

# RCA VICTOR MODEL 4T

## Four-Tube, Single-Band, A-C, Superheterodyne-Reflex Receiver

### TECHNICAL INFORMATION

#### Electrical Specifications

##### RADIOTRON COMPLEMENT

- |  |                                    |
|--|------------------------------------|
| (1) RCA-6A7.....First Detector-Oscillator        | (3) RCA-41.....Power Output        |
| (2) RCA-6B7....I-F., 2nd Det., Audio, and A.V.C. | (4) RCA-1V.....Half-Wave Rectifier |

Frequency Range.....540-1,720 kc.  
Intermediate Frequency.....460 kc.  
Alignment Frequencies.....460 kc. (I.F.), 1,500 kc. (antenna and oscillator)

##### POWER SUPPLY RATINGS

Rating A.....105-125 volts, 50-60 cycles, 50 watts  
Rating B.....105-125 volts, 25-60 cycles, 50 watts  
Rating C.....100-130/140-160/195-250 volts, 40-60 cycles, 50 watts

##### POWER OUTPUT

Undistorted.....1.75 watts  
Maximum.....2.5 watts

##### LOUDSPEAKER

Type.....Electrodynamic  
Impedance (V.C.).....3.2 ohms at 400 cycles

Pilot Lamp.....Mazda No. 46, 6.3 volts, 0.25 amperes

#### Mechanical Specifications

##### CABINET DIMENSIONS

Height.....14 $\frac{3}{4}$  inches    Width.....11 $\frac{1}{4}$  inches    Depth.....6 $\frac{1}{4}$  inches  
Weight (Net).....13 pounds    Weight (Shipping).....16 pounds  
Chassis Base Dimensions.....9 $\frac{3}{4}$  inches x 5 $\frac{1}{2}$  inches x 2 inches  
Over-all Height of Chassis.....6 $\frac{1}{2}$  inches  
Operating Controls.....(1) Tuning, (2) Power Switch—Volume

#### General Features

This model contains a four-tube chassis mounted in a table-type cabinet. The superheterodyne circuit is used, incorporating such features of design as automatic volume control, magnetite core adjusted i-f transformers, diode detection, reflexed audio system,

electrodynamic speaker, and improved antenna wave-trap. The frequency range extends from 540 to 1,720 kc. which covers the regular broadcast band and includes police calls in the 1,600 to 1,720 kc. portion of the range.

#### Circuit Description

Four Radiotrons are associated in combination with a superheterodyne circuit. Two of the Radiotrons are applied so as to obtain plural functions. The first tube, an RCA-6A7 pentagrid converter tube, is employed as a combination first detector and oscillator. The second tube, an RCA-6B7, performs the functions of i-f amplification, diode detection, audio amplification, and automatic volume control. A power-amplifier pentode, RCA-41, is used in the output stage.

Half-wave rectification is used in the power-supply stage. The speaker field winding serves as a reactor in the filter circuit.

The radio-frequency and intermediate-frequency stages are intercoupled by means of transformers. The antenna transformer couples directly into the first detector, having its secondary tuned by one section (front) of the two-gang tuning condenser. The oscillator system is tuned by the second (rear) section

