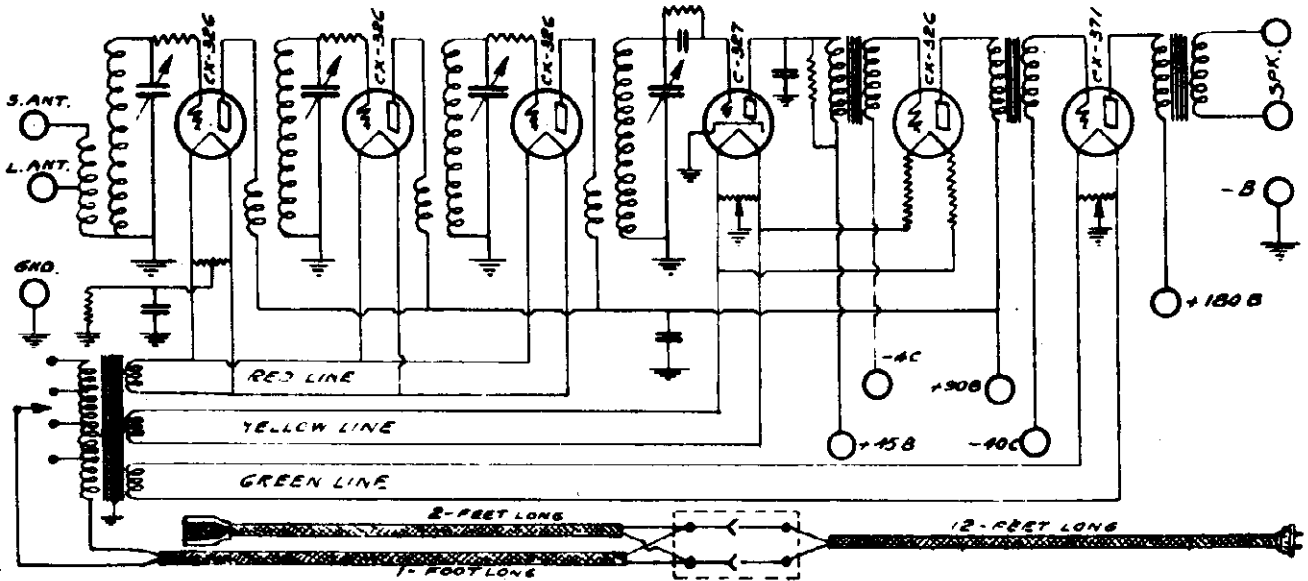
ELECTRAD LW-1729



ELECTRAD 1757

MODEL 7-Tube AC
MODEL B-Eliminator
Schematics

FARRAND MFG. COMPANY



SCHEMATIC DIAGRAM.

DIAGRAMS for FARRAND "B" ELIMINATOR.

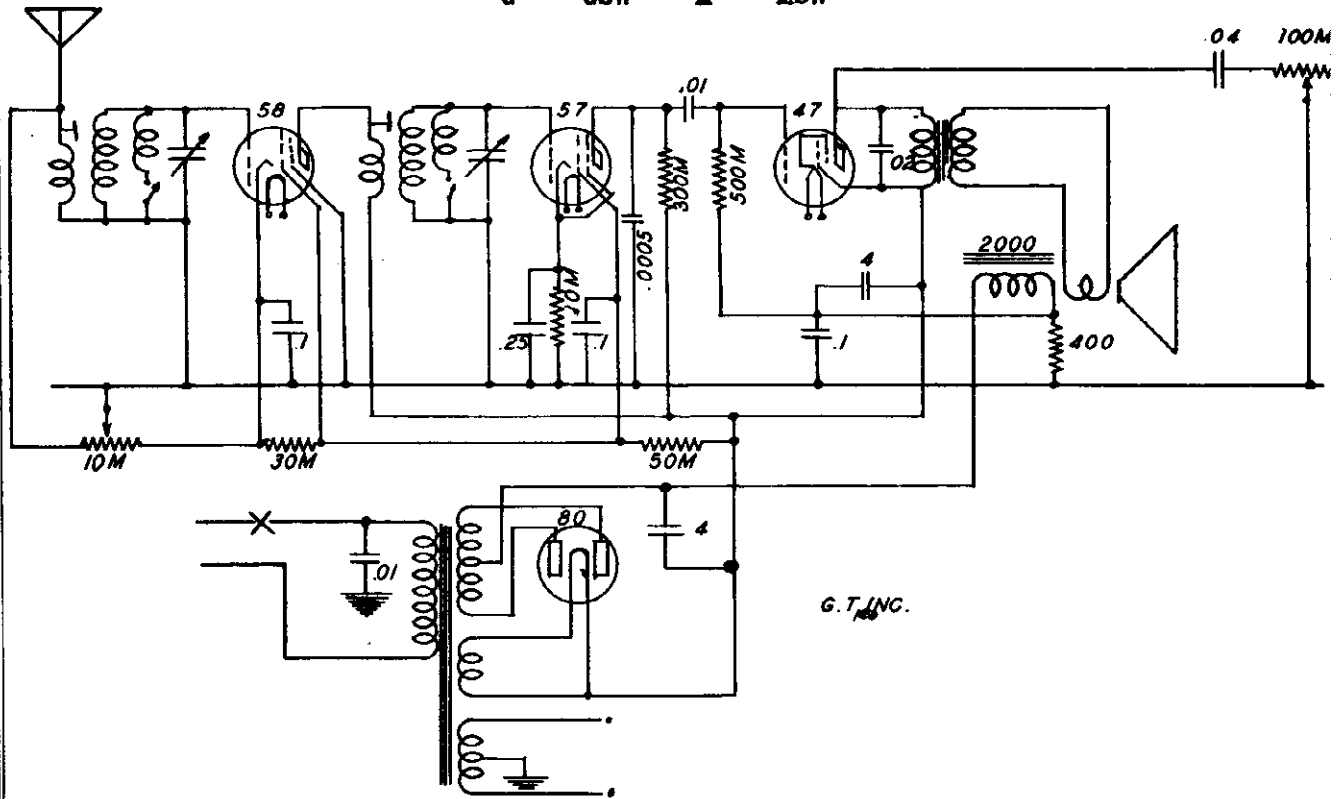
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DATE: 11-1-26	DATE: 11-1-26	DATE:

GENERAL TELEVISION, INC.

MODELS G, GSW, M, MSW
 MODELS A, B, C, E
 Regular & SW Models
 Schematics

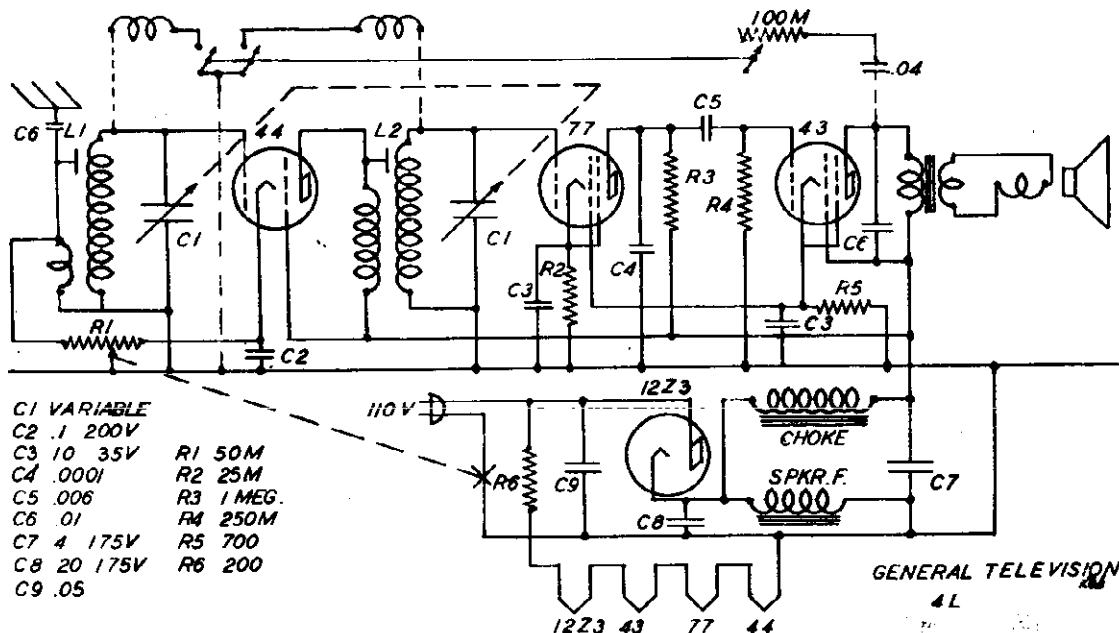
SCHEMATIC DIAGRAMS

AC MODELS
 "G" "GSW" "M" "MSW"



G.T. INC.

AC-DC MODELS
 "A" "B" "C" "E" REGULAR AND "SW" MODELS



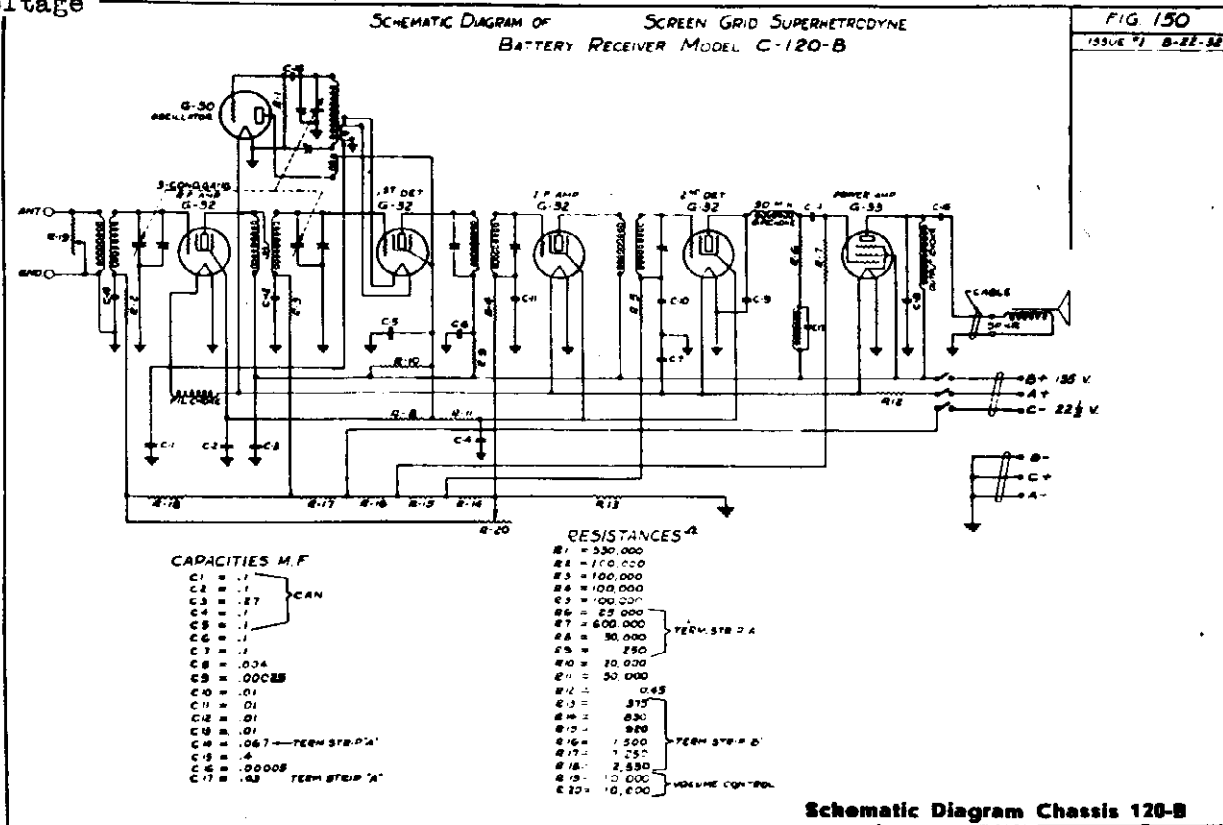
- C1 VARIABLE
- C2 .1 200V
- C3 10 35V
- C4 .0001
- C5 .006
- C6 .01
- C7 4 175V
- C8 20 175V
- C9 .05
- R1 50M
- R2 25M
- R3 1 MEG.
- R4 250M
- R5 700
- R6 200

GENERAL TELEVISION INC.

4L

MODEL 123
Chassis 120-B
Schematic, Alignment
Voltage

GRIGSBY - GRUNOW CO.



COLOR CODE

SPEAKER—Red and green or black (with small lugs)
"A" Plus—Red (with large lug)
"A" Minus—Black (with large lug)
"B" Plus—Red 135 volt
"B" Minus—Black
"C" Plus—Black 22½ volt
"C" Minus—Blue

ALIGNMENT

Align with the volume control in maximum position and the input reduced to keep the output below 1 watt.
An output meter should be used to insure the proper adjustment of all aligning condensers. Supply a 175 K.C. signal to the grid of the first detector tube and align all intermediate frequency condensers for maximum output.
Supply a 1,500 K.C. signal to the input of the receiver and tune the receiver to this signal. Then adjust all radio frequency alignment condensers for maximum output.
Supply a 600 K.C. signal to the input of the receiver and tune the receiver to this signal. Then adjust the oscillator tracking condenser and tuning control simultaneously for maximum output. For each adjustment of the oscillator tracking condenser there will be a different dial setting which gives maximum output. The combination of tracing condenser adjustment and dial setting which give maximum output, disregarding the calibration point is the correct adjustment.

VOLUME CONTROL

The Model 120-B chassis is equipped with a double volume control unit. Each section of the unit has a value of 10,000 ohms. One section of the volume control governs the voltage input to the antenna whereas the other section adjusts the bias voltages obtainable of the voltage divider.

TABLE OF VOLTAGES

Tube Purpose	Type	Fil Volts D.C.	Plate Volts D.C.	Plate Current M.A. D.C.	Screen Volts D.C.	Screen Current M.A. D.C.
R.F. Amp.	G-32	2.0	135	1.2	40	.3
Oscil.	G-30	2.0	55	3.0	—	—
1st Det.	G-32	2.0	135	.2	55	.2
I.F. Amp.	G-32	2.0	135	.3	22	.3
2nd Det.	G-32	2.0	20	*	22	.4
Pentode	G-33	2.0	130	12	135	2.6

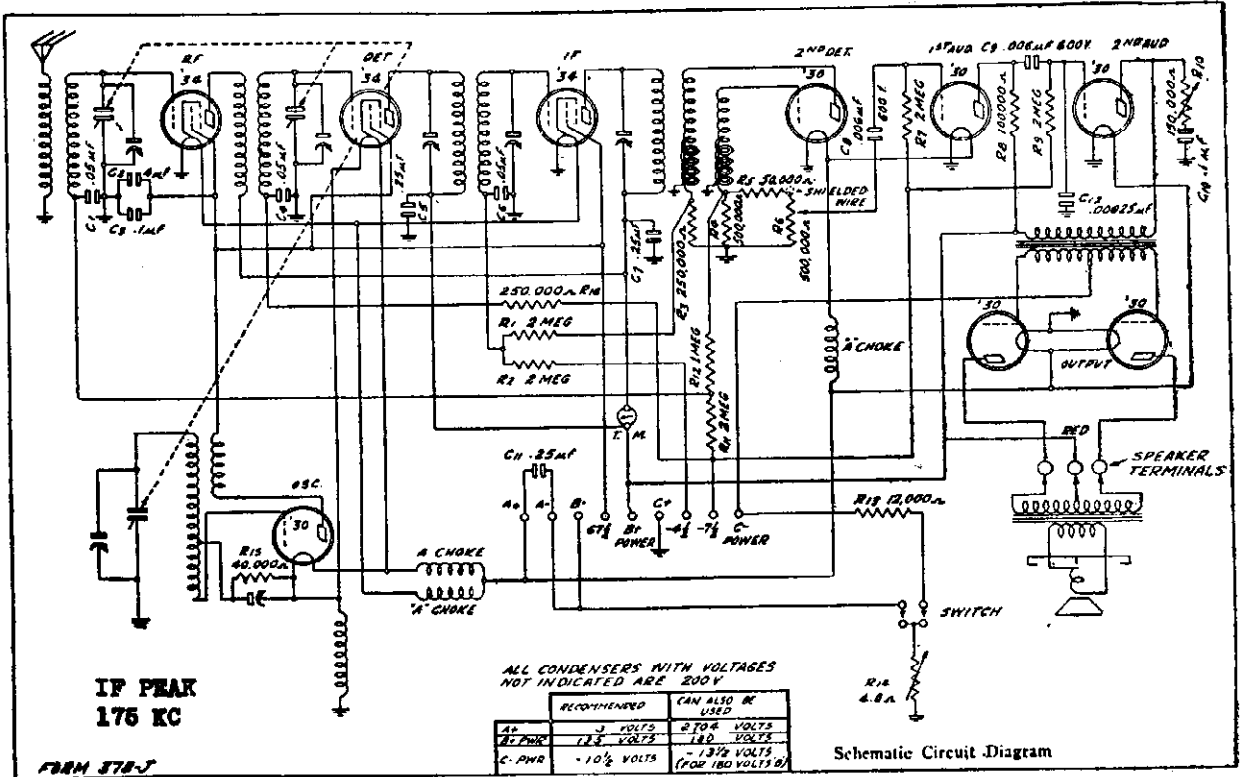
*Less than .1 M.A.

BIAS VOLTAGES

	Volume Control at Maximum	Volume Control at Minimum
R.F. Ampl.	-3 Volt	-11 Volt
Oscillator	0 Volt	0 Volt
1st Det.	-8 Volt	-14 Volt
I.F. Amp.	-3 Volt	-3 Volt
2nd Det.	-8 Volt	-8 Volt
Pentode	-13.5 Volt	-13.5 Volt

GULBRANSEN CO.

MODEL 392
Schematic, Voltage
Socket, Trimmers



Voltages at Sockets

"B" AND "C" BATTERIES UP TO RATED VOLTAGE—FILAMENT CONTROL KNOB SET SO THAT FILAMENT VOLTAGE IS 2—ANTENNA LEAD SHORTENED TO GROUND—VOLTAGES READ FROM NEGATIVE FILAMENT LEG

Type of Tube	Function	Across Filament	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
'34	R.F.	2.0	125	65	2.88 ⁽¹⁾	2.3
'34	1st Det.	2.0	130	65	7.5 ⁽¹⁾	1.4
'30	Osc.	2.0	67		4.15 ⁽²⁾	1.6-4 ⁽²⁾
'34	I.F.	2.0	120	65	2.38 ⁽¹⁾	2.4
'30	2nd Det.	2.0	0		0	0
'30	1st Audio	2.0	85		7.5 ⁽¹⁾	.5
'30	Driver	2.0	125		7.5 ⁽¹⁾	4.0
'30	Output	2.0	130		10.	1.1

(1) Computed figure—cannot be read with ordinary voltmeter because of high resistance in this circuit. See article "Voltages" for further information
 (2) Subject to variation with dial setting.

