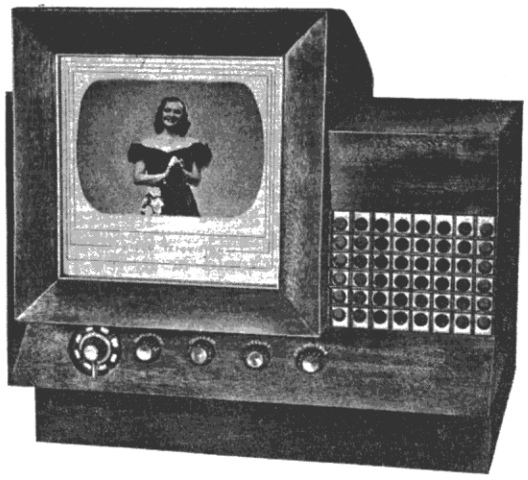
PHILCO CORP. MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122



MODELS 48-1000 AND 48-1000-5

MODELS 48-1050 AND 48-1050-5

SPECIFICATIONS

NOTE: All text references to the following models are for Code 122 only.

Models 48-1000 and 48-1000-5 are table models. Models 48-1050 and 48-1050-5 are console models. These twenty-seven tube, ten-inch, direct-view Television Receivers are designed to provide reception of television broadcasts on Channels 1 through 13. Except for the cabinets, and those components which differ for 50-cycle operation (in Models 48-1000-5 and 48-1050-5) these Receivers are essentially identical. (The 50-cycle models have an additional filter condenser in the power supply, and the 50-cycle power transformers are placed in different physical locations.) The following specifications apply to all four models.

Aerials

Provision for two aerials, one for the low-frequency television channels (1 to 6 inclusive), and one for the high-frequency channels (7 to 13 inclusive), using 300-ohm, balanced-type transmission line.

Channel Tuning

The Philco Precision Channel Selector provides for selection of any one of the thirteen television channels. (Although there are a total of thirteen channels, the F.C.C. allots a maximum of seven to any one locality.)

The use of Automatic Tuning with Electronic Control eliminates the need for a fine-tuning control. Automatic Level Control of Picture and Sound overcomes fading of picture and sound.

Audio

Audio output, 2.5 watts; continuously variable tone control; bass compensation; 6-inch permanent-magnet speaker; ratio-type FM detector.

Picture

Picture size, 6-1/8 x 8-1/4 inches; picture tube, direct view with magnetic focus and magnetic deflection, using hard-tube deflection oscillators.

Intermediate Frequencies

Video carrier: 26.6 megacycles
Audio carrier: 22.1 megacycles

Electrical

Operating voltage, 110—120 volts, a.c.; power consumption, 275 watts

Power supplies (two): 325 volts at 300 ma., d.c.; 7300 volts (approx.) at 200 microamperes

Vacuum Tubes (27)

LOKTAL	OCTAL	MINIATURE	CRT
1—7B4	1—1B3GT	6—6AG5	1—10BP4
2—7B5	2—5U4G	2—6AL5	
1—7B6	1—5V4G	1—6AT6	
1—7C5	1—6BG6G	1—6J6	
1—7F8	2—6SL7GT		
2—7H7	1—6K6GT		

MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122 PHILCO CORP.

INSTALLATION

Aerials

To obtain the best possible performance, the television receiver must be used with the correct aerial, properly installed. Philco Television Aerials combine efficiency, high-quality construction, and ease of installation. Two dipole aerial kits and two reflector kits are available. Either aerial kit may be used alone or in combination with its corresponding reflector kit, thus providing four possible aerial types. These four types are adequate for all ordinary installations.

Philco Broad-Band Television Aerial Kit, Part No. 45-1563, for reception of Channels 1 through 6, is designed for use in areas of high signal strength and low noise or interference level. Reflector Kit for Broad-Band Television Aerial, Part No. 45-1564, should be used with this aerial where signal strength is only fair, or where noise or interference is troublesome. Philco Broad-Band Television Aerial Kit, Part No. 45-1561, and Reflector Kit for Broad-Band Television Aerial, Part No. 45-1562, should be used, in similar cases, for reception of Channels 7 through 13. Complete instructions for installation are included with each kit.

For satisfactory reception, the aerial should be located as high as practicable, and clear of obstructions. A Philco aerial mast will provide the required height and simplify installation problems. A mast should always be used where the reflector kit is installed. Where guy wires can be used, Philco Aerial Mast Kit, Part No. 45-1560 (8-ft., sectional), is recommended. Where the use of guy wires is not possible or permissible, the Philco 12-ft. Aerial Mast Kit, Part No. 45-1569, or Philco Aerial Mast and Bracket Assembly, Part No. 45-1551-2, should be installed.

Receiver Location

Before the owner decides upon the location and position of the Receiver in the room, it is important that he be informed of the requirements for best reception.

The table-model Receiver should be placed so that the center of the picture tube is at a comfortable eye level for a seated person (the console cabinet is designed to provide the proper picture height). The distance between the Receiver and the viewer should be from 4 feet to 10 feet, depending upon individual preference. The Receiver should be placed so that the viewer does not face any distracting source of light. The Receiver presents a picture of sufficient brilliance for comfortable viewing in a room having a reasonably high level of general illumination; however, windows and lamps can cause annoying reflections if the viewing screen faces such sources of light.

Unpacking and Assembling the Receiver

NOTE: When feasible, the receivers are shipped with the picture tubes installed and ready for use; however, some models must be shipped with this tube packed separately. Accordingly, the following instructions for unpacking and assembling the receivers are divided into two sets of instructions:

a. For Receivers Shipped with Picture Tube Installed

1. Read the instructions printed on the carton.
2. Remove the Receiver from the carton.
3. If the Receiver is packed with a shipping cradle attached, carefully place the Receiver face-down on a blanket, so that the shipping cradle mounting screws can be removed. Remove and discard the cradle.
4. Remove the wood screws which hold the back cover of the Receiver, and remove the cover.
5. Loosen the four chassis mounting bolts so that the chassis floats freely on the rubber shock pads, and pull out the fiber packing strips.
6. Remove the Station Tabs envelope and the User's Instructions.
7. Inspect the Receiver chassis, making certain that all tubes are secure in their sockets, and that all tube shields are in place.
8. Referring to figure 4, make certain that the coils are inserted properly in the Philco Precision Channel Selector compartments. The oscillator coil, which is slug-tuned, should be in the front; the aerial coil, which is not adjustable, should be in the rear. Each pair of coils is identified by part numbers ending with identical digits. The last digit indicates the television broadcast channel number. For example, 32-4122-3 and 32-4115-3 are the oscillator and aerial coils for Channel 3.
9. Note the locations of the a-f-c test jack, align test jack, and a-g-c control, shown in figure 37.
10. Make certain that the speaker cable, deflection-yoke cable, picture-tube cable and high-voltage-anode connections are properly made, and that the cables are dressed as shown in figure 5.
11. Install the front-panel control knobs.
12. Connect the Receiver to a 110-volt, a-c power source of the proper frequency, using a line cord with a standard male connector, Part No. L2183, and a special female connector and a shell flange, Part Nos. 27-6217 and 56-4346 (to fit a-c interlock).

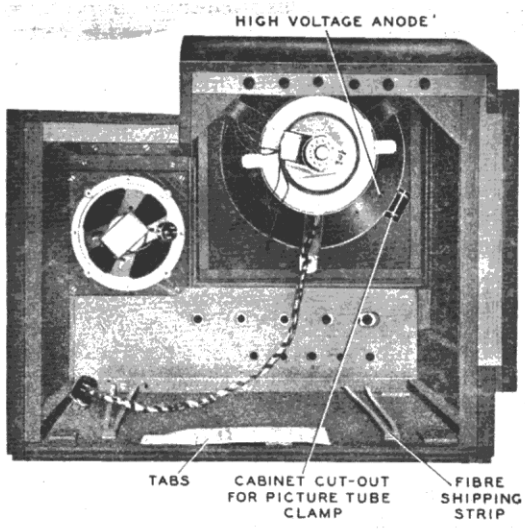


FIGURE 1. REAR VIEW, CHASSIS REMOVED

b. For Receivers Shipped with Picture Tube Packed Separately

1. Read the instructions printed on the carton.
2. Remove the Receiver from the carton.
3. If the Receiver is packed with a shipping cradle, carefully place the Receiver face-down on a blanket, so that the shipping-cradle mounting screws can be removed. Remove and discard the cradle.
4. Remove the control knobs and Philco Precision Channel Selector knobs from the front of the Receiver.

5. Remove the wood screws which hold the back cover of the Receiver, and remove the cover. Remove the four chassis mounting bolts.

6. Disconnect the speaker cable.

7. Slide the chassis out of the cabinet.

8. Remove the picture-tube mounting assembly; a 3/8" hollow-spindle socket wrench may be used for this purpose.

9. Loosen the staples which hold the two fiber packing strips, but do not remove the strips at this time.

10. Remove the Station Tabs envelope and the User's Instructions.

11. Remove the picture tube from its packing box, after noting the box marking which indicates the proper end to open. CAUTION: Do not handle or carry the tube by grasping the tube neck or base. Hold it face-down in the palm of one hand, while steadying it with the other hand. Avoid touching the high-voltage anode on the side of the tube (the high-voltage charge sometimes remains for many weeks). Place the picture tube face-down on a piece of cloth.

12. Before proceeding, refer to figures 2 and 3.

13. Loosen the clamp screw on the picture-tube mounting assembly, and loosen the three length-adjustment nuts which hold the tube-supporting collar.

14. Slide the mounting assembly over the neck of the picture tube, being careful not to damage the connections inside the deflection-coil yoke.

15. Line up the high-voltage anode with the clamp screw (see figure 2). Make certain that the face of the picture tube fits flush with the front rim of the mounting assembly, and tighten the clamp screw just sufficiently to hold the tube firmly.

16. Referring to figure 3, loosen the deflection-yoke clamp. Push the yoke forward until it touches the tube, and tighten the yoke clamp.

17. Push the tube-supporting collar forward until the leather bumpers touch the tube. Position the neck of the tube so that it is centered in the focus coil, and tighten the three nuts of the tube-supporting collar. CAUTION: If the neck is not properly centered, the tube may break when the collar nuts are tightened.

18. Place the beam bender over the neck of the tube, with the large coil nearest the tube base, and align it so that the coils are on the side of the tube opposite the anode connection.

Tighten the beam-bender clamp sufficiently to hold it in place and yet allow further adjustment.

19. Clean the face of the picture tube and the inside and outside of the glass dust cover in the cabinet.

20. With the cabinet face-down on a blanket, install the tube assembly in the cabinet, positioning it so that the front clamp screw fits into the cutout in the cabinet, as shown in figure 1.

21. Make certain that all tubes are secure in their sockets, and that all tube shields are securely in place.

22. Referring to figure 4, make certain that the coils are inserted properly in the Philco Precision Channel Selector compartments. The oscillator

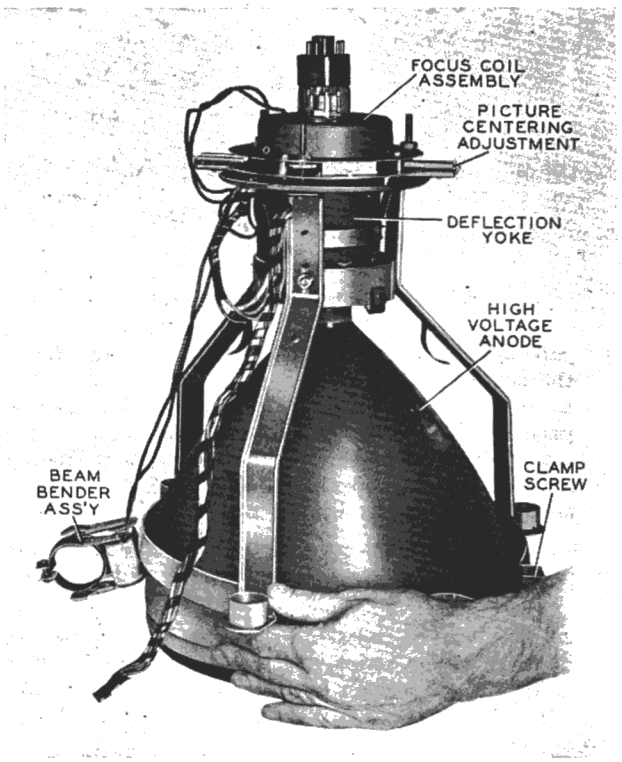


FIGURE 2. ASSEMBLING PICTURE TUBE IN MOUNTING

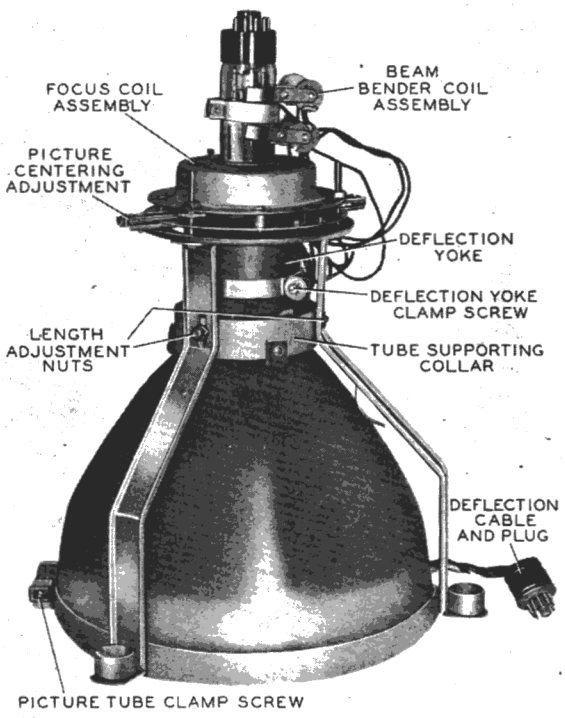


FIGURE 3. COMPLETED PICTURE-TUBE ASSEMBLY

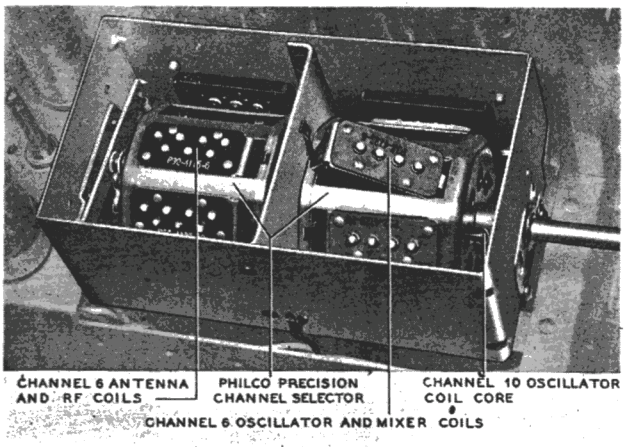


FIGURE 4. INSERTING COILS

coil, which is slug-tuned, should be in the front; the aerial coil, which is not adjustable, should be in the rear. Each pair of coils is identified by part numbers ending with identical digits. The last digit indicates the television broadcast channel number. For example, 32-4122-3 and 32-4115-3 are the oscillator and aerial coils for Channel 3.

23. Before replacing the chassis, note the locations of the a-f-c test jack, align test jack, and a-f-c control, shown in figure 37.

24. Replace the chassis in the cabinet. Remove the fiber shipping strips. The chassis should float freely on the rubber shock pads after the chassis mounting screws are replaced.

25. Connect the speaker-cable, deflection-yoke cable, picture-tube cable, and high-voltage-anode-cable connectors to their receptacles, and dress the cable leads as shown in figure 5.

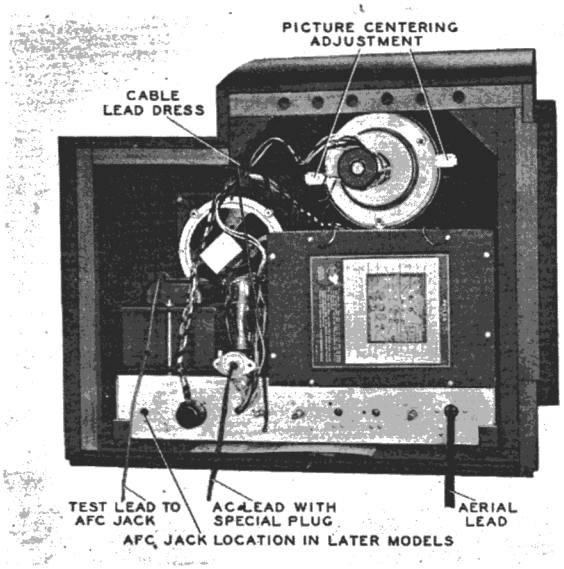


FIGURE 5. REAR VIEW, SHOWING TEST AND AERIAL CONNECTIONS AND REAR CONTROLS

26. Replace the front-panel control knobs.

27. Connect the Receiver to a 110-volt, a-c power source of the proper frequency, using a line cord with a standard male connector, Part No. L2183, and a special female connector and a shell flange, Part Nos. 27-6217 and 56-4346 (to fit a-c interlock).

Adjusting the Receiver

1. With the Receiver properly located and the aerial connected, turn the OFF-ON-TONE control to ON, and allow the Receiver to warm up for about five minutes.

2. Referring to figure 6, set the BACKGROUND control to its maximum clockwise position, and the BEAM BENDER control (shown in figure 7), on the rear of the chassis, about 3/4-turn clockwise. Then move the beam-bender coil slightly forward and backward, and to the left and right, to obtain maximum brilliance on the picture-tube face. Adjust the BEAM BENDER control for maximum over-all brilliance of the raster; turn the BACKGROUND control counterclockwise, as necessary, to observe the effect of the BEAM BENDER adjustment.

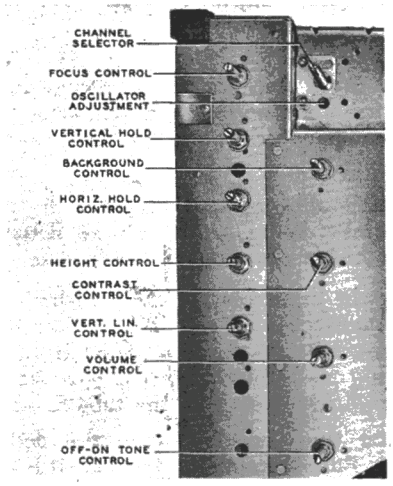


FIGURE 6. FRONT CONTROLS

3. Turn the Philco Precision Channel Selector to the station to be used for adjustments. Adjust the oscillator tuning core (figure 6) until the sound is clearly heard, and set the VOLUME control for a comfortable volume.

4. Set the VERT. HOLD control to the center of the range through which the picture is vertically stationary.

5. Set the HORIZ. HOLD control to the center of the range through which the picture is horizontally stationary.

6. Adjust the FOCUS control for best over-all sharpness of the picture, and adjust the CONTRAST and BACKGROUND controls for a pleasing range of gray shades in the picture.

