

Instructions for RCA Victor Models R-51-B and R-53-B 10-Tube Battery-Operated Superheterodyne Receivers

INSTALLATION

Preliminary—After unpacking the instrument, remove the interior packing material on top of the chassis. (On the *console* model, first remove the unfinished wood shipping strip fastened across the rear of the chassis.) Place the instrument where connections can be made conveniently to the antenna and ground. If the instrument is of the *table mounting* type, it should preferably be located where the battery cable will reach a compartment suitable for concealing the batteries (the *console* model provides space within the cabinet for all batteries).

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 essential for satisfactory results.

A good ground connection is necessary for best performance of this receiver. The connection to ground should be as short and direct as possible. If the ground connection cannot be made to a cold water pipe, a metal stake driven from 4 to 6 feet into moist earth is recommended. 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.

Batteries—The following batteries are required:

"A" Battery—One Eveready Air Cell, No. A-600.

"B" Battery—Four 45-volt dry batteries. The cabinet of the *console* model is designed to hold standard size batteries, such as: Eveready No. 485 or 772; Burgess No. 22308 or 2308; or equivalent. For the *table* model (with externally mounted batteries), somewhat greater economy will normally be obtained by using extra large (heavy duty) batteries, such as: Eveready No. 486 or 770; Burgess No. 21308 or 10308; or equivalent.

"C" Battery—One 4½ volt *tapped* "C" battery (having a "3" volt terminal), such as Eveready No. 771-T, Burgess No. 2370, or equivalent.

Make certain that the on-off switch, on the right-hand side (viewing the front) of the cabinet, is in the "off" position. Then connect the batteries *exactly* as shown by the battery connection diagram on the rear of the chassis. Separate insulated wires are furnished for necessary connections between the batteries.

Radiotrons—Refer to the tube location diagram on the license label inside the cabinet, and install the Radiotrons as follows:

- (1) Unpack the Radiotrons carefully and insert them in the proper sockets.
- (2) Press the metal shields down firmly over the Radiotrons indicated by double circles.
- (3) Connect the short flexible leads, equipped with spring contacts, securely to the top grid terminals of the proper RCA-34 Radiotrons.

OPERATION

The operating controls on the front panel are shown in Fig. 1. Proceed as follows:

1. Set the On-Off Switch, on the right side (facing the front) of the cabinet, to the "on" position.
2. Advance the Volume Control about one half turn from the extreme counter-clockwise position and turn the Station Selector in either direction until a station is heard. (The dial



Figure 1

scale is calibrated in kilocycles to facilitate location and identification of stations.) If no station is heard, advance the Volume Control further in a clockwise direction and again rotate the Selector.

3. After receiving a signal, turn the Volume Control counter-clockwise until the volume is reduced to a low level. Now readjust the Station Selector accurately to the position mid-way between the points where the quality becomes poor or the signal disappears. This setting provides the fine quality of reproduction possible with this instrument.

4. Adjust the Volume Control to obtain the desired volume.

NOTE—The automatic volume control maintains the volume substantially constant irrespective of normal fluctuations of signal strength (fading). Also, other stations with good signal strength may be received at approximately the same volume without readjustment of the Volume Control.

5. Adjust the Tone Control to obtain the desired tone quality, or turn it counter-clockwise to reduce noise interference.

6. When through operating, set the On-Off switch to the "off" position.

NOTE—Improved performance may sometimes be obtained by interchanging the three RCA-34 Radiotrons in their respective sockets.

Important—To avoid damage to the Radiotrons, always set the On-Off Switch in the "off" position while interchanging or replacing Radiotrons, or while new batteries are being installed.

Fuse—The Radiotron filaments are protected by a 0.5 ampere fuse connected in the "B+" (red) lead from the on-off switch. Should the receiver at any time fail to operate, separate the coupling-type fuse holder and examine the fuse (being careful not to lose the tubular spacer, which is necessary to insulate the fuse from the metal holder). If the fuse is burned out, check all battery connections and have all tubes tested by your dealer before installing a new fuse. This is a special fuse—obtain replacement fuses from your dealer—do not use any substitute for this fuse.

