

MODELS 4X, 4X3, 4X4  
Circuit Data  
Alignment, Parts

RCA MFG. CO., INC.

Stock No.	Description	Part Price
12847	Coil—Power cord, 135 ohm resistance (R14).....	.93
12006	Cap—1000-ohm wire and lead for Stock No. 12847.....	.27
4150	Lamp—Dial lamp, 6.3 volt—Package of 5.....	.60
12409	Lead—Antenna lead approximately 20 feet long.....	.15
12842	Resistor—Iron core reactor (L11).....	1.00
12846	Resistor—50 ohm—insulated—1/4 watt—Package of 5 (R11).....	1.00
12844	Resistor—50 ohm—carbon type—1/10 watt—Package of 5 (R10).....	.75
12845	Resistor—10,000 ohm—insulated—1/4 watt—Package of 5 (R3, R7).....	1.00
13112	Resistor—1,000 ohm—insulated—1/4 watt—Package of 5 (R2).....	1.00
12896	Resistor—50,000 ohm—insulated—1/4 watt—Package of 5 (R5).....	1.00
11297	Resistor—330,000 ohm—carbon type—1/10 watt—Package of 5 (R6).....	.75
11452	Resistor—10,000 ohm—5 (R8) type—1/10 watt—Package of 5.....	.75
12285	Resistor—170,000 ohm—insulated—1/4 watt—Package of 5 (R9, R9).....	1.00
12013	Resistor—1 meg—carbon type—1/10 watt—Package of 5 (R13).....	.75
12845	Resistor—Wire wound 40 ohms (R3).....	.40
12806	Resistor—100 ohm—insulated—1/4 watt—Package of 5 (R1).....	.75
12408	Shield—I.F. transformer shield for Stock No. 12849.....	.28
11218	Shield—Radiofon shield.....	.15
12607	Shield—Shield top for Stock No. 12839.....	.30
12607	Spring—Remainder spring of core Stock No. 12006—Package of 20.....	.36
4786	Socket—Contact 75 or 252.....	.15
4787	Socket—7-contact 6A7 or 6F7 radiofon socket.....	.15
12846	Socket—Dial lamp socket.....	.25
12839	Transformer—100-0-100—500 cycles—500 volt—1.5:1—C11, C12, R4, R10.....	1.90
12840	Transformer—second I.F. transformer complete (L4, L5, C16, R13).....	1.90
12837	Trap—Wave trap (L1).....	.70
12836	Volume Control and power switch (R4, R1).....	1.10
REPRODUCER ASSEMBLIES		
12499	Coil—Field coil (L12).....	1.60
12711	Coil—Neuroshaking coil (L11).....	.25
12498	Coil—Reproducer cone and drum cap (L10).....	1.20
9684	Reproducer—Complete.....	2.13
12900	Transformer—Output transformer (T1).....	1.60
REPRODUCER ASSEMBLIES (MER9642)		
13149	Coil—Reproducer field coil (L11).....	1.60
13150	Coil—Reproducer normalizing coil (L11).....	.25
13148	Coil—Reproducer cone complete (L10).....	1.25
9750	Transformer—Speaker complete.....	5.90
13151	Transformer—Output transformer (T1).....	1.60
MISCELLANEOUS ASSEMBLIES		
12834	Dial—Station selector dial scale (4X and 4X3).....	.50
12915	Dial—Station selector dial scale (Used on 4X4 only).....	.55
12833	Knob—Station selector knob—Package of 5.....	.50
13934	Knob—Station selector knob—Package of 5 (4X4 only).....	.45
12913	Knob—Volume control knob—Package of 5 (4X4 only).....	.45
12673	Knob—Volume control knob—Package of 5.....	.58
12835	Screw—Chassis mounting screw and washers—Package of 10.....	.30
4119	Screw—Set screw for knob Stock No. 12673, 12833, 12913 and 12914—Package of 20.....	.30

The prices quoted above are subject to change without notice.

output to produce a suitable indication on the output indicator. Adjust the oscillator and antenna trimmers C3 and C4 for maximum (peak) output.

