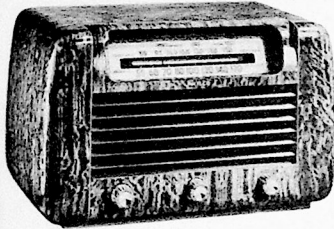




HOME RADIO

PHILCO RADIO



Model 46-427

SPECIFICATIONS

CABINET	Model 46-427 (Wood, walnut finish)
CIRCUIT	Six-tube superheterodyne
FREQUENCY RANGE	Broadcast—540 to 1700 kc. Short-wave—9.5 to 15.0 mc.
POWER INPUT	105 to 120 volts—A.C. or D.C.
POWER CONSUMPTION	32 watts
ANTENNA	Built-in loop or external
INTERMEDIATE FREQUENCY	455 kc.
PHILCO TUBES USED	14AF7/XXD, 7B7 (2), 7C6, 50L6GT, 35Z5GT/G
PILOT LAMP	6 to 8-volt, bayonet base, brown bead, Part No. 34-2068

PHILCO TROUBLE-SHOOTING PROCEDURE

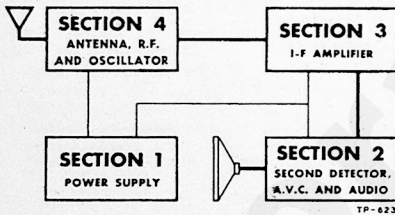


Figure 1. Block diagram (Heavy lines indicate signal path).

In this manual, the receiver circuit is divided into four sections, as shown in figure 1. One test point is designated for each section, as shown in figure 2. Abnormal indications, secured when checking at these test points, localize trouble to the section under test. After localization, isolation of the faulty part is accomplished by testing in the order shown in the sectional test charts. A high-quality signal generator, and a volt-ohmmeter are

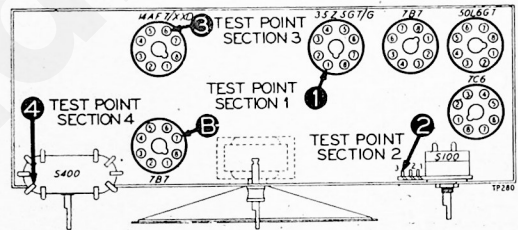


Figure 2. Bottom view, showing test points.

required. Voltage readings shown were taken with a 20,000-ohms-per-volt meter. To localize trouble, connect the receiver to the power line; turn receiver volume control full on; see that all tube filaments are lighted; then proceed in the order given in the following chart. When applying a signal, connect the signal-generator output lead through a condenser (.01 to .25 mf.). Remedy any defect encountered before proceeding to the next check.

TESTS TO ISOLATE TROUBLE TO ONE SECTION

SECTION	TEST	NORMAL RESULTS
1	Measure voltage between point 1 (+) and B-.	*85 volts
2	Apply an audio signal through a condenser (.01 to .25 mf.) between point 2 and B-.	Loud, clear signal
3	Apply a weak modulated r-f signal (455 kc.) through a condenser (.01 to .25 mf.) between point 3 and B-.	Loud, clear signal
4	Apply a weak modulated r-f signal (1,000 kc.) through a condenser (.01 to .25 mf.) between point 4 and B-. (Band switch in "Broadcast" position.) Repeat this test at 12.0 mc. with band switch in "Shortwave" position.	Loud, clear signal

* For 117-volt a-c input. When operating on d-c line and no voltage can be measured, reverse power plug.

TESTS TO ISOLATE TROUBLE WITHIN SECTION 1

Make all tests for this section with a volt-ohmmeter, using the 0-250v. d.c. range. See figures 3 and 4 for location of test points.

TESTS POINTS	NORMAL READING	POSSIBLE CAUSE OF ABNORMAL READING
A to B-	112v.	No voltage indicates defective 35Z5, or shorted C-101. Low voltage indicates defective 35Z5, leaky or open C-101, or shorted C-200. (Refer to Section 2 for location.)
C to B-	85v.	No voltage indicates open speaker field. Low voltage indicates leaky C-101 or C-200. (Refer to Section 2 for location.)

