

Instructions for RCA Victor R-28-P

Five-Tube Double-Range Superheterodyne

INSTALLATION

Location—The instrument should be placed convenient to the antenna and ground connections and to an electrical outlet. To prevent damage to the cabinet finish and possible internal injury, the instrument should not be placed on a radiator or too close to a source of heat. It must be mounted only in the normal upright position, so as to insure proper ventilation and maximum life of the tubes. Particularly if the cabinet is of the small box or chest type, care should be taken to avoid restriction of natural ventilation as would occur with the set fitted into a small compartment or backed up too close to a wall or other vertical plane surface.

Antenna and Ground—An antenna 25 to 75 feet long, including the lead-in and ground connections, is recommended. The antenna should be well insulated from all objects, and should not be run close to or parallel with electric circuits inside or outside the building. Generally, an indoor antenna of short or medium length should be found satisfactory. An outdoor antenna of greater length may provide some increase in the receiving range, and is recommended for localities remote from broadcasting stations. When the receiver is installed in a building of metallic construction, an outdoor antenna is *required* for satisfactory results.

A *good* ground connection is essential for best performance. It should be as short and direct as possible, and preferably should be made to a cold water pipe. An approved ground clamp should be used to insure a tight and permanent connection.

Two flexible leads are provided at the rear of the receiver for connecting to the antenna and ground. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both connections should be soldered and wrapped with insulating tape.

Power Supply—Connect the power cord to an electrical outlet supplying alternating current at the proper voltage and frequency (cycles), as specified on the rating label attached to the rear of the receiver.

Radiotrons—The instrument is equipped and tested at the factory with RCA Radiotrons and is shipped with the tubes in the sockets. The set is therefore ready to operate when it is removed from the carton and external connections are made as heretofore described. The corrugated-paper covers, used to protect the tubes during shipment, should be removed before operating the set.

If, when first installed, the receiver does not operate or performs imperfectly, one or more of the tubes, shields or dome terminal leads may have been jarred loose in shipment. Refer to the tube location diagram on the rating label and *make certain*:

- That all tubes are in the proper sockets and pressed down firmly. *Never apply power to the instrument unless all Radiotrons are in place.*
- That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.
- That the spring connectors at the ends of the short flexible leads are securely attached to the dome terminals of the proper Radiotrons as indicated on the diagram.

NOTE—On closed-back models, it will be necessary to take off the rear cover of the cabinet in order to remove the corrugated-paper tube covers and to inspect the tube installation as outlined above. Because of the small clearance above the tubes on some models, the chassis must be entirely removed from the cabinet in order to test or replace the Radiotrons. To permit withdrawal of the chassis, it is necessary to take off the four knobs on the front panel and remove the four bolts through the bottom of the cabinet. When it is desired to have the tubes tested in one of these models, it is recommended that the complete instrument be taken to a reputable dealer, who will generally be glad to remove and test the Radiotrons without charge except for necessary tube replacements.

OPERATION

The instrument has four operating controls, located on the front panel of the cabinet, as follows:

- Volume Control (Combined with Power Switch)** (Left-hand Knob)—In the extreme counter-clockwise position the power switch is "off." Rotating the knob slightly clockwise turns on the power—further rotation increases the volume.
- Tone Range Switch** (Middle Knob)—This switch has two positions. The counter-clockwise position gives full range reproduction. In the clockwise position, high-frequency (treble) response is decreased; also in this position, static interference (when present) is reduced.
- Station Selector** (Right-hand Knob—Symmetrical with Volume Control)—This control is equipped with an illuminated dial, calibrated to facilitate location and identification of stations (add one cipher to scale numerals to obtain frequency in kilocycles).
- Frequency Range Switch** (Below and to Right of Station Selector)—With this knob in the *counter-clockwise* position, broadcasting stations in the 540–1500 kilocycle range will be received (frequencies in this range are indicated by the large numerals adjacent to the scale graduations). With the knob in the *clockwise* position, stations operating in the 1400–2800 kilocycle range will be received (frequencies in this range are indicated approximately by the small numerals at the top of the dial), as follows:
 - Police Calls**—At dial settings near "80" for stations transmitting at 1712 kilocycles, and at "118–122" for stations operating in the 2450 kilocycle band.

