

14" CDU 1448TS COLOUR MONITOR UNIT

This display is manufactured by PHILIPS.

CHARACTERISTICS

Analog VGA compatible colour display

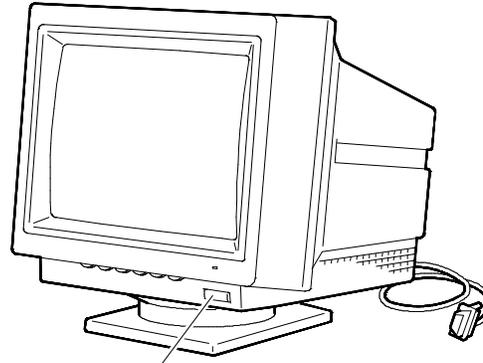
- Screen dimensions: 14"
Horizontal dimension: 240 mm \pm 4 mm
Vertical dimension: 180 mm \pm 4 mm
- Input voltage: 220 V: 196 - 264 Vac
110 V: 90 - 132 Vac
Mains frequency: 50 - 60 Hz: 48 - 62 Hz
- Resolutions and operating frequencies:

Resolution	Horizontal frequency	Vertical frequency
640 x 350	31.469 KHz	70.08 Hz
640 x 400	31.469 KHz	70.08 Hz
640 x 480	31.469 KHz	59.64 Hz
800 x 600	48.077 KHz	72.18 Hz
1024 x 768	48.363 KHz	60.08 Hz
- Sync signals:
Horizontal sync signal: H. SYNC
Vertical sync signal: V. SYNC
- Polarity:

Resolution	Horizontal sync	Vertical sync
640 x 350	positive	negative
640 x 400	negative	positive
640 x 480	negative	negative
800 x 600	positive/negative	positive/negative
1024 x 768	positive/negative	positive/negative
- Level: TTL
- Input signals:
Video: R, G, B drive (Red, Green, Blue)
Signal: Linear voltage steps (63 steps of 11 mV)
Level: 0 - 700 mV
Polarity: Positive
- Resolutions displayed: 640 x 350 lines by columns (Standard VGA)
640 x 400 lines by columns (Standard VGA)
640 x 480 lines by columns (Standard VGA)
800 x 600 lines by columns (Super VGA)
1024 x 768 lines by columns (VGA Plus)
- External controls:
Contrast
Brightness
Vertical shift
Horizontal shift
Vertical size
Horizontal size

REMOVING THE CASING AND DISASSEMBLY

1. Switch the unit off by its ON/OFF button. Also switch off the system it is connected to. Disconnect the signals cable from the system and the power cord from its connector on the monitor.



ON/OFF SWITCH

Fig. 17-1 CDU 1448TS display unit

2. Set the unit with the screen face down (after laying a sponge cloth on the work bench to prevent scoring) and unscrew the four screws securing the casing.
3. Lift the casing upwards and take the video signals cable through its hole in the cover.

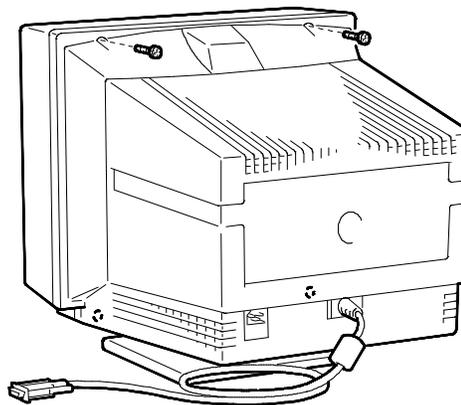


Fig. 17-2 Removal of display casing fixing screws

HIGH VOLTAGE DISCHARGE

4. After removing the casing and before performing any work on the unit boards and cables, the extra high tension (25 KV anode voltage) must be discharged. Use a screwdriver to discharge the CRT anode through a cable to the display chassis ground.