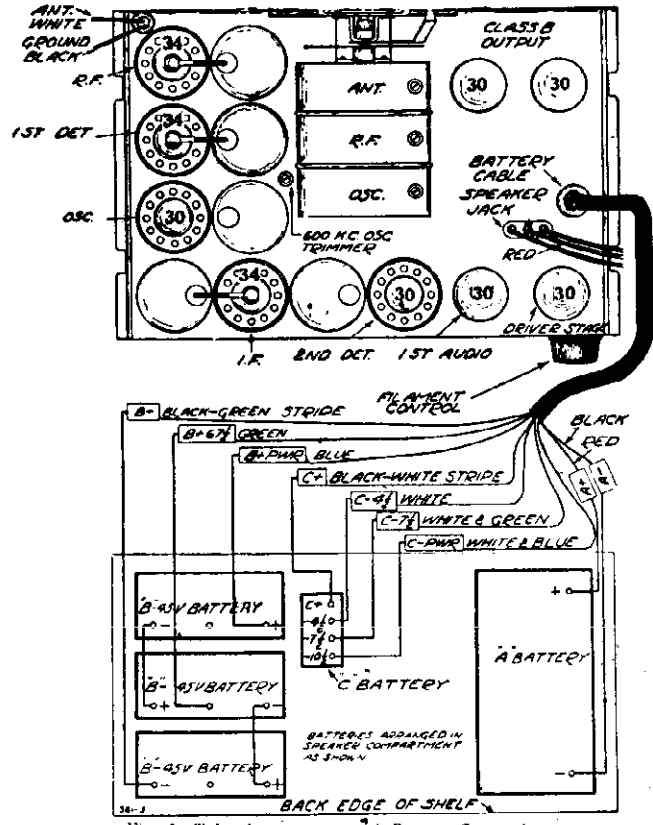
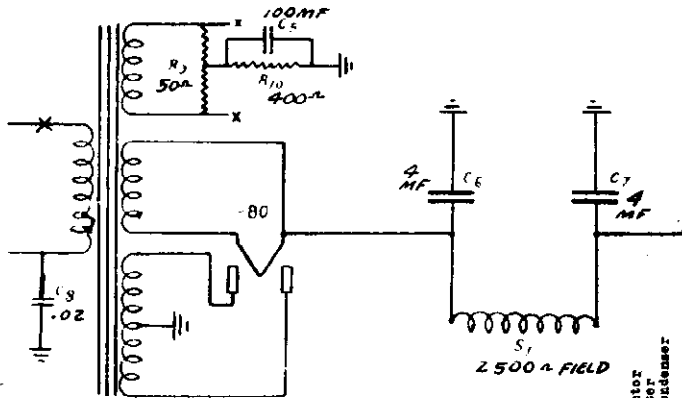
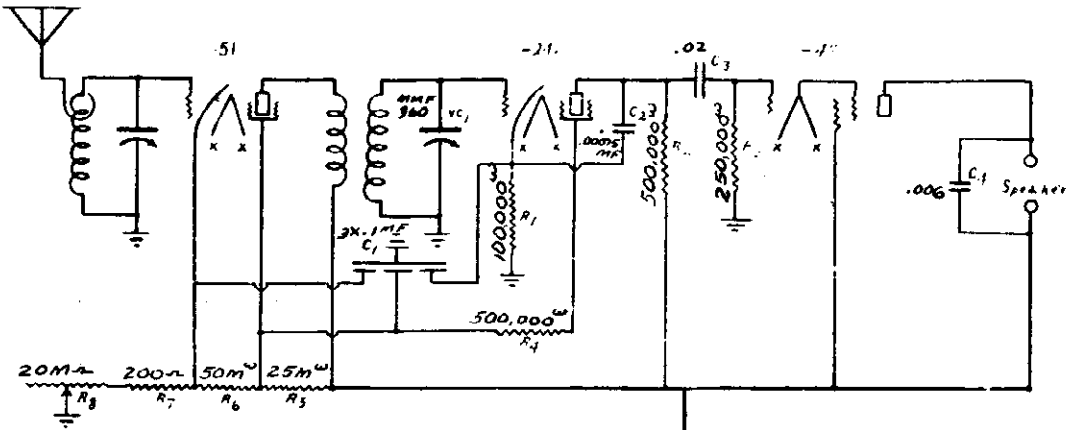


Fig. 2—Tube Arrangement and Battery Connections

MODEL 4-Tube Pentode
Schematic
MODEL Sky Hawk Patrician
Schematic, Parts

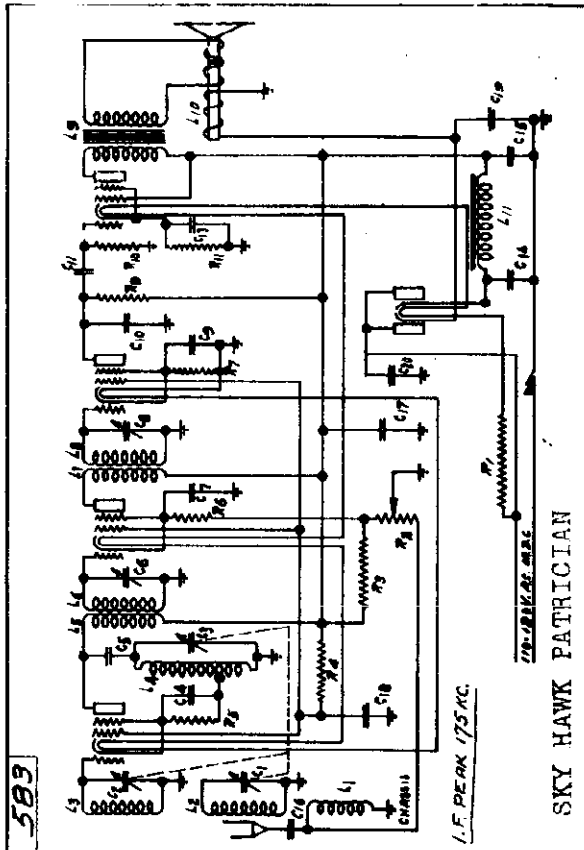
HIGH FREQUENCY LABORATORIES
REPUBLIC INDUSTRIES



Drawn By
J.M.
6-11-31

Released By


#167
FIRST SERIES
4-Tube Pentode
High Frequency Lab
Chicago

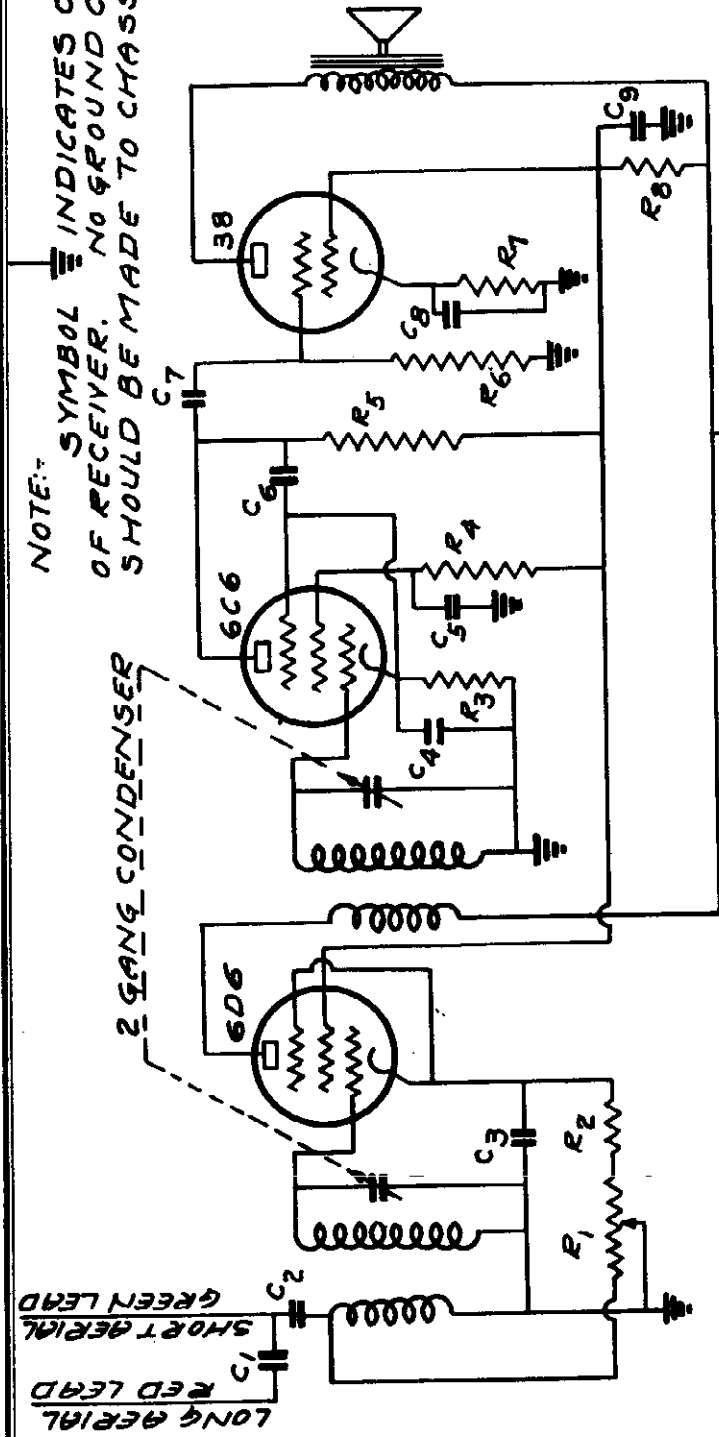


Code	Part No.	Description	Code	Part No.	Description
R1	170	Ohm Resistor	C10	205	.001 MFD. Second Detector Plate R.F. Filter
R2	10,000	Ohm Volume Control and Cathode Resistor	C11	269	.01 MFD. Audio Feed Condenser
R3	75,000	Ohm Resistor I.F. Cathode Resistor	C12	225	25 MFD. C. Bias By-pass Condenser
R4	40,000	Ohm Resistor Screen Resistor	C13	965	12 MFD. Voltage Filter Condenser
R5	5,000	Ohm Resistor First Detector & Oscillator Cathode Resistor	C14	965	4 MFD. Voltage Filter Condenser
R6	500	Ohm Resistor I.F. Cathode Resistor	C15	265	.001 MFD. Antenna Series Condenser
R7	20,000	Ohm Resistor Second Detector Cathode	C16	267	.5 B Supply By-pass Condenser
R8	250,000	Ohm Resistor Second Detector Plate Load	C17	272	.1 500 Volt Screen By-pass Condenser
R9	500,000	Ohm Resistor Output Load	C18	965	4 MFD. Voltage Filter Condenser
R10	500	Ohm Resistor 45 Bias Resistor	C19	272	.1 MFD. 200 Volt Line By-pass Condenser
R11	500	Ohm Resistor 45 Bias Resistor	C20	272	.1 MFD. 200 Volt Line By-pass Condenser
C1	368	MFD. Preslector Section of Variable Condenser	L1	647	Preslector Primary 178 Turns #56 S.S.E. U.S.
C2	365	MFD. Preslector Section of Variable Condenser	L2	647	Preslector First Secondary U.S. Turns #56 S.S.E. U.S.
C3	350	MFD. Oscillator Section of Variable Condenser	L3	647	Preslector Second Secondary U.S. Turns #56 S.S.E. U.S.
C4	265	.001 MFD. First Detector Cathode Resistor	L4	956	Oscillator Coil 88 Turns Tap-16 Turns #56 S.S.E. U.S.
C5	265	.001 MFD. Oscillator Cathode Resistor	L5	956	First I.F. Primary 650 Turns #56 S.S.E. U.S.
C6	265	.001 MFD. Oscillator Cathode Resistor	L6	956	Second I.F. Primary 650 Turns #56 S.S.E. U.S.
C7	265	.001 MFD. Oscillator Cathode Resistor	L7	957	Second I.F. Secondary 650 Turns #56 S.S.E. U.S.
C8	265	.001 MFD. Oscillator Cathode Resistor	L8	957	Second I.F. Secondary 650 Turns #56 S.S.E. U.S.
C9	265	.001 MFD. Oscillator Cathode Resistor	L9	917	Single #45 Output Transformer 3,000 Ohm Speaker Field
			L10	940	32 Henry Choke
			L11	940	32 Henry Choke

HUDSON-ROSS, INC.

MODEL Legion
Schematic

NOTE: SYMBOL  INDICATES CHASSIS OF RECEIVER. NO GROUND CONNECTION SHOULD BE MADE TO CHASSIS.



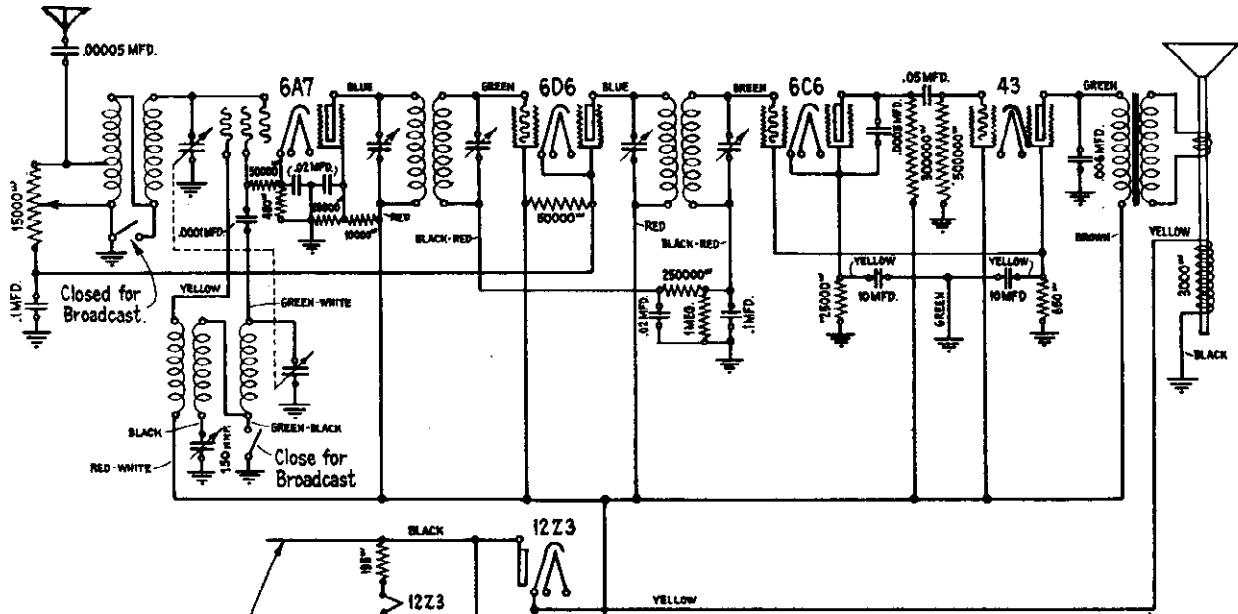
- R1 — 300 M OHM VOLUME CONTROL
- R2 — 250 OHM FIXED IN VOLUME CONTROL
- R3 — 15 M OHM RESISTOR
- R4 — 1 MEG.
- R5 — 500 M.
- R6 — 1 MEG.
- R7 — 1500
- R8 — 15 M
- R9 — 280 OHM RESISTANCE IN LINE CORD.

- C1 — 75 MMFD. CONDENSER
- C2 — .01 MFD. CONDENSER
- C3 — .1
- C4 — 10.
- C5 — .1
- C6 — .0005
- C7 — .01
- C8 — .1
- C9 — .8.
- C10 — .1
- C11 — .8.

HUDSON-ROSS INC	
CHICAGO, ILL.	
CIRCUIT DIAGRAM	
MODEL "LEGION"	
DATE	DRAWN
3-1-34	REK
	M
	104

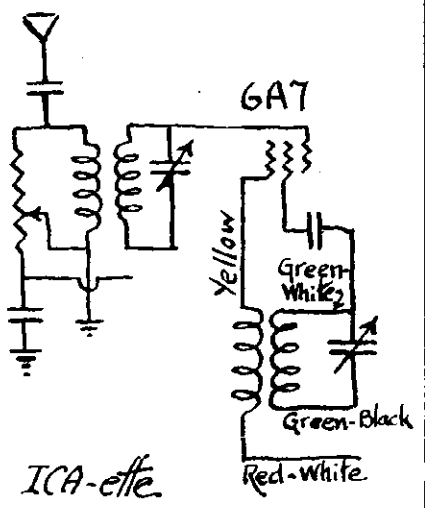
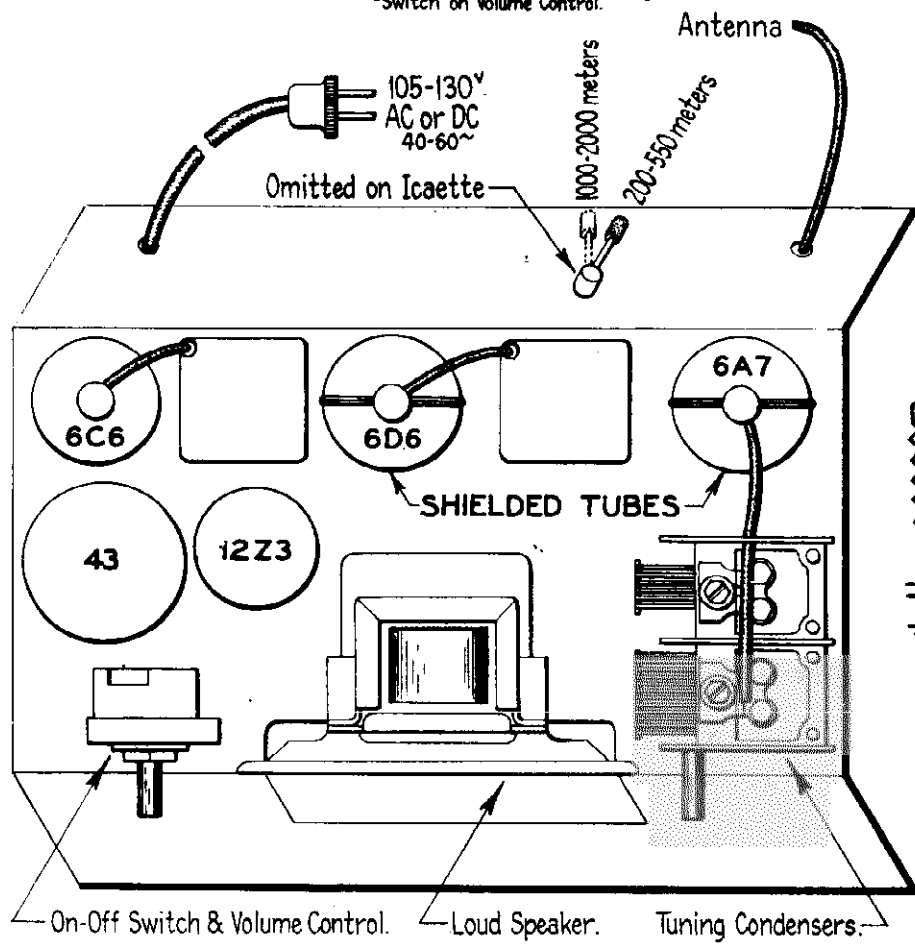
MODEL Envoyette
Schematic, Socket
MODEL ICA-ette
Schematic