- Amateur Radio "Phone"**—At dial settings "90–95" (assigned band 1900–2000 kilocycles).
- Aviation Reports, Airport Beacons, etc.**—At dial settings "95–118" (assigned band 2000–2400 kilocycles).
- Amateur Radio "CW" (Code)**—At dial settings "30–90" (assigned band 1715–1900 kilocycles). Signals of this class are normally unintelligible or inaudible with this type of receiver.

To operate the receiver, proceed as follows:

- Set the Frequency Range Switch for the desired frequency band—see preceding paragraph (4).
- Turn on the power and set the Volume Control fully clockwise for maximum volume—reduce the setting if too noisy.
- Allow approximately one-half minute for the tubes to heat, then turn the Station Selector slowly over the range of the dial until a desirable station program is heard.

NOTE—The majority of stations in the 1400–2800 kilocycle band do not offer continuous programs. Police calls are usually intermittent, at regular or irregular intervals. Strong local stations in the 540–1500 kilocycle broadcast band may be audible (sometimes at more than one point on the dial) when the Frequency Range Switch is set for 1400–2800 kilocycles.

- For best reproduction reduce the Volume Control setting and adjust the Station Selector accurately for loudest volume. Always use the Volume Control—never the Station Selector—for regulation of volume.
- Set the Tone Range Switch for the preferred tone quality.
- When through operating, turn the Volume Control knob fully counter-clockwise until the "off" click of the power switch is heard.