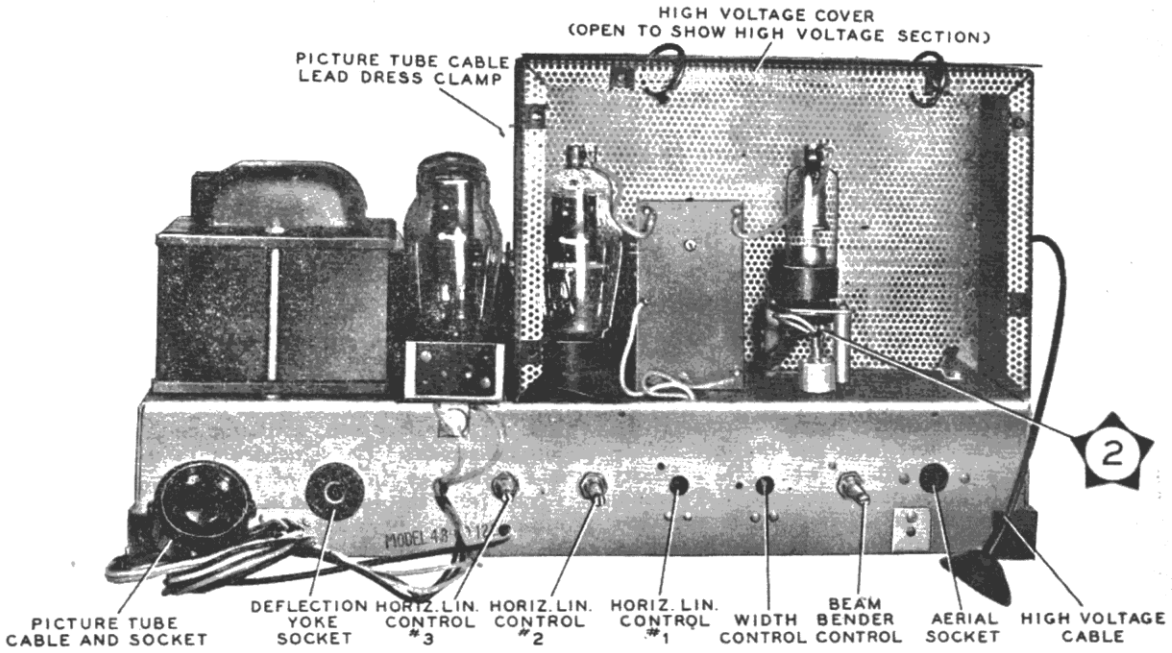


FIGURE 7. REAR CONTROLS

7. Loosen the deflection-yoke clamp, and position the yoke so that the edges of the picture are parallel to the mask. Then tighten the clamp.

8. Loosen the two hex-head nuts on the centering bar, on the deflection-yoke assembly, and adjust the position of the bar to obtain perfect vertical and horizontal centering of the picture. See figures 5

9. Using a test-pattern signal, adjust the VERT. LIN. control for a symmetrical vertical pattern.

10. Adjust the HEIGHT control until the picture covers the face of the tube vertically.
Readjust the VERT. LIN. control if necessary.

11. Using a test-pattern signal, adjust the HORIZ. LIN. controls for a symmetrical horizontal pattern. See figure 15. Linearity controls 2 and 3 are in series, and therefore have a similar effect upon the picture. Linearity control 1 acts independently of controls 2 and 3.

12. Adjust the WIDTH control until the picture covers the face of the tube horizontally.
Readjust the HORIZ. LIN. control if necessary, and then, if necessary, readjust the centering bar. When the picture is properly centered, tighten the two hex-head nuts.

13. Before adjusting the frequency of the local oscillator, allow the Receiver to operate for *at least 20 minutes*. Connect a 20,000-ohms-per-volt meter to the a-f-c test jack; remove the Philco Precision Channel Selector knobs. Turn the core of the oscillator coil (see figure 6) in a clockwise direction for a positive voltage indication, then turn it in a counterclockwise direction for a negative indication, noting the zero, or crossover, point; from the zero point, turn the core clockwise until a +.2-volt indication is obtained.

14. Repeat the adjustment made in step 13 for each station in the area. Replace the Philco Precision Channel Selector knobs.

15. Remove the voltmeter from the a-f-c test jack, and connect a calibrated oscilloscope to the align test jack. A 2-volt peak-to-peak signal should be observed. If the correct indication is not obtained, adjust the Automatic Level Control of Picture and Sound (shown in figure 37), on the top of the chassis.

16. With the OFF-ON-TONE control in the OFF position, remove the picture-tube socket, attach a test lead to the grid (pin 2), and replace the socket. Connect the oscilloscope to this test lead. Turn the OFF-ON-TONE control to ON, and the CONTRAST control fully clockwise. A peak-to-peak voltage reading of 70 to 80 volts should be obtained, indicating a gain of 35 to 40 in the video amplifier and video output stages. (If the measured gain deviates appreciably from this range, trouble is indicated; refer to the trouble-shooting section of this manual.) Remove the test lead from the picture tube.

17. Set the Receiver for the station having the weakest signal, and make certain that the VERT. HOLD and HORIZ. HOLD controls are adjusted correctly. Recheck all other control adjustments for best picture quality.

18. Attach a 20,000-ohms-per-volt voltmeter to the align test jack. While observing the picture and the voltmeter, have an assistant rotate the aerial slowly until the best position, or "orientation", is obtained, as indicated by the highest possible meter reading consistent with a picture free from ghosts and interference. (Refer to the instructions packed with the Philco Aerial Kit which was installed.) Remove the voltmeter.

19. Turn the OFF-ON-TONE control to OFF, and remove the special line cord. Replace the cabinet back. The Receiver is now ready for operation.

CIRCUIT DESCRIPTION

Models 48-1000, 48-1000-5, 48-1050, and 48-1050-5 employ identical chassis except for the minor differences previously mentioned; therefore, for purposes of circuit analysis and trouble shooting, they will be considered as one model.

The schematic diagram, figure 32, is divided into five major sections. The block diagram, figure 18, shows this division and the interrelation of the sections. For circuit analysis, the sections will be considered in the following order: the Radio-Frequency Section, the Video Section, the Audio Section, the Sweep Section, and the Power-Supply Section.

The Radio-Frequency Section

Television reception, in the very-high-frequency range from 44 to 216 megacycles, requires special design techniques. The Philco Precision Channel Selector is designed to provide the short leads and the low switch-contact resistance and capacitance which are necessary to obtain high sensitivity at these frequencies. To insure maximum sensitivity and selectivity, and at the same time to maintain the necessary six-megacycle band-pass, separate aerial, r-f-amplifier, oscillator, and mixer coils are used for each channel. These coils are built on "snap-in" assemblies; two assemblies, of two coils each, comprise a set of coils for any one channel. One coil assembly contains the aerial and r-f-amplifier windings, while the other assembly contains the oscillator and mixer windings. The proper sets of coils, for the channels in use in the area where the Receiver is to be operated, are installed in the Philco Precision Channel Selector. This system of channel selection has the further advantage of providing for the use of separate high-band and low-band aerials in those areas where the characteristics of the usable signals are such as to require this type of installation. Special installations, using as many as four aerials, are also possible. Information on such installations are included in the instructions furnished with each Philco Television Aerial Kit.

Turning the Philco Precision Channel Selector knob to the desired channel connects the correct aerial, aerial coil, r-f amplifier coil, oscillator coil, and mixer coil into the circuits. The signal from the aerial is amplified and applied to the grid of the mixer, along with the signal from the local oscillator. The output of the mixer contains both the audio and the video intermediate-frequency signals.

The local oscillator, a modified Colpitts, is designed to obtain maximum frequency stability. In addition, automatic frequency control is provided; a reactance modulator electronically controls the oscillator frequency, compensating automatically, and instantly, for any drift of the oscillator frequency or incoming-signal frequency. This compensation is controlled by a d-c signal derived from the audio discriminator, where deviation of the audio i-f center frequency develops a positive or negative voltage. This voltage, applied to the grid of the modulator, swings the oscillator frequency either higher or lower, to re-establish the correct intermediate frequency. The output of the discriminator is zero volts when the center frequency is correct.

For any given channel, the signal frequencies existing in the Receiver may be found in the following chart.

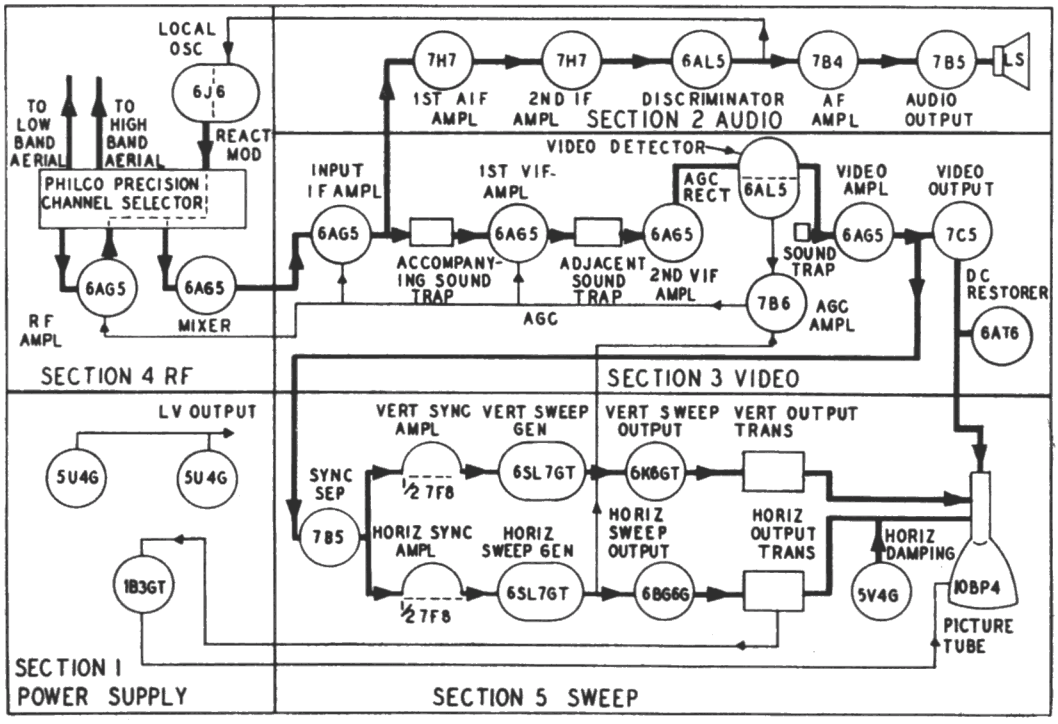


FIGURE 18. BLOCK DIAGRAM

PHILCO CORP. MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122

Channel No.	Band Width (mc.)	Video-Carrier Frequency (mc.)	Audio-Carrier Frequency (mc.)	Local-Osc. Frequency (mc.)	Video I.F. (mc.)	Audio I.F. (mc.)	Adj. Audio I.F. (mc.)
1	44-50	45.25	49.75	71.85	26.6	22.1	none
2	54-60	55.25	59.75	81.85	26.6	22.1	32.1
3	60-66	61.25	65.75	87.85	26.6	22.1	28.1*
4	66-72	67.25	71.75	93.85	26.6	22.1	28.1*
5	76-82	77.25	81.75	103.85	26.6	22.1	32.1
6	82-88	83.25	87.75	109.85	26.6	22.1	28.1*
7	174-180	175.25	179.75	201.85	26.6	22.1	none
8	180-186	181.25	185.75	207.85	26.6	22.1	28.1*
9	186-192	187.25	191.75	213.85	26.6	22.1	28.1*
10	192-198	193.25	197.75	219.85	26.6	22.1	28.1*
11	198-204	199.25	203.75	225.85	26.6	22.1	28.1*
12	204-210	205.25	209.75	231.85	26.6	22.1	28.1*
13	210-216	211.25	215.75	237.85	26.6	22.1	28.1*

***Adjacent-audio i-f signal which is within the receiver pass band, and which is rejected by the adjacent-audio trap, as explained below.**

The Video Section

The audio i-f, video i-f, and adjacent-audio i-f signals are all present in the output of the mixer. These intermediate-frequency signals are transferred through impedance-coupler Z300 to the input i-f amplifier. All signals between 28.1 and 22.1 megacycles are amplified and passed on to impedance-coupler Z301. The audio i-f signal is transferred to the audio i-f amplifier through the plate circuit of the input i-f amplifier. The accompanying-sound trap No. 1 (adjusted by L301B) presents a high impedance to the audio i-f signal, so that little or no audio i-f signal is passed on to the first video i-f amplifier. The video i-f (and adjacent-audio i-f) signals are amplified in the first video i-f amplifier. The adjacent-audio i-f signal is rejected by the adjacent-sound trap (adjusted by L302B) in impedance-coupler Z302, leaving only the video i-f signal, which is further amplified by the second video i-f amplifier. This signal is applied, through impedance-coupler Z303, to the 6AL5 video detector and a-g-c rectifier; in the video detector section, the negative portion of the modulation is rectified, and becomes the video signal. The biasing arrangement on the a-g-c rectifier section permits only the sync tips of the positive modulation to be rectified, thereby yielding a voltage which is proportional to the strength of the incoming signal, and unaffected by the video variations. This voltage is applied to the grid of the triode section of the 7B6 a-g-c amplifier, governing the amplifying action of the tube. A small amount of the sweep voltage from the horizontal-sweep generator is also applied to the grid of the 7B6, and the amplified signal appears in the plate circuit. This signal is applied, through condenser C322, to the diode plates of the 7B6, providing a d-c voltage, of negative polarity, which is proportional to the amplitude of the received signal. This a-g-c voltage is used to control the gain of the r-f amplifier, the input i-f amplifier, and the first video i-f amplifier, thus serving to maintain constant video and audio output levels.

A second accompanying-sound trap (sound trap No. 2) is incorporated in the output circuit of the video detector, to remove any small percentage of audio i-f signal which may have passed the first trap.

The video signal is amplified in the video amplifier and applied to the 7C5 video output tube, where it receives its final amplification.

The 4.5-mc. trap, in the plate circuit of the video amplifier, removes the signal induced by the beating of the video and audio i-f signals, which have a frequency difference of exactly 4.5 mc.

D-c restoration is accomplished by the 6AT6 tube, which conducts during the synchronizing pulses, producing a positive d-c voltage at the grid of the picture tube; this voltage is proportional to the composite signal amplitude. The picture-tube brightness, therefore, will vary only from scene to scene, and not from frame to frame, in the received picture.

The complex signal path in the video output circuit contains frequency-compensating networks, to insure an essentially flat response from 30 c.p.s. to 4.0 megacycles, approximately. Excellent definition in the picture is thereby insured.

The Audio Section

The Audio Section contains two stages of audio-i-f amplification, broadly tuned to pass a 22.1 ± 250-kc. signal. This pass band provides for excellent frequency-modulated sound. The discriminator is an improved ratio-type detector, the output of which is applied through the volume control to the audio amplifier. The amplified signal drives the 7B5 audio output tube, which works into a permanent-magnet speaker.

The bass-compensating network is connected to the tap on the volume control. The tone control permits attenuation of the treble tones.

The discriminator also develops the control signal for the local-oscillator frequency-control circuit, as described in the discussion of the Radio-Frequency Section.

The Sweep Section

A video signal, taken from the screen grid of the video amplifier, is fed to the control grid of the 7B5 sync separator. This tube is grid-leak biased so that only the sync-signal portion of the signal is amplified. In addition, the circuit components are so chosen that the sync signals are limited, or clipped, producing uniform output signals over a wide range of variation in the input signal. See figure 19. This actions helps to make the control of the sweep voltages more positive. The output of the sync separator is applied to the vertical-sync amplifier through a long-time-constant circuit, which responds only to the "wide" vertical-sync signals. The horizontal-sync pulses are passed to the horizontal-sync amplifier by a short-time-constant circuit. The outputs of the sync amplifiers control their respective blocking oscillators, which, in turn, initiate the horizontal and vertical sweep voltages. These voltages are amplified, and are transferred, by transformer coupling, to the picture-tube deflection coils.

The horizontal sweep, being much faster than the vertical sweep, requires circuit refinements not needed for the vertical sweep. The plate circuit of the horizontal-sweep oscillator tube contains a shock excited, or "ringing", tank consisting of L503 and C516. The positive sync pulse at the first grid (pin 1) triggers the blocking oscillator. During the positive swing of the grid, the plate current of the first section of the tube increases rapidly. When the grid voltage falls sharply to its maximum negative peak (see figure 33),

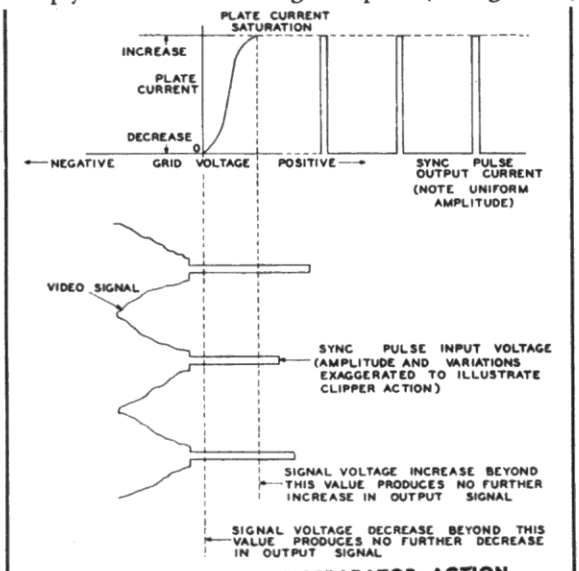


FIGURE 19. SYNC-SEPARATOR ACTION

due to the feedback developed in the transformer, the plate current is abruptly cut off. The sudden stopping of plate-current flow produces an oscillating voltage at the resonant frequency of the tank (approximately 15,000 c.p.s.). This sine-wave voltage is combined, at the second cathode (pin 6) of the sweep oscillator, with the negative pulse from the first plate (pin 2). See figure 36. The frequency of this resonant circuit, in conjunction with the oscillator-circuit time constant, as determined by the HORIZ. HOLD CONTROL, sets the frequency of the oscillator. The stabilization thus produced by the resonant circuit reduces the effect of noise on the horizontal sweep.

The horizontal-sweep current is produced and controlled in the following manner:

1. The sawtooth sweep voltage from the horizontal-oscillator tube is applied to the horizontal-output-tube grid, causing a steady increase in current through the primary of T503. A constant voltage is thereby induced in the secondary of T503 and, consequently, this voltage appears across the deflection yoke.

2. The constant voltage across the yoke initiates a current flow in the yoke. This current, which, because of the R, L, and C constants of the circuit, increases in an essentially linear manner, causes the beam to move from the center toward the right-hand edge of the screen.

3. When the signal is removed from the grid of the output tube, the primary current of T503 is abruptly cut off, thereby inducing a large reverse voltage in the secondary of T503.

4. This reverse voltage quickly causes the current in the deflection coil to drop rapidly through zero to a maximum in the opposite direction, driving the picture-tube beam quickly across the screen, from right to left.

5. At the instant the reverse current reaches maximum, (when the beam is at the left-hand edge of the screen) the sweep signal is again applied to the grid of the horizontal-output tube.

6. The induced voltage in the secondary of T503 now opposes the flow of reverse current in the deflection yoke, causing the current to fall to zero; because of the constants of the circuit, plus the action of the 5V4G horizontal-damping tube, the reverse current decreases in a linear fashion. As this current decreases, the sweep spot progresses from the left-hand side of the tube toward the center. This starting portion of the sweep is developed by the action of the damping tube while the horizontal output tube is virtually cut off.

