



Models 41-280, 41-285, 41-287, 41-290; Code 121

SPECIFICATIONS

Models 41-280, 41-285, 41-287 and 41-290 are alternating current (A. C.) operated super-heterodyne radios incorporating Electric push button and Manual tuning, and the New Philco Built-in American and Overseas Loop Aerial System. In addition these models are designed to receive the sound of a television program tuned in by special type Philco Television Radios.

In general, these models are similar with the exception of the audio circuits, number of tubes used and cabinet design. Model 41-280 is an eight (8) tube radio; Models 41-285 and 41-287 are nine (9) tube radios employing the same chassis but assembled in different cabinets, and Model 41-290 consists of a ten (10) tube chassis. These differences are shown in the schematic diagram and parts lists.

Other features of design included in these models are: Three tuning ranges covering the frequencies listed below; continuously variable tone control; audio bass frequency compensation at low volume; Push-pull pentode audio output circuit with screen Phase inversions; New Type (12) twelve inch speaker and illuminated push button indicators.

ELECTRIC PUSH BUTTON TUNING: The automatic tuning mechanism of each model is identical and consists of eight (8) electric tuning push buttons, seven (7) of the push buttons are used for selecting broadcast stations, and one as the power control (On-Off switch).

The lowest frequency station push button labeled "Television" can be adjusted for reception of the sound channel of a television program received by Philco television sets. This push button may also be used in conjunction with a Philco Wireless Record Player.

AERIAL CONNECTIONS: The built-in loop aerial system is designed to operate without an outside aerial or ground, and to give exceptionally sensitive receiving performance of stations on standard and shortwave frequencies. Another feature is its noise-reducing characteristic. The loop can be turned to the position in which it picks up a minimum amount of interference, or if interference is not present the loop may be set in the position where best reception is obtained.

When operating the radio in steel reinforced buildings and other shielded locations, the Philco 1941 Outdoor Aerial, Part No. 45-2817, is recommended for maximum receiving performance. The outdoor aerial can be easily connected to the radio by inserting the plug attached to the transformer unit into the socket provided at the rear of the chassis. This aerial can be obtained from your local Philco distributor. A ground connection is not required with either type of installation.

POWER SUPPLY: 115 volts, 60 cycle A. C.

These models can also be operated on 25 cycle current. To do this it is necessary to replace the 60 cycle power transformer with a 25 cycle transformer as indicated in the parts lists.

POWER CONSUMPTION: Model 41-280, 41-285-287, 41-290, 60 watts.

FREQUENCY TUNING RANGES: 540 to 1720 K. C.: 2.3 to 7.0 M. C.: 9.0 to 12.0 M. C.

INTERMEDIATE FREQUENCY: 455 K. C.

AUDIO OUTPUT: 2 watts.

PHILCO TUBES USED: Model 41-280; XXL, R. F. mixer; XXL, oscillator; Two 7B7, I. F. amplifiers; 7C6, 2nd detector; 1st audio, A. V. C. Two 41 audio output and a 84, rectifier.

Model 41-285, 41-287; XXL, R. F. mixer; XXL, oscillator; Two 7B7, I. F. amplifiers; 7A6, 2nd detector; 7C6, 1st audio, A. V. C.; Two 41 audio output, and an 84 rectifier.

Model 41-290; 10 Tubes—XXL, R. F. mixer; XXL, oscillator; Two 7B7, I. F. amplifier; 7A6, 2nd detector; 7C6, 1st audio, A. V. C.; 37, audio phase inverter; Two 41 audio output, and an 84 rectifier.

