

14" COLOR DISPLAY UNIT CDU1448G/HY01 (DSM 50-149)

This display unit is manufactured by **HYUNDAI** and is identified as **DSM 50-149** on the front and rear of its case, and in the Progetto di Gestione. This unit is also identified as **CDU 1448G/HY01** on the homologation plate, also on the rear of its case.

CHARACTERISTICS

VGA-compatible analog multiscan monitor with power management features.

- Diagonal screen size: 14"
Horizontal size: 250 ± 8 mm
Vertical size: 188 ± 4 mm
- Input voltage: 90-264 V (universal power supply)
Line frequency: 50-60 Hz ± 3 Hz
Degaussing: At power on
Power dissipation: 80 W max.
Current: < 2 A
- Video input signals: Red, Green, Blue, Hsync and Vsync
Termination: 75 Ω to ground
Level: 0-700 mV
Polarity: Positive
Rise/fall time: < 8 ns
- External adjustments: Contrast
Brightness
Horizontal size
Vertical size
Horizontal shift
Vertical shift
Pincushion distortion

- Preset Timings

VIDEO MODES	VGA			ERGO VGA	SVGA		VGA PLUS
	HORIZONTAL RESOLUTION (DOTS)	640			640	800	
FREQUENCY (KHz)	31.469			37.86	37.88	48.07	48.36
VERTICAL RESOLUTION (LINES)	350	400	480	480	600		768
FREQUENCY (Hz)	70.08	70.08	59.95	72.8	60.31	72.18	60
INTERLACED	NO	NO	NO	NO	NO	NO	NO
V/H POLARITY	-/+	+/-	-/-	-/-	+/+	+/+	-/-
PIXEL RATE (MHz)	25.175	25.175	25.175	31.5	40	50	65

- Power Management

VIDEO MODE	HORIZ. SYNC.	VERT. SYNC.	VIDEO	POWER SAVING	RECOVERY TIME	CONSUM.
ON	PULSE	PULSE	ACTIVE	NO	NO	< 80 W
STAND-BY	NO PULSE	PULSE	BLANKED	MINIMUM	SHORT	< 15 W
SUSPEND	PULSE	NO PULSE	BLANKED	SUBSTANCIAL	LONG	< 15 W
OFF	NO PULSE	NO PULSE	BLANKED	MAXIMUM	DEPENDS ON SYSTEM	< 5 W

- VGA Connector

- 1 Red video input
- 2 Green video input
- 3 Blue video input
- 4 Connected to pin 10
- 5 Not connected
- 6 Red video ground
- 7 Green video ground
- 8 Blue video ground
- 9 Not connected
- 10 Logic ground
- 11 Identify output (connected to pin 10)
- 12 Identify output
- 13 Horizontal sync
- 14 Vertical sync
- 15 Not connected

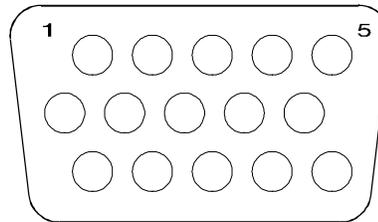


Fig. 42-1 VGA Connector

REMOVING THE CASE

1. Disconnect power supply cable (A) and signals cable (S) from their respective connectors on the rear of the display unit.

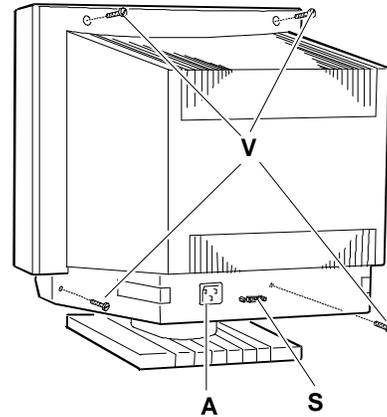
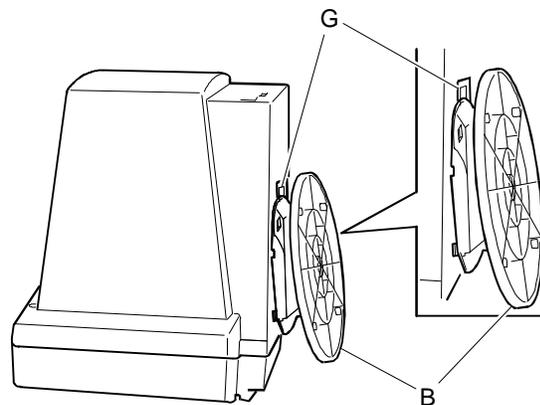


