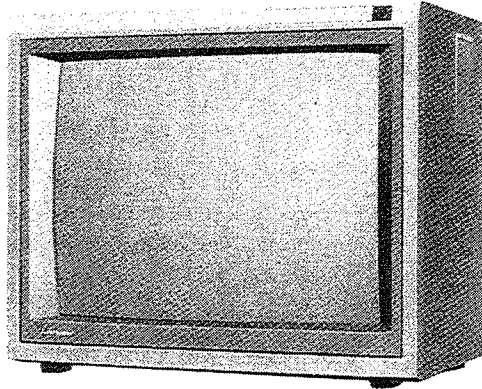


1161

OCTOBER
1987**mitsubishi**

Service Manual

COLOR MONITOR
SX1 CHASSIS FAMILY**MODEL
AM-3501R****CAUTION**

Before servicing this chassis, it is important that the serviceman reads the "SAFETY PRECAUTIONS" and "PRODUCT SAFETY NOTICE" in this service manual.

SPECIFICATIONS

- Power Input AC120V60Hz
- Power Consumption 320W
- Signal
 - VIDEO Input: EXT1, EXT2, EXT3, VTR,
S-Y/C, D-SUB 25Pin
 - Output: THROUGH (EXT1), SWITCHED
VTR, D-SUB 25Pin
 - RGB TTL Input: D-SUB 9Pin
(8/16/64/AUTO Color/
Monochrome)
 - RGB ANALOG Input: D-SUB 25Pin/BNC
(Separate Sync/
Sync on Green)
 - Output: BNC
(Through)
 - Super Impose: VIDEO+ANALOG
(Ys/Ym/AV)
- Speaker 4"×6"Oval type, 8ohm 2pcs.
- Picture Tube A89JVU81X 110° Deflection
- Picture High Voltage 30KV (at 0mA)
- Cabinet 755mm (H) ×910mm (W) ×594mm (D)
Dimensions 29-3/4" (H) ×35-7/8" (W) ×23-3/8" (D)
- Weight (Net) 110kg
242.5lbs
- Special Features
 - Automatic tracking of wide range horizontal and vertical scanning frequencies.
f (H) : 15.5~35KHz
f (V) : 40~70Hz
 - Size and position of the screen can be adjusted with external controls.
 - High-resolution 35"color CRT, 1.0mm stripe pitch.
 - Supports wide variety of input signals such as, video composite, RGB TTL, RGB ANALOG and Super Impose.
 - Diverse displays are obtainable by input of various signals such as composite video, RGB TTL, analog and monochrome.

MITSUBISHI ELECTRIC SALES AMERICA, INC.

5757 Plaza Drive P.O. Box 6007 Cypress, California 90630-0007

SAFETY PRECAUTIONS

NOTICE. Observe all cautions and safety related notes located inside the receiver cabinet and on the receiver chassis.

WARNING

1. Operation of this receiver, outside the cabinet or with the cover removed, involves a shock hazard from the receiver power supplies. Work on the receiver should not be attempted by anyone who is not thoroughly familiar with precautions necessary when working on high-voltage equipment.
2. Do not install, remove or handle the picture tube in any manner unless shatter-proof goggles are worn. People not so equipped should be kept away while the picture tube is being handled. Keep the picture tube away from the body while handling.

X-RADIATION WARNING

The surface of the picture tube may generate X-Radiation. Precaution during service and, if possible, the use of a lead apron is recommended for shielding while handling.

When replacing the picture tube, use only the designated replacement part since it is a critical component with regard to X-Radiation as noted above. (No high-voltage adjustments are provided.) The high-voltage specification is described on page 1.

LEAKAGE CURRENT CHECK

Before returning the receiver to the customer, it is recommended that leakage current be measured according to the following methods.

1. Cold Check

With the AC plug removed from the 120V AC source, place a jumper across the two AC plug prongs. Turn the receiver AC switch on. Using an ohm-meter, connect one lead to the jumpered AC plug and touch the other lead to each exposed metal part (antennas, handle bracket, metal cabinet, screwheads, metal overlays, control shafts, etc.), particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistance reading of 1 megohm. Any resistance below this value indicates an abnormality which requires corrective action. Exposed metal parts not having a return path to the chassis will indicate an open circuit.

2. Hot Check

The test sequence, with reference to the measuring circuit in Fig. 1, is as follows:

- (1) With switch S1 open, the receiver is to be connected to the measuring circuit. Immediately after connection, the leakage current is measured using both positions of switch S2, and with the switching devices in the receiver in all of their operating positions.
- (2) Switch S1 is then to be closed, energizing the receiver, and immediately after closing the switch, the leakage current is to be measured using both positions of switch S2, and with the switching devices in the receiver in all of their operating positions.

Current measurements of items (1) and (2) are to be repeated after the receiver has reached thermal stabilization.

The leakage current shall not be more than 0.5 milliampere.

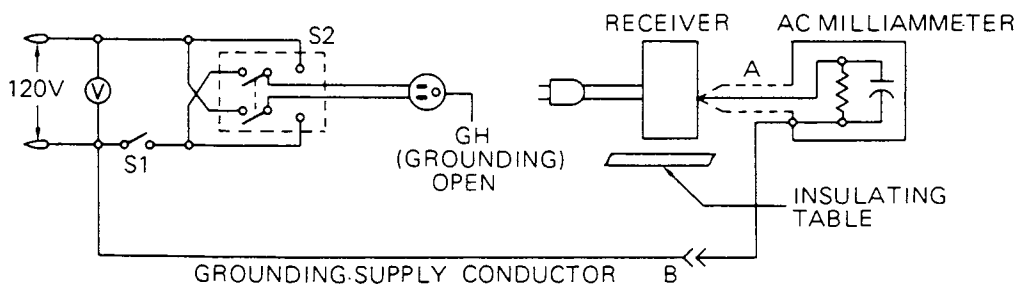


Fig. 1

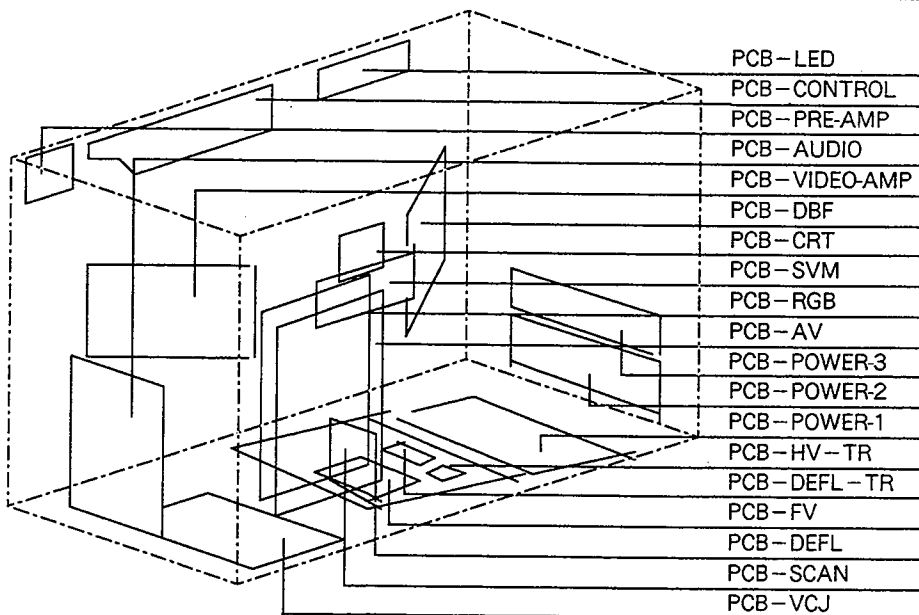
PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in television receivers have special safety related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this service manual. Electrical components having such features are identified by shading on the schematic diagram and the parts list of this service manual and by marking on the supplementary sheet for this chassis to be issued subsequently. Therefore replacements for any safety parts should be identical in value and characteristics.

