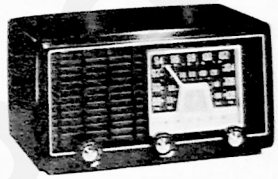
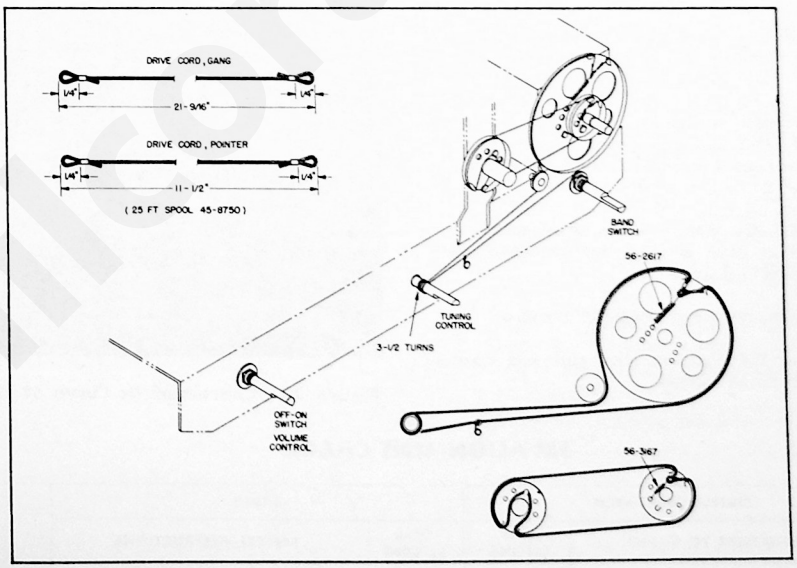
PHILCO RADIO MODEL 53-956

SPECIFICATIONS

CABINET	Plastic table model
CIRCUIT	Six-tube superheterodyne plus selenium rectifier
FREQUENCY RANGES	
Broadcast	540—1620 kc.
FM	88—108 mc.
AUDIO OUTPUT	1 watt
OPERATING VOLTAGE	105—125 volts, a.c./d.c.
POWER CONSUMPTION	45 watts
AERIAL	Built-in pancake 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., 19V8 det.-a.v.c.-1st audio, 35C5GT output



MODEL 53-956



TP2-226Q

Figure 1. Drive-Cord Installation Details

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-μf. condenser to junction of LA1 and L8.	455 kc.	Gang fully open.	Adjust for maximum output, in order given.	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.	1620 kc. (2nd index mark from right).	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

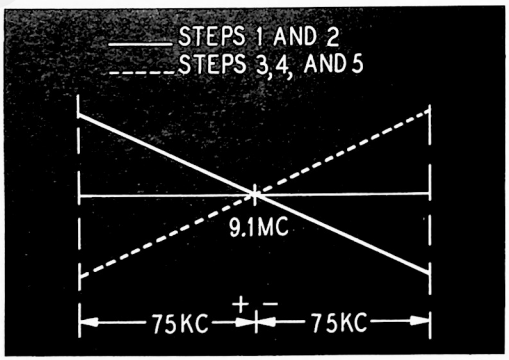
RADIO CONTROLS—Set volume control to maximum, set band switch for FM reception, and set tuning control as indicated in chart.

OSCILLOSCOPE—Connect ground lead to chassis. Connect vertical input to FM TEST jack, J2; connect horizontal input to horizontal sweep output of sweep generator. (Oscilloscope is used for steps 1 and 2.)

SWEEP GENERATOR—Use FM r-f sweep signal generator. Connect output lead as given in chart. Set frequency and sweep width as indicated in chart.

OUTPUT METER—Connect across voice-coil terminals.

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



TP1-2111

Figure 2. Characteristic Curve of FM Detector

FM 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 .01-μf. condenser to control grid (pin 1) of 12AU6 2nd i-f amplifier.	9.1 mc. (75-kc. deviation).	88mc. (gang meshed).	Balance and adjust detector for maximum indication on scope, as shown in figure 2.	TC8—detector sec. TC7—detector pri.

