

# PHILCO



# SERVICE

## HOME RADIO

### PHILCO RADIO-PHONOGRAPH, MODEL 47-1227

#### CIRCUIT DESCRIPTION

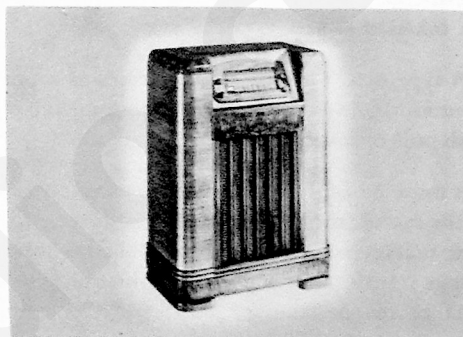
The Philco Model 47-1227 is a nine-tube superheterodyne radio-phonograph combination providing reception on the standard broadcast band, 540—1720 kc and the FM band, 88—108 mc.

A low-impedance loop within the cabinet provides adequate signal pickup on the broadcast band. Satisfactory FM reception usually requires the use of an outdoor dipole aerial (Philco Part No. 45-1462). In areas of high signal strength, however, the dipole built into the cabinet is sufficient for FM operation.

A tuned r-f stage, using a type 6AG5 high-frequency pentode tube, functions on the FM band. The converter stage employs a 7F8 high-frequency double triode. The converter and r-f stages are built on a separate chassis, to insure reliable performance at high frequencies. These stages provide high signal-to-noise ratio, high conversion efficiency, and good image rejection.

Two transformer-coupled i-f stages are used. The i-f transformers have two sets of windings; one set is tuned to 455 kc for AM operation, the other to 9.1 mc for FM operation. Switching of the windings to attenuate undesired beat frequencies is necessary only in the first i-f transformer. The large difference between intermediate frequencies makes further switching unnecessary.

The first i-f stage employs a 6BA6 (miniature type) high-frequency pentode amplifier; the pen-



TP-1442

#### MODEL 47-1227 SPECIFICATIONS

CABINET	Wood, walnut finish
CIRCUIT	Nine-tube superheterodyne
FREQUENCY RANGES:	
Broadcast	540 to 1720 kc
Frequency Modulation	88 to 108 mc
AUDIO OUTPUT	6 watts
OPERATING VOLTAGE	105—120 volts, 60 cycles, a.c.
POWER CONSUMPTION	110 watts
AERIALS	Built-in low-impedance loop and FM dipole. Provision for external aerial.
INTERMEDIATE FREQUENCIES:	
AM	455 kc
FM	9.1 mc
RECORD PLAYER	Philco Automatic Record Changer, Model D-10
SPEAKER	12" electrodynamic
PHILCO TUBES (9)	6AG5, 7F8, 6BA6, 7B7, 7X7, 6J5GT, 6K6GT (2), 5AZ4
PANEL LAMPS (2)	6—8-volt, Part No. 34-2040
BIN LAMP	6—8-volt, Part No. 34-2039

tode section of a 7R7 double-diode-pentode tube functions as the second i-f amplifier. One diode of the 7R7 tube is used for AM detection, while the other diode develops a-v-c voltage.

The ratio-detector circuit used for FM detection operates through the two diodes of the 7X7 tube; this circuit has good noise-reducing properties and a superior tuning characteristic. The triode section of the 7X7 tube is used as a first audio and phono amplifier stage. The output of the AM detector, FM detector, or phono pickup is switched into this circuit by the operation of the function switch.

A type 6J5GT triode tube operates as a phase inverter, driving the two 6K6GT output tubes in push-pull operation.

A more uniform frequency response is obtained by the use of inverse feedback. The inverse-feedback voltage is taken from the secondary of the output transformer, and applied through resistor R211 to the junction of R204 and the volume control.

The TONE control is continuously variable; with clockwise rotation, the bass is increased, and as rotation is continued, the high frequencies are attenuated.

The 12-inch electrodynamic speaker provides excellent bass reproduction.

### PHILCO TROUBLE-SHOOTING PROCEDURE

In this manual, the circuit is divided into four sections, with individual chassis base layouts and a complete schematic showing test points for each section. The first step in each trouble-shooting chart is a master check, which makes it possible to determine whether trouble exists in that section without going through the entire test procedure. Failure to secure the "Normal Indication" in a given step indicates trouble, which should then be located by voltage, resistance, or capacitance

checks of the parts associated with the point under test, and remedied before testing further.

For service information on the record changer, refer to the service manual PR-1156 for the Philco Automatic Record Changer, Models D-10 and D-10A.

### SYMBOLIZATION AND TERMINOLOGY

All components in the radio circuit are symbolized and located as follows:

C—condenser    LA—loop aerial    S—switch  
I—pilot lamp    LS—loudspeaker    T—transformer  
L—choke or coil    R—resistor    Z—electrical ass'y

100-series components are in Section 1 — power supply

200-series components are in Section 2—audio amplifier

300-series components are in Section 3 — i-f amplifier, second detector and/or discriminator, and a.v.c.

400-series components are in Section 4 — the aerial, r-f and oscillator.

The main switch assembly, commonly referred to in the past as the "Band Switch", is used, in many instances, for various purposes in addition to band switching. Therefore, in this manual, the main wafer-switch assembly is designated as the "Function Switch".

### PRELIMINARY CHECKS

The following preliminary checks are recommended, before turning on the radio.

1. Carefully inspect both top and bottom of the chassis. Make sure that all tubes are secure in the proper positions. Look for bad connections, burnt resistors, or other obvious faults.

2. Measure the resistance between B+ (pin no. 8 of the 5AZ4 rectifier tube) and the radio chassis, with the ohmmeter polarity such that it gives the highest resistance reading; if the reading is lower than 50,000 ohms, check condensers C102, and C103 (A and B) for leakage or shorts.

**CALIBRATING DIAL BACKPLATE**

When the radio chassis is removed from the cabinet, dial calibration and alignment points may be marked by small pencil dots made on the dial-backplate assembly below the pointer.

The method of measuring for these points is illustrated in figure 1, which shows the relationship between dial marking and scale backplate.

Hold a ruler against the scale backplate in the position shown. Make dots at the proper points for the desired frequency settings. When the ruler is correctly placed, the index point is 1-9/16 inches from the reference point, as shown in figure 1.

With the tuning gang fully meshed, the pointer should be adjusted on the dial drive cord to coincide with the index mark.