DISASSEMBLY PROCEDURES

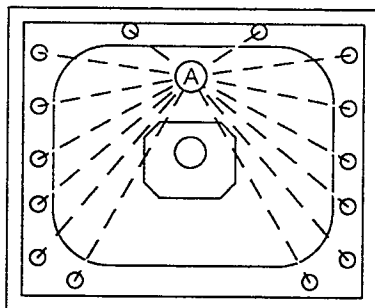
REMOVAL OF PCB

- AUDIO-PCB
- VIDEO-AMP-PCB
- DBF-PCB
- CRT-PCB
- RGB & AV-PCB
- POWER-PCB
- DEFL-PCB
(HV-TR-PCB)
(DEFL-TR-PCB)
(FV-PCB)
- SCAN-PCB
- VCJ-PCB



FRONT-MASK REMOVAL

1. Remove the 14 screws (A) around the perimeter of the mask, as shown in Figure 2.
2. Unplug all inter-connecting cables to the assemblies mounted on the FRONT-MASK, and open all ties securing the cables.
3. Tilt the top of the FRONT-MASK forward and then lift the mask from the cabinet.



MASK REMOVAL

Figure 2

PICTURE TUBE REPLACEMENT

GENERAL

In some instances, after picture tube replacement, Purity and Convergence may require adjustment. If it is required, follow the procedure described in the alignment section of this manual.

CAUTION: Safety goggles must be worn at all times when handling the picture tube.

CAUTION: The picture tube is extremely sensitive to mechanical shock, therefore care must be taken at all times when handling the picture tube.

SUGGESTED TOOLS AND JIGS

The following tools and jigs are useful for replacement and final adjustment of the picture tube, and are available through the National Parts Department.

1. T TYPE BOX DRIVER #859C35802 (Figure 1)

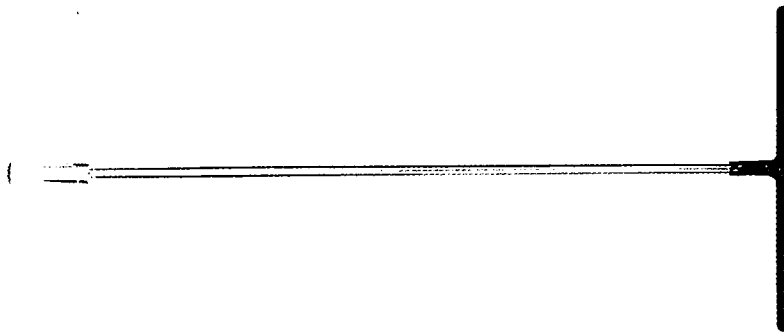


Figure 1

2. CRT-JACK-Part #859C35801 (Figure 2).
Capable of supporting the picture tube and adjusting its position in the cabinet.

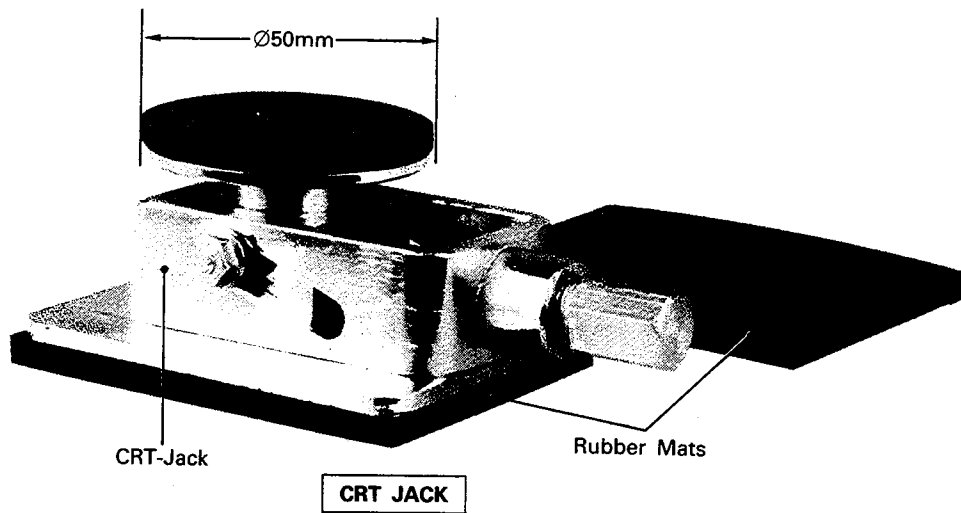


Figure 2

PICTURE TUBE REMOVAL PROCEDURE

1. Remove the 17 back screws and remove the Cabinet Back.
2. Carefully pierce the silicon adhesive at the outer edge of the second anode cover (Figure 3) and discharge the picture tube to the CRT Shield.

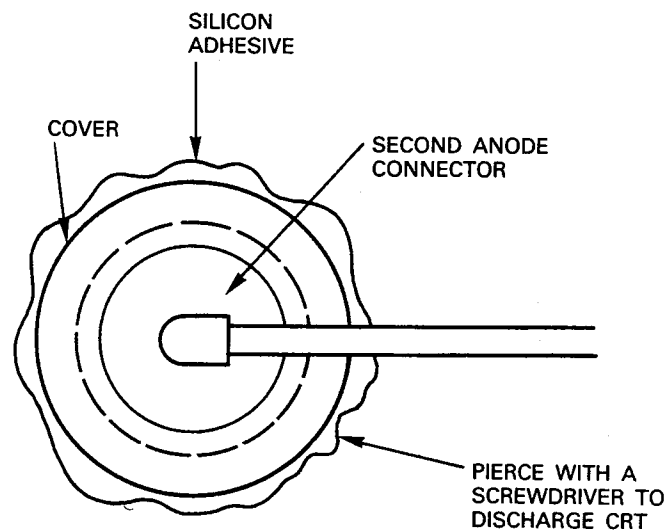
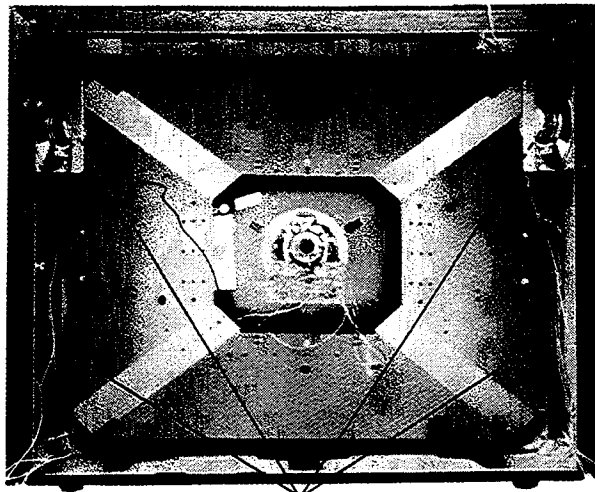


Figure 3

3. Use a thin blade tool to carefully cut the silicon adhesive around the outer perimeter of the second anode connector cover and the surface of the CRT.