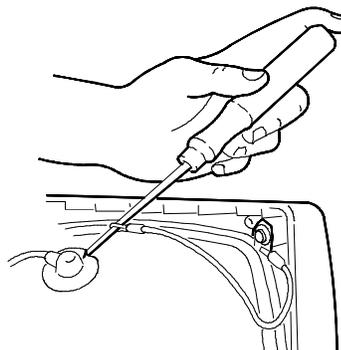


Fig. 17-3 Discharging the EHT

REMOVING THE VIDEO AMPLIFIER BOARD AND SIGNALS CABLE

5. Remove the layer of adhesive silicon on the connection between the CRT connector and the connector of the video amplifier board, used for monitor protection during transport.
6. Unscrew the screws blocking the two cables that join the metal frame of the video amplifier board to the frame of the motherboard.
7. Disconnect the video amplifier board from the CRT. Disconnect connectors M305 and M307 providing interface to the motherboard, connector M302 for video signals cable interface, connector M304 connected to the monitor ground and connector M303 to the grid G2 (SCREEN).
8. Open the cover of grid G3 (FOCUS) and desolder the black wire.
9. The video amplifier board is now free of all connections.
10. To take the metal cover off the video amplifier board, desolder the six points PS where board and cover meet.
11. To remove the video signals cable, unscrew the screw (G) fixing the metal support to the motherboard and remove the cable from connector M401 on the motherboard (the cable has already been removed from connector M302 on the video amplifier board).

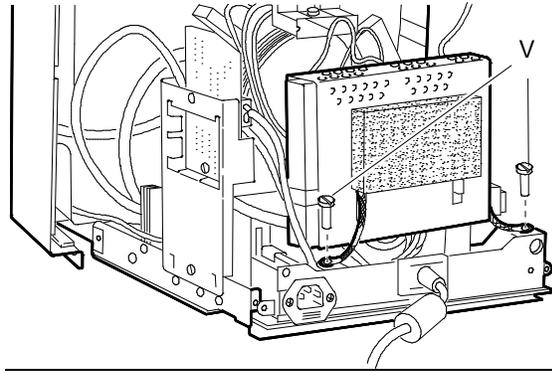


Fig. 17-4 Removing the screws on the video amplifier board cables

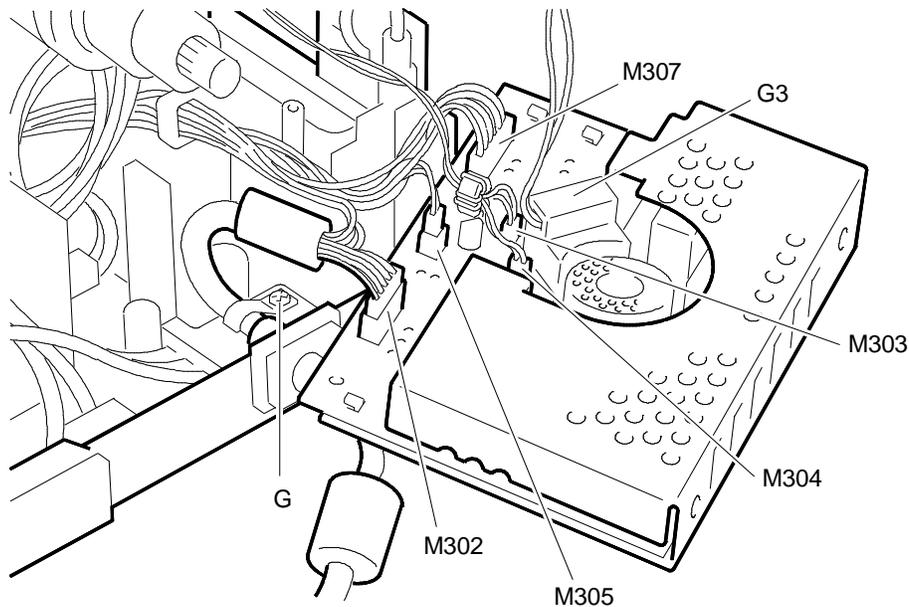


Fig. 17-5 Removing the video amplifier board, metal cover and signals cable

REMOVING THE EMI BOARD

WARNING: Be sure to discharge the anode before removing the EMI board or interfering with connectors M101 or M103.

12. Remove the two cables connected to connectors M101 and M103.
13. Unscrew the screw (V) securing the metal support of the EMI board to the monitor chassis.
14. To detach the board from the metal support, unscrew the screw (F) and take out the dowel (T), pressing on both sides.

