

RCA VICTOR MODELS 117 AND 214

Five-Tube, Two-Band, A. C. Superheterodyne Receivers

SERVICE NOTES

ELECTRICAL SPECIFICATIONS

Voltage and Frequency Ratings.....	$\left\{ \begin{array}{l} 105-125 \text{ Volts, } 50-60 \text{ Cycles} \\ 105-125 \text{ Volts, } 25-60 \text{ Cycles} \\ 105-125/195-250 \text{ Volts, } 50-60 \text{ Cycles} \end{array} \right.$
Power Consumption.....	80 Watts
Radiotrons and Functions.....	$\left\{ \begin{array}{l} (1) \text{ RCA-6A7 First Detector and Oscillator} \\ (2) \text{ RCA-6D6 I.F. Amplifier} \\ (3) \text{ RCA-6B7 Second Detector, Audio Amplifier, A.V.C.} \\ (4) \text{ RCA-41 Power Output} \\ (5) \text{ RCA-80 Rectifier} \end{array} \right.$
Tuning Frequency Ranges.....	540 to 1720 KC. and 2250 to 6850 KC.
Alignment Frequencies.....	460 KC. (I.F.), 1720 KC. (R.F. and Oscillator) and 600 KC. (Oscillator)
Undistorted Output.....	1.75 Watts
Maximum Output.....	3.5 Watts
Loudspeaker.....	Electrodynamic

PHYSICAL SPECIFICATIONS

	<i>Model 117</i>	<i>Model 214</i>
Height.....	16 Inches.....	37 $\frac{1}{4}$ Inches
Width.....	13 $\frac{1}{4}$ Inches.....	23 Inches
Depth.....	9 $\frac{1}{4}$ Inches.....	9 $\frac{1}{2}$ Inches

The chassis employed in these two receivers are identical. Such distinctions as:—Short-wave reception — Superheterodyne circuit — Diode detection — Automatic volume control—Resistance coupled audio — Tone control—Airplane selector dial—and Electrodynamic speaker, characterize the design.

Particular mounting methods are used for supporting the chassis to the cabinet to exclude undesirable microphonic reaction between the speaker, and the Radiotrons and the variable tuning capacitor plates.

Antenna-ground screw terminals are used to simplify and insure positive connection of the input leads. The terminals are also arranged to permit convenient mounting of a "Double-Doublet" antenna transformer available from the manufacturer of these receivers for use with the highly efficient "World-Wide" antenna.

Additional service convenience is incorporated by use of a plug-connector attachment in the cable joining chassis to loudspeaker. This method allows the service man to remove the receiver from the cabinet without disturbing the speaker.

