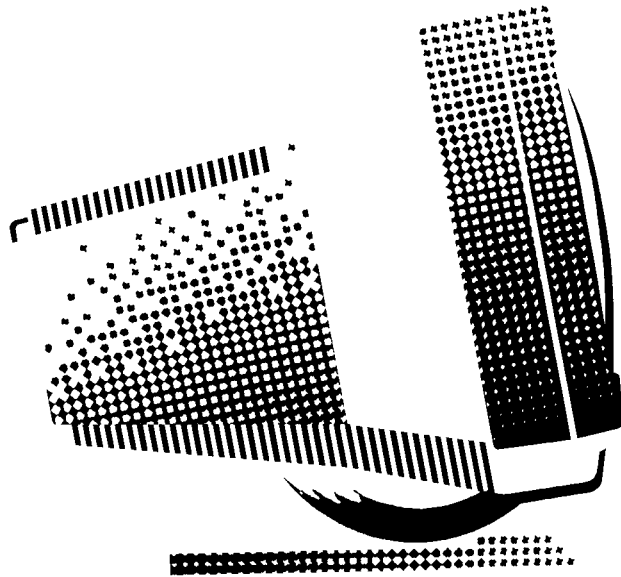


# VT420 Service Guide

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## About This Guide

This guide describes how to service the VT420 monochrome video terminal. The guide is for Digital's service personnel.

The guide has five chapters that cover the following topics:

- VT420 models and features
- Troubleshooting and testing
- Removing and replacing field replaceable units (FRUs)
- Adjusting the video monitor
- Using set-up

Appendices provide information on the following topics:

- Modems, cables, and related documentation
- VT420 models and recommended spares
- Physical/functional diagrams

### Tools Required

You need the following tools to service the VT420 video terminal:

<b>Tool</b>	<b>Part Number</b>
Anode discharge tool	29-24717-00
25-pin, RS-232 EIA loopback connector	12-15336-00
Metric measuring tape	29-25342-00
Two 6-pin, DEC-423 loopback connectors (modular jack)	12-25083-01
Phillips screwdriver, number 2	29-11005-00
Tuning wand	29-23189-00
Video alignment tool	29-26128-00

## Conventions

The following conventions are used in this guide:

Warnings	Provide information to prevent personal injury.
Cautions	Provide information to prevent damage to equipment.
Notes	Provide general operating information.
Set-up features	The names of set-up features appear in <b>bold</b> type. Example: Use the <b>save</b> feature in the Set-Up Directory screen. Set-up feature settings and fields appear in <i>this type</i> . These are the settings that appear on the screen. Example: Select the <i>Screen Align</i> field.
ANSI keyboard keys (LK401 or LK421)	Appear as normal text in a <code>box</code> . Example: Press the <code>Return</code> key.
PC keyboard keys (LK443 or LK444)	Appear as <b>bold</b> text in a <code>box</code> . Example: Press the <b>Return</b> key.
ANSI keys (with PC keys)	When a PC (LK443/LK444) command sequence differs from an ANSI (LK401/LK421) command sequence, the PC key sequence appears in parentheses after the ANSI key sequence. Example: Press the <code>Return</code> key ( <b>Enter</b> ).
RS-232	Used to represent electrical standard EIA 232-D, which replaces electrical standard RS-232-C.
PN	This is an abbreviation for <i>part number</i> .



# VT420 Models and Features

## 1.1 VT420 Models

The VT420 is a monochrome text terminal that provides all VT320 features plus enhancements. The VT420 has a 359 mm (14-inch) diagonal monitor with a flat, antiglare screen. The monitor can display 24, 25, 36, or 48 lines of text in an 80- or 132-column format. The last line of each session is reserved for a status line. An attachable tilt-swivel base lets the user adjust the viewing angle for optimum comfort.

There are three models of the VT420 video terminal:

- North American (VT mode)
- Worldwide (VT mode)
- Worldwide (VT mode and PC TERM mode)

The worldwide models come in two versions, standard and low-emission.

## 1.2 VT420 Features

The following list includes the features that are common to the North American and model and two worldwide models. Table 1-1 lists the differences between the three models. The worldwide model with PC TERM mode can use the standard ANSI (LK401), short ANSI (LK421), or PC (LK443/LK444) keyboard. See *Installing and Using the VT420 Video Terminal with PC Terminal Mode* for details on the features of the different keyboards.

## 2 VT420 Models and Features

### Common Features

- Two-session capability
- Local copy and paste feature
- Off-screen page memory
- Ability to display 24, 25, 36, or 48 lines/screen
- Screen centering capability
- Screen overscan
- FCC Class A compliance
- Two 6-pin, DEC-423 connectors (One is for the primary host port, and one is for the secondary host or printer port. Both have DEC-423 local direct-connect capability.)
- Asynchronous communication up to 38.4K bits/second
- Four operating modes:
  - VT400 mode, 7-bit controls (default)
  - VT400 mode, 8-bit controls
  - VT100 mode
  - VT52 mode
- Ability to store macros
- One full-screen window or two horizontal split-screen windows
- Screen saver
- Character sets:
  - U.S. ASCII
  - DEC Supplemental Graphic
  - ISO Latin Alphabet No. 1
  - ISO Latin-1 Supplemental
  - DEC Special Graphic
  - DEC Technical
  - Downloadable character set
- Terminal status line
- Keyboard indicator on the last line of the screen
- Ability to disable or enable keys **F1** through **F5**
- Extended keyboard reports

- LK401 keyboard that includes
  - Right and left Alt Function keys
  - Right Compose Character key
  - Lock and Hold LEDs

**Table 1–1 VT420 Model Differences**

Features	NA	WW	PC
FCC Class B compliance	No	Yes	Yes
AC power cord:			
Attached	Yes	No	No
Detachable with country-specific plug	No	Yes	Yes
Power supply ac input and line frequency:			
120 V at 60 Hz only	Yes	No	No
100 V to 240 V (autoselect) at 50 Hz or 60 Hz	No	Yes	Yes
One 25-pin, RS-232 connector for the primary host, with modem control	No	Yes	Yes
Screen rotation capability	No	Yes	Yes
National replacement character sets	No	Yes	Yes
Two <span style="border: 1px solid black; padding: 0 2px;">Group Shift</span> keys on the German LK401 keyboard to replace the <span style="border: 1px solid black; padding: 0 2px;">Compose Character</span> keys	No	Yes	Yes
PC TERM mode	No	No	Yes
PC character sets	No	No	Yes
PC keyboard with 101 or 102 keys (LK443/LK444)	No	No	Yes
Short ANSI (UNIX style) keyboard with 74 keys (LK421)	No	No	Yes
Support for XPC communications protocol*	No	No	Yes
Driver support for the terminal in appropriate operating systems	No	No	Yes

\*Refers to the remapping of XON and XOFF points in PC TERM mode. After remapping, XON is 65<sub>16</sub> and XOFF is 67<sub>16</sub>.

NA = North American model with VT mode.

WW = worldwide model with VT mode.

PC = worldwide model with VT mode and PC TERM mode.

# 2

## Troubleshooting and Testing

This chapter explains how to troubleshoot general problems on the VT420 terminal. The chapter also describes how to run the self-tests built into the terminal and lists error codes for the tests.

### 2.1 Troubleshooting

Table 2–1 lists probable causes and solutions for general problems with the terminal.

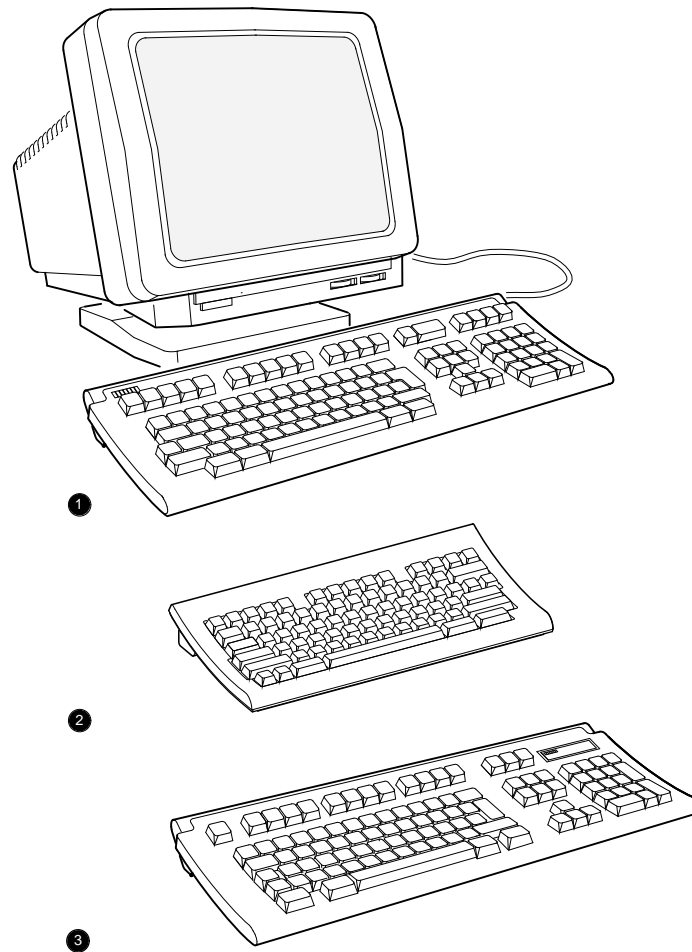
When you turn on the VT420 terminal, it performs a power-up self-test to check for problems. If the test finds an error, the terminal may display an error message at the upper-left corner of the screen (Section 2.4).

During the test, the LED indicators on the keyboard (Figure 2–1) flash on and off. If the test is successful:

- The keyboard makes one bell tone.
- The keyboard LEDs turn off.
- A VT420 OK message appears on the screen.

For details on the power-up self-test, see Section 2.2.3.

The worldwide model with PC TERM mode can use the standard ANSI (LK401), short ANSI (LK421), or PC (LK443/LK444) keyboard. See *Installing and Using the VT420 Video Terminal with PC Terminal Mode* for details on the features of the different keyboards.



LJ-01105-T10

**Figure 2-1 VT420 Video Terminal with Keyboards**

- ❶ ANSI (LK401/LK402) keyboard
- ❷ Short ANSI (LK421, UNIX style) keyboard
- ❸ PC (LK443/LK444) keyboard

6 Troubleshooting and Testing

**Table 2-1 Troubleshooting the VT420**

<b>Symptom</b>	<b>Probable Cause</b>	<b>Solution *</b>
<b>Problems at Power-Up</b>		
Nothing appears on the screen.	Terminal board.	1. Make sure all connectors on the board are seated properly. 2. Replace the terminal board (3.3).
The VT420 OK display appears and the bell tone sounds, but the VT420 cannot communicate with host.	The terminal was powered down with sessions enabled.	When power is restored to the terminal, press <b>F4</b> ( <b>Alt</b> <b>Scroll Lock</b> ).
	VT420 communication port cable is loose.	Check the cable connection on the rear of terminal.
	Baud rate is incorrect.	Check the <b>transmit</b> and <b>receive</b> speeds in the Communications Set-Up screen.
	The <b>on-line/local</b> feature is set to Local.	Change the feature setting to On Line in the Global Set-Up screen.
	Communication port circuits are faulty.	Run the RS-232 or DEC-423 loopback tests (2.2.4, 2.2.5, 2.2.6).
Continuous bell sound at power up.	Terminal board.	Replace the terminal board (3.3).
	An object is resting on the keyboard	Remove all objects from the keyboard.
The bell tone does not sound, but VT420 OK appears on the screen.	Keyboard.	Replace the keyboard (3.4).
	Keyboard speaker transducer	Replace the keyboard (3.4).

\* Section numbers follow the solution.

**Table 2-1 (Cont.) Troubleshooting the VT420**

Symptom	Probable Cause	Solution*
<b>Screen Display Problems</b>		
Screen is off center or rotated.	There is interference from electromagnetic energy.	Adjust the screen by using the <code>Screen Align</code> field in the Set-Up Directory screen. On worldwide models, you can also adjust the screen rotation.
A horizontal or vertical line appears on the screen.	Terminal board.	Replace the terminal board (3.3).
	CRT yoke harness connector	Check and reconnect the connector (3.2).
The screen display is distorted or jittery.	Terminal board.	Replace the terminal board (3.3).
	CRT/yoke/bezel assembly.	Replace the CRT/yoke/bezel assembly (3.2).
	There is electrical interference from nearby devices.	Move the terminal away from nearby electrical devices.
The monitor is out of alignment	The monitor is out of alignment	Adjust the monitor (Chapter 4).
	Terminal board.	Replace the terminal board (3.3).
	Replace the CRT/yoke/bezel assembly	Replace the CRT/yoke/bezel assembly (3.2).
The screen display does not scroll. The hold indicator is on.	The <code>F1</code> ( <code>Scroll Lock</code> ) key was pressed.	Press <code>F1</code> ( <code>Scroll Lock</code> ) to resume scrolling.
The terminal appears locked and does not respond to data from the host.		In the Set-Up Directory: <ol style="list-style-type: none"> <li>1. Select <code>Clear Comm</code> to clear the terminal.</li> <li>2. Select <code>Reset</code> to reset the terminal.</li> </ol>

\* Section numbers follow the solution.