CABINET DIMENSIONS:

Model	Height	Width	Depth
41-280	39 1/2"	28 5/8"	13 3/4"
41-285	40 1/2"	30"	14 1/8"
41-287	36 3/4"	31 1/4"	12 7/8"
41-290	41"	30 5/8"	15 5/8"

ADJUSTING ELECTRIC PUSH BUTTON TUNING

To adjust the electric push buttons accurately for reception of broadcast stations, a vacuum tube voltmeter such as Philco Models 027 and 028 should be used. In addition, an insulated padding screw driver, Part No. 45-2610, and Loktal aligning adapter, Part No. 45-2767, are required. With this equipment at hand proceed as follows:

Select seven of the most popular stations received in the locality. Insert the station call letters into the spaces above the buttons. The station with the lowest frequency is placed in the second button on the left and the highest frequency is placed in the eighth push button on the right. Each push button is adjusted by two adjusting screws located on the rear of the chassis. Each set of screws is numbered and labeled "Ant.", "Osc." and covers a frequency range as follows:

Push Button	Frequency Range
1, 2, 3	540-1060 K. C.
4, 5	650-1110 K. C.
6, 7	920-1600 K. C.

Looking at the front of the cabinet, the second button on the left is adjusted by adjusting screw No. 1. The next push button by adjusting screw No. 2 and the remaining push buttons in order.

1. Remove the 7C6 A. F. tube from its socket and insert the aligning adaptor, then replace the tube in the adaptor. Connect the negative terminal of the vacuum tube voltmeter to the wire which protrudes from the side of the adaptor. Attach the positive terminal of the voltmeter to the chassis.

2. Press in "Off-On" push button. Turn "Bands" knob to broadcast.

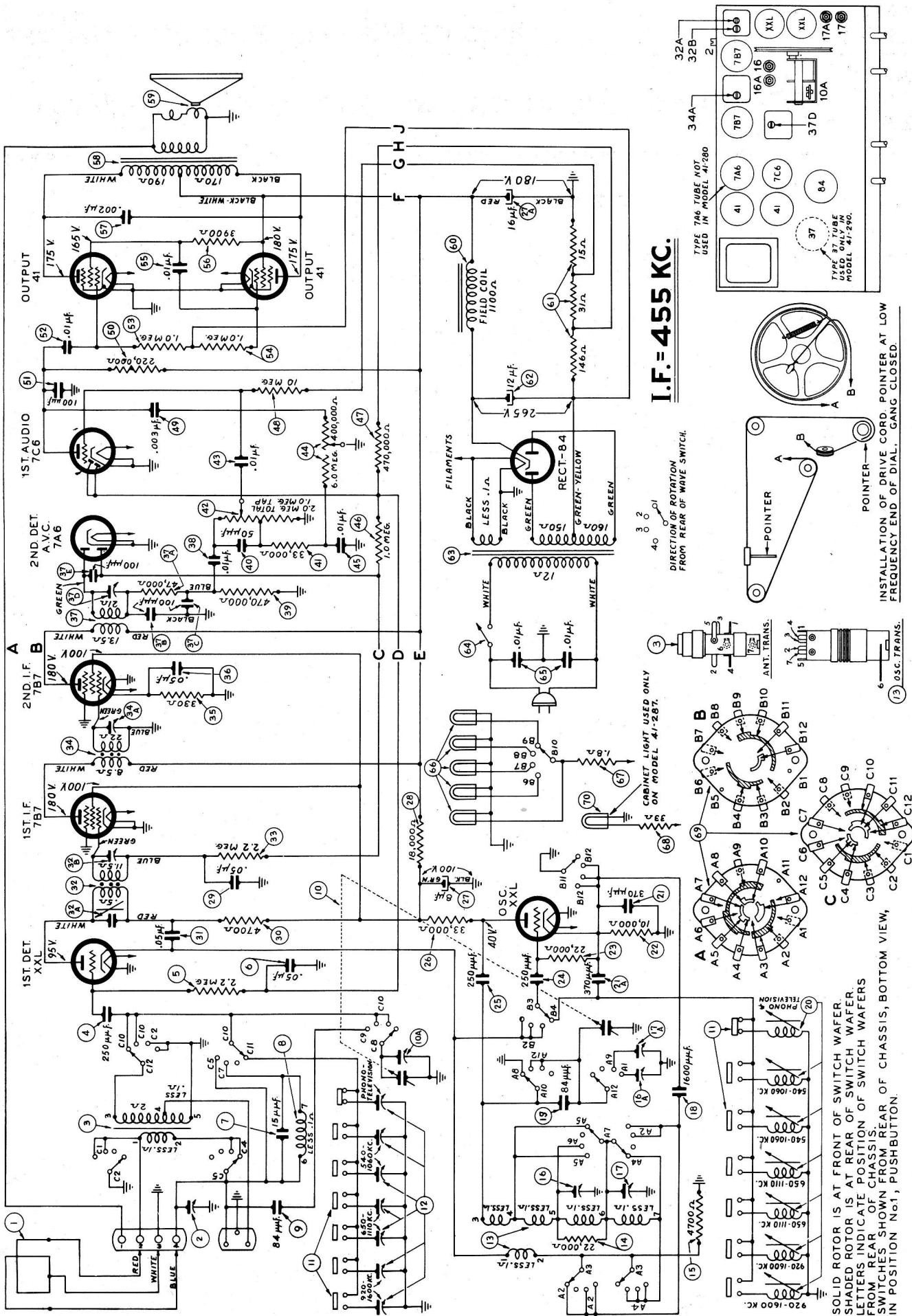
3. Set up the Model 077 Station Setter near the receiver and connect a loop aerial (made from a few turns of wire 12 inch in diameter) to the high and ground output jacks of the signal generator. Turn the output controls to maximum and set the modulation control to "MOD. ON."