DESCRIPTION OF ELECTRICAL CIRCUIT

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

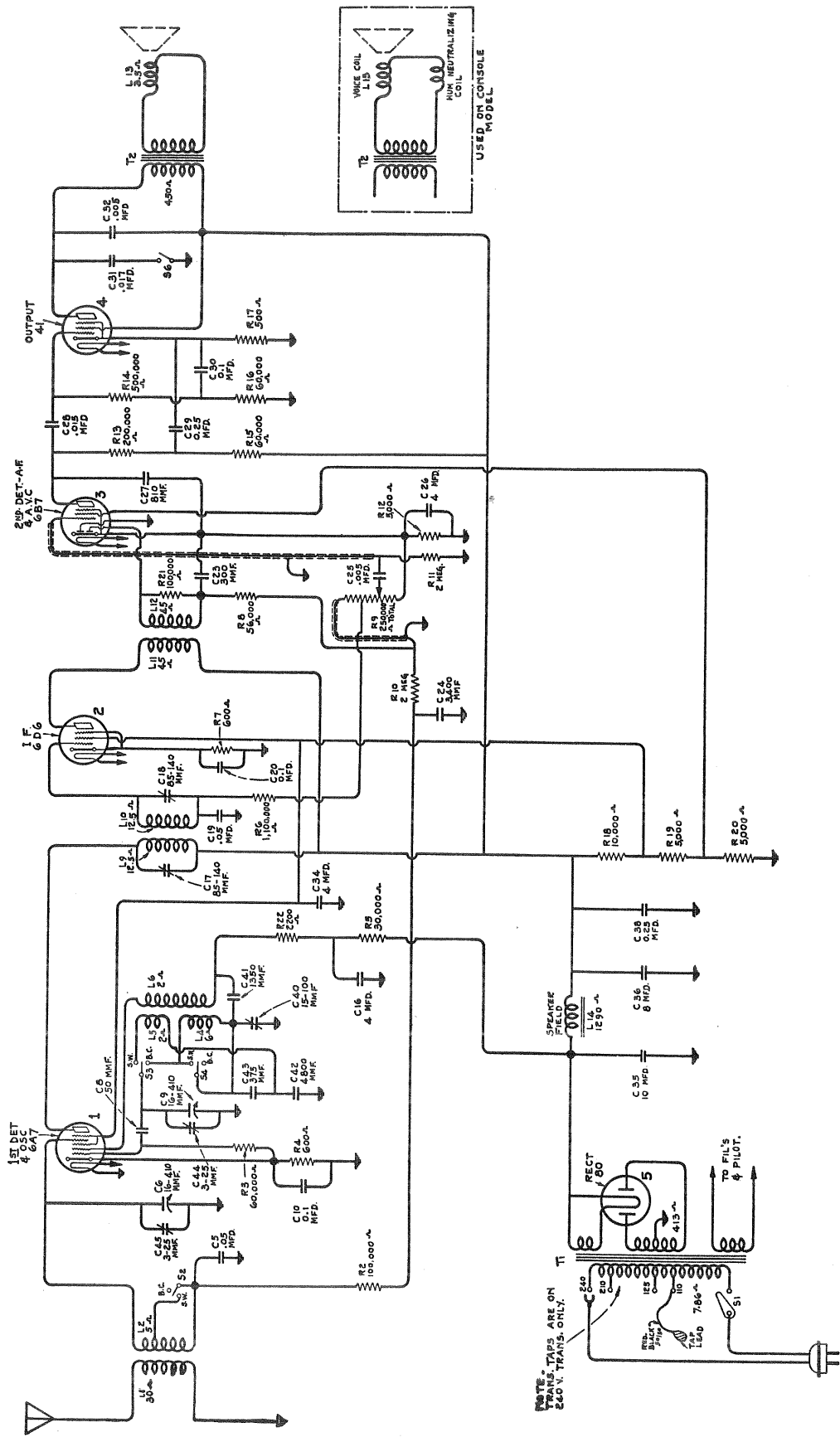


Figure 1—Schematic Circuit Diagram

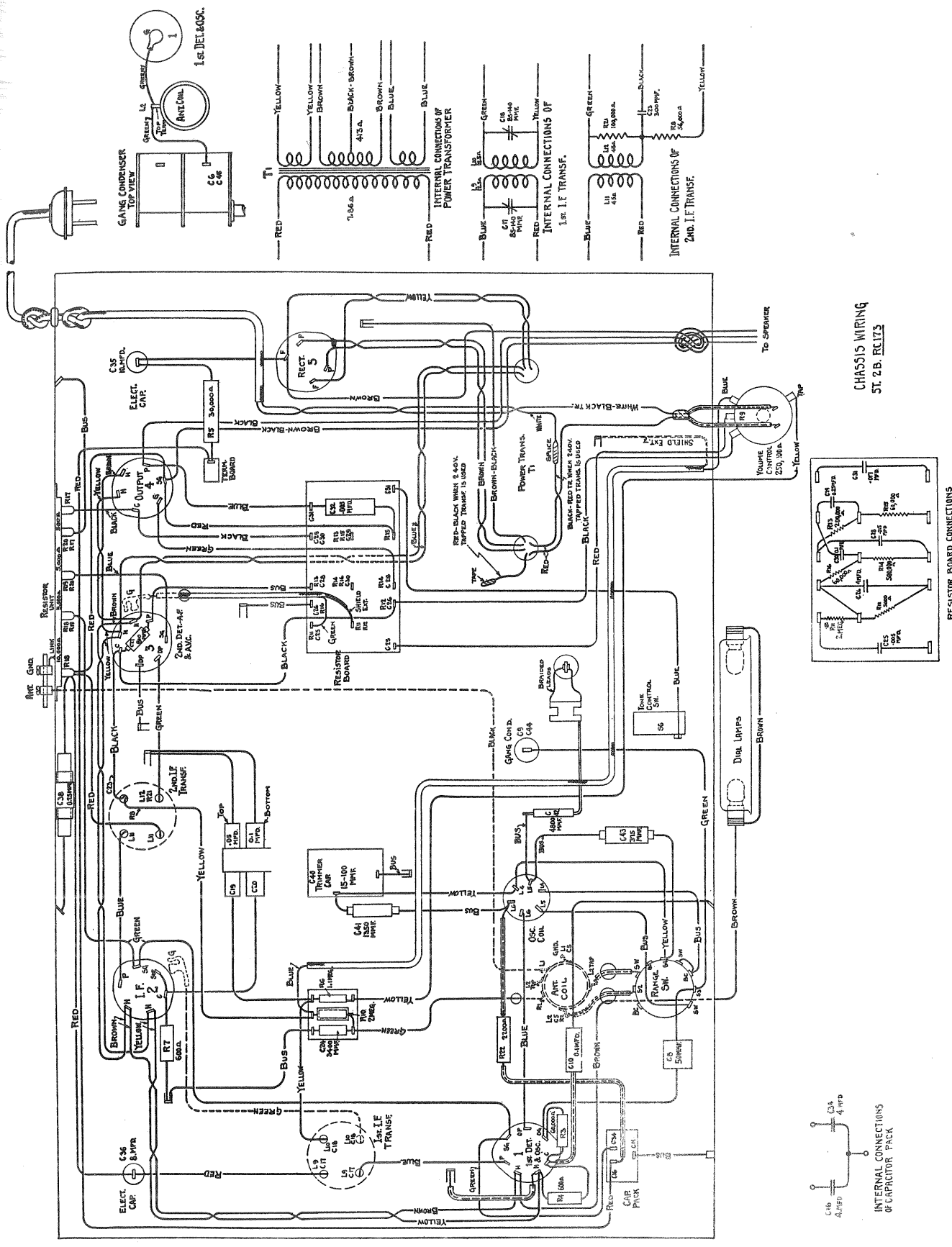


Figure 2—Chassis Wiring Diagram

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.

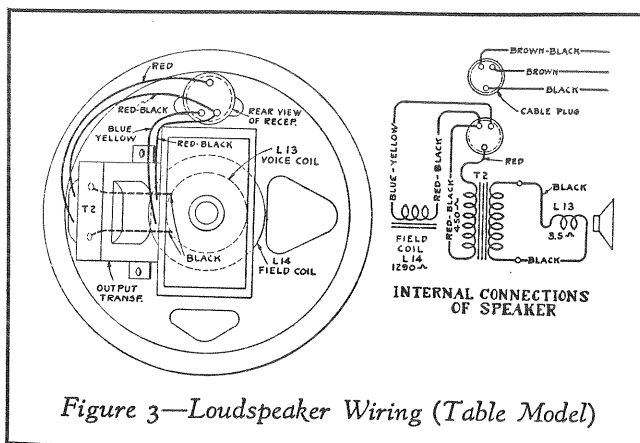


Figure 3—Loudspeaker Wiring (Table Model)

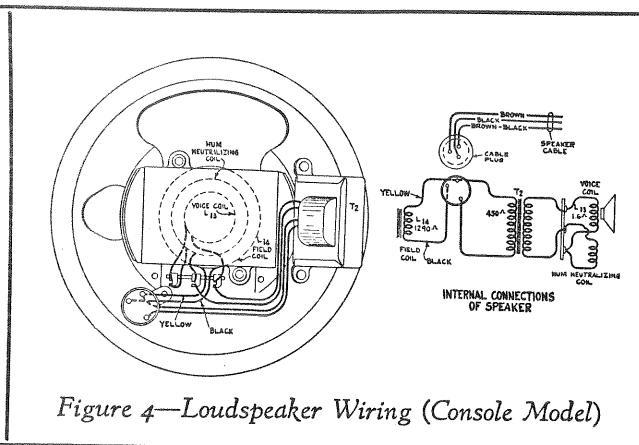


Figure 4—Loudspeaker Wiring (Console Model)

SERVICE DATA

(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:

- (a) 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.

- (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.

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 5. They should be adjusted in the following manner:

- (a) 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.

- (b) 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.
- (c) Retune 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 radio-telegraph 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.