**Loudspeaker**

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed either permanently by cutting it away with a sharp knife, or by softening its cement with a very light application of acetone using care not to allow the acetone to flow down into the air gap. The dust cover may be cemented back in place with amberoid upon completion of adjustment.

**Radiofon Socket Voltages**

The voltage values indicated from the Radiofon socket contacts, grid caps, resistors, terminals and receiver chassis on figure 1, have been carefully selected so as to provide a rapid check of the circuit for defective parts, based on the values of the test circuit for the Radiofon with the Schematic Circuit Diagrams, figure 1, and the Chassis Wiring Diagram, figure 2, will permit the location of certain troubles which would otherwise be difficult to ascertain. Each value as specified should hold within  $\pm 20\%$  of the indicated value. Variations in excess of this limit will usually be indicative of trouble in the basic circuit. These voltages were measured with set tuned to approximately 530 kc, no signal being received, and volume control set to maximum. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm per-volt 3-c meter, having ranges of 10, 50, and 250 volts. Use meter range above voltage to be measured. A-c voltages were measured with a corresponding 1-c meter.

**Resistance Measurements**

The resistance values shown between Radiofon socket contacts and caps, resistors, terminals and receiver chassis on figure 1, have been carefully selected so as to provide a rapid check of the circuit for defective parts, based on the values of the test circuit for the Radiofon with the Schematic Circuit Diagrams, figure 1, and the Chassis Wiring Diagram, figure 2, will permit the location of certain troubles which would otherwise be difficult to ascertain. Each value as specified should hold within  $\pm 20\%$  of the indicated value. Variations in excess of this limit will usually be indicative of trouble in the basic circuit. These values were measured with the Radiofon in sockets, power supply disconnected, tuning condenser in full mark and volume control set at maximum except where otherwise noted. In all cases of measuring the resistance between points of the circuit and ground, it will be necessary to connect the other end of the test leads to the chassis ground. If the polarity of the resistance meter is not known, it may be readily ascertained by connecting a d-c voltmeter of indicated polarity across the terminals of the device.

**REPLACEMENT PARTS**

Stock No.	Description	Part Price
RECEIVER ASSEMBLIES		
12118	Cap—Grid condenser—Package of 5.....	.15
12405	Capacitor—47 Mmf. (C16).....	.25
12838	Capacitor—36 Mmf. (C13).....	.20
12404	Capacitor—150 Mmf. (C2).....	.20
12117	Capacitor—160 Mmf. (C1) (C5).....	.20
12316	Capacitor—810 Mmf. (C15).....	.25
5107	Capacitor—3025 Mmf. (C7).....	.16
4838	Capacitor—35 Mmf. (C10, C11, C14).....	.15
4836	Capacitor—35 Mmf. (C10).....	.20
4840	Capacitor—35 Mmf. (C11).....	.20
12484	Capacitor—0.25 Mfd. (C23).....	.30
12844	Capacitor—0.25 Mfd. (C6).....	.24
12844	Capacitor—Pack comprising 2 sections each 16 Mfd. (C12).....	1.50
12817	Coil—Oscillator coil (L4, L5).....	1.25
12818	Condenser—1-yrng variable using condenser (C1, C4, C7, C8).....	1.85
12842	.....	2.20

such as the RCA Stock No. 9295, will be required as the source of the signal at the specified alignment frequencies. Visual indication of the receiver output during alignment is also necessary to accurately show when the correct point of adjustment is reached. The RCA Stock No. 4317 Neon Output Indicator is especially suitable for this use.

The procedure outlined below should be followed in adjusting the various trimming capacitors and modded magnetic cores:

**I-F Core Adjustment**

The three adjustment screws (one on top and one on bottom of first i-f transformer and one on bottom of second i-f transformer) are located as shown by figures 1 and 4. Each circuit must be aligned to a basic frequency of 460 kc. To do this, attach the output indicator across the loudspeaker voice coil. Connect the output of the test oscillator through a .05-mfd. capacitor to the RCA-6A7 control grid, the ground of the test oscillator being connected to the receiver chassis. Set the test oscillator to 460 kc. Advance the receiver volume control to the full-on position and adjust the receiver tuning control to a point within its range where no interference is encountered either from broadcast stations or the heterodyne oscillator. Increase the output of the test oscillator until a slight indication is apparent on the output indicator.