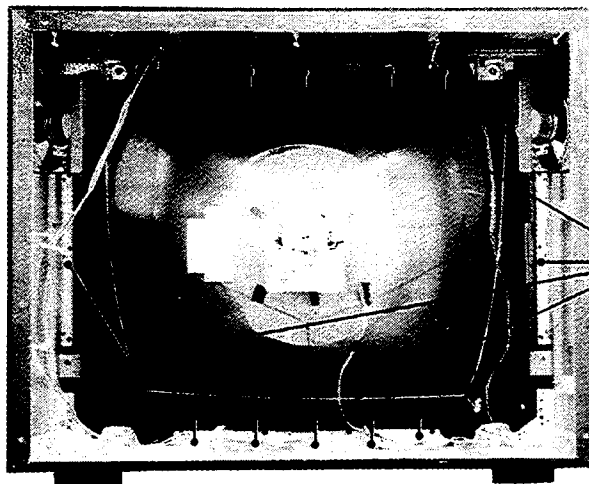
4. Peel the cover free of the CRT and the second anode connector. Remove any residual silicon adhesive between the second anode connector insulation and the CRT.
5. Disconnect the second anode connector from the CRT.
6. Remove the PCBs as described in the Disassembly Procedure. (Page 3)
7. Remove the 4 Hex nuts securing the SHIELD-COVER and remove the SHIELD-COVER from the cabinet. (Figure 4)



Shield cover securing screws

Figure 4

8. Remove the 15 screws securing the FRONT-MASK and remove the FRONT-MASK. (Figure 5)



Front mask
securing screws

Figure 5

9. Remove the single mounting screw from each CRT-HOLDER (L & R), but leave the Holders L & R in place. (Figure 6)

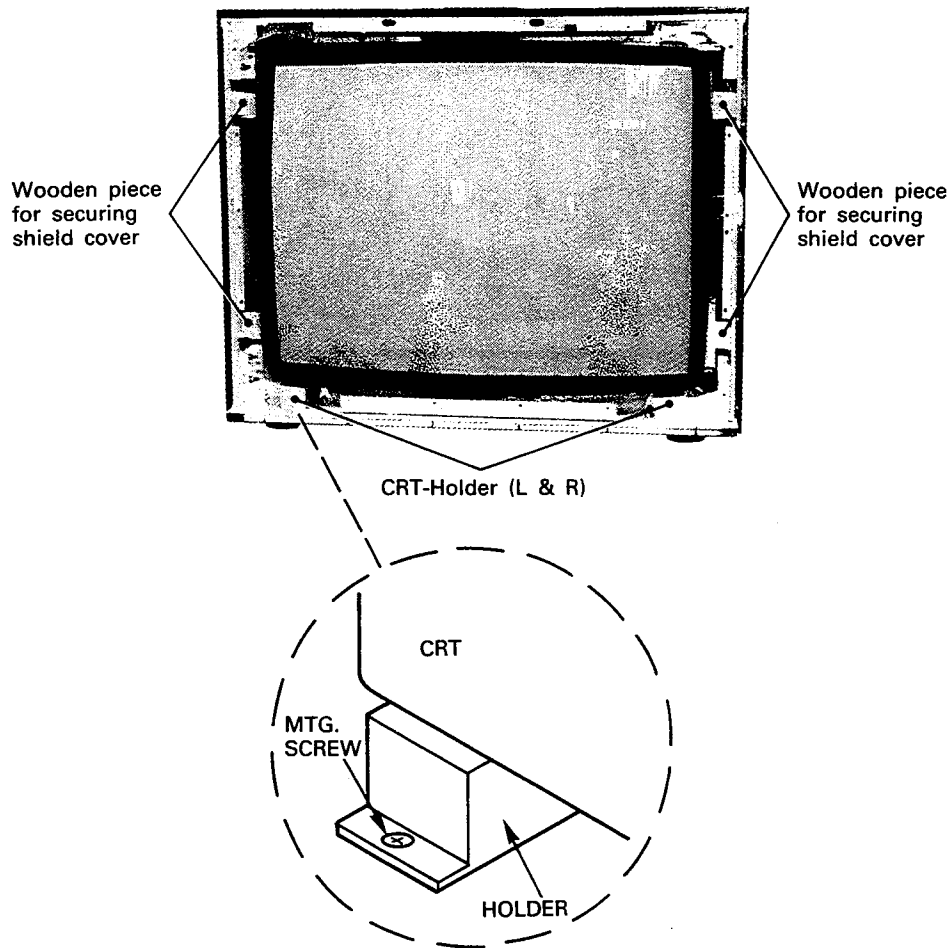


Figure 6

10. Place a thick cushion or slab of foam rubber on the floor and carefully lie the TV set on its face, taking care not to strike or scratch the face of the picture tube.
11. Remove the 4 picture tube mounting hex nuts and washers. (Figure 7)
12. Lift the cabinet from the picture tube. The CRT-HOLDERS (L & R) will fall free when the cabinet is removed. Be sure to lift the cabinet high enough to clear the neck of the CRT.
- Note:** If the mounting screws have not been removed from the two CRT-HOLDERS, the cabinet cannot be removed from the CRT.

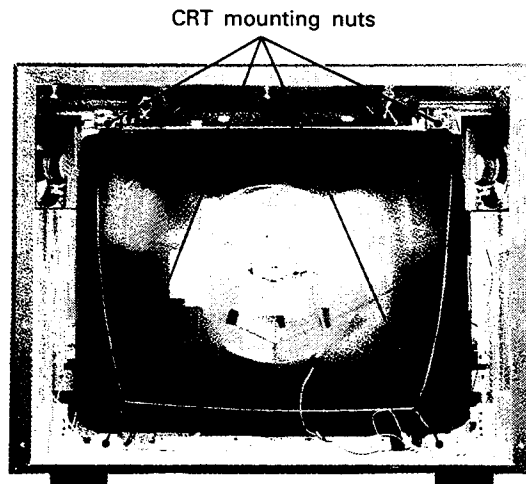


Figure 7

13. Remove the CRT mounting screw and the two philips head screws from each LUG-HOLDER, then remove all four LUG-HOLDERS. (Figure 8)
14. Remove the CRT grounding wire.