7. Since the secondary voltage across T503 remains constant for the duration of the sweep, the action described in step 2 is continued, producing an approximately linear change of deflection current in the original direction, and causing the sweep to continue smoothly to the right. This latter portion of the sweep is developed by the action of the horizontal output tube.

8. Again the sweep signal cuts off the horizontal-output tube, and the current in the deflection yoke dies to zero and then reverses, causing the beam to return to the left before the next sweep begins.

9. During the return sweeps, the high counter-voltages induced in the yoke are damped by the 5V4G horizontal-damping tube, thus preventing unrestricted oscillations in the yoke. This damping action also charges C520 and C522, and their charge acts as an additive voltage, so that the plate voltage of the horizontal-output tube is equal to the B+ voltage (345 volts) plus the voltage across C520. This extra voltage aids in obtaining a better sweep action without requiring a higher B+ supply voltage.

10. When the horizontal-output tube is abruptly cut off at the end of each sweep, the induced voltage in the primary of T503 causes a very high voltage (approximately 7000 volts) to appear at the plate of the high-voltage rectifier, 1B3GT. This voltage is used to supply the d-c anode voltage for the picture tube.

The Power-Supply Section

The low-voltage d-c supply employs two 5U4G rectifier tubes, which are connected in parallel to provide the high-current, 345 volts, 245 volts, and -12 volts for the receiver circuits. The high-voltage circuit operates on the induced voltage in the autotransformer winding of the horizontal-sweep-output transformer; this voltage is rectified by a 1B3GT tube. Because of the high-frequency (15,750-cycle) source, very little filtering is needed.

Safety "interlock" disconnects are provided in the 115-volt, a-c input circuit to remove the power from the set when the protective back cover of the receiver is removed, and when the deflection-yoke plug is disconnected.

In Models 48-1000-5 and 48-1050-5 (for 50-cycle operation), the low-voltage power supplies are provided with additional filter capacitance. In these models the power transformer is mounted at such an angle, with respect to the picture tube and other components, as to minimize the interaction of magnetic fields.

THE PHILCO TROUBLE-SHOOTING PROCEDURE FOR TELEVISION RECEIVERS

The Philco trouble-shooting procedure for television receivers is logical, thorough, and easy to follow.

The basis of any effective method of trouble shooting is:

First, localization of the trouble to a functional section, or block of circuits.

Second, isolation of the faulty circuit, or stage, within that section.

Third, location of the defective part within that circuit.

The receiver circuit is divided into five functional sections, or blocks of circuits, as follows:

Section 1—the power-supply circuits
Section 2—the audio circuits
Section 3—the video circuits
Section 4—the r-f circuits
Section 5—the sweep circuits

In the Philco trouble-shooting procedure, localization of the trouble to a functional section is accomplished, if possible, by the OPERATIONAL CHECK. Charts are given to help the serviceman make this check quickly and accurately. Practically all of the troubles which occur in a television receiver cause abnormal indications on the screen or from the speaker, or both. By simply looking and listening, the serviceman often can localize the trouble to a block of circuits immediately, without needless testing.

If the trouble cannot be localized by the OPERATIONAL CHECK, it can be localized by the TEST-POINT ANALYSIS. To aid in this analysis, the parts in the schematic diagram, base layouts, and replacement parts list are symbolized according to the section numbers, and a trouble-shooting chart is given for each section. Each sectional chart refers to one or more "major" test points (numbers within stars), and a subordinate group of "key" test points (letters within circles), which are indicated on the schematic diagram and base layout. A few tests at the "major" test points throughout the receiver, as directed in the trouble-shooting charts, will definitely localize the trouble to a particular section, and eliminate other sections from suspicion.

After the trouble has been localized to a section, either by the OPERATIONAL CHECK or the TEST-POINT ANALYSIS, a few additional tests at the "key" test points, specified in the chart for that section, will isolate the faulty circuit. The defective part can then be located by testing tubes, by simple voltage and resistance measurements, by substitution of parts, or, in some circuits, by waveform checks. Trouble revealed by any test should be corrected before testing further.

IMPORTANT!

To insure proper operation, all repairs should be made using exact replacement parts, and the new part should be located in the exact position from which the original part was removed. If it is necessary to temporarily move other parts or wiring to make the repair, be sure to dress the parts and wiring back to their original positions after the repair has been made.

OPERATIONAL CHECK

NOTE: Do not make an operational check if the complaint indicates that the Receiver cannot be turned on without risk of further damage — proceed to the TEST-POINT ANALYSIS.

If the complaint indicates that the Receiver can be turned on without risk of further damage, turn on the Receiver and set the channel selector to receive a television station which is on the air. Either the picture or the sound, or both, may be unsatisfactory. If both are unsatisfactory, check the aerial installation. If this inspection fails to reveal trouble, refer to the classified portions of the following charts.

SOUND PRESENT, BUT PICTURE MISSING

INDICATION	PROBABLE TROUBLE	REFERENCE
Only bright, horizontal line appears on picture tube.	Defective vertical-sweep circuit.	Refer to Section 5 trouble-shooting chart.
No picture, but sound is good, and raster appears.	Trouble in video section, except input i-f stage.	Refer to Section 3 trouble-shooting chart.
Sound good, but picture tube and screen unlighted.	Defective high-voltage power supply or horizontal-sweep circuit.	Refer to Section 1 and Section 5 trouble-shooting charts.

MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122 PHILCO CORP.

PICTURE PRESENT, BUT SOUND MISSING

INDICATION	PROBABLE TROUBLE	REFERENCE
Picture good, but no sound.	Trouble in audio section.	Refer to Section 2 trouble-shooting chart.

BOTH SOUND AND PICTURE MISSING

INDICATION	PROBABLE TROUBLE	REFERENCE
Set dead (no picture or sound), but raster appears.	Defective 7B6 a-g-c tube, causing cut-off of input i.f. Defective r-f, mixer, oscillator, input i-f stage, or a-g-c circuit.	Refer to Section 3 and Section 4 trouble-shooting charts.
Set completely dead (no picture, sound, or raster).	Defective low-voltage power supply.	Refer to Section 1 trouble-shooting chart.
Flashes in raster, with aerial disconnected.	High-voltage power supply arcing over (corona discharge).	Refer to Section 1 and Section 5 trouble-shooting charts. Check lead dress of high-voltage circuit.

PICTURE DOES NOT REMAIN STATIONARY

INDICATION	PROBABLE TROUBLE	REFERENCE
Picture will not sync vertically and horizontally.	Defective sync-separator tube or associated circuit, or weak signal with high noise level.	Refer to Section 5 trouble-shooting chart.
Picture will not sync vertically.	Defective vertical-sync amplifier or vertical-sweep-generator tube, or associated circuits.	Refer to Section 5 trouble-shooting chart.
Picture will not sync horizontally.	Defective horizontal-sync amplifier or horizontal-sweep-generator tube, or associated circuits.	Refer to Section 5 trouble-shooting chart.

IMPROPER PICTURE SIZE

INDICATION	PROBABLE TROUBLE	REFERENCE
WIDTH control will not reduce width of raster.	Defective WIDTH control or associated circuit, or low anode voltage.	Refer to Section 5 trouble-shooting chart.
Raster too small, either vertically or horizontally (HEIGHT and WIDTH controls properly adjusted).	Low output from low-voltage power supply, weak vertical or horizontal-output tube, or insufficient drive for output tubes.	Refer to Section 5 trouble-shooting chart.

PICTURE DISTORTED

INDICATION	PROBABLE TROUBLE	REFERENCE
Picture S-shaped on side.	Hum in horizontal-deflection coils.	Check power-supply filters. Refer to Section 1 trouble-shooting chart.
Picture folded in horizontal plane.	Weak 5V4G damping tube, or trouble in associated circuit.	Refer to Section 5 trouble-shooting chart.

PHILCO CORP. MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122

PICTURE NOT CLEAR

INDICATION	PROBABLE TROUBLE	REFERENCE
Sound and picture weak.	A-g-c control incorrectly set, or defective 7B6 tube. Weak r-f amplifier, oscillator, mixer, or input i-f amplifier tubes. Defective aerial.	Refer to Section 3 and Section 4 trouble-shooting charts. Check aerial.
Picture too dark (CONTRAST and BACKGROUND controls properly adjusted).	A-g-c control incorrectly set, or defective 7B8 tube, causing no a.g.c.	Refer to Section 3 trouble-shooting chart.
Multiple images (ghosts) appear.	Defective aerial installation, or incorrect orientation of aerial. Standing waves on transmission line.	Check aerial and transmission line.
Insufficient contrast in picture (a-g-c control properly adjusted).	Insufficient gain in video section, or defective picture tube.	Refer to Section 3 trouble-shooting chart.
Beat pattern (fine, weaving, meshed lines).	Improperly aligned 4.5-mc. trap. Interference from short-wave transmitter.	Refer to step 14. Check aerial orientation.
Sound in picture (horizontal bars following modulation).	Microphonic tubes, oscillator-core adjustment incorrectly set, or L301B and L309 (accompanying sound traps) incorrectly adjusted.	Refer to alignment chart.
Picture lacks sharpness of detail.	Defective focus circuits, or weak focus-assembly magnet. Trouble in r-f, i-f, or video stages.	Refer to Section 1 trouble-shooting chart, step 5. Refer to Section 3 and Section 4 trouble-shooting charts.
Picture lacks detail (focus properly adjusted).	Misalignment of Receiver, or defective aerial system.	Refer to alignment chart. Check aerial system.
Picture background unstable.	Trouble in d-c restorer.	Refer to "D-c Restoration Check".

RECEIVER DOES NOT OPERATE ON ALL CHANNELS

INDICATION	PROBABLE TROUBLE	REFERENCE
Trouble on one channel only (stations receivable on other channels).	Improper adjustment of oscillator for channel, or open oscillator or r-f coil.	Refer to Section 4 trouble-shooting chart.

TEST-POINT ANALYSIS

PRELIMINARY CHECK

Remove the Receiver chassis from the cabinet and carefully inspect it for evidence of burnt or overheated parts, tubes broken or loose in sockets, broken or loose connections, defective insulation or other indication of trouble. If any indications of trouble are found, locate the cause of the trouble before replacing the damaged part.

After the inspection has been made, and any necessary repairs have been completed, connect the Receiver for operation on the bench, using the speaker and picture tube from the set being repaired.

MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122 PHILCO CORP.

TEST EQUIPMENT REQUIRED FOR TEST-POINT ANALYSIS

To perform the trouble-shooting tests, the following test equipment and parts are required:

VTVM (or 20,000-ohms-per-volt voltmeter) with 10,000-volt multiplier

OSCILLOSCOPE with broad-band amplifiers

SIGNAL GENERATORS

Audio signal generator

AM signal generator (frequency range of 20 mc. to 28 mc. for i-f tests; frequency range for r-f tests to cover local station carrier frequencies)

FM signal generator (center frequency range of 20 mc. to 30 mc., and sweep range of at least 250 kc.)

MISCELLANEOUS

.1-mf., 600-volt, paper condenser

50-mmf. condenser (mica, 2000-volt rating)

.002-mf. condenser (mica, 2000-volt rating)

1000-ohm resistor (non-inductive)

Line cord with a standard male connector, Part No. L2183, and a special female connector and a shell flange, Part Nos. 27-6217 and 56-4346 (to fit a-c interlock).

TROUBLE SHOOTING SECTION 1—POWER-SUPPLY CIRCUITS

NOTE: *For all steps except step 7, connect VTVM or 20,000-ohms-per-volt voltmeter between test point and ground. For step 7, connect 20,000-ohms-per-volt voltmeter, with 10,000-volt multiplier, between test point and ground.

Voltage readings given were measured at a line voltage of 117 volts, a.c.

If the "NORMAL INDICATION" is obtained in steps 1 and 7, proceed with the tests for Section 2 (audio circuits); if not, isolate and correct the trouble in this section.

LOW-VOLTAGE POWER SUPPLY

STEP	TEST POINT	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	①	+245 volts d.c.		If normal indication is obtained, proceed with step 7. If abnormal indication is obtained, proceed with step 2.
2	Ⓐ	117 volts a.c. (110 to 120 volts).	Low voltage No voltage	Incorrect power source. Defective: S100, P100, J100, W100, J500*, P500*.
3	Ⓑ Remove 5U4G tubes.	720 volts a.c.	Low voltage No voltage	Defective: T100†. Shorted filament circuit. Defective: T100†.
4	Ⓒ Replace 5U4G tubes.	+345 volts d.c.	High voltage Low voltage No voltage	Open: R541*, R547*, R548*, R100A, L501*, L502*. Defective: 5U4G. Open: C102, C103. Shorted or leaky: C102, C103, C105A, C105B, C219B*. Defective: 5U4G. Shorted: C102, C103, C105A. Open: L100.
5	Ⓓ	−12 volts d.c.	High voltage No voltage	Open: R547*, R548*, L501*, L502* Shorted: C104.
6	①	+245 volts d.c.	High voltage Low voltage No voltage	Trouble in another section. Shorted: C105B. Trouble in another section. Open: R100.

TROUBLE SHOOTING SECTION 1 — POWER SUPPLY — Continued

HIGH-VOLTAGE POWER SUPPLY
DANGER! HIGH VOLTAGE

STEP	TEST POINT	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
7 See Note above.	⑫	7300 (approx.) volts d.c. (CONTRAST and BACKGROUND controls set at minimum).	No voltage Low voltage	Defective: horizontal-sweep circuit*, 1B3GT, T503*. Open: R101. Open: C106, C520*, C522*. Defective: 5V4G*.

* This part, located in another section, may cause abnormal indication in this section.

† REPLACING 50-CYCLE POWER TRANSFORMER (T100): The 50-cycle power transformer is mounted on a special bracket. After replacing this transformer, it may be necessary to change its position on the bracket to minimize hum interference. With a station test pattern tuned in, turn the transformer slightly on the bracket until minimum hum interference is apparent. The effect of hum is noticeable as a gray, horizontal bar, drifting downward across the picture. (This effect is not apparent if the 50-cycle Receiver is operated on 60-cycle current.)

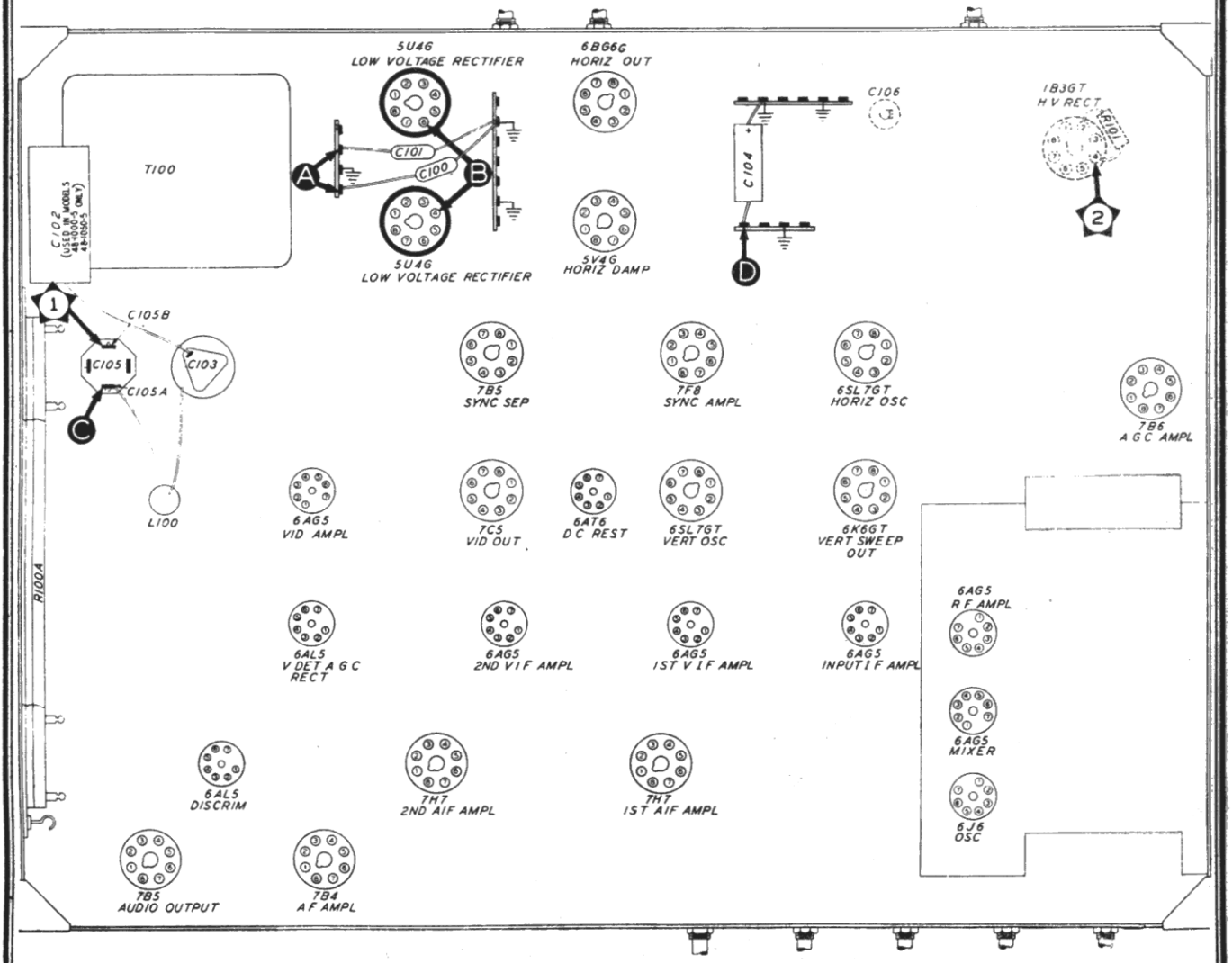


FIGURE 27. BOTTOM VIEW, SHOWING SECTION 1 TEST POINTS

MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122 PHILCO CORP.

TROUBLE SHOOTING SECTION 2—AUDIO CIRCUITS

Set VOLUME control to maximum and TONE control fully clockwise:

NOTE 1: Use an FM signal generator, set to 22.1 mc. An AM (400-cycle modulated) signal generator may be used if FM signal generator is not available. If AM signal generator is used, it should be adjusted slightly below 22.1 mc. For steps 1, 5, 6, and 7, connect signal generator between test point and ground; use .1-mf. condenser in series with signal lead. Use moderate to weak output.

NOTE 2: For steps 2, 3, and 4, connect audio signal generator, set at 400 cycles, between test point and ground; use .1-mf. condenser in series with signal lead. Use moderate to weak output.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 3 (video circuits); if not, isolate and correct the trouble in this section.