Adjust the bottom core screw of the second i-f transformer to produce maximum (peak) indicated receiver output. Then adjust the two core screws of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device.

It is advisable to repeat the adjustment of all i-f core screws to assure that the interaction between them has not disturbed the original adjustment.

**Wave-Trap Adjustment**

Attach the output of the test oscillator to the "Antenna terminal" (see wave-trap, top view chassis, figure 2) through an 80-mmf. capacitor, the ground connection of the test oscillator and receiver chassis being connected as before. Receiver "Antenna wire" should be sealed up for this and the following r-f adjustments.

Leave the test oscillator adjusted to 460 kc as before. Then adjust the wave-trap trimmer to the point which causes maximum suppression of the 460 kc signal.

**R-F Trimmer Adjustments**

Since the dial is mounted on the cabinet, it will be necessary to perform the operation, in sequence, as follows:

Place the receiver in its cabinet. Set the gang tuning condenser to its maximum capacity (full mark) position and place the tuning knob on the gang tuning condenser shaft. Tighten the knob set screw with the dial pointer set to the low-frequency calibration line beyond 530 kc (beyond "15" on the dial). Turn the tuning knob until the dial pointer indicates 1,500 kc. Remove the tuning knob from shaft and receiver from cabinet, being careful not to disturb the setting of the gang condenser.

With the test oscillator and output indicator connected as specified under "Wave-trap adjustment" and receiver volume control in its maximum position, tune the test oscillator to 1,500 kc and regulate its

**General Features**

Each model contains a four-tube chassis mounted in a table-type cabinet. The superheterodyne type of circuit is used, with such features of design as magnetic core adjusted i-f transformers, improved core adjusted antenna wave-trap, illumination of full-vision dial scale, resistance-coupled audio system, and an electrodynamic loudspeaker. The tuning range covers from 540 to 1,720 kc, which includes the standard broadcast and one police band.

**Circuit Arrangement**

The conventional superheterodyne type of circuit, consisting of a combined first-detector-oscillator stage, a combined i-f amplifier and second detector stage, an audio power-output stage, and a half-wave rectifier stage, is used.

**Tuned Circuits**

The antenna and oscillator coils are tuned by a variable two-section gang condenser having trimming capacitors in shunt with each section. A wave-trap is employed and is connected in series with the antenna to reduce undesirable signals in the range of the i-f amplifier. It is tuned to 460 kc by means of a screw attached to the modded magnetic core.

The intermediate-frequency amplifier system consists of the pentode section of the RCA-6F7 in a transformer-coupled circuit. This stage operates at a basic frequency of 460 kc. Adjustable magnetic cores are provided for adjusting the inductance of the first i-f transformer primary and secondary and the second i-f transformer secondary windings to 460 kc.

**Second Detector and Audio System**

The second-detector circuit uses the triode portion of the RCA-6F7 in a conventional three-element power-detector circuit. The output of this stage is resistance-capacitance coupled to an RCA-43 power-output tube which, in turn, is transformer-coupled to the dynamic speaker.

**Receiver**

The plate, grid, cathode, and the loudspeaker field voltages required for the operation of this receiver are supplied by the RCA-21Z5 tube operating as a half-wave rectifier.

