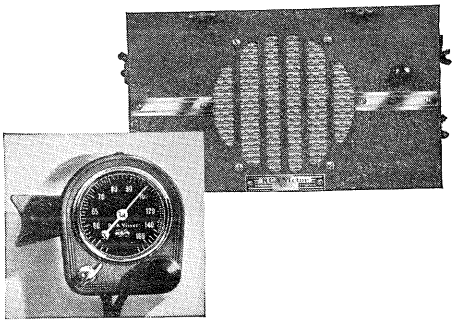
RCA Victor
Automobile Radio M-107

SERVICE NOTES



SERVICE DIVISION

RCA Victor Company, Inc.

Camden, N. J., U. S. A.

A RADIO CORPORATION OF AMERICA SUBSIDIARY

REPRESENTATIVES IN PRINCIPAL CITIES

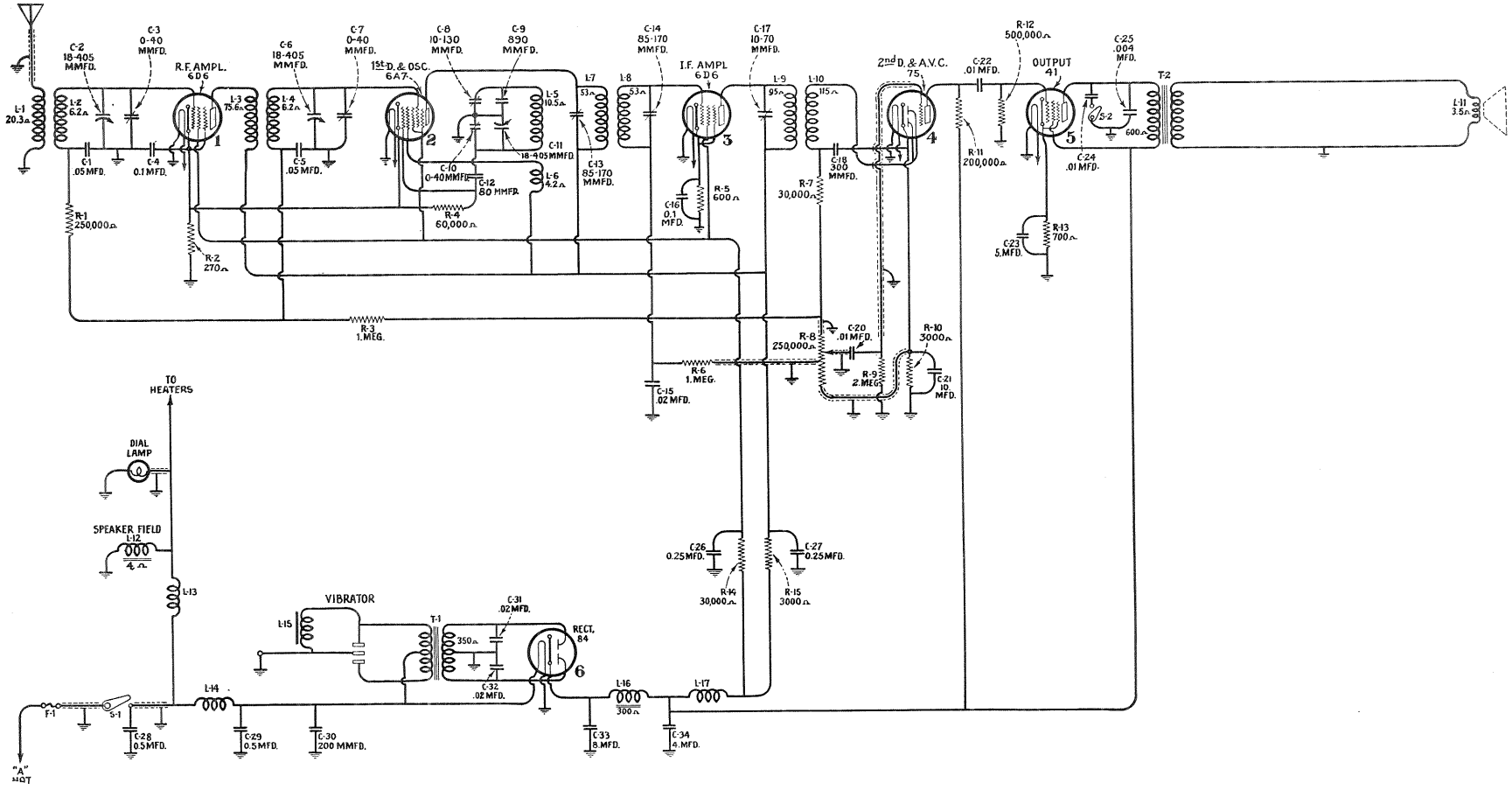


Figure 1—Schematic Circuit Diagram

RCA VICTOR MODEL M-107

Six-Tube Automobile Receiver

SERVICE NOTES

ELECTRICAL SPECIFICATIONS

Type and Number of Radiotrons Used—2 RCA-6D6, 1 RCA-6A7, 1 RCA-75, 1 RCA-41, 1 RCA-84

