PHILCO
Factory-Supervised
Service

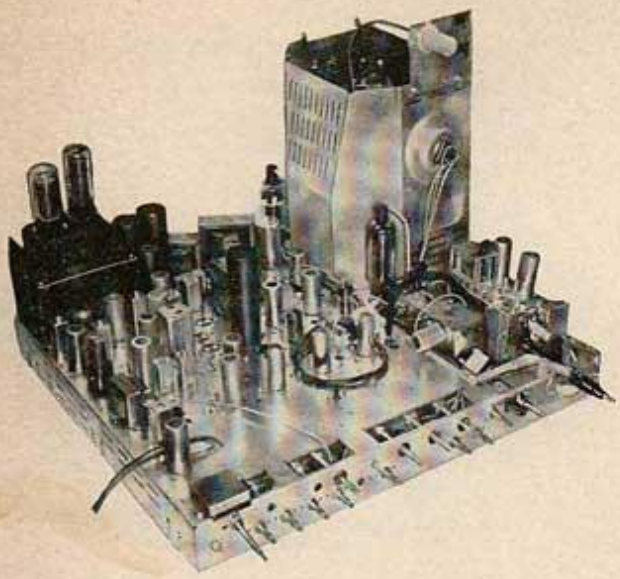
PHILCO

Color Television

SERVICE MANUAL FOR TV-123 CHASSIS

PR-3012

PHILCO COLOR TELEVISION SERVICE MANUAL FOR TV-123 CHASSIS - FILE D1



TUBE COMPLEMENT

Ref. Symbol	Tube Type	Function
S1 (Tuner)	6X8	Oscillator—Mixer
S2 (Tuner)	X155	RF Amplifier
S1	6T8	Ratio Det.—1st Audio Amp.
S2	6AU6	Sound I.F.
S3	6AS8	5th V.I.F.—Chroma Det.
S4	6CB6	3rd V.I.F.
S5	6BZ6	2nd V.I.F.
S6	6BZ6	1st V.I.F.
S7	6AS8	4th V.I.F.—Video Det.
S8	6AW8	Chroma & Sound IF
S9	6AN8	1st Video Amp.—Noise Inverter
S10	12BH7A	2nd & 3rd Video Amp.
S11	6V6GT	Audio Output
S12	6CL6	Chroma Amp.
S13	6AN8	A.G.C. Amp.—Color Killer
S14	12AT7	Sync. separator—A.G.C. Clamp
S15	6M3	Horizontal Damper
S16	6AN8	Gate Clamp—Burst Amp.
S17	12BH7A	Demodulators
S18	6BJ8	Hor. Phase Splitter—Phase Comparer
S19	6BA8	Hor. Osc.—Hor. Buffer
S20	6AL5	Phase Detector
S21	6AN8	Color osc.—Reactance Tube
S22	6BA8	Vert. osc.—Vert. Buffer
S23	6AV5GT	Vert. Output
S24	6CL5	Hor. Output
S25	6BK4	Hi-Voltage Shunt Regulator
S26	3A2	Hi-Voltage Rectifier
S27	3A3	Hi-Voltage Rectifier
S28	3A2	Focus Rectifier
S29	5V3	400V B+ Rectifier
S30	5U4GB	240V B+ Rectifier
	21AXP22	Picture Tube

CAUTION:

To prevent damage to the set and to lessen the shock hazard to the technician, the 6CL5 horizontal output tube should be removed except for those adjustments, requiring its operation.

ANTENNA ORIENTATION

For the greatest color program enjoyment, the picture must be as free as possible of ghosts and other forms of interference. Proper location and orientation of the whole antenna system is of prime importance.

HOME INSTALLATION

The following is a simplified touch up procedure to be used when installing a model 22D5100-123 or 22D5102-123 in a customer's home. It is normally not necessary to go through the complete procedure as outlined in the next section unless trouble is encountered.