**SERVICE DATA**

**Alignment Procedure**

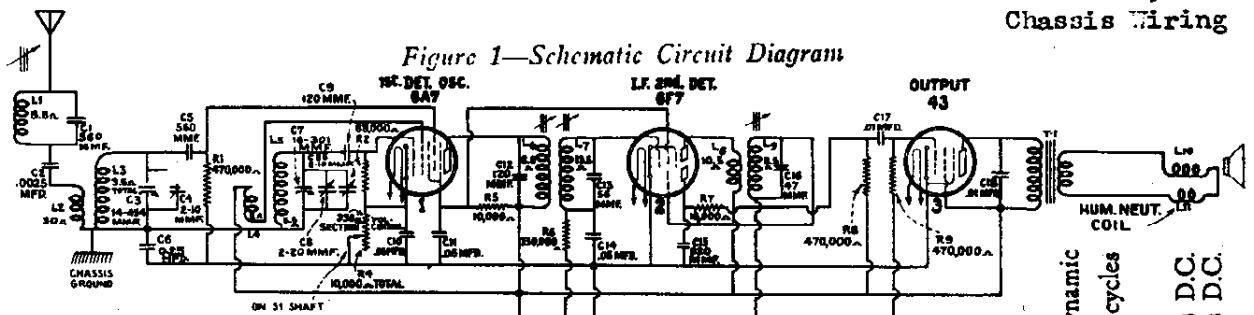
There are two alignment trimmers provided in the antenna-coil and oscillator-coil tuned circuits. The i-f transformer adjustments are made by means of three screws attached to modded magnetic cores. The wave-trap is likewise adjusted by a screw attached to its modded core. Re-adjustments may occasionally occur from continued extremes of climate, dampening, purposed alteration for service, or after repairs have been made to the r-f or i-f tuned circuits. Imperfect alignment usually causes the impairment of sensitivity, selectivity, and tone quality. Such conditions will usually occur simultaneously.

In re-adjusting the tuned circuits, it is important to apply a definite procedure and to use adequate and reliable test equipment. A standard test oscillator,

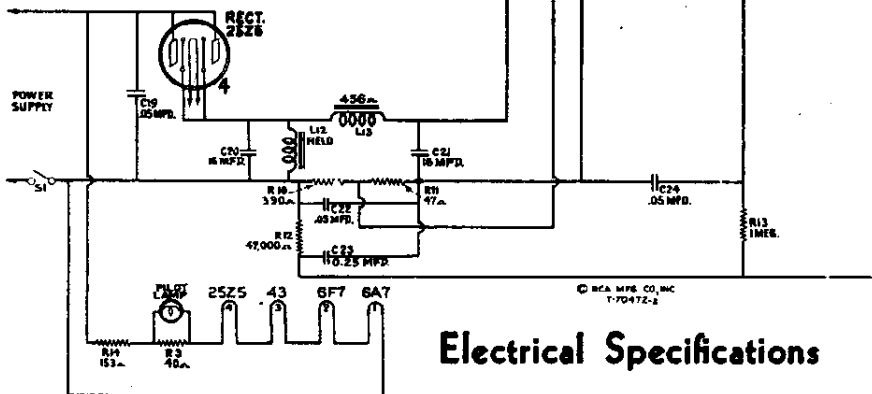
RCA MFG. CO., INC.

MODELS 4X, 4X3, 4X4  
Schematic, Data  
Chassis Wiring

Figure 1—Schematic Circuit Diagram



Intermediate Frequency.....460 kc



Electrical Specifications

LOUDSPEAKER  
Type.....Electrodynamical  
Impedance (v.c.) { M80864-1, 4.5 ohms }  
                          { M80864-2, 3.0 ohms }  
POWER OUTPUT  
Undistorted.....0.3 watts A.C., 0.25 watts D.C.  
Maximum.....0.8 watts A.C., 0.6 watts D.C.

FREQUENCY RANGE

"Standard Broadcast" (A)..... 540-1,720 kc

ALIGNMENT FREQUENCIES

"Standard Broadcast" (A) ...1,500 kc (osc. and ant.)

RADIOTRON COMPLEMENT

- (1) RCA-6A7.....First Detector-Oscillator
- (2) RCA-6F7.....I. F. and Second Detector
- (3) RCA-43.....Power Output
- (4) RCA-25Z5.....Half-wave Rectifier