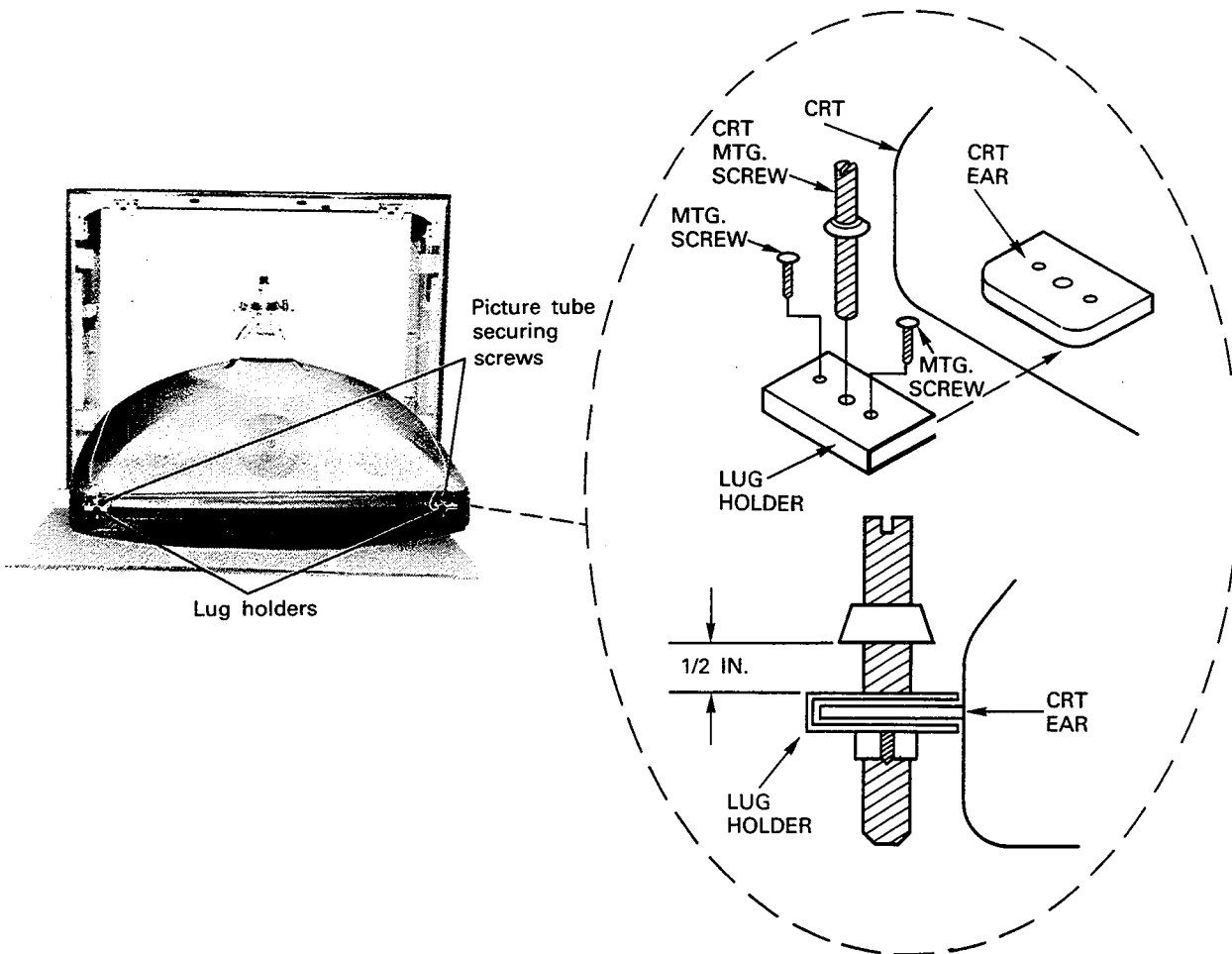


Figure 8

PICTURE TUBE INSTALLATION PROCEDURE

1. Place a cushion on the floor and carefully lie the replacement CRT face down on the cushion.
2. Install the CRT ground wire.
3. Install a LUG-HOLDER on each of the CRT Ears, and secure each with the two Philips mounting screw. (Figure 8)
4. Manually start a CRT mounting screw in each LUG-HOLDER, leave approximately 1/2 inch between the bushing on the screw and the LUG-HOLDER. (Figure 8)
5. Place the cabinet over the picture tube and position it so the distance between the CRT and cabinet is equal on both sides and so the CRT is as far as possible toward the top of the cabinet.
6. Secure the CRT to the cabinet with the 4 CRT mounting washers and hex nuts. (Figure 7)
7. Turn the TV upright, slide the CRT-HOLDERS (L & R) under the front of the CRT and secure both CRT-HOLDERS with a Philips mounting screw. (Figure 6)

Note: If the CRT is sitting too low to insert the CRT-HOLDERS, raise the CRT by the procedure described in Step 8.

8. Check that the picture tube is seated securely in the HOLDERS (L & R). If required lower or raise the CRT by the following procedure:
 - (1) Insert the JACK-CRT under the side of the CRT to be raised or lowered. (Figure 9)
 - (2) Adjust the height of the JACK-CRT so it is flush against the bottom of the CRT.
 - (3) Loosen the upper CRT mounting nut on the side to be raised or lowered, then the diagonally opposite lower mounting nut, and lastly the lower mounting nut on the side to be moved, as illustrated in Figure 9.

CAUTION: Loosen the CRT mounting nuts in small steps only so the CRT does not suddenly drop onto the CRT-HOLDERS.

- (4) Lower or raise the CRT to the desired position by adjusting the height of the JACK-CRT.
- (5) Tighten all four CRT mounting nuts.

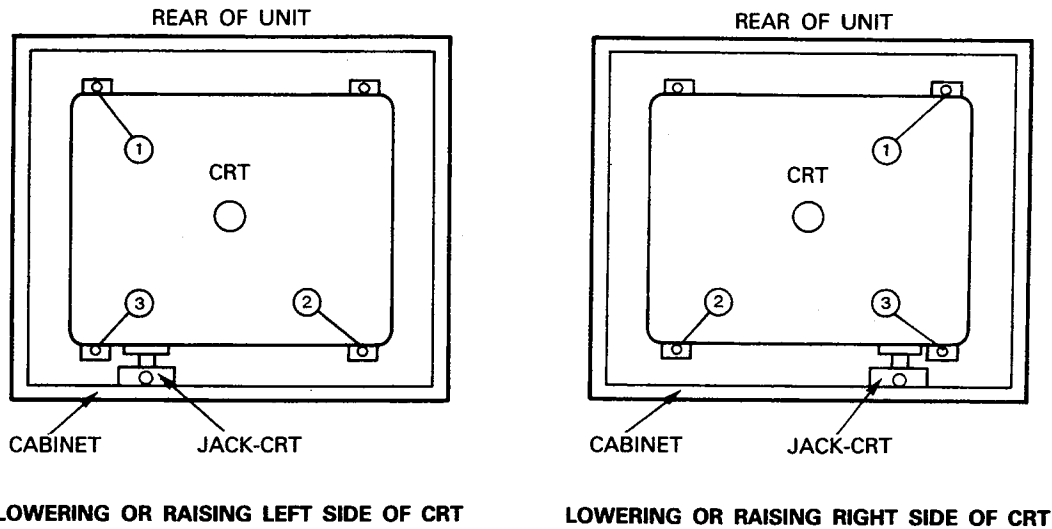


Figure 9

9. Temporarily insert the FRONT-MASK in the cabinet and check that no space exists between the picture tube and the mask, or between the mask and the cabinet. If no space exists proceed to step 11. If a space does exist proceed to Step 10.
10. Adjust the 4 CRT adjustment screws (Figure 7) with a flat blade screwdriver to vary the front to rear position of the CRT to eliminate any gaps between the CRT and mask, or mask and cabinet. (Rotate the CRT screw clockwise to move the picture tube toward the front of the cabinet and Counter Clockwise to move it toward the rear).
11. When the CRT position is correct, securely tighten the 4 CRT mounting nuts. (Figure 7)
12. Install and tighten the 14 FRONT-MASK mounting screws. (Figure 5)
13. Reinstall the SHIELD-COVER. (Figure 4)
14. Install the PCBs.
15. Connect the second anode connector to the picture tube.
16. Apply silicon compound to the surface of the CRT around the second anode connector insulation and then press the second anode cover in place.