4. Manually tune in the station to be set up on the first push button. After doing this set the indicator of the 077 Signal Generator to the frequency of the station being received. As the indicator approaches the frequency of the station a whistle will be heard; leave the indicator at this point.

5. Turn "Bands" knob to push button position. Using the insulated screw driver, turn the "Osc." screw until the broadcast station identified by the signal generator is heard; at this point, turn the indicator of the signal generator away from the frequency of the station. Readjust No. 1 "Osc." and "Ant." screws for maximum deflection of the vacuum tube voltmeter pointer. The push button is adjusted properly to the station at this point.

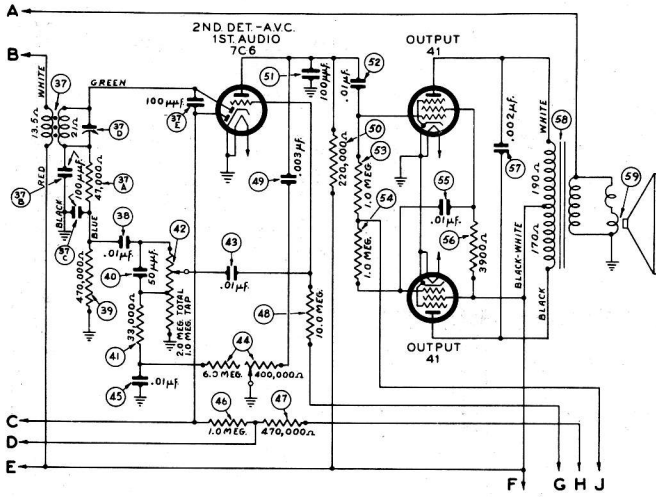
After setting up the first station the same procedure as outlined above is used for the remaining stations. When these models are set up to receive the sound of a television program tuned in by the special type Philco Television Sets or if it is to be used in conjunction with a Philco Record Player, the lowest frequency push button should be used. To tune in these programs, the same procedure as given for broadcast stations above is used.

Further details for setting up this receiver for operation with Philco Television Sets or Record Players are supplied with the instruments.

