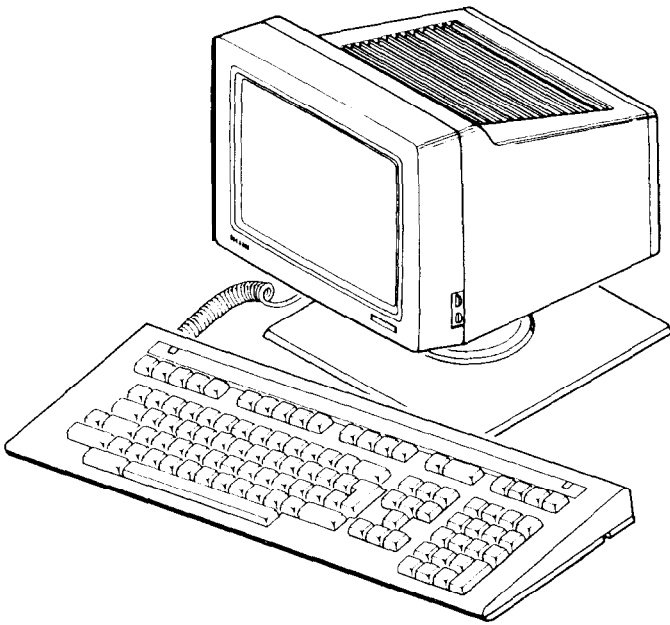


EK-VT340-PS-002

VT340

Pocket Service Guide



digitalTM

CONTENTS

ABOUT THIS GUIDE

Warnings, Cautions, and Notes	vii
VT340 Video Terminal.	viii
Tools and Equipment	ix
Recommended Spares List	ix

1 TESTING AND TROUBLESHOOTING

1.1	General.	1
1.2	Using Self-Tests	1
1.3	Power-Up Self-Test.	1
1.4	Diagnostic Set-Up	3
1.5	Diagnostic Self-Tests.	5
1.5.1	Loopback Tests.	5
1.5.2	Power-Up Test	8
1.5.3	Screen Tests	8
1.6	Printer Problems.	8
1.7	Self-Test Error Codes	10
1.7.1	NVR Error-- 1 Code	10
1.8	Troubleshooting General Problems.	13

2 REMOVING AND REPLACING FRUs

2.1	General.	16
2.2	Rear Panel	16
2.3	ROM Cartridge.	17
2.4	Rear Enclosure/Base Assembly	18
2.5	Terminal Control Module	20
2.6	Discharging the CRT.	22
2.7	Power Supply/Monitor and Arc Protection Assembly	25
2.7.1	Input Voltage Selection.	31
2.8	Video Amp Module.	32
2.9	AC Inlet/Switch Assembly	34
2.10	Control/Bracket Assembly (Brightness and Contrast)	35
2.11	LED Assembly (Power Indicator)	37
2.12	CRT/Bezel/Chassis Assembly	38
2.13	CRT Disposal (Digital Field Service Only)	40
2.14	Keyboard	44
2.15	Mouse or Tablet (Options).	47

iv CONTENTS

3 ALIGNING THE VIDEO MONITOR

3.1	General-	45
3.2	Monitor Adjustments - - - - -	45
3.2.1	Before You Start - - - - -	48
3.2.2	Setting Cutoff - - - - -	48
3.2.3	Displaying Screen Tests - - - - -	52
3.2.4	Color Gain - - - - -	53
3.2.5	Display Size - - - - -	56
3.2.5.1	Horizontal Centering - - - - -	57
3.2.5.2	Horizontal Phase - - - - -	58
3.2.5.3	Rectangularity	59
3.2.5.4	Vertical Centering. - - - - -	60
3.2.5.5	Horizontal Width and Vertical Height	61
3.2.6	Character Quality. - - - - -	64
3.2.6.1	Linearity - - - - -	64
3.2.6.2	Focus - - - - -	66
3.2.7	Viewer Preference - - - - -	68

4 USING SET-UP

4.1	General.	69
4.2	What is Set-Up?	69
4.2.1	Dual Sessions.	69
4.3	Entering and Leaving Set-Up - - - - -	70
4.4	Selecting a Set-Up Screen - - - - -	70
4.5	Selecting Set-Up Features - - - - -	71
4.6	Saving Set-Up Values - - - - -	71
4.7	Recalling Set-Up Values - - - - -	72

A VT330/VT340 DOCUMENTATION

B TROUBLESHOOTING THE SESSION SUPPORT UTILITY

C FRU EXPLODED VIEW DRAWINGS

D CABLES

E PHYSICAL/FUNCTIONAL DIAGRAM

CONTENTS v

FIGURES

1-1	Successful Power-Up Self-Test Display . . .	2
1-2	Diagnostic Set-Up Screen	3
1-3	VT340 Ports and Loopback Connectors . . .	6
3-1	Video Adjustments Controls	49
4-1	Set-Up Directory.	74
c-1	VT340 FRUs (External View)	83
c-2	VT340 FRUs (Internal View).	84
D-1	VT340 Cable Connections	85
E-1	Physical/Functional Diagram	87

TABLES

1-1	VT340 Display Error Codes	12
1-2	VT340 Troubleshooting Chart	13
D-1	Interface Cables	86

ABOUT THIS GUIDE

This guide describes how to service the VT340 color video terminal in the field. The guide covers the following topics.

- Testing and troubleshooting the field replaceable units (FRUs)
- Removing and replacing FRUs
- Aligning the video monitor
- Using set-up

Appendices provide information on the following topics.

- Related documentation
- Troubleshooting the Session Support Utility
- FRU exploded view diagrams
- Cables
- Physical/functional diagram

WARNINGS, CAUTIONS, AND NOTES

The warnings, cautions, and notes in this guide have specific purposes.

WARNING Contains information to prevent personal injury.

CAUTION Contains information to prevent damage to equipment.

NOTE Contains general information you should be aware of.

VT340 VIDEO TERMINAL

The VT340 is a text and color graphics video terminal that is compatible with the VT241. The VT340 supports different versions of Digital's LK201 corporate keyboard, for different languages.

The VT340 uses a four-plane bitmap to display 16 colors at a time, from a palette of 4096 possible colors. The monitor has a 332 mm (13 inch) anti-glare screen. The VT340 can display 24 rows of text in 80 or 132 columns. The twenty-fifth display line is a status line. The terminal's built-in tilt-swivel base lets the user adjust the screen for viewing comfort.

The VT340 has five interface connectors.

Connector	Connects the VT340 to...
Comm1 RS232 (25-pin)	A primary host computer, directly or indirectly (through a terminal server or modem).
Comm1 DEC-423 (6-pin)	A primary host computer, directly or indirectly (through a terminal server).
Comm2 DEC-423 (6-pin)	A secondary host computer, directly or indirectly (through a terminal server).
Printer DEC-423 (6-pin)	A printer.
Mouse/tablet (1-pin micro-DIN)	A mouse or graphics tablet.

The VT340 operates on full-duplex, asynchronous communication lines.

TOOLS AND EQUIPMENT

You need the following tools and equipment to service the VT340 video terminal.

Tools and Equipment	Part Number
Phillips screwdriver, number 2	29-13510-00
Anode discharge tool	29-24717-00
Video alignment tool	29-24746-00
Tuning wand	29-23 190-00
Metric measuring tape	29-25342-00
Loopback connectors	
Host EIA (25pin)	12-15336-00
Modular jack (6-pin)	12-25083-01
Micro-DIN (7-pin)	12-25628-01
Color video service kit (without power pack)	A2-S0099-00
Power packs	
90 to 110 Vac, 50 Hz	29-25448
104 to 126 Vac, 60 Hz	29-25449
198 to 242 Vac, 50 Hz	29-25450

RECOMMENDED SPARES LIST

The following is the recommended spares list for the VT340.

Spares	Part Number
Terminal control module	54-16965-01
Video amp module	54-16963-01
Control/bracket assembly	70-22618-02
Inlet/switch assembly	70-23685-01
PS/monitor and arc protection assembly	70-24516-01
Rear enclosure/base assembly	70-23687-61
ROM cartridge assembly	54-16967-04
CRT/bezel/chassis assembly	
(Northern Hemisphere)	70-23688-01
(Southern Hemisphere)	70-23688-02
Rear panel	74-33422-01

x ABOUT THIS GUIDE

Spares

Fart Number

Keyboards

North American/UK.	LK201-NA
North American/U.K. (WPS)	LK201-PA
Belgian	LK201-LB
Danish	LK201-RD
Dutch	LK201-LH
Finnish	LK201-NF
French	LK201-LP
French Canadian	LK201-LC
German/Austrian	LK201-LG
Italian	LK201-LI
Norwegian	LK201-RN
Portuguese	LK201-LV
Spanish	LK201-LS
Swedish	LK201-LM
Swiss (French)	LK201-LK
Swiss (German)	LK201-LL

Options

Mouse	vsxxx-AA
Graphics tablet	VSXXX-AB

1 TESTING AND TROUBLESHOOTING

1.1 GENERAL

This chapter describes how to run the self-tests built into the VT340 video terminal. The chapter also lists error codes for the tests and describes how to troubleshoot general problems.

1.2 USING SELF-TESTS

The VT340 has seven self-tests to help you isolate failures to the terminal's field replaceable units (FRUs). You run these tests from the terminal's Diagnostic Set-Up screen (Paragraph 1.4). The power-up self-test also runs each time you turn the terminal on.

If a test finds a faulty FRU, adjust or replace the faulty unit. Then repeat the tests in this chapter, to ensure the terminal operates correctly. Appendix C shows each FRU.

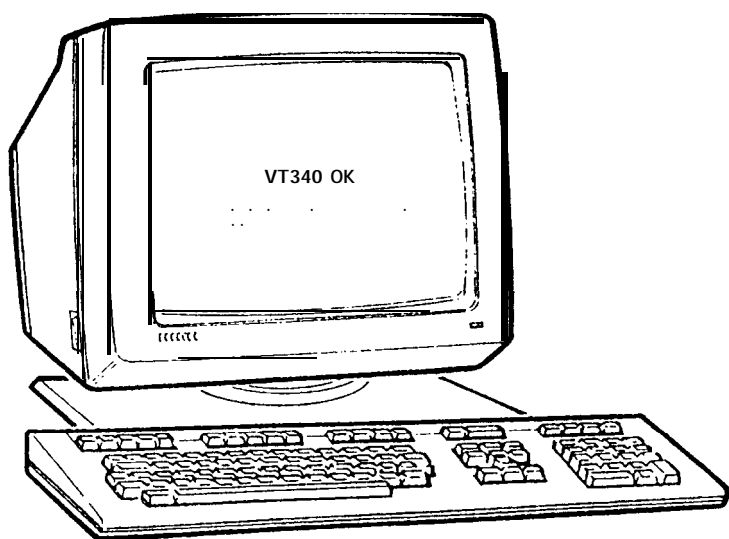
1.3 POWER-UP SELF-TEST

This test runs automatically each time you turn the terminal on. The test checks the terminal's internal memory, keyboard, and video circuitry. The test also makes sure the communication ports, printer port, and locator device port are operating correctly. The loopback self-tests on the Diagnostic Set-Up screen perform a more complete test of each port.

A successful power-up self-test ends as follows (Figure 1-1).

2 TESTING AND TROUBLESHOOTING

1. The keyboard's LED indicators are off.
2. The keyboard makes the bell tone sound.
3. A "VT340 OK" message appears in a rectangle on the screen, With the firmware revision level and a set-up screen copyright message. This message disappears when
 - the terminal receives any character except XON, XOFF, or NULL.
 - you press any key.
 - you leave the terminal on but inactive for 30 minutes.



MA 0492 86A

Figure 1-1 Successful Power-Up Self-Test Display

If the Test Finds an Error

First look at the screen. The terminal will display one or more error messages. Each error message starts on a new line at the left margin of the display. Paragraph 1.7 describes the error messages.

If the screen display is faulty, check the keyboard LED indicators. They also display the error code.

If other problems occur, see Paragraph 1.8. It lists some common operating problems, their probable causes, and suggested solutions.

TESTING AND TROUBLESHOOTING 3

1.4 DIAGNOSTIC SET-UP

You use the Diagnostic Set-Up screen (Figure 1-2) to run one or more of the terminal's seven self-tests. Paragraph 1.5 describes each test.

You can run the five loopback tests and the power-up test in any combination. Each test runs until it is complete, or until the terminal detects an error. You must run the screen tests separately from the loopback tests and power-up test.

NOTE

If you are unfamiliar with the terminal's set-up screens, see Chapter 4.

DIAGNOSTIC SET-UP		VT340 Version V2.1
feature	Current Setting	
Comm1 External Loopback (b)	disabled	
Comm2 External Loopback (b)	disabled	
Printer External Loopback	disabled	
Locator External Loopback	disabled	
Power-Up Test	disabled	
Run Tests	Repeat Tests	
Run Screen Tests		
Use up/down arrow keys to select feature, right/left arrow keys to change current setting. To return to the Set-Up Directory, press SELECT key.		
Copyright © 1988, Digital Equipment Corporation - All Rights Reserved		
1 1 (01, 01)	Overstrike Mode	Printer: None

MA 0900 86C

Figure 1-2 Diagnostic Set-Up Screen

The top half of the Diagnostic Set-Up screen has two columns.

Feature Current Setting

Feature Column

This column lists the individual loopback tests and the power-up test.

Current Setting Column

This column shows you if a test is enabled or disabled. You must enable a test before you can run it. Initially, all tests are disabled.

4 TESTING AND TROUBLESHOOTING

How to Change a Test's Current Setting

Use the **↑** and **↓** keys to move the cursor to the selected test in the feature column. Use the **←** and **→** keys or Enter key to change the test's current setting (enabled or disabled).

How to Run a Self-Test

You can run one or more self-tests as follows. YOU can run the tests one time or repeatedly. Before you run a loopback test, you must connect a loopback connector to the selected port (Paragraph 1.5.1). To run the screen tests, see Chapter 3.

1. Press Set-Up. The Set-Up Directory appears.
2. Use the arrow keys to move the cursor to Diagnostic Set-Up. Press Enter to display the Diagnostic Set-Up screen.
3. Use the arrow keys to enable each test YOU want to run.
4. Use the arrow keys to move the cursor to Run Tests or Repeat Tests.

Run Tests performs each enabled test one time.

Repeat Tests performs each enabled test continuously.

5. Press Enter to start the self-tests.

NOTE

The continuously running test ends when an error occurs or when you turn off the power. The keyboard does not make a bell tone sound during a continuously running test.

1.5 DIAGNOSTIC SELF-TESTS

You can select seven different self-tests from the Diagnostic Set-Up screen. The first five tests are loopback tests that check the terminal's three communication ports, the printer port, and the locator device port.

The sixth test is the power-up self-test. The last test is a set of screen patterns that field service personnel use to adjust the video display (Chapter 3).

1.5.1 Loopback Tests

All five loopback tests work the same way. You plug a loopback connector into the port you want to test. The loopback connector connects the port's transmit and receive data lines.

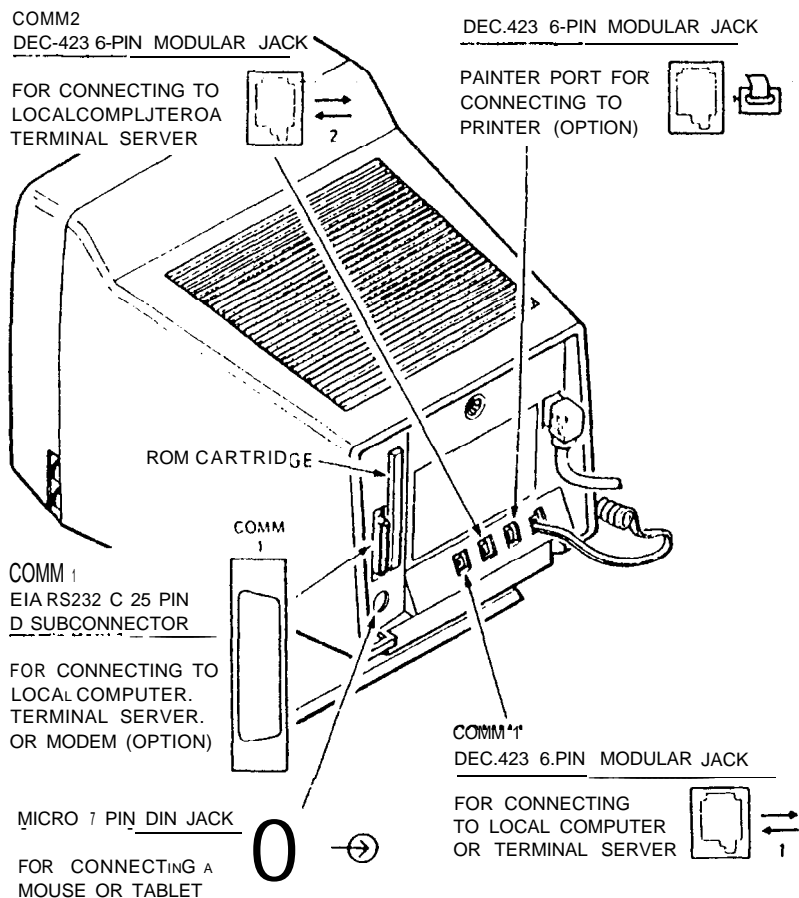
When you run the test, the terminal sends a predefined set of characters on its transmit line and receives them on its receive line. Then the terminal compares the output characters to the input characters. If the characters do not match, an error message appears on the screen.

You must use a loopback connector, or the test will fail. Use the following loopback connectors.

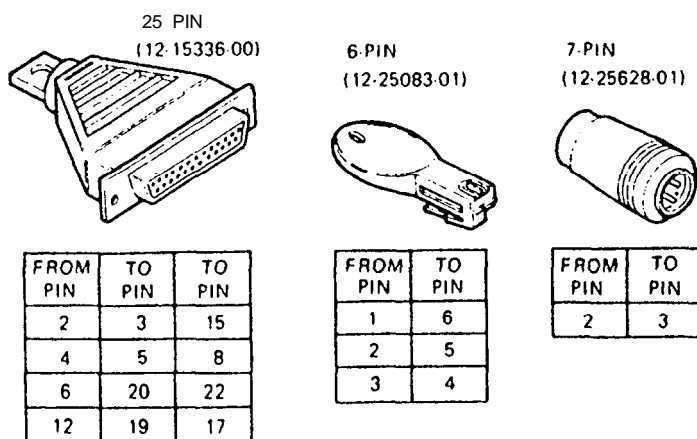
Loopback Connector	Part Number
Host EIA port (25-pin)	12-16336-00
Modular jack (6-pin)	12-25083-01
Micro-DIN ('I-pin)	12-25628-01

Figure 1-3 shows the five VT340 ports and the three loopback connectors. Note that the VT340 has two Comm1 connectors.

6 TESTING AND TROUBLESHOOTING



LOOPBACK CONNECTORS



MA 0622 86

Figure 1-3 VT340 Ports and Loopback Connectors

TESTING AND TROUBLESHOOTING 7

How to Run a Loopback Test

1. Turn the terminal off (0).
2. Disconnect the cable from the port you are testing.
3. Connect the appropriate loopback connector to the port,

Test	Loopback Connector
Comm1 (25-pin)	12-15336-00
Comm1 (6-pin)	12-25083-01
Comm2 (6-pin)	12-25083-01
Printer (6-pin)	12-25083-01
Locator (7-pin)	12-25628-01

4. Turn the terminal on (1).
5. Use the Diagnostic Set-Up screen to run the test.

A successful test ends as follows.

1. The keyboard's LED indicators are off.
2. The keyboard makes a bell tone sound.
3. A "VT340 OK" message appears on the screen.

If the Test Finds an Error

Your screen may display one of the following messages. See Paragraph 1.7 for details.

Comm1 25-pin test

VT340 Comm1 Port Data Error -- 2

VT340 Comm1 Port Control Error -- 3

Comm1 6-pin test

VT340 Comm1 DEC-423 Data Error -- 5

Comm2 6-pin test

VT340 Comm2 DEC-423 Data Error -- 6

Printer 6-pin test

VT340 Printer Port Error -- 7

Locator 7-pin test

VT340 Locator Port Error -- 8

8 TESTING AND TROUBLESHOOTING

1.5.2 Power-Up Test

This test is the same as the power-up self-test described in Paragraph 1.3. If you select this test, the continuously running test ends when an error occurs or when you turn off the power.

1.5.3 Screen Tests

These tests are a series of calibration and alignment displays. You use these patterns to adjust the display height, width, and linearity. You do not need a loopback connector for these tests.

See Chapter 3 for the procedures used with these tests.

1.6 PRINTER PROBLEMS

If a printer connected to a VT340 does not print, use the following steps to isolate the problem to the printer or terminal.

1. Run the power-up self-test (Paragraph 1.3). If the terminal passes the test, go to step 2.
2. Run the printer external loopback self-test (Paragraph 1.5.1). If the terminal passes this test, go to step 3.

NOTE

If your terminal passes the above tests, it is running correctly. The problem is **probably** not in the terminal.

3. Test the printer. See your printer's pocket service guide for the correct procedures. If your printer is operating correctly, go to step 4.

TESTING AND TROUBLESHOOTING 9

4. Check the following set-up features to make sure your terminal and your printer are compatible. If you are unfamiliar with the terminal's set-up screens, see Chapter 4.
 - Check the Printer Assignment feature in the Global Set-Up screen. Make sure the printer is assigned **to** the session you are in. If the printer is assigned to the other session, the printer will not print from your session.
 - Check the printer's status on the status line in set-up.

Printer Status	Meaning
Ready	The printer is available to print.
Not Ready	The printer port is not available to print.
None	The printer is turned off or not connected to the printer port.
Auto Print	When you or the host end a line with a carriage return, the terminal sends the line to the printer.
Controller	Information from the host goes directly to the printer.
Busy	The printer port is performing another operation (such as Local Print).
Not Assigned	The printer port is not assigned to the active session.

- Check the following features in the Printer **Set-Up** screen. The settings for the printer and terminal must match.

Print speed (**75** to **19.2K** baud)

Character format (**8-** or **7-bit**; even, odd, or no parity)

Stop bits (**1** or **2**)

Flow control (**XON/XOFF**, **DSR/DTR**)

10 TESTING AND TROUBLESHOOTING

5. Make sure you are using the correct cable between your terminal and printer (Appendix D). Make sure the connections are secure at both ends of the cable.
6. Put your terminal in the local state by using the On Line/Local feature in the Global Set-Up screen. Then leave set-up and type some characters on the screen.
7. Press the Local Print key. The data on your screen should print out if the printer is operating correctly. If the data does not print out, go back to step 3.

1.7 SELF-TEST ERROR CODES

If your screen displays an error message, see Table 1-1. It lists the field replaceable unit (FRU) you must replace to correct the problem.

If your VT340 fails the power-up self-test, see the troubleshooting chart, Table 1-2.

If there is a problem with the screen display, check the keyboard's LED indicators. The LED indicators always display the error code for the test currently running. This test must run successfully before your terminal clears the LED error code.

If the LEDs flash or stay on during the test, replace the terminal control module (Paragraph 2.5).