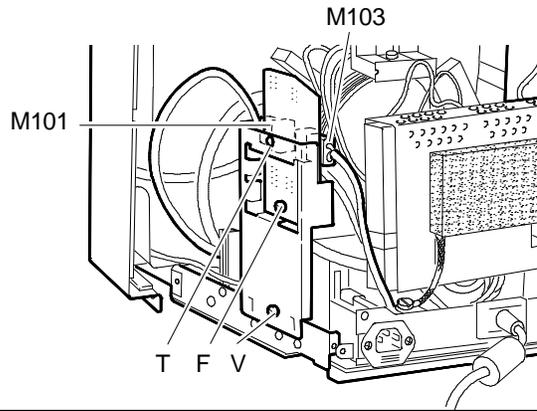


Fig. 17-6 Removing the EMI board

WARNING: When reassembling the board, insert the cables into the right connectors, M101 or M103, taking care not to take the BLUE for the BROWN.

REMOVING THE MOTHERBOARD

15. Unscrew the two screws shown in the figure to the side and remove the degauss cable from connector M102 and the monitor LED cable from connector M104.
16. Be sure to discharge the EHT (25 KV) before removing the anode.
17. To remove the anode, lift up the rubber cap, squeeze the metal contacts with a pair of pliers and remove them from the hole in the CRT.

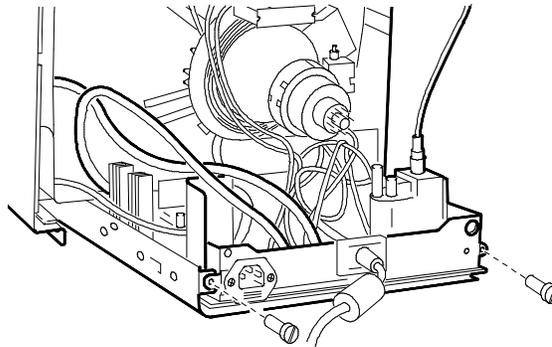


Fig. 17-7 Removing the motherboard - 1st stage

18. Remove the cable connecting the deflection winding to the motherboard from connector M405.

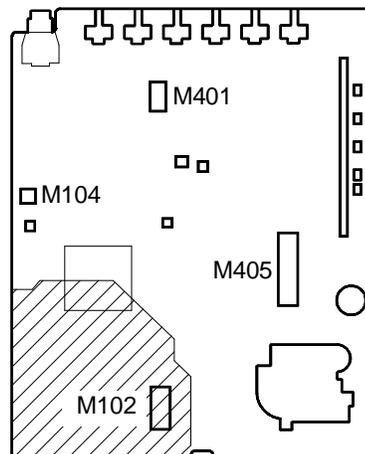


Fig. 17-8 Motherboard connectors

19. The board is now free of its connections and can be removed by sliding it along the guides in the monitor frame.

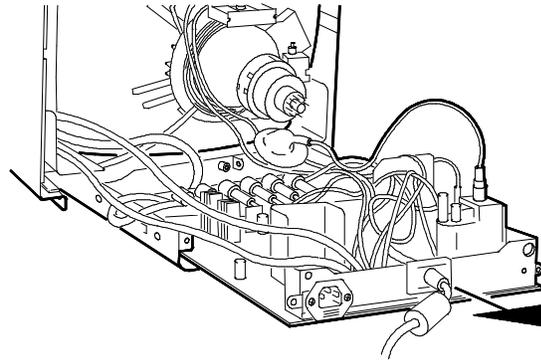


Fig. 17-9 Removing the motherboard - 2nd stage

20. When replacing the motherboard, check that the metal ring (C) on the EHT anode contacts is fast against the O-ring (D) of the anode suction cap as shown in the figure to the side. This ensures sound contact between the anode connections.

