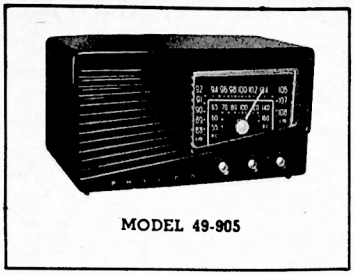
PHILCO RADIO MODEL 49-905



MODEL 49-905

SPECIFICATIONS

CABINET	Plastic, brown finish
CIRCUIT	Six-tube superheterodyne
FREQUENCY RANGES	
Broadcast	540—1620 kc.
FM	88—108 mc.
AUDIO OUTPUT	1 watt
OPERATING VOLTAGE	105—120 volts, a.c./d.c.
POWER CONSUMPTION	30 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)	35W4, 35C5, 12AU6, 12AT7, 19T8, 6BH6

TP—5850

SYMBOLIZATION

The components in the radio circuit are symbolized according to the types of parts and the sections of the radio in which the parts are located. The prefix letter of the symbol designates the type of part as follows:

C—condenser
I—pilot lamp
L—choke or coil
LA—loop aerial
LS—loud-speaker
R—resistor
S—switch
T—transformer
W—line cord
WS—wafer switch
Z—electrical assembly

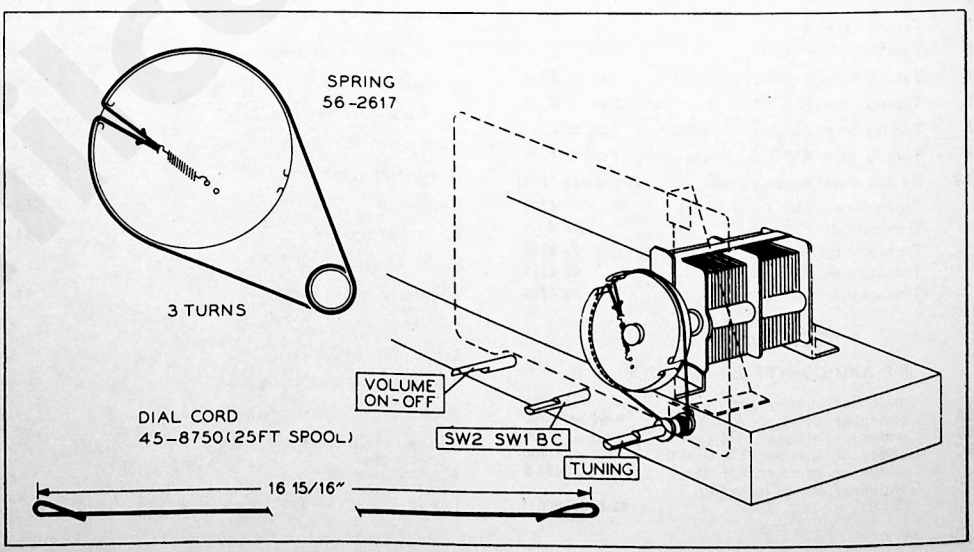


Figure 1. Drive-Cord Installation Details

AM ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Ground lead to B-, output lead through .1-mf. condenser to mixer grid (pin 7 of 12AT7).	455 kc.	540 kc.	Adjust tuning cores, in order given, for maximum output. Do not repeat adjustments.	TC304B—AM 2nd i-f sec. TC304A—AM 2nd i-f pri. — SEE NOTE TC302B—AM 1st i-f sec. TC302A—AM 1st i-f pri. — SEE NOTE
2	Radiating loop (See note below.)	1600 kc.	1600 kc.	Adjust trimmer for maximum output.	C400B—AM osc.
3	Same as step 2.	1500 kc.	1500 kc.	Adjust trimmer for maximum output.	C400—AM aerial

NOTE: Make up a six-to-eight-turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads and place near radio loop aerial. Make certain that loop aerial is connected to radio.