**Table 2-1 (Cont.) Troubleshooting the VT420**

<b>Symptom</b>	<b>Probable Cause</b>	<b>Solution*</b>
<b>Screen Display Problems</b>		
The screen is blank, except for the blinking block cursor in the lower-right corner. The screen has been inactive for one-half hour.	CRT saver feature is activated.	Press any key to restore the screen display.
Phosphor retains an imprint of characters on the screen when the monitor is turned off.	CRT/yoke/bezel assembly.	Replace the CRT/yoke/bezel assembly (3.2).
<b>Character Display Problems</b>		
In local mode, the screen displays different characters than those typed.	Alternate character set selected.	Clear by selecting the <code>Reset</code> field in the Set-Up Directory.
	<b>Worldwide only:</b> Wrong keyboard language selected.	Check the <b>keyboard language</b> feature in the Set-Up Directory.
	Keyboard.	Replace the keyboard (3.4).
	Terminal board.	Replace the terminal board (3.3).

\* Section numbers follow the solution.



**Table 2-1 (Cont.) Troubleshooting the VT420**

<b>Symptom</b>	<b>Probable Cause</b>	<b>Solution*</b>
<b>Character Display Problems</b>		
While on-line with the host, the screen displays different characters than those typed. (The terminal works in local mode.)	<p>Incorrect transmit and receive speeds.</p> <p>Incorrect bits per character or parity setting.</p> <p>Stop bits setting is incorrect.</p> <p>Terminal board.</p>	<p>Set the speeds to match the host, in the Communications Set-Up screen.</p> <p>Set the <b>data bits/parity</b> feature to match the host, in the Communications Set-Up screen.</p> <p>Set the <b>stop bits</b> feature to match the host, in the Communications Set-Up screen.</p> <p>Replace the terminal board (3.3).</p>
When using the copy and paste feature, the pasted characters do not match the characters selected. (VMS environment)	<p>Transmit speed is set to 19200 baud, causing the terminal to send characters faster than the host computer can receive them.</p>	<p>Using the VMS operating system, type the following command at the \$ prompt: SET TERMINAL/HOSTSYNC</p>
Messages are garbled and reverse question marks appear on the screen.	<p>Baud rate is incorrect.</p> <p>XON/XOFF flow control is not enabled.</p> <p>Terminal board.</p>	<p>Check the <b>transmit</b> and <b>receive</b> speeds in the Communications Set-Up screen.</p> <p>Enable XON/XOFF flow control with the <b>XOFF</b> feature in the Communications Set-Up screen.</p> <p>Replace the terminal board (3.3).</p>
<b>Other Problems</b>		
[F11] ( [Esc] ) does not work when running self-tests.	<p>Incorrect mode settings</p>	<p>Select Local in the Global Set-Up screen. Select VT100 Mode in the General Set-Up screen.</p>

\* Section numbers follow the solution.

**Table 2–1 (Cont.) Troubleshooting the VT420**

<b>Symptom</b>	<b>Probable Cause</b>	<b>Solution*</b>
<b>Other Problems</b>		
After power-up, one or more keyboard LEDs stay on. Or, the LEDs do not go through their power-up sequence.	Keyboard.	Replace the keyboard (3.4).
	Terminal board.	Replace the terminal board (3.3).
The set-up cursor does not appear.	Terminal board.	Replace the terminal board (3.3).
When using a modem, the modem speed select signals do not work.	Cables.	Check all cables and cable connections. Replace the terminal board (3.3).
	Terminal board.	
<b>Worldwide model:</b> In PC TERM mode, a modem does not work with the terminal.	The modem's XON/XOFF settings are incompatible with the terminal.	Use a modem with compatible XON/XOFF settings. In PC TERM mode, the terminal's XON point is 65 <sub>16</sub> characters, and the XOFF point is 67 <sub>16</sub> characters.

\* Section numbers follow the solution.

## 2.2 VT420 Self-Tests

The VT420 has a series of self-tests to determine if the terminal board is the faulty field replaceable unit (FRU). You can run each test from the keyboard by entering the escape sequence for the test. Table 2–2 lists the tests and their escape sequences.

If a test indicates the terminal board is faulty, refer to

- Chapter 4, to adjust the components on the board, or
- Chapter 3, to replace the board

After making adjustments or replacing the terminal board, repeat the tests in this chapter to ensure the terminal operates correctly.

## 2.2.1 Before You Start

Before you run any self-test, you must either

- Install the appropriate loopback connector on the communication port, or
- Set the terminal to **local** mode

You should save the current settings in set-up before you run tests. If you are unfamiliar with set-up, see 5, “Using Set-Up”.

- Use the arrow keys to move the cursor in all set-up screens.
- The `[Enter]` and `[Return]` keys perform the same function in all set-up screens.

To set the terminal to local mode:

1. Press `[F3]` ( `[Alt]` `[SetUp]` ) to enter set-up. The Set-Up Directory screen appears.
2. Move the cursor to the `Global` field. Press `[Enter]`. The Global Set-Up screen appears.
3. Move the cursor to the `On Line` field. Press the `[Enter]` key to change the setting to `Local`.
4. Press `[F3]` ( `[Alt]` `[SetUp]` ) to leave set-up. You do not need to save the settings because they take effect when you exit set-up.

Remember to return the set-up features to their original settings after testing.

## 2.2.2 How to Type an Escape Character

### PC (LK443/LK444) Keyboard Only

Use the `[Esc]` key.

### All Keyboard Models

There are three ways to type an escape (ESC) character:

- Press `[Ctrl]` `[ ]`
- Press `[Ctrl]` `[3]`

## 12 Troubleshooting and Testing

- Set the terminal to `VT100 Mode` in the General Set-Up screen. In VT100 mode, you can press `F11` to generate an ESC character. See Chapter 5 for a description on using set-up.

**Table 2–2 VT420 Self-Test Chart**

Self-Test	Prerequisites	Sequence*
Power-up	None	Turn the terminal on.
Selected while the VT420 is operating.	Set-up – Local mode	Once: <b>ESC [ 4 ; 1 y</b> Continuously: <b>ESC [ 4 ; 1 ; 9 y</b>
RS-232 port data lines loopback†	RS-232 loopback connector	Once: <b>ESC [ 4 ; 2 y</b> Continuously: <b>ESC [ 4 ; 2 ; 9 y</b>
RS-232 port control lines loopback†	RS-232 loopback connector	Once: <b>ESC [ 4 ; 6 y</b> Continuously: <b>ESC [ 4 ; 6 ; 9 y</b>
Printer port loopback	DEC-423 port loopback connector	Once: <b>ESC [ 4 ; 3 y</b> Continuously: <b>ESC [ 4 ; 3 ; 9 y</b>
DEC-423 port loopback	DEC-423 port loopback connector	Once: <b>ESC [ 4 ; 7 y</b> Continuously: <b>ESC [ 4 ; 7 ; 9 y</b>
Screen alignment pattern	Set-up – Local mode	<b>ESC 8</b>
Run all above tests, except screen alignment pattern.	See individual tests. All loopback connectors must be connected.	Once: <b>ESC [ 4 ; 0 y</b> Continuously: <b>ESC [ 4 ; 0 ; 9 y</b>

\* Do not type spaces between the characters in any escape (ESC) sequence. The sequences are shown with spaces for clarity only.

† Worldwide models only.

### 2.2.3 Power-Up Self-Test

This test runs automatically each time you turn on the terminal. The test checks the terminal's internal memory, keyboard, and video circuitry. The test also checks the communication and printer ports to see if they are operating correctly. The individual loopback tests perform a more complete test of each port.

You can also run the power-up self-test manually while the terminal is operating, as follows:

#### NOTE

**After you run the power-up self-test, all the set-up features are automatically set to their saved values.**

1. Set up the terminal (Sections 2.2.1 and 2.2.2).
2. Type one of the following DECTST sequences:

<b>ESC [ 4 ; 1 y</b>	Runs the test once.
<b>ESC [ 4 ; 1 ; 9 y</b>	Runs the test continuously.

#### While the test is running:

A `wait` message appears in the upper-left corner of the screen. The `wait` message may disappear at times, but it reappears until the test detects an error or the terminal's power is turned off.

#### NOTE

**The DECTST control function causes a disconnect. Do not use DECTST when the connection is made through a modem.**

#### If the test is successful:

1. The keyboard's LED indicators turn off.
2. The keyboard makes a bell tone.
3. A `VT420 OK` message appears on the screen. This message disappears when any of the following events occur:
  - The terminal receives any character except **XON**, **XOFF**, or **NUL**.
  - You press any key.
  - You leave the terminal on and inactive for 30 minutes.

**If the test finds an error:**

If possible, the terminal displays an error message at the upper-left corner of the screen. Each error message starts on a new line at the left margin of the display. Table 2-3 describes these error messages.

The error messages disappear when the terminal receives any character (except XON) or when you type any key. In local mode, the terminal ignores characters from the host, so error messages are not affected.

### **2.2.4 DEC-423 Port Loopback Test (6-Pin)**

For this test, connect the DEC-423 port transmit and receive data lines together with a loopback connector (Figure 2-2). 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.

**To run the test:**

Use a DEC-423 loopback connector, PN 12-25083-01.

1. Set up the terminal (Sections 2.2.1 and 2.2.2).
2. Connect the loopback connector to the 6-pin DEC-423 port.
3. Type one of the following sequences:

<b>ESC [ 4 ; 7 y</b>	Runs the test once.
<b>ESC [ 4 ; 7 ; 9 y</b>	Runs the test continuously.

**NOTE**

**The continuously running test ends only if an error occurs or you turn off the terminal. The keyboard does not make a bell tone during this test.**

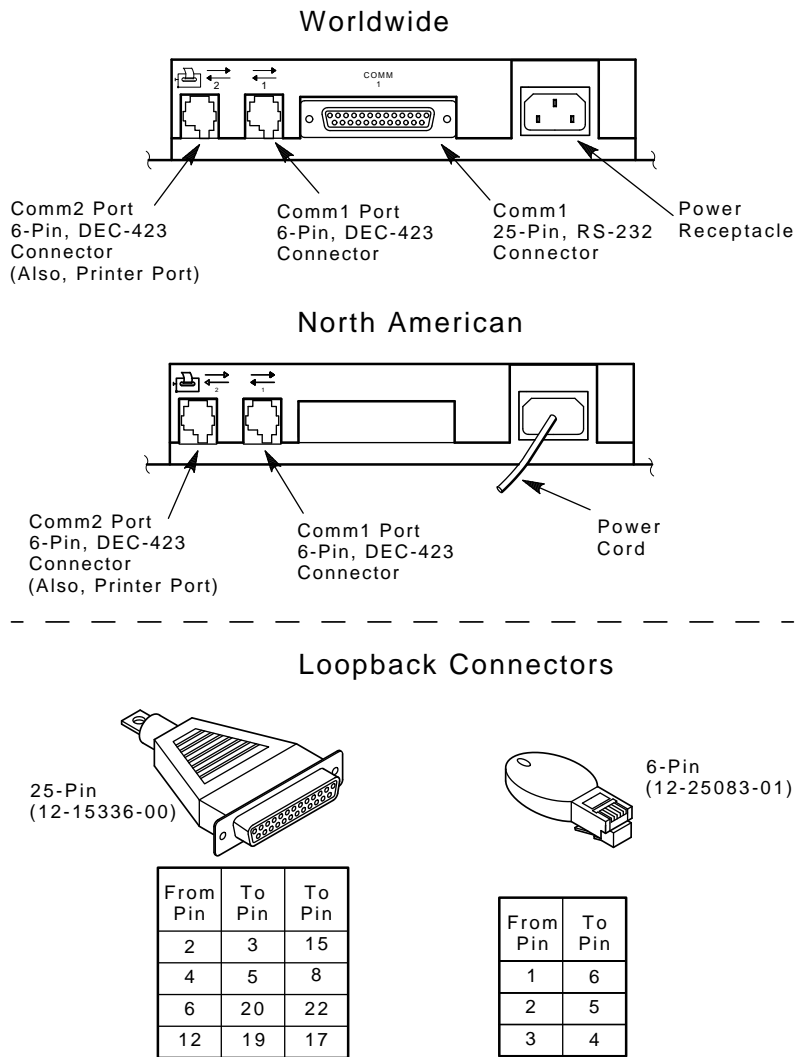
**If the test is successful:**

1. The keyboard makes a bell tone.
2. The keyboard's LED indicators are off.
3. A VT420 OK message appears on the screen.

**If the test finds an error:**

The screen displays the following message. See Table 2–3.

VT420 DEC-423 Port Error -- 5



GSF\_1448\_89.DG

**Figure 2–2 VT420 Rear Connector Panel and Loopback Connectors**

### 2.2.5 RS-232 Port Data Lines Loopback Test (25-Pin, Worldwide Model Only)

For this test, you connect the RS-232 port transmit and receive data lines together with a loopback connector (Figure 2-2). 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.

#### To run the test:

Use an RS-232 loopback connector, PN 12-15336-00.

1. Set up the terminal (Sections 2.2.1 and 2.2.2).
2. Connect the loopback connector to the 25-pin RS-232 port (Figure 2-2).
3. Type one of the following sequences:
  - ESC [ 4 ; 2 y**      Runs the test once.
  - ESC [ 4 ; 2 ; 9 y**    Runs the test continuously.

#### NOTE

**The continuously running test ends only if an error occurs or you turn off the terminal. The keyboard does not make a bell tone during this test.**

#### If the test is successful:

1. The keyboard makes a bell tone.
2. The keyboard's LED indicators turn off.
3. A VT420 OK message appears on the screen.

#### If the test finds an error:

The screen displays the following message. See Table 2-3.

```
VT420 RS-232 Port Error -- 2
```



## 2.2.6 RS-232 Port Control Lines Loopback Test (25-Pin, Worldwide Model Only)

This test checks the following control signals:

- Data terminal ready (DTR)
- Request to send (RTS)
- Carrier detect (CD)
- Data set ready (DSR)
- Clear to send (CTS)

### To run the test:

Use an RS-232 loopback connector, PN 12-15336-00.