INSULINE CORP. OF AMERICA



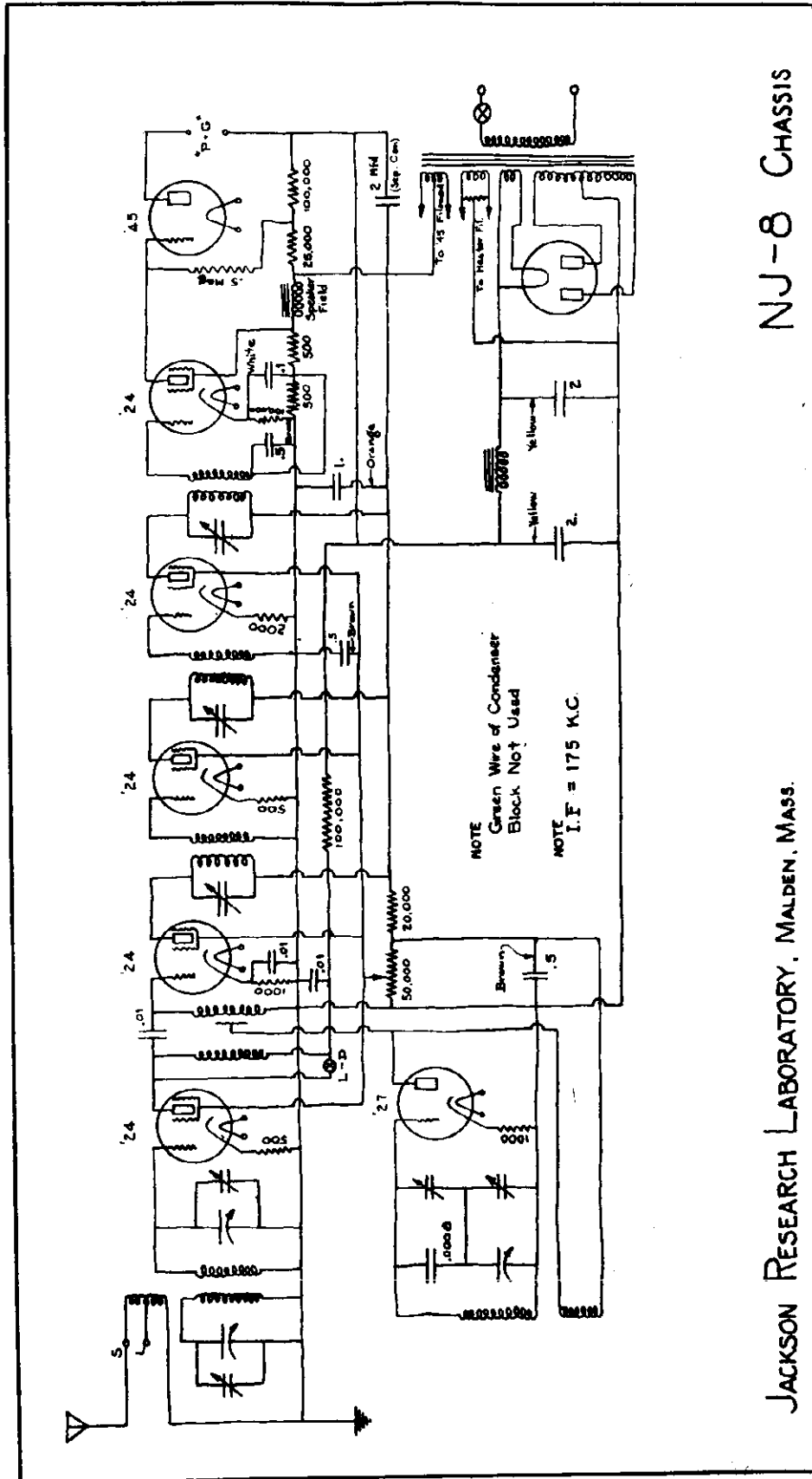
ICA-ENVOYETTE	
AC or DC Receiver	
Date 6/15/34	Wave length Range 200-2000
Drawn L.N.K.	
Checked J.S.	
Designed J.S.	Chassis Dimen. 9 1/2 x 5 x 6"
Approved J.S.	Chassis Weight 5 1/2 lbs.
INSULINE CORP. OF AMERICA	
25-26 Park Place, New York, N.Y., U.S.A.	

ICA-ette Broadcast Receiver same as above, with change shown below,



JACKSON RESEARCH LAB.

MODEL NJ-8
Schematic

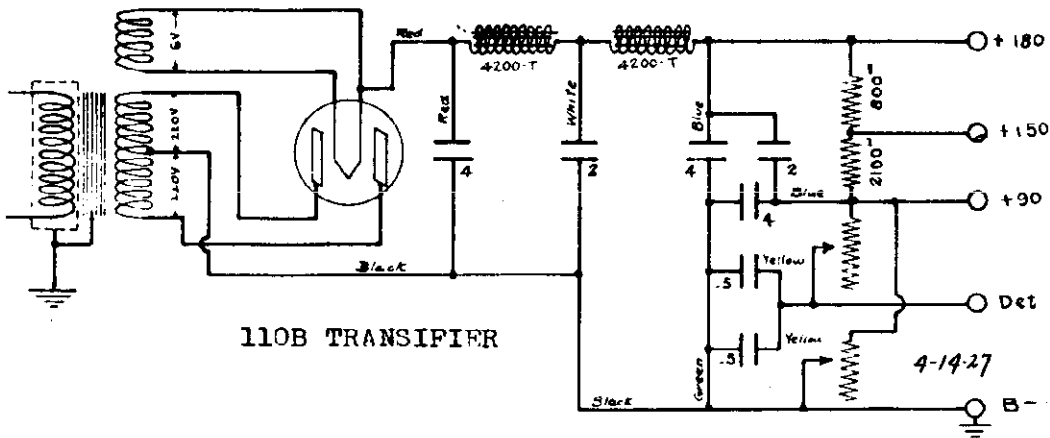
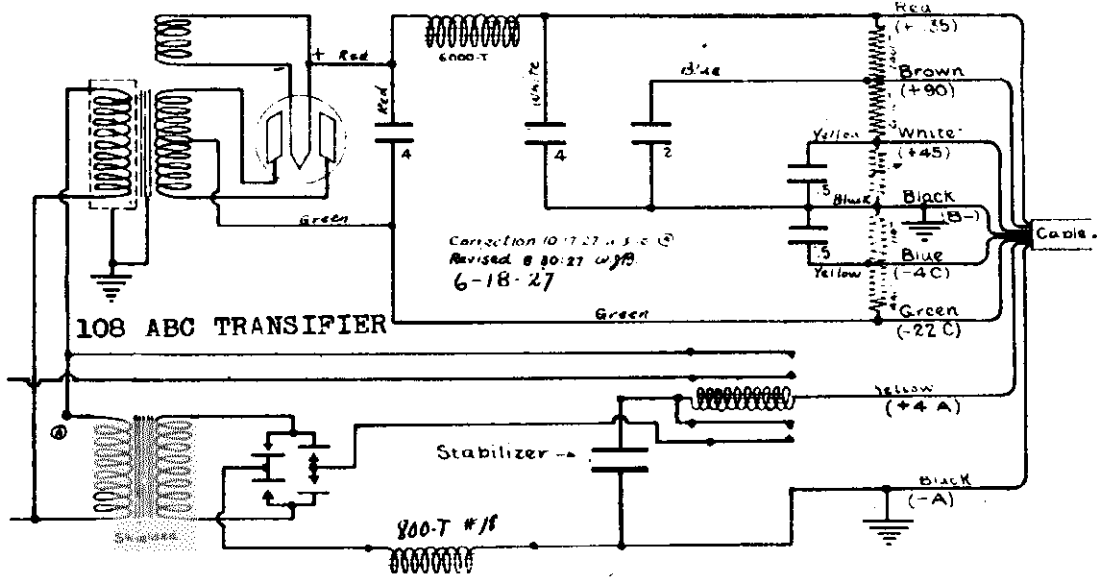
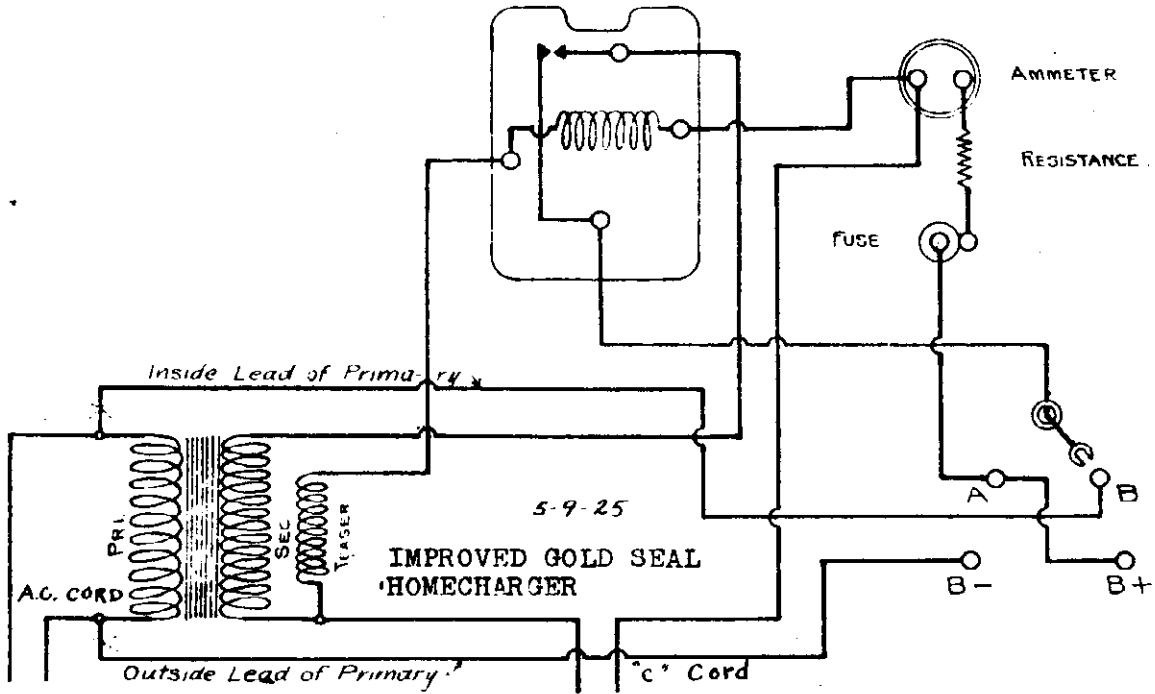


NJ-8 CHASSIS

JACKSON RESEARCH LABORATORY, MALDEN, MASS.

MODEL Improved Gold Seal
 MODEL 108 ABC Transifier
 MODEL 110B Transifier
 Schematics

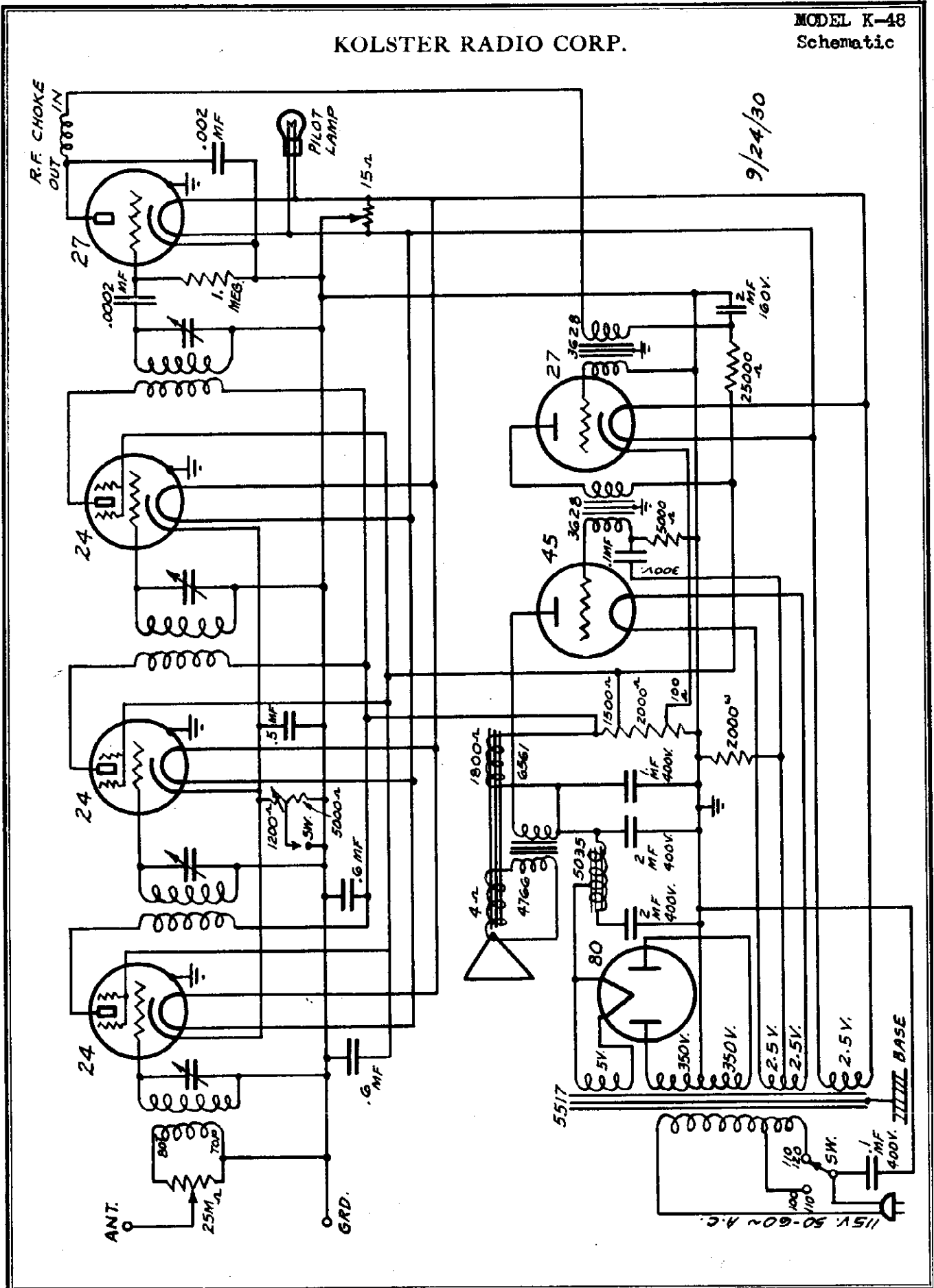
KODEL RADIO CORP.



KOLSTER RADIO CORP.

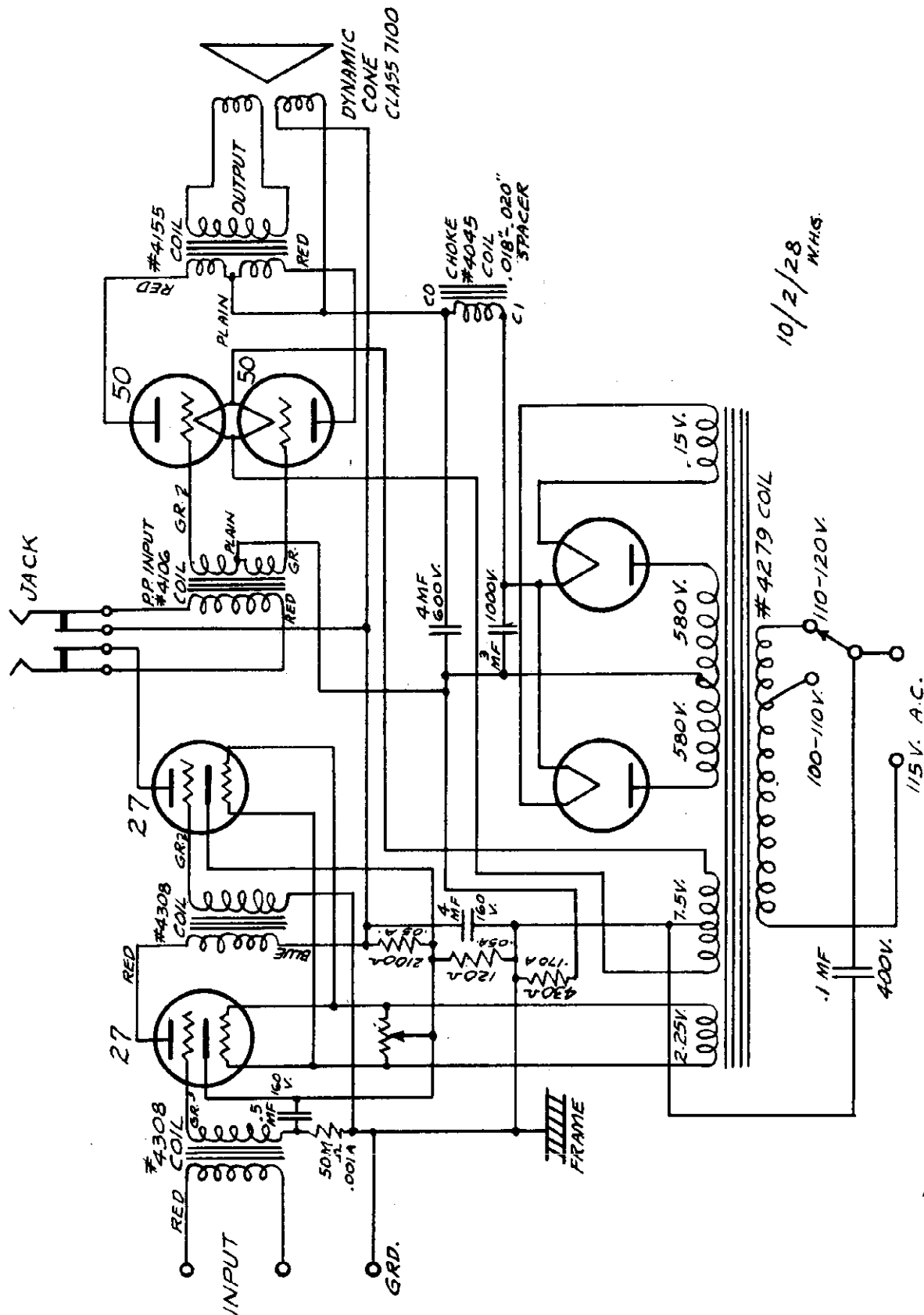
MODEL K-48
Schematic

9/24/30



MODEL Power Amplifier
Schematic

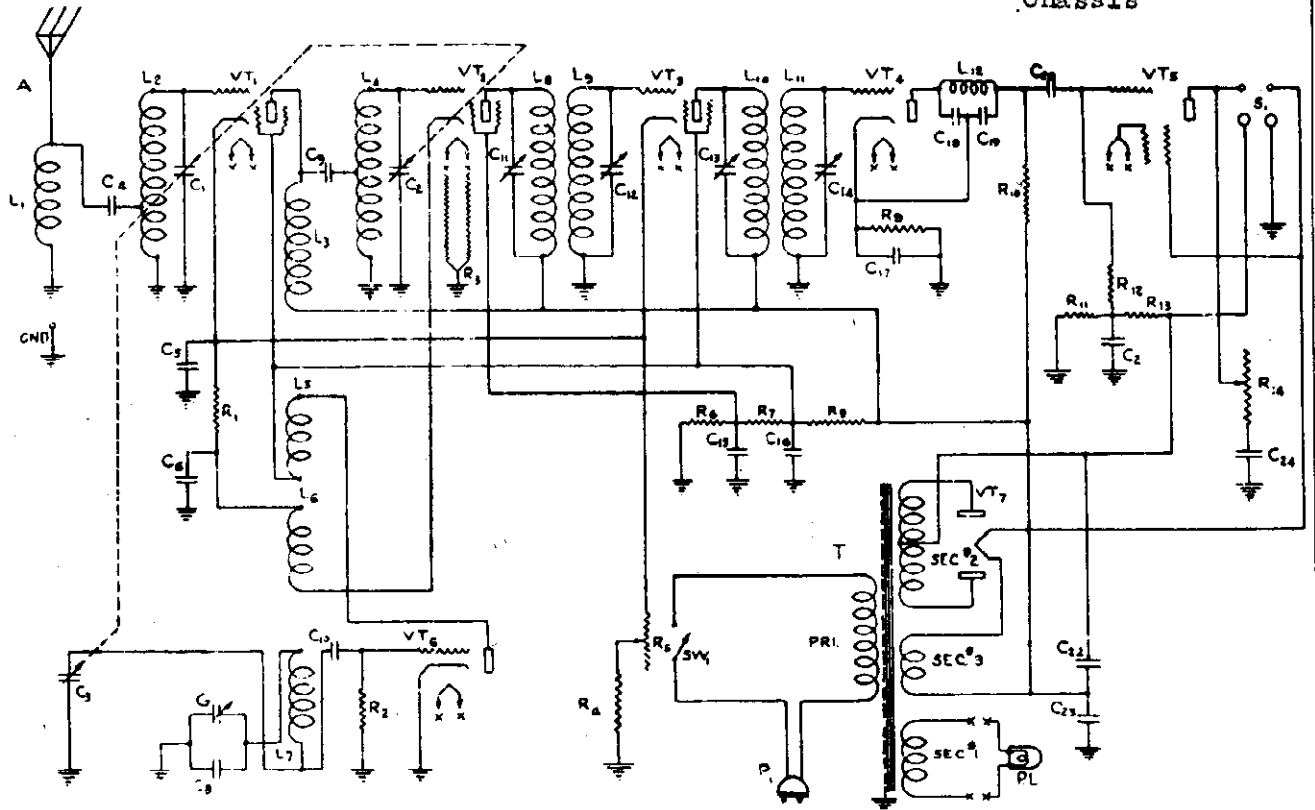
KOLSTER RADIO CORP.