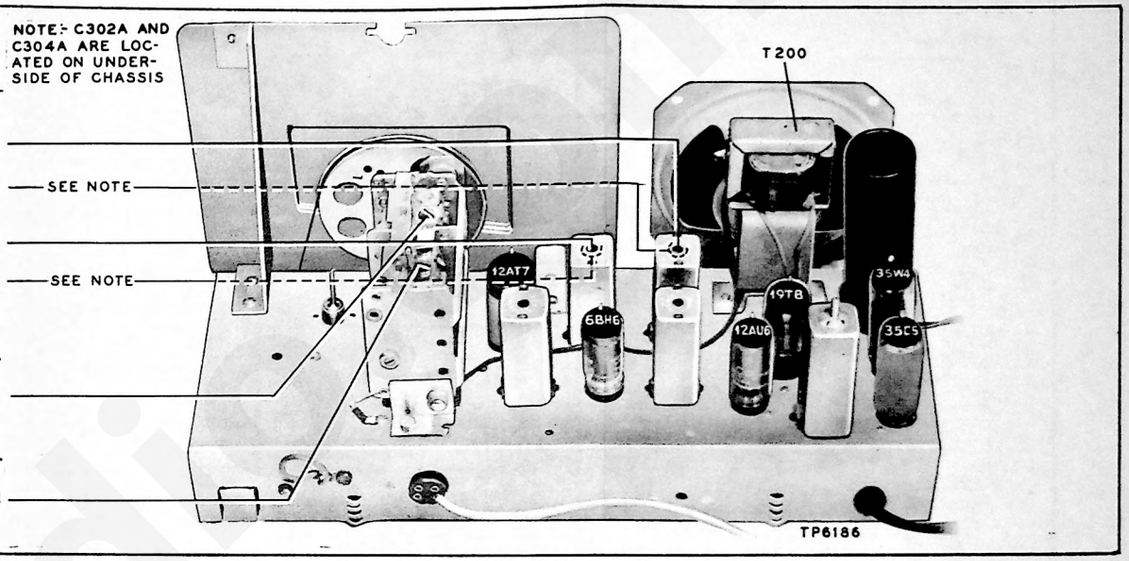


Figure 2. Top View, Showing AM Trimmer Locations

FM ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Through .1-mf. condenser to pin 1 of 6BH6.	9.1 mc.	88 mc.	Adjust tuning cores for maximum reading on alignment indicator. Attenuate signal generator to maintain reading of approximately 10 volts. Repeat adjustments until no further improvement is noted. After this step, do not disturb any of these tuning cores, except as directed in step 3.	TC303B—discriminator sec. TC303A—discriminator pri. TC301B—FM 2nd i-f sec. TC301A—FM 2nd i-f pri. — SEE NOTE
2	Through .1-mf. condenser to pin 7 of 12AT7.	9.1 mc.	88 mc.	Adjust tuning cores for maximum reading on alignment indicator. Repeat adjustments until no further improvement is noted. Do not disturb these tuning cores after this step.	TC300B—FM 1st i-f sec. TC300A—FM 1st i-f pri. — SEE NOTE
3	Same as step 2.	9.1 mc.	88 mc.	Adjust tuning core for minimum reading on output meter. This adjustment is critical; repeat to make sure it is correct.	TC303B—discriminator sec. — SEE NOTE
4	To terminal 1 of J400.	105 mc.	105 mc.	Adjust trimmer for maximum reading on alignment indicator.	C401—FM osc.
5	Same as step 4.	105 mc.	105 mc.	Same as step 4.	C400C—FM aerial
6	Same as step 4.	92 mc.	92 mc.	Same as step 4.	L402—FM osc. (tracking) — LOCATED ON UNDERSIDE OF CHASSIS
7	Same as step 4.	92 mc.	92 mc.	Same as step 4.	L403—FM aerial (tracking) — LOCATED ON UNDERSIDE OF CHASSIS
8	Repeat steps 4 through 7 until no further improvement is noted.				

