VXT 2000 Windowing Terminal and DECimage 2000 Option

Service Guide

Order Number: EK-VXT20-SV. B01

May 1992

This document describes how to install and service VXT 2000 and DECimage 2000 windowing terminals, including how to start a session on a host computer system.

Revision/Update Information: This is a revised document.

Digital Equipment Corporation
Maynard, Massachusetts

Contents

1 A Look at the Terminal

2 Installing the Terminal

3 Testing

4 Troubleshooting

5 Removing and Replacing FRUs

6 Starting a Session

A Related Documents

B Recommended Spares List

C Self-Test Error Descriptions

Index

Figures

Tables

About This Guide

This guide describes how to install and service VXT 2000 and DECimage 2000 windowing terminals, including how to start a session on a host computer system.

Audience

This guide is for Digital Services personnel and qualified self-maintenance customers.

Organization

The guide contains six chapters and three appendices:

- Chapter 1, "A Look at the Terminal," describes the terminal's hardware and connectors, operating features, and site requirements.

- Chapter 2, "Installing the Terminal," describes how to unpack and install the terminal. The installation procedure describes how to connect the monitor, mouse, keyboard, network cable, and optional printer or tablet.

- Chapter 3, "Testing," describes how to run the terminal's built-in self-tests and diagnostic tests and how to determine if there is a memory error.

- Chapter 4, "Troubleshooting," describes how to troubleshoot the VXT 2000 and DECimage 2000 windowing terminals.

- Chapter 5, "Removing and Replacing FRUs," describes how to remove and replace the field replaceable units (FRUs) for the terminal. Some FRUs are customer-installable options.

- Chapter 6, "Starting a Session," provides step-by-step procedures on how to start using the terminal with a host computer.

- Appendix A, "Related Documents," provides a list of related documents.

- Appendix B, "Recommended Spares List," provides a list of the terminal's recommended spare parts.
- Appendix C, "Self-Test Error Descriptions," describes the terminal's self-test error codes.

Tools and Equipment

You need the following tools to service the terminal:

Tools and Equipment	Part Number
Phillips screwdriver, number 2	29–11005–00
Wrist strap and antistatic mat (included in Digital Services antistatic kit)	29–26246–00
Two Ethernet terminators (H8225–00)*	12–26318–01
ThinWire Ethernet T-connector (H8223–00)	12–25869–01
Mouse loopback connector	12–25628–01
Tools required for VR315, VRC16, VRM17, VR319, VR320, and VR326 monitors. (See the service documentation for each monitor.)	

*The thickwire Ethernet connector does not have a loopback connector.

Conventions

The following conventions are used in this guide:

Convention	Meaning
terminal	Refers to the VXT 2000 or DECimage 2000 windowing terminal.
mouse	Refers to any pointing device, such as a mouse, a puck, or a stylus.
MB1, MB2, and MB3	MB1 indicates the left mouse button. MB2 indicates the middle mouse button. MB3 indicates the right mouse button. (The buttons can be redefined by the user.)
Keyboard key	Keys or switches that are labeled appear in a ⬚box⬚. Example: Press the ⬚Return⬚ key.
⬚Ctrl⬚ *key*	For ⬚Ctrl⬚ key sequences, hold down ⬚Ctrl⬚ and press the other key.
Warning	Provides information to prevent personal injury.
Caution	Provides information to prevent damage to equipment or software.
Note	Provides general information about the current topic.
Menu items . . .	Menu items followed by . . . will display a dialog box when selected.
PN	This is an abbreviation for part number.

Notes to the Reader

The screens and windows shown in this guide represent the latest information available at the time of publication. Some screens and windows may not exactly match those that appear on your terminal or reflect the system-default settings.

1
A Look at the Terminal

This chapter provides an overview of the terminal's hardware and connectors, operating features, site requirements, and memory requirements.

1.1 Product Description

The terminal can

- Connect to an Ethernet network through the terminal's thickwire, ThinWire, or twisted-pair port

- Connect directly to a computer through the terminal's serial port

- Display multiple DECterm windows and applications over both the Ethernet and serial line simultaneously

- Interact over an Ethernet network with multiple DECterm terminal windows and X window applications running under the VMS, ULTRIX, or other UNIX operating system

- Communicate with the LAT protocol for VMS systems, the transmission control protocol/Internet protocol (TCP/IP) for ULTRIX and other UNIX systems, and the local area system transport (LASTport) protocol for the InfoServer system

When a DECimage 2000 module is installed, the terminal can
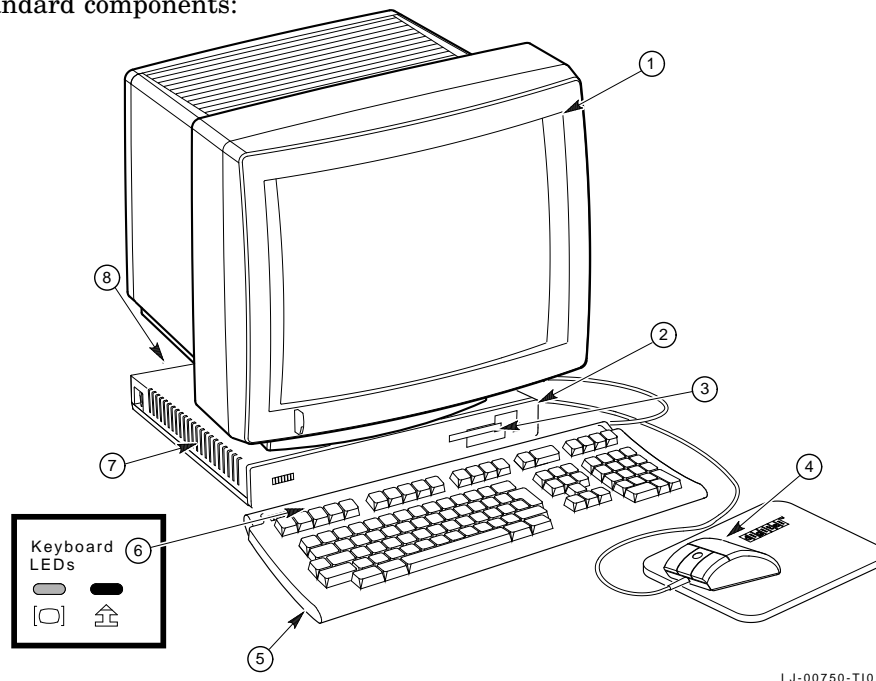
- Run X image extension (XIE) applications, which let the terminal display images quickly by decompressing, scaling, and rotating data. See the *VXT 2000 Windowing Terminal User Information* guide for more information on XIE programming and applications.

1.2 Terminal Components

The VXT 2000 and DECimage 2000 windowing terminals include the following
standard components:

LJ-00750-TI0

Item	Name	Description
(1)	Monitor	VR315, VRC16, VRM17, VR319, VR320, or VR326.
(2)	System box	Contains system logic module, video driver module, memory controller, memory modules, power supply, fan, and connectors. The DECimage 2000 terminal also contains a DECimage 2000 module.
(3)	Terminal logo	VXT 2000 or DECimage 2000.
(4)	Mouse	Three-button input device (VSXXX-GA).
(5)	Keyboard	LK400 series.
(6)	Keyboard LEDs	Hold and lock indicators (LK401/LK402 keyboards only).
(7)	Power LED	Green LED (visible through the ventilation slots).
(8)	Diagnostic LEDs	Eight yellow LEDs on the rear panel of the system box.

1.2.1 Monitor

The terminal uses a monochrome monitor (VRM17, VR315, VR319) or a color monitor (VRC16, VR320, VR326). For information on servicing the monitor, see the service guide for each monitor (Appendix A).

1.2.2 Keyboard

The terminal uses an LK400 series keyboard—LK401, LK402, or LK 421.

- The LK401–*xx* and LK402–*xx* keyboards have four groups of keys: the main keyboard, numeric and editing keypads, and top-row function keys. The keyboards also have two LED indicators (hold and lock) and two audible indicators (keyclick and bell). The LK401–*xx* is the standard version, and the LK402–*xx* is the word processing version.

- The LK421–*xx* keyboard is a short version of the LK401 keyboard, often used in UNIX environments. The LK421–*xx* does not have a numeric keypad or LED indicators. Users can still perform numeric keypad functions by using alternate key sequences.

1.2.3 Mouse

The mouse is a three-button pointing device. The mouse lets you move the screen cursor and perform many screen actions, such as choosing items from menus, changing button settings in dialog boxes, and moving windows.
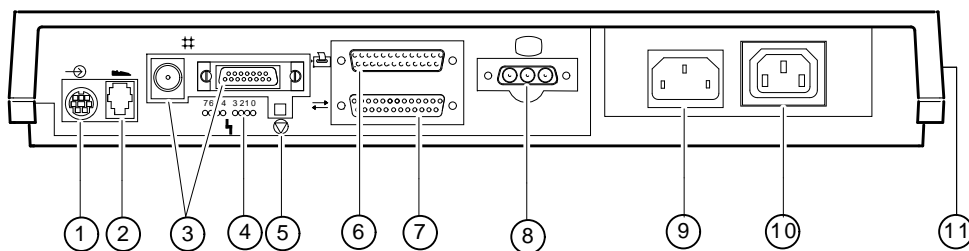
1.2.4 System Box

The system box provides the connectors for power, system communication, the keyboard, monitor, mouse, and a serial or parallel printer. The system box is 368 mm (14.5 in.) deep × 394 mm (15.5 in.) wide × 57 mm (2.25 in.) high.

System Box Connectors and Switches

The rear panel on system box includes the following connectors and switches:

LJ-00714-TI0

(1) Mouse/pointer	(5) Halt switch	(9) System box ac power
(2) Keyboard	(6) Serial port	(10) Monitor ac power
(3) Ethernet connectors:	(7) Parallel printer port	(11) AC power switch
• ThinWire and thickwire (shown) or	(8) Monitor connector:	
•Twisted-pair (not shown) and thickwire	•Color (shown) or	
(4) Diagnostic LEDs	• Monochrome (not shown)	

System Box FRUs

The system box includes the following the field replaceable units (FRUs) in the system box. Appendix B lists all FRU part numbers.
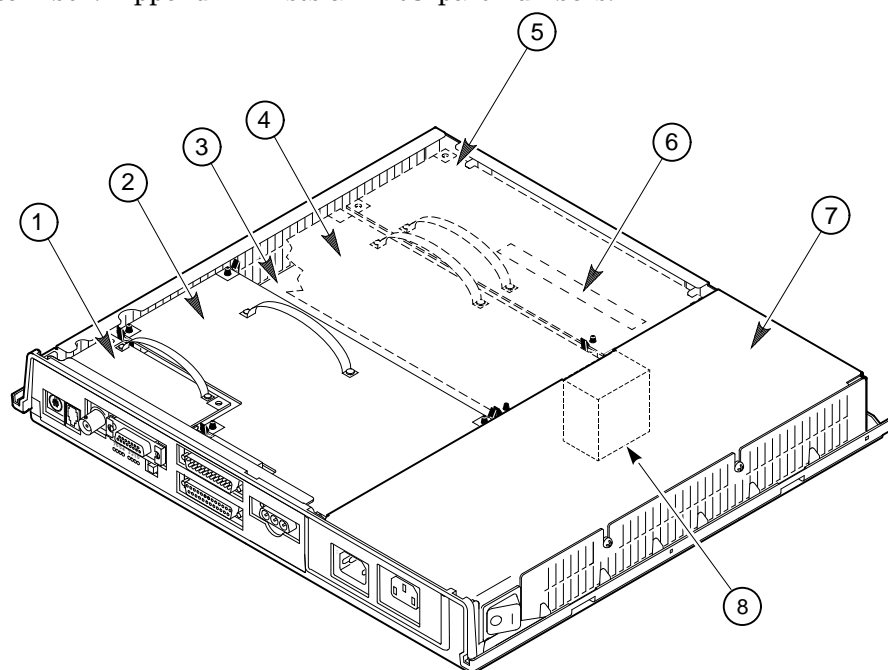
LJ-01727-TI0

(1)	Network module*	(5)	Memory controller board*
(2)	Video module	(6)	Memory module(s) (MEMs)* (installed on other side of memory controller board)
(3)	System logic module	(7)	Power supply assembly
(4)	DECimage 2000 module*	(8)	Fan

*Customer installable.

1.3 Operating Features

This section briefly describes terminal sessions, network protocols, and how to control feature settings on the terminal.

1.3.1 X Window Sessions and Terminal Window Sessions

The terminal allows you to open two types of sessions on host computers: X window sessions and VXT DECterm terminal window sessions.

X Window Session
To run an X window session, you log in to a host that has X window applications.

You can have one X window session and several VXT DECterm terminal window sessions open at the same time. Within the X window session, you can run multiple X window clients. Each X window session and terminal window session appear in a separate window.

Terminal Window Session
The terminal has a VXT DECterm terminal emulator that allows you to log in to a host as you would on a conventional video terminal. VXT DECterm windows are compatible with VT300 series text terminals and offer enhancements such as user-selectable fonts.

1.3.2 Network Communication Protocols

You can use the terminal with VMS, ULTRIX, or UNIX operating systems. You can run video terminal sessions and X window sessions on any of these operating systems.

For UNIX and ULTRIX systems:

The transmission control protocol/Internet protocol (TCP/IP) is the communication protocol. The terminal can use the TCP/IP Telnet or LAT communication protocols to make terminal window connections to UNIX and ULTRIX host systems in a wide-area network.

For VMS systems:

The LAT protocol is the communication protocol.

For InfoServer systems:

The terminal uses the LASTport protocol for InfoServer systems.

1.3.3 Terminal Software

The terminal downloads its VXT system image software from a host or an InfoServer. The InfoServer provides these added capabilities:

- Memory paging

- Configuration and font management for groups of terminals

1.3.4 Customizing the Terminal

There are several ways to check and control the terminal's operating features.

- **Terminal Manager Customize menu**
  When you click on Customize in the Terminal Manager window, the Customize menu appears. This menu lets you change many of the terminal's operating features, such as the keyboard setup, the display language, and the cursor style for the pointer (mouse).

  You can also customize boot and X server settings. If you have a DECimage 2000 module installed and want to use XIE applications, you must customize X server settings to enable XIE (Section 2.1.5).

- **VXT DECterm Options menu**
  When you create a Telnet, LAT, or serial port terminal window, the terminal displays a VXT DECterm window. The window includes an Options menu that lets you change certain terminal window features while an application is running. Many applications handle customization of the terminal window.

- **Window Manager Options menu**
  When you click on the window menu button in any window, the window manager displays a window menu. From the window menu, you can choose an Options submenu that lets you customize many window management features.

- **Configuration Manager window**
  Terminals that use VXT server-based software from an InfoServer have a configuration manager. When you click on Configuration... in the Terminal Manager window's Customize menu, the terminal displays a Configuration submenu. From this submenu, you can access the Resource Management and Font Management dialog boxes.

1.3.5 Checking the Terminal's System Configuration

From the Terminal Manager window, you can display a System Configuration dialog box to quickly verify many of the terminal's customizable configuration settings, such as the VXT system image, the work group, and the Ethernet address. To display this dialog box:

1. Click on the **Session** menu in the Terminal Manager window.

2. Click on the **Status** menu item to display a Status submenu.

3. Click on **System Configuration...** to display the System Configuration dialog box.

To learn how to use these windows and menus, see the *VXT 2000 Windowing Terminal User Information* guide.

1.4 Site Requirements

The terminal requires certain system software and network hardware to operate. The system manager or responsible site manager must ensure these requirements are met. The *VXT Software System Management Information* guide describes the required system management tasks for the terminal.

1.4.1 Network Hardware Support

The terminal requires one of the following physical connections to connect to a host computer system:

Ethernet connector (thick-wire, ThinWire, or twisted-pair)	Allows the terminal to operate with X window applications and multiple terminal window sessions, using the LAT or TCP/IP network protocol. An Ethernet connector is needed to operate with X window or DECwindows software.
Serial line	Allows the terminal to connect directly to a single host, as on traditional VT*xxx* video terminals.

