

# RCA VICTOR MODEL 119

## Five-Tube, Two-Band, A. C. Superheterodyne Receiver

### SERVICE NOTES

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#### 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 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.....	3.5 Watts
Loudspeaker.....	6-Inch, Electro-Dynamic

#### PHYSICAL SPECIFICATIONS

Height.....	15 Inches
Width.....	13 $\frac{5}{8}$ Inches
Depth.....	8 $\frac{3}{8}$ Inches

This model contains a five-tube chassis, shock mounted into a table-type cabinet. The superheterodyne type of circuit is used, with such features of design as: Automatic volume control, diode detection, two-point tone control, illuminated full-vision dial scale, resistance-coupled audio system, electrodynamic loudspeaker, and other important points of improvement.

Service convenience has been an especial requirement in the layout and construction of this receiver. A plug-connector attachment is used in the chassis to speaker cable which will allow ready removal of either unit without disturbing the other. Trimmer adjustments are located at accessible points, and their number reduced to the least that is consistent with efficient operation.

#### 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 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.

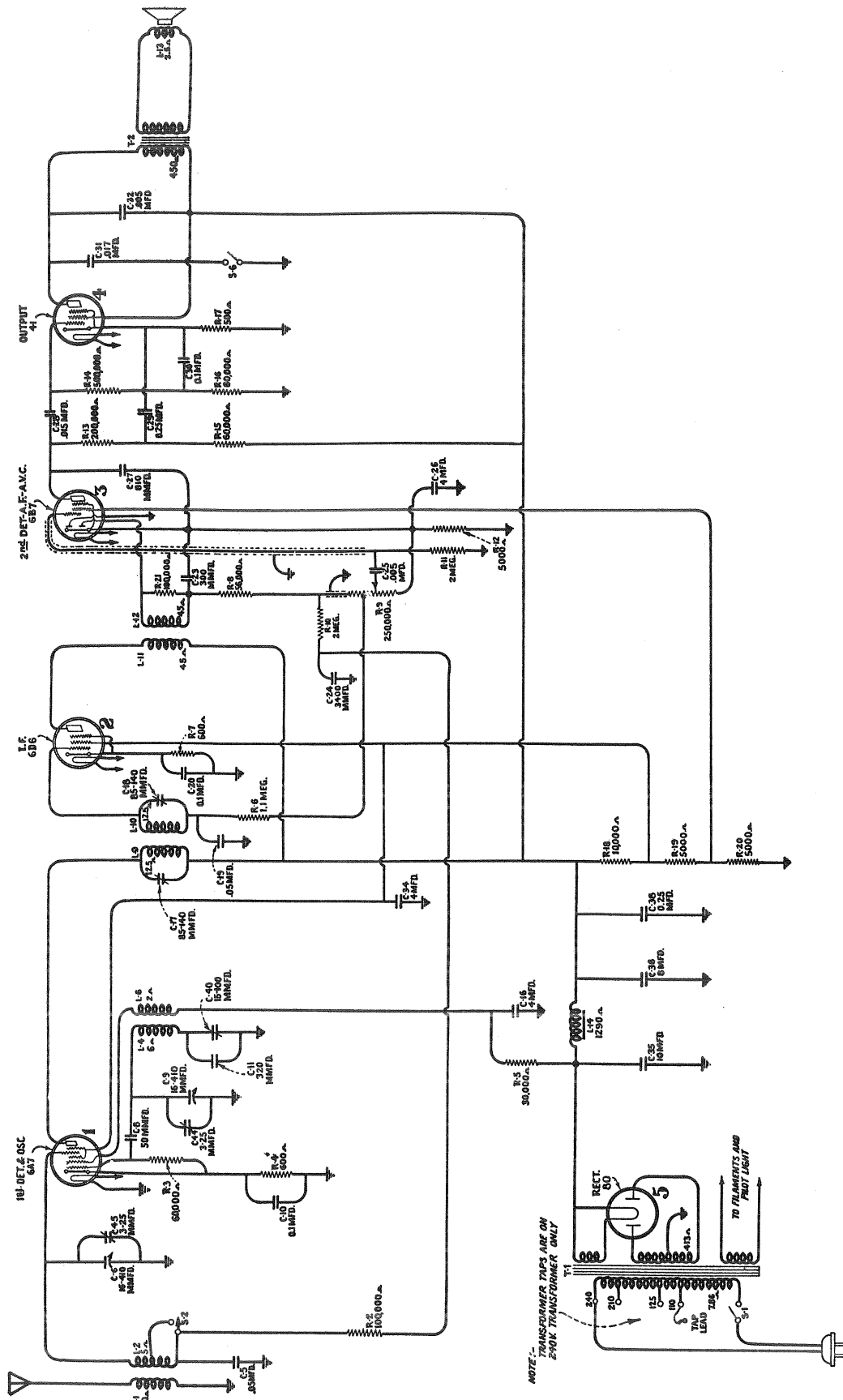


Figure 1—Schematic Circuit Diagram



## SERVICE DATA

### (1) Line-Up Capacitor Adjustment:

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. A number of standard service instruments, which are useful for receiver adjustments, 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 and does not require adjustment. 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 (C18 and C17) of the first i-f transformer for maximum receiver output.

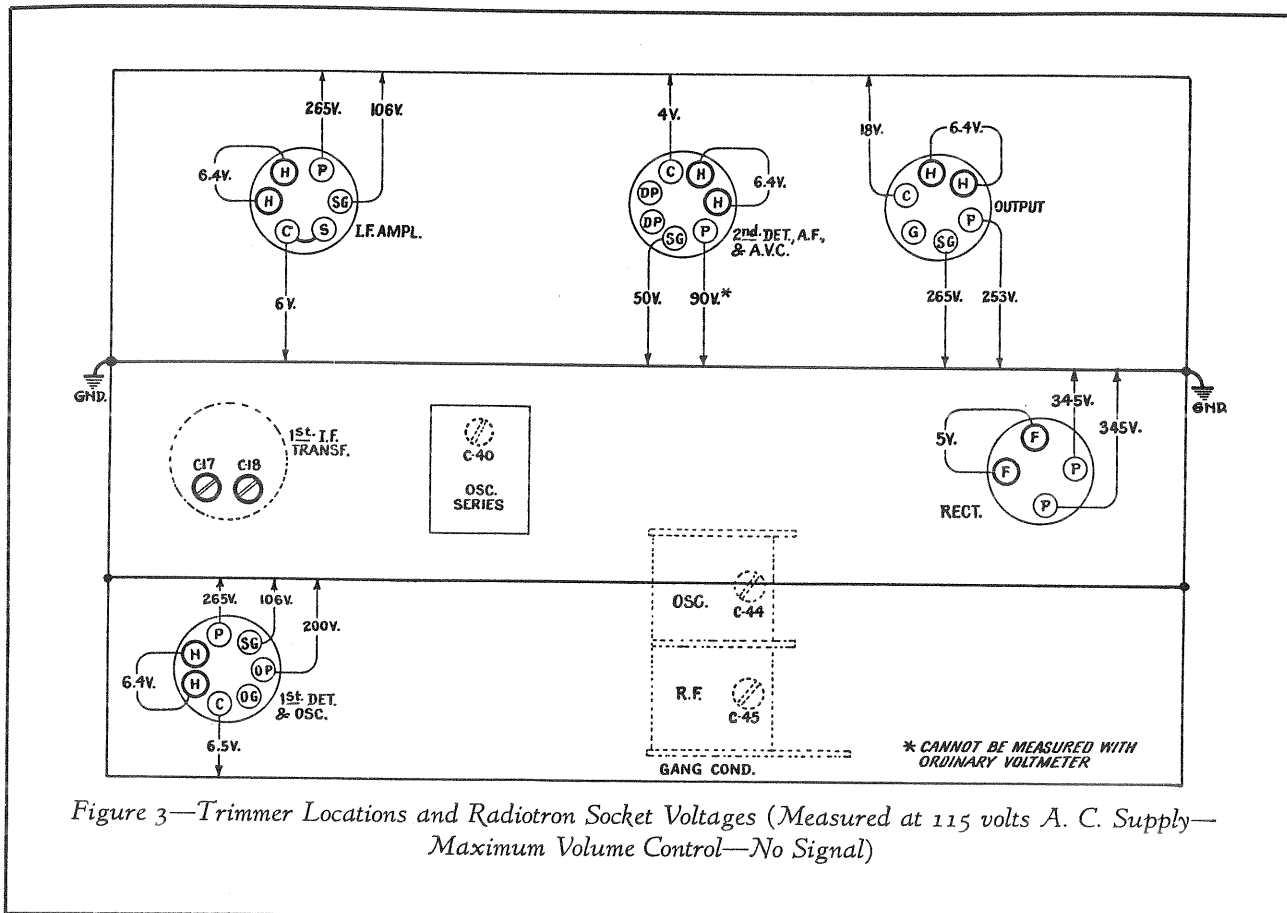


Figure 3—Trimmer Locations and Radiotron Socket Voltages (Measured at 115 volts A. C. Supply—Maximum Volume Control—No Signal)

## 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:

- (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) Re-tune 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 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.