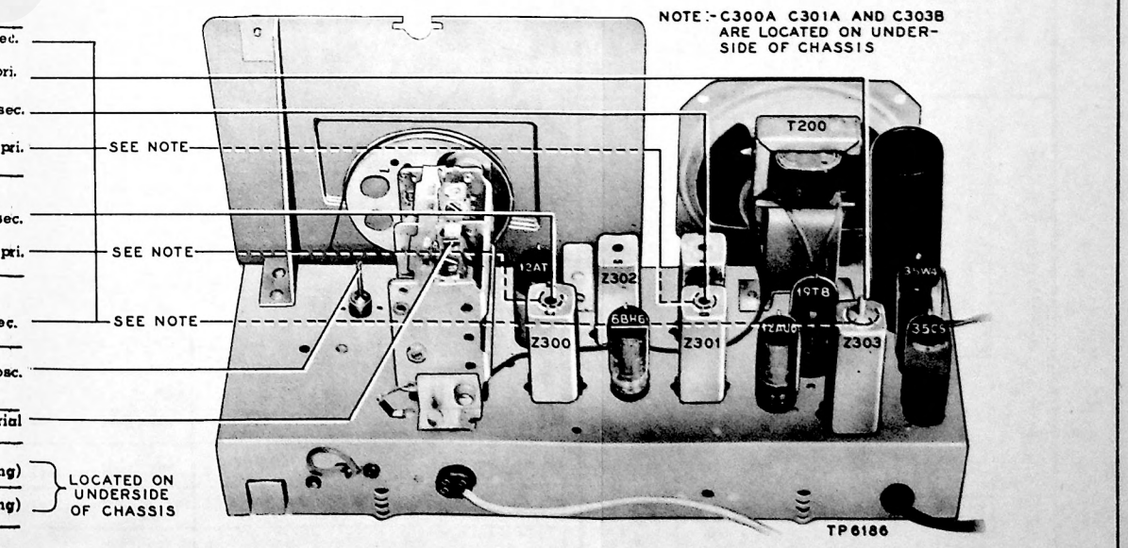


Figure 3. Top View, Showing FM Trimmer Locations

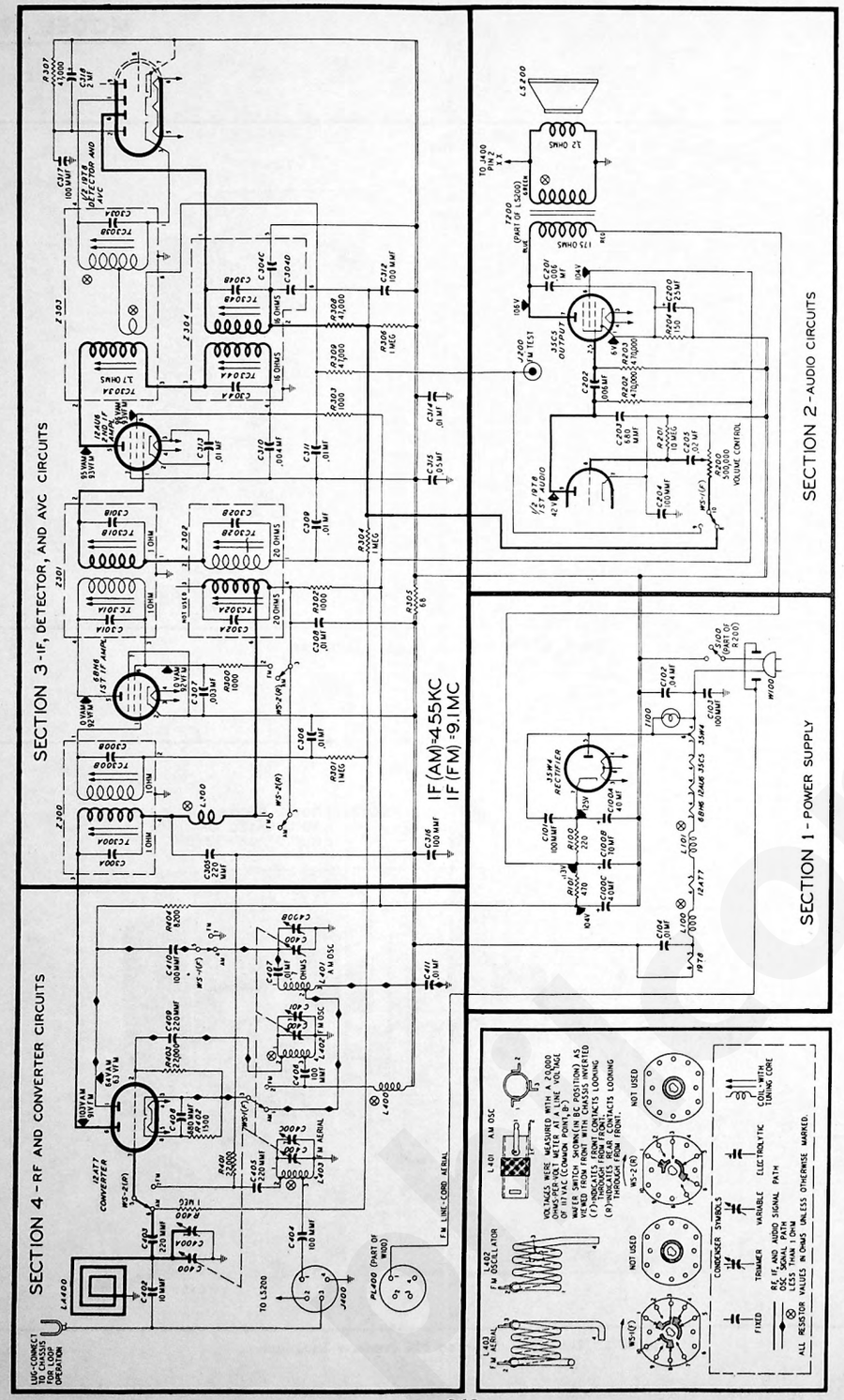


Figure 4. Philco Radio Model 49-905, Sectionalized Schematic Diagram.

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 dial pointer to coincide with index mark at low-frequency end of dial.

OUTPUT METER—Connect across voice-coil terminals.

AM R-F SIGNAL GENERATOR—Connect as indicated in chart. Use modulated output.

RADIO CONTROLS—Set volume control to maximum, and set band switch to broadcast position.

OUTPUT LEVEL—During alignment, adjust signal-generator output to maintain output-meter indication below 1.25 volts.

FM ALIGNMENT PROCEDURE

Make AM Alignment First

OUTPUT METER—Connect across voice-coil terminals.

ALIGNMENT INDICATOR—Connect negative lead of 20,000-ohms-per-volt meter to pin 2 of 19T8 tube; connect positive lead to B–, test point B, in Section 2. Use 10-volt range.

AM R-F SIGNAL GENERATOR—Generator must have sufficient output to give a reading of 8.5 volts on alignment indicator. Connect ground lead to B–; connect output lead as indicated in chart. Use modulated output.

RADIO CONTROLS—Set volume control to maximum, and set band switch to FM position. Allow radio and signal generator to operate for at least 15 minutes before making alignment.

