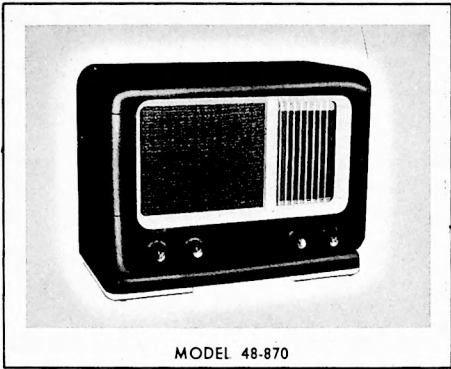


PHILCO-TROPIC RADIO MODEL 48-870



MODEL 48-870

SPECIFICATIONS

CABINET.....Wood, Philcote, bird's-eye maple
 CIRCUIT.....8-tube superheterodyne (provision
 for external record player)

FREQUENCY RANGES

Standard Broadcast (BC).....	540—1700 kc.
Short Wave 1 (SW1).....	1.62—5.3 mc.
Short Wave 2 (SW2).....	7.4—22.0 mc.
Band Spread 1 (49M).....	5.2—7.5 mc.
Band Spread 2 (31M).....	9.35—9.9 mc.
Band Spread 3 (25M).....	11.35—12.0 mc.
Band Spread 4 (19M).....	14.75—15.6 mc.
Band Spread 5 (16M).....	17.7—18.2 mc.
Band Spread 6 (13M).....	20.7—21.9 mc.

AUDIO OUTPUT.....10 watts
 OPERATING VOLTAGES.....95—125 or 190—250
 volts, 50/60 cycles,
 a.c.

POWER CONSUMPTION.....80 watts
 AERIAL.....Philco Aerial, Part No. 45-1469
 INTERMEDIATE FREQUENCY.....455 kc.
 PHILCO TUBES (8).....7A7(2), 7S7, 7B6,
 7A4, 7B5(2), 5AZ4

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
 LS—loud-speaker
 R—resistor

S—switch
 T—transformer
 W—line cord
 WS—wafer switch
 Z—electrical assembly

The number of the symbol, except when the number is less than 100, 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

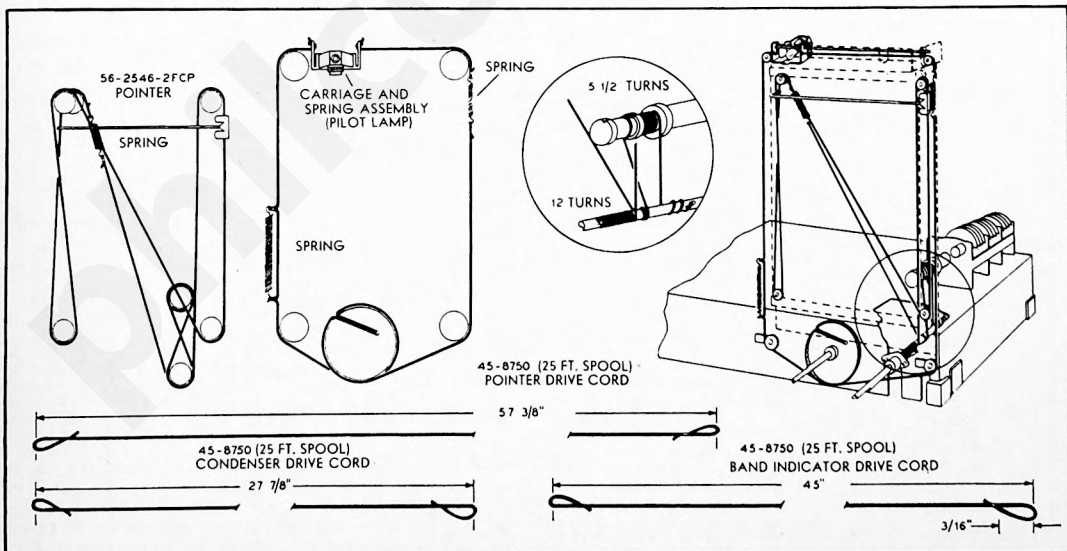


Figure 1. Drive-Cord Installation Details

TP-5395E

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 gang fully closed, adjust dial pointer to coincide with index mark (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, TC403C, flush with rear end of oscillator coil form. Aerial core, TC403A, and r-f core, TC403B, should now extend approximately 1/16" beyond their coil forms. If this condition cannot be obtained, make compromise settings for best tracking consistent with calibration.