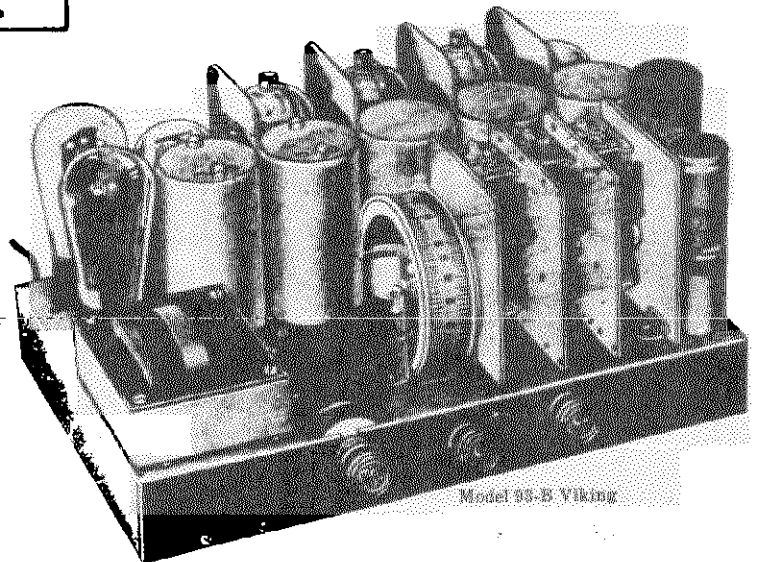
10/2/28
N.H.S.

KROHLER MFG. CO.

MODEL 93-B Viking
Schematic, Voltage
Chassis

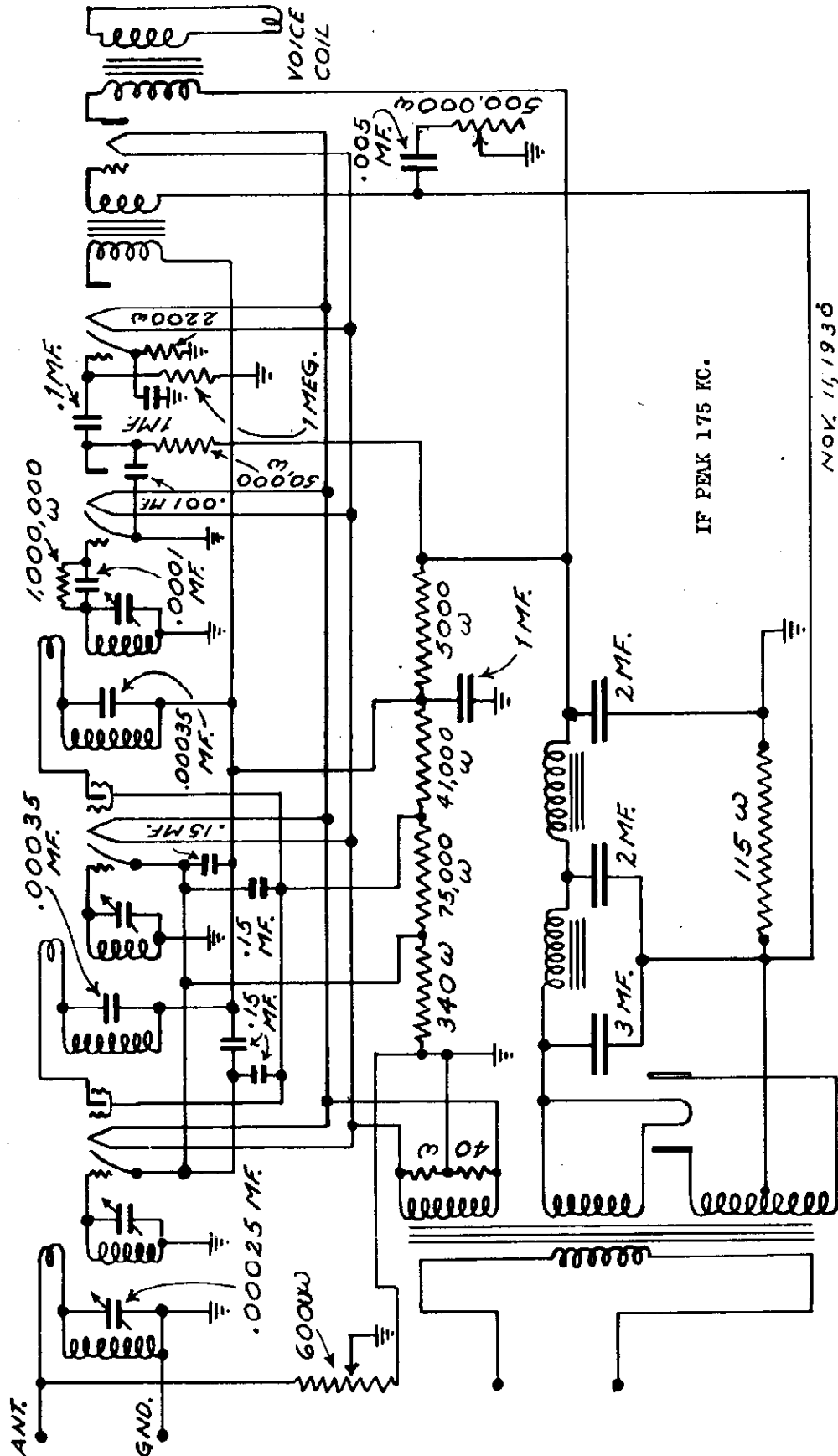


MODEL 93-B				
Tube	Type	Plate	S. Grid	Cath.
Osc.	'27	80	--	--
R.F.	'35	190	85	1.5
Det.	'35	190	45	2.
I.F.	'35	190	85	1.5
Det.	'27	125	--	12.
Pwr.	'47	175	190	
Rect.	'80			
Vol.-Max.		Volts To Ground.		



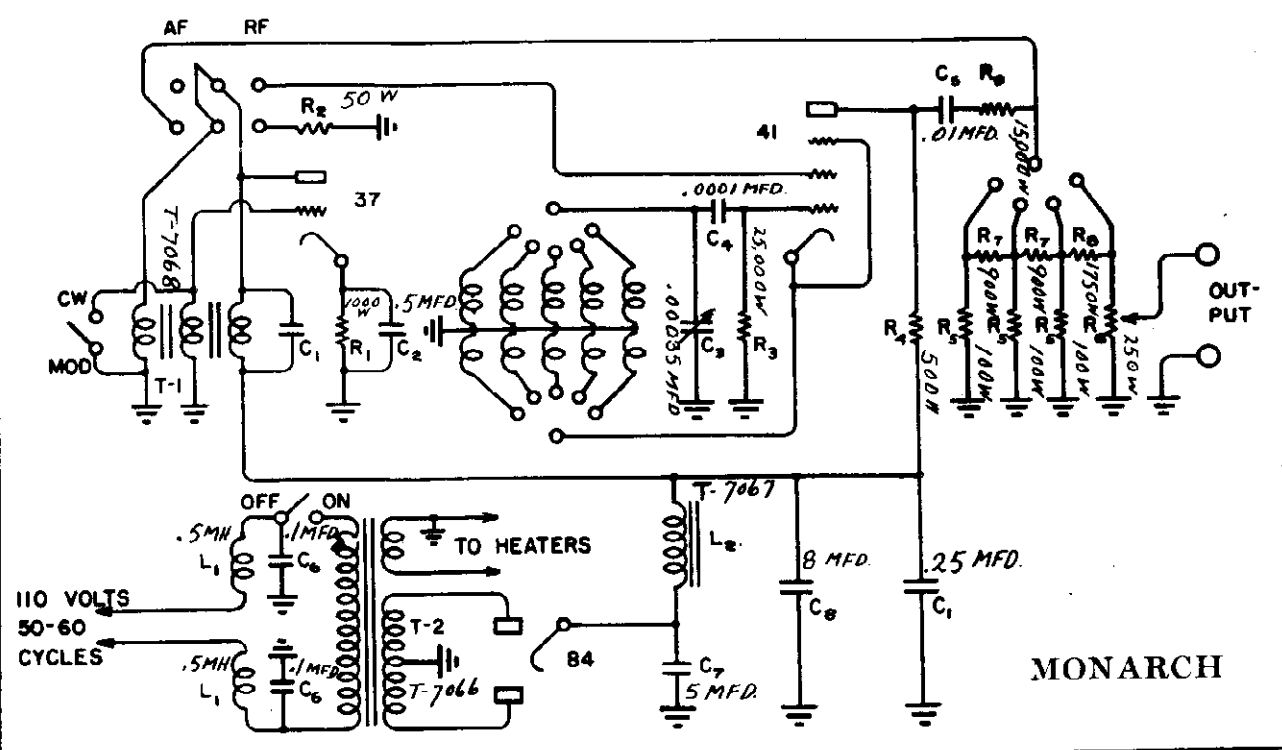
MODEL 84
Schematic

LARKIN CO., INC.



MONARCH MFG. CO. MODEL A-W. Signal Generator
 MODEL 10, 32-Volt Converter
 ELECTRONIC LABS. Schematics

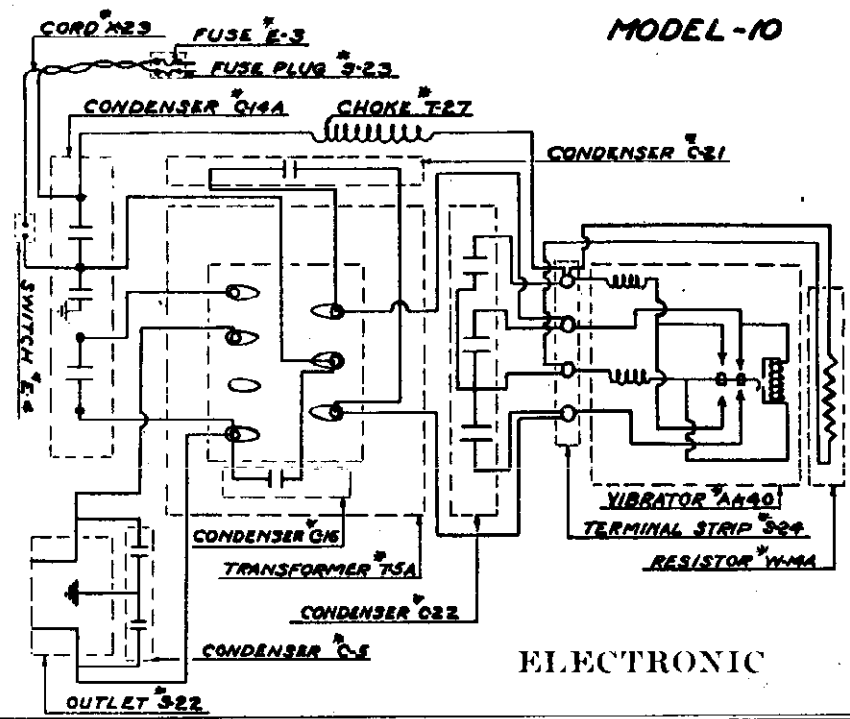
ALL-WAVE STANDARD SIGNAL GENERATOR



MONARCH

SCHEMATIC DIAGRAM

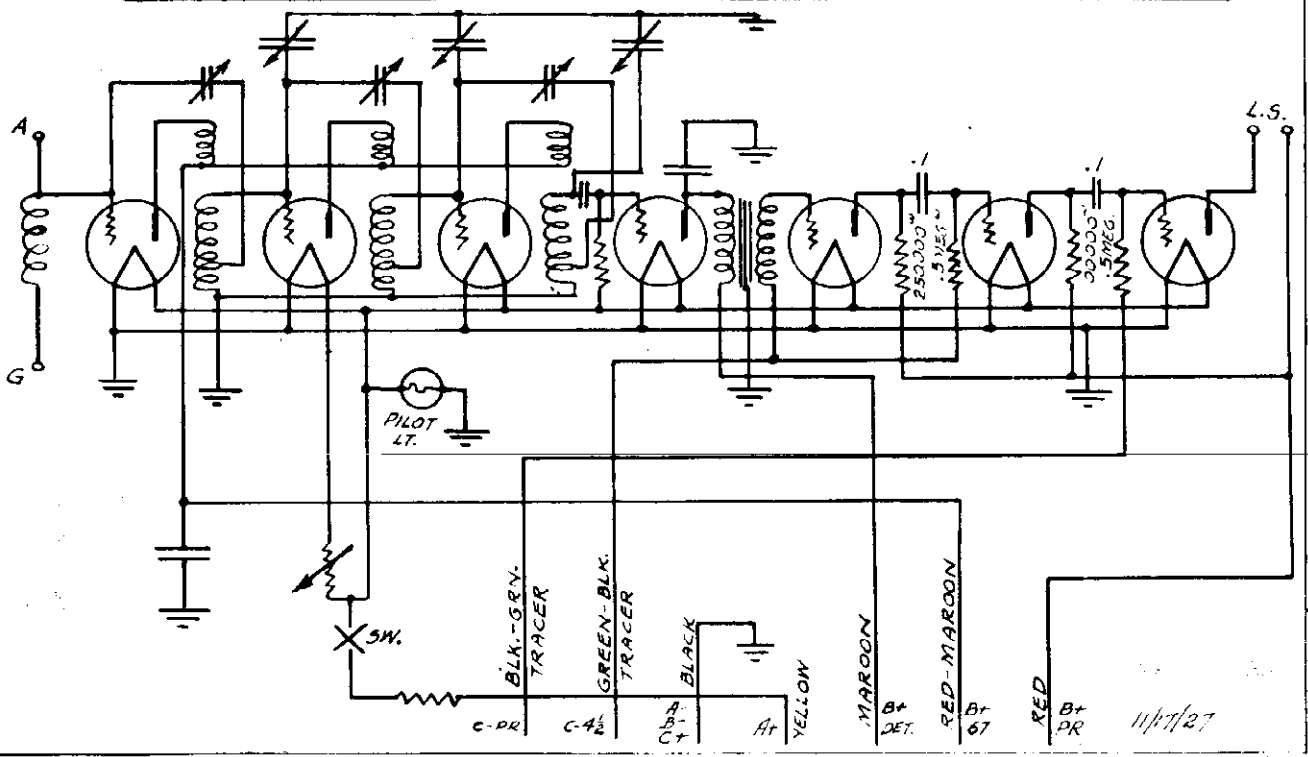
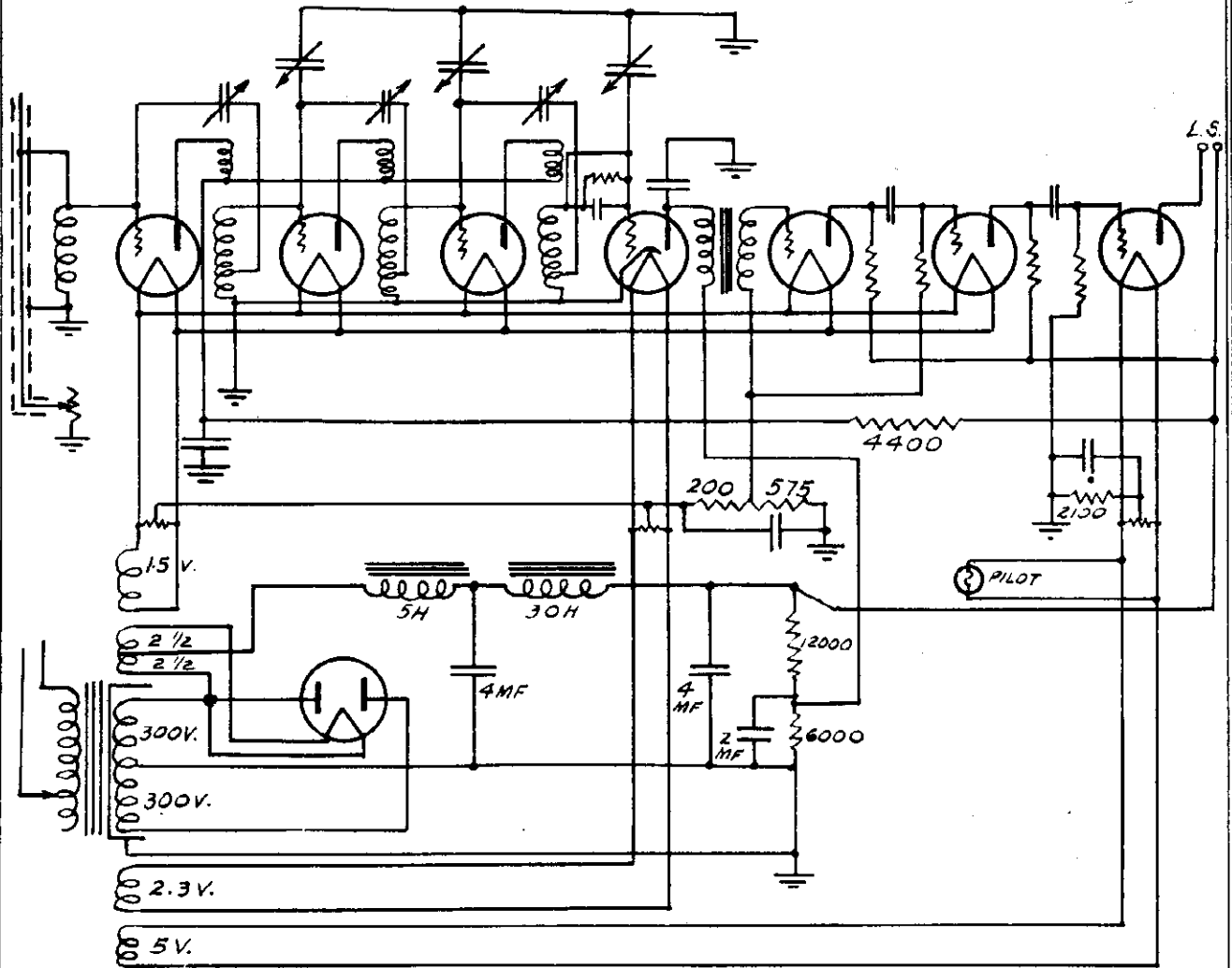
MODEL 10 32 VOLT CONVERTER