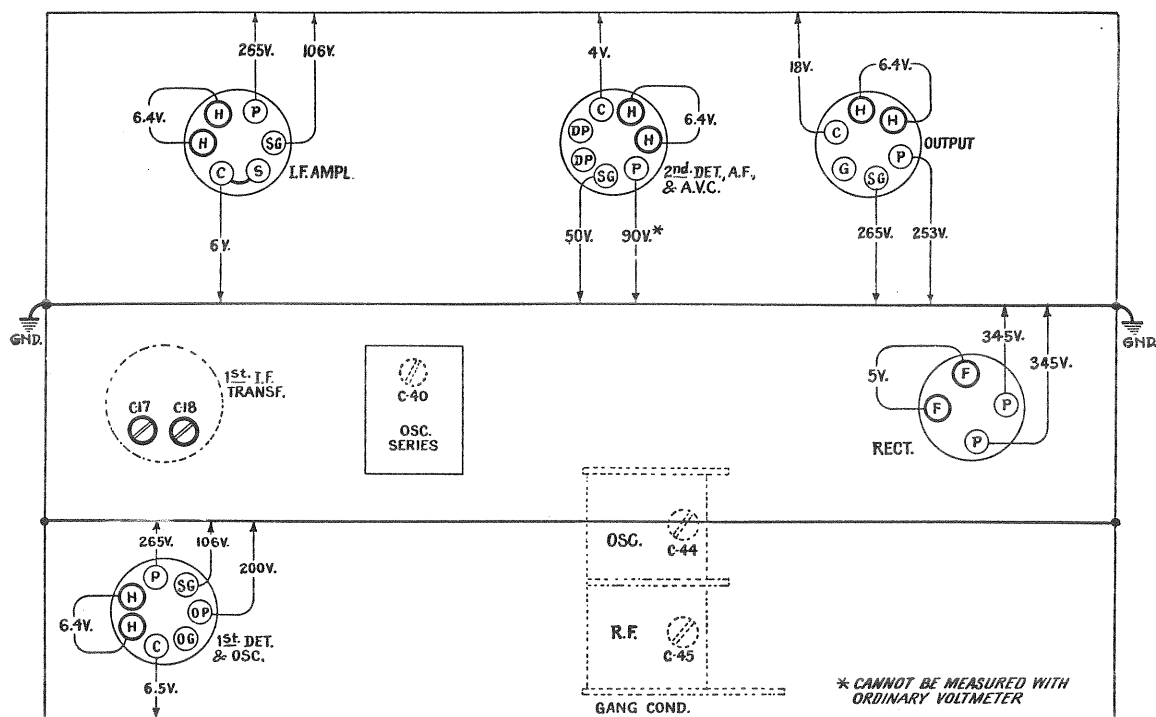


Figure 5—Trimmer Locations and Radiotron Socket Voltages
(Measured at 115 volts line supply—Maximum Volume Control—No Signal)