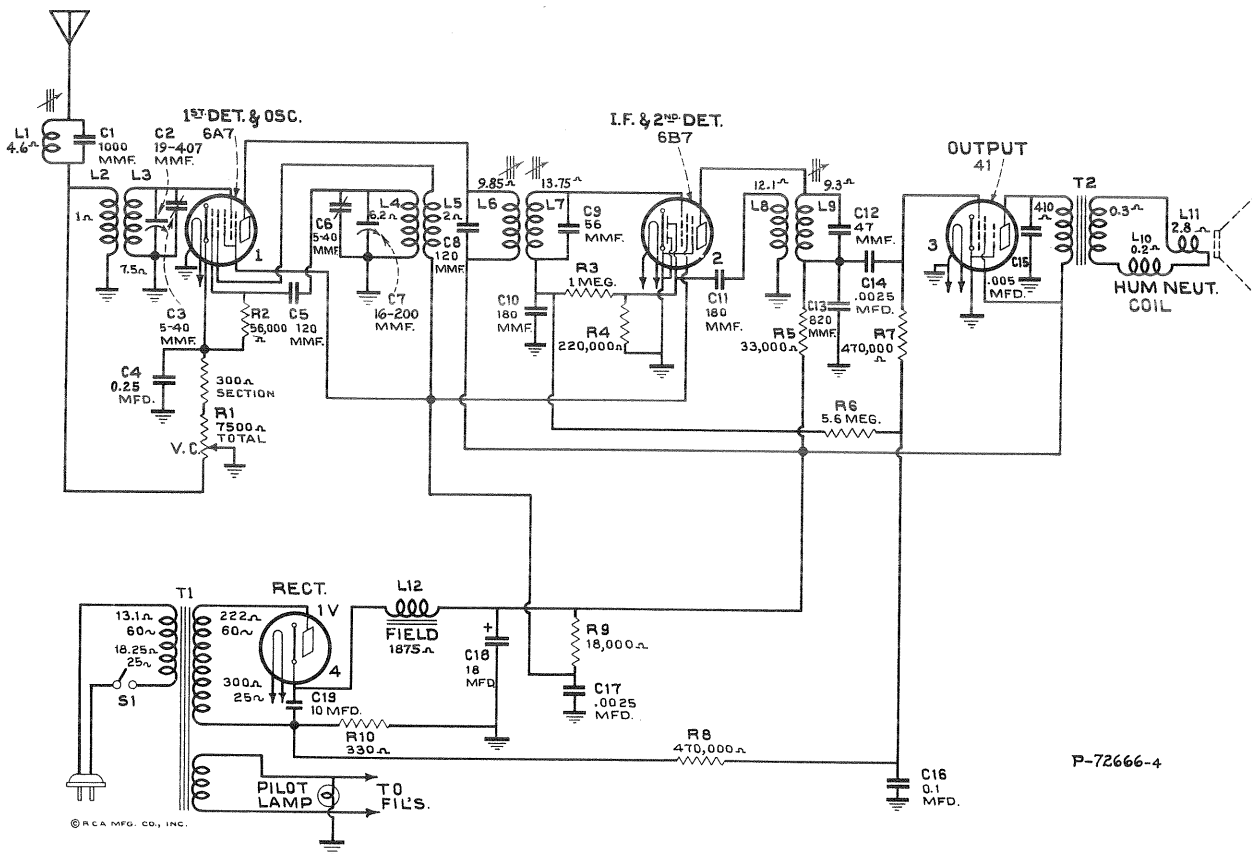


Figure 1—Schematic Circuit Diagram

\* On some instruments C-4 is .05 mfd. Make all replacements with Stock No. 4840.