1. Turn the receiver on, tune in a station and allow the set to warm up. No color purity or convergence adjustments should be made until the set has warmed up for at least 20 minutes.
2. During the warm-up period, observe the picture quality such as possible presence of ghosts, interference, weak or too strong signals, etc. Establish whether or not to use the antenna attenuator for each channel received. Proper location and orientation of the whole antenna system is of prime importance for good color reception.
3. *a.*—After the 20 minutes warm-up, turn the color control down (fully counter-clockwise) so that only a black and white picture remains.
   b.—Adjust the purity control, VR-21, at the rear for the most uniform coloring over the entire screen area. This adjustment is not to remove any colored fringes which may exist around the edges of any objects in the picture, as this fringing is a function of convergence.
   c.—If there are still areas of color contamination at the edges, remove the side and instrument panels (see the appropriate paragraphs following this section), and adjust the rim magnets.
   d.—If acceptable uniformity still cannot be obtained the complete color purity and convergence procedure must be done. See complete set-up procedure following this section.
4. The final CRT adjustment is white balance.
   a.—Adjust the contrast and brightness controls for an average picture. Do not overdrive the CRT grids.
   b.—Turn the blue and green G1 controls, VR-8B and VR-8A, down so that only a red raster remains.
   c.—If the red G2, VR-7B, has been moved or the seal broken it should be readjusted as in White Balance under complete set-up procedure. This should not normally be required.
   d.—Turn up the green G1, VR-8A, until a greenish yellow is obtained. There should be as much green in the darker areas of the picture as in the bright areas.
   e.—If the dark areas are too red, turn up the green G2, VR9A, readjusting the green G1 for the greenish yellow. (If the dark areas are too green, turn down the green G2, readjusting the G1 to regain the greenish yellow.)
   f.—Turn up the blue G1, VR-8B, for a gray raster. Use the same technique for adjusting the blue G2, VR-9B, as was used in step (e) for the green G2.

GROUNDING OF WINDOW TRIM

CAUTION: To avoid shock hazard due to a static charge, the metal trim strips around the safty glass window must be maintained at chassis ground potential. The grounding sequence is as follows: Chassis ground is connected to the CRT frame by a fifth lead in the yoke cable. The metallic parts of the yoke shield and convergence assembly are connected by ground leads to the CRT frame. Pieces of foil are mounted under the left hand top and bottom mounting feet of the CRT frame and connect to the left hand retaining bolts of the top and bottom window trim strips. The trim strip at each side of the window is in pressure contact with the top and bottom strips at each corner.

If this grounding sequence has been disturbed by service disassembly, a resistance check should be made from chassis ground to each of the side trim strips as soon as the unit is reassembled.

COMPLETE SET-UP PROCEDURE FOR TV-123 CHASSIS

The following is the complete procedure for setting up a TV-123 color chassis. The steps must be followed in the order given. Sealed adjustments may be reset by technician. Sealing done at factory to prevent shifting of adjustments during packing and transporting only.

RECEIVER LOCATION

A color receiver is susceptible to the effects of the earth's magnetic field, and any other magnetic field that may be present. A location should be chosen for the receiver where it will not be near any large electrical apparatus, or any large mass of steel or iron, such as a steel wall or post. No magnetic device should be placed on or near the receiver. The receiver should be positioned in a semi-darkened area where any lights which may be used will not shine directly on the screen, as high ambient light will desaturate the colors.

REMOVAL OF CABINET BACK, CONTROL PANEL AND SIDE PANEL

1. Removal of Cabinet Back

   a.—Turn set off. When the back is loosened the interlock switch shorts out the anode voltage. This short, if maintained for more than a few seconds will damage the 3A2 high voltage rectifier.

   b.—Remove all back retaining screws except those holding the antenna panel. Remove the back leaving the antenna panel mounted to cabinet.

   c.—Before turning the set on, disable the interlock switch (mounted on top of the high voltage cage) if a picture is necessary to the adjustments. Otherwise remove the 6CL5 horizontal output tube.

2. Removal of Control Panel

   a.—Remove back as given above. Keep set turned *off*.

   b.—Remove the knob strip and all control knobs.

   c.—Remove the wing nut from the lower left corner of the panel. This is the oval head screw. The wing nut is accessible from the inside at the lower right hand side of the panel.

   d.—Remove the 5 Phillips wood screws from the front of panel; 2 at the top corners, 2 at the center of each side and 1 from the lower right corner. The panel is now free and may be lifted out.

3. Removal of Side Panel

   a.—Remove back as given above. Keep set turned *off*.

   b.—Remove the two wing nuts from the inside. These are located at the rear edge of the panel, one at the top and one at the bottom corners. From the outside they may be identified as the two oval head screws.

   c.—Remove the two Phillips head wood screws. The panel is now free and may be removed. This gives access to the four field purity magnets on the left side.

ADJUSTMENT ACCURACY:

Picture quality, as an end result, will only be as good as the accuracy and care with which the adjustments are made.

CAUTION: An accidental change of a previously set control may all adjustments and necessitate re-doing the entire set-up. Extreme care must be taken to adjust the controls specified in their proper sequence.

A. HIGH VOLTAGE AND DEFLECTION CIRCUITS

1. Turn set on. Allow normal warm up time (approximately 15 minutes), and set line voltage to 117 volts. Set channel selector to a desired signal and synchronize picture using vertical hold and horizontal hold controls. (If horizontal synchronization is not within range of hold control, center this control and adjust the horizontal frequency control (VR-20B) to lock in.