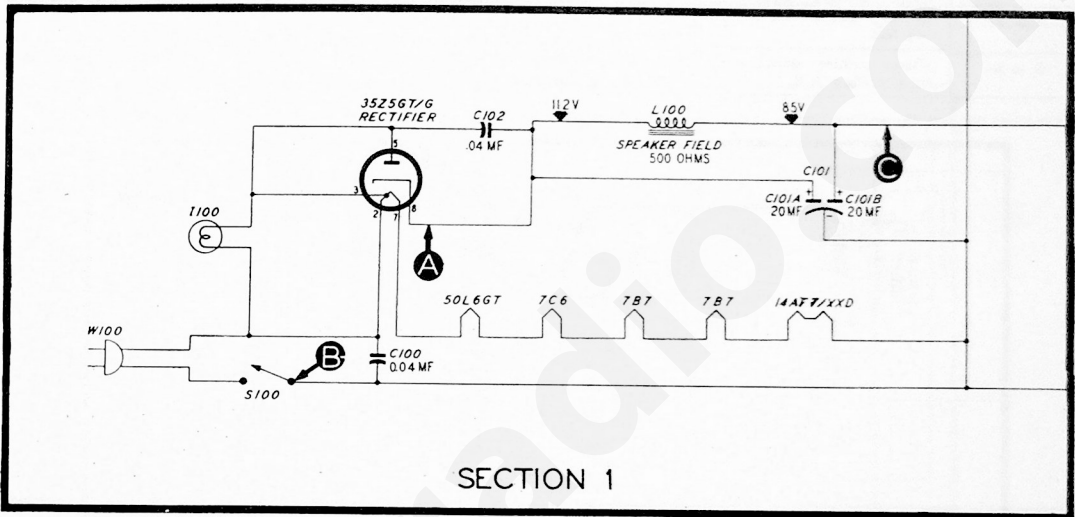


Figure 3. Section 1 schematic.

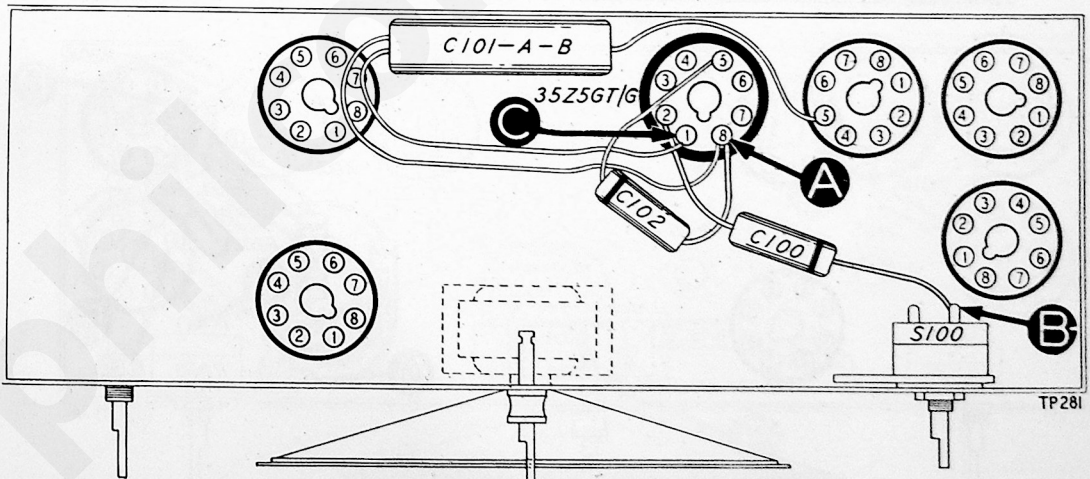


Figure 4. Bottom view, showing section 1 test points.

