15" DISPLAY UNIT CDU1564OD/GS01 (DSM 60-510)

This display unit is manufactured by **GOLDSTAR** and is identified as **DSM 60-510** on the front and rear of its case, and in the Progetto di Gestione. This unit is also identified as **CDU1564OD/GS01** on the homologation plate on the rear of the case.

CHARACTERISTICS

15" VGA-compatible, multiscan color monitor with analog input signals and the power management and DDC-1/2B features.

- Diagonal screen size: 15"
  Horizontal size: 262 ± 4 mm
  Vertical size: 196 ± 4 mm
- Input voltage: 90-264 V (Universal power supply)
  Line frequency: 50-60 Hz ± 5%
  Degaussing: Automatic at power on
  Power dissipation: <100 W
  Current consumption: <1.5 A
- Video input signals: Analog R.G.B. (Red, Green, Blue) separate
  H.s. and V.s. (horizontal and vertical synchronisms)
  Video input: 75 Ω to ground
  Level: 0-700 mV
  Polarity: Positive
- External controls: Power switch
  Power LED
  Manual degauss
  Adjust buttons (**+** and **-)**
  Select buttons (▲ and ▼)
- Possible adjustments: Contrast, Brightness, Zoom, Recall,
  Horizontal position, Horizontal size,
  Vertical position, Vertical size,
  Pincushion distortion, Keystone distortion,
  Rotation Help, RGB Selection, RGB adjustment
- Input timing limits

Parameter	Horizontal	**Vertical**
Frequency	30 - 65 KHz	50 - 110 Hz
Blanking	≥ 3.5 µs	≥ 0.5 ms
Back Porch	≥ 1 µs	≥ 0.5 ms
Front Porch	≤ Back Porch	
Sync Pulse	≥ 1 µs	≥ 0.05 ms

- Preset timings

HORIZ. (DOTS)	720	640	640	800	800	1024	1024	640	640	720	640	1024
FREQ. (KHz)	31.5	31.5	37.5	48.1	46.9	56.5	60	31.5	37.9	37.9	37.9	48.4
VERT. (LINES)	400	480	480	600	600	768	768	350	350	400	480	768
FREQ. (Hz)	70.1	59.9	75	72.2	75	70.1	75	70.1	85.1	85	72.8	60
INTERL.	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
V/H POLARITY	+/-	-/-	-/-	+/+	+/+	-/-	+/+	-/+	-/+	+/-	-/-	-/-
PIXEL R. (MHz)	28.3	25.2	31.5	50	49.5	75	78.7	25.2	31.5	35.5	31.5	65

NOTE: The RECALL function can be used with the first 7 timings. The monitor can automatically store 23 video modes. The new video modes must differ from the existing ones by at least a 500 Hz horizontal scan frequency or by an 0.5 Hz vertical scan frequency, or the sync signal must have different polarities.

- Power Management

VIDEO MODE	**HORIZ. SYNC**	**VERTICAL SYNC**	**VIDEO**	**POWER SAVING**	**RESTORE TIME**	**LED STATUS**
ON	PULSE	PULSE	ACTIVE	< 90 W		GREEN
STAND-BY	NO PULSE	PULSE	BLANKED	< 15 W	< 5 SEC	AMBER/GREEN
SUSPEND	PULSE	NO PULSE	BLANKED	< 15 W	< 5 SEC	AMBER/GREEN
OFF	NO PULSE	NO PULSE	BLANKED	< 5 W	< 15 SEC	AMBER

- DDC-1/2B VGA connector

1 Red video input
2 Green video input
3 Blue video input
4 Logic ground
5 Self test
6 Red video ground
7 Green video ground
8 Blue video ground
9 Not connected
10 Logic ground
11 Logic ground
12 SDA (Serial Data)
13 Horizontal sync
14 Vertical sync
15 SCL (Serial Clock)

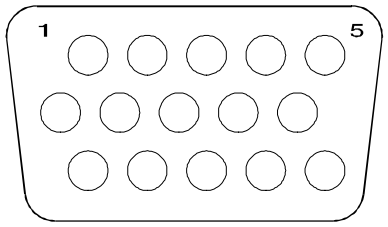


Fig. 3-1 DDC-1/2B VGA Connector

REMOVING THE MONITOR CASE

1. Unplug power cord (A) from its connector on the rear of the monitor.

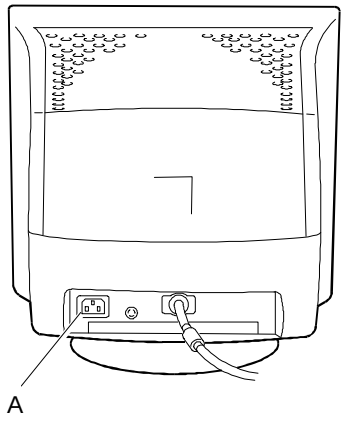


Fig. 3-2 Rear View of the Monitor Case

2. Rest the monitor on a workbench with its screen facing downwards. Press the securing clip and release the base from its slots by pushing it upwards.
3. Using a Phillips screwdriver, remove the two screws (V) indicated in figure 3-4.
4. Always with the monitor screen resting on the workbench, gently lift the cover so that it opens wide from the bottom. Hold the monitor's front frame with one hand and turn the rear of the case with the other. This will release the two securing holes (A) on the upper part of the case so that it can then be removed.