2. Immediately after set has warmed up, the high voltage regulator must be adjusted to limit the high voltage to 25KV with brightness and contrast at minimum. Using Philco meter #M-8100 with hi-voltage probe #45-9799-1, connect probe to anode lead, "NEG" on meter to chassis and adjust (VR-6) for 25KV.

3. *a.*—Remove horizontal output fuse, (F3) and replace with a 10 ohm, 1 watt resistor. With DC voltmeter on 10 volt scale connect meter across resistor and adjust the horizontal limiting coil (T24) for minimum voltage. Now turn slug counter clockwise to 2.1 VDC. (In the event that the minimum voltage exceeds 2.1 volts by more than .15 volts the circuitry should be checked for trouble. 2.25 volts is maximum allowable voltage at minimum setting. Perform step 4 and repeat above adjustments if voltage changes.

   b.—If a DC circuit meter, 0-500 mils, is available connect in place of the fuse directly, without the use of a resistor. Adjust (T24) for minimum current and then adjust counter clockwise for 210MA. In the event the minimum current exceeds 210 MA by more than 15 MA the circuit should be checked for trouble. 225 MA is maximum allowable current at minimum setting.

4. Adjust the horizontal drive control (VR-19) in such a manner that the vertical white bar or bars near the center of the picture tube just disappear.

5. Adjust horizontal width, vertical height and vertical linearity, checking for correct amount of scan.

6. Using the high voltage Philco meter #M-8100 and the high voltage probe, 45-8799-1, reset the high voltage regulator control (VR-6) for 25KV at normal setting of brightness and contrast controls. With brightness and contrast controls at minimum the hi voltage shall not exceed 26.5 KV.

B. HORIZONTAL OSCILLATOR

1. Physically center the horizontal hold control to mid-range.
2. Ground B40-4 and B40-5 test points. See figure 22.
3. Adjust horizontal frequency control, VR-20B, until the oscillator is at sync frequency by observing the picture. The oscillator will not lock in because the triode grid control voltage is grounded.
4. Adjust the horizontal frequency control until approximately equal frequency deviations from 15,750KC are obtained at both ends of the horizontal hold control. This is done by counting the number of slanted blanking bars at each end of control. A tolerance of one bar is acceptable. For example, a count of 3 bars on one end and 4 bars on the other end.
5. Remove the ground from B40-4 and adjust the horizontal ringing coil (T21) figure 22, until the oscillator is again at sync frequency. Remove the ground from B40-5. With the hor. frequency control and ringing coil properly set, the picture should not go out of sync at either end of the hold control.

6. With a scope connected at test point TP10 (pin 8 of S16) the burst is adjusted by means of the burst timing control (VR-20A) until the right hand edge of the burst falls at the right hand edge of the gate pulse (see figure 1) with the horizontal hold control turned to the full clockwise position. The burst must remain at the top of the gate pulse for any setting of the horizontal hold control. Chroma information (following burst) must not reach the top of the gate pulse for any setting of the horizontal control. This adjustment should only be made with a signal from a color program transmission.

C. CONVERGENCE COIL

1. Calibrate the scope for 40 V.P.P.
2. Disconnect the convergence assembly plug from its socket, J4, on the cable from the chassis.
3. Connect the scope between pin #2 of the convergence assembly socket and ground.
4. Turn the blue horizontal amplitude control, VR-7A, to maximum. (full clockwise)
5. Adjust the horizontal convergence coil, T-23, until the parabolic wave form on scope is 40 volts peak to peak in amplitude.

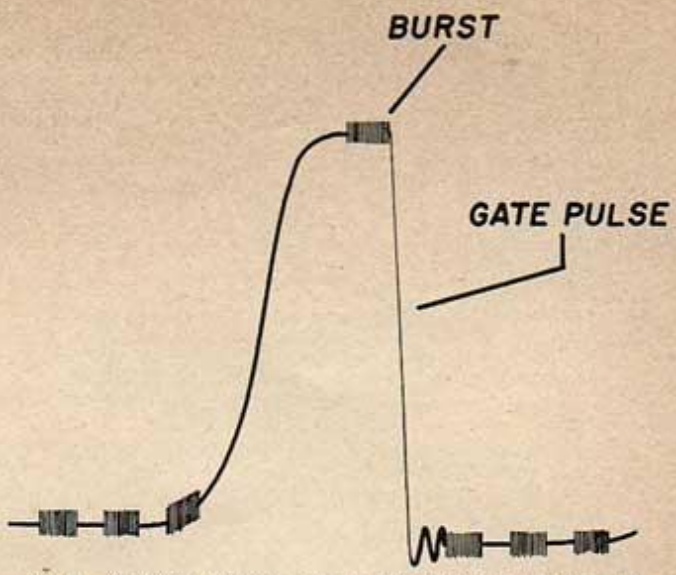


Fig. 1. Waveform showing correct relationship between Burst and Gate Pulse as adjusted by Burst Timing Control, VR-20A.