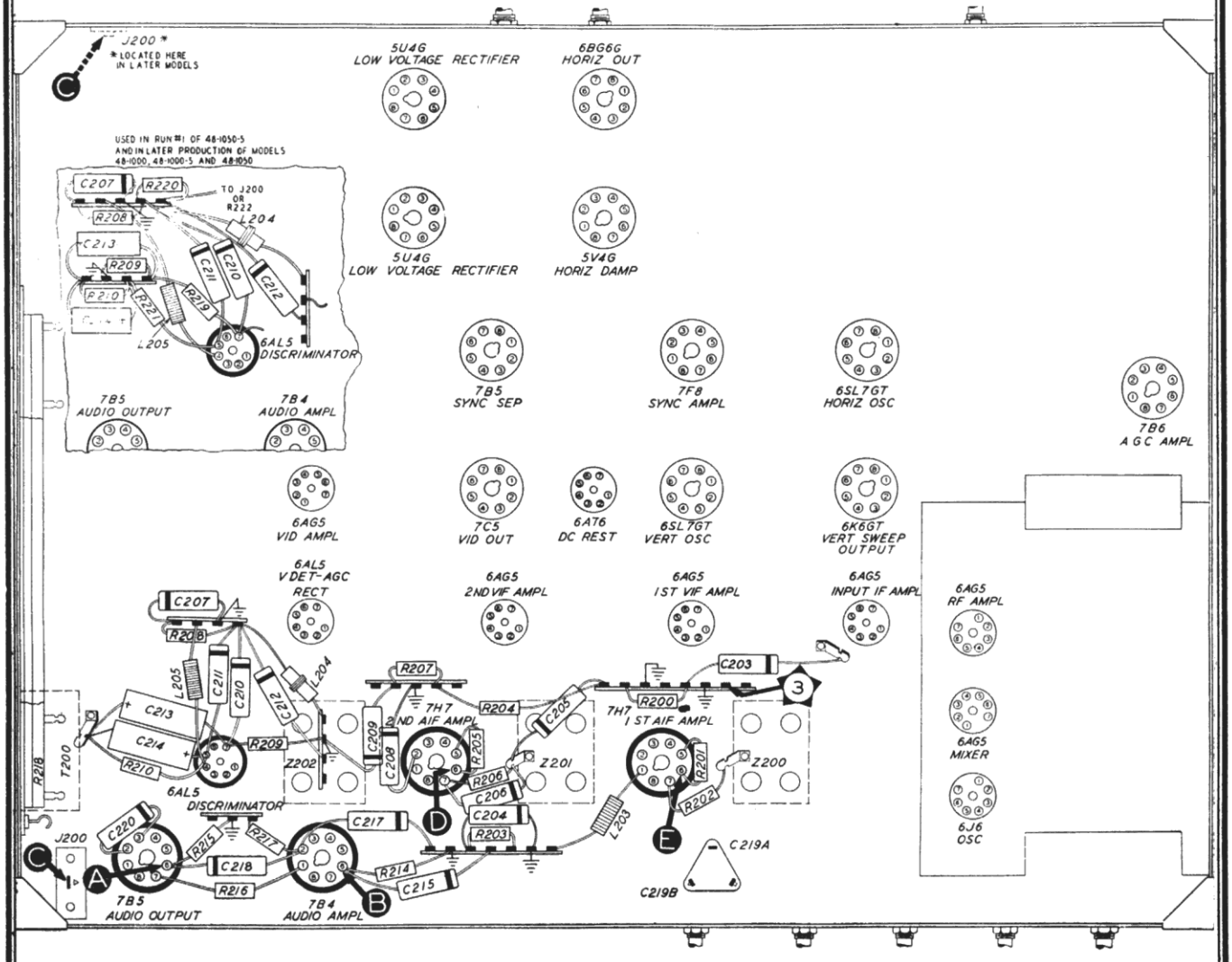


FIGURE 28. BOTTOM VIEW, SHOWING SECTION 2 TEST POINTS

PHILCO CORP. MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122

TROUBLE SHOOTING SECTION 2 — AUDIO CIRCUITS — Continued

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1 See Note 1.	③	Loud, clear audio signal.	Trouble in this section; proceed with step 2.
2 See Note 2.	Ⓐ	Loud, clear audio signal.	Defective: LS200, T200, C220, 7B5. Open: C219A, R218, R216. Leaky: C219B.
3 See Note 2.	Ⓑ	Loud, clear audio signal, louder than in step 2.	Defective: 7B4. Open: C218, R214, R215, R217.
4 See Note 2.	Ⓒ	Clear audio signal, weaker than in step 3.	Defective: R213, R211. Shorted: C210, C211, C213, C214, C216. Open: C212, C215, R214.
5 See Note 1.	Ⓓ	Loud, clear audio signal, louder than in step 4.	Defective: 6AL5 (discriminator), 7H7 (2nd a.i.f.), Z202. Open: L204, L205, R205, R207, R209, R210, R206, C206. Shorted: C209, C208, C207. Misalignment: See alignment chart.
6 See Note 1.	Ⓔ	Loud, clear audio signal, louder than in step 5.	Defective: 7H7 (1st a.i.f.), Z201. Open: R201, R202, R204, C205, L203. Shorted: C205. Misalignment: See alignment chart.
7 See Note 1.	③	Loud, clear audio signal.	Defective: Z200. Open R200. Shorted: C203. Misalignment: See alignment chart. Trouble in Section 3.

TROUBLE SHOOTING SECTION 3—VIDEO CIRCUITS

Set CONTRAST control fully clockwise. Set BACKGROUND control so that raster is faintly visible on picture tube. (If raster cannot be obtained, proceed to Section 5, and test for horizontal and vertical sweep action; after correcting the trouble, return to this section.)

NOTE 1: For steps 1, 5, 6, 7, 8, and 10, connect AM signal generator, set at 26.6 mc. and modulated at 400 cycles, between test point and ground; use .1-mf. condenser in series with signal lead.

NOTE 2: For steps 2, 3, and 4, connect audio signal generator, set at 400 cycles, between test point and ground; use .1-mf. condenser in series with signal lead.

NOTE 3: For step 9, connect AM signal generator, set at 26.6 mc. and modulated at 400 cycles, between grid (pin 1) of 6AG5 mixer tube and ground; use .1-mf. condenser in series with signal lead. Adjust generator for weak output. Connect VTVM or 20,000-ohms-per-volt voltmeter between test point and ground, with negative lead to test point. Use 5-volt range. Observe voltage indication while turning a-g-c control through its range.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 4 (r-f circuits); if not, isolate and correct the trouble in this section.

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1 See Note 1.	④	Strong, alternate white and black bars on picture tube, with weak signal-generator output.	Trouble in this section; proceed with step 2.
2 See Note 2.	Ⓐ	Alternate white and black bars, with strong signal-generator output.	Defective: 10BP4, 6AT6, R343. Open: C333, L312, R342, R340, R341. Shorted: C328D, C331, C332, C333.
3 See Note 2.	Ⓑ	Same as step 2, except stronger bars, with less signal-generator output than in step 2.	Defective: 7C5, R333. Open: R335, R336, R337, R332, R334. Shorted: C328C, C328D.

MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122 PHILCO CORP.

TROUBLE SHOOTING SECTION 3 — VIDEO CIRCUITS — Continued

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
4 See Note 2.	C	Same as step 2, except stronger bars, with less signal-generator output than in step 3.	Defective: 6AG5 (video amplifier). Open: L310, R331, L311, R326, R327, R328, R329, C327, C330. Shorted: C328A, C328B.
5 See Note 1.	D	Same as step 2, with strong signal-generator output.	Defective: 6AL5 (video detector). Open: L308, C325, R324, L307. Shorted: C321, C323.
6 See Note 1.	E	Same as step 2, with less signal-generator output than in step 5.	Defective: 6AG5 (2nd video i.f.), Z303. Open: R313, R314, L306, R312, C314. Shorted: C315, C316, C317.
7 See Note 1.	F	Same as step 2, with less signal-generator output than in step 6.	Defective: 6AG5 (1st video i.f.), Z302. Open: R310, R311, L305, R309. Shorted: C311, C312, C313.
8 See Note 1.	G	Same as step 2, with less signal-generator output than in step 7.	Defective: 6AG5 (input i.f.), Z301. Open: R200*, R307, R306, L304. Shorted: C307, C308, C309, C203*.
9 See Note 3.	H	0 to 1.5v negative as a-g-c control is varied through its range.	Trouble in horizontal-sweep circuit. Refer to Section 5 trouble-shooting chart. Defective: 7B6, 6AL5 (a-g-c rectifier), R321. Open: C318, C319, C320, C322, R315, R316, R317, R318, R319, R320, R322, R323, R325. Shorted: C318, C319, C320, C322, C326.
10 See Note 1.	4	Same as step 1.	Defective: Z300.

* This part, located in another section, may cause abnormal indication in this section.

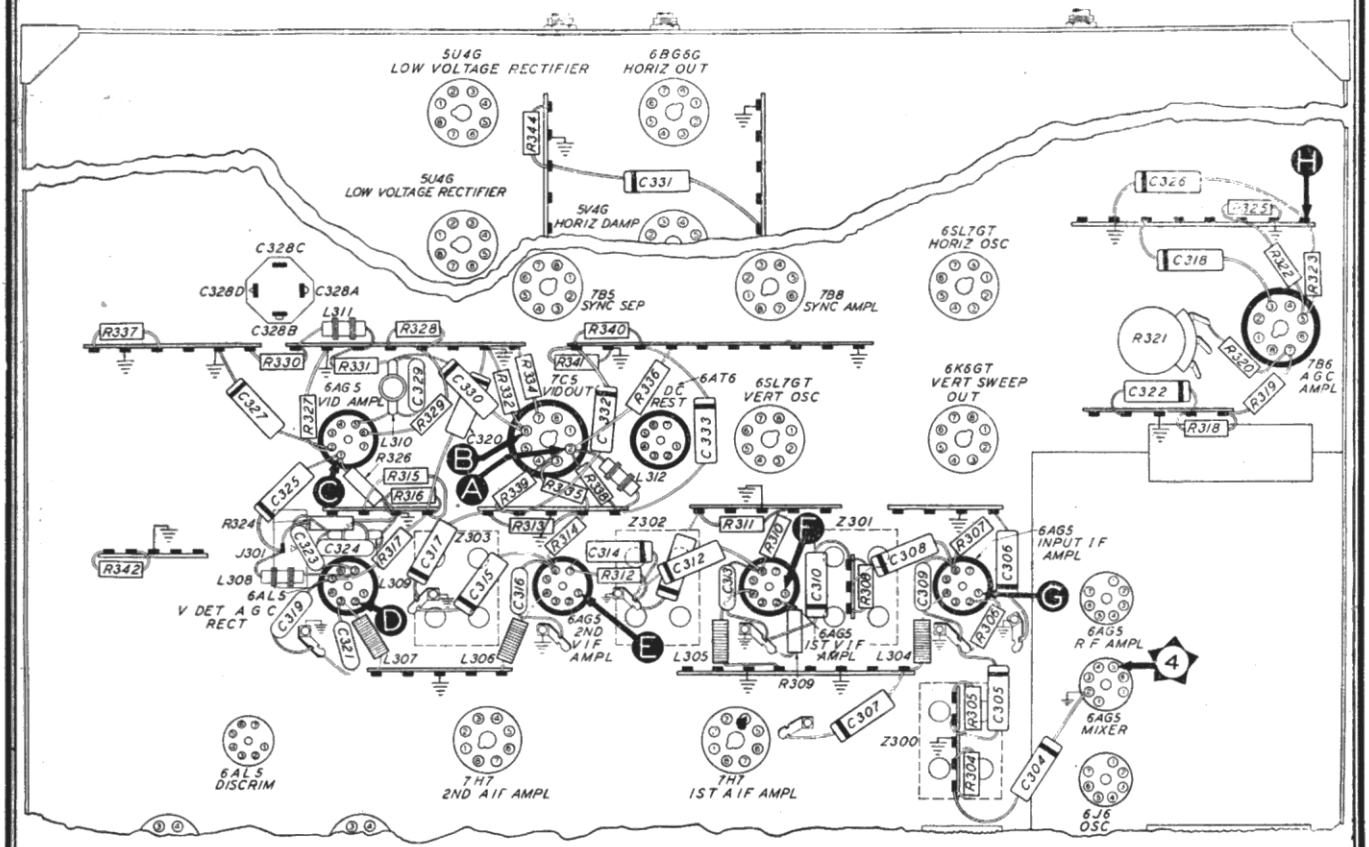


FIGURE 29. BOTTOM VIEW, SHOWING SECTION 3 TEST POINTS

TROUBLE SHOOTING SECTION 4—R-F CIRCUITS

Set channel selector to desired channel (make certain that proper coils are inserted in channel selector), and turn VOLUME control fully clockwise.

For all steps except step 2, connect AM signal generator, set to audio-carrier frequency of desired channel (see page 11 for frequency chart), between test point and ground; use .1-mf. condenser in series with signal lead. In steps 1 and 5, loose coupling should be used.

NOTE: For step 2, connect voltmeter (VTVM, or 20,000-ohms-per-volt voltmeter), with 1000-ohm isolating resistor in series with prod end of negative lead, between test point A and pin 7 of oscillator tube.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 5 (sweep circuits); if not, isolate and correct the trouble in this section.

STEP	TEST POINT	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	⑤	Loud, clear audio signal.	Weak or no signal.	Trouble in this section; proceed with step 2.
2 See Note above.	Ⓐ	2.5 volts negative.	Low or no voltage.	Defective: 6J6, Z400. Open: L402, R401, C404. Shorted: C409, C404, C403, C402.

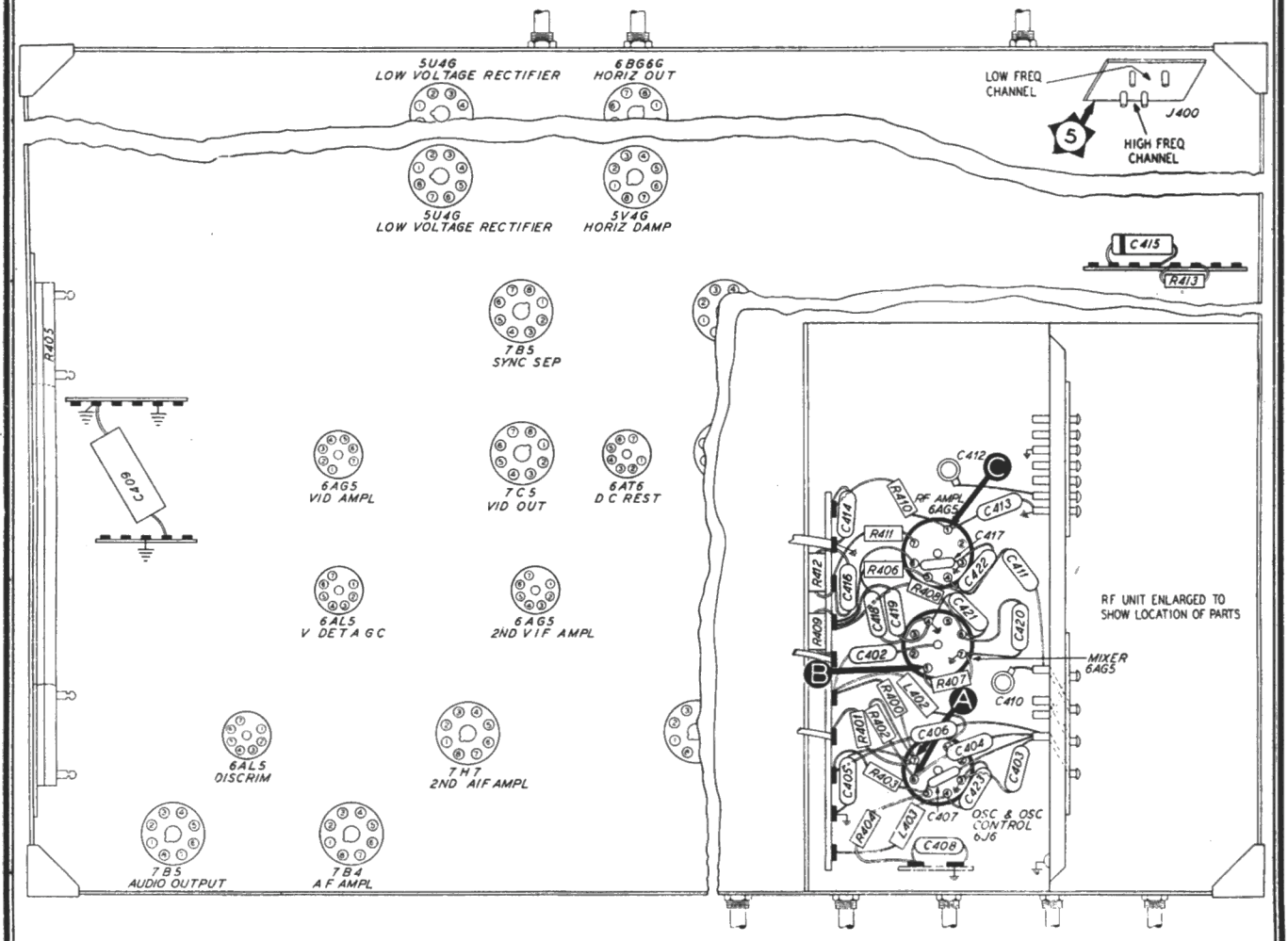


FIGURE 30. BOTTOM VIEW, SHOWING SECTION 4 TEST POINTS

MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122 PHILCO CORP.

TROUBLE SHOOTING SECTION 4 — R-F CIRCUITS — Continued

STEP	TEST POINT	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
3	B	Loud, clear audio signal.	Weak or no signal.	Oscillator off frequency. Defective: 6AG5 (input i.f.), 6AG5 (mixer), Z300*. Open: R304*, R403, R409. Shorted: C304*, C420, C421, C411, C419.
4	C	Loud, clear audio signal.	Weak or no signal.	Defective: 6AG5 (r-f amplifier), Z400. Open: R406, C413, R411, R412. Shorted: C417, C418.
5	5	Loud, clear audio signal.	Weak or no signal.	Defective: Z401.

* This part, located in another section, may cause abnormal indication in this section.

TROUBLE SHOOTING SECTION 5—SWEEP CIRCUITS

BE SAFE! Turn the Receiver off before making connections for test purposes.

For waveforms taken at the vertical sweep and sync circuits, the oscilloscope must be synchronized at approximately 30 c.p.s. (half the vertical sweep rate), and, for waveforms taken at the horizontal sweep and sync circuits, at approximately 7,875 c.p.s. (half the horizontal sweep rate). These tests must be made with a standard RMA television signal applied to the receiver input. The test chart signal from a television station may be used. The voltage values indicated under each waveform in the "NORMAL INDICATION" column are peak-to-peak values. For all steps except 1, 6, 12, 14, and 15, connect oscilloscope (vertical plates) between test point and ground.

NOTE 1: For steps 1 and 6, use 50-mmf. and .002-mf. condensers, in series, as a capacitance voltage divider between pin 9 of J500 (test point 6) and ground, with .002-mf. condenser at ground side; connect vertical plates of oscilloscope across .002-mf. condenser.

NOTE 2: For steps 12 and 15, use a d-c blocking condenser (.5-mf., 600-volt) in ground lead of oscilloscope; connect 50-mmf. and .002-mf. capacitance voltage divider between pin 3 of L505B and pin 6 of 5V4G tube; connect vertical plates of oscilloscope across .002-mf. condenser.

NOTE 3: For step 14, connect 50-mmf. and .002-mf. capacitance voltage divider between plate cap of 6BG6G tube and ground, with .002-mf. condenser at ground side; connect vertical plates of oscilloscope across .002-mf. condenser.