PHILCO SERVICE

RADIO MODEL 46-427

TESTS TO ISOLATE TROUBLE WITHIN SECTION 2

For all tests in this section, use the audio range of the signal generator. Connect the output lead through a condenser (.01 to .25 m.f.) to the point indicated, and the ground lead to B-. Adjust signal generator output for a clear, audible signal.

TEST POINTS	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
D to B-	Clear, audible signal from speaker.	No signal, weak, or distorted signal indicates defective 50L6, output transformer T-200, or speaker LS-200, shorted condenser C-201, leaky condenser C-202, or open resistor R-204.
E to B-	Clear, audible signal, same as preceding test.	No signal indicates open condenser C-202.
F to B-	Clear, audible signal, noticeably louder than preceding test.	No signal, or weak signal, indicates defective 7C6, or open resistor R-202.
G to B-	Clear, audible signal, same as preceding test.	No signal indicates open condenser C-203. Hum, noise, or distortion indicates defective volume control.*

* In making this test, the volume control should be rotated throughout its range. Noise, or distortion indicates a defective control.

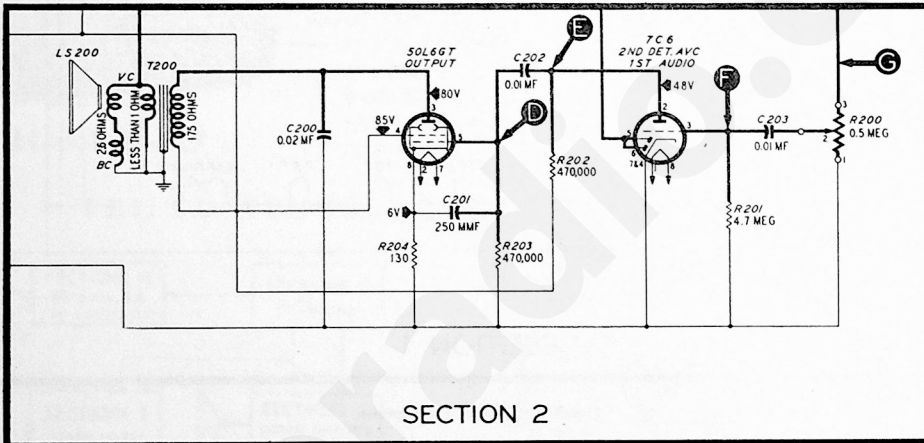


Figure 5. Section 2 schematic.

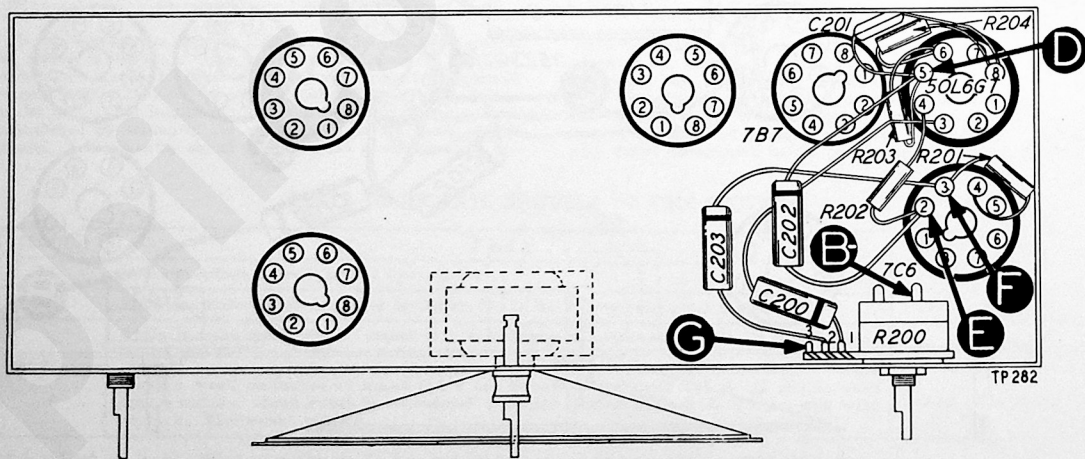


Figure 6. Bottom view, showing section 2 test points.

