

PHILCO RADIO MODEL 51-934

SPECIFICATIONS

CABINET	Plastic table model
CIRCUIT	Six-tube superheterodyne plus selenium rectifier
FREQUENCY RANGES	
Broadcast	540—1630 kc.
FM	88—108 mc.
AUDIO OUTPUT	1 watt
OPERATING VOLTAGE	105—125 volts, a.c./d.c.
POWER CONSUMPTION	35 watts
AERIAL	Built-in high-impedance loop for AM, line cord for FM; provision for connecting external aerial.
INTERMEDIATE FREQUENCY	
AM	455 kc.
FM	9.1 mc.
PHILCO TUBES (6)	12AU6 r-f ampl., 12AT7 converter, 12BA6 1st i-f ampl., 12AU6 2nd i-f ampl., 19C8 det.—a.v.c.—1st audio, 50C5 output

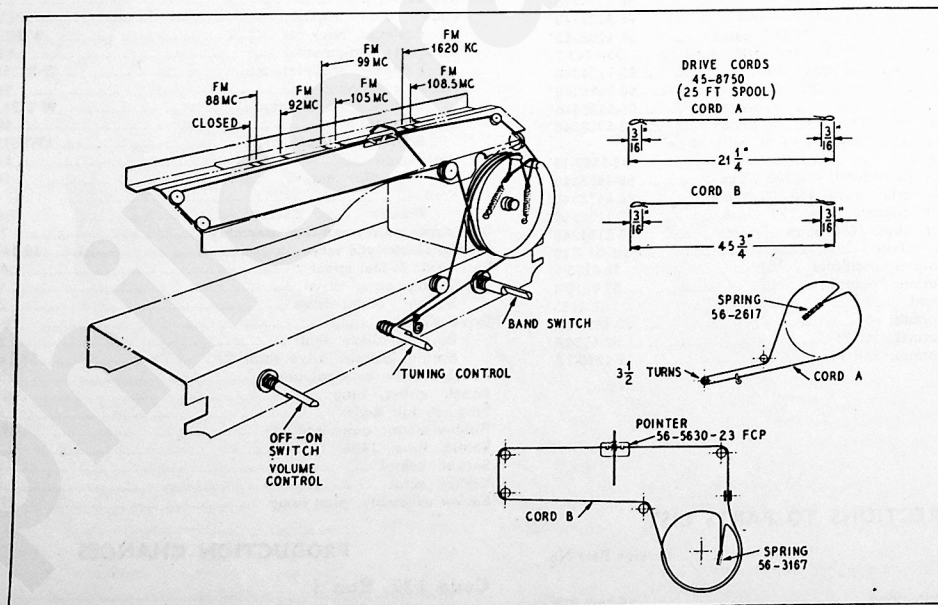


Figure 1. Drive-Cord Installation Details

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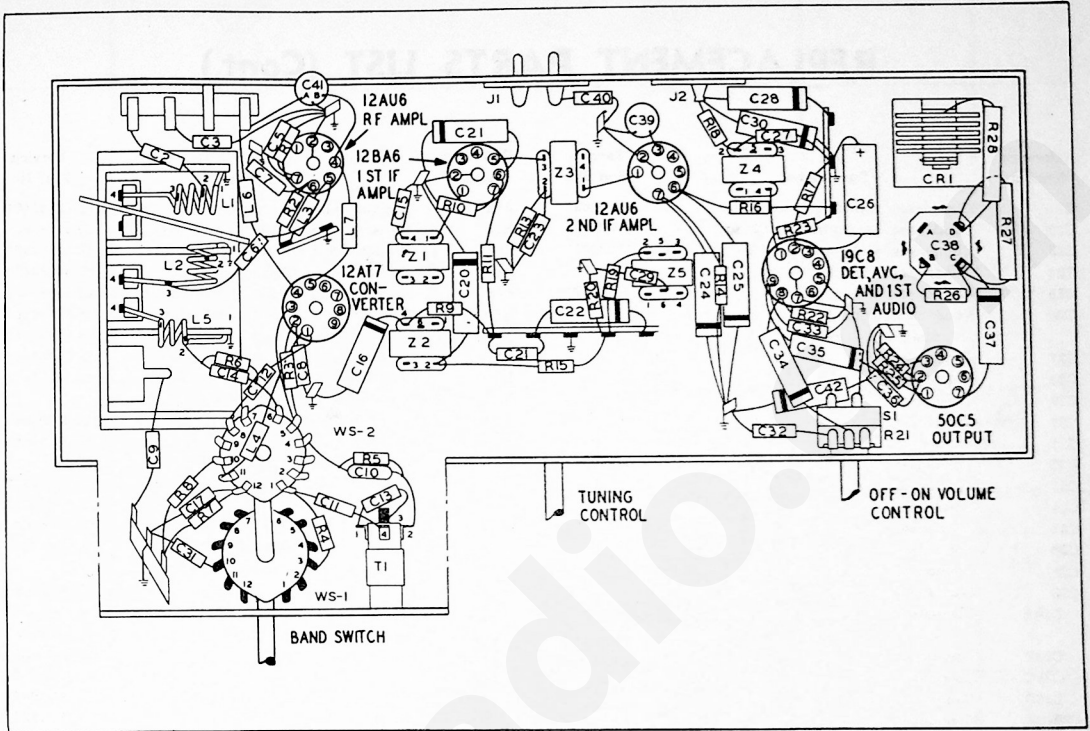