SERVICE ADJUSTMENT

PURITY AND CONVERGENCE

GENERAL

Purity and Convergence adjustment should be achieved in the following sequence order, when replacing Picture-Tube, Deflection-Yoke, or Purity-Convergence Magnetic Assembly.

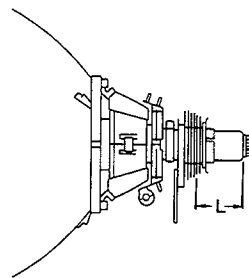
Note 1: Picture-tube which is for the purpose of service is supplied in the form of assembly with Picture-tube, Deflection-yoke and Purity/Convergence magnetic assembly.

As a rule, Purity/Convergence adjustment has been already preset at factory, so that the regular adjustment only is required.

Note 2: When replacing either Deflection-yoke or Purity/Convergence magnetic assembly, proceed in the following procedure (1)-(4).

PROCEDURE

- (1) Remove the deflection-yoke and the rubber wedges from the picture-tube-cone with care not to strike or scratch the cone surface.
- (2) Clean the remaining cement off the deflection-yoke and the surface of the picture-tube-cone.
- (3) Put the deflection-yoke on the neck of the picture-tube, fully forward against cone.
- (4) Put the Purity/Convergence assembly on the neck of the picture-tube so that the distance between the 6-pole magnet and the base of the tube is 40 mm (1-9/16 inches) as shown in Fig. 4-1, and tighten the screw by hand.
- (5) Demagnetize the front and sides of the picture-tube with a degaussing coil.



CRT	LENGTH
A89JVU81X	1-9/16 inches

Fig. 4-1

Preliminary Adjustment

1. Purity

- (1) Connect the receiver to an external crosshatch generator with blank raster capabilities.

Set generator to "RASTER" position.

- (2) Set the B-CUT off switch S602 (on VCJ-PCB) to the extreme left position to produce a yellow raster.
- (3) With the deflection yoke positioned fully forward, adjust the purity magnet so that the yellow bar is at the center of the screen with normal vertical centering.

- (4) Slide the deflection yoke slowly backwards to produce a uniform yellow raster.
- (5) Produce the primary color rasters; red, green, and blue and make sure no contamination is observed for each color.

To produce a red raster, set the B-CUT off switch S602 and G-CUT off switch S601 to the extreme left position.

To produce green and blue primary color, short-circuit the base and emitter of O605 (R-AMP) and set the B-CUT off switch S602 or G-CUT off switch S601 to the extreme left position. Temporarily fasten the deflection yoke.

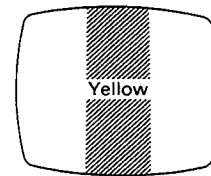


Fig. 4-2

2. Static Convergence

- (1) Connect receiver to an external crosshatch generator set to crosshatch position.
- (2) Set Contrast control to minimum (fully counter-clockwise). If necessary, adjust Brightness.
- (3) Turn the plastic lock nut clockwise as observed from the back to loosen Convergence-Purity Assembly.
- (4) Adjust the two 4-pole magnets to converge red and blue vertical and horizontal lines at the center of the screen.
- (5) Adjust the two 6-pole magnets to converge the red and blue lines on green.

3. Focus

If necessary, adjust focus. Be certain focus is optimum throughout the entire screen.

Regular Adjustment

1. Purity

- (1) Connect the receiver to an external crosshatch generator with blank raster capabilities.

Set generator to "RASTER" position.

- (2) Set the B-CUT off switch S602 to the extreme left position and to produce yellow raster.
- (3) Loosen the deflection yoke screw and move it forward. Make certain that the yellow bar is at the horizontal center. If necessary, adjust purity magnets to center it.
- (4) Slide the yoke backwards to produce a uniform yellow raster.
- (5) Using the same procedure as for preliminary Adjustment, produce red, blue, and green primary color raster and make sure no contamination is observed for each color.
- (6) If necessary, repeat above steps.
- (7) Tighten the yoke in position.

Note:

- Adjustment of the 4-pole magnets affects red and blue beams, moving them an equal distance in opposite directions.
- Adjustment of the 6-pole magnets affects red and blue beams, moving an equal distance in the same direction.
- The degree of the angle between the tab on the 4-pole magnet and that on the 6-pole magnet controls the amount of beam movement.
- Rotation of the 4 and 6-pole magnets together controls the direction of beam movement.

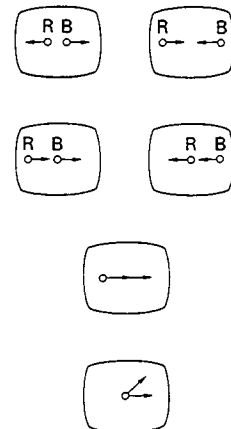


Fig. 4-3

Note: When adjusting the deflection yoke position, never touch any portion of the yoke other than the screw. Do not touch the purity ring magnets unless absolutely necessary, in which case carry out preliminary purity adjustment procedures again. The color select switches S601 and S602 must be reset to their original positions, otherwise abnormal tint will occur on color programs.

2. Static Convergence

- (1) Provide a cross-hatch signal.
- (2) Set Contrast control to minimum.
- (3) Adjust the 4-pole magnets to converge red and blue vertical and horizontal lines at the center of the screen.
- (4) Adjust the 6-pole magnets to place the red and blue converged lines on the green.
- (5) If necessary, repeat steps (3) and (4) above.
- (6) Fasten the plastic lock nut of the Convergence-purity Assembly by turning clockwise.

3. Peripheral Convergence

- (1) Observe the horizontal lines at the center of screen. If the red and blue horizontal lines have shifted crossing the green horizontal lines, as shown in Fig. 4-6, converge by vertically tilting yoke. Then confirm that vertical lines at the screen center are also converged.
- (2) Observe the vertical lines at left and right center of the screen as shown in Fig. 4-7. If red or blue is shifted against green, converge by tilting the yoke horizontally. Then confirm that the horizontal lines both at top and bottom centers of the screen are also converged.
- (3) Insert three rubber wedges between the picture tube cone surface and the deflection yoke, as indicated in Fig. 4-8, so that no space remains.
- (4) Observe the entire screen and make sure convergence adjustment is completed. If necessary, change the positions of the wedges and repeat steps (1) and (2) above.
- (5) After positioning the wedges, gently turn each wedge over and strip the tape from the rear to expose the adhesive material, then replace each wedge in position to adhere to the picture tube cone.