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					
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.....
4880	Bracket—Tone control switch mounting bracket.....	.12	4784	Socket—4-contact Radiotron socket.....	.15
4427	Bracket—Volume control mounting bracket..	.18	4785	Socket—6-contact Radiotron socket.....	.15
4244	Cap—Grid contact cap—Package of 5.....	.20	4786	Socket—6-contact Radiotron socket.....	.15
3861	Capacitor—Adjustable capacitor (C40).....	.78	4787	Socket—7-contact Radiotron socket.....	.15
4442	Capacitor—50 mmfd. (C8).....	.22	4904	Switch—Range switch (S2, S3, S4).....	.75
4913	Capacitor—375 mmfd. (C43).....	.20	5052	Switch—Tone control switch (S6).....	.30
5044	Capacitor—810 mmfd. (C27).....	.20	4900	Transformer—First intermediate frequency transformer (L9, L10, C17, C18).....	2.25
4914	Capacitor—1350 mmfd. (C41).....	.24	4901	Transformer—Second intermediate frequency transformer (L11, L12, R8, R21, C23)....	1.50
4881	Capacitor—3400 mmfd. (C24).....	.20	4898	Transformer—Power transformer—105-125 volts—25-50 cycles.....	5.55
4912	Capacitor—4800 mmfd. (C42).....	.38	4897	Transformer—Power transformer—105-125 volts—50-60 cycles (T1).....	3.98
4793	Capacitor—0.005 mfd. (C25).....	.20	4899	Transformer—Power transformer—105-125 200-240 volts—40-60 cycles.....	4.05
4868	Capacitor—0.005 mfd. (C32).....	.20	CONDENSER DRIVE ASSEMBLIES		
4792	Capacitor—0.015 mfd. (C28).....	.22	5048	Dial—Station selector dial.....	.38
4906	Capacitor—0.017 mfd. (C31).....	.25	5046	Drive—Tuning condenser drive assembly—Complete.....	1.04
4836	Capacitor—0.05 mfd. (C5, C19).....	.30	4475	Indicator—Station selector (indicator) pointer.	.18
4791	Capacitor—0.1 mfd. (C10, C20).....	.24	4340	Lamp—Station selector dial lamp—Package of 5.....	.60
4841	Capacitor—0.1 mfd. (C30).....	.22	3943	Screen—Translucent screen for dial light—Package of 2.....	.18
3597	Capacitor—0.25 mfd. (C29, C38).....	.40	5047	Shaft—Condenser drive shaft.....	.22
3796	Capacitor—4.0 mfd. (C26).....	.60	3858	Socket—Station selector dial lamp socket....	.26
4428	Capacitor—8.0 mfd. (C36).....	1.05	REPRODUCER ASSEMBLIES (CONSOLE MODEL)		
7790	Capacitor—10.0 mfd. (C35).....	1.05	9579	Coil—Field coil (L14).....	2.10
7589	Capacitor pack—Comprising two 4.0 mfd. capacitors (C16, C34).....	1.64	9533	Cone—Reproducer cone—Mounted and centered on metal housing (L13).....	3.50
4358	Clamp—Capacitor mounting clamp for capacitors—Stock Nos. 7790 and 4428....	.15	5118	Connector—3-contact male connector plug for reproducer.....	.25
4903	Coil—Antenna coil (L1, L2, R2, C5).....	1.58	5119	Connector—3-contact female connector plug for reproducer cable.....	.25
4902	Coil—Oscillator coil (L4, L5, L6).....	1.22	9578	Reproducer—Complete.....	6.58
4896	Condenser—2-gang variable tuning condenser (C6, C9, C44, C45).....	3.48	4818	Transformer—Output transformer (T2).....	2.15
4790	Volume control (R9, S1).....	1.40	REPRODUCER ASSEMBLIES (TABLE MODEL)		
5045	Lead—Single conductor—Shielded lead from volume control to resistor (R10).....	.20	4915	Cable—3-conductor reproducer cable.....	.50
3218	Resistor—600 ohms—Carbon type— $\frac{1}{4}$ watt (R4, R7)—Package of 5.....	1.00	9587	Coil—Field coil, magnet and cone support (L14).....	2.18
5185	Resistor—2200 ohms—Carbon type— $\frac{1}{2}$ watt (R22)—Package of 5.....	1.00	9588	Cone—Reproducer cone (L13)—Package of 5.	3.55
4436	Resistor—5000 ohms—Carbon type— $\frac{1}{4}$ watt (R12)—Package of 10.....	2.00	5118	Connector—3-contact male connector plug for reproducer.....	.25
2240	Resistor—30,000 ohms—Carbon type—1 watt (R5).....	.22	5119	Connector—3-contact female connector plug for reproducer cable.....	.25
3602	Resistor—60,000 ohms—Carbon type— $\frac{1}{4}$ watt (R3, R15, R16)—Package of 5.....	1.00	9586	Reproducer—Complete.....	5.95
3118	Resistor—100,000 ohms—Carbon type— $\frac{1}{4}$ watt (R2)—Package of 5.....	1.00	4893	Transformer—Output transformer (T2).....	1.48
3116	Resistor—200,000 ohms—Carbon type— $\frac{1}{4}$ watt (R13)—Package of 5.....	1.00	MISCELLANEOUS ASSEMBLIES		
6186	Resistor—500,000 ohms—Carbon type— $\frac{1}{4}$ watt (R14)—Package of 5.....	1.00	6755	Bezel—Metal bezel for station selector dial glass.....	.50
4783	Resistor—1,100,000 ohms—Carbon type— $\frac{1}{4}$ watt (R6)—Package of 5.....	1.00	6707	Glass—Station selector dial glass.....	.20
6242	Resistor—2 megohms—Carbon type— $\frac{1}{4}$ watt (R10, R11)—Package of 5.....	1.00	4449	Knob—Package of 5.....	.60
4721	Resistor—Tapped resistor—one 10,000 ohms, two 5,000 ohms and one 500 ohms sections (R17, R18, R19, R20).....	.88	6708	Ring—Retaining ring for dial glass—Package of 5.....	.44
3584	Ring—Oscillator coil retaining ring—Package of 5.....	.40	4917	Screw—Chassis mounting screw and washer (for table model)—Package of 4.....	.15
5049	Screw—First I.F. transformer clamp screw—No. 6-32- $\frac{3}{16}$ " set screw—Package of 5....	.10	5178	Screw—Chassis mounting screw assembly (for console model)—Package of 4.....	.15
4908	Shield—Second I.F. transformer shield.....	.45			
5186	Shield—First I.F. transformer shield.....	.28			
3623	Shield—Oscillator coil shield.....	.30			
3782	Shield—Second detector Radiotron shield.....	.26			
3942	Shield—First Detector and output Radiotron shield.....	.18			