Figure 2. Symbolized Chassis, Showing Parts Placement

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REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts; also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation of the radio will be either unchanged or improved. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.	Reference Symbol	Description	Service Part No.
C1	Condenser, tuning gang, 5-section	31-2756	C10	Condenser, d-c blocking, .01 μ f.	30-1226-10
C1A	Condenser, trimmer, BC aerial	Part of C1	C11	Condenser, neutralizing, 6.5 μ f.	30-1224-6
C1B	Condenser, trimmer, FM r-f	Part of C1	C12	Condenser, d-c blocking, 220 μ f.	62-122001001
C1C	Condenser, trimmer, BC oscillator	Part of C1	C13	Condenser, fixed trimmer, temperature compensating, 7.5 μ f.	30-1224-8
C1D	Condenser, trimmer, FM aerial	Part of C1	C14	Condenser, d-c blocking, 220 μ f.	62-122001001*
C2	Condenser, aerial isolating, 100 μ f.	62-110009001*	C15	Condenser, r-f by-pass, 100 μ f.	62-110009001*
C3	Condenser, aerial isolating, 100 μ f.	62-110009001*	C16	Condenser, plate decoupling, .01 μ f.	
C4	Condenser, aerial isolating, .01 μ f.	45-3505-41	C17	Condenser, r-f by-pass, 100 μ f.	62-110009001*
C5	Condenser, cathode by-pass, 100 μ f.	62-110009001*	C18	Condenser, trimmer, FM oscillator	31-6511
C6	Condenser, d-c blocking, 220 μ f.	62-122001001	C19	Condenser, fixed trimmer, temperature compensating, 7.5 μ f.	30-1224-8
C7	Condenser, screen by-pass, 1500 μ f.	62-215001011*	C20	Condenser, a-v-c decoupling, .01 μ f.	
C8	Condenser, oscillator grid, 100 μ f.	62-110009001*			
C9	Condenser, d-c blocking, 220 μ f.	62-122001001			

REPLACEMENT PARTS LIST (Cont.)