1. Set up the terminal (Sections 2.2.1 and 2.2.2).
2. Connect the loopback connector to the 25-pin RS-232 port (Figure 2-2).
3. Type one of the following sequences:

<b>ESC [ 4 ; 6 y</b>	Runs the test once.
<b>ESC [ 4 ; 6 ; 9 y</b>	Runs the test continuously.

### NOTE

**The continuously running test ends only if an error occurs or you turn off the terminal. The keyboard does not make a bell tone during this test.**

### If the test is successful:

1. The keyboard makes a bell tone.
2. The keyboard's LED indicators turn off.
3. A VT420 OK message appears on the screen.

### If the test finds an error:

The screen displays the following message. See Table 2-3.

```
VT420 RS-232 Port Controls Error -- 3
```

## 2.2.7 Printer Port Loopback Test (6-Pin)

For this test, you connect the printer transmit and receive data lines together with a loopback connector (Figure 2–2). 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.

### To run the test:

Use a DEC-423 loopback connector, PN 12-25083-01.

1. Set up the terminal (Sections 2.2.1 and 2.2.2).
2. Connect the loopback connector to the 6-pin DEC-423 port.
3. Type the following sequences:

<b>ESC [ 4 ; 3 y</b>	Runs the test once.
<b>ESC [ 4 ; 3 ; 9 y</b>	Runs the test continuously.

### NOTE

**The continuously running test ends only if an error occurs or you turn off the terminal. The keyboard does not make a bell tone during this test.**

### If the test is successful:

1. The keyboard makes a bell tone.
2. The keyboard's LED indicators are off.
3. A VT420 OK message appears on the screen.

### If the test finds an error:

The screen displays the following message. See Table 2–3.

```
VT420 DEC-423 Port Error -- 6
```

## 2.2.8 Screen Alignment Test

This test fills the screen with uppercase E's. Use this display to adjust the display height, width, and linearity. See Chapter 4 for the adjustment procedures.

**To run the test:**

1. Set up the terminal (Sections 2.2.1 and 2.2.2).
2. Check the following settings in the Display Set-Up screen:
  - Make sure the **columns** feature is set to 80 Columns.
  - Set the **number of lines/screen** feature to 24 Lines/Screen.
3. Type **ESC # 8**. The screen fills with a pattern of uppercase E's.
4. Perform the adjustment procedures in Chapter 4.

## 2.3 Printer Problems

If the VT420 is connected to a local printer, you may have to troubleshoot some printer problems. The following procedure helps you isolate the problem to the printer or the terminal.

**To troubleshoot printer problems:**

1. Run the power-up self-test (Section 2.2.3).  
If the terminal passes the test, go to step 2.
2. Run the printer port loopback self-test (Section 2.2.7).  
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 service guide for the correct procedures. If your printer is operating correctly, go to step 4.
4. Go to the Printer Set-Up screen.
  - Check the following settings. They must match the printer's settings. See your printer's service guide for the correct settings.
    - Baud rate
    - Data bits/character
    - Parity
  - Make sure `Printer: Ready` appears on the VT420 status line.
5. Make sure you are using the correct cable between the terminal and printer (Appendix A). Make sure the connections are secure at both ends of the cable.

6. Set up the terminal (Sections 2.2.1 and 2.2.2).
7. Type the following sequence: **ESC # 8**.  
The screen displays a test pattern of uppercase E's.
8. Press the **F2** (Print) key. If the printer is operating correctly, the test pattern displayed on the screen should print out.

## 2.4 Error Codes

If the self-test finds an error, the terminal

- Stops operating
- Makes the keyboard bell tone sound
- Displays an error message in the upper-left corner of the screen

Table 2-3 lists the error messages and solutions.

**Table 2-3 VT420 Display Error Codes**

Error Message	Solution*
VT420 NVR Error - 1	<ol style="list-style-type: none"> <li>1. Press <b>F3</b> ( <b>Alt</b> <b>SetUp</b> ) to enter the Set-Up Directory.</li> <li>2. Move the cursor to the Default field and press <b>Enter</b>.</li> <li>3. Move the cursor to the Save field and press <b>Enter</b>.</li> <li>4. Move the cursor to the Global field and press <b>Enter</b>.</li> <li>5. Move the cursor to the second field on the second line. Press <b>Enter</b> until the setting changes to S1=Comm1, S2=Comm2.</li> <li>6. Press <b>F3</b> ( <b>Alt</b> <b>SetUp</b> ) to leave set-up.</li> <li>7. Press <b>F4</b> to switch sessions.</li> <li>8. Repeat steps 1 to 3 for the second session.</li> <li>9. Press <b>F3</b> ( <b>Alt</b> <b>SetUp</b> ) to leave set-up.</li> <li>10. Turn the VT420 off, then on.</li> </ol>

\*Section numbers follow the solution.

**Table 2-3 (Cont.) VT420 Display Error Codes**

Error Message	Solution*
RS-232 Port Data Error - 2 (worldwide model only)	11. If the error continues, replace the terminal board (3.3). Replace the terminal board (3.3).
RS-232 Port Controls Error - 3 (worldwide model only)	Replace the terminal board (3.3).
Keyboard Error - 4	<ol style="list-style-type: none"> <li>1. Make sure the keyboard is plugged in.</li> <li>2. Replace the keyboard (3.4).</li> <li>3. If the error continues, replace the terminal board (3.3).</li> </ol>
DEC-423 Port Error - 5	Replace the terminal board (3.3).
Printer Port Error - 6	Replace the terminal board (3.3).

\*Section numbers follow the solution.

# 3

## Removing and Replacing FRUs

This chapter shows you how to remove and replace the field replaceable units (FRUs) for the VT420. See Appendix B for the recommended spares list.

### **CAUTION**

**Always use a static protection kit (PN 29-26246-00) when handling static-sensitive material.**

This chapter covers all three models of the VT420, the North American model and the two worldwide models. Where differences occur, the worldwide procedure appears first, then the North American procedure.

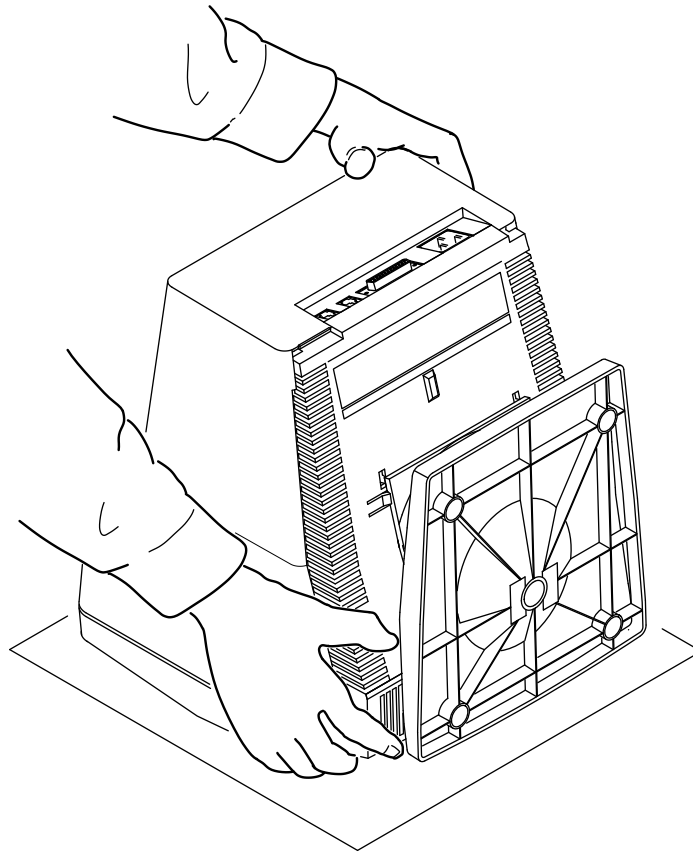
### **3.1 Top Cover**

Remove the top cover as follows. You can leave the tilt-swivel base in place.

1. Turn off the terminal and unplug the power cord from the wall outlet.

If you have a worldwide model, you can disconnect the power cord from the back of the terminal, as well.

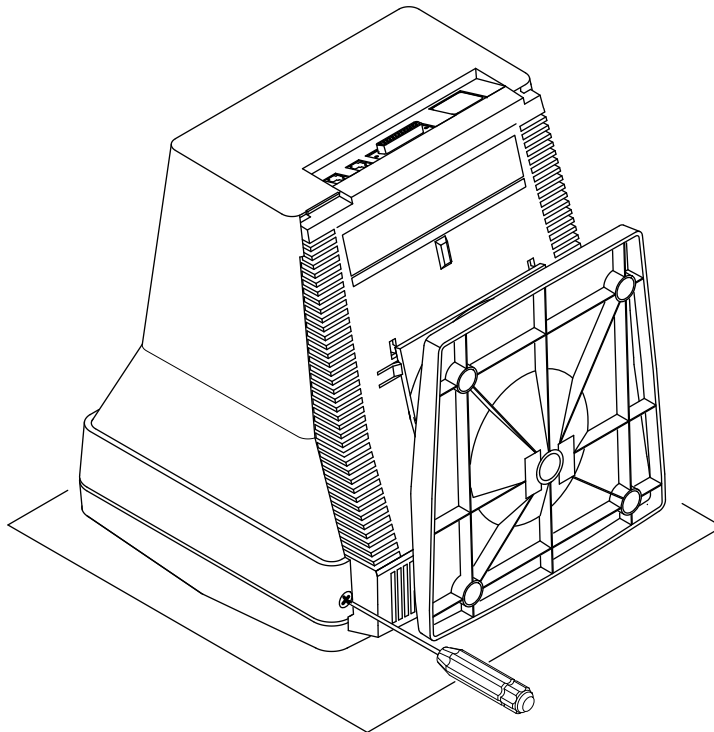
2. Place the terminal facedown on a clean piece of paper, to avoid scratching the bezel.



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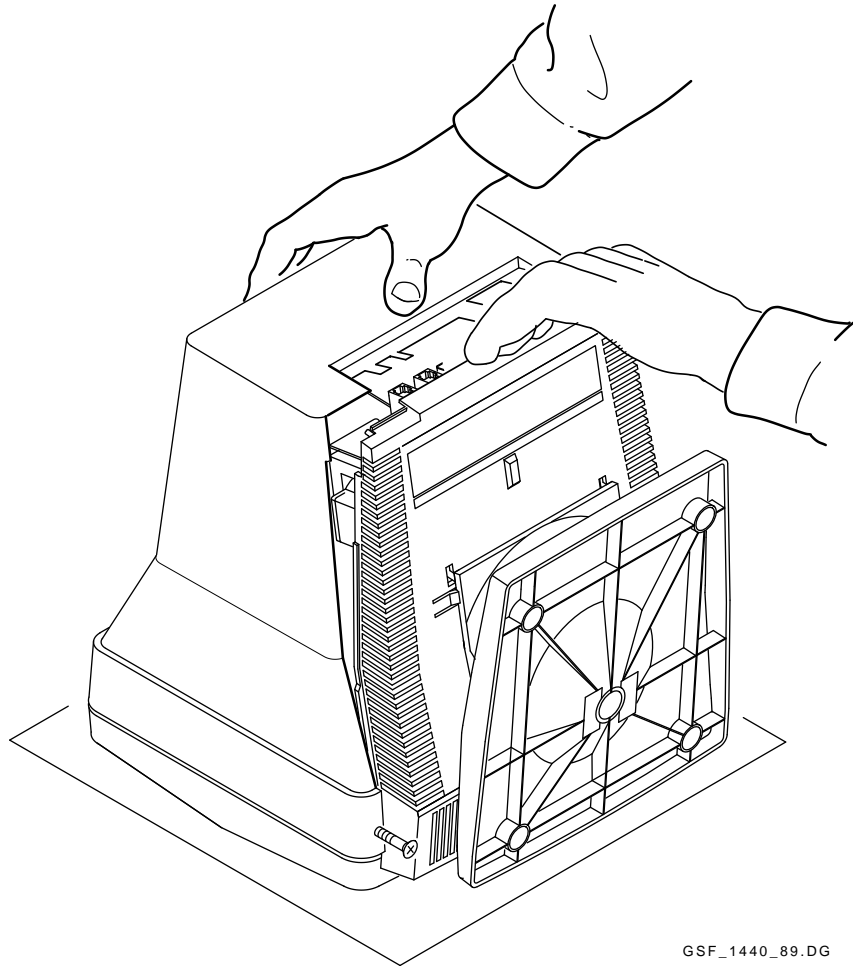
3. Loosen the two captive screws at the base of the bezel so the screws extend out from the top cover.



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4. Grasp the rear of the top cover firmly with one hand. Place your other hand securely on the base assembly.
5. With your hands in position, push down on the base assembly and pull the top cover away from the base. Place the cover aside.





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To install the top cover:

1. Extend the captive screws out from the top cover.
2. Slide the top cover into the front bezel so the two tabs on the top of the bezel align with the cover. Align the rest of the cover with the base assembly.
3. Align and tighten the captive screws.

On the North American model, make sure the small connector cover is installed on the rear panel.