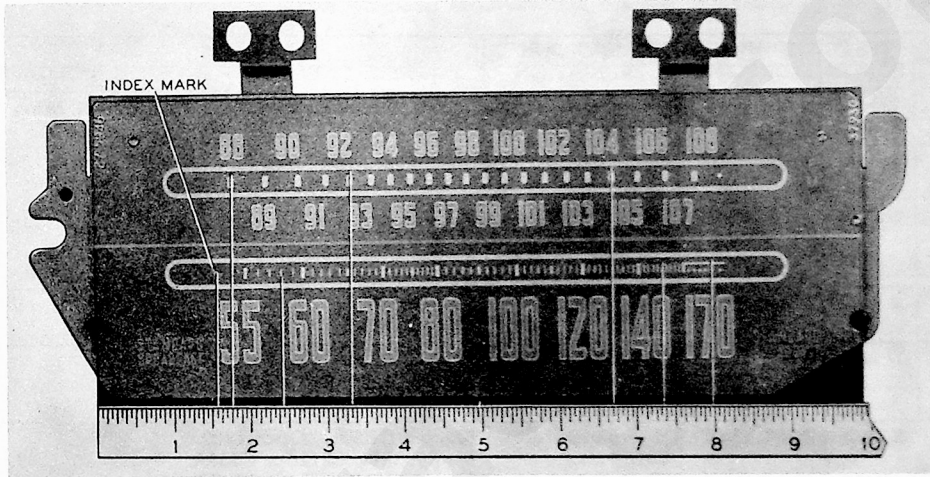


FIGURE 1. DIAL-BACKPLATE CALIBRATION MEASUREMENTS.

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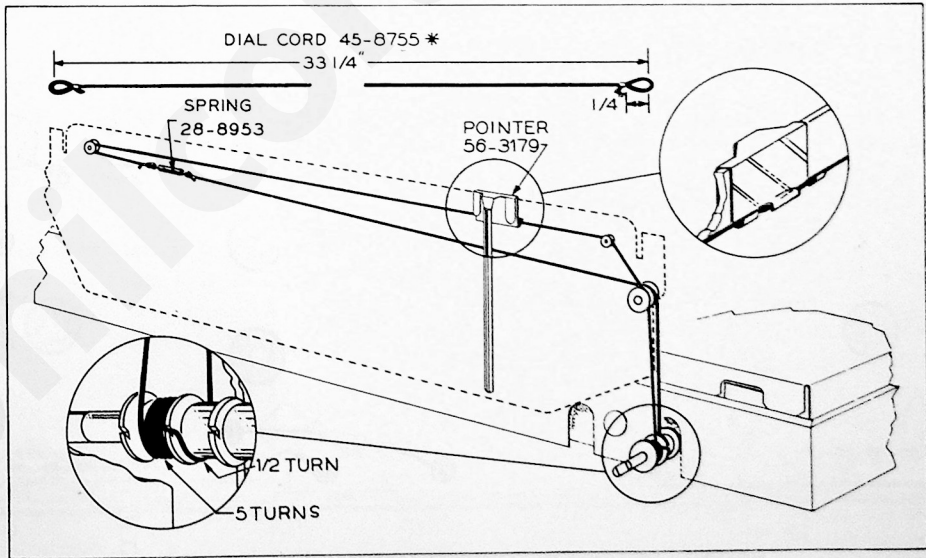


FIGURE 2. POINTER-DRIVE-CORD INSTALLATION DETAILS.

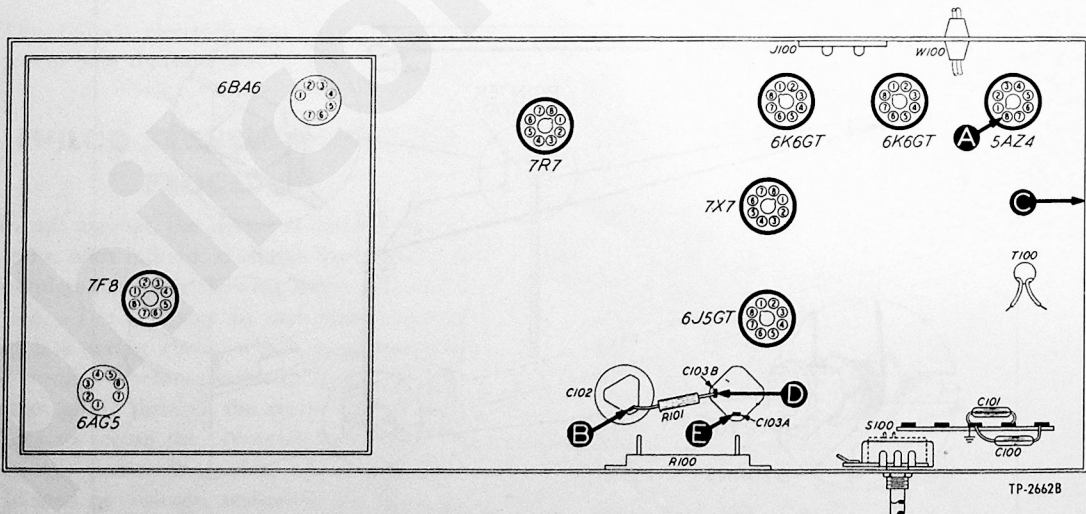
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**SECTION 1 – TROUBLE SHOOTING**

**CAUTION:** Do not turn on power with speaker disconnected, as this may cause damage to the radio.

Make all tests for this section with a volt-ohmmeter, using the applicable d-c ranges. Voltages were taken with a 20,000-ohms-per-volt meter at a line voltage of 117 volts, a.c. The VOLUME control was set at minimum and the TONE control fully counterclockwise; the function switch was set in BC (broadcast) position. See figure 3 for location of test points. Follow steps in proper sequence; if the "Normal Indication" is obtained in step 1, proceed with tests for Section 2; if not, isolate and remedy the trouble in this section. It will be noted that certain parts in other sections of the radio are listed under "Possible Cause of Abnormal Indication" because they may produce abnormal indication in Section 1.

STEP	TEST POINTS	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	D to C E to C	208 volts 290 volts	No voltage or incorrect voltage	Trouble in this section. Isolate by the following tests.
2	A to C	350 volts	No voltage  Low voltage  High voltage	Defective 5AZ4 tube, T100, S100 or W100. Shorted C102. Open R100. Defective 5AZ4 tube. Shorted or leaky C102, C308, C311, C322, C309, C408 or C409. Shorted or leaky C103A or C103B. Open L100, R101 or T200.
3	B to C	Negative 20 volts	High voltage Low or no voltage	Open R100. Shorted R100. Weak 6K6GT tubes.
4	D to C	208 volts	No voltage Low voltage High voltage	Shorted C103B. Open R101. Leaky C103B, C319, C307 or C310. Open R300 or R303.
5	E to C	290 volts	No voltage Low voltage High voltage	Shorted C103A. Open L100. Leaky C211, C212, or C103A. Grounded T200. Shorted L100. Weak 6K6GT tubes.
Listening Test				Abnormal hum may be caused by open C100, C101, C102 or C103A.



**FIGURE 3. BOTTOM VIEW, SHOWING SECTION 1 TEST POINTS.**

## SECTION 2 – TROUBLE SHOOTING

Connect the audio-signal generator ground lead to test point "C" (chassis); connect the output lead through a .1-mf condenser to the test points indicated in the chart. Set the radio VOLUME control to maximum and adjust the signal-generator output as indicated in the chart. If the "Normal Indication" is obtained in step 1, proceed to Section 3; if not, isolate and remedy the trouble in this section.