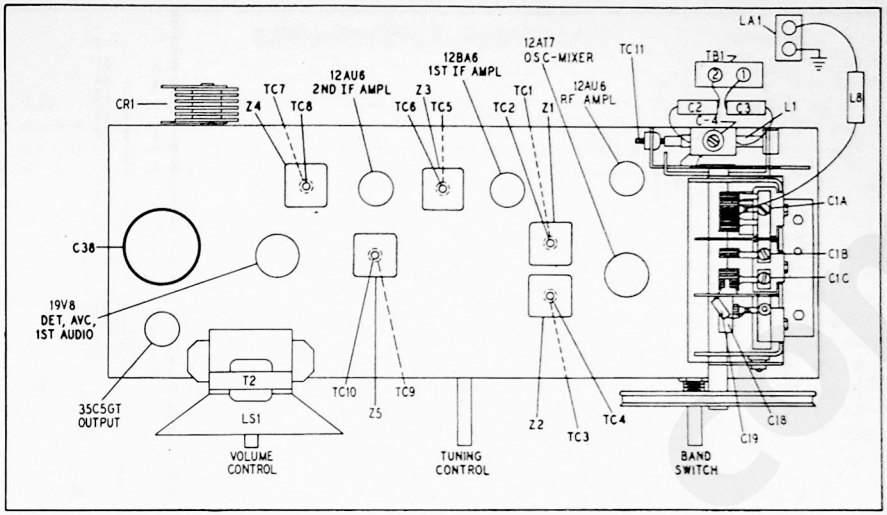


Figure 3. Top View, Showing Trimmer Locations

FM ALIGNMENT CHART (Cont.)

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
2	Ground lead to chassis. Output lead through a .01-μf. condenser to FM tuning gang stator lug, junction of C1 and pin 4 of L2.	Same as step 1.	Same as step 1.	Adjust for maximum indication on scope, as shown in figure 2.	TC6—FM 2nd i-f sec. TC5—FM 2nd i-f pri. TC2—FM 1st i-f sec. TC1—FM 1st i-f pri.
3	Ground lead to lug 3 of TB1. Output lead to lug 2 of TB1. See note 1 below.	108.5 mc.	108.5 mc. (1st index mark from right).	Adjust for maximum indication on output meter.	C18—FM osc.
4	Same as step 3.	88 mc.	88 mc. (1st index mark from left).	Adjust for maximum indication on output meter. See note 2 below.	L5—FM osc.
5	Same as step 3.	105 mc.	105 mc. (3rd index mark from right).	Adjust for maximum indication on output meter while rocking tuning condenser.	C1B—FM r-f.
6	Same as step 3.	105 mc.	105 mc.	Adjust for maximum indication on output meter.	C4—FM aerial.
7	Same as step 3.	92 mc.	92 mc. (3rd index mark from left).	Adjust for maximum indication on output meter. See note 3 below.	L2—FM r-f coil.
If FM aerial coil, L1, is replaced, it should be adjusted as directed in step 8, below.					
8	Same as step 3.	92 mc.	92 mc.	Adjust for maximum indication on output meter.	TC11—FM aerial.

NOTE 1: For accurate results, the signal-generator output impedance must be 300 ohms, to match the input impedance of TB1. If the generator impedance is less than 300 ohms, a resistor of the proper value may be used in series with the output lead to make the impedance correct. For example, if the output impedance is 150 ohms, place a 150-ohm resistor in series with the output lead.

NOTE 2: If oscillator does not tune as low as 88 mc., compress the turns on the oscillator coil. If oscillator tunes too low, spread the turns slightly. After coil is adjusted, repeat step 3.

NOTE 3: Check resonance of coil L2 by inserting end of a tuning wand, such as Philco Part No. 56-6100, in the coil. If output increases when iron end is placed in coil, compress turns slightly. If output increases when brass end is placed in coil, spread the turns. If output decreases when either end is placed in coil, no adjustment is necessary. After the coil is adjusted, readjust trimmer C1B and repeat steps 3 through 8 until no further improvement is obtained.