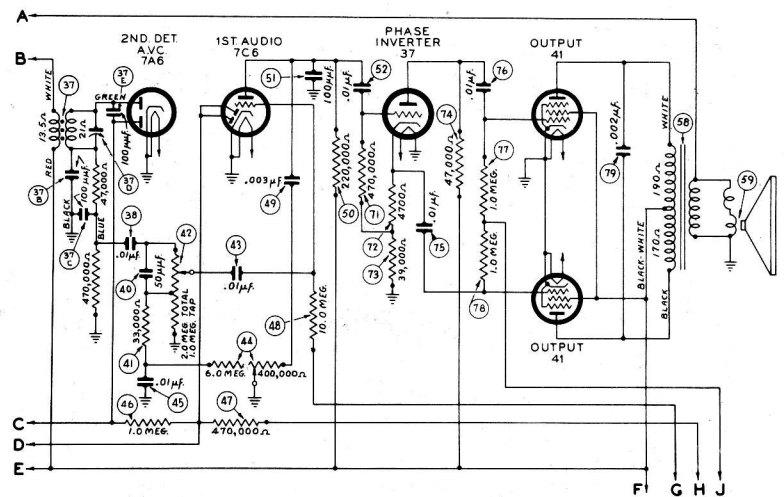


SCHEMATIC DIAGRAM — MODELS 41-280, 41-285, 41-287, 41-290

The above diagram is the complete electrical circuit for the Models 41-285, 41-287. The same general circuit is also used in Models 41-280 and 41-290, with the exception of the 2nd detector, 1st audio A. V. C. wiring, Model 41-280 and the audio circuit, Model 41-290.