See Table 1-2 for other troubleshooting procedures.

1. 7. 1 NVR Error — 1 Code

If a "VT340 NVR Error — 1" message appears when you turn on VT340, there is a problem with the terminal's nonvolatile memory (NVR) that stores the factorydefault set-up settings. You can save the factory-default settings in NVR as follows. This procedure applies to single or dual sessions.

TESTING AND TROUBLESHOOTING 11

1. Press Set-Up. The Set-Up Directory appears,
2. Move the **cursor** to Recall Facto& Default Settings and press Enter,
3. Move the cursor to Save Current Settings and press Enter.
4. Move the cursor to User-Defined Key Set-Up and press Enter. The User-Defined Key Set-Up screen appears.
5. Move the cursor to Save User-Defined Keys and press Enter.
6. Press Select to return to the Set-Up Directory.
7. Press Next Screen to display the Global Set-Up screen.
8. Move the cursor to Dual Terminal and press Enter to enable the dual sessions feature.
9. Press Set-Up **to** leave set-up.
10. Press Switch Session (**F4**) **to** move to the second session.
11. Press Set-Up to display the Set-Up Directory again.
12. Move the cursor to Recall Factory Default Settings and press Enter.
13. Move the cursor to Save Current Settings and press **Enter**.
14. Press Set-Up to leave set-up.
15. Turn the terminal off, then on. If the "VT340 NVR Error — 1" message still appears on the screen, the terminal has a hardware failure. See Table 1-1.

12 TESTING AND TROUBLESHOOTING

Table 1-1 VT340 Display Error Codes

Error Message*	Solution†
NVR Error — 1	<ol style="list-style-type: none"> 1. Recover from the NVR (1.7.1). 2. Replace the terminal control module (2.6).
Comm1 Port Data Error — 2	Replace the terminal control module (2.5).
Comm1 Port Control Error — 3	Replace the terminal control module (2.5).
Keyboard Error — 4	<ol style="list-style-type: none"> 1. See if the keyboard is plugged in. 2. Turn the VT340 off, then on. 3. If the error continues, replace the keyboard (2.14). 4. If the error still continues, replace the PS/monitor and arc protection assembly 12.71.
Comm1 DEC-423 Data Error — 5	Replace the PS/monitor and arc protection assembly (2.7).
Comm2 DEC-423 Data Error — 6	Replace the PS/monitor and arc protection assembly (2.71).
Printer Port Error — 7	Replace the PS/monitor and arc protection assembly (2.9).
Locator Port Error — 8	<ol style="list-style-type: none"> 1. See if the mouse/tablet is plugged in. 2. Turn the VT340 off, then on. 3. If the error continues, replace the mouse/tablet (2.15). 4. If the error still continues, replace the terminal control module (2.51).

• All error messages start with "**VT340**".

† Paragraph numbers are in bold type.

TESTING AND TROUBLESHOOTING 13

1.8 TROUBLESHOOTING GENERAL PROBLEMS .

Table 1-2 lists some common operating problems, their probable causes, and suggested solutions.

Table 1-2 VT340 Troubleshooting Chart

Symptom	Probable Cause	Suggested Solution+
No VT340 OK display, power indicator off, no bell tone.	VT340 not plugged in, or no power at wall outlet.	Plug in the VT340 , or try another wall outlet.
	AC power cord	Check for an <i>open</i> line or shorts.
	Voltage select jumper on wrong pin.	Check that the voltage select jumper is configured correctly on the PS/monitor and arc protection assembly.
	Inlet/switch assembly	Check the connections on the PS/monitor and arc protection assembly.
Power indicator flashes.	PS/monitor and arc protection assembly	Replace the PS/monitor and arc protection assembly (2.7).
	ROM cartridge	Check that the ROM cartridge is installed,
Keyboard LEDs flash or stay on.	Terminal control module	Replace the terminal control module (2.6).
	Terminal control module	Replace the terminal control module (2.5) .
Compressed raster (white lines) appears, but no video display.	Video cable connections	Check the connections from the PS/monitor and arc protection assembly to the CRT yoke.
	Video amp module	Replace the video amp module (2.8).
Raster appears, but no video display.	Video amp module	Check connectors and reconnect.
		Replace the video amp module (2.8).

* Paragraph numbers are in bold type.

14 TESTING AND TROUBLESHOOTING

Table 1-2 VT340 Troubleshooting Chart (Cont)

Symptom	-Probable Cause	Suggested Solution*
CRT filaments not lit.	CRT/bezel/chassis assembly	Replace the CRT/bezel/chassis assembly (2.13).
VT340 OK display present, power indicator off.	LED assembly	Check the connection to the PS/monitor and arc protection assembly (2.7). Replace the LED assembly (2.11).
Screen display distorted.	Monitor is out of alignment.	Perform the alignment procedures (Chapter 3).
	Monitor circuit	Replace the PS/monitor and arc protection assembly (2.7).
	Terminal control module	Replace the terminal control module (2.5).
	CRT/bezel/chassis	Replace the CRT/bezel/chassis (2.12).
No bell tone.	Warning bell is disabled.	Set Warning Bell to "high" or "low" in Keyboard Set-Up.
	Keyboard speaker faulty.	Replace the keyboard (2.14).
Different characters appear on screen than were typed in local.	Alternate character set selected.	Use Recall Saved Settings in the Set-Up Directory.
	Keyboard	Replace the keyboard (2.14).
	Terminal control module	Replace the terminal control module (2.5).
Different characters appear on screen than were typed while on-line with host. (Terminal works in local).	Transmit and receive speeds are set wrong.	Set speeds to match host (Communications Set-Up).
	Bits per character or parity setting is wrong.	Set Character Format to match host (Communications Set-Up).
	Stop Bits setting is wrong.	Set Stop Bits to match host (Communications Set-Up).

- Paragraph numbers are in bold type.

TESTING AND TROUBLESHOOTING 15

Table 1-2 **VT340** Troubleshooting Chart (Cont)

Symptom	Probable Cause	Suggested Solution*
Screen display does not scroll. Hold Session indicator is on.	Screen display is locked.	Press the Hold Session key to release.
Terminal appears locked, does not respond to data from host.	—	Clear the terminal with the Clear Communications field in the Set-Up Directory.
Screen goes blank after successful power-up, then is inactive for one-half hour. Power indicator is on.	CRT Saver feature in Global Set-Up is enabled.	Press any key to reactivate screen.
Messages are incomplete.	XON/XOFF not selected.	Set Transmit Flow Control to " XON/XOFF " (Communications Set-Up).
	Comm port connections	Check cables at comm ports.
	CPU module	Replace the CPU module (2.6).
Terminal does not respond to an escape sequence .	Incorrect Terminal Mode selected.	Check the setting of the Terminal Mode feature in General Set-Up.

- Paragraph numbers are in bold type.

2 REMOVING AND' REPLACING FRUs

2.1 GENERAL

This chapter shows you how to remove and replace VT340 field replaceable units (FRUs). Appendix C contains exploded view drawings that provide the location, part name, and part number of each FRU.

CAUTION

Use a static protection kit (PN 29-11762-00) when handling any internal components.

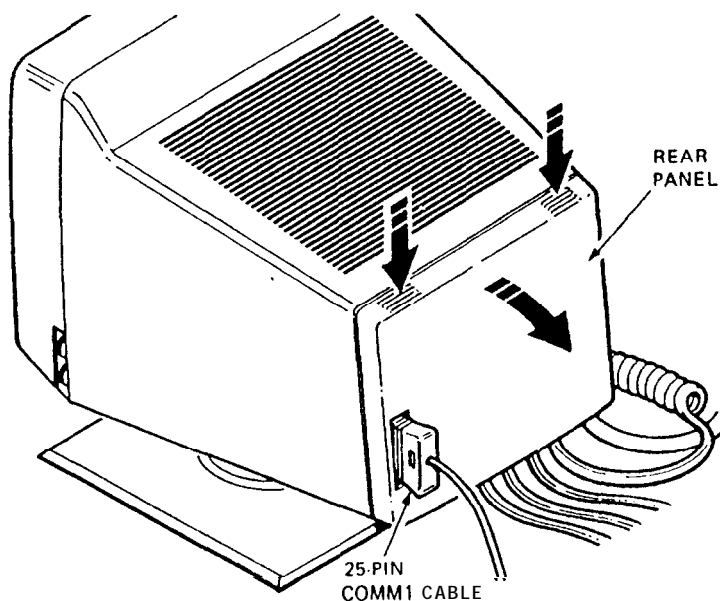
2.2 REAR PANEL

Remove the rear panel as follows.

1. Grasp the top of the rear panel and pull toward you.
2. If there is a cable connected to the 25-pin Comm1 port, slide the panel down the cable and away from the terminal.

Otherwise, lower the panel and remove from the terminal. Set the panel aside.

To install the rear panel, reverse steps 1 and 2.



REMOVING AND REPLACING FRUs 17

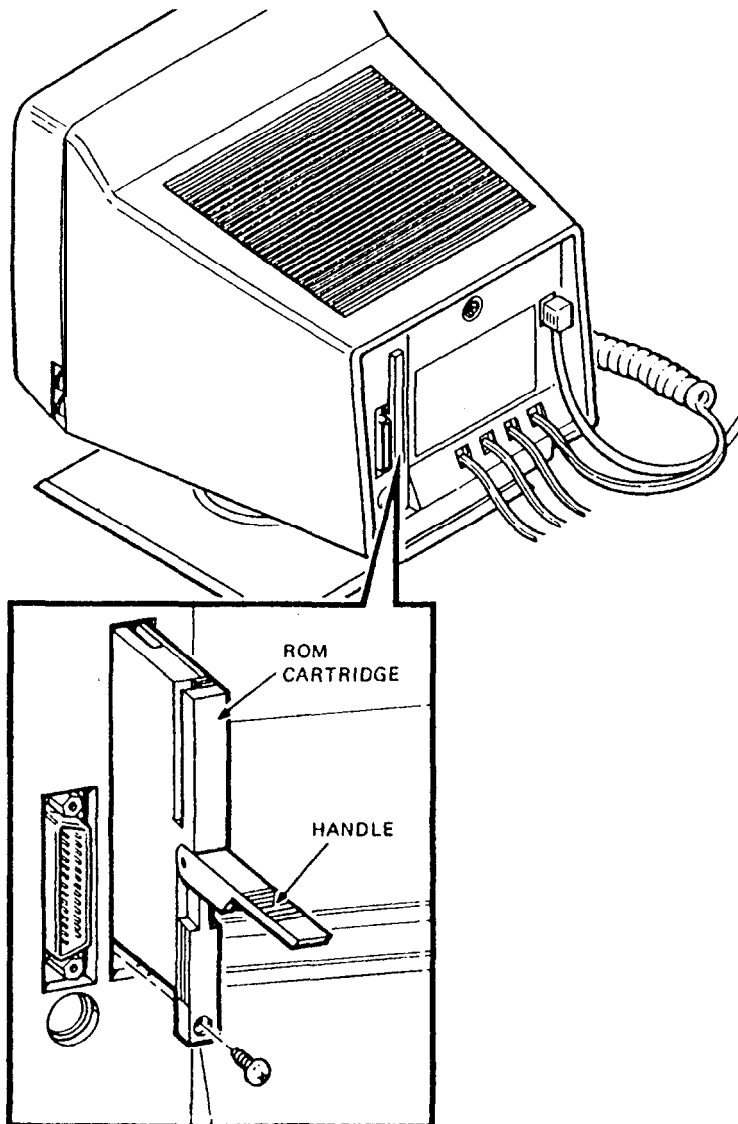
2.3 ROM CARTRIDGE

Remove the **ROM cartridge** as follows: First remove the following FRU.

Rear panel (Paragraph 2.2)

1. Turn the terminal's power switch off (0).
2. Lift the handle on the ROM cartridge.
3. Remove the **phillips** screw on the bottom of the ROM cartridge. This screw holds the ROM cartridge to the terminal control module.
4. To remove the ROM cartridge, grasp the handle and pull firmly.

To install the ROM cartridge, reverse steps 1 through 4.



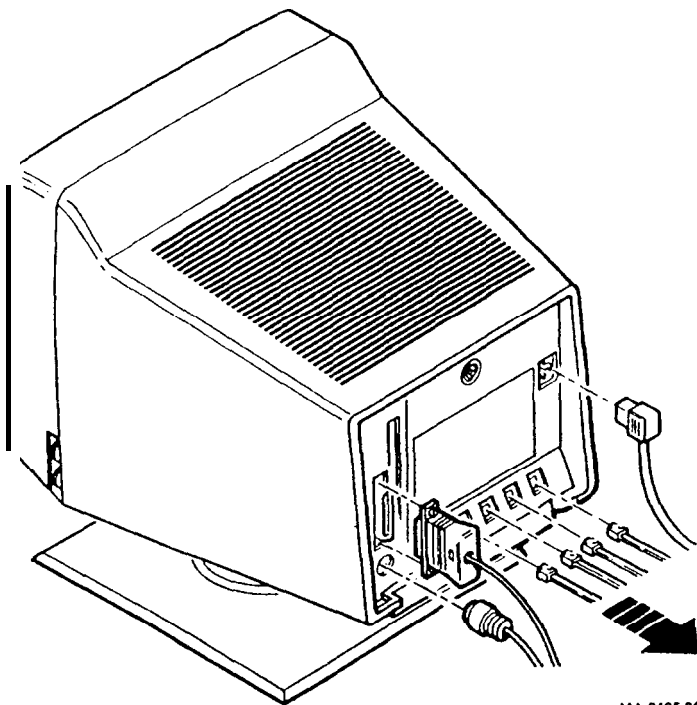
18 REMOVING AND REPLACING FRUs

2.4 REAR ENCLOSURE/BASE ASSEMBLY

Remove the rear enclosure/base assembly as follows.
First remove the following FRU.

Rear panel (Paragraph 2.2)

1. Unplug the power cord from the wall outlet first, then from the terminal.
2. Disconnect the keyboard cable from the terminal.
3. Disconnect all other cables from the rear of the terminal, including the following.
 - host port cable(s)
 - printer cable
 - locator device cable



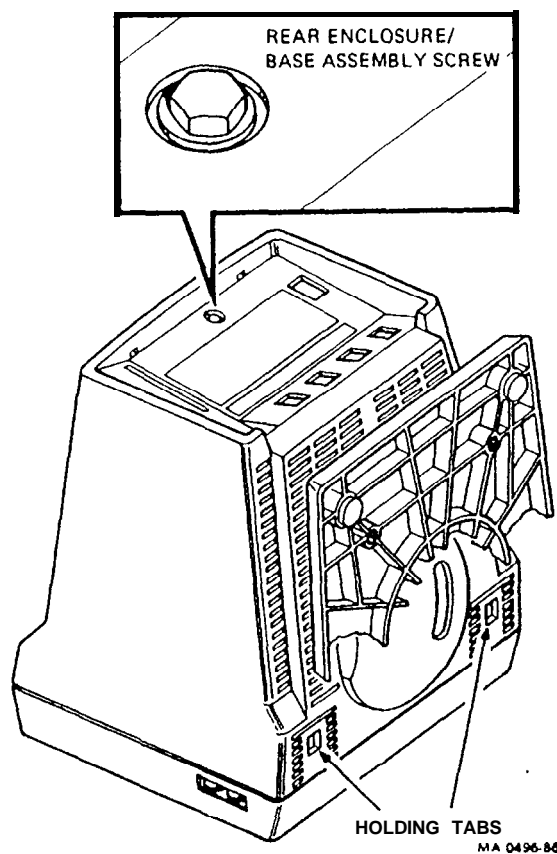
4. Place a piece of paper on a flat working surface, Carefully place the monitor facedown on the paper. The paper prevents scratches on the monitor **bezel**.

NOTE

You must clean the face of the CRT after you service the terminal.

REMOVING AND REPLACING FRUs 19

5. Use a 5/16 inch nutdriver to loosen the captive screw on the rear panel. This screw holds the rear enclosure/base assembly to the chassis.



WARNING

The next step exposes you to the CRT anode, which stores a high voltage. Use caution while the rear enclosure is off the terminal.

6. Remove the rear enclosure/base assembly by pressing the two holding tabs in and sliding the cover straight up.

To install the rear enclosure/base assembly, reverse steps 1 through 6.

CAUTION

When you **install the rear enclosure/base assembly**, carefully align the screw hole and holding tabs.

20 REMOVING AND REPLACING FRUs

2.5 TERMINAL CONTROL MODULE

Remove the terminal control module as follows.
First remove the following **FRUs**.

Rear panel (Paragraph 2.2).

ROM cartridge (Paragraph 2.3).

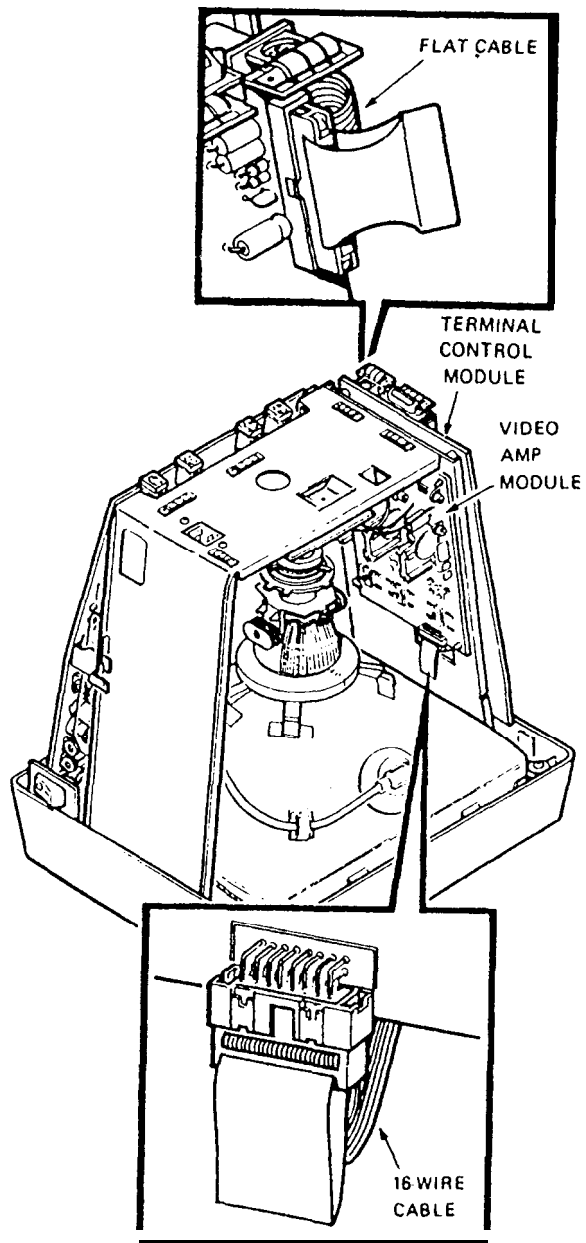
Rear enclosure/base assembly (Paragraph 2.4).

CAUTION

Use a static protection kit
(PN 29-11762-00) when handling any internal components.

1. Disconnect the following cables on the terminal control module.
 - flat cable to the **PS/monitor** and arc protection assembly
 - 16-wire cable to the video amp module (This cable is on the rear of the terminal control module.)
2. Loosen the two **phillips** screws that hold the terminal control module to the chassis.

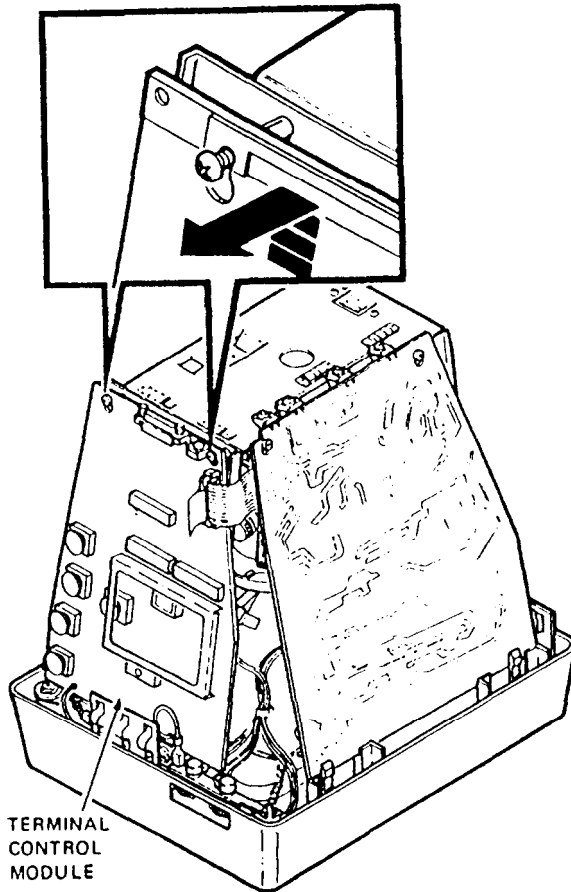
REMOVING AND REPLACING FRUs 21



MA 0206 88

22 REMOVING AND REPLACING FRUs

3. Slide the module up and gently pull the module toward you. Feed the cable through the opening in the chassis. -



MA 0207-88

To install the terminal control module, reverse steps 1 **through** 3. The terminal control module has two **notches on the bottom**. Place the notches on the legs of the chassis.

2.6 DISCHARGING THE CRT

Discharge the CRT as follows. First remove the following FRUs.

WARNING

The following steps expose you to the CRT anode, which may store a high voltage.

Rear panel (Paragraph 2.2).

Rear enclosure/base assembly (Paragraph 2.4).

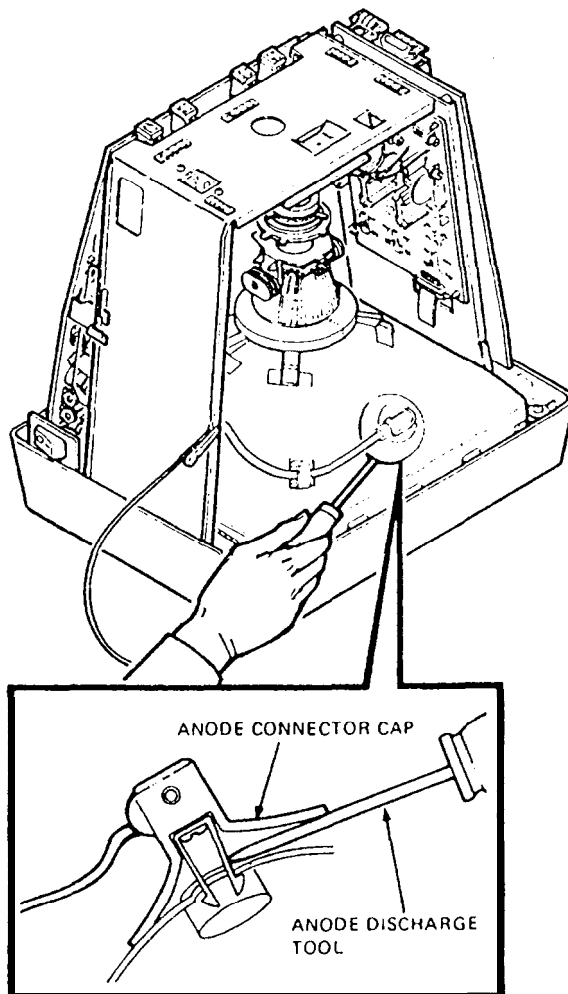
REMOVING AND REPLACING FRUs 23

1. Attach the clip **end of the anode discharge tool** (PN 29-247-17-00) to the metal chassis.
2. Push the probe end under the soft plastic anode connector cap, until you feel the probe touching the anode connector.