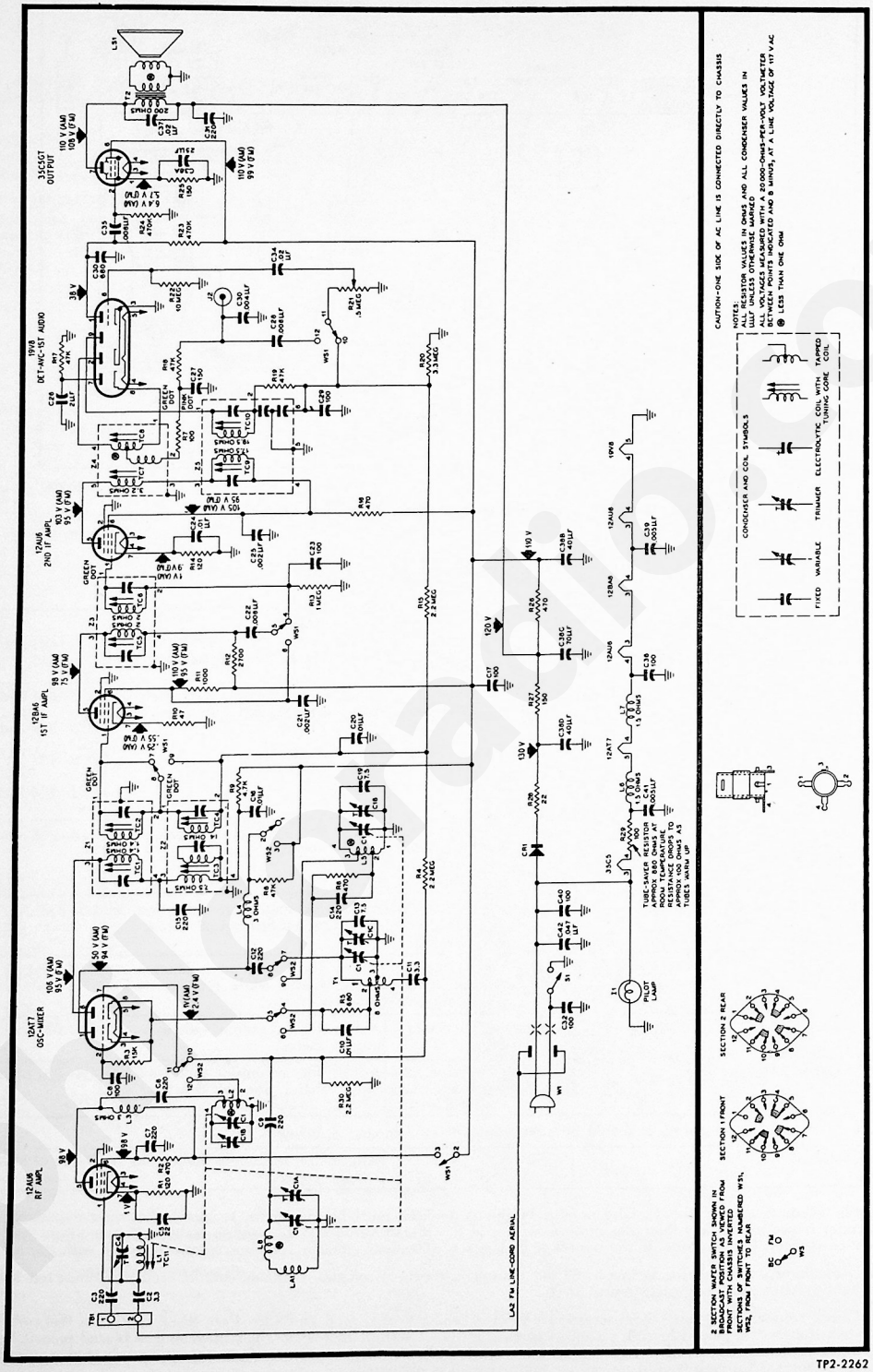


Figure 4. Philco Radio Model 53-956, Schematic Diagram

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 will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.
C1	Condenser, tuning gang, 5-section	31-2762-1
C1A	Condenser, trimmer, BC aerial	Part of C1
C1B	Condenser, trimmer, FM r-f	Part of C1
C1C	Condenser, trimmer, BC oscillator	Part of C1
C2	Condenser, aerial isolating, 3.3 μμf.	30-1221
C3	Condenser, aerial isolating, 220 μμf.	62-122001001*
C4	Condenser, FM aerial trimmer	45-3034
C5	Condenser, cathode by-pass,	
C6	Condenser, d-c blocking, 220 μμf.	
C7	Condenser, screen by-pass, 220 μμf.	62-122001001*
C8	Condenser, oscillator grid, 100 μμf.	62-110001021*
C9	Condenser, d-c blocking, 220 μμf.	62-122001001*
C10	Condenser, cathode by-pass, .01 μf.	30-4650-58*
C11	Condenser, neutralizing, 3.3 μμf.	30-1224-49
C12	Condenser, d-c blocking 220 μμf.	62-122001001*
C13	Condenser, fixed trimmer, 7.5 μμf.	30-1224-65
C14	Condenser, cathode by-pass, 220 μμf.	62-122001001*
C15	Condenser, r-f by-pass, 220 μμf.	62-122001001*
C16	Condenser, plate decoupling, .01 μf.	30-4650-58*
C17	Condenser, r-f by-pass, 100 μμf.	62-110009001*
C18	Condenser, trimmer, FM oscillator	31-6511-10
C19	Condenser, fixed trimmer, 7.5 μμf.	30-1224-8
C20	Condenser, a-v-c decoupling, .01 μf.	30-4650-58*
C21	Condenser, screen by-pass, .002 μf.	30-4650-54*
C22	Condenser, neutralizing, .006 μf.	30-4650-57*
C23	Condenser, i-f by-pass, 100 μμf.	62-110001021*
C24	Condenser, cathode by-pass, .01 μf.	30-4650-58*
C25	Condenser, screen by-pass, .002 μf.	30-4650-54*
C26	Condenser, electrolytic, diode-load filter, 2 μf., 50v	
C27	Condenser, i-f by-pass, 150 μμf.	62-115001011*
C28	Condenser, d-c blocking, .006 μf.	30-4650-57*
C29	Condenser, i-f by-pass, 100 μμf.	62-110001021*
C30	Condenser, de-emphasis, .004 μf.	30-4650-56*
C31	Condenser, plate decoupling, 220 μμf.	62-122001001*