NOTE: During this operation be careful not to damage the monitor case securing holes.

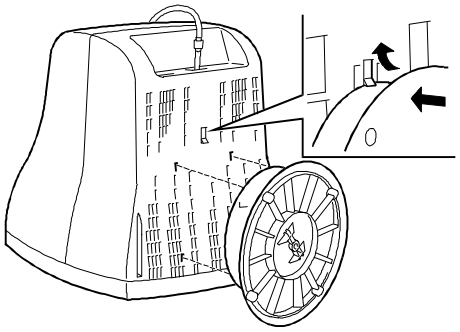


Fig. 3-3 Removing the Base

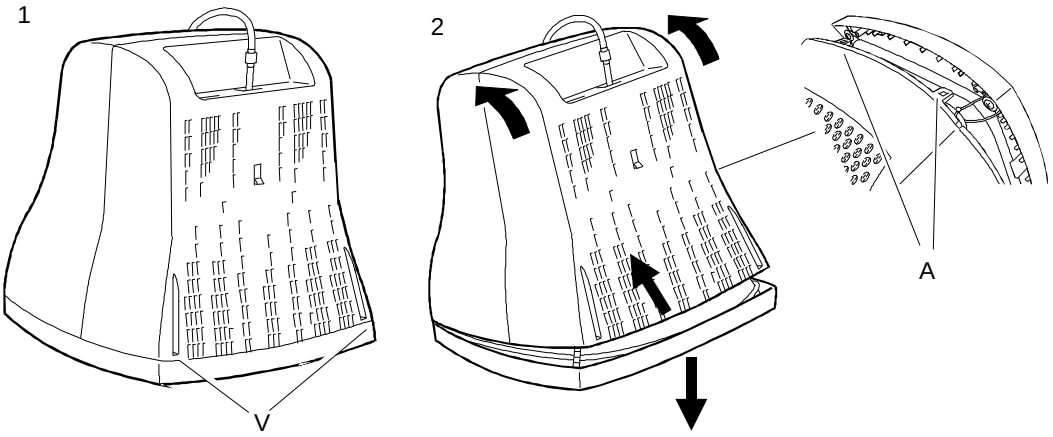


Fig. 3-4 Removing the Monitor Case

DISCHARGING THE ANODE

5. After having removed the case and before performing any other operation with the boards and cables of the display unit, discharge the high voltage. Discharge the CRT anode by means of a screwdriver connected to the display unit's frame ground.

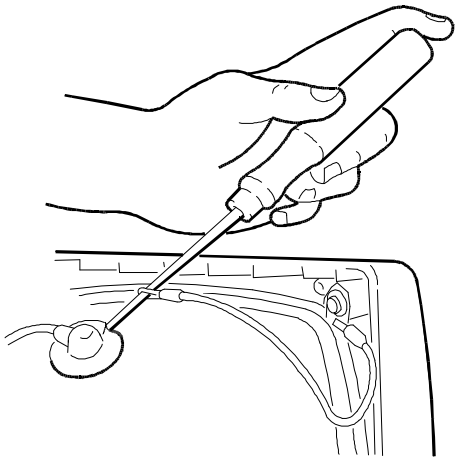


Fig. 3-5 Discharging the CRT Anode

REPLACING THE FUSE

6. If the display unit does not work due to a blown fuse, the fuse needs to be replaced. The figure on the side shows the location of the fuse (F) on the main board.

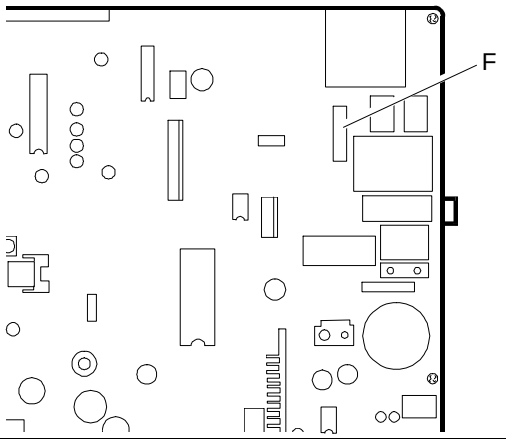


Fig. 3-6 Locating the Fuse

REMOVING THE VIDEO AMPLIFIER BOARD

7. Remove all connections from the metal cover of the video amplifier board (A).
8. Remove the metal cover if you only need to work on the solder side of the board.
9. Remove the layer of adhesive silicone from the connection between the CRT connector and the video amplifier board connector (A). This layer is used to protect the display unit during transport. Turn over the video amplifier board.