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

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

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

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

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTIONS TO RADIO	FREQ.	BAND SWITCH	TUNING	
1	Through 1-mfd. condenser (center) section of tuning gang, C400. (Remove trimmer cover plate)	455 kc.	BC	Cont. method	TC300B—1st i-f pri. TC300A—1st i-f sec. TC301B—2nd i-f sec. TC301A—2nd i-f pri.
2	Through 400-ohm resistor to aerial terminal.	9.0 mc.	SW2	9.0 mc.	TC402—SW2 sec. TC401—SW2 r. l. TC400—SW2 aerial
3	Same as step 2.	21.0 mc.	SW2	21.0 mc.	C418F—SW2 sec. (21.0 mc.) C400D—SW2 r. l. (21.0 mc.) C400B—SW2 aerial (21.0 mc.)
4	Same as step 2.	21.0 mc.	SW2	20.1 mc.	
5	Repeat steps 2 and 3 until no further increase is obtained.				
6	Same as step 2.	5.0 mc.	SW1	5.0 mc.	C414B—SW1 sec.
7	Through 200-mfd. cond. to aerial terminal.	1500 kc.	BC	1500 kc.	C414C—BC sec. (reties) C415—BC sec. (shunt)
8	Same as step 8.	560 kc.	BC	580 kc.	C414C—BC sec. (reties)
9	Same as step 8.	7.3 mc.	B51	7.3 mc.	C414A—B51 sec. C417B—B51 r. l. C417A—B51 aerial
10	Through 400-ohm resistor to aerial terminal.	9.7 mc.	B52	9.7 mc.	C418C—B52 sec. C418A—B52 r. l.
11	Same as step 10.	11.7 mc.	B53	11.7 mc.	C418H—B53 sec. C418B—B53 r. l.
12	Same as step 10.	15.2 mc.	B54	15.2 mc.	C418I—B54 sec. C418C—B54 r. l. C417E—B54 aerial
13	Same as step 10.	17.8 mc.	B55	17.8 mc.	C416A—B55 sec. C418D—B55 r. l. C417D—B55 aerial
14	Same as step 10.	21.5 mc.	B56	21.5 mc.	C416B—B56 sec. C418E—B56 r. l. C417C—B56 aerial

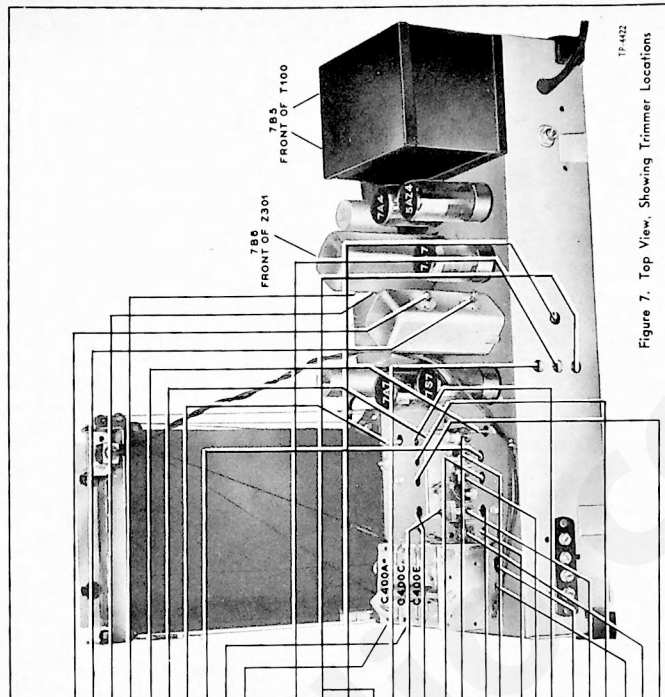


Figure 3. Top View, Showing Trimmer Locations

Figure 7. Top View, Showing Trimmer Locations

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."