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1.	A	Loud, clear signal with low signal-generator output.	Trouble within this section. Isolate by the following tests.
2	B (Remove 6J5GT tube)	Loud, clear signal with high signal-generator output.	Defective 6K6GT tube, T200 or LS200. Open R214. Shorted or leaky C212 or C214.
3	D (Remove 6J5GT tube)	Same as step 2.	Defective 6K6GT tube. Shorted or leaky C211. Open R215.
4	E (Replace 6J5GT tube)	Loud, clear signal with moderate signal-generator output.	Defective 6J5GT tube. Open R212, R209 or R210. Leaky or shorted C210.
5	F	Loud, clear signal with low signal-generator output.	Defective 7X7 tube. Open R207 or C210. Shorted C206.
6	A	Same as step 5.	Shorted C202, C201 or C326. Open R201, C203, R203 or C208.
7	PL200 (Function switch on PHONO)	Same as step 5.	Defective PL200 or FS2 (R).
Listening Test		Distortion may be caused by leaky C210, C212, C211, C213 or C214. Hum will result if C213 is open.	

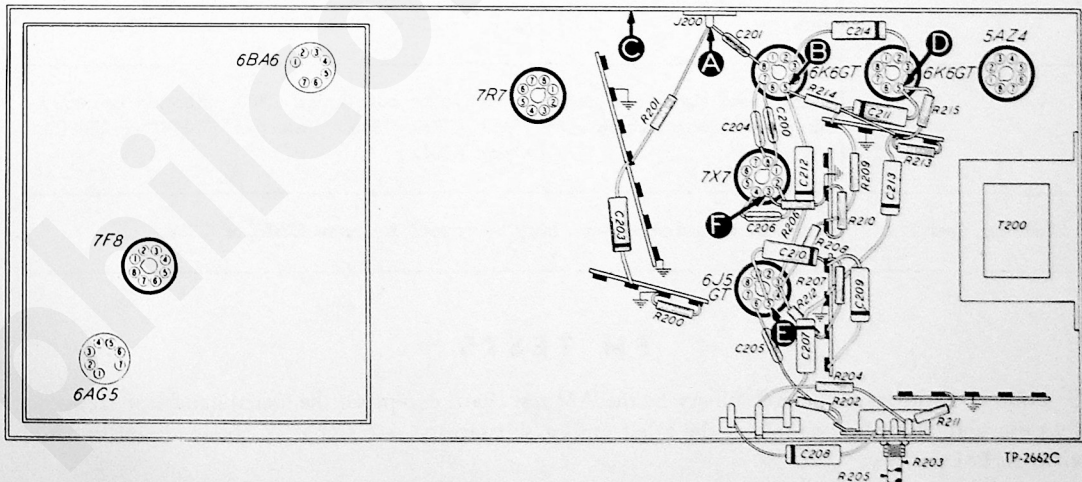


FIGURE 4. BOTTOM VIEW, SHOWING SECTION 2 TEST POINTS.

## SECTION 3 – TROUBLE SHOOTING

### AM TESTS

For the following tests, use an r-f signal generator, with modulated output, set at 455 kc. Connect the generator ground lead to the radio chassis, test point "C"; connect the output lead through a .1-mf condenser to the test points indicated.

Turn the radio VOLUME control to maximum, function switch to BC (broadcast) position, and TONE control fully counterclockwise.

If the "Normal Indication" is obtained in the first step, proceed to the FM tests, or to the tests in Section 4; if not, isolate and remedy the trouble in this section.

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear signal with low signal-generator output.	Trouble within this section. Isolate by the following tests.
2	B	Loud, clear signal with high signal-generator output.	Defective 7R7 tube or Z302. Improperly aligned Z302. Open R313 or R314. Leaky or shorted C322, C321 or C326. Defective switch FS3 (R) or FS2 (R).
3	D	Loud, clear signal with moderate signal-generator output.	Defective or misaligned Z301. Defective 6BA6 tube. Open R306, R304, R305 or C307. Shorted or leaky C308, C309, C307, C311, or C310.
4	A	Loud, clear signal with low signal-generator output.	Defective or misaligned Z300. Shorted or leaky C303, C304, C305. Defective FS4 (R) or FS4 (F). Open R301.
Listening Test		Distorted signal with hum, may be caused by open C307, or C319.	

### FM TESTS

Follow the instructions preliminary to the AM test chart, except set the signal-generator frequency to 9.1 mc, and detune to one side or the other until a satisfactory test signal is obtained; set function switch to FM position.

SECTION 3 — Continued

The most satisfactory check on the operation of the discriminator circuit is the ability to make proper alignment, as described on pages 238, 239 and 240.

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	B	Loud, clear signal with high signal-generator output.	Defective 7X7 tube or C325. Open R318. Leaky or shorted C324, C328 or C323. Defective or mis-aligned Z302.
2	D	Same as step 1.	Same parts as listed in AM tests, step 3.
3	A	Loud, clear signal with low signal-generator output.	Same parts as listed in AM tests, step 4.

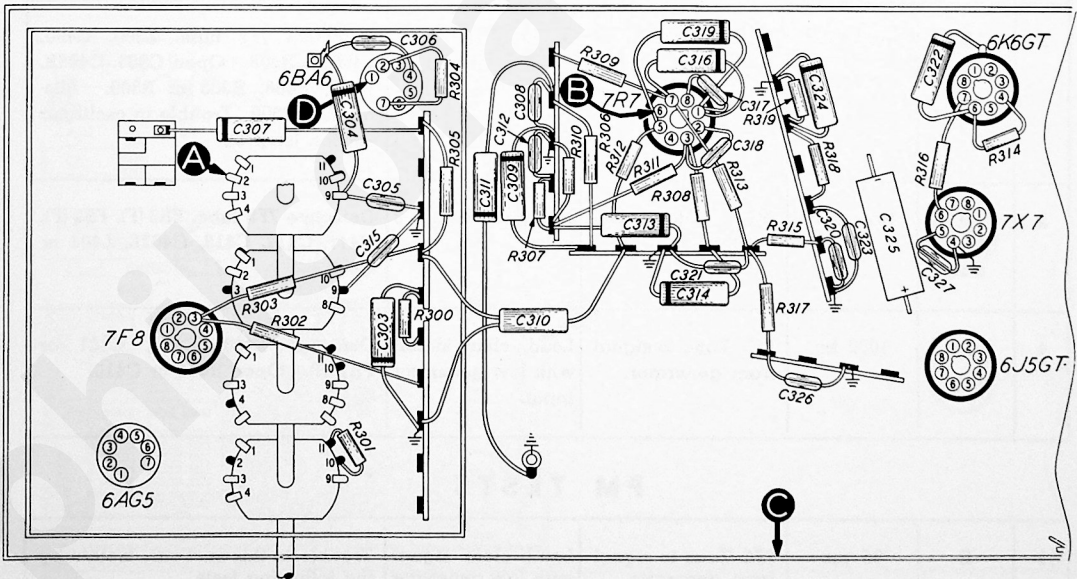


FIGURE 5. BOTTOM VIEW, SHOWING SECTION 3 TEST POINTS.