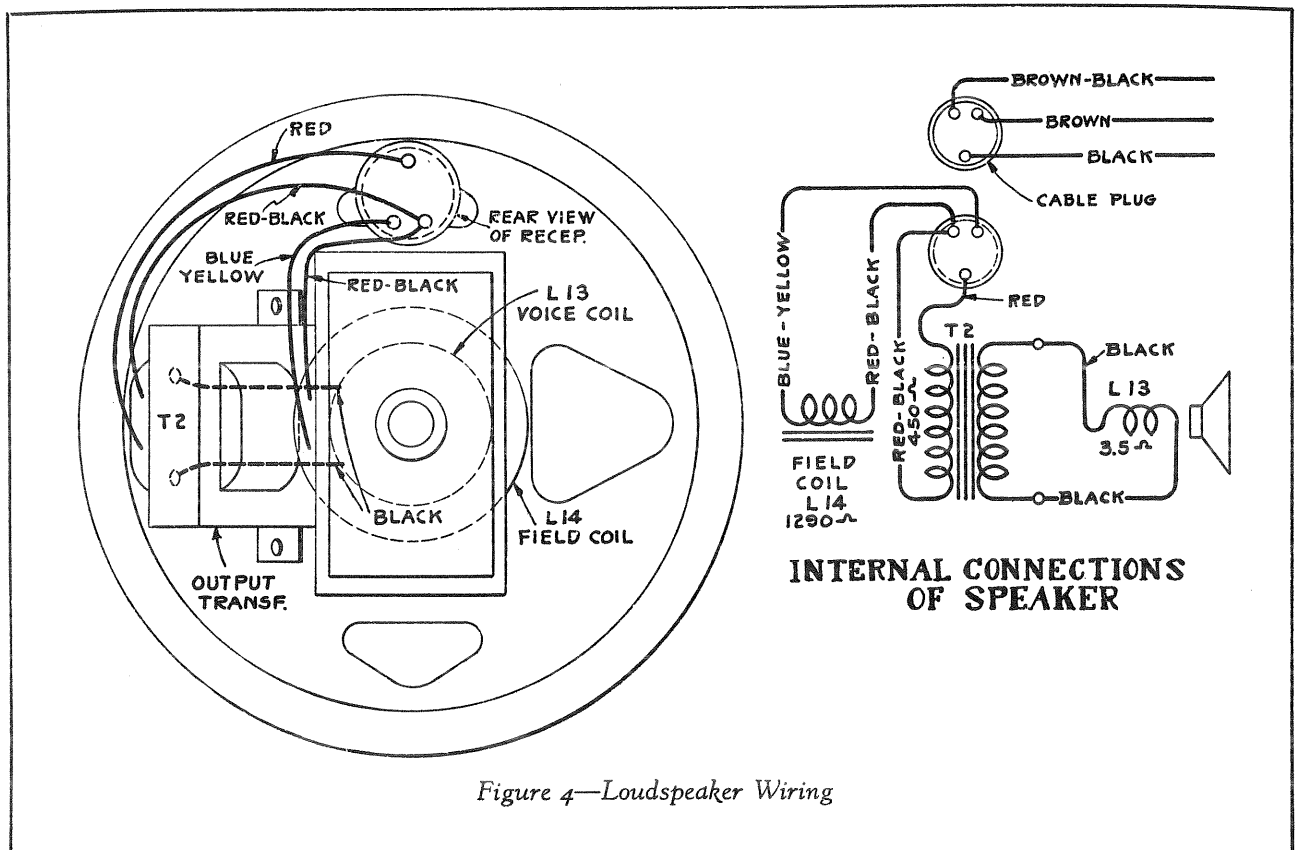


Figure 4—Loudspeaker Wiring

# 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
<b>RECEIVER ASSEMBLIES</b>					
4379	Board—Terminal board—Engraved "ANT-GND".....	\$0.20	3942	Shield—First Detector and output Radiotron shield.....	\$0.18
4244	Cap—Contact cap.....	.20	3782	Shield—Second Detector Radiotron shield....	.26
3861	Capacitor—Adjustable capacitor (C40).....	.78	7487	Shield—I.F. Radiotron shield.....	.25
5094	Capacitor—50 mmfd. (C8).....	.20	5186	Shield—First I.F. transformer shield.....	.28
5151	Capacitor—320 mmfd. (C11).....	.20	4908	Shield—Second I.F. transformer shield.....	.45
5044	Capacitor—810 mmfd. (C27).....	.20	3858	Socket—Dial lamp socket.....	.26
4881	Capacitor—3400 mmfd. (C24).....	.20	4784	Socket—4-contact Radiotron socket.....	.15
4793	Capacitor—0.005 mfd. (C25).....	.20	4785	Socket—6-contact Radiotron socket.....	.15
4868	Capacitor—0.005 mfd. (C32).....	.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
4836	Capacitor—0.05 mfd. (C5, C19).....	.30	4905	Switch—Tone control switch (S5).....	.30
4841	Capacitor—0.1 mfd. (C10, C20, C30).....	.22	4900	Transformer—First intermediate frequency transformer (L9, L10, C17, C18).....	2.25
3597	Capacitor—0.25 mfd. (C29, C38).....	.40	4901	Transformer—Second intermediate frequency transformer (L11, L12, C23, R8, R21)....	1.50
3796	Capacitor—4.0 mfd. (C26).....	.60	4898	Transformer—Power transformer—105-125 volts—25-50 cycles.....	5.55
4428	Capacitor—8.0 mfd. (C36).....	1.05	4897	Transformer—Power transformer—105-125 volts—50-60 cycles (T1).....	3.98
7790	Capacitor—10.0 mfd. (C35).....	1.05	4899	Transformer—Power transformer—105-125/200-240 volts—40-60 cycles.....	4.05
7589	Capacitor pack—Comprising two 4.0 mfd. capacitors (C16, C34).....	1.64	4429	Volume control (R9, S1).....	1.40
4358	Clamp—Capacitor mounting clamp for Stock No. 4428 and No. 7790.....	.15	<b>REPRODUCER ASSEMBLIES</b>		