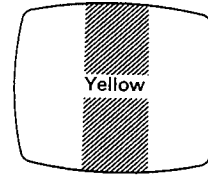


Fig. 4-4

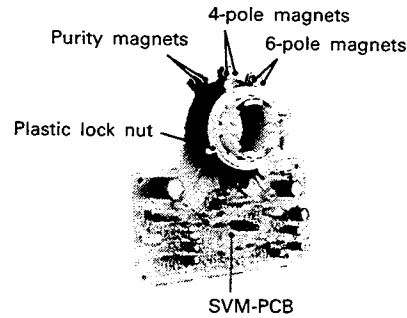


Fig. 4-5

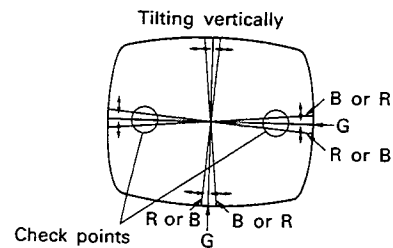


Fig. 4-6

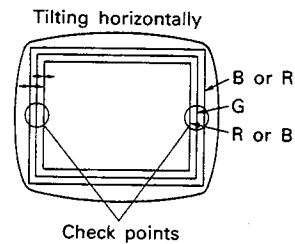


Fig. 4-7

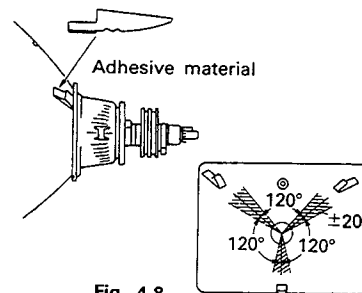
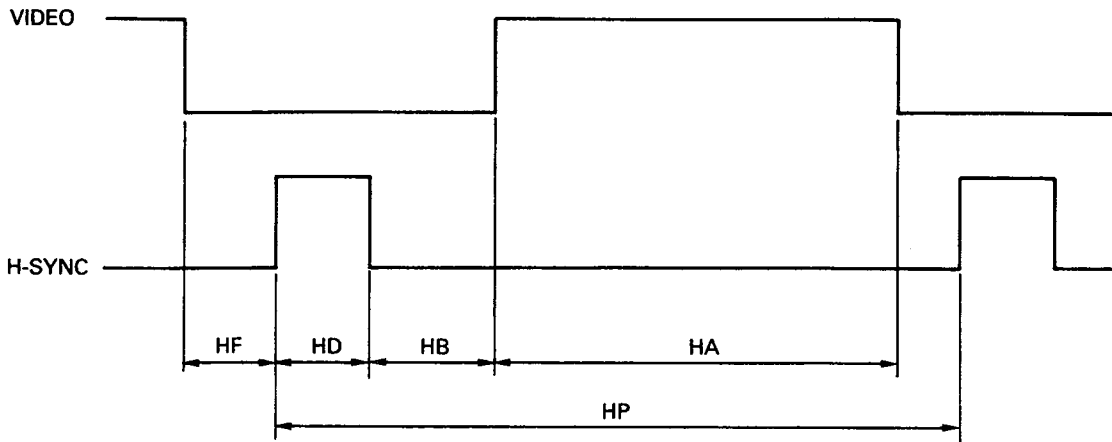


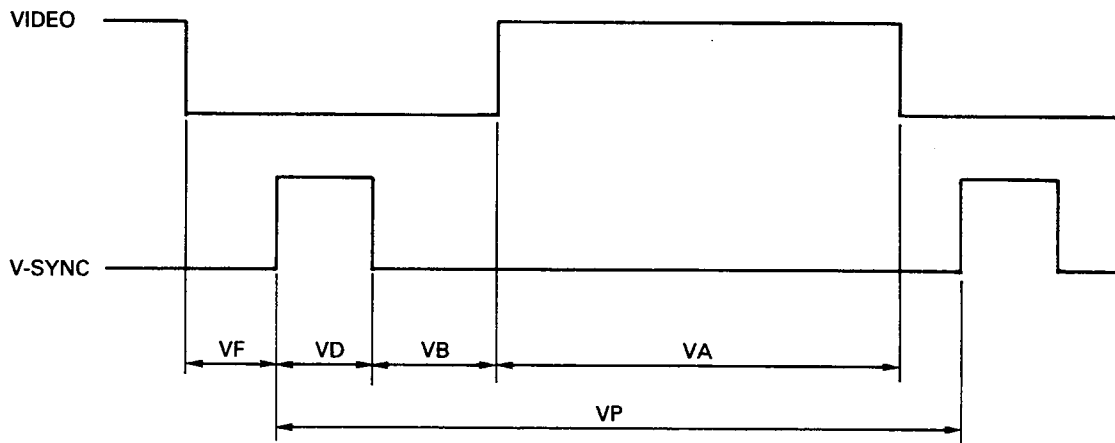
Fig. 4-8

TIMING CHART

HORIZONTAL



VERTICAL

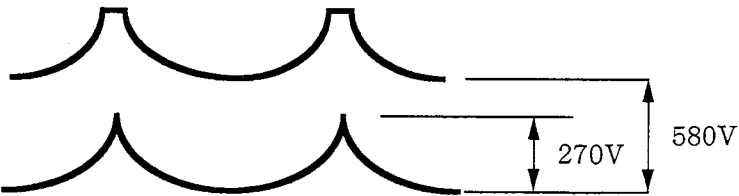


MODE	Horizontal Timing					Vertical Timing					Unit	f _H (kHz)	f _V (Hz)	Note
	HP	HF	HD	HB	HA	VP	VF	VD	VB	VA				
M1-2	63.78	6.47	4.45	8.03	44.83	16680	1640	190	2110	12740	μS	15.7	60	CGA
M2-1	45.75	-0.14	4.924	1.65	39.62	16750	44	595	100	16011	μS	21.8	59.7	EGA
M3-1	54.34	0.348	8.29	1.49	44.212	20040	51	868	133	18990	μS	18.4	50	MDA
M4-1	32	0.64	5.12	0.64	25.6	16670	384	512	418	15356	μS	31.25	60	
M5-1	32.7	0.2	4.48	2.36	25.66	16650	97	65	816	15672	μS	30.5	60	PGA Mode control "H" 480 lines
M5-2	32.7	0.2	4.48	2.36	25.66	16650	1400	65	2120	13065	μS	30.5	60	PGA Mode control "L" 400 lines

SERVICE ADJUSTMENT

<p>High voltage Adjustment (EGA) <M2-1></p>	<p>VR5T1 VR5T2</p>	<p>Note : VR5T1 and VR5T2 are fixed by melting with soldering iron.</p> <ol style="list-style-type: none"> (1) Set VR5T1 and VR5T2 at full counterclockwise position. (2) Connect a DC voltmeter between pin-1 (+) and pin-2 (-) of connector "D8". (3) Provide an RGB EGA white raster signal.<M2-1> (4) Adjust VR5T1 for $26.2 \pm 0.2V$ reading on the meter. (5) After completion of adjustment, fix the VR5T1 by melting with soldering iron.
<p>Horizontal width (Summary) (EGA) <M2-1></p>	<p>VR553</p>	<ol style="list-style-type: none"> (1) Provide an RGB EGA white raster signal.<M2-1> (2) Set underscan position. (3) Reset H-SIZE control. (4) Adjust VR553 for approx 90% horizontal SIZE.
<p>X- Protector Adjustment</p>	<p>VR5T2</p>	<p>★This adjustment should be made after completing the beam adjustment.</p> <ol style="list-style-type: none"> (1) Provide a composite monochrome color bar signal. (15.734KHz) (2) Set overscan position. (3) Connect a DC voltmeter between test-point TP-91 (+) and TP1Z (-). (4) Adjust CONTRAST and BRIGHT control for 100V reading. (5) Connect a DC voltmeter between pin-1 (+) and pin-2 (-) of connector "D9". (6) Adjust VR5T2 for $1.9 \pm 0.2V$ reading on the meter. (7) After completion of adjustment, fix the VR5T1 by melting with soldering iron.
<p>Vertical width Change over SW (EGA) <M2-1></p>	<p>VR403 VR404</p>	<ol style="list-style-type: none"> (1) Set VR403 and VR404 at full counterclockwise position. (2) Provide an RGB EGA crosshatch signal <M2-1> (3) Set underscan position. (4) Reset V-POSI and V-SIZE control. (5) f (V) : 53.3Hz (6) Turn the VF-L control VR404 clockwise until suddenly open. (7) f (V) : 58.3Hz (8) Turn the VF-L control VR404 counterclockwise until suddenly open.
<p>Vertical width (Summary) (EGA) <M2-1></p>	<p>VR452</p>	<ol style="list-style-type: none"> (1) Provide an RGB EGA white raster signal.<M2-1> (2) Set underscan position. (3) Adjust Height control VR452 for approx 90% vertical SIZE.

