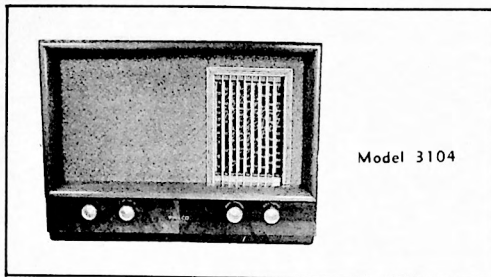


PHILCO-TROPIC RADIO MODEL 3104



SPECIFICATIONS

CABINET	Wood, mahogany finish
CIRCUIT	Eight-tube superheterodyne
FREQUENCY RANGES	
Broadcast (BC)	540—1700 kc.
Short Wave 1 (SW1)	1.62—5.8 mc.
Short Wave 2 (SW2)	7.5—22 mc.
Band Spread 1 (BS1)	5.2—7.6 mc.
Band Spread 2 (BS2)	9.35—9.9 mc.
Band Spread 3 (BS3)	11.35—12.0 mc.
Band Spread 4 (BS4)	14.75—15.6 mc.
Band Spread 5 (BS5)	17.25—18.2 mc.
Band Spread 6 (BS6)	20.7—21.9 mc.
AUDIO OUTPUT	9 watts
OPERATING VOLTAGES	90—125 volts or 180—250 volts, 50/60 cycles, a.c.
POWER CONSUMPTION	80 watts
AERIAL	100-foot external aerial, such as Philco Part No. 45-1469
INTERMEDIATE FREQUENCY	
	455 kc.
PHILCO TUBES (8)	7H7, 7S7, 7E7, 7R7, 7A4, 7B5(2), 5AZ4
	TP 7507

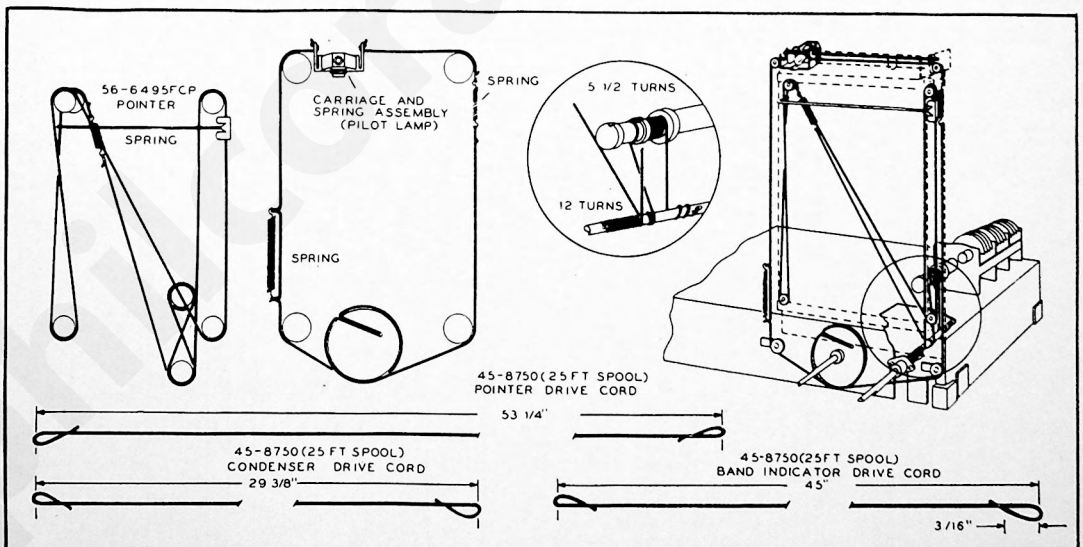


Figure 1. Drive-Cord Installation Details

ALIGNMENT PROCEDURE

CAUTION: Before connecting the radio to the power source, make certain that the voltage change-over switch is correctly set for the line voltage.