NOTE: Check resonance of coils L402 and L403 by inserting each end of a powdered-iron tuning core, such as Philco Part No. 56-6100, into the coils. If the signal strength increases when the iron end is inserted, compress the turns slightly. If the signal strength increases when the brass end is inserted, spread the turns slightly. If the signal strength decreases when either the iron or the brass end is inserted, no further adjustment is necessary. Do not spread or compress turns of coil excessively; only a small change is required at these high frequencies.

REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) indicate general replacement items. These numbers may not be identical with those on factory assemblies; also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and replacement 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."

SECTION 1

POWER SUPPLY

Reference Symbol	Description	Service Part No.
C100	Condenser, electrolytic, 3-section	30-2568-10
C100A	Condenser, filter, 40 mf., 150v	Part of C100
C100B	Condenser, filter, 70 mf., 150v	Part of C100
C100C	Condenser, filter, 40 mf., 150v	Part of C100
C101	Condenser, r-f by-pass, 100 mmf.	62-110009001*
C102	Condenser, line by-pass, .04 mf.	45-3500*
C103	Condenser, r-f by-pass, 100 mmf.	62-110009001*
C104	Condenser, line by-pass, .01 mf.	61-0120*
I100	Lamp, pilot, 110 v	34-2068
L100	Coil, r-f choke	32-4111
L101	Coil, r-f choke	32-4111
R100	Resistor, filter, 220 ohms	66-1224340*
R101	Resistor, filter, 470 ohms	66-1474340*
S100	Switch, on-off	Part of R200
W100	Line-cord-and-plug assembly	L-2183*