SECOND DETECTOR CIRCUIT — MODEL 41-280



AUDIO CIRCUIT — MODEL 41-290

**Replacement Parts
All Models**

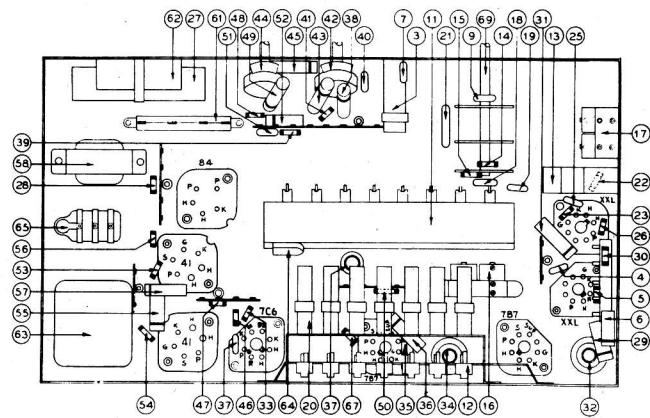
SCH. No.	DESCRIPTION	PART No.
1	Loop Aerial	76-1090
2	Compensator (Aerial 12 M. C.)	31-6308
3	R. F. Transformer (Broadcast)	32-3485
4	Mica Condenser (250 mmfd.)	60-125157
5	Resistor (2.2 megohms)	33-522339
6	Condenser (.05 mfd., 200 volts)	30-4512
7	Mica Condenser (.15 mmfd.)	60-135337
8	Part of 3	
9	Silver Mica Condenser (84 mmfd.)	30-1181
10	Tuning Condenser	31-2482
11	Push-button Switch	42-1587
12	Padder Strip (Push-buttons)	31-6366
13	Oscillator Transformer	32-3478
14	Resistor (22,000 ohms)	33-322339
15	Resistor (4700 ohms)	33-247339
16	Compensator Dual (1500 K. C. Osc.)	31-6298
16A	Compensator (6 M. C. Part of 16)	
17	Compensator Dual (580 K. C.)	31-6355
17A	Compensator (12 M. C. Osc. Part of 17)	
18	Mica Condenser (1600 mmfd.)	60-216324
19	Silver Mica Condenser (84 mmfd.)	30-1181
20	Osc. Trans. Assem. (7 coils, Push-buttons)	32-3486
20A	Coils 1, 2, 3, 4, 5 of Assembly (20)	32-3042
20B	Coils 6, 7 of Assembly (20)	32-3041
	Iron Core	28-6916
	Coil Mounting Spring	28-8910
	Centering Cup	30-6336
21	Mica Condenser Dual (370 mmfd.)	30-1183
21A	Part of 21 (370 mmfd.)	
22	Resistor (10,000 ohms)	33-310339
23	Resistor (22,000 ohms)	33-322339
24	Mica Condenser (250 mmfd.)	60-125157
25	Mica Condenser (250 mmfd.)	30-1155
26	Resistor (33,000 ohms)	33-322339
27	Electrolytic Cond. (8-16 mfd., 400 volts)	30-2475
28	Resistor (18,000 ohms)	33-318339
29	Resistor (2.2 megohm)	33-522339
30	Resistor (4700 ohms)	33-247339
31	Condenser (.05 mfd., 400 volts)	30-4518
32	1st I. F. Transformer	32-3482
33	Condenser (.05 mfd., 200 volts)	32-3483
34	2nd I. F. Transformer	32-3483
35	Resistor (330 ohms)	33-133336
36	Condenser (.05 mfd., 400 volts)	30-4519
37	3rd I. F. Transformer	32-3484
37A	Resistor (47,000 ohms, Part of 37)	33-347339
37B	Mica Condenser (100 mmfd., Part of 37)	
37C	Mica Condenser (100 mmfd., Part of 37)	
37D	Compensator (Part of 37)	
37E	Mica Condenser (100 mmfd.)	60-110157
38	Condenser (.01 mfd., 400 volts)	30-4572
39	Resistor (470,000 ohms)	33-447339
40	Mica Condenser (50 mmfd.)	60-050137
41	Resistor (33,000 ohms)	33-333339
42	Volume Control	33-3408
43	Condenser (.01 mfd., 400 volts)	30-4572
44	Tone Control	33-5403
45	Condenser (.01 mfd., 400 volts)	30-4572
46	Resistor (1 megohm)	33-510339
47	Resistor (470,000 ohms)	33-447339
48	Resistor (10 megohms)	33-451039
49	Condenser (.003 ohms, 1000 volts)	30-4469
50	Resistor (220,000 ohms)	33-422339
51	Mica Condenser (100 mmfd.)	60-110157
52	Condenser (.01 mfd., 400 volts)	30-4572
53	Resistor (1 megohm)	33-510339
54	Resistor (1 megohm)	33-510339
55	Condenser (.01 mfd., 400 volts)	30-4572
56	Resistor (3900 ohms)	33-239339
57	Condenser (.002 mfd., 400 volts)	30-4579
58	Output Transformer	32-8120
59	Cone Assembly (for Speaker 36-1523-2, Models 285, 287, 290)	36-4173
	Cone Assembly (for Speaker 36-1514-4)	36-4170
60	Field Coil (Replace Speaker)	33-3393
61	Resistor (15-31-146 ohms)	33-3393
62	Electrolytic Condenser (12 mfd.)	30-2474
63	Power Transformer (110 volts, 60 cycle)	32-8122
64	A. C. Switch	42-1626
65	Condenser (.01-01 mfd.)	39030DG
66	Pilot Lamps (Indicator, Push-button)	34-2064
67	Pilot Lamp (Dial)	34-2210
68	Resistor (1.8 ohms)	33-918336
69	Resistor (33 ohms)	33-033336
70	Range Switch	42-1588
71	Pilot Lamp (Cabinet Jewel, Model 287)	34-2064

PARTS USED IN MODEL 41-290 ONLY

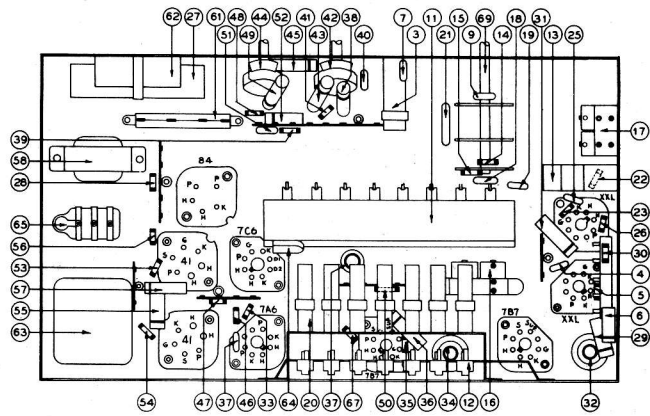
71	Resistor (470,000 ohms)	33-447339
72	Resistor (4700 ohms)	33-247339
73	Resistor (39,000 ohms)	33-347339
74	Resistor (47,000 ohms)	33-347339
75	Condenser (.01 mfd., 400 volts)	30-4572
76	Condenser (.01 mfd., 400 volts)	30-4572
77	Resistor (1 megohm)	33-510339
78	Resistor (1 megohm)	33-510339
79	Condenser (.002 mfd., 400 volts)	30-4579