If the "NORMAL INDICATION" is not obtained in steps 1, 7, 12, and 16, follow the steps, or sections, specified for testing the circuits in which abnormal operation is indicated.

VERTICAL-SWEEP CIRCUIT

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION	SPECIAL NOTES
1 See Note 1.	6	 24v	Trouble in vertical-sweep circuit; proceed with step 2.	
2	A	 220v	Defective: 6SL7GT (vertical-sweep generator), T500. Open: R509, R521, R520, R512, R513, C505, C506A, C507. Shorted: C505, C506A, C507, C504.	

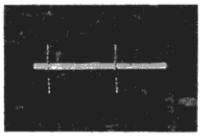
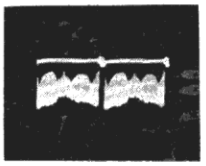
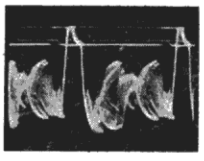
PHILCO CORP. MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122

TROUBLE SHOOTING SECTION 5 — SWEEP CIRCUITS — Continued

VERTICAL-SWEEP CIRCUIT

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION	SPECIAL NOTES
3	B	 35v	Open: R516, R515, R514, R517, R518, C506B. Shorted: C506B, C508.	
4	C Remove vertical-output tube.	 32v	Open: C508, C509, R519, R522. Shorted: C509, C506C, C508.	
5	D Replace vertical-output tube.	 180v	Defective: 6K6GT, T501. Open: C506C, R524, R523, L500C, L500D. Shorted: C506C.	
6 See Note 1.	6	Same as step 1.	Open: L500C, L500D, R500A, R500B.	

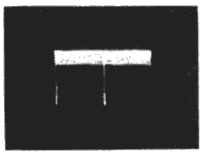
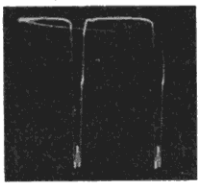
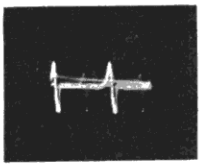
VERTICAL-SYNC CIRCUIT

7	7 Remove vertical-sweep-generator tube.	 22v	Trouble in vertical-sync circuit; proceed with step 8.	
8	E	 20v	Defective: 6AG5 (video amplifier), or other trouble in Section 3. Refer to Section 3 trouble-shooting procedure. Open: C500, R501, R502. Shorted: C500.	
9	F	 4v	Defective: 7B5 (sync separator). Open: R505, R504, R503, R506. Shorted: C501.	

MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122 PHILCO CORP.

TROUBLE SHOOTING SECTION 5 — SWEEP CIRCUITS — Continued

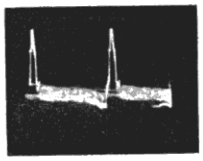
VERTICAL-SYNC CIRCUIT

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION	SPECIAL NOTES
10	G	 3v	Open: C502, R507, R508. Shorted: C502.	
11	7	Same as step 7.	Defective: 7F8. Open: C504, R510, R511, R509. Shorted: C503, C504.	After step 11, replace vertical-sweep-generator tube.
HORIZONTAL-SWEEP CIRCUIT				
12 See Note 2.	8	 475v	Trouble in horizontal-sweep circuit; proceed with step 13.	
13	H Remove horizontal output tube.	 58v	Defective: 6SL7GT (horizontal-sweep generator), T502. Shorted: C515, C516, C513A, C517. Open: R528, R529, R530, R531, R532, R533, R534, R535, R536, R537, R538, C514, C516, C517, C518.	See also figures 33, 34, 35, and 36.
14 See Note 3.	J Replace horizontal output tube.	 3080v	Defective: 6BG6G, T503, 5V4G. Open: C513B, C519, R539, R540, R541, R542, R543, R544, R545, R546, L500A, L500B. Shorted: C513B, C520, C522, C519, C521.	
15 See Note 2.	8	Same as step 12.	Defective: L500A, L500B.	
HORIZONTAL-SYNC CIRCUIT				
16	9 Remove horizontal-sweep-generator tube.	 5v	Trouble in horizontal-sync circuit; proceed with step 17.	

PHILCO CORP. MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122

TROUBLE SHOOTING SECTION 5 — SWEEP CIRCUITS — Continued

HORIZONTAL-SYNC CIRCUIT

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION	SPECIAL NOTES
17	K	 3v	Open: C510, R525.	See also steps 8 and 9.
18	9	Same as step 16.	Defective: 7F8. Open: R526, R527, C512, R529. Shorted: C511, C512.	After step 18, replace horizontal - sweep-generator tube.

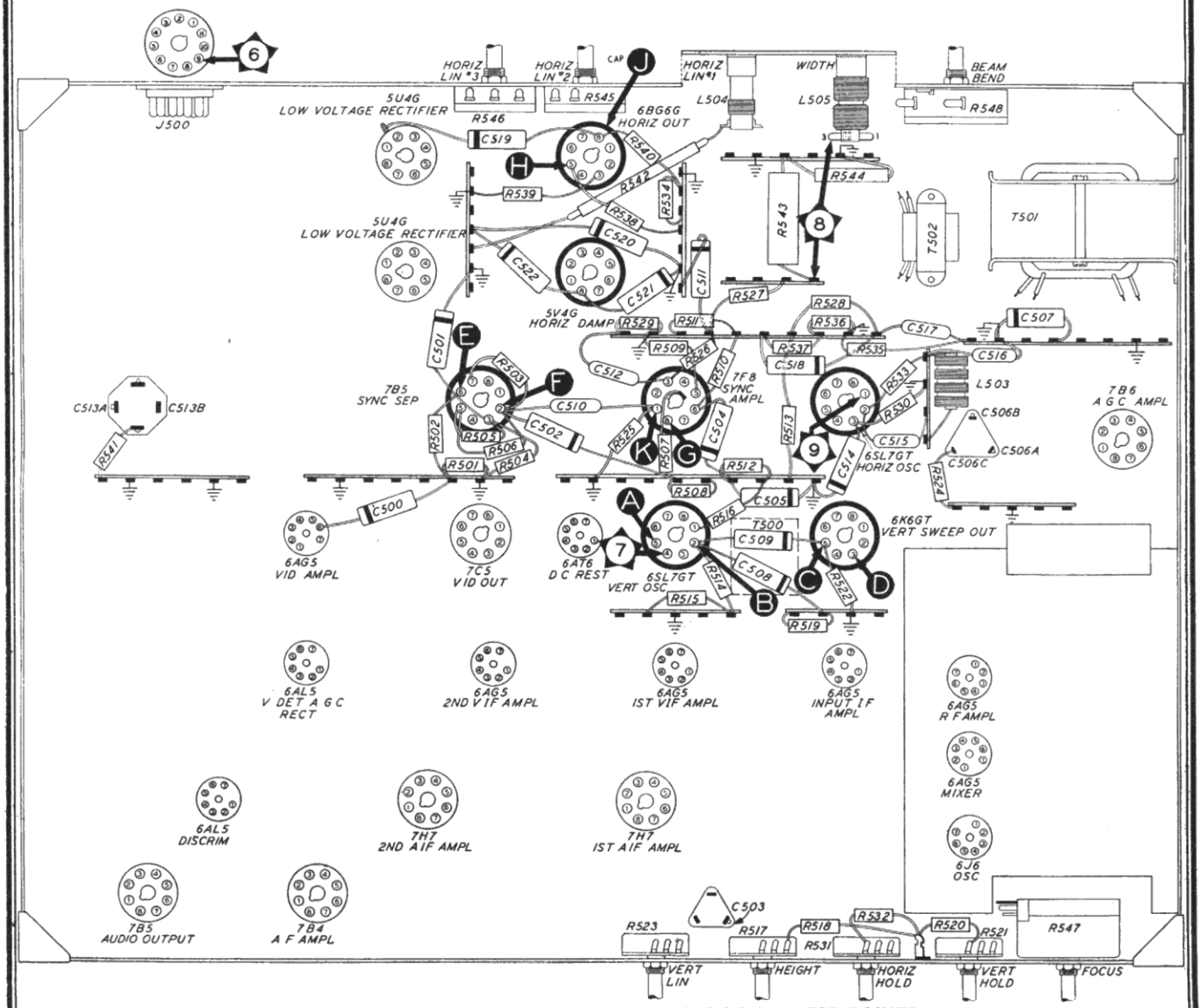


FIGURE 31. BOTTOM VIEW, SHOWING SECTION 5 TEST POINTS

MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122 PHILCO CORP.

ALIGNMENT

CAUTION: Dangerous potentials are present in the Receiver when it is operating, and for a short time after it has been turned off.

General

The intermediate frequencies of the Receiver are 22.1 megacycles for the audio channel and 26.6 megacycles for the video channel. The alignment of circuits operating at these high frequencies requires accurately calibrated equipment and extreme care in making the adjustments. The following precautions must be observed.

The top of the work bench should be metallic, or a separate metal plate should be placed on the bench; the Receiver chassis and signal-generator case must make good metal-to-metal contact with the bench top or plate, which should be securely grounded.

All leads from the signal generator must be shielded. The unshielded length of signal lead must be kept very short, and the shield must be clipped to the Receiver chassis at a point close to the signal-lead connection. The signal-generator output lead should be terminated with a shunt resistance equal to its characteristic impedance.

The signal-generator output must be kept low enough to prevent overloading the Receiver circuits. Limiting action produced by overloaded circuits causes incorrect response curves.

All adjustments should be made with low-loss, non-metallic alignment tools.

Never disconnect the picture tube, picture-tube yoke, or loud-speaker while the Receiver is turned on. (The yoke plug acts as an interlock which opens the primary supply circuit of the Receiver when the plug is disconnected.) If it is desired, for special purposes, to operate the Receiver without the speaker and the picture-tube assembly, remove the vertical and horizontal sweep-generator tubes and the audio-output tube before turning on the Receiver.

NOTE: Before starting the alignment, allow the Receiver and equipment to warm up for at least 20 minutes.

Test Equipment Required for Alignment and Adjustments

Special test equipment for television-receiver alignment will be available in the near future. Such equipment may combine several of the test instruments listed below. The information given for each instrument is generalized, so that the serviceman can determine whether his present equipment is adequate.

VOLTMETER

Vacuum-tube voltmeter or 20,000-ohms-per-volt voltmeter, with ranges of 0—1, 0—10, and 0—600 volts, a.c. and d.c.

OSCILLOSCOPE

Calibrated; vertical sensitivity of 1 volt (peak-to-peak) per inch, or better.

The following equipment is necessary to properly align and adjust the receiver:

IMPORTANT!

Do not attempt these adjustments unless the specified test equipment is available.

FM SIGNAL GENERATOR

Deviation, ±4 mc.; center-frequency ranges, 20 mc. to 30 mc.; sweep-sync output with either built-in or separate phase corrector.

AM SIGNAL GENERATOR

Carrier-frequency ranges, 20 mc. to 30 mc. (accurately calibrated); accurate output indicator (either calibrated attenuator or separate output meter); known modulation percentage (variable up to 100% is preferred).

Alignment Chart

VIDEO I.F.

STEP	OUTPUT-INDICATOR CONNECTION	SIGNAL-GENERATOR CONNECTION	SIGNAL-GENERATOR SETTING	ADJUST
1	Connect oscilloscope vertical input to align test jack. Connect horizontal input to sweep output of FM generator. (See Note 1.)	Connect FM and AM generators to grid (pin 1) of 2nd video-i-f amplifier. (See Note 2.)	Set FM generator to 25 mc., deviation ± 4 mc. Set AM generator (unmodulated) to 27.1 mc., to produce marker "pip" on response curve.	Set C303B fully counterclockwise. Adjust L303A and L303B for single peak at 27.1 mc. (indicated by position of marker "pip").

PHILCO CORP. MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122

Alignment Chart — Continued

VIDEO I.F.

STEP	OUTPUT-INDICATOR CONNECTION	SIGNAL-GENERATOR CONNECTION	SIGNAL-GENERATOR SETTING	ADJUST
2	Same as step 1.	Same as step 1.	FM generator, same as step 1. AM generator (unmodulated) to 23.1 mc., to produce marker "pip" on response curve.	Adjust C303B clockwise until low-frequency peak of response curve is at 23.1 mc.; curve should resemble curve 4. It may be necessary to readjust L303A or L303B slightly, to equalize amplitude of peaks.
3	Same as step 1.	Disconnect FM generator. Connect AM generator to grid (pin 1) of 1st video-i-f amplifier.	28.1 mc. (modulated).	Adjust L302B and L309 for minimum signal.
4	Same as step 1.	Connect FM and AM generators to grid (pin 1) of 1st video-i-f amplifier. (See Note 2.)	FM generator, same as step 6. Set AM generator (unmodulated) to 23.75 mc. and 26.6 mc., as required, to produce marker "pips" on response curve.	Adjust L302A for low-frequency peak, and L302C for high-frequency peak, to obtain response curve similar to curve 3.
5	Same as step 1.	Disconnect FM generator. Connect AM generator to grid (pin 1) of input-i-f amplifier.	22.1 mc. (modulated).	Adjust L301B for minimum signal.
6	Same as step 1.	Connect FM and AM generators to grid (pin 1) of input-i-f amplifier. (See Note 2.)	Set FM generator to 25 mc., deviation ±4 mc. Set AM generator (unmodulated) to 22.75 mc., 24.25 mc., 25.75 mc., and 27.0 mc., as required, to produce marker "pips" on response curve.	Adjust L301A and L301C for response curve similar to curve 2.
7	Same as step 1.	Connect FM and AM generators to grid (pin 1) of mixer. (See Notes 2 and 3.)	FM generator, same as step 6. Set AM generator (unmodulated) to 22.6 mc., 23.75 mc., 24.6 mc., and 26.6 mc., as required, to produce marker "pips" on response curve.	Adjust L300A, C300B, and L300B for over-all response curve similar to curve 1. (C300B controls band width.) If curve is not satisfactory, see Note 4.
AUDIO I.F.				
8	Connect oscilloscope vertical input to a-f-c test jack. (See Note 1.) Connect horizontal input to sweep output of FM generator.	Connect FM and AM generators to grid (pin 6) of 2nd audio-i-f amplifier. (See Note 2.)	Set FM generator to 22.1 mc., deviation ±3 mc. Set AM generator (unmodulated) to produce marker "pips" on discriminator curve at each of the three following points, in turn: 1. crossover point 2. negative peak 3. positive peak	No adjustments for this step. Observe the frequency setting of the AM generator required to produce "pips" at each of the three points. The following frequencies should be indicated: 1. crossover point—22.1 mc. 2. negative peak—21.8 mc. 3. positive peak—22.4 mc.
9	Same as step 8.	Same as step 8.	Same setting of FM generator. Set AM generator (unmodulated) to produce marker "pip" at crossover point on discriminator curve.	Adjust L202B until crossover point occurs at frequency setting of 22.1 mc. (See Note 5.)
10	Same as step 8.	Same as step 8.	Same setting of FM generator. Set AM generator (unmodulated) first to 21.8 mc., then to 22.4 mc., to produce marker "pips" on discriminator curve, as adjustments are made.	Adjust L202A and C202C until marker "pips" occur at negative and positive peaks of discriminator curve (thus making the two peaks 600 kc. apart). (See Note 5.)

MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122 PHILCO CORP.

Alignment Chart — Continued

AUDIO I.F.

STEP	OUTPUT-INDICATOR CONNECTION	SIGNAL-GENERATOR CONNECTION	SIGNAL-GENERATOR SETTING	ADJUST
11	Same as step 8.	Connect FM generator to grid (pin 6) of 1st audio-i-f amplifier.	22.1 mc., deviation ±3 mc. Adjust output for same amplitude obtained in step 10.	Adjust L201A for maximum amplitude while keeping amplitude of peaks equal.
12	Same as step 8.	Connect FM generator to grid (pin 1) of input-i-f amplifier.	Same as step 11.	Adjust L200A for maximum amplitude.
13	Same as step 8.	Connect FM and AM generators to grid (pin 1) of mixer. (See Notes 2 and 3.)	Set FM generator to 25 mc. deviation ±4 mc. Set AM generator (unmodulated) to 22.4 mc., 22.1 mc., and 21.8 mc. as required, to produce marker "pips" on discriminator curve.	If necessary adjust L200A and L201A slightly to equalize the amplitude of the negative and positive peaks of the discriminator output curve.
14	Connect oscilloscope vertical input, through .01-mf., 600-volt, isolating condenser, to plate (pin 2) of 7C5 video output amplifier.	FM generator not used. Connect AM generator to grid (pin 1) of 6AG5 video amplifier.	4.5 mc. (unmodulated), strong output.	Adjust L310 for minimum signal.

FINAL I.F. CHECK

NOTE: The procedure given in the following step is performed to make certain that the accompanying sound trap ∓1 and the discriminator are tuned to the same frequency.

15	Connect oscilloscope vertical input to align test jack. Connect VTVM or 20,000-ohms-per-volt voltmeter to a-f-c test jack.	FM generator not used. Connect AM generator to grid (pin 1) of input-i-f amplifier.	22.1 mc. (Set generator, unmodulated, for minimum signal on oscilloscope.)	D-c output of discriminator should be zero. If not, readjust L202B. (See Note 6.)

ALIGNMENT NOTES

NOTE 1: Connect the "hot" lead of the oscilloscope vertical input through a 10,000-ohm isolating resistor, to prevent radiation from the lead.

NOTE 2: Connect the signal lead of the AM generator through a small isolating condenser, approximately 10 mmf.

NOTE 3: Grounding of the signal lead shield is critical at this point. Try adding additional grounding, while observing the output curve, until no change in curve results from added grounds.

NOTE 4: If necessary, readjust L301A, L302C, L301C, and L302A *slightly*, to obtain best possible reproduction of curve 1. IMPORTANT: DO NOT DISTURB L303A, L303B, C303B, L302B, or L301B.

NOTE 5: When making this adjustment, it is possible to apparently obtain the proper curve, and yet have the discriminator output (a-f-c) voltage so phased as to shift the oscillator frequency away from the correct frequency, thus preventing the oscillator from locking in. To avoid this difficulty, check the phasing by observing the polarity of the discriminator output voltage; negative output voltage is produced when the audio-i.f. is lower than the center frequency. If this condition does not exist, turn C303B further in (clockwise) until the required polarity is obtained.

NOTE 6: If this adjustment requires more than 1/2 turn of L202B, the discriminator output curve should be rechecked (see step 8). If necessary, readjust C202C *slightly*, to obtain equal peaks on the response curve.

ADJUSTMENTS AND CHECKS

Automatic Level Control of Picture and Sound (A-G-C) Adjustment

Connect an AM signal generator to the aerial jack, J400, and set the frequency 2.5 mc. above the picture carrier frequency of the channel to which the Precision Channel Selector is set. Adjust the signal generator for 100% modulation (if possible), and an output level of 500 microvolts.

Connect a calibrated oscilloscope to the align test jack, and adjust the a-g-c control R321 (see figure 37) to obtain a 2-volt peak-to-peak reading on the oscilloscope.

If the signal generator is not capable of 100% modulation, but the modulation percentage is known (check by trapezoid method), set the a-g-c adjustment to the same percentage of the 2-volt reading as the generator modulation percentage. For example, if the generator is 30% modulated, set the a-g-c adjustment for 30% of 2 volts peak-to-peak, which is 0.6 volt peak-to-peak.