The drawings below, figures 2A through 2F, are only intended as explanation for terms used in the convergence procedure. The drawings are idealized, they should not be considered as the only acceptable relationships.

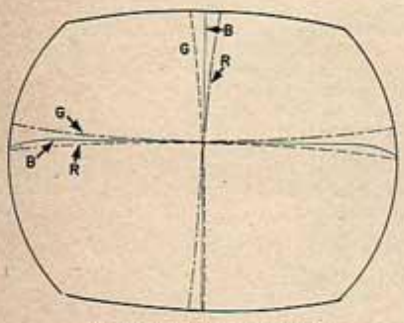


Fig. 2A. Initial static convergence

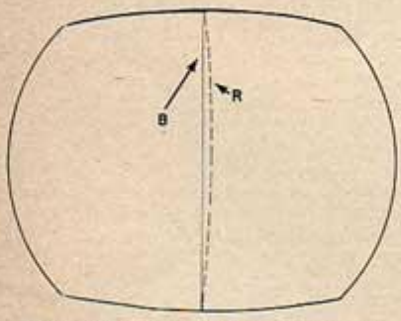


Fig. 2B. Symmetrical displacement of vertical lines

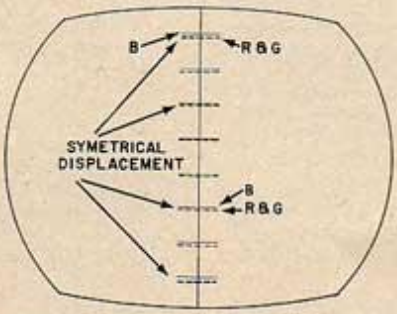


Fig. 2C. Symmetrical displacement of horizontal lines on vertical axis

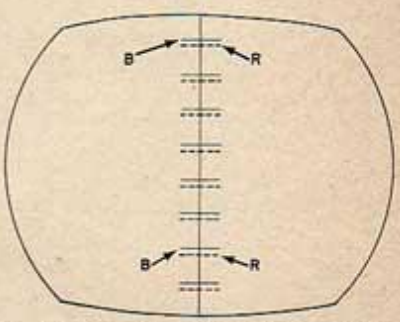


Fig. 2D. Equal displacement of horizontal lines on vertical axis

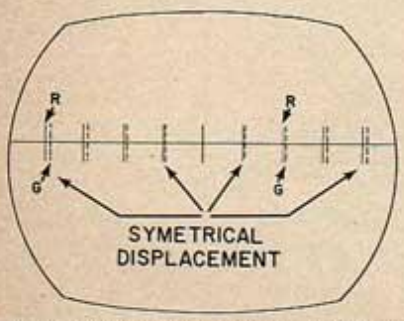


Fig. 2E. Symmetrical displacement of vertical lines on horizontal axis

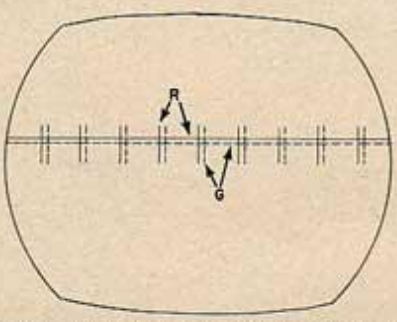


Fig. 2F. Equal displacement of vertical lines on horizontal axis

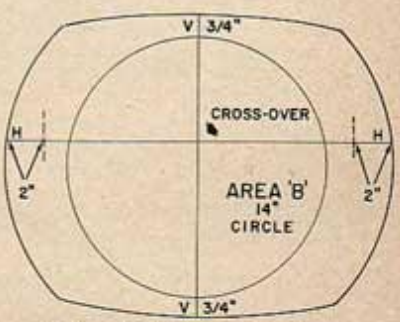


Fig. 2G. Acceptable convergence tolerances

D. COLOR PURITY

1. Check the following mechanical dimensions:

   a.—*Yoke should be physically centered around the neck of the CRT.*

   b.—The convergence coil and magnet assembly should be positioned over the internal pole pieces in the neck of the CRT. The red, green and blue convergence magnet assemblies should be positioned to line up as closely as possible to the exact position of the three guns. The blue magnet is marked by painting the clamp screw black and always appear at the top of the tube neck.

   c.—The blue lateral magnet should be aligned exactly over the two internal pole pieces and the adjustable magnet should be directly above the blue gun.

2. *a.*—Using an inverted dot pattern from Philco generator #7100 (white lines on a black field) adjust the red, green and blue convergence magnets and blue lateral magnet to converge all three beams at the center of the tube.

   b.—Adjust the focus control, VR-22, for sharpest presentation.

