



Models 17, 19, 22

SPECIFICATIONS—Models 17, 19, 22

TYPE OF CIRCUIT: Models 17, 19, and 22 are Electric Push-button and dial tuned radios incorporating the new Philco Built-in Super Aerial system which eliminates an outside aerial and reduces local static interference to a minimum. The models are also designed to receive the sound of a television program tuned in by special type Philco Television Sets.

PHILCO BUILT-IN SUPER AERIAL SYSTEM—Included in the built-in super aerial system is a statically shielded loop for broadcast band reception and a short wave receiving loop. A feature of the built-in broadcast band statically shielded loop is that it may 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.

In general, these models are similar with the exception of the number of tubes used and cabinet design.

Other features of design are: Continuously variable tone control; three tuning ranges covering the frequencies listed below; automatic bass compensation and degenerative push-pull pentode audio output circuit. Outside aerial connections are also provided for remote localities where station signal strength is very weak.

Each model is equipped with eight electric tuning push buttons for automatically selecting stations. Six of the push buttons are used for broadcast stations, one for

selecting dial tuning and one push button may be set up for the sound program tuned in by special Philco Television Converters, when such are available. In the meantime a broadcast station can be set on this button.

POWER SUPPLY: 115 Volts, 25 and 60 cycle AC.

POWER CONSUMPTION: 60 watts.

FREQUENCY TUNING RANGES: Three.

540 to 1550 K. C.

1.5 to 3.4 K. C.

6.0 to 18 M. C.

INTERMEDIATE FREQUENCY: 460 K. C.

AUDIO OUTPUT: 2 watts.

PHILCO TUBES USED:

MODELS 17 & 19—1232E, R. F.; 6J8EG, Converter; 7B7E, I. F.; 7C6, Second Detector and First Audio; two 41E, Audio Power Outputs; 84, Rectifier.

MODEL—22—1232E, R. F.; 7J7E, Converter; 7B7E, I. F.; 7A6, Detector; 7C6, First Audio; two 41E, Power Outputs; 84, Rectifier.

CABINET DIMENSIONS:

	Height	Width	Depth
Model 17, type "T"	10 1/2"	18 1/2"	12 1/2"
Model 19, type "XF"	39 1/2"	28 5/8"	13 3/4"
Model 22, type "XF"	41"	29"	14 1/2"

ADJUSTING ELECTRIC PUSH BUTTON TUNING

In order to adjust the electric push buttons accurately for reception of broadcast stations, a vacuum tube voltmeter such as Philco Model 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 windows above the buttons. The station with the lowest frequency is placed in the first button on the left and the highest frequency is placed in the seventh (7) push-button. Each push button is adjusted by two set screws located on the rear of the push button unit. Each set of screws is numbered 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 first button on the left is adjusted by set screw No. 1. The next push button by set 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. Turn the receiver on and set the tuning range knob to "Broadcast." Press "IN" "Dial" push-button (extreme right hand).

3. Set up the Model 177 Signal Generator about 3 feet from the receiver and connect a loop constructed out of about 2 feet of wire 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." Manually tune in the first station to be set up on push button No. 1. After doing this set the indicator of the 177 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, then press "IN" No. 1 push-button. Using the insulated screw driver turn the No. 1 "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. Station No. 1 is now adjusted properly. After setting up the first station the same procedure as outlined above is used for the remaining stations.

When this model is to be set up to receive the sound of a television program tuned in by the special type Philco Television Sets when available, push-button No. 1 should be used. To tune in these programs, the same procedure as given for ordinary broadcast stations as outlined above is used.

Further details for setting up this receiver for operation with Philco Television Sets will be supplied with the instruments, when they become available.