Fig. 42-2 Removing the Case

2. Rest the monitor with its screen against a flat and protected working surface. Press at point G and slide the base out of the securing slots.
3. Using a Philips screwdriver, remove the four screws indicated in figure 42-2 and then remove the case.



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Fig. 42-3 Removing the Base

DISCHARGING THE ANODE

1. After having removed the case and before performing any other operation with the boards and cables of the display unit, discharge the high voltage (23.5 KV anode voltage). Use a screwdriver connected to the display frame ground by means of a cable to discharge the CRT anode.

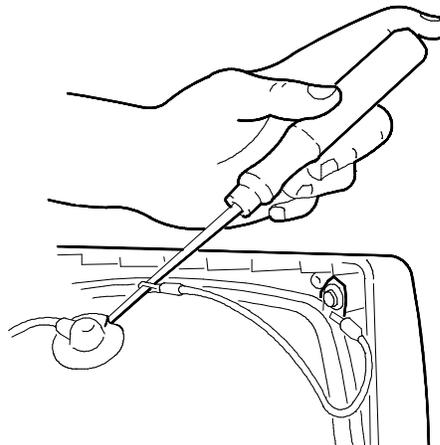


Fig. 42-4 Discharging the CRT Anode

REMOVING THE VIDEO AMPLIFIER BOARD

1. Free the metal cover of the video amplifier board (A) from all connections.
2. 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 during transport. Turn over the video amplifier board.

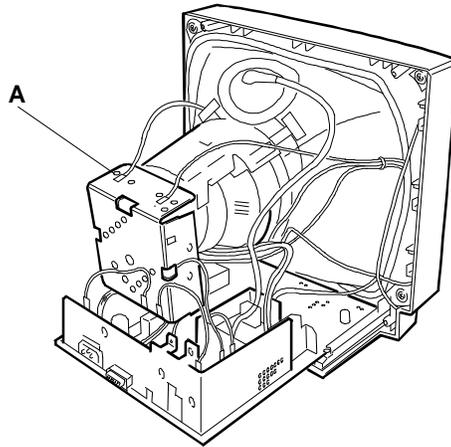


Fig. 42-5 Removing the Video Amplifier Board

3. Free the board by disconnecting the cables from the following connectors: P401, P402, G1 (black cable) and G2 (red cable).

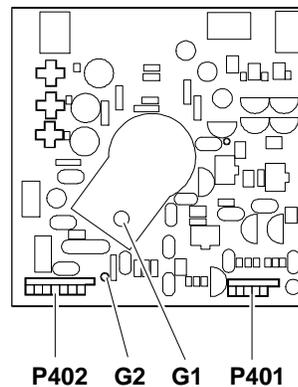


Fig. 42-6 Locating the Connectors on the Video Amplifier Board

REMOVING THE MAIN BOARD

1. Be sure to discharge the EHT high voltage before removing the anode.
2. Remove the anode by lifting the rubber cap, squeezing the two metal contacts with a pair of pliers and removing the contacts through the hole in the CRT.
3. Remove the main board by extracting the two pins (P) that secure the board to its plastic support.