1.4.2 Memory Requirements

When you turn on the terminal, it loads its VXT software from an InfoServer or from a host computer system. There are different memory requirements for using server-based or host-based software. A DECimage 2000 module also requires more memory.

If You Use...	And...	Your Terminal Needs...
Server-based VXT software	-	4 megabytes of memory
Server-based VXT software	DECimage 2000 module	6 megabytes
Host-based VXT software	-	10 megabytes
Host-based VXT software	DECimage 2000 module	12 megabytes

The standard terminal comes with 4 megabytes of memory. You can add memory by installing a memory controller board and memory modules in the terminal's system box. Some terminals have a memory controller board already installed.

Standard Terminal

- 4-megabyte system logic module

  or

- 2-megabyte system logic module and 2-megabyte memory controller module

Optional Memory

- 2-megabyte memory controller module

1.4.3 Hardware Configurations

The VXT 2000 product uses four basic system box models and six monitors, allowing for eight product variations. Each system box includes an Ethernet card with two connectors—thickwire and ThinWire, or thickwire and twisted pair. The two types of Ethernet card doubles the number of possible product variations.

The following table shows which monitors can be used with each system box.

Note

To verify the type of monitor and system box you have, look at the label on the back of your unit.

Monitor		System Box	
Size and Type	Model	Thickwire and ThinWire	Thickwire and Twisted Pair
15-inch monochrome	VR315–DA	VX20A–AD	VX20A–BD
17-inch monochrome	VRM17–AA	VX20A–AC	VX20A–BC
19-inch monochrome	VR319–DA	VX20A–AC	VX20A–BC
15-inch color	VR326–DA	VX20A–AB	VX20A–BB
17-inch color	VRC16–CA	VX20A–AB	VX20A–BB
19-inch color	VR320–DA	VX20A–AA	VX20A–BA
17-inch grayscale	VRM17–AA	VX20A–AA	VX20A–BA
19-inch grayscale	VR319–DA	VX20A–AA	VX20A–BA

1.4.4 System Software Support

The following table summarizes the system resources needed to open X window sessions or terminal window sessions:

Operation	Operating System	Communication Protocol
X window session	VMS Version 5.3-1 or higher	LAT
	UNIX (any version)	TCP/IP TFTP (UDP) for font service
	UWS Version 2.1 or higher (includes ULTRIX Version 3.1)	TCP/IP TFTP (UDP) for font service
Terminal session	VMS Version 4.0 or higher	LAT
	UNIX (any version)	Telnet (TCP/IP)

Operation	Operating System	Communication Protocol
	ULTRIX (any version)	Telnet (TCP/IP)
	UWS Version 2.2	LAT

1.4.5 System Software Support for the DECimage 2000 Module

In addition to the terminal's standard software requirements (Section 1.4.4),
the DECimage 2000 module requires VXT Version 1.1 or later to run XIE
applications.

2

Installing the Terminal

This chapter provides step-by-step instructions on how to

- Unpack, inspect, and check the terminal's components
- Connect the monitor, mouse, keyboard, and network cable to your terminal
- Connect an optional printer or tablet
- Turn on your terminal

_____ **Before You Start** _____

Carefully read all installation instructions before you turn on the power.

2.1 Installation Steps

2.1.1 Unpack and check the contents of each carton.

_____ **WARNING** _____

If necessary, use two people to lift or move the monitor.

- Make sure you have all the items shown in the following **Standard Parts Checklist**.
- If you ordered optional memory, cables, a network module, or DECimage 2000 module, also refer to the following **Optional Parts Checklist**.
- Carefully inspect the components for shipping damage. If you have missing or damaged items, contact your sales representative and delivery agent.

• Save the empty shipping cartons and packing material for repacking, in case you move or relocate your terminal.

Standard Parts Checklist

LJ-00845-TI0
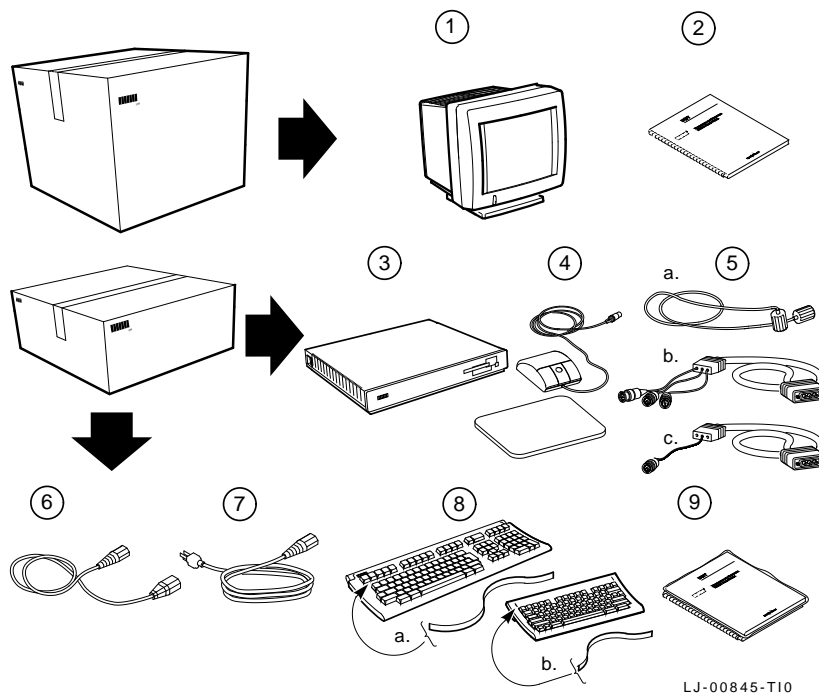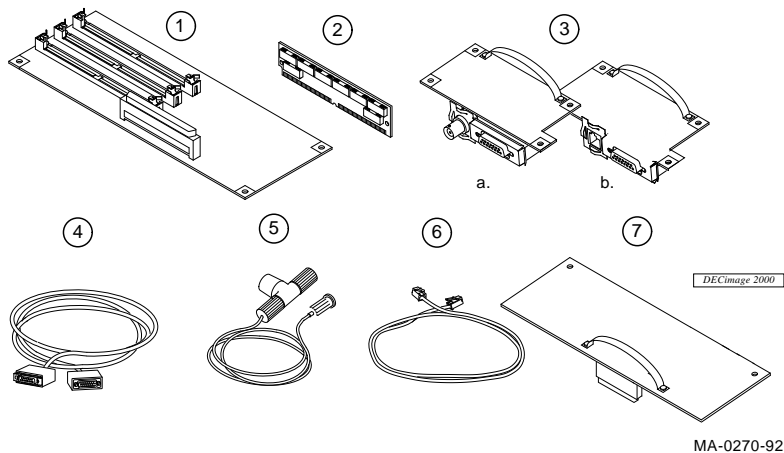
(1)	Monitor: VR315, VRC16, VRM17, VR319, VR320, or VR326	(6)	Monitor to system box power cord
(2)	Monitor installation guide	(7)	System box power cord
(3)	System box	(8)	Keyboard and legend strip: (a) LK401 ANSI, or (b) LK421 short ANSI (UNIX style)
(4)	Mouse and mouse pad	(9)	User documentation kit
(5)	Monitor to system box cable: (a) monochrome, (b) color, or (c) grayscale		

Installing the Terminal
2.1 Installation Steps

Optional Parts Checklist

MA-0270-92

---------------------------------- **Caution** ----------------------------------

If you ordered a memory controller module, a DECimage 2000 module,
or memory modules, do not remove them from the antistatic bag at this
time. Static electricity can damage these components.

----

(1) 2-megabyte memory controller board

(2) 2- or 4-megabyte memory module (up to three modules)

 A 4-megabyte module has components mounted on both sides.

(3) Network board with (a) ThinWire and thickwire connectors, or (b) twisted-pair and
 thickwire connectors.

(4) Thickwire Ethernet network cable

(5) ThinWire Ethernet network cable, T-connector, and terminator

(6) Twisted-pair Ethernet network cable

(7) DECimage 2000 module and DECimage 2000 system box label

(8) Serial port and parallel port cables and adapters (not shown)

2.1.2 Install any optional memory, network, or image module first.

Go to Chapter 5 to remove the system box cover and install any options, then return here.

2.1.3 Place the system box and monitor in position.

Place the system box on a level surface. Place the monitor on top of the system box. Leave enough room at the rear of the system box and monitor for connecting cables.

2.1.4 Connect the cables to the system box.

Refer to the following figure and connect cables in order.

1. Connect the mouse or graphics tablet to the system box. Set the mouse on the mouse pad.

2. Connect the keyboard to the system box. Lower the keyboard's legs and install the legend strip for the top-row keys.

3. Connect your network cable to the system box. Connect the other end of the cable to your local area network. Your system box has two network connectors—(a) a ThinWire connector and a thickwire connector, or (b) a twisted-pair connector and a thickwire connector.
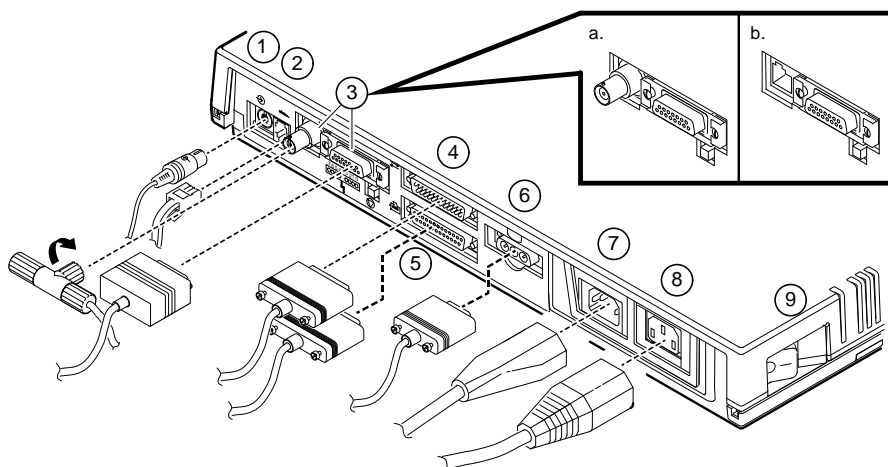
LJ-00481-TI0

Below the network connectors are indicator lights and a CPU halt button, used in servicing the terminal.

4. If you have a serial printer or secondary host computer, connect the printer or host to the system box.

5. If you have a parallel printer, connect the printer to the system box.

6. Connect one end of the monitor cable to the monitor and the other end to the system box. The connector for a color or grayscale monitor is shown. When you connect a color or grayscale cable, make sure pin A1 is on the left.

7. Make sure the monitor's power switch is off. Make sure the ⎡Ｉ Ｏ⎤ power switch on the system box is off (O). Connect the long power cord to the system box, then to a grounded electrical outlet.

   If you have a VRM17 monitor: Set the high scan/low scan switch at the rear of the monitor to the high scan position.

8. Connect the short power cord to the monitor and the system box.

9. Turn the monitor's power switch on. Turn the system box's ⎡Ｉ Ｏ⎤ power switch on by pressing (Ｉ).

Check the terminal's test display.

1. When you turn on the terminal, it performs its self-tests. During the tests, you should see the following display on your monitor:

Display	**Meaning**
VXT V01.001	VXT boot ROM version number
08-00-2B-11-22-33	Terminal's Ethernet address
*nn*MB	Megabytes of memory installed (4 to 18)
■■■■■□□□□	Self-test progress indicator (Fills in as tests are completed.)

   If you installed additional memory: While the self-tests are running, make sure the amount of memory listed in the self-test display (*nn*MB) equals the total number of megabytes installed in your terminal.
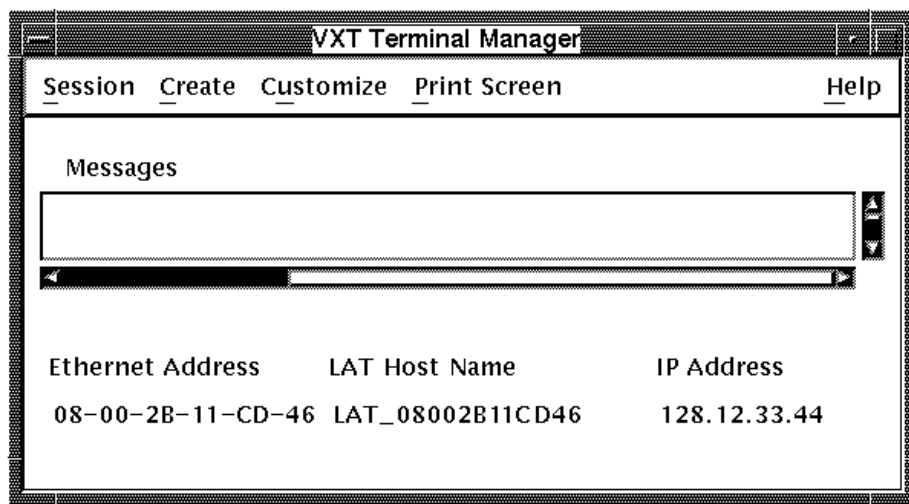
   The standard terminal comes with 4 megabytes of installed memory. The terminal requires 10 megabytes of installed memory to load the VXT system image from a host system.

Standard	+	**Optional**	=	**Display**
4 megabytes	+	2 to 14 megabytes	=	6 to 18 megabytes

2. When the self-tests are done, the terminal loads its software from a supporting host system or server (such as one of Digital's InfoServer models). Then the terminal displays the following Terminal Manager window:

Terminal Manager Window

```
┌─────────────────────────────────────────────────────────────┐
│ ─              VXT Terminal Manager                    ▪  ▣  │
├─────────────────────────────────────────────────────────────┤
│  Session  Create  Customize  Print Screen            Help    │
│                                                              │
│   Messages                                                   │
│  ┌────────────────────────────────────────────────────┐ ▲  │
│  │                                                    │    │
│  │                                                    │ ▼  │
│  ├────────────────────────────────────────────────────┤    │
│  │ ◄ ████████████        ►│                               │
│                                                              │
│   Ethernet Address      LAT Host Name      IP Address        │
│                                                              │
│   08-00-2B-11-CD-46  LAT_08002B11CD46     128.12.33.44       │
│                                                              │
└─────────────────────────────────────────────────────────────┘
```

LJ–01140–RAGS

You may also see a log-in box from your host system, if your system manager has set up the terminal's AutoStart feature.

If you do not see the Terminal Manager window, go to Chapter 4. The Help menu at the upper right of the window only appears on server-based terminals.

2.1.5 If you installed a DECimage 2000 module . . .

You can verify the installation of the module by viewing the terminal's System Configuration dialog box as follows:

1. Use your mouse to point to the **Session** menu name in the Terminal Manager window's menu bar. Click mouse button 1 (MB1) to display the Session menu.

2. Point to the **Status** menu item and click MB1 to display the Status submenu.

3. Point to the **System Configuration...** menu item and click MB1 to display the System Configuration dialog box.

4. Look at the **Image Option** line to see if the DECimage 2000 module is present. If the module is not present, reinstall the module (Section 5.5). If the module is still not listed as present, contact your Digital service representative.

5. Point to the **Close** button and click MB1 to exit out of the dialog box.

Installing the Terminal
2.1 Installation Steps

If you have a DECimage 2000 module installed and want to use XIE applications, you must enable XIE in the Customize X Server dialog box.

1. Click on the **Customize** menu in the Terminal Manager window.

2. Click on the **Customize X Server** menu item to display the Customize X Server dialog box.

3. In the Customize X Server dialog box, click on the **XIE Image** button to enable XIE. When enabled, the button is filled in. The new setting takes effect when you reboot the terminal.

2.1.6 Final steps . . .

- This is a good time to set the brightness, contrast, and viewing angle of your monitor. See your monitor's installation guide for instructions.

- If you had problems with the installation, review the installation steps carefully. If the problem continues, refer to Chapter 4.

<div style="text-align: right">

3

Testing

</div>

This chapter describes how to

- Run the terminal's built-in self-tests and diagnostic tests

- Determine if there is a memory error

- Display video alignment patterns on the monitor

To test the monitor, see the monitor's service guide. To troubleshoot the terminal, refer to Chapter 4.