Pilot Lamp.....Mazda No. 40, 6.3 volts, 0.15 ampere

Power Supply Rating (105-125 volts) |...50-60 cycles—55 watts, D.C.—50 watts

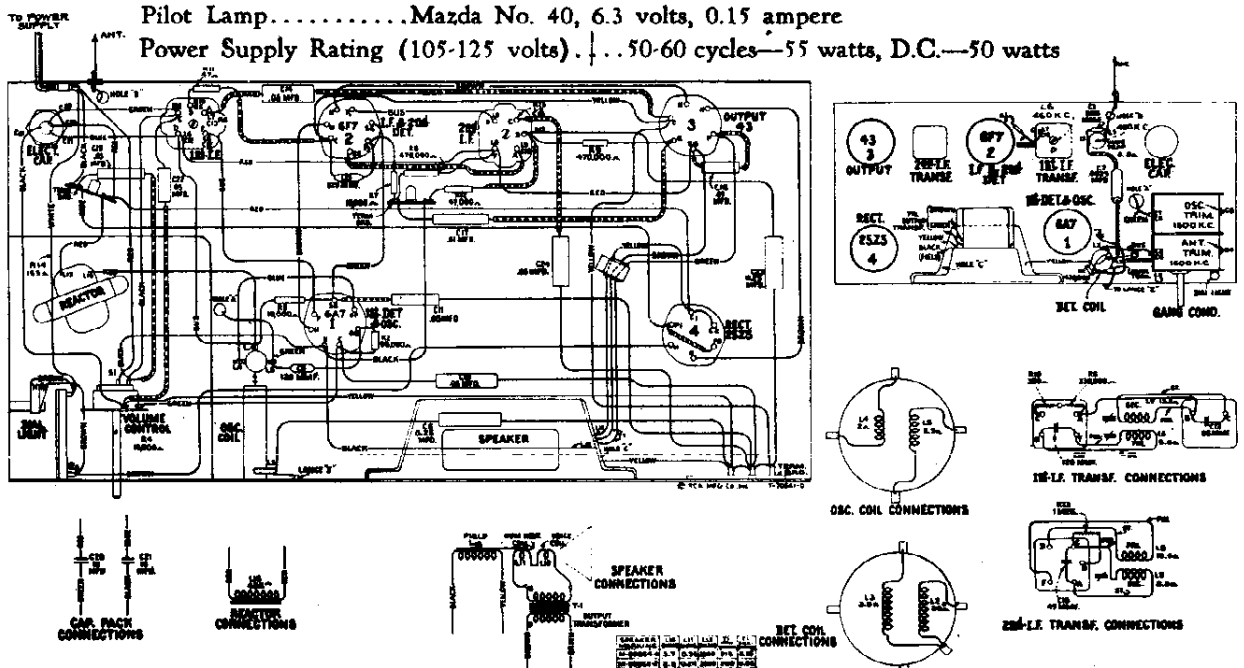


Figure 2—Chassis Wiring Diagram, Radiotron, Coil, and Trimmer Locations

MODELS 4X, 4X3, 4X4  
 Socket, Trimmers  
 Voltage, Resistance

RCA MFG. CO., INC.