C32	Condenser, line by-pass, 100 μμf.	62-110001021*
C33	Condenser, plate by-pass, 680 μμf.	62-168001001*
C34	Condenser, d-c blocking, .02 μf.	30-4650-60*
C35	Condenser, d-c blocking, .006 μf.	30-4650-57*
C36	Condenser, filament by-pass, 100 μμf.	62-110001021*
C37	Condenser, tone compensation, .02 μf.	30-4650-60*
C38	Condenser, electrolytic, 4-section	
C38A	Condenser, cathode by-pass, 25 μf., 25v	Part of C38
C38B	Condenser, filter, 40 μf., 150v	Part of C38
C38C	Condenser, filter, 70 μf., 150v	Part of C38
C38D	Condenser, filter, 40 μf., 150v	Part of C38
C39	Condenser, filament by-pass, .005 μf.	30-1238-1*
C40	Condenser, line by-pass, 100 μμf.	62-110001021*
C41	Condenser, filament by-pass, .005 μf.	30-1238-1*
C42	Condenser, line by-pass, .047 μf.	30-4650-45*
CR1	Selenium rectifier, 100 ma., 117v	34-8003-1
I1	Pilot lamp, frosted, 117v, 7 watts	34-2605
J1	Jack, male, a-c	27-6240-5
J2	Socket, FM test	27-6180
L1	Coil, FM aerial, complete with grommet	32-4532A
L2	Coil, FM r-f	32-4415-2
L3	Choke, r-f, 3.3 μh.	32-4422-10
L4	Choke, r-f, 3.3 μh.	32-4422-10
L5	Coil, FM oscillator	32-4414-5
L6	Choke, filament, 2.2 μh.	32-4422-8
L7	Choke, filament, 2.2 μh.	32-4422-8
L8	Choke, r-f, 4.1 μh.	32-4061-3
LA1	AM loop and support assembly	76-7836
LA2	Line-cord aerial, FM	Part of W1
LS1	Speaker, 4" p-m, including output transformer	36-1625-14
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, 2.2 megohms	66-5228340*
R5	Resistor, parasitic suppressor, 680 ohms	66-1688340*
R6	Resistor, parasitic suppressor, 470 ohms	66-1478340*
R7	Resistor, loading, 100 ohms	66-1108340*
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*
R12	Resistor, plate decoupling, 2700 ohms	66-2278340*
R13	Resistor, grid return, 1 megohm	66-5108340*
R14	Resistor, cathode bias, 120 ohms	66-1128340*
R15	Resistor, a-v-c filter, 2.2 megohms	66-5228340*
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*

