

MODELS 41-280, 41-285, 41-287, 41-290, 41-296; CODE 121

SPECIFICATIONS

Models 41-290, 41-285, 41-287, 41-290 and 41-290 are alternating current (A. C.) enclosed 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.

Model 41-296X incorporates the same chassis as is used in Model 41-285, Code 121. The cabinet and loop aerial, however, differ from Model 41-285. These parts are listed below. With the exception of the cabinet and loop aerial, the service information for Model 41-285, Code 121, applies also to Model 41-296.

When operating the radio in steel reinforced buildings and other shielded locations, the Philco 194 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
FREQUENCY TUNING RANGES: 510 to 1720 K. C.: 2.3 to 2.0 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; 7A6, 2nd detector; 7C6, 1st audio, A. V. C. Two 41 audio output, and an 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. amplifiers; 7A6, 2nd detector; 7C6, 1st audio, A. V. C.; 37, audio phase inverter; Two 41 audio output, and an 84 rectifier.

| Model | Height | Width | Depth |
|--------|---------|---------|---------|
| 41-280 | 29 1/4" | 25 3/4" | 13 3/4" |
| 41-285 | 40 1/4" | 30" | 14 1/4" |
| 41-287 | 36 3/4" | 31 1/4" | 12 5/8" |
| 41-290 | 31" | 30 3/4" | 15 1/2" |

CABINET DIMENSIONS:

Replacement Parts — All Models

| SCHEM. No. | DESCRIPTION | PART No. | SCHEM. No. | DESCRIPTION | PART No. | SCHEM. No. | DESCRIPTION | PART No. |
|------------|--|-----------|------------|--|-----------|------------|--|----------|
| 1 | Loop Aerial | 76-1090 | 44 | Tone Control | 33-5403 | | Dial Scale (All Models) | 27-5655 |
| 2 | Compensator (Aerial 12 M. C.) | 31-6308 | 45 | Condenser (.01 mfd., 400 volts) | 30-4572 | | Dial Scale Rubber Channel (two required) | 54-4854 |
| 3 | R. F. Transformer | 32-1481 | 46 | Resistor (1 megohm, 400 volts) | 33-10339 | | Dial Pointer | 54-1514 |
| 4 | Mica Condenser (.250 mfd.) | 60-125157 | 47 | Resistor (470,000 ohms) | 33-447339 | | Dial Tuning Shaft Assembly | 76-1088 |
| 5 | Resistor (.22 megohm) | 33-822339 | 48 | Resistor (10 megohms) | 33-610339 | | Dial Tuning "C" Washer | 26-2043 |
| 6 | Condenser (.05 mfd., 200 volts) | 30-4519 | 49 | Condenser (.003 ohms, 1000 volts) | 30-4459 | | Dial Tuning Spring Washer | 56-1659 |
| 7 | Mica Condenser (.15 mfd.) | 60-015337 | 50 | Resistor (220,000 ohms) | 33-422339 | | Drive Card | 31-2520 |
| 8 | Part of 3 | | 51 | Mica Condenser (100 mmfd.) | 60-110157 | | Rubber Corner (Tuning Condenser Mtg.) | 38-556 |
| 9 | Silver Mica Condenser (.84 mmfd.) | 30-1181 | 52 | Condenser (.01 mfd., 400 volts) | 30-4572 | | Jewel (Pilot Light, 41-287X Cabinet) | 27-4777 |
| 10 | Tuning Condenser | 31-2482 | 53 | Resistor (1 megohm) | 33-10339 | | Knob (Tuning Volume) | 27-9667 |
| 11 | Push-button Switch | 42-1587 | 54 | Resistor (1 megohm) | 33-10339 | | Knob (Push-Buttons) | 54-4009 |
| 12 | Padder Strip (Push-buttons) | 31-6366 | 55 | Condenser (.01 mfd., 400 volts) | 30-4572 | | Rubber Washer (Chassis Mounting) | 27-4371 |
| 13 | Oscillator Transformer | 32-3478 | 56 | Resistor (3900 ohms) | 33-235339 | | Rubber Corner (Chassis) | 27-4564 |
| 14 | Resistor (22,000 ohms) | 33-322339 | 57 | Condenser (.01 mfd., 400 volts) | 30-4572 | | Rubber Gasket (Tuning Condenser Mtg.) | 37-4996 |
| 15 | Resistor (4700 ohms) | 33-247339 | 59 | Cone Assembly (for Speaker 36-1523-2) | 36-4173 | | Speaker (41-280, 41-287, 290) | 36-1526 |
| 16 | Compensator Dual (1500 K. C. Osc.) | 31-6355 | 60 | Cone Assembly (for Speaker 36-1514-4) | 36-4170 | | Speaker (41-280) | 36-1514 |
| 16A | Compensator 16 | 31-6355 | 61 | Field Coil (Speaker) | 36-4173 | | Spring (Dial Backing Plate) | 76-1080 |
| 17 | Compensator Dual (580 K. C.) | 31-6298 | 61 | Resistor (15-31-148 ohms) | 33-3393 | | Spring (Drive Cord) | 28-8913 |
| 17A | Compensator (12 M. C. Osc., Part of 17) | | 62 | Electrolytic Condenser (12 mfd., 50 volts) | 30-2474 | | Socket Assembly (Band Indicator) | 76-1079 |
| 18 | Mica Condenser (1600 mmfd.) | 60-216324 | 63 | Power Transformer (110 volts, 60 cycle) | 32-1122 | | Socket (Rectifier) | 27-8035 |
| 19 | Silver Mica Condenser (.84 mmfd.) | 30-1181 | 64 | A. C. Switch | 42-1266 | | Socket Tube (#1) | 27-8036 |
| 20 | Osc. Trans. Assem. (7 coils, Push-buttons) | 32-3486 | 65 | Condenser (.01-01 mfd.) | 38-02064 | | Socket Tube (Rubber, Oscillator Tube) | 27-8129 |
| 20A | Coils 1, 2, 3, 4, 5 of Assembly (20) | 32-3042 | 66 | Pilot Lamps (Indicator, Push-button) | 34-2064 | | Socket Tubes (Bakelite) | 27-8131 |
| 20B | Coils 6, 7 of Assembly (20) | 32-3041 | 67 | Pilot Lamp (Indicator, Push-button) | 34-2064 | | Television Tab | 27-5648 |
| 21 | Centering Spring | 28-8910 | 68 | Resistor (1.8 ohms) | 33-918336 | | Tab (On-Off) | 27-5647 |
| 21A | Mica Condenser Dual (370 mmfd.) | 30-1183 | 69 | Range Switch | 42-1586 | | Tab Cover | 27-5620 |
| 22 | Part of 21 (370 mmfd.) | | 70 | Pilot Lamp (Cabinet Jewel, Model 287) | 34-2064 | | Tab Kit | 40-8998 |
| 23 | Mica Condenser (10,000 ohms) | 33-103339 | | | | | Fast Strip (Push-button) | W-523 |
| 24 | Mica Condenser (22,000 ohms) | 33-222339 | | | | | Screw (P. B. Switch Mounting) | W-288 |
| 25 | Mica Condenser (250 mfd.) | 60-125157 | | | | | Screw (Chassis Mounting) | W-1345 |
| 26 | Mica Condenser (.250 mfd.) | 30-1123 | | | | | Screw (Base Mounting, 41-280, 285) | W-2073A |
| 27 | Resistor (13,000 ohms) | 33-103339 | | | | | Screw (Base Mounting) | W-1345 |
| 27 | Electrolytic Cond. (.8-16 mfd., 400 volts) | 30-2475 | | | | | Pinout (Range Switch, Volume Control) | W-2157 |
| 28 | Resistor (470,000 ohms) | 33-447339 | | | | | Pinout (P. B. Switch Mounting) | W-2157 |
| 29 | Resistor (.22 megohm) | 33-822339 | | | | | Sleeve (Loop Mounting, 2 required) | 28-2257 |
| 30 | Resistor (4700 ohms) | 33-247339 | | | | | Sleeve (Loop Mounting, 1 required) | 56-1907 |
| 31 | Condenser (.05 mfd., 400 volts) | 30-4518 | | | | | Spring Washer (Loop Mounting) | 28-1266 |
| 32 | 1st I. F. Transformer | 32-3482 | | | | | Washer (Speaker Mounting) | 27-7467 |
| 33 | Condenser (.05 mfd., 400 volts) | 30-4518 | | | | | Washer (Chassis Mounting) | 28-1266 |
| 34 | 2nd I. F. Transformer | 32-3483 | | | | | Washer (Loop Mounting, 2 required) | W-151 |
| 35 | Resistor (470,000 ohms) | 33-447339 | | | | | Washer (Loop Mounting, 1 required) | W-425 |
| 36 | Condenser (.05 mfd., 200 volts) | 30-4519 | | | | | | |
| 37 | 3rd I. F. Transformer | 32-3484 | | | | | | |
| 37A | Resistor (470,000 ohms, Part of 37) | 33-447339 | | | | | | |
| 37C | Mica Condenser (100 mmfd., Part of 37) | | | | | | | |
| 37D | Compensator (Part of 37) | | | | | | | |
| 38 | Mica Condenser (100 mmfd., Part of 37) | 60-110157 | | | | | | |
| 39 | Resistor (.01 mfd., 400 volts) | 30-4572 | | | | | | |
| 39 | Resistor (470,000 ohms) | 33-447339 | | | | | | |
| 40 | Mica Condenser (80 mmfd.) | 60-020137 | | | | | | |
| 41 | Resistor (33,000 ohms) | 33-322339 | | | | | | |
| 42 | Volume Control | 33-103339 | | | | | | |
| 43 | Condenser (.01 mfd., 400 volts) | 30-4572 | | | | | | |