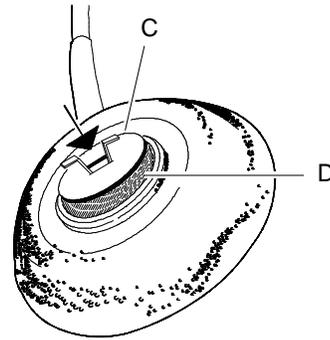


Fig. 17-10 Replacing the anode

REMOVING THE CRT

NOTE: The CRT forms a whole with the yoke on which the deflection windings and convergence magnets are mounted. The magnets are laid on the yoke by the CRT manufacturer and must not be moved, otherwise there may be mis-convergence errors which are very difficult to correct. Spare tubes come with the yoke already assembled.

21. Unscrew the four screws (A) in the four corners securing the CRT to the front frame of the monitor.
22. Cut the two strips fastening the defauss winding (B).
23. Lift the CRT out of the front frame, freeing it from the degauss winding.
24. Remove the ground winding (C) from the CRT, together with its spring (D). The ground winding must be put back in place on the new CRT.

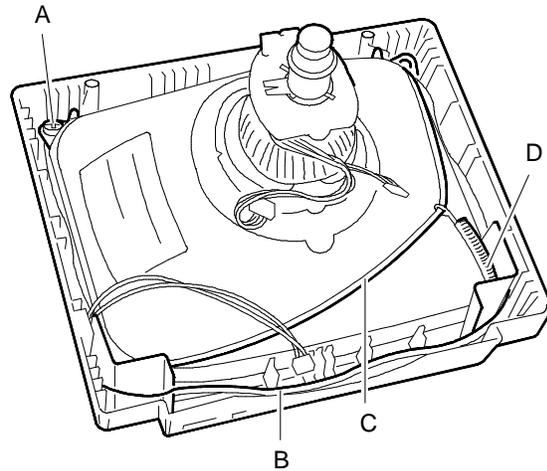


Fig. 17-11 Removing the CRT

ADJUSTING THE MONITOR

The adjustment points are on the three boards of the monitor:

- Motherboard
- Triple frequency board
- Video amplifier board.

Some of the motherboard potentiometers are accessible without disassembling the monitor. These are the external adjustment controls on the front of the monitor; they are shown in the figure to the side.

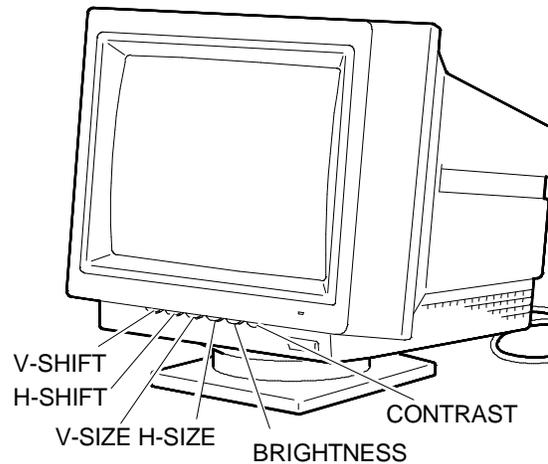


Fig. 17-12 Location of the external control potentiometers

ADJUSTMENTS ON THE MOTHERBOARD AND TRIPLE FREQUENCY BOARD

The adjustment procedures described below guarantee correct setting of the monitor. For best results, it is essential to follow the order in which the procedures are listed.

ADJUSTMENTS OF THE POWER SUPPLY OUTPUT VOLTAGE B+

- Set the external CONTRAST (3312) and BRIGHTNESS (3318) potentiometers to minimum level.
- Set the external V-SIZE (3567) and H-SIZE (3568) potentiometers to minimum.
- Set trimmers 3131 and 3138 to the central, mid-range position.
- Connect a voltmeter to read the direct current voltage between capacitor 2123 and ground (B+ output).
- Switch on the display.
- From the Personal Computer's SYSTEM TEST, select the 640 BY 480 GRAPHICS subtest.
- Adjust trimmer 3131 to obtain a voltage of 89 V +/- 0.5 V on the B+ output.
- From the Personal Computer's System Test, select the HIGH RESOLUTION GRAPHICS subtest with the 800 BY 600 or 1024 BY 768 resolution.
- Set trimmer 3138 to obtain a voltage of 143 V +/- 0.5 V on the B+ output.