MISCELLANEOUS PARTS

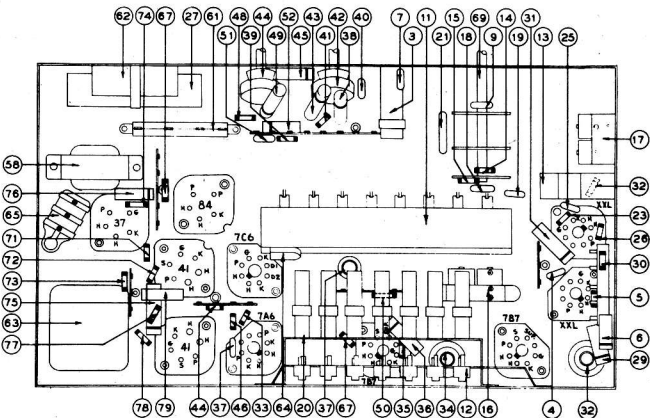
Bezel (41-280, 41-285, 41-287)	27-4985
Bezel (41-290)	54-4038
Cabinet (41-285X)	10497A
Cabinet (41-290X)	10498A
Cabinet (41-280XF)	10496A
Cabinet (41-287X)	10515A
Cord (Power)	1-3199
Cable (Speaker)	41-3542
Clip (Aerial Coil Mounting)	28-5002



PART LOCATIONS UNDERSIDE — MODEL 41-280



PART LOCATIONS UNDERSIDE — MODELS 41-285-287



PART LOCATIONS UNDERSIDE — MODEL 41-290

MISCELLANEOUS PARTS (CONT.)		
SCHE. No.	DESCRIPTION	PART No.
	Clip (Osc. Coil Mounting)	28-5003
	Clamp (Electrolytic Condenser)	56-1848
	Dial Scale (All Models)	27-5655
	Dial Scale Rubber Channel (two required)	54-4854
	Dial Pointer	56-1516
	Dial Tuning Shaft Assembly	76-1088
	Dial Tuning "C" Washer	28-2043
	Dial Tuning Spring Washer	56-1659
	Drive Cord	31-2502
	Drum Assembly (Drive Cord)	38-9856
	Jewel (Pilot Light, 41-287X Cabinet)	27-4777
	Knob (Tuning Volume)	27-4987
	Knob (Push-buttons)	54-4009
	Rubber Washer (Chassis Mounting)	27-4571
	Rubber Corner (Chassis)	27-4564

SCHE. No.	DESCRIPTION	PART No.
	Rubber Grommet (Tuning Condenser Mtg.)	27-4596
	Speaker (41-285, 287, 290)	36-1523
	Speaker (41-280)	36-1514
	Spring (Dial Background Plate Mtg.)	28-8006
	Spring (Drive Cord)	28-8913
	Socket (Dial Lighting)	76-1080
	Socket Assembly (Band Indicator)	76-1079
	Socket Assm. (Pilot Light, Push-buttons)	38-907
	Socket (Rectifier)	27-6035
	Socket Tube (41)	27-6036
	Socket Tube (Rubber, Oscillator Tube)	27-6129
	Socket Tubes (Bakelite)	27-6131
	Socket (3 prong, aerial)	27-6145
	Television Tab	27-5648
	Tab (Off-On)	27-5647
	Tab Cover	27-5629
	Tab Kit	40-6995