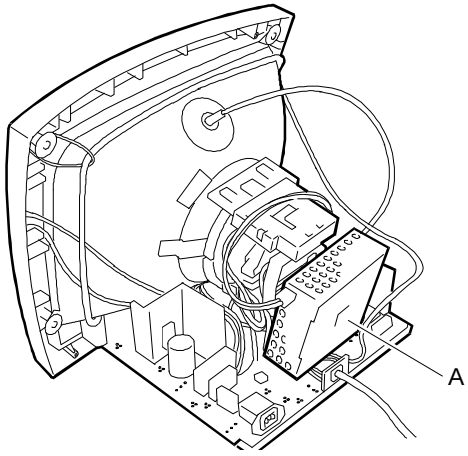


Fig. 3-7 Removing the Video Amplifier Board

10. Free the board by disconnecting the cables from the following connectors: P301, P302 and P304.

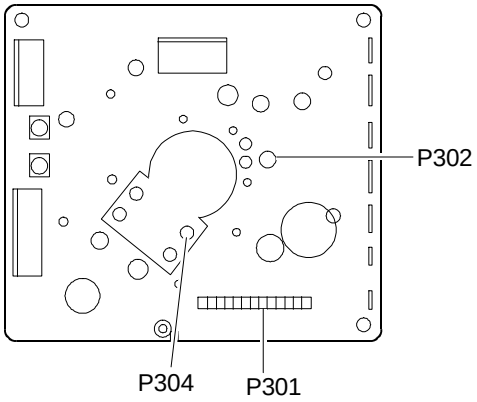


Fig. 3-8 Locating the Connectors on the Video Amplifier Board

REMOVING THE MAIN BOARD

11. Be sure to discharge the EHT high voltage before removing the anode.
12. Remove the anode by lifting the rubber cap, squeezing the two metal contacts with a pair of pliers and removing these contacts through the specific hole in the CRT.
13. Disconnect all accessible cables from the main board. The main board has the following connectors: P202, P201, P104, P902, P651, P903, P701.

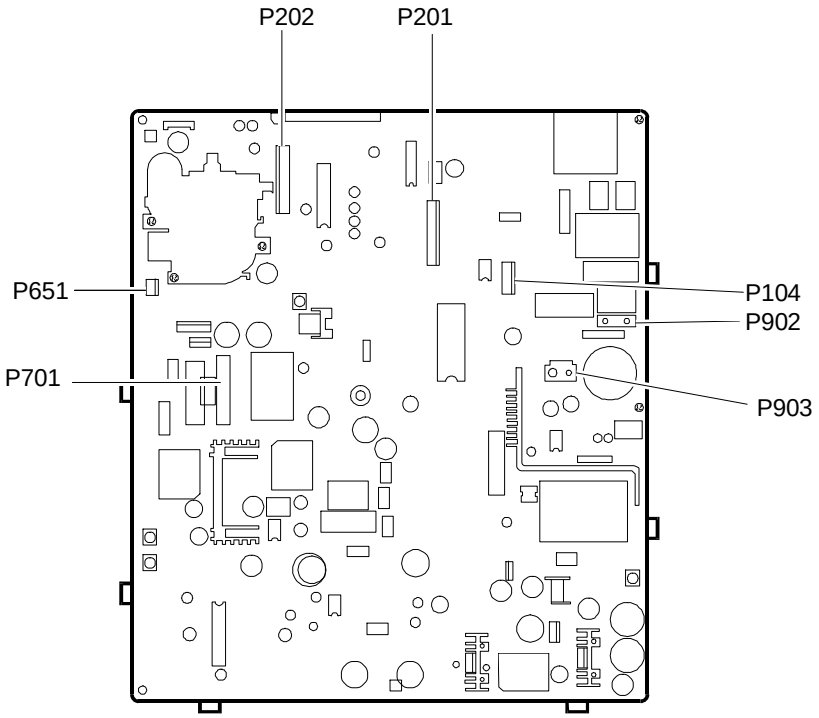


Fig. 3-9 Locating the Connectors on the Main Board

14. Remove the two securing screws (V) and then remove the screws securing the ground cables to the sides of the metal frame.
15. Remove the metal frame by pulling it upwards.