5051	Coil—Antenna coil (L1, L2, C5, R2).....	1.28	4915	Cable—3 conductor reproducer cable—Complete with 3-contact female connector....	.50
5050	Coil—Oscillator coil (L4, L6).....	.56	9587	Coil—Field coil, magnet and cone support (L14).....	2.18
4896	Condenser—2-gang variable tuning condenser (C6, C9, C44, C45).....	3.48	9588	Cone—Reproducer cone (L13)—Package of 5.....	3.55
3708	Resistor—600 ohms—Carbon type— $\frac{1}{4}$ watt (R4, R7)—Package of 5.....	1.00	5118	Connector—3-contact male connector for reproducer cable.....	.25
4436	Resistor—5000 ohms—Carbon type— $\frac{1}{4}$ watt (R12)—Package of 10.....	2.00	5119	Connector—3-contact female connector for reproducer cable.....	.25
2240	Resistor—30,000 ohms—Carbon type—1 watt (R5).....	.22	9586	Reproducer—Complete.....	5.95
3602	Resistor—60,000 ohms—Carbon type— $\frac{1}{4}$ watt (R3, R15, R16)—Package of 5.....	1.00	4893	Transformer—Output transformer (T2).....	1.48
3118	Resistor—100,000 ohms—Carbon type— $\frac{1}{4}$ watt (R2)—Package of 5.....	1.00	<b>MISCELLANEOUS ASSEMBLY</b>		
3116	Resistor—200,000 ohms—Carbon type— $\frac{1}{4}$ watt (R13)—Package of 5.....	1.00	5111	Dial—Station selector dial scale.....	.32
6186	Resistor—500,000 ohms—Carbon type— $\frac{1}{4}$ watt (R14)—Package of 5.....	1.00	4132	Knob—Station selector knob—Package of 5..	.55
4783	Resistor—1,100,000 ohms—Carbon type— $\frac{1}{4}$ watt (R6)—Package of 5.....	1.00	4449	Knob—Volume control, range switch, or tone control knob—Package of 5.....	.60
6242	Resistor—2 megohms—Carbon type— $\frac{1}{4}$ watt (R10, R11)—Package of 5.....	1.00	4340	Lamp—Station selector dial lamp—Package of 5	.60
4721	Resistor—Tapped resistor—One 500 ohm, two 5,000 ohm, and one 10,000 ohm sections (R17, R18, R19, R20).....	.88	4909	Pointer—Station selector pointer.....	.15
3584	Ring—Oscillator coil retaining ring.....	.40	3886	Reflector—Station selector dial reflector.....	.30
3623	Shield—Oscillator coil shield.....	.30	4917	Screw—Chassis mounting screw—Comprising one screw, and one washer—Package of 4	.15