3. Turn off the green and blue guns using the G1 controls (VR-8A & VR-8B), leaving only a red field. Set up proper red color purity in the following manner.

   a.—Pull out all equalizer magnets around the rim of the tube (retract the magnets, all the way into their cups) for minimum effect.

   b.—The face of the picture tube should be faced magnetic east or west, as shown by a compass. If faced *West,* the purity control (VR-21) must be rotated fully *counter-clockwise,* if faced *East,* VR-21 must be rotated *fully clockwise.*

   c.—For the best possible color purity, the receiver should be degaussed at this point. See the procedure following this section.

   d.—Rotate the color purity magnet as a unit around the neck of the CRT for best red saturation in the center. Also, adjust the purity magnet pole tabs, individually, for best red center.

   e.—If there are edge impurities, adjust the yoke axially to extend the red field as far as possible from the central area, being particularly aware of the top and bottom central area. Check physical position of the yoke to be sure that no horizontal tilt or decentering has been introduced with the axial positioning of the yoke, as tilting will cause convergence errors.

   f.—Set equalizer magnets to eliminate remaining errors in red field. Turn down brightness control to just beyond the point where the red gun is cut off. Increase the green G1 and check field for purity. Turn down the green G1 and turn up the blue G1, check field for purity. It may be necessary to compromise the setting of the equalizer magnets to obtain the best overall red, blue and green fields. If a large correction by the rim magnets (magnets all the way out of their cups) is required, the set may need degaussing as given in 3(c) above.

   g.—Increase brightness control to normal and adjust G1 controls on blue and green guns for best white balance. Reset the equalizer magnets for the best white field, but do not sacrifice red, green or blue purity any more than is necessary.

   h.—Return the receiver to the desired location and adjust the purity control, VR-21 to give the most uniform white. If objectionable errors still exist in the white field, the rim magnets may be slightly retouched. The purity control is provided so that in the majority of cases the receiver may be placed in a different location, requiring only readjustment of the control for acceptable purity. However, some picture tubes will require readjustment of the rim magnets.

4. Using an inverted cross-hatch pattern, reconverge at the center. Also, re-check the height, vertical linearity, horizontal and vertical centering and readjust if necessary.

DEGAUSSING OF COLOR RECEIVER TO IMPROVE COLOR PURITY

Due to magnetization of metal parts surrounding the color tube and also magnetization of component parts of the color tube itself, it may be necessary in the field to degauss the color receiver to obtain good color purity.

A suitable degaussing coil may be constructed using 400 turns of #20 enameled copper wire formed into a coil 18 inches in diameter taped with vinyl tape. This degaussing coil can be plugged directly into a 110 volt A.C. supply. *A short duty cycle should be used* in order to keep the heating effect in the coil at a minimum, safe level.

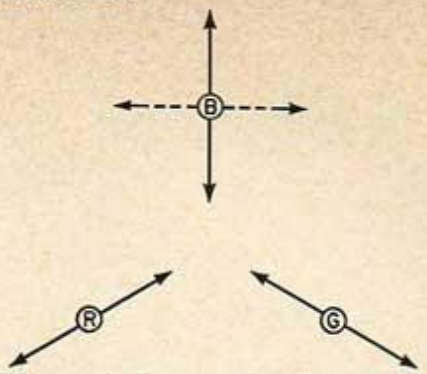


Fig. 4. Diagramatic illustration showing direction of deflection of each color dot caused by its individual convergence controls. Each dot only moves along the path indicated when its convergence magnetic field is varied by either the convergence magnet or the dynamic controls. The blue beam moves in the path indicated by the broken arrows only under the influence of the blue-lateral magnet.

To degauss the color receiver, first pull all of the color purity rim magnets into their cups. Plug the coil into an A.C. supply. Hold the coil for a period of 10 seconds each against the front, sides, top, bottom, and then return to the front of the receiver. *Do not* place degausser near the cabinet back at any time as the flux density of the convergence magnets may be reduced. The coil should be moved around the receiver in such a manner that the plane of the coil is always parallel to the cabinet or tube face. On completing this cycle, the coil should be backed away from the front of the receiver, rotated 90° and disconnected from the A.C. supply. The receiver should now be ready to be adjusted for color purity. The 90° rotation of the coil in the final step of degaussing should be in a direction to make the plane of the coil perpendicular to the face of the tube.

After a set has been degaussed it will be necessary to perform the color purity, convergence and white balance adjustments.