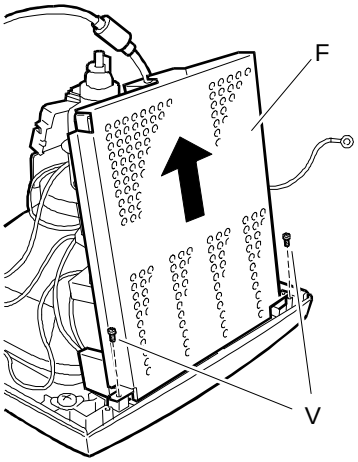


Fig. 3-10 Removing the Metal Frame

16. Remove the main board and plastic support from the CRT.

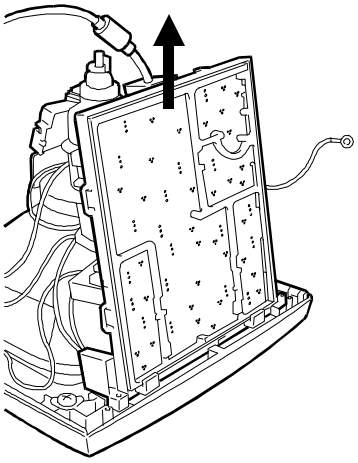


Fig. 3-11 Removing the Main Board and Plastic Support from the CRT

17. To separate the main board from the plastic support, remove the six screws (V) and release clips (G).

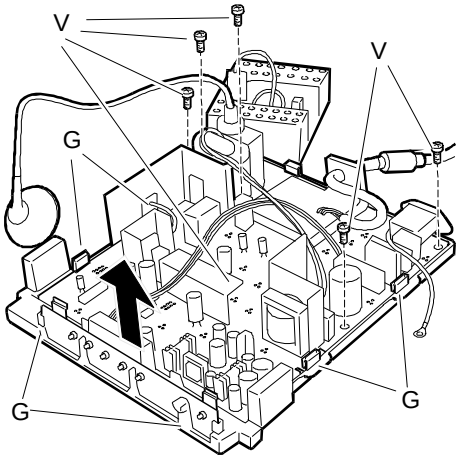


Fig. 3-12 Detaching the Main Board from its Metal Support

REMOVING THE CONSOLE BOARD

18. To remove the console board (C) with the display unit's external controls, remove this board from its plastic support.

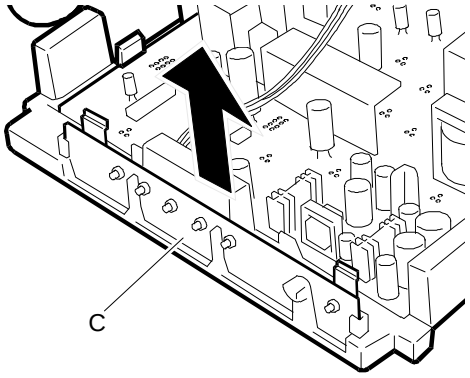


Fig. 3-13 Removing the Console Board

REMOVING THE CRT

NOTE: The CRT and yoke form a single unit on which the deflection coils and convergence magnets are fitted. The magnets are set by the manufacturer and must not be moved so as to avoid convergence errors that are difficult to correct. A spare tube with a yoke already fitted is provided.

19. Remove the four screws (V) that secure the CRT to the display unit front cover.

20. Remove ground winding (M) by removing the spring that holds this coil and the degauss winding (D) in place. Both coils must be fitted back onto the new CRT.

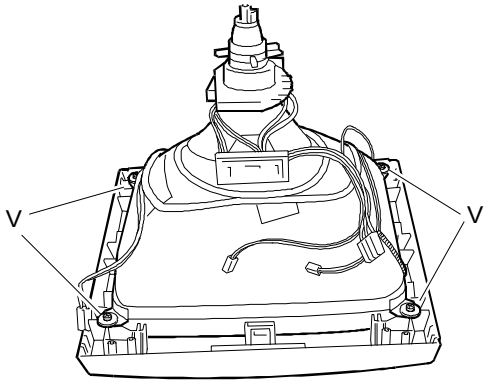


Fig. 3-14 Removing the CRT

REASSEMBLY PROCEDURE

21. To reassemble the display unit follow its disassembly procedure in reverse order.

DISPLAY ADJUSTMENTS

Two kinds of display adjustments are available for this display unit:

- External controls and adjustments that can be carried out by the user.
- Internal adjustments to be carried out by the field engineering service.

EXTERNAL CONTROLS AND ADJUSTMENTS

The following are located on the front of the display unit:

- Power switch (I)
- Power LED (L)
- External control panel (P).

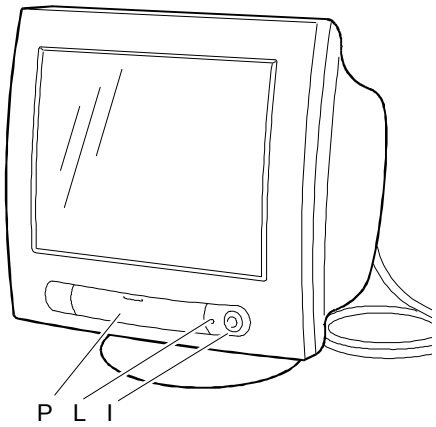


Fig. 3-15 Display Unit

In order to use the external controls and make adjustments, the operator must use the buttons on the external control panel shown in the figure on the side. Press gently on the center part of this panel to open it.

The buttons on the control panel have the following functions:

1. Manual Degauss: degausses the image.
2. Select buttons (▲ and ▼): pressing these buttons selects one of the four adjustment menus and the specific adjustment that can be made.
3. Adjust buttons (**+** and **-**): pressing these buttons allows the desired parameter to be adjusted.