CAUTION

Do not scratch the glass of the CRT when discharging the anode.

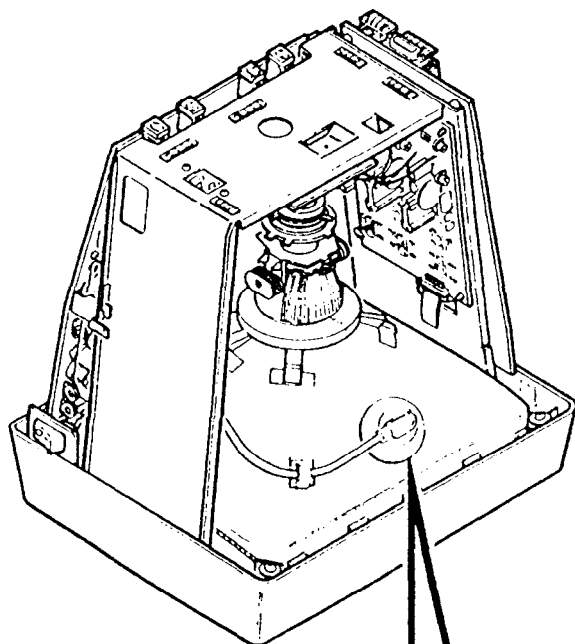
3. Hold the probe against the anode connector for at least 3 seconds, then remove the probe.



MA 0208-88

24 REMOVING AND REPLACING FRUs

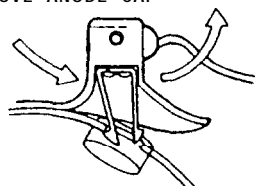
4. Remove the CRT anode wire from the cable clamp on the CRT.
5. Remove the CRT- anode connector from the CRT, as shown.



A PUSH IN THE DIRECTION
OF THE ARROW



B WHEN ONE BARB IS FREE
PUSH IN THE OPPOSITE
DIRECTION (SEE ARROWS) TO
REMOVE ANODE CAP



REMOVING AND REPLACING FRUs 25

2.7 POWER SUPPLY/MONITOR AND ARC PROTECTION ASSEMBLY

Remove the power supply (PS)/monitor and arc protection assembly as follows. First remove the following FRUs.

Rear panel (Paragraph 2.2).

Rear enclosure/base assembly (Paragraph 2.4).

WARNING

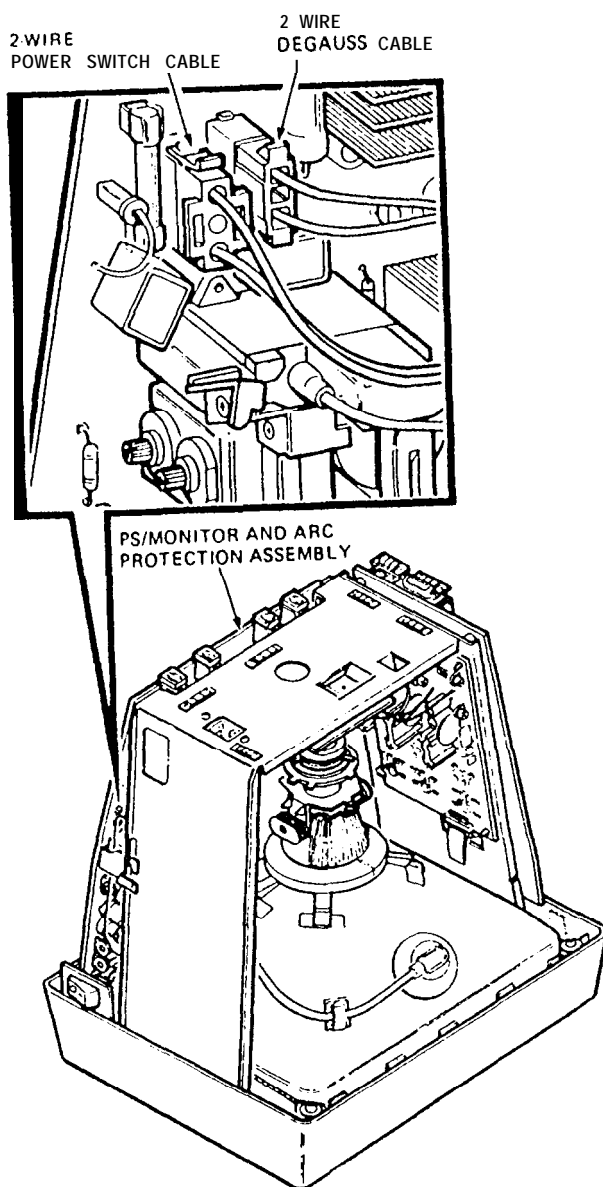
You must discharge the **CRT (Paragraph 2.6) before removing the PS/monitor and arc protection assembly.**

1. **Disconnect the flat cable on the terminal control module. This cable goes to the PS/monitor and arc protection assembly.**
2. **Loosen the two phillips screws that hold the PS/monitor and arc protection assembly to the chassis.**
3. Gently slide the module up and off the screws.



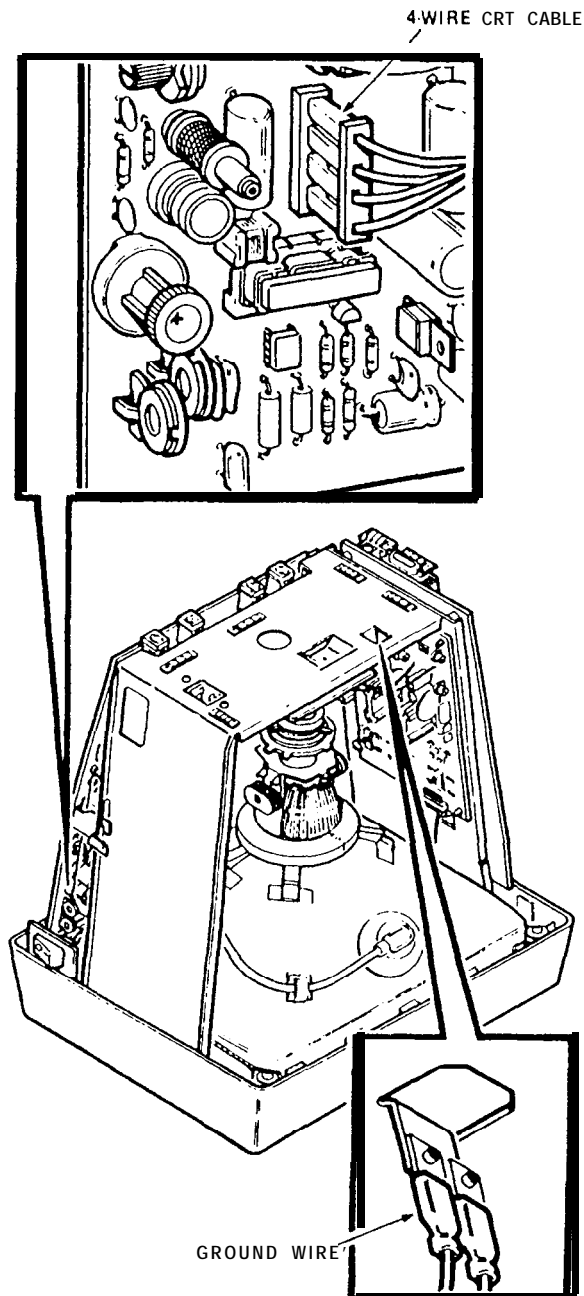
26 REMOVING AND REPLACING FRUs

4. Disconnect the 2-wire internal degauss cable on the PS/monitor and arc protection assembly.
5. Remove the internal degauss cable and CRT socket cable from the cable clamp on the side of the chassis
6. Disconnect the 2-wire power switch cable on the PS/monitor and arc protection assembly.



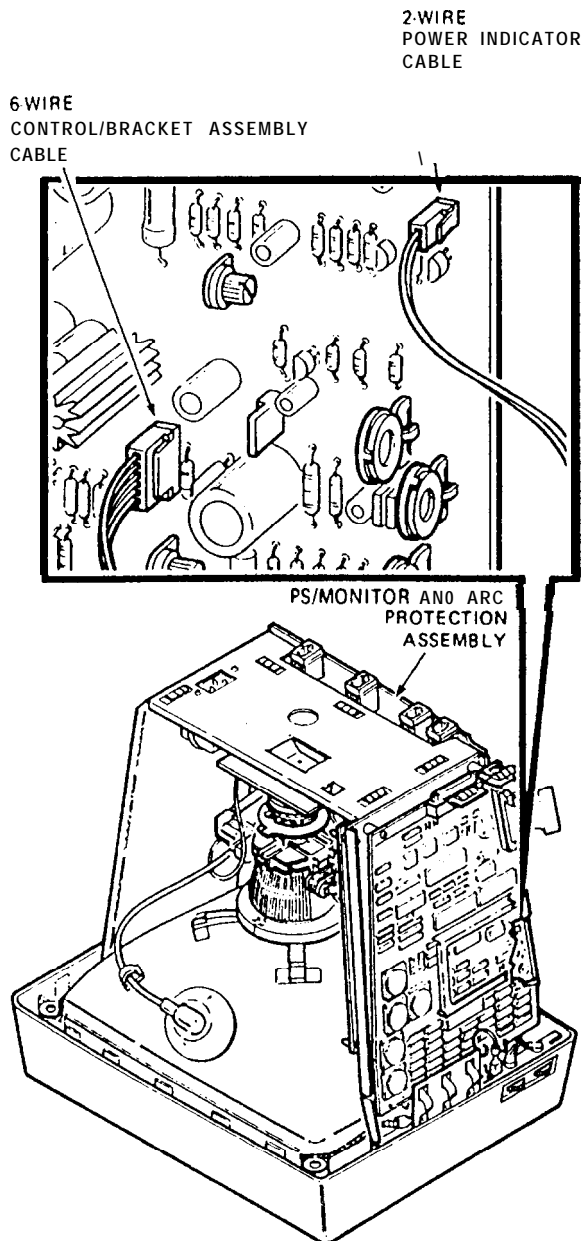
REMOVING AND REPLACING FRUs 27

7. Disconnect the **4-wire CRT cable** on the **PS/monitor and arc protection assembly**. This cable goes to the CRT yoke.
8. Disconnect the ground wire on the chassis that goes to the **PS/monitor and arc protection assembly**.



28 REMOVING AND REPLACING FRUs

9. Disconnect the following cables on the PS/monitor and arc protection assembly. To disconnect a cable, press the tab under the connector.
 - X-wire cable to the power indicator
 - 6-wire cable to the control/bracket assembly

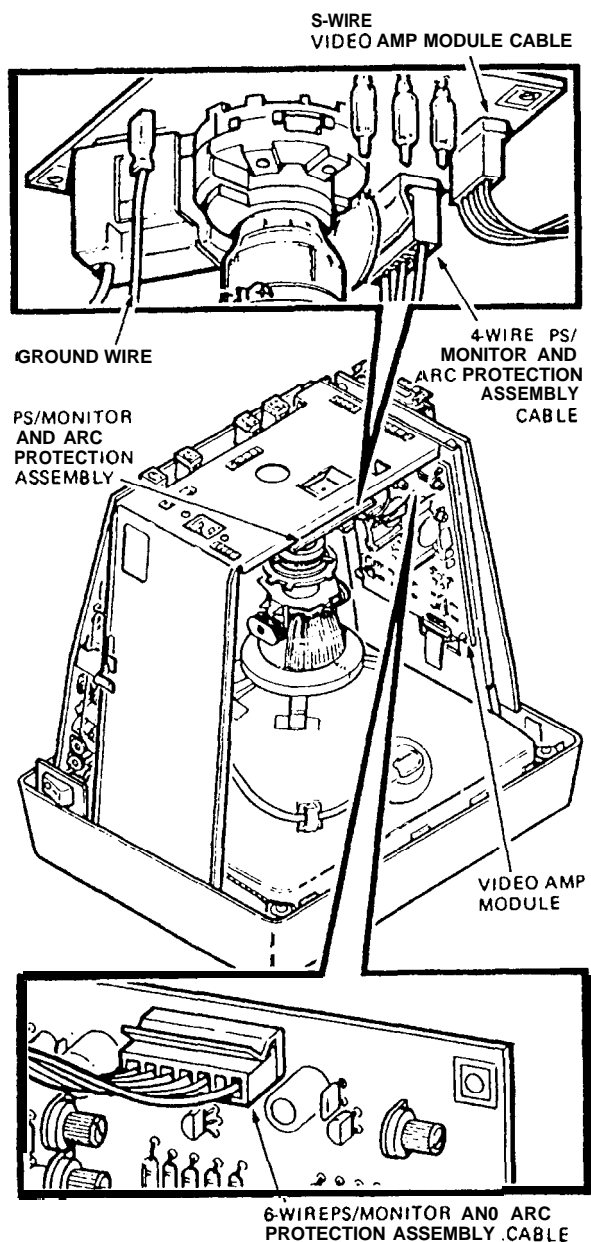


REMOVING AND REPLACING FRUs 29

10. Part of the **PS/monitor** and arc protection assembly sits on the neck of the CRT. Disconnect the following wires from that part.

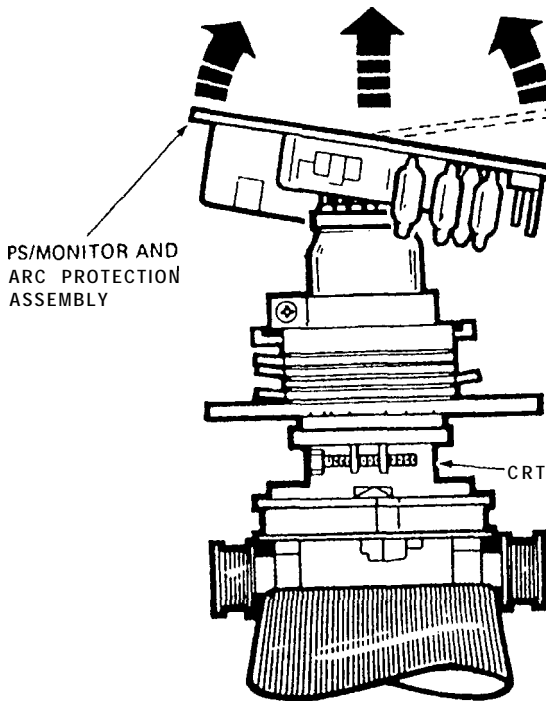
- 4-wire cable
- white ground wire
- 3-wire cable to the video amp module

11. Disconnect the **6-wire** cable on the video amp module. This cable comes from the **PS/monitor** and arc protection assembly.



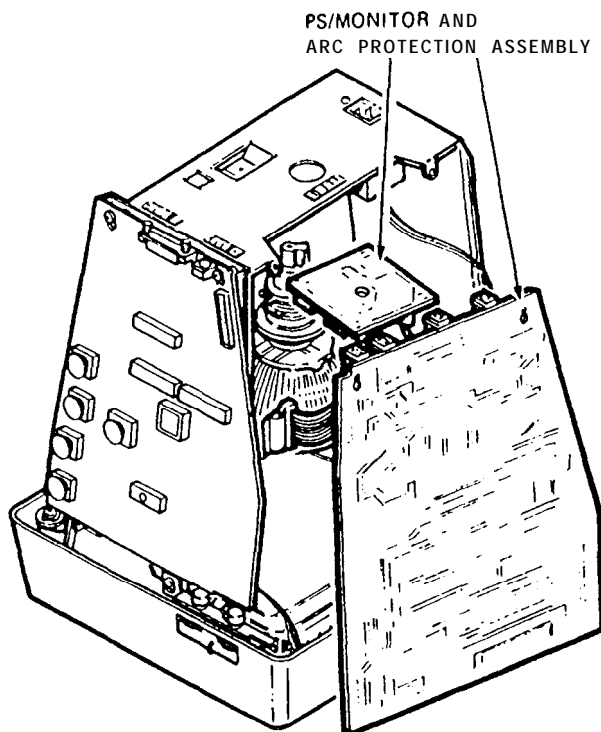
30 REMOVING AND REPLACING FRUs

12. Carefully lift the PS/monitor and arc protection assembly off the neck of the CRT by using a gentle side-to-side motion.



MA-1382-86

- 13 Remove the PS/monitor and arc protection assembly from the chassis.



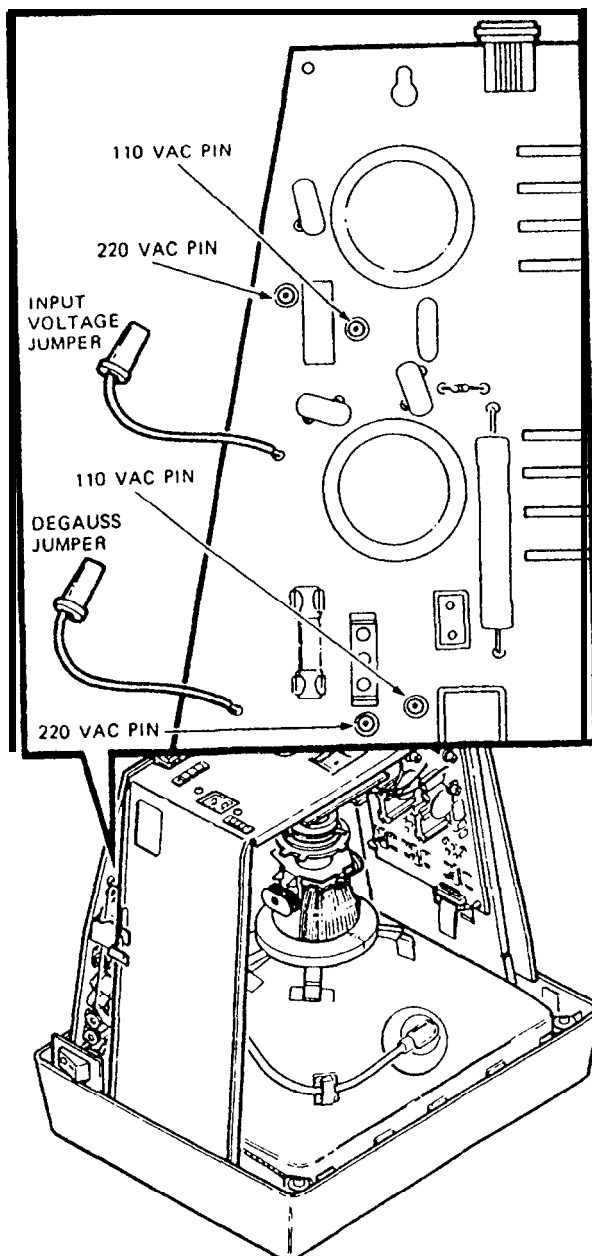
MA-1383-86

To install the PS/monitor and arc protection assembly, reverse steps 1 through 13.

2.7.1 Input Voltage Selection

Make sure you set the jumpers on the PS/monitor and arc protection assembly to match the input voltage **used**.

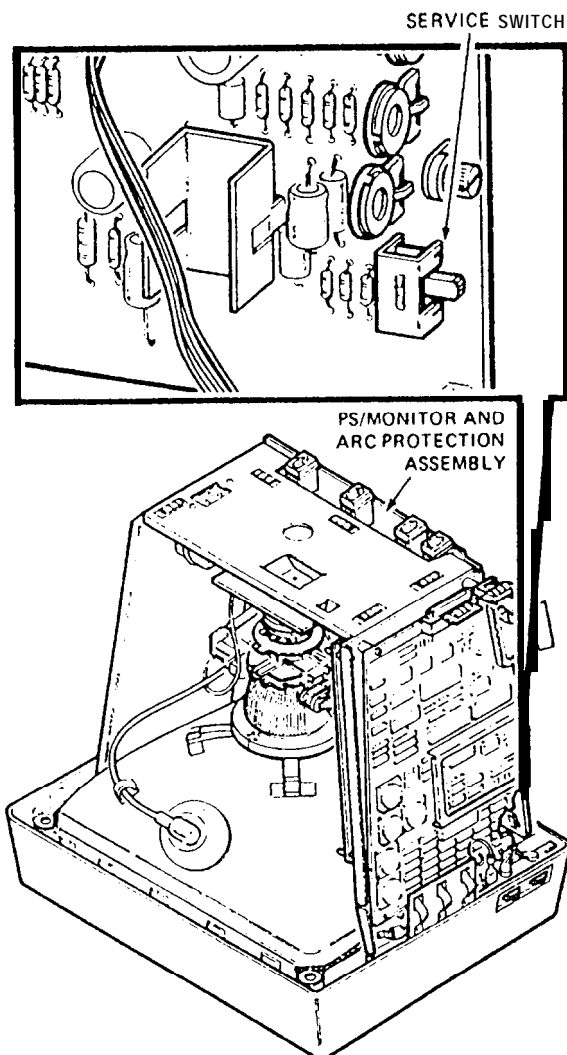
1. For 110 V, place the input voltage select jumper on the 110 pin. For 220 V, place the jumper on the '220 pin.
2. For 110 V, place the degauss jumper on the 110 pin. For 220 V, place the jumper on the 220 pin.



32 REMOVING AND REPLACING FRUs

NOTE

Make sure the service switch is between the two **white lines** on the **PS/monitor** and arc protection assembly. This setting indicates the terminal is in the operating state.



MA 0216-88

2.8 VIDEO AMP MODULE

Remove the video amp module as follows. First remove the following **FRUs**.

Rear panel (Paragraph 2.2).

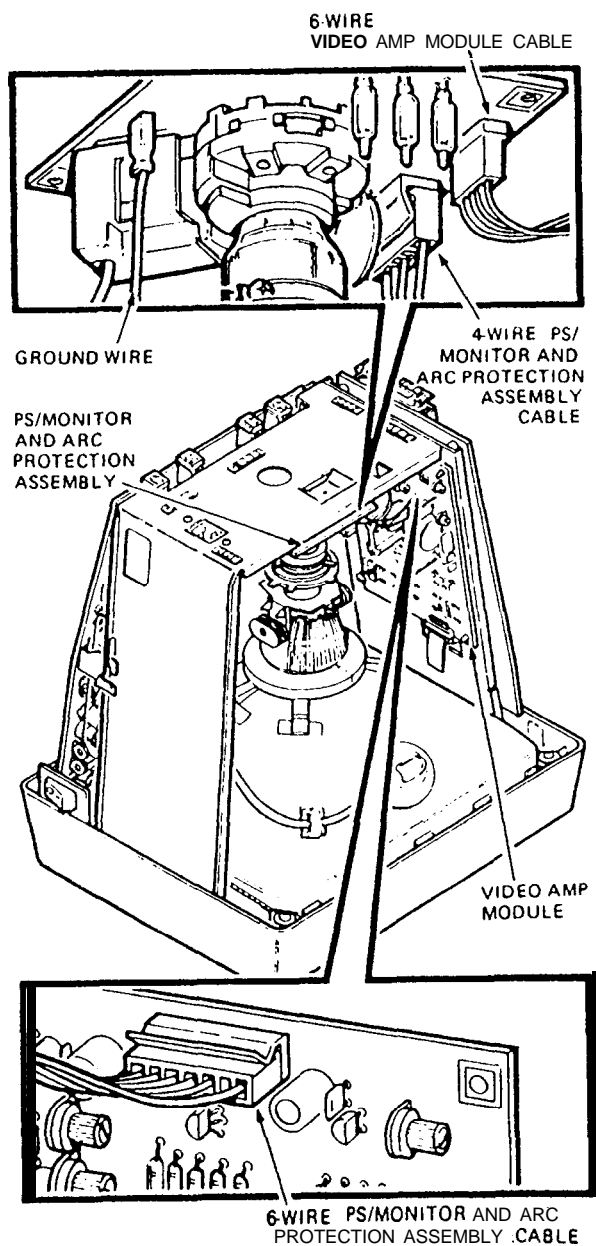
Rear enclosure/base assembly (Paragraph 2.4).