E. A.G.C. CONTROL

1. Turn the receiver to a reasonably stationary signal.
2. Calibrate the scope for 35 V.P.P. deflection.
3. Connect the scope to the plate of the 1st video amplifier (B13-3).
4. Adjust the scope vertical centering control until top of sync tips are even with the lower scope calibration mark.
5. Intermittently short the 2nd det. output (Pin 2 of J2) to "B" minus (B19-5) while observing scope. Use chassis bolt with clip-lead connected. See figure 5. Slip detector lead along threads for "pips" or intermittent connections to prevent scope input from charging.

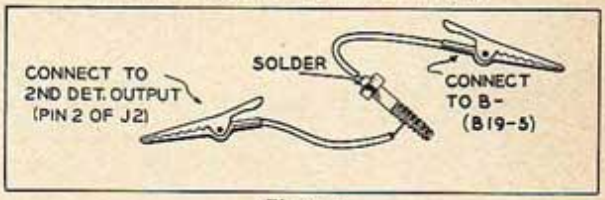


Figure 5

6. Set the A.G.C. control, VR-15, for a 35 volt difference between sync tips and B + which is the uppermost point of travel of the scope trace when the 2nd detector is momentarily shorted to "B minus".

F. DYNAMIC CONVERGENCE

1. Set contrast control to approx. ½ on. Advance the brightness control, then lower to the point where the background just becomes black.

   Using the crosshatch pattern, converge the center of the tube with the three convergence magnets and the

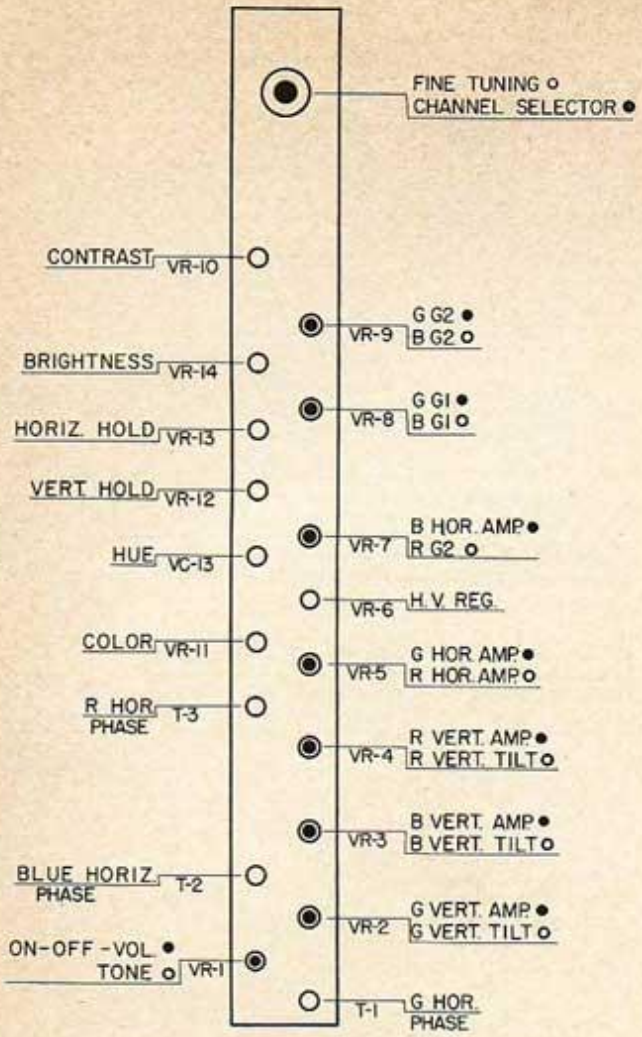


Fig. 3.

blue lateral magnet. (This is static or DC convergence). See figure 2a. See note 2 following convergence step 11.