PARTS USED IN MODEL 41-290 ONLY

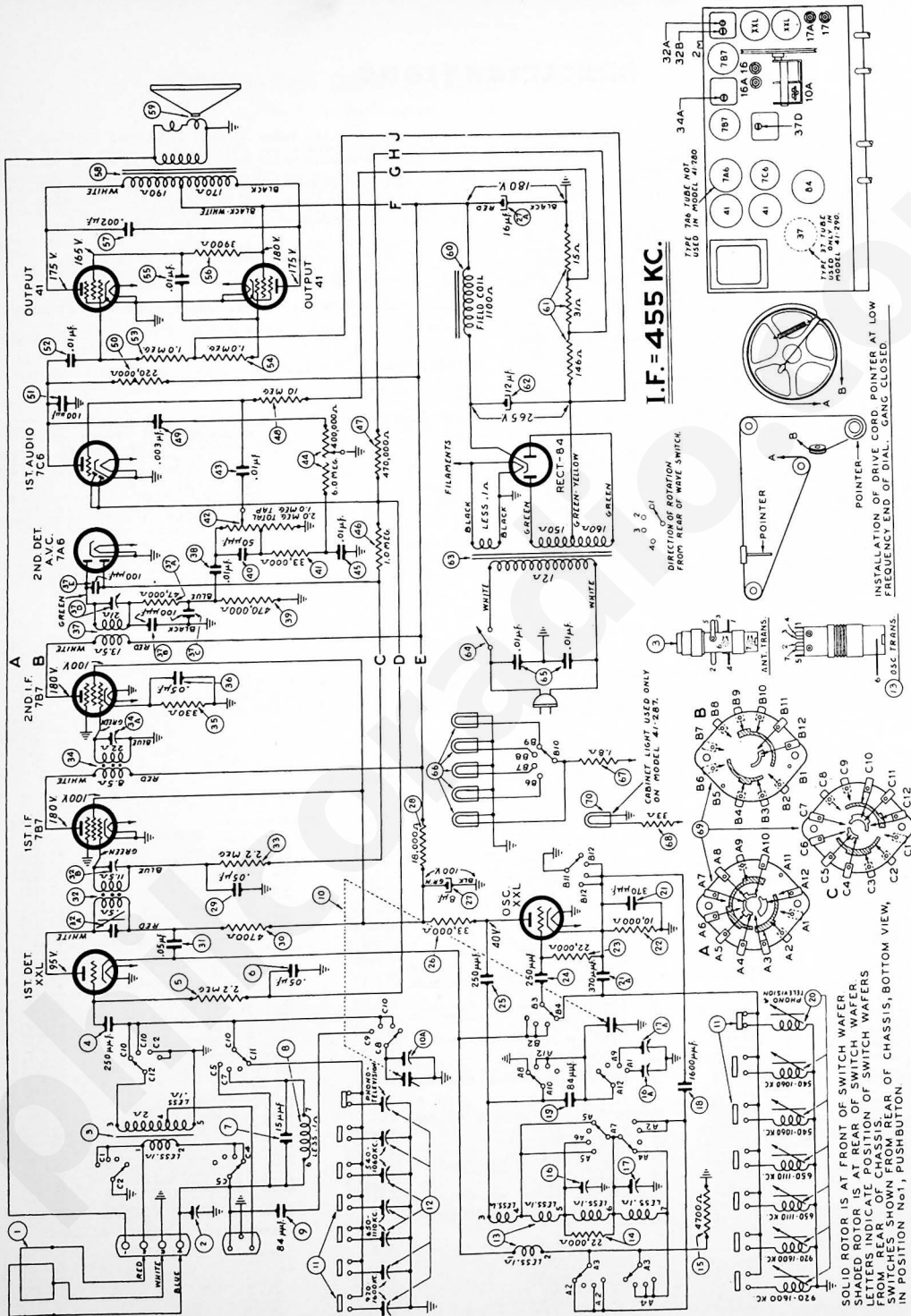
| | | |
|----|---------------------------------|-----------|
| 71 | Resistor (470,000 ohms) | 33-447339 |
| 72 | Resistor (4700 ohms) | 33-247339 |
| 73 | Resistor (10,000 ohms) | 33-103339 |
| 74 | Resistor (47,000 ohms) | 33-347339 |
| 75 | Condenser (.01 mfd., 400 volts) | 30-4572 |
| 76 | Condenser (.01 mfd., 400 volts) | 30-4572 |
| 77 | Resistor (1 megohm) | 33-10339 |
| 78 | Resistor (.002 mfd., 400 volts) | 30-4579 |