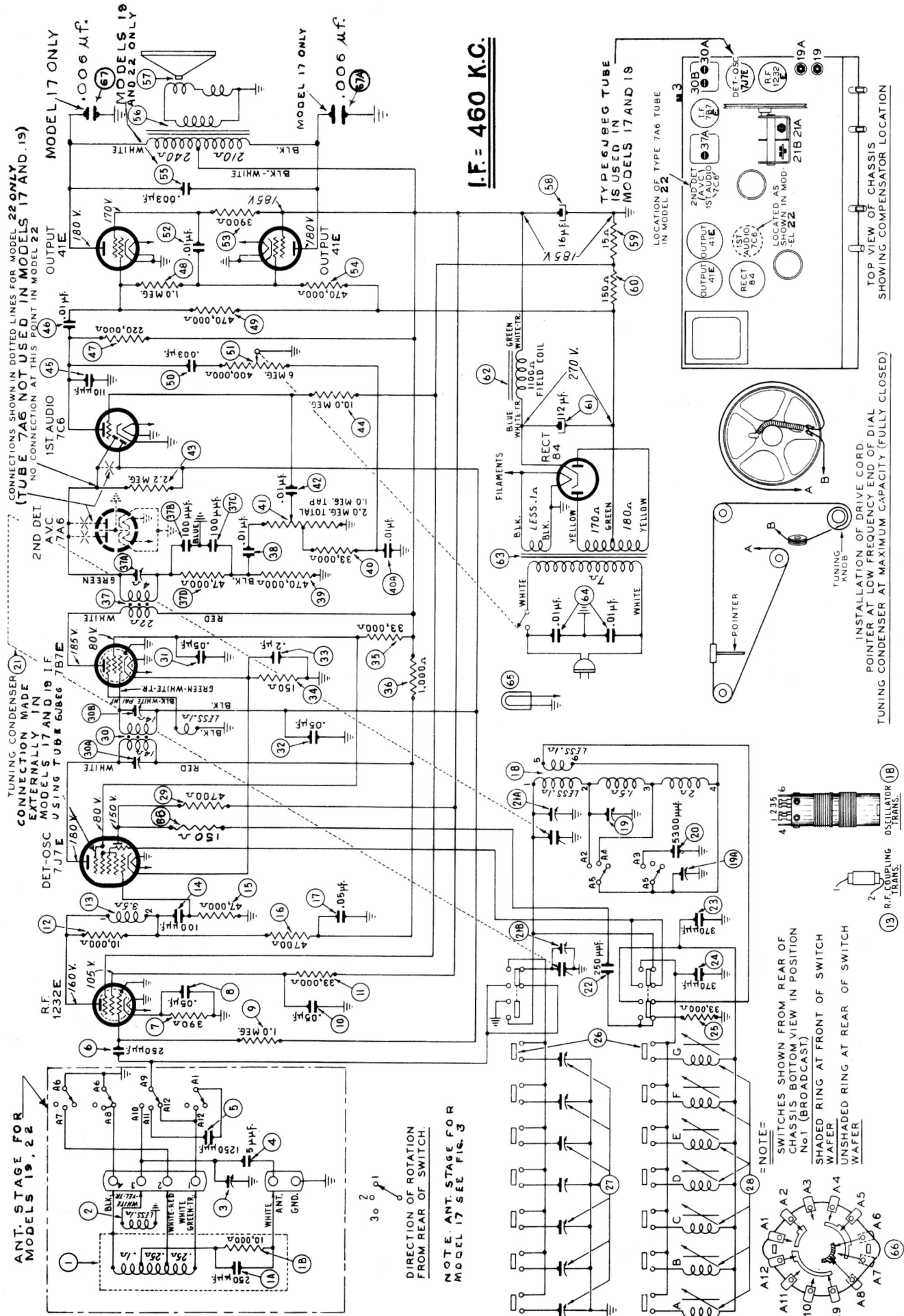


Fig. 1—Schematic Diagram

The voltages indicated were measured with a Philco Model 028 Voltmeter (1000 ohms per volt)—Power supply 115 volts. Volume control minimum—No signal being received—Range switch "Brdcast."