SECTION 1 POWER SUPPLY

Reference Symbol	Description	Service Part No.
C100	Condenser, by-pass, .003 mf.....	61-0115*
C101	Condenser, by-pass, .003 mf.....	61-0115*
C102	Condenser, electrolytic, filter, 15 mf., 450v	30-2568-1
C103	Condenser, filter, 10 mf.....	Part of 30-2570-15§
C104	Condenser, line filter, .01 mf.....	61-0120*
C105	Condenser, line filter, .01 mf.....	61-0120*
I100	Pilot lamp	34-2064
R100	Resistor, B+ filter, 4700 ohms	
R101	Resistor, bias bleeder, 180 ohms...	66-1185340*
R102	Resistor, bias bleeder, 100 ohms...	66-1104340*
R103	Resistor, bias voltage divider, 1 megohm	66-5103340*
R104	Resistor, bias voltage divider, 120,000 ohms	66-4123340*
S100	Switch, on-off	Part of R212
T100	Transformer, power	32-8246-1
WS2-1(F)	Switch-wafer section	Part of 42-1817†
WS2-1(R)	Switch-wafer section	Part of 42-1817†
W100	Line cord	L2183*

SECTION 2 AUDIO CIRCUITS

C200	Condenser, electrolytic, cathode by-pass, 10 mf., 25v.....	30-2417-8
C201	Condenser, r-f by-pass,	
C202	Condenser, electrolytic, filter, 10 mf., 450v	Part of 30-2570-15§
C203	Condenser, d-c blocking, .006 mf.....	30-1226
C204	Condenser, d-c blocking, .006 mf.....	30-1226-2
C205	Condenser, d-c blocking, .006 mf.....	30-1226-2
C206	Condenser, bias filter, 2 mf.....	45-3500-3*
C207	Condenser, tone compensation, .003 mf.,	61-0117*
C208	Condenser, tone compensation, .002 mf.,	61-0122*
C209	Condenser, tone compensation, 100 mmf.	60-10105407*
C210	Condenser, bass compensation, .01 mf.,	61-0120*
C211	Condenser, phono input filter, 270 mmf.	

SECTION 2 (Continued) AUDIO CIRCUITS

Reference Symbol	Description	Service Part No.
C212	Condenser, d-c blocking, .006 mf.....	30-1226-2
LS200	Speaker, p-m	36-1455-1
R200	Volume control, 2 megohms (tap at 1 megohm).....	33-5497
R201	Resistor, diode load, 330,000 ohms...	66-4333340*
R202	Resistor, cathode bias, 1800 ohms...	66-2183340*
R203	Resistor, plate load, 100,000 ohms...	66-4103340*
R204	Resistor, decoupling, 2200 ohms.....	66-2224340
R205	Resistor, grid return, 470,000 ohms...	66-4473340*
R206	Resistor, cathode bias, 2200 ohms...	66-2223340*
R207	Resistor, cathode load, 22,000 ohms...	66-3223340*
R208	Resistor, grid return, 470,000 ohms...	66-4473340*
R209	Resistor, grid return, 470,000 ohms...	66-4473340*
R210	Resistor, plate load, 22,000 ohms...	66-3223340*
R211	Resistor, grid-bias filter, 1 megohm...	66-5103340*
R212	Tone control (with on-off switch) 6 megohms	33-5499
R213	Resistor, phono compensation, 47,000 ohms	66-3473340*
R214	Resistor, bass compensation, 47,000 ohms	66-3473340*
T200	Transformer, output	32-8300-1
WS1-1(F)	Switch-wafer section	Part of 42-1818‡