MISCELLANEOUS PARTS

| | |
|--------------------------------|---------|
| Bezel (41-280, 41-285, 41-287) | 27-4958 |
| Bezel (41-290) | 27-4958 |
| Cabinet (41-285X) | 10497A |
| Cabinet (41-290X) | 10497A |
| Cabinet (41-280X) | 10496A |
| Cabinet (41-287X) | 10185A |
| Card (Power) | L-3199 |
| Cable (Speaker) | 41-3542 |
| Clip (Aerial Coil Mounting) | 28-8002 |
| Clip (Osc. Coil Mounting) | 28-8003 |
| Clamp (Electrolytic Condenser) | 56-1848 |

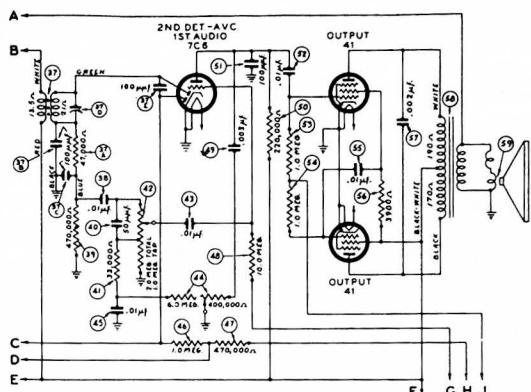
PARTS USED IN MODEL 41-296X

| | |
|---------------------------------------|-----------|
| Cabinet | 10499-B |
| Cone Assembly | 36-1526-4 |
| Drive Card | 31-2520 |
| Field Coil | 36-4173 |
| Knob (Tuning Volume) | 27-9667 |
| Knob (Push-Buttons) | 54-4009 |
| Pinout (Range Switch, Volume Control) | W-2157 |
| Pinout (P. B. Switch Mounting) | W-2157 |
| Sleeve (Loop Mounting, 2 required) | 28-2257 |
| Sleeve (Loop Mounting, 1 required) | 56-1907 |
| Spring Washer (Loop Mounting) | 28-1266 |
| Washer (Speaker Mounting) | 27-7467 |
| Washer (Chassis Mounting) | 28-1266 |
| Washer (Loop Mounting, 2 required) | W-151 |
| Washer (Loop Mounting, 1 required) | W-425 |
| Screw | W-288 |

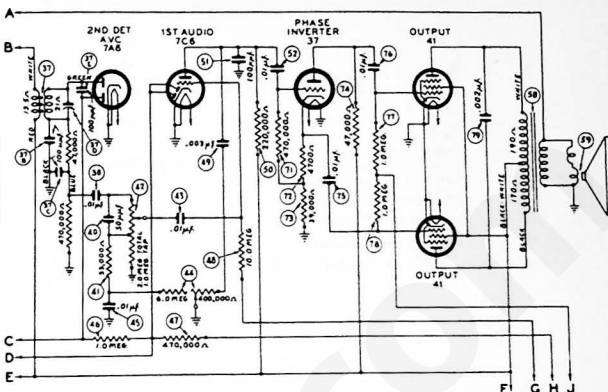


SCHEMATIC DIAGRAM — MODELS 41-280, 41-285, 41-287, 41-290

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. The wiring and tube changes are shown on page 85.