## 3.2 CRT/Yoke/Bezel Assembly

To remove the CRT/yoke/bezel assembly:

1. Turn off the terminal and unplug the power cord from the wall outlet.
2. Remove the top cover (Section 3.1).

### WARNING

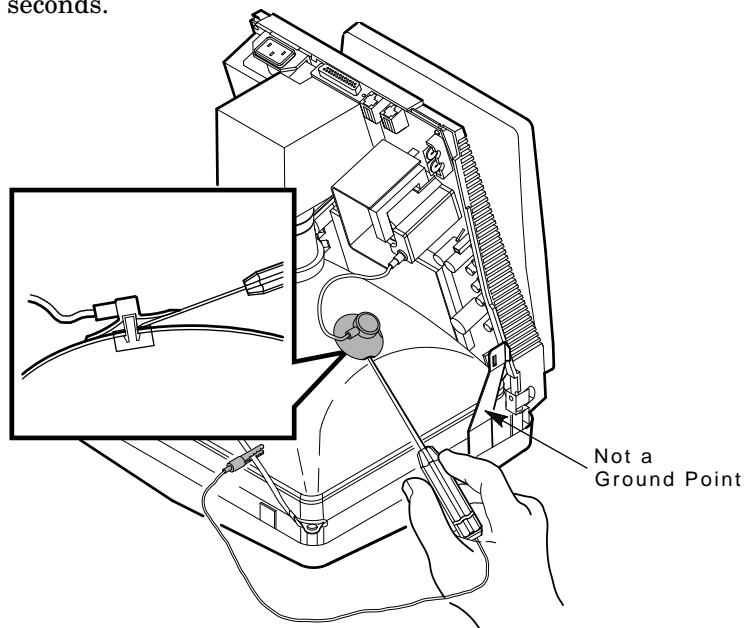
**The following steps may expose you to high voltages. To protect yourself, discharge the anode with anode discharge tool (PN 29-24717-00).**

3. Discharge the anode as follows.
  - a. Attach the alligator clip of the anode discharge tool to the grounding braid on the rear of the CRT.

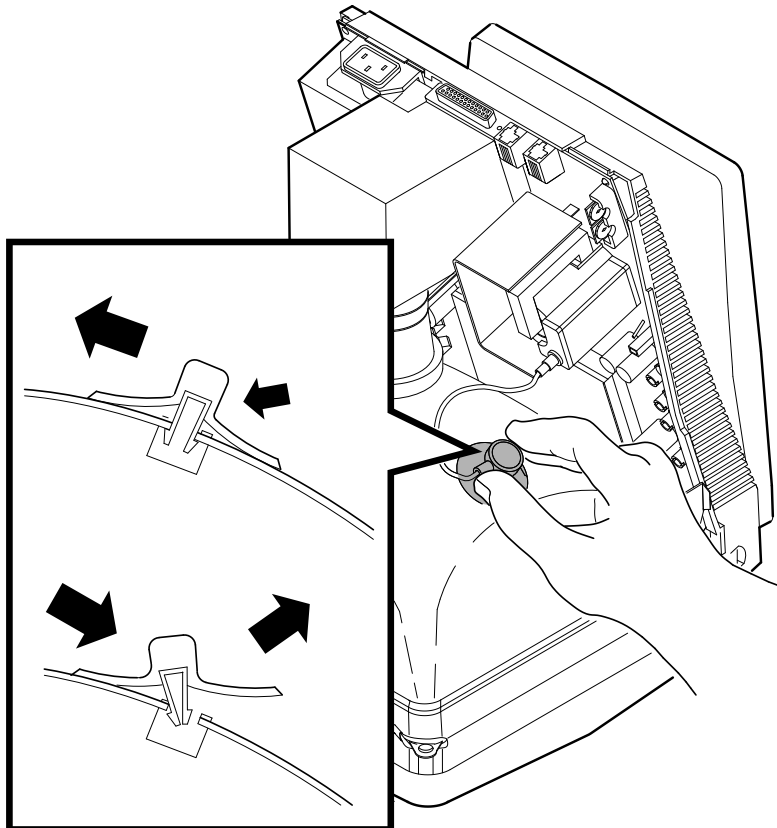
### WARNING

**The support bracket assembly is *not* a ground point.**

- b. Insert the tool under the rubber anode cap until you make contact with the anode connector. Discharge the anode for at least three seconds.



- c. Remove the anode discharge tool.
4. Remove the CRT anode connector from the CRT.
  - a. Grasp the rubber anode cap and push the cap away from you.
  - b. Press the front of the cap with you thumb and lift the front up to get one of the wire prongs out of the anode hole. Lift the cap to ensure the wire prong is out of the hole.
  - c. If both of the wire prongs are still in the anode hole, repeat the previous steps until one is out.
  - d. Pull the back of the rubber anode cap forward and lift up to get the other wire prong (the anode connector) out of the anode hole.

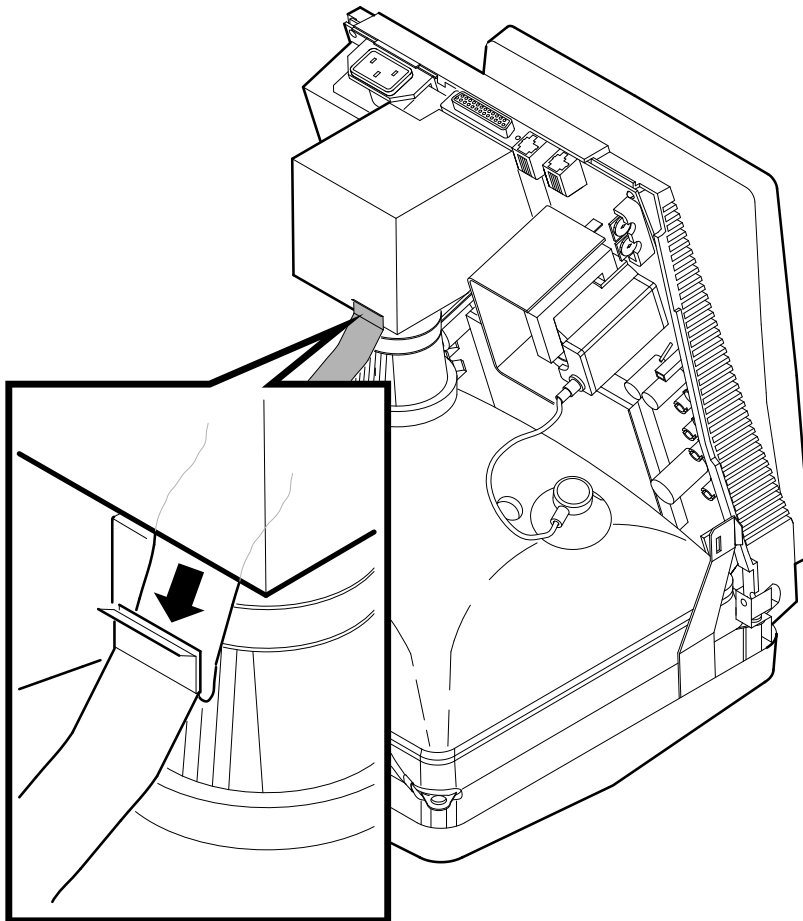


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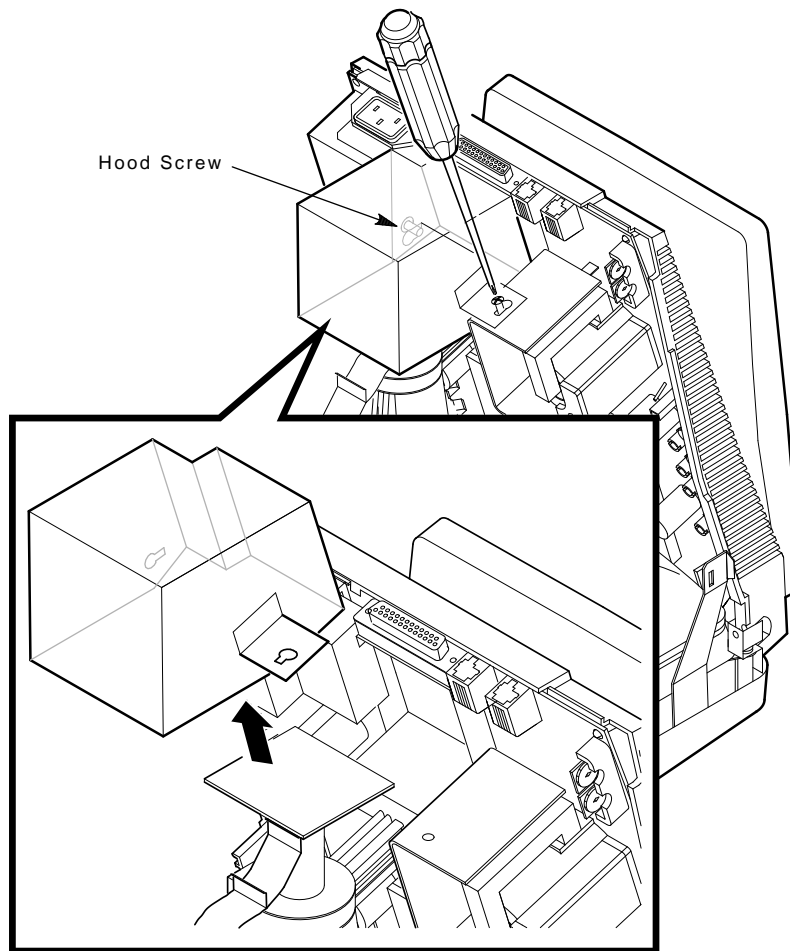
**NOTE**

**If you have a North American model, skip the next two steps.**

5. If you have a worldwide model, disconnect the ground clip from the hood.

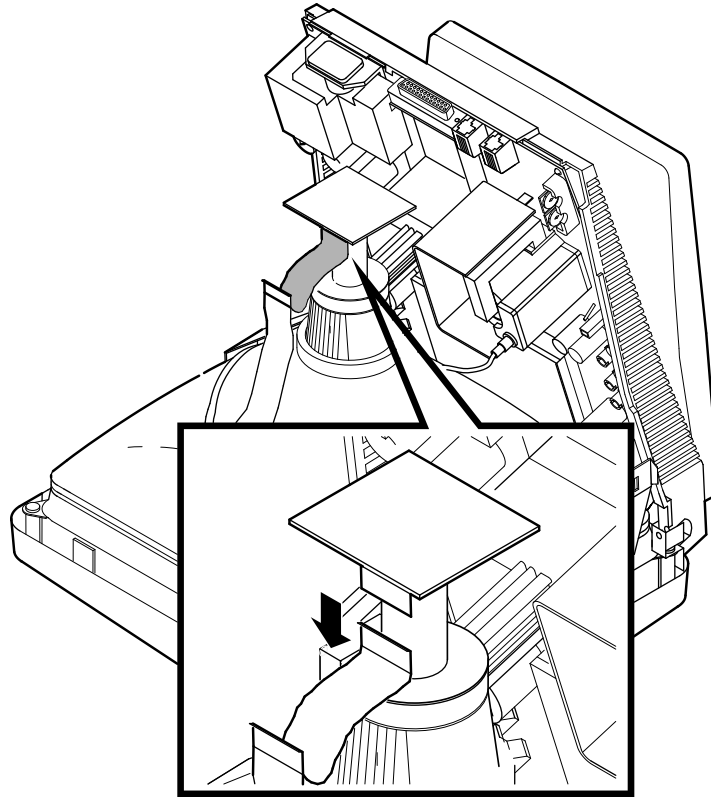


6. If you have a worldwide model, loosen the two screws securing the hood and remove the hood.



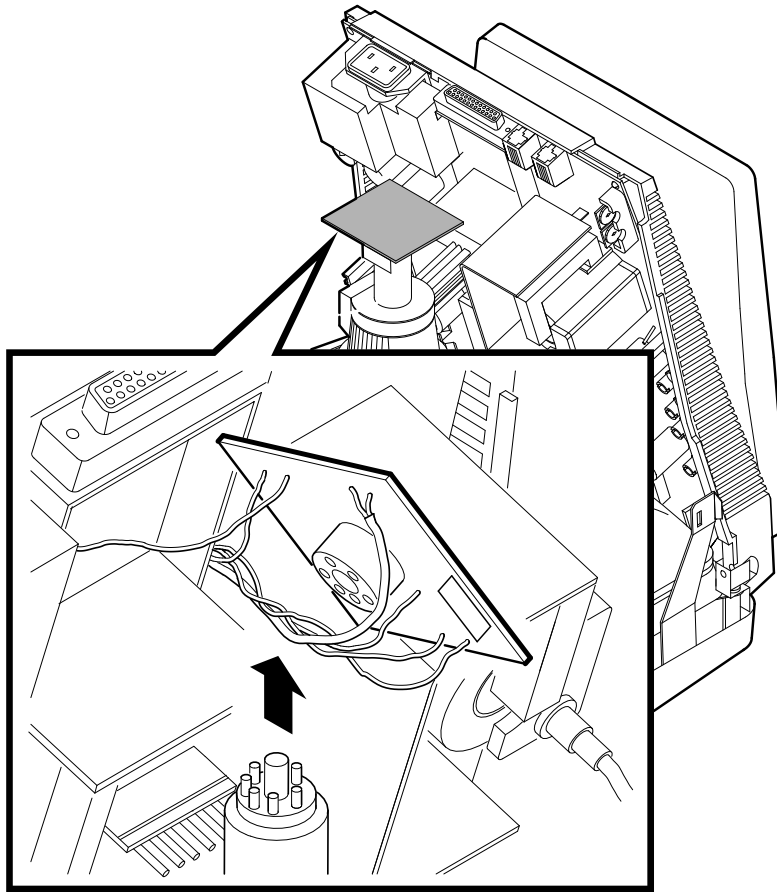
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7. Disconnect the ground clip from the arc protection board.