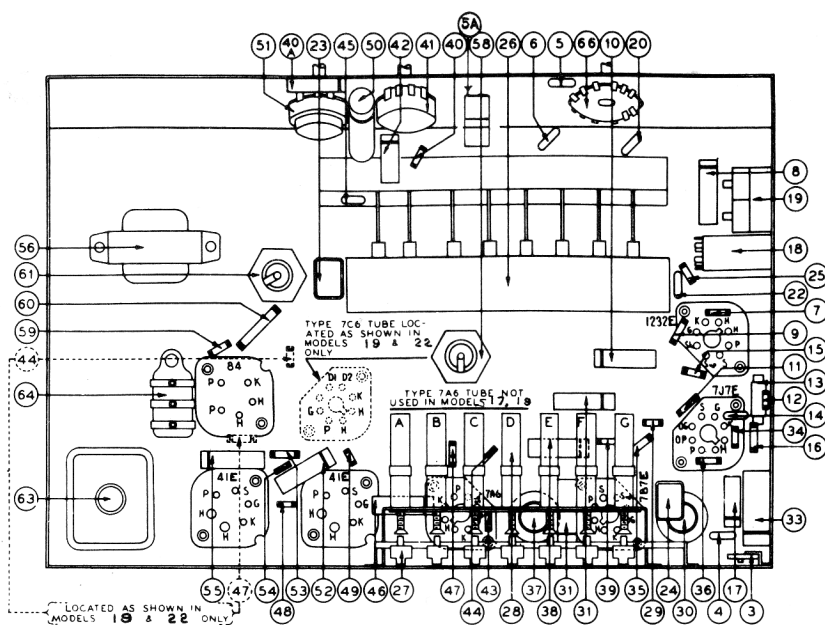


Fig. 2 Part Locations Underside of Chassis

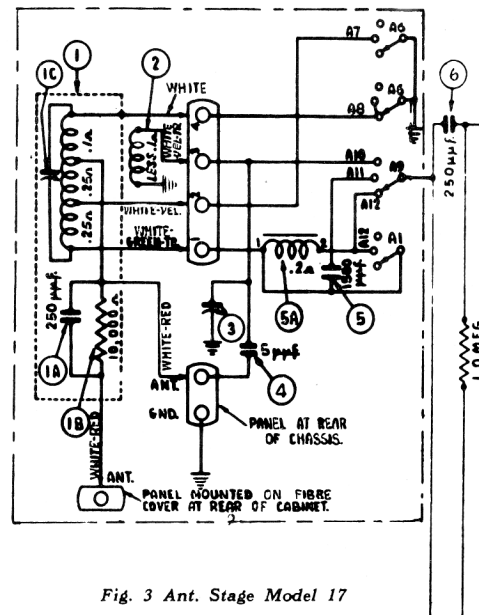


Fig. 3 Ant. Stage Model 17

REPLACEMENT PARTS - MODELS 17, 19 & 22

Schem. No.	Description	Part No.	Schem. No.	Description	Part No.
1	Loop Ass'y (Broadcast) Models 19 & 22.....	38-9880	41	Volume Control (2.0 Meg.).....	33-5275
1A	Loop Ass'y (Broadcast) Model 17.....	38-9894	42	Tubular Condenser (.01 Mfd.).....	30-4479
1B	Mica Condenser (250 Mmfd.).....	61-0033	43	Resistor (2.2 Meg., 1/2 watt).....	33-522344
1C	Resistor (10,000 ohms, 1/2 watt).....	33-310344	44	Resistor (10.0 Meg., 1/2 watt).....	33-610344
2	Compensator Ass'y (Short Wave) Model 17.....	31-6318	45	Mica Condenser (110 Mmfd.).....	30-1130
3	Loop Ass'y (Short Wave) Models 19 & 22.....	38-9935	46	Tubular Condenser (.01 Mfd.).....	30-4572
4	Compensator.....	31-6308	47	Resistor (220,000 ohms, 1/2 watt).....	33-422344
5	Mica Condenser (5 Mmfd.).....	30-1097	48	Resistor (1.0 Meg., 1/2 watt).....	33-510344
6	Mica Condenser (1500 Mmfd.) Model 17.....	7139	49	Resistor (470,000 ohms, 1/2 watt).....	33-447344
7	Mica Condenser (1250 Mmfd.) Models 19 & 22.....	5886	50	Tubular Condenser (.003 Mfd.).....	30-4469
8	Mica Condenser (250 Mmfd.).....	61-0033	51	Tone Control & On-Off Switch.....	33-5314
9	Resistor (390 ohms, 1/2 watt).....	33-139331	52	Tubular Condenser (.01 Mfd.).....	30-4572
10	Tubular Condenser (.05 Mfd.).....	30-4444	53	Resistor (3900 ohms, 1/2 watt).....	33-239344
11	Resistor (1.0 meg., 1/2 watt).....	33-510344	54	Resistor (470,000 ohms, 1/2 watt).....	33-447344
12	Tubular Condenser (.05 Mfd.).....	30-4123	55	Tubular Condenser (.003 Mfd.) Models 19&22.....	30-4469
13	Resistor (33,000 ohms, 1/2 watt).....	33-333344	56	Output Transformer.....	32-8053
14	Resistor (10,000 ohms, 1/2 watt).....	33-310344	57	Cone & Voice Coil Ass'y - Model 17.....	---
15	R.F. Coupling Transformer.....	32-3194	58	Cone & Voice Coil Ass'y - Model 19.....	---
16	Mica Condenser (100 Mmfd.).....	30-1128	59	Cone & Voice Coil Ass'y - Model 22.....	---
17	Resistor (47,000 ohms, 1/2 watt).....	33-347344	60	Electrolytic Condenser (16 Mfd.).....	30-2406
18	Resistor (4700 ohms, 1/2 watt).....	33-247344	61	Resistor (15 ohms, 1/2 watt).....	33-015331
19	Tubular Condenser (.05 Mfd.).....	30-4123	62	Resistor (150 ohms, 1 watt).....	33-115431
20	Oscillator Transformer.....	32-3195	63	Electrolytic Cond. (12 Mfd.).....	30-2405
21	Compensator (2 section).....	31-6298	64	Field Coil (Replace Spkr.).....	---
22	Mica Condenser (5300 Mmfd.).....	30-1134	65	Power Trans. (115 volt, 25 cy) Models 19&22.....	32-8086