The a-g-c setting is now approximately the same as when the Receiver leaves the factory. However, this adjustment is reset at the time of installation to adjust the Receiver for best reception in the locality where it is to be used. At installation, the Receiver is set for approximately 2 volts peak-to-peak on the local television station or stations. By this means, overloading of the Receiver video circuits or sync drop-out is prevented. Failure to obtain the 2-volt peak-to-peak signal indicates trouble in the aerial installation.

Video-Amplifier-Gain Check

Leave the AM signal generator connected to the aerial jack, J400, and adjusted the same as for the a-g-c adjustment above. Connect the calibrated oscilloscope to the 7C5 video output amplifier as directed in step 14 of the alignment chart. Set the CONTRAST control fully clockwise. With a 2-volt, peak-to-peak detector output, a peak-to-peak voltage reading of approximately 70 volts should be obtained, indicating a gain of approximately 35 in the video-amplifier stages. If the detector output is less than 2 volts, peak-to-peak, the picture-tube grid voltage will be less than 70 volts, but the gain, i.e., grid voltage ÷ detector voltage, will be the same. If the video-amplifier gain is low, try new video amplifier and output tubes; if the gain is still low, check for trouble in Section 3.

This gain check is also made at the time of installation of the Receiver, using a received signal.

D-c Restoration Check

With the CONTRAST control turned fully clockwise, connect a 20,000-ohms-per-volt voltmeter between the picture-tube grid and the chassis. The voltage measured at this point should be approximately 20 to 30 volts positive (with a 2-volt, peak-to-peak signal at the detector).

Should the proper video-amplifier gain be obtained, but with a lower-than-normal voltage in the d-c restoration check, trouble is indicated in the d-c restoration circuit.

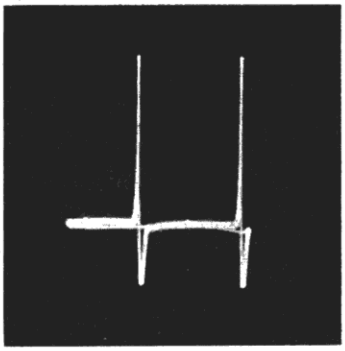


FIGURE 33. WAVEFORM AT GRID (PIN 1) OF 6SL7GT HORIZONTAL-SWEEP OSCILLATOR

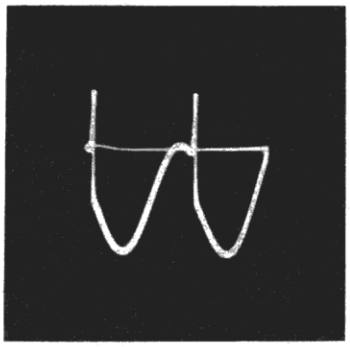


FIGURE 34. WAVEFORM AT PLATE (PIN 2) OF 6SL7GT HORIZONTAL-SWEEP OSCILLATOR

FIGURE 35. WAVEFORM (TAKEN THROUGH 50-MMF. CONDENSER) AT PLATE (PIN 5) OF 6SL7GT HORIZONTAL-SWEEP OSCILLATOR

FIGURE 36. WAVEFORM AT CATHODE (PIN 6) OF 6SL7GT HORIZONTAL-SWEEP OSCILLATOR

MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122 PHILCO CORP.

SYMBOLIZATION

The components in the Receiver circuit are symbolized according to the types of parts and the sections of the Receiver in which the parts are located. The prefix letter of the symbol designates the type of part, as follows:

C —condenser	**L —choke or coil**	**S —switch**
I —pilot lamp	**LS—loud-speaker**	**T —transformer**
J —connector (receptacle)	**P —connector (plug)**	**W —power cord**
	R —resistor	**Z —electrical assembly**

The number of the symbol designates the section in which the part is located, as follows:

100-series components are in Section 1, the power-supply circuits.
200-series components are in Section 2, the audio circuits.
300-series components are in Section 3, the video circuits.
400-series components are in Section 4, the r-f circuits.
500-series components are in Section 5, the sweep circuits.

A suffix letter identifies the part as a component of the assembly which bears an identical number without a suffix letter, and with perhaps a different prefix letter.

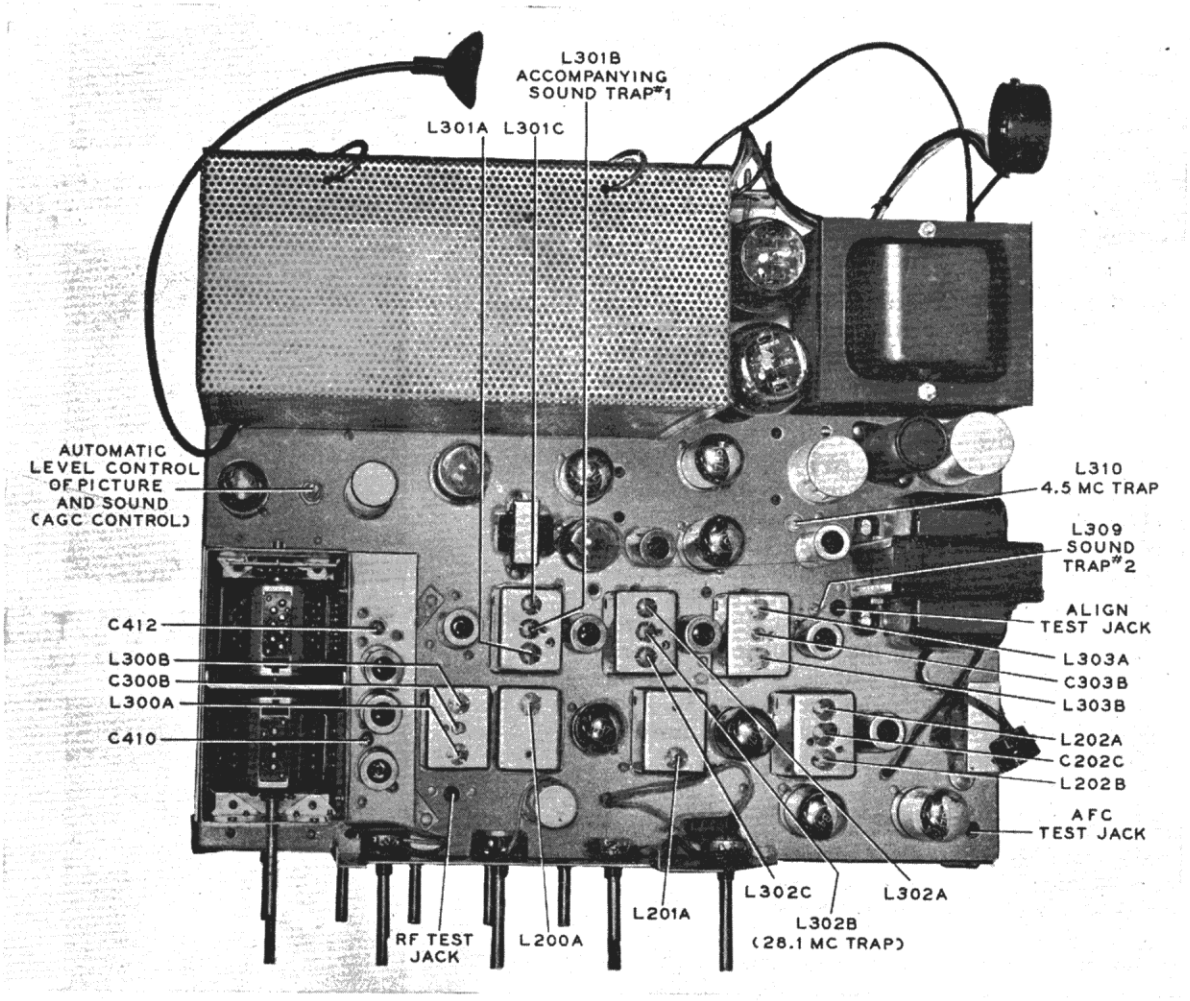


FIGURE 37. TOP VIEW OF CHASSIS, SHOWING TRIMMER AND TUNING-CORE LOCATIONS

PHILCO CORP. MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122

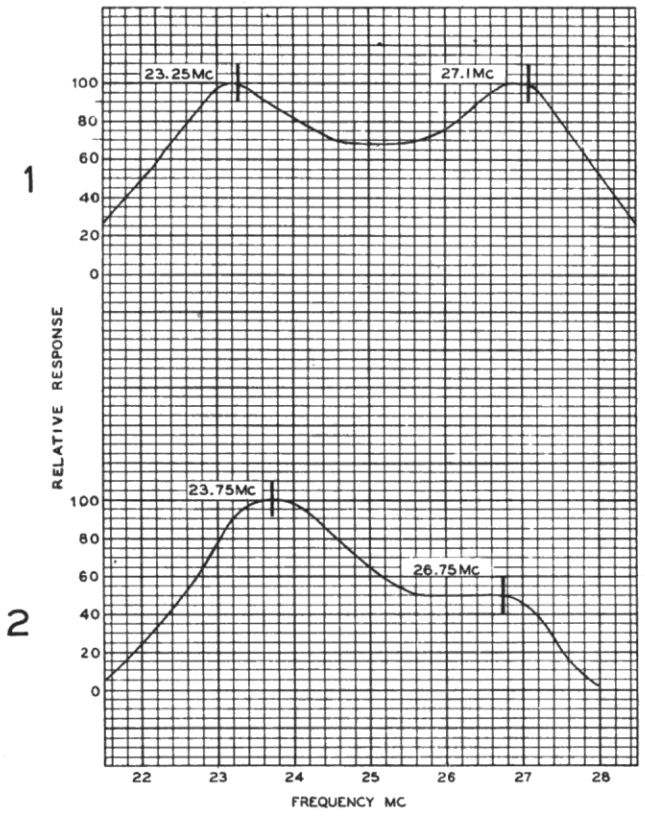


FIGURE 38. VIDEO I-F CURVES 1 AND 2

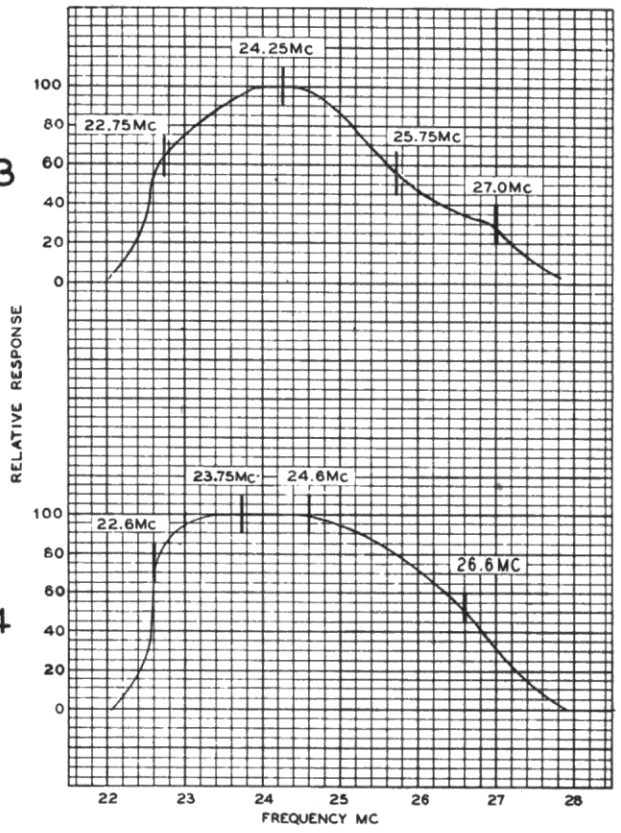
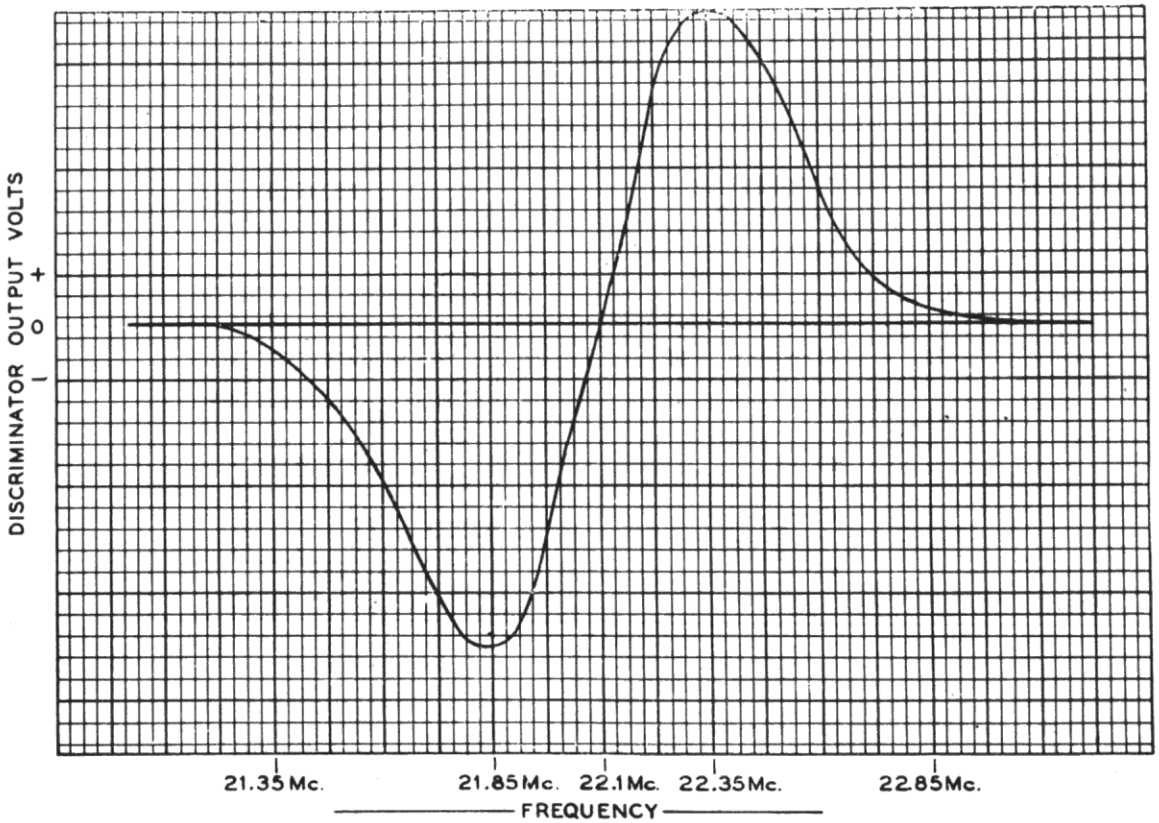


FIGURE 39. VIDEO I-F CURVES 3 AND 4



DISCRIMINATOR CHARACTERISTIC – SWEEP GENERATOR FED INTO INPUT I.F. STAGE

FIGURE 40. DISCRIMINATOR CURVE

MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122

PHILCO CORP.

REPLACEMENT PARTS LIST

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

SECTION 1 — POWER-SUPPLY CIRCUITS

Reference Symbol	Description	Service Part No.
C100	Condenser, line filter, .01 mf.	30-1226-1
C101	Condenser, line filter, .01 mf.	30-1226-1
C102	Condenser, electrolytic, low-voltage filter, 30 mf. (Models 48-1000-5 and 48-1050-5 only)	30-2568-19
C103	Condenser, electrolytic, low-voltage filter, 30 mf.	30-2568-19
C104	Condenser, electrolytic, low-voltage filter, 50 mf.	30-2417-2
C105	Condenser, electrolytic, 4-section, includes C105A, C105B, C513A, and C513B	30-2570-8
C105A	Condenser, low-voltage filter, 40 mf.	Part of C105
C105B	Condenser, low-voltage filter, 20 mf.	Part of C105
C106	Condenser, high-voltage filter, 500 mmf., 10 kv.	30-1229
J100	Connector, cabinet interlock	27-6217
L100	Filter choke	32-8308
P100	Connector, cabinet interlock	54-4426-2
R100	Resistor, 3-section, includes R100A, R218, and R405	33-3435-5
R100A	Resistor, voltage dropping, 820 ohms	Part of R100
R101	Resistor, high-voltage current limiting, 1 megohm	66-5104340
S100	Power switch	Part of R213
T100	Power transformer Models 48-1000 and 48-1050 Models 48-1000-5 and 48-1050-5	32-8303 32-8344
W100	Power cord and plug	L2183

SECTION 2 — AUDIO CIRCUITS

C200A	Condenser, coupling, 220 mmf.	Part of Z200
C201A	Condenser, coupling, 220 mmf.	Part of Z201
C202A	Condenser, coupling, 100 mmf.	Part of Z202
C202B	Condenser, loading, 10 mmf.	Part of Z202
C202C	Condenser, balancing	Part of Z202
C203	Condenser, plate by-pass, .05 mf.	61-0122*
C204	Condenser, a-f-c filter, .1 mf.	61-0113*
C205	Condenser, plate by-pass, .001 mf.	45-3500-5*
C206	Condenser, cathode by-pass, .001 mf.	45-3500-5*
C207	Condenser, a-f-c filter, .1 mf.	61-0113*
C208	Condenser, plate by-pass, 5 mmf.	30-1224-5
C209	Condenser, plate by-pass, .001 mf.	45-3500-5*
C210	Condenser, r-f by-pass, .004 mf.	61-0179*
C211	Condenser, r-f by-pass, .004 mf.	61-0179*
C212	Condenser, coupling, .05 mf.	61-0122*
C213	Condenser, electrolytic, noise suppression, 10 mf.	30-2417-3
C214	Condenser, electrolytic, noise suppression, 10 mf.	30-2417-3
C215	Condenser, coupling, .05 mf.	61-0122*
C216	Condenser, bass compensation, .01 mf.	61-0120*
C217	Condenser, tone compensation, .004 mf.	61-0179
C218	Condenser, coupling, .05 mf.	61-0122*
C219	Condenser, electrolytic, 3-section, includes C219A, C219B, and C503	30-2570-16
C219A	Condenser, cathode by-pass, 40 mf.	Part of C219
C219B	Condenser, filter, 10 mf.	Part of C219
C220	Condenser, audio by-pass, .006 mf.	61-0105*
J200	A-f-c test jack	27-6180
L200A	Coil, 1st a-i-f	Part of Z200
L201A	Coil, 2nd a-i-f	Part of Z201

SECTION 2 (Continued)

Reference Symbol	Description	Service Part No.
L202A	Discriminator primary	Part of Z202
L202B	Discriminator secondary	Part of Z202
L203	Choke, filament	32-4112-3
L204	Choke, balancing	32-4143-1
L205	Choke, filament	32-4112-3
LS200	Loud-speaker	36-1613-2
R200	Resistor, plate filter, 220 ohms	66-1223340*
R201	Resistor, grid, 100,000 ohms	66-4108540
R202	Resistor, cathode, 68 ohms	66-0688340
R203	Resistor, a-f-c filter, 560,000 ohms	66-4563340*
R204	Resistor, plate filter, 10,000 ohms	66-3105340
R205	Resistor, grid, 220,000 ohms	66-4223340*
R206	Resistor, cathode, 150 ohms	66-1158340
R207	Resistor, plate filter, 10,000 ohms	66-3105340
R208	Resistor, a-f-c filter, 560,000 ohms	66-4563340*
R209	Resistor, discriminator load, 27,000 ohms	66-3273340*
R210	Resistor, discriminator load, 27,000 ohms	66-3273340*
R211	Volume control, 2 megohms, tapped at 1 megohm	33-5535-9
R212	Resistor, bass compensation, 47,000 ohms	66-3473340*
R213	Tone control (with power switch), 5 megohms	33-5538-9
R214	Resistor, grid, 4.7 megohms	66-5473340*
R215	Resistor, grid, 1 megohm	66-5103340*
R216	Resistor, cathode bias, 470 ohms	66-1475340*
R217	Resistor, plate load, 330,000 ohms	66-4333340*
R218	Resistor, plate dropping, 1500 ohms	Part of R100
R219†	Resistor, r-f isolating, 3300 ohms	66-2333340*
R220†	Resistor, r-f isolating, 10,000 ohms	66-3103340*
R221†	Resistor, r-f isolating, 2,200 ohms	66-2223340*
R222†	Resistor, r-f isolating, 1,000 ohms	66-2103340*
T200	Transformer, audio output	32-8244-1
Z200	Coupler, 1st a-i-f, 22.1 mc., includes C200A and L200A	32-4100
Z201	Coupler, 2nd a-i-f, 22.1 mc., includes C201A and L201A	32-4099
Z202	Transformer, discriminator, 22.1 mc., includes C202A, C202B, C202C, L202A and L202B	32-4214

† These resistors are used in Model 48-1050-5 only, beginning with run #1.