(Continued on next page)

REPLACEMENT PARTS LIST (Cont.)

Reference Symbol	Description	Service Part No.
R25	Resistor, cathode bias, 150 ohms	66-1158340°
R26	Resistor, filter, 470 ohms, 1 watt	66-1474340°
R27	Resistor, filter, 150 ohms, 2 watts	66-1155360°
R28	Resistor, current limiting, 22 ohms, 2 watts	
R29	Resistor, current limiting, 100 ohms	33-1343-3
R30	Resistor, grid return, 2.2 megohms	66-5228340°
S1	Switch, off-on	Part of R21
T1	Transformer, AM oscillator	32-4569-1
T2	Transformer, output	Part of LS1
W1	Line cord	41-3865-3
W2	Cable, FM aerial, 72-ohm twin lead	41-3987
WS	Switch, band, 2-wafer	42-1924-1
Z1	Transformer, FM, 1st i-f	32-4518A
Z2	Transformer, AM, 1st i-f	32-4516A
Z3	Transformer, FM, 2nd i-f	32-4518-1A
Z4	Transformer, FM, detector	32-4310-4A
Z5	Transformer, AM, 2nd i-f	32-4517A

MISCELLANEOUS

Description	Service Part No.
Cabinet	10941
Back, flange, and socket assembly	76-7829

MISCELLANEOUS (Cont.)

Description	Service Part No.
Fastener, back mtg. (4)	W-2235-FA9
Dial scale	54-4987
Knob, FM-AM	54-4774-28
Knob, tuning	54-4774-26
Knob, volume-off-on	54-4774-27
Clip, pilot lamp	56-3545-FA3
Drive cord, 25-foot spool	45-8750°
Pointer	56-9906
Shaft, drive	56-7931FA11
Spring, gang drive	56-2617
Spring, pointer drive	56-3167
Rubber mount, speaker (2)	54-4651-1
Socket, 12BA6 (i-f ampl.)	27-6265
Socket, 12AU6 (i-f ampl.)	27-6265
Socket, 12AU6 (r-f ampl.)	27-6275-1
Socket, 12AT7	27-6203-6
Socket, 19V8	27-6203-6
Socket, 35C5	27-6203-12
Shield, tube (2)	56-5629-3
Shield, tube. base (1)	56-3978-1FA3
Shield, tube base (2)	56-5628-1FA3
Socket, assembly, pilot lamp	27-6233-21
Spring, hairpin	28-8610