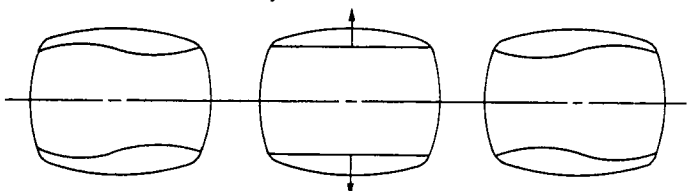
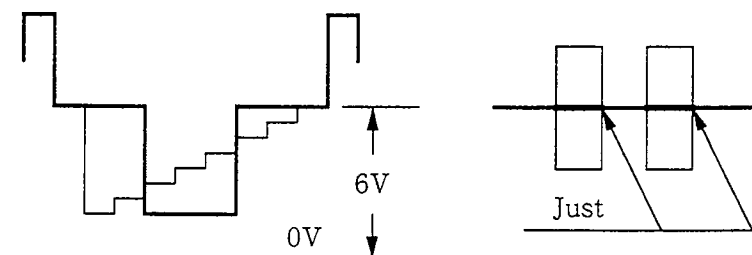
SERVICE ADJUSTMENT

<p>Raster position (EGA) <M2-1></p>	<p>S551</p>	<ol style="list-style-type: none"> (1) Provide an RGB EGA crosshatch signal.<M2-1> (2) Set S552 for mechanical center position. (3) Set S551 for extreme right position. (4) Adjust S552 for optimum position.
<p>Horizontal position (EGA) <M2-1></p> <p>(PGA) <M5-1></p> <p>(MDA) <M3-1></p> <p>(CGA) <M1-2></p> <p>(Composite)</p>	<p>VR5P3</p> <p>VR5P4</p> <p>VR5P5</p> <p>VR5P6</p> <p>VR5P7</p>	<ol style="list-style-type: none"> (1) Provide an RGB EGA monochrome signal.<M2-1> (2) Set underscan position. (3) Reset H-POSI control. (4) Adjust VR5P3 to center picture. <ol style="list-style-type: none"> (1) Provide an RGB PGA monochrome signal.<M5-1> (2) Set underscan position. (3) Reset H-POSI control. (4) Adjust VR5P4 to center picture. <ol style="list-style-type: none"> (1) Provide an RGB MDA monochrome signal.<M3-1> (2) Set underscan position. (3) Reset H-POSI control. (4) Adjust VR5P5 to center picture. <ol style="list-style-type: none"> (1) Provide an RGB CGA monochrome signal.<M1-2> (2) Set overscan position. (3) Reset H-POSI control. (4) Adjust VR5P6 to center picture. <ol style="list-style-type: none"> (1) Provide a composite monochrome signal. (2) Reset H-POSI control. (3) Adjust VR5P7 to center picture.
<p>DBF- AGC</p>	<p>VR453 VR5501 VR5503</p>	<ol style="list-style-type: none"> (1) Turn OFF the power switch. (2) Connect an oscilloscope to test-point TP-8A on PCB-DBF. (3) Set VR453 (PCB-VCJ) and VR5501,VR5502 (PCB-DBF) at mechanical center position. (4) Turn on the power switch. (5) Provide a RGB EGA signal.<M2-1> (6) Set underscan position. (7) Adjust VR453 for best symmetry wave form pattern. (8) Connect an oscilloscope to test-point TP-8B. (CAUTION : Risk of electric shock) (9) Adjust VR5502 clockwise for reading of 270V. (10) Adjust VR5501 clockwise for reading of 580V. 

SERVICE ADJUSTMENT

<p>East– West PCC (EGA) <M2–1></p> <p>(Composite)</p>	<p>VR5J1</p> <p>VR5J2</p>	<p>(1) Provide an RGB EGA crosshatch signal.<M2–1> (2) Set underscan position. (3) Adjust VR5J1 for minimum East-West PCC distortion.</p> <p>(1) Provide a composite crosshatch signal. (2) Set overscan position. (3) Adjust VR5J2 for minimum East-West PCC distortion.</p>
<p>Horizontal width (EGA) <M2–1></p> <p>(Composite)</p>	<p>VR551 VR553</p> <p>VR552</p>	<p>(1) Set VR551,VR552 and VR553 at mechanical center position. (2) Provide an RGB EGA white raster signal.<M2–1> (3) Set underscan position. (4) Set H-SIZE control at minimum position. (5) Adjust VR553 so that horizontal width becomes 24 in. (6) Reset H-SIZE control. (7) Adjust VR551 so that horizontal width becomes 25-3/8 in.</p> <p>(1) Provide a composite monochrome signal. (2) Set underscan position. (3) Reset H-SIZE control. (4) Adjust VR552 so that horizontal width becomes 25-3/8 in.</p>
<p>Vertical width (EGA) <M2–1></p> <p>(Composite)</p> <p>(PGA) <M5–2></p>	<p>VR451 VR452</p> <p>VR401</p> <p>VR402</p>	<p>(1) Provide an RGB EGA crosshatch signal.<M2–1> (2) Set underscan position. (3) Reset V-POSI and V-SIZE control. (4) Adjust HEIGHT control VR452 so that vertical width becomes 19-3/16±3/16 in. (5) Adjust V-LIN control VR451 for symmetry of vertical linearity. (6) Readjust HEIGHT control VR452 so that vertical width becomes 19-3/16±3/16 in.</p> <p>(1) Provide a composite monochrome signal. (2) Set overscan position. (3) Reset V-SIZE and V-POSI control. (4) Adjust V-SIZE-O control VR401 for picture symmetry.</p> <p>(1) Provide an RGB PGA crosshatch signal.<M5–2> (2) Set underscan position. (3) Reset V-POSI and V-SIZE control. (4) Adjust V-SIZE-P control VR402 so that vertical width becomes 19-3/4±3/16 in.</p>