WARNING

You must discharge the CRT (Paragraph 2.6) before removing the video amp module.

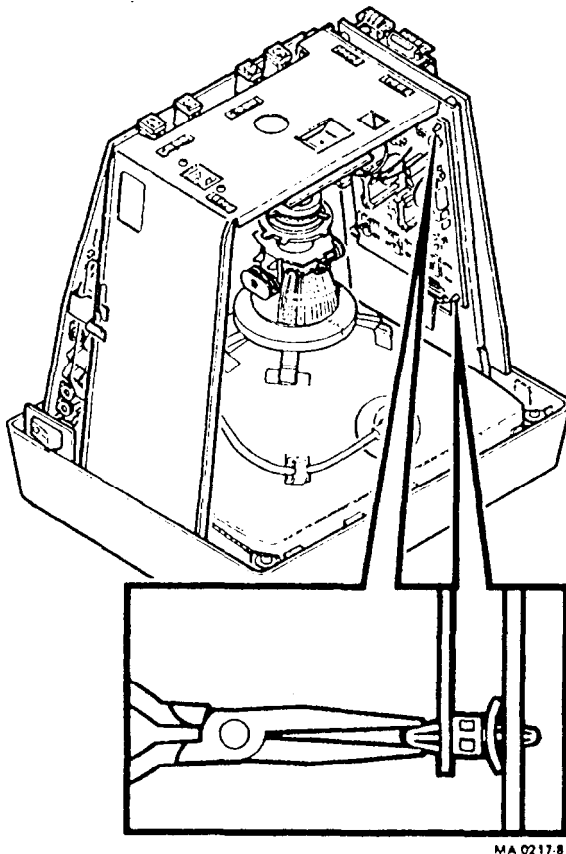
REMOVING AND REPLACING FRUs 33

1. Disconnect the following cables on the video amp module.
 - 16-wire cable to the terminal control module
 - 6-wire cable to the PS/monitor and arc protection assembly
2. On the neck of the CRT, disconnect the 3-wire video amp cable on the PS/monitor and arc protection assembly.



34 REMOVING AND REPLACING FRUs

3. Remove the video amp module by squeezing the module's standoffs with needlenose pliers.



MA 0217-88

To install the video amp module, reverse steps 1 through 3. The video amp module has two notches on the side. Place these notches on the legs of the chassis.

2.9 AC INLET/SWITCH ASSEMBLY

Remove the ac inlet/switch assembly as follows. First remove the following **FRUs**.

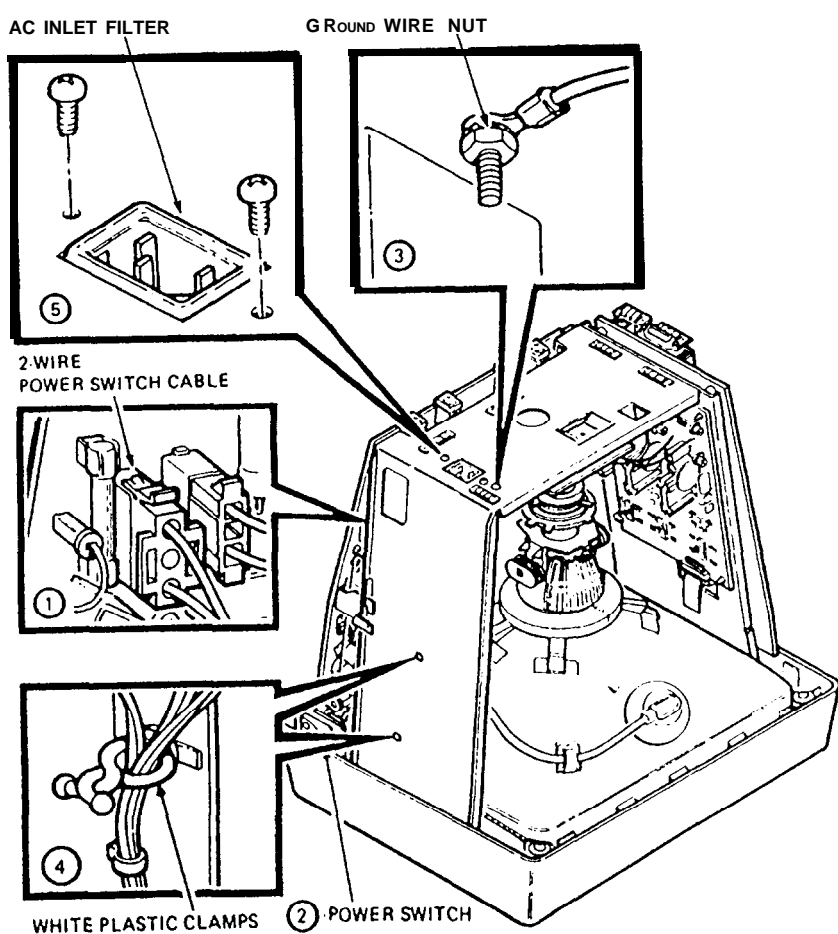
Rear panel (Paragraph 2.2).

Rear enclosure/base assembly (Paragraph 2.4).

1. Find the **2-wire** cable from the power switch to the **PS/monitor** and arc protection assembly. Disconnect the cable at the assembly.
2. Pull the switch up and out of the holder. Bring the switch to the front of the unit,

REMOVING AND REPLACING FRUs 35

3. Use a $\frac{3}{8}$ inch nutdriver to remove the nut that holds the ground wires from the ac inlet filter to the chassis.
4. Release the ac inlet/switch assembly cable from white plastic clamp on the side of the chassis.
5. Hold the ac inlet filter while removing the two phillips screws on the rear chassis. Remove the filter.



To install the ac inlet/switch assembly, reverse steps 1 through 5.

2.10 CONTROL/BRACKET ASSEMBLY (BRIGHTNESS AND CONTRAST)

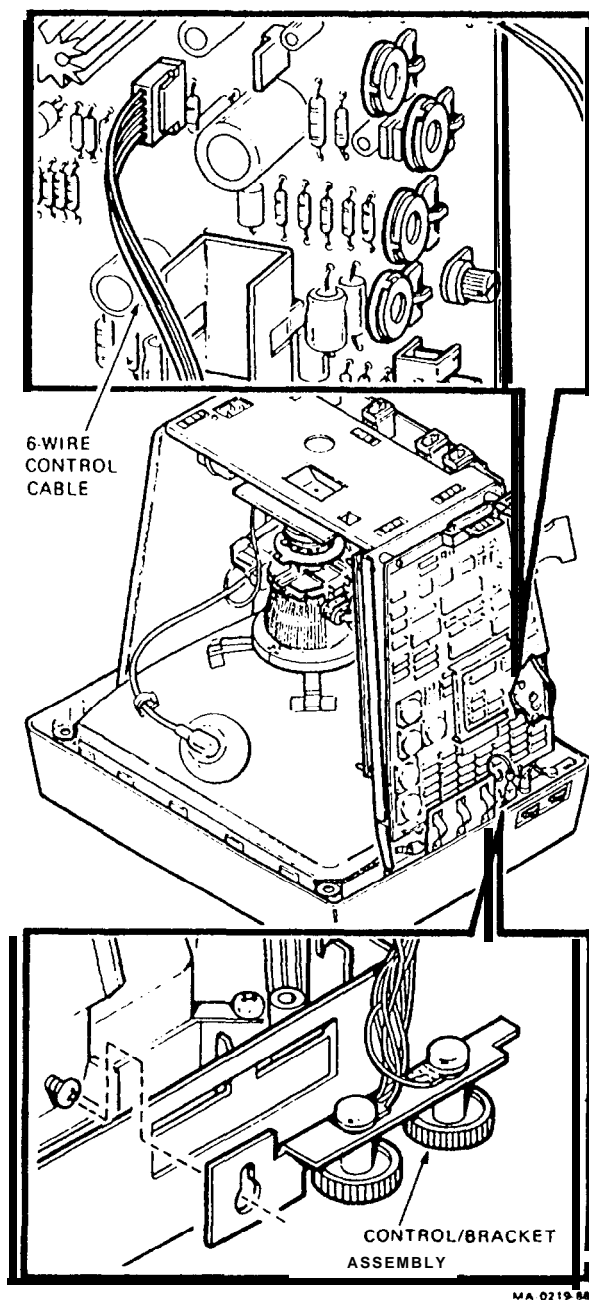
Remove the control/bracket assembly as follows. First remove the following FRUs.

Rear panel (Paragraph 2.2).

Rear enclosure/base assembly (Paragraph 2.4).

36 REMOVING AND REPLACING FRUs

1. Disconnect the 6-wire control cable on the PSI monitor and arc protection assembly by pressing the tab under the connector.
2. Loosen the phillips screw that holds the brightness and contrast controls to the chassis.
3. Lift the control/bracket assembly off the chassis.



To install the control/bracket assembly, reverse steps 1 through 3.

REMOVING AND REPLACING FRUs 37

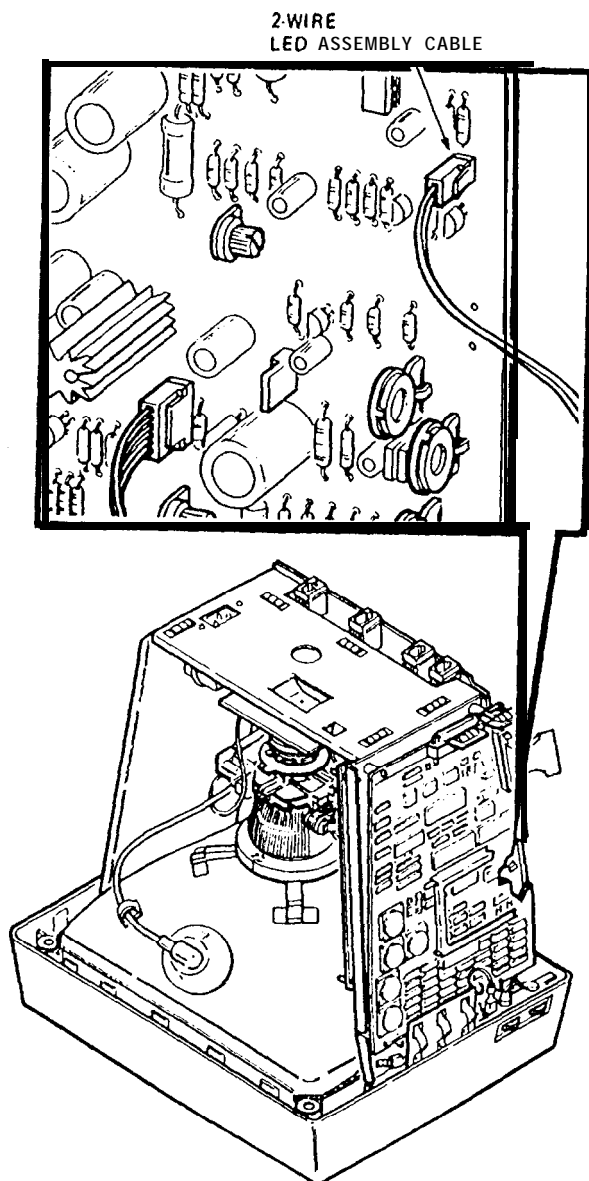
2.11 LED ASSEMBLY (POWER INDICATOR)

Remove the LED assembly as follows. First remove the following **FRUs**.

Rear panel (Paragraph 2.2).

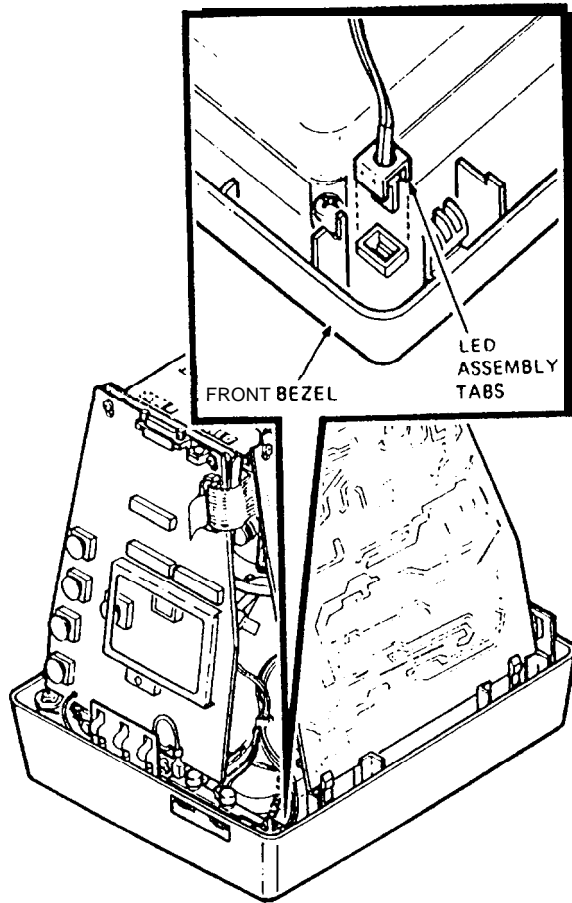
Rear enclosure/base assembly (Paragraph 2.4).

1. Find the **2-wire** cable from the front bezel to the **PS/monitor** and arc protection assembly.
Disconnect the cable at the module by pressing the tab under the connector.



38 REMOVING AND REPLACING FRUs

2. Lift the LED assembly from the front bezel by spreading the tabs on the LED with a small-bladed screwdriver.



MA 0221-68

To install the LED assembly, reverse steps 1 and 2.

2.12 CRT/BEZEL/CHASSIS ASSEMBLY

The CRT/bezel/chassis is one FRU. Do not try to remove or repair any part of this assembly in the field. To replace the assembly, remove and save the following FRUs.

REMOVING AND REPLACING FRUs 39

WARNING

You must-discharge the CRT (Paragraph 2.6) before removing the PS/monitor and arc protection assembly, and the video amp module.

Rear panel (Paragraph 2.2)

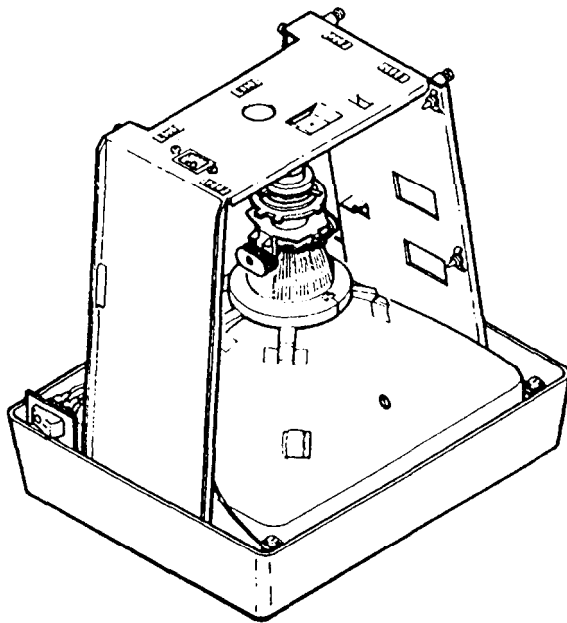
ROM cartridge (Paragraph 2.3).

Rear enclosure/base assembly (Paragraph 2.4)

Terminal control module (Paragraph 2.5)

PS/monitor and arc protection assembly (Paragraph 2.7)

Video amp module (Paragraph 2.8)



MA 0222-88

To install the CRT/bezel/chassis assembly, reverse the above procedures. Place a piece of paper on a flat working surface. Carefully place the new monitor facedown on the paper. The paper prevents scratches to the monitor bezel.

40 REMOVING AND REPLACING FRUs

2.13 CRT DISPOSAL (DIGITAL FIELD SERVICE ONLY)

This section describes how to safely dispose of the monitor's cathode-ray tube (CRT).

NOTE

This procedure supersedes all other tech tips about replacing and disposing of **CRTs. This procedure is for Digital personnel only, and is not intended for use by OEM and self-maintenance customers.**

CRTs are glass vacuum tubes. Because air pressure outside the tube is greater than air pressure inside, there is always the possibility of accidental implosion.

WARNING

You must handle CRTs very carefully to avoid accidental implosion and shattering glass.

To prevent personal injury from CRT implosion, use the following guidelines and disposal procedure to remove and dispose of a CRT. These guidelines and procedure are Digital field policy for all CRTs more than 3 inches in diameter.

Location

Work in areas where risks and exposure are limited to trained Digital personnel. Only Digital personnel should be in the area during CRT removal and replacement.

Protective Gear

Any person replacing a CRT must wear at least safety goggles and the approved gloves.

Safety goggles	pn 29-16141-00
Gloves	pn 29-16146-00

WARNING

To avoid injury to the eyes or hands, always wear goggles and gloves when you work with a CRT.

REMOVING AND REPLACING FRUs 41

Handling a CRT

- **Never** handle the CRT by the neck, Always use two hands and hold the CRT by the sides near its face.
- Keep the CRT away from your body during handling.
- Do not let the neck strike anything.
- Do not rest the CRT on its neck.
- Do not let the CRT touch any tools, such as screwdrivers and soldering irons.

Stocking and Storage

All CRTs must be kept in a closed container or mounted in the device cabinetry.

CRT Disposal

Use the following procedure to safely dispose of CRTs. Always perform this procedure at a Digital facility.

WARNING

Do not dispose of any CRT until it is rendered inoperative and safe to dispose.

Never perform the following disposal procedure at the customer site. Return the defective CRT to the local Digital facility for disposal.

At the Digital facility you will need

- An area clear of nonessential personnel
- A second person in the area in case of an emergency
- Safety goggles (PN 29-16141-00)
- Gloves (PN 29-16146-00)
- Pliers (PN 29-10311-00)

WARNING

Be careful when performing this procedure. For your safety, you must use the specified gloves and goggles.

42 REMOVING AND REPLACING FRUs

Never handle pieces of phosphor-coated glass without wearing protective gloves.

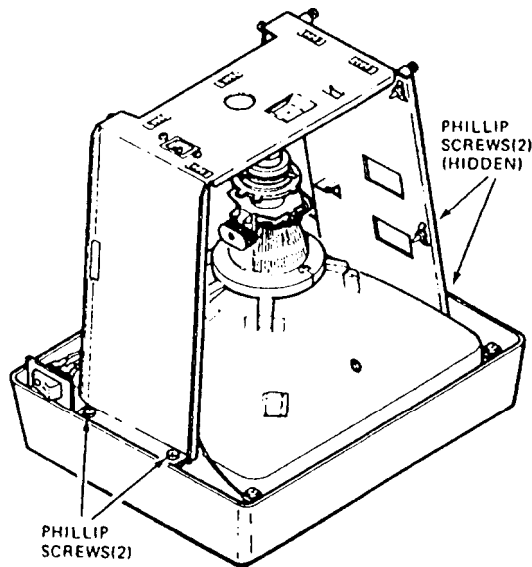
Before you perform- the following procedure, remove the **FRUs** listed in Paragraph 2.12.

Then, remove the following **FRUs**.

inlet/switch assembly (Paragraph 2.9)

Control/bracket assembly (Paragraph 2.10)

1. Remove the four **phillips** screws that secure the chassis to the CRT/bezel.

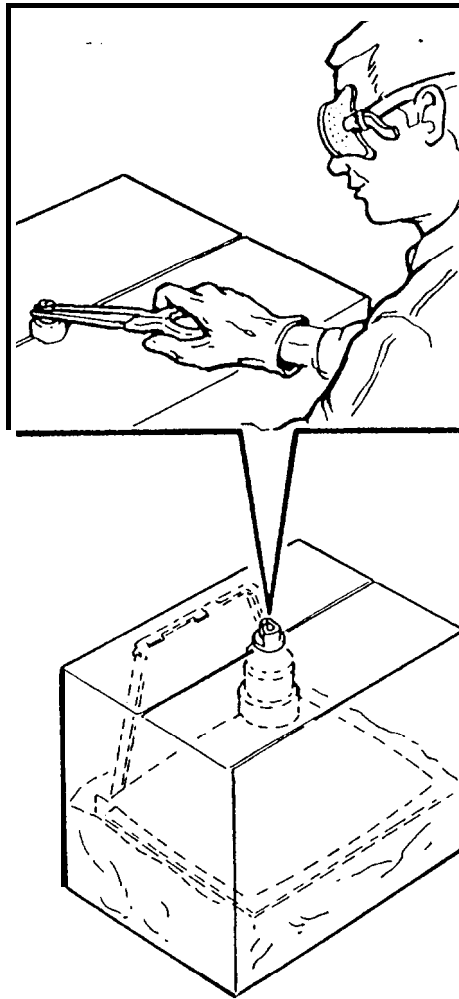


2. Remove the chassis.
3. Discard the chassis.
4. Place the old CRT and the original packing material in the container from which you removed the new CRT.
5. Seal up the container so that only the very tip of the CRT neck is exposed.
6. Using the specified pliers, slowly crush, but do not snap, the evacuation point. Do not move or disturb the CRT until the hissing sound of inrushing air has stopped.

NOTE

The evacuation point is a protrusion that extends from the circular area defined by the CRT neck pins. The glass protrusion is sometimes encased in a protective plastic cap, and more force is required to crush it.