DIAL POINTER: With tuning-condenser plates fully meshed, adjust dial pointer to coincide with index mark (the second mark below "55") at low-frequency end of dial.

BAND-SPREAD TUNING CORES: With tuning control at extreme low-frequency setting, set oscillator core TC405 flush with rear end of oscillator-coil form. Aerial core TC401 and r-i core TC403 should now extend approximately 1/16" beyond their coil forms.

SIGNAL GENERATOR: Connect ground lead to chassis, and output lead as indicated in chart. Use modulated output.

RADIO CONTROLS: Set volume control to maximum, and tone control fully clockwise. Set band switch, tuning control, and signal-generator frequency as indicated in chart.

OUTPUT METER: Connect between voice-coil lug on speaker and chassis.

OUTPUT LEVEL: During alignment, signal-generator output must be attenuated to maintain output-meter reading below 1.5 volts.

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	BAND SWITCH	DIAL SETTING	
1	Through .1-µf. condenser to antenna or (terminal section of C404).	455 kc.	BC	Tuning gang fully meshed.	C301B—2nd l1 sec. C301A—2nd l1 pt. C300B—1st l1 sec. C300A—1st l1 pt.
2	Through 200-µf. condenser to aerial terminal (lug 1 of TR400).	580 kc.	BC	580 kc.	C114A—BC sec. (series)
3	Same as step 2.	1500 kc.	BC	1500 kc.	C413—BC sec. (bush) C400B—BC r1 C400A—BC aerial
4	Through 400-ohm resistor to aerial terminal (lug 1 of TR400).	5.0 mc.	SW1	5.0 mc.	C141B—SW1 sec.
5	Same as step 4.	7.5 mc.	B51	7.5 mc.	C141C—B51 sec. C407D—B51 r1 C402D—B51 aerial
6					C407E—SW2 r1 C407F—SW2 r1 C402E—SW2 aerial
7	Same as step 4.	9.0 mc.	SW2	9.0 mc.	TC403—SW2 sec. TC402—SW2 r1 TC400—SW2 aerial
8	Same as step 4.	21.0 mc.	SW2	21.0 mc.	C407E—SW2 sec. C407F—SW2 r1 C402E—SW2 aerial
9	Same as step 4.	15.2 mc.	B54	15.2 mc.	C407F—B54 sec. C407C—B54 r1 C402C—B54 aerial
10	Same as step 4.	9.7 mc.	B52	9.7 mc.	C407H—B52 sec.
11	Same as step 4.	11.7 mc.	B53	11.7 mc.	C407G—B53 sec.
12	Same as step 4.	17.8 mc.	B55	17.8 mc.	C424B—B55 sec. C407B—B55 r1 C402B—B55 aerial
13	Same as step 4.	21.5 mc.	B56	21.5 mc.	C424A—B56 sec. C407A—B56 r1 C402A—B56 aerial