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8. Remove the arc protection board from the back of the CRT.



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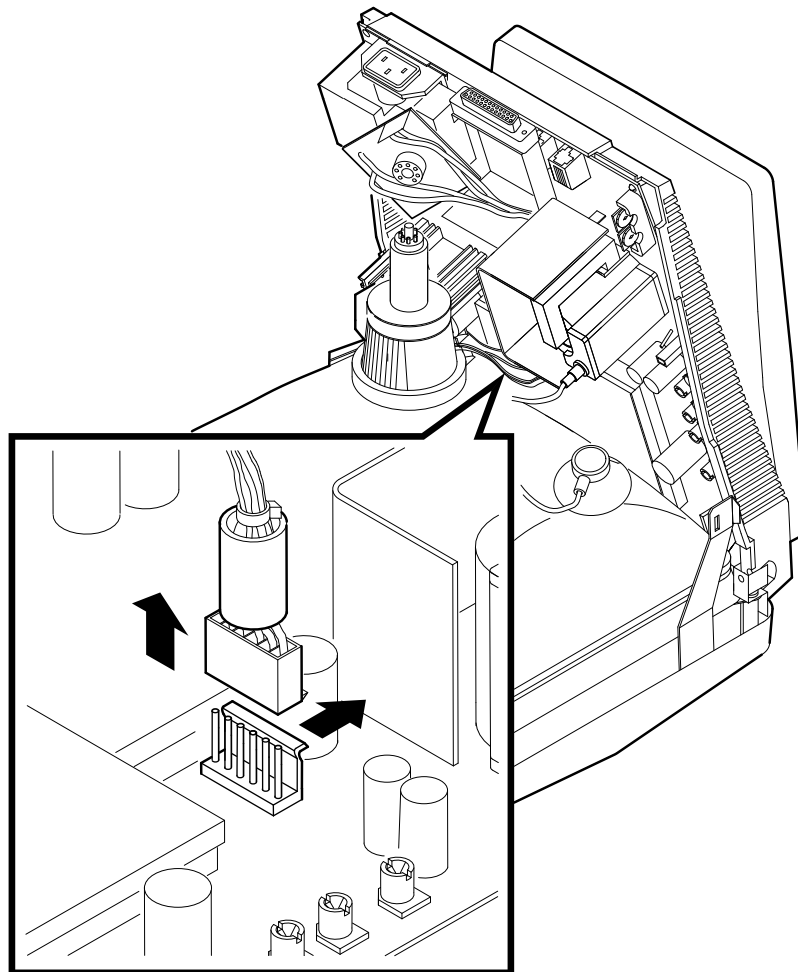
**CAUTION**

**To prevent damage to terminal board components, be careful when you unlock and remove the yoke wiring harness connector in the next step.**

**To prevent damage to the connector wires, only pull on the connector.**

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9. Disconnect the locking connector on the yoke wiring harness from the terminal board by pushing the locking tab and pulling the connector.

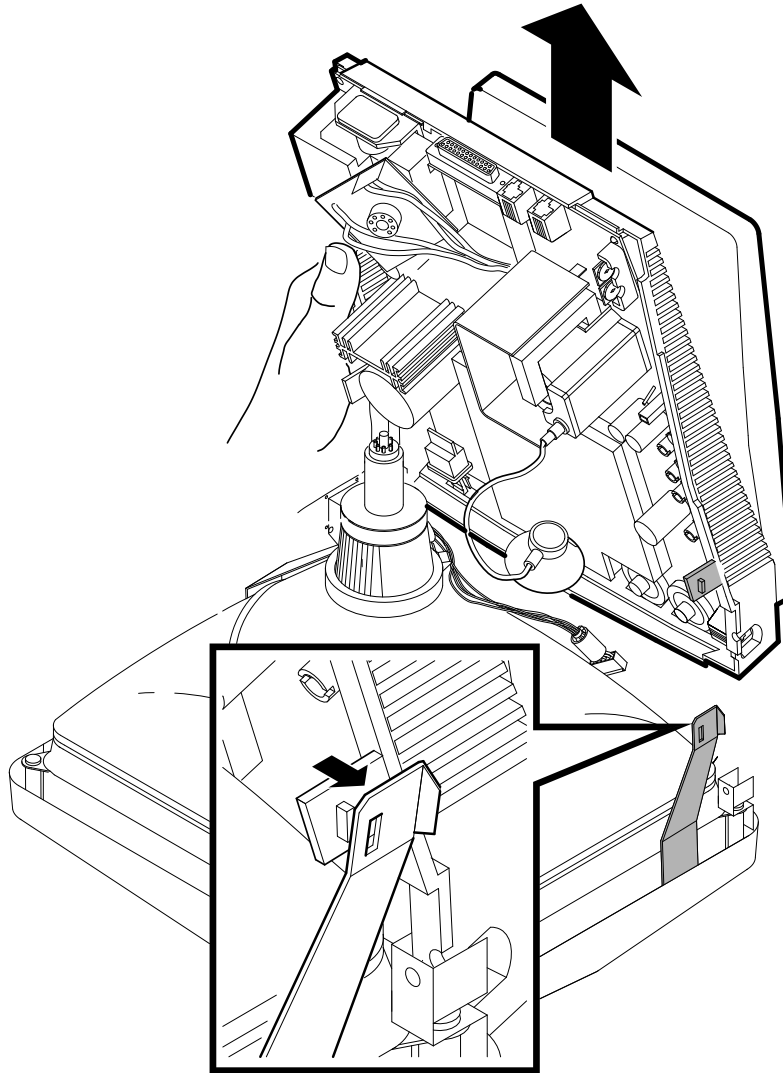


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10. Separate the base from the CRT/yoke/bezel assembly, as follows:
  - a. Release the two base support brackets.



- b. Lift or pull the base away from the CRT/yoke/bezel assembly.



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To install the CRT/yoke/bezel assembly, reverse the installation steps.

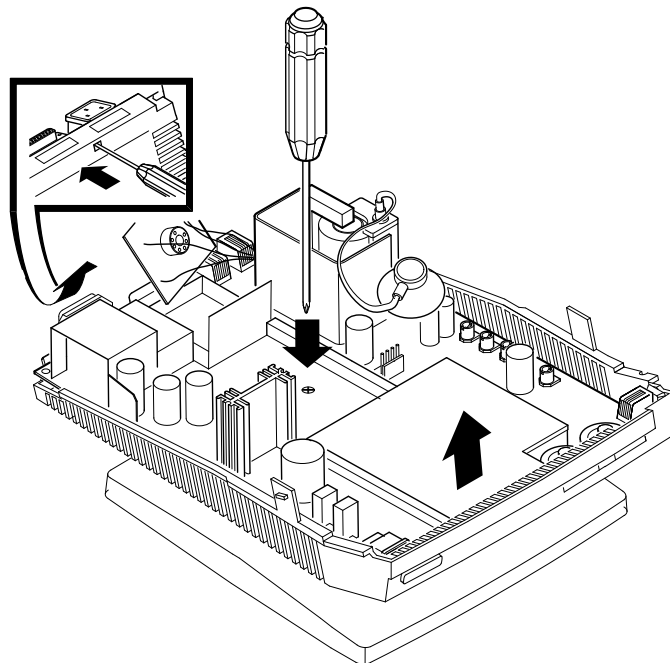
### 3.3 Terminal Board Assembly

To remove the terminal board assembly:

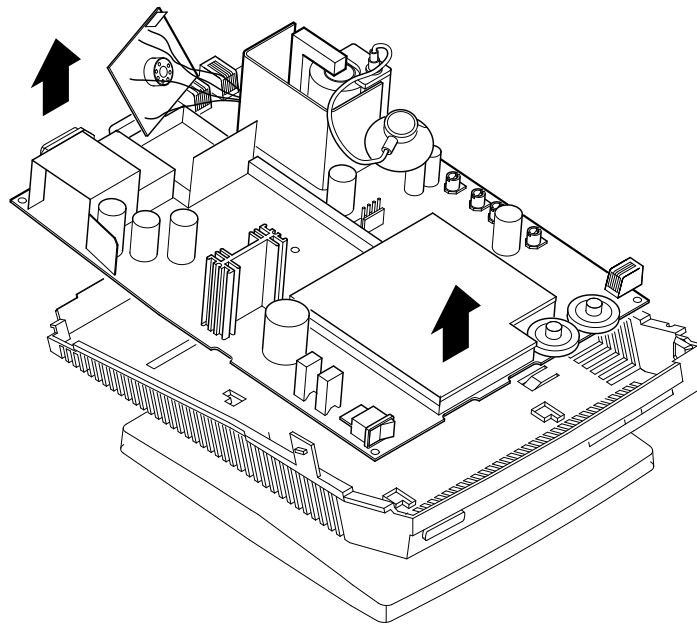
**CAUTION**

**To prevent damage to internal components, do not replace the fuse if it burns out. A burnt fuse is a symptom of a problem inside the terminal.**

1. Turn off the terminal and unplug the power cord from the wall outlet.  
If you have a worldwide model, you should also disconnect the power cord from the back of the terminal.
2. Disconnect all cables from the terminal.
3. Remove the top cover (Section 3.1).
4. Remove the CRT/yoke/bezel assembly (Section 3.2).
5. Loosen the captive screw in the center of the terminal board.



6. Pull the board away from the plastic tab on the connector side of the terminal board. You can release the tab by inserting a screwdriver through the hole below the tab.
7. Lift the terminal board out of the base.



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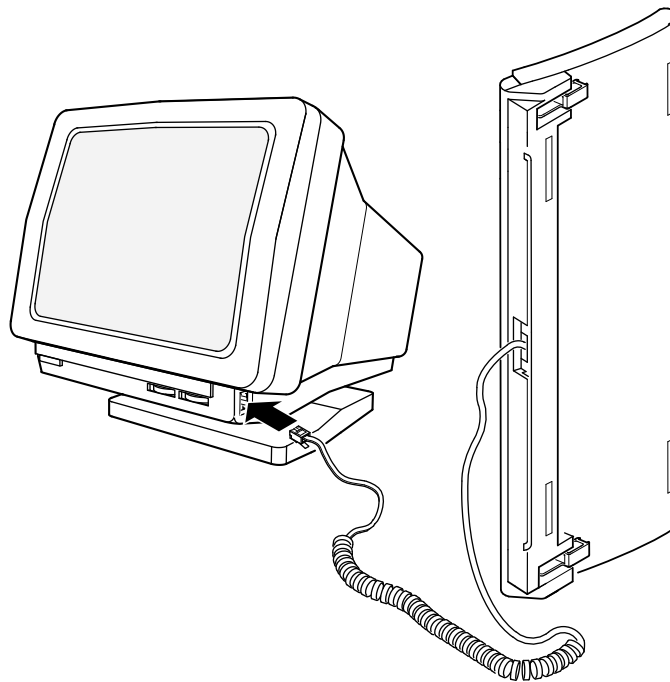
To install the terminal board assembly, reverse the installation steps. If you need to adjust the video display, refer to Chapter 4.

### 3.4 Keyboard

If the keyboard is faulty, replace the keyboard. Turn the terminal off and disconnect the keyboard cable from the keyboard cable connector on the right side of the terminal. Remove and save the legend strip. The PC (LK443/LK444) keyboard does not have a legend strip.

To install a new keyboard:

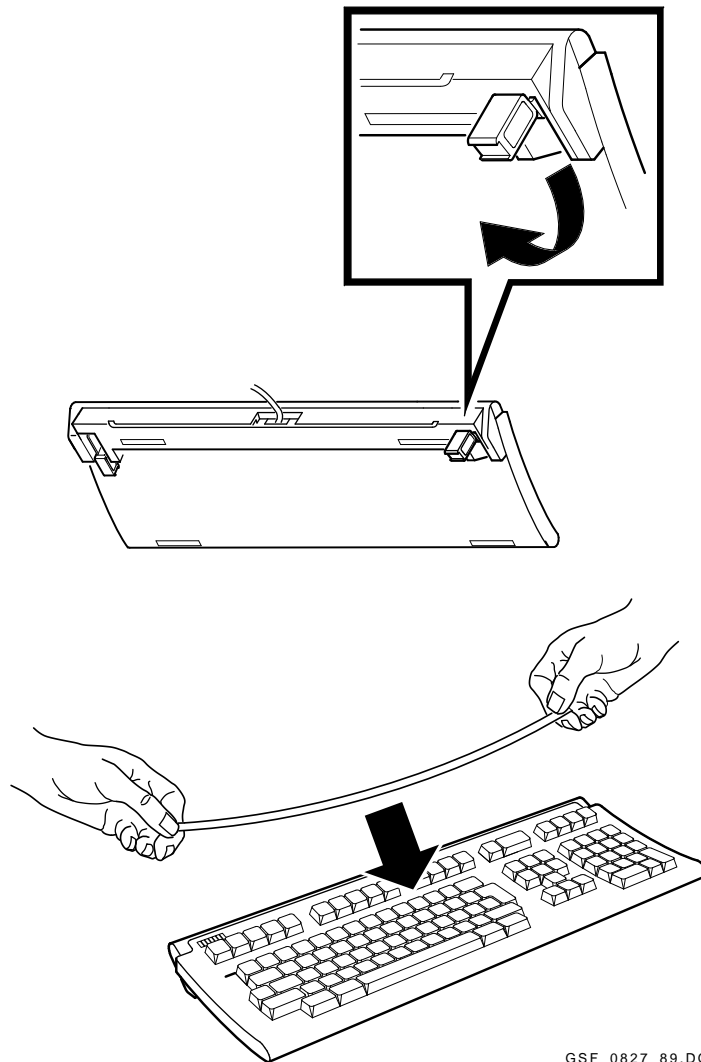
1. Turn the terminal off.
2. The keyboard cable is already connected to the back of the keyboard. If you want the keyboard cable routed to the right or left, press it into one of the grooves on the bottom of the keyboard.
3. Insert the other end of the cable into the keyboard connector on the right side of the terminal.
4. Turn the terminal on.