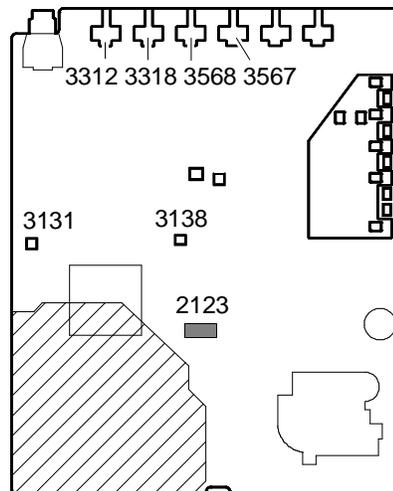


Fig. 17-13 Adjusting the power supply B+ output

ADJUSTING THE HORIZONTAL SYNC

- Short resistors 3484 and 3485 to ground.
- From the Personal Computer's System Test select the 640 BY 480 GRAPHICS subtest.
- Adjust trimmer 3421 to correct the picture.
- From the Personal Computer's System Test, select the HIGH RESOLUTION GRAPHICS subtest with the 800 BY 600 or 1024 BY 768 resolution
- Adjust trimmer 3425 to correct the picture.
- Remove the short circuit connection from resistors 3484 and 3485.

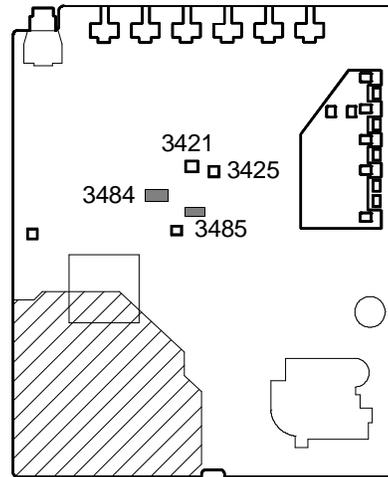


Fig. 17-14 Horizontal sync adjustment

ADJUSTING GEOMETRIC DISTORTION

- From the Personal Computer's System Test, select the TEST PATTERNS subtest, pattern CROSS HATCH WITH CIRCLE IN THE CENTRE OF SCREEN.
- Set the external control potentiometers H-SHIFT (3416) and V-SHIFT (3524) to the mid-range positions.
- Set the CONTRAST external control potentiometer (3312) to the click position and the BRIGHTNESS (3318) to maximum.

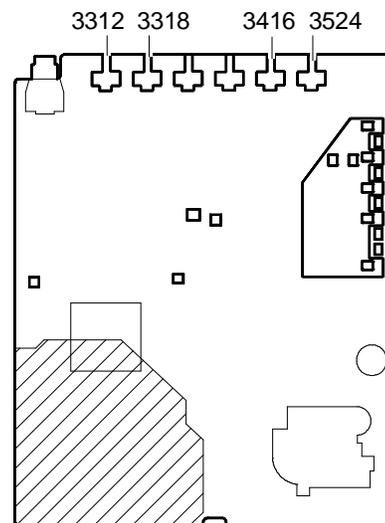


Fig. 17-15 Geometric distortion adjustment

ADJUSTING PICTURE HORIZONTAL CENTERING

- Set the H-SHIFT (3416) external potentiometer to the mid-range position.
- From the Personal Computer's System Test, select the 640 BY 480 GRAPHICS subtest. Adjust trimmer 3452 to give a good horizontal centering of the raster. Adjust trimmer 3413 to put the picture in the centre of the screen horizontally. $|A - B|$ 4 mm.
- From the Personal Computer's System Test, select the HIGH RESOLUTION GRAPHICS subtest, resolution 1024 BY 768. Adjust trimmer 3922 to give a good horizontal centering of the raster in the screen. $|A - B|$ 4 mm.
- From the Personal Computer's System Test, select the HIGH RESOLUTION GRAPHICS subtest, resolution 800 BY 600. Adjust trimmer 3917 to give a good horizontal centering of the raster in the screen. $|A - B|$ 4 mm.