2. *a.*—Turn the three vertical amplitude controls (VR-2A, VR-3A and VR-4A) to approximately half amplitude.
   b.—Adjust the red vertical tilt, VR-4B, for symmetrical displacement of the center red vertical line with respect to the center vertical blue line. See figure 2b.
   c.—Adjust green vertical tilt, VR-2B, for symmetrical displacement of the center green vertical line with respect to the center vertical blue line. Similar to figure 2b.
   d.—Adjust blue vertical tilt, VR-3B, for symmetrical displacement of the blue horizontal lines from the red and green horizontal lines where they cross the center vertical line. See figure 2c.
   e.—Turn red and green Hor. Amp (VR-5B & VR-5A) to minimum (fully ccw).
   f.—Reconverge at the center. Step 2 is to minimize the effects of interaction.
3. *a.*—Turn off the green gun with the green G1 control, VR-8A.
   b.—Adjust the red vertical amplitude, VR-4A, and tilt, VR-4B, to make the red vertical line parallel to the center blue vertical line.
   c.—Reconverge at the center using the red magnet.
4. *a.*—Adjust the blue vertical amplitude, VR-3A, and tilt, VR-3B, for equal displacement of the blue horizontal lines and in the same direction from the red horizontal lines where they cross the center blue vertical line. See figure 2d.
   b.—Reconverge at the center with the blue magnet. At this point the red and blue should be completely converged (within the limits) on the vertical axis.
5. *a.*—Turn up the green gun with the green G1, VR-8A.
   b.—Adjust the green vertical amplitude, VR-2A, and tilt, VR-2B, to make the center vertical green line parallel to the center vertical magenta line (converged red and blue).
   c.—Reconverge at the center with the green magnet. The pattern should now be converged to within ¾" from top and bottom, along the vertical centerline.
6. *a.*—Adjust blue horizontal amplitude, VR-7A, and phase T-2, to make the center horizontal blue line parallel to the red and green horizontal center lines.
   b.—Reconverge at the center using the blue magnet.
   c.—Turn off the blue gun using the blue G1, VR-8B.
7. *a.*—Turn red horizontal amplitude VR-5B up (fully clockwise).
   b.—Adjust red phase, T-3 for symmetrical displacement of the red vertical lines and in the same direction from the green vertical lines along the horizontal center line. See figure 2E.
   c.—Turn red horizontal amplitude, VR-5B, back to minimum.
8. *a.*—Turn green horizontal amplitude, VR-5A, to maximum.
   b.—Adjust green phase, T-1, for symetrical displacement of the green vertical lines and in the same direction from the red vertical lines along the horizontal center line. See figure 2E.
   c.—Turn green horizontal amplitude, VR-5A, back to minimum.
9. *a.*—Turn up red, VR-5B, and green VR-5A, amplitudes simultaneously to obtain equal displacement of the green vertical lines and parallel or superimposed horizontal red and green lines along the horizontal axis only. See figure 2F.
   b.—Reconverge at the center with the red and green magnets. The red and green should now be converged (within the limits) on both the horizontal and vertical axis.
10. *a.*—Turn up the blue gun with the blue G1, VR-8B.
    b.—Readjust blue horizontal amplitude, VR-7A, and phase, T-2, to superimpose the center blue horizontal line on the yellow (converged red & green) line.
    c.—It may be necessary to readjust the blue lateral magnet to obtain symmetrical displacement of the blue vertical lines from the yellow vertical lines along the center horizontal axis.
    d.—The horizontal and vertical axis should now be converged within the limits. Any corner errors are to be ignored.
11. Acceptable Convergence Tolerances: (See Fig. 2G)
    a.—Center crossover point "A" should be perfectly converged.
    b.—Horizontal Axis—no greater than one color dot error except for last 2 inches at sides of raster.
    c.—Vertical Axis—no greater than one color dot error except for the last ¾ of an inch at top and bottom.
    d.—Area "B" should have no greater than two color dot error except for horizontal and vertical axes mentioned.
    e.—Outside of area "B" an error of more than two dots is acceptable.

NOTE 1: After making any convergence adjustments, RESEAL ALL control shafts, coil cores, convergence magnets and rim magnets.

NOTE 2: Initial static (DC) convergence—It may be found easier to turn the blue gun off with the blue G1, VR-8B. The red and green beams are then converged. The blue gun is turned back up and the blue beam is then converged with the red and green. If the set was badly misconverged, requiring a large movement of the blue beam, the red and green convergence may be upset upon bringing in the blue. This is caused by interaction between the various magnetic convergence fields. It may be necessary to repeat the static convergence for best possible results.

See Fig. 4 for direction of movement of each beam under the influence of the convergence magnets.

G. WHITE BALANCE

1. Calibrate the scope for 65 volts peak to peak.
2. Be sure the AGC control has been properly set and adjust the line voltage to 117 VAC.
3. Set the brightness control, VR-14, to approximately ½ full rotation from minimum.
4. Connect the scope to the red cathode, Pin 4 of C.R.T.
5. Turn the receiver to a reasonably stationary signal containing whites and blacks.
6. Adjust the contrast control, VR-10, for 65 volts peak to peak measurement of white to black video information.
7. Adjust the brightness control clockwise to a point where the sync tips start to compress. Then, back off the control slightly until just out of compression.
8. Set the blue G1 control, VR-8B, and the green G1 control, VR-8A, to minimum. Full C.C.W.
9. Set the blue G2, VR-9B, and green G2, VR-9A, control to minimum. Full C.C.W. If necessary, increase red G2, VR-7B, to obtain presentation on picture tube.
10. Adjust the vertical hold control, VR-12, until the vertical blanking bar is positioned midway between top and bottom of the picture.
11. Adjust the red G2 control until the blanking bar just goes black.
12. Connect the Philco Color Bar and Pattern Generator (model 7100) to the receiver antenna terminals and set the pattern selector switch to the black and white bar position. A reasonably stationary black and white picture may be used.
13. Adjust the green G1 control and the green G2 control so that all levels of the bar chart are similar shades of yellow. The G2 control has a primary influence over the darker parts of the chart and the G1 control over the lighter portions. For example: should the light parts be too green and the dark parts too red, the green G1 control should be turned back and the green G2 control increased.
14. Adjust the blue G1 control and blue G2 control for a neutral gray and white in the bar chart. The same procedure as used for adjusting the green G1 control and green G2 control apply to the blue G1 control and blue G2 control. For example: if the dark part of the picture is too blue and the light part too yellow, the blue G2 control should be decreased and the blue G1 control increased.