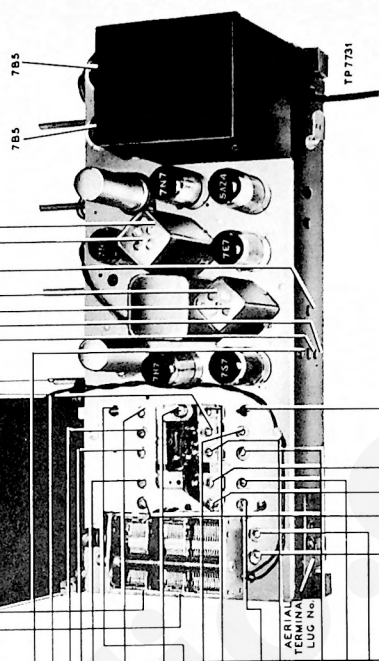


Figure 2. Top View, Showing Trimmer Locations

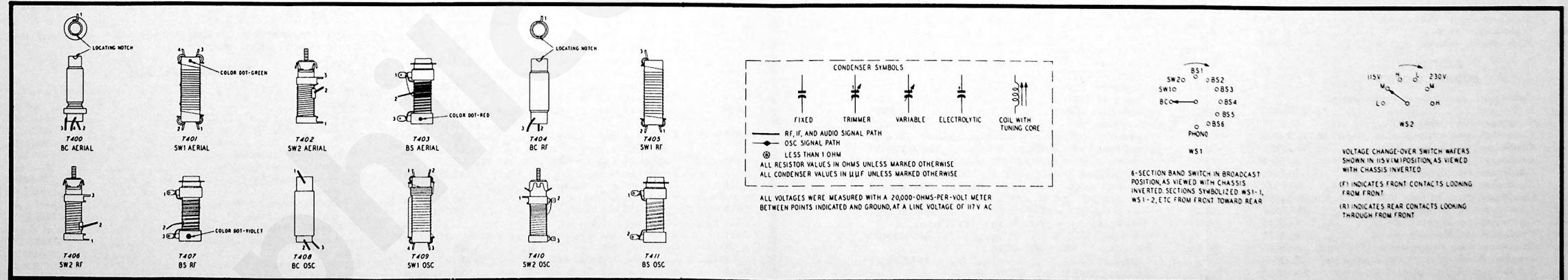
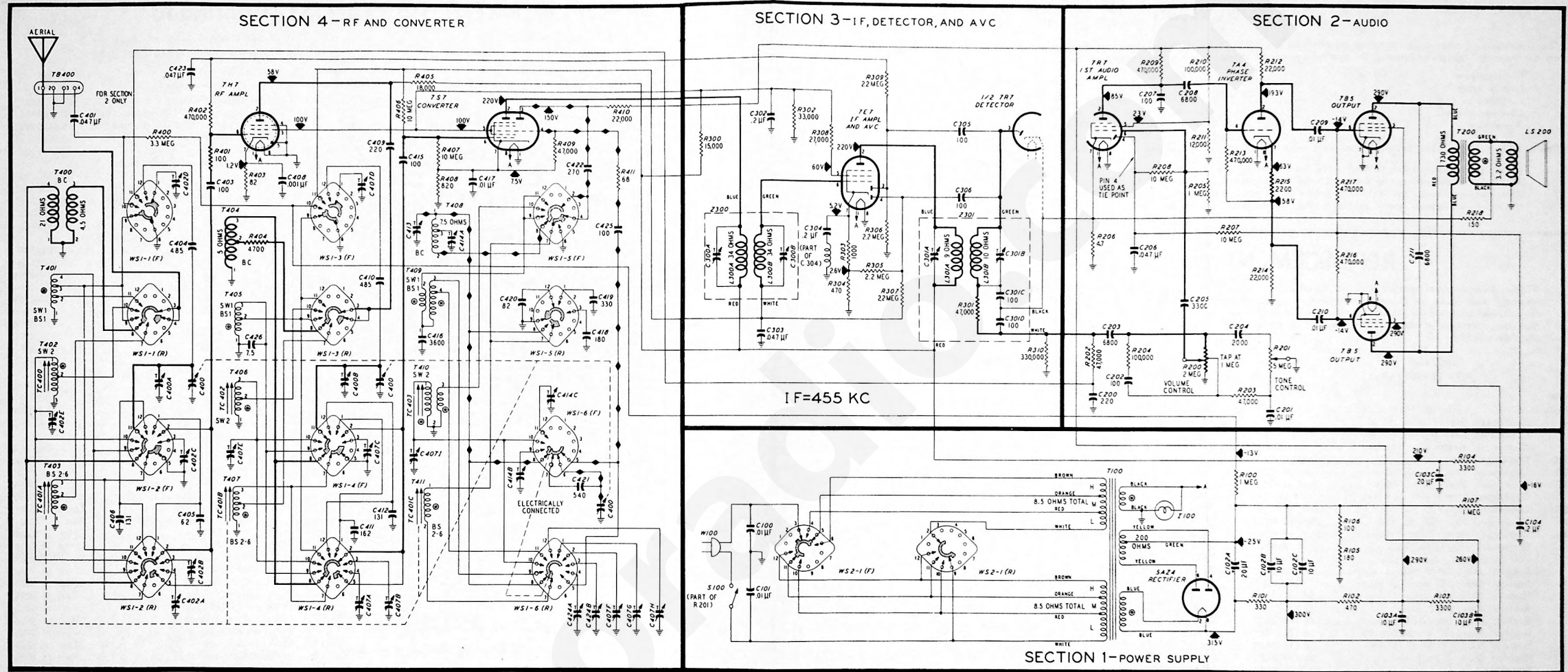