SECTION 2

AUDIO CIRCUITS

Reference Symbol	Description	Service Part No.
C200	Condenser, electrolytic, cathode by-pass 25 mf., 25v	45-3001
C201	Condenser, tone compensation, .006 mf.	45-3500-7*
C202	Condenser, d-c blocking, .006 mf.	45-3500-7*
C203	Condenser, parasitic suppressor, 680 mmf.	60-10685401
C204	Condenser, r-f by-pass, 100 mmf.	62-110009001*
C205	Condenser, d-c blocking, .02 mf.	45-3500-3
J200	Jack, FM test	27-6180

SECTION 2 (Continued)

AUDIO CIRCUITS

Reference Symbol	Description	Service Part No.
LS200	Speaker	36-1614
R200	Volume control (with off-on switch), 500,000 ohms	33-5538-39
R201	Resistor, grid return, 10 megohms	66-6103340*
R202	Resistor, plate load, 470,000 ohms	66-4473340*
R203	Resistor, grid return, 470,000 ohms	66-4473340*
R204	Resistor, cathode bias, 150 ohms	66-1153340*
T200	Transformer, output	Part of LS200
WS-1(F)	Switch-wafer section	Part of 42-1870†

SECTION 3

I-F, DETECTOR, AND A-V-C CIRCUITS

C300A	Condenser, fixed trimmer	Part of Z300
C300B	Condenser, fixed trimmer	Part of Z300
C301A	Condenser, fixed trimmer	Part of Z301
C301B	Condenser, fixed trimmer	Part of Z301
C302A	Condenser, fixed trimmer	Part of Z302
C302B	Condenser, fixed trimmer	Part of Z302
C303A	Condenser, fixed trimmer	Part of Z303
C304A	Condenser, fixed trimmer	Part of Z304
C304B	Condenser, fixed trimmer	Part of Z304
C304C	Condenser, i-f filter	Part of Z304
C304D	Condenser, i-f filter	Part of Z304
C305	Condenser, r-f by-pass, 220 mmf.	62-122001001*
C306	Condenser, r-f by-pass, .01 mf.	61-0120*
C307	Condenser, screen by-pass, .003 mf.	61-0109*

REPLACEMENT PARTS LIST (Continued)

SECTION 3 (Continued)

I-F, DETECTOR, AND A-V-C CIRCUITS

	Description	Service Part No.
C308	Condenser, plate by-pass, .01 mf.	61-0120*
C309	Condenser, r-f by-pass, .01 mf.	61-0120*
C310	Condenser, screen by-pass, .004 mf.	61-0179
C311	Condenser, r-f by-pass, .01 mf.	61-0120*
C312	Condenser, r-f by-pass, 100 mmf.	62-110009001*
C313	Condenser, filament r-f by-pass, .01 mf.	61-0120*
C314	Condenser, i-f by-pass, .01 mf.	61-0120*
C315	Condenser, i-f by-pass, .05 mf.	61-0122
C316	Condenser, r-f by-pass, 100 mmf.	62-110009001*
C317	Condenser, r-f by-pass, 100 mmf.	62-110009001*
C318	Condenser, electrolytic, filter, 2 mf., 50v	30-2417-7
L300	Coil, r-f choke	32-4111
R300	Resistor, screen dropping, 1000 ohms	66-2103340*
R301	Resistor, grid return, 1 megohm	66-5103340*
R302	Resistor, plate load, 1000 ohms	66-2103340*
R303	Resistor, screen dropping, 1000 ohms	66-2103340*
R304	Resistor, a-v-c filter, 1 megohm	66-5103340*
R305	Resistor, isolating, 68 ohms	66-0683340*
R306	Resistor, a-v-c return, 1 megohm	66-5103340*
R307	Resistor, FM-detector load, 47,000 ohms	66-3473340*
R308	Resistor, diode load, 47,000 ohms	66-3473340*
R309	Resistor, isolating, 47,000 ohms	66-3473340*
TC300A	Tuning core, FM 1st i-f primary	Part of Z300
TC300B	Tuning core, FM 1st i-f secondary	Part of Z300
TC301A	Tuning core, FM 2nd i-f primary	Part of Z301
TC301B	Tuning core, FM 2nd i-f secondary	Part of Z301
TC302A	Tuning core, AM 1st i-f primary	Part of Z302
TC302B	Tuning core, AM 1st i-f secondary	Part of Z302
TC303A	Tuning core, FM 3rd i-f primary	Part of Z303
TC303B	Tuning core, FM 3rd i-f secondary	Part of Z303
TC304A	Tuning core, AM 2nd i-f primary	Part of Z304
TC304B	Tuning core, AM 2nd i-f secondary	Part of Z304
WS-2(R)	Switch-wafer section	Part of 42-1870†
Z300	Transformer, FM 1st i-f	32-4257
Z301	Transformer, FM 2nd i-f	32-4257-1
Z302	Transformer, AM 1st i-f	32-4258
Z303	Transformer, FM 3rd i-f	32-4310
Z304	Transformer, AM 2nd i-f	32-4240