Reference Symbol	Description	Service Part No.
C21	Condenser, screen by-pass, .002 μ f.	61-0062*
C22	Condenser, neutralizing, .006 μ f.	45-3500-7*
C23	Condenser, i-f by-pass, 100 μ mf.	62-110009001*
C24	Condenser, cathode by-pass, .01 μ f.	
C25	Condenser, screen by-pass, .002 μ f.	61-0062*
C26	Condenser, electrolytic diode-load filter, 2 μ f., 50v	30-2417-7
C27	Condenser, i-f by-pass, 330 μ mf.	62-133001001
C28	Condenser, d-c blocking, .006 μ f.	45-3500-7*
C29	Condenser, i-f by-pass, 100 μ mf.	62-110009001*
C30	Condenser, de-emphasis, .004 μ f.	61-0179*
C31	Condenser, i-f by-pass, 100 μ mf.	62-110009001*
C32	Condenser, i-f by-pass, 100 μ mf.	62-110009001*
C33	Condenser, plate by-pass, 680 μ mf.	62-168001001
C34	Condenser, d-c blocking, .02 μ f.	61-0108*
C35	Condenser, d-c blocking, .006 μ f.	61-0105*
C36	Condenser, grid by-pass, 100 μ mf.	62-110009001*
C37	Condenser, tone compensation, .006 μ f.	61-0105*
C38	Condenser, electrolytic, 4-section	30-2570-46
C38A	Condenser, cathode by-pass, 25 μ f., 25v	Part of C38
C38B	Condenser, filter, 40 μ f., 150v	Part of C38
C38C	Condenser, filter, 70 μ f., 150v	Part of C38
C38D	Condenser, filter, 40 μ f., 150v	Part of C38
C39	Condenser, filament by-pass, .005 μ f.	30-1238-1
C40	Condenser, line by-pass, 100 μ mf.	62-110009001*
C41	Condenser, ceramic, 2-section	30-1239
C41A	Condenser, filament by-pass, .004 μ f.	Part of C41
C41B	Condenser, filament by-pass, .004 μ f.	Part of C41
C42	Condenser, line by-pass, .04 μ f.	45-3500
CRI	Selenium rectifier, 100 ma., 117v	34-8003-1
I1	Pilot lamp, frosted, 117v, 7 watts	34-2605
J1	Jack, male, a-c	27-4785-13
J2	Socket, FM test	27-6180
L1	Coil, FM aerial	32-4415-1
L2	Coil, FM r-f	32-4416-1
L3	Choke, r-f, 3.3 μ h.	32-4422-10
L4	Choke, r-f, 3.3 μ h.	32-4422-10
L5	Coil, FM oscillator	32-4414-1
L6	Choke, filament, 2.2 μ h.	32-4422-8
L7	Choke, filament, 2.2 μ h.	32-4422-8
LA1	Loop aerial, AM	32-4052-49
LA2	Line-cord aerial, FM	Part of W1
LS1	Speaker, 4" p-m, including output transformer	
R1	Resistor, cathode bias, 120 ohms	66-1128340*
R2	Resistor, screen decoupling, 470 ohms	66-1478340*
R3	Resistor, grid return, 15,000 ohms	66-3158340*
R4	Resistor, grid return, 1 megohm	66-5108340*
R5	Resistor, parasitic suppressor, 680 ohms	66-1688340*
R6	Resistor, parasitic suppressor, 470 ohms	66-1478340*
R7	Resistor, plate dropping, FM, 1000 ohms	66-2108340*
R8	Resistor, plate dropping, AM, 47,000 ohms	66-3478340*
R9	Resistor, plate dropping, 4700 ohms	66-2478340*
R10	Resistor, cathode bias, 47 ohms	66-0478340*
R11	Resistor, screen decoupling, 1000 ohms	66-2108340*

Reference Symbol	Description	Service Part No.
R12	Resistor, plate decoupling, 2200 ohms	66-2228340*
R13	Resistor, grid return, 1 megohm	66-5108340*
R14	Resistor, cathode bias, 120 ohms	66-1128340*
R15	Resistor, a-v-c filter, 1 megohm	66-5108340*
R16	Resistor, decoupling, 470 ohms	66-1478340*
R17	Resistor, FM diode load, 47,000 ohms	66-3478340*
R18	Resistor, de-emphasis, 47,000 ohms	66-3478340*
R19	Resistor, i-f filter, 47,000 ohms	66-3478340*
R20	Resistor, a-v-c load, 3.3 megohms	66-5338340*
R21	Volume control (with off-on switch), 500,000 ohms	33-5566-20
R22	Resistor, grid return, 10 megohms	66-6108340*
R23	Resistor, plate load, 470,000 ohms	66-4478340*
R24	Resistor, grid return, 470,000 ohms	66-4478340*
R25	Resistor, cathode bias, 150 ohms	66-1158340*
R26	Resistor, filter, 470 ohms, 1 watt	66-1474340*
R27	Resistor, filter, 150 ohms, 2 watts	66-1185340*
R28	Resistor, current limiting, 22 ohms, 2 watt	66-0225360
S1	Switch, off-on	Part of R21
T1	Transformer, AM oscillator	32-4458
T2	Transformer, output	Part of L51
W1	Line cord	41-3791-2
W2	Cable, FM aerial, 72-ohm twin lead	41-3987
WS	Switch, band, 2-wafer	42-1924
Z1	Transformer, FM, 1st i-f	32-4372A
Z2	Transformer, AM, 1st i-f	32-4258-3A
Z3	Transformer, FM, 2nd i-f	32-4372-2A
Z4	Transformer, FM, 3rd i-f	32-4310-1A
Z5	Transformer, AM, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Cabinet	10796
Back, flange, and socket assembly	76-5738
Fastener, back mtg. (4)	W-2235FA9
Baffle	54-8069
Fastener, baffle mtg. (2)	W-2235-2FA9
Dial Scale	54-5089
Clip, scale mtg. (4)	56-7808FE11
Knob, FM-AM	54-4774-2
Knob, tuning	54-4774
Knob, volume-off-on	54-4774-1
Dial Backplate Assembly	76-5733
Drive cord, 25-foot spool	45-8750*
Pointer	56-5630-23
Shaft, drive	56-7931FA11
Spring, gang drive	56-2617
Spring, pointer drive	56-3167
Rubber mounts, gang (5)	27-4771-1
Rubber mounts, speaker (2)	54-4651-1
Socket, 12BA6, 12AU6 (i-f ampl.), 50C5	27-6203
Socket, 12AU6 (r-f ampl.)	27-6203-1
Socket, 12AT7	27-6203-6
Socket, 19C8	27-6203-5
Spacer, "T", speaker mtg. (2)	1W29155FA3
Washer, speaker mtg. (2)	1W52224FA3