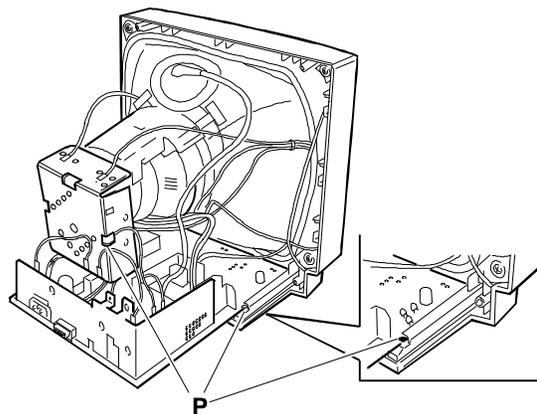


Fig. 42-7 Removing the Main Board

4. To remove the main board completely, disconnect the cables from the following connectors on the main board: P101, P111, RGB, P301, P502, W2 and W6.

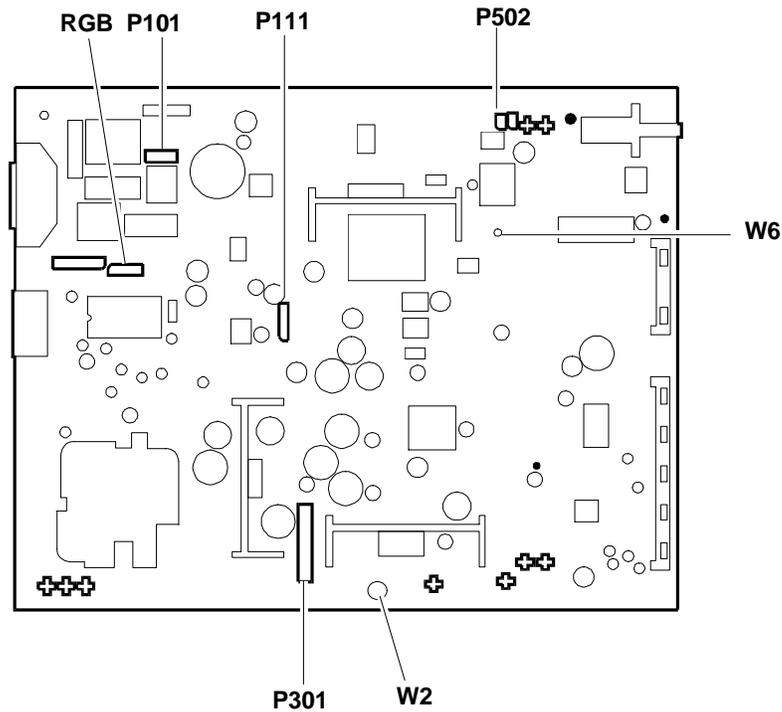


Fig. 42-8 Locating the Connectors on the Main Board

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REMOVING THE CRT

NOTE: The CRT and yoke form a single assembly on which the deflection windings 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 comes with the yoke already fitted.

1. Remove the four screws that secure the CRT to the front cover of the display unit.
2. 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.



REASSEMBLY PROCEDURES

3. To reassemble the display unit follow its disassembly procedures in reverse order.

Fig. 42-9 Locating the Connectors on the Video Amplifier Board

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.

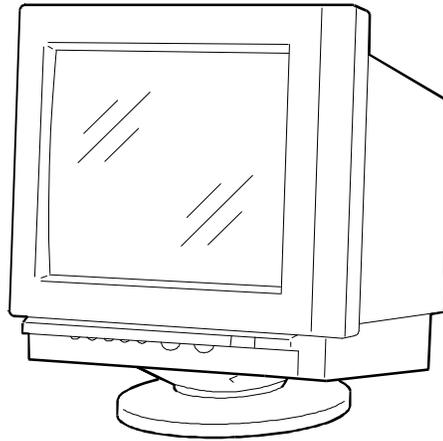


Fig. 42-10 Display Unit

EXTERNAL CONTROLS AND ADJUSTMENTS

In order to perform the external controls and adjustments the user has to use the buttons on the display unit's external control panel, shown in the figure on the side and listed in the following table.