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**SECTION 4 – TROUBLE SHOOTING**

For tests indicated in this section with the exception of oscillator test, use an r-f signal generator with modulated output. Connect the generator ground lead to the radio chassis, test point "C"; connect the output lead through a .1-mf condenser to the test points indicated.

Turn the VOLUME control to maximum and the TONE control to nearly OFF position.

Set the function switch, TUNING control, and signal-generator frequency as indicated in chart.

Oscillator test: (AM tests, step 3, FM tests, step 3). Attach the positive lead of a high-resistance voltmeter to the 7F8 oscillator cathode (pin 4). Connect the negative lead through a 100,000-ohm isolating resistor to the 7F8 oscillator grid (pin 1) test point "D". Use a suitable meter range (0-10 to 0-50 volts).

Absence of negative grid voltage in either AM or FM position of function switch indicates that the oscillator is not functioning; check the parts listed in the chart for the oscillator tests.

**AM TESTS**

STEP	TEST POINT	SIG. GEN. FREQUENCY	FUNCTION SWITCH AND TUNING CONTROL	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	1000 kc	BC. Tune to signal from generator.	Loud, clear signal with low generator input.	Trouble in this section. Isolate by the following tests.
2	B	1000 kc	Same as step 1.	Same as step 1.	Defective 7F8 tube, Z300, C400, L406 or R408. Open C303, C402B, R405, R406, R303 or R300. Misaligned Z300. Trouble in oscillator section (step 3).
3	D (Osc. test)	Not used	BC. Rotate 540-1720 kc	Negative 2 to 3 volts.	Defective 7F8 tube, FS3 (F), FS2 (F), C411, C412, C413, C402B, L404 or C400.
4	A	1000 kc	BC. Tune to signal from generator.	Loud, clear signal with low generator input.	Defective L400, C400, C401 or FS1 (R). Open R404 or C410.

**FM TESTS**

1	E	95 mc	FM. Tune to signal from generator.	Loud, clear signal with low generator input.	Trouble in this section. Isolate by the following tests.
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SECTION 4 — Continued

STEP	TEST POINT	SIG. GEN. FREQUENCY	FUNCTION SWITCH AND TUNING CONTROL	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
2	B	95 mc	Same as step 1.	Same as step 1.	Same troubles as in AM tests, step 2.
3	D (Osc. test)	Not used	FM. Rotate 88 to 108 mc.	Negative Voltage. Approx. 1 volt.	Defective 7F8 tube, FS3 (R), FS2 (R), C411, C412, C413, C400 or L405.
4	F	95 mc	FM. Tune to signal from generator.	Loud, clear signal with low generator input.	Defective C407, L403, C400, C400B, or FS1 (R).
5	E	95 mc	FM. Tune to signal from generator.	Loud, clear signal with low generator input.	Defective 6AG5 tube, C400, L401 or C400A. Open R400, R401, R402, R403, L402 or C403. Shorted or leaky C408 or C409.

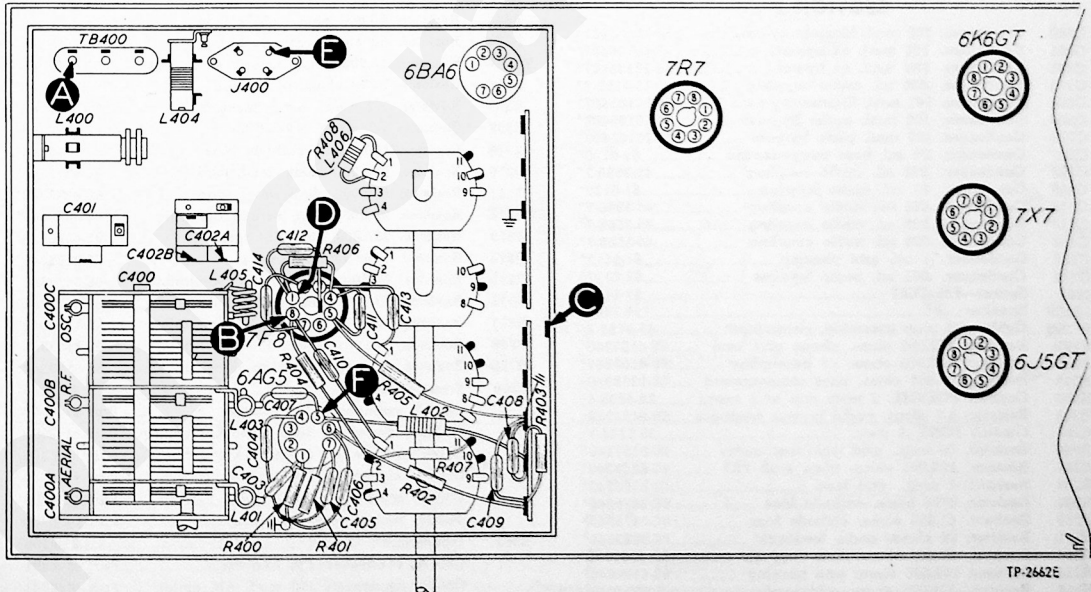


FIGURE 6. BOTTOM VIEW, SHOWING SECTION 4 TEST POINTS.

# REPLACEMENT PARTS LIST

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

## SECTION 1

Reference No.	Description	Service Part No.
†C100	Condenser, .01 mf, line filter	61-0120*
†C101	Condenser, .01 mf, line filter	61-0120*
C102	Condenser, electrolytic 20 mf, high-voltage filter	30-2555*
C103	Condenser, electrolytic	30-2556*
	C301A: condenser, 25 mf, high-voltage filter	Part of C103
	C103B: condenser, 10 mf, isolating filter	Part of C103
I100	Lamp, bin	34-2039*
I101	Lamp, panel	34-2040*
I102	Lamp, panel	34-2040*
J100	Socket, a-c phono power	27-6200
L100	Field, speaker	Part of LS200
R100	Resistor, 165 ohms, 6K6 bias	33-3435-1
R101	Resistor, 15,000 ohms, voltage-dropping	66-3155340*
S100	Switch, power ON-OFF	Part of R205
S101	Bin-light switch	42-1702
S102	Switch, phono a-c power	Part of 42-1803
T100	Transformer, power	32-8248
W100	Cord, line	L-3199