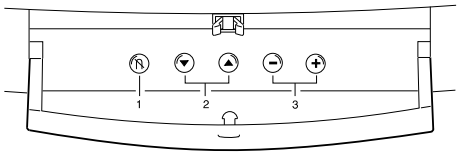


Fig. 3-16 Buttons on the External Control Panel

The menus and related adjustments are of the OSD (On Screen Display) type, in other words they are displayed when the select buttons (▲ and ▼) are pressed. The four adjustment menus displayed are listed below:

MENU 1

CONTRAST - Selects image contrast

BRIGHTNESS - Selects image brightness

ZOOM - Adjusts the image horizontally and vertically

RECALL - Restores all the factory set parameters

MENU 2

HORIZONTAL SHIFT - Adjusts the horizontal shift of the image

HORIZONTAL SIZE - Adjusts the horizontal size of the image

VERTICAL SHIFT - Adjusts the vertical shift of the image on the screen

VERTICAL SIZE - Adjusts the vertical size of the image

MENU 3

PINCUSHION DISTORTION - Corrects the pincushion distortion of the image

KEYSTONE DISTORTION - Corrects the keystone distortion of the image

ROTATION - Corrects the rotation of the image clockwise and counterclockwise

HELP - Displays factory-set and user-defined values.

MENU 4

RGB SELECTION - Selects the color temperature from among the following values: 9300^0 K / 7200^0 k / user definable

RGB ADJUSTMENT - Adjusts the color temperature as defined by the user

Proceed as follows to adjust the ODS (On Screen Display) parameters:

1. Press the Select buttons (▲ and ▼) to highlight the adjustment to be made.
2. Press the Adjust buttons (**+** and **-**) to adjust the selected parameter.
3. Repeat steps 1 and 2 for each adjustment desired.
4. All adjustments are automatically stored in video memory.

NOTE: The menus are no longer displayed after 5 or 6 seconds. An adjustment needs to be activated on the screen in order for it to be made.

All adjustments are automatically stored and are kept in memory even after the monitor is powered off. Use the RECALL function to restore the factory settings.

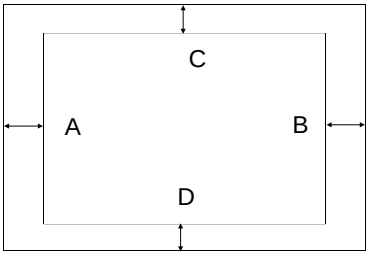
Given below are the characteristics of an image to be used as reference during adjustment:

Horizontal size: 262 ± 4 mm

Vertical size: 196 ± 4 mm

$|A-B| \leq 4$ mm

$|C-D| \leq 4$ mm



HELP MENU

The Help menu provides information regarding the operations of the display unit. This menu consists of three sequential menus. The first menu indicates the total number of video modes that are set at the factory and set directly by the user, in addition to information on the video mode on display at that moment. The second menu displays the data relating to the factory set video modes while the third menu displays the data relating to the user-defined video modes. Press the + or - button to toggle between the video modes.

INTERNAL ADJUSTMENTS

Internal adjustments are performed by the field engineer. Follow these procedures step-by-step since some adjustments affect those that follow.

VIDEO AMPLIFIER BOARD ADJUSTMENT TRIMMER

VR301 Green bias adjustment
VR302 Red bias adjustment

NOTE: The BIAS is the gain of the electron gun.