REMOVING AND REPLACING FRUs 43



MA-1300-87

7. Seal the carton with packing tape and dispose of it in the Digital site's trash compactor or receptacle.

NOTE

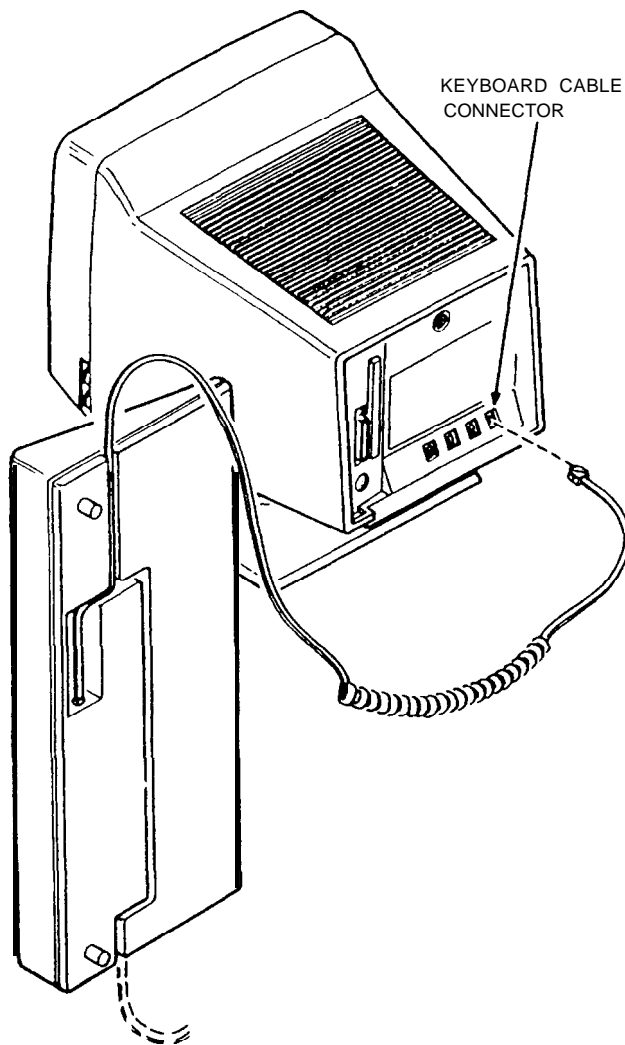
This safe "gassing" of the CRT is necessary to prevent liability and safety problems that may arise from accidental CRT implosion.

44 REMOVING AND REPLACING FRUs

2.14 KEYBOARD

If the keyboard is faulty, replace the complete **key-board** (whole option **swap**). Remove the keyboard as follows.

1. Disconnect the keyboard cable from the rear of the terminal.

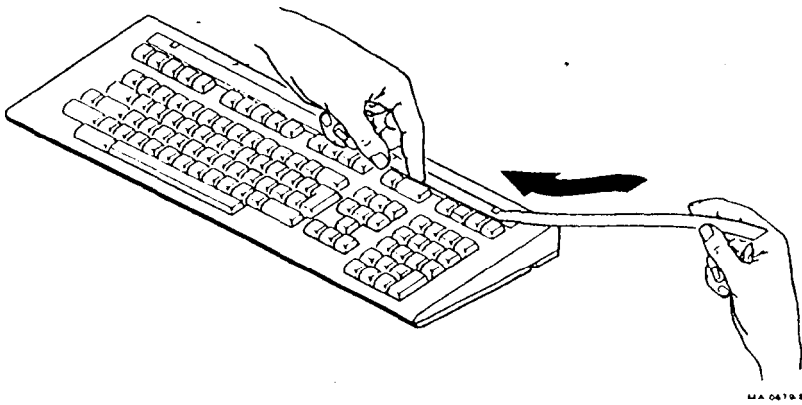


MA 0623-86

Install the legend strip
(**non-U.S./U.K.** keyboards only).

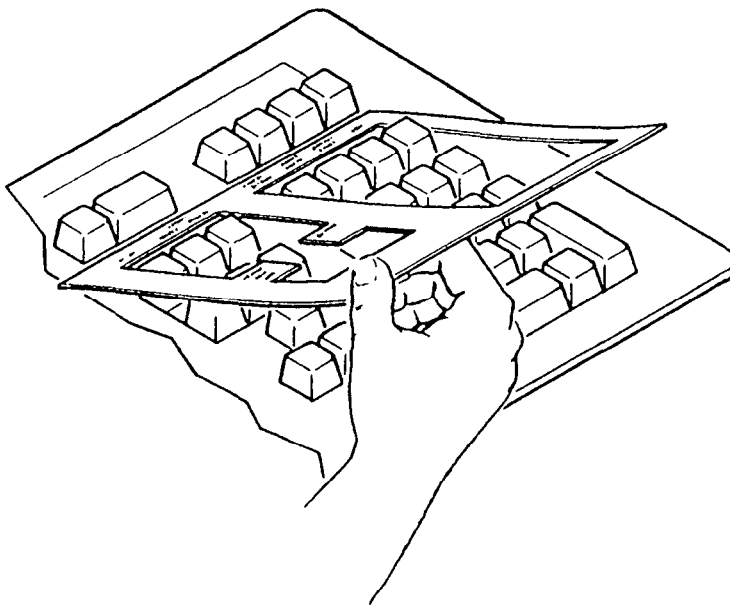
1. Remove the legend strip from the old keyboard.
2. Slide the legend strip under the tabs, so it fits over the legend strip already on the new keyboard.

REMOVING AND REPLACING FRUs 45

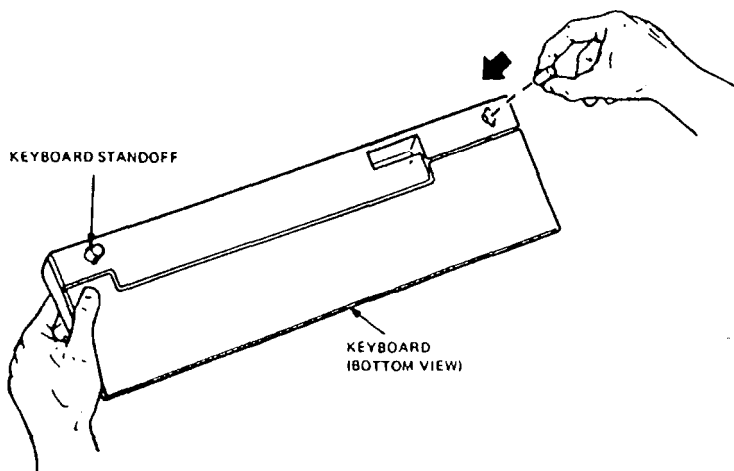


Install the template for the local editing keys
(non-U.S./U.K. keyboards only).

1. Place the template so that it fits around the editing and numeric keypads.



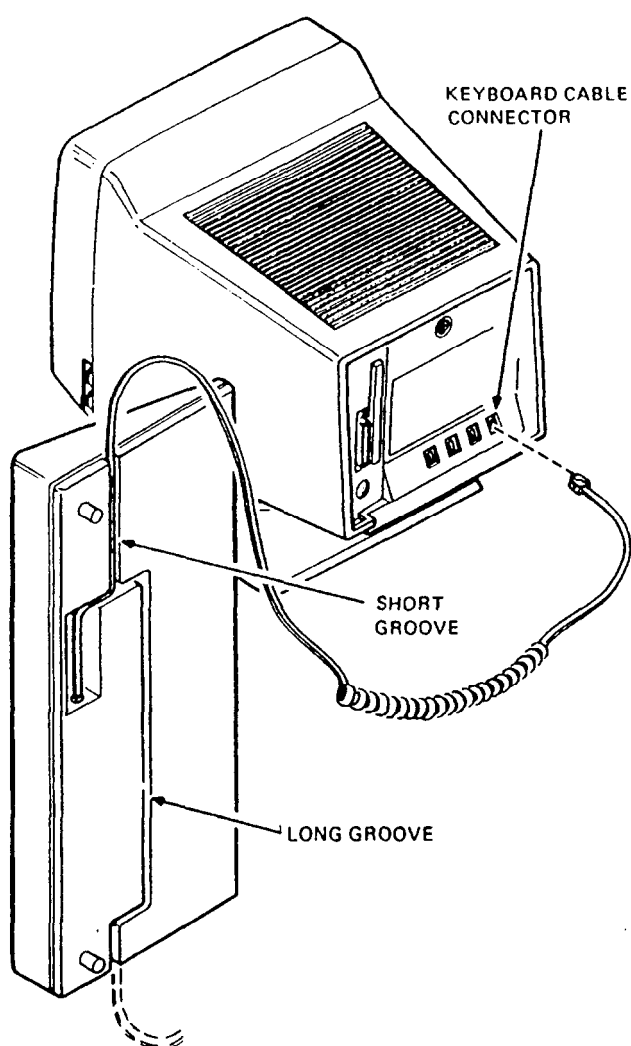
Install the keyboard standoffs.



46 REMOVING AND REPLACING FRUs

Connect the keyboard to the terminal.

1. Turn the terminal's power switch off (0).
2. Insert the long straight end of the keyboard cable into the connector on the bottom of the keyboard.
3. Press the cable into the long or short groove. Use the long groove if routing to the left. Use the short groove if routing to the right.
4. Insert the other end of the cable into the keyboard connector on the rear of the terminal.

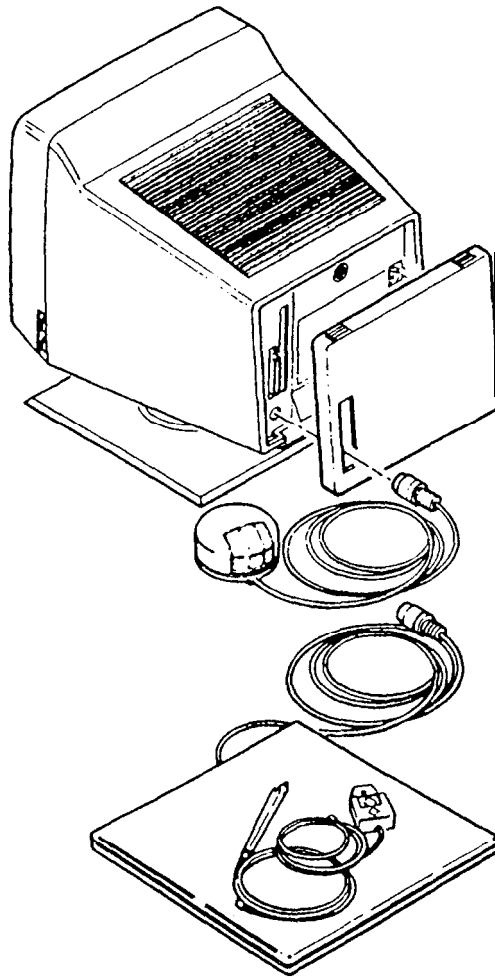


MA.0624-B6

REMOVING AND REPLACING FRUs 47

2.15 MOUSE or TABLET (OPTIONS)

The VSXXX-AA mouse and the VSXXX-AB graphics tablet are single **FRUs** (whole option swap). The cable for the mouse or tablet connects to the 'I-pin locator device connector on the rear of the terminal. To disconnect a mouse or tablet, first remove the terminal's rear panel (Paragraph 2.2). Then disconnect the mouse or tablet cable from the terminal.



To install a new mouse or tablet, first feed its cable through the opening in the rear panel. Connect the cable to the 'I-pin connector, then install the rear panel.

NOTE

The cable for the mouse or tablet has a keying plug. Make sure you align the keying plug to the slot on the 7-pin connector.

3 ALIGNING THE VIDEO MONITOR

3.1 GENERAL

This chapter shows you how to align the VT340 monitor. You do not have to perform every adjustment procedure each time you align a monitor. However, you **should** check all adjustments in the order shown, because many adjustments affect each other. If a setting is already correct, you can skip that adjustment and go on to the next one.

You must use the screen alignment test patterns to make all adjustments. Use Paragraph **3.2.1** to set up the terminal for adjustments.

Use a metric measuring tape (PN 29-25342-00) to measure the dimensions of the screen display. To avoid scratching the screen with the tape's metal clip, start the measurement at 10 cm (100 mm). Make sure all adjustments are made under these conditions.

3.2 MONITOR ADJUSTMENTS

Figure 3-1 shows the **location** of the controls used to make most adjustments. The individual procedures describe the purpose of each control.

Let the terminal warm up for at least 20 minutes before performing any adjustments (color bias and drive controls) on the video amp module.

Let the terminal warm up for at least 5 minutes before performing any other adjustments on the PSI monitor and arc protection assembly,

ALIGNING THE VIDEO MONITOR 49

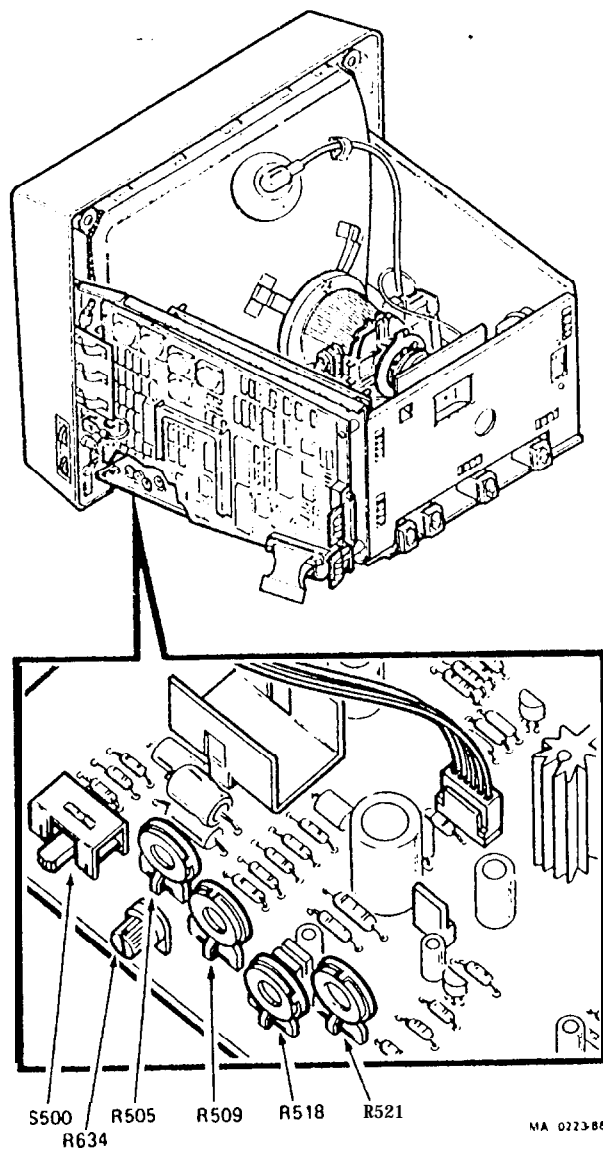


Figure 3-1 Video Adjustment Controls (1 of 2)

- S500 Service switch
- R63 4 Subcontrast
- R505 Vertical height
- R509 Vertical linearity
- R518 Vertical centering
- R52 1 Rectangularity

50 ALIGNING THE VIDEO MONITOR

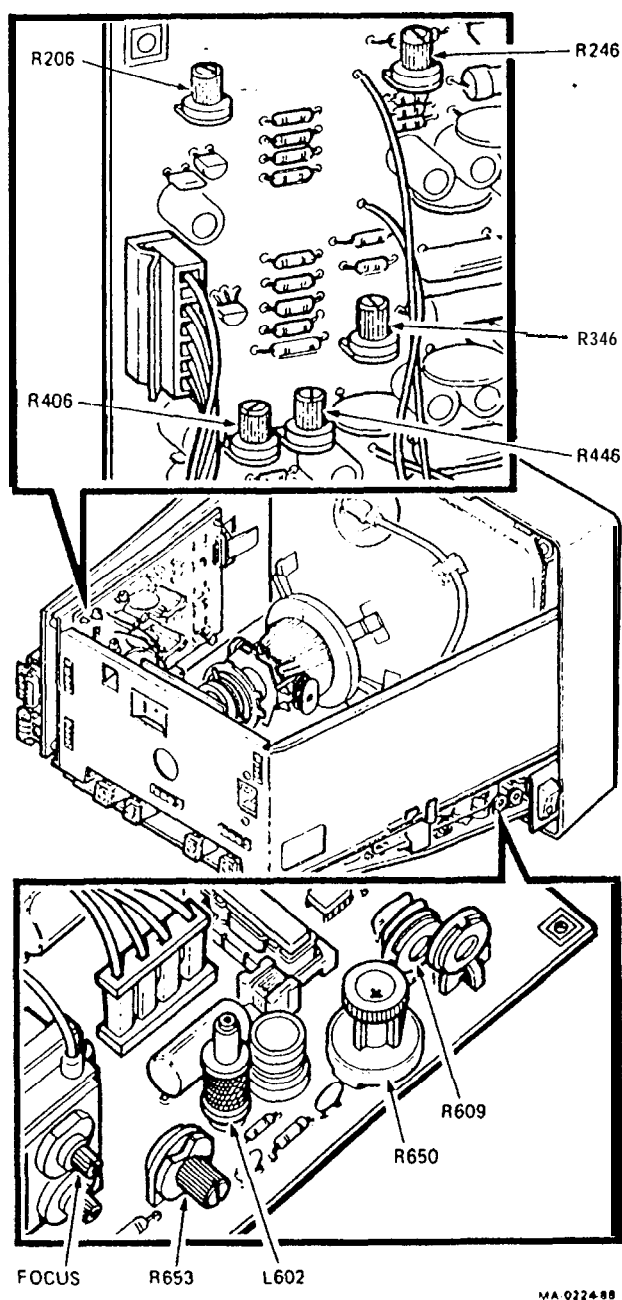


Figure 3-1 Video Adjustment Controls (2 of 21)

R206	Red drive	L602	Horizontal width
R246	Red bias	R609	Horizontal phase
R346	Green bias	R650	Horizontal centering
R406	Blue drive	R653	Cutoff
R446	Blue bias		

3.2.1 Before You Start

Before you perform adjustments, set up the terminal as follows. First remove the following **FRUs**.

Rear panel (Paragraph 2.2).

Rear enclosure/base assembly (Paragraph 2.4).

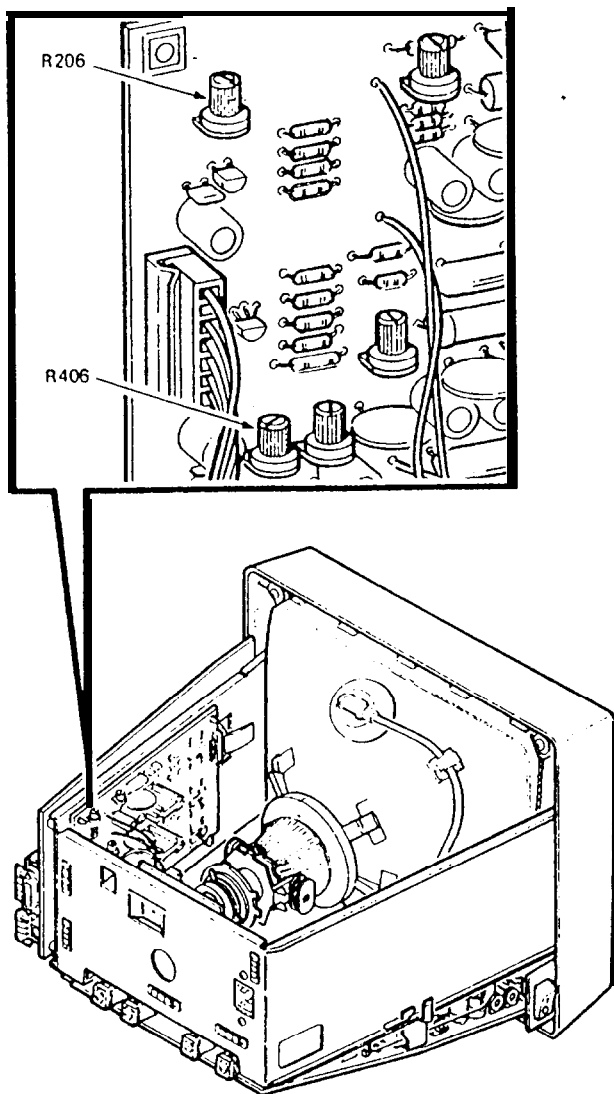
1. Place your terminal on a nonconductive surface.
2. Reconnect the keyboard cable and power cord.
3. Turn the power switch on (1). Wait for "VT340 OK" to appear on the screen,
4. Let the terminal warm up for at least 20 minutes before performing any adjustments (color bias and drive controls) on the video amp module.

3.2.2 Setting Cutoff

Cutoff is the point of operation in a CRT tube where current does not flow.

1. Set the brightness and contrast controls to minimum.
2. Turn the R246 (R-Bias), R346 (G-Bias), and R446 (B-Bias) controls to their midrange position.
3. Set the R206 (R-Drive) and R406 (B-Drive) controls on the video amp module to a full counter-clockwise position.

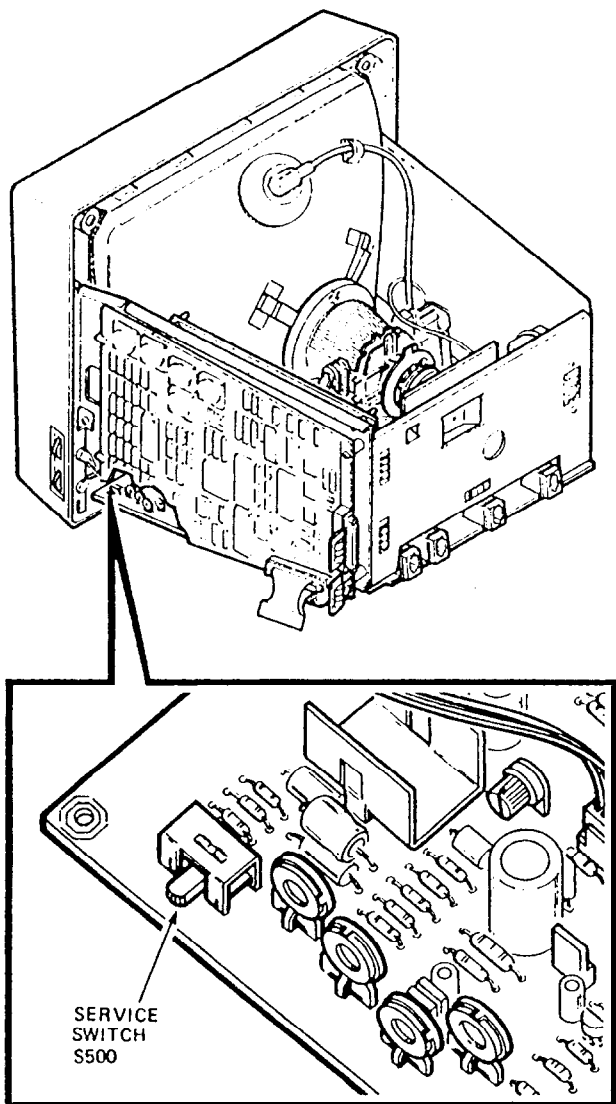
52 ALIGNING THE VIDEO MONITOR



MA 0228-88

ALIGNING THE VIDEO MONITOR 53

4. Set the service switch (S500) on the PS/monitor and arc protection assembly to the rear position.



5. Slowly turn the R653 (G2) control clockwise, until you see a horizontal line on the screen. If a line is present, go to step 6. Note the color of the line — red, green, or blue.