AM ALIGNMENT PROCEDURE

Make alignment with loop aerial connected to radio. The AM alignment should be completed before the FM alignment is made.

DIAL POINTER—With tuning-condenser plates fully meshed, adjust pointer to coincide with index mark at low-frequency end of dial backplate.

RADIO CONTROLS—Set volume control to maximum, set band switch for broadcast reception, and set tuning control as indicated in chart.

OUTPUT METER—Connect across voice-coil terminals.

SIGNAL GENERATOR—Use AM r-f signal generator, with modulated output. Connect generator and set frequency as indicated in chart.

OUTPUT LEVEL—During alignment, signal-generator output must be attenuated to hold output-meter reading below 1.25 volts.

AM ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Ground lead to chassis. Output lead through a .1- μ f. condenser to mixer grid (pin 7) of 12AT7.	455 kc.	540 kc. (gang fully meshed)	Adjust for maximum output.	TC10—2nd AM i-f sec. TC9—2nd AM i-f pri. TC4—1st AM i-f sec. TC3—1st AM i-f pri.
2	Radiating loop. See note below.	1620 kc.	1600 kc.	Adjust for maximum output.	C1C—osc. trimmer
3	Same as step 2.	1500 kc.	1500 kc.	Adjust for maximum output.	C1A—aerial trimmer

RADIATING LOOP: Make up a six-to-eight-turn, 6-inch-diameter loop from insulated wire; connect to generator terminals, and place near radio loop aerial. Radio loop aerial must be connected.

FM ALIGNMENT PROCEDURE

Make AM alignment first.

RADIO CONTROLS—Set volume control to maximum, set band switch for FM reception, and set tuning control as indicated in chart.

OUTPUT METER—Connect across voice-coil terminals. (This meter is used only for step 3).

D-C VOLTMETER—Connect negative lead of d-c voltmeter (resistance of at least 20,000 ohms per volt) to pin 2 of 19C8 tube, and positive lead to chassis. Use 0–10-volt range.

SIGNAL GENERATOR—Use AM r-f signal generator, with modulated output. Connect ground lead to chassis. Connect output lead and set frequency as indicated in chart. Generator must have sufficient output to give reading of approximately 8.5 volts on d-c voltmeter; during alignment, generator output must be attenuated to hold meter reading at this value.

NOTE: Before starting FM alignment, allow radio and signal generator to warm up for 15 minutes.

FM ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Through a .1- μ f. condenser to control grid (pin 1) of 12BA6 1st i-f ampl.	9.1 mc.	88 mc.	Adjust tuning cores for maximum reading on d-c voltmeter. Attenuate signal generator to maintain a reading of approximately 10 volts. Repeat adjustments until no further improvement is noted. After this step, do not disturb these tuning cores except as directed in step 3.	TC8—discriminator sec. TC7—discriminator pri. TC6—FM 2nd i-f sec. TC5—FM 2nd i-f pri.

FM ALIGNMENT CHART (Cont.)