TESTS TO ISOLATE TROUBLE WITHIN SECTION 3

For all tests in this section, set signal generator at 455 kc., modulation ON. Connect output lead through a condenser (.01 to .25 mfd.) to point indicated, and ground lead to point B-. Adjust signal generator output for clear, audible signal.

TEST POINTS	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
H to B-	Audible signal from speaker.	No signal indicates defective 7B7, i-f transformer Z-302, shorted condenser C-303, open resistor R-301, or defective diode section of 7C6 (Section 2).
J to B-	Audible signal from speaker, louder than preceding test.	No signal indicates defective 7B7, or i-f transformer Z-301.
K to B-	Audible signal from speaker, same as preceding test.	No signal indicates defective i-f transformer Z-300, or open resistor R-300.

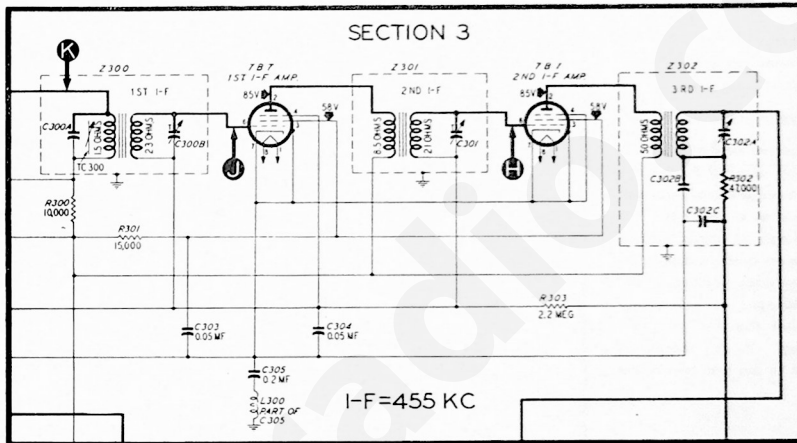


Figure 7. Section 3 schematic.

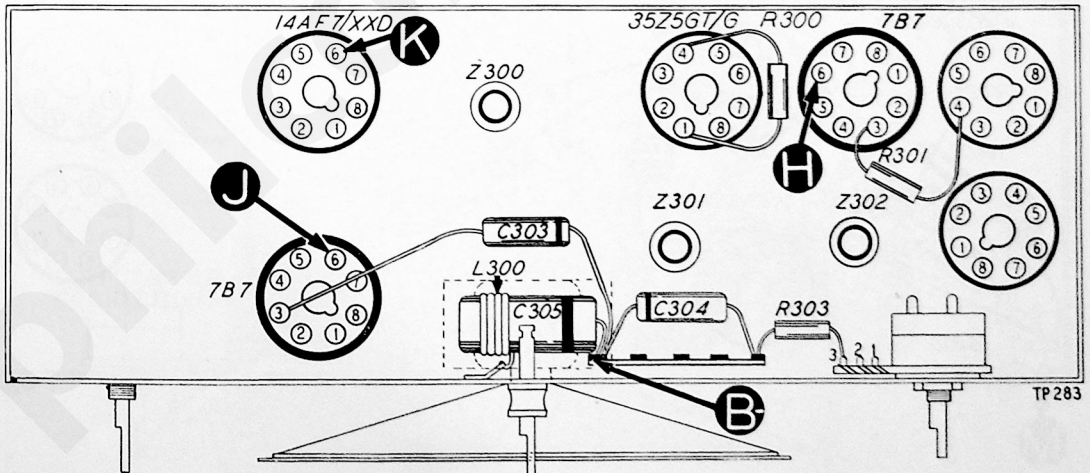


Figure 8. Bottom view, showing section 3 test points.