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

C300A	Condenser, fixed, 60 mmf. (part of Z300)	60-00605237
C300B	Condenser, fixed, 108 mmf. (part of Z300)	30-1220*
C301A	Condenser, fixed, 108 mmf. (part of Z301)	30-1220*
C301B	Condenser, fixed, 108 mmf. (part of Z301)	30-1220*
C301C	Condenser, i-f filter, 100 mmf. (part of Z301).....	60-10105407
C301D	Condenser, i-f filter, 100 mmf. (part of Z301).....	60-10105407
C302	Condenser, filter, 20 mf., 450v. Part of	30-2570-15§
C303	Condenser, a-v-c by-pass, .05 mf.....	30-1226
C304	Condenser, a-v-c filter, 2 mf.....	45-3500-2*
C305	Condenser, d-c blocking, 100 mmf....	60-10105407*

REPLACEMENT PARTS LIST (Continued)

SECTION 3 (Continued)

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

Reference Symbol	Description	Service Part No.
R300	Resistor, i-f filter, 47,000 ohms (part of Z301).....	66-3473340*
R301	Resistor, a-v-c filter, 2.2 megohms.....	66-5223340*
R302	Resistor, diode bias, 2.2 megohms.....	66-5223340*
R303	Resistor, plate decoupling, 3300 ohms.....	66-2333540
R304	Resistor, a-v-c diode load, 1 megohm.....	66-5103340*
R305	Resistor, diode bias filter, 2.2 megohms.....	66-5223340*
TC300A	Tuning core.....	Part of Z300
TC300B	Tuning core.....	Part of Z300
TC301A	Tuning core.....	Part of Z301
TC301B	Tuning core.....	Part of Z301
Z300	Transformer, 1st i-f.....	32-3980
Z301	Transformer, 2nd i-f.....	32-3981

SECTION 4

R-F AND CONVERTER CIRCUITS

C400	Condenser, tuning gang.....	
C400A	Tuning-gang section, aerial.....	Part of C400
C400B	Trimmer, aerial.....	Part of C400
C400C	Tuning-gang section, r-f.....	Part of C400
C400D	Trimmer, r. f.....	Part of C400
C400E	Tuning-gang section, osc.....	Part of C400
C401	Condenser, shunt, 12.0 mc. BS, 131 mmf.....	60-10135237*
C402	Condenser, shunt, 9.0 mc. BS, 198 mmf.....	60-10205237*
C403	Condenser, d-c blocking, 100 mmf.....	60-10105407*
C404	Condenser, screen by-pass, 2 mf.....	45-3500-3*
C405	Condenser, d-c blocking; 270 mmf.....	
C406	Condenser, d-c blocking, 100 mmf.....	60-10105407*
C407	Condenser, d-c blocking, 100 mmf.....	60-10105407*
C408	Condenser, shunt, SW2 aerial, 15 mmf.....	60-00205307
C409	Condenser, fixed, BS aerial, 485 mmf.....	30-1220-23
C410	Condenser, fixed, BS1 r. f., 485 mmf.....	30-1220-23
C411	Condenser, tracker, SW1, 3600 mmf.....	60-20395404*
C412	Condenser, fixed, BS1 osc., 485 mmf.....	30-1220-23
C413	Condenser, coupling, 270 mmf.....	
C414	Condenser assembly, trimmer, 3-section, 31-6477-4.....	
C414A	Condenser, trimmer, BS1 osc. (7.5 mc.).....	Part of C414
C414B	Condenser, trimmer, SW1 osc. (5.0 mc.).....	Part of C414
C414C	Condenser, series padder, BC osc. (580 kc.).....	Part of C414

SECTION 4 (Continued)