SERVICE ADJUSTMENT

<p>North-South PCC (CGA) <M1-2></p>	<p>L451</p>	<ol style="list-style-type: none"> (1) Provide a composite crosshatch signal.<M1-2> (2) Reset V-POS1 and V-SIZE control. (3) Set overscan position. (4) Adjust L451 for optimum North-South PCC phase. <p style="text-align: center;">Adjust for maximum</p>  <p>(a) Low inductance (b) Normal (c) High inductance</p> <p>※ Simplified method Connect an oscilloscope across C465. Adjust L451 for maximum waveform.</p>
<p>Comb Filter</p>		<ol style="list-style-type: none"> (1) Provide a composite color bar signal.(to EXT1) (2) Connect an oscilloscope to test-point TP-1A (R2A1). Set oscilloscope sensitivity. V.scale : 50mV/DIV H.scale : 2 μ S/DIV (3) Set VR201 at mechanical center position. (4) Adjust L203 for minimum phase. (3.58MHz : less than 5mVp-p, 7.16MHz : less than 10mVp-p)
<p>VIDEO RGB Circuit</p>	<p>VR204</p>	<p>★ This adjustment should be made after setting clamp-switch to the mode A position. (DIP SW No.6)</p> <ol style="list-style-type: none"> (1) Provide a composite color bar signal.(to EXT1) (2) Reset TINT,COLOR,BRT and CONT control. Set G-CUT-OFF and B-CUT-OFF switch at center position. (4) Set WHITE-SW at extreme rear position. (5) Connect an oscilloscope to test-point TP-1H. (IC201 pin-18) (6) Adjust VR2A5 for DC6V, as shown in (a). (7) Ground test-point TP-1L (R2H7). (8) Connect an oscilloscope to test-point TP-4G. (9) Adjust VR204 for coincidence, as shown in (b). <p>(a) VR2A5 Adjustment (b) VR204 Adjustment</p> 

SERVICE ADJUSTMENT

<p>Video CONT Video R-DRIVE Video B-DRIVE</p>	<p>VR2A4 VR202 VR203</p>	<ol style="list-style-type: none"> (1) Set SCREEN VR at full counterclockwise position. (2) Disconnect connector "DT". (3) Provide a composite color-bar signal (to EXT1). (4) Connect an oscilloscope to test-point TP-4G. (5) Adjust VR2A4 for 0.54Vp-p. (6) Set WHITE-SW at extreme rear position. (7) Connect an oscilloscope to test-point TP-4R. (8) Adjust VR202 for 0.54Vp-p. (9) Connect an oscilloscope to test-point TP-4B. (10) Adjust VR2A3 for 0.54Vp-p. (11) Reconnect connector "DT".
<p>R-CUT-OFF G-CUT-OFF B-CUT-OFF R-DRIVE G-DRIVE B-DRIVE D/A SUB CONT D/ASUB BRIGHT SCREEN VR</p>	<p>VR6D1 VR6D2 VR6D3 VR8A1 VR8A2 VR8A3 VR8A4 VR8A5</p>	<ol style="list-style-type: none"> (1) Provide a composite monoscope signal (to EXT1). (2) Set overscan position. (3) Reset BRT and CONT control. (4) Set VR6D1,6D2 and 6D3 at full counterclockwise position. Set VR8A1,VR8A2 and VR8A3 at full clockwise position. (5) Connect an oscilloscope to test-point TP-6R (IC8B4 pin-14). (6) Adjust VR8A4 for 7.0V. (7) Set SERVICE-SW S451 (PCB-VCJ) at rear position. (8) Connect an oscilloscope to test-point TP-4K. (9) Adjust VR8A5 for DC200V. (10) Turn the SCREEN control clockwise until a red,blue or green horizontal line appears. (11) Adjust VR6D1,VR6D2 or VR6D3 to produce a white line. (12) Set WHITE-SW S603 at rear position. (13) Connect a voltmeter (input IMP=1M Ω) between test-point TP-91 (+) and TP-1Z (-). (14) Provide a composite monochrome color-bar signal. (15) Adjust VR8A4 for DC100V. (16) Provide a composite monoscope signal. (17) Adjust VR8A1,VR8A2 or VR8A3 to produce a white raster over the entire screen. (18) Provide a composite monochrome color-bar signal. (19) Readjust VR8A4 for DC100V. (20) Reset WHITE SW at front position.

SERVICE ADJUSTMENT

<p>RGB R-DRIVE RGB G-DRIVE RGB B-DRIVE</p>	<p>VR8A6 VR8B0 VR8A7</p>	<p>(1) Provide an RGB TTL CGA white raster signal.(to D-SUB9pin) (R,G,B,g="H") (2) Set RGB TTL 16 colors position. Set RGB 16 colors CONTRAST VR at full clockwise position. (3) Set underscan position. (4) Reset BRT and CONT control. (5) Set the mode A position.(DIP SW No.6) (6) Set VR8A8 at full clockwise position. (7) Connect a DC voltmeter between test-point TP-91 (+) and TP-1Z (-). (8) Set VR8A0 at full counterclockwise position. (9) Adjust VR8A0 for DC90V. (10) Set VR8A6,VR8B0 and VR8A7 at full clockwise position. (11) Adjust VR8A6,VR8B0 and VR8A7 to produce a white raster over the entire screen.</p>				
<p>RGB SUB CONT RGB TTL BRIGHT</p>	<p>VR8A8 VR8A0</p>	<p>(1) Provide an RGB ANALOG CGA white raster signal. (to D-SUB 25pin or BNC 75ohm $0.6 \pm 0.01V_{p-p}$) (2) Set RGB ANALOG SEPARATE SYNC position. (3) Reset BRT and CONT control. (4) Connect a voltmeter (input IMP=1MΩ) between test-point TP-9Z (+) and TP-1Z (-). (5) Adjust VR8A8 for DC100V. (6) Provide a RGB TTL CGA white raster signal.(R,G,B,g="H") (7) Set RGB TTL 16 colors position. (8) Adjust VR8A0 for DC100V.</p>				
<p>MONOCHROME SUB CONT</p>	<p>VR8A9</p>	<p>(1) Provide an RGB TTL CGA white raster signal.(R,G,B,g="H") (2) Set the SELECT position.(DIP switch No.1 to No.5) (3) Set RGB MONOCHROME position. (4) Reset BRT and CONT control. (5) Set VR8A9 at full counterclockwise position. (6) Adjust VR8A9 for DC90V.</p>				
<p>SUB TINT SUB COLOR</p>	<p>VR602 VR601</p>	<p>(1) Provide a composite color-bar signal. (2) Reset TINT,COLOR,BRT and CONT control. (3) Adjust VR601 and VR602 for optimum.</p> <p>※Connect a vectorscope to TP-46R</p> <table border="1" data-bbox="716 1780 1248 1892"> <tr> <td>R-VECTOR</td> <td>R-AMPLITUDE</td> </tr> <tr> <td>110°</td> <td>2.3Vp-p</td> </tr> </table>	R-VECTOR	R-AMPLITUDE	110°	2.3Vp-p
R-VECTOR	R-AMPLITUDE					
110°	2.3Vp-p					

SERVICE ADJUSTMENT

FOCUS

- (1) Provide an RGB EGA crosshatch signal.
- (2) Set underscan position.
- (3) Set RGB ANALOG position.
- (4) Adjust FOCUS-2VR control for optimum center V-line.
- (5) Adjust FOCUS-1VR control for optimum center H-line.
- (6) Readjust several times for best results.