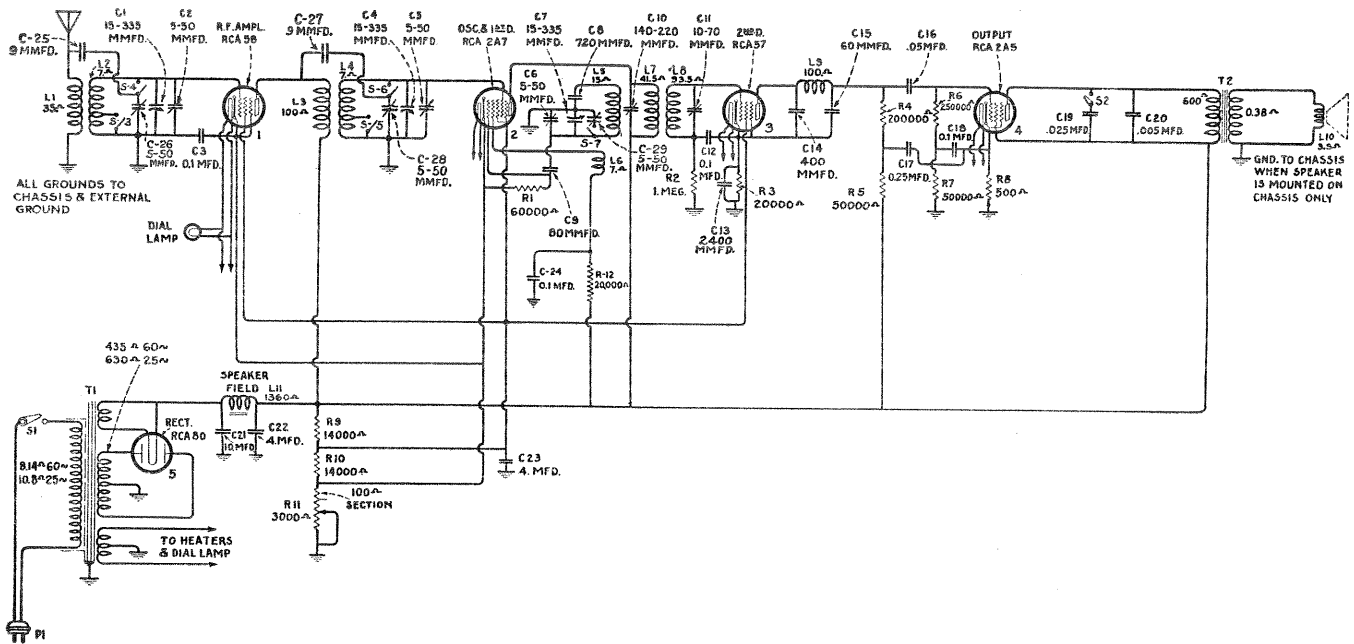


Figure A—Schematic Circuit

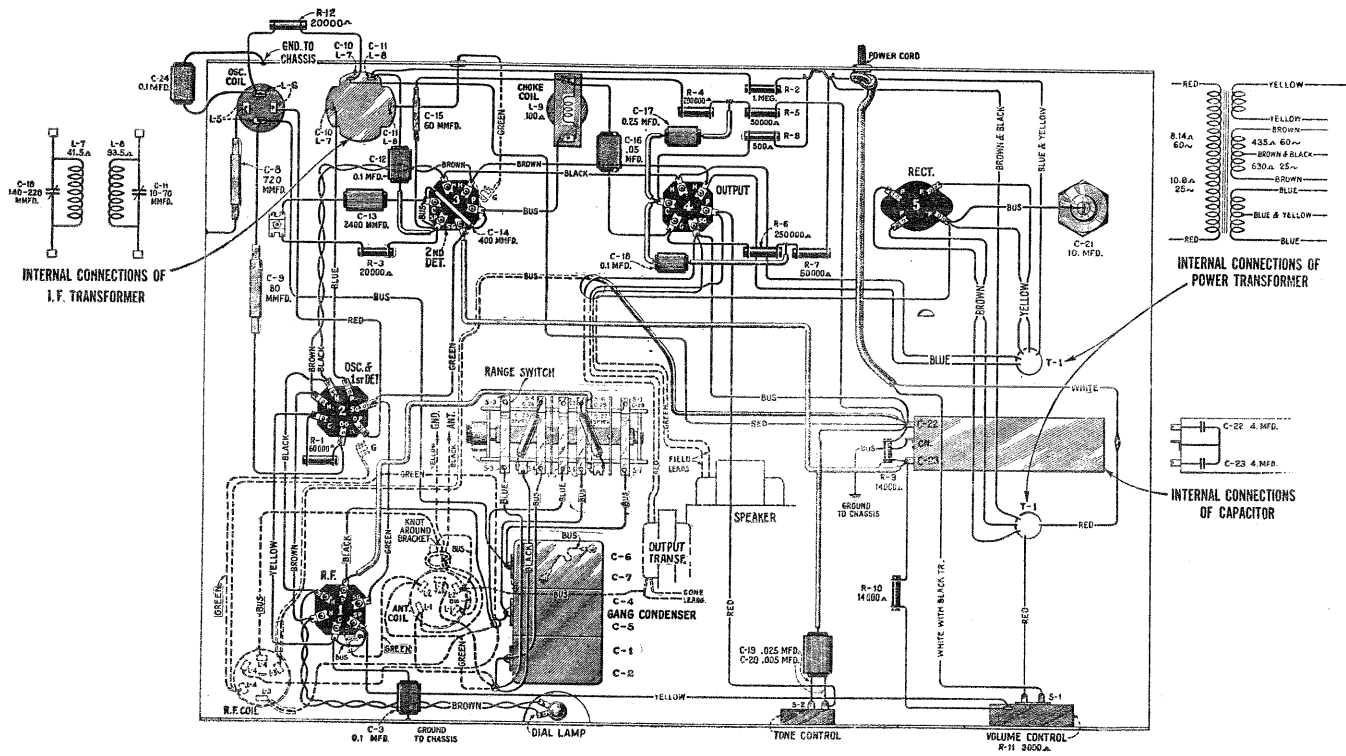


Figure B—Wiring Diagram

SERVICE DATA

Voltage Rating.....	115 Volts
Frequency Rating.....	25-40 Cycles and 50-60 Cycles
Power Consumption.....	70 Watts
Number and Types of Radiotrons.....	1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total 5
Undistorted Output.....	1.75 Watts
Frequency Range.....	540 K. C. to 1500 K. C. and 1400 K. C. to 2800 K. C.

This receiver is a five-tube Super-Heterodyne incorporating a Dynamic Loudspeaker as a part of the chassis; two-point tone control; single heater type Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic and Figure B the wiring diagram. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer using two tuned circuits, a second detector, an output tube and a rectifier.

