

# RCA-VICTOR CO., INC.

**MODEL M-116**  
**Voltage**  
**Alignment Data**

- Power Requirements ..... 105-125 volt,  
50-60 Cycle A. C. or 6-volt Storage Battery
- Power Consumption .. 115 Volts, 60 Cycles A. C.—40 Watts,  
Battery—5.7 Amperes at 6.3 Volts
- Number and Types of Radiotrons ..... 1 RCA-78,  
1 RCA-6A7, 1 RCA-6B7, 1 RCA-41, 1 RCA-1-V—Total 5
- Maximum Undistorted Power Output ..... 1.8 Watts
- Maximum Output ..... 3.6 Watts
- Type of Rectifier ..... A. C.—Radiotron RCA-1-V  
Battery—Vibrator Inverter-Rectifier
- Tuning Frequency Range ..... 540 K. C.—1500 K. C.

This automobile receiver is of unique design and construction. Among its many features is its adaptability to either battery or 110-volt alternating current operation. This is accomplished by having a separate power transformer and a

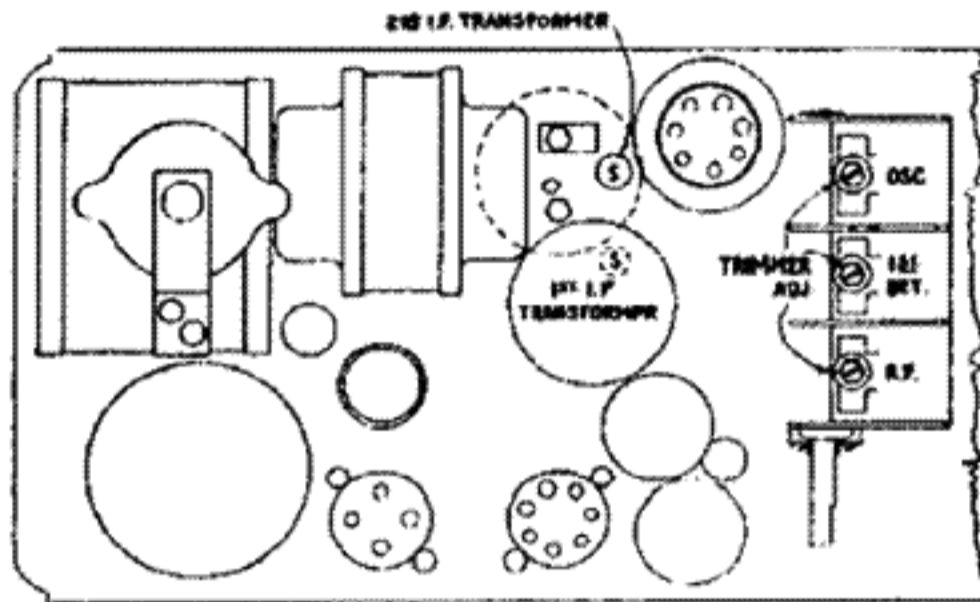


Figure C—Location of Line-up Capacitors

tube rectifier for alternating current, while the conventional vibrator inverter-rectifier with its associated transformer is used for battery operation.

Other important features include its compact portable size, full vision "airplane" type dial, tone control, sensitivity switch, electro-dynamic loudspeaker and the inherent sensitivity, selectivity and tone quality characteristic of the super-heterodyne.

Figure A shows the schematic diagram, Figure B the wiring diagram, Figure C the location of the line-up capacitors and Figure D the wiring of the battery cable. A brief description of the circuit follows:

**Radio Circuit**—The radio circuit consists of four Radiotrons; namely, an RCA-78 R. F. stage, an RCA-6A7 first detector-oscillator, an RCA-6B7 intermediate frequency amplifier, second detector and A. V. C. and an RCA-41 output amplifier.

**Power Circuit**—The power circuit for battery operation consists of a vibrator inverter-rectifier with its associated transformer and filter circuits. The heaters of the various Radiotrons are powered direct from the car storage battery. The operating switch is so arranged that at one position battery operation is obtained, while at the other position, proper connections are made for A. C. operation.

When the switch is at the A. C. position, the A. C. input current is connected to the primary of the A. C. transformer. Two secondaries are provided, one for furnishing power to the Radiotron heaters and the dial lamp, the other for plate supply to Rectifier RCA-1-V. The output of the rectifier is then filtered by the same filtering system as that used for battery operation. The loudspeaker field is used as a filter reactor.

## Inverter-Rectifier Adjustments

This receiver uses a vibrator inverter-rectifier for supplying all plate and grid voltages when operated from a battery source. This unit is accurately adjusted and sealed at the factory and service adjustment should not be attempted.

## Line-up Capacitor Adjustments

The three R. F. line-up capacitors and two I. F. tuning capacitors are accessible and may require adjustments. The R. F. adjustments are made at 1400 K. C. and the I. F. adjustments at 175 K. C. In order to make these adjustments, it is first necessary to remove the cover of the instrument. The following procedure should be used:

### R. F. Adjustment :

- (a) Check the position of the dial pointer. It should be aligned with the low-frequency end graduation, as indicated by the small arrow marked "Max. Cap." when the tuning capacitor rotor is fully meshed with the stator.
- (b) Procure a modulated oscillator giving a signal at 1400 K. C. (Stock No. 9050), a non-metallic screw driver (Stock No. 7065) and an output meter. Connect the output meter across the cone coil of the loudspeaker.
- (c) Couple the output of the oscillator from antenna to ground, set the dial at 140, and the oscillator at 1400 K. C.
- (d) Place the oscillator and receiver in operation and adjust the oscillator output so that a small deflection is obtained in the output meter when the volume control is at its maximum position.
- (e) Then adjust the three line-up capacitors until a maximum deflection in the output meter is obtained. Readjust these capacitors a second time, as there is a slight interlocking of adjustments.

### I. F. Adjustments :

- (a) Procure a modulated oscillator giving a signal at 175 K. C. (Stock No. 9050), a non-metallic screw driver (Stock No. 7065) and an output meter.
- (b) Connect the oscillator between the control grid of the first detector and ground.
- (c) Connect the output meter across the voice coil of the loudspeaker. Then connect the antenna lead to ground and adjust the tuning capacitor so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output until a small deflection is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.
- (d) Each transformer has but one winding that is tuned by means of an adjustable capacitor, the other windings being untuned. The capacitors should be adjusted for maximum output. At the time I. F. adjustments are made it is good practice to follow this adjustment with the R. F. adjustments, due to the interlocking that always occurs. The reverse of this, however, is not always true.

## RADIOTRON SOCKET VOLTAGES

115 Volts A. C. or 6.3 Volt Battery—No Signal—Max. Sensitivity

Radiotron No.	Cathode to Ground	Cathode to Screen Grid Volts	Cathode to Plate Volts	Cathode Current M. A.	Heater Volts
RCA-78 R. F.	4.2	86	216	5.5	5.9
RCA-6A7	4.2	86	216	10.0 Total	5.9
		—	216		
RCA-6B7 Second Det.	2.7	87	207	4.5	5.9
RCA-41 Power	15.0	255	235	30.0	5.9
RCA-1-V	—	—	325 RMS	50.0	5.9

SOLID CONNECTIONS FOR  
 +A GROUNDED. DOTTED  
 CONNECTIONS FOR -A GROUNDED.

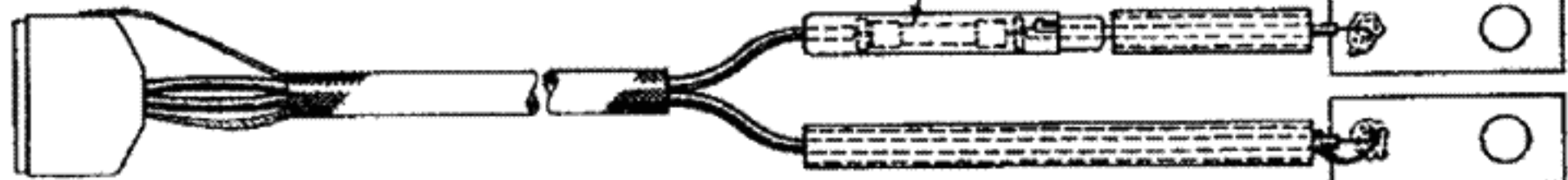


Figure D—Internal Connections of Cable

MODEL M-116  
Chassis Wiring

RCA-VICTOR CO., INC.

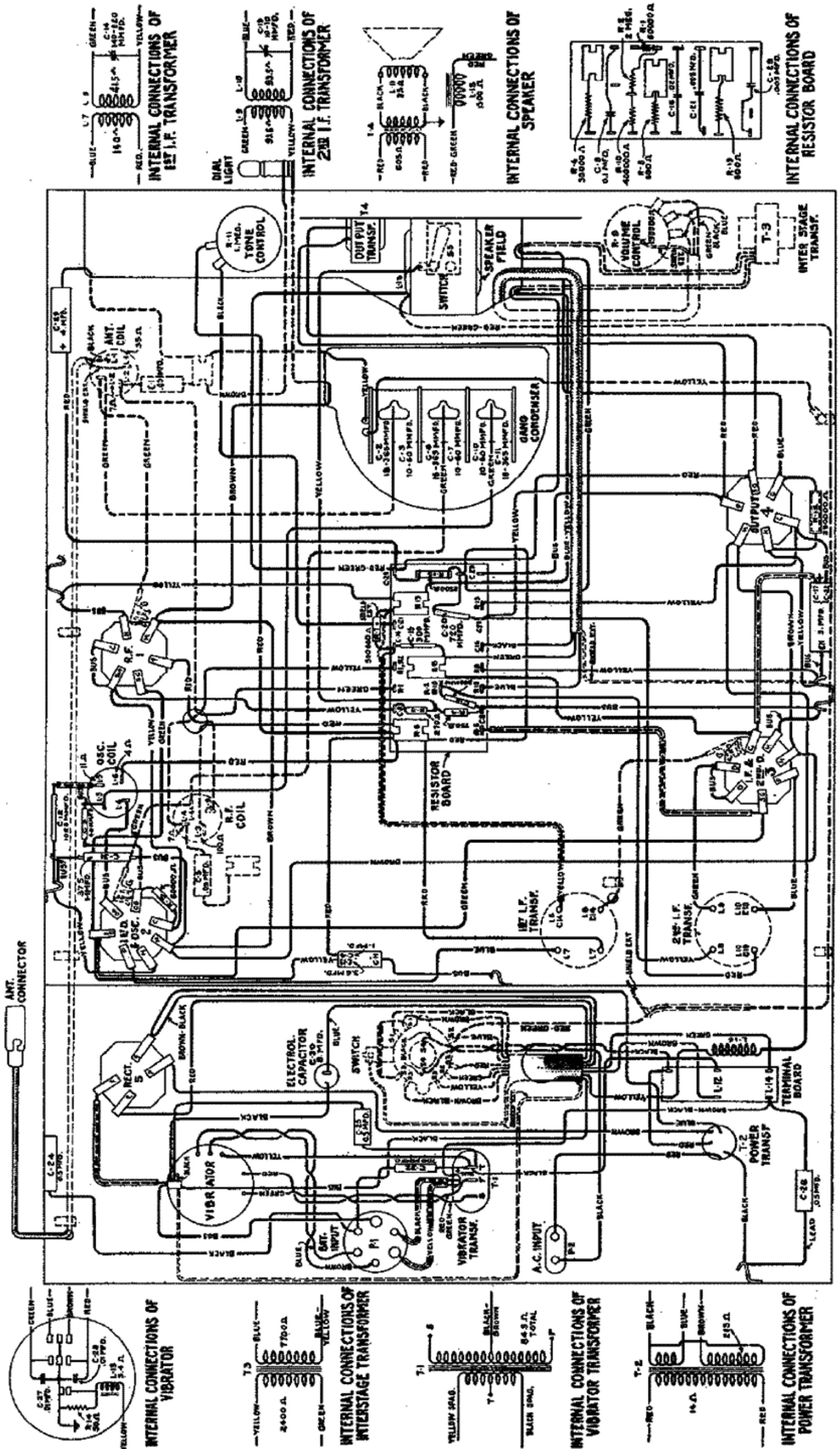


Figure B—Wiring Diagram

# INSTALLATION

## Automobile Installation

A typical installation of this receiver in an auto is accomplished in the following manner: Lift the seat upon which the instrument will rest, lay the battery cable and antenna shielded lead-in wire in position and then replace the seat. In cases where the automobile battery is mounted beneath that seat, however, it will be necessary to connect the battery cable to the battery (as described in the subsequent paragraph entitled "Connection to Battery") before replacing the seat. Finally, mount the receiver on the seat, attach the connector of the lead-in wire to the short (antenna) lead extending from the rear of the instrument and, with the power switch "off" (in AC position), insert the battery cable plug in the receptacle located adjacent to the antenna lead entrance.

**Connection to Antenna**—Feed the antenna lead-in wire beneath floor mat to the side of car nearest the wire extending from the antenna. The wire from a factory-installed roof antenna ordinarily is brought down one of the front pillar posts and left in a coil behind the instrument panel. In such cases, therefore, the lead-in wire after leaving the floor mat should be concealed behind the kick-board, then soldered to the wire extending from the antenna at the lower end of the body pillar post, after cutting the necessary length from each wire to eliminate excessive slack. Insulate the joint with tape and then solder or bond the pig-tail extension from the lead-in shield braid to the car frame.

A similar procedure is followed when either alternative form of antenna ("interior" roof or plate type) is employed except that the lead-in wire probably will follow a different route in each case. Such antennas should be mounted as far to the rear of the car as possible to insure minimum ignition interference. The lead-in wire for the interior type unit thus may be carried down the rear quarter of top and then behind the back cushion of seat in open and convertible models or may be anchored to any convenient pillar post in closed models. With the plate antenna, the lead-in wire should be fed through any opening in the floor board.

**Connection to Battery**—Since, in most cars, the storage battery is located below the floor boards of the driving compartment, the battery cable has been made sufficiently long to reach the battery after passing beneath the driver's seat (see note concerning longer cable available for rear seat operation—Equipment, "Battery Cable Package"). Run the cable under the floor mat and through the floor opening provided above the battery and

connect the cable lugs to the battery terminal clamps as illustrated. The lug stamped "BATT. GROUND" must be connected to that side of the battery grounded to the car frame and the remaining lug (on lead with fuse receptacle) attached to the supply side of the battery. Finally, replace the floor cover, notching the side of the opening if necessary to provide clearance for the battery cable.

### Suppression of Ignition Interference

1. Disconnect all wires from the spark plugs. Fasten one spark-plug suppressor to the top of each plug and re-attach the wires to the free ends of the suppressors. These suppressors may be mounted either in line with or at right angles to the plugs in order to avoid interference with metallic parts grounded to the engine or frame.

2. If the distributor is of the plug-in type, disconnect the center wire from the plug-in, the distributor suppressor into the distributor head and insert the wire in the free end of the suppressor.

**NOTE**—For cap-type distributors, exchange the distributor suppressor at your dealer's for one of a special type. Cut the wire leading from the distributor to the coil and screw the suppressor into the end attached to the distributor. Screw the other end of the wire (leading to the coil) into the opposite end of the suppressor.

3. Clamp the generator capacitor against the generator frame. The screw holding the cut-out ordinarily may be utilized for securing this unit. Connect the capacitor lead to the terminal on the generator side of the cut-out switch. (In some cases, however, less interference will be encountered with this lead connected to the opposite side of the cutout; the most suitable position therefore should be determined by trial.)

4. The ignition capacitor (unit with two leads) must be connected between the battery terminal of the ammeter and any convenient screw on the instrument panel. In certain cars, interference will be reduced still further by connecting an additional capacitor (obtainable from your dealer) between the battery side of the ignition coil and the car frame.

### Home Installation

The circular insert on the frontispiece illustrates a typical installation of this receiver on lighting-circuit operation. Simply place the instrument upon a table or other level surface, attach the antenna lead-in wire (using the small connector furnished) and, with the power switch "off" (in "AUTO" position), connect the power cord to an electrical outlet supplying alternating current at the voltage and frequency (cycles) specified on the rating label inside the case.

# 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
2240	Resistor—30,000 ohms—Carbon type— $\frac{1}{2}$ watt (R6)	\$0.22	9436	Transformer—Power transformer—105-125 volts, 50-60 cycles (T2)	\$4.00
2734	Capacitor—145 mfd. (C-36)—Package of 5	1.50	9457	Transformer—Power transformer—9 volts (T1)	4.78
2747	Cap—Contact cap—Package of 5	.50	CABLE ASSEMBLIES		
2917	Washer—"C" washer for condenser drive and shaft assembly—Package of 10	.25	3466	Connector—Antenna lead-in connector	.60
3218	Resistor—600 ohms—Carbon type— $\frac{1}{2}$ watt (R8)—Package of 5	1.00	3646	Fuse—20 ampere—Package of 5	.40
3469	Resistor—2,500 ohms—Carbon type—1 watt (R15)—Package of 5	1.10	4008	Shield—Metal shield for cable plug—Package of 5	.58
3536	Capacitor—Comprising two 5.0 mfd. (C17, C22)	1.10	4009	Terminal—Metal terminal (plate) for battery connection—Package of 5	.44
3572	Socket—7-contact Radiotron socket	.38	4010	Terminal—Metal terminal—Improved "Best-Ground"—For battery connection—Package of 5	.44
3584	Ring—Antenna, R. F. or oscillator coil retaining ring—Package of 5	.40	6159	Plug—Battery cable plug	.50
3597	Capacitor—0.25 mfd. (C33)	.40	6516	Connector—Fuse connector	.16
3602	Resistor—60,000 ohms—Carbon type— $\frac{1}{2}$ watt (R1, R5)—Package of 5	1.00	6760	Cable—7-conductor shielded—Switch cable	.40
3619	Resistor—400,000 ohms—Carbon type— $\frac{1}{2}$ watt (R10)—Package of 5	1.00	6761	Cable—2-conductor shielded—Approximately 10 ft. length, from resistor board to volume control	.26
3621	Coil—Choke coil—Located on terminal board (L14)	.35	6762	Lead—Antenna lead-in—Approximately 15 ft. length, with connector	.44
3623	Shield—Antenna, R. F. or oscillator coil shield	.30	6773	Cable—Battery cable—Plus A grounded—Overall length approximately 61 inches—Complete with plug, fuse, fuse connector and terminal	2.36
3632	Resistor—500 ohms—Carbon type (R13)—Package of 5	1.10	6774	Cable—Battery cable—Minus A grounded—Overall length approximately 61 inches—Complete with plug, fuse, fuse connector and terminal	2.36
3639	Capacitor—0.02 mfd. (C16)	.25	6775	Cable—Battery cable—Plus A grounded—Overall length approximately 105 inches—Complete with plug, fuse, fuse connector and terminal	1.26
3694	Capacitor—10 mfd. (C9)	.22	6776	Cable—Battery cable—Minus A grounded—Overall length approximately 105 inches—Complete with plug, fuse, fuse connector and terminal	.42
3699	Resistor—720 mfd. (C20)	.40	6777	Cable—Antenna lead-in cable—Shielded—Approximately 98 inches long—With connector	1.10
3744	Resistor—250,000 ohms—Carbon type— $\frac{1}{2}$ watt (R12)—Package of 5	1.00	6778	Cable—7-conductor shielded cable—Approximately 58 inches long	2.04
3751	Capacitor—0.5 mfd. (C25)	.32	6834	Cable—Battery cable—Minus "A" grounded—Overall length approximately 185 inches—Complete with plug, fuse, fuse connector and terminal	3.92
3877	Capacitor—0.1 mfd. (C8)	.25	6835	Cable—Battery cable—Plus "A" grounded—Overall length approximately 185 inches—Complete with plug, fuse, fuse connector and terminal	2.25
3888	Capacitor—0.05 mfd. (C1, C5)	.25	MISCELLANEOUS PARTS		
3920	Plug—6-contact "AC" connection plug	.30	3940	Handle—Carrying handle	.44
3937	Capacitor—300 mfd. (C15, C18)	.34	3951	Knob—Tone control, volume control or suppressor switch knob—Package of 5	.60
3954	Shield—Radiotron shield	.26	3962	Knob—Station selector knob—Package of 5	1.00
3955	Screw—Chassis mounting screw and washer assembly—Package of 10	.68	3963	Knob—"A-C-D-C" switch knob—Package of 5	.60
3956	Clamp—Capacitor mounting clamp—Package of 5	.42	3964	Base—Metal base for station selector dial glass	.54
3957	Plug—2-contact "AC" connection plug	.30	3965	Glass—Station selector dial glass	.22
3958	Plug—6-contact "DC" connection plug	.40	3966	Spring—Contact spring—Grounds vibrator shield to case—Package of 10	.92
3968	Spring—Tuning condenser drive cord tension spring—Package of 10	.30	4011	Capacitor—0.5 mfd. (C24)	.60
3969	Cord—Tuning condenser drive cord—Package of 10	1.22	4017	Scale—Station selector dial scale—Package of 5	1.38
3970	Drum and shaft assembly—Small—For tuning condenser drive	.24	6151	Suppressor—Spark plug suppressor	.56
3971	Excitator—Switch excitator engraved "AC-DC"	.24	6152	Suppressor—Distributor suppressor	.56
3972	Drum and bobbin assembly—Large—For tuning condenser drive	.34	6175	Suppressor—Distributor suppressor—Splice in type	.46
3993	Screw—Set screw for tuning condenser drive drum—Package of 10	.25	6494	Capacitor—0.5 mfd.—Ammeter capacitor	.72
4001	Capacitor—1.025 mfd. (C12)	.32	6495	Capacitor—0.3 mfd.—Generator capacitor	.56
4002	Capacitor—375 mfd. (C31)	.30	6670	Capacitor—0.3 mfd.—Generator capacitor—"Elbow" type	.94
4003	Capacitor—100 mfd. (C32)	.30	6763	Cord—Power cord with connector	10.04
4020	Resistor—750 ohms—Carbon type— $\frac{1}{2}$ watt (R4)—Package of 5	1.00	7694	Vibrator—Complete (C27, C28, L13, R14)	5.44
4089	Capacitor—Two 0.05 mfd. (C34, C35)	.40	7696	Housing—Metal housing—Top section	.90
6135	Resistor—270 ohms—Carbon type— $\frac{1}{2}$ watt (R1)—Package of 5	1.00	7697	Base—Housing base	33.50
6186	Lamp—Station selector dial lamp—Package of 5	1.75	9058	Oscillator—Test oscillator—150 to 25,000 K. C.	
6442	Resistor—2 megohms—Carbon type— $\frac{1}{2}$ watt (R2)—Package of 5	1.00	REPRODUCER ASSEMBLIES		
6481	Resistor—60,000 ohms—Carbon type— $\frac{1}{2}$ watt (R5)—Package of 5	1.00	6750	Screen—Dust screen	.28
6510	Socket—4-contact Radiotron socket	.88	6751	Screen—Metal screen	.46
6512	Capacitor—0.005 mfd. (C21)	.28	6764	Transformer—Output transformer (T4)	1.42
6538	Condenser—3-gang variable tuning condenser assembly (C1, C2, C3, C4, C10, C11)	5.16	6772	Ring—Felt ring—Used between speaker and metal housing—Package of 5	1.29
6740	Transformer—First intermediate frequency transformer (L7, L8, C14)	2.16	8987	Cone—Reproducer cone (L11)—Package of 5	5.00
6741	Transformer—Second intermediate frequency transformer (L9, L10, C19)	1.78	9458	Reproducer complete	5.26
6742	Coil—Antenna coil assembly (L1, L2)	.96	9459	Coil—Comprising field coil, magnet and cone support (L15)	3.34
6743	Coil—R. F. coil assembly (L3, L4)	.88	REPRODUCER ASSEMBLIES		
6744	Capacitor—0.05 mfd. (C26)	.30	6750	Screen—Dust screen	.28
6745	Coil—Oscillator coil assembly (L5, L6)	.62	6751	Screen—Metal screen	.46
6746	Volume control (R9)	1.20	6764	Transformer—Output transformer (T4)	1.42
6747	Tone control (R11)	1.20	6772	Ring—Felt ring—Used between speaker and metal housing—Package of 5	1.29
6748	Switch—Nerve amplifier switch (S5)	2.14	8987	Cone—Reproducer cone (L11)—Package of 5	5.00
6749	Switch—AC-DC switch (S1, S2, S3, S4)	2.14	9458	Reproducer complete	5.26
6759	Transformer—Interstage transformer (T3)	2.55	9459	Coil—Comprising field coil, magnet and cone support (L15)	3.34
6781	Capacitor—Comprising one 3.0 mfd. and one 1.0 mfd. (C4, C13)	1.10			
6782	Capacitor—4.0 mfd. (C29)	1.10			
7485	Socket—4-contact Radiotron socket	.40			

RCA-VICTOR CO., INC.

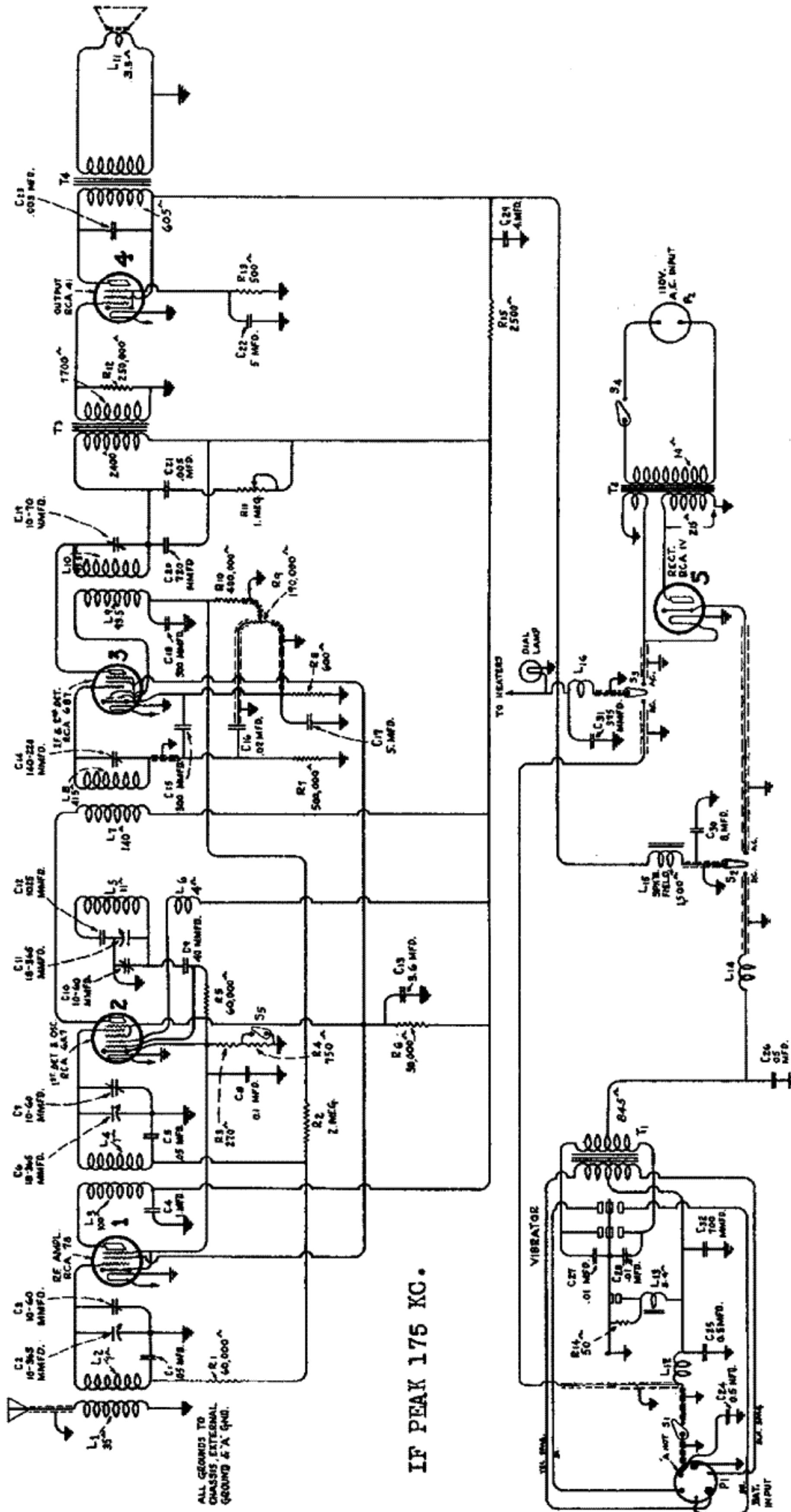


Figure A—Schematic Circuit Diagram