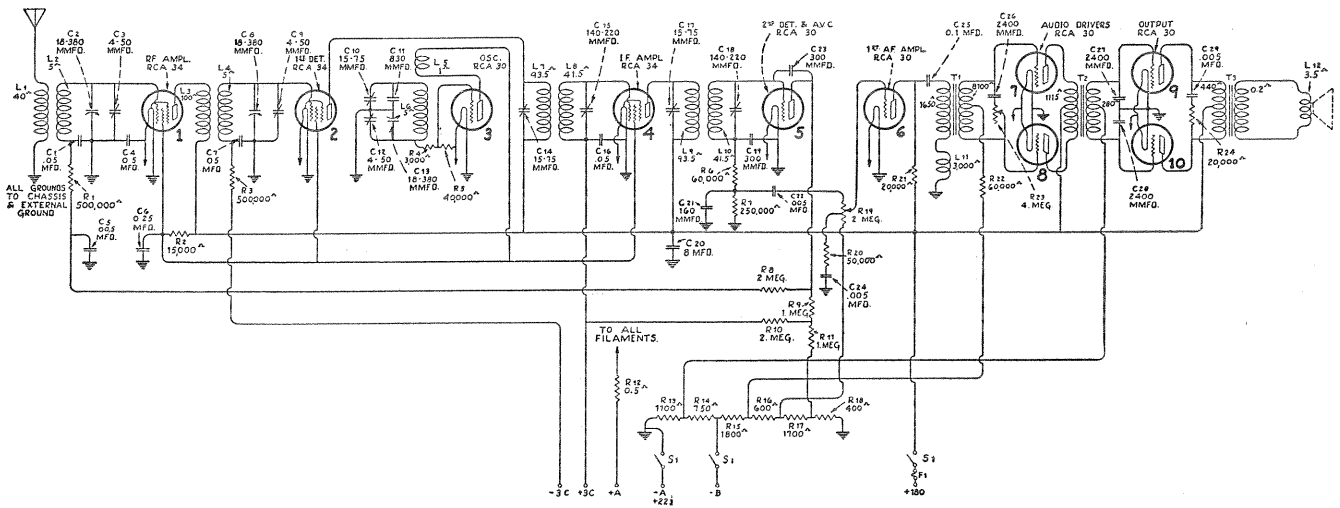
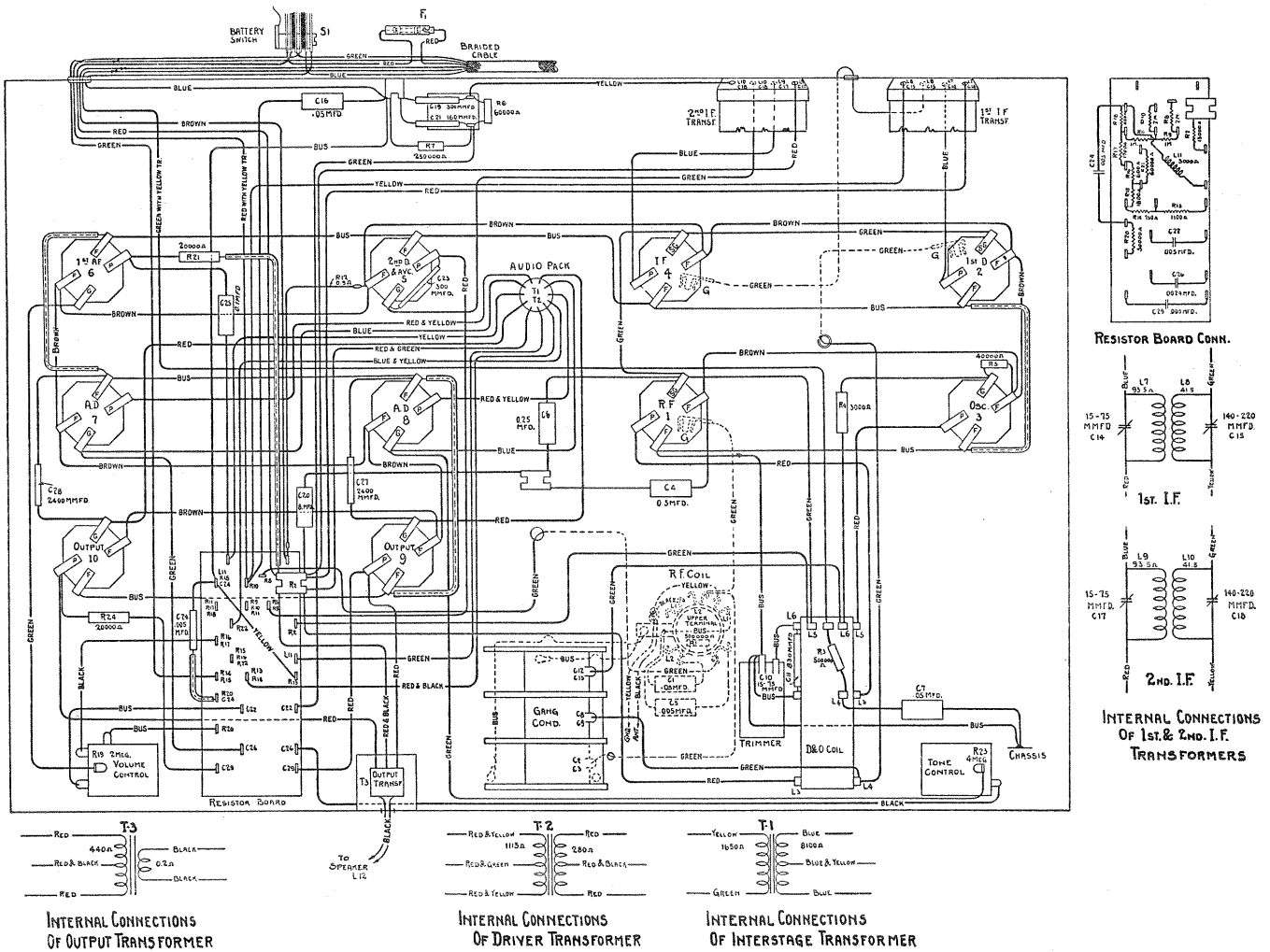