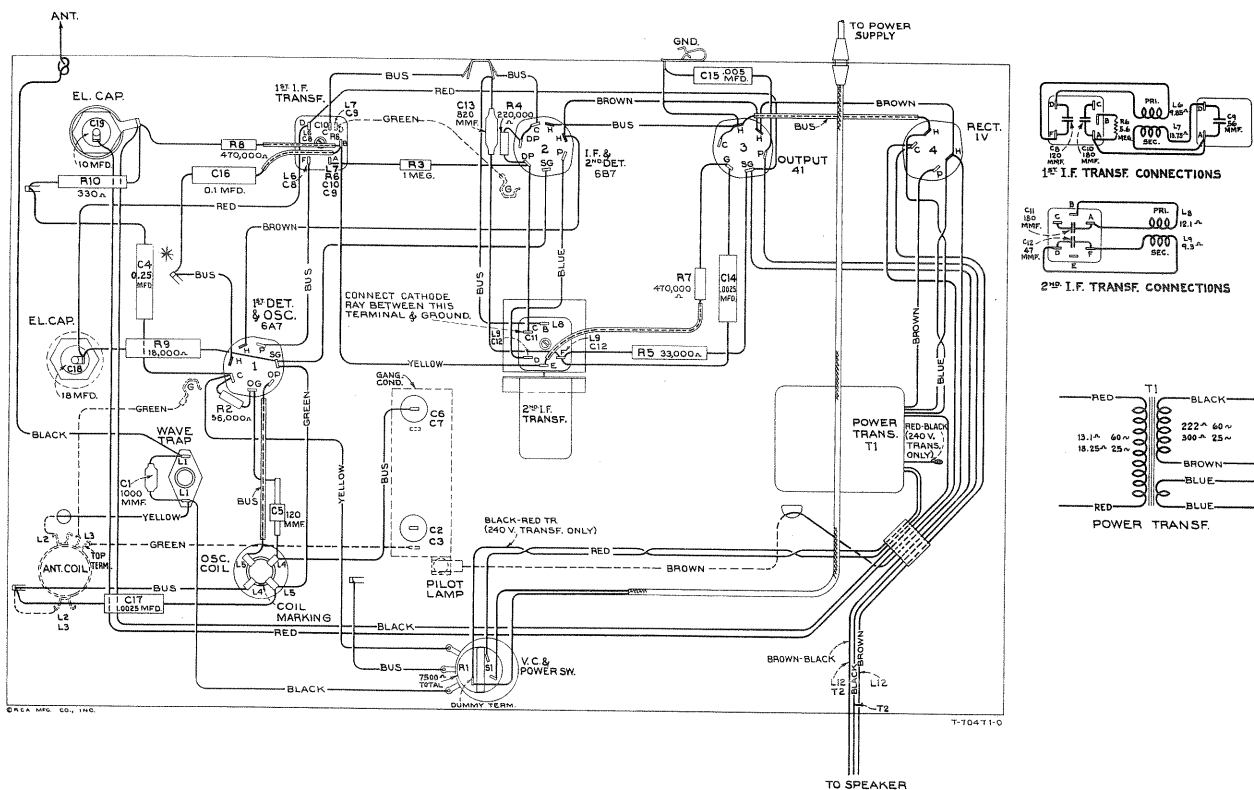


Figure 2—Chassis Wiring Diagram

of the condenser. Adjustable magnetite-core trimmers are provided for adjusting the inductance of the windings of the input i-f transformer (primary and secondary) and the output transformer (primary) so as to resonate at 460 kc. with the fixed capacitors shunting these respective coils. The i-f signal originating in the first-detector circuit is transferred to the control grid of the RCA-6B7, amplified in the pentode section, coupled back to the diode section of this same tube where it is rectified before passing through resistor R-4. A fraction of the audio component developed across resistor R-4 appears across

resistor R-6 from whence it is transferred to the control grid of the Radiotron 6B7 through winding L-7; L-7 and capacitor C-10 offering low and high reactance respectively to audio frequencies. The amplified audio signal, in the plate circuit of the RCA-6B7, developed across resistor R-5 is coupled to the control grid of the power-output tube for final amplification. The output of this stage is coupled to the loudspeaker through the output transformer T-4. The d-c signal component, of the diode rectified current, developed across resistor R-4, increases the bias of the RCA-6B7, thereby reducing its gain and giving A.V.C. action.

## SERVICE DATA

*NOTE: Oscillation may occur in receiver if external ground connection is not used.*

The various diagrams of this booklet contain such information as will be needed to locate causes for defective operation if such develops. The values of resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams.

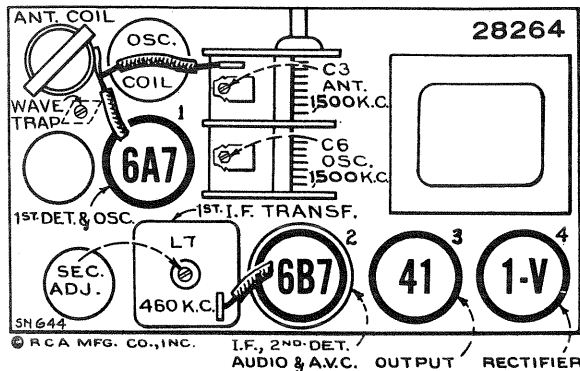


Figure 3—Radiotron, Coil, and Trimmer Locations

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 resistance only. Ratings of less than one ohm are generally omitted.