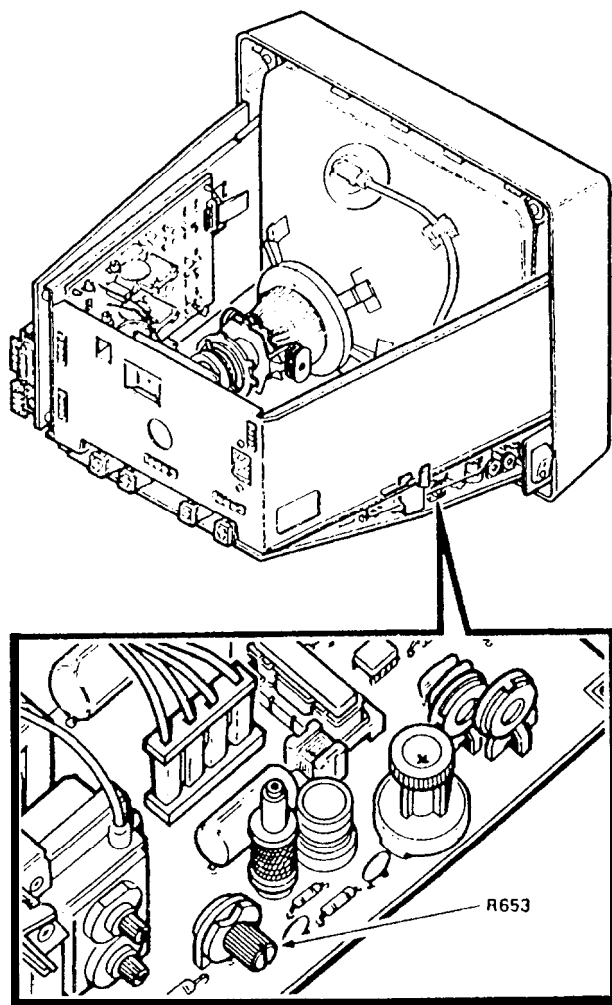
CAUTION

Whenever the horizontal line appears, set the line to a dim viewing level. Failure to do so may burn the phosphor on the CRT.

54 ALIGNING THE VIDEO MONITOR

6. Slowly turn the **R653 (G2)** control counterclockwise, ***until the line just disappears.*** Do not turn the control too far.

The cutoff point for that color is **now set**. Do not adjust the cutoff (bias) control for that color during the rest of this procedure.



NOTE

When you set the bias controls for the other two colors, make sure the horizontal line just disappears. It is important to set all three bias controls so that the three colors disappear at the same point.

ALIGNING THE VIDEO MONITOR 55

7. Turn the-bias control for one of the two other colors, **until** you see a line of that color on the screen. Then turn the control back, until the line just disappears.
8. Repeat step 7 for the third color.
9. Set the service switch (S500) on the PS/monitor and arc protection assembly to the forward position.
10. Turn the contrast control to maximum.
11. Turn the brightness control until the raster (white lines) just appears. Then turn the control back, until the raster just disappears.

NOTE

Any data now displayed on the screen will be green.

3.2.3 Displaying Screen Tests

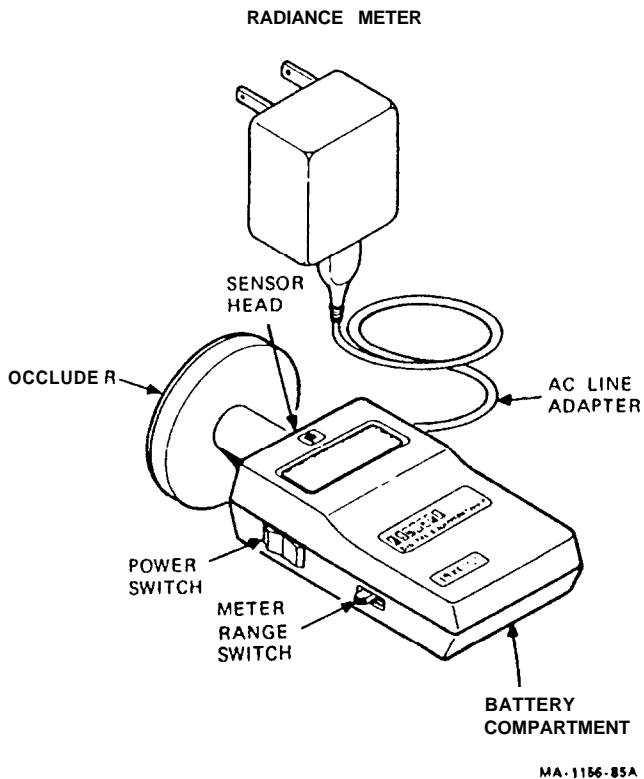
The screen test displays a series of test patterns. You run the screen test from the Diagnostic Set-Up screen (Paragraph 1.4).

1. Let the terminal warm up for at least 20 minutes before performing adjustments (color bias and drive controls) on the video amp module.
2. Press Set-Up to enter set-up. The Set-Up **Directory** screen appears.
3. Use the arrow keys to move the highlighting cursor to the Diagnostics Set-Up field. Press Enter to display the Diagnostics Set-Up screen.
4. Use the arrow keys to select Run Screen Tests in the Diagnostics Set-Up screen.
5. Press Enter to run the screen tests. The **moni-**tor displays a series of screen tests repeatedly. To keep a test pattern on the screen, press the Hold Session key.

56 ALIGNING THE VIDEO MONITOR

3.2.4 Color Gain

For this adjustment, you need the radiance meter supplied with the color video service kit (PN A2-S0099-01). The kit comes with a manual that contains important information on using the meter. You should read this manual before using the meter.



Prepare the meter for use by removing the cap and attaching the occluder assembly.

CAUTION

Do not touch the filter while the cap is removed. Do not tighten the occluder too far.

ALIGNING THE VIDEO MONITOR 57

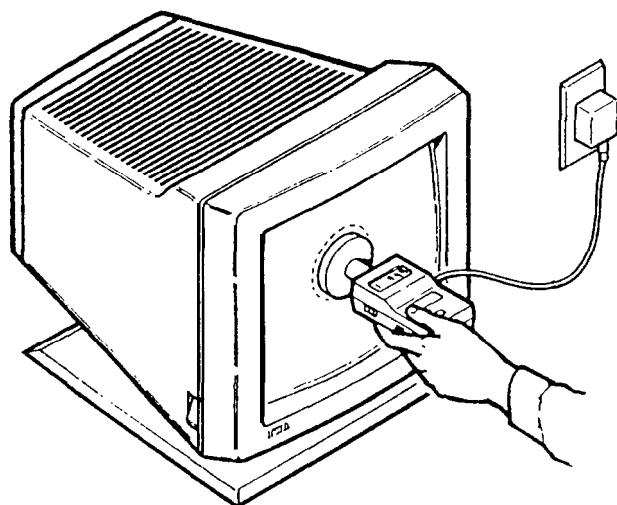
The meter's power switch has three positions.

Down	-Power on, without a backlight
Center	Power off
Up	Power on, with a backlight

Set the power switch to the down position (power on without a backlight).

The meter range switch lets you select the accuracy of the meter's decimal readout. Set the switch to the second position from top of meter (1.999).

Place the occluder firmly against the center of the screen. Take a red china pencil and draw an arc on the screen around the occluder.



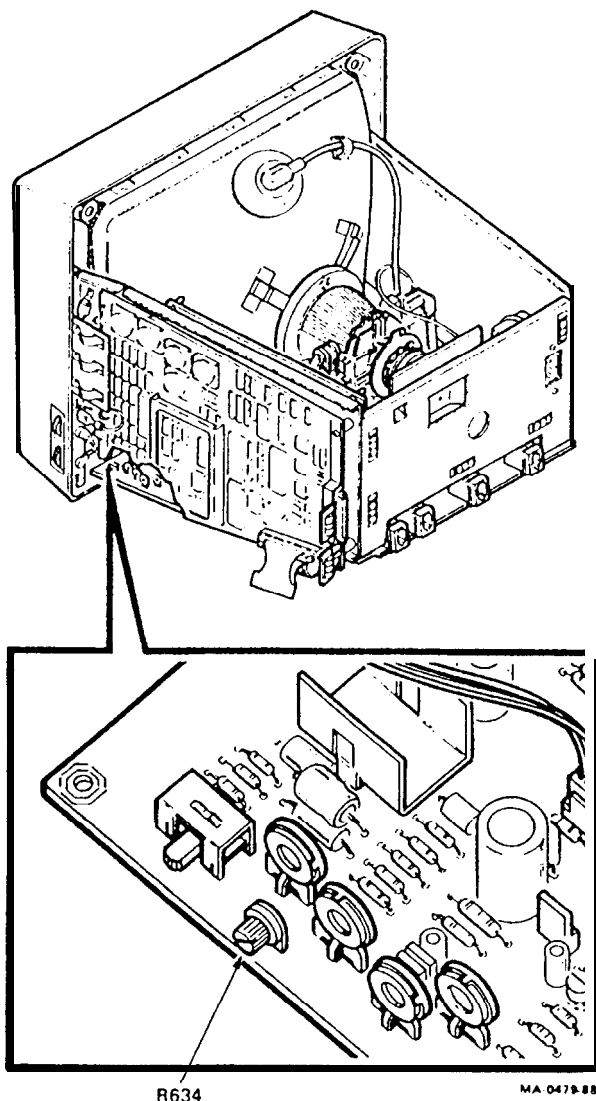
NOTE

You must take all meter readings with the meter centered in this arc.

1. Run the screen test.
2. Stop the test at the green screen by pressing Hold Session.
3. Ensure that the contrast control is set to maximum and the brightness control is adjusted so that the raster just disappears.
4. Place the occluder in the arc on the screen and adjust **R634** (sub-contrast control) until the meter reads 0.095.

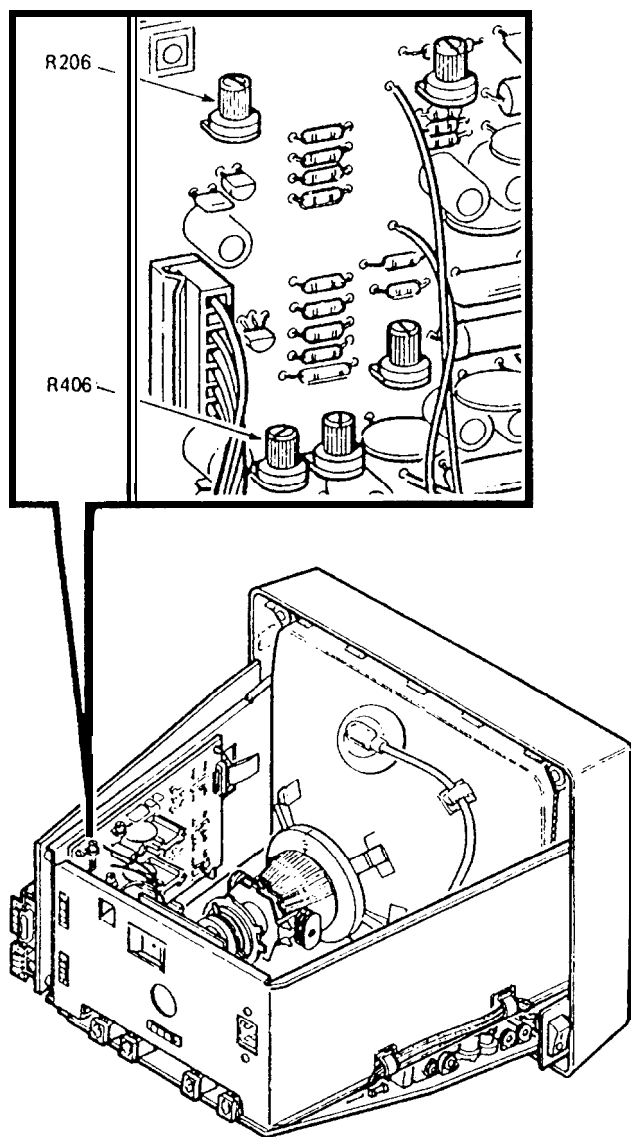
58 ALIGNING THE VIDEO MONITOR

5. Continue the screen test by pressing Hold Session. Stop the test at the blue screen by pressing Hold Session again.



ALIGNING THE VIDEO MONITOR 59

6. Place the **occluder** in the arc on the screen and adjust the **R406** (B-Drive) control until the meter reads 0.192.



MA-1398-86

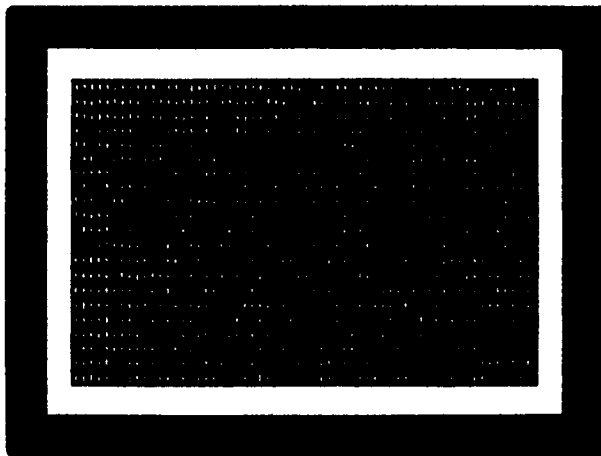
7. Continue the screen test by pressing Hold Session. Stop the test at the red screen by pressing Hold Session again.
8. Place the **occluder** in the arc on the screen and adjust the R206 (R-Drive) control until the meter reads 0.153.
9. Display the white screen, using Hold Session.
10. Adjust the brightness and contrast controls to a comfortable viewing level.

60 ALIGNING THE VIDEO MONITOR

3.2.5 Display Size

This section describes how to check and adjust horizontal centering, horizontal phase, rectangularity, vertical centering, horizontal width, and vertical height. To perform these adjustments, first do the following.

1. Run the screen test (Paragraph 3.2.3).
2. Stop the test at the screen of E's with a white border, by pressing Hold Session.

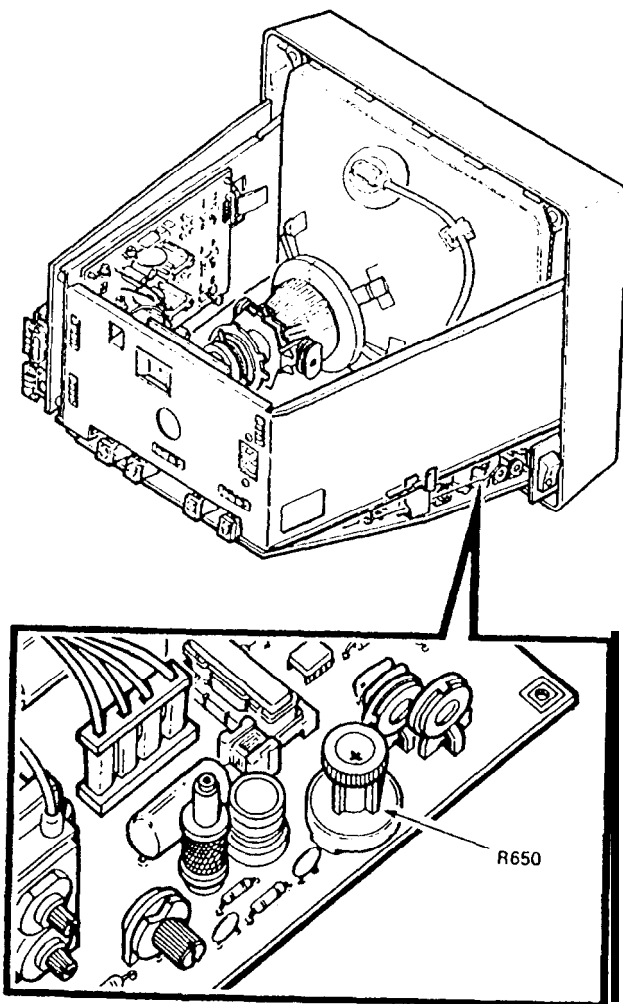


MA-0629 86

ALIGNING THE VIDEO MONITOR 61

3.2.5.1 Horizontal Centering - Check and adjust the horizontal centering as follows.

1. Set the brightness control to maximum. Then set the contrast control to minimum.
2. Check the raster. It should appear centered on the screen.
3. If necessary, adjust the R650 (Hor. Center) control to center the raster.

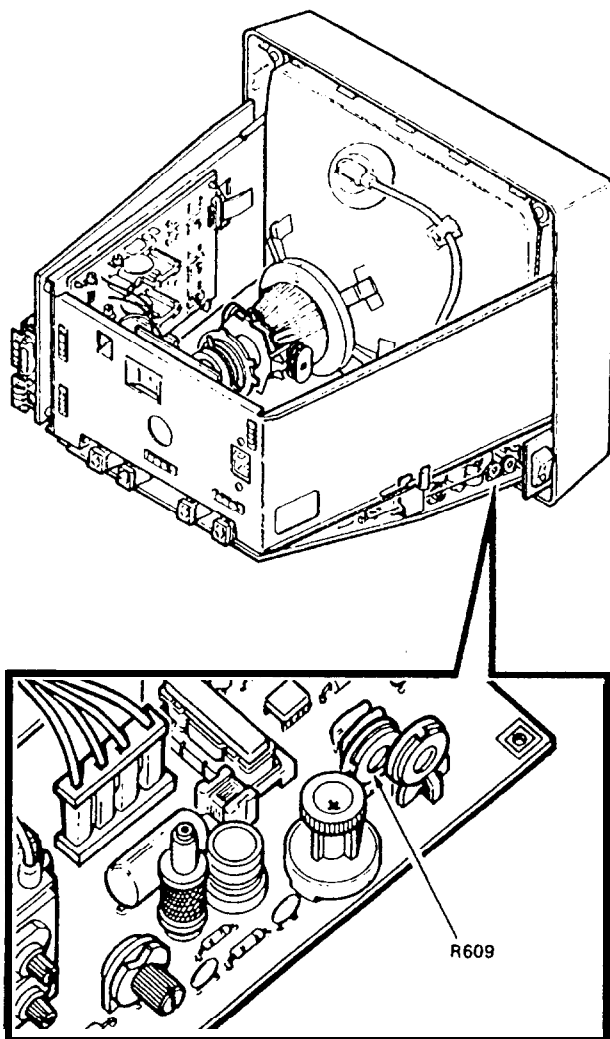


MA 0229-88

62 ALIGNING THE VIDEO MONITOR

3.2.5.2 Horizontal Phase - Check and adjust the horizontal phase as follows.

1. Adjust the brightness control until the raster appears around the screen of E's with a white border.
2. Adjust the R609 (H-Phase) control until the display appears centered in the raster.

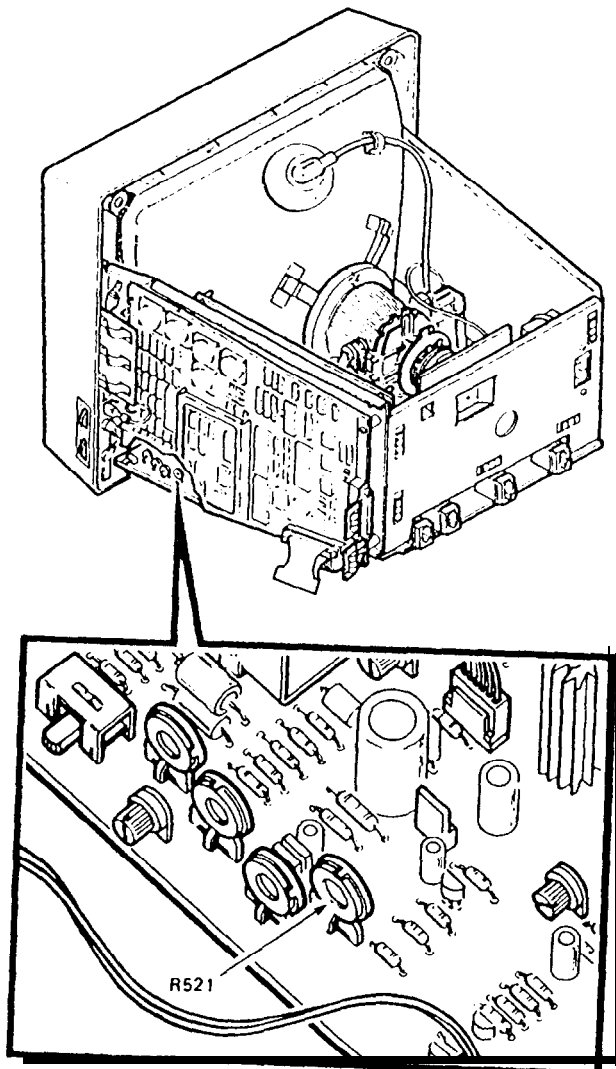


MA-0730-BB

ALIGNING THE VIDEO MONITOR 63

3.2.5.3 Rectangularity - This procedure ensures that the sides of the video display are straight, not curved. The curved line effect is known as *pin-cushioning* (when the lines curve in) or *barreling* (when the lines curve out).

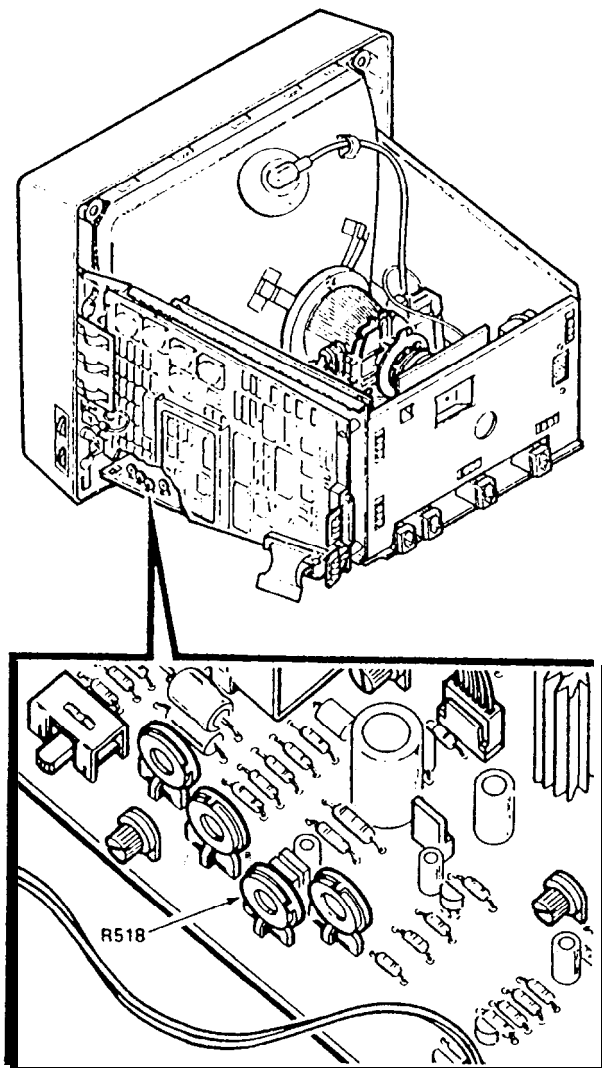
1. Check that the sides of the screen of E's are straight.
2. If necessary, adjust the **R521** (Side-Pin) control until the sides appear straight.



64 ALIGNING THE VIDEO MONITOR

3.2.5.4 Vertical Centering - Check and adjust the vertical centering as follows.

1. Look at the screen of E's. It should appear vertically centered on the screen.
2. If necessary, adjust the **R518** (V-Cent) control until the display appears centered.