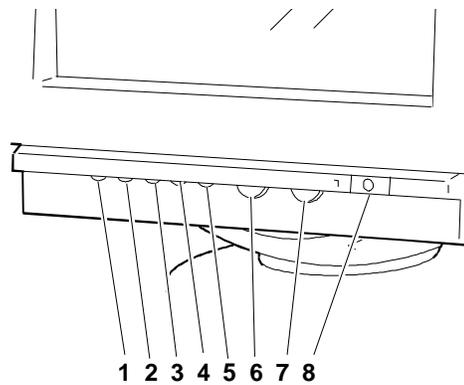


Fig. 42-11 External Adjustments and Controls

EXTERNAL CONTROLS	
1	PINCUSHION
2	VERTICAL SIZE
3	VERTICAL SHIFT
4	HORIZONTAL SIZE
5	HORIZONTAL SHIFT
6	CONTRAST
7	BRIGHTNESS
8	POWER SWITCH

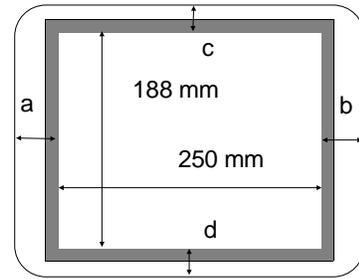
The following is a list of the adjustments which can be made by the user on the following image characteristics:

Horizontal size: 250 ± 8 mm

Vertical size: 188 ± 4 mm

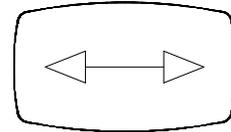
$|a - b| \leq 6$ mm

$|c - d| \leq 6$ mm



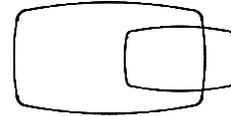
HORIZONTAL SIZE

This button adjusts the picture's display width.



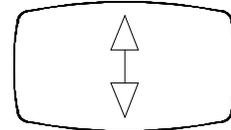
HORIZONTAL SHIFT

This button adjusts the picture's horizontal positioning.



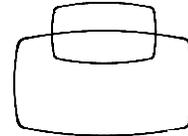
VERTICAL SIZE

This button adjusts the picture's display height.



VERTICAL SHIFT

This button adjusts the picture's vertical positioning.



PINCUSHION

This button adjusts the picture's pincushion distortion.



BRIGHTNESS

This button adjusts the picture's brightness.

CONTRAST

This button adjusts the picture's contrast.

POWER SWITCH

This switch powers the display unit on and off.

INTERNAL ADJUSTMENTS

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

MAIN BOARD ADJUSTMENT TRIMMER

VR201	Vertical size adjustment
VR203	Vertical linearity adjustment
VR303	Key-stone adjustment
VR304	Horizontal size adjustment
VR309	Sub-brightness adjustment
VR404	Blue gain adjustment
VR405	Red gain adjustment
VR407	Sub-contrast adjustment
VR501	Horizontal hold adjustment