Figure 3. Philco-Tropic Radio Model 3104, Sectionalized Schematic Diagram,

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

The number of the symbol designates the section in which the part is located, as follows:

- 100-series components are in Section 1—the power supply.
- 200-series components are in Section 2—the audio circuits.
- 300-series components are in Section 3—the i-f detector, and a-v-c circuits.
- 400-series components are in Section 4—the r-f and converter circuits.

REPLACEMENT PARTS LIST

NOTE: Part numbers marked with an asterisk (*) are 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 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, line by-pass, .01 μ f.	61-0120*
C101	Condenser, line by-pass, .01 μ f.	61-0120*
C102	Condenser, electrolytic, 3-section	30-2570-15
C102A	Condenser, filter, 20 μ f., 450v	Part of C102
C102B	Condenser, filter, 10 μ f., 450v	Part of C102
C102C	Condenser, filter, 10 μ f., 450v	Part of C102
C103	Condenser, electrolytic, 3-section	30-2570-15
C103A	Condenser, filter, 10 μ f., 450v	Part of C103
C103B	Condenser, filter, 10 μ f., 450v	Part of C103
C103C	Condenser, filter, 20 μ f., 450v	Part of C103
C104	Condenser, bias filter, .2 μ f.	30-4644
I100	Pilot lamp, 6.3v	34-2064
R100	Resistor, filter, cutoff bias, 1 megohm	66-5103340*
R101	Resistor, filter, 330 ohms, 3 watts	33-1334-8
R102	Resistor, filter, 470 ohms, 1 watt	66-1474340*
R103	Resistor, filter, 3300 ohms	66-2123340*
R104	Resistor, plate load, 3300 ohms	66-2125340*
R105	Resistor, bias, 180 ohms, 2 watts	66-1185340*
R106	Resistor, bias, 100 ohms, 1 watt	66-1104340*
R107	Resistor, bias, 1 megohm	66-5103340*
S100	Switch, off-on	Part of R201
T100	Transformer, power	32-8246-1
W100	Line Cord	L-2183*
WS2	Switch, voltage change-over	42-1817
WS2-1(F)	Wafer-switch section	Part of WS2
WS2-1(R)	Wafer-switch section	Part of WS2

SECTION 2
AUDIO CIRCUITS

Reference Symbol	Description	Service Part No.
C200	Condenser, phono tone compensation, 220 μ f.	62-122001001*
C201	Condenser, bass compensation, .01 μ f.	61-0120*
C202	Condenser, tone compensation, 100 μ f.	62-122001001*
C203	Condenser, d-c blocking, 6800 μ f.	45-3500-7*
C204	Condenser, tone compensation, 2000 μ f.	61-0062*
C205	Condenser, d-c blocking, 3300 μ f.	61-0109*
C206	Condenser, bias filter, .047 μ f.	61-0122*
C207	Condenser, plate by-pass, 100 μ f.	62-122001001*
C208	Condenser, d-c blocking, 6800 μ f.	45-3500-7*
C209	Condenser, d-c blocking, .01 μ f.	61-0120*
C210	Condenser, d-c blocking, .01 μ f.	61-0120*
C211	Condenser, tone compensation, 6800 μ f.	61-0105*
LS200	Speaker, 8-inch, p. m., 3.2-ohm voice coil	36-1828-3
R200	Volume control, 2 megohms (center tap)	33-5535-23
R201	Tone control (with off-on switch), 5 megohms	33-5566-1