SECTION 3 — VIDEO CIRCUITS

C300A	Condenser, coupling, 100 mmf.	Part of Z300
C300B	Condenser, coupling, trimmer	Part of Z300
C301A	Condenser, coupling, 100 mmf.	Part of Z301
C301B	Condenser, balancing, 56 mmf.	Part of Z301
C301C	Condenser, balancing, 56 mmf.	Part of Z301
C302A	Condenser, coupling, 100 mmf.	Part of Z302
C302B	Condenser, balancing, 22 mmf.	Part of Z302
C302C	Condenser, balancing, 22 mmf.	Part of Z302
C303A	Condenser, coupling, 100 mmf.	Part of Z303
C303B	Condenser, coupling, trimmer	Part of Z303
C304	Condenser, plate by-pass, .004 mf.	61-0179*
C305	Condenser, a-g-c filter, .004 mf.	61-0179*
C306	Condenser, screen by-pass, .004 mf.	61-0179*
C307	Condenser, filament by-pass, .004 mf.	61-0179*
C308	Condenser, screen by-pass, .004 mf.	61-0179*
C309	Condenser, screen by-pass, 10 mmf.	62-010009001
C310	Condenser, a-g-c filter, .004 mf.	61-0179*
C311	Condenser, plate by-pass, .004 mf.	61-0179*
C312	Condenser, screen by-pass, .004 mf.	61-0179*
C313	Condenser, screen by-pass, 10 mmf.	62-010009001
C314	Condenser, cathode by-pass, .004 mf.	61-0179*
C315	Condenser, screen by-pass, .004 mf.	61-0179*
C316	Condenser, screen by-pass, 10 mmf.	62-010009001
C317	Condenser, plate by-pass, .004 mf.	61-0179*
C318	Condenser, a-g-c coupling, .01 mf.	61-0120*
C319	Condenser, a-g-c filter, 22 mmf.	62-022009001

PHILCO CORP. MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122

REPLACEMENT PARTS LIST — Continued

SECTION 3 (Continued)

Reference Symbol	Description	Service Part No.
C320	Condenser, a-g-c filter, .05 mf.	61-0122*
C321	Condenser, filament filter, 470 mmf.	62-147001001
C322	Condenser, coupling, .01 mf.	61-0120*
C323	Condenser, r-f filter, 10 mmf.	62-010009001
C324	Condenser, sound trap, 47 mmf.	Part of L309
C325	Condenser, coupling, .1 mf.	61-0113*
C326	Condenser, a-g-c filter, .5 mf.	61-0133*
C327	Condenser, cathode by-pass, .003 mf.	61-0109*
C328	Condenser, electrolytic, 4-section, includes C328A, C328B, C328C, and C328D	30-2570-10
C328A	Condenser, screen decoupling, 10 mf.	Part of C328
C328B	Condenser, plate decoupling, 10 mf.	Part of C328
C328C	Condenser, screen decoupling, 10 mf.	Part of C328
C328D	Condenser, plate decoupling, 10 mf.	Part of C328
C329	Condenser, 4.5-mc. trap, 56 mmf.	62-056409001
C330	Condenser, coupling, .05 mf.	61-0122*
C331	Condenser, blocking, .5 mf.	45-3500-4*
C332	Condenser, blocking, .004 mf.	61-0179*
C333	Condenser, coupling, .05 mf.	61-0122*
J300	Tuner test jack	27-6180
J301	Align test jack	27-6180
L300A	Coil, plate tuning	Part of Z300
L300B	Coil, grid tuning	Part of Z300
L301A	Coil, plate tuning	Part of Z301
L301B	Coil, trap tuning (accompanying sound)	Part of Z301
L301C	Coil, grid tuning	Part of Z301
L302A	Coil, plate tuning	Part of Z302
L302B	Coil, trap tuning (adjacent sound)	Part of Z302
L302C	Coil, grid tuning	Part of Z302
L303A	Coil, plate tuning	Part of Z303
L303B	Coil, detector tuning	Part of Z303
L304	Choke, filament	32-4112-3
L305	Choke, filament	32-4112-3
L306	Choke, filament	32-4112-3
L307	Choke, filament	32-4112-3
L308	Coil, video peaking	32-4143
L309	Coil, trap tuning (accompanying sound)	32-4218
L310	Coil, trap tuning (video 4.5 mc.)	32-4155
L311	Coil, video peaking	32-4143-1
L312	Coil, video peaking	32-4143-2
R300A	Resistor, plate damping, 10,000 ohms	Part of Z300
R300B	Resistor, grid damping, 10,000 ohms	Part of Z300
R301A	Resistor, plate damping, 22,000 ohms	Part of Z301
R301B	Resistor, balancing (sound trap), 5600 ohms	Part of Z301
R301C	Resistor, grid damping, 33,000 ohms	Part of Z301
R302A	Resistor, plate damping, 10,000 ohms	Part of Z302
R302B	Resistor, balancing (sound trap), 22,000 ohms	Part of Z302
R302C	Resistor, grid damping, 8200 ohms	Part of Z302
R303A	Resistor, plate damping, 33,000 ohms	Part of Z303
R304	Resistor, plate filter, 3300 ohms	66-2333340*
R305	Resistor, a-g-c filter, 2200 ohms	66-2223340*
R306	Resistor, cathode bias, 68 ohms	66-0683340*
R307	Resistor, screen dropping, 56,000 ohms	66-3563340*
R308	Resistor, a-g-c filter, 2200 ohms	66-2223340*
R309	Resistor, cathode bias, 68 ohms	66-0683340*
R310	Resistor, screen dropping, 56,000 ohms	66-3563340*
R311	Resistor, plate filter, 3300 ohms	66-2333340*
R312	Resistor, cathode bias, 180 ohms	66-1183340*
R313	Resistor, plate filter, 3300 ohms	66-2333340
R314	Resistor, screen dropping, 56,000 ohms	66-3563340*
R315	Resistor, grid load, 1 megohm	66-5103340*
R316	Resistor, diode load, 470,000 ohms	66-4473340*
R317	Resistor, r-f filter, 100,000 ohms	66-4103340*
R318	Resistor, plate load, 220,000 ohms	66-4223340*
R319	Resistor, cathode bias, 82,000 ohms	66-3824340*
R320	Resistor, cathode bias, 1,000 ohms	66-2103340*
R321	Resistor, variable, a-g-c control, 5,000 ohms	33-5539-16
R322	Resistor, diode load, 470,000 ohms	66-4473340*

SECTION 3 (Continued)

Reference Symbol	Description	Service Part No.
R323	Resistor, a-g-c filter, 1 megohm	66-5103340*
R324	Resistor, diode load, 3300 ohms	66-2333340*
R325	Resistor, diode load, 470,000 ohms	66-4473340*
R326	Resistor, grid, 1 megohm	66-5103340*
R327	Resistor, cathode bias, 120 ohms	66-1123340*
R328	Resistor, screen filter, 47,000 ohms	66-3473340*
R329	Resistor, sync pickoff, 10,000 ohms	66-3103340*
R330	Resistor, plate filter, 3300 ohms	66-2333340*
R331	Resistor, plate load, 1800 ohms	66-2183340*
R332	Resistor, grid load, 820,000 ohms	66-4823340*
R333	Contrast control, 1000 ohms	33-5546-6
R334	Resistor, minimum bias, 68 ohms	66-0683340*
R335	Resistor, screen filter, 68,000 ohms	66-3683340*
R336	Resistor, plate load, 2000 ohms	33-1335-74
R337	Resistor, plate filter, 1000 ohms	66-2105340
R338	Resistor, peaker damping, 27,000 ohms	66-3273340*
R339	Resistor, isolating, 10,000 ohms	66-3103340*
R340	Resistor, grid load, 470,000 ohms	66-4473340*
R341	Resistor, diode load, 1 megohm	66-5103340*
R342	Resistor, voltage divider, 390,000 ohms	66-4393340*
R343	Background control, 250,000 ohms	33-5539-17
R344	Resistor, cathode minimum bias, 100,000 ohms	66-4103340*
Z300	Coupler, input-i-f, 22.1 mc. and 26.6 mc., includes C300A, C300B, R300A, R300B, L300A, and L300B	32-4093
Z301	Coupler, 1st v-i-f, 26.6 mc., includes C301A, C301B, C301C, R301A, R301B, R301C, L301A, L301B, and L301C	32-4213
Z302	Coupler, 2nd v-i-f, 26.6 mc., includes C302A, C302B, C302C, R302A, R302B, R302C, L302A, L302B, and L302C	32-4213-1
Z303	Coupler, detector, 26.6 mc., includes C303A, C303B, R303A, L303A, and L303B	32-4093-1

SECTION 4 — R-F CIRCUITS

C401A	Condenser, aerial tuning	Part of Z401
C401B	Condenser, aerial tuning	Part of Z401
C402	Condenser, plate by-pass, 470 mmf.	62-147001001
C403	Condenser, grid by-pass, 10 mmf.	62-010009001
C404	Condenser, blocking, 22 mmf.	62-022009001
C405	Condenser, cathode by-pass, 220 mmf.	62-122001001
C406	Condenser, phase shifter, 220 mmf.	62-122001001
C407	Condenser, frequency compensating, 3.3 mmf.	30-1221
C408	Condenser, a-f-c filter, 470 mmf.	62-147001001
C409	Condenser, electrolytic, plate filter, 10 mf.	30-2417-6
C410	Condenser, trimmer, plate tuning	31-6493
C411	Condenser, blocking, 220 mmf.	62-122001001
C412	Condenser, aerial trimmer	31-6493
C413	Condenser, grid isolation, 220 mmf.	62-122001001
C414	Condenser, a-g-c filter, 470 mmf.	62-147001001
C415	Condenser, a-g-c filter, .1 mf.	61-0113*
C416	Condenser, cathode by-pass, 470 mmf.	62-147001001
C417	Condenser, screen by-pass, 470 mmf.	62-147001001
C418	Condenser, screen by-pass, 10 mmf.	62-010009001
C419	Condenser, plate by-pass, 470 mmf.	62-147001001
C420	Condenser, screen by-pass, 470 mmf.	62-147001001
C421	Condenser, screen by-pass, 10 mmf.	62-010009001
C422	Condenser, filament by-pass, 470 mmf.	62-147001001
C423	Condenser, filament by-pass, 470 mmf.	62-147001001
J400	Aerial receptacle	27-6214-1
L400A	Coil, oscillator	Part of Z400
L400B	Coil, mixer	Part of Z400
L401A	Coil, aerial	Part of Z401
L401B	Coil, r-f coupling	Part of Z401
L401C	Coil, r-f	Part of Z401
L402	Choke, oscillator plate	32-4112-2
L403	Choke, filament	32-4112-4
R400	Resistor, cathode bleeder, 22,000 ohms	66-3224340

MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122

PHILCO CORP.

REPLACEMENT PARTS LIST — Continued

SECTION 4 (Continued)

Reference Symbol	Description	Service Part No.
R401	Resistor, cathode bias, 220 ohms	66-1228340*
R402	Resistor, grid leak, 22,000 ohms	66-3228540
R403	Resistor, phase shifter, 560 ohms	66-1568340
R404	Resistor, grid leak, 22,000 ohms	66-3228540
R405	Resistor, plate filter, 6200 ohms	Part of R100
R406	Resistor, plate load, 2700 ohms	66-2278340
R407	Resistor, grid leak, 100,000 ohms	66-4108540*
R408	Resistor, screen dropping, 56,000 ohms	66-3568340
R409	Resistor, plate filter, 1,000 ohms	66-2108540
R410	Resistor, grid leak, 100,000 ohms	66-4108540*
R411	Resistor, cathode degeneration, 68 ohms	66-0688340
R412	Resistor, cathode bias, 100 ohms	66-1108340
R413	Resistor, a-g-c filter, 1 megohm	66-5103340*
Z400	Oscillator-and-mixer-coil assembly	
	Channel 1‡	32-4122-1
	Channel 2	32-4122-2
	Channel 3	32-4122-3
	Channel 4	32-4122-4
	Channel 5	32-4122-5
	Channel 6	32-4122-6
	Channel 7	32-4122-7
	Channel 8	32-4122-8
	Channel 9	32-4122-9
	Channel 10	32-4122-10
	Channel 11	32-4122-11
	Channel 12	32-4122-12
	Channel 13	32-4122-13
Z401	Aerial-and-r-f-coil assembly	
	Channel 1‡	32-4115-1
	Channel 2	32-4115-2
	Channel 3	32-4115-3
	Channel 4	32-4115-4
	Channel 5	32-4115-5
	Channel 6	32-4115-6
	Channel 7	32-4115-7
	Channel 8	32-4115-8
	Channel 9	32-4115-9
	Channel 10	32-4115-10
	Channel 11	32-4115-11
	Channel 12	32-4115-12
	Channel 13	32-4115-13

‡ Since Channel 1 is not yet in use, Channel 1 coils are not available, but will be made available when this channel is released for operation.

SECTION 5 — SWEEP CIRCUITS

Reference Symbol	Description	Service Part No.
C500	Condenser, coupling, .05 mf.	61-0122*
C501	Condenser, screen by-pass, .1 mf.	61-0113*
C502	Condenser, coupling, .1 mf.	61-0113*
C503	Condenser, electrolytic, plate filter, 10 mf.	Part of C219
C504	Condenser, coupling, .006 mf.	45-3500-7*
C505	Condenser, integrating, .001 mf.	45-3500-5*
C506	Condenser, electrolytic, 3-section	30-2570-16
C506A	Condenser, plate filter, 10 mf.	Part of C506
C506B	Condenser, plate filter, 10 mf.	Part of C506
C506C	Condenser, cathode by-pass, 40 mf.	Part of C506
C507	Condenser, by-pass, .1 mf.	61-0113*
C508	Condenser, feedback, .1 mf.	61-0113*
C509	Condenser, coupling, .25 mf.	61-0125*
C510	Condenser, differentiating, 100 mmf.	60-10105407
C511	Condenser, plate filter, .05 mf.	61-0122*
C512	Condenser, coupling, 1000 mmf.	60-20105401*
C513A	Condenser, electrolytic, plate filter, 10 mf.	Part of C105
C513B	Condenser, electrolytic, cathode by-pass, 10 mf.	Part of C105
C514	Condenser, cathode by-pass, .1 mf.	61-0113*
C515	Condenser, cathode coupling, 560 mmf.	60-10515307
C516	Condenser, plate tank, 2000 mmf.	60-20205304*

SECTION 5 (Continued)

Reference Symbol	Description	Service Part No.
C517	Condenser, sweep integrating, 680 mmf.	60-10685401
C518	Condenser, coupling, .01 mf.	61-0120*
C519	Condenser, screen by-pass, .1 mf.	61-0113*
C520	Condenser, plate booster, .1 mf.	61-0113*
C521	Condenser, linearity, .02 mf.	61-0108*
C522	Condenser, plate booster, .05 mf.	61-0122*
J500	Receptacle, chassis (deflection-yoke-cable connector)	27-6229
L500A	Horizontal-deflection coil	Part of Z500
L500B	Horizontal-deflection coil	Part of Z500
L500C	Vertical-deflection coil	Part of Z500
L500D	Vertical-deflection coil	Part of Z500
L501	Focus coil	Part of Z501
L502A	Beam bender coil	Part of Z502
L502B	Beam bender coil	Part of Z502
L503	Coil, horizontal-oscillator tank, 60 mh.	32-4256,
L504	Linearity control #1	32-4211
L505	Width-adjustment coils	32-4163-2 (red dot)
L505A	Width-adjustment coil	Part of L505
L505B	Width-adjustment coil	Part of L505
P500	Deflection-yoke-plug connector and cable	41-3764-1
R500A	Resistor, damping, 1000 ohms (part of Z500)	66-2108540
R500B	Resistor, damping, 1000 ohms (part of Z500)	66-2108540
R501	Resistor, grid, 2.2 megohms	66-5223340*
R502	Resistor, current limiting, 22,000 ohms	66-3228540
R503	Resistor, plate bleeder, 10,000 ohms	66-3103340*
R504	Resistor, screen bleeder, 10,000 ohms	66-3103340*
R505	Resistor, screen dropping, 1 megohm	66-5104340
R506	Resistor, plate load, 1.2 megohms	66-5124340
R507	Resistor, grid, 470,000 ohms	66-4473340*
R508	Resistor, current limiting, 220,000 ohms	66-4223340*
R509	Resistor, cathode bias, 2200 ohms	66-2223340*
R510	Resistor, plate load, 68,000 ohms	66-3683340*
R511	Resistor, plate filter, 22,000 ohms	66-3223340*
R512	Resistor, grid, 10,000 ohms	66-3103340*
R513	Resistor, plate filter, 100,000 ohms	66-4103340*
R514	Resistor, plate load, 470,000 ohms	66-4473340*
R515	Resistor, plate filter, 22,000 ohms	66-3223340*
R516	Resistor, grid, 10,000 ohms	66-3103340*
R517	Height control, 250,000 ohms	33-5539-13
R518	Height-control bleeder, 68,000 ohms	66-3683340*
R519	Resistor, feedback, 2200 ohms	66-2223340*
R520	Resistor, minimum grid bias, 27,000 ohms	66-3273340*
R521	Vert. hold control, 100,000 ohms	33-5539-15
R522	Resistor, grid, 2.2 megohms	66-5223340*
R523	Vert. lin. control, 5,000 ohms	33-5546-3
R524	Resistor, minimum cathode bias, 1000 ohms	66-2103340*
R525	Resistor, differentiating, 100,000 ohms	66-4103340*
R526	Resistor, plate load, 10,000 ohms	66-3104340*
R527	Resistor, plate filter, 10,000 ohms	66-3104340*
R528	Resistor, plate load, 150,000 ohms	66-4153340
R529	Resistor, sync injection, 220 ohms	66-1223340
R530	Resistor, cathode bias, 1000 ohms	66-2103340
R531	Horiz. hold control, 25,000 ohms	33-5539-28
R532	Horiz. hold control minimum bias 33,000 ohms	66-3333340
R533	Resistor, plate load, 2200 ohms	66-2223340
R534	Resistor, plate filter, 100,000 ohms	66-4108540
R535	Resistor, high-pass filter, 1800 ohms	66-2183340
R536	Resistor, voltage divider (a-g-c take-off), 6800 ohms	66-2683340*
R537	Resistor, voltage divider (a-g-c take-off), 82,000 ohms	66-3823340*
R538	Resistor, current limiting, 100 ohms	66-1103340*
R539	Resistor, cathode bias, 100 ohms	66-1105340
R540	Resistor, screen filter, 3900 ohms	66-2395340