### 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 molded magnetite cores.

All of the adjustable circuits of this receiver have been properly aligned at the factory to give correct performance and their settings should remain intact indefinitely when the receiver is used under ordinary conditions. However, necessity for re-adjustment may occasionally occur from continued extremes of temperature, climate, tampering or purported alteration for services, or after repairs have been made to the r-f or i-f tuned circuits. Improper alignment usually

causes the impairment of sensitivity, selectivity, and tone quality. Such conditions will usually exist 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 such as the RCA Stock No. 9595 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 following procedure should be observed in adjusting the various trimming capacitors and molded magnetite cores:

#### I-F Core Adjustments

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 3 and 7. Each circuit must be aligned to a basic frequency of 460 kc. To do this, attach the output indicator across the loudspeaker voice coil or across the output transformer primary. Connect the output of the test oscillator to the RCA-6A7 control grid, the ground of the test oscillator being connected to the receiver ground terminal. Adjust the test oscillator to 460 kc. Advance the receiver tuning control to a point within its range where no interference is encountered either from local broadcast stations or local oscillator. Set the volume control to its maximum position. Increase the output of the test oscillator until a slight indication is apparent on the output indicator. Adjust the bottom screw of the second i-f transformer to produce maximum (peak) indicated receiver output. Then adjust the two screws 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 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 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 black antenna lead through a 300-ohm resistor, the ground connection of the test oscillator remaining the same. Leave the test oscillator adjusted to 460 kc. as before. Turn the rotor plates of the two-gang tuning condenser completely out of mesh. Then adjust the wave-trap trimmer to the point which causes maximum suppression of the 460 kc. signal.

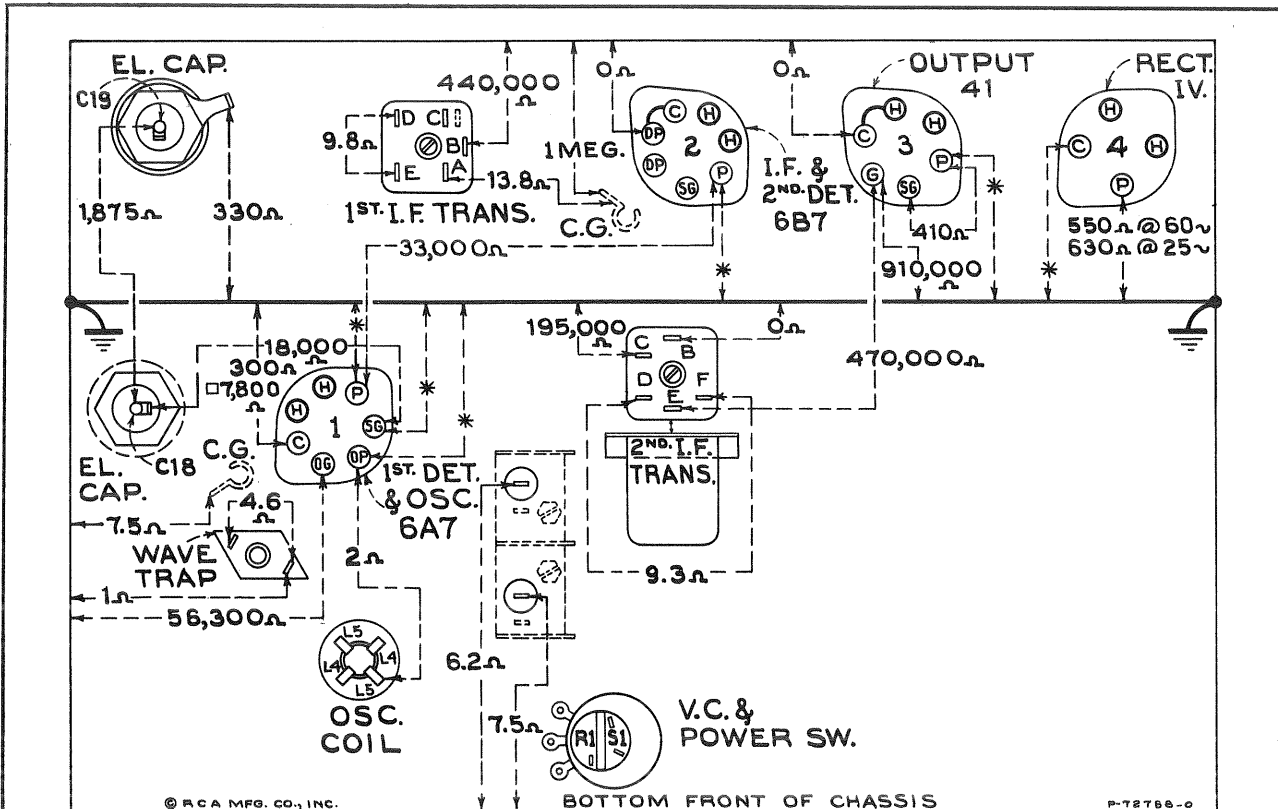
## R-F Trimmer Adjustments

Calibrate the tuning dial by first loosening its set screw and then rotating dial until the extreme end calibration mark (beyond 55 on dial) is in alignment