SECTION 2—(Continued)
AUDIO CIRCUITS

Reference Symbol	Description	Service Part No.
R202	Resistor, phono filter, 47,000 ohms	66-3478340*
R203	Resistor, bass compensation, 47,000 ohms	66-3478340*
R204	Resistor, tone compensation, 100,000 ohms	66-4108340*
R205	Resistor, grid return, 1 megohm	66-5108340*
R206	Resistor, cathode bias, 4.7 ohms	66-9478340*
R207	Resistor, bias 10 megohms	66-6108340*
R208	Resistor, bias 10 megohms	66-6108340*
R209	Resistor, plate load, 470,000 ohms	66-4478340*
R210	Resistor, screen dropping, 100,000 ohms	66-4108340*
R211	Resistor, screen bleeder, 12,000 ohms	66-3128340*
R212	Resistor, plate load, 22,000 ohms	66-3228340*
R213	Resistor, grid return, 470,000 ohms	66-4478340*
R214	Resistor, cathode load, 22,000 ohms	66-3228340*
R215	Resistor, cathode bias, 2200 ohms	66-2228340*
R216	Resistor, bias, 470,000 ohms	66-4478340*
R217	Resistor, bias, 470,000 ohms	66-4478340*
R218	Resistor, feedback, 150 ohms	66-1158340*
T200	Transformer, output	32-8300-1

SECTION 3
I-F, DETECTOR, AND A-V-C CIRCUITS

Reference Symbol	Description	Service Part No.
C300A	Condenser, trimmer	Part of Z300
C300B	Condenser, trimmer	Part of Z300
C301A	Condenser, trimmer	Part of Z301
C301B	Condenser, trimmer	Part of Z301
C301C	Condenser, i-f filter, 100 μ f. (part of Z301)	60-10105237*
C301D	Condenser, i-f filter, 100 μ f. (part of Z301)	60-10105237*
C302	Condenser, screen by-pass, 2 μ f.	45-3500-3*
C303	Condenser, a-v-c filter, .047 μ f.	61-0122*
C304	Condenser, cathode by-pass, 2 μ f. (special)	30-4644
C305	Condenser, a-v-c isolating, 100 μ f.	62-110009001*
C306	Condenser, a-v-c isolating, 100 μ f.	62-110009001*
L300A	Coil, primary, 1st i-f	Part of Z300
L300B	Coil, secondary, 1st i-f	Part of Z300
L301A	Coil, primary, 2nd i-f	Part of Z301
L301B	Coil, secondary, 2nd i-f	Part of Z301
R300	Resistor, screen voltage divider, 15,000 ohms, 1 watt	66-3154340*
R301	Resistor, i-f filter, 47000 ohms (part of Z301)	66-3478340*
R302	Resistor, neutralizing, 33,000 ohms, 1 watt	66-3334340*
R303	Resistor, cathode bias, 1000 ohms	66-2108340*

REPLACEMENT PARTS LIST—Continued

SECTION 3—(Continued)
I-F, DETECTOR AND A-V-C CIRCUITS

Reference Symbol	Description	Service Part No.
R304	Resistor, bias, 470 ohms	66-1478340*
R305	Resistor, a-v-c load, 2.2 megohms	66-5228340*
R306	Resistor, a-v-c load, 2.2 megohms	66-5228340*
R307	Resistor, a-v-c filter, 2.2 megohms	66-5228340*
R308	Resistor, screen dropping, 27,000 ohms	66-3278340*
R309	Resistor, a-v-c filter, 2.2 megohms	66-5228340*
R310	Resistor, diode load, 330,000 ohms	66-4338340*
Z300	Transformer, 1st i-f	32-3976
Z301	Transformer, 2nd i-f	32-4376