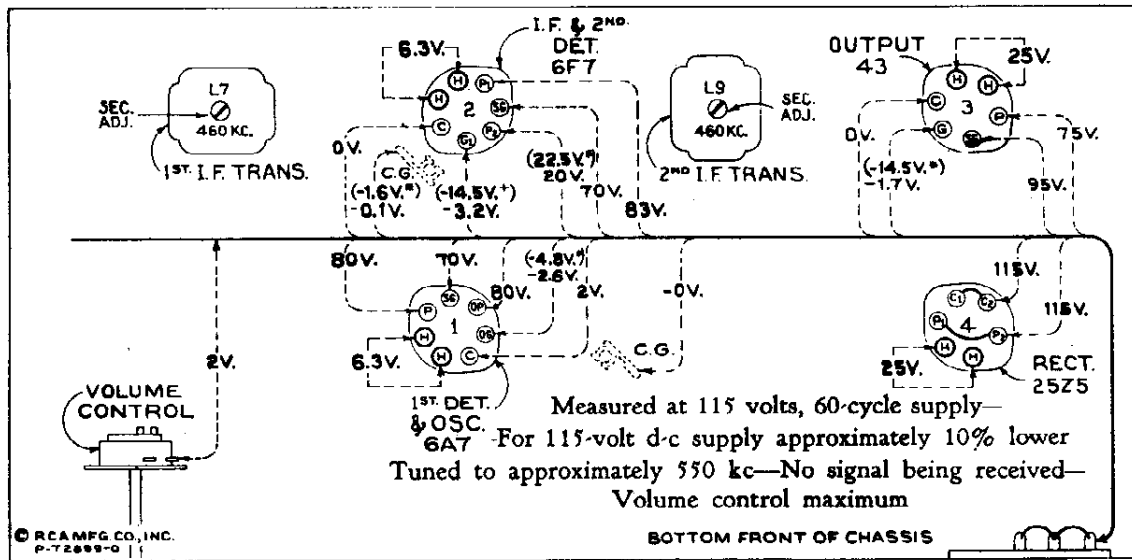


Figure 4—Radiotron Socket Voltages and Trimmer Locations

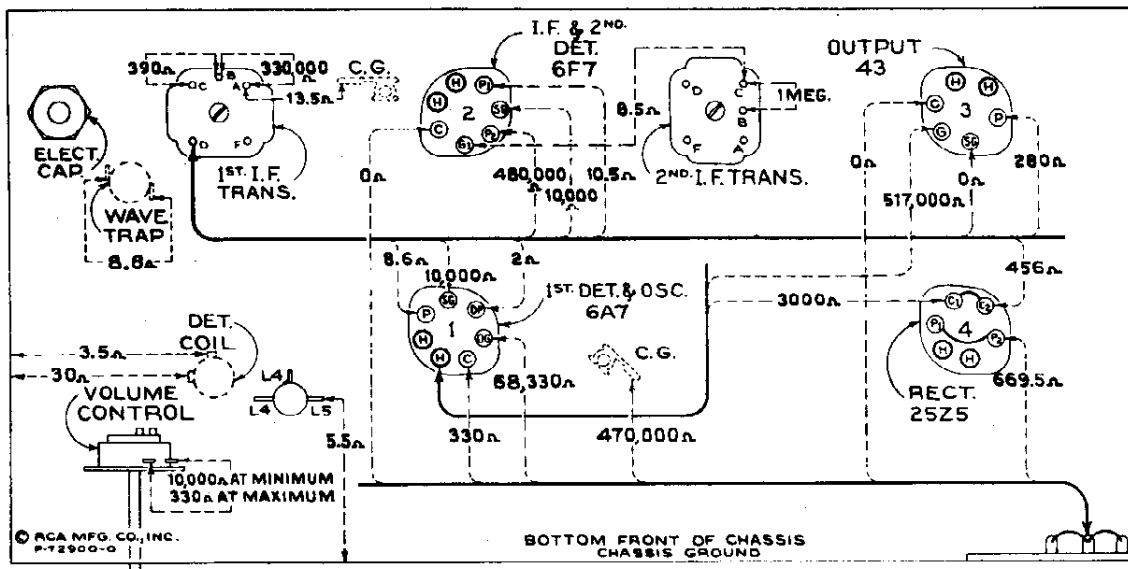


Figure 3—Resistance Diagram

Power supply disconnected—Radiotrons in sockets—Tuning condenser in full-mesh  
 Volume control maximum

### Mechanical Specifications

CABINET DIMENSIONS	MODEL 4X	MODEL 4X3	MODEL 4X4
Height.....	10 <sup>7</sup> / <sub>8</sub> inches.....	12 inches.....	10 <sup>1</sup> / <sub>2</sub> inches.....
Width.....	8 <sup>5</sup> / <sub>16</sub> inches.....	7 <sup>1</sup> / <sub>2</sub> inches.....	7 <sup>3</sup> / <sub>8</sub> inches.....
Depth.....	5 <sup>5</sup> / <sub>8</sub> inches.....	5 <sup>1</sup> / <sub>8</sub> inches.....	5 <sup>5</sup> / <sub>8</sub> inches.....
<b>WEIGHTS</b>			
Net.....	9 pounds.....	9 pounds.....	8 <sup>1</sup> / <sub>2</sub> pounds.....
Shipping.....	11 pounds.....	11 pounds.....	10 <sup>1</sup> / <sub>2</sub> pounds.....
Chassis Base Dimensions.....	9 <sup>1</sup> / <sub>4</sub> inches x 4 <sup>5</sup> / <sub>8</sub> inches x 1 <sup>1</sup> / <sub>2</sub> inches		
Over-all Height of Chassis.....	5 <sup>3</sup> / <sub>4</sub> inches		
Operating Controls.....	(1) Power Switch-Volume, (2) Tuning		