ELECTRONIC

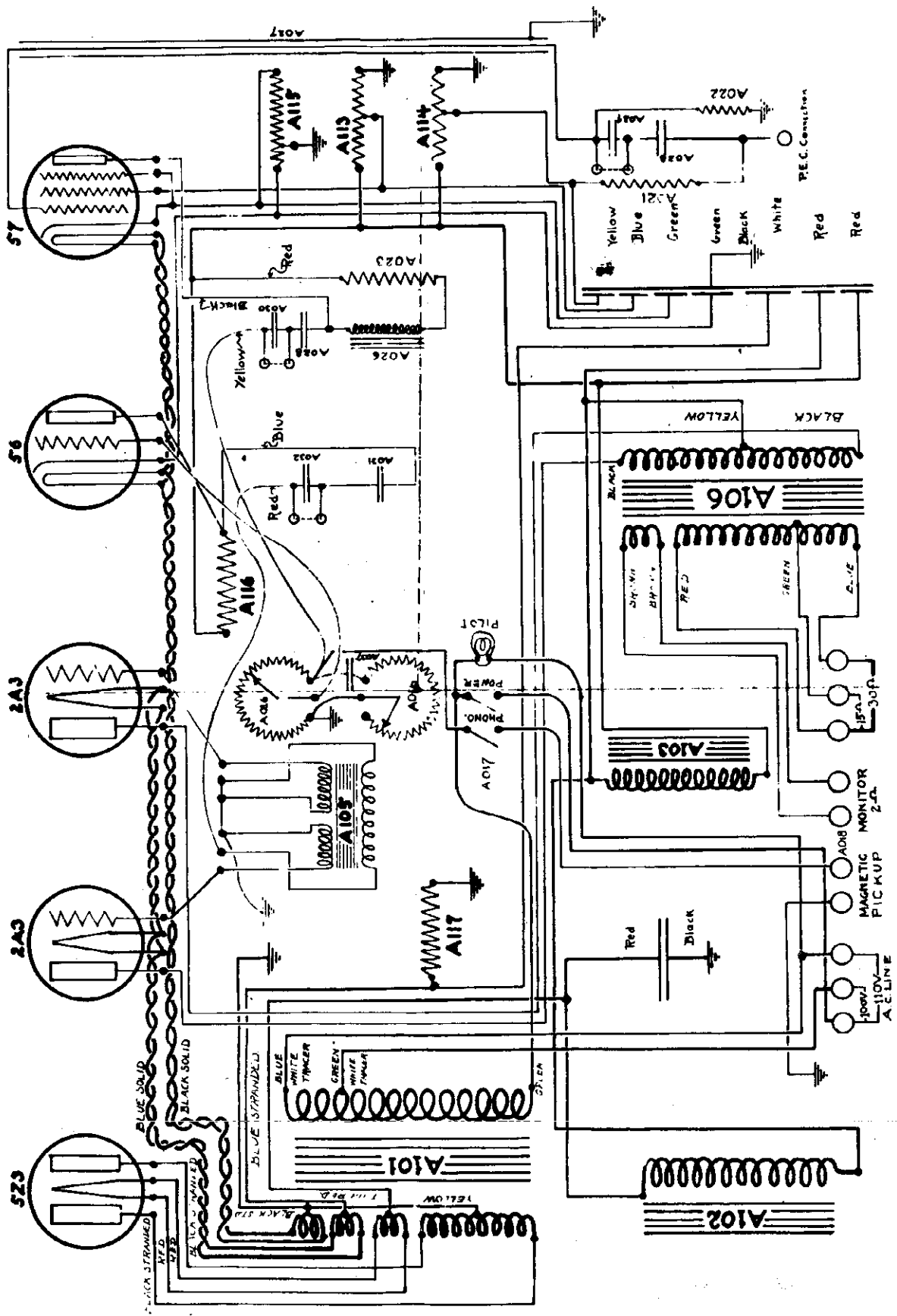
WILLIAM J. MURDOCK CO.

MODEL 8-Tube AC
MODEL 7-Tube Battery
Schematics



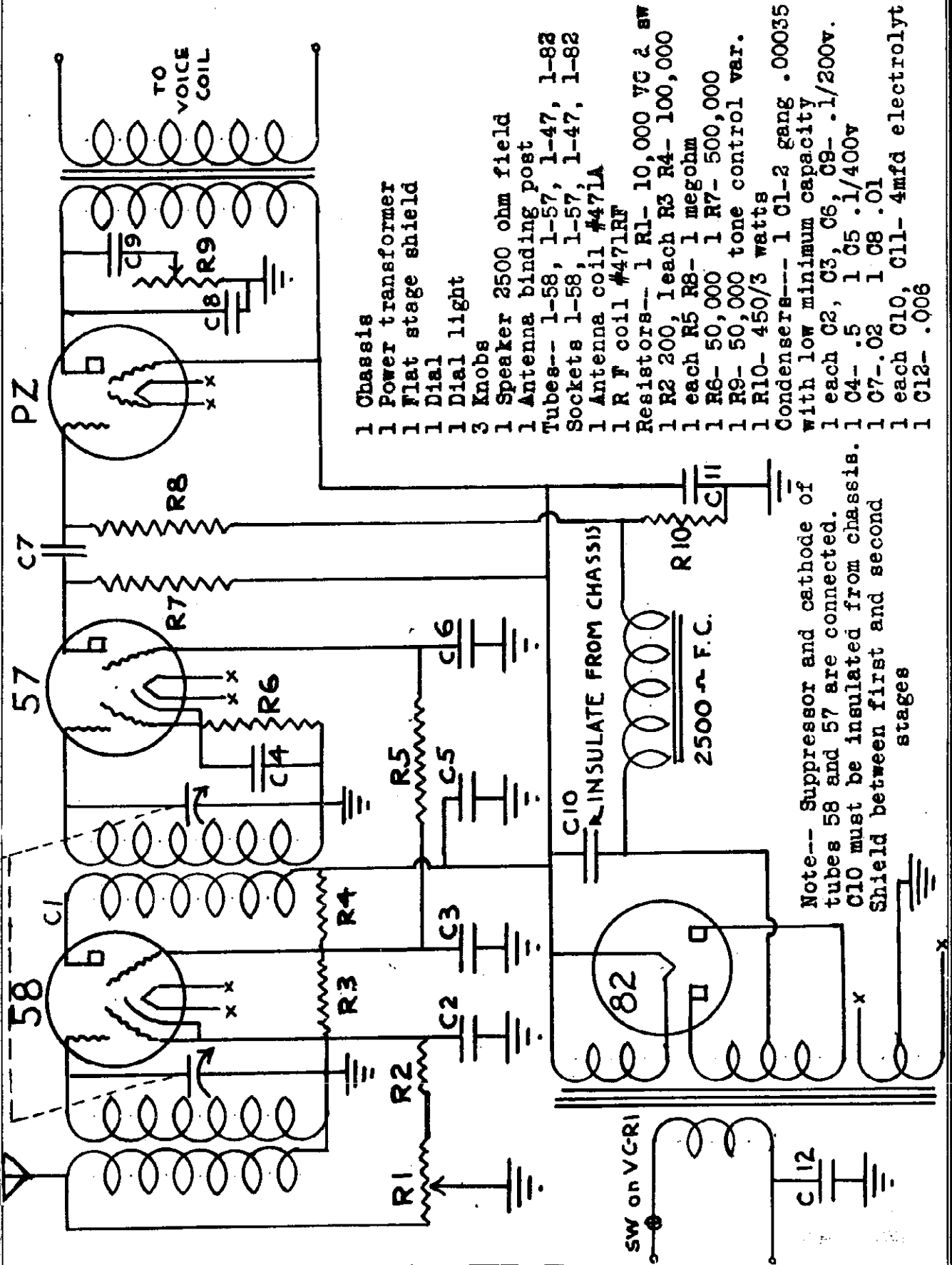
PACENT ELECTRIC CO., INC.

MODEL HFA 112 Amplifier Schematic



MODEL Spero Four Schematic

PACIFIC RADIO EXCHANGE

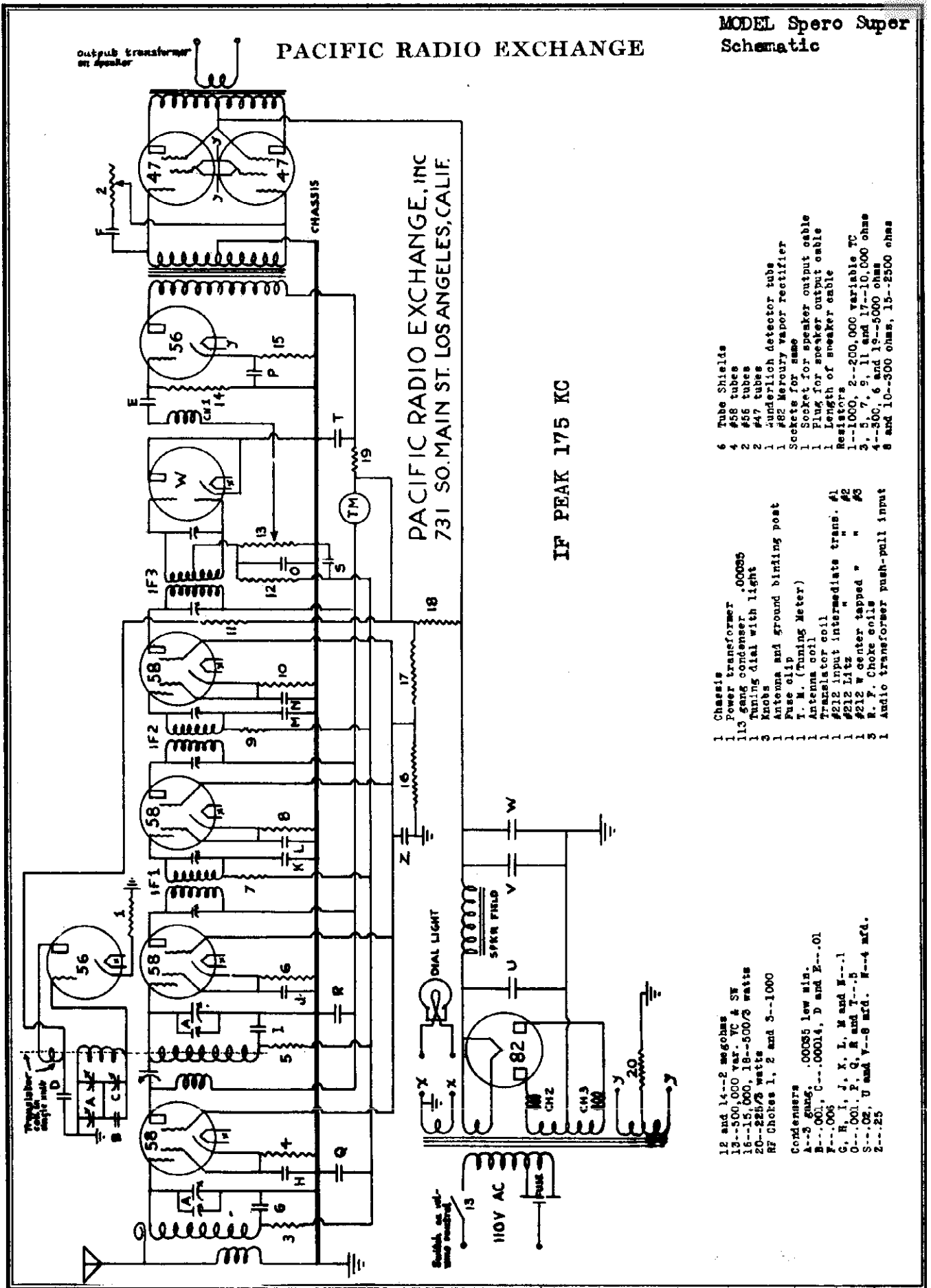


- 1 Chassis
- 1 Power transformer
- 1 Flat stage shield
- 1 Dial light
- 1 Dial light
- 3 Knobs
- 1 Speaker 2500 ohm field
- 1 Antenna binding post
- Tubes-- 1-58, 1-57, 1-47, 1-82
- Sockets 1-58, 1-57, 1-47, 1-82
- 1 Antenna coil #471A
- 1 R F coil #471RF
- Resistors-- 1 R1- 10,000 VC & SW
- 1 R2 200, 1 each R3 R4- 100,000
- 1 each R5 R8- 1 megohm
- 1 R6- 50,000 1 R7- 500,000
- 1 R9- 50,000 tone control var.
- 1 R10- 450/3 watts
- Condensers--- 1 C1-2 gang .00035 with low minimum capacity
- 1 each C2, C3, C6, C9-.1/200v.
- 1 C4-.5 1 C5-.1/400v
- 1 C7-.02 1 C8 .01
- 1 each C10, C11- 4mfd electrolytic
- 1 C12-.006

Note-- Suppressor and cathode of tubes 58 and 57 are connected. C10 must be insulated from chassis. Shield between first and second stages

MODEL Spero Super Schematic

PACIFIC RADIO EXCHANGE



PACIFIC RADIO EXCHANGE, INC.
731 SO. MAIN ST. LOS ANGELES, CALIF.

IF PEAK 175 KC

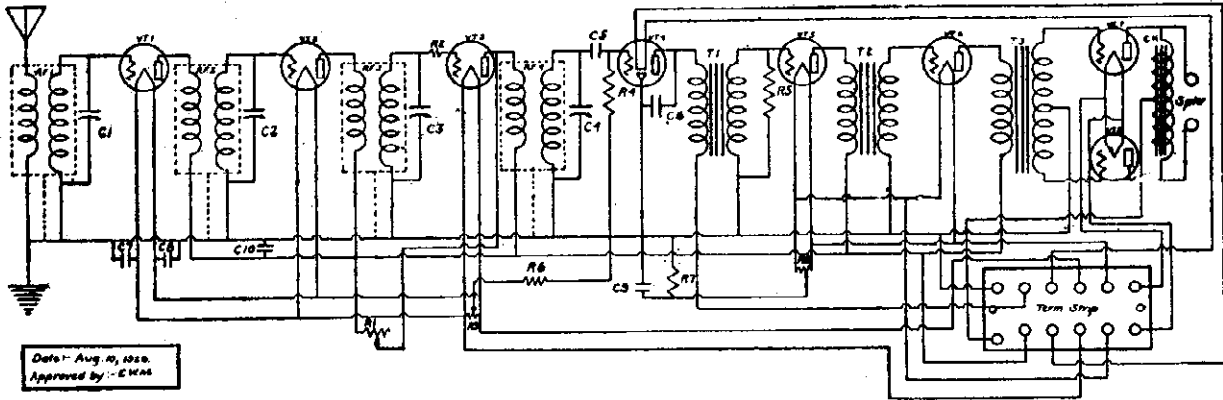
- 1 Chassis
- 1 Power transformer .00055
- 1 113 gang condenser .00055
- 1 Tuning dial with light
- 3 Knobs
- 1 Antenna and ground binding post
- 1 Fuse clip
- 1 T. M. (Tuning Meter)
- 1 Antenna coil
- 1 Translater coil
- 1 #212 input intermediats trans. #1
- 1 #212 11tz " #2
- 1 #212 W center tapped " #3
- 2 R. F. Choke coils
- 1 Audio transformer push-pull input

- 12 and 14--2 megohms
- 13--500,000 var. VC & SW
- 15--15,000, 18--500/3 wats
- 20--225/3 wats
- RF Chokes 1, 2 and 3--1000
- Condensers
- A--3 gang, .00055 low min.
- B--.001, C--.00014, D and E--.01
- F--.005
- G, H, I, J, K, L, M and N--.1
- O--.001, P, Q, R and T--.5
- S--.02, U and V--8 mfd. W--4 mfd.
- Z--.25

MODEL 8 AC

Schematic, Parts

PACKARD RADIO CO.



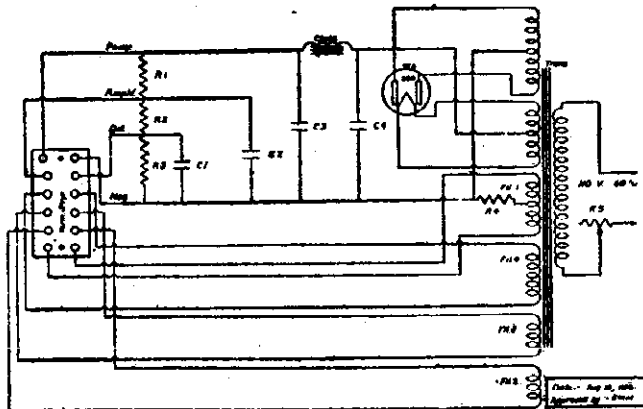
Date: Aug. 11, 1929.
Approved by: E.M.M.

- C1, C2, C3, C4 —Variable tuning condensers.
- RF1, RF2, RF3, RF4—Radio frequency shielded coils (dotted lines indicate shields).
- VT1, VT2, VT3 —Radio frequency amp. tubes of '26 type.
- VT4 —Detector tube of 5-prong '27 type.
- VT5, VT6 —Audio frequency amp. tubes of '26 type.
- VT7, VT8 —Power tubes of '71A type.
- T1, T2 —Audio transformers.
- T3 —Push-pull input transformer.
- Ck —Push-pull output choke.
- C5 —Grid condenser.
- C6 —R. F. by-pass condenser.
- C7, C8 —By-pass condenser.

- C9 —By-pass condenser.
- C10 —By-pass condenser.
- R1 —Volume control.
- R2 —Grid suppressor.
- R3 —Center tapped fixed resistor.
- R4 —Grid leak.
- R5 —Resistor.
- R6 —Biasing resistor.
- R7 —Biasing resistor.
- R8 —Center tapped variable resistor.
- Spkr. —Jacks for speaker cord tips.
- Term. Strip—Terminal strip on cord attached to set by which Pack is connected.

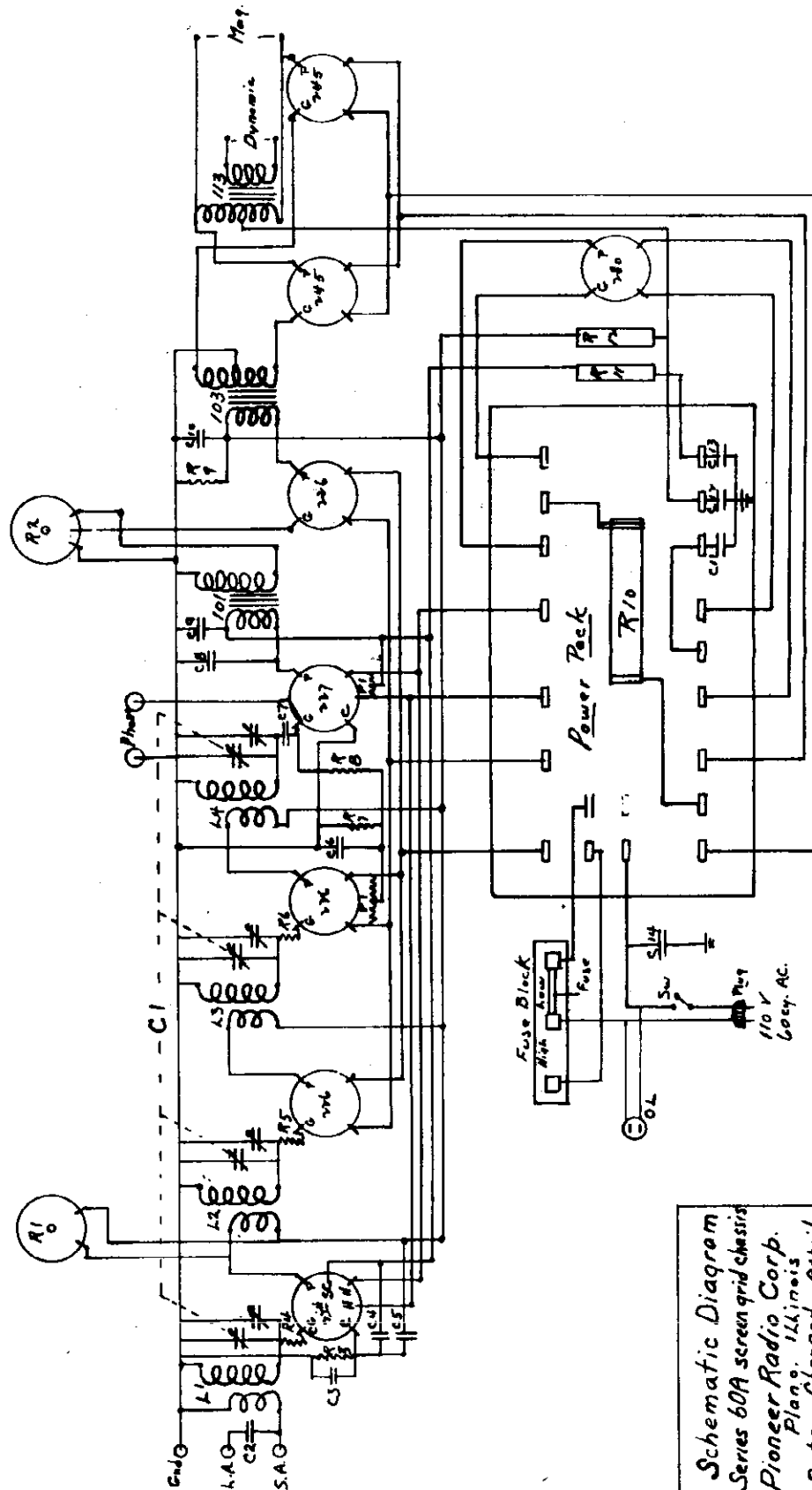
Circuit Diagram of Power Pack

- Choke —Filter choke.
- Trans. —Power transformer.
- VT9 —Full-wave rectifier tube of '80 type.
- C1, C2 —Filter condensers.
- C3 —Filter condensers.
- C4 —Filter condensers.
- R1 —Resistor.
- R2 —Resistor.
- R3 —Resistor.
- R4 —Biasing resistor.
- R5 —Variable resistor for line volt. control.
- Power —Plate voltage for power tubes.
- Amplif. —Plate voltage for audio frequency and radio frequency amp. tubes.
- Det. —Plate voltage for detector tube.
- Neg. —Negative or ground potential terminal of Pack.
- Term. Strip—Terminal strip where Pack is connected to set.
- Fil. 1 —Filament supply for '71 tubes.
- Fil. 2 —Filament supply for audio amp. tubes.
- Fil. 3 —Filament supply for radio amp. tubes.
- Fil. 4 —Filament supply for detector tube.