3.1 Self-Tests

The terminal has a series of self-tests to help you isolate failures to faulty device and field replaceable units (FRUs). You can run self-tests in two ways.

- Automatically during power-up

- Manually in console mode

The terminal automatically runs initialization self-tests during power-up. During the power-up process, the diagnostics test the basic functions of all FRUs. If the diagnostics detect an error, they continue testing (if possible) until finished, then report any errors.

You can configure the terminal to run a minimal or extended power-up self-test at power-up by entering a command in console mode. You can also run self-tests manually in console mode.

Testing
3.1 Self-Tests

3.1.1 Running Self-Tests in Console Mode

Table 3–1 lists the power-up self-tests that run each time you turn on the terminal's power switch.

To enter console mode:

Press the halt switch on the rear panel of the terminal. When you enter console mode, the terminal resets itself and quits all session activity. mode. The system displays the >>> console prompt.

Note

Before running tests in console mode, enter the UNJAM command at the console prompt to clear all pending interrupts.

To choose a minimal or extended power-up self-test:

To run a minimal self-test automatically at power-up, enter the following command:

```
>>> SET FBOOT 1
```

To run the extended self-test automatically at power-up, enter the following command:

```
>>> SET FBOOT 0
```

To run self-tests individually:

You may want to run self-tests at a time other than power-up. You can run individual tests or a range of test with TEST command. Use the test numbers listed in Table 3–1. For example, to run all self-tests, enter the following command:

```
>>> TEST 1:12
```

Table 3–1 Power-Up Self-Tests

Device Number	Device	Test Number
1	NVR test	T 1
2	Video (monochrome)	T 2

(continued on next page)

Table 3–1 (Cont.)   Power-Up Self-Tests

Device Number	Device	Test Number
3	QDZ (serial port, mouse, and keyboard)	T 3
4	Cache	T 4
5	Memory (MEM)	T 5
6	Floating point unit (FPU)	T 6
7	Interval timer (IT)	T 7
8	System logic	T 8
9	Network interface (NI)	T 9
10	Parallel port	T 10
12	Image test (IMG)	T 12

If you set the diagnostic environment to manufacturing mode, you must install loopback connectors on the mouse and serial communication ports (Table B–1). To select the manufacturing diagnostic environment, enter the following command:

```
>>> SET DIAGENV 3
```

3.1.2 Checking the Self-Test Results

Power-up testing begins by displaying various patterns on the screen. The total test time depends on how much memory is installed and whether or not you are using fast boot (FBOOT) mode.

If a test finds an error:

1. Record the error code.

2. Find the error code and suggested solution in Table 4–1.

3. Repeat the tests in this chapter to ensure the terminal operates correctly.

If the power-up self-tests finish successfully:

- The keyboard bell rings.

- On the LK401 and LK402 keyboards, the keyboard LEDs turn off. (The LK421–AA keyboard does not have any LEDs.)

- The terminal displays the Terminal Manager window (Figure 3–1) after the power-up self-test patterns complete successfully.

- The diagnostic summary box in the window indicates the font path status and system-related messages.

Figure 3–1 Terminal Manager Window
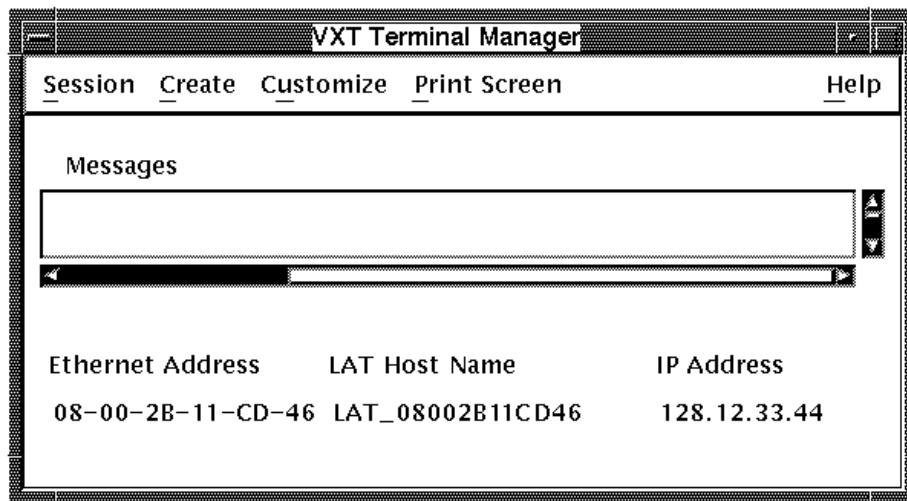
3.1.3 Diagnostic LED Power-Up Sequence

At power-up, the terminal's self-tests check the system before the system tries to boot. The diagnostic LEDs on the rear of the system box indicate which test is in progress.

Table 3–2 lists the LED display for each device being tested. If diagnostic testing completes successfully, the LEDs turn off. If an error occurs, the LEDs display a flashing error code to indicate which test failed. See Section 4.6 to troubleshoot the LED error codes.

Table 3–2   Power-Up LED Codes

LED Display		LED Code	
Device	**| Subtest**	**(Hex.)**	**Description**
General Power-Up LED Codes			
●●●●	| ●●●●	FF	Power has been applied, but no instruction has been run.
●●●●	| ●●●o	FE	Power-up testing has started.
●●●●	| ●●o●	FD	Waiting for memory to initialize.
●●●●	| ●●oo	FC	Sizing memory in the terminal.
●●●●	| ●o●●	FB	Running a byte mask test on memory needed by the console.
●●●●	| ●o●o	FA	Performing a full memory data path test on memory needed by the console.
●●●●	| ●oo●	F9	Initializing the console data structures.
●●●●	| ●ooo	F8	Performing the auto configuration.
●●●●	| o●●●	F7	Testing the NVR device.
●●●●	| o●●o	F6	Testing the serial controller (QDZ) device.
●●●●	| o●o●	F5	Testing the graphics output device.
●●●●	| o●oo	F4	Initializing the console device.
●●●●	| oo●●	F3	Starting the console program.
oo●o	| oooo	20	Starting the monochrome/SPX self-test.
oo●●	| oooo	30	Starting the QDZ test.
oo●●	| oooo	40	Starting the cache test.
o●o●	| oooo	50	Starting the full memory test.
o●●o	| oooo	60	Starting the floating-point unit (FPU) test.
o●●●	| oooo	70	Starting the interval timer (IT) test.
●ooo	| oooo	80	Starting the ROM test.

Key to LED Codes

The left four LEDs = the device number.
The right four LEDs = the subtest number.

● = LED on; o = LED off.

Testing
3.1 Self-Tests

Table 3–2 (Cont.)   Power-Up LED Codes

LED Display		LED Code	
Device	**| Subtest**	**(Hex.)**	**Description**
General Power-Up LED Codes			
•oo•	| oooo	90	Starting the network interface (NI) self-test.
•o••	| oooo	D0	Starting the parallel port test.
•o••	| ooo•	D1	Starting the parallel port interrupt test.
•o••	| oo•o	D2	Starting the data path test.
•o••	| oo••	D3	Starting the command signal test.
DECimage 2000 Module Power-Up LED Codes			
If you have installed a DECimage 2000 module, the following tests are also performed:			
••oo	| oooo	C0	Waiting for decompression and rotation logic cell arrays (LCAs) to be programmed.
••oo	| ooo•	C1	Testing the image registers.
••oo	| oo•o	C2	Testing the CCITT decompression chip.
••oo	| oo••	C3	Testing the scalution device.
••oo	| o•oo	C4	Testing the look-up table (LUT) RAMs.
••oo	| o•o•	C5	Testing the first-in, first-out (FIFO) devices.
••oo	| o••o	C6	Testing the image path pipeline.
••oo	| o•••	C7	Testing the rotation LCA.
••oo	| •ooo	C8	Testing the image interrupt path to the base system.

Key to LED Codes

The left four LEDs = the device number.
The right four LEDs = the subtest number.

• = LED on; o = LED off.

3.2 Displaying the Software Version Number

You can display the VXT software version number by clicking on the Terminal Manager window's title bar (Figure 3–1). You can also check the software version by viewing the System Configuration dialog box (Section 1.3.5).

3.3 Network Service Failure Messages

The terminal may experience network problems even though the power-up self-tests finish successfully. Network problems may occur because vital network services failed.

If the network fails, the terminal may display one of the following network service failure messages at the top of the screen:

```
Cannot locate system image, retrying ...
Cannot connect with system image, retrying ...
Cannot locate free pagefile storage, retrying ...
Cannot locate pagefile, retrying ...
Cannot connect with pagefile, retrying ...
Cannot extend pagefile, more disk space is needed on server
```

If a network error occurs, contact the system manager or the Digital network service representative.

3.4 Checking for Memory Errors

The terminal displays memory status messages under certain conditions. You can also check for soft memory errors in console mode.

3.4.1 Memory Status Messages

The terminal reports memory status or potential memory problems in the Messages box of the Terminal Manager window (Figure 3–1) when the terminal is using the host-based VXT system software. Table 3–3 describes possible memory status messages.

Table 3–3   Memory Status Messages

Status Message	Description
Memory Not Low	There is enough memory for the terminal to perform normal operations. The terminal displays a Memory Not Low message in the Terminal Manager window.
Memory Low	If the memory level continues to decrease, then the local VXT DECterm windows and remote client sessions may fail. The terminal continues to operate normally in this state.
Memory Very Low	If the memory level continues to decrease, then all terminal operations may fail. If the memory condition becomes Very Low when the terminal is servicing an X protocol request from a remote client, the request fails and the terminal disconnects the session to the remote client immediately. The terminal will not service any new X session requests, but all other operation continue normally.
No Memory Left	If there is no memory left, all terminal operations may fail until the user clears the No Memory Left condition. The terminal does not display any warning messages and operates as though it is in the Memory Very Low condition. If the terminal cannot recover enough memory to operate normally, the terminal restarts itself.

3.4.2 Soft Error Messages

If you suspect that the customer has a memory problem, such as not being able to run an application that ran previously, enter the following console command:

>>> **SHOW ERROR**

The SHOW ERROR command displays any soft error message along with other errors. See Chapter 4 to troubleshoot either hard or soft errors.

3.5 Screen Alignment Patterns

You must use screen alignment test patterns to make all video adjustments. See your monitor's service guide for alignment procedures. To display a test pattern, you use screen alignment test patterns menu in console mode.

To enter console mode, you press the halt switch on the rear panel of the terminal (System Box Connectors and Switches). When you enter console mode, the terminal quits all session activity and performs a software reset.

To view the screen alignment test patterns menu, enter the following command at the >>> console prompt:

>>> **T/UTIL 2**

From the menu, choose the alignment pattern that you will be using for video alignment.

To return from a display pattern to the menu, press the space bar. To return to the console prompt, press Ctrl C.

4

Troubleshooting

This chapter describes how to troubleshoot hard and soft errors on the VXT 2000 and DECimage 2000 windowing terminals by

- Using error codes displayed on the screen (Sections 4.4 and 4.5)
- Using error codes displayed by the LEDs (Sections 4.4.1 and 4.6)
- Checking a table of general problems (Section 4.7)

4.1 Troubleshooting Sequence

When troubleshooting the terminal, use the following sequence:

1. Check the console error codes.
2. Check the LED error codes.
3. Check the troubleshooting table in this chapter.

Example

Suppose the video module is loose.

1. There are *no console error codes*, because the video display is not working.
2. There is *no LED error code*, because the LEDs may be running through the test sequence.
3. Check *Table 4–11* for a screen display problem that matches the symptoms of your terminal.

Symptom Screen Display Problems	Suggested Solutions
Monitor's power LED is on, but no video is displayed, and the system box LEDs are blinking.	Check for a loose video module (Section 5.6).

4. Follow the suggested solutions in the order listed in the table.

4.2 Before You Start

The following information will help you troubleshoot the terminal easily and effectively:

WARNING

If you smell burning components, turn off the monitor's power switch and terminal's power switch off, then unplug the power cord.

- If you are going to service a display problem, ask the customer to warm the monitor up for at least 20 minutes before you arrive, if possible.

- Magnetic fields affect monitor performance and can give a false indication of a monitor failure. Place the monitor away from any electromagnetic devices (such as printers and terminals) or large magnetized objects (such as filing cabinets and steel beams in walls).

4.3 Hard and Soft Errors

The terminal's power-up tests and self-tests can detect hard errors and soft errors.

- Hard errors are fatal errors that force the terminal to quit all session activity and enter console mode.

- Soft errors can be fatal or nonfatal errors. Nonfatal errors do not interrupt session activity. Fatal soft errors can occur during customer service mode. Many memory errors may be soft errors, because the terminal can operate as a server-based machine.

4.3.1 Entering Console Mode After a Hard Error

If a self-test detects a hard error on a networked terminal, the terminal automatically enters console mode and displays the >>> console mode prompt. In console mode, you can use the SHOW ERROR and SHOW MEM commands to display error information.

4.4 Troubleshooting Soft Memory Errors

The self-tests report many memory errors as soft errors. When a self-test finds a soft memory error, the terminal still indicates the self-test was successful. To troubleshoot soft memory errors, you need to display the memory positions and gaps so you can determine which FRU to replace. Therefore, you must correct any video problems before trying to correct any soft memory error.

To display soft errors:

Normally, the terminal does not display soft memory errors, except during the self-tests. You can use the SHOW ERROR console command to display any soft errors and other errors.

Example—Troubleshooting Soft Memory Errors

To determine if the self-tests detected a memory error:

1. Enter console mode by pressing the halt switch on the rear of the system box.

2. Enter the SHOW CONFIG command to determine the memory in the system. The display will show memory locations for components, such as those shown in Figure 4–1.

Figure 4–1 Sample Configurations—12 MB and 6 MB Systems

12 MB Memory System

4 MB Memory Option	B f f f f f 800000

2 MB Memory Option	7 f f f f f 600000

6 MB Memory System

2 MB Memory Option	5 f f f f f 400000

2 MB Memory Option	5 f f f f f 400000

System Logic Module	3 f f f f f 000000

System Logic Module	3 f f f f f 000000

LJ-01805-TI0

Each 2 MB memory (MEM) option occupies a 1fffff segment of memory.

Each 4 MB MEM option occupies a 3fffff segment of memory.

In SHOW CONFIG displays, the slot locations S[0], S[1], and S[2] correspond to locations J1, J2, and J3, respectively, on the memory controller module.

If the SHOW CONFIG command shows a 2 MB MEM at S[0] and a 4 MB MEM at S[1], the memory map is as follows:

000000 3fffff	4K bytes for the system logic module
400000 5fffff	2K bytes for the memory controller module
600000 7fffff	S[0] (2MB MEM)
800000 Bfffff	S[1] (4MB MEM)

The MEM cards can be any combination of 4 and 2 MB MEM cards. The only restriction is that you must load the MEM slots starting with S[0] and progressing to S[2]. If there is an empty slot between MEMs, the self-tests report a hard memory error.

3. Enter the SHOW ERROR command at the console prompt.

If the self-tests detect a memory error, the console displays a memory error code beginning with a question mark. For example:

`?001 005 MEM nnn`

`?` indicates a soft error.

`001` indicates a field replaceable unit—the system logic module.

`005` indicates the device that failed—memory.

`MEM` indicates a memory error.

`nnn` indicates where the memory error occurred.

4. Enter the SHOW MEM command to determine the areas of memory. This
    command displays any valid gap in the memory areas, as well as any bad
    memory area. A **valid gap** in memory is space reserved for future memory
    expansion.

    Examples

    •   If the terminal has a valid gap in memory and the maximum memory
        is 6 megabytes (MB), then the SHOW MEM command may display the
        following information:

        ```
        200000   3fffff
        5dffff   5fffff
        ```

        –   `200000 – 3fffff` is a valid gap for a system logic module that has 2
            MB of resident memory (Figure 4–2). This gap will not exist with a
            system logic module that has 4 MB of resident memory.