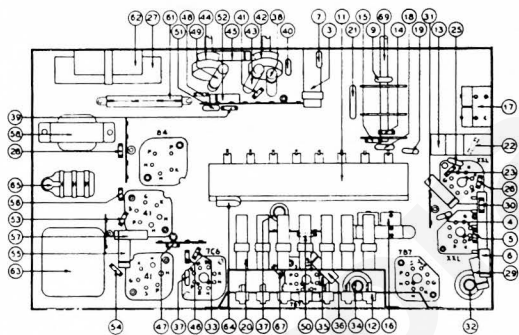


SECOND DETECTOR CIRCUIT — MODEL 41-280

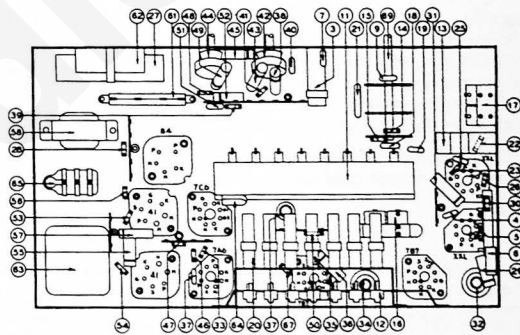


AUDIO CIRCUIT — MODEL 41-290

The above Schematic Diagrams indicate the 2nd detector and audio circuits of Models 41-280, 41-290. The R. F. and audio circuits of these Models are the same as Models 41-285, 41-287, shown on Page 84. The letters "A" to "J" at the wiring connections in the above diagram, indicate the connections to the power and R. F. circuits on the 41-285, 41-287 diagram.



PART LOCATIONS UNDERSIDE — MODEL 41-280



PART LOCATIONS UNDERSIDE — MODELS 41-285-287

PRODUCTION CHANGES

Production Run 2 — Model 41-280

Production Run 3 — Model 41-280, 41-285, 41-287
To improve high frequency coverage on push button tuning, push button oscillator coils (20A) in parts list changed from Part No. 32-3042 to 32-3597.

Run 4 — Models 41-280, 41-285, 41-287

Run 3 — Model 41-280

Beginning with the above production run numbers 3 and 4, the push button oscillator transformer assembly (20) consisting of 7 coils was changed from Part No. 32-3486 to 32-3591. This change was made to improve the frequency coverage of push button tuning oscillator circuit.

Run 5 — Models 41-280, 41-285, 41-287

Run 4 — Model 41-280

Beginning with the above production run numbers 4 and 5 the padder strip (push button) "12" on diagram, was changed from Part No. 31-6366 to 31-6399. The new padder improves the frequency coverage of the aerial circuit on push button tuning.

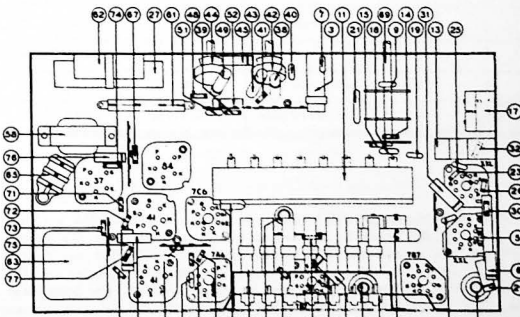
Models 41-280, Run 7; 41-285, Run 7; 41-287, Run 7, and 41-290, Run 5

To improve the Bass compensation action in the volume control circuit beginning with the above production run numbers, resistor (41) 33,000 ohms was changed to 100,000 ohms, Part No. 33-410339. Condenser (45) .01 mfd., 400 volts was also changed to .003 mfd., 1000 volts Part No. 30-4469.

The speaker on Models 41-285, 41-287 and 41-290 was also changed from Part No. 36-1523 to 36-1535. This change was also made on the production runs indicated above.

Beginning with Run 5, a new band indicator and dial scale was used in the above models. The new parts are as follows:

Drive Cord, 31-2520; Spring (for drive cord) 28-8964; Dial scale, 27-5655; Pilot lamp assembly (Band Indicator), 76-1171;



PART LOCATIONS UNDERSIDE — MODEL 41-290

Pulley (Band Indicator), 56-2036; Sleeve (Pulley mounting), 56-1926; Speed Nut, W-2210.

The band switch (69) on diagram, Part No. 42-1586 was also changed to Part No. 42-1645 on Run 5 receivers.

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.