MA 0232-88

ALIGNING THE VIDEO MONITOR 65

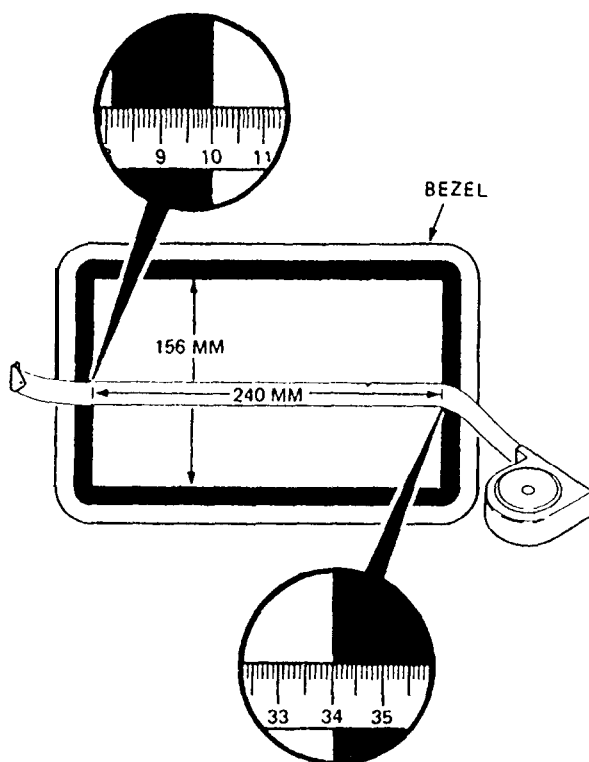
3.2.5.5 Horizontal Width and Vertical Height -

Check and adjust the horizontal width and vertical height as follows.

NOTE

In the following steps, use a metric measuring tape (PN 29-25342) to measure the dimensions of the screen display. To avoid scratching the screen with the tape's metal clip, start each measurement at 10 cm (100 mm).

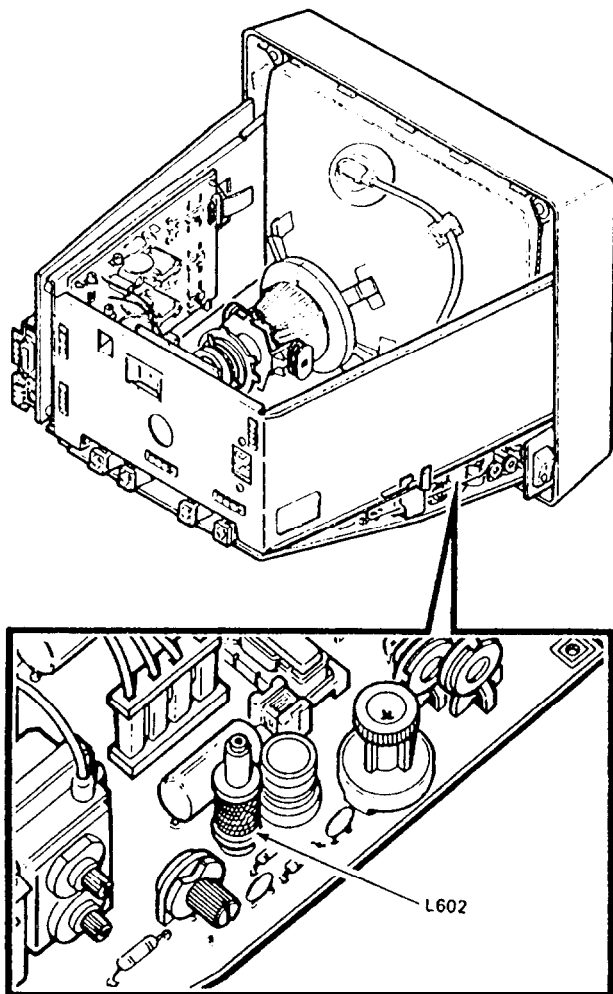
In the following figure, the screen of E's display is removed for clarity.



MA 0633 86A

66 ALIGNING THE VIDEO MONITOR

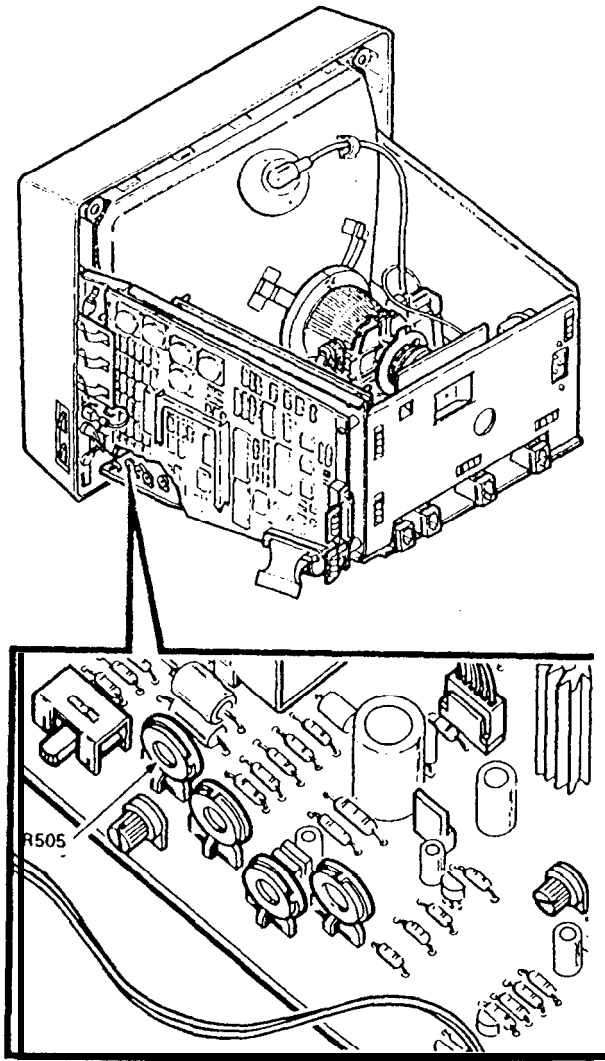
1. Check the outside edges of the screen of E's for a horizontal width of about 240 mm \pm 2.0 mm.
2. If necessary, adjust the width to 240 mm by using the L602 (horizontal width) control.



MA-0233-88

ALIGNING THE VIDEO MONITOR 67

3. Check the **outside** edges of the screen of E's for a vertical height- of $156 \text{ mm} \pm 2.0 \text{ mm}$.
4. If necessary, adjust the height to 156 mm by using the R505 (V-Size) control.



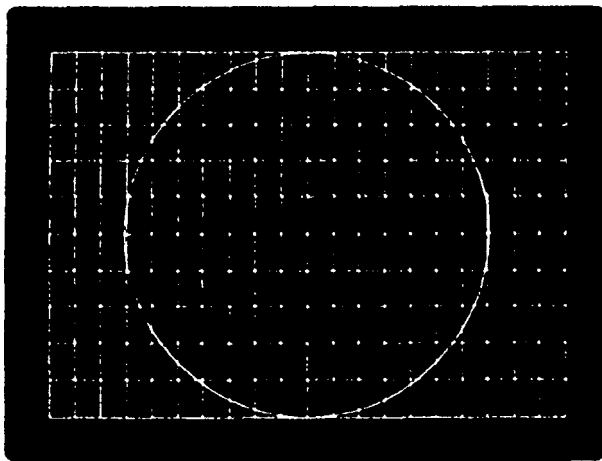
MA 0234-88

68 ALIGNING THE VIDEO MONITOR

3.2.6 Character Quality

This section describes how to check and adjust linearity and focus. -To perform these adjustments, first do the following,

1. Run the screen test (Paragraph 3.2.3).
2. Stop the test at the following screen by pressing the Hold **Session**.



MA 0636-86

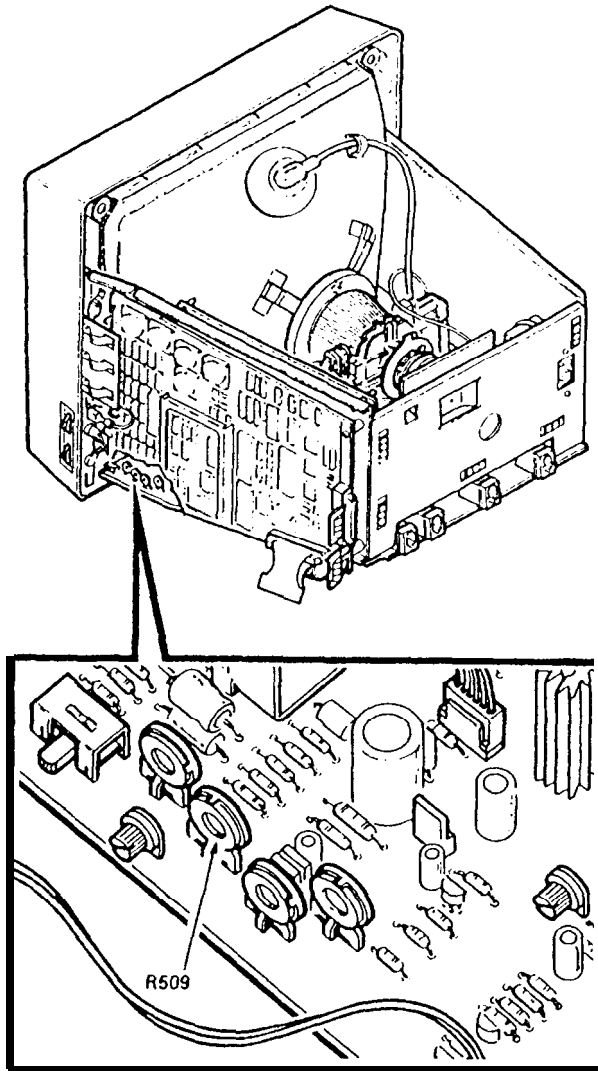
3.2.6.1 Linearity - Check and adjust the linearity as follows.

1. Check the height of the four corner blocks in the test display. The blocks should all be the same height.

Also check if the circle appears round.

ALIGNING THE VIDEO MONITOR 69

2. If necessary, - adjust the R509 (V-Lin) control so the blocks are the same height and the circle appears round.



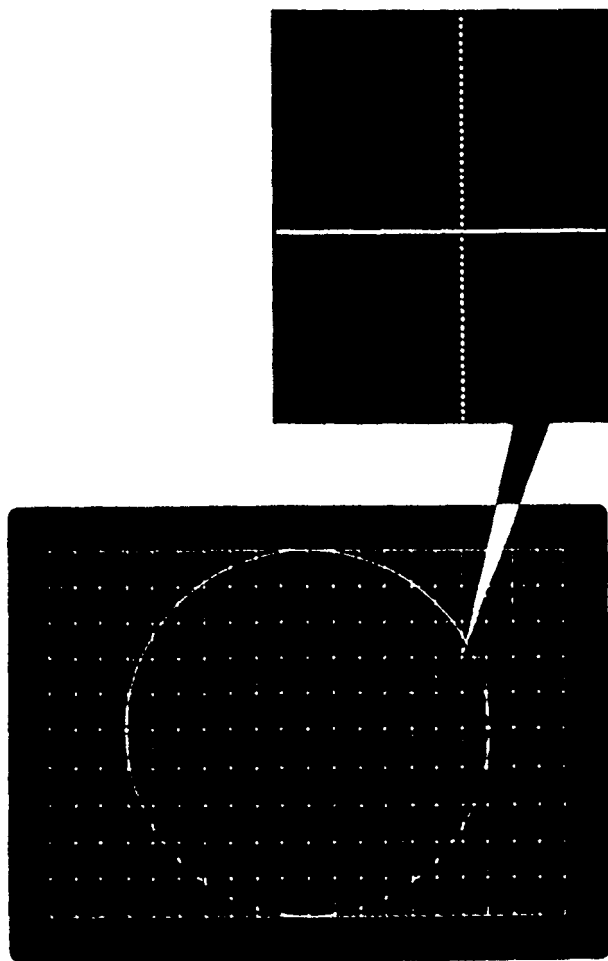
MA 0235 88

3. If you adjust the linearity, you must readjust the vertical height (Paragraph 3.2.5.5).

70 ALIGNING THE VIDEO MONITOR

3.2.6.2 Focus - Check and adjust the focus as follows.

1. Find the point on the crosshatch pattern that is four blocks from the right edge and three blocks from the top.



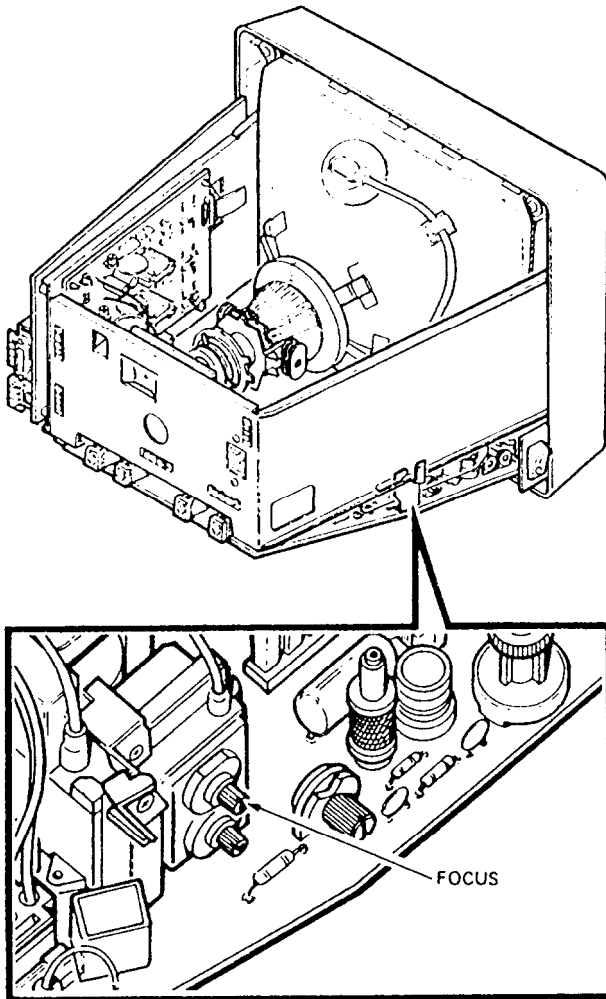
2. Examine the intersecting lines for sharpness.

NOTE

Make sure the screen is clean. A dirty screen can appear to affect the focus. In some cases, the operator may want the focus set to suit personal preference.

ALIGNING THE VIDEO MONITOR 71

3. If necessary, adjust the focus control on the fly-back transformer so the intersecting lines are sharp.

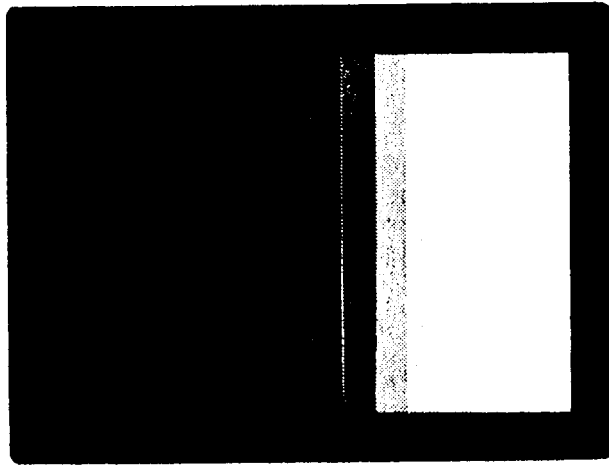


72 ALIGNING THE VIDEO MONITOR

3.2.7 Viewer Preference

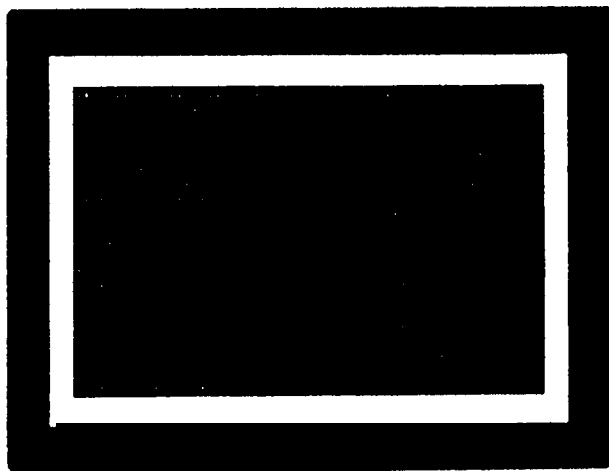
This procedure lets you set the brightness and contrast to the viewer's preference.

1. Run the screen test (Paragraph 3.2.3).
2. Stop the test at the screen with a gray scale by pressing Hold Session.



MA 0052 87

3. Adjust the brightness and contrast controls to the preferred viewing level.
4. Continue the screen test by pressing Hold Session. Stop the test at the screen of E's by pressing Hold Session again.



MA 0059 86

5. Check the horizontal width and vertical height (Paragraph 3.2.5.5). Adjust if necessary.

4 USING SET-UP

4.1 GENERAL

The VT340 terminal has a set-up utility that lets you change the settings of operating features from the keyboard. This chapter provides a brief summary of how to use set-up. Chapter 5 of the ***Installing and Using the VT330/VT340 Video Terminal*** describes the set-up utility in detail.

4.2 WHAT IS SET-UP?

The set-up utility is a series of display screens. Each screen lists a group of related features, such as communications or diagnostics. Each set-up **screen** has basic directions at the bottom for selecting and changing feature settings. You can move from screen to screen in set-up.

4.2.1 Dual Sessions

The VT340 can run two sessions with the host system at the same time. Each session has its own set-up settings. If the terminal is set for dual sessions, the set-up screens display the settings for the active session. Chapters 3 and 8 of ***Installing and Using the VT330/VT340 Video Terminal*** describe how to set up and use dual sessions.

4.3 ENTERING AND LEAVING SET-UP

You enter set-up by pressing the Set-Up key on the top row of the keyboard. When you **press** Set-Up, the Set-Up Directory screen appears (Figure 4-1). The top half of the Set-Up Directory lists all the VT340 set-up screens. The bottom half lists some action you can perform directly from the Set-Up Directory.

You can leave set-up from any set-up screen, by pressing Set-Up again.

```

SET-UP DIRECTORY                                     VT340 Version V2.1

General Set-Up      Keyboard Set-Up
Display Set-Up      User-Defined Key Set-Up
Communications Set-Up Local Editing Set-Up
Printer Set-Up      Tab Set-Up
Graphics Set-Up     Diagnostics Set-Up
                   Color Set-Up

Reset Session       Save Current Settings
Clear Display       Recall Saved Settings
Clear Communications Recall Factory Default Settings
Enable Sessions     Set-Up Language: English
Disable Sessions

Use arrow keys to select desired action, then press ENTER key.
To move among screens, you can press NEXT SCREEN and PREV SCREEN keys.
To leave Set-Up, press Set-Up key.
Copyright © 1988, Digital Equipment Corporation - All Rights Reserved.
  
```

Figure 4-1 Set-Up Directory

4.4 SELECTING A SET-UP SCREEN

You can select any set-up screen from the Set-Up Directory screen.

1. Press Set-Up to enter set-up. The Set-Up Directory appears.
2. Use the arrow keys to move the highlighting cursor to the name of the screen you want to display.
3. Press Enter. The selected screen appears.



USING SET-UP 75

You can also use the Next Screen key to move from one set-up screen to the next. You can use the Prev Screen key to back up to a screen you have already seen. The screens appear in the order listed in the Set-Up Directory. You can press Next Screen and Prev Screen when viewing any set-up screen.

To return to the Set-Up Directory, press the Select key.

4.5 SELECTING SET-UP FEATURES

You use the arrow keys to move the cursor to any field on a set-up screen. There are two basic types of fields.

Action fields	When you move to an action field and press Enter, the terminal performs that action. The Set-Up Directory, User-Defined Key, and Tab screens have action fields.
Features	Features have more than one setting. You use the  ,  , or Enter key to change the current setting of a feature. When you leave set-up, the terminal uses the new setting you selected.

Do not change any settings unless necessary.

4.6 SAVING SET-UP VALUES

You may want to save the current settings in set-up before you run tests. Check with the user. When you save settings, you can recall them later. You can save all set-up settings as follows. If the terminal is set for dual sessions, this procedure only applies to the active session.

1. Press Set-Up to enter set-up. The Set-Up Directory screen appears.
2. Use the arrow keys to move to the Save Current Settings field in the Set-Up Directory screen.
3. Press Enter to save the current settings.

76 USING SET-UP

4.7 RECALLING SET-UP VALUES

You can reset the terminal to a previous set of set-up values. There are two types of set-up values you can recall. Check with the user to see which settings were in use.

- Factory-default settings
- Saved settings (previously selected by the user)

You can recall set-up values as follows. If the terminal is set for dual sessions, this procedure applies only to the active session.

1. Press Set-Up to enter set-up. The Set-Up Directory screen appears.
2. Use the arrow keys to select the Recall Factory Default Settings or Recall Saved Settings field.
3. Press Enter to recall the selected set-up values.

A VT330/VT340 DOCUMENTATION

In addition to this guide, you can order the following **VT330/VT340** documents from Digital.

Installing and Using

The **VT330/VT340** Video Terminal **EK-VT3XX-UG**

This manual provides users with the information needed to install, operate, and maintain the VT330/VT340 terminals. The manual describes all controls, indicators, and keys. The manual also describes set-up and special features such as dual sessions and local editing.

VT330/VT340

Programmer Reference **Manual** (two volumes)

Vol. 1: Text Programming

EK-VT3XX-TP

This manual provides programmers with information on character processing, character codes, and control functions available for general text applications.

Vol. 2: Graphics Programming

EK-VT3XX-GP

This manual provides programmers with information on graphics features of the VT330 and VT340 terminals. The manual describes three types of graphics programming: **ReGIS**, Tektronix 4010/4014, and sixels. The manual also describes how to program a locator device (mouse or graphics tablet) and how to print graphics.

VT330/VT340

Programmer Pocket Guide

EK-VT3XX-HR

This guide is a summary of the text and graphics control functions described in the two-volume programmer reference manual.

VT330 Pocket Service Guide

EK-VT330-PS

This guide provides service personnel with the information needed to test, troubleshoot, and repair the VT330 monochrome video terminal.

78 A: VT330/VT340 DOCUMENTATION

VT330 Video Terminal IPB

EK-VT330-IP

VT340 Video Terminal IPB

EK-VT340-IP

These documents provide a detailed parts breakdown of the VT330 and VT340 field replaceable parts. The documents do not contain part numbers for components on the printed circuit boards. However, these components are listed in the *Field Maintenance Print Set*, ordered separately.

VT330 Field Maintenance Print Set MP-02411-01

VT340 Field Maintenance Print Set MP-02412-01

These documents provide a complete set of electrical and mechanical schematic diagrams for the VT330 and VT340 terminals.

Installing and Using

The **Session Support Utility**

AA-JB84B-TE

This guide provides system managers with instructions for installing SSU software to support dual sessions over a single communication line. The guide is part of an SSU software kit. The kit is available on different media.