Date: Aug. 11, 1929.
Approved by: E.M.M.

PIONEER RADIO CORPORATION

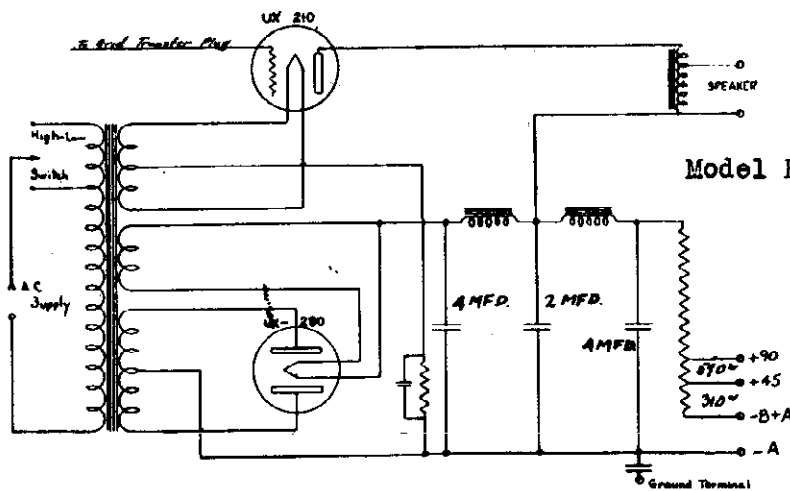
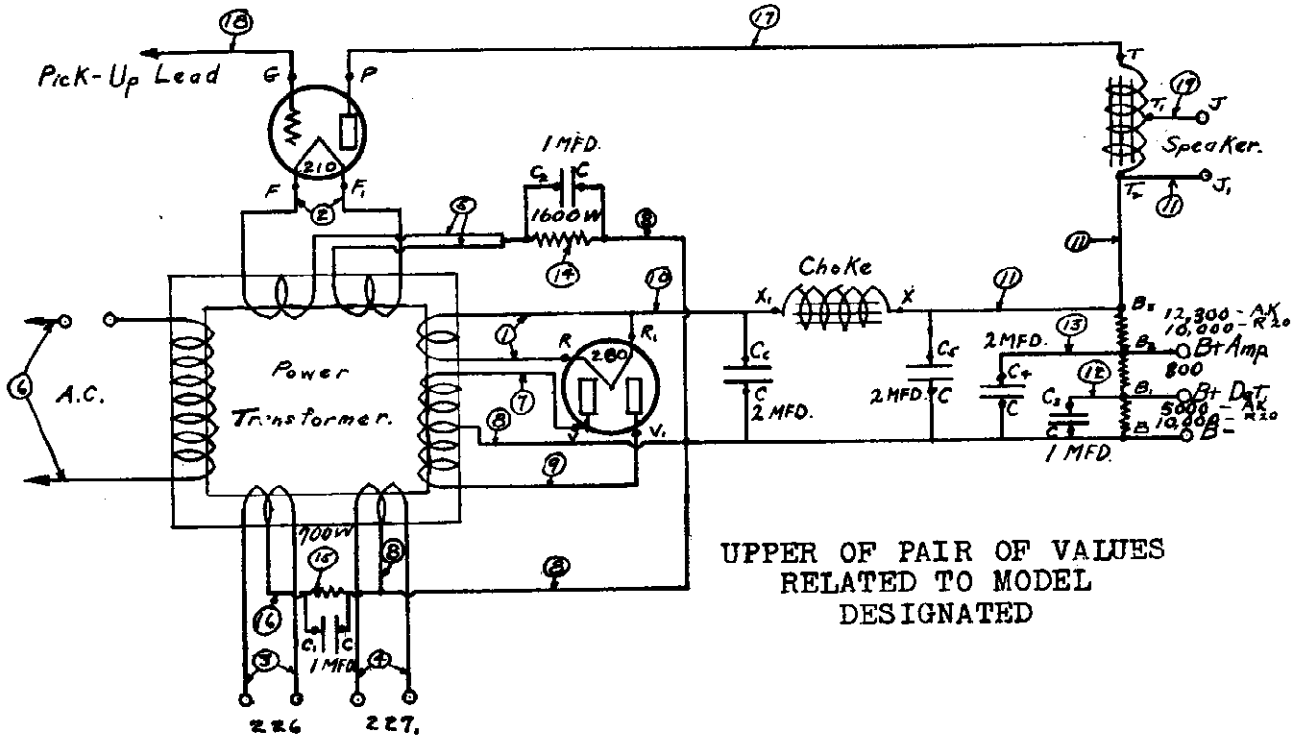


Schematic Diagram
 Series 60A screen grid chassis
 Pioneer Radio Corp.
 Plano, Illinois
 Date Changed April
 7-1-29

MODELS AK, R-20
 MODELS R 25-28
 Schematics

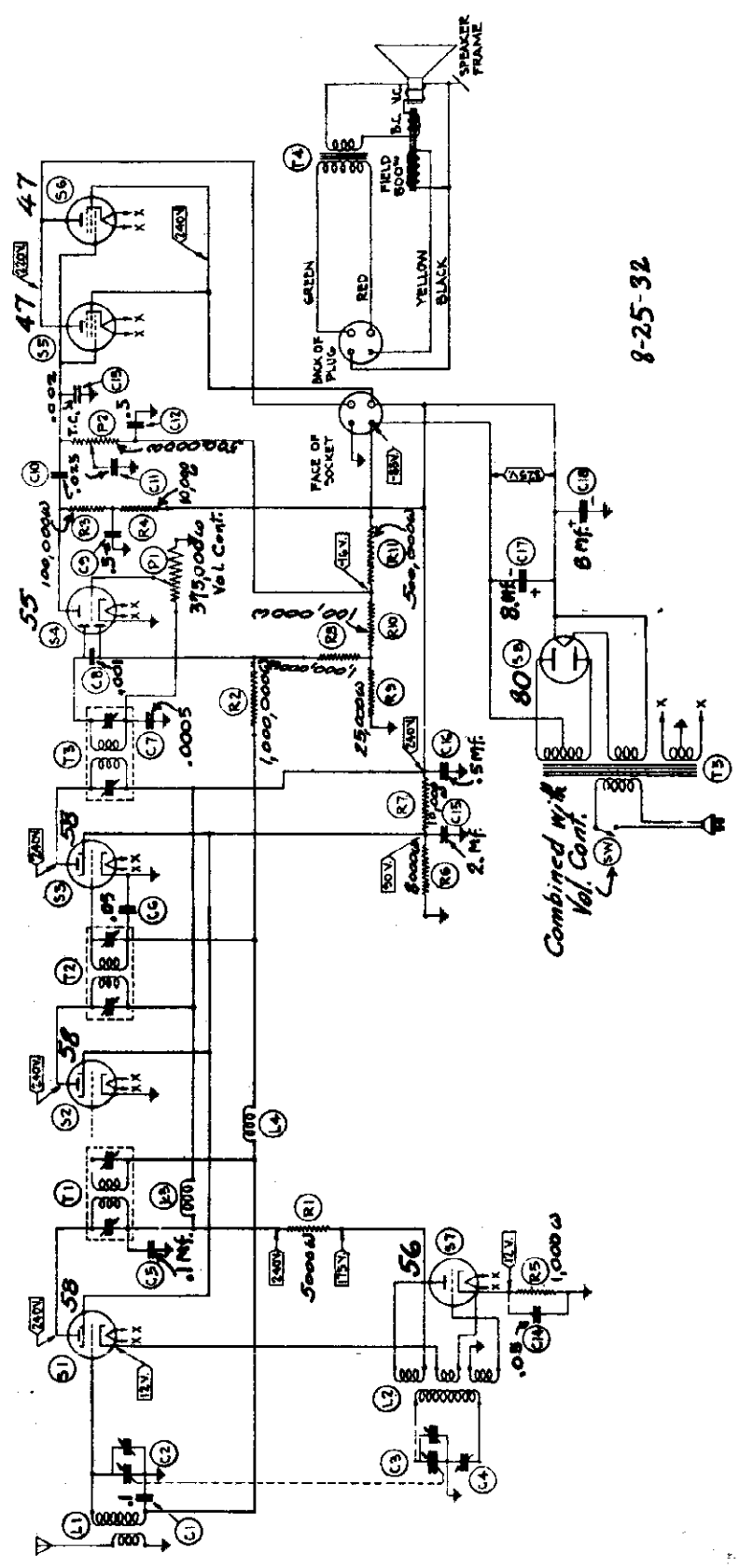
RADIO RECEPTOR CO.

SCHEMATIC DIAGRAM OF POWERIZER



SILVER - MARSHALL, Inc.

MODEL Y Schematic

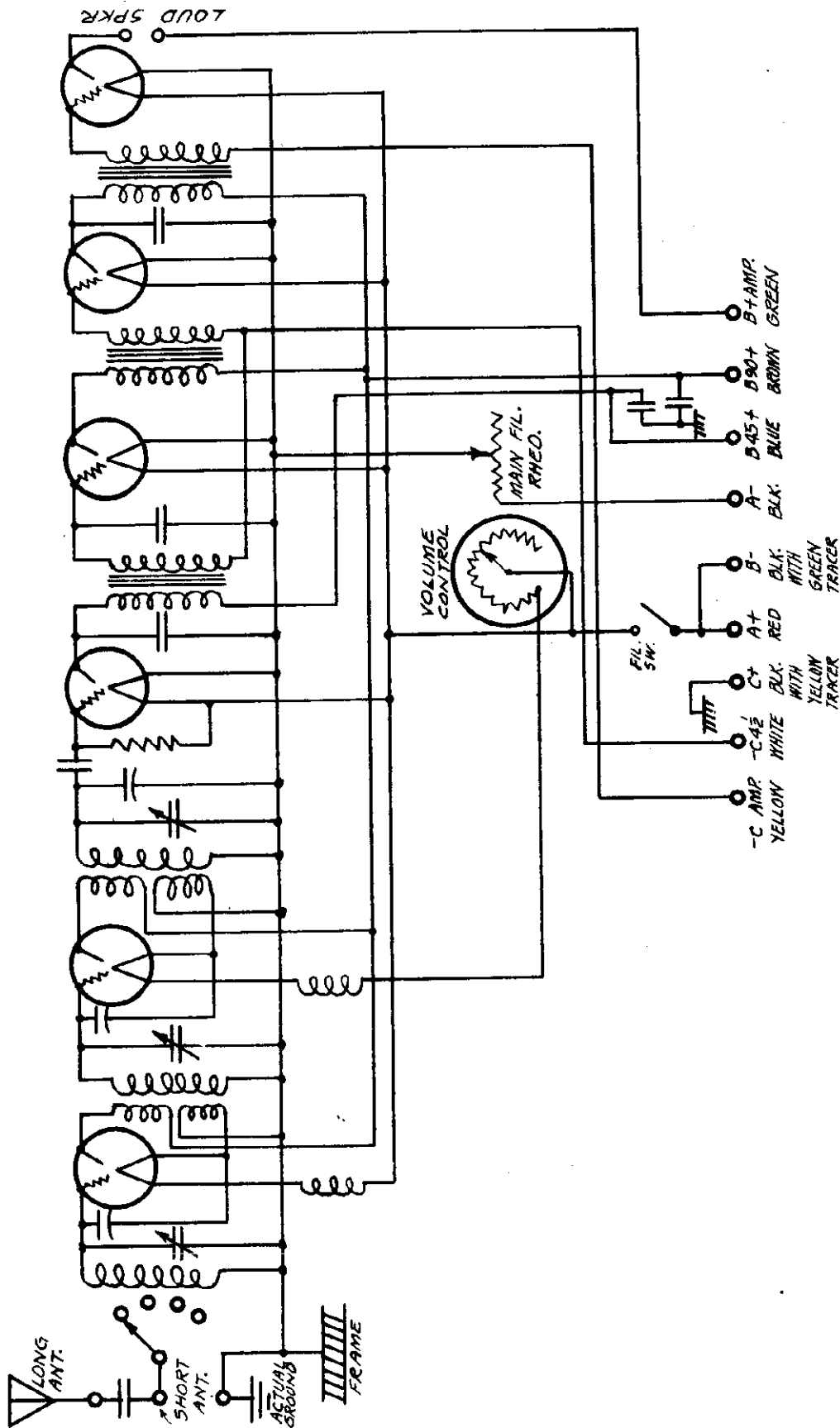


8-25-32

MODEL "Y"
BROADCAST RECEIVER

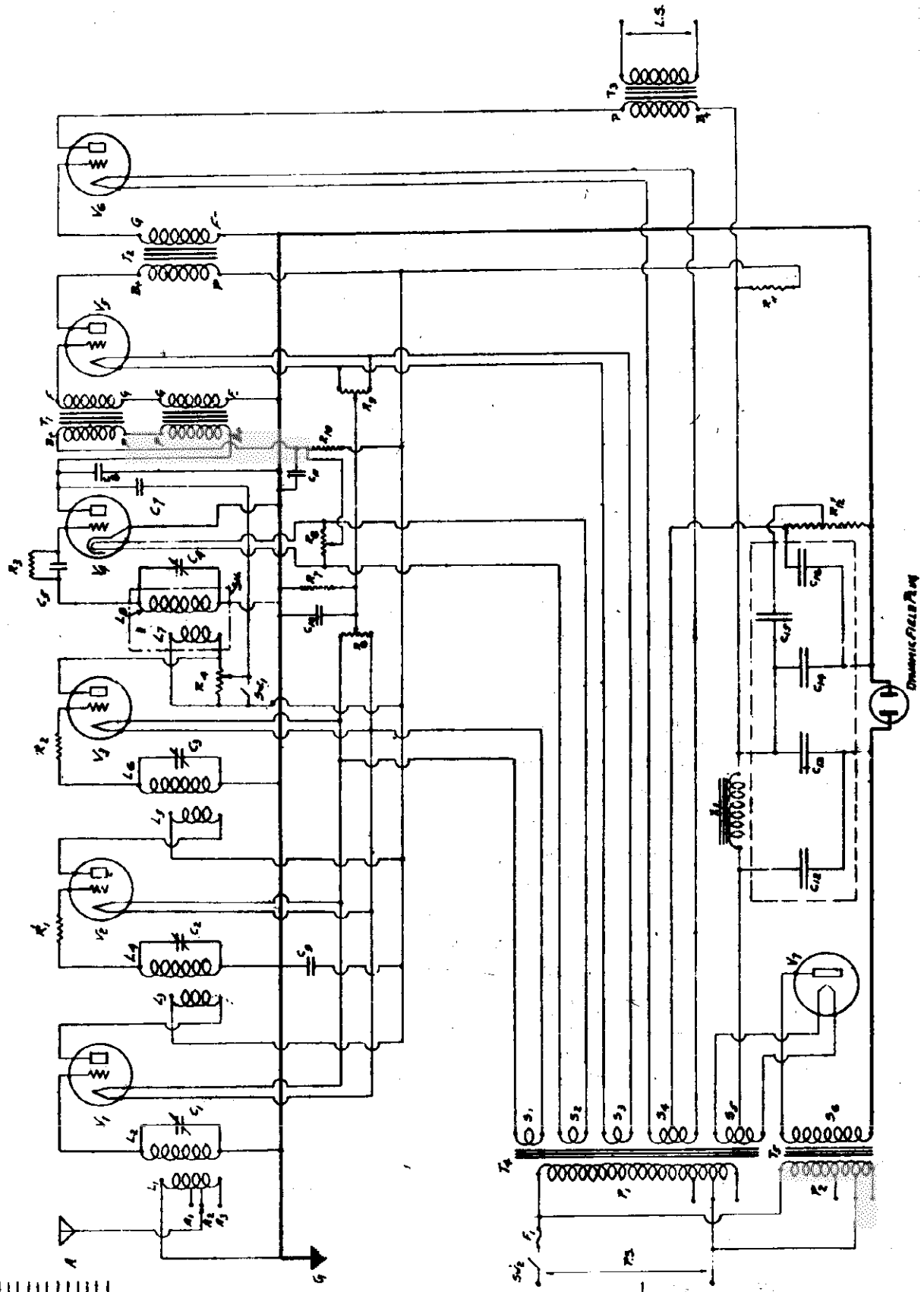
MODEL D
Schematic

SONORA PHONOGRAPH CO. Inc.