## SECTION 2

C200	Condenser, 100 mmf, filament by-pass	60-10105407*
C201	Condenser, 100 mmf, r-f by-pass	60-10105407*
C202	Condenser, 100 mmf, r-f by-pass	60-10105407*
C203	Condenser, .006 mf, audio coupling	45-3500-7*
C204	Condenser, 100 mmf, filament by-pass	60-10105407*
C205	Condenser, 100 mmf, audio by-pass	60-10105407*
C206	Condenser, 100 mmf, plate by-pass	60-10105407*
C207	Condenser, .01 mf, bass compensation	61-0120*
C208	Condenser, .006 mf, audio coupling	45-3500-7*
C209	Condenser, .01 mf, audio by-pass	61-0120*
C210	Condenser, .006 mf, audio coupling	45-3500-7*
C211	Condenser, .006 mf, audio coupling	45-3500-7*
C212	Condenser, .006 mf, audio coupling	45-3500-7*
C213	Condenser, .1 mf, grid phasing	61-0113*
C214	Condenser, .003 mf, audio by-pass	61-0117*
J200	Socket—FM TEST	27-6180
LS200	Speaker	36-1595
PL200	Cable and plug assembly, phono-input	41-3735-2
R200	Resistor, 150,000 ohms, phono grid load	66-4153340*
R201	Resistor, 100,000 ohms, r-f decoupling	66-4103340*
R202	Resistor, 33,000 ohms, bass compensating	66-3333340
R203	Control, VOLUME, 2 meg. (top at 1 meg.)	33-5535-1
R204	Resistor, 4.7 ohms, audio inverse feedback	66-9473340
R205	Control, TONE, 6 meg.	33-5538-1
R206	Resistor, 10 meg., grid leak, first audio	66-6103340*
R207	Resistor, 220,000 ohms, plate load 7X7	66-4223340*
R208	Resistor, 1 meg., grid load	66-5103340*
R209	Resistor, 4700 ohms, cathode bias	66-2473340*
R210	Resistor, 47,000 ohms, cathode bias	66-3473340*
R211	Resistor, 68 ohms, audio feedback	66-0683340*
R212	Resistor, 56,000 ohms, plate load 6J5	66-3563340*
R213	Resistor, 150,000 ohms, grid phasing	66-4153340*
R214	Resistor, 330,000 ohms, grid load	66-4333340*
R215	Resistor, 330,000 ohms, grid load	66-4333340*
T200	Transformer, output	32-8274

## SECTION 3

Reference No.	Description	Service Part No.
C303	Condenser, .01 mf, plate decoupling	61-0120*
C304	Condenser, .01 mf, a-v-c decoupling	61-0120*
C305	Condenser, 100 mmf, a-v-c decoupling	60-10105407*
C306	Condenser, 100 mmf, filament by-pass	60-10105407*
C307	Condenser, .01 mf, screen by-pass	61-0120*
C308	Condenser, 100 mmf., plate decoupling	60-10105407*
C309	Condenser, .01 mf, plate decoupling	61-0120*
C310	Condenser, .01 mf, by-pass plate decoupling	30-4641
C311	Condenser, .01 mf, plate decoupling	61-0120*
C312	Condenser, 250 mmf, a-v-c decoupling	60-10255237*
C313	Condenser, .01 mf, a-v-c decoupling	61-0120*
C314	Condenser, .01 mf, a-v-c filter	61-0120*
C315	Condenser, 100 mmf, a-v-c decoupling	60-10105407*
C316	Condenser, .05 mf, cathode by-pass	61-0122*
C317	Condenser, 100 mmf, filament by-pass	60-10105407*
C318	Condenser, 100 mmf, a-v-c coupling	60-10105407*
C319	Condenser, .01 mf, screen by-pass	61-0120*
C320	Condenser, 100 mmf, r-f by-pass	60-10105407*
C321	Condenser, 100 mmf, r-f by-pass	60-10105407*
C322	Condenser, .05 mf, plate decoupling	61-0122*
C323	Condenser, 100 mmf, r-f by-pass	60-10105407*
C324	Condenser, .008 mf, r-f by-pass	61-0174*
C325	Condenser, 5 mf, noise limiter	30-2417*
C326	Condenser, 100 mmf, r-f by-pass	60-10105407*
†C327	Condenser, 6 mmf, r-f by-pass	30-1224-9
C328	Condenser, 100 mmf, r-f by-pass	66-10105407*
R300	Resistor, 47,000 ohms, plate load, 7F8	66-3473340*
R301	Resistor, 2.2 meg., a-v-c decoupling	66-5223340*
R302	Resistor, 4700 ohms, plate load	66-2473340*
R303	Resistor, 33,000 ohms, plate load	66-3333340*
R304	Resistor, 68 ohms, cathode bias	66-0683340*
†R305	Resistor, 10,000 ohms, screen dropping	66-3103340*
R306	Resistor, 1,000 ohms, plate load	66-2103340*
R307	Resistor, 2.2 meg., a-v-c decoupling	66-5223340*
R308	Resistor, 3.3 meg., a-v-c filter	66-5333340*
R309	Resistor, 150 ohms, cathode bias	66-1153340*
R310	Resistor, 220,000 ohms, a-v-c load	66-4223340*
R311	Resistor, 820,000 ohms, a-v-c load	66-4823340*
†R312	Resistor, 33,000 ohms, screen dropping	66-3333340*
R313	Resistor, 330,000 ohms, r-f return	66-4333340*
R314	Resistor, 1000 ohms, plate load	66-2103340*
R315	Resistor, 47,000 ohms, diode decoupling	66-3473340*
R316	Resistor, 47,000 ohms, noise limiter	66-3473340*
R317	Resistor, 100,000 ohms, diode decoupling	66-4103340*
R318	Resistor, 100,000 ohms, FM decoupling	66-4103340*
R319	Resistor, 6.8 meg., discriminator load	66-5683340*
Z300	Transformer, 1st i-f	32-4146*
	C300A: condenser, FM trimmer	Part of Z300
	C300B: condenser, 3000 mmf, AM tuning	Part of Z300
	C300C: condenser, 6 mmf, i-f coupling	Part of Z300
	C300D: condenser, FM trimmer	Part of Z300
	C300E: condenser, AM trimmer	Part of Z300
	TC300, tuning core, AM	Part of Z300
Z301	Transformer, 2nd i-f	32-4156*
	C301A: condenser, FM trimmer	Part of Z301
	C301B: condenser, 300 mmf, AM tuning	Part of Z301
	C301C: condenser, FM trimmer	Part of Z301
	C301D: condenser, AM trimmer	Part of Z301

† REFER to PRODUCTION CHANGES

REPLACEMENT PARTS LIST — Continued

SECTION 3 — Continued

Reference No.	Description	Service Part No.
Z302	Transformer, 3rd i-f	32-4147*
C302A:	condenser, 470 mmf, AM tuning	Part of Z302
C302B:	condenser, AM trimmer	Part of Z302
C302C:	condenser, 27 mmf, FM coupling	Part of Z302
C302D:	condenser, FM trimmer	Part of Z302
C302E:	condenser, 25 mmf, FM tuning	Part of Z302
C302F:	condenser, 15 mmf, FM tuning	Part of Z302
TC302:	tuning core, FM tuning	Part of Z302