23	Tuning Cond. Ass'y (Model 17).....	31-2401	66	Power Trans. (115 volt, 60 cy).....	32-8052
24	Tuning Cond. Ass'y (Model 19 & 22).....	31-2391	67	Power Trans. (115 volt, 25 cy) Model 17.....	32-8074
25	Mica Condenser (250 Mmfd.).....	61-0033	68	Line Cond. (Bakelite .01-.01 Mfd.).....	3903D9
26	Silver Mica Condenser (370 Mmfd.).....	30-1110	69	Pilot Lamp.....	34-2210
27	Silver Mica Condenser (370 Mmfd.).....	30-1110	70	Wave Switch.....	42-1490
28	Resistor (33,000 ohms, 1/2 watt).....	33-333344	71	Tubular Cond. (.006 Mfd.) Model 17.....	32-8054
29	Push Button Switch.....	42-1489	72	Tubular Cond. (.006 Mfd.) Model 17.....	30-4504
30	Padder Strip (Push-button).....	31-6299	73	Resistor (150 ohms, 1/2 watt).....	33-115344
31	Coil Strip Ass'y.....	32-3193			
32	Coil No. 1.....	---			
33	Coil No. 2.....	---			
34	Coil No. 3.....	---			
35	Coil No. 4.....	---			
36	Coil No. 5.....	---			
37	Coil No. 6.....	---			
38	Coil No. 7.....	---			
39	Resistor (4700 ohms, 1/2 watt).....	33-347344			
40	1st I.F. Transformer Ass'y.....	32-3245			
41	Tubular Condenser (.05 Mfd.).....	30-4123			
42	Tubular Condenser (.05 Mfd.).....	30-4519			
43	Tubular Condenser (.2 Mfd.).....	30-4536			
44	Resistor (150 ohms, 1/2 watt).....	33-115331			
45	Resistor (33,000 ohms, 1/2 watt).....	33-333344			
46	Resistor (1000 ohms, 1/2 watt).....	33-210344			
47	2nd I.F. Transformer Ass'y.....	32-3246			
48	Tubular Condenser (.01 Mfd.).....	30-4479			
49	Resistor (470,000 ohms, 1/2 watt).....	33-447344			
50	Resistor (33,000 ohms, 1/2 watt).....	33-333344			
51	Tubular Condenser (.01 Mfd.).....	30-4479			

MISCELLANEOUS PARTS

Bezel Ass'y.....	40-6489
Line Cord.....	L-3199C
Scale.....	27-5508
Drive Cord.....	31-2383
Pointer.....	56-1516
Dial Spring.....	28-8913
Drum Assembly.....	38-9856
Speaker Cable.....	41-3492
Knob Ass'y.....	27-4332
P.B. Knob.....	27-4866
Mounting Rubber (Chassis).....	27-4571
Mounting Rubber (Chassis Corner).....	27-4564
Chassis Mounting Screw.....	W-1345PA3
Socket (Five Prong).....	27-6035
Socket (Six prong).....	27-6036
Socket (Octal - 6J5EG).....	27-6120
Socket (Loktal - 7J7E).....	27-6129
Socket (Loktal).....	27-6131
Tab Kit.....	40-6501

ALIGNING OF COMPENSATING CONDENSERS EQUIPMENT REQUIRED

(1) **Signal Generator.** In order to properly adjust this receiver an accurately calibrated signal generator such as Philco Model 177 is required. This signal generator covers a frequency range of 540 to 36,000 K. C. (2) **Indicating Device.** To obtain maximum signal strength and accurate adjustment of the padders a vacuum tube voltmeter and circuit tester such as Philco Model 028 is recommended.