Magtape	00-Q*ZAV-HM
RX50	00-Q*ZAV-H3
TK50	00-Q*ZAV-H5

* = processor number.

B TROUBLESHOOTING THE-SESSION SUPPORT UTILITY

The VT340 can run dual sessions over a single communication line if Digital's SSU software is installed on the host system. If you have problems running dual sessions with SSU software, first check the software versions running on the system and the terminal.

- The host system must have VMS V4.4 or later, and SSU V1.0 or later.
- The host system must have VMS V4.4 or later, and SSU V1.0 or later, See "Restrictions" at the end of the appendix.

Next, make sure the following set-up features are set correctly.

In Global Set-Up

- Dual Terminal should be "enabled".
- Terminal Comm Ports should be set to "Sessions Comm1" or "Sessions Comm2", depending on the **comm** port you are using.

In Display Set-Up

- Vertical Coupling should be "enabled".

The rest of this appendix lists symptoms and solutions for SSU problems. Many of the symptoms shown are DCL error messages. In order to make your error messages appear in the same format as those shown here, type the following command at the DCL \$ prompt.

```
$ set message/nofacility/severity/noid/text
```

PROBLEMS WITH ENABLING SSU SOFTWARE

When SSU software is installed correctly, you can enable it by typing "ssu enable" after the \$ prompt. This section lists some error messages that may appear on the terminal when you try to enable SSU software.

Message

```
$ ssu enable
%E, failure to enable multiple sessions on <dev:>
XE, specified device is not associated with a
    virtual terminal.
```

Solution

- This error is often caused by using the DCL command SET HOST to log into the host system. When you use SET HOST, the system identifies the terminal as an **RTxx:** device. SSU does not work on **RTxx:** devices. You must log directly onto the system.
- Use the DCL command SHOW TERMINAL to see if your system has virtual terminals enabled. The first line of the response should show "Terminal: **VTAnnn**". If not, this is an SSU problem that needs to be resolved on the host system. Have the system manager do an SSU INSERT on the physical line. See ***Installing and Using the Session Support Utility***.

Message

```
$ ssu enable
%E, error opening device TDA:
%W, no such device available
```

Solution

- Make sure (1) SSU was installed without any errors, and (2) the system startup procedure executes the file called **SSU_STARTUP.COM**. See ***Installing and Using the Session Support Utility***.
- Make sure TDDRIVER is loaded on your VMS system, by typing the DCL command:

```
$ SHOW DEVICE _TDA
```


B: THE SESSION SUPPORT UTILITY 81

You should get a list of terminal devices in the left column, including at least **TDA0**. If the message "No s&h device available" appears, TDDRIVER is not loaded correctly. This is an SSU problem that needs to be resolved on the host system. See *Installing and Using the Session Support Utility*.

- Make sure the system's TDDRIVER and SSU software have the same version number, and that the version is V1.0 or later. You can check the version numbers with the DCL commands ANALYZE/IMAGE SYSSYSTEM:TDDRIVER.EXE and ANALYZE/IMAGE SYSSYSTEM:SSU.EXE. Look for the line saying "Image file identification: SSU V1.0".

Message

```
$ ssu enable
%W, unrecognized command verb - check
    validity and spelling
```

Solution

- Make sure all SSU installation instructions were performed correctly, in particular the ones that include the definition of the SSU command in the common user start-up file. See *Installing and Using the Session Support Utility*.

Message

```
$ ssu enable
!@AJ!@AJ!@AJ!@AJ!@AJ!@AJ
```

Solution

Make sure the set-up features listed at the beginning of this appendix are set correctly.

In **Global** Set-Up

- Dual Terminal should be "enabled".
- Terminal Comm Ports should be set to "Sessions Comm1" or "Sessions **Comm2**", depending on the **comm** port you are using.

In Display Set-Up

- Vertical Coupling should be "enabled".

82 B: THE SESSION SUPPORT UTILITY

DECserver LAT PROBLEMS

Symptom

Your session(s) were running fine, but now the terminal is not responding. You think that you are still logged into the system.

Solution

- Select Disable Sessions in the Set-Up Directory.
- At the Local > prompt, reconnect to your VMS system and log in. If system parameters allow disconnected jobs, you may now be able to reconnect to your old job.

Symptom

When you try to enable sessions or open a session, the terminal's warning bell sounds or you get thrown back to the Local> prompt.

Solution

Make sure you do not set your terminal server "forward" or "local" characters to Ctrl-\ or **Ctrl-T**. To be safe, enter the following commands for your terminal server before logging into VMS.

```
Local> set local none  
Local> set forward none
```

Restrictions

- DECserver 200 lines
 - For systems running **VAX/VMS V4.4** or **V4.5**:
If the LAT+ driver shipped with the DECserver 200 lines is installed, you cannot use SSU on the DECserver 200 lines.

The normal LAT driver shipped with VAX/VMS V4.4 or V4.5 will work with SSU.
 - For systems running **VAX/VMS V4.6** or later and its associated LAT driver shipped with the DECserver 200: You can use SSU on the DECserver 200 lines.
- SSU is not supported on the OPAO: device, due to internal differences between this device and all other terminal devices on VAXNMS.

C FRU EXPLODED VIEW DRAWINGS

Figures C-1 and C-2 show the VT340 FRUs and their part numbers.

LK201-NA US/UK
LK201-LC FRENCH/CANADIAN
LK201-LB BELGIUM
LK201-RD DANISH
LK201-NF FINNISH
LK201-LG AUSTRIAN
LK201-LH HOLLAND
LK201-LI ITALIAN
LK201-LK SWISS/FRENCH
LK201-LL SWISS/GERMAN
LK201-LM SWEDEN
LK201-RN NORWAY
LK201-LP FRANCE
LK201-LS SPANISH
LK201-LV PORTUGAL
LK201-PA US/UK WPS (GOLD)

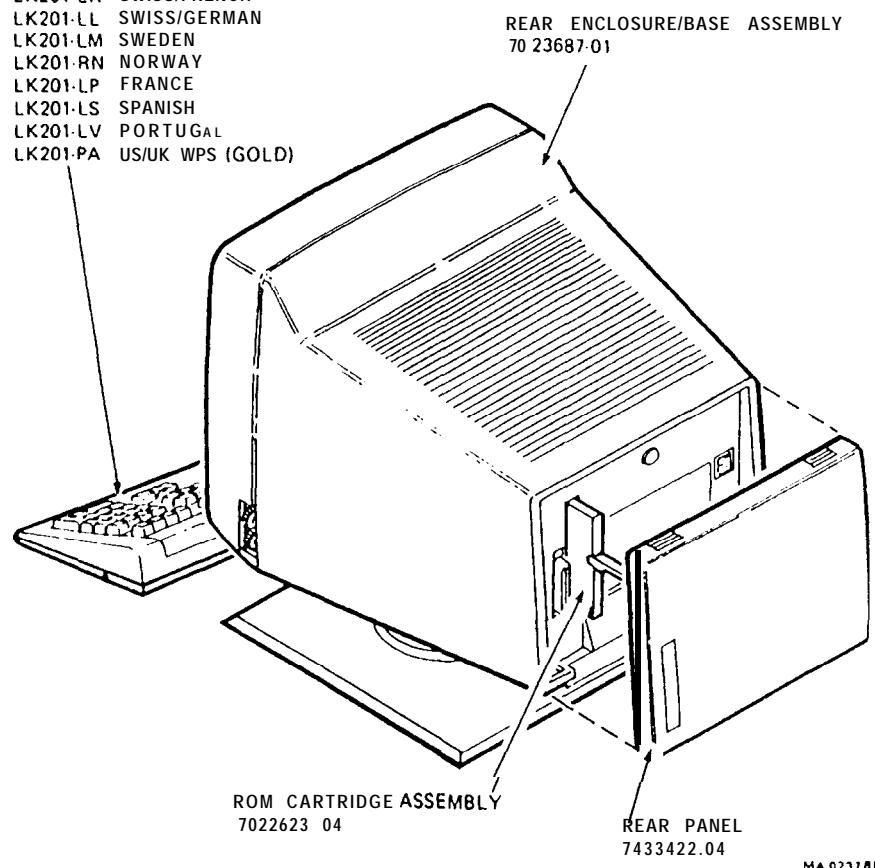


Figure C-1 VT340 FRUs (External View)

84 C: FRU EXPLODED VIEW DRAWINGS

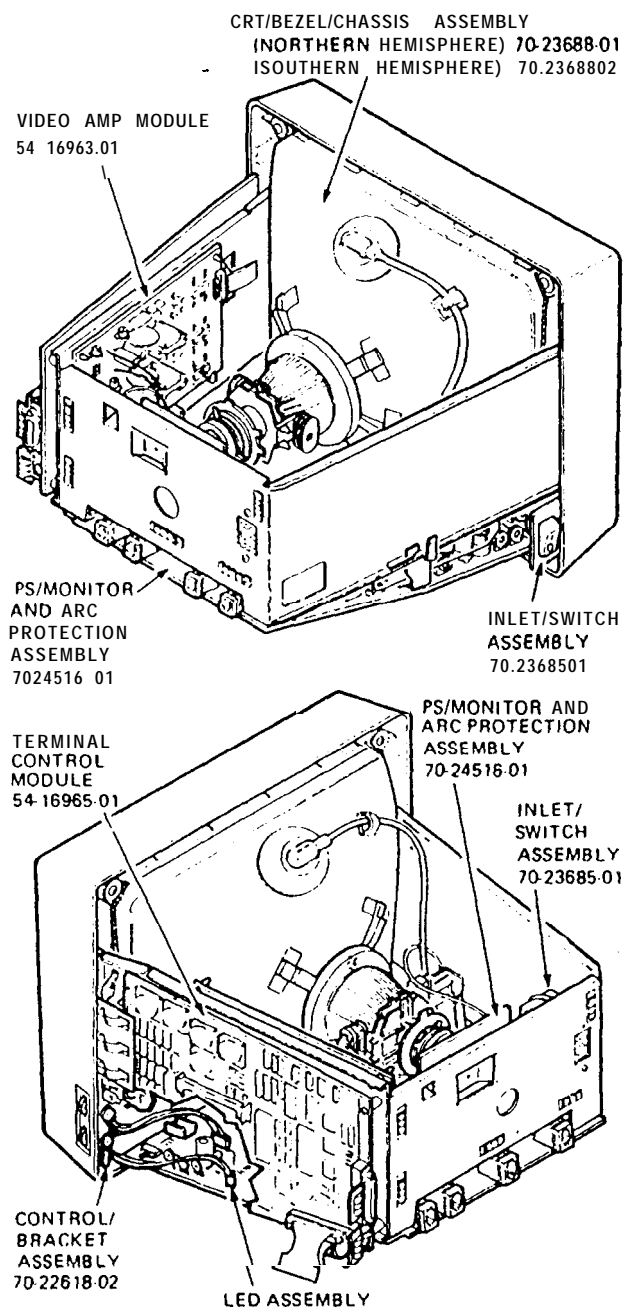


Figure C-Z VT340 FRUs (Internal View)

D CABLES

Figure D-1 shows the possible cable connections for the VT340 terminal. Table D-1 lists the interface cables and their part numbers.

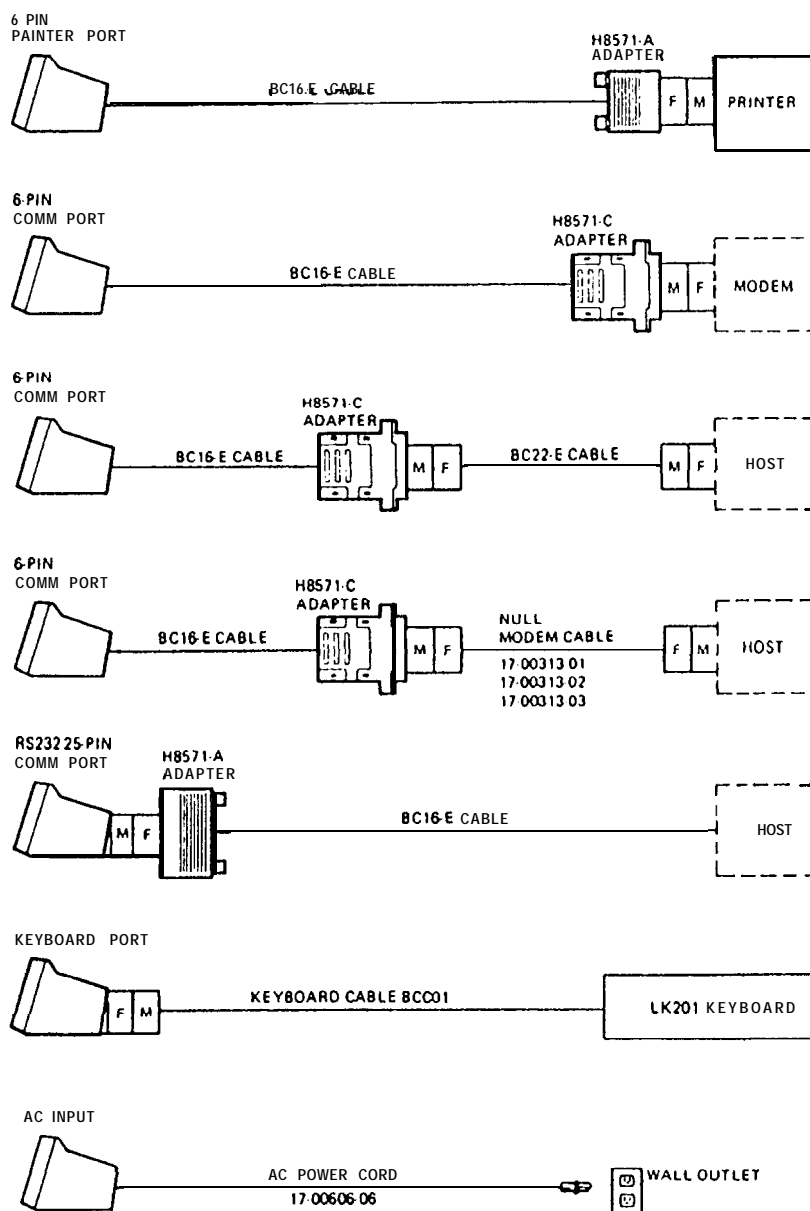


Figure D-1 VT340 Cable Connections

86 D: CABLES

Table D-1 Interface Cables

Part Number	Length	Connector
Adapters		
H8571-A		25-pin F
H8571-C		25-pin M
Extension Cables		
BC22E-10	10 ft (3 m)	25-pin F RS232 to
BC22E-25	25 ft (7.6 m)	25-pin M RS232
Null Modem Cables		
17-00313-01	10 ft (3 m)	25-pin F RS232 to
17-00313-02	25 ft (7.6 m)	25-pin F RS232
17-00313-03	50 ft (15.2 m)	
Communication Cables		
BC16E-10	10 ft (3 m)	6-pin M DEC-423 to
BC16E-25	25 ft (7.6 m)	6-pin M DEC-423
Keyboard Cable		
17-00294-00	6 ft (1.8 m)	Telephone jack
AC Power Cables Country		
17-00198-08	Australia, New Zealand	
17-00199-13	Austria, Belgium, Finland, France, Germany, Netherlands, Norway, Sweden	
17-00606-06	Canada, Japan, Mexico, United States	
17-003 IO-06	Denmark	
17-00456-09	India, South Africa	
17-00209-09	Ireland, United Kingdom	
17-00457-09	Israel	
17-00364-09	Italy	
17-00210-06	Switzerland	

M = male, F = female.

PS/Monitor and Arc Protection Assembly (Cont)

J701 Ground
Pin 1 GND Ground

J702 Internal PS/Monitor APA
Pin 1 GND Ground
2 G1 Grid 1
3 Heater
4 Not used
5 G2 Grid 2

J704 Video Connector
Pin 1 Red
2 GND Ground
3 GND Ground
4 Green
5 GND Ground
6 Blue

J801 AC Input
Pin 1 Phase
2 GND Ground
3 Neutral

J802 Degauss
Pin 1 Phase
2 Not used
3 Neutral

J900 LED
Pin 1 Sig Signal
2 -12 V

Video Amp Module

J200 Terminal Control Connector
Pin 5 GNDB Blue ground
6 GNDG Green ground
11 GNDC Common ground
12 GNDR Red ground

J204 CRT Arc Protection Connector

Pin 1 +120 V
2 Not used
3 +70 V
4 +5 V
5 ACL Auto-contrast level
6 -12 V
7 GND Ground

Terminal Control Module

J1 Power Supply/Monitor Module Interface Connector

Pin 1 VERT SYNC Vertical sync
2 -12 V
3 HOR SYNC Horizontal sync
4 +12 V
5 RESET
6 +5 V
7 K/BRXD Keyboard received data
8 +5 V
9 K/BTXD Keyboard transmitted data
10 +5 V
11 PTRDSR Printer data set ready
12 +5 V
13 PTRRXD Printer received data
14 +5 V
15 PTRCMM Printer receive ground
16 +5 V
17 PTRTXD Printer transmitted data
18 +5 V
19 PTRDTR Printer data terminal ready
20 GND Ground
21 H2DSR Comm2 data set ready
22 GND Ground
23 H2RXD Comm2 received data
24 GND Ground
25 H2CMM Comm2 receive ground

26 GND Ground
27 H2TXD Comm2 transmitted data
28 GND Ground
29 H2DTR Comm2 data terminal ready
30 GND Ground
31 E423DSR Comm1 data set ready
32 GND Ground
33 E423RXD Comm1 received data
34 MFGTEST/STATUS
Manufacturing test
35 423CMM Comm1 receive ground
36 +5 V
37 423TXD Comm1 transmitted data
38 GND Ground
39 423DTR Comm1 data terminal ready
40 GND Ground

J2 Locator Connector

Pin 1 GND Ground
2 MOUSERXD Received data
3 MOUSETXD Transmitted data
4 -12 V
5 +5 V
6 +12 V
7 Not used

J3 EIA 25-Pin Comm1 Connector

Pin 1 GND Ground
2 TXD Transmitted data
3 RXD Received data
4 RTS Ready to send
5 CTS Clear to send
6 DSR Data set ready
7 SIG GND Signal ground
8 CDL Carrier detect
9 Not used
10 Not used
11 Not used

12 SPD1 Speed indicator
13 Not used
14 Not used
15 Not used
16 Not used
17 Not used
18 Not used
19 Not used
20 DTR Data terminal ready
21 Not used
22 Not used
23 SPDS Speed select
24 Not used
25 Not used

J4 Video Output
Pin 5 GND Ground
6 GND Ground
11 GND Ground
12 GND Ground

E PHYSICAL/FUNCTIONAL DIAGRAM

Figure E-1 is a physical/functional diagram showing how the VT340 components work together.

NOTE

All voltage readings are based on a line voltage of 115 Vac. Your readings may differ, depending on your line voltage.

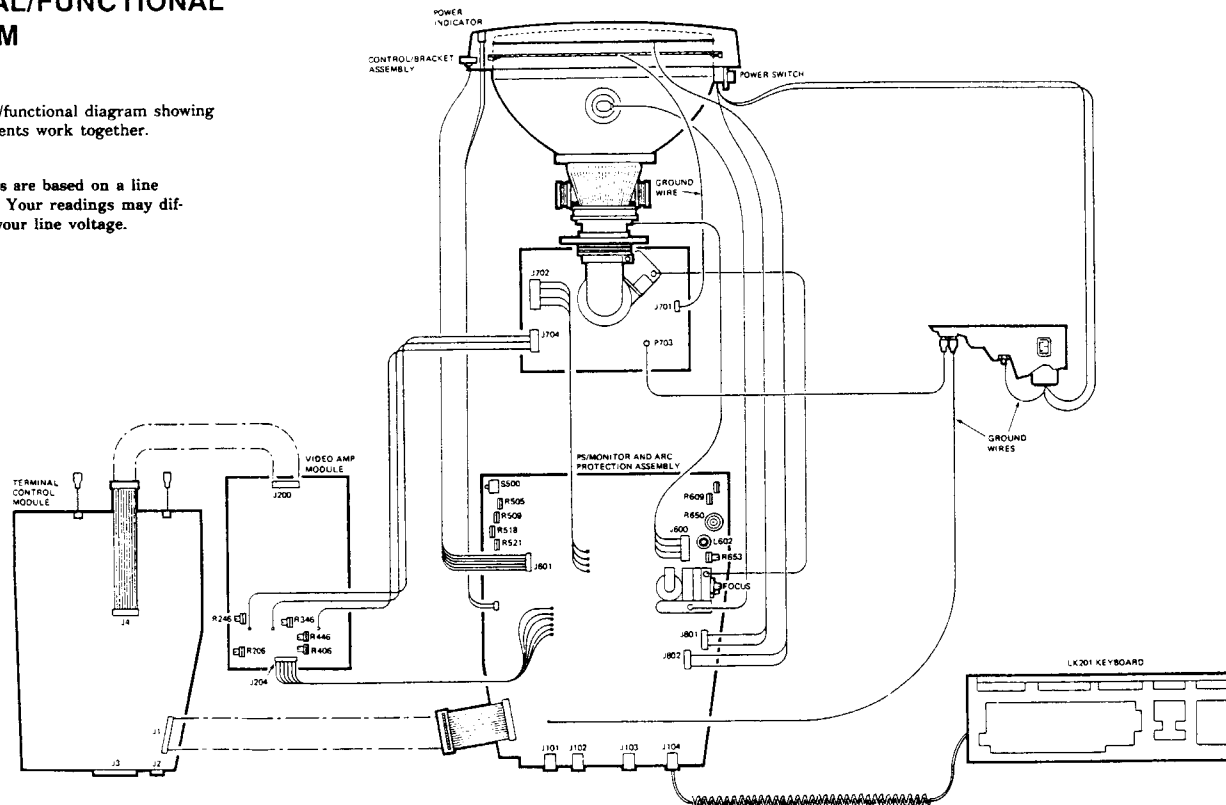


Figure E-1 VT340 Physical/Functional Diagram

PS/Monitor and Arc Protection Assembly

J101 Comm1 Port Connector

Pin	1	423DTR	Data terminal ready
	2	423TXD	Transmitted data
	3	GND	Transmit ground
	4	423CMM	Receive ground
	5	423RXD	Received data
	6	423DSR	Data set ready

J102 Comm2 Port Connector

Pin	1	H2DTR	Data terminal ready
	2	H2TXD	Transmitted data
	3	GND	Transmit ground
	4	H2CMM	Receive ground
	5	H2RXD	Received data
	6	H2DSR	Data set ready

J103 Printer Port Connector

Pin	1	PTRDTR	Data terminal ready
	2	PTRTXD	Transmitted data
	3	GND	Transmit ground
	4	PTRCMM	Receive ground
	5	PTRRXD	Received data
	6	PTRDSR	Data set ready

J104 Keyboard Port Connector

Pin	1	K/BTXD	Transmitted data
	2	GND	Ground
	3	+12 V	
	4	K/BRXD	Received data

J600 CRT Yoke

Pin	1	Hor yoke
	2	Hor yoke
	3	Vert yoke
	4	Vert yoke

J601 Control/Bracket

Pin	1	Contrast
	2	Contrast
	3	Contrast
	4	Brightness
	5	Brightness
	6	Brightness