SECTION 4
R-F AND CONVERTER CIRCUITS

Reference Symbol	Description	Service Part No.
C400	Condenser, tuning gang, 3-section	31-2725-2
C400A	Condenser, trimmer, aerial	Part of C400
C400B	Condenser, trimmer, r-f	Part of C400
C401	Condenser, phono isolation, d-c blocking, .047 μ f.	61-0122*
C402	Condenser, trimmer assembly, 5-section	31-6507-5
C402A	Condenser, trimmer, BS6 aerial	Part of C402
C402B	Condenser, trimmer, BS5 aerial	Part of C402
C402C	Condenser, trimmer, BS4 aerial	Part of C402
C402D	Condenser, trimmer, BS1 aerial	Part of C402
C402E	Condenser, trimmer, SW2 aerial	Part of C402
C403	Condenser, d-c blocking, 100 μ f.	62-110009001*
C404	Condenser, fixed padder, BS1 aerial, 485 μ f.	30-1220-23
C405	Condenser, fixed trimmer, BS3 aerial, 62 μ f.	60-00625307*
C406	Condenser, fixed trimmer, BS2 aerial, 131 μ f.	60-10135237*
C407	Condenser, trimmer assembly, 9-section	31-6507-4
C407A	Condenser, trimmer, BS6 r-f	Part of C407
C407B	Condenser, trimmer, BS5 r-f	Part of C407
C407C	Condenser, trimmer, BS4 r-f	Part of C407
C407D	Condenser, trimmer, BS1 r-f	Part of C407
C407E	Condenser, trimmer, SW2 r-f	Part of C407
C407F	Condenser, trimmer, BS4 osc.	Part of C407
C407G	Condenser, trimmer, BS3 osc.	Part of C407
C407H	Condenser, trimmer, BS2 osc.	Part of C407
C407I	Condenser, trimmer, SW2 osc.	Part of C407
C408	Condenser, cathode by-pass, 1000 μ f.	30-1225*
C409	Condenser, d-c blocking, 220 μ f.	62-122001001*
C410	Condenser, fixed padder, BS1 r-f, 485 μ f.	30-1220-23
C411	Condenser, fixed trimmer, BS3 r-f, 62 μ f.	60-00625307*
C412	Condenser, fixed trimmer, BS2 r-f, 131 μ f.	60-10135237*
C413	Condenser, trimmer, BC osc.	31-6308
C414	Condenser, trimmer strip, 3-section	31-6477-4
C414A	Condenser, trimmer, BC osc.	Part of C414
C414B	Condenser, trimmer, SW1 osc.	Part of C414
C414C	Condenser, trimmer, BS1 osc.	Part of C414
C415	Condenser, d-c blocking, 100 μ f.	62-110009001*
C416	Condenser, fixed padder, SW1 osc., 3600 μ f.	60-20395404*
C417	Condenser, cathode by-pass, .01 μ f.	61-0120*
C418	Condenser, fixed padder, BS3 and BS4 osc., 180 μ f.	30-1220-30*
C419	Condenser, fixed padder, BS1 and BS2 osc., 330 μ f.	60-10335407*
C420	Condenser, fixed padder, BS1 osc., 82 μ f.	60-00825237*
C421	Condenser, fixed padder, BS1 osc., 540 μ f.	60-10565314*
C422	Condenser, d-c blocking, 270 μ f.	60-10275407*
C423	Condenser, a-v-c filter, .047 μ f.	61-0122*
C424	Condenser, trimmer assembly, 2-section	31-6476-19
C424A	Condenser, trimmer, BS6 osc.	Part of C424
C424B	Condenser, trimmer, BS5 osc.	Part of C424
C425	Condenser, d-c blocking, 100 μ f.	60-10105407*
C426	Condenser, fixed trimmer, SW1 r-f, 7.5 μ f.	30-1224-8