TESTS TO ISOLATE TROUBLE WITHIN SECTION 4

NOTE: As a preliminary test, the tuning control should be rotated throughout its range. Any scraping noise heard in the speaker indicates bent plates, dirty wiper contacts, or dirt between the plates.

To fully check this section, all tests should first be made with the receiver and signal generator set at 540 kc., and then repeated at 1700 kc.

This procedure should also be followed in testing the short-wave band, with the receiver and signal generator set at 9.5 mc.; and then at 15 mc.

Connect the signal-generator output through a condenser (.01 to .25 mfd.) to the point indicated, and the ground lead to B-. Adjust the signal-generator output control for a clear, audible signal.

TEST POINTS	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
L to B-	Clear, audible signal from speaker.	No signal indicates defective 14AF7 or transformer T-401, open resistor R-402, or shorted condenser C-409. †(For supplementary oscillator test see footnote below.)
M to B-	Clear, audible signal from speaker.	No signal indicates defective coil L-400 (Broadcast) or T-400 (Short-wave).

OSCILLATOR GRID BIAS VOLTAGE

† Attach the positive lead of a 20,000-ohms-per-volt meter to point P, and the prod end of the negative lead, through a 50,000-ohm resistor, to point N. Set the meter on 10-volt or similar range and rotate the tuning condenser through its entire range on each position of the band switch. Absence of voltage at any point indicates that the oscillator is not functioning. If so, check the components listed in the first test in the chart above.

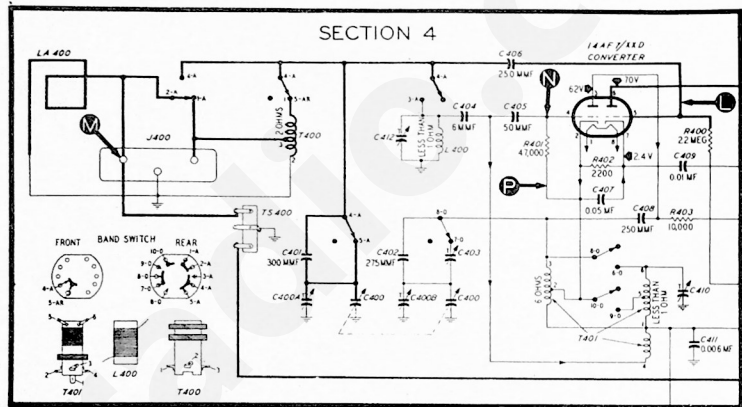


Figure 9. Section 4 schematic.

TP-6333

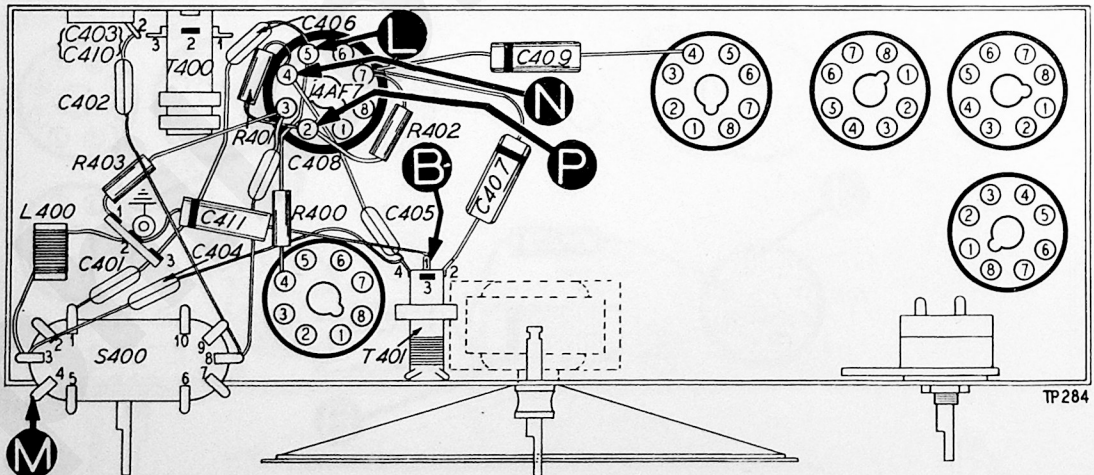


Figure 10. Bottom view, showing section 4 test points.