Battery Current (6.3-Volt Battery): —Total, 6

Speaker Field (Cold)	1.35 Amperes
Tubes	2.1 Amperes
Dial Lamp	0.15 Ampere
Power Supply (No Signal)	3.15 Amperes
Total (No Signal)	6.75 Amperes
Tuning Frequency Range	540 K. C.–1600 K. C.
Maximum Undistorted Output	1.9 Watts
Maximum Output	3.35 Watts
Line-up Frequencies	175 K. C.–600 K. C.–1400 K. C.

PHYSICAL SPECIFICATIONS

Height	7½ Inches
Width	12 Inches
Depth (Case Alone)	7 Inches

This six-tube automobile receiver incorporates the latest mechanical and electrical refinements for furnishing a rugged, fool-proof, mobile-type receiver having performance equivalent to that of a high-quality home receiver. Ease of installation, accessibility for servicing and ruggedness of construction are features of unusual interest.

In performance the receiver is characterized by unusual tone quality, adequate output, high sensitivity and excellent selectivity. Full control of all features is made possible by having the station selector, volume control and operating switch accessible on the steering column control and two-point tone control on the front of the receiver proper.

The construction of the unit embodies several new features of particular interest to the service man. The receiver case is mounted to the dash of the car by means of a single bolt. The case of the receiver is made in two sections so that the chassis may be dropped down for inspection or tube replacement, merely by removing and loosening several thumb nuts and screws. The receiver proper is divided into three units, the power supply including a plug-in type vibrator, a loudspeaker unit including the output transformer, and the receiver chassis. Each of these several units may be removed for replacement or repair merely by the use of a screwdriver and soldering iron.

ELECTRICAL DESCRIPTION OF CIRCUIT

The circuit is of the superheterodyne type, having features such as automatic volume control, diode second detector, two-point tone control and a Pentode output stage. The power supply consists of a plug-in type vibrator-inverter and tube rectifier and a specially designed filter system which eliminates all traces of vibrator R. F. interference from the power supply.

Examining the circuit closely we find the following functions taking place while the receiver is in operation.

The signal enters the receiver through the shielded antenna lead-in and the antenna coupling coil. The signal voltage is applied to the grid of the first R. F. tube by means of the secondary coupling coil, which is tuned by means of the first unit of the three-gang tuning capacitor. The R. F. tube is a Radiotron RCA-6D6, which is a super-control R. F. amplifying Radiotron which gives a minimum amount of cross modulation, hum modulation and modulation distortion. This tube has the general characteristics of the RCA-58.

The output of the R. F. stage is fed to the Radiotron RCA-6A7, which is a combined oscillator and first