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECT:ON TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
2	Through a .1- μ f. condenser to mixer grid (pin 7) of 12AT7.	9.1 mc.	88 mc.	Adjust tuning cores for maximum reading on d-c voltmeter. Repeat adjustments until no further improvement is noted. Do not disturb these tuning cores after this step.	TC2—FM 1st i-f sec. TC1—FM 1st i-f pri.
3	Same as step 1.	9.1 mc.	88 mc.	Adjust tuning core for minimum reading on output meter. This adjustment is critical; repeat to make certain it is correct.	TC8—discriminator sec.
4	To terminal 1 of T1.	105 mc.	105 mc.	Adjust trimmer for maximum reading on d-c voltmeter.	C18—FM osc.
5	Same as step 4.	105 mc.	105 mc.	Same as step 4.	C1B—FM r-f C1D—FM aerial.
6	Same as step 4.	92 mc.	92 mc.	Adjust coil for maximum reading on d-c voltmeter.	L5—osc. (tracking)
7	Same as step 4.	92 mc.	92 mc.	Same as step 6.	L2—FM r-f (tracking) L1—FM aerial. (tracking)
8	Same as step 4.	105 mc.	105 mc.	Same as step 4.	C18—FM osc.
9	Repeat steps 4 through 8 until no further improvement is noted.				

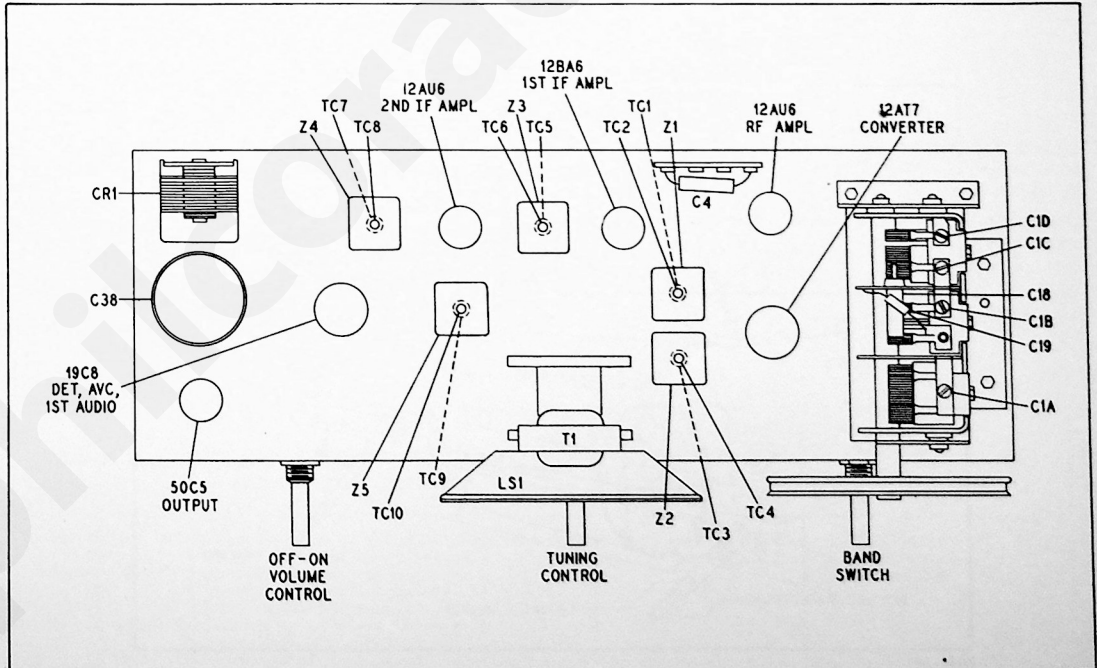


Figure 4. Top View, Showing Trimmer Locations

TPO-376

MODEL 51-934
CORRECTIONS TO PARTS LIST

Reference Symbol	Description	Service Part No.
C16	Condenser, plate decoupling, .01 μ f.	61-0120
C20	Condenser, a-v-c decoupling, .01 μ f.	61-0120
C24	Condenser, cathode by-pass, .01 μ f.	61-0120
LS1	Speaker, 4" p-m, including output transformer	36-1614-6

PRODUCTION CHANGES

Code 121, Run 2

A wiring point change was made, to facilitate production.

Code 121, Run 3

C42, Part No. 45-3500, was removed.

C42 was changed to .047 μ f., Part No. 45-3505-45, and was wired from the hot side of the a-c line to the chassis.

Code 122, Run 1

The 50C5 output tube was replaced by a 35C5. The 19C8 detector-a.v.c.-1st audio tube was replaced by a 19V8.