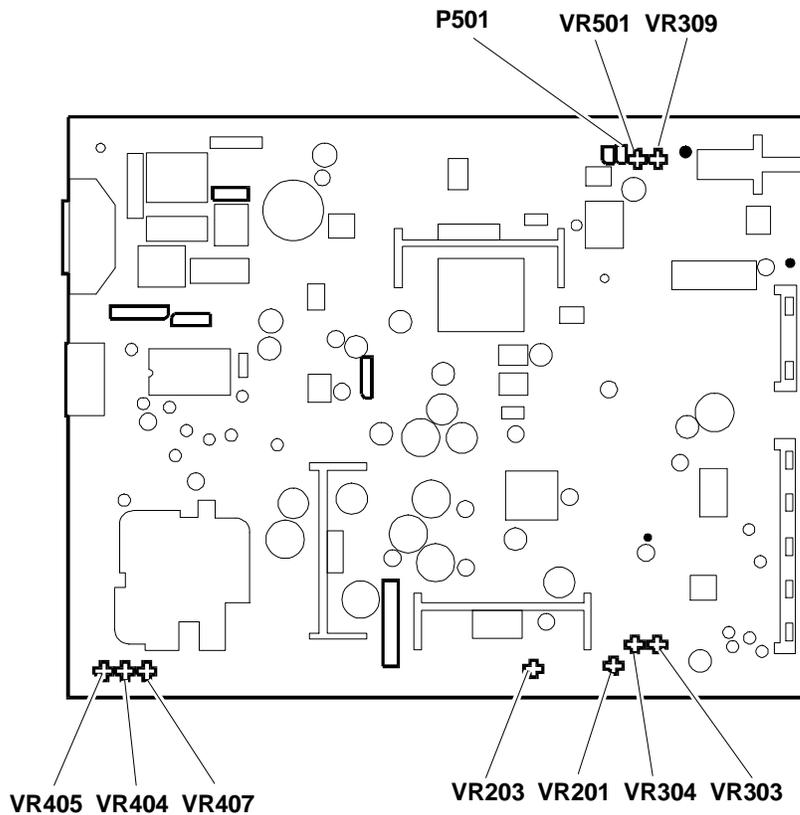


Fig. 42-12 Main Board Adjustments

VIDEO AMPLIFIER BOARD ADJUSTMENT TRIMMER

VR401	Red cut-off adjustment
VR402	Green cut-off adjustment
VR403	Blue cut-off adjustment

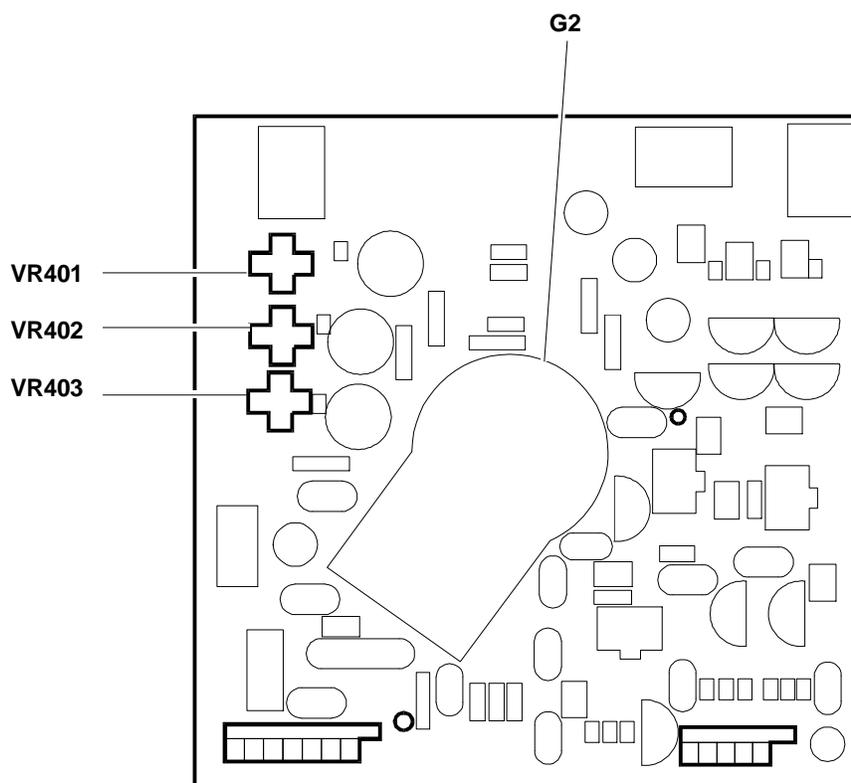


Fig. 42-13 Video Amplifier Board Adjustments

PRELIMINARIES

The input voltages must be within the 100-240 V and with a line frequency of 50-60 Hz. The display unit must be powered on at least 20 minutes before making the adjustments so that it has time to adequately warm up.

EQUIPMENT

- Digital voltmeter
- 40 Hz to 100 KHz frequency meter
- Color coordinate analyzer
- Video signal generator or a System Test diskette for Olivetti Personal Computers
- High voltage meter (above 30 KV)

NOTE: To display video signals, use a video signal generator or the System Test diskette for Olivetti Personal Computers.