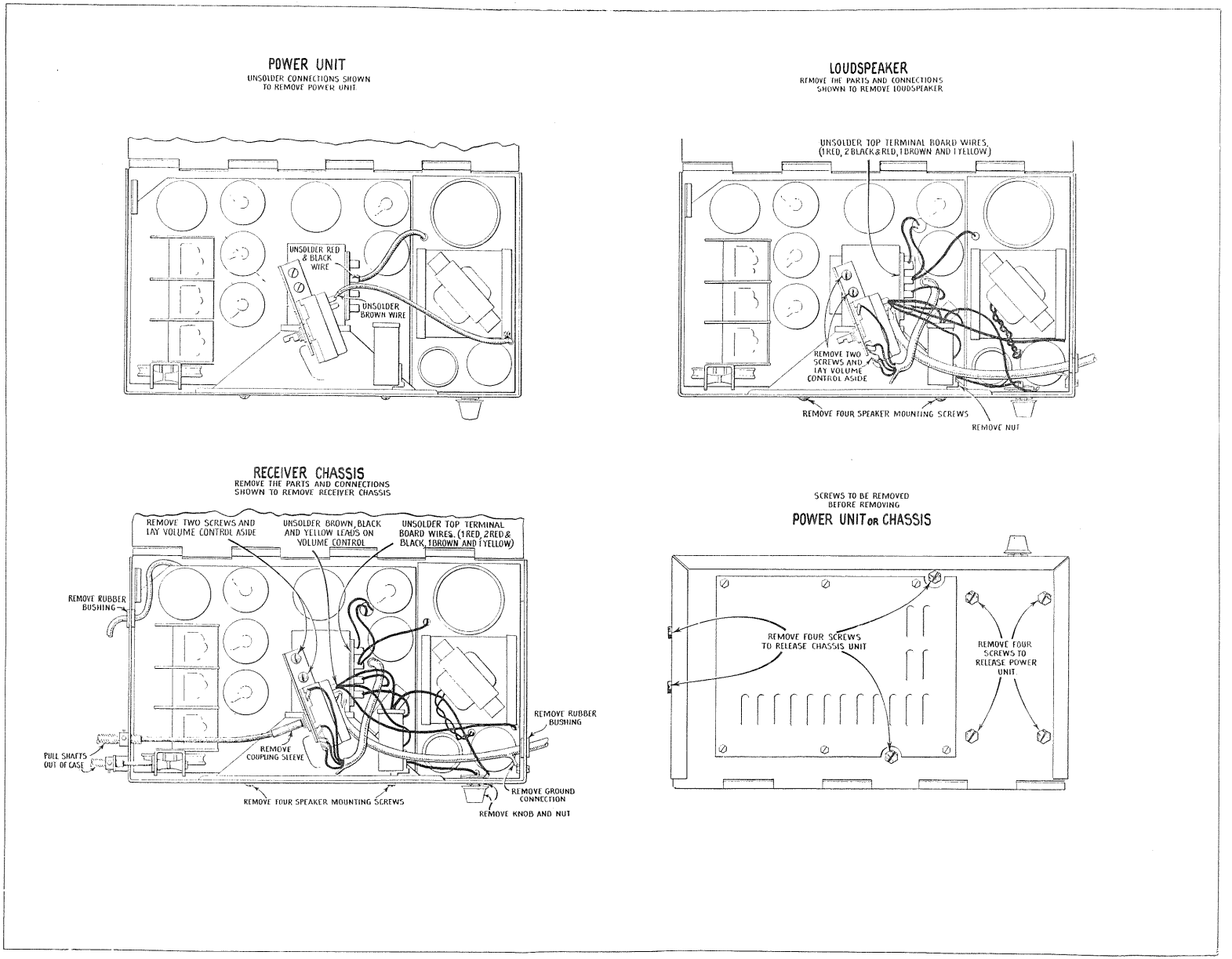


Figure 2—Details of Removing Units from Chassis

detector. The detector grid circuit is tuned to the signal, whereas the oscillator grid circuit is tuned to a frequency 175 K. C. higher than the signal. The use of a suitable bridge circuit provides a method whereby the tuning capacitor maintains this same frequency difference throughout its tuning range. The output of the detector is the difference or beat frequency provided by combining the signal and oscillator frequency and is the I. F. frequency of the receiver. A single I. F. stage using Radiotron RCA-6D6 and two I. F. transformers. Three tuned circuits are provided for selecting and amplifying the I. F. signal. The output of this stage is applied to the second detector.

The next tube is an RCA-75, which is a combined second detector, automatic volume control and audio amplifier. The signal is applied to the diode sections of this tube, which act as a two-element rectifier. The direct current component of the rectified signal produces a voltage drop across resistor R-8. This voltage drop constitutes the automatic bias voltage for the R. F., 1st detector and I. F. amplifier which gives the automatic volume control action of the receiver. The volume control selects the amount of audio voltage that is applied to the grid of the RCA-75 and thereby regulates the audio output of this tube and of the entire receiver.

The output of the audio section of the RCA-75 is resistance coupled to the grid circuit of the RCA-41, which is the power output stage.

The tone control, comprising a switch and capacitor, is connected from plate of the RCA-41 output stage to ground. Maximum attenuation of the high frequencies is obtained when the switch is closed. The plate circuit is coupled through a step-down transformer to the cone coil of the reproducer unit.

Field excitation power is obtained by connecting the loudspeaker field directly across the car battery. Filament power is obtained in a similar manner, all Radiotrons having 6.3-volt heaters. Plate and grid voltage for all tubes is obtained through the vibrator inverter unit and its associated rectifier, transformer and filter circuits. An RCA-84 rectifier tube is used in the power supply unit for rectifying the alternating current output from the step-up transformer.

SERVICE DATA

(1) Removing Units from Chassis:

The three major units, the power unit, the loudspeaker and the receiver chassis, are easily removed independently without disturbing the other units not removed. To do this, the use of a screwdriver and soldering iron are the only tools required. Figure 2 shows the details of the screws and terminals to be removed in each individual case.

(2) Line-Up Capacitor Adjustments:

Adjustable capacitors are provided in the R. F. oscillator and intermediate frequency amplifier to provide a means of properly aligning the receiver. A modulated R. F. oscillator such as Full-Range Test Oscillator, type TMV-97-B (Stock No. 9050), a non-metallic screwdriver such as alignment wrench Stock No. 4160 and an output meter are required for properly aligning this receiver. Refer to Figure 3 for the location of the line-up capacitors.