Figure A—Schematic Circuit



INTERNAL CONNECTIONS OF OUTPUT TRANSFORMER

INTERNAL CONNECTIONS OF DRIVER TRANSFORMER

INTERNAL CONNECTIONS OF INTERSTAGE TRANSFORMER

Figure B—Wiring Diagram

SERVICE DATA

Total "A" Battery Current.....0.6 Amperes
 Average "B" Battery Current.....18 M. A.
 Type and Number of Radiotrons.....7 RCA-230, 3 RCA-234—Total, 10
 Undistorted Output.....1.6 Watts

This receiver is a ten-tube battery operated Super-Heterodyne giving excellent performance. Features such as automatic volume control, continuously variable tone control, double class "B" audio amplifier, low "A" and "B" battery current drain, permanent magnet dynamic loudspeaker, exceptional fidelity, large undistorted output, compensated volume control, and the inherent sensitivity, selectivity, and tone quality of the Super-Heterodyne characterize this instrument. The performance of this receiver is comparable in all respects to a modern A. C. receiver of similar design.

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from the rear of the chassis. Proceed as follows:

- Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver, such as Stock No. 7065, and an output meter.
- Remove the oscillator tube and connect a ground to the chassis. A tube base with a 16000 ohms resistor connected between one filament prong and the plate prong must be substituted for the oscillator tube.
- Connect the oscillator output between the first detector control grid and the negative terminal on the 4.5 volt bias battery. 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 secondary and then the primary of the second and then 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 screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

- Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screw driver, such as Stock No. 7065, and an output meter. Also a socket wrench is necessary for the main tuning capacitor trimmers.
- Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the first line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.
- Adjust the three line-up capacitors accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.
- Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.
- Then realign at 1400 K. C. This completes the adjustments.

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.

RADIOTRON SOCKET VOLTAGES

New "A" and "B" Batteries—No Signal Received

Radiotron No.	Control Grid to Filament Volts	Screen Grid to Filament Volts	Plate to Filament Volts	Plate Current M. A.	Filament Volts
R. F.—RCA-234	2.0	65.0	157.5	3.0	2.15
Oscillator—RCA-230	—	—	65.0	4.0	2.15
First Detector—RCA-234	5.0	65.0	157.5	1.0	2.15
I. F.—RCA-234	2.0	65.0	157.5	3.0	2.15
Second Detector—RCA-230	0	—	—2.0	0	2.15
First A. F.—RCA-230	10.5	—	130.0	1.25	2.15
Driver A. F.—RCA-230	13.5	—	150.0	1.5	2.15
Driver A. F.—RCA-230	13.5	—	150.0	1.5	2.15
Power—RCA-230	13.5	—	150.0	1.5	2.15
Power—RCA-230	13.5	—	150.0	1.5	2.15