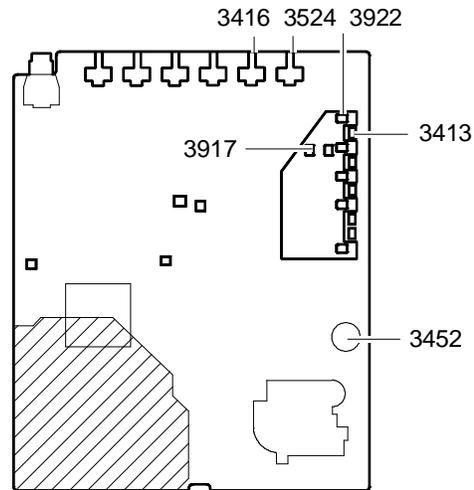
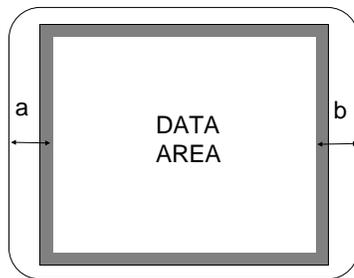
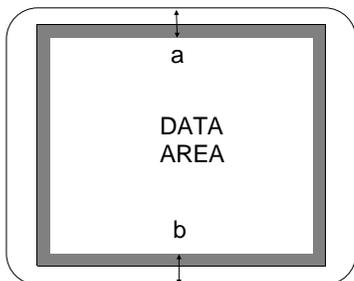


Fig. 17-16 Horizontal and vertical centering of the image



ADJUSTING PICTURE VERTICAL CENTERING

- Adjust the V-SHIFT external potentiometer (3524) to put the picture in the centre of the screen vertically. $|A - B| < 4$ mm.



ADJUSTING THE HORIZONTAL WIDTH

- From the Personal Computer's System Test, select the 640 BY 480 GRAPHICS subtest.
- Set the H-SIZE external potentiometer (3568) to minimum.
- Adjust the horizontal width of the picture to 235 mm using trimmer 3553.
- Adjust horizontal width of the picture to 240 mm using the H-SIZE external potentiometer (3568).
- From the Personal Computer's System Test, select the HIGH RESOLUTION GRAPHICS subtest, resolution 1024 BY 768. Set horizontal width of the picture to 240 mm using trimmer 3925.

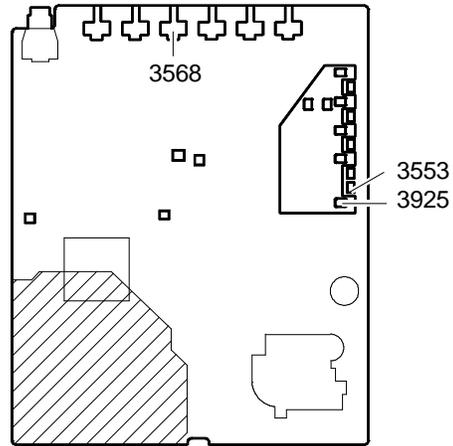
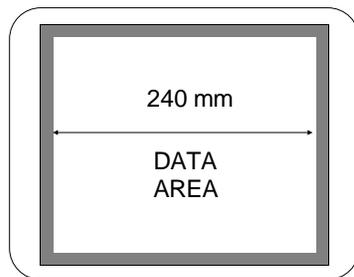


Fig. 17-17 Horizontal width adjustment



ADJUSTING THE VERTICAL WIDTH

- From the Personal Computer's System Test, select the 640 BY 350 GRAPHICS subtest.
- Set the V-SIZE external potentiometer (3567) to minimum.
- Adjust the vertical width of the picture to 150 mm using trimmer 3537.
- Adjust vertical width of the picture to 180 mm using the V-SIZE external potentiometer (3567).
- From the Personal Computer's System Test, select the 640 BY 400 GRAPHICS subtest. Adjust vertical width of the picture to 180 mm using trimmer 3926.
- From the Personal Computer's System Test, select the 640 BY 480 GRAPHICS subtest. Adjust vertical width of the picture to 180 mm using trimmer 3539.
- From the Personal Computer's System Test, select the HIGH RESOLUTION GRAPHICS subtest, resolution 800 BY 600. Adjust vertical width of the picture to 180 mm using trimmer 3919.
- From the Personal Computer's System Test, select the HIGH RESOLUTION GRAPHICS subtest, resolution 1024 BY 768. Adjust vertical width of the picture to 180 mm using trimmer 3923.