SECTION 4—(Continued)
R-F AND CONVERTER CIRCUITS

Reference Symbol	Description	Service Part No.
R400	Resistor, bias bleeder, 3.3 megohms	66-5338340*
R401	Resistor, suppressor, 100 ohms	66-1108340*
R402	Resistor, grid return, 470,000 ohms	66-4478340*
R403	Resistor, cathode bias, 82 ohms	66-0828340*
R404	Resistor, isolating, 4700 ohms	66-2478340*
R405	Resistor, plate load, 18,000 ohms, 2 watts	66-3185340*
R406	Resistor, a-v-c isolating, 10 megohms	66-6108340*
R407	Resistor, grid return, 10 megohms	66-6108340*
R408	Resistor, cathode bias, 820 ohms	66-1828340*
R409	Resistor, grid return, 47,000 ohms	66-3478340*
R410	Resistor, plate load, 22,000 ohms, 1 watt	66-3224340*
R411	Resistor, osc. stabilizer, 68 ohms	66-0688340*
T400	Transformer, BC aerial	32-4368
T401	Transformer, SW1 and BS1 aerial	32-4364
T402	Transformer, SW2 aerial	32-4208
T403	Transformer, BS2, BS3, BS4, BS5, and BS6 aerial	32-3670
T404	Transformer, BC r-f	32-4369
T405	Transformer, SW1 and BS1 r-f	32-4364-1
T406	Transformer, SW2 r-f	32-4208-7
T407	Transformer, BS2, BS3, BS4, BS5, and BS6 r-f	32-3671
T408	Transformer, BC osc.	32-4370
T409	Transformer, SW1 and BS1 osc.	32-4207-2
T410	Transformer, SW2 osc.	32-4208-2
T411	Transformer, BS2, BS3, BS4, BS5, and BS6 osc.	32-4212-2
TB400	Terminal panel	38-9744
TC400	Tuning core, SW2 aerial	Part of T402
TC401	Tuning-core assembly, 3-section	76-1281-1
TC401A	Tuning core, band-spread aerial	Part of TC401
TC401B	Tuning core, band-spread r-f	Part of TC401
TC401C	Tuning core, band-spread osc.	Part of TC401
TC402	Tuning core, SW2 r-f	Part of T406
TC403	Tuning core, SW2 osc.	Part of T410
WS1	Wafer switch, band change, 6 wafers	42-1883†
WS1-1(F)	Wafer-switch section	Part of WS1
WS1-1(R)	Wafer-switch section	Part of WS1
WS1-2(F)	Wafer-switch section	Part of WS1
WS1-2(R)	Wafer-switch section	Part of WS1
WS1-3(F)	Wafer-switch section	Part of WS1
WS1-3(R)	Wafer-switch section	Part of WS1
WS1-4(F)	Wafer-switch section	Part of WS1
WS1-4(R)	Wafer-switch section	Part of WS1
WS1-5(F)	Wafer-switch section	Part of WS1
WS1-5(R)	Wafer-switch section	Part of WS1
WS1-6(F)	Wafer-switch section	Part of WS1
WS1-6(R)	Wafer-switch section	Part of WS1

† 42-1883 includes both the band-change wafer switch and the drive-shaft-and-bearing assembly.

MISCELLANEOUS

Description	Service Part No.
Cabinet	10739
Back	54-7749
Baffle assembly	40-7643
Feet (4)	54-4579
Cord, drive (25-ft. spool)	45-8750*
Dial-plate assembly	76-4438
Dial-scale assembly	76-4437
Pointer	56-6495FCP
Spring, indicator (2)	56-3066FA38
Spring, indicator	56-2980FA38
Drive-shaft-and-bearing assembly	Part of WS1
Drum assembly (band indicator)	76-1246FA33
Knob (4)	54-4488-3
Pilot-lamp assembly	76-1238-1
Pilot-lamp-carriage-and-spring assembly	76-1512
Plug, a-c, continental adapter	L-3275*
Socket, Loktal (8)	27-8207