SECTION 4

R-F AND CONVERTER CIRCUITS

C400	Condenser, tuning gang	31-2733
C400A	Condenser, trimmer, AM aerial	Part of C400
C400B	Condenser, trimmer, AM osc.	Part of C400
C400C	Condenser, trimmer, FM aerial	Part of C400
C401	Condenser, trimmer, FM osc.	31-6495-2
C402	Condenser, aerial isolating, 10 mmf.	62-010009001*

SECTION 4 (Continued)

R-F AND CONVERTER CIRCUITS

	Description	Service Part No.
C403	Condenser, isolating, 220 mmf.	62-122001001*
C404	Condenser, isolating, FM aerial, 100 mmf.	62-110009001*
C405	Condenser, d-c blocking, 220 mmf.	62-122001001*
C406	Condenser, d-c blocking, 100 mmf.	62-110009001*
C407	Condenser, d-c blocking, .01 mf.	61-0120*
C408	Condenser, r-f by-pass, 680 mmf.	60-10685401*
C409	Condenser, d-c blocking, 220 mmf.	62-122001001*
C410	Condenser, d-c blocking, 100 mmf.	62-110009001*
C411	Condenser, r-f by-pass, .01 mf.	61-0120*
J400	Jack, FM aerial	27-6214
L400	Coil, r-f choke	32-4111
L401	Coil, AM osc.	32-4153-1
L402	Coil, FM osc.	32-4018-7
L403	Coil, FM aerial	32-4159-1
LA400	Loop aerial	32-4052-21
PL400	Plug, line-cord FM aerial	Part of W100
R400	Resistor, grid return, 1 megohm	66-5103340*
R401	Resistor, grid return, 22,000 ohms	66-3223340*
R402	Resistor, cathode bias, 1500 ohms	66-2153340*
R403	Resistor, grid return, 22,000 ohms	66-3223340
R404	Resistor, plate load, 8200 ohms	66-2823340
WS-1(F)	Switch-wafer section	Part of 42-1870†
WS-2(R)	Switch-wafer section	Part of 42-1870†

MISCELLANEOUS

Description	Service Part No.
Baffle-and-cloth assembly	40-7535
Cabinet	10714
Back, cabinet	54-7630
Cord, drive (25-ft. spool)	45-8750*
Drive-shaft assembly	76-4034
Knob, tuning	54-4527-1
Knob, band switch	54-4527-4
Knob, volume-on-off	54-4527
Pilot-lamp assembly	76-1179-6
Pointer	54-4599
Scale, dial	54-5011
Socket, miniature (4 required)	27-6226
Socket, 9-pin miniature (2 required)	27-6203-6
Spring, gang drive	56-2617
Window, acetate	54-4595

† 42-1870 is a two-section wafer switch (band switch)