HORIZONTAL HOLD SETTING

- Display a cross-hatch pattern in the 48.36 KHz 1024x768 VGA video mode.
- Attach the positive pole of the frequency meter probe to the red cable of the deflection yoke and the negative pole to the display unit frame and then attach connector P501 (see the figure 42-12) to ground.
- Adjust trimmer VR501 on the main board until measuring a horizontal frequency of 48.36 KHz \pm 0.25 KHz.

B+ VOLTAGE CONTROL

Make sure that the B+ voltage is 84 V \pm 5 V in the 31.469 640x480 VGA video mode.

HORIZONTAL PHASE SETTING

- Display a cross-hatch pattern in the 31.469 KHz 640x480 video mode.
- Center the picture horizontally using the horizontal shift external adjustment potentiometer.

VERTICAL LINEARITY SETTING

- Display a cross-hatch pattern in the 31.469 KHz 640x480 video mode.
- Adjust the vertical linearity using trimmer VR203 on the main board.

VERTICAL CENTERING SETTING

- Display a cross-hatch pattern in the 31.469 KHz 640x480 video mode.
- Center the picture vertically by using the vertical shift external adjustment potentiometer.

VERTICAL SIZE SETTING

- Display a cross-hatch pattern in the 31.469 KHz 640x480 video mode.
- Adjust the vertical size external adjustment potentiometer to its minimum setting.
- Adjust the vertical size of the picture by using the VR201 trimmer on the main board.

HORIZONTAL SIZE SETTING

- Display a cross-hatch pattern in the 48.36 KHz 1024x768 video mode.
- Adjust the pincushion distortion, horizontal size and vertical size external adjustment potentiometers to their maximum setting.
- Adjust the horizontal size of the picture by using trimmer VR304 on the main board.
- Further adjust the picture's horizontal size using the pincushion distortion external adjustment potentiometer.

KEY-STONE SETTING

- Display a cross-hatch pattern in the 31.469 KHz 640x480 video mode.
- Adjust the picture's key-stone using trimmer VR303 on the main board.

PINCUSHION

- Display a cross-hatch pattern in the 31.469 KHz 640x480 video mode.
- Adjust the picture's pincushion using the corresponding external potentiometer.
- If necessary, use trimmer VR303 on the main board to compensate for the trapezoid distortion.

SUB-BRIGHTNESS SETTING

- Display a cross-hatch pattern in the 31.469 KHz 640x480 video mode (input video signal amplitude of 0 mV).
- Adjust the brightness using trimmer VR309 on the main board until measuring a luminance of 0.8 ± 0.2 FL.

SUB-CONTRAST SETTING

- Display a white pattern in the 31.469 KHz 640x480 VGA video mode (input video signal amplitude of 700 mV).
- Turn the external contrast potentiometer to its maximum setting.
- Adjust the contrast by using trimmer VR407 on the main board until measuring a luminance of 20.5 FL.

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WHITE BALANCE SETTING

- Turn trimmers VR404, VR405 and VR407 on the main board clockwise to their maximum setting.
- Turn trimmers VR401, VR402 and VR403 on the video amplifier board counterclockwise to their maximum setting.
- Turn trimmer VR309 on the main board to its center position.
- Adjust the Screen potentiometer of the FBT transformer on the main board until measuring a voltage of 560 ± 10 V on pin G2 (see figure 42-13) of the video amplifier board.
- Display a black pattern in the 31.469 KHz 640x480 VGA video mode.
- Using trimmers VR401, VR402 and VR403 of the video amplifier board, adjust the chromaticity coordinates to $X = 0.290 \pm 0.02$ and $Y = 0.280 \pm 0.02$.