        –   `5dffff – 5fffff` is the **scratch RAM** area. Scratch RAM is 128K
            bytes of memory reserved for booting, always positioned at the top
            of memory. As more memory modules are installed, these numbers
            increase to occupy the last 128K bytes in memory.

Figure 4–2 Example of 6 MB System with Soft Memory Error

6 MB Memory System		Areas Displayed by SHOW MEM Command		
	5f f f f f	5dffff	5fffff	(Scratch RAM)
Memory Option	42f f f f			
	41f f f f	41ffff	42ffff	(Memory Error)
	4000000			
DRAM Frame Buffer	3f f f f f	200000	3fffff	(Valid Gap)
	2000000			
System Logic Module with 4 MB RAM	1f f f f f			
	0000000			

LJ-01807-TI0

- If the terminal has bad memory and the top of memory is 6 MB, then the SHOW MEM command may display the following information:

```
200000 3fffff
41ffff 42ffff
5dffff 5fffff
```

  - `200000 – 3fffff` is the valid gap on the system logic module.

  - `41ffff – 42ffff` is not normal for a 6 MB system. These numbers represent the bottom and top, respectively, of the bad memory area.

  - `5dffff – 5fffff` is the scratch RAM area at the top of memory.

5. By analyzing the memory data, you can determine the valid gaps, the scratch RAM area, and any bad memory data. By comparing the memory data with the configuration, you can determine which FRU is showing the soft bad memory error.

   - In Figure 4–2, the bad memory area (`41ffff – 42ffff`) is within the memory configuration area of `400000 – 5fffff`. This area is the resident 2 MB RAM on the memory controller module, so the memory controller module should be replaced.

4.4.1 Troubleshooting Soft Memory Errors by LEDs

When self-tests find the first soft error, the memory test displays the soft errors on the screen (Table 4–1). The diagnostic LEDs on the system box momentarily display the memory test error code (Section 4.6).

4.5 Troubleshooting Hard Errors

If the terminal's self-tests find an error, the terminal attempts to display an error code on the screen and a device code on the diagnostic LEDs. Table 4–1 lists the error codes reported on the screen. If the video fails, refer to Section 4.6 to read the error code from the LEDs.

To troubleshoot hard errors:

1. At the >>> console prompt, enter the SET FBOOT 0 command. This command sets the self-test mode to non-fastboot, so the terminal tests all resident memory.

2. Record any screen error code. If the video failed, record any LED device code.

   Normally, the terminal does not display a code for soft memory errors. If you suspect a soft memory error, see Section 4.4.

3. Check Table 4–1 for screen error code you recorded, to determine if the error is a device error. If the video failed, check the tables in Section 4.6 for your LED device code.

   For a detailed description of the error codes, see Appendix C.

Example—Troubleshooting Hard Errors

For hard errors, the power-up self-tests may report the following information:

VXT V01.*nnn*	ROM version
nn-nn-nn-nn-nn-nn	The terminal's Ethernet address
2MB	Megabytes of memory installed
?? 001 9 VNI 0168	Error for disconnected network cable.
?? 003 3 QDZ 0096	Other error messages (See Figure 4–3 and Table 4–1.)
▣▣▣▣▣☐☐☐☐	Self-test progress indicator (Fills in as tests are completed.)

Figure 4–3 shows the format of an error message.

Figure 4–3 Error Message Format

```
?? 003 3 QDZ 0096
 │   │  │  │    │
 │   │  │  │    0096  - Error code in decimal.
 │   │  │  │
 │   │  │  QDZ  - Failed device name.
 │   │  │
 │   │  3  - Failed device number.
 │   │
 │   003  - FRU on the failed device.
 │
 ??   - Error indication.
```

Table 4–1 lists possible error codes. The probable solution for any error code not listed in the table is to replace the system logic module. To display a complete list of all the devices in the terminal's configuration, enter the SHOW CONFIG console command.

Network Interface (NI) Errors

If a network interface (NI) error occurs, check the rear of the system box to verify that a loopback connector is installed on the selected network port and that the network cable is firmly connected.

If needed, enter the TEST 9 console command to run the NI self-test again.

Table 4–1   Self-Test Error Codes

General Self-Test Error Codes

Error Code (Decimal)	Replace	Error Code (Decimal)	Replace
0066	Memory controller	0170	NI module
0068	Memory controller	0172	NI module
0071	NI module	0256	Video module
0080	Keyboard	0512	Video module
0096	Mouse	0514	Memory controller
0128	Video module	0770	Memory controller
0130	NI module	1024	Video module
0132	NI module	1280	Video module
0160	NI module	1536	Video module
0162	NI module	1794	Video module
0164	NI module	2050	Video module
0166	NI module	2304	Memory controller
0168	NI module	2305	Memory controller

DECimage 2000 Self-Test Error Codes

Error Code (Decimal)	Replace	Error Code (Decimal)	Replace
0000	DECimage 2000 module	0080	DECimage 2000 module
0016	DECimage 2000 module	0096	DECimage 2000 module
0032	DECimage 2000 module	0112	DECimage 2000 module
0048	DECimage 2000 module	0128	DECimage 2000 module
0064	DECimage 2000 module		

4.6 LED Error Codes

If the screen cannot display an error message, you can check the LED error code displayed by the diagnostic LEDs on the rear of the system box. Use the following tables to troubleshoot LED error codes. The tables describe the LED error codes and list the suggested action to take.

Key to Tables

In the **LED Display** column:

The left four LEDs = the device number.
The right four LEDs = the subtest number.

• = LED on.
o = LED off.

The **Replace** or **Action** column refers you to the appropriate section in Chapter 5.

Table 4–2 NVR LED Error Codes

LED Display Dev. | Test	LED Code (Hex)	Description	Replace
ooo• | ooo•	11	NVR test failed.	System logic module (5.7).

Table 4–3   Monochrome LED Error Codes

LED Display Dev. | Test	LED Code (Hex)	Description	Action
oo•o | oooo	20	Monochrome/SPX self-test has been entered. LEDs sequence without returning an error.	Check for loose connectors.
oo•o | ooo•	21	Monochrome configure test failed.	Replace the video module (5.6).
oo•o | oo•o	22	Monochrome reset test failed.	Replace the video module (5.6).
oo•o | oo••	23	Monochrome memory test failed.	Replace the video module (5.6).
oo•o | o•oo	24	Monochrome RAMdac test failed.	Replace the video module (5.6).
oo•o | o•o•	25	Monochrome cursor test failed.	Replace the video module (5.6).
oo•o | o••o	26	Monochrome drawing test failed.	Replace the video module (5.6).

Table 4–4   QDZ LED Error Codes

LED Display Dev. | Test	LED Code (Hex)	Description	Action
oo•• | oooo	30	QDZ test has been entered. LEDs sequence without returning an error.	Check for loose connectors.
oo•• | ooo•	31	QDZ reset test failed.	Replace the system logic module (5.7).
oo•• | oo•o	32	QDZ modem test failed.	Replace the system logic module (5.7).
oo•• | oo••	33	QDZ polled test failed.	Replace the system logic module (5.7).
oo•• | o•oo	34	QDZ interrupt test failed.	Replace the system logic module (5.7).
oo•• | o•o•	35	LK401 test failed.	Replace the keyboard (5.10).

(continued on next page)

Table 4–4 (Cont.)   QDZ LED Error Codes

LED Display Dev.	Test	LED Code (Hex)	Description	Action
oo●●	o●●o	36	Mouse test failed.	Replace the mouse (5.10).

Table 4–5   Cache LED Error Codes

LED Display Dev.	Test	LED Code (Hex)	Description	Replace
o●oo	ooo●	41	Data store read write error.	System logic module (5.7)
o●oo	oo●o	42	Read/write error to the tag area.	System logic module (5.7)
o●oo	oo●●	43	The cache did not contain the proper state of the valid bit. This is part 1 where valid should be set.	System logic module (5.7)
o●oo	o●oo	44	Error during the cache tag validation. The tag diagnostic space is missing.	System logic module (5.7)
o●oo	o●o●	45	Unexpected TAG Parity error.	System logic module (5.7)
o●oo	o●●o	46	Cache did not provide the expected data during cache hit testing.	System logic module (5.7)
o●oo	o●●●	47	Parity was not expected.	System logic module (5.7)
o●oo	●ooo	48	Tag not valid during cache hit test.	System logic module (5.7)
o●oo	●oo●	49	Data not expected during cache hit test.	System logic module (5.7)
o●oo	●o●o	4A	Cache write through test failed. The information in the data store did not agree with expected data.	System logic module (5.7)

Table 4–5 (Cont.)   Cache LED Error Codes

LED Display	LED Code		
Dev. | Test	(Hex)	Description	Replace
o•oo | •o••	4B	Cache write through test failed. The information in the memory did not agree with expected data.	System logic module (5.7)
o•oo | ••oo	4C	Error occurred during a write miss.	System logic module (5.7)

Table 4–6   MEM LED Error Codes

LED Display	LED Code		
Dev. | Test	(Hex)	Description	Replace
o•o• | oooo	50	Memory byte mask test failed.	Memory controller (5.2)
o•o• | ooo•	51	Memory error occurred in the forward pass.	Memory controller (5.2)
o•o• | oo•o	52	Memory error occurred in the reverse pass.	Memory controller (5.2)
o•o• | oo••	53	Memory error in parity test 1.	Memory controller (5.2)
o•o• | o•oo	54	Memory error in parity test 2.	Memory controller (5.2)

Table 4–7   SYS Device LED Error Codes

LED Display	LED Code		
Dev. | Test	(Hex)	Description	Replace
•ooo | oooo	80	ROM verify test failed.	System logic module (5.7)
•ooo | ooo•	81	Interrupt controller test failed.	System logic module (5.7)

Table 4–8 NI Device LED Error Codes

LED Display Dev. | Test	LED Code (Hex)	Description	Action
•oo• | oooo	90	NI self-test has been entered. LEDs sequence without returning an error.	Check for loose connectors.
•oo• | ooo•	91	Network address test failed.	Replace the system logic module (5.7).
•oo• | oo•o	92	NI register test failed.	Replace the system logic module (5.7).
•oo• | oo••	93	NI initialization test failed.	Replace the system logic module (5.7).
•oo• | o•oo	94	NI internal loopback/DMA test failed.	Replace the system logic module (5.7).
•oo• | o•o•	95	NI interrupt test failed.	Replace the system logic module (5.7).
•oo• | o••o	96	NI CRC test failed.	Replace the system logic module (5.7).
•oo• | o•••	97	NI receive miss/buffer test failed.	Replace the system logic module (5.7).
•oo• | •ooo	98	NI collision test failed.	Replace the system logic module (5.7).
•oo• | •oo•	99	NI address filtering test failed.	Replace the system logic module (5.7).
•oo• | •o•o	9A	NI external loopback test failed.	Replace the system logic module (5.7).
•oo• | •o••	9B	NI transmit buffer test failed.	Replace the system logic module (5.7).

Table 4–9 Printer Port Device LED Error Codes

LED Display Dev. | Test	LED Code (Hex)	Description	Action
•o•• | oooo	D0	Entered printer port test. LEDs sequence without returning an error.	Check for loose connectors.

Table 4–9 (Cont.)   Printer Port Device LED Error Codes

LED Display Dev. | Test	LED Code (Hex)	Description	Action
●o●● | ooo●	D1	Started printer port interrupt test.	
●o●● | oo●o	D2	Started data path test.	
●o●● | oo●●	D3	Started command signal test.	

Table 4–10   DECimage 2000 Module LED Error Codes

LED Display Dev. | Test	LED Code (Hex)	Description	Replace
●●oo | oooo	C0	Logic cell array (LCA) ROM load test failed.	DECimage 2000 module (5.5)
●●oo | ooo●	C1	Image register test failed.	DECimage 2000 module (5.5)
●●oo | oo●o	C2	CCITT decompression chip self-test failed.	DECimage 2000 module (5.5)
●●oo | oo●●	C3	Scalution test failed.	DECimage 2000 module (5.5)
●●oo | o●oo	C4	Look-up table (LUT) test failed.	DECimage 2000 module (5.5)
●●oo | o●o●	C5	First-in, first out (FIFO) test failed.	DECimage 2000 module (5.5)
●●oo | o●●o	C6	Image path test failed.	DECimage 2000 module (5.5)
●●oo | o●●●	C7	Rotation LCA test failed.	DECimage 2000 module (5.5)
●●oo | ●ooo	C8	Image interrupt test failed.	DECimage 2000 module (5.5)

4.7 Troubleshooting General Problems

Table 4–11 describes some general operating problems and suggested solutions. Some problems have several suggested solutions. Try the suggested solutions in the order listed.

Troubleshoot the terminal as follows:

1. Ask the operator to describe the problem. The operator often has the most information about how the problem occurred.

2. Identify the problem. The screen display often helps identify the problem.

3. Isolate the problem. Check column 1 in Table 4–11 for a symptom that matches your problem. Then try the suggested solutions.

4. After you correct a problem, display the host system alignment test patterns to make sure that no other problem exists. See Section 3.5 for displaying test patterns.

Table 4–11   Troubleshooting the Terminal

Symptom	Suggested Solution
Monitor Problems	
The monitor's power LED does not turn on.	Check the monitor's power cord connection on the rear of the system box and on the monitor.
	Check the system box's power cord connection on the rear of system box and at the power outlet.
	Connect the monitor's power cord directly to the power outlet.
	See the monitor's service guide.
The monitor loses power, but the LEDs on the system box remain on.	Check the monitor's power cord by plugging it directly into the power outlet.
	Replace the monitor's power cord.
The monitor loses power for no apparent reason, or the Terminal Manager window appears after the monitor lost power for no apparent reason.	Thermal shutdown occurred. See the monitor's service guide.

Table 4–11 (Cont.)   Troubleshooting the Terminal

Symptom	Suggested Solution
Monitor Problems	
The monitor's power LED is on, but no video is displayed. The LEDs on the system box are blinking.	Check for a loose video module (Section 5.6).
	Replace the video module (Section 5.6).
	Replace the system logic module (Section 5.7).
Memory Problems	
The memory quota seems low.	Check the message in the Terminal Manager window's message box (Section 3.4.1).
	There is not enough memory installed in the terminal.
	Memory modules are installed in the wrong slot. Install the memory modules in the correct slot (Section 5.3).
Problems at Power-Up	
The Terminal Manager window appears, but the keyboard bell does not ring.	The power-up self-tests detected a soft or hard error. See Section 4.4 to troubleshoot soft memory errors.
	See Section 4.5 to troubleshoot hard errors.
Replace the keyboard (Section 5.10).)	
The Terminal Manager window appears, and the keyboard bell rings, but the terminal cannot communicate with host.	Check the ThinWire port's cable connection on the rear of system box.
	Enter the correct terminal IP address (Chapter 6).
	Check the terminal's serial port and parallel port cable connections on the rear of system box.
	The serial communication port circuits are faulty. Run the serial port loopback tests. See test 9 (NI test) in Section 3.1.1.
	The baud rate is incorrect. Check the Transmit and Receive speeds in the Serial and Parallel Ports dialog box. To access the dialog box, click on the Terminal Manager window's Customize menu and choose the Customize Communications submenu.
A continuous keyclick sound occurs at power-up.	Check for a stuck keyboard key.
	Replace the keyboard (Section 5.10).

Table 4–11 (Cont.) Troubleshooting the Terminal

Symptom	Suggested Solution
Problems at Power-Up	
Cannot save customized settings.	When the system logic module was replaced, the system ROM was not installed on the new system logic module.
Customized settings are lost without any apparent reason.	Ask the system manager or responsible site manager to check if the terminal is set to read-only mode. See the chapter on using the configuration manager, in the *VXT 2000 Windowing Terminal User Information* guide.
The system does not respond, even though the mouse indicator moves on the screen.	Check if there are messages (Section 3.3) at the top of the screen. If messages appear at the top of the screen, then the InfoServer is having problems and the terminal is operating correctly.
Screen Display Problems	
Curved lines appear on screen during power-up.	This is a normal action. The terminal is operating correctly.
The screen is off-center or rotated.	Move the terminal to another location.
Horizontal or vertical line appears on screen.	See the monitor's service guide.
The screen display is distorted or jittery.	Nearby devices are creating electrical interference. Move the terminal away from the electrical devices.
	The monitor is out of alignment. See the monitor's service guide.
The screen image seems to wobble at the end of a successful power-up sequence.	This is a normal action. The terminal is operating correctly.
In local mode, the terminal displays different characters than those typed.	Choose the correct character set from the General Options dialog box in the Options menu of a VXT DECterm window.
	Select the correct keyboard type by using the Customize Keyboard dialog box, accessed from the Terminal Manager window's Customize menu.