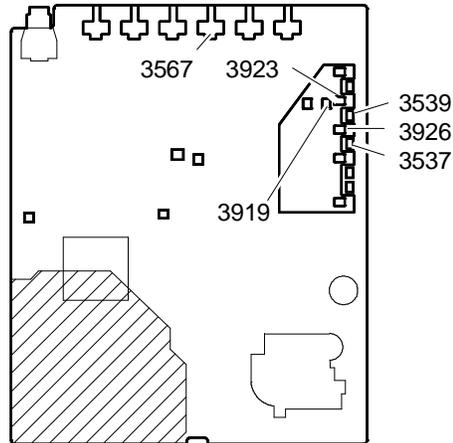
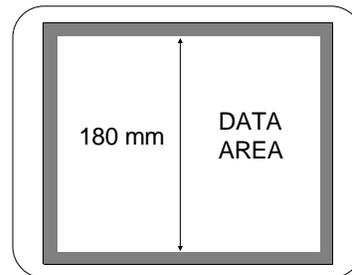


Fig. 17-18 Vertical width adjustment



ADJUSTING THE EAST-WEST DISTORTION

- From the Personal Computer's System Test, select the HIGH RESOLUTION GRAPHICS subtest, resolution 1024 BY 768.
- Adjust trimmer 3544 to correct the East-West (pincushion) distortion.
- From the Personal Computer's System Test, select the 640 BY 350 GRAPHICS subtest.
- Adjust trimmer 3924 to correct East-West (pincushion) distortion.

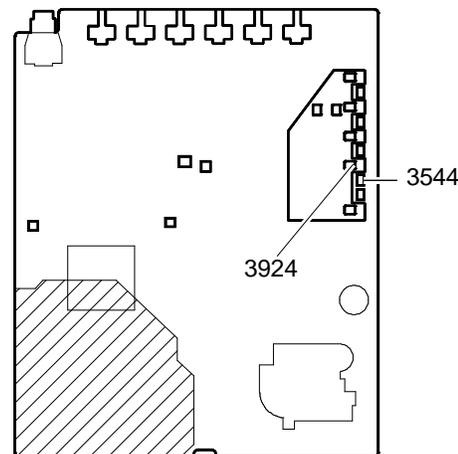


Fig. 17-19 Pincushion distortion adjustment

ADJUSTING THE FOCUS

- From the Personal Computer's System Test, select the 640 BY 480 GRAPHICS subtest.
- Set the BRIGHTNESS external control potentiometer (3318) to the click position and CONTRAST (3312) to maximum.
- Adjust the FOCUS potentiometer, located on the top of line transformer S406, to give the best focus possible.

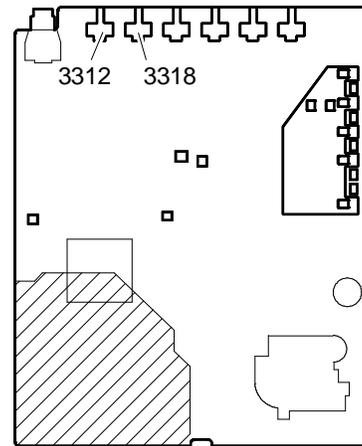
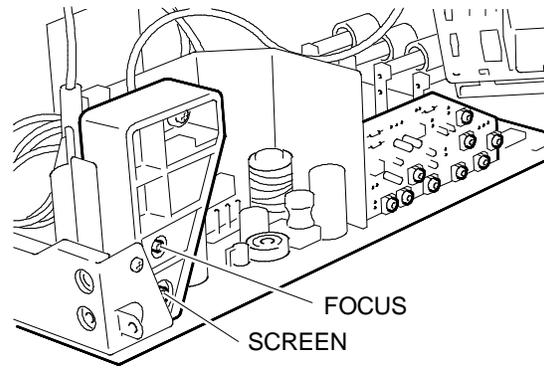
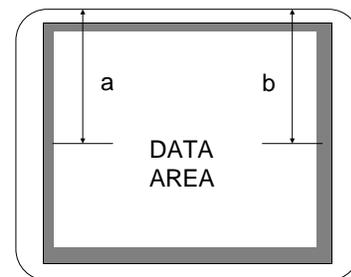


Fig. 17-20 Focus adjustment

ADJUSTING THE TILT

- From the Personal Computer's System Test, select the TEST PATTERNS subtest, pattern CROSS HATCH WITH CIRCLE IN THE CENTRE OF SCREEN.
- Check correct adjustment of the picture tilt, with the parameters shown in the figure to the side. $|A - B| \leq 2$ mm.
- If the picture tilt adjustment error is not within the range indicated above, adjust position of the CRT again, acting on the locking screws.