R-F AND CONVERTER CIRCUITS

Reference Symbol	Description	Service Part No.
C415	Condenser, trimmer, BC osc. (1500 kc.).....	31-6308
C416	Condenser assembly, trimmer, 2-section.....	31-6489
C416A	Condenser, trimmer, BS5 osc. (17.8 mc.).....	Part of C416
C416B	Condenser, trimmer, BS6 osc. (21.5 mc.).....	Part of C416
C417	Condenser assembly, trimmer, 5-section.....	31-6507-1
C417A	Condenser, trimmer, BS1 aerial (7.5 mc.).....	Part of C417
C417B	Condenser, trimmer, BS1 r. f. (7.5 mc.).....	Part of C417
C417C	Condenser, trimmer, BS6 aerial.....	Part of C417
C417D	Condenser, trimmer, BS5 aerial.....	Part of C417
C417E	Condenser, trimmer, BS4 aerial.....	Part of C417
C418	Condenser assembly, trimmer, 9-section.....	31-6507
C418A	Condenser, trimmer, BS2 r. f.....	Part of C418
C418B	Condenser, trimmer, BS3 r. f.....	Part of C418
C418C	Condenser, trimmer, BS4 r. f.....	Part of C418
C418D	Condenser, trimmer, BS5 r. f.....	Part of C418
C418E	Condenser, trimmer, BS6 r. f.....	Part of C418
C418F	Condenser, trimmer, SW2 osc. (21.0 mc.).....	Part of C418
C418G	Condenser, trimmer, BS2 osc. (9.7 mc.).....	Part of C418
C418H	Condenser, trimmer, BS3 osc. (11.7 mc.).....	Part of C418
C418J	Condenser, trimmer, BS4 osc. (15.2 mc.).....	Part of C418
L400	Coil, SW1 aerial.....	32-4206
L401	Coil, SW2 aerial.....	32-4208
L402	Coil, BS1 aerial.....	32-4206-2
L403	Coil, BS aerial.....	32-3670
L404	Coil, BC r. f.....	32-4082
L405	Coil, SW1 r. f.....	32-4206-1
L406	Coil, SW2 r. f.....	32-4208-1
L407	Coil, BS1 r. f.....	32-4206-3
L408	Coil, BS r. f.....	32-3671
L409	Coil, BC osc.....	32-4083
R400	Resistor, suppressor, 100 ohms.....	66-1103340*
R401	Resistor, grid leak; 470,000 ohms.....	66-4473340*
R402	Resistor, plate load, 15,000 ohms.....	66-3153340
R403	Resistor, screen voltage divider, 15,000 ohms.....	66-3154340
R404	Resistor, screen voltage divider, 33,000 ohms.....	66-3333340*
R405	Resistor, grid leak, 470,000 ohms.....	66-4473340*
R406	Resistor, plate feed, 18,000 ohm.s.....	66-3183340
R407	Resistor, oscillator stabilizer, 120 ohms.....	66-1123340*

REPLACEMENT PARTS LIST (Continued)

SECTION 4 (Continued) R-F AND CONVERTER CIRCUITS

Reference Symbol	Description	Service Part No.
R408	Resistor, grid return,	
T400	Transformer, BC aerial.....	32-4081
T401	Transformer, SW1 osc.....	32-4207
T402	Transformer, SW2 osc.....	32-4208-2
T403	Transformer, BS1 osc.....	32-4207-1
T404	Transformer, BS osc.....	32-4212
TC400	Core, tuning, SW2 aerial.....	Part of L401
TC401	Core, tuning, SW2 r. f.....	Part of L406
TC402	Core, tuning, SW2 osc.....	Part of T402
TC403	Core assembly, gang tuning, 3-section,	76-1281-1
TC403A	Core, tuning, BS aerial.....	Part of TC403
TC403B	Core, tuning, BS r. f.....	Part of TC403
TC403C	Core, tuning, BS osc.....	Part of TC403
WS1-1(F)	Switch-wafer section.....	Part of 42-1818‡
WS1-1(R)	Switch-wafer section.....	Part of 42-1818‡
WS1-2(F)	Switch-wafer section.....	Part of 42-1818‡
WS1-2(R)	Switch-wafer section.....	Part of 42-1818‡
WS1-3(F)	Switch-wafer section.....	Part of 42-1818‡
WS1-3(R)	Switch-wafer section.....	Part of 42-1818‡
WS1-4(F)	Switch-wafer section.....	Part of 42-1818‡
WS1-4(R)	Switch-wafer section.....	Part of 42-1818‡
WS1-5(F)	Switch-wafer section.....	Part of 42-1818‡
WS1-5(R)	Switch-wafer section.....	Part of 42-1818‡
WS1-6(F)	Switch-wafer section.....	Part of 42-1818‡