CONNECTING ALIGNING EQUIPMENT

OUTPUT METER: Connect to lugs on terminal strip, indicated in Figure 11.

SIGNAL GENERATOR: Connect as indicated in chart.

VOLUME CONTROL: Set to maximum.

OUTPUT LEVEL: Use lowest output-meter range. As alignment progresses, adjust signal-generator output to keep meter reading near center of scale.

NOTE: All r-f alignment operations (steps 2 through 8) must be performed with chassis and loop installed in cabinet.

SIGNAL GENERATOR			RECEIVER			
	Connections to Receiver	Dial Setting	Band Switch Setting	Dial Setting	Special Instructions	Adjust Trimmers in Order Listed
1	Ground lead to B-; output lead through .05-mf. condenser to ant. section of tuning condenser.	455 kc.	Broadcast	1600 kc.	Adjust for maximum output.	C302A C301 C300B TC300
2					Preset C403 to one-half turn from tight.	
3	Radiating loop (see note below).	1700 kc.	Broadcast	1700 kc.	Adjust for maximum output.	C400B
4	Same as step 3	1500 kc.	Broadcast	1500 kc.	Adjust for maximum output.	C400A
5	Same as step 3	580 kc.	Broadcast	580 kc.	Adjust for maximum output while rocking tuning condenser.	C403
6	Same as step 3	1700 kc.	Broadcast	1700 kc.	Adjust for maximum output.	C400B
7	Same as step 3	15.0 mc.	Shortwave	15.0 mc.	Adjust for maximum output (image should be heard at 14.1 mc.).	C410
8	Same as step 3	15.0 mc.	Shortwave	15.0 mc.	Adjust for maximum output while rocking tuning condenser.	C412

RADIATING LOOP: Make up a 6-8-turn, 6-inch-diameter loop, using insulated wire; connect to signal-generator leads and place near radio loop.

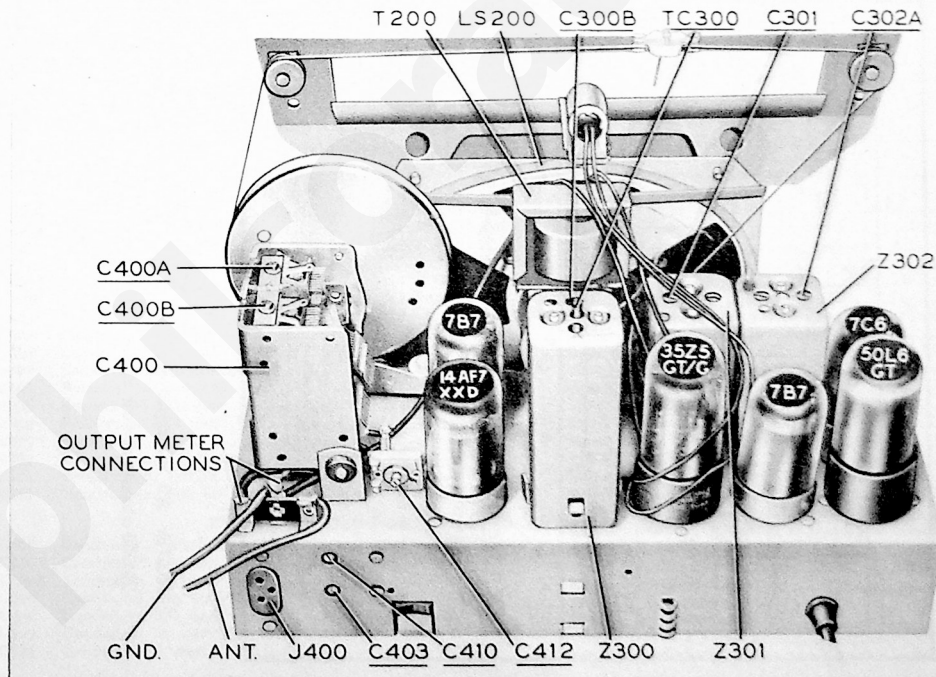


Figure 11. Top view, showing trimmer condenser locations.