ADJUSTING THE VIDEO AMPLIFIER BOARD

- Set trimmers 3321, 3324, 3327, 3379, 3376 and 3373 in the mid-range positions.
- Set the Personal Computer to display a full page blank screen in the 640 BY 480 GRAPHICS mode.
- Set the BRIGHTNESS external control potentiometer in the click position, the CONTRAST external control potentiometer and contrast pre-adjustment trimmer 3316 to minimum.
- Set the VG2 potentiometer (SCREEN) on line transformer S406 to minimum.
- Adjust potentiometer VG2 to increment the voltage of grid VG2 (SCREEN) so that each of the colours - red, green and blue - becomes just visible (background colour).
- Adjust the cut-off trimmers 3373, 3376 and 3379 to the same output brightness level to give the best possible raster background colour.
- Turn the BRIGHTNESS external control potentiometer (3318) to maximum for a double check of the raster background colour.
- Turn the BRIGHTNESS external control potentiometer (3318) back to the click position.
- Set the CONTRAST external control potentiometer (3312) and the contrast pre-adjustment trimmer 3316 to the mid-range positions.
- Set the gain adjustment trimmers 3321, 3324 and 3327 to the same output brightness level to give the best possible video colour.
- If necessary, turn the contrast pre-adjust trimmer 3316 to improve picture sharpness.
- Turn the CONTRAST external control potentiometer (3312) to maximum for a double check of the colours displayed.

NOTE: Only perform these adjustments on a display that has been on for at least 10 mins.

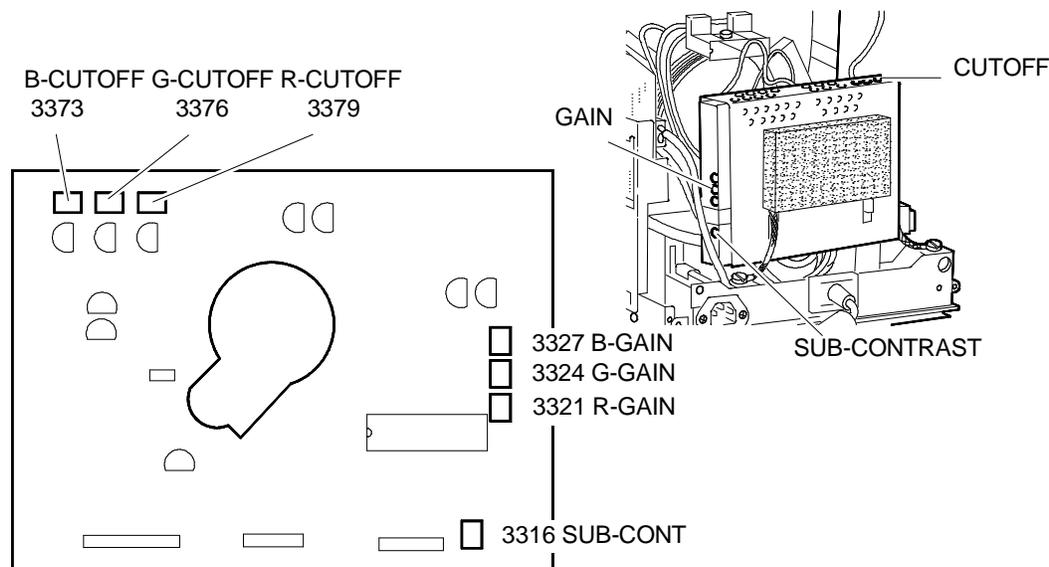


Fig. 17-21 Video amplifier board adjustments