SECTION 4 (Continued) R-F AND CONVERTER CIRCUITS

Reference Symbol	Description	Service Part No.
WS1-6(R)	Switch-wafer section.....	Part of 42-1818‡
§ 30-2570-15	Condenser, electrolytic, 10-10-20 mf., 450v (includes C103, C202, and C302).	
† 42-1817	Wafer switch, single-wafer, voltage change-over.	
‡ 42-1818	Wafer switch, 6-wafer, band selector-phon.	

MISCELLANEOUS

Description	Service Part No.
Cabinet.....	10626A
Back, cabinet.....	54-7078
Screw, wood, for cabinet back (4).....	1W25336FA3
Cord, drive (25-ft. spool).....	45-8750*
Dial-plate assembly.....	76-3134
Dial-scale assembly.....	76-3136
Pointer.....	56-2546-2FCP
Spring, indicator.....	56-3066FA38
Spring, indicator.....	56-2980FA38
Drive shaft and bearing.....	76-1712
Drum assembly (band indicator).....	76-1246FA33
Knob (4).....	54-4323
Pilot-lamp assembly.....	76-1236-1
Pilot-lamp carriage-and-spring assembly.....	76-1512
Plug, a-c.....	L3275
Pulley, tuning gang.....	76-3145
Rod, pilot lamp (pilot-lamp carrier).....	56-2133
Screw, dial-plate mtg. (2).....	1W25372FA3
Socket, Loktal (8).....	27-6138*

REVISIONS AND ADDITIONS TO 48-870 SERVICE MANUAL

Reference Symbol	Description	Service Part No.
Parts List Additions		
R409	Resistor, neutralization, 10,000 ohms	66-3108340*
Parts List Corrections		
R100	Resistor, B+ filter, 4700 ohms, 1 watt	66-2474340*
C201	Condenser, r-f by-pass, 250 mmf.	60-10255237*
C211	Condenser, phono input filter, 250 mmf.	60-10255237*
†C400	Condenser, tuning gang	31-2725-2
C405	Condenser, d-c blocking, 250 mmf.	60-10255237*
C408	Condenser, shunt, SW2 aerial, 15 mmf.	30-1223-3
C413	Condenser, coupling, 250 mmf.	60-10255237*
R408	Resistor, grid return, 47,000 ohms	66-3473340*

†NOTE: Some of the early sets had tuning condenser Part No. 31-2725. For replacement, Part No. 31-2725-2 should be used. The new condenser gang will greatly reduce microphonics.

PRODUCTION CHANGES

No production changes were made in this model.

CRITICAL LEAD DRESS

1. To reduce hum pickup: The yellow phono leads from the front of WS1 to the 3-lug wiring panel in the middle of the chassis should be dressed down to the chassis, under other wiring and components. The red lead from pin 5 of the 7A4 tube to the volume control should be dressed upward, and spaced away from other components. The green lead from the arm of the volume control to the grid (pin 3) of the 7B6 should be dressed upward, away from the socket and other components.

2. To eliminate heat damage to C100 and C101, they should be dressed away from the chassis and the 5AZ4 socket.

3. To obtain proper padding and tracking: The brown lead from C418F to WS1-6(R), lug 9, should be dressed away from the side of the chassis. The white lead from C415 to WS1-6(R), lug 7, should be dressed away from the side of the chassis. The red lead from C414A to WS1-6(R), lug 10, should be dressed away from the side of the chassis. The leads from C416A and C416B should be as short as possible. The black lead from the ground lug of the tuning gang to the r-f unit should be as short as possible. The ground straps from the tuning gang should be dressed clear of the chassis and the shields of the r-f unit.