Symbol designations used in the schematics and parts list are as follows:

- | | |
|-----------------|----------------------------|
| C—condenser | S—switch |
| I—pilot lamp | T—transformer |
| LA—loop antenna | W—power cord and plug |
| LS—loudspeaker | Z—i-f transformer assembly |
| R—resistor | |

NOTE: Parts marked with an asterisk (*) are general replacement items, and the part numbers will not be identical with those used on factory assemblies. Use only the "Service Part No." shown below when ordering replacements.

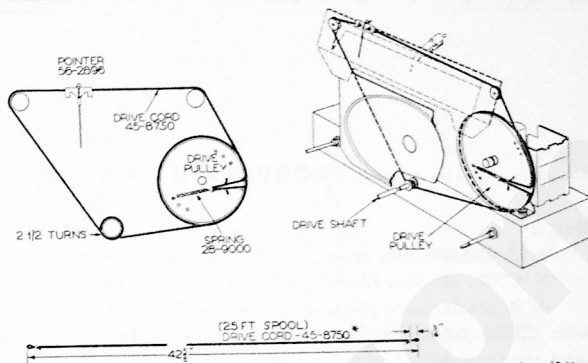


Figure 13. Drive cord installation details.

REPLACEMENT PARTS LIST

SECTION 1		
Reference Number	Description	Service Part No.
C100	Condenser, .04 mf.	30-4119
C101	Condenser, electrolytic, 20-20 mf.	30-2541
C101A	Condenser, 20 mf.	Part of C101
C101B	Condenser, 20 mf.	Part of C101
C102	Condenser, .04 mf.	30-4119
I100	Lamp, pilot	34-2068
L100	Coil, field	Part of LS200
S100	Switch, a-c	Part of R200
W100	Cord, line	L3199
SECTION 2		
C200	Condenser, .02 mf.	30-4599*
C201	Condenser, 250 mfm.	60-10245407*
C202	Condenser, .01 mf.	61-0120*
C203	Condenser, .01 mf.	61-0120*
LS200	Speaker	36-1591*
R200	Volume control, .5 meg.	33-5458
R201	Resistor, 4.7 megs.	66-5473340*
R202	Resistor, 470,000 ohms	66-4473340*
R203	Resistor, 470,000 ohms	66-4473540*
R204	Resistor, 130 ohms	66-1133340*
T200	Transformer, output	32-8164
SECTION 3		
C300A	Condenser	Part of Z300
C300B	Condenser, trimmer	Part of Z300
C301	Condenser, trimmer	Part of Z301
C302A	Condenser, trimmer	Part of Z302
C302B	Condenser	Part of Z302
C302C	Condenser	Part of Z302
C303	Condenser, .05 mf.	30-4518*
C304	Condenser, .05 mf.	30-4518*
C305	Condenser-and-choke assembly	76-1161
L300	Choke	Part of C305
R300	Resistor, 10,000 ohms	66-3103340*
R301	Resistor, 15,000 ohms	66-3153340
R302	Resistor, 47,000 ohms	Part of Z302
R303	Resistor, 2.2 megs.	66-5223340*
Z300	Transformer, 1st i-f	32-3956
Z301	Transformer, 2nd i-f	32-3957
Z302	Transformer, 3rd i-f	32-3958
SECTION 4		
C400	Condenser, tuning	31-2555
C400A	Condenser, trimmer	Part of C400
C400B	Condenser, trimmer	Part of C400
C401	Condenser, 275 mfm.	30-1220-7*
C402	Condenser, 275 mfm.	30-1220-7*
C403	Condenser bc, oscillator trimmer	Part of C-410
C404	Condenser, 6 mfm.	60-90505007*