- Adjust trimmers VR402, VR403 when the raster is red, trimmers VR401, VR403 when the raster is green and trimmers VR401, VR402 when the raster is blue.
- Once these adjustments are made, adjust trimmer VR309 on the main board until measuring a luminance of 0.8 ± 0.2 FL.
- Display a white pattern in the 31.469 KHz 640x480 VGA video mode.
- Turn the external brightness potentiometer to its minimum setting and measure a luminance of 3 ± 0.5 FL using the external contrast potentiometer.
- Use trimmers VR404 and VR405 to adjust the chromaticity coordinates to $X = 0.290 \pm 0.02$ and $Y = 0.280 \pm 0.02$.

FOCUS ADJUSTMENT

- Display a cross-hatch pattern in the 31.469 KHz 640x480 VGA video mode, video level of 700 mV.
- Turn the external brightness potentiometer to the position where a click is sounded and then turn the external contrast potentiometer to its maximum setting.
- Adjust the focus potentiometer of the FBT transformer until reaching the best possible focus.

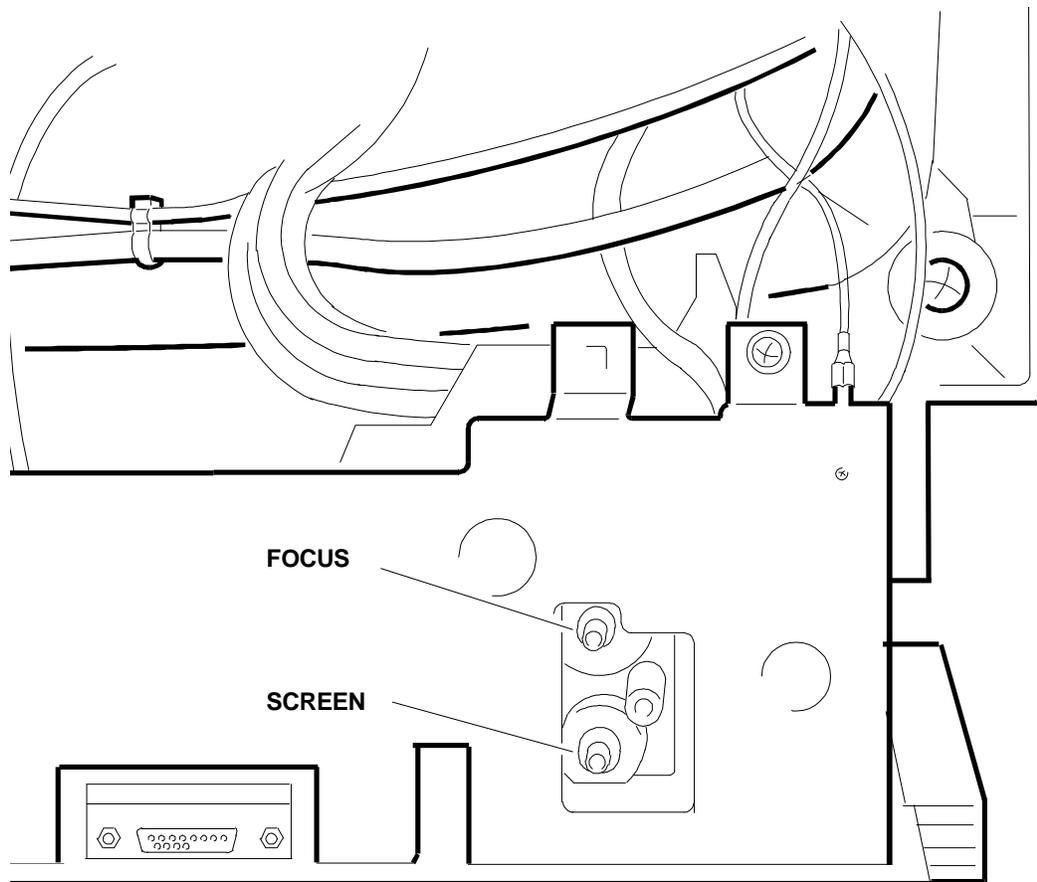


Fig. 42-14 Focus and Screen Potentiometers