I. F. Tuning Adjustments:

Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from beneath the chassis as shown in Figure 3. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the primary and secondary of the first I. F. transformers, until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments:

The three-gang capacitor trimmer screws are located on the main tuning capacitor, accessible at the top of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic

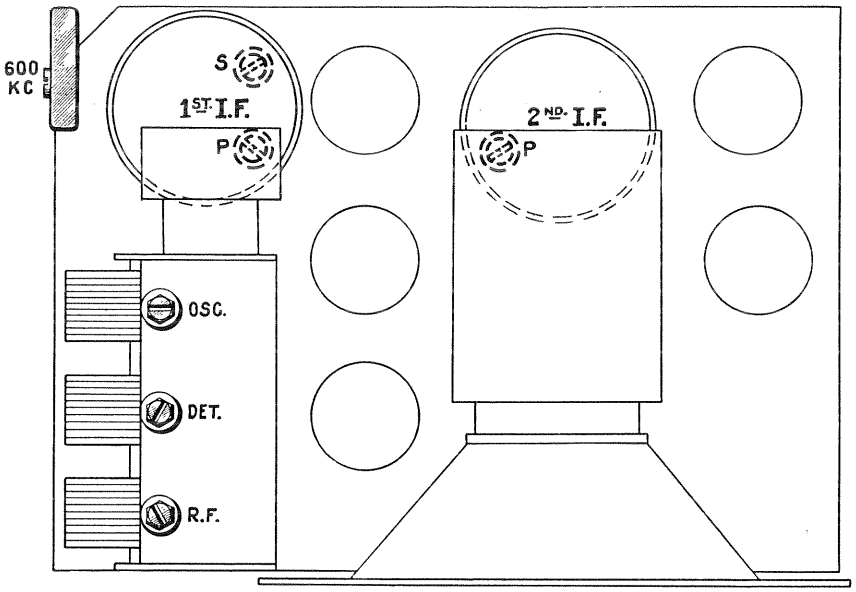


Figure 3—Location of Line-Up Capacitors

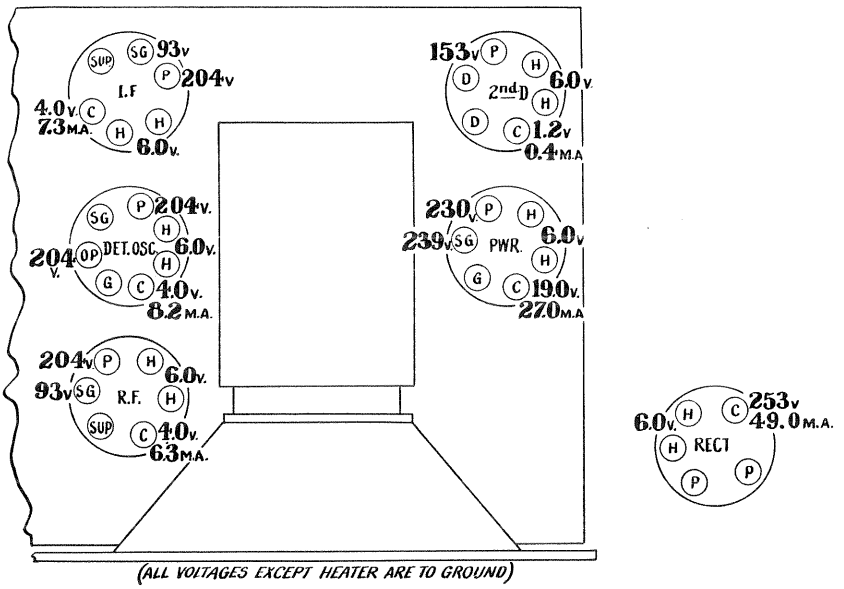


Figure 4—Voltages at Individual Socket Contacts

screwdriver such as Stock No. 4160 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Place the receiver in operation and attach the control box as in normal operation. Turn the tuning control until the tuning capacitors are fully meshed. Then set the indicator on the dial at the 530 K. C. reading. Turn the tuning control until the dial reads 1400. Then set the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the three-gang capacitor trimmer screws until maximum output is obtained. Be careful not to disturb the relation of the control box to the receiver after setting the dial.

(c) After making the 1400 K. C. adjustment, shift the oscillator to 600 K. C. and tune in the signal. Adjust the 600 K. C. trimmer, accessible from the side of the chassis for maximum output while rocking the gang-capacitor back and forth. Then again check the adjustment described in (b).

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

(4) R. F. Interference from Vibrator with Shielded Lead-In Disconnected from Antenna:

In event R. F. interference originating with the vibrator inverter-rectifier unit is encountered, check the following points:

(a) Vibrator not properly seated. The vibrator must be pushed tight against its socket at all times.

(b) The various by-pass capacitors, such as C-28, C-29 and C-30 and chokes L-13, L-14 and L-16, must be properly connected, and in operating condition. It is well to remember that some of the interference produced by the vibrator is of a frequency as high as one meter and any replacement of capacitors must always be made with one of similar mechanical as well as electrical construction.