PHILCO CORP. MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122

REPLACEMENT PARTS LIST — Continued

SECTION 5 (Continued)

Reference Symbol	Description	Service Part No.
R541	Resistor, horizontal initial centering, 4.7 ohms	66-9473340
R542	Resistor, filament dropping, 0.8 ohms	33-1334-1
R543	Resistor, linearity control limiting, 3500 ohms**	33-1335-75
R544	Resistor, linearity control limiting, 2000 ohms**	33-1335-74
R545	Hor. lin. control #2, 10,000 ohms	33-5546-8
R546	Hor. lin. control #3, 10,000 ohms	33-5546-8
R547	Focus control, 200 ohms, 25 watts	33-5547-2
R548	Beam bender control, 50 ohms	33-5546-4
T500	Transformer, vertical-sweep generator	32-8304
T501	Transformer, vertical-sweep output	32-8306
T502	Transformer, horizontal-sweep generator	32-8307
T503	Transformer, horizontal-sweep output	32-8331
Z500	Deflection-coil assembly, includes L500A, L500B, L500C, L500D, R500A, and R500B	32-9604
Z501	Focus-coil assembly, includes L501	76-2622-1
Z502	Beam-bending coil assembly, includes L502A, and L502B	76-2623

** In some sets, R543 and R544 are replaced by a single resistor, 6200 ohms, 5 watts, Service Part No. 33-1335-19.

MISCELLANEOUS

Description	Service Part No.
Cabinet	
Model 48-1000	10672A
Model 48-1000-5	10672B
Models 48-1050 and 48-1050-5	10694
Cabinet Hardware and Parts	
Baffle, wood, picture tube	
Models 48-1000 and 48-1000-5	219068
Models 48-1050 and 48-1050-5	219098
Baffle-and-cloth assembly	
Models 48-1000 and 48-1000-5	219064
Models 48-1050 and 48-1050-5, right hand	40-6958
Models 48-1050 and 48-1050-5, left hand	40-6958-1
Bracket (a-c interlock)	56-4344FA3
Cabinet back	
Models 48-1000 and 48-1000-5	76-3058FJ31
Models 48-1050 and 48-1050-5	54-7483
Cloth, grille	
Models 48-1050 and 48-1050-5	44-1568
Door (lid), control, adjusting panel	
Models 48-1000 and 48-1000-5	45-6399
Models 48-1050 and 48-1050-5	45-6406
Dust cover, glass	
Models 48-1000 and 48-1000-5	54-7340
Models 48-1050 and 48-1050-5	54-7340-1
Escutcheon	
Models 48-1000 and 48-1000-5	76-2924
Foot (4 req.)	27-4911

MISCELLANEOUS (Continued)

Description	Service Part No.
Frame, picture-tube mounting	76-2616
Grille, Models 48-1000 and 48-1000-5	54-4432
Hinge, front adjustment drop panel, (2 req.)	
Models 48-1000 and 48-1000-5	56-4515
Knobs (5 req.)	54-4376
Knob assembly, selector	76-2953FCP
Mask, picture-tube	
Models 48-1000 and 48-1000-5	54-4451
Models 48-1050 and 48-1050-5	54-4521
Ornaments, grille	
Models 48-1050 and 48-1050-5	56-5103
Panel, adjustment and control	
Models 48-1050 and 48-1050-5	45-6405
Plug, cabinet back, interlock	27-6217
Screw, front adjusting panel	
Models 48-1050 and 48-1050-5	1W-25492FA9
Selector-knob-and-spring assembly	76-2953FCP
Shell flange, a-c interlock	56-4346
Speaker bolt (4 req.)	W1695
Tab kit (station call letters)	40-6948
Window, picture-tube	
Models 48-1000 and 48-1000-5	54-7340
Models 48-1050 and 48-1050-5	54-7340-1
Cable assembly, high voltage (10BP4)	41-3771-2
Cable-and-socket assembly, picture tube	41-3772-1
Cable assembly, deflection yoke	41-3783
Cable, speaker	41-3738-2
Panel, high-voltage shield	56-4132FA15
Plug, chassis, interlock	54-4426-2
Rubber, chassis-mounting	27-4571
Screw, chassis mounting	1W-19780FA3
Shield, assembly, high voltage	76-2695
Shield base, miniature socket	56-3978FA3
Shield, miniature tube	56-3979FA5
Screw, tube baffle	1W25203
Socket, loktal (8 required)	27-6138
Socket, miniature, 6J6 tube	27-6203-1
Socket, miniature (9 req.)	27-6226
Socket, octal (7 req.)	27-6174
Retaining ring, socket (4 req.)	56-4125FA3
Socket, octal-ring mounting, 1B3GT tube	27-6222
Retaining ring, socket	56-4106
Socket, picture-tube cable	27-6229
Socket, aerial plug	27-6214-1
Socket, test (3 req.)	27-6180
Spring, 6J6 tube	56-4724
Spring, station-selector knob	56-2351-2
Stand-off (2 req.)	54-7309-1
Tuner assembly	76-3109
Oscillator and mixer contact panel (4 connection)	76-2678
Aerial and r-f contact panel (7 connection)	76-2664
Shaft-and-drum assembly	76-3110
Washer, chassis mounting	56-4997FA3

MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122 PHILCO CORP.

PRODUCTION CHANGES

The production changes are classified by run numbers. To determine the run number of a set, examine the series of numbers stamped in ink on the rear of the chassis. The last two digits of the series give the run number. For instance, if the number is 0332016702, the set is Run 2.

CORRECTIONS TO REPLACEMENT PARTS LISTS

SECTION 2

R206 should be Part No. 66-1153340*.
Z202 should be Part No. 32-4214-4.

SECTION 4

Z400 should be Part Nos. 32-4222-1 to 32-4222-13, inclusive.

MISCELLANEOUS

Spring, station-selector knob should be Part No. 56-5241.

NOTES ON MISCELLANEOUS PARTS

a. The term "dust cover" refers to "window, picture tube".

b. In the Model 48-1000, the window marked "Philco Television" is Part No. 27-5949; the mask is Part No. 54-7451.

c. In the Model 48-1000, the clear window uses mask Part No. 54-4522.

d. In the Model 48-1050, the clear window uses mask Part No. 54-4521.

e. Screw, tube baffle, Part No. 1W25203, is not available.

CORRECTIONS TO TEXT

ALIGNMENT

a. Add to preliminary information: "During alignment, a 3-volt battery should be connected between the a-g-c bus and ground (negative to a-g-c bus)."

b. Page 29: L309 should be removed from the ADJUST column of step 3 and placed in the ADJUST column of step 5.

c. Page 30, NOTE 5: C303B should be L202A.

CORRECTIONS TO ILLUSTRATIONS

a. Figures 38 and 39: The numbers of the curves should be reversed, i.e., 4, 3, 2, 1.

b. Figure 32 (schematic): the wire feeding R227 (insert, Section 2) and the a-f-c bus should be connected between R220 and C212.

c. L503 (in Section 5) should be 60 millihenries instead of 6 ohms.

PRODUCTION CHANGES

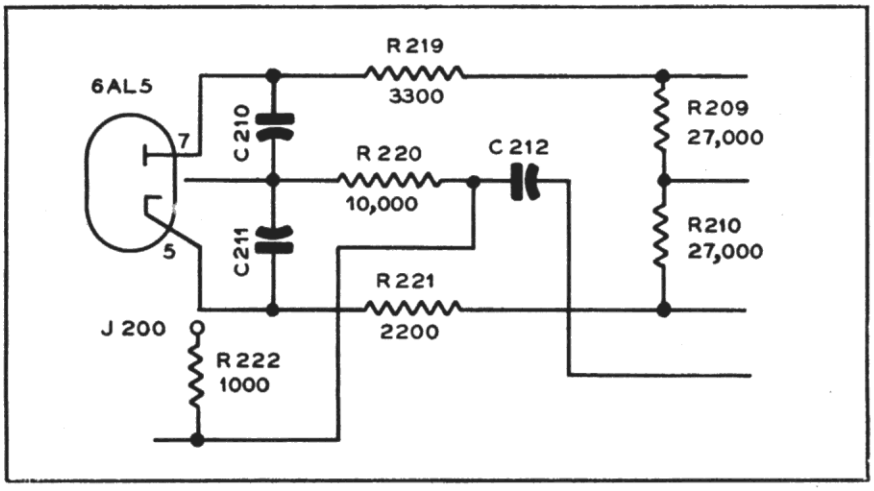
Run No.	Description of Change	New or Added Part No.	Old or Removed Part No.	Reason for Change
2	C500 changed to .047 mf.**	61-0122	61-0122	Standardization of parts
	R505 changed from ½ watt to 1 watt	66-5104340	66-5103540	To improve stability
3	R534 changed to 22,000 ohms	66-3223340	66-4103540	To increase sync stability
	R510 changed to 82,000 ohms	66-3823340	66-3683340	To improve vertical sync

PHILCO CORP. MODELS 48-1000, 48-1000-5, 48-1050, 48-1050-5, CODE 122

PRODUCTION CHANGES *(Continued)*

Run No.	Description of Change	New or Added Part No.	Old or Removed Part No.	Reason for Change
4 & 5	R219 added, 3300 ohms	66-2333340		To reduce harmonic beat, and improve FM-AM ratio. (See accompanying schematic.)
	R220 added, 10,000 ohms	66-3103340		
	R221 added, 2200 ohms	66-2223340		
	R222 added, 1000 ohms	66-2103340		
6	R543 and R544 replaced by a single resistor of 6200 ohms	33-1335-19	33-1335-74 33-1335-75	To improve performance
7	R205 replaced by a 40-millihenry choke	32-4143-1	66-4223340	To improve stability of a.i.f., and reduce interference caused by harmonic beats
	R222, which was added in runs 4 and 5, was replaced by a 40-millihenry choke	32-4143-1	66-2103340	
8	R529 changed to 330 ohms	66-1333340	66-1223340	To improve horizontal sync stability
9	R535 removed, and C517 grounded.		66-2183340	To reduce transient oscillation within horizontal amp.
	R536 changed to 18,000 ohms	66-3183340	66-2683340	
	R537 changed to 180,000 ohms	66-4183340	66-3823340	
	C520 changed to .08 mf.	45-3501	61-0113340	
	C519 removed		61-0113340	
	C521 removed		61-0188	
	680-mmf. condenser added, from cathode (pin 3) of horizontal output tube (6BG6G) to ground.	60-10685401		

** Substitute a .05-mf. condenser, Part No. 61-0122, for replacement purposes.



Discriminator Circuit Changes in Runs 4 and 5.

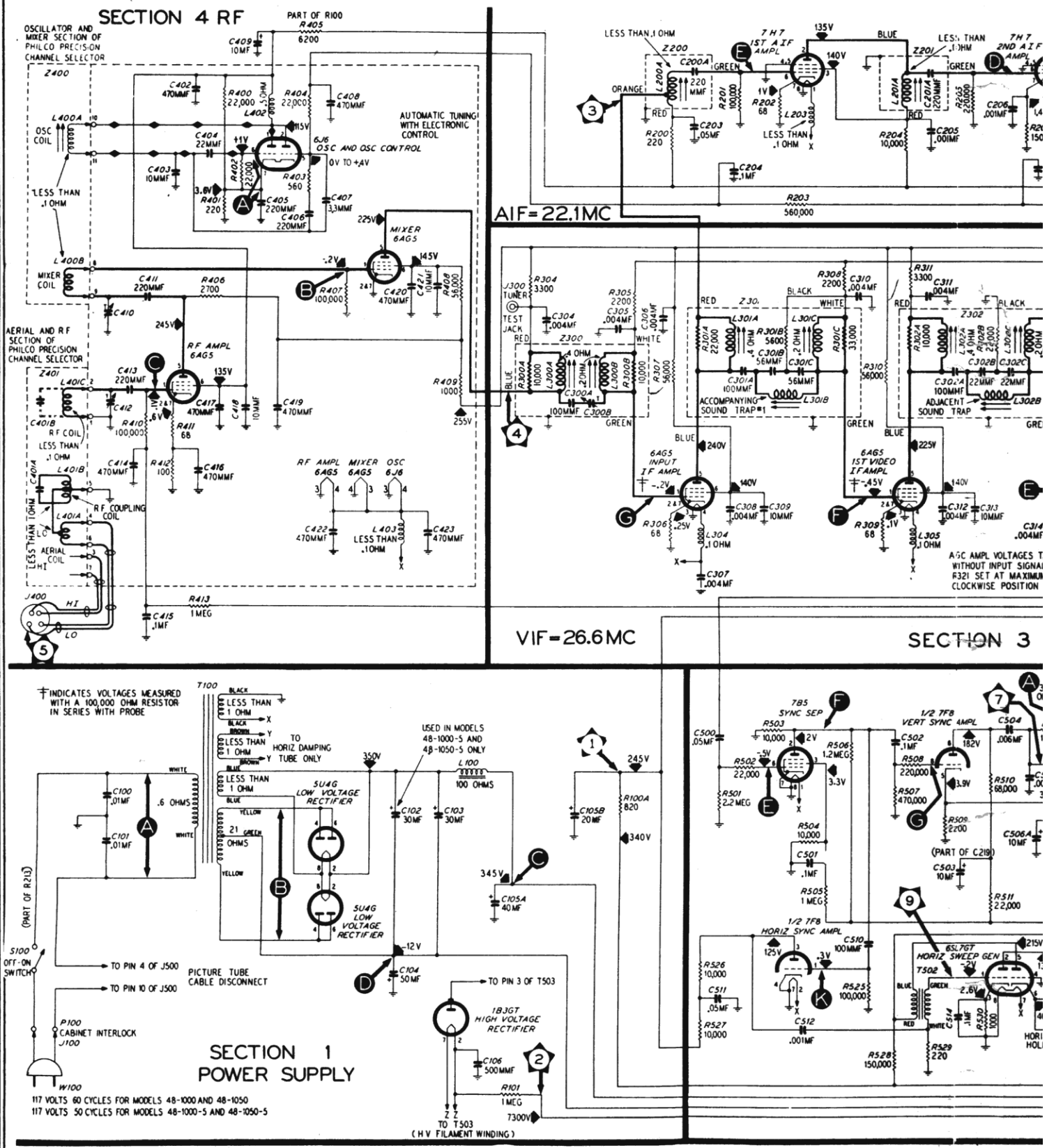
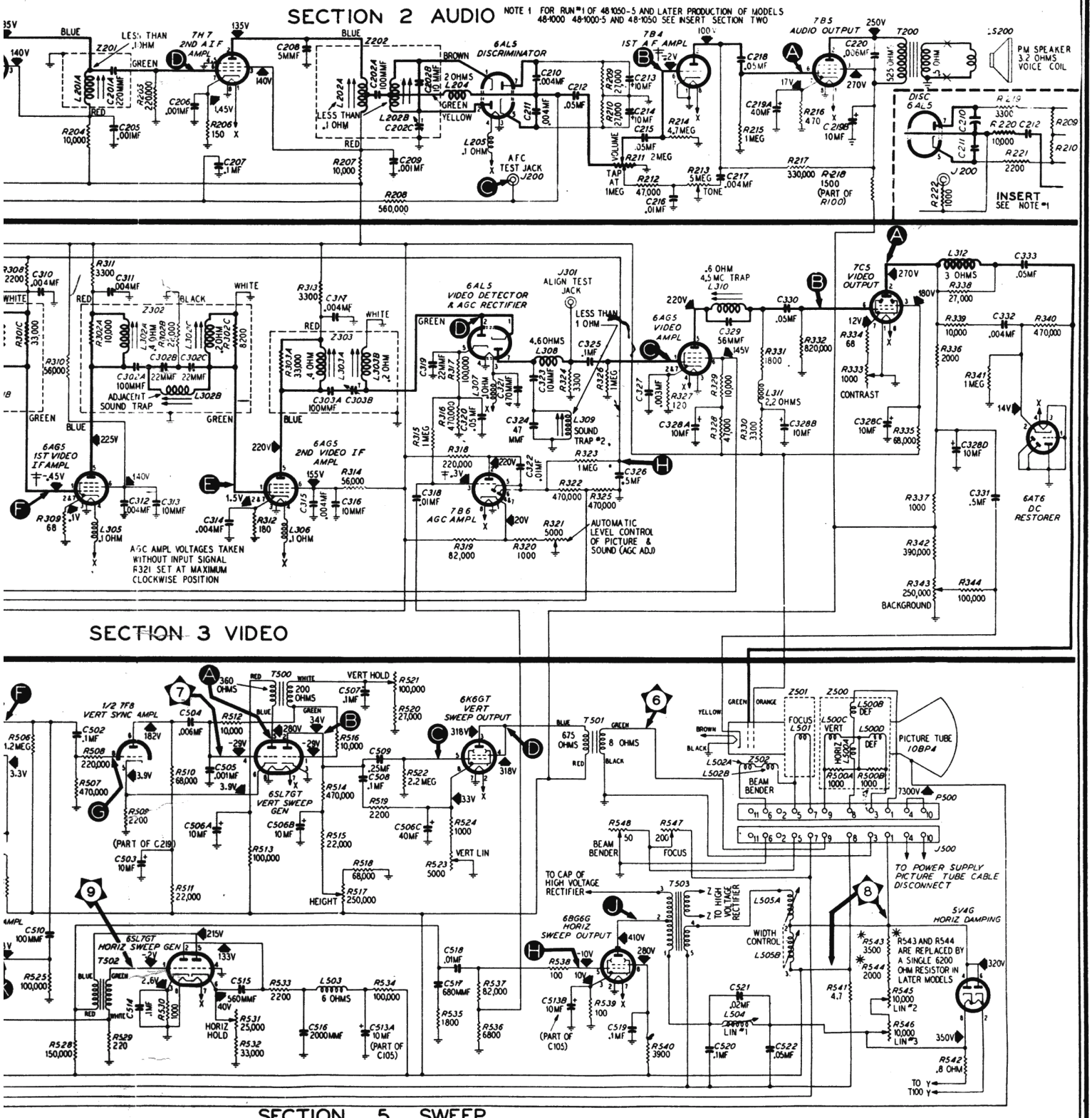


FIGURE 32. SECTIONALIZED SCHEMATIC DIAGRAM

PHILCO CORP.

MODELS 48-1000, 48-1000-5,
48-1050, 48-1050-5, CODE 122



IALIZED SCHEMATIC DIAGRAM, SHOWING TEST POINTS