SECTION 4

C400	Condenser, tuning gang	31-2703-2
C400A:	condenser, FM aerial trimmer	Part of C400
C400B:	condenser, FM mixer trimmer	Part of C400
C400C:	condenser, FM oscillator trimmer	Part of C400
C401	Condenser, 1500-kc trimmer	31-6473
C402	Condenser trimmer assembly, two-section	31-6476-5
C402A:	condenser, shunt trimmer, BC osc.	Part of C402
C402B:	condenser, series trimmer, BC osc.	Part of C402
C403	Condenser, 51 mmf, FM coupling	60-00515307*
C404	Condenser, 100 mmf, filament by-pass	60-10105407*
C405	Condenser, 100 mmf, cathode by-pass	60-10105407*
C406	Condenser, 100 mmf, screen by-pass	60-10105407*
C407	Condenser, 33 mmf, FM coupling	60-00305307*
C408	Condenser, 1500 mmf, plate by-pass 6AG5	60-20155404*
C409	Condenser, 1500 mmf, screen by-pass 6AG5	60-20155404*
C410	Condenser, 220 mmf, converter coupling	60-10245307*
C411	Condenser, 750 mmf, cathode coupling	60-10755301*
C412	Condenser, 100 mmf, grid by-pass	60-10105407*
C413	Condenser, 220 mmf, osc. coupling	60-10245307*
C414	Condenser, 100 mmf, filament by-pass	60-10105407*
J400	Socket, 4-prong, external aerial	27-6214-1
L400	Coil, BC aerial	32-4033-2
L401	Coil, FM aerial	32-4158
L402	Choke, plate choke	32-4061
L403	Coil, FM r-f	32-4159
L404	Coil, BC oscillator	32-4019-4
L405	Coil, FM oscillator	32-4018-2
L406	Choke, parasitic oscillation suppressor	32-4157
LA400	Loop assembly, broadcast	76-1989
R400	Resistor, 2.2 meg., grid load	66-5223340*
R401	Resistor, 150 ohms, cathode bias	66-1153340*
R402	Resistor, 47,000 ohms, screen dropping	66-3473340*
R403	Resistor, 1000 ohms, plate decoupling	66-2103340*
R404	Resistor, 2.2 meg., a-v-c decoupling	66-5223340*
R405	Resistor, 1500 ohms, cathode bias	66-2153340*
R406	Resistor, 15,000 ohms, grid leak	66-3153340*
R407	Resistor, 470,000 ohms, a-v-c decoupling	66-4473340*
R408	Resistor, 1500 ohms, a-v-c parasitic oscillation suppressor	Part of L406
FS	Function switch	42-1803
FS1, section,	function switch	Part of 42-1803
FS2, section,	function switch	Part of 42-1803
FS3, section,	function switch	Part of 42-1803
FS4, section,	function switch	Part of 42-1803
TB400	Terminal panel, aerial	38-9942