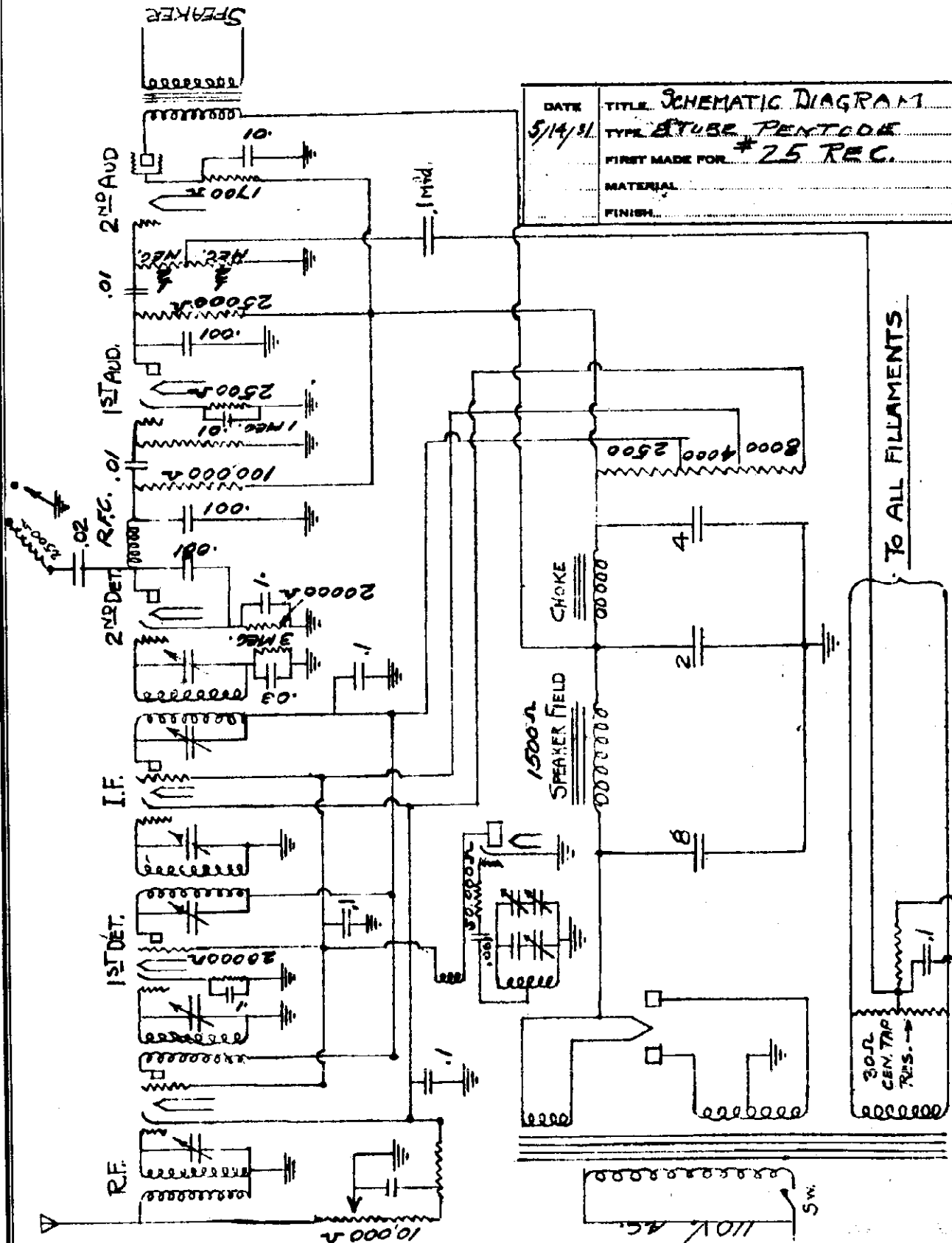
SPLITDORF RADIO CORP.

DATE: 5-29-38
 DRAWN BY: L.G.S. 904
 CHECKED BY: []
 APPROVED BY: []
 TITLE: WIRING DIAGRAM FOR PAD-4 RECEIVER
 120-B-5
 1937 NO.



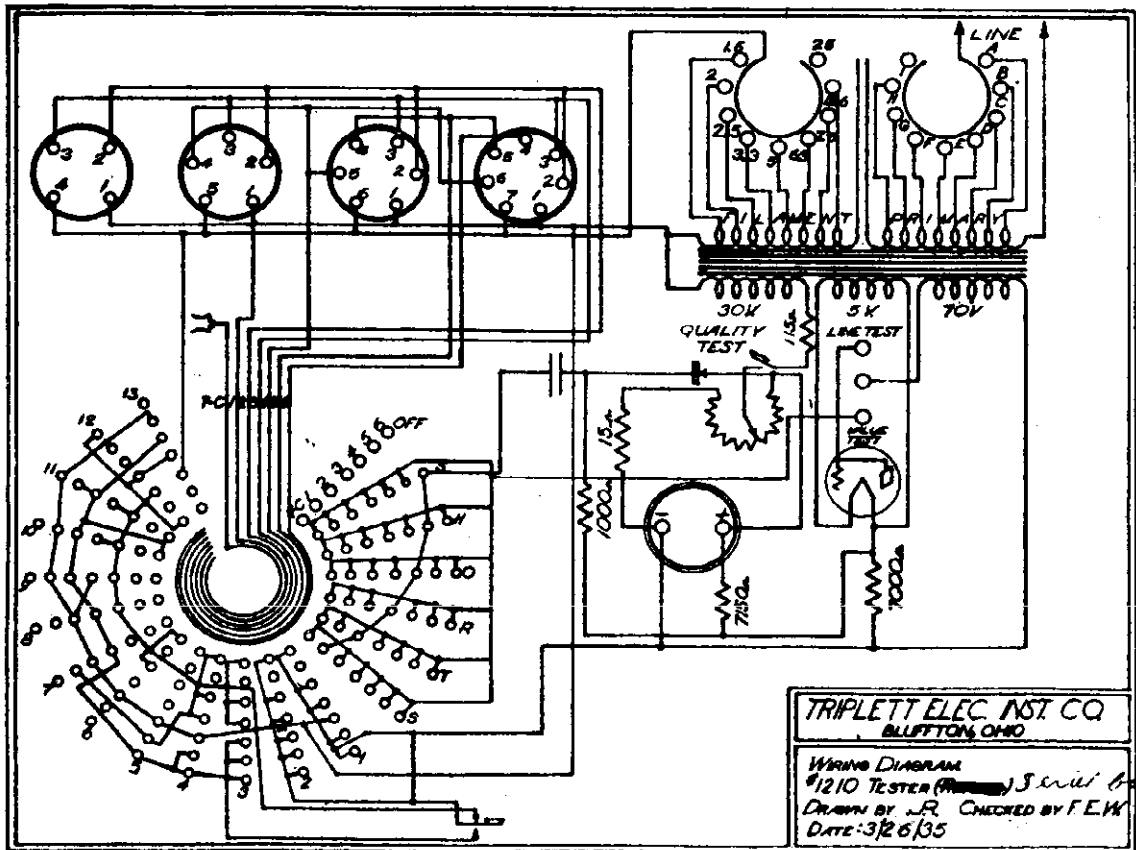
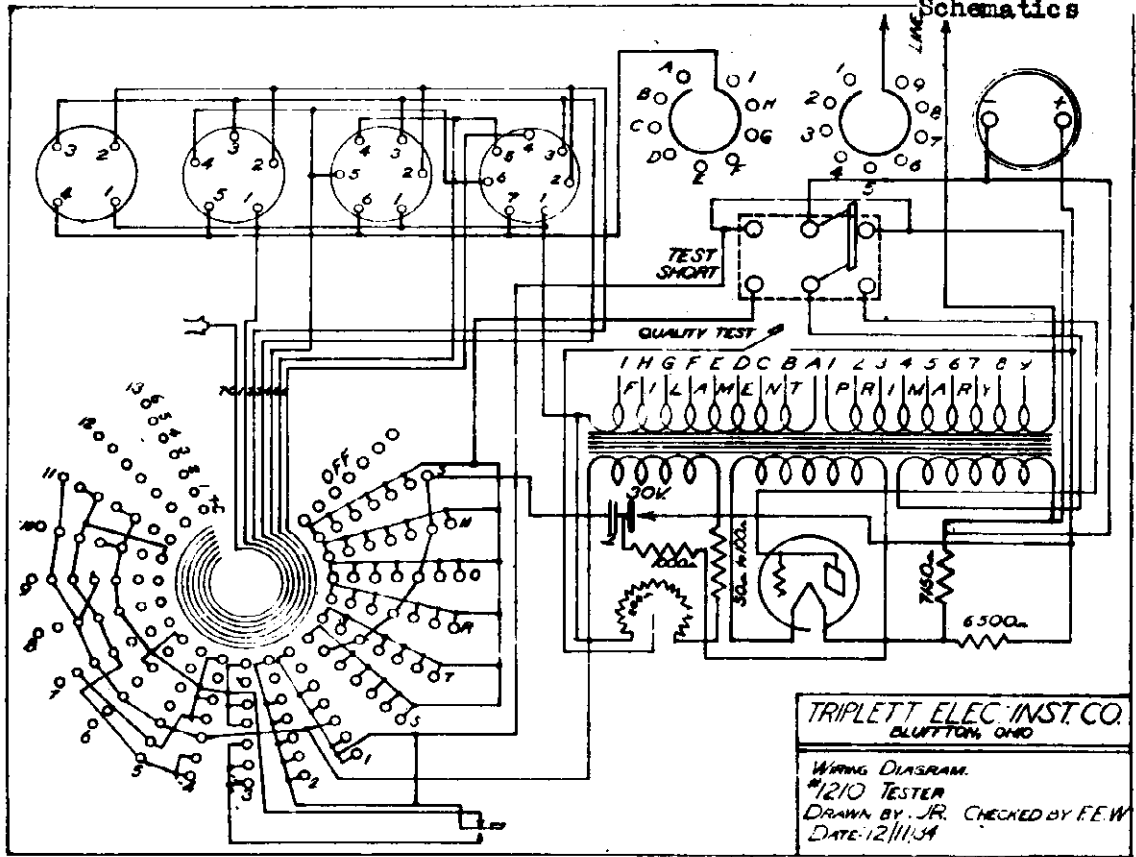
MODEL 8-Tube Pentode
Schematic

STEINITE RADIO CO.



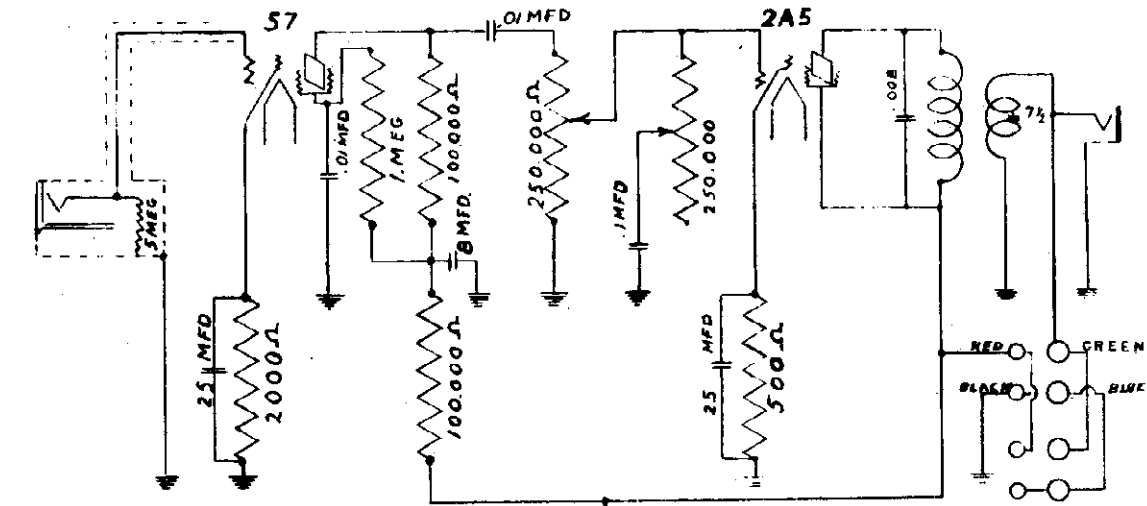
TRIPLETT ELECTRICAL INSTRUMENT

MODEL 1210 Tester
2 Types, Above and
Below Serial 100,000
Schematics

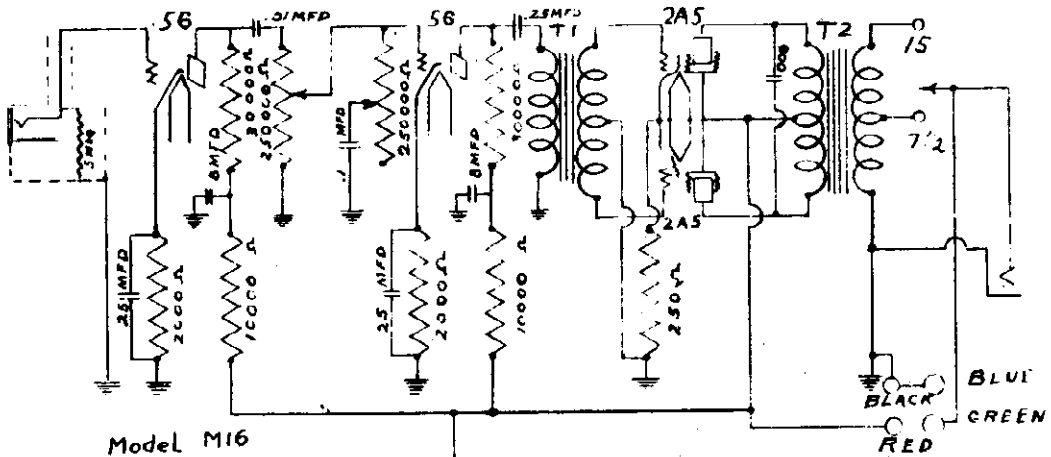
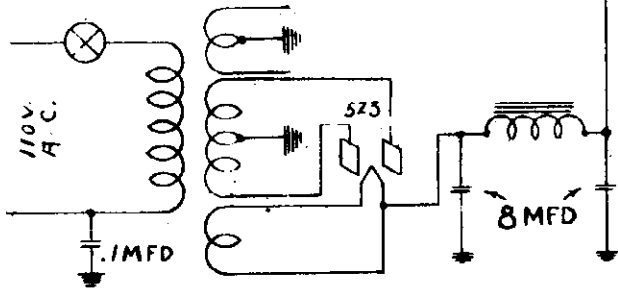


MODEL M-8
 MODEL M-16
 Schematics

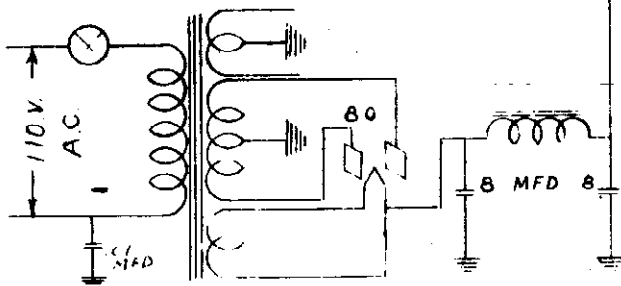
THE TURNER CO.



Model M8



Model M16



The Turner Company
 700 Third Avenue S. E.
 CEDAR RAPIDS, IOWA

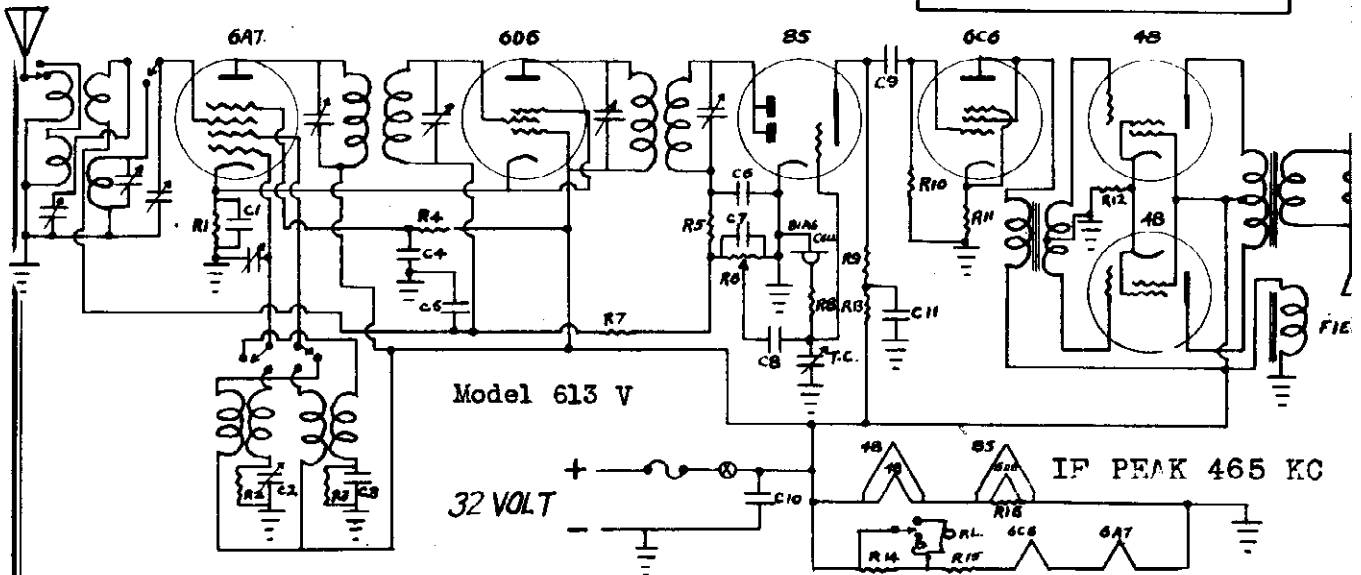
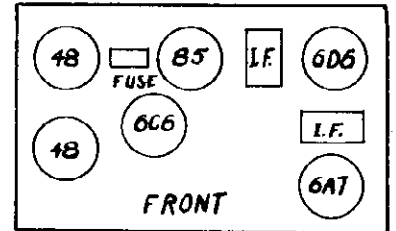
UNIVERSAL BATTERY CO.