(5) Voltage Readings:

The following voltages are those at the tube socket 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.

(6) Vibrator Inverter:

The Vibrator Inverter unit used in this receiver is of advanced design and construction. It is adjusted by means of special equipment at the factory and then sealed to prevent tampering. The unit is provided with a special plug-in base so that in event of suspected failure it may be easily interchanged with one of known condition.

With the seals unbroken, the Vibrator carries the standard ninety-day guarantee, which also applies to all parts of the receiver. Vibrator defects should be remedied by replacement, not by attempted adjustment.

RADIOTRON SOCKET VOLTAGES

6.3 Volt Battery—No Signal—Minimum Volume

Radiotron 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, D. C.
RCA-6D6—R. F.		4.0	93	204	6.3	6.0
RCA-6A7	1st Det.	4.0	93	204	8.2	6.0
	Osc.	—	—	204		
RCA-6D6—I. F.		4.0	93	204	7.3	6.0
RCA-75—2nd Det.		1.2	—	153*	0.4	6.0
RCA-41—Pwr.		19.0	239	230	27.0	6.0
RCA-84—Rect.		253	—	—	49.0	6.0

* Voltage impossible to measure with ordinary voltmeter.

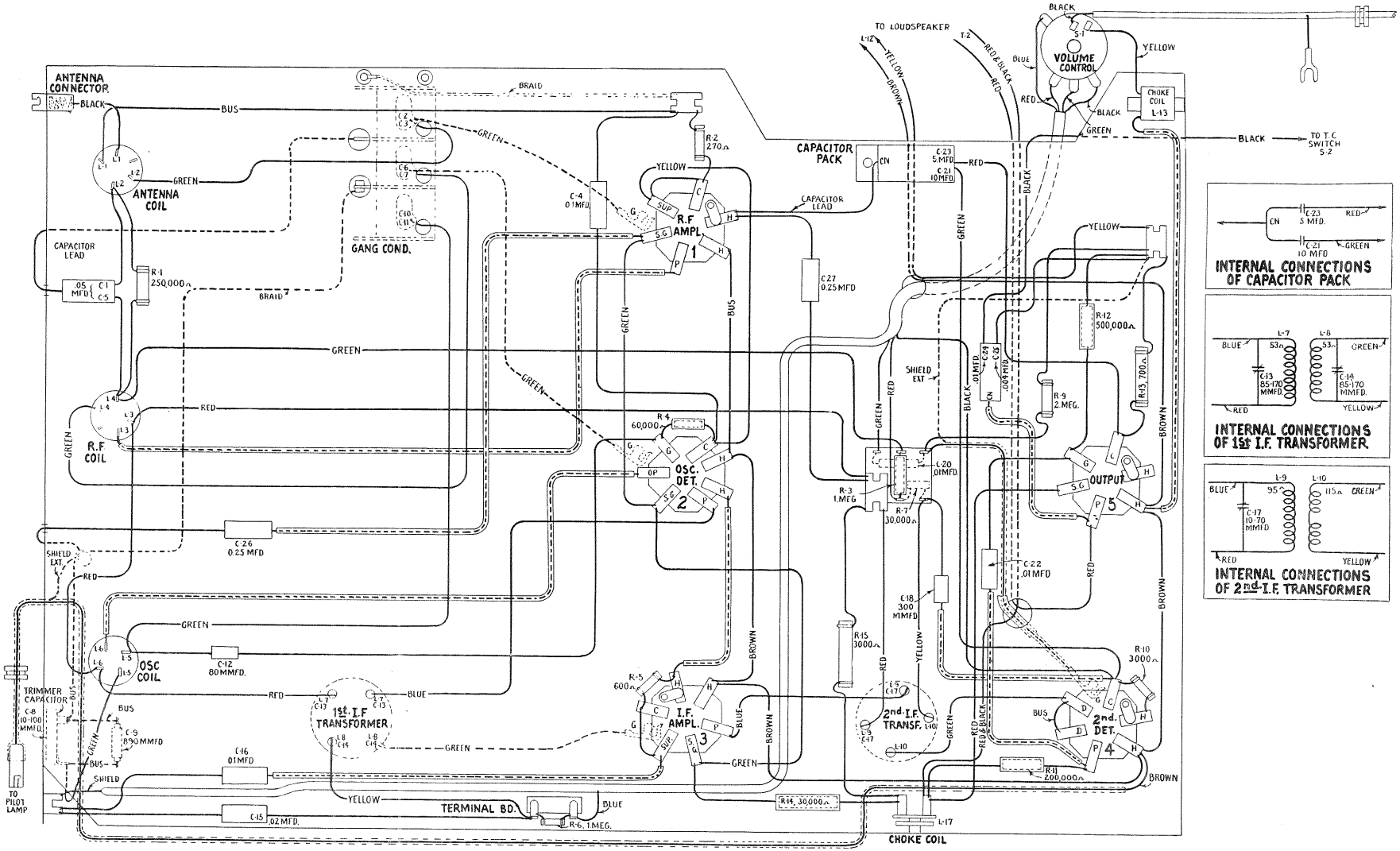


Figure 5—Receiver Assembly Wiring Diagram

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4305	Bracket—Tuning condenser drive bracket assembly	$0.45
6981	Cable—4-conductor shielded volume control cable	.42
4300	Cable—Single-conductor—Power input cable	.56
4301	Cable—Single-conductor—Dial lamp cable	.38
3861	Capacitor—Adjustable trimmer capacitor (C8)	.78
4246	Capacitor—80 mmfd. (C12)	.24
4248	Capacitor—300 mmfd. (C18)	.22
4245	Capacitor—890 mmfd. (C9)	.26
3639	Capacitor—.02 mfd. (C15)	.25
3701	Capacitor—.01 mfd. (C20, C22)	.30
3877	Capacitor—0.1 mfd. (C4, C16)	.32
3597	Capacitor—.25 mfd. (C26, C27)	.40
4304	Capacitor—0.5 mfd. (C28)	.72
6979	Capacitor pack—Comprising one .01 and one .004 mfd. (C24, C25)	.28
6963	Capacitor pack—Comprising one 5. mfd. and one 10 mfd. capacitor (C21, C23)	1.10
4243	Capacitor pack—Comprising two .05 mfd. capacitors (C1, C5)	.35
6965	Coil—Antenna coil (L1, L2)	.70
4299	Coil—Choke coil (L13)	.35
4298	Coil—Choke coil (L17)	.28
6967	Coil—Oscillator coil (L5, L6)	.52
6966	Coil—R. F. coil assembly (L3, L4)	.80
7768	Condenser—3-gang variable tuning condenser (C2, C3, C6, C7, C10, C11)	4.75
4306	Cord—Tuning condenser drive cord—Package of 10	1.05
6493	Drum—Tuning condenser dial drum and hub with set screws	.40
3584	Ring—Antenna, R. F. or oscillator coil retaining ring—Package of 5	.40
4307	Roller—Tuning condenser idler roller—Package of 5	.25