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					
2747	Cap—Contact cap—Package of 5.....	\$0.50	6176	Escutcheon—Operating switch escutcheon—Package of 5..	\$0.50
3003	Cushion—Sponge rubber chassis support cushion—Pack- age of 4.....	.30	6186	Resistor—500,000 ohms—Carbon type—¼ watt—Pack- age of 5.....	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt—Package of 5.....	1.00	6192	Spring—3 gang tuning condenser drive cord tension spring —Package of 10.....	.30
3088	Knob—Operating switch knob—Package of 5.....	.50	6242	Resistor—2 megohm—Carbon type—¼ watt—Package of 5.....	1.00
3114	Resistor—50,000 ohms—Carbon type—¼ watt—Package of 5.....	1.00	6279	Resistor—15,000 ohms—Carbon type—½ watt—Pack- age of 5.....	1.00
3238	Screw—Set screw for switch knob No. 3088—Package of 10.....	.25	6281	Resistor—1,100 ohms—Carbon type—½ watt—Package of 5.....	1.00
3358	Resistor—3,000 ohms—Carbon type—½ watt—Package of 5.....	1.00	6288	Knob—Station selector, tone control or volume control knob—Package of 5.....	1.00
3382	Resistor—750 ohms—Carbon type—¼ watt—Package of 5.....	1.00	6298	Cord—3 gang tuning condenser drive cord—Package of 5..	.60
3449	Coil—Choke coil located on resistor board.....	1.12	6300	Socket—UX Radiotron socket.....	.35
3472	Capacitor—0.0024 mfd.....	.32	6320	Capacitor—670 mmfd.—Located on detector oscillator coil —Package of 5.....	1.50
3556	Capacitor—0.05 mfd.—Located on antenna coil.....	.34	6323	Shaft—Tuning condenser drive shaft with one flat washer and two "C" washers—Package of 2.....	.20
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5.....	1.00	6332	Switch—Operating switch.....	1.60
3616	Capacitor—300 mmfd.....	.34	6449	Tone control complete with mounting nut.....	1.06
3634	Capacitor—160 mmfd.....	.34	6512	Capacitor—0.005 mfd.....	.28
3640	Capacitor—0.05 mfd.....	.25	6516	Connector—Fuse connector.....	.16
3643	Capacitor—0.005 mfd.....	.25	6522	Shield—Radiotron shield.....	.30
3702	Capacitor—0.25 mfd.....	.42	6523	Transformer—Audio transformer assembly comprising driver transformer and interstage transformer.....	5.24
3703	Resistor—1,700 ohms—Carbon type—¼ watt—Package of 5.....	1.00	6524	Transformer—First intermediate frequency transformer.....	2.28
3704	Resistor—400 ohms—Carbon type—¼ watt—Package of 5..	1.00	6525	Transformer—Second intermediate frequency transformer..	2.25
3706	Resistor—1,800 ohms—Carbon type—¼ watt—Package of 5.....	1.00	6526	Transformer—Output transformer.....	1.80
3707	Volume control—Complete with mounting nut.....	1.40	6533	Condenser—3 gang variable tuning condenser.....	5.55
3708	Resistor—600 ohms—Carbon type—¼ watt—Package of 5.....	1.00	6544	Coil—Antenna coil assembly.....	.85
3743	Resistor—0.5 ohm—Flexible type—Package of 5.....	1.00	6545	Coil—Detector oscillator coil.....	2.44
3744	Resistor—250,000 ohms—Carbon type—¼ watt—Pack- age of 5.....	1.00	6546	Scale—Dial and dial scale.....	.75
3748	Fuse—½ ampere—Package of 5.....	.40	6548	Capacitor—8.0 mfd. capacitor.....	.95
3749	Capacitor—0.1 mfd.....	.30	6549	Cable—Battery connecting cable.....	1.25
6114	Resistor—20,000 ohms—Carbon type—1 watt—Package of 5.....	1.10	6604	Capacitor—0.5 mfd.....	.50
6143	Resistor—40,000 ohms—Carbon type—¼ watt—Package of 5.....	1.00	7062	Capacitor—Adjustable trimming capacitor 15 to 70 mmfd..	.50
			7439	Drum—Dial drum with set screws and 3 dial mounting nuts.	.35
			7523	Escutcheon—Station selector escutcheon.....	.50
REPRODUCER ASSEMBLIES					
			8920	Ring—Cone retaining ring.....	.35
			9431	Bracket—Cone bracket and magnet assembly.....	8.10
			9432	Cone—Reproducer cone complete with voice coil.....	1.89

RCA Victor Company, Inc.

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