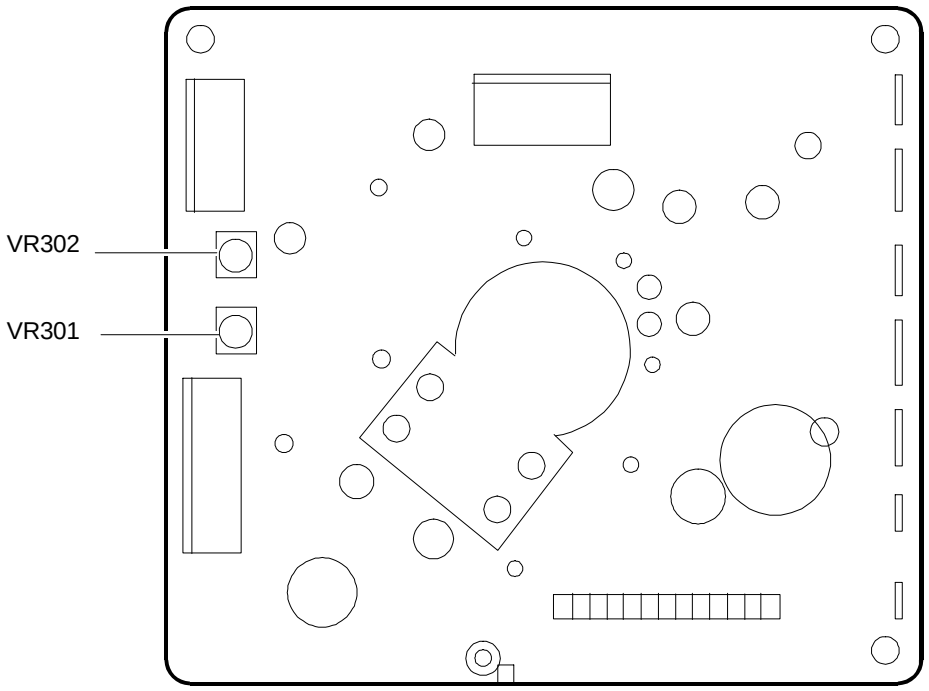


Fig. 3-17 Video Amplifier Board Adjustments

MAIN BOARD ADJUSTMENT TRIMMER

VR501	High voltage adjustment
VR801	Horizontal linearity adjustment
VR802	Sub-brightness adjustment
VR951	B+ voltage adjustment
SW701	Raster centering

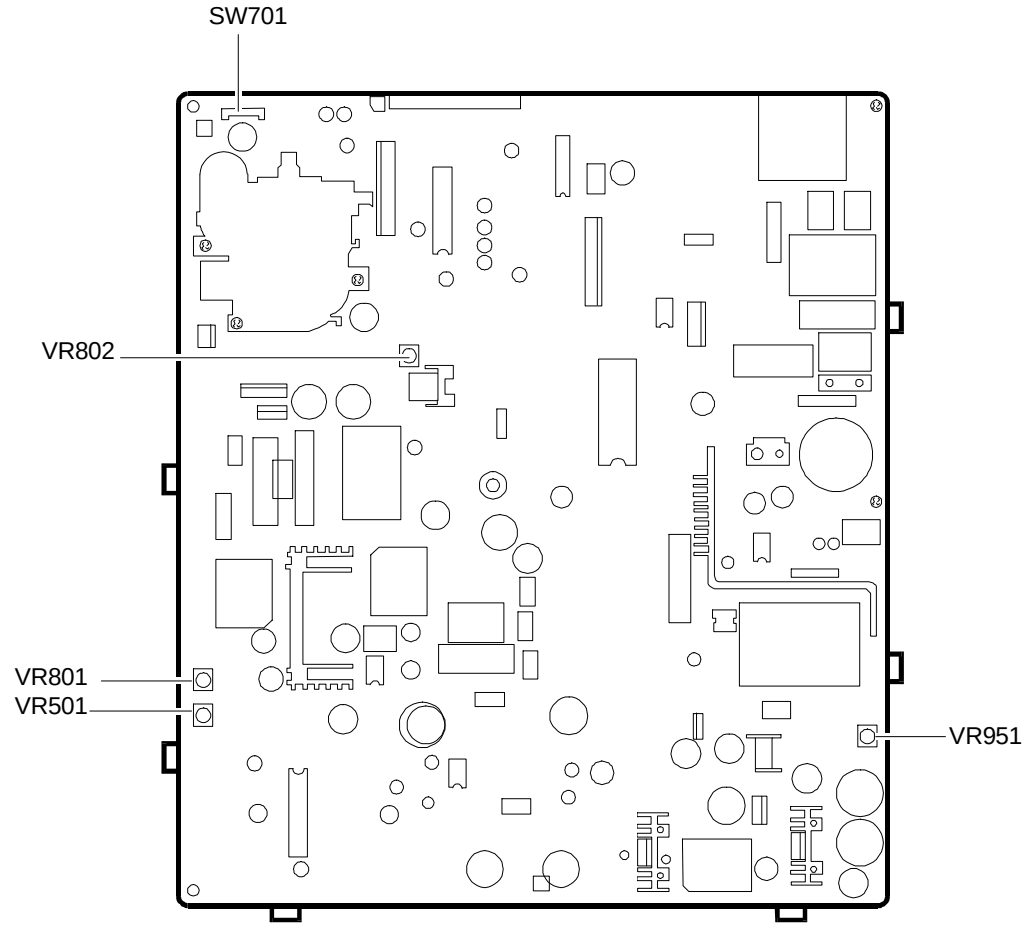


Fig. 3-18 Main Board Adjustments

REQUIRED EQUIPMENT

- Digital voltmeter
- 40 Hz to 100 KHz frequency counter
- Color coordinate analyzer
- Video signal generator or System Test diskette in the case of Olivetti personal computers
- High voltage meter (above 30 KV)

B+ VOLTAGE SETTING

- Display a cross-hatch pattern in the 640x480 60 Hz video mode.
- Attach a voltmeter to the cathode of diode D955.
- Adjust the voltage to 50 ± 0.5 V using the VR951 trimmer on the main board.

HIGH VOLTAGE SETTING

- Display a cross-hatch pattern in the 640x480 60 Hz video mode.
- Attach a high voltage voltmeter to the cathode of diode D713.
- Adjust the voltage to 42.5 ± 0.2 V using trimmer VR501 on the main board.