Table 4–11 (Cont.)   Troubleshooting the Terminal

Symptom	Suggested Solution
Screen Display Problems	
While on-line with the host, the terminal displays different characters than those typed. (The terminal works in local mode.)	Transmit and receive speeds are incorrect. Set the speeds to match the host by using the Serial and Parallel Ports dialog box. To access the dialog box, click on the Terminal Manager window's Customize menu and choose the Customize Communications submenu.
	Bits/character or parity setting is wrong. Set the Word Size or Parity setting to match the host by using the Serial and Parallel Ports dialog box.
	The stop bits setting is incorrect. Set the Stop Bits number to match the host by using the Serial and Parallel Ports dialog box.
Messages are garbled, and reverse question marks appear on the screen.	XON/XOFF flow control is not enabled. Click on the XOFF at 64 or 128 button in the Serial and Parallel Ports dialog box. To access the dialog box, click on the Terminal Manager window's Customize menu and choose the Customize Communications submenu.
The screen display does not scroll.	Press F1 to resume scrolling.
The screen is blank.	Press any key to restore the screen display.
	Check the Screen Saver setting in the Customize Screen Background dialog box, accessed from the Terminal Manager window's Customize menu.
The terminal fails after warming up. The screen goes blank, and the power supply LED turns off.	Thermal shutdown occurred. Check the fan connector.
	Replace the fan (Section 5.9).
	Replace the power supply (Section 5.8).
Image Display Problems	
XIE session initialization is refused.	Check to make sure that the terminal is running VXT software Version 1.1 or higher (Section 3.2).
	Check to make sure that the XIE Image toggle button is on in the Customize X Server dialog box (Section 2.1.5).

Table 4–11 (Cont.)   Troubleshooting the Terminal

Symptom	Suggested Solution
Image Display Problems	
Poor performance for bitonal image operations.	Check to make sure that you are running VXT software Version 1.1 or higher (Section 3.2).
	Check to make sure that the XIE Image toggle button is on in the Customize X Server dialog box (Section 2.1.5).
	Check to make sure that the terminal was booted from a VXT physical image that has XIE capability.
	To do this:
	1. Click on the **Session** menu in the Terminal Manager window.
	2. Click on the **Status** menu item to display a Status submenu.
	3. Click on the **System Configuration...** menu item.
	4. In the System Configuration dialog box, check the VXT Software field. If the entry is Color (or Mono) Physical VXTi, the terminal was booted from a VXT physical image with XIE capability. If not, you must reboot the system from a VXT physical image that has XIE capability. For details, see the Customize Boot dialog box in the *VXT 2000 Windowing Terminal User Information* guide.
	Run the diagnostics again, to make sure the DECimage 2000 module passes all tests. (Section 3.1).
	If the DECimage 2000 module fails a diagnostic test, verify that the board is installed properly. If the diagnostic test still fails, replace the module (Section 5.5).
No image or a partial image is displayed.	Run the diagnostics to make sure the DECimage 2000 module passes all tests. (Section 3.1).

Table 4–11 (Cont.)   Troubleshooting the Terminal

Symptom	Suggested Solution
Image Display Problems	
	If the module fails a diagnostic test, verify that the module is installed properly. If the module still fails, replace the module (Section 5.5). If the module passes the diagnostics test, check that the image data file is not corrupted.

5

Removing and Replacing FRUs

This chapter describes how to remove and replace the field replaceable units
(FRUs) for the terminal. See Appendix B for the recommended spares list and
part numbers.

_____ **Caution** _____

Always use a static protection kit (PN 29-26246-00) when handling any
internal components.

_____

This guide does not cover removal and replacement procedures for the terminal's
monitor. For information on a monitor, see the monitor's service guide:

Monitor	Document Title	Order Number
VRM17	VRM17 Monitor Service Guide	EK–VRM17–SG
VR315	VR315 Monochrome Monitor Service Guide	EK–VR315–SV
VR319	VR319 Monitor Service Guide	EK–VR319–SV
VR320	VR320 Monitor Service Guide	EK–VR320–SV
VR326	VR326 Color Monitor Service Guide	EK–VR326–SV

5.1 System Box Cover

To remove the system box cover:

1. Turn the system box's ⏻ power switch off (O).

2. Turn the monitor's ⏻ power switch off (O).

3. Disconnect the terminal's power cord from the power outlet, then from the rear of the system box. Also disconnect the monitor's power cord from the rear of the system box.

4. Disconnect the monitor video cable from the rear of the monitor.

5. Remove the monitor from the top of the system box.

6. Release the top cover of the system box by pushing your fingers in the two slots on the side of the box, as shown.

7. Slowly lift the top cover until you release the hinges on the other side of the box. Lift the top cover completely off the system box.

To install the system box cover: Reverse steps 1 through 7.

LJ-00846-TI0
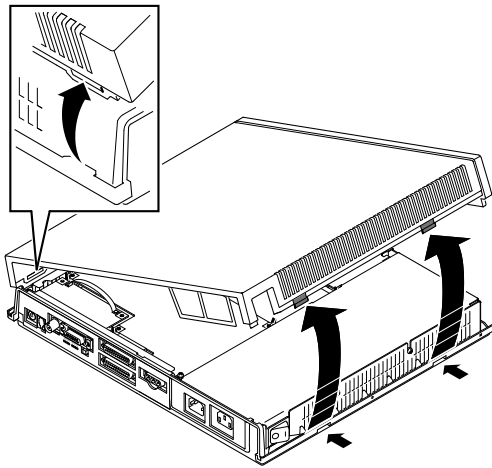
5.2 Memory Controller Module

_____ **Caution** _____

The memory controller module can be damaged by electrostatic discharge. Handle the module by its cover or strap. Avoid contact with any components or circuitry within the system box.

_____

To remove the memory controller module:

1. Remove the system box cover (Section 5.1).

2. Release the standoff clip by gently pushing the clip away from the module and lifting up on the edge of the module.
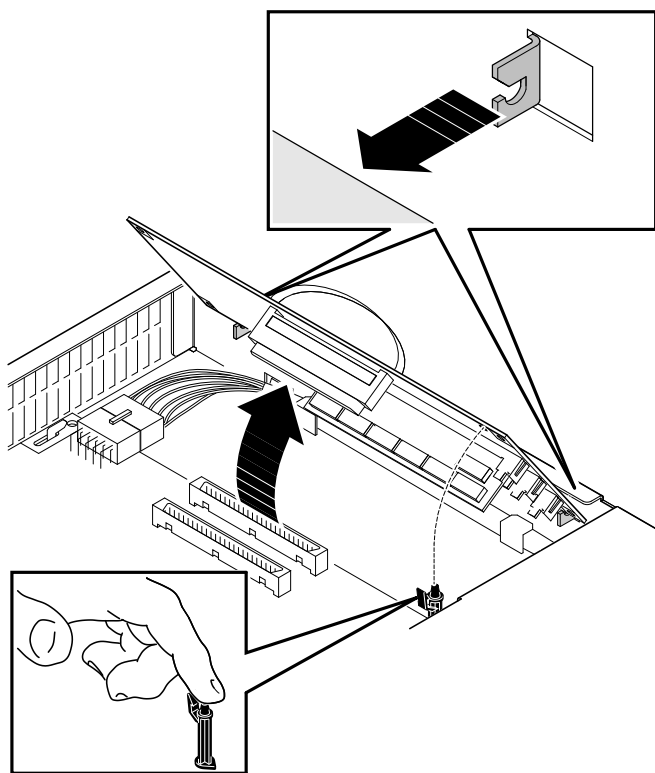
LJ-00475-TI0

3. Grasp the strap of the memory controller module and pull up firmly.

4. Slowly lift the module until it is released from the chassis hooks. Lift the module out of the system box.

5. Place the module on top of the power supply with the strap side down. Use the power supply as an antistatic work surface to remove and replace memory modules.

   Remove the memory modules from the old memory controller module and install them on the new memory controller module (Section 5.3).

To install the memory controller module: Reverse steps 1 through 4. Ensure the back of the module is seated into the metal guide hooks, then press firmly on top of the handle to seat the connector.
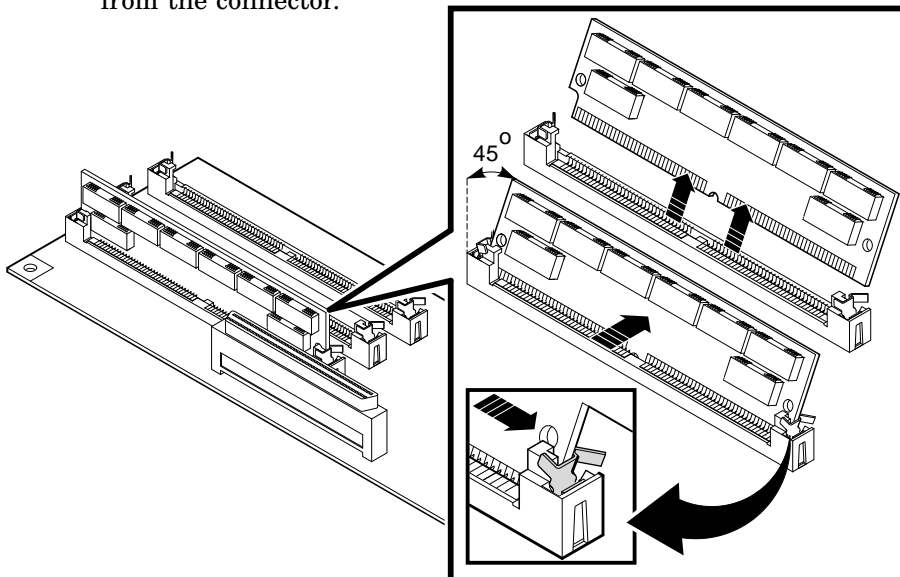
5.3 Memory Modules

_____ **Caution** _____

Memory modules can be damaged by electrostatic discharge. Handle the
memory module by the side edges of the module. Avoid contact with the
gold contact fingers on the module.
_____

5.3.1 Removing Memory Modules

To remove memory modules from the memory controller module:

1. Remove the system box cover (Section 5.1).

2. Remove the memory controller module (Section 5.2).

3. Remove the memory modules in order, starting with the module farthest
   away from the memory controller module connector.

   a. Release both sides of the memory module from the connector by gently
      pushing each clip away from the sides of the module.

   b. Grasp the edges of the memory module firmly and lift up to remove it
      from the connector.

LJ-00751-TI0
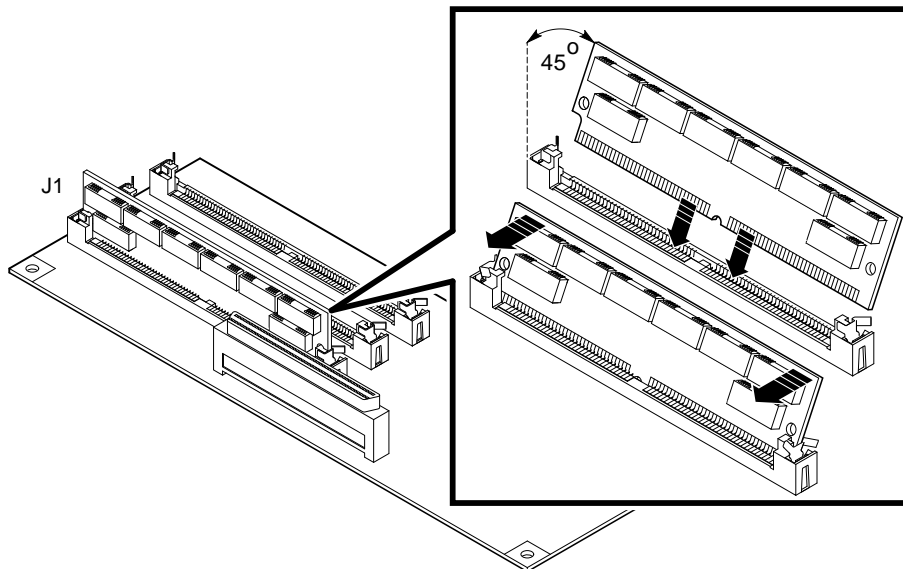
5.3.2 Installing Memory Modules

To install memory modules on the memory controller module:

1. Remove the memory modules from the shipping bag and place them on top of the power supply.

2. Insert the first memory module into slot J1 at a 45-degree angle. The notch on the bottom corner of the memory module should be near the edge of the memory controller module, as shown.

3. While pushing down on the top of the memory module, push the memory module into a standup position. Both sides of the module lock into the metal connector clips. Make sure the platic tabs go into the holes on the memory module. Also make sure the metal connector clips return to their original position, locked in place.

Repeat these steps for a second and third memory module, if used. Insert the second module into slot J2 and the third module into slot J3.

LJ-00476-TI0

5.4 Network Module

_____ Caution _____

The network module can be damaged by electrostatic discharge. Handle
the network module by its cover or strap.

_____

The network module comes in two variations. One type has a ThinWire connector
and a thickwire connector. The other type has a twisted-pair connector and
thickwire connector. The removal and replacement procedures are the same for
both types.

To remove the network module:

1. Remove the system box cover (Section 5.1).

2. Remove the network connector from the rear of the system box.

3. Release the standoff clip by gently pushing the clip away from the module
   and lifting up on the edge of the module.

4. Grasp the strap of the network module and pull up firmly to release the
   module connector from the system logic module.

5. Slowly lift the module until the rear chassis hooks release. Lift the module
   out of the system box.
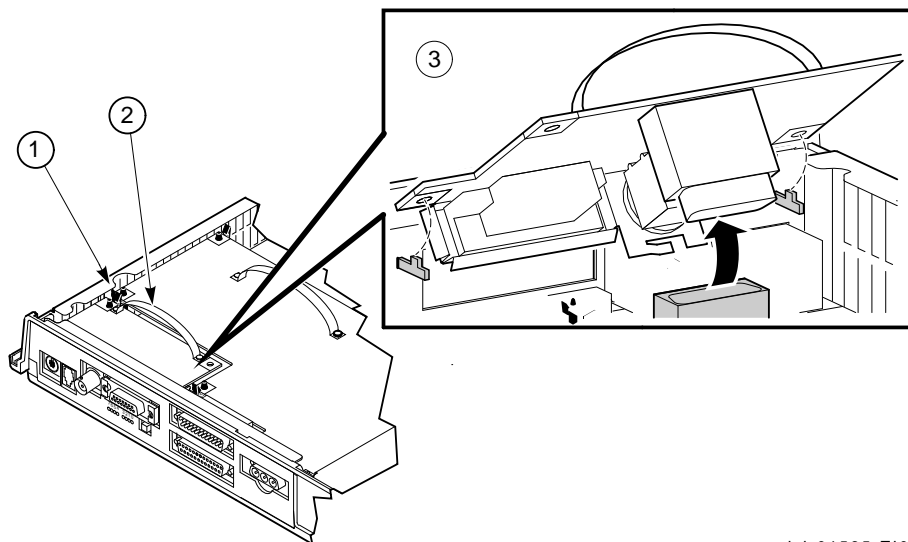
LJ-01535-TI0

To install the network module:

1. Grasp the strap of the module.

2. Align the holes on the module with the chassis hooks on the rear panel of the system box.

3. Carefully lower the module onto its connector and standoff in the system box. Use the standoff as a guide to align the connector on the board with the connector in the system box.

4. Press down firmly on the module to seat the connector and lock the module in the standoff clip.

5.5 DECimage 2000 Module

_____ **Caution** _____

The DECimage 2000 module can be damaged by electrostatic discharge.
Handle the board by its cover or strap. Avoid contact with any
components or circuitry in the system box.