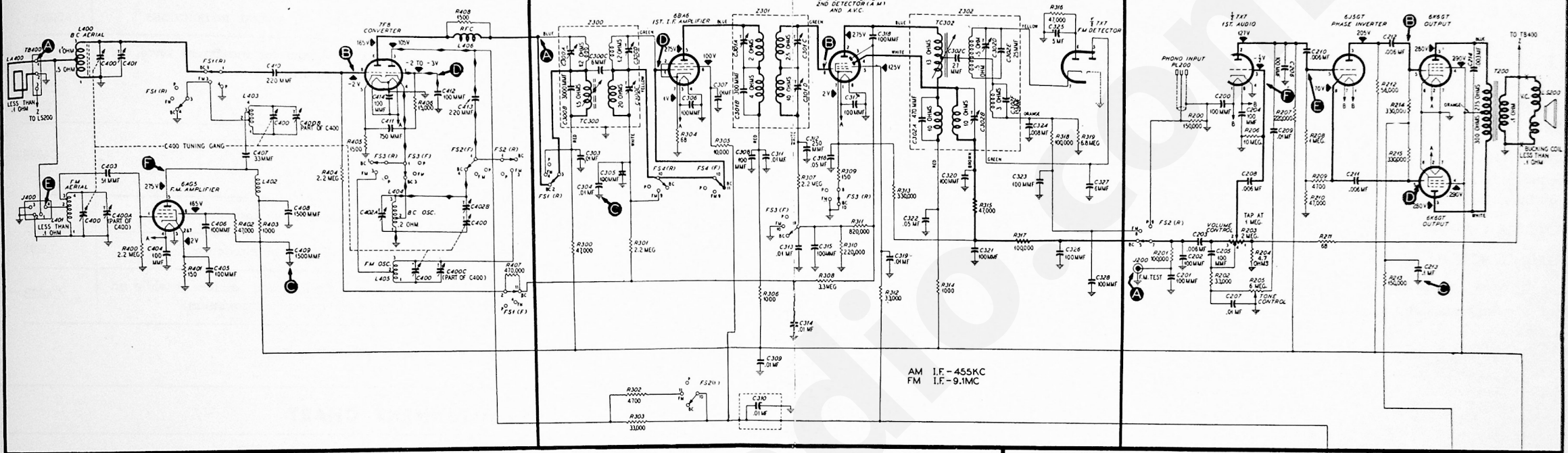
MISCELLANEOUS

Description	Service Part No.
<b>Bin-Light Parts:</b>	
Bin-light cable, socket and switch assembly	76-2728
Cord, pull (25-ft. spool)	45-8760*
Lamp, bin-light	34-2039*
Spring, pull-cord	28-8991
Cable assembly	41-3754-5
Cable, shielded	41-3754-11
<b>Cabinet and Cabinet Hardware:</b>	
Tilt front	45-6370
<b>Top panel (waterfall section):</b>	45-6393
Loop assembly, BC	76-1989
Spring washer (loop mtg.)	28-4186
Loop assembly, FM	76-2029-9
Washer (2 reqd.)	1W52540FA3
Bin mechanism, left hand	76-2176
Bin mechanism, right-hand	76-2174
Cabinet	10643C
Baffle, wood	219041
Baffle and cloth assembly	40-6770
Bezel, wood	16802
Bolt, speaker-mounting	W1587
Dial-scale plate assembly	76-2005
Frame, mounting assembly	76-2199
Hinge, baffle	45-6200
Lamp bracket	56-2332
Grommet (superstructure mounting)	27-4596
<b>Capacitor mounting water, insulated</b>	45-6239
<b>Capacitor mounting water, metal</b>	45-6240
<b>Chassis Mounting Hardware:</b>	
Foot assembly, (4) mounting grommet	54-4122
Nut, "T"	W2502FA3
Washer	W2271FA3
Clip, aerial	28-5002FA1
Clip, BC oscillator	56-4303FA1
<b>Dial-Scale Hardware:</b>	
Cord, pointer-drive (25-ft. spool)	45-8755*
Pointer	56-3179
Scale and backplate assembly	76-2226-3
Mounting screws (4)	1W24894FE11
Spacer (2), scale backplate	56-3279FA3
Rubber band	54-4234
Spring, pointer-drive-cord	28-8953
Grommet (2), superstructure mtg. — sub. and plate assy.	27-4596
Spacer (2), superstructure mtg. — sub. and plate assy.	1W29184FA3
Washer (2)	1W52116FA3
Screw (2)	1W25349FA3
Function switch	42-1803
<b>Function-Switch Hardware:</b>	
Link assembly	76-2186
Phono OFF-ON switch	Part of 42-1803
Shaft	56-3298FA11
Washer, "C"	1W42535FA3
Grommet (3), r-f chassis mounting	54-4295
Knob (4)	54-4105
Lamp, panel (2)	34-2040*
Lamp-socket assembly, panel (2)	76-2109
Washer	1W52237FA3
<b>Record Changer Mounting Parts:</b>	
Bolt (4), changer-mounting	56-3295
Grommet (4), changer-mounting	54-4313
Nut, "T" (4), changer-mounting	1W56643FA3
Pinnut (4), changer-mounting	1W29061FA3
Spring (8), changer-mounting	56-3043
Socket (3), Loktal	27-6138*
Socket (1), Loktal (7F8)	27-6213*
Socket (1), Miniature (6BA6)	27-6203-4
Socket (3), octal	27-6199*
Socket (1), Miniature (6AG5)	27-6203-3
<b>Speaker Hardware:</b>	
Bolt, mounting	W1587FA3
Cable and plug assembly	41-3701
Nut (4), speaker-mounting	1W19988FA3
Plug, speaker-cable	27-4419-2

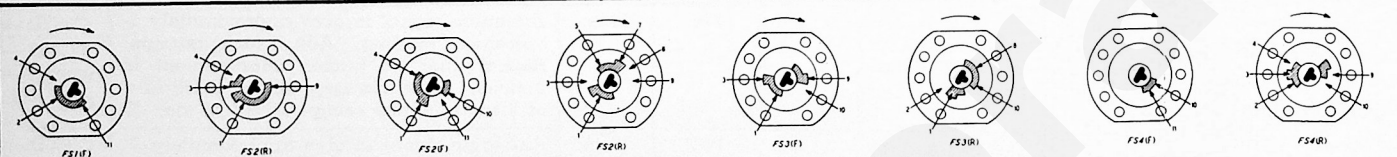
SECTION 4

SECTION 3

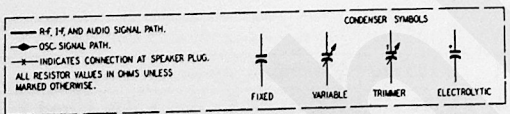
SECTION 2



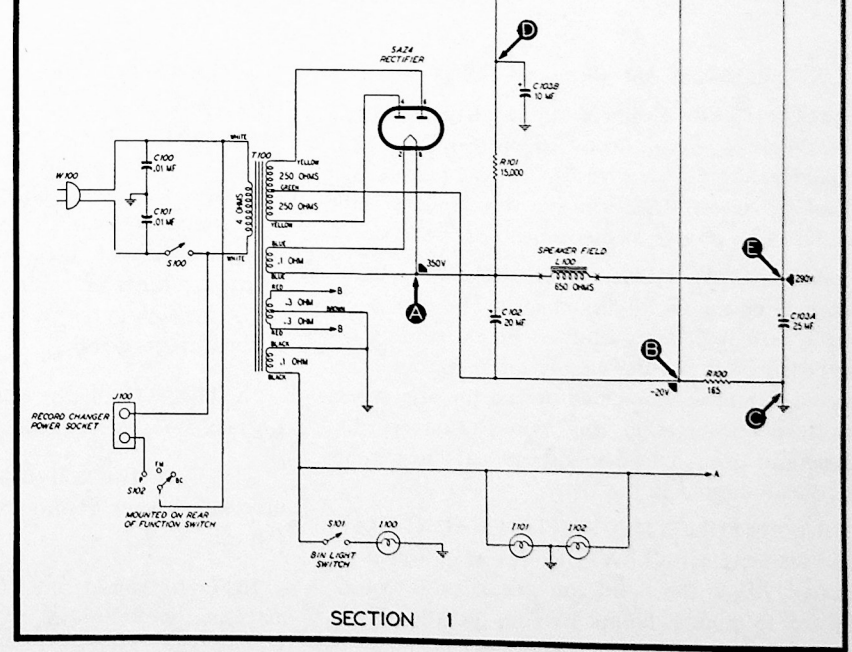
AM I.F. - 455KC  
FM I.F. - 9.1MC



FS FUNCTION SWITCH SECTIONS SHOWN IN BC POSITION AS VIEWED WHEN CHASSIS IS INVERTED  
(F) INDICATES FRONT CONTACTS LOOKING FROM FRONT.  
(R) INDICATES REAR CONTACTS LOOKING THROUGH FROM FRONT.  
SWITCH SYMBOLS FS1, FS2, FS3 AND FS4 INDICATES PLACEMENT OF SECTIONS FROM FRONT OF CHASSIS TO REAR.



ALL VOLTAGE, CAPACITY, AND RESISTANCE VALUES SHOWN ARE AVERAGE. THE VOLTAGES WERE MEASURED BETWEEN THE POINTS INDICATED AND THE RADIO POWER SUPPLY (G), USING A 20,000-OHM-PER-VOLT METER, WITH 117-VOLT, 60-CYCLE INPUT TO THE RADIO POWER SUPPLY. THE VOLUME CONTROL AND TONE CONTROL WERE SET TO COUNTERCLOCKWISE POSITION AND THE FUNCTION SWITCH WAS SET TO BROADCAST POSITION. THE OSCILLATOR GRID VOLTAGE WAS TAKEN BETWEEN PINS 1 AND 4 OF THE 7B8 TUBE USING A 100,000-OHM ISOLATING RESISTOR IN SERIES WITH THE NEGATIVE PROBE OF THE VOLTMETER LEAD.



SECTION 1

FIGURE 7. PHILCO RADIO-PHONOGRAPH MODEL 47-1227 — COMPLETE SECTIONALIZED SCHEMATIC, SHOWING TEST POINTS.

## AM ALIGNMENT PROCEDURE

When the complete AM and FM alignments are to be made, the AM alignment should be made first; if FM alignment is not required, the AM alignment alone may be made.

**RADIO DIAL POINTER:** With tuning-condenser plates fully meshed, adjust pointer to coincide with index mark at low-frequency end of scale.