6135	Resistor—270 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
3218	Resistor—600 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
4242	Resistor—3,000 ohms—Carbon type—¼ watt (R10)—Package of 5	1.00
3152	Resistor—30,000 ohms—Carbon type—¼ watt (R7)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R4)—Package of 5	1.00
3116	Resistor—200,000 ohms—Carbon type—¼ watt (R11)—Package of 5	1.00
3744	Resistor—250,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R12)—Package of 5	1.00
3033	Resistor — 1 megohm — Carbon type — ¼ watt (R3, R6)—Package of 5	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R9)—Package of 5	1.00
4302	Resistor—700 ohms—Carbon type—1 watt (R13)—Package of 10	$2.00
2240	Resistor—30,000 ohms—Carbon type—1 watt (R14)	.22
4239	Resistor—3,000 ohms—Carbon type—3 watt (R15)	.25
3623	Shield—Antenna, R. F. or oscillator coil shield	.30
4233	Shield—Detector oscillator or output Radiotron shield	.22
4236	Shield—I. F. or R. F. amplifier Radiotron shield	.22
4232	Socket—6-contact Radiotron socket	.35
3572	Socket—7-contact Radiotron socket	.38
6192	Spring—Tuning condenser drive cord tension spring—Package of 10	.30
6960	Transformer—First intermediate frequency transformer (L7, L8, C13, C14)	1.80
6962	Transformer—Second intermediate frequency transformer (L9, L10, C17)	1.85
6978	Volume control (R8)	1.20
	CONTROL BOX ASSEMBLIES	
6976	Back—Control box back	.75
7769	Box—Control box complete	3.90
3690	Bracket and strap assembly—Comprising one bracket, two screws, one lockwasher and one strap	.40
7770	Cover—Control box front cover	.86
4259	Cover—Station selector dial cover—Transparent celluloid—Package of 5	.92
4261	Dial—Station selector dial	.15
4258	Key—Volume control key	.20
4340	Lamp—Dial lamp—Package of 5	.60
4260	Pointer—Station selector indicator	.18
4257	Ring—Station selector dial cover ring (escutcheon)	.75
4262	Screen—Dial light screen—Package of 5	.26
4255	Screw—No. 4-40-¼ inch oval head machine screw for holding cover to control box back—Package of 10	.16
4252	Screw—No. 10-32-$\frac{11}{32}$-inch fillister head set screw for holding condenser drive and pinion gear and volume coupling control shaft—Package of 10	.32
3652	Screw—No. 10-32-¼-inch cupped point set screw for holding station selector or volume control flexible drive shaft to control box—Package of 10	.32
4254	Shaft—Volume control coupling shaft	.36
4250	Shaft and gear—Station selector pointer shaft and gear	.56
4251	Shaft and gear—Station selector drive shaft and pinion gear	.20
4253	Spring—Volume control key holding spring—Package of 10	.32