_____

To remove the DECimage 2000 module:

1. Remove the system box cover (Section 5.1).

2. Release the standoff clips by gently pushing the clips away from the module
    and lifting up on the edge of the module.

3. Grasp the strap of the DECimage 2000 module and pull up firmly.
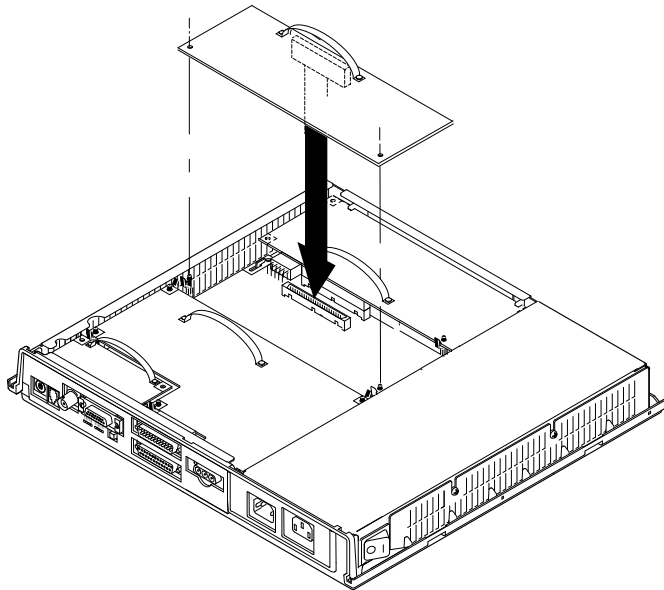
MA-0272-92

To install the DECimage 2000 module:

1. Remove the system box cover.

2. Follow the directions on the power supply label to touch the power supply and neutralize any static charge.

3. Remove the DECimage 2000 module from its antistatic bag.

4. Grasp the strap of the DECimage 2000 module.

5. Slide the edge of the module under the edge of the metal chassis, then carefully place the module on top of its connector and two standoff clips.

   Use the standoff clips as guides to align the connector on the board with the connector in the system box.

6. Press down firmly on the module to seat the connector. Then press down on the corners of the module to lock it in the two standoff clips.

7. Replace the system box cover.

8. Place the DECimage 2000 label on the front of the system box.
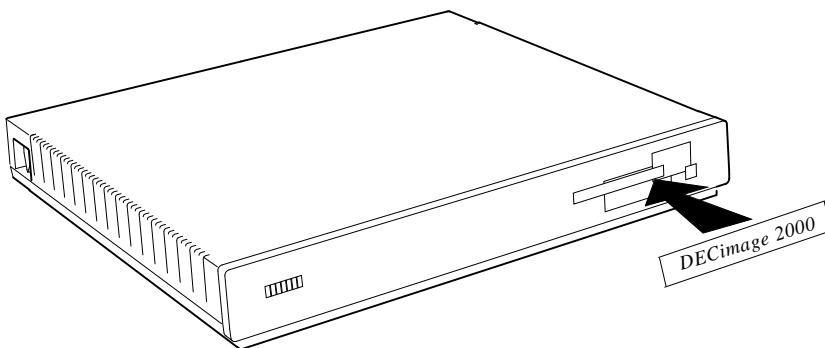
MA-0269-92

5.6 Video Module

─────────── **Caution** ───────────
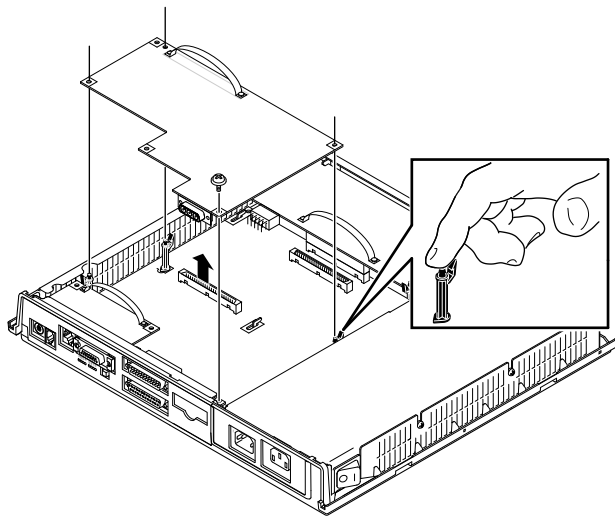
The video module can be damaged by electrostatic discharge. Handle the
video module by its edges.

───────────────────────────────────

To remove the video module:

1. Remove the system box cover (Section 5.1).

2. Disconnect the video cable from the rear of the system box.

3. Remove the single Phillips screw holding the video module to the chassis.

4. Release the three standoff clips by gently pushing each clip away from the
    module and lifting up on the edges of the module.

5. Grasp the edges of the module and pull up firmly.

To install the video module: Reverse steps 1 through 3.

To position the module, slide the side of the module under the edge of the metal
chassis so the video connector fits in the video connector opening. Align the
connector on the module with the connector in the system box, using the three
standoffs. Then press the module into place.

LJ-00718-TI0

5.7 System Logic Module

The system logic module contains the Ethernet chip. If you are replacing only the logic module, then you should install the Ethernet chip from the old module onto the new logic module. When you reuse the original Ethernet chip, the system manager does not have to change the Ethernet address. However, if the Ethernet chip is faulty, then you should replace the logic module and the chip.

To remove the system logic module:

1. Remove the system box cover (Section 5.1).

2. Remove the memory controller module, if installed (Section 5.2).

3. Remove the network module (Section 5.4)

4. Remove the video module (Section 5.6).

5. Remove the Ethernet chip.

6. Unplug the power supply cable by pressing in the release clip on the cable's connector and pulling out the cable.
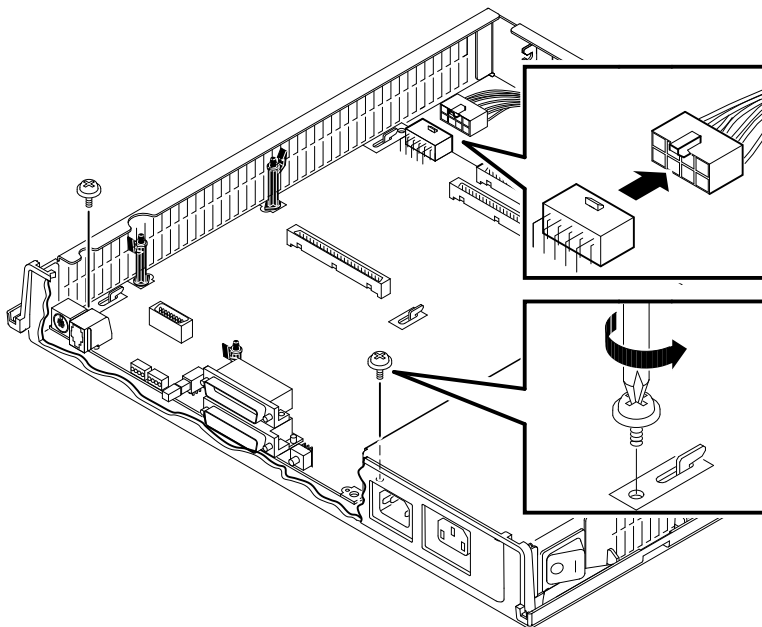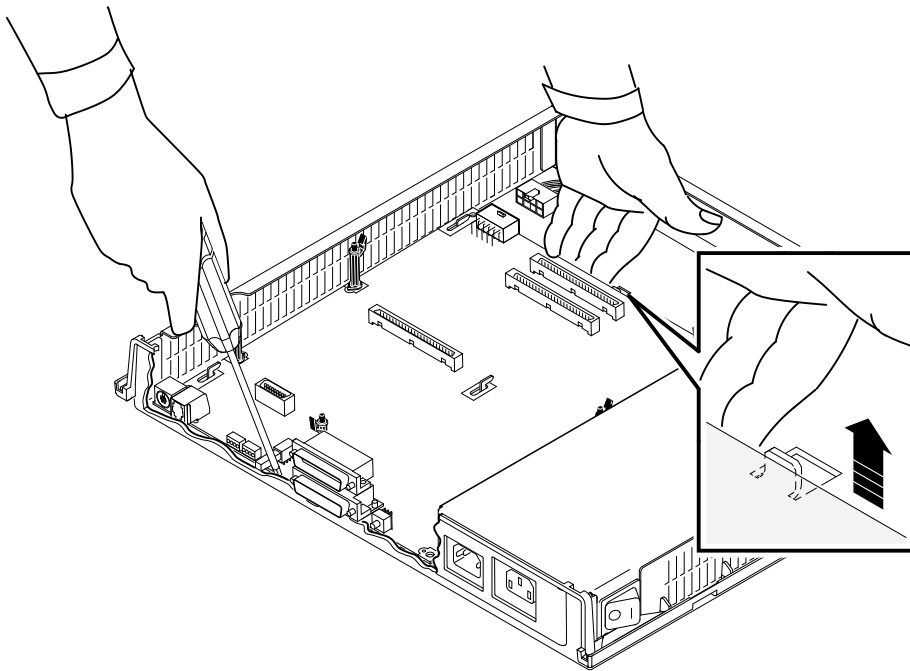
LJ-00835-TI0

7. Disconnect any cables connected to the logic module through the rear panel.

8. Remove the two Phillips screws holding the system logic module to the system box.

9. With one hand, insert a flat-head screwdriver between the chassis and the edge of the system logic module, as shown.

10. With the other hand, lift up on the opposite edge of the module to release that edge from its locking tab.

LJ-00836-TI0

11. Slide the system logic module 1/4 inch toward the front of the system box. Use the chassis for leverage and gently push the module with the screwdriver to unlock the six chassis hooks.

12. Lift the system logic module out of the system box.
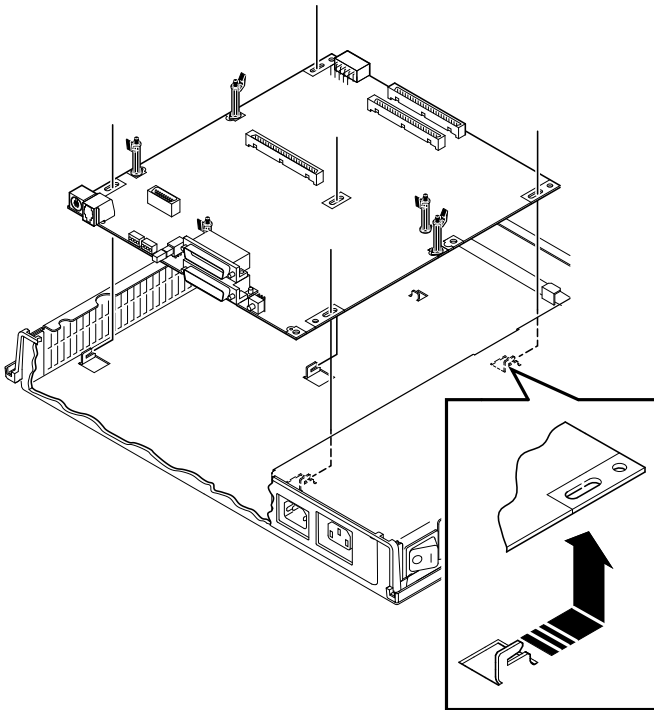
LJ-00837-TI0

To install the system logic module: Reverse steps 1 through 8.

- Unless the Ethernet address chip is faulty, you must remove the Ethernet address chip from the old system logic module and install it on the new module. Make sure the chip aligns with the notches when you seat it.

- Make sure the system logic module fits into all six chassis hooks.

- Make sure the single locking tab firmly holds the system logic module in place.

- Make sure you replace both screws to meet grounding requirements.

- Reconnect the power supply cable.

Entering the User's Customized Settings

After you replace the system logic module, refer to Chapter 6 to enter and save the user's required settings. These include host name or IP address, font paths, and the terminal IP address.
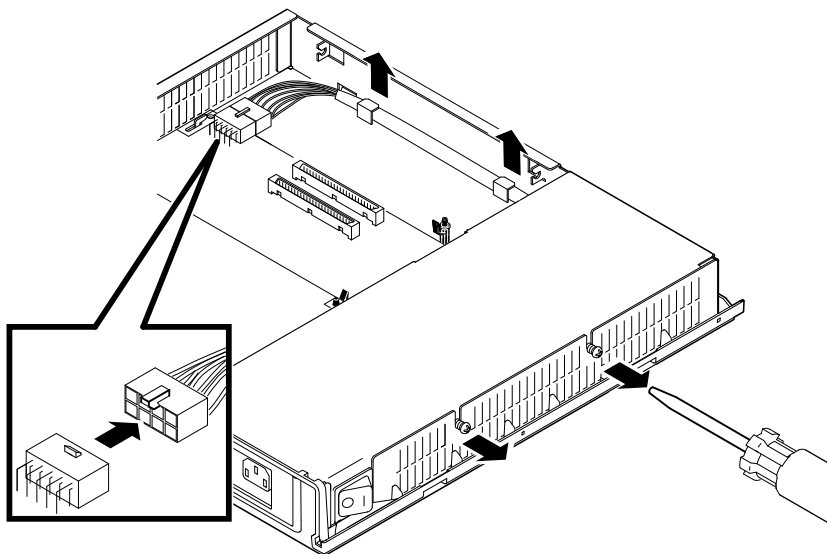
5.8 Power Supply

To remove the power supply:

1. Remove the system box cover (Section 5.1).

2. Remove the memory controller module, if installed (Section 5.2).

3. Disconnect the power supply cable on the system logic module.

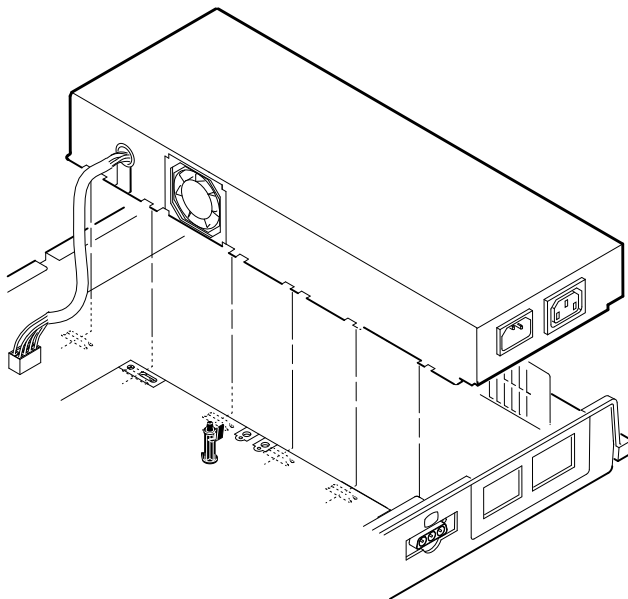4. Loosen the two screws holding the power supply to the system box.

LJ-00876-TI0

5. Lift up the screw side of the power supply to slide the power supply's holding tabs out of the slots on the bottom of the chassis.

6. Lift the power supply out of the system box.

To install the power supply: Reverse steps 1 through 5.

LJ-00877-TI0
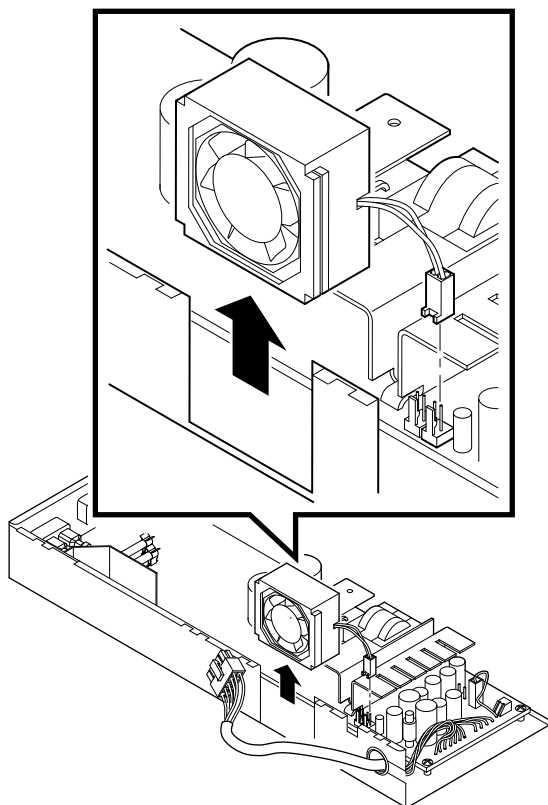
5.9 Fan

To remove the fan:

1. Remove the system box cover (Section 5.1).

2. Remove the power supply (Section 5.8).

3. Disconnect the fan's power wire from the power supply.

4. Slide the fan out of the power supply.

To install the fan: Reverse steps 1 through 4.