with the dial shadow-indicator while the two-gang tuning condenser plates are in full mesh. Re-tighten set screw.

The output meter should be left connected to the output system. The connections for the test oscillator remain the same as for "Wave-trap adjustment."

Adjust the test oscillator to 1,500 kc. and set the receiver tuning control to a dial reading of 1,500 kc. Leave the volume control at its maximum position. Regulate the output of the test oscillator until a slight indication is perceptible at the receiver output. Then adjust the two trimming capacitors C-6 and C-3 of the oscillator and antenna coils, Figure 3, so that each produces maximum (peak) receiver output.



NOTE: □ VOLUME CONTROL AT "MIN." POSITION.  
\* OPEN CIRCUIT (LEAKAGE OF ELECTROLYTIC CAPACITORS ONLY).

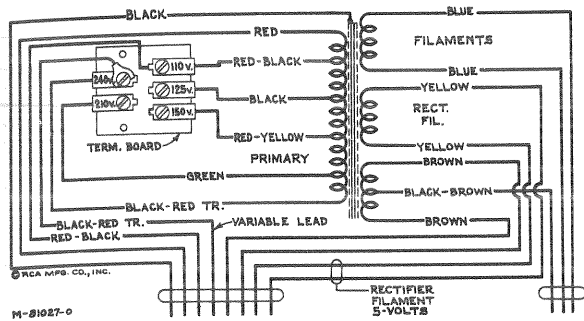
Figure 4—Resistance Diagram

Power Supply Disconnected—Radiotrons in sockets—Tuning Condenser in full mesh—  
Volume Control Maximum

## Resistance Measurement

The resistance values shown between Radiotron socket contacts, grid caps, resistors, terminals, and receiver chassis ground, on Figure 4, have been carefully selected so as to facilitate a rapid continuity check of the circuits. The use of this diagram in conjunction with the Schematic Circuit Diagram, Figure 1, and Chassis Wiring Diagram, Figure 2, will permit the location of certain troubles which might otherwise be difficult to ascertain. Each value as specified should hold within  $\pm 20\%$ . Variations in excess of this limit will usually be indicative of trouble in

circuit under test. Resistance values were measured with the Radiotrons in sockets; tuning condenser in full mesh, 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 negative terminal of the resistance meter to chassis-ground. If the polarity of the resistance meter is not known, it may be readily ascertained by connecting a d-c voltmeter of indicated polarity across the terminals of the device.