MODEL 613V
 MODELS 7232, 7332
 Schematics, Parts
 Socket Layouts

PARTS

- | | | |
|----------------------|------------------------|------------------------|
| R1-250Ω RESISTOR | R10-500MΩ RESISTOR | C3-.004 MICA CONDENSER |
| R2-50MΩ " | R11-750Ω " | C4-.1-200V. " |
| R3-15MΩ " | R12-350Ω " | C5-.01-200V. " |
| R4-25MΩ " | R13-100MΩ " | C6-.0001 MICA " |
| R5-50MΩ " | R14-40Ω 2 Watt " | C7-.0001 " " |
| R6-500M VOL. CONTROL | R15-40Ω 2 " " | C8-.05-200V. " |
| R7-1 MEG. RESISTOR | R16-40Ω 2 " " | C9-.05-200V. " |
| R8-500MΩ " | C1-.1-200 V. CONDENSER | C10-.25-200V. " |
| R9-100MΩ " | C2-500MFD. PAD. " | C11-.1-200V. " |
| Model 613V | C1C-TONE CONTROL | |

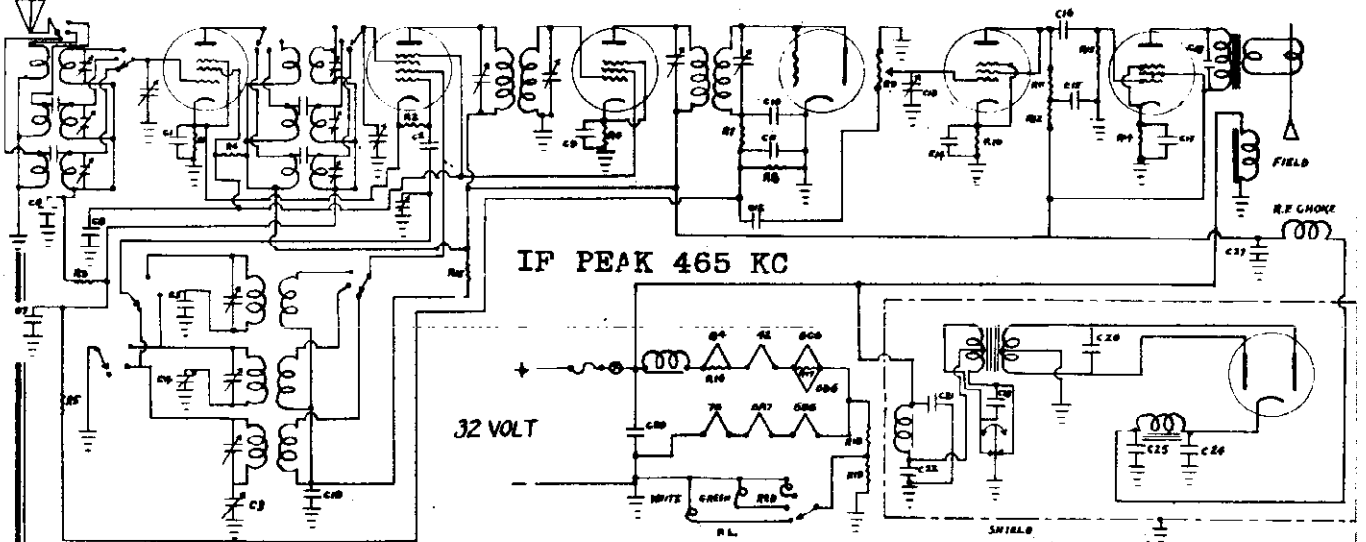
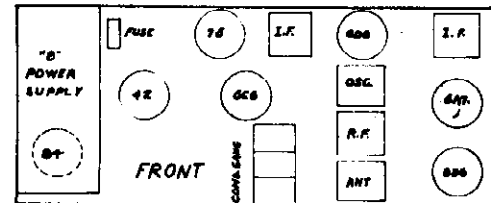
TUBE LOCATIONS



PARTS

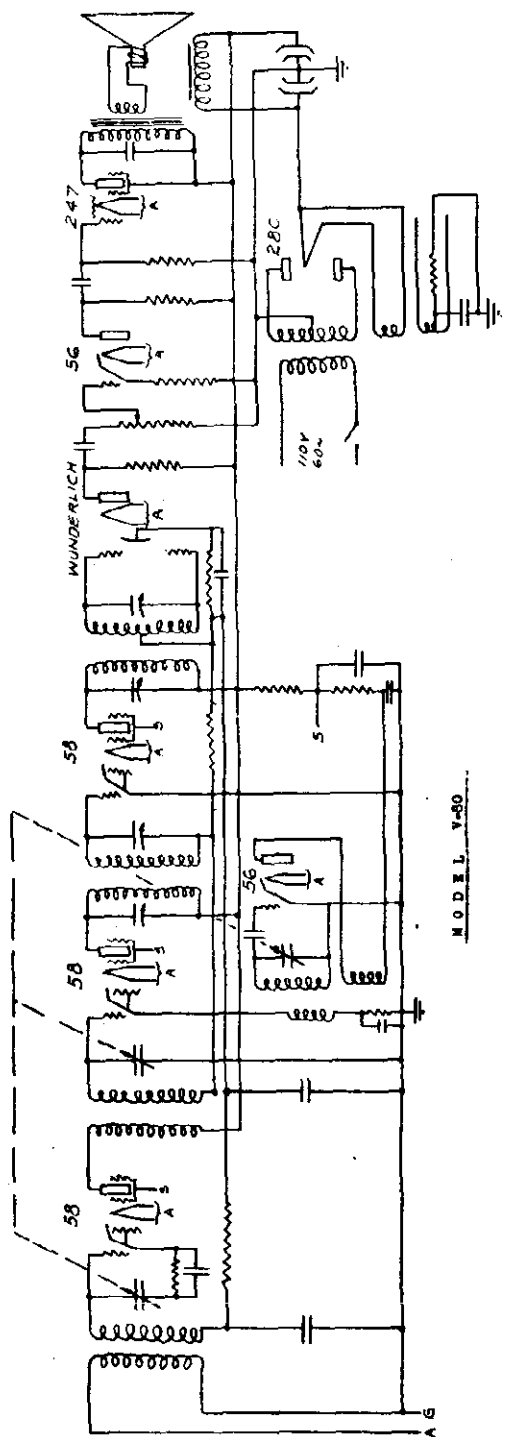
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|----------------------|--------------------|-----------------------|----------------------|--------------------|
| R1-250Ω RESISTOR | R10-5MΩ RESISTOR | R19-15Ω 2 1/2 Watt | C10-.0001 MICA COND. | C19-.1-400V. COND. |
| R2-50MΩ " | R11-100MΩ " | C1-.1-200V. CONDENSER | C11-.0001 MICA " | C20-.004 MICA " |
| R3-1 MEG. " | R12-100MΩ " | C2-.0001 MICA " | C12-.05-200V. " | C21-.25-200V. " |
| R4-25MΩ " | R13-250MΩ " | C3-450MFD. PAD. | C13-TONE CONTROL | C22-.25-200V. " |
| R5-1 MEG. " | R14-1MΩ " | C4-1000MFD. PAD. | C14-.25-200V. COND. | C23-.5-200V. " |
| R6-250Ω " | R15-10MΩ " | C5-.003 MICA COND. | C15-.1-400 V. " | C24-13MFD-500 V. |
| R7-50MΩ " | R16-30Ω 1 1/2 Watt | C6-.01-200V. " | C16-.05-100V. " | C25-6 MFD.-500V. |
| R8-500MΩ " | R17-60Ω 1/2 Watt | C7-.01-200 V. " | C17-18 MFD.-35 V. | C26-.02-800 V. |
| R9-500M VOL. CONTROL | R18-30Ω 5 Watt | C8-.1-400V. " | C18-.005-600V. COND. | C27-.25-600V. |
| Models 7232, 7332 | | C9-.1-200V. " | | |

TUBE LOCATIONS

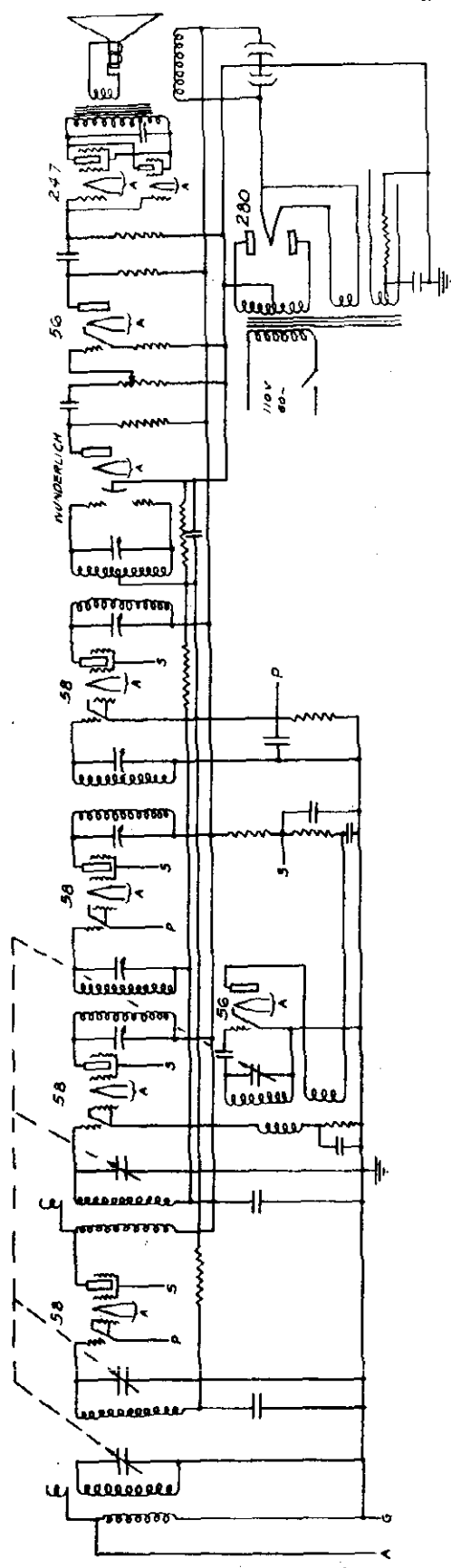


VOCO RADIO MFG. CO., INC.

MODEL V-80
MODEL V-100
Schematics



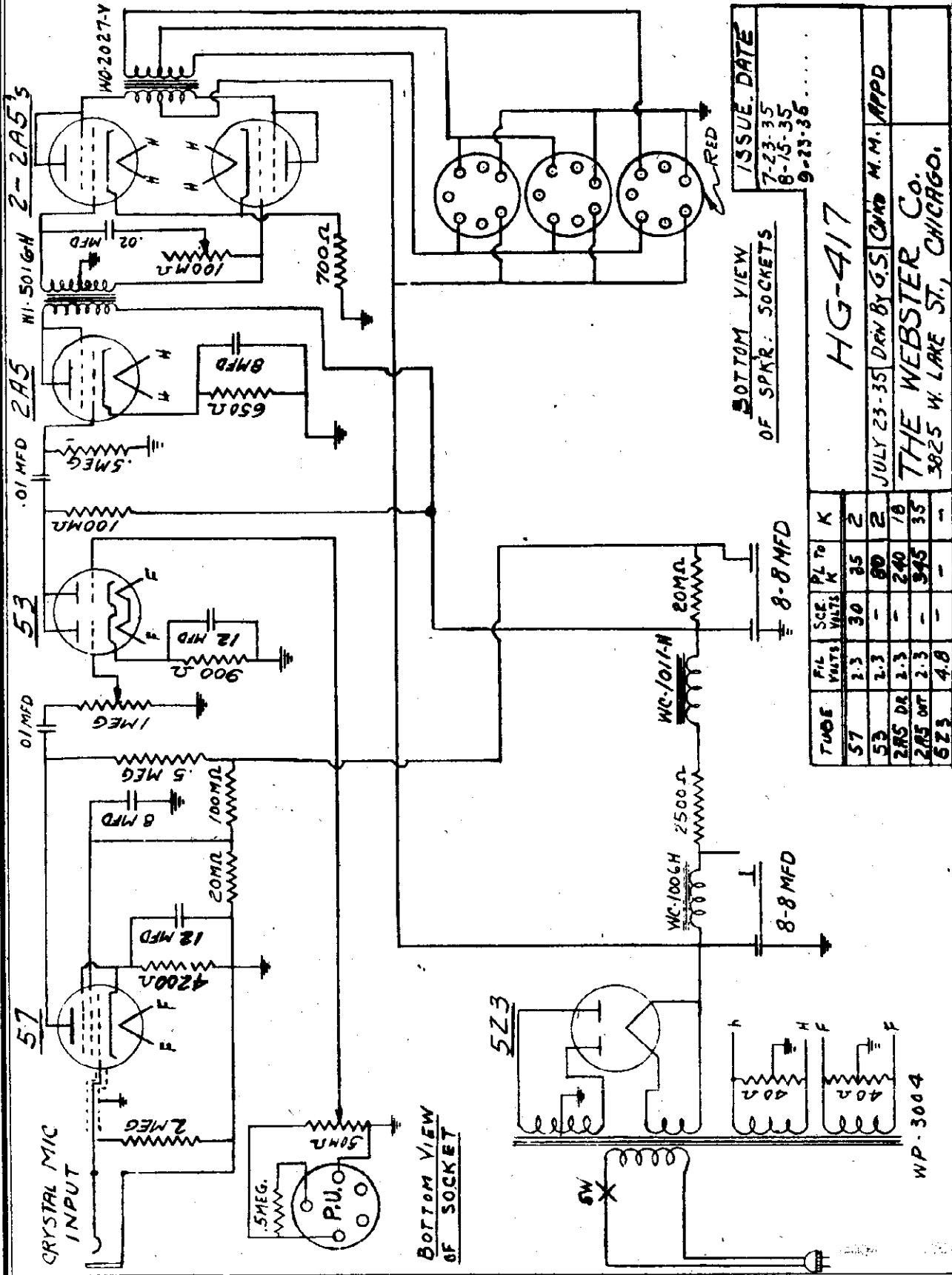
MODEL V-80



MODEL V-100

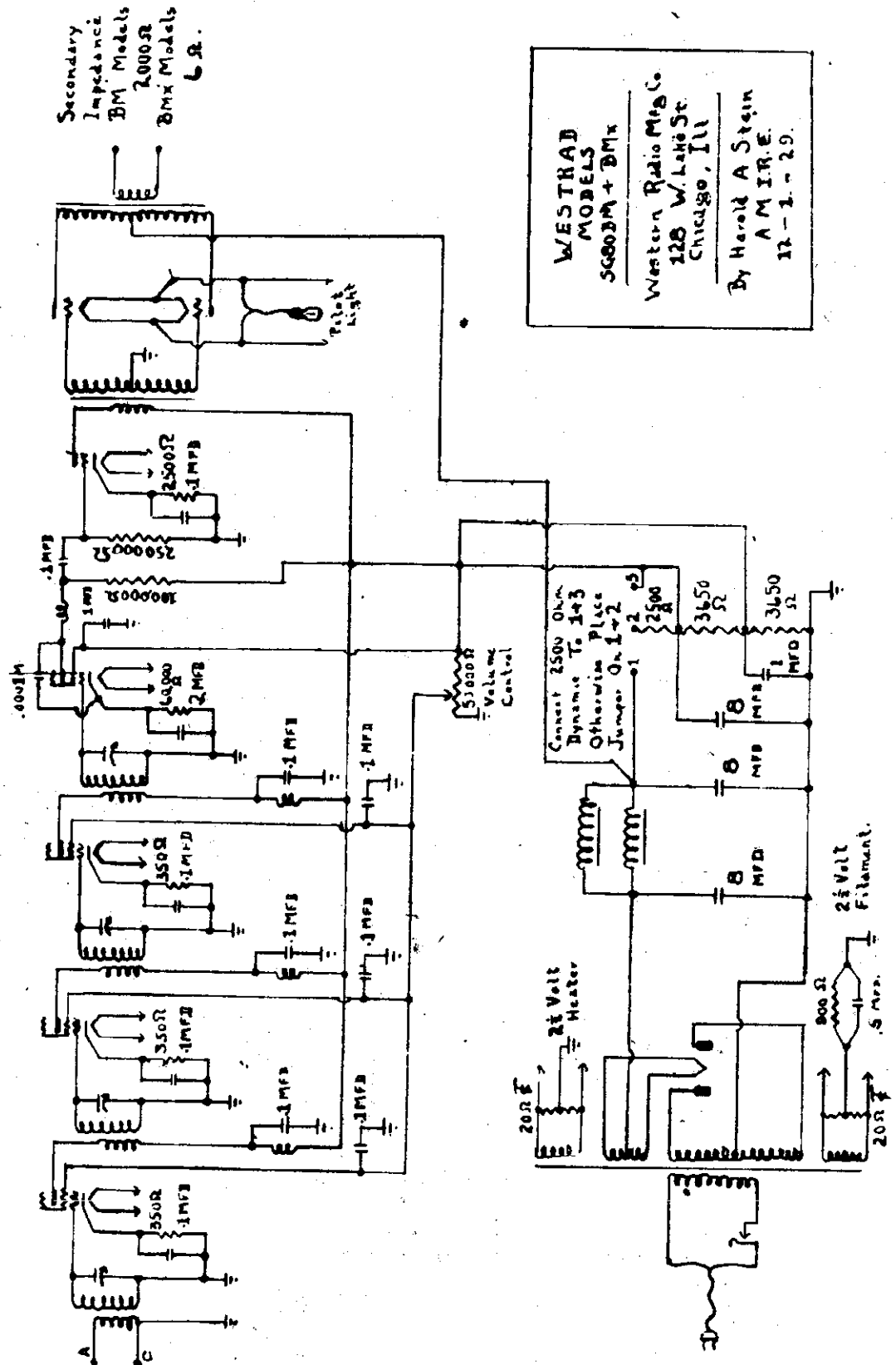
MODEL HG-417
Schematic

WEBSTER CO.



WESTERN RADIO MFG. CO.

MODEL SG 80 BM
Schematic



WESTRAD
MODELS
5603M + BMx
Western Radio Mfg. Co.
128 W. Lake St.
Chicago, Ill.
By Harold A. Stein
A.M.I.R.E.
12-1-29.

MODEL 550
Schematic, Parts
Data

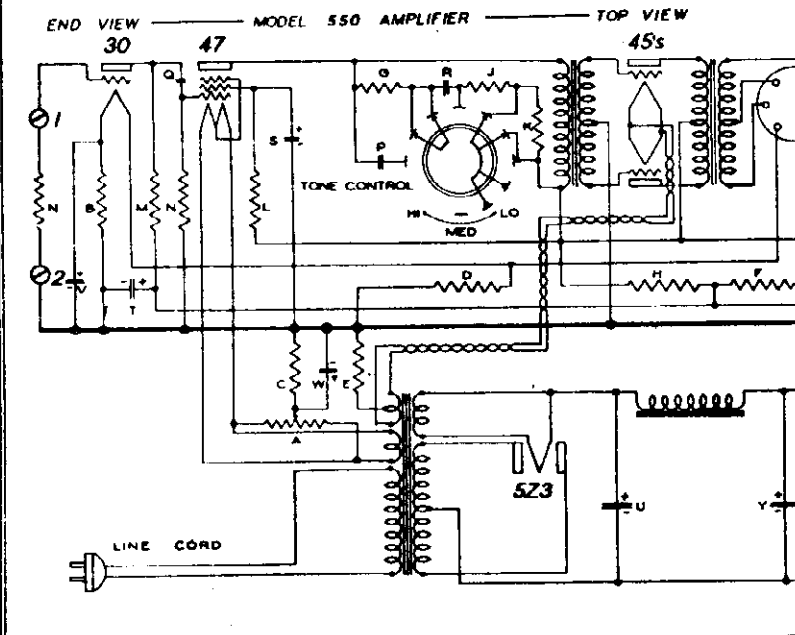
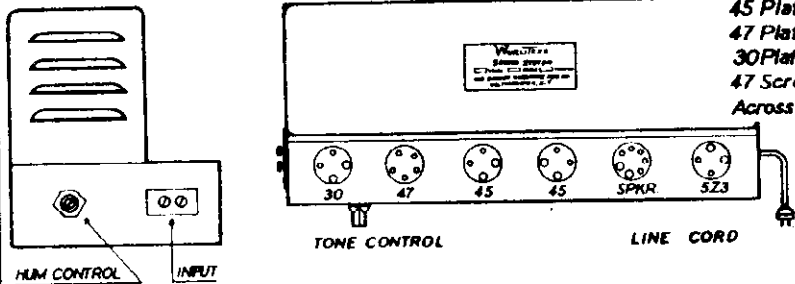
THE RUDOLPH WURLITZER CO.

SIMPLEX POWER AMPLIFIER
MODEL 550
SERIAL NUMBER SERIES 5 500 001
DRAWING NUMBER 97

Measure all D.C. voltages from chassis with a 1000 ohm per volt meter with the line at 115volts 60 cycles.

AVERAGE D.C. VOLTAGES

45 Plates	338v.	45 Bias	57.5v
47 Plate	313v	47 Bias	19v.
30 Plate	75v.	30 Bias	4.3v
47 Screen	294v.	5Z3 Fil.	365v.
Across cond. Y	340v.	Across cond. T	170v.



LEGEND

- Connection
- NO Connection
- ⊥ Ground
- ⊙ Ohm
- MΩ Kilohm
- Δ Megohm

PARTS LIST

- amplifier unit
- A 20 μ hum Control
 - B 65 μ w.w. res.
 - C 500 μ w.w. res.
 - D 280 μ volt. div.
 - E 775 μ volt. div.
 - F 1850 μ volt. div.
 - G 4800 μ carbon.
 - H 7000 μ volt. div.
 - I 1500 μ carbon w/2
 - K 4 MΩ carbon w/2
 - L 5 MΩ carbon w/1
 - M 100MΩ carbon w/4
 - N 0.5 Ω carbon w/4
 - P 0.1 μf. 500v paper
 - Q 0.05 μf. 400v paper
 - R .3 μf. 400v paper
 - S 2 μf. 450v dry
 - T 8 μf. 200v dry
 - U 5 μf. 47.5v wet
 - V 10 μf. 25v dry
 - W 25 μf. 25v dry
 - Y 30 μf. 400v wet
- volume control unit
- a 15MΩ carbon w/4
 - b 50MΩ carbon w/4
 - c 50 MΩ dual var.
 - d 150MΩ dual var.
 - e 0.0018 μf. mica
 - f 0.004 μf. mica
 - g 25 μf. 200v paper