LJ-00715-TI0

5.10 Keyboard, Mouse, and Printer

Disconnect the keyboard, mouse, and printer cables from the rear of the system box. You do not have to turn off the power.

To install a keyboard, mouse, and printer, connect its cable to the appropriate connector on the rear of the system box.

6

Starting a Session

This chapter provides step-by-step procedures on how to start using your terminal with a host computer. If you are unfamiliar with using a mouse or windows, see *VXT 2000 Windowing Terminal User Information* for more detailed procedures with supporting screens.

Before you start, you should set the terminal to use the desired display language and keyboard type. By default, the terminal uses the English language and the North American keyboard type.

You can use your terminal with a wide range of operating systems, including the UNIX, ULTRIX, or VMS operating systems. You can open two types of sessions on these systems—an X window session or a terminal window session.

The chapter covers the following topics:

- Terminal Manager Window
- Choosing the Display Language
- Choosing the Correct Keyboard Type
- Starting a Session on Your Host System
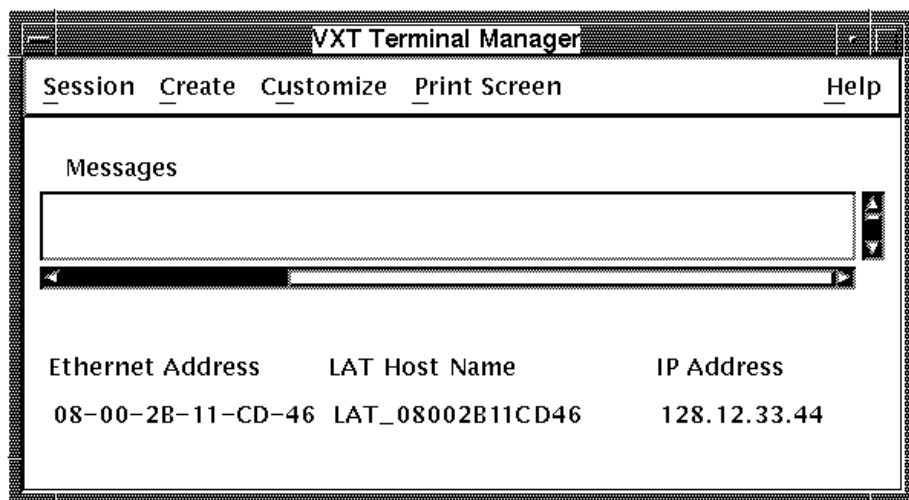- Using the Keyboard Instead of the Mouse
- Ending a Session

6.1 Terminal Manager Window

When you turn on the terminal, it performs its self-tests, then normally displays the Terminal Manager window. You use the Terminal Manager window to create sessions on your host system.

The menu bar of the Terminal Manager window contains four menu names: Session, Create, Customize, and Print Screen. Server-based systems also have a Help menu.

LJ–01140–RAGS

AutoStart

The Session menu has a customizable AutoStart feature that lets you automatically connect to a chosen host or service when you turn the terminal on. In this case, the terminal displays a log-in box and you can start a session immediately by logging in. For information on entering a host service for the AutoStart feature, see *VXT 2000 Windowing Terminal User Information*.

This chapter describes how to start a session on a terminal that has not been customized to use the AutoStart feature.

Help Menu for Creating Sessions

The Help menu in the Terminal Manager window also provides access to step-by-step instructions on creating sessions.

6.2 Choosing the Display Language

Before you start, you should set the terminal to use the desired display language. The display language is initially set to English.

To change the display language:

1. Turn on the terminal. After the terminal completes its self-tests, the Terminal Manager window is displayed.

2. Point to the **Customize** menu name in the Terminal Manager window's menu bar. Click mouse button 1 to display the Customize menu.

3. Point to the **Language . . .** menu item. Click mouse button 1 (MB1) to display the Customize Language dialog box.

4. In the dialog box, click on your language choice. Your choice is highlighted.

5. Click on the **OK** button to save your choice and dismiss the Customize Language dialog box.

6. To apply your choice, you must quit the terminal session:

   a. Point to the **Session** menu name in the Terminal Manager window's menu bar. Click MB1 to display the Session menu.

   b. Point to the **Quit** menu item and click MB1 to quit the terminal session and restart the terminal.

   c. The terminal displays a confirmation box, asking if you really want to quit the session. Click on **Yes**.

   The Terminal Manager window is displayed in your chosen language.

6.3 Choosing the Correct Keyboard Type

Digital's standard ANSI keyboard comes in many models, for use with different languages. By default, the terminal is set to work with the North American keyboard type. If you have another keyboard, you must change the setting.

To change the keyboard type:

1. Turn on the terminal. After the terminal completes its self-tests, the Terminal Manager window is displayed.

2. Point to the **Customize** menu in the Terminal Manager's menu bar. Click mouse button 1 (MB1) to display the Customize menu.

3. Point to the **Keyboard . . .** menu item and click MB1 to display the Customize Keyboard dialog box.

4. Turn the keyboard upside down and look for a label that specifies the model number. The model number should be in a format similar to LK401-*xx*. Use the *xx* value to choose your keyboard type from the Keyboard Type scroll box.

   For example, if you have a Belgian French keyboard and the model number is LK401-AP, you can choose either the Belgian_French_LK401_AP_DP or Belgian_French_LK401_AP_TW setting. The choice of a *TW* (typewriter) version or *DP* (data processing) version affects keys with more than three characters on their keycaps. Data processing characters are on the right half of keycaps.

5. Click on the your keyboard choice in the Keyboard Type scroll box. If needed, click on the arrows to scroll through the selections until you see your keyboard model.

6. Click on the **OK** button to save your choice and dismiss the Customize Keyboard dialog box.

6.4 Starting a Session on Your Host System

The following sections show you how to use the Terminal Manager window to

- Create an IP X window or TELNET terminal window session on a UNIX or ULTRIX system

- Create a LAT X window or LAT terminal window session on a VMS system

- Create a terminal window session on a system using the serial port

6.4.1 Creating an IP X Window or TELNET Terminal Window Session

This section describes how to create an IP X window session or a TELNET terminal window session, on a UNIX or ULTRIX host system.

Enter and save the terminal's IP address.

Before you start your first session, you must enter and save the terminal's IP address. You only need to perform this procedure one time.

1. Turn on the terminal. The Terminal Manager window is displayed.

2. Display the Customize TCP/IP dialog box.

   a. Point to the **Customize** menu name in the Terminal Manager window's menu bar. Click mouse button 1 (MB1) to display the Customize menu.

   b. Point to the **Communications** menu item. Click MB1 to display the Communications submenu.

    c.   Point to the **TCP/IP . . .** menu item. Click MB1 to display the Customize TCP/IP dialog box.

3. Enter your terminal's IP address in the **IP Address** box. For example: `12.123.123.12`

4. Optional: Click on the **IP Subnet Mask** box and enter your terminal's IP subnet mask. For example: `255.255.0.0`

5. Click on the **OK** button to save the settings and dismiss the dialog box. The IP address you entered is displayed at the lower right of the Terminal Manager window.

Create the Session

After you save the terminal's IP address, you can start an IP X or TELNET terminal window session as follows:

1. Point to the **Create** menu name in the Terminal Manager window's menu bar. Click MB1 to display the Create menu.

2. **For an IP X session:** Click on the **IP X Session . . .** menu item to display the Create an IP X Session dialog box.

   For a TELNET terminal window session: Click on the **TELNET Terminal Window . . .** menu item to display the Create a TELNET Terminal Window dialog box.

3. Enter a host name or IP address, then connect to the host:

   a.   In the **Host Name or IP Address** box, enter the name or IP address of the host you want to connect to.

       For example: `12.123.123.12`

   b.   Click on the **Add** button to add your host to the Preferred Services scroll box.

   c.   Click on the **Save** button to save your host name or host IP address, so you do not have to enter it each time you turn on the terminal.

   d.   Click on the **Connect** button to connect to the host. The terminal displays a log-in prompt.

4. Log in to the session.

6.4.2 Creating a LAT X Window or Terminal Window Session

This section describes how to create a LAT X window session or LAT terminal window session on a VMS host system.

1. Turn on the terminal. The Terminal Manager window is displayed.

    Point to the **Create** menu name in the Terminal Manager window's menu bar. Click mouse button 1 (MB1) to display the Create menu.

2. **For a LAT X session:** Click on the **LAT X Session . . .** menu item to display the Create a LAT X Session dialog box.

    For a LAT terminal window session: Click on the **LAT Terminal Window . . .** menu item to display the Create a LAT Terminal Window dialog box.

3. Enter a service or host name, then connect to the host.

    a. In the **Service or Host Name** box, enter the name of the service or host you want to connect to.

        For example: `VMSNODE`

    b. Click on the **Add** button to add your host to the Services scroll box.

    c. Click on the **Save** button to save your host name so you do not have to enter it each time you turn on the terminal.

    d. Click on the **Connect** button to connect to the service in the box. The terminal displays a log-in prompt.

4. Log in to the session.

6.4.3 Starting a Terminal Window Session on the Serial Port

This section describes how to start a terminal window session on a UNIX, ULTRIX, or VMS system that is connected to the terminal's serial port.

1. Turn on the terminal. The Terminal Manager window is displayed.

2. Point to the **Create** menu name in the Terminal Manager window's menu bar. Click mouse button 1 (MB1) to display the Create menu.

3. Click on the **Terminal Window on Serial Port . . .** menu item to display a serial terminal window.

4. Press the Return key until the log-in prompt is displayed.

5. Log in to the host as you would on a conventional video terminal.

6.5 Using the Keyboard Instead of the Mouse

The terminal uses a Motif window manager that lets you use the mouse or keyboard to navigate through windows and make menu selections. For example, you can use the following key functions to choose menu items:

To ...	Press...
Activate keyboard navigation and move to the first menu in a menu bar	F10
Move to different menus in the menu bar	→ and ←
Pull down a menu	Alt Function + the underlined letter in the menu's name
Move to a menu item	↓ and ↑ keys
Choose a menu item	Return
Dismiss the menu and deactivate keyboard navigation	F10

For more information on using the keyboard instead of the mouse, see *VXT 2000 Windowing Terminal User Information*.

6.6 Ending a Session

You can end a session at any point, by choosing the Quit menu item from the Session menu. Choosing Quit returns the terminal to its initial start-up state. End a session only after completing your work. When you end a session, the terminal

- Terminates all host connections

- Deletes all windows on the screen

- Performs a complete software reset

- Displays the Terminal Manager window

To end your session:

1. Point to the **Session** menu name in the Terminal Manager's menu bar. Click MB1 to display the Session menu.

2. Click on the **Quit** menu item. The terminal displays a dialog box to confirm that you want to end the session.

   - To end the session, click on the **Yes** button.

   - To remain in the session, click on the **No** button.

A

Related Documents

Table A–1 lists documents that can be ordered from Digital. This guide refers to these documents.

Table A–1   Related Documents

Documents	Order Number
VXT 2000 Windowing Terminal User Information	EK–VXT20–UG
VXT 2000 Windowing Terminal and DECimage 2000 Option Installing and Getting Started	EK–VXT20–IN
VXT 2000 Illustrated Parts Breakdown	EK–V2000–IP
VRM17 Monitor Service Guide	EK–VRM17–SG
VR315 Monochrome Monitor Service Guide	EK–VR315–SV
VR319 Monitor Service Guide	EK–VR319–SV
VR320 Monitor Service Guide	EK–VR320–SV
VR326 Color Monitor Service Guide	EK–VR326–SV

A.1 Ordering Information

You can order options and documentation by mail, phone, or electronically.

Need Help?

If you need help deciding which documentation best meets your needs, please call 800–343–4040 before placing your order.

Electronic Orders

To place an order at the Electronic Store, dial 800–234–1998 using a 1200- or 2400-baud modem. If you need help, call 800–DIGITAL (800–344–4825).

Telephone or Direct Mail Orders

If You Are From . . .	Call . . .	Or Write . . .
Continental USA, Alaska, or Hawaii	800–DIGITAL	Digital Equipment Corporation P.O. Box CS2008 Nashua, New Hampshire 03061
Puerto Rico	809–754–7575	Local Digital subsidiary
Canada From outside Canada	800–267–6215 613–591–6000	Digital Equipment of Canada Attn: DECdirect Operations KAO2/2 P.O. Box 13000 100 Herzberg Road Kanata, Ontario, Canada K2K 2A6
International	–	Local Digital subsidiary or approved distributor

Digital Personnel

You can order documentation by electronic mail. Contact the following organizations for instructions:

If You Need . . .	Contact . . .
Software documentation[1]	USASSB Order Processing WMO/E15 *or* U.S. Area Software Supply Business Digital Equipment Corporation Westminster, MA 01473
Hardware documentation	Publishing & Circulation Services (P&CS) NRO2-2/I5 Digital Equipment Corporation Northboro, MA 01532

[1]You must request an electronic Internal Software Order Form.

B

Recommended Spares List

This appendix lists the recommended spares for the terminal. For monitor FRUs, refer to the monitor's service guide. See Appendix A for a list of related documentation.