SECTION 4 (Cont.)		
Reference Number	Description	Service Part No.
C405	Condenser, 50 mfm.	60-00515307*
C406	Condenser, 250 mfm.	60-10245407*
C407	Condenser, .05 mf.	30-4518*
C408	Condenser, 250 mfm.	60-10245407*
C409	Condenser, .01 mf.	61-0120*
C410	Condenser, s-w oscillator-trimmer	31-6453
C411	Condenser, .006 mf.	30-4504*
C412	Condenser, s-w antenna-trimmer	31-6426
J400	Socket, antenna	27-6145
LA400	Loop assembly	76-1279
L400	Coil, antenna, s-w shunt	32-3716
R400	Resistor, 2.2 megs.	66-5223340*
R401	Resistor, 47,000 ohms	66-3473340*
R402	Resistor, 2200 ohms	66-2223340
R403	Resistor, 10,000 ohms	66-3103340*
S400	Switch, band	42-1772
T400	Coil, antenna	32-4008
T401	Coil, oscillator	32-3991
TS400	Wiring-panel assembly	12W45654

MISCELLANEOUS

Bands, rubber, scale-mounting	54-4176
Cabinet	10650
Clamp, electrolytic-condenser-mounting	56-1466FA3
Clip, antenna-coil	28-5002FA3
Dial, back-plate assembly	76-1588
Diffusing panel	54-4343-1
Drive-shaft assembly	76-1323
Drive cord (25 ft. spools)	45-8750*
Feet, felt	W2190
Grill-cloth assembly	40-6779
Grommet, rubber, tuning-condenser front mounting	27-4596
Grommet, tuning-condenser rear mounting	54-4020
Knob assembly	54-4311
Pointer	56-2896
Rivets	1W36671FA5
Scale, dial	27-5895
Screw and lockwasher, scale-mounting	1W32228FA3
Screw and lockwasher, speaker-mounting	1W32228FA3
Screw, gang-mounting	W758FA3
Sleeve, tuning-condenser	28-5665FA3
Socket—Loktal	27-6138*
Socket—octal	27-6139*
Socket assembly, pilot-light	76-1392*
Spring, drive-cord	56-2617
Spring clip	56-3587
Strap, scale-mounting	56-2068
Washer, chassis-mounting	1W37654FA3
Washer, gang-mounting	1W52353FA3
Wiring panel, 3 lugs	76-2148
Wiring panel, 5 lugs	12W45672

PRODUCTION CHANGES FOR MODEL 46-427

CODE 121

Run 2

- a. A 120,000-ohm resistor, Part No. 66-4123340*, was added, between B- bus and chassis.
- b. C305, condenser-and-choke assembly, .2mf., Part No. 76-1161, was changed to .15 mf., Part No. 76-2361.
- c. A condenser-and-choke assembly, Part No. 76-2362, was added, between B- bus and chassis (in parallel with C305); the condenser lead of this assembly was connected to the condenser lead of C305; the choke lead was connected to the chassis.

CRITICAL LEAD DRESS AND PARTS PLACEMENT FOR MODEL 46-427

1. The rear lead of loop LA400 should be connected to the right-hand (facing rear of chassis) lug of the antenna wiring panel; the front loop lead should be connected to the center lug of the same panel.
2. The blue lead of i-f transformer Z301 should be dressed toward the front of the chassis, and away from the green lead of i-f transformer Z300.
3. Condenser C203 should be dressed away from condenser C200.
4. The blue lead of the output transformer, T200, should be dressed down to the chassis, and away from condenser C203 and the 7C6 socket.
5. The a-c line lead at the 35Z5GT socket should be dressed toward the rear of the chassis, and away from condenser C203.
6. The green lead of i-f transformer Z302 should be dressed around the 7C6 socket and toward the front of the chassis.
7. The green lead of i-f transformer Z301 should be dressed toward the 35Z5GT socket, and away from the blue lead of i-f transformer Z302.