RASTER CENTERING

- Display a cross-hatch pattern in the 1024X768 60 Hz video mode.
- Set brightness to its maximum level so that the raster becomes visible.
- Center the raster on the screen using switch SW701 on the main board.

FOCUS ADJUSTMENT

Set the external contrast and brightness controls to their maximum setting.

Display a page of character H's in the 1024x768 video mode.

Adjust the FOCUS potentiometer of the FBT transformer to improve image focus.

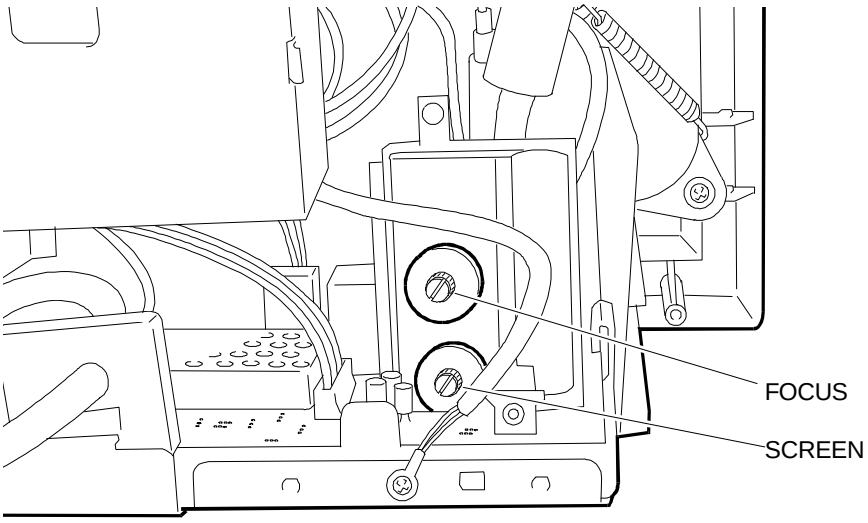


Fig. 3-19 Focus and Screen Potentiometers

SCREEN IMAGE AND WHITE BALANCE ADJUSTMENTS

NOTE: To make these adjustments use an **adapter cable** and the specific **software program** provided by the manufacturer.

- Attach the adapter cable between the display unit to be adjusted, a signals generator (or personal computer) and another personal computer.