Primary Resistance - 23.6 ohms Total  
Secondary Resistance - 180 ohms Total

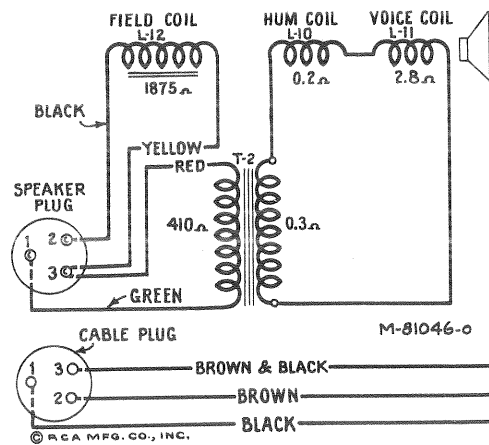
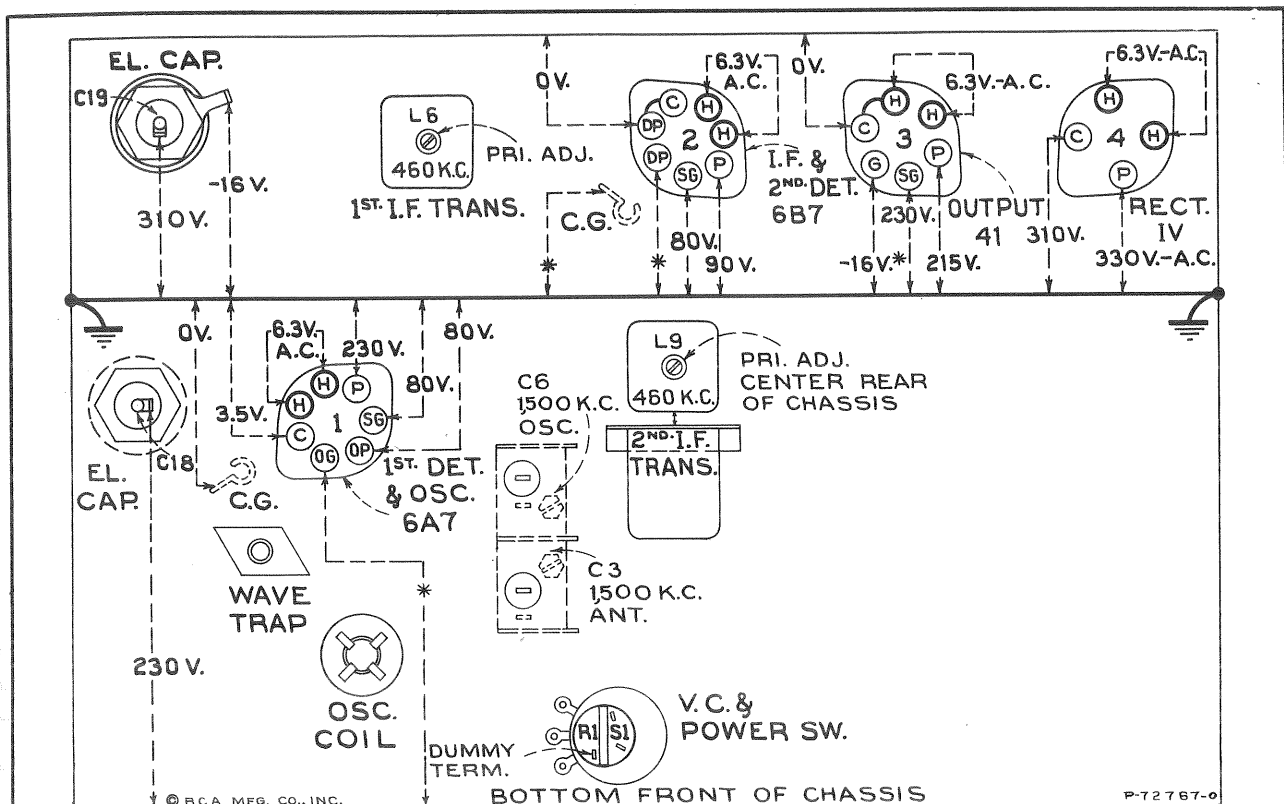


Figure 6—Loudspeaker Wiring



\* CANNOT BE MEASURED WITH ORDINARY VOLTMETER.

Figure 7—Radiotron Socket Voltages and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc.—No signal being received—Volume Control Maximum

### Radiotron Socket Voltages

The voltage values indicated from the Radiotron socket contacts, grid caps, resistors, and terminals to receiver chassis ground on Figure 7 will assist in locating cause for faulty operation. Each value as specified should hold within  $\pm 20\%$  when the receiver is normally operative at its rated line voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. These voltages were measured with receiver tuned to ap-

proximately 1,000 kc., no signal being received and volume control set at maximum. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the voltage to be measured. A-C voltages were measured with a corresponding a-c meter.