5. If you want the keyboard raised up, lower the two legs on the bottom.
6. Turn the keyboard over. Install the legend strip, aligning the strip with the tabs.

**ANSI (LK401) keyboard:** Place the strip below the top-row function keys as shown.

**Short ANSI (LK421) keyboard:** Place the strip above the top-row function keys.



### 3.5 CRT Disposal (Digital Service Representatives Only)

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

#### NOTE

**This procedure replaces any other tech tips on 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 service policy for all CRTs more than three inches in diameter.

#### Location

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

#### Protective Gear

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

Safety goggles	PN 29-16141
Gloves	PN 29-16146

#### WARNING

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

### 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 on 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)
- Gloves (PN 29-16146)
- Pliers (PN 19-10008)

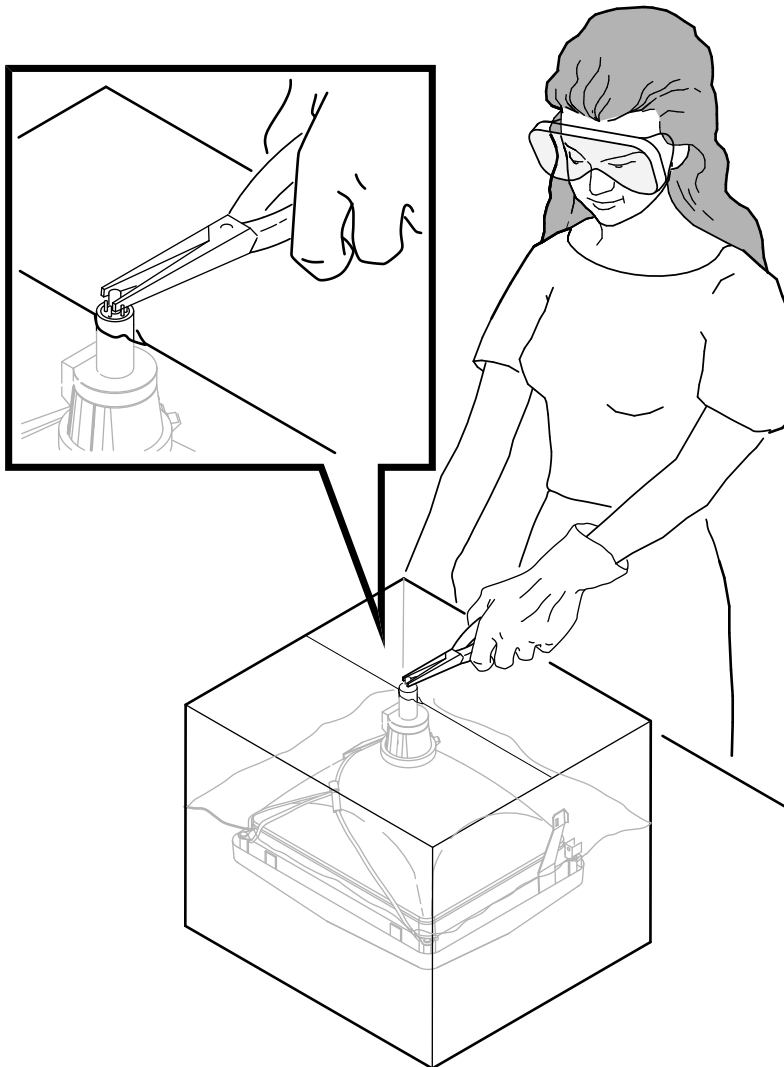
#### **WARNING**

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

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

1. Place the old CRT and the original packing material in the container from which you removed the new CRT.





2. Seal up the container so that only the very tip of the CRT neck is exposed.
3. 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.**

4. 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.**

# 4

## Adjusting the Video Monitor

This chapter describes how to adjust the VT420 monitor. You do not have to perform every adjustment each time you align the 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 setting.

### 4.1 Aligning the Screen

The alignment of the screen on the VT420 may have changed after shipping. This change occurs when the VT420 is shipped to countries where the magnetic field of the earth is different from that of the shipping location. Before making any adjustments inside the monitor, align the screen from the Set-Up Directory screen.

Center or rotate the border of the screen as follows:

Use the arrow keys to move the cursor in all set-up screens.

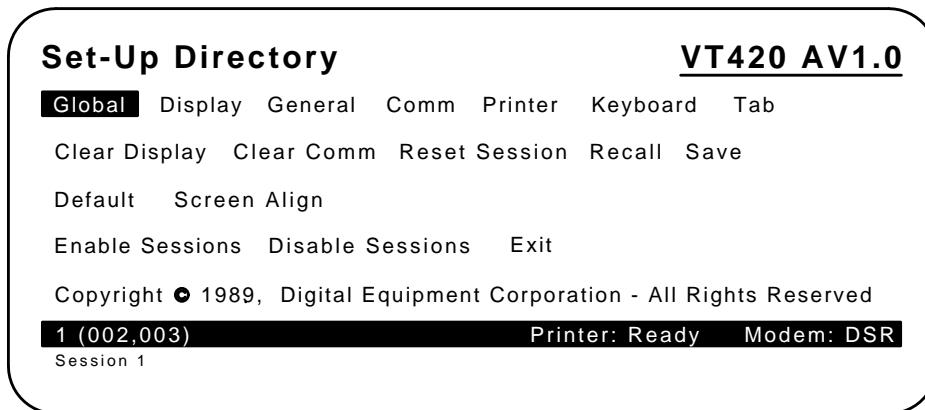
The **Enter** and **Return** keys perform the same function in all set-up screens.

1. Press the **F3** (Set-Up) key to enter set-up. The Set-Up Directory screen appears (Figure 4-1). The cursor is on the `Global Set-Up` field.

## Worldwide



## North American



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**Figure 4-1 Set-Up Directory Screens**

2. Move the cursor to the Screen Align field.
3. Press **Enter** and follow the instructions that appear on the screen (Figure 4-2).

### Worldwide

Hold down the Shift key while using the four arrow keys to center the border on the screen.

Hold down the Control key while using the left and right arrow keys to rotate the border on the screen.

Press Enter to return to the Set-Up Directory.

### North American

Hold down the Control key while using the left and right arrow keys to rotate the border on the screen.

Press Enter to return to the Set-Up Directory.

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Figure 4-2 Screen Align Screens

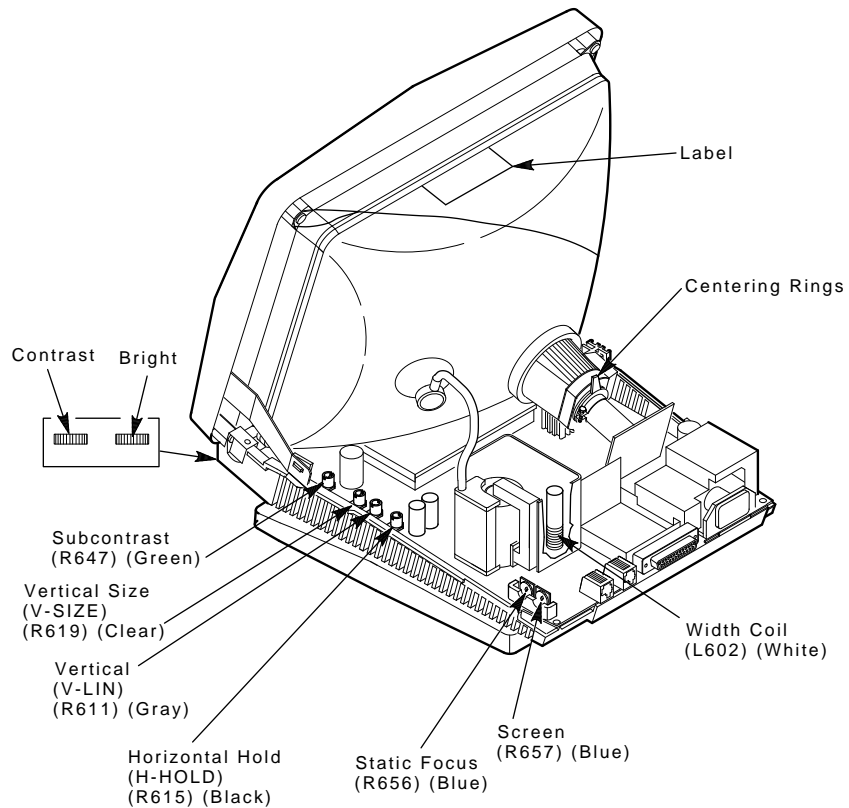
**NOTE**

**The North American model of the VT420 does not have the feature to rotate the active display on the screen.**

4. When you have finished centering or rotating the border, return to the Set-Up Directory. Move the cursor to the *Save* field.
5. Press **[Enter]**. This saves all the current settings in each set-up screen. A *Done* message appears at the bottom of the screen.
6. Press **[F3]** to leave set-up.

## 4.2 Monitor Adjustments

Figure 4-3 shows the location of the controls you use to make adjustments.



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**Figure 4-3** Monitor Adjustment Controls

### 4.2.1 Before You Start

Before you perform any adjustments, complete the following steps:

**WARNING**

**The following procedures expose you to high voltages. Use caution when performing them.**

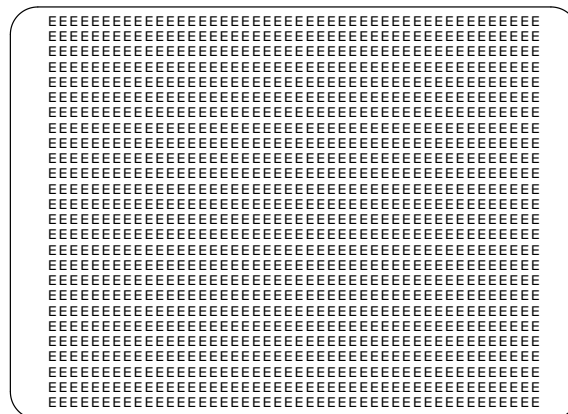
1. Remove the top cover (Section 3.1).
2. Plug in the power cord.
3. Turn the power switch on by moving it toward the ( I ). Wait for the VT420 OK message to appear on the screen.
4. Make sure all shields are in place before doing any adjustments.

### 4.2.2 Displaying the Screen Test Pattern

You use the same screen test pattern for all monitor adjustments. The test pattern is a screen full of E's (Figure 4-4). To display the test pattern:

1. Set up the terminal (Sections 2.2.1 and 2.2.2).
2. Enter the sequence **ESC # 8** to display a screen full of E's.

If you do not know how to enter an ESC character, see Section 2.2.2.



MA-X0938-88

**Figure 4-4 Screen Test Pattern**

### 4.2.3 Screen Control

To adjust the screen control:

1. On the front of terminal, set the brightness control to maximum and the contrast control to minimum.
2. Adjust the screen control (R657) until the white background (raster) almost disappears, but is still visible.
3. Readjust the brightness control to the user's preference.

### 4.2.4 Subcontrast

To adjust the subcontrast control:

1. Display the alignment pattern of E's (Section 4.2.2).
2. Set the contrast control on the front of the terminal to maximum.
3. Turn the brightness control on the right side of the terminal until the raster just disappears.
4. Adjust the SUB CONTRAST control (R647) to the maximum intensity, maintaining the focus of screen characters.
5. Readjust the contrast control to the user's preference.

### 4.2.5 Rotation

#### Worldwide Model

To adjust the rotation:

1. Recall the default settings for the terminal by using the `Default` field in the Set-Up Directory.
2. Adjust the rotation by using the `Screen Align` field in the Set-Up Directory.

#### North American Model

To adjust the rotation:

1. Display the alignment pattern of E's (Section 4.2.2).

#### **WARNING**

**The next step exposes you to the CRT anode, which stores a high voltage. Use caution when working this area.**

2. Loosen the yoke clamp screw on the CRT neck (Figure 4-5).

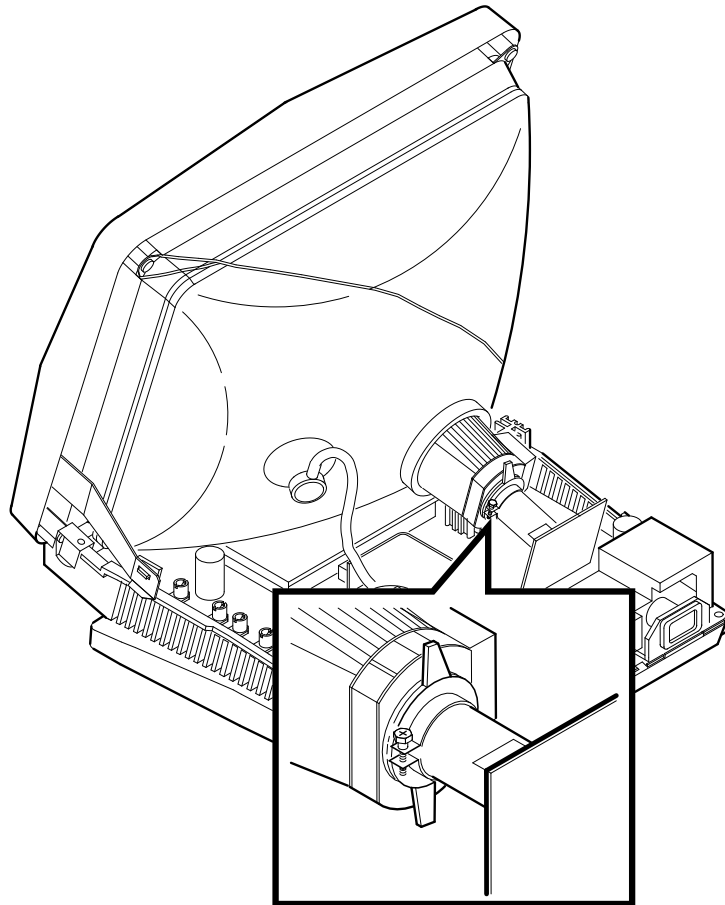
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3. Gently rotate the yoke until the display is square and level on the CRT/yoke/bezel assembly.