Removal and Cleaning of Safety Glass Window

1. Remove cabinet back as given on page 1. Set must be *off*.
2. Remove the two wing nuts (accessible from inside of cabinet), one at each end, from the bottom trim strip. These are the two round head, slotted machine screws.
3. Remove the two Phillips screws from the trim strip and remove the strip.
4. Remove the two screws holding "U" window channel.
5. The window may now be removed by pulling out at the bottom and dropping down.
6. Both the CRT face plate and the safety glass may be cleaned. Use only a clean, soft cloth and "Windex" or similar cleaning solution.
7. When replacing, be sure that the front trim strips are at chassis ground potential. See note above.

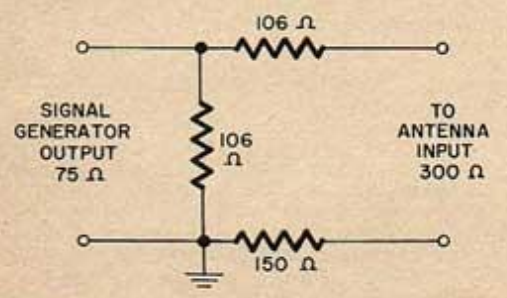


Fig. 6.

ALIGNMENT PROCEDURE

The following is the complete alignment procedure. Where all circuits require alignment it should be done in the order given, i.e, Tuner, Video I-F, Sound I-F, Chroma I-F, Color Osc. and Demodulation.

CAUTION

When performing alignment as indicated in tables 1 through 6, S24, the 6CL5 horizontal output tube must be removed.

EXTENSION CABLE KIT: A set of extension cables is available to aid in the servicing of the TV-123. The part number of the Kit is 421-8001.

TUNER OSCILLATOR ALIGNMENT, T-51

TABLE NO. 1

AM GENERATOR: Connect to receiver antenna input terminals. (no matching network is required). Use unmodulated r-f output.

OSCILLOSCOPE: Connect the vertical input lead to the video detector output, pin 2 of test jack J2. Connect the scope ground lead to the chassis.

BIAS: Inject-25 volts into pin 1 of test jack J1.

FINE TUNING: Preset the fine tuning to the mechanical midpoint of its range.

STEP	AM GENERATOR DIAL SETTING	RECEIVER TUNING	ADJUST
1	47.25 MC	UHF position	Adjust VC-9, VC-2 and VC-12, in that order, for minimum indication on scope. These are the three 47.25 MC adjacent channel traps. It is imperative that these adjustments be done accurately.
2	209.75 MC	channel 13	T2
3	203.75 MC	channel 12	VC5
4	197.75 MC	channel 11	VC6
5	191.75 MC	channel 10	VC7
6	185.75 MC	channel 9	VC8
7	179.75 MC	channel 8	VC9
8	173.75 MC	channel 7	VC10
9	81.75 MC	channel 6	T7
10	75.75 MC	channel 5	T6
11	65.75 MC	channel 4	T5
12	59.75 MC	channel 3	T4
13	53.75 MC	channel 2	T3

FOR MINIMUM INDICATION ON SCOPE

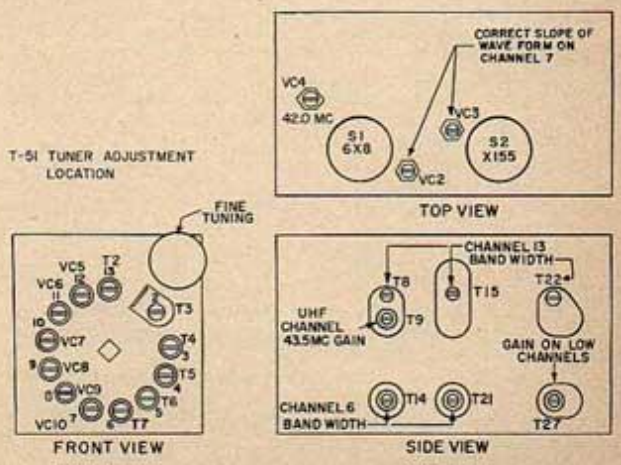


Fig. 7. Tuner Adjustment Layout, T-51.