Table B–1   VX20A System Box Field Replaceable Units

Description	Part Number
Top cover, plastic	74–27014–01
Bottom cover, plastic	74–39208–02
Front bezel, plastic	74–39210–05
Chassis base	74–42605–01
Feet	90–10738–01
Screw for power supply, video module, and system logic module	90–09984–07
Insulator sheet for system logic module	74–43159–01
Shielding, clip-on	12–22380–02
Standoff, nylon	12–19857–05
Loopback Connectors	
Loopback connector, MMJ (H3103–00)	12–25083–01
Mouse loopback connector	12–25628–01
ThinWire Ethernet T-connector (H8223–00)	12–25869–01
ThinWire Ethernet cable 50–ohm terminator (H8225–00) (two are required)	12–26318–01

Table B–2   VX20A–AD/BD Monochrome 2-Plane VXT 2000 with 15 in. Monitor

Description	Part Number
System logic module (2 MB, initial shipments)	54–20530–02
System logic module (4 MB) (will replace –02 version)	54–20530–04
Monochrome video module	54–20532–04
Memory controller module (2 MB)	VX20X–MA
DECimage 2000 module	VX20A–OP
Memory module (2 MB)	MS200–AA
Memory module (4 MB)	MS200–BA
Thickwire/twisted-pair Ethernet board (–BD)	54–20482–01
Thickwire/ThinWire Ethernet board (–AD)	54–20480–01
Power supply assembly	H7109–B
Fan assembly	70–26582–01

Table B–3   VX20A–AC/BC Monochrome 2-Plane VXT 2000 with 17 in./19 in. Monitor

Description	Part Number
System logic module (2 MB, initial shipments)	54–20530–02
System logic module (4 MB) (will replace –02 version)	54–20530–04
Monochrome video module (VRE01 monitor)	54–20532–03
Memory controller module (2 MB)	VX20X–MA
DECimage 2000 module	VX20A–OP
Memory module (2 MB)	MS200–AA
Memory module (4 MB)	MS200–BA
Thickwire/twisted-pair Ethernet board (–BD)	54–20482–01
Thickwire/ThinWire Ethernet board (–AD)	54–20480–01
Power supply assembly	H7109–B
Fan assembly	70–26582–01

Recommended Spares List

Table B–4   VX20A–AB/BB Color 8-Plane VXT 2000 with 15 in./17 in. Monitor

Description	Part Number
System logic module (2 MB, initial shipments)	54–20530–02
System logic module (4 MB) (will replace –02 version)	54–20530–04
Color video module (1024 x 768)	54–20470–02
Memory controller module (2 MB)	VX20X–MA
DECimage 2000 module	VX20A–OP
Memory module (2 MB)	MS200–AA
Memory module (4 MB)	MS200–BA
Thickwire/twisted-pair Ethernet board (–BD)	54–20482–01
Thickwire/ThinWire Ethernet board (–AD)	54–20480–01
Power supply assembly	H7109–B
Fan assembly	70–26582–01

Table B–5   VX20A–AA/BA Color/Grayscale 8-Plane VXT 2000 with 19 in. Color Monitor or 17 in./19 in. Monochrome Monitor

Description	Part Number
System logic module (2 MB, initial shipments)	54–20530–02
System logic module (4 MB) (will replace –02 version)	54–20530–04
Color video module (1280 x 1024)	54–20470–01
Memory controller module (2 MB)	VX20X–MA
DECimage 2000 module	VX20A–OP
Memory module (2 MB)	MS200–AA
Memory module (4 MB)	MS200–BA
Thickwire/twisted-pair Ethernet board (–BD)	54–20482–01
Thickwire/ThinWire Ethernet board (–AD)	54–20480–01
Power supply assembly	H7109–B
Fan assembly	70–26582–01

Table B–6 General Recommended Spares

Description	Part Number
Cables	
Power cable, system box to monitor	17–03217–01
Thickwire Ethernet cable	17–01321–01
ThinWire Ethernet cable	17–01241–09
Twisted-pair Ethernet cable (uncrossed)	BN24G–03
Twisted-pair Ethernet cable (crossed)	BN24F–03
VRM17 or VR319 monochrome video cable, 0.71 m (28 in.)	17–02441–01
VRM17 or VR319 monochrome video cable, 1.52 m (60 in.)	17–02441–02
VRM17 or VR319 grayscale video cable 0.71 m (28 in.)	17–02878–01
VR320 or VR326 3w3 color video cable 0.71 m (28 in.)	17–02906–02
VX20A Power Cords for System Box	
Australia, New Zealand	BN20V–2E
Austria, Belgium, Finland, France, Germany, Netherlands, Norway, Portugal, Spain, Sweden	BN20S–2E
Canada	BN20P–2E
Denmark, Israel	BN20U–2E
Ireland, United Kingdom	BN20R–2E
Italy	BN20W–2E
Switzerland	BN20T–2E
USA	17–00606–02
VSXXX–AB Tablet	
Stylus	29–25995–00
Tablet puck	29–25996–00
Tablet assembly	29–25997–00
Tablet printed circuit board and cable	29–25998–00
Tablet top enclosure	29–25999–00
Tablet bottom enclosure	29–26000–00
VSXXX–GA Mouse	
Mouse pad	12–36561–01

Recommended Spares List

Table B–7 Keyboard Recommended Spares

Keyboard	Standard	Word Processing (WPS)	Short UNIX
North American/ United Kingdom	LK401–AA	LK402–AA	LK421–AA
Belgium/Flemish	LK401–AB	LK402–AB	None
Canada (English)	LK401–AQ	LK402–AQ	None
Canada (French)	LK401–AC	LK402–AC	None
Denmark	LK401–AD	LK402–AD	None
Finland	LK401–AF	LK402–AF	None
France	LK401–AP	LK402–AP	None
Germany/Austria	LK401–AG	LK402–AG	None
Hebrew	LK401–AT	None	None
Italy	LK401–AI	LK402–AI	None
Netherlands	LK401–AH	LK402–AH	None
Norway	LK401–AN	LK402–AN	None
Portugal	LK401–AV	LK402–AV	None
Spain	LK401–AS	LK402–AS	None
Sweden	LK401–AM	LK402–AM	None
Switzerland (French)	LK401–AK	LK402–AK	None
Switzerland (German)	LK401–AL	LK402–AL	None

C

Self–Test Error Descriptions

Table C–1 lists the device numbers for all possible devices in the terminal's configuration. Table C–2 through Table C–11 describe the meaning for all terminal errors.

Table C–1 Configuration Devices

Device Number	Device	Refer to ...
1	Nonvolatile RAM (NVR)	Table C–2
2	Monochrome (MONO)	Table C–3
3	Serial line controller (QDZ)	Table C–4
4	Cache self-test	Table C–5
5	Memory module (MEM)	Table C–6
6	Floating point unit (FPU)	Table C–7
7	Interval timer (IT)	Table C–8
8	System logic module (SYS)	Table C–9
9	Network interface (NI)	Table C–10
10	Parallel printer port	Table C–11
11	Reserved for future use	–
12	DECimage 2000 module (IMG)	Table C–12
13 to 99	Reserved for future use	–

Self-Test Error Descriptions

Table C–2   NVR Self-Test Error Codes

Error (Decimal)	Error (Hex.)	Meaning	Replace
4	4	Bad battery.	System logic module
8	8	NVR register test failed.	System logic module
12	C	Battery down and NVR register test failed.	System logic module
64	40	Battery check test failed (hard error).	System logic module
65	41	Battery check test failed (soft error).	System logic module
72	48	Battery check test failed and NVR register test failed.	System logic module

Table C–3   Monochrome Self-Test Error Codes

Error (Decimal)	Error (Hex.)	Meaning	Replace
256	100	Monochrome configuration failed.	Video module
512	200	Monochrome reset failed.	Video module
1024	300	Monochrome RAMDAC failed.	Video module
1280	400	Monochrome cursor failed.	Video module
128	080	No memory to use for data area.	Video module
1536	600	Byte mask test of VMEM failed.	Video module
1794	702	Data compare error occurred during the forward pass of VMEM.	Video module
2050	802	Data compare error occurred during the reverse pass of VMEM.	Video module

Table C–4 QDZ Self-Test Error Codes

Error (Decimal)	Error (Hex.)	Meaning	Replace
16	10	QDZ reset test failed.	System logic module
32	20	QDZ modem test failed.	System logic module
48	30	QDZ polled test failed.	System logic module
64	40	QDZ interrupt driver transfer test failed.	System logic module
80	50	QDZ LK401 test failed.	Keyboard
96	60	QDZ mouse test failed.	Mouse
112	70	QDZ INIT driver failed.	System logic module
128	80	No memory to use for data area.	System logic module
144	90	QDZ AB timer failed.	System logic module
160	A0	QDZ CD timer failed.	System logic module
224	E0	QDZ modem signal interrupt failed.	System logic module

Self-Test Error Descriptions

Table C–5 Cache Self-Test Error Codes

Error (Decimal)	Error (Hex.)	Meaning	Replace
512	200	Read/write error to the data store.	System logic module
768	300	Read/write to the tag store.	System logic module
1024	400	Valid bit failed to set as designed.	System logic module
1280	500	Tag does not contain tag for diagnostic space.	System logic module
1536	600	Unexpected tag parity error.	System logic module
1792	700	Cache failed to provide expected data during a cache hit.	System logic module
2048	800	Cache data parity error.	System logic module
2304	900	Tag not valid during cache hit testing.	System logic module
2560	A00	Data not valid during cache hit testing.	System logic module
2816	B00	Cache data write-through test failed, because of invalid data in the cache data store.	System logic module
3072	C00	Cache data write-through test failed, because of invalid data in memory.	System logic module

Table C–6   MEM Self-Test Error Codes

Error (Decimal)	Error (Hex.)	Meaning	Replace
66	042	A gap was found between MEM pairs.	Memory controller
68	044	Illegal MEM configuration register.	Memory controller
256	100	Byte mask test failure.	Memory controller
514	202	Data compare error occurred during the forward pass.	Memory controller
770	302	Data compare error occurred during the reverse pass.	Memory controller
1280	500	Default memory pattern (01010101) deposit failure.	Memory controller
1536	600	No contiguous 512K bank in option memory.	Memory controller
2304	900	Main memory configuration does not match the top of memory (hard error) in keyboard loopback mode.	Memory controller
2305	901	Main memory configuration does not match the top of memory (soft error) except in manufacturing mode.	Memory controller

Self-Test Error Descriptions

Table C–7 FPU Self-Test Error Codes

Error (Decimal)	Error (Hex.)	Meaning	Replace
258	102	MOVE instruction test failed.	System logic module
260	104	Unexpected exception occurred during MOVE test.	System logic module
514	202	MNEGF instruction test failed.	System logic module
516	204	Unexpected exception occurred during MNEGF test.	System logic module
770	302	ACBF instruction test failed.	System logic module
772	304	Unexpected exception occurred during ACBF test.	System logic module
1026	402	ADDF2/ADDF3 instruction test failed.	System logic module
1028	404	Unexpected exception occurred during ADDFx test.	System logic module
1282	502	CMPF instruction test failed.	System logic module
1284	504	Unexpected exception occurred during CMPF test.	System logic module
1538	602	CVTFD/CVTFG instruction test failed.	System logic module
1540	604	Unexpected exception occurred during CVTFD/CVTFG test.	System logic module
1794	702	CVTFx instruction test failed.	System logic module
1796	704	Unexpected exception occurred during CVTFx test.	System logic module
2050	802	CVTxF instruction test failed.	System logic module
2052	804	Unexpected exception occurred during CVTxF test.	System logic module
2306	902	DIVF2/DIVF3 instruction test failed.	System logic module
2308	904	Unexpected exception occurred during DIVFx test.	System logic module
2562	A02	EMODF instruction test failed.	System logic module

Table C–7 (Cont.) FPU Self-Test Error Codes

Error (Decimal)	Error (Hex.)	Meaning	Replace
2564	A04	Unexpected exception occurred during EMODF test.	System logic module
2818	B02	MULF2/MULF3 instruction test failed.	System logic module
2820	B04	Unexpected exception occurred during MULFx test.	System logic module
3074	C02	POLYF instruction test failed.	System logic module
3076	C04	Unexpected exception occurred during POLYF test.	System logic module
3330	D02	SUBF2/SUBF3 instruction test failed.	System logic module
3332	D04	Unexpected exception occurred during SUBFx test.	System logic module
3586	E02	TSTF instruction test failed.	System logic module
3588	E04	Unexpected exception occurred during TSTF test.	System logic module

Table C–8 IT Self-Test Error Codes

Error (Decimal)	Error (Hex.)	Meaning	Replace
2	02	Interval timer failed to interrupt at the correct rate.	System logic module

Table C–9 SYS Self-Test Error Codes

Error (Decimal)	Error (Hex.)	Meaning	Replace
2	02	System ROM test failed.	System logic module
128	80	Invalidate filter RAM error.	System logic module

Self-Test Error Descriptions

Table C–10 NI Self-Test Error Codes

Error (Decimal)	Error (Hex.)	Meaning	Replace
If a network interface (NI) error occurs, then verify that a loopback connector is installed on the selected network port on the back of the system box or that the network cable is firmly connected. Rerun the NI self-test, if necessary.			
16	10	Network address ROM error: read access failed.	System logic module
18	12	Network address ROM error: null address.	System logic module
20	14	Network address ROM error: bad group address.	System logic module
22	16	Network address ROM error: bad checksum.	System logic module
24	18	Network address ROM error: bad group 2.	System logic module
26	1A	Network address ROM error: bad group 3.	System logic module
28	1C	Network address ROM error: bad test patterns.	System logic module
30	1E	SGEC CSR0 read/write error.	System logic module
32	20	SGEC CSR0 read/write error.	System logic module
34	22	SGEC CSR0 read/write error.	System logic module
36	24	SGEC CSR0 read/write error.	System logic module
38	26	SGEC CSR0 read/write error.	System logic module
40	28	SGEC CSR0 read/write error.	System logic module
42	2A	SGEC CSR0 read/write error.	System logic module
44	2C	SGEC CSR0 read/write error.	System logic module
46	2E	SGEC CSR0 read/write error.	System logic module
48	30	SGEC CSR0 read/write error.	System logic module
50	32	SGEC CSR0 read/write error.	System logic module
52	34	SGEC CSR0 read/write error.	System logic module
54	36	SGEC CSR0 read/write error.	System logic module
56	38	SGEC CSR0 read/write error.	System logic module

(continued on next page)

Table C–10 (Cont.)   NI Self-Test Error Codes

Error (Decimal)	Error (Hex.)	Meaning	Replace
58	3A	SGEC CSR0 read/write error.	System logic module
60	3C	SGEC CSR0 read/write error.	System logic module
62	3E	SGEC chip self-test: ROM error.	System logic module
64	40	SGEC chip self-test: RAM error.	System logic module
66	42	SGEC chip self-test: address filter RAM error.	System logic module
68	44	SGEC chip self-test: transmit FIFO error.	System logic module
70	46	SGEC chip self-test: receive FIFO error.	System logic module
72	48	SGEC chip self-test: self-test loopback error.	NI module
74	4A	SGEC initialization: setup frame send failure.	System logic module
76	4C	SGEC interrupts: initialization failed.	System logic module
78	4E	SGEC interrupts: transmit failed.	System logic module
80	50	SGEC interrupts: receive failed.	System logic module
82	52	SGEC interrupts: packet comparison failed.	System logic module
84	54	SGEC interrupts: NI ISR not entered.	System logic module
86	56	SGEC interrupts: NI ISR entered multiple times.	System logic module
88	58	SGEC CRC: initialization failed.	System logic module
90	5A	SGEC CRC: transmit failed.	System logic module
92	5C	SGEC CRC: receive failed.	System logic module
94	5E	SGEC CRC: packet comparison failed.	System logic module
96	60	SGEC CRC: SGEC generated bad CRC.	System logic module

(continued on next page)

Self-Test Error Descriptions

Table C–10 (Cont.) NI Self-Test Error Codes

Error (Decimal)	Error (Hex.)	Meaning	Replace
98	62	SGEC CRC: SGEC rejected good CRC.	System logic module
100	64	SGEC CRC: SGEC accepted bad CRC.	System logic module
102	66	SGEC CRC: other error.	System logic module
104	68	SGEC collision: initialization failed.	System logic module
106	6A	SGEC collision: unknown transmit error.	System logic module
108	6C	SGEC collision: RETRY not flagged.	System logic module
110	6E	SGEC collision: transmitter disabled.	System logic module
112	70	SGEC address filtering: initialization failed.	System logic module
114	72	SGEC address filtering: transmit failed.	System logic module
116	74	SGEC address filtering: receive failed.	System logic module
118	76	SGEC address filtering: packet comparison failed.	System logic module
120	78	SGEC address filtering: broadcast filtering failed.	System logic module
122	7A	SGEC address filtering: promiscuous mode failed.	System logic module
124	7C	SGEC address filtering: null destination accepted.	System logic module
126	7E	SGEC address filtering: good logical address rejected.	System logic module
128	80	SGEC external loopback: initialization failed.	NI module
130	82	SGEC external loopback: packet comparison failed.	NI module

Table C–10 (Cont.)   NI Self-Test Error Codes

Error (Decimal)	Error (Hex.)	Meaning	Replace
132	84	SGEC external loopback: check NI port connector.	NI module

Table C–11   Parallel Printer Port Self-Test Error Codes

Error (Decimal)	Error (Hex.)	Meaning	Replace
32	20	Data path error.	System logic module
48	30	Control signal path error.	System logic module
64	40	Interrupt signal path error.	System logic module
128	80	No memory available for data area.	System logic module

Table C–12   DECimage 2000 Module Self-Test Error Codes

Error (Decimal)	Error (Hex.)	Meaning	Replace
00	00	Logic cell array (LCA) ROM load test failed.	DECimage 2000 module
16	10	Image register test failed.	DECimage 2000 module
32	20	CCITT decompression chip self-test failed.	DECimage 2000 module
48	30	Scalution test failed.	DECimage 2000 module
64	40	Look-up table (LUT) test failed.	DECimage 2000 module
80	50	First-in, first out (FIFO) test failed.	DECimage 2000 module
96	60	Image path test failed.	DECimage 2000 module
112	70	Rotation LCA test failed.	DECimage 2000 module
128	80	Image interrupt test failed.	DECimage 2000 module

Index