Line-up Capacitor Adjustment

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

- (a) Procure a modulated oscillator giving a signal at 175 K. C., 1400 K. C., and 2440 K. C. An output meter and non-metallic screw driver are also necessary.
- (b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.
- (c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1400 K. C. This is done with the Range Switch at the broadcast position. A similar manner is used as that of the I. F., except that the oscillator is set at 1400 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.
- (d) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

RADIOTRON SOCKET VOLTAGES

115 Volt A. C. Line

MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater, Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

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					
2269	Capacitor—720 mmfd.....	\$0.75	3615	Knob—Tone control or range switch knob—Package of 5	\$0.60
2747	Contact cap—Package of 5.....	.50	3623	Shield—Antenna or R. F. Coil shield.....	.30
2749	Capacitor—2,400 mmfd.....	.35	3705	Scale—Dial scale assembly.....	.50
3024	Capacitor—9 mmfd.—Package of 2.....	.50	6228	Resistor—200,000 ohms—Carbon type— $\frac{1}{2}$ watt—Package of 5.....	1.00
3050	Resistor—14,000 ohms—Carbon type—3 watts.....	.25	6303	Resistor—20,000 ohms—Carbon type— $\frac{1}{2}$ watt—Package of 5.....	1.00
3076	Resistor—1 megohm—Carbon type— $\frac{1}{2}$ watt—Package of 5.....	1.00	6306	Resistor—14,000 ohms—Carbon type—1 watt—Package of 5.....	1.10
3456	Capacitor—0.05 mfd.....	.44	6464	Transformer—I. F. transformer.....	1.88
3459	Capacitor—80 mmfd.....	.44	6465	Volume control—Complete with mounting nut.....	1.22
3472	Capacitor—0.0024 mfd.....	.32	6466	Switch—Tone control switch.....	.45
3514	Resistor—250,000 ohms—Carbon type— $\frac{1}{2}$ watt—Package of 5.....	1.00	6471	Coil—Oscillator coil assembly.....	.74
3555	Capacitor—0.1 mfd.—Oscillator filter.....	.36	6527	Coil—Antenna coil.....	1.08
3572	Socket—Radiotron 7 contact socket.....	.38	6528	Coil—R. F. coil assembly.....	.94
3573	Socket—Radiotron 4 contact socket.....	.32	6529	Switch—Range switch—Long.....	1.25
3574	Coil—Choke coil.....	.68	6530	Switch—Range switch—Short.....	1.25
3575	Socket—Dial lamp socket and bracket.....	.34	7485	Socket—Radiotron 6 contact socket.....	.40
3584	Ring—R. F. or oscillator coil retaining ring—Package of 5.....	.40	7487	Shield—Radiotron tube shield.....	.25
3590	Escutcheon—Station selector escutcheon—Package of 5.....	1.40	7588	Condenser—Three gang variable tuning condenser.....	2.85
3591	Escutcheon—Name plate escutcheon—Package of 5.....	1.40	7589	Capacitor—Filter capacitor—Two 4.0 mfd. in container.....	1.64
3592	Knob—Station selector or volume control knob—Package of 5.....	.80	7590	Capacitor—10.0 mfd.....	1.40
3593	Screw—Chassis mounting screw—Package of 10.....	.30	8985	Transformer—Power transformer—105-125 volts—50-60 cycles.....	4.26
3594	Resistor—50,000 ohms—Carbon type— $\frac{1}{2}$ watt—Package of 5.....	1.00	8986	Transformer—Power transformer—200-250 volts—60 cycles.....	4.38
3596	Capacitor—60 mmfd.....	.36	9002	Transformer—Power transformer—105-125 volts—25-50 cycles.....	6.00
3597	Capacitor—0.25 mfd.....	.40	REPRODUCER ASSEMBLIES		
3598	Capacitor—0.1 mfd.....	.36	6467	Transformer—Output transformer.....	1.44
3602	Resistor—60,000 ohms—Carbon type— $\frac{1}{4}$ watt—Package of 5.....	1.00	8987	Cone—Reproducer cone—Package of 5.....	5.00
3603	Resistor—500 ohms—Carbon type—1 watt—Package of 5.....	1.10	8988	Coil assembly—Comprising field coil, magnet and cone support.....	2.35
3604	Capacitor—400 mmfd.....	.30			
3606	Capacitor—Comprising one 0.005 mfd. and one 0.025 mfd. capacitors.....	.40			

RCA Victor Company, Inc.

CAMDEN, N. J., U. S. A.