MOUNTING PARTS		
SCHE. No.	DESCRIPTION	PART No.
	Felt Strip (Push-button)	27-9689
	Screw (P. B. Switch Mounting)	W-523
	Screw (Loop Mounting)	W-288
	Screw (Chassis Mounting)	W-1345
	Screw (Bezel Mounting, 41-280, 285)	W-2073FA9
	Screw (Bezel Mounting, 41-290)	W-2073FB26
	Palnut (Range Switch, Volume Control)	W-2157
	Sleeve (P. B. Switch Mounting)	56-1505
	Sleeve (Loop Mounting, 2 required)	28-2257
	Sleeve (Loop Mounting, 1 required)	56-1907
	Spring Washer (Loop Mounting)	28-4186
	Washer (Speaker Mounting)	27-7467
	Washer (Chassis Mounting)	28-5114
	Washer (Loop Mounting, 2 required)	W-151
	Washer (Loop Mounting, 1 required)	W-425

ALIGNING R. F. AND I. F. COMPENSATORS

The following procedure is the same for all models.

EQUIPMENT REQUIRED

1. **Signal Generator:** Covering the frequency range of the receiver, such as Philco Models 077 or 177.
2. **Aligning Indicator:** Either a vacuum tube voltmeter or an audio output meter may be used as an aligning indicator. Philco Models 027 and 028. Circuit testers contain both these meters.
3. **Tools:** Philco Fiber Screw Driver, Part No. 45-2610.

CONNECTING ALIGNING INSTRUMENTS

Either a vacuum tube voltmeter or an audio output meter may be used as a signal indicator when adjusting the receiver.

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator, make the following connections: Attach the negative (—) terminal of the voltmeter to any point in the circuit where the A. V. C. voltage can be obtained. Connect the positive (+) terminal of the vacuum tube voltmeter to the chassis.

Audio Output Meter: Terminal No. 1 is provided on the loop aerial panel for connecting one lead of the audio output meter to the voice coil of the speaker. The other lead of the meter is connected to the chassis. When using these connections, the lowest A. C. scale of the meter must be used. (0 to 10 volts).

The audio output meter can also be connected between the plate of the output tube and the ground of the chassis.

Signal Generator: When adjusting the "I. F." padders, the high side of the signal generator is connected through a .1 mfd. condenser to terminal 4 of the loop aerial terminal panel at the rear of the chassis. The ground or low side of the signal generator is connected to the ground of the receiver.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet. Do not remove the receiving loop from the cabinet. It is necessary when adjusting the padders, that the receiver be left in the cabinet.

After connecting the aligning indicator, adjust the compensators in the order shown in the tabulation below. Locations of the compensators are shown on the schematic diagram. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in order	
1	High side to No. 4 terminal loop panel.	455 K. C.	580 K. C.	Vol. Max. Range Switch "S. W." Positions	32A, 32B 34A, 37D	
2	Use loop on generator	1500 K. C.	1500 K. C.	Vol. Max. Range Switch Broadcast	16, 10	Note A
3	Use loop on generator	580 K. C.	580 K. C.	Vol. Max. Range Switch Broadcast	17	Roll Tuning Condensers Note B
4	Use loop on generator	Perform operation No. 2 again				
5	Use loop on generator	6 M. C.	6 M. C.	Range Switch "Police"	16A	
6	Use loop on generator	12 M. C.	12 M. C.	Range Switch "S. W."	17A, 2	Note C

NOTE A — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable in this position is shown in the schematic.

NOTE B — When adjusting the low frequency compensator of Range One (Broadcast) or the aerial padders of the high frequency tuning range; the receiver Tuning Condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first

setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

NOTE C — To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator (17A) to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a first peak is obtained on the output meter. Adjust the compensator for maximum output at this first peak.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 910 K. C. above the frequency being used on any high frequency range.

The aerial padder (2) must be adjusted to maximum by rolling the tuning condenser. If two signal peaks occur when turning the padder, adjust to maximum output on the second signal peak from the tight position (screw all the way down) of the padder.