CONNECTING ALIGNING INSTRUMENTS

VACUUM TUBE VOLTMETER—To use the vacuum tube voltmeter as an alignment indicator make the following connections:

1. Adjusting I. F. Circuit.

Remove the 1232E R. 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 (light color) which protrudes from the side of the adaptor. Attach the positive terminal of the voltmeter to the black wire.

2. Adjusting R. F. Circuit.

To adjust the R. F. circuit, the aligning adaptor is inserted in the 7C6 A. F. tube socket. The vacuum tube voltmeter remains connected to the adaptor as given in the above paragraph.

With the voltmeter connected in this manner a very sensitive indication of the A. V. C. voltage is obtained when the padders are adjusted. If an audio output meter is used, connect it to the plate and socket terminals of the 41E

When using the vacuum tube voltmeter, an aligning adaptor, Philco Part No. 45-2767, is necessary for connecting to the A. V. C. circuit. These testers also contain an audio output meter which may also be used as an indicating device. (3) **Aligning Tools.** Fiber handle screw driver, Philco Part No. 45-2610, and fiber wrench, Philco Part No. 7696.

output tube and adjust the output meter for the 0 to 30 A. C. scale.

After connecting the aligning indicator, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown on the schematic diagram, page No. 2. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

SIGNAL GENERATOR: When adjusting the I. F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to terminal No. 1 of the loop terminal panel at the rear of the chassis. The ground or low side of the signal generator is connected to the chassis 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 receiver loop from the cabinet. It is necessary when adjusting the padders that the receiver be left in the cabinet.

17 — 19 — 22

Operations	SIGNAL GENERATOR		RECEIVER			Remarks
	Output Connections	Dial Frequency	Dial Frequency	Control Settings	Adjust Compensators for Max. Signal	
1	High Side to No. 1 Ter. Loop Panel	I. F. 460 K. C.	580 K. C. No Signal	Range Sw. "Brdst." Volume "Max." Push-Button "Dial"	37A, 30A, 30B	See Note A.
2	Use Loop on Generator	18 M. C.	18 M. C.	Range Sw. "SW." Volume "Max." Push-Button "Dial"	21A	Note B. Note D.
3	Use Loop on Generator	1400 K. C.	1400 K. C.	Range Sw. "Brdst." Volume "Max."	19A, 21B	See Note E. for Model 17
4	Use Loop on Generator	600 K. C.	600 K. C.	Range Sw. "Brdst." Volume "Max."	19	Roll Cond. Note C.
5	Use Loop on Generator	1400 K. C.	1400 K. C.	Range Sw. "Brdst." Volume "Max."	19A, 21B	Roll Cond. Note C.
6	Use Loop on Generator	18 M. C.	18 M. C.	Range Sw. "SW."	3	Roll Cond. Note C.

NOTE A—A "Dummy Antenna" consisting of a .1 mfd. condenser is connected in series with the signal generator output lead (high side).

NOTE B—**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 diagram.

NOTE C—When adjusting the low frequency compensator of Range One (Broadcast) or the antenna and R. F. compensators of the high frequency tuning ranges; 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 there is no further gain in output reading.

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

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 920 K. C. below the frequency being used on any high frequency range.

NOTE E—In the Model 17, the 1400 K. C. ant. compensator, (21B in Models 19 and 22) is located in the Broadcast Loop Assembly and is compensator 1C of Fig. 3.

MANY OF THE PARTS IN THIS PHILCO, SUCH AS CONDENSERS AND RESISTORS, ARE HELD TO MUCH CLOSER TOLERANCE THAN STANDARD REPLACEMENT PARTS. GENUINE PHILCO REPLACEMENT PARTS MUST BE USED TO OBTAIN SATISFACTORY PERFORMANCE OF THIS MODEL.

PHILCO PRODUCTS LIMITED

PARTS AND SERVICE DIVISION
TORONTO, ONT.