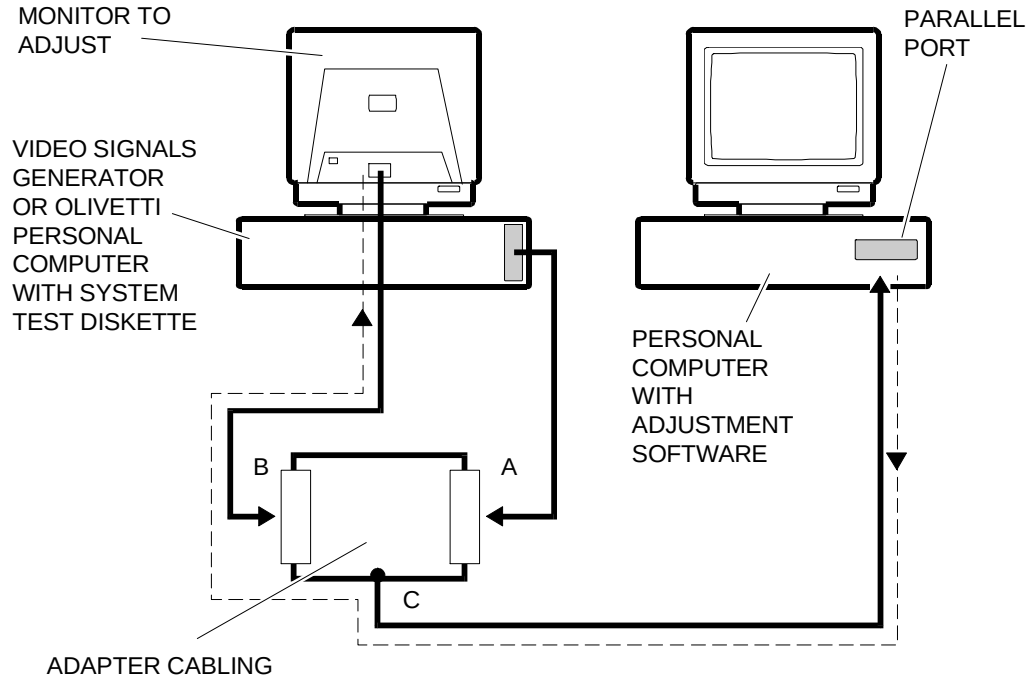


Fig. 3-20 Cabling for Adjustment

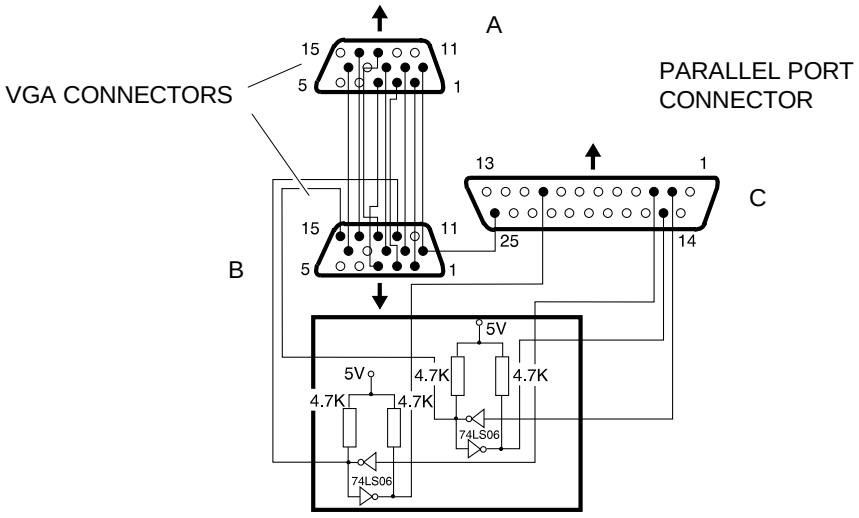


Fig. 3-21 Adapter Cabling

- Run the software program supplied by the manufacturer and needed to make the adjustments.
- Display a cross-hatch pattern in the preset video modes.
- Make the following adjustments using the control panel external commands:
  - Adjust the horizontal size of the image to 262 ± 4 mm
  - Adjust the image on the screen horizontally
  - Adjust the vertical size of the image to 196 ± 4 mm
  - Adjust the image on the screen vertically
  - Adjust the pincushion distortion, keystone distortion and tilt until obtaining the best possible image.
- Proceed as follows for white balance and brightness adjustments:
  - Affix the color coordinate sensor to the center of the CRT.
  - Press the Degauss button to demagnetize the CRT.
  - Display a pattern with R, G, B signals at 0 mV in the 1024X768 60 Hz video mode.
  - Set the external brightness control and the sub-brightness adjustment trimmer VR802 on the main board, to their maximum settings.
  - Set the external contrast control to its maximum setting and, using the adjustment program, the sub-contrast control to its center position.
  - Set the bias adjustment trimmers VR301 (G-BIAS) and VR302 (R-BIAS) on the video amplifier board to their minimum settings.
  - Adjust the SCREEN potentiometer of the FBT transformer until obtaining a raster brightness of 0.1 FL.
  - Using trimmers VR301 and VR302 on the video amplifier adjust the chromaticity coordinates to X = 0.290 ± 0.02 and Y = 0.280 ± 0.02.
  - Using trimmer VR802 on the main board, adjust raster brightness to 0.3 ± 0.1 FL.
  - Display a screen with a CENTRAL BOX 20% in the 1024x768 60 Hz video mode.
  - Select the **COLOR ADJ** parameter from the main menu of the adjustment program. Repeat the selection of the **COLOR ADJ** parameter in the next menu.
  - Select the color temperature parameter **COLOR 1** to be adjusted.
  - Using the **R-DRIVE 1**, **G-DRIVE 1**, **B-DRIVE 1** parameters of the adjustment program, adjust the chromaticity coordinates to X = 0.290 ± 0.02 and Y = 0.280 ± 0.02.
  - Save the result by pressing **ENTER**.
  - Select the **COLOR ADJ** parameter from the main menu of the adjustment program. Repeat the selection of the **COLOR ADJ** parameter in the next menu.
  - Select the color temperature parameter **COLOR 1** to be adjusted.
  - With the **SUB-CONTRAST 1** parameter of the adjustment program, adjust the brightness of the screen with the white central box at 60 ± 1 FL.
  - Select the **COLOR ADJ** parameter from the main menu of the adjustment program. Repeat the selection of the **COLOR ADJ** parameter in the next menu.
  - Select the color temperature parameter **COLOR 2** to be adjusted.
  - Using the **R-DRIVE 1**, **G-DRIVE 1**, **B-DRIVE 1** parameters of the adjustment program, adjust the chromaticity coordinates to X = 0.290 ± 0.02 and Y = 0.280 ± 0.02.

– Store the result by pressing **ENTER**.
– Select the **COLOR ADJ** parameter from the main menu of the adjustment program. Repeat the selection of the **COLOR ADJ** parameter in the next menu.
– Select the color temperature parameter **COLOR 2** to be adjusted.
– With the **SUB-CONTRAST 2** parameter of the adjustment program, adjust the brightness of the screen with the white central box at 60 ± 1 FL.
– Display a white pattern in the 1024x768 60 Hz video mode.
– Using the **ABL** parameter of the adjustment program, adjust the brightness to 30 ± 1 FL.
– Exit from the adjustment software program provided by the manufacturer.

■