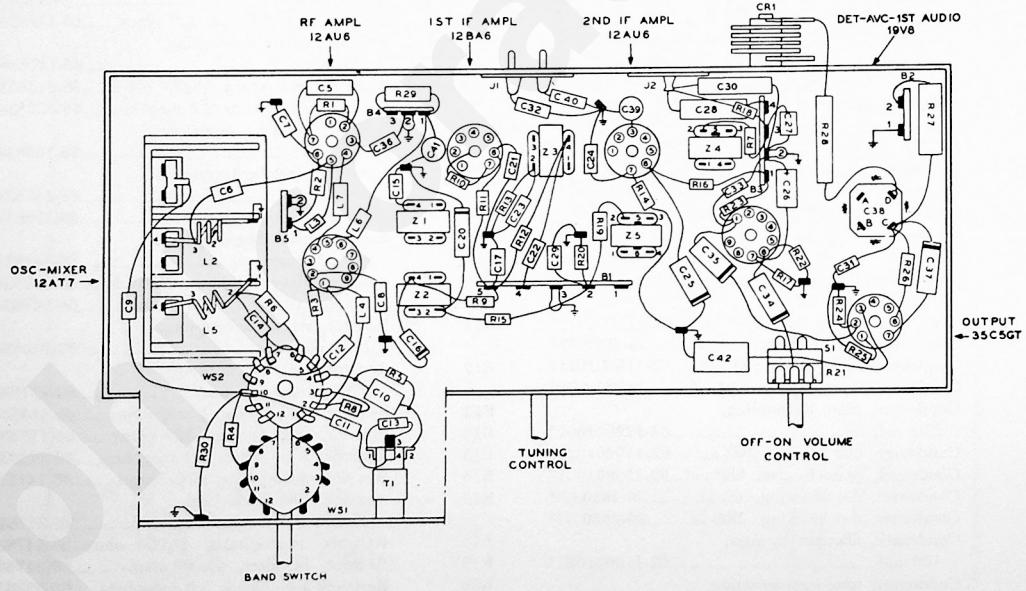


Figure 5. Base View, Showing Parts Placement

REVISIONS AND ADDITIONS TO MODEL 53-956 SERVICE MANUAL

PARTS LIST CORRECTIONS

Reference Symbol	Description	Service Part No.
C5	Condenser, cathode by-pass, 33 $\mu\mu$f.	62-033009001
C6	Condenser, d-c blocking, 220 $\mu\mu$f.	62-122001001
C26	Condenser, electrolytic, diode-load filter, 2 μf., 50v.	45-3035-4
C38	Condenser, electrolytic, 4-section	30-2570-46
R28	Resistor, current limiting, 22 ohms, 2 watts	33-1355

NOTE: In some cases, a single printed circuit unit is used instead of condenser C14 and resistor R6. In such cases, order the replacement part by using Part No. 30-6002.

PRODUCTION CHANGES

RUN 2

C6, the 220-$\mu\mu$f. d-c blocking condenser, was changed to 470 $\mu\mu$f., Part No. 62-147001001. C5, the 22-$\mu\mu$f. cathode by-pass condenser, was changed to 33 $\mu\mu$f., Part No. 62-033009001.

A 100-ohm resistor, Part No. 66-1108340, was added, in series with the FM line-cord antenna.

RUN 3

The AM oscillator transformer, T1, was replaced by a new transformer Part No. 32-4569-2.

RUN 4

A copper ground strap was added, to reduce oscillator ground currents.

RUN 5

Changes were made in the cabinet back assembly, to increase sensitivity. Replacement part numbers are unchanged.

RUN 11

Run 1 sets were stamped Run 11 by mistake.

ADDITIONAL INFORMATION

REMOVAL OF CHASSIS FROM CABINET

To remove the chassis from the cabinet, proceed as follows:

1. Remove the dial scale by removing the screw holding the scale.

2. Remove the dial pointer by pulling it straight away from the cabinet.

3. Do not attempt to remove the knobs from the cabinet. They are secured by a lock-type washer inside the cabinet. Remove the knobs from the shafts by pulling away from the cabinet.

4. Remove the screws from the bottom of the cabinet, and remove the chassis from the cabinet. Be careful not to break the speaker leads.

To replace the chassis in the cabinet, reverse the above procedure.

To set the dial pointer to indicate the correct frequency, turn the tuning control until the tuning gang is fully closed. Place the pointer on the shaft so that it coincides with the index mark at the low-frequency end of the dial.