**CAUTION**

**Make sure you take up the slack on the CRT clamp before you tighten the screw. Do not overtighten, or you may crack the CRT neck.**

4. Tighten the screw on the CRT connector clamp.



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**Figure 4-5** Rotation and Centering Adjustment



#### 4.2.6 Horizontal Width

Check and adjust the horizontal width as follows. You need a metric measuring tape (PN 29-25342).

1. Display the Screen Align screen by selecting the `Screen Align` field in the Set-Up Directory screen.
2. Use your metric measuring tape to measure the width of the active video display.
3. If the size does not measure approximately 232 mm, use the tuning wand (PN 29-26128-00) to adjust the horizontal `WIDTH` (L602) coil.

#### 4.2.7 Vertical Height

To check and adjust the vertical height:

1. Display the Screen Align screen by selecting the `Screen Align` field in the Set-Up Directory screen.
2. Use your metric measuring tape to measure the height of the active video display. If the size does not measure approximately 168 mm, use the tuning wand to adjust the `V-SIZE` control (R619).
3. If necessary, readjust the vertical linearity (`V-LIN`) (R611) (Section 4.2.8).

#### 4.2.8 Vertical Linearity

To check and adjust the vertical linearity:

1. Display the alignment pattern of E's (Section 4.2.2).
2. Check the height of the E characters on the top and bottom rows of the display. All characters should appear to be the same size.
3. If necessary, use the tuning wand to adjust the `V-LIN` control (R611) until all characters are the same height.
4. If necessary, readjust the vertical height (`V-SIZE`) (R619) (Section 4.2.7).

### 4.2.9 Centering

To check and adjust the centering of the screen display:

1. Display the Screen Align screen by selecting the `Screen Align` field in the Set-Up Directory screen (Figure 4-2).
2. Follow the instructions on the screen to center the active video display.
3. If you are not able to center the display, select the `Default` field from the Set-Up Directory screen to recall the factory-default settings.
4. Make sure you have completed the following adjustments, if they are needed:
  - Screen control
  - Subcontrast
  - Rotation
  - Horizontal width
  - Vertical height
  - Vertical linearity
5. Use the centering rings on the neck of the CRT to center the active video display within the CRT bezel (Figure 4-5).

### 4.2.10 Focus

To check and adjust the focus:

1. Display the alignment pattern of E's (Section 4.2.2).
2. Check the E characters at the four corners and at the center of the screen. The characters should appear clearly in focus.

#### NOTE

**Make sure the screen is clean. This condition can appear to affect the focus.**

3. If necessary, adjust the STATIC FOCUS control (R656) so that you can see each character clearly and distinctly.

# 5

## Using Set-Up

The VT420 terminal has a series of set-up screens that let you change the settings of operating features from the keyboard. This chapter provides a brief summary of how to use set-up. The set-up chapter in *Installing and Using the VT420 Video Terminal* describes the set-up screens in detail.

Each set-up screen provides a group of related features, such as communication or display features. You can move from one set-up screen to the other to change or review settings.

### 5.1 Displaying Set-Up Screens

To enter or leave set-up, you press **F3** (**Alt** **SetUp**). When you enter set-up, the Set-Up Directory appears (Figure 5-1).

You can select any set-up screen from the Set-Up Directory. Use the arrow keys to move the cursor to name of the desired screen. Then press the **Enter** or **Return** key to display that screen.

### Worldwide

**Set-Up Directory** VT420 V1.0

**Global** Display General Comm Printer Keyboard Tab

Clear Display Clear Comm Reset Session Recall Save

Set-Up=English North American Keyboard Default

Enable Sessions Disable Sessions Exit Screen Align

Copyright © 1989, Digital Equipment Corporation - All Rights Reserved

**1 (002,003)** Printer: Ready Modem: DSR

Session 1

### North American

**Set-Up Directory** VT420 AV1.0

**Global** Display General Comm Printer Keyboard Tab

Clear Display Clear Comm Reset Session Recall Save

Default Screen Align

Enable Sessions Disable Sessions Exit

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**1 (002,003)** Printer: Ready Modem: DSR

Session 1

GSF\_1589\_89.DG

Figure 5-1 Set-Up Directory Screens

## 5.2 Changing Settings

You use the arrow keys to move to different fields in each set-up screen. The cursor highlights the selected field in reverse video.

Some set-up features are action fields. Others are parameter fields with two or more possible settings.

**Action fields**      Move the cursor to the desired field. Then press **Enter** or **Return** to have the terminal perform the action.

**Parameter fields**      Move the cursor to the desired field. Then press **Enter** or **Return** to step through the values until the desired value appears.

## 5.3 Saving Set-Up Values

You should save the current settings in set-up before you run tests. Inform the user about your action. Saving the user's current settings before you run tests enables you to recall them later.

To save the current set-up settings:

1. Press **F3** ( **Alt** **setUp** ) to enter Set-Up. The Set-Up Directory appears.
2. Use the arrow keys to move the cursor to the `save` field.
3. Press **Enter**. This procedure saves the current settings in all set-up screens.

The **save** feature stores the current values of the set-up features. The terminal uses these values until you change them.

## 5.4 Recalling Set-Up Values

You can reset the terminal to the previous set-up values by recalling the values from the Set-Up Directory screen. You can select two types of set-up values. Ask the user which settings were in use.

- Recall (user's saved settings)
- Default (factory-default settings)

To select

1. Saved settings—Move the cursor to the `Recall` field and press **Enter**.
2. Factory-default settings—Move the cursor to the `Default` field and press **Enter**.

# A

## Modems, Cables, and Documentation

You can order the following modems, cables, and manuals from Digital for the North American and worldwide versions of the VT420. See the end of this appendix for ordering information.

### A.1 Modems

Part Number	Description
DF242 Scholar Plus	300, 1200, and 2400 baud, full-duplex asynchronous
DF224	300, 1200, and 2400 baud, full-duplex, asynchronous
DF124	300, 600, and 1200 baud, full-duplex, asynchronous

### A.2 Cables

Figure A-1 shows cable connections to the VT420.

Part Number	Length	Connector
<b>Printer Cables and Adapter (VT420 to printer)</b>		
BC16E-10	3 m (10 ft)	6-pin M DEC-423 to
BC16E-25	7.6 m (25 ft)	6-pin M DEC-423
H8751-A adapter	–	6-pin F DEC-423 to 25-pin F RS-232
H8751-C or -F adapter	–	25-pin F RS-232 to 6-pin M DEC-423

M = male. F = female.

xx = length in feet (10, 25, 50, 100, 200, 250).

<b>Part Number</b>	<b>Length</b>	<b>Connector</b>
<b>Extension Cables</b>		
BC22E-10	3 m (10 ft)	25-pin F RS-232 to
BC22E-25	7.6 m (25 ft)	25-pin M RS-232
<b>Null Modem Cables</b>		
BC22D-xx	–	25-pin F RS-232 to 25-pin F RS-232
<b>Communication Cables</b>		
BC16E-10	3 m (10 ft)	6-pin M DEC-423 to
BC16E-25	7.6 m (25 ft)	6-pin M DEC-423
<b>AC Power Cables</b>		
	<b>Country</b>	
BN20V-2E	Australia, New Zealand	
BN20S-2E	Austria, Belgium, Finland, France, Germany, Netherlands, Norway, Portugal, Spain, Sweden	
BN20P-2E	Canada	
BN20U-2E	Denmark	
BN20R-2E	Ireland, United Kingdom	
BN19U-2E	Israel	
BN20W-2E	Italy	
BN20T-2E	Switzerland	
M = male. F = female. xx = length in feet (10, 25, 50, 100, 200, 250).		

56 Modems, Cables, and Documentation

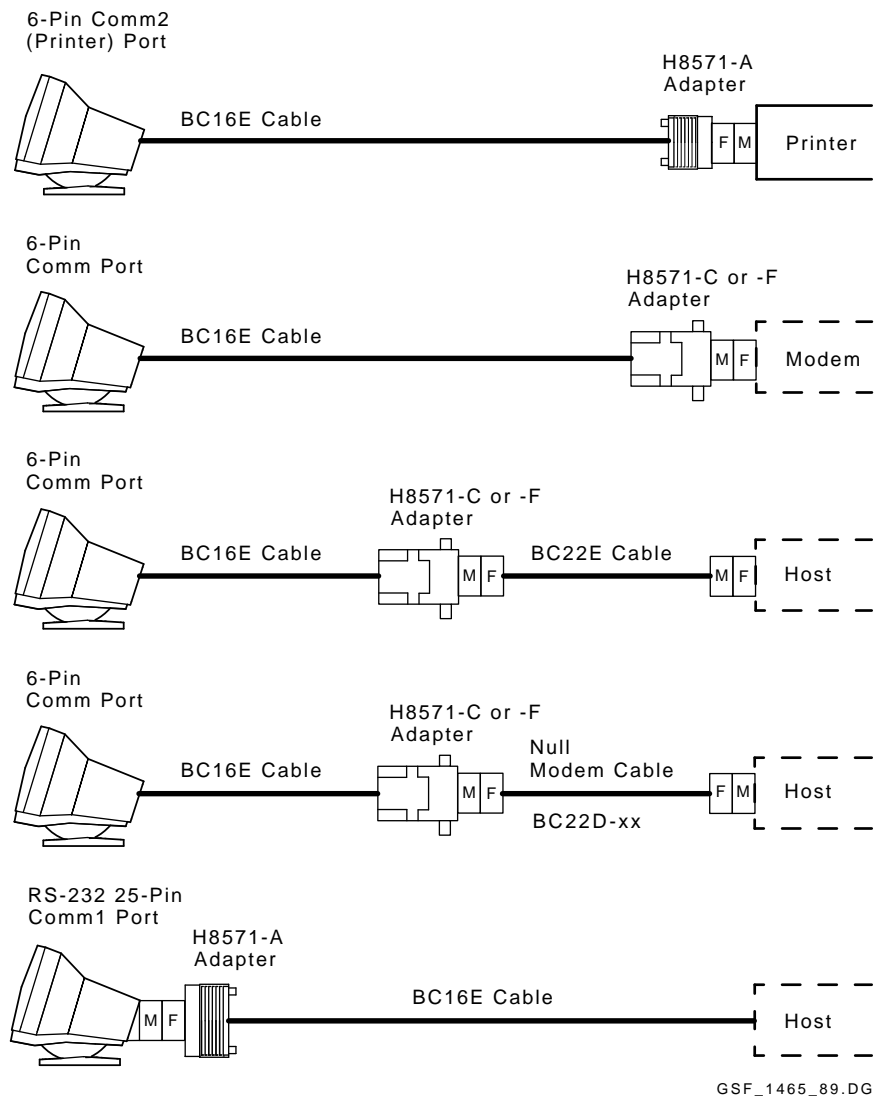


Figure A-1 VT420 Cables



### A.3 Related Documentation

You can order the following VT420 documents from Digital:

**Installing and Using the VT420 Video Terminal**

Provides users with the information needed to install, operate, and maintain the VT420 terminal. Also provides a summary of programming control functions. There are two versions of this manual.

**North American Model** **EK-VT420-UG**

**Worldwide Model** **EK-VT420-UU**

**Installing and Using the VT420 Video Terminal with PC Terminal Mode** **EK-VT42A-UU**

Provides users with the information needed to install, operate, and maintain the VT420 terminal with PC terminal mode. Also provides a summary of programming control functions.

**VT420 Programmer Reference Manual** **EK-VT420-RM**

Provides information on character processing, character codes, and control functions available for all VT420 applications including PC terminal mode.

**VT420 Video Terminal Illustrated Parts Breakdown** **EK-VT420-IP**

Provides a detailed parts breakdown of the terminal's field replaceable units. Does not provide part numbers for printed circuit board components.

**VT420 Family Field Maintenance Print Set** **MP-02949-01**

Provides a complete set of VT420 electrical and mechanical schematic diagrams.

**Installing and Using the Session Support Utility** **AA-JB84C-TE**

Provides system managers with instructions for installing SSU software to support two sessions over one communication line. The guide is part of an SSU software kit. The kit is available on different media.

# B

## VT420 Recommended Spares

This appendix has two sections.

- Section B.1 lists the available models of the VT420 video terminal.
- Section B.2 lists the spare components that a Digital service representative should have when servicing a VT420 video terminal.
- Section B.3 lists the keyboard model numbers.