# 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>					
6956	Cap—Radiotron shield top for Stock No. 3942 .....	.15	12607	Shield—First I.F. transformer shield cap..	.30
12118	Cap—Grid contact cap—Package of 5...	.15	11126	Shield—Oscillator coil shield.....	.12
12405	Capacitor—47 Mmfd. (C12).....	.26	3942	Shield—Radiotron shield.....	.18
12629	Capacitor—56 Mmfd. (C9).....	.20	12408	Shield—Second I.F. transformer shield...	.28
12404	Capacitor—120 Mmfd. (C8).....	.26	4794	Socket—4-contact rectifier RCA-1V Radiotron socket.....	.15
12634	Capacitor—120 Mmfd. (C5).....	.20	4786	Socket—6-contact RCA-41 Radiotron socket .....	.15
12406	Capacitor—180 Mmfd. (C10, C11).....	.26	4787	Socket—7-contact RCA-6A7 or RCA-6B7 Radiotron socket.....	.15
12536	Capacitor—820 Mmfd. (C13).....	.25	12625	Socket—Dial lamp socket, bracket and indicator .....	.28
12635	Capacitor—1,000 Mmfd. (C1).....	.25	12007	Spring—Retaining spring for Stock No. 12006—Package of 10.....	.36
5107	Capacitor—.0025 Mfd. (C14, C17).....	.16	12627	Transformer—First I.F. transformer (L6, L7, C8, C9, C10, R6).....	1.84
4838	Capacitor—.005 Mfd. (C15).....	.20	11664	Transformer—Power transformer, 105-125 volts, 50-60 cycles (T1).....	3.60
4841	Capacitor—0.1 Mfd. (C16).....	.22	11665	Transformer—Power transformer, 105-125 volts, 25-60 cycles (T1).....	5.06
4840	Capacitor—0.25 Mfd. (C4).....	.30	11666	Transformer—Power transformer, 100-130, 140-160, 195-250 volts, 40-60 cycles .....	3.80
11240	Capacitor—10 Mfd. (C19).....	1.08	12630	Transformer—Second I.F. transformer (L8, L9, C11, C12).....	1.44
5212	Capacitor—18 Mfd. (C18).....	1.16	12631	Trap—Wave trap (L1).....	.65
11661	Coil—Antenna coil (L2, L3).....	.52	11663	Volume Control—Volume control and operating switch (R1, S1).....	1.20
11662	Coil—Oscillator coil (L4, L5).....	.56	<b>REPRODUCER ASSEMBLIES</b>		
12624	Condenser—2-gang variable tuning condenser (C2, C3, C6, C7).....	2.50	12446	Coil—Neutralizing coil (L10).....	.22
12006	Core—Core and stud assembly for Stock Nos. 12627, 12630 and 12631.....	.22	12576	Coil—Reproducer field coil (L12).....	1.70
12632	Dial—Indicator dial scale.....	.45	12574	Cone—Reproducer cone complete (L11).....	1.35
12626	Indicator—Tuning indicator for Stock No. 12625—Package of 10.....	.22	5118	Connector—3-contact male connector plug for Reproducer.....	.25
4340	Lamp—Dial lamp—Package of 5.....	.60	5119	Connector—3-contact female connector plug for Reproducer.....	.25
11670	Resistor—330 ohms, carbon type, 1 watt (R10)—Package of 5.....	1.10	9698	Reproducer, complete.....	5.70
11671	Resistor—18,000 ohms, carbon type, 2 watt (R9).....	.22	12575	Transformer—Output transformer (T2).....	1.60
11669	Resistor—33,000 ohms, carbon type, 1 watt (R5)—Package of 5.....	1.10	<b>MISCELLANEOUS ASSEMBLIES</b>		
12286	Resistor—56,000 ohms, Insulated, 1/4 watt (R2)—Package of 5.....	1.00	11347	Knob—Station selector knob—Package of 5 .....	.75
12264	Resistor—220,000 ohms, Insulated, 1/4 watt (R4)—Package of 5.....	1.00	12638	Knob—Volume control knob—Package of 5 .....	.58
12285	Resistor—470,000 ohms, Insulated, 1/4 watt (R7, R8)—Package of 5.....	1.00	11349	Spring—Retaining spring for knob, Stock Nos. 11347 and 12638—Package of 5.....	.15
12200	Resistor—1 megohm, Insulated, 1/4 watt (R3)—Package of 5.....	1.00			
12628	Resistor—5.6 megohm, carbon type, 1/10 watt (R6)—Package of 5.....	.75			
12633	Screw—Set screw for dial, Stock No. 12632—Package of 10.....	.18			
12008	Shield—First I.F. transformer shield.....	.28			

The prices quoted above are subject to change without notice.

### SERVICE HINTS

- (1) Hum or distortion when tuned to a station may be due to improper connection of resistor R-2.