**VOLUME CONTROL:** Maximum clockwise.

**TONE CONTROL:** Maximum counterclockwise.

**AM SIGNAL GENERATOR:** Connect ground lead to radio chassis and output lead as indicated in chart.

**OUTPUT METER:** Connect between terminal 3 (voice-coil connection) of aerial terminal strip (TB400) and chassis.

**OUTPUT LEVEL:** During alignment, the input signal must be attenuated to hold the output-meter reading below 1.5 volts.

**RADIO FUNCTION SWITCH, RADIO DIAL and SIGNAL GENERATOR:** Set as indicated in chart.

**NOTE:** Make up a coil of insulated wire consisting of 6 to 8 turns, about 6" in diameter. Connect coil ends to the signal generator leads and suspend coil near radio broadcast loop.

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## FM ALIGNMENT PROCEDURE

**NOTE:** Make AM alignment first.

**D-C METER:** Connect the negative lead of a 20,000-ohms-per-volt meter to pin 6 of the 7X7 tube and the positive lead to chassis (across the 5-mf condenser, C325, in the discriminator circuit). Use 10-volt meter range.

**AM SIGNAL GENERATOR:** Use modulated output for the entire alignment. The generator must have sufficient output to give a reading of approximately 9 volts on the d-c meter and the signal should be attenuated during the alignment to keep the meter at this value. Connect the generator ground lead to chassis and the output lead as indicated in the chart.

**RADIO FUNCTION SWITCH, RADIO DIAL and SIGNAL GENERATOR:** Set as indicated in chart. Allow the radio and generator to warm up for 15 minutes before starting the alignment.

**NOTE 1:** The resonance of the circuits using coils L401, L403, and L405 may be checked with a powdered-iron tuning core, such as Part No. 56-6100. If the signal strength (meter reading) increases when the iron end is inserted in the coil, compress the turns slightly. If the signal increases when the threaded brass end is inserted, spread the turns. Do not compress or spread the turns excessively; only a small change is required at these frequencies.

**NOTE 2:** Oscillator coil L405 — Adjust coil for maximum meter reading.

**NOTE 3:** R-F coil L403 — Adjust coil for maximum meter reading while rocking tuning control.

**NOTE 4:** Aerial coil L401 — Adjust coil for maximum meter reading.

# AM ALIGNMENT CHART

MODEL 47-1227

SIGNAL GENERATOR			RADIO			
STEP	CONNECTIONS TO RADIO	DIAL	FUNCTION SWITCH	DIAL	SPECIAL INSTRUCTIONS	ADJUST
1	Through .1-mf condenser to terminal 1 of TB400	455 kc	BC	540 kc	Adjust for maximum once only in order.	C302B C301D C300E TC300
2	6" coil loosely coupled to loop. See note*	580 kc	BC	580 kc	Adjust for maximum.	C402B
3	Same as step 2	1700 kc	BC	1700 kc	Adjust for maximum.	C402A
4	Same as step 2	1500 kc	BC	1500 kc	Adjust for maximum.	C401
5	Same as step 2	580 kc	BC	580 kc (approx.)	Rock tuning condenser while adjusting for maximum.	C402B
6	Repeat steps 3, 4, 5 and 4 in order until no improvement results.					

FIGURE 8. CHASSIS VIEW, SHOWING AM TRIMMER LOCATIONS.

TP-2941

# FM ALIGNMENT CHART

SIGNAL GENERATOR			RADIO			
STEP	CONNECTIONS TO RADIO	DIAL	FUNCTION SWITCH	DIAL	SPECIAL INSTRUCTIONS	ADJUST
1	Through .1-mf condenser to (pin 1) 6BA6 (test point E)	9.1 mc	FM	88 mc	Attenuate signal to give approximately 9-volt meter reading. Adjust for maximum. Repeat until no further improvement is noticed. After this step, do not touch any of these trimmers except C302D in step 3.	C302D TC302 C301C C301A
2	Through a .1-mf condenser to (pin 8) 7F8 (test point B)	9.1 mc	FM	88 mc	Attenuate signal to give approximately 9-volt meter reading. Adjust for maximum. Repeat until no further improvement is noticed. After this step, do not touch any of these trimmers.	C300D C300A
3	Same as step 2	9.1 mc	FM	88 mc	Double check the adjustment of C302D to make sure that minimum audio output is obtained from the speaker. This is a critical adjustment. Turn trimmer very slowly.	
4	Connect signal generator to terminal 4, J400	105 mc	FM	105 mc	Maximum meter reading. This is the oscillator high-frequency padder adjustment.	C400C
5	Same as step 4	105 mc	FM	105 mc	Max. — rock tuning control.	C400B
6	Same as step 4	105 mc	FM	105 mc	Maximum meter reading.	C400A
7	Same as step 4	92 mc	FM	92 mc	Adjust L405. See notes 1 and 2.	
8	Same as step 4	92 mc	FM	92 mc	Adjust L403. See notes 1 and 3.	
9	Same as step 4	92 mc	FM	92 mc	Adjust L401. See notes 1 and 4.	
10	Repeat steps 4 through 10 until no further increase is obtained.					

FIGURE 9. CHASSIS VIEW, SHOWING FM TRIMMER LOCATIONS.

TP-2941

## PRODUCTION CHANGES FOR MODEL 47-1227 CODE 121 (MAIN CHASSIS)

### RUN 2

C327, 6 mmf., Part No. 30-1224-9, was changed to 7.5 mmf., Part No. 30-1224-8.

### RUN 3

The line filter condenser, .01-.01 mf., Part No. 39030DG, was changed to two separate condensers, C100 and C101, .01 mf., Part No. 61-0120\* (as shown in manual).

## CODE 121 (R-F CHASSIS)

### RUN 2

- a. R312, 33,000 ohms, Part No. 66-3333340\*, was changed to 68,000 ohms, Part No. 66-3683340\*.
- b. R305, 10,000 ohms, Part No. 66-3103340\*, was changed to 27,000 ohms, Part No. 66-3273340\*.

## CRITICAL LEAD DRESS AND PARTS PLACEMENT FOR MODEL 47-1227

1. All leads of the 1st i-f transformer, Z300, should be dressed along the base. The green and blue leads should be dressed apart.
2. Condenser C413 should be wired with short leads, and should be dressed above the 7F8 socket.
3. The leads from the broadcast osc. coil, L404, should be dressed away from the FM osc. coil, L405.
4. The leads of C407 should be kept as short as possible.
5. All leads of the 2nd and 3rd i-f transformers Z301 and Z302 should be dressed along the chassis base, with two exceptions:
  - a. The white lead of Z302 should be dressed upward in space.
  - b. The blue lead of Z301 should be dressed around the rear of the shield and along the base.
6. Lugs 1 and 5 of the 6BA6 socket should be "lanned" down toward the base.

## GENERAL INFORMATION ON MODEL 47-1227

### FREQUENCY SHIFT IN FM OPERATION

Intermittent shorting of the 7F8 tube base to the chassis will cause frequency shift in FM operation. To eliminate this trouble, insulate the 7F8 base from the chassis by placing strips of tape around the edges of the 7F8 socket.

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