### B.1 VT420 Models

The VT420 comes in the following basic models and versions:

<b>Location</b>	<b>Model Number</b>	<b>Screen Color</b>	<b>Power Requirement</b>
<b>North American Terminals (Standard Version)</b>			
North America	VT420-A2	White	120 V
	VT420-B2	Green	120 V
	VT420-C2	Amber	120 V
<b>Worldwide Terminals (Standard Version)</b>			
Northern Hemisphere	VT420-A4	White	100 V to 240 V
	VT420-B4	Green	100 V to 240 V
	VT420-C4	Amber	100 V to 240 V

<b>Location</b>	<b>Model Number</b>	<b>Screen Color</b>	<b>Power Requirement</b>
Southern Hemisphere	VT420-A5	White	100 V to 240 V
	VT420-B5	Green	100 V to 240 V
	VT420-C5	Amber	100 V to 240 V
Israel (Hebrew)	VT420-A7	White	100 V to 240 V
	VT420-B7	Green	100 V to 240 V
	VT420-C7	Amber	100 V to 240 V
Greece	VT420-A8	White	100 V to 240 V
	VT420-B8	Green	100 V to 240 V
Turkey	VT420-A9	White	100 V to 240 V
	VT420-B9	Green	100 V to 240 V
	VT420-C9	Amber	100 V to 240 V
Automatic Data Processing, Inc. (ADP)	VT42C-B4	Green	100 V to 240 V
Olivetti	WS885-A4 PC TERM	White	100 V to 240 V
	WS885-B4 PC TERM	Green	100 V to 240 V
	WS885-C4 PC TERM	Amber	100 V to 240 V
<b>Worldwide Terminal (Low-Emission Version)</b>			
Northern and Southern Hemispheres	VT420-A6	White	100 V to 240 V
	VT420-D6 PC TERM	White	100 V to 240 V
Kodak	VT42C-A1	White	100 V to 250 V
Olivetti	WS885-L PC TERM	White	100 V to 240 V

## B.2 Recommended Spares

The following is a list of recommended spares for the VT420 video terminal:

<b>Assembly</b>	<b>Part Number</b>	<b>Model Number</b>
Tilt-swivel base	70-26541-01	—
Top cover	70-26542-01	—
Bottom cover	70-26535-01	—
CRT/bezel/yoke		
White	70-26534-04	—
Green	70-26534-05	—
Amber	70-26534-06	—
White (low emission)	70-26534-07	—
ADP 70-26534-15	VT42C-B4	
Terminal board		
North American	70-26536-01	VT420-A2, -B2, -C2
Worldwide: Northern and Southern Hemispheres	70-26536-02	VT420-A4, -B4, -C4, -A5, -B5, -C5
Worldwide: Hebrew	70-26536-04	VT420-A7, -B7, -C7
Worldwide: Olivetti	70-26536-05	WS885-A4, -B4, -C4 (PC TERM)
Worldwide: Greek	70-26536-07	VT420-A8, -B8
Worldwide: Turkish	70-26536-08	VT420-A9, -B9, -C9
Worldwide: ADP	70-26536-12	VT42C-B4
Low emission: Northern and Southern Hemispheres	70-26536-03	VT420-A6
	70-26536-11	VT420-D6 (PC TERM)
Low emission: Olivetti	70-26536-06	WS885-L (PC TERM)

<b>Loopback Connector</b>	<b>Part Number</b>
DEC-423 port	12-25083-01
RS-232 port	12-15336-00

### B.3 Keyboard Models

The keyboards for the VT420 are available in the following versions:

<b>Country</b>	<b>Model Number</b>	
	<b>Standard</b>	<b>WPS</b>
<b><u>LK401 ANSI Keyboard</u></b>		
North America/United Kingdom	LK401-AA	LK402-AA
Belgium (Flemish)	LK401-AB	LK402-AB
Canada (English)	—	LK401-AE
Canada (French)	LK401-AC	LK402-AC
Denmark	LK401-AD	LK402-AD
Finland	LK401-AF	LK402-AF
France/Belgium	LK401-AP	LK402-AP
Germany/Austria	LK401-AG	LK402-AG
Italy	LK401-AI	LK402-AI
Netherlands (Dutch)	LK401-AH	LK402-AH
Norway	LK401-AN	LK402-AN
Portugal	LK401-AV	LK402-AV
Spain	LK401-AS	LK402-AS
Sweden	LK401-AM	LK402-AM
Switzerland (French)	LK401-AK	LK402-AK
Switzerland (German)	LK401-AL	LK402-AL
<b><u>LK421 Short ANSI (UNIX) Keyboard</u></b>		
North America/United Kingdom	LK421-AA	—

62 VT420 Recommended Spares

<b>Country</b>	<b>Model Number</b>	
	<b>Standard</b>	<b>WPS</b>
<b><u>LK443 PC Keyboard</u></b>		
Canada (French)	LK443-AC	—
North America	LK443-AA	—
<b><u>LK444 (PC) Keyboard</u></b>		
Australia/New Zealand	LK444-AZ	—
Belgium	LK444-AB	—
Canada (English)	LK444-AQ	—
Denmark	LK444-AD	—
Finland	LK444-CA	—
France	LK444-AP	—
France (English)	LK444-AQ	—
Germany/Austria	LK444-AG	—
Italy	LK444-AI	—
Netherlands (Dutch)	LK444-AH	—
Norway	LK444-AN	—
Portugal	LK444-AV	—
Spain	LK444-AS	—
Sweden	LK444-AM	—
Switzerland (French/German)	LK444-CH	—
United Kingdom/Ireland	LK444-AE	—

# C

## Physical/Functional Diagrams

This appendix shows the components and pin assignments for the North American and worldwide models of the VT420 video terminal.

Figure C-1 shows the components of the North American model.

Figure C-2 shows the components of the worldwide models.

64 Physical/Functional Diagrams

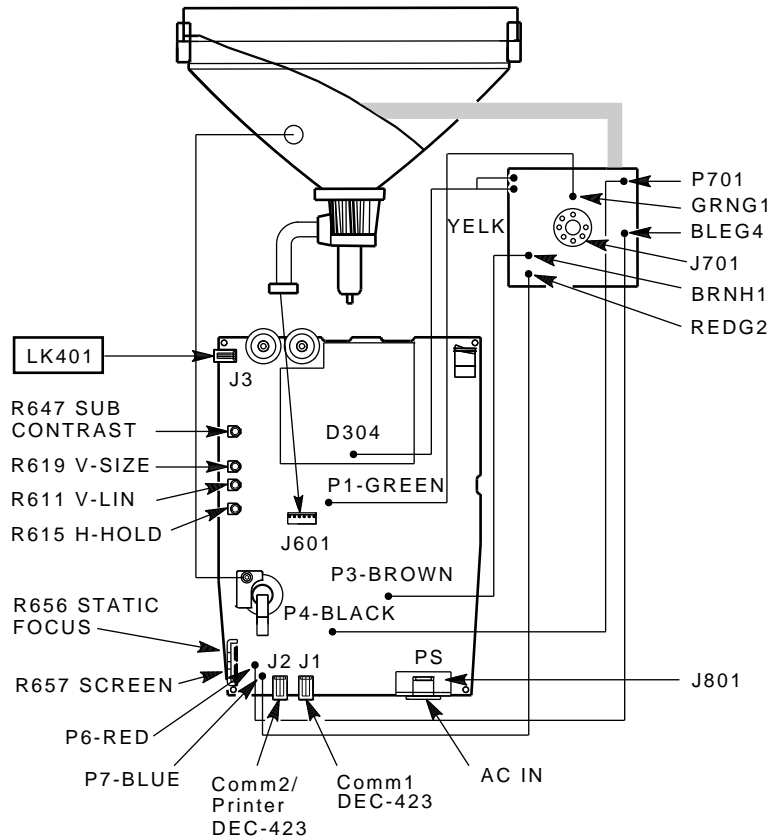


Figure C-1 VT420 North American Model

**VT420 North American Model: Signals and Pin Assignments**

**Terminal Board Assembly**

**J1 DEC-423 Comm1 Port Connector**

Pin	1	HDTR2	Data terminal ready
	2	HTXD2	Transmitted data
	3	GND	Transmit ground
	4	HCOM	Receive ground
	5	RXD2	Received data



6	DSR2	Data set ready
---	------	----------------

**J2 DEC-423 Comm2/Printer Port Connector**

Pin	1	HPTRDTR	Data terminal ready
	2	HPTRTXD	Transmitted data
	3	GND	Transmit ground
	4	PTRCOM	Receive ground
	5	PTRRXD	Received data
	6	PTRDSR	Data set ready

**J3 Keyboard Port Connector**

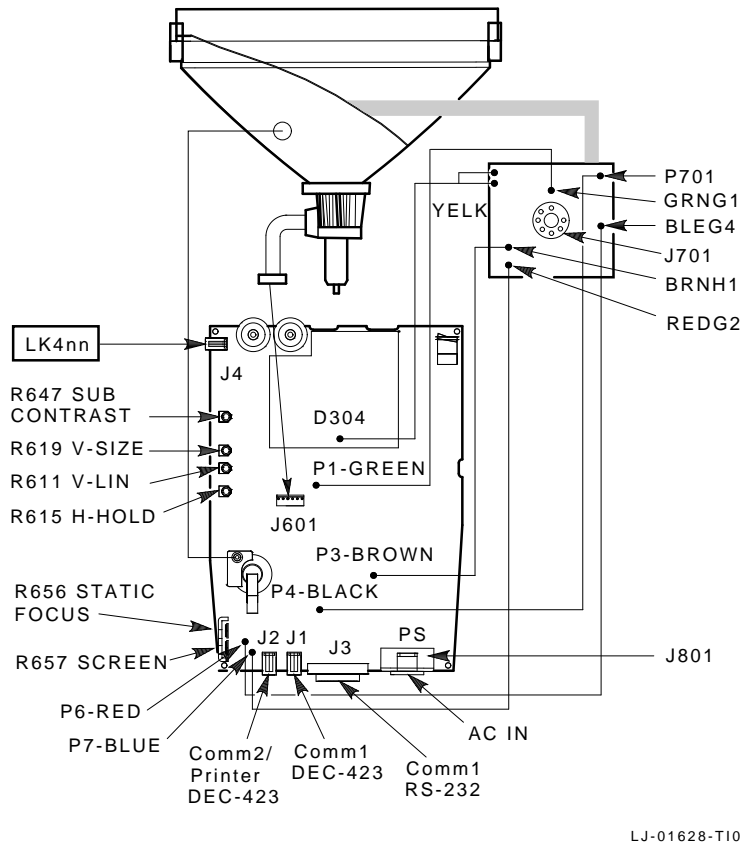
	1	HKBTXD	Transmitted data
	2	GND	Ground
	3	+12 V	
	4	KBRXD	Received data

**CRT/Yoke/Bezel Assembly****J601 CRT Yoke Connector**

Pin	1	No connection
	2	No connection
	3	Vertical yoke
	4	Vertical yoke
	5	Horizontal yoke
	6	Horizontal yoke

**Arc Protection Board Assembly****J701 CRT Socket Connector**

Pin	1	GRN G1	Grid 1 (green)
	2	YEL K2	Cathode (yellow)
	3	BRN H1	Heater -12 V (brown)
	4	P701 (H2)	Heater ground (black)
	5	Not used	
	6	RED G2	Grid 2 (red)
	7	BLU G4	Grid 4 (blue)



LJ-01628-T10

Figure C-2 VT420 Worldwide Models

### VT420 Worldwide Model: Signals and Pin Assignments

#### Terminal Board Assembly

##### J1 DEC-423 Comm1 Port Connector

Pin	1	HDTR2	Data terminal ready
	2	HTXD2	Transmitted data
	3	GND	Transmit ground
	4	HCOM	Receive ground
	5	RXD2	Received data

	6	DSR2	Data set ready
--	---	------	----------------

**J2 DEC-423 Comm2/Printer Port Connector**

Pin	1	HPTRDTR	Data terminal ready
	2	HPTRTXD	Transmitted data
	3	GND	Transmit ground
	4	PTRCOM	Receive ground
	5	PTRRXD	Received data
	6	PTRDSR	Data set ready

**J3 RS-232 Comm1 Port Connector**

Pin	1	GND	Ground
	2	HTXD1	Transmitted data
	3	RXD1	Received data
	4	HRTS	Request to send
	5	CTS	Clear to send
	6	DSR1	Data set ready
	7	SIG GND	Signal ground
	8	HCD	Carrier detect
	9	Not used	
	10	Not used	
	11	Not used	
	12	SPDIND	Speed indicator
	13	Not used	
	14	Not used	
	15	Not used	
	16	Not used	
	17	Not used	
	18	Not used	
	19	Not used	
	20	HDTR1	Data terminal ready
	21	Not used	
	22	Not used	
	23	HSPDSEL	Speed select
	24	Not used	
	25	Not used	

**J4 Keyboard Port Connector**

	1	HKBTXD	Transmitted data
	2	GND	Ground
	3	+12 V	
	4	KBRXD	Received data

### **CRT/Yoke/Bezel Assembly**

#### **J601 CRT Yoke Connector**

Pin	1	Rotation coil (green)
	2	Rotation coil (black)
	3	Vertical yoke (brown)
	4	Vertical yoke (yellow)
	5	Horizontal yoke (white)
	6	Horizontal yoke (red)

### **Arc Protection Board Assembly**

#### **J701 CRT Socket Connector**

Pin	1	GRN G1	Grid 1 (green)
	2	YEL K2	Cathode (yellow)
	3	BRN H1	Heater -12 V (brown)
	4	P701 (H2)	Heater ground (black)
	5	Not used	
	6	RED G2	Grid 2 (red)
	7	BLU G4	Grid 4 (blue)

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## HOW TO ORDER ADDITIONAL DOCUMENTATION

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