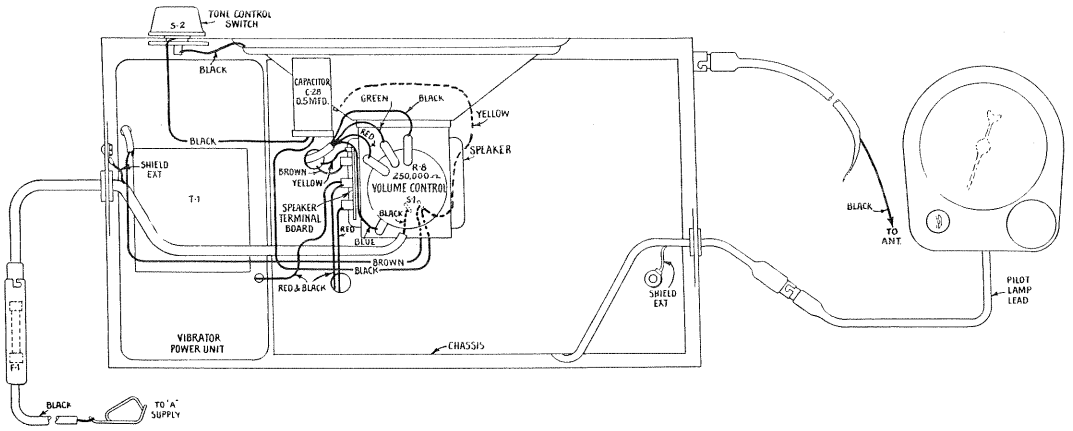


Figure 6—Assembly Wiring Diagram

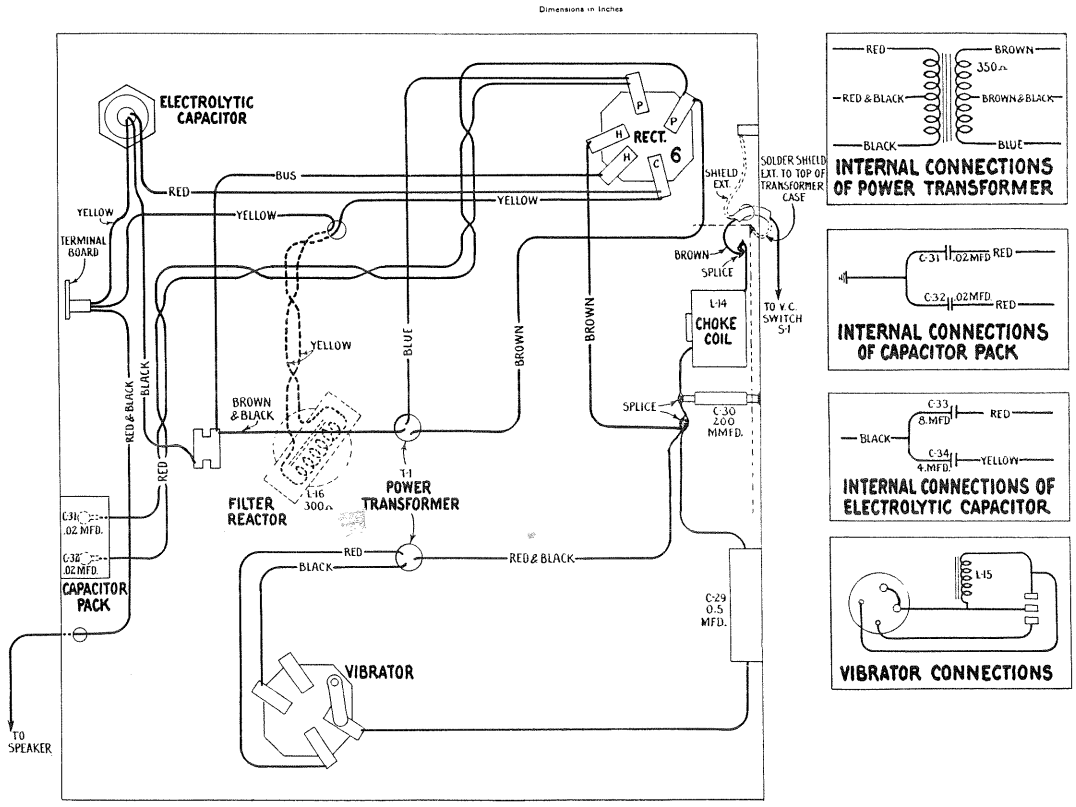


Figure 7—Power Unit Wiring Diagram

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
	FLEXIBLE SHAFT AND CABLE ASSEMBLIES	
7762	Cable—Dial lamp cable with socket and section of connector	$0.76
4264	Clamp—Metal clamp for holding flexible shafts—Package of 10	.35
4295	Screw—No. 10-32-¼-inch cupped point set screw—Fastens flexible shaft housing to metal case—Package of 10	.20
7771	Shaft—Station selector flexible drive shaft approximately 28 inches long	1.44
7773	Shaft—Station selector flexible drive shaft approximately 23 inches long	1.32
7772	Shaft—Volume control flexible drive shaft approximately 32 inches long	1.68
7774	Shaft—Volume control flexible drive shaft approximately 27 inches long	1.56
4265	Sleeve—Coupling sleeve for volume control shaft—Package of 5	.15
4263	Socket—Dial lamp socket	.20
	POWER SUPPLY UNIT	
4013	Capacitor—200 mmfd. (C30)	.30
4293	Capacitor—0.5 mfd. (C29)	.60
7779	Capacitor—Comprising two .02 mfd. capacitors (C31, C32)	.96
7776	Capacitor—Comprising one 8. mfd. and one 4 mfd. capacitors (C33, C34)	1.90
3956	Clamp—Capacitor mounting clamp—Package of 5	.32
7778	Coil—Filter reactor choke coil (L14)	.45
7777	Reactor—Filter reactor (L16)	1.14
4308	Screw—Binder head No. 6-32-¼-inch screw for mounting capacitor pack—package of 10	.18
6980	Socket—4-contact vibrator socket	.20
7484	Socket—5-contact Rectifier socket	.35
7775	Transformer—Vibrator transformer (T1)	3.78
7780	Vibrator complete (L15)	4.96
	REPRODUCER ASSEMBLIES	
9496	Coil—Field coil, magnet and cone support (L12)	2.95
9492	Cone—Reproducer cone (L11)—Package of 5.	3.70
6982	Transformer—Output transformer (T2)	1.35
9494	Reproducer complete	5.65
4277	Screw—No. 8-32-⅜-inch binder head reproducer mounting screw—Package of 10	.22
	HOUSING ASSEMBLIES	
4322	Bracket assembly—Station selector drive shaft bracket and bushing	.28
4321	Cloth—Grille cloth	.22
7781	Housing—Front section of housing complete —Less hinge pin	3.38
7782	Housing—Rear section of housing complete —Less hinge pin	$2.68
4320	Nut—Wing nut—Package of 10	.38
4266	Pin—Hinge pin—Package of 5	.42
4318	Screw—Wing screw—Package of 10	.98
4319	Screw—No. 6-¼-inch slotted hex head self tapping—Fastens case bottom to front section of housing—Package of 10	.50
4295	Screw—No. 10-32-¼-inch headless set screw —Used to fasten drive shafts to housing—Package of 10	.20
	MISCELLANEOUS ASSEMBLIES	
4287	Body—Antenna connector body—Package of 10	.40
4289	Body—Fuse connector body—Package of 10.	.35
3689	Bracket—Receiver mounting bracket, bolt and nut assembly	.30
4283	Cable — Antenna lead-in cable — Approximately 35 inches long	.80
4288	Cap—Antenna or fuse connector cap—Package of 10	.36
4293	Capacitor—Ammeter capacitor—.5 mfd.	.60
6495	Capacitor—Generator capacitor—.5 mfd.	.72
4291	Clip—"A" supply clip—Package of 10	.70
4286	Ferrule—Antenna or fuse connector ferrule and bushing—Package of 10	.38
3646	Fuse—20 ampere (F1)—Package of 5	.40
4290	Insulator—Fuse connector insulator—Package of 10	.35
4323	Knob—Tone control switch knob—Package of 5	.70
4282	Knob—Station selector knob—Package of 5.	.65
7766	Lead—Power lead with female section of fuse connector—From power cable to battery	.30
4492	Plate—Ornamental plate located on housing front—Package of 2	.58
4494	Plate—RCA Victor name plate	.94
4493	Screw—No. 4 self-tapping screw for mounting ornamental plates—Package of 10	.56
4495	Screw—No. 8 self-tapping screw for mounting station selector drive shaft and bushing —Package of 10	.52
4294	Screw—No. 10-32-5/16-inch hex head used to mount receiver chassis to housing—Package of 10	.45
4303	Screw—No. 10-32-7/16-inch hex head used to mount power unit to housing—Package of 10	.22
4284	Spring—Antenna or fuse connector spring—Package of 10	.30
6152	Suppressor—Distributor suppressor	.56
6151	Suppressor—Spark plug suppressor	.56
6669	Switch—Tone control switch (S2)	.50
4285	Washer—Antenna or fuse connector insulating washer—Package of 10	.22