R.C.A. Victor Co., Inc.

Model: M-116	**Chassis:**	**Year:** Pre October 1934
Power:	**Circuit:**	**IF:**
Tubes:		
Bands:		

Resources
Riders 5 (V) RCA 5-39
Riders 5 (V) RCA 5-40
Riders 5 (V) RCA 5-41
Riders 5 (V) RCA 5-42

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

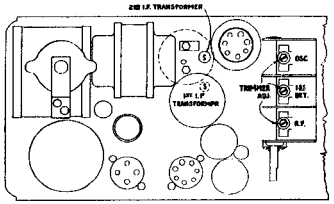

Figure C—Location of Line-up Capacitors

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 superheterodyne.

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 that of 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	First Detector	4.2	86	216	10.0 Total	5.9
	Oscillator		—	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

Figure D—Internal Connections of Cable

MODEL M-116
Chassis Wiring

RCA-VICTOR CO., INC.

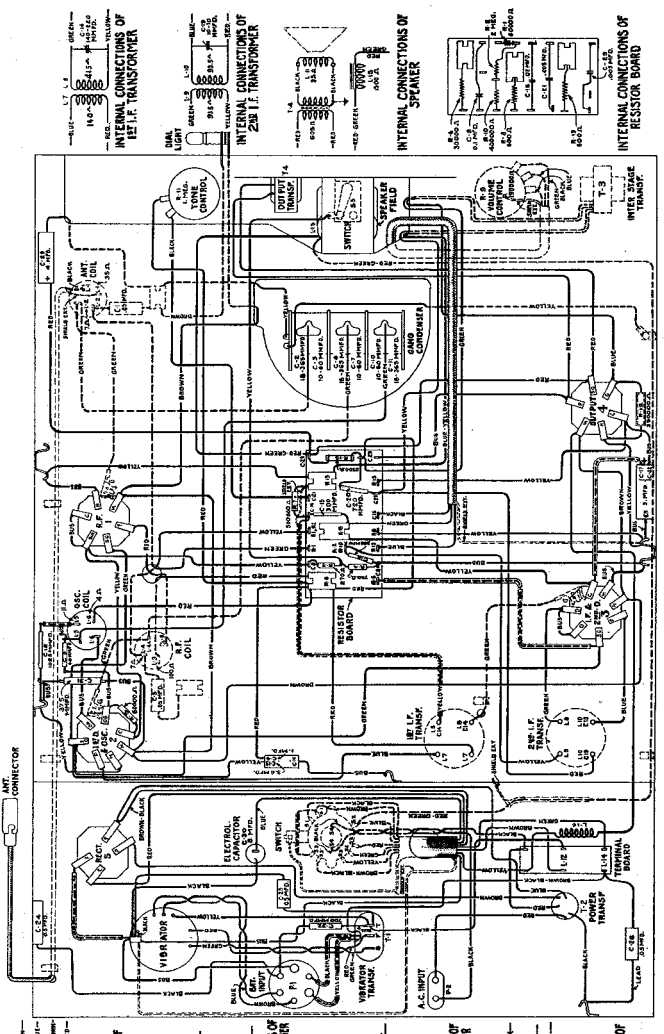

Figure B—Wiring Diagram

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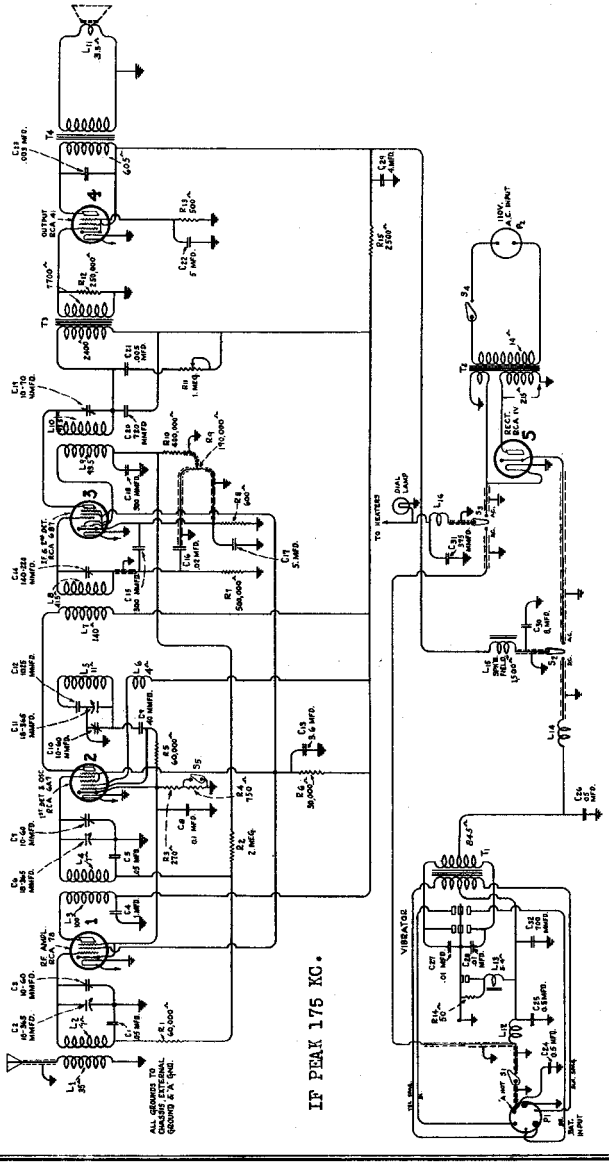

Figure A—Schematic Circuit Diagram

MODEL M-116
Installation Notes
Parts List

RCA-VICTOR CO., INC.

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 head. Plug 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
	RECEIVER ASSEMBLIES	
2240	Resistor—30,000 ohms—Carbon type—¼ watt (R6)	$0.22
2734	Capacitor—745 mfd. (C-36)—Package of 5	1.50
2747	Cap—Contact cap—Package of 5	.50
2917	Washer—"C" washer for condenser drum and shaft assembly—Package of 10	.25
3218	Resistor—600 ohms—Carbon type—¼ watt (R8)—Package of 5	1.00
3469	Resistor—2,500 ohms—Carbon type—1 watt (R15)—Package of 5	1.10
3536	Capacitor—Comprising two 5.0 mfd. (C17, C22)	1.10
3572	Socket—7-contact Radiotron socket	.38
3584	Ring—Antenna, R. F. or oscillator coil retaining ring—Package of 5	.40
3597	Capacitor—0.25 mfd. (C33)	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R1, R5)—Package of 5	1.00
3619	Resistor—400,000 ohms—Carbon type—¼ watt (R10)—Package of 5	1.00
3621	Coil—Choke coil—Located on terminal board (L14)	.35
3623	Shield—Antenna, R. F. or oscillator coil shield	.30
3682	Resistor—500 ohms—Carbon type (R13)—Package of 5	1.10
3639	Capacitor—0.02 mfd. (C16)	.25
3696	Capacitor—40 mmfd. (C9)	.22
3699	Capacitor—720 mmfd. (C20)	.40
3744	Resistor—250,000 ohms—Carbon type—¼ watt (R12)—Package of 5	1.00
3751	Capacitor—0.5 mfd. (C25)	.40
3877	Capacitor—0.1 mfd. (C8)	.32
3888	Capacitor—0.05 mfd. (C1, C5)	.25
3920	Capacitor—0.003 mfd. (C23)	.25
3987	Capacitor—300 mmfd. (C15, C18)	.34
3950	Shield—Radiotron shield	.26
3954	Screw—Chassis mounting screw and washer assembly—Package of 10	.32
3955	Coil—Choke coil—Located on terminal board (L12)	.68
3956	Clamp—Capacitor mounting clamp—Package of 5	.32
3957	Indicator—Station selector indicator pointer—Package of 5	.42
3958	Plug—2-contact "AC" connection plug	.50
3959	Plug—6-contact "DC" connection plug	.60
3968	Spring—Tuning condenser drive cord tension spring—Package of 10	.30
3969	Cord—Tuning condenser drive cord—Package of 10	1.22
3970	Drum and shaft assembly—Small—For tuning condenser drive	.24
3971	Escutcheon—Switch escutcheon engraved "AC-DC"	.24
3972	Drum and bushing assembly—Large—For tuning condenser drive	.34
3993	Screw—Set screw for tuning condenser drive drum—Package of 10	.25
4001	Capacitor—1,02 5mmfd. (C12)	.32
4002	Capacitor—375 mmfd. (C31)	.30
4003	Capacitor—700 mmfd. (C32)	.30
4020	Resistor—750 ohms—Carbon type—¼ watt (R4)—Package of 5	1.00
4089	Capacitor—Two 0.05 mfd. (C34, C35)	.40
6135	Resistor—270 ohms—Carbon type—¼ watt (R3)—Package of 5	1.00
6165	Lamp—Station selector dial lamp—Package of 5	1.75
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R7)—Package of 5	1.00
6242	Resistor—2 megohms—Carbon type—¼ watt (R2)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
6300	Socket—4-contact Radiotron socket	.35
6512	Capacitor—0.005 mfd. (C21)	.28
6738	Capacitor—6.0 mfd. (C30)	1.54
6739	Condenser—3-gang variable tuning condenser assembly (C2, C3, C6, C7, C10, C11)	5.16
6740	Transformer—First intermediate frequency transformer (L7, L8, C14)	2.16
6741	Transformer—Second intermediate frequency transformer (L9, L10, C19)	1.78
6742	Coil—Antenna coil assembly (L1, L2)	.88
6743	Coil—R. F. coil assembly (L3, L4)	.98
6744	Capacitor—0.05 mfd. (C26)	.30
6745	Coil—Oscillator coil assembly (L5, L6)	.62
6746	Volume control (R9)	1.20
6747	Tone control (R11)	1.20
6748	Switch—Noise suppressor switch (S5)	.40
6749	Switch—AC-DC switch (S1, S2, S3, S4)	2.14
6759	Transformer—Interstage transformer (T3)	2.55
6781	Capacitor—Comprising one 3.6 mfd. and one 1.0 mfd. (C4, C13)	1.10
6782	Capacitor—4.0 mfd. (C29)	1.10
7485	Socket—6-contact Radiotron socket	.40
9456	Transformer—Power transformer—105-125 volts, 50-60 cycles (T2)	$4.00
9457	Transformer—Power transformer—9 volts (T1)	4.78
	CABLE ASSEMBLIES	
3466	Connector—Antenna lead-in connector	.60
3646	Fuse—20 amperes—Package of 5	.40
4008	Shield—Metal shield for cable plug—Package of 5	.58
4009	Terminal—Metal terminal (plain) for battery connection—Package of 5	.44
4010	Terminal—Metal terminal engraved "Batt-Ground"—For battery connection—Package of 5	.44
6150	Plug—Battery cable plug	.50
6516	Connector—Fuse connector	.16
6760	Cable—7-conductor shielded—Switch cable	.40
6761	Cable—2-conductor shielded—Approximately 10½ inches long, from resistor board to volume control	.26
6762	Lead—Antenna lead-in—Approximately 15¾ inches long—With connector	.44
6773	Cable—Battery cable—Plus A grounded—Overall length approximately 61 inches—Complete with plug, fuse, fuse connector and terminal	2.36
6774	Cable—Battery cable—Minus A grounded—Overall length approximately 61 inches—Complete with plug, fuse, fuse connector and terminal	2.36
6775	Cable—Battery cable—Plus A grounded—Overall length approximately 105 inches—Complete with plug, fuse, fuse connector and terminal	3.30
6776	Cable—Battery cable—Minus A grounded—Overall length approximately 105 inches—Complete with plug, fuse, fuse connector and terminal	3.30
6777	Cable—Antenna lead-in cable—Shielded—Approximately 98 inches long—With connector	1.26
6778	Cable—7-conductor shielded cable	.42
6779	Cable—2-conductor shielded cable—Approximately 58 inches long	1.10
6780	Cable—2-conductor shielded cable—Approximately 102 inches long	2.04
6834	Cable—Battery cable—Minus "A" grounded—Overall length approximately 185 inches—Complete with plug, fuse, fuse connector and terminal	3.92
6835	Cable—Battery cable—Plus "A" grounded—Overall length approximately 185 inches—Complete with plug, fuse, fuse connector and terminal	3.92
6836	Lacquer—Touch up lacquer (1 pint of lacquer and 1 pint of thinner)	2.25
	MISCELLANEOUS PARTS	
3960	Handle—Carrying handle	.44
3961	Knob—Tone control, volume control or suppressor switch knob—Package of 5	.60
3962	Knob—Station selector knob—Package of 5	1.00
3963	Knob—"AC-DC" switch knob—Package of 5	.60
3964	Bezel—Metal bezel for station selector dial glass	.54
3965	Glass—Station selector dial glass	.22
3966	Spring—Contact spring—Grounds vibrator shield to case—Package of 10	.92
4011	Capacitor—0.5 mfd. (C24)	.60
4017	Scale—Station selector dial scale—Package of 5	1.38
6151	Suppressor—Spark plug suppressor	.56
6152	Suppressor—Distributor suppressor	.56
6175	Suppressor—Distributor suppressor—Splice in type	.56
6494	Capacitor—0.5 mfd.—Ammeter capacitor	.46
6495	Capacitor—0.5 mfd.—Generator capacitor	.72
6670	Suppressor—Spark plug suppressor—"Elbow" type	.56
6763	Cord—Power cord with connectors	.94
7694	Vibrator—Complete (C27, C28, L13, R14)	10.04
7696	Housing—Metal housing—Top section	5.44
7697	Base—Housing base	.90
9050	Oscillator—Test oscillator—150 to 25,000 K. C.	33.50
	REPRODUCER ASSEMBLIES	
6750	Screen—Dust screen	.28
6751	Screen—Metal screen	.46
6764	Transformer—Output transformer (T4)	1.42
6772	Ring—Felt ring—Used between speaker and metal housing—Package of 5	1.20
8987	Cone—Reproducer cone (L11)—Package of 5	5.00
9458	Reproducer complete	5.20
9459	Coil